

SIEMENS



Process Automation

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30 años de soluciones para la industria

Field Instruments for Process Automation

















US Edition

Catalog
FI 01

Edition
2018

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Process Automation



Catalog FI 01 · 2018 US Edition

Supersedes:
Catalog FI 01· 2017 US Edition

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Please contact your local Siemens branch.

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How to optimize processes with our automation and instrumentation portfolio

High-quality processes are crucial in the process industry. Only then do you get the required results. And it is only then that plants work efficiently and therefore productively.

Process instrumentation and analytics as well as weighing technology all play a crucial role here. They measure, analyze, regulate and control industrial processes and thus contribute to increasing the efficiency of process plants and improving their product quality.

Benefit from the versatility of our holistic solutions for your process tasks – with integrated solutions from a single source. Benefit from the openness of the systems. And from constant innovations and comprehensive services.



Process Instrumentation



Weighing Technology



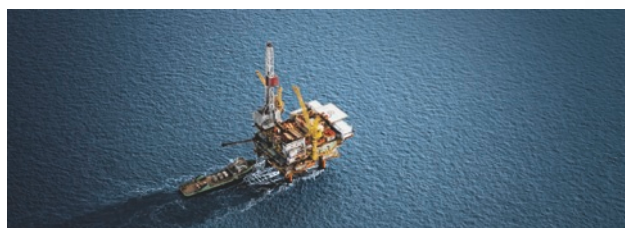
Process Analytics



Communication and Software

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In the areas of process instrumentation and process analytics as well as weighing and dosing systems, our main focus is on the process industries, such as the chemical, oil & gas and hydrocarbon processing, water and wastewater, pharmaceutical, mining, aggregates, cement, pulp and paper, food and beverage, and shipbuilding industries.



How to increase process efficiency and product quality

In field instrumentation, maximum precision and absolutely reliable measurement results are key. Only then can you increase the efficiency of your process plants and improve their product quality. Whether you're dealing with pressure, temperature, flow or level, we offer you a globally unique range of transmitters for field instrumentation. Our comprehensive portfolio also includes weighing and batching systems, pneumatic valve positioners, process controllers and process recorders.



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Pressure measurement without ifs and buts: SITRANS P

SITRANS P is a complete range of measurement instruments for measuring relative pressure, differential pressure and absolute pressure. In addition to high measuring accuracy and ruggedness, the modular system features superb operating convenience and functionality as well as a perfect safety concept.



SITRANS P500 – Digital transmitter for high-precision applications with unparalleled specifications for overall performance and long-term stability

- Deviations from the characteristic curve of less than 0.03% of the calibrated measuring range for different pressure and level requirements
- Design of the measuring cells allows for use with media temperatures of up to 125 °C even without the use of a remote seal system
- Good step response time (T63) of only 88 ms ensures plant safety in critical applications
- Device configuration via standard HART® protocol-compatible tools or directly on-site with local operation and LCD display
- Graphics-enabled display shows curve and trend diagrams for goal-oriented process monitoring



SITRANS P310

- Suitable for installation in SIL 2 measuring circuits according to IEC 61508/IEC 61511
- Digital transmitter with built-in HART® diagnostic functions
- Comprehensive certificates and approvals, such as ATEX Ex i, Ex d, Ex nA/ic, FM, CSA
- Variants for relative pressure and differential pressure measurements



SITRANS P320 **NEW**

- High measuring accuracy 0.065 %
- Developed according to IEC61508 standards for SIL2/3
- New larger and improved HMI display with NAMUR NE107 support
- 4 operation buttons
- Remote Safety Handling
- Industries: Chemicals , Oil & Gas, Energy, Marine, Engineering, Water/Wastewater



SITRANS P DS III

- Suitable for installation in SIL 2 measuring circuits according to IEC 61508/IEC 61511
- Digital pressure transmitter with numerous diagnostic and simulation functions for measuring relative, absolute and differential pressures as well as flow and fill levels, comprehensive international certificates and approvals
- HART®, PROFIBUS PA or FOUNDATION Fieldbus communication
- For extreme chemical and mechanical loads as well as electromagnetic influences
- Additional safety features such as plant and self-monitoring, error diagnostics and notification of the next calibration date
- Unique self-test function for fail-safe operation



SITRANS P410

- Suitable for installation in SIL 2 measuring circuits according to IEC 61508/IEC 61511
- Digital transmitter with increased measuring accuracy
- Built-in diagnostic functions for HART®, PROFIBUS PA or FOUNDATION Fieldbus communication
- Enhanced measuring accuracy of 0.04%
- Design variants for relative and differential pressure measurements
- SITRANS P DS III certification (e.g. ATEX Ex i, Ex d, Ex nA/ic, FM, CSA)



SITRANS P420 **NEW**

- High measuring accuracy 0.040 %
- Developed according to IEC61508 standards for SIL2/3
- New larger and improved HMI display with NAMUR NE107 support
- 4 operation buttons
- Remote Safety Handling
- Ready for Digitalization
- Industries: Chemicals , Oil & Gas, Energy, Marine, Engineering



SITRANS LH100/LH300

- Suitable for applications ranging from drinking water or wastewater up to corrosive liquids thanks to stainless steel enclosure
- Rugged submersible sensors for hydrostatic level measurement
- Installation possible in pipes with 1" inner diameter



SITRANS P200/210/220

- Single-range transmitter for relative, absolute and hydrostatic pressure
- Pressure sensors: Stainless steel sensors (SITRANS P210 and SITRANS P220) as well as sensors with ceramic membrane (SITRANS P200)
- Conversion of measured pressure into either 4–20 mA or 0–10 V signal



SITRANS P280

- WirelessHART® pressure transmitter for process monitoring or asset management
- Wireless data transmission
- Battery operated with extremely low power consumption
- Direct mounting possible on containers and pipes in remote parts of the plant as well as on moving or rotating devices thanks to compact and rugged design



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SITRANS P compact

- Analog transmitter for absolute and relative pressure
- Hygienic design in accordance with EHEDG, FDA and GMP recommendations
- Stainless steel process connections and enclosure
- Measurement deviation $\leq 0.2\%$



SITRANS P300

- More than 90 different process connection variants offer the highest degree of flexibility
- Versatile communication connection via HART® protocol, PROFIBUS PA or FOUNDATION Fieldbus
- Fulfills EHEDG, FDA and 3A requirements
- Maximum measurement deviation of 0.075%
- Can be combined with flush-mounted absolute or relative pressure measuring cells



Because every degree matters: SITRANS T

SITRANS T products are the temperature measurement professionals, even in extreme conditions. Whether used in hot, cold or hazardous environments – the communicative SITRANS T meets all expectations. And whether you're looking for sensors or transmitters for head, rail or field mounting – all are available individually or as complete measuring points. Our cost-effective SITRANS T transmitters offer high precision in every application and are quick and easy to connect to thermocouples or resistance thermometers. The SIMATIC PDM intelligent software package permits parameterization in just minutes, and input errors are avoided.



SITRANS TS500 – Temperature sensors for pipes and vessels – from simple applications to solutions for harsh environments

- Modular system with thermowell made of barstock material, extension, connection head, and optional transmitter or display
- Version for intrinsic safety, flameproof and nonsparking are available

Transmitters for head mounting



SITRANS TH100

- Pt100 single input transmitter
- Diagnostics LED
- Supports four-wire Pt100
- 4–20 mA
- Low-cost and compact



SITRANS TH320 **NEW**

- Universal and HART® single input transmitter
- Diagnostics LED
- Supports four-wire RTD/TC/mV and resistances
- Supports Callendar-van-Dusen
- HART® 7 + SIL 2/3 (IEC 61508)
- Interface for local HMI



SITRANS TH420 **NEW**

- HART® dual input transmitter
- Hot backup function
- Drift detection function
- Diagnostics LED
- Supports two four-wire RTD/TC/mV and resistances
- Supports Callendar-van-Dusen
- HART® 7 + SIL 2/3 (IEC 61508)
- Interface for local HMI

SITRANS TH400

- Fieldbus transmitter
- For PROFIBUS PA or FOUNDATION Fieldbus
- Configurable with SIMATIC PDM (PA) or AMS (FF)
- Extensive diagnostics and simulation functions
- Transmission of important device and process data over the bus cable

Transmitters for rail mounting



SITRANS TR320 **NEW**

- Universal and HART® single input transmitter
- Diagnostics LED
- Supports four-wire RTD/TC/mV and resistances
- Supports Callendar-van-Dusen
- HART® 7 + SIL 2/3 (IEC 61508)

SITRANS TR420 **NEW**

- HART® dual input transmitter
- Hot backup function
- Drift detection function
- Diagnostics LED
- Supports two four-wire RTD/TC/mV and resistances
- Supports Callendar-van-Dusen
- HART® 7 + SIL 2/3 (IEC 61508)

Transmitters for field installation

**SITRANS TF**

- IP66/67/68 degree of protection
- Used where there is excessive heat or vibration at the measuring point
- HART®/PA/FF communication
- Optional programmable digital display
- Can be used as a remote display without transmitter

**SITRANS TF280**

- WirelessHART® temperature transmitter for direct mounting on containers and pipes in remote parts of the plant as well as on moving or rotating devices thanks to the compact and rugged design
- Used for process monitoring or asset management
- Wireless transmission of measured process values
- Battery operated with extremely low power consumption

Transmitters for fiber-optic temperature measurement

**SITRANS TO500**

- Fiber-optic temperature transmitter
- Diameter of sensor measuring probe < 2 mm
- Up to 48 measuring points per sensor measuring probe
- Simple and low-cost installation thanks to rolled sensor measuring probe



Everything flows: SITRANS F

Whether measuring gas, liquids or steam – choosing the right flowmeter is decisive for productivity. This is where the SITRANS F line comes in. Our portfolio contains the right flowmeter for every application and medium, with five different flow technologies available to suit a wide range of operating conditions: Coriolis, electromagnetic, ultrasonic, vortex and differential pressure.



SITRANS FC330/FC310 **NEW**

- Innovative and user-friendly transmitter, with audit trails, datalogger, trend curves, datalogger and advanced diagnostic functionalities
- Sizes from DN 15 to DN 150 with compact and remote mounted transmitter
- Transmitter with up to 4 I/O and communication e.g. Profibus, Hart and single Modbus RTU output
- Solid performance with mass flow accuracy 0.1% or 0.2% and density down to 2 kg/m³

SITRANS F C Coriolis mass flowmeters

The SITRANS F C multivariable devices measure the direct mass flow rate of liquids and gases in almost any application. They deliver reliable and repeatable information on mass flow, volume flow, temperature, density, and concentration (e.g. Brix or Plato). They are available in sensor, transmitter, and flowmeter system versions, and fulfill requirements for high performance in oil & gas, chemical, food & beverage, pharmaceutical, and automotive applications.



SITRANS FC430/FC410

- Innovative and user-friendly transmitter, with audit trails, trend curves and advanced diagnostic functionalities.
- Sizes from DN 15 to DN 50 in standard version, compact or remote mounted
- Solid performance with mass flow accuracy 0.1% and density accuracy 0.5 kg/m³
- Robust frame construction isolates from external noise and vibrations



SITRANS FC300

- Compact sensor with rugged, space-saving sensor design in stainless steel for all applications
- Optimal hygiene, safety, and CIP cleanability for the food & beverage industry as well as pharmaceutical applications, thanks to single-tube construction without internal welds, reductions, or flow splitters
- Easy installation using a Plug & Play interface



SITRANS F C MASS 2100 Low Flow **NEW**

- Single tube in sizes from DI 1.5 to DI 15, with a wide selection of available connections
- Withstands pressure rates up to 1000 bar
- Ideal for a broad range of low-flow applications within the automotive, chemical and food & beverage industries



SIFLOW FC070

- Quick installation and integration of the multiparameter transmitter into the SIMATIC system
- Among the most compact, space-saving, and versatile transmitters on the market



SITRANS FCS200

- Fits in where space is crucial, providing extra flexibility in any compressed natural gas (CNG) application for both new installations and replacements
- Available in DN 10 to DN 25 and easy to install, with a wide range of different connections available
- Broad application fit within dispensers, compressors and distribution
- Easily adaptable as sensor is available with a wide range of standard gas process connectors to meet virtually any market requirement

SITRANS F M electromagnetic flowmeters

The task of an electromagnetic flowmeter from the SITRANS F M product family is to measure flow volume of electrically conducting fluids such as water, chemicals, food and beverage, slurries, sludge, paper stock and mining slurries with magnetic particles. The SITRANS F M product range is divided into three meter types:



Modular pulsed DC meters SITRANS F M DN 2 to DN 2000 (1/12" to 78")

- Full transmitter program MAG 5000/ MAG 6000/MAG 6000 I compact- or remote-mounted
- Multiple I/O as standard and communication modules PROFIBUS PA/DP, DeviceNet FOUNDATION Fieldbus, HART® and Modbus RTU are available
- MAG 5100 W sensor designed for water and wastewater applications
- MAG 3100 P designed for process industry and the harsh requirements in the chemical industry
- MAG 3100/MAG 3100 HT sensor for general process industries
- MAG 1100/1100 HT sensor for general process industries
- MAG 1100 F [3] sensor for food and beverage and pharmaceutical industries



Battery-operated water meters MAG 8000 DN 25 to DN 1200 (1" to 48")

- Battery-powered solution that makes it easier than ever to install a reliable water meter virtually anywhere
- Battery lifetime up to 15 years*
- IP68 (NEMA 6P) enclosure and sensor painting according to ISO 12944 class C4M corrosivity for burial and submerged applications
- Easy installation without straight inlet/outlet
- Rich add-on communication modules: Modbus RTU, Encoder card, 3G/UMTS module

MAG 8000 with 3G/UMTS module

- Rich data transmission protocols supported by 3G module: SMS, secured e-mail and secured FTP
- Remote Qualification Certificate built into the 3G module enables comprehensive device diagnostics and off-site audits
- Configurable analog input for external ratiometric pressure transmitter in parallel with flow measurement (2-in-1 solution), or 4–20 mA alarm signal input for external tamper and flooding detector
- MAG 8000 clock synchronization with Internet NTP server featuring adjustable time zone setting ensures that measurement data is always accurately time-stamped
- Single SMS synchronizes the data transmission time for all MAG 8000 devices in field
- Real-time SMS notification for MAG 8000 alarms



High-powered AC meters TRANSMAG 2 / 911/E DN 15 to DN 1000 (1/2" to 40")

- Specially designed for heavy mining slurries with or without magnetic particles as well as the most difficult applications in the pulp and paper industry
- Low conductive medias $\geq 1 \mu\text{S/cm}$ ($0.1 \mu\text{S/cm}$ depending on medium)
- No movable parts
- Stable zero point / pulsed alternating field – for accurate flow signal and excellent signal strength
- SmartPLUG concept
- Comprehensive self-diagnostics

*for 4 D-cell external battery pack

SITRANS F S ultrasonic flowmeters

Our ultrasonic flowmeters deliver extremely accurate results in a wide range of conductivities, viscosities, temperatures, densities and pressures. This makes them the optimal choice for measuring a variety of process industry applications. SITRANS F S ultrasonic flowmeters are available in inline and clamp-on versions. Both meter types can be used with homogeneous conductive and non-conductive liquids.



Inline ultrasonic flowmeters

- Suitable for industrial applications with pipe sizes from DN 50 to DN 600 (2" to 24") (larger sizes on request)
- Available as 2-path systems in combination with SITRANS FUS060 transmitter
- 1-path and 4-path systems on special request also available in combination with the SITRANS FUS060 transmitter
- Option between mild steel and stainless steel on request
- Sensors can be exchanged without interrupting operation



SONOKIT retrofit flowmeter type

- The SONOKIT system is designed for inline retrofitting on all existing pipelines up to DN 3000 (120") as a 1-track or 2-track flowmeter
- Flexible SITRANS FUS060 transmitters with HART® or PROFIBUS PA (up to DN 3000/120")
- The unique design enables installation on empty pipes or pipes under pressure without process shutdown
- Robust version can be buried and withstands constant flooding
- Outstanding accuracy; the bigger the pipe, the more accurate the result
- 4-path systems (up to DN 1500/60") are also available on special request



SITRANS FUS380 and FUE380

- For the utility industry, the 2-track flowmeters, SITRANS FUS380 and FUE380, are designed to measure water flow in district heating plants, local networks, boiler stations, substations and other general water applications
- Also suitable for chiller plants (including glycol mixes without type approval)
- Custody transfer approvals for district heating custody transfer applications (MID MI-004). Sizes range from DN 50 to 1200 (2" to 48")
- Battery or mains power enables installation where needed. Battery lifetime up to 6 years
- Ideal for energy metering together with the SITRANS FUE950 energy calculator
- With heatmeter type approval (MID MI-004)

Clamp-on ultrasonic flowmeters

The externally mounted sensors of SITRANS F S clamp-on ultrasonic flowmeters are quickly and easily installed on the outside of a pipe, making them the perfect choice for existing applications or where corrosive, toxic or high-pressure fluids rule out the option of cutting the pipe. The cost-efficient technology provides highly accurate measurement of liquids in pipes ranging from DN 6 to DN 10000 in size.



SITRANS FS230

- Digitally based system featuring market-leading accuracy of 0.5 to 1% of flow rate
- Best-in-class 100 Hz data update rate reliably detects even the smallest changes in flow
- WideBeam® transit-time technology allows for measurement of virtually any liquid, even those with high levels of aeration or suspended solids
- Large graphical display with intuitive navigation, multiple setup wizards and patented pipe configuration menu
- SensorFlash® microSD card stores all operational data for easy device transfer and servicing
- Designed in accordance with FM, ATEX and IECEx Zone 2 requirements
- Application examples include raw and potable water, effluent, district heating and cooling, hydroelectricity and nuclear feed water



SITRANS FS220

- Cost-efficient system offering the most commonly required measurement functions
- Consistently high accuracy of 1% of flow rate and 0.25% repeatability according to ISO 11631
- Enhanced zero stability results in minimal need to set a zero point
- WideBeam® transit-time technology allows for measurement of virtually any liquid, even those with high levels of aeration or suspended solids
- Large graphical display with intuitive navigation, multiple setup wizards and patented pipe configuration menu
- SensorFlash® microSD card stores all operational data for easy device transfer and servicing
- Suitable for multiple sectors requiring budget-conscious liquid flow instrumentation, including water and wastewater, power, HVAC and chemical industries



SITRANS F X vortex flowmeters

Vortex flowmeters provide accurate volumetric and mass flow measurement of steam, gases, and both conductive and non-conductive liquids. The vortex flowmeter functions as an “all-in-one” solution with integrated temperature and pressure compensation together with an optional energy calculation. It is specially designed for applications that require reliable flow measuring independent of pressure, temperature, viscosity and density. This makes it well suited for such industries as chemical, HVAC & power, food & beverage, oil & gas, and pharmaceutical. SITRANS F X vortex flowmeters are available as flanged or sandwich versions in the following configurations:



SITRANS FX300

- Volumetric flowmeter. Measurement of steam, gases, and both conductive and non-conductive liquids. Temperature compensation for saturated steam included in basic version as standard
- Mass flowmeter. With pressure and temperature compensation for mass and standard volume flow measurement of gases or superheated steam. Integrated temperature and pressure sensors
- Option with pressure sensor and isolation valve allows the pressure sensor to be shut off for the purpose of pressure or leak testing of the pipeline or for being exchanged without interrupting the process

SITRANS FX300 dual transmitter

- Dual measurement for twofold reliability
- Redundant system with two independent sensors and two converters



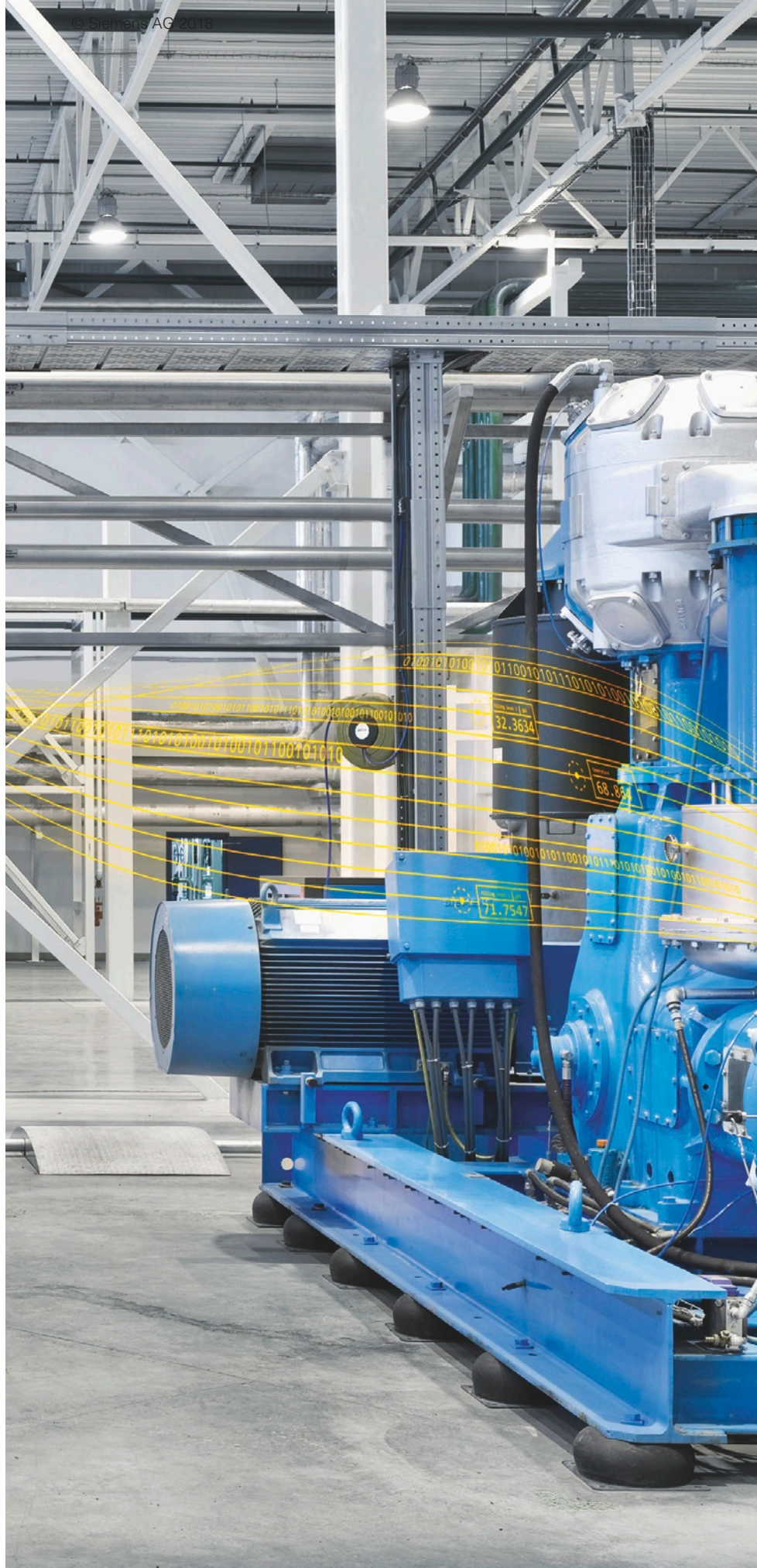
SITRANS FX330

- Integrated pressure and temperature compensation for lower installation costs and increased accuracy
- Integrated reduction of nominal diameter results in a large turndown ratio, reducing installation costs and potential for leakage
- Provides redundant storage of all calibration and configuration data within the display memory and the electronics module
- Designed from the ground up to be fully compliant with the IEC 61508 SIL 2 safety standard
- Cost-efficient energy calculation including net heat measurement



SITRANS P – differential pressure flowmeters

- Universal flow measurement for liquids, gases and vapors
- Always provide accurate results even with large bores, high temperature and extreme pressure



Always on the level

Indispensable in numerous applications in the process industries:
Whether point level detection or continuous level measurement,
our comprehensive offering has the right solution for your application.



SITRANS LR560 – The robust level transmitter
for continuous monitoring of solids and liquids

- 2-wire, 78 GHz FMCW for ranges up to 100 m (328 ft)
- Very narrow 4-degree beam angle with 3" lens antenna
- Aiming flanges with purge, easy to install
- Process Intelligence integrated and plug and play performance



Continuous level measurement

Continuous level measurement constantly monitors dynamic processes. The measurements are transmitted as an analog signal or digital value. We offer a wide range of transmitters based on a variety of technologies, including ultrasonic, radar, guided wave radar, capacitance, gravimetric, and hydrostatic processes.

Sonic Intelligence and Process Intelligence

The signal processing technologies differentiate between the true echo from the material and false echoes from obstructions or electrical noise. The sophisticated software is supported by field data gained from more than a million applications. This in-depth knowledge and experience is built into the software's advanced algorithms to provide intelligent processing of echo profiles. The result is a repeatable, fast, and reliable measurement.

Radar level measurement with intelligent signal processing

- Non-contacting and low-maintenance
- Microwaves require no carrier medium, for precise measurements even under harsh process conditions
- High performance and easy implementation using just a few parameter entries on the infrared handheld interface or via configuration tools such as SIMATIC PDM, SITRANS DTM/PACTware, or AMS



SITRANS LR460

- 4-wire, 24 GHz FMCW radar level transmitter to a range of 100 m
- For bulk solids in vessels and ideal for applications with extreme dust and high temperatures to 200 °C and with media with a low bulk density/low dielectric properties



SITRANS LR260

- 2-wire, 25 GHz pulse radar level transmitter to a range of 30 m with quick update time
- For solids and liquids in storage vessels with extreme levels of dust and in gas hazardous areas



SITRANS LR250

- 2-wire, 25 GHz pulse radar level transmitter to a range of 20 m
- For liquids and slurries in storage and process vessels with high temperatures and pressures
- Also for corrosive or aggressive materials and hygienic or sanitary requirements thanks to the new flanged and hygienic encapsulated antennas



SITRANS LR200

- 2-wire, 6 GHz pulse radar level transmitter for liquids
- Ideal for process vessels with turbulence, heavy deposit, as well as with high temperatures and pressures to a range of 20 m



SITRANS Probe LR

- 2-wire, 6 GHz pulse radar level transmitter to a range of 20 m
- For the simple monitoring of liquids and slurries in storage vessels with nominal pressure and temperature

Guided wave radar

This technology uses time domain reflectometry (TDR) to measure levels by guiding an electromagnetic pulse down a probe (solid rod, cable or coaxial probe) toward the material. When the pulse reaches the material surface, the change in dielectric value between the air and the material causes a portion of the pulse to reflect back toward the transmitter. Guided wave radar is unaffected by vapor, density, foam, dielectric fluctuations, temperature or pressure changes, and works well for short- and medium-range measurements of materials with low dielectric constants such as liquefied gases. The interface between two liquids (e.g. oil/water) can also be measured with both level and interface reported via various communication protocols.

SITRANS LG series:



SITRANS LG240

- For use in hygienic and corrosive applications

SITRANS LG250

- Highly flexible solution for liquid level and interface applications. Extremely versatile for many applications

SITRANS LG260

- Ideal for measuring the level in medium-range solids applications, including grains, plastics, and cement

SITRANS LG270

- Offers configuration options for extreme conditions, including high temperature and high pressure applications

All versions include:

- Automatic buildup adjustment
- Remote display and electronics options
- 2 mm accuracy
- Backlight with full graphic display, top or side mountable
- SIL 2/3 approved
- Field replaceable probes
- Quick setup wizards
- USB service port option

Ultrasonic level measurement

Whether short or long range – our market-leading ultrasonic level measurement is an extremely cost-effective solution. It's also suitable for harsh environmental conditions such as vibrations or dust. The non-contacting technology is used in numerous industries to monitor liquids, bulk solids, and slurries.



SITRANS LUT400

- Compact, single-point, ultrasonic controllers for continuous level or volume measurement of liquids, slurries, and bulk solids, and high accuracy monitoring of open channel flow
- Industry-leading 1 mm accuracy, setup time of less than a minute
- Intuitive navigation via the local user interface
- Compatible with the entire line of Siemens Echomax ultrasonic sensors with a 0.3 to 60 m range



HydroRanger 200

- Level controller for up to six pumps, including pump control, differential control, and open-channel flow monitoring



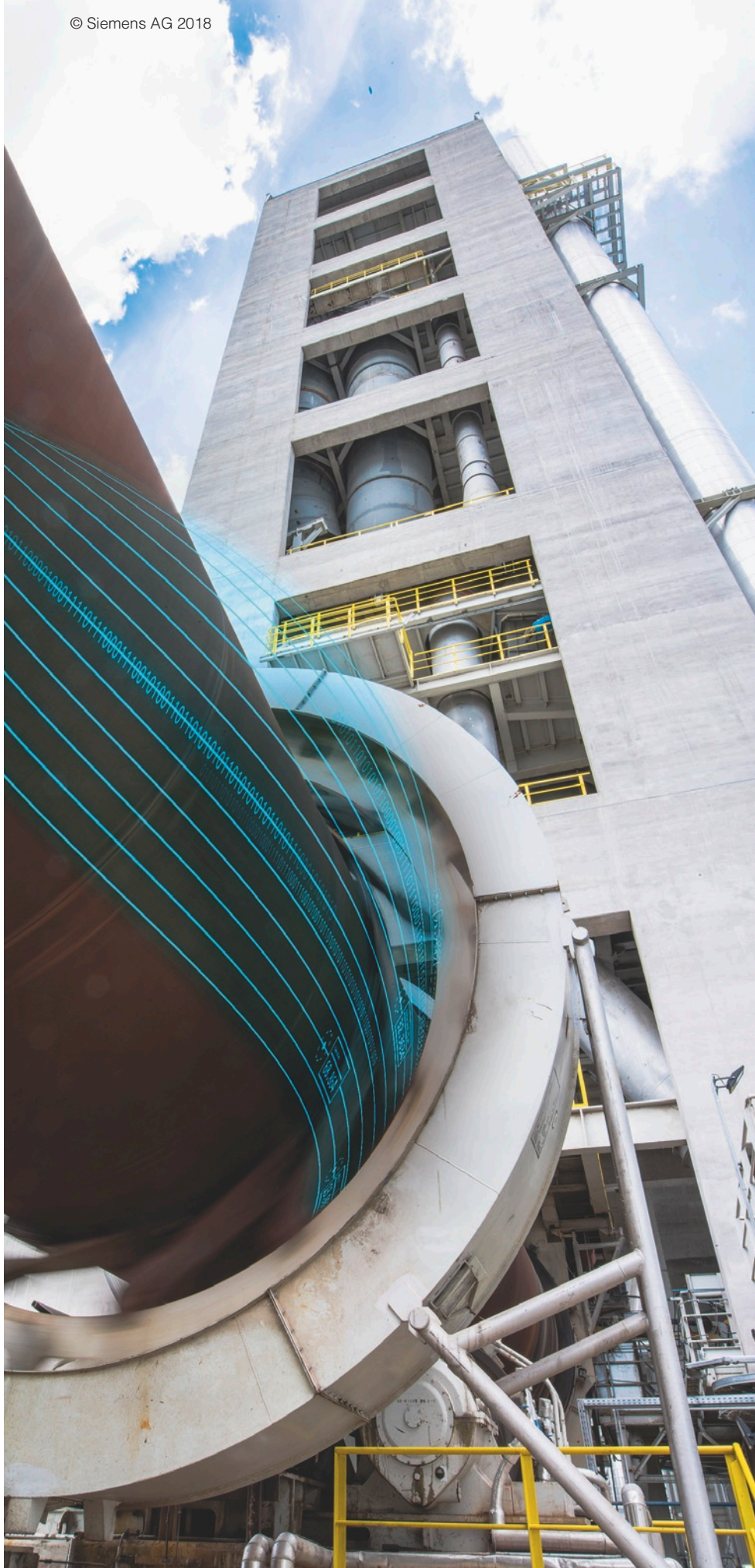
SITRANS Probe LU

- 2-wire, loop-powered ultrasonic transmitter for level/volume/flow monitoring of liquids in storage vessels, simple process vessels, and open channels up to 12 meters (39.4 ft) tall



SITRANS LU150 / SITRANS LU180

- Suitable for general applications with liquids, slurries, and bulk solids in open or closed vessels up to 5 m (16.4 ft) tall
- Compact, short-range ultrasonic level transmitter
- General purpose or intrinsically safe, two-wire, 4 to 20 mA loop-powered



Point level detection

We offer you a comprehensive portfolio for extremely reliable and precise point level detection. Our wide selection includes ultrasonic, rotating, and vibrating level switches as well as RF capacitance switches with inverse frequency shift technology that are cost-effective and suitable for virtually all applications, from bulk solids to liquids.

Vibrating, rotary paddle

- Especially suitable for low bulk density applications
- Ideal for use in harsh and abrasive environments, thanks to their rugged design
- For detecting high, low, and demand levels in solids, liquids, and slurry applications
- A wide variety of configuration options makes them suitable for any environment
- Simple to use with no complicated setup or configuration
- Stainless, aluminum and plastic enclosure options and high-grade steel process connections provide exceptional resistance to mechanical forces, a long service life, and low cost of ownership
- Options for SIL 2



SITRANS LPS200

- Rotary paddle switch that detects solids with densities as low as 15 g/l
- Motor protection
- SIL 2 certification for best-in-class reliability and performance
- Options for fail-safe rotation monitoring and alarming



SITRANS LVS100 and LVS200

- Vibrating level switches that detect solids with densities as low as 5 g/l
- Best-in-class sensitivity detection
- Options for buildup monitoring



SITRANS LVL100 and LVL200

- Vibrating level switches for liquid and slurry applications, including high, low, and demand level alarms and pump protection
- Wide application range including high temperatures and pressures, hygienic versions, large variety of enclosure materials, SIL 2 options and remote testing



Pointek ULS200 Ultrasonic

- Non-contacting ultrasonic level switch with two switch points
- Ideal for sticky materials and an effective solution for bulk solids, liquids and slurries



RF Capacitance

Pointek RF capacitance point level switches measure interfaces, solids, liquids, slurries and foam. The inverse frequency shift technology provides accurate and reliable measurement results even in dusty, turbulent and vaporous environments or in applications with product buildup. Small changes in level create large changes in frequency. Consequently, Pointek devices have greater sensitivity and consistently outperform conventional devices. With their rugged aluminum or chemically resistive plastic enclosures and wide variety of process connections, Siemens Pointek switches are compatible with most applications.

Pointek CLS100

- Suitable for level detection in constricted spaces
- Sensguard protection of probe for harsh and abrasive environments and chemically resistive probe types available
- Compact 2-wire or 4-wire switch



Pointek CLS200 and CLS300

- Suitable for level detection in demanding conditions with high pressures and temperatures
- Suitable for aggressive applications including very high temperatures and pressures
- SIL 2 options
- Smart PROFIBUS versions with digital display
- Remote operation via PROFIBUS for status and function testing
- Remote detection of buildup and monitoring of other process condition changes

Continuous capacitance

Our unique inverse frequency shift approach to capacitance technology ensures accurate, reliable and repeatable measurements, even in dusty, turbulent and vaporous environments or in situations with product buildup. Because even a small level change creates a large change in frequency, our instruments provide better resolution and consistently outperform conventional devices. With special features such as Active-Shield technology, they protect the measurement from the effects of moisture, vapors, foam, temperature and pressure variations, and buildup. Together with the modular probe options available on various models, they offer practical solutions to a wide variety of continuous level and interface applications.



SITRANS LC300

- Ideal for standard and industrial applications in the chemical, hydrocarbon processing, food and beverage, mining, aggregate and cement industries

Hydrostatic

Low-cost level measurement for direct mounting or mounting with remote seals on tanks and vessels



SITRANS LH100 and SITRANS P DS III

- Suitable for a wide range of applications in the chemical and petrochemical industries
- Highly resistant to extreme chemical and mechanical loads as well as electromagnetic interference

Gravimetric (see catalog WT 10)

Gravimetric level measurement with SIWAREX weighing technology offers highly precise measurement without material contact independent of medium temperature, tank shape, built-in parts, or material characteristics.

**SIWAREX WP321** (see catalog WT 10)

- Technology module for the SIMATIC ET 200SP distributed I/O system
- For level measurements in silos and bunkers; convenient and seamless integration of platform scales directly into the automation environment



The diagnosis: first class

They ensure safe and trouble-free procedures in a wide variety of process industries around the world: positioners precisely control the entire range of valves and master even special tasks with absolute reliability. At the same time, we have continued to expand our proven range of products throughout the years – always based on your needs.



SIPART PS2 – State-of-the-art positioners with innovative features such as non-contact position detection, booster options and extended diagnostics



SIPART PS2

- Most widely used positioner for linear and part-turn actuators
- Generates diagnostic data for itself, its environment as well as valve and actuator
- Easy installation and fast commissioning
- Reduced maintenance required in the plant
- Safe process control
- Versions with external non-contacting travel sensors
- High flexibility in the range of stroke from 3 up to 200 mm
- Communication via PROFIBUS PA, FOUNDATION Fieldbus or HART®
- Ex d explosion-proof version
- Makrolon, aluminum or stainless steel enclosure



- Fail-in-place function: Prevent valves from closing during a power failure. Alternatively, the fail-safe function makes sure that the valve moves to the safety position
- Integrated booster option for quick control of large drives
- Extended diagnostic options such as Valve Performance Tests (VPT) detect the maintenance requirements of the valve during scheduled plant standstills
- Low operating costs thanks to minimal air consumption



- High functional safety in emergency situations. The following valve and actuator failures can be detected: Sluggish valve movement, pneumatic leakage (e.g. tear in membrane), pipe blockage or valve plug tear with continuous processes (C processes), valve seat or valve plug wear, deposits or caking at the valve seat or valve plug, stuffing box stiction, "Partial Stroke Test" (PST) for open/closed valves (e.g. safety valves) and for servo solenoid valves
- 316L stainless steel enclosure for nearshore, offshore as well as oil and gas applications in hazardous areas

Early detection protects your process

Process protection devices can be used as early warning systems to avoid costly interruptions and breakdowns of equipment. They detect flow problems, blockages, screen faults, machinery slowdowns, or burst filter bags. Their rugged construction makes them impervious to dust, dirt, buildup, and moisture. Installed in a million control applications in industrial processes and in mechanical and systems engineering and other areas, the SIPART DR series is your solution for process control. The compact controllers with continuous output signal or step contact output have been specially designed for space-saving panel mounting.



SITRANS AS100 – Acoustic sensor used for solids flow detection, featuring a compact, stainless steel construction for harsh environments and non-invasive mounting

- Detection of high-frequency acoustic emissions from friction or the impact of dust, powders, granules, and other solids
- Signaling of flow/no flow or high/low flow
- Compatible with SITRANS CU02, which processes signals from the sensor
- Provision of relay and analog outputs for connection into a process, or direct connection to a PLC analog output

Acoustic sensors

Non-invasive acoustic sensors detect inaudible, high-frequency acoustic emissions generated by friction and impact, caused by materials in motion.



SITRANS DA400

- Acoustic analyzer for the condition monitoring of oscillating displacement pumps
- Simultaneous and continuous monitoring of up to four independent delivery valves
- Easy system operation and configuration either locally by LCD and keyboard or via PROFIBUS DP/PA

Motion sensors

Non-contacting motion sensors detect changes in motion and speed of conveying, reciprocating, and rotating machinery.



Milltronics MFA 4p

- Plant protection through the detection of absence of motion, as well as underspeed or overspeed conditions
- Probes usable in hazardous, high-temperature, and harsh conditions, thanks to its superior design
- With MSP or XPP probes



SITRANS WM100

- For detecting the absence or presence of motion of rotating, reciprocating, and conveying equipment
- Heavy-duty alarm switch

Process controllers (see catalog MP 31)

SIPART DR controllers are outstanding thanks to their extreme reliability and ease of use. Various software packages are available to make their handling easy and intuitive and to extend their scope of application. The standard version already offers comprehensive controller hardware that can be upgraded quickly and easily for specific applications by means of a large number of optional input and output modules. Plug-in modules for communications over RS 232/RS 485 or PROFIBUS DP are also available.



Process recorders (see catalog MP 20)

SIREC D200, 300, 400 display recorders are used for continuous monitoring of process quantities, plant maintenance, process optimization, or troubleshooting. With these, we offer you a full line of state-of-the-art solutions for the most demanding requirements.



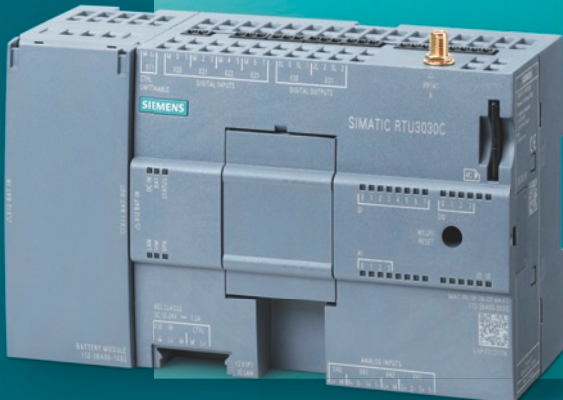
Expand as you go

Integrated communication down to the field level is becoming an increasingly important factor for the success of our customers. Availability of the instruments in automation solutions at all times is necessary to gather information about the state of the plant from the existing data, and to derive the correct maintenance measures with regard to time and scope. This is not a problem with our modern solutions. Even proven plants that have been running for many years can be expanded with a small investment in such a way that the most important data is available – not only locally, but with secure worldwide access if required.



SIMATIC 3010C/ RTU3030C – The compact remote terminal units monitor remote measuring points, even in locations where no power supply exists.

- Easy configuration using a web browser instead of programming
- Flexible power supply from batteries, solar energy or 24 V DC
- Energy-optimized operation and integrated energy management for connected analog and digital sensors
- Secure communication (TeleControl Basic protocol, SINAUT ST7, DNP3 and IEC 60870-5-104) via the integrated UMTS modem (RTU3030C) or via LAN port (RTU3010C) in addition to a SCALANCE S or SCALANCE M.
- Extended temperature range from -40 to $+70$ °C as well as optional additional enclosure in IP68





SITRANS RD500

- Remote monitoring of inventory levels as well as process and environmental applications
- Collection and saving of measured values for flow, level, pressure, temperature and weighing
- Integrated web server for easy configuration without programming
- E-mail and text message notifications for alarm messages
- Flexible data transmission worldwide

WirelessHART® components

WirelessHART® enables the integration of measuring points that could not be implemented before due to the operating environment or for economic reasons. In addition to the SITRANS TF280 transmitters for temperature measurement and SITRANS P280 for pressure measurement, the SITRANS AW210 and SITRANS AW200 WirelessHART® adapters integrate instruments with HART® capability as well as analog devices that do not support HART® communication. Access to diagnostic data can be implemented with these adapters at low costs in most cases, especially when the control system does not support integrated HART® communication.



SITRANS AW200

- Connection option of up to four HART® devices in multi-drop mode
- Support of 4–20 mA devices without HART®
- Power supply of the connected field device via an integrated battery



SITRANS AW210

- Access to all online values (process values/diagnostic information) and parameters of the connected devices
- Supply via 4–20 mA loop when used in a maintenance environment
- Use in hazardous areas even with Ex d
- Possible to connect up to eight HART® devices in multi-drop mode
- Support of 4–20 mA devices without HART®

IE/PB Link PN IO

- Can constitute the gateway between PROFINET and PROFIBUS
- From the IO-controller viewpoint, all DP slaves are treated like IO devices with a PROFINET interface
- Use as a data records router for the parameter assignment of field devices via SIMATIC PDM (Process Device Manager) in all plants with PROFIBUS DP

Remote digital display

The universal remote digital displays allow remote display of and access to measurement data.



SITRANS RD100 and RD200

- Suitable for level, flow, pressure, temperature and weighing applications
- Can be used in a large variety of environments (low/high temperatures, hazardous areas)
- Simple programming and installation



SITRANS RD300

- Ideal for flow rate, total and control applications as well as for use with most field devices
- Data logged and displayed on the PC with the free RD software

Remote data manager

Remote data managers facilitate remote monitoring through data logging, web access and alarm event processing of the integrated devices.



How to implement multiple standards with just one solution

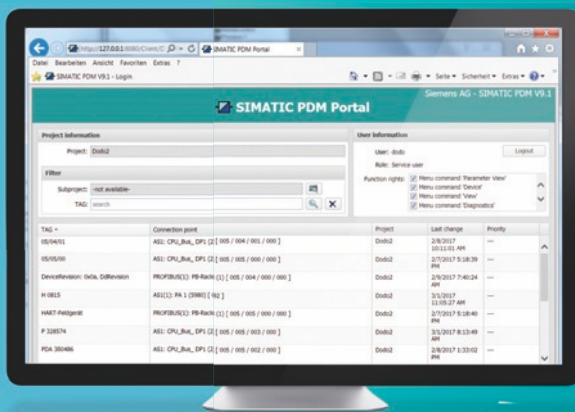
Depending on industry and region, multiple communication protocols are often used – even in the most modern automation solutions. The largest variety can be found when connecting the field level to the control level. It is imperative to connect these different protocols seamlessly with one another and ensure transparent transitions for users. We provide a large variety of hardware and software components to ensure you always find the optimum solution.





Device integration from the field to the world

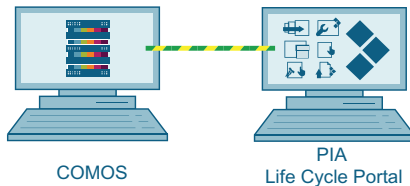
Our process instruments support all major industry standards for modern fieldbus communication, such as HART®, PROFIBUS, FOUNDATION Fieldbus and Modbus, and are therefore suitable for use in all automation solutions. Additional benefits are provided by our SIMATIC PCS 7 process control system and the SITRANS Library, including increased transparency and integration of specific functions for our devices from the SITRANS and SIPART product families that already exist in your plant. These days, it is an absolute must that each device is accessible at all times. Whether the device is local, the centerpiece of a plant or on the other side of the globe – flexibility, security and control at all times are no longer just optional extras. We can provide you with the components you need to accomplish this goal.



SIMATIC PDM (Process Device Manager) – Easy device integration with significant benefits

- Flexible tool for operation of more than 4,000 different field devices and other automation components over the entire life cycle of your plant
- Universal implementation as a central, integrated tool in a Maintenance Station or directly connected to a local field device
- Graphical user interface and intuitive Quick Start wizards for configuration, parameterization, diagnostics and maintenance
- Supports all important industry standards for modern fieldbus communication, such as HART®, PROFIBUS, FOUNDATION Fieldbus and Modbus
- Client-server architecture enables flexible use with consistent data management that is always up-to-date

Integration in plant planning



- Seamless integration of our product configurator in your plant planning with COMOS.
- Fast and easy design of Sitrans field devices directly from the planning environment.
- Automatic transfer of configured device data.
- Simplified device integration saves valuable development time.
- Availability query for already installed devices.

SITRANS Library

- Easy use of device-specific functions and data from devices of the SITRANS and SIPART product families, such as dosing or totalizers in solutions with SIMATIC PCS 7
- Library with device-specific function blocks, block symbols and faceplates
- Fully compatible with SIMATIC PCS 7 Standard Advanced Process Library (APL) throughout the entire life cycle, from engineering to running of the plant

Central maintenance even for third-party systems

SIMATIC PDM (Process Device Manager)

SIMATIC PDM, with its more than 4,000 integrated field devices, also comes into its own as a central maintenance station in control solutions from other manufacturers.

- Connection to existing PROFIBUS segments over IE/PB Link PN IO
- Direct connection to HART® devices with a HART® modem, HART® multiplexer or WirelessHART® SITRANS AW210 adapter
- Supports all important industry standards for modern fieldbus communication, such as HART®, PROFIBUS, FOUNDATION Fieldbus and Modbus
- Client-server architecture enables flexible use with consistent data management that is always up-to-date. On the client only an Internet browser is required
- PDM V9.1 supports FDI packages

Secure worldwide accessibility of devices and systems

Global communication requires a high level of security. Key aspects of transmitted data are confidentiality, authenticity, sender verification and availability. Virtual Private Networks (VPN) with the highest level of encryption are often used. With SINEMA RC it is easy to set up such a global infrastructure due to the availability of all necessary components for wireless and wired-based communication. This means you can access your units and plants installed around the world in no time.

SINEMA RC (Remote Connect)

- Management platform for remote networks enables easy remote access for teleservice or remote maintenance
- Establishment of encrypted connections with OpenVPN with just one mouse click
- Protocol-independent, IP-based communication
- Virtual Network Computing (VNC) enables customer service control and problem analysis on site

Fieldbuses

Introduction to the digital world

Distributed automation solutions based on open fieldbuses are standard today in many sectors of the production and process industries. Only in conjunction with fieldbuses can the advantages of digital communication be fully realized, including better transmission of measured values while maintaining the original accuracy, diagnostic options and remote parameterization. Field devices are optimally integrated into the entire plant thanks to modern fieldbus communication such as HART®, PROFIBUS and FOUNDATION Fieldbus as well as Modbus TCP and RTU. Since the devices are integrated into SIMATIC PCS 7 Asset Management, users have access to diagnostic information from the field devices at all times, enabling them to optimize maintenance and unplanned service of their plants and prevent downtime.

PROFIBUS

- Industry standard IEC 61158 for numerous applications in the production and process industries
- PROFIBUS DP as fast system bus for connection of remote I/O stations, such as ET 200
- PROFIBUS PA for use in hazardous area with simultaneous supply of the devices
- PROFIsafe for secure communication (safety levels up to SIL 2) parallel to standard communication on one cable

PROFINET

- PROFIBUS International open Industrial Ethernet standard for automation
- Enables synchronization, real-time and deterministic communication of the fastest processes
- Allows for seamless integration of other fieldbus systems like PROFIBUS DP

FOUNDATION Fieldbus

- Open standard of the FieldComm Group (FCG)
- In addition to actuators, field devices for measurement of pressure, temperature, flow and level are available for the intrinsically safe FF bus

HART® –

Field communication protocol

- Industry standard IEC 61158 with more than 30 million installed devices
- Expands the analog 4–20 mA current loop with industry-standard digital communication
- Combination of proven analog transmission of measured values and simultaneous digital communication with bidirectional, acyclic transmission
- Transmission of diagnostics, maintenance and process information from field devices to host systems

WirelessHART®

- Wireless standard based on the HART® protocol since HART® V7.0
- Transmission of up to eight process values without loss in accuracy
- Complete wireless access to diagnostic and maintenance information as well as parameters over the wireless network
- The latest security technologies for protection of network and data
- Ideal for measurements of moving, rotating or hard-to-reach equipment such as tanks and silos or for temporary measurement applications

Modbus RTU

- Industry standard IEC 61158
- For widely distributed serial industrial communication
- Supported by SIMATIC PDM
- Data are transmitted cyclically between the Modbus master and one or more Modbus slaves

Modbus TCP

- Industry standard IEC 61158
- Multi-master system
- Homogenous transition from Modbus TCP to lower-level Modbus RTU networks possible (Modbus RTU device address must always be specified in addition to the IP address)
- Modbus RTU devices are usually integrated into the SIMATIC PCS 7 via Modbus TCP and a type CM101 converter
- Central accessibility of all Modbus RTU devices downstream from a CM101 using SIMATIC PDM and SIMATIC PCS 7 controllers simultaneously

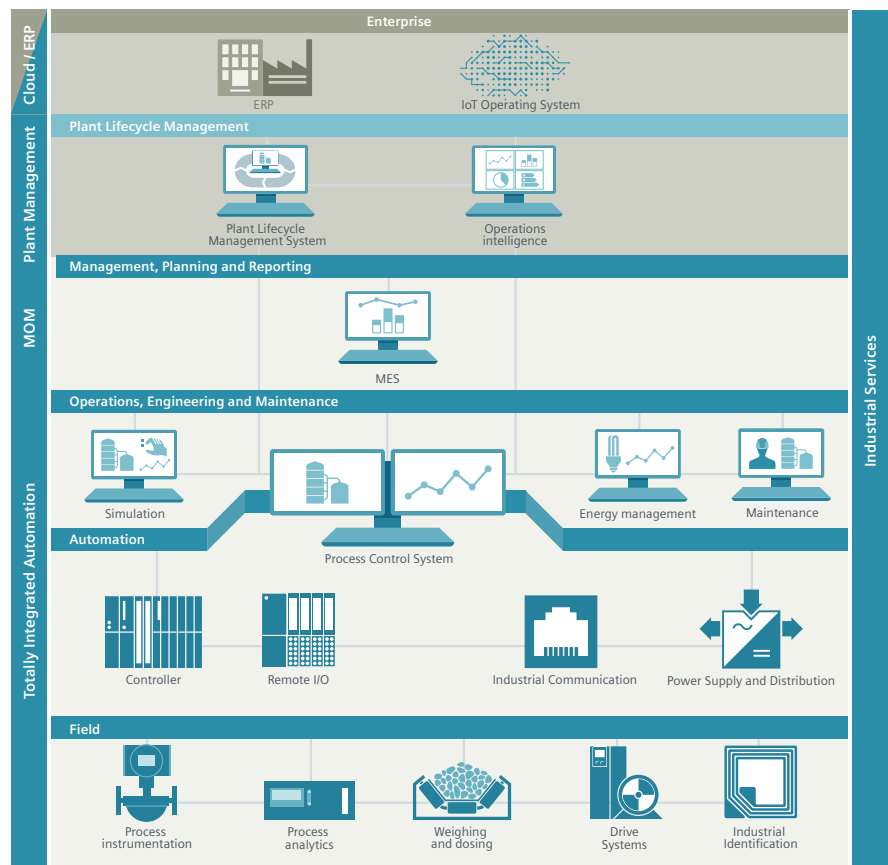
SITRANS DTM

Two technologies are available today for the description and integration of field devices and other automation components: the Electronic Device Description Language (EDDL) and the so-called Field Device Tool (FDT). A device described with EDDL is represented as EDD; a software component developed with FDT is represented as a Device Type Manager (DTM). A DTM can represent one or more devices. Parameterization of the Field Device Tool/Device Type Manager (FDT/DTM) technology for Siemens devices observing international standards.

- SITRANS DTM is a certified DTM
- Supports many devices from the SITRANS product family
- Uses EDDs for the devices and provides all required aspects of the device integration via the FDT interface
- Can be used in so-called FDT Frame applications such as FieldCare or PACTware

Totally Integrated Automation – TIA

In light of the growing complexity of machines and plants along with rising engineering costs, efficient engineering is a key factor for success in the manufacturing industry. Totally Integrated Automation, industrial automation from Siemens, makes engineering efficient. The open system architecture covers the entire production process and ensures the efficient interaction of all automation components. This is achieved with consistent data management, global standards, and uniform hardware and software interfaces. These common features minimize the engineering overhead, thus reducing costs, short-ening the time-to-market and increasing flexibility.



Pressure Measurement



1/3 Product overview

Single-range transmitters for general applications

- 1/6 SITRANS P200 for gauge and abs. pressure
- 1/12 SITRANS P210 for gauge pressure
- 1/17 SITRANS P220 for gauge pressure
- Transmitter for hydrostatic level
- 1/23 - SITRANS LH100
- 1/28 - SITRANS LH300
- 1/34 SITRANS P Compact for gauge and absolute pressure

Transmitters with WirelessHART

- 1/43 SITRANS P280 for gauge and abs. pressure

Transmitters for food, pharmaceuticals and biotechnology

- 1/48 SITRANS P300 for gauge and abs. pressure
- 1/70 SITRANS P300 Accessories/Spare parts
- 1/71 SITRANS P300 - Factory-mounting of valve manifolds on transmitters

Transmitters for the paper industry

- 1/73 SITRANS P300 and DS III for gauge pressure with PMC connection
- Technical description
- Technical specifications, ordering data, dimensional drawings
- 1/78 - SITRANS P DS III with PMC connection
- 1/84 - SITRANS P300 with PMC connection

Transmitters for applications with basic requirements (Basic)

- 1/91 SITRANS P310
- Technical description
- Technical specifications, ordering data, dimensional drawings
- 1/95 - for gauge pressure
- 1/101 - for differential pressure and flow
- 1/110 Accessories/Spare parts

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/420

- 1/112 Technical description
- Technical specifications, ordering data, dimensional drawings
- 1/117 - for gauge pressure (pressure series)
- 1/126 - for gauge pressure (differential pressure series)
- 1/136 - for gauge and absolute pressure, flush-mounted diaphragm
- 1/148 - for absolute pressure (pressure series)
- 1/156 - for absolute pressure (differential pressure series)
- 1/165 - for differential pressure and flow
- 1/179 - for level

SITRANS P DS III

- 1/193 Technical description
- Technical specifications, ordering data, dimensional drawings
- 1/200 - for gauge pressure
- 1/210 - for gauge and absolute pressure with front-flush diaphragm
- 1/223 - for absolute pressure (from gauge pressure series)
- 1/233 - for absolute pressure (from differential pressure series)
- 1/244 - for differential pressure and flow
- 1/260 - for level
- 1/274 Accessories/Spare parts
- 1/280 Factory-mounting of valve manifolds on transmitters

SITRANS P410

- 1/284 Technical description
- Technical specifications, ordering data, dimensional drawings
- 1/290 - for gauge pressure
- 1/302 - for differential pressure and flow
- 1/321 Accessories/Spare parts

Transmitters for applications with highest requirements (Premium)

SITRANS P500

- 1/324 Technical description
- Technical specifications, ordering data, dimensional drawings
- 1/329 - for differential pressure and flow
- 1/337 - for level
- 1/346 Accessories/Spare parts
- 1/349 Factory-mounting of valve manifolds on transmitters

You can download all instructions, catalogs and certificates for SITRANS P free of charge at the following Internet address:
www.usa.siemens.com/pressure

Pressure Measurement



Remote seals for transmitters and pressure gauges

SITRANS P320/420

- 1/352 Technical description
- 1/365 Diaphragm seals of sandwich design
 - with flexible capillary
- 1/371 Diaphragm seals of flange design
 - with flexible capillary
- 1/379 - directly fitted on transmitter
- 1/386 - fixed connection and with capillary
- 1/393 Diaphragm seal, screwed design
 - directly mounted or/and with capillary
- 1/397 Quick-release diaphragm seals
- 1/402 Miniature diaphragm seals
- 1/404 Clamp-on seals of flange design
- 1/409 Quick-release inline seals
- 1/414 Flushing rings for diaphragm seals
- 1/416 Measuring setups
 - with remote seals
 - without remote seals
- 1/417
- 1/419

SITRANS P DS III

- 1/422 Technical description
- 1/428 Pancake type diaphragm seal with flexible capillary tube
- 1/429 Flange-type diaphragm seal directly connected
- 1/430 Flange-type diaphragm seal, with extension
- 1/432 Diaphragm seal "flanged off-line low-pressure type", directly connected
- 1/434 Flange-type diaphragm seal with flexible capillary tube
- 1/436 Diaphragm seal "flanged off-line type"
- 1/438 Diaphragm seal "flanged off-line low-pressure type"
- 1/440 Flushing rings
- 1/442 Diaphragm seal with quick connection
- 1/443 Inline diaphragm seal with quick connection
- 1/447 Diaphragm seal "threaded design"
- 1/448 Diaphragm seal "threaded, low-pressure design"
- 1/450 Inline diaphragm seal, wafer for pressure
- 1/452 Diaphragm seal, saddle
- 1/454 Measuring setups
 - with remote seals
 - without remote seals
- 1/455
- 1/457
- 1/459 Questionnaires

Fittings

- 1/461 Technical description
- 1/462 Double shut-off valves
- 1/464 2-, 3- and 5-spindle valve manifolds DN 5
- 1/468 Oval flange

You can download all instructions, catalogs and certificates for SITRANS P free of charge at the following Internet address:
www.usa.siemens.com/pressure

Overview






Application	Description	Software for parameterization
SITRANS P Single-range transmitters for general applications		
	SITRANS P200 Two or three-wire transmitters for measuring gauge and absolute pressure <ul style="list-style-type: none"> • Single-range transmitters for gauge and absolute pressure • Ceramic measuring cell • For general applications 	1/6 –
	SITRANS P210 Single-range transmitters for gauge pressure <ul style="list-style-type: none"> • Stainless steel measuring cell • For low-pressure applications 	1/12 –
	SITRANS P220 Single-range transmitters for gauge pressure <ul style="list-style-type: none"> • Stainless steel measuring cell, fully welded • For high-pressure applications and refrigeration technology 	1/17 –
	SITRANS LH100 Two-wire transmitter for measuring hydrostatic levels <ul style="list-style-type: none"> • For measuring liquid levels in wells, tanks, channels, dams etc. • With ceramic diaphragm, Ø 23.4 mm 	1/23 –
	SITRANS LH300 Two-wire transmitter for measuring hydrostatic levels <ul style="list-style-type: none"> • For measuring liquid levels in wells, tanks, channels, dams etc. • With ceramic diaphragm, Ø 30 mm • Suitable for small measuring ranges 	1/28 –
 	SITRANS P Compact Transmitters for gauge and absolute pressure for food, pharmaceuticals and biotechnology <ul style="list-style-type: none"> • Single-range transmitters in two-wire system • Hygiene-based design with various aseptic connections according to EHEDG, FDA and GMP recommendations. 	1/34 –
SITRANS P · Transmitters with WirelessHART communication		
	SITRANS P280 Wireless transmitter with Wireless HART for measuring gauge and absolute pressure <ul style="list-style-type: none"> • Wireless communication with WirelessHART • Battery operation • Parameterization using 3 buttons and SIMATIC PDM with HART modem or wireless with WirelessHART 	1/43 SIMATIC PDM
SITRANS P · Transmitters for food, pharmaceuticals and biotechnology		
 	SITRANS P300 Two-wire transmitters for measuring gauge and absolute pressure <ul style="list-style-type: none"> • Hygiene-based design according to EHEDG, 3A, FDA and GMP • Parameterization using 3 buttons and communication over HART, PROFIBUS PA or FOUNDATION Fieldbus • Standard process connection G1/2", 1/2-NPT and front-flush process connections available • Range adjustment 100 : 1 	1/48 SIMATIC PDM
	Factory-mounting of valve manifolds on SITRANS P300 transmitters <ul style="list-style-type: none"> • Simplified assembly • With pressure test • Stainless steel valve manifolds 	1/71 –

Pressure Measurement

Product overview

1

Application	Description	Software for parameterization
SITRANS P · Transmitters for gauge pressure for the paper industry		
	<p>Two-wire transmitters for measuring gauge pressure</p> <p>SITRANS P300 and SITRANS P DS III with PMC connection for the paper industry</p> <ul style="list-style-type: none"> • Range adjustment 100 : 1 • Process connections for the paper industry • Parameterization using 3 buttons and HART, PROFIBUS PA or FOUNDATION Fieldbus 	1/73 SIMATIC PDM
SITRANS P Transmitters for applications with basic requirements (Basic)		
	<p>Two-wire transmitter for measuring:</p> <ul style="list-style-type: none"> • Gauge pressure, • Differential pressure and • Flow <p>SITRANS P310</p> <ul style="list-style-type: none"> • Measuring accuracy up to 0.075 % • Range adjustment: 100 : 1 • Parameterization using 3 buttons and HART 	1/91 SIMATIC PDM
SITRANS P Transmitters for applications with advanced requirements (Advanced)		
	<p>Two-wire transmitters for measuring:</p> <ul style="list-style-type: none"> • Gauge pressure, • Absolute pressure, • Differential pressure and • Flow or • Level <p>SITRANS P320/P420 NEW</p> <ul style="list-style-type: none"> • Measuring accuracy: <ul style="list-style-type: none"> - SITRANS P320: 0.065 % - SITRANS P420 0.04 % • Fast step response time of up to 105 ms • Developed according to IEC 61508, SIL2/3 applications • SIL validation remotely • Diagnostics according to Namur NE107 • 4-key operation 	1/112 SIMATIC PDM
	<p>Two-wire transmitters for measuring:</p> <ul style="list-style-type: none"> • Gauge pressure, • Absolute pressure, • Differential pressure and • Flow or • Level <p>SITRANS P DS III</p> <ul style="list-style-type: none"> • Measuring accuracy up to 0.065 % • Range adjustment: 100 : 1 • Parameterization using: <ul style="list-style-type: none"> - 3 buttons and HART for SITRANS P DS III HART - 3 buttons and PROFIBUS PA for SITRANS P DS III PA series - 3 buttons and FOUNDATION Fieldbus for SITRANS P DS III FF series • Available ex stock 	1/193 SIMATIC PDM
	<p>Factory mounting of valve manifolds on gauge, absolute or differential pressure transmitters SITRANS P DS III</p> <ul style="list-style-type: none"> • Simplified assembly • With pressure test • Stainless steel valve manifolds 	1/280 —
	<p>Two-wire transmitters for measuring:</p> <ul style="list-style-type: none"> • Gauge pressure, • Differential pressure and • Flow <p>SITRANS P410</p> <ul style="list-style-type: none"> • Measuring accuracy up to 0.04 % • Range adjustment 100 : 1 • Parameterization using: <ul style="list-style-type: none"> - 3 buttons and HART for SITRANS P410 HART - 3 buttons and PROFIBUS PA for SITRANS P410 PA - 3 buttons and FOUNDATION Fieldbus for SITRANS P410 FF 	1/284 SIMATIC PDM
	<p>Factory mounting of valve manifolds on gauge, absolute or differential pressure transmitters SITRANS P410</p> <ul style="list-style-type: none"> • Factory valve block mounting for SITRANS P410 is possible. Depending on the available P410 variants, please see the configuration options for SITRANS P DS III (page 1/280). 	—

Application	Description	Software for parameterization
SITRANS P - Transmitters for applications with highest requirements (Premium)		
	Two-wire transmitters for measuring: <ul style="list-style-type: none"> Differential pressure Volume flow Mass flow Level Volume Mass 	SITRANS P500 <ul style="list-style-type: none"> Measuring accuracy up to 0.03 % Range adjustment: 200 :1 High measuring accuracy Very fast response time Extremely good long-term stability Parameterization using 3 buttons or HART
	Factory-mounting of manifolds on differential pressure transmitters SITRANS P500 <ul style="list-style-type: none"> Simplified assembly With pressure test Stainless steel valve manifolds 	1/324 SIMATIC PDM
Remote seals for transmitters and pressure gauges		
	Remote seals for measuring viscous, corrosive or fibrous media (as well as media at extreme temperatures)	Remote seals for SITRANS P320/420 NEW Remote seals for SITRANS P DSIII
	<ul style="list-style-type: none"> Remote seals in sandwich and flange designs Quick-release remote seals for the food industry Wide range of diaphragm materials and fill fluid available 	1/352 – 1/422
Fittings		
	Shutting off the lines for the medium and differential pressure Mounting of transmitter on valve manifold or shut-off fitting	Shut-off fittings and valve manifolds available in steel, brass or stainless steel Valve manifolds available for the various process connections of the SITRANS P transmitters
	Accessories for fittings <ul style="list-style-type: none"> Oval flange 	1/461 – 1/468

Supplied product documentation on DVD and safety instructions



The scope of delivery of the Siemens products for process instrumentation includes a multilingual instruction sheet with **safety instructions** as well as a uniform **mini DVD – Process Instrumentation and Weighing Systems**.

This DVD contains the most important manuals and certificates for the Siemens process instrumentation and weighing technology portfolio. The delivery may also contain product-specific or order-specific printed materials.

For additional information, refer to the Annex on page 10/3.

Pressure Measurement

Single-range transmitters for general applications

SITRANS P200 for gauge and absolute pressure

1

Overview



The SITRANS P200 pressure transmitter measures the gauge and absolute pressure of liquids, gases and vapors.

- Ceramic measuring cell
- Gauge and absolute measuring ranges 1 to 60 bar (15 to 1000 psi)
- For general applications

Benefits

- High measuring accuracy
- Rugged stainless steel enclosure
- High overload withstand capability
- For aggressive and non-aggressive media
- For measuring the pressure of liquids, gases and vapors
- Compact design

Application

The SITRANS P200 pressure transmitter for gauge and absolute pressure is used in the following industrial areas:

- Mechanical engineering
- Shipbuilding
- Power engineering
- Chemical industry
- Water supply

Design

Device structure without explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm installed in a stainless steel enclosure. It can be used with a connector per EN 175301-803-A (IP65), a M12 device plug (IP67), a cable (IP67) or a Quickon cable quick screw connection (IP67) connected electrically. The output signal is between 4 and 20 mA or 0 and 10 V.

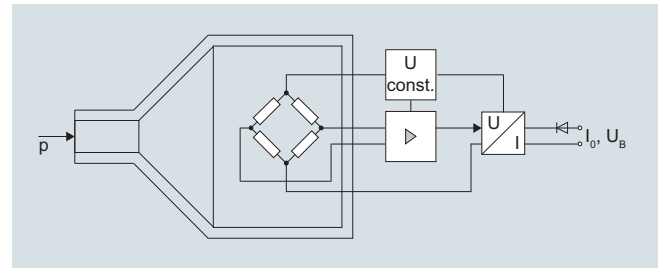
Device structure with explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm installed in a stainless steel enclosure. It can be used with a connector per EN 175301-803-A (IP65) or a M12 device plug (IP67) connected electrically. The output signal is between 4 and 20 mA.

Function

The pressure transmitter measures the gauge and absolute pressure of liquids and gases as well as the level of liquids.

Mode of operation



SITRANS P200 pressure transmitters (7MF1565-...), functional diagram

The ceramic measuring cell has a thin-film resistance bridge to which the operating pressure p is transmitted through a ceramic diaphragm.

The voltage output from the measuring cell is converted by an amplifier into an output current of 4 to 20 mA or an output voltage of 0 to 10 V DC.

The output current and voltage are linearly proportional to the input pressure.

Pressure Measurement

Single-range transmitters for general applications

SITRANS P200 for gauge and absolute pressure

1

Technical specifications

Application Gauge and absolute pressure measurement		Liquids, gases and vapors		Electromagnetic compatibility		<ul style="list-style-type: none"> • acc. IEC 61326-1/-2/-3 • acc. NAMUR NE21, only for ATEX versions and with a max. measuring deviation $\leq 1\%$
Mode of operation Measuring principle		Piezo-resistive measuring cell (ceramic diaphragm)		Design Weight		Approx. 0.090 kg (0.198 lb)
Measured variable		Gauge and absolute pressure		Process connections		See dimension drawings
Inputs Measuring range		Gauge pressure - Metric - US measuring range		Electrical connections		<ul style="list-style-type: none"> • Connector per EN 175301-803-A Form A with cable inlet M16x1.5 or 1/2-14 NPT or Pg 11 • M12 device plug • 2 or 3-wire (0.5 mm²) cable ($\varnothing \pm 5.4$ mm) • Quickon cable quick screw connection
Absolute pressure - Metric - US measuring range		1 ... 60 bar (15 ... 870 psi) 15 ... 1000 psi		Wetted parts materials		Al ₂ O ₃ - 96 % Stainless steel, mat. No. 1.4404 (SST 316 L)
Output Current signal		4 ... 20 mA (U _B - 10 V)/0.02 A		<ul style="list-style-type: none"> • Measuring cell • Process connection 		FPM (Standard) Neoprene Perbunan EPDM
<ul style="list-style-type: none"> • Load • Auxiliary power U_B 		DC 7 ... 33 V (10 ... 30 V for Ex)		<ul style="list-style-type: none"> • Gasket 		Stainless steel, mat. No. 1.4404 (SST 316 L)
Voltage signal		0 ... 10 V DC		Non-wetted parts materials		Stainless steel, mat. No. 1.4404 (SST 316 L)
<ul style="list-style-type: none"> • Load • Auxiliary power U_B • Power consumption 		≥ 10 k Ω 12 ... 33 V DC < 7 mA at 10 k Ω		<ul style="list-style-type: none"> • Enclosure • Rack • Cables 		Plastic PVC
Ratiometric output		0 ... 90 %		Certificates and approvals		Classification according to pressure equipment directive (PED 2014/68/EU)
<ul style="list-style-type: none"> • Load • Auxiliary power U_B • Power consumption 		≥ 10 k Ω 5 V DC $\pm 10\%$ < 7 mA at 10 k Ω		Lloyd's Register of Shipping (LR) ¹⁾ Germanischer Lloyd (GL) ¹⁾ American Bureau of Shipping (ABS) ¹⁾ Bureau Veritas (BV) ¹⁾ Det Norske Veritas (DNV) ¹⁾ Drinking water approval (ACS) ¹⁾ EAC ¹⁾		For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)
Characteristic curve		Linear rising		Underwriters Laboratories (UL) ¹⁾		12/20010 GL19740 11 HH00 ABS_11_HG 789392_PDA BV 271007A0 BV A 12553 ACS 15 ACC NY 360 № TC RU C-DE.ГБ05.B.00732 OC НАННО «ЦБЭЗ»
Measuring accuracy Error in measurement at limit setting incl. hysteresis and reproducibility		<ul style="list-style-type: none"> • Typical: 0.25 % of measuring span • Maximum: 0.5 % of measuring span 		UL 20110217 - E34453 IEC UL DK 21845		Ex II 1/2 G Ex ia IIC T4 Ga/Gb Ex II 1/2 D Ex ia IIIC T125 °C Da/Db
Step response time T ₉₉		< 5 ms		Explosion protection		SEV 10 ATEX 0146 U _i ≤ 30 V DC; I _i ≤ 100 mA; P _i ≤ 0.75 W
Long-term stability		0.25 % of measuring span/year		Connection to certified intrinsically-safe resistive circuits with maximum values:		L _i = 0 nH; C _i = 0 nF
<ul style="list-style-type: none"> • Lower range value and measuring span 		0.25 % of measuring span/year		Effective internal inductance and capacity for versions with plugs per EN 175301-803-A and M12		
Influence of ambient temperature		0.25 %/10 K of measuring span				
<ul style="list-style-type: none"> • Lower range value and measuring span • Influence of power supply 		0.005 %/V				
Conditions of use Process temperature with gasket made of:		-15 ... +125 °C (+5 ... +257 °F) -35 ... +100 °C (-31 ... +212 °F) -20 ... +100 °C (-4 ... +212 °F) -40 ... +125 °C (-40 ... +257 °F), usable for drinking water				
<ul style="list-style-type: none"> • FPM (Standard) • Neoprene • Perbunan • EPDM 		-25 ... +85 °C (-13 ... +185 °F) -50 ... +100 °C (-58 ... +212 °F)				
Ambient temperature		-50 ... +100 °C (-58 ... +212 °F)				
Storage temperature		-50 ... +100 °C (-58 ... +212 °F)				
Degree of protection (to EN 60529)		<ul style="list-style-type: none"> • IP 65 with connector per EN 175301-803-A • IP 67 with M12 device plug • IP 67 with cable • IP 67 with cable quick screw connection 				

¹⁾ For variants with output signal 0 ... 5 V and ratiometric output available soon.

Pressure Measurement

Single-range transmitters for general applications

SITRANS P200 for gauge and absolute pressure

1

Selection and ordering data

SITRANS P 200 pressure transmitters for pressure and absolute pressure for general applications

Characteristic curve deviation typ. 0.25 %

Wetted parts materials: Ceramic and stainless steel + sealing material

Non-wetted parts materials: stainless steel

[Click on the Article No. for the online configuration in the PIA Life Cycle Portal.](#)

Article No.

Order code

7MF1565 -

Measuring range		Overload limit		Burst pressure	
		Min.	Max.		
For gauge pressure					
0 ... 1 bar	(0 ... 14.5 psi)	-1 bar	(-14.5 psi)	2.5 bar	(36.26 psi)
0 ... 1.6 bar	(0 ... 23.2 psi)	-1 bar	(-14.5 psi)	4 bar	(58.02 psi)
0 ... 2.5 bar	(0 ... 36.3 psi)	-1 bar	(-14.5 psi)	6.25 bar	(90.65 psi)
0 ... 4 bar	(0 ... 58.0 psi)	-1 bar	(-14.5 psi)	10 bar	(145 psi)
0 ... 6 bar	(0 ... 87.0 psi)	-1 bar	(-14.5 psi)	15 bar	(217 psi)
0 ... 10 bar	(0 ... 145 psi)	-1 bar	(-14.5 psi)	25 bar	(362 psi)
0 ... 16 bar	(0 ... 232 psi)	-1 bar	(-14.5 psi)	40 bar	(580 psi)
0 ... 25 bar	(0 ... 363 psi)	-1 bar	(-14.5 psi)	62.5 bar	(906 psi)
0 ... 40 bar	(0 ... 580 psi)	-1 bar	(-14.5 psi)	100 bar	(1450 psi)
0 ... 60 bar	(0 ... 870 psi)	-1 bar	(-14.5 psi)	150 bar	(2175 psi)

Other version, add Order code and plain text: Measuring range: ... up to ... bar (psi)

For absolute pressure					
0 ... 0.6 bar a	(0 ... 8.7 psi a)	0 bar a	(0 psi a)	2.5 bar a	(36.26 psi a)
0 ... 1 bar a	(0 ... 14.5 psi a)	0 bar a	(0 psi a)	2.5 bar a	(36.26 psi a)
0 ... 1.6 bar a	(0 ... 23.2 psi a)	0 bar a	(0 psi a)	4 bar a	(58.02 psi a)
0 ... 2.5 bar a	(0 ... 36.3 psi a)	0 bar a	(0 psi a)	6.25 bar a	(90.65 psi a)
0 ... 4 bar a	(0 ... 58.0 psi a)	0 bar a	(0 psi a)	10 bar a	(145 psi a)
0 ... 6 bar a	(0 ... 87.0 psi a)	0 bar a	(0 psi a)	15 bar a	(217 psi a)
0 ... 10 bar a	(0 ... 145 psi a)	0 bar a	(0 psi a)	25 bar a	(362 psi a)
0 ... 16 bar a	(0 ... 232 psi a)	0 bar a	(0 psi a)	40 bar a	(580 psi a)

Other version, add Order code and plain text: Measuring range: ... up to ... mbar a (psi a)

Measuring ranges for gauge pressure					
0 ... 15 psi	-14.5 psi	35 psi	> 35 psi		
3 ... 15 psi	-14.5 psi	35 psi	> 35 psi		
0 ... 20 psi	-14.5 psi	50 psi	> 50 psi		
0 ... 30 psi	-14.5 psi	80 psi	> 80 psi		
0 ... 60 psi	-14.5 psi	140 psi	> 140 psi		
0 ... 100 psi	-14.5 psi	200 psi	> 200 psi		
0 ... 150 psi	-14.5 psi	350 psi	> 350 psi		
0 ... 200 psi	-14.5 psi	550 psi	> 550 psi		
0 ... 300 psi	-14.5 psi	800 psi	> 800 psi		
0 ... 500 psi	-14.5 psi	1400 psi	> 1400 psi		
0 ... 750 psi	-14.5 psi	2000 psi	> 2000 psi		
0 ... 1000 psi	-14.5 psi	2000 psi	> 2000 psi		

Other version, add Order code and plain text: Measuring range: ... up to ... psi

Measuring ranges for absolute pressure					
0 ... 10 psi a	0 psi a	35 psi a	> 35 psi a		
0 ... 15 psi a	0 psi a	35 psi a	> 35 psi a		
0 ... 20 psi a	0 psi a	50 psi a	> 50 psi a		
0 ... 30 psi a	0 psi a	80 psi a	> 80 psi a		
0 ... 60 psi a	0 psi a	140 psi a	> 140 psi a		
0 ... 100 psi a	0 psi a	200 psi a	> 200 psi a		
0 ... 150 psi a	0 psi a	350 psi a	> 350 psi a		
0 ... 200 psi a	0 psi a	550 psi a	> 550 psi a		
0 ... 300 psi a	0 psi a	800 psi a	> 800 psi a		

Other version, add Order code and plain text: Measuring range: ... up to ... psi a

3BA
3BB
3BD
3BE
3BG
3CA
3CB
3CD
3CE
3CG

9AA

H1Y

5AG
5BA
5BB
5BD
5BE
5BG
5CA
5CB

9AA

H2Y

4BB
4BC
4BD
4BE
4BF
4BG
4CA
4CB
4CD
4CE
4CF
4CG

9AA

H1Y

6AG
6BA
6BB
6BD
6BE
6BG
6CA
6CB
6CC

9AA

H2Y

Pressure Measurement

Single-range transmitters for general applications

SITRANS P200 for gauge and absolute pressure

1

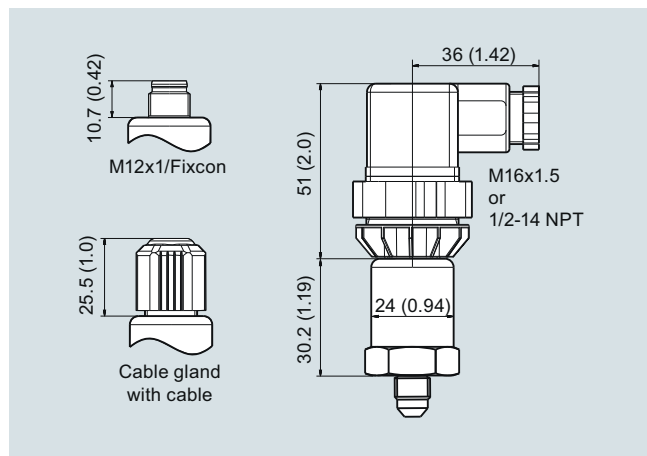
Selection and ordering data	Article No.	Order code
SITRANS P 200 pressure transmitters for pressure and absolute pressure for general applications Accuracy typ. 0.25 % Wetted parts materials: Ceramic and stainless steel + sealing material Non-wetted parts materials: stainless steel	7MF1565-	
Output signal 4 ... 20 mA; two-wire system; power supply 7 ... 33 V DC (10 ... 30 V DC for ATEX versions) 0 ... 10 V; three-wire system; power supply 12 ... 33 V DC 0 ... 5 V; 3-wire system; auxiliary power 7 ... 33 V DC Ratiometric 10 ... 90 %; 3-wire system; auxiliary power 5 V DC ± 10 %		0 10 20 30
Explosion protection (only 4 ... 20 mA) None With explosion protection Ex ia IIC T4		0 1
Electrical connection Connector per DIN EN 175301-803-A, stuffing box thread M16 (with coupling) M12 device plug per IEC 61076-2-101 Connection via fixed mounted cable, 2 m (not for type of protection "Intrinsic safety i") Quickon cable quick screw connection PG9 (not for type of protection "Intrinsic safety i") Connector per DIN EN 175301-803-A, stuffing box thread 1/2"-14 NPT (with coupling) Connector per DIN EN 175301-803-A, stuffing box thread PG11 (with coupling) Fixed mounted cable, length 5 m Special version		1 2 03 04 5 6 07 9 N1Y
Process connection G½" male per EN 837-1 (½" BSP male) (standard for metric pressure ranges mbar, bar) G½" male thread and G1/8" female thread G¼" male per EN 837-1 (¼" BSP male) 7/16"-20 UNF male ¼"-18 NPT male (standard for pressure ranges inH ₂ O and psi) ¼"-18 NPT female ½"-14 NPT male ½"-14 NPT female 7/16"-20 UNF female M20x1.5 male G1/4" to DIN 3852 Form E G1/2" to DIN 3852 Form E Special version		A B C D E F G H J P Q R Z P1Y
Sealing material between sensor and enclosure Viton (FPM, standard) Neoprene (CR) Perbunan (NBR) EPDM Special version		A B C D Z Q1Y
Version Standard version		1
Further designs Supplement the Article No. with "-Z" and add Order code. Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2 Oxygen version, free of oil and degreased, max. operating pressure 60 bar, max. process temperature +85 °C (only in conjunction with the sealing material Viton between sensor and enclosure and not with explosion protection version)	C11 E10	

Pressure Measurement

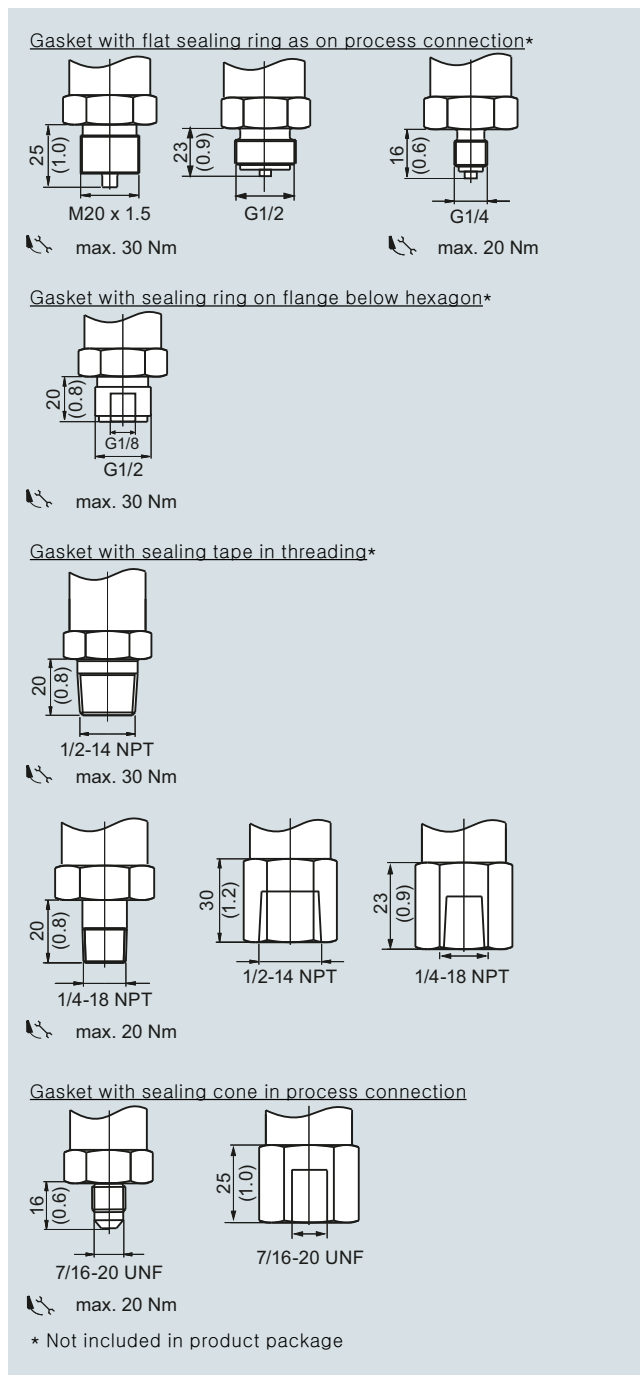
Single-range transmitters for general applications

SITRANS P200 for gauge and absolute pressure

Dimensional drawings



SITRANS P200, electrical connections, dimensions in mm (inch)



SITRANS P200, process connections, dimensions in mm (inch)

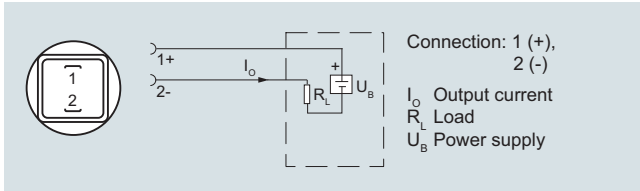
Pressure Measurement

Single-range transmitters for general applications

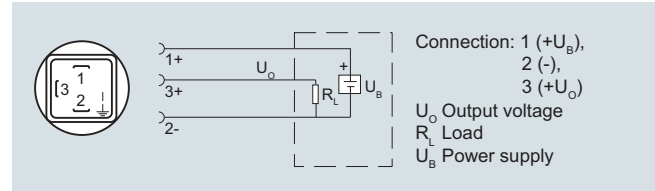
SITRANS P200 for gauge and absolute pressure

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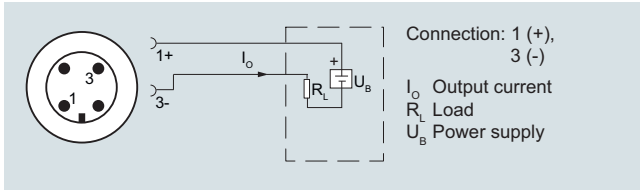
Schematics



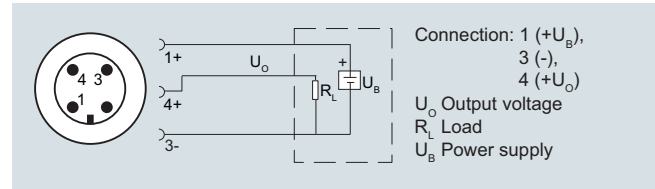
Connection with current output and connector per EN 175301



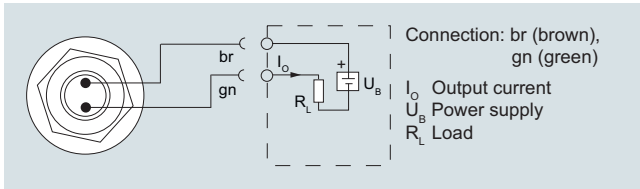
Connection with voltage output, ratiometric output and plug according to EN 175301



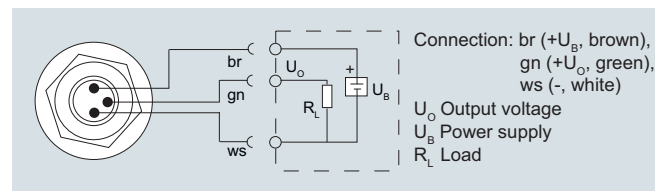
Connection with current output and M12x1 device plug



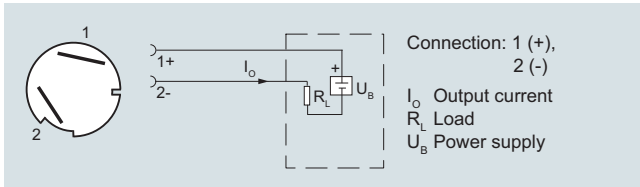
Connection with voltage output, ratiometric output and M12x1 device plug



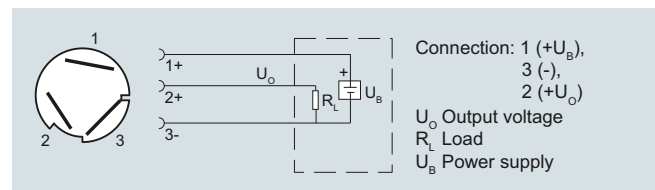
Connection with current output and cable



Connection with voltage output, ratiometric output and cable



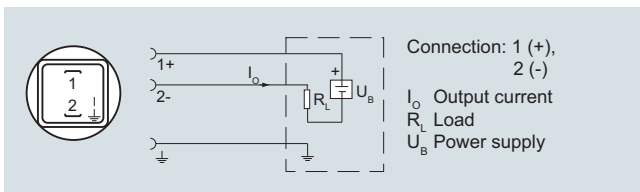
Connection with current output and Quickon cable quick screw connection



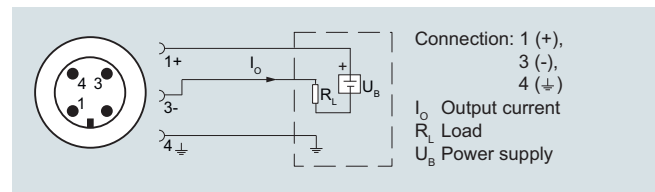
Connection with voltage output, ratiometric output and Quickon fast cable termination

Version with explosion protection: 4 ... 20 mA

The grounding connection is conductively bonded to the transmitter enclosure



Connection with current output and connector per EN 175301 (Ex)



Connection with current output and M12x1 device plug (Ex)

Pressure Measurement

Single-range transmitters for general applications

SITRANS P210 for gauge pressure

1

Overview



The pressure transmitter SITRANS P210 measures the gauge pressure of liquids, gases and vapors.

- Stainless steel measuring cell
- Measuring ranges 100 to 600 mbar (1.45 to 8.7 psi) relative
- For low-pressure applications

Benefits

- High measuring accuracy
- Rugged stainless steel enclosure
- High overload withstand capability
- For aggressive and non-aggressive media
- For measuring the pressure of liquids, gases and vapors
- Compact design

Application

The pressure transmitter SITRANS P210 for gauge pressure is used in the following industrial areas:

- Mechanical engineering
- Shipbuilding
- Power engineering
- Chemical industry
- Water supply

Design

Device structure without explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm installed in a stainless steel enclosure. It can be used with a connector per EN 175301-803-A (IP65), a M12 device plug (IP67), a cable (IP67) or a Quickon cable quick screw connection (IP67) connected electrically. The output signal is between 4 and 20 mA or 0 and 10 V.

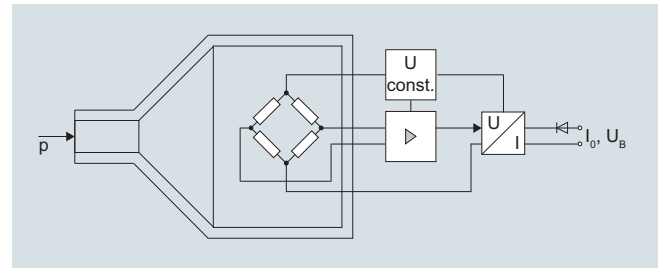
Device structure with explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm installed in a stainless steel enclosure. It can be used with a connector per EN 175301-803-A (IP65) or a M12 device plug (IP67) connected electrically. The output signal is between 4 and 20 mA.

Function

The pressure transmitter measures the gauge pressure of liquids and gases as well as the level of liquids.

Mode of operation



SITRANS P210 pressure transmitters (7MF1566-...), functional diagram

The stainless steel measuring cell has a thin-film resistance bridge to which the operating pressure p is transmitted through a stainless steel diaphragm.

The voltage output from the measuring cell is converted by an amplifier into an output current of 4 to 20 mA or an output voltage of 0 to 10 V DC.

The output current and voltage are linearly proportional to the input pressure.

Pressure Measurement

Single-range transmitters for general applications

SITRANS P210 for gauge pressure

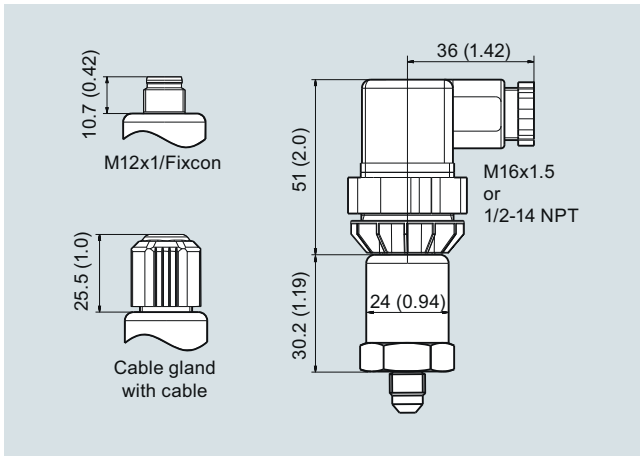
1

Technical specifications

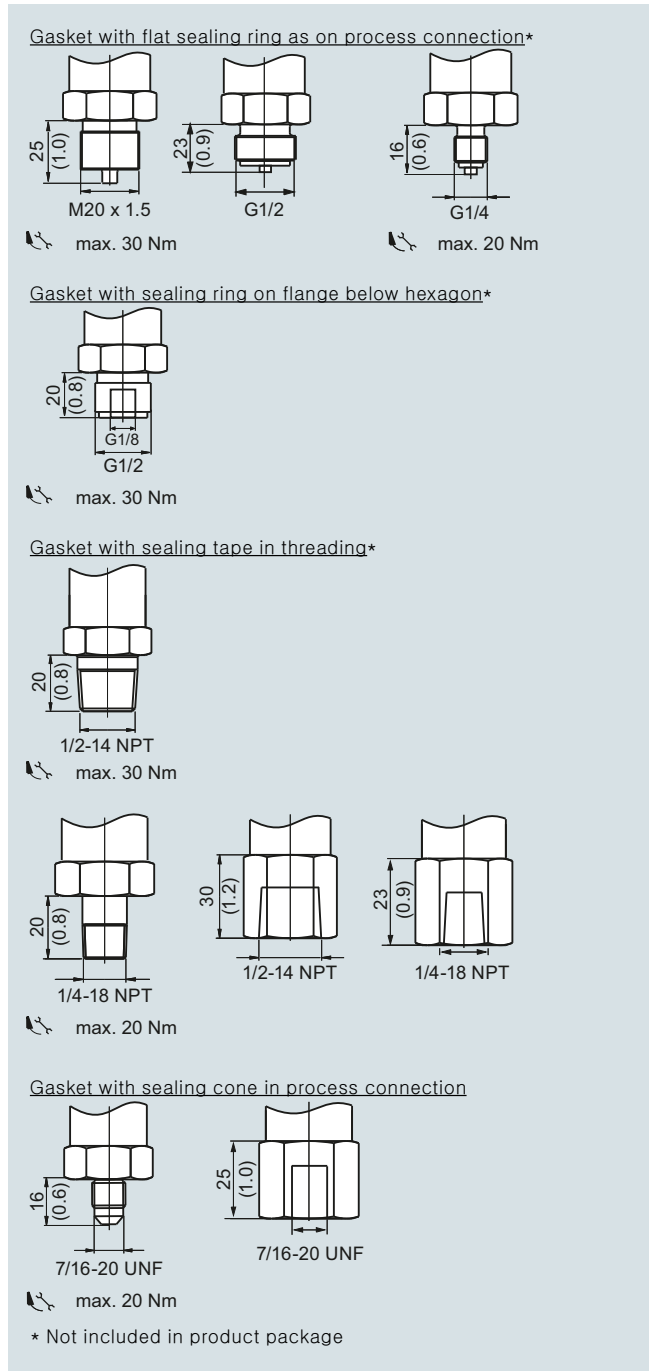
Application	Liquids, gases and vapors
Mode of operation	
Measuring principle	Piezoresistive measuring cell (stainless steel diaphragm)
Measured variable	Gauge pressure
Inputs	
Measuring range	
• Gauge pressure	100 ... 600 mbar (1.5 ... 8.7 psi)
Output	
Current signal	4 ... 20 mA
• Load	($U_B - 10 \text{ V}$)/0.02 A
• Auxiliary power U_B	DC 7 ... 33 V (10 ... 30 V for Ex)
Voltage signal	0 ... 10 V DC
• Load	$\geq 10 \text{ k}\Omega$
• Auxiliary power U_B	12 ... 33 V DC
• Power consumption	< 7 mA at 10 k Ω
Ratiometric output	0 ... 90 %
• Load	$\geq 10 \text{ k}\Omega$
• Auxiliary power U_B	5 V DC $\pm 10 \%$
• Power consumption	< 7 mA at 10 k Ω
Characteristic curve	Linear rising
Measuring accuracy	
Error in measurement at limit setting incl. hysteresis and reproducibility	<ul style="list-style-type: none"> • Typical: 0.25 % of measuring span • Maximum: 0.5 % of measuring span
Step response time T_{99}	< 5 ms
Long-term stability	
• Lower range value and measuring span	0.25 % of measuring span/year
Influence of ambient temperature	
• Lower range value and measuring span	<ul style="list-style-type: none"> • 0.25 %/10 K of measuring span • 0.5 %/10K of measuring span for a measuring range 100 ... 400 mbar
• Influence of power supply	0.005 %/V
Conditions of use	
Process temperature with gasket made of:	
• FPM (Standard)	-15 ... +125 °C (+5 ... +257 °F)
• Neoprene	-35 ... +100 °C (-31 ... +212 °F)
• Perbunan	-20 ... +100 °C (-4 ... +212 °F)
• EPDM	-40 ... +125 °C (-40 ... +257 °F), usable for drinking water
Ambient temperature	-25 ... +85 °C (-13 ... +185 °F)
Storage temperature	-50 ... +100 °C (-58 ... +212 °F)
Degree of protection (to EN 60529)	<ul style="list-style-type: none"> • IP 65 with connector per EN 175301-803-A • IP 67 with M12 device plug • IP 67 with cable • IP 67 with cable quick screw connection
Electromagnetic compatibility	<ul style="list-style-type: none"> • acc. IEC 61326-1/-2/-3 • acc. NAMUR NE21, only for ATEX versions and with a max. measuring deviation $\leq 1 \%$
Mounting position	upright

Design	
Weight	Approx. 0.090 kg (0.198 lb)
Process connections	See dimension drawings
Electrical connections	<ul style="list-style-type: none"> • Connector per EN 175301-803-A Form A with cable inlet M16x1.5 or 1/2-14 NPT or Pg 11 • M12 device plug • 2 or 3-wire (0.5 mm²) cable ($\varnothing \pm 5.4 \text{ mm}$) • Quickon cable quick screw connection
Wetted parts materials	
• Measuring cell	Stainless steel, mat.-No. 1.4435
• Process connection	Stainless steel, mat. No. 1.4404 (SST 316 L)
• Gasket	<ul style="list-style-type: none"> • FPM (Standard) • Neoprene • Perbunan • EPDM
Non-wetted parts materials	
• Enclosure	Stainless steel, mat. No. 1.4404 (SST 316 L)
• Rack	Plastic
• cables	PVC
Certificates and approvals	
Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; meets requirements as per article 4, paragraph 3 (good engineering practice)
Lloyd's Register of Shipping (LR) ¹⁾	12/20010
Germanischer Lloyd (GL) ¹⁾	GL19740 11 HH00
American Bureau of Shipping (ABS) ¹⁾	ABS_11_HG 789392_PDA
Bureau Veritas (BV) ¹⁾	BV 271007A0 BV
Det Norske Veritas (DNV) ¹⁾	A 12553
Drinking water approval (ACS) ¹⁾	ACS 15 ACC NY 360
EAC ¹⁾	№ TC RU C-DE.ГБ05.В.00732 OC НАННО «ЦБВЭ»
Underwriters Laboratories (UL) ¹⁾	
• for USA and Canada	UL 20110217 - E34453
• worldwide	IEC UL DK 21845
Explosion protection	
Intrinsic safety "i" (only with current output)	Ex II 1/2 G Ex ia IIC T4 Ga/Gb Ex II 1/2 D Ex ia IIIC T125 °C Da/Db
EC type-examination certificate	SEV 10 ATEX 0146
Connection to certified intrinsically-safe resistive circuits with maximum values:	$U_i \leq 30 \text{ V DC}$; $I_i \leq 100 \text{ mA}$; $P_i \leq 0.75 \text{ W}$
Effective internal inductance and capacity for versions with plugs per EN 175301-803-A and M12	$L_i = 0 \text{ nH}$; $C_i = 0 \text{ nF}$

¹⁾ For variants with output signal 0 ... 5 V and ratiometric output available soon.

Dimensional drawings

SITRANS P210, electrical connections, dimensions in mm (inch)



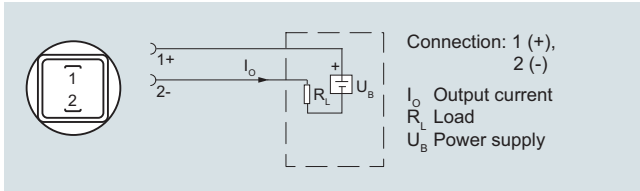
SITRANS P210, process connections, dimensions in mm (inch)

Pressure Measurement

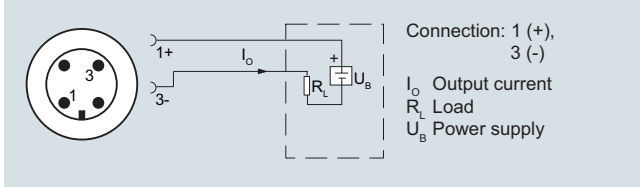
Single-range transmitters for general applications

SITRANS P210 for gauge pressure

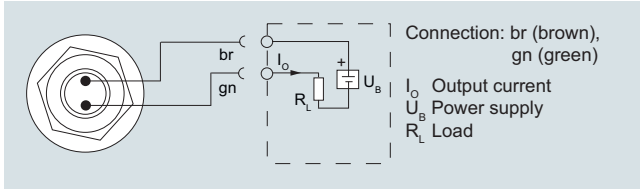
Schematics



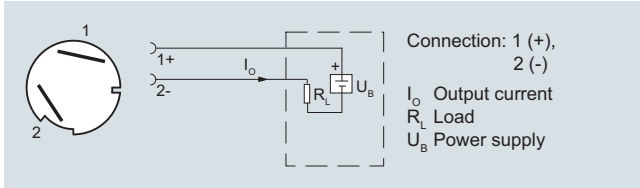
Connection with current output and connector per EN 175301



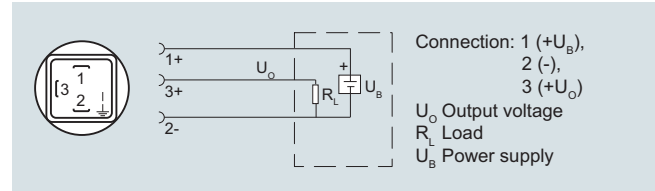
Connection with current output and M12x1 device plug



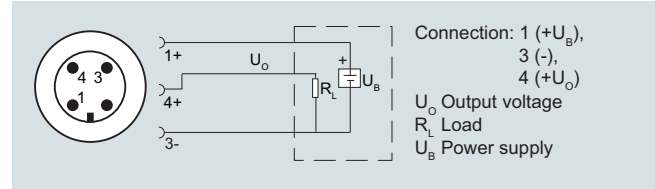
Connection with current output and cable



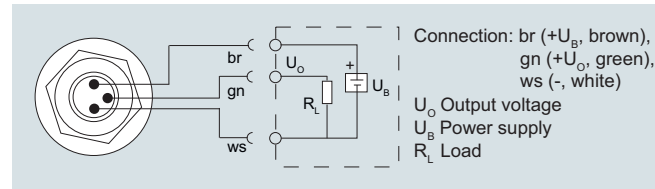
Connection with current output and Quickon cable quick screw connection



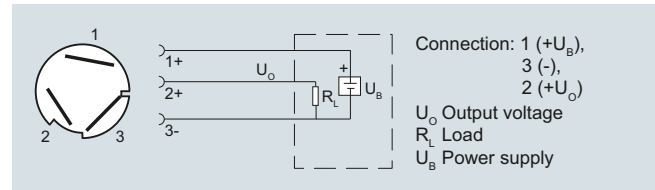
Connection with voltage output, ratiometric output and plug according to EN 175301



Connection with voltage output, ratiometric output and M12x1 device plug



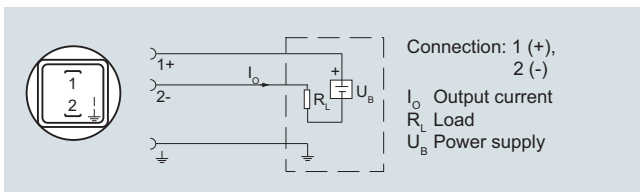
Connection with voltage output, ratiometric output and cable



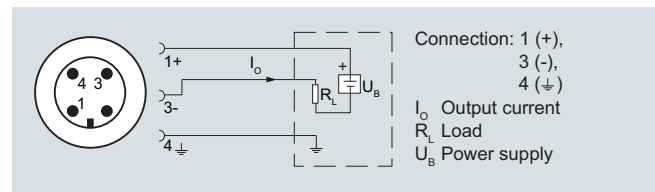
Connection with voltage output, ratiometric output and Quickon fast cable termination

Version with explosion protection: 4 ... 20 mA

The grounding connection is conductively bonded to the transmitter enclosure



Connection with current output and connector per EN 175301 (Ex)



Connection with current output and M12x1 device plug (Ex)

Overview



The pressure transmitter SITRANS P220 measures the gauge pressure of liquids, gases and vapors.

- Stainless steel measuring cell, fully welded
- Measuring ranges 2.5 to 1000 bar (36.3 to 14500 psi) relative
- For high-pressure applications and refrigeration technology division

Benefits

- High measuring accuracy
- Rugged stainless steel enclosure
- High overload withstand capability
- For aggressive and non-aggressive media
- For measuring the pressure of liquids, gases and vapors
- Compact design
- Gasket-less

Application

The pressure transmitter SITRANS P220 for gauge pressure is used in the following industrial areas:

- Mechanical engineering
- Shipbuilding
- Power engineering
- Chemical industry
- Water supply

Design

Device structure without explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm installed in a stainless steel enclosure. It can be used with a connector per EN 175301-803-A (IP65), a M12 device plug (IP67), a cable (IP67) or a Quickon cable quick screw connection (IP67) connected electrically. The output signal is between 4 and 20 mA or 0 and 10 V.

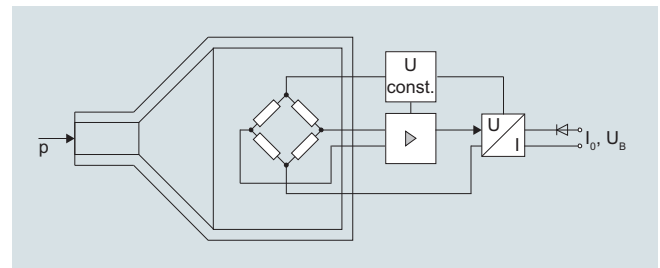
Device structure with explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm installed in a stainless steel enclosure. It can be used with a connector per EN 175301-803-A (IP65) or a M12 device plug (IP67) connected electrically. The output signal is between 4 and 20 mA.

Function

The pressure transmitter measures the gauge pressure of liquids and gases as well as the level of liquids.

Mode of operation



SITRANS P220 pressure transmitters (7MF1567-...), functional diagram

The stainless steel measuring cell has a thick-film resistance bridge to which the operating pressure p is transmitted through a stainless steel diaphragm.

The voltage output from the measuring cell is converted by an amplifier into an output current of 4 to 20 mA or an output voltage of 0 to 10 V DC.

The output current and voltage are linearly proportional to the input pressure.

Pressure Measurement

Single-range transmitters for general applications

SITRANS P220 for gauge pressure

1

Technical specifications

Application		Design	
Gauge pressure measurement	Liquids, gases and vapors	Weight	Approx. 0.090 kg (0.198 lb)
Mode of operation		Process connections	See dimension drawings
Measuring principle	Piezoresistive measuring cell (stainless steel diaphragm)	Electrical connections	<ul style="list-style-type: none"> Connector per EN 175301-803-A Form A with cable inlet M16x1.5 or 1/2-14 NPT or Pg 11 M12 device plug 2 or 3-wire (0.5 mm²) cable (Ø ± 5.4 mm) Quickon cable quick screw connection
Measured variable	Gauge pressure	Wetted parts materials	
Inputs		<ul style="list-style-type: none"> Measuring cell Process connection 	Stainless steel, mat.-No. 1.4016 Stainless steel, mat. No. 1.4404 (SST 316 L)
Measuring range		Non-wetted parts materials	
<ul style="list-style-type: none"> Gauge pressure - Metric - US measuring range 	2.5 ... 1000 bar (36 ... 14500 psi) 30... 14500 psi	<ul style="list-style-type: none"> Enclosure 	Stainless steel, mat. No. 1.4404 (SST 316 L) Plastic PVC
Output		Certificates and approvals	
Current signal	4 ... 20 mA	Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)
<ul style="list-style-type: none"> Load Auxiliary power U_B 	(U _B - 10 V)/0.02 A DC 7 ... 33 V (10 ... 30 V for Ex)	Lloyd's Register of Shipping (LR) ¹⁾	12/20010
Voltage signal	0 ... 10 V DC	Germanischer Lloyd (GL) ¹⁾	GL19740 11 HH00
<ul style="list-style-type: none"> Load Auxiliary power U_B Power consumption 	≥ 10 kΩ 12 ... 33 V DC < 7 mA at 10 kΩ	American Bureau of Shipping (ABS) ¹⁾	ABS_11_HG 789392_PDA
Ratiometric output	0 ... 90 %	Bureau Veritas (BV) ¹⁾	BV 271007A0 BV
<ul style="list-style-type: none"> Load Auxiliary power U_B Power consumption 	≥ 10 kΩ 5 V DC ± 10 % < 7 mA at 10 kΩ	Det Norske Veritas (DNV) ¹⁾	A 12553
Characteristic curve	Linear rising	Drinking water approval (ACS) ¹⁾	ACS 15 ACC NY 360
Measuring accuracy		EAC ¹⁾	№ TC RU C-DE.ГБ05.В.00732 ОС НАННО «ЦСВЭ»
Error in measurement at limit setting incl. hysteresis and reproducibility	<ul style="list-style-type: none"> Typical: 0.25 % of measuring span Maximum: 0.5 % of measuring span 	CRN ²⁾	0F18659.5C
Step response time T ₉₉	< 5 ms	Underwriters Laboratories (UL) ¹⁾	UL 20110217 - E34453
Long-term stability		<ul style="list-style-type: none"> for USA and Canada worldwide 	IEC UL DK 21845
<ul style="list-style-type: none"> Lower range value and measuring span 	0.25 % of measuring span/year	Explosion protection	
Influence of ambient temperature		Intrinsic safety "i" (only with current output)	Ex II 1/2 G Ex ia IIC T4 Ga/Gb Ex II 1/2 D Ex ia IIIC T125 °C Da/Db
<ul style="list-style-type: none"> Lower range value and measuring span Influence of power supply 	0.25 %/10 K of measuring span 0.005 %/V	EC type-examination certificate	SEV 10 ATEX 0146
Conditions of use		Connection to certified intrinsically-safe resistive circuits with maximum values:	U _i ≤ 30 V DC; I _i ≤ 100 mA; P _i ≤ 0.75 W
<ul style="list-style-type: none"> Process temperature Ambient temperature Storage temperature Degree of protection (to EN 60529) 	-40 ... +120 °C (-40 ... +248 °F) -25 ... +85 °C (-13 ... +185 °F) -50 ... +100 °C (-58 ... +212 °F)	Effective internal inductance and capacity for versions with plugs per EN 175301-803-A and M12	L _i = 0 nH; C _i = 0 nF
		CSA ²⁾	70006348
			Class I, Division I, Groups A, B, C and D; Class II, Division 1, Groups E, F and G, Class III
			Class I, Division 2, Groups A, B, C and D; Class II, Division 2, Groups F and G, Class III
			A/Ex ia IIC T4 Ga/Gb A/Ex ia IIIC T125°C Da/Db
Electromagnetic compatibility	<ul style="list-style-type: none"> acc. IEC 61326-1/-2/-3 acc. NAMUR NE21, only for ATEX versions and with a max. measuring deviation ≤ 1 % 		

¹⁾ For variants with output signal 0 ... 5 V and ratiometric output available soon.

²⁾ See ordering data for available versions.

Pressure Measurement

Single-range transmitters for general applications

SITRANS P220 for gauge pressure

1

Selection and ordering data

SITRANS P 220 pressure transmitters for gauge pressure, high-pressure and refrigeration applications, fully-welded version

Accuracy typ. 0.25 %

Wetted parts materials: stainless steel

Non-wetted parts materials: stainless steel

[Click on the Article No. for the online configuration in the PIA Life Cycle Portal.](#)

Article No.

Order code

Measuring range

Overload limit

Mini-
mum

Max.

Burst pressure

For gauge pressure

0 ... 2.5 bar	(0 ... 36.3 psi)	-1 bar (-14.5 psi)	6.25 bar (90.7 psi)	25 bar (363 psi)	
0 ... 4 bar	(0 ... 58 psi)	-1 bar (-14.5 psi)	10 bar (145 psi)	40 bar (870 psi)	
0 ... 6 bar	(0 ... 87 psi)	-1 bar (-14.5 psi)	15 bar (217 psi)	60 bar (522 psi)	
0 ... 10 bar	(0 ... 145 psi)	-1 bar (-14.5 psi)	25 bar (362 psi)	60 bar (870 psi)	
0 ... 16 bar	(0 ... 232 psi)	-1 bar (-14.5 psi)	40 bar (580 psi)	96 bar (1392 psi)	
0 ... 25 bar	(0 ... 363 psi)	-1 bar (-14.5 psi)	62.5 bar (906 psi)	150 bar (2176 psi)	
0 ... 40 bar	(0 ... 580 psi)	-1 bar (-14.5 psi)	100 bar (1450 psi)	240 bar (3481 psi)	
0 ... 60 bar	(0 ... 870 psi)	-1 bar (-14.5 psi)	150 bar (2175 psi)	360 bar (5221 psi)	
0 ... 100 bar	(0 ... 1450 psi)	-1 bar (-14.5 psi)	250 bar (3625 psi)	600 bar (8702 psi)	
0 ... 160 bar	(0 ... 2320 psi)	-1 bar (-14.5 psi)	400 bar (5801 psi)	960 bar (13924 psi)	
0 ... 250 bar	(0 ... 3625 psi)	-1 bar (-14.5 psi)	625 bar (9064 psi)	1500 bar (21756 psi)	
0 ... 400 bar	(0 ... 5801 psi)	-1 bar (-14.5 psi)	1000 bar (14503 psi)	2400 bar (34809 psi)	
0 ... 600 bar	(0 ... 8702 psi)	-1 bar (-14.5 psi)	1500 bar (21755 psi)	3600 bar (52200 psi)	
0 ... 1000 bar	(0 ... 14500 psi)	-1 bar (-14.5 psi)	1500 bar (21755 psi)	5000 bar (72520 psi)	

Other version, add Order code and plain text:

Measuring range: ... up to ... bar (psi)

Measuring ranges for gauge pressure

0 ... 30 psi	-14.5 psi	75 psi	360 psi	*
0 ... 60 psi	-14.5 psi	150 psi	580 psi	*
0 ... 100 psi	-14.5 psi	250 psi	580 psi	*
0 ... 150 psi	-14.5 psi	375 psi	870 psi	*
0 ... 200 psi	-14.5 psi	500 psi	1390 psi	*
0 ... 300 psi	-14.5 psi	750 psi	2170 psi	*
0 ... 500 psi	-14.5 psi	1250 psi	3480 psi	*
0 ... 750 psi	-14.5 psi	1875 psi	5220 psi	*
0 ... 1000 psi	-14.5 psi	2500 psi	5220 psi	*
0 ... 1500 psi	-14.5 psi	3750 psi	8700 psi	*
0 ... 2000 psi	-14.5 psi	5000 psi	13920 psi	*
0 ... 3000 psi	-14.5 psi	7500 psi	21750 psi	*
0 ... 5000 psi	-14.5 psi	12500 psi	34800 psi	*
0 ... 6000 psi	-14.5 psi	15000 psi	34800 psi	*
0 ... 8700 psi	-14.5 psi	21755 psi	52200 psi	*
0 ... 14500 psi	-14.5 psi	21755 psi	72520 psi	*

Other version, add Order code and plain text: Measuring range: ... up to ... psi

Output signal

4 ... 20 mA; two-wire system; power supply 7 ... 33 V DC (10 ... 30 V DC for ATEX versions)

0 ... 10 V; three-wire system; power supply 12 ... 33 V DC

0 ... 5 V; 3-wire system; auxiliary power 7 ... 33 V DC

Ratiometric 10 ... 90 %; 3-wire system; auxiliary power 5 V DC ± 10 %

Explosion protection (only 4 ... 20 mA)

None

With explosion protection Ex ia IIC T4

Electrical connection

Connector per DIN EN 175301-803-A, stuffing box thread M16 (with coupling) *

M12 device plug per IEC 61076-2-101

Connection via fixed mounted cable, 2 m (not for type of protection "Intrinsic safety i")

Quickon cable quick screw connection PG9 (not for type of protection "Intrinsic safety i")

Connector per DIN EN 175301-803-A, stuffing box thread 1/2"-14 NPT (with coupling) *

Connector per DIN EN 175301-803-A, stuffing box thread PG11 (with coupling) *

Fixed mounted cable, length 5 m

Special version

* Order code E21 required for complete configuration with CRN and cCSA_{US} Ex approval.

Pressure Measurement

Single-range transmitters for general applications

SITRANS P220 for gauge pressure

1

Selection and ordering data

SITRANS P 220 pressure transmitters for gauge pressure, high-pressure and refrigeration applications, fully-welded version

Accuracy typ. 0.25 %

Wetted parts materials: stainless steel

Non-wetted parts materials: stainless steel

Process connection

G½" male per EN 837-1 (½" BSP male) (standard for metric pressure ranges mbar, bar)

G½" male thread and G1/8" female thread

G¼" male per EN 837-1 (¼" BSP male)

7/16"-20 UNF male

¼"-18 NPT male (standard for pressure ranges in H₂O and psi) *

¼"-18 NPT female (Only for measuring ranges ≤ 60 bar (870 psi))

½"-14 NPT male

½"-14 NPT female (Only for measuring ranges ≤ 60 bar (870 psi))

7/16"-20 UNF female

M20x1.5 male

G1/4" to DIN 3852 Form E

G1/2" to DIN 3852 Form E

Special version

Version

Standard version *

Further designs

Supplement the Article No. with "-Z" and add Order code.

Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2 (not possible for measuring ranges > 0 ... 600 bar/0 ... 8 702 psi)

Oxygen version, free of oil and degreased (not in conjunction with explosion protection version)

With CRN and cCSA_{US} Ex approval (only for measuring ranges 0 ... 30 psi bis 0 ... 8 700 psi)* Order code E21 required for complete configuration with CRN and cCSA_{US} Ex approval..

Article No.

Order code

7MF1567-

A

A

B

C

D

E

F

G

H

J

P

Q

R

Z

1

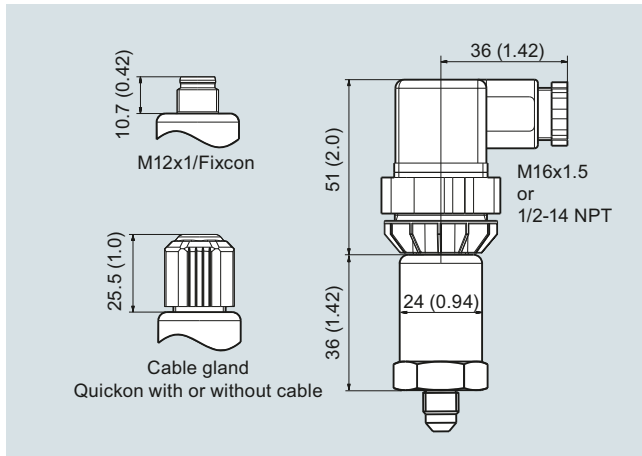
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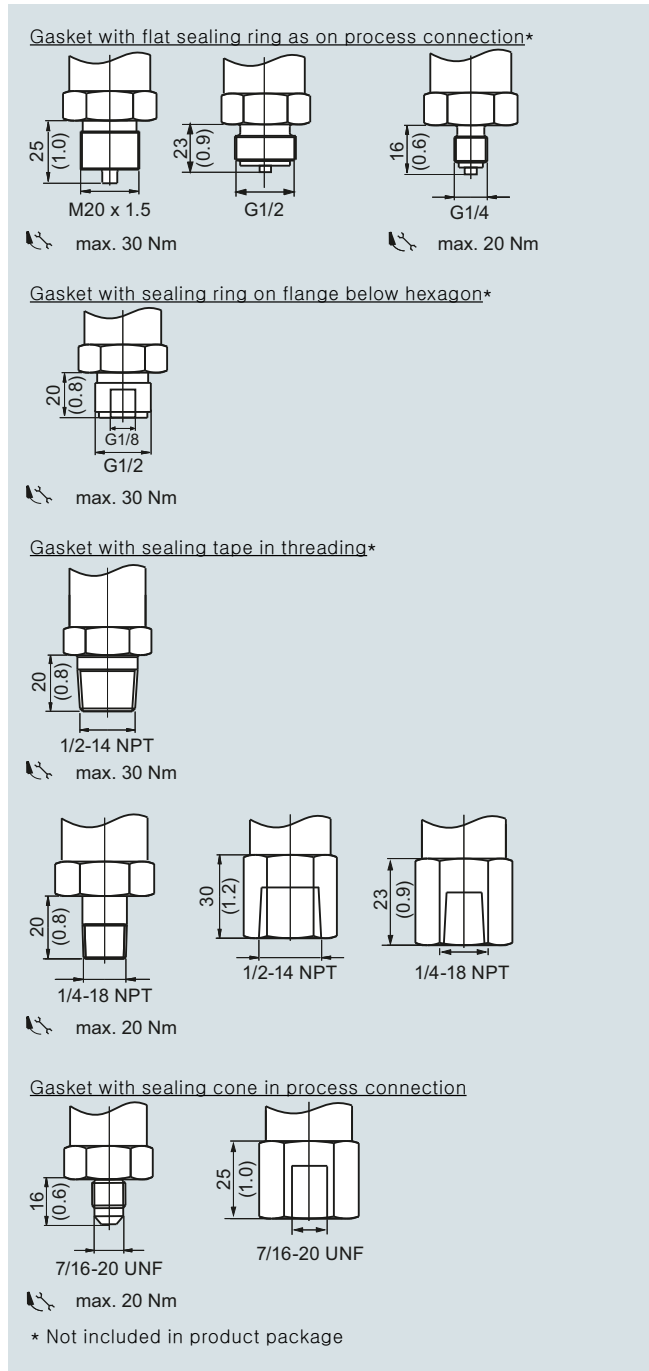
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E10

E21

Dimensional drawings

SITRANS P220, electrical connections, dimensions in mm (inch)



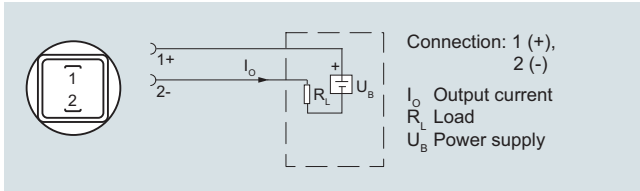
SITRANS P220, process connections, dimensions in mm (inch)

Pressure Measurement

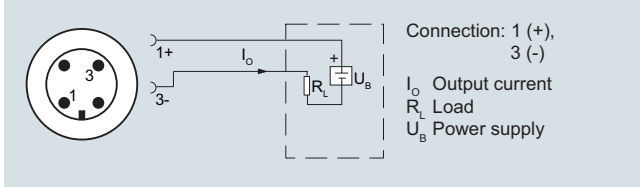
Single-range transmitters for general applications

SITRANS P220 for gauge pressure

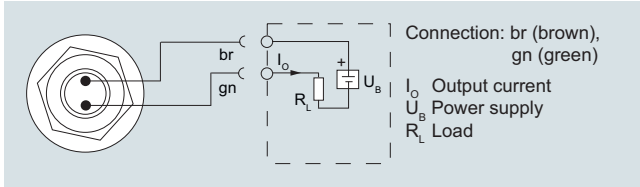
Schematics



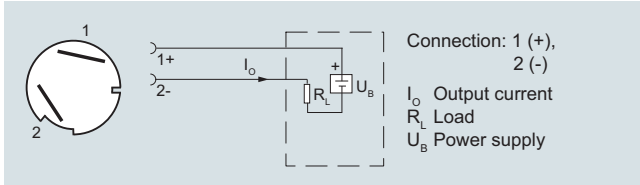
Connection with current output and connector per EN 175301



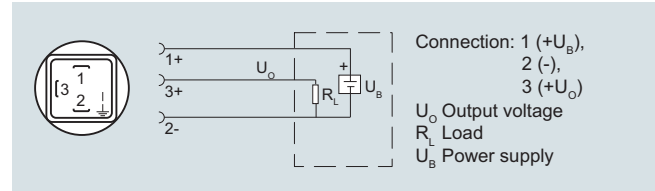
Connection with current output and M12x1 device plug



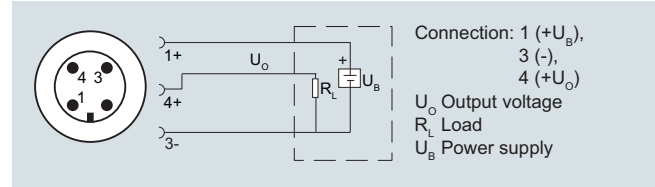
Connection with current output and cable



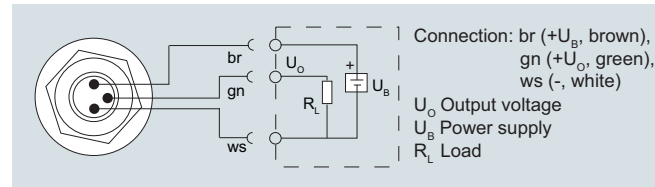
Connection with current output and cable quick screw connection Quick-on



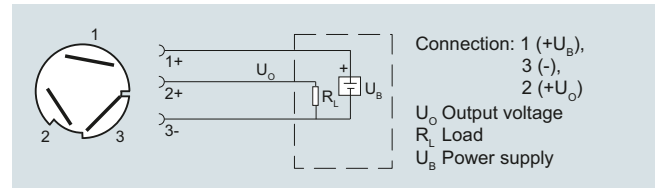
Connection with voltage output, ratiometric output and plug according to EN 175301



Connection with voltage output, ratiometric output and M12x1 device plug



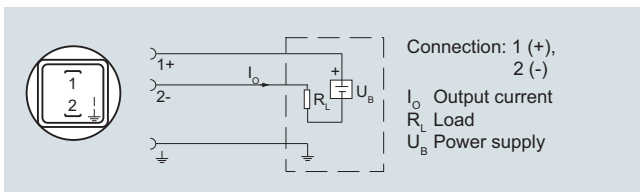
Connection with voltage output, ratiometric output and cable



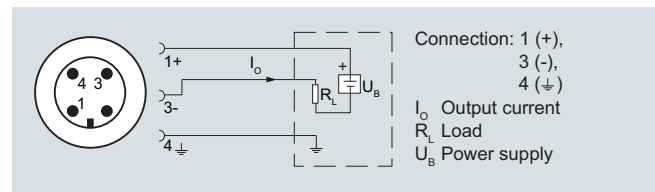
Connection with voltage output, ratiometric output and Quickon fast cable termination

Version with explosion protection: 4 ... 20 mA

The grounding connection is conductively bonded to the transmitter enclosure



Connection with current output and connector per EN 175301 (Ex)



Connection with current output and M12x1 device plug (Ex)

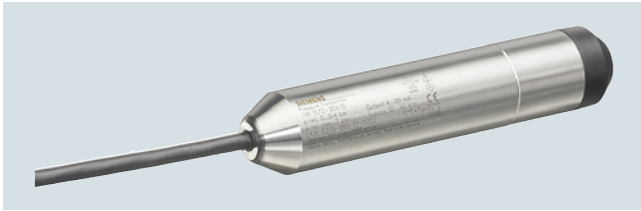
Pressure Measurement

Single-range transmitters for general applications

SITRANS LH100 Transmitter for hydrostatic level

1

Overview



The pressure transmitter SITRANS LH100 is a submersible sensor for hydrostatic level measurement.

The pressure transmitter measures the liquid levels in tanks, containers, channels and dams. The SITRANS LH100 pressure transmitters are available for various measuring ranges and with explosion protection as an option.

A junction box and a cable hanger are available as accessories for simple installation.

Benefits

- Compact design
- Simple installation
- Small error in measurement (0.3 %)
- Degree of protection IP68

Application

SITRANS LH100 pressure transmitters are used in the following branches, for example:

- Shipbuilding
- Water/waste water supply
- For use in unpressurized/open vessels and wells

Design

The pressure transmitter has a built-in ceramic sensor which is equipped with a Wheatstone resistance bridge.

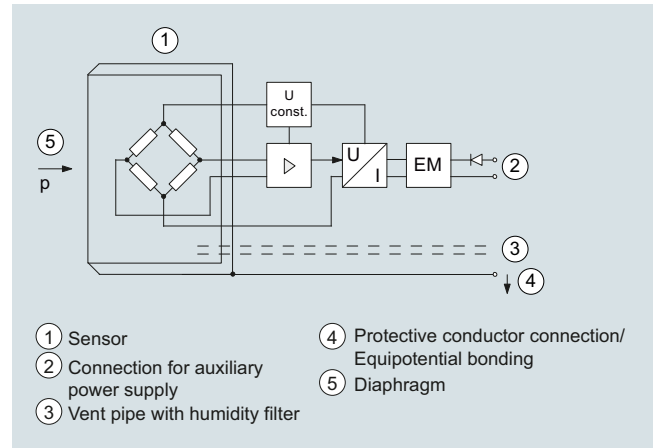
These pressure transmitters are equipped with an electronic circuit fitted together with the sensor in a stainless steel housing. In addition, the connecting cable contains a vent pipe which is equipped with a humidity filter to prevent the build-up of condensation.

The diaphragm is protected against external influences by a protective cap.

The sensor, the electronics and the connecting cable are housed in an enclosure with small dimensions.

The pressure transmitter is temperature-compensated for a wide temperature range.

Function



SITRANS LH100 pressure transmitter, mode of operation and connection diagram

On one side of the sensor (1), the diaphragm (5) is exposed to the hydrostatic pressure which is proportional to the submersion depth. This pressure is compared with atmospheric pressure. Pressure compensation is carried out using the vent pipe (3) in the connecting cable. The vent pipe is equipped with a humidity filter which prevents the build-up of condensation in the vent pipe.

The hydrostatic pressure of the liquid column acts on the diaphragm of the sensor and transmits the pressure to the Wheatstone resistance bridge in the sensor.

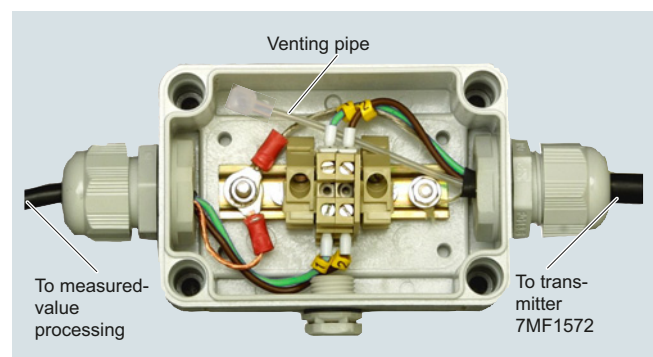
The output voltage of the sensor is applied to the electronic circuit where it is converted into an output current of 4 to 20 mA.

The protective conductor connection/equipotential bonding (4) is connected to the enclosure.

Integration

It is generally recommended that the connecting cable of the SITRANS LH100 transmitter is connected to the junction box, which can be ordered separately, and secured with the cable hanger, also available separately. The junction box has to be installed near the measuring point.

If the medium is anything other than water, it is also necessary to check compatibility with the specified materials of the transmitter.



Junction box 7MF1572-8AA, open, schematic diagram

Pressure Measurement

Single-range transmitters for general applications

SITRANS LH100 Transmitter for hydrostatic level



Measuring point setup, generally with junction box 7MF1572-8AA and 7MF1572-8AB cable hanger

Technical specifications

Pressure transmitter SITRANS LH100 (submersible sensor)

Mode of operation

Measuring principle piezo-resistive

Input

Measured variable Hydrostatic level

Measuring range Max. permissible operating pressure

- | | |
|--|---|
| • 0 ... 3 mH ₂ O (0 ... 9 ftH ₂ O) | • 1.5 bar (21.8 psi) (corresponds to 15 mH ₂ O (45 ftH ₂ O)) |
| • 0 ... 4 mH ₂ O (0 ... 12 ftH ₂ O) | • 1.5 bar (21.8 psi) (corresponds to 15 mH ₂ O (45 ftH ₂ O)) |
| • 0 ... 5 mH ₂ O (0 ... 15 ftH ₂ O) | • 1.5 bar (21.8 psi) (corresponds to 15 mH ₂ O (45 ftH ₂ O)) |
| • 0 ... 6 mH ₂ O (0 ... 18 ftH ₂ O) | • 1.5 bar (21.8 psi) (corresponds to 15 mH ₂ O (45 ftH ₂ O)) |
| • 0 ... 10 mH ₂ O (0 ... 30 ftH ₂ O) | • 3.0 bar (43.5 psi) (corresponds to 30 mH ₂ O (90 ftH ₂ O)) |
| • 0 ... 20 mH ₂ O (0 ... 60 ftH ₂ O) | • 5.0 bar (72.5 psi) (corresponds to 50 mH ₂ O (150 ftH ₂ O)) |
| • 0 ... 0.3 bar | • 1.5 bar |
| • 0 ... 0.4 bar | • 1.5 bar |
| • 0 ... 0.5 bar | • 1.5 bar |
| • 0 ... 0.6 bar | • 1.5 bar |
| • 0 ... 1 bar | • 3.0 bar |
| • 0 ... 2 bar | • 5.0 bar |

Output

Output signal 4 ... 20 mA

Measuring accuracy

According to IEC 60770-1

Error in measurement at limit setting including hysteresis and reproducibility 0.3% of full-scale value (typical)

Measuring range

- | | |
|---|---|
| • 0 ... 3 mH ₂ O (0 ... 9 ftH ₂ O bzw. 0 ... 0.3 bar) | 0.5 % of full-scale value (typical)
1.0% of full-scale value (maximum) |
| • For all other measuring ranges | 0.3 % of full-scale value (typical)
0.6% of full-scale value (maximum) |

Influence of ambient temperature

Measuring range

- | | |
|---|---|
| • 3 mH ₂ O (9 ftH ₂ O or 0.3 bar) | Zero and span
0.5 %/10 K of full-scale value |
| • 4 ... 6 mH ₂ O (12 ... 18 ftH ₂ O or 0.4...0.6 bar) | 0.45 %/10 K of full-scale value |
| • > 6 mH ₂ O (> 18 ftH ₂ O or > 0.6 bar) | 0.3 %/10 K of full-scale value |

Long-term stability

Measuring range

- | | |
|---|---|
| • 3 mH ₂ O (9 ftH ₂ O or 0.3 bar) | Zero and span
0.4 % of full-scale value/year |
| • 4 ... 6 mH ₂ O (12 ... 18 ftH ₂ O or 0.4...0.6 bar) | 0.25% of full-scale value/year |
| • > 6 mH ₂ O (> 18 ftH ₂ O or > 0.6 bar) | 0.2 % of full-scale value/year |

Rated conditions

Ambient conditions

- | | |
|-----------------------|----------------------------------|
| • Process temperature | -10 ... +80 °C (14 ... 176 °F) |
| • Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |

Degree of protection according to IEC 60529

IP68

Pressure Measurement

Single-range transmitters for general applications

SITRANS LH100 Transmitter for hydrostatic level

1

Design

Weight	≈ 0.2 kg (≈ 0.44 lb)
• Pressure transmitter	0.025 kg/m (≈ 0.015 lb/ft)
• Cable; maximum cable length 100 m (330 ft)	
Electrical connection	Cable with 3 conductors, vent pipe and integrated humidity filter
Material	
• Seal diaphragm	Al ₂ O ₃ ceramic, 96%
• Enclosure	Stainless steel, mat. no. 1.4404/316L
• Gasket	FPM (standard)
	EPDM (optional)
• Connecting cable	PE-HD (standard)
	PE-LD (in the case of versions with EPDM seal, suitable for drinking water)

Auxiliary power

Terminal voltage on pressure transmitter U_B	10 ... 33 V DC
	10 ... 30 V DC for transmitter with intrinsic safety explosion protection

Certificates and approvals

Drinking water approval (ACS)	Applied for
Drinking water approval (WRAS)	1403525
EAC	№ TC RU C-DE.ГБ05.B.00732 OC НАИИО «ЦСВЭ»
Underwriters Laboratories (UL)	2014-11-17 - E344532
The transmitter is not subject to the pressure equipment directive (PED 2014/68/EU)	
Explosion protection	
• Intrinsic safety "i"	IECEX SEV 14.0003 SEV 14 ATEX 0109
- Marking	II 1 G Ex ia IIC T4 Ga

Junction box

Application	for connecting the transmitter cable
Design	
Weight	0.2 kg (0.44 lb)
Electrical connection	2 x 3-way (28 to 18 AWG)
Cable entry	2 x Pg 9
Enclosure material	polycarbonate
Vent pipe for atmospheric pressure	
Rated conditions	
Degree of protection according to IEC 60529	IP65

Cable hanger

Application	for mounting the transmitter
Design	
Weight	0.16 kg (0.35 lb)
Material	Galvanized steel, polyamide

Pressure Measurement

Single-range transmitters for general applications

SITRANS LH100 Transmitter for hydrostatic level

1

Selection and ordering data

Article No.

Order code

Pressure transmitter SITRANS LH100 (submersible sensor)

7MF1572 -

A

For measurement of the hydrostatic level through submersion, two-wire system, 4...20 mA, enclosure material mat. no. 1.4404 (316L), measuring cell Al_2O_3 ceramic, with permanently mounted PE cable

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Measuring range Cable length

0 ... 3 mH ₂ O ¹⁾	10 m
0 ... 4 mH ₂ O	10 m
0 ... 5 mH ₂ O	10 m
0 ... 6 mH ₂ O	10 m
0 ... 10 mH ₂ O	20 m
0 ... 20 mH ₂ O	30 m
0 ... 9 ftH ₂ O ¹⁾	33 ft
0 ... 12 ftH ₂ O	33 ft
0 ... 15 ftH ₂ O	33 ft
0 ... 18 ftH ₂ O	33 ft
0 ... 30 ftH ₂ O	66 ft
0 ... 60 ftH ₂ O	98 ft
0 ... 0.3 bar ¹⁾	10 m
0 ... 0.4 bar	10 m
0 ... 0.5 bar	10 m
0 ... 0.6 bar	10 m
0 ... 1 bar	20 m
0 ... 2 bar	30 m

1 C
1 D
1 E
1 F
1 H
1 K
2 C
2 D
2 E
2 F
2 H
2 K
3 C
3 D
3 E
3 F
3 H
3 K

Special versions:

Measuring ranges for special versions between

0 ... 3 mH₂O and 0 ... 30 mH₂O or

0 ... 9 ftH₂O and 0 ... 100 ftH₂O or

0 ... 0.3 bar and 0 ... 3 bar possible.

Special cable length/Special measuring range

Please add „-Z“ to Article No. and specify Order code and plain text.

Note: Indication of measuring range Y01 is always necessary.

For evaluation of the maximum possible cable length following data have to be regarded:

Transmitter:

$C_i = 0 \mu\text{F}$, $L_i = 0 \mu\text{H}$

Cable:

$C_k = 0.19 \text{ nF}$ per meter cable

$L_k = 1.5 \mu\text{H}$ per meter cable

The maximum permitted data of the transmitter's power supply have to be considered!

3 m (10 ft)

5 m (16 ft)

7 m (23 ft)

10 m (33 ft)

15 m (49 ft)

20 m (66 ft)

25 m (82 ft)

30 m (98 ft)

40 m (131 ft)

50 m (164 ft)

60 m (198 ft)¹⁾

70 m (231 ft)¹⁾

80 m (264 ft)¹⁾

90 m (297 ft)¹⁾

100 m (330 ft)¹⁾

H 1 A
H 1 B
H 1 C
H 1 D
H 1 E
H 1 F
H 1 G
H 1 H
H 1 J
H 1 K
H 1 L
H 1 M
H 1 N
H 1 P
H 1 Q

9 A

H . .
+
Y 0 1

Selection and ordering data

Article No.

Order code

Pressure transmitter SITRANS LH100 (submersible sensor)

7MF1572 -

A

For measurement of the hydrostatic level through submersion, two-wire system, 4...20 mA, enclosure material mat. no. 1.4404 (316L), measuring cell Al_2O_3 ceramic, with permanently mounted PE cable

Sealing material between sensor and enclosure

- FPM (Standard)
- EPDM (for drinking water applications)

1
2

Explosion protection

- without
- With ATEX II 1 G Ex ia IIC T4 Ga and IECEx Ex ia IIC T4 Ga

0
1

Additional versions

Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2, add "-Z" to article no. and add order code.

Indication of measuring range (only at special cable lengths) in "..." to ... mH₂O" or "..." to ... ftH₂O" or "..." to ... bar"

Order code

C11

Y01

Accessories/spare parts

Junction box

for connecting the transmitter cable

Article No.

7MF1572-8AA

Cable hanger

for securing the pressure transmitter

7MF1572-8AB

Protective caps as spare parts (10-pack)

7MF1572-8AD

Humidity filters as spare parts (10-pack)

7MF1572-8AE

¹⁾ Approvals pending.

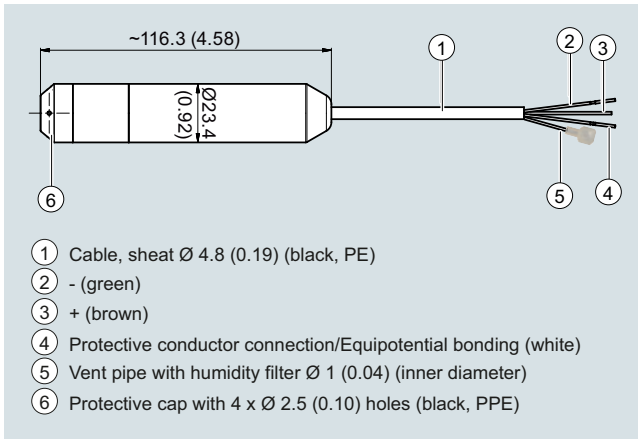
Pressure Measurement

Single-range transmitters for general applications

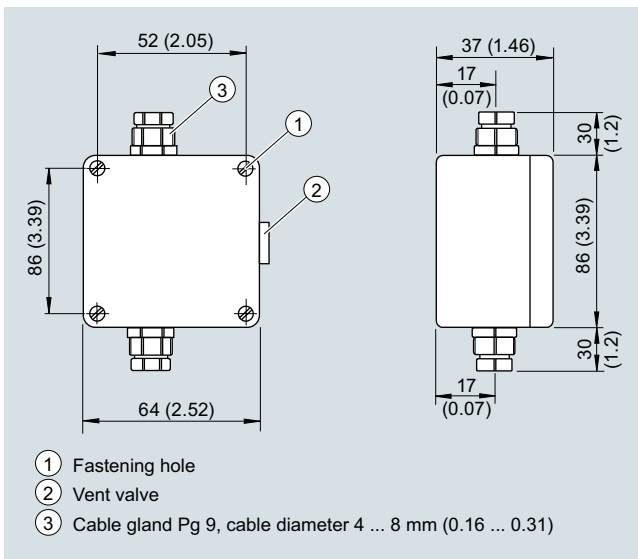
SITRANS LH100 Transmitter for hydrostatic level

1

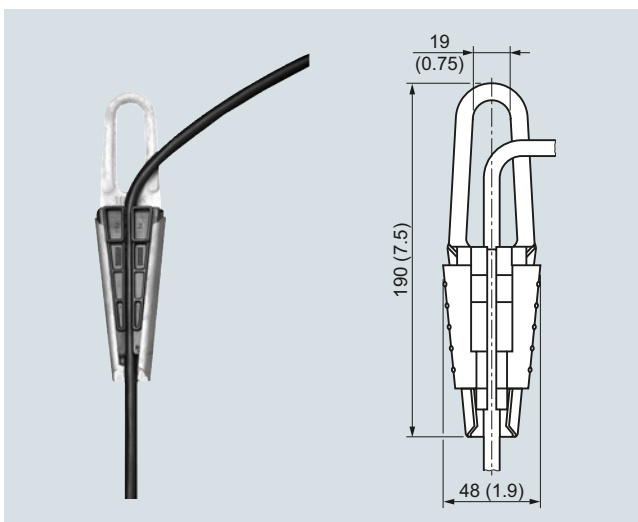
Dimensional drawings



SITRANS LH100 pressure transmitter, dimensions in mm (inch)



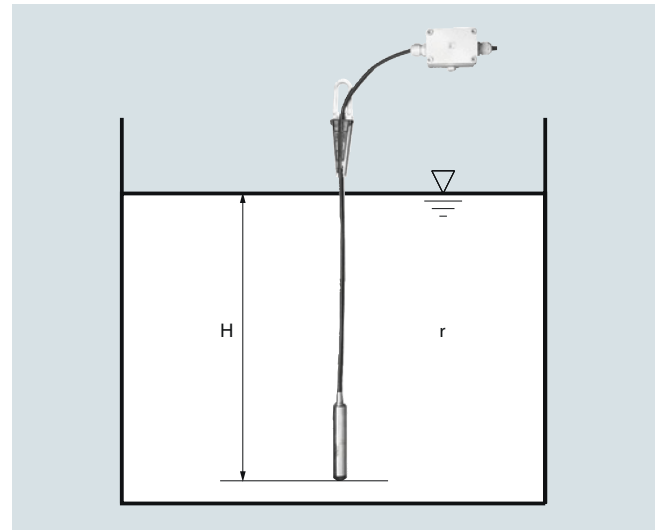
Junction box, dimensions in mm (inch)



Cable hanger, dimensions in mm (inch)

More information

Establishing the measuring range for water as process medium



Calculation of the measuring range:

$$p = \rho \times g \times H$$

with:

ρ = density of medium

g = local acceleration due to gravity

H = maximum level

Example:

Medium: Water, $\rho = 1\,000\text{ kg/m}^3$

Acceleration due to gravity: 9.81 m/s^2

Start-of-scale: 0 m

Maximum level: 6.0 m

Cable length: 10 m

Calculation:

$$p = 1\,000\text{ kg/m}^3 \times 9.81\text{ m/s}^2 \times 6.0\text{ m}$$

$$p = 58\,860\text{ N/m}^2$$

$$p = 589\text{ mbar}$$

Transmitter to be ordered:

7MF1572-1FA10

Plus, if required, junction box 7MF1572-8AA and cable hanger 7MF1572-8AB

Pressure Measurement

Single-range transmitters for general applications

SITRANS LH300 Transmitter for hydrostatic level

1

Overview



The pressure transmitter SITRANS LH300 is a submersible sensor for hydrostatic level measurement with cap made of PPE (left), stainless steel (mid) and ETFE (right).

The pressure transmitter measures the liquid levels in tanks, containers, channels and dams. The SITRANS LH300 pressure transmitters are available for various measuring ranges and with explosion protection as an option.

A junction box and a cable hanger are available as accessories for simple installation.

Benefits

- Compact design
- Simple installation
- Small error in measurement (0.15 % typical)
- Degree of protection IP68

Application

SITRANS LH300 pressure transmitters are used in the following branches, for example:

- Shipbuilding
- Water/waste water supply
- Drinking water facilities
- For use in unpressurized/open vessels and wells
- Desalination plants

Design

The pressure transmitter has a built-in ceramic sensor which is equipped with a Wheatstone resistance bridge.

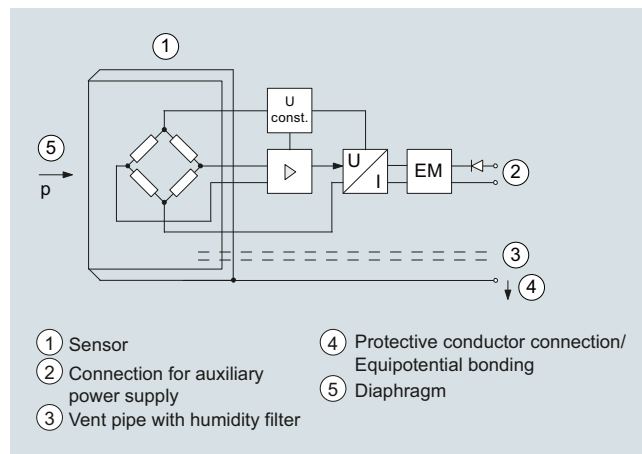
These pressure transmitters are equipped with an electronic circuit fitted together with the sensor in a stainless steel housing. In addition, the connecting cable contains a vent pipe which is equipped with a humidity filter to prevent the build-up of condensation.

The diaphragm is protected against external influences by a protective cap.

The sensor, the electronics and the connecting cable are housed in an enclosure with small dimensions.

The pressure transmitter is temperature-compensated for a wide temperature range.

Function



SITRANS LH300 pressure transmitter, mode of operation and connection diagram

On one side of the sensor (1), the diaphragm (5) is exposed to the hydrostatic pressure which is proportional to the submersion depth. This pressure is compared with atmospheric pressure. Pressure compensation is carried out using the vent pipe (3) in the connecting cable. The vent pipe is equipped with a humidity filter which prevents the build-up of condensation in the vent pipe.

The hydrostatic pressure of the liquid column acts on the diaphragm of the sensor and transmits the pressure to the Wheatstone resistance bridge in the sensor.

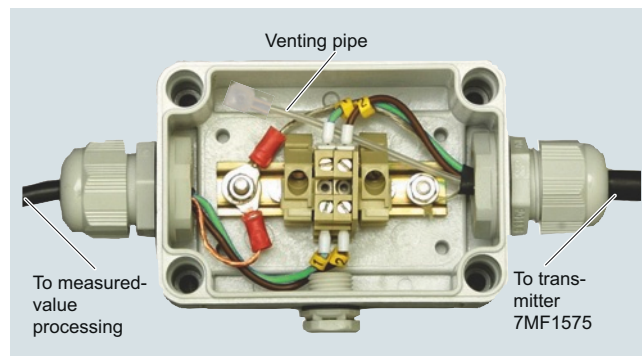
The output voltage of the sensor is applied to the electronic circuit where it is converted into an output current of 4 to 20 mA.

The protective conductor connection/equipotential bonding (4) is connected to the enclosure.

Integration

It is generally recommended that the connecting cable of the SITRANS LH300 transmitter is connected to the junction box, which can be ordered separately, and secured with the cable hanger, also available separately. The junction box has to be installed near the measuring point, but outside the media.

If the medium is anything other than water, it is also necessary to check compatibility with the specified materials of the transmitter, cable and gasket.



Junction box 7MF1575-8AA, open, schematic diagram

Pressure Measurement

Single-range transmitters for general applications

SITRANS LH300 Transmitter for hydrostatic level

1



Measuring point setup, generally with junction box 7MF1575-8AA and 7MF1575-8AB cable hanger

Technical specifications

Pressure transmitter SITRANS LH300 (submersible sensor)

Mode of operation

Measuring principle	Piezo-resistive
---------------------	-----------------

Input

Measured variable	Hydrostatic level
Measuring range	Max. permissible operating pressure
• 0 ... 1 mH ₂ O (0 ... 3 ftH ₂ O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH ₂ O (45 ftH ₂ O))
• 0 ... 2 mH ₂ O (0 ... 6 ftH ₂ O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH ₂ O (45 ftH ₂ O))
• 0 ... 3 mH ₂ O (0 ... 9 ftH ₂ O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH ₂ O (45 ftH ₂ O))
• 0 ... 4 mH ₂ O (0 ... 12 ftH ₂ O)	• 2 bar (29 psi) (corresponds to 20 mH ₂ O (60 ftH ₂ O))
• 0 ... 5 mH ₂ O (0 ... 15 ftH ₂ O)	• 2 bar (29 psi) (corresponds to 20 mH ₂ O (60 ftH ₂ O))
• 0 ... 6 mH ₂ O (0 ... 18 ftH ₂ O)	• 2 bar (29 psi) (corresponds to 20 mH ₂ O (60 ftH ₂ O))
• 0 ... 10 mH ₂ O (0 ... 30 ftH ₂ O)	• 5 bar (72.5 psi) (corresponds to 50 mH ₂ O (150 ftH ₂ O))
• 0 ... 20 mH ₂ O (0 ... 60 ftH ₂ O)	• 10 bar (145 psi) (corresponds to 100 mH ₂ O (300 ftH ₂ O))
• 0 ... 40 mH ₂ O (0 ... 120 ftH ₂ O)	• 20 bar (290 psi) (corresponds to 200 mH ₂ O (600 ftH ₂ O))
Special measuring ranges	
• Up to 100 mH ₂ O (300 ftH ₂ O)	• 20 bar (290 psi) (corresponds to 200 mH ₂ O (600 ftH ₂ O))
• Up to 160 mH ₂ O (480 ftH ₂ O)	• 24 bar (348 psi) (corresponds to 240 mH ₂ O (720 ftH ₂ O))

Measuring range

• 0 ... 0.1 bar	• 1.5 bar
• 0 ... 0.2 bar	• 1.5 bar
• 0 ... 0.3 bar	• 1.5 bar
• 0 ... 0.4 bar	• 2 bar
• 0 ... 0.5 bar	• 2 bar
• 0 ... 0.6 bar	• 2 bar
• 0 ... 1 bar	• 5 bar
• 0 ... 2 bar	• 10 bar
• 0 ... 4 bar	• 20 bar

Special measuring range

• Up to 10 bar	• 20 bar
• Up to 16 bar	• 24 bar

Output

Output signal	4 ... 20 mA
---------------	-------------

Measuring accuracy

Error in measurement at limit setting including hysteresis and reproducibility	≤ 0.15 % of full-scale value (typical) ≤ 0.3 % of full-scale value (maximum)
Influence of ambient temperature	≤ 0.05 %/10 K of full-scale value (zero and span)
Long-term stability	≤ 0.15 % of full-scale value/year (zero and span)

Rated conditions

Ambient conditions	
• Process temperature	-10 ... +80 °C (14 ... 176 °F)
• Storage temperature	-20 ... +80 °C (-4 ... +176 °F)
Degree of protection according to IEC 60529	IP68

Pressure Measurement

Single-range transmitters for general applications

SITRANS LH300 Transmitter for hydrostatic level

1

Design

Weight	≈ 0.4 kg (≈ 0.88 lb)
• Pressure transmitter	0.08 kg/m (≈ 0.059 lb/ft)
• Cable	
Maximal freely suspended length	300 m (990 ft)
Electrical connection	Cable with 2 conductors, vent pipe and integrated humidity filters
Material	
• Seal diaphragm	Al ₂ O ₃ ceramic, 99.6 %
• Enclosure	Stainless steel, mat. no. 1.4404/316L and 1.4539/904L (sea water applications) respectively
	FPM (standard)
• Gasket	EPDM (optional)
	PE (standard/drinking water applications)
• Connecting cable	FEP (for aggressive media)
	Stainless steel, PPE or ETFE
• Cap	

Auxiliary power

Terminal voltage on pressure transmitter U_B	10 ... 33 V DC for transmitter without explosion protection
	10 ... 30 V DC for transmitter with intrinsic safety explosion protection

Certificates and approvals

Drinking water approval (ACS)	17 ACC NY 055
Drinking water approval (WRAS)	Pending
Drinking water approval (DVGW/KTW W270)	Pending
EAC	TC N RU Д-DE.ΓA02.B.05092
Underwriters Laboratories (UL)	ML File No. E344532, issued 2017-08-17
Shipbuilding approval (LR)	Pending
Shipbuilding approval (DNV/GL)	Pending
Shipbuilding approval (BV)	Pending
Shipbuilding approval (ABS)	Pending
Pressure equipment directive	The transmitter is not subject to the pressure equipment directive (PED 2014/68/EU)
Explosion protection	
• ATEX	SEV 16 ATEX 0121
• IEC Ex	IEC Ex SEV 16.0003
• EAC Ex	TC RU C-DE.AA87.B.00324
• Intrinsic safety "i"	
- Marking	II 1 G Ex ia IIC T4 Ga

Junction box

Application	For connecting the transmitter cable
Design	
Weight	0.2 kg (0.44 lb)
Electrical connection	2 x 3-way (28 to 18 AWG)
Cable entry	2 x PG 13.5
Enclosure material	Polycarbonate
Vent pipe for atmospheric pressure	
Rated conditions	
Degree of protection according to IEC 60529	IP65

Cable hanger

Application	For mounting the transmitter
Design	
Weight	0.16 kg (0.35 lb)
Material	Galvanized steel, polyamide
Terminal area	For cable with a diameter of 5.5 ... 9.5 mm

Pressure Measurement

Single-range transmitters for general applications

SITRANS LH300 Transmitter for hydrostatic level

1

Selection and ordering data		Article No.	Order code	Selection and ordering data		Article No.	Order code
Pressure transmitter SITRANS LH300 (submersible sensor)		7MF1575-		Pressure transmitter SITRANS LH300 (submersible sensor)		7MF1575-	
For hydrostatic level measurement, submersible transmitter, two-wire connection, 4 ... 20 mA, body material see Order option, measuring cell Al ₂ O ₃ ceramics (99.6 % purity), with fixed mounted cable, material of protective cap at PE cable: PPE (colour black) material of protective cap at FEP cable: PPE (colour white) Note: junction box and cable hanger have to be ordered separately.				PE cable for general purpose and drinking water applications			
Click on the Article No. for the online configuration in the PLM Life Cycle Portal.				Special cable length Please add „Z“ to Article No. and specify Order code and plain text: Y01: Cable length		9 X	H . . + Y 01
Measuring range				3 m (≈ 10 ft)			H 1 A
Cable length (PE cable)				5 m (≈ 16 ft)			H 1 B
0 ... 1 mH ₂ O	5 m	1 A		7 m (≈ 23 ft)			H 1 C
0 ... 2 mH ₂ O	5 m	1 B		10 m (≈ 33 ft)			H 1 D
0 ... 3 mH ₂ O	10 m	1 C		15 m (≈ 50 ft)			H 1 E
0 ... 4 mH ₂ O	10 m	1 D		20 m (≈ 65 ft)			H 1 F
0 ... 5 mH ₂ O	10 m	1 E		25 m (≈ 80 ft)			H 1 G
0 ... 6 mH ₂ O	10 m	1 F		30 m (≈ 100 ft)			H 1 H
0 ... 10 mH ₂ O	20 m	1 H		40 m (≈ 130 ft)			H 1 J
0 ... 20 mH ₂ O	30 m	1 K		50 m (≈ 160 ft)			H 1 K
0 ... 40 mH ₂ O	50 m	1 L		60 m (≈ 200 ft)			H 1 L
0 ... 3 ftH ₂ O	5 m (≈ 15 ft)	2 A		70 m (≈ 230 ft)			H 1 M
0 ... 6 ftH ₂ O	5 m (≈ 15 ft)	2 B		80 m (≈ 265 ft)			H 1 N
0 ... 9 ftH ₂ O	10 m (≈ 30 ft)	2 C		90 m (≈ 295 ft)			H 1 P
0 ... 12 ftH ₂ O	10 m (≈ 30 ft)	2 D		100 m (≈ 330 ft)			H 1 Q
0 ... 15 ftH ₂ O	10 m (≈ 30 ft)	2 E		125 m (≈ 410 ft)			H 1 R
0 ... 18 ftH ₂ O	10 m (≈ 30 ft)	2 F		150 m (≈ 495 ft)			H 1 S
0 ... 30 ftH ₂ O	20 m (≈ 60 ft)	2 H		175 m (≈ 575 ft)			H 1 T
0 ... 60 ftH ₂ O	30 m (≈ 90 ft)	2 K		200 m (≈ 650 ft)			H 1 U
0 ... 120 ftH ₂ O	50 m (≈ 150 ft)	2 L		225 m (≈ 740 ft)			H 1 V
0 ... 0.1 bar	5 m	3 A		250 m (≈ 820 ft)			H 1 W
0 ... 0.2 bar	5 m	3 B		275 m (≈ 900 ft)			H 1 X
0 ... 0.3 bar	10 m	3 C		300 m (≈ 990 ft)			H 2 A
0 ... 0.4 bar	10 m	3 D		350 m (≈ 1150 ft)			H 2 B
0 ... 0.5 bar	10 m	3 E		400 m (≈ 1320 ft)			H 2 C
0 ... 0.6 bar	10 m	3 F		450 m (≈ 1480 ft)			H 2 D
0 ... 1 bar	20 m	3 H		500 m (≈ 1650 ft)			H 2 E
0 ... 2 bar	30 m	3 K		550 m (≈ 1815 ft)			H 2 F
0 ... 4 bar	50 m	3 L		600 m (≈ 1980 ft)			H 2 G
Special versions:				650 m (≈ 2145 ft)			H 2 H
<u>Measuring ranges for special versions between</u>				700 m (≈ 2310 ft)			H 2 J
0 ... 1 mH ₂ O and 0 ... 160 mH ₂ O or				750 m (≈ 2475 ft)			H 2 K
0 ... 3 ftH ₂ O and 0 ... 530 ftH ₂ O or				800 m (≈ 2640 ft)			H 2 L
0 ... 0.1 bar and 0 ... 16 bar possible.				850 m (≈ 2800 ft)			H 2 M
				900 m (≈ 2970 ft)			H 2 N
				950 m (≈ 3135 ft)			H 2 P
				1000 m (≈ 3300 ft)			H 2 Q
				Other special cable length Please add „Z“ to Article No. and specify Order codes and plain text: H1Y: Cable length		9 X	H 1 Y + Y 01
				Y01: Measuring range			

Pressure Measurement

Single-range transmitters for general applications

SITRANS LH300 Transmitter for hydrostatic level

1

Selection and ordering data	Article No.	Order code	Selection and ordering data	Article No.	Order code
Pressure transmitter SITRANS LH300 (submersible sensor)	7MF1575-		Pressure transmitter SITRANS LH300 (submersible sensor)	7MF1575-	
FEP cable for aggressive media			Material of housing		
Special cable length Please add „Z“ to Article No. and specify Order code and plain text: Y01: Cable length	9 X	H . . + Y 0 1	Stainless steel 316L (1.4404)	A	
3 m (≈ 10 ft)		H 5 A	Stainless steel 316L (1.4404)	B	
5 m (≈ 16 ft)		H 5 B	Stainless steel 316L (1.4404)	C	
7 m (≈ 23 ft)		H 5 C	Stainless steel 904L (1.4539) for sea water applications	D	
10 m (≈ 33 ft)		H 5 D	Stainless steel 904L (1.4539) for sea water applications	E	
15 m (≈ 50 ft)		H 5 E	Stainless steel 904L (1.4539) for seawater applications	F	
20 m (≈ 65 ft)		H 5 F			
25 m (≈ 80 ft)		H 5 G			
30 m (≈ 100 ft)		H 5 H			
40 m (≈ 130 ft)		H 5 J			
50 m (≈ 160 ft)		H 5 K			
60 m (≈ 200 ft)		H 5 L			
70 m (≈ 230 ft)		H 5 M			
80 m (≈ 265 ft)		H 5 N			
90 m (≈ 295 ft)		H 5 P			
100 m (≈ 330 ft)		H 5 Q			
125 m (≈ 410 ft)		H 5 R			
150 m (≈ 495 ft)		H 5 S			
175 m (≈ 575 ft)		H 5 T			
200 m (≈ 650 ft)		H 5 U			
225 m (≈ 740 ft)		H 5 V			
250 m (≈ 820 ft)		H 5 W			
275 m (≈ 900 ft)		H 5 X			
300 m (≈ 990 ft)		H 6 A			
350 m (≈ 1150 ft)		H 6 B			
400 m (≈ 1320 ft)		H 6 C			
450 m (≈ 1480 ft)		H 6 D			
500 m (≈ 1650 ft)		H 6 E			
550 m (≈ 1815 ft)		H 6 F			
600 m (≈ 1980 ft)		H 6 G			
650 m (≈ 2145 ft)		H 6 H			
700 m (≈ 2310 ft)		H 6 J			
750 m (≈ 2475 ft)		H 6 K			
800 m (≈ 2640 ft)		H 6 L			
850 m (≈ 2800 ft)		H 6 M			
900 m (≈ 2970 ft)		H 6 N			
950 m (≈ 3135 ft)		H 6 P			
1000 m (≈ 3300 ft)		H 6 Q			
Other special cable length Please add „Z“ to Article No. and specify Order codes and plain text: H1Y: Cable length	9 X	H 5 Y + Y 0 1			
Y01: Measuring range					
			Material of protective cap		
			Protective capability made of PPE (recom- mended for PE cable)		
			Protective cap made of ETFE (standard with FEP cable)		
			Stainless steel 316L (1.4404)		
			Protective cap PPE		
			Protective cap ETFE		
			Stainless steel 904L (1.4539) for seawater applications		
			Sealing material between sensor and housing		
			FPM (Standard)	1	
			EPDM (for drinking water)	2	
			Explosion protection		
			without	0	
			With ATEX II 1 G Ex ia IIC T4 Ga, IECEx Ex ia IIC T4 Ga and EAC Ex (only pos- sible for cable length ≤ 300 m (990 ft))	1	
			Additional versions		
			Quality Inspection Certificate (factory calibra- tion) to IEC 60770-2 (6 points upward)		Order code C11
			Accessories/spare parts		Article No.
			Junction box		7MF1575-8AA
			Cable hanger		7MF1575-8AB
			Protective caps, PPE, as spare part (10-pack)		7MF1575-8AD
			Protective caps, ETFE, as spare part (10-pack)		7MF1575-8AE
			Humidity filters as spare part (10-pack)		7MF1575-8AF
			Protective cap, stainless steel 316L (1.4404) for waste water applications		7MF1575-8AG
			Protective cap, stainless steel 904L (1.4539) for sea water applications		7MF1575-8AH

Pressure Measurement

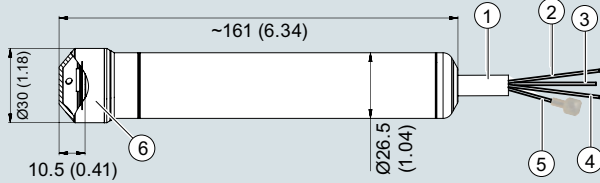
Single-range transmitters for general applications

SITRANS LH300 Transmitter for hydrostatic level

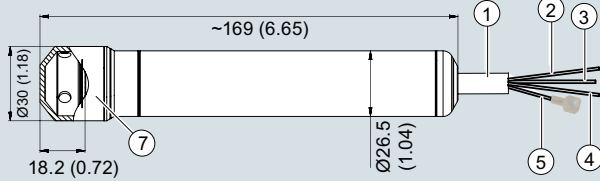
1

Dimensional drawings

Sensor with protective cap (PPE, ETFE)

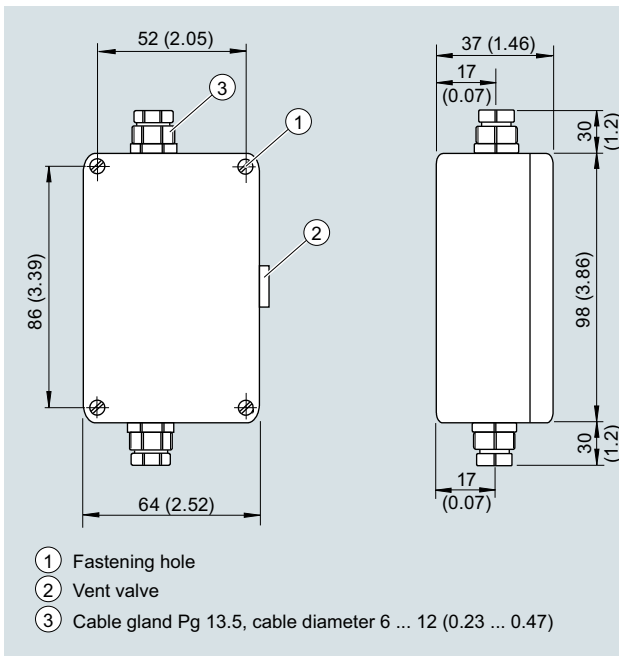


Sensor with protective cap (stainless steel)

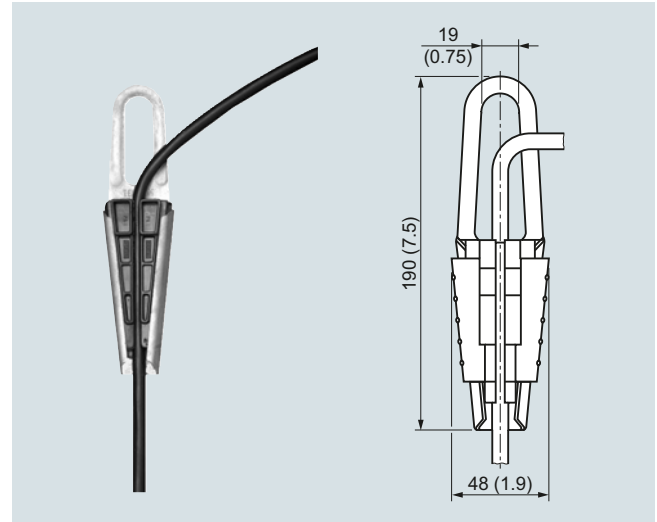


- ① Cable, sheath Ø 8.3 (0.33)
- ② - (blue)
- ③ + (brown)
- ④ Protective conductor connection/Equipotential bonding (black)
- ⑤ Vent pipe with humidity filter Ø 1 (0.04) (inner diameter)
- ⑥ Protective cap (PPE or PTFE) with 4 x Ø 2.5 (0.10) holes
- ⑦ Protective cap (stainless steel) with 4 x Ø 5 (0.20) holes

SITRANS LH300 pressure transmitter, dimensions in mm (inch)



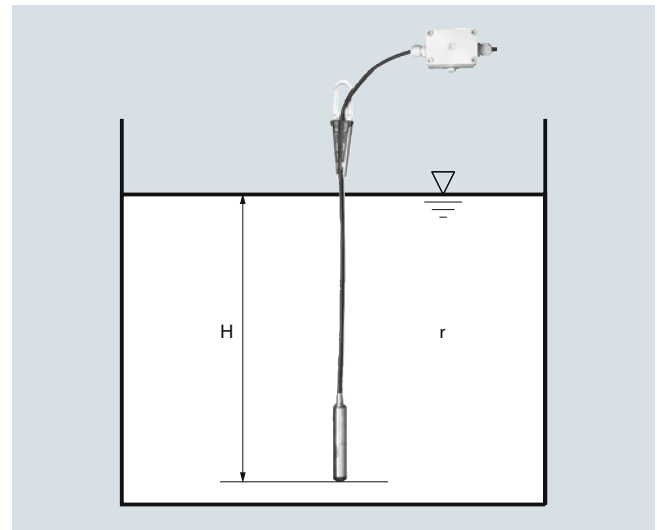
Junction box, dimensions in mm (inch)



Cable hanger, dimensions in mm (inch)

More information

Determination of the measuring range for medium water



Calculation of the measuring range:

$$p = \rho \times g \times H$$

with:

ρ = density of medium

g = local acceleration due to gravity

H = maximum level

Example:

Medium: Water, $\rho = 1\,000 \text{ kg/m}^3$

Acceleration due to gravity: 9.81 m/s^2

Start-of-scale: 0 m

Maximum level: 6.0 m

Cable length: 10 m

Calculation:

$$p = 1\,000 \text{ kg/m}^3 \times 9.81 \text{ m/s}^2 \times 6.0 \text{ m}$$

$$p = 58\,860 \text{ N/m}^2$$

$$p = 589 \text{ mbar}$$

Transmitter to be ordered:

7MF1575-1FA10

Plus, if required, junction box 7MF1575-8AA and cable hanger 7MF1575-8AB

Pressure Measurement

Single-range transmitters for general applications

SITRANS P Compact for gauge and absolute pressure

1

Overview



The SITRANS P Compact pressure transmitter is designed for the special requirements of the food, pharmaceutical and biotechnology industries.

The use of high-grade materials guarantees compliance with hygiene regulations.

Particular value has been placed on a high surface quality. The system can be electropolished in addition.

A further important feature is the hygiene-based design of the process connection by means of various aseptic connections.

The completely welded stainless steel housing can be designed up to degree of protection IP67.

Using appropriate thermal decouplers, the SITRANS P Compact pressure transmitter can be used for process temperatures up to 200 °C (392 °F).

Benefits

- Measuring ranges from 0 to 160 mbar (0 to 2.32 psi) to 0 to 40 bar (0 to 580 psi)
- Linearity error including hysteresis < +0.2 % of full-scale value
- Piezo-resistive measurement system, vacuum-proof and overload-proof
- Hygiene-based design according to EHEDG, FDA and GMP recommendations
- Material and surface quality according to hygiene requirements
- Wetted parts made of stainless steel; completely welded
- Signal output 4 to 20 mA (0 to 20 mA as option)
- Stainless steel housing with degree of protection IP65 (IP67 as option)
- Process temperature up to 200 °C (392 °F)
- Explosion protection II 2G Ex [ib] IIC T6 to ATEX
- Easy and safe to clean

Application

The SITRANS P Compact pressure transmitter is designed for the special requirements of the food, pharmaceutical and biotechnology industries.

The use of high-grade materials guarantees compliance with hygiene regulations.

The SITRANS P Compact pressure transmitter is available in many versions. Exact adaptation of the pressure transmitter to conditions at the place of use is thus possible

Design

The electronics is potted to protect it against moisture, corrosive atmospheres and vibration.

Notes on operating the pressure transmitter

Compensation of internal atmospheric pressure

Compensation of the internal atmospheric pressure of the SITRANS P Compact pressure transmitters is performed as follows:

- in the plug versions by means of the screwed gland (IP65)
- in the field housings by means of an integral sintered filter (IP65) or a vented cable (IP67)
- in versions with cable outlet by means of a vented cable (IP67)

In the absolute pressure range there is no need for compensation with respect to atmospheric pressure.

Note: These degrees of protection are only achieved under the following conditions:

- if the pressure transmitter is installed correctly
- if the screwed glands are securely tightened
- if the cable diameters agree with the nominal diameters of the gaskets in the housing

Note: The integral EMC measures are only effective if the earth connection is made correctly.

CE marking

The CE marking of the pressure transmitter certifies compliance with the guidelines of the European Council (9/336/EC), the EMC law (13.11.1992), as well as the applicable generic standards.

Interference-free operation in systems and plants is achieved only if the specifications for shielding, earthing, cable routing and electrical isolation are observed during installation and assembly.

Hazardous areas

Note: Electrical equipment in hazardous areas must only be installed and operated by trained personnel.

Modifications to units and connections result in cancellation of the explosion protection and guarantee.

With intrinsically-safe circuits, make sure that equipotential bonding exists throughout the complete cabling inside and outside of the hazardous area. The limits specified in the ATEX approval must be observed.

Function

The process pressure acts on a piezo-resistive semiconductor measuring bridge through a remote seal and a transmission liquid. The pressure transmitter converts the pressure values into a load-independent current.

A compensation network makes the output signal largely independent of the ambient temperature. As a result of a specially adapted remote seal connection with minimized volume, the influence of the process temperature on the output signal is greatly reduced compared to a conventional screw connection.

The pressure transmitters can be powered with a non-regulated DC voltage of 10 to 30 V. Output signals common to measuring technology are available.

Technical specifications**Pressure transmitters for food, pharmaceuticals and biotechnology****Mode of operation**

Measuring principle	piezo-resistive
---------------------	-----------------

Input

Measured variable	gauge or absolute pressure
Measuring range	0 ... 160 mbar (0 ... 2.32 psi) ... 0 ... 40 bar (0 ... 580 psi)

Output

Output signal	
• 2-wire system	4 ... 20 mA
• Three-wire system	0 ... 20 mA

Measuring accuracy

Acc. to IEC 60770-1	
Error in measurement at limit setting incl. hysteresis and reproducibility	$\leq 0.2\%$ of full-scale value
Adjustment accuracy	$\leq \pm 0.2\%$ of full-scale value
Step response time	< 20 ms
<u>Influence of ambient temperature</u>	
On the enclosure	
• Zero point	< 0.2 %/10 K of full-scale value
• Measuring span	< 0.2 %/10 K of full-scale value
On the process connection (remote seals)	Zero error (depends on design)
• Flange remote seal	
- DN 25 / 1"	4.8 mbar/10 K (0.069 psi/10 K)
- DN 32 / 1¼"	2.3 mbar/10 K (0.033 psi/10 K)
- DN 40 / 1½"	1.6 mbar/10 K (0.023 psi/10 K)
- DN 50 / 2"	0.6 mbar/10 K (0.009 psi/10 K)
• Clamp-on seal	
- DN 25 / 1"	9.5 mbar/10 K (0.14 psi/10 K)
- DN 32 / 1¼"	4.1 mbar/10 K (0.06 psi/10 K)
- DN 40 / 1½"	3.9 mbar/10 K (0.05 psi/10 K)
- DN 50 / 2"	3.9 mbar/10 K (0.05 psi/10 K)

The zero error specified for the process connection should be considered as a guideline for a standard design. We will produce a detailed system calculation on request. Systems with reduced remote seal errors are available on request.

Rated conditions

Installation conditions

- Mounting position

Any, vertical as standard

Ambient conditions

- Ambient temperature
- Storage temperature
- Process temperature

-10 ... +70 °C (14 ... 158 °F)

-10 ... +90 °C (14 ... 194 °F)

Max. 200 °C (392 °F), depending on design

Vacuum-resistant

0 mbar (0 psi) absolute at max. 50 °C. Higher process temperatures on request.

- Degree of protection (to EN 60529)

IP65, optional IP67

- Electromagnetic Compatibility

- Emitted interference

To EN 50081 Part 1, issue 1993 (residential and industrial areas). The unit has no own emissions.

- Noise immunity to

EN 50082 Part 2, issue March 1995 (industrial areas)

Design

Weight (without remote seal)

- Field enclosure

≈ 460 G (≈ 1.01 (lb))

- Enclosure with plug

≈ 200 g (≈ 0.44 lb)

Enclosure

- Designs

- Field housing IP65 or IP67, with screwed gland
- Angled plug DIN 43650, IP65
- Cable connection, IP67
- M12 device plug, IP65

- Material

Stainless steel, mat. no. 1.4404/316L/1.4305

Material of union nut

Polyamide (with electrical connection using plug or cable)
Electronics unit potted with silicone
Internal ventilation for measuring ranges < 16 bar (< 232 psi), through housing thread or connection cable depending on design

Process connection

- Versions

See ordering data

- Material of coupling

Stainless steel, mat. no. 1.4404/316L

Power supply

Terminal voltage on transmitter

10 ... 30 V DC

Rated voltage

24 V DC

Certificates and approvals

Classification according to pressure equipment directive (PED 2014/68/EU)

- For 7MF8010-1... (with diaphragm seal)

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

- For 7MF8010-2... (with clamp-on seal)

For gases of fluid group 1 and liquids of fluid group 1; complies with the requirements of article 4, paragraph 1 (appendix 1); assigned to category III, conformity evaluation module H by the TÜV Nord

Explosion protection

- Intrinsic safety "i"
- Marking

TÜV 03 ATEX 2099 X
Ex II 2G Ex ib IIC T6

Pressure Measurement

Single-range transmitters for general applications

SITRANS P Compact for gauge and absolute pressure

1

Selection and Ordering data	Article No.	Ord. code
SITRANS P Compact pressure transmitters for pressure and absolute pressure with diaphragm flush at front	7MF8010 -	
2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 ... 20 mA	1	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Diaphragm seal with quick-release clamp		
Milk pipe union to DIN 11851 with slotted union nut		
• DN 25	AD	
• DN 32	AE	
• DN 40	AF	
• DN 50	AG	
• DN 65	AH	
Milk pipe union to DIN 11851 with threaded socket		
• DN 25	BD	
• DN 32	BE	
• DN 40	BF	
• DN 50	BG	
• DN 65	BH	
Clamp connection to DIN 32676		
• DN 25	CD	
• DN 40	CF	
• DN 50	CG	
Clamp connection to ISO 2852		
• 1 inch	DM	
• 1½ inch	DN	
• 2 inch	DP	
• 2½ inch	DQ	
IDF standard with slotted union nut		
• 1 inch	EM	
• 1½ inch	EN	
• 2 inch	EP	
IDF standard with threaded socket		
• 1 inch	FM	
• 1½ inch	FN	
• 2 inch	FP	
SMS standard with slotted union nut		
• 1 inch	GM	
• 1½ inch	GN	
• 2 inch	GP	
SMS standard with threaded socket		
• 1 inch	HM	
• 1½ inch	HN	
• 2 inch	HP	
DRD flange, without welding-type flange		
• DN 50, PN 40	JH	
Varivent connection (Tuchenhausen)		
• D = 50, for Varivent housing DN 25 and 1 inch	KF	
• D = 68, for Varivent housing DN 40 ... DN 125 and 1½ ... 6 inch	KL	
Special version (add Order code and plain text)	ZA	J 1 Y
Filling liquid		
Food oil, FDA-listed	3	
Special version (add Order code and plain text)	9	L 1 Y
Output signal		
4 ... 20 mA	1	
Special version (add Order code and plain text)	9	M 1 Y

Selection and Ordering data	Article No.	Ord. code
SITRANS P Compact pressure transmitters for pressure and absolute pressure with diaphragm flush at front	7MF8010 -	
2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 ... 20 mA	1	
Diaphragm seal with aseptic connection		
Aseptic screwed gland to DIN 11864-1, form A, with slotted union nut		
• 1 inch	PM	
• 1½ inch	PN	
• 2 inch	PP	
• 2½ inch	PQ	
Aseptic screwed gland to DIN 11864-1, form A with threaded socket		
• 1 inch	QM	
• 1½ inch	QN	
• 2 inch	QP	
• 2½ inch	QQ	
Aseptic screwed NEUMO with slotted union nut ¹⁾		
• DN 25	RD	
• DN 32	RE	
• DN 40	RF	
• DN 50	RG	
Aseptic screwed NEUMO with threaded socket ¹⁾		
• DN 25	SD	
• DN 32	SE	
• DN 40	SF	
• DN 50	SG	
Aseptic screwed NEUMO with clamp connection, form R ¹⁾		
• DN 25	TD	
• DN 32	TE	
• DN 40	TF	
• DN 50	TG	
Aseptic screwed NEUMO with clamp connection, form V ¹⁾		
• DN 25	UD	
• DN 32	UE	
• DN 40	UF	
• DN 50	UG	
Male thread DIN 3852 Form A		
• G½", min. meas. span 1.6 bar (23.2 psi)	XA	
• G¾", min. meas. span 1 bar (14.5 psi)	XB	
• G1", min. meas. span 0.4 bar (5.8 psi)	XC	
• G1½", min. meas. span 0.25 bar (3.63 psi)	XD	
• G2", min. meas. span 0.16 bar (2.32 psi)	XE	
Special version (add Order code and plain text)	ZA	J 1 Y
Filling liquid		
Food oil, FDA-listed	3	
Special version (add Order code and plain text)	9	L 1 Y
Output signal		
4 ... 20 mA	1	
Special version (add Order code and plain text)	9	M 1 Y

¹⁾ Please specify as well:
Connections for pipes: R01, R02 or R03, see table "Further designs" on next page

Pressure Measurement

Single-range transmitters for general applications

SITRANS P Compact for gauge and absolute pressure

1

Selection and Ordering data		Article No.	Ord. code	Selection and Ordering data		Article No.	Ord. code
SITRANS P Compact pressure transmitters for pressure and absolute pressure with diaphragm flush at front		7MF8010-		SITRANS P Compact pressure transmitters for pressure and absolute pressure with diaphragm flush at front		7MF8010-	
2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 ... 20 mA		1		2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 ... 20 mA		1	
Housing design (stainless steel mat. No. 1.4404/316L) / electr. connection				Measured range			
Housing with angled plug to DIN 43650, IP65		1		Overload pressure			
Housing with M12 device plug, IP65, union nut made of polyamide		2		(continued)			
Housing with M12 device plug, IP65, union nut made of stainless steel		3		-1 ... +9 bar (-14.5 ... +130.5 psi)	30 bar (435 psi)	GA	
Stainless steel field housing (small) with cable gland, IP65		4		-1 ... +15 bar (-14.5 ... +217.6 psi)	50 bar (725 psi)	GB	
Stainless steel field housing (small) with cable gland, IP67		5		0 ... 1 bar a (0 ... 14.5 psi a)	10 bar a (145 psi a)	HA	
Internal ventilation for measuring ranges < 16 bar (< 232 psi)				0 ... 1.6 bar a (0 ... 23.2 psi a)	10 bar a (145 psi a)	HB	
Measured range				0 ... 2.5 bar a (0 ... 36.3 psi a)	16 bar a (232 psi a)	HC	
0 ... 160 mbar (0 ... 2.32 psi)	2 bar (29 psi)	BB		0 ... 4 bar a (0 ... 58 psi a)	16 bar a (232 psi a)	HD	
0 ... 250 mbar (0 ... 3.63 psi)	2 bar (29 psi)	BC		0 ... 6 bar a (0 ... 87 psi a)	30 bar a (435 psi a)	HE	
0 ... 400 mbar (0 ... 5.8 psi)	6 bar (87 psi)	BD		0 ... 10 bar a (0 ... 145 psi a)	30 bar a (435 psi a)	JA	
0 ... 600 mbar (0 ... 8.7 psi)	6 bar (87 psi)	BE		Special version (add Order code and plain text)		ZA	P1Y
0 ... 1 bar (0 ... 14.5 psi)	10 bar (145 psi)	CA		Explosion protection			
0 ... 1.6 bar (0 ... 23.2 psi)	10 bar (145 psi)	CB		without			1
0 ... 2.5 bar (0 ... 36.3 psi)	16 bar (232 psi)	CC		with, to ATEX 100a, II 2 G, Ex ib IIC T6			2
0 ... 4 bar (0 ... 58 psi)	16 bar (232 psi)	CD		Further designs		Order code	
0 ... 6 bar (0 ... 87 psi)	30 bar (435 psi)	CE		Please add "-Z" to Article No. and specify Order code			
0 ... 10 bar (0 ... 145 psi)	30 bar (435 psi)	DA		Hygiene version		P01	
0 ... 16 bar (0 ... 232 psi)	50 bar (725 psi)	DB		Roughness of process connection: Foil $R_a < 0.8 \mu\text{m}$ ($3.15 \cdot 10^{-8}$ inch); Welded seams $R_a < 1.5 \mu\text{m}$ ($5.9 \cdot 10^{-8}$ inch)			
0 ... 25 bar (0 ... 363 psi)	50 bar (725 psi)	DC		Integral cooling element		K01	
0 ... 40 bar (0 ... 580 psi)	70 bar (1015 psi)	DD		Process temperature max. 200 °C (392 °F) instead of 140 °C (284 °F)			
-160 ... 0 mbar (-2.32 ... 0 psi)	2 bar (29 psi)	EB		Connections for pipe			
-250 ... 0 bar (-3.73 ... 0 psi)	2 bar (29 psi)	EC		Pipes to DIN 11850		R01	
-400 ... 0 bar (-5.8 ... 0 psi)	6 bar (87 psi)	ED		ISO pipes to DIN 2463		R02	
-600 ... 0 bar (-8.7 ... 0 psi)	6 bar (87 psi)	EE		Pipes to O. D. Tubing "BS 4825 Part 1"		R03	
-1 ... 0 bar (-14.5 ... 0 psi)	10 bar (145 psi)	FA		Certificates			
-1 ... 0.6 bar (-14.5 ... 8.7 psi)	10 bar (145 psi)	FB		Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2		C11	
-1 ... 1.5 bar (-14.5 ... 21.8 psi)	16 bar (232 psi)	FC		Inspection certificate to EN 10204-3.1		C12	
-1 ... 3 bar (-14.5 ... 43.5 psi)	16 bar (232 psi)	FD		Use of FDA-listed remote seal filling liquids certified by test report to EN 10204-2.2		C17	
-1 ... 5 bar (-14.5 ... 72.5 psi)	30 bar (435 psi)	FE		Roughness depth measurement R_a certified by test report to EN 10204-3.1		C18	
				Certification to EHEDG for clamp-on seals with aseptic screwed gland to DIN 11864		C19	

Pressure Measurement

Single-range transmitters for general applications

SITRANS P Compact for gauge and absolute pressure

1

Selection and Ordering data	Article No.	Ord. code
SITRANS P Compact pressure transmitters for pressure and absolute pressure with clamp-on remote seal	7MF8010 -	
2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 ... 20 mA	2	
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Clamp-on remote seal (screwed gland at both ends) with quick-release clamps		
Milk pipe union to DIN 11851 with threaded socket		
• DN 25	AD	
• DN 32	AE	
• DN 40	AF	
• DN 50	AG	
• DN 65	AH	
Clamp connection to DIN 32676		
• DN 25	CD	
• DN 32	CE	
• DN 40	CF	
• DN 50	CG	
• DN 65	CH	
Clamp connection to ISO 2852 ¹⁾		
• 1 inch	DM	
• 1½ inch	DN	
• 2 inch	DP	
• 2½ inch	DQ	
Special version (add Order code and plain text)	ZA	J 1 Y
Filling liquid		
Food oil, FDA-listed	3	
Special version (add Order code and plain text)	9	L 1 Y
Output signal		
4 ... 20 mA	1	
Special version (add Order code and plain text)	9	M 1 Y

¹⁾ Please note the internal diameter of the pipe. Please specify pipe classes (see "Further designs")

Selection and Ordering data	Article No.	Ord. code
SITRANS P Compact pressure transmitters for pressure and absolute pressure with clamp-on remote seal	7MF8010 -	
2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 ... 20 mA	2	
Clamp-on seal with aseptic connection		
Aseptic screwed gland to DIN 11864-1, form A with threaded socket		
• 1 inch	QM	
• 1½ inch	QN	
• 2 inch	QP	
Aseptic screwed NEUMO with threaded socket ¹⁾		
• DN 25	SD	
• DN 32	SE	
• DN 40	SF	
• DN 50	SG	
• DN 65	SH	
Aseptic screwed NEUMO with clamp connection, form R ¹⁾		
• DN 25	TD	
• DN 32	TE	
• DN 40	TF	
• DN 50	TG	
Aseptic screwed gland SÜDMO with threaded socket W 501 ¹⁾		
• 1 inch	VM	
• 1½ inch	VN	
• 2 inch	VP	
Aseptic screwed gland SÜDMO with clamp connection W 601 ¹⁾		
• 1 inch	WM	
• 1½ inch	WN	
• 2 inch	WP	
Special version (add Order code and plain text)	ZA	J 1 Y
Filling liquid		
Food oil, FDA-listed	3	
Medicinal white oil	2	
Special version (add Order code and plain text)	9	L 1 Y
Output signal		
4 ... 20 mA	1	
Special version (add Order code and plain text)	9	M 1 Y

¹⁾ Please specify as well:
Connections for pipes: R01, R02 or R03, see table "Further designs" on next page

Pressure Measurement

Single-range transmitters for general applications

SITRANS P Compact for gauge and absolute pressure

1

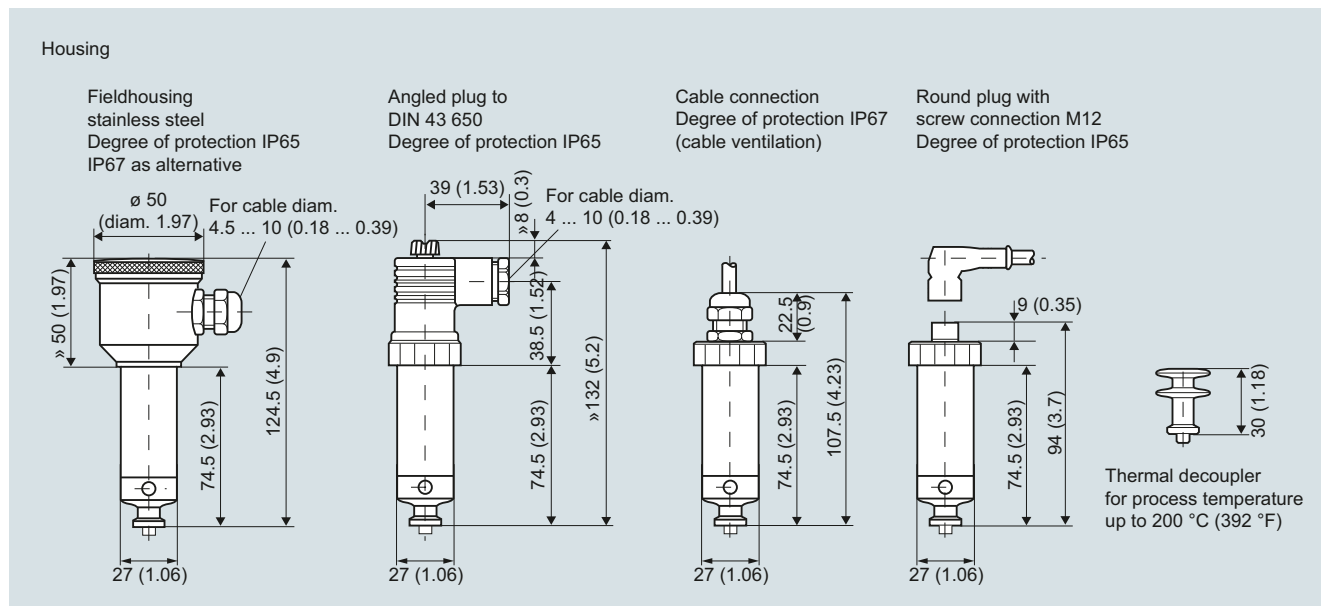
Selection and Ordering data		Article No.	Ord. code	Selection and Ordering data		Article No.	Ord. code
SITRANS P Compact pressure transmitters for pressure and absolute pressure with clamp-on remote seal		7 MF 8 0 1 0 -		SITRANS P Compact pressure transmitters for pressure and absolute pressure with clamp-on remote seal		7 MF 8 0 1 0 -	
2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 ... 20 mA		2		2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 ... 20 mA		2	
Housing design (stainless steel mat. No. 1.4404/316L) / electr. connection				Measured range Overload pressure (continued)			
Housing with angled plug to DIN 43650, IP65, union nut made of polyamide		1		-1 ... 9 bar (-14.5 ... 130.5 psi)	30 bar (435 psi)	GA	
Housing with M12 device plug, IP65, union nut made of polyamide		2		-1 ... 15 bar (-14.5 ... 217.6 psi)	50 bar (725 psi)	GB	
Housing with M12 device plug, IP65, union nut made of stainless steel		3		0 ... 1 bar a (0 ... 14.5 psi a)	10 bar a (145 psi a)	HA	
Stainless steel field housing (small) with cable gland, IP65		4		0 ... 1.6 bar a (0 ... 23.2 psi a)	10 bar a (145 psi a)	HB	
Stainless steel field housing (small) with cable gland, IP67		5		0 ... 2.5 bar a (0 ... 36.3 psi a)	16 bar a (232 psi a)	HC	
Internal ventilation for measuring ranges < 16 bar (< 232 psi)				0 ... 4 bar a (0 ... 58 psi a)	16 bar a (232 psi a)	HD	
Measured range Overload pressure	0 ... 160 mbar (0 ... 2.32 psi)	BB		0 ... 6 bar a (0 ... 87 psi a)	30 bar a (435 psi a)	HE	
	0 ... 250 mbar (0 ... 3.63 psi)	BC		0 ... 10 bar a (0 ... 145 psi a)	30 bar a (435 psi a)	JA	
	0 ... 400 mbar (0 ... 5.8 psi)	BD		Special version (add Order code and plain text)		ZA	P1 Y
	0 ... 600 mbar (0 ... 8.7 psi)	BE		Explosion protection			
	0 ... 1 bar (0 ... 14.5 psi)	CA		without			1
	0 ... 1.6 bar (0 ... 23.2 psi)	CB		with, to ATEX 100a, II 2 G, Ex ib IIC T6			2
	0 ... 2.5 bar (0 ... 36.3 psi)	CC		Further designs		Order code	
	0 ... 4 bar (0 ... 58 psi)	CD		Please add "-Z" to Article No. and specify Order code			
	0 ... 6 bar (0 ... 87 psi)	CE		Hygiene version		P01	
	0 ... 10 bar (0 ... 145 psi)	DA		Roughness of process connection: Foil $R_a < 0.8 \mu\text{m}$ ($3.15 \cdot 10^{-8}$ inch); Welded seams $R_a < 1.5 \mu\text{m}$ ($5.9 \cdot 10^{-8}$ inch)			
	0 ... 16 bar (0 ... 232 psi)	DB		Integral cooling element		K01	
	0 ... 25 bar (0 ... 363 psi)	DC		Process temperature max. 200 °C (392 °F) instead of 140 °C (284 °F)			
	0 ... 40 bar (0 ... 580 psi)	DD		Connections for pipe		R01	
	-160 ... 0 mbar (-2.32 ... 0 psi)	EB		Pipes to DIN 11850		R02	
	-250 ... 0 bar (-3.73 ... 0 psi)	EC		ISO pipes to ISO 2463		R03	
	-400 ... 0 bar (-5.8 ... 0 psi)	ED		Pipes to O. D. Tubing "BS 4825 Part 1"			
	-600 ... 0 bar (-8.7 ... 0 psi)	EE		Certificates		C11	
	-1 ... 0 bar (-14.5 ... 0 psi)	FA		Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2			
	-1 ... 0.6 bar (-14.5 ... 8.7 psi)	FB		Inspection certificate to EN 10204-3.1		C12	
	-1 ... 1.5 bar (-14.5 ... 21.8 psi)	FC		Use of FDA-listed remote seal filling liquids certified by test report to EN 10204-2.2		C17	
	-1 ... 3 bar (-14.5 ... 43.5 psi)	FD		Roughness depth measurement R_a certified by test report to EN 10204-3.1		C18	
	-1 ... 5 bar (-14.5 ... 72.5 psi)	FE		Certification to EHEDG for clamp-on seals with aseptic screwed gland to DIN 11864		C19	

Pressure Measurement

Single-range transmitters for general applications

SITRANS P Compact for gauge and absolute pressure

Dimensional drawings

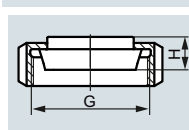


SITRANS P Compact, dimensions in mm (inch)

Process connections

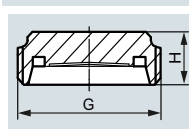
Diaphragm seal with quick-release clamp

Milk pipe union to DIN 11851 with slotted union nut



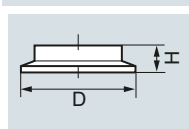
DN	PN	H mm (inch)	G
25	40	24 (0.95)	Rd. 52 x 1/6"
32	40	24 (0.95)	Rd. 58 x 1/6"
40	40	24 (0.95)	Rd. 65 x 1/6"
50	25	25.1 (0.99)	Rd. 78 x 1/6"
65	25	28.6 (1.13)	Rd. 95 x 1/6"

Milk pipe union to DIN 11851 with threaded socket



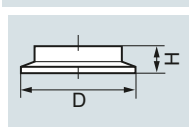
DN	PN	H mm (inch)	G
25	40	-	Rd. 52 x 1/6"
32	40	20 (0.79)	Rd. 58 x 1/6"
40	40	20 (0.79)	Rd. 65 x 1/6"
50	25	20 (0.79)	Rd. 78 x 1/6"
65	25	22 (0.87)	Rd. 95 x 1/6"

Clamp connection to DIN 32676



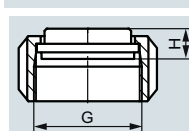
DN	PN	H mm (inch)	D mm (inch)
25	16	14 (0.55)	50.5 (2)
40	16	14 (0.55)	50.5 (2)
50	16	14 (0.55)	64 (2.52)

Clamp connection to ISO 2852



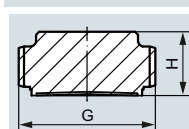
DN	PN	H mm (inch)	D mm (inch)
1"	16	14 (0.55)	50.5 (2)
1½"	16	12 (0.47)	50.5 (2)
2"	16	14 (0.55)	64 (2.52)
2½"	16	14 (0.55)	77.5 (3.05)

IDF standard with slotted union nut



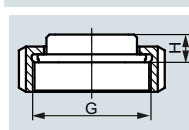
DN	PN	H mm (inch)	G inch (IDF thread)
1"	40	21 (0.83)	1"
1½"	40	13.5 (0.53)	1½"
2"	25	15 (0.59)	2"

IDF standard with threaded socket



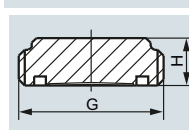
DN	PN	H mm (inch)	G inch (IDF thread)
1"	40	21 (0.83)	1"
1½"	40	13.5 (0.53)	1½"
2"	25	15 (0.59)	2"

SMS standard with slotted union nut



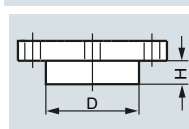
DN	PN	H mm (inch)	G
1"	40	16 (0.63)	Rd 40 x 1.6"
1½"	40	16 (0.63)	Rd 60 x 1.6"
2"	25	16 (0.63)	Rd 70 x 1.6"

SMS standard with threaded socket



DN	PN	H mm (inch)	G
1"	40	16 (0.63)	Rd 40 x 1.6"
1½"	40	20 (0.79)	Rd 60 x 1.6"
2"	25	20 (0.79)	Rd 70 x 1.6"

DRD flange, without welding-type flange



DN	PN	H mm (inch)	D mm (inch)
50	40	16.7 (0.66)	65.5 (2.58)

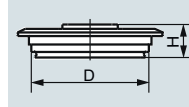
Pressure Measurement

Single-range transmitters for general applications

SITRANS P Compact for gauge and absolute pressure

1

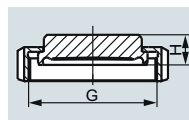
Varivent connection



DN	PN	H mm (inch)	D mm (inch)
25	25	19 (0.75)	50 (1.97)
40 ... 125	25/10	19 (0.75)	68 (2.68)

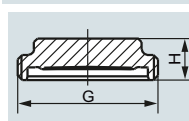
Diaphragm seal with aseptic connection

Aseptic screwed gland to DIN 11864-1, form A, with slotted union nut



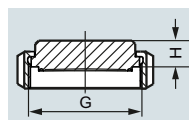
DN	PN	H mm (inch)	G
1"	40	20 (0.79)	Rd 52 x 1/6"
1½"	40	20 (0.79)	Rd 58 x 1/6"
2"	25	20 (0.79)	Rd 65 x 1/6"
2½"	25	20 (0.79)	Rd 78 x 1/6"

Aseptic screwed gland to DIN 11864-1, form A, with threaded socket



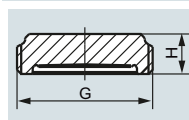
DN	PN	H mm (inch)	G
1"	40	15 (0.59)	Rd 52 x 1/6"
1½"	40	15 (0.59)	Rd 58 x 1/6"
2"	25	15 (0.59)	Rd 65 x 1/6"
2½"	25	15 (0.59)	Rd 78 x 1/6"

Aseptic screwed NEUMO BioConnect with slotted union nut



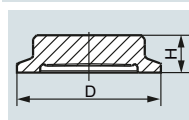
DN	PN	H mm (inch)	G
25	16	15 (0.59)	M 42 x 2
32	16	15 (0.59)	M 52 x 2
40	16	15 (0.59)	M 56 x 2
50	16	15 (0.59)	M 68 x 2

Aseptic screwed NEUMO BioConnect with threaded socket



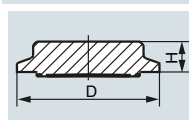
DN	PN	H mm (inch)	G
25	16	20 (0.79)	M 42 x 2
32	16	20 (0.79)	M 52 x 2
40	16	20 (0.79)	M 56 x 2
50	16	20 (0.79)	M 68 x 2

Aseptic screwed NEUMO BioConnect with clamp connection, form R



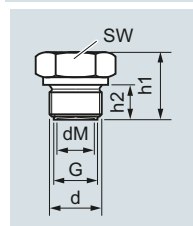
DN	PN	H mm (inch)	D mm (inch)
25	40	20 (0.79)	50.5 (2)
32	40	20 (0.79)	50.5 (2)
40	40	20 (0.79)	64 (2.52)
50	25	20 (0.79)	77.4 (3.05)

Aseptic screwed NEUMO BioConnect with clamp connection, form V



DN	PN	H mm (inch)	D mm (inch)
25	40	15 (0.59)	50.5 (2)
32	40	15 (0.59)	50.5 (2)
40	40	15 (0.59)	64 (2.52)
50	25	15 (0.59)	77.4 (3.05)

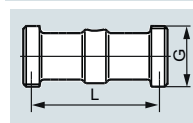
Male thread DIN 3852, form A



G	d mm (inch)	d _M mm (inch)	h ₁ mm (inch)	h ₂ mm (inch)	SW mm (inch)
G½A	26 (1.02)	17.5 (0.69)	27 (1.06)	14 (0.55)	27 (1.06)
G¾A	32 (1.26)	22.6 (0.89)	31 (1.22)	16 (0.63)	32 (1.26)
G1A	39 (1.54)	27 (1.06)	33 (1.30)	18 (0.71)	51 (2.01)
G1½A	55 (2.17)	40 (1.57)	40 (1.57)	22 (0.87)	55 (2.17)
G2A	68 (2.68)	51 (2.00)	42 (1.65)	24 (0.94)	70 (2.76)

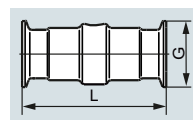
Clamp-on remote seal (screwed gland at both ends) with quick-release clamps

Milk pipe union to DIN 11851 with threaded socket



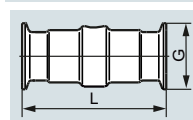
DN	PN	L mm (inch)	G
25	40	110 (4.33)	Rd 52 x 1/6"
32	40	110 (4.33)	Rd 58 x 1/6"
40	40	110 (4.33)	Rd 65 x 1/6"
50	25	110 (4.33)	Rd 78 x 1/6"
65	25	110 (4.33)	Rd 95 x 1/6"

Clamp connection to DIN 32676



DN	PN	L mm (inch)	D mm (inch)
25	16	110 (4.33)	50.5 (2)
32	16	110 (4.33)	50.5 (2)
40	16	110 (4.33)	50.5 (2)
50	16	110 (4.33)	64 (2.52)
65	10	110 (4.33)	91 (3.58)

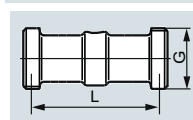
Clamp connection to ISO 2852



DN	PN	L mm (inch)	D mm (inch)
1"	16	110 (4.33)	50.5 (2)
1½"	16	110 (4.33)	50.5 (2)
2"	16	110 (4.33)	64 (2.52)
2½"	16	110 (4.33)	91 (3.58)

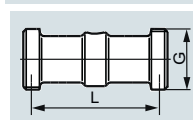
Clamp-on seal with aseptic connection

Aseptic screwed gland to DIN 11864-1, form A, with threaded socket



DN	PN	L mm (inch)	G
1"	40	110 (4.33)	Rd 52 x 1/6"
1½"	40	110 (4.33)	Rd 65 x 1/6"
2"	25	110 (4.33)	Rd 78 x 1/6"

Aseptic screwed NEUMO BioConnect with threaded socket



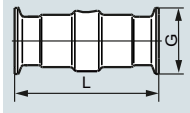
DN	PN	L mm (inch)	G
25	16	110 (4.33)	M 42 x 2
32	16	110 (4.33)	M 52 x 2
40	16	110 (4.33)	M 56 x 2
50	16	110 (4.33)	M 68 x 2
65	16	110 (4.33)	M 90 x 3

Pressure Measurement

Single-range transmitters for general applications

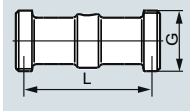
SITRANS P Compact for gauge and absolute pressure

Aseptic screwed NEUMO BioConnect with clamp connection, form R



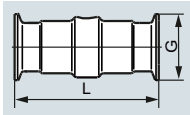
DN	PN	L mm (inch)	D mm (inch)
25	16	110 (4.33)	50.4 (2)
32	16	110 (4.33)	50.4 (2)
40	16	110 (4.33)	64 (2.52)
50	16	110 (4.33)	77.4 (3.05)

Aseptic screwed gland SÜDMO with threaded socket W 501



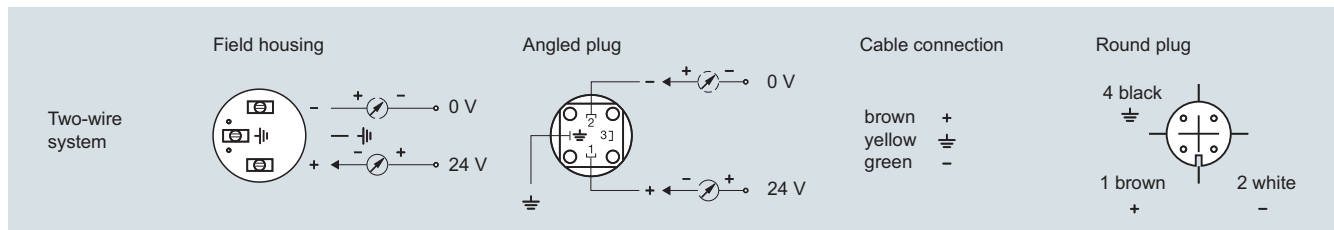
DN	PN	L mm (inch)	G
1"	25	110 (4.33)	Rd 44 x 1/6"
1½"	25	110 (4.33)	Rd 58 x 1/6"
2"	20	110 (4.33)	Rd 78 x 1/6"

Aseptic screwed gland SÜDMO with threaded socket W 601



DN	PN	L mm (inch)	D mm (inch)
1"	16	110 (4.33)	50.5 (2)
1½"	16	110 (4.33)	64 (2.52)
2"	16	110 (4.33)	77.5 (3.05)

Schematics



SITRANS P Compact, connection diagram

Overview



SITRANS P280 for flexible and cost-effective applications in pressure monitoring

- Supports the WirelessHART standard (HART V 7.1)
- Very high security level for wireless data transmission
- Built-in local user interface (LUI) with 3-button operation
- Optimum display and readability using graphical display (104 x 80 pixels) with integrated backlight
- Stand-by (deep sleep phase) can be activated and deactivated device with push of a button
- Battery power supply
- Battery service life up to 5 years
- Extend battery service life with HART modem interface which can be shut off
- Optimized power consumption through new design, and increase in battery service life.
- Simple configuration thanks to SIMATIC PDM
- Device meets IP65 degree of protection
- Can be used for absolute and gauge pressure measurements

Benefits

The SITRANS P280 is a pressure transmitter that features Wireless HART as the standard communication interface.

Also available is a wired interface to connect a HART modem:

- Flexible pressure measurements
- Save costs on wiring for difficult installation conditions. Wireless technology offers cost advantages in cases where extensive wiring cost would normally apply.
- It enables additional hitherto unfeasible measuring points, particularly for monitoring purposes.
- Easy installation on moveable equipment
- Enables cost-effective temporary measurements, for example for process optimizations.
- Optimum solution in addition to wired communication and new possibilities for system solutions in process automation

Application

The SITRANS P280 is a WirelessHART field device for measuring absolute and gauge pressure.

The measuring ranges for absolute and gauge pressure measurements are 0 to 1.6, 10, 50, 200 and 320 bar (0 to 23, 145, 725, 2900 and 4641 psi).

The sensor is integrated into the transmitter housing.

On the wireless communication side, the transmitter supports the WirelessHART standard. A HART modem can be connected to the transmitter particularly for initial commissioning, alternatively the device can be commissioned comfortably by means of the local pushbuttons w/o any additional handset devices.

It can be used in all industries and applications in non-explosive areas.

Design

The SITRANS P280 has a robust aluminum enclosure and is suitable for outside use. It conforms with the IP65 safety class.

The operating temperature range is -40 to +80 °C (-40 to +176 °F). Power supply is provided through an integrated battery, which is available as an accessory. The device is only approved for operation with this battery.

The aerial features a rotatable joint which can be used for directional alignment. Wireless signals can thus be optimally received and transmitted.

A special highlight is the option for direct operation on the device. The operating strategy used in this case seamlessly integrates into the strategy of all new Siemens field devices.

Using the device's control buttons, it is easy to turn the HART modem interface of the device on and off. The device can be put to passive status and reactivated at any time. This helps to extend the service life of the battery.

The SITRANS P280 transmitter features a ceramic measuring cell for gauge and absolute pressure measurements.

Function

The SITRANS P280 can join to a WirelessHART network. It can be parameterized and operated through this network. Measured process values are transported via the network to a WirelessHART gateway.

Field device data received by the WirelessHART-Gateway is transmitted to the connected systems, for example the process control system SIMATIC PCS 7. An introduction to the mode of operation of WirelessHART can be found in Catalog FI 01, section 8 or at <http://www.siemens.com/wirelesshart>.

Pressure Measurement

Transmitters with WirelessHART

SITRANS P280 for gauge and absolute pressure

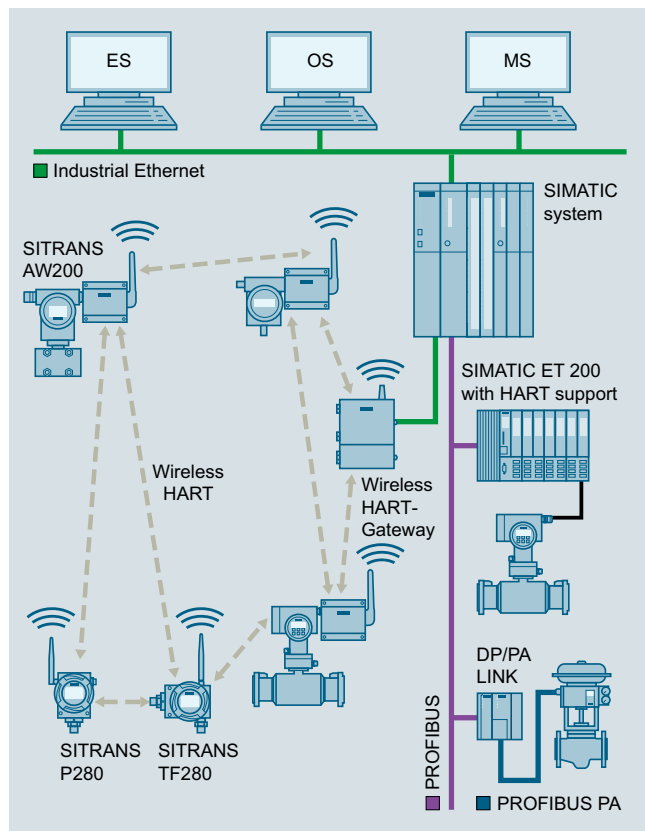
Integration

Connecting to SIMATIC PCS 7

The integration of field devices in SIMATIC PCS 7 and other process control systems can now be done seamlessly and cost-effectively with wireless technology, especially in situations where high wiring costs may be expected. Of particular interest are measuring points which are to be added and for which no MSR wiring is available.

Siemens WirelessHART devices are designed for optimum compatibility with products in the SCALANCE W range.

Where larger distances between the WirelessHART-Gateway and control systems need to be overcome, this connection can also be implemented on a wireless and cost-effective basis using the products of the SCALANCE W family.



Integration of a meshed network in SIMATIC PCS 7

Configuration

Configuration of the SITRANS P280 may be carried out as follows:

- Initial commissioning for the SITRANS P280 with SIMATIC PDM is generally carried out via a HART modem or the integrated local user interface, since the network ID and join key must be set up on the device before it can be accepted and integrated into the WirelessHART network.
- Once it is integrated into the network, the device can be conveniently operated with the WirelessHART network, the onsite HART modem or via the local user interface.
- Siemens WirelessHART devices operate with optimum coexistence to SCALANCE W family products.

Technical specifications

SITRANS P280 WirelessHART pressure transmitter

Mode of operation

Measuring principle	piezo-resistive
Measured variable	Gauge and absolute pressure

Gauge pressure input

Measuring range	Overload limit/Bursting pressure
0 ... 1.6 bar (0 ... 23 psi)	4 bar (58 psi)
0 ... 10 bar (0 ... 145 psi)	20 bar (290 psi)
0 ... 50 bar (0 ... 725 psi)	100 bar (1450 psi)
0 ... 200 bar (0 ... 2900 psi)	400 bar (5801 psi)
0 ... 320 bar (0 ... 4641 psi)	640 bar (9282 psi)

Units

mbar, bar, mH₂O, iH₂O, atm, Torr, gcm², kgcm², Pa, kPa, MPa, psi, mmHG, mmH₂O, ftH₂O, inHG, inH₂O

Absolute pressure input

Measuring range	Overload limit/Bursting pressure
0 ... 1.6 bar a (0 ... 23 psi a)	4 bar a (58 psi a)
0 ... 10 bar a (0 ... 145 psi a)	20 bar a (290 psi a)
0 ... 50 bar a (0 ... 725 psi a)	100 bar a (1450 psi a)
0 ... 200 bar a (0 ... 2900 psi a)	400 bar a (5801 psi a)
0 ... 320 bar a (0 ... 4641 psi a)	640 bar a (9282 psi a)

Units

mbar, bar, mH₂O, iH₂O, atm, Torr, gcm², kgcm², Pa, kPa, MPa, psi, mmHG, mmH₂O, ftH₂O, inHG, inH₂O

Output

Output signal	2.4 GHz Wireless signal with TSMP (Time Synchronized Mesh Protocol)
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Measuring accuracy

Error in measurement at limit setting incl. hysteresis and reproducibility	typ. 0.17 % of sensor's span max. 0.25 % of sensor's span
Long-term stability	max. ± 0.25 % of sensor/year span
Influence of ambient temperature	typ. 0.07 %/10K, max. 0.2 %/10 K of sensor's span

Rated conditions

Ambient conditions	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F) (in ambient temperatures below -20 °C (-4 °F) and above +70 °C (158 °F), readability of the display is limited.)
• Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
• Relative humidity	< 95 %
Climatic class	4K4H in accordance with EN 60721-3-4 (stationary use at locations not protected against weather)
Degree of protection	IP65/NEMA 4
Allowable media temperature	-40 ... +85 °C (-40 ... +185 °F)

Pressure Measurement

Transmitters with WirelessHART

SITRANS P280 for gauge and absolute pressure

1

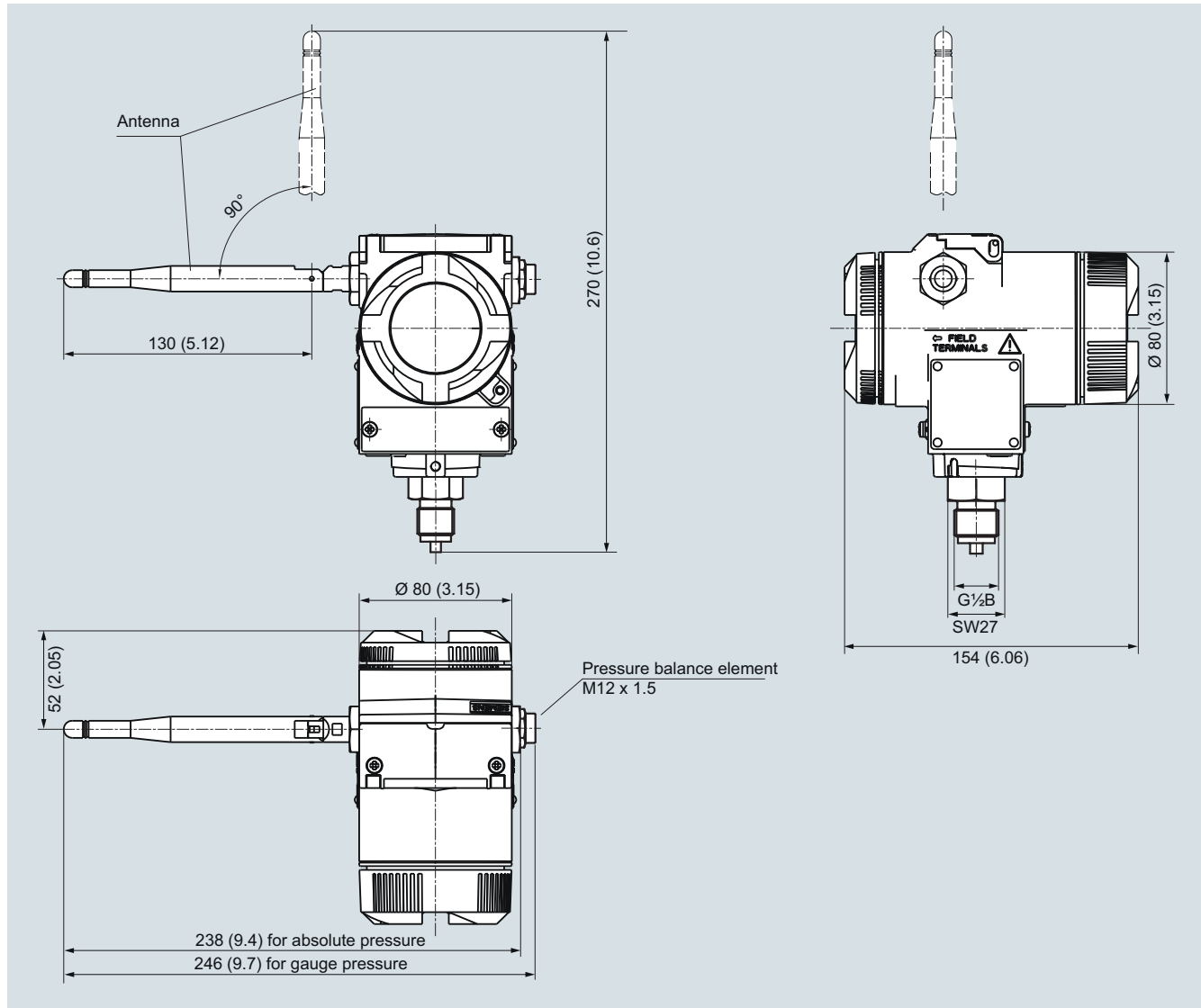
Design		Selection and Ordering data	Article No.
Enclosure material	low-copper die-cast aluminum, AC-AISI12(Fe)	SITRANS P280 WirelessHART pressure transmitter (Required battery not included with delivery, see accessories) Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7MP1120-
Shock resistance	in accordance with DIN EN 60068-2-29 / 03.95		0
Resistance to vibration	in accordance with DIN EN 60068-2-6/ 12.07		
Weight		Measuring cell filling Dry measuring cell	0
• without battery	1.5 kg (3.31 lb)		
• With battery	1.6 kg (3.53 lb)	Measuring span Gauge pressure 0 ... 1.6 bar (0 ... 23 psi) 0 ... 10 bar (0 ... 145 psi) 0 ... 50 bar (0 ... 725 psi) 0 ... 200 bar (0 ... 2900 psi) 0 ... 320 bar (0 ... 4641 psi) Absolute pressure 0 ... 1.6 bar a (0 ... 3 psi a) 0 ... 10 bar a (0 ... 145 psi a) 0 ... 50 bar a (0 ... 725 psi a) 0 ... 200 bar a (0 ... 2900 psi a) 0 ... 320 bar a (0 ... 4641 psi a)	D E F G H M N P Q R
Dimensions (W x H x D)	See Dimensional drawing		
Process connection	<ul style="list-style-type: none"> G½B male thread as per EN 837-1 ½-14 NPT 	Wetted parts Ceramic	K
Sensor break	Is recognized	Display Display, visible	1
Displays and controls		Enclosure Die-cast aluminum	1
Display (with illumination)	104 x 80 pixels	Process connection G½ as per EN 837-1 ½-14 NPT	0 1
• Size of display	adjustable	Explosion protection Without	A
• Number of digits	adjustable	Antenna Variable, attached to device	A
• Number of spaces after comma			
Setting options	<ul style="list-style-type: none"> on site with 3 buttons with SIMATIC PDM or HART-Communicator 	Further designs Please add "-Z" to Article No. and specify Order code(s) and plain text.	Order code
Power supply		Stainless steel tag plate (measuring point description) max. 16 digits entered in plain text Y15:	Y15
Battery	3.6 V DC	Measuring point message max. 27 characters entered in plain text: Y16:	Y16
Communication		Accessories	Article No.
Radio	WirelessHART V7.1 conforming	Lithium battery for SITRANS TF280/P280	7MP1990-0AA00
Transmission frequency band	2.4 GHz (ISM-Band)	Mounting bracket, steel	7MF4997-1AC
Transmission range under reference conditions	Up to 250 m (line of sight) in outside areas Up to 50 m (greatly dependent on obstacles) in inside areas	Mounting bracket, stainless steel	7MF4997-1AJ
Communication interfaces	<ul style="list-style-type: none"> HART communication with HART modem WirelessHART 	Cover, die-cast aluminum, without window	7MF4997-1BB
		Cover, die-cast aluminum, with window	7MF4997-1BE
		HART modem with USB interface	7MF4997-1DB
		SIMATIC PDM	see Sec. 8
Certificates and approvals			
Wireless communication approvals	R&TTE, FCC		
General Product Safety	CSA US/C, CE, UL		
Classification according to pressure equipment directive (PED 2014/68/EU)	Gases: Fluid group 1 Liquids: Fluid group 1; meets requirements as per Section 3, Subsection 3 (sound engineering practice)		

Pressure Measurement

Transmitters with WirelessHART

SITRANS P280 for gauge and absolute pressure

Dimensional drawings



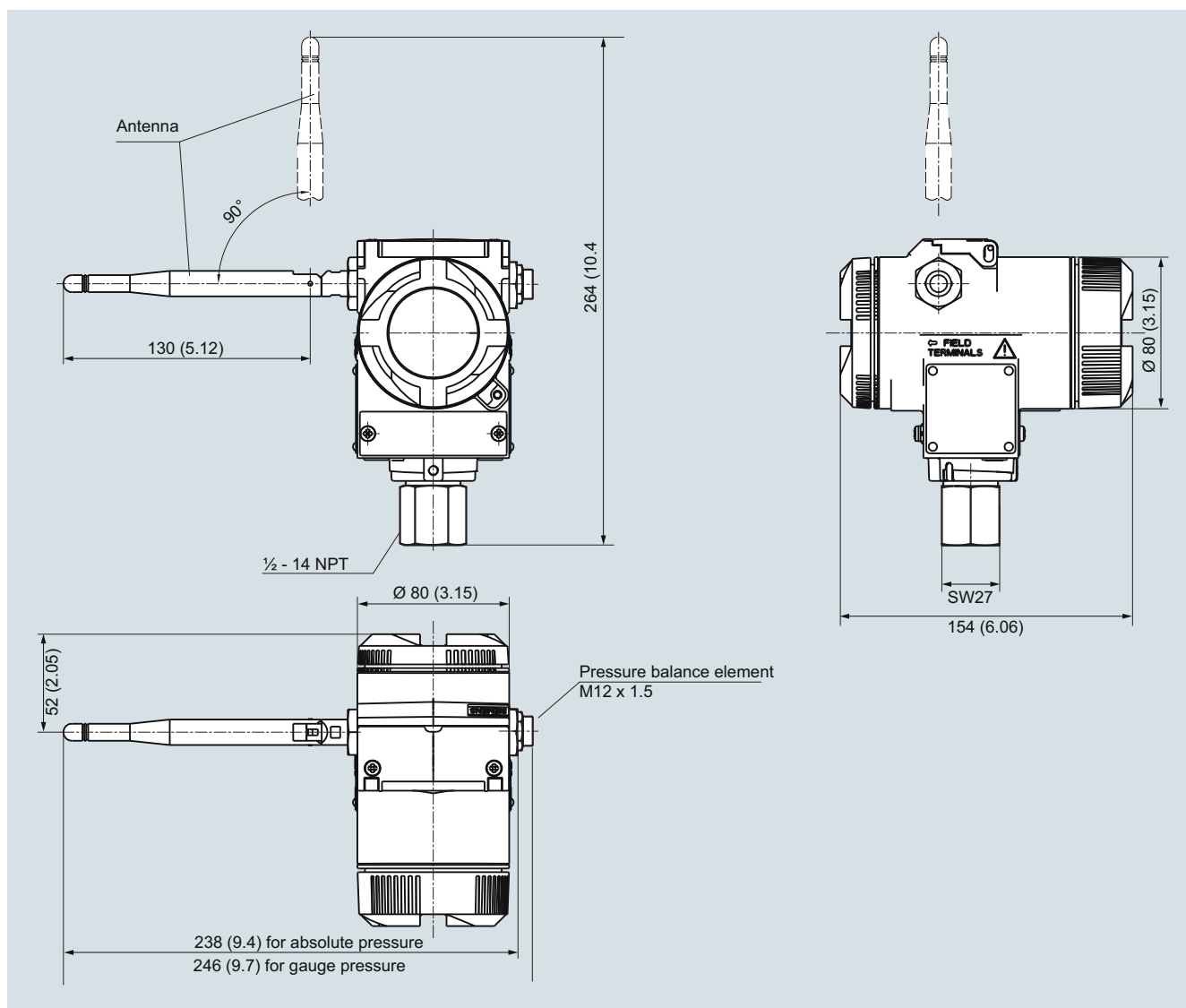
SITRANS P280 WirelessHART pressure transmitter, process connection G 1/2", dimensions in mm (inch)
The dimensional drawing of the mounting bracket see on page 1/279.

Pressure Measurement

Transmitters with WirelessHART

SITRANS P280 for gauge and absolute pressure

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SITRANS P280 WirelessHART pressure transmitter, process connection 1/2 - 14 NPT, dimensions in mm (inch)
The dimensional drawing of the mounting bracket see on page 1/279.

Pressure Measurement

Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

Overview



The SITRANS P300 is a digital pressure transmitter for relative and absolute pressure. The conventional thread versions are available as process connections, as are flush-mounted versions. A large number of the flush-mounted versions are suitable for food and pharmaceutical applications, and satisfy the EHEDG and 3A hygiene requirements.

The output signal is a load-independent direct current from 4 to 20 mA or a PROFIBUS PA or FOUNDATION signal, which is linearly proportional to the input pressure. Communication is via HART protocol or PROFIBUS PA interface. Convenient buttons for easy local operation of the basic settings of the pressure transmitter.

The SITRANS P300 has a single-chamber stainless steel casing. The pressure transmitter is approved with "intrinsically safe" type of protection. It can be used in zone 1 or zone 0.

Benefits

- High quality and service life
- High reliability even under extreme chemical and mechanical loads
- Extensive diagnosis and simulation functions
- Minimum conformity error
- Small long-term drift
- Wetted parts made of high-grade materials (such as stainless steel, Hastelloy)
- Measuring range 0.008 bar to 400 bar (0.1 psi to 5802 psi)
- High measuring accuracy
- Parameterization over control keys and HART or PROFIBUS PA or FOUNDATION Fieldbus

Application

The pressure transmitter is available in versions for gauge pressure and for absolute pressure. The output signal is always a load-independent direct current from 4 to 20 mA or a PROFIBUS PA or FOUNDATION Fieldbus signal, which is linearly proportional to the input pressure. The pressure transmitter measures aggressive, non-aggressive and hazardous gases, as well as vapors and liquids.

It can be used for the following measurement types:

- Gauge pressure
- Absolute pressure

With appropriate parameter settings, it can also be used for the following additional measurement types:

- Level
- Volume
- Mass

The "intrinsically-safe" Ex version of the transmitter can be installed in hazardous areas (zone 1). The transmitters are provided with an EC type examination certificate and comply with the respective harmonized European standards of ATEX.

Gauge pressure

This variant measures aggressive, non-aggressive and hazardous gases, vapors and liquids.

The smallest span is 0.01 bar (0.15 psi), the largest is 400 bar (5802 psi).

Level

With appropriate parameter settings, the gauge pressure variant measures the level of aggressive, non-aggressive and hazardous liquids.

For measuring the level in an open container you require one device; for measuring the level in a closed container, you require two devices and a process control system.

Absolute pressure

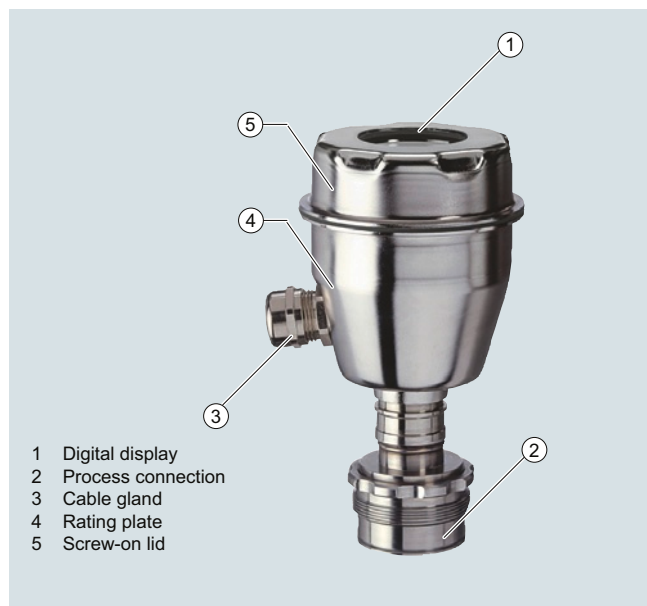
This variant measures the absolute pressure of aggressive, non-aggressive and hazardous gases, vapors and liquids.

The smallest span is 0.008 bar a (0.12 psi a), the largest is 30 bar a (435 psi a).

Design

The device comprises:

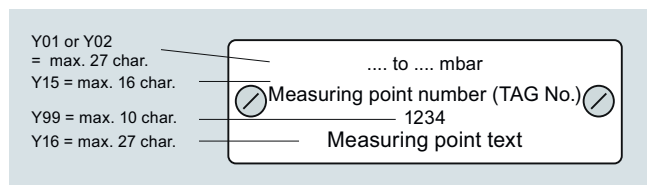
- Electronics
- Housing
- Measuring cell



Perspective view of SITRANS P300

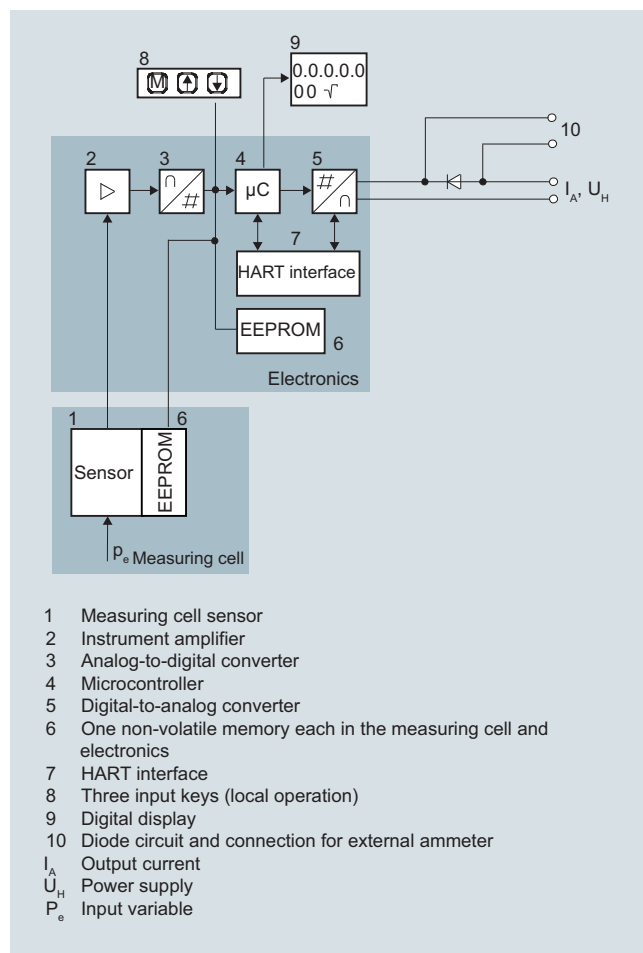
The housing has a screw-on lid (5) and, depending on the version, is with or without an inspection window. The electrical terminal housing, the buttons for operation of the device are located under this lid and, depending on the version, the display. The connections for the auxiliary power U_H and the shield are in the terminal housing. The cable gland is mounted on the side of the housing. The measuring cell with the process connection (2) is located on the bottom of the housing. The measuring cell with the process connection may differ from the one shown in the diagram, depending on the device version.

Example of attached measuring points sign



Function

Operation of electronics with HART communication



Function diagram of electronics

The input pressure is converted into an electrical signal by the sensor (1). This signal is amplified by the measuring amplifier (2), and digitalized in an analog-to-digital converter (3). The digital signal is analyzed in a microcontroller (4) and corrected according to linearity and thermal characteristics. In a digital-to-analog converter (5) it is then converted into the output current of 4 to 20 mA. A diode circuit provides reverse polarity protection. You can make an uninterrupted current measurement with a low-ohm ammeter at the connection (10). The data specific to the measuring cell, the electronic data and parameter settings are stored in two non-volatile memories (6). The first memory is linked to the measuring cell, the second to the electronics.

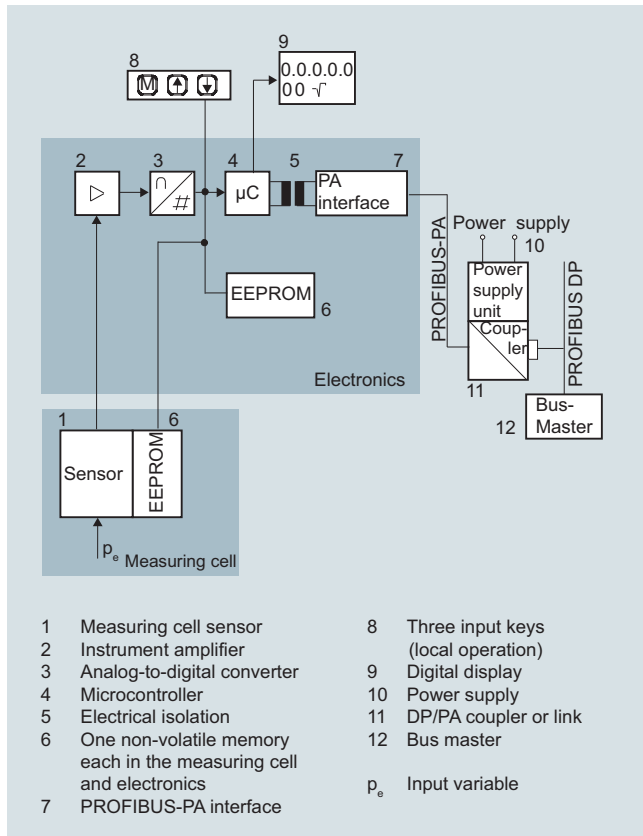
The buttons (8) can be used to call up individual functions, so-called modes. If you have a device with a display (9), you can use this to track mode settings and other messages. The basic mode settings can be changed with a computer via the HART modem (7).

Pressure Measurement

Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

Operation of electronics with PROFIBUS PA communication

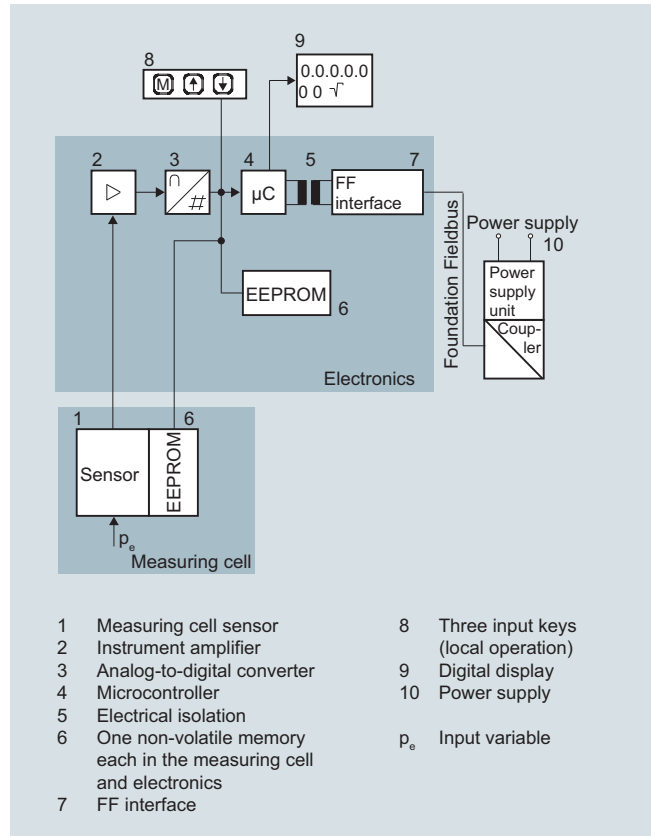


Function diagram of electronics

The input pressure is converted into an electrical signal by the sensor (1). This signal is amplified by the measuring amplifier (2) and digitalized in an analog-to-digital converter (3). The digital signal is analyzed in a microcontroller (4) and corrected according to linearity and thermal characteristics. It is then made available at the PROFIBUS PA over an electrically isolated PROFIBUS PA interface (7). The data specific to the measuring cell, the electronic data and parameter settings are stored in two non-volatile memories (6). The first memory is linked to the measuring cell, the second to the electronics.

The buttons (8) can be used to call up individual functions, so-called modes. If you have a device with a display (9), you can use this to track mode settings and other messages. The basic mode settings (12) can be changed with a computer over the bus master.

Operation of electronics with FOUNDATION Fieldbus communication



Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") amplified by the measuring amplifier (2) and digitalized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, its linearity and temperature response corrected, and provided on the FOUNDATION Fieldbus through an electrically isolated FOUNDATION Fieldbus interface (7).

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

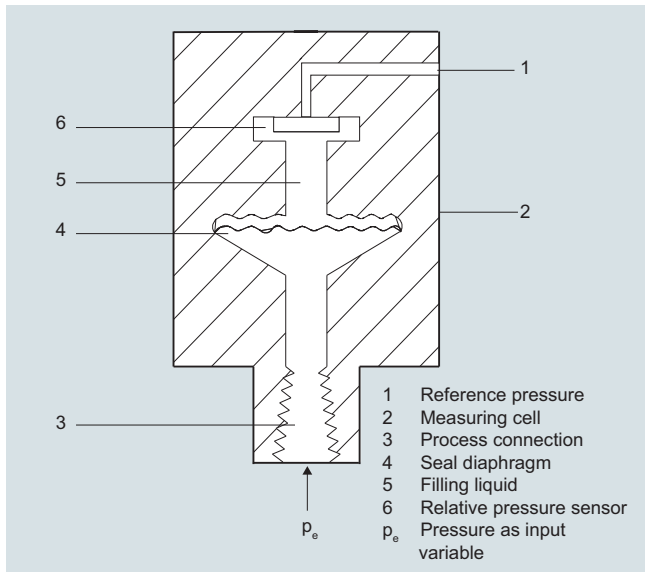
Using the three input buttons (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The results with status values and diagnostic values are transferred by cyclic data transmission on the FOUNDATION Fieldbus. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as National Instruments Configurator is required for this.

Mode of operation of the measuring cells

The process connections available include the following:

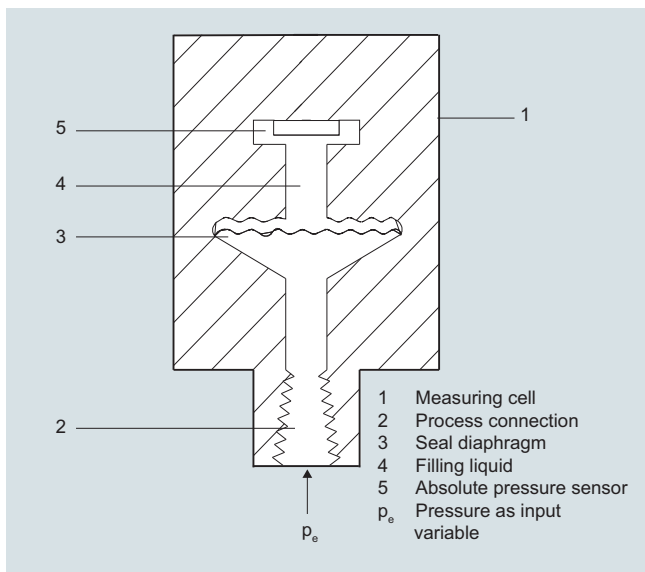
- G $\frac{1}{2}$
- $\frac{1}{2}$ -14 NPT
- Flush-mounted diaphragm:
 - Flanges to EN
 - Flanges to ASME
 - NuG and pharmaceutical connections

Measuring cell for gauge pressure

Measuring cell for gauge pressure, function diagram

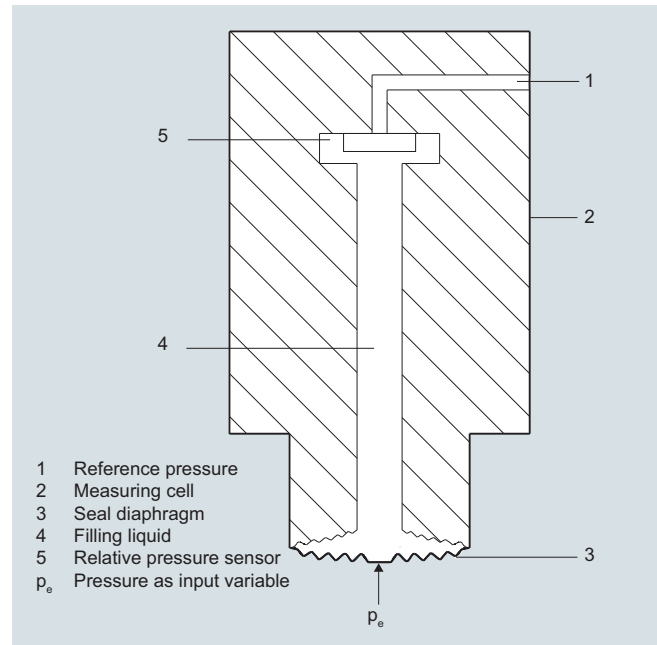
The input pressure (p_e) is transferred to the gauge pressure sensor (6) via the seal diaphragm (4) and the filling liquid (5), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

Transmitters with spans ≤ 63 bar (≤ 926.1 psi) measure the input pressure compared to atmospheric, transmitters with spans of ≥ 160 bar (≥ 2352 psi) compared to a vacuum.

Measuring cell for absolute pressure

Measuring cell for absolute pressure, function diagram

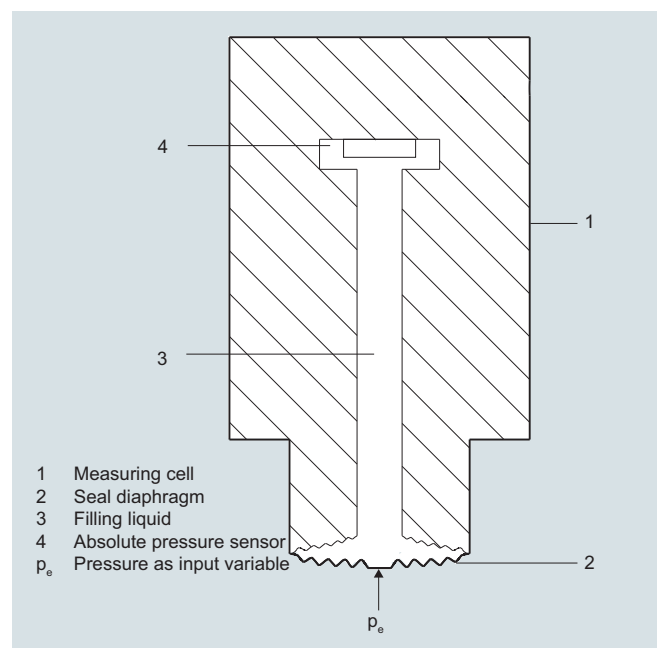
The input pressure (p_e) is transferred to the absolute pressure sensor (5) via the seal diaphragm (3) and the filling liquid (4), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

Measuring cell for gauge pressure, front-flush diaphragm

Measuring cell for gauge pressure, front-flush diaphragm, function diagram

The input pressure (p_e) is transferred to the gauge pressure sensor (6) via the seal diaphragm (4) and the filling liquid (5), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

Transmitters with spans ≤ 63 bar (≤ 926.1 psi) measure the input pressure compared to atmospheric, transmitters with spans of ≥ 160 bar (≥ 2352 psi) compared to a vacuum.

Measuring cell for absolute pressure, front-flush diaphragm

Measuring cell for absolute pressure, front-flush diaphragm, function diagram

Pressure Measurement

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SITRANS P300 for gauge and absolute pressure

The input pressure (p_e) is transferred to the absolute pressure sensor (5) via the seal diaphragm (3) and the filling liquid (4), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

Parameterization

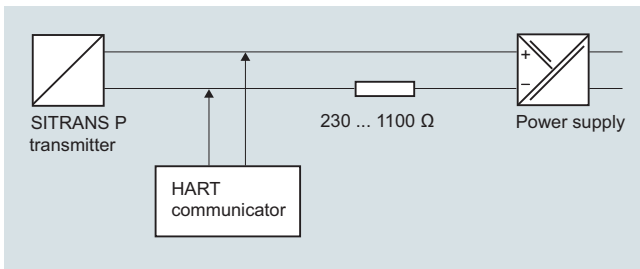
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

Parameterization using the input buttons (local operation)

With the input buttons you can easily set the most important parameters without any additional equipment.

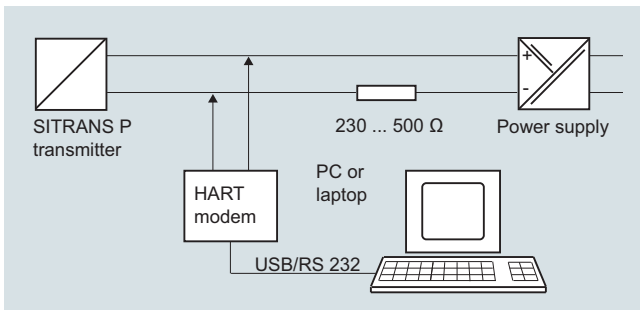
Parameterization using HART communication

Parameterization using HART communication is performed with a HART communicator or a PC.



Communication between a HART communicator and a pressure transmitter

When parameterizing with the HART communicator, the connection is made directly to the 2-wire cable.



HART communication between a PC communicator and a pressure transmitter

When parameterizing with a PC, the connection is made through a HART modem.

The signals needed for communication in conformity with the HART 5.x or 6.x protocols are superimposed on the output current using the Frequency Shift Keying (FSK) method.

Adjustable parameters on SITRANS P300 with HART communication

Parameters	Input keys	HART communication
Start of scale	x	x
Full-scale value	x	x
Electrical damping	x	x
Start-of-scale value without application of a pressure ("Blind setting")	x	x
Full-scale value without application of a pressure ("Blind setting")	x	x
Zero adjustment	x	x
current transmitter	x	x
Fault current	x	x
Disabling of buttons, write protection	x	x ¹⁾
Type of dimension and actual dimension	x	x
Input of characteristic		x
Freely-programmable LCD		x
Diagnostic functions		x

¹⁾ Cancel apart from write protection

Diagnostic functions for SITRANS P300 with HART communication

- Zero correction display
- Event counter
- Limit transmitter
- Saturation alarm
- Slave pointer
- Simulation functions
- Maintenance timer

Available physical units of display for SITRANS P300 with HART communication

Table style: Technical specifications 2

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm ² , kg/cm ² , inH ₂ O, inH ₂ O (4 °C), mmH ₂ O, ftH ₂ O (20 °C), inHg, mmHg
Level (height data)	m, cm, mm, ft, in
Volume	m ³ , dm ³ , hl, yd ³ , ft ³ , in ³ , US gallon, Imp. gallon, bushel, barrel, barrel liquid
Mass	g, kg, t, lb, Ston, Lton, oz
Temperature	K, °C, °F, °R
Miscellaneous	%, mA

SITRANS P300 for gauge and absolute pressure

Parameterization through PROFIBUS PA interface

Fully digital communication through PROFIBUS PA, profile 3.0, is particularly user-friendly. The PROFIBUS connects the SITRANS P300 PA to a process control system, e.g. SIMATIC PSC 7. Communication is possible even in a potentially explosive environment.

For parameterization through PROFIBUS you need suitable software, e.g. SIMATIC PDM (Process Device Manager).

Parameterization through FOUNDATION Fieldbus interface

Fully digital communication through FOUNDATION Fieldbus is particularly user-friendly. Through the FOUNDATION Fieldbus the P300 is connected to a process control system. Communication is possible even in a potentially explosive environment.

For parameterization through the FOUNDATION Fieldbus you need suitable software, e.g. National Instruments Configurator.

Adjustable parameters for SITRANS P300 with PROFIBUS PA and FOUNDATION Fieldbus

Adjustable parameters	Input keys	PROFIBUS PA and FOUNDATION Fieldbus interface
Electrical damping	x	x
Zero adjustment (correction of position)	x	x
Buttons and/or function disabling	x	x
Source of measured-value display	x	x
Physical dimension of display	x	x
Position of decimal point	x	x
Bus address	x	x
Adjustment of characteristic	x	x
Input of characteristic		x
Freely-programmable LCD		x
Diagnostic functions		x

Diagnostic functions for SITRANS P300 with PROFIBUS PA and FOUNDATION Fieldbus

- Event counter
- Slave pointer
- Maintenance timer
- Simulation functions
- Display of zero correction
- Limit transmitter
- Saturation alarm

Physical dimensions available for the display

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	MPa, kPa, Pa, bar, mbar, torr, atm, psi, g/cm ² , kg/cm ² , mmH ₂ O, mmHg (4 °C), inH ₂ O, inHg (4 °C), ftH ₂ O (20 °C), mmHg, inHg
Level (height data)	m, cm, mm, ft, in, yd
Mass	g, kg, t, lb, Ston, Lton, oz
Volume	m ³ , dm ³ , hl, yd ³ , ft ³ , in ³ , US gallon, imp. gallon, bushel, barrel, barrel liquid
volume flow	m ³ /s, m ³ /min, m ³ /h, m ³ /d, l/s, l/min, l/h, l/d, Ml/d, ft ³ /s, ft ³ /min, ft ³ /h, ft ³ /d, US gallon/s, US gallon/min, US gallon/h, US gallon/d, bbl/s, bbl/min, bbl/h, bbl/d
Mass flow	g/s, g/min, g/h, g/d, kg/s, kg/min, kg/h, kg/d, t/s, t/min, t/h, t/d, lb/s, lb/min, lb/h, lb/d, STon/s, STon/min, STon/h, STon/d, LTon/s, LTon/min, LTon/h, LTon/d
Total mass flow	t, kg, g, lb, oz, LTon, STon
Temperature	K, °C, °F, °R
Miscellaneous	%

Hygiene version

In the case of the SITRANS P300 with 7MF812-... front-flush diaphragm, selected connections comply with the requirements of the EHEDG or 3A. You will find further details in the order form. Please note in particular that the seal materials used must comply with the requirements of 3A. Similarly, the filling liquids used must be FDA-compliant.

Pressure Measurement

Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

Technical specifications

SITRANS P300 for gauge and absolute pressure

Gauge pressure input

Measured variable

Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)

(for oxygen measurement, max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/process temperature)

HART	PROFIBUS PA/ FOUNDATION Fieldbus		
Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure
8.3 ... 250 mbar 0.83 ... 25 kPa 0.12 ... 3.6 psi	250 mbar 25 kPa 3.6 psi	4 bar 400 kPa 58 psi	6 bar 600 kPa 87 psi
0.01 ... 1 bar 1 ... 100 kPa 0.15 ... 14.5 psi	1 bar 100 kPa 14.5 psi	4 bar 400 kPa 58 psi	6 bar 600 kPa 87 psi
0.04 ... 4 bar 4 ... 400 kPa 0.58 ... 58 psi	4 bar 400 kPa 58 psi	7 bar 0.7 MPa 102 psi	10 bar 1 MPa 145 psi
0.16 ... 16 bar 16 ... 1600 kPa 2.3 ... 232 psi	16 bar 1600 kPa 232 psi	21 bar 2.1 MPa 305 psi	32 bar 3.2 MPa 464 psi
0.63 ... 63 bar 63 ... 6300 kPa 9.1 ... 914 psi	63 bar 6300 kPa 914 psi	67 bar 6.7 MPa 972 psi	100 bar 10 MPa 1450 psi
1.6 ... 160 bar 0.16 ... 16 MPa 23 ... 2321 psi	160 bar 16 MPa 2321 psi	167 bar 16.7 MPa 2422 psi	250 bar 2.5 MPa 3626 psi
4 ... 400 bar 0.4 ... 40 kPa 58 ... 5802 psi	400 bar 40 kPa 5802 psi	400 bar 40 MPa 5802 psi	600 bar 60 MPa 8700 psi

Lower measuring limit

(for 250mbar/25 kPa/3.6 psi measuring cells, the lower measuring limit is 750 mbar a/75 kPa a/10.8 psi a. The measuring cell is vacuum-resistant up to 30 mbar a/3 kPa a/0.44 psi a.)

- Measuring cell with silicone oil
- Measuring cell with inert filling liquid

Upper measuring limit

30 mbar a/3 kPa a/0.44 psi a
30 mbar a/3 kPa a/0.44 psi a
100 % of max. span
(for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 ° (140 °F) ambient temperature/process temperature)

Absolute pressure input

Measured variable

Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)

HART	PROFIBUS PA/ FOUNDATION Fieldbus		
Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure
8.34 ... 250 mbar a 0.83 ... 25 kPa a 3.35 ... 100 inH ₂ O a 0.13 ... 3.63 psi a	250 mbar a 25 kPa a 100 inH ₂ O a	1.5 bar a 150 kPa a 21.8 psi a	6 bar a 600 kPa a 87 psi a
43.34 ... 1300 mbar a 4.33 ... 130 kPa a 17.42 ... 522.4 inH ₂ O a 0.63 ... 18.86 psi a	1300 mbar a 130 kPa a 525 inH ₂ O	2.6 bar a 260 kPa a 37.7 psi a	10 bar a 1 MPa a 145 psi a
0.17 ... 5 bar a 17 ... 500 kPa a 2.43 ... 72.5 psi a	5000 mbar a 500 kPa a 72.5 psi a	10 bar a 1 MPa a 145 psi a	30 bar a 3 MPa a 435 psi a
1 ... 30 bar a 0.1 ... 3 MPa a 14.6 ... 435 psi a	30 bar a 3 MPa a 435 psi a	45 bar a 4.5 MPa a 653 psi a	100 bar a 10 MPa a 1450 psi a

Pressure Measurement

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SITRANS P300 for gauge and absolute pressure

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SITRANS P300 for gauge and absolute pressure

Lower measuring limit	0 mbar a/0 kPa a /0 psi a
<ul style="list-style-type: none"> Measuring cell with silicone oil Measuring cell with inert filling liquid 	30 mbar a/3 kPa a/0.44 psi a
<ul style="list-style-type: none"> for process temperature $-20\text{ °C} < \vartheta \leq +60\text{ °C}$ ($-4\text{ °F} < \vartheta \leq +140\text{ °F}$) for process temperature $60\text{ °C} < \vartheta \leq +100\text{ °C}$ (max. 85 °C for measuring cell 30 bar) ($140\text{ °F} < \vartheta \leq +212\text{ °F}$ (max. 185 °F for meas. cell 435 psi)) 	$30\text{ mbar a} + 20\text{ mbar a} \cdot (\vartheta - 60\text{ °C})/\text{°C}$ $3\text{ kPa a} + 2\text{ kPa a} \cdot (\vartheta - 60\text{ °C})/\text{°C}$ $0.44\text{ psi a} + 0.29\text{ psi a} \cdot (\vartheta - 140\text{ °F})/\text{°F}$
Upper measuring limit	100 % of max. span (for oxygen measurement max. 100 bar/10 MPa/1450 psi und 60 °C (140 °F) ambient temperature/process temperature)
Start of scale value	Between the measuring limits (fully adjustable)

Input of gauge pressure, with front-flush diaphragm

Measured variable	Gauge pressure, front-flush			
Span (continuously adjustable) or measuring range, max. operating pressure and max. test pressure	HART	PROFIBUS PA/ FOUNDATION Fieldbus		
	Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure
	0.01 ... 1 bar	1 bar	4 bar	6 bar
	1 ... 100 kPa	100 kPa	400 kPa	600 kPa
	0.15 ... 14.5 psi	14.5 psi	58 psi	87 psi)
	0.04 ... 4 bar	4 bar	7 bar	10 bar
	4 ... 400 kPa	400 kPa	0.7 MPa	1 MPa
	0.58 ... 58 psi	58 psi	102 psi	145 psi
	0.16 ... 16 bar	16 bar	21 bar	32 bar
	16 ... 1600 kPa	1600 kPa	2.1 MPa	3.2 MPa
	2.3 ... 232 psi	232 psi	305 psi	464 psi
	0.63 ... 63 bar	63 bar	67 bar	100 bar
	63 ... 6300 kPa	6300 kPa	6.7 MPa	10 MPa
	9.1 ... 914 psi	914 psi	972 psi	1450 psi
Lower measuring limit	100 mbar a/10 kPa a/1.45 psi a			
<ul style="list-style-type: none"> Measuring cell with silicone oil filling Measuring cell with inert filling liquid Measuring cell with Neobee 	100 mbar a/10 kPa a/1.45 psi a			
Upper measuring limit	100% of max. span			

Input of absolute pressure, with front-flush diaphragm

Measured variable	Absolute pressure, front-flush			
Span (continuously adjustable) or measuring range, max. operating pressure and max. test pressure	HART	PROFIBUS PA/ FOUNDATION Fieldbus		
	Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure
	43 ... 1300 mbar a	1300 mbar a	2.6 bar a	10 bar a
	4.3 ... 130 kPa a	130 kPa a	260 kPa a	1 MPa a
	17 ... 525 inH ₂ O a	525 inH ₂ O a	37.7 psi a	145 psi a
	160 ... 5000 mbar a	5000 mbar a	10 bar a	30 bar a
	16 ... 500 kPa a	500 kPa a	1 MPa a	3 MPa a
	2.32 ... 72.5 psi a	72.5 psi a	145 psi a	435 psi a
	1 ... 30 bar a	30 bar a	45 bar a	100 bar a
	0.1 ... 3 MPa a	3 MPa a	4.5 MPa a	10 MPa a
	14.5 ... 435 psi a	435 psi a	653 psi a	1450 psi a
	Depending on the process connection, the span may differ from these values			
Lower measuring limit	0 mbar a/0 kPa a/0 psi a			
Upper measuring limit	100 % of max. span			

Output	HART	PROFIBUS PA/ FOUNDATION Fieldbus
Output signal	4 ... 20 mA	Digital PROFIBUS PA or FOUNDATION Fieldbus signal
Physical bus	-	IEC 61158-2
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.	
Electrical damping (step width 0.1 s)	Set to 2 s (0 ... 100 s)	

Pressure Measurement

Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

SITRANS P300 for gauge and absolute pressure

Measuring accuracy for gauge pressure

Reference conditions

According to IEC 60770-1

- Increasing characteristic
- Start-of-scale value 0 bar/kPa/psi
- Stainless steel seal diaphragm
- Measuring cell with silicone oil
- Room temperature 25 °C (77 °F)

Measuring span ratio r (spread, Turn-Down)

$r = \text{max. measuring span} / \text{set measuring span or nominal pressure range}$

Error in measurement at limit setting incl. hysteresis and reproducibility

- Linear characteristic

- 250 mbar/25 kPa/3.6 psi

$r \leq 1.25$: ≤ 0.075 %
 $1.25 < r \leq 30$: $\leq (0.008 \cdot r + 0.065)$ %

- 1 bar/100 kPa/3.6 psi
 4 bar/400 kPa/58 psi
 16 bar/1.6 MPa/232 psi
 63 bar/6.3 MPa/914 psi
 160 bar/16 MPa/2321 psi

$r \leq 5$: ≤ 0.075 %
 $5 < r \leq 100$: $\leq (0.005 \cdot r + 0.05)$ %

- 400 bar/40 MPa/5802 psi

$r \leq 3$: ≤ 0.075 %
 $3 < r \leq 10$: $\leq (0.0029 \cdot r + 0.071)$ %
 $10 < r \leq 100$: $\leq (0.005 \cdot r + 0.05)$ %

Influence of ambient temperature
 (in percent per 28 °C (50 °F))

- 250 mbar/25 kPa/3.6 psi

$\leq (0.16 \cdot r + 0.1)$ %

- 1 bar/100 kPa/3.6 psi
 4 bar/400 kPa/58 psi
 16 bar/1.6 MPa/232 psi
 63 bar/6.3 MPa/914 psi
 160 bar/16 MPa/2321 psi
 400 bar/40 MPa/5802 psi

$\leq (0.07 \cdot r + 0.08)$ %

Long-term stability (temperature change ± 30 °C (± 54 °F))

- 250 mbar/25 kPa/3.6 psi

$\leq (0.25 \cdot r)$ % per year

- 1 bar/100 kPa/3.6 psi
 4 bar/400 kPa/58 psi

$\leq (0.25 \cdot r)$ % in 5 years

- 16 bar/1.6 MPa/232 psi
 63 bar/6.3 MPa/914 psi
 160 bar/16 MPa/2321 psi
 400 bar/40 MPa/5802 psi

$\leq (0.125 \cdot r)$ % in 5 years

Effect of mounting position

≤ 0.05 mbar/0.005 kPa/0.000725 psi per 10° inclination
 (zero point correction is possible with position error compensation)

Effect of auxiliary power supply
 (in percent per change in voltage)

0.005 % per 1 V

Measuring value resolution for PROFIBUS PA and
 FOUNDATION Fieldbus

$3 \cdot 10^{-5}$ of the rated measuring range

SITRANS P300 for gauge and absolute pressure**Measuring accuracy for absolute pressure**

Reference conditions

According to IEC 60770-1

- Increasing characteristic
- Start-of-scale value 0 bar/kPa/psi
- Stainless steel seal diaphragm
- Measuring cell with silicone oil
- Room temperature 25 °C (77 °F)

Measuring span ratio r (spread, Turn-Down) $r = \text{max. measuring span/set measuring span or nominal pressure range}$

Error in measurement at limit setting incl. hysteresis and reproducibility

- Linear characteristic

- $r \leq 10$ $\leq 0.1 \%$ - $10 < r \leq 30$ $\leq 0.2 \%$ Influence of ambient temperature
(in percent per 28 °C (50 °F))

- 250 mbar a/25 kPa a/3.6 psi a

 $\leq (0.15 \cdot r + 0.1) \%$

- 1300 mbar a/130 kPa a/18.8 psi a
5 bar a/500 kPa a/72.5 psi a
30 bar a/3000 kPa a/435 psi a

 $\leq (0.08 \cdot r + 0.16) \%$ Long-term stability (temperature change ± 30 °C (± 54 °F)) $\leq (0.25 \cdot r) \%$ in 5 years

Effect of mounting position (in pressure per change in angle)

 $\leq 0.05 \text{ mbar}/0.005 \text{ kPa}/0.000725 \text{ psi}$ per 10° inclination
(zero point correction is possible with position error compensation)Effect of auxiliary power supply
(in percent per change in voltage)

0.005 % per 1 V

Measuring value resolution for PROFIBUS PA and
FOUNDATION Fieldbus $3 \cdot 10^{-5}$ of the rated measuring range**Measuring accuracy for gauge and absolute pressure,
with front-flush diaphragm**

According to IEC 60770-1

Reference conditions

- Increasing characteristic
- Start-of-scale value 0 bar/kPa/psi
- Stainless steel seal diaphragm
- Measuring cell with silicone oil
- Room temperature 25 °C (77 °F)

Measuring span ratio r (spread, Turn-Down) $r = \text{max. measuring span/set measuring span or nom. pressure range}$

Error in measurement at limit setting incl. hysteresis and reproducibility

- Linear characteristic

- $r \leq 5$ $\leq 0.075 \%$ - $5 < r \leq 100$ $\leq (0.005 \cdot r + 0.05) \%$ - $r \leq 10$

-

 $\leq 0.2 \%$ - $10 < r \leq 30$

-

 $\leq 0.4 \%$ Influence of ambient temperature
(as percentage per 28 °C (50 °F)) $\leq (0.08 \cdot r + 0.16) \%$ $\leq (0.16 \cdot r + 0.24) \%$ Effect of process temperature
(in pressure per temperature change)

- Temperature difference between process temperature and ambient temperature

3 mbar/0.3 kPa/0.04 psi per 10 K

Long-term stability (temperature change ± 30 °C (± 54 °F)) $(0.25 \cdot r) \%$ in 5 years

Effect of mounting position (in pressure per change in angle)

0.4 mbar/0.04 kPa/0.006 per 10° inclination
(zero point correction is possible with position error compensation)Effect of auxiliary power supply
(in percent per change in voltage)

0.005 % per 1 V

Measuring value resolution for PROFIBUS PA and
FOUNDATION Fieldbus $3 \cdot 10^{-5}$ of the rated measuring range

Pressure Measurement

Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

SITRANS P300 for gauge and absolute pressure

Rated conditions

Installation conditions

Ambient temperature

- Measuring cell with silicone oil
- Measuring cell with Neobee oil (FDA-compliant, with flush-mounted diaphragm)
- Measuring cell with inert liquid
- Display readable
- Storage temperature

Observe the temperature class in areas subject to explosion hazard.

-40 ... +85 °C (-40 ... +185 °F)

-10 ... +85 °C (14 ... +185 °F)

-40 ... +85 °C (-40 ... +185 °F)

-30 ... +85 °C (-22 ... +185 °F)

-50 ... +85 °C (-58 ... +185 °F)

(for Neobee: -20 ... +85 °C (-4 ... +185 °F))

(for temperature oil: -10 ... +85 °C (14 ... +165 °F))

Climatic class

Condensation

Relative humidity 0 ... 100 %

Condensation permissible, suitable for use in the tropics

Degree of protection

- according to EN 60529
- according to NEMA 250

IP65, IP68

IP65, IP68, Type 4X, enclosure cleaning, resistant to lyes, steam to 150 °C (302 °F)

Electromagnetic Compatibility

- Emitted interference and interference immunity

Acc. to IEC 61326 and NAMUR NE 21

Medium conditions

Temperature of medium

- Measuring cell with silicone oil
- Measuring cell with silicone oil (FDA-compliant, with flush-mounted diaphragm)
- Measuring cell with Neobee oil "Measuring cell with Neobee oil (FDA-compliant, with flush-mounted diaphragm)
- Measuring cell with silicone oil, with temperature decoupler (only for gauge pressure version with flush-mounted diaphragm)
- Measuring cell with Neobee oil, with temperature decoupler (only for gauge pressure version with flush-mounted diaphragm)
- Measuring cell with inert liquid
- Measuring cell with high-temperature oil (only for gauge pressure version with flush-mounted diaphragm)

-40 ... +100 °C (-40 ... +212 °F)

-40 ... +150 °C (-40 ... +302 °F)

-10 ... +150 °C (-14 ... +302 °F)

-40 ... +200 °C (-40 ... +392 °F)

-10 ... +200 °C (14 ... +392 °F)

-20 ... +100 °C (-4 ... +212 °F)

-10 ... +250 °C (14 ... 482 °F)

Design (standard version)

Weight (without options)

Approx. 800 g (1.8 lb)

Enclosure material

Stainless steel, mat. no. 1.4301/304

Material of parts in contact with the medium

- Connection shank
- Oval flange
- Seal diaphragm
- Measuring cell filling

Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819

Stainless steel, mat. no. 1.4404/316L

Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819

- Silicone oil
- Inert filling liquid

Process connection

- G½B to EN 837-1
- Female thread ½-14 NPT
- Oval flange PN 160 (MAWP 2320 psi) with fastening thread:
- 7/16 -20 UNF to IEC 61518/DIN EN 61518
- M10 as per DIN 19213

SITRANS P300 for gauge and absolute pressure**Design (version with front-flush diaphragm)**

Weight (without options)	approx. 1 ... 13 kg (2.2 ... 29 lb)
Enclosure material	Stainless steel, mat. no. 1.4301/304
Material of parts in contact with the medium	
• Process connection	Stainless steel, mat. no. 1.4404/316L
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L
• Measuring cell filling	<ul style="list-style-type: none"> • Silicone oil • Inert filling liquid • FDA compliant fill fluid (Neobee oil)
Process connection	<ul style="list-style-type: none"> • Flanges as per EN and ASME • F&B and pharmaceutical flanges
Surface quality touched-by-media	R_a -values $\leq 0.8 \mu\text{m}$ (32 μ -inch)/welds $R_a \leq 1.6 \mu\text{m}$ (64 μ -inch) (Process connections acc. to 3A; R_a -values $\leq 0.8 \mu\text{m}$ (32 μ -inch)/welds $R_a \leq 0.8 \mu\text{m}$ (32 μ -inch))

Power supply U_H

	HART	PROFIBUS PA/FOUNDATION Fieldbus
Terminal voltage on transmitter	10.5 ... 42 V DC for intrinsically safe operation: 10.5 ... 30 V DC	
Power supply	-	Supplied through bus
Separate power supply	-	Not necessary
Bus voltage		
• Without Ex	-	9 ... 32 V
• With intrinsically-safe operation	-	9 ... 24 V
Current consumption		
• Max. basic current	-	12.5 mA
• Start-up current \leq basic current	-	Yes
• Max. fault current in the event of a fault	-	15.5 mA
Fault disconnection electronics (FDE) available	-	Yes

Pressure Measurement

Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

SITRANS P300 for gauge and absolute pressure		
Certificates and approvals	HART	PROFIBUS PA/ FOUNDATION Fieldbus
Classification according to PED 2014/68/EU	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of Article 4, paragraph 3 (sound engineering practice)	
Water, waste water	Pending	
<u>Explosion protection</u>		
Intrinsic safety "i"	PTB 05 ATEX 2048	
<ul style="list-style-type: none"> Marking Permissible ambient temperature <ul style="list-style-type: none"> Temperature class T4 Temperature class T5 Temperature class T6 Connection 	II 1/2 G Ex ia IIC/IIB T4/T5/T6 Ga/Gb	
<ul style="list-style-type: none"> Effective inner capacitance: Effective internal inductance: 	-40 ... +85 °C (-40 ... +185 °F) -40 ... +70 °C (-40 ... +158 °F) -40 ... +60 °C (-40 ... +140 °F)	To certified intrinsically-safe circuits with peak values: FISCO supply unit: $U_i = 17.5 \text{ V}$, $I_i = 380 \text{ mA}$, $P_i = 5.32 \text{ W}$ Linear barrier: $U_i = 24 \text{ V}$, $I_i = 250 \text{ mA}$, $P_i = 1.2 \text{ W}$ $C_i = 1.1 \text{ nF}$ $L_i \leq 7 \text{ } \mu\text{H}$
Explosion protection to FM for USA and Canada (cFM _{US})	To certified intrinsically-safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$, $R_i = 300 \text{ } \Omega$	
<ul style="list-style-type: none"> Identification (DIP) or (IS); (NI) 	$C_i = 6 \text{ nF}$ $L_i = 0.4 \text{ mH}$	
<ul style="list-style-type: none"> Identification (DIP) or (IS) 	Certificate of Compliance 3025099 CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4 ... T6; CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III Certificate of Compliance 3025099C CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC 4 ... T6; CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III	
Dust explosion protection for zone 20/21/22	PTB 05 ATEX 2048	
<ul style="list-style-type: none"> Marking Permissible ambient temperature <ul style="list-style-type: none"> Temperature class T4 Temperature class T5 Temperature class T6 Connection 	II 1 D Ex ia IIC T120 °C Da II 1/2 D Ex ia IIC T120 °C Da/Db II 2 D Ex ib IIC T120 °C Db -40 ... +85 °C (-40 ... +185 °F) (in the case of mineral glass windows only -20 ... +85 °C (-4 ... +185 °F)) -40 ... +70 °C (-40 ... +158 °F) (in the case of mineral glass windows only -20 ... +70 °C (-4 ... +158 °F)) -40 ... +60 °C (-40 ... +140 °F) (in the case of mineral glass windows only -20 ... +60 °C (-4 ... +140 °F))	
<ul style="list-style-type: none"> Effective inner capacitance: Effective internal inductance: 	To certified intrinsically-safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$ $C_i = 6 \text{ nF}$ $L_i = 0.4 \text{ } \mu\text{H}$	To certified intrinsically-safe circuits with peak values: $U_i = 24 \text{ V}$, $I_i = 380 \text{ mA}$, $P_i = 5.32 \text{ mW}$ $C_i = 5 \text{ nF}$ $L_i = 10 \text{ } \mu\text{H}$
Type of protection Ex nA/nL/ic (Zone 2)	PTB 05 ATEX 2048	
<ul style="list-style-type: none"> Marking Permissible ambient temperature <ul style="list-style-type: none"> Temperature class T4 Temperature class T5 Temperature class T6 Ex nA/nL connection Ex ic connection Effective inner capacitance: Effective internal inductance: 	II 2/3 G Ex ic IIC/IIB T4/T5/T6 Gb/Gc II 2/3 G Ex nA IIC T4/T5/T6 Gb/Gc -40 ... +85 °C (-40 ... +185 °F) (in the case of mineral glass windows only -20 ... +85 °C (-4 ... +185 °F)) -40 ... +70 °C (-40 ... +158 °F) (in the case of mineral glass windows only -20 ... +70 °C (-4 ... +158 °F)) -40 ... +60 °C (-40 ... +140 °F) (in the case of mineral glass windows only -20 ... +60 °C (-4 ... +140 °F))	To certified intrinsically-safe circuits with peak values: $U_m = 45 \text{ V}$ To certified intrinsically-safe circuits with peak values: $U_i = 45 \text{ V}$ $C_i = 6 \text{ nF}$ $L_i = 0.4 \text{ mH}$
		To certified intrinsically-safe circuits with peak values: $U_m = 32 \text{ V}$ To certified intrinsically-safe circuits with peak values: $U_i = 32 \text{ V}$ $C_i = 5 \text{ nF}$ $L_i = 20 \text{ } \mu\text{H}$

Pressure Measurement

Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

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HART Communication		FOUNDATION Fieldbus communication	
HART communication	230 ... 1100 Ω	Function blocks	3 function blocks analog input, 1 function block PID
Protocol	HART Version 5.x	• Analog input	Yes, linearly rising or falling characteristic
Software for computer	SIMATIC PDM	- Adaptation to customer-specific process variables	0 ... 100 s
PROFIBUS PA communication		- Electrical damping, adjustable	Output/input (can be locked within the device with a bridge)
Simultaneous communication with master class 2 (max.)	4	- Simulation function	parameterizable (last good value, substitute value, incorrect value)
The address can be set using	Configuration tool or local operation (standard setting Address 126)	- Failure mode	Yes, one upper and lower warning limit and one alarm limit respectively
Cyclic data usage		- Limit monitoring	Yes
• Output byte	5 (one measured value) or 10 (two measured values)	- Square-rooted characteristic for flow measurement	Standard FOUNDATION Fieldbus function block
• Input byte	0.1 or 2 (totalizer mode and reset function for dosing)	• PID	1 resource block
• Internal preprocessing		• Physical block	1 transducer block Pressure with calibration, 1 transducer block LCD
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B	Transducer blocks	
Function blocks	2	• Pressure transducer block	
• Analog input		- Can be calibrated by applying two pressures	Yes
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic	- Monitoring of sensor limits	Yes
- Electrical damping adjustable	0 ... 100 s	- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function
- Simulation function	Input /Output		
- Failure function	parameterizable (last good value, substitute value, incorrect value)		
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively		
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output		
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)		
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively		
• Physical block	1		
Transducer blocks	2		
• Pressure transducer block			
- Can be calibrated by applying two pressures	Yes		
- Monitoring of sensor limits	Yes		
- Specification of a container characteristic with	Max. 30 nodes		
- Simulation function for measured pressure value and sensor temperature	Constant value or over parameterizable ramp function		

Pressure Measurement

Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

Selection and Ordering data		Article No.
SITRANS P300 pressure transmitters for relative and absolute pressure , single-chamber measuring housing, rating plate inscription in English		
4 ... 20 mA/HART		7MF8023 -
PROFIBUS PA		7MF8024 -
FOUNDATION Fieldbus (FF)		7MF8025 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Measuring cell cleaning	
Silicone oil	normal	1
Inert liquid	Cleanliness level 2 to DIN 25410	3
Measuring span (min. ... max.)		
8.3 ... 250 mbar	(0.12 ... 3.63 psi)	A
0.01 ... 1 bar	(0.145 ... 14.5 psi)	B
0.04 ... 4 bar	(0.58 ... 58 psi)	C
0.16 ... 16 bar	(2.32 ... 232 psi)	D
0.63 ... 63 bar	(9.14 ... 914 psi)	E
1.6 ... 160 bar	(23.2 ... 2320 psi)	F
4 ... 400 bar	(58 ... 5802 psi)	G
8.34 ... 250 mbar a	(0.13 ... 3.63 psi a)	Q
43.34 ... 1300 mbar a	(0.63 ... 18.86 psi a)	S
0.17 ... 5 bar a	(2.43 ... 72.5 psi a)	T
1 ... 30 bar a	(14.6 ... 435 psi a)	U
Wetted parts materials		
Seal diaphragm	Measuring cell	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Hastelloy	Hastelloy	C
Version for diaphragm seals in conjunction with process connector "female thread 1/2-14 NPT" (recommended version) ^{1) 2) 3) 4) 5)}		Y
Process connection		
• Connection shank G1/2B to EN 837-1		0
• Female thread 1/2-14 NPT		1
• Stainless steel oval flange with process connection (Oval flange has no female thread) ⁶⁾		
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		2
- Mounting thread M10 to DIN 19213		3
- Mounting thread M12 to DIN 19213		4
• Male thread M20 x 1.5		5
• Male thread 1/2 -14 NPT		6
Non-wetted parts materials		
• Stainless steel, deep-drawn and electrolytically polished		4
Version		
• Standard versions		1
Explosion protection		
• None		A
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		B
• Zone 20/21/22 ⁷⁾		C
• Ex nA/nL (Zone 2) ⁸⁾		E
• with FM "intrinsic safety" (cFM _{US})		M
Electrical connection / cable entry		
• Screwed gland M20x1.5 (polyamide) ⁹⁾		A
• Screwed gland M20x1.5 (metal)		B
• Screwed gland M20x1.5 (stainless steel)		C
• M12 device plug (stainless steel), without cable socket		G
• Screwed gland 1/2-14 NPT metal thread ¹⁰⁾		H
• Screwed gland 1/2-14 NPT stainless steel thread		J

Selection and Ordering data		Article No.
SITRANS P300 pressure transmitters for relative and absolute pressure , single-chamber measuring housing, rating plate inscription in English		
4 ... 20 mA/HART		7MF8023 -
PROFIBUS PA		7MF8024 -
FOUNDATION Fieldbus (FF)		7MF8025 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Display		
• Without display, with keys, closed lid		1
• With display and keys, closed lid ¹¹⁾		2
• With display and keys, lid with polycarbonate disc		4
• (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure units) ¹¹⁾		5
• With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with polycarbonate disc ¹¹⁾		6
• With display and keys, lid with glass pane (setting on HART devices: mA, with PROFIBUS and FOUNDATION Fieldbus equipment: pressure units) ¹¹⁾		7
• With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with glass pane ¹¹⁾		

Power supply units see Chap. 7 "Supplementary Components".

A quick-start guide is included in the scope of delivery of the device.

- When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF802-...Y...-... and 7MF4900-1...-B
- The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- Remote seal for direct mounting only available in combination with process connection 1/2-14 NPT.
- M10 fastening thread: Max. span 160 bar (2320 psi) 7/16-20 UNF and M12 fastening thread: Max. span 400 bar (5802 psi)
- Only available together with electrical connection option A
- Only available together with electrical connection options B, C or G.
- Only together with HART electronics.
- Without cable gland.
- Display cannot be turned.

Pressure Measurement

Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

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Selection and Ordering data		Article No.
SITRANS P300 pressure transmitters for relative and absolute pressure with front-flush membrane , single-chamber measuring housing, rating plate inscription in English		
4 ... 20 mA/HART		7 MF 8 1 2 3 -
PROFIBUS PA		7 MF 8 1 2 4 -
FOUNDATION Fieldbus (FF)		7 MF 8 1 2 5 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Measuring cell cleaning	
Silicone oil	normal	1
Inert liquid		3
FDA compliant fill fluid		
• Neobee oil	normal	4
Measuring span (min. ... max.)		
0.01 ... 1 bar	(0.15 ... 14.5 psi)	B
0.04 ... 4 bar	(0.58 ... 58 psi)	C
0.16 ... 16 bar	(2.32 ... 232 psi)	D
0.63 ... 63 bar	(9.14 ... 914 psi)	E
43.34 ... 1300 mbar a ¹⁾	(0.63 ... 18.86 psi a ¹⁾)	S
0.17 ... 5 bar a ¹⁾	(2.43 ... 72.5 psi a ¹⁾)	T
1 ... 30 bar a ¹⁾	(14.6 ... 435 psi a ¹⁾)	U
Wetted parts materials		
Seal diaphragm	Measuring cell	
Stainless steel	Stainless steel	A
Hastelloy ²⁾	Stainless steel	B
Process connection		
<ul style="list-style-type: none"> Flange version with Order code M.., N.., R.. or Q.. (see "Further designs") 		7
Non-wetted parts materials		
<ul style="list-style-type: none"> Stainless steel, deep-drawn and electrolytically polished 		4
Version		
<ul style="list-style-type: none"> Standard versions 		1
Explosion protection		
<ul style="list-style-type: none"> None With ATEX, Type of protection: <ul style="list-style-type: none"> "Intrinsic safety (Ex ia)" Zone 20/21/22³⁾ Ex nA/nL (Zone 2)⁴⁾ with FM "intrinsic safety" (cFM_{US}) 		A B C E M
Electrical connection / cable entry		
<ul style="list-style-type: none"> Screwed gland M20x1.5 (polyamide)⁵⁾ Screwed gland M20x1.5 (metal) Screwed gland M20x1.5 (stainless steel) M12 device plug (stainless steel), without cable socket Screwed gland ½-14 NPT metal thread ⁶⁾ Screwed gland ½-14 NPT stainless steel thread ⁶⁾ 		A B C G H J

Selection and Ordering data		Article No.
SITRANS P300 pressure transmitters for relative and absolute pressure with front-flush membrane , single-chamber measuring housing, rating plate inscription in English		
4 ... 20 mA/HART		7 MF 8 1 2 3 -
PROFIBUS PA		7 MF 8 1 2 4 -
FOUNDATION Fieldbus (FF)		7 MF 8 1 2 5 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Display		
<ul style="list-style-type: none"> Without display, with keys, closed lid 		1
<ul style="list-style-type: none"> With display and keys, closed lid⁷⁾ 		2
<ul style="list-style-type: none"> With display and keys, lid with polycarbonate disc (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure units)⁷⁾ 		4
<ul style="list-style-type: none"> With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with polycarbonate disc⁷⁾ 		5
<ul style="list-style-type: none"> With display and keys, lid with glass pane (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure units)⁷⁾ 		6
<ul style="list-style-type: none"> With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with glass pane⁷⁾ 		7

Power supply units see Chap. 7 "Supplementary Components"

A quick-start guide is included in the scope of delivery of the device.

- 1) Not with temperature decoupler P00, not for process connections R01, R02, R04, R10 and R11, and can only be ordered in conjunction with silicone oil.
- 2) Only available for flanges with options M.., N.. and Q..
- 3) Only together with electrical connection option A.
- 4) Only available together with electrical connection options B, C or G.
- 5) Only together with HART electronics.
- 6) Without cable gland.
- 7) Display cannot be turned.

Pressure Measurement

Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

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Selection and Ordering data	Order code			
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
Pressure transmitter with mounting bracket (2 shackles, 4 nuts, 4 U-plates, 1 angle) made of: made completely of stainless steel, for wall or pipe mounting	A02	✓	✓	✓
Cable socket for M12 device plugs • Stainless steel	A51	✓	✓	✓
Rating plate inscription (instead of English)				
• German	B10	✓	✓	✓
• French	B12	✓	✓	✓
• Spanish	B13	✓	✓	✓
• Italian	B14	✓	✓	✓
English rating plate Pressure units in inH ₂ O and/or psi	B21	✓	✓	✓
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2¹⁾	C11	✓	✓	✓
Inspection certificate²⁾ Acc. to EN 10204-3.1	C12	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	C14	✓	✓	✓
Degree of protection IP65/IP68 (only for M20x1.5 and ½-14 NPT)	D12	✓	✓	✓
Degree of protection IP6k9k (only for M20x1.5)	D46	✓	✓	✓
CRN approval Canada (Canadian Registration Number)	E22	✓	✓	✓
Export approval Korea	E11	✓	✓	✓
Ex-protection Ex ia according to EAC Ex (Russia)	E80	✓	✓	✓
Ex Approval Ex ia/ib NEPSI	E55	✓	✓	✓
Only for SITRANS P300 with front-flush diaphragm (7MF81...-...)				
Flange to EN 1092-1, Form B1 • DN 25, PN 40 ³⁾ • DN 40, PN 40 • DN 40, PN 100 • DN 50, PN 16 • DN 50, PN 40 • DN 80, PN 16 • DN 80, PN 40	M11 M13 M23 M04 M14 M06 M16	✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓
Flanges to ASME B16.5 • 1", class 150 ⁴⁾ • 1½", class 150 • 2", class 150 • 3", class 150 • 4", class 150 • 1", class 300 ⁴⁾ • 1½", class 300 • 2", class 300 • 3", class 300 • 4", class 300	M40 M41 M42 M43 M44 M45 M46 M47 M48 M49	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓
Threaded connector to DIN 3852-2, form A, thread to ISO 228 • G ¾"-A, front-flush ⁴⁾ • G 1"-A, front-flush ⁴⁾ • G 2"-A, front-flush	R01 R02 R04	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓
Tank connection⁵⁾ Sealing is included in delivery • TG 52/50, PN 40 • TG 52/150, PN 40	R10 R11	✓ ✓	✓ ✓	✓ ✓

Selection and Ordering data	Order code			
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
Sanitary process connection according DIN 11851 (Dairy connection with slotted union nut) • DN 50, PN 25 • DN 80, PN 25	N04 N06	✓ ✓	✓ ✓	✓ ✓
Tri-Clamp connection according DIN 32676/ISO 2852 3A compliant ⁶⁾ • DN 50/2", PN 16 • DN 65/2.5", PN 10	N14 N15	✓ ✓	✓ ✓	✓ ✓
Varivent connection 3A and EHEDG compliant ⁶⁾ • Type N = 68 for Varivent housing DN 40 ... 125 and 1½" ... 6", PN 40	N28	✓	✓	✓
Temperature decoupler up to 200 °C⁷⁾ for front-flush diaphragm version	P00	✓	✓	✓
Bio-Control sanitary process connection • DN 50, PN 16 • DN 65, PN 16	Q53 Q54	✓ ✓	✓ ✓	✓ ✓
Sanitary process connection to DRD • DN 50, PN 40	M32	✓	✓	✓
SMS socket with union nut • 2" • 2½" • 3"	M67 M68 M69	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓
SMS threaded socket • 2" • 2½" • 3"	M73 M74 M75	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓
IDF socket with union nut ISO 2853 • 2" • 2½" • 3"	M82 M83 M84	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓
IDF threaded socket ISO 2853 • 2" • 2½" • 3"	M92 M93 M94	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓
Sanitary process connection to NEUMO Bio-Connect screw connection 3A and EHEDG compliant ⁶⁾ • DN 50, PN 16 • DN 65, PN 16 • DN 80, PN 16 • DN 100, PN 16 • DN 2", PN 16 • DN 2½", PN 16 • DN 3", PN 16 • DN 4", PN 16	Q05 Q06 Q07 Q08 Q13 Q14 Q15 Q16	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓
Sanitary process connection to NEUMO Bio-Connect flange connection 3A and EHEDG compliant ⁶⁾ • DN 50, PN 16 • DN 65, PN 16 • DN 80, PN 16 • DN 100, PN 16 • DN 2", PN 16 • DN 2½", PN 16 • DN 3", PN 16 • DN 4", PN 16	Q23 Q24 Q25 Q26 Q31 Q32 Q33 Q34	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓

Pressure Measurement

Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

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Selection and Ordering data	Order code			
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code.				
Sanitary process connection to NEUMO Bio-Connect clamp connection 3A and EHEDG compliant ⁶⁾				
• DN 50, PN 16	Q39	✓	✓	✓
• DN 65, PN 10	Q40	✓	✓	✓
• DN 80, PN 10	Q41	✓	✓	✓
• DN 100, PN 10	Q42	✓	✓	✓
• DN 2½", PN 16	Q48	✓	✓	✓
• DN 3", PN 10	Q49	✓	✓	✓
• DN 4", PN 10	Q50	✓	✓	✓
Sanitary process connection to NEUMO Bio-Connect S flange connection				
• DN 2", PN 16	Q72	✓	✓	✓
Aseptic threaded socket to DIN 11864-1 Form A 3A compliant ⁶⁾				
• DN 50, PN 25	N33	✓	✓	✓
• DN 65, PN 25	N34	✓	✓	✓
• DN 80, PN 25	N35	✓	✓	✓
• DN 100, PN 25	N36	✓	✓	✓
Aseptic flange with notch to DIN 11864-2 Form A 3A compliant ⁶⁾				
• DN 50, PN 16	N43	✓	✓	✓
• DN 65, PN 16	N44	✓	✓	✓
• DN 80, PN 16	N45	✓	✓	✓
• DN 100, PN 16	N46	✓	✓	✓
Aseptic flange with groove to DIN 11864-2 Form A 3A compliant ⁶⁾				
• DN 50, PN 16	N43 + P11	✓	✓	✓
• DN 65, PN 16	N44 + P11	✓	✓	✓
• DN 80, PN 16	N45 + P11	✓	✓	✓
• DN 100, PN 16	N46 + P11	✓	✓	✓
Aseptic clamp with groove to DIN 11864-3 Form A 3A compliant ⁶⁾				
• DN 50, PN 25	N53	✓	✓	✓
• DN 65, PN 25	N54	✓	✓	✓
• DN 80, PN 16	N55	✓	✓	✓
• DN 100, PN 16	N56	✓	✓	✓

Selection and Ordering data	Order code			
Additional data		HART	PA	FF
Please add "-Z" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	Y01	✓	✓ ⁸⁾	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	Y15	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	Y16	✓	✓	✓
Entry of HART TAG Max. 8 characters, specify in plain text: Y17:	Y17	✓		
Setting of the display in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H ₂ O ³⁾ , inH ₂ O ³⁾ , ftH ₂ O ³⁾ , mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM or %) ref. temperature 20 °C	Y21	✓	✓	✓
Setting of the display in non-pressure units⁹⁾ Specify in plain text: Y22: up to l, m ³ , m, USg, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y22 + Y01	✓		
Preset bus address (possible between 1 ... 126) Specify in plain text: Y25:	Y25		✓	✓

Factory mounting of valve manifolds, see accessories.

Only Y01, Y15, Y16, Y17, Y21, Y22 and Y25 can be factory preset

✓ = available

Ordering example

Item line: 7MF8023-1DB24-1AB7-Z

B line: A02 + Y01 + Y21

C line: Y01: 1 ... 10 bar (14.5 ... 145 psi)

C line: Y21: bar (psi)

1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

2) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

3) Special seal in Viton included in the scope of delivery (FKM; temperature range -20 ... +200 °C (-4 ... +392 °F))

4) Cannot be combined with Order code P00. Can only be ordered with silicone oil measuring cell filling.

5) The weldable socket can be ordered under accessories.

6) 3A compliance ensured only when 3A compliant sealing rings are used.

7) Conformity according to 3A and EHEDG. The maximum permissible temperatures of the medium depend on the respective cell fillings (see medium conditions).

8) Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

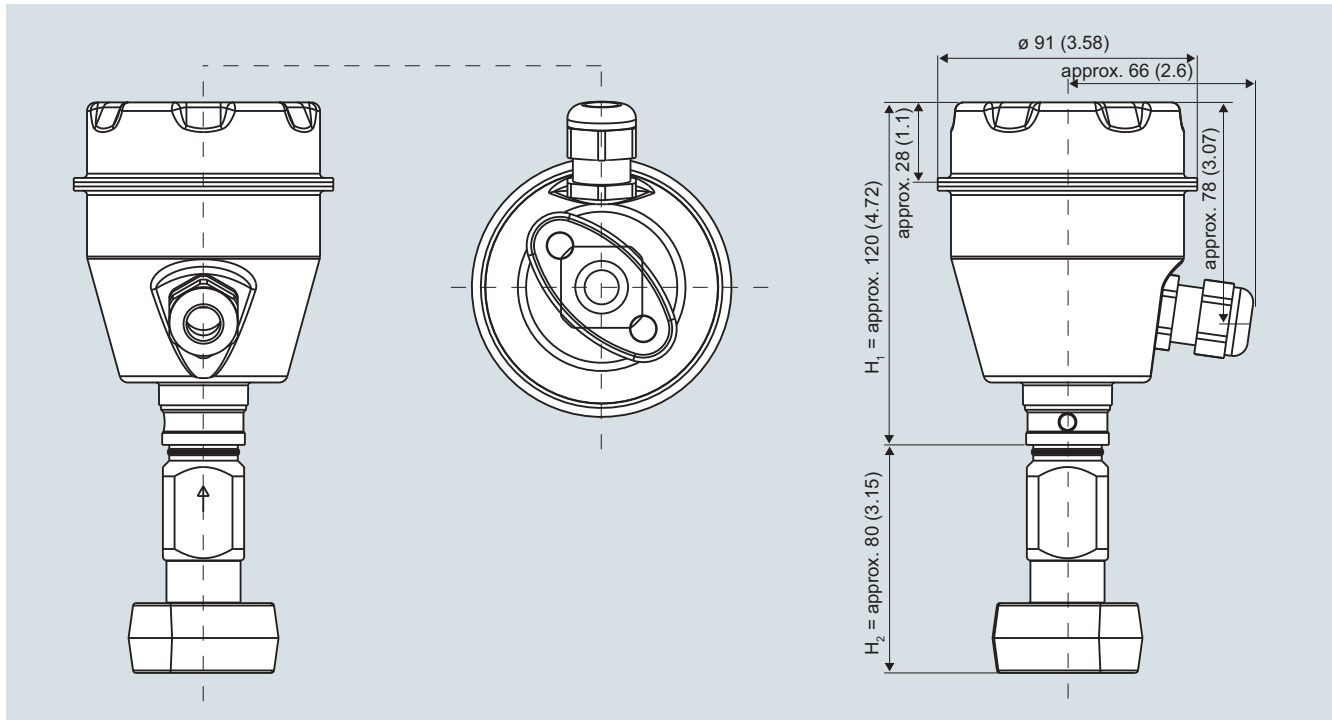
9) Preset values can only be changed over SIMATIC PDM.

Pressure Measurement

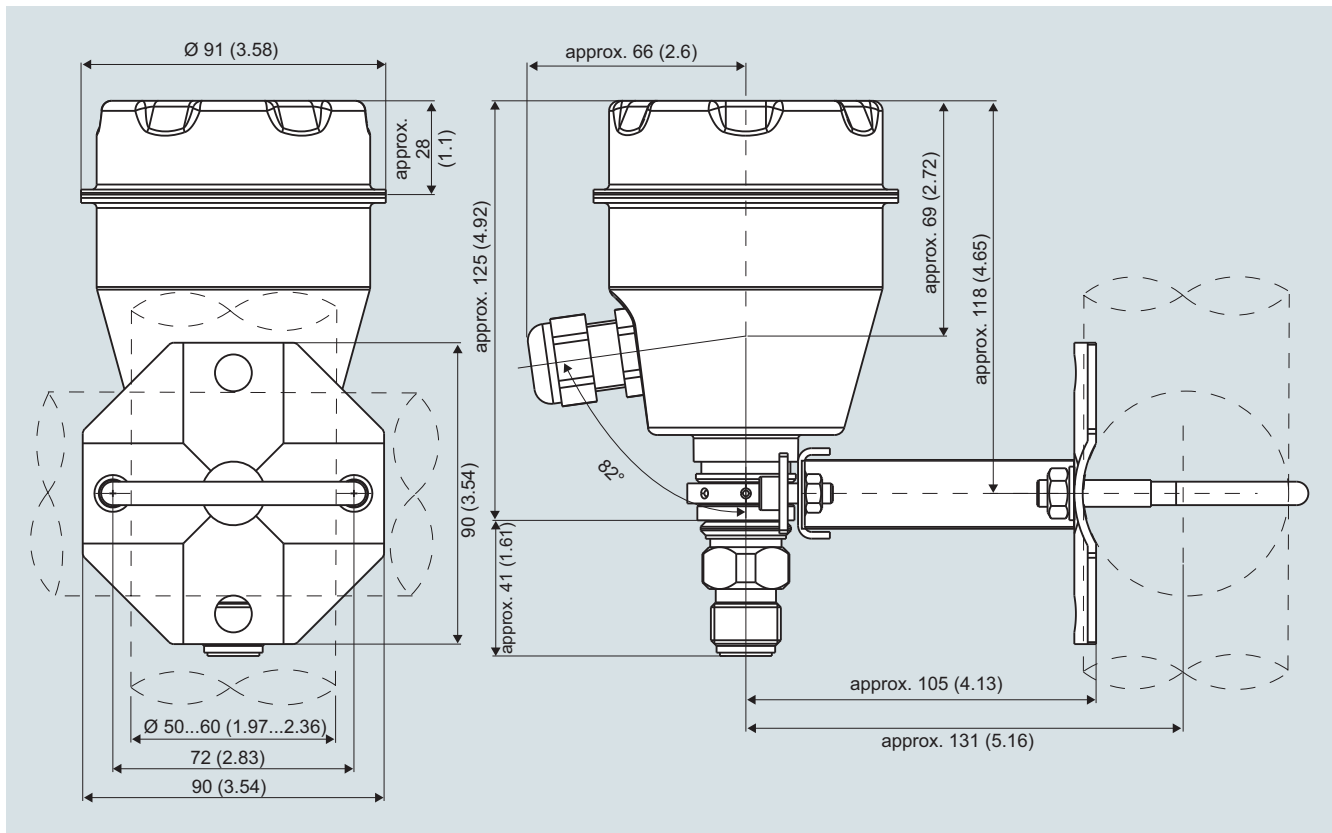
Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

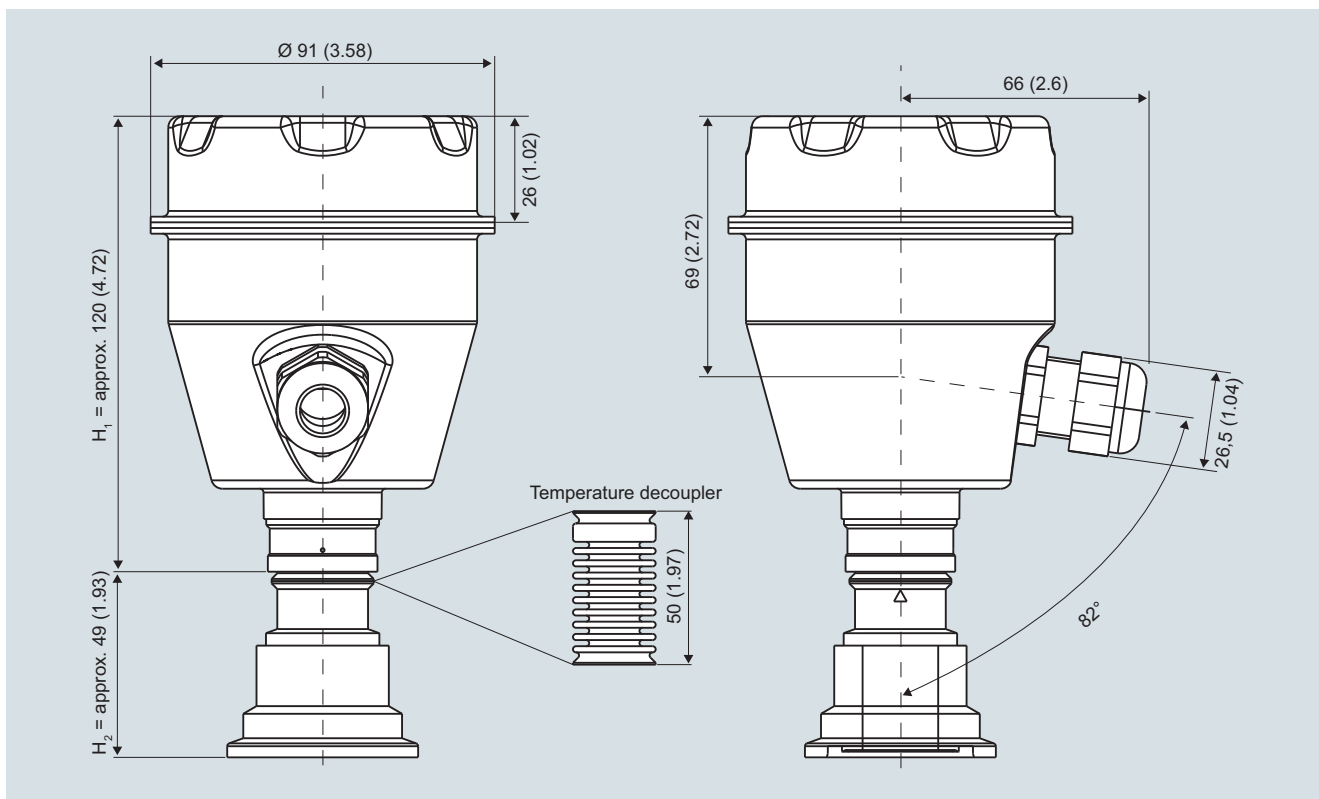
Dimensional drawings



SITRANS P300, with oval flange, dimensions in mm (inch)



SITRANS P300, process connection M20 x 1.5, with mounted mounting bracket, dimensions in mm (inch)



SITRANS P300, front-flush, dimensions in mm (inch)

The diagram shows a SITRANS P300 with an example of a flange. In this drawing the height is subdivided into H_1 and H_2 .

H_1 = Height of the SITRANS P300 up to a defined cross-section

H_2 = Height of the flange up to this defined cross-section

Only the height H_2 is indicated in the dimensions of the flanges.

Pressure Measurement

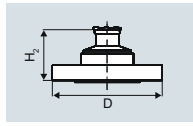
Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 for gauge and absolute pressure

Flanges as per EN and ASME

Flange to EN

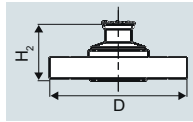
EN 1092-1



Order code	DN	PN	ØD	H ₂
M11	25	40	115 mm (4.5")	Approx. 52 mm (2")
M13	40	40	150 mm (5.9")	
M23	40	100	170 mm (6.7")	
M04	50	16	165 mm (6.5")	
M14	50	40	165 mm (6.5")	
M06	80	16	200 mm (7.9")	
M16	80	40	200 mm (7.9")	

Flanges to ASME

ASME B16.5

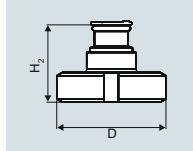


Order code	DN	PN	ØD	H ₂
M40	1"	150	110 mm (4.3")	Approx. 52 mm (2")
M41	1½"	150	130 mm (5.1")	
M42	2"	150	150 mm (5.9")	
M43	3"	150	190 mm (7.5")	
M44	4"	150	230 mm (9.1")	
M46	1½"	300	155 mm (6.1")	
M47	2"	300	165 mm (6.5")	
M48	3"	300	210 mm (8.1")	
M49	4"	300	255 mm (10.0")	

NuG and pharmaceutical connections

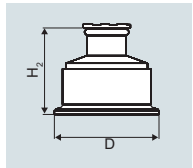
Connections to DIN

DIN 11851 (milk pipe union with slotted union nut)



Order code	DN	PN	ØD	H ₂
N04	50	25	92 mm (3.6")	Approx. 52 mm (2")
N06	80	25	127 mm (5.0")	

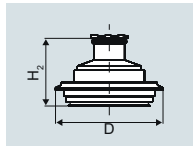
Tri-Clamp nach DIN 32676



Order code	DN	PN	ØD	H ₂
N14	50	16	64 mm (2.5")	Approx. 52 mm (2")
N15	65	10	91 mm (3.6")	

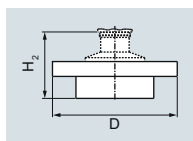
Other connections

Varivent connection



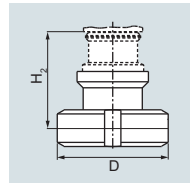
Order code	DN	PN	ØD	H ₂
N28	40 ... 125	40	84 mm (3.3")	Approx. 52 mm (2")

Sanitary process connection to DRD



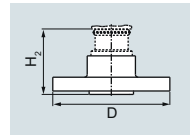
Order code	DN	PN	ØD	H ₂
M32	50	40	105 mm (4.1")	Approx. 52 mm (2")

Sanitary process screw connection to NEUMO Bio-Connect



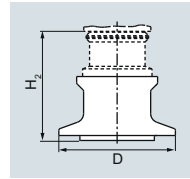
Order code	DN	PN	ØD	H ₂
Q05	50	16	82 mm (3.2")	Approx. 52 mm (2")
Q06	65	16	105 mm (4.1")	
Q07	80	16	115 mm (4.5")	
Q08	100	16	145 mm (5.7")	
Q13	2"	16	82 mm (3.2")	
Q14	2½"	16	105 mm (4.1")	
Q15	3"	16	105 mm (4.1")	
Q16	4"	16	145 mm (5.7")	

Sanitary process connection to NEUMO Bio-Connect flange connection



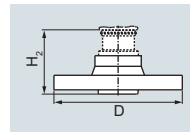
Order code	DN	PN	ØD	H ₂
Q23	50	16	110 mm (4.3")	Approx. 52 mm (2")
Q24	65	16	140 mm (5.5")	
Q25	80	16	150 mm (5.9")	
Q26	100	16	175 mm (6.9")	
Q31	2"	16	100 mm (3.9")	
Q32	2½"	16	110 mm (4.3")	
Q33	3"	16	140 mm (5.5")	
Q34	4"	16	175 mm (6.9")	

Sanitary process connection to NEUMO Bio-Connect clamp connection



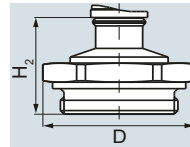
Order code	DN	PN	ØD	H ₂
Q39	50	16	77.4 mm (3.0")	Approx. 52 mm (2")
Q40	65	10	90.9 mm (3.6")	
Q41	80	10	106 mm (4.2")	
Q42	100	10	119 mm (4.7")	
Q48	2½"	16	90.9 mm (3.6")	
Q49	3"	10	106 mm (4.2")	
Q50	4"	10	119 mm (4.7")	

Sanitary process connection to NEUMO Bio-Connect S flange connection



Order code	DN	PN	ØD	H ₂
Q72	2"	16	125 mm (4.9")	Approx. 52 mm (2")

Threaded connection G¾", G1" and G2" acc. to DIN 3852



Order code	DN	PN	ØD	H ₂
R01	¾"	60	37 mm (1.5")	Approx. 45 mm (1.8")
R02	1"	60	48 mm (1.9")	Approx. 47 mm (1.9")
R04	2"	60	78 mm (3.1")	Approx. 52 mm (2")

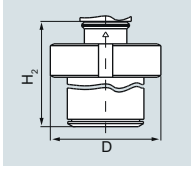
Pressure Measurement

Transmitters for food, pharmaceuticals and biotechnology

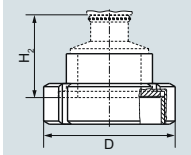
SITRANS P300 for gauge and absolute pressure

1

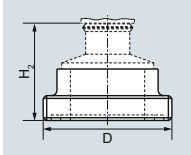
Tank connection TG 52/50 and TG52/150

	Order code	DN	PN	ØD	H ₂
	R10	25	40	63 mm (2.5")	Approx. 63 mm (2.5")
	R11	25	40	63 mm (2.5")	Approx. 170 mm (6.7")

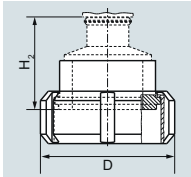
SMS socket with union nut

	Order code	DN	PN	ØD	H ₂
	M67	2"	25	84 mm (3.3")	Approx. 52 mm (2")
	M68	2½"	25	100 mm (3.9")	
	M69	3"	25	114 mm (4.5")	

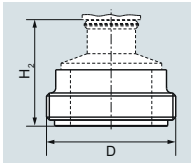
SMS threaded socket

	Order code	DN	PN	ØD	H ₂
	M73	2"	25	70 x 1/6 mm	Approx. 52 mm (2")
	M74	2½"	25	85 x 1/6 mm	
	M75	3"	25	98 x 1/6 mm	

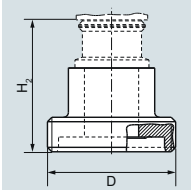
IDF socket with union nut

	Order code	DN	PN	ØD	H ₂
	M82	2"	25	77 mm (3")	Approx. 52 mm (2")
	M83	2½"	25	91 mm (3.6")	
	M84	3"	25	106 mm (4.2")	

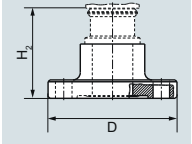
IDF threaded socket

	Order code	DN	PN	ØD	H ₂
	M92	2"	25	64 mm (2.5")	Approx. 52 mm (2")
	M93	2½"	25	77.5 mm (3.1")	
	M94	3"	25	91 mm (3.6")	

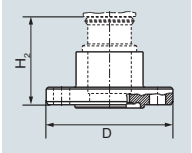
Aseptic threaded socket to DIN 11864-1 Form A

	Order code	DN	PN	ØD	H ₂
	N33	50	25	78 x 1/6"	Approx. 52 mm (2")
	N34	65	25	95 x 1/6"	
	N35	80	25	110 x 1/4"	
	N36	100	25	130 x 1/4"	

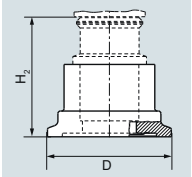
Aseptic flange with notch to DIN 11864-2 Form A

	Order code	DN	PN	ØD	H ₂
	N43	50	16	94	Approx. 52 mm (2")
	N44	65	16	113	
	N45	80	16	133	
	N46	100	16	159	

Aseptic flange with groove to DIN 11864-2 Form A

	Order code	DN	PN	ØD	H ₂
	N43 + P11	50	16	94	Approx. 52 mm (2")
	N44 + P11	65	16	113	
	N45 + P11	80	16	133	
	N46 + P11	100	16	159	

Aseptic clamp with groove to DIN 11864-3 Form A

	Order code	DN	PN	ØD	H ₂
	N53	50	25	77.5	Approx. 52 mm (2")
	N54	65	25	91	
	N55	80	16	106	
	N56	100	16	130	

Pressure Measurement

Transmitters for food, pharmaceuticals and biotechnology

SITRANS P300 Accessories/Spare parts

1

Selection and Ordering data	Article No.
<i>Spare parts / Accessories</i>	
Mounting bracket and fastening parts kit made of stainless steel	7MF8997-1AA
Lid without window gasket not included	7MF8997-1BA
Lid with glass window gasket not included	7MF8997-1BD
NBR enclosure sealing	7MF8997-1BG
Measuring point label unlabeled	7MF8997-1CA
Cable gland <ul style="list-style-type: none"> metal plastic (blue) 	7MF8997-1EA 7MF8997-1EB
Weldable sockets for PMC connection <ul style="list-style-type: none"> PMC Style Standard: Thread 1½" PMC Style Minibolt: front-flush 1" 	7MF4997-2HA 7MF4997-2HB
Gaskets for PMC connection (packing unit = 5 units) <ul style="list-style-type: none"> PTFE seal for PMC Style Standard: Thread 1½" Gasket made of Viton for PMC Style Minibolt: front-flush 1" 	7MF4997-2HC 7MF4997-2HD
Weldable socket for TG 52/50 and TG 52/150 connection <ul style="list-style-type: none"> TG 52/50 connection TG 52/150 connection 	7MF4997-2HE 7MF4997-2HF
Seals for TG 52/50 and TG 52/150 made of silicone	7MF4997-2HG
Seals for flange connection with front-flush diaphragm Material FKM (Viton); temperature range: -20 ... +200 °C (-4 ... +392 °F), 10 units <ul style="list-style-type: none"> DN 25, PN 40 (M11) 1", class 150 (M40) 	7MF4997-2HH 7MF4997-2HK

Selection and Ordering data	Article No.
Documentation The entire documentation is available for download free-of-charge in various languages at: http://www.siemens.com/processinstrumentation/documentation Compact operating instructions <ul style="list-style-type: none"> English, German, Spanish, French, Italian, Dutch 	A5E03434657
Certificates (order only via SAP) instead of Internet download <ul style="list-style-type: none"> hard copy (to order) on DVD (to order) 	A5E03252406 A5E03252407
HART modem with USB interface	7MF4997-1DB
Power supply units see Chap. 7 "Supplementary Components".	

Overview

The SITRANS P300 transmitter for gauge and absolute pressure can be delivered factory-fitted with the following valve manifolds:

- 7MF9011-4EA and 7MF9011-4FA valve manifolds for gauge pressure and absolute pressure transmitters

Design

The 7MF9011-4EA valve manifolds are sealed with gaskets made of PTFE between transmitter and the valve manifold as standard. Soft iron, stainless steel and copper gaskets are also available for sealing purposes if preferred.

The 7MF9011-4FA valve manifolds are sealed with PTFE sealing tape between the transmitter and the valve manifold.

Once installed, the complete unit is checked under pressure for leaks (compressed air 6 bar (87 psi)) and is certified leak-proof with a test report to EN 10204 - 2.2.

All valve manifolds should preferably be secured with the respective mounting brackets. The transmitters are mounted on the valve manifold and not on the unit itself.

If you order a mounting bracket when choosing the option "Factory mounting of valve manifolds", you will receive a mounting bracket for the valve manifold instead of a bracket for mounting the transmitter.

If you order an acceptance test certificate 3.1 to EN 10204 when choosing the option "Factory mounting of valve manifolds", a separate certificate is provided for the transmitters and the valve manifolds respectively.

Selection and Ordering data

7MF9011-4FA valve manifold on gauge and absolute pressure transmitters



Add **-Z** to the Article No. of the transmitter and add Order codes

SITRANS P300
7MF802-...1.-...
With process connection
female thread 1/2-14 NPT
in-sealed with PTFE sealing tape
Delivery incl. high-pressure test certified
by test report to EN 10204-2.2

T03

Further designs:

Delivery includes mounting brackets and mounting clips made of stainless steel (instead of the mounting bracket supplied with the transmitter)

A02

Supplied acceptance test certificate to EN 10204- 3.1 for transmitters and mounted valve manifold

C12

7MF9011-4EA valve manifold on gauge and absolute pressure transmitters



Add **-Z** to the Article No. of the transmitter and add Order codes

SITRANS P300
7MF802-...0.-...
with process connection
collar G1/2 A to EN 837-1
with gasket made of PTFE between valve
manifold and transmitter

T02

Alternative sealing material:

- Soft iron
- Stainless steel, Mat. No. 14571
- copper

A70

A71

A72

Delivery incl. high-pressure test certified
by test report to EN 10204-2.2

Further designs:

Delivery includes mounting brackets and mounting clips made of stainless steel (instead of the mounting bracket supplied with the transmitter)

A02

Supplied acceptance test certificate to EN 10204- 3.1 for transmitters and mounted valve manifold

C12

Pressure Measurement

Transmitters for food, pharmaceuticals and biotechnology

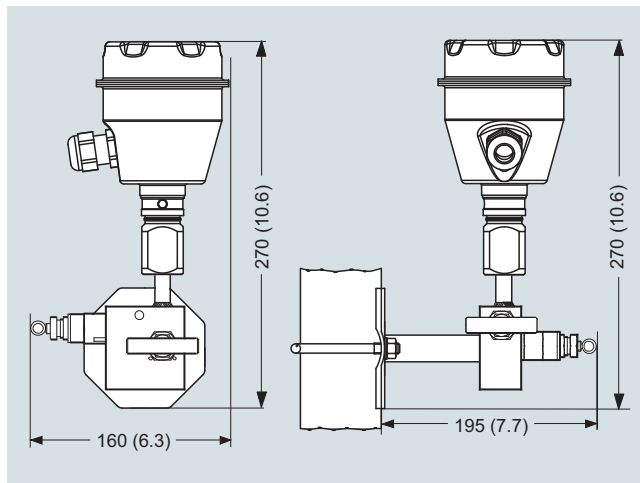
SITRANS P300 - Factory-mounting of valve manifolds on transmitters

Dimensional drawings

Valve manifolds mounted on SITRANS P300



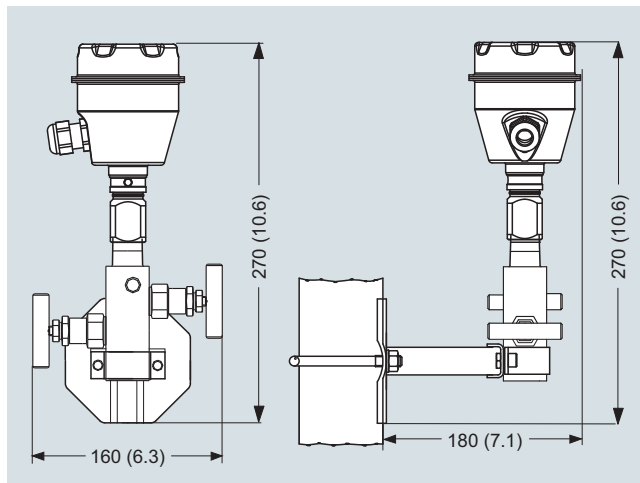
7MF9011-4EA valve manifold with mounted gauge pressure and absolute pressure transmitters



7MF9011-4EA valve manifold with mounted gauge pressure and absolute pressure transmitters, dimensions in mm (inch)



7MF9011-4FA valve manifold with mounted gauge pressure and absolute pressure transmitters



7MF9011-4FA valve manifold with mounted gauge pressure and absolute pressure transmitters, dimensions in mm (inch)

Overview



The SITRANS P300 and DS III pressure transmitters have been fitted with special process connections for the paper industry. With the two process connection threads 1½" and 1" flush at the front, the SITRANS P300 and DS III transmitters can be used for all processes in the paper industry.

SITRANS P300 and SITRANS PDS III series pressure transmitters are digital pressure transmitters featuring extensive user-friendliness and high accuracy. The parameterization is performed using control keys via HART, PROFIBUS-PA or FOUNDATION Fieldbus interface.

Extensive functionality enables the pressure transmitter to be precisely adapted to the plant's requirements. Operation is very simple in spite of the numerous setting options.

Transmitters with type of protection "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The transmitters are provided with an EC type examination certificate and comply with the corresponding harmonized European standards (ATEX).

Various versions of the pressure transmitters are available for measuring:

- Gauge pressure
- Level
- Mass level
- Volume level

Benefits

- High quality and service life
- High reliability even under extreme chemical and mechanical loads, e.g. abrasion.
- For aggressive and non-aggressive gases, vapors and liquids
- Extensive diagnosis and simulation functions
- Minimum conformity error
- Small long-term drift
- Wetted parts made of Hastelloy
- Infinitely adjustable span from 0.03 bar to 16 bar (0.43 psi to 232 psi) for DS III with HART interface
- Nominal measuring range from 1 bar to 16 bar (14.5 psi to 232 psi) for DS III with PROFIBUS PA and FOUNDATION Fieldbus interface
- Infinitely adjustable span from 0.03 bar to 16 bar (0.43 psi to 232 psi) for SITRANS P300 with HART interface
- Nominal measuring range from 1 bar to 16 bar (14.5 psi to 232 psi) for SITRANS P300 with PROFIBUS PA interface
- High measuring accuracy
- Parameterization over control keys and HART Communication, or over PROFIBUS PA or FOUNDATION Fieldbus interface (DS III only).

Application

The pressure transmitters of the DS III series, can be used in industrial areas with extreme chemical and mechanical loads. Electromagnetic compatibility in the range 10 kHz to 1 GHz makes the DS III pressure transmitters suitable for locations with high electromagnetic emissions.

Pressure transmitters with type of protection "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The pressure transmitters are provided with an EC type examination certificate and comply with the corresponding harmonized European standards (ATEX).

Pressure transmitters with the type of protection "Intrinsic safety" for use in zone 0 may be operated with power supply units of category "ia" and "ib".

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

The pressure transmitter can be operated locally over 3 control keys or programmed externally over HART or over PROFIBUS-PA or FOUNDATION Fieldbus interface (only DS III).

SITRANS P, DS III series

Measured variable: Gauge pressure of aggressive and non-aggressive gases, vapors and liquids.

Span (infinitely adjustable)

For DS III with HART: 0.03 ... 16 bar (0.433 ... 232 psi)

Nominal measuring range

For DS III with PROFIBUS PA or FOUNDATION Fieldbus: 1 ... 16 bar (14.5 ... 232 psi)

SITRANS P300Span (infinitely adjustable)

For DS III with HART: 0.03 ... 16 bar (0.433 ... 232 psi)

Nominal measuring range

For DS III with PROFIBUS PA or FOUNDATION Fieldbus: 1 ... 16 bar (14.5 ... 232 psi)

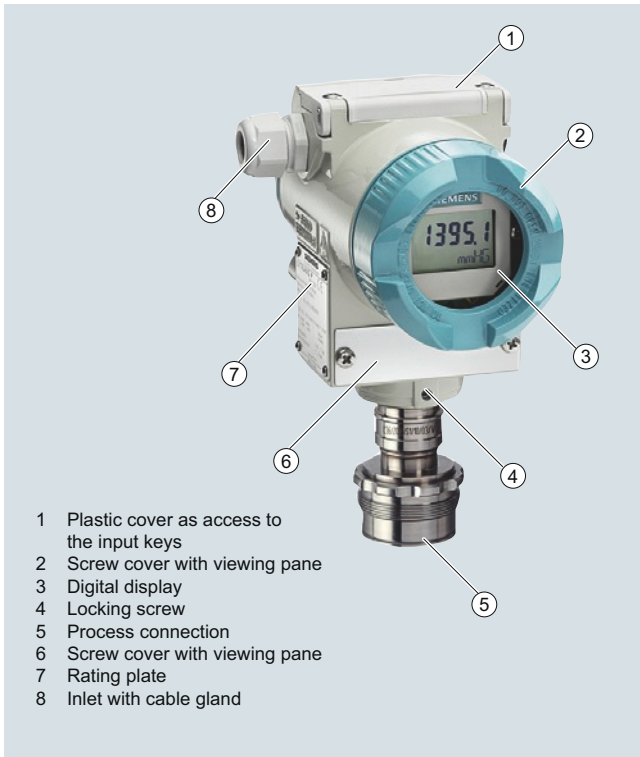
Pressure Measurement

Transmitters for gauge pressure for the paper industry

SITRANS P DS III and P300 with PMC connection - Technical description

Design

SITRANS P DS III



- 1 Plastic cover as access to the input keys
- 2 Screw cover with viewing pane
- 3 Digital display
- 4 Locking screw
- 5 Process connection
- 6 Screw cover with viewing pane
- 7 Rating plate
- 8 Inlet with cable gland

Device front view, SITRANS P DS III

The transmitter consists of various components depending on the order. The possible versions are listed in the ordering information. The components described below are the same for all transmitters.

The rating plate (7, Figure "Device front view") with the Article No. is located on the side of the housing. The specified number together with the ordering information provide details on the optional design details and on the possible measuring range (physical properties of built-in sensor element).

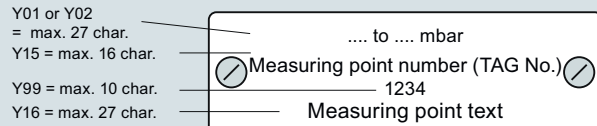
The approval label is located on the opposite side.

The housing is made of die-cast aluminium or stainless steel precision casting. A round cover is screwed on at the front and rear of the housing. The front cover (2) can be fitted with a viewing pane so that the measured values can be read directly on the display. The inlet (8) for the electrical connection is located either on the left or right side. The unused opening on the opposite side is sealed by a blanking plug. The protective earth connection is located on the rear of the housing.

The electrical connections for the power supply and screen are accessible by unscrewing the rear cover. The bottom part of the housing contains the measuring cell with process connection (5). The measuring cell is prevented from rotating by a locking screw (4). As the result of this modular design, the measuring cell and the electronics can be replaced separately from each other. The set parameter data are retained.

At the top of the housing is a plastic cover (1), which hides the input keys.

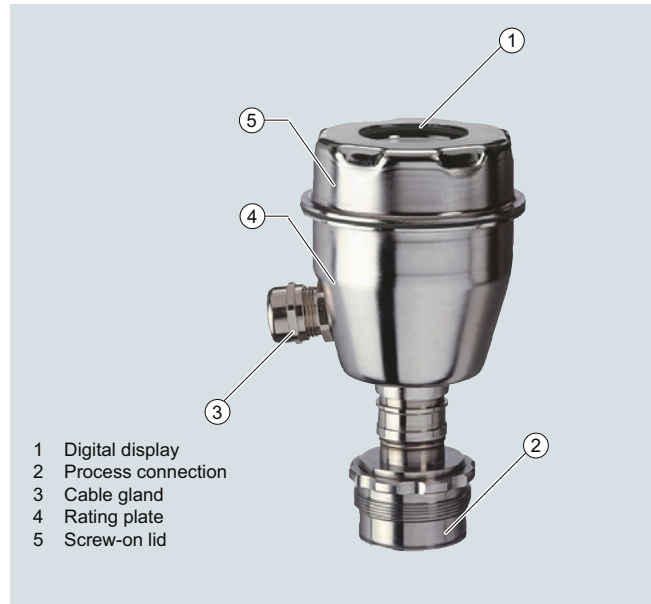
Example for an attached measuring point label



SITRANS P300

The device comprises:

- Electronics
- Housing
- Measuring cell

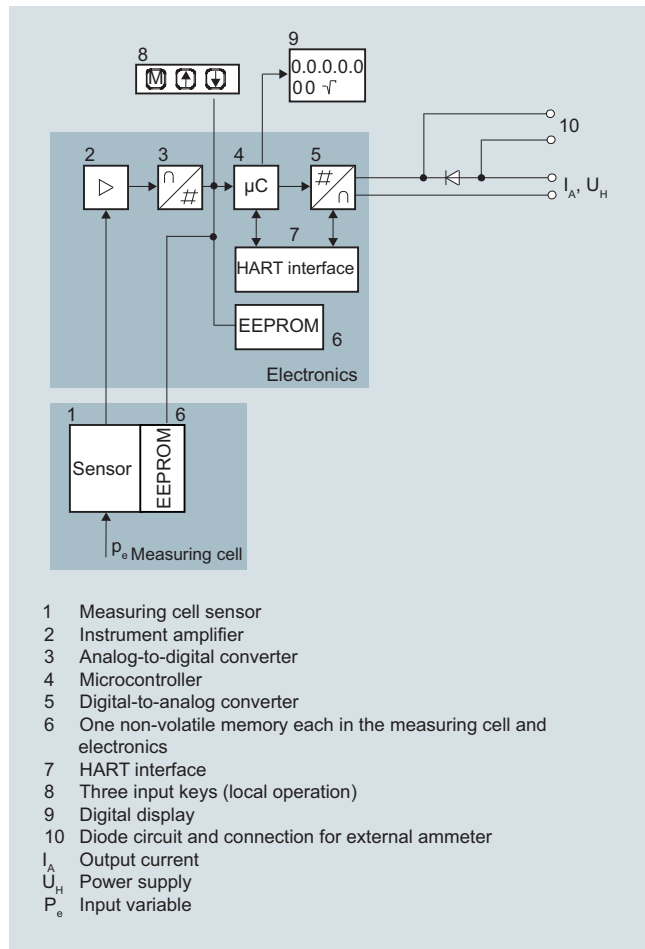


Perspective view of the SITRANS P300

The housing has a screw-on lid (5) and, depending on the version, is with or without an inspection window. The electrical terminal housing, the buttons for operation of the device are located under this lid and, depending on the version, the display. The connections for the auxiliary power UH and the shield are in the terminal housing. The cable gland is on the side of the housing. The measuring cell with the process connection (2) is located on the bottom of the housing. The measuring cell with the process connection may differ from the one shown in the diagram, depending on the device version.

Function

Operation of electronics with HART communication



Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in a microcontroller, its linearity and temperature response corrected, and converted in a digital-to-analog converter (5) into an output current of 4 to 20 mA.

The diode circuit (10) protects against incorrect polarity.

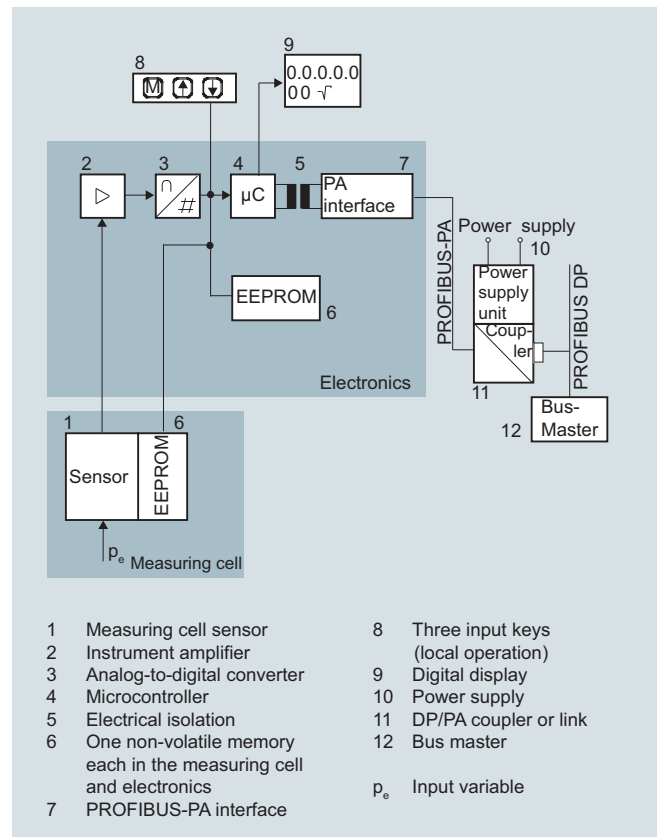
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the 3 input keys (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The HART modem (7) permits parameterization using a protocol according to the HART specification.

The pressure transmitters with spans ≤ 63 bar (914 psi) measure the input pressure compared to atmosphere, the transmitters with spans 160 bar (2320 psi) measure compared to vacuum.

Operation of electronics with PROFIBUS PA communication



Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, its linearity and temperature response corrected, and provided on the PROFIBUS PA through an electrically isolated PA interface (7).

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The first memory is linked with the measuring cell, the second with the electronics. This modular design means that the electronics and the measuring cell can be replaced separately from one another.

Using the three input buttons (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

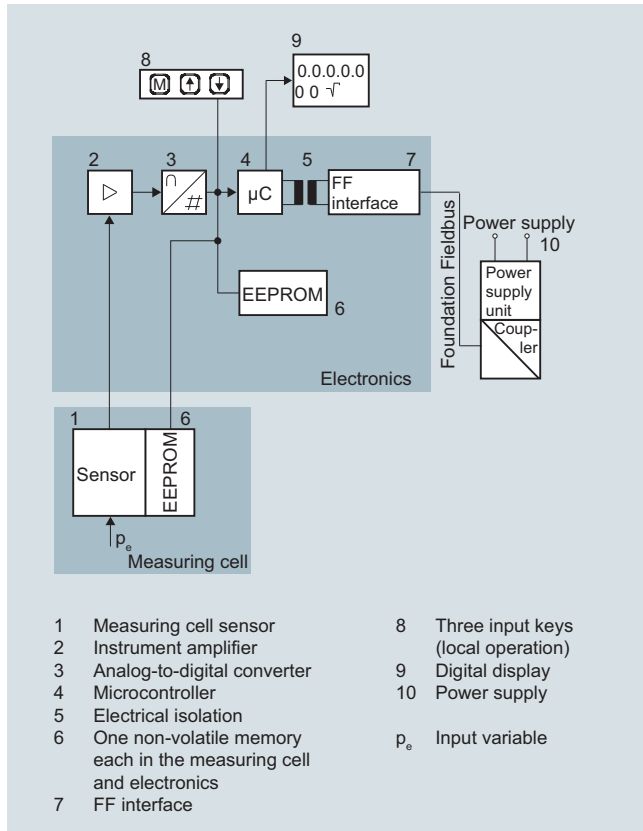
The results with status values and diagnostic values are transferred by cyclic data transmission on the PROFIBUS PA. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as SIMATIC PDM is required for this.

Pressure Measurement

Transmitters for gauge pressure for the paper industry

SITRANS P DS III and P300 with PMC connection - Technical description

Operation of electronics with FOUNDATION Fieldbus communication



Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, its linearity and temperature response corrected, and provided on the FOUNDATION Fieldbus through an electrically isolated FOUNDATION Fieldbus interface (7).

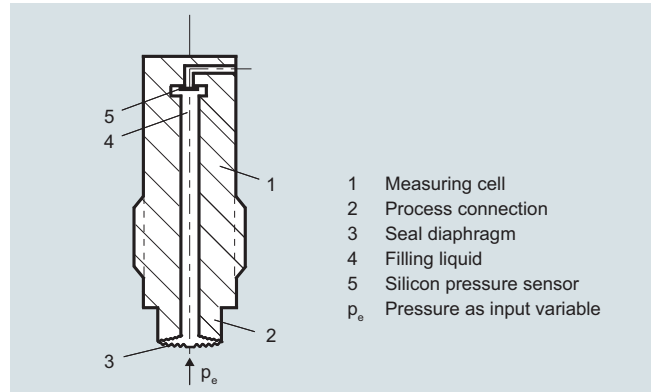
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the three input buttons (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The results with status values and diagnostic values are transferred by cyclic data transmission on the FOUNDATION Fieldbus. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as National Instruments Configurator is required for this.

Mode of operation of the measuring cell

Measuring cell for gauge pressure with front-flush diaphragm



Measuring cell for gauge pressure, with front-flush diaphragm for paper industry, function diagram

The pressure p_e is applied through the process connection (2, Figure "Measuring cell for gauge pressure, with front-flush diaphragm for paper industry, function diagram") to the measuring cell (1). This pressure is subsequently transmitted further through the seal diaphragm (3) and the filling liquid (4) to the silicon pressure sensor (5) whose measuring diaphragm is then flexed. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

Parameterization

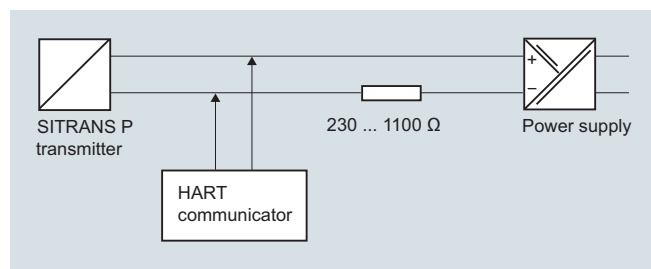
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

Parameterization using the input buttons (local operation)

With the input buttons you can easily set the most important parameters without any additional equipment.

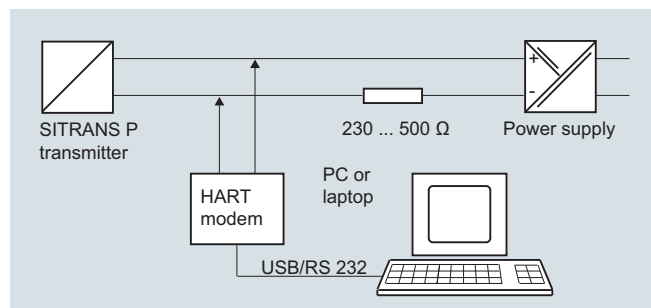
Parameterization using HART

Parameterization using HART is performed with a HART Communicator or a PC.



Communication between a HART Communicator and a pressure transmitter

When parameterizing with the HART Communicator, the connection is made directly to the 2-wire cable.



HART communication between a PC communicator and a pressure transmitter

When parameterizing with a PC, the connection is made through a HART modem.

The signals needed for communication in conformity with the HART 5.x or 6.x protocols are superimposed on the output current using the Frequency Shift Keying (FSK) method.

Adjustable parameter DS III with HART and P300 with HART

Parameters	Input keys	HART communication
Start of scale	x	x
Full-scale value	x	x
Electrical damping	x	x
Start-of-scale value without application of a pressure ("Blind setting")	x	x
Full-scale value without application of a pressure ("Blind setting")	x	x
Zero adjustment	x	x
current transmitter	x	x
Fault current	x	x
Disabling of buttons, write protection	x	x ¹⁾
Type of dimension and actual dimension	x	x
Characteristic (linear)	x	x
Input of characteristic		x
Freely-programmable LCD		x
Diagnostic functions		x

¹⁾ Cancel apart from write protection

Diagnostic functions for DS III with HART and P300 with HART

- Zero correction display
- Event counter
- Limit transmitter
- Saturation alarm
- Slave pointer
- Simulation functions
- Maintenance timer

Available physical units of display for DS III with HART and P300 with HART

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm ² , kg/cm ² , inH ₂ O, inH ₂ O (4 °C), mmH ₂ O, ftH ₂ O (20 °C), inHg, mmHg
Level (height data)	m, cm, mm, ft, in
Volume	m ³ , dm ³ , hl, yd ³ , ft ³ , in ³ , US gallon, Imp. gallon, bushel, barrel, barrel liquid
Mass	g, kg, t, lb, Ston, Lton, oz
Temperature	K, °C, °F, °R
Miscellaneous	%, mA

Parameterization through PROFIBUS PA interface

Fully digital communication through PROFIBUS PA, profile 3.0, is particularly user-friendly. The PROFIBUS connects the DS III PA to a process control system, e.g. SIMATIC PSC 7. Communication is possible even in a potentially explosive environment.

For parameterization through PROFIBUS you need suitable software, e.g. SIMATIC PDM (Process Device Manager).

Parameterization through FOUNDATION Fieldbus interface

Fully digital communication through FOUNDATION Fieldbus is particularly user-friendly. Through the FOUNDATION Fieldbus the DS III with FOUNDATION Fieldbus is connected to a process control system. Communication is possible even in a potentially explosive environment.

For parameterization through the FOUNDATION Fieldbus you need suitable software, e.g. National Instruments Configurator.

Adjustable parameters for DS III with PROFIBUS PA and FOUNDATION Fieldbus, and P300 with PROFIBUS PA and FOUNDATION Fieldbus

Adjustable parameters	Input keys	PROFIBUS PA and FOUNDATION Fieldbus interface
Electrical damping	x	x
Zero adjustment (correction of position)	x	x
Buttons and/or function disabling	x	x
Source of measured-value display	x	x
Physical dimension of display	x	x
Position of decimal point	x	x
Bus address	x	x
Adjustment of characteristic	x	x
Input of characteristic		x
Freely-programmable LCD		x
Diagnostic functions		x

Diagnostic functions for DS III with PROFIBUS PA and FOUNDATION Fieldbus, and P300 with PROFIBUS PA and FOUNDATION Fieldbus

- Event counter
- Slave pointer
- Maintenance timer
- Simulation functions
- Display of zero correction
- Limit transmitter
- Saturation alarm

Physical dimensions available for the display

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	MPa, hPa, kPa, Pa, bar, mbar, torr, atm, psi, g/cm ² , kg/cm ² , mmH ₂ O, mmH ₂ O (4 °C), inH ₂ O, inH ₂ O (4 °C), ftH ₂ O, mmHg, inHg
Level (height data)	m, cm, mm, ft, in, yd
Mass	g, kg, t, lb, Ston, Lton, oz
Volume	m ³ , dm ³ , hl, yd ³ , ft ³ , in ³ , US gallon, Imp. gallon, bushel, barrel, barrel liquid
Temperature	K, °C, °F, °R
Miscellaneous	%

Pressure Measurement

Transmitters for gauge pressure for the paper industry

SITRANS P DS III with PMC connection

1

Technical specifications

SITRANS P, DS III series for gauge pressure with PMC connection for the paper industry

Input	Gauge pressure			
Measured variable				
Span (fully adjustable) or measuring range, max. operating pressure and max. test pressure	HART	PROFIBUS PA/ FOUNDATION Fieldbus		
	Span	Nominal measuring range	Max. operating pres- sure MAWP (PS)	Max. perm. test pressure
	0.01 ... 1 bar 1 ... 100 kPa 0.15 ... 14.5 psi	1 bar 100 kPa 14.5 psi	4 bar 400 kPa 58 psi	6 bar 600 kPa 87 psi
	0.04 ... 4 bar 4 ... 400 kPa 0.58 ... 58 psi	4 bar 400 kPa 58 psi	7 bar 0.7 MPa 102 psi	10 bar 1 MPa 145 psi
	0.16 ... 16 bar 16 ... 1600 kPa 2.3 ... 232 psi	16 bar 1600 kPa 232 psi	21 bar 2.1 MPa 305 psi	32 bar 3.2 MPa 464 psi
Lower measuring limit (For PMC-Style Minibolt no span < 500 mbar adjustable)	100 mbar a/10 kPa a/1.45 psi a			
Upper measuring limit	100% of max. span			
Output	HART	PROFIBUS PA/ FOUNDATION Fieldbus		
Output signal	4 ... 20 mA	Digital PROFIBUS PA and FOUNDATION Fieldbus signal		
• Lower limit (infinitely adjustable)	3.55 mA, factory preset to 3.84 mA	-		
• Upper limit (infinitely adjustable)	23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA	-		
Load				
• Without HART communication	$R_B \leq (U_H - 10.5 \text{ V})/0.023 \text{ A in } \Omega$, U_H : Power supply in V	-		
• With HART communication	$R_B = 230 \dots 500 \Omega$ (SIMATIC PDM) or $R_B = 230 \dots 1100 \Omega$ (HART-Communicator)	-		
Physical bus	-	IEC 61158-2		
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.			
Electrical damping (step width 0.1 s)	Set to 2 s (0 ... 100 s)			
Measuring accuracy	Acc. to IEC 60770-1			
Reference conditions (All error data refer always refer to the set span)	• Increasing characteristic • Start-of-scale value 0 bar/kPa/psi • Stainless steel seal diaphragm • Silicone oil filling • Room temperature 25 °C (77 °F)			
Measuring span ratio r (spread, Turn-Down)	r = max. measuring span/set measuring span or nom. pressure range			
Error in measurement at limit setting incl. hysteresis and reproducibility				
• Linear characteristic				
- r ≤ 5	≤ 0.075 %			
- 5 < r ≤ 100	≤ (0.005 · r + 0.05) %			
Influence of ambient temperature (in percent per 28 °C (50 °F))	≤ (0.08 · r + 0.16) %			
Long-term stability (temperature change ± 30 °C (± 54 °F))	≤ (0.25 · r) % in 5 years			
Effect of mounting position	≤ 0.1 mbar/0.01 kPa/0.00145 psi per 10° inclination (zero point correction is possible with position error compensation)			
Effect of auxiliary power supply (in percent per change in voltage)	0.005 % per 1 V			
Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus	3 · 10 ⁻⁵ of nominal measuring range			

SITRANS P, DS III series for gauge pressure with PMC connection for the paper industry		
	HART	PROFIBUS PA and FOUNDATION Fieldbus
Rated conditions		
Degree of protection		
• according to EN 60529	IP66 (optional IP66/IP68)	
• according to NEMA 250	Type 4X	
Temperature of medium	-40 ... +100 °C (-40 ... +212 °F)	
Ambient conditions		
• Ambient temperature	-20 ... +85 °C (-4 ... +185 °F)	
- Transmitter	-40 ... +85 °C (-40 ... +185 °F)	
• Storage temperature	-50 ... +85 °C (-58 ... +185 °F)	
• Climatic class		
- Condensation	Relative humidity 0 ... 100 % Condensation permissible, suitable for use in the tropics	
• Electromagnetic Compatibility		
- Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21	
Design		
Weight (without options)	≈ 1.5 kg (≈ 3.3 lb)	
Enclosure material	Low-copper die-cast aluminum, GD-AISI12 or stainless steel precision casting, mat. no. 1.4408	
Wetted parts materials		
• Gasket (standard)	PTFE flat gasket	
• O-ring (minibolt)	FPM (Viton) or optionally: FFPM or NBR	
Measuring cell filling	Silicone oil or inert filling liquid	
Process connection (standard)	Flush-mounted, 1½", PMC Standard design	
Process connection (minibolt)	Flush-mounted, 1", minibolt design	
Power supply U_H		
Terminal voltage on transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically-safe mode	-
Power supply	-	Supplied through bus
Separate 24 V power supply	-	Not necessary
Bus voltage		
• Not Ex	-	9 ... 32 V
• With intrinsically-safe operation	-	9 ... 24 V
Current consumption		
• Basic current (max.)	-	12.5 mA
• Start-up current ≤ basic current	-	Yes
• Max. current in event of fault	-	15.5 mA
Fault disconnection electronics (FDE) available	-	Yes
Certificates and approvals		
Classification according to PED 2014/68/EU	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)	

Pressure Measurement

Transmitters for gauge pressure for the paper industry

SITRANS P DS III with PMC connection

1

HART communication

HART communication	230 ... 1100 Ω
Protocol	HART Version 5.x
Software for computer	SIMATIC PDM

PROFIBUS PA communication

Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local operation (standard setting address 126)
Cyclic data usage	
• Output byte	5 (one measured value) or 10 (two measured values)
• Input byte	0, 1, or 2 (register operating mode and reset function for metering)
Internal preprocessing	
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B
Function blocks	2
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 ... 100 s
- Simulation function	Input /Output
- Failure mode	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	2
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Specification of a container characteristic with	Max. 30 nodes
- Square-rooted characteristic for flow measurement	Yes
- Gradual volume suppression and implementation point of square-root extraction	Parameterizable
- Simulation function for measured pressure value and sensor temperature	Constant value or over parameterizable ramp function

FOUNDATION Fieldbus communication

Function blocks	3 function blocks analog input, 1 function block PID
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 ... 100 s
- Simulation function	Output/input (can be locked within the device with a bridge)
- Failure mode	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
- Square-rooted characteristic for flow measurement	Yes
• PID	Standard FOUNDATION Fieldbus function block
• Physical block	1 resource block
Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function

Pressure Measurement

Transmitters for gauge pressure for the paper industry

SITRANS P DS III with PMC connection

1

Selection and Ordering data		Article No.
SITRANS P pressure transmitters for gauge pressure, with PMC connection series DS III with HART		7 MF 4 1 3 3 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Measuring cell-cleaning	
Silicone oil	normal	1
Inert liquid	grease-free to cleanliness level 2	3
Measuring span (min. ... max.)		
0.01 ... 1 bar ¹⁾	(0.15 ... 14.5 psi) ¹⁾	B
0.04 ... 4 bar	(0.58 ... 58 psi)	C
0.16 ... 16 bar	(2.32 ... 232 psi)	D
Wetted parts materials		
Seal diaphragm	Connection shank	
Hastelloy	Stainless steel	B
Process connection		
<ul style="list-style-type: none"> PMC Style Standard: Thread 1½" PMC Style Minibolt: front-flush 1" (not with minimum span: 500 mbar (7.25 psi) - version "B") 		2 3
Non-wetted parts materials		
<ul style="list-style-type: none"> Housing made of die-cast aluminium Housing stainless steel precision casting 		0 3
Version		
<ul style="list-style-type: none"> Standard version, German plate inscription, setting for pressure unit: bar International version, English plate inscription, setting for pressure unit: bar Chinese version, English plate inscription, setting for pressure unit: Pascal 		1 2 3
All versions include DVD with compact operating instructions in various EU languages.		
Explosion protection		
<ul style="list-style-type: none"> None With ATEX, Type of protection: <ul style="list-style-type: none"> "Intrinsic safety (Ex ia)" "Explosion-proof (Ex d)"²⁾ „Ex nA/ic (Zone 2)"³⁾ FM + CSA intrinsic safe (is)⁴⁾ With FM + CSA, Type of protection: <ul style="list-style-type: none"> "Intrinsic Safe and Explosion Proof (is + xp)"³⁾⁴⁾ 		A B D E F NC
Electrical connection / cable entry		
<ul style="list-style-type: none"> Female thread M20 x 1.5 Female thread ½-14 NPT M12 device plugs (stainless steel)^{5) 6)} 		B C F
Display		
<ul style="list-style-type: none"> Without display Without visible display (display concealed, setting: mA) With visible display (setting: mA) With customer-specific display (setting as specified, Order code "Y21" required) 		0 1 6 7

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:

- Quick-start guide
- Sealing ring

¹⁾ Only with "PMC Style Standard" process connection

²⁾ Without cable gland, with blanking plug

³⁾ Configurations with M12 device plugs are only available in Ex ic.

⁴⁾ Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.

⁵⁾ Only in connection with Ex approval A, B, E or F.

⁶⁾ M12 delivered without cable socket

Selection and Ordering data		Article No.
SITRANS P pressure transmitter for gauge pressure, with PMC connection DS III with PROFIBUS PA (PA)		7 MF 4 1 3 4 -
DS III with FOUNDATION Fieldbus (FF)		7 MF 4 1 3 5 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Meas. cell cleaning	
Silicone oil	normal	1
Inert liquid	grease-free to cleanliness level 2	3
Nominal measuring range		
1 bar ¹⁾	(14.5 psi) ¹⁾	B
4 bar	(58 psi)	C
16 bar	(232 psi)	D
Wetted parts materials		
Seal diaphragm	Connection shank	
Hastelloy	Stainless steel	B
Process connection²⁾		
<ul style="list-style-type: none"> PMC Style Standard: Thread 1½" PMC Style Minibolt: front-flush 1" (minimum span: 500 mbar (7.25 psi), not available with 1-bar-measuring cell (Option B)) 		2 3
Non-wetted parts materials		
<ul style="list-style-type: none"> Housing made of die-cast aluminium Housing stainless steel precision casting 		0 3
Version		
<ul style="list-style-type: none"> Standard version, German plate inscription, setting for pressure unit: bar International version, English plate inscription, setting for pressure unit: bar Chinese version, English plate inscription, setting for pressure unit: Pascal 		1 2 3
All versions include DVD with compact operating instructions in various EU languages.		
Explosion protection		
<ul style="list-style-type: none"> None With ATEX, Type of protection: <ul style="list-style-type: none"> "Intrinsic safety (Ex ia)" "Explosion-proof (Ex d)"³⁾ „Ex nA/ic (Zone 2)"⁴⁾ FM + CSA intrinsic safe (is)⁵⁾ With FM + CSA, Type of protection: <ul style="list-style-type: none"> "Intrinsic Safe and Explosion Proof (is + xp)"³⁾⁵⁾ 		A B D E F NC
Electrical connection / cable entry		
<ul style="list-style-type: none"> Female thread M20 x 1.5 Female thread ½-14 NPT M12 device plugs (stainless steel)^{6) 7)} 		B C F
Display		
<ul style="list-style-type: none"> Without display Without visible display (display concealed, setting: bar) With visible display (setting: bar) With customer-specific display (setting as specified, Order code "Y21" required) 		0 1 6 7

Included in delivery of the device:

- Quick-start guide
- Sealing ring

¹⁾ Only with "PMC Style Standard" process connection

²⁾ Sealing is included in delivery.

³⁾ Without cable gland, with blanking plug

⁴⁾ Configurations with M12 device plugs are only available in Ex ic.

⁵⁾ Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505

⁶⁾ Only in connection with Ex approval A, B, E or F.

⁷⁾ M12 delivered without cable socket

Pressure Measurement

Transmitters for gauge pressure for the paper industry

SITRANS P DS III with PMC connection

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Selection and Ordering data	Order code			
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code.				
Device plugs				
• Angled	A32	✓		
• Han 8D (metal, gray)	A33	✓		
M12 cable sockets (metal (CuZn))	A50	✓	✓	✓
Rating plate inscription (instead of German)				
• English	B11	✓	✓	✓
• French	B12	✓	✓	✓
• Spanish	B13	✓	✓	✓
• Italian	B14	✓	✓	✓
• Cyrillic (russian)	B16	✓	✓	✓
English rating plate Pressure units in inH ₂ O and/or psi	B21	✓	✓	✓
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2	C11	✓	✓	✓
Inspection certificate Acc. to EN 10204-3.1	C12	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	C14	✓	✓	✓
"Functional safety (SIL2)" certificate acc. to IEC 61508	C20	✓		
"Functional safety (SIL2/3)" certificate acc. to IEC 61508	C23	✓		
PED for Russia with initial calibration mark	C99	✓	✓	✓
Setting of the upper saturation limit of the output signal to 22.0 mA	D05	✓	✓	✓
Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)	D12	✓	✓	✓
Export approval Korea	E11	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-...-B..)	E55 ¹⁾	✓	✓	✓
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-...-D..)	E56 ¹⁾	✓	✓	✓
Ex protection "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-...-E..)	E57 ¹⁾	✓	✓	✓
Ex protection „Ex ia“, „Ex d" and „Zone 2" to NEPSI (China) (only for transmitter 7MF4...-...-R..)	E58 ¹⁾	✓	✓	✓
Mounting				
• Weldable sockets for standard 1½" threaded connection	P01	✓	✓	✓
• Weldable socket for minibolt connection 1" (incl. screw 5/16-18 UNC-2B and washer)	P02	✓	✓	✓

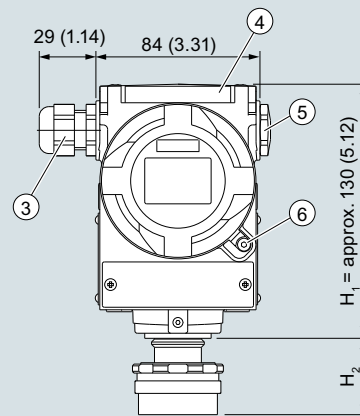
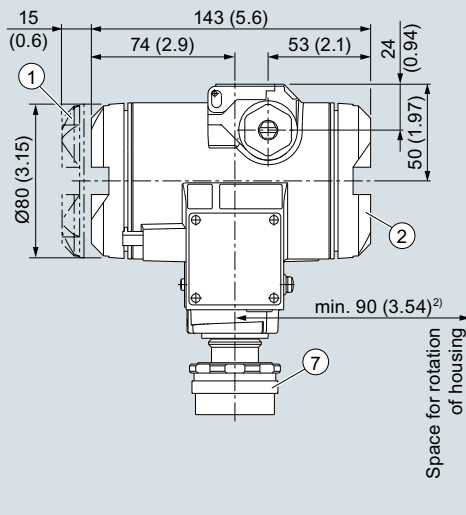
¹⁾ When the additional ex option is selected, the ATEX marking on the device is omitted. Only the Ex option selected via the Z option is marked.

Selection and Ordering data	Order code			
Additional data		HART	PA	FF
Please add "-Z" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	Y01	✓	✓ ¹⁾	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	Y15	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	Y16	✓	✓	✓
Entry of HART address (TAG) Max. 8 characters, specify in plain text: Y17:	Y17	✓		
Setting of pressure indication in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H ₂ O ⁺ , inH ₂ O ⁺ , ftH ₂ O ⁺ , mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM or % *) ref. temperature 20 °C	Y21	✓	✓	✓
Setting of pressure indication in non-pressure units²⁾ Specify in plain text: Y22: up to l, m ³ , m, USg, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y22 + Y01	✓		
Preset bus address possible between 1 and 126 Max. 8 characters, specify in plain text: Y25:	Y25		✓	✓
Only "Y01" and "Y21" can be factory preset				
✓ = available				
ordering example				
Item line: 7MF4133-1DB20-1AB7-Z				
B line: C11 + Y01 + Y21				
C line: Y01: 1 ... 10 bar (14.5 ... 145 psi)				
C line: Y21: bar (psi)				

¹⁾ Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

²⁾ Preset values can only be changed over SIMATIC PDM.

Dimensional drawings



① Electronic side, digital display
(longer overall length for cover with window)¹⁾

② Terminal side¹⁾

③ Electrical connection:
Screwed gland M20 x 1,5 or screwed gland ½-14 NPT or
M12 device plug

④ Protective cover over keys

⑤ Blanking plug

⑥ Screw cover - safety bracket (only for type of protection
"Explosion-proof enclosure", not shown in the drawing)

⑦ Process connection: PMC standard

¹⁾ Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing

²⁾ 92 mm (3.6 inch) for minimum distance to permit rotation with indicator

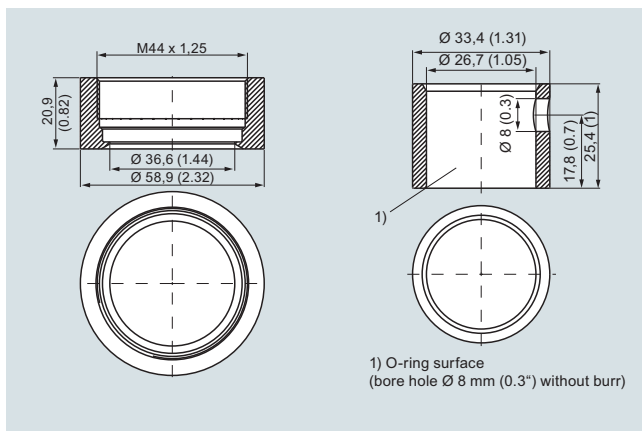
SITRANS P DS III pressure transmitters for gauge pressure, with PMC connection, dimensions in mm (inch)

The diagram shows a SITRANS P DS III with an example of a flange. In this drawing the height is subdivided into H_1 and H_2 .

H_1 = Height of the SITRANS P DS III up to a defined cross-section

H_2 = Height of the flange up to this defined cross-section

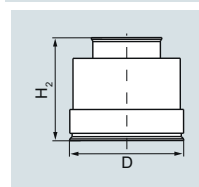
Only the height H_2 is indicated in the dimensions of the flanges.



PMC Style Standard (left) and PMC Style Minibolt (right) weldable sockets, dimensions in mm (inch)

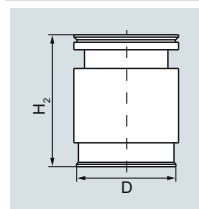
Material: Stainless steel, Mat. No. 1.4404/316L

PMC Style standard



DN	PN	ØD	H ₂
		40.9 mm (1.6")	approx. 36.8 mm (1.4")

PMC Style minibolt



DN	PN	ØD	H ₂
		26.3 mm (1.0")	approx. 33.1 mm (1.3")

Pressure Measurement

Transmitters for gauge pressure for the paper industry

SITRANS P300 with PMC connection

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Technical specifications

SITRANS P300 for gauge pressure with PMC connection for the paper industry

Input		Gauge pressure (front-flush)	
Measured variable		HART	PROFIBUS PA/ FOUNDATION Fieldbus
Span (fully adjustable) or measuring range, max. operating pressure and max. test pressure		Span	Nominal measuring range
		0.01 ... 1 bar 1 ... 100 kPa 0.15 ... 14.5 psi	1 bar 100 kPa 14.5 psi
		0.04 ... 4 bar 4 ... 400 kPa 0.58 ... 58 psi	4 bar 400 kPa 58 psi
		0.16 ... 16 bar 16 ... 1600 kPa 2.3 ... 232 psi	16 bar 1600 kPa 232 psi
Lower measuring limit (For PMC-Style Minibolt no span < 500 mbar adjustable)		100 mbar a/10 kPa a/1.45 psi a	
Upper measuring limit		100 % of max. span	
Output		HART	PROFIBUS PA/ FOUNDATION Fieldbus
Output signal		4 ... 20 mA	Digital PROFIBUS PA and FOUNDATION Fieldbus signal
• Lower limit (infinitely adjustable)		3.55 mA, factory preset to 3.84 mA	-
• Upper limit (infinitely adjustable)		23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA	-
Load		$R_B \leq (U_H - 10.5 \text{ V})/0.023 \text{ A}$ in Ω U_H : Power supply in V	-
• Without HART communication		$R_B = 230 \dots 500 \Omega$ (SIMATIC PDM) or $R_B = 230 \dots 1100 \Omega$ (HART Communicator)	-
• With HART communication		-	IEC 61158-2
Physical bus		-	IEC 61158-2
Protection against polarity reversal		Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.	
Electrical damping (step width 0.1 s)		Set to 2 s (0 ... 100 s)	
Measuring accuracy		Acc. to IEC 60770-1	
Reference conditions		<ul style="list-style-type: none"> Increasing characteristic Start-of-scale value 0 bar/kPa/psi Stainless steel seal diaphragm Measuring cell with silicone oil Room temperature 25 °C (77 °F) 	
Measuring span ratio r (spread, Turn-Down)		$r = \text{max. measuring span/set measuring span or nom. pressure range}$	
Error in measurement at limit setting incl. hysteresis and reproducibility			
Linear characteristic			
- $r \leq 5$		$\leq 0.075 \%$	
- $5 < r \leq 100$		$\leq (0.005 \cdot r + 0.05) \%$	
Influence of ambient temperature (in percent per 28 °C (50 °F))		$\leq (0.08 \cdot r + 0.16) \%$	
Long-term stability (temperature change $\pm 30 \text{ °C}$ ($\pm 54 \text{ °F}$))		$\leq (0.25 \cdot r) \%$ in 5 years	
Effect of mounting position		$\leq 0.1 \text{ mbar}/0.01 \text{ kPa}/0.00145 \text{ psi}$ per 10° inclination (zero point correction is possible with position error compensation)	
Effect of auxiliary power supply (in percent per change in voltage)		0.005 % per 1 V	
Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus		$3 \cdot 10^{-5}$ of nominal measuring range	

SITRANS P300 for gauge pressure with PMC connection for the paper industry**Rated conditions**Installation conditions

Ambient temperature

- Measuring cell with silicone oil
- Display readable
- Storage temperature

Climatic class

Condensation

Degree of protection

- according to EN 60529
- according to NEMA 250

Electromagnetic Compatibility

- Emitted interference and interference immunity

Medium conditions

Temperature of medium

- Measuring cell with silicone oil

Observe the temperature class in areas subject to explosion hazard.

-40 ... +85 °C (-40 ... +185 °F)

-30 ... +85 °C (-22 ... +185 °F)

-50 ... +85 °C (-58 ... +185 °F)

Relative humidity 0 ... 100 %

Condensation permissible, suitable for use in the tropics

IP65, IP68

Type 4X, enclosure cleaning, resistant to lyes, steam to 150 °C (302 °F)

Acc. to IEC 61326 and NAMUR NE 21

-40 ... +100 °C (-40 ... +212 °F)

Design

Weight (without options)

Enclosure material

Material of parts in contact with the medium

- Seal diaphragm
- Measuring cell filling

Surface quality touched-by-media

Approx. 1 kg (2.2 lb)

Stainless steel, mat. no. 1.4301/304

Hastelloy C276, mat. no. 2.4819

Silicone oil

Ra-values ≤ 0.8 µm (32 µ inch)/welds Ra ≤ 1.6 µm (64 µ inch)

Power supply U_H

Terminal voltage on transmitter

Power supply

Separate power supply

Bus voltage

- Without Ex
- With intrinsically-safe operation

Current consumption

- Max. basic current
- Start-up current ≤ basic current
- Max. fault current in the event of a fault

Fault disconnection electronics (FDE) available

HART

10.5 ... 42 V DC
for intrinsically safe operation:
10.5 ... 30 V DC

-

-

-

-

-

-

-

PROFIBUS PA/ FOUNDATION Fieldbus

Supplied through bus

Not necessary

9 ... 32 V

9 ... 24 V

12.5 mA

Yes

15.5 mA

Yes

Pressure Measurement

Transmitters for gauge pressure for the paper industry

SITRANS P300 with PMC connection

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SITRANS P300 for gauge pressure with PMC connection for the paper industry

Certificates and approvals

Classification according to PED 2014/68/EU

Explosion protection

Intrinsic safety "i"

Marking

Permissible ambient temperature

- Temperature class T4
- Temperature class T5
- Temperature class T6

Connection

Effective inner capacitance:

Effective internal inductance:

Explosion protection to FM for USA and Canada (cFM_{US})

- Identification (DIP) or (IS); (NI)

- Identification (DIP) or (IS)

HART

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of Article 4, paragraph 3 (sound engineering practice)

PTB 05 ATEX 2048

II 1/2 G Ex ia IIC/IIB T4/T5/T6 Ga/Gb

-40 ... +85 °C (-40 ... +185 °F)

-40 ... +70 °C (-40 ... +158 °F)

-40 ... +60 °C (-40 ... +140 °F)

To certified intrinsically-safe circuits with peak values:

$U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$,
 $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$

$C_i = 6 \text{ nF}$

$L_i = 0.4 \text{ mH}$

PROFIBUS PA/ FOUNDATION Fieldbus

To certified intrinsically-safe circuits with peak values:

FISCO supply unit:
 $U_i = 17.5 \text{ V}$, $I_i = 380 \text{ mA}$,
 $P_i = 5.32 \text{ W}$

Linear barrier:
 $U_i = 24 \text{ V}$, $I_i = 250 \text{ mA}$, $P_i = 1.2 \text{ W}$

$C_i = 1.1 \text{ nF}$

$L_i \leq 7 \mu\text{H}$

Certificate of Compliance 3025099

CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4 ... T6; CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III

Certificate of Compliance 3025099C

CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC 4 ... T6; CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III

HART communication		FOUNDATION Fieldbus communication	
HART	230 ... 1100 Ω	Function blocks	3 function blocks analog input, 1 function block PID
Protocol	HART Version 5.x		
Software for computer	SIMATIC PDM		
PROFIBUS PA communication		• Analog input	Yes, linearly rising or falling characteristic
Simultaneous communication with master class 2 (max.)	4	- Adaptation to customer-specific process variables	0 ... 100 s
The address can be set using	Configuration tool Local operation (standard setting Address 126)	- Electrical damping, adjustable	Output/input (can be locked within the device with a bridge)
Cyclic data usage		- Simulation function	parameterizable (last good value, substitute value, incorrect value)
• Output byte	One measured value: 5 bytes Two measured values: 10 bytes	- Failure mode	Yes, one upper and lower warning limit and one alarm limit respectively
• Input byte	Register operating mode: 1 bytes Reset function due to metering: 1 bytes	- Limit monitoring	Yes
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B	- Square-rooted characteristic for flow measurement	
Function blocks	2	• PID	Standard FOUNDATION Fieldbus function block
• Analog input		• Physical block	1 resource block
- Adaptation to customer-specific process variables	Linearly rising or falling characteristic	Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
- Electrical damping	0 ... 100 s adjustable	• Pressure transducer block	
- Simulation function	Input /Output	- Can be calibrated by applying two pressures	Yes
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively	- Monitoring of sensor limits	Yes
• Register (totalizer)	Can be reset and preset Optional direction of counting Simulation function of the register output	- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively		
• Physical block	1		
Transducer blocks	2		
• Pressure transducer block			
- Monitoring of sensor limits	Yes		
- Specification of a container characteristic with	Max. 31 nodes		
- Characteristic curve	Linear		
- Simulation function	Available		
• Transducer block "Electronic temperature"			
Simulation function	Available		

Pressure Measurement

Transmitters for gauge pressure for the paper industry

SITRANS P300 with PMC connection

Selection and Ordering data		Article No.
SITRANS P300 pressure transmitters with PMC connection , single-chamber measuring housing, rating plate inscription in English		
with 4 ... 20 mA / HART		7MF8123-
with PROFIBUS PA		7MF8124-
with FOUNDATION Fieldbus (FF)		7MF8125-
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Measuring cell cleaning	
Silicone oil	normal	1
Inert liquid	Cleanliness level 2 to DIN 25410	3
Measuring span		
1 bar ¹⁾	(14.5 psi)	B
4 bar	(58 psi)	C
16 bar	(232 psi)	D
Wetted parts materials		
Seal diaphragm	Measuring cell	
Hastelloy	Stainless steel	B
Process connection		
<ul style="list-style-type: none"> PMC Style Standard: Thread 1½" PMC Style Minibolt: front-flush 1" (minimum span: 500 mbar (7.25 psi), not available with 1-bar-measuring cell (Option B)) 		2 3
Non-wetted parts materials		
<ul style="list-style-type: none"> Stainless steel, deep-drawn and electrolytically polished 		4
Version		
<ul style="list-style-type: none"> Standard versions 		1
Explosion protection		
<ul style="list-style-type: none"> None With ATEX, Type of protection: <ul style="list-style-type: none"> "Intrinsic safety (Ex ia)" Zone 20/21/22²⁾ Ex nA/nL (Zone 2)³⁾ With FM + CSA, Type of protection: <ul style="list-style-type: none"> "Intrinsic Safe (is)" (planned)⁴⁾ 		A B C E M
Electrical connection/cable entry		
<ul style="list-style-type: none"> Screwed gland M20 x .5 (polyamide)⁵⁾ Screwed gland M20 x 1.5 (metal) Screwed gland M20 x 1.5 (stainless steel) M12 device plug (stainless steel), without cable socket ½-14 NPT metal thread⁶⁾ ½-14 NPT stainless steel thread⁶⁾ 		A B C G H J

Selection and Ordering data		Article No.
SITRANS P300 pressure transmitters with PMC connection , single-chamber measuring housing, rating plate inscription in English		
with 4 ... 20 mA / HART		7MF8123-
with PROFIBUS PA		7MF8124-
with FOUNDATION Fieldbus (FF)		7MF8125-
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Display		
<ul style="list-style-type: none"> Without display, with keys, closed lid With display and keys, closed lid ⁷⁾ With display and keys, lid with polycarbonate disc (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure units)⁷⁾ With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with polycarbonate disc ⁷⁾ With display and keys, lid with glass pane (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure unit)⁷⁾ With display (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with glass pane⁷⁾ 		1 2 4 5 6 7

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:

- Quick-start guide
- Sealing ring

- 1) Only with "Standard" process connection"
- 2) Not in conjunction with electrical connection option A.
- 3) Only available together with electrical connection options B, C or G.
- 4) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.
- 5) Only together with HART electronics.
- 6) Without cable gland.
- 7) Display cannot be turned.

Pressure Measurement

Transmitters for gauge pressure for the paper industry

SITRANS P300 with PMC connection

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Selection and Ordering data		Order code			
Further designs			HART	PA	FF
Add "-Z" to Article No. and specify Order code.					
Cable socket for M12 device plugs					
• Stainless steel	A51	✓	✓	✓	✓
Rating plate inscription					
(instead of English)					
• German	B10	✓	✓	✓	✓
• French	B12	✓	✓	✓	✓
• Spanish	B13	✓	✓	✓	✓
• Italian	B14	✓	✓	✓	✓
English rating plate	B21	✓	✓	✓	✓
Pressure units in inH ₂ O and/or psi					
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2	C11	✓	✓	✓	✓
Inspection certificate	C12	✓	✓	✓	✓
Acc. to EN 10204-3.1					
Factory certificate	C14	✓	✓	✓	✓
Acc. to EN 10204-2.2					
Setting of the upper saturation limit of the output signal to 22.0 mA	D05	✓	✓	✓	✓
Degree of protection IP65/IP68	D12	✓	✓	✓	✓
(only for M20x1.5 and ½-14 NPT)					
Mounting					
• Weldable sockets for standard 1½" threaded connection	P01	✓	✓	✓	✓
• Weldable socket for minibolt connection 1" (incl. screw 5/16-18 UNC-2B and washer)	P02	✓	✓	✓	✓
Selection and Ordering data		Order code			
Additional data			HART	PA	FF
Please add "-Z" to Article No. and specify Order code(s) and plain text.					
Measuring range to be set	Y01	✓	✓ ¹⁾		
Specify in plain text (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi					
Stainless steel tag plate and entry in device variable (measuring point description)	Y15	✓	✓	✓	✓
Max. 16 characters, specify in plain text: Y15:					
Measuring point text (entry in device variable)	Y16	✓	✓	✓	✓
Max. 27 char., specify in plain text: Y16:					
Entry of HART address (TAG)	Y17	✓			
Max. 8 char., specify in plain text: Y17:					
Setting of pressure indication in pressure units	Y21	✓	✓	✓	✓
Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected:					
bar, mbar, mm H ₂ O ^{*)} , inH ₂ O ^{*)} , ftH ₂ O ^{*)} , mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM or %) ref. temperature 20 °C					
Setting of pressure indication in non-pressure units²⁾	Y22 + Y01	✓			
Specify in plain text: Y22: up to l, m ³ , m, USg, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)					
Preset bus address	Y25		✓	✓	
possible between 1 and 126 Specify in plain text: Y25:					
Only "Y01" and "Y21" can be factory preset					
✓ = available					

¹⁾ Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

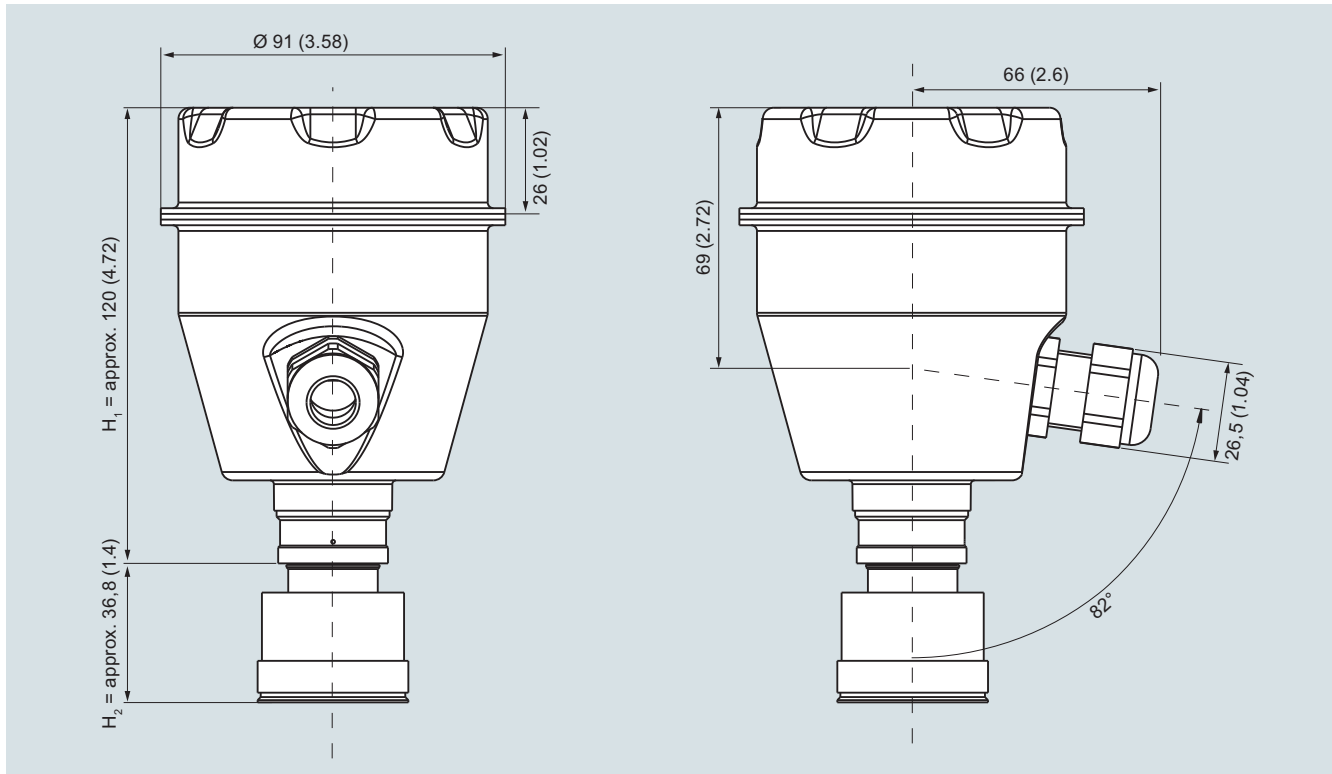
²⁾ Preset values can only be changed over SIMATIC PDM.

Pressure Measurement

Transmitters for gauge pressure for the paper industry

SITRANS P300 with PMC connection

Dimensional drawings



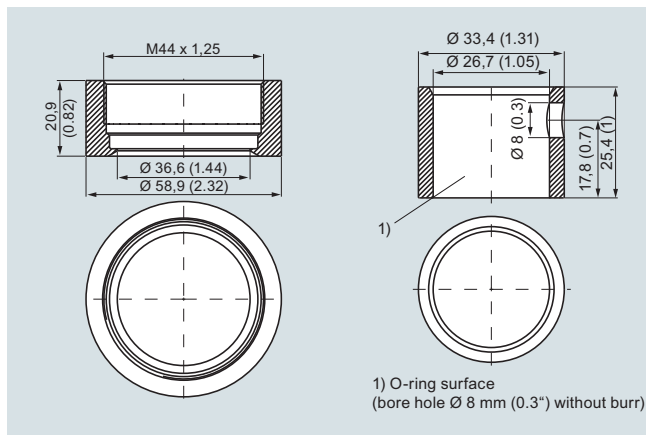
SITRANS P300 pressure transmitters for gauge pressure, with PMC connection, dimensions in mm (inch)

The diagram shows a SITRANS P300 with an example of a flange. In this drawing the height is subdivided into H_1 and H_2 .

H_1 = Height of the SITRANS P300 up to a defined cross-section

H_2 = Height of the flange up to this defined cross-section

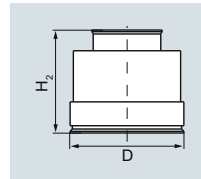
Only the height H_2 is indicated in the dimensions of the flanges.



PMC Style Standard (left) and PMC Style Minibolt (right) weldable sockets, dimensions in mm (inch)

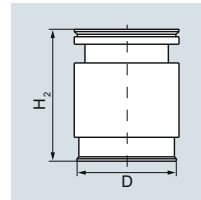
Material: Stainless steel, mat. No. 1.4404 / 316L

PMC Style Standard



DN	PN	ØD	H ₂
		40.4 mm (1.6")	Approx. 36.8 mm (1.4")

PMC Style Mini bolt



DN	PN	ØD	H ₂
		26.3 mm (1.0")	Approx. 33.1 mm (1.3")

Overview

SITRANS P310 pressure transmitters are digital pressure transmitters with a high level of operating convenience. With a measurement accuracy of 0.075 %, they complement the SITRANS P DS III and round off the portfolio. The parameterization is performed using input buttons or the HART interface.

Extensive functionality enables the pressure transmitter to be precisely adapted to the plant's requirements. Operation is very simple in spite of the numerous setting options.

Transmitters with type of protection "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The transmitters are provided with an EC type examination certificate and comply with the corresponding harmonized European standards (ATEX).

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

SITRANS P310 pressure transmitters are available in various versions for measuring:

- Gauge pressure
- Differential pressure
- Volume flow
- Mass flow

Benefits

- High quality and service life
- High reliability even under extreme chemical and mechanical loads
- For aggressive and non-aggressive gases, vapors and liquids
- Extensive diagnosis and simulation functions
- Good long-term stability
- Wetted parts made of high-grade materials (stainless steel, Hastelloy)
- Infinitely adjustable spans from 0.01 bar to 700 bar (0.15 psi to 10153 psi)
- Measuring accuracy 0.075 %
- Parameterization over input buttons and HART interface

Application

SITRANS P310 pressure transmitters are particularly suited for use in the industrial areas of Energy, Oil & Gas as well as Water/Wastewater. Electromagnetic compatibility in the range 10 kHz to 1 GHz makes them suitable for locations with high electromagnetic emissions.

Pressure transmitters with type of protection "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The pressure transmitters are provided with an EC type examination certificate and comply with the corresponding harmonized European standards (ATEX).

Pressure transmitters with the type of protection "Intrinsic safety" for use in zone 0 may be operated with power supply units of category "ia" and "ib".

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

The pressure transmitter can be operated locally over 3 input buttons or programmed externally over HART interface.

Pressure transmitter for gauge pressure

Measured variable: Gauge pressure of aggressive and non-aggressive gases, vapors and liquids.

Span (infinitely adjustable):
0.01 bar to 700 bar (0.15 psi to 10153 psi)

Pressure transmitters for differential pressure and flow

Measured variables:

- Differential pressure
- Small positive or negative pressure
- Flow $q \sim \sqrt{\Delta p}$ (together with a primary differential pressure device (see Chapter "Flow Meters"))

Span (infinitely adjustable):
1 mbar ... 30 bar (0.0145 ... 435 psi)

Pressure Measurement

Transmitters for applications with basic requirements (Basic)
SITRANS P310

Technical description

1

Design



Front view

The transmitter consists of various components depending on the order. The possible versions are listed in the ordering information. The components described below are the same for all transmitters.

The rating plate (7, Figure "Front view") with the Article No. is located on the side of the housing. The specified number together with the ordering information provide details on the optional design details and on the possible measuring range (physical properties of built-in sensor element).

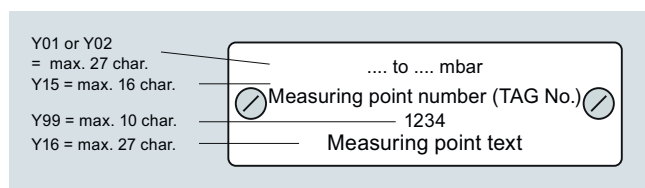
The approval label is located on the opposite side.

The housing is made of die-cast aluminium or stainless steel precision casting. A round cover (6) is screwed on at the front and rear of the housing. The front cover can be fitted with a viewing pane so that the measured values can be read directly on the display. The inlet (8) for the electrical connection is located either on the left or right side. The unused opening on the opposite side is sealed by a blanking plug. The protective earth connection is located on the rear of the housing.

The electrical connections for the power supply and screen are accessible by unscrewing the rear cover. The bottom part of the housing contains the measuring cell with process connection (5). The measuring cell is prevented from rotating by a locking screw (4). As the result of this modular design, the measuring cell and the electronics can be replaced separately from each other. The set parameter data are retained.

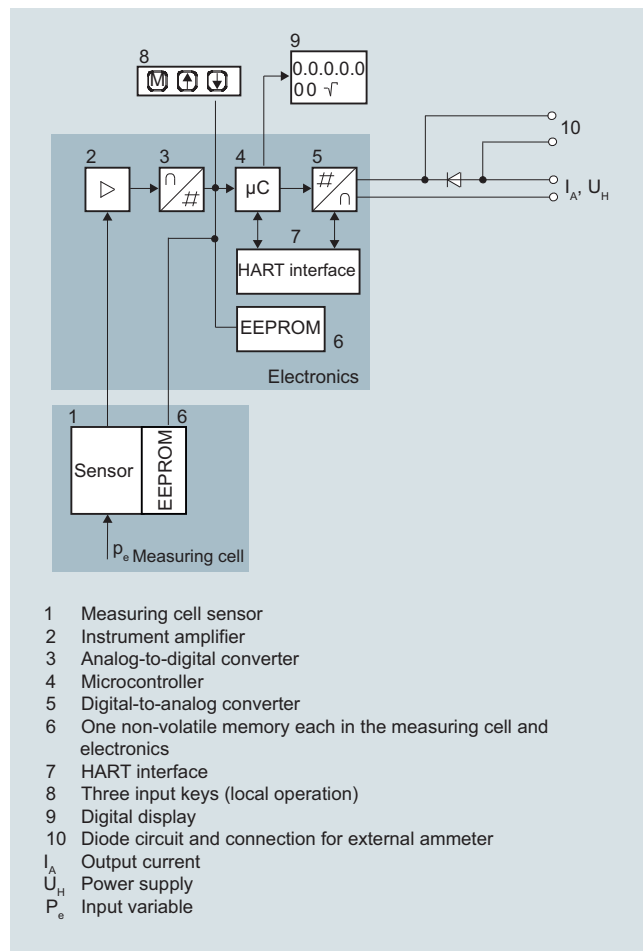
At the top of the housing is a plastic cover (1), which hides the input keys.

Example for an attached measuring point label



Function

Operation of electronics with HART communication



Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of the electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in a microcontroller, its linearity and temperature response corrected, and converted in a digital-to-analog converter (5) into an output current of 4 to 20 mA.

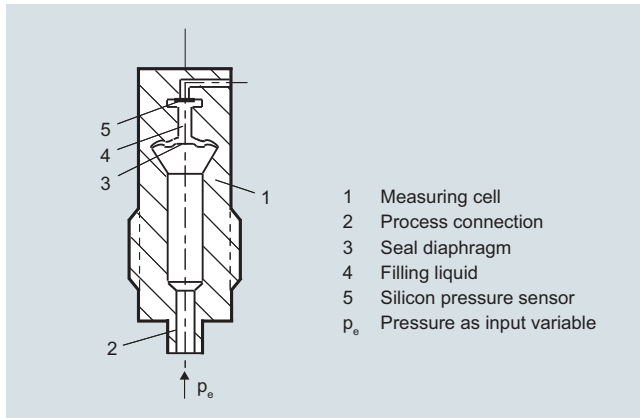
The diode circuit (10) protects against incorrect polarity.

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the 3 input keys (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

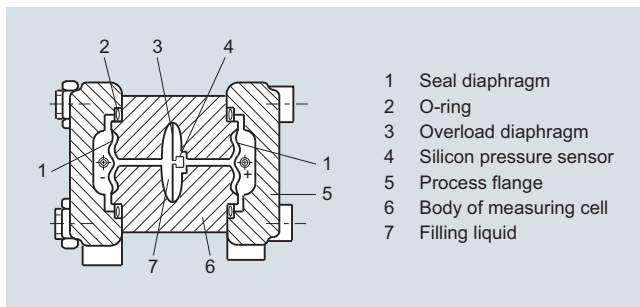
The HART modem (7) permits parameterization using a protocol according to the HART specification.

The pressure transmitters with spans ≤ 63 bar measure the input pressure compared to atmosphere, transmitters with spans ≥ 160 bar compared to vacuum.

Mode of operation of the measuring cellsMeasuring cell for gauge pressure

Measuring cell for gauge pressure, function diagram

The pressure p_e is applied through the process connection (2, Figure "Measuring cell for gauge pressure, function diagram") to the measuring cell (1). This pressure is subsequently transmitted further through the seal diaphragm (3) and the filling liquid (4) to the silicon pressure sensor (5) whose measuring diaphragm is then flexed. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

Measuring cell for differential pressure and flow

Measuring cell for differential pressure and flow, function diagram

The differential pressure is transmitted through the seal diaphragms (1, Figure "Measuring cell for differential pressure and flow, function diagram") and the filling liquid (7) to the silicon pressure sensor (4).

The measuring diaphragm is flexed by the applied differential pressure. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the differential pressure.

An overload diaphragm is installed to provide protection from overloads. If the measuring limits are exceeded, the overload diaphragm (3) is flexed until the seal diaphragm rests on the body of the measuring cell (6), thus protecting the silicon pressure sensor from overloads.

Parameterization SITRANS P310

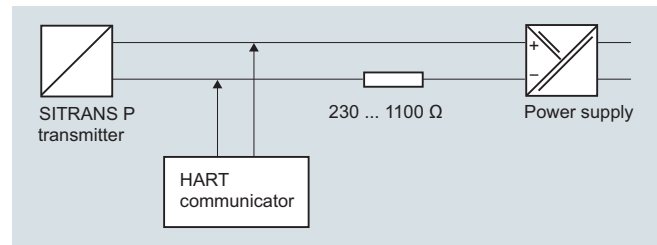
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

Parameterization using the input buttons (local operation)

With the input buttons you can easily set the most important parameters without any additional equipment.

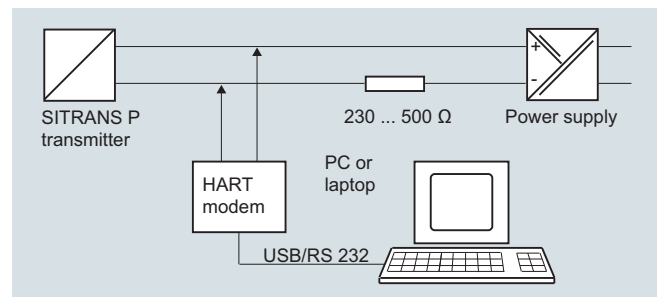
Parameterization using HART

Parameterization using HART is performed with a HART Communicator or a PC.



Communication between a HART Communicator and a pressure transmitter

When parameterizing with the HART Communicator, the connection is made directly to the 2-wire cable.



HART communication between a PC communicator and a pressure transmitter

When parameterizing with a PC, the connection is made through a HART modem.

The signals needed for communication in conformity with the HART 5.x or 6.x protocols are superimposed on the output current using the Frequency Shift Keying (FSK) method.

Adjustable parameters, DS III with HART

Parameters	Input keys (DS III HART)	HART communication
Start of scale	x	x
Full-scale value	x	x
Electrical damping	x	x
Start-of-scale value without application of a pressure ("Blind setting")	x	x
Full-scale value without application of a pressure ("Blind setting")	x	x
Zero adjustment	x	x
current transmitter	x	x
Fault current	x	x
Disabling of buttons, write protection	x	x ¹⁾
Type of dimension and actual dimension	x	x
Characteristic (linear / square-rooted)	x ²⁾	x ²⁾
Input of characteristic		x
Freely-programmable LCD		x
Diagnostic functions		x

¹⁾ Cancel apart from write protection

²⁾ Only differential pressure

Pressure Measurement

Transmitters for applications with basic requirements (Basic)
SITRANS P310

Technical description

Available physical units of display for SITRANS P310 with HART

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm ² , kg/cm ² , inH ₂ O, inH ₂ O (4 °C), mmH ₂ O, ftH ₂ O (20 °C), inHg, mmHg
Level (height data)	m, cm, mm, ft, in
Volume	m ³ , dm ³ , hl, yd ³ , ft ³ , in ³ , US gallon, Imp. gallon, bushel, barrel, barrel liquid
Mass	g, kg, t, lb, Ston, Lton, oz
volume flow	m ³ /d, m ³ /h, m ³ /s, l/min, l/s, ft ³ /d, ft ³ /min, ft ³ /s, US gallon/min, US gallon/s
Mass flow	t/d, t/h, t/min, kg/d, kg/h, kg/min, kg/s, g/d, g/h, g/min, g/s, lb/d, lb/h, lb/min, lb/s, LTon/d, LTon/h, STon/d, STon/h, STon/min
Temperature	K, °C, °F, °R
Miscellaneous	%, mA

Technical specifications

SITRANS P310 for gauge pressure

Input

Measured variable

Gauge pressure

Span (fully adjustable), max. operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)

Span

Max. operating pressure MAWP (PS)

Max. perm. test pressure

0.01 ... 1 bar
1 ... 100 kPa
0.15 ... 14.5 psi4 bar
400 kPa
58 psi6 bar
600 kPa
87 psi0.04 ... 4 bar
4 ... 400 kPa
0.58 ... 58 psi7 bar
0.7 MPa
102 psi10 bar
1 MPa
145 psi0.16 ... 16 bar
16 ... 1600 kPa
2.3 ... 232 psi21 bar
2.1 MPa
305 psi32 bar
3.2 MPa
464 psi0.63 ... 63 bar
63 ... 6300 kPa
9.1 ... 914 psi67 bar
6.7 MPa
972 psi100 bar
10 MPa
1450 psi1.6 ... 1 bar
0.16 ... 16 MPa
23 ... 2321 psi167 bar
16.7 MPa
2422 psi250 bar
25 MPa
3626 psi4 ... 400 bar
0.4 ... 40 MPa
58 ... 5802 psi400 bar
40 MPa
5802 psi600 bar
60 MPa
8700 psi7 ... 700 bar
0.7 ... 70 MPa
102 ... 10153 psi800 bar
80 MPa
11603 psi800 bar
80 MPa
11603 psi

Lower measuring limit

- Measuring cell with silicone oil filling

30 mbar a/3 kPa a/0.44 psi a

Upper measuring limit

100 % of max. span

Start of scale value

Between the measuring limits continuously adjustable

Output

Output signal

4 ... 20 mA

- Lower limit (infinitely adjustable)
- Upper limit (infinitely adjustable)

3.55 mA, factory preset to 3.84 mA

23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA

Load

- Without HART

 $R_B \leq (U_H - 10.5 \text{ V})/0.023 \text{ A in } \Omega$
 U_H : Power supply in V

- With HART

 $R_B = 230 \dots 500 \Omega$ (SIMATIC PDM) or
 $R_B = 230 \dots 1100 \Omega$ (HART Communicator)

Protection against polarity reversal

Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.

Electrical damping (step width 0.1 s)

Set to 2 s (0 ... 100 s)

Pressure Measurement

Transmitters for applications with basic requirements (Basic)

SITRANS P310

for gauge pressure

1

SITRANS P310 for gauge pressure

Measuring accuracy

Reference conditions

Acc. to IEC 60770-1

- Increasing characteristic
- Start-of-scale value 0 bar/kPa/psi
- Stainless steel seal diaphragm
- Silicone oil filling
- Room temperature 25 °C (77 °F)

Measuring span ratio r (spread, Turn-Down)

$r = \text{max. measuring span} / \text{set measuring span}$

Error in measurement at limit setting incl. hysteresis and reproducibility

- Linear characteristic

- 1 bar/100 kPa/3.6 psi
- 4 bar/400 kPa/58 psi
- 16 bar/1.6 MPa/232 psi
- 63 bar/6.3 MPa/914 psi
- 160 bar/16 MPa/2321 psi
- 400 bar/40 MPa/5802 psi
- 700 bar/70 MPa/10152 psi

$r \leq 5 :$ $\leq 0.075 \%$
 $5 < r \leq 100 :$ $\leq (0.005 \cdot r + 0.07) \%$

$r \leq 3 :$ $\leq 0.075 \%$
 $3 < r \leq 100 :$ $\leq (0.005 \cdot r + 0.07) \%$

Influence of ambient temperature (in percent per 28 °C (50 °F))

- at -40 ... +85 °C (-40 ... 185 °F)

$\leq (0.15 \cdot r + 0.25) \%$

Long-term stability (temperature change ± 30 °C (± 54 °F))

$\leq (0.25 \cdot r) \%$ in 5 years

Effect of mounting position

$\leq 0.05 \text{ mbar} / 0.005 \text{ kPa} / 0.000725 \text{ psi}$ per 10° inclination
 (zero point correction is possible with position error compensation)

Effect of auxiliary power supply
 (in percent per change in voltage)

0.005 % per 1 V

Rated conditions

Degree of protection

- according to EN 60529
- according to NEMA 250

IP66 (optional IP66/IP68)

Type 4X

Temperature of medium

- Measuring cell with silicone oil filling
- In conjunction with dust explosion protection

-40 ... +100 °C (-40 ... +212 °F)

-20 ... +60 °C (-4 ... +140 °F)

Ambient conditions

- Ambient temperature

- Transmitter

-40 ... +85 °C (-40 ... +185 °F)

- Display readable

-30 ... +85 °C (-22 ... +185 °F)

- Storage temperature

-50 ... +85 °C (-58 ... +185 °F)

- Climatic class

- Condensation

Relative humidity 0 ... 100 %
 Condensation permissible, suitable for use in the tropics

- Electromagnetic Compatibility

- Emitted interference and interference immunity

Acc. to IEC 61326 and NAMUR NE 21

Design

Weight (without options)

Die-cast aluminum: $\approx 2.0 \text{ kg}$ ($\approx 4.4 \text{ lb}$)
 Stainless steel precision casting: $\approx 4.6 \text{ kg}$ ($\approx 10.1 \text{ lb}$)

Enclosure material

Low-copper die-cast aluminum, GD-AISI 12 or stainless steel precision casting, mat. no. 1.4408

Wetted parts materials

- Connection shank

Stainless steel, mat. no. 1.4404/316L or Hastelloy C4, mat. no. 2.4602

- Seal diaphragm

Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819

Measuring cell filling

Silicone oil

Process connection

Connection shank G $\frac{1}{2}$ B to DIN EN 837-1, female thread $\frac{1}{2}$ -14 NPT or male thread M20 x 1.5

Material of mounting bracket

- Steel

Sheet-steel, Mat. No. 1.0330, chrome-plated

- Stainless steel 304

Sheet stainless steel, mat. no. 1.4301 (SS 304)

- Stainless steel 316L

Sheet stainless steel, mat. no. 1.4404 (SS 316L)

Power supply U_H

Terminal voltage on transmitter

10.5 ... 45 V DC
 10.5 ... 30 V DC in intrinsically-safe mode

SITRANS P, DS III series for gauge pressure**Certificates and approvals**

Classification according to PED 2014/68/EU

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

Explosion protection

• Intrinsic safety "i"

PTB 13 ATEX 2007 X

- Marking

Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb

- Permissible ambient temperature

-40 ... +85 °C (-40 ... +185 °F) temperature class T4;
 -40 ... +70 °C (-40 ... +158 °F) temperature class T5;
 -40 ... +60 °C (-40 ... +140 °F) temperature class T6

- Connection

To certified intrinsically-safe circuits with peak values:
 $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$,
 $P_i = 750 \text{ mW}$; $R_i = 300 \Omega$

- Effective internal inductance/capacitance

 $L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

• Explosion-proof "d"

PTB 99 ATEX 1160

- Marking

Ex II 1/2 G Ex d IIC T4/T6 Gb

- Permissible ambient temperature

-40 ... +85 °C (-40 ... +185 °F) temperature class T4;
 -40 ... +60 °C (-40 ... +140 °F) temperature class T6

- Connection

To circuits with values: $U_H = 10.5 \dots 45 \text{ V DC}$

• Dust explosion protection for zone 20 (pending)

PTB 01 ATEX 2055

- Marking

Ex II 1 D Ex ta IIIC T120 °C Da
 Ex II 1/2 D Ex ta/tb IIIC T120 °C Da/Db

- Permissible ambient temperature

-40 ... +85 °C (-40 ... +185 °F)

- Max. surface temperature

120 °C (248 °F)

- Connection

To certified intrinsically-safe circuits with peak values:
 $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$,
 $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$

- Effective internal inductance/capacitance

 $L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

• Dust explosion protection for zone 21/22 (pending)

PTB 01 ATEX 2055

- Marking

Ex II 2 D Ex tb IIIC T120 °C Db

- Connection

To circuits with values:
 $U_H = 10.5 \dots 45 \text{ V DC}$; $P_{\max} = 1.2 \text{ W}$

• Type of protection "n" (zone 2)

PTB 13 ATEX 2007 X

- Marking

Ex II 2/3 G Ex nA IIC T4/T5/T6 Gb/Gc
 Ex II 2/3 G Ex ic IIC T4/T5/T6 Gb/Gc

- Connection (Ex nA)

 $U_m = 45 \text{ V}$

- Connections (Ex ic)

To circuits with values:
 $U_i = 45 \text{ V}$

- Effective internal inductance/capacitance

 $L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

• Explosion protection acc. to FM (pending)

Certificate of Compliance 3008490

- Identification (XP/DIP) or (IS); (NI)

CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC
 T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

• Explosion protection to CSA (pending)

Certificate of Compliance 1153651

- Identification (XP/DIP) or (IS)

CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I,
 DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

HART communication

HART

230 ... 1100 Ω

Protocol

HART Version 5.x

Software for computer

SIMATIC PDM


Pressure Measurement

Transmitters for applications with basic requirements (Basic)

SITRANS P310

for gauge pressure

1

Selection and Ordering data		Article No.
Pressure transmitter for gauge pressure, SITRANS P310 with HART		7MF2033 -
 Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Measuring cell cleaning	
Silicone oil	normal	1
Measuring span (min. ... max.)		
0.01 ... 1 bar	(0.15 ... 14.5 psi)	B
0.04 ... 4 bar	(0.58 ... 58 psi)	C
0.16 ... 16 bar	(2.32 ... 232 psi)	D
0.63 ... 63 bar	(9.14 ... 914 psi)	E
1.6 ... 160 bar	(23.2 ... 2320 psi)	F
4.0 ... 400 bar	(58.0 ... 5802 psi)	G
7.0 ... 700 bar	(102.0 ... 10153 psi)	J
Wetted parts materials		
Seal diaphragm	Process connection	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Version for diaphragm seals in conjunction with process connector "female thread 1/2-14 NPT" (recommended version) ^{1) 2) 3) 4)}		Y 1
Version for diaphragm seals in conjunction with process connector "G1/2B connection shank" ^{1) 2) 3) 4)}		Y 0
Process connection		
• Connection shank G1/2B to EN 837-1		0
• Female thread 1/2-14 NPT		1
• Male thread M20 x 1.5		5
Non-wetted parts materials		
• Housing made of die-cast aluminium		0
• Housing stainless steel precision casting ⁵⁾		3
Version		
• Standard version, German plate inscription, setting for pressure unit: bar		1
• International version, English plate inscription, setting for pressure unit: bar		2
• Chinese version, English plate inscription, setting for pressure unit: Pascal		3
All versions include DVD with compact operating instructions in various EU languages.		
Explosion protection		
• None		A
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		B
- "Explosion-proof (Ex d)" ⁶⁾		D
- "Ex nA/ic (Zone 2)" ⁷⁾		E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)" ^{8) 9)} (pending)		R
• FM + CSA intrinsic safe (is) (pending) ¹⁰⁾		F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D ^{8) 9) 10)} (pending)		S
• With FM + CSA, Type of protection:		
- "Intrinsic Safe and Explosion Proof (is + xp)" ^{6) 10)} (pending)		NC
Electrical connection / cable entry		
• Screwed gland M20 x1 .5		B
• Screwed gland 1/2-14 NPT		C
• Han 7D device plug (plastic housing) incl. mating connector ¹¹⁾		D

Selection and Ordering data		Article No.
Pressure transmitter for gauge pressure, SITRANS P310 with HART		7MF2033 -
Display		
• without display		0
• without visible display (display concealed, setting: mA)		1
• with visible display (setting: mA)		6
• with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)		7
Power supply units see Chap. 7 "Supplementary Components".		
A quick-start guide is included in the scope of delivery of the device.		
1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.		
2) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.		
3) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF403-..Y.-..... and 7MF4900-1....B		
4) The standard measuring cell filling of configurations with remote seals (Y) is silicone oil.		
5) Not in conjunction with Electrical connection "Han 7D device plug".		
6) Without cable gland, with blanking plug		
7) Configurations with Han and M12 device plugs are only available in Ex ic.		
8) With enclosed cable gland Ex ia and blanking plug.		
9) Only in connection with IP66.		
10) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.		
11) Only in connection with Ex approval A, B or E.		

Pressure Measurement

Transmitters for applications with basic requirements (Basic)

SITRANS P310

for gauge pressure

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Selection and Ordering data	Order code
Further designs Add "-Z" to Article No. and specify Order code.	
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:	
• Steel	A01
• Stainless steel 304	A02
• Stainless steel 316L	A03
Device plugs¹⁾	
• Han 7D (metal)	A30
• Han 8D (instead of Han 7D)	A31
• Angled	A32
• Han 8D (metal)	A33
Rating plate inscription (instead of German)	
• French	B12
• Spanish	B13
English rating plate Pressure units in inH ₂ O and/or psi	B21
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2²⁾	C11
Inspection certificate³⁾ Acc. to EN 10204-3.1	C12
Factory certificate Acc. to EN 10204-2.2	C14
Acceptance certificate (EN 10204-3.1) PMI test of parts in contact with medium	C15
Functional safety (SIL2) (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C20
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C23
PED for Russia with initial calibration mark	C99
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)	D07
Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)	D12
Cable gland and sealing plug made of metal	D32
TAG plate empty (no inscription)	D61
Export approval Korea	E11
CRN approval Canada (Canadian Registration Number)	E22
Dual seal	E24
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF2033-.....-B..)	E55 ⁴⁾
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF2033-.....-D..)	E56 ⁴⁾
Ex protection "Zone 2" to NEPSI (China) (only for transmitter 7MF2033-.....-E..)	E57 ⁴⁾
Ex-protection Ex ia according to EAC Ex (Russia) (only for transmitter 7MF2.....-B..)	E80
Ex-protection Ex d according to EAC Ex (Russia) (only for transmitter 7MF2.....-D..)	E81
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia) (only for transmitter 7MF2.....-E..)	E82

Selection and Ordering data	Order code
Further designs Add "-Z" to Article No. and specify Order code.	
Transient protector 6 kV (lightning protection)	J01
Marine approvals	
• Det Norske Veritas Germanischer Lloyd (DNV-GL)	S10
• Lloyds Register (LR)	S11
• French marine classification society Bureau Veritas (BV)	S12
• American Bureau of Shipping (ABS)	S14
• Russian Maritime Register (RMR)	S16
• Korean Register of Shipping (KR)	S17
1) Han device plug IP65	
2) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the <u>total</u> combination is certified here.	
3) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.	
4) When the additional ex option is selected, the ATEX marking on the device is omitted. Only the Ex option selected via the Z option is marked.	
Selection and Ordering data	Order code
Additional data Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	Y01
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	Y15
Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	Y16
Entry of HART address (TAG) Max. 8 characters, specify in plain text: Y17:	Y17
Setting of pressure indication in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H ₂ O [*] , inH ₂ O [*] , ftH ₂ O [*] , mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM or % [*]) ref. temperature 20 °C	Y21
Setting of pressure indication in non-pressure units¹⁾ Specify in plain text: Y22: up to l/min, m ³ /h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y22 + Y01
Ordering example Item line: 7MF2033-1EA00-1AA7-Z B line: A01 + Y01 + Y21 C line: Y01: 10 ... 20 bar (145 ... 290 psi) C line: Y21: bar (psi)	

1) Preset values can only be changed over SIMATIC PDM.

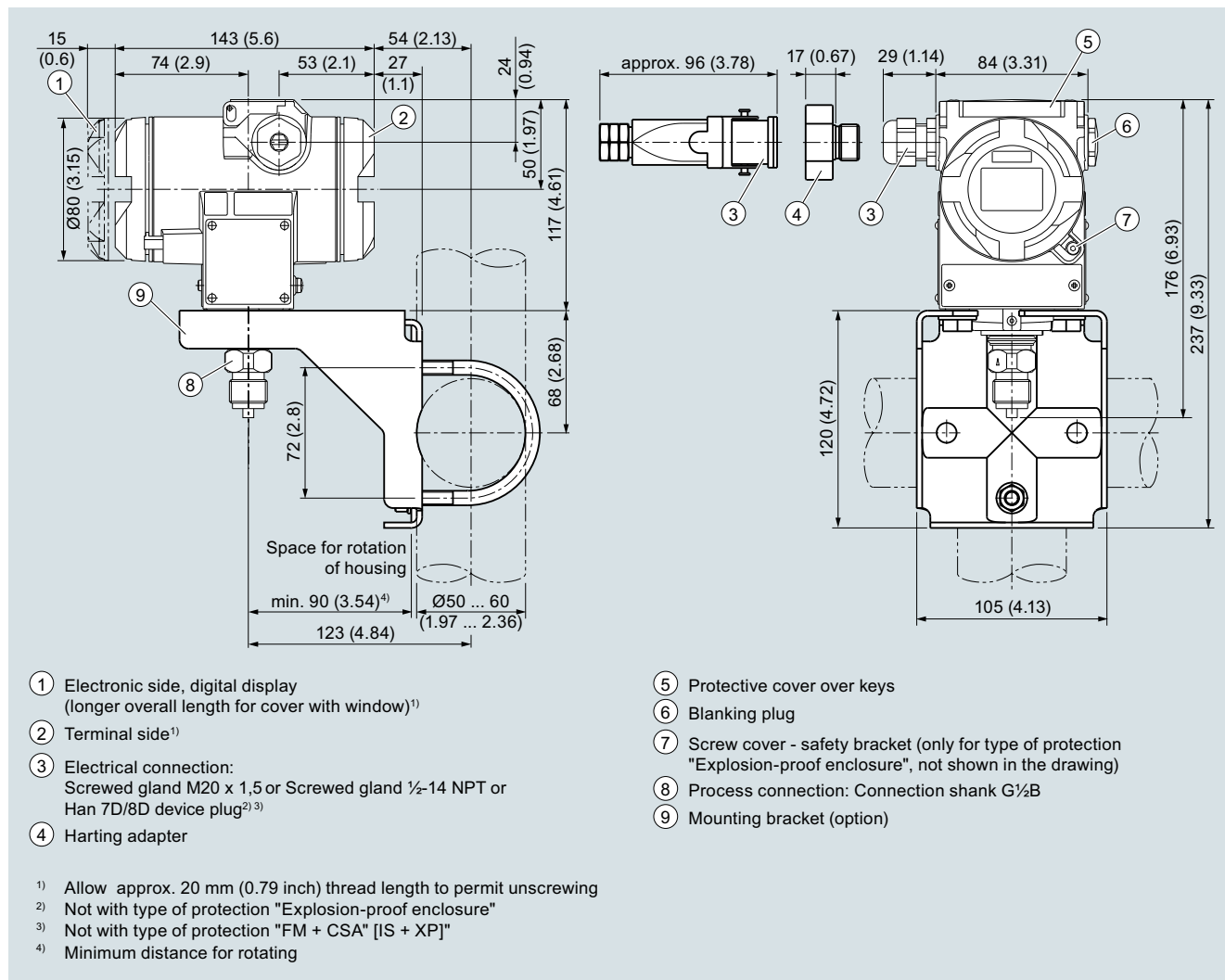
Pressure Measurement

Transmitters for applications with basic requirements (Basic)

SITRANS P310

for gauge pressure

Dimensional drawings



SITRANS P310 pressure transmitters for gauge pressure, dimensions in mm (inch)

Technical specifications**SITRANS P310 for differential pressure and flow****Input**

Measured variable

Differential pressure and flow

Span (fully adjustable), max. operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive)

Span

Max. operating pressure MAWP (PS)

1 ... 60 mbar
0.1 ... 6 kPa
0.4 ... 24 inH₂O160 bar
16 MPa
2320 psi2.5 ... 250 mbar
0.2 ... 25 kPa
1 ... 100 inH₂O6 ... 600 mbar
0.6 ... 60 kPa
2.4 ... 240 inH₂O16 ... 1600 mbar
1.6 ... 160 kPa
6.4 ... 642 inH₂O50 ... 5000 mbar
5 ... 500 kPa
20 ... 2000 inH₂O0.3 ... 30 bar
0.03 ... 3 MPa
4.35 ... 435 psi

Lower measuring limit

- Measuring cell with silicone oil filling

-100 % of max. measuring range (-33 % for 30 bar/3 MPa/435 psi cell) or
30 mbar a/3 kPa a/0.44 psi a

Upper measuring limit

100 % of max. span

Start of scale value

Between the measuring limits continuously adjustable

Output

Output signal

4 ... 20 mA

- Lower limit (infinitely adjustable)

3.55 mA, factory preset to 3.84 mA

- Upper limit (infinitely adjustable)

23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA

Load

- Without HART

$$R_B \leq (U_H - 10.5 \text{ V}) / 0.023 \text{ A in } \Omega$$

$$U_H: \text{Power supply in V}$$

- With HART

$$R_B = 230 \dots 500 \Omega \text{ (SIMATIC PDM) or}$$

$$R_B = 230 \dots 1100 \Omega \text{ (HART Communicator)}$$

Protection against polarity reversal

Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.

Electrical damping (step width 0.1 s)

Set to 2 s (0 ... 100 s)

Pressure Measurement

Transmitters for applications with basic requirements (Basic)

SITRANS P310

for differential pressure and flow

SITRANS P310 for differential pressure and flow

Measuring accuracy

Reference conditions

(All error data refer always refer to the set span)

Acc. to IEC 60770-1

- Increasing characteristic
- Start-of-scale value 0 bar/kPa/psi
- Stainless steel seal diaphragm
- Silicone oil filling
- Room temperature 25 °C (77 °F)

Measuring span ratio r (spread, Turn-Down)

$r = \text{max. measuring span/set measuring span or nom. pressure range}$

Error in measurement at limit setting incl. hysteresis and reproducibility

• Linear characteristic

- 60 mbar/6 kPa/0.87 psi

$r \leq 5 :$ $\leq 0.075 \%$
 $5 < r \leq 60 :$ $\leq (0.005 \cdot r + 0.07) \%$

- 250 mbar/25 kPa/3.6 psi
 600 mbar/60 kPa/8.7 psi
 1600 mbar/160 kPa/23.2 psi
 5000 mbar/500 kPa/72.5 psi
 30 bar/3000 kPa/435 psi

$r \leq 5 :$ $\leq 0.075 \%$
 $5 < r \leq 100 :$ $\leq (0.005 \cdot r + 0.07) \%$

• Square-rooted characteristic (flow > 50 %)

- 60 mbar/6 kPa/0.87 psi

$r \leq 5 :$ $\leq 0.075 \%$
 $5 < r \leq 60 :$ $\leq (0.005 \cdot r + 0.07) \%$

- 250 mbar/25 kPa/3.6 psi
 600 mbar/60 kPa/8.7 psi
 1600 mbar/160 kPa/23.2 psi
 5000 mbar/500 kPa/72.5 psi
 30 bar/3000 kPa/435 psi

$r \leq 5 :$ $\leq 0.075 \%$
 $5 < r \leq 100 :$ $\leq (0.005 \cdot r + 0.07) \%$

• Square-rooted characteristic (flow > 25 ... 50 %)

- 60 mbar/6 kPa/0.87 psi

$r \leq 5 :$ $\leq 0.15 \%$
 $5 < r \leq 60 :$ $\leq (0.01 \cdot r + 0.14) \%$

- 250 mbar/25 kPa/3.6 psi
 600 mbar/60 kPa/8.7 psi
 1600 mbar/160 kPa/23.2 psi
 5000 mbar/500 kPa/72.5 psi
 30 bar/3000 kPa/435 psi

$r \leq 5 :$ $\leq 0.15 \%$
 $5 < r \leq 100 :$ $\leq (0.01 \cdot r + 0.14) \%$

Influence of ambient temperature (in percent per 28 °C (50 °F))

• at -40 ... +85 °C (-40 ... +185 °F)

$\leq (0.15 \cdot r + 0.25) \%$

Influence of static pressure

• on the zero point

- 60 mbar/6 kPa/0.87 psi
 250 mbar/25 kPa/3.63 psi
 600 mbar/60 kPa/8.7 psi
 1600 mbar/160 kPa/23.21 psi

$\leq (0.15 \cdot r) \%$ per 70 bar
 (zero point correction is possible with position error compensation)

- 5 bar/500 kPa/72.5 psi
 30 bar/3 MPa/435 psi

$\leq (0.2 \cdot r) \%$ per 70 bar
 (zero point correction is possible with position error compensation)

• on the span

$\leq 0.14 \%$ per 70 bar/7 MPa/1015 psi

Long-term stability

(temperature change ± 30 °C (± 54 °F))

$\leq (0.25 \cdot r) \%$ in 5 years
 static pressure max. 70 bar/7 MPa/1015 psi

Effect of mounting position (in pressure per change in angle)

≤ 0.7 mbar/0.07 kPa/0.001015 psi per 10° inclination
 (zero point correction is possible with position error compensation)

Effect of auxiliary power supply (in percent per change in voltage)

0.005 % per 1 V

SITRANS P310 for differential pressure and flow**Rated conditions**

Degree of protection

- according to EN 60529
- according to NEMA 250

Temperature of medium

- Measuring cell with silicone oil filling

- In conjunction with dust explosion protection

Ambient conditions

- Ambient temperature

- Transmitter

- Display readable

- Storage temperature

- Climatic class

- Condensation

- Electromagnetic Compatibility

- Emitted interference and interference immunity

IP66 (optional IP66/IP68)

Type 4X

-40 ... +100 °C (-40 ... +212 °F);
-20 ... +100 °C (-4 ... +212 °F) with 30 bar measuring cell

-20 ... +60 °C (-4 ... +140 °F)

-40 ... +85 °C (-40 ... +185 °F)

-30 ... +85 °C (-22 ... +185 °F)

-50 ... +85 °C (-58 ... +185 °F)

Relative humidity 0 ... 100 %

Condensation permissible, suitable for use in the tropics

Acc. to IEC 61326 and NAMUR NE 21

Design

Weight (without options)

Die-cast aluminum: ≈ 4.5 kg (≈ 9.9 lb)

Stainless steel precision casting: ≈ 7.1 kg (≈ 15.6 lb)

Enclosure material

Low-copper die-cast aluminum, GD-AISI12 or stainless steel precision casting, mat. no. 1.4408

Wetted parts materials

- Seal diaphragm
- Process flanges and sealing screw
- O-Ring

Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819

Stainless steel, mat. no. 1.4408, Hastelloy C4, mat. no. 2.4602

FPM (Viton) or optionally: PTFE, FEP, FEPM and NBR

Measuring cell filling

Silicone oil

Process connection

Female thread 1/4-18 NPT and flange connection with mounting thread M10 to DIN 19213 or 7/16-20 UNF to IEC 61518/DIN EN 61518

Material of mounting bracket

- Steel
- Stainless steel 304
- Stainless steel 316L

Sheet-steel, Mat. No. 1.0330, chrome-plated

Sheet stainless steel, mat. no. 1.4301 (SS 304)

Sheet stainless steel, mat. no. 1.4404 (SS 316L)

Power supply U_H

Terminal voltage on transmitter

10.5 ... 45 V DC

10.5 ... 30 V DC in intrinsically-safe mode

Pressure Measurement

Transmitters for applications with basic requirements (Basic)

SITRANS P310

for differential pressure and flow

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SITRANS P310 for differential pressure and flow

Certificates and approvals

Classification according to PED 2014/68/EU

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

Explosion protection

- Intrinsic safety "i"

- Marking
- Permissible ambient temperature
- Connection
- Effective internal inductance/capacitance

PTB 13 ATEX 2007 X

Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb

-40 ... +85 °C (-40 ... +185 °F) temperature class T4;
-40 ... +70 °C (-40 ... +158 °F) temperature class T5;
-40 ... +60 °C (-40 ... +140 °F) temperature class T6

To certified intrinsically-safe circuits with peak values:
 $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$

$L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

- Explosion-proof "d"

- Marking
- Permissible ambient temperature

PTB 99 ATEX 1160

Ex II 1/2 G Ex d IIC T4/T6 Gb

-40 ... +85 °C (-40 ... +185 °F) temperature class T4;
-40 ... +60 °C (-40 ... +140 °F) temperature class T6

To circuits with values: $U_H = 10.5 \dots 45 \text{ V DC}$

- Dust explosion protection for zone 20 (pending)

- Marking
- Permissible ambient temperature
- Max. surface temperature
- Connection
- Effective internal inductance/capacitance

PTB 01 ATEX 2055

Ex II 1 D Ex ta IIIC T120 °C Da

Ex II 1/2 D Ex ta/tb IIIC T120 °C Da/Db

-40 ... +85 °C (-40 ... +185 °F)

120 °C (248 °F)

To certified intrinsically-safe circuits with peak values:
 $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$

$L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

$L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$

- Dust explosion protection for zone 21/22 (pending)

- Marking
- Connection

PTB 01 ATEX 2055

Ex II 2 D Ex tb IIIC T120 °C Db

To circuits with values: $U_H = 10.5 \dots 45 \text{ V DC}$; $P_{\max} = 1.2 \text{ W}$

- Type of protection "n" (zone 2)

- Marking
- Connection (Ex nA)
- Connection (Ex ic)

PTB 13 ATEX 2007 X

Ex II 2/3 G Ex nA IIC T4/T5/T6 Gb/Gc

Ex II 2/3 G Ex ic IIC T4/T5/T6 Gb/Gc

$U_m = 45 \text{ V}$

To circuits with values:

$U_i = 45 \text{ V}$

$L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

- Explosion protection acc. to FM (pending)

- Identification (XP/DIP) or (IS); (NI)

Certificate of Compliance 3008490

CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

- Explosion protection to CSA (pending)

- Identification (XP/DIP) or (IS)

Certificate of Compliance 1153651

CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

HART communication

HART

230 ... 1100 Ω

Protocol

HART Version 5.x

Software for PC

SIMATIC PDM

Pressure Measurement

Transmitters for applications with basic requirements (Basic)

SITRANS P310

for differential pressure and flow

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Selection and Ordering data		Article No.	Selection and Ordering data		Article No.
SITRANS P DS III with HART pressure transmitters for differential pressure and flow, PN 32/160 (MAWP 464/2320 psi)		7 MF 2 4 3 3 -	SITRANS P DS III with HART pressure transmitters for differential pressure and flow, PN 32/160 (MAWP 464/2320 psi)		7 MF 2 4 3 3 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			Electrical connection/cable entry <ul style="list-style-type: none"> Screwed gland M20 x 1.5 Screwed gland ½-14 NPT Han 7D device plug (plastic housing) incl. mating connector^{12/13)} 		B C D
Measuring cell filling	Measuring cell cleaning		Display <ul style="list-style-type: none"> Without display Without visible display (display concealed, setting: mA) With visible display (setting: mA) with customer-specific display (setting as specified, Order code "Y21" or "Y22" required) 		0 1 6 7
Silicone oil	normal	1	Power supply units see Chap. 7 "Supplementary Components".		
Measuring span (min. ... max.) PN 160 (MAWP 2320 psi) 1 ... 60 mbar (0.4015 ... 24.09 inH ₂ O) 2.5 ... 250 mbar (1.004 ... 100.4 inH ₂ O) 6 ... 600 mbar (2.409 ... 240.9 inH ₂ O) 16 ... 1600 mbar (6.424 ... 642.4 inH ₂ O) 50 ... 5000 mbar (20.08 ... 2008 inH ₂ O) 0.3 ... 30 bar (4.35 ... 435 psi)		C D E F G H	Included in delivery of the device: <ul style="list-style-type: none"> Quick-start guide Sealing plug(s) or sealing screw(s) for the process flanges(s) 		
Wetted parts materials (stainless steel process flanges) Seal diaphragm Parts of measuring cell			<ol style="list-style-type: none"> When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the <u>total</u> combination is certified here. If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals. The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF443-..Y.-..... and 7MF4900-1...-B The standard measuring cell filling for configurations with remote seals (Y) is silicone oil. Not suitable for connection of remote seal. Position of the top vent valve in the process flange (see dimensional drawing). Not in conjunction with Electrical connection "Han 7D device plug". Without cable gland, with blanking plug With enclosed cable gland Ex ia and blanking plug Configurations with Han and M12 device plugs are only available in Ex ic. Only in connection with IP66. Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505. Only in connection with Ex approval A, B or E. Permissible only for crimp-contact of conductor cross-section 1 mm² 		
Stainless steel	Stainless steel	A			
Hastelloy	Stainless steel	B			
Version for diaphragm seal ^{1) 2) 3) 4)}		Y			
Process connection Female thread ¼-18 NPT with flange connection					
<ul style="list-style-type: none"> Sealing screw opposite process connection Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518 Mounting thread M10 to DIN 19213 (only for replacement requirement) 		2			
<ul style="list-style-type: none"> Vent on side of process flange⁵⁾ Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518 Mounting thread M10 to DIN 19213 (only for replacement requirement) 		0			
		6			
		4			
Non-wetted parts materials process flange screws Electronics housing					
Stainless steel	Die-cast aluminum	2			
Stainless steel	Stainless steel precision casting ⁶⁾	3			
Version <ul style="list-style-type: none"> Standard version, German plate inscription, setting for pressure unit: bar International version, English plate inscription, setting for pressure unit: bar Chinese version, English plate inscription, setting for pressure unit: Pascal All versions include DVD with compact operating instructions in various EU languages.		1			
		2			
		3			
Explosion protection <ul style="list-style-type: none"> None With ATEX, Type of protection: <ul style="list-style-type: none"> "Intrinsic safety (Ex ia)" "Explosion-proof (Ex d)"⁷⁾ "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)⁸⁾ "Ex nA/ic (Zone 2)"⁹⁾ "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)"⁸⁾¹⁰⁾ (pending) FM + CSA intrinsic safe (is) (pending)¹¹⁾ FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D⁸⁾¹⁰⁾¹¹⁾ (pending) With FM + CSA, Type of protection: <ul style="list-style-type: none"> "Intrinsic Safe and Explosion Proof (is + xp)"⁷⁾¹¹⁾ (pending) 		A B D P E R F S NC			

Pressure Measurement

Transmitters for applications with basic requirements (Basic)

SITRANS P310

for differential pressure and flow

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Selection and Ordering data	Order code
Further designs Add "-Z" to Article No. and specify Order code.	
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:	
• Steel	A01
• Stainless steel 304	A02
• Stainless steel 316L	A03
O-rings for process flanges (instead of FPM (Viton))	
• PTFE (Teflon)	A20
• FEP (with silicone core, approved for food)	A21
• FFP (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F)	A22
• NBR (Buna N)	A23
Device plugs¹⁾	
• Han 7D (metal)	A30
• Han 8D (instead of Han 7D)	A31
• Angled	A32
• Han 8D (metal)	A33
Sealing screws (2 units) ¼-18 NPT, with valve in mat. of process flanges	A40
Rating plate inscription (instead of German)	
• French	B12
• Spanish	B13
English rating plate Pressure units in inH ₂ O and/or psi	B21
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2²⁾	C11
Inspection certificate³⁾ to EN 10204-3.1	C12
Factory certificate to EN 10204-2.2	C14
Acceptance certificate (EN 10204-3.1) PMI test of parts in contact with medium	C15
Functional safety (SIL2) (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C20
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C23
PED for Russia with initial calibration mark	C99
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)	D07
Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)	D12
Cable gland and sealing plug made of metal	D32
Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges	D37
TAG plate empty (no inscription)	D61

Selection and Ordering data	Order code
Further designs Add "-Z" to Article No. and specify Order code.	
Export approval Korea	E11
Dual seal	E24
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-.....-B..)	E55 ⁴⁾
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-.....-D..)	E56 ⁴⁾
Explosion-proof "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-E..)	E57 ⁴⁾
Ex-protection Ex ia according to EAC Ex (Russia) (only for transmitter 7MF2...-.....-B..)	E80
Ex-protection Ex d according to EAC Ex (Russia) (only for transmitter 7MF2...-.....-D..)	E81
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia) (only for transmitter 7MF2...-.....-E..)	E82
Vent on side for gas measurements	H02
Stainless steel process flanges for vertical differential pressure lines	H03
Transient protector 6 kV (lightning protection)	J01
Marine approvals	
• Det Norske Veritas Germanischer Lloyd (DNV-GL)	S10
• Lloyds Register (LR)	S11
• French marine classification society Bureau Veritas (BV)	S12
• American Bureau of Shipping (ABS)	S14
• Russian Maritime Register (RMR)	S16
• Korean Register of Shipping (KR)	S17

¹⁾ Han device plug IP65

²⁾ When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

³⁾ If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

⁴⁾ When the additional ex option is selected, the ATEX marking on the device is omitted. Only the Ex option selected via the Z option is marked.

Selection and Ordering data	Order code
Additional data	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Measuring range to be set	
Specify in plain text:	
• in the case of linear characteristic curve (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	Y01
• in the case of square rooted characteristic (max. 5 characters): Y02: ... up to ... mbar, bar, kPa, MPa, psi	Y02
Stainless steel tag plate and entry in device variable (measuring point description)	Y15
Max. 16 characters, specify in plain text: Y15:	
Measuring point text (entry in device variable)	Y16
Max. 27 char., specify in plain text: Y16:	
Entry of HART address (TAG)	Y17
Max. 8 char., specify in plain text: Y17:	
Setting of pressure indication in pressure units	Y21
Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ...	
Note: The following pressure units can be selected: bar, mbar, mm H ₂ O [*] , inH ₂ O [*] , ftH ₂ O [*] , mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM or % *) ref. temperature 20 °C	
Setting of pressure indication in non-pressure units¹⁾	Y22 + Y01 or Y02
Specify in plain text: Y22: up to l/min, m ³ /h, m, USgpm, ... (specification of measuring range in pressure units "Y01" or "Y02" is essential, unit with max. 5 characters)	

Only Y01, Y15, Y16, Y17, Y21 and Y22 can be factory preset.

¹⁾ Preset values can only be changed over SIMATIC PDM.

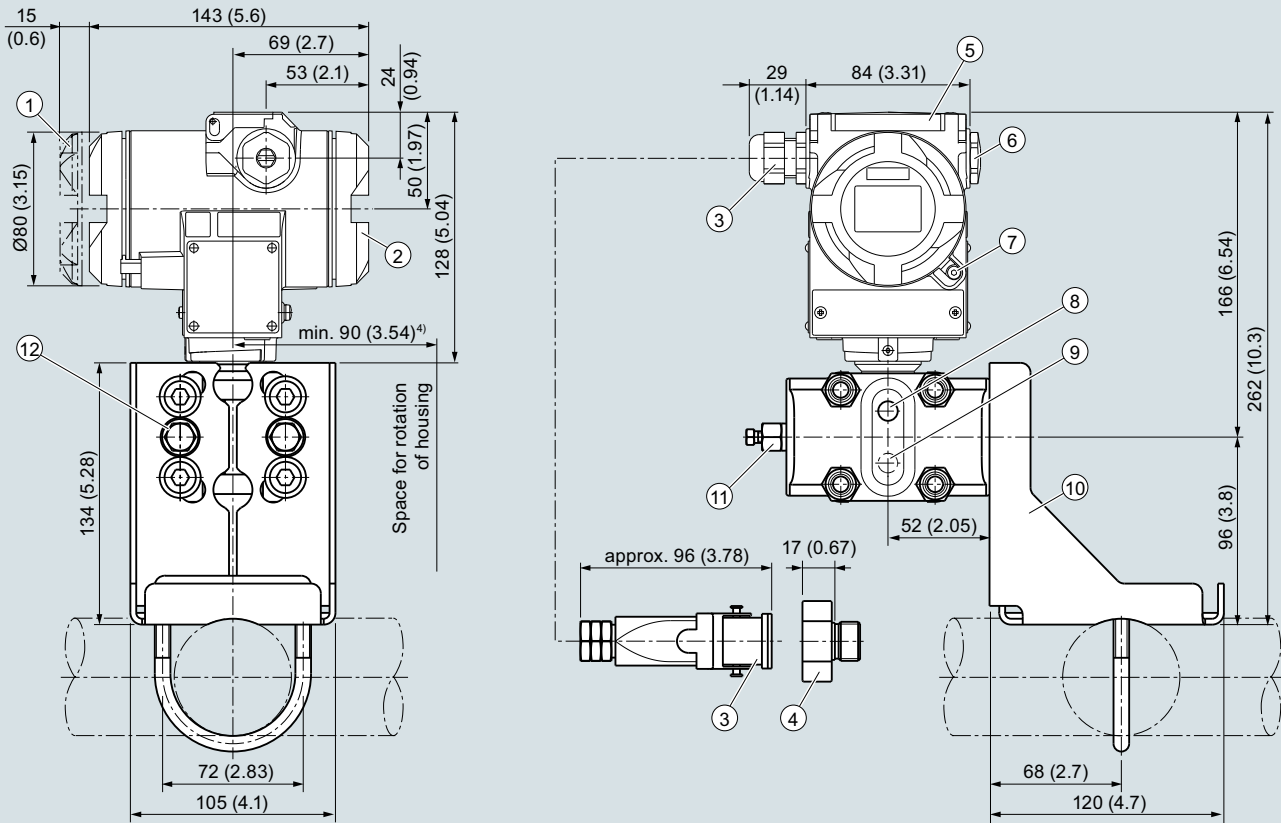
Pressure Measurement

Transmitters for applications with basic requirements (Basic)

SITRANS P310

for differential pressure and flow

Dimensional drawings



- ① Electronic side, digital display (longer overall length for cover with window)¹⁾
- ② Terminal side¹⁾
- ③ Electrical connection: Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or Han 7D/8D device plug^{2) 3)}
- ④ Harting adapter
- ⑤ Protective cover over keys

- ⑥ Blanking plug
- ⑦ Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
- ⑧ Lateral venting for liquid measurement (Standard)
- ⑨ Lateral venting for gas measurement (suffix H02)
- ⑩ Mounting bracket (option)
- ⑪ Sealing screw with valve (option)
- ⑫ Process connection: ¼-18 NPT (IEC 61518)

¹⁾ Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing

²⁾ Not with type of protection "Explosion-proof enclosure"

³⁾ Not with type of protection "FM + CSA" [IS + XP]"

⁴⁾ 92 mm (3.62 inch) for minimum distance to permit rotation with indicator

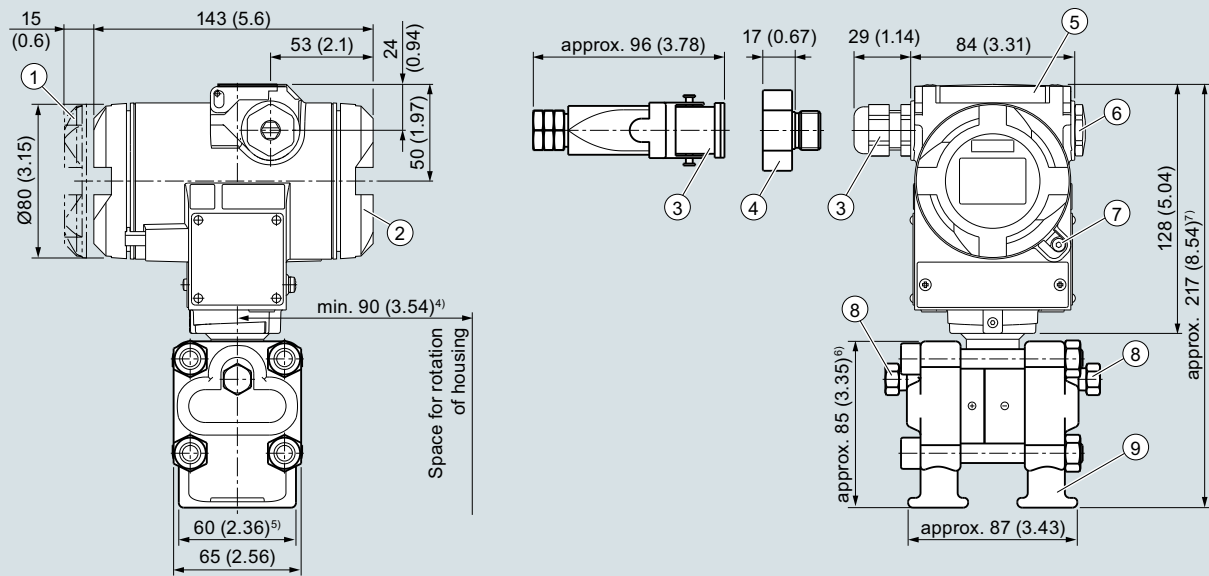
SITRANS P310 pressure transmitters for differential pressure and flow, dimensions in mm (inch)

Pressure Measurement

Transmitters for applications with basic requirements (Basic) SITRANS P310

for differential pressure and flow

1



- ① Electronic side, digital display (longer overall length for cover with window)¹⁾
- ② Terminal side¹⁾
- ③ Electrical connection: Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or Han 7D/8D device plug²⁾ 3)
- ④ Harting adapter
- ⑤ Protective cover over keys
- ⑥ Blanking plug
- ⑦ Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
- ⑧ Sealing screw with valve (option)
- ⑨ Process connection: ¼-18 NPT (IEC 61518)

- ¹⁾ Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
- ²⁾ Not with type of protection "Explosion-proof enclosure"
- ³⁾ Not with type of protection "FM + CSA" [IS + XP]"
- ⁴⁾ 92 mm (3.6 inch) for minimum distance to permit rotation with indicator
- ⁵⁾ 74 mm (2.9 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)
- ⁶⁾ 91 mm (3.6 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)
- ⁷⁾ 219 mm (8.62 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)

SITRANS P310 pressure transmitters for differential pressure and flow, with process covers for vertical differential pressure lines, optional "H03", dimensional drawing, dimensions in mm (inch)



SITRANS P310 pressure transmitters for differential pressure and flow, with process covers for vertical differential pressure lines

Pressure Measurement

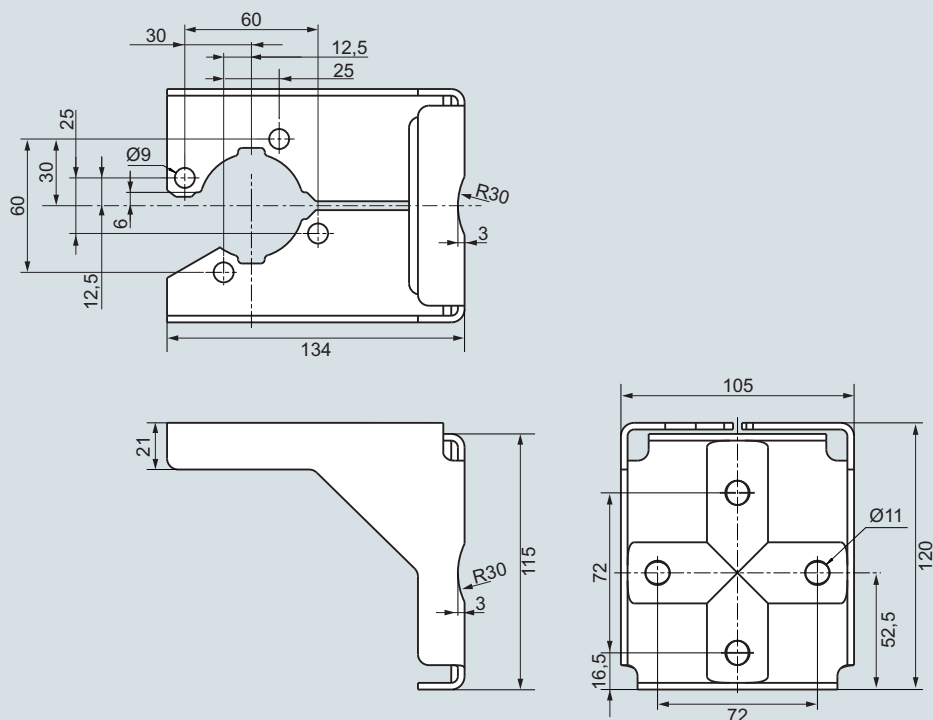
Transmitters for applications with basic requirements (Basic)
SITRANS P310

Accessories/Spare Parts

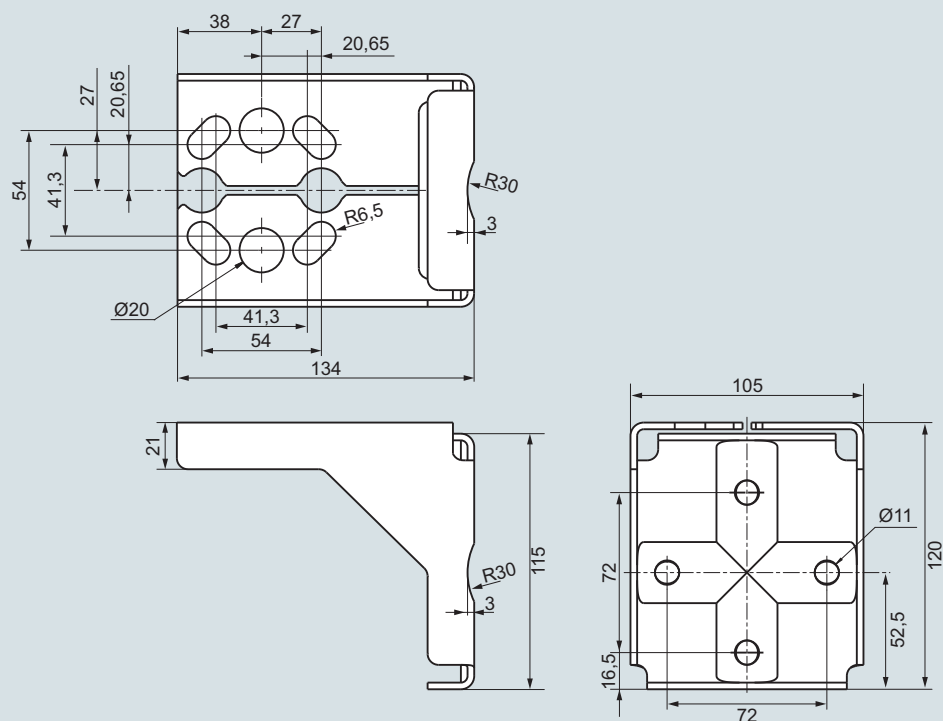
Selection and Ordering data	Article No.
Spare parts/Accessories	
Mounting bracket and fastening parts for pressure transmitters SITRANS P310 (7MF2033-.....-..C.) • made of steel • made of stainless steel 304/1.4301 • made of stainless steel 316L/1.4404	7MF4997-1AB 7MF4997-1AH 7MF4997-1AP
Mounting bracket and fastening parts for pressure transmitters SITRANS P310 (7MF2033-.....-..A., ..B., ..D. and ..F.) • made of steel • made of stainless steel 304/1.4301 • made of stainless steel 316L/1.4404	7MF4997-1AC 7MF4997-1AJ 7MF4997-1AQ
Mounting and fastening brackets For differential pressure transmitters with flange thread M10 SITRANS P310 (7MF2433-...) • made of steel • made of stainless steel 304/1.4301 • made of stainless steel 316L/1.4404	7MF4997-1AD 7MF4997-1AK 7MF4997-1AR
Mounting and fastening brackets For differential pressure transmitters with flange thread 7/16 -20 UNF SITRANS P310 (7MF2533-...) • made of steel • made of stainless steel 304/1.4301 • made of stainless steel 316L/1.4404	7MF4997-1AF 7MF4997-1AM 7MF4997-1AT
Cover Made of die-cast aluminum, including gasket. Compatible for Ex and non-Ex transmitters • without window • with window	7MF4997-1BB 7MF4997-1BE
Cover Made of stainless steel, including gasket. Compatible for Ex and non-Ex transmitters • without window • with window	7MF4997-1BC 7MF4997-1BF 7MF4997-1BR
Digital indicator Including mounting material	
Measuring point label • without inscription (5 units) • Printed (1 unit) Data according to Y01 or Y02, Y15, Y16 and Y99 (see "Pressure transmitters")	7MF4997-1CA 7MF4997-1CB-Z Y...:
Mounting screws For measuring point label, grounding and con- nection terminals or for display (50 units)	7MF4997-1CD
Sealing screws (1 set = 2 units) for process flange • made of stainless steel • made of Hastelloy	7MF4997-1CG 7MF4997-1CH
Sealing screws with vent valve Complete (1 set = 2 units) • made of stainless steel • made of Hastelloy	7MF4997-1CP 7MF4997-1CQ
O-rings for process flanges made of: • FPM (Viton) • PTFE (Teflon) • FEP (with silicone core, approved for food) • FFPM (Kalrez, compound 4079) • NBR (Buna N)	7MF4997-2DA 7MF4997-2DB 7MF4997-2DC 7MF4997-2DD 7MF4997-2DE
Sealing ring for process connection	see "Fittings"

Selection and Ordering data	Article No.
Documentation The entire documentation is available for download free-of-charge in various languages at: http://www.siemens.com/ processinstrumentation/documentation	A5E35603949
Certificates (order only via SAP) instead of Internet download • hard copy (to order) • on DVD (to order)	A5E03252406 A5E03252407
HART modem with USB interface	7MF4997-1DB
Power supply units see Chap. 7 "Supplementary Components".	

Dimensional drawings



Mounting bracket for SITRANS P310 gauge and absolute pressure-transmitters, dimensions in mm
mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)



Mounting bracket for SITRANS P310 differential pressure transmitter, dimensions in mm
mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P320/P420

Technical description

1

Overview



SITRANS P320/P420 pressure transmitters are digital pressure transmitters featuring extensive user-friendliness and high accuracy. The parameter assignment is performed using input buttons or the HART interface.

The comprehensive functionality makes for precise adjustment of the pressure transmitter to the requirements of the plant. Operation is very user-friendly in spite of the numerous setting options.

Due to their advanced diagnostic functionalities according to NAMUR NE107, the SITRANS P320/P420 pressure transmitters are very suitable for use in chemical plants. Thanks to the advanced diagnostic functions and the process value storage, the SITRANS P420 is "Ready for Digitalization".

The "Remote Safety Handling" function saves customers significant amounts of time and money, because the SIL function can be switched on and validated remotely via SIMATIC PDM. This eliminates travel times and on-site operation via the local display or keyboard.

Parameter assignment using the HART protocol is very easy and quick thanks to the innovative EDD with integrated Quick Start wizard.

The transmitters can be equipped with various types of remote seals for special applications such as the measurement of highly viscous substances.

SITRANS P320/P420 pressure transmitters are available in various versions for measuring:

- Gauge pressure
- Absolute pressure
- Differential pressure
- Level
- Volume flow
- Mass flow

Benefits

- Diagnostic functions in accordance with NAMUR recommendation NE107
- SIL devices developed according to IEC 61508
- SIL validation on the device or remotely with SIMATIC PDM
- Reduction of internal inductance for Ex applications to LI = 0
- Step response time for pressure type T63 = 105 ms and for differential pressure type 135 ms.
- Minimal conformity error
- Very low temperature influence
- Very good long-term stability
- High quality and service life
- High reliability even under extreme chemical and mechanical loads
- For corrosive and non-corrosive gases, vapors and liquids
- Extensive diagnostics and simulation functions
- Separate replacement of measuring cell and electronics without recalibration
- Wetted parts made of high-grade materials (e.g., stainless steel, alloy, gold, Monel, tantalum)
- Infinitely adjustable spans from 0.01 bar to 700 bar (0.15 psi to 10153 psi)
- Convenient parameterization over 4 input buttons and HART interface

Application

SITRANS P320/P420 pressure transmitters can be used in industrial areas with extreme chemical and mechanical loads.

The pressure transmitters can be used in zone 1 or zone 0 with the corresponding Ex approval.

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

The pressure transmitter can be operated locally over 4 input buttons or programmed externally over HART interface.

Pressure transmitter for gauge pressure

Measured variable:

- Gauge pressure of corrosive and non-corrosive gases, vapors and liquids.

Span (infinitely adjustable)

- For SITRANS P320/P420 with HART: 0.01 bar to 700 bar (0.15 psi to 10153 psi)

There are two series:

- Gauge pressure series
- Differential pressure series

Pressure transmitters for absolute pressure

Measured variable:

- Absolute pressure of corrosive and non-corrosive gases, vapors and liquids.

Span (infinitely adjustable)

- For SITRANS P320/P420 with HART: 8.3 mbar a to 100 bar a (0.12 to 1450 psi a)

There are two series:

- Gauge pressure series
- Differential pressure series

Pressure transmitters for differential pressure and flow

Measured variables:

- Differential pressure
- Small positive or negative overpressure
- Flow $q \sim \sqrt{\Delta p}$ (together with a primary differential pressure transducer (see section "Flow meters"))

Span (infinitely adjustable)

- For SITRANS P320/P420 with HART: 1 mbar to 30 bar (0.0145 to 435 psi)

Pressure transmitters for level

Measured variable:

- Level of corrosive and non-corrosive liquids in open and closed vessels.

Span (infinitely adjustable)

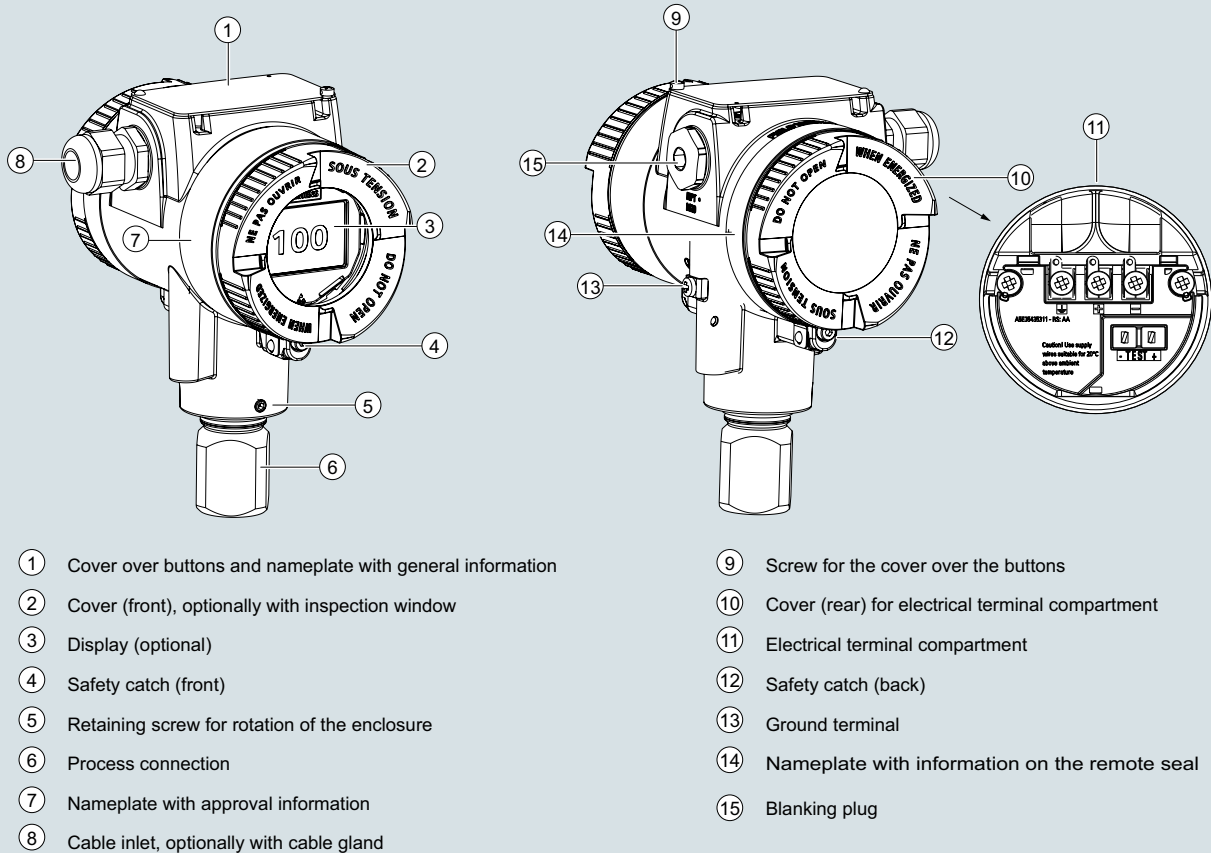
- For SITRANS P320/P420 with HART: 25 mbar to 5 bar (0.363 to 72.5 psi)

Type of the mounting flange:

- EN 1092-1 flanges
- ASME B16.5 flanges
- J.I.S. flanges
- Diverse range of sealing surface forms available

Design

Depending on the customer-specific order, the device comprises different parts.

**Device front view**

- The electronics enclosure is made of die cast aluminum or precision cast stainless steel.
- The housing has a removable circular cover at the front and the back.
- Depending on the device version, the front cover (2) may be designed as an inspection window.
- The cable inlet (8) to the electrical terminal compartment is at the side; either the left or right-hand one can be used. The unused opening is closed with a blanking plug (15).
- The ground terminal (13) is located on the side.

- The electrical terminal compartment (11) for the auxiliary power and shield is accessible when you remove the back cover (10).
- The measuring cell with process connection (6) is located in the bottom part of the enclosure. The measuring cell is prevented from rotating by a locking screw (5).
- Thanks to the modular design of the pressure transmitter, the measuring cell and application electronics or terminal compartment can be replaced if required.
- The cover over buttons (1), under which there are 4 buttons, is located on the upper face of the enclosure. The nameplate with general information is located on the cover over the buttons.

Pressure Measurement

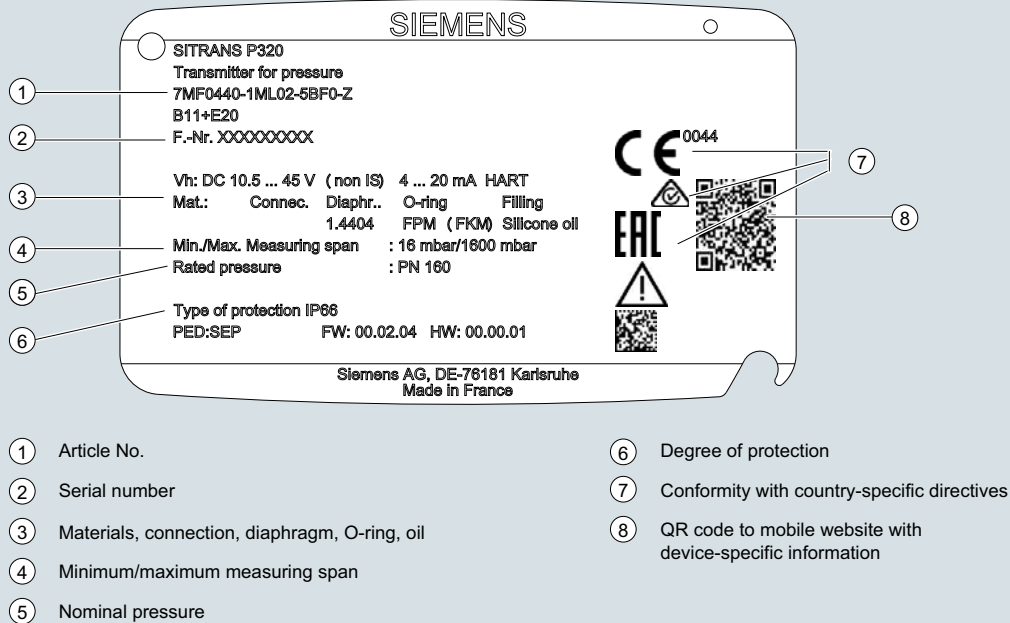
Transmitters for applications with advanced requirements (Advanced)
SITRANS P320/P420

Technical description

Nameplates

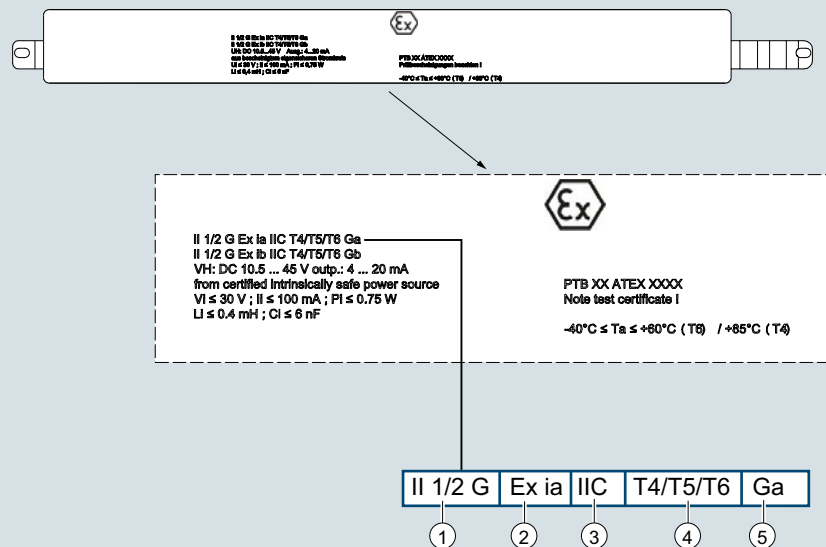
Nameplate

The nameplate with the article no. and other important information, such as design details and technical data, is located on the cover over the buttons.



Nameplate with approval information

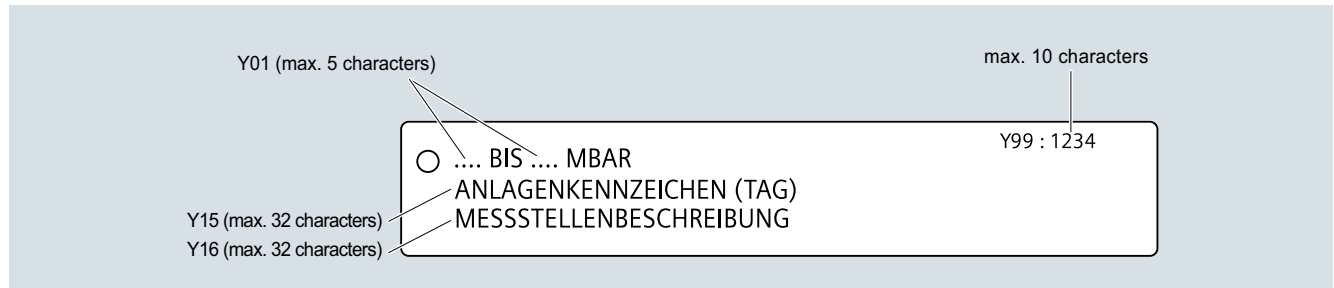
The nameplate with approval information is located on the front of the enclosure.



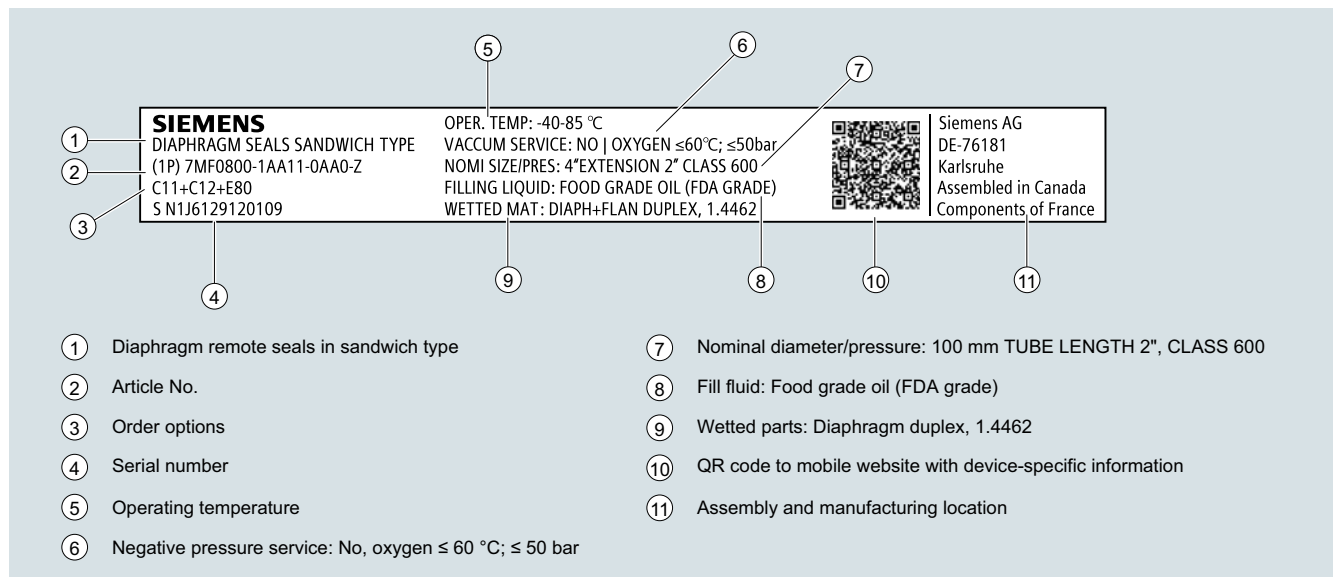
- 1** Characteristics of the hazardous area
- 2** Type of protection
- 3** Group (gas, dust)
- 4** Maximum surface temperature (temperature class)
- 5** Device protection level

Measuring point label

The measuring point label is located under the front cover.

Nameplate with information on the remote seals

The nameplate with information on the remote seals is located on the back of the enclosure.



Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P320/P420

Technical description

Function

Adjustable parameters and diagnostics

SITRANS P320/P420 with HART communication

Parameters	Input buttons	SITRANS P320	SITRANS P420
Application, measurement type	x	x	x
Adjusting start of scale value/full scale value	x	x	x
Setting start of scale value/full scale value	x	x	x
Electrical damping	x	x	x
Zero adjustment	x	x	x
Fault current	x	x	x
Saturation limits	x	x	x
Scaling of the display	x	x	x
Characteristic selection	x	x	x
Temperature unit	x	x	x
Key lock	x	x	x
Change user pin	x	x	x
Functional safety	x	x	x
Loop test	x	x	x
Start view	x	x	x
Pressure reference	x	x	x
Reset	x	x	x
Diagnostics and trend log			
Min/Max pointer		x	x
Limit monitoring			2
Event counter (overflow/underflow)			2
Trend log			2, max. 1 500 values

Available physical units of display for SITRANS P320/P420

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	Pa, MPa, kPa, hPa, bar, mbar, psi, g/cm ² , kg/cm ² , kgf/cm ² , inH ₂ O, inH ₂ O (4 °C), ftH ₂ O, mmH ₂ O, mmH ₂ O (4 °C), mH ₂ O (4 °C), mmHg, inHg, atm, torr
Level (height data)	m, cm, mm, ft, in
Volumes (fill level)	m ³ , l, hl, in ³ , ft ³ , yd ³ , gal, gal (UK), bu, bbl, bbl (US), SCF, Nm ³ , NI
Volume (flow)	m ³ /sec, m ³ /h, m ³ /d, l/sec, l/min, l/h, Ml/d, ft ³ /sec, ft ³ /h, ft ³ /d, SCF/min, SCF/h, NI/h, Nm ³ /hgal/sec, gal/min, gal/h, gal/d, Mgal/d, gal (UK)/sec, gal (UK)/min, gal (UK)/h, gal (UK)/d, bbl/sec, bbl/min, bbl/h, bbl/d
Mass (flow)	Kg/sec, kg/min, kg/h, kg/d, g/sec, g/min, g/h, t/min, t/h, t/d, lb/sec, lb/min, lb/h, lb/d, ton/min, ton/h, ton/d, ton (UK)/h, ton (UK)/d
Temperature	°C, °F
Miscellaneous	%, mA, free text max. 12 characters

For more device information and technical specifications, refer to the individual device versions.

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for gauge pressure (pressure series)

1

Technical specifications

SITRANS P320 / SITRANS P420 for gauge pressure (pressure series)

Input

Measured variable	Gauge pressure		
Span (infinitely adjustable) or measuring range, max. permissible operating pressure (in accordance with Pressure Equipment Directive 2014/68/EU) and max. test pressure (pursuant to DIN 16086) (for oxygen measurement, max. 100 bar/ 10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/process temperature)	Span	Max. permissible operating pressure MAWP (PS)	Maximum permissible test pressure
	8.3 ... 250 mbar	4 bar	6 bar
	0.83 ... 25 kPa	0.4 MPa	0.6 MPa
	0.12 ... 3.6 psi	58 psi	87 psi
	0.01 ... 1 bar	6 bar	9 bar
	1 ... 100 kPa	0.6 MPa	0.9 MPa
	0.15 ... 14.5 psi	87 psi	130 psi
	0.04 ... 4 bar	20 bar	30 bar
	4 ... 400 kPa	2 MPa	3 MPa
	0.58 ... 58 psi	290 psi	435 psi
	0.16 ... 16 bar	45 bar	70 bar
	0.016 ... 1.6 MPa	4.5 MPa	7 MPa
	2.3 ... 232 psi	652 psi	1015 psi
	0.63 ... 63 bar	80 bar	120 bar
	0.063 ... 6.3 MPa	8 MPa	12 MPa
	9.1 ... 914 psi	1160 psi	1740 psi
	1.6 ... 160 bar	240 bar	380 bar
	0.16 ... 16 MPa	24 MPa	38 MPa
	23 ... 2321 psi	3480 psi	5511 psi
	4 ... 400 bar	400 bar	600 bar
	0.4 ... 40 MPa	40 MPa	60 MPa
	58 ... 5802 psi	5802 psi	8702 psi
	7 ... 700 bar	800 bar	800 bar
	0.7 ... 70 MPa	80 MPa	80 MPa
	102 ... 10153 psi	11603 psi	11603 psi
Measuring limits	For 250 mbar/25 kPa/3.6 psi measuring cells, the lower measuring limit is 750 mbar a/75 kPa a/10.8 psi a. The measuring cell is vacuum-resistant up to 30 mbar a/3 kPa a/0.44 psi a.		
• Low measuring limit	30 mbar a/3 kPa a/0.44 psi a		
- Measuring cell with silicone oil filling	30 mbar a/3 kPa a/0.44 psi a		
- Measuring cell with inert oil	100 mbar a/10 kPa a/1.45 psi a		
- Measuring cell with FDA-compliant oil	100% of the max. measuring span (for oxygen measurement max. 100 bar/10 MPa/ 1450 psi and 60 °C (140 °F) ambient temperature/process temperature)		
• Upper measuring limit	Between the measuring limits (infinitely adjustable)		
• Start of scale			

Output

Output signal	4 ... 20 mA		
• Low saturation limit (infinitely adjustable)	3.55 mA, factory preset to 3.8 mA		
• High saturation limit (infinitely adjustable)	22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA		
• Ripple (without HART communication)	$I_{pp} \leq 0.5\%$ of max. output current		
Adjustable damping	0 ... 100 s, continuously adjustable over remote operation		
	0 ... 100 s, in increments of 0.1 s, adjustable over display		
• Current transmitter	3.55 ... 22.8 mA		
• Failure signal	3.55 ... 22.8 mA		
Load	Resistor R [Ω]		
• Without HART communication	$R = (U_H - 10.5 \text{ V})/22.8 \text{ mA}$, U_H : Power supply in V		
• With HART communication	$R = 230 \dots 1100 \Omega$ (HART communicator (handheld)) $R = 230 \dots 500 \Omega$ (SIMATIC PDM)		
Characteristic curve	<ul style="list-style-type: none"> • Linearly increasing or linearly decreasing • Linear increase or decrease or according to the square root (only for differential pressure and flow) 		
Physical bus	-		
Polarity-independent	-		

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for gauge pressure (pressure series)

SITRANS P320 / SITRANS P420 for gauge pressure (pressure series)

Measuring accuracy

Reference conditions

- According to EN 60770-1
- Rising characteristic curve
- Start of scale value 0 bar/kPa/psi
- Seal diaphragm stainless steel
- Measuring cell with silicone oil filling
- Room temperature 25 °C (77 °F)

Conformity error at limit point setting, including hysteresis and repeatability

Measuring span ratio r (spread, Turn-Down)

- Linear characteristic

- 250 mbar/25 kPa/3.6 psi

r = max. measuring span/set measuring span and nominal measuring range

$r \leq 1.25$: $\leq 0.075\%$ (SITRANS P320)

$\leq 0.065\%$ (SITRANS P420)

$1.25 < r \leq 30$: $\leq (0.008 \cdot r + 0.055)\%$

$r \leq 5$: $\leq 0.065\%$ (SITRANS P320)

$\leq 0.04\%$ (SITRANS P420)

$5 < r \leq 100$: $\leq (0.004 \cdot r + 0.045)\%$

$r \leq 3$: $\leq 0.075\%$ (SITRANS P320)

$3 < r \leq 100$: $\leq (0.005 \cdot r + 0.05)\%$ (SITRANS P420)

$r \leq 5$: $\leq 0.075\%$ (SITRANS P420)

$5 < r \leq 100$: $\leq (0.005 \cdot r + 0.05)\%$ (SITRANS P420)

Influence of ambient temperature
in % per 28 °C (50 °F)

- 250 mbar/25 kPa/3.6 psi

$\leq (0.16 \cdot r + 0.1)\%$

- 1 bar/100 kPa/3.6 psi

$\leq (0.05 \cdot r + 0.1)\%$

- 4 bar/400 kPa/58 psi

$\leq (0.025 \cdot r + 0.125)\%$

- 16 bar/1.6 MPa/232 psi

- 63 bar/6.3 MPa/914 psi

- 160 bar/16 MPa/2321 psi

- 400 bar/40 MPa/5802 psi

- 700 bar/70 MPa/10152 psi

$\leq (0.08 \cdot r + 0.16)\%$

Long-term stability at ± 30 °C (± 54 °F)

- 250 mbar/25 kPa/3.6 psi

$\leq (0.25 \cdot r)\%$ per year

- 1 bar/100 kPa/3.6 psi

In 5 years $\leq (0.25 \cdot r)\%$

In 10 years $\leq (0.35 \cdot r)\%$

- 4 bar/400 kPa/58 psi

In 5 years $\leq (0.125 \cdot r)\%$

- 16 bar/1.6 MPa/232 psi

In 10 years $\leq (0.15 \cdot r)\%$

- 63 bar/6.3 MPa/914 psi

- 160 bar/16 MPa/2321 psi

- 400 bar/40 MPa/5802 psi

- 700 bar/70 MPa/10152 psi

In 5 years $\leq (0.25 \cdot r)\%$

In 10 years $\leq (0.35 \cdot r)\%$

Step response time T_{63} (without electrical damping)

Approx. 0.105 s

Effect of mounting position (in pressure per change of angle)

≤ 0.05 mbar/0.005 kPa/0.000725 psi per 10° incline
(zero point correction is possible with position error compensation)

Effect of auxiliary power (in % per voltage change)

0.005% per 1 V

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for gauge pressure (pressure series)

1

SITRANS P320 / SITRANS P420 for gauge pressure (pressure series)**Rated conditions**

Temperature of medium

- Measuring cell with silicone oil filling -40 ... +100 °C (-40 ... +212 °F)
- Measuring cell with inert oil

- 1 bar/100 kPa/3.6 psi -40 ... +85 °C (-40 ... +185 °F)
- 4 bar/400 kPa/58 psi
- 16 bar/1.6 MPa/232 psi
- 63 bar/6.3 MPa/914 psi

- 160 bar/16 MPa/2321 psi -20 ... +100 °C (-4 ... +212 °F)
- 400 bar/40 MPa/5802 psi
- 700 bar/70 MPa/10152 psi

- Measuring cell with FDA-compliant oil -10 ... +100 °C (14 ... +212 °F)

Ambient conditions

- Ambient temperature/enclosure

Observe the temperature class in areas subject to explosion hazard.

- Measuring cell with silicone oil filling -40 ... +85 °C (-40 ... +185 °F)

- Measuring cell with inert oil for gauge pressure measuring cells: -40 ... +85 °C (-40 ... +185 °F)

- 1 bar/100 kPa/3.6 psi
- 4 bar/400 kPa/58 psi
- 16 bar/1.6 MPa/232 psi
- 63 bar/6.3 MPa/914 psi

- Measuring cell with inert oil -20 ... +85 °C (-4 ... +185 °F)

- Measuring cell with FDA-compliant oil -10 ... +85 °C (14 ... +185 °F)

- Display -20 ... +80 °C (-4 ... +176 °F)

- Storage temperature -50 ... +85 °C (-58 ... +185 °F) (with FDA-compliant oil: -20 ... +85 °C (-4 ... +185 °F))

- Climatic class in accordance with IEC 60721-3-4 4K4H

- Degree of protection

- According to IEC 60529 IP66, IP68
- According to NEMA 250 Type 4X

- Electromagnetic compatibility

- Emitted interference and interference immunity According to IEC 61326 and NAMUR NE 21

Design

Weight

Approx. 2.3 kg (5.07 lb) with aluminum enclosure
Approx. 4.2 kg (9.25 lb) for stainless steel enclosure

Material

- Wetted parts materials

- Process connection Stainless steel, material no. 1.4404/316L or Alloy C22, material no. 2.4602
- Oval flange Stainless steel, mat. no. 1.4404/316L
- Seal diaphragm Stainless steel, material no. 1.4404/316L or Alloy C276, material no. 2.4819

- Non-wetted parts materials

- Electronics housing
 - Low-copper die-cast aluminum GD-AlSi 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M
 - Standard: Powder coating with polyurethane
 - Option: 2 coats: Coat 1: epoxy-based; coat 2: Polyurethane
 - Stainless steel type plate (1.4404/316L)
- Mounting bracket Electroplated steel or stainless steel

Process connection

- Connection shank G1/2A according to DIN EN 837-1
- Female thread 1/2-14 NPT
- Male thread M20 x 1.5 and 1/2-14 NPT
- Oval flange (PN 160 (MWP 2320 psi g)) with fastening screw thread:
- Oval flange (PN 420 (MWP 2320 psi g)) with fastening screw thread:
 - 7/16-20 UNF according to EN 61518
 - M10 according to DIN 19213
- Oval flange (PN 420 (MWP 2320 psi g)) with fastening screw thread:
 - 7/16-20 UNF according to EN 61518
 - M12 according to DIN 19213
- Male thread M20 x 1.5 and 1/2-14 NPT

Electrical connection

- Cable entry via the following screwed glands:
- M20 x 1.5
 - 1/2-14 NPT
 - Han 7D/Han 8D device plug¹⁾
 - M12 device plug

Displays and controls

Keys

4 keys for operation directly on the device

Display

- With or without integrated display (optional)
- Cover with inspection window (optional)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for gauge pressure (pressure series)

SITRANS P320 / SITRANS P420 for gauge pressure (pressure series)

Auxiliary power U_H

Terminal voltage on pressure transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically safe mode
Ripple	$U_{SS} \leq 0.2 \text{ V}$ (47 ... 125 Hz)
Noise	$U_{eff} \leq 1.2 \text{ mV}$ (0.5 ... 10 kHz)
Auxiliary power	–
Separate supply voltage	–

Certificates and approvals

Classification according to pressure equipment directive (PED 2014/68/EU) For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

Drinking water	
• WRAS (England)	Available soon
• ACS (France)	Available soon
• DVGW (Germany)	Available soon
• NSF (USA)	Available soon
CRN (Canada)	Available soon
Explosion protection acc. to NEPSI (China)	Available soon
Explosion protection acc. to INMETRO (Brazil)	Available soon
BAM (Germany), oxygen expenditures	Available soon
Explosion protection	
• Intrinsic safety "i"	
- Marking	II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Permissible temperature of measuring medium	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Connection	To certified intrinsically safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$ $U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$ $L_i = 0.24 \text{ } \mu\text{H/C}_i = 3.29 \text{ nF}$
- Effective internal inductance/capacitance	
• Flameproof enclosure "d"	
- Marking	Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Permissible temperature of measuring medium	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Connection	To a circuit with the operating values: $U_n = 10.5 \text{ to } 45 \text{ V}$, $4 \text{ ... } 20 \text{ mA}$
• Dust explosion protection for Zone 20, 21, 22	
- Marking	Ex II 1D Ex tb IIIC T120 °C Da Ex II 2D Ex tb IIIC T120 °C Db Ex II 3D Ex tc IIIC T120 °C Dc
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
- Permissible temperature of measuring medium	-40 ... +100 °C (-40 ... +212 °F)
- Max. surface temperature	120 °C (248 °F)
- Connection	To a circuit with the operating values: $U_n = 10.5 \text{ to } 45 \text{ V}$, $4 \text{ ... } 20 \text{ mA}$
• Dust explosion protection for Zone 20, 21, 22	
- Marking	Ex II 1D Ex ia IIIC T120 °C Da Ex II 2D Ex ib IIIC T120 °C Db Ex II 3D Ex ic IIIC T120 °C Dc
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
- Permissible temperature of measuring medium	-40 ... +100 °C (-40 ... +212 °F)
- Connection	To certified intrinsically safe circuits with the peak values: $U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$ $U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$ $L_i = 0.24 \text{ } \mu\text{H/C}_i = 3.29 \text{ nF}$
- Effective internal inductance/capacitance	

SITRANS P320 / SITRANS P420 for gauge pressure (pressure series)

• Type of protection for Zone 2	Ex II 3G Ex ec IIC T4/T6 Gc Ex II 3G Ex ic IIC T4/T6 Gc
- Marking	
- Permissible ambient temperature "ec"	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +40 °C (-40 ... +104 °F) temperature class T6
- Permissible ambient temperature "ic"	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +80 °C (-40 ... +176 °F) temperature class T6
- Permissible temperature of measuring medium	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- "ec" connection	To a circuit with the operating values: $U_n = 10.5$ to 30 V, 4 ... 20 mA
- "ic" connection	To certified intrinsically safe circuits with the peak values: $U_i = 30$ V, $I_i = 101$ mA, $P_i = 760$ mW $U_i = 29$ V, $I_i = 110$ mA, $P_i = 800$ mW Effective internal inductance/capacitance: $L_i = 0.24$ μH/ $C_i = 3.29$ nF Available soon CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III Available soon CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III
• Explosion protection acc. to FM	
- Marking (XP/DIP) or IS; NI; S	
• Explosion protection according to CSA	
- Marking (XP/DIP) or (IS)	

¹⁾ Han 8D is identical to Han 8U.

HART communication

HART	230 ... 1100 Ω
Protocol	HART 7
Software for computer	SIMATIC PDM

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P320/P420

for gauge pressure (pressure series)

Selection and ordering data

Article No.

Pressure transmitters for gauge pressure (pressure series)

SITRANS P320

7MF030 - - - - -

SITRANS P420

7MF040 - - - - -

➤ Click on the Article no. for the online configuration in the PIA Life Cycle Portal.

Communication

HART, 4 ... 20 mA

Measuring cell filling

Silicone oil

Inert liquid

Neobee oil

Maximum measuring span

250 mbar (3.6 psi)

1000 mbar (14.5 psi)

4000 mbar (58 psi)

16 bar (232 psi)

63 bar (914 psi)

160 bar (2321 psi)

400 bar (5802 psi)

700 bar (10153 psi)

Process connection

Male thread M20 x 1.5

Male thread G½ (DIN EN 837-1)

Female thread ½-14 NPT

Male thread ½-14 NPT

Oval flange, mounting thread: 7/16-20 UNF (IEC 61518)

Oval flange, mounting thread: M10 (DIN 19213)

Oval flange, mounting thread: M12 (DIN 19213)

Version for diaphragm seal pressure

Wetted parts materials: Process connection, seal diaphragm

Stainless steel 316L/1.4404, stainless steel 316L/1.4404

Stainless steel 316L/1.4404, alloy C276/2.4819

Alloy C22/2.4602, alloy C276/2.4819

Non-wetted parts materials

Die-cast aluminum

Stainless steel precision casting CF3M/1.4409 similar to 316L

Enclosure

Dual chamber device

Type of protection

Without Ex

Intrinsic safety

Flameproof enclosure

Flameproof enclosure, intrinsic safety

Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2

Dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2

Combination of options B, C and L (zone model)

Combination of options B, C and M (zone model, Class Division)

Electrical connections/cable entries

Thread for cable gland

• 2 x M20 x 1.5

• 2 x ½-14 NPT

Local operation/display

Without display (cover closed)

With display (cover closed)

With display (cover with glass pane)

0

1

3

4

F

J

N

Q

T

V

W

X

B

D

E

F

G

H

J

U

0

1

2

1

2

5

A

B

C

D

L

M

S

T

F

M

0

1

2

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for gauge pressure (pressure series)

1

Selection and ordering data

Options	Order code	Options	Order code
Add "-Z" to article no. and specify order code.		Device options	
Cable glands included		PDF file with device settings	D10
Plastic	A00	Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and cover	D20
Metal	A01	FVMQ enclosure sealing	D21
Stainless steel	A02	IP66/IP68 degree of protection (not for M12 and Han device plugs)	D30
Stainless steel 316L/1.4404	A03	TAG label empty	D40
CMP, for XP devices	A10	Without labeling of the measuring range on the TAG label	D41
CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A11	Stainless steel Ex plate 1.4404/316L	D42
CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A12	Increase of pressure stage from PN 420 to PN 500	D50
Han device plug mounted left		Overvoltage protection up to 6 kV (external)	D71
Han 7D device plug (plastic, straight)	A30	Adhesive labels on transport packaging (supplied by customer)	D90
Han 7D device plug (plastic, angled)	A31		
Han 7D device plug (metal, straight)	A32	General approval without Ex approval	
Han 7D device plug (metal, angled)	A33	Worldwide (CE, RCM) except EAC, FM, CSA, KCC	E00
Han 8D device plug (plastic, straight)	A34	Worldwide (CE, RCM, EAC, FM, CSA, KCC)	E01
Han 8D device plug (plastic, angled)	A35	CSA	E06
Han 8D device plug (metal, straight)	A36	EAC	E07
Han 8D device plug (metal, angled)	A37	FM	E08
Cable socket included		KCC	E09
Plastic, for Han 7D/8D device plugs	A40	UL	E10
Metal, for Han 7D/8D device plugs	A41	Explosion protection approvals	
M12 device plug mounted left		ATEX (Europe)	E20
Stainless steel, without cable socket	A62	CSA (USA and Canada)	E21
Stainless steel, with cable socket	A63	FM (USA and Canada)	E22
Cable entry/connector mounting		IECEX (Worldwide)	E23
2x sealing plugs M20 x 1.5, IP66/68 installed on both sides	A90	EACEx (GOST-R, -K, -B)	E24
2x sealing plugs ½-14 NPT, IP66/68 installed on both sides	A91	INMETRO (Brazil)	E25
Cable gland/connector mounted left	A97	KCs (Korea)	E26
Cable gland/connector mounted on right	A99	NEPSI (China)	E27
Nameplate labeling		PESO (India)	E28
German (bar)	B11	TIIS Hazardous (Japan)	E29
French (bar)	B12	UKR Sepro (Ukraine)	E30
Spanish (bar)	B13	ATEX (Europe) and IECEX (Worldwide)	E47
Italian (bar)	B14	CSA (Canada) and FM (USA)	E48
Chinese (bar)	B15	ATEX (Europe) and IECEX (Worldwide) + CSA (Canada) and FM (USA)	E49
Russian (bar)	B16	Marine approvals	
English (psi)	B20	DNV-GL (Det Norske Veritas/Germanischer Lloyd)	E50
Chinese (Pa)	B35	LR (Lloyds Register)	E51
Certificates		BV (Bureau Veritas)	E52
Quality test certificate, 5-point factory calibration (IEC 60770-2)	C11	ABS (American Bureau of Shipping)	E53
Acceptance certificate (EN 10204-3.1) - Material of pressurized and wetted parts	C12	KR (Korean Register of Shipping)	E56
Test report - NACE (MR 0103-2012 and MR 0175-2009)	C13	RINA (Registro Italiano Navale)	E57
Test report (EN 10204-2.2) - Wetted parts	C14	CCS (China Classification Society)	E58
Acceptance certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts	C15	Country-specific approvals	
Certificates for functional safety		CRN approval Canada (Canadian Registration Number)	E60
Functional safety (IEC 61508) - SIL2/3	C20	Special approvals	
		Oxygen application (with inert liquid, max. 100 bar (1 450 psi) at 60° C (140 °F))	E80
		Dual seal	E81
		WRC / WRAS (drinking water); only with pressure cap O-rings made of EPDM	E83
		NSF61 (drinking water)	E84
		ACS (drinking water)	E85

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P320/P420

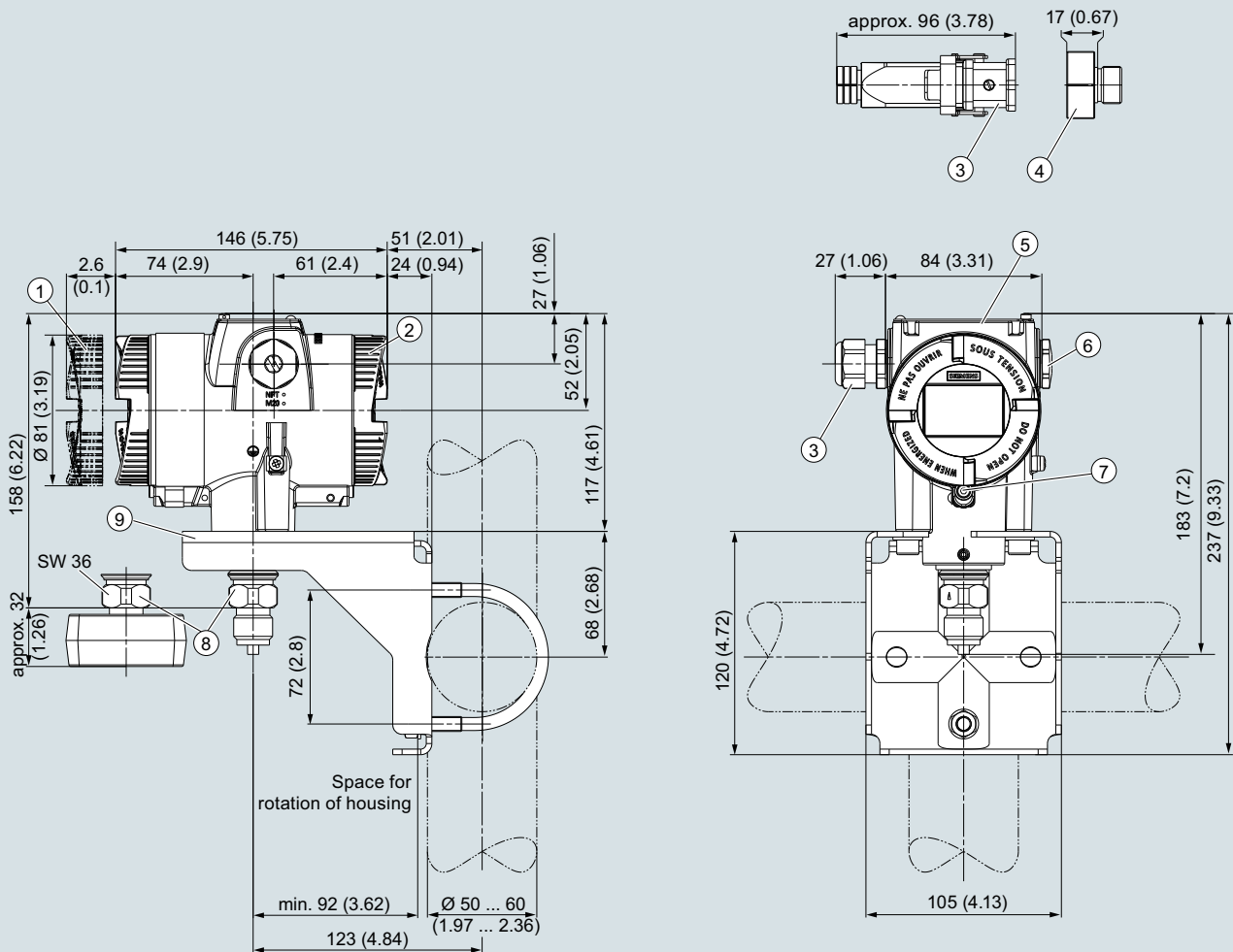
for gauge pressure (pressure series)

1

Options	Order code
Mounting bracket	
Steel, galvanized	H01
Stainless steel 1.4301/304	H02
Stainless steel 1.4404/316L	H03
Flange connections with flange EN 1092-1	
With flange adapter G½ Form B1	
• DN 25 PN 40, stainless steel 1.4571/316Ti	J80
• DN 50 PN 40, stainless steel 1.4571/316Ti	J81
• DN 80 PN 40, stainless steel 1.4571/316Ti	J82
With siphon G½ Form B1	
• DN 25 PN 40, stainless steel 1.4571/316Ti	J83
• DN 50 PN 40, stainless steel 1.4571/316Ti	J84
• DN 80 PN 40, stainless steel 1.4571/316Ti	J85
• DN 25 PN 100, stainless steel 1.4571/316Ti	J86
Process flanges, gaskets (instead of standard gaskets FKM (FPM))	
Seal (EN 837-1) material Fe (soft iron)	K60
Seal (EN 837-1) material 1.4571	K61
Seal (EN 837-1) material Cu	K62
Process connection	
Process connection male thread G½, bore hole 11 mm	K80
Shut-off valves, pneumatic blocks	
With mounted pneumatic block 7MF9011-4EA, process connection at transmitter G½ shank, PTFE sealing ring and pressure test certified in test report (EN 10204-2.2)	T02
With mounted pneumatic block 7MF9011-4FA, process connection at transmitter female thread ½-14 NPT, sealing tape. With PTFE sealing ring and pressure test certified in test report (EN 10204-2.2)	T03
With mounted pneumatic block 7MF9411-5AA, process connection at transmitter oval flange with PTFE gasket, steel mounting screws, pressure test certified in test report (EN 10204-2.2)	T05
With mounted pneumatic block 7MF9411-5AA, process connection at transmitter oval flange with PTFE gasket, stainless steel mounting screws, pressure test certified in test report (EN 10204-2.2)	T06

Selection and ordering data

Customer-specific device settings	Order code
Add "-Z" to article no., specify order code and plain text or drop-down list selection.	
Measuring span Start of scale value (max. 5 characters), full scale value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Drop-down list: Pa, MPa, kPa, hPa, bar, mbar, psi, g/cm², kg/cm², kgf/cm², inH₂O, inH₂O (4°C), ftH₂O, mmH₂O, mmH₂O (4°C), mH₂O (4°C), mmHg, inHg, atm, torr	Y01
TAG (on stainless steel plate and device parameters, max. 32 characters) Input field: Free text, max. 32 characters	Y15
Measuring point description (on stainless steel plate and device parameters, max. 32 characters) Input field: Free text, max. 32 characters	Y16
TAG short (device parameters, max. 8 characters) Input field: Free text, max. 8 characters	Y17
Local display [Pressure, Percent], reference [None, Absolute, Relative], example: Pressure gauge Drop-down list: Percent, pressure unit, pressure unit abs., pressure unit gauge	Y21
Local display Scaling with standard units [m³/s, l/s, m, inch, ...], example 1 ... 5 m Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Drop-down list: m, cm, mm, in, ft, m³, l, hl, in³, yd³, gal, gal (UK), bu, bbl, bbl (US), SCF, Nm³, NI.	Y22
Local display Scaling with user-specific units (max. 12 characters), example 1 ... 5 m Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Input field 3: Free text, max. 8 characters	Y23
Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA Drop-down list 1: 3.9, 4 Drop-down list 2: 20.8, 22	Y30
Fault current instead of 3.6 mA [22.5 mA, 22.8 mA] Drop-down list: 3.75; 21.75; 22.5; 22.6	Y31
Damping in seconds instead of 2 s (0.0 ... 100.0 s) Input field: max. 4 characters and numbers only; decimal places as dot (comma is automatically converted to dot); min. value = 0; max. value = 100.	Y32
ID number of special version Input field: max. 4 characters and only natural numbers from 0 ... 9999	Y99

Dimensional drawings

- ① Electronic side, display (longer overall length for cover with window)¹⁾
- ② Terminal side
- ③ Electrical connection: screw gland M20 x 1,5³⁾ or screw gland ½-14 NPT or Han 7D/Han 8D^{2) 3)} device plug or M12 device plug^{2) 3)}
- ④ Harting adapter
- ⑤ Cover over buttons and nameplate with general information
- ⑥ Blanking plug
- ⑦ Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure")
- ⑧ Process connection: connection shank G½B or oval flange
- ⑨ Mounting bracket (option)

¹⁾ In addition, allow approx. 22 mm (0.87 inch) for the thread length when removing the covers

²⁾ Not with type of protection "Explosion-proof enclosure"

³⁾ Not with type of protection "FM + CSA" [is + XP]"

SITRANS P320/P420 pressure transmitter for gauge pressure (pressure series), dimensions in mm (inch)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for gauge pressure (differential pressure series)

Technical specifications

SITRANS P320 / SITRANS P420 for gauge pressure (differential pressure series)

Input

Measured variable	Gauge pressure		
Span (infinitely adjustable) and maximum operating pressure (pursuant to Pressure Equipment Directive 2014/68/EU)	Span	Max. permissible operating pressure MAWP (PS)	Maximum permissible test pressure
	1 ... 20 mbar	160 bar	160 bar
	0.1 ... 2 kPa	16 MPa	16 MPa
	0.4019 ... 8.037 inH ₂ O	2320 psi	2320 psi
	1 ... 60 mbar	160 bar	160 bar
	0.1 ... 6 kPa	16 MPa	16 MPa
	0.4019 ... 24.11 inH ₂ O	2320 psi	2320 psi
	2.5 ... 250 mbar	160 bar	160 bar
	0.2 ... 25 kPa	16 MPa	16 MPa
	1.005 ... 100.5 inH ₂ O	2320 psi	2320 psi
	6 ... 600 mbar	160 bar	160 bar
	0.6 ... 60 kPa	16 MPa	16 MPa
	2.41 ... 241.1 inH ₂ O	2320 psi	2320 psi
	16 ... 1600 mbar	160 bar	160 bar
	1.6 ... 160 kPa	16 MPa	16 MPa
	6.43 ... 643 inH ₂ O	2320 psi	2320 psi
	50 ... 5000 mbar	160 bar	160 bar
	5 ... 500 kPa	16 MPa	16 MPa
	20.09 ... 2009 inH ₂ O	2320 psi	2320 psi
	0.3 ... 30 bar	160 bar	160 bar
	0.03 ... 3 MPa	16 MPa	16 MPa
	4.35 ... 435 psi	2320 psi	2320 psi
Measuring limits			
• Low measuring limit			
- Measuring cell with silicone oil filling	30 mbar a/3 kPa a/0.44 psi a		
- Measuring cell with inert oil	30 mbar a/3 kPa a/0.44 psi a		
- Measuring cell with FDA-compliant oil	100 mbar a/10 kPa a/1.45 psi a		
• Upper measuring limit	100% of the max. measuring span (for oxygen measurement max. 100 bar/10 MPa/ 1450 psi and 60 °C (140 °F) ambient temperature/process temperature)		
• Start of scale	Between the measuring limits (infinitely adjustable)		

Output

Output signal	HART
• Low saturation limit (infinitely adjustable)	4 ... 20 mA
• High saturation limit (infinitely adjustable)	3.55 mA, factory preset to 3.8 mA
• Ripple (without HART communication)	22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA
	$I_{pp} \leq 0.5\%$ of max. output current
Adjustable damping	0 ... 100 s, continuously adjustable over remote operation
	0 ... 100 s, in increments of 0.1 s, adjustable over display
• Current transmitter	3.55 ... 22.8 mA
• Failure signal	3.55 ... 22.8 mA
Load	Resistor R [Ω]
• Without HART communication	$R = (U_H - 10.5 \text{ V})/22.8 \text{ mA}$, U_H : Power supply in V
• With HART communication	$R = 230 \dots 1100 \Omega$ (HART communicator (handheld)) $R = 230 \dots 500 \Omega$ (SIMATIC PDM)
Characteristic curve	<ul style="list-style-type: none"> • Linearly increasing or linearly decreasing • Linear increase or decrease or according to the square root (only for differential pressure and flow)
Physical bus	-
Polarity-independent	-

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for gauge pressure (differential pressure series)

1

SITRANS P320 / SITRANS P420 for gauge pressure (differential pressure series)**Measuring accuracy**

Reference conditions

- According to EN 60770-1
- Rising characteristic curve
- Start of scale value 0 bar/kPa/psi
- Seal diaphragm stainless steel
- Measuring cell with silicone oil filling
- Room temperature 25 °C (77 °F)

Conformity error at limit point setting, including hysteresis and repeatability

Measuring span ratio r (spread, Turn-Down)

- Linear characteristic

- 20 mbar/2 kPa/8.031 inH₂O- 60 mbar/6 kPa/24.09 inH₂O

- 250 mbar/25 kPa/3.6 psi
 600 mbar/60 kPa/240.9 inH₂O
 1600 mbar/160 kPa/642.4 inH₂O
 5000 mbar/500 kPa/2008 inH₂O
 30 bar/3 MPa/435 psi

 $r = \text{max. measuring span/set measuring span and nominal measuring range}$

$r \leq 5$:	$\leq 0.075\%$
$5 < r \leq 20$:	$\leq (0.005 \cdot r + 0.05)\%$
$r \leq 5$:	$\leq 0.075\%$
$5 < r \leq 60$:	$\leq (0.005 \cdot r + 0.05)\%$
$r \leq 5$:	$\leq 0.065\%$ (SITRANS P320)
	$\leq 0.04\%$ (SITRANS P420)
$5 < r \leq 100$:	$\leq (0.005 \cdot r + 0.045)\%$ (SITRANS P320)
	$\leq (0.004 \cdot r + 0.045)\%$ (SITRANS P420)

Influence of ambient temperature as % per 28 °C (50 °F)

- 20 mbar/2 kPa/8.031 inH₂O
 - 60 mbar/6 kPa/24.09 inH₂O
 - 250 mbar/25 kPa/3.6 psi
 600 mbar/60 kPa/240.9 inH₂O
 1600 mbar/160 kPa/642.4 inH₂O
 5000 mbar/500 kPa/2008 inH₂O
 30 bar/3 MPa/435 psi
 - 250 mbar/25 kPa/3.6 psi
 5000 mbar/500 kPa/2008 inH₂O
 - 600 mbar/60 kPa/240.9 inH₂O
 1600 mbar/160 kPa/642.4 inH₂O
 30 bar/3 MPa/435 psi

$\leq (0.15 \cdot r + 0.1)\%$
 $\leq (0.075 \cdot r + 0.1)\%$
 $\leq (0.025 \cdot r + 0.125)\%$ (SITRANS P320)

 $\leq (0.025 \cdot r + 0.625)\%$ (SITRANS P420) $\leq (0.0125 \cdot r + 0.625)\%$ (SITRANS P420)Long-term stability at ± 30 °C (± 54 °F)

- 20 mbar/2 kPa/8.031 inH₂O
 - 60 mbar/6 kPa/24.09 inH₂O
 - 250 mbar/25 kPa/3.6 psi
 600 mbar/60 kPa/240.9 inH₂O
 1600 mbar/160 kPa/642.4 inH₂O
 5000 mbar/500 kPa/2008 inH₂O

$\leq (0.2 \cdot r)\%$ per year
 In 5 years $\leq (0.25 \cdot r)\%$
 In 5 years $\leq (0.125 \cdot r)\%$
 In 10 years $\leq (0.15 \cdot r)\%$

- 30 bar/3 MPa/435 psi

In 5 years $\leq (0.25 \cdot r)\%$
 In 10 years $\leq (0.35 \cdot r)\%$

Step response time T_{63} (without electrical damping)

Approx. 0.1 s

Effect of mounting position (in pressure per change of angle)

$\leq 0.07 \text{ mbar}/0.007 \text{ kPa}/0.01015266 \text{ psi}$ per 10° incline
 (zero-point correction is possible with position error compensation)

Effect of auxiliary power (in % per voltage change)

0.005% per 1 V

Rated conditions

Temperature of medium

- Measuring cell with silicone oil filling
 - Measuring cell 30 bar (435 psi), PN 420
- Measuring cell with inert oil
 - Measuring cell 30 bar (435 psi), PN 420
- Measuring cell with FDA-compliant oil
- In conjunction with dust explosion protection

-40 ... +100 °C (-40 ... +212 °F)
 -20 ... +85 °C (-4 ... +185 °F)
 -20 ... +100 °C (-4 ... +212 °F)
 -20 ... +85 °C (-4 ... +185 °F)
 -10 ... +100 °C (14 ... +212 °F)
 -40 ... +85 °C (-4 ... +185 °F)

Ambient conditions

- Ambient temperature/enclosure
 - Measuring cell with silicone oil filling
 - Measuring cell with silicone oil filling, measuring cell 30 bar (435 psi), PN 420
 - Measuring cell with inert oil
 - Measuring cell with FDA-compliant oil
 - Display
- Storage temperature
- Climatic class in accordance with IEC 60721-3-4
- Degree of protection
 - According to IEC 60529
 - According to NEMA 250
- Electromagnetic compatibility
 - Emitted interference and interference immunity

Observe the temperature class in areas subject to explosion hazard.

-40 ... +85 °C (-40 ... +185 °F)
 -20 ... +85 °C (-4 ... +185 °F)
 -20 ... +85 °C (-4 ... +185 °F)
 -10 ... +85 °C (14 ... +185 °F)
 -20 ... +80 °C (-4 ... +176 °F)
 -50 ... +85 °C (-58 ... +185 °F); with FDA-compliant oil: -20 ... +85 °C (-4 ... +185 °F)
 4K4H

IP66, IP68
 Type 4X

According to IEC 61326 and NAMUR NE 21

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for gauge pressure (differential pressure series)

SITRANS P320 / SITRANS P420 for gauge pressure (differential pressure series)

Design

Weight	Approx. 3.9 kg (8.5 lb) with aluminum enclosure Approx. 5.8 kg (12.7 lb) with stainless steel enclosure
Material	
• Wetted parts materials	
- Seal diaphragm	Stainless steel, mat. no. 1.4404/316L, Alloy C276, mat. no. 2.4819, Monel, mat. no. 2.4360, tantalum or gold
- Process flanges and sealing plugs	Stainless steel, mat. no. 1.4408 to PN 160, mat. no. 1.4571/316Ti for PN 420, Alloy C22, 2.4602 or Monel, mat. no. 2.4360
- O-ring	FPM (Viton) or optionally: PTFE, FEP, FEPM and NBR
• Non-wetted parts materials	
- Electronics housing	<ul style="list-style-type: none"> • Low-copper die-cast aluminum GD-AISI 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M • Standard: Powder coating with polyurethane Option: 2 coats: Coat 1: epoxy-based; coat 2: Polyurethane • Stainless steel type plate (1.4404/316L)
- Pressure flange screws	Stainless steel ISO 3506-1 A4-70
- Mounting bracket	Steel, electrogalvanized steel, or stainless steel
Process connection	½-18 NPT female thread and flat connection with 7/16-20 UNF fastening screw thread in accordance with EN 61518 or M10 fastening screw thread in accordance with DIN 19213 (M12 for PN 420 (MWP 6092 psi))
Electrical connection	<p>Screw terminals</p> <p>Cable entry via the following screwed glands:</p> <ul style="list-style-type: none"> • M20 x 1.5 • ½-14 NPT • Han 7D/Han 8D device plug¹⁾ • M12 device plug

Displays and controls

Keys	4 keys for operation directly on the device
Display	<ul style="list-style-type: none"> • With or without integrated display (optional) • Cover with inspection window (optional)

Auxiliary power U_H

Terminal voltage on pressure transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically safe mode
Ripple	$U_{SS} \leq 0.2 \text{ V}$ (47 ... 125 Hz)
Noise	$U_{eff} \leq 1.2 \text{ mV}$ (0.5 ... 10 kHz)
Auxiliary power	–
Separate supply voltage	–

Certificates and approvals

Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)
Drinking water	
• WRAS (England)	Available soon
• ACS (France)	Available soon
• DVGW (Germany)	Available soon
• NSF (USA)	Available soon
CRN (Canada)	Available soon
Explosion protection acc. to NEPSI (China)	Available soon
Explosion protection acc. to INMETRO (Brazil)	Available soon
BAM (Germany), oxygen expenditures	Available soon
Explosion protection	
• Intrinsic safety "i"	
- Marking	II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Permissible temperature of measuring medium	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Connection	To certified intrinsically safe circuits with the peak values: $U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$ $U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$ $L_i = 0.24 \text{ μH/C}_i = 3.29 \text{ nF}$
- Effective internal inductance/capacitance	
• Flameproof enclosure "d"	
- Marking	Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Permissible temperature of measuring medium	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Connection	To a circuit with the operating values: $U_n = 10.5 \text{ to } 45 \text{ V}$, $I_n = 4 \text{ ... } 20 \text{ mA}$

SITRANS P320 / SITRANS P420 for gauge pressure (differential pressure series)

<ul style="list-style-type: none"> Dust explosion protection for Zone 20, 21, 22 <ul style="list-style-type: none"> Marking Permissible ambient temperature Permissible temperature of measuring medium Max. surface temperature Connection Dust explosion protection for Zone 20, 21, 22 <ul style="list-style-type: none"> Marking Permissible ambient temperature Permissible temperature of measuring medium Connection Effective internal inductance/capacitance Type of protection for Zone 2 <ul style="list-style-type: none"> Marking Permissible ambient temperature "ec" Permissible ambient temperature "ic" Permissible temperature of measuring medium "ec" connection "ic" connection Explosion protection acc. to FM <ul style="list-style-type: none"> Marking (XP/DIP) or IS; NI; S Explosion protection according to CSA <ul style="list-style-type: none"> Marking (XP/DIP) or (IS) 	<p>Ex II 1D Ex tb IIIC T120 °C Da Ex II 2D Ex tb IIIC T120 °C Db Ex II 3D Ex tc IIIC T120 °C Dc</p> <p>-40 ... +80 °C (-40 ... +176 °F) -40 ... +100 °C (-40 ... +212 °F) 120 °C (248 °F)</p> <p>To a circuit with the operating values: $U_n = 10.5$ to 45 V, 4 ... 20 mA</p> <p>Ex II 1D Ex ia IIIC T120 °C Da Ex II 2D Ex ib IIIC T120 °C Db Ex II 3D Ex ic IIIC T120 °C Dc</p> <p>-40 ... +80 °C (-40 ... +176 °F) -40 ... +100 °C (-40 ... +212 °F)</p> <p>To certified intrinsically safe circuits with the peak values: $U_i = 30$ V, $I_i = 101$ mA, $P_i = 760$ mW $U_i = 29$ V, $I_i = 110$ mA, $P_i = 800$ mW $L_i = 0.24$ μH/$C_i = 3.29$ nF</p> <p>Ex II 3G Ex ec IIC T4/T6 Gc Ex II 3G Ex ic IIC T4/T6 Gc</p> <p>-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +40 °C (-40 ... +104 °F) temperature class T6 -40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +80 °C (-40 ... +176 °F) temperature class T6</p> <p>-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6</p> <p>To a circuit with the operating values: $U_n = 10.5$ to 30 V, 4 ... 20 mA</p> <p>To certified intrinsically safe circuits with the peak values: $U_i = 30$ V, $I_i = 101$ mA, $P_i = 760$ mW $U_i = 29$ V, $I_i = 110$ mA, $P_i = 800$ mW</p> <p>Effective internal inductance/capacitance: $L_i = 0.24$ μH/$C_i = 3.29$ nF</p> <p>Available soon CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III</p> <p>Available soon CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III</p>
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¹⁾ Han 8D is identical to Han 8U.

HART communication

HART	230 ... 1100 Ω
Protocol	HART 7
Software for computer	SIMATIC PDM

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for gauge pressure (differential pressure series)

Selection and ordering data

Article No.

Pressure transmitters for gauge pressure (differential pressure series)

SITRANS P320

7MF031 - - - - -

SITRANS P420

7MF041 - - - - -

➤ Click on the Article no. for the online configuration in the PIA Life Cycle Portal.

Communication

HART, 4 ... 20 mA

0

Measuring cell filling

Silicone oil

1

Inert liquid

3

Neobee oil

4

Maximum measuring span

20 mbar (8.037 inH₂O)

B

60 mbar (24.11 inH₂O)

D

250 mbar (1005 inH₂O)

G

600 mbar (241.1 inH₂O)

H

1 600 mbar (643 inH₂O)

M

5000 mbar (2009 inH₂O)

P

30 bar (435 psi)

R

Process connection

Oval flange, mounting thread: 7/16-20 UNF (IEC 61518)

L

Oval flange, mounting thread: M10 (PN 160), (DIN 19213)

M

Oval flange, mounting thread: 7/16-20 UNF (IEC 61518) with lateral ventilation

N

Oval flange, mounting thread: M10 (PN 160) (DIN 19213) with lateral ventilation

P

Wetted parts materials: Process connection, seal diaphragm

Stainless steel 316L/1.4404, stainless steel 316L/1.4404

0

Stainless steel 316L/1.4404, alloy C276/2.4819

1

Alloy C22/2.4602, alloy C276/2.4819

2

Tantalum/tantalum (not in combination with maximum measuring span 20 mbar (0.29 psi) and 60 mbar (0.87 psi))

4

Monel 00/2.4360, Monel 400/2.4360 (not in combination with maximum measuring span 20 mbar (0.29 psi) and 60 mbar (0.87 psi))

6

Stainless steel 316L/1.4404, gold-plated (not in combination with maximum measuring span 20 mbar (0.29 psi) and 60 mbar (0.87 psi))

8

Non-wetted parts materials

Die-cast aluminum

1

Stainless steel precision casting CF3M/1.4409 similar to 316L

2

Enclosure

Dual chamber device

5

Type of protection

Without Ex

A

Intrinsic safety

B

Flameproof enclosure

C

Flameproof enclosure, intrinsic safety

D

Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2

L

Dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2

M

Combination of options B, C and L (zone model)

S

Combination of options B, C and M (zone model, Class Division)

T

Electrical connections/cable entries

Thread for cable gland

• 2 x M20 x 1.5

• 2 x 1/2-14 NPT

F
M

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for gauge pressure (differential pressure series)

	Article No.
Pressure transmitters for gauge pressure (differential pressure series)	
SITRANS P320	7MF 0 3 1 - - - - -
SITRANS P420	7MF 0 4 1 - - - - -
Local operation/display	
Without display (cover closed)	0
With display (cover closed)	1
With display (cover with glass pane)	2

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for gauge pressure (differential pressure series)

Selection and ordering data

Options	Order code	Options	Order code
Add "-Z" to article no. and specify order code.		Device options	
Cable glands included		PDF file with device settings	D10
Plastic	A00	Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and cover	D20
Metal	A01	FVMQ enclosure sealing	D21
Stainless steel	A02	IP66/IP68 degree of protection (not for M12 and Han device plugs)	D30
Stainless steel 316L/1.4404	A03	TAG label empty	D40
CMP, for XP devices	A10	Without labeling of the measuring range on the TAG label	D41
CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A11	Stainless steel Ex plate 1.4404/316L	D42
CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A12	Increase of pressure stage from PN 420 to PN 500	D50
Han device plug mounted left		Overvoltage protection up to 6 kV (external)	D71
Han 7D device plug (plastic, straight)	A30	Adhesive labels on transport packaging (supplied by customer)	D90
Han 7D device plug (plastic, angled)	A31		
Han 7D device plug (metal, straight)	A32	General approval without Ex approval	
Han 7D device plug (metal, angled)	A33	Worldwide (CE, RCM) except EAC, FM, CSA, KCC	E00
Han 8D device plug (plastic, straight)	A34	Worldwide (CE, RCM, EAC, FM, CSA, KCC)	E01
Han 8D device plug (plastic, angled)	A35	CSA	E06
Han 8D device plug (metal, straight)	A36	EAC	E07
Han 8D device plug (metal, angled)	A37	FM	E08
Cable socket included		KCC	E09
Plastic, for Han 7D/8D device plugs	A40	UL	E10
Metal, for Han 7D/8D device plugs	A41	Explosion protection approvals	
M12 device plug mounted left		ATEX (Europe)	E20
Stainless steel, without cable socket	A62	CSA (USA and Canada)	E21
Stainless steel, with cable socket	A63	FM (USA and Canada)	E22
Cable entry/connector mounting		IECEx (Worldwide)	E23
2x sealing plugs M20 x 1.5, IP66/68 installed on both sides	A90	EACEx (GOST-R, -K, -B)	E24
2x sealing plugs ½-14 NPT, IP66/68 installed on both sides	A91	INMETRO (Brazil)	E25
Cable gland/connector mounted left	A97	KCs (Korea)	E26
Cable gland/connector mounted on right	A99	NEPSI (China)	E27
Nameplate labeling		PESO (India)	E28
German (bar)	B11	TiS Hazardous (Japan)	E29
French (bar)	B12	UKR Sepro (Ukraine)	E30
Spanish (bar)	B13	ATEX (Europe) and IECEx (Worldwide)	E47
Italian (bar)	B14	CSA (Canada) and FM (USA)	E48
Chinese (bar)	B15	ATEX (Europe) and IECEx (Worldwide) + CSA (Canada) and FM (USA)	E49
Russian (bar)	B16	Marine approvals	
English (psi)	B20	DNV-GL (Det Norske Veritas/Germanischer Lloyd)	E50
Chinese (Pa)	B35	LR (Lloyds Register)	E51
Certificates		BV (Bureau Veritas)	E52
Quality test certificate, 5-point factory calibration (IEC 60770-2)	C11	ABS (American Bureau of Shipping)	E53
Acceptance certificate (EN 10204-3.1) - Material of pressurized and wetted parts	C12	KR (Korean Register of Shipping)	E56
Test report - NACE (MR 0103-2012 and MR 0175-2009)	C13	RINA (Registro Italiano Navale)	E57
Test report (EN 10204-2.2) - Wetted parts	C14	CCS (China Classification Society)	E58
Acceptance certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts	C15	Country-specific approvals	
Certificates for functional safety		CRN approval Canada (Canadian Registration Number)	E60
Functional safety (IEC 61508) - SIL2/3	C20		

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for gauge pressure (differential pressure series)

1

Options	Order code
Special approvals	
Oxygen application (with inert liquid, max. 100 bar (1 450 psi) at 60° C (140 °F))	E80
Dual seal	E81
WRC / WRAS (drinking water); only with pressure cap O-rings made of EPDM	E83
NSF61 (drinking water)	E84
ACS (drinking water)	E85
Mounting bracket	
Steel, galvanized	H01
Stainless steel 1.4301/304	H02
Stainless steel 1.4404/316L	H03
Process flanges; screw plug with vent valve	
Welded in on right	J08
Welded in on left	J09
Glued in on right	J10
Glued in on left	J11
Flange connections with flange EN 1092-1	
Form B1	
• DN 25 PN 40, stainless steel 1.4571/316Ti	J70
• DN 50 PN 40, stainless steel 1.4571/316Ti	J71
• DN 80 PN 40, stainless steel 1.4571/316Ti	J72
• DN 15 PN 40, stainless steel 1.4571/316Ti	J78
Form C	
• DN 25 PN 40, stainless steel 1.4571/316Ti	J73
• DN 50 PN 40, stainless steel 1.4571/316Ti	J74
• DN 80 PN 40, stainless steel 1.4571/316Ti	J75
Flange connection options	
Flange connection and temperature extension	J76
Flange connection with epoxy resin coating	J77
Process flanges; special materials	
Reserved for 7MF7: without process flanges, without screws, without gaskets	K00
Process flange material alloy C4/2.4610	K01
Process flange material Monel 400/2.4360	K02
Process connection material PVDF, on the side ½-14 NPT	K05
Process flanges/process connection material PVDF, flange on the side EN 1092-1 Form B1 DN 25 PN 40, MAWP 4 bar	K06
Process flanges/process connection material PVDF, flange on the side EN 1092-1 Form B1 DN 40 PN 40, MAWP 4 bar	K07
Process flanges; process connection option	
Process flange with process connection G½ welded on	K20
Process connection (oval flange) NAM (ASTAVA)	K21
Process flanges chambered with gaskets	
1x chambered, graphite	K40
1x chambered, PTFE	K41
2x chambered, PTFE	K42
Process flanges, gaskets (instead of standard gaskets FKM (FPM))	
O-ring, process flanges, PTFE	K50
O-ring, process flanges, FEP (with silicone core, approved for food)	K51
O-ring, process flanges, FFKM (FFPM)	K52
O-ring, process flanges, NBR	K53
O-ring, process flanges, EPDM	K54

Options	Order code
Process flange options	
Process flanges for vertical differential pressure lines (half process flange)	K81
Process flanges (+) - side front	K82
Process flange screws, process flange nuts, material Monel 400/2.4360	K83
Valve ¼-18 NPT, material same as process flanges	K84
Valve mounted on the side, measured medium: Gas	K85
Oval flange enclosed, gasket PTFE + mounting screws	K86
Pneumatic blocks	
With mounted pneumatic block (3-way) 7MF9411-5BA, PTFE sealing rings, chrome-plated steel screws and pressure test certified in test report (EN 10204-2.2)	U01
With mounted pneumatic block (3-way) 7MF9411-5BA, PTFE sealing rings, stainless steel screws and pressure test certified in test report (EN 10204-2.2)	U02
With mounted pneumatic block (5-way) 7MF9411-5CA, PTFE sealing rings, chrome-plated steel screws and pressure test certified in test report (EN 10204-2.2)	U03
With mounted pneumatic block (5-way) 7MF9411-5CA, PTFE sealing rings, stainless steel screws and pressure test certified in test report (EN 10204-2.2)	U04

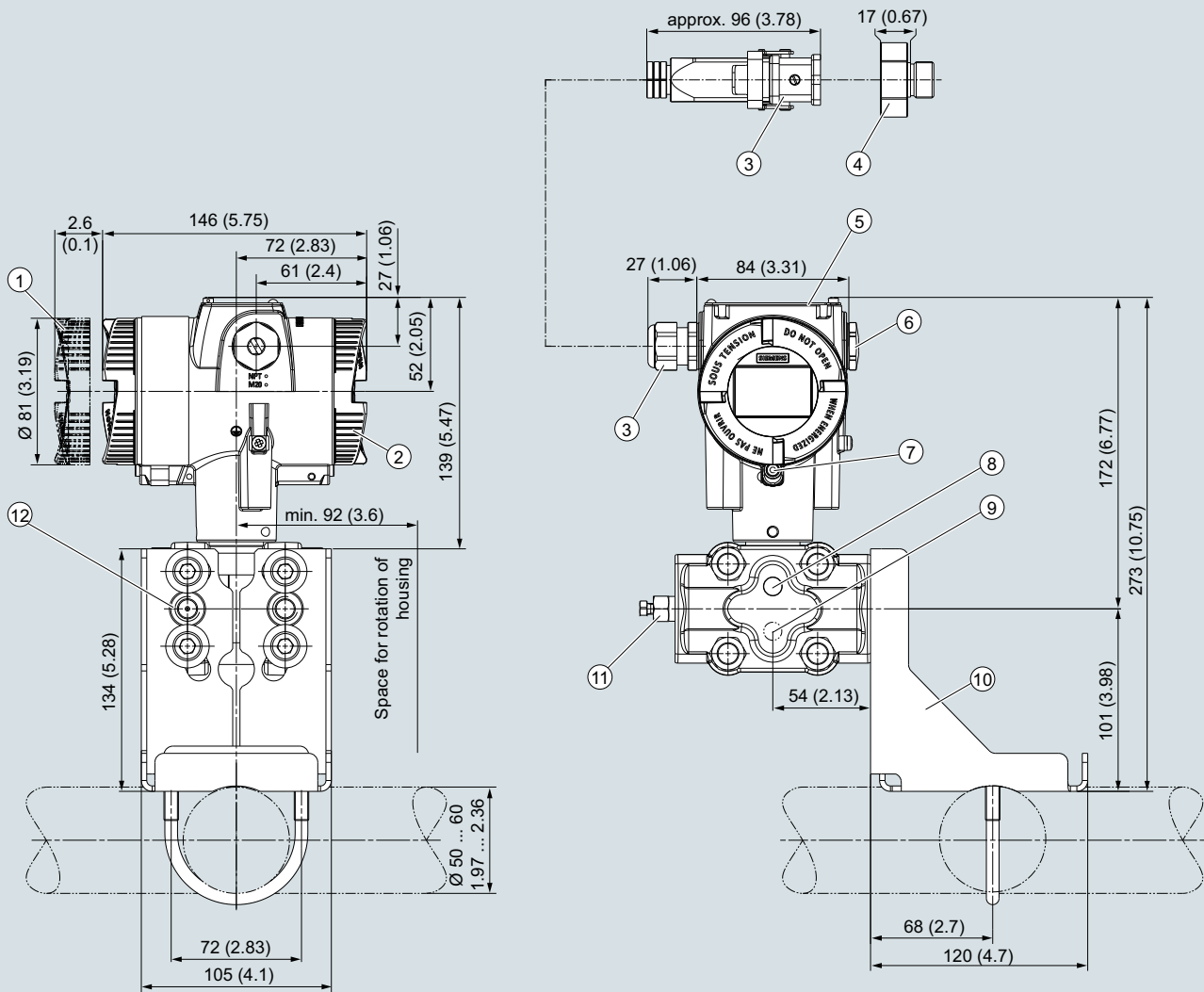
Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P320/P420

for gauge pressure (differential pressure series)

Selection and ordering data

Customer-specific device settings	Order code
Add "-Z" to article no., specify order code and plain text or drop-down list selection.	
Measuring span Start of scale value (max. 5 characters), full scale value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Drop-down list: Pa, MPa, kPa, hPa, bar, mbar, psi, g/cm ² , kg/cm ² , kgf/cm ² , inH ₂ O, inH ₂ O (4°C), ftH ₂ O, mmH ₂ O, mmH ₂ O (4°C), mH ₂ O (4°C), mmHg, inHg, atm, torr	Y01
TAG (on stainless steel plate and device parameters, max. 32 characters) Input field: Free text, max. 32 characters	Y15
Measuring point description (on stainless steel plate and device parameters, max. 32 characters) Input field: Free text, max. 32 characters	Y16
TAG short (device parameters, max. 8 characters) Input field: Free text, max. 8 characters	Y17
Local display [Pressure, Percent], reference [None, Absolute, Relative], example: Pressure gauge Drop-down list: Percent, pressure unit, pressure unit abs., pressure unit gauge	Y21
Local display Scaling with standard units [m³/s, l/s, m, inch, ...], example 1 ... 5 m Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Drop-down list: m, cm, mm, in, ft, m ³ , l, hl, in ³ , ft ³ , yd ³ , gal, gal (UK), bu, bbl, bbl (US), SCF, Nm ³ , NI.	Y22
Local display Scaling with user-specific units (max. 12 characters), example 1 ... 5 m Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Input field 3: Free text, max. 8 characters	Y23
Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA Drop-down list 1: 3.9, 4 Drop-down list 2: 20.8, 22	Y30
Fault current instead of 3.6 mA [22.5 mA, 22.8 mA] Drop-down list: 3.75; 21.75; 22.5; 22.6	Y31
Damping in seconds instead of 2 s (0.0 ... 100.0 s) Input field: max. 4 characters and numbers only; decimal places as dot (comma is automatically converted to dot); min. value = 0; max. value = 100.	Y32
ID number of special version Input field: max. 4 characters and only natural numbers from 0 ... 9999	Y99

Dimensional drawings

- ① Electronic side, display
(longer overall length for cover with window)¹⁾
- ② Terminal side
- ③ Electrical connection:
screw gland M20 x 1,5³⁾ or screw gland ½-14 NPT or
Han 7D/Han 8D²⁾ ③ device plug or M12 device plug²⁾ ③
- ④ Harting adapter
- ⑤ Cover over buttons and nameplate with general information

- ⑥ Blanking plug
- ⑦ Screw cover - safety bracket
(only for type of protection "Explosion-proof enclosure")
- ⑧ Lateral venting for liquid measurement (Standard)
- ⑨ Lateral venting for gas measurement (suffix K85)
- ⑩ Mounting bracket (option)
- ⑪ Sealing screw with valve (option)
- ⑫ Process connection: ¼-18 NPT (IEC 61518)

¹⁾ In addition, allow approx. 22 mm (0.87 inch) for the thread length when removing the covers

²⁾ Not with type of protection "Explosion-proof enclosure"

³⁾ Not with type of protection "FM + CSA" [is + XP]"

SITRANS P320/P420 pressure transmitter for relative pressure (differential pressure series), dimensions in mm (inch)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for gauge and absolute pressure, flush-mounted diaphragm

Technical specifications

SITRANS P320 / SITRANS P420 for gauge and absolute pressure, with flush-mounted diaphragm

Input of gauge pressure, with flush-mounted diaphragm

Measured variable

Gauge pressure

Span (infinitely adjustable) or measuring range, max. operating pressure and max. test pressure

Span

Max. permissible operating pressure MAWP (PS)

Maximum permissible test pressure

Refer to the information on the nameplate of the pressure transmitter and the data on the mounting flange¹⁾

0.01 ... 1 bar
1 ... 100 kPa
0.15 ... 14.5 psi
0.04 ... 4 bar
4 ... 400 kPa
0.58 ... 58 psi
0.16 ... 16 bar
0.016 ... 1.6 MPa
2.3 ... 232 psi
0.6 ... 63 bar
0.063 ... 6.3 MPa
9.1 ... 914 psi

Measuring limits

- Low measuring limit
 - Measuring cell with silicone oil filling
 - Measuring cell with inert oil
 - Measuring cell with FDA-compliant oil
- Upper measuring limit

100 mbar a/10 kPa a/1.45 psi a
100 mbar a/10 kPa a/1.45 psi a
100 mbar a/10 kPa a/1.45 psi a
100% of max. span

Input of absolute pressure, with flush-mounted diaphragm

Measured variable

Absolute pressure

Span (infinitely adjustable) or measuring range, max. operating pressure and max. test pressure

Span

Max. permissible operating pressure MAWP (PS)

Maximum permissible test pressure

Refer to the information on the nameplate of the pressure transmitter and the data on the mounting flange¹⁾

43 ... 1300 mbar a
4.3 ... 130 kPa a
17 ... 525 inH₂O a
166 ... 5000 mbar a
16.6 ... 500 kPa a
2.41 ... 72.5 psi a
1 ... 30 bar a
0.1 ... 3 MPa a
14.5 ... 435 psi a

Depending on the process connection, the span may differ from these values.

Measuring limits

- Low measuring limit
 - Measuring cell with silicone oil filling
- Upper measuring limit

0 bar a/0 kPa a/0 psi a
100% of max. span

Start of scale

Between the measuring limits (infinitely adjustable)

Output

HART

Output signal

4 ... 20 mA
3.55 mA, factory preset to 3.8 mA
22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA
 $I_{pp} \leq 0.5\%$ of max. output current
0 ... 100 s, continuously adjustable over remote operation
0 ... 100 s, in increments of 0.1 s, adjustable over display
3.55 ... 22.8 mA
3.55 ... 22.8 mA

- Low saturation limit (infinitely adjustable)
- High saturation limit (infinitely adjustable)
- Ripple (without HART communication)

Adjustable damping

- Current transmitter
- Failure signal

Load

- Without HART communication

- With HART communication

Resistor R [Ω]
 $R = (U_H - 10.5 \text{ V}) / 22.8 \text{ mA}$,
 U_H : Power supply in V
 $R = 230 \dots 1100 \Omega$ (HART communicator (handheld))
 $R = 230 \dots 500 \Omega$ (SIMATIC PDM)

Characteristic curve

- Linearly increasing or linearly decreasing
- Linear increase or decrease or according to the square root (only for differential pressure and flow)

Physical bus

-

Polarity-independent

-

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for gauge and absolute pressure, flush-mounted diaphragm

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SITRANS P320 / SITRANS P420 for gauge and absolute pressure, with flush-mounted diaphragm

Gauge pressure measuring accuracy, with flush-mounted diaphragm

Reference conditions

- According to EN 60770-1
- Rising characteristic curve
- Start of scale value 0 bar/kPa/psi
- Seal diaphragm stainless steel
- Measuring cell with silicone oil filling
- Room temperature 25 °C (77 °F)

Conformity error at limit point setting, including hysteresis and repeatability

Measuring span ratio r (spread, Turn-Down)

r = maximum measuring span/set measuring span or nominal measuring range

- Linear characteristic

- 1 bar/100 kPa/3.6 psi
- 4 bar/400 kPa/58 psi
- 16 bar/1.6 MPa/232 psi
- 63 bar/6.3 MPa/914 psi

$r \leq 5$: $\leq 0.075\%$

$5 < r \leq 100$: $\leq (0.005 \cdot r + 0.05)\%$

Influence of ambient temperature in % per 28 °C (50 °F)

- 1 bar/100 kPa/3.6 psi
- 4 bar/400 kPa/58 psi
- 16 bar/1.6 MPa/232 psi
- 63 bar/6.3 MPa/914 psi

$\leq (0.08 \cdot r + 0.16)\%$

Long-term stability at ± 30 °C (± 54 °F)

- 1 bar/100 kPa/3.6 psi
- 4 bar/400 kPa/58 psi
- 16 bar/1.6 MPa/232 psi
- 63 bar/6.3 MPa/914 psi
- 16 bar/1.6 MPa/232 psi
- 63 bar/6.3 MPa/914 psi

In 5 years $\leq (0.25 \cdot r)\%$

In 5 years $\leq (0.125 \cdot r)\%$

Step response time T_{63} (without electrical damping)

Approx. 0.1 s

Effect of mounting position (in pressure per change of angle)

0.4 mbar/0.04 kPa/0.006 per 10° incline
(zero point correction is possible with position error compensation)

Effect of auxiliary power (in % per voltage change)

0.005% per 1 V

Absolute pressure measuring accuracy with flush diaphragm

Reference conditions

- According to EN 60770-1
- Rising characteristic curve
- Start of scale value 0 bar/kPa/psi
- Seal diaphragm stainless steel
- Measuring cell with silicone oil filling
- Room temperature 25 °C (77 °F)

Conformity error at limit point setting, including hysteresis and repeatability

Measuring span ratio r (spread, Turn-Down)

r = maximum measuring span/set measuring span or nominal measuring range

- Linear characteristic

- All measuring cells

$r \leq 10$: $\leq 0.2\%$

$10 < r \leq 30$: $\leq 0.4\%$

Influence of ambient temperature in % per 28 °C (50 °F)

- All measuring cells

$\leq (0.16 \cdot r + 0.24)\%$

Long-term stability at ± 30 °C (± 54 °F)

- All measuring cells

In 5 years $\leq (0.25 \cdot r)\%$

Step response time T_{63} (without electrical damping)

Approx. 0.2 s

Effect of mounting position (in pressure per change of angle)

0.4 mbar/0.04 kPa/0.006 per 10° incline
(zero point correction is possible with position error compensation)

Effect of auxiliary power (in % per voltage change)

0.005% per 1 V

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P320/P420

for gauge and absolute pressure, flush-mounted diaphragm

SITRANS P320 / SITRANS P420 for gauge and absolute pressure, with flush-mounted diaphragm

Rated conditions

Temperature of medium²⁾

- Measuring cell with silicone oil filling

-40 ... +150 °C (-40 ... +302 °F)
-40 ... +200 °C (-40 ... +392 °F) with cooling extension
-20 ... +100 °C (-4 ... +212 °F)
-10 ... +150 °C (14 ... +302 °F)
-10 ... +200 °C (14 ... +392 °F) with cooling extension

Ambient conditions

- Ambient temperature/enclosure
 - Measuring cell with silicone oil filling
 - Measuring cell with inert oil (different pressure classes)
- Measuring cell with FDA-compliant oil
- Display
- Storage temperature
- Climatic class in accordance with IEC 60721-3-4
- Degree of protection
 - According to IEC 60529
 - According to NEMA 250
- Electromagnetic compatibility
 - Emitted interference and interference immunity

Observe the temperature class in areas subject to explosion hazard.

-40 ... +85 °C (-40 ... +185 °F)

1 bar/100 kPa/3.6 psi

4 bar/400 kPa/58 psi

16 bar/1.6 MPa/232 psi

63 bar/6.3 MPa/914 ps

-40 ... +100 °C (-40 ... +212 °F)

160 bar/16 MPa/2321 psi

400 bar/40 MPa/5802 psi

700 bar/70 MPa/10152 ps

-20 ... +100 °C (-4 ... +212 °F)

-10 ... +85 °C (14 ... +185 °F)

-20 ... +80 °C (-4 ... +176 °F)

-50 ... +85 °C (-58 ... +185 °F) (with FDA-compliant oil: -20 ... +85 °C (-4 ... +185 °F))

4K4H

IP66, IP68

Type 4X

According to IEC 61326 and NAMUR NE 21

Design

Weight (pressure transmitter without mounting flange)

Material

- Wetted parts materials
 - Process connection
 - Seal diaphragm
- Non-wetted parts materials
 - Electronics housing

Stainless steel, mat. no. 1.4404/316L

Stainless steel, material no. 1.4404/316L or Alloy C276, material no. 2.4819

- Low-copper die-cast aluminum GD-AISI 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M

- Standard: Powder coating with polyurethane

Option: 2 coats: Coat 1: epoxy-based; coat 2: Polyurethane

- Stainless steel type plate (1.4404/316L)

Steel, electrogalvanized steel, or stainless steel

- Mounting bracket

Process connection

- Flanges according to EN and ASME
- F&B and pharmaceutical flanges
- BioConnect/BioControl
- PMC style

Electrical connection

Cable entry via the following screwed glands:

- M20 x 1.5
- ½-14 NPT
- Han 7D/Han 8D device plug³⁾
- M12 device plug

Displays and controls

Keys

4 keys for operation directly on the device

Display

- With or without integrated display (optional)
- Cover with inspection window (optional)

Auxiliary power U_H

Terminal voltage on pressure transmitter

10.5 ... 45 V DC

10.5 ... 30 V DC in intrinsically safe mode

Ripple

U_{SS} ≤ 0.2 V (47 ... 125 Hz)

Noise

U_{eff} ≤ 1.2 mV (0.5 ... 10 kHz)

Auxiliary power

–

Separate supply voltage

–

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for gauge and absolute pressure, flush-mounted diaphragm

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SITRANS P320 / SITRANS P420 for gauge and absolute pressure, with flush-mounted diaphragm

Certificates and approvals

Classification according to pressure equipment directive (PED 2014/68/EU)

Drinking water

- WRAS (England)
- ACS (France)
- DVGW (Germany)
- NSF (USA)

CRN (Canada)

Explosion protection acc. to NEPSI (China)

Explosion protection acc. to INMETRO (Brazil)

BAM (Germany), oxygen expenditures

Explosion protection

- Intrinsic safety "i"

- Marking

- Permissible ambient temperature

- Permissible temperature of measuring medium

- Connection

- Effective internal inductance/capacitance

- Flameproof enclosure "d"

- Marking

- Permissible ambient temperature

- Permissible temperature of measuring medium

- Connection

- Dust explosion protection for Zone 20, 21, 22

- Marking

- Permissible ambient temperature

- Permissible temperature of measuring medium

- Max. surface temperature

- Connection

- Dust explosion protection for Zone 20, 21, 22

- Marking

- Permissible ambient temperature

- Permissible temperature of measuring medium

- Connection

- Effective internal inductance/capacitance

- Type of protection for Zone 2

- Marking

- Permissible ambient temperature "ec"

- Permissible ambient temperature "ic"

- Permissible temperature of measuring medium

- "ec" connection

- "ic" connection

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

Available soon

Available soon

Available soon

Available soon

Available soon

Available soon

Available soon

Available soon

II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb

-40 ... +80 °C (-40 ... +176 °F) temperature class T4

-40 ... +70 °C (-40 ... +158 °F) temperature class T6

-40 ... +100 °C (-40 ... +212 °F) temperature class T4

-40 ... +70 °C (-40 ... +158 °F) temperature class T6

To certified intrinsically safe circuits with peak values:

$U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$

$U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$

$L_i = 0.24 \text{ } \mu\text{H/C}_i = 3.29 \text{ nF}$

Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb

-40 ... +80 °C (-40 ... +176 °F) temperature class T4

-40 ... +70 °C (-40 ... +158 °F) temperature class T6

-40 ... +100 °C (-40 ... +212 °F) temperature class T4

-40 ... +70 °C (-40 ... +158 °F) temperature class T6

To a circuit with the operating values:

$U_n = 10.5 \text{ to } 45 \text{ V}$, $4 \text{ ... } 20 \text{ mA}$

Ex II 1D Ex tb IIIC T120 °C Da

Ex II 2D Ex tb IIIC T120 °C Db

Ex II 3D Ex tc IIIC T120 °C Dc

-40 ... +80 °C (-40 ... +176 °F)

-40 ... +100 °C (-40 ... +212 °F)

120 °C (248 °F)

To a circuit with the operating values:

$U_n = 10.5 \text{ to } 45 \text{ V}$, $4 \text{ ... } 20 \text{ mA}$

Ex II 1D Ex ia IIIC T120 °C Da

Ex II 2D Ex ib IIIC T120 °C Db

Ex II 3D Ex ic IIIC T120 °C Dc

-40 ... +80 °C (-40 ... +176 °F)

-40 ... +100 °C (-40 ... +212 °F)

To certified intrinsically safe circuits with the peak values:

$U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$

$U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$

$L_i = 0.24 \text{ } \mu\text{H/C}_i = 3.29 \text{ nF}$

Ex II 3G Ex ec IIC T4/T6 Gc

Ex II 3G Ex ic IIC T4/T6 Gc

-40 ... +80 °C (-40 ... +176 °F) temperature class T4

-40 ... +40 °C (-40 ... +104 °F) temperature class T6

-40 ... +80 °C (-40 ... +176 °F) temperature class T4

-40 ... +80 °C (-40 ... +176 °F) temperature class T6

-40 ... +100 °C (-40 ... +212 °F) temperature class T4

-40 ... +70 °C (-40 ... +158 °F) temperature class T6

To a circuit with the operating values:

$U_n = 10.5 \text{ to } 30 \text{ V}$, $4 \text{ ... } 20 \text{ mA}$

To certified intrinsically safe circuits with the peak values:

$U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$

$U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$

Effective internal inductance/capacitance:

$L_i = 0.24 \text{ } \mu\text{H/C}_i = 3.29 \text{ nF}$

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for gauge and absolute pressure, flush-mounted diaphragm

SITRANS P320 / SITRANS P420 for gauge and absolute pressure, with flush-mounted diaphragm

- | | |
|---|---|
| <ul style="list-style-type: none"> • Explosion protection acc. to FM <ul style="list-style-type: none"> - Marking (XP/DIP) or IS; NI; S • Explosion protection according to CSA <ul style="list-style-type: none"> - Marking (XP/DIP) or (IS) | <p>Available soon</p> <p>CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III</p> <p>Available soon</p> <p>CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III</p> |
|---|---|

- 1) The MAWP value of the pressure transmitter can be lower than the PN value of the mounting flange and vice versa.
To determine the maximum permissible operating pressure and the maximum permissible test pressure, use the lowest value as reference.
- 2) Observe the temperature limits in the process connection standards (e.g. DIN 32676 and DIN 11851) for the maximum process temperature for flush-mounted process connections.
- 3) Han 8D is identical to Han 8U.

HART communication

HART	230 ... 1100 Ω
Protocol	HART 7
Software for computer	SIMATIC PDM

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for gauge and absolute pressure, flush-mounted diaphragm

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Selection and ordering data

	Article No.
Pressure transmitter for gauge and absolute pressure, with flush-mounted diaphragm	
SITRANS P320 for gauge pressure	7MF030 - - - - -
SITRANS P420 for gauge pressure	7MF040 - - - - -
SITRANS P320 for absolute pressure	7MF032 - - - - -
SITRANS P420 for absolute pressure	7MF042 - - - - -
Click on the Article no. for the online configuration in the PIA Life Cycle Portal.	
Communication	
HART, 4 ... 20 mA	0
Measuring cell filling	
Silicone oil	1
Inert liquid	3
Neobee oil	4
Maximum measuring span	
1000 mbar (14.5 psi)	0 J
4000 mbar (58 psi)	0 N
16 bar (232 psi)	0 Q
63 bar (914 psi)	0 T
1 300 mbar a (18.9 psi a)	2 L
5000 mbar a (72.5 psi a)	2 P
30 bar a (435 psi a)	2 R
Process connection	
Flush-mounted diaphragm	K
Wetted parts materials: Process connection, seal diaphragm	
Stainless steel 316L/1.4404, stainless steel 316L/1.4404	0
Stainless steel 316L/1.4404, alloy C276/2.4819	1
Alloy C22/2.4602, alloy C276/2.4819	2
Non-wetted parts materials	
Die-cast aluminum	1
Stainless steel precision casting CF3M/1.4409 similar to 316L	2
Enclosure	
Dual chamber device	5
Type of protection	
Without Ex	A
Intrinsic safety	B
Flameproof enclosure	C
Flameproof enclosure, intrinsic safety	D
Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2	L
Dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2	M
Combination of options B, C and L (zone model)	S
Combination of options B, C and M (zone model, Class Division)	T
Electrical connections/cable entries	
Thread for cable gland	
• 2 x M20 x 1.5	F
• 2 x ½-14 NPT	M
Local operation/display	
Without display (cover closed)	0
With display (cover closed)	1
With display (cover with glass pane)	2

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for gauge and absolute pressure, flush-mounted diaphragm

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Selection and ordering data

Options	Order code	Options	Order code
Add "-Z" to article no. and specify order code.		Device options	
Cable glands included		PDF file with device settings	D10
Plastic	A00	Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and cover	D20
Metal	A01	FVMQ enclosure sealing	D21
Stainless steel	A02	IP66/IP68 degree of protection (not for M12 and Han device plugs)	D30
Stainless steel 316L/1.4404	A03	TAG label empty	D40
CMP, for XP devices	A10	Without labeling of the measuring range on the TAG label	D41
CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A11	Stainless steel Ex plate 1.4404/316L	D42
CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A12	Increase of pressure stage from PN 420 to PN 500	D50
Han device plug mounted left		Overvoltage protection up to 6 kV (external)	D71
Han 7D device plug (plastic, straight)	A30	Adhesive labels on transport packaging (supplied by customer)	D90
Han 7D device plug (plastic, angled)	A31		
Han 7D device plug (metal, straight)	A32	General approval without Ex approval	
Han 7D device plug (metal, angled)	A33	Worldwide (CE, RCM) except EAC, FM, CSA, KCC	E00
Han 8D device plug (plastic, straight)	A34	Worldwide (CE, RCM, EAC, FM, CSA, KCC)	E01
Han 8D device plug (plastic, angled)	A35	CSA	E06
Han 8D device plug (metal, straight)	A36	EAC	E07
Han 8D device plug (metal, angled)	A37	FM	E08
Cable socket included		KCC	E09
Plastic, for Han 7D/8D device plugs	A40	UL	E10
Metal, for Han 7D/8D device plugs	A41	Explosion protection approvals	
M12 device plug mounted left		ATEX (Europe)	E20
Stainless steel, without cable socket	A62	CSA (USA and Canada)	E21
Stainless steel, with cable socket	A63	FM (USA and Canada)	E22
Cable entry/connector mounting		IECEx (Worldwide)	E23
2x sealing plugs M20 x 1.5, IP66/68 installed on both sides	A90	EACEx (GOST-R, -K, -B)	E24
2x sealing plugs ½-14 NPT, IP66/68 installed on both sides	A91	INMETRO (Brazil)	E25
Cable gland/connector mounted left	A97	KCs (Korea)	E26
Cable gland/connector mounted on right	A99	NEPSI (China)	E27
Nameplate labeling		PESO (India)	E28
German (bar)	B11	TIIS Hazardous (Japan)	E29
French (bar)	B12	UKR Sepro (Ukraine)	E30
Spanish (bar)	B13	ATEX (Europe) and IECEx (Worldwide)	E47
Italian (bar)	B14	CSA (Canada) and FM (USA)	E48
Chinese (bar)	B15	ATEX (Europe) and IECEx (Worldwide) + CSA (Canada) and FM (USA)	E49
Russian (bar)	B16	Marine approvals	
English (psi)	B20	DNV-GL (Det Norske Veritas/Germanischer Lloyd)	E50
Chinese (Pa)	B35	LR (Lloyds Register)	E51
Certificates		BV (Bureau Veritas)	E52
Quality test certificate, 5-point factory calibration (IEC 60770-2)	C11	ABS (American Bureau of Shipping)	E53
Acceptance certificate (EN 10204-3.1) - Material of pressurized and wetted parts	C12	KR (Korean Register of Shipping)	E56
Test report - NACE (MR 0103-2012 and MR 0175-2009)	C13	RINA (Registro Italiano Navale)	E57
Test report (EN 10204-2.2) - Wetted parts	C14	CCS (China Classification Society)	E58
Acceptance certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts	C15	Country-specific approvals	
Certificates for functional safety		CRN approval Canada (Canadian Registration Number)	E60
Functional safety (IEC 61508) - SIL2/3	C20	Special approvals	
		Oxygen application (with inert liquid, max. 100 bar (1 450 psi) at 60° C (140 °F))	E80
		Dual seal	E81
		WRC / WRAS (drinking water); only with pressure cap O-rings made of EPDM	E83
		NSF61 (drinking water)	E84

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for gauge and absolute pressure, flush-mounted diaphragm

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Options	Order code
ACS (drinking water)	E85
3A (hygiene)	E86
EHEDG (hygiene)	E87
Process flanges, gaskets (instead of standard gas-gaskets FKM (FPM))	
Seal (EN 837-1) material Fe (soft iron)	K60
Seal (EN 837-1) material 1.4571	K61
Seal (EN 837-1) material Cu	K62
Process connection	
Process connection male thread G $\frac{1}{2}$, bore hole 11 mm	K80
Flanges according to DIN EN 1092-1 Form B1 and ASME standard B16.5	
EN 1092-1 Form B1	
• DN 50 PN 16	M03
• DN 80 PN 16	M05
• DN 25 PN 40	M10
• DN 40 PN 40	M12
• DN 50 PN 40	M13
• DN 80 PN 40	M15
• DN 40 PN 100	M22
ASME B16.5	
• 1" Class 150 RF	M30
• 1 ½" Class 150 RF	M31
• 2" Class 150 RF	M32
• 3" Class 150 RF	M33
• 4" Class 150 RF	M34
• 1" Class 300 RF	M35
• 1 ½" Class 300 RF	M36
• 2" Class 300 RF	M37
• 3" Class 300 RF	M38
• 4" Class 300 RF	M39
Sanitary connections in accordance with the standard	
Sanitary flange DIN 11851	
• with slotted union nut DN 50 PN 25	N03
• with slotted union nut DN 80 PN 25	N05
Tri-Clamp	
• DIN 32676 DN 50 PN 16	N14
• DIN 32676 DN 65 PN 10	N15
• ISO 2852 2" PN 40	N22
• ISO 2852 3" PN 40	N23
Aseptic threaded socket	
• DIN 11864-1 Form A DN 50 PN 25	N33
• DIN 11864-1 Form A DN 65 PN 25	N34
• DIN 11864-1 Form A DN 80 PN 25	N35
• DIN 11864-1 Form A DN100 PN 25	N36
Aseptic flange with notch	
• DIN 11864-2 Form A DN 50 PN 16	N43
• DIN 11864-2 Form A DN 65 PN 16	N44
• DIN 11864-2 Form A DN 80 PN 16	N45
• DIN 11864-2 Form A DN100 PN 16	N46
Aseptic clamp with groove	
• DIN 11864-3 Form A DN 50 PN 25	N53
• DIN 11864-3 Form A DN 65 PN 25	N54
• DIN 11864-3 Form A DN 80 PN 16	N55
• DIN 11864-3 Form A DN100 PN 16	N56

Options	Order code
Sanitary connections manufacturer-specific	
Varivent type N for pipes DN 40 ... DN 125 PN 40	P06
NEUMO BioConnect flange	
• DN 50 PN 16	P14
• DN 65 PN 16	P15
• DN 80 PN 16	P16
• DN100 PN 16	P17
• 2" PN 16	P23
• 2 ½" PN 16	P24
• 3" PN 16	P25
• 4" PN 16	P26
NEUMO BioConnect clamp	
• DN 50 PN 16	P34
• DN 65 PN 10	P35
• DN 80 PN 10	P36
• DN 100 PN 10	P37
• 2 ½" PN 16	P43
• 3" PN 10	P44
• 4" PN 10	P45
NEUMO BioControl flange	
• DN 50 PN 16	P51
• DN 65 PN 16	P52
• DN 80 PN 16	P53
Sanitary connections special design	
Tank connection	
• TG 52/50 PN 40 with seal	Q00
• TG 52/150 PN 40 with seal	Q01
DRD flange D = 65 mm DN 50 PN 40	Q15
SMS socket	
• with union nut 2" PN 25	Q22
• with union nut 2 ½" PN 25	Q23
• with union nut 3" PN 25	Q24
• with thread 2" PN 25	Q28
• with thread 2 ½" PN 25	Q29
• with thread 3" PN 25	Q30
IDF socket	
• with union nut ISO 2853 2" PN 25	Q42
• with union nut ISO 2853 2 ½" PN 25	Q43
• with union nut ISO 2853 3" PN 25	Q44
• with thread ISO 2853 2" PN 25	Q48
• with thread ISO 2853 2 ½" PN 25	Q49
• with thread ISO 2853 3" PN 25	Q50
Weldable sockets for tank connection	
Weldable piece for TG52/50	Q90
Weldable piece for TG52/150	Q91
Connections for the paper industry	
Process connection PMC Style Standard	R00
Process connection PMC Style Minibolt	R01
Weldable sockets for PMC Style Standard	R02
Weldable sockets for PMC Style Minibolt	R03
Threaded connection	
Male thread G $\frac{3}{4}$ -A DIN 3852	R11
Male thread G1-A DIN 3852	R12
Male thread G2-A DIN 3852	R14
Special options front-flush	
Temperature decoupler (media temperature up to 200 °C)	R85
Mating connector including seal	R90

Pressure Measurement

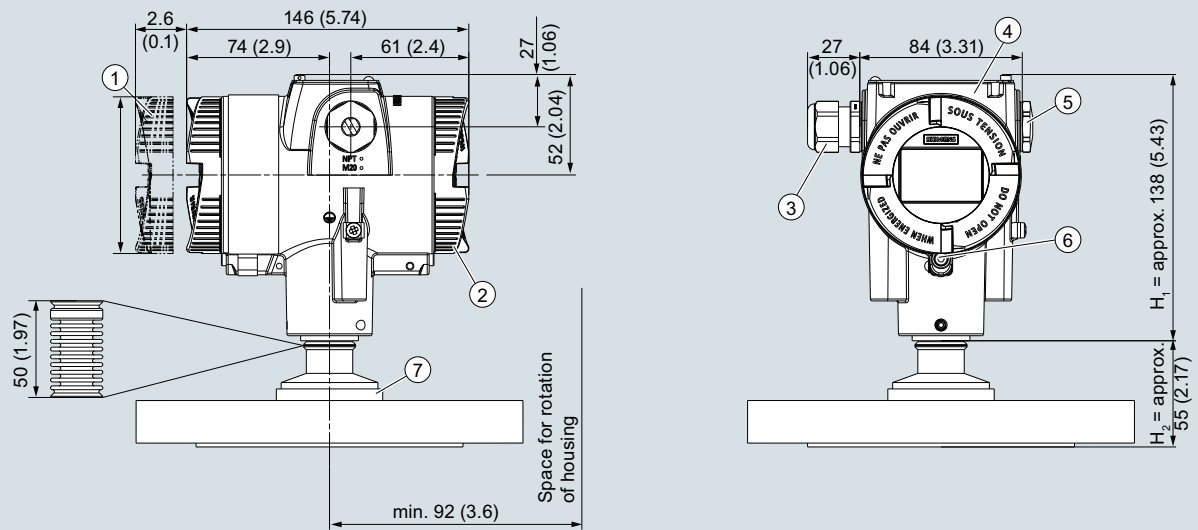
Transmitters for applications with advanced requirements (Advanced)
SITRANS P320/P420

for gauge and absolute pressure, flush-mounted diaphragm

1

Selection and ordering data

Customer-specific device settings	Order code
Add "-Z" to article no., specify order code and plain text or drop-down list selection.	
Measuring span Start of scale value (max. 5 characters), full scale value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Drop-down list: Pa, MPa, kPa, hPa, bar, mbar, psi, g/cm ² , kg/cm ² , kgf/cm ² , inH ₂ O, inH ₂ O (4°C), ftH ₂ O, mmH ₂ O, mmH ₂ O (4°C), mH ₂ O (4°C), mmHg, inHg, atm, torr	Y01
TAG (on stainless steel plate and device parameters, max. 32 characters) Input field: Free text, max. 32 characters	Y15
Measuring point description (on stainless steel plate and device parameters, max. 32 characters) Input field: Free text, max. 32 characters	Y16
TAG short (device parameters, max. 8 characters) Input field: Free text, max. 8 characters	Y17
Local display [Pressure, Percent], reference [None, Absolute, Relative], example: Pressure gauge Drop-down list: Percent, pressure unit, pressure unit abs., pressure unit gauge	Y21
Local display Scaling with standard units [m³/s, l/s, m, inch, ...], example 1 ... 5 m Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Drop-down list: m, cm, mm, in, ft, m ³ , l, hl, in ³ , ft ³ , yd ³ , gal, gal (UK), bu, bbl, bbl (US), SCF, Nm ³ , NI.	Y22
Local display Scaling with user-specific units (max. 12 characters), example 1 ... 5 m Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Input field 3: Free text, max. 8 characters	Y23
Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA Drop-down list 1: 3.9, 4 Drop-down list 2: 20.8, 22	Y30
Fault current instead of 3.6 mA [22.5 mA, 22.8 mA] Drop-down list: 3.75; 21.75; 22.5; 22.6	Y31
Damping in seconds instead of 2 s (0.0 ... 100.0 s) Input field: max. 4 characters and numbers only; decimal places as dot (comma is automatically converted to dot); min. value = 0; max. value = 100.	Y32
ID number of special version Input field: max. 4 characters and only natural numbers from 0 ... 9999	Y99

Dimensional drawings

- | | |
|--|---|
| ① Electronic side, display
(longer overall length for cover with window) ¹⁾ | ④ Cover over buttons and nameplate with general information |
| ② Terminal side | ⑤ Blanking plug |
| ③ Electrical connection:
screw gland M20 x 1,5 ³⁾ or screw gland ½-14 NPT or
Han 7D/Han 8D ²⁾ device plug or M12 device plug ²⁾ 3 | ⑥ Screw cover - safety bracket
(only for type of protection "Explosion-proof enclosure") |
| | ⑦ Process connection |

¹⁾ In addition, allow approx. 22 mm (0.87 inch) for the thread length when removing the covers

²⁾ Not with type of protection "Explosion-proof enclosure"

³⁾ Not with type of protection "FM + CSA" [is + XP]"

SITRANS P320/P420 pressure transmitter, with flush-mounted diaphragm, dimensions in mm (inch)

This figure consists of a SITRANS P320/P420 with an example flange.

In this figure, the height is divided into H_1 and H_2 .

H_1 = Height of the SITRANS P320/P420 up to a defined cross-section

H_2 = Height of the flange up to this defined cross-section

Only the height H_2 is indicated in the dimensions of the flanges.

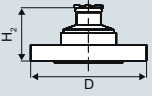
Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P320/P420

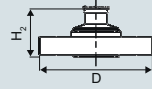
for gauge and absolute pressure, flush-mounted diaphragm

Flanges according to EN and ASME

Flange according to EN

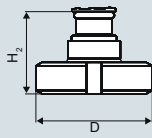
EN 1092-1					
	Order code	DN	PN	ØD	H ₂
	M03	50	16	165 mm (6.5")	Approx. 52 mm (2")
	M05	80	16	200 mm (7.9")	
	M10	25	40	115 mm (4.5")	
	M12	40	40	150 mm (5.9")	
	M13	50	40	165 mm (6.5")	
	M15	80	40	200 mm (7.9")	
	M22	40	100	170 mm (6.7")	

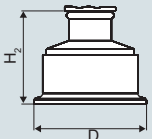
Flanges according to ASME

ASME B16.5					
	Order code	DN	Class	ØD	H ₂
	M30	1"	150	110 mm (4.3")	Approx. 52 mm (2")
	M31	1½"	150	130 mm (5.1")	
	M32	2"	150	150 mm (5.9")	
	M33	3"	150	190 mm (7.5")	
	M34	4"	150	230 mm (9.1")	
	M35	1"	300	125 mm (4.9")	
	M36	1½"	300	155 mm (6.1")	
	M37	2"	300	165 mm (6.5")	
	M38	3"	300	210 mm (8.1")	
	M39	4"	300	255 mm (10.0")	

NuG and pharmaceutical connections

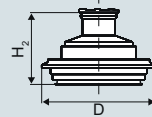
Connections to DIN

DIN 11851 (milk pipe union with slotted union nut)					
	Order code	DN	PN	ØD	H ₂
	N03	50	25	92 mm (3.6")	Approx. 52 mm (2")
	N05	80	25	127 mm (5.0")	

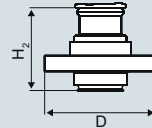
TriClamp according to DIN 32676					
	Order code	DN	PN	ØD	H ₂
	N14	50	16	64 mm (2.5")	Approx. 52 mm (2")
	N15	65	10	91 mm (3.6")	
	N22	2"	16	64 mm (2.5")	Approx. 52 mm (2")
	N23	3"	10	91 mm (3.6")	

Other connections

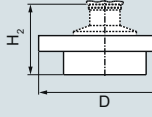
Varivent connection

	Order code	DN	PN	ØD	H ₂
	P06	40 ... 125	40	84 mm (3.3")	Approx. 52 mm (2")

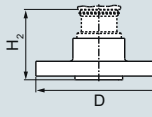
Bio-control connection

	Order code	DN	PN	ØD	H ₂
	P51	50	16	90 mm (3.5")	Approx. 52 mm (2")
	P52	65	16	120 mm (4.7")	
	P53	80	16	150 mm (5.9")	

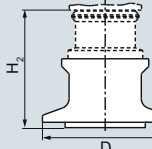
Sanitary process connection according to DRD

	Order code	DN	PN	ØD	H ₂
	Q15	65	40	105 mm (4.1")	Approx. 52 mm (2")

Sanitary process connection according to NEUMO BioConnect flange connection

	Order code	DN	PN	ØD	H ₂
	P14	50	16	110 mm (4.3")	Approx. 52 mm (2")
	P15	65	16	140 mm (5.5")	
	P16	80	16	150 mm (5.9")	
	P17	100	16	175 mm (6.9")	
	P23	2"	16	100 mm (3.9")	
	P24	2½"	16	110 mm (4.3")	
	P25	3"	16	140 mm (5.5")	
	P26	4"	16	175 mm (6.9")	

Sanitary process connection according to NEUMO BioConnect clamp connection

	Order code	DN	PN	ØD	H ₂
	P34	50	16	77.4 mm (3.0")	Approx. 52 mm (2")
	P35	65	10	90.9 mm (3.6")	
	P36	80	10	106 mm (4.2")	
	P37	100	10	119 mm (4.7")	
	P43	2½"	16	77.4 mm (3.0")	
	P44	3"	10	90.9 mm (3.6")	
	P45	4"	10	119 mm (4.7")	

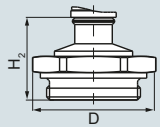
Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P320/P420

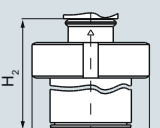
for gauge and absolute pressure, flush-mounted diaphragm

1

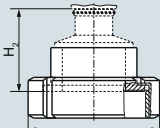
Threaded connection G $\frac{3}{4}$ ", G1" and G2" acc. to DIN 3852

	Order code	DN	PN	ØD	H ₂
	R11	$\frac{3}{4}$ "	63	37 mm (1.5")	Approx. 45 mm (1.8")
	R12	1"	63	48 mm (1.9")	Approx. 47 mm (1.9")
	R14	2"	63	78 mm (3.1")	Approx. 52 mm (2")

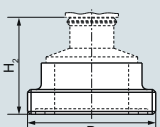
Tank connection TG 52/50 and TG52/150

	Order code	DN	PN	ØD	H ₂
	Q00	25	40	63 mm (2.5")	Approx. 63 mm (2.5")
	Q01	25	40	63 mm (2.5")	Approx. 170 mm (6.7")

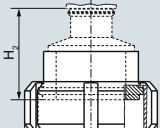
SMS socket with union nut

	Order code	DN	PN	ØD	H ₂
	Q22	2"	25	84 mm (3.3")	Approx. 52 mm (2.1")
	Q23	2½"	25	100 mm (3.9")	
	Q24	3"	25	114 mm (4.5")	

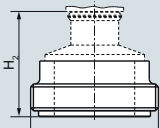
SMS threaded socket

	Order code	DN	PN	ØD	H ₂
	Q28	2"	25	70 x 1/6 mm	Approx. 52 mm (2.1")
	Q29	2½"	25	85 x 1/6 mm	
	Q30	3"	25	98 x 1/6 mm	

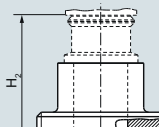
IDF socket with union nut

	Order code	DN	PN	ØD	H ₂
	Q28	2"	25	77 mm (3")	Approx. 52 mm (2.1")
	Q29	2½"	25	91 mm (3.6")	
	Q30	3"	25	106 mm (4.2")	

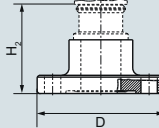
IDF threaded socket

	Order code	DN	PN	ØD	H ₂
	Q48	2"	25	64 mm (2.5")	Approx. 52 mm (2.1")
	Q49	2½"	25	77.5 mm (3.1")	
	Q50	3"	25	91 mm (3.6")	

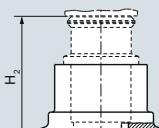
Aseptic threaded socket according to DIN 11864-1 Form A

	Order code	DN	PN	ØD	H ₂
	N33	50	25	78 x 1/6"	Approx. 52 mm (2.1")
	N34	65	25	95 x 1/6"	
	N35	80	25	110 x 1/4"	
	N36	100	25	130 x 1/4"	

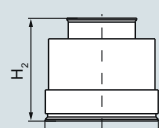
Aseptic flange with notch to DIN 11864-2 Form A

	Order code	DN	PN	ØD	H ₂
	N43	50	16	94 (3.7")	Approx. 52 mm (2.1")
	N44	65	16	113 (4.4")	
	N45	80	16	133 (5.2")	
	N46	100	16	159 (6.3")	

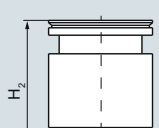
Aseptic clamp with groove according to DIN 11864-3 Form A

	Order code	DN	PN	ØD	H ₂
	N53	50	25	77.5 (3.1")	Approx. 52 mm (2.1")
	N54	65	25	91 (3.6")	
	N55	80	16	106 (4.2")	
	N56	100	16	130 (5.1")	

Process connection PMC Style Standard

	Order code	DN	PN	ØD	H ₂
	R00	-	-	40.9 mm (1.6")	Approx. 36.8 mm (1.4")

Process connection PMC Style Minibolt

	Order code	DN	PN	ØD	H ₂
	R01	-	-	26.3 mm (1.0")	Approx. 33.1 mm (1.3")

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for absolute pressure (pressure series)

Technical specifications

SITRANS P320 / SITRANS P420 for absolute pressure (pressure series)

Input

Measured variable	Absolute pressure		
Span (infinitely adjustable) or measuring range, max. permissible operating pressure (in accordance with Pressure Equipment Directive 2014/68/EU) and max. test pressure (pursuant to DIN 16086)	Span	Max. permissible operating pressure MAWP (PS)	Maximum permissible test pressure
	8.3 ... 250 mbar a	4 bar a	6 bar a
	0.83 ... 25 kPa a	0.4 MPa a	0.6 MPa a
	3.3 ... 100.5 inH ₂ O a	58 psi a	87 psi a
	43 ... 1300 mbar a	6.6 bar a	10 bar a
	4.3 ... 130 kPa a	0.66 MPa a	1 MPa a
	17.3 ... 522 inH ₂ O a	95 psi a	145 psi a
	166 ... 5000 mbar a	20 bar a	30 bar a
	16.6 ... 500 kPa a	2 MPa a	3 MPa a
	2.41 ... 72.5 psi a	290 psi a	435 psi a
	1 ... 30 bar a	65 bar a	100 bar a
	0.1 ... 3 MPa a	6.5 MPa a	10 MPa a
	14.5 ... 435 psi a	942 psi a	1450 psi a
	5.3 ... 160 bar a	240 bar	380 bar a
	0.53 ... 16 MPa a	24 MPa	38 MPa a
	77 ... 2321 psi a	3480 psi	5511 psi a
	13.3 ... 400 bar a	400 bar a	600 bar a
	1.3 ... 40 MPa a	40 MPa a	60 MPa a
	192 ... 5802 psi a	5802 psi a	8702 psi a
	23.3 ... 700 bar a	800 bar a	800 bar a
	2.3 ... 70 MPa a	80 MPa a	80 MPa a
	337 ... 10153 psi a	11603 psi a	11603 psi a
Measuring limits	0 mbar a/kPa a/psi a		
• Low measuring limit	For process temperature $-20^{\circ}\text{C} < \vartheta \leq +60^{\circ}\text{C}$ ($-4^{\circ}\text{F} < \vartheta \leq +140^{\circ}\text{F}$)		
- Measuring cell with silicone oil filling	For process temperature $60^{\circ}\text{C} < \vartheta \leq +100^{\circ}\text{C}$ (max. 85°C for measuring cell 30 bar) ($140^{\circ}\text{F} < \vartheta \leq +212^{\circ}\text{F}$ (max. 185°F for measuring cell 435 psi))		
- Measuring cell with inert oil	30 mbar a/3 kPa a/0.44 psi a		
	30 mbar a + 20 mbar a · ($\vartheta - 60^{\circ}\text{C}$)/ $^{\circ}\text{C}$		
	3 kPa a + 2 kPa a · ($\vartheta - 60^{\circ}\text{C}$)/ $^{\circ}\text{C}$		
	0.44 psi a + 0.29 psi a · ($\vartheta - 140^{\circ}\text{F}$)/ $^{\circ}\text{F}$		
• Upper measuring limit	100% of the max. measuring span (for oxygen measurement max. 100 bar/10 MPa/ 1450 psi and 60°C (140°F) ambient temperature/process temperature)		
• Start of scale	Between the measuring limits (infinitely adjustable)		
Output	HART		
Output signal	4 ... 20 mA		
• Low saturation limit (infinitely adjustable)	3.55 mA, factory preset to 3.8 mA		
• High saturation limit (infinitely adjustable)	22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA		
• Ripple (without HART communication)	$I_{pp} \leq 0.5\%$ of max. output current		
Adjustable damping	0 ... 100 s, continuously adjustable over remote operation		
	0 ... 100 s, in increments of 0.1 s, adjustable over display		
• Current transmitter	3.55 ... 22.8 mA		
• Failure signal	3.55 ... 22.8 mA		
Load	Resistor R [Ω]		
• Without HART communication	$R = (U_H - 10.5 \text{ V})/22.8 \text{ mA}$, U_H : Power supply in V		
• With HART communication	$R = 230 \dots 1100 \Omega$ (HART communicator (handheld)) $R = 230 \dots 500 \Omega$ (SIMATIC PDM)		
Characteristic curve	<ul style="list-style-type: none"> Linearly increasing or linearly decreasing Linear increase or decrease or according to the square root (only for differential pressure and flow) 		
Physical bus	-		
Polarity-independent	-		

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for absolute pressure (pressure series)

1

SITRANS P320 / SITRANS P420 for absolute pressure (pressure series)**Measuring accuracy**

Reference conditions

- According to EN 60770-1
- Rising characteristic curve
- Start of scale value 0 bar/kPa/psi
- Seal diaphragm stainless steel
- Measuring cell with silicone oil filling
- Room temperature 25 °C (77 °F)

Conformity error at limit point setting, including hysteresis and repeatability

Measuring span ratio r (spread, Turn-Down)

- Linear characteristic (all measuring cells)

- $r \leq 10$
- $10 < r \leq 30$

 r = maximum measuring span/set measuring span or nominal measuring range

- $\leq 0.1\%$
- $\leq 0.2\%$

Influence of ambient temperature
(in % per 28 °C (50 °F))

- 250 mbar a/25 kPa a/3.6 psi a
- 1300 mbar a/130 kPa a/18.8 psi a
- 5 bar a/500 kPa a/72.5 psi a
- 30 bar a/3000 kPa a/435 psi a
- 100 bar a/10 MPa a/1450 psi a
- 160 bar a/16 MPa a/2321 psi a
- 400 bar a/40 MPa a/5802 psi a
- 700 bar a/70 MPa a/10153 psi a

- $\leq (0.15 \cdot r + 0.1)\%$
- $\leq (0.08 \cdot r + 0.16)\%$

Long-term stability at ± 30 °C (± 54 °F)In 5 years $\leq (0.25 \cdot r)\%$ Step response time T_{63} (without electrical damping)

Approx. 0.2 s

Effect of mounting position (in pressure per change of angle)

 ≤ 0.05 mbar/0.005 kPa/0.000725 psi per 10° incline
(zero point correction is possible with position error compensation)

Effect of auxiliary power (in % per voltage change)

0.005% per 1 V

Rated conditions

Temperature of medium

- Measuring cell with silicone oil filling
- Measuring cell with inert oil

-40 ... +100 °C (-40 ... +212 °F)

- 1 bar/100 kPa/3.6 psi
- 4 bar/400 kPa/58 psi
- 16 bar/1.6 MPa/232 psi
- 63 bar/6.3 MPa/914 psi
- 160 bar/16 MPa/2321 psi
- 400 bar/40 MPa/5802 psi
- 700 bar/70 MPa/10153 psi

-40 ... +85 °C (-40 ... +185 °F)

-20 ... +100 °C (-4 ... +212 °F)

- Measuring cell with FDA-compliant oil

-10 ... +100 °C (14 ... +212 °F)

Ambient conditions

- Ambient temperature/enclosure

Observe the temperature class in areas subject to explosion hazard.

- Measuring cell with silicone oil filling
- Measuring cell with inert oil for gauge pressure measuring cells:
- 1 bar/100 kPa/3.6 psi
- 4 bar/400 kPa/58 psi
- 16 bar/1.6 MPa/232 psi
- 63 bar/6.3 MPa/914 psi

-40 ... +85 °C (-40 ... +185 °F)

-40 ... +85 °C (-40 ... +185 °F)

- Measuring cell with inert oil
- Measuring cell with FDA-compliant oil
- Display

-20 ... +85 °C (-4 ... +185 °F)

-10 ... +85 °C (14 ... +185 °F)

-20 ... +80 °C (-4 ... +176 °F)

- Storage temperature

-50 ... +85 °C (-58 ... +185 °F) (with FDA-compliant oil: -20 ... +85 °C (-4 ... +185 °F))

- Climatic class in accordance with IEC 60721-3-4

4K4H

- Degree of protection

- According to IEC 60529
- According to NEMA 250

IP66, IP68
Type 4X

- Electromagnetic compatibility

- Emitted interference and interference immunity

According to IEC 61326 and NAMUR NE 21

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for absolute pressure (pressure series)

SITRANS P320 / SITRANS P420 for absolute pressure (pressure series)

Design

Weight	Approx. 2.3 kg (5.07 lb) with aluminum enclosure Approx. 4.2 kg (9.25 lb) for stainless steel enclosure
Material	
• Wetted parts materials	
- Process connection	Stainless steel, material no. 1.4404/316L or Alloy C22, material no. 2.4602
- Oval flange	Stainless steel, mat. no. 1.4404/316L
- Seal diaphragm	Stainless steel, material no. 1.4404/316L or Alloy C276, material no. 2.4819
• Non-wetted parts materials	
- Electronics housing	<ul style="list-style-type: none"> • Low-copper die-cast aluminum GD-AISI 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M • Standard: Powder coating with polyurethane Option: 2 coats: Coat 1: epoxy-based; coat 2: Polyurethane • Stainless steel type plate (1.4404/316L)
- Mounting bracket	Electrogalvanized steel or stainless steel
Process connection	<ul style="list-style-type: none"> • Connection shank G1/2A according to DIN EN 837-1 • Female thread 1/2-14 NPT • Male thread M20 x 1.5 and 1/2-14 NPT • Oval flange (PN 160 (MWP 2320 psi g)) with fastening screw thread: • Oval flange (PN 420 (MWP 2320 psi g)) with fastening screw thread: <ul style="list-style-type: none"> - 7/16-20 UNF according to EN 61518 - M10 according to DIN 19213 • Oval flange (PN 420 (MWP 2320 psi g)) with fastening screw thread: <ul style="list-style-type: none"> - 7/16-20 UNF according to EN 61518 - M12 according to DIN 19213 • Male thread M20 x 1.5 and 1/2-14 NPT
Electrical connection	Cable entry via the following screwed glands: <ul style="list-style-type: none"> • M20 x 1.5 • 1/2-14 NPT • Han 7D/Han 8D device plug¹⁾ • M12 device plug

Displays and controls

Keys	4 keys for operation directly on the device
Display	<ul style="list-style-type: none"> • With or without integrated display (optional) • Cover with inspection window (optional)

Auxiliary power U_H

Terminal voltage on pressure transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically safe mode
Ripple	$U_{SS} \leq 0.2 \text{ V}$ (47 ... 125 Hz)
Noise	$U_{eff} \leq 1.2 \text{ mV}$ (0.5 ... 10 kHz)
Auxiliary power	–
Separate supply voltage	–

Certificates and approvals

Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)
Drinking water	
• WRAS (England)	Available soon
• ACS (France)	Available soon
• DVGW (Germany)	Available soon
• NSF (USA)	Available soon
CRN (Canada)	Available soon
Explosion protection acc. to NEPSI (China)	Available soon
Explosion protection acc. to INMETRO (Brazil)	Available soon
BAM (Germany), oxygen expenditures	Available soon

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for absolute pressure (pressure series)

1

SITRANS P320 / SITRANS P420 for absolute pressure (pressure series)**Explosion protection**

• Intrinsic safety "i"

- Marking
- Permissible ambient temperature
- Permissible temperature of measuring medium
- Connection

II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb
 -40 ... +80 °C (-40 ... +176 °F) temperature class T4
 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
 -40 ... +100 °C (-40 ... +212 °F) temperature class T4
 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
 To certified intrinsically safe circuits with peak values:
 $U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$
 $U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$
 $L_i = 0.24 \text{ } \mu\text{H/C}_i = 3.29 \text{ nF}$

• Flameproof enclosure "d"

- Marking
- Permissible ambient temperature
- Permissible temperature of measuring medium
- Connection

Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb
 -40 ... +80 °C (-40 ... +176 °F) temperature class T4
 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
 -40 ... +100 °C (-40 ... +212 °F) temperature class T4
 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
 To a circuit with the operating values:
 $U_n = 10.5 \text{ to } 45 \text{ V}$, $4 \text{ ... } 20 \text{ mA}$

• Dust explosion protection for Zone 20, 21, 22

- Marking
- Permissible ambient temperature
- Permissible temperature of measuring medium
- Max. surface temperature
- Connection

Ex II 1D Ex tb IIIC T120 °C Da
 Ex II 2D Ex tb IIIC T120 °C Db
 Ex II 3D Ex tc IIIC T120 °C Dc
 -40 ... +80 °C (-40 ... +176 °F)
 -40 ... +100 °C (-40 ... +212 °F)
 120 °C (248 °F)
 To a circuit with the operating values:
 $U_n = 10.5 \text{ to } 45 \text{ V}$, $4 \text{ ... } 20 \text{ mA}$

• Dust explosion protection for Zone 20, 21, 22

- Marking
- Permissible ambient temperature
- Permissible temperature of measuring medium
- Connection

Ex II 1D Ex ia IIIC T120 °C Da
 Ex II 2D Ex ib IIIC T120 °C Db
 Ex II 3D Ex ic IIIC T120 °C Dc
 -40 ... +80 °C (-40 ... +176 °F)
 -40 ... +100 °C (-40 ... +212 °F)
 To certified intrinsically safe circuits with the peak values:
 $U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$
 $U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$
 $L_i = 0.24 \text{ } \mu\text{H/C}_i = 3.29 \text{ nF}$

• Effective internal inductance/capacitance

• Type of protection for Zone 2

- Marking
- Permissible ambient temperature "ec"
- Permissible ambient temperature "ic"
- Permissible temperature of measuring medium
- "ec" connection
- "ic" connection

Ex II 3G Ex ec IIC T4/T6 Gc
 Ex II 3G Ex ic IIC T4/T6 Gc
 -40 ... +80 °C (-40 ... +176 °F) temperature class T4
 -40 ... +40 °C (-40 ... +104 °F) temperature class T6
 -40 ... +80 °C (-40 ... +176 °F) temperature class T4
 -40 ... +80 °C (-40 ... +176 °F) temperature class T6
 -40 ... +100 °C (-40 ... +212 °F) temperature class T4
 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
 To a circuit with the operating values:
 $U_n = 10.5 \text{ to } 30 \text{ V}$, $4 \text{ ... } 20 \text{ mA}$
 To certified intrinsically safe circuits with the peak values:
 $U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$
 $U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$
 Effective internal inductance/capacitance:
 $L_i = 0.24 \text{ } \mu\text{H/C}_i = 3.29 \text{ nF}$

• Explosion protection acc. to FM

- Marking (XP/DIP) or IS; NI; S

Available soon
 CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III

• Explosion protection according to CSA

- Marking (XP/DIP) or (IS)

Available soon
 CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III

1) Han 8D is identical to Han 8U.

HART communication

HART	230 ... 1100 Ω
Protocol	HART 7
Software for computer	SIMATIC PDM

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P320/P420

for absolute pressure (pressure series)

Selection and ordering data

Article No.

Pressure transmitters for absolute pressure (pressure series)

SITRANS P320

7MF032 - - - - -

SITRANS P420

7MF042 - - - - -

➤ Click on the Article no. for the online configuration in the PIA Life Cycle Portal.

Communication

HART, 4 ... 20 mA

Measuring cell filling

Silicone oil

Inert liquid

Neobee oil

Maximum measuring span

250 mbar a (100.5 inH₂O a)

1 300 mbar a (522 inH₂O a)

5000 mbar a (72.5 psi a)

30 bar a (435 psi a)

160 bar a (2 321 psi a)

400 bar a (5 802 psi a)

700 bar a (10 153 psi a)

Process connection

Male thread M20 x 1.5

Male thread G½ (DIN EN 837-1)

Female thread ½-14 NPT

Male thread ½-14 NPT

Oval flange, mounting thread: 7/16-20 UNF (IEC 61518)

Oval flange, mounting thread: M10 (DIN 19213)

Oval flange, mounting thread: M12 (DIN 19213)

Version for diaphragm seal pressure

Wetted parts materials: Process connection, seal diaphragm

Stainless steel 316L/1.4404, stainless steel 316L/1.4404

Stainless steel 316L/1.4404, alloy C276/2.4819

Alloy C22/2.4602, alloy C276/2.4819

Non-wetted parts materials

Die-cast aluminum

Stainless steel precision casting CF3M/1.4409 similar to 316L

Enclosure

Dual chamber device

Type of protection

Without Ex

Intrinsic safety

Flameproof enclosure

Flameproof enclosure, intrinsic safety

Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2

Dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2

Combination of options B, C and L (zone model)

Combination of options B, C and M (zone model, Class Division)

Electrical connections/cable entries

Thread for cable gland

- 2 x M20 x 1.5
- 2 x ½-14 NPT

Local operation/display

Without display (cover closed)

With display (cover closed)

With display (cover with glass pane)

0

1

3

4

F

L

P

R

V

W

X

B

D

E

F

G

H

J

U

0

1

2

1

2

5

A

B

C

D

L

M

S

T

F

M

0

1

2

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for absolute pressure (pressure series)

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Selection and ordering data

Options	Order code	Options	Order code
Add "-Z" to article no. and specify order code.		Device options	
Cable glands included		PDF file with device settings	D10
Plastic	A00	Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and cover	D20
Metal	A01	FVMQ enclosure sealing	D21
Stainless steel	A02	IP66/IP68 degree of protection (not for M12 and Han device plugs)	D30
Stainless steel 316L/1.4404	A03	TAG label empty	D40
CMP, for XP devices	A10	Without labeling of the measuring range on the TAG label	D41
CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A11	Stainless steel Ex plate 1.4404/316L	D42
CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A12	Increase of pressure stage from PN 420 to PN 500	D50
Han device plug mounted left		Overvoltage protection up to 6 kV (external)	D71
Han 7D device plug (plastic, straight)	A30	Adhesive labels on transport packaging (supplied by customer)	D90
Han 7D device plug (plastic, angled)	A31		
Han 7D device plug (metal, straight)	A32	General approval without Ex approval	
Han 7D device plug (metal, angled)	A33	Worldwide (CE, RCM) except EAC, FM, CSA, KCC	E00
Han 8D device plug (plastic, straight)	A34	Worldwide (CE, RCM, EAC, FM, CSA, KCC)	E01
Han 8D device plug (plastic, angled)	A35	CSA	E06
Han 8D device plug (metal, straight)	A36	EAC	E07
Han 8D device plug (metal, angled)	A37	FM	E08
Cable socket included		KCC	E09
Plastic, for Han 7D/8D device plugs	A40	UL	E10
Metal, for Han 7D/8D device plugs	A41	Explosion protection approvals	
M12 device plug mounted left		ATEX (Europe)	E20
Stainless steel, without cable socket	A62	CSA (USA and Canada)	E21
Stainless steel, with cable socket	A63	FM (USA and Canada)	E22
Cable entry/connector mounting		IECEx (Worldwide)	E23
2x sealing plugs M20 x 1.5, IP66/68 installed on both sides	A90	EACEx (GOST-R, -K, -B)	E24
2x sealing plugs ½-14 NPT, IP66/68 installed on both sides	A91	INMETRO (Brazil)	E25
Cable gland/connector mounted left	A97	KCs (Korea)	E26
Cable gland/connector mounted on right	A99	NEPSI (China)	E27
Nameplate labeling		PESO (India)	E28
German (bar)	B11	TIIS Hazardous (Japan)	E29
French (bar)	B12	UKR Sepro (Ukraine)	E30
Spanish (bar)	B13	ATEX (Europe) and IECEx (Worldwide)	E47
Italian (bar)	B14	CSA (Canada) and FM (USA)	E48
Chinese (bar)	B15	ATEX (Europe) and IECEx (Worldwide) + CSA (Canada) and FM (USA)	E49
Russian (bar)	B16	Marine approvals	
English (psi)	B20	DNV-GL (Det Norske Veritas/Germanischer Lloyd)	E50
Chinese (Pa)	B35	LR (Lloyds Register)	E51
Certificates		BV (Bureau Veritas)	E52
Quality test certificate, 5-point factory calibration (IEC 60770-2)	C11	ABS (American Bureau of Shipping)	E53
Acceptance certificate (EN 10204-3.1) - Material of pressurized and wetted parts	C12	KR (Korean Register of Shipping)	E56
Test report - NACE (MR 0103-2012 and MR 0175-2009)	C13	RINA (Registro Italiano Navale)	E57
Test report (EN 10204-2.2) - Wetted parts	C14	CCS (China Classification Society)	E58
Acceptance certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts	C15	Country-specific approvals	
Certificates for functional safety		CRN approval Canada (Canadian Registration Number)	E60
Functional safety (IEC 61508) - SIL2/3	C20		

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P320/P420

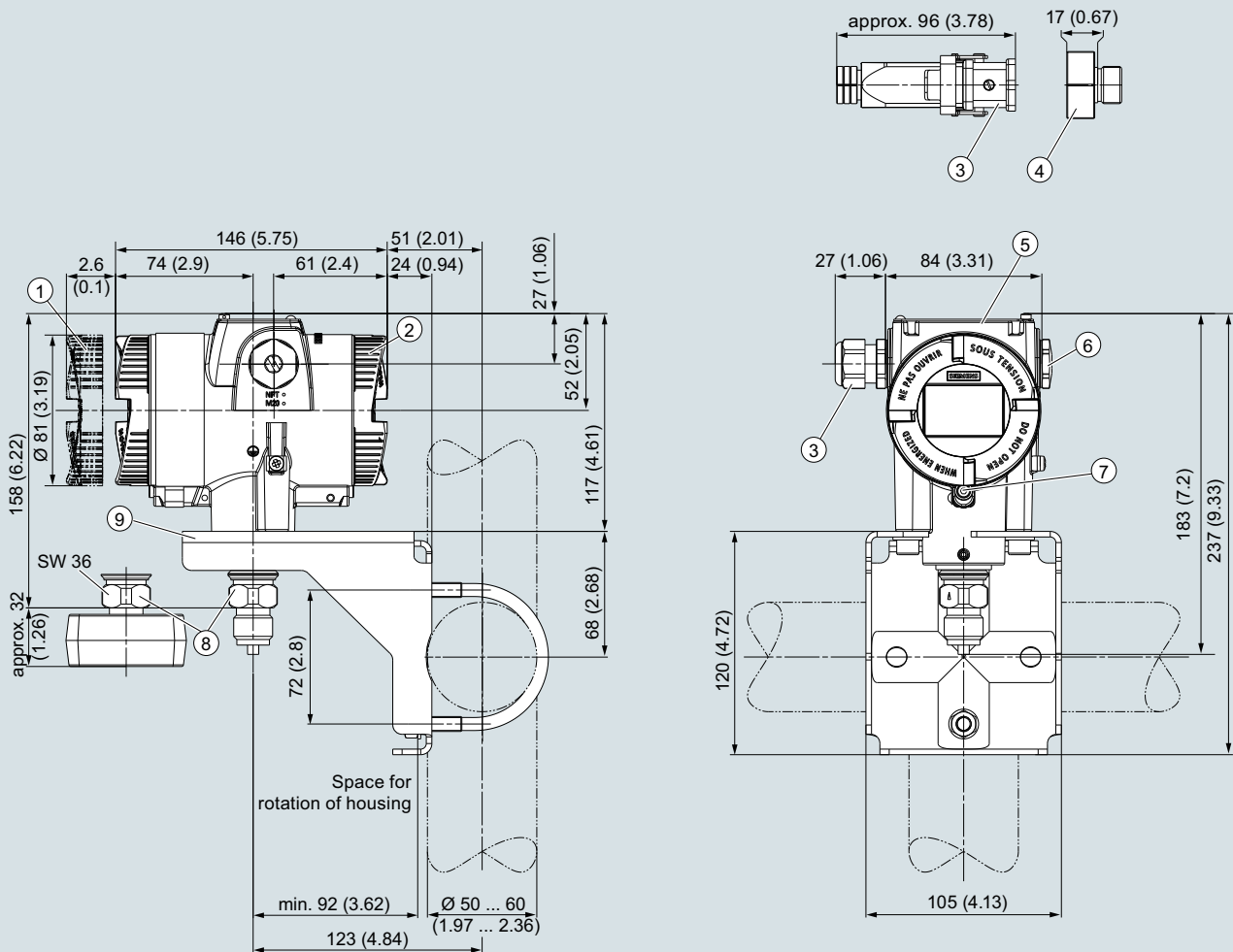
for absolute pressure (pressure series)

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Options	Order code
Special approvals	
Oxygen application (with inert liquid, max. 100 bar (1 450 psi) at 60° C (140 °F))	E80
Dual seal	E81
WRC / WRAS (drinking water); only with pressure cap O-rings made of EPDM	E83
NSF61 (drinking water)	E84
ACS (drinking water)	E85
Mounting bracket	
Steel, galvanized	H01
Stainless steel 1.4301/304	H02
Stainless steel 1.4404/316L	H03
Flange connections with flange EN 1092-1	
With flange adapter G½ Form B1	
• DN 25 PN 40, stainless steel 1.4571/316Ti	J80
• DN 50 PN 40, stainless steel 1.4571/316Ti	J81
• DN 80 PN 40, stainless steel 1.4571/316Ti	J82
With siphon G½ Form B1	
• DN 25 PN 40, stainless steel 1.4571/316Ti	J83
• DN 50 PN 40, stainless steel 1.4571/316Ti	J84
• DN 80 PN 40, stainless steel 1.4571/316Ti	J85
• DN 25 PN 100, stainless steel 1.4571/316Ti	J86
Process flanges, gaskets (instead of standard gaskets FKM (FPM))	
Seal (EN 837-1) material Fe (soft iron)	K60
Seal (EN 837-1) material 1.4571	K61
Seal (EN 837-1) material Cu	K62
Process connection	
Process connection male thread G½, bore hole 11 mm	K80
Shut-off valves, pneumatic blocks	
With mounted pneumatic block 7MF9011-4EA, process connection at transmitter G½ shank, PTFE sealing ring and pressure test certified in test report (EN 10204-2.2)	T02
With mounted pneumatic block 7MF9011-4FA, process connection at transmitter female thread ½-14 NPT, sealing tape. With PTFE sealing ring and pressure test certified in test report (EN 10204-2.2)	T03
With mounted pneumatic block 7MF9411-5AA, process connection at transmitter oval flange with PTFE gasket, steel mounting screws, pressure test certified in test report (EN 10204-2.2)	T05
With mounted pneumatic block 7MF9411-5AA, process connection at transmitter oval flange with PTFE gasket, stainless steel mounting screws, pressure test certified in test report (EN 10204-2.2)	T06

Selection and ordering data

Customer-specific device settings	Order code
Add "-Z" to article no., specify order code and plain text or drop-down list selection.	
Measuring span Start of scale value (max. 5 characters), full scale value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi	Y01
Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Drop-down list: Pa, MPa, kPa, hPa, bar, mbar, psi, g/cm², kg/cm², kgf/cm², inH₂O, inH₂O (4°C), ftH₂O, mmH₂O, mmH₂O (4°C), mH₂O (4°C), mmHg, inHg, atm, torr	
TAG (on stainless steel plate and device parameters, max. 32 characters)	Y15
Input field: Free text, max. 32 characters	
Measuring point description (on stainless steel plate and device parameters, max. 32 characters)	Y16
Input field: Free text, max. 32 characters	
TAG short (device parameters, max. 8 characters)	Y17
Input field: Free text, max. 8 characters	
Local display [Pressure, Percent], reference [None, Absolute, Relative], example: Pressure gauge	Y21
Drop-down list: Percent, pressure unit, pressure unit abs., pressure unit gauge	
Local display Scaling with standard units [m³/s, l/s, m, inch, ...], example 1 ... 5 m	Y22
Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Drop-down list: m, cm, mm, in, ft, m³, l, hl, in³, yd³, gal, gal (UK), bu, bbl, bbl (US), SCF, Nm³, NI.	
Local display Scaling with user-specific units (max. 12 characters), example 1 ... 5 m	Y23
Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Input field 3: Free text, max. 8 characters	
Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA	Y30
Drop-down list 1: 3.9, 4 Drop-down list 2: 20.8, 22	
Fault current instead of 3.6 mA [22.5 mA, 22.8 mA]	Y31
Drop-down list: 3.75; 21.75; 22.5; 22.6	
Damping in seconds instead of 2 s (0.0 ... 100.0 s)	Y32
Input field: max. 4 characters and numbers only; decimal places as dot (comma is automatically converted to dot); min. value = 0; max. value = 100.	
ID number of special version	Y99
Input field: max. 4 characters and only natural numbers from 0 ... 9999	

Dimensional drawings

① Electronic side, display
(longer overall length for cover with window)¹⁾

② Terminal side

③ Electrical connection:
screw gland M20 x 1,5³⁾ or screw gland ½-14 NPT or
Han 7D/Han 8D^{2) 3)} device plug or M12 device plug^{2) 3)}

④ Harting adapter

⑤ Cover over buttons and nameplate
with general information

⑥ Blanking plug

⑦ Screw cover - safety bracket
(only for type of protection "Explosion-proof enclosure")

⑧ Process connection: connection shank G½B or oval flange

⑨ Mounting bracket (option)

¹⁾ In addition, allow approx. 22 mm (0.87 inch) for the thread length when removing the covers

²⁾ Not with type of protection "Explosion-proof enclosure"

³⁾ Not with type of protection "FM + CSA" [is + XP]"

SITRANS P320/P420 pressure transmitter for absolute pressure (pressure series), dimensions in mm (inch)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for absolute pressure (differential pressure series)

Technical specifications

SITRANS P320 / SITRANS P420 for absolute pressure (differential pressure series)

Input

Measured variable	Absolute pressure		
Span (infinitely adjustable) and maximum operating pressure (pursuant to Pressure Equipment Directive 2014/68/EU)	Span	Max. permissible operating pressure MAWP (PS)	Maximum permissible test pressure
	8.3 ... 250 mbar a	32 bar a	48 bar a
	0.83 ... 25 kPa a	3.2 MPa a	4.8 MPa a
	3.3 ... 100.5 inH ₂ O a	464 psi a	696 psi a
	43 ... 1300 mbar a	32 bar a	48 bar a
	4.3 ... 130 kPa a	3.2 MPa a	4.8 MPa a
	17.3 ... 522 inH ₂ O a	464 psi a	696 psi a
	166 ... 5000 mbar a	32 bar a	240 bar a
	16.6 ... 500 kPa a	3.2 MPa a	24 MPa a
	2.41 ... 72.5 psi a	464 psi a	3480 psi a
	1 ... 30 bar a	160 bar a	240 bar a
	0.1 ... 3 MPa a	16 MPa a	24 MPa a
	14.5 ... 435 psi a	2320 psi a	3480 psi a
	5 ... 100 bar a	160 bar a	240 bar a
	0.5 ... 10 MPa a	16 MPa a	24 MPa a
	76.9 ... 1450 psi a	2320 psi a	3480 psi a
Measuring limits			
• Low measuring limit			
- Measuring cell with silicone oil filling	0 mbar a/kPa a/psi a		
- Measuring cell with inert liquid	For process temperature $-20^{\circ}\text{C} < \vartheta \leq +60^{\circ}\text{C}$ ($-4^{\circ}\text{F} < \vartheta \leq +140^{\circ}\text{F}$)		
	For process temperature $60^{\circ}\text{C} < \vartheta \leq +100^{\circ}\text{C}$ (max. 85°C for measuring cell 30 bar) ($140^{\circ}\text{F} < \vartheta \leq +212^{\circ}\text{F}$ (max. 185°F for measuring cell 435 psi))		
	100% of the max. measuring span (for oxygen measurement max. 100 bar/10 MPa/ 1450 psi and 60°C (140°F) ambient temperature/process temperature)		
• Upper measuring limit	Between the measuring limits (infinitely adjustable)		
• Start of scale			

Output

Output signal	HART		
• Low saturation limit (infinitely adjustable)	4 ... 20 mA		
• High saturation limit (infinitely adjustable)	3.55 mA, factory preset to 3.8 mA		
• Ripple (without HART communication)	22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA		
Adjustable damping	$I_{pp} \leq 0.5\%$ of max. output current		
	0 ... 100 s, continuously adjustable over remote operation		
	0 ... 100 s, in increments of 0.1 s, adjustable over display		
• Current transmitter	3.55 ... 22.8 mA		
• Failure signal	3.55 ... 22.8 mA		
Load	Resistor R [Ω]		
• Without HART communication	$R = (U_H - 10.5 \text{ V})/22.8 \text{ mA}$, U_H : Power supply in V		
• With HART communication	$R = 230 \dots 1100 \Omega$ (HART communicator (handheld)) $R = 230 \dots 500 \Omega$ (SIMATIC PDM)		
Characteristic curve	<ul style="list-style-type: none"> • Linearly increasing or linearly decreasing • Linear increase or decrease or according to the square root (only for differential pressure and flow) 		
Physical bus	-		
Polarity-independent	-		

Measuring accuracy

Reference conditions	<ul style="list-style-type: none"> • According to EN 60770-1 • Rising characteristic curve • Start of scale value 0 bar/kPa/psi • Seal diaphragm stainless steel • Measuring cell with silicone oil filling • Room temperature 25°C (77°F)
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Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for absolute pressure (differential pressure series)

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SITRANS P320 / SITRANS P420 for absolute pressure (differential pressure series)

Conformity error at limit point setting, including hysteresis and repeatability

Measuring span ratio r (spread, Turn-Down)

- Linear characteristic (all measuring cells)

- $r \leq 10$
- $10 < r \leq 30$

 r = maximum measuring span/set measuring span or nominal measuring range

- $\leq 0.1\%$
- $\leq 0.2\%$

Influence of ambient temperature (in % per 28 °C (50 °F))

- 250 mbar a/25 kPa a/3.6 psi a
- 1300 mbar a/130 kPa a/18.8 psi a
- 5 bar a/500 kPa a/72.5 psi a
- 30 bar a/3000 kPa a/435 psi a
- 100 bar a/10 MPa a/1450 psi a
- 160 bar a/16 MPa a/2321 psi a
- 400 bar a/40 MPa a/5802 psi a
- 700 bar a/70 MPa a/10152 psi a

- $\leq (0.15 \cdot r + 0.1)\%$
- $\leq (0.08 \cdot r + 0.16)\%$

Long-term stability at ± 30 °C (± 54 °F)In 5 years $\leq (0.25 \cdot r)\%$ Step response time T_{63} (without electrical damping)

Approx. 0.2 s

Effect of mounting position (in pressure per change of angle)

 ≤ 0.7 mbar/0.07 kPa/0.001015 psi per 10° incline (zero point correction is possible with position error compensation)

Effect of auxiliary power (in % per voltage change)

0.005% per 1 V

Rated conditions

Temperature of medium

- Measuring cell with silicone oil filling
 - Measuring cell 30 bar (435 psi), PN 420
- Measuring cell with inert oil
 - Measuring cell 30 bar (435 psi), PN 420
- Measuring cell with FDA-compliant oil
- In conjunction with dust explosion protection

- 40 ... +100 °C (-40 ... +212 °F)
- 20 ... +85 °C (-4 ... +185 °F)
- 20 ... +100 °C (-4 ... +212 °F)
- 20 ... +85 °C (-4 ... +185 °F)
- 10 ... +100 °C (14 ... +212 °F)
- 40 ... +85 °C (-4 ... +185 °F)

Ambient conditions

- Ambient temperature/enclosure
 - Measuring cell with silicone oil filling
 - Measuring cell with silicone oil filling, measuring cell 30 bar (435 psi), PN 420
 - Measuring cell with inert oil
 - Measuring cell with FDA-compliant oil
 - Display
- Storage temperature
- Climatic class in accordance with IEC 60721-3-4
- Degree of protection
 - According to IEC 60529
 - According to NEMA 250
- Electromagnetic compatibility
 - Emitted interference and interference immunity

- Observe the temperature class in areas subject to explosion hazard.
- 40 ... +85 °C (-40 ... +185 °F)
- 20 ... +85 °C (-4 ... +185 °F)
- 20 ... +85 °C (-4 ... +185 °F)
- 10 ... +85 °C (14 ... +185 °F)
- 20 ... +80 °C (-4 ... +176 °F)
- 50 ... +85 °C (-58 ... +185 °F); with FDA-compliant oil: -20 ... +85 °C (-4 ... +185 °F)
- 4K4H
- IP66, IP68
- Type 4X
- According to IEC 61326 and NAMUR NE 21

Design

Weight

- Approx. 3.9 kg (8.5 lb) with aluminum enclosure
- Approx. 5.8 kg (12.7 lb) with stainless steel enclosure

Material

- Wetted parts materials

- Seal diaphragm
- Process flanges and sealing plugs

Stainless steel, mat. no. 1.4404/316L, Alloy C276, mat. no. 2.4819, Monel, mat. no. 2.4360, tantalum or gold

Stainless steel, mat. no. 1.4408 to PN 160, mat. no. 1.4571/316Ti for PN 420, Alloy C22, 2.4602 or Monel, mat. no. 2.4360

FPM (Viton) or optionally: PTFE, FEP, FEPM and NBR

- O-ring
- Non-wetted parts materials

- Electronics housing

- Low-copper die-cast aluminum GD-AISI 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M
- Standard: Powder coating with polyurethane
- Option: 2 coats: Coat 1: epoxy-based; coat 2: Polyurethane
- Stainless steel type plate (1.4404/316L)
- Stainless steel ISO 3506-1 A4-70
- Steel, electrogalvanized steel, or stainless steel

- Pressure flange screws
- Mounting bracket

Process connection

$\frac{1}{2}$ -18 NPT female thread and flat connection with 7/16-20 UNF fastening screw thread in accordance with EN 61518 or M10 fastening screw thread in accordance with DIN 19213 (M12 for PN 420 (MWP 6092 psi))

Electrical connection

- Screw terminals
- Cable entry via the following screwed glands:
 - M20 x 1.5
 - $\frac{1}{2}$ -14 NPT
 - Han 7D/Han 8D device plug¹⁾
 - M12 device plug

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P320/P420

for absolute pressure (differential pressure series)

SITRANS P320 / SITRANS P420 for absolute pressure (differential pressure series)

Displays and controls

Keys	4 keys for operation directly on the device
Display	<ul style="list-style-type: none"> • With or without integrated display (optional) • Cover with inspection window (optional)

Auxiliary power U_H

Terminal voltage on pressure transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically safe mode
Ripple	$U_{SS} \leq 0.2 \text{ V}$ (47 ... 125 Hz)
Noise	$U_{eff} \leq 1.2 \text{ mV}$ (0.5 ... 10 kHz)
Auxiliary power	–
Separate supply voltage	–

Certificates and approvals

Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)
Drinking water	
• WRAS (England)	Available soon
• ACS (France)	Available soon
• DVGW (Germany)	Available soon
• NSF (USA)	Available soon
CRN (Canada)	Available soon
Explosion protection acc. to NEPSI (China)	Available soon
Explosion protection acc. to INMETRO (Brazil)	Available soon
BAM (Germany), oxygen expenditures	Available soon
Explosion protection	
• Intrinsic safety "i"	
- Marking	II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Permissible temperature of measuring medium	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Connection	To certified intrinsically safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$ $U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$ $L_i = 0.24 \mu\text{H}/C_i = 3.29 \text{ nF}$
- Effective internal inductance/capacitance	
• Flameproof enclosure "d"	
- Marking	Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Permissible temperature of measuring medium	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- Connection	To a circuit with the operating values: $U_n = 10.5 \text{ to } 45 \text{ V}$, $4 \text{ ... } 20 \text{ mA}$
• Dust explosion protection for Zone 20, 21, 22	
- Marking	Ex II 1D Ex tb IIIC T120 °C Da Ex II 2D Ex tb IIIC T120 °C Db Ex II 3D Ex tc IIIC T120 °C Dc
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
- Permissible temperature of measuring medium	-40 ... +100 °C (-40 ... +212 °F)
- Max. surface temperature	120 °C (248 °F)
- Connection	To a circuit with the operating values: $U_n = 10.5 \text{ to } 45 \text{ V}$, $4 \text{ ... } 20 \text{ mA}$
• Dust explosion protection for Zone 20, 21, 22	
- Marking	Ex II 1D Ex ia IIIC T120 °C Da Ex II 2D Ex ib IIIC T120 °C Db Ex II 3D Ex ic IIIC T120 °C Dc
- Permissible ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
- Permissible temperature of measuring medium	-40 ... +100 °C (-40 ... +212 °F)
- Connection	To certified intrinsically safe circuits with the peak values: $U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$ $U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$ $L_i = 0.24 \mu\text{H}/C_i = 3.29 \text{ nF}$
- Effective internal inductance/capacitance	

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• Type of protection for Zone 2	Ex II 3G Ex ec IIC T4/T6 Gc Ex II 3G Ex ic IIC T4/T6 Gc
- Marking	
- Permissible ambient temperature "ec"	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +40 °C (-40 ... +104 °F) temperature class T6
- Permissible ambient temperature "ic"	-40 ... +80 °C (-40 ... +176 °F) temperature class T4 -40 ... +80 °C (-40 ... +176 °F) temperature class T6
- Permissible temperature of measuring medium	-40 ... +100 °C (-40 ... +212 °F) temperature class T4 -40 ... +70 °C (-40 ... +158 °F) temperature class T6
- "ec" connection	To a circuit with the operating values: $U_n = 10.5$ to 30 V, 4 ... 20 mA
- "ic" connection	To certified intrinsically safe circuits with the peak values: $U_i = 30$ V, $I_i = 101$ mA, $P_i = 760$ mW $U_i = 29$ V, $I_i = 110$ mA, $P_i = 800$ mW Effective internal inductance/capacitance: $L_i = 0.24$ μH/ $C_i = 3.29$ nF Available soon
• Explosion protection acc. to FM	CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6; CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III
- Marking (XP/DIP) or IS; NI; S	Available soon
• Explosion protection according to CSA	CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6; CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III
- Marking (XP/DIP) or (IS)	

¹⁾ Han 8D is identical to Han 8U.

HART communication

HART	230 ... 1100 Ω
Protocol	HART 7
Software for computer	SIMATIC PDM

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for absolute pressure (differential pressure series)

Selection and ordering data

Article No.

Pressure transmitters for absolute pressure (differential pressure series)

SITRANS P320

7MF033 - - - - -

SITRANS P420

7MF043 - - - - -

➤ Click on the Article no. for the online configuration in the PIA Life Cycle Portal.

Communication

HART, 4 ... 20 mA

Measuring cell filling

Silicone oil

Inert liquid

Neobee oil

Maximum measuring span

250 mbar a (100.5 inH₂O a)

1 300 mbar a (522 inH₂O a)

5000 mbar a (72.5 psi a)

30 bar a (435 psi a)

100 bar a (1450 psi a)

Process connection

Oval flange, mounting thread: 7/16-20 UNF (IEC 61518)

Oval flange, mounting thread: M10 (DIN 19213)

Oval flange, mounting thread: 7/16-20 UNF (IEC 61518) with lateral ventilation

Oval flange, mounting thread: M10 (DIN 19213) with lateral ventilation

Version for diaphragm seal with mounting thread 7/16-20 UNF (IEC 61518)

Version for diaphragm seal with mounting thread M10 (DIN 19213)

Wetted parts materials: Process connection, seal diaphragm

Stainless steel 316L/1.4404, stainless steel 316L/1.4404

Stainless steel 316L/1.4404, alloy C276/2.4819

Alloy C22/2.4602, alloy C276/2.4819

Tantalum/tantalum

Monel 00/2.4360, Monel 400/2.4360

Stainless steel 316L/1.4404, gold-plated

Non-wetted parts materials

Die-cast aluminum

Stainless steel precision casting CF3M/1.4409 similar to 316L

Enclosure

Dual chamber device

Type of protection

Without Ex

Intrinsic safety

Flameproof enclosure

Flameproof enclosure, intrinsic safety

Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2

Dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2

Combination of options B, C and L (zone model)

Combination of options B, C and M (zone model, Class Division)

Electrical connections/cable entries

Thread for cable gland

• 2 x M20 x 1.5

• 2 x 1/2-14 NPT

Local operation/display

Without display (cover closed)

With display (cover closed)

With display (cover with glass pane)

0

1

3

4

G

L

P

R

U

Q

R

S

T

V

W

0

1

2

4

6

8

1

2

5

A

B

C

D

L

M

S

T

F

M

0

1

2

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

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for absolute pressure (differential pressure series)

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Selection and ordering data

Options	Order code	Options	Order code
Add "-Z" to article no. and specify order code.		Device options	
Cable glands included		PDF file with device settings	D10
Plastic	A00	Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and cover	D20
Metal	A01	FVMQ enclosure sealing	D21
Stainless steel	A02	IP66/IP68 degree of protection (not for M12 and Han device plugs)	D30
Stainless steel 316L/1.4404	A03	TAG label empty	D40
CMP, for XP devices	A10	Without labeling of the measuring range on the TAG label	D41
CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A11	Stainless steel Ex plate 1.4404/316L	D42
CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A12	Increase of pressure stage from PN 420 to PN 500	D50
Han device plug mounted left		Overvoltage protection up to 6 kV (external)	D71
Han 7D device plug (plastic, straight)	A30	Adhesive labels on transport packaging (supplied by customer)	D90
Han 7D device plug (plastic, angled)	A31		
Han 7D device plug (metal, straight)	A32	General approval without Ex approval	
Han 7D device plug (metal, angled)	A33	Worldwide (CE, RCM) except EAC, FM, CSA, KCC	E00
Han 8D device plug (plastic, straight)	A34	Worldwide (CE, RCM, EAC, FM, CSA, KCC)	E01
Han 8D device plug (plastic, angled)	A35	CSA	E06
Han 8D device plug (metal, straight)	A36	EAC	E07
Han 8D device plug (metal, angled)	A37	FM	E08
Cable socket included		KCC	E09
Plastic, for Han 7D/8D device plugs	A40	UL	E10
Metal, for Han 7D/8D device plugs	A41	Explosion protection approvals	
M12 device plug mounted left		ATEX (Europe)	E20
Stainless steel, without cable socket	A62	CSA (USA and Canada)	E21
Stainless steel, with cable socket	A63	FM (USA and Canada)	E22
Cable entry/connector mounting		IECEx (Worldwide)	E23
2x sealing plugs M20 x 1.5, IP66/68 installed on both sides	A90	EACEx (GOST-R, -K, -B)	E24
2x sealing plugs ½-14 NPT, IP66/68 installed on both sides	A91	INMETRO (Brazil)	E25
Cable gland/connector mounted left	A97	KCs (Korea)	E26
Cable gland/connector mounted on right	A99	NEPSI (China)	E27
Nameplate labeling		PESO (India)	E28
German (bar)	B11	TiIS Hazardous (Japan)	E29
French (bar)	B12	UKR Sepro (Ukraine)	E30
Spanish (bar)	B13	ATEX (Europe) and IECEx (Worldwide)	E47
Italian (bar)	B14	CSA (Canada) and FM (USA)	E48
Chinese (bar)	B15	ATEX (Europe) and IECEx (Worldwide) + CSA (Canada) and FM (USA)	E49
Russian (bar)	B16	Marine approvals	
English (psi)	B20	DNV-GL (Det Norske Veritas/Germanischer Lloyd)	E50
Chinese (Pa)	B35	LR (Lloyds Register)	E51
Certificates		BV (Bureau Veritas)	E52
Quality test certificate, 5-point factory calibration (IEC 60770-2)	C11	ABS (American Bureau of Shipping)	E53
Acceptance certificate (EN 10204-3.1) - Material of pressurized and wetted parts	C12	KR (Korean Register of Shipping)	E56
Test report - NACE (MR 0103-2012 and MR 0175-2009)	C13	RINA (Registro Italiano Navale)	E57
Test report (EN 10204-2.2) - Wetted parts	C14	CCS (China Classification Society)	E58
Acceptance certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts	C15	Country-specific approvals	
Certificates for functional safety		CRN approval Canada (Canadian Registration Number)	E60
Functional safety (IEC 61508) - SIL2/3	C20		

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

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Options	Order code	Options	Order code
Special approvals		Process flange options	
Oxygen application (with inert liquid, max. 100 bar (1 450 psi) at 60° C (140 °F))	E80	Process flanges for vertical differential pressure lines (half process flange)	K81
Dual seal	E81	Process flanges (+) - side front	K82
WRC / WRAS (drinking water); only with pressure cap O-rings made of EPDM	E83	Process flange screws, process flange nuts, material Monel 400/2.4360	K83
NSF61 (drinking water)	E84	Valve ¼-18 NPT, material same as process flanges	K84
ACS (drinking water)	E85	Valve mounted on the side, measured medium: Gas	K85
Mounting bracket		Oval flange enclosed, gasket PTFE + mounting screws	K86
Steel, galvanized	H01	Pneumatic blocks	
Stainless steel 1.4301/304	H02	With mounted pneumatic block (3-way) 7MF9411-5BA, PTFE sealing rings, chrome-plated steel screws and pressure test certified in test report (EN 10204-2.2)	U01
Stainless steel 1.4404/316L	H03	With mounted pneumatic block (3-way) 7MF9411-5BA, PTFE sealing rings, stainless steel screws and pressure test certified in test report (EN 10204-2.2)	U02
Process flanges; screw plug with vent valve		With mounted pneumatic block (5-way) 7MF9411-5CA, PTFE sealing rings, chrome-plated steel screws and pressure test certified in test report (EN 10204-2.2)	U03
Welded in on right	J08	With mounted pneumatic block (5-way) 7MF9411-5CA, PTFE sealing rings, stainless steel screws and pressure test certified in test report (EN 10204-2.2)	U04
Welded in on left	J09		
Glued in on right	J10		
Glued in on left	J11		
Flange connections with flange EN 1092-1			
Form B1			
• DN 25 PN 40, stainless steel 1.4571/316Ti	J70		
• DN 50 PN 40, stainless steel 1.4571/316Ti	J71		
• DN 80 PN 40, stainless steel 1.4571/316Ti	J72		
• DN 15 PN 40, stainless steel 1.4571/316Ti	J78		
Form C			
• DN 25 PN 40, stainless steel 1.4571/316Ti	J73		
• DN 50 PN 40, stainless steel 1.4571/316Ti	J74		
• DN 80 PN 40, stainless steel 1.4571/316Ti	J75		
Flange connection options			
Flange connection and temperature extension	J76		
Flange connection with epoxy resin coating	J77		
Process flanges; special materials			
Reserved for 7MF7: without process flanges, without screws, without gaskets	K00		
Process flange material alloy C4/2.4610	K01		
Process flange material Monel 400/2.4360	K02		
Process connection material PVDF, on the side ½-14 NPT	K05		
Process flanges/process connection material PVDF, flange on the side EN 1092-1 Form B1 DN 25 PN 40, MAWP 4 bar	K06		
Process flanges/process connection material PVDF, flange on the side EN 1092-1 Form B1 DN 40 PN 40, MAWP 4 bar	K07		
Process flanges; process connection option			
Process flange with process connection G½ welded on	K20		
Process connection (oval flange) NAM (ASTAVA)	K21		
Process flanges chambered with gaskets			
1x chambered, graphite	K40		
1x chambered, PTFE	K41		
2x chambered, PTFE	K42		
Process flanges, gaskets (instead of standard gaskets FKM (FPM))			
O-ring, process flanges, PTFE	K50		
O-ring, process flanges, FEP (with silicone core, approved for food)	K51		
O-ring, process flanges, FFKM (FFPM)	K52		
O-ring, process flanges, NBR	K53		
O-ring, process flanges, EPDM	K54		

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for absolute pressure (differential pressure series)

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Selection and ordering data

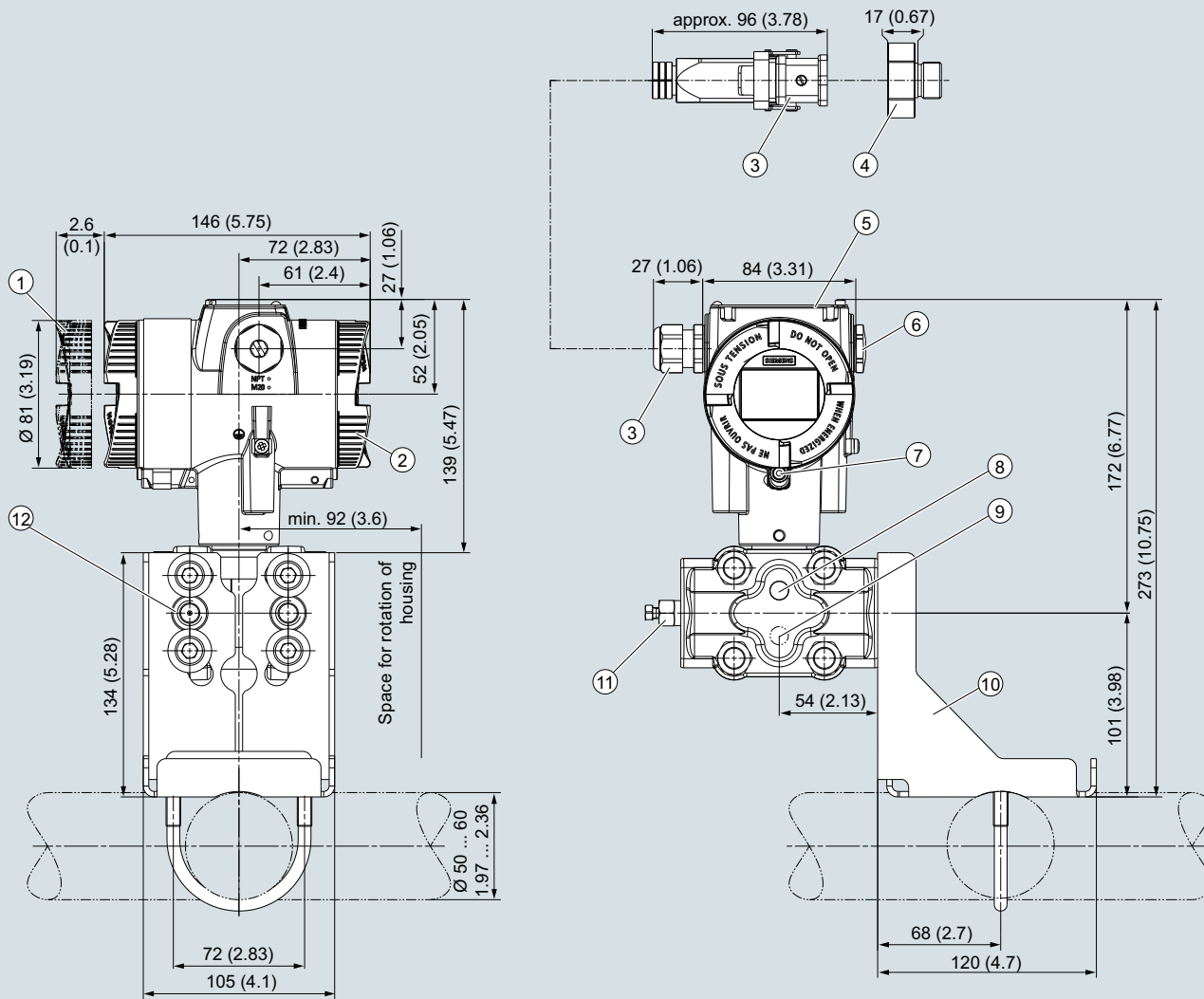
Customer-specific device settings	Order code
Add "-Z" to article no., specify order code and plain text or drop-down list selection.	
Measuring span Start of scale value (max. 5 characters), full scale value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Drop-down list: Pa, MPa, kPa, hPa, bar, mbar, psi, g/cm ² , kg/cm ² , kgf/cm ² , inH ₂ O, inH ₂ O (4°C), ftH ₂ O, mmH ₂ O, mmH ₂ O (4°C), mH ₂ O (4°C), mmHg, inHg, atm, torr	Y01
TAG (on stainless steel plate and device parameters, max. 32 characters) Input field: Free text, max. 32 characters	Y15
Measuring point description (on stainless steel plate and device parameters, max. 32 characters) Input field: Free text, max. 32 characters	Y16
TAG short (device parameters, max. 8 characters) Input field: Free text, max. 8 characters	Y17
Local display [Pressure, Percent], reference [None, Absolute, Relative], example: Pressure gauge Drop-down list: Percent, pressure unit, pressure unit abs., pressure unit gauge	Y21
Local display Scaling with standard units [m³/s, l/s, m, inch, ...], example 1 ... 5 m Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Drop-down list: m, cm, mm, in, ft, m ³ , l, hl, in ³ , ft ³ , yd ³ , gal, gal (UK), bu, bbl, bbl (US), SCF, Nm ³ , NI.	Y22
Local display Scaling with user-specific units (max. 12 characters), example 1 ... 5 m Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Input field 3: Free text, max. 8 characters	Y23
Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA Drop-down list 1: 3.9, 4 Drop-down list 2: 20.8, 22	Y30
Fault current instead of 3.6 mA [22.5 mA, 22.8 mA] Drop-down list: 3.75; 21.75; 22.5; 22.6	Y31
Damping in seconds instead of 2 s (0.0 ... 100.0 s) Input field: max. 4 characters and numbers only; decimal places as dot (comma is automatically converted to dot); min. value = 0; max. value = 100.	Y32
ID number of special version Input field: max. 4 characters and only natural numbers from 0 ... 9999	Y99

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P320/P420

for absolute pressure (differential pressure series)

Dimensional drawings



- ① Electronic side, display
(longer overall length for cover with window)¹⁾
- ② Terminal side
- ③ Electrical connection:
screw gland M20 x 1,5³⁾ or screw gland ½-14 NPT or
Han 7D/Han 8D^{2) 3)} device plug or M12 device plug^{2) 3)}
- ④ Harting adapter
- ⑤ Cover over buttons and nameplate with general information

- ⑥ Blanking plug
- ⑦ Screw cover - safety bracket
(only for type of protection "Explosion-proof enclosure")
- ⑧ Lateral venting for liquid measurement (Standard)
- ⑨ Lateral venting for gas measurement (suffix K85)
- ⑩ Mounting bracket (option)
- ⑪ Sealing screw with valve (option)
- ⑫ Process connection: ¼-18 NPT (IEC 61518)

¹⁾ In addition, allow approx. 22 mm (0.87 inch) for the thread length when removing the covers

²⁾ Not with type of protection "Explosion-proof enclosure"

³⁾ Not with type of protection "FM + CSA" [is + XP]"

SITRANS P320/P420 pressure transmitter for absolute pressure (differential pressure series), dimensions in mm (inch)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for differential pressure and flow

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Technical specifications

SITRANS P320 / SITRANS P420 for differential pressure and flow

Input

Measured variable	Differential pressure and flow			
Span (infinitely adjustable) and maximum operating pressure (pursuant to Pressure Equipment Directive 2014/68/EU)	Span	Max. permissible operating pressure MAWP (PS)	Maximum permissible test pressure	
	1 ... 20 mbar	160 bar	240 bar	
	0.1 ... 2 kPa	16 MPa	24 MPa	
	0.4019 ... 8.037 inH ₂ O	2320 psi	3480 psi	
	1 ... 60 mbar	160 bar	240 bar	
	0.1 ... 6 kPa	16 MPa	24 MPa	
	0.4019 ... 24.11 inH ₂ O	2320 psi	3480 psi	
	2.5 ... 250 mbar	160 bar	240 bar	
	0.2 ... 25 kPa	16 MPa	24 MPa	
	1.005 ... 100.5 inH ₂ O	2320 psi	3480 psi	
	6 ... 600 mbar	160 bar	240 bar	
	0.6 ... 60 kPa	16 MPa	24 MPa	
	2.41 ... 241.1 inH ₂ O	2320 psi	3480 psi	
	16 ... 1600 mbar	160 bar	240 bar	
	1.6 ... 160 kPa	16 MPa	24 MPa	
	6.43 ... 643 inH ₂ O	2320 psi	3480 psi	
	50 ... 5000 mbar	160 bar	240 bar	
	5 ... 500 kPa	16 MPa	24 MPa	
	20.09 ... 2009 inH ₂ O	2320 psi	3480 psi	
	0.3 ... 30 bar	160 bar	240 bar	
	0.03 ... 3 MPa	16 MPa	24 MPa	
	4.35 ... 435 psi	2320 psi	3480 psi	
	2.5 ... 250 mbar	420 bar	630 bar	
	0.25 ... 25 kPa	42 MPa	63 MPa	
	1.005 ... 100.5 inH ₂ O	6092 psi	9137 psi	
	6 ... 600 mbar	420 bar	630 bar	
	0.6 ... 60 kPa	42 MPa	63 MPa	
	2.41 ... 241.1 inH ₂ O	6092 psi	9137 psi	
	16 ... 1600 mbar	420 bar	630 bar	
	1.6 ... 160 kPa	42 MPa	63 MPa	
	6.43 ... 643 inH ₂ O	6092 psi	9137 psi	
	50 ... 5000 mbar	420 bar	630 bar	
	5 ... 500 kPa	42 MPa	63 MPa	
	20.09 ... 2009 inH ₂ O	6092 psi	9137 psi	
	0.3 ... 30 bar	420 bar	630 bar	
	0.03 ... 3 MPa	42 MPa	63 MPa	
	4.35 ... 435 psi	6092 psi	9137 psi	
	Measuring limits			
	• Low measuring limit			
	- Measuring cell with silicone oil filling	-100% of maximum measuring range or 30 mbar a /3 kPa a /0.44 psi a		
- Measuring cell with inert liquid				
	For process temperature -20 °C < $\vartheta \leq +60$ °C (-4 °F < $\vartheta \leq +140$ °F)	-100% of maximum measuring range or 30 mbar a /3 kPa a /0.44 psi a		
	For process temperature 60 °C < $\vartheta \leq +100$ °C (max. 85 °C for measuring cell 30 bar with PN 420) (140 °F < $\vartheta \leq +212$ °F (max. 185 °F for measuring cell 435 psi))	-100% of maximum measuring range or 30 mbar a /3 kPa a /0.44 psi a		
		30 mbar a + 20 mbar a · (ϑ - 60 °C)/°C 3 kPa a + 2 kPa a · (ϑ - 60 °C)/°C 0.44 psi a + 0.29 psi a · (ϑ - 140 °F)/°F		
- Measuring cell with FDA-compliant oil	For process temperature -10 °C < $\vartheta \leq +100$ °C (-14 °F < $\vartheta \leq +212$ °F)	-100% of maximum measuring range or 100 mbar a /10 kPa a /14.5 psi a		
• Upper measuring limit	100% of the max. measuring span (for oxygen measurement max. 100 bar/10 MPa/ 1450 psi and 60 °C (140 °F) ambient temperature/process temperature)			
• Start of scale	Between the measuring limits (infinitely adjustable)			

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for differential pressure and flow

SITRANS P320 / SITRANS P420 for differential pressure and flow

Output	HART
Output signal	4 ... 20 mA
<ul style="list-style-type: none"> Low saturation limit (infinitely adjustable) High saturation limit (infinitely adjustable) Ripple (without HART communication) 	3.55 mA, factory preset to 3.8 mA 22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA $I_{pp} \leq 0.5\%$ of max. output current
Adjustable damping	0 ... 100 s, continuously adjustable over remote operation
<ul style="list-style-type: none"> Current transmitter Failure signal 	0 ... 100 s, in increments of 0.1 s, adjustable over display 3.55 ... 22.8 mA 3.55 ... 22.8 mA
Load	Resistor R [Ω]
<ul style="list-style-type: none"> Without HART communication 	$R = (U_H - 10.5 \text{ V})/22.8 \text{ mA}$, U_H : Power supply in V $R = 230 \dots 1100 \Omega$ (HART communicator (handheld)) $R = 230 \dots 500 \Omega$ (SIMATIC PDM)
<ul style="list-style-type: none"> With HART communication 	
Characteristic curve	<ul style="list-style-type: none"> Linearly increasing or linearly decreasing Linear increase or decrease or according to the square root (only for differential pressure and flow)
Physical bus	-
Polarity-independent	-
Measuring accuracy	
Reference conditions	<ul style="list-style-type: none"> According to EN 60770-1 Rising characteristic curve Start of scale value 0 bar/kPa/psi Seal diaphragm stainless steel Measuring cell with silicone oil filling Room temperature 25 °C (77 °F)
Conformity error at limit point setting, including hysteresis and repeatability	
Measuring span ratio r (spread, Turn-Down)	r = maximum measuring span/set measuring span or nominal measuring range
<ul style="list-style-type: none"> Linear characteristic 	
- 20 mbar/2 kPa/0.29 psi	$r \leq 5$: $\leq 0.075\%$ $5 < r \leq 20$: $\leq (0.005 \cdot r + 0.05)\%$
- 60 mbar/6 kPa/0.87 psi	$r \leq 5$: $\leq 0.075\%$ $5 < r \leq 60$: $\leq (0.005 \cdot r + 0.05)\%$
- 250 mbar/25 kPa/3.63 psi	$r \leq 5$: $\leq 0.065\%$ (SITRANS P320)
- 600 mbar/60 kPa/8.7 psi	$5 < r \leq 100$: $\leq (0.004 \cdot r + 0.045)\%$ (SITRANS P320)
- 1600 mbar/160 MPa/23.21 psi	
- 5 bar/500 kPa/72.5 psi	
- 30 bar/3 MPa/435 psi	
- 250 mbar/25 kPa/3.63 psi (PN 160)	$r \leq 5$: $\leq 0.04\%$ (SITRANS P420)
- 600 mbar/60 kPa/8.7 psi	$5 < r \leq 100$: $\leq (0.004 \cdot r + 0.045)\%$ (SITRANS P420)
- 1600 mbar/160 MPa/23.21 psi	
- 5 bar/500 kPa/72.5 psi	
- 30 bar/3 MPa/435 psi	
- 250 mbar/25 kPa/3.63 psi (PN 420)	$r \leq 5$: $\leq 0.065\%$ (SITRANS P420)
<ul style="list-style-type: none"> Square-rooted characteristic (flow > 50%) 	
- 20 mbar/2 kPa/0.29 psi	$r \leq 5$: $\leq 0.075\%$ $5 < r \leq 20$: $\leq (0.005 \cdot r + 0.05)\%$
- 60 mbar/6 kPa/0.87 psi	$r \leq 5$: $\leq 0.075\%$ $5 < r \leq 60$: $\leq (0.005 \cdot r + 0.05)\%$
- 250 mbar/25 kPa/3.63 psi	$r \leq 5$: $\leq 0.065\%$ (SITRANS P320)
- 600 mbar/60 kPa/8.7 psi	$5 < r \leq 100$: $\leq 0.04\%$ (SITRANS P420)
- 1600 mbar/160 MPa/23.21 psi	$\leq (0.004 \cdot r + 0.045)\%$
- 5 bar/500 kPa/72.5 psi	
- 30 bar/3 MPa/435 psi	
<ul style="list-style-type: none"> Square-rooted characteristic (flow 25 ... 50%) 	
- 20 mbar/2 kPa/0.29 psi	$r \leq 5$: $\leq 0.15\%$ $5 < r \leq 20$: $\leq (0.01 \cdot r + 0.1)\%$
- 60 mbar/6 kPa/0.87 psi	$r \leq 5$: $\leq 0.15\%$ $5 < r \leq 60$: $\leq (0.01 \cdot r + 0.1)\%$
- 250 mbar/25 kPa/3.63 psi	$r \leq 5$: $\leq 0.13\%$ (SITRANS P320)
- 600 mbar/60 kPa/8.7 psi	$5 < r \leq 100$: $\leq 0.008\%$ (SITRANS P420)
- 1600 mbar/160 MPa/23.21 psi	$\leq (0.008 \cdot r + 0.09)\%$
- 5 bar/500 kPa/72.5 psi	
- 30 bar/3 MPa/435 psi	

SITRANS P320 / SITRANS P420 for differential pressure and flow

Influence of ambient temperature (in % per 28 °C (50 °F))

- 20 mbar/2 kPa/0.29 psi	$\leq (0.15 \cdot r + 0.1)\%$
- 60 mbar/6 kPa/0.87 psi	$\leq (0.075 \cdot r + 0.1)\%$
- 250 mbar/25 kPa/3.63 psi	$\leq (0.025 \cdot r + 0.125)\%$ (SITRANS P320)
600 mbar/60 kPa/8.7 psi	
1600 mbar/160 MPa/23.21 psi	
5 bar/500 kPa/72.5 psi	
30 bar/3 MPa/435 psi	
- 250 mbar/25 kPa/3.63 psi	$\leq (0.025 \cdot r + 0.0625)\%$ (SITRANS P420)
5 bar/500 kPa/72.5 psi	
30 bar/3 MPa/435 psi	
- 600 mbar/60 kPa/8.7 psi	$\leq (0.0125 \cdot r + 0.0625)\%$ (SITRANS P420)
1600 mbar/160 MPa/23.21 psi	
30 bar/3 MPa/435 psi	

Effect of static pressure

• on the start of scale	Zero-point correction is possible with position error compensation
- 20 mbar/2 kPa/0.29 psi	$\leq (0.15 \cdot r)\%$ per 70 bar
- 60 mbar/6 kPa/0.87 psi	$\leq (0.1 \cdot r)\%$ per 70 bar
250 mbar/25 kPa/3.63 psi	
600 mbar/60 kPa/8.7 psi	
1600 mbar/160 MPa/23.21 psi	
5 bar/500 kPa/72.5 psi	
30 bar/3 MPa/435 psi	
- 5 bar/500 kPa/72.5 psi	$\leq (0.1 \cdot r)\%$ per 70 bar (SITRANS P320)
	$\leq (0.15 \cdot r)\%$ per 70 bar (SITRANS P420)
• on the span	
- 20 mbar/2 kPa/0.29 psi	$\leq 0.2\%$ per 70 bar
- 60 mbar/6 kPa/0.87 psi	$\leq 0.1\%$ per 70 bar
250 mbar/25 kPa/3.63 psi	
600 mbar/60 kPa/8.7 psi	
1600 mbar/160 MPa/23.21 psi	
30 bar/3 MPa/435 psi	
- 5 bar/500 kPa/72.5 psi	$\leq 0.15\%$ per 70 bar (SITRANS P320)
	$\leq 0.1\%$ per 70 bar (SITRANS P420)

Long-term stability at ± 30 °C (± 54 °F)

• 20 mbar/2 kPa/0.29 psi	Static pressure max. 70 bar/7 MPa/1015 psi
• 60 mbar/6 kPa/0.87 psi	$\leq (0.2 \cdot r)\%$ per year
• 250 mbar/25 kPa/3.63 psi	In 5 years $\leq (0.25 \cdot r)\%$
600 mbar/60 kPa/8.7 psi	In 5 years $\leq (0.125 \cdot r)\%$
1600 mbar/160 MPa/23.21 psi	In 10 years $\leq (0.15 \cdot r)\%$
5 bar/500 kPa/72.5 psi	
• 30 bar/3 MPa/435 psi	In 5 years $\leq (0.25 \cdot r)\%$
	In 10 years $\leq (0.35 \cdot r)\%$

Step response time T_{63} (without electrical damping)

• 20 mbar/2 kPa/0.29 psi	Approx. 0.295 s
• 60 mbar/6 kPa/0.87 psi	Approx. 0.245 s
• 250 mbar/25 kPa/3.63 psi	Approx. 0.195 s
• 600 mbar/60 kPa/8.7 psi	Approx. 0.145 s
1600 mbar/160 MPa/23.21 psi	
5 bar/500 kPa/72.5 psi	
30 bar/3 MPa/435 psi	

Effect of mounting position (in pressure per change of angle)

 ≤ 0.7 mbar/0.07 kPa/0.028 inH₂O per 10° incline (zero point correction is possible with position error compensation)

Effect of auxiliary power (in % per voltage change)

0.005% per 1 V

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for differential pressure and flow

SITRANS P320 / SITRANS P420 for differential pressure and flow

Rated conditions

Temperature of medium

- Measuring cell with silicone oil filling
 - Measuring cell 30 bar (435 psi), PN 420
- Measuring cell with inert oil
 - Measuring cell 30 bar (435 psi), PN 420
- Measuring cell with FDA-compliant oil
- In conjunction with dust explosion protection

-40 ... +100 °C (-40 ... +212 °F)
 -20 ... +85 °C (-4 ... +185 °F)
 -20 ... +100 °C (-4 ... +212 °F)
 -20 ... +85 °C (-4 ... +185 °F)
 -10 ... +100 °C (14 ... +212 °F)
 -40 ... +85 °C (-4 ... +185 °F)

Ambient conditions

- Ambient temperature/enclosure
 - Measuring cell with silicone oil filling
 - Measuring cell with silicone oil filling, measuring cell 30 bar (435 psi), PN 420
 - Measuring cell with inert oil
 - Measuring cell with FDA-compliant oil
 - Display
- Storage temperature
- Climatic class in accordance with IEC 60721-3-4
- Degree of protection
 - According to IEC 60529
 - According to NEMA 250
- Electromagnetic compatibility
 - Emitted interference and interference immunity

Observe the temperature class in areas subject to explosion hazard.

-40 ... +85 °C (-40 ... +185 °F)
 -20 ... +85 °C (-4 ... +185 °F)
 -20 ... +85 °C (-4 ... +185 °F)
 -10 ... +85 °C (14 ... +185 °F)
 -20 ... +80 °C (-4 ... +176 °F)
 -50 ... +85 °C (-58 ... +185 °F) (with FDA-compliant oil: -20 ... + 85 °C (-4 ... +185 °F))
 4K4H

IP66, IP68
 Type 4X

According to IEC 61326 and NAMUR NE 21

Design

Weight

Approx. 3.9 kg (8.5 lb) with aluminum enclosure
 Approx. 5.8 kg (12.7 lb) with stainless steel enclosure

Material

- Wetted parts materials
 - Seal diaphragm
 - Process flanges and sealing plugs
 - O-ring
- Non-wetted parts materials
 - Electronics housing

Stainless steel, mat. no. 1.4404/316L, Alloy C276, mat. no. 2.4819, Monel, mat. no. 2.4360, tantalum or gold
 Stainless steel, mat. no. 1.4408 to PN 160, mat. no. 1.4571/316Ti for PN 420, Alloy C22, 2.4602 or Monel, mat. no. 2.4360
 FPM (Viton) or optionally: PTFE, FEP, FEPM and NBR

- Low-copper die-cast aluminum GD-AISI 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M
 - Standard: Powder coating with polyurethane
 Option: 2 coats: Coat 1: epoxy-based; coat 2: Polyurethane
 - Stainless steel type plate (1.4404/316L)
- Stainless steel ISO 3506-1 A4-70
 Steel, electrogalvanized steel, or stainless steel

Process connection

1/2-18 NPT female thread and flat connection with 7/16-20 UNF fastening screw thread in accordance with EN 61518 or M10 fastening screw thread in accordance with DIN 19213 (M12 for PN 420 (MWP 6092 psi))

Electrical connection

Screw terminals
 Cable entry via the following screwed glands:

- M20 x 1.5
- 1/2-14 NPT
- Han 7D/Han 8D device plug¹⁾
- M12 device plug

Displays and controls

Keys

4 keys for operation directly on the device

Display

- With or without integrated display (optional)
- Cover with inspection window (optional)

Auxiliary power U_H

Terminal voltage on pressure transmitter

10.5 ... 45 V DC
 10.5 ... 30 V DC in intrinsically safe mode

Ripple

U_{SS} ≤ 0.2 V (47 ... 125 Hz)

Noise

U_{eff} ≤ 1.2 mV (0.5 ... 10 kHz)

Auxiliary power

—

Separate supply voltage

—

SITRANS P320 / SITRANS P420 for differential pressure and flow**Certificates and approvals**

Classification according to pressure equipment directive (PED 2014/68/EU)

Drinking water

- WRAS (England)
- ACS (France)
- DVGW (Germany)
- NSF (USA)

CRN (Canada)

Explosion protection acc. to NEPSI (China)

Explosion protection acc. to INMETRO (Brazil)

BAM (Germany), oxygen expenditures

Explosion protection

- Intrinsic safety "i"

- Marking
- Permissible ambient temperature
- Permissible temperature of measuring medium
- Connection

- Effective internal inductance/capacitance

- Flameproof enclosure "d"

- Marking
- Permissible ambient temperature
- Permissible temperature of measuring medium
- Connection

- Dust explosion protection for Zone 20, 21, 22

- Marking
- Permissible ambient temperature
- Permissible temperature of measuring medium
- Max. surface temperature
- Connection

- Dust explosion protection for Zone 20, 21, 22

- Marking
- Permissible ambient temperature
- Permissible temperature of measuring medium
- Connection

- Effective internal inductance/capacitance

- Type of protection for Zone 2

- Marking
- Permissible ambient temperature "ec"
- Permissible ambient temperature "ic"
- Permissible temperature of measuring medium
- "ec" connection
- "ic" connection

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

For flow only

For gases of fluid group 1 and liquids of fluid group 1; fulfills the basic safety requirements as per article 3, paragraph 1 (appendix 1); classified as category III, module H conformity evaluation by TÜV Nord

Available soon

Available soon

Available soon

Available soon

Available soon

Available soon

Available soon

Available soon

II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb

-40 ... +80 °C (-40 ... +176 °F) temperature class T4

-40 ... +70 °C (-40 ... +158 °F) temperature class T6

-40 ... +100 °C (-40 ... +212 °F) temperature class T4

-40 ... +70 °C (-40 ... +158 °F) temperature class T6

To certified intrinsically safe circuits with peak values:

$U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$

$U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$

$L_i = 0.24 \text{ } \mu\text{H/C}_i = 3.29 \text{ nF}$

Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb

-40 ... +80 °C (-40 ... +176 °F) temperature class T4

-40 ... +70 °C (-40 ... +158 °F) temperature class T6

-40 ... +100 °C (-40 ... +212 °F) temperature class T4

-40 ... +70 °C (-40 ... +158 °F) temperature class T6

To a circuit with the operating values:

$U_n = 10.5 \text{ to } 45 \text{ V}$, $4 \text{ ... } 20 \text{ mA}$

Ex II 1D Ex tb IIIC T120 °C Da

Ex II 2D Ex tb IIIC T120 °C Db

Ex II 3D Ex tc IIIC T120 °C Dc

-40 ... +80 °C (-40 ... +176 °F)

-40 ... +100 °C (-40 ... +212 °F)

120 °C (248 °F)

To a circuit with the operating values:

$U_n = 10.5 \text{ to } 45 \text{ V}$, $4 \text{ ... } 20 \text{ mA}$

Ex II 1D Ex ia IIIC T120 °C Da

Ex II 2D Ex ib IIIC T120 °C Db

Ex II 3D Ex ic IIIC T120 °C Dc

-40 ... +80 °C (-40 ... +176 °F)

-40 ... +100 °C (-40 ... +212 °F)

To certified intrinsically safe circuits with the peak values:

$U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$

$U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$

$L_i = 0.24 \text{ } \mu\text{H/C}_i = 3.29 \text{ nF}$

Ex II 3G Ex ec IIC T4/T6 Gc

Ex II 3G Ex ic IIC T4/T6 Gc

-40 ... +80 °C (-40 ... +176 °F) temperature class T4

-40 ... +40 °C (-40 ... +104 °F) temperature class T6

-40 ... +80 °C (-40 ... +176 °F) temperature class T4

-40 ... +80 °C (-40 ... +176 °F) temperature class T6

-40 ... +100 °C (-40 ... +212 °F) temperature class T4

-40 ... +70 °C (-40 ... +158 °F) temperature class T6

To a circuit with the operating values:

$U_n = 10.5 \text{ to } 30 \text{ V}$, $4 \text{ ... } 20 \text{ mA}$

To certified intrinsically safe circuits with the peak values:

$U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$

$U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$

Effective internal inductance/capacitance:

$L_i = 0.24 \text{ } \mu\text{H/C}_i = 3.29 \text{ nF}$

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for differential pressure and flow

SITRANS P320 / SITRANS P420 for differential pressure and flow

- | | |
|---|---|
| <ul style="list-style-type: none"> • Explosion protection acc. to FM <ul style="list-style-type: none"> - Marking (XP/DIP) or IS; NI; S • Explosion protection according to CSA <ul style="list-style-type: none"> - Marking (XP/DIP) or (IS) | <p>Available soon</p> <p>CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III</p> <p>Available soon</p> <p>CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III</p> |
|---|---|

HART communication

HART	230 ... 1100 Ω
Protocol	HART 7
Software for computer	SIMATIC PDM

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for differential pressure and flow

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Selection and ordering data

Article No.	
Pressure transmitters for differential pressure and flow, PN 160 (MAWP 2320 psi)	
SITRANS P320	7MF034
SITRANS P420	7MF044
Click on the Article no. for the online configuration in the PIA Life Cycle Portal.	
Communication	
HART, 4 ... 20 mA	0
Measuring cell filling	
Silicone oil	1
Inert liquid	3
Neobee oil	4
Maximum measuring span	
20 mbar (8.037 inH ₂ O)	B
60 mbar (24.11 inH ₂ O)	D
250 mbar (100.5 inH ₂ O)	G
600 mbar (241.1 inH ₂ O)	H
1 600 mbar (643 inH ₂ O)	M
5000 mbar (2009 inH ₂ O)	P
30 bar (435 psi)	R
Process connection	
Oval flange, mounting thread: 7/16"-20 UNF (IEC 61518)	L
Oval flange, mounting thread: M10 (PN 160) (DIN 19213)	M
Oval flange, mounting thread: 7/16"-20 UNF (IEC 61518) with lateral ventilation	N
Oval flange, mounting thread: M10 (PN 160) (DIN 19213) with lateral ventilation	P
Oval flange, mounting thread: 7/16"-20 UNF (IEC 61518)	Q
Oval flange, mounting thread: M10 (DIN 19213); only for 100 bar (1450 psi)	R
Oval flange, mounting thread: 7/16"-20 UNF (IEC 61518) with lateral ventilation	S
Oval flange, mounting thread: M10 (DIN 19213) with lateral ventilation	T
Wetted parts materials: Process connection, seal diaphragm	
Stainless steel 316L/1.4404, stainless steel 316L/1.4404	0
Stainless steel 316L/1.4404, alloy C276/2.4819	1
Alloy C22/2.4602, alloy C276/2.4819	2
Tantalum/tantalum (not in combination with maximum measuring span 20 mbar (0.29 psi) and 60 mbar (0.87 psi))	4
Monel 00/2.4360, Monel 400/2.4360 (not in combination with maximum measuring span 20 mbar (0.29 psi) and 60 mbar (0.87 psi))	6
Stainless steel 316L/1.4404, gold-plated (not in combination with maximum measuring span 20 mbar (0.29 psi) and 60 mbar (0.87 psi))	8
Non-wetted parts materials	
Die-cast aluminum	1
Stainless steel precision casting CF3M/1.4409 similar to 316L	2
Enclosure	
Dual chamber device	5
Type of protection	
Without Ex	A
Intrinsic safety	B
Flameproof enclosure	C
Flameproof enclosure, intrinsic safety	D
Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2	L
Dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2	M
Combination of options B, C and L (zone model)	S
Combination of options B, C and M (zone model, Class Division)	T
Electrical connections/cable entries	
Thread for cable gland	
• 2 x M20 x 1.5	F
• 2 x 1/2-14 NPT	M

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P320/P420

for differential pressure and flow

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		Article No.
Pressure transmitters for differential pressure and flow, PN 160 (MAWP 2320 psi)		
SITRANS P320	7MF034	- - - - -
SITRANS P420	7MF044	- - - - -
Local operation/display		
Without display (cover closed)		0
With display (cover closed)		1
With display (cover with glass pane)		2

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for differential pressure and flow

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Article No.

Pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)**SITRANS P320**

7MF035 - - - - -

SITRANS P420

7MF045 - - - - -

[Click on the Article no. for the online configuration in the PIA Life Cycle Portal.](#)
Communication

HART, 4 ... 20 mA

Measuring cell filling

Silicone oil

Inert liquid

Neobee oil

Maximum measuring span250 mbar (100.5 inH₂O)600 mbar (241.1 inH₂O)1 600 mbar (643 inH₂O)5000 mbar (2009 inH₂O)

30 bar (435 psi)

Process connection

Oval flange, mounting thread: 7/16-20 UNF (IEC 61518)

Oval flange, mounting thread: M12 (PN 420) (DIN 19213)

Oval flange, mounting thread: 7/16-20 UNF (IEC 61518) with lateral ventilation

Oval flange, mounting thread: M12 (PN 420) (DIN 19213) with lateral ventilation

Version for diaphragm seal with mounting thread 7/16-20 UNF (IEC 61518)

Version for diaphragm seal with mounting thread M10 (DIN 19213)

Version for diaphragm seal (level and capillary) with mounting thread 7/16-20 UNF (IEC 61518)

Wetted parts materials: Process connection, seal diaphragm

Stainless steel 316L/1.4404, stainless steel 316L/1.4404

Stainless steel 316L/1.4404, alloy C276/2.4819

Alloy C22/2.4602, alloy C276/2.4819

Tantalum/tantalum

Monel 00/2.4360, Monel 400/2.4360

Stainless steel 316L/1.4404, gold-plated

Non-wetted parts materials

Die-cast aluminum

Stainless steel precision casting CF3M/1.4409 similar to 316L

Enclosure

Dual chamber device

Type of protection

Without Ex

Intrinsic safety

Flameproof enclosure

Flameproof enclosure, intrinsic safety

Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2

Dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2

Combination of options B, C and L (zone model)

Combination of options B, C and M (zone model, Class Division)

Electrical connections/cable entries

Thread for cable gland

• 2 x M20 x 1.5

• 2 x 1/2-14 NPT

Local operation/display

Without display (cover closed)

With display (cover closed)

With display (cover with glass pane)

0

1

3

4

G

H

M

P

R

L

M

N

P

V

W

X

0

1

2

4

6

8

1

2

5

A

B

C

D

L

M

S

T

F

M

0

1

2

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for differential pressure and flow

1

Selection and ordering data

Options	Order code	Options	Order code
Add "-Z" to article no. and specify order code.		Device options	
Cable glands included		PDF file with device settings	D10
Plastic	A00	Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and cover	D20
Metal	A01	FVMQ enclosure sealing	D21
Stainless steel	A02	IP66/IP68 degree of protection (not for M12 and Han device plugs)	D30
Stainless steel 316L/1.4404	A03	TAG label empty	D40
CMP, for XP devices	A10	Without labeling of the measuring range on the TAG label	D41
CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A11	Stainless steel Ex plate 1.4404/316L	D42
CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A12	Increase of pressure stage from PN 420 to PN 500	D50
Han device plug mounted left		Overvoltage protection up to 6 kV (external)	D71
Han 7D device plug (plastic, straight)	A30	Adhesive labels on transport packaging (supplied by customer)	D90
Han 7D device plug (plastic, angled)	A31		
Han 7D device plug (metal, straight)	A32	General approval without Ex approval	
Han 7D device plug (metal, angled)	A33	Worldwide (CE, RCM) except EAC, FM, CSA, KCC	E00
Han 8D device plug (plastic, straight)	A34	Worldwide (CE, RCM, EAC, FM, CSA, KCC)	E01
Han 8D device plug (plastic, angled)	A35	CSA	E06
Han 8D device plug (metal, straight)	A36	EAC	E07
Han 8D device plug (metal, angled)	A37	FM	E08
Cable socket included		KCC	E09
Plastic, for Han 7D/8D device plugs	A40	UL	E10
Metal, for Han 7D/8D device plugs	A41	Explosion protection approvals	
M12 device plug mounted left		ATEX (Europe)	E20
Stainless steel, without cable socket	A62	CSA (USA and Canada)	E21
Stainless steel, with cable socket	A63	FM (USA and Canada)	E22
Cable entry/connector mounting		IECEx (Worldwide)	E23
2x sealing plugs M20 x 1.5, IP66/68 installed on both sides	A90	EACEx (GOST-R, -K, -B)	E24
2x sealing plugs ½-14 NPT, IP66/68 installed on both sides	A91	INMETRO (Brazil)	E25
Cable gland/connector mounted left	A97	KCs (Korea)	E26
Cable gland/connector mounted on right	A99	NEPSI (China)	E27
Nameplate labeling		PESO (India)	E28
German (bar)	B11	Tiis Hazardous (Japan)	E29
French (bar)	B12	UKR Sepro (Ukraine)	E30
Spanish (bar)	B13	ATEX (Europe) and IECEx (Worldwide)	E47
Italian (bar)	B14	CSA (Canada) and FM (USA)	E48
Chinese (bar)	B15	ATEX (Europe) and IECEx (Worldwide) + CSA (Canada) and FM (USA)	E49
Russian (bar)	B16	Marine approvals	
English (psi)	B20	DNV-GL (Det Norske Veritas/Germanischer Lloyd)	E50
Chinese (Pa)	B35	LR (Lloyds Register)	E51
Certificates		BV (Bureau Veritas)	E52
Quality test certificate, 5-point factory calibration (IEC 60770-2)	C11	ABS (American Bureau of Shipping)	E53
Acceptance certificate (EN 10204-3.1) - Material of pressurized and wetted parts	C12	KR (Korean Register of Shipping)	E56
Test report - NACE (MR 0103-2012 and MR 0175-2009)	C13	RINA (Registro Italiano Navale)	E57
Test report (EN 10204-2.2) - Wetted parts	C14	CCS (China Classification Society)	E58
Acceptance certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts	C15	Country-specific approvals	
Certificates for functional safety		CRN approval Canada (Canadian Registration Number)	E60
Functional safety (IEC 61508) - SIL2/3	C20		

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for differential pressure and flow

1

Options	Order code
Special approvals	
Oxygen application (with inert liquid, max. 100 bar (1 450 psi) at 60° C (140 °F))	E80
Dual seal	E81
WRC / WRAS (drinking water); only with pressure cap O-rings made of EPDM	E83
NSF61 (drinking water)	E84
ACS (drinking water)	E85
Mounting bracket	
Steel, galvanized	H01
Stainless steel 1.4301/304	H02
Stainless steel 1.4404/316L	H03
Process flanges; screw plug with vent valve	
Welded in on right	J08
Welded in on left	J09
Glued in on right	J10
Glued in on left	J11
Flange connections with flange EN 1092-1	
Form B1	
• DN 25 PN 40, stainless steel 1.4571/316Ti	J70
• DN 50 PN 40, stainless steel 1.4571/316Ti	J71
• DN 80 PN 40, stainless steel 1.4571/316Ti	J72
• DN 15 PN 40, stainless steel 1.4571/316Ti	J78
Form C	
• DN 25 PN 40, stainless steel 1.4571/316Ti	J73
• DN 50 PN 40, stainless steel 1.4571/316Ti	J74
• DN 80 PN 40, stainless steel 1.4571/316Ti	J75
Flange connection options	
Flange connection and temperature extension	J76
Flange connection with epoxy resin coating	J77
Process flanges; special materials	
Reserved for 7MF7: without process flanges, without screws, without gaskets	K00
Process flange material alloy C4/2.4610	K01
Process flange material Monel 400/2.4360	K02
Process connection material PVDF, on the side ½-14 NPT	K05
Process flanges/process connection material PVDF, flange on the side EN 1092-1 Form B1 DN 25 PN 40, MAWP 4 bar	K06
Process flanges/process connection material PVDF, flange on the side EN 1092-1 Form B1 DN 40 PN 40, MAWP 4 bar	K07
Process flanges; process connection option	
Process flange with process connection G½ welded on	K20
Process connection (oval flange) NAM (ASTAVA)	K21
Process flanges chambered with gaskets	
1x chambered, graphite	K40
1x chambered, PTFE	K41
2x chambered, PTFE	K42
Process flanges, gaskets (instead of standard gaskets FKM (FPM))	
O-ring, process flanges, PTFE	K50
O-ring, process flanges, FEP (with silicone core, approved for food)	K51
O-ring, process flanges, FFKM (FFPM)	K52
O-ring, process flanges, NBR	K53
O-ring, process flanges, EPDM	K54

Options	Order code
Process flange options	
Process flanges for vertical differential pressure lines (half process flange)	K81
Process flanges (+) - side front	K82
Process flange screws, process flange nuts, material Monel 400/2.4360	K83
Valve ¼-18 NPT, material same as process flanges	K84
Valve mounted on the side, measured medium: Gas	K85
Oval flange enclosed, gasket PTFE + mounting screws	K86
Pneumatic blocks	
With mounted pneumatic block (3-way) 7MF9411-5BA, PTFE sealing rings, chrome-plated steel screws and pressure test certified in test report (EN 10204-2.2)	U01
With mounted pneumatic block (3-way) 7MF9411-5BA, PTFE sealing rings, stainless steel screws and pressure test certified in test report (EN 10204-2.2)	U02
With mounted pneumatic block (5-way) 7MF9411-5CA, PTFE sealing rings, chrome-plated steel screws and pressure test certified in test report (EN 10204-2.2)	U03
With mounted pneumatic block (5-way) 7MF9411-5CA, PTFE sealing rings, stainless steel screws and pressure test certified in test report (EN 10204-2.2)	U04

Pressure Measurement

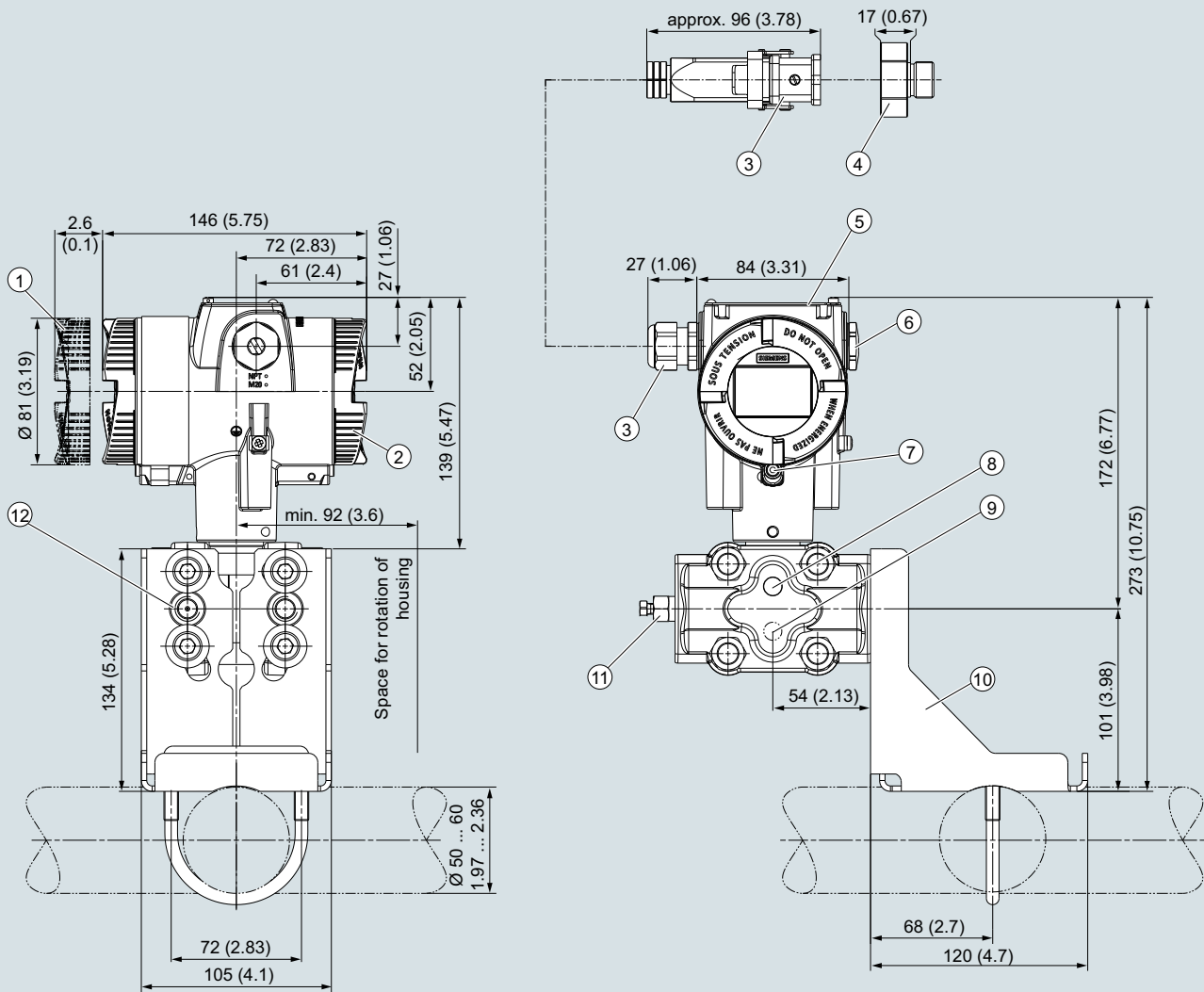
Transmitters for applications with advanced requirements (Advanced)
SITRANS P320/P420

for differential pressure and flow

1

Selection and ordering data

Customer-specific device settings	Order code
Add "-Z" to article no., specify order code and plain text or drop-down list selection.	
Measuring span Start of scale value (max. 5 characters), full scale value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Drop-down list: Pa, MPa, kPa, hPa, bar, mbar, psi, g/cm ² , kg/cm ² , kgf/cm ² , inH ₂ O, inH ₂ O (4°C), ftH ₂ O, mmH ₂ O, mmH ₂ O (4°C), mH ₂ O (4°C), mmHg, inHg, atm, torr	Y01
Square-rooted characteristic [VSLN2, MSLN2], example: VSLN2 Drop-down list: VSLN2, MSLN2	Y02
TAG (on stainless steel plate and device parameters, max. 32 characters) Input field: Free text, max. 32 characters	Y15
Measuring point description (on stainless steel plate and device parameters, max. 32 characters) Input field: Free text, max. 32 characters	Y16
TAG short (device parameters, max. 8 characters) Input field: Free text, max. 8 characters	Y17
Local display [Pressure, Percent], reference [None, Absolute, Relative], example: Pressure gauge Drop-down list: Percent, pressure unit, pressure unit abs., pressure unit gauge	Y21
Local display Scaling with standard units [m³/s, l/s, m, inch, ...], example 1 ... 5 m³/s Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Drop-down list: m, cm, mm, in, ft, m ³ , l, hl, in ³ , ft ³ , yd ³ , gal, gal (UK), bu, bbl, bbl (US), SCF, Nm ³ , NI, m ³ /sec, m ³ /h, m ³ /d, l/sec, l/min, l/h, Ml/d, ft ³ /sec, ft ³ /h, ft ³ /d, SCF/min, SCF/h, NI/h, Nm ³ /h, gal/sec, gal/min, gal/h, gal/d, Mgal/d, gal (UK)/sec, gal (UK)/min, gal (UK)/h, gal (UK)/d, bbl/sec, bbl/min, bbl/h, bbl/d, kg/sec, kg/min, kg/h, kg/d, g/sec, g/min, g/h, t/min, t/h, t/d, lb/sec, lb/min, lb/h, lb/d, ton/min, ton/h, ton/d, ton (UK)/h, ton (UK)/d.	Y22
Local display Scaling with user-specific units (max. 12 characters), example 1 ... 5 m Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Input field 3: Free text, max. 8 characters	Y23
Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA Drop-down list 1: 3.9, 4 Drop-down list 2: 20.8, 22	Y30
Fault current instead of 3.6 mA [22.5 mA, 22.8 mA] Drop-down list: 3.75; 21.75; 22.5; 22.6	Y31
Damping in seconds instead of 2 s (0.0 ... 100.0 s) Input field: max. 4 characters and numbers only; decimal places as dot (comma is automatically converted to dot); min. value = 0; max. value = 100.	Y32
ID number of special version Input field: max. 4 characters and only natural numbers from 0 ... 9999	Y99

Dimensional drawings

- ① Electronic side, display
(longer overall length for cover with window)¹⁾
- ② Terminal side
- ③ Electrical connection:
screw gland M20 x 1,5³⁾ or screw gland ½-14 NPT or
Han 7D/Han 8D²⁾ device plug or M12 device plug²⁾ 3
- ④ Harting adapter
- ⑤ Cover over buttons and nameplate with general information

- ⑥ Blanking plug
- ⑦ Screw cover - safety bracket
(only for type of protection "Explosion-proof enclosure")
- ⑧ Lateral venting for liquid measurement (Standard)
- ⑨ Lateral venting for gas measurement (suffix K85)
- ⑩ Mounting bracket (option)
- ⑪ Sealing screw with valve (option)
- ⑫ Process connection: ¼-18 NPT (IEC 61518)

¹⁾ In addition, allow approx. 22 mm (0.87 inch) for the thread length when removing the covers

²⁾ Not with type of protection "Explosion-proof enclosure"

³⁾ Not with type of protection "FM + CSA" [is + XP]"

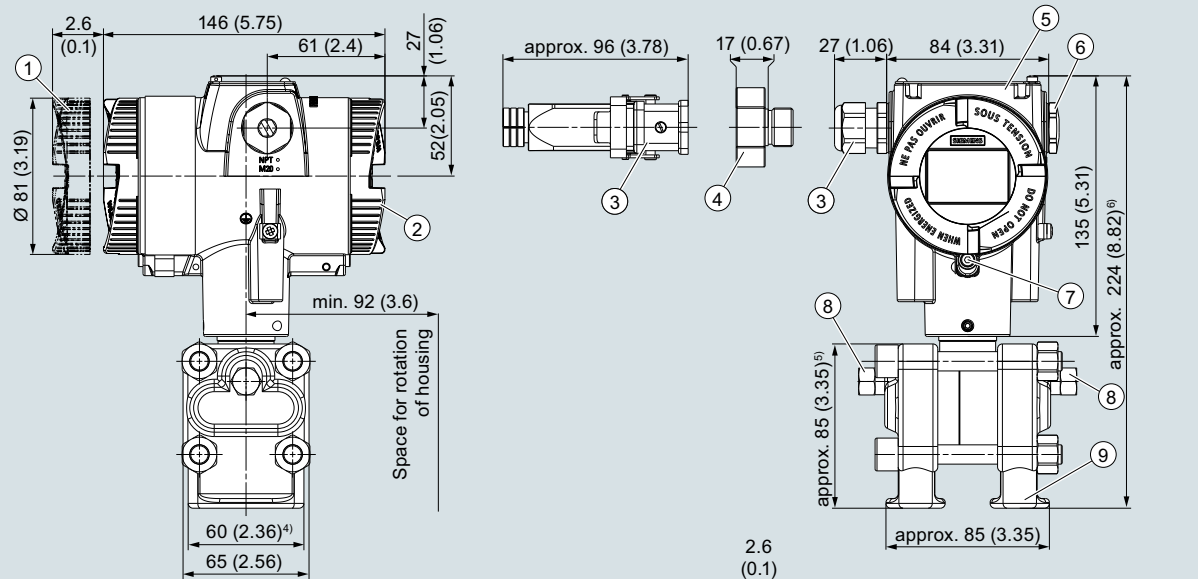
SITRANS P320/P420 pressure transmitter for differential pressure and flow, dimensions in mm (inch)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for differential pressure and flow



① Electronic side, display
(longer overall length for cover with window)¹⁾

② Terminal side

③ Electrical connection:
screw gland M20 x 1.5³⁾ or screw gland ½-14 NPT or
Han 7D/Han 8D^{2) 3)} device plug or M12 device plug^{2) 3)}

④ Harting adapter

⑤ Cover over buttons and nameplate
with general information

⑥ Blanking plug

⑦ Screw cover - safety bracket
(only for type of protection "Explosion-proof enclosure")

⑧ Sealing screw with valve (option)

⑨ Process connection: ¼-18 NPT (IEC 61518)

¹⁾ In addition, allow approx. 22 mm (0.87 inch) for the thread length when removing the covers

²⁾ Not with type of protection "Explosion-proof enclosure"

³⁾ Not with type of protection "FM + CSA" [is + XP]"

⁴⁾ 74 mm (2.9 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)

⁵⁾ 91 mm (3.6 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)

⁶⁾ 226 mm (8.9 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)

SITRANS P320/P420 pressure transmitter for differential pressure and flow with process covers for vertical differential pressure lines (option "K81"), dimensions in mm (inch)

Technical specifications

SITRANS P320 / SITRANS P420 for level

Input

Measured variable

Level

Span (infinitely adjustable) and maximum operating pressure (pursuant to Pressure Equipment Directive 2014/68/EU)

Span

Max. permissible operating pressure MAWP (PS)

Maximum permissible test pressure

25 ... 250 mbar
 2.5 ... 25 kPa
 10 ... 100.5 inH₂O
 25 ... 600 mbar
 2.5 ... 60 kPa
 10 ... 241 inH₂O
 53 ... 1600 mbar
 5.3 ... 160 kPa
 21 ... 643 inH₂O
 166 ... 5000 mbar
 16.6 ... 500 kPa
 2.41 ... 72.5 psi

See "Mounting flange"

Measuring limits

• Low measuring limit

- Measuring cell with silicone oil filling
- Measuring cell with inert oil
- Measuring cell with FDA-compliant oil

-100% of max. measuring range or 30 mbar a/3 kPa a/0.44 psi a depending on the mounting flange

-100% of max. measuring range or 30 mbar a/3 kPa a/0.44 psi a depending on the mounting flange

-100% of max. measuring range or 100 mbar a/10 kPa a/1.45 psi a

• Upper measuring limit

100% of max. span

• Start of scale

Between the measuring limits (infinitely adjustable)

Output

HART

Output signal

4 ... 20 mA

• Low saturation limit (infinitely adjustable)

3.55 mA, factory preset to 3.8 mA

• High saturation limit (infinitely adjustable)

22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA

• Ripple (without HART communication)

 $I_{pp} \leq 0.5\%$ of max. output current

Adjustable damping

0 ... 100 s, continuously adjustable over remote operation

0 ... 100 s, in increments of 0.1 s, adjustable over display

• Current transmitter

3.55 ... 22.8 mA

• Failure signal

3.55 ... 22.8 mA

Load

Resistor R [Ω]

• Without HART communication

 $R = (U_H - 10.5 \text{ V}) / 22.8 \text{ mA}$, U_H : Power supply in V

• With HART communication

 $R = 230 \dots 1100 \Omega$ (HART communicator (handheld)) $R = 230 \dots 500 \Omega$ (SIMATIC PDM)

Characteristic curve

• Linearly increasing or linearly decreasing

• Linear increase or decrease or according to the square root (only for differential pressure and flow)

Physical bus

-

Polarity-independent

-

Measuring accuracy

Reference conditions

- According to EN 60770-1
- Rising characteristic curve
- Start of scale value 0 bar/kPa/psi
- Seal diaphragm stainless steel
- Measuring cell with silicone oil filling
- Room temperature 25 °C (77 °F)

Conformity error at limit point setting, including hysteresis and repeatability

Measuring span ratio r (spread, Turn-Down)

 $r = \text{maximum measuring span/set measuring span or nominal measuring range}$

• Linear characteristic

- 250 mbar/25 kPa/3.6 psi
- 600 mbar/60 kPa/8.7 psi
- 1600 mbar/160 kPa/23.21 psi
- 5 bar/500 kPa/72.5 psi

 $r \leq 5$: $\leq 0.065\%$ (SITRANS P320) $\leq 0.004\%$ (SITRANS P420) $5 < r \leq 10$: $\leq (0.004 \cdot r + 0.045)\%$

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for level

SITRANS P320 / SITRANS P420 for level

Influence of ambient temperature¹⁾
in % per 28 °C (50 °F)

- SITRANS P320 $\leq (0.025 \cdot r + 0.125)\%$
 - 250 mbar/25 kPa/3.6 psi
 - 600 mbar/60 kPa/8.7 psi
 - 1600 mbar/160 kPa/23.21 psi
 - 5 bar/500 kPa/72.5 psi
- SITRANS P420 $\leq (0.025 \cdot r + 0.625)\%$
 - 250 mbar/25 kPa/3.6 psi
 - 5 bar/500 kPa/72.5 psi
 - 600 mbar/60 kPa/8.7 psi
 - 1600 mbar/160 kPa/23.21 psi

Effect of static pressure

- on the start of scale $\leq (0.1 \cdot r)\%$ per nominal pressure
 - 50 mbar/25 kPa/3.63 psi
 - 600 mbar/60 kPa/8.70 psi
 - 1600 mbar/160 kPa/23.21 psi
 - 5 bar/500 kPa/72.52 psi
- on the span $\leq (0.15 \cdot r)\%$ per nominal pressure
 $\leq (0.1 \cdot r)\%$ per nominal pressure

Long-term stability at ± 30 °C (± 54 °F)

- all measuring cells In 5 years $\leq (0.25 \cdot r)\%$ static pressure max. 70 bar/7 MPa/1015 psi

Step response time T_{63} (without electrical damping) Approx. 0.2 s

Influence of mounting position Depends on the fill fluid in the mounting flange

Effect of auxiliary power (in % per voltage change) 0.005% per 1 V

Rated conditions

Temperature of medium

- Measuring cell with silicone oil filling
- High-pressure side: See "Mounting flange"
 - Low-pressure side: -40 ... +100 °C (-40 ... +212 °F)

Ambient conditions

- Ambient temperature/enclosure

Always consider the assignment of max. permissible operating temperature to max. permissible operating pressure of the respective flange connection.

 - Measuring cell with silicone oil filling -40 ... +85 °C (-40 ... +185 °F)
 - Display -20 ... +80 °C (-4 ... +176 °F)
- Storage temperature -50 ... +85 °C (-58 ... +185 °F)
- Climatic class in accordance with IEC 60721-3-4 4K4H
- Degree of protection
 - According to IEC 60529 IP66, IP68
 - According to NEMA 250 Type 4X
- Electromagnetic compatibility
 - Emitted interference and interference immunity According to IEC 61326 and NAMUR NE 21

Vibration resistance

- Reference conditions Specifications apply to devices without mounting bracket
- General operating conditions
 - Oscillations (sine) IEC 60068-2-6
 - 10 ... 58 Hz, 0.3 mm (0.01 inch)
 - 58 ... 500 Hz, 20 m/s² (65.62 ft/s²)
 - 1 octave/min
 - 5 cycles/axis
 - Continuous shocks (half-sine) IEC 60068-2-27
 - 250 m/s² (820 ft/s²)
 - 6 ms
 - 2000 shocks/axis
 - Noise (digitally controlled) IEC 60068-2-64
 - 10 ... 200 Hz; 1 (m/s²)²/Hz (3.28 (ft/s²)²/Hz)
 - 200 ... 500 Hz; 0.3 (m/s²)²/Hz (0.98 (ft/s²)²/Hz)
 - 4 hours/axle
- Rated conditions for marine applications
 - IEC 60068-2-6 2 ... 25 Hz, 1.6 mm (0.06 inch)
 - DNVGL-CG-0339, clause 6 25 ... 100 Hz, 40 m/s² (131.23 ft/s²)
 - Lloyd's Register Test Specification Number 1, section 12. 1 octave/min
 - Bureau Veritas Pt C, Ch 3, Sec 6, Table 1, No 7

SITRANS P320 / SITRANS P420 for level**Design**

Weight

- According to EN (pressure transmitter with mounting flange, without tube)
- According to ASME (pressure transmitter with mounting flange, without tube)

Material

- Wetted parts materials

- High-pressure side

Seal diaphragm of mounting flange

Stainless steel, mat. no. 1.4404/316L, Monel 400, mat. no. 2.4360, Alloy B2, mat. no. 2.4617, Alloy C276, mat. no. 2.4819, Alloy C22, mat. no. 2.4602, tantalum, PTFE, PFA, ECTFE

Sealing surface

Smooth according to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA for stainless steel 316L, EN 2092-1 form B2 or ASME B16.5 RFSF for the remaining materials

- Sealing material in the process flanges

For standard applications

Viton

For underpressure applications on the mounting flange

Copper

- Low-pressure side

Seal diaphragm

Stainless steel, mat. no. 1.4404/316L

Process flange locking screws

Stainless steel, mat. no. 1.4408

Screw plug

Stainless steel ISO 3506-1 A4-70

O-ring

FPM (Viton)

- Non-wetted parts materials

- Electronics housing

- Low-copper die-cast aluminum GD-AISI 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M
- Standard: Powder coating with polyurethane
- Option: 2 coats: Coat 1: epoxy-based; coat 2: Polyurethane
- Stainless steel type plate (1.4404/316L)

Pressure flange screws

Stainless steel ISO 3506-1 A4-70

Measuring cell filling

- Mounting flange fill fluid

Silicone oil

Silicone oil or other material

Process connection

- High-pressure side
- Low-pressure side

Flange according to EN and ASME

1/4-18 NPT female thread and flat connection with M10 fastening screw thread in accordance with DIN 19213 (M12 for PN 420 (MWP 6092 psi)) or 7/16-20 UNF in accordance with EN 61518

Electrical connection

Screw terminals

Cable entry via the following screwed glands:

- M20 x 1.5
- 1/2-14 NPT
- Han 7D/Han 8D device plug²⁾
- M12 device plug

Displays and controls

Keys

4 keys for operation directly on the device

Display

- With or without integrated display (optional)
- Cover with inspection window (optional)

Auxiliary power U_H

Terminal voltage on pressure transmitter

10.5 ... 45 V DC
10.5 ... 30 V DC in intrinsically safe mode

Ripple

 $U_{SS} \leq 0.2 \text{ V}$ (47 ... 125 Hz)

Noise

 $U_{eff} \leq 1.2 \text{ mV}$ (0.5 ... 10 kHz)

Auxiliary power

—

Separate supply voltage

—

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for level

SITRANS P320 / SITRANS P420 for level

Certificates and approvals

Classification according to pressure equipment directive (PED 2014/68/EU)

Drinking water

- WRAS (England)
- ACS (France)
- DVGW (Germany)
- NSF (USA)

CRN (Canada)

Explosion protection acc. to NEPSI (China)

Explosion protection acc. to INMETRO (Brazil)

BAM (Germany), oxygen expenditures

Explosion protection

- Intrinsic safety "i"
 - Marking
 - Permissible ambient temperature
 - Permissible temperature of measuring medium
 - Connection
- Effective internal inductance/capacitance
- Flameproof enclosure "d"
 - Marking
 - Permissible ambient temperature
 - Permissible temperature of measuring medium
 - Connection
- Dust explosion protection for Zone 20, 21, 22
 - Marking
 - Permissible ambient temperature
 - Permissible temperature of measuring medium
 - Max. surface temperature
 - Connection
- Dust explosion protection for Zone 20, 21, 22
 - Marking
 - Permissible ambient temperature
 - Permissible temperature of measuring medium
 - Connection
- Effective internal inductance/capacitance
- Type of protection for Zone 2
 - Marking
 - Permissible ambient temperature "ec"
 - Permissible ambient temperature "ic"
 - Permissible temperature of measuring medium
 - "ec" connection
 - "ic" connection

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

Available soon

Available soon

Available soon

Available soon

Available soon

Available soon

Available soon

Available soon

II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb

-40 ... +80 °C (-40 ... +176 °F) temperature class T4

-40 ... +70 °C (-40 ... +158 °F) temperature class T6

-40 ... +100 °C (-40 ... +212 °F) temperature class T4

-40 ... +70 °C (-40 ... +158 °F) temperature class T6

To certified intrinsically safe circuits with peak values:

$U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$

$U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$

$L_i = 0.24 \text{ } \mu\text{H/C}_i = 3.29 \text{ nF}$

Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb

-40 ... +80 °C (-40 ... +176 °F) temperature class T4

-40 ... +70 °C (-40 ... +158 °F) temperature class T6

-40 ... +100 °C (-40 ... +212 °F) temperature class T4

-40 ... +70 °C (-40 ... +158 °F) temperature class T6

To a circuit with the operating values:

$U_n = 10.5 \text{ to } 45 \text{ V}$, $4 \text{ ... } 20 \text{ mA}$

Ex II 1D Ex tb IIIC T120 °C Da

Ex II 2D Ex tb IIIC T120 °C Db

Ex II 3D Ex tc IIIC T120 °C Dc

-40 ... +80 °C (-40 ... +176 °F)

-40 ... +100 °C (-40 ... +212 °F)

120 °C (248 °F)

To a circuit with the operating values:

$U_n = 10.5 \text{ to } 45 \text{ V}$, $4 \text{ ... } 20 \text{ mA}$

Ex II 1D Ex ia IIIC T120 °C Da

Ex II 2D Ex ib IIIC T120 °C Db

Ex II 3D Ex ic IIIC T120 °C Dc

-40 ... +80 °C (-40 ... +176 °F)

-40 ... +100 °C (-40 ... +212 °F)

To certified intrinsically safe circuits with the peak values:

$U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$

$U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$

$L_i = 0.24 \text{ } \mu\text{H/C}_i = 3.29 \text{ nF}$

Ex II 3G Ex ec IIC T4/T6 Gc

Ex II 3G Ex ic IIC T4/T6 Gc

-40 ... +80 °C (-40 ... +176 °F) temperature class T4

-40 ... +40 °C (-40 ... +104 °F) temperature class T6

-40 ... +80 °C (-40 ... +176 °F) temperature class T4

-40 ... +80 °C (-40 ... +176 °F) temperature class T6

-40 ... +100 °C (-40 ... +212 °F) temperature class T4

-40 ... +70 °C (-40 ... +158 °F) temperature class T6

To a circuit with the operating values:

$U_n = 10.5 \text{ to } 30 \text{ V}$, $4 \text{ ... } 20 \text{ mA}$

To certified intrinsically safe circuits with the peak values:

$U_i = 30 \text{ V}$, $I_i = 101 \text{ mA}$, $P_i = 760 \text{ mW}$

$U_i = 29 \text{ V}$, $I_i = 110 \text{ mA}$, $P_i = 800 \text{ mW}$

Effective internal inductance/capacitance:

$L_i = 0.24 \text{ } \mu\text{H/C}_i = 3.29 \text{ nF}$

SITRANS P320 / SITRANS P420 for level

- | | |
|---|--|
| <ul style="list-style-type: none"> • Explosion protection acc. to FM <ul style="list-style-type: none"> - Marking (XP/DIP) or IS; NI; S • Explosion protection according to CSA <ul style="list-style-type: none"> - Marking (XP/DIP) or (IS) | Available soon
CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III
Available soon
CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III |
|---|--|

1) Specification only applies to the basic unit. The remote seal error must be considered additively.

2) Han 8D is identical to Han 8U.

HART communication

HART	230 ... 1100 Ω
Protocol	HART 7
Software for computer	SIMATIC PDM

Mounting flange

Nominal diameter	Nominal pressure
• Acc. to EN 1092-1	
- DN 80	PN 40
- DN100	PN 16, PN 40
• According to ASME B16.5	
- 3 inch	Class 150, class 300
- 4 inch	Class 150, class 300

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for level

Selection and ordering data

Article No.

Pressure transmitters for level

SITRANS P320

7MF036 - - - - -

SITRANS P420

7MF046 - - - - -

➤ Click on the Article no. for the online configuration in the PIA Life Cycle Portal.

Communication

HART, 4 ... 20 mA

Measuring cell filling

Silicone oil

Inert liquid

Neobee oil

Maximum measuring span

250 mbar (100.5 inH₂O)

600 mbar (241 inH₂O)

1 600 mbar (643 inH₂O)

5000 mbar (72.5 psi)

Process connection

Version for diaphragm seal with mounting thread $7/16$ -20 UNF (IEC 61518)

Wetted parts materials: Process connection, seal diaphragm

Stainless steel 316L/1.4404, stainless steel 316L/1.4404

Non-wetted parts materials

Die-cast aluminum

Stainless steel precision casting CF3M/1.4409 similar to 316L

Enclosure

Dual chamber device

Type of protection

Without Ex

Intrinsic safety

Flameproof enclosure

Flameproof enclosure, intrinsic safety

Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2

Dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2

Combination of options B, C and L (zone model)

Combination of options B, C and M (zone model, Class Division)

Electrical connections/cable entries

Thread for cable gland

• 2 x M20 x 1.5

• 2 x 1/2-14 NPT

Local operation/display

Without display (cover closed)

With display (cover closed)

With display (cover with glass pane)

0

1

3

4

G

H

M

P

V

0

1

2

5

A

B

C

D

L

M

S

T

F

M

0

1

2

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for level

1

Selection and ordering data

Options	Order code	Options	Order code
Add "-Z" to article no. and specify order code.		Device options	
Cable glands included		PDF file with device settings	D10
Plastic	A00	Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and cover	D20
Metal	A01	FVMQ enclosure sealing	D21
Stainless steel	A02	IP66/IP68 degree of protection (not for M12 and Han device plugs)	D30
Stainless steel 316L/1.4404	A03	TAG label empty	D40
CMP, for XP devices	A10	Without labeling of the measuring range on the TAG label	D41
CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A11	Stainless steel Ex plate 1.4404/316L	D42
CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A12	Increase of pressure stage from PN 420 to PN 500	D50
Han device plug mounted left		Overvoltage protection up to 6 kV (external)	D71
Han 7D device plug (plastic, straight)	A30	Adhesive labels on transport packaging (supplied by customer)	D90
Han 7D device plug (plastic, angled)	A31		
Han 7D device plug (metal, straight)	A32	General approval without Ex approval	
Han 7D device plug (metal, angled)	A33	Worldwide (CE, RCM) except EAC, FM, CSA, KCC	E00
Han 8D device plug (plastic, straight)	A34	Worldwide (CE, RCM, EAC, FM, CSA, KCC)	E01
Han 8D device plug (plastic, angled)	A35	CSA	E06
Han 8D device plug (metal, straight)	A36	EAC	E07
Han 8D device plug (metal, angled)	A37	FM	E08
Cable socket included		KCC	E09
Plastic, for Han 7D/8D device plugs	A40	UL	E10
Metal, for Han 7D/8D device plugs	A41	Explosion protection approvals	
M12 device plug mounted left		ATEX (Europe)	E20
Stainless steel, without cable socket	A62	CSA (USA and Canada)	E21
Stainless steel, with cable socket	A63	FM (USA and Canada)	E22
Cable entry/connector mounting		IECEx (Worldwide)	E23
2x sealing plugs M20 x 1.5, IP66/68 installed on both sides	A90	EACEx (GOST-R, -K, -B)	E24
2x sealing plugs ½-14 NPT, IP66/68 installed on both sides	A91	INMETRO (Brazil)	E25
Cable gland/connector mounted left	A97	KCs (Korea)	E26
Cable gland/connector mounted on right	A99	NEPSI (China)	E27
Nameplate labeling		PESO (India)	E28
German (bar)	B11	TIIS Hazardous (Japan)	E29
French (bar)	B12	UKR Sepro (Ukraine)	E30
Spanish (bar)	B13	ATEX (Europe) and IECEx (Worldwide)	E47
Italian (bar)	B14	CSA (Canada) and FM (USA)	E48
Chinese (bar)	B15	ATEX (Europe) and IECEx (Worldwide) + CSA (Canada) and FM (USA)	E49
Russian (bar)	B16	Marine approvals	
English (psi)	B20	DNV-GL (Det Norske Veritas/Germanischer Lloyd)	E50
Chinese (Pa)	B35	LR (Lloyds Register)	E51
Certificates		BV (Bureau Veritas)	E52
Quality test certificate, 5-point factory calibration (IEC 60770-2)	C11	ABS (American Bureau of Shipping)	E53
Acceptance certificate (EN 10204-3.1) - Material of pressurized and wetted parts	C12	KR (Korean Register of Shipping)	E56
Test report - NACE (MR 0103-2012 and MR 0175-2009)	C13	RINA (Registro Italiano Navale)	E57
Test report (EN 10204-2.2) - Wetted parts	C14	CCS (China Classification Society)	E58
Acceptance certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts	C15	Country-specific approvals	
Certificates for functional safety		CRN approval Canada (Canadian Registration Number)	E60
Functional safety (IEC 61508) - SIL2/3	C20		

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

1

for level

Options	Order code
Special approvals	
Oxygen application (with inert liquid, max. 100 bar (1 450 psi) at 60° C (140 °F))	E80
Dual seal	E81
WRC / WRAS (drinking water); only with pressure cap O-rings made of EPDM	E83
NSF61 (drinking water)	E84
ACS (drinking water)	E85

Selection and ordering data

Customer-specific device settings	Order code
Add "-Z" to article no., specify order code and plain text or drop-down list selection.	
Measuring span Start of scale value (max. 5 characters), full scale value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Drop-down list: Pa, MPa, kPa, hPa, bar, mbar, psi, g/cm ² , kg/cm ² , kgf/cm ² , inH ₂ O, inH ₂ O (4°C), ftH ₂ O, mmH ₂ O, mmH ₂ O (4°C), mH ₂ O (4°C), mmHg, inHg, atm, torr	Y01
TAG (on stainless steel plate and device parameters, max. 32 characters) Input field: Free text, max. 32 characters	Y15
Measuring point description (on stainless steel plate and device parameters, max. 32 characters) Input field: Free text, max. 32 characters	Y16
TAG short (device parameters, max. 8 characters) Input field: Free text, max. 8 characters	Y17
Local display [Pressure, Percent], reference [None, Absolute, Relative], example: Pressure gauge Drop-down list: Percent, pressure unit, pressure unit abs., pressure unit gauge	Y21
Local display Scaling with standard units [m³/s, l/s, m, inch, ...], example 1 ... 5 m Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Drop-down list: m, cm, mm, in, ft, m ³ , l, hl, in ³ , ft ³ , yd ³ , gal, gal (UK), bu, bbl, bbl (US), SCF, Nm ³ , NI.	Y22
Local display Scaling with user-specific units (max. 12 characters), example 1 ... 5 m Input field 1 and input field 2: max. 5 characters and numbers only; decimal places as dot (comma is automatically converted to dot). Input field 3: Free text, max. 8 characters	Y23
Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA Drop-down list 1: 3.9, 4 Drop-down list 2: 20.8, 22	Y30
Fault current instead of 3.6 mA [22.5 mA, 22.8 mA] Drop-down list: 3.75; 21.75; 22.5; 22.6	Y31
Damping in seconds instead of 2 s (0.0 ... 100.0 s) Input field: max. 4 characters and numbers only; decimal places as dot (comma is automatically converted to dot); min. value = 0; max. value = 100.	Y32
ID number of special version Input field: max. 4 characters and only natural numbers from 0 ... 9999	Y99

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for level

1

Selection and Ordering data			Article No.	Order code
Diaphragm seal			7MF0814 -	
Flange type design, direct connected to a SITRANS P transmitter for level 7MF03../7MF04.. (order separately) Scope of delivery: 1 off			03 - 0	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.				
Connecting standard EN 1092-1				
Nominal diameter	Nominal pressure			
DN 40	PN 10/16/25/40	0DD		
	PN 63/100	0DF		
	PN 160	0DG		
DN 50	PN 10/16/25/40	0ED		
	PN 63/100	0EE		
	PN 160	0EF		
DN 80	PN 10/16/25/40	0GD		
	PN 100	0GF		
DN 100	PN 10/16	0HB		
	PN 25/40	0HD		
DN 125	PN 16	0JB		
	PN 40	0JD		
Connecting standard ASME B16.5				
Nominal diameter	Nominal pressure			
1½ inch	class 150	1LA		
	class 300	1LB		
	class 400/600	1LD		
	class 900/1500	1LF		
2 inch	class 150	1MA		
	class 300	1MB		
	class 400/600	1MD		
	class 900/1500	1MF		
3 inch	class 150	1PA		
	class 300	1PB		
	class 600	1PD		
	class 1500	1PF		
4 inch	class 150	1QA		
	class 300	1QB		
	class 400	1QD		
	class 1500	1QF		
5 inch	class 150	1RA		
	class 300	1RB		
	class 400	1RC		
Connecting standard J.I.S.				
Nominal diameter	Nominal pressure			
DN 50	10K	2ES		
	20k	2ET		
	50K	2EU		
DN 80	10K	2GS		
	20k	2GT		
	50K	2GU		
DN 100	10K	2HS		
	20k	2HT		
	50K	2HU		
Other version		9AA		H1Y
Add Order code and plain text				
Selection and Ordering data			Article No.	Order code
Diaphragm seal			7MF0814 -	
Flange type design, direct connected to a SITRANS P transmitter for level 7MF03../7MF04.. (order separately) Scope of delivery: 1 off			03 - 0	
Filling liquid				
Silicone oil M5			A	
Silicone oil M50			B	
High-temperature oil			C	
Halocarbon oil			D	
Food-grade oil (FDA listed)			E	
Other version, add Order code and plain text:			Z	P1Y
Filling liquid: ...				
Wetted parts materials				
Stainless steel 316L			A	
• Without coating			D	
• With PFA coating			E0	
• With PTFE coating			F	
• With ECTFE coating			G	
Monel 400, 2.4360			J	
Hastelloy C276, 2.4819			K	
Tantalum			L0	
Titanium, 3.7035			M0	
Nickel 201			Q	
Diaphragm Duplex, 1.4462			R	
Diaphragm plus flange Duplex, 1.4462			S0	
Stainless steel 316L with gold coating			U0	
Hastelloy C4, 2.4610			V0	
Hastelloy C22, 2.4602			Z8	Q1Y
Other version				
Add Order code and plain text				
Extension length				
• without			0	
• 50 mm (2")			1	
• 100 mm (4")			2	
• 150 mm (6")			3	
• 200 mm (8")			4	
• 250 mm (10")			5	
Other version			Z8	Q1Y
Add Order code and plain text				

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for level

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Selection and Ordering data

Article No.

Order
code

Diaphragm seal

Flange type design, direct connected to a SITRANS P transmitter for level
7MF03../7MF04.. (order separately)
Scope of delivery: 1 off

7MF0814 -

03 - 0

Customer-specific extension length

Wetted parts stainless steel without coating

Range	Standard length	
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	A 1
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	A 2
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	A 3
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	A 4
201 ... 250 mm (7.91 ... 9.84")	250 mm (9.84")	A 5

Wetted parts stainless steel with ECTFE coating

Range	Standard length	
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	F 1
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	F 2
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	F 3
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	F 4
201 ... 250 mm (7.91 ... 9.84")	250 mm (9.84")	F 5

Wetted parts stainless steel with PFA coating

Range	Standard length	
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	D 1
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	D 2
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	D 3
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	D 4
201 ... 250 mm (7.91 ... 9.84")	250 mm (9.84")	D 5

• Wetted parts Monel 400

Range	Standard length	
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	G 1
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	G 2
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	G 3
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	G 4

• Wetted parts Hastelloy C276

Range	Standard length	
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	J 1
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	J 2
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	J 3
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	J 4

Selection and Ordering data

Article No.

Order
code

Diaphragm seal

Flange type design, direct connected to a SITRANS P transmitter for level
7MF03../7MF04.. (order separately)
Scope of delivery: 1 off

7MF0814 -

03 - 0

• Wetted parts Tantalum

Range	Standard length	
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	K 1
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	K 2
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	K 3
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	K 4

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for level

1

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Further designs		Further designs	
Add "-Z" to Article No. and specify Order code.		Add "-Z" to Article No. and specify Order code.	
Factory certificates		Sealing surface	
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11	Operating Temperature; Lower range value ... °C (°F), upper range value ... °C (°F)	Y10
Inspection certificate to EN 10204-3.1 - material of body and wetted parts	C12	Static pressure: ... bar (psi)	Y11
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)	C13	Customer specific extension length (enter required length in plain text)	Y44
Inspection certificate (EN 10204-3.1) - PMI test of pressure containing and wetted parts	C15		
Certificate of FDA-approved fill oil (to EN10204-2.2)	C17		
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (Includes SIL conformity declaration)	C20		
Accessories			
Spark arrester (for differential pressure and level transmitter)	D62		
Low-temperature version (for Silicon Oil M50 only)	D67		
Negative pressure services			
Certification acc. to NACE MR-0103	D83		
Includes acceptance test certificate 3.1 acc. to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	D88		
General product approvals without explosion proof approvals			
Oil-and grease-free cleaned version (for O ₂ -appl. including certificate EN10204-2.2 (only with fill fluid Halocarbon oil max. temperature 60 °C and max. pressure 50 bar)	E80		
Oil-and grease-free cleaned version (not for O ₂ -appl. including certificate EN10204-2.2 (only with fill fluid Halocarbon oil)	E87		
Sealing surface			
Sealing surface smooth, form B2/EN1092-1 resp. RFSF/ANSI B16.5 (wetted parts 316L only)	M50		
Sealing surface groove to EN1092-1, form D (instead of sealing surface B1, wetted parts 316L only)	M54		
Sealing surface RJF (groove) to ASME B16.5 (instead of sealing surface RF 125...250AA, wetted parts 316L only)	M64		
Sealing surface with tongue to EN1092-1, form C (wetted parts 316L only)			
• DN 40	M71		
• DN 50	M72		
• DN 80	M73		
• DN 100	M74		
• DN 125	M75		
Sealing surface with spigot to EN1092-1, form E (wetted parts 316L only)			
• DN 40	M77		
• DN 50	M78		
• DN 80	M79		
• DN 100	M80		
• DN 125	M81		
Sealing surface with recess to EN1092-1, form F (wetted parts 316L only)			
• DN 50	M84		
• DN 80	M85		
• DN 100	M86		
• DN 125	M87		

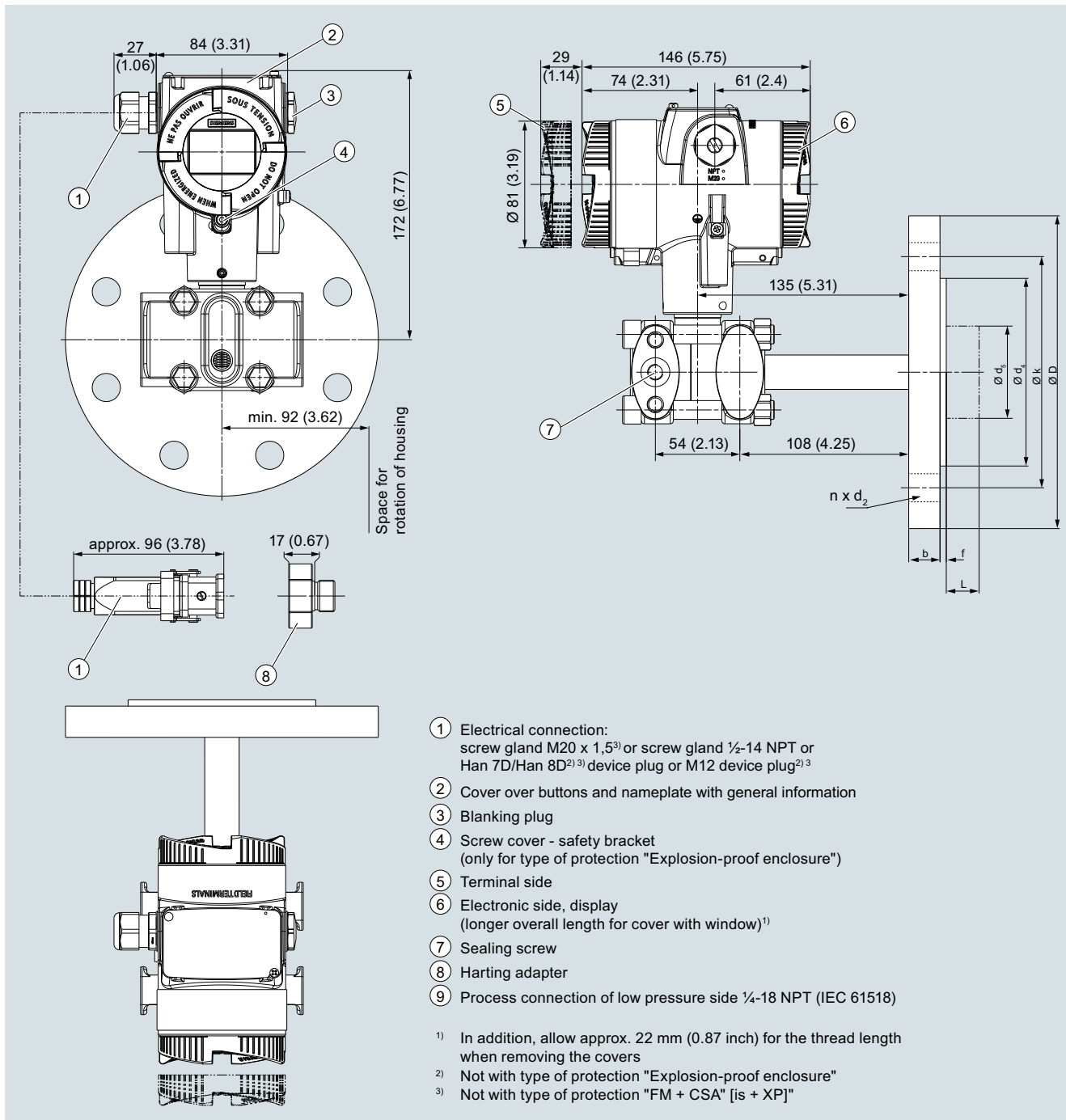
Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for level

Dimensional drawings



SITRANS P320/P420 pressure transmitter for level, including mounting flange, dimensions in mm (inch)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for level

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Connection to EN 1092-1

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with tube	d _M without tube	f	k	n	L
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
DN 40	PN 10/16/25/40	16	150	18	88	38	30	42	2	110	4	0, 50, 100, 150 or 200
	PN 63/100	24	170	22	88	38	30	42	2	125	4	
	PN 160	26	170	22	88	38	30	42	2	125	4	
DN 50	PN 10/16/25/40	18	165	18	102	48.3	40	51	2	125	4	
	PN 63/100	26	195	26	102	48.3	40	51	2	145	4	
	PN 160	28	195	26	102	48.3	40	51	2	145	4	
DN 80	PN 10/16/25/40	22	200	18	138	76	65	85	2	160	8	
	PN 100	30	230	26	138	76	65	85	2	180	8	
DN 100	PN 10/16	18	220	18	158	94	85	85	2	180	8	
	PN 25/40	22	235	22	162	94	85	85	2	190	8	
DN 125	PN 16	20	250	18	188	127	85	116	2	210	8	
	PN 40	24	270	26	188	127	85	116	2	220	8	

Connection according to ASME B16.5

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with tube	d _M without tube	f	k	n	L
	lb/sq.in.	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)		inch (mm)
1½ inch	150	0.63 (15.9)	4.92 (125)	0.63 (15.9)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.08 (2)	3.87 (98.4)	4	0, 2, 3.94, 5.94 or 7.87 (0, 50, 100, 150 or 200)
	300	0.75 (19.1)	6.10 (155)	0.87 (22.2)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.08 (2)	4.5 (114.3)	4	
	400/600	0.88 (22.3)	6.10 (155)	0.87 (22.2)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.28 (7)	4.5 (114.3)	4	
	900/1500	1.25 (31.8)	7.09 (180)	1.13 (28.6)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.28 (7)	4.87 (123.8)	4	
2 inch	150	0.69 (17.5)	5.91 (150)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.08 (2)	4.75 (120.7)	4	
	300	0.81 (20.7)	6.5 (165)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.08 (2)	5 (127)	8	
	400/600	1.00 (25.4)	6.5 (165)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.28 (7)	5 (127)	8	
	900/1500	1.5 (38.1)	8.46 (215)	1.00 (25.4)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.28 (7)	6.5 (165.1)	8	
3 inch	150	0.88 (22.3)	7.48 (190)	0.75 (19.1)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.08 (2)	6 (152.4)	4	
	300	1.06 (27)	8.27 (210)	0.87 (22.2)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.08 (2)	6.63 (168.3)	8	
	600	1.23 (31.8)	8.27 (210)	0.87 (22.2)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.28 (7)	6.63 (168.3)	8	
	1500	1.88 (47.7)	10.43 (265)	1.25 (31.8)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.28 (7)	8 (203.2)	8	
4 inch	150	0.88 (22.3)	9.06 (230)	0.75 (19.1)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.08 (2)	7.5 (190.5)	8	
	300	1.19 (30.2)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.08 (2)	7.87 (200)	8	
	400	1.38 (35)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.28 (7)	7.87 (200)	8	
	1500	2.13 (54)	12.20 (310)	1.37 (34.9)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.28 (7)	9.5 (241.3)	8	
5 inch	150	0.88 (22.3)	10.04 (255)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.08 (2)	8.5 (215.9)	8	
	300	1.31 (33.4)	11.02 (280)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.08 (2)	9.25 (235)	8	
	400	1.50 (38.1)	11.02 (280)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.28 (7)	9.25 (235)	8	

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P320/P420

for level

Process connection according to J.I.S

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with tube	d _M without tube	f	k	n	L
		mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)		mm (inch)
DN 50	10K	14 (0.55)	155 (6.10)	19 (0.75)	96 (3.78)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	120 (4.72)	4	0, 50, 100, 150 or 200 (0, 2, 3.94, 5.94 or 7.87)
	20K	16 (0.63)	165 (6.50)	19 (0.75)	96 (3.78)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	120 (4.72)	8	
	40K	26 (1.02)	165 (6.50)	19 (0.75)	105 (4.13)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	130 (5.12)	8	
DN 80	10K	16 (0.63)	185 (7.28)	19 (0.75)	126 (4.96)	76 (2.99)	65 (2.56)	85 (3.35)	2	150 (5.91)	8	
	20K	20 (0.79)	200 (7.87)	23 (0.91)	132 (5.20)	76 (2.99)	65 (2.56)	85 (3.35)	2	160 (6.30)	8	
	40K	32 (1.26)	210 (8.27)	23 (0.91)	140 (5.51)	76 (2.99)	65 (2.56)	85 (3.35)	2	170 (6.30)	8	
DN 100	10K	16 (0.63)	210 (8.27)	19 (0.75)	151 (5.94)	94 (3.7)	85 (3.35)	85 (3.35)	2	175 (6.89)	8	
	20K	22 (0.87)	225 (8.86)	23 (0.91)	160 (6.30)	94 (3.7)	85 (3.35)	85 (3.35)	2	185 (7.28)	8	
	40K	36 (1.42)	250 (9.84)	25 (0.98)	165 (6.50)	94 (3.7)	85 (3.35)	85 (3.35)	2	205 (8.07)	8	

d: Internal diameter of seal according to DIN 2690

d_M: Effective diaphragm diameter

Overview

SITRANS P DS III pressure transmitters are digital pressure transmitters featuring extensive user-friendliness and high accuracy. The parameterization is performed using control keys or via HART, PROFIBUS-PA or FOUNDATION Fieldbus interface.

Extensive functionality enables the pressure transmitter to be precisely adapted to the plant's requirements. Operation is very simple in spite of the numerous setting options.

Transmitters with type of protection "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The transmitters are provided with an EC type examination certificate and comply with the corresponding harmonized European standards (ATEX).

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

Various versions of the DS III pressure transmitters are available for measuring:

- Gauge pressure
- Absolute pressure
- Differential pressure
- Level
- Volume level
- Mass level
- Volume flow
- Mass flow

Benefits

- High quality and service life
- High reliability even under extreme chemical and mechanical loads
- For aggressive and non-aggressive gases, vapors and liquids
- Extensive diagnosis and simulation functions
- Separate replacement of measuring cell and electronics without recalibration
- Minimum conformity error
- Good long-term stability
- Wetted parts made of high-grade materials (e.g. stainless steel, Hastelloy, gold, Monel, tantalum)

- Infinitely adjustable span from 0.01 bar to 700 bar (0.15 psi to 10153 psi) for DS III with HART interface
- Nominal measuring range from 1 bar to 700 bar (14.5 psi to 10153 psi) for DS III with PROFIBUS PA and FOUNDATION Fieldbus interface
- High measuring accuracy
- Parameterization over control keys and HART or PROFIBUS PA, or FOUNDATION Fieldbus interface.

Application

The pressure transmitters of the DS III series, can be used in industrial areas with extreme chemical and mechanical loads. Electromagnetic compatibility in the range 10 kHz to 1 GHz makes the DS III pressure transmitters suitable for locations with high electromagnetic emissions.

Pressure transmitters with type of protection "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The pressure transmitters are provided with an EC type examination certificate and comply with the corresponding harmonized European standards (ATEX).

Pressure transmitters with the type of protection "Intrinsic safety" for use in zone 0 may be operated with power supply units of category "ia" and "ib".

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

The pressure transmitter can be programmed locally using the 3 control buttons or externally via HART or PROFIBUS PA or FOUNDATION Fieldbus interface.

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P DS III

Technical description

Pressure transmitter for gauge pressure

Measured variable: Gauge pressure of aggressive and non-aggressive gases, vapors and liquids.

Span (infinitely adjustable)

for DS III with HART: 0.01 bar to 700 bar (0.15 psi to 10153 psi)

Nominal measuring range

for DS III with PROFIBUS PA and FOUNDATION Fieldbus:
1 bar to 700 bar (14.5 psi to 10153 psi)

Pressure transmitters for absolute pressure

Measured variable: Absolute pressure of aggressive and non-aggressive gases, vapors and liquids.

Span (infinitely adjustable)

for DS III with HART: 8.3 mbar a ... 100 bar a (0.12 ... 1450 psi a)

Nominal measuring range

for DS III with PROFIBUS PA and FOUNDATION Fieldbus:
250 mbar a ... 100 bar a (3.6 ... 1450 psi a)

There are two series:

- Gauge pressure series
- Differential pressure series

Pressure transmitters for differential pressure and flow

Measured variables:

- Differential pressure
- Small positive or negative pressure
- Flow $q \sim \sqrt{\Delta p}$ (together with a primary differential pressure device (see Chapter "Flow Meters"))

Span (infinitely adjustable)

for DS III with HART: 1 mbar ... 30 bar (0.0145 ... 435 psi)

Nominal measuring range

for DS III with PROFIBUS PA and FOUNDATION Fieldbus:
20 mbar ... 30 bar (0.29 ... 435 psi)

Pressure transmitters for level

Measured variable: Level of aggressive and non-aggressive liquids in open and closed vessels.

Span (infinitely adjustable)

for DS III with HART: 25 mbar ... 5 bar (0.363 ... 72.5 psi)

Nominal measuring range

for DS III with PROFIBUS PA and FOUNDATION Fieldbus:
250 mbar ... 5 bar (3.63 ... 72.5 psi)

Nominal diameter of the mounting flange

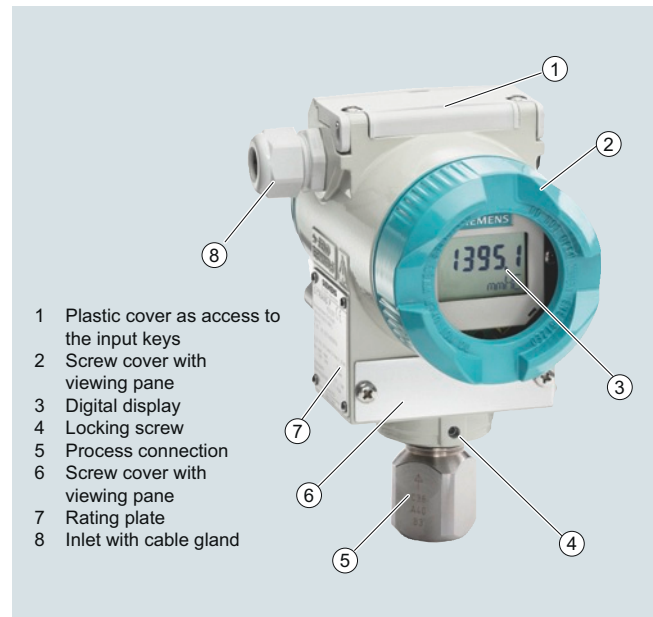
- DN 80 or DN 100
- 3 inch or 4 inch

In the case of level measurements in open containers, the low-pressure connection of the measuring cell remains open (measurement "compared to atmospheric").

In the case of measurements in closed containers, the lower-pressure connection has to be connected to the container in order to compensate the static pressure.

The wetted parts are made from a variety of materials, depending on the degree of corrosion resistance required.

Design



Front view

The transmitter consists of various components depending on the order. The possible versions are listed in the ordering information. The components described below are the same for all transmitters.

The rating plate (7, Figure "Front view") with the Article No. is located on the side of the housing. The specified number together with the ordering information provide details on the optional design details and on the possible measuring range (physical properties of built-in sensor element).

The approval label is located on the opposite side.

The housing is made of die-cast aluminium or stainless steel precision casting. A round cover (6) is screwed on at the front and rear of the housing. The front cover can be fitted with a viewing pane so that the measured values can be read directly on the display. The inlet (8) for the electrical connection is located either on the left or right side. The unused opening on the opposite side is sealed by a blanking plug. The protective earth connection is located on the rear of the housing.

The electrical connections for the power supply and screen are accessible by unscrewing the rear cover. The bottom part of the housing contains the measuring cell with process connection (5). The measuring cell is prevented from rotating by a locking screw (4). As the result of this modular design, the measuring cell and the electronics can be replaced separately from each other. The set parameter data are retained.

At the top of the housing is a plastic cover (1), which hides the input keys.

Example for an attached measuring point label

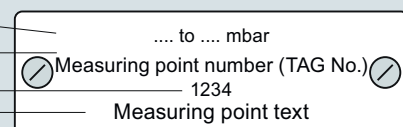
Y01 or Y02

= max. 27 char.

Y15 = max. 16 char.

Y99 = max. 10 char.

Y16 = max. 27 char.



Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

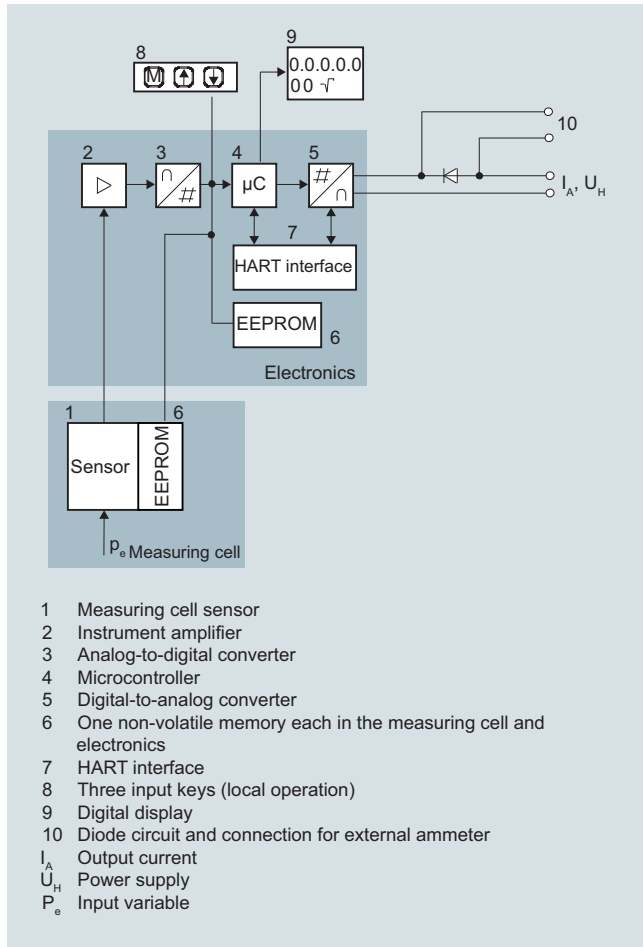
SITRANS P DS III

Technical description

1

Function

Operation of electronics with HART communication



Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of the electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in a microcontroller, its linearity and temperature response corrected, and converted in a digital-to-analog converter (5) into an output current of 4 to 20 mA.

The diode circuit (10) protects against incorrect polarity.

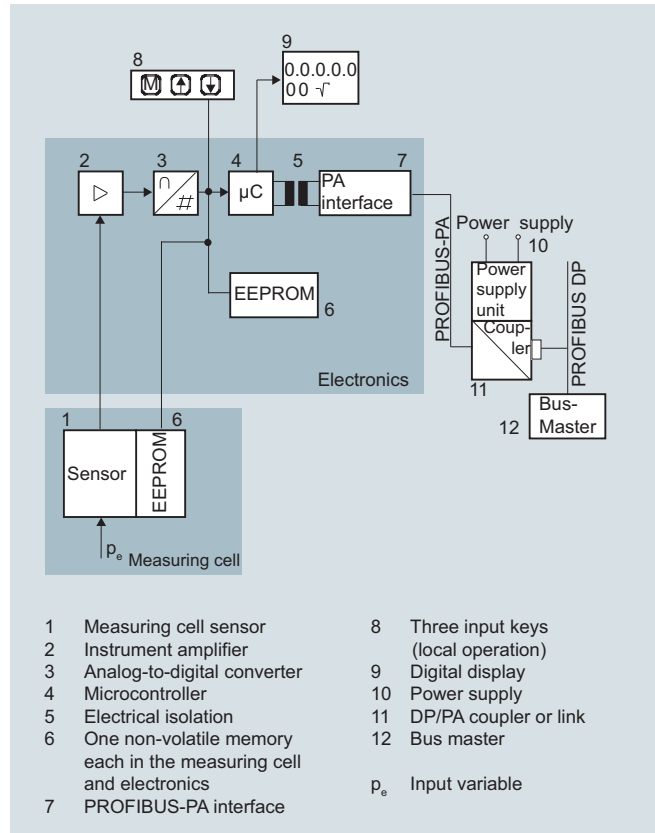
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the 3 input keys (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The HART modem (7) permits parameterization using a protocol according to the HART specification.

The pressure transmitters with spans ≤ 63 bar measure the input pressure compared to atmosphere, transmitters with spans ≥ 160 bar compared to vacuum.

Operation of electronics with PROFIBUS PA communication



Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of the electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, its linearity and temperature response corrected, and provided on the PROFIBUS PA through an electrically isolated PA interface (7).

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the three input buttons (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The results with status values and diagnostic values are transferred by cyclic data transmission on the PROFIBUS PA. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as SIMATIC PDM is required for this.

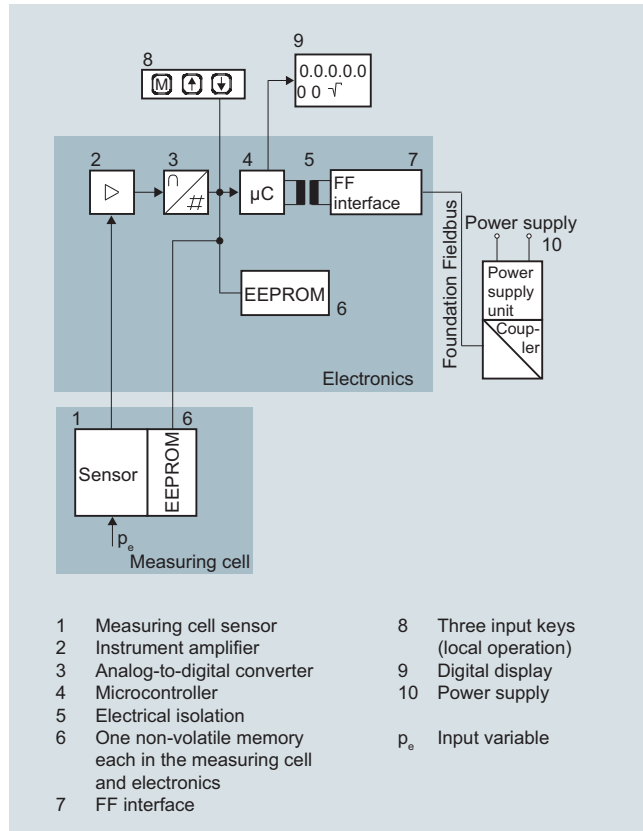
Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P DS III

1

Technical description

Operation of electronics with FOUNDATION Fieldbus communication



Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, its linearity and temperature response corrected, and provided on the FOUNDATION Fieldbus through an electrically isolated FOUNDATION Fieldbus interface (7).

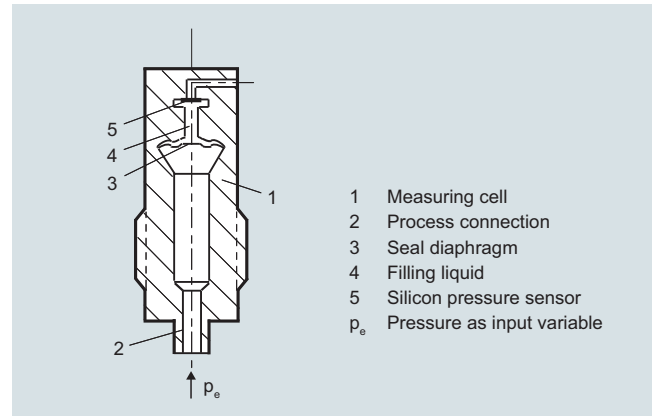
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the three input buttons (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The results with status values and diagnostic values are transferred by cyclic data transmission on the FOUNDATION Fieldbus. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as National Instruments Configurator is required for this.

Mode of operation of the measuring cells

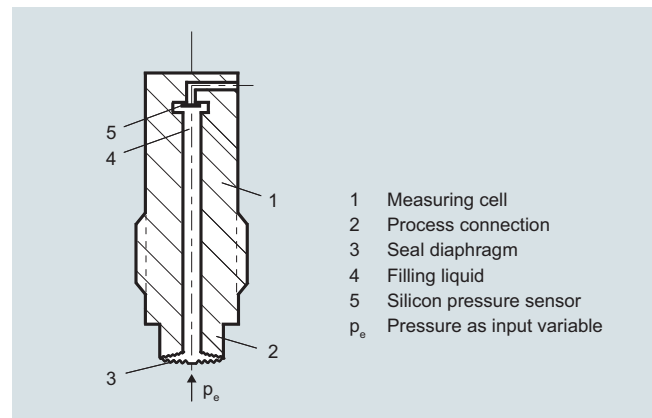
Measuring cell for gauge pressure



Measuring cell for gauge pressure, function diagram

The pressure p_e is applied through the process connection (2, Figure "Measuring cell for gauge pressure, function diagram") to the measuring cell (1). This pressure is subsequently transmitted further through the seal diaphragm (3) and the filling liquid (4) to the silicon pressure sensor (5) whose measuring diaphragm is then flexed. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

Measuring cell for gauge pressure with front-flush diaphragm



Measuring cell for gauge pressure, with front-flush diaphragm for paper industry, function diagram

The pressure p_e is applied through the process connection (2, Figure "Measuring cell for gauge pressure, with front-flush diaphragm for paper industry, function diagram") to the measuring cell (1). This pressure is subsequently transmitted further through the seal diaphragm (3) and the filling liquid (4) to the silicon pressure sensor (5) whose measuring diaphragm is then flexed. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

Pressure Measurement

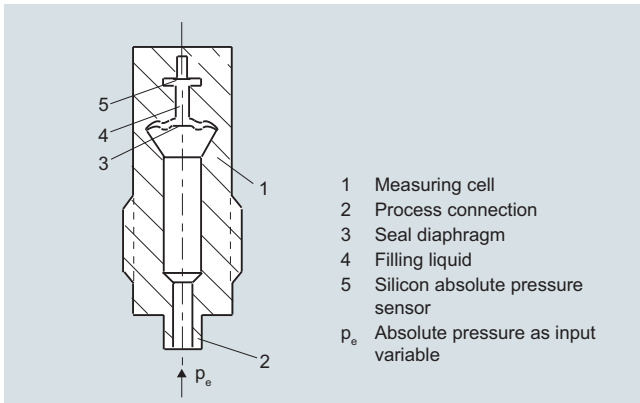
Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

Technical description

1

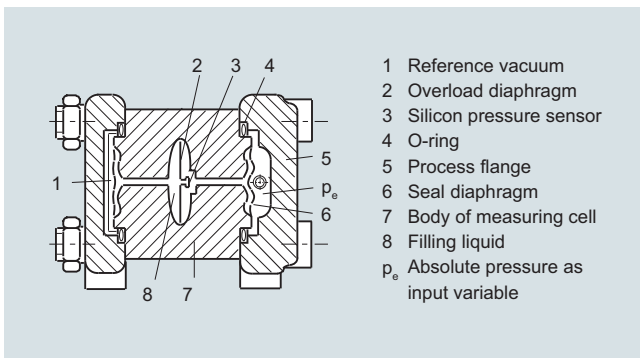
Measuring cell for absolute pressure from gauge pressure series



Measuring cell for absolute pressure from the pressure series, function diagram

The absolute pressure p_e is transmitted through the seal diaphragm (3, Figure "Measuring cell for absolute pressure from pressure series, gauge pressure, function diagram") and the filling liquid (4) to the silicon absolute pressure sensor (5) whose measuring diaphragm is then flexed. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

Measuring cell for absolute pressure from differential pressure series



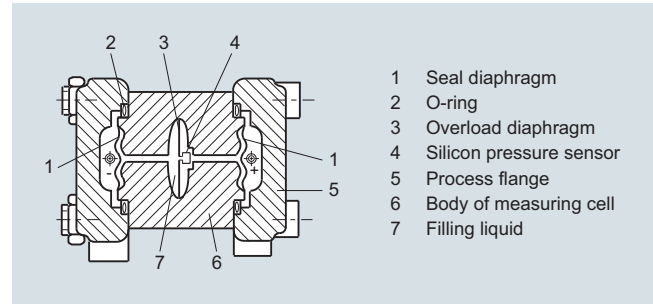
Measuring cell for absolute pressure from differential pressure series, function diagram

The input pressure p_e is transmitted through the seal diaphragm (6, Figure "Measuring cell for absolute pressure from differential pressure series, function diagram") and the filling liquid (8) to the silicon pressure sensor (3).

The difference in pressure between the input pressure p_e and the reference vacuum (1) on the low-pressure side of the measuring cell flexes the measuring diaphragm. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

An overload diaphragm is installed to provide protection from overloads. If the measuring limits are exceeded, the overload diaphragm (2) is flexed until the seal diaphragm rests on the body of the measuring cell (7), thus protecting the silicon pressure sensor from overloads.

Measuring cell for differential pressure and flow



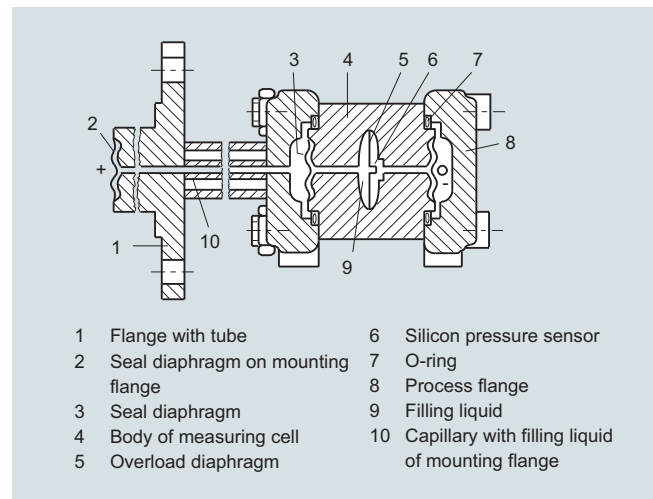
Measuring cell for differential pressure and flow, function diagram

The differential pressure is transmitted through the seal diaphragms (1, Figure "Measuring cell for differential pressure and flow, function diagram") and the filling liquid (7) to the silicon pressure sensor (4).

The measuring diaphragm is flexed by the applied differential pressure. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the differential pressure.

An overload diaphragm is installed to provide protection from overloads. If the measuring limits are exceeded, the overload diaphragm (3) is flexed until the seal diaphragm rests on the body of the measuring cell (6), thus protecting the silicon pressure sensor from overloads.

Measuring cell for level



Measuring cell for level, function diagram

The input pressure (hydrostatic pressure) acts hydraulically on the measuring cell through the seal diaphragm on the mounting flange (2, Figure "Measuring cell for level, function diagram"). This differential pressure is subsequently transmitted further through the measuring cell (3) and the filling liquid (9) to the silicon pressure sensor (6) whose measuring diaphragm is then flexed.

This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit.

This change in resistance results in a bridge output voltage proportional to the differential pressure.

An overload diaphragm is installed to provide protection from overloads. If the measuring limits are exceeded, the overload diaphragm (5) is flexed until the seal diaphragm rests on the body of the measuring cell (4), thus protecting the silicon pressure sensor from overloads.

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

1

Technical description

Parameterization DS III

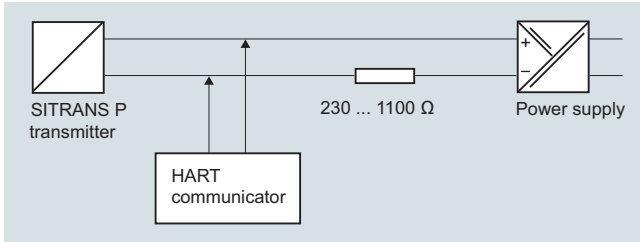
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

Parameterization using the input buttons (local operation)

With the input buttons you can easily set the most important parameters without any additional equipment.

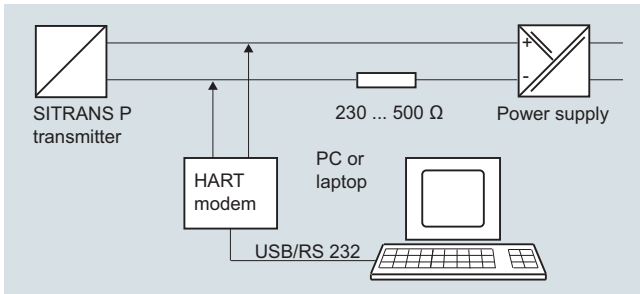
Parameterization using HART

Parameterization using HART is performed with a HART Communicator or a PC.



Communication between a HART Communicator and a pressure transmitter

When parameterizing with the HART Communicator, the connection is made directly to the 2-wire cable.



HART communication between a PC communicator and a pressure transmitter

When parameterizing with a PC, the connection is made through a HART modem.

The signals needed for communication in conformity with the HART 5.x or 6.x protocols are superimposed on the output current using the Frequency Shift Keying (FSK) method.

Adjustable parameters, DS III with HART

Parameters	Input keys (DS III HART)	HART communication
Start of scale	x	x
Full-scale value	x	x
Electrical damping	x	x
Start-of-scale value without application of a pressure ("Blind setting")	x	x
Full-scale value without application of a pressure ("Blind setting")	x	x
Zero adjustment	x	x
current transmitter	x	x
Fault current	x	x
Disabling of buttons, write protection	x	x ¹⁾
Type of dimension and actual dimension	x	x
Characteristic (linear / square-rooted)	x ²⁾	x ²⁾
Input of characteristic		x
Freely-programmable LCD		x
Diagnostic functions		x

¹⁾ Cancel apart from write protection

²⁾ Only differential pressure

Diagnostic functions for DS III with HART

- Zero correction display
- Event counter
- Limit transmitter
- Saturation alarm
- Slave pointer
- Simulation functions
- Maintenance timer

Available physical units of display for DS III with HART

Table style: Technical specifications 2

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm ² , kg/cm ² , inH ₂ O, inH ₂ O (4 °C), mmH ₂ O, ftH ₂ O (20 °C), inHg, mmHg
Level (height data)	m, cm, mm, ft, in
Volume	m ³ , dm ³ , hl, yd ³ , ft ³ , in ³ , US gallon, Imp. gallon, bushel, barrel, barrel liquid
Mass	g, kg, t, lb, Ston, Lton, oz
volume flow	m ³ /d, m ³ /h, m ³ /s, l/min, l/s, ft ³ /d, ft ³ /min, ft ³ /s, US gallon/min, US gallon/s
Mass flow	t/d, t/h, t/min, kg/d, kg/h, kg/min, kg/s, g/d, g/h, g/min, g/s, lb/d, lb/h, lb/min, lb/s, LTon/d, LTon/h, STon/d, STon/h, STon/min
Temperature	K, °C, °F, °R
Miscellaneous	%, mA

Parameterization through PROFIBUS PA interface

Fully digital communication through PROFIBUS PA, profile 3.0, is particularly user-friendly. Through the PROFIBUS the DS III with PROFIBUS PA is connected to a process control system, e. g. SIMATIC PSC 7. Communication is possible even in a potentially explosive environment.

For parameterization through PROFIBUS you need suitable software, e.g. SIMATIC PDM (Process Device Manager).

Parameterization through FOUNDATION Fieldbus interface

Fully digital communication through FOUNDATION Fieldbus is particularly user-friendly. Through the FOUNDATION Fieldbus the DS III with FOUNDATION Fieldbus is connected to a process control system. Communication is possible even in a potentially explosive environment.

For parameterization through the FOUNDATION Fieldbus you need suitable software, e.g. National Instruments Configurator.

Adjustable parameters for DS III with PROFIBUS PA and FOUNDATION Fieldbus

Parameters	Input keys	PROFIBUS PA and FOUNDATION Fieldbus interface
Electrical damping	x	x
Zero adjustment (correction of position)	x	x
Buttons and/or function disabling	x	x
Source of measured-value display	x	x
Physical dimension of display	x	x
Position of decimal point	x	x
Bus address	x	x
Adjustment of characteristic	x	x
Input of characteristic		x
Freely-programmable LCD		x
Diagnostics functions		x

Diagnostic functions for DS III with PROFIBUS PA and FOUNDATION Fieldbus

- Event counter
- Slave pointer
- Maintenance timer
- Simulation functions
- Display of zero correction
- Limit transmitter
- Saturation alarm

Physical dimensions available for the display

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	MPa, kPa, Pa, bar, mbar, torr, atm, psi, g/cm ² , kg/cm ² , mmH ₂ O, mmH ₂ O (4 °C), inH ₂ O, inH ₂ O (4 °C), ftH ₂ O (20 °C), mmHg, inHg
Level (height data)	m, cm, mm, ft, in, yd
Volume	m ³ , dm ³ , hl, yd ³ , ft ³ , in ³ , US gallon, Imp. gallon, bushel, barrel, barrel liquid
volume flow	m ³ /s, m ³ /min, m ³ /h, m ³ /d, l/s, l/min, l/h, l/d, Ml/d, ft ³ /s, ft ³ /min, ft ³ /h, ft ³ /d, US gallon/s, US gallon/min, US gallon/h, US gallon/d, bbl/s, bbl/min, bbl/h, bbl/d
Mass flow	g/s, g/min, g/h, g/d, kg/s, kg/min, kg/h, kg/d, t/s, t/min, t/h, t/d, lb/s, lb/min, lb/h, lb/d, STon/s, STon/min, STon/h, STon/d, LTon/s, LTon/min, LTon/h, LTon/d
Total mass flow	t, kg, g, lb, oz, LTon, STon
Temperature	K, °C, °F, °R
Miscellaneous	%

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for gauge pressure

Technical specifications

SITRANS P, DS III series for gauge pressure

Input

Measured variable

Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)

(for oxygen measurement, max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/process temperature)

Gauge pressure

HART

PROFIBUS PA/ FOUNDATION Fieldbus

Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure
8.3 ... 250 mbar 0.83 ... 25 kPa 0.12 ... 3.6 psi	250 mbar 25 kPa 3.6 psi	4 bar 400 kPa 58 psi	6 bar 600 kPa 87 psi
0.01 ... 1 bar 1 ... 100 kPa 0.15 ... 14.5 psi	1 bar 100 kPa 14.5 psi	4 bar 400 kPa 58 psi	6 bar 600 kPa 87 psi
0.04 ... 4 bar 4 ... 400 kPa 0.58 ... 58 psi	4 bar 400 kPa 58 psi	7 bar 0.7 MPa 102 psi	10 bar 1 MPa 145 psi
0.16 ... 16 bar 16 ... 1600 kPa 2.3 ... 232 psi	16 bar 1600 kPa 232 psi	21 bar 2.1 MPa 305 psi	32 bar 3.2 MPa 464 psi
0.63 ... 63 bar 63 ... 6300 kPa 9.1 ... 914 psi	63 bar 6300 kPa 914 psi	67 bar 6.7 MPa 972 psi	100 bar 10 MPa 1450 psi
1.6 ... 160 bar 0.16 ... 16 MPa 23 ... 2321 psi	160 bar 16 MPa 2321 psi	167 bar 16.7 MPa 2422 psi	250 bar 25 MPa 3626 psi
4 ... 400 bar 0.4 ... 40 MPa 58 ... 5802 psi	400 bar 40 MPa 5802 psi	400 bar 40 MPa 5802 psi	600 bar 60 MPa 8702 psi
7 ... 700 bar 0.7 ... 70 MPa 102 ... 10153 psi	700 bar 70 MPa 10153 psi	800 bar 80 MPa 11603 psi	800 bar 80 MPa 11603 psi

Lower measuring limit

(for 250mbar/25 kPa/3.6 psi measuring cells, the lower measuring limit is 750 mbar a/75 kPa a/10.8 psi a. The measuring cell is vacuum-resistant up to 30 mbar a/3 kPa a/0.44 psi a.)

- Measuring cell with silicone oil filling
- Measuring cell with inert filling liquid

Upper measuring limit

30 mbar a/3 kPa a/0.44 psi a

30 mbar a/3 kPa a/0.44 psi a

100% of max. span (max. 100 bar/10 MPa/1450 psi for oxygen measurement) ambient temperature/process temperature 60 °C (140 °F)

Output

Output signal

- Lower limit (infinitely adjustable)
- Upper limit (infinitely adjustable)

Load

- Without HART
- With HART

Physical bus

Protection against polarity reversal

Electrical damping (step width 0.1 s)

HART

4 ... 20 mA

3.55 mA, factory preset to 3.84 mA
23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA

$R_B \leq (U_H - 10.5 \text{ V})/0.023 \text{ A in } \Omega$
 U_H : Power supply in V

$R_B = 230 \dots 500 \Omega$ (SIMATIC PDM) bzw.
 $R_B = 230 \dots 1100 \Omega$ (HART-Communicator)

-

Protected against short-circuit and polarity reversal.
Each connection against the other with max. supply voltage.

Set to 2 s (0 ... 100 s)

PROFIBUS PA/FOUNDATION Fieldbus

Digital PROFIBUS PA and FOUNDATION Fieldbus signal

-

-

-

-

IEC 61158-2

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for gauge pressure

1

SITRANS P, DS III series for gauge pressure**Measuring accuracy**

Reference conditions

Acc. to IEC 60770-1

- Increasing characteristic
- Start-of-scale value 0 bar/kPa/psi
- Stainless steel seal diaphragm
- Silicone oil filling
- Room temperature 25 °C (77 °F)

Measuring span ratio r (spread, Turn-Down) $r = \text{max. measuring span/set measuring span or nom. pressure range}$

Error in measurement at limit setting incl. hysteresis and reproducibility

• Linear characteristic

- 250 mbar/25 kPa/3.6 psi

 $r \leq 1.25 : \leq 0.065 \%$
 $1.25 < r \leq 30 : \leq (0.008 \cdot r + 0.055) \%$

- 1 bar/100 kPa/3.6 psi
 4 bar/400 kPa/58 psi
 16 bar/1.6 MPa/232 psi
 63 bar/6.3 MPa/914 psi
 160 bar/16 MPa/2321 psi

 $r \leq 5 : \leq 0.065 \%$
 $5 < r \leq 100 : \leq (0.004 \cdot r + 0.045) \%$

- 400 bar/40 MPa/5802 psi
 700 bar/70 MPa/10152 psi

 $r \leq 3 : \leq 0.075 \%$
 $3 < r \leq 10 : \leq (0.0029 \cdot r + 0.071) \%$
 $10 < r \leq 100 : \leq (0.005 \cdot r + 0.05) \%$
Influence of ambient temperature
(in percent per 28 °C (50 °F))

• 250 mbar/25 kPa/3.6 psi

 $\leq (0.16 \cdot r + 0.1) \%$

• 1 bar/100 kPa/3.6 psi

 $\leq (0.05 \cdot r + 0.1) \%$

• 4 bar/400 kPa/58 psi
 16 bar/1.6 MPa/232 psi
 63 bar/6.3 MPa/914 psi
 160 bar/16 MPa/2321 psi
 400 bar/40 MPa/5802 psi

 $\leq (0.025 \cdot r + 0.125) \%$

• 700 bar/70 MPa/10152 psi

 $\leq (0.08 \cdot r + 0.16) \%$ Long-term stability (temperature change ± 30 °C (± 54 °F))

• 250 mbar/25 kPa/3.6 psi

 $\leq (0.25 \cdot r) \%$ per year

• 1 bar/100 kPa/3.6 psi
 4 bar/400 kPa/58 psi

 $\leq (0.25 \cdot r) \%$ in 5 years

• 16 bar/1.6 MPa/232 psi
 63 bar/6.3 MPa/914 psi
 160 bar/16 MPa/2321 psi
 400 bar/40 MPa/5802 psi

 $\leq (0.125 \cdot r) \%$ in 5 years

• 700 bar/70 MPa/10152 psi

 $\leq (0.25 \cdot r) \%$ in 5 years

Effect of mounting position

 $\leq 0.05 \text{ mbar}/0.005 \text{ kPa}/0.000725 \text{ psi}$ per 10° inclination
 (zero point correction is possible with position error compensation)
Effect of auxiliary power supply
(in percent per change in voltage)

0.005 % per 1 V

Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus

 $3 \cdot 10^{-5}$ of nominal measuring range

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for gauge pressure

SITRANS P, DS III series for gauge pressure

Rated conditions

Degree of protection

- according to EN 60529
- according to NEMA 250

IP66 (optional IP66/IP68)

Type 4X

Temperature of medium

- Measuring cell with silicone oil filling
- Measuring cell with inert filling liquid

-40 ... +100 °C (-40 ... +212 °F)

- 1 bar/100 kPa/3.6 psi
- 4 bar/400 kPa/58 psi
- 16 bar/1.6 MPa/232 psi
- 63 bar/6.3 MPa/914 psi

-40 ... +85 °C (-40 ... +185 °F)

- 160 bar/16 MPa/2321 psi
- 400 bar/40 MPa/5802 psi
- 700 bar/70 MPa/10152 psi

-20 ... +100 °C (-4 ... +212 °F)

- Measuring cell with Neobee fill fluid (FDA-compliant)
- In conjunction with dust explosion protection

-10 ... +100 °C (+14 ... +212 °F)

-20 ... +60 °C (-4 ... +140 °F)

Ambient conditions

- Ambient temperature (silicone oil and inert oil)

- Transmitter
- Display readable

-40 ... +85 °C (-40 ... +185 °F)

-30 ... +85 °C (-22 ... +185 °F)

- Ambient temperature (Neobee fill fluid)

- Transmitter

-10 ... +85 °C (+14 ... +185 °F)

- Storage temperature

-50 ... +85 °C (-58 ... +185 °F)

- Climatic class

- Condensation

Relative humidity 0 ... 100 %/Condensation permissible, suitable for use in the tropics

- Electromagnetic Compatibility

- Emitted interference and interference immunity

Acc. to IEC 61326 and NAMUR NE 21

Design

Weight (without options)

Die-cast aluminum: ≈ 2.0 kg (≈ 4.4 lb)
Stainless steel precision casting: ≈ 4.6 kg (≈ 10.1 lb)

Enclosure material

Low-copper die-cast aluminum, GD-AlSi 12 or stainless steel precision casting, mat. no. 1.4408

Wetted parts materials

- Connection shank
- Oval flange
- Seal diaphragm

Stainless steel, mat. no. 1.4404/316L or Hastelloy C4, mat. no. 2.4602

Stainless steel, mat. no. 1.4404/316L

Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819

Measuring cell filling

Silicone oil or inert filling liquid (maximum value with oxygen measurement pressure 100 bar (1450 psi) at 60 °C (140 °F))

Process connection

Connection shank G $\frac{1}{2}$ B to DIN EN 837-1, female thread $\frac{1}{2}$ -14 NPT or oval flange (PN 160 (MAWP 2320 psi)) to DIN 19213 with mounting thread M10 or $\frac{7}{16}$ -20 UNF to IEC 61518/DIN EN 61518

Material of mounting bracket

- Steel
- Stainless steel 304
- Stainless steel 316L

Sheet-steel, Mat. No. 1.0330, chrome-plated

Sheet stainless steel, mat. no. 1.4301 (SS 304)

Sheet stainless steel, mat. no. 1.4404 (SS 316L)

Power supply U_H

Terminal voltage on transmitter

10.5 ... 45 V DC
10.5 ... 30 V DC in intrinsically-safe mode

PROFIBUS PA/FOUNDATION Fieldbus

-

Power supply

-

Supplied through bus

Separate 24 V power supply

-

Not necessary

Bus voltage

- Not Ex
- With intrinsically-safe operation

-

9 ... 32 V

-

9 ... 24 V

Current consumption

- Basic current (max.)
- Start-up current ≤ basic current
- Max. current in event of fault

-

12.5 mA

-

Yes

-

15.5 mA

Fault disconnection electronics (FDE) available

-

Yes

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for gauge pressure

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SITRANS P, DS III series for gauge pressure	HART	PROFIBUS PA/ FOUNDATION Fieldbus
Certificates and approvals		
Classification according to PED 2014/68/EU	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)	
Explosion protection		
• Intrinsic safety "i"	PTB 13 ATEX 2007 X	
- Marking	Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +70 °C (-40 ... +158 °F) temperature class T5; -40 ... +60 °C (-40 ... +140 °F) temperature class T6	
- Connection	To certified intrinsically-safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$; $R_i = 300 \Omega$	FISCO supply unit: $U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$ Linear barrier: $U_o = 24 \text{ V}$, $I_o = 174 \text{ mA}$, $P_o = 1 \text{ W}$ $L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$
- Effective internal inductance/capacitance	$L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$	
• Explosion-proof "d"	PTB 99 ATEX 1160	
- Marking	Ex II 1/2 G Ex d IIC T4/T6 Gb	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6	
- Connection	To circuits with values: $U_H = 10.5 \dots 45 \text{ V DC}$	To circuits with values: $U_H = 9 \dots 32 \text{ V DC}$
• Dust explosion protection for zone 20	PTB 01 ATEX 2055	
- Marking	Ex II 1 D Ex ta IIIC T120°C Da Ex II 1/2 D Ex ta/tb IIIC T120°C Da/Db	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F)	
- Max. surface temperature	120 °C (248 °F)	
- Connection	To certified intrinsically-safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$	FISCO supply unit: $U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$ Linear barrier: $U_o = 24 \text{ V}$, $I_o = 250 \text{ mA}$, $P_o = 1 \text{ W}$ $L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$
- Effective internal inductance/capacitance	$L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$	
• Dust explosion protection for zone 21/22	PTB 01 ATEX 2055	
- Marking	Ex II 2 D Ex tb IIIC T120°C Db	
- Connection	To circuits with values: $U_H = 10.5 \dots 45 \text{ V DC}$; $P_{\max} = 1.2 \text{ W}$	To circuits with values: $U_H = 9 \dots 32 \text{ V DC}$; $P_{\max} = 1 \text{ W}$
• Type of protection "n" (zone 2)	PTB 13 ATEX 2007 X	
- Marking	Ex II 2/3 G Ex nA IIC T4/T5/T6 Gb/Gc Ex II 2/3 G Ex ic IIC T4/T5/T6 Gb/Gc	
- Connection (Ex nA)	$U_m = 45 \text{ V}$	$U_m = 32 \text{ V}$
- Connections (Ex ic)	To circuits with values: $U_i = 45 \text{ V}$	FISCO supply unit ic: $U_o = 17.5 \text{ V}$, $I_o = 570 \text{ mA}$ Linear barrier: $U_o = 32 \text{ V}$, $I_o = 132 \text{ mA}$, $P_o = 1 \text{ W}$ $L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$
- Effective internal inductance/capacitance	$L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$	
• Explosion protection acc. to FM	Certificate of Compliance 3008490	
- Identification (XP/DIP) or (IS); (NI)	CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III	
• Explosion protection to CSA	Certificate of Compliance 1153651	
- Identification (XP/DIP) or (IS)	CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III	

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P DS III

for gauge pressure

HART communication		FOUNDATION Fieldbus communication	
HART	230 ... 1100 Ω	Function blocks	3 function blocks analog input, 1 function block PID
Protocol	HART Version 5.x	• Analog input	Yes, linearly rising or falling characteristic
Software for computer	SIMATIC PDM	- Adaptation to customer-specific process variables	0 ... 100 s
PROFIBUS PA communication		- Electrical damping, adjustable	Output/input (can be locked within the device with a bridge)
Simultaneous communication with master class 2 (max.)	4	- Simulation function	parameterizable (last good value, substitute value, incorrect value)
The address can be set using	Configuration tool or local operation (standard setting address 126)	- Failure mode	Yes, one upper and lower warning limit and one alarm limit respectively
Cyclic data usage		- Limit monitoring	Yes
• Output byte	5 (one measured value) or 10 (two measured values)	- Square-rooted characteristic for flow measurement	Standard FOUNDATION Fieldbus function block
• Input byte	0, 1, or 2 (register operating mode and reset function for metering)	• PID	1 resource block
Internal preprocessing		• Physical block	1 transducer block Pressure with calibration, 1 transducer block LCD
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B	Transducer blocks	
Function blocks	2	• Pressure transducer block	
• Analog input		- Can be calibrated by applying two pressures	Yes
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic	- Monitoring of sensor limits	Yes
- Electrical damping, adjustable	0 ... 100 s	- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function
- Simulation function	Input /Output		
- Failure mode	parameterizable (last good value, substitute value, incorrect value)		
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively		
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output		
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)		
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively		
• Physical block	1		
Transducer blocks	2		
• Pressure transducer block			
- Can be calibrated by applying two pressures	Yes		
- Monitoring of sensor limits	Yes		
- Specification of a container characteristic with	Max. 30 nodes		
- Square-rooted characteristic for flow measurement	Yes		
- Gradual volume suppression and implementation point of square-root extraction	Parameterizable		
- Simulation function for measured pressure value and sensor temperature	Constant value or over parameterizable ramp function		

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for gauge pressure

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Selection and Ordering data		Article No.	Selection and Ordering data		Article No.
Pressure transmitter for gauge pressure, SITRANS P DS III with HART		7MF4033 -	Pressure transmitter for gauge pressure, SITRANS P DS III with HART		7MF4033 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			Explosion protection		
Measuring cell filling			<ul style="list-style-type: none"> None 		A
Measuring cell cleaning			<ul style="list-style-type: none"> With ATEX, Type of protection: <ul style="list-style-type: none"> "Intrinsic safety (Ex ia)" "Explosion-proof (Ex d)"⁸⁾ "Intrinsic safety and flameproof enclosure (Ex ia + Ex d)"⁹⁾ "Ex nA/ic (Zone 2)"¹⁰⁾ "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)"⁸⁾¹¹⁾ FM + CSA intrinsic safe (is)¹²⁾ FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D⁹⁾¹¹⁾¹²⁾ With FM + CSA, Type of protection: <ul style="list-style-type: none"> "Intrinsic Safe and Explosion Proof (is + xp)"⁷⁾¹²⁾ 		B D P E R F S
Silicone oil	normal	1	Electrical connection / cable entry		
Inert liquid ¹⁾	grease-free to cleanliness level 2	3	<ul style="list-style-type: none"> Screwed gland M20 x1 .5 Screwed gland ½-14 NPT Han 7D device plug (plastic housing) incl. mating connector¹³⁾ M12 device plugs (stainless steel)¹³⁾¹⁴⁾ 		B C D F
FDA compliant fill fluid ²⁾			Display		
• Neobee oil	normal	4	<ul style="list-style-type: none"> Without display Without visible display (display concealed, setting: mA) With visible display (setting: mA) with customer-specific display (setting as specified, Order code "Y21" or "Y22" required) 		0 1 6 7
Measuring span (min. ... max.)			Power supply units see Chap. 7 "Supplementary Components".		
8.3 ... 250 mbar	(0.12 ... 3.6 psi)	A	A quick-start guide is included in the scope of delivery of the device.		
0.01 ... 1 bar	(0.15 ... 14.5 psi)	B	¹⁾ For oxygen application, add Order code E10. ²⁾ Available for measuring ranges 1 ... 63 bar. ³⁾ When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the <u>total</u> combination is certified here. ⁴⁾ If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals. ⁵⁾ The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF403-...Y... and 7MF4900-1...-B ⁶⁾ The standard measuring cell filling of configurations with remote seals (Y) is silicone oil. ⁷⁾ Not in conjunction with Electrical connection "Han 7D device plug". ⁸⁾ Without cable gland, with blanking plug ⁹⁾ With enclosed cable gland Ex ia and blanking plug ¹⁰⁾ Configurations with Han and M12 device plugs are only available in Ex ic. ¹¹⁾ Only in connection with IP66. ¹²⁾ Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505. ¹³⁾ Only in connection with Ex approval A, B or E. ¹⁴⁾ M12 delivered without cable socket		
0.04 ... 4 bar	(0.58 ... 58 psi)	C			
0.16 ... 16 bar	(2.32 ... 232 psi)	D			
0.63 ... 63 bar	(9.14 ... 914 psi)	E			
1.6 ... 160 bar	(23.2 ... 2320 psi)	F			
4.0 ... 400 bar	(58.0 ... 5802 psi)	G			
7.0 ... 700 bar	(102.0 ... 10153 psi)	J			
Wetted parts materials					
Seal diaphragm	Process connection				
Stainless steel	Stainless steel	A			
Hastelloy	Stainless steel	B			
Hastelloy	Hastelloy	C			
Version for diaphragm seals in conjunction with process connector "female thread ½-14 NPT" (recommended version) ^{3) 4) 5) 6)}		Y 1			
Version for diaphragm seals in conjunction with process connector "G½B connection shank" ^{3) 4) 5) 6)}		Y 0			
Process connection					
<ul style="list-style-type: none"> Connection shank G½B to EN 837-1 Female thread ½-14 NPT Stainless steel oval flange with process connection (Oval flange has no female thread) <ul style="list-style-type: none"> Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518 Mounting thread M10 to DIN 19213 Mounting thread M12 to DIN 19213 Male thread M20 x 1.5 Male thread ½ -14 NPT 		0 1 2 3 4 5 6			
Non-wetted parts materials					
<ul style="list-style-type: none"> Housing made of die-cast aluminium Housing stainless steel precision casting⁷⁾ 		0 3			
Version					
<ul style="list-style-type: none"> Standard version, German plate inscription, setting for pressure unit: bar International version, English plate inscription, setting for pressure unit: bar Chinese version, English plate inscription, setting for pressure unit: Pascal 		1 2 3			
All versions include DVD with compact operating instructions in various EU languages.					

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for gauge pressure

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Selection and Ordering data		Article No.
Pressure transmitter for gauge pressure		
SITRANS P DS III with PROFIBUS PA (PA)		7MF4034-
SITRANS P DS III with FOUNDATION Fieldbus (FF)		7MF4035-
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Measuring cell cleaning	
Silicone oil	normal	1
Inert liquid ¹⁾	grease-free to cleanliness level 2	3
FDA compliant fill fluid ²⁾		
• Neobee oil	normal	4
Nominal measuring range		
250 mbar	(3.6 psi)	A
1 bar	(14.5 psi)	B
4 bar	(58 psi)	C
16 bar	(232 psi)	D
63 bar	(914 psi)	E
160 bar	(2320 psi)	F
400 bar	(5802 psi)	G
700 bar	(10153 psi)	J
Wetted parts materials		
Seal diaphragm	Process connection	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Hastelloy	Hastelloy	C
Version for diaphragm seals in conjunction with process connector "female thread 1/2-14 NPT" (recommended version) ^{3) 4) 5) 6)}		Y 1
Version for diaphragm seals in conjunction with process connector "G1/2B connection shank" ^{3) 4) 5) 6)}		Y 0
Process connection		
• Connection shank G1/2B to EN 837-1		0
• Female thread 1/2-14 NPT		1
• Stainless steel oval flange with process connection (Oval flange has no female thread) ⁷⁾		
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		2
- Mounting thread M10 to DIN 19213		3
- Mounting thread M12 to DIN 19213		4
• Male thread M20 x 1.5		5
• Male thread 1/2-14 NPT		6
Non-wetted parts materials		
• Housing made of die-cast aluminium		0
• Housing stainless steel precision casting		3
Version		
• Standard version, German label inscription, setting of pressure unit: bar		1
• International version, English label inscription, setting of pressure unit: psi		2
• Chinese version, English label inscription, setting of pressure unit: kPa		3
All versions include DVD with compact operating instructions in various EU languages.		

Selection and Ordering data		Article No.
Pressure transmitter for gauge pressure		
SITRANS P DS III with PROFIBUS PA (PA)		7MF4034-
SITRANS P DS III with FOUNDATION Fieldbus (FF)		7MF4035-
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Explosion protection		
• None		A
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		B
- "Explosion-proof (Ex d)" ⁸⁾		D
- "Intrinsic safety and flameproof enclosure (Ex ia + Ex d)" ⁹⁾		P
- "Ex nA/ic (Zone 2)" ¹⁰⁾		E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)" ^{9) 11)}		R
• FM + CSA intrinsic safe (is) ¹²⁾		F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D ^{9) 11) 12)}		S
• With FM + CSA, Type of protection:		
- "Intrinsic Safe and Explosion Proof (is + xp)" ^{7) 12)}		NC
Electrical connection/cable entry		
• Screwed gland M20 x 1.5		B
• Screwed gland 1/2-14 NPT		C
• M12 device plugs (stainless steel) ^{13) 14)}		F
Display		
• Without display		0
• Without visible display (display concealed, setting: bar)		1
• With visible display (setting: bar)		6
• with customer-specific display (setting as specified, Order code "Y21" required)		7
A quick-start guide is included in the scope of delivery of the device.		
1) For oxygen application, add Order code E10.		
2) Available for measuring ranges 1 ... 63 bar.		
3) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the <u>total</u> combination is certified here.		
4) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.		
5) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF403-...Y... and 7MF4900-1...-B		
6) The standard measuring cell filling of configurations with remote seals (Y) is silicone oil.		
7) M10 fastening thread: Max. span 160 bar (2320 psi)		
7/16-20 UNF and M12 fastening thread: Max. span 400 bar (5802 psi)		
8) Without cable gland, with blanking plug.		
9) With enclosed cable gland Ex ia and blanking plug.		
10) Configurations with Han and M12 device plugs are only available in Ex ic.		
11) Only in connection with IP66.		
12) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.		
13) M12 delivered without cable socket.		
14) Only in connection with Ex approval A, B, E or F.		

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for gauge pressure

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Selection and Ordering data	Order code			
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:				
• Steel	A01	✓	✓	✓
• Stainless steel 304	A02	✓	✓	✓
• Stainless steel 316L	A03	✓	✓	✓
Device plugs¹⁾				
• Han 7D (metal)	A30	✓		
• Han 8D (instead of Han 7D)	A31	✓		
• Angled	A32	✓		
• Han 8D (metal)	A33	✓		
Cable sockets for M12 device plugs (metal (CuZn))	A50	✓	✓	✓
Rating plate inscription (instead of German)				
• English	B11	✓	✓	✓
• French	B12	✓	✓	✓
• Spanish	B13	✓	✓	✓
• Italian	B14	✓	✓	✓
• Cyrillic (russian)	B16	✓	✓	✓
English rating plate Pressure units in inH ₂ O and/or psi	B21	✓	✓	✓
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2²⁾	C11	✓	✓	✓
Inspection certificate³⁾ Acc. to EN 10204-3.1	C12	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	C14	✓	✓	✓
Acceptance certificate (EN 10204-3.1) PMI test of parts in contact with medium	C15	✓	✓	✓
Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C20	✓		
Functional safety (PROFIsafe) Certificate and PROFIsafe protocol	C21 ⁴⁾		✓	
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C23	✓		
PED for Russia with initial calibration mark	C99	✓	✓	✓
Setting of the upper saturation limit of the output signal to 22.0 mA	D05	✓		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)	D07	✓	✓	✓
Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)	D12	✓	✓	✓
Supplied with oval flange (1 item), PTFE packing and screws in thread of oval flange	D37	✓	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included	D59	✓	✓	✓
Use in or on zone 1D/2D⁵⁾ (only together with type of protection "Intrinsic safety" (transmitter 7MF4...-.....-B.. Ex ia) and IP66)	E01	✓	✓	✓
Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))	E10	✓	✓	✓
Export approval Korea	E11	✓	✓	✓

Selection and Ordering data	Order code			
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
CRN approval Canada (Canadian Registration Number)	E22 ⁶⁾	✓	✓	✓
Dual seal	E24	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-B..)	E25 ⁷⁾	✓	✓	✓
"Flameproof" explosion protection according to INMETRO (Brazil) (only for transmitter 7MF4...-.....-D..)	E26 ⁷⁾	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia + Ex d) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-P..)	E28 ⁷⁾	✓	✓	
Ex Approval IEC Ex (Ex ia) (only for transmitter 7MF4...-.....-B..)	E45 ⁷⁾	✓	✓	✓
Ex Approval IEC Ex (Ex d) (only for transmitter 7MF4...-.....-D..)	E46 ⁷⁾	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-.....-B..)	E5 ⁷⁾	✓	✓	✓
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-.....-D..)	E56 ⁷⁾	✓	✓	✓
Ex protection "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-E..)	E57 ⁷⁾	✓	✓	✓
Ex protection „Ex ia“, „Ex d“ and „Zone 2“ to NEPSI (China) (only for transmitter 7MF4...-.....-R..)	E58 ⁷⁾	✓	✓	✓
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea) (only for transmitter 7MF4...-.....-[B, D]..-Z + E11)	E70 ⁷⁾	✓	✓	✓
Ex-protection Ex ia according to EAC Ex (Russia) (only for transmitter 7MF4...-.....-B..)	E80	✓	✓	✓
Ex-protection Ex d according to EAC Ex (Russia) (only for transmitter 7MF4...-.....-D..)	E81	✓	✓	✓
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia) (only for transmitter 7MF4...-.....-E..)	E82	✓	✓	✓
Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia) (only for transmitter 7MF4...-.....-R..)	E83	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)	G10	✓	✓	✓
Transient protector 6 kV (lightning protection)	J01	✓	✓	✓
Process connection Astava	J06	✓	✓	✓

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for gauge pressure

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Selection and Ordering data	Order code			
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
Marine approvals				
• Det Norske Veritas Germanischer Lloyd (DNV-GL)	S10	✓	✓	✓
• Lloyds Register (LR)	S11	✓	✓	✓
• French marine classification society Bureau Veritas (BV)	S12	✓	✓	✓
• American Bureau of Shipping (ABS)	S14	✓	✓	✓
• Russian Maritime Register (RMR)	S16	✓	✓	✓
• Korean Register of Shipping (KR)	S17	✓	✓	✓

1) Han device plug IP65

2) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

3) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

4) Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H

5) Option does not contain gas explosion protection; only dust explosion protection: Use in or at Zone 1D/2D.

6) Cannot be ordered with remote seal.

7) When the additional ex option is selected, the ATEX marking on the device is omitted. Only the Ex option selected via the Z option is marked.

Selection and Ordering data	Order code			
Additional data Please add "-Z" to Article No. and specify Order code(s) and plain text.		HART	PA	FF
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	Y01	✓	✓ ¹⁾	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	Y15²⁾	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	Y16	✓	✓	✓
Entry of HART address (TAG) Max. 8 characters, specify in plain text: Y17:	Y17	✓		
Setting of pressure indication in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H ₂ O ³⁾ , inH ₂ O ³⁾ , ftH ₂ O ³⁾ , mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM or % *) ref. temperature 20 °C	Y21	✓	✓	✓
Setting of pressure indication in non-pressure units³⁾ Specify in plain text: Y22: up to l/min, m ³ /h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y22 + Y01	✓		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	Y25		✓	✓
Damping adjustment in seconds (0 ... 100 s)	Y30	✓	✓	✓

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset

✓ = available

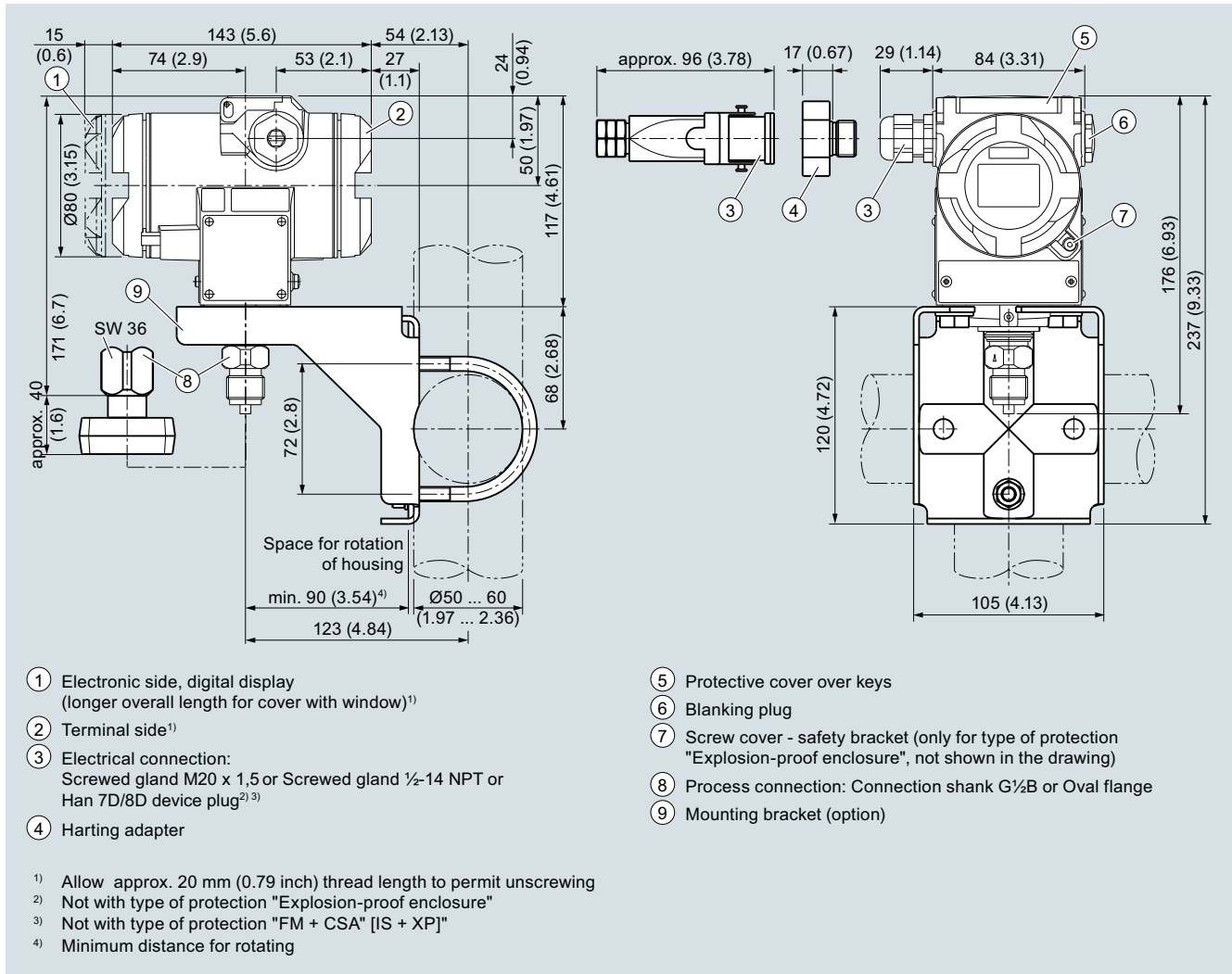
Ordering example

Item line: 7MF4033-1EA00-1AA7-Z
B line: A01 + Y01 + Y21
C line: Y01: 10 ... 20 bar (145 ... 290 psi)
C line: Y21: bar (psi)

1) Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

2) If you do not wish to have any text engraved for Y15, then do not make any further text entries as "Y15:".

3) Preset values can only be changed over SIMATIC PDM.

Dimensional drawings

SITRANS P DS III pressure transmitters for gauge pressure, dimensions in mm (inch)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for gauge/absolute pressure, with front-flush diaphragm

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Technical specifications

SITRANS P DS III series for gauge and absolute pressure, with front-flush diaphragm

Input of gauge pressure, with front-flush diaphragm

Measured variable

Span (continuously adjustable) or measuring range, max. operating pressure and max. test pressure

Gauge pressure, front-flush

HART	PROFIBUS PA/ FOUNDATION Fieldbus		
Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure
0.01 ... 1 bar 1 ... 100 kPa 0.15 ... 14.5 psi	1 bar 100 kPa 14.5 psi	4 bar 400 kPa 58 psi	6 bar 600 kPa 87 psi)
0.04 ... 4 bar 4 ... 400 kPa 0.58 ... 58 psi	4 bar 400 kPa 58 psi	7 bar 0.7 MPa 102 psi	10 bar 1 MPa 145 psi
0.16 ... 16 bar 16 ... 1600 kPa 2.3 ... 232 psi	16 bar 1600 kPa 232 psi	21 bar 2.1 MPa 305 psi	32 bar 3.2 MPa 464 psi
0.63 ... 63 bar 63 ... 6300 kPa 9.1 ... 914 psi	63 bar 6300 kPa 914 psi	67 bar 6.7 MPa 972 psi	100 bar 10 MPa 1450 psi

Lower measuring limit

- Measuring cell with silicone oil filling
- Measuring cell with inert filling liquid
- Measuring cell with Neobee

100 mbar a/10 kPa a/1.45 psi a

100 mbar a/10 kPa a/1.45 psi a

100 mbar a/10 kPa a/1.45 psi a

Upper measuring limit

100 % of max. span

Input of absolute pressure, with front-flush diaphragm

Measured variable

Span (continuously adjustable) or measuring range, max. operating pressure and max. test pressure

Absolute pressure, front-flush

HART	PROFIBUS PA/ FOUNDATION Fieldbus		
Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure
43.34 ... 1300 mbar a 4.33 ... 130 kPa a 17 ... 525 inH ₂ O a	1300 mbar a 130 kPa a 525 inH ₂ O a	2.6 bar a 260 kPa a 37.7 psi a	10 bar a 1 MPa a 145 psi a
160 ... 5000 mbar a 16 ... 500 kPa a 2.32 ... 72.5 psi a	5000 mbar a 500 kPa a 72.5 psi a	10 bar a 1 MPa a 145 psi a	30 bar a 3 MPa a 435 psi a
1 ... 30 bar a 0.1 ... 3 MPa a 14.6 ... 435 psi a	30 bar a 3 MPa a 435 psi a	45 bar a 4.5 MPa a 653 psi a	100 bar a 10 MPa a 1450 psi a

Depending on the process connection, the span may differ from these values

Lower measuring limit

0 mbar a/0 kPa a/0 psi a

Upper measuring limit

100 % of max. span

Output

Output signal

- Lower limit (infinitely adjustable)
- Upper limit (infinitely adjustable)

4 ... 20 mA

3.55 mA, factory preset to 3.84 mA

23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA

Load

- Without HART
- With HART

$R_B \leq (U_H - 10.5 \text{ V})/0.023 \text{ A}$ in Ω ,
 U_H : Power supply in V

$R_B = 230 \dots 500 \Omega$ (SIMATIC PDM) or
 $R_B = 230 \dots 1100 \Omega$ (HART Communicator)

Physical bus

-

IEC 61158-2

Protection against polarity reversal

Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.

Electrical damping (step width 0.1 s)

Set to 2 s (0 ... 100 s)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for gauge/absolute pressure, with front-flush diaphragm

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SITRANS P DS III series for gauge and absolute pressure, with front-flush diaphragm

Measuring accuracy

Reference conditions
(All error data refer always refer to the set span)

Acc. to IEC 60770-1

- Increasing characteristic
- Start-of-scale value 0 bar/kPa/psi
- Stainless steel seal diaphragm
- Silicone oil filling
- Room temperature 25 °C (77 °F)

Measuring span ratio r (spread, Turn-Down)

$r = \text{max. measuring span/set measuring span or nom. pressure range}$

Error in measurement at limit setting incl. hysteresis and reproducibility

- Linear characteristic

Gauge pressure, front-flush

Absolute pressure, front-flush

- $r \leq 5$

$\leq 0.075 \%$

-

- $5 < r \leq 100$

$\leq (0.005 \cdot r + 0.05) \%$

-

- $r \leq 10$

-

$\leq 0.2 \%$

- $10 < r \leq 30$

-

$\leq 0.4 \%$

Influence of ambient temperature (in percent per 28 °C (50 °F)) $\leq (0.08 \cdot r + 0.16) \%$

$\leq (0.16 \cdot r + 0.24) \%$

Effect of ambient temperature
(in pressure per temperature change)

- Temperature difference between medium temperature and ambient temperature

3 mbar/0.3 kPa/0.04 psi per 10 K

Long-term stability (temperature change ± 30 °C (± 54 °F))

$\leq (0.25 \cdot r) \%$ in 5 years

Effect of mounting position (in pressure per change in angle)

0.4 mbar/0.04 kPa/0.006 per 10° inclination
(zero point correction is possible with position error compensation)

Effect of auxiliary power supply
(in percent per change in voltage)

0.005 % per 1 V

Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus

$3 \cdot 10^{-5}$ of nominal measuring range

Rated conditions

Installation conditions

Ambient temperature

Observe the temperature class in areas subject to explosion hazard.

- Measuring cell with silicone oil

-40 ... +85 °C (-40 ... +185 °F)

- Measuring cell with Neobee oil (with front-flush diaphragm)

-10 ... +85 °C (14 ... +185 °F)

- Measuring cell with inert liquid

-40 ... +85 °C (-40 ... +185 °F)

- Transmitter

-40 ... +85 °C (-40 ... +185 °F)

- Display readable

-30 ... +85 °C (-22 ... +185 °F)

- Storage temperature

-50 ... +85 °C (-58 ... +185 °F)
(in the case of Neobee: -20 ... +85 °C (-4 ... +185 °F))
(for high temperature oil: -10 ... +85 °C (14 ... 185 °F))

Climatic class

- Condensation

Relative humidity 0 ... 100 %
Condensation permissible, suitable for use in the tropics

Degree of protection

- according to EN 60529

IP66 (optional IP66/IP68)

- according to NEMA 250

Type 4X

Electromagnetic Compatibility

- Emitted interference and interference immunity

Acc. to IEC 61326 and NAMUR NE 21

Medium conditions

Temperature of medium

The max. medium temperature of the front-flush process connections is to be taken into account in accordance with the relevant connection standards (e. g. DIN 32676, DIN 11851 etc.).

- Measuring cell with silicone oil

-40 ... +100 °C (-40 ... +212 °F)

- Measuring cell with silicone oil (with front-flush diaphragm)

-40 ... +150 °C (-40 ... +302 °F)

- Measuring cell with Neobee oil (with front-flush diaphragm)

-10 ... +150 °C (14 ... 302 °F)

- Measuring cell with silicone oil, with temperature decoupler (only for gauge pressure version with front-flush diaphragm)

-40 ... +200 °C (-40 ... +392 °F)

- Measuring cell with Neobee oil, with temp. decoupler (only for gauge pressure version with flush-mounted diaphragm)

-10 ... +200 °C (14 ... 392 °F)

- Measuring cell with inert filling liquid

-20 ... +100 °C (-4 ... +212 °F)

- Measuring cell with high-temperature oil (only for gauge pressure version with front-flush diaphragm)

-10 ... +250 °C (14 ... 482 °F)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for gauge/absolute pressure, with front-flush diaphragm

SITRANS P DS III series for gauge and absolute pressure, with front-flush diaphragm

Design

Weight (without options)	≈ 1.5 kg (≈ 3.3 lb)
Enclosure material	Low-copper die-cast aluminum, GD-AISI12 or stainless steel precision casting, mat. no. 1.4408
Wetted parts materials	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819
Measuring cell filling	Silicone oil or inert filling liquid
Process connection	<ul style="list-style-type: none"> • Flanges as per EN and ASME • F&B and pharmaceutical flanges
Surface quality touched-by-media	R_a -values $\leq 0.8 \mu\text{m}$ (32 $\mu\text{-inch}$)/welds $R_a \leq 1.6 \mu\text{m}$ (64 $\mu\text{-inch}$) (Process connections acc. to 3A; R_a -values $\leq 0.8 \mu\text{m}$ (32 $\mu\text{-inch}$)/welds $R_a \leq 0.8 \mu\text{m}$ (32 $\mu\text{-inch}$))

Power supply U_H

	HART	PROFIBUS PA/FOUNDATION Fieldbus
Terminal voltage on transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically-safe mode	-
Power supply	-	Supplied through bus
Separate 24 V power supply necessary	-	No
Bus voltage		
• Not Ex	-	9 ... 32 V
• With intrinsically-safe operation	-	9 ... 24 V
Current consumption		
• Basic current (max.)	-	12.5 mA
• Start-up current \leq basic current	-	Yes
• Max. current in event of fault	-	15.5 mA
Fault disconnection electronics (FDE) available	-	Yes

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for gauge/absolute pressure, with front-flush diaphragm

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SITRANS P DS III series for gauge and absolute pressure, with front-flush diaphragm

Certificates and approvals

Classification according to PED 2014/68/EU	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)	
Explosion protection	PTB 13 ATEX 2007 X	
• Intrinsic safety "i"	Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb	
- Marking	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +70 °C (-40 ... +158 °F) temperature class T5; -40 ... +60 °C (-40 ... +140 °F) temperature class T6	
- Permissible ambient temperature		
- Connection	To certified intrinsically-safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$; $R_i = 300 \Omega$	FISCO supply unit: $U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$ Linear barrier: $U_o = 24 \text{ V}$, $I_o = 250 \text{ mA}$, $P_o = 1.2 \text{ W}$
- Effective internal inductance/capacitance	$L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$	$L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$
• Explosion-proof "d"	PTB 99 ATEX 1160	
- Marking	Ex II 1/2 G Ex d IIC T4/T6 Gb	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6	
- Connection	To circuits with values: $U_H = 10.5 \dots 45 \text{ V DC}$	To circuits with values: $U_H = 9 \dots 32 \text{ V DC}$
• Dust explosion protection for zone 20	PTB 01 ATEX 2055	
- Marking	Ex II 1 D Ex ta IIIC T120°C Da Ex II 1/2 D Ex ta/tb IIIC T120°C Da/Db	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F)	
- Max. surface temperature	120 °C (248 °F)	
- Connection	To certified intrinsically-safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$	FISCO supply unit: $U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$ Linear barrier: $U_o = 24 \text{ V}$, $I_o = 250 \text{ mA}$, $P_o = 1 \text{ W}$
- Effective internal inductance/capacitance	$L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$	$L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$
• Dust explosion protection for zone 21/22	Ex II 2 D Ex tb IIIC T120°C Db	
- Marking	Ex II 2 D IP65 T 120 °C	
- Connection	To circuits with values: $U_H = 10.5 \dots 45 \text{ V DC}$; $P_{\max} = 1.2 \text{ W}$	To circuits with values: $U_H = 9 \dots 32 \text{ V DC}$; $P_{\max} = 1 \text{ W}$
• Type of protection "n" (zone 2)	PTB 13 ATEX 2007 X	
- Marking	Ex II 2/3 G Ex nA IIC T4/T5/T6 Gb/Gc Ex II 2/3 G Ex ic IIC T4/T5/T6 Gb/Gc	
- Connection (Ex nA)	$U_m = 45 \text{ V}$	$U_m = 32 \text{ V}$
- Connections (Ex ic)	To circuits with values: $U_i = 45 \text{ V}$	FISCO supply unit ic: $U_o = 17.5 \text{ V}$, $I_o = 570 \text{ mA}$ Linear barrier: $U_o = 32 \text{ V}$, $I_o = 132 \text{ mA}$, $P_o = 1 \text{ W}$
- Effective internal inductance/capacitance	$L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$	$L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$
• Explosion protection acc. to FM	Certificate of Compliance 3008490	
- Identification (XP/DIP) or (IS); (NI)	CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III	
• Explosion protection to CSA	Certificate of Compliance 1153651	
- Identification (XP/DIP) or (IS)	CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III	

Hygiene version

In the case of SITRANS P DSIII with 7MF413x front-flush diaphragm, selected connections comply with the requirements of EHEDG.

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P DS III

for gauge/absolute pressure, with front-flush diaphragm

HART communication		FOUNDATION Fieldbus communication	
HART	230 ... 1100 Ω	Function blocks	3 function blocks analog input, 1 function block PID
Protocol	HART Version 5.x	• Analog input	Yes, linearly rising or falling characteristic
Software for computer	SIMATIC PDM	- Adaptation to customer-specific process variables	0 ... 100 s
PROFIBUS PA communication		- Electrical damping, adjustable	Output/input (can be locked within the device with a bridge)
Simultaneous communication with master class 2 (max.)	4	- Simulation function	parameterizable (last good value, substitute value, incorrect value)
The address can be set using	Configuration tool or local operation (standard setting address 126)	- Failure mode	Yes, one upper and lower warning limit and one alarm limit respectively
Cyclic data usage		- Limit monitoring	Yes
• Output byte	5 (one measured value) or 10 (two measured values)	- Square-rooted characteristic for flow measurement	Standard FOUNDATION Fieldbus function block
• Input byte	0, 1, or 2 (register operating mode and reset function for metering)	• PID	1 resource block
Internal preprocessing		• Physical block	1 transducer block Pressure with calibration, 1 transducer block LCD
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B	Transducer blocks	
Function blocks	2	• Pressure transducer block	
• Analog input		- Can be calibrated by applying two pressures	Yes
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic	- Monitoring of sensor limits	Yes
- Electrical damping, adjustable	0 ... 100 s	- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function
- Simulation function	Input /Output		
- Failure mode	parameterizable (last good value, substitute value, incorrect value)		
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively		
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output		
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)		
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively		
• Physical block	1		
Transducer blocks	2		
• Pressure transducer block			
- Can be calibrated by applying two pressures	Yes		
- Monitoring of sensor limits	Yes		
- Specification of a container characteristic with	Max. 30 nodes		
- Square-rooted characteristic for flow measurement	Yes		
- Gradual volume suppression and implementation point of square-root extraction	Parameterizable		
- Simulation function for measured pressure value and sensor temperature	Constant value or over parameterizable ramp function		



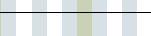













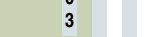
















Pressure Measurement







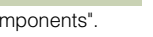
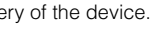
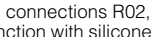

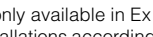




Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for gauge/absolute pressure, with front-flush diaphragm

1

Selection and Ordering data		Article No.
Pressure transmitter for gauge and absolute pressure, front-flush diaphragm, SITRANS P DS III HART		7MF4133 -
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		

Selection and Ordering data		Article No.
Pressure transmitter for gauge and absolute pressure, front-flush diaphragm, SITRANS P DS III HART		7MF4133 -
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		

Display

- Without display
- Without visible display (display concealed, setting: mA)
- With visible display (setting: mA)
- With customer-specific display (setting as specified, Order code "Y21" or "Y22" required)

Power supply units see Chap. 7 "Supplementary Components".

A quick-start guide is included in the scope of delivery of the device.

- 1) Not with temperature decoupler P00, not for process connections R02, R04, R10 and R11, and can only be ordered in conjunction with silicone oil.
- 2) Only available for flanges with options M.., N.. and Q..
- 3) Without cable gland, with blanking plug
- 4) Configurations with Han and M12 device plugs are only available in Ex ic.
- 5) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.
- 6) Only in connection with IP66.
- 7) With enclosed cable gland Ex ia and blanking plug.
- 8) Only in connection with Ex approval A, B or E.
- 9) Only in connection with Ex approval A, B, E or F.
- 10) M12 delivered without cable socket

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for gauge/absolute pressure, with front-flush diaphragm

1

Selection and Ordering data		Article No.
Pressure transmitter P for gauge and absolute pressure, front-flush diaphragm:		
SITRANS P DS III with PROFIBUS PA (PA)		7 M F 4 1 3 4 -
SITRANS P DS III with FOUNDATION Fieldbus (FF)		7 M F 4 1 3 5 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Measuring cell cleaning	
Silicone oil	normal	1
Inert liquid		3
FDA compliant fill fluid		
• Neobee oil	normal	4
Nominal measuring range		
1 bar	(14.5 psi)	B
4 bar	(58 psi)	C
16 bar	(232 psi)	D
63 bar	(914 psi)	E
1300 mbar a ¹⁾	(18.86 psi a ¹⁾)	S
5 bar a ¹⁾	(72.5 psi a ¹⁾)	T
30 bar a ¹⁾	(435 psi a ¹⁾)	U
Wetted parts materials		
Seal diaphragm	Connection shank	
Stainless steel	Stainless steel	A
Hastelloy ²⁾	Stainless steel	B
Process connection		
• Flange version with Order code M.., N.., R.. or Q..		7
Non-wetted parts materials		
• Housing made of die-cast aluminium		0
• Housing stainless steel precision casting		3
Version		
• Standard version, German plate inscription, setting for pressure unit: bar		1
• International version, English plate inscription, setting for pressure unit: bar		2
• Chinese version, English plate inscription, setting for pressure unit: Pascal		3
All versions include DVD with compact operating instructions in various EU languages.		
Explosion protection		
• None		A
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		B
- "Explosion-proof (Ex d)" ³⁾		D
- „Ex nA/ic (Zone 2)" ⁴⁾		E
• FM + CSA intrinsic safe (is) ⁵⁾		F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D ⁵⁾⁶⁾⁷⁾		S
• With FM + CSA, Type of protection:		
- "Intrinsic Safe and Explosion Proof (is + xp)" ³⁾⁵⁾ (available soon)		NC
Electrical connection/cable entry		
• Screwed gland M20 x 1.5		B
• Screwed gland ½-14 NPT		C
• M12 device plugs (stainless steel) ^{8) 9)}		F

Selection and Ordering data		Article No.
Pressure transmitter P for gauge and absolute pressure, front-flush diaphragm:		
SITRANS P DS III with PROFIBUS PA (PA)		7 M F 4 1 3 4 -
SITRANS P DS III with FOUNDATION Fieldbus (FF)		7 M F 4 1 3 5 -
Display		
• Without display		0
• Without visible display (display concealed, setting: bar)		1
• With visible display (setting: bar)		6
• With customer-specific display (setting as specified, Order code "Y21" required)		7
A quick-start guide is included in the scope of delivery of the device.		
1) Not with temperature decoupler P00, not for process connections R01, R02, R04, R10 and R11, and can only be ordered in conjunction with silicone oil.		
2) Only available for flanges with options M.., N.. and Q.		
3) Without cable gland, with blanking plug		
4) Configurations with Han and M12 device plugs are only available in Ex ic.		
5) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.		
6) Only in connection with IP66.		
7) With enclosed cable gland Ex ia and blanking plug.		
8) Only in connection with Ex approval A, B, E or F.		
9) M12 delivered without cable socket		

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for gauge/absolute pressure, with front-flush diaphragm

1

Selection and Ordering data		Order code			
Further designs Add "-Z" to Article No. and specify Order code.			HART	PA	FF
Device plugs¹⁾					
• Han 7D (metal)		A30	✓		
• Han 8D (instead of Han 7D)		A31	✓		
• Angled		A32	✓		
• Han 8D (metal)		A33	✓		
Cable sockets for M12 device plugs (metal (CuZn))		A50	✓	✓	✓
Rating plate inscription (instead of German)					
• English		B11	✓	✓	✓
• French		B12	✓	✓	✓
• Spanish		B13	✓	✓	✓
• Italian		B14	✓	✓	✓
• Cyrillic (russian)		B16	✓	✓	✓
English rating plate Pressure units in inH ₂ O and/or psi		B21	✓	✓	✓
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2		C11	✓	✓	✓
Inspection certificate Acc. to EN 10204-3.1		C12	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2		C14	✓	✓	✓
Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration		C20	✓		
Functional safety (PROFIsafe) Certificate and PROFIsafe protocol		C21 ²⁾		✓	
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration		C23	✓		
PED for Russia with initial calibration mark		C99	✓	✓	✓
Setting of the upper saturation limit of the output signal to 22.0 mA		D05	✓		
Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)		D12	✓	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included		D59	✓	✓	✓
Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))		E10	✓	✓	✓
Export approval Korea		E11	✓	✓	✓
CRN approval Canada (Canadian Registration Number)		E22 ³⁾	✓	✓	✓
Dual seal		E24	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-B..)		E25 ⁴⁾	✓	✓	✓
"Flameproof" explosion protection according to INMETRO (Brazil) (only for transmitter 7MF4...-.....-D..)		E26 ⁴⁾	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia + Ex d) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-P..)		E28 ⁴⁾	✓	✓	
Ex Approval IEC Ex (Ex ia) (only for transmitter 7MF4...-.....-B..)		E45 ⁴⁾	✓	✓	✓
Ex Approval IEC Ex (Ex d) (only for transmitter 7MF4...-.....-D..)		E46 ⁴⁾	✓	✓	✓
Selection and Ordering data		Order code			
Further designs Add "-Z" to Article No. and specify Order code.			HART	PA	FF
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-.....-B..)		E55 ⁴⁾	✓	✓	✓
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-.....-D..)		E56 ⁴⁾	✓	✓	✓
Ex protection "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-E..)		E57 ⁴⁾	✓	✓	✓
Ex protection „Ex ia“, „Ex d“ and „Zone 2“ to NEPSI (China) (only for transmitter 7MF4...-.....-R..)		E58 ⁴⁾	✓	✓	✓
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea) (only for transmitter 7MF4...-.....-[B, D]..-Z + E11)		E70 ⁴⁾	✓	✓	✓
Ex-protection Ex ia according to EAC Ex (Russia)		E80	✓	✓	✓
Ex-protection Ex d according to EAC Ex (Russia)		E81	✓	✓	✓
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)		E82	✓	✓	✓
Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)		E83	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)		G10	✓	✓	✓
Transient protector 6 kV (lightning protection)		J01	✓	✓	✓
Flanges to EN 1092-1, Form B1					
• DN 25, PN 40 ⁵⁾		M11	✓	✓	✓
• DN 40, PN 40		M13	✓	✓	✓
• DN 40, PN 100		M23	✓	✓	✓
• DN 50, PN 16		M04	✓	✓	✓
• DN 50, PN 40		M14	✓	✓	✓
• DN 80, PN 16		M06	✓	✓	✓
• DN 80, PN 40		M16	✓	✓	✓
Flanges to ASME B16.5					
• Stainless steel flange 1" class 150 ⁵⁾		M40	✓	✓	✓
• Stainless steel flange 1½" class 150		M41	✓	✓	✓
• Stainless steel flange 2" class 150		M42	✓	✓	✓
• Stainless steel flange 3" class 150		M43	✓	✓	✓
• Stainless steel flange 4" class 150		M44	✓	✓	✓
• Stainless steel flange 1½" class 300		M46	✓	✓	✓
• Stainless steel flange 2" class 300		M47	✓	✓	✓
• Stainless steel flange 3" class 300		M48	✓	✓	✓
• Stainless steel flange 4" class 300		M49	✓	✓	✓
Threaded connector to DIN 3852-2, form A, thread to ISO 228					
• G ¾"-A, front-flush ⁶⁾		R01	✓	✓	✓
• G 1"-A, front-flush ⁶⁾		R02	✓	✓	✓
• G 2"-A, front-flush		R04	✓	✓	✓
Tank connection⁷⁾ Sealing is included in delivery					
• TG 52/50, PN 40		R10	✓	✓	✓
• TG 52/150, PN 40		R11	✓	✓	✓

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P DS III

for gauge/absolute pressure, with front-flush diaphragm

1

Selection and Ordering data	Order code			
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
Sanitary process connection according DIN 11851 (Dairy connection with slotted union nut)				
• DN 50, PN 25	N04	✓	✓	✓
• DN 80, PN 25	N06	✓	✓	✓
Tri-Clamp connection according DIN 32676/ISO 2852				
• DN 50/2", PN 16	N14	✓	✓	✓
• DN 65/2.5", PN 10	N15	✓	✓	✓
Varivent connection EHEDG compliant				
• Type N = 68 for Varivent housing DN 40 ... 125 and 1½" ... 6", PN 40	N28	✓	✓	✓
Temperature decoupler up to 200 °C⁸⁾ for version with front-flush diaphragm	P00	✓	✓	✓
Sanitary process connection to DRD • DN 50, PN 40	M32	✓	✓	✓
SMS socket with union nut				
• 2"	M67	✓	✓	✓
• 2½"	M68	✓	✓	✓
• 3"	M69	✓	✓	✓
SMS threaded socket				
• 2"	M73	✓	✓	✓
• 2½"	M74	✓	✓	✓
• 3"	M75	✓	✓	✓
IDF socket with union nut ISO 2853				
• 2"	M82	✓	✓	✓
• 2½"	M83	✓	✓	✓
• 3"	M84	✓	✓	✓
IDF threaded socket ISO 2853				
• 2"	M92	✓	✓	✓
• 2½"	M93	✓	✓	✓
• 3"	M94	✓	✓	✓
Sanitary process connection to NEUMO Bio-Connect screw connection EHEDG compliant				
• DN 50, PN 16	Q05	✓	✓	✓
• DN 65, PN 16	Q06	✓	✓	✓
• DN 80, PN 16	Q07	✓	✓	✓
• DN 100, PN 16	Q08	✓	✓	✓
• DN 2", PN 16	Q13	✓	✓	✓
• DN 2½", PN 16	Q14	✓	✓	✓
• DN 3", PN 16	Q15	✓	✓	✓
• DN 4", PN 16	Q16	✓	✓	✓
Sanitary process connection to NEUMO Bio-Connect flange connection EHEDG compliant				
• DN 50, PN 16	Q23	✓	✓	✓
• DN 65, PN 16	Q24	✓	✓	✓
• DN 80, PN 16	Q25	✓	✓	✓
• DN 100, PN 16	Q26	✓	✓	✓
• DN 2", PN 16	Q31	✓	✓	✓
• DN 2½", PN 16	Q32	✓	✓	✓
• DN 3", PN 16	Q33	✓	✓	✓
• DN 4", PN 16	Q34	✓	✓	✓

Selection and Ordering data	Order code			
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
Sanitary process connection to NEUMO Bio-Connect clamp connection EHEDG compliant				
• DN 50, PN 16	Q39	✓	✓	✓
• DN 65, PN 10	Q40	✓	✓	✓
• DN 80, PN 10	Q41	✓	✓	✓
• DN 100, PN 10	Q42	✓	✓	✓
• DN 2½", PN 16	Q48	✓	✓	✓
• DN 3", PN 10	Q49	✓	✓	✓
• DN 4", PN 10	Q50	✓	✓	✓
Bio-Control sanitary process connection				
• DN 50, PN 16	Q53	✓	✓	✓
• DN 65, PN 16	Q54	✓	✓	✓
Sanitary process connection to NEUMO Bio-Connect S flange connection				
• DN 2", PN 16	Q72	✓	✓	✓
Aseptic threaded socket to DIN 11864-1 Form A				
• DN 50, PN 25	N33	✓	✓	✓
• DN 65, PN 25	N34	✓	✓	✓
• DN 80, PN 25	N35	✓	✓	✓
• DN 100, PN 25	N36	✓	✓	✓
Aseptic flange with notch to DIN 11864-2 Form A				
• DN 50, PN 16	N43	✓	✓	✓
• DN 65, PN 16	N44	✓	✓	✓
• DN 80, PN 16	N45	✓	✓	✓
• DN 100, PN 16	N46	✓	✓	✓
Aseptic flange with groove to DIN 11864-2 Form A				
• DN 50, PN 16	N43 + P11	✓	✓	✓
• DN 65, PN 16	N44 + P11	✓	✓	✓
• DN 80, PN 16	N45 + P11	✓	✓	✓
• DN 100, PN 16	N46 + P11	✓	✓	✓
Aseptic clamp with groove to DIN 11864-3 Form A				
• DN 50, PN 25	N53	✓	✓	✓
• DN 65, PN 25	N54	✓	✓	✓
• DN 80, PN 16	N55	✓	✓	✓
• DN 100, PN 16	N56	✓	✓	✓

1) Han device plug IP65

2) Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H.

3) Cannot be ordered with remote seal.

4) When the additional ex option is selected, the ATEX marking on the device is omitted. Only the Ex option selected via the Z option is marked.

5) Special seal in Viton included in the scope of delivery.
FKM; temperature range -20 ... +200 °C (-4 ... +392 °C)

6) Cannot be combined with Order code P00. Can only be ordered with silicone oil measuring cell filling.

7) The weldable socket can be ordered under accessories.

8) 3A and EHEDG compliant. The maximum permissible temperatures of the medium depend on the respective cell fillings (see medium conditions).

Selection and Ordering data	Order code			
Additional data		HART	PA	FF
Please add "-Z" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	Y01	✓	✓ ¹⁾	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	Y15	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	Y16	✓	✓	✓
Entry of HART address (TAG) Max. 8 characters, specify in plain text: Y17:	Y17	✓		
Setting of pressure indicator in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H ₂ O ¹⁾ , inH ₂ O ¹⁾ , ftH ₂ O ¹⁾ , mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM or % ¹⁾ ref. temperature 20 °C	Y21	✓	✓	✓
Setting of pressure indication in non-pressure units²⁾ Specify in plain text: Y22: up to l/min, m ³ /h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y22 + Y01	✓		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	Y25		✓	✓
Damping adjustment in seconds (0 ... 100 s)	Y30	✓	✓	✓

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset

✓ = available

ordering example

Item line: 7MF4133-1DB20-1AB7-Z
B line: A22 + Y01 + Y21
C line: Y01: 1 ... 10 bar (14.5 ... 145 psi)
C line: Y21: bar (psi)

¹⁾ Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

²⁾ Preset values can only be changed over SIMATIC PDM.

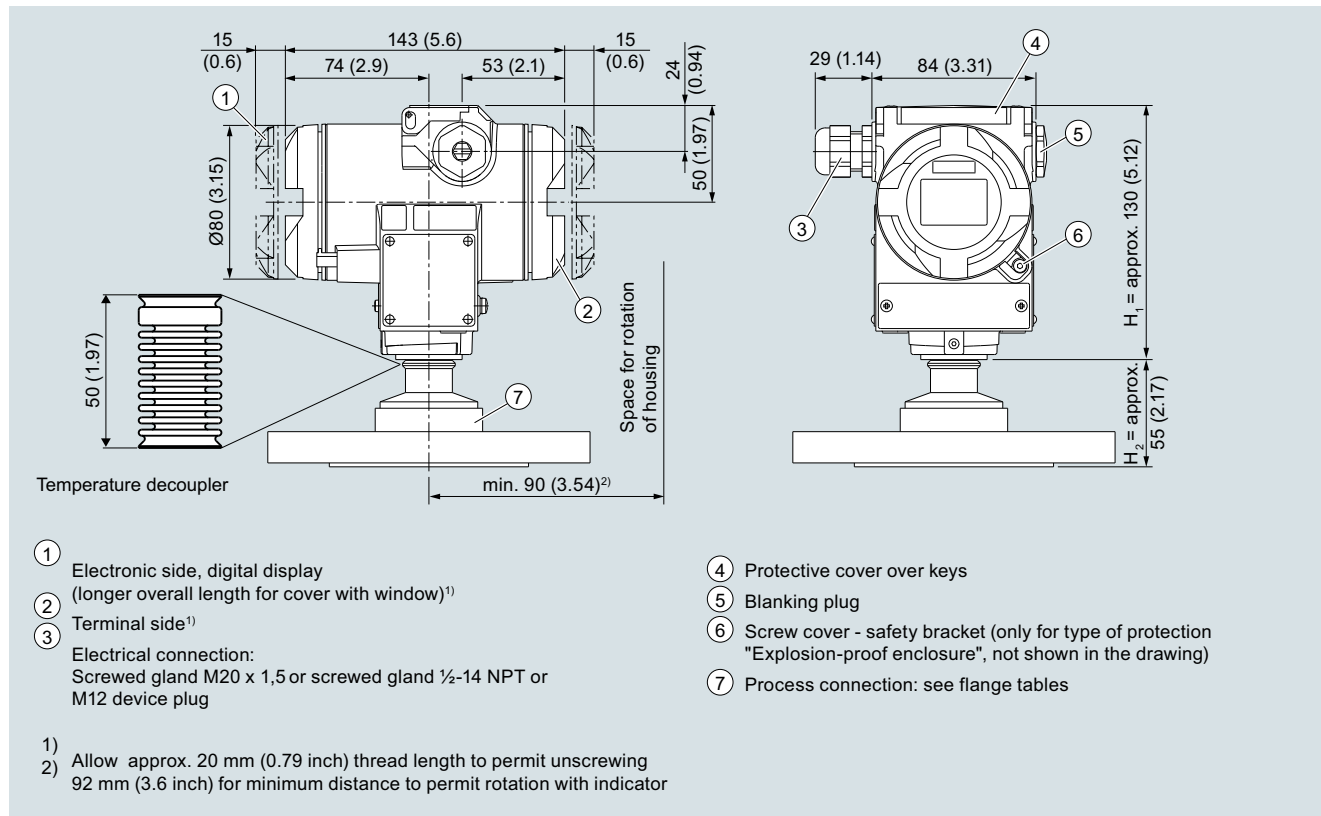
Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for gauge/absolute pressure, with front-flush diaphragm

Dimensional drawings



SITRANS P pressure transmitters, DS III series for gauge pressure, with front-flush diaphragm, dimensions in mm (inch)

The diagram shows a SITRANS P DS III with an example of a flange. In this drawing the height is subdivided into H_1 and H_2 .

H_1 = Height of the SITRANS P300 up to a defined cross-section

H_2 = Height of the flange up to this defined cross-section

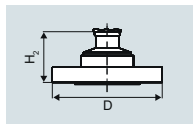
Only the height H_2 is indicated in the dimensions of the flanges.

Pressure Measurement

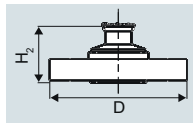
Transmitters for applications with advanced requirements (Advanced)
SITRANS P DS III

for gauge/absolute pressure, with front-flush diaphragm

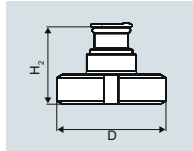
1

Flanges as per EN and ASMEFlange to EN**EN 1092-1**

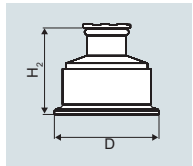
Order code	DN	PN	ØD	H ₂
M11	25	40	115 mm (4.5")	Approx. 52 mm (2")
M13	40	40	150 mm (5.9")	
M23	40	100	170 mm (6.7")	
M04	50	16	165 mm (6.5")	
M14	50	40	165 mm (6.5")	
M06	80	16	200 mm (7.9")	
M16	80	40	200 mm (7.9")	

Flanges to ASME**ASME B16.5**

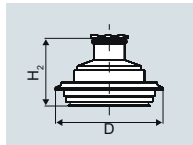
Order code	DN	PN	ØD	H ₂
M40	1"	150	110 mm (4.3")	Approx. 52 mm (2")
M41	1½"	150	130 mm (5.1")	
M42	2"	150	150 mm (5.9")	
M43	3"	150	190 mm (7.5")	
M44	4"	150	230 mm (9.1")	
M46	1½"	300	155 mm (6.1")	
M47	2"	300	165 mm (6.5")	
M48	3"	300	210 mm (8.1")	
M49	4"	300	255 mm (10.0")	

NuG and pharmaceutical connectionsConnections to DIN**DIN 11851 (milk pipe union with slotted union nut)**

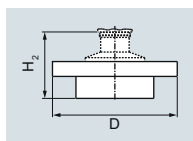
Order code	DN	PN	ØD	H ₂
N04	50	25	92 mm (3.6")	Approx. 52 mm (2")
N06	80	25	127 mm (5.0")	

Tri-Clamp nach DIN 32676

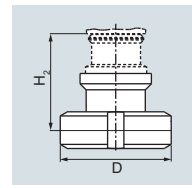
Order code	DN	PN	ØD	H ₂
N14	50	16	64 mm (2.5")	Approx. 52 mm (2")
N15	65	10	91 mm (3.6")	

Other connections**Varivent connection**

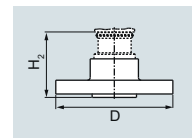
Order code	DN	PN	ØD	H ₂
N28	40 ... 125	40	84 mm (3.3")	Approx. 52 mm (2")

Sanitary process connection to DRD

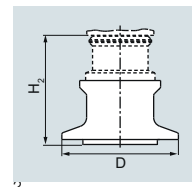
Order code	DN	PN	ØD	H ₂
M32	50	40	105 mm (4.1")	Approx. 52 mm (2")

Sanitary process screw connection to NEUMO Bio-Connect

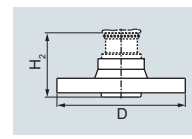
Order code	DN	PN	ØD	H ₂
Q05	50	16	82 mm (3.2")	Approx. 52 mm (2")
Q06	65	16	105 mm (4.1")	
Q07	80	16	115 mm (4.5")	
Q08	100	16	145 mm (5.7")	
Q13	2"	16	82 mm (3.2")	
Q14	2½"	16	105 mm (4.1")	
Q15	3"	16	105 mm (4.1")	
Q16	4"	16	145 mm (5.7")	

Sanitary process connection to NEUMO Bio-Connect flange connection

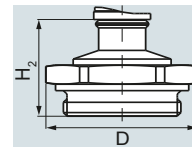
Order code	DN	PN	ØD	H ₂
Q23	50	16	110 mm (4.3")	Approx. 52 mm (2")
Q24	65	16	140 mm (5.5")	
Q25	80	16	150 mm (5.9")	
Q26	100	16	175 mm (6.9")	
Q31	2"	16	100 mm (3.9")	
Q32	2½"	16	110 mm (4.3")	
Q33	3"	16	140 mm (5.5")	
Q34	4"	16	175 mm (6.9")	

Sanitary process connection to NEUMO Bio-Connect clamp connection

Order code	DN	PN	ØD	H ₂
Q39	50	16	77.4 mm (3.0")	Approx. 52 mm (2")
Q40	65	10	90.9 mm (3.6")	
Q41	80	10	106 mm (4.2")	
Q42	100	10	119 mm (4.7")	
Q48	2½"	16	90.9 mm (3.6")	
Q49	3"	10	106 mm (4.2")	
Q50	4"	10	119 mm (4.7")	

Sanitary process connection to NEUMO Bio-Connect S flange connection

Order code	DN	PN	ØD	H ₂
Q72	2"	16	125 mm (4.9")	Approx. 52 mm (2")

Threaded connection G¾", G1" and G2" acc. to DIN 3852

Order code	DN	PN	ØD	H ₂
R01	¾"	60	37 mm (1.5")	Approx. 45 mm (1.8")
R02	1"	60	48 mm (1.9")	Approx. 47 mm (1.9")
R04	2"	60	78 mm (3.1")	Approx. 52 mm (2")

Pressure Measurement

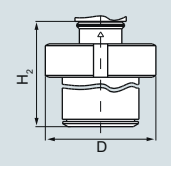
Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

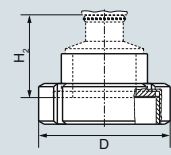
for gauge/absolute pressure, with front-flush diaphragm

1

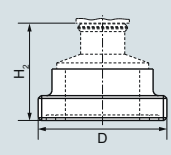
Tank connection TG 52/50 and TG52/150

	Order code	DN	PN	ØD	H ₂
	R10	25	40	63 mm (2.5")	Approx. 63 mm (2.5")
	R11	25	40	63 mm (2.5")	Approx. 170 mm (6.7")

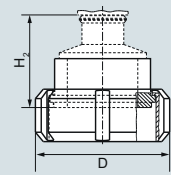
SMS socket with union nut

	Order code	DN	PN	ØD	H ₂
	M67	2"	25	84 mm (3.3")	Approx. 52 mm (2")
	M68	2½"	25	100 mm (3.9")	
	M69	3"	25	114 mm (4.5")	

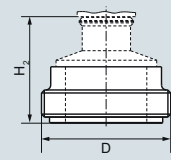
SMS threaded socket

	Order code	DN	PN	ØD	H ₂
	M73	2"	25	70 x 1/6 mm	Approx. 52 mm (2")
	M74	2½"	25	85 x 1/6 mm	
	M75	3"	25	98 x 1/6 mm	

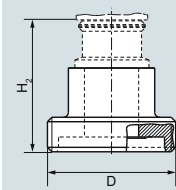
IDF socket with union nut

	Order code	DN	PN	ØD	H ₂
	M82	2"	25	77 mm (3")	Approx. 52 mm (2")
	M83	2½"	25	91 mm (3.6")	
	M84	3"	25	106 mm (4.2")	

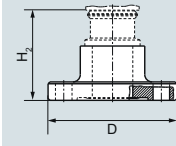
IDF threaded socket

	Order code	DN	PN	ØD	H ₂
	M92	2"	25	64 mm (2.5")	Approx. 52 mm (2")
	M93	2½"	25	77.5 mm (3.1")	
	M94	3"	25	91 mm (3.6")	

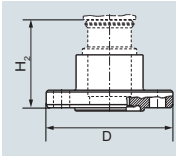
Aseptic threaded socket to DIN 11864-1 Form A

	Order code	DN	PN	ØD	H ₂
	N33	50	25	78 x 1/6"	Approx. 52 mm (2")
	N34	65	25	95 x 1/6"	
	N35	80	25	110 x 1/4"	
	N36	100	25	130 x 1/4"	

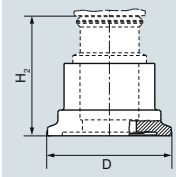
Aseptic flange with notch to DIN 11864-2 Form A

	Order code	DN	PN	ØD	H ₂
	N43	50	16	94	Approx. 52 mm (2")
	N44	65	16	113	
	N45	80	16	133	
	N46	100	16	159	

Aseptic flange with groove to DIN 11864-2 Form A

	Order code	DN	PN	ØD	H ₂
	N43 + P11	50	16	94	Approx. 52 mm (2")
	N44 + P11	65	16	113	
	N45 + P11	80	16	133	
	N46 + P11	100	16	159	

Aseptic clamp with groove to DIN 11864-3 Form A

	Order code	DN	PN	ØD	H ₂
	N53	50	25	77.5	Approx. 52 mm (2")
	N54	65	25	91	
	N55	80	16	106	
	N56	100	16	130	

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for absolute pressure (from gauge pressure series)

1

Technical specifications

SITRANS P DS III series for absolute pressure (from the gauge pressure series)

Input

Measured variable

Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)

Absolute pressure

HART

PROFIBUS PA/ FOUNDATION Fieldbus

Span	Nominal measuring range	Max. operating pressure MAWP (PS)	Max. perm. test pressure
8.34 ... 250 mbar a	250 mbar a	1.5 bar a	6 bar a
0.83 ... 25 kPa a	25 kPa a	150 kPa a	600 kPa a
3.35 ... 100 inH ₂ O a	100 inH ₂ O a	21.8 psi a	87 psi a
43.34 ... 1300 mbar a	1300 mbar a	2.6 bar a	10 bar a
4.33 ... 130 kPa a	130 kPa a	260 kPa a	1 MPa a
17.42 ... 522.4 inH ₂ O a	525 inH ₂ O a	37.7 psi a	145 psi a
170 ... 5000 mbar a	5000 mbar a	10 bar a	30 bar a
17 ... 500 kPa a	500 kPa a	1 MPa a	3 MPa a
2.43 ... 72.5 psi a	72.5 psi a	145 psi a	435 psi a
1 ... 30 bar a	30 bar a	45 bar a	100 bar a
0.1 ... 3 MPa a	3 MPa a	4.5 MPa a	10 MPa a
14.6 ... 435 psi a	435 psi a	653 psi a	1450 psi a
5.34 ... 160 bar a	160 bar a	167 bar a	250 bar a
0.53 ... 16 MPa a	16 MPa a	16.7 MPa a	25 MPa a
77.4 ... 2321 psi a	2321 psi	2422 psi	3626 psi
13.34 ... 400 bar a	400 bar a	400 bar a	600 bar a
1.3 ... 40 MPa a	40 MPa a	40 MPa a	60 MPa a
193.4 ... 5802 psi a	5802 psi a	5802 psi a	8702 psi a
23.34 ... 700 bar a	700 bar a	800 bar a	800 bar a
2.33 ... 70 MPa a	70 MPa a	80 MPa a	80 MPa a
338.43 ... 10153 psi a	10153 psi a	11603 psi a	11603 psi a

Lower measuring limit

- Measuring cell with silicone oil filling
- Measuring cell with inert filling liquid
 - for process temperature -20 °C < ϑ ≤ +60 °C (-4 °F < ϑ ≤ +140 °F)
 - for process temperature 60 °C < ϑ ≤ +100 °C (max. 85 °C for measuring cell 30 bar) (140 °F < ϑ ≤ +212 °F (max. 185 °F for measuring cell 435 psi))

0 mbar a/0 kPa a/0 psi a

30 mbar a/3 kPa a/0.44 psi a

30 mbar a + 20 mbar a · (ϑ - 60 °C)/°C
 3 kPa a + 2 kPa a · (ϑ - 60 °C)/°C
 0.44 psi a + 0.29 psi a · (ϑ - 140 °F)/°F

Upper measuring limit

100 % of max. span
 (for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/process temperature)

Start of scale value

Between the measuring limits (fully adjustable)

Output

Output signal

HART

4 ... 20 mA

PROFIBUS PA/FOUNDATION Fieldbus

Digital PROFIBUS PA and FOUNDATION Fieldbus signal

- Lower limit (infinitely adjustable)
- Upper limit (infinitely adjustable)

3.55 mA, factory preset to 3.84 mA

23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA

Load

- Without HART
- With HART

 $R_B \leq (U_H - 10.5 \text{ V})/0.023 \text{ A}$ in Ω ,
 U_H : Power supply in V

 $R_B = 230 \dots 500 \Omega$ (SIMATIC PDM) or
 $R_B = 230 \dots 1100 \Omega$ (HART Communicator)

Physical bus

-

IEC 61158-2

Protection against polarity reversal

Protected against short-circuit and polarity reversal.
 Each connection against the other with max. supply voltage.

Electrical damping (step width 0.1 s)

Set to 2 s (0 ... 100 s)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced) SITRANS P DS III

for absolute pressure (from gauge pressure series)

SITRANS P DS III series for absolute pressure (from the gauge pressure series)

Measuring accuracy

Reference conditions
(All error data refer always refer to the set span)

Acc. to IEC 60770-1

- Increasing characteristic
- Start-of-scale value 0 bar/kPa/psi
- Stainless steel seal diaphragm
- Silicone oil filling
- Room temperature 25 °C (77 °F)

Measuring span ratio r (spread, Turn-Down)

$r = \text{max. measuring span/set measuring span or nom. pressure range}$

Error in measurement at limit setting incl.
hysteresis and reproducibility

- Linear characteristic

- $r \leq 10$

$\leq 0.1 \%$

- $10 < r \leq 30$

$\leq 0.2 \%$

Influence of ambient temperature
(in percent per 28 °C (50 °F))

- 250 mbar a/25 kPa a/3.6 psi a

$\leq (0.15 \cdot r + 0.1) \%$

- 1300 mbar a/130 kPa a/18.8 psi a
5 bar a/500 kPa a/72.5 psi a
30 bar a/3000 kPa a/435 psi a
100 bar a/10 MPa a/1450 psi a
160 bar a/16 MPa a/2321 psi a
400 bar a/40 MPa a/5802 psi a
700 bar a/50 MPa a/10152 psi a

$\leq (0.08 \cdot r + 0.16) \%$

Long-term stability (temperature change $\pm 30 \text{ °C}$ ($\pm 54 \text{ °F}$))

$\leq (0.25 \cdot r) \%$ in 5 years

Effect of mounting position (in pressure per change in angle)

$\leq 0.05 \text{ mbar}/0.005 \text{ kPa}/0.000725 \text{ psi}$ per 10° inclination
(zero point correction is possible with position error compensation)

Effect of auxiliary power supply
(in percent per change in voltage)

0.005 % per 1 V

Measuring value resolution for PROFIBUS PA and
FOUNDATION Fieldbus

$3 \cdot 10^{-5}$ of nominal measuring range

Rated conditions

Degree of protection

- according to EN 60529
- according to NEMA 250

IP66 (optional IP66/IP68)

Type 4X

Temperature of medium

- Measuring cell with silicone oil filling

-40 ... +100 °C (-40 ... +212 °F)

-20 ... +100 °C (-4 ... +212 °F) with 30 bar a measuring cell

- Measuring cell with inert filling liquid

-20 ... +100 °C (-4 ... +212 °F)

- In conjunction with dust explosion protection

-20 ... +60 °C (-4 ... +140 °F)

Ambient conditions

- Ambient temperature

- Transmitter

-40 ... +85 °C (-40 ... +185 °F)

- Display readable

-30 ... +85 °C (-22 ... +185 °F)

- Storage temperature

-50 ... +85 °C (-58 ... +185 °F)

- Climatic class

- Condensation

Relative humidity 0 ... 100 %
Condensation permissible, suitable for use in the tropics

- Electromagnetic Compatibility

- Emitted interference and interference immunity

Acc. to IEC 61326 and NAMUR NE 21

SITRANS P DS III series for absolute pressure (from the gauge pressure series)**Design**

Weight (without options)	≈ 1.5 kg (≈ 3.3 lb)
Enclosure material	Low-copper die-cast aluminum, GD-AlSi 12 or stainless steel precision casting, mat. no. 1.4408
Wetted parts materials	
• Connection shank	Stainless steel, mat. no. 1.4404/316L or Hastelloy C4, mat. no. 2.4602
• Oval flange	Stainless steel, mat. no. 1.4404/316L
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819
Measuring cell filling	Silicone oil or inert filling liquid (maximum value with oxygen measurement pressure 100 bar (1450 psi) at 60 °C (140 °F))
Process connection	Connection shank G½B to EN 837-1, female thread ½ -14 NPT or oval flange (PN 160 (MAWP 2320 psi a)) to DIN 19213 with mounting thread M10 or 7/16-20 UNF to IEC 61518/DIN EN 61518
Material of mounting bracket	
• Steel	Sheet-steel, Mat. No. 1.0330, chrome-plated
• Stainless steel 304	Sheet stainless steel, mat. no. 1.4301 (SS 304)
• Stainless steel 316L	Sheet stainless steel, mat. no. 1.4404 (SS 316L)

Power supply U_H

	HART	PROFIBUS PA/FOUNDATION Fieldbus
Terminal voltage on transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically-safe mode	-
Power supply		Supplied through bus
Separate 24 V power supply necessary	-	No
Bus voltage		
• Not Ex	-	9 ... 32 V
• With intrinsically-safe operation	-	9 ... 24 V
Current consumption		
• Basic current (max.)	-	12.5 mA
• Start-up current ≤ basic current	-	Yes
• Max. current in event of fault	-	15.5 mA
Fault disconnection electronics (FDE) available	-	Yes

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P DS III

for absolute pressure (from gauge pressure series)

SITRANS P DS III series for absolute pressure (from the gauge pressure series)

Certificates and approvals

Classification according to PED 2014/68/EU

Explosion protection

- Intrinsic safety "i"

- Marking
- Permissible ambient temperature

- Connection

- Effective internal inductance/capacitance

- Explosion-proof "d"

- Marking
- Permissible ambient temperature

- Connection

- Dust explosion protection for zone 20

- Marking
- Permissible ambient temperature
- Max. surface temperature
- Connection

- Effective internal inductance/capacitance

- Dust explosion protection for zone 21/22

- Marking
- Connection

- Type of protection "n" (zone 2)

- Marking
- Connection (Ex nA)
- Connection (Ex ic)

- Effective internal inductance/capacitance

- Explosion protection acc. to FM

- Identification (XP/DIP) or (IS); (NI)

- Explosion protection to CSA

- Identification (XP/DIP) or (IS)

HART

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

PTB 13 ATEX 2007 X

Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb

-40 ... +85 °C (-40 ... +185 °F) temperature class T4;
-40 ... +70 °C (-40 ... +158 °F) temperature class T5;
-40 ... +60 °C (-40 ... +140 °F) temperature class T6

To certified intrinsically-safe circuits with peak values:

$U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$,
 $P_i = 750 \text{ mW}$; $R_i = 300 \Omega$

$L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

PTB 99 ATEX 1160

Ex II 1/2 G Ex d IIC T4/T6 Gb

-40 ... +85 °C (-40 ... +185 °F) temperature class T4;
-40 ... +60 °C (-40 ... +140 °F) temperature class T6

To circuits with values: $U_H = 10.5 \dots 45 \text{ V DC}$

PTB 01 ATEX 2055

Ex II 1 D Ex ta IIC T120°C Da

Ex II 1/2 D Ex ta/tb IIC T120°C Da/Db

-40 ... +85 °C (-40 ... +185 °F)
120 °C (248 °F)

To certified intrinsically-safe circuits with peak values:

$U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$,
 $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$

$L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

PTB 01 ATEX 2055

Ex II 2 D Ex tb IIC T120°C Db

To circuits with values: $U_H = 10.5 \dots 45 \text{ V DC}$; $P_{\max} = 1.2 \text{ W}$

PTB 13 ATEX 2007 X

Ex II 2/3 G Ex nA IIC T4/T5/T6 Gb/Gc
Ex II 2/3 G Ex ic IIC T4/T5/T6 Gb/Gc

$U_m = 45 \text{ V}$

To circuits with values:
 $U_i = 45 \text{ V}$

$L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

Certificate of Compliance 3008490

CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

Certificate of Compliance 1153651

CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

PROFIBUS PA/ FOUNDATION Fieldbus

FISCO supply unit:

$U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$

Linear barrier:

$U_o = 24 \text{ V}$, $I_o = 250 \text{ mA}$, $P_o = 1.2 \text{ W}$

$L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$

To circuits with values: $U_H = 9 \dots 32 \text{ V DC}$

FISCO supply unit:

$U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$

Linear barrier:

$U_o = 24 \text{ V}$, $I_o = 250 \text{ mA}$, $P_o = 1.2 \text{ W}$

$L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$

To circuits with values: $U_H = 9 \dots 32 \text{ V DC}$;
 $P_{\max} = 1 \text{ W}$

$U_m = 32 \text{ V}$

FISCO supply unit ic:

$U_o = 17.5 \text{ V}$, $I_o = 570 \text{ mA}$

Linear barrier:

$U_o = 32 \text{ V}$, $I_o = 132 \text{ mA}$, $P_o = 1 \text{ W}$

$L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$

HART communication		FOUNDATION Fieldbus communication	
HART	230 ... 1100 Ω	Function blocks	3 function blocks analog input, 1 function block PID
Protocol	HART Version 5.x		
Software for computer	SIMATIC PDM		
PROFIBUS PA communication		• Analog input	Yes, linearly rising or falling characteristic
Simultaneous communication with master class 2 (max.)	4	- Adaptation to customer-specific process variables	0 ... 100 s
The address can be set using	Configuration tool or local operation (standard setting address 126)	- Electrical damping, adjustable	Output/input (can be locked within the device with a bridge)
Cyclic data usage		- Simulation function	parameterizable (last good value, substitute value, incorrect value)
• Output byte	5 (one measured value) or 10 (two measured values)	- Failure mode	Yes, one upper and lower warning limit and one alarm limit respectively
• Input byte	0, 1, or 2 (register operating mode and reset function for metering)	- Limit monitoring	Yes
Internal preprocessing		- Square-rooted characteristic for flow measurement	Standard FOUNDATION Fieldbus function block
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B	• PID	1 resource block
Function blocks	2	• Physical block	1 transducer block Pressure with calibration, 1 transducer block LCD
• Analog input		Transducer blocks	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic	• Pressure transducer block	
- Electrical damping, adjustable	0 to 100 s	- Can be calibrated by applying two pressures	Yes
- Simulation function	Input /Output	- Monitoring of sensor limits	Yes
- Failure mode	parameterizable (last good value, substitute value, incorrect value)	- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively		
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output		
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)		
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively		
• Physical block	1		
Transducer blocks	2		
• Pressure transducer block			
- Can be calibrated by applying two pressures	Yes		
- Monitoring of sensor limits	Yes		
- Specification of a container characteristic with	Max. 30 nodes		
- Square-rooted characteristic for flow measurement	Yes		
- Gradual volume suppression and implementation point of square-root extraction	Parameterizable		
- Simulation function for measured pressure value and sensor temperature	Constant value or over parameterizable ramp function		

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for absolute pressure (from gauge pressure series)

1

Selection and Ordering data		Article No.
Pressure transmitters for absolute pressure from gauge pressure series SITRANS P DS III with HART		7MF4233 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Measuring cell cleaning	
Silicone oil	normal	1
Inert liquid ¹⁾	grease-free to cleanliness level 2	3
Measuring span (min. ... max.)		
8.34 ... 250 mbar a	(0.13 ... 3.63 psi a)	D
43.34 ... 1300 mbar a	(0.63 ... 18.86 psi a)	F
0.17 ... 5 bar a	(2.43 ... 72.5 psi a)	G
1 ... 30 bar a	(14.6 ... 435 psi a)	H
5.34 ... 160 bar a ²⁾	(77.4 ... 2 321 psi a)	L
13.34 ... 400 bar a ²⁾	(193.4 ... 5 802 psi a)	M
23.34 ... 700 bar a ²⁾	(338.43 ... 10 153 psi a)	N
Wetted parts materials		
Seal diaphragm	Process connection	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Hastelloy	Hastelloy	C
Version for diaphragm seals in conjunction with process connector "female thread 1/2-14 NPT" (recommended version) ^{3) 4) 5) 6) 7)}		Y 1
Version for diaphragm seals in conjunction with process connector "G1/2B connection shank" ^{3) 4) 5) 6) 7)}		Y 0
Process connection		
• Connection shank G1/2B to EN 837-1		0
• Female thread 1/2-14 NPT		1
• Stainless steel oval flange with process connection (Oval flange has no female thread)		
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		2
- Mounting thread M10 to DIN 19213		3
- Mounting thread M12 to DIN 19213		4
• Male thread M20 x 1.5		5
• Male thread 1/2 -14 NPT		6
Non-wetted parts materials		
• Housing made of die-cast aluminium		0
• Housing stainless steel precision casting ⁸⁾		3
Version		
• Standard version, German plate inscription, setting for pressure unit: bar		1
• International version, English plate inscription, setting for pressure unit: bar		2
• Chinese version, English plate inscription, setting for pressure unit: Pascal		3
All versions include DVD with compact operating instructions in various EU languages.		
Explosion protection		
• None		A
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		B
- "Explosion-proof (Ex d)" ⁹⁾		D
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)" ¹⁰⁾		P
- "Ex nA/ic (Zone 2)" ¹¹⁾		E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)" ¹⁰⁾¹²⁾		R
• FM + CSA intrinsic safe (is) ¹³⁾		F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D ¹⁰⁾¹²⁾¹³⁾		S
• With FM + CSA, Type of protection:		
- "Intrinsic Safe and Explosion Proof (is + xp)" ⁹⁾¹³⁾		NC

Selection and Ordering data	Article No.
Pressure transmitters for absolute pressure from gauge pressure series SITRANS P DS III with HART	7MF4233 -
Electrical connection/cable entry	
• Screwed gland M20x1.5	B
• Screwed gland 1/2-14 NPT	C
• Han 7D device plug (plastic housing) incl. mating connector ¹⁴⁾	D
• M12 device plugs (stainless steel) ^{15) 16)}	F
Display	
• Without display	0
• Without visible display (display concealed, setting: mA)	1
• With visible display (setting: mA)	6
• with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)	7

Power supply units see Chap. 7 "Supplementary Components".

A quick-start guide is included in the scope of delivery of the device.

- 1) For oxygen application, add Order code E10.
- 2) Available soon
- 3) Version 7MF4233-1DY... only up to max. span 200 mbar a (80 inH₂O a).
- 4) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here. If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 5) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 6) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF423-...Y... and 7MF4900-1...-B
- 7) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- 8) Not in conjunction with Electrical connection "Han 7D device plug".
- 9) Without cable gland, with blanking plug.
- 10) With enclosed cable gland Ex ia and blanking plug.
- 11) Configurations with Han and M12 device plugs are only available in Ex ic.
- 12) Only in connection with IP66.
- 13) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.
- 14) Only in connection with Ex approval A, B or E.
- 15) Only in connection with Ex approval A, B, E or F.
- 16) M12 delivered without cable socket

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for absolute pressure (from gauge pressure series)

1

Selection and Ordering data		Article No.	
Pressure transmitters for absolute pressure from gauge pressure series			
SITRANS P DS III with PROFIBUS PA (PA)		7 M F 4 2 3 4 -	
SITRANS P DS III with FOUNDATION Fieldbus (FF)		7 M F 4 2 3 5 -	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Measuring cell filling	Measuring cell cleaning		
Silicone oil	normal	1	
Inert liquid ¹⁾	grease-free to cleanliness level 2	3	
Nominal measuring range			
250 mbar a	(3.63 psi a)	D	
1300 mbar a	(18.86 psi a)	F	
5 bar a	(72.5 psi a)	G	
30 bar a	(435 psi a)	H	
160 bar a ²⁾	(2 321 psi a)	L	
400 bar a ²⁾	(5 802 psi a)	M	
700 bar a ²⁾	(10 153 psi a)	N	
Wetted parts materials			
Seal diaphragm	Process connection		
Stainless steel	Stainless steel	A	
Hastelloy	Stainless steel	B	
Hastelloy	Hastelloy	C	
Version for diaphragm seals in conjunction with process connector "female thread ½-14 NPT" (recommended version) ^{3) 4) 5) 6) 7)}		Y 1	
Version for diaphragm seals in conjunction with process connector "G½B connection shank" ^{3) 4) 5) 6) 7)}		Y 0	
Process connection			
• Connection shank G½B to EN 837-1		0	
• Female thread ½-14 NPT		1	
• Stainless steel oval flange with process connection (Oval flange has no female thread)			
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		2	
- Mounting thread M10 to DIN 19213		3	
- Mounting thread M12 to DIN 19213		4	
• Male thread M20 x 1.5		5	
• Male thread ½ -14 NPT		6	
Non-wetted parts materials			
• Housing made of die-cast aluminium		0	
• Housing stainless steel precision casting		3	
Version			
• Standard version, German plate inscription, setting for pressure unit: bar		1	
• International version, English plate inscription, setting for pressure unit: bar		2	
• Chinese version, English plate inscription, setting for pressure unit: Pascal		3	
All versions include DVD with compact operating instructions in various EU languages.			

Selection and Ordering data		Article No.	
Pressure transmitters for absolute pressure from gauge pressure series			
SITRANS P DS III with PROFIBUS PA (PA)		7 M F 4 2 3 4 -	
SITRANS P DS III with FOUNDATION Fieldbus (FF)		7 M F 4 2 3 5 -	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Explosion protection			
• None			A
• With ATEX, Type of protection:			
- "Intrinsic safety (Ex ia)"			B
- "Explosion-proof (Ex d) ⁸⁾			D
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d) ⁹⁾			P
- "Ex nA/ic (Zone 2)" ¹⁰⁾			E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D) ^{9) 11)}			R
• FM + CSA intrinsic safe (is) ¹²⁾			F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D ^{9) 11) 12)}			S
• With FM + CSA, Type of protection:			
- "Intrinsic Safe and Explosion Proof (is + xp) ^{8) 12)}			NC
Electrical connection/cable entry			
• Screwed gland M20 x 1.5			B
• Screwed gland ½-14 NPT			C
• M12 device plugs (stainless steel) ^{13) 14)}			F
Display			
• Without display			0
• Without visible display (display concealed, setting: bar)			1
• With visible display (setting: bar)			6
• with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)			7
A quick-start guide is included in the scope of delivery of the device.			
1) For oxygen application, add Order code E10.			
2) Available soon			
3) Version 7MF4233-1DY... only up to max. span 200 mbar a (2.9 psi a).			
4) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the <u>total</u> combination is certified here.			
5) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.			
6) The diaphragm seal is to be specified with a separate order number and must be included wiht the transmitter order number, for example 7MF423-...Y... and 7MF4900-1...-B			
7) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.			
8) Without cable gland, with blanking plug.			
9) With enclosed cable gland Ex ia and blanking plug.			
10) Configurations with Han and M12 device plugs are only available in Ex ic.			
11) Only in connection with IP66.			
12) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.			
13) Only in connection with Ex approval A, B, E or F.			
14) M12 delivered without cable socket.			

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P DS III

for absolute pressure (from gauge pressure series)

1

Selection and Ordering data	Order code			
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code.				
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:				
• Steel	A01	✓	✓	✓
• Stainless steel 304	A02	✓	✓	✓
• Stainless steel 316L	A03	✓	✓	✓
Device plugs¹⁾				
• Han 7D (metal)	A30	✓		
• Han 8D (instead of Han 7D)	A31	✓		
• Angled	A32	✓		
• Han 8D (metal)	A33	✓		
Cable sockets for M12 device plugs (metal (CuZn))	A50	✓	✓	✓
Rating plate inscription (instead of German)				
• English	B11	✓	✓	✓
• French	B12	✓	✓	✓
• Spanish	B13	✓	✓	✓
• Italian	B14	✓	✓	✓
• Cyrillic (russian)	B16	✓	✓	✓
English rating plate	B21	✓	✓	✓
Pressure units in inH ₂ O and/or psi				
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2²⁾	C11	✓	✓	✓
Inspection certificate³⁾	C12	✓	✓	✓
Acc. to EN 10204-3.1				
Factory certificate	C14	✓	✓	✓
Acc. to EN 10204-2.2				
Acceptance certificate (EN 10204-3.1)	C15	✓	✓	✓
PMI test of parts in contact with medium				
Functional safety (SIL2)	C20	✓		
Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration				
Functional safety (PROFIsafe) Certificate and PROFIsafe protocol	C21 ⁴⁾		✓	
Functional safety (SIL2/3)	C23	✓		
Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration				
PED for Russia with initial calibration mark	C99	✓	✓	✓
Setting of the upper saturation limit of the output signal to 22.0 mA	D05	✓		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)	D07	✓	✓	✓
Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)	D12	✓	✓	✓
Supplied with oval flange (1 item), PTFE packing and screws in thread of oval flange	D37	✓	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included	D59	✓	✓	✓
Use in or on zone 1D/2D⁵⁾ (only together with type of protection "Intrinsic safety" (transmitter 7MF4...-.....-B.. Ex ia) and IP65)	E01	✓	✓	✓
Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))	E10	✓	✓	✓
Export approval Korea	E11	✓	✓	✓

Selection and Ordering data	Order code			
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code.				
CRN approval Canada (Canadian Registration Number)	E22 ⁶⁾	✓	✓	✓
Dual seal	E24	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-B..)	E25 ⁷⁾	✓	✓	✓
"Flameproof" explosion protection according to INMETRO (Brazil) (only for transmitter 7MF4...-.....-D..)	E26 ⁷⁾	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia + Ex d) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-P..)	E28 ⁷⁾	✓	✓	
Ex Approval IEC Ex (Ex ia) (only for transmitter 7MF4...-.....-B..)	E45 ⁷⁾	✓	✓	✓
Ex Approval IEC Ex (Ex d) (only for transmitter 7MF4...-.....-D..)	E46 ⁷⁾	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-.....-B..)	E55 ⁷⁾	✓	✓	✓
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-.....-D..)	E56 ⁷⁾	✓	✓	✓
Explosion-proof "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-E..)	E57 ⁷⁾	✓	✓	✓
Ex protection „Ex ia“, „Ex d“ and „Zone 2“ to NEPSI (China) (only for transmitter 7MF4...-.....-R..)	E58 ⁷⁾	✓	✓	✓
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea) (only for transmitter 7MF4...-.....-[B, D]..-Z + E11)	E70 ⁷⁾	✓	✓	✓
Ex-protection Ex ia according to EAC Ex (Russia)	E80	✓	✓	✓
Ex-protection Ex d according to EAC Ex (Russia)	E81	✓	✓	✓
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)	E82	✓	✓	✓
Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)	E83	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)	G10	✓	✓	✓
Transient protector 6 kV (lightning protect.)	J01	✓	✓	✓
Oval flange NAM (ASTAVA)	J06	✓	✓	✓
Marine approvals				
• Det Norske Veritas Germanischer Lloyd (DNV-GL)	S10	✓	✓	✓
• Lloyds Register (LR)	S11	✓	✓	✓
• French marine classification society Bureau Veritas (BV)	S12	✓	✓	✓
• American Bureau of Shipping (ABS)	S14	✓	✓	✓
• Russian Maritime Register (RMR)	S16	✓	✓	✓
• Korean Register of Shipping (KR)	S17	✓	✓	✓

¹⁾ Han device plug IP65

²⁾ When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

³⁾ If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

⁴⁾ Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H.

⁵⁾ Option does not contain gas explosion protection; only dust explosion protection: Use in or at Zone 1D/2D.

⁶⁾ Cannot be ordered with remote seal.

⁷⁾ When the additional ex option is selected, the ATEX marking on the device is omitted. Only the Ex option selected via the Z option is marked.

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for absolute pressure (from gauge pressure series)

1

Selection and Ordering data	Order code			
Additional data		HART	PA	FF
Please add "-Z" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar a, bar a, kPa _{abs} , MPa _{abs} , psi a ²⁾	Y01	✓	✓ ¹⁾	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	Y15	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	Y16	✓	✓	✓
Entry of HART address (TAG) Max. 8 characters, specify in plain text: Y17:	Y17	✓		
Setting of pressure indication in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H ₂ O ^{*)} , inH ₂ O ^{*)} , ftH ₂ O ^{*)} , mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM or % *) ref. temperature 20 °C	Y21	✓	✓	✓
Setting of pressure indication in non-pressure units³⁾ Specify in plain text: Y22: up to l/min, m ³ /h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y22 + Y01	✓		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	Y25		✓	✓
Damping adjustment in seconds (0 ... 100 s)	Y30	✓	✓	✓

Factory mounting of valve manifolds, see accessories.

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset

✓ = available

1) Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

2) Only absolute pressure units selectable. Negative pressure values not permitted.

3) Preset values can only be changed over SIMATIC PDM.

Transmitters for applications with advanced requirements (Advanced)

for absolute pressure (from gauge pressure series)

[illegible]

SITRANS P DS III pressure transmitters for absolute pressure, from the pressure series, dimensions in mm (inch)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for absolute pressure (from differential pressure series)

1

Technical specifications

SITRANS P, DS III for absolute pressure (from the differential pressure series)

Input			
Measured variable	Absolute pressure		
Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)	HART	PROFIBUS PA/ FOUNDATION Fieldbus	
	Span	Nominal measuring range	Max. operating pressure MAWP (PS)
	8.34 ... 250 mbar a 0.834 ... 25 kPa a 3 ... 100 inH ₂ O a	250 mbar a 25 kPa a 100 inH ₂ O a	32 bar a 3.2 MPa a 464 psi a
	43.34 ... 1300 mbar a 4.33 ... 130 kPa a 17 ... 525 inH ₂ O a	1300 mbar a 130 kPa a 525 inH ₂ O a	32 bar a 3.2 MPa a 464 psi a
	170 ... 5000 mbar a 17 ... 500 kPa a 2.43 ... 72.5 psi a	5000 mbar a 500 kPa a 72.5 psi a	32 bar a 3.2 MPa a 464 psi a
	1 ... 30 bar a 0.1 ... 3 MPa a 14.6 ... 435 psi a	30 bar a 3 MPa a 435 psi a	160 bar a 16 MPa a 2320 psi a
	5.3 ... 100 bar a 0.5 ... 10 MPa a 76.9 ... 1450 psi a	100 bar a 10 MPa a 1450 psi a	160 bar a 16 MPa a 2320 psi a
	Lower measuring limit	0 mbar a/0 kPa a/0 psi a	
• Measuring cell with silicone oil filling			
• Measuring cell with inert filling liquid			
- for process temperature -20 °C < $\vartheta \leq +60\text{ °C}$ (-4 °F < $\vartheta \leq +140\text{ °F}$)	30 mbar a/3 kPa a/0.44 psi a		
- for process temperature 60 °C < $\vartheta \leq +100\text{ °C}$ (max. 85 °C for measuring cell 30 bar) (140 °F < $\vartheta \leq +212\text{ °F}$ (max. 185 °F for measuring cell 435 psi))	30 mbar a + 20 mbar a · ($\vartheta - 60\text{ °C}$)/°C 3 kPa a + 2 kPa a · ($\vartheta - 60\text{ °C}$)/°C 0.44 psi a + 0.29 psi a · ($\vartheta - 140\text{ °F}$)/°F		
Upper measuring limit	100 % of max. span (for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/process temperature)		
Start of scale value	Between the measuring limits (fully adjustable)		
Output	HART	PROFIBUS PA/ FOUNDATION Fieldbus	
Output signal	4 ... 20 mA	Digital PROFIBUS PA and FOUNDATION Fieldbus signal	
• Lower limit (infinitely adjustable)	3.55 mA, factory preset to 3.84 mA	-	
• Upper limit (infinitely adjustable)	23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA	-	
Load			
• Without HART	$R_B \leq (U_H - 10.5\text{ V})/0.023\text{ A}$ in Ω , U_H : Power supply in V	-	
• With HART	$R_B = 230 \dots 500\ \Omega$ (SIMATIC PDM) or $R_B = 230 \dots 1100\ \Omega$ (HART Communicator)	-	
Physical bus	-	IEC 61158-2	
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.		
Electrical damping (step width 0.1 s)	Set to 2 s (0 ... 100 s)		

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P DS III

for absolute pressure (from differential pressure series)

SITRANS P, DS III for absolute pressure (from the differential pressure series)

Measuring accuracy

Reference conditions
(All error data refer always refer to the set span)

Acc. to IEC 60770-1

- Increasing characteristic
- Start-of-scale value 0 bar/kPa/psi
- Stainless steel seal diaphragm
- Silicone oil filling
- Room temperature 25 °C (77 °F)

Measuring span ratio r (spread, Turn-Down)

$r = \text{max. measuring span/set measuring span or nom. pressure range}$

Error in measurement at limit setting incl.
hysteresis and reproducibility

- Linear characteristic

- $r \leq 10$

$\leq 0.1 \%$

- $10 < r \leq 30$

$\leq 0.2 \%$

Influence of ambient temperature
(in percent per 28 °C (50 °F))

- 250 mbar a/25 kPa a/3.6 psi a

$\leq (0.15 \cdot r + 0.1) \%$

- 1300 mbar a/130 kPa a/18.8 psi a
5 bar a/500 kPa a/72.5 psi a
30 bar a/3000 kPa a/435 psi a
100 bar a/10 MPa a/1450 psi a

$\leq (0.08 \cdot r + 0.16) \%$

Long-term stability
(temperature change ± 30 °C (± 54 °F))

$\leq (0.25 \cdot r) \%$ in 5 years

Effect of mounting position (in pressure per change in angle)

$\leq 0.7 \text{ mbar}/0.07 \text{ kPa}/0.001015 \text{ psi}$ per 10° inclination
(zero point correction is possible with position error compensation)

Effect of auxiliary power supply
(in percent per change in voltage)

0.005 % per 1 V

Measuring value resolution for PROFIBUS PA and
FOUNDATION Fieldbus

$3 \cdot 10^{-5}$ of nominal measuring range

Rated conditions

Degree of protection

- according to EN 60529
- according to NEMA 250

IP66 (optional IP66/IP68)

Type 4X

Temperature of medium

- Measuring cell with silicone oil filling
- Measuring cell with inert filling liquid
- In conjunction with dust explosion protection

-40 ... +100 °C (-40 ... +212 °F)

-20 ... +100 °C (-4 ... +212 °F)

-20 ... +60 °C (-4 ... +140 °F)

Ambient conditions

- Ambient temperature

- Transmitter

-40 ... +85 °C (-40 ... +185 °F)

- Display readable

-30 ... +85 °C (-22 ... +185 °F)

- Storage temperature

-50 ... +85 °C (-58 ... +185 °F)

- Climatic class

- Condensation

Relative humidity 0 ... 100 %
Condensation permissible, suitable for use in the tropics

- Electromagnetic Compatibility

- Emitted interference and interference immunity

Acc. to IEC 61326 and NAMUR NE 21

SITRANS P, DS III for absolute pressure (from the differential pressure series)**Design**

Weight (without options)	≈ 4.5 kg (≈ 9.9 (lb))
Enclosure material	Low-copper die-cast aluminum, GD-AlSi12 or stainless steel precision casting, mat. no. 1.4408
Wetted parts materials	
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819, Monel, mat. no. 2.4360, tantalum or gold
• Process flanges and sealing screw	Stainless steel, mat. no. 1.4408, Hastelloy C4, mat. no. 2.4602 or Monel, mat. no. 2.4360
• O-Ring	FPM (Viton) or optionally: PTFE, FEP, FEPM and NBR
Measuring cell filling	Silicone oil or inert filling liquid (maximum value with oxygen measurement pressure 100 bar (1450 psi) at 60 °C (140 °F))
Process connection	1/4-18 NPT and flange connection with mounting thread M10 to DIN 19213 or 7/16-20 UNF to IEC 61518/DIN EN 61518
Material of mounting bracket	
• Steel	Sheet-steel, Mat. No. 1.0330, chrome-plated
• Stainless steel 304	Sheet stainless steel, mat. no. 1.4301 (SS 304)
• Stainless steel 316L	Sheet stainless steel, mat. no. 1.4404 (SS 316L)

Power supply U_H

	HART	PROFIBUS PA/FOUNDATION Fieldbus
Terminal voltage on transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically-safe mode	-
Power supply		Supplied through bus
Separate 24 V power supply necessary	-	No
Bus voltage		
• Not Ex	-	9 ... 32 V
• With intrinsically-safe operation	-	9 ... 24 V
Current consumption		
• Basic current (max.)	-	12.5 mA
• Start-up current ≤ basic current	-	Yes
• Max. current in event of fault	-	15.5 mA
Fault disconnection electronics (FDE) available	-	Yes

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P DS III

for absolute pressure (from differential pressure series)

SITRANS P, DS III for absolute pressure (from the differential pressure series)

Certificates and approvals

Classification according to PED 2014/68/EU

Explosion protection

- Intrinsic safety "i"

- Marking
- Permissible ambient temperature
- Connection

- Effective internal inductance/capacitance

- Explosion-proof "d"

- Marking
- Permissible ambient temperature
- Connection

- Dust explosion protection for zone 20

- Marking
- Permissible ambient temperature
- Max. surface temperature
- Connection

- Effective internal inductance/capacitance

- Dust explosion protection for zone 21/22

- Marking
- Connection

- Type of protection "n" (zone 2)

- Marking
- Connection (Ex nA)
- Connection (Ex ic)

- Effective internal inductance/capacitance

- Explosion protection acc. to FM

- Identification (XP/DIP) or (IS); (NI)

- Explosion protection to CSA

- Identification (XP/DIP) or (IS)

HART

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

PTB 13 ATEX 2007 X

Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb

-40 ... +85 °C (-40 ... +185 °F) temperature class T4;
-40 ... +70 °C (-40 ... +158 °F) temperature class T5;
-40 ... +60 °C (-40 ... +140 °F) temperature class T6

To certified intrinsically-safe circuits with peak values:
 $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$,
 $P_i = 750 \text{ mW}$; $R_i = 300 \Omega$

$L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

PTB 99 ATEX 1160

Ex II 1/2 G Ex d IIC T4/T6 Gb

-40 ... +85 °C (-40 ... +185 °F) temperature class T4;
-40 ... +60 °C (-40 ... +140 °F) temperature class T6

To circuits with values:
 $U_H = 10.5 \dots 45 \text{ V DC}$

PTB 01 ATEX 2055

Ex II 1 D Ex ta IIIC T120°C Da

Ex II 1/2 D Ex ta/tb IIIC T120°C Da/Db

-40 ... +85 °C (-40 ... +185 °F)
120 °C (248 °F)

To certified intrinsically-safe circuits with peak values:
 $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$,
 $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$

$L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

PTB 01 ATEX 2055

Ex II 2 D Ex tb IIIC T120°C Db

To circuits with values:
 $U_H = 10.5 \dots 45 \text{ V DC}$; $P_{\max} = 1.2 \text{ W}$

PTB 13 ATEX 2007 X

Ex II 2/3 G Ex nA IIC T4/T5/T6 Gb/Gc
Ex II 2/3 G Ex ic IIC T4/T5/T6 Gb/Gc

$U_m = 45 \text{ V}$

To circuits with values:
 $U_i = 45 \text{ V}$

$L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

Certificate of Compliance 3008490

CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

Certificate of Compliance 1153651

CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

PROFIBUS PA/ FOUNDATION Field-bus

FISCO supply unit:
 $U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$

Linear barrier:
 $U_o = 24 \text{ V}$, $I_o = 250 \text{ mA}$, $P_o = 1.2 \text{ W}$

$L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$

To circuits with values: $U_H = 9 \dots 32 \text{ V DC}$

FISCO supply unit:
 $U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$

Linear barrier:
 $U_o = 24 \text{ V}$, $I_o = 250 \text{ mA}$, $P_o = 1.2 \text{ W}$

$L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$

To circuits with values:
 $U_H = 9 \dots 32 \text{ V DC}$; $P_{\max} = 1 \text{ W}$

$U_m = 32 \text{ V}$

FISCO supply unit ic:
 $U_o = 17.5 \text{ V}$, $I_o = 570 \text{ mA}$

Linear barrier:
 $U_o = 32 \text{ V}$, $I_o = 132 \text{ mA}$, $P_o = 1 \text{ W}$

$L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$

HART communication		FOUNDATION Fieldbus communication	
HART	230 ... 1100 Ω	Function blocks	3 function blocks analog input, 1 function block PID
Protocol	HART Version 5.x		
Software for computer	SIMATIC PDM		
PROFIBUS PA communication			
Simultaneous communication with master class 2 (max.)	4	• Analog input	Yes, linearly rising or falling characteristic
The address can be set using	Configuration tool or local operation (standard setting address 126)	- Adaptation to customer-specific process variables	0 to 100 s
Cyclic data usage		- Electrical damping, adjustable	Output/input (can be locked within the device with a bridge)
• Output byte	5 (one measured value) or 10 (two measured values)	- Simulation function	parameterizable (last good value, substitute value, incorrect value)
• Input byte	0, 1, or 2 (register operating mode and reset function for metering)	- Failure mode	Yes, one upper and lower warning limit and one alarm limit respectively
Internal preprocessing		- Limit monitoring	Yes
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B	- Square-rooted characteristic for flow measurement	
Function blocks	2	• PID	Standard FOUNDATION Fieldbus function block
• Analog input		• Physical block	1 resource block
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic	Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
- Electrical damping, adjustable	0 ... 100 s		
- Simulation function	Input /Output	• Pressure transducer block	
- Failure mode	parameterizable (last good value, substitute value, incorrect value)	- Can be calibrated by applying two pressures	Yes
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively	- Monitoring of sensor limits	Yes
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output	- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)		
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively		
• Physical block	1		
Transducer blocks	2		
• Pressure transducer block			
- Can be calibrated by applying two pressures	Yes		
- Monitoring of sensor limits	Yes		
- Specification of a container characteristic with	Max. 30 nodes		
- Square-rooted characteristic for flow measurement	Yes		
- Gradual volume suppression and implementation point of square-root extraction	Parameterizable		
- Simulation function for measured pressure value and sensor temperature	Constant value or over parameterizable ramp function		

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for absolute pressure (from differential pressure series)

1

Selection and Ordering data		Article No.
Pressure transmitters for absolute pressure from differential pressure series, SITRANS P DS III with HART		7MF4333 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Measuring cell cleaning	
Silicone oil	normal	1
Inert liquid ¹⁾	grease-free to cleanliness level 2	3
Measuring span (min. ... max.)		
8.34 ... 250 mbar a	(0.13 ... 3.63 psi a)	D
43.34 ... 1300 mbar a	(0.63 ... 18.86 psi a)	F
0.17 ... 5 bar a	(2.43 ... 72.5 psi a)	G
1 ... 30 bar a	(14.6 ... 435 psi a)	H
5.3 ... 100 bar a	(76.9 ... 1450 psi a)	KE
Wetted parts materials		
Seal diaphragm	Parts of measuring cell	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Hastelloy	Hastelloy	C
Tantalum	Tantalum	E
Monel	Monel	H
Gold	Gold	L
Version for diaphragm seal ^{2) 3) 4) 5) 6)}		Y
Process connection		
Female thread 1/4-18 NPT with flange connection		
• Sealing screw opposite process connection		
- Mounting thread 7/16"-20 UNF to IEC 61518/DIN EN 61518		2
- Mounting thread M10 to DIN 19213 (only for replacement requirement)		0
• Vent on side of process flange ⁷⁾		
- Mounting thread 7/16"-20 UNF to IEC 61518/DIN EN 61518		6
- Mounting thread M10 to DIN 19213 (only for replacement requirement)		4
Non-wetted parts materials		
process flange screws	Electronics housing	
Stainless steel	Die-cast aluminum	2
Stainless steel	Stainless steel precision casting ⁸⁾	3
Version		
• Standard version, German plate inscription, setting for pressure unit: bar		1
• International version, English plate inscription, setting for pressure unit: bar		2
• Chinese version, English plate inscription, setting for pressure unit: Pascal		3
All versions include DVD with compact operating instructions in various EU languages.		
Explosion protection		
• None		A
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		B
- "Explosion-proof (Ex d)" ⁹⁾		D
- "Intrinsic safety and flameproof enclosure (Ex ia + Ex d)" ¹⁰⁾		P
- "Ex nA/ic (Zone 2)" ¹¹⁾		E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)" ¹⁰⁾¹²⁾		R
• FM + CSA intrinsic safe (is) ¹³⁾		F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D ¹⁰⁾¹²⁾¹³⁾		S
• With FM + CSA, Type of protection:		
- "Intrinsic Safe and Explosion Proof (is + xp)" ⁹⁾¹³⁾		NC

Selection and Ordering data		Article No.
Pressure transmitters for absolute pressure from differential pressure series, SITRANS P DS III with HART		7MF4333 -
Electrical connection/cable entry		
• Screwed gland M20 x 1.5		B
• Screwed gland 1/2-14 NPT		C
• Han 7D device plug (plastic housing) incl. mating connector ¹⁴⁾		D
• M12 device plugs (stainless steel) ^{15) 16)}		F
Display		
• Without display		0
• Without visible display (display concealed, setting: mA)		1
• With visible display (setting: mA)		6
• with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)		7

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:

- Quick-start guide
- Sealing plug(s) or sealing screw(s) for the process flanges(s)

- For oxygen applications, add Order code E10.
- Version 7MF4333-1DY... only up to max. span 200 mbar a (2.9 psi a).
- When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF433-...Y... and 7MF4900-1...-B
- The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- Not for span "5.3 ... 100 bar a (76.9 ... 1450 psi a)". Position of the top vent valve in the process flange (see dimensional drawing).
- Not in conjunction with Electrical connection "Han 7D device plug".
- Without cable gland, with blanking plug
- With enclosed cable gland Ex ia and blanking plug
- Configurations with Han and M12 device plugs are only available in Ex ic.
- Only in connection with IP66.
- Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.
- Only in connection with Ex approval A, B or E.
- Only in connection with Ex approval A, B, E or F.
- M12 delivered without cable socket.

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for absolute pressure (from differential pressure series)

1

Selection and Ordering data		Article No.	
Pressure transmitter for absolute pressure from differential pressure series			
SITRANS P DS III with PROFIBUS PA (PA)		7MF4334-	
SITRANS P DS III with FOUNDATION Fieldbus (FF)		7MF4335-	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Measuring cell filling	Measuring cell cleaning		
Silicone oil	normal	1	
Inert liquid ¹⁾	grease-free to cleanliness level 2	3	
Nominal measuring range			
250 mbar a	(3.63 psi a)	D	
1300 mbar a	(18.86 psi a)	F	
5 bar a	(72.5 psi a)	G	
30 bar a	(435 psi a)	H	
100 bar a	(1450 psi a)	KE	
Wetted parts materials			
Seal diaphragm	Parts of measuring cell		
Stainless steel	Stainless steel	A	
Hastelloy	Stainless steel	B	
Hastelloy	Hastelloy	C	
Tantalum	Tantalum	E	
Monel	Monel	H	
Gold	Gold	L	
Version as diaphragm seal 2) 3) 4) 5) 6)		Y	
Process connection			
Female thread 1/4-18 NPT with flange connection			
<ul style="list-style-type: none"> Sealing screw opposite process connection <ul style="list-style-type: none"> Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518 Mounting thread M10 to DIN 19213 (only for replacement requirement) 		2	
<ul style="list-style-type: none"> Vent on side of process flange ⁷⁾ <ul style="list-style-type: none"> Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518 Mounting thread M10 to DIN 19213 (only for replacement requirement) 		0	
		6	
		4	
Non-wetted parts materials			
process flange screws	Electronics housing		
Stainless steel	Die-cast aluminum	2	
Stainless steel	Stainless steel precision casting	3	
Version			
<ul style="list-style-type: none"> Standard version, German plate inscription, setting for pressure unit: bar 		1	
<ul style="list-style-type: none"> International version, English plate inscription, setting for pressure unit: bar 		2	
<ul style="list-style-type: none"> Chinese version, English plate inscription, setting for pressure unit: Pascal 		3	
All versions include DVD with compact operating instructions in various EU languages.			
Explosion protection			
<ul style="list-style-type: none"> None 		A	
<ul style="list-style-type: none"> With ATEX, Type of protection: <ul style="list-style-type: none"> "Intrinsic safety (Ex ia)" 		B	
<ul style="list-style-type: none"> "Explosion-proof (Ex d)"⁸⁾ 		D	
<ul style="list-style-type: none"> "Intrinsic safety and flameproof enclosure (Ex ia + Ex d)"⁹⁾ 		P	
<ul style="list-style-type: none"> "Ex nA/ic (Zone 2)"¹⁰⁾ 		E	
<ul style="list-style-type: none"> "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)"^{9) 11)} 		R	
<ul style="list-style-type: none"> FM + CSA intrinsic safe (is)¹²⁾ 		F	
<ul style="list-style-type: none"> FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D^{9) 11) 12)} 		S	
<ul style="list-style-type: none"> With FM + CSA, Type of protection: <ul style="list-style-type: none"> "Intrinsic Safe and Explosion Proof (is + xp)"^{8) 12)} 		NC	

Selection and Ordering data	Article No.
Pressure transmitter for absolute pressure from differential pressure series	
SITRANS P DS III with PROFIBUS PA (PA)	7MF4334-
SITRANS P DS III with FOUNDATION Fieldbus (FF)	7MF4335-

Electrical connection/cable entry

- Screwed gland M20 x 1.5
- Screwed gland 1/2-14 NPT
- M12 device plugs (stainless steel)^{13) 14)}

B
C
F**Display**

- Without display
- Without visible display (display concealed, setting: bar)
- With visible display (setting: bar)
- With customer-specific display (setting as specified, Order code "Y21" required)

0
1
6
7

Included in delivery of the device:

- Quick-start guide
- Sealing plug(s) or sealing screw(s) for the process flanges(s)

- For oxygen application, add Order code E10.
- Version 7MF4334-1DY... only up to max. span 200 mbar a (80 inH₂O a).
- When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF433-...Y... and 7MF4900-1...-B
- The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- Not for nominal measuring range 100 bar a (1450 psi a). Position of the top vent valve in the process flange (see dimensional drawing).
- Without cable gland, with blanking plug
- With enclosed cable gland Ex ia and blanking plug
- Configurations with Han and M12 device plugs are only available in Ex ic.
- Only in connection with IP66.
- Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.
- 11) Only in connection with Ex approval A, B, E or F.
- M12 delivered without cable socket

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P DS III

for absolute pressure (from differential pressure series)

1

Selection and Ordering data		Order code			
Further designs Add "-Z" to Article No. and specify Order code.			HART	PA	FF
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:					
• Steel	A01	✓	✓	✓	
• Stainless steel 304	A02	✓	✓	✓	
• Stainless steel 316L	A03	✓	✓	✓	
O-rings for process flanges (instead of FPM (Viton))					
• PTFE (Teflon)	A20	✓	✓	✓	
• FEP (with silicone core, approved for food)	A21	✓	✓	✓	
• FFP (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F)	A22	✓	✓	✓	
• NBR (Buna N)	A23	✓	✓	✓	
Device plugs¹⁾					
• Han 7D (metal)	A30	✓			
• Han 8D (instead of Han 7D)	A31	✓			
• Angled	A32	✓			
• Han 8D (metal)	A33	✓			
Sealing screw 1/4-18 NPT, with valve in mat. of process flanges		A40	✓	✓	✓
Cable sockets for M12 device plugs (metal (CuZn))		A50	✓	✓	✓
Rating plate inscription (instead of German)					
• English	B11	✓	✓	✓	
• French	B12	✓	✓	✓	
• Spanish	B13	✓	✓	✓	
• Italian	B14	✓	✓	✓	
• Cyrillic (russian)	B16	✓	✓	✓	
English rating plate Pressure units in inH ₂ O and/or psi		B21	✓	✓	✓
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2²⁾		C11	✓	✓	✓
Inspection certificate³⁾ Acc. to EN 10204-3.1		C12	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2		C14	✓	✓	✓
Acceptance certificate (EN 10204-3.1) PMI test of parts in contact with medium		C15	✓	✓	✓
Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration		C20	✓		
Functional safety (PROFIsafe) Certificate and PROFIsafe protocol		C21 ⁴⁾		✓	
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration		C23	✓		
PED for Russia with initial calibration mark		C99	✓	✓	✓

Selection and Ordering data		Order code			
Further designs Add "-Z" to Article No. and specify Order code.			HART	PA	FF
Setting of the upper saturation limit of the output signal to 22.0 mA		D05	✓		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)		D07	✓	✓	✓
Degree of protection IP66/IP68 (only for M20 x 1.5 and 1/2-14 NPT)		D12	✓	✓	✓
Supplied with oval flange (1 item), PTFE packing and screws in thread of process flange		D37	✓	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included		D59	✓	✓	✓

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for absolute pressure (from differential pressure series)

1

Selection and Ordering data		Order code			
<i>Further designs</i>			HART	PA	FF
Add "-Z" to Article No. and specify Order code.					
Use in or on zone 1D/2D⁵⁾ (only together with type of protection "Intrinsic safety" (transmitter 7MF4...-...-B.. Ex ia)" and IP66)	E01	✓	✓	✓	✓
Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))	E10	✓	✓	✓	✓
Export approval Korea	E11	✓	✓	✓	✓
CRN approval Canada (Canadian Registration Number)	E22 ⁶⁾	✓	✓	✓	✓
Dual seal	E24	✓	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia) to INMETRO (Brazil) (only for transmitter 7MF4...-...-B..)	E25 ⁷⁾	✓	✓	✓	✓
"Flameproof" explosion protection according to INMETRO (Brazil) (only for transmitter 7MF4...-...-D..)	E26 ⁷⁾	✓	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia + Ex d) to INMETRO (Brazil) (only for transmitter 7MF4...-...-P..)	E28 ⁷⁾	✓	✓	✓	✓
Ex Approval IEC Ex (Ex ia) (only for transmitter 7MF4...-...-B..)	E45 ⁷⁾	✓	✓	✓	✓
Ex Approval IEC Ex (Ex d) (only for transmitter 7MF4...-...-D..)	E46 ⁷⁾	✓	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-...-B..)	E55 ⁷⁾	✓	✓	✓	✓
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-...-D..)	E56 ⁷⁾	✓	✓	✓	✓
Explosion-proof "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-...-E..)	E57 ⁷⁾	✓	✓	✓	✓
Ex protection „Ex ia“, „Ex d" and „Zone 2" to NEPSI (China) (only for transmitter 7MF4...-...-R..)	E58 ⁷⁾	✓	✓	✓	✓
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea) (only for transmitter 7MF4...-...-[B, D]-Z + E11)	E70 ⁷⁾	✓	✓	✓	✓
Ex-protection Ex ia according to EAC Ex (Russia)	E80	✓	✓	✓	✓
Ex-protection Ex d according to EAC Ex (Russia)	E81	✓	✓	✓	✓
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)	E82	✓	✓	✓	✓
Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)	E83	✓	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)	G10	✓	✓	✓	✓
Interchanging of process connection side	H01	✓	✓	✓	✓
Vent on side for gas measurements	H02	✓	✓	✓	✓
Stainless steel process flanges for vertical differential pressure lines (not together with K01, K02 and K04) ⁸⁾	H03	✓	✓	✓	✓

Selection and Ordering data		Order code			
<i>Further designs</i>			HART	PA	FF
Add "-Z" to Article No. and specify Order code.					
Transient protector 6 kV (lightning protection)	J01	✓	✓	✓	✓
Chambered graphite gasket for process flange	J02	✓	✓	✓	✓
Chambered PTFE graphite gasket	J03	✓	✓	✓	✓
EPDM O-rings for process flange with approval (WRC/WRAS)	J05	✓	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on right when viewing the display)⁹⁾	J08	✓	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on left when viewing the display)⁹⁾	J09	✓	✓	✓	✓
Process flange					
• Hastelloy	K01	✓	✓	✓	✓
• Monel	K02	✓	✓	✓	✓
• Stainless steel with PVDF insert max. PN 10 (MAWP 145 psi), max. temperature of medium 90 °C (194 °F) For ½-14 NPT inner process connection on the side in the middle of the process flange, vent valve not possible	K04	✓	✓	✓	✓
Marine approvals					
• Det Norske Veritas Germanischer Lloyd (DNV-GL)	S10	✓	✓	✓	✓
• Lloyds Register (LR)	S11	✓	✓	✓	✓
• French marine classification society Bureau Veritas (BV)	S12	✓	✓	✓	✓
• American Bureau of Shipping (ABS)	S14	✓	✓	✓	✓
• Russian Maritime Register (RMR)	S16	✓	✓	✓	✓
• Korean Register of Shipping (KR)	S17	✓	✓	✓	✓

1) Han device plug IP65

2) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

3) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

4) Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H

5) Option does not contain gas explosion protection; only dust explosion protection: Use in or at Zone 1D/2D.

6) Cannot be ordered with remote seal.

7) When the additional ex option is selected, the ATEX marking on the device is omitted. Only the Ex option selected via the Z option is marked.

8) Not suitable for connection of remote seals.

9) Blanking plug is standard configuration. Order option A40 if a vent valve is required instead of a blanking plug.

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P DS III

for absolute pressure (from differential pressure series)

Selection and Ordering data	Order code			
Additional data		HART	PA	FF
Please add "-Z" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar a, bar a, kPa _{abs} , MPa _{abs} , psi a ²⁾	Y01	✓	✓ ¹⁾	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	Y15	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	Y16	✓	✓	✓
Entry of HART address (TAG) Max. 8 characters, specify in plain text: Y17:	Y17	✓		
Setting of pressure indication in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H ₂ O ^{*)} , inH ₂ O ^{*)} , ftH ₂ O ^{*)} , mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM or % *) ref. temperature 20 °C	Y21	✓	✓	✓
Setting of pressure indication in non-pressure units³⁾ Specify in plain text: Y22: up to l/min, m ³ /h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y22 + Y01	✓		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	Y25		✓	✓
Damping adjustment in seconds (0 ... 100 s)	Y30	✓	✓	✓

Factory mounting of valve manifolds, see accessories.

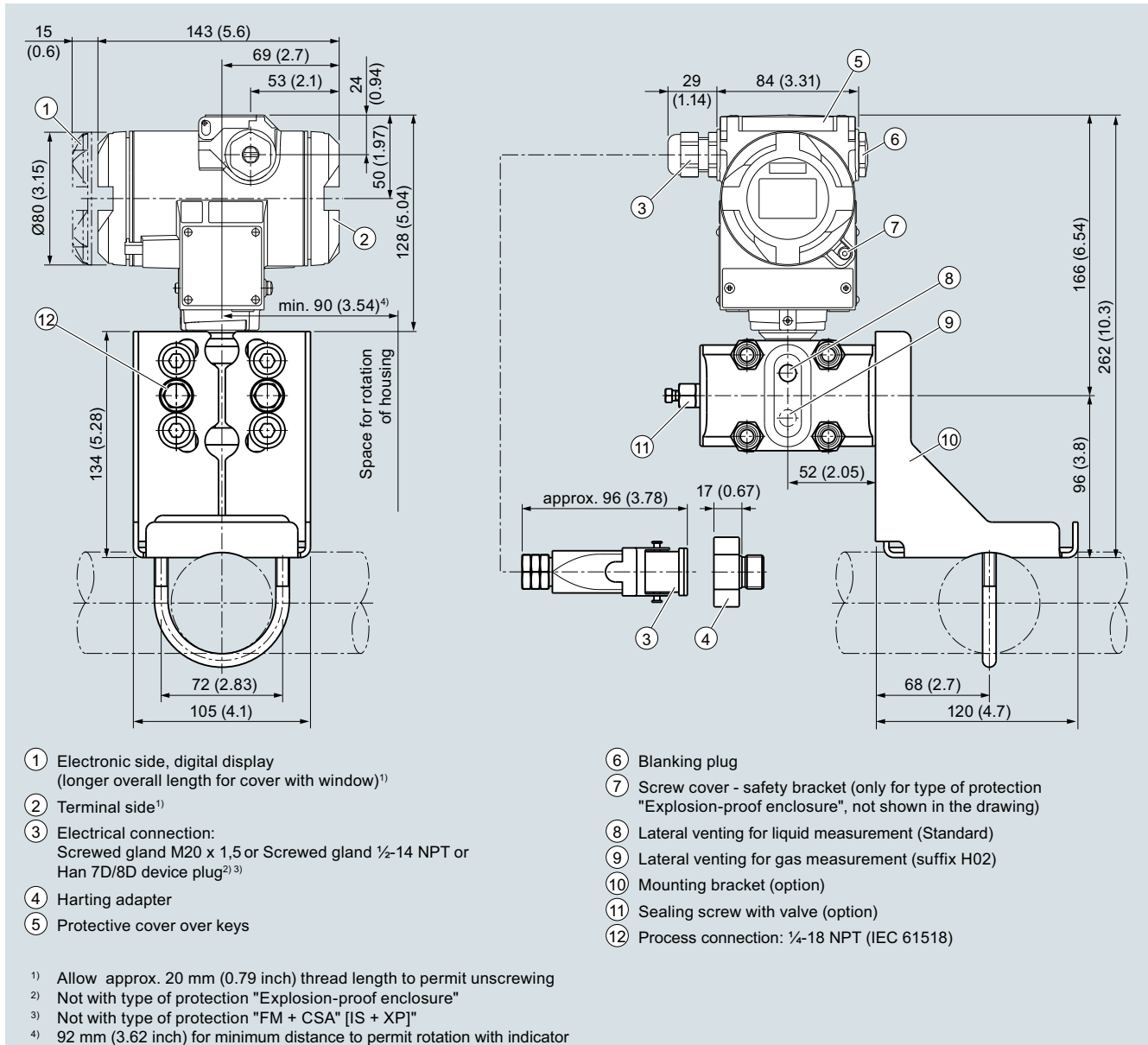
Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset

✓ = available

1) Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

2) Only absolute pressure units selectable. Negative pressure values not permitted.

3) Preset values can only be changed over SIMATIC PDM.

Dimensional drawings

SITRANS P DS III pressure transmitters for absolute pressure, from the differential pressure series, dimensions in mm (inch)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for differential pressure and flow

Technical specifications

SITRANS P, DS III for differential pressure and flow

Input

Measured variable

Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)

Differential pressure and flow

HART	PROFIBUS PA/ FOUNDATION Fieldbus	
Span	Nominal measuring range	Max. operating pressure MAWP (PS)
1 ... 20 mbar 0.1 ... 2 kPa 0.4 ... 8 inH ₂ O	20 mbar 2 kPa 8 inH ₂ O	32 bar 3.2 MPa 464 psi
1 ... 60 mbar 0.1 ... 6 kPa 0.4 ... 24 inH ₂ O	60 mbar 6 kPa 24.1 inH ₂ O	160 bar 16 MPa 2320 psi
2.5 ... 250 mbar 0.2 ... 25 kPa 1 ... 100 inH ₂ O	250 mbar 25 kPa 100 inH ₂ O	
6 ... 600 mbar 0.6 ... 60 kPa 2.4 ... 240 inH ₂ O	600 mbar 60 kPa 240 inH ₂ O	
16 ... 1600 mbar 1.6 ... 160 kPa 6.4 ... 642 inH ₂ O	1600 mbar 160 kPa 642 inH ₂ O	
50 ... 5000 mbar 5 ... 500 kPa 20 ... 2000 inH ₂ O	5000 mbar 500 kPa 2000 inH ₂ O	
0.3 ... 30 bar 0.03 ... 3 MPa 4.35 ... 435 psi	30 bar 3 MPa 435 psi	
2.5 ... 250 mbar 0.2 ... 25 kPa 1 ... 100 inH ₂ O	250 mbar 25 kPa 100 inH ₂ O	420 bar 42 MPa 6091 psi
6 ... 600 mbar 0.6 ... 60 kPa 2.4 ... 240 inH ₂ O	600 mbar 60 kPa 240 inH ₂ O	(500 bar/50 MPa/7250 psi can be ordered optionally with Order Code D56)
16 ... 1600 mbar 1.6 ... 160 kPa 6.4 ... 642 inH ₂ O	1600 mbar 160 kPa 642 inH ₂ O	
50 ... 5000 mbar 5 ... 500 kPa 20 ... 2000 inH ₂ O	5000 mbar 500 kPa 2000 inH ₂ O	
0.3 ... 30 bar 0.03 ... 3 MPa 4.35 ... 435 psi	30 bar 3 MPa 435 psi	
Lower measuring limit		
<ul style="list-style-type: none"> Measuring cell with silicone oil filling 		
-100 % of max. span (-33 % with measuring cell 30 bar/3 MPa/435 psi) or 30 mbar a/3 kPa a/0.44 psi a		
<ul style="list-style-type: none"> Measuring cell with inert filling liquid 		
- for process temperature -20 °C < ϑ ≤ +60 °C (-4 °F < ϑ ≤ +140 °F)		
-100 % of max. span (-33 % with measuring cell 30 bar/3 MPa/435 psi) or 30 mbar a/3 kPa a/0.44 psi a		
- for process temperature 60 °C < ϑ ≤ +100 °C (max. 85 °C for measuring cell 30 bar) (140 °F < ϑ ≤ +212 °F (max. 185 °F for measuring cell 435 psi))		
30 mbar a + 20 mbar a · (ϑ - 60 °C)/°C 3 kPa a + 2 kPa a · (ϑ - 60 °C)/°C 0.44 psi a + 0.29 psi a · (ϑ - 140 °F)/°F		
Upper measuring limit		
100 % of max. span (for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/process temperature)		
Start of scale value		
Between the measuring limits (fully adjustable)		

Pressure Measurement

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SITRANS P, DS III for differential pressure and flow

Output	HART	PROFIBUS PA/FOUNDATION Fieldbus
Output signal	4 ... 20 mA	Digital PROFIBUS PA and FOUNDATION Fieldbus signal
<ul style="list-style-type: none"> Lower limit (infinitely adjustable) Upper limit (infinitely adjustable) 	3.55 mA, factory preset to 3.84 mA 23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA (with order code D05)	-
Load		
<ul style="list-style-type: none"> Without HART With HART 	$R_B \leq (U_H - 10.5 \text{ V})/0.023 \text{ A in } \Omega$ U_H : Power supply in V $R_B = 230 \dots 500 \Omega$ (SIMATIC PDM) or $R_B = 230 \dots 1100 \Omega$ (HART Communicator)	-
Physical bus	-	IEC 61158-2
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.	
Electrical damping (step width 0.1 s)	Set to 2 s (0 ... 100 s)	
Measuring accuracy	Acc. to IEC 60770-1	
Reference conditions (All error data refer always refer to the set span)	<ul style="list-style-type: none"> Increasing characteristic Start-of-scale value 0 bar/kPa/psi Stainless steel seal diaphragm Silicone oil filling Room temperature 25 °C (77 °F) 	
Measuring span ratio r (spread, Turn-Down)	$r = \text{max. measuring span/set measuring span or nom. pressure range}$	
Error in measurement at limit setting incl. hysteresis and reproducibility		
<ul style="list-style-type: none"> Linear characteristic 		
- 20 mbar/2 kPa/0.29 psi	$r \leq 5 :$ $5 < r \leq 10 :$ $10 < r \leq 20 :$	$\leq 0.075 \%$ $\leq (0.0029 \cdot r + 0.071) \%$ $\leq (0.0045 \cdot r + 0.071) \%$
- 60 mbar/6 kPa/0.87 psi	$r \leq 5 :$ $5 < r \leq 60 :$	$\leq 0.075 \%$ $\leq (0.005 \cdot r + 0.05) \%$
- 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kPa/72.5 psi 30 bar/3 MPa/435 psi	$r \leq 5 :$ $5 < r \leq 100 :$	$\leq 0.065 \%$ $\leq (0.004 \cdot r + 0.045) \%$
<ul style="list-style-type: none"> Square-rooted characteristic (flow > 50 %) 		
- 20 mbar/2 kPa/0.29 psi	$r \leq 5 :$ $5 < r \leq 10 :$ $10 < r \leq 20 :$	$\leq 0.075 \%$ $\leq (0.0029 \cdot r + 0.071) \%$ $\leq (0.0045 \cdot r + 0.071) \%$
- 60 mbar/6 kPa/0.87 psi	$r \leq 5 :$ $5 < r \leq 60 :$	$\leq 0.075 \%$ $\leq (0.005 \cdot r + 0.05) \%$
- 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kPa/72.5 psi 30 bar/3 MPa/435 psi	$r \leq 5 :$ $5 < r \leq 100 :$	$\leq 0.065 \%$ $\leq (0.004 \cdot r + 0.045) \%$
<ul style="list-style-type: none"> Square-rooted characteristic (flow > 25 ... 50 %) 		
- 20 mbar/2 kPa/0.29 psi	$r \leq 5 :$ $5 < r \leq 10 :$ $10 < r \leq 20 :$	$\leq 0.15 \%$ $\leq (0.0058 \cdot r + 0.142) \%$ $\leq (0.009 \cdot r + 0.142) \%$
- 60 mbar/6 kPa/0.87 psi	$r \leq 5 :$ $5 < r \leq 60 :$	$\leq 0.015 \%$ $\leq (0.01 \cdot r + 0.1) \%$
- 250 mbar/25 kPa/3.63 psi 600 mbar/60 kPa/8.7 psi 1600 mbar/160 kPa/23.21 psi 5 bar/500 kPa/72.5 psi 30 bar/3 MPa/435 psi	$r \leq 5 :$ $5 < r \leq 100 :$	$\leq 0.13 \%$ $\leq (0.008 \cdot r + 0.09) \%$

Pressure Measurement

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Measuring accuracy (continued)

Acc. IEC 60770-1

Influence of ambient temperature
(in percent per 28 °C (50 °F))

- 20 mbar/2 kPa/0.29 psi $\leq (0.15 \cdot r + 0.1) \%$
- 60 mbar/6 kPa/0.87 psi $\leq (0.075 \cdot r + 0.1) \%$
- 250 mbar/25 kPa/3.63 psi $\leq (0.025 \cdot r + 0.125) \%$
- 600 mbar/60 kPa/8.7 psi
- 1600 mbar/160 kPa/23.21 psi
- 5 bar/500 kPa/72.5 psi
- 30 bar/3 MPa/435 psi

Influence of static pressure

- on the zero point
 - 20 mbar/2 kPa/0.29 psi $\leq (0.15 \cdot r) \%$ per 32 bar
(zero-point correction is possible with position error adjustment)
 - 60 mbar/6 kPa/0.87 psi $\leq (0.1 \cdot r) \%$ per 70 bar
250 mbar/25 kPa/3.63 psi
(zero-point correction is possible with position error adjustment)
 - 600 mbar/60 kPa/8.7 psi
 - 1600 mbar/160 kPa/23.21 psi
 - 5 bar/500 kPa/72.5 psi $\leq (0.2 \cdot r) \%$ per 70 bar
30 bar/3 MPa/435 psi
(zero-point correction is possible with position error adjustment)
- on the span
 - 20 mbar/2 kPa/0.29 psi $\leq 0.2 \%$ per 32 bar
 - 60 mbar/6 kPa/0.87 psi $\leq 0.14 \%$ per 70 bar
 - 250 mbar/25 kPa/3.63 psi
 - 600 mbar/60 kPa/8.7 psi
 - 1600 mbar/160 kPa/23.21 psi
 - 5 bar/500 kPa/72.5 psi
 - 30 bar/3 MPa/435 psi

Long-term stability
(temperature change ± 30 °C (± 54 °F))

Static pressure max. 70 bar/7 MPa/ 1015 psi

- 20 mbar/2 kPa/0.29 psi $\leq (0.2 \cdot r) \%$ per year
- 60 mbar/6 kPa/0.87 psi $\leq (0.25 \cdot r) \%$ in 5 years
- 30 bar/3 MPa/435 psi
- 250 mbar/25 kPa/3.63 psi $\leq (0.125 \cdot r) \%$ in 5 years
- 600 mbar/60 kPa/8.7 psi
- 1600 mbar/160 kPa/23.21 psi
- 5 bar/500 kPa/72.5 psi

Effect of mounting position (in pressure per change in angle)

≤ 0.7 mbar/0.07 kPa/0.028 inH₂O per 10° inclination
(zero-point correction is possible with position error adjustment)

Effect of auxiliary power supply
(in percent per change in voltage)

0.005 % per 1 V

Measuring value resolution for PROFIBUS PA and
FOUNDATION Fieldbus

$3 \cdot 10^{-5}$ of nominal measuring range

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

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SITRANS P, DS III for differential pressure and flow**Rated conditions**

Degree of protection

- according to EN 60529
- according to NEMA 250

IP66 (optional IP66/IP68)

Type 4X

Temperature of medium

- Measuring cell with silicone oil filling

-40 ... +100 °C (-40 ... +212 °F) -20 ... +100 °C (-4 ... +212 °F)
with 30 bar measuring cell

- Measuring cell with inert filling liquid
- Measuring cell with Neobee fill fluid (FDA-compliant)
- In conjunction with dust explosion protection

-20 ... +100 °C (-4 ... +212 °F)

-10 ... +100 °C (+14 ... +212 °F)

-20 ... +60 °C (-4 ... +140 °F)

Ambient conditions

- Ambient temperature (silicone oil and inert oil)

- Transmitter

-40 ... +85 °C (-40 ... +185 °F)

-20 ... +85 °C (-4 ... +185 °F) with 30 bar measuring cell

- Display readable

-30 ... +85 °C (-22 ... +185 °F)

- Ambient temperature (Neobee fill fluid)

- Transmitter

-10 ... +85 °C (+14 ... +185 °F)

- Storage temperature

-50 ... +85 °C (-58 ... +185 °F)

- Climatic class

- Condensation

Relative humidity 0 ... 100 %

Condensation permissible, suitable for use in the tropics

- Electromagnetic Compatibility

- Emitted interference and interference immunity

Acc. to IEC 61326 and NAMUR NE 21

Design

Weight (without options)

Die-cast aluminum: ≈ 4.5 kg (≈ 9.9 lb)
Stainless steel precision casting: ≈ 7.1 kg (≈ 15.6 lb)

Enclosure material

Low-copper die-cast aluminum, GD-AISI12 or stainless steel precision casting, mat. no. 1.4408

Wetted parts materials

- Seal diaphragm

Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819, Monel, mat. no. 2.4360, tantalum or gold

- Process flanges and sealing screw

Stainless steel, mat. no. 1.4408, Hastelloy C4, mat. no. 2.4602 or Monel, mat. no. 2.4360

- O-Ring

FPM (Viton) or optionally: PTFE, FEP, FEPM and NBR

Measuring cell filling

Silicone oil or inert filling liquid (maximum value with oxygen measurement pressure 100 bar (1450 psi) at 60 °C (140 °F))

Process connection

Female thread 1/4-18 NPT and flange connection with mounting thread M10 to DIN 19213 or 7/16-20 UNF to IEC 61518/DIN EN 61518

Material of mounting bracket

- Steel
- Stainless steel 304
- Stainless steel 316L

Sheet-steel, Mat. No. 1.0330, chrome-plated

Sheet stainless steel, mat. no. 1.4301 (SS 304)

Sheet stainless steel, mat. no. 1.4404 (SS 316L)

Power supply U_H

Terminal voltage on transmitter

HART10.5 ... 45 V DC
10.5 ... 30 V DC in intrinsically-safe mode**PROFIBUS PA/ FOUNDATION Fieldbus**

-

Supplied through bus

Power supply

-

No

Separate 24 V power supply necessary

Bus voltage

- Not Ex
- With intrinsically-safe operation

-

9 ... 32 V

-

9 ... 24 V

Current consumption

- Basic current (max.)
- Start-up current ≤ basic current
- Max. current in event of fault

-

12.5 mA

-

Yes

-

15.5 mA

Fault disconnection electronics (FDE) available

-

Yes

Pressure Measurement

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Certificates and approvals

Classification according to PED 2014/68/EU

Explosion protection

- Intrinsic safety "i"
 - Marking
 - Permissible ambient temperature
 - Connection
 - Effective internal inductance/capacitance
- Explosion-proof "d"
 - Marking
 - Permissible ambient temperature
 - Connection
- Dust explosion protection for zone 20
 - Marking
 - Permissible ambient temperature
 - Max. surface temperature
 - Connection
 - Effective internal inductance/capacitance
- Dust explosion protection for zone 21/22
 - Marking
 - Connection
- Type of protection "n" (zone 2)
 - Marking
 - Connection (Ex nA)
 - Connection (Ex ic)
 - Effective internal inductance/capacitance
- Explosion protection acc. to FM
 - Identification (XP/DIP) or (IS); (NI)
- Explosion protection to CSA
 - Identification (XP/DIP) or (IS)

HART

- PN 32/160 (MAWP 464/2320 psi) for gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)
- PN 420 (MAWP 6092) for gases of fluid group 1 and liquids of fluid group 1; complies with basic safety requirements of Article 4, paragraph 1 (appendix 1); assigned to category III, conformity evaluation module H by the TÜV Nord.

PTB 13 ATEX 2007 X

Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb

-40 ... +85 °C (-40 ... +185 °F) temperature class T4;
-40 ... +70 °C (-40 ... +158 °F) temperature class T5;
-40 ... +60 °C (-40 ... +140 °F) temperature class T6

To certified intrinsically-safe circuits with peak values:
 $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$;
 $R_i = 300 \Omega$

$L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

PTB 99 ATEX 1160

Ex II 1/2 G Ex d IIC T4/T6 Gb

-40 ... +85 °C (-40 ... +185 °F) temperature class T4;
-40 ... +60 °C (-40 ... +140 °F) temperature class T6

To circuits with values:
 $U_H = 10.5 \dots 45 \text{ V DC}$

PTB 01 ATEX 2055

Ex II 1 D Ex ta IIIC T120°C Da

Ex II 1/2 D Ex ta/tb IIIC T120°C Da/Db

-40 ... +85 °C (-40 ... +185 °F)

120 °C (248 °F)

To certified intrinsically-safe circuits with peak values:
 $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$,
 $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$

$L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

PTB 01 ATEX 2055

Ex II 2 D Ex tb IIIC T120°C Db

To circuits with values: $U_H = 10.5 \dots 45 \text{ V DC}$; $P_{\max} = 1.2 \text{ W}$

PTB 13 ATEX 2007 X

Ex II 2/3 G Ex nA IIC T4/T5/T6 Gb/Gc

Ex II 2/3 G Ex ic IIC T4/T5/T6 Gb/Gc

$U_m = 45 \text{ V}$

To circuits with values:
 $U_i = 45 \text{ V}$

$L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

Certificate of Compliance 3008490

CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

Certificate of Compliance 1153651

CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

PROFIBUS PA/ FOUNDATION Fieldbus

FISCO supply unit:
 $U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$

Linear barrier:
 $U_o = 24 \text{ V}$, $I_o = 250 \text{ mA}$, $P_o = 1.2 \text{ W}$

$L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$

To circuits with values:
 $U_H = 9 \dots 32 \text{ V DC}$

FISCO supply unit:
 $U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$

Linear barrier:
 $U_o = 24 \text{ V}$, $I_o = 250 \text{ mA}$, $P_o = 1 \text{ W}$

$L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$

To circuits with values: $U_H = 9 \dots 32 \text{ V DC}$;
 $P_{\max} = 1 \text{ W}$

$U_m = 32 \text{ V}$

FISCO supply unit ic:
 $U_o = 17.5 \text{ V}$, $I_o = 570 \text{ mA}$

Linear barrier:
 $U_o = 32 \text{ V}$, $I_o = 132 \text{ mA}$, $P_o = 1 \text{ W}$

$L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

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HART communication		FOUNDATION Fieldbus communication	
HART	230 ... 1100 Ω	Function blocks	3 function blocks analog input, 1 function block PID
Protocol	HART Version 5.x		
Software for PC	SIMATIC PDM		
PROFIBUS PA communication			
Simultaneous communication with master class 2 (max.)	4	• Analog input	Yes, linearly rising or falling characteristic
The address can be set using	Configuration tool or local operation (standard setting address 126)	- Adaptation to customer-specific process variables	0 ... 100 s
Cyclic data usage		- Electrical damping, adjustable	Output/input (can be locked within the device with a bridge)
• Output byte	5 (one measured value) or 10 (two measured values)	- Simulation function	parameterizable (last good value, substitute value, incorrect value)
• Input byte	0, 1, or 2 (register operating mode and reset function for metering)	- Failure mode	Yes, one upper and lower warning limit and one alarm limit respectively
Internal preprocessing		- Limit monitoring	Yes
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B	- Square-rooted characteristic for flow measurement	
Function blocks	2	• PID	Standard FOUNDATION Fieldbus function block
• Analog input		• Physical block	1 resource block
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic	Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
- Electrical damping, adjustable	0 ... 100 s		
- Simulation function	Input /Output	• Pressure transducer block	
- Failure mode	parameterizable (last good value, substitute value, incorrect value)	- Can be calibrated by applying two pressures	Yes
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively	- Monitoring of sensor limits	Yes
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output	- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)		
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively		
• Physical block	1		
Transducer blocks	2		
• Pressure transducer block			
- Can be calibrated by applying two pressures	Yes		
- Monitoring of sensor limits	Yes		
- Specification of a container characteristic with	Max. 30 nodes		
- Square-rooted characteristic for flow measurement	Yes		
- Gradual volume suppression and implementation point of square-root extraction	Parameterizable		
- Simulation function for measured pressure value and sensor temperature	Constant value or over parameterizable ramp function		

Pressure Measurement

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Selection and Ordering data		Article No.
SITRANS P DS III with HART pressure transmitters for differential pressure and flow, PN 32/160 (MAWP 464/2320 psi)		7 MF 4 4 3 3 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Measuring cell cleaning	
Silicone oil	normal	1
Inert liquid ¹⁾	grease-free to cleanliness level 2	3
FDA compliant fill fluid ²⁾		
• Neobee oil	normal	4
Measuring span (min. ... max.)		
PN 32 (MAWP 464 psi)		
1 ... 20 mbar ³⁾	(0.4 ... 8 inH ₂ O)	B
PN 160 (MAWP 2320 psi)		
1 ... 60 mbar	(0.4 ... 24 inH ₂ O)	C
2.5 ... 250 mbar	(1.004 ... 100.4 inH ₂ O)	D
6 ... 600 mbar	(2.4 ... 240 inH ₂ O)	E
16 ... 1600 mbar	(6.4 ... 642 inH ₂ O)	F
50 ... 5000 mbar	(20 ... 2000 inH ₂ O)	G
0.3 ... 30 bar	(4.35 ... 435 psi)	H
Wetted parts materials		
(stainless steel process flanges)		
Seal diaphragm	Parts of measuring cell	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Hastelloy	Hastelloy	C
Tantalum ⁴⁾	Tantalum	E
Monel ⁴⁾	Monel	H
Gold ⁴⁾	Gold	L
Version for diaphragm seal ^{5) 6) 7) 8)}		Y
Process connection		
Female thread 1/4-18 NPT with flange connection		
• Sealing screw opposite process connection		
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		2
- Mounting thread M10 to DIN 19213 (only for replacement requirement)		0
• Vent on side of process flange ³⁾		
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		6
- Mounting thread M10 to DIN 19213 (only for replacement requirement)		4
Non-wetted parts materials		
process flange screws	Electronics housing	
Stainless steel	Die-cast aluminum	2
Stainless steel	Stainless steel precision casting ⁹⁾	3
Version		
• Standard version, German plate inscription, setting for pressure unit: bar		1
• International version, English plate inscription, setting for pressure unit: bar		2
• Chinese version, English plate inscription, setting for pressure unit: Pascal		3
All versions include DVD with compact operating instructions in various EU languages.		

Selection and Ordering data		Article No.
SITRANS P DS III with HART pressure transmitters for differential pressure and flow, PN 32/160 (MAWP 464/2320 psi)		7 MF 4 4 3 3 -
Explosion protection		
• None		A
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		B
- "Explosion-proof (Ex d)" ¹⁰⁾		D
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)" ¹¹⁾		P
- "Ex nA/ic (Zone 2)" ¹²⁾		E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)" ¹¹⁾¹³⁾		R
• FM + CSA intrinsic safe (is)" ¹⁴⁾		F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D" ¹¹⁾¹³⁾¹⁴⁾		S
• With FM + CSA, Type of protection:		
- "Intrinsic Safe and Explosion Proof (is + xp)" ¹⁰⁾¹⁴⁾		NC
Electrical connection/cable entry		
• Screwed gland M20 x 1.5		B
• Screwed gland 1/2-14 NPT		C
• Han 7D device plug (plastic housing) incl. mating connector ¹⁵⁾¹⁶⁾		D
• M12 device plugs (stainless steel) ¹⁷⁾¹⁸⁾		F
Display		
• Without display		0
• Without visible display (display concealed, setting: mA)		1
• With visible display (setting: mA)		6
• with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)		7
Power supply units see Chap. 7 "Supplementary Components".		
Included in delivery of the device:		
• Quick-start guide		
• Sealing plug(s) or sealing screw(s) for the process flanges(s)		
1) For oxygen application, add Order code E10.		
2) Available for measuring ranges 250 mbar ... 5 bar.		
3) Not suitable for connection of remote seal. Position of the top vent valve in the process flange (see dimensional drawing).		
4) Not in conjunction with max. span 20 and 60 mbar (8.03 and 24.09 inH ₂ O))		
5) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the <u>total</u> combination is certified here.		
6) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.		
7) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF443-...Y...-... and 7MF4900-1...-B		
8) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.		
9) Not in conjunction with Electrical connection "Han 7D device plug".		
10) Without cable gland, with blanking plug		
11) With enclosed cable gland Ex ia and blanking plug		
12) Configurations with Han and M12 device plugs are only available in Ex ic.		
13) Only in connection with IP66.		
14) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.		
15) Only in connection with Ex approval A, B or E.		
16) Permissible only for crimp-contact of conductor cross-section 1 mm ²		
17) Only in connection with Ex approval A, B, E or F.		
18) M12 delivered without cable socket.		

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for differential pressure and flow

1

Selection and Ordering data		Article No.	Selection and Ordering data		Article No.
Pressure transmitters for differential pressure and flow PN 32/160 (MAWP 464/2320 psi)			Pressure transmitters for differential pressure and flow PN 32/160 (MAWP 464/2320 psi)		
SITRANS P DS III with PROFIBUS PA (PA)		7 MF 4 4 3 4 -	SITRANS P DS III with PROFIBUS PA (PA)		7 MF 4 4 3 4 -
SITRANS P DS III with FOUNDATION Fieldbus (FF)		7 MF 4 4 3 5 -	SITRANS P DS III with FOUNDATION Fieldbus (FF)		7 MF 4 4 3 5 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Measuring cell filling	Measuring cell cleaning		Explosion protection		
Silicone oil	normal	1	• None		A
Inert liquid ¹⁾	grease-free to cleanliness level 2	3	• With ATEX, Type of protection:		
FDA compliant fill fluid ²⁾			- "Intrinsic safety (Ex ia)"		B
• Neobee oil	normal	4	- "Explosion-proof (Ex d)" ⁹⁾		D
			- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)" ¹⁰⁾		P
			- "Ex nA/ic (Zone 2)" ¹¹⁾		E
			- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)" ¹⁰⁾¹²⁾		R
			• FM + CSA intrinsic safe (is) ¹³⁾		F
			• FM + CSA (is + ep) + Ex ia + Ex d (ATEX)+ Zone 1D/2D ¹⁰⁾¹²⁾¹³⁾		S
			• With FM + CSA, Type of protection:		
			- "Intrinsic Safe and Explosion Proof (is + xp)" ⁹⁾¹³⁾		NC
			Electrical connection/cable entry		
			• Screwed gland M20 x 1.5		B
			• Screwed gland ½-14 NPT		C
			• M12 device plugs (stainless steel) ^{14) 15)}		F
			Display		
			• Without display		0
			• Without visible display (display concealed, setting: bar)		1
			• With visible display (setting: bar)		6
			• With customer-specific display (setting as specified, Order code "Y21" required)		7
			Included in delivery of the device:		
			• Quick-start guide		
			• Sealing plug(s) or sealing screw(s) for the process flanges(s)		
			1) For oxygen application, add Order code E10.		
			2) Available for measuring ranges 250 mbar ... 5 bar.		
			3) Not suitable for connection of remote seal. Position of the top vent valve in the process flange (see dimensional drawing).		
			4) Not in conjunction with max. span 20 and 60 mbar (8.03 and 24.09 inH ₂ O))		
			5) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.		
			6) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.		
			7) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF443-...Y... and 7MF4900-1...-B		
			8) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.		
			9) Without cable gland, with blanking plug.		
			10) With enclosed cable gland Ex ia and blanking plug.		
			11) Configurations with Han and M12 device plugs are only available in Ex ic.		
			12) Only in connection with IP66.		
			13) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.		
			14) Only in connection with Ex approval A, B, E or F.		
			15) M12 delivered without cable socket		
Wetted parts materials					
(stainless steel process flanges)					
Seal diaphragm	Parts of measuring cell				
Stainless steel	Stainless steel	A			
Hastelloy	Stainless steel	B			
Hastelloy	Hastelloy	C			
Tantalum ⁴⁾	Tantalum	E			
Monel ⁴⁾	Monel	H			
Gold ⁴⁾	Gold	L			
Version as diaphragm seal ^{5) 6) 7) 8)}		Y			
Process connection					
Female thread ¼-18 NPT with flange connection					
• Sealing screw opposite process connection					
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		2			
- Mounting thread M10 to DIN 19213 (only for replacement requirement)		0			
• Venting on side of process flanges ³⁾					
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		6			
- Mounting thread M10 to DIN 19213 (only for replacement requirement)		4			
Non-wetted parts materials					
process flange screws	Electronics housing				
Stainless steel	Die-cast aluminum	2			
Stainless steel	Stainless steel precision casting	3			
Version					
• Standard versions		1			
• International version, English label inscriptions, documentation in 5 languages on DVD (no Order code selectable)		2			
Version					
• Standard version, German plate inscription, setting for pressure unit: bar		1			
• International version, English plate inscription, setting for pressure unit: bar		2			
• Chinese version, English plate inscription, setting for pressure unit: Pascal		3			
All versions include DVD with compact operating instructions in various EU languages.					

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for differential pressure and flow

1

Selection and Ordering data	Order code			
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:				
• Steel	A01	✓	✓	✓
• Stainless steel 304	A02	✓	✓	✓
• Stainless steel 316L	A03	✓	✓	✓
O-rings for process flanges (instead of FPM (Viton))				
• PTFE (Teflon)	A20	✓	✓	✓
• FEP (with silicone core, approved for food)	A21	✓	✓	✓
• FFFM (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F)	A22	✓	✓	✓
• NBR (Buna N)	A23	✓	✓	✓
Device plugs¹⁾				
• Han 7D (metal)	A30	✓		
• Han 8D (instead of Han 7D)	A31	✓		
• Angled	A32	✓		
• Han 8D (metal)	A33	✓		
Sealing screws (2 units) 1/4-18 NPT, with valve in mat. of process flanges	A40	✓	✓	✓
Cable sockets for M12 device plugs (metal (CuZn))	A50	✓	✓	✓
Rating plate inscription (instead of German)				
• English	B11	✓	✓	✓
• French	B12	✓	✓	✓
• Spanish	B13	✓	✓	✓
• Italian	B14	✓	✓	✓
• Cyrillic (russian)	B16	✓	✓	✓
English rating plate Pressure units in inH ₂ O and/or psi	B21	✓	✓	✓
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2²⁾	C11	✓	✓	✓
Inspection certificate³⁾ to EN 10204-3.1	C12	✓	✓	✓
Factory certificate to EN 10204-2.2	C14	✓	✓	✓
Acceptance certificate (EN 10204-3.1) PMI test of parts in contact with medium	C15	✓	✓	✓
Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C20	✓		
Functional safety (PROFIsafe) Certificate and PROFIsafe protocol	C21 ⁴⁾		✓	
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C23	✓		
PED for Russia with initial calibration mark	C99	✓	✓	✓

Selection and Ordering data	Order code			
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
Setting of the upper saturation limit of the output signal to 22.0 mA	D05	✓		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)	D07	✓	✓	✓
Degree of protection IP66/IP68 (only for M20 x 1.5 and 1/2-14 NPT)	D12	✓	✓	✓
Process flange screws made of Monel (max. nominal pressure PN20)	D34	✓	✓	✓
Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges	D37	✓	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included	D59	✓	✓	✓
Use in or on zone 1D/2D⁵⁾ (only together with type of protection "Intrinsic safety" (transmitter 7MF4...-.....-B.. Ex ia)" and IP66)	E01	✓	✓	✓
Overfilling safety device for flammable and non-flammable liquids (max. PN 32 (MAWP 464 psi), basic device with type of protection "Intrinsic safety (Ex ia)", to WHG and VbF, not together with measuring cell filling "inert liquid")	E08	✓		
Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))	E10	✓	✓	✓
Export approval Korea	E11	✓	✓	✓
CRN approval Canada (Canadian Registration Number)	E22 ⁶⁾	✓	✓	✓
Dual seal	E24	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-B..)	E25 ⁷⁾	✓	✓	✓
"Flameproof" explosion protection according to INMETRO (Brazil) (only for transmitter 7MF4...-.....-D..)	E26 ⁷⁾	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia + Ex d) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-P..)	E28 ⁷⁾	✓	✓	
Ex Approval IEC Ex (Ex ia) (only for transmitter 7MF4...-.....-B..)	E45 ⁷⁾	✓	✓	✓
Ex Approval IEC Ex (Ex d) (only for transmitter 7MF4...-.....-D..)	E46 ⁷⁾	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-.....-B..)	E55 ⁷⁾	✓	✓	✓
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-.....-D..)	E56 ⁷⁾	✓	✓	✓
Explosion-proof "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-E..)	E57 ⁷⁾	✓	✓	✓
Ex protection „Ex ia“, „Ex d“ and „Zone 2“ to NEPSI (China) (only for transmitter 7MF4...-.....-R..)	E58 ⁷⁾	✓	✓	✓
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea) (only for transmitter 7MF4...-.....-[B, D]..-Z + E11)	E70 ⁷⁾	✓	✓	✓

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for differential pressure and flow

1

Selection and Ordering data		Order code			
Further designs Add "-Z" to Article No. and specify Order code.			HART	PA	FF
Ex-protection Ex ia according to EAC Ex (Russia)		E80	✓	✓	✓
Ex-protection Ex d according to EAC Ex (Russia)		E81	✓	✓	✓
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)		E82	✓	✓	✓
Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)		E83	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)		G10	✓	✓	✓
Interchanging of process connection side		H01	✓	✓	✓
Vent on side for gas measurements		H02	✓	✓	✓
Stainless steel process flanges for vertical differential pressure lines (not together with K01, K02 and K04⁸⁾)		H03	✓	✓	✓
Transient protector 6 kV (lightning protection)		J01	✓	✓	✓
Chambered graphite gasket for process flange		J02	✓	✓	✓
Chambered PTFE graphite gasket		J03	✓	✓	✓
EPDM O-rings for process flange with approval (WRC/WRAS)		J05	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on right when viewing the display⁹⁾)		J08	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on left when viewing the display⁹⁾)		J09	✓	✓	✓
Process flange					
• Hastelloy		K01	✓	✓	✓
• Monel		K02	✓	✓	✓
• Stainless steel with PVDF insert max. PN 10 (MAWP 145 psi), max. temperature of medium 90 °C (194 °F), for ½-14 NPT inner process connection on the side in the middle of the process flange, vent valve not possible		K04	✓	✓	✓
Marine approvals					
• Det Norske Veritas Germanischer Lloyd (DNV-GL)		S10	✓	✓	✓
• Lloyds Register (LR)		S11	✓	✓	✓
• French marine classification society Bureau Veritas (BV)		S12	✓	✓	✓
• American Bureau of Shipping (ABS)		S14	✓	✓	✓
• Russian Maritime Register (RMR)		S16	✓	✓	✓
• Korean Register of Shipping (KR)		S17	✓	✓	✓

Selection and Ordering data		Order code			
Additional data Please add "-Z" to Article No. and specify Order code(s) and plain text.			HART	PA	FF
Measuring range to be set Specify in plain text: • in the case of linear characteristic curve (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi • in the case of square rooted characteristic (max. 5 characters): Y02: ... up to ... mbar, bar, kPa, MPa, psi		Y01	✓	✓ ¹⁾	
		Y02	✓		
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:		Y15	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 char., specify in plain text: Y16:		Y16	✓	✓	✓
Entry of HART address (TAG) Max. 8 char., specify in plain text: Y17:		Y17	✓		
Setting of pressure indicator in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H ₂ O ⁺ , inH ₂ O ⁺ , ftH ₂ O ⁺ , mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM or % *) ref. temperature 20 °C		Y21	✓	✓	✓
Setting of pressure indicator in non-pressure units²⁾ Specify in plain text: Y22: up to l/min, m ³ /h, m, USgpm, ... (specification of measuring range in pressure units "Y01" or "Y02" is essential, unit with max. 5 characters)		Y22 ³⁾ + Y01 or Y02	✓		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:		Y25		✓	✓
Damping adjustment in seconds (0 ... 100 s)		Y30	✓	✓	✓

Factory mounting of valve manifolds, see accessories.

✓ = available

1) Han device plug IP65

2) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

3) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

4) Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H

5) Option does not contain gas explosion protection; only dust explosion protection: Use in or at Zone 1D/2D.

6) Cannot be ordered with remote seal.

7) When the additional ex option is selected, the ATEX marking on the device is omitted. Only the Ex option selected via the Z option is marked.

8) Not suitable for connection of remote seal.

9) Blanking plug is standard configuration. Order option A40 if a vent valve is required instead of a blanking plug.

1) Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

2) Preset values can only be changed over SIMATIC PDM.

3) Not in conjunction with over-filling safety device for flammable and non-flammable liquids (Order code "E08")

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for differential pressure and flow

1

Selection and Ordering data		Article No.
SITRANS P DS III with HART pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)		7MF4533 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Measuring cell cleaning	
Silicone oil	normal	1
Inert liquid ¹⁾	grease-free to cleanliness level 2	3
Measuring span (min. ... max.)		
2.5 ... 250 mbar	(1.004 ... 100 inH ₂ O)	D
6 ... 600 mbar	(2.4 ... 240 inH ₂ O)	E
16 ... 1600 mbar	(6.4 ... 642 inH ₂ O)	F
50 ... 5000 mbar	(20 ... 2000 inH ₂ O)	G
0.3 ... 30 bar	(4.35 ... 435 psi)	H
Wetted parts materials		
(stainless steel process flanges)		
Seal diaphragm	Parts of measuring cell	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Gold ²⁾	Gold	L
Version for diaphragm seal 3) 4) 5) 6)		Y
Process connection		
Female thread 1/4-18 NPT with flange connection		
<ul style="list-style-type: none"> Sealing screw opposite process connection <ul style="list-style-type: none"> Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518 Mounting thread M12 to DIN 19213 (only for replacement requirement) Venting on side of process flanges, location of vent valve at top of process flanges (see dimensional drawing) <ul style="list-style-type: none"> Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518 Mounting thread M12 to DIN 19213 (only for replacement requirement) 		3 1 7 5
Non-wetted parts materials		
process flange screws	Electronics housing	
Stainless steel	Die-cast aluminum	2
Stainless steel	Stainless steel precision casting ⁷⁾	3
Version		
<ul style="list-style-type: none"> Standard version, German plate inscription, setting for pressure unit: bar International version, English plate inscription, setting for pressure unit: bar Chinese version, English plate inscription, setting for pressure unit: Pascal 		1 2 3
All versions include DVD with compact operating instructions in various EU languages.		
Explosion protection		
<ul style="list-style-type: none"> None With ATEX, Type of protection: <ul style="list-style-type: none"> "Intrinsic safety (Ex ia)" "Explosion-proof (Ex d)"⁸⁾ "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)⁹⁾ "Ex nA/ic (Zone 2)"¹⁰⁾ "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)"⁹⁾¹¹⁾ FM + CSA intrinsic safe (is)¹²⁾ FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D⁹⁾¹¹⁾¹²⁾ With FM + CSA, Type of protection: <ul style="list-style-type: none"> "Intrinsic safety and explosion-proof (is + xp)"⁸⁾¹²⁾, max PN 360 		A B D P E R F S NC

Selection and Ordering data	Article No.
SITRANS P DS III with HART pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)	7MF4533 -
Electrical connection/cable entry	
<ul style="list-style-type: none"> Screwed gland M20x1.5 Screwed gland 1/2-14 NPT Han 7D device plug (plastic housing) incl. mating connector¹³⁾¹⁴⁾ M12 device plugs (stainless steel)^{15) 16)} 	B C D F
Display	
<ul style="list-style-type: none"> Without display Without visible display (display concealed, setting: mA) With visible display (setting: mA) with customer-specific display (setting as specified, Order code "Y21" or "Y22" required) 	0 1 6 7

Power supply units see Chap. 7 "Supplementary Components".

Scope of delivery: Pressure transmitter as ordered (Instruction Manual is extra ordering item)

- For oxygen application, add Order code E10.
- Not in conjunction with max. span 600 mbar (240.9 inH₂O)
- When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF453-...Y...-... and 7MF4900-1...-B
- The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- Not in conjunction with Electrical connection "Han 7D device plug".
- Without cable gland, with blanking plug
- With enclosed cable gland Ex ia and blanking plug
- Configurations with Han and M12 device plugs are only available in Ex ic.
- Only in connection with IP66.
- Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.
- Only in connection with Ex approval A, B or E.
- Permissible only for crimp-contact of conductor cross-section 1 mm²
- Only in connection with Ex approval A, B, E or F.
- M12 delivered without cable socket.

Selection and Ordering data		Article No.	
Pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)			
SITRANS P DS III with PROFIBUS PA (PA)		7 MF 4 5 3 4 -	
SITRANS P DS III with FOUNDATION Fieldbus (FF)		7 MF 4 5 3 5 -	
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Measuring cell filling	Measuring cell cleaning		
Silicone oil	normal	1	
Inert liquid ¹⁾	grease-free to cleanliness level 2	3	
Nominal measuring range			
250 mbar	(100 inH ₂ O)	D	
600 mbar	(240 inH ₂ O)	E	
1600 mbar	(642 inH ₂ O)	F	
5 bar	(2000 inH ₂ O)	G	
30 bar	(435 psi)	H	
Wetted parts materials			
(stainless steel process flanges)			
Seal diaphragm	Parts of measuring cell		
Stainless steel	Stainless steel	A	
Hastelloy	Stainless steel	B	
Gold ²⁾	Gold	L	
Version for diaphragm seal ^{3) 4) 5) 6)}		Y	
Process connection			
Female thread ¼-18 NPT with flange connection			
• Sealing screw opposite process connection			
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		3	
- Mounting thread M12 to DIN 19213 (only for replacement requirement)		1	
• Venting on side of process flanges, location of vent valve at top of process flanges (see dimensional drawing).			
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		7	
- Mounting thread M12 to DIN 19213 (only for replacement requirement)		5	
Non-wetted parts materials			
Process flange screws	Electronics housing		
Stainless steel	Die-cast aluminum	2	
Stainless steel	Stainless steel precision casting	3	
Version			
• Standard version, German plate inscription, setting for pressure unit: bar		1	
• International version, English plate inscription, setting for pressure unit: bar		2	
• Chinese version, English plate inscription, setting for pressure unit: Pascal		3	
All versions include DVD with compact operating instructions in various EU languages.			

Selection and Ordering data		Article No.	
Pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)			
SITRANS P DS III with PROFIBUS PA (PA)		7 MF 4 5 3 4 -	
SITRANS P DS III with FOUNDATION Fieldbus (FF)		7 MF 4 5 3 5 -	
Explosion protection			
• None			A
• With ATEX, Type of protection:			
- "Intrinsic safety (Ex ia)"			B
- "Explosion-proof (Ex d)" ⁷⁾			D
- "Intrinsic safety and flameproof enclosure (Ex ia + Ex d)" ⁸⁾			P
- "Ex nA/ic (Zone 2)" ⁹⁾			E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)" ^{8) 10)}			R
• FM + CSA intrinsic safe (is) ¹¹⁾			F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX)+ Zone 1D/2D ^{9) 10) 11)}			S
• With FM + CSA, Type of protection:			
- "Intrinsic safety and explosion-proof (is + xp)" ^{7) 11)} , max PN 360			NC
Electrical connection/cable entry			
• Screwed gland M20 x 1.5			B
• Screwed gland ½-14 NPT			C
• M12 device plugs (stainless steel) ^{12) 13)}			F
Display			
• Without (display hidden)			0
• Without visible display (display concealed, setting: bar)			1
• With visible display (setting: bar)			6
• With customer-specific display (setting as specified, Order code "Y21" required)			7
Included in delivery of the device:			
• Quick-start guide			
• Sealing plug(s) or sealing screw(s) for the process flanges(s)			
1) For oxygen application, add Order code E10.			
2) Not in conjunction with max. span 600 mbar (240.9 inH ₂ O)			
3) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the <u>total</u> combination is certificated here.			
4) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.			
5) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF453-..Y.-.... and 7MF4900-1....-B			
6) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.			
7) Without cable gland, with blanking plug.			
8) With enclosed cable gland Ex ia and blanking plug.			
9) Configurations with Han and M12 device plugs are only available in Ex ic			
10) Only in connection with IP66.			
11) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.			
12) Only in connection with Ex approval A, B, E or F.			
13) M12 delivered without cable socket			

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for differential pressure and flow

1

Selection and Ordering data	Order code				Selection and Ordering data	Order code			
Further designs		HART	PA	FF	Setting of the upper saturation limit of the output signal to 22.0 mA	D05	✓		
Add "-Z" to Article No. and specify Order code.					Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)	D07	✓	✓	✓
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:					(only together with seal diaphragm made of Hastelloy and stainless steel)				
• Steel	A01	✓	✓	✓	Degree of protection IP66/IP68	D12	✓	✓	✓
• Stainless steel 304	A02	✓	✓	✓	(only for M20 x 1.5 and ½-14 NPT)				
• Stainless steel 316L	A03	✓	✓	✓	Nom. press. rating PN 500 (MAWP 7250 psi)	D56	✓		
					(Only for measuring cell 600 mbar ... 30 bar (240 inH ₂ O ... 435 psi), SIL- and Ex-options not possible) ³⁾				
O-rings for process flanges					Capri cable gland 4F CrNi and clamping device (848699 + 810634) included	D59	✓	✓	✓
(instead of FPM (Viton))					Use in or on zone 1D/2D⁴⁾	E01	✓	✓	✓
• PTFE (Teflon)	A20	✓	✓	✓	(only together with type of protection "Intrinsic safety" (transmitter 7MF4...-.....-B.. Ex ia) and IP66)				
• FEP (with silicone core, approved for food)	A21	✓	✓	✓	Export approval Korea	E11	✓	✓	✓
• FFKM (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F)	A22	✓	✓	✓	CRN approval Canada	E22⁵⁾	✓	✓	✓
• NBR (Buna N)	A23	✓	✓	✓	(Canadian Registration Number)				
Device plugs¹⁾					Dual seal	E24	✓	✓	✓
• Han 7D (metal)	A30	✓			Explosion-proof "Intrinsic safety" (Ex ia) to INMETRO (Brazil)	E25⁶⁾	✓	✓	✓
• Han 8D (instead of Han 7D)	A31	✓			(only for transmitter 7MF4...-.....-B..)				
• Angled	A32	✓			"Flameproof" explosion protection according to INMETRO (Brazil)	E26⁶⁾	✓	✓	✓
• Han 8D (metal)	A33	✓			(only for transmitter 7MF4...-.....-D..)				
Sealing screws (2 units)	A40	✓	✓	✓	Explosion-proof "Intrinsic safety" (Ex ia + Ex d) to INMETRO (Brazil)	E28⁶⁾	✓	✓	
¼-18 NPT, with valve in mat. of process flanges					(only for transmitter 7MF4...-.....-P..)				
Cable sockets for M12 device plugs (metal (CuZn))	A50	✓	✓	✓	Ex Approval IEC Ex (Ex ia)	E45⁶⁾	✓	✓	✓
					(only for transmitter 7MF4...-.....-B..)				
Rating plate inscription (instead of German)					Ex Approval IEC Ex (Ex d)	E46⁶⁾	✓	✓	✓
• English	B11	✓	✓	✓	(only for transmitter 7MF4...-.....-D..)				
• French	B12	✓	✓	✓	Explosion-proof "Intrinsic safety" to NEPSI (China)	E55⁶⁾	✓	✓	✓
• Spanish	B13	✓	✓	✓	(only for transmitter 7MF4...-.....-B..)				
• Italian	B14	✓	✓	✓	Ex prot. "Explosion-proof" to NEPSI (China)	E56⁶⁾	✓	✓	✓
• Cyrillic (russian)	B16	✓	✓	✓	(only for transmitter 7MF4...-.....-D..)				
English rating plate	B21	✓	✓	✓	Explosion-proof "Zone 2" to NEPSI (China)	E57⁶⁾	✓	✓	✓
Pressure units in inH ₂ O and/or psi					(only for transmitter 7MF4...-.....-E..)				
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2	C11	✓	✓	✓	Ex protection „Ex ia", „Ex d" and „Zone 2" to NEPSI (China)	E58⁶⁾	✓	✓	✓
Inspection certificate	C12	✓	✓	✓	(only for transmitter 7MF4...-.....-R..)				
Acc. to EN 10204-3.1					"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea)	E70⁶⁾	✓	✓	✓
Factory certificate	C14	✓	✓	✓	(only for transmitter 7MF4...-.....-B..)				
Acc. to EN 10204-2.2					Ex-protection Ex ia acc. to EAC Ex (Russia)	E80	✓	✓	✓
Acceptance certificate (EN 10204-3.1)	C15	✓	✓	✓	Ex-protection Ex d acc. to EAC Ex (Russia)	E81	✓	✓	✓
PMI test of parts in contact with medium					Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)	E82	✓	✓	✓
Functional safety (SIL2)	C20	✓			Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)	E83	✓	✓	✓
Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration									
Functional safety (PROFIsafe) Certificate and PROFIsafe protocol	C21²⁾		✓						
Functional safety (SIL2/3)	C23	✓							
Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration									
PED for Russia with initial calibration mark	C99	✓	✓	✓					

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for differential pressure and flow

1

Selection and Ordering data	Order code			
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code.				
Two coats of lacquer on casing and cover (PU on epoxy)	G10	✓	✓	✓
Interchanging of process connection side	H01	✓	✓	✓
Stainless steel process flanges for vertical differential pressure lines	H03	✓	✓	✓
Transient protector 6 kV (lightning protection)	J01	✓	✓	✓
Chambered graphite gasket for process flange	J02	✓	✓	✓
EPDM O-rings for process flange with approval (WRC/WRAS)	J05	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on right when viewing the display)⁷⁾	J08	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on left when viewing the display)⁷⁾	J09	✓	✓	✓
Marine approvals				
• Det Norske Veritas Germanischer Lloyd (DNV-GL)	S10	✓	✓	✓
• Lloyds Register (LR)	S11	✓	✓	✓
• French marine classification society Bureau Veritas (BV)	S12	✓	✓	✓
• American Bureau of Shipping (ABS)	S14	✓	✓	✓
• Russian Maritime Register (RMR)	S16	✓	✓	✓
• Korean Register of Shipping (KR)	S17	✓	✓	✓

1) Han device plug IP65

2) Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H

3) Tested according to IEC 61010. Only for measuring materials of the group of fluids 2 in accordance with PED permissible. Not for use with dangerous media suitable.

4) Option does not contain gas explosion protection; only dust explosion protection: Use in or at Zone 1D/2D.

5) Cannot be ordered with remote seal.

6) When the additional ex option is selected, the ATEX marking on the device is omitted. Only the Ex option selected via the Z option is marked.

7) Blanking plug is standard configuration. Order option A40 if a vent valve is required instead of a blanking plug.

Selection and Ordering data	Order code			
Additional data		HART	PA	FF
Please add "-Z" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set				
Specify in plain text:				
• in the case of linear characteristic curve (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	Y01	✓	✓ ¹⁾	
• in the case of square rooted characteristic (max. 5 characters): Y02: ... up to ... mbar, bar, kPa, MPa, psi	Y02	✓		
Stainless steel tag plate and entry in device variable (measuring point description)	Y15	✓	✓	✓
Max. 16 characters, specify in plain text: Y15:				
Measuring point text (entry in device variable)	Y16	✓	✓	✓
Max. 27 char., specify in plain text: Y16:				
Entry of HART address (TAG)	Y17	✓		
Max. 8 char., specify in plain text: Y17:				
Setting of pressure indication in pressure units	Y21	✓	✓	✓
Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ...				
Note: The following pressure units can be selected: bar, mbar, mm H ₂ O ³⁾ , inH ₂ O ³⁾ , ftH ₂ O ³⁾ , mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM or %) ref. temperature 20 °C				
Setting of pressure indication in non-pressure units²⁾	Y22 + Y01 or Y02	✓		
Specify in plain text: Y22: up to l/min, m ³ /h, m, USgpm, ... (specification of measuring range in pressure units "Y01" or "Y02" is essential, unit with max. 5 characters)				
Preset bus address	Y25		✓	✓
possible between 1 and 126 Specify in plain text: Y25:				
Damping adjustment in seconds (0 ... 100 s)	Y30	✓	✓	✓

Factory mounting of valve manifolds, see accessories.

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset.

✓ = available

1) Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

2) Preset values can only be changed over SIMATIC PDM.

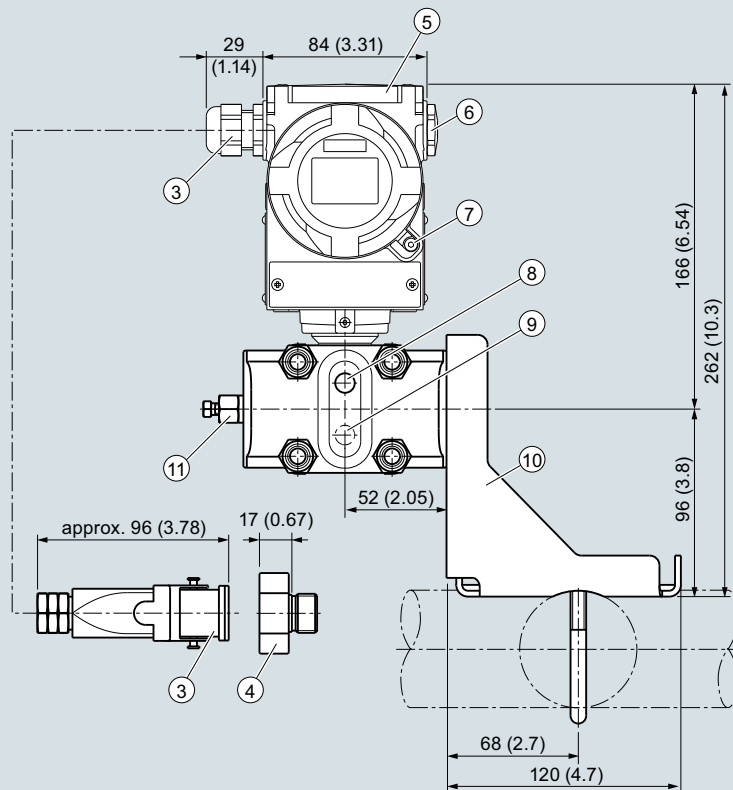
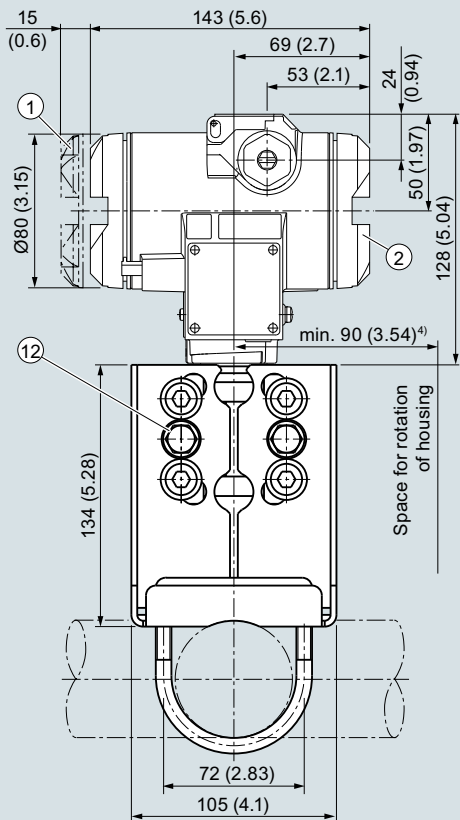
Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for differential pressure and flow

Dimensional drawings



- ① Electronic side, digital display (longer overall length for cover with window)¹⁾
- ② Terminal side¹⁾
- ③ Electrical connection: Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or Han 7D/8D device plug^{2) 3)}
- ④ Harting adapter
- ⑤ Protective cover over keys

- ⑥ Blanking plug
- ⑦ Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
- ⑧ Lateral venting for liquid measurement (Standard)
- ⑨ Lateral venting for gas measurement (suffix H02)
- ⑩ Mounting bracket (option)
- ⑪ Sealing screw with valve (option)
- ⑫ Process connection: ¼-18 NPT (IEC 61518)

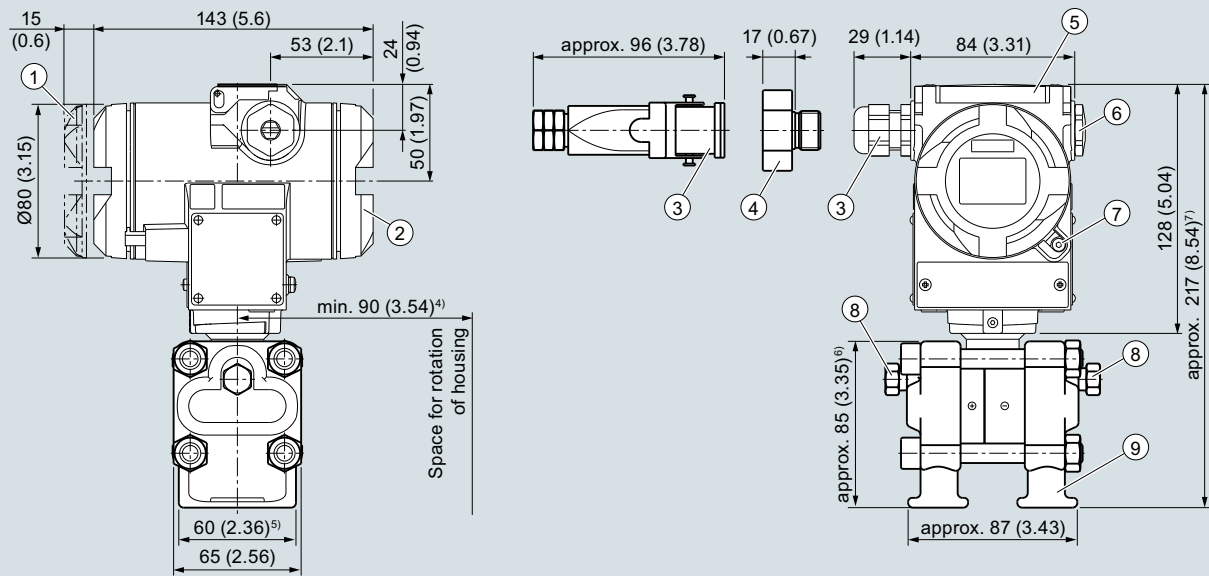
¹⁾ Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing

²⁾ Not with type of protection "Explosion-proof enclosure"

³⁾ Not with type of protection "FM + CSA" [IS + XP]"

⁴⁾ 92 mm (3.62 inch) for minimum distance to permit rotation with indicator

SITRANS P DS III pressure transmitters for differential pressure and flow, dimensions in mm (inch)



① Electronic side, digital display
(longer overall length for cover with window)¹⁾

② Terminal side¹⁾

③ Electrical connection:
Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or
Han 7D/8D device plug^{2) 3)}

④ Harting adapter

⑤ Protective cover over keys

⑥ Blanking plug

⑦ Screw cover - safety bracket (only for type of protection
"Explosion-proof enclosure", not shown in the drawing)

⑧ Sealing screw with valve (option)

⑨ Process connection: ¼-18 NPT (IEC 61518)

¹⁾ Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing

²⁾ Not with type of protection "Explosion-proof enclosure"

³⁾ Not with type of protection "FM + CSA" [IS + XP]"

⁴⁾ 92 mm (3.6 inch) for minimum distance to permit rotation with indicator

⁵⁾ 74 mm (2.9 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)

⁶⁾ 91 mm (3.6 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)

⁷⁾ 219 mm (8.62 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)

SITRANS P DS III pressure transmitters for differential pressure and flow, with process covers for vertical differential pressure lines, optional "H03", dimensional drawing, dimensions in mm (inch)



SITRANS P DS III pressure transmitters for differential pressure and flow, with process covers for vertical differential pressure lines

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for level

Technical specifications

SITRANS P DS III for level

Input

Measured variable

Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)

Level

HART

PROFIBUS PA/ FOUNDATION Fieldbus

Span

Nominal measuring range

Max. operating pressure MAWP (PS)

25 ... 250 mbar
2.5 ... 25 kPa
10 ... 100 inH₂O250 mbar
25 kPa
100 inH₂O

See "Mounting flange"

25 ... 600 mbar
2.5 ... 60 kPa
10 ... 240 inH₂O600 mbar
60 kPa
240 inH₂O53 ... 1600 mbar
5.3 ... 160 kPa
21 ... 640 inH₂O1600 mbar
160 kPa
642 inH₂O160 ... 5000 mbar
16 ... 500 kPa
2.32 ... 72.5 psi5000 mbar
500 kPa
72.5 psi

Lower measuring limit

- Measuring cell with silicone oil filling
- Measuring cell with inert filling liquid

-100 % of max. span or 30 mbar a/3 kPa a/0.44 psi a depending on mounting flange

-100 % of max. span or 30 mbar a/3 kPa a/0.44 psi a depending on mounting flange

Upper measuring limit

100 % of max. span

Start of scale value

Between the measuring limits (fully adjustable)

Output

Output signal

HART

PROFIBUS PA/FOUNDATION Fieldbus

4 ... 20 mA

Digital PROFIBUS PA and FOUNDATION Fieldbus signal

- Lower limit (infinitely adjustable)
- Upper limit (infinitely adjustable)

3.55 mA, factory preset to 3.84 mA

-

23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA

-

Load

- Without HART

 $R_B \leq (U_H - 10.5 \text{ V})/0.023 \text{ A in } \Omega$
 U_H : Power supply in V

-

- With HART

 $R_B = 230 \dots 500 \Omega$ (SIMATIC PDM) or
 $R_B = 230 \dots 1100 \Omega$ (HART Communicator)

-

Physical bus

-

IEC 61158-2

Protection against polarity reversal

Protected against short-circuit and polarity reversal.
Each connection against the other with max. supply voltage.

Electrical damping (step width 0.1 s)

Set to 2 s (0 ... 100 s)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for level

1

SITRANS P DS III for level**Measuring accuracy**

Reference conditions

Acc. to IEC 60770-1

- Increasing characteristic
- Start-of-scale value 0 bar/kPa/psi
- Stainless steel seal diaphragm
- Silicone oil filling
- Room temperature 25 °C (77 °F)

Measuring span ratio r (spread, Turn-Down) $r = \text{max. measuring span/set measuring span or nom. pressure range}$

Error in measurement at limit setting incl. hysteresis and reproducibility

- Linear characteristic

- 250 mbar/25 kPa/3.6 psi

 $r \leq 5 : \leq 0.125 \%$
 $5 < r \leq 10 : \leq (0.007 \cdot r + 0.09) \%$

- 600 mbar/60 kPa/8.7 psi

 $r \leq 5 : \leq 0.125 \%$
 $5 < r \leq 25 : \leq (0.007 \cdot r + 0.09) \%$
- 1600 mbar/160 kPa/23.21 psi
5 bar/500 kPa/72.5 psi
 $r \leq 5 : \leq 0.125 \%$
 $5 < r \leq 30 : \leq (0.007 \cdot r + 0.09) \%$
Influence of ambient temperature
(in percent per 28 °C (50 °F))

- 250 mbar/25 kPa/3.6 psi

 $\leq (0.4 \cdot r + 0.16) \%$

- 600 mbar/60 kPa/8.7 psi

 $\leq (0.24 \cdot r + 0.16) \%$

- 1600 mbar/160 kPa/23.21 psi
5 bar/500 kPa/72.5 psi

 $\leq (0.2 \cdot r + 0.16) \%$

Influence of static pressure

- on the zero point

- 250 mbar/25 kPa/3.6 psi

 $\leq (0.3 \cdot r) \%$ per nominal pressure

- 600 mbar/60 kPa/8.7 psi

 $\leq (0.15 \cdot r) \%$ per nominal pressure- 1600 mbar/160 kPa/23.21 psi
5 bar/500 kPa/72.5 psi $\leq (0.1 \cdot r) \%$ per nominal pressure

- on the span

 $\leq (0.1 \cdot r) \%$ per nominal pressureLong-term stability
(temperature change ± 30 °C (± 54 °F))
 $\leq (0.25 \cdot r) \%$ in 5 years
 static pressure max. 70 bar/7 MPa/1015 psi

Effect of mounting position

Depending on filling liquid of mounting flange

Effect of auxiliary power supply
(in percent per change in voltage)

0.005 % per 1 V

Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus

 $3 \cdot 10^{-5}$ of nominal measuring range**Rated conditions**

Degree of protection

- according to EN 60529
- according to NEMA 250

IP66 (optional IP68/IP68)

Type 4X

Temperature of medium

- Measuring cell with silicone oil filling

- High-pressure side

-40 ... +100¹⁾ °C (-40 ... +212¹⁾ °F) $p_{\text{abs}} \geq 1$ bar: -40 ... +175 °C (-40 ... +347 °F) $p_{\text{abs}} < 1$ bar: -40 ... +80 °C (-40 ... +176 °F)

- Low-pressure side

-40 ... +100 °C (-40 ... +212 °F)

-20 ... +60 °C (-4 ... +140 °F) in conjunction with dust explosion protection

Ambient conditions

- Ambient temperature
 - Transmitter
 - Display readable
- Storage temperature
- Climatic class
 - Condensation

-40 ... +85 °C (-40 ... +185 °F)

-30 ... +85 °C (-22 ... +185 °F)

-50 ... +85 °C (-58 ... +185 °F)

Relative humidity 0 ... 100 %, condensation permissible, suitable for use in the tropics

- Electromagnetic Compatibility

- Emitted interference and interference immunity

Acc. to IEC 61326 and NAMUR NE 21

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for level

SITRANS P DS III for level

Design

Weight (without options)

- To EN (pressure transmitter with mounting flange, without tube)

≈ 11 ... 13 kg (≈ 24.2 ... 28.7 (lb))

- To ASME (pressure transmitter with mounting flange, without tube)

≈ 11 ... 18 kg (≈ 24.2 ... 39.7 lb)

Enclosure material

Low-copper die-cast aluminum, GD-AISI12 or stainless steel precision casting, mat. no. 1.4408

Wetted parts materials

High-pressure side

- Seal diaphragm of mounting flange

- Stainless steel, W.-Nr. 1.4404/316L
 - coated with PFA
 - coated with PTFE
 - coated with ECTFE
 - gold plated
- Monel 400, mat. no. 2.4360
- Hastelloy C276, mat. no. 2.4619
- Hastelloy C4, mat. no. 2.4602
- Hastelloy C22, mat. no. 2.4602
- Tantalum
- Titanium, mat. no. 3.7035
- Nickel 201
- Duplex 2205, mat. no. 1.4462

Measuring cell filling

Silicone oil

Process connection

- High-pressure side

Flange to EN and ASME

- Low-pressure side

Female thread 1/4-18 NPT and flange connection with mounting thread M10 to DIN 19213 or 7/16-20 UNF to IEC 61518/DIN EN 61518

Power supply U_H

Terminal voltage on transmitter

10.5 ... 45 V DC
10.5 ... 30 V DC in intrinsically-safe mode

PROFIBUS PA/FOUNDATION Fieldbus

-

Power supply

Supplied through bus

Separate 24 V power supply necessary

-

No

Bus voltage

- Not Ex
- With intrinsically-safe operation

-

9 ... 32 V

-

9 ... 24 V

Current consumption

- Basic current (max.)
- Start-up current ≤ basic current
- Max. current in event of fault

-

12.5 mA

-

Yes

-

15.5 mA

Fault disconnection electronics (FDE) available

-

Yes

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for level

1

SITRANS P DS III for level**Certificates and approvals**

Classification according to PED 2014/68/EU

Explosion protection

• Intrinsic safety "i"

- Marking
- Permissible ambient temperature

- Connection

- Effective internal inductance/capacitance

• Explosion-proof "d"

- Marking
- Permissible ambient temperature

- Connection

• Dust explosion protection for zone 20

- Marking

- Permissible ambient temperature

- Max. surface temperature

- Connection

- Effective internal inductance/capacitance

• Dust explosion protection for zone 21/22

- Marking

- Connection

• Type of protection "n" (zone 2)

- Marking

- Connection (Ex nA)

- Connection (Ex ic)

- Effective internal inductance/capacitance

• Explosion protection acc. to FM

- Identification (XP/DIP) or (IS); (NI)

• Explosion protection to CSA

- Identification (XP/DIP) or (IS)

HART

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

PTB 13 ATEX 2007 X

Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb

-40 ... +85 °C (-40 ... +185 °F) temperature class T4;
 -40 ... +70 °C (-40 ... +158 °F) temperature class T5;
 -40 ... +60 °C (-40 ... +140 °F) temperature class T6

To certified intrinsically-safe circuits with peak values:
 $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$,
 $P_i = 750 \text{ mW}$; $R_i = 300 \Omega$

 $L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

PTB 99 ATEX 1160

Ex II 1/2 G Ex d IIC T4/T6 Gb

-40 ... +85 °C (-40 ... +185 °F) temperature class T4;
 -40 ... +60 °C (-40 ... +140 °F) temperature class T6

To circuits with values:
 $U_H = 10.5 \dots 45 \text{ V DC}$

PTB 01 ATEX 2055

Ex II 1 D Ex ta IIIC T120°C Da

Ex II 1/2 D Ex ta/tb IIIC T120°C Da/Db

-40 ... +85 °C (-40 ... +185 °F)

120 °C (248 °F)

To certified intrinsically-safe circuits with peak values:
 $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$,
 $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$

 $L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

PTB 01 ATEX 2055

Ex II 2 D Ex tb IIIC T120°C Db

To circuits with values:
 $U_H = 10.5 \dots 45 \text{ V DC}$; $P_{\max} = 1.2 \text{ W}$

PTB 13 ATEX 2007 X

Ex II 2/3 G Ex nA IIC T4/T5/T6 Gb/Gc

Ex II 2/3 G Ex ic IIC T4/T5/T6 Gb/Gc

 $U_m = 45 \text{ V}$

To circuits with values:
 $U_i = 45 \text{ V}$

 $L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

Certificate of Compliance 3008490

CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

Certificate of Compliance 1153651

CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

PROFIBUS PA/ FOUNDATION Fieldbus

FISCO supply unit:
 $U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$

Linear barrier:
 $U_o = 24 \text{ V}$, $I_o = 250 \text{ mA}$, $P_o = 1.2 \text{ W}$

 $L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$

To circuits with values:
 $U_H = 9 \dots 32 \text{ V DC}$

FISCO supply unit:
 $U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$
 Linear barrier:
 $U_o = 24 \text{ V}$, $I_o = 250 \text{ mA}$, $P_o = 1.2 \text{ W}$

 $L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$

To circuits with values: $U_H = 9 \dots 32 \text{ V DC}$; $P_{\max} = 1 \text{ W}$

 $U_m = 32 \text{ V}$

FISCO supply unit ic:
 $U_o = 17.5 \text{ V}$, $I_o = 570 \text{ mA}$

Linear barrier:
 $U_o = 32 \text{ V}$, $I_o = 132 \text{ mA}$, $P_o = 1 \text{ W}$

 $L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$

1) This value may be increased if the process connection is sufficiently insulated.

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

1

for level

HART communication		FOUNDATION Fieldbus communication	
HART	230 ... 1100 Ω	Function blocks	3 function blocks analog input, 1 function block PID
Protocol	HART Version 5.x	• Analog input	Yes, linearly rising or falling characteristic
Software for computer	SIMATIC PDM	- Adaptation to customer-specific process variables	0 ... 100 s
PROFIBUS PA communication		- Electrical damping, adjustable	Output/input (can be locked within the device with a bridge)
Simultaneous communication with master class 2 (max.)	4	- Simulation function	parameterizable (last good value, substitute value, incorrect value)
The address can be set using	Configuration tool or local operation (standard setting address 126)	- Failure mode	Yes, one upper and lower warning limit and one alarm limit respectively
Cyclic data usage		- Limit monitoring	Yes
• Output byte	5 (one measured value) or 10 (two measured values)	- Square-rooted characteristic for flow measurement	
• Input byte	0, 1, or 2 (register operating mode and reset function for metering)	• PID	Standard FOUNDATION Fieldbus function block
Internal preprocessing		• Physical block	1 resource block
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B	Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
Function blocks	2	• Pressure transducer block	
• Analog input		- Can be calibrated by applying two pressures	Yes
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic	- Monitoring of sensor limits	Yes
- Electrical damping, adjustable	0 ... 100 s	- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function
- Simulation function	Input/Output		
- Failure mode	parameterizable (last good value, substitute value, incorrect value)		
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively		
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output	Mounting flange	
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)	Nominal diameter	Nominal pressure
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively	• Acc. to EN 1092-1	
• Physical block	1	- DN 80	PN 40
Transducer blocks	2	- DN100	PN16, PN40
• Pressure transducer block		• To ASME B16.5	
- Can be calibrated by applying two pressures	Yes	- 3 inch	class 150, class 300
- Monitoring of sensor limits	Yes	- 4 inch	class 150, class 300
- Specification of a container characteristic with	Max. 30 nodes		
- Square-rooted characteristic for flow measurement	Yes		
- Gradual volume suppression and implementation point of square-root extraction	Parameterizable		
- Simulation function for measured pressure value and sensor temperature	Constant value or over parameterizable ramp function		

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for level

1

Selection and Ordering data		Article No.
Pressure transmitter for level, SITRANS P DS III with HART		7MF4633 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		Y -
Measuring cell filling	Measuring cell cleaning	
Silicone oil	normal	1
Measuring span (min. ... max.)		
25 ... 250 mbar	(10 ... 100 inH ₂ O)	D
25 ... 600 mbar	(10 ... 240 inH ₂ O)	E
53 ... 1600 mbar	(21 ... 642 inH ₂ O)	F
0.16 ... 5 bar	(64.3 ... 2000 inH ₂ O)	G
Process connection of low-pressure side		
Female thread 1/4-18 NPT with flange connection		
<ul style="list-style-type: none"> Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518 		2
<ul style="list-style-type: none"> Mounting thread M10 to DIN 19213 (only for replacement requirement) 		0
Non-wetted parts materials		
process flange screws	Electronics housing	
Stainless steel	Die-cast aluminum	2
Stainless steel	Stainless steel precision casting ¹⁾	3
Version		
<ul style="list-style-type: none"> Standard version, German plate inscription, setting for pressure unit: bar 		1
<ul style="list-style-type: none"> International version, English plate inscription, setting for pressure unit: bar 		2
<ul style="list-style-type: none"> Chinese version, English plate inscription, setting for pressure unit: Pascal 		3
All versions include DVD with compact operating instructions in various EU languages.		
Explosion protection		
<ul style="list-style-type: none"> None 		A
<ul style="list-style-type: none"> With ATEX, Type of protection: <ul style="list-style-type: none"> "Intrinsic safety (Ex ia)" "Explosion-proof (Ex d)"²⁾ "Intrinsic safety and flameproof enclosure (Ex ia + Ex d)"³⁾ "Ex nA/ic (Zone 2)"⁴⁾ "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)"³⁾⁵⁾ 		B D P
<ul style="list-style-type: none"> FM + CSA intrinsic safe (is)⁶⁾ 		E
<ul style="list-style-type: none"> FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D³⁾⁵⁾⁶⁾ 		R
<ul style="list-style-type: none"> With FM + CSA, Type of protection: <ul style="list-style-type: none"> "Intrinsic Safe and Explosion Proof (is + xp)"¹⁾⁶⁾ 		F S
Electrical connection/cable entry		NC
<ul style="list-style-type: none"> Screwed gland M20x1.5 		B
<ul style="list-style-type: none"> Screwed gland 1/2-14 NPT 		C
<ul style="list-style-type: none"> Han 7D device plug (plastic housing) incl. mating connector⁷⁾ 		D
<ul style="list-style-type: none"> M12 device plugs (stainless steel)^{8) 9)} 		F
Display		
<ul style="list-style-type: none"> Without display 		0
<ul style="list-style-type: none"> Without visible display (display concealed, setting: mA) 		1
<ul style="list-style-type: none"> With visible display (setting mA) 		6
<ul style="list-style-type: none"> With customer-specific display (setting as specified, Order code "Y21" or "Y22" required) 		7

Ordering information

1st order item: Pressure transmitter 7MF4633-...
 2nd order item: Mounting flange 7MF4912-3...

ordering example

Item line 1: 7MF4633-1EY20-1AA1-Z
 B line: Y01
 C line: Y01: 80 to 143 mbar (1.16 to 2.1 psi)
 Item line 2: 7MF4912-3GE01

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:

- Quick-start guide
 - Sealing plug(s) or sealing screw(s) for the process flanges(s)
- 1) Not in conjunction with Electrical connection "Han 7D device plug".
 - 2) Without cable gland, with blanking plug.
 - 3) With enclosed cable gland Ex ia and blanking plug.
 - 4) Configurations with Han and M12 device plugs are only available in Ex ic.
 - 5) Only in connection with IP66.
 - 6) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.
 - 7) Only in connection with Ex approval A, B or E.
 - 8) M12 delivered without cable socket
 - 9) Only in connection with Ex approval A, B, E or F.

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for level

1

Selection and Ordering data	Article No.
Pressure transmitters for level	
SITRANS P DS III with PROFIBUS PA (PA)	7MF4634-
SITRANS P DS III with FOUNDATION Fieldbus (FF)	7MF4635-
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	1 Y -
Nominal measuring range	
250 mbar (100 inH ₂ O)	D
600 mbar (240 inH ₂ O)	E
1600 mbar (642 inH ₂ O)	F
5 bar (2000 inH ₂ O)	G
Process connection of low-pressure side	
Female thread 1/4-18 NPT with flange connection	
• Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518	2
• Mounting thread M10 to DIN 19213 (only for replacement requirement)	0
Non-wetted parts materials	
process flange screws Electronics housing	
Stainless steel Die-cast aluminum	2
Stainless steel Stainless steel precision casting	3
Version	
• Standard version, German plate inscription, setting for pressure unit: bar)	1
• International version, English plate inscription, setting for pressure unit: bar	2
• Chinese version, English plate inscription, setting for pressure unit: Pascal	3
All versions include DVD with compact operating instructions in various EU languages.	
Explosion protection	
• None	A
• With ATEX, Type of protection:	
- "Intrinsic safety (Ex ia)"	B
- "Explosion-proof (Ex d)" ¹⁾	D
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d) ²⁾	P
- "Ex nA/ic (Zone 2)" ³⁾	E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D) ²⁾⁴⁾	R
• FM + CSA intrinsic safe (is) ⁵⁾	F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D ²⁾⁴⁾⁵⁾	S
• With FM + CSA, Type of protection:	
- "Intrinsic Safe and Explosion Proof (is + xp)" ¹⁾⁵⁾	NC
Electrical connection/cable entry	
• Screwed gland M20 x 1.5	B
• Screwed gland 1/2-14 NPT	C
• M12 device plugs (stainless steel) ^{6) 7)}	F
Display	
• Without display	0
• Without visible display (display concealed, setting: bar)	1
• With visible display (setting: bar)	6
• With customer-specific display (setting as specified, Order code "Y21" required)	7

Ordering information

1st order item: Pressure transmitter 7MF4634-...

2nd order item: Mounting flange 7MF4912-...

Ordering example

Item line 1: 7MF4634-1EY20-1AA1

Item line 2: 7MF4912-3GE01

Included in delivery of the device:

- Quick-start guide
- Sealing plug(s) or sealing screw(s) for the process flanges(s)

- 1) Without cable gland, with blanking plug.
- 2) With enclosed cable gland Ex ia and blanking plug.
- 3) Configurations with Han and M12 device plugs are only available in Ex ic.
- 4) Only in connection with IP66.
- 5) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.
- 6) M12 delivered without cable socket
- 7) Only in connection with Ex approval A, B, E or F.

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for level

1

Selection and Ordering data		Order code			
Further designs			HART	PA	FF
Add "-Z" to Article No. and specify Order code.					
O-rings for process flanges on low-pressure side (instead of FPM (Viton))					
• PTFE (Teflon)	A20	✓	✓	✓	✓
• FEP (with silicone core, approved for food)	A21	✓	✓	✓	✓
• FFPM (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F)	A22	✓	✓	✓	✓
• NBR (Buna N)	A23	✓	✓	✓	✓
Device plugs¹⁾					
• Han 7D (metal)	A30	✓			
• Han 8D (instead of Han 7D)	A31	✓			
• Angled	A32	✓			
• Han 8D (metal)	A33	✓			
Sealing screw 1/4-18 NPT, with valve in mat. of process flanges		A40	✓	✓	✓
Cable sockets for M12 device plugs (metal (CuZn))		A50	✓	✓	✓
Rating plate inscription (instead of German)					
• English	B11	✓	✓	✓	✓
• French	B12	✓	✓	✓	✓
• Spanish	B13	✓	✓	✓	✓
• Italian	B14	✓	✓	✓	✓
• Cyrillic (russian)	B16	✓	✓	✓	✓
English rating plate Pressure units in inH ₂ O and/or psi	B21	✓	✓	✓	✓
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2		C11	✓	✓	✓
Inspection certificate Acc. to EN 10204-3.1		C12	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2		C14	✓	✓	✓
Acceptance certificate (EN 10204-3.1) PMI test of parts in contact with medium		C15	✓	✓	✓
Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration		C20	✓		
Functional safety (PROFIsafe) Certificate and PROFIsafe protocol		C21 ²⁾		✓	
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration		C23	✓		
PED for Russia with initial calibration mark		C99	✓	✓	✓
Setting of the upper saturation limit of the output signal to 22.0 mA		D05	✓		
Degree of protection IP66/IP68 (only for M20x1.5 and 1/2-14 NPT)		D12	✓	✓	✓
Supplied with oval flange (1 item), PTFE packing and screws in thread of process flange		D37	✓	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included		D59	✓	✓	✓

Selection and Ordering data		Order code			
Further designs			HART	PA	FF
Add "-Z" to Article No. and specify Order code.					
Use on zone 1D / 2D³⁾ (only together with type of protection "Intrinsic safety" (transmitter 7MF4...-.....-B.. Ex ia) and IP66)		E01	✓	✓	✓
Overfilling safety device for flammable and non-flammable liquids (max. PN 32 (MAWP 464 psi), basic device with type of protection "Intrinsic safety (Ex ia)", to WHG and VbF, not together with measuring cell filling "inert liquid")		E08	✓		
Export approval Korea		E11	✓	✓	✓
Dual seal		E24	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-B..)		E25 ⁴⁾	✓	✓	✓
"Flameproof" explosion protection according to INMETRO (Brazil) (only for transmitter 7MF4...-.....-D..)		E26 ⁴⁾	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia + Ex d) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-P..)		E28 ⁴⁾	✓	✓	
Ex Approval IEC Ex (Ex ia) (only for transmitter 7MF4...-.....-B..)		E45 ⁴⁾	✓	✓	✓
Ex Approval IEC Ex (Ex d) (only for transmitter 7MF4...-.....-D..)		E46 ⁴⁾	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-.....-B..)		E55 ⁴⁾	✓	✓	✓
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-.....-D..)		E56 ⁴⁾	✓	✓	✓
Ex protection "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-E..)		E57 ⁴⁾	✓	✓	✓
Ex protection „Ex ia“, „Ex d“ and „Zone 2“ to NEPSI (China) (only for transmitter 7MF4...-.....-R..)		E58 ⁴⁾	✓	✓	✓
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea) (only for transmitter 7MF4...-.....-[B, D]..-Z + E11)		E70 ⁴⁾	✓	✓	✓
Ex-protection Ex ia according to EAC Ex (Russia)		E80	✓	✓	✓
Ex-protection Ex d according to EAC Ex (Russia)		E81	✓	✓	✓
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)		E82	✓	✓	✓
Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)		E83	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)		G10	✓	✓	✓
Replacement of process connection side		H01	✓	✓	✓

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for level

1

Selection and Ordering data	Order code			
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code.				
Transient protector 6 kV (lightning protection)	J01	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on right when viewing the display)⁵⁾	J08	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on left when viewing the display)⁵⁾	J09	✓	✓	✓

1) Han device plug IP65

2) Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H

3) Option does not contain gas explosion protection; only dust explosion protection: Use in or at Zone 1D/2D.

4) When the additional ex option is selected, the ATEX marking on the device is omitted. Only the Ex option selected via the Z option is marked.

5) Blanking plug is standard configuration. Order option A40 if a vent valve is required instead of a blanking plug.

Selection and Ordering data	Order code			
Additional data		HART	PA	FF
Please add "-Z" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	Y01	✓	✓ ¹⁾	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	Y15	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	Y16	✓	✓	✓
Entry of HART address (TAG) Max. 8 characters, specify in plain text: Y17:	Y17	✓		
Setting of pressure indicator in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H ₂ O ^{*)} , inH ₂ O ^{*)} , ftH ₂ O ^{*)} , mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM or % *) ref. temperature 20 °C	Y21	✓	✓	✓
Setting of pressure indicator in non-pressure units²⁾ Specify in plain text: Y22: up to l/min, m ³ /h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y22³⁾ + Y01	✓		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	Y25		✓	✓
Damping adjustment in seconds (0 ... 100 s)	Y30	✓	✓	✓

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset

✓ = available

1) Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

2) Preset values can only be changed over SIMATIC PDM.

3) Not in conjunction with over-filling safety device for flammable and non-flammable liquids (Order code "E08")

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for level

1

Selection and Ordering data		Article No.	Order code
Mounting flange		7MF4912	
Directly mounted on the SITRANS P pressure transmitter (converter part) for level, for DS III series		3	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Connection to EN 1092-1			
Nominal diameter	Nominal pressure		
DN 25	PN 10/16/25/40	Z	J 0 A
	PN 63/100/160	Z	J 0 B
DN 40	PN 10/16/25/40	Z	J 0 C
	PN 63/100	Z	J 0 D
	PN 160	Z	J 0 E
DN 50	PN 10/16/25/40	A	
	PN 100	B	
DN 80	PN 10/16/25/40	D	
DN 100	PN 10/16	G	
	PN 25/40	H	
Connection to ASME B16.5			
Nominal diameter	Nominal pressure		
1 inch	class 150	Z	J 6 A
	class 300	Z	J 6 B
	class 400/600	Z	J 6 C
	class 900/1500	Z	J 6 D
1½ inch	class 150	Z	J 6 E
	class 300	Z	J 6 F
	class 400/600	Z	J 6 G
	class 900/1500	Z	J 6 H
2 inch	class 150	L	
	class 300	M	
	class 400/600	N	
	class 900/1500	P	
3 inch	class 150	Q	
	class 300	R	
4 inch	class 150	T	
	class 300	U	
Flange acc. to JIS			
Nominal diameter	Nominal pressure		
JIS DN 50	10 K 316L	Z	J 7 A
	20 K 316L	Z	J 7 B
JIS DN 80	10 K 316L	Z	J 7 C
	20 K 316L	Z	J 7 D
Other version, add Order code and plain text: Nominal diameter: ...; Nominal press.: ...		Z	J 1 Y
Wetted parts materials			
<ul style="list-style-type: none"> Stainless steel 316L <ul style="list-style-type: none"> Coated with PFA Coated with PTFE Coated with ECTFE¹⁾ Monel 400, mat. no. 2.4360 Hastelloy C276, mat. no. 2.4819 Hastelloy C4, mat. no. 2.4602 Hastelloy C22, mat. no. 2.4602 Tantalum Titanium, mat. no. 3.7035 (max. 150 °C (302 °F)) Nickel 201 (max. 260 °C (500 °F)) Duplex 2205, mat. no. 1.4462 Duplex 2205, mat. no. 1.4462, incl. main body Stainless steel 316L, gold plated, thickness approx. 25 µm 		A	
		D	
		E	0
		F	
		G	
		J	
		U	
		V	0
		K	
		L	0
		M	0
		Q	
		R	
		S	0
Tube length			
<ul style="list-style-type: none"> without tube 		0	
Other version: add Order code and plain text: material of parts in contact with medium:, tubus length:		Z 8	K 1 Y

Selection and Ordering data		Article No.	Order code
Mounting flange		7MF4912	
Directly mounted on the SITRANS P pressure transmitter (converter part) for level, for DS III series		3	
Customer-specific tubus length			
Specify customer-specific length with Y44, see Order Code			
<ul style="list-style-type: none"> Wetted parts materials: Stainless steel without foil 			
Range	Standard length		
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	A 1	
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	A 2	
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	A 3	
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	A 4	
201 ... 250 mm (7.91 ... 9.84")	250 mm (9.84")	A 5	
<ul style="list-style-type: none"> Wetted parts materials: Stainless steel coated with ECTFE 			
Range	Standard length		
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	F 1	
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	F 2	
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	F 3	
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	F 4	
201 ... 250 mm (7.91 ... 9.84")	250 mm (9.84")	F 5	
<ul style="list-style-type: none"> Wetted parts materials: Stainless steel coated with PFA 			
Range	Standard length		
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	D 1	
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	D 2	
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	D 3	
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	D 4	
201 ... 250 mm (7.91 ... 9.84")	250 mm (9.84")	D 5	
<ul style="list-style-type: none"> Wetted parts materials: Monel 400 			
Range	Standard length		
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	G 1	
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	G 2	
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	G 3	
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	G 4	
<ul style="list-style-type: none"> Wetted parts materials: Hastelloy C276 			
Range	Standard length		
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	J 1	
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	J 2	
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	J 3	
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	J 4	
<ul style="list-style-type: none"> Wetted parts materials: Tantalum 			
Range	Standard length		
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	K 1	
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	K 2	
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	K 3	
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	K 4	
Filling liquid			
<ul style="list-style-type: none"> Silicone oil M5 Silicone oil M50 High-temperature oil Halocarbon oil (for O₂-measurement)²⁾ Food oil (FDA-listed) 		1	
		2	
		3	
		4	
		7	
Other version, add Order code and plain text: filling liquid: ...		9	M 1 Y

1) For vacuum on request

2) Oil and grease-free cleaning according to DIN 25410, level 2, and packaging included in scope of delivery. Refer to "Further designs" C10 and E10.

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

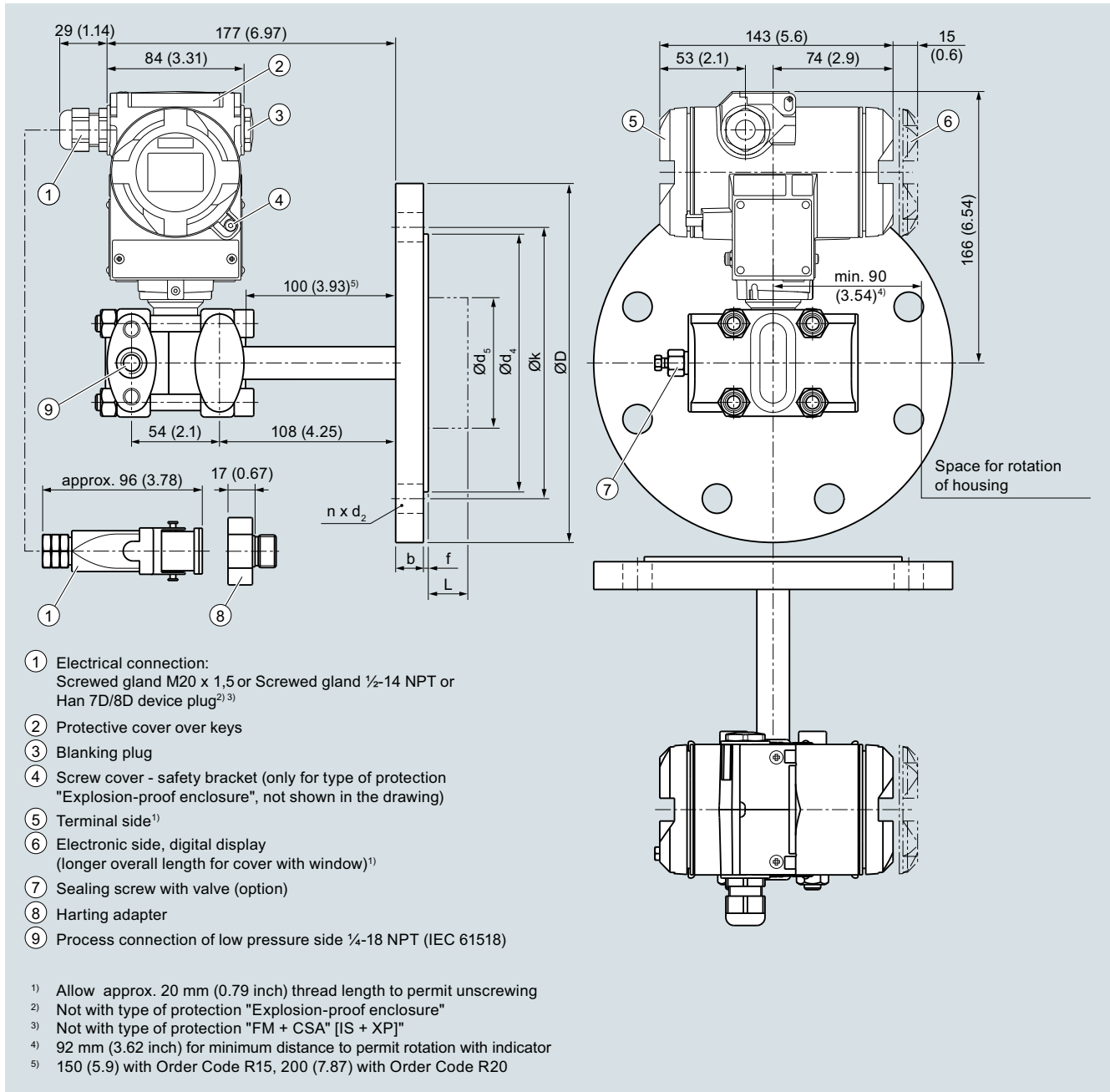
for level

1

Selection and Ordering data	Order code			
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code.				
Customer-specific tubus length Select range, enter desired length in plain text (No entry = standard length)	Y44	✓	✓	✓
Spark arrester For mounting on zone 0 (incl. documentation)	A01	✓	✓	✓
Remote seal nameplate attached out of stainless steel, contains Article No. and order number of the remote seal supplier	B20	✓	✓	✓
Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill fluid, certified by certificate acc. to EN 10204-2.2	C10	✓	✓	✓
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2	C11	✓	✓	✓
Inspection certificate Acc. to EN 10204-3.1	C12	✓	✓	✓
2.2 Certificate of FDA approval of fill oil Only in conjunction with filling liquid "Food oil" (FDA listed)"	C17	✓	✓	✓
"Functional safety (SIL2)" certificate to IEC 61508 (only for conjunction with the Order code "C20" in the case of SITRANS P DS III transmitter)	C20	✓	✓	
"Functional safety (SIL2/3)" certificate to IEC 61508 (only for conjunction with the Order code "C23" in the case of SITRANS P DS III transmitter)	C23	✓	✓	
Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 acc. to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	D07	✓	✓	✓
Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 acc. to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	D08	✓	✓	✓
Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, <u>only for oxygen application</u> , only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2	E10	✓	✓	✓
Epoxy painting Not possible with negative pressure service Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40.. and 7MF42..., only possible with process connection G½B according to EN 837-1.	E15	✓	✓	✓

Selection and Ordering data	Order code			
Further designs		HART	PA	FF
Add "-Z" to Article No. and specify Order code.				
One sided-mounting, sealing surface below	H20			
Sealing surface smooth, form B2 or RFSF (Stainless steel diaphragm) previously DIN 2501, form E	J11	✓	✓	✓
Sealing surface groove, EN 1092-1, form D instead of sealing surface B1 (only for wetted parts made of stainless steel 316L)	J14	✓	✓	✓
Sealing surface with spring according to EN 1092-1, form F, (previously DIN 2512, form F) in stainless steel 316L				
DN 25	J30	✓	✓	✓
DN 40	J31	✓	✓	✓
DN 50	J32	✓	✓	✓
DN 80	J33	✓	✓	✓
DN 100	J34	✓	✓	✓
DN 125	J35	✓	✓	✓
Sealing surface with male face according to EN 1092-1, form E (previously DIN 2512, form V13) in stainless steel 316L				
DN 25	J40	✓	✓	✓
DN 40	J41	✓	✓	✓
DN 50	J42	✓	✓	✓
DN 80	J43	✓	✓	✓
DN 100	J44	✓	✓	✓
DN 125	J45	✓	✓	✓
Sealing surface with female face according to EN 1092-1, form F (previously DIN 2512, form R13) in stainless steel 316L				
DN 25	J50	✓	✓	✓
DN 40	J51	✓	✓	✓
DN 50	J52	✓	✓	✓
DN 80	J53	✓	✓	✓
DN 100	J54	✓	✓	✓
DN 125	J55	✓	✓	✓
Sealing surface B1 or ASME B16.5 RF 125 ... 250 AA instead of sealing surface B2 or RFSF (only for wetted parts made of Hastelloy C276 (2.4819), tantalum and Duplex 2205 (1.4462) and for nominal sizes 2", 3", DN 50 and DN 80)	J12	✓	✓	✓
Sealing surface RJF (groove, previously RTJ) ASME B16.5 instead of sealing surface ASME B16.5 RF 125 ... 250 AA (only for wetted parts made of stainless steel 316L)	J24	✓	✓	✓
Elongated pipe, 150 mm instead of 100 mm, max. medium temperature 250 °C, observe the maximum permissible media temperature of the filling liquid.	R15	✓	✓	✓
Elongated pipe, 200 mm instead of 100 mm, max. medium temperature 300 °C, observe the maximum permissible media temperature of the filling liquid.	R20	✓	✓	✓
Negative pressure service for use in the low-pressure measuring range for transmitter for level Note: suffix "Y01" required with pressure transmitter	V04	✓	✓	✓
Extended negative pressure service for use in the low-pressure measuring range for transmitter for level Note: suffix "Y01" required with pressure transmitter ✓ = available	V54	✓	✓	✓

Dimensional drawings



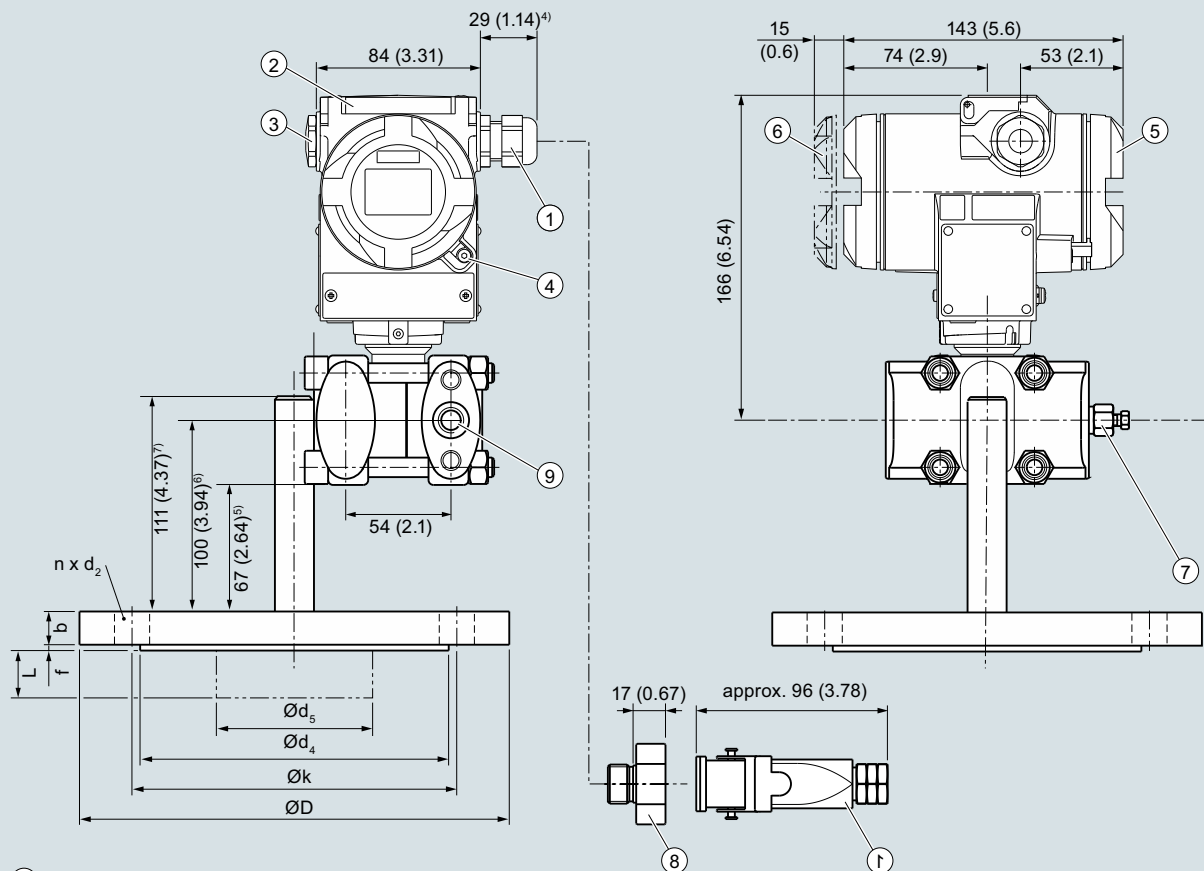
SITRANS P DS III with HART pressure transmitters for level, including mounting flange, dimensions in mm (inch)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for level



- ① Electrical connection:
Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or
Han 7D/8D device plug^{2) 3)}
- ② Protective cover over keys
- ③ Blanking plug
- ④ Screw cover - safety bracket (only for type of protection
"Explosion-proof enclosure", not shown in the drawing)
- ⑤ Terminal side¹⁾
- ⑥ Electronic side, digital display
(longer overall length for cover with window)¹⁾
- ⑦ Sealing screw with valve (option)
- ⑧ Harting adapter
- ⑨ Process connection of low pressure side ¼-18 NPT (IEC 61518)

¹⁾ Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing

²⁾ Not with type of protection "Explosion-proof enclosure"

³⁾ Not with type of protection "FM + CSA" [IS + XP]"

⁴⁾ For Pg 13,5 with adapter approx. 45 mm (1.77 inch)

⁵⁾ 117 (4.61) with Order Code R15, 167 (6.57) with Order Code R20

⁶⁾ 150 (5.19) with Order Code R15, 200 (7.87) with Order Code R20

⁷⁾ 161 (6.34) with Order Code R15, 211 (8.31) with Order Code R20

SITRANS P DS III with HART pressure transmitters for level, including mounting flange, one sided-mounting, sealing surface below (order code H20), dimensions in mm (inch)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

for level

1

Connection to EN 1092-1

Nominal diameter	Nominal pressure	b	D	d	d ₂	d ₄	d ₅	d _M	f	k	n	L
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
DN 50	PN 10/16/25/40	20	165	90	18	102	48.3	45 ¹⁾	2	125	4	0, 50, 100, 150 or 200
	PN 100	28	195	90	26	102	48.3	45 ¹⁾	2	145	8	
DN 80	PN 10/16/25/40	24	200	90	18	138	76	72 ²⁾	2	160	8	
	PN 100	32	230	90	26	138	76	72 ²⁾	2	180	8	
DN 100	PN 10/16	20	220	115	18	158	94	89	2	180	8	
	PN 25/40	24	235	115	22	162	94	89	2	190	8	

Connection to ASME B16.5

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M	f	k	n	L
	lb./sq.in	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)
2 inch	150	0.77 (19.5)	5.91 (150)	0.79 (20)	3.62 (92)	1.9 (48.3)	1.77 ¹⁾ (45)	0.08 (2)	4.74 (120.5)	4	0, 2, 3.94, 5.94 or 7.87 (0, 50, 100, 150 or 200)
	300	0.89 (22.7)	6.5 (165)	0.79 (20)	3.62 (92)	1.9 (48.3)	1.77 ¹⁾ (45)	0.08 (2)	5 (127)	8	
	400/600	1.28 (32.4)	6.5 (165)	0.79 (20)	3.62 (92)	1.9 (48.3)	1.77 ¹⁾ (45)	0.28 (7)	5 (127)	8	
	900/1500	1.78 (45.1)	8.46 (215)	1.02 (26)	5 (127)	1.9 (48.3)	1.77 ¹⁾ (45)	0.28 (7)	6.5 (165)	8	
3 inch	150	0.96 (24.3)	7.48 (190)	0.79 (20)	5 (127)	3 (76)	2.83 ²⁾ (72)	0.08 (2)	6 (152.5)	4	
	300	1.14 (29)	8.27 (210)	0.87 (22)	5 (127)	3 (76)	2.83 ²⁾ (72)	0.08 (2)	6.63 (168.5)	8	
	600	1.53 (38.8)	8.27 (210)	0.87 (22)	5 (127)	3 (76)	2.83 ²⁾ (72)	0.28 (7)	6.63 (168.5)	8	
4 inch	150	0.96 (24.3)	9.06 (230)	0.79 (20)	6.22 (158)	3.69 (94)	3.5 (89)	0.08 (2)	7.5 (190.5)	8	
	300	1.27 (32.2)	10.04 (255)	0.87 (22)	6.22 (158)	3.69 (94)	3.5 (89)	0.08 (2)	7.87 (200)	8	
	400	1.65 (42)	10.04 (255)	1.02 (26)	6.22 (158)	3.69 (94)	3.5 (89)	0.28 (7)	7.87 (200)	8	

d: Internal diameter of gasket to DIN 2690

d_M: Effective diaphragm diameter¹⁾ 59 mm = 2.32 inch with tube length L=0.²⁾ 89 mm = 3½ inch with tube length L=0.

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

Accessories/Spare Parts

1

Selection and Ordering data		Article No.
Replacement measuring cell for pressure for SITRANS P DS III		7MF4990 - ■ ■ ■ ■ 0 - 0 DB 0
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Measuring cell cleaning	
Silicone oil	Normal	1
Inert liquid	grease-free to cleanliness level 2	3
Measured span (min. ... max.)		
8.3 ... 250 mbar	(0.12 ... 3.6 psi)	A
0.01 ... 1 bar	(0.15 ... 14.5 psi)	B
0.04 ... 4 bar	(0.6 ... 58 psi)	C
0.16 ... 16 bar	(2.32 ... 232 psi)	D
0.63 ... 63 bar	(9.14 ... 914 psi)	E
1.6 ... 160 bar	(23.2 ... 2 320 psi)	F
4.0 ... 400 bar	(58.0 ... 5 802 psi)	G
7.0 ... 700 bar	(102.0 ... 10 153 psi)	J
Wetted parts materials		
Seal diaphragm	Process connection	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Hastelloy	Hastelloy	C
Process connection		
• Connection shank G½B to EN 837-1		0
• Female thread ½-14 NPT		1
• Oval flange made of stainless steel, max. span 160 bar (2320 psi)		
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		2
- Mounting thread M10 to DIN 19213		3
Further designs		Order code
Please add "-Z" to Article No. and specify Order code.		
Inspection certificate		C12
to EN 10204-3.1		

Selection and Ordering data		Article No.
Replacement measuring cell for absolute pressure for SITRANS P DS III (from the pressure series)		7MF4992 - ■ ■ ■ ■ 0 - 0 DB 0
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Measuring cell cleaning	
Silicone oil	Normal	1
Inert liquid	grease-free to cleanliness level 2	3
Measured span (min. ... max.)		
8.3 ... 250 mbar a	(0.12 ... 3.63 psi a)	D
43 ... 1300 mbar a	(0.62 ... 18.86 psi a)	F
0.16 ... 5 bar a	(2.32 ... 72.5 psi a)	G
1 ... 30 bar a	(14.5 ... 435 psi a)	H
Wetted parts materials		
Seal diaphragm	Process connection	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Hastelloy	Hastelloy	C
Process connection		
• Connection shank G½B to EN 837-1		0
• Female thread ½-14 NPT		1
• Oval flange made of stainless steel, max. span 160 bar (2320 psi)		
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		2
- Mounting thread M10 to DIN 19213		3
Further designs		Order code
Please add "-Z" to Article No. and specify Order code.		
Inspection certificate		C12
to EN 10204-3.1		

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

Accessories/Spare Parts

1

Selection and Ordering data	Article No.
Replacement measuring cell for absolute pressure (from the differential pressure series) for SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus series	7MF4993 - - 0 DC 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Measuring cell filling Measuring cell cleaning	
Silicone oil Normal	1
Inert liquid grease-free to cleanliness level 2	3
Measured span (min. ... max.)	
8.3 ... 250 mbar a (0.12 ... 3.63 psi a)	D
43 ... 1300 mbar a (0.62 ... 18.86 psi a)	F
0.16 ... 5 bar a (2.32 ... 72.5 psi a)	G
1 ... 30 bar a (14.5 ... 435 psi a)	H
5.3 ... 100 bar a (76.9 ... 1450 psi a)	KE
Wetted parts materials	
Seal diaphragm Parts of measuring cell	
Stainless steel Stainless steel	A
Hastelloy Stainless steel	B
Hastelloy Hastelloy	C
Tantalum Tantalum	E
Monel Monel	H
Gold Gold	L
Process connection	
Female thread 1/4-18 NPT with flange connection	
• Sealing screw opposite process connection	
- Mounting thread M10 to DIN 19213	0
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518	2
• Vent on side of process flange ¹⁾	
- Mounting thread M10 to DIN 19213	4
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518	6
Non-wetted parts materials	
• Stainless steel process flange screws	2
Further designs	Order code
Please add "-Z" to Article No. and specify Order code.	
O-rings for process flanges (instead of FPM (Viton))	
• PTFE (Teflon)	A20
• FEP (with silicone core, approved for food)	A21
• FFPM (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F)	A22
• NBR (Buna N)	A23
Inspection certificate to EN 10204-3.1	C12
Process connection G1/2B	D16
Remote seal flanges (not together with K01, K02 and K04)	D20
Vent on side for gas measurements	H02
Process flanges	
• without	K00
• with process flange made of	
- Hastelloy	K01
- Monel	K02
- Stainless steel with PVDF insert max. PN 10 (MAWP 145 psi) max. temperature of medium 90 °C (194 °F) For 1/2-14 NPT inner process connection on the side in the middle of the process flange, vent valve not possible	K04

¹⁾ Not for span 5.3 ... 100 bar (76.9 ... 1450 psi)

Selection and Ordering data	Article No.
Replacement measuring cell for differential pressure and PN 32/160 (MAWP 464/2320 psi) for SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus series	7MF4994 - - 0 DC 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Measuring cell filling Measuring cell cleaning	
Silicone oil Normal	1
Inert liquid grease-free to cleanliness level 2	3
Measured span (min. ... max.)	
PN 32 (MAWP 464 psi)	
1 ... 20 mbar ¹⁾ (0.4 ... 8 inH ₂ O)	B
PN 160 (MAWP 2320 psi)	
1 ... 60 mbar (0.4 ... 24 inH ₂ O)	C
2.5 ... 250 mbar (1 ... 100 inH ₂ O)	D
6 ... 600 mbar (2.4 ... 240 inH ₂ O)	E
16 ... 1600 mbar (6.4 ... 642 inH ₂ O)	F
50 ... 5000 mbar (20 ... 2000 inH ₂ O)	G
0.3 ... 30 bar (4.35 ... 435 psi)	H
Wetted parts materials (stainless steel process flanges)	
Seal diaphragm Parts of measuring cell	
Stainless steel Stainless steel	A
Hastelloy Stainless steel	B
Hastelloy Hastelloy	C
Tantalum ²⁾ Tantalum	E
Monel ²⁾ Monel	H
Gold ²⁾ Gold	L
Process connection	
Female thread 1/4-18 NPT with flange connection	
• Sealing screw opposite process connection	
- Mounting thread M10 to DIN 19213	0
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518	2
• Vent on side of process flange	
- Mounting thread M10 to DIN 19213	4
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518	6
Non-wetted parts materials	
Stainless steel process flange screws	2
Further designs	Order code
Please add "-Z" to Article No. and specify Order code.	
O-rings for process flanges (instead of FPM (Viton))	
• PTFE (Teflon)	A20
• FEP (with silicone core, approved for food)	A21
• FFPM (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F)	A22
• NBR (Buna N)	A23
Inspection certificate to EN 10204-3.1	C12
Remote seal flanges (not together with K01, K02 and K04)	D20
Vent on side for gas measurements	H02
Stainless steel process flanges for vertical differential pressure lines (not together with K01, K02 and K04)	H03
Process flanges	
• without	K00
• with process flange made of	
- Hastelloy	K01
- Monel	K02
- Stainless steel with PVDF insert, max. PN 10 (MAWP 145 psi), max. temperature of medium 90 °C (194 °F). For 1/2-14 NPT inner process connection on the side in the middle of the process flange, vent valve not possible	K04

¹⁾ Not suitable for connection of remote seal


²⁾ Only together with max. spans 250, 1600, 5000 and 30000 mbar (100 inH₂O, 642 inH₂O, 2000 inH₂O and 435 psi).

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P DS III

Accessories/Spare Parts

1

Selection and Ordering data		Article No.
Replacement measuring cell for differential pressure and PN 420 (MAWP 6092 psi) for SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus series		7MF4995 -  - 0 DC 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Measuring cell cleaning	
Silicone oil	Normal	1
Measured span (min. ... max.)		
2.5 ... 250 mbar	(1 ... 100 inH ₂ O)	D
6 ... 600 mbar	(2.4 ... 240 inH ₂ O)	E
16 ... 1600 mbar	(6.4 ... 642 inH ₂ O)	F
50 ... 5000 mbar	(20 ... 2000 inH ₂ O)	G
0.3 ... 30 bar	(4.35 ... 435 psi)	H
Wetted parts materials		
(stainless steel process flanges)		
Seal diaphragm	Parts of measuring cell	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Gold ¹⁾	Gold	L
Process connection		
Female thread 1/4-18 NPT with flange connection		
• Sealing screw opposite process connection		
- Mounting thread M12 to DIN 19213		1
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		3
• Vent on side of process flange		
- Mounting thread M12 to DIN 19213		5
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		7
Non-wetted parts materials		
• Stainless steel process flange screws		2
Further designs		Order code
Please add "-Z" to Article No. and specify Order code.		
O-rings for process flanges		
(instead of FPM (Viton))		
• PTFE (Teflon)		A20
• FEP (with silicone core, approved for food)		A21
• FFPM (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F)		A22
• NBR (Buna N)		A23
Inspection certificate		C12
to EN 10204-3.1		
Stainless steel process flanges for vertical differential pressure lines		H03
without process flanges		K00

¹⁾ Not together with max. span 600 mbar (240 inH₂O)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

Accessories/Spare Parts

1

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
Spare parts/Accessories		Digital indicator Including mounting material for SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus	7MF4997-1BR
Mounting bracket and fastening parts for pressure transmitters SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus (7MF403-.....-..C.) For absolute pressure transmitters SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus (7MF423-.....-..C.) • made of steel • made of stainless steel 304/1.4301 • made of stainless steel 316L/1.4404	7MF4997-1AB 7MF4997-1AH 7MF4997-1AP	Measuring point label • without inscription (5 units) • Printed (1 unit) Data according to Y01 or Y02, Y15, Y16 and Y99 (see "Pressure transmitters")	7MF4997-1CA 7MF4997-1CB-Z Y...:
Mounting bracket and fastening parts for pressure transmitters SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus (7MF403-.....-..A., -..B., -..D. and -..F.) For absolute pressure transmitters SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus (7MF423-.....-..A., -..B., -..D. and -..F.) • made of steel • made of stainless steel 304/1.4301 • made of stainless steel 316L/1.4404	7MF4997-1AC 7MF4997-1AJ 7MF4997-1AQ	Mounting screws For measuring point label, grounding and connection terminals or for display (50 units)	7MF4997-1CD
Mounting and fastening brackets For differential pressure transmitters with flange thread M10 SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus (7MF433-.... and 7MF443-....) • made of steel • made of stainless steel 304/1.4301 • made of stainless steel 316L/1.4404	7MF4997-1AD 7MF4997-1AK 7MF4997-1AR	Sealing screws (1 set = 2 units) for process flange • made of stainless steel • made of Hastelloy	7MF4997-1CG 7MF4997-1CH
Mounting and fastening brackets For differential pressure transmitters with flange thread M12 SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus (7MF453-....) • made of steel • made of stainless steel 304/1.4301 • made of stainless steel 316L/1.4404	7MF4997-1AE 7MF4997-1AL 7MF4997-1AS	Sealing screws with vent valve Complete (1 set = 2 units) • made of stainless steel • made of Hastelloy	7MF4997-1CP 7MF4997-1CQ
Mounting and fastening brackets For differential and absolute pressure transmitters with flange thread 7/16 -20 UNF SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus (7MF433-...., 7MF443-.... and 7MF453-....) • made of steel • made of stainless steel 304/1.4301 • made of stainless steel 316L/1.4404	7MF4997-1AF 7MF4997-1AM 7MF4997-1AT	Application electronics • for SITRANS P DS III with HART • for SITRANS P DS III with PROFIBUS PA • for SITRANS P DS III with FOUNDATION Fieldbus	7MF4997-1DK 7MF4997-1DL 7MF4997-1DM
Cover Made of die-cast aluminum, including gasket, for SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus. Compatible for Ex and non-Ex transmitters • without window • with window	7MF4997-1BB 7MF4997-1BE	Connection board • for SITRANS P DS III • for SITRANS P DS III PROFIBUS PA and FOUNDATION Fieldbus	7MF4997-1DN 7MF4997-1DP
Cover Made of stainless steel, including gasket, for SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus. Compatible for Ex and non-Ex transmitters • without window • with window	7MF4997-1BC 7MF4997-1BF	O-rings for process flanges made of: • FPM (Viton) • PTFE (Teflon) • FEP (with silicone core, approved for food) • FFPM (Kalrez, compound 4079) • NBR (Buna N)	7MF4997-2DA 7MF4997-2DB 7MF4997-2DC 7MF4997-2DD 7MF4997-2DE
		Sealing ring for process connection	see "Fittings"
		Weldable sockets for PMC connection • PMC Style Standard: Thread 1½" • PMC Style Minibolt: front-flush 1"	7MF4997-2HA 7MF4997-2HB
		Gaskets for PMC connection (packing unit = 5 units) • PTFE seal for PMC Style Standard: Thread 1½" • Gasket made of Viton for PMC Style Minibolt: front-flush 1"	7MF4997-2HC 7MF4997-2HD
		Weldable socket for TG52/50 and TG52/150 connection • TG52/50 connection • TG52/150 connection	7MF4997-2HE 7MF4997-2HF
		Seals for TG 52/50 and TG 52/150 made of silicone (FDA compliant)	7MF4997-2HG
		Seals for flange connection with front-flush diaphragm Material FKM (Viton); temperature range: -20 ... +200 °C (-4 ... +392 °F), 10 units • DN 25, PN 40 (M11) • 1", class 150 (M40)	7MF4997-2HH 7MF4997-2HK

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

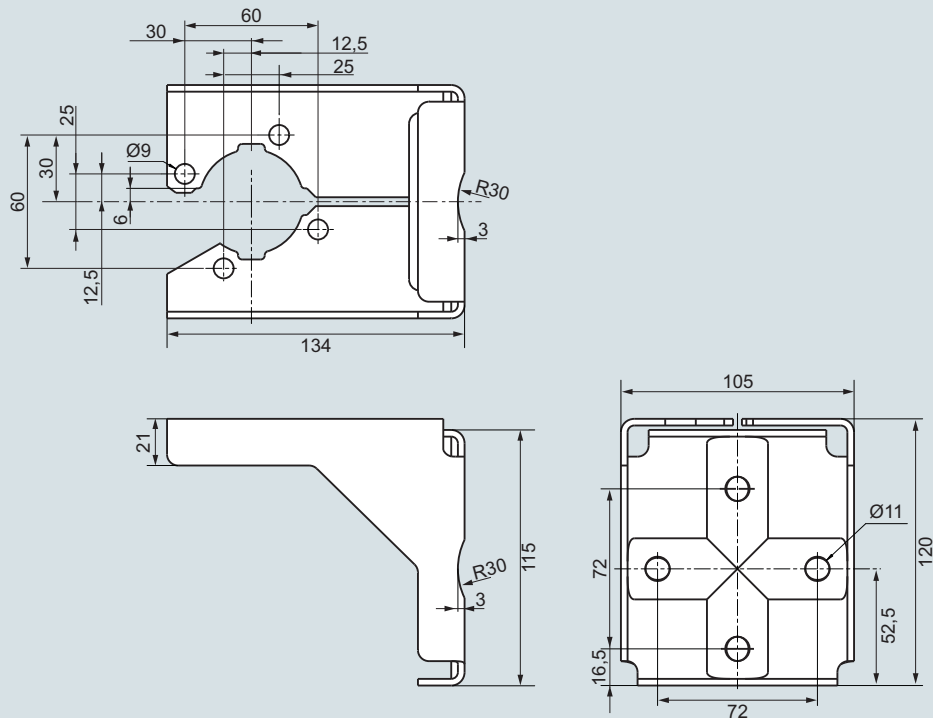
SITRANS P DS III

Accessories/Spare Parts

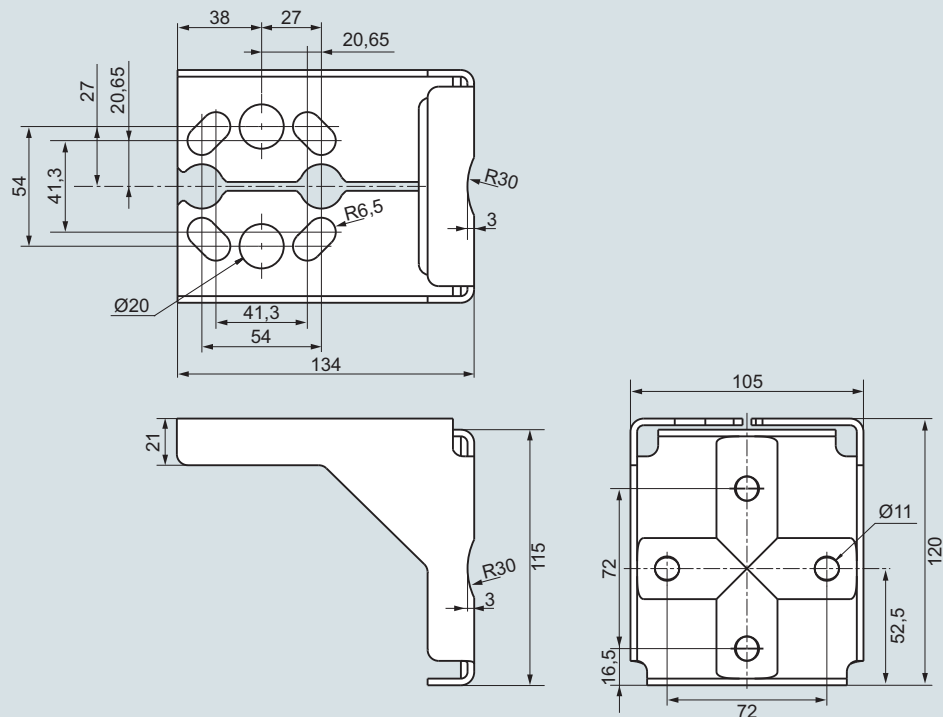
Selection and Ordering data	Article No.
Documentation The entire documentation is available for download free-of-charge in various languages at: http://www.siemens.com/processinstrumentation/documentation Compact operating instructions SITRANS P DS III/P410 • English, German, Spanish, French, Italian, Dutch	A5E03434626
Certificates (order only via SAP) instead of Internet download • hard copy (to order) • on DVD (to order)	
HART modem with USB interface	

Power supply units see Chap. 7 "Supplementary Components".

Dimensional drawings



Mounting bracket for SITRANS P DS III, SITRANS P410 and SITRANS P280 gauge and absolute pressure-transmitters, dimensions in mm
mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)



Mounting bracket for SITRANS P DS III and SITRANS P410 differential pressure transmitter, dimensions in mm
mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

1

Factory-mounting of valve manifolds on transmitters

Overview

SITRANS P transmitters

- DS III for relative and absolute pressure (both designs) and
- DS III for differential pressure

can be delivered factory-fitted with the following valve manifolds:

- 7MF9011-4EA and 7MF9011-4FA valve manifolds for gauge pressure and absolute pressure transmitters
- 7MF9411-5BA and 7MF9411-5CA valve manifolds for absolute pressure and differential pressure transmitters

Design

The 7MF9011-4EA valve manifolds are sealed with gaskets made of PTFE between transmitter and the valve manifold as standard. Soft iron, stainless steel and copper gaskets are also available for sealing purposes if preferred.

The 7MF9011-4FA valve manifolds are sealed with PTFE sealing tape between the transmitter and the valve manifold.

The 7MF9411-5BA and 7MF9411-5CA valve manifolds are sealed with PTFE sealing rings between the transmitter and the valve manifold.

Once installed, the complete unit is checked under pressure for leaks (compressed air 6 bar (87 psi)) and is certified leak-proof with a test report to EN 10204 - 2.2.

All valve manifolds should preferably be secured with the respective mounting brackets. The transmitters are mounted on the valve manifold and not on the unit itself.

If you order a mounting bracket when choosing the option "Factory mounting of valve manifolds", you will receive a mounting bracket for the valve manifold instead of a bracket for mounting the transmitter.

If you order an acceptance test certificate 3.1 to EN 10204 when choosing the option "Factory mounting of valve manifolds", a separate certificate is provided for the transmitters and the valve manifolds respectively.

Selection and Ordering data

7MF9411-5AA valve manifold for relative and absolute pressure transmitters



Add „Z" to the Article No. of the transmitter and add order codes.

SITRANS P DSIII
7MF403-...2-..., 7MF423-...2-... ,
7MF403-...3-..., 7MF423-...3-... ,
7MF403-...4-..., 7MF423-...4-...

With process connection oval flange with PTFE gasket and **steel** mounting screws.

Delivery including high-pressure test certified by factory certificate according to EN 10204-2.2

Additional versions:

Delivery includes mounting brackets and mounting clips made of stainless steel (instead of the mounting bracket supplied with the transmitter)

Supplied acceptance test certificate to EN 10204- 3.1 for transmitters and mounted valve manifold

With manufacturer declaration according to NACE, MR-0175

Order code

T05

A02

C12

D07

7MF9411-5AA valve manifold for relative and absolute pressure transmitters



Add „Z" to the Article No. of the transmitter and add order codes.

SITRANS P DSIII
7MF403-...2-..., 7MF423-...2-... ,
7MF403-...3-..., 7MF423-...3-... ,
7MF403-...4-..., 7MF423-...4-...

With process connection oval flange with PTFE gasket and **stainless steel** mounting screws.

Delivery including high-pressure test certified by factory certificate according to EN 10204-2.2

Additional versions:

Delivery includes mounting brackets and mounting clips made of stainless steel (instead of the mounting bracket supplied with the transmitter)

Supplied acceptance test certificate to EN 10204- 3.1 for transmitters and mounted valve manifold

With manufacturer declaration according to NACE, MR-0175

Order code

T06

A02

C12

D07

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

Factory-mounting of valve manifolds on transmitters

1

7MF9011-4FA valve manifold on relative and absolute pressure transmitters



Add **-Z** to the Article No. of the transmitter and add Order codes

SITRANS P DSIII
7MF403-...1-..., 7MF423-...1-...
With process connection
female thread 1/2-14 NPT
in-sealed with PTFE sealing tape
Delivery incl. high-pressure test certified
by test report to EN 10204-2.2

Order
code**T03**

Further designs:

Delivery includes mounting brackets and
mounting clips made of stainless steel
(instead of the mounting bracket supplied
with the transmitter)

A02

Supplied acceptance test certificate to
EN 10204- 3.1 for transmitters and
mounted valve manifold

C12

With manufacturer declaration according
to NACE, MR-0175

D07

7MF9011-4EA valve manifold on relative and absolute pressure transmitters



Add **-Z** to the Article No. of the transmitter and add Order codes

SITRANS P DSIII
7MF403-...0-..., 7MF423-...0-...
with process connection
collar G1/2 A to EN 837-1
with gasket made of PTFE between valve
manifold and transmitter

Order
code**T02**

Alternative sealing material:

- Soft iron
- Stainless steel, Mat. No. 14571
- copper

A70**A71****A72**

Delivery incl. high-pressure test certified
by test report to EN 10204-2.2

Further designs:

Delivery includes mounting brackets and
mounting clips made of stainless steel
(instead of the mounting bracket supplied
with the transmitter)

A02

Supplied acceptance test certificate to
EN 10204- 3.1 for transmitters and
mounted valve manifold

C12

With manufacturer declaration according
to NACE, MR-0175

D07

7MF9411-5BA valve manifold on absolute and differential pressure transmitters



Add **-Z** to the Article No. of the transmitter and add Order codes

SITRANS P DSIII
7MF433-..., 7MF443-... and
7MF453-...¹⁾
mounted with gaskets made of PTFE and
screws made of
• chromized steel
• made of stainless steel
Delivery incl. high-pressure test certified
by test report to EN 10204-2.2

Order
code**U01****U02**

Further designs:

Delivery includes mounting bracket and
mounting clips made of
• Steel
• Stainless steel
(instead of the mounting bracket supplied
with the transmitter)

A01**A02**

Supplied acceptance test certificate to
EN 10204-3.1 for transmitters and
mounted valve manifold

C12

With manufacturer declaration according
to NACE, MR-0175

D07

7MF9411-5CA valve manifold on differential pressure transmitters



Add **-Z** to the Article No. of the transmitter and add Order codes

SITRANS P DSIII
7MF443-... and 7MF453-...¹⁾
mounted with gaskets made of PTFE and
screws made of
• chromized steel
• Stainless steel
Delivery incl. high-pressure test certified
by test report to EN 10204-2.2

Order
code**U03****U04**

Further designs:

Delivery includes mounting bracket and
mounting clips made of
• Steel
• Stainless steel
(instead of the mounting bracket supplied
with the transmitter)

A01**A02**

Supplied acceptance test certificate to
EN 10204-3.1 for transmitters and
mounted valve manifold

C12

With manufacturer declaration according
to NACE, MR-0175

D07

¹⁾ For 7MF453-... transmitters, you require a 7/10-20 UNF connection thread in the process flange

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P DS III

1

Factory-mounting of valve manifolds on transmitters

Dimensional drawings

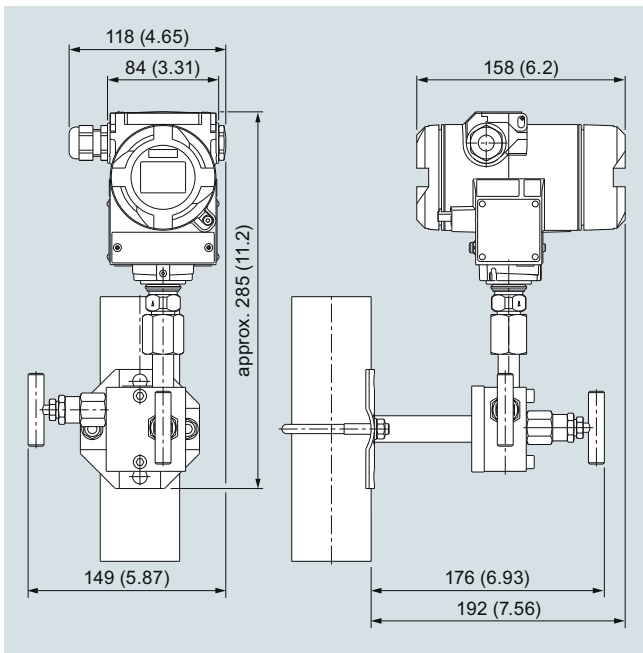
Valve manifolds mounted on SITRANS P DS III



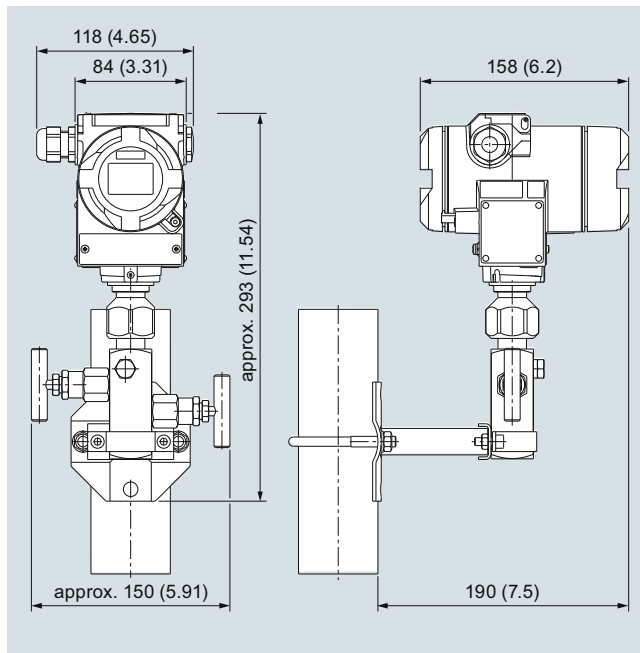
7MF9011-4EA valve manifold with mounted gauge pressure and absolute pressure transmitters



7MF9011-4FA valve manifold with mounted gauge pressure and absolute pressure transmitters



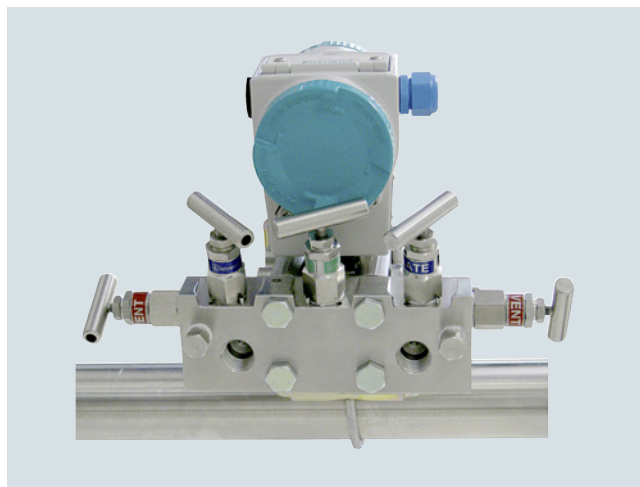
7MF9011-4EA valve manifold with mounted gauge pressure and absolute pressure transmitters, dimensions in mm (inch)



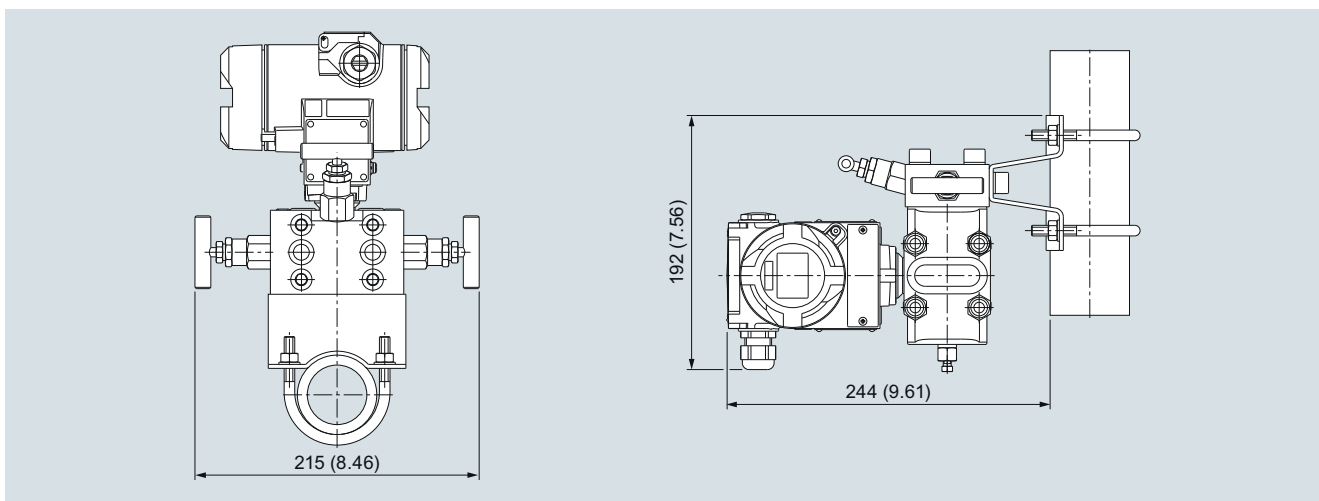
7MF9011-4FA valve manifold with mounted gauge pressure and absolute pressure transmitters, dimensions in mm (inch)



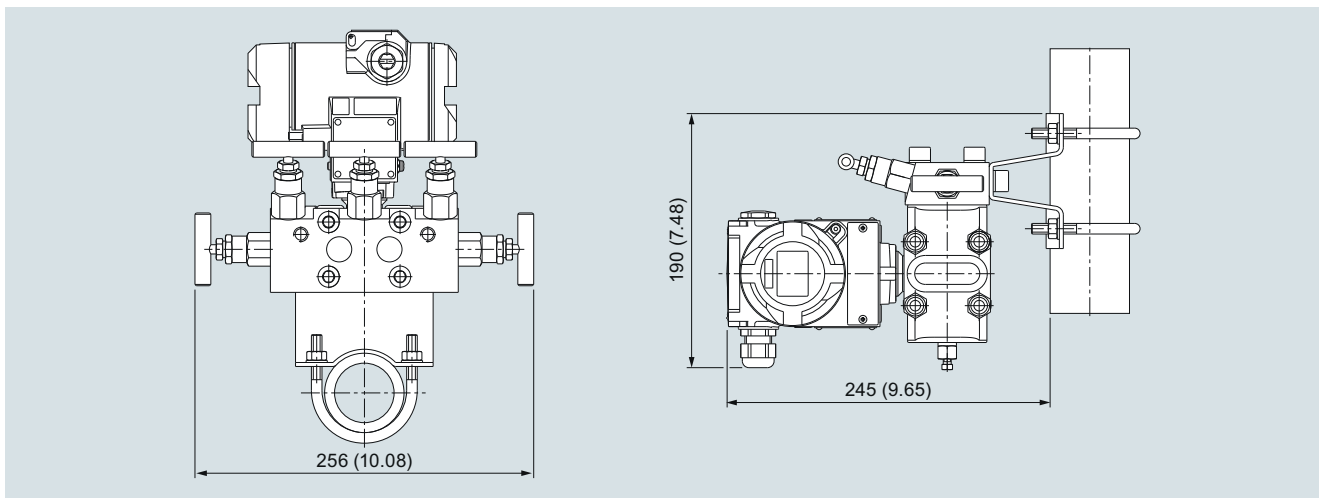
7MF9411-5BA valve manifold with mounted differential pressure transmitter



7MF9411-5CA valve manifold with mounted differential pressure transmitter



7MF9411-5BA valve manifold with mounted differential pressure transmitter, dimensions in mm (inch)



7MF9411-5CA valve manifold with mounted differential pressure transmitter, dimensions in mm (inch)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P410

Technical description

1

Overview



SITRANS P410 pressure transmitters are digital pressure transmitters with a high level of operating convenience. Technically, they are based on the SITRANS P DS III but offer an increased measuring accuracy of 0.04%. This means the SITRANS P 410 is perfectly suited for measuring tasks with increased accuracy requirements. The parameterization is performed using input buttons or via HART or via PROFIBUS PA or FOUNDATION Fieldbus interface.

The comprehensive functionality makes for precise adjustment of the pressure transmitter to the requirements of the plant. Operation is very simple, despite the variety of setting options.

Pressure transmitters with type of protection "Intrinsic safety" and "Explosion-proof" may be installed in hazardous areas (zone 1) or in zone 0. The transmitters are provided with an EC type examination certificate and comply with the respective harmonized European standards (ATEX).

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

SITRANS P410 pressure transmitters are available in various versions for measuring:

- Gauge pressure
- Differential pressure
- Volume flow
- Mass flow

Benefits

- High quality and service life
- For aggressive and non-aggressive gases, vapors and liquids
- Extensive diagnostics and simulation functions
- Minimal conformity error
- Good long-term stability
- Wetted parts made of high-grade materials (e.g., stainless steel, Hastelloy)
- Infinitely adjustable spans from 0.01 bar to 160 bar (0.15 psi to 2321 psi) for P410 with HART interface
- Nominal measuring ranges from 1 bar to 160 bar (14.5 psi to 2321 psi) for P410 with PROFIBUS PA and FOUNDATION Fieldbus interface
- High measuring accuracy
- Parameterization over input buttons and HART, PROFIBUS PA or FOUNDATION Fieldbus interface.

Application

SITRANS P410 pressure transmitters can be used in industrial areas with extreme chemical and mechanical loads. Electromagnetic compatibility in the range 10 kHz to 1 GHz makes the P410 suitable for locations with high electromagnetic emissions.

Pressure transmitters with type of protection "Flameproof enclosure" may be installed in hazardous areas (zone 1) or in zone 0. The pressure transmitters are provided with an EC type examination certificate and comply with the corresponding harmonized European standards (ATEX).

Pressure transmitters with the type of protection "Intrinsic safety" for use in zone 0 may be operated with power supply units of category "ia" and "ib".

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

The pressure transmitter can be operated locally over 3 input buttons or programmed externally over HART or over PROFIBUS PA or FOUNDATION Fieldbus interface.

Pressure transmitter for gauge pressure

Measured variable: Gauge pressure of aggressive and non-aggressive gases, vapors and liquids.

Span (infinitely adjustable)

for P410 with HART: 0.01 bar to 160 bar (0.15 psi to 2321 psi)

Nominal measuring range

for P410 with PROFIBUS PA and FOUNDATION Fieldbus:
1 bar to 160 bar (14.5 psi to 2321 psi)

Pressure transmitters for differential pressure and flow

Measured variables:

- Differential pressure
- Small positive or negative pressure
- Flow $q \sim \sqrt{\Delta p}$ (together with a primary differential pressure device (see Chapter "Flow Meters"))

Span (infinitely adjustable)

for P410 with HART: 1 mbar ... 30 bar (0.0145 ... 435 psi)

Nominal measuring range

for P410 with PROFIBUS PA and FOUNDATION Fieldbus:
20 mbar ... 30 bar (0.29 ... 435 psi)

Design



Front view

The transmitter consists of various components depending on the order. The possible versions are listed in the ordering information. The components described below are the same for all transmitters.

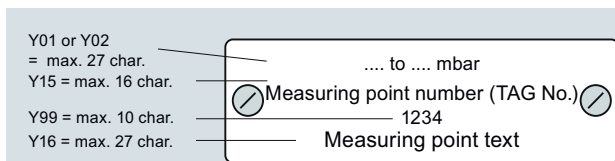
The rating plate (7, Figure "Front view") with the Article No. is located on the side of the housing. The specified number together with the ordering information provide details on the optional design details and on the possible measuring range (physical properties of built-in sensor element).

The approval label is located on the opposite side.

The housing is made of die-cast aluminium or stainless steel precision casting. A round cover (6) is screwed on at the front and rear of the housing. The front cover can be fitted with a viewing pane so that the measured values can be read directly on the display. The inlet (8) for the electrical connection is located either on the left or right side. The unused opening on the opposite side is sealed by a blanking plug. The protective earth connection is located on the rear of the housing.

The electrical connections for the power supply and screen are accessible by unscrewing the rear cover. The bottom part of the housing contains the measuring cell with process connection (5). The measuring cell is prevented from rotating by a locking screw (4). As the result of this modular design, the measuring cell and the electronics can be replaced separately from each other. The set parameter data are retained.

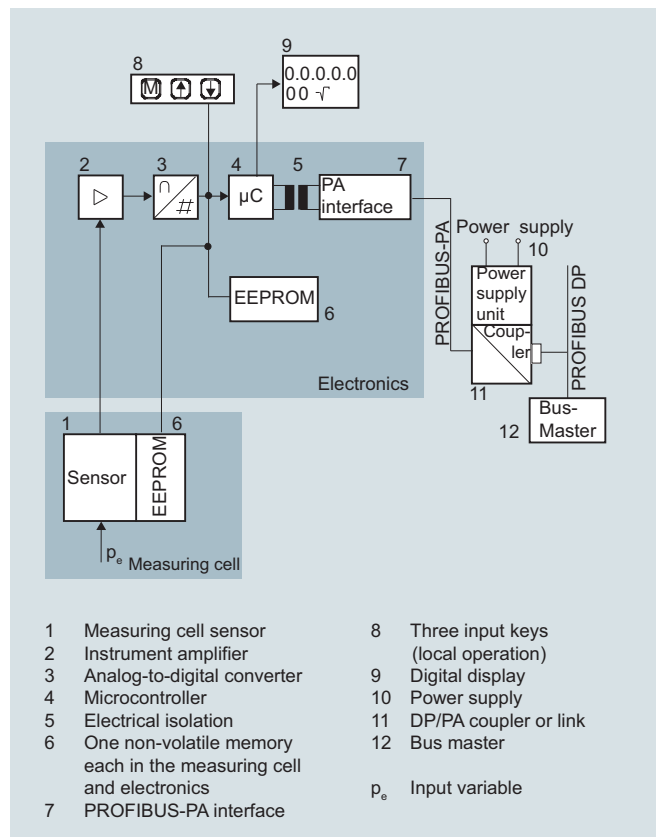
At the top of the housing is a plastic cover (1), which hides the input keys.

Example for an attached measuring point label

Transmitters for applications with advanced requirements (Advanced)

Function

Operation of electronics with PROFIBUS PA communication



Function diagram of electronics

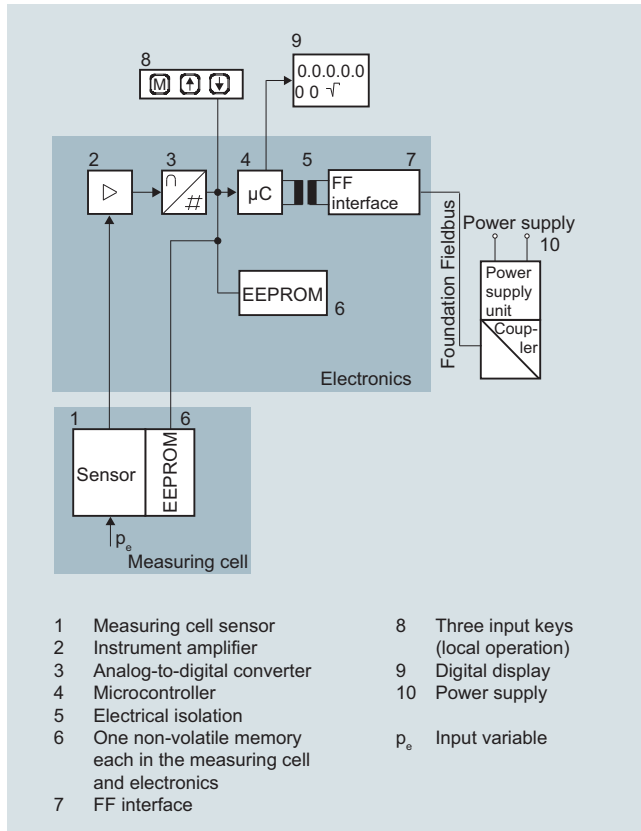
The bridge output voltage created by the sensor (1, Figure "Function diagram of the electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, its linearity and temperature response corrected, and provided on the PROFIBUS PA through an electrically isolated PA interface (7).

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the three input buttons (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The results with status values and diagnostic values are transferred by cyclic data transmission on the PROFIBUS PA. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as SIMATIC PDM is required for this.

The pressure transmitters with spans ≤ 63 bar measure the input pressure compared to atmosphere, transmitters with spans ≥ 160 bar compared to vacuum.

Operation of electronics with FOUNDATION Fieldbus communication

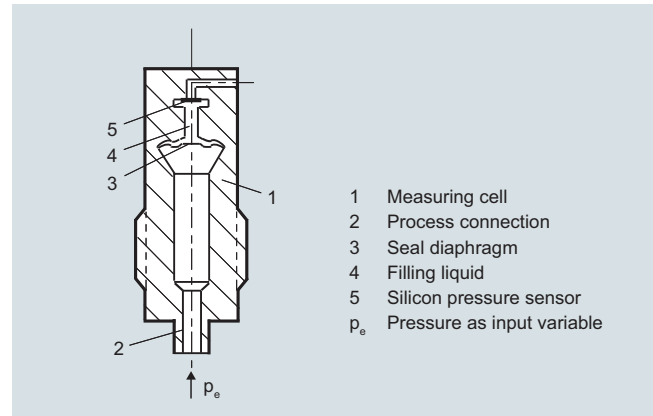
Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, its linearity and temperature response corrected, and provided on the FOUNDATION Fieldbus through an electrically isolated FOUNDATION Fieldbus interface (7).

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

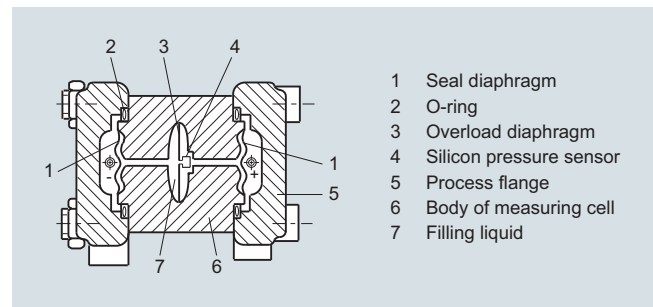
Using the three input buttons (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The results with status values and diagnostic values are transferred by cyclic data transmission on the FOUNDATION Fieldbus. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as National Instruments Configurator is required for this.

Mode of operation of the measuring cells**Measuring cell for gauge pressure**

Measuring cell for gauge pressure, function diagram

The pressure p_e is applied through the process connection (2, Figure "Measuring cell for gauge pressure, function diagram") to the measuring cell (1). This pressure is subsequently transmitted further through the seal diaphragm (3) and the filling liquid (4) to the silicon pressure sensor (5) whose measuring diaphragm is then flexed. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the differential pressure.

Measuring cell for differential pressure and flow

Measuring cell for differential pressure and flow, function diagram

The differential pressure is transmitted through the seal diaphragms (1, Figure "Measuring cell for differential pressure and flow, function diagram") and the filling liquid (7) to the silicon pressure sensor (4).

The measuring diaphragm is flexed by the applied differential pressure. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the differential pressure.

An overload diaphragm is installed to provide protection from overloads. If the measuring limits are exceeded, the overload diaphragm (3) is flexed until the seal diaphragm rests on the body of the measuring cell (6), thus protecting the silicon pressure sensor from overloads.

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced) SITRANS P410

Technical description

Parameterization SITRANS P410

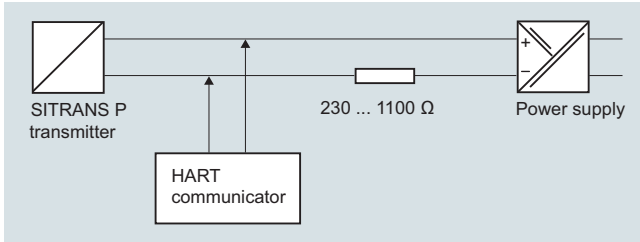
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

Parameterization using the input buttons (local operation)

With the input buttons you can easily set the most important parameters without any additional equipment.

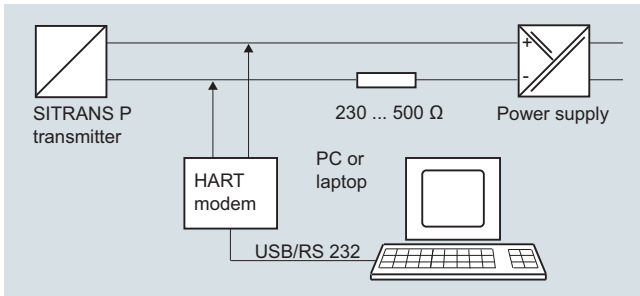
Parameterization using HART

Parameterization using HART is performed with a HART Communicator or a PC.



Communication between a HART Communicator and a pressure transmitter

When parameterizing with the HART Communicator, the connection is made directly to the 2-wire cable.



HART communication between a PC communicator and a pressure transmitter

When parameterizing with a PC, the connection is made through a HART modem.

The signals needed for communication in conformity with the HART 5.x or 6.x protocols are superimposed on the output current using the Frequency Shift Keying (FSK) method.

Adjustable parameters, SITRANS P410 with HART

Parameters	Input keys (DS III HART)	HART communication
Start of scale	x	x
Full-scale value	x	x
Electrical damping	x	x
Start-of-scale value without application of a pressure ("Blind setting")	x	x
Full-scale value without application of a pressure ("Blind setting")	x	x
Zero adjustment	x	x
current transmitter	x	x
Fault current	x	x
Disabling of buttons, write protection	x	x ¹⁾
Type of dimension and actual dimension	x	x
Characteristic (linear / square-rooted)	x ²⁾	x ²⁾
Input of characteristic		x
Freely-programmable LCD		x
Diagnostic functions		x

¹⁾ Cancel apart from write protection

²⁾ Only differential pressure

Diagnostic functions for SITRANS P410 with HART

- Zero correction display
- Event counter
- Limit transmitter
- Saturation alarm
- Slave pointer
- Simulation functions
- Maintenance timer

Available physical units of display for SITRANS P410 with HART

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm ² , kg/cm ² , inH ₂ O, inH ₂ O (4 °C), mmH ₂ O, ftH ₂ O (20 °C), inHg, mmHg
Level (height data)	m, cm, mm, ft, in
Volume	m ³ , dm ³ , hl, yd ³ , ft ³ , in ³ , US gallon, Imp. gallon, bushel, barrel, barrel liquid
Mass	g, kg, t, lb, Ston, Lton, oz
volume flow	m ³ /d, m ³ /h, m ³ /s, l/min, l/s, ft ³ /d, ft ³ /min, ft ³ /s, US gallon/min, US gallon/s
Mass flow	t/d, t/h, t/min, kg/d, kg/h, kg/min, kg/s, g/d, g/h, g/min, g/s, lb/d, lb/h, lb/min, lb/s, Lton/d, Lton/h, Ston/d, Ston/h, Ston/min
Temperature	K, °C, °F, °R
Miscellaneous	%, mA

Parameterization through PROFIBUS PA interface

Fully digital communication through PROFIBUS PA, profile 3.0, is particularly user-friendly. Through the PROFIBUS the DS III with PROFIBUS PA is connected to a process control system, e. g. SIMATIC PSC 7. Communication is possible even in a potentially explosive environment.

For parameterization through PROFIBUS you need suitable software, e.g. SIMATIC PDM (Process Device Manager).

Parameterization through FOUNDATION Fieldbus interface

Fully digital communication through FOUNDATION Fieldbus is particularly user-friendly. Through the FOUNDATION Fieldbus the DS III with FOUNDATION Fieldbus is connected to a process control system. Communication is possible even in a potentially explosive environment.

For parameterization through the FOUNDATION Fieldbus you need suitable software, e.g. National Instruments Configurator.

Adjustable parameters for SITRANS P410 with PROFIBUS PA and FOUNDATION Fieldbus

Parameters	Input keys	PROFIBUS PA and FOUNDATION Fieldbus interface
Electrical damping	x	x
Zero adjustment (correction of position)	x	x
Buttons and/or function disabling	x	x
Source of measured-value display	x	x
Physical dimension of display	x	x
Position of decimal point	x	x
Bus address	x	x
Adjustment of characteristic	x	x
Input of characteristic		x
Freely-programmable LCD		x
Diagnostics functions		x

Diagnostic functions for SITRANS P410 with PROFIBUS PA and FOUNDATION Fieldbus

- Event counter
- Slave pointer
- Maintenance timer
- Simulation functions
- Display of zero correction
- Limit transmitter
- Saturation alarm

Physical dimensions available for the display

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	MPa, kPa, Pa, bar, mbar, torr, atm, psi, g/cm ² , kg/cm ² , mmH ₂ O, mmH ₂ O (4 °C), inH ₂ O, inH ₂ O (4 °C), ftH ₂ O (20 °C), mmHg, inHg
Level (height data)	m, cm, mm, ft, in, yd
Volume	m ³ , dm ³ , hl, yd ³ , ft ³ , in ³ , US gallon, Imp. gallon, bushel, barrel, barrel liquid
volume flow	m ³ /s, m ³ /min, m ³ /h, m ³ /d, l/s, l/min, l/h, l/d, Ml/d, ft ³ /s, ft ³ /min, ft ³ /h, ft ³ /d, US gallon/s, US gallon/min, US gallon/h, US gallon/d, bbl/s, bbl/min, bbl/h, bbl/d
Mass flow	g/s, g/min, g/h, g/d, kg/s, kg/min, kg/h, kg/d, t/s, t/min, t/h, t/d, lb/s, lb/min, lb/h, lb/d, STon/s, STon/min, STon/h, STon/d, LTon/s, LTon/min, LTon/h, LTon/d
Total mass flow	t, kg, g, lb, oz, LTon, STon
Temperature	K, °C, °F, °R
Miscellaneous	%

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for gauge pressure

Technical specifications

SITRANS P410 for gauge pressure

Input

Measured variable

Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive) and max. test pressure (pursuant to DIN 16086)

Gauge pressure

HART

PROFIBUS PA/ FOUNDATION Fieldbus

Span

Nominal measuring range

Max. operating pressure MAWP (PS)

Max. perm. test pressure

0.01 ... 1 bar
1 ... 100 kPa
0.15 ... 14.5 psi

1 bar
100 kPa
14.5 psi

4 bar
400 kPa
58 psi

6 bar
600 kPa
87 psi

0.04 ... 4 bar
4 ... 400 kPa
0.58 ... 58 psi

4 bar
400 kPa
58 psi

7 bar
0.7 MPa
102 psi

10 bar
1 MPa
145 psi

0.16 ... 16 bar
16 ... 1600 kPa
2.3 ... 232 psi

16 bar
1600 kPa
232 psi

21 bar
2.1 MPa
305 psi

32 bar
3.2 MPa
464 psi

0.63 ... 63 bar
63 ... 6300 kPa
9.1 ... 914 psi

63 bar
6300 kPa
914 psi

67 bar
6.7 MPa
972 psi

100 bar
10 MPa
1450 psi

1.6 ... 160 bar
0.16 ... 16 MPa
23 ... 2321 psi

160 bar
16 MPa
2321 psi

167 bar
16.7 MPa
2422 psi

250 bar
2.5 MPa
3626 psi

Lower measuring limit

- Measuring cell with silicone oil filling

30 mbar a/3 kPa a/0.44 psi a

Upper measuring limit

100 % of max. span

Output

Output signal

- Lower limit (infinitely adjustable)
- Upper limit (infinitely adjustable)

4 ... 20 mA

Digital PROFIBUS PA and FOUNDATION Fieldbus signal

3.55 mA, factory preset to 3.84 mA

-

23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA

-

Load

- Without HART

$R_B \leq (U_H - 10.5 \text{ V})/0.023 \text{ A}$ in Ω ,
 U_H : Power supply in V

-

- With HART

$R_B = 230 \dots 500 \Omega$ (SIMATIC PDM) or
 $R_B = 230 \dots 1100 \Omega$ (HART Communicator)

-

Physical bus

-

IEC 61158-2

Protection against polarity reversal

Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.

Electrical damping (step width 0.1 s)

Set to 2 s (0 ... 100 s)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for gauge pressure

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SITRANS P410 for gauge pressure**Measuring accuracy**

Reference conditions

Acc. to IEC 60770-1

- Increasing characteristic
- Start-of-scale value 0 bar/kPa/psi
- Stainless steel seal diaphragm
- Silicone oil filling
- Room temperature 25 °C (77 °F)

Measuring span ratio r (spread, Turn-Down) $r = \text{max. measuring span/set measuring span or nom. pressure range}$

Error in measurement at limit setting incl. hysteresis and reproducibility

• Linear characteristic

- 1 bar/100 kPa/14.5 psi
- 4 bar/400 kPa/58 psi
- 16 bar/1.6 MPa/232 psi
- 63 bar/6.3 MPa/914 psi
- 160 bar/16 MPa/2321 psi

 $r \leq 5 : \leq 0.04 \%$
 $5 < r \leq 100 : \leq (0.004 \cdot r + 0.045) \%$
Influence of ambient temperature
(in percent per 28 °C (50 °F))

- 1 bar/100 kPa/14.5 psi
- 4 bar/400 kPa/58 psi
- 16 bar/1.6 MPa/232 psi
- 63 bar/6.3 MPa/914 psi
- 160 bar/16 MPa/2321 psi

 $\leq (0.05 \cdot r + 0.1) \%$
 $\leq (0.025 \cdot r + 0.125) \%$
Long-term stability (temperature change ± 30 °C (± 54 °F))

- 1 bar/100 kPa/14.5 psi
- 4 bar/400 kPa/58 psi
- 16 bar/1.6 MPa/232 psi
- 63 bar/6.3 MPa/914 psi
- 160 bar/16 MPa/2321 psi

 $\leq (0.25 \cdot r) \%$ in 5 years
 $\leq (0.125 \cdot r) \%$ in 5 years

Effect of mounting position

 $\leq 0.05 \text{ mbar}/0.005 \text{ kPa}/0.000725 \text{ psi}$ per 10° inclination
 (zero point correction is possible with position error compensation)
Effect of auxiliary power supply
(in percent per change in voltage)

0.005 % per 1 V

Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus

 $3 \cdot 10^{-5}$ of nominal measuring range

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for gauge pressure

SITRANS P410 for gauge pressure

Rated conditions

Degree of protection

- according to EN 60529
- according to NEMA 250

IP66 (optional IP66/IP68)

Type 4X

Temperature of medium

- Measuring cell with silicone oil filling
- Measuring cell with inert filling liquid
- In conjunction with dust explosion protection

-40 ... +100 °C (-40 ... +212 °F)

-20 ... +100 °C (-4 ... +212 °F)

-20 ... +60 °C (-4 ... +140 °F)

Ambient conditions

- Ambient temperature

- Transmitter

-40 ... +85 °C (-40 ... +185 °F)

- Display readable

-30 ... +85 °C (-22 ... +185 °F)

- Storage temperature

-50 ... +85 °C (-58 ... +185 °F)

- Climatic class

- Condensation

Relative humidity 0 ... 100 %

Condensation permissible, suitable for use in the tropics

- Electromagnetic Compatibility

- Emitted interference and interference immunity

Acc. to IEC 61326 and NAMUR NE 21

Design

Weight (without options)

Die-cast aluminum: ≈ 2.0 kg (≈ 4.4 lb)

Stainless steel precision casting: ≈ 4.6 kg (≈ 10.1 lb)

Enclosure material

Low-copper die-cast aluminum, GD-AISI 12 or stainless steel precision casting, mat. no. 1.4408

Wetted parts materials

- Connection shank
- Oval flange
- Seal diaphragm

Stainless steel, mat. no. 1.4404/316L or Hastelloy C4, mat. no. 2.4602

Stainless steel, mat. no. 1.4404/316L

Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819

Measuring cell filling

Silicone oil or inert filling liquid
(maximum value with oxygen measurement pressure 100 bar (1450 psi) at 60 °C (140 °F))

Process connection

Connection shank G $\frac{1}{2}$ B to DIN EN 837-1, female thread $\frac{1}{2}$ -14 NPT or oval flange (PN 160 (MAWP 2320 psi)) to DIN 19213 with mounting thread M10 or $\frac{7}{16}$ -20 UNF to IEC 61518/DIN EN 61518

Material of mounting bracket

- Steel
- Stainless steel 304
- Stainless steel 316L

Sheet-steel, Mat. No. 1.0330, chrome-plated

Sheet stainless steel, mat. no. 1.4301 (SS 304)

Sheet stainless steel, mat. no. 1.4404 (SS 316L)

Power supply U_H

Terminal voltage on transmitter

10.5 ... 45 V DC

10.5 ... 30 V DC in intrinsically-safe mode

PROFIBUS PA/ FOUNDATION Fieldbus

-

Power supply

Supplied through bus

Separate 24 V power supply necessary

-

No

Bus voltage

- Not Ex
- With intrinsically-safe operation

-

9 ... 32 V

-

9 ... 24 V

Current consumption

- Basic current (max.)
- Start-up current ≤ basic current
- Max. current in event of fault

-

12.5 mA

-

Yes

-

15.5 mA

Fault disconnection electronics (FDE) available

-

Yes

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for gauge pressure

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SITRANS P410 for gauge pressure**Certificates and approvals**

Classification according to PED 2014/68/EU

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

Explosion protection

• Intrinsic safety "i"

- Marking
- Permissible ambient temperature

PTB 13 ATEX 2007 X

Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb

-40 ... +85 °C (-40 ... +185 °F) temperature class T4;
 -40 ... +70 °C (-40 ... +158 °F) temperature class T5;
 -40 ... +60 °C (-40 ... +140 °F) temperature class T6

- Connection

To certified intrinsically-safe circuits with peak values:
 $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$,
 $P_i = 750 \text{ mW}$; $R_i = 300 \Omega$

FISCO supply unit:

 $U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$

Linear barrier:

 $U_o = 24 \text{ V}$, $I_o = 174 \text{ mA}$, $P_o = 1 \text{ W}$

- Effective internal inductance/capacitance

 $L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$ $L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$

• Explosion-proof "d"

- Marking
- Permissible ambient temperature

PTB 99 ATEX 1160

Ex II 1/2 G Ex d IIC T4/T6 Ga/Gb

-40 ... +85 °C (-40 ... +185 °F) temperature class T4;
 -40 ... +60 °C (-40 ... +140 °F) temperature class T6

- Connection

To circuits with values: $U_H = 10.5 \dots 45 \text{ V DC}$ To circuits with values: $U_H = 9 \dots 32 \text{ V DC}$

• Dust explosion protection for zone 20 (pending)

- Marking
- Permissible ambient temperature
- Max. surface temperature
- Connection

PTB 01 ATEX 2055

Ex II 1 D Ex ta IIIC T120°C Da

Ex II 1/2 D Ex ta/tb IIIC T120°C Da/Db

-40 ... +85 °C (-40 ... +185 °F)

120 °C (248 °F)

To certified intrinsically-safe circuits with peak values:
 $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$,
 $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$

FISCO supply unit:

 $U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$

Linear barrier:

 $U_o = 24 \text{ V}$, $I_o = 250 \text{ mA}$, $P_o = 1 \text{ W}$

- Effective internal inductance/capacitance

 $L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$ $L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$

• Dust explosion protection for zone 21/22 (pending)

- Marking
- Connection

PTB 01 ATEX 2055

Ex II 2 D Ex tb IIIC T120°C Db

To circuits with values:
 $U_H = 10.5 \dots 45 \text{ V DC}$; $P_{\max} = 1.2 \text{ W}$

To circuits with values:

 $U_H = 9 \dots 32 \text{ V DC}$; $P_{\max} = 1 \text{ W}$

• Type of protection "n" (zone 2)

- Marking
- Connection (Ex nA)
- Connections (Ex ic)

PTB 13 ATEX 2007 X

Ex II 2/3 G Ex nA IIC T4/T5/T6 Gb/Gc

Ex II 2/3 G Ex ic IIC T4/T5/T6 Gb/Gc

 $U_m = 45 \text{ V}$

To circuits with values:
 $U_i = 45 \text{ V}$

 $U_m = 32 \text{ V}$

FISCO supply unit ic:

 $U_o = 17.5 \text{ V}$, $I_o = 570 \text{ mA}$

Linear barrier:

 $U_o = 32 \text{ V}$, $I_o = 132 \text{ mA}$, $P_o = 1 \text{ W}$

- Effective internal inductance/capacitance

 $L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$ $L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$

• Explosion protection acc. to FM (pending)

- Identification (XP/DIP) or (IS); (NI)

Certificate of Compliance 3008490

CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

• Explosion protection to CSA (pending)

- Identification (XP/DIP) or (IS)

Certificate of Compliance 1153651

CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P410

for gauge pressure

HART communication		FOUNDATION Fieldbus communication	
HART	230 ... 1100 Ω	Function blocks	3 function blocks analog input, 1 function block PID
Protocol	HART Version 5.x	• Analog input	Yes, linearly rising or falling characteristic
Software for computer	SIMATIC PDM	- Adaptation to customer-specific process variables	0 ... 100 s
PROFIBUS PA communication		- Electrical damping, adjustable	Output/input (can be locked within the device with a bridge)
Simultaneous communication with master class 2 (max.)	4	- Simulation function	parameterizable (last good value, substitute value, incorrect value)
The address can be set using	Configuration tool or local operation (standard setting address 126)	- Failure mode	Yes, one upper and lower warning limit and one alarm limit respectively
Cyclic data usage		- Limit monitoring	Yes
• Output byte	5 (one measured value) or 10 (two measured values)	- Square-rooted characteristic for flow measurement	Standard FOUNDATION Fieldbus function block
• Input byte	0, 1, or 2 (register operating mode and reset function for metering)	• PID	1 resource block
Internal preprocessing		• Physical block	1 transducer block Pressure with calibration, 1 transducer block LCD
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B	Transducer blocks	
Function blocks	2	• Pressure transducer block	
• Analog input		- Can be calibrated by applying two pressures	Yes
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic	- Monitoring of sensor limits	Yes
- Electrical damping, adjustable	0 ... 100 s	- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function
- Simulation function	Input /Output		
- Failure mode	parameterizable (last good value, substitute value, incorrect value)		
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively		
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output		
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)		
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively		
• Physical block	1		
Transducer blocks	2		
• Pressure transducer block			
- Can be calibrated by applying two pressures	Yes		
- Monitoring of sensor limits	Yes		
- Specification of a container characteristic with	Max. 30 nodes		
- Square-rooted characteristic for flow measurement	Yes		
- Gradual volume suppression and implementation point of square-root extraction	Parameterizable		
- Simulation function for measured pressure value and sensor temperature	Constant value or over parameterizable ramp function		

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for gauge pressure

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Selection and Ordering data		Article No.	Order code
Pressure transmitter for gauge pressure, SITRANS P410 with HART		7MF4033-	-Z C41
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Measuring cell filling	Measuring cell cleaning		
Silicone oil	normal		
Measuring span (min. ... max.)			
0.01 ... 1 bar (0.15 ... 14.5 psi)			
0.04 ... 4 bar (0.58 ... 58 psi)			
0.16 ... 16 bar (2.32 ... 232 psi)			
0.63 ... 63 bar (9.14 ... 914 psi)			
1.6 ... 160 bar (23.2 ... 2320 psi)			
Wetted parts materials			
Seal diaphragm	Process connection		
Stainless steel	Stainless steel		
Hastelloy	Stainless steel		
Hastelloy	Hastelloy		
Version for diaphragm seals in conjunction with process connector "female thread ½-14 NPT"			
(recommended version) ^{1) 2) 3) 4)}			
Version for diaphragm seals in conjunction with process connector "G½B connection shank" ^{1) 2) 3) 4)}			
Process connection			
<ul style="list-style-type: none"> • Connection shank G½B to EN 837-1 • Female thread ½-14 NPT • Stainless steel oval flange with process connection (Oval flange has no female thread) <ul style="list-style-type: none"> - Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518 - Mounting thread M10 to DIN 19213 - Mounting thread M12 to DIN 19213 • Male thread M20 x 1.5 • Male thread ½ -14 NPT 			
Non-wetted parts materials			
<ul style="list-style-type: none"> • Housing made of die-cast aluminium • Housing stainless steel precision casting⁵⁾ 			
Version			
<ul style="list-style-type: none"> • Standard version, German plate inscription, setting for pressure unit: bar • International version, English plate inscription, setting for pressure unit: bar • Chinese version, English plate inscription, setting for pressure unit: Pascal 			
All versions include DVD with compact operating instructions in various EU languages.			
Explosion protection			
<ul style="list-style-type: none"> • None • With ATEX, Type of protection: <ul style="list-style-type: none"> - "Intrinsic safety (Ex ia)" - "Explosion-proof (Ex d)"⁶⁾ - "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)⁷⁾ - "Ex nA/ic (Zone 2)"⁸⁾ - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)"⁷⁾⁹⁾ • FM + CSA intrinsic safe (is) (pending)¹⁰⁾ • FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D⁷⁾⁹⁾¹⁰⁾ • With FM + CSA, Type of protection: <ul style="list-style-type: none"> - "Intrinsic Safe and Explosion Proof (is + xp)"⁶⁾¹⁰⁾ 			
Electrical connection / cable entry			
<ul style="list-style-type: none"> • Screwed gland M20 x1 .5 • Screwed gland ½-14 NPT • Han 7D device plug (plastic housing) incl. mating connector¹¹⁾ • M12 device plugs (stainless steel)¹¹⁾¹²⁾ 			

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for gauge pressure

Selection and Ordering data	Article No.	Order code
Pressure transmitter for gauge pressure, SITRANS P410 with HART	7MF4033-	-Z C41
Display		
• Without display		0
• Without visible display (display concealed, setting: mA)		1
• With visible display (setting: mA)		6
• with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)		7

Power supply units see Chap. 7 "Supplementary Components".

A quick-start guide is included in the scope of delivery of the device.

- 1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF403-...Y... and 7MF4900-1...-B
- 4) The standard measuring cell filling of configurations with remote seals (Y) is silicone oil.
- 5) Not in conjunction with Electrical connection "Han 7D device plug".
- 6) Without cable gland, with blanking plug
- 7) With enclosed cable gland Ex ia and blanking plug
- 8) Configurations with Han and M12 device plugs are only available in Ex ic.
- 9) Only in connection with IP66.
- 10) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.
- 11) Only in connection with Ex approval A, B or E.
- 12) M12 delivered without cable socket

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for gauge pressure

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Selection and Ordering data		Article No.	Order code
Pressure transmitter for gauge pressure			
SITRANS P410 with PROFIBUS PA (PA)		7MF4034-	-Z C41
SITRANS P410 with FOUNDATION Fieldbus (FF)		7MF4035-	-Z C41
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Measuring cell filling	Measuring cell cleaning		
Silicone oil	normal		
Nominal measuring range			
1 bar	(14.5 psi)		
4 bar	(58 psi)		
16 bar	(232 psi)		
63 bar	(914 psi)		
160 bar	(2320 psi)		
Wetted parts materials			
Seal diaphragm	Process connection		
Stainless steel	Stainless steel		
Hastelloy	Stainless steel		
Hastelloy	Hastelloy		
Version for diaphragm seals in conjunction with process connector "female thread ½-14 NPT" (recommended version) ^{1) 2) 3) 4)}			
Version for diaphragm seals in conjunction with process connector "G½B connection shank" ^{1) 2) 3) 4)}			
Process connection			
<ul style="list-style-type: none"> • Connection shank G½B to EN 837-1 • Female thread ½-14 NPT • Stainless steel oval flange with process connection (Oval flange has no female thread) ⁵⁾ <ul style="list-style-type: none"> - Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518 - Mounting thread M10 to DIN 19213 - Mounting thread M12 to DIN 19213 • Male thread M20 x 1.5 • Male thread ½ -14 NPT 			
Non-wetted parts materials			
<ul style="list-style-type: none"> • Housing made of die-cast aluminium • Housing stainless steel precision casting 			
Version			
<ul style="list-style-type: none"> • Standard version, German label inscription, setting of pressure unit: bar • International version, English label inscription, setting of pressure unit: psi • Chinese version, English label inscription, setting of pressure unit: kPa 			
All versions include DVD with compact operating instructions in various EU languages.			
Explosion protection			
<ul style="list-style-type: none"> • None • With ATEX, Type of protection: <ul style="list-style-type: none"> - "Intrinsic safety (Ex ia)" - "Explosion-proof (Ex d)"⁶⁾ - "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)⁷⁾ - "Ex nA/ic (Zone 2)"⁸⁾ - "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)"^{7) 9)} • FM + CSA intrinsic safe (is)¹⁰⁾ • FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D⁷⁾⁹⁾¹⁰⁾ • With FM + CSA, Type of protection: <ul style="list-style-type: none"> - "Intrinsic Safe and Explosion Proof (is + xp)"⁶⁾¹⁰⁾ 			
Electrical connection/cable entry			
<ul style="list-style-type: none"> • Screwed gland M20 x 1.5 • Screwed gland ½-14 NPT • M12 device plugs (stainless steel)^{11) 12)} 			

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for gauge pressure

Selection and Ordering data

Pressure transmitter for gauge pressure

SITRANS P410 with PROFIBUS PA (PA)

Article No.

Order code

7MF4034-  -  **-Z C41**

SITRANS P410 with FOUNDATION Fieldbus (FF)

7MF4035-  -  **-Z C41**

Display

- Without display
- Without visible display (display concealed, setting: bar)
- With visible display (setting: bar)
- with customer-specific display (setting as specified, Order code "Y21" required)

0
1
6
7

A quick-start guide is included in the scope of delivery of the device.

- 1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF403-...Y.-... and 7MF4900-1...-B
- 4) The standard measuring cell filling of configurations with remote seals (Y) is silicone oil.
- 5) M10 fastening thread: Max. span 160 bar (2320 psi)
7/16-20 UNF and M12 fastening thread: Max. span 400 bar (5802 psi)
- 6) Without cable gland, with blanking plug.
- 7) With enclosed cable gland Ex ia and blanking plug.
- 8) Configurations with Han and M12 device plugs are only available in Ex ic.
- 9) Only in connection with IP66.
- 10) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.
- 11) M12 delivered without cable socket.
- 12) Only in connection with Ex approval A, B, E or F.

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for gauge pressure

1

Selection and Ordering data		Order code			
Further designs Add "-Z" to Article No. and specify Order code.			HART	PA	FF
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:					
• Steel	A01	✓	✓	✓	✓
• Stainless steel 304	A02	✓	✓	✓	✓
• Stainless steel 316L	A03	✓	✓	✓	✓
Device plugs¹⁾					
• Han 7D (metal)	A30	✓			
• Han 8D (instead of Han 7D)	A31	✓			
• Angled	A32	✓			
• Han 8D (metal)	A33	✓			
Cable sockets for M12 device plugs (metal (CuZn))	A50	✓	✓	✓	✓
Rating plate inscription (instead of German)					
• English	B11	✓	✓	✓	✓
• French	B12	✓	✓	✓	✓
• Spanish	B13	✓	✓	✓	✓
• Italian	B14	✓	✓	✓	✓
English rating plate Pressure units in inH ₂ O and/or psi	B21	✓	✓	✓	✓
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2²⁾		C11	✓	✓	✓
Inspection certificate³⁾ Acc. to EN 10204-3.1		C12	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2		C14	✓	✓	✓
Acceptance certificate (EN 10204-3.1) PMI test of parts in contact with medium		C15	✓	✓	✓
Functional safety (SIL2) (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration		C20	✓		
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration		C23	✓		
Increased measuring accuracy (mandatory specification for SITRANS P410)		C41	✓	✓	✓
PED for Russia with initial calibration mark		C99	✓	✓	✓
Setting of the upper saturation limit of the output signal to 22.0 mA		D05	✓		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)		D07	✓	✓	✓
Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)		D12	✓	✓	✓
Supplied with oval flange (1 item), PTFE packing and screws in thread of oval flange		D37	✓	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included		D59	✓	✓	✓
TAG plate empty (no inscription)		D61	✓	✓	✓

Selection and Ordering data		Order code			
Further designs Add "-Z" to Article No. and specify Order code.			HART	PA	FF
Use in or on zone 1D/2D⁴⁾ (only together with type of protection "Intrinsic safety" (transmitter 7MF4...-.....-B.. Ex ia) and IP66)		E01	✓	✓	✓
CRN approval Canada (Canadian Registration Number)		E22 ⁵⁾	✓	✓	✓
Dual seal		E24	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-.....-B..)		E55 ⁶⁾	✓	✓	✓
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-.....-D..)		E56 ⁶⁾	✓	✓	✓
Ex protection "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-E..)		E57 ⁶⁾	✓	✓	✓
Ex protection „Ex ia“, „Ex d" and „Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-R..)		E58 ⁶⁾	✓	✓	✓
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea) (pending) (only for transmitter 7MF4...-.....-[B, D]..-Z + E11)		E70 ⁶⁾	✓	✓	✓
Ex-protection Ex ia according to EAC Ex (Russia)		E80	✓	✓	✓
Ex-protection Ex d according to EAC Ex (Russia)		E81	✓	✓	✓
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)		E82	✓	✓	✓
Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)		E83	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)		G10	✓	✓	✓
Transient protector 6 kV (lightning protection)		J01	✓	✓	✓
Oval flange NAM (ASTAVA)		J06	✓	✓	✓
Marine approvals					
• Det Norske Veritas Germanischer Lloyd (DNV-GL)	S10	✓	✓	✓	✓
• Lloyds Register (LR)	S11	✓	✓	✓	✓
• French marine classification society Bureau Veritas (BV)	S12	✓	✓	✓	✓
• American Bureau of Shipping (ABS)	S14	✓	✓	✓	✓
• Russian Maritime Register (RMR)	S16	✓	✓	✓	✓
• Korean Register of Shipping (KR)	S17	✓	✓	✓	✓

Factor valve block mounting for SITRANS P410 is possible. Depending on the available P410 variants, please see the configuration options for SITRANS P DS III (page 1/280).

1) Han device plug IP65

2) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

3) If the acceptance test certificate 3.1. is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

4) Option does not contain gas explosion protection; only dust explosion protection: Use in or at Zone 1D/2D.

5) Cannot be ordered with remote seal.

6) When the additional ex option is selected, the ATEX marking on the device is omitted. Only the Ex option selected via the Z option is marked.

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P410

for gauge pressure

Selection and Ordering data	Order code			
Additional data Please add "-Z" to Article No. and specify Order code(s) and plain text.		HART	PA	FF
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	Y01	✓	✓ ¹⁾	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	Y15	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	Y16	✓	✓	✓
Entry of HART address (TAG) Max. 8 characters, specify in plain text: Y17:	Y17	✓		
Setting of pressure indication in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H ₂ O ^{*)} , inH ₂ O ^{*)} , ftH ₂ O ^{*)} , mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM or % *) ref. temperature 20 °C	Y21	✓	✓	✓
Setting of pressure indication in non-pressure units²⁾ Specify in plain text: Y22: up to l/min, m ³ /h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y22 + Y01	✓		

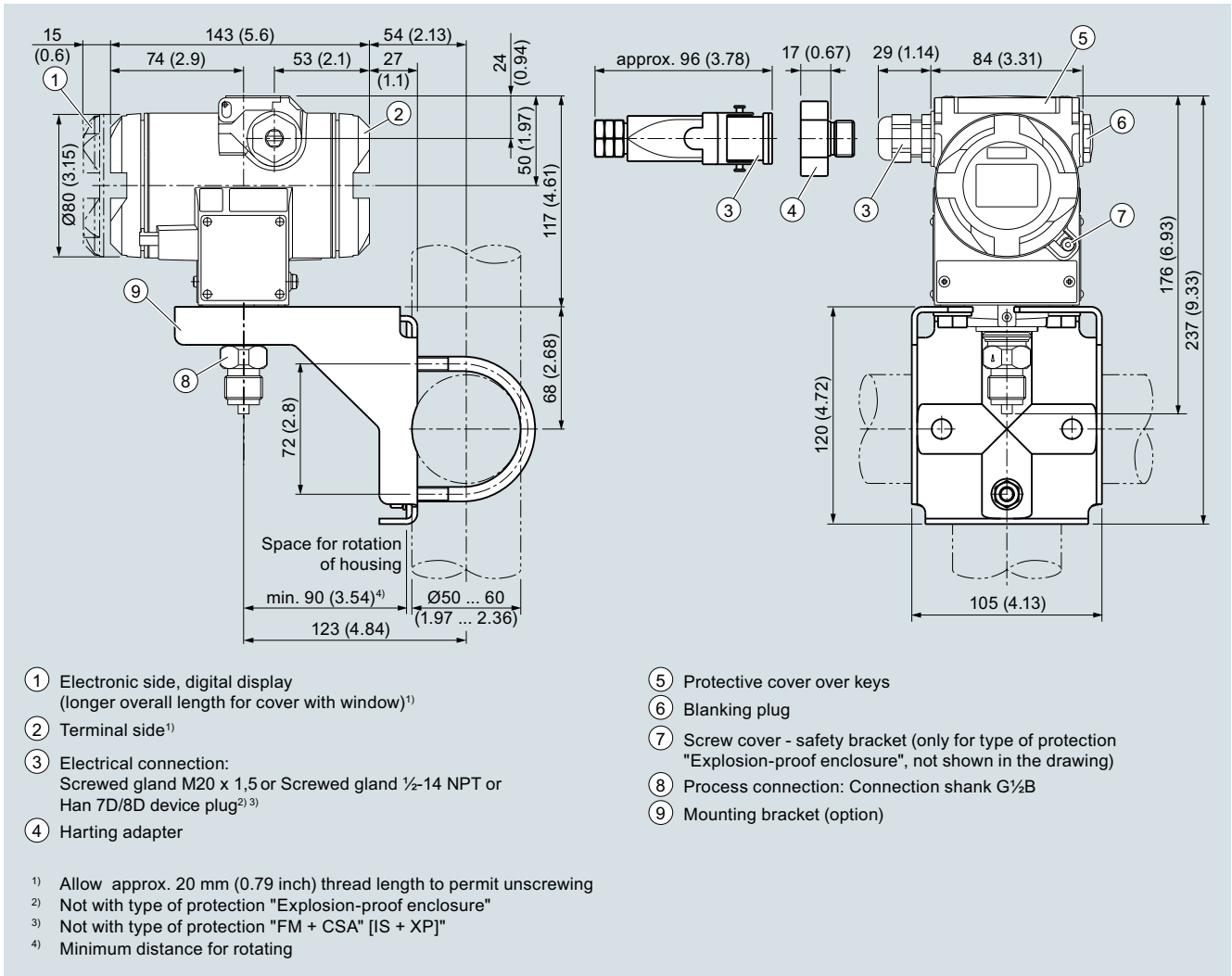
✓ = available

Ordering example

Item line: 7MF4033-1EA00-1AA7-Z C41
B line: A01 + Y01 + Y21
C line: Y01: 10 ... 20 bar (145 ... 290 psi)
C line: Y21: bar (psi)

¹⁾ Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

²⁾ Preset values can only be changed over SIMATIC PDM.

Dimensional drawings

SITRANS P410 pressure transmitters for gauge pressure, dimensions in mm (inch)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for differential pressure and flow

Technical specifications

SITRANS P410 for differential pressure and flow

Input		Differential pressure and flow	
Measured variable		HART	PROFIBUS PA/ FOUNDATION Fieldbus
Span (fully adjustable) or measuring range, max. operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive)		Span	Max. operating pressure MAWP (PS)
		2.5 ... 250 mbar 0.2 ... 25 kPa 1 ... 100 inH ₂ O	250 mbar 25 kPa 100 inH ₂ O
		6 ... 600 mbar 0.6 ... 60 kPa 2.4 ... 240 inH ₂ O	600 mbar 60 kPa 240 inH ₂ O
		16 ... 1600 mbar 1.6 ... 160 kPa 6.4 ... 642 inH ₂ O	1600 mbar 160 kPa 642 inH ₂ O
		50 ... 5000 mbar 5 ... 500 kPa 20 ... 2000 inH ₂ O	5000 mbar 500 kPa 2000 inH ₂ O
		0.3 ... 30 bar 0.03 ... 3 MPa 4.35 ... 435 psi	30 bar 3 MPa 435 psi
		6 ... 600 mbar 0.6 ... 60 kPa 2.4 ... 240 inH ₂ O	600 mbar 60 kPa 240 inH ₂ O
		16 ... 1600 mbar 1.6 ... 160 kPa 6.4 ... 642 inH ₂ O	1600 mbar 160 kPa 642 inH ₂ O
		50 ... 5000 mbar 5 ... 500 kPa 20 ... 2000 inH ₂ O	5000 mbar 500 kPa 2000 inH ₂ O
		0.3 ... 30 bar 0.03 ... 3 MPa 4.35 ... 435 psi	30 bar 3 MPa 435 psi
Lower measuring limit		-100 % of max. span (-33 % with measuring cell 30 bar/3 MPa/435 psi) or 30 mbar a/3 kPa a/0.44 psi a	
• Measuring cell with silicone oil filling			
Upper measuring limit			
Start of scale value		100 % of max. span	
		Between the measuring limits (fully adjustable)	
Output		HART	PROFIBUS PA/ FOUNDATION Fieldbus
Output signal		4 ... 20 mA	Digital PROFIBUS PA and FOUNDATION Fieldbus signal
• Lower limit (infinitely adjustable)		3.55 mA, factory preset to 3.84 mA	-
• Upper limit (infinitely adjustable)		23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA	-
Load		$R_B \leq (U_H - 10.5 \text{ V})/0.023 \text{ A}$ in Ω , U_H : Power supply in V	-
• Without HART		$R_B = 230 \dots 500 \Omega$ (SIMATIC PDM) or $R_B = 230 \dots 1100 \Omega$ (HART Communicator)	-
• With HART		-	-
Physical bus		-	IEC 61158-2
Protection against polarity reversal		Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.	
Electrical damping (step width 0.1 s)		Set to 2 s (0 ... 100 s)	

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for differential pressure and flow

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SITRANS P410 for differential pressure and flow**Measuring accuracy**

Reference conditions

Acc. to IEC 60770-1

- Increasing characteristic
- Start-of-scale value 0 bar/kPa/psi
- Stainless steel seal diaphragm
- Silicone oil filling
- Room temperature 25 °C (77 °F)

Measuring span ratio r (spread, Turn-Down) $r = \text{max. measuring span/set measuring span or nom. pressure range}$

Error in measurement at limit setting incl. hysteresis and reproducibility

• Linear characteristic

- 250 mbar/25 kPa/3.63 psi
- 600 mbar/60 kPa/8.7 psi
- 1600 mbar/160 kPa/23.21 psi
- 5 bar/500 kPa/72.5 psi
- 30 bar/3 MPa/435 psi

$$\begin{aligned} r \leq 5 : & \leq 0.04 \% \\ 5 < r \leq 100 : & \leq (0.004 \cdot r + 0.045) \% \end{aligned}$$

• Square-rooted characteristic (flow > 50 %)

- 250 mbar/25 kPa/3.63 psi
- 600 mbar/60 kPa/8.7 psi
- 1600 mbar/160 kPa/23.21 psi
- 5 bar/500 kPa/72.5 psi
- 30 bar/3 MPa/435 psi

$$\begin{aligned} r \leq 5 : & \leq 0.04 \% \\ 5 < r \leq 100 : & \leq (0.004 \cdot r + 0.045) \% \end{aligned}$$

• Square-rooted characteristic (flow > 25 ... 50 %)

- 250 mbar/25 kPa/3.63 psi
- 600 mbar/60 kPa/8.7 psi
- 1600 mbar/160 kPa/23.21 psi
- 5 bar/500 kPa/72.5 psi
- 30 bar/3 MPa/435 psi

$$\begin{aligned} r \leq 5 : & \leq 0.08 \% \\ 5 < r \leq 100 : & \leq (0.008 \cdot r + 0.09) \% \end{aligned}$$

Influence of ambient temperature (in percent per 28 °C (50 °F))

- 250 mbar/25 kPa/3.63 psi
- 600 mbar/60 kPa/8.7 psi
- 1600 mbar/160 kPa/23.21 psi
- 5 bar/500 kPa/72.5 psi
- 30 bar/3 MPa/435 psi

$$\leq (0.025 \cdot r + 0.125) \%$$

Influence of static pressure

• on the zero point (PKN)

- 250 mbar/25 kPa/3.63 psi
- 600 mbar/60 kPa/8.7 psi
- 1600 mbar/160 kPa/23.21 psi

$$\leq (0.1 \cdot r) \% \text{ per 70 bar}$$

(zero-point correction is possible with position error adjustment)

- 5 bar/500 kPa/72.5 psi
- 30 bar/3 MPa/435 psi

$$\leq (0.2 \cdot r) \% \text{ per 70 bar}$$

(zero-point correction is possible with position error adjustment)

• on the span (PKS)

- 250 mbar/25 kPa/3.63 psi
- 600 mbar/60 kPa/8.7 psi
- 1600 mbar/160 kPa/23.21 psi
- 5 bar/500 kPa/72.5 psi
- 30 bar/3 MPa/435 psi

$$\leq 0.14 \% \text{ per 70 bar}$$

Long-term stability (temperature change ± 30 °C (± 54 °F))

Static pressure max. 70 bar/7 MPa/1015 psi

- 250 mbar/25 kPa/3.63 psi
- 600 mbar/60 kPa/8.7 psi
- 1600 mbar/160 kPa/23.21 psi
- 5 bar/500 kPa/72.5 psi

$$\leq (0.125 \cdot r) \% \text{ in 5 years}$$

- 30 bar/3 MPa/435 psi

$$\leq (0.25 \cdot r) \% \text{ in 5 years}$$

Effect of mounting position (in pressure per change in angle)

$$\leq 0.7 \text{ mbar}/0.07 \text{ kPa}/0.028 \text{ inH}_2\text{O} \text{ per } 10^\circ \text{ inclination}$$

(zero-point correction is possible with position error adjustment)

Effect of auxiliary power supply (in percent per change in voltage)

$$0.005 \% \text{ per } 1 \text{ V}$$

Measuring value resolution for PROFIBUS PA and FOUNDATION Fieldbus

$$3 \cdot 10^{-5} \text{ of nominal measuring range}$$

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for differential pressure and flow

SITRANS P410 for differential pressure and flow

Rated conditions

Degree of protection

- according to EN 60529
- according to NEMA 250

Temperature of medium

- Measuring cell with silicone oil filling

- In conjunction with dust explosion protection

Ambient conditions

- Ambient temperature

- Transmitter

- Display readable

- Storage temperature

- Climatic class

- Condensation

- Electromagnetic Compatibility

- Emitted interference and interference immunity

IP66 (optional IP66/IP68)

Type 4X

-40 ... +100 °C (-40 ... +212 °F)

-20 ... +100 °C (-4 ... +212 °F) with 30 bar measuring cell

-20 ... +60 °C (-4 ... +140 °F)

-40 ... +85 °C (-40 ... +185 °F)

-30 ... +85 °C (-22 ... +185 °F)

-50 ... +85 °C (-58 ... +185 °F)

Relative humidity 0 ... 100 %

Condensation permissible, suitable for use in the tropics

Acc. to IEC 61326 and NAMUR NE 21

Design

Weight (without options)

Die-cast aluminum: ≈ 4.5 kg (≈ 9.9 lb)

Stainless steel precision casting: ≈ 7.1 kg (≈ 15.6 lb)

Enclosure material

Low-copper die-cast aluminum, GD-AISI12 or stainless steel precision casting, mat. no. 1.4408

Wetted parts materials

- Seal diaphragm

Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819

- Process flanges and sealing screw

Stainless steel, mat. no. 1.4408, Hastelloy C4, mat. no. 2.4602

- O-Ring

FPM (Viton) or optionally: PTFE, FEP, FEPM and NBR

Measuring cell filling

Silicone oil or inert filling liquid
(maximum value with oxygen measurement pressure 100 bar (1450 psi) at 60 °C (140 °F))

Process connection

Female thread 1/4-18 NPT and flange connection with mounting thread M10 to DIN 19213 or 7/16-20 UNF to IEC 61518/DIN EN 61518

Material of mounting bracket

- Steel

Sheet-steel, Mat. No. 1.0330, chrome-plated

- Stainless steel 304

Sheet stainless steel, mat. no. 1.4301 (SS 304)

- Stainless steel 316L

Sheet stainless steel, mat. no. 1.4404 (SS 316L)

Power supply U_H

Terminal voltage on transmitter

10.5 ... 45 V DC

10.5 ... 30 V DC in intrinsically-safe mode

PROFIBUS PA/ FOUNDATION Fieldbus

-

Power supply

Supplied through bus

Separate 24 V power supply necessary

-

No

Bus voltage

- Not Ex

-

9 ... 32 V

- With intrinsically-safe operation

-

9 ... 24 V

Current consumption

- Basic current (max.)

-

12.5 mA

- Start-up current ≤ basic current

-

Yes

- Max. current in event of fault

-

15.5 mA

Fault disconnection electronics (FDE) available

-

Yes

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for differential pressure and flow

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SITRANS P410 for differential pressure and flow**Certificates and approvals**

Classification according to PED 2014/68/EU

Explosion protection

• Intrinsic safety "i"

- Marking
- Permissible ambient temperature
- Connection

- Effective internal inductance/capacitance

• Explosion-proof "d"

- Marking
- Permissible ambient temperature
- Connection

• Dust explosion protection for zone 20 (pending)

- Marking
- Permissible ambient temperature
- Max. surface temperature
- Connection

- Effective internal inductance/capacitance

• Dust explosion protection for zone 21/22 (pending)

- Marking
- Connection

• Type of protection "n" (zone 2)

- Marking
- Connection (Ex nA)
- Connection (Ex ic)

- Effective internal inductance/capacitance

• Explosion protection acc. to FM (pending)

- Identification (XP/DIP) or (IS); (NI)

• Explosion protection to CSA (pending)

- Identification (XP/DIP) or (IS)

HART

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

PTB 13 ATEX 2007 X

Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb

-40 ... +85 °C (-40 ... +185 °F) temperature class T4;
 -40 ... +70 °C (-40 ... +158 °F) temperature class T5;
 -40 ... +60 °C (-40 ... +140 °F) temperature class T6

To certified intrinsically-safe circuits with peak values:
 $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$;
 $R_i = 300 \Omega$

 $L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

PTB 99 ATEX 1160

Ex II 1/2 G Ex d IIC T4/T6 Ga/Gb

-40 ... +85 °C (-40 ... +185 °F) temperature class T4;
 -40 ... +60 °C (-40 ... +140 °F) temperature class T6

To circuits with values: $U_H = 10.5 \dots 45 \text{ V}$ DC

PTB 01 ATEX 2055

Ex II 1 D Ex ta IIIC T120°C Da

Ex II 1/2 D Ex ta/tb IIIC T120°C Da/Db

-40 ... +85 °C (-40 ... +185 °F)
 120 °C (248 °F)

To certified intrinsically-safe circuits with peak values:
 $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$,
 $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$

 $L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

PTB 01 ATEX 2055

Ex II 2 D Ex tb IIIC T120°C Db

To circuits with values: $U_H = 10.5 \dots 45 \text{ V}$ DC; $P_{\max} = 1.2 \text{ W}$

PTB 13 ATEX 2007 X

Ex II 2/3 G Ex nA IIC T4/T5/T6 Gb/Gc

Ex II 2/3 G Ex ic IIC T4/T5/T6 Gb/Gc

 $U_m = 45 \text{ V}$ To circuits with values:
 $U_i = 45 \text{ V}$ $L_i = 0.4 \text{ mH}$, $C_i = 6 \text{ nF}$

Certificate of Compliance 3008490

CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

Certificate of Compliance 1153651

CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III

PROFIBUS PA/ FOUNDATION FieldbusFISCO supply unit:
 $U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$ Linear barrier:
 $U_o = 24 \text{ V}$, $I_o = 250 \text{ mA}$, $P_o = 1.2 \text{ W}$ $L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$ To circuits with values: $U_H = 9 \dots 32 \text{ V}$ DCFISCO supply unit:
 $U_o = 17.5 \text{ V}$, $I_o = 380 \text{ mA}$, $P_o = 5.32 \text{ W}$ Linear barrier:
 $U_o = 24 \text{ V}$, $I_o = 250 \text{ mA}$, $P_o = 1 \text{ W}$ $L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$ To circuits with values: $U_H = 9 \dots 32 \text{ V}$ DC;
 $P_{\max} = 1 \text{ W}$ $U_m = 32 \text{ V}$ FISCO supply unit ic:
 $U_o = 17.5 \text{ V}$, $I_o = 570 \text{ mA}$ Linear barrier:
 $U_o = 32 \text{ V}$, $I_o = 132 \text{ mA}$, $P_o = 1 \text{ W}$ $L_i = 7 \mu\text{H}$, $C_i = 1.1 \text{ nF}$

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for differential pressure and flow

HART communication		FOUNDATION Fieldbus communication	
HART	230 ... 1100 Ω	Function blocks	3 function blocks analog input, 1 function block PID
Protocol	HART Version 5.x		
Software for PC	SIMATIC PDM		
PROFIBUS PA communication		• Analog input	Yes, linearly rising or falling characteristic
Simultaneous communication with master class 2 (max.)	4	- Adaptation to customer-specific process variables	0 ... 100 s
The address can be set using	Configuration tool or local operation (standard setting address 126)	- Electrical damping, adjustable	Output/input (can be locked within the device with a bridge)
Cyclic data usage		- Simulation function	parameterizable (last good value, substitute value, incorrect value)
• Output byte	5 (one measured value) or 10 (two measured values)	- Failure mode	Yes, one upper and lower warning limit and one alarm limit respectively
• Input byte	0, 1, or 2 (register operating mode and reset function for metering)	- Limit monitoring	Yes
Internal preprocessing		- Square-rooted characteristic for flow measurement	
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B	• PID	Standard FOUNDATION Fieldbus function block
Function blocks	2	• Physical block	1 resource block
• Analog input		Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic	• Pressure transducer block	
- Electrical damping, adjustable	0 ... 100 s	- Can be calibrated by applying two pressures	Yes
- Simulation function	Input /Output	- Monitoring of sensor limits	Yes
- Failure mode	parameterizable (last good value, substitute value, incorrect value)	- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively		
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output		
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)		
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively		
• Physical block	1		
Transducer blocks	2		
• Pressure transducer block			
- Can be calibrated by applying two pressures	Yes		
- Monitoring of sensor limits	Yes		
- Specification of a container characteristic with	Max. 30 nodes		
- Square-rooted characteristic for flow measurement	Yes		
- Gradual volume suppression and implementation point of square-root extraction	Parameterizable		
- Simulation function for measured pressure value and sensor temperature	Constant value or over parameterizable ramp function		

Selection and Ordering data		Article No.	Order Code
SITRANS P410 with HART pressure transmitters for differential pressure and flow, PN 160 (MAWP 2320 psi)		7MF4433-	-Z C41
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Measuring cell filling	Measuring cell cleaning		
Silicone oil	normal		
Measuring span (min. ... max.)			
2.5 ... 250 mbar	(1.004 ... 100.4 inH ₂ O)		
6 ... 600 mbar	(2.409 ... 240.9 inH ₂ O)		
16 ... 1600 mbar	(6.424 ... 642.4 inH ₂ O)		
50 ... 5000 mbar	(20.08 ... 2008 inH ₂ O)		
0.3 ... 30 bar	(4.35 ... 435 psi)		
Wetted parts materials			
(stainless steel process flanges)			
Seal diaphragm	Parts of measuring cell		
Stainless steel	Stainless steel		
Hastelloy	Stainless steel		
Hastelloy	Hastelloy		
Version for diaphragm seal ^{1) 2) 3) 4)}			
Process connection			
Female thread 1/4-18 NPT with flange connection			
<ul style="list-style-type: none"> Sealing screw opposite process connection <ul style="list-style-type: none"> Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518 Mounting thread M10 to DIN 19213 (only for replacement requirement) Vent on side of process flange⁵⁾ <ul style="list-style-type: none"> Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518 Mounting thread M10 to DIN 19213 (only for replacement requirement) 			
Non-wetted parts materials			
process flange screws	Electronics housing		
Stainless steel	Die-cast aluminum		
Stainless steel	Stainless steel precision casting ⁶⁾		
Version			
<ul style="list-style-type: none"> Standard version, German plate inscription, setting for pressure unit: bar International version, English plate inscription, setting for pressure unit: bar Chinese version, English plate inscription, setting for pressure unit: Pascal 			
All versions include DVD with compact operating instructions in various EU languages.			
Explosion protection			
<ul style="list-style-type: none"> None With ATEX, Type of protection: <ul style="list-style-type: none"> "Intrinsic safety (Ex ia)" "Explosion-proof (Ex d)"⁷⁾ "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)⁸⁾ "Ex nA/ic (Zone 2)"⁹⁾ "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)"⁸⁾¹⁰⁾ FM + CSA intrinsic safe (is) (pending)¹¹⁾ FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D⁸⁾¹⁰⁾¹¹⁾ With FM + CSA, Type of protection: <ul style="list-style-type: none"> "Intrinsic Safe and Explosion Proof (is + xp)"⁷⁾¹¹⁾ 			

Transmitters for applications with advanced requirements (Advanced)

for differential pressure and flow

¹⁵⁾M12 delivered without cable socket.

Selection and Ordering data		Article No.	Order code
Pressure transmitters for differential pressure and flow PN 160 (MAWP 2320 psi)			
SITRANS P410 with PROFIBUS PA (PA)		7MF4434-	-Z C41
SITRANS P410 with FOUNDATION Fieldbus (FF)		7MF4435-	-Z C41
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Measuring cell filling	Measuring cell cleaning		
Silicone oil	normal		
Nominal measuring range			
250 mbar (100.4 inH ₂ O)			
600 mbar (240.9 inH ₂ O)			
1600 mbar (642.4 inH ₂ O)			
5 bar (2008 inH ₂ O)			
30 bar (435 psi)			
Wetted parts materials			
(stainless steel process flanges)			
Seal diaphragm	Parts of measuring cell		
Stainless steel	Stainless steel		
Hastelloy	Stainless steel		
Hastelloy	Hastelloy		
Version as diaphragm seal 1) 2) 3) 4)			
Process connection			
Female thread 1/4-18 NPT with flange connection			
<ul style="list-style-type: none"> Sealing screw opposite process connection <ul style="list-style-type: none"> Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518 Mounting thread M10 to DIN 19213 (only for replacement requirement) Venting on side of process flanges 5) <ul style="list-style-type: none"> Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518 Mounting thread M10 to DIN 19213 (only for replacement requirement) 			
Non-wetted parts materials			
process flange screws	Electronics housing		
Stainless steel	Die-cast aluminum		
Stainless steel	Stainless steel precision casting		
Version			
<ul style="list-style-type: none"> Standard version, German plate inscription, setting for pressure unit: bar International version, English plate inscription, setting for pressure unit: bar Chinese version, English plate inscription, setting for pressure unit: Pascal All versions include DVD with compact operating instructions in various EU languages.			
Explosion protection			
<ul style="list-style-type: none"> None With ATEX, Type of protection: <ul style="list-style-type: none"> "Intrinsic safety (Ex ia)" "Explosion-proof (Ex d)"⁶⁾ "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)⁷⁾ "Ex nA/ic (Zone 2)"⁸⁾ "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)"^{7) 9)} (not for DS III FF) FM + CSA intrinsic safe (is) (pending)¹⁰⁾ FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D⁷⁾⁹⁾¹⁰⁾ With FM + CSA, Type of protection: <ul style="list-style-type: none"> "Intrinsic Safe and Explosion Proof (is + xp)"⁸⁾¹⁰⁾ 			
Electrical connection/cable entry			
<ul style="list-style-type: none"> Screwed gland M20 x 1.5 Screwed gland 1/2-14 NPT M12 device plugs (stainless steel)^{11) 12)} 			

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for differential pressure and flow

Selection and Ordering data

Pressure transmitters for differential pressure and flow PN 160 (MAWP 2320 psi)

SITRANS P410 with PROFIBUS PA (PA)

Article No.

Order code

7MF4434-  -  -Z C41

SITRANS P410 with FOUNDATION Fieldbus (FF)

7MF4435-  -  -Z C41

Display

- Without display
- Without visible display (display concealed, setting: bar)
- With visible display (setting: bar)
- With customer-specific display (setting as specified, Order code "Y21" required)

0
1
6
7

Included in delivery of the device:

- Quick-start guide
- Sealing plug(s) or sealing screw(s) for the process flanges(s)

- When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- If the acceptance test certificate 3.1. is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF443-...Y... and 7MF4900-1...-B
- The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- Not suitable for connection of remote seal. Position of the top vent valve in the process flange (see dimensional drawing).
- Without cable gland, with blanking plug.
- With enclosed cable gland Ex ia and blanking plug.
- Configurations with Han and M12 device plugs are only available in Ex ic.
- Only in connection with IP66.
- Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.
- Only in connection with Ex approval A, B, E or F.
- M12 delivered without cable socket

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for differential pressure and flow

1

Selection and Ordering data	Order code			
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:				
• Steel	A01	✓	✓	✓
• Stainless steel 304	A02	✓	✓	✓
• Stainless steel 316L	A03	✓	✓	✓
O-rings for process flanges (instead of FPM (Viton))				
• PTFE (Teflon)	A20	✓	✓	✓
• FEP (with silicone core, approved for food)	A21	✓	✓	✓
• FFKM (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F)	A22	✓	✓	✓
• NBR (Buna N)	A23	✓	✓	✓
Device plugs¹⁾				
• Han 7D (metal)	A30	✓		
• Han 8D (instead of Han 7D)	A31	✓		
• Angled	A32	✓		
• Han 8D (metal)	A33	✓		
Sealing screws (2 units) 1/4-18 NPT, with valve in mat. of process flanges	A40	✓	✓	✓
Cable sockets for M12 device plugs (metal (CuZn))	A50	✓	✓	✓
Rating plate inscription (instead of German)				
• English	B11	✓	✓	✓
• French	B12	✓	✓	✓
• Spanish	B13	✓	✓	✓
• Italian	B14	✓	✓	✓
English rating plate Pressure units in inH ₂ O and/or psi	B21	✓	✓	✓
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2²⁾	C11	✓	✓	✓
Inspection certificate³⁾ to EN 10204-3.1	C12	✓	✓	✓
Factory certificate to EN 10204-2.2	C14	✓	✓	✓
Acceptance certificate (EN 10204-3.1) PMI test of parts in contact with medium	C15	✓	✓	✓
Functional safety (SIL2) (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C20	✓		
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C23	✓		
Increased measuring accuracy (mandatory specification for SITRANS P410)	C41	✓	✓	✓
PED for Russia with initial calibration mark	C99	✓	✓	✓

Selection and Ordering data	Order code			
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
Setting of the upper saturation limit of the output signal to 22.0 mA	D05	✓		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)	D07	✓	✓	✓
Degree of protection IP66/IP68 (only for M20 x 1.5 and 1/2-14 NPT)	D12	✓	✓	✓
Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges	D37	✓	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included	D59	✓	✓	✓
TAG plate empty (no inscription)	D61	✓	✓	✓
Use in or on zone 1D/2D⁴⁾ (only together with type of protection "Intrinsic safety" (transmitter 7MF4...-.....-B.. Ex ia) and IP66)	E01	✓	✓	✓
Dual seal	E24	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-.....-B..)	E55 ⁵⁾	✓	✓	✓
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-.....-D..)	E56 ⁵⁾	✓	✓	✓
Explosion-proof "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-E..)	E57 ⁵⁾	✓	✓	✓
Ex protection „Ex ia“, „Ex d" and „Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-R..)	E58 ⁵⁾	✓	✓	✓
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea) (pending) (only for transmitter 7MF4...-.....-[B, D]..-Z + E11)	E70 ⁵⁾	✓	✓	✓
Ex-protection Ex ia according to EAC Ex (Russia)	E80	✓	✓	✓
Ex-protection Ex d according to EAC Ex (Russia)	E81	✓	✓	✓
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)	E82	✓	✓	✓
Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)	E83	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)	G10	✓	✓	✓
Interchanging of process connection side	H01	✓	✓	✓
Vent on side for gas measurements	H02	✓	✓	✓
Stainless steel process flanges for vertical differential pressure lines (not together with K01, K02 and K04) ⁶⁾	H03	✓	✓	✓

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for differential pressure and flow

1

Selection and Ordering data	Order code			
Further designs Add "-Z" to Article No. and specify Order code.		HART	PA	FF
Transient protector 6 kV (lightning protection)	J01	✓	✓	✓
Chambered graphite gasket for process flange	J02	✓	✓	✓
Chambered PTFE graphite gasket	J03	✓	✓	✓
EPDM O-rings for process flange with approval (WRC/WRAS)	J05	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on right when viewing the display)⁷⁾	J08	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on left when viewing the display)⁷⁾	J09	✓	✓	✓
Marine approvals				
• Det Norske Veritas Germanischer Lloyd (DNV-GL)	S10	✓	✓	✓
• Lloyds Register (LR)	S11	✓	✓	✓
• French marine classification society Bureau Veritas (BV)	S12	✓	✓	✓
• American Bureau of Shipping (ABS)	S14	✓	✓	✓
• Russian Maritime Register (RMR)	S16	✓	✓	✓
• Korean Register of Shipping (KR)	S17	✓	✓	✓

Factor valve block mounting for SITRANS P410 is possible. Depending on the available P410 variants, please see the configuration options for SITRANS P DS III (page 1/280).

✓ = available

- 1) Han device plug IP65
- 2) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 3) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 4) Option does not contain gas explosion protection; only dust explosion protection: Use in or at Zone 1D/2D
- 5) When the additional ex option is selected, the ATEX marking on the device is omitted. Only the Ex option selected via the Z option is marked.
- 6) Not suitable for connection of remote seal.
- 7) Blanking plug is standard configuration. Order option A40 if a vent valve is required instead of a blanking plug.

Selection and Ordering data	Order code			
Additional data Please add "-Z" to Article No. and specify Order code(s) and plain text.		HART	PA	FF
Measuring range to be set Specify in plain text: • in the case of linear characteristic curve (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi • in the case of square rooted characteristic (max. 5 characters): Y02: ... up to ... mbar, bar, kPa, MPa, psi	Y01 Y02	✓ ✓	✓ ¹⁾ ✓	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	Y15	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 char., specify in plain text: Y16:	Y16	✓	✓	✓
Entry of HART address (TAG) Max. 8 char., specify in plain text: Y17:	Y17	✓		
Setting of pressure indicator in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H ₂ O ⁺ , inH ₂ O ⁺ , ftH ₂ O ⁺ , mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM or %) ref. temperature 20 °C	Y21	✓	✓	✓
Setting of pressure indicator in non-pressure units²⁾ Specify in plain text: Y22: up to l/min, m ³ /h, m, USgpm, ... (specification of measuring range in pressure units "Y01" or "Y02" is essential, unit with max. 5 characters)	Y22 ³⁾ + Y01 or Y02	✓		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	Y25		✓	✓
Damping adjustment in seconds (0 ... 100 s)	Y30	✓	✓	✓

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset

✓ = available

- 1) Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.
- 2) Preset values can only be changed over SIMATIC PDM.
- 3) Not in conjunction with over-filling safety device for flammable and non-flammable liquids (Order code "E08")

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for differential pressure and flow

1

Selection and Ordering data		Article No.	Order code
SITRANS P DS III with HART pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)		7MF4533-	-Z C41
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Measuring cell filling	Measuring cell cleaning		
Silicone oil	normal	1	
Measuring span (min. ... max.)			
6 ... 600 mbar	(2.4 ... 240 inH ₂ O)	E	
16 ... 1600 mbar	(6.4 ... 642 inH ₂ O)	F	
50 ... 5000 mbar	(20 ... 2000 inH ₂ O)	G	
0.3 ... 30 bar	(4.35 ... 435 psi)	H	
Wetted parts materials			
(stainless steel process flanges)			
Seal diaphragm	Parts of measuring cell	A	
Stainless steel	Stainless steel	B	
Hastelloy	Stainless steel	Y	
Version for diaphragm seal ^{1) 2) 3) 4)}			
Process connection			
Female thread 1/4-18 NPT with flange connection			
• Sealing screw opposite process connection			
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		3	
- Mounting thread M12 to DIN 19213 (only for replacement requirement)		1	
• Venting on side of process flanges, location of vent valve at top of process flanges (see dimensional drawing)			
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		7	
- Mounting thread M12 to DIN 19213 (only for replacement requirement)		5	
Non-wetted parts materials			
process flange screws	Electronics housing		
Stainless steel	Die-cast aluminum	2	
Stainless steel	Stainless steel precision casting ⁵⁾	3	
Version			
• Standard version, German plate inscription, setting for pressure unit: bar		1	
• International version, English plate inscription, setting for pressure unit: bar		2	
• Chinese version, English plate inscription, setting for pressure unit: Pascal		3	
All versions include DVD with compact operating instructions in various EU languages.			
Explosion protection			
• None			A
• With ATEX, Type of protection:			
- "Intrinsic safety (Ex ia)"			B
- "Explosion-proof (Ex d)" ⁶⁾			D
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)" ⁷⁾			P
- "Ex nA/ic (Zone 2)" ⁸⁾			E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)" ⁷⁾⁹⁾			R
• FM + CSA intrinsic safe (is) (pending) ¹⁰⁾			F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D ⁷⁾⁹⁾¹⁰⁾			S
• With FM + CSA, Type of protection:			
- "Intrinsic safety and explosion-proof (is + xp)" ⁶⁾¹⁰⁾ , max PN 360			NC
Electrical connection/cable entry			
• Screwed gland M20x1.5			B
• Screwed gland 1/2-14 NPT			C
• Han 7D device plug (plastic housing) incl. mating connector ^{11) 12)}			D
• M12 device plugs (stainless steel) ¹³⁾¹⁴⁾			F



Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for differential pressure and flow

1

Selection and Ordering data	Article No.	Order code
SITRANS P DS III with HART pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)	7MF4533-  -  -Z C41	
Display		
• Without display		0
• Without visible display (display concealed, setting: mA)		1
• With visible display (setting: mA)		6
• with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)		7

Power supply units see Chap. 7 "Supplementary Components".

Scope of delivery: Pressure transmitter as ordered (Instruction Manual is extra ordering item)

- 1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF453-...Y.-... and 7MF4900-1...-B
- 4) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- 5) Not in conjunction with Electrical connection "Han 7D device plug".
- 6) Without cable gland, with blanking plug
- 7) With enclosed cable gland Ex ia and blanking plug
- 8) Configurations with Han and M12 device plugs are only available in Ex ic.
- 9) Only in connection with IP66.
- 10) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.
- 11) Only in connection with Ex approval A, B or E.
- 12) Permissible only for crimp-contact of conductor cross-section 1 mm²
- 13) Only in connection with Ex approval A, B, E or F.
- 14) M12 delivered without cable socket.

Selection and Ordering data		Article No.	Order Code
Pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)			
SITRANS P410 with PROFIBUS PA (PA)		7MF4534-	-Z C41
SITRANS P410 with FOUNDATION Fieldbus (FF)		7MF4535-	-Z C41
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Measuring cell filling	Measuring cell cleaning		
Silicone oil	normal		
Nominal measuring range			
600 mbar	(240 inH ₂ O)		
1600 mbar	(642 inH ₂ O)		
5 bar	(2000 inH ₂ O)		
30 bar	(435 psi)		
Wetted parts materials			
(stainless steel process flanges)			
Seal diaphragm	Parts of measuring cell		
Stainless steel	Stainless steel		
Hastelloy	Stainless steel		
Version for diaphragm seal ^{1) 2) 3) 4)}			
Process connection			
Female thread 1/4-18 NPT with flange connection			
<ul style="list-style-type: none"> Sealing screw opposite process connection <ul style="list-style-type: none"> Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518 Mounting thread M12 to DIN 19213 (only for replacement requirement) Venting on side of process flanges, location of vent valve at top of process flanges (see dimensional drawing). <ul style="list-style-type: none"> Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518 Mounting thread M12 to DIN 19213 (only for replacement requirement) 			
Non-wetted parts materials			
Process flange screws	Electronics housing		
Stainless steel	Die-cast aluminum		
Stainless steel	Stainless steel precision casting		
Version			
<ul style="list-style-type: none"> Standard version, German plate inscription, setting for pressure unit: bar International version, English plate inscription, setting for pressure unit: bar Chinese version, English plate inscription, setting for pressure unit: Pascal 			
All versions include DVD with compact operating instructions in various EU languages.			
Explosion protection			
<ul style="list-style-type: none"> None With ATEX, Type of protection: <ul style="list-style-type: none"> "Intrinsic safety (Ex ia)" "Explosion-proof (Ex d)"⁵⁾ "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)⁶⁾ "Ex nA/ic (Zone 2)"⁷⁾ "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)"⁶⁾⁸⁾ FM + CSA intrinsic safe (is) (pending)⁹⁾ FM + CSA (is + ep) + Ex ia + Ex d (ATEX) + Zone 1D/2D⁶⁾⁷⁾⁹⁾ With FM + CSA, Type of protection: <ul style="list-style-type: none"> "Intrinsic safety and explosion-proof (is + xp)"⁶⁾⁹⁾, max PN 360 			
Electrical connection/cable entry			
<ul style="list-style-type: none"> Screwed gland M20 x 1.5 Screwed gland 1/2-14 NPT M12 device plugs (stainless steel) ^{10) 11)} 			





Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for differential pressure and flow

1

Selection and Ordering data	Article No.	Order Code
Pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)		
SITRANS P410 with PROFIBUS PA (PA)	7MF4534-  - 	-Z C41
SITRANS P410 with FOUNDATION Fieldbus (FF)	7MF4535-  - 	-Z C41
Display		
• Without (display hidden)		0
• Without visible display (display concealed, setting: bar)		1
• With visible display (setting: bar)		6
• With customer-specific display (setting as specified, Order code "Y21" required)		7

Included in delivery of the device:

- Quick-start guide
- Sealing plug(s) or sealing screw(s) for the process flanges(s)

- 1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.
- 2) If the acceptance test certificate 3.1. is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.
- 3) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF453-...Y...-.... and 7MF4900-1....-B
- 4) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
- 5) Without cable gland, with blanking plug.
- 6) With enclosed cable gland Ex ia and blanking plug.
- 7) Configurations with Han and M12 device plugs are only available in Ex ic.
- 8) Only in connection with IP66.
- 9) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505.
- 10) Only in connection with Ex approval A, B, E or F.
- 11) M12 delivered without cable socket

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for differential pressure and flow

1

Selection and Ordering data		Order code			
Further designs			HART	PA	FF
Add "-Z" to Article No. and specify Order code.					
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:					
• Steel	A01	✓	✓	✓	✓
• Stainless steel 304	A02	✓	✓	✓	✓
• Stainless steel 316L	A03	✓	✓	✓	✓
O-rings for process flanges (instead of FPM (Viton))					
• PTFE (Teflon)	A20	✓	✓	✓	✓
• FEP (with silicone core, approved for food)	A21	✓	✓	✓	✓
• FFFM (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F)	A22	✓	✓	✓	✓
• NBR (Buna N)	A23	✓	✓	✓	✓
Device plugs¹⁾					
• Han 7D (metal)	A30	✓			
• Han 8D (instead of Han 7D)	A31	✓			
• Angled	A32	✓			
• Han 8D (metal)	A33	✓			
Sealing screws (2 units) 1/4-18 NPT, with valve in mat. of process flanges		A40	✓	✓	✓
Cable sockets for M12 device plugs (metal (CuZn))		A50	✓	✓	✓
Rating plate inscription (instead of German)					
• English	B11	✓	✓	✓	✓
• French	B12	✓	✓	✓	✓
• Spanish	B13	✓	✓	✓	✓
• Italian	B14	✓	✓	✓	✓
English rating plate Pressure units in inH ₂ O and/or psi		B21	✓	✓	✓
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2		C11	✓	✓	✓
Inspection certificate Acc. to EN 10204-3.1		C12	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2		C14	✓	✓	✓
Functional safety (SIL2) (pending) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration		C20	✓		
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration		C23	✓		
Increased measuring accuracy (mandatory specification for SITRANS P410)		C41	✓	✓	✓
PED for Russia with initial calibration mark		C99	✓	✓	✓
Setting of the upper saturation limit of the output signal to 22.0 mA		D05	✓		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)		D07	✓	✓	✓
Degree of protection IP66/IP68 (only for M20 x 1.5 and 1/2-14 NPT)		D12	✓	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included		D59	✓	✓	✓
TAG plate empty (no inscription)		D61	✓	✓	✓

Selection and Ordering data		Order code			
Further designs			HART	PA	FF
Add "-Z" to Article No. and specify Order code.					
Use in or on zone 1D/2D²⁾ (only together with type of protection "Intrinsic safety" (transmitter 7MF4...-.....-B.. Ex ia) and IP66)		E01	✓	✓	✓
Dual seal		E24	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-.....-B..)		E55 ³⁾	✓	✓	✓
Ex prot. "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-.....-D..)		E56 ³⁾	✓	✓	✓
Explosion-proof "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-E..)		E57 ³⁾	✓	✓	✓
Ex protection „Ex ia“, „Ex d“ and „Zone 2“ to NEPSI (China) (only for transmitter 7MF4...-.....-R..)		E58 ³⁾	✓	✓	✓
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea) (pending) (only for transmitter 7MF4...-.....-[B, D]..-Z + E11)		E70 ³⁾	✓	✓	✓
Ex-protection Ex ia according to EAC Ex (Russia)		E80	✓	✓	✓
Ex-protection Ex d according to EAC Ex (Russia)		E81	✓	✓	✓
Ex-protection Ex nA/ic (Zone 2) according to EAC Ex (Russia)		E82	✓	✓	✓
Ex-protection Ex ia + Ex d + Zone 1D/2D according to EAC Ex (Russia)		E83	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)		G10	✓	✓	✓
Interchanging of process connection side		H01	✓	✓	✓
Vent on side for gas measurements		H02	✓	✓	✓
Stainless steel process flanges for vertical differential pressure lines		H03	✓	✓	✓
Transient protector 6 kV (lightning protection)		J01	✓	✓	✓
Chambered graphite gasket for process flange		J02	✓	✓	✓
Chambered PTFE graphite gasket		J03	✓	✓	✓
EPDM O-rings for process flange with approval (WRC/WRAS)		J05	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on right when viewing the display)⁴⁾		J08	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on left when viewing the display)⁴⁾		J09	✓	✓	✓
Marine approvals					
• Det Norske Veritas Germanischer Lloyd (DNV-GL)	S10	✓	✓	✓	✓
• Lloyds Register (LR)	S11	✓	✓	✓	✓
• French marine classification society Bureau Veritas (BV)	S12	✓	✓	✓	✓
• American Bureau of Shipping (ABS)	S14	✓	✓	✓	✓
• Russian Maritime Register (RMR)	S16	✓	✓	✓	✓
• Korean Register of Shipping (KR)	S17	✓	✓	✓	✓

Factor valve block mounting for SITRANS P410 is possible. Depending on the available P410 variants, please see the configuration options for SITRANS P DS III (page 1/280).

1) Han device plug IP65

2) Option does not contain gas explosion protection; only dust explosion protection: Use in or at Zone 1D/2D.

3) When the additional ex option is selected, the ATEX marking on the device is omitted. Only the Ex option selected via the Z option is marked.

4) Blanking plug is standard configuration. Order option A40 if a vent valve is required instead of a blanking plug.

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)
SITRANS P410

for differential pressure and flow

1

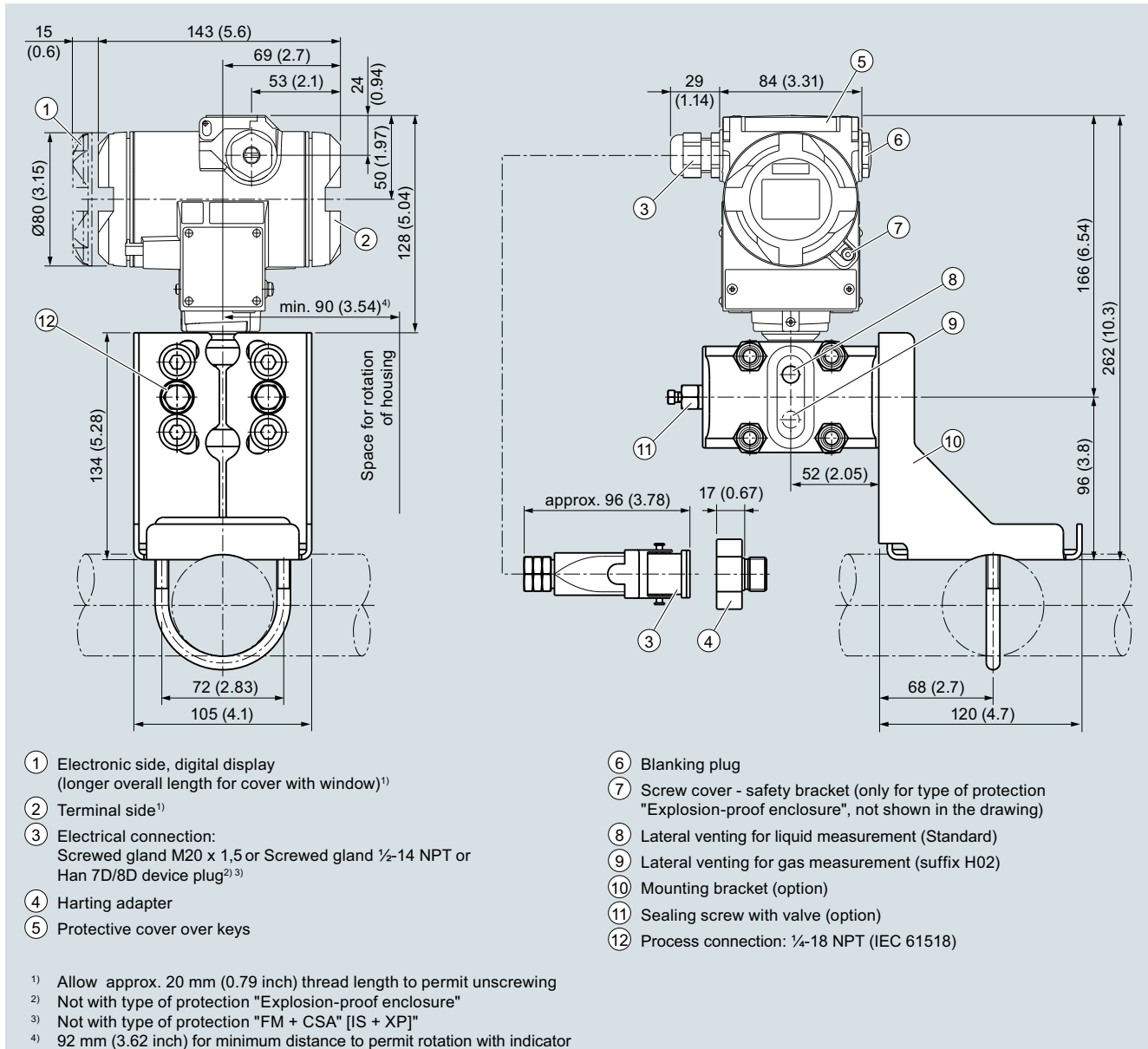
Selection and Ordering data	Order code			
Additional data		HART	PA	FF
Please add "-Z" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text: • in the case of linear characteristic curve (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi • in the case of square rooted characteristic (max. 5 characters): Y02: ... up to ... mbar, bar, kPa, MPa, psi	Y01 Y02	✓ ✓	 ✓ ¹⁾	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	Y15	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 char., specify in plain text: Y16:	Y16	✓	✓	✓
Entry of HART address (TAG) Max. 8 char., specify in plain text: Y17:	Y17	✓		
Setting of pressure indication in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H ₂ O ^{*)} , inH ₂ O ^{*)} , ftH ₂ O ^{*)} , mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM or % *) ref. temperature 20 °C	Y21	✓	✓	✓
Setting of pressure indication in non-pressure units²⁾ Specify in plain text: Y22: up to l/min, m ³ /h, m, USgpm, ... (specification of measuring range in pressure units "Y01" or "Y02" is essential, unit with max. 5 characters)	Y22 + Y01 or Y02	✓		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	Y25		✓	✓
Damping adjustment in seconds (0 ... 100 s)	Y30	✓	✓	✓

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset.

✓ = available

¹⁾ Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

²⁾ Preset values can only be changed over SIMATIC PDM.

Dimensional drawings

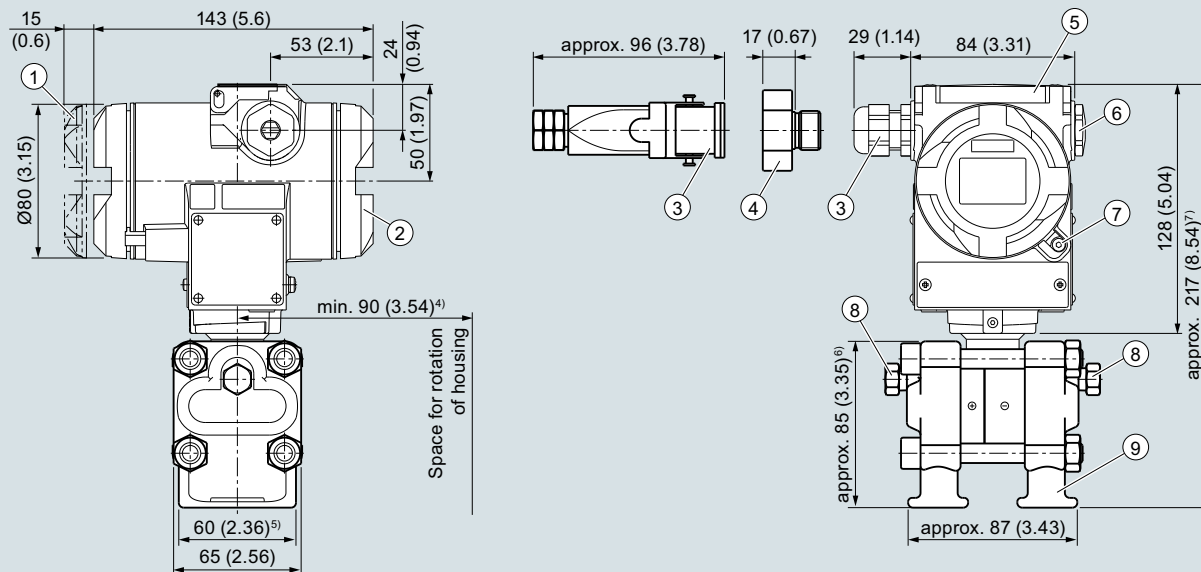
SITRANS P410 pressure transmitters for differential pressure and flow, dimensions in mm (inch)

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

for differential pressure and flow



1) Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing

2) Not with type of protection "Explosion-proof enclosure"

3) Not with type of protection "FM + CSA" [IS + XP]

4) 92 mm (3.6 inch) for minimum distance to permit rotation with indicator

5) 74 mm (2.9 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)

6) 91 mm (3.6 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)

7) 219 mm (8.62 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)

SITRANS P410 pressure transmitters for differential pressure and flow, with process covers for vertical differential pressure lines, optional "H03", dimensional drawing, dimensions in mm (inch)



SITRANS P410 pressure transmitters for differential pressure and flow, with process covers for vertical differential pressure lines

Pressure Measurement

Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

Accessories/Spare parts

1

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
Accessories/Spare parts		Mounting screws	
Mounting bracket and fastening parts for pressure transmitters SITRANS P410 with HART, P410 with PROFIBUS PA and P410 with FOUNDATION Fieldbus (7MF403-.....-..C.)		For measuring point label, grounding and connection terminals or for display (50 units)	7MF4997-1CD
<ul style="list-style-type: none"> made of steel made of stainless steel 304/1.4301 made of stainless steel 316L/1.4404 	7MF4997-1AB 7MF4997-1AH 7MF4997-1AP	Sealing screws (1 set = 2 units) for process flange	
		<ul style="list-style-type: none"> made of stainless steel made of Hastelloy 	7MF4997-1CG 7MF4997-1CH
Mounting bracket and fastening parts for pressure transmitters SITRANS P410 with HART, P410 with PROFIBUS PA and P410 with FOUNDATION Fieldbus (7MF403-.....-..A., ..B., ..D. and ..F.)		Sealing screws with vent valve Complete (1 set = 2 units)	
<ul style="list-style-type: none"> made of steel made of stainless steel 304/1.4301 made of stainless steel 316L/1.4404 	7MF4997-1AC 7MF4997-1AJ 7MF4997-1AQ	<ul style="list-style-type: none"> made of stainless steel made of Hastelloy 	7MF4997-1CP 7MF4997-1CQ
Mounting and fastening brackets For differential pressure transmitters with flange thread M10 SITRANS P410 with HART, P410 with PROFIBUS PA and P410 with FOUNDATION Fieldbus (7MF443-....)		Connection board	
<ul style="list-style-type: none"> made of steel made of stainless steel 304/1.4301 made of stainless steel 316L/1.4404 	7MF4997-1AD 7MF4997-1AK 7MF4997-1AR	<ul style="list-style-type: none"> for SITRANS P410 for SITRANS P410 with PROFIBUS PA and P410 with FOUNDATION Fieldbus 	7MF4997-1DN 7MF4997-1DP
Mounting and fastening brackets For differential pressure transmitters with flange thread M12 SITRANS P410 with HART, P410 with PROFIBUS PA and P410 with FOUNDATION Fieldbus (7MF453-....)		O-rings for process flanges made of:	
<ul style="list-style-type: none"> made of steel made of stainless steel 304/1.4301 made of stainless steel 316L/1.4404 	7MF4997-1AE 7MF4997-1AL 7MF4997-1AS	<ul style="list-style-type: none"> FPM (Viton) PTFE (Teflon) FEP (with silicone core, approved for food) FFPM (Kalrez, compound 4079) NBR (Buna N) 	7MF4997-2DA 7MF4997-2DB 7MF4997-2DC 7MF4997-2DD 7MF4997-2DE
Mounting and fastening brackets For differential pressure transmitters with flange thread 7/16 -20 UNF SITRANS P410 with HART, P410 with PROFIBUS PA and P410 with FOUNDATION Fieldbus (7MF443-.... and 7MF453-....)		Sealing ring for process connection	see "Fittings"
<ul style="list-style-type: none"> made of steel made of stainless steel 304/1.4301 made of stainless steel 316L/1.4404 	7MF4997-1AF 7MF4997-1AM 7MF4997-1AT		
Cover Made of die-cast aluminum, including gasket, for SITRANS P410 with HART, P410 with PROFIBUS PA and P410 with FOUNDATION Fieldbus. Compatible for Ex and non-Ex transmitters			
<ul style="list-style-type: none"> without window with window 	7MF4997-1BB 7MF4997-1BE		
Cover Made of stainless steel, including gasket, or SITRANS P410 with HART, P410 with PROFIBUS PA and P410 with FOUNDATION Fieldbus. Compatible for Ex and non-Ex transmitters			
<ul style="list-style-type: none"> without window with window 	7MF4997-1BC 7MF4997-1BF 7MF4997-1BR		
Digital indicator Including mounting material, for SITRANS P410 with HART, P410 with PROFIBUS PA and P410 with FOUNDATION Fieldbus			
Measuring point label			
<ul style="list-style-type: none"> without inscription (5 units) Printed (1 unit) Data according to Y01 or Y02, Y15, Y16 and Y99 (see "Pressure transmitters") 	7MF4997-1CA 7MF4997-1CB-Z Y...:		

Pressure Measurement

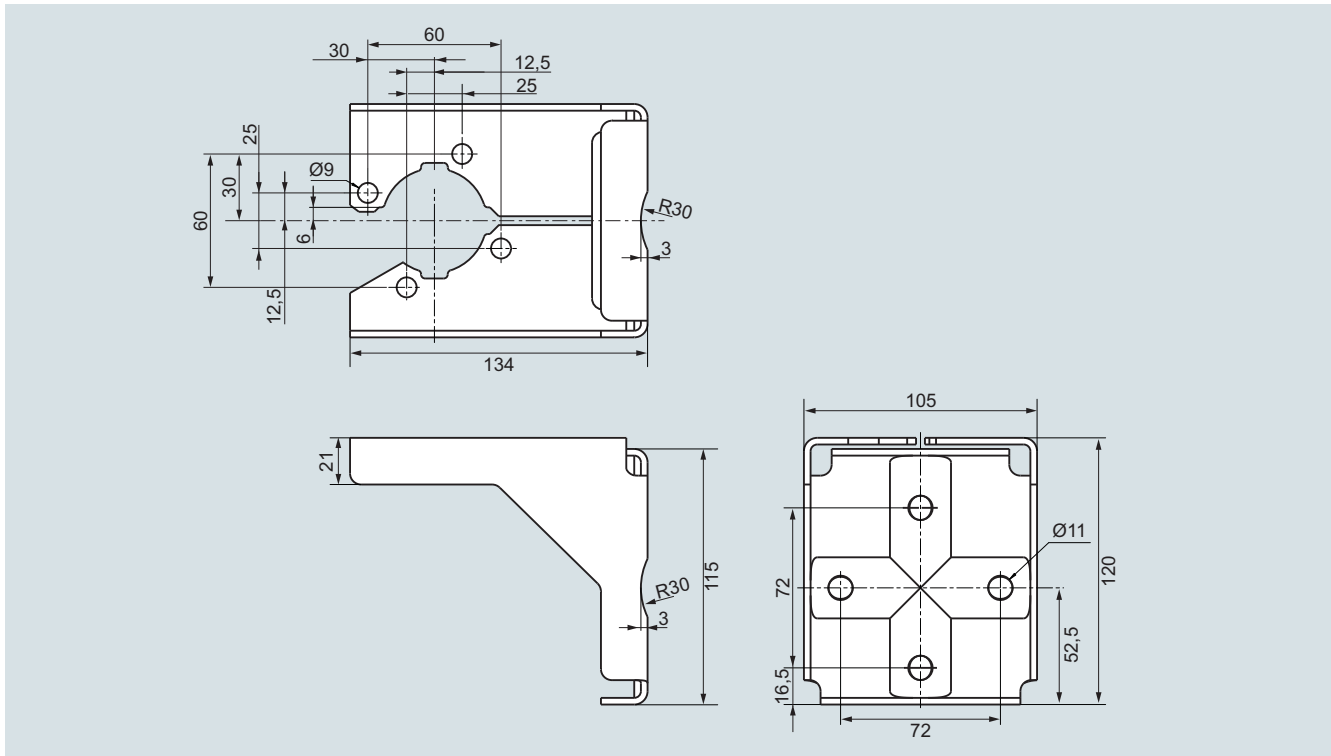
Transmitters for applications with advanced requirements (Advanced)

SITRANS P410

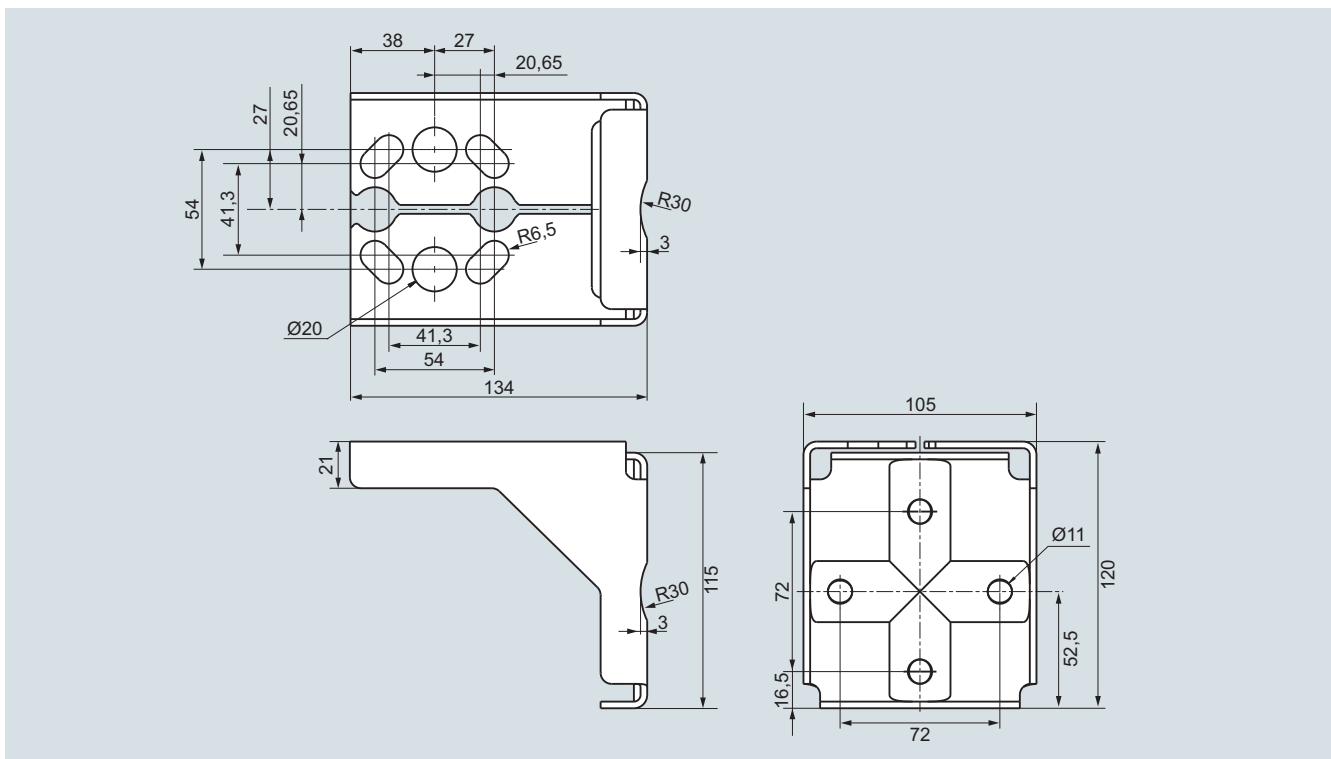
Accessories/Spare parts

Selection and Ordering data	Article No.
Documentation The entire documentation is available for download free-of-charge in various languages at: http://www.siemens.com/processinstrumentation/documentation Compact operating instructions SITRANS P DS III/P410 • English, German, Spanish, French, Italian, Dutch	A5E03434626
Certificates (order only via SAP) instead of Internet download • hard copy (to order) • on DVD (to order)	A5E03252406 A5E03252407
HART modem with USB interface	7MF4997-1DB

Power supply units see Chap. 7 "Supplementary Components".

Dimensional drawings

Mounting bracket for SITRANS P410 gauge pressure-transmitters, dimensions in mm
mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)



Mounting bracket for SITRANS P410 differential pressure transmitter, dimensions in mm
mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)

Pressure Measurement

Transmitters for applications with highest requirements (Premium)
SITRANS P500

Technical description

Overview



SITRANS P500 pressure transmitters are digital pressure transmitters featuring extensive user-friendliness and which fulfil the most stringent demands of accuracy, long-term stability, speed and lots more.

Extensive functionality allows you to set the pressure transmitter specifically to your own requirements. Despite their many settings options, local set-up is easy. A multi-lingual menu with clear text instructions guides you through the process. There are also help texts available.

The innovative EDD with integrated QuickStart assistance is also quick and easy to configure by computer using the HART protocol.

Extensive diagnostic functions, e.g. min/max pointer for pressure and temperature, or limit value indicator, make sure you always have the process under control. You can also display additional process values such as temperature or static pressure. The simultaneous display of mass, resulting from a volume, is also easy.

The SITRANS P500 pressure transmitters can be configured to measure:

- Differential pressure
- Level
- Volume
- Mass
- Volume flow
- Mass flow

Benefits

- High measuring accuracy
- Very fast response time
- Extremely good long-term stability
- High reliability even under extreme chemical and mechanical loads
- For aggressive and non-aggressive gases, vapors and liquids
- Extensive diagnosis and simulation functions which can be used both on site as well as via HART.
- Optional separate replacement of measuring cell and electronics without recalibration.
- Extremely low conformity error values

- Infinitely adjustable spans of 1 mbar to 32 bar (0.0145 to 465 psi; 0.4 to 12860 inH₂O)
- Extremely good total performance and conformity error values with no loss of performance up to a turndown of 10 guaranteed.
- Additional integrated sensor for static pressure
- Parameterization via on-site control keys or HART
- Short process flanges enable space-saving installation.

Application

The SITRANS P500 pressure transmitters can be used in industrial areas with extreme chemical and mechanical loads. Electromagnetic compatibility in the range 10 kHz to 1 GHz makes them suitable for locations with high electromagnetic emissions.

Pressure transmitters with ratings "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The pressure transmitter comes with a CE-declaration of conformity and fulfils the corresponding unified European directives (ATEX).

Pressure transmitters with the type of protection "Intrinsic safety" for use in zone 0 may be operated with power supply units of category "ia" and "ib".

With newly designed measuring cell, it is possible to work with process temperatures of -40 to 125 °C (-40 to +257 °F) without having to use a remote seal.

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous fluids.

The pressure transmitter can be fully parameterized locally via the three operating keys and externally via HART.

Pressure transmitters for differential pressure and flow

- Measured variables:
 - Differential pressure
 - Small positive or negative pressure
 - Flow $q \sim \sqrt{\Delta p}$ (together with a primary element (see Chapter "Flow Meters"))
- Span (freely adjustable)
for SITRANS P500: 1 mbar to 32 bar (0.0145 to 465 psi; 0.4 to 12860 inH₂O)

Pressure transmitters for level

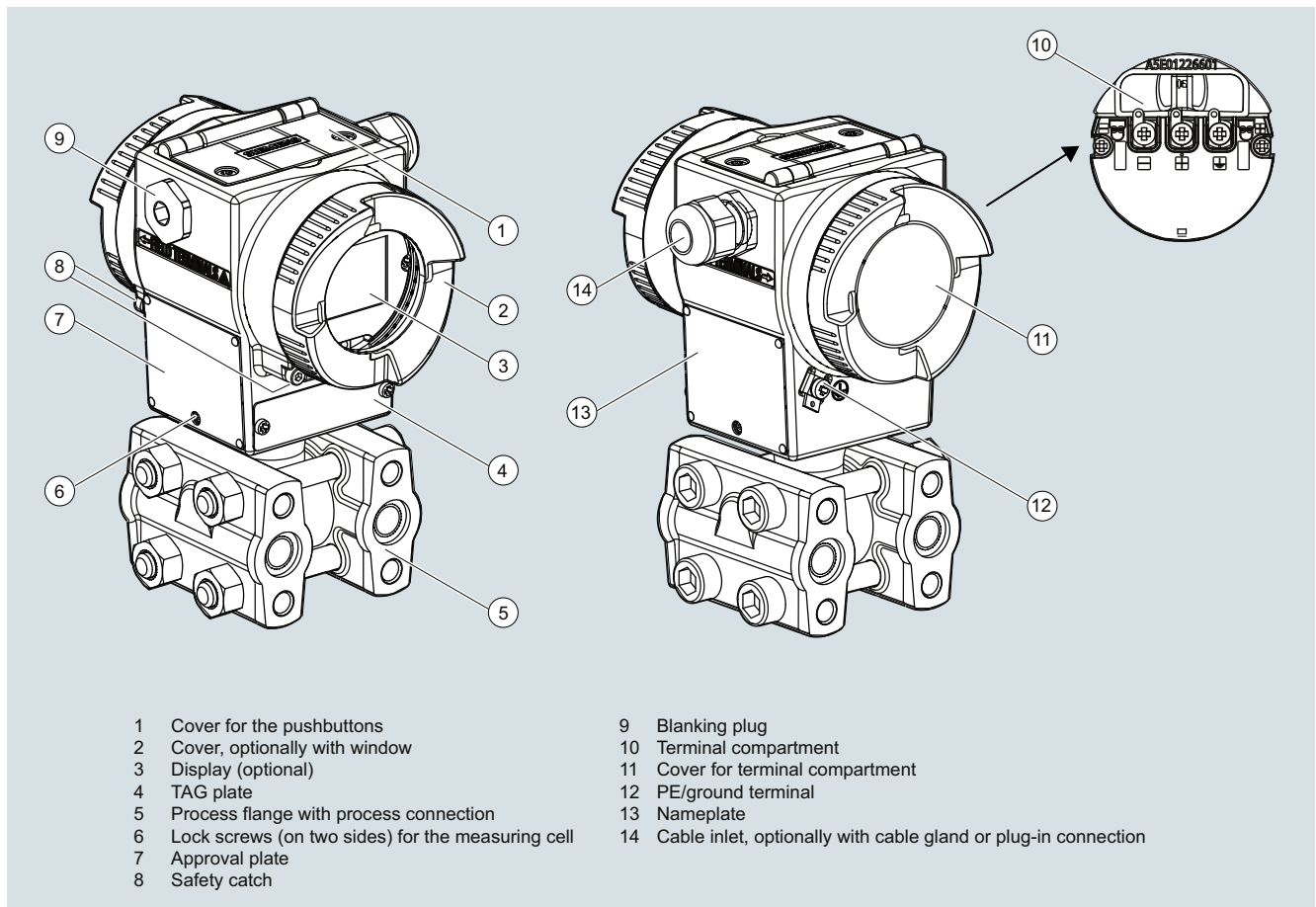
- Measured variable: Level of aggressive and non-aggressive liquids in open and closed vessels.
- Span (freely adjustable)
for SITRANS P500: 1.25 to 6250 mbar (0.5 to 2509 inH₂O)

- Nominal diameter of the mounting flange
 - DN 50 / PN 40
 - DN 80 / PN 40
 - DN 100/ PN 16, PN 40
 - 2 inch/class 150, class 300
 - 3 inch/class 150, class 300
 - 4 inch/ class 150, class 300
 - customized special version

In the case of level measurements in open vessels, the low-pressure connection of the measuring cell remains open (measurement "compared to atmospheric").

In the case of measurements in closed vessels, the lower-pressure connection has to be connected to the vessel in order to compensate the static pressure.

The wetted parts are made from a variety of materials, depending on the degree of corrosion resistance required.

Design**View of transmitter**

- The electronics housing is made of coated die-cast aluminum.
- The casing has round screwed covers front and back.
- Depending on the design the front cover is fitted with an inspection window. You can read off the measured value directly from the optional display through the window.
- The inlet to the terminal compartment is located either on the left or right side. The unused opening in each case is sealed by a blanking plug.
- The PE/ground terminal is on the back of the housing.
- Access to the terminal compartment for auxiliary power and shielding by unscrewing the cover.
- Beneath the electronic housing is the measuring cell with its process flanges at which the process connections are available. The modular design of the pressure transmitter lets you replace the measuring cell, electronics and connection board as required.
- On the top of the housing you can see the screwed cover of the three local pushbuttons of the transmitter.

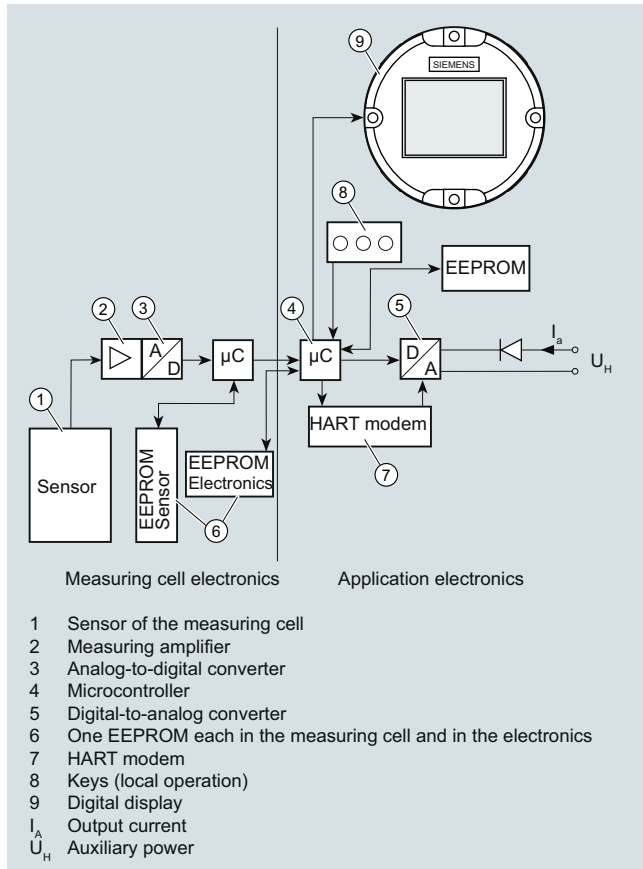
Pressure Measurement

Transmitters for applications with highest requirements (Premium)
SITRANS P500

Technical description

Function

Operation of electronics with HART communication



Function diagram of electronics

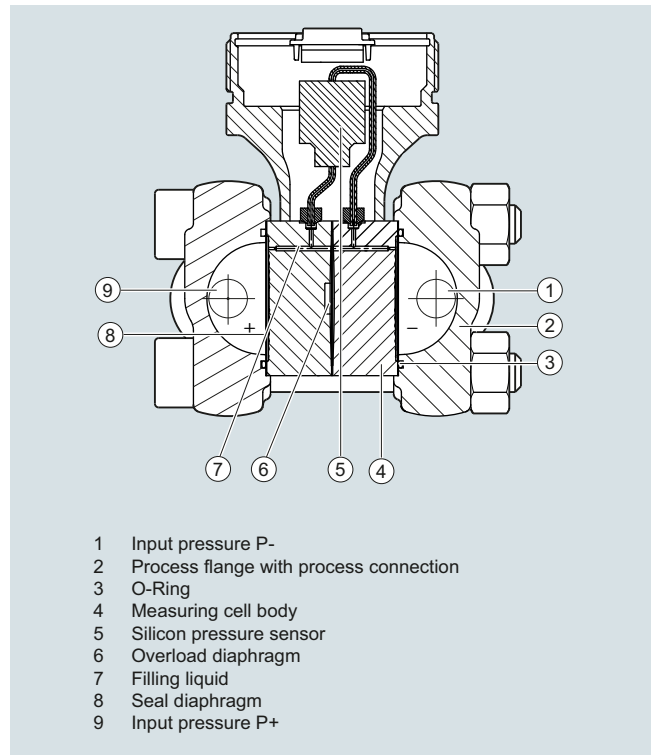
- The input pressure is converted into an electrical signal by the sensor.
- This signal is amplified by the measuring amplifier and digitized in an analog-to-digital converter.
- The digital signal is analyzed in a microcontroller and corrected according to linearity and thermal characteristics.
- In a digital-to-analog converter it is then converted into the output current of 4 to 20 mA. When connected to supply lines, a diode circuit provides reverse polarity protection.
- The measuring cell-specific data, the electronic data and the parameterization data is held in two EEPROMs. One EEPROM is incorporated into the measuring cell electronics, the other is incorporated into the application electronics.

Operation

- The three local pushbuttons enable you both to navigate and carry out configuration and to visually track messages and process values, provided a display is available.
- If you have a device without a display, you can carry out zero adjustment using the three local pushbuttons. It is possible to retrofit a display at any time.
- You can also carry out settings by computer via a HART modem.

Mode of operation of the measuring cells

Measuring cell for differential pressure and flow



Measuring cell for differential pressure and flow, function diagram

- The differential pressure is transmitted via the seal diaphragm and the filling liquid to the silicon pressure sensor.
- If the measuring limits are exceeded, the overload diaphragm flexes until the seal diaphragm touches the body of the measuring cell. This protects the sensor module from overload.
- The differential pressure causes the measuring diaphragm of the silicon pressure sensor to flex.
- The displacement changes the resistance value of the 4 piezo resistors in the measuring diaphragm in a bridge circuit.
- The change in the resistance causes a bridge output voltage proportional to the input pressure.

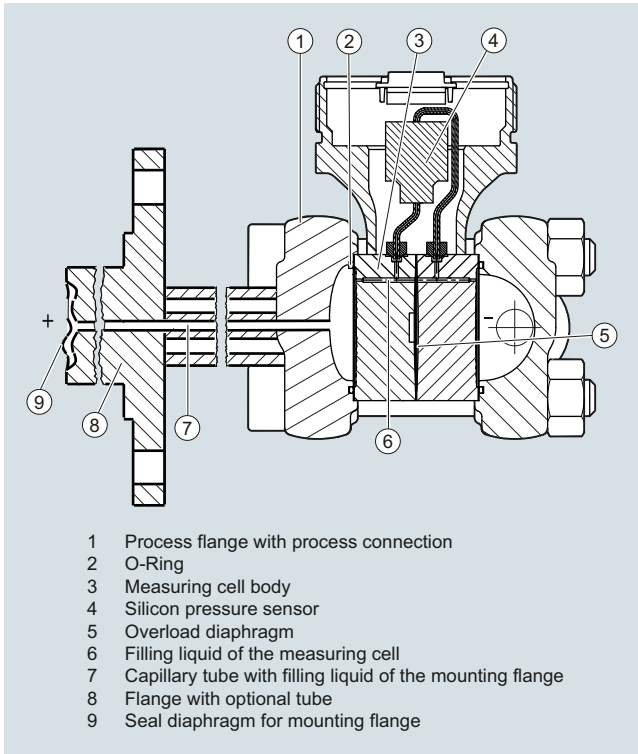
Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500

Technical description

Measuring cell for level



Measuring cell for level, function diagram

- The input pressure (hydrostatic pressure) acts hydraulically on the measuring cell via the seal diaphragm on the mounting flange.
- The differential pressure applied to the measuring cell is transmitted via the seal diaphragm and the filling liquid to the silicon pressure sensor.
- If the measuring limits are exceeded, the overload diaphragm flexes until the seal diaphragm touches the body of the measuring cell. This protects the sensor module from overload.
- The differential pressure causes the measuring diaphragm of the silicon pressure sensor to flex.
- The displacement changes the resistance value of the 4 piezo resistors in the measuring diaphragm in a bridge circuit.
- The change in the resistance causes a differential pressure proportional to the input pressure.

Configuration of SITRANS P500 HART

Depending on the version, there are a range of options for configuring the pressure transmitter and for setting or reading the parameters.

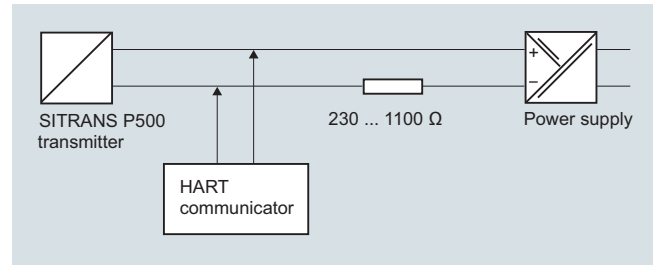
Configuration using the pushbuttons (local operation)

You can configure the transmitter in situ using the three keys provided a display is available. If you have no display, you can only carry out zero adjustment.

It is possible to retrofit a display. See accessories.

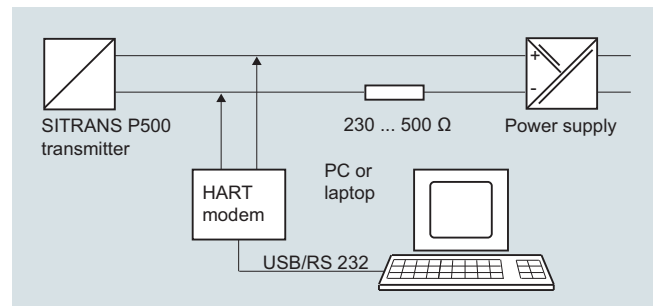
Configuration using HART

Parameterization using HART is carried out using a HART Communicator or a PC in conjunction with a HART modem.



Communication between a HART Communicator and a pressure transmitter

When parameterizing with the HART Communicator, the connection is made directly to the 2-wire cable.



HART communication between a PC communicator and a pressure transmitter

For configuring via PC a HART modem is used which connects the transmitter to the PC.

The signals needed for communication in conformity with the HART 6.0 protocols are superimposed on the output current using the Frequency Shift Keying (FSK) method.

The necessary device files are available for download on the Internet.

SITRANS P500 configuration options

The transmission offers you full configuring options both via HART as well as in situ provided the optional display is available.

For simple parameterizing we also offer the easy to understand QuickStart function with guided commissioning.

SITRANS P500 diagnostic functions

- Maintenance timer
- Min/Max pointer (both resetable and non-resetable)
 - Pressure (incl. time and temperature stamp)
 - Static pressure (incl. time and temperature stamp)
 - Sensor temperature (incl. time stamp)
 - Electronic temperature (incl. time stamp)
- Limit monitor block
- Diagnostic warning
- Diagnostic alarm
- Simulation functions
- Display of trends and histograms
- Operating hours meter

Pressure Measurement

Transmitters for applications with highest requirements (Premium)
SITRANS P500

Technical description

Physical dimensions available for the SITRANS P500 HART display

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm ² , kg/cm ² , mmH ₂ O (4 °C), inH ₂ O (4 °C), inH ₂ O (20 °C), mmH ₂ O, mmH ₂ O (4 °C), ftH ₂ O (20 °C), inHg, mmHg, hPA
Level	m, cm, mm, ft, in
Volume	m ³ , dm ³ , hl, yd ³ , ft ³ , in ³ , gallon, Imp. gallon, bushel, barrel, barrel liquid, l; Norm (standard) l; Norm (standard) m ³ , Norm (standard) feet ³
Mass	g, kg, t (metric), lb, Ston, Lton, oz
Volume flow	m ³ /d, m ³ /h, m ³ /s, l/min, l/s, ft ³ /d, ft ³ /min, ft ³ /s, US gallon/min, gallon/s, l/h, milL/d, gallon/d, gallon/h, milgallon/d, Imp.gallon/s, Imp.gallon/m, Imp.gallon/h, Imp.gallon/d, Norm (standard) m ³ /h, Norm (standard) l/h, Norm (standard) ft ³ /h, Norm (standard) ft ³ /m, barrel liquid/s, barrel liquid/m, barrel liquid/h
Mass flow	t/d, t/h, t/min, kg/d, kg/h, kg/min, kg/s, g/h, g/min, g/s, lb/d, lb/min, lb/s, LTon/d, LTon/h, STon/d, STon/h, STon/min
Temperature	K, °C, °F, °R
Miscellaneous	%, mA

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500

for differential pressure and flow

1

Technical specifications

Input		Measuring accuracy	
Measured variable	Differential pressure and flow	Reference conditions (in accordance with IEC 60770-1)	<ul style="list-style-type: none"> • Rising characteristic curve • Start of scale 0 bar • Stainless steel seal diaphragm • Measuring cell with silicone oil filling • Room temperature (25 °C (77 °F))
Span (infinitely adjustable)	Span (min. ... max.)	All error information always refers to the set span.	
	Maximum operating pressure (static pressure)	Error in measurement at limit setting incl. hysteresis and reproducibility	
	1.00 ... 50 mbar (0.4 ... 20 inH ₂ O)	r: Span ratio	
	1.25 ... 250 mbar (0.5 ... 100 inH ₂ O)	(r: Span ratio (r = max. span / set span))	
	6.25 ... 1250 mbar (2.5 ... 502 inH ₂ O)	Linear characteristic	r ≤ 10
	31.25 ... 6250 mbar (12.54 ... 2509 inH ₂ O)	• 50 mbar (20 inH ₂ O)	≤ 0.06 %
	0.16 ... 32 bar (2.33 ... 465 psi)	• 250 mbar (100 inH ₂ O)	≤ 0.03 %
		1250 mbar (502 inH ₂ O)	
		6250 mbar (2509 inH ₂ O)	
		32 bar (465 psi)	
Lower range limit	-100 % of max. span and/or 30 mbar a (0.44 psi a)	Square-rooted characteristic	r ≤ 10
• Measuring cell with silicone oil filling		• Flow > 50 %	r ≥ 10
Upper range limit	100 % of max. span	- 50 mbar (20 inH ₂ O)	≤ 0.06 %
Start of scale	Between measuring limits (freely adjustable)	- 250 mbar (100 inH ₂ O)	≤ 0.03 %
		1250 mbar (502 inH ₂ O)	
		6250 mbar (2509 inH ₂ O)	
		32 bar (465 psi)	
		• Flow 25 % ... 50 %	r ≤ 10
		- 50 mbar (20 inH ₂ O)	≤ 0.12 %
		- 250 mbar (100 inH ₂ O)	≤ 0.06 %
		1250 mbar (502 inH ₂ O)	
		6250 mbar (2509 inH ₂ O)	
		32 bar (465 psi)	
		Influence of ambient temperature per 28 °C (50 °F)	
		• 50 mbar (20 inH ₂ O)	≤ (0.04 · r + 0.05) %
		• 250 mbar (100 inH ₂ O)	≤ (0.025 · r + 0.014) %
		• 1250 mbar (502 inH ₂ O)	≤ (0.006 · r + 0.03) %
		6250 mbar (2509 inH ₂ O)	
		32 bar (465 psi)	
		Influence of static pressure	
		• At the start of scale value (PKN)	
		- 50 mbar (20 inH ₂ O)	≤ (0.1 · r) % per 70 bar (1015 psi) correction via zero point correction
		- 250 mbar (100 inH ₂ O)	≤ (0.035 · r) % per 70 bar (1015 psi) correction via zero point correction
		- 1250 mbar (502 inH ₂ O)	≤ (0.007 · r) % per 70 bar (1015 psi) correction via zero point correction
		6250 mbar (2509 inH ₂ O)	
		32 bar (465 psi)	
		• On the span (PKS)	
		- 50 mbar (20 inH ₂ O)	≤ 0.13 % per 70 bar (1015 psi)
		- 250 mbar (100 inH ₂ O)	≤ 0.03 % per 70 bar (1015 psi)
		1250 mbar (502 inH ₂ O)	
		6250 mbar (2509 inH ₂ O)	≤ 0.09 % per 70 bar (1015 psi)
		32 bar (465 psi)	≤ 0.05 % per 70 bar (1015 psi)

Output

Output current signal	4 ... 20 mA
• Lower current limit (freely adjustable)	3.55 mA, factory setting 3.8 mA
• Upper current limit (freely adjustable)	23 mA, factory setting 20.5 mA
• Ripple (without HART communication)	$I_{pp} \leq 0.4$ % of max. output current
• adjustable damping	0... 100 s in steps of 0.1 s, factory-setting: 2 s
• current transmitter	3.55 ... 23 mA
• Failure signal	adjustable within limits::
	• Bottom: 3.55 ... 3.7 mA (default value: 3.6 mA)
	• Top: 21.0 ... 23 mA (default value: 22.8 mA)
Load	
• Without HART communication	$R_B \leq (U_H - 10.5 \text{ V}) / 0.023 \text{ A}$ in Ω , U_H : Power supply in V
• With HART communication	
- HART Communicator	$R_B = 230 \dots 1100 \Omega$
- HART modem	$R_B = 230 \dots 500 \Omega$
Characteristic curve	Linearly rising, linearly falling, square rooted characteristic rising, bidirectional square rooted characteristic and user-specific

Pressure Measurement

Transmitters for applications with highest requirements (Premium)
SITRANS P500

for differential pressure and flow

Total Performance¹⁾			Design	
• Linear characteristic	$r \leq 5$	$5 < r \leq 10$	Weight (without options)	Approx. 3.3 kg (7.3 lb)
- 50 mbar (20 inH ₂ O)	$\leq 0.27 \%$	$\leq 0.46 \%$	Material of parts in contact with the medium	
- 250 mbar (100 inH ₂ O)	$\leq 0.14 \%$	$\leq 0.27 \%$	• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L, Hastelloy C276, Monel 400
- 1250 mbar (502 inH ₂ O) 6250 mbar (2509 inH ₂ O) 32 bar (465 psi)	$\leq 0.09 \%$	$\leq 0.14 \%$	• Process connection and sealing screw	PN 160: stainless steel, mat.-No. 1.4404/316L
Square rooted characteristic			• Sealing material in the process connections	
• Flow > 50 %	$r \leq 5$	$5 < r \leq 10$	- O-Ring	• Standard: Viton (FKM (FPM))
- 50 mbar (20 inH ₂ O)	$\leq 0.27 \%$	$\leq 0.46 \%$		• Optional: NBR PTFE (virginal) PTFE (glass fiber-reinforced) FFPM (Kalrez) ²⁾ Graphite
- 250 mbar (100 inH ₂ O)	$\leq 0.14 \%$	$\leq 0.27 \%$		
- 1250 mbar (502 inH ₂ O) 6250 mbar (2509 inH ₂ O) 32 bar (465 psi)	$\leq 0.09 \%$	$\leq 0.14 \%$		
• Flow 25 % ... 50 %	$r \leq 5$	$5 < r \leq 10$		
- 50 mbar (20 inH ₂ O)	$\leq 0.54 \%$	$\leq 0.92 \%$	Material of parts not in contact with media	
- 250 mbar (100 inH ₂ O)	$\leq 0.28 \%$	$\leq 0.54 \%$	Die-cast aluminum housing	• Low copper die-cast aluminum AC-AlSi12 (Fe) or AC-AlSi 10 Mg (Fe) to DIN EN 1706
- 1250 mbar (502 inH ₂ O) 6250 mbar (2509 inH ₂ O) 32 bar (465 psi)	$\leq 0.18 \%$	$\leq 0.28 \%$		• Lacquer on polyurethane base, optional epoxy-based primer
Step response time T_{63} without electrical damping			Stainless steel precision cast housing	• Stainless steel name plates (mat. no. 1.4404/316L)
• 50 mbar (20 inH ₂ O)	≤ 140 ms, contains a dead time of ≤ 45 ms		Process connection screws	Stainless steel, mat. no. 1.4404/316L
• 250 mbar (100 inH ₂ O) 1250 mbar (502 inH ₂ O) 6250 mbar (2509 inH ₂ O) 32 bar (465 psi)	≤ 88 ms, contains a dead time of ≤ 45 ms		Mounting bracket	Steel or stainless steel mat. no. 1.4301
Long-term stability	$\leq (0.05 \cdot r) \%$ per 5 years $\leq (0.08 \cdot r) \%$ per 10 years		Measuring cell filling	Silicone oil
Influence of power supply	$\leq 0.005 \%$ /1 V		Process connection	1/4-18 NPT female thread and flange connection with M10 to DIN 19213 or 7/16-20 UNF mounting thread to IEC 61518/DIN EN 61518
Rated conditions			Electrical connection	• Screw terminals • Cable entry via the following screwed glands: - M20 x 1.5 - 1/2-14 NPT - Han 7D/Han 8D device plug - M12 plug device
Mounting position	Any			
Ambient conditions			Displays and controls	
• Ambient temperature (Note: Observe the temperature class in areas subject to explosion hazard.)			Pushbuttons	3 for local programming directly on transmitter
- Total device	-40 ... +85 °C (-40 ... +185 °F)		Display	• With or without integrated display • Cover with or without window
- Readable display	-20 ... +85 °C (-4 ... +185 °F)			
- Storage temperature	-50 ... +90 °C (-58 ... +194 °F)			
Climatic class				
• Condensation	Relative humidity 0 ... 100 % (condensation permissible)			
Degree of protection (to IEC 60529)	IP66/IP 68 and NEMA 4X (with corresponding cable gland)			
Electromagnetic Compatibility				
• Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21			
Permissible pressures	According to 2014/68/EU pressure equipment directive			
Temperature of medium				
• Measuring cell with silicone oil filling	-40 ... +125 °C (-40 ... +257 °F)			
			Auxiliary power supply	
			Terminal voltage on transmitter	• DC 10.6 ... 44 V • With intrinsically-safe operation DC 10.6 ... 30 V

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

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Certificates and approvals

Classification according to PED 2014/68/EU

- PN 160 (MAWP 2320 psi)

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

Explosion protection

Explosion protection for Europe (to ATEX)

- Intrinsic safety "i"
 - Marking PTB 09 ATEX 2004 X
 - Permissible ambient temperature Ex II 1/2 G Ex ia/ib IIC T4
 - Connection -40 ... +85 °C (-40 ... +185 °F)
 - Effective internal inductance: To certified intrinsically-safe circuits with peak values:
 $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$; $R_i = 300 \Omega$
 - Effective inner capacitance: $L_i = 400 \mu\text{H}$
- Explosion-proof "d"
 - Marking BVS 09 ATEX E 027
 - Permissible ambient temperature Ex II 1/2 G Ex db ia IIC T4/T6 Ga/Gb
 - Connection -40 ... +85 °C (-40 ... +185 °F)
 - Effective internal inductance: temperature class T4; -40 ... +60 °C (-40 ... +140 °F)
 - Effective inner capacitance: temperature class T6
 - Connection To circuits with values:
 $U_m = \text{DC } 10.5 \dots 45 \text{ V}$
- Dust explosion protection for zone 20
 - Marking BVS 09 ATEX E 027
 - Permissible ambient temperature Ex II 1 D Ex ta ia IIC T120°C Da
 - Max. surface temperature -40 ... +85 °C (-40 ... +185 °F)
 - Connection 120 °C (248 °F)
 - Effective internal inductance: To certified intrinsically-safe circuits with peak values:
 $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$
 - Effective inner capacitance: $L_i = 400 \mu\text{H}$
- Dust explosion protection for zone 21/22
 - Marking BVS 09 ATEX E 027
 - Connection Ex II 2D Ex tb ia IIC T120°C Db
 - Effective internal inductance: To circuits with values:
 $U_m = 10.5 \dots 45 \text{ V DC}$; $P_{\text{max}} = 1.2 \text{ W}$
- Type of protection "n" (zone 2)
 - Marking PTB 09 ATEX 2004 X
 - "nA" connection Ex II 3 G Ex nA II T4/T6
 - "nL, ic" connection Ex II 2/3 G Ex ib/nL IIC T4/T6
 - Effective internal inductance: Ex II 2/3 G Ex ib/ic IIC T4/T6
 - Effective inner capacitance: $U_m = 45 \text{ V DC}$
 - Effective inner capacitance: $U_i = 45 \text{ V}$
 - Effective inner capacitance: $L_i = 400 \mu\text{H}$
 - Effective inner capacitance: $C_i = 6 \text{ nF}$

Explosion protection for USA (to FM)

Certificate of Compliance

- Identification (XP/DIP) or (IS)

- Permissible Ambient Temperature

- Entity parameters

- Marking (NI/NO)

- Permissible Ambient Temperature

- (NI/S) parameters

Explosion protection for Canada (to cCSA US)

Certificate of Compliance

- Marking (XP/DIP)

- Permissible ambient temperature

- Entity parameters

- Marking (ia/ib)

- Permissible ambient temperature

- Entity parameters

- Marking (NI/n)

- Permissible ambient temperature

- NI/nA parameters

- nL parameters

No. 3033013

XP CL I, DIV 1, GP ABCDEFG T4 / T6
DIP CL II, III, DIV1, GP EFG T4/T6
IS CL I, II, III, DIV1, GP ABCDEFG T4
CL I, Zone 0, AEx ia IIC T4
CL I, Zone 1, AEx ib IIC T4

$T_a = \text{T4: } -40 \dots +85 \text{ °C}$
(-40 ... +185 °F)
 $T_a = \text{T6: } -40 \dots +60 \text{ °C}$
(-40 ... +140 °F)

According to "control drawing":
A5E02189134N

$U_m = 30 \text{ V}$, $I_m = 100 \text{ mA}$,
 $P_i = 750 \text{ mW}$, $L_i = 400 \mu\text{H}$, $C_i = 6 \text{ nF}$

NI CL I, DIV 2, GP ABCD T4/T6
NI CL I, Zone 2, GP IIC T4/T6
S CL II, III, GPFG T4/T6
NI CL I, DIV 2, GP ABCD T4/T6, NIFW
NI CL I, Zone 2, GP IIC T4/T6, NIFW
NI CLII, III, DIV 2, GP FG T4/T6, NIFW

$T_a = \text{T4: } -40 \dots +85 \text{ °C}$
(-40 ... +185 °F)
 $T_a = \text{T6: } -40 \dots +60 \text{ °C}$
(-40 ... +140 °F)

According to "control drawing":
A5E02189134N

$U_m = 45 \text{ V}$, $L_i = 400 \mu\text{H}$, $C_i = 6 \text{ nF}$

No. 2280963

CL I, DIV 1, GP ABCD T4 /T6;
CL II, DIV 1, GP EFG T4/T6

$T_a = \text{T4: } -40 \dots +85 \text{ °C}$ (-40 ... +185 °F)
 $T_a = \text{T6: } -40 \dots +60 \text{ °C}$ (-40 ... +140 °F)

According to "control drawing":
A5E02189134N
 $U_m = 45 \text{ V}$

CL I, Ex ia/Ex ib IIC, T4
CL II, III, Ex ia/Ex ib, GP EFG, T4
CL I, AEx ia/AEx ib IIC, T4
CL II, III, AEx ia/ AEx ib, GP EFG, T4

$T_a = \text{T4: } -40 \dots +85 \text{ °C}$
(-40 ... +185 °F)

$U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$,
 $R_i = 300 \Omega$, $L_i = 400 \mu\text{H}$, $C_i = 6 \text{ nF}$

CL I, DIV 2, GP ABCD T4/T6
CL II, III, DIV 2, GP FG T4/T6
Ex nA IIC T4/T6
AEx nA IIC T4/T6
Ex nL IIC T4/T6
AEx nL IIC T4/T6

$T_a = \text{T4: } -40 \dots +85 \text{ °C}$ (-40 ... +185 °F)
 $T_a = \text{T6: } -40 \dots +60 \text{ °C}$ (-40 ... +140 °F)

According to "control drawing":
A5E02189134N
 $U_m = 45 \text{ V}$

According to "control drawing":
A5E02189134N
 $U_i = 45 \text{ V}$, $I_i = 100 \text{ mA}$, $L_i = 400 \mu\text{H}$,
 $C_i = 6 \text{ nF}$

Pressure Measurement

Transmitters for applications with highest requirements (Premium)
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Explosion protection for China (acc. to NEPSI)

• Intrinsic safety "i"	GYJ111111X
- Marking	Ex ia/ib IIB/IIC T4
- Perm. ambient temperature	40 ... +85 °C (-40 ... +185 °F)
- Connection	To certified intrinsically-safe circuits with maximum values: $U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$
- Effective internal inductance	$L_i = 400 \text{ mH}$
- Effective inner capacitance	$C_i = 6 \text{ nF}$
• Explosion-proof "d"	GYJ111112
- Marking	Ex dia IIC T4/T6
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6
- Connection	To circuits with values: $U_m = \text{DC } 10.5 \dots 45 \text{ V}$
• Dust explosion protection for zone 21/22	GYJ111112
- Marking	DIP A21 TA,T120 °C IP68 D21
- Connection	To circuits with values: $U_m = \text{DC } 10.5 \dots 45 \text{ V}$
• Type of protection "n" (zone 2)	GYJ111111X
- Marking	Ex nL IIB/IIC T4/T6 Ex nA II T4/T6
- Connection	$U_i = 45 \text{ V DC}$
- Effective internal inductance	$L_i = 400 \text{ mH}$
- Effective inner capacitance	$C_i = 6 \text{ nF}$

1) The total performance includes the errors caused by temperature effects, static pressure effects and conformity error, including hysteresis and repeatability.

2) Not in combination with span "G".

HART communication

Load with connection of	
• HART communicator	$R_B = 230 \dots 1100 \Omega$
• HART modem	$R_B = 230 \dots 500 \Omega$
Cable	2 wire shielded: $\leq 3.0 \text{ km}$ (1.86 miles), multiwire shielded: $\leq 1.5 \text{ km}$ (0.93 miles)
Protocol	HART Version 6.0
PC/laptop requirements	IBM compatible, RAM > 32 MByte, hard disk > 70 MByte, depending on modem type: RS 232-interface or USB connection, VGA graphics
Software for computer	SIMATIC PDM 6.0

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500

for differential pressure and flow

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Selection and Ordering data

Article No.

Pressure transmitters for differential pressure and flow, SITRANS P500 HART, PN 160 (MAWP 2320 psi)

7MF54- - - - 0

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Enclosure**Thread for cable gland¹⁾**

Die-cast aluminum, dual compartment

M20x1.5

Die-cast aluminum, dual compartment

½-14 NPT

Stainless steel precision casting, two-chamber housing

M20x1.5

Stainless steel precision casting, two-chamber housing

½-14 NPT

Output

4 ... 20 mA, HART

Measuring cell filling

Silicone oil

Measuring cell cleaning

normal

Measuring span1.00 ... 50 mbar (0.4 ... 20 inH₂O)1.25 ... 250 mbar (0.5 ... 100.4 inH₂O)6.25 ... 1250 mbar (2.5 ... 502 inH₂O)31.25 ... 6250 mbar (12.54 ... 2509 inH₂O)

0.16 ... 32 bar (2.33 ... 465 psi)

Wetted parts materials

Seal diaphragm

Process flange

Stainless steel 1.4404/316L

Stainless steel 1.4404/316L

Hastelloy C276²⁾

Stainless steel 1.4404/316L

Monel 400²⁾

Stainless steel 1.4404/316L

Hastelloy

Hastelloy

Process connection

Female thread ¼-18 NPT

- Sealing screw opposite process connection

- Mounting thread 7/16 - 20 UNF according to IEC 61518/DIN EN 61518
- Mounting thread M10 to DIN 19213

- Vent on side of process flange³⁾

- Mounting thread 7/16 - 20 UNF according to IEC 61518/DIN EN 61518
- Mounting thread M10 to DIN 19213

¹⁾ Cable glands must be ordered separately from "Further designs" (add "-Z" to Article No. and specify order code).

²⁾ Not together with Measuring span "C".

²⁾ Not in conjunction with remote seals (option V00).

Pressure Measurement

Transmitters for applications with highest requirements (Premium)
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Selection and Ordering data

Order code

Further designs

Add "-Z" to Article No. and specify Order code.

Attachments

Mounting bracket made of steel	A01
Mounting bracket made of stainless steel 304	A02
Mounting bracket made of stainless steel 316L	A03

Display

(Standard: no display, cover closed)

With display and blanking cover	A10
With display and glass cover	A11

Special casing / cover version

Two coats of lacquer on casing, cover (PU on epoxy)	A20
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Electrical connection and cable entry

(Standard: no cable gland, only dust protection caps)

Cable gland made of plastic (IP66/68) ⁴⁾	A50
Cable glands made of metal (IP66/68)	A51
Cable glands made of stainless steel (IP66/68)	A52
M12 device plug without cable socket (IP66/67) ⁴⁾	A60
M12 device plug complete with cable socket (IP66/67) ⁴⁾	A61
Han 7D device plug, plastic, straight (with cable socket) (IP65) ⁴⁾	A71
Han 7D device plug, plastic, angled (with cable socket) (IP65) ⁴⁾	A72
Han 7D device plug, metal enclosure, straight (with cable socket) (IP65) ⁴⁾	A73
Han 7D device plug, metal enclosure, angled (with cable socket) (IP65) ⁴⁾	A74
Han 8D device plug, plastic, straight (with cable socket) (IP65) ⁴⁾	A75
Han 8D device plug, plastic, angled (with cable socket) (IP65) ⁴⁾	A76
Han 8D device plug, metal enclosure, straight (with cable socket) (IP65) ⁴⁾	A77
Han 8D device plug, metal enclosure, angled (with cable socket) (IP65) ⁴⁾	A78
PG 13.5 adapters ⁴⁾	A82

Language for labels, quick-start guide, menu language default⁹⁾

(instead of English as standard)

German	B10
French	B12
Spanish	B13
Italian	B14
Chinese	B15
Russian	B16
Japanese	B17
English with units psi/inH ₂ O/°F	B21

Special version: Supplementary menu languages

(Standard: English, German, French, Spanish, Italian)

Asia language package (in addition: Chinese, Japanese, Russian)	B80
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Certificates

(available online for downloading)¹⁾

Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2 ²⁾	C11
Acceptance test certificate according to EN 10204-3.1 ³⁾	C12
Acceptance certificate (EN 10204-3.1); PMI test of parts in contact with medium	C15

Functional Safety (SIL2)

Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration

C20

Selection and Ordering data

Order code

Further designs

Add "-Z" to Article No. and specify Order code.

Degree of protection approvals: Ex ia/ib (intrinsic safety)

Ex ia/ib protection (ATEX) (T4)	E00
Ex IS protection (FM) (T4)	E01
Ex IS protection (cCSA _{US}) (T4)	E02
Ex ia/ib protection (NEPSI) (T4)	E06

Degree of protection approvals: Ex d (flameproof)

Ex d explosion-proof (ATEX)(T4/T6)	E20
Ex XP explosion-proof and DIP (FM)(T4/T6)	E21
Ex XP explosion-proof and DIP (cCSA _{US})(T4/T6)	E22
Ex d explosion-proof (NEPSI)(T4/T6)	E26

Degree of protection approvals: n/NI

Zone 2 (nA, nL, ic) (ATEX) (T4/T6)	E40
Div2 NI, Div2 NI-field wiring (FM) (T4/T6)	E41
Zone 2 (nA, nL), Div2 NI (cCSA _{US}) (T4/T6)	E42
Zone 2 (nA, nL) (NEPSI) (T4/T6)	E46

Degree of protection approvals: Dust Zone 20/21/22

Use in Zone 21/22 (Ex tD) (ATEX) Ex tb	E60
Use in Zone 20/21/22 (Ex iaD) (ATEX) Ex ta	E61
Use in Zone 21/22 (Ex DIP) (NEPSI)	E66

Degree of protection approvals: Combinations

IS protection and XP and DIP (FM)	E71
IS protection and XP and DIP (cCSA _{US})	E72
IS protection and XP and DIP (FM/cCSA _{US})	E73

Supplementary approvals/degree of protection

Ex-protection Ex ia according to EAC Ex (Russia)	E80
Ex-protection Ex d according to EAC Ex (Russia)	E81
Dual Seal approval ⁵⁾	E85
Export approval Korea	E86

Special process connection versions (diff. pressure)

Side vents for gas measurements ⁹⁾	L32
Swap process connection: high-pressure side at front	L33

Mosquito protection

4 pcs. for 1/4-18 NPT thread	L36
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Process flanges, O-rings, special material Standard: Viton (FKM (FPM))

Process conn. sealing rings made of PTFE (Teflon), virginal	L60
Process connection sealing rings made of PTFE (Teflon), glass fiber-reinforced	L61
Process connection sealing rings made of FFPM (Kalrez) ¹⁰⁾	L62
Process connection sealing rings made of NBR	L63
Process connection sealing rings made of graphite	L64

Drain/Vent valve (1 set = 2 units)

2 ventilation valves 1/4- 18 NPT, in material of process flanges)	L80
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Remote seals

Transmitters with connection of remote seal ⁶⁾ (For premounted valve manifolds see page 1/349)	V00
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¹⁾ Enclosed in print or as DVD: see page 1/347.

²⁾ When also ordering the quality inspection certificate (factory calibration) according to IEC 60770-2 for transmitters with mounted diaphragm seals: Order this certificate only together with the remote seals. The measuring accuracy of the total combination is certified here.

³⁾ When also ordering the acceptance test certificate according to EN 10204-3.1 for transmitters with mounted diaphragm seals: Order this certificate as well in addition to the respective remote seals.

⁴⁾ Not together with types of protection "Explosion-proof", "Ex nA" and "Intrinsic safety and explosion-proof"

⁵⁾ Only in conjunction with FM and/or cCSA_{US}

⁶⁾ Please select a remote seal separately. Also refer to the information under footnote 2). Remote seals see page 1/422.

⁷⁾ The Han 8D device plug is identical with the former Han 8U version.

⁸⁾ For option B15, B16 and B17 the menu language default is english. Otherwise the Option B80 (Asia language package) is necessary.

⁹⁾ Only in conjunction with process connection "Vent on side".

¹⁰⁾ Not together with Measuring span "G".

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

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Selection and Ordering data	Order code
Additional data Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Measuring range to be set Specify in plain text:	
<ul style="list-style-type: none"> In the case of linear characteristic curve (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi 	Y01
<ul style="list-style-type: none"> In the case of square rooted characteristic (max. 5 characters): Y02: ... up to ... mbar, bar, kPa, MPa, psi 	Y02
Measuring point number and measuring point identifier (only standard ASCII character set) Specify in plain text:	
Measuring point number (TAG No.), max. 16 characters Y15:	Y15
Measuring point text (max. 27 char.) Y16:	Y16
Entry of HART address (TAG), max. 32 characters Y17:	Y17
Setting of pressure indication in pressure units Specify in plain text (standard setting: mbar) Y21: bar, kPa, MPa, psi, ...	Y21
Note: The following pressure units are selectable: bar, mbar, mm H ₂ O*, in H ₂ O*, ftH ₂ O*, mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM, % or mA *) Reference temperature 20 °C	
Setting of pressure indication in non-pressure units¹⁾ Specify in plain text:	Y22 +
Y22: ... up to ... l/min, m ³ /h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y01 or Y02
Customer-specific settings Damping setting (range: 0 ... 100 s) (Standard setting: 2 s)	Y30

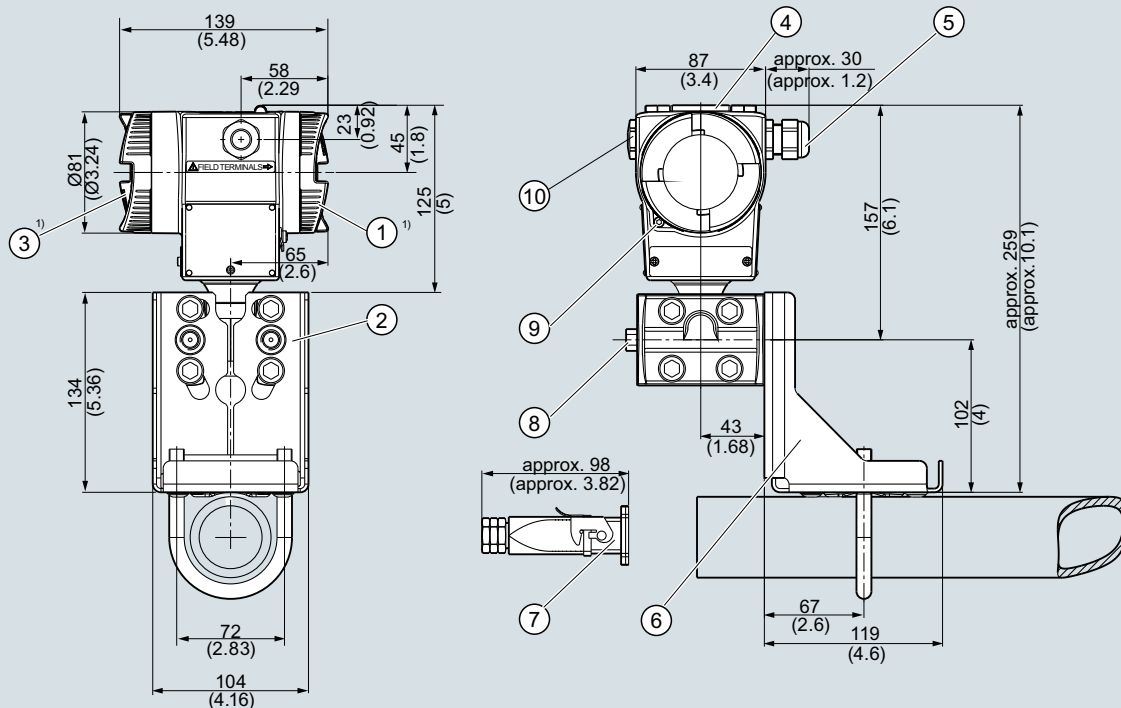
¹⁾ Preset values can only be changed over SIMATIC PDM.

Pressure Measurement

Transmitters for applications with highest requirements (Premium)
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Dimensional drawings



- 1 Terminal side
- 2 Process connection: 1/4-18 NPT (EN 61518)
- 3 Electronics side, digital display
- 4 Protective cover for the pushbuttons
- 5 Cable entry:
 - Screwed gland M20 x 1.5³⁾
 - Screwed gland 1/2-14 NPT
 - Han 7D/8D device plug²⁾³⁾
 - M12 device plug
- 6 Mounting bracket (optional)

- 7 Electrical connection:
 - Han 7D/Han 8D device plug/socket²⁾³⁾
- 8 Vent valve (optional)
- 9 Safety catch
- 10 Blanking plug

¹⁾ Allow approx. 20 mm (0.79 inch) additional thread length

²⁾ Not with type of protection "Explosion-proof"

³⁾ Not with type of protection "FM + cCSA_{US} [IS + XP]"

SITRANS P pressure transmitter for differential pressure and flow, P500 series, measurements in mm (inch)

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500

for level

1

Technical specifications

Input			Long-term stability		≤ (0.05 · r) % per 5 years ≤ (0.08 · r) % per 10 years
Measured variable	Level		Influence of ambient temperature per 28 °C (50 °F) ¹⁾		
Span (infinitely adjustable)	Span (min. ... max.)	Maximum operating pressure	• 250 mbar (100 inH ₂ O)		≤ (0.025 · r + 0.014) %
	1.25 ... 250 mbar (0.5 ... 100 inH ₂ O)	See "Mounting flange"	• 1250 mbar (502 inH ₂ O) 6250 mbar (2509 inH ₂ O)		≤ (0.006 · r + 0.03) %
	6.25 ... 1250 mbar (2.5 ... 500 inH ₂ O)		Influence of static pressure		
	31.25 ... 6250 mbar (12.54 ... 2509 inH ₂ O)		• At the start of scale value (PKN) ^{1) 2)}		
Lower range limit			- 250 mbar (100 inH ₂ O)	≤ (0.035 · r) % je 70 bar (1015 psi) correction via zero point correction	
• Measuring cell with silicone oil filling	-100 % of max. span or 500 mbar a (7.25 psi a) vacuum resistance Also available as vacuum-resistant remote seal: 30 mbar a (0.44 psi a)		- 1250 mbar (502 inH ₂ O) 6250 mbar (2509 inH ₂ O)	≤ (0.007 · r) % je 70 bar (1015 psi) correction via zero point correction	
Upper range limit	100% of max. span		• On the span (PKS) ¹⁾	≤ 0.03 % je 70 bar (1015 psi)	
Start of scale	Between measuring limits (freely adjustable)		- 250 mbar (100 inH ₂ O) 1250 mbar (502 inH ₂ O)	≤ 0.09 % je 70 bar (1015 psi)	
			- 6250 mbar (2509 inH ₂ O)	≤ 0.005 %/1 V	
Output			Rated conditions		
Output current signal	4 ... 20 mA		Mounting position	Defined by flange	
• Lower current limit (freely adjustable)	3.55 mA, factory setting 3.8 mA		Ambient conditions		
• Upper current limit (freely adjustable)	23 mA, factory setting 20.5 mA		• Ambient temperature (Note: Observe the temperature class in areas subject to explosion hazard.)		
• Ripple (without HART communication)	I _{pp} ≤ 0.4 of max. output current		- total device	-40 ... +85 °C (-40 ... +185 °F)	
• adjustable damping	0... 100 s in steps of 0.1 s, factory setting 2 s		- Readable display	-20 ... +85 °C (-4 ... +185 °F)	
• current transmitter	3.55 ... 23 mA		- Storage temperature	-50 ... +90 °C (-58 ... +194 °F)	
• Failure signal	Adjustable within limits: • Lower: 3.55 ... 3.7 mA (factory setting 3.6 mA) • Upper: 21.0 ... 23 mA (factory setting 22.8 mA)		Climatic class		
Load			• Condensation	Relative humidity 0 ... 100 % (condensation permissible)	
• Without HART communication	R _B ≤ (U _H - 10.5 V)/0.023 A in Ω, U _H : Power supply in V		Degree of protection to IEC 60529	IP66/IP68 and NEMA 4X (with corresponding cable gland)	
• With HART communication			Electromagnetic Compatibility		
- HART Communicator	R _B = 230 ... 1100 Ω		• Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21	
- HART modem	R _B = 230 ... 500 Ω		Permissible pressures	According to 2014/68/EU pressure equipment directive	
Characteristic curve	Linearly rising or linearly falling and user-specific		Medium temperature of high-pressure side		
			• Measuring cell with silicone oil filling		
			- p _{abs} ≥ 1 bar	-40 ... +175 ³⁾ °C (-40 ... +347 ³⁾ °F)	
			- p _{abs} < 1 bar	-40 ... +80 °C (-40 ... +176 °F)	
Measuring accuracy			Design		
Reference conditions (in accordance with IEC 60770-1)	• Rising characteristic curve • Start of scale 0 bar • Stainless steel seal diaphragm • Measuring cell with silicone oil filling • Room temperature (25 °C (77 °F))		Weight		
All error information always refers to the set span.			• To EN (pressure transmitter with mounting flange, without tube)	approx. 9.8 ... 11.8 kg (21.6... 26.0 (lb)	
Error in measurement at limit setting incl. hysteresis and reproducibility			• To ASME (pressure transmitter with mounting flange, without tube)	approx. 9.8 ... 16.8 kg (21.6 ... 37.0 lb)	
r: Span ratio (r = max. span / set span)					
Linear characteristic	r ≤ 10	r ≥ 10			
• 250 mbar (100 inH ₂ O) 1250 mbar (502 inH ₂ O) 6250 mbar (2509 inH ₂ O)	≤ 0.03 %	≤ (0.003 · r) %			

Pressure Measurement

Transmitters for applications with highest requirements (Premium)
SITRANS P500

for level

Material of wetted parts at the high-pressure side		Auxiliary power supply	
• Seal diaphragm of mounting flange	Stainless steel 1.4404/316L, Hastelloy C276, mat. no. 2.4819, Monel 400, mat. no. 2.4360, Tantal, PFA auf Edelstahl 1.4404/316L, PTFE auf Edelstahl 1.4404/316L	Terminal voltage on transmitter	<ul style="list-style-type: none"> • DC 10.6 ... 44 V • With intrinsically-safe operation DC 10.6 ... 30 V
• Sealing face	Smooth to EN 1092-1, Form B1 and/or ASME B16.5 RF 125 ... 250 AA for stainless steel 316L, EN 1092-1 Form B2 and/or ASME B16.5 RFSF in the case of other materials	Certificates and approvals	
• Sealing material in the process connection		Classification according to PED 2014/68/EU	
- O-Ring	<ul style="list-style-type: none"> • Standard: Viton (FKM (FPM)) • Optional: NBR, PTFE (virginal), PTFE (glas fiber-reinforced), FPM (Kalrez), Graphite 	• PN 160 (MAWP 2320 psi)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)
- For vacuum application of mounting flange	Copper	Explosion protection	
Material of wetted parts at the low-pressure side		<u>Explosion protection for Europe (to ATEX)</u>	
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L, Hastelloy C276, Monel 400	• Intrinsic safety "i"	PTB 09 ATEX 2004 X
• Process connection and sealing screw	• Stainless steel, mat. no. 1.4404/316L	- Marking	Ex II 1/2 G Ex ia/ib IIC T4
• Sealing material in the process connection	<ul style="list-style-type: none"> • Standard: Viton (FKM (FPM)) • Optional: NBR, PTFE (virginal), PTFE (glas fiber-reinforced), FPM (Kalrez), Graphite 	- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F)
- O-Ring		- Connection	To certified intrinsically-safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$; $R_i = 300 \Omega$
Material of parts not in contact with media		- Effective internal inductance:	$L_i = 400 \mu\text{H}$
Die-cast aluminum housing	<ul style="list-style-type: none"> • Low copper die-cast aluminum AC-AlSi12 (Fe) or AC-AlSi 10 Mg (Fe) to DIN EN 1706 • Lacquer on polyurethane base, optional epoxy-based primer • Stainless steel serial plate 	- Effective inner capacitance:	$C_i = 6 \text{ nF}$
Stainless steel precision cast housing	Stainless steel, mat. no. 1.4404/316L	• Explosion-proof "d"	BVS 09 ATEX E 027
Process connection screws	Stainless steel	- Marking	Ex II 1/2 G Ex db ia IIC T4/T6 Ga/Gb
Measuring cell filling	Silicone oil	- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6
• Liquid mounting flange	Silicone oil or other material	- Connection	To circuits with values: $U_m = \text{DC } 10.5 \dots 45 \text{ V}$
Process connection		• Dust explosion protection for zone 20	BVS 09 ATEX E 027
• High-pressure side	Flange to EN and ASME	- Marking	Ex II 1 D Ex ta ia IIC T120°C Da
• Low-pressure side	1/4-18 NPT female thread and flange connection with M10 to DIN 19213 or 7/16-20 UNF mounting thread to IEC 61518/DIN EN 61518	- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F)
Electrical connection	<ul style="list-style-type: none"> • Screw terminals • Cable entry via the following screwed glands: <ul style="list-style-type: none"> - M20 x 1.5 - 1/2-14 NPT - Han 7D/Han 8D device plug - M12 plug device 	- Max. surface temperature	120 °C (248 °F)
Displays and controls		- Connection	To certified intrinsically-safe circuits with peak values: $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$, $R_i = 300 \Omega$
Push buttons	3; for operation directly on the device	- Effective internal inductance:	$L_i = 400 \mu\text{H}$
Display	<ul style="list-style-type: none"> • With or without integrated display • Cover with or without window 	- Effective inner capacitance:	$C_i = 6 \text{ nF}$
		• Dust explosion protection for zone 21/22	BVS 09 ATEX E 027
		- Marking	Ex II 2 D Ex tb ia IIC T120°C Db
		- Connection	To circuits with values: $U_H = 10.5 \dots 45 \text{ V DC}$; $P_{\text{max}} = 1.2 \text{ W}$
		• Type of protection "n" (zone 2)	PTB 09 ATEX 2004 X
		- Marking	Ex II 3 G Ex nA II T4/T6 Ex II 2/3 G Ex ib/nL IIC T4/T6 Ex II 2/3 G Ex ib/ic IIC T4/T6
		- "nA" connection	$U_m = 45 \text{ V DC}$
		- "nL, ic" connection	$U_i = 45 \text{ V}$
		- Effective internal inductance	$L_i = 400 \mu\text{H}$
		- Effective inner capacitance	$C_i = 6 \text{ nF}$

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500

for level

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Explosion protection for USA (to FM)

Certificate of Compliance	No. 3033013
• Identification (XP/DIP) or (IS)	XP CL I, DIV 1, GP ABCDEFG T4 / T6 DIP CL II, III, DIV1, GP EFG T4/T6 IS CL I, II, III, DIV1, GP ABCDEFG T4 CL I, Zone 0, AEx ia IIC T4 CL I, Zone 1, AEx ib IIC T4
- Permissible Ambient Temperature	$T_a = T4: -40 \dots +85 \text{ }^{\circ}\text{C}$ (-40 ... +185 °F) $T_a = T6: -40 \dots +60 \text{ }^{\circ}\text{C}$ (-40 ... +140 °F)
- Entity parameters	According to "control drawing": A5E02189134N $U_m = 30 \text{ V}$, $I_m = 100 \text{ mA}$, $P_i = 750 \text{ mW}$, $L_i = 400 \text{ } \mu\text{H}$, $C_i = 6 \text{ nF}$
• Marking (NI/NO)	NI CL I, DIV 2, GP ABCD T4/T6 NI CL I, Zone 2, GP IIC T4/T6 S CL II, III, GPFG T4/T6 NI CL I, DIV 2, GP ABCD T4/T6, NIFW NI CL I, Zone 2, GP IIC T4/T6, NIFW NI CLII, III, DIV 2, GP FG T4/T6, NIFW
- Permissible Ambient Temperature	$T_a = T4: -40 \dots +85 \text{ }^{\circ}\text{C}$ (-40 ... +185 °F) $T_a = T6: -40 \dots +60 \text{ }^{\circ}\text{C}$ (-40 ... +140 °F)
- (NI/S) parameters	According to "control drawing": A5E02189134N $U_m = 45 \text{ V}$, $L_i = 400 \text{ } \mu\text{H}$, $C_i = 6 \text{ nF}$

Explosion protection for Canada

(to $C_{CSA_{US}}$)	
Certificate of Compliance	No. 2280963
• Marking (XP/DIP)	CL I, DIV 1, GP ABCD T4 /T6; CL II, DIV 1, GP EFG T4/T6
- Permissible Ambient Temperature	$T_a = T4: -40 \dots +85 \text{ }^{\circ}\text{C}$ (-40 ... +185 °F) $T_a = T6: -40 \dots +60 \text{ }^{\circ}\text{C}$ (-40 ... +140 °F)
- Entity parameters	According to "control drawing": A5E02189134N, $U_m = 45 \text{ V}$
• Marking (ia/ib)	CL I, Ex ia/Ex ib IIC, T4 CL II, III, Ex ia/Ex ib, GP EFG, T4 CL I, AEx ia/AEx ib IIC, T4 CL II, III, AEx ia/ AEx ib, GP EFG, T4
- Permissible Ambient Temperature	$T_a = T4: -40 \dots +85 \text{ }^{\circ}\text{C}$ (-40 ... +185 °F)
- Entity parameters	$U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$, $R_i = 300 \text{ } \Omega$, $L_i = 400 \text{ } \mu\text{H}$, $C_i = 6 \text{ nF}$
• Marking (NI/n)	CL I, DIV2, GP ABCD T4/T6 CL II, III, DIV2, GP FG T4/T6 Ex nA IIC T4/T6 AEx nA IIC T4/T6 Ex nL IIC T4/T6 AEx nL IIC T4/T6
- Permissible Ambient Temperature	$T_a = T4: -40 \dots +85 \text{ }^{\circ}\text{C}$ (-40 ... +185 °F) $T_a = T6: -40 \dots +60 \text{ }^{\circ}\text{C}$ (-40 ... +140 °F)
- NI/nA parameters	According to "control drawing": A5E02189134N, $U_m = 45 \text{ V}$
- nL parameters	According to "control drawing": A5E02189134N, $U_i = 45 \text{ V}$, $I_i = 100 \text{ mA}$, $L_i = 400 \text{ } \mu\text{H}$, $C_i = 6 \text{ nF}$

Explosion protection for China (acc. to NEPSI)

• Intrinsic safety "i"	GYJ111111X Ex ia/ib IIB/IIC T4 40 ... +85 °C (-40 ... +185 °F)
- Marking	
- Permissible ambient temperature	
- Connection	To certified intrinsically-safe circuits with maximum values: $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 750 \text{ mW}$
- Effective internal inductance	$L_i = 400 \text{ mH}$
- Effective inner capacitance	$C_i = 6 \text{ nF}$
• Explosion-proof "d"	GYJ111112
- Marking	Ex dia IIC T4/T6
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6
- Connection	To circuits with values: $U_m = \text{DC } 10.5 \dots 45 \text{ V}$
• Dust explosion protection for zone 21/22	GYJ111112
- Marking	DIP A21 TA,T120 °C IP68 D21
- Connection	To circuits with values: $U_m = \text{DC } 10.5 \dots 45 \text{ V}$
• Type of protection "n" (zone 2)	GYJ111111X
- Marking	Ex nL IIB/IIC T4/T6 Ex nA II T4/T6
- Connection	$U_i = 45 \text{ V DC}$
- Effective internal inductance	$L_i = 400 \text{ mH}$
- Effective inner capacitance	$C_i = 6 \text{ nF}$

- 1) Only relevant for the pressure transmitter. The temperature error of the remote seal must be calculated separately.
- 2) If the Type "D" measuring cell is used, the error should be increased by a factor of 5. This error can be reduced to 0 by a means of a zero adjustment.
- 3) This value may be increased if the process connection is sufficiently insulated.

HART communication

Load with connection of	
• HART Communicator	$R_B = 230 \dots 1100 \text{ } \Omega$
• HART modem	$R_B = 230 \dots 500 \text{ } \Omega$
Cable	2 wire shielded: $\leq 3.0 \text{ km}$ (1.86 miles), multiwire shielded: $\leq 1.5 \text{ km}$ (0.93 miles)
Protocol	HART Version 6.0
PC/laptop requirements	IBM compatible, RAM > 32 MByte, hard disk > 70 MByte, depending on modem type: RS 232-interface or USB connection, VGA graphics
Software for computer	SIMATIC PDM 6.0

Pressure Measurement

Transmitters for applications with highest requirements (Premium)
SITRANS P500

for level

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Selection and Ordering data		Article No.	Order code
Pressure transmitters for level, SITRANS P500 HART		7MF56	- - - - - 0 - - - - -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Enclosure	Thread for cable gland⁹⁾		
Die-cast aluminum, dual compartment	M20x1.5	0	
Die-cast aluminum, dual compartment	½-14 NPT	1	
Stainless steel precision casting, two-chamber housing	M20x1.5	2	
Stainless steel precision casting, two-chamber housing	½-14 NPT	3	
Output		3	
4 ... 20 mA, HART			
Measuring cell filling	Measuring cell cleaning		
Silicone oil	normal	1	
Measuring span (min. ... max.)			
1.25 ... 250 mbar	(0.5 ... 100 inH ₂ O)		D
6.25 ... 1250 mbar	(2.5 ... 500 inH ₂ O)		E
31.25 ... 6250 mbar	(12.54 ... 2509 inH ₂ O)		F
Wetted parts of the low-pressure side			
(stainless steel process flanges)			
Seal diaphragm	Process connection		
Stainless steel 1.4404/316L	Stainless steel 1.4404/316L		A
Hastelloy C276	Stainless steel 1.4404/316L		B
Monel 400	Stainless steel 1.4404/316L		C
Process connection of low-pressure side			
Female thread ¼-18 NPT			
<ul style="list-style-type: none"> Sealing screw opposite process connection <ul style="list-style-type: none"> Mounting thread 7/16 - 20 UNF according to IEC 61518/DIN EN 61518 Mounting thread M10 to DIN 19213 Vent on side of process flange <ul style="list-style-type: none"> Mounting thread 7/16 - 20 UNF according to IEC 61518/DIN EN 61518 Mounting thread M10 to DIN 19213 		0	
		1	
		4	
		5	
Wetted parts materials (high-pressure side)			
Stainless steel 1.4404/316L			0
Hastelloy C276 mat. no. 2.4819			1
Monel 400 mat. no. 2.4360			2
Tantalum			3
PFA coated on stainless steel			4
PTFE on stainless steel 1.4404/316L (not in combination with an extension)			6 A
Other version			9 Y
Add Order code and plain text:			
Material: ... ; Extension length: ...			N 1 Y
Process connection on high-pressure side: Extension length			
None			A
50 mm (1.97 inch)			B
100 mm (3.94 inch)			C
150 mm (5.90 inch)			D
200 mm (7.87 inch)			E
Other version: See option "9" for "Wetted parts materials"			
Process connection on high-pressure side: Nominal diameter/Nominal pressure			
DN 50, PN 40 ⁶⁾			B
DN 80, PN 40			D
DN 100, PN 16			G
DN 100, PN 40			H
2", class 150 ⁶⁾			L
2", class 300 ⁶⁾			M
3", class 150			Q
3", class 300			R
4", class 150			T
4", class 300			U
Other version, add			Z
Order code and plain text:			
Nominal diameter: ... ; Nominal pressure: ...			Q 1 Y

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500

for level

Selection and Ordering data	Article No.	Order code
Pressure transmitters for level, SITRANS P500 HART	7MF56-0	
Process connection on high-pressure side: Filling liquid		
Silicone oil M5		0
Silicone oil M50		1
High-temperature oil		2
Halocarbon (for oxygen measurement)		3
FDA compliant oil		4
Other version, add		9
Order code and plain text:		R1Y
Filling liquid: ...		

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Pressure Measurement

Transmitters for applications with highest requirements (Premium)
SITRANS P500

for level

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Selection and Ordering data	Order code
Further designs Add "-Z" to Article No. and specify Order code.	
Display (Standard: no display, cover closed)	
With display and blanking cover	A10
With display and glass cover	A11
Special version: cover/casing	
Two coats of lacquer on casing, cover (PU on epoxy)	A20
Electrical connection and cable entry (Standard: no cable gland, only dust protection caps)	
Cable gland made of plastic (IP66/68) ⁴⁾	A50
Cable glands made of metal (IP66/68)	A51
Cable glands made of stainless steel (IP66/68)	A52
M12 device plug without cable socket (IP66/67) ⁴⁾	A60
M12 device plug, cable socket (IP66/67) ⁴⁾	A61
Han 7D device plug, plastic, straight (with cable socket) (IP65) ⁴⁾	A71
Han 7D device plug, plastic, angled (with cable socket) (IP65) ⁴⁾	A72
Han 7D device plug, metal enclosure, straight (with cable socket) (IP65) ⁴⁾	A73
Han 7D device plug, metal enclosure, angled (with cable socket) (IP65) ⁴⁾	A74
Han 8D device plug, plastic, straight (with cable socket) (IP65) ⁴⁾ ⁷⁾	A75
Han 8D device plug, plastic, angled (with cable socket) (IP65) ⁴⁾ ⁷⁾	A76
Han 8D device plug, metal enclosure, straight (with cable socket) (IP65) ⁴⁾ ⁷⁾	A77
Han 8D device plug, metal enclosure, angled (with cable socket) (IP65) ⁴⁾ ⁷⁾	A78
PG 13.5 adapters ⁴⁾	A82
Language for labels, quick-start guide and menu language default⁸⁾ (instead of English as standard)	
German	B10
French	B12
Spanish	B13
Italian	B14
Chinese	B15
Russian	B16
Japanese	B17
English with units: psi/inH ₂ O	B21
Special version: Supplementary menu languages (Standard: English, German, French, Spanish, Italian)	
Asia language package (in addition: Chinese, Japanese, Russian)	B80
Certificates (available online for downloading)¹⁾	
Quality Inspection Certificate (5-point characteristic curve test) according to IEC 60770-2 ²⁾	C11
Acceptance test certificate according to EN 10204-3.1 ³⁾	C12
Acceptance certificate (EN 10204-3.1); PMI test of parts in contact with medium	C15
Functional Safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	C20
Degree of protection approvals: Ex ia/ib (intrinsic safety)	
Ex ia/ib protection (ATEX) (T4)	E00
Ex IS protection (FM) (T4)	E01
Ex IS protection (C _{CSA} US) (T4)	E02
Ex ia/ib protection (NEPSI) (T4)	E06

Selection and Ordering data	Order code
Further designs Add "-Z" to Article No. and specify Order code.	
Degree of protection approvals: Ex d (flameproof)	
Ex d explosion-proof (ATEX)(T4/T6)	E20
Ex XP explosion-proof and DIP (FM)(T4/T6)	E21
Ex XP explosion-proof and DIP (C _{CSA} US)(T4/T6)	E22
Ex d explosion-proof (NEPSI)(T4/T6)	E26
Degree of protection approvals: n/NI	
Zone 2 (nA, nL, ic) (ATEX) (T4/T6)	E40
Div2 NI, Div2 NI-field wiring (FM) (T4/T6)	E41
Zone 2 (nA, nL), Div2 NI (C _{CSA} US) (T4/T6)	E42
Zone 2 (nA, nL) (NEPSI) (T4/T6)	E46
Degree of protection approvals: Zone 20/21/22	
Use in Zone 21/22 (Ex tD) (ATEX) Ex tb	E60
Use in Zone 20/21/22 (Ex iaD) (ATEX) Ex ta	E61
Use in Zone (Ex DIP) (ATEX) (NEPSI)	E66
Degree of protection approvals: Combinations	
IS protection and XP and DIP (FM)	E71
IS protection and XP and DIP (C _{CSA} US)	E72
IS protection and XP and DIP (FM/C _{CSA} US)	E73
Supplementary approvals / degree of protection	
Ex-protection Ex ia according to EAC Ex (Russia)	E80
Ex-protection Ex d according to EAC Ex (Russia)	E81
Dual Seal approval ⁵⁾	E85
Export approval Korea	E86
Special process connection versions (diff. pressure)	
Swap process connection: high-pressure side at front	L33
Mosquito protection	
4 pcs. for 1/4-18 NPT thread	L36
Process flanges, O-rings, special material Standard: Viton (FKM (FPM))	
Process connection sealing rings made of PTFE (Teflon), virginal	L60
Process connection sealing rings made of PTFE (Teflon), glass fiber-reinforced	L61
Process connection sealing rings made of FFKM (Kalrez)	L62
Process connection sealing rings made of NBR	L63
Process connection sealing rings made of graphite	L64
Drain/Vent valve (1 set = 2 units)	
2 ventilation valves 1/4- 18 NPT, in material of process flange)	L80
Vacuum-proof design	
Vacuum service	V04
Spark arrester	V05
For mounting on zone 0 (including documentation)	
¹⁾ Enclosed in print or as DVD: see page 1/347. ²⁾ When also ordering the quality inspection certificate (factory calibration) according to IEC 60770-2 for transmitters with mounted diaphragm seals: Order this certificate only together with the remote seals. The measuring accuracy of the total combination is certified here. ³⁾ When also ordering the acceptance test certificate according to EN 10204-3.1 for transmitters with mounted diaphragm seals: Order this certificate as well in addition to the respective remote seals. ⁴⁾ Not together with types of protection "Explosion-proof", "Ex nA" and "Intrinsic safety and explosion-proof" ⁵⁾ Only in conjunction with FM and/or C _{CSA} US ⁶⁾ Not recommended for Measuring span "D" ⁷⁾ The Han 8D device plug is identical with the former Han 8U version. ⁸⁾ For option B15, B16 and B17 the menu language default is English. Otherwise the Option B80 (Asia language package) is necessary. ⁹⁾ Cable glands must be ordered separately from "Further designs" (add "-Z" to Article No. and specify order code).	

Selection and ordering data	Order code
Additional data Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Measuring range to be set Specify in plain text: Linear characteristic curve (max. 5 characters): Y01: ... up to ... mbar, kPa, MPa, psi	Y01
Measuring point number and measuring point identifier (only standard ASCII character set) Specify in plain text: Measuring point number (TAG No.), max. 16 characters Y15:	Y15
Measuring point text (max. 27 char.) Y16:	Y16
Entry of HART address (TAG), max. 32 characters Y17:	Y17
Setting of pressure indication in pressure units Specify in plain text (standard setting: mbar) Y21: bar, kPa, MPa, psi, ... Note: The following pressure units are selectable: bar, mbar, mm H ₂ O*, in H ₂ O*, ftH ₂ O*, mmHG, inHG, psi, Pa, kPa, MPa, g/cm ² , kg/cm ² , Torr, ATM, % or mA *) Reference temperature 20 °C	Y21
Setting of pressure indication in non-pressure units¹⁾ Specify in plain text: Y22: ... up to ... l/min, m ³ /h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	Y22 + Y01
Customer-specific settings Damping setting (range: 0 ... 100 s) (Standard setting: 2 s)	Y30

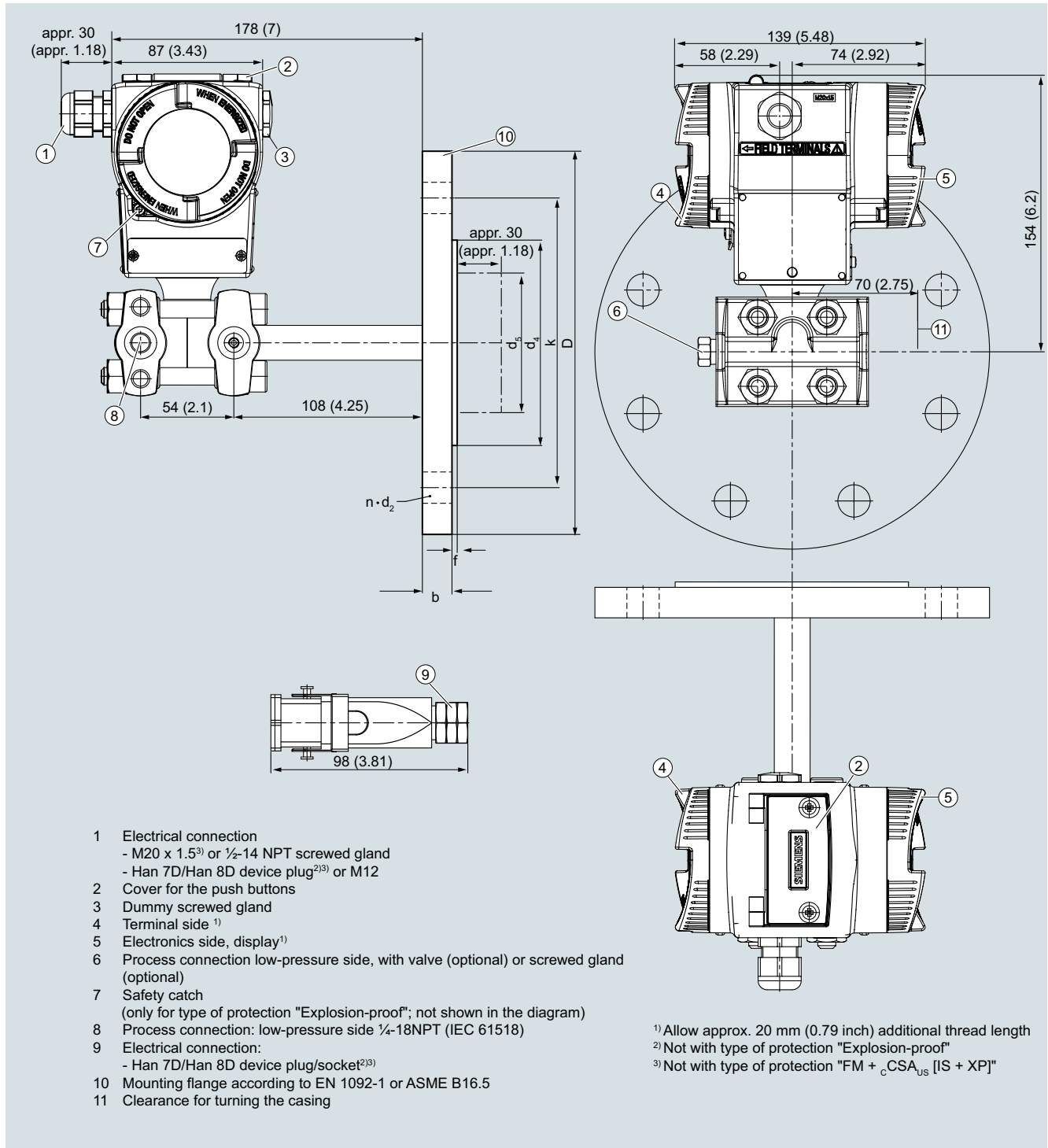
¹⁾ Preset values can only be changed over SIMATIC PDM.

Pressure Measurement

Transmitters for applications with highest requirements (Premium)
SITRANS P500

for level

Dimensional drawings



SITRANS P pressure transmitter for filling level, P500 series, measurements in mm (inch)

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500

for level

1

Connection to EN 1092-1

Nominal diameter	Nominal pressure	b mm	D mm	d mm	d ₂ mm	d ₄ mm	d ₅ mm	d _M mm	f mm	k mm	n	L mm
DN50	PN 40	20	165	61	18	102	48.3	45 ¹⁾	2	125	4	0, 50, 100, 150 or 200
DN 80	PN 40	24	200	90	18	138	76	72 ²⁾	2	160	8	
DN 100	PN 16	20	220	115	18	158	94	89	2	180	8	
	PN 40	24	235	115	22	162	94	89	2	190	8	

Connection to ASME B16.5

Nominal diameter	Nominal pressure lb/sq.in.	b inch (mm)	D inch (mm)	d ₂ inch (mm)	d ₄ inch (mm)	d ₅ inch (mm)	d _M inch (mm)	f inch (mm)	k inch (mm)	n	L inch (mm)
2 inch	class 150	0.77 (19.5)	5.91 (150)	0.75 (19.0)	3.62 (92)	1.9 (48.3)	1.77 (45) ¹⁾	0.079 (2.0)	4.75 (120.7)	4	0, 2, 3.94, 5.94 or 7.87
	class 300	0.89 (22.7)	6.49 (165)	0.75 (19.0)	3.62 (92)	1.9 (48.3)	1.77 (45) ¹⁾	0.079 (2.0)	5.0 (127)	8	
3 inch	class 150	0.96 (24.3)	7.5 (190.5)	0.75 (19.0)	5 (127)	3.0 (76)	2.83 (72) ²⁾	0.079 (2.0)	6 (152.4)	4	(0, 50, 100, 150 or 200)
	class 300	1.14 (29.0)	8.27 (210)	0.87 (22.2)	5 (127)	3.0 (76)	2.83 (72) ²⁾	0.079 (2.0)	6.69 (168.3)	8	
4 inch	class 150	0.96 (24.3)	9.06 (230)	0.75 (19.0)	6.19 (157.2)	3.69 (94)	3.5 (89)	0.079 (2.0)	7.5 (190.5)	8	
	class 300	1.27 (32.2)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.5 (89)	0.079 (2.0)	7.88 (200)	8	

Explanations of tables:

d: Internal diameter of gasket to DIN 2690

d_M: Effective diaphragm diameter

d₅: Diameter of extension

f: Milling edge

L: Extension length

¹⁾ 59 mm = 2.32 inch with tube length L=0.

²⁾ 89 mm = 3½ inch with tube length L=0.

Pressure Measurement

Transmitters for applications with highest requirements (Premium)
SITRANS P500

Accessories/Spare parts

Selection and ordering data		Article No.
Replacement measuring cells for differential pressure		7MF5994 -
SITRANS P pressure transmitters for differential pressure and flow, P500 HART PN 160 series (MAWP 2320 psi)		1
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	Measuring cell cleaning	
Silicone oil	normal	1
Measuring span (min. ... max.)		
1.00 ... 50 mbar	(0.4 ... 20 inH ₂ O)	C
1.25 ... 250 mbar	(0.5 ... 100 inH ₂ O)	D
6.25 ... 1250 mbar	(2.5 ... 502 inH ₂ O)	E
31.25 ... 6250 mbar	(12.54 ... 2509 inH ₂ O)	F
0.16 ... 32 bar	(2.33 ... 465 psi)	G
Wetted parts materials		
(stainless steel process flanges)		
Seal diaphragm	Parts of measuring cell	
Stainless steel 1.4404/316L	Stainless steel 1.4404/316L	A
Hastelloy C276 ¹⁾	Stainless steel 1.4404/316L	B
Monel 400 ¹⁾	Stainless steel 1.4404/316L	C
Process connection		
Female thread 1/4-18 NPT		
• Sealing screw opposite process connection		
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		0
- Mounting thread M10 to DIN 19213		1
• Vent on side of process flange		
- Mounting thread 7/16-20 UNF to IEC 61518/DIN EN 61518		4
- Mounting thread M10 to DIN 19213		5
Further designs		Order code
Add "-Z" to Article No. and specify Order code.		
Acceptance test certificate		C12
Acc. to EN 10204-3.1		
Without process flanges		K00
Vent on side for gas measurements ²⁾		L32
Process flanges, O-ring, special material		
Standard: Viton (FKM (FPM))		
Process connection sealing rings made of PTFE (Teflon), virginal		L60
Process connection sealing rings made of PTFE (Teflon), glass fiber-reinforced		L61
Process connection sealing rings made of FPM (Kalrez) ²⁾		L62
Process flanges, O-rings made of NBR		L63
Process flanges, O-rings made of graphite		L64

¹⁾ Not together with Measuring span "C".

²⁾ Only in conjunction with process connection code 4 or 5.

²⁾ Not together with Measuring span "G".

Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500

Accessories/Spare parts

1

Selection and Ordering data

	Article No.
Mounting brackets For differential pressure transmitters with flange thread M10 (7MF54...10 and 7MF54...50) <ul style="list-style-type: none"> Made of steel Made of stainless steel Made of stainless steel 	7MF5987-1AA 7MF5987-1AD 7MF5987-1AG
Mounting brackets for differential pressure transmitter with flange thread 7/16-20 UNF (7MF54...00 and 7MF54...40) <ul style="list-style-type: none"> Made of steel Made of stainless steel Made of stainless steel 	7MF5987-1AC 7MF5987-1AF 7MF5987-1AJ
Cover Made of die-cast aluminum, including O-ring <ul style="list-style-type: none"> Without inspection window With inspection window Made of stainless steel, including seal <ul style="list-style-type: none"> Without inspection window With inspection window 	7MF5987-1BE 7MF5987-1BF 7MF5987-1BG 7MF5987-1BH
Digital indicator Including mounting material	7MF5987-1BR
TAG plate (incl. fastening material) Without inscription (5 pcs.) Printed (1 pc.) Data according to Y01 or Y02, Y15 and Y16 (see "SITRANS P transmitters")	7MF5987-1CA 7MF5987-1CB-Z Y...:
Mounting screws For TAG plate, grounding and connection terminals and securing and locking screws (30 units)	7MF5987-1CC
Sealing plugs for process flange (1 set = 2 units) <ul style="list-style-type: none"> Made of stainless steel Made of Hastelloy 	7MF4997-1CG 7MF4997-1CH
Vent valve Complete (1 set = 2 units) <ul style="list-style-type: none"> Made of stainless steel Made of Hastelloy 	7MF4997-1CP 7MF4997-1CQ
Electronics module HART, intrinsically safe Ex ia for installation in transmitter casing (observe warranty conditions)	7MF5987-1DC
Connection board (incl. fastening material) HART, intrinsically safe Ex ia for installation in transmitter casing (observe warranty conditions)	7MF5987-1DM
Push buttons assembly (incl. fastening material) For replacement of operating keys for on-site operation of the transmitter	7MF5987-2AF
Sealing ring for <ul style="list-style-type: none"> Process connection NBR sealing ring for screw cover (10 pcs.) NBR sealing ring for interface measuring cell/housing (10 pcs.) 	See catalog FI01, "Fittings" 7MF4997-2EA 7MF4997-2EB

Selection and Ordering data

	Article No.
Documentation The entire documentation is available for download free-of-charge in various languages at: http://www.siemens.com/processinstrumentation/documentation Compact operating instructions <ul style="list-style-type: none"> German, Spanish, French, Italian, Dutch Estonian, Latvian, Lithuanian, Polish, Romanian Bulgarian, Czech, Finnish, Slovakian, Slovenian Danish, Greek, Portuguese, Swedish, Hungarian Russian 	A5E02344532 A5E02307339 A5E02307340 A5E02307341 A5E02307338
HART modem With USB interface	7MF4997-1DB
Certificates (order only via SAP) additional to internet download <ul style="list-style-type: none"> Hard copy (to order) On DVD (to order) 	A5E03252406 A5E03252407

For power supply units, see catalog FI01 "Supplementary Components".

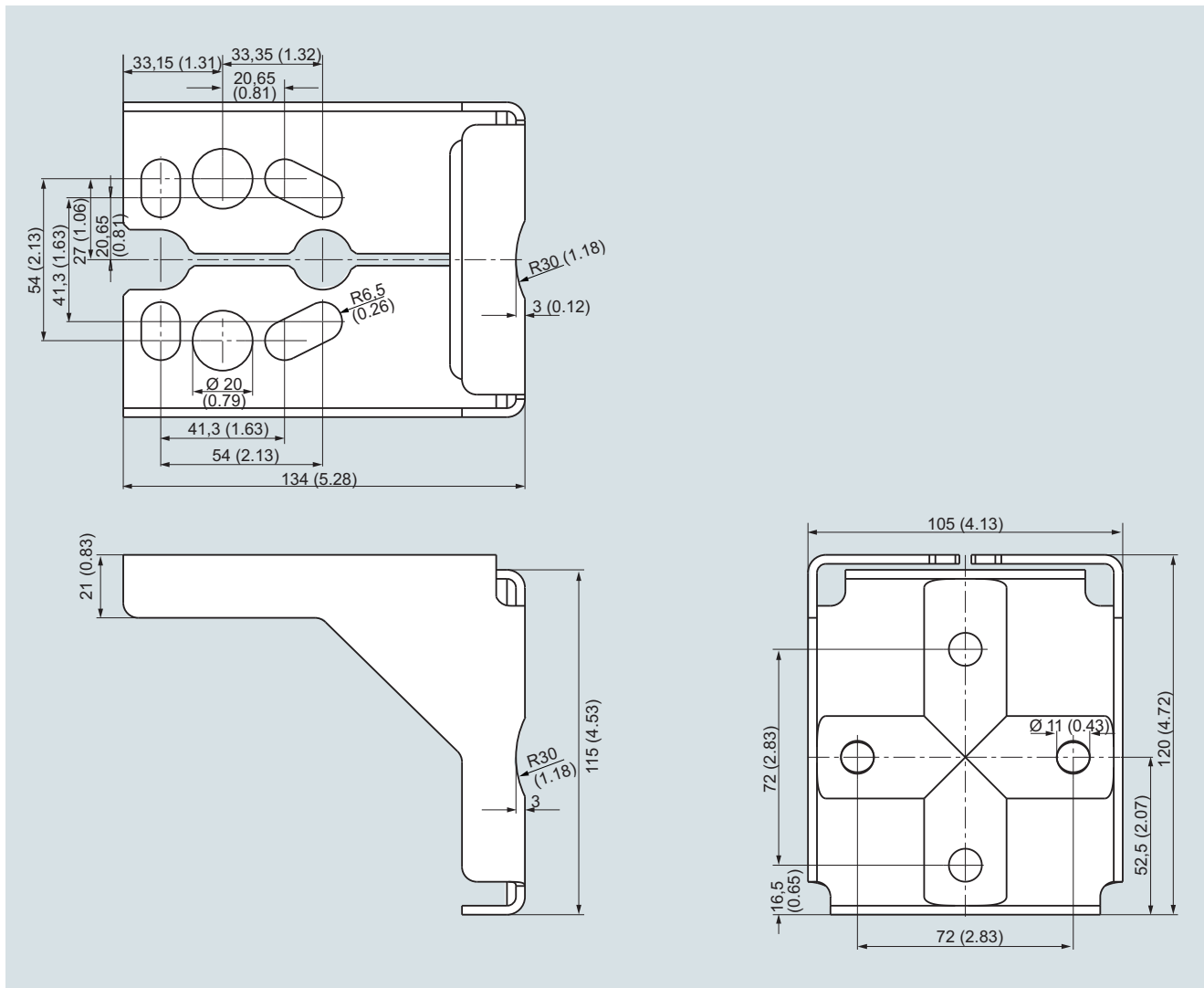
Pressure Measurement

Transmitters for applications with highest requirements (Premium)

SITRANS P500

Accessories/Spare parts

Dimensional drawings



Mounting bracket for SITRANS P pressure transmitter, P500 series, measurements in mm (inch)

Mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)

Overview

The SITRANS P500 transmitter can be delivered factory-fitted with the following manifolds:

- Valve manifolds 7MF9411-5BA: Three valve manifold for differential pressure transmitter
- Valve manifolds 7MF9411-5CA: Three valve manifold for differential pressure transmitter

Design

The 7MF9411-5BA and 7MF9411-5CA manifolds are sealed with PTFE sealing rings between the transmitter and the manifold.

Once installed, the complete unit is checked under pressure for leaks (compressed air 6 bar (2411 inH₂O)) and is certified leak-proof with a test report to EN 10204 - 2.2.

All manifolds should preferably be secured with the respective mounting brackets. The transmitters are mounted on the manifold and not on the unit itself.

If you order a mounting bracket when choosing the option "Factory mounting of manifolds", you will receive a mounting bracket for the manifold instead of a bracket for mounting the transmitter.

If you order an acceptance test certificate 3.1 to EN 10204 when choosing the option "Factory mounting of manifolds", a separate certificate is provided for the transmitters and the manifolds respectively.

Selection and ordering Data**Manifold 7MF9411-5BA on SITRANS P pressure transmitter P500 for differential pressure and flow**

Add -Z to the Article No. of the transmitter and add Order codes

SITRANS P500 7MF54...-...

mounted with gaskets made of PTFE and screws made of

- Chromized steel
- Stainless steel

Delivery incl. high-pressure test certified by factory certificate to EN 10204-2.2

Further designs:

Delivery includes mounting bracket and mounting clips made of

- Steel
- Stainless steel

(instead of the mounting bracket supplied with the transmitter)

Supplied acceptance test certificate to EN 10204-3.1 for transmitters and mounted valve manifold

Order code

U01

U02

A01

A02

C12

Manifold 7MF9411-5CA on SITRANS P500 pressure transmitter for differential pressure and flow

Add -Z to the Article No. of the transmitter and add Order codes

SITRANS P500 7MF54...-...

mounted with gaskets made of PTFE and screws made of

- Chromized steel
- Stainless steel

Delivery incl. high-pressure test certified by factory certificate to EN 10204-2.2

Further designs:

Delivery includes mounting bracket and mounting clips made of

- Steel
- Stainless steel

(instead of the mounting bracket supplied with the transmitter)

Supplied acceptance test certificate to EN 10204-3.1 for transmitters and mounted valve manifold

Order code

U03

U04

A01

A02

C12

Pressure Measurement

Transmitters for applications with highest requirements (Premium)
SITRANS P500

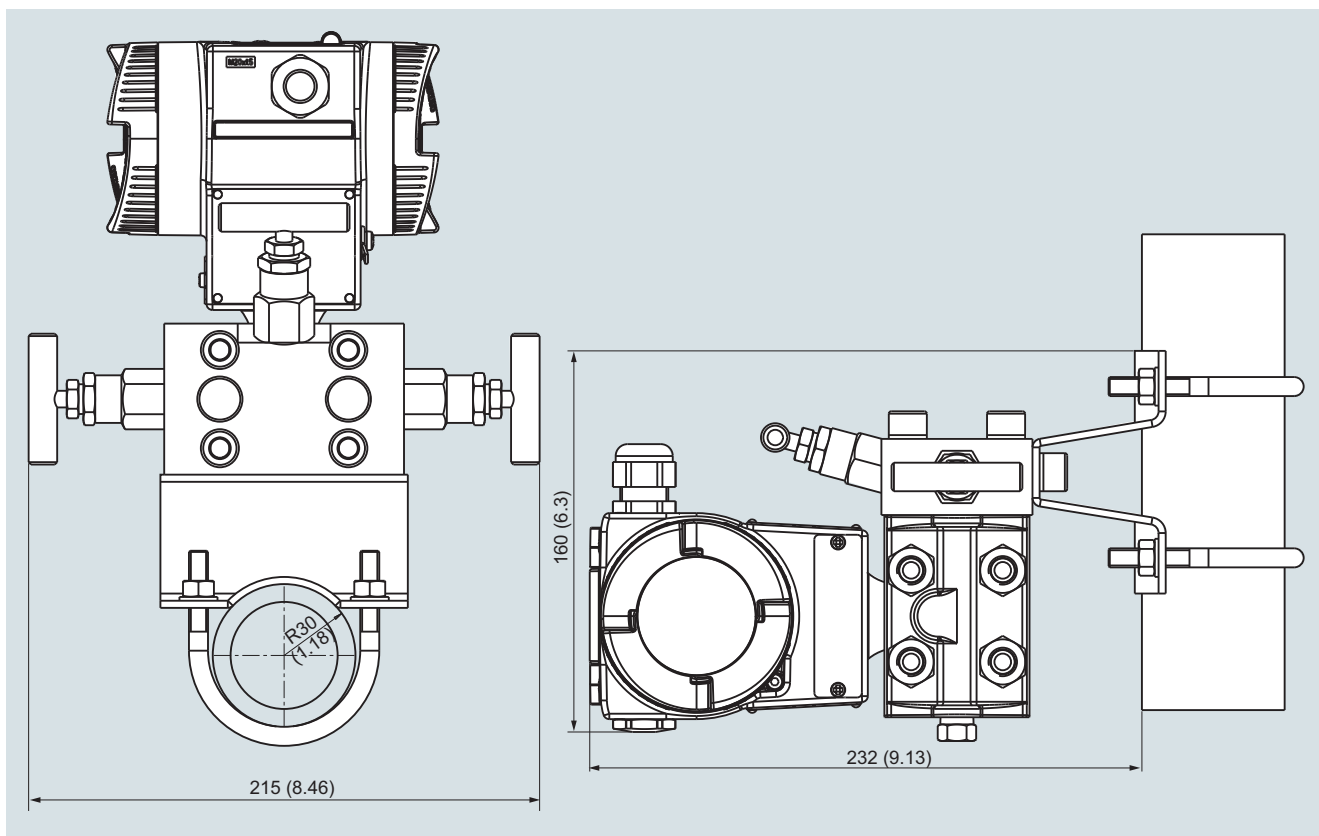
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Factory-mounting of valve manifolds on transmitters

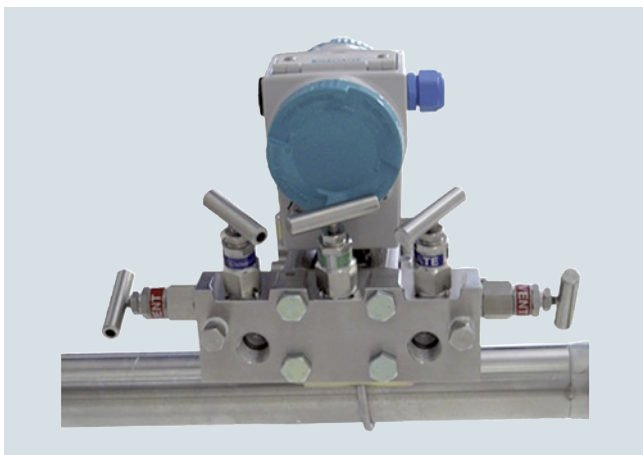
Dimensional drawings



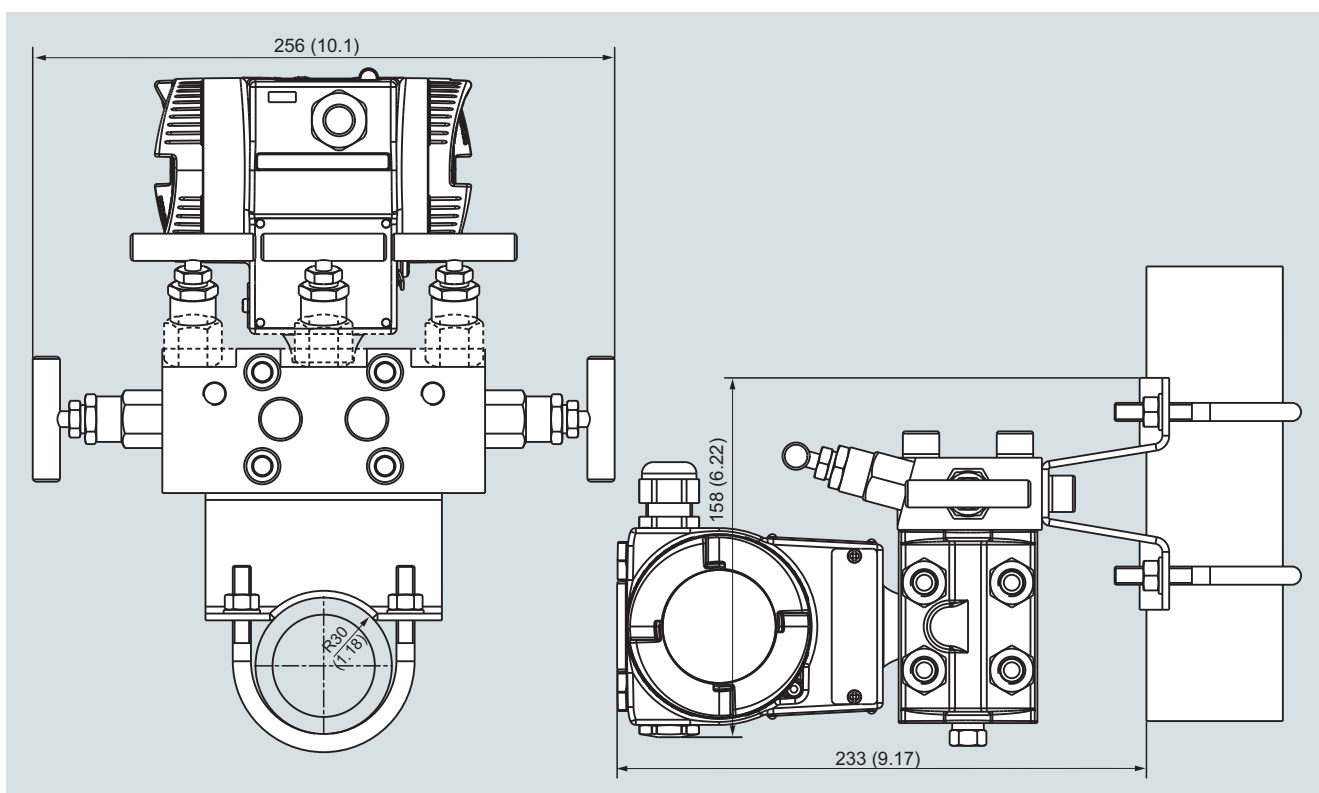
Manifold 7MF9411-5BA with attached SITRANS P500 pressure transmitter for differential pressure and flow (incl. mounting bracket)



Manifold 7MF9411-5BA with attached SITRANS P500 pressure transmitter for differential pressure and flow, measurements in mm (inch)



Manifold 7MF9411-5CA with attached SITRANS P500 pressure transmitter for differential pressure and flow (incl. mounting bracket)



Manifold 7MF9411-5CA with attached SITRANS P500 pressure transmitter for differential pressure and flow, measurements in mm (inch)

Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

1

Technical description

Overview

In many cases the pressure transmitter and the measured medium have to be physically separated. It is then necessary to use a remote seal.

The remote seals can be used with the SITRANS P320/420 pressure transmitter series:

- Pressure
- Absolute pressure
- Differential pressure and flow

Note

When configuring your remote seal, be sure to read the information about transmission response, temperature error and response time to be found in the sections "Function" and "Technical data". Only then will the remote seal work to optimum effect.

Benefits

- No direct contact between the pressure transmitter and the medium
- Individual configuration of the pressure transmitter for perfect adaptation to the operating conditions
- Available in many versions
- Specially designed for difficult operating conditions
- Quick-release versions available for the food industry

Application

Remote seal systems should be used if a separation between the measured medium and the measuring instrument is essential or appropriate.

Examples of such cases:

- The temperature of the medium is outside the limits specified for the pressure transmitter.
- The medium is corrosive and requires diaphragm materials which are not available for the pressure transmitter.
- The medium is highly viscous or contains solids which would block the measuring chambers of the pressure transmitter.
- The medium may freeze in the measuring chambers or pulse line.
- The medium is heterogeneous or fibrous.
- The medium tends towards polymerization or crystallization.
- The process requires quick-release remote seals, as necessary e.g. in the food industry for fast cleaning.
- The process requires cleaning of the measuring point, e.g. in a batch process.

Design

A remote seal system consists of the following components.

- Pressure transmitter
- One or two remote seals
- Filling liquid
- Connection between pressure transmitter and remote seal (direct mounting or by means of capillary)

The volume in contact with the measured medium is terminated by a flat elastic diaphragm lying in a bed. Between the diaphragm and the pressure transmitter is the filling liquid.

In many cases, a capillary has to be connected between the remote seal and the pressure transmitter in order e.g. to minimize temperature effects on the latter when hot media are involved.

However, the capillary influences the response time and the temperature response of the complete remote seal system. Two capillaries of equal length must always be used to connect a remote seal to a pressure transmitter for differential pressure.

The remote seal can be optionally equipped with a projecting diaphragm (tube).

Remote seals of sandwich design are fitted with a dummy flange.

Designs

Diaphragm seal

With diaphragm seals, the pressure is measured by means of a flat diaphragm which rests in a bed.

The following types of diaphragm seals exist:



Diaphragm seal of sandwich design without (left) and with a projecting diaphragm (tube)

- Sandwich design
- Sandwich design with projecting diaphragm (tube) to DIN or ASME which are secured using a dummy flange.



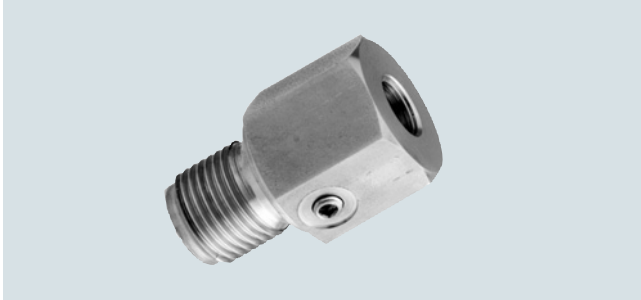
Diaphragm seal of flange design without (left) and with a projecting diaphragm (tube)

- Flange design
- Flange design with projecting diaphragm (tube) to DIN or ASME, secured using holes in the flange.



Quick-release diaphragm seal

- Quick-release remote seals, e.g. to DIN 11851, SMS standard, IDF standard, APV RJF standard, clamp connection, etc.
- Miniature diaphragm seal with male thread for screwing into tapped holes
- Remote seals with customer-specific process connections

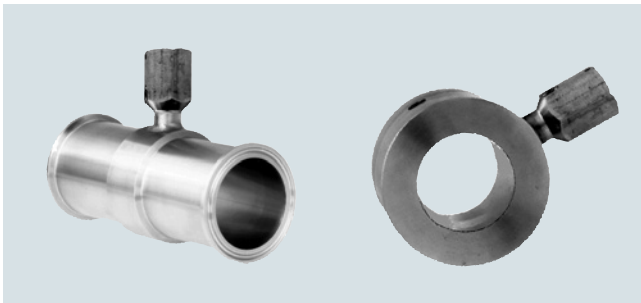


Miniature diaphragm seal with diaphragm flush with front

- Miniature diaphragm seals

The quick-release remote seals are used above all in the food industry. Their design means that the measured medium cannot accumulate in dead volumes. The quick-release clamp present on the remote seal means that quick dismounting is possible for cleaning.

Clamp-on seal



Clamp-on seal with quick-release design (left) and for flange mounting

With clamp-on seals, the pressure is first measured using a cylindrical diaphragm positioned in a pipe, and then transmitted to the pressure transmitter by means of the filling liquid.

The clamp-on seal is a special design for flowing media. It consists of a cylindrical pipe in which a cylindrical diaphragm is embedded. Since it is completely integrated in the process pipe, no turbulences, dead volumes or other obstructions to the flow occur. Furthermore, the clamp-on seal can be cleaned by a pig.

The following types of clamp-on seals exist:

- Quick-release clamp-on seals, e.g. to DIN 11851, SMS standard, IDF standard, APV/RJF standard, clamp connection etc. The quick-release facility attached to the remote seal enables the seal to be removed quickly for cleaning purposes.
- Clamp-on seals for flanging to EN or ASME.
- Clamp-on seals with customer-specific process connections.

Note:

The pressure data on the transmitter and the remote seal must be observed with regard to pressure/temperature behavior.

Function

The measured pressure is transferred from the diaphragm to the filling liquid and passes through the capillary to the measuring chamber of the pressure transmitter. The interior of the diaphragm seal and of the capillary, as well as the measuring chamber of the transmitter, are filled gas-free by the filling liquid.

Transmission response

The transmission response of a remote seal is characterized by the following variables:

- Temperature error
- Adjustment time

Temperature error

Temperature errors are caused by the change of volume of the filling liquid due to temperature variations. To select the right remote seal you must calculate the temperature error.

Below you will find an overview of the factors which influence the size of the temperature error, as well as information on how to calculate the temperature error.

The temperature error is dependent on the following variables:

- Rigidity of the diaphragm used
- Filling liquid used
- Influence of the filling liquid underneath the process flanges or in the connection shank of the pressure transmitter
- Internal diameter of the capillary: The bigger the internal diameter, the bigger the temperature error
- Length of the capillary: The longer the capillary, the bigger the temperature error

Diaphragm rigidity

The rigidity of the diaphragm is of decisive importance. The bigger the diameter of the diaphragm, the softer the diaphragm and the more sensitively it reacts to temperature-induced changes in volume of the filling liquid.

The result is that small measuring ranges are only possible with large diaphragm diameters.

Other factors apart from diaphragm rigidity which also play a role:

- Diaphragm thickness
- Diaphragm material
- Coatings if present

Filling liquid

Every filling liquid reacts to temperature variations with a change of volume. Temperature errors can be minimized by selecting a suitable filling liquid, but the filling liquid must also be appropriate for the temperature limits and operating pressure. Furthermore, the filling liquid must also be physiologically harmless.

Since the filling liquid is present under the diaphragm, in the capillary and under the process flange of the pressure transmitter (or in the connection shank), the temperature error must be calculated separately for each combination.

Note:

A vacuum-resistant remote seal is recommended for continuous low-pressure operation at 500 mbar or below, including during commissioning (see ordering data).

An example of a temperature error calculation can be found in the section "Technical Specifications".

Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

1

Technical description

Response time

The response time is dependent on the following factors:

- Internal diameter of the capillary: The bigger the internal diameter, the shorter the response time
- Viscosity of the filling liquid: The greater the viscosity, the longer the response time
- Length of the capillary: The longer the capillary, the longer the response time
- Pressure in the pressure measuring system: The higher the pressure, the shorter the response time

Recommendations

The following should be observed to obtain an optimum combination of transmitter and remote seal:

- Choose the biggest possible diameter for the remote seal. The effective diameter of the seal diaphragm is then bigger and the temperature error smaller.
- Choose the shortest possible capillary. The response time is then shorter and the temperature error smaller
- Choose the filling liquid with the least viscosity and the smallest coefficient of expansion. Make sure, however, that the filling liquid meets the process requirements with regard to pressure, vacuum and temperature. And ensure that the filling liquid and the medium are compatible with one another.
- Note the following points for use in the vacuum range:
 - The pressure transmitter must always be positioned below the lowest spigot.
 - The operating range of some filling liquids is very limited with regard to the permissible temperature of the medium.
 - A vacuum-proof seal is necessary for continuous operation in the low-pressure range.
- Recommendations for the minimum span can be found in the section "Technical data".

Note

The remote seals listed here are a selection of the most common designs. On account of the large variety of process connections, certain remote seals which are not listed here may be available nevertheless.

Other versions can be:

- Other process connections, standards
- Aseptic or sterile connections
- Other dimensions
- Other nominal pressures
- Special diaphragm materials, including coatings
- Other sealing faces
- Other filling liquids
- Other capillary lengths
- Sheathing of capillaries with protective hose
- Calibration at higher/lower temperatures etc.

Please contact your local Siemens office for further information.

Negative pressure service

Liquids, such as silicone oils, inert or those suitable for food, are used in remote seal systems for transmission of the process pressure to the pressure transmitter.

In each liquid, particles have the tendency to leave the liquid compound with increasing temperature (transition from liquid to gaseous aggregate state). This means the vapor pressure increases with increasing temperature and is dependent on the substance or mixture being present.

The higher the temperature and the lower the associated process pressure in the liquid, the more difficult it gets to guarantee the desired transmission properties of the fill fluid and therefore the measuring arrangement.

Plus the sealing elements at the transmitter must be designed so that a diffusion of molecules from the atmosphere into the remote seal system is prevented due to the constantly occurring negative pressure.

In addition to the influencing variables process pressure and process temperature, the vapor pressure curve of the fill fluid at the remote seal end and the stiffness of the remote seal membrane impact the functionality of the remote seal in the negative pressure range.

This means you have to pay special attention to the physical properties of fill fluids with applications in the negative pressure range.

There are three stages for the negative pressure resistance:

- **Standard design** of the remote seal without additional protective measures, suitable for the overpressure range and low negative pressure range. This design is identified with (1) in the diagrams below in section 3.
- **Negative pressure service** with suitable seals and treated fill fluid, identified with (2) in the diagrams below in section 3. Here you select the order codes D81 or D83, depending on the mounting type.
- **Extended negative pressure service** with more extended treatment of the fill fluid and the remote seals, identified in the diagrams below. Here you select the order codes D85 or D88, depending on the mounting type.

There are two more areas in the diagrams. The area (4) identifies an area that has to be clarified with Technical Support prior to placing the order. The area (5) describes the area in which the remote seal fill fluid is permanently destroyed and the entire remote seal is therefore without function.

Technical specifications of the remote seal filling liquids

Filling liquid	Number in the Article No.	Density at 20°C [kg/dm ³]	Viscosity at 20°C [mm ² /s]	Suitable for negative pressure service	Suitable for extended negative pressure service
Silicone oil M5	1	0.914	4	x	-
Silicone oil M50	2	0.966	50	x	x
High-temperature oil	3	1.070	57	x	x
Halocarbon oil	4	1.968	14	x	-
Food oil (FDA-listed)	7	0.920	10	x	x

The suitable negative pressure service is specified with the pressure/temperature curves of the respective liquids described below.

Note: For reasons of operational safety, the transmitter must not exceed the height of the remote seal - with differential pressure applications, the height of the bottom remote seal - for measurements in the negative pressure range. The associated installation types B, C1, C2 or H are described at the end of this section under the topic "Measuring arrangements".

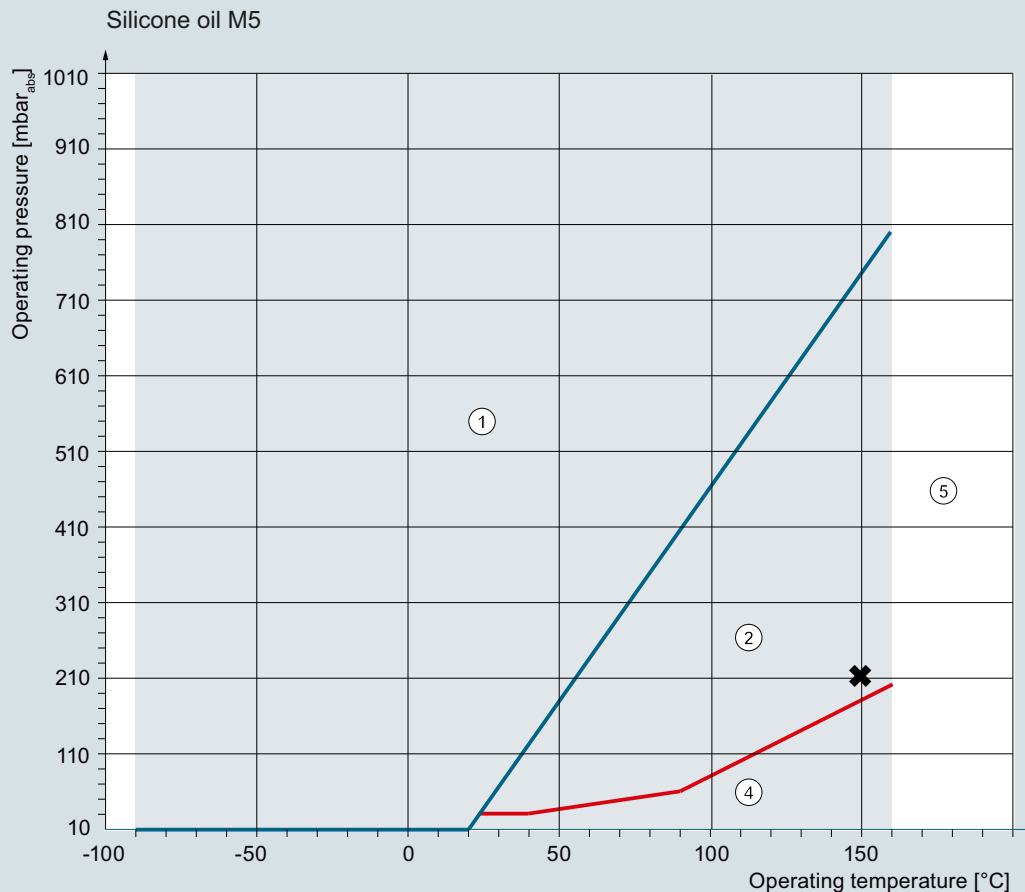
Selection of the required negative pressure service

The procedure for determining the required negative pressure service is described below using the silicone oil M5 as fill fluid. The minimum existing process pressure of a fictitious process is 200 mbar_{abs} (2.9 psi) (at a maximum process temperature of 150 °C (302 °F)). This intersection is identified by an "x" in the diagram below. This means the negative pressure service D81 or D83 (depending on the application) is sufficient in this example.

The suitable negative pressure resistance is determined this way for all other fill fluids.

Note:

Note the response times according to the table on page 1/364.



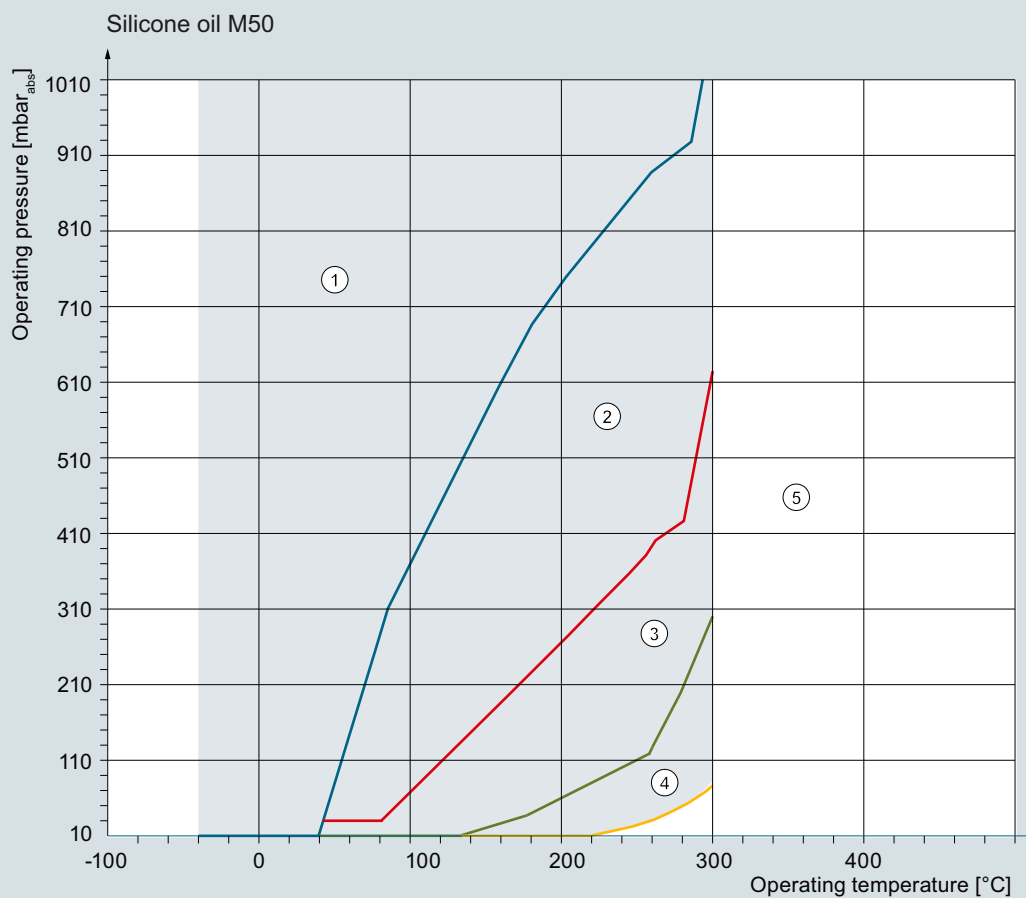
- ① Operating range of the standard remote seal design without special measures.
- ② Operating range for which the **negative pressure service D81 or D83** is required.
Note: An extended negative pressure service is **not** possible for this fill fluid.
- ④ Please contact Technical Support for applications in this area.
Detailed information regarding application, process and ambient data are necessary.
- ⑤ Area in which you have to expect the destruction of the fill fluid.
A function of the remote seal is not specified here.

Permissible operating range:
Max. temperature limit: 160 °C
Min. temperature limit: -90 °C

Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

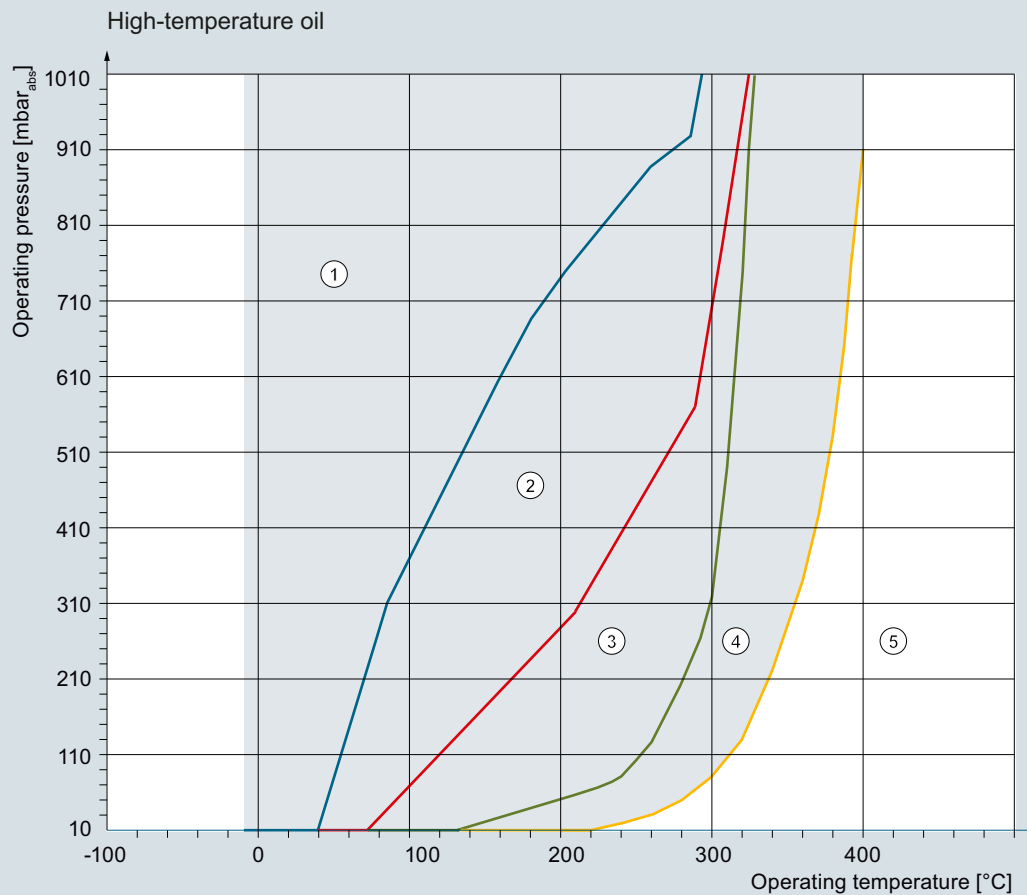
Technical description



- ① Operating range of the standard remote seal design without special measures.
- ② Operating range for which the **negative pressure service D81 or D83** is required.
- ③ Operating range for which the **extended negative pressure service D85 or D88** is required
- ④ Please contact Technical Support for applications in this area.
Detailed information regarding application, process and ambient data are necessary.
- ⑤ Area in which you have to expect the destruction of the fill fluid.
A function of the remote seal is not specified here.

Permissible operating range:
Max. temperature limit: 300 °C
Min. temperature limit: -40 °C

Negative pressure applications with silicone oil M50



- ① Operating range of the standard remote seal design without special measures.
- ② Operating range for which the **negative pressure service D81 or D83** is required.
- ③ Operating range for which the **extended negative pressure service D85 or D88** is required
- ④ Please contact Technical Support for applications in this area. Detailed information regarding application, process and ambient data are necessary.
- ⑤ Area in which you have to expect the destruction of the fill fluid. A function of the remote seal is not specified here.

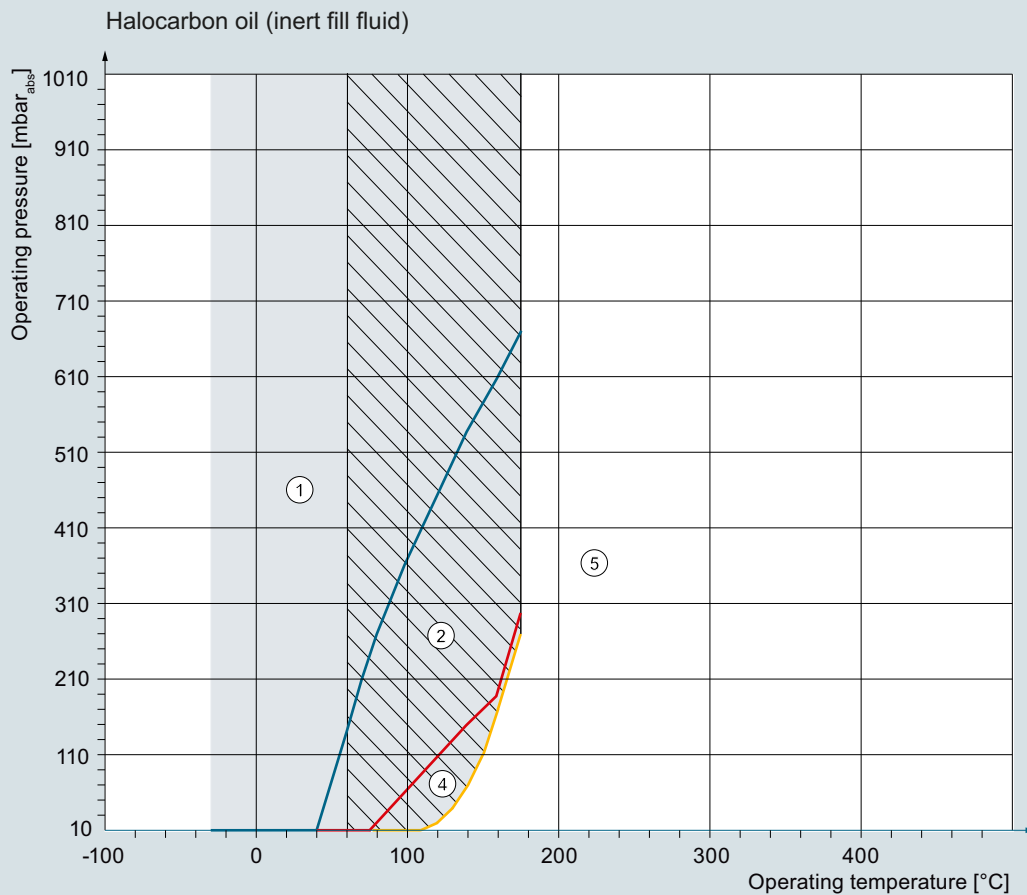
Permissible operating range:
Max. temperature limit: 400 °C
Min. temperature limit: -10 °C

Negative pressure applications with high-temperature oil

Pressure Measurement

Remote seals for transmitters and pressure gauges
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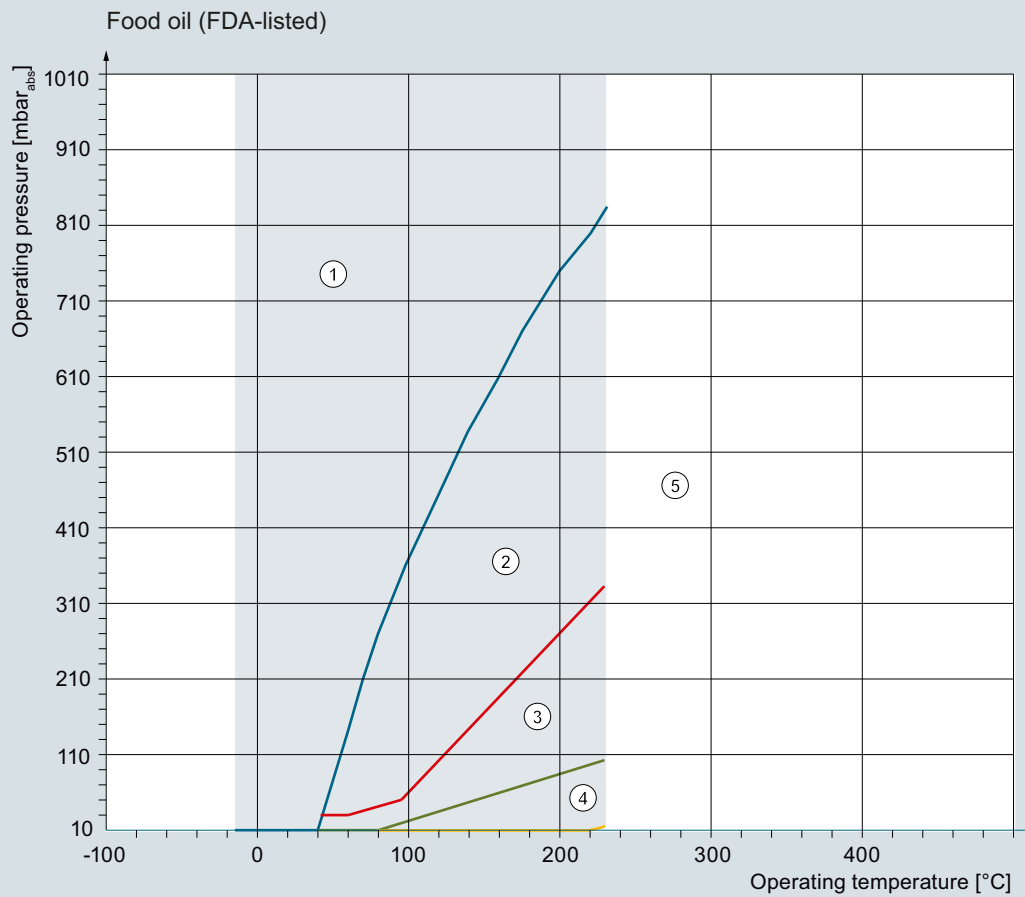
- ① Operating range of the standard remote seal design without special measures.
- ② Operating range for which the **negative pressure service D81 or D83** is required.
Note: An extended negative pressure service is **not** possible for this fill fluid.
- ④ Please contact Technical Support for applications in this area.
Detailed information regarding application, process and ambient data are necessary.
- ⑤ Area in which you have to expect the destruction of the fill fluid.
A function of the remote seal is not specified here.

Permissible operating range:
Max. temperature limit: 175 °C
Min. temperature limit: -30 °C

Oxygen application for operating temperature between 60 and 175 °C
and also for operating pressure > 50 bar not permissible.

Negative pressure applications with halocarbon oil (inert filling liquid)

A BAM approval for process temperatures up to 60 °C (140 °F) and system pressures up to 50 bar (725 psi) is available for the oxygen application.



- ① Operating range of the standard remote seal design without special measures.
- ② Operating range for which the **negative pressure service D81 or D83** is required.
- ③ Operating range for which the **extended negative pressure service D85 or D88** is required
- ④ Please contact Technical Support for applications in this area.
Detailed information regarding application, process and ambient data are necessary.
- ⑤ Area in which you have to expect the destruction of the fill fluid.
A function of the remote seal is not specified here.

Permissible operating range:
Max. temperature limit: 230 °C
Min. temperature limit: -15 °C

Negative pressure applications with food oil (FDA listed)

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Temperature error Diaphragm seals

Temperature errors of diaphragm seals when connected to pressure transmitters for pressure, absolute pressure, differential pressure (single-sided) and level

	Nominal diameter/ design	Diaphragm diameter		Temperature error of remote seal f_{RS}		Temperature error of capillary f_{Cap}		Temperature error of process flange/connec- tion spigot f_{PF}		Recommended min. spans (guid- ance values, observe temp. error)	
		mm	(inch)	mbar/ 10 K	(psi/ 10 K)	mbar/ (10 K · m_{Cap})	(psi/ (10 K · m_{Cap}))	mbar/ 10 K	(psi/ 10 K)	mbar	(psi)
Sandwich design or with flange to EN 1092-1	DN 50 without tube	59	(2.32)	1.5	(0.022)	2	(0.029)	2	(0.029)	200	(2.90)
	DN 50 with tube	45	(1.89)	5	(0.073)	10	(0.145)	10	(0.145)	500	(7.25)
	DN 80 without tube	89	(3.50)	0.2	(0.003)	0.2	(0.003)	0.2	(0.003)	100	(1.45)
	DN 80 with tube	72	(2.83)	1	(0.015)	1	(1.015)	1	(1.015)	250	(3.63)
	DN 100 without tube	89	(3.50)	0.2	(0.003)	0.4	(0.006)	0.4	(0.006)	100	(1.45)
	DN 100 with tube	89	(3.50)	0.4	(0.006)	0.4	(0.006)	0.4	(0.006)	100	(1.45)
	DN 125 without tube	124	(4.88)	0.2	(0.003)	0.1	(0.002)	0.1	(0.002)	20	(0.29)
	DN 125 with tube	124	(4.88)	0.2	(0.003)	0.1	(0.002)	0.1	(0.002)	20	(0.29)
Sandwich design or with flange to ASME B16.5	2 inch without tube	59	(2.32)	1.5	(0.022)	2	(0.029)	2	(0.029)	200	(2.90)
	2 inch with tube	45	(1.89)	5	(0.073)	10	(0.145)	10	(0.145)	500	(7.25)
	3 inch without tube	89	(3.50)	0.2	(0.003)	0.2	(0.003)	0.2	(0.003)	100	(1.45)
	3 inch with tube	72	(2.83)	1	(0.015)	1	(1.015)	1	(1.015)	250	(3.63)
	4 inch without tube	89	(3.50)	0.2	(0.003)	0.4	(0.006)	0.4	(0.006)	100	(1.45)
	4 inch with tube	89	(3.50)	0.4	(0.006)	0.4	(0.006)	0.4	(0.006)	100	(1.45)
	5 inch without tube	124	(4.88)	0.2	(0.003)	0.1	(0.002)	0.1	(0.002)	20	(0.29)
	5 inch with tube	124	(4.88)	0.2	(0.003)	0.1	(0.002)	0.1	(0.002)	20	(0.29)
Remote seal with union nut to DIN 11851	DN 25	25	(0.98)	20	(0.290)	60	(0.870)	60	(0.870)	6000	(87)
	DN 32	32	(1.26)	8	(0.116)	25	(0.363)	25	(0.363)	4000	(58)
	DN 40	40	(1.57)	4	(0.058)	10	(0.145)	10	(0.145)	2000	(29)
	DN 50	52	(2.05)	4	(0.058)	5	(0.073)	5	(0.073)	500	(7.25)
	DN 65	59	(2.32)	3	(0.044)	4	(0.058)	4	(0.058)	500	(7.25)
	DN 80	72	(2.83)	1	(0.015)	1	(0.015)	1	(0.015)	250	(3.63)
Remote seal, screwed gland design	DN 50	52	(2.05)	4	(0.058)	5	(0.073)	5	(0.073)	500	(7.25)
Remote seal with threaded socket to DIN 11851	DN 25	25	(0.98)	20	(0.290)	60	(0.870)	60	(0.870)	6000	(87)
	DN 32	32	(1.26)	8	(0.116)	25	(0.363)	25	(0.363)	4000	(58)
	DN 40	40	(1.57)	4	(0.058)	10	(0.145)	10	(0.145)	2000	(29)
	DN 50	52	(2.05)	4	(0.058)	5	(0.073)	5	(0.073)	500	(7.25)
	DN 65	59	(2.32)	3	(0.044)	4	(0.058)	4	(0.058)	500	(7.25)
	DN 80	72	(2.83)	1	(0.015)	1	(0.015)	1	(0.015)	250	(3.63)
Clamp connec- tion	1½ inch	32	(1.26)	8	(0.116)	25	(0.363)	25	(0.363)	4000	(58)
	2 inch	40	(1.57)	4	(0.058)	10	(0.145)	10	(0.145)	2000	(29)
	2½ inch	59	(2.32)	3	(0.044)	5	(0.073)	5	(0.073)	500	(7.25)
	3 inch	72	(2.83)	1	(0.015)	1	(0.015)	1	(0.015)	250	(3.63)
Miniature dia- phragm seal	G1B	25	(0.98)	20	(0.290)	60	(0.870)	60	(0.870)	6000	(87)
	G1½B	40	(1.57)	4	(0.058)	10	(0.145)	10	(0.145)	2000	(29)
	G2B	52	(2.05)	4	(0.058)	5	(0.073)	5	(0.073)	500	(7.25)

Remarks:

- Values apply for the filling liquids silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil and food oil (FDA listed).
- Values apply to stainless steel as the diaphragm material.

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Remote seals for transmitters and pressure gauges
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Temperature errors of diaphragm seals with connection to differential pressure transmitters (double-sided)

	Nominal diameter/ design	Diaphragm diameter		Temperature error of remote seal f_{RS}		Temperature error of capillary f_{Cap}		Temperature error of process flange/connec- tion spigot f_{PF}		Recommended min. spans (guidance val- ues, observe temperature error)	
		mm	(inch)	mbar/ 10 K	(psi/ 10 K)	mbar/ (10 K · m_{Cap})	(psi/ (10 K · m_{Cap}))	mbar/ 10 K	(psi/ 10 K)	mbar	(psi)
Sandwich design or with flange to EN 1092-1	DN 50 without tube	59	(2.32)	0.3	(0.0043)	0.3	(0.0045)	0.3	(0.0045)	250	(3.626)
	DN 50 with tube	45	(1.89)	1.26	(0.018)	1.7	(0.025)	1.7	(0.025)	250	(3.626)
	DN 80 without tube	89	(3.50)	0.05	(0.001)	0.05	(0.001)	0.05	(0.0007)	50	(0.725)
	DN 80 with tube	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.45)
	DN 100 without tube	89	(3.50)	0.05	(0.001)	0.07	(0.001)	0.07	(0.001)	50	(0.725)
	DN 100 with tube	89	(3.50)	0.1	(0.002)	0.07	(0.001)	0.07	(0.001)	50	(0.725)
	DN 125 without tube	124	(4.88)	0.05	(0.001)	0.03	(0.0004)	0.03	(0.0004)	20	(0.29)
	DN 125 with tube	124	(4.88)	0.05	(0.001)	0.03	(0.0004)	0.03	(0.0004)	20	(0.29)
Sandwich design with flange to ASME B16.5	2 inch without tube	59	(2.32)	0.3	(0.0043)	0.3	(0.0043)	0.3	(0.0045)	250	(3.626)
	2 inch with tube	45	(1.89)	1.26	(0.018)	1.7	(0.025)	1.7	(0.025)	250	(3.626)
	3 inch without tube	89	(3.50)	0.05	(0.001)	0.05	(0.0007)	0.05	(0.0007)	50	(0.725)
	3 inch with tube	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.45)
	4 inch without tube	89	(3.50)	0.05	(0.001)	0.07	(0.001)	0.07	(0.001)	50	(0.725)
	4 inch with tube	89	(3.50)	0.1	(0.002)	0.07	(0.001)	0.07	(0.001)	50	(0.725)
	5 inch without tube	124	(4.88)	0.05	(0.001)	0.03	(0.0004)	0.03	(0.0004)	20	(0.29)
	5 inch with tube	124	(4.88)	0.05	(0.001)	0.03	(0.0004)	0.03	(0.0004)	20	(0.29)
Remote seal, screwed gland design	DN 50	52	(2.05)	1	(0.015)	0.83	(0.012)	0.83	(0.012)	250	(3.626)
Remote seal with union nut to DIN 11851	DN 50	52	(2.05)	1	(0.015)	0.83	(0.012)	0.83	(0.012)	250	(3.626)
	DN 65	59	(2.32)	0.7	(0.010)	0.67	(0.010)	0.67	(0.010)	250	(3.626)
	DN 80	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.450)
Remote seal with threaded socket to DIN 11851	DN 50	52	(2.05)	1	(0.015)	0.83	(0.012)	0.83	(0.012)	250	(3.626)
	DN 65	59	(2.32)	0.7	(0.010)	0.67	(0.010)	0.67	(0.010)	250	(3.626)
	DN 80	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.450)
Clamp connec- tion	2 inch	40	(1.57)	1	(0.015)	2.5	(0.036)	2.5	(0.036)	2000	(29.01)
	2½ inch	59	(2.32)	0.7	(0.010)	0.67	(0.010)	0.67	(0.010)	250	(3.626)
	3 inch	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.450)

Remarks:

- Values apply for the filling liquids silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil and food oil (FDA listed).
- Values apply to stainless steel as the diaphragm material.

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Remote seals for transmitters and pressure gauges
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Temperature error Clamp-on seals

Temperature errors of clamp-on seals when connected to pressure transmitters for gauge pressure and absolute pressure, and with single-sided connection to pressure transmitters for differential pressure

Nominal diameter/ design	Temperature error of remote seal f_{RS}		Temperature error of capillary f_{Cap}		Temperature error of pro- cess flange/connection spigot f_{PF}		Recommended min. spans (guidance values, observe temperature error)	
	mbar/10 K	(psi/10 K)	mbar/10 K	(psi/10 K)	mbar/10 K	(psi/10 K)	mbar	(psi)
DN 25 (1 inch)	6.0	(0.0870)	8.5	(0.123)	8.5	(0.123)	1000	(14.5)
DN 40 (1½ inch)	4.5	(0.065)	4.5	(0.065)	4.5	(0.065)	250	(3.63)
DN 50 (2 inch)	4.0	(0.058)	3.0	(0.044)	3.0	(0.044)	100	(1.45)
DN 80 (3 inch)	9.5	(0.138)	5.0	(0.073)	5.0	(0.073)	100	(1.45)
DN 100 (4 inch)	8.0	(0.012)	3.0	(0.044)	3.0	(0.044)	100	(1.45)

Temperature errors of clamp-on seals with double-sided connection to pressure transmitters for differential pressure

Nominal diameter/ design	Temperature error of remote seal f_{RS}		Temperature error of capillary f_{Cap}		Temperature error of pro- cess flange/connection spigot f_{PF}		Recommended min. spans (guidance values, observe temperature error)	
	mbar/10 K	(psi/10 K)	mbar/10 K	(psi/10 K)	mbar/10 K	(psi/10 K)	mbar	(psi)
DN 25 (1 inch)	2.3	(0.033)	1.8	(0.026)	1.8	(0.026)	1000	(14.5)
DN 40 (1½ inch)	0.8	(0.012)	0.3	(0.004)	0.3	(0.004)	250	(3.63)
DN 50 (2 inch)	0.3	(0.004)	0.1	(0.002)	0.1	(0.002)	100	(1.45)
DN 80 (3 inch)	3.0	(0.044)	0.5	(0.007)	0.5	(0.007)	100	(1.45)
DN 100 (4 inch)	1.0	(0.015)	0.1	(0.002)	0.1	(0.002)	100	(1.45)

Remarks:

- Values apply for the filling liquids silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil and food oil (FDA listed).
- Half the values apply to glycerin/water mixture as the filling liquid.
- Values apply to stainless steel as the diaphragm material.
- Diaphragm thickness 0.05 mm (0.002 inch) for DN 25/DN 40/DN 50 and 0.1 mm (0.004 inch) for DN 80/DN 100

Calculation of the temperature error

The following equation is used to calculate the temperature error:

$$dp = (\vartheta_{RS} - \vartheta_{Cal}) \cdot f_{RS} + (\vartheta_{Cap} - \vartheta_{Cal}) \cdot l_{Cap} \cdot f_{Cap} + (\vartheta_{TR} - \vartheta_{Cal}) \cdot f_{PF}$$

dp	Additional temperature error (mbar)
ϑ_{RS}	Temperature on remote seal diaphragm (generally corresponds to temperature of medium)
ϑ_{Cal}	Calibration (reference) temperature (20 °C (68 °F))
f_{RS}	Temperature error of remote seal
ϑ_{Cap}	Ambient temperature on the capillaries
l_{Cap}	Capillary length
f_{Cap}	Temperature error of capillaries
ϑ_{TR}	Ambient temperature on pressure transmitter
f_{PF}	Temperature error of the oil filling in the process flanges of the pressure transmitter

Example of temperature error calculation**Existing conditions:**

SITRANS P pressure transmitter for differential pressure, 250 mbar, set to 0 ... 100 mbar, with DN 100 remote seal diaphragms without tube, diaphragm made of stainless steel, mat. No. 1.4404/316L	$f_{RS} = 0.05 \text{ mbar}/10 \text{ K}$ (0.039 inH ₂ O/10 K)
Capillary length	$l_{Cap} = 6 \text{ m (19.7 ft)}$
Capillaries fitted on both sides	$f_{Cap} = 0.07 \text{ mbar}/(10 \text{ K} \cdot m_{Cap})$ (0.028 inH ₂ O/(10 K · m _{Cap}))
Filling liquid silicone oil M5	$f_{PF} = 0.07 \text{ mbar}/10 \text{ K}$ (0.028 inH ₂ O/10 K)
Process temperature	$\vartheta_{RS} = 100 \text{ °C (212 °F)}$
Temperature on the capillaries	$\vartheta_{Cap} = 50 \text{ °C (122 °F)}$
Temperature on pressure transmitter	$\vartheta_{TR} = 50 \text{ °C (122 °F)}$
Calibration temperature	$\vartheta_{Cal} = 20 \text{ °C (68 °F)}$

Required:

Additional temperature error of remote seals: dp

Calculation:**in mbar**

$$dp = (100 \text{ °C} - 20 \text{ °C}) \cdot 0.05 \text{ mbar}/10 \text{ K} + (50 \text{ °C} - 20 \text{ °C}) \cdot 6 \text{ m} \cdot 0.07 \text{ mbar}/(10 \text{ K} \cdot \text{m}) + (50 \text{ °C} - 20 \text{ °C}) \cdot 0.07 \text{ mbar}/10 \text{ K}$$

$$dp = 0.4 \text{ mbar} + 1.26 \text{ mbar} + 0.21 \text{ mbar}$$

in inH₂O

$$dp = (212 \text{ °F} - 68 \text{ °F}) \cdot 0.039 \text{ inH}_2\text{O}/10 \text{ K} + (112 \text{ °F} - 68 \text{ °F}) \cdot 19.7 \text{ ft} \cdot 0.028 \text{ inH}_2\text{O}/(10 \text{ K} \cdot 3.28 \text{ ft}) + (112 \text{ °F} - 68 \text{ °F}) \cdot (0.028 \text{ inH}_2\text{O}/10 \text{ K})$$

$$dp = 0.16 \text{ inH}_2\text{O} + 0.51 \text{ inH}_2\text{O} + 0.08 \text{ inH}_2\text{O}$$

Result:

$$dp = 1.87 \text{ mbar (0.75 inH}_2\text{O)}$$

(corresponds to 2.27% of set span)

Note

The determined temperature error only applies to the error resulting from connection of the remote seal.

The transmission response of the respective transmitter is not included in this consideration.

It must be calculated separately, and the resulting error added to the error determined above from connection of the remote seal.

Dependence of temperature error on diaphragm material

The temperature errors listed in the previous table are based on the use of stainless steel as the diaphragm material. If other diaphragm materials are used, the temperature errors change as follows:

Diaphragm material	Change in temperature error of remote seal
	Increase in values by
Stainless steel, Duplex, ...	See previous tables
Hastelloy C4, mat. No. 2.4602	50 %
Hastelloy C276, mat. No. 2.4819	50 %
Monel 400, mat. No. 2.4360	60 %
Tantalum	50 %
Titanium	50 %
PTFE coating on stainless steel diaphragm	80 %
ECTFE coating or PFA coating on stainless steel diaphragm	100 %
Gold coating on stainless steel diaphragm	40 %
Inconel	50 %
Incoloy	50 %

Maximum temperature of medium

Note:

When taking into account the maximum medium temperature, the application limits of the fill fluids and gaskets used as well as the pressure/temperature limits of the respective process connections must also be taken into consideration.

The following maximum temperatures of the medium apply depending on the material of the wetted parts.

Material	Max. temperature of medium	Min./max. pressure
Stainless steel, 316L	400 °C (752 °F)	No restriction
PTFE coating	200 °C (392 °F)	< 0 bar (0 psi); gauge pressure
	260 °C (500 °F)	0 bar (0 psi)/25 bar (363 psi); gauge pressure
	150 °C (302 °F)	25 bar (363 psi)/40 bar (580 psi); gauge pressure
	50 °C (302 °F)	40 bar (580 psi)/60 bar (870 psi); gauge pressure
ECTFE coating	150 °C (302 °F)	For pressures < 1 bar (14.5 psi) on request
PFA coating	200 °C (392 °F)	< 0 bar (0 psi); gauge pressure
	260 °C (500 °F)	25 bar (363 psi)/40 bar (580 psi); gauge pressure
	150 °C (302 °F)	40 bar (580 psi)/60 bar (870 psi); gauge pressure
	50 °C (302 °F)	For pressures < 1 bar (14.5 psi) on request
Hastelloy C4, mat. No. 2.4602	400 °C (752 °F)	No restriction
Hastelloy C276, mat. No. 2.4819	400 °C (752 °F)	No restriction
Hastelloy C22, mat. No. 2.4602	400 °C (752 °F)	No restriction
Monel 400, mat. No. 2.4360	400 °C (752 °F)	No restriction
Tantalum	300 °C (572 °F)	No restriction
Duplex, mat. No. 1.4462	250 °C (482 °F)	No restriction
Titanium	150 °C (302 °F)	No restriction
Inconel	400 °C (752 °F)	No restriction
Incoloy	400 °C (752 °F)	No restriction
Gold coating	400 °C (752 °F)	No restriction

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Maximum capillary length for diaphragm seals (guidance values)

Nom. diam.		Max. length of capillary			
		Diaphragm seal		Clamp-on seal	
		m	(ft)	m	(ft)
DN 25	(1 inch)	2.5	(8.2)	2.5	(8.2)
DN 32	(1¼ inch)	2.5	(8.2)	2.5	(8.2)
DN 40	(1½ inch)	4	(13.1)	6	(19.7)
DN 50	(2 inch)	6	(19.7)	10	(32.8)
DN 65	(2½ inch)	8	(26.2)	10	(32.8)
DN 80	(3 inch)	15	(49.1)	10	(32.8)
DN 100	(4 inch)	15	(49.1)	10	(32.8)
DN 125	(5 inch)	15	(49.1)	-	-

Response times

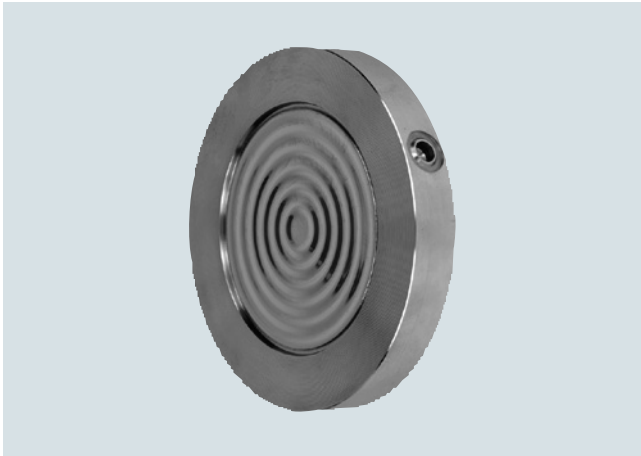
The values listed in the following table are the response times (in seconds per meter of capillary) for a change in pressure which corresponds to the set span.

The listed values must be multiplied by the respective length of the capillary, or with transmitters for differential pressure and flow by the total length of both capillaries.

The response times are independent of the set span within the range of the respective transmitter. The response times are of insignificant importance for spans above 10 bar (145 psi). The response times of the pressure transmitters are not considered in the table.

Filling liquid	Density		Temperature on capillary		Response time in s/m (s/ft) with max. span of pressure transmitter					
	kg/dm ³	(lb/in ³)	°C	(°F)	250 mbar	(101 inH ₂ O)	600 mbar	(241 inH ₂ O)	1600 mbar	(643 inH ₂ O)
Silicone oil M5	0.914	(0.033)	+60	(140)	0.06	(0.018)	0.02	(0.006)	0.01	(0.003)
			+20	(68)	0.11	(0.034)	0.02	(0.006)	0.02	(0.006)
			-20	(-4)	0.3	(0.091)	0.12	(0.037)	0.05	(0.015)
Silicone oil M50	0.966	(0.035)	+60	(140)	0.6	(0.183)	0.25	(0.076)	0.09	(0.027)
			+20	(68)	0.61	(0.186)	0.26	(0.079)	0.1	(0.030)
			-20	(-4)	1.69	(0.515)	0.71	(0.216)	0.27	(0.082)
High-temperature oil	1.070	(0.039)	+60	(140)	0.14	(0.043)	0.06	(0.018)	0.02	(0.006)
			+20	(68)	0.65	(0.198)	0.27	(0.082)	0.1	(0.030)
			-10	(14)	3.96	(1.207)	1.65	(0.503)	0.62	(0.189)
Halocarbon oil	1.968	(0.071)	+60	(140)	0.07	(0.021)	0.03	(0.009)	0.01	(0.003)
			+20	(68)	0.29	(0.088)	0.12	(0.037)	0.05	(0.015)
			-20	(-4)	2.88	(0.878)	1.2	(0.366)	0.45	(0.137)
Food oil (FDA listed)	0.920	(0.033)	+60	(140)	0.75	(0.229)	0.33	(0.101)	0.17	(0.052)
			+20	(68)	4	(1.220)	1.75	(0.534)	0.67	(0.204)
			-20	(-4)	20	(6.100)	8.5	(2.593)	3.25	(0.991)

Permissible data of filling liquids for pressure and temperature see diagrams on page 1/355 ff.

Overview

Diaphragm seals of sandwich design

Technical specifications**Diaphragm seals of sandwich design**

Nominal diameter	Nominal pressure	Sealing material in the process flanges	
Connecting standard EN 1092-1		• For pressure transmitters, absolute pressure transmitters and low-pressure applications	Copper
• DN 25, DN 40, DN 50, DN 65, DN 80, DN 100, DN 125	PN 16 ... PN 400	• For other applications	Viton
Connecting standard ASME B16.5		Maximum pressure	See above and the technical data of the pressure transmitters
• 1 inch, 1½ inch, 2 inch, 2½ inch, 3 inch, 4 inch, 5 inch	Class 150 ... class 2500	Tube length	Without tube as standard (tube available on request)
Connecting standard J.I.S.		Capillary	
• DN 25, DN 40, DN 50, DN 65, DN 80, DN 100, DN 125	10K ... 63K	• Length	Max. 10 m (32.8 ft), longer lengths on request
Sealing face		• Internal diameter	max. 2 mm (0.079 inch)
• For stainless steel, mat. No. 1.4404/316L	To EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA	• Minimum bending radius	150 mm (5.9 inch)
• For the other materials	To EN 1092-1, form B2 or ASME B16.5 RFSF	Filling liquid	Silicone oil M5 Silicone oil M50 High-temperature oil Halocarbon oil (for measuring O ₂) Food grade oil (FDA listed)
Materials		Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals
• Main body	Stainless steel mat. no. 1.4404/316L	Weight	Approx. 4 kg (8.82 lb)
• Wetted parts	Stainless steel mat. no. 1.4404/316L • Without coating • PTFE coating • ECTFE coating (for vacuum on request) • PFA coating Monel 400, mat. No. 2.4360 Hastelloy C276, mat. No. 2.4819 Hastelloy C4, mat. No. 2.4602 Hastelloy C22, mat. no. 2.4602 Tantalum Titanium, mat. no. 3.7035 Nickel 201 Duplex 2205, mat. no. 1.4462 Stainless steel 316L, gold plated, thickness approx. 25 µm	Certificate and approvals	
• Capillary	Stainless steel, mat. No. 1.4571/316Ti	Classification according to pressure equipment directive (DGRL 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)
• Sheath	Spiral protective tube made of stainless steel, mat. No. 1.4301/304		

Pressure Measurement

Remote seals for transmitters and pressure gauges

SITRANS P320/P420

Diaphragm seals of sandwich design with flexible capillary

Selection and Ordering data

Article No.

Order
code

Diaphragm seal

Sandwich type design, with flexible capillary tube, connected with flexible capillary tube to a

- SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately, Scope of delivery: 1 off
- SITRANS P320/P420 transmitter for absolute pressure, 7MF03../7MF04.. order separately, Scope of delivery: 1 off
- SITRANS P320/P420 transmitter for differential pressure and flow, 7MF03../7MF04.. order separately, Scope of delivery: 2 off

7MF0800 -

7MF0801 -

7MF0802 -

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Nominal diameter Nominal pressure

Connecting standard EN 1092-1

(DN 25, DN 40 and DN 50 recommended only for pressure transmitters)

DN 25	PN 16 ... 400	0BQ
DN 40	PN 16 ... 400	0DQ
DN 50	PN 16 ... 400	0EQ
DN 65	PN 16 ... 400	0FQ
DN 80	PN 16 ... 400	0GQ
DN 100	PN 16 ... 400	0HQ
DN 125	PN 16 ... 400	0JQ

Connecting standard ASME B16.5

(1 inch, 1½ inch and 2 inch recommended only for pressure transmitters)

1 inch	class 150 ... 2500	1KX
1½ inch	class 150 ... 2500	1LX
2 inch	class 150 ... 2500	1MX
2½ inch	class 150 ... 2500	1NX
3 inch	class 150 ... 2500	1PX
4 inch	class 150 ... 2500	1QX
5 inch	class 150 ... 2500	1RX

Connecting standard J.I.S.

(DN 25, DN 40 and DN 50 recommended only for pressure transmitters)

DN 25	10K ... 63K	2BW
DN 40	10K ... 63K	2DW
DN 50	10K ... 63K	2EW
DN 65	10K ... 63K	2FW
DN 80	10K ... 63K	2GW
DN 100	10K ... 63K	2HW
DN 125	10K ... 63K	2JW

Other version

Add Order code and plain text

9AA

H1Y

Length of capillary

1 m	10
1,6 m	11
2 m	12
2,5 m	13
3 m	14
4 m	15
5 m	16
6 m	17
7 m	18
8 m	20
9 m	21
10 m	22

Selection and Ordering data

Article No.

Order
code

Diaphragm seal

Sandwich type design, with flexible capillary tube, connected with flexible capillary tube to a

- SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately, Scope of delivery: 1 off
- SITRANS P320/P420 transmitter for absolute pressure, 7MF03../7MF04.. order separately, Scope of delivery: 1 off
- SITRANS P320/P420 transmitter for differential pressure and flow, 7MF03../7MF04.. order separately, Scope of delivery: 2 off

7MF0800 -

7MF0801 -

7MF0802 -

11 m (only for 7MF0802)

23

12 m (only for 7MF0802)

24

13 m (only for 7MF0802)

25

14 m (only for 7MF0802)

26

15 m (only for 7MF0802)

27

Other version

98

Add Order code and plain text

L1Y

Filling liquid

Silicone oil M5
Silicone oil M50
High-temperature oil
Halocarbon oil
Food-grade oil (FDA listed)
Other version
Add Order code and plain text

A

B

C

D

E

Z

P1Y

Wetted parts materials

Stainless steel 316L
• Without coating
• With PFA coating
• With PTFE coating
• With ECTFE coating
Monel 400, 2.4360
Hastelloy C276, 2.4819
Tantalum
Titanium, 3.7035
Nickel 201
Diaphragm Duplex, 1.4462
Diaphragm plus flange Duplex, 1.4462
Stainless steel 316L with gold coating
Hastelloy C4, 2.4610
Hastelloy C22, 2.4602

A

D

E0

F

G

J

K

L0

M0

Q

R

S0

U0

V0

Z8

Q1Y

Other version

Add Order code and plain text

Extension length

- without
- 50 mm (2")
- 100 mm (4")
- 150 mm (6")
- 200 mm (8")
- 250 mm (10")

0

1

2

3

4

5

Z8

Q1Y





Other version

Add Order code and plain text

Pressure MeasurementRemote seals for transmitters and pressure gauges
SITRANS P320/P420

Diaphragm seals of sandwich design with flexible capillary

1

Selection and Ordering data		Article No.	Order code
Diaphragm seal			
Sandwich type design, with flexible capillary tube, connected with flexible capillary tube to a			
<ul style="list-style-type: none"> SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately Scope of delivery: 1 off 		7MF0800 -	
<ul style="list-style-type: none"> SITRANS P320/P420 transmitter for absolute pressure, 7MF03../7MF04.. order separately, Scope of delivery: 1 off 		7MF0801 -	
<ul style="list-style-type: none"> SITRANS P320/P420 transmitter for differential pressure and flow, 7MF03../7MF04.. order separately, Scope of delivery: 2 off 		7MF0802 -	
			- 0
Customer-specific extension length			
<ul style="list-style-type: none"> Wetted parts stainless steel without coating 			
Range	Standard length		
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	A 1	
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	A 2	
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	A 3	
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	A 4	
201 ... 250 mm (7.91 ... 9.84")	250 mm (9.84")	A 5	
<ul style="list-style-type: none"> Wetted parts stainless steel with ECTFE coating 			
Range	Standard length		
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	F 1	
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	F 2	
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	F 3	
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	F 4	
201 ... 250 mm (7.91 ... 9.84")	250 mm (9.84")	F 5	
<ul style="list-style-type: none"> Wetted parts stainless steel with PFA coating 			
Range	Standard length		
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	D 1	
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	D 2	
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	D 3	
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	D 4	
201 ... 250 mm (7.91 ... 9.84")	250 mm (9.84")	D 5	
<ul style="list-style-type: none"> Wetted parts Monel 400 			
Range	Standard length		
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	G 1	
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	G 2	
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	G 3	
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	G 4	
			- 0
Diaphragm seal			
Sandwich type design, with flexible capillary tube, connected with flexible capillary tube to a			
<ul style="list-style-type: none"> SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately Scope of delivery: 1 off 		7MF0800 -	
<ul style="list-style-type: none"> SITRANS P320/P420 transmitter for absolute pressure, 7MF03../7MF04.. order separately, Scope of delivery: 1 off 		7MF0801 -	
<ul style="list-style-type: none"> SITRANS P320/P420 transmitter for differential pressure and flow, 7MF03../7MF04.. order separately, Scope of delivery: 2 off 		7MF0802 -	
			- 0
<ul style="list-style-type: none"> Wetted parts Hastelloy C276 			
Range	Standard length		
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	J 1	
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	J 2	
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	J 3	
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	J 4	
<ul style="list-style-type: none"> Wetted parts Tantalum 			
Range	Standard length		
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	K 1	
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	K 2	
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	K 3	
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	K 4	
			- 0

Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

Diaphragm seals of sandwich design with flexible capillary

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Further designs		Further designs	
Add "-Z" to Article No. and specify Order code.		Add "-Z" to Article No. and specify Order code.	
Factory certificates		Sealing surface with recess to EN1092-1, form F (wetted parts 316L only)	
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11	• DN 25	M82
Inspection certificate to EN 10204-3.1 - material of body and wetted parts	C12	• DN 40	M83
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)	C13	• DN 50	M84
Inspection certificate (EN 10204-3.1) - PMI test of pressure containing and wetted parts	C15	• DN 80	M85
Certificate of FDA-approved fill oil (to EN10204-2.2)	C17	• DN 100	M86
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (Includes SIL conformity declaration)	C20	• DN 125	M87
Accessories		Capillary connection (only for 7MF0800)	
Spark arrestor (for gauge and absolute pressure transmitters)	D61	Single-side mounted at differential pressure transmitters at high-side	S03
Spark arrestor (for differential pressure and level transmitters)	D62	Single-side mounted at differential pressure transmitters at low-side	S04
Low-temperature version (for Silicon Oil M50 only)	D67	Capillary coating	
Negative pressure services		PE protective tube	
Negative pressure service (for gauge and absolute pressure transmitters)	D81	1 m	S10
Negative pressure service (for differential pressure transmitters)	D83	1,6 m	S11
Extended negative pressure service (for gauge and absolute pressure transmitters) (only 7MF0800)	D85	2 m	S12
Extended negative pressure service (for differential pressure transmitters)	D88	2,5 m	S13
General product approvals without explosion proof approvals		3 m	S14
Oil-and grease-free cleaned version (for O ₂ -appl. including certificate EN10204-2.2 (only with fill fluid Halocarbon oil max. temperature 60 °C and max. pressure 50 bar)	E80	4 m	S15
Oil-and grease-free cleaned version (not for O ₂ -appl. including certificate EN10204-2.2 (only with fill fluid Halocarbon oil)	E87	5 m	S16
Sealing surface		6 m	S17
Sealing surface smooth, form B2/EN1092-1 resp. RFSF/ANSI B16.5 (wetted parts 316L only)	M50	7 m	S18
Sealing surface groove to EN1092-1, form D (instead of sealing surface B1, wetted parts 316L only)	M54	8 m	S19
Sealing surface RJF (groove) to ASME B16.5 (instead of sealing surface RF 125...250AA, wetted parts 316L only)	M64	9 m	S20
Sealing surface with tongue to EN1092-1, form C (wetted parts 316L only)		10 m	S21
• DN 25	M70	11 m (only for 7MF0802)	S22
• DN 40	M71	12 m (only for 7MF0802)	S23
• DN 50	M72	13 m (only for 7MF0802)	S24
• DN 80	M73	14 m (only for 7MF0802)	S25
• DN 100	M74	15 m (only for 7MF0802)	S26
• DN 125	M75	PTFE protective tube	
Sealing surface with spigot to EN1092-1, form E (wetted parts 316L only)		1 m	S40
• DN 25	M76	1,6 m	S41
• DN 40	M77	2 m	S42
• DN 50	M78	2,5 m	S43
• DN 80	M79	3 m	S44
• DN 100	M80	4 m	S45
• DN 125	M81	5 m	S46
		6 m	S47
		7 m	S48
		8 m	S49
		9 m	S50
		10 m	S51
		11 m (only for 7MF0802)	S52
		12 m (only for 7MF0802)	S53
		13 m (only for 7MF0802)	S54
		14 m (only for 7MF0802)	S55
		15 m (only for 7MF0802)	S56

Selection and Ordering data	Order code
Further designs	
Add "-Z" to Article No. and specify Order code.	
<u>PVC protective tube</u>	
1 m	S70
1,6 m	S71
2 m	S72
2,5 m	S73
3 m	S74
4 m	S75
5 m	S76
6 m	S77
7 m	S78
8 m	S79
9 m	S80
10 m	S81
11 m (only for 7MF0802)	S82
12 m (only for 7MF0802)	S83
13 m (only for 7MF0802)	S84
14 m (only for 7MF0802)	S85
15 m (only for 7MF0802)	S86
Device settings	
Operating Temperature; Lower range value ... °C (°F), upper range value ... °C (°F)	Y10
Static pressure: ... bar (psi)	Y11
Customer specific extension length (enter required length in plain text)	Y44

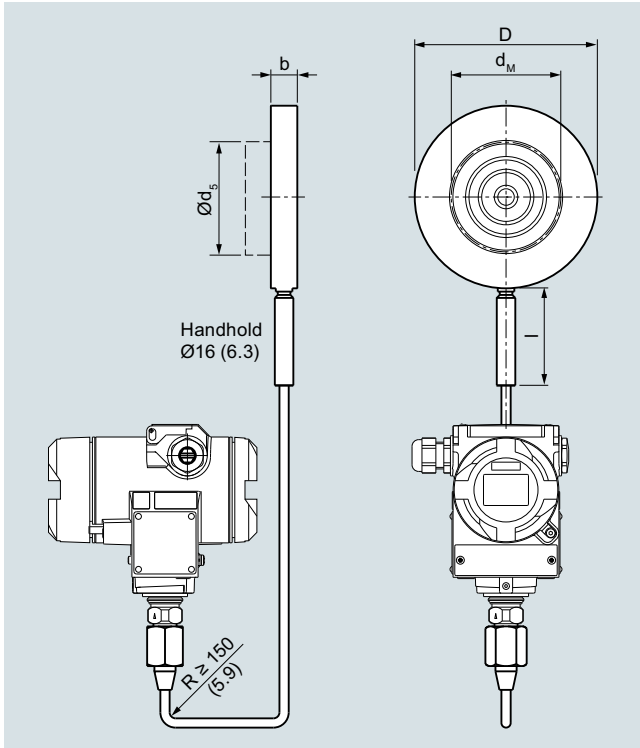
Pressure Measurement

Remote seals for transmitters and pressure gauges

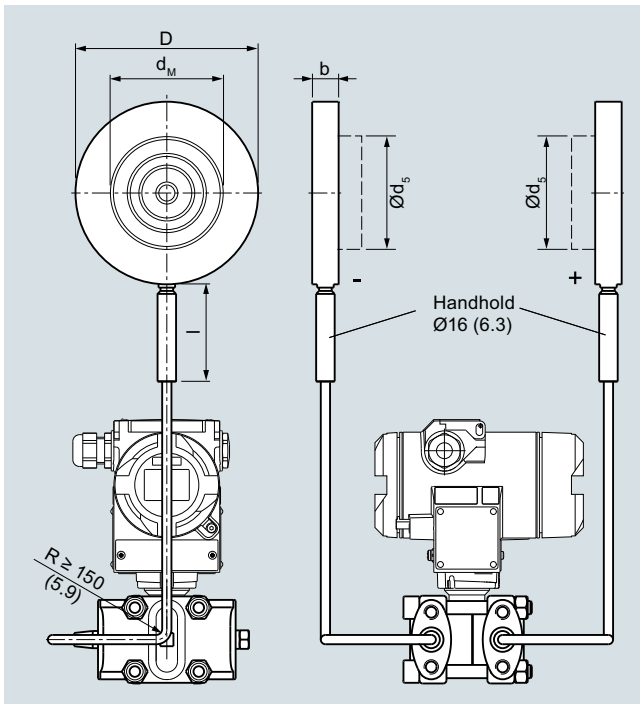
SITRANS P320/P420

Diaphragm seals of sandwich design with flexible capillary

Dimensional drawings



Diaphragm seals of sandwich design with flexible capillary for connection to SITRANS P pressure transmitters for pressure, dimensions in mm (inch)



Diaphragm seals of sandwich design (without flange) with flexible capillary for connection to SITRANS P pressure transmitters for absolute pressure or differential pressure and flow, dimensions in mm (inch)

Connection to EN 1092-1

Nom. diameter	Nom. pressure	b	D	d ₅	d _M with tube	d _M w/o tube	l
		mm	mm	mm	mm	mm	mm
DN 25	PN 16 ... PN 400	20	68	24,5	22.6	27	100
DN 40		20	88	38	30	40	100
DN 50		20	102	48.3	40	51	100
DN 65		20	122	48,3	40	65	100
DN 80		20	138	76	65	85	100
DN 100		20	158	94	85	85	100
DN 125		22	188	125	116	116	100

Connection to ASME B16.5

Nom. diameter	Nom. pressure	b	D	d ₅	d _M with tube	d _M w/o tube	l
	lb/sq.in.	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
1 inch	150 ... 2500	20 (0.79)	51 (2.01)	24.5 (0.96)	22.6 (0.89)	30 (1.18)	100 (3.94)
1½ inch		20 (0.79)	73 ()	38 (1.5)	30 (1.18)	40 (1.57)	100 (3.94)
2 inch		20 (0.79)	100 (3.94)	48.3 (1.9)	40 (1.57)	51 (2.01)	100 (3.94)
2½ inch		20 (0.79)	105 (4.13)	48.3 (1.9)	40 (1.57)	65 (2.56)	100 (3.94)
3 inch		20 (0.79)	134 (5.28)	72 (3)	65 (2.56)	85 (3.35)	100 (3.94)
4 inch		20 (0.79)	158 (6.22)	94 (3.69)	85 (3.35)	85 (3.35)	100 (3.94)
5 inch		22 (0.87)	186 (7.32)	125 (4.92)	116 (4.57)	116 (4.57)	100 (3.94)

Connection to J.I.S.

Nom. diameter	Nom. pressure	b	D 10K, 20K	D 30K... 63K	d ₅	d _M with tube	d _M w/o tube	l
		mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
DN 25	10K ... 63K	20 (0.79)	67 (2.64)	70 (2.76)	24.5 (0.96)	22.6 (0.89)	30 (1.18)	100 (3.94)
DN 40		20 (0.79)	81 (3.19)	90 (3.54)	38 (1.5)	30 (1.18)	36 (1.42)	100 (3.94)
DN 50		20 (0.79)	96 (3.78)	105 (4.13)	48.3 (1.9)	40 (1.57)	51 (2.01)	100 (3.94)
DN 65		20 (0.79)	116 (4.57)	130 (5.12)	48.3 (1.9)	40 (1.57)	65 (2.56)	100 (3.94)
DN 80		20 (0.79)	132 (5.2)	140 (5.51)	76 (2.99)	65 (2.56)	85 (3.35)	100 (3.94)
DN 100		20 (0.79)	160 (6.3)	160 (6.3)	94 (3.69)	85 (3.35)	85 (3.35)	100 (3.94)
DN 125		20 (0.79)	195 (7.68)	195 (7.68)	125 (4.92)	116 (4.57)	116 (4.57)	100 (3.94)

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5

d_M: Effective diaphragm diameter

Diaphragm seals of flange design with flexible capillary

1

Overview



Diaphragm seals of flange design

Technical specifications

Diaphragm seals of flange design with flexible capillary

Nominal diameter	Nominal pressure	Materials	
Connecting standard EN 1092-1		• Main body	Stainless steel mat. no. 1.4404/316L Stainless steel mat. no. 1.4404/316L
• DN 25	PN 10/16/25/40/63/100/160/250	• Wetted parts	• Without coating • PTFE coating • ECTFE coating (for vacuum on request) • PFA coating
• DN 40	PN 10/16/25/40/63/100/160		Monel 400, mat. No. 2.4360
• DN 50	PN 10/16/25/40/63/100		Hastelloy C276, mat. No. 2.4819
• DN 80	PN 10/16/25/40/100		Hastelloy C4, mat. No. 2.4602
• DN 100	PN 10/16/25/40		Hastelloy C22, W.-Nr. 2.4602
• DN 125	PN 16/40		Tantalum
Connecting standard ASME B16.5			Titanium, W.-Nr. 3.7035
• 1 inch	Class 150/300/600/1500		Nickel 201
• 1½ inch	Class 150/300/400/600/900/1500		Duplex 2205, mat. no. 1.4462
• 2 inch	Class 150/300/400/600/900/1500		Stainless steel 316L, gold plated, thickness approx. 25 µm
• 3 inch	Class 150/300/600/1500		
• 4 inch	Class 150/300/400/1500	• Capillary	Stainless steel, mat. No. 1.4571/316Ti
• 5 inch	Class 150/300/400	• Sheath	Spiral protective tube made of stainless steel, mat. no. 1.4301/304
Connecting standard J.I.S.		Sealing material in the process flanges	
• DN 50	10K	• For pressure transmitters, absolute pressure transmitters and low-pressure applications	Copper
• DN 80	20K	• For other applications	Viton
• DN 100	40K	Maximum pressure	See above and the technical data of the pressure transmitter
Sealing face		Tube length	Without tube as standard (tube available on request)
• For stainless steel, mat. No. 1.4404/316L	To EN 1092-1, form B1 or ASMR B16.5 RF 125 ... 250 AA	Capillary	
• For the other materials	To EN 1092-1, form B2 or ASME B16.5 RFSF	• Length	Max. 10 m (32.8 ft), longer lengths on request
		• Internal diameter	2 mm (0.079 inch)
		• Minimum bending radius	150 mm (5.9 inch)
		Filling liquid	
		(for remote seals of sandwich and flange design)	Silicone oil M5
			Silicone oil M50
			High-temperature oil
			Halocarbon oil (for measuring O ₂)
			Food oil (FDA listed)
		Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal
			More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals
		Weight	Approx. 4 kg (8.82 lb)
		Certificate and approvals	
		Classification according to pressure equipment directive (DGRL 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

Pressure Measurement

Remote seals for transmitters and pressure gauges

SITRANS P320/P420

Diaphragm seals of flange design with flexible capillary

Selection and Ordering data

Article No.

Order
code

Diaphragm seal

Flange type design, with flexible capillary tube, connected with flexible capillary tube to a

- SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately Scope of delivery: 1 off
- SITRANS P320/P420 transmitter for absolute pressure, 7MF03../7MF04.. order separately, Scope of delivery: 1 off
- SITRANS P320/P420 transmitter for differential pressure and flow, 7MF03../7MF04.. order separately, Scope of delivery: 2 off

7MF0810 -

7MF0811 -

7MF0812 -

- 0

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Nominal diameter Nominal pressure

Connecting standard EN 1092-1

(DN 25, DN 40 and DN 50 recommended only for pressure transmitters)

DN 25	PN 10/16/25/40	0BD
	PN 63/100	0BF
	PN 160	0BG
DN 40	PN 250	0BH
	PN 10/16/25/40	0DD
	PN 63/100	0DF
DN 50	PN 160	0DG
	PN 10/16/25/40	0ED
	PN 63	0EE
DN 80	PN 100	0EF
	PN 10/16/25/40	0GD
	PN 100	0GF
DN 100	PN 10/16	0HB
	PN 25/40	0HD
DN 125	PN 16	0JB
	PN 40	0JD

Connecting standard ASME B16.5

(1 inch, 1½ inch and 2 inch recommended only for pressure transmitters)

1 inch	class 150	1KL
	class 300	1KM
	class 600	1KN
	class 1500	1KP
1½ inch	class 150	1LA
	class 300	1LB
	class 400/600	1LD
	class 900/1500	1LF
2 inch	class 150	1MA
	class 300	1MB
	class 400/600	1MD
	class 900/1500	1MF
3 inch	class 150	1PA
	class 300	1PB
	class 600	1PD
	class 1500	1PF
4 inch	class 150	1QA
	class 300	1QB
	class 400	1QC
	class 1500	1QF
5 inch	class 150	1RA
	class 300	1RB
	class 400	1RC

Selection and Ordering data

Article No.

Order
code

Diaphragm seal

Flange type design, with flexible capillary tube, connected with flexible capillary tube to a

- SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately Scope of delivery: 1 off
- SITRANS P320/P420 transmitter for absolute pressure, 7MF03../7MF04.. order separately, Scope of delivery: 1 off
- SITRANS P320/P420 transmitter for differential pressure and flow, 7MF03../7MF04.. order separately, Scope of delivery: 2 off

7MF0810 -

7MF0811 -

7MF0812 -

- 0

Connecting standard J.I.S.

(DN 50 recommended only for pressure transmitters)

DN 50	10 K
	20 K
	40 K
DN 80	10 K
	20 K
	40 K
DN 100	10 K
	20 K
	40 K

Other version

Add Order code and plain text

Transmitter connection

Connection via capillary tube

Length of capillary

1 m	10
1,6 m	11
2 m	12
2,5 m	13
3 m	14
4 m	15
5 m	16
6 m	17
7 m	18
8 m	20
9 m	21
10 m	22
11 m (only for 7MF0812)	23
12 m (only for 7MF0812)	24
13 m (only for 7MF0812)	25
14 m (only for 7MF0812)	26
15 m (only for 7MF0812)	27
Other version	98

Add Order code and plain text

Filling liquid

Silicone oil M5
Silicone oil M50
High-temperature oil
Halocarbon oil
Food-grade oil (FDA grade)
Other version
Add Order code and plain text

A
B
C
D
E
Z
P1Y

Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

Diaphragm seals of flange design with flexible capillary

1

Selection and Ordering data		Article No.	Order code	Selection and Ordering data		Article No.	Order code
Diaphragm seal Flange type design, with flexible capillary tube, connected with flexible capillary tube to a • SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately Scope of delivery: 1 off • SITRANS P320/P420 transmitter for absolute pressure, 7MF03../7MF04.. order separately, Scope of delivery: 1 off • SITRANS P320/P420 transmitter for differential pressure and flow, 7MF03../7MF04.. order separately, Scope of delivery: 2 off		7MF0810 - 7MF0811 - 7MF0812 -	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div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Pressure Measurement

Remote seals for transmitters and pressure gauges

SITRANS P320/P420

1

Diaphragm seals of flange design with flexible capillary

Selection and Ordering data

Article No.

Order code

Diaphragm seal

Flange type design, with flexible capillary tube, connected with flexible capillary tube to a

- SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately Scope of delivery: 1 off
- SITRANS P320/P420 transmitter for absolute pressure, 7MF03../7MF04.. order separately, Scope of delivery: 1 off
- SITRANS P320/P420 transmitter for differential pressure and flow, 7MF03../7MF04.. order separately, Scope of delivery: 2 off

7MF0810 -

7MF0811 -

7MF0812 -



Wetted parts Tantalum

Range	Standard length
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")

K 1

K 2

K 3

K 4

Selection and Ordering data

Order code

Further designs

Add "-Z" to Article No. and specify Order code.

Factory certificates

Quality inspection certificate (Five-step factory calibration) to IEC 60770-2

C11

Inspection certificate to EN 10204-3.1 - material of body and wetted parts

C12

Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)

C13

Inspection certificate (EN 10204-3.1) - PMI test of pressure containing and wetted parts

C15

Certificate of FDA-approved fill oil (to EN10204-2.2)

C17

Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (Includes SIL conformity declaration)

C20

Accessories

Spark arrestor (for gauge and absolute pressure transmitters)

D61

Spark arrestor (for differential pressure and flow transmitters)

D62

Low-temperature version (for Silicon Oil M50 only)

D67

Negative pressure services

Negative pressure service (for gauge and absolute pressure transmitters) (only for 7MF0810)

D81

Negative pressure service (for differential pressure transmitters)

D83

Extended negative pressure service (for gauge and absolute pressure transmitters) (only for 7MF0810)

D85

Extended negative pressure service (for differential pressure transmitters)

D88

General product approvals without explosion proof approvals

Oil-and grease-free cleaned version (for O₂-appl. including certificate EN10204-2.2 (only with fill fluid Halocarbon oil max. temperature 60 °C and max. pressure 50 bar)

E80

Oil-and grease-free cleaned version (not for O₂-appl. including certificate EN10204-2.2 (only with fill fluid Halocarbon oil)

E87

Sealing surface

Sealing surface smooth, form B2/EN1092-1 resp. RFSF/ANSI B16.5 (wetted parts 316L only)

M50

Sealing surface groove to EN1092-1, form D (instead of sealing surface B1, wetted parts 316L only)

M54

Sealing surface RJF (groove) to ASME B16.5 (instead of sealing surface RF 125...250AA, wetted parts 316L only)

M64

Sealing surface with tongue to EN1092-1, form C (wetted parts 316L only)

- DN 25
- DN 40
- DN 50
- DN 80
- DN 100
- DN 125

M70
M71
M72
M73
M74
M75

Sealing surface with spigot to EN1092-1, form E (wetted parts 316L only)

- DN 25
- DN 40
- DN 50
- DN 80
- DN 100
- DN 125

M76
M77
M78
M79
M80
M81

Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

Diaphragm seals of flange design with flexible capillary**1**

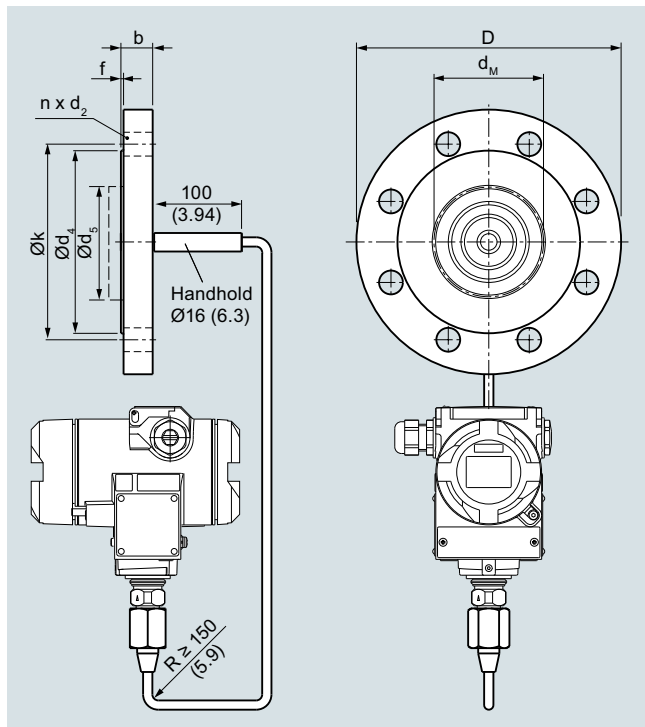
Selection and Ordering data	Order code	Selection and Ordering data	Order code
Further designs		Further designs	
Add "-Z" to Article No. and specify Order code.		Add "-Z" to Article No. and specify Order code.	
Sealing surface with recess to EN1092-1, form F (wetted parts 316L only)		<u>PVC protective tube</u>	
• DN 25	M82	1 m	S70
• DN 40	M83	1,6 m	S71
• DN 50	M84	2 m	S72
• DN 80	M85	2,5 m	S73
• DN 100	M86	3 m	S74
• DN 125	M87	4 m	S75
		5 m	S76
		6 m	S77
		7 m	S78
		8 m	S79
		9 m	S80
		10 m	S81
		11 m (only for 7MF0802)	S82
		12 m (only for 7MF0802)	S83
		13 m (only for 7MF0802)	S84
		14 m (only for 7MF0802)	S85
		15 m (only for 7MF0802)	S86
Capillary connection		Device settings	
<u>For 7MF0810</u>		Operating Temperature; Lower range value ... °C (°F),	Y10
Radial capillary pipe outlet (for single-side mounting and capillary connection only)	S01	upper range value ... °C (°F)	Y11
Single-side mounted at differential pressure transmitters at high-side	S03	Static pressure: ... bar (psi)	Y44
Single-side mounted at differential pressure transmitters at low-side	S04	Customer specific extension length (enter required length in plain text)	
Elongated pipe, 150 mm instead of 100 mm	S05		
Elongated pipe, 200 mm instead of 100 mm	S06		
Elongated pipe elbow, 200 mm instead of 130 mm cooling element	S07		
	S08		
<u>For 7MF0811</u>			
Radial capillary pipe outlet (for single-side mounting and capillary connection only)	S01		
<u>For 7MF0812</u>			
Radial capillary pipe outlet (for double-side mounting)	S02		
Capillary coating			
<u>PE protective tube</u>			
1 m	S10		
1,6 m	S11		
2 m	S12		
2,5 m	S13		
3 m	S14		
4 m	S15		
5 m	S16		
6 m	S17		
7 m	S18		
8 m	S19		
9 m	S20		
10 m	S21		
11 m (only for 7MF0802)	S22		
12 m (only for 7MF0802)	S23		
13 m (only for 7MF0802)	S24		
14 m (only for 7MF0802)	S25		
15 m (only for 7MF0802)	S26		
<u>PTFE protective tube</u>			
1 m	S40		
1,6 m	S41		
2 m	S42		
2,5 m	S43		
3 m	S44		
4 m	S45		
5 m	S46		
6 m	S47		
7 m	S48		
8 m	S49		
9 m	S50		
10 m	S51		
11 m (only for 7MF0802)	S52		
12 m (only for 7MF0802)	S53		
13 m (only for 7MF0802)	S54		
14 m (only for 7MF0802)	S55		
15 m (only for 7MF0802)	S56		

Pressure Measurement

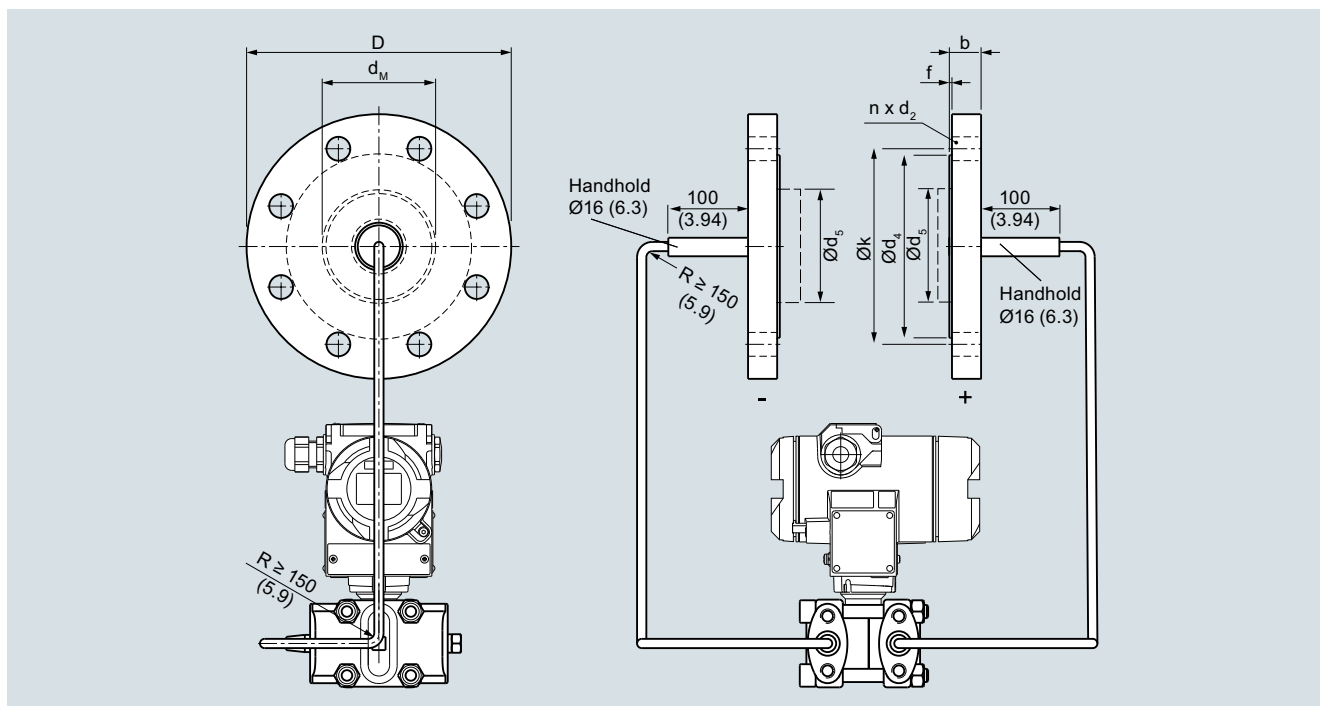
Remote seals for transmitters and pressure gauges
SITRANS P320/P420

Diaphragm seals of flange design with flexible capillary

Dimensional drawings



Diaphragm seals of flange design with flexible capillary for connection to SITRANS P pressure transmitters for pressure, dimensions in mm (inch)



Diaphragm seals of flange design with flexible capillary for connection to SITRANS P pressure transmitters for absolute pressure or for differential pressure and flow, dimensions in mm (inch)

Pressure MeasurementRemote seals for transmitters and pressure gauges
SITRANS P320/P420**Diaphragm seals of flange design with flexible capillary**

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Connection to EN 1092-1

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with exten- sion	d _M without exten- sion	f	k	n	L
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
DN 25	PN 10/16/25/40	18	115	14	68	24.5	22.6	27	2	85	4	0, 50, 100, 150 oder 200
	PN 63/100	24	140	18	68	24.5	22.6	27	2	100	4	
	PN 160	24	140	18	68	24.5	22.6	27	2	100	4	
	PN 250	28	150	22	68	24.5	22.6	27	2	105	4	
DN 40	PN 10/16/25/40	16	150	18	88	38	30	42	2	110	4	
	PN 63/100	24	170	22	88	38	30	42	2	125	4	
	PN 160	26	170	22	88	38	30	42	2	125	4	
DN 50	PN 10/16/25/40	18	165	18	102	48.3	40	51	2	125	4	
	PN 63/100	26	195	26	102	48.3	40	51	2	145	4	
	PN 160	28	195	26	102	48.3	40	51	2	145	4	
DN 80	PN 10/16/25/40	22	200	18	138	76	65	85	2	160	8	
	PN 100	30	230	26	138	76	65	85	2	180	8	
DN 100	PN 10/16	18	220	18	158	94	85	85	2	180	8	
	PN 25/40	22	235	22	162	94	85	85	2	190	8	
DN 125	PN 16	20	250	18	188	127	85	116	2	210	8	
	PN 40	24	270	26	188	127	85	116	2	220	8	

Connection to ASME B16.5

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with exten- sion	d _M without exten- sion	f	k	n	L
	lb./sq.in	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)
1 inch	150	0.71 (18)	4.33 (110)	0.61 (15.6)	2 (50.8)	0.96 (24.5)	0.89 (22.6)	1.18 (30)	0.08 (2)	3.13 (79.4)	4	0, 2, 3.94, 5.94 oder 7.87 (0, 50, 100, 150 oder 200)
	300	0.77 (19.5)	4.92 (125)	0.75 (19.1)	2 (50.8)	0.96 (24.5)	0.89 (22.6)	1.18 (30)	0.08 (2)	3.5 (88.9)	4	
	600	0.96 (24.5)	4.92 (125)	0.75 (19.1)	2 (50.8)	0.96 (24.5)	0.89 (22.6)	1.18 (30)	0.28 (7)	3.5 (88.9)	4	
	1500	1.4 (35.6)	5.91 (150)	1 (25.4)	2 (50.8)	0.96 (24.5)	0.89 (22.6)	1.18 (30)	0.28 (7)	4 (101.6)	4	
1½ inch	150	0.63 (15.9)	4.92 (125)	0.63 (15.9)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.08 (2)	3.87 (98.4)	4	
	300	0.75 (19.1)	6.10 (155)	0.87 (22.2)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.08 (2)	4.5 (114.3)	4	
	400/600	0.88 (22.3)	6.10 (155)	0.87 (22.2)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.28 (7)	4.5 (114.3)	4	
	900/1500	1.25 (31.8)	7.09 (180)	1.13 (28.6)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.28 (7)	4.87 (123.8)	4	
2 inch	150	0.69 (17.5)	5.91 (150)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.08 (2)	4.75 (120.7)	4	
	300	0.81 (20.7)	6.5 (165)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.08 (2)	5 (127)	8	
	400/600	1.00 (25.4)	6.5 (165)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.28 (7)	5 (127)	8	
	900/1500	1.5 (38.1)	8.46 (215)	1.00 (25.4)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.28 (7)	6.5 (165.1)	8	
3 inch	150	0.88 (22.3)	7.48 (190)	0.75 (19.1)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.08 (2)	6 (152.4)	4	
	300	1.06 (27)	8.27 (210)	0.87 (22.2)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.08 (2)	6.63 (168.3)	8	
	600	1.23 (31.8)	8.27 (210)	0.87 (22.2)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.28 (7)	6.63 (168.3)	8	
	1500	1.88 (47.7)	10.43 (265)	1.25 (31.8)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.28 (7)	8 (203.2)	8	
4 inch	150	0.88 (22.3)	9.06 (230)	0.75 (19.1)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.08 (2)	7.5 (190.5)	8	
	300	1.19 (30.2)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.08 (2)	7.87 (200)	8	
	400	1.38 (35)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.28 (7)	7.87 (200)	8	
	1500	2.13 (54)	12.20 (310)	1.37 (34.9)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.28 (7)	9.5 (241.3)	8	
5 inch	150	0.88 (22.3)	10.04 (255)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.08 (2)	8.5 (215.9)	8	
	300	1.31 (33.4)	11.02 (280)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.08 (2)	9.25 (235)	8	
	400	1.50 (38.1)	11.02 (280)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.28 (7)	9.25 (235)	8	

Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

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Diaphragm seals of flange design with flexible capillary

Connection to J.I.S

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with extension	d _M without extension	f	k	n	L
		mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)		mm (inch)
DN 50	10K	14 (0.55)	155 (6.10)	19 (0.75)	96 (3.78)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	120 (4.72)	4	0, 50, 100, 150 oder 200 (0, 2, 3.94, 5.94 oder 7.87)
	20K	16 (0.63)	165 (6.50)	19 (0.75)	96 (3.78)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	120 (4.72)	8	
	40K	26 (1.02)	165 (6.50)	19 (0.75)	105 (4.13)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	130 (5.12)	8	
DN 80	10K	16 (0.63)	185 (7.28)	19 (0.75)	126 (4.96)	76 (2.99)	65 (2.56)	85 (3.35)	2	150 (5.91)	8	
	20K	20 (0.79)	200 (7.87)	23 (0.91)	132 (5.20)	76 (2.99)	65 (2.56)	85 (3.35)	2	160 (6.30)	8	
	40K	32 (1.26)	210 (8.27)	23 (0.91)	140 (5.51)	76 (2.99)	65 (2.56)	85 (3.35)	2	170 (6.30)	8	
DN 100	10K	16 (0.63)	210 (8.27)	19 (0.75)	151 (5.94)	94 (3.7)	85 (3.35)	85 (3.35)	2	175 (6.89)	8	
	20K	22 (0.87)	225 (8.86)	23 (0.91)	160 (6.30)	94 (3.7)	85 (3.35)	85 (3.35)	2	185 (7.28)	8	
	40K	36 (1.42)	250 (9.84)	25 (0.98)	165 (6.50)	94 (3.7)	85 (3.35)	85 (3.35)	2	205 (8.07)	8	

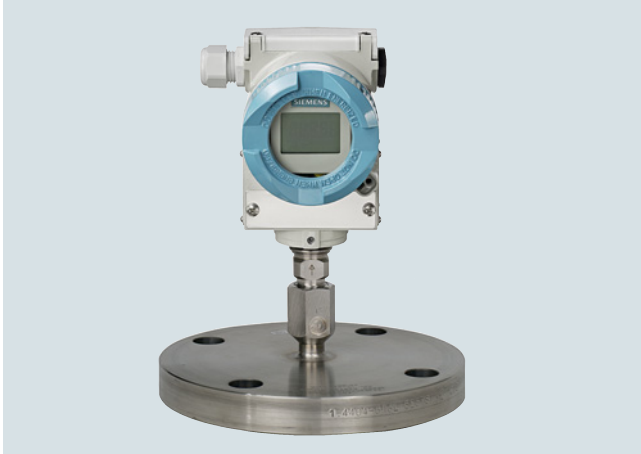
d: Internal diameter of gasket to DIN 2690

d_M: Effective diaphragm diameter

Diaphragm seals of flange design directly fitted on transmitter

1

Overview



Diaphragm seals of flange design, directly fitted on a pressure transmitter for pressure

Technical specifications

Diaphragm seals (flange design) for pressure and absolute pressure, directly fitted on a transmitter

Nominal diameter	Nominal pressure
Connecting standard EN 1092-1	
• DN 25	PN 10/16/25/40/63/100/160/250
• DN 40	PN 10/16/25/40/63/100/160
• DN 50	PN 10/16/25/40/63/100
• DN 80	PN 10/16/25/40/100
• DN 100	PN 10/16/25/40
• DN 125	PN 16/40
Connecting standard ASME B16.5	
• 1 inch	Class 150/300/600/1500
• 1½ inch	Class 150/300/400/600/900/1500
• 2 inch	Class 150/300/400/600/900/1500
• 3 inch	Class 150/300/600/1500
• 4 inch	Class 150/300/400/1500
• 5 inch	Class 150/300/400
Connecting standard J.I.S.	
• DN 50	10K
• DN 80	20K
• DN 100	40K
Sealing face	
• For stainless steel, mat. No. 1.4404/316L	To EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA
• For the other materials	Smooth to EN 1092-1, form B2 or ASME B16.5 RFSF

Materials

- Main body
- Wetted parts

Stainless steel, 1.4404/316L

Stainless steel, 1.4404/316L

- Without coating
 - PTFE coating
 - ECTFE coating (for vacuum on request)
 - PFA coating
- Monel 400, mat. No. 2.4360
Hastelloy C276, mat. No. 2.4819
Hastelloy C4, mat. No. 2.4602
Hastelloy C22, mat. No. 2.4602
Tantalum
Titanium, mat. No. 3.7035
Nickel 201
Duplex 2205, mat. no. 1.4462
Stainless steel 316L, gold plated, thickness approx. 25 µm

• Capillary

Stainless steel, 1.4571/316Ti

- Sealing material at the transmitter connection

Copper

Maximum pressure

See above and the technical data of the transmitter

Tube length

- Without tube
- 50 mm (1.97 inch)
- 100 mm (3.94 inch)
- 150 mm (5.91 inch)
- 200 mm (7.87 inch)

Capillary

- Length

Max. 10 m (32.8 ft), longer lengths on request

- Internal diameter

2 mm (0.079 inch)

- Minimum bending radius

150 mm (5.9 inch)

Filling liquid

- Silicone oil M5
- Silicone oil M50
- High-temperature oil
- Halocarbon oil (for measuring O₂)
- Food oil (FDA listed)

Max. recommended process temperature

170 °C (338 °F)

Permissible ambient temperature

Dependent on the pressure transmitter and the filling liquid of the remote seal.

More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals.

Weight

Approx. 4 kg (8.82 lb)

Certificate and approvals

Classification according to pressure equipment directive (DGRL 2014/68/EU)

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

Pressure Measurement

Remote seals for transmitters and pressure gauges

SITRANS P320/P420

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Diaphragm seals of flange design directly fitted on transmitter

Selection and Ordering data

Article No.

Order
code

Diaphragm seal

Flange type design, directly mounted to a

- SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately
- Scope of delivery: 1 off

7MF0810 -

- 0

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Nominal diameter Nominal pressure

Connecting standard EN 1092-1

DN 25	PN 10/16/25/40	0BD
	PN 63/100	0BF
	PN 160	0BG
	PN 250	0BH
DN 40	PN 10/16/25/40	0DD
	PN 63/100	0DF
	PN 160	0DG
DN 50	PN 10/16/25/40	0ED
	PN 63	0EE
	PN 100	0EF
DN 80	PN 10/16/25/40	0GD
	PN 100	0GF
DN 100	PN 10/16	0HB
	PN 25/40	0HD
DN 125	PN 16	0JB
	PN 40	0JD

Connecting standard ASME B16.5

1 inch	class 150	1KL
	class 300	1KM
	class 600	1KN
	class 1500	1KP
1½ inch	class 150	1LA
	class 300	1LB
	class 400/600	1LD
	class 900/1500	1LF
2 inch	class 150	1MA
	class 300	1MB
	class 400/600	1MD
	class 900/1500	1MF
3 inch	class 150	1PA
	class 300	1PB
	class 600	1PD
	class 1500	1PF
4 inch	class 150	1QA
	class 300	1QB
	class 400	1QC
	class 1500	1QF
5 inch	class 150	1RA
	class 300	1RB
	class 400	1RC

Connecting standard J.I.S.

DN 50	10K	2ES
	20K	2ET
	40K	2EU
DN 80	10K	2GS
	20K	2GT
	40K	2GU
DN 100	10K	2HS
	20K	2HT
	40K	2HU

Other version
Add Order code and plain text

9AA H1Y

Selection and Ordering data

Article No.

Order
code

Diaphragm seal

Flange type design, directly mounted to a

- SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately
- Scope of delivery: 1 off

7MF0810 -

- 0

Transmitter connection

Without capillary tube, direct mount straight connection (for gauge pressure)

00

Without capillary tube, direct mount connection via 90°-bow (for gauge pressure)

01

Filling liquid

- Silicone oil M5
 - Silicone oil M50
 - High-temperature oil
 - Halocarbon oil
 - Food-grade oil (FDA listed)
 - Other version
- Add Order code and plain text

A
B
C
D
E
Z P1Y

Wetted parts materials

- Stainless steel 316L
 - Without coating
 - With PFA coating
 - With PTFE coating
 - With ECTFE coating
 - Monel 400, 2.4360
 - Hastelloy C276, 2.4819
 - Tantalum
 - Titanium, 3.7035
 - Nickel 201
 - Diaphragm Duplex, 1.4462
 - Diaphragm plus flange Duplex, 1.4462
 - Stainless steel 316L with gold coating
 - Hastelloy C4, 2.4610
 - Hastelloy C22, 2.4602
 - Other version
- Add Order code and plain text

A
D
E0
F
G
J
K
L0
M0
Q
R
S0
U0
V0
Z8 Q1Y


Extension length

- without
- 50 mm (2")
- 100 mm (4")
- 150 mm (6")
- 200 mm (8")
- 250 mm (10")

0
1
2
3
4
5
Z8 Q1Y

Other version
Add Order code and plain text

Selection and Ordering data		Article No.	Order code
Diaphragm seal Flange type design, directly mounted to a • SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately Scope of delivery: 1 off		7MF0810 -	
Customer-specific extension length • Wetted parts stainless steel without coating			
Range	Standard length		
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	A 1	
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	A 2	
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	A 3	
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	A 4	
201 ... 250 mm (7.91 ... 9.84")	250 mm (9.84")	A 5	
• Wetted parts stainless steel with ECTFE coating			
Range	Standard length		
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	F 1	
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	F 2	
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	F 3	
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	F 4	
201 ... 250 mm (7.91 ... 9.84")	250 mm (9.84")	F 5	
• Wetted parts stainless steel with PFA coating			
Range	Standard length		
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	D 1	
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	D 2	
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	D 3	
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	D 4	
201 ... 250 mm (7.91 ... 9.84")	250 mm (9.84")	D 5	
• Wetted parts Monel 400			
Range	Standard length		
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	G 1	
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	G 2	
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	G 3	
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	G 4	

Selection and Ordering data		Article No.	Order code														
Diaphragm seal Flange type design, directly mounted to a <ul style="list-style-type: none">SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately Scope of delivery: 1 off		7MF0810-  - 0															
<ul style="list-style-type: none">Wetted parts Hastelloy C276 <table><tr><th>Range</th><th>Standard length</th><th></th></tr><tr><td>20 ... 50 mm (0.79 ... 1.97")</td><td>50 mm (1.97")</td><td>J 1</td></tr><tr><td>51 ... 100 mm (2.01 ... 3.94")</td><td>100 mm (3.94")</td><td>J 2</td></tr><tr><td>101 ... 150 mm (3.98 ... 5.91")</td><td>150 mm (5.91")</td><td>J 3</td></tr><tr><td>151 ... 200 mm (5.94 ... 7.87")</td><td>200 mm (7.87")</td><td>J 4</td></tr></table>			Range	Standard length		20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	J 1	51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	J 2	101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	J 3	151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	J 4
Range	Standard length																
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	J 1															
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	J 2															
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	J 3															
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	J 4															
<ul style="list-style-type: none">Wetted parts Tantalum <table><tr><th>Range</th><th>Standard length</th><th></th></tr><tr><td>20 ... 50 mm (0.79 ... 1.97")</td><td>50 mm (1.97")</td><td>K 1</td></tr><tr><td>51 ... 100 mm (2.01 ... 3.94")</td><td>100 mm (3.94")</td><td>K 2</td></tr><tr><td>101 ... 150 mm (3.98 ... 5.91")</td><td>150 mm (5.91")</td><td>K 3</td></tr><tr><td>151 ... 200 mm (5.94 ... 7.87")</td><td>200 mm (7.87")</td><td>K 4</td></tr></table>		Range	Standard length		20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	K 1	51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	K 2	101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	K 3	151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	K 4	
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Pressure Measurement

Remote seals for transmitters and pressure gauges

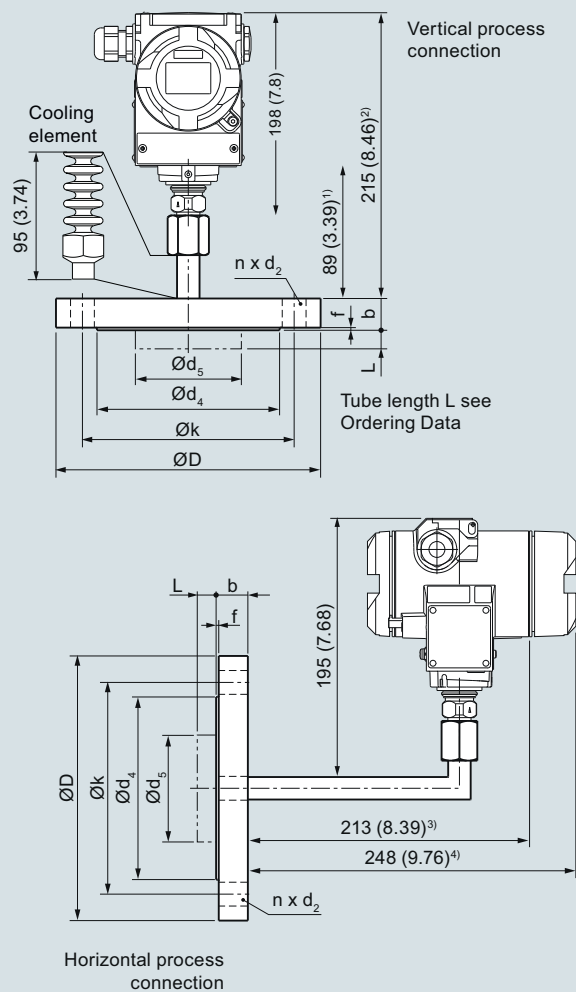
SITRANS P320/P420

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Diaphragm seals of flange design directly fitted on transmitter

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Further designs		Further designs	
Add "-Z" to Article No. and specify Order code.		Add "-Z" to Article No. and specify Order code.	
Factory certificates		Sealing surface with recess to EN1092-1, form F (wetted parts 316L only)	
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11	• DN 25	M82
Inspection certificate to EN 10204-3.1 - material of body and wetted parts	C12	• DN 40	M83
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)	C13	• DN 50	M84
Inspection certificate (EN 10204-3.1) - PMI test of pressure containing and wetted parts	C15	• DN 80	M85
Certificate of FDA-approved fill oil (to EN10204-2.2)	C17	• DN 100	M86
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (Includes SIL conformity declaration)	C20	• DN 125	M87
Accessories		Device settings	
Spark arrestor (for gauge and absolute pressure transmitters)	D61	Operating Temperature; Lower range value ... °C (°F), upper range value ... °C (°F)	Y10
Low-temperature version (for Silicon Oil M50 only)	D67	Static pressure: ... bar (psi)	Y11
Negative pressure services		Customer specific extension length (enter required length in plain text)	Y44
Negative pressure service (for gauge and absolute pressure transmitters)	D81		
Extended negative pressure service (for gauge and absolute pressure transmitters) (only for 7MF0810)	D85		
General product approvals without explosion proof approvals			
Oil-and grease-free cleaned version (for O ₂ -appl. including certificate EN10204-2.2 (only with fill fluid Halocarbon oil max. temperature 60 °C and max. pressure 50 bar)	E80		
Oil-and grease-free cleaned version (not for O ₂ -appl. including certificate EN10204-2.2 (only with fill fluid Halocarbon oil)	E87		
Sealing surface			
Sealing surface smooth, form B2/EN1092-1 resp. RFSF/ANSI B16.5 (wetted parts 316L only)	M50		
Sealing surface groove to EN1092-1, form D (instead of sealing surface B1, wetted parts 316L only)	M54		
Sealing surface RJF (groove) to ASME B16.5 (instead of sealing surface RF 125...250AA, wetted parts 316L only)	M64		
Sealing surface with tongue to EN1092-1, form C (wetted parts 316L only)			
• DN 25	M70		
• DN 40	M71		
• DN 50	M72		
• DN 80	M73		
• DN 100	M74		
• DN 125	M75		
Sealing surface with spigot to EN1092-1, form E (wetted parts 316L only)			
• DN 25	M76		
• DN 40	M77		
• DN 50	M78		
• DN 80	M79		
• DN 100	M80		
• DN 125	M81		

Dimensional drawings



¹⁾ 200 (7.9) with option R20, 278 (11.0) with cooling element opt. R22)

²⁾ 324 (12.8) with option R20, 326 (12.9) with cooling element opt. R22)

³⁾ 283 (11.14) with option R21

4) 318 (12.52) with option R21

Diaphragm seals of flange design, direct connection to a SITRANS P pressure transmitter (process connection vertical (top) and horizontal (bottom)), dimensions in mm (inch)

Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

Diaphragm seals of flange design directly fitted on transmitter

Connection to EN 1092-1

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with extension	d _M without extension	f	k	n	L
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
DN 25	PN 10/16/25/40	18	115	14	68	24.5	22.6	27	2	85	4	0, 50, 100, 150 oder 200
	PN 63/100	24	140	18	68	24.5	22.6	27	2	100	4	
	PN 160	24	140	18	68	24.5	22.6	27	2	100	4	
	PN 250	28	150	22	68	24.5	22.6	27	2	105	4	
DN 40	PN 10/16/25/40	16	150	18	88	38	30	42	2	110	4	
	PN 63/100	24	170	22	88	38	30	42	2	125	4	
	PN 160	26	170	22	88	38	30	42	2	125	4	
DN 50	PN 10/16/25/40	18	165	18	102	48.3	40	51	2	125	4	
	PN 63/100	26	195	26	102	48.3	40	51	2	145	4	
	PN 160	28	195	26	102	48.3	40	51	2	145	4	
DN 80	PN 10/16/25/40	22	200	18	138	76	65	85	2	160	8	
	PN 100	30	230	26	138	76	65	85	2	180	8	
DN 100	PN 10/16	18	220	18	158	94	85	85	2	180	8	
	PN 25/40	22	235	22	162	94	85	85	2	190	8	
DN 125	PN 16	20	250	18	188	127	85	116	2	210	8	
	PN 40	24	270	26	188	127	85	116	2	220	8	

Connection to ASME B16.5

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with extension	d _M without extension	f	k	n	L
	lb./sq.in	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)
1 inch	150	0.71 (18)	4.33 (110)	0.61 (15.6)	2 (50.8)	0.96 (24.5)	0.89 (22.6)	1.18 (30)	0.08 (2)	3.13 (79.4)	4	0, 2, 3.94, 5.94 oder 7.87 (0, 50, 100, 150 oder 200)
	300	0.77 (19.5)	4.92 (125)	0.75 (19.1)	2 (50.8)	0.96 (24.5)	0.89 (22.6)	1.18 (30)	0.08 (2)	3.5 (88.9)	4	
	600	0.96 (24.5)	4.92 (125)	0.75 (19.1)	2 (50.8)	0.96 (24.5)	0.89 (22.6)	1.18 (30)	0.28 (7)	3.5 (88.9)	4	
	1500	1.4 (35.6)	5.91 (150)	1 (25.4)	2 (50.8)	0.96 (24.5)	0.89 (22.6)	1.18 (30)	0.28 (7)	4 (101.6)	4	
1½ inch	150	0.63 (15.9)	4.92 (125)	0.63 (15.9)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.08 (2)	3.87 (98.4)	4	
	300	0.75 (19.1)	6.10 (155)	0.87 (22.2)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.08 (2)	4.5 (114.3)	4	
	400/600	0.88 (22.3)	6.10 (155)	0.87 (22.2)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.28 (7)	4.5 (114.3)	4	
	900/1500	1.25 (31.8)	7.09 (180)	1.13 (28.6)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.28 (7)	4.87 (123.8)	4	
2 inch	150	0.69 (17.5)	5.91 (150)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.08 (2)	4.75 (120.7)	4	
	300	0.81 (20.7)	6.5 (165)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.08 (2)	5 (127)	8	
	400/600	1.00 (25.4)	6.5 (165)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.28 (7)	5 (127)	8	
	900/1500	1.5 (38.1)	8.46 (215)	1.00 (25.4)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.28 (7)	6.5 (165.1)	8	
3 inch	150	0.88 (22.3)	7.48 (190)	0.75 (19.1)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.08 (2)	6 (152.4)	4	
	300	1.06 (27)	8.27 (210)	0.87 (22.2)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.08 (2)	6.63 (168.3)	8	
	600	1.23 (31.8)	8.27 (210)	0.87 (22.2)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.28 (7)	6.63 (168.3)	8	
	1500	1.88 (47.7)	10.43 (265)	1.25 (31.8)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.28 (7)	8 (203.2)	8	
4 inch	150	0.88 (22.3)	9.06 (230)	0.75 (19.1)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.08 (2)	7.5 (190.5)	8	
	300	1.19 (30.2)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.08 (2)	7.87 (200)	8	
	400	1.38 (35)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.28 (7)	7.87 (200)	8	
	1500	2.13 (54)	12.20 (310)	1.37 (34.9)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.28 (7)	9.5 (241.3)	8	
5 inch	150	0.88 (22.3)	10.04 (255)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.08 (2)	8.5 (215.9)	8	
	300	1.31 (33.4)	11.02 (280)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.08 (2)	9.25 (235)	8	
	400	1.50 (38.1)	11.02 (280)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.28 (7)	9.25 (235)	8	

Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

Diaphragm seals of flange design directly fitted on transmitterConnection to J.I.S

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with exten- sion	d _M without exten- sion	f	k	n	L
		mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)		mm (inch)
DN 50	10K	14 (0.55)	155 (6.10)	19 (0.75)	96 (3.78)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	120 (4.72)	4	0, 50, 100, 150 oder 200 (0, 2, 3.94, 5.94 oder 7.87)
	20K	16 (0.63)	165 (6.50)	19 (0.75)	96 (3.78)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	120 (4.72)	8	
	40K	26 (1.02)	165 (6.50)	19 (0.75)	105 (4.13)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	130 (5.12)	8	
DN 80	10K	16 (0.63)	185 (7.28)	19 (0.75)	126 (4.96)	76 (2.99)	65 (2.56)	85 (3.35)	2	150 (5.91)	8	
	20K	20 (0.79)	200 (7.87)	23 (0.91)	132 (5.20)	76 (2.99)	65 (2.56)	85 (3.35)	2	160 (6.30)	8	
	40K	32 (1.26)	210 (8.27)	23 (0.91)	140 (5.51)	76 (2.99)	65 (2.56)	85 (3.35)	2	170 (6.30)	8	
DN 100	10K	16 (0.63)	210 (8.27)	19 (0.75)	151 (5.94)	94 (3.7)	85 (3.35)	85 (3.35)	2	175 (6.89)	8	
	20K	22 (0.87)	225 (8.86)	23 (0.91)	160 (6.30)	94 (3.7)	85 (3.35)	85 (3.35)	2	185 (7.28)	8	
	40K	36 (1.42)	250 (9.84)	25 (0.98)	165 (6.50)	94 (3.7)	85 (3.35)	85 (3.35)	2	205 (8.07)	8	

d: Internal diameter of gasket to DIN 2690

d_M: Effective diaphragm diameter

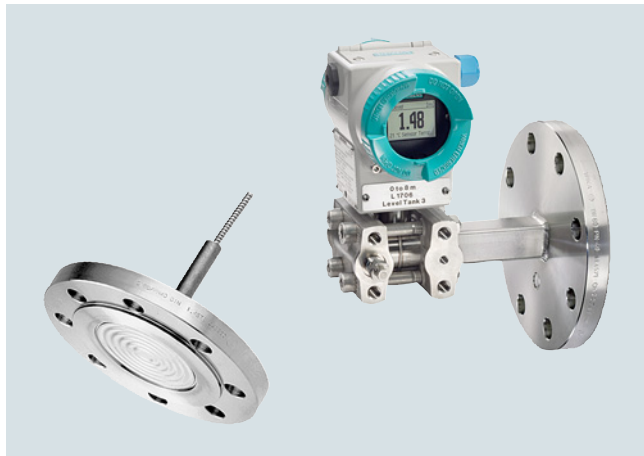
Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

1

Diaphragm seals of flange design fixed connection and with capillary

Overview



Diaphragm seals of screwed design for pressure transmitters for differential pressure, fixed connection and with flexible capillary

Technical specifications

Diaphragm seals of screwed design for pressure transmitters for differential pressure, fixed connection and with flexible capillary

Nominal diameter	Nominal pressure
Connecting standard EN 1092-1	
• DN 40	PN 10/16/25/40/63/100/160
• DN 50	PN 10/16/25/40/63/100
• DN 80	PN 10/16/25/40/100
• DN 100	PN 10/16/25/40
• DN 125	PN 16/40
Connecting standard ASME B16.5	
• 1½ inch	Class 150/300/400/600/900/1500
• 2 inch	Class 150/300/400/600/900/1500
• 3 inch	Class 150/300/600/1500
• 4 inch	Class 150/300/400/1500
• 5 inch	Class 150/300/400
Connecting standard J.I.S.	
• DN 50	10K
• DN 80	20K
• DN 100	40K
Sealing face	
• For stainless steel, mat. No. 1.4404/316L	To EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA
• For the other materials	To EN 1092-1, form B2 or ASME B16.5 RFSF

Materials

- Main body
- Wetted parts

Stainless steel, 1.4404/316L
Stainless steel, 1.4404/316L
• Without coating
• PTFE coating
• ECTFE coating (for vacuum on request)
• PFA coating
Monel 400, mat. No. 2.4360
Hastelloy C276, mat. No. 2.4819
Hastelloy C4, mat. No. 2.4602
Hastelloy C22, W.-Nr. 2.4602
Tantalum
Titanium, W.-Nr. 3.7035
Nickel 201
Duplex 2205, mat. no. 1.4462
Stainless steel 316L, gold plated, thickness approx. 25 µm
Stainless steel, mat. No. 1.4571/316Ti
Spiral protective tube made of stainless steel, mat. No. 1.4301/304

- Capillary

- Sheath

Sealing material in the process flanges

- For pressure transmitters, absolute pressure transmitters and low-pressure applications
- For other applications

Copper

Maximum pressure

Viton

See above and the technical data of the pressure transmitter

Tube length

Without tube
50 mm (1.97 inch)
100 mm (3.94 inch)
150 mm (5.91 inch)
200 mm (7.87 inch)

Capillary

- Length

Max. 10 m (32.8 ft), longer lengths on request

- Internal diameter

2 mm (0.079 inch)

- Minimum bending radius

150 mm (5.9 inch)

Filling liquid

Silicone oil M5

Silicone oil M50

High-temperature oil

Halocarbon oil (for measuring O₂)

Food oil (FDA listed)

170 °C (338 °F)

Max. recommended process temperature

Permissible ambient temperature

Dependent on the pressure transmitter and the filling liquid of the remote seal

More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals

Weight

Approx. 4 kg (8.82 lb)

Certificate and approvals

Classification according to pressure equipment directive (DGRL 2014/68/EU)

For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

Diaphragm seals of flange design fixed connection and with capillary

1

Selection and Ordering data		Article No.	Order code
Diaphragm seal			
Flange type design, direct connected at high-side and with flexible capillary tube at low-side to			
<ul style="list-style-type: none"> SITRANS P320/P420 transmitter for differential pressure and flow, 7MF03../7MF04.. order separately Scope of delivery: 2 off 		7MF0813 -	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Nominal diameter	Nominal pressure		
Connecting standard EN 1092-1			
DN 40	PN 10/16/25/40	0DD	
	PN 63/100	0DF	
	PN 160	0DG	
DN 50	PN 10/16/25/40	0ED	
	PN 63	0EE	
	PN 100	0EF	
DN 80	PN 10/16/25/40	0GD	
	PN 100	0GF	
DN 100	PN 10/16	0HB	
	PN 25/40	0HD	
DN 125	PN 16	0JB	
	PN 40	0JD	
Connecting standard ASME B16.5			
1½ inch	class 150	1LA	
	class 300	1LB	
	class 400/600	1LD	
	class 900/1500	1LF	
2 inch	class 150	1MA	
	class 300	1MB	
	class 400/600	1MD	
	class 900/1500	1MF	
3 inch	class 150	1PA	
	class 300	1PB	
	class 600	1PD	
	class 1500	1PF	
4 inch	class 150	1QA	
	class 300	1QB	
	class 400	1QC	
	class 1500	1QF	
5 inch	class 150	1RA	
	class 300	1RB	
	class 400	1RC	
Connecting standard J.I.S.			
DN 50	10K	2ES	
	20K	2ET	
	40K	2EU	
DN 80	10K	2GS	
	20K	2GT	
	40K	2GU	
DN 100	10K	2HS	
	20K	2HT	
	40K	2HU	
Other version		9AA	H1Y
Add Order code and plain text			
Selection and Ordering data		Article No.	Order code
Diaphragm seal			
Flange type design, direct connected at high-side and with flexible capillary tube at low-side to			
<ul style="list-style-type: none"> SITRANS P320/P420 transmitter for differential pressure and flow, 7MF03../7MF04.. order separately Scope of delivery: 2 off 		7MF0813 -	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Length of capillary tube at low-side			
1 m		10	
1,6 m		11	
2 m		12	
2,5 m		13	
3 m		14	
4 m		15	
5 m		16	
6 m		17	
7 m		18	
8 m		20	
9 m		21	
10 m		22	
Other version		98	L1Y
Add Order code and plain text			
Filling liquid			
Silicone oil M5		A	
Silicone oil M50		B	
High-temperature oil		C	
Halocarbon oil		D	
Food-grade oil (FDA listed)		E	
Other version		Z	P1Y
Add Order code and plain text			

Pressure Measurement

Remote seals for transmitters and pressure gauges

SITRANS P320/P420

1

Diaphragm seals of flange design fixed connection and with capillary

Selection and Ordering data

Article No.

Order
code

Diaphragm seal

Flange type design, direct connected at high-side and with flexible capillary tube at low-side to

- SITRANS P320/P420 transmitter for differential pressure and flow, 7MF03../7MF04.. order separately
- Scope of delivery: 2 off

7MF0813 -

- 0

Wetted parts materials

Stainless steel 316L

- Without coating
- With PFA coating
- With PTFE coating
- With ECTFE coating

Monel 400, 2.4360

Hastelloy C276, 2.4819

Tantalum

Titanium, 3.7035

Nickel 201

Diaphragm Duplex, 1.4462

Diaphragm plus flange Duplex, 1.4462

Stainless steel 316L with gold coating

Hastelloy C4, 2.4610

Hastelloy C22, 2.4602

Other version

Add Order code and plain text

Extension length

- without
- 50 mm (2")
- 100 mm (4")
- 150 mm (6")
- 200 mm (8")
- 250 mm (10")

Other version

Add Order code and plain text

Customer-specific extension length

- Wetted parts stainless steel without coating

Range	Standard length	
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	A 1
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	A 2
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	A 3
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	A 4
201 ... 250 mm (7.91 ... 9.84")	250 mm (9.84")	A 5

- Wetted parts stainless steel with ECTFE coating

Range	Standard length	
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	F 1
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	F 2
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	F 3
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	F 4
201 ... 250 mm (7.91 ... 9.84")	250 mm (9.84")	F 5

Selection and Ordering data

Article No.

Order
code

Diaphragm seal

Flange type design, direct connected at high-side and with flexible capillary tube at low-side to

- SITRANS P320/P420 transmitter for differential pressure and flow, 7MF03../7MF04.. order separately
- Scope of delivery: 2 off

7MF0813 -

- 0

- Wetted parts stainless steel with PFA coating

Range	Standard length	
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	D 1
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	D 2
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	D 3
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	D 4
201 ... 250 mm (7.91 ... 9.84")	250 mm (9.84")	D 5

- Wetted parts Monel 400

Range	Standard length	
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	G 1
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	G 2
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	G 3
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	G 4

- Wetted parts Hastelloy C276

Range	Standard length	
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	J 1
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	J 2
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	J 3
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	J 4

- Wetted parts Tantalum

Range	Standard length	
20 ... 50 mm (0.79 ... 1.97")	50 mm (1.97")	K 1
51 ... 100 mm (2.01 ... 3.94")	100 mm (3.94")	K 2
101 ... 150 mm (3.98 ... 5.91")	150 mm (5.91")	K 3
151 ... 200 mm (5.94 ... 7.87")	200 mm (7.87")	K 4

Diaphragm seals of flange design fixed connection and with capillary

1

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Further designs		Further designs	
Add "-Z" to Article No. and specify Order code.		Add "-Z" to Article No. and specify Order code.	
Factory certificates		Capillary coating	
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11	<u>PE protective tube</u>	
Inspection certificate to EN 10204-3.1 - material of body and wetted parts	C12	1 m	S10
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)	C13	1,6 m	S11
Inspection certificate (EN 10204-3.1) - PMI test of pressure containing and wetted parts	C15	2 m	S12
Certificate of FDA-approved fill oil (to EN10204-2.2)	C17	2,5 m	S13
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (Includes SIL conformity declaration)	C20	3 m	S14
		4 m	S15
		5 m	S16
		6 m	S17
		7 m	S18
		8 m	S19
		9 m	S20
		10 m	S21
		<u>PTFE protective tube</u>	
		1 m	S40
		1,6 m	S41
		2 m	S42
		2,5 m	S43
		3 m	S44
		4 m	S45
		5 m	S46
		6 m	S47
		7 m	S48
		8 m	S49
		9 m	S50
		10 m	S51
		<u>PVC protective tube</u>	
		1 m	S70
		1,6 m	S71
		2 m	S72
		2,5 m	S73
		3 m	S74
		4 m	S75
		5 m	S76
		6 m	S77
		7 m	S78
		8 m	S79
		9 m	S80
		10 m	S81
		Device settings	
		Operating Temperature; Lower range value ... °C (°F), upper range value ... °C (°F)	Y10
		Static pressure: ... bar (psi)	Y11
		Customer specific extension length (enter required length in plain text)	Y44
Accessories			
Spark arrestor (for differential pressure and level transmitters)	D62		
Low-temperature version (for Silicon Oil M50 only)	D67		
Negative pressure services			
Negative pressure service (for differential pressure transmitters)	D83		
Extended negative pressure service (for differential pressure transmitters)	D88		
General product approvals without explosion proof approvals			
Oil-and grease-free cleaned version (for O ₂ -appl. including certificate EN10204-2.2 (only with fill fluid Halocarbon oil max. temperature 60 °C and max. pressure 50 bar)	E80		
Oil-and grease-free cleaned version (not for O ₂ -appl. including certificate EN10204-2.2 (only with fill fluid Halocarbon oil)	E87		
Sealing surface			
Sealing surface smooth, form B2/EN1092-1 resp. RFSF/ANSI B16.5 (wetted parts 316L only)	M50		
Sealing surface groove to EN1092-1, form D (instead of sealing surface B1, wetted parts 316L only)	M54		
Sealing surface RJF (groove) to ASME B16.5 (instead of sealing surface RF 125...250AA, wetted parts 316L only)	M64		
Sealing surface with tongue to EN1092-1, form C (wetted parts 316L only)			
• DN 25	M70		
• DN 40	M71		
• DN 50	M72		
• DN 80	M73		
• DN 100	M74		
• DN 125	M75		
Sealing surface with spigot to EN1092-1, form E (wetted parts 316L only)			
• DN 25	M76		
• DN 40	M77		
• DN 50	M78		
• DN 80	M79		
• DN 100	M80		
• DN 125	M81		
Sealing surface with recess to EN1092-1, form F (wetted parts 316L only)			
• DN 25	M82		
• DN 40	M83		
• DN 50	M84		
• DN 80	M85		
• DN 100	M86		
• DN 125	M87		

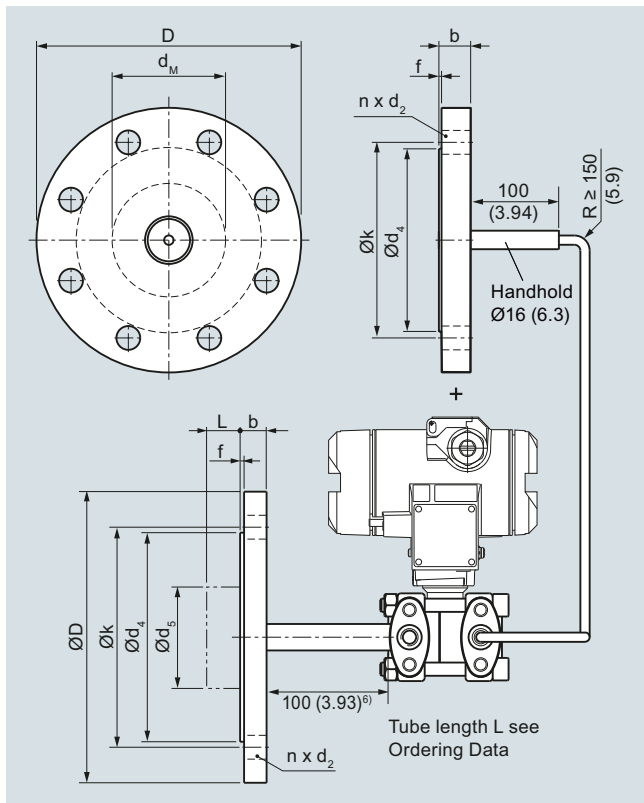
Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

1

Diaphragm seals of flange design fixed connection and with capillary

Dimensional drawings



Diaphragm seals of screwed design with flexible capillary, fixed connection, for connection to a SITRANS P pressure transmitter for differential pressure, dimensions in mm (inch)

Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

Diaphragm seals of flange design fixed connection and with capillary

1

Connection to EN 1092-1

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with exten- sion	d _M without exten- sion	f	k	n	L
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
DN 40	PN 10/16/25/40	16	150	18	88	38	30	42	2	110	4	0, 50, 100, 150 oder 200
	PN 63/100	24	170	22	88	38	30	42	2	125	4	
	PN 160	26	170	22	88	38	30	42	2	125	4	
DN 50	PN 10/16/25/40	18	165	18	102	48.3	40	51	2	125	4	
	PN 63/100	26	195	26	102	48.3	40	51	2	145	4	
	PN 160	28	195	26	102	48.3	40	51	2	145	4	
DN 80	PN 10/16/25/40	22	200	18	138	76	65	85	2	160	8	
	PN 100	30	230	26	138	76	65	85	2	180	8	
DN 100	PN 10/16	18	220	18	158	94	85	85	2	180	8	
	PN 25/40	22	235	22	162	94	85	85	2	190	8	
DN 125	PN 16	20	250	18	188	127	85	116	2	210	8	
	PN 40	24	270	26	188	127	85	116	2	220	8	

Connection to ASME B16.5

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with exten- sion	d _M without exten- sion	f	k	n	L
	lb./sq.in	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)		inch (mm)
1½ inch	150	0.63 (15.9)	4.92 (125)	0.63 (15.9)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.08 (2)	3.87 (98.4)	4	0, 2, 3.94, 5.94 oder 7.87 (0, 50, 100, 150 oder 200)
	300	0.75 (19.1)	6.10 (155)	0.87 (22.2)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.08 (2)	4.5 (114.3)	4	
	400/600	0.88 (22.3)	6.10 (155)	0.87 (22.2)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.28 (7)	4.5 (114.3)	4	
	900/1500	1.25 (31.8)	7.09 (180)	1.13 (28.6)	2.87 (73)	1.5 (38)	1.18 (30)	1.42 (36)	0.28 (7)	4.87 (123.8)	4	
2 inch	150	0.69 (17.5)	5.91 (150)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.08 (2)	4.75 (120.7)	4	
	300	0.81 (20.7)	6.5 (165)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.08 (2)	5 (127)	8	
	400/600	1.00 (25.4)	6.5 (165)	0.75 (19.1)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.28 (7)	5 (127)	8	
	900/1500	1.5 (38.1)	8.46 (215)	1.00 (25.4)	3.63 (92.1)	1.9 (48.3)	1.57 (40)	2.01 (51)	0.28 (7)	6.5 (165.1)	8	
3 inch	150	0.88 (22.3)	7.48 (190)	0.75 (19.1)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.08 (2)	6 (152.4)	4	0, 2, 3.94, 5.94 oder 7.87 (0, 50, 100, 150 oder 200)
	300	1.06 (27)	8.27 (210)	0.87 (22.2)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.08 (2)	6.63 (168.3)	8	
	600	1.23 (31.8)	8.27 (210)	0.87 (22.2)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.28 (7)	6.63 (168.3)	8	
	1500	1.88 (47.7)	10.43 (265)	1.25 (31.8)	5 (127)	3 (76)	2.65 (65)	3.35 (85)	0.28 (7)	8 (203.2)	8	
4 inch	150	0.88 (22.3)	9.06 (230)	0.75 (19.1)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.08 (2)	7.5 (190.5)	8	
	300	1.19 (30.2)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.08 (2)	7.87 (200)	8	
	400	1.38 (35)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.28 (7)	7.87 (200)	8	
	1500	2.13 (54)	12.20 (310)	1.37 (34.9)	6.19 (157.2)	3.69 (94)	3.35 (85)	3.35 (85)	0.28 (7)	9.5 (241.3)	8	
5 inch	150	0.88 (22.3)	10.04 (255)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.08 (2)	8.5 (215.9)	8	0, 2, 3.94, 5.94 oder 7.87 (0, 50, 100, 150 oder 200)
	300	1.31 (33.4)	11.02 (280)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.08 (2)	9.25 (235)	8	
	400	1.50 (38.1)	11.02 (280)	0.87 (22.2)	7.31 (185.7)	5 (127)	4.57 (116)	4.57 (116)	0.28 (7)	9.25 (235)	8	

Pressure Measurement

Remote seals for transmitters and pressure gauges

SITRANS P320/P420

1

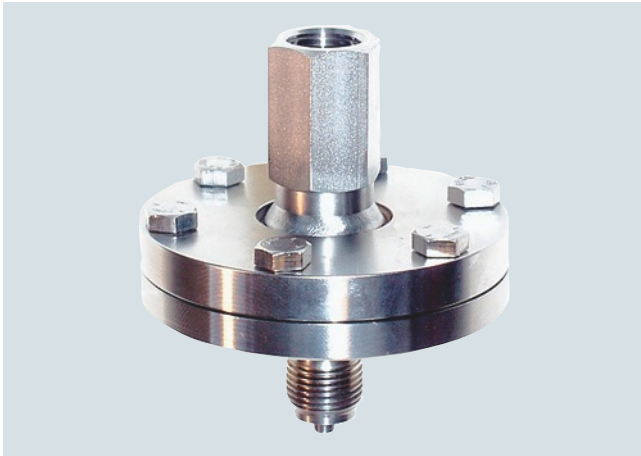
Diaphragm seals of flange design fixed connection and with capillary

Connection to J.I.S

Nominal diameter	Nominal pressure	b	D	d ₂	d ₄	d ₅	d _M with exten- sion	d _M without exten- sion	f	k	n	L
		mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)		mm (inch)
DN 50	10K	14 (0.55)	155 (6.10)	19 (0.75)	96 (3.78)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	120 (4.72)	4	0, 50, 100, 150 oder 200 (0, 2, 3.94, 5.94 oder 7.87)
	20K	16 (0.63)	165 (6.50)	19 (0.75)	96 (3.78)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	120 (4.72)	8	
	40K	26 (1.02)	165 (6.50)	19 (0.75)	105 (4.13)	48.3 (1.9)	40 (1.57)	51 (2.01)	2	130 (5.12)	8	
DN 80	10K	16 (0.63)	185 (7.28)	19 (0.75)	126 (4.96)	76 (2.99)	65 (2.56)	85 (3.35)	2	150 (5.91)	8	
	20K	20 (0.79)	200 (7.87)	23 (0.91)	132 (5.20)	76 (2.99)	65 (2.56)	85 (3.35)	2	160 (6.30)	8	
	40K	32 (1.26)	210 (8.27)	23 (0.91)	140 (5.51)	76 (2.99)	65 (2.56)	85 (3.35)	2	170 (6.30)	8	
DN 100	10K	16 (0.63)	210 (8.27)	19 (0.75)	151 (5.94)	94 (3.7)	85 (3.35)	85 (3.35)	2	175 (6.89)	8	
	20K	22 (0.87)	225 (8.86)	23 (0.91)	160 (6.30)	94 (3.7)	85 (3.35)	85 (3.35)	2	185 (7.28)	8	
	40K	36 (1.42)	250 (9.84)	25 (0.98)	165 (6.50)	94 (3.7)	85 (3.35)	85 (3.35)	2	205 (8.07)	8	

d: Internal diameter of gasket to DIN 2690

d_M: Effective diaphragm diameter

Overview

Diaphragm seal, screwed gland design with inside diaphragm for gauge, absolute and differential pressure for direct mounting



Process connection, open measuring flange

Technical specifications**Diaphragm seal, screwed gland with inside diaphragm**

Process connection	Nominal pressure
<ul style="list-style-type: none"> Open flange EN1092-1 <ul style="list-style-type: none"> - DN 15 - DN 20 - DN 25 Open flange ASME B16.5 <ul style="list-style-type: none"> - ½ inch, ¾ inch, 1 inch Thread to EN 837-1 <ul style="list-style-type: none"> - G¼"B, G½"B, G¾"B, G1"B Thread ASME B1.20.1 <ul style="list-style-type: none"> - ¼" NPT-M, ¼" NPT-F - ½" NPT-M, ½" NPT-F - ¾" NPT-M, ¾" NPT-F - 1" NPT-M, 1" NPT-F 	PN 10/16/25/40/63/100/160/250 PN 10/16/25/40 PN 10/16/25/40/63/100/160/250
	Class 150/300/600/1500
	PN 100/250
	Class 1500/3675 Class 1500/3675 Class 1500/3675 Class 1500/3675
Sealing face for open measurement flange	
<ul style="list-style-type: none"> For stainless steel, mat. no. 1.4404/316L 	To EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA
Materials	
<ul style="list-style-type: none"> Lower section (in the case of process connection thread) Diaphragm 	Stainless steel, Mat. no. 1.4404/316L Stainless steel, Mat. no. 1.4404/316L <ul style="list-style-type: none"> No coating With PTFE coating Monel 400, mat. no. 2.4360 Hastelloy C276, mat. no. 2.4819 Hastelloy C4, mat. no. 2.4602 Tantal Stainless steel 316L, gold plated, thickness approx. 25 µm Stainless steel, mat. no. 1.4404/316L
<ul style="list-style-type: none"> Top section (process connection in the case of an open measurement flange) Capillary Sealing material on the process connection Sealing material between top and bottom section 	Stainless steel 1.4571/316Ti Viton or copper (in the case of vacuum-free version) Viton (FKM) (standard) Teflon (PTFE) metal spring ring (silver-coated)

Capillary	
<ul style="list-style-type: none"> Length Internal diameter Minimum bending radius Sheath 	Max. 10 m (32.8 ft) 2 mm (0.079 inch) 150 mm (5.9 inch) Stainless steel protective tube, mat. No. 1.4301/304
Filling liquid	<ul style="list-style-type: none"> Silicone oil M5 Silicone oil M50 High-temperature oil Halocarbon oil (for measuring O₂) Food oil (FDA listed)
Max. recommended process temperature	170 °C (338 °F)
Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal More information can be found in the technical specifications of the pressure transmitters and in the section "Technical data of filling liquid" in the introduction to the remote seals
Weight	Approx. 1.5 kg (3.3 lb)
Certificates and approvals	
Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

Pressure Measurement

Remote seals for transmitters and pressure gauges

SITRANS P320/P420

Diaphragm seal, screwed design directly mounted or/and with capillary

Selection and Ordering data

Article No.

Order
code

Diaphragm seal threaded design

With inside diaphragm, directly connected or connected via flexible capillary tube to a

- SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately
Scope of delivery: 1 off
- SITRANS P320/P420 transmitter for differential pressure and flow, 7MF03../7MF04.. order separately,
Scope of delivery: 2 off

7MF0840 -

7MF0842 -

- 0 0

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Nominal diameter Nominal pressure

Open flange, connecting standard EN 1092-1

DN 15	PN 10/16/25/40	0AD
	PN 63/100	0AF
	PN 160	0AG
	PN 250	0AH
DN 20	PN 10/16/25/40	0AM
DN 25	PN 10/16/25/40	0BD
	PN 63/100	0BF
	PN 160	0BG
	PN 250	0BH

Open flange, connecting standard

ASME B16.5

½ inch	class 150	1KA
	class 300	1KB
	class 600	1KC
	class 1500	1KD
¾ inch	class 150	1KF
	class 300	1KG
	class 600	1KH
	class 1500	1KJ
1 inch	class 150	1KL
	class 300	1KM
	class 600	1KN
	class 1500	1KP

Process connection thread EN 837-1

G¼"B	PN 100	3SB
G¼"B	PN 250	3SC
G½"B	PN 100	3SF
G½"B	PN 250	3SG
G¾"B	PN 100	3SK
G¾"B	PN 250	3SL
G1"B	PN 100	3SP
G1"B	PN 250	3SQ

Process connection thread ASME B1.20.1

¼"-NPT-M	Class 1500	5TA
¼"-NPT-M	Class 3675	5TB
¼"-NPT-F	Class 1500	5TC
¼"-NPT-F	Class 3675	5TD
½"-NPT-M	Class 1500	5TE
½"-NPT-M	Class 3675	5TF
½"-NPT-F	Class 1500	5TG
½"-NPT-F	Class 3675	5TH
¾"-NPT-M	Class 1500	5TJ
¾"-NPT-M	Class 3675	5TK
¾"-NPT-F	Class 1500	5TL
¾"-NPT-F	Class 3675	5TM
1"-NPT-M	Class 1500	5TN
1"-NPT-M	Class 3675	5TP
1"-NPT-F	Class 1500	5TQ
1"-NPT-F	Class 3675	5TR

Other version

Add Order code and plain text

9AA H1Y

Selection and Ordering data

Article No.

Order
code

Diaphragm seal threaded design

With inside diaphragm, directly connected or connected via flexible capillary tube to a

- SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately
Scope of delivery: 1 off
- SITRANS P320/P420 transmitter for differential pressure and flow, 7MF03../7MF04.. order separately,
Scope of delivery: 2 off

7MF0840 -

7MF0842 -

- 0 0

Transmitter connection

Without capillary tube, direct mount straight connection (for gauge pressure)

Connection via capillary tube

Length of capillary

1 m

1,6 m

2 m

2,5 m

3 m

4 m

5 m

6 m

7 m

8 m

9 m

10 m

Other version

Add Order code and plain text

Filling liquid

Silicone oil M5

Silicone oil M50

High-temperature oil

Halocarbon oil

Food-grade oil (FDA listed)

Other version

Add Order code and plain text

Wetted parts materials

Stainless steel 316L without coating

Stainless steel 316L with PTFE-coating

Monel 400, 2.4360

Hastelloy C276, 2.4819

Tantalum

Stainless steel 316L with gold coating

Hastelloy C4, 2.4610

Other version

Add Order code and plain text

00

10

11

12

13

14

15

16

17

18

20

21

22

98

L1Y

A

B

C

D

E

Z

P1Y

A

E

G

J

K

S

U

Z

Q1Y

Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

Diaphragm seal, screwed design directly mounted or/and with capillary**1**

Selection and Ordering data		Order code	
Further designs			
Add "-Z" to Article No. and specify Order code.			
Factory certificates			
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2		C11	
Inspection certificate to EN 10204-3.1 - material of body and wetted parts		C12	
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)		C13	
Inspection certificate (EN 10204-3.1) - PMI test of pressure containing and wetted parts		C15	
Certificate of FDA-approved fill oil (to EN10204-2.2)		C17	
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (Includes SIL conformity declaration)		C20	
Accessories			
Low-temperature version (for Silicon Oil M50 only)		D67	
Flushing port ¼"-18 NPT unsealed		D70	
Flushing port ¼"-18 NPT sealed with stainless steel plug		D71	
Sealing material between upper and lower housing PTFE (instead of FKM viton)		D75	
Sealing material between upper and lower housing metal C-circlip (instead of FKM viton)		D76	
PTFE coating for lower housing (only for G½B PN 100, DN 25 PN 10 ... 40, 1 inch Class 150/300)		D77	
Negative pressure services			
Negative pressure service (for gauge and absolute pressure transmitters)		D81	
Negative pressure service (for differential pressure transmitters)		D83	
Extended negative pressure service (for gauge and absolute pressure transmitters)		D85	
Extended negative pressure service (for differential pressure transmitters)		D88	
General product approvals without explosion proof approvals			
Oil-and grease-free cleaned version (for O ₂ -appl. including certificate EN10204-2.2 (only with fill fluid Halocarbon oil max. temperature 60 °C and max. pressure 50 bar)		E80	
Oil-and grease-free cleaned version (not for O ₂ -appl. including certificate EN10204-2.2 (only with fill fluid Halocarbon oil)		E87	
Capillary connection (only for 7MF0840)			
Single-side mounted at differential pressure transmitters at high-side		S03	
Single-side mounted at differential pressure transmitters at low-side		S04	
Cooling element		S08	

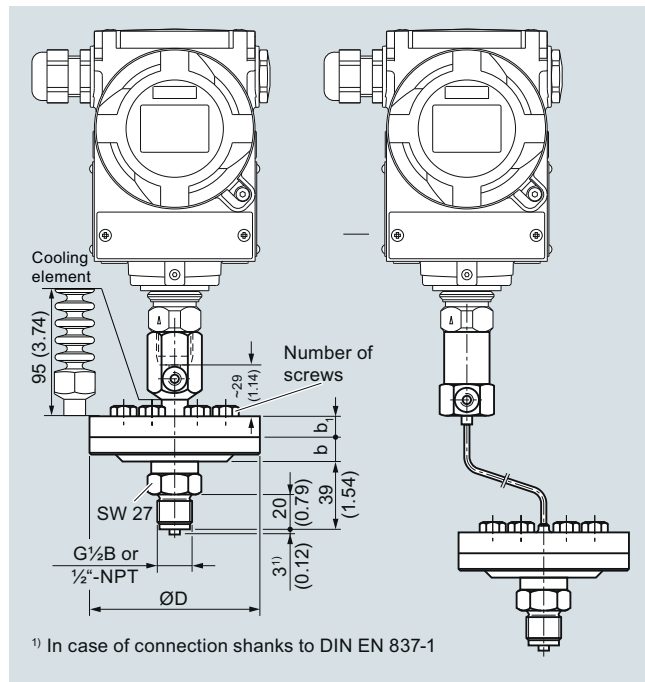
Selection and Ordering data		Order code	
Further designs			
Add "-Z" to Article No. and specify Order code.			
Capillary coating			
<u>PE protective tube</u>			
1 m		S10	
1,6 m		S11	
2 m		S12	
2,5 m		S13	
3 m		S14	
4 m		S15	
5 m		S16	
6 m		S17	
7 m		S18	
8 m		S19	
9 m		S20	
10 m		S21	
<u>PTFE protective tube</u>			
1 m		S40	
1,6 m		S41	
2 m		S42	
2,5 m		S43	
3 m		S44	
4 m		S45	
5 m		S46	
6 m		S47	
7 m		S48	
8 m		S49	
9 m		S50	
10 m		S51	
<u>PVC protective tube</u>			
1 m		S70	
1,6 m		S71	
2 m		S72	
2,5 m		S73	
3 m		S74	
4 m		S75	
5 m		S76	
6 m		S77	
7 m		S78	
8 m		S79	
9 m		S80	
10 m		S81	
Device settings			
Operating Temperature; Lower range value ... °C (°F), upper range value ... °C (°F)		Y10	
Static pressure: ... bar (psi) (only for 7MF0842)		Y11	

Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

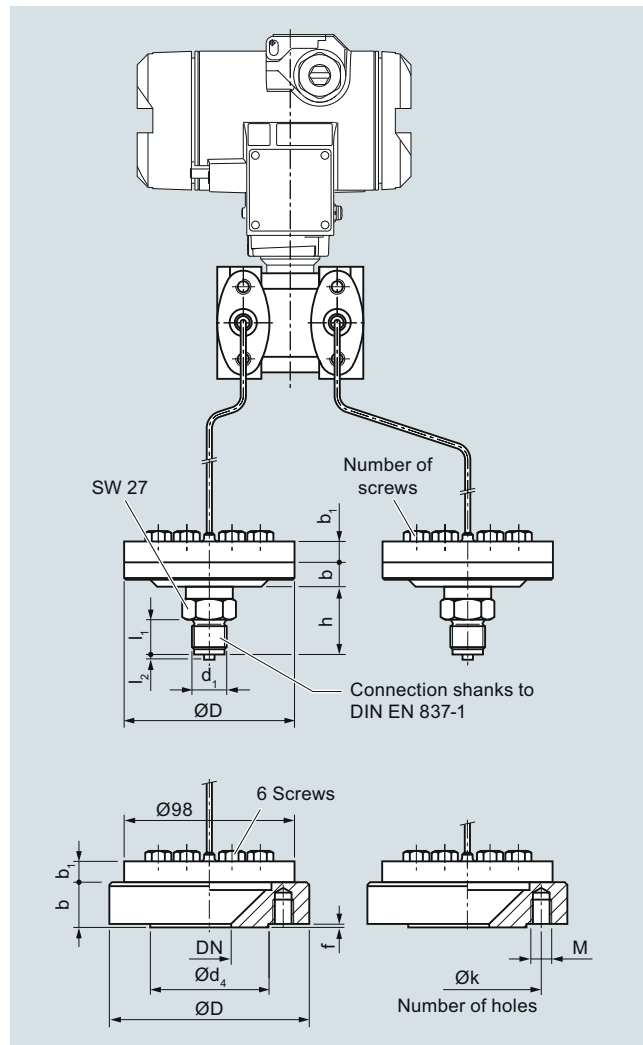
Diaphragm seal, screwed design directly mounted or/and with capillary

Dimensional drawings



Diaphragm seal, screwed gland with inside diaphragm, for gauge and absolute pressure, direct and attached directly to the transmitter with with capillaries, dimensions in mm (inch)

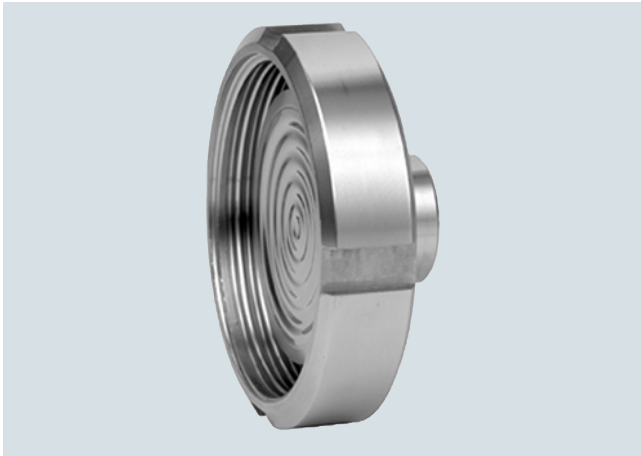
Range	D mm	b mm	b ₁ mm	Number of screws
up to 100 bar	98	14	16	6
up to 250 bar	98	14	20	12



Diaphragm seal, screwed gland with inside diaphragm, for differential pressure, direct and attached directly to the transmitter with with capillaries, dimensions in mm (inch)

Nomi- nal diam- eter	Nominal pressure	D mm	d ₄ mm	k mm	M	Number of holes	b mm	b ₁ mm	f mm
DN 25	PN 10/16/ 25/40	115	68	85	M12	4	26	12	2
1 inch	150 lb/sq.in	110	50.8	79.4	M12	4	32	12	2
1 inch	300 lb/sq.in	125	50.8	88.9	M16	4	32	12	2

Overview



Quick-release diaphragm seals, to DIN 11851 with slotted union nut



Quick-release diaphragm seals, with clamp connection

Quick-release diaphragm seals are available for the following SITRANS P pressure transmitter series:

- For pressure: P300, DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus
- For differential pressure and flow: P500, DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus
- The quick-release remote seals are common designs in the food industry. Their design means that the measured medium cannot accumulate in dead volumes. The quick-release clamp present on the remote seal means that quick dismantling is possible for cleaning.

Technical specifications

Quick-release diaphragm seal

Connection, nominal diameter	Nominal pressure
<ul style="list-style-type: none"> • Standard to DIN 11851 with nut <ul style="list-style-type: none"> - DN 25/32/40 - DN 50/65/80 • Standard to DIN 11851 with thread <ul style="list-style-type: none"> - DN 25/32/40 - DN 50/65/80 • Standard clamp ISO 2852 <ul style="list-style-type: none"> - DN 25/38/51 - DN 63.5/76.1 	PN 40 PN 25 PN 40 PN 25 PN 16 PN 10

- Standard clamp DIN 32676, row C Tri-clamp
 - 1 inch, 1½ inch
 - 2 inch, 2½ inch
 - 3 inch

PN 25
 PN 16
 PN 10

- Standard clamp DIN 32676, row A metric
 - DN 25/32/40
 - DN 50
 - DN 65

PN 25
 PN 16
 PN 10

- Varivent
 - DN 25/32/40/50

PN 25

- DRD-flange
 - DN 50

PN 40

Sealing face

- For stainless steel, mat. No. 1.4404/316L

To EN 1092-1, form B1 or
 ASME B 16.5RF 125 ... 250 AA

- For the other materials

To EN 1092-1, form B2 or
 ASME B16.5 RFSF

Materials

- Main body
- Wetted parts
- Capillary

Stainless steel 316L

Stainless steel 316L

Stainless steel, mat.
 No. 1.4571/316Ti

- Sheath

Spiral protective tube made of
 stainless steel, mat. No.
 1.4301/316

Maximum pressure

See above and the technical data
 of the pressure transmitter

Tube length

Without tube

Capillary

- Length

Max. 10 m (32.8 ft), longer
 lengths on request

- Internal diameter

2 mm (0.079 inch)

- Minimum bending radius

150 mm (5.9 inch)

- Sheath

Spiral protective tube made of
 stainless steel, mat. No.
 1.4301/316

Filling liquid

Food oil (FDA listed)

Permissible ambient temperature

Dependent on the pressure trans-
 mitter and the filling liquid of the
 remote seal

More information can be found in
 the technical data of the pressure
 transmitters and in the section
 "Technical data of filling liquid" in
 the Technical description to the
 remote seals

Weight

Approx. 4 kg (8.82 lb)

Certificates and approvals

Classification according to pressure
 equipment directive
 (DGRL 2014/68/EU)

For gases of fluid group 1 and liq-
 uids of fluid group 1; complies
 with requirements of article 4,
 paragraph 3 (sound engineering
 practice)

EHEDG

Complies with EHEDG recom-
 mendations

Pressure Measurement

Remote seals for transmitters and pressure gauges

SITRANS P320/P420

Quick-release diaphragm seals

1

Selection and Ordering data

Article No.

Order
code

Quick release diaphragm seal

Flange type design, with flexible capillary tube or directly connected to a

- SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately
Scope of delivery: 1 off
- SITRANS P320/P420 transmitter for differential pressure and flow, 7MF03../7MF04.. order separately
Scope of delivery: 1 off

7MF0830 -

7MF0832 -

- 0 A 0

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Nominal diameter Nominal pressure

Connection standard DIN 11851 with nut

DN 25	PN 40	0 BM
DN 32	PN 40	0 CD
DN 40	PN 40	0 DM
DN 50	PN 25	0 EK
DN 65	PN 25	0 FL
DN 80	PN 25	0 GK

Connection standard DIN 11851 with thread

DN 25	PN 40	1 BM
DN 32	PN 40	1 CD
DN 40	PN 40	1 DM
DN 50	PN 25	1 EK
DN 65	PN 25	1 FL
DN 80	PN 25	1 GK

Connection standard Clamp ISO 2852

DN 25	PN 16	2 BK
DN 38	PN 16	2 CQ
DN 51	PN 16	2 FH
DN 63.5	PN 10	2 FJ
DN 76.1	PN 10	2 GJ

Connection standard Clamp DIN 32676, row C Tri-clamp

DN 1"	PN 25	3 KV
DN 1½"	PN 25	3 LV
DN 2"	PN 16	3 MV
DN 2½"	PN 16	3 NV
DN 3"	PN 10	3 PV

Connection standard Clamp DIN 32676, row A metric

DN 25	PN 25	4 BL
DN 32	PN 25	4 CC
DN 40	PN 25	4 DL
DN 50	PN 16	4 EJ
DN 65	PN 10	4 FK

Varivent

DN 25/32	PN 25	5 CL
DN 40/50	PN 25	5 DK

DRD-flange

DN 50	PN 40	6 EM
-------	-------	------

Other version
Add Order code and plain text

9 AA H 1 Y

Selection and Ordering data

Article No.

Order
code

Quick release diaphragm seal

Flange type design, with flexible capillary tube or directly connected to a

- SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately
Scope of delivery: 1 off
- SITRANS P320/P420 transmitter for differential pressure and flow, 7MF03../7MF04.. order separately
Scope of delivery: 1 off

7MF0830 -

7MF0832 -

- 0 A 0

Transmitter connection

Without capillary tube, direct mount straight connection (for gauge pressure)

Connection via capillary tube

Length of capillary

1 m
1,6 m
2 m
2,5 m
3 m
4 m
5 m
6 m
7 m
8 m
9 m
10 m

Other version

Add Order code and plain text

Filling liquid

Food-grade oil (FDA listed)

Other version

Add Order code and plain text

0 0

1 0

1 1

1 2

1 3

1 4

1 5

1 6

1 7

1 8

2 0

2 1

2 2

9 8

L 1 Y

E

Z

P 1 Y

Pressure MeasurementRemote seals for transmitters and pressure gauges
SITRANS P320/P420**Quick-release diaphragm seals**

1

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Further designs		Further designs	
Add "-Z" to Article No. and specify Order code.		Add "-Z" to Article No. and specify Order code.	
Factory certificates		<u>PVC protective tube</u>	
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11	1 m	S70
Inspection certificate to EN 10204-3.1 - material of body and wetted parts	C12	1,6 m	S71
Inspection certificate (EN 10204-3.1) - PMI test of pressure containing and wetted parts	C15	2 m	S72
Certificate of FDA-approved fill oil (to EN10204-2.2)	C17	2,5 m	S73
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (Includes SIL conformity declaration)	C20	3 m	S74
		4 m	S75
		5 m	S76
		6 m	S77
		7 m	S78
		8 m	S79
		9 m	S80
		10 m	S81
Negative pressure services		Device settings	
Negative pressure service (for gauge and absolute pressure transmitters)	D81	Operating Temperature; Lower range value ... °C (°F), upper range value ... °C (°F)	Y10
Negative pressure service (for differential pressure transmitters)	D83		
Extended negative pressure service (for gauge and absolute pressure transmitters)	D85		
Extended negative pressure service (for differential pressure transmitters)	D88		
Capillary connection (only for 7MF0830)			
Single-side mounted at differential pressure transmitters at high-side	S03		
Single-side mounted at differential pressure transmitters at low-side	S04		
Cooling element	S08		
Capillary coating			
<u>PE protective tube</u>			
1 m	S10		
1,6 m	S11		
2 m	S12		
2,5 m	S13		
3 m	S14		
4 m	S15		
5 m	S16		
6 m	S17		
7 m	S18		
8 m	S19		
9 m	S20		
10 m	S21		
<u>PTFE protective tube</u>			
1 m	S40		
1,6 m	S41		
2 m	S42		
2,5 m	S43		
3 m	S44		
4 m	S45		
5 m	S46		
6 m	S47		
7 m	S48		
8 m	S49		
9 m	S50		
10 m	S51		

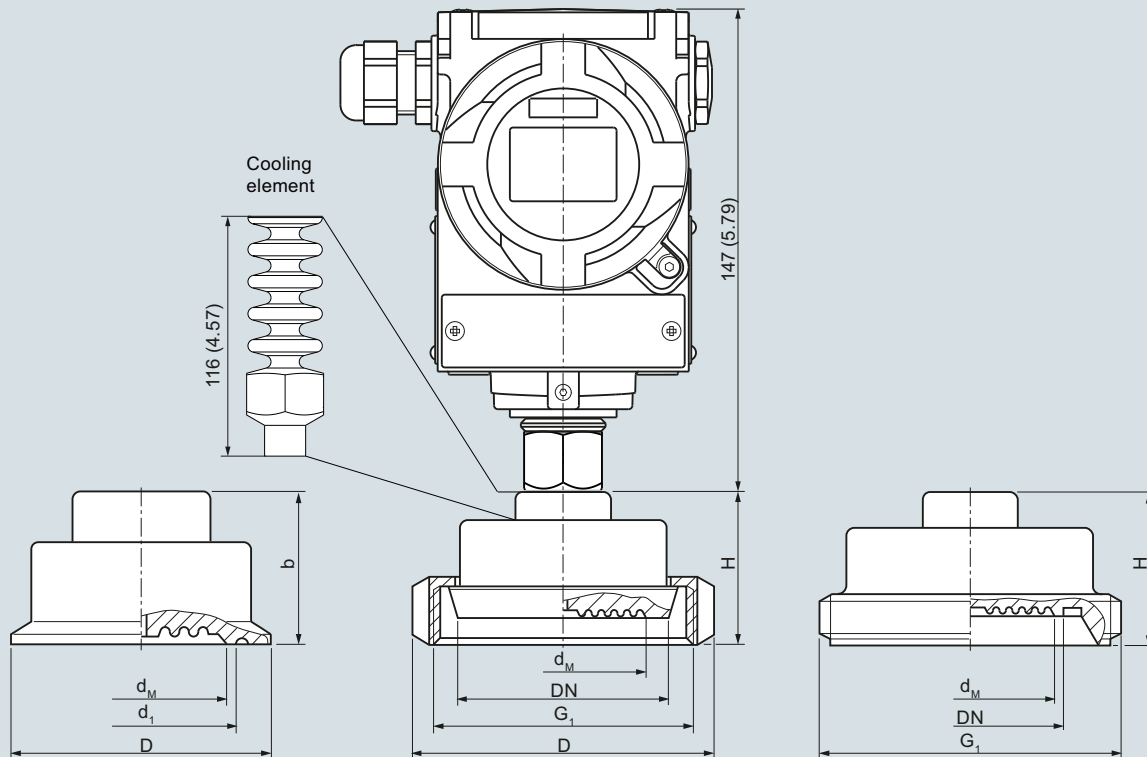
Pressure Measurement

Remote seals for transmitters and pressure gauges

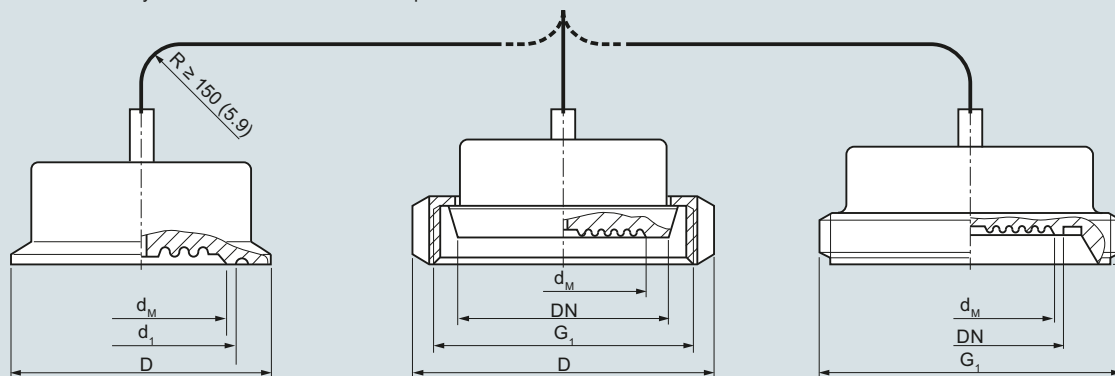
SITRANS P320/P420

Quick-release diaphragm seals

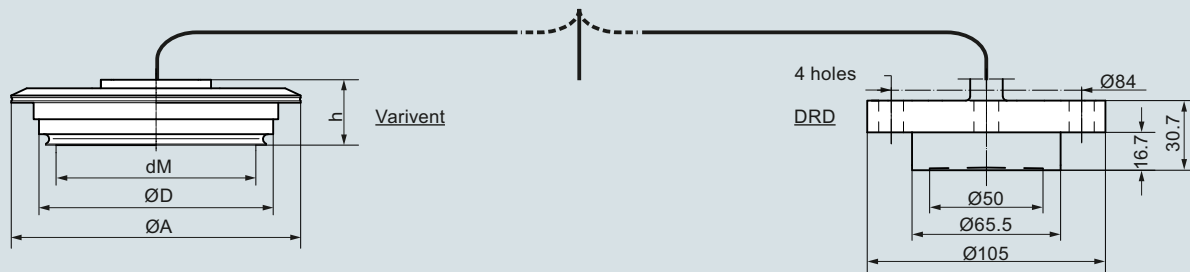
Dimensional drawings



Mounted directly on SITRANS P transmitter for pressure



Mounted on SITRANS P transmitter for pressure or differential pressure and flow



Quick-release diaphragm seal, dimensions in mm (inch)

Pressure MeasurementRemote seals for transmitters and pressure gauges
SITRANS P320/P420**Quick-release diaphragm seals**

1

Connection to DIN 11851 with slotted union nut

Nominal diameter	Ø d _M mm	Ø D mm	H mm	G ₁ mm
DN 25	25	63	36	Rd 52x1/6
DN 32	32	70	36	Rd 52x1/6
DN 40	40	78	36	Rd 65x1/6
DN 50	52	112	36	Rd 78x1/6
DN 65	65	112	36	Rd 95x1/6
DN 80	72	127	36	Rd 110x1/6

Connection to DIN 11851 with threaded socket

Nominal diameter	Ø d _M mm	H mm	G ₁ mm
DN 25	25	36	Rd 52x1/6
DN 32	32	36	Rd 52x1/6
DN 40	40	36	Rd 65x1/6
DN 50	52	36	Rd 78x1/6
DN 65	65	36	Rd 95x1/6
DN 80	72	36	Rd 110x1/6

Clamp connection to ISO 2852 for pipes to ISO 2037

Nominal diameter	Nominal pressure	d _M mm	d ₁ mm	b mm	D mm
DN 25	PN 16	22.6	43.5	14	50.5
DN 38	PN 16	34	43.5	12	50.5
DN 51	PN 16	46	56.5	14	64
DN 63.5	PN 10	51	70.5	14	77.5
DN 76.1	PN 10	65	83.5	14	91

Clamp connection to DIN 32676 row C (Tri-Clamp) for pipes to ASME BPE

Nominal diameter	Nominal pressure	d _M mm (inch)	d ₁ mm (inch)	b mm (inch)	D mm (inch)
1"	PN 25	22.6 (0.89)	43.5 (1.71)	14 (0.55)	50.5 (1.99)
1½"	PN 25	34 (1.34)	43.5 (1.71)	12 (0.47)	50.5 (1.99)
2"	PN 16	46 (1.81)	56.5 (2.22)	14 (0.55)	64 (2.52)
2½"	PN 16	51 (2.01)	70.5 (2.78)	14 (0.55)	77.5 (3.05)
3"	PN 16	65 (2.56)	83.5 (3.29)	14 (0.55)	91 (3.58)

Clamp connection to DIN 32676 row A (metric) for pipes to EN 10357 (DIN 11850)

Nominal diameter	Nominal pressure	Ø d _M mm	d ₁ mm	b mm	D mm
DN 25	PN 25	22.6	43.5	14	50.5
DN 32	PN 25	27	43.5	12	50.5
DN 40	PN 25	34	43.5	12	50.5
DN 50	PN 16	46	56.5	14	64
DN 65	PN 16	65	83.5	14	91

Varivent

Nominal diameter	d _M mm (inch)	A mm (inch)	D mm (inch)	h mm (inch)
DN 25, DN 32, 1", 1¼"	40 (1.57)	66 (2.6)	50 (1.97)	19 (0.75)
DN 40 ... 125, 1½" ... 6"	58 (2.28)	84 (3.331)	68 (2.68)	19 (0.75)

d_M Effective diaphragm diameter

Pressure Measurement

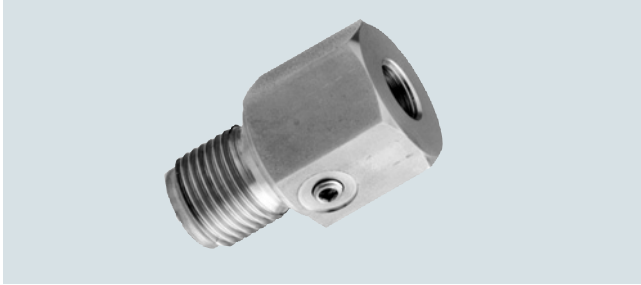
Remote seals for transmitters and pressure gauges

SITRANS P320/P420

1

Miniature diaphragm seals

Overview



Miniature diaphragm seals

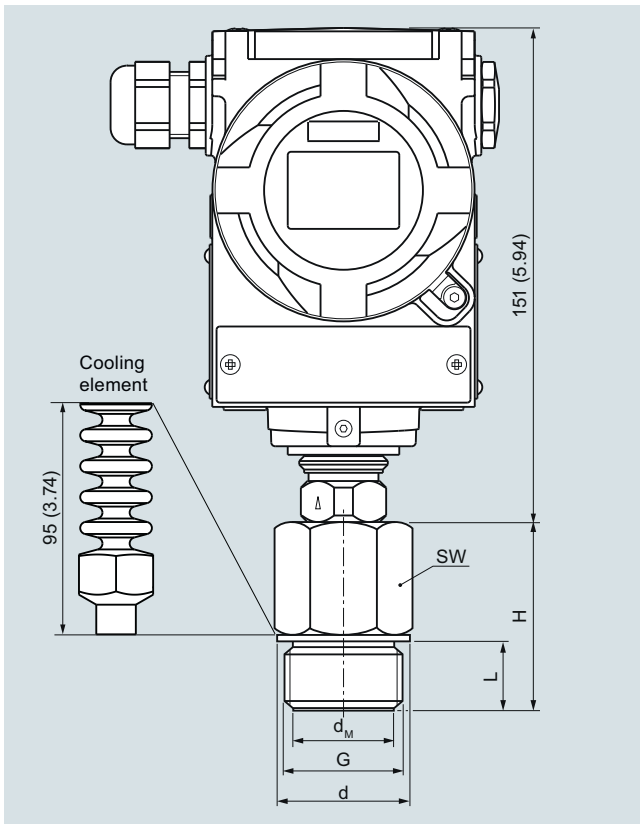
The miniature diaphragm seals are available for the SITRANS P320/420 pressure transmitter series.

Suitable for high pressures, contaminated, fibrous and viscous media in the chemical, paper, food and drink industries.

Design

- Flush-mounted diaphragm
- No dead spaces
- Fixed threaded stems

Dimensional drawings



Miniature diaphragm seal, dimensions in mm (inch)

G	Ø d _M		SW		Ø d		L		H	
	mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)
G1B	25	(0.98)	41	(1.61)	39	(1.53)	28	(1.1)	56	(2.21)
G1½B	40	(1.57)	55	(2.17)	60	(2.36)	30	(1.18)	50	(1.97)
G2B	50	(1.97)	60	(2.36)	70	(2.76)	30	(1.18)	63	(2.48)

G	Ø d _M		SW		L		H	
	mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)
1"-NPT	27	(1.06)	41	(1.61)	25	(0.98)	40	(1.57)
1½"-NPT	34	(1.34)	55	(2.17)	26	(1.02)	45	(1.77)
2"-NPT	46	(1.81)	65	(2.56)	26	(1.02)	45	(1.77)

d_M: Effective diaphragm diameter

Technical specifications

Miniature diaphragm seals

Span with	
• G1B and 1"-NPT	> 6 bar (> 87 psi)
• G1½B and 1½"-NPT	> 2 bar (> 29 psi)
• G2B and 2"-NPT	> 600 mbar (> 8.7 psi)
Filling liquid	Silicone oil M5 or food oil (FDA listed)
Material	
• Main body	Stainl. steel mat No. 1.4404/ 316L or Hastelloy C276, mat No. 2.4819
• Diaphragm	Stainl. steel mat No. 1.4404 / 316L or Hastelloy C276, mat. No. 2.4819
Maximum pressure	100% of nominal pressure of pressure transmitter, up to maximum of PN 400 (5802 psi) (depending on the seal used)
Temperature of use	Same as pressure transmitter
Temperature range of medium	Same as pressure transmitter
Max. recommended process temperature	150 °C (302 °F)
Weight	
• G1B and 1"-NPT	Approx. 0.3 kg (approx. 0.66 lb)
• G1½B and 1½"-NPT	Approx. 0.5 kg (approx. 1.10 lb)
• G2B and 2"-NPT	Approx. 0.8 kg (approx. 1.76 lb)
Certificate and approvals	
Classification according to pressure equipment directive (DGRL 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)

Pressure Measurement

Remote seals for transmitters and pressure gauges SITRANS P320/P420

Miniature diaphragm seals

1

Selection and Ordering data		Article No.	Order code	Selection and Ordering data		Order code
Miniature diaphragm seal				Further designs		
directly connected to a				Add "-Z" to Article No. and specify Order code.		
<ul style="list-style-type: none"> SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately Scope of delivery: 1 off 		7MF0850 -		Factory certificates		
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		00 - 00		Quality inspection certificate (Five-step factory calibration) to IEC 60770-2		C11
				Inspection certificate to EN 10204-3.1 - material of body and wetted parts		C12
				Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)		C13
				Inspection certificate (EN 10204-3.1) - PMI test of pressure containing and wetted parts		C15
				Certificate of FDA-approved fill oil (to EN10204-2.2)		C17
				Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (Includes SIL conformity declaration)		C20
				Negative pressure services		
				Negative pressure service		D81
				Extended negative pressure service (for gauge and absolute pressure transmitters)		D85
				Capillary connection		
				Cooling element between transmitter and remote seal		S08
				Device settings		
				Operating Temperature; Lower range value ... °C (°F), upper range value ... °C (°F)		Y10
Process connection						
Connection standard DIN 3852						
G 1/2"	PN 400	4ST				
G 3/4"	PN 400	4SU				
G 1"	PN 400	4SV				
G 1 1/2"	PN 400	4SW				
G 2"	PN 400	4SX				
Connection standard ASME B1.20.1						
1/2"-NPT-M	class 5800	5TS				
3/4"-NPT-M	class 5800	5TT				
1"-NPT-M	class 5800	5TU				
1 1/2"-NPT-M	class 5800	5TV				
2"-NPT-M	class 5800	5TW				
Other version		9AA	H1Y			
Add Order code and plain text						
Filling liquid						
Silicone oil M5		A				
Food-grade oil (FDA listed)		E				
Other version		Z	P1Y			
Add Order code and plain text						
Wetted parts material						
Stainless steel 316L without coating		A				
Hastelloy C276, 2.4819		J				

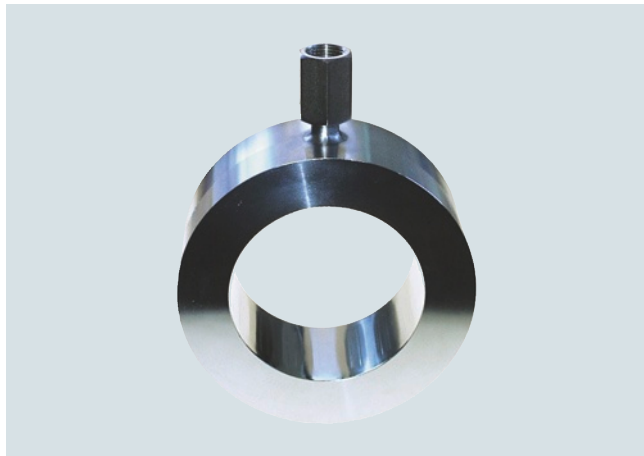
Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

Clamp-on seals of flange design

1

Overview



Inline seals for flange-mounting

The inline seal is completely integrated in the process line. It is particularly suitable for flowing and highly viscous media.

The inline remote seal consists of a cylindrical jacket into which a thin-walled pipe is welded. It is clamped directly between two flanges in the pipeline.

Design

- Inline seals for flange-mounting (flange design) to EN/ASME for SITRANS P pressure transmitters
 - For pressure: P300, DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus
 - For differential pressure and flow: DS III with HART, DS III with PROFIBUS PA, DS III with FOUNDATION Fieldbus and P500
- Sealing face to EN 1092-1 or ASME B16.5
- Connection to the transmitter directly or by means of a flexible capillary (max. 10 m long)
- See Technical data for details of materials used for the wetted parts
- Material used for the capillary, the guard sleeve, the seal's main body and the measuring cell: Stainless steel, mat.-No. 1.4571
- Filling liquid: Silicone oil, high-temperature oil, halocarbon oil, food oil (FDA listed) or glycerin/water (not suitable for uses in low-pressure range)

Function

The measured pressure is transferred from the diaphragm to the filling liquid and passes either directly or through the capillary to the measuring chamber of the pressure transmitter. The interior of the diaphragm seal and of the capillary, as well as the measuring chamber of the pressure transmitter, are filled gas-free by the filling liquid.

Note:

When operating in the low-pressure range, also during commissioning, it is recommended to use a vacuum-proof remote seal (see Selection and Ordering data).

Technical specifications

Inline seals for flange-mounting

Nominal diameter	Nominal pressure
Connecting standard EN 1092-1	
• DN 25/40/50/65/80/100/125	PN 6 ... PN 100
Connecting standard ASME B16.5	
• 1, 1½, 2, 2½, 3, 4, 5 inch	Class 150 ... class 2500
Process connection	Flange to EN 1092-1 or ASME B 16.5
Sealing face	<ul style="list-style-type: none"> • for stainless steel mat. no. 1.4404/316L according to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA • for all other materials according to EN 1092-1, form B2 or ASME B16.5 RFSF
Materials	
• Main body	Stainless steel 1.4404/316L
• Diaphragm	Stainless steel 1.4404/316L
• Wetted parts	Stainless steel 1.4404/316L
	<ul style="list-style-type: none"> • Without coating • ECTFE coating (for vacuum on request) • PFA coating
	Monel 400, mat. No. 2.4360
	Hastelloy C276, mat. No. 2.4819
	Hastelloy C4, mat. No. 2.4602
	Tantalum
• Capillary	Stainless steel, mat. No. 1.4571/316Ti
• Sheath	Spiral protective tube made of stainless steel, mat. No. 1.4301/316
Capillary	
• Length	Max. 10 m (32.8 ft)
• Internal diameter	2 mm (0.079 inch)
• Minimum bending radius	150 mm (5.9 inch)
Filling liquid	Silicone oil M5
	Silicone oil M50
	High-temperature oil
	Halocarbon oil
	Food oil (FDA listed)
Permissible ambient temperature	See pressure transmitters, see filling liquid
Weight	Approx. 4 kg (8.82 lb)

Certificates and approvals

Classification according to pressure equipment directive (DGRL 2014/68/EU)



For gases of fluid group 1 and liquids of fluid group 1; complies with the requirements of article 4, paragraph 1 (appendix 1); assigned to category III, conformity evaluation module H by the TÜV Nord

Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

Clamp-on seals of flange design

1

Selection and Ordering data		Article No.	Order code
Inline-diaphragm seal			
Sandwich type design, directly connected or connected with flexible capillary tube to a			
<ul style="list-style-type: none"> SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately Scope of delivery: 1 off 		7MF0900 -	
<ul style="list-style-type: none"> SITRANS P320/P420 transmitter for differential pressure and flow, 7MF03../7MF04.. order separately, Scope of delivery: 2 off 		7MF0902 -	
			
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Nominal diameter	Nominal pressure		
Connecting standard EN 1092-1			
DN 25	PN 6 ... 100	0BP	
DN 40	PN 6 ... 100	0DP	
DN 50	PN 6 ... 100	0EP	
DN 65	PN 6 ... 100	0FP	
DN 80	PN 6 ... 100	0GP	
DN 100	PN 6 ... 100	0HP	
DN 125	PN 6 ... 100	0JP	
Connecting standard ASME B16.5			
1 inch	class 150 ... 2500	1KX	
1½ inch	class 150 ... 2500	1LX	
2 inch	class 150 ... 2500	1MX	
2½ inch	class 150 ... 2500	1NX	
3 inch	class 150 ... 2500	1PX	
4 inch	class 150 ... 2500	1QX	
5 inch	class 150 ... 2500	1RX	
Other version Add Order code and plain text		9AA	H1Y
Transmitter connection			
Without capillary tube, direct mount straight connection (for gauge pressure)		00	
Without capillary tube, direct mount connection via 90°-bow (for gauge pressure)		01	
Connection via capillary tube			
Length of capillary			
1 m		10	
1,6 m		11	
2 m		12	
2,5 m		13	
3 m		14	
4 m		15	
5 m		16	
6 m		17	
7 m		18	
8 m		20	
9 m		21	
10 m		22	
11 m (only for 7MF0900)		23	
12 m (only for 7MF0900)		24	
13 m (only for 7MF0900)		25	
14 m (only for 7MF0900)		26	
15 m (only for 7MF0900)		27	
Other version Add Order code and plain text		98	L1Y
Selection and Ordering data		Article No.	Order code
Inline-diaphragm seal			
Sandwich type design, directly connected or connected with flexible capillary tube to a			
<ul style="list-style-type: none"> SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately Scope of delivery: 1 off 		7MF0900 -	
<ul style="list-style-type: none"> SITRANS P320/P420 transmitter for differential pressure and flow, 7MF03../7MF04.. order separately, Scope of delivery: 2 off 		7MF0902 -	
			
Filling liquid			
Silicone oil M5		A	
Silicone oil M50		B	
High-temperature oil		C	
Halocarbon oil		D	
Food-grade oil (FDA listed)		E	
Other version Add Order code and plain text		Z	P1Y
Wetted parts materials			
Stainless steel 316L		A	
<ul style="list-style-type: none"> Without coating 		D	
<ul style="list-style-type: none"> With PFA coating 		F	
<ul style="list-style-type: none"> With ECTFFE coating 		G	
Monel 400, 2.4360		J	
Hastelloy C276, 2.4819		K	
Tantalum		U	
Hastelloy C4, 2.4610		Z	Q1Y
Other version Add Order code and plain text			

Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

Clamp-on seals of flange design

1

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Further designs		Further designs	
Add "-Z" to Article No. and specify Order code.		Add "-Z" to Article No. and specify Order code.	
Factory certificates		Sealing surface with recess to EN1092-1, form F (wetted parts 316L only)	
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11	• DN 25	M82
Inspection certificate to EN 10204-3.1 - material of body and wetted parts	C12	• DN 40	M83
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)	C13	• DN 50	M84
Inspection certificate (EN 10204-3.1) - PMI test of pressure containing and wetted parts	C15	• DN 80	M85
Certificate of FDA-approved fill oil (to EN10204-2.2)	C17	• DN 100	M86
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (Includes SIL conformity declaration)	C20	• DN 125	M87
Accessories		Capillary connection	
Spark arrestor (for gauge and absolute pressure transmitters)	D61	For 7MF0900	
Spark arrestor (for differential pressure and level transmitters)	D62	Single-side mounted at differential pressure transmitters at high-side	S03
Low-temperature version (for Silicon Oil M50 only)	D67	Single-side mounted at differential pressure transmitters at low-side	S04
Negative pressure services		cooling element	S08
Negative pressure service (for gauge and absolute pressure transmitters)	D81	Capillary coating	
Negative pressure service (for differential pressure transmitters)	D83	<u>PE protective tube</u>	
Extended negative pressure service (for gauge and absolute pressure transmitters)	D85	1 m	S10
Extended negative pressure service (for differential pressure transmitters)	D88	1,6 m	S11
General product approvals without explosion proof approvals		2 m	S12
Oil-and grease-free cleaned version (for O ₂ -appl. including certificate EN10204-2.2 (only with fill fluid Halocarbon oil max. temperature 60 °C and max. pressure 50 bar)	E80	2,5 m	S13
Oil-and grease-free cleaned version (not for O ₂ -appl. including certificate EN10204-2.2 (only with fill fluid Halocarbon oil)	E87	3 m	S14
Sealing surface		4 m	S15
Sealing surface smooth, form B2/EN1092-1 resp. RFSF/ANSI B16.5 (wetted parts 316L only)	M50	5 m	S16
Sealing surface groove to EN1092-1, form D (instead of sealing surface B1, wetted parts 316L only)	M54	6 m	S17
Sealing surface RJF (groove) to ASME B16.5 (instead of sealing surface RF 125...250AA, wetted parts 316L only)	M64	7 m	S18
Sealing surface with tongue to EN1092-1, form C (wetted parts 316L only)		8 m	S19
• DN 25	M70	9 m	S20
• DN 40	M71	10 m	S21
• DN 50	M72	11 m (only for 7MF0902)	S22
• DN 80	M73	12 m (only for 7MF0902)	S23
• DN 100	M74	13 m (only for 7MF0902)	S24
• DN 125	M75	14 m (only for 7MF0902)	S25
Sealing surface with spigot to EN1092-1, form E (wetted parts 316L only)		15 m (only for 7MF0902)	S26
• DN 25	M76	<u>PTFE protective tube</u>	
• DN 40	M77	1 m	S40
• DN 50	M78	1,6 m	S41
• DN 80	M79	2 m	S42
• DN 100	M80	2,5 m	S43
• DN 125	M81	3 m	S44
		4 m	S45
		5 m	S46
		6 m	S47
		7 m	S48
		8 m	S49
		9 m	S50
		10 m	S51
		11 m (only for 7MF0902)	S52
		12 m (only for 7MF0902)	S53
		13 m (only for 7MF0902)	S54
		14 m (only for 7MF0902)	S55
		15 m (only for 7MF0902)	S56

Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

Clamp-on seals of flange design**1**

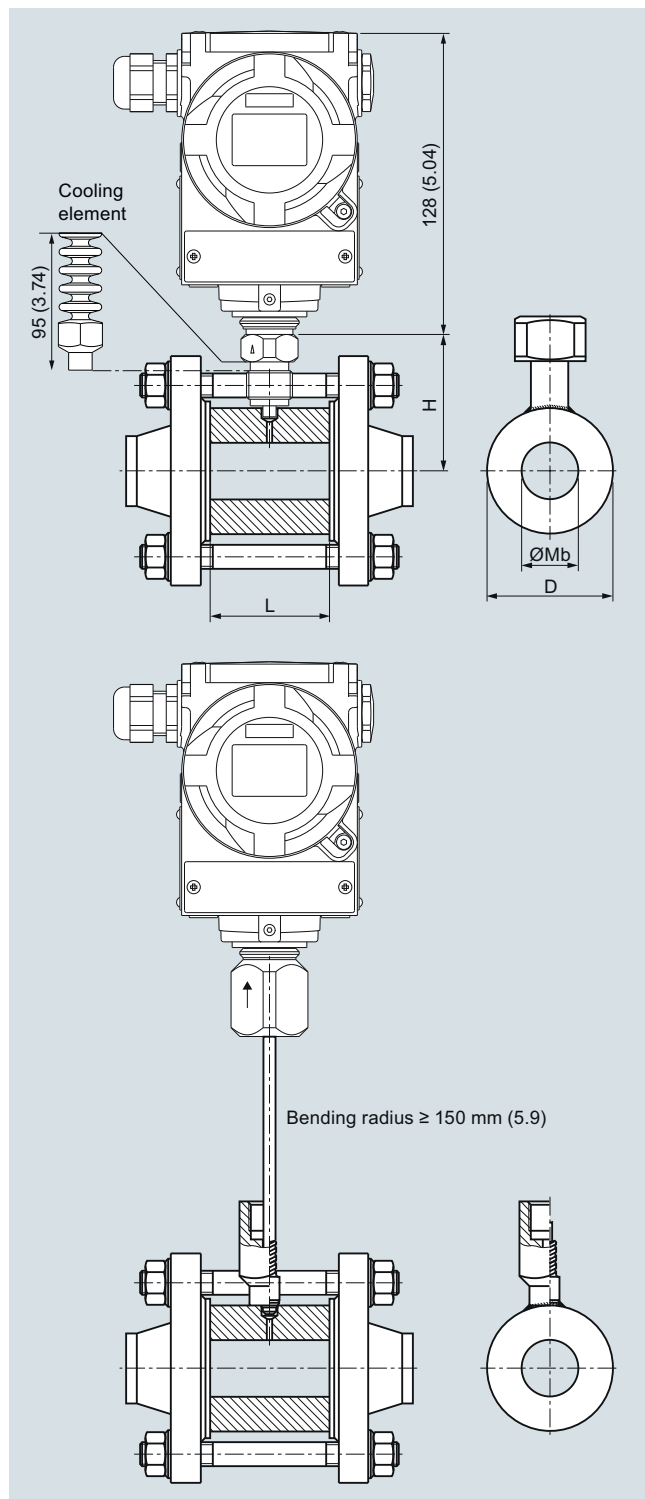
Selection and Ordering data	Order code
Further designs	
Add "-Z" to Article No. and specify Order code.	
<u>PVC protective tube</u>	
1 m	S70
1,6 m	S71
2 m	S72
2,5 m	S73
3 m	S74
4 m	S75
5 m	S76
6 m	S77
7 m	S78
8 m	S79
9 m	S80
10 m	S81
11 m (only for 7MF0902)	S82
12 m (only for 7MF0902)	S83
13 m (only for 7MF0902)	S84
14 m (only for 7MF0902)	S85
15 m (only for 7MF0902)	S86
Device settings	
Operating Temperature; Lower range value ... °C (°F), upper range value ... °C (°F)	Y10
Static pressure: ... bar (psi) (only for 7MF0902)	Y11

Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

Clamp-on seals of flange design

Dimensional drawings



Inline seal for flange-mounting, connected to SITRANS P pressure transmitter, dimensions in mm (inch)

Connection to EN 1092-1

DN mm	PN bar	D mm	Mb mm	L mm	H mm
25	6 ... 100	68	28.5	60	81
40		88	43.1	60	91
50		100	54.5	60	93
65		120	70.3	60	107
80		138	82.5	60	116
100		160	107.1	60	127
125		188	127	60	141

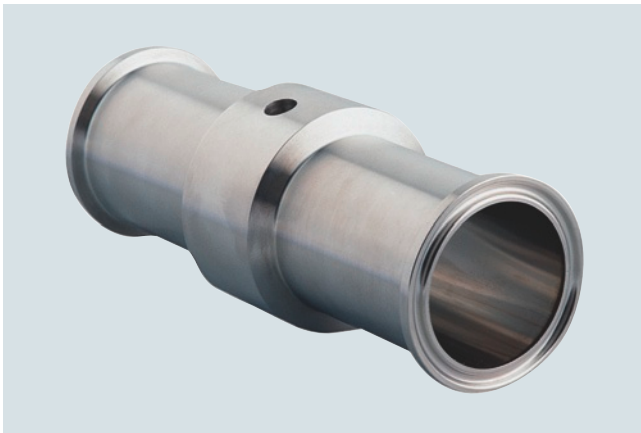
Connection to ASME B16.5

DN (inch)	Class	D mm (inch)	Mb mm (inch)	L mm (inch)	H mm (inch)
1	150 ... 2500	50 (1.97)	28.5 (1.12)	60 (2.36)	72 (2.83)
1½	150 ... 2500	73.5 (2.89)	43.1 (1.70)	60 (2.36)	84 (3.31)
2	150 ... 2500	91.9 (3.62)	54.5 (2.15)	60 (2.36)	93 (3.66)
2½	150 ... 2500	104.6 (4.12)	70.3 (2.77)	60 (2.36)	99 (3.9)
3	150 ... 2500	127 (5)	82.5 (3.25)	60 (2.36)	110 (4.33)
4	150 ... 2500	157.2 (6.19)	107.1 (4.22)	60 (2.36)	125 (4.92)
5	150 ... 2500	188 (7.4)	127 (5)	60 (2.36)	141 (5.55)

Overview



Quick-release inline seals, to DIN 11851 with threaded socket



Quick-release inline seals, with clamp connection

Quick-release inline seals for pressure are available for the following SITRANS P pressure transmitter series:

- P300
- DS III with HART
- DS III with PROFIBUS PA
- DS III with FOUNDATION Fieldbus

Application

The quick-release inline seal is a special design for flowing media and high-viscosity media. Since it is completely integrated in the process pipe, no turbulences, dead volumes or other obstructions to the flow occur. The measured medium flows unhindered through the inline seal and results in self-cleaning of the measuring chamber. Furthermore, the inline seal can be cleaned by a pig.

Design

The quick-release clamp is available in two versions:

- DIN 11851 with threaded socket
- Clamp connection

The inline seal is connected to the pressure transmitter either directly or by way of a capillary.

Function

The measured pressure is transferred from the diaphragm, mounted on the inner circumference of the inline seal, to the filling liquid and then passes through the capillary to the measuring chamber of the pressure transmitter. The interior of the inline seal and of the capillary, as well as the measuring chamber of the pressure transmitter, are filled gas-free by the filling liquid.

Note:

When operating in the low-pressure range, also during commissioning, it is recommended to use a vacuum-proof pressure transmitter (see Selection and Ordering data).

Technical specifications

Inline seals of quick-release design for pressure

Connection	Nominal diameter	Nominal pressure
• Standard to DIN 11851 with thread	DN 25/32/40	PN 40
	DN 50/65/80	PN 25
• Standard Clamp ISO 2852	DN 25/38/51	PN 16
	DN 63.5/76.1	PN 10
• Standard Clamp DIN 32676, row C Tri-clamp	1, 1½ inch	PN 25
	2, 2½ inch	PN 16
	3 inch	PN 10
	DN 25/32/40	PN 25
	DN 50	PN 16
• Standard Clamp DIN 32676, row A metric	DN 65	PN 10
Material		
• Main body	Stainless steel 1.4404/316L	
• Diaphragm	Stainless steel 1.4404/316L	
Capillary		
• Length	Max. 10 m (32.8 ft)	
• Internal diameter	2 mm (0.079 inch)	
• Minimum bending radius	150 mm (5.9 inch)	
• Sheath	Spiral protective tube made of stainless steel, mat. No. 1.4301/316	
Filling liquid	• Food oil (FDA listed)	
Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals	
Weight	Approx. 4 kg (approx. 8.82 lb)	
Certificate and approvals		
Classification according to pressure equipment directive (DGRL 2014/68/EU)	For gases of fluid group 1 and liquids of fluid group 1; complies with the requirements of article 4, paragraph 1 (appendix 1); assigned to category III, conformity evaluation module H by the TÜV Nord	
EHEDG	Complies with EHEDG recommendations	

Pressure Measurement

Remote seals for transmitters and pressure gauges

SITRANS P320/P420

Quick-release inline seals

1

Selection and Ordering data

Article No.

Order
code

Quick release inline-seal

Flange type design, with flexible capillary tube or directly connected to a

- SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately
Scope of delivery: 1 off

7MF0930 -

- 0 A 0

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Nominal diameter Nominal pressure

Connection standard DIN 11851 with thread

DN 25	PN 40	1 BM
DN 32	PN 40	1 CD
DN 40	PN 40	1 DM
DN 50	PN 25	1 EK
DN 65	PN 25	1 FL
DN 80	PN 25	1 GK

Connection standard Clamp ISO 2852

DN 25	PN 16	2 BK
DN 38	PN 16	2 CQ
DN 51	PN 16	2 FH
DN 63,5	PN 10	2 FJ
DN 76,1	PN 10	2 GJ

Connection standard Clamp DIN 32676, row C Tri-clamp

DN 1"	PN 25	3 KV
DN 1½"	PN 25	3 LV
DN 2"	PN 16	3 MV
DN 2½"	PN 16	3 NV
DN 3"	PN 10	3 PV

Connection standard Clamp DIN 32676, row A metric

DN 25	PN 25	4 BL
DN 32	PN 25	4 CC
DN 40	PN 25	4 DL
DN 50	PN 16	4 EJ
DN 65	PN 10	4 FK

Other version
Add Order code and plain text

9 AA H 1 Y

Selection and Ordering data

Article No.

Order
code

Quick release inline-seal

Flange type design, with flexible capillary tube or directly connected to a

- SITRANS P320/P420 transmitter for gauge pressure or absolute pressure (only together with negative pressure service), 7MF03../7MF04.. order separately
Scope of delivery: 1 off

7MF0930 -

- 0 A 0

Transmitter connection

Without capillary tube, direct mount straight connection (for gauge pressure)

Connection via capillary tube

Length of capillary

1 m
1,6 m
2 m
2,5 m
3 m
4 m
5 m
6 m
7 m
8 m
9 m
10 m

Other version

Add Order code and plain text

Filling liquid

Food-grade oil (FDA listed)

Other version

Add Order code and plain text

0 0

1 0
1 1
1 2
1 3
1 4
1 5
1 6
1 7
1 8
2 0
2 1
2 2

9 8

E Z

L 1 Y

P 1 Y

Pressure MeasurementRemote seals for transmitters and pressure gauges
SITRANS P320/P420**Quick-release inline seals**

1

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Further designs		Further designs	
Add "-Z" to Article No. and specify Order code.		Add "-Z" to Article No. and specify Order code.	
Factory certificates		Device settings	
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	C11	Operating Temperature; Lower range value ... °C (°F), upper range value ... °C (°F)	Y10
Inspection certificate to EN 10204-3.1 - material of body and wetted parts	C12		
Inspection certificate (EN 10204-3.1) - PMI test of pressure containing and wetted parts	C15		
Certificate of FDA-approved fill oil (to EN10204-2.2)	C17		
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (Includes SIL conformity declaration)	C20		
Negative pressure services			
Negative pressure service (for gauge and absolute pressure transmitters)	D81		
Extended negative pressure service (for gauge and absolute pressure transmitters)	D85		
Capillary connection			
Single-side mounted at differential pressure transmitters at high-side	S03		
Single-side mounted at differential pressure transmitters at low-side	S04		
cooling element	S08		
Capillary coating			
<u>PE protective tube</u>			
1 m	S10		
1,6 m	S11		
2 m	S12		
2,5 m	S13		
3 m	S14		
4 m	S15		
5 m	S16		
6 m	S17		
7 m	S18		
8 m	S19		
9 m	S20		
10 m	S21		
<u>PTFE protective tube</u>			
1 m	S40		
1,6 m	S41		
2 m	S42		
2,5 m	S43		
3 m	S44		
4 m	S45		
5 m	S46		
6 m	S47		
7 m	S48		
8 m	S49		
9 m	S50		
10 m	S51		
<u>PVC protective tube</u>			
1 m	S70		
1,6 m	S71		
2 m	S72		
2,5 m	S73		
3 m	S74		
4 m	S75		
5 m	S76		
6 m	S77		
7 m	S78		
8 m	S79		
9 m	S80		
10 m	S81		

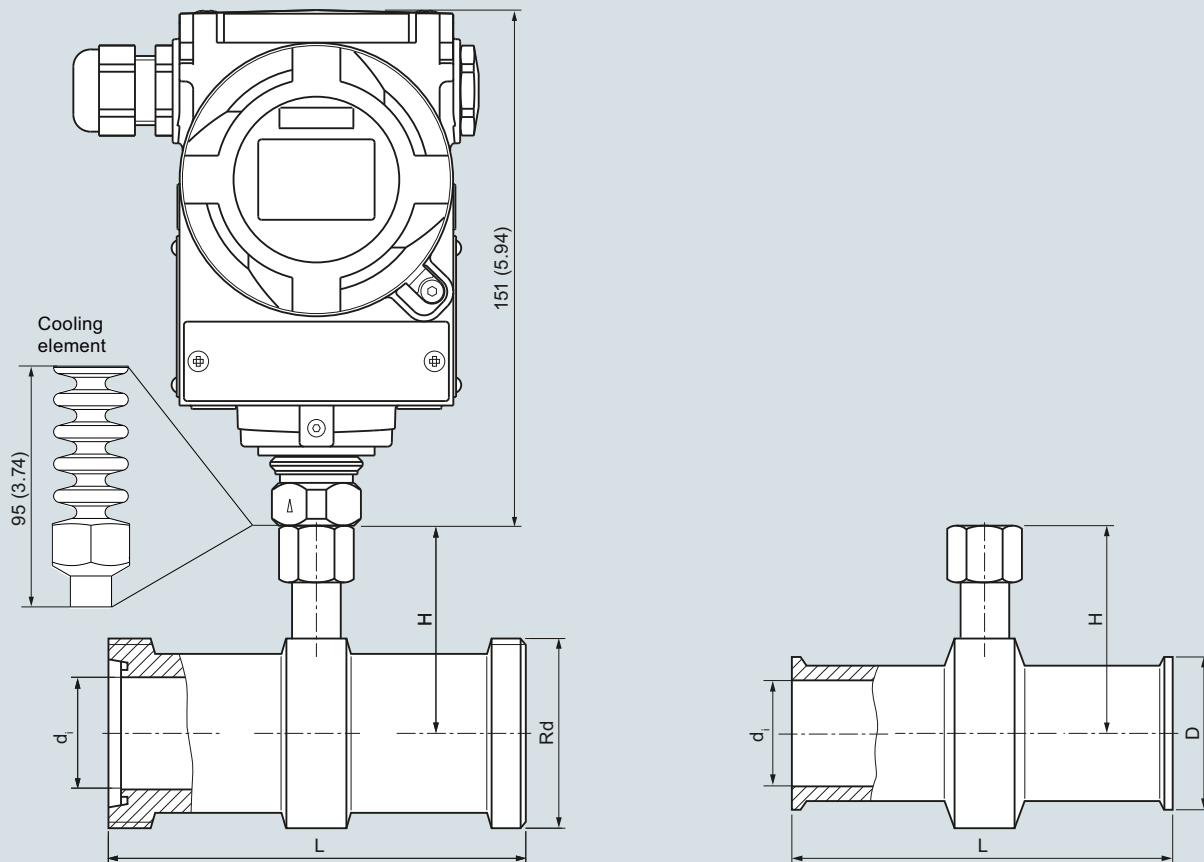
Pressure Measurement

Remote seals for transmitters and pressure gauges

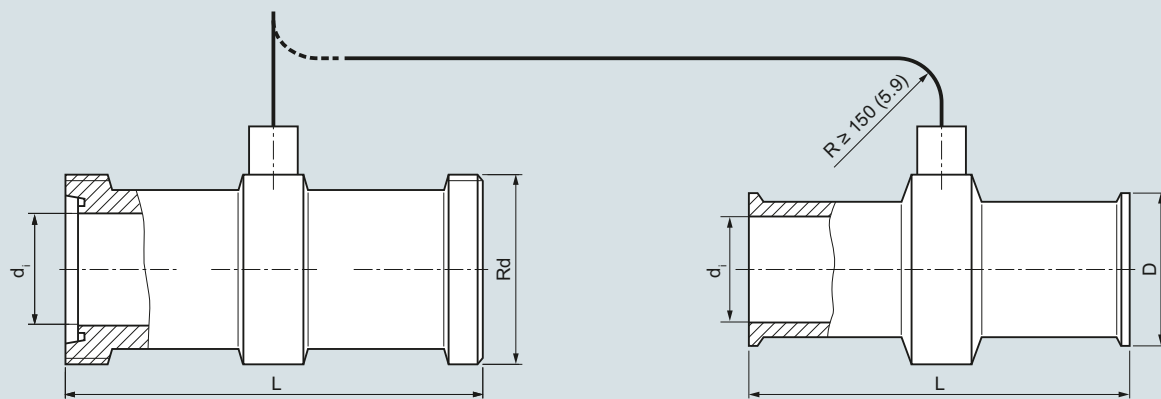
SITRANS P320/P420

Quick-release inline seals

Dimensional drawings



Mounted directly on SITRANS P transmitter for pressure



Mounted on SITRANS P transmitter for pressure or differential pressure and flow

Quick-release inline seal, dimensions in mm (inch)

Clamp-on seals for pipes to EN 10357 (DIN 11851)

Food connections							
DIN 11851				DIN 32676			
	Length	Inner diameter	Connection height	Nominal pressure	Round thread connection to DIN 11851	Nominal pressure	Clamp connection to DIN 32676
Nominal diameter	L (mm)	di (mm)	h (mm)		Thread Rd		D (mm)
DN 10	96	10	27.5	PN 40	28 x 1/8"	PN 16	34
DN 15	150	16	12	PN 40	34 x 1/8"	PN 16	34
DN 25	110	26	21	PN 40	52 x 1/6"	PN 16	50.5
DN 32	110	32	26	PN 40	58 x 1/6"	PN 16	50.5
DN 40	110	38	28.5	PN 40	65 x 1/6"	PN 16	50.5
DN 50	110	50	34	PN 25	78 x 1/6"	PN 16	64
DN 65	110	66	42	PN 25	95 x 1/6"	PN 10	91
DN 80	60	81	47.5	PN 25	110 x 1/4"	PN 10	106
DN 100	60	100	60	PN 25	130 x 1/4"	PN 10	119

Clamp-on seals for pipes to BS 4825 Part 3 and O.D. Tube (suited for pipes to ASME-BPE)

Food connection							
IDF to ISO 2853				Clamp connection to ISO 2852			
	Length	Inner diameter	Connection height	Nominal pressure	IDF-Thread to ISO 2853	Nominal pressure	Clamp connection to ISO 2852
Nominal diameter	L (mm)	di (mm)	h (mm)		IDF-thread (Tr)		D (mm)
1 inch	25.4 mm	110	22.2	PN 40	37 x 3.175	PN 16	50.5
1½ inch	38 mm	110	34.8	PN 40	50 x 3.175	PN 16	50.5
2 inch	51 mm	110	47.8	PN 25	64 x 3.175	PN 16	64
1½ inch	63.5 mm	110	60.3	PN 25	77.5 x 3.175	PN 16	77.5
3 inch	76.1 mm	60	72.9	PN 25	91 x 3.175	PN 10	91
4 inch	101.6 mm	60	97.6	PN 25	118 x 3.175	PN 10	119

Pressure Measurement

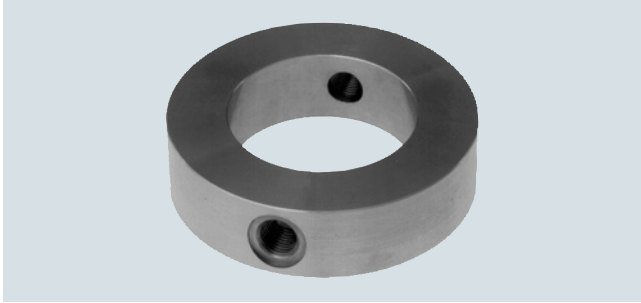
Remote seals for transmitters and pressure gauges

SITRANS P320/P420

1

Flushing rings for diaphragm seals

Overview



Flushing ring

Flushing rings are required for flange-mounted and sandwich-type remote seals (Article No. 7MF0800 ... 7MF0814) if the danger exists that the process conditions and the geometry of the connection could cause the medium to form deposits or blockages.

The flushing ring is clamped between the process flange and the remote seal.

Deposits can be flushed away from the diaphragm through the holes in the side, or the pressure volume can be vented. Different nominal diameters and forms permit adaptation to the respective process flange.

Process connection

For flanges to EN and ASME:
DN 50, 80, 100, 125; PN 16 ... 100 or
DN 2 inch, 3 inch, 4 inch, 5 inch; Class 150 ... 600

Standard design

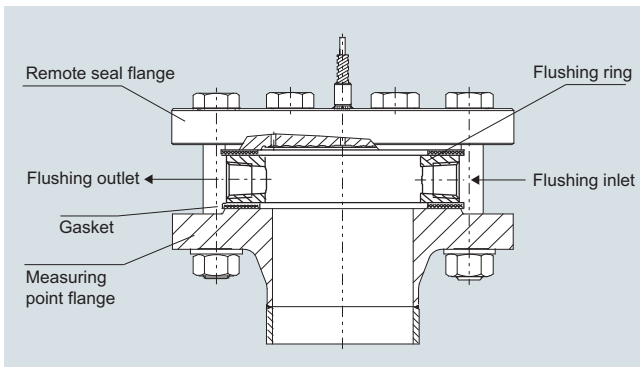
Material: CrNi-Stahl, mat. No. 1.4404/316L
Sealing faces and flushing holes: See Selection and Ordering data

Technical specifications

Flushing ring for remote seals of sandwich and flange design

Nominal diameter	Nominal pressure
• DN 50	PN 16 ... PN 100
• DN 80	PN 16 ... PN 100
• DN 100	PN 16 ... PN 100
• DN 125	PN 16 ... PN 100
• 2 inch	Class 150 ... class 600
• 3 inch	Class 150 ... class 600
• 4 inch	Class 150 ... class 600
• 5 inch	Class 150 ... class 600
Sealing face	
• To EN 1092-1	Form B1
	Form B2
	Form D/Form D
	Form C/Form C
	Form C/Form C
	Form E
	Form F
• To ASME B16.5	RF 125 ... 250 AA
	RFSF
	RJF ring groove
Flushing holes (2 off), female thread	• G $\frac{1}{4}$
	• G $\frac{1}{2}$
	• $\frac{1}{4}$ -18 NPT
	• $\frac{1}{2}$ -14 NPT
Material	Stainless steel 1.4404/316L

Design



Installation example

Selection and Ordering data

Article No.Ord. code

Flushing ring

7MF4925 -

for remote seals 7MF0800 to 7MF0814

1

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Nom. diam.

Nom. press.

- DN 50 PN 16 ... PN 100
- DN 80 PN 16 ... PN 100
- DN 100 PN 16 ... PN 100
- DN 125 PN 16 ... PN 100

A
B
C
D

- 2 inch Class 150 ... 600
- 3 inch Class 150 ... 600
- 4 inch Class 150 ... 600
- 5 inch Class 150 ... 600

G
H
J
K

Other version

Add Order code and plain text:

Nominal pressure: ...; Nominal pressure: ...

Z

J 1 Y

Sealing face

- EN 1092-1
 - Form B1
 - Form B2
 - Form C/Form C
 - Form D/Form C
 - Form D/Form D
- Form E
- Form F
- ASME B16.5
 - RF 125 ... 250 AA
 - RFSF
 - RJF ring groove

A
C
D
E
F

G
H

M
Q
R

Other version

Add Order code and plain text:

Sealing face: ...

Z

K 1 Y

Flushing holes (2 off)

- Female thread G $\frac{1}{4}$
- Female thread G $\frac{1}{2}$
- Female thread $\frac{1}{4}$ -18 NPT
- Female thread $\frac{1}{2}$ -14 NPT

1
2
3
4

Material

- Stainless steel 316L

Other version

Add Order code and plain text:

Material: ...

0
9

M 1 Y

Further designs

Please add "-Z" to Article No. and specify Order code.

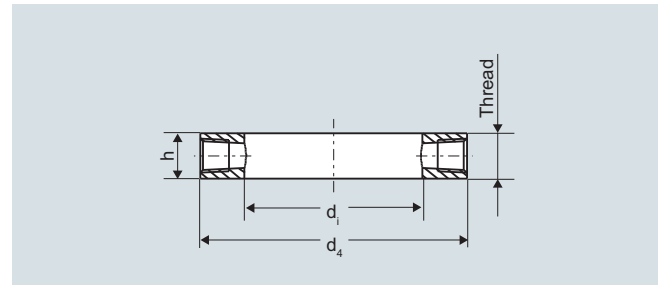
Order code

Inspection certificate

to EN 10204, section 3.1

C12

Dimensional drawings



Flushing ring, dimension drawing

Connection to EN 1092-1

DN (mm)	PN (bar)	d ₄ (mm)	d _i (mm)	h (mm)	Weight (kg)
50	16 ... 100	102	62	30	1.10
80	16 ... 100	138	92	30	1.90
100	16 ... 100	162	92	30	3.15
125	16 ... 100	188	126	30	3.50

Connection to ASME B 16.5

DN inch	Class	d ₄ mm (in.)	d _i mm (in.)	h mm (in.)	Weight kg (lb)
2	150 ... 600	92 (3.62)	62 (2.44)	30 (1.18)	0.60 (1.32)
3	150 ... 600	127 (5)	92 (3.62)	30 (1.18)	1.05 (2.31)
4	150 ... 600	157 (6.18)	92 (3.62)	30 (1.18)	2.85 (6.28)
5	150 ... 600	185.5 (7.3)	126 (4.96)	30 (1.18)	3.30 (7.28)

Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

Measuring setups

1

Overview

This section shows examples of typical measuring setups for using SITRANS P pressure transmitters with and without remote seals.

Equations for calculating start of scale and full scale are provided for each example.

Questionnaires are included to help you select the right combination of remote seal and pressure transmitter.

Installation

Remote seals of sandwich design are fitted between the connection flange of the measuring point and a dummy flange. Remote seals of flange design are fitted directly on the connection flange of the measuring point. The respective pressure rating of the dummy flange or the flanged remote seal must be observed.

The pressure transmitter should be installed below the connection flange (and below the lower connection flange in the case of differential pressure transmitters). This arrangement must be used in the low-pressure range.

When measuring at pressures above atmospheric, the pressure transmitter can also be installed above the connection flange.

The capillaries between the remote seal and the pressure transmitter should be as short as possible to obtain a good transmission response.

Offset of measuring range

If there is a difference in height between the two connection flanges when measuring with two remote seals, an additional differential pressure will result from the oil filling of the remote seal capillaries. This results in a measuring range offset which has to be taken into account when you set the pressure transmitter.

An offset in the measuring range also occurs when combining a remote seal with a transmitter if the remote seal is not installed at the same height as the transmitter.

Pressure transmitter output

If the level, separation layer or density increase in closed vessels, the differential pressure and hence the output signal of the pressure transmitter also increase.

For an inverted relationship between the differential pressure and the output signal, the start-of-scale and full-scale values of the SITRANS P must be interchanged.

With open vessels, a rising pressure is usually assigned to an increasing level, separation layer or density.

Influence of ambient temperature

Temperature differences between the individual capillaries and between the individual remote seals should be avoided.

Temperature variations in the area of the measuring setup cause a change in volume of the filling liquid and hence measuring errors.

Notes

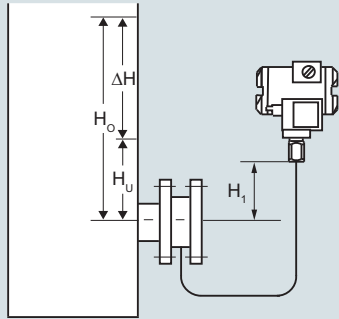
- For the separation layer measurement, the separation layer has to be positioned between the two spigots. Also you must make sure that the level in the container is always above the top spigot.
- When measuring density, make sure that the level of the medium remains constant. The level should be above the top spigot.

Possible combinations of pressure transmitters and remote seals

Type of installation	Pressure transmitters	Remote seals
A/B	7MF030-... 7MF031-... 7MF040-... 7MF041-...	7MF0800-... 7MF0810-...
C ₁ and C ₂	7MF032-... 7MF042-... 7MF033-... 7MF043-...	7MF0800-... 7MF0810-... (negative pressure service in each case) 7MF0801-... 7MF0811-...
D	7MF034-... 7MF035-... 7MF044-... 7MF045-...	7MF0802-... 7MF0812-...
E	7MF034-... 7MF035-... 7MF044-... 7MF045-...	7MF0813-...
G, H and J	7MF034-... 7MF035-... 7MF044-... 7MF045-...	7MF0802-... 7MF0812-...

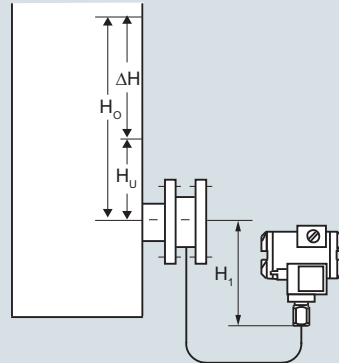
Dimensional drawings**Types of installation for pressure and level measurements (open vessels)**

Installation type A



Pressure transmitter
above the measuring point

Installation type B



Pressure transmitter
below the measuring point

$H_1 \leq 7 \text{ m (23 ft)}$, with halocarbon oil as filling liquid only $H_1 \leq 4 \text{ m (13.1 ft)}$

Installation type A

$$\text{Start-of-scale: } p_{MA} = \rho_{FL} \cdot g \cdot H_U - \rho_{Oil} \cdot g \cdot H_1$$

$$\text{Full-scale: } p_{ME} = \rho_{FL} \cdot g \cdot H_O - \rho_{Oil} \cdot g \cdot H_1$$

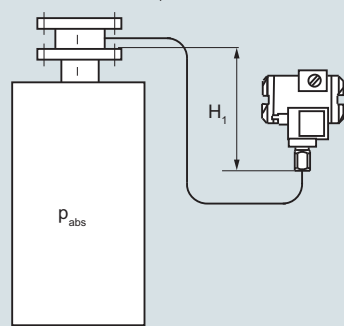
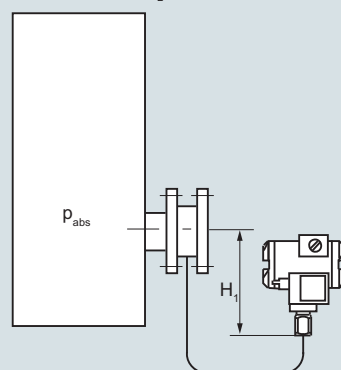
Installation type B

$$\text{Start-of-scale: } p_{MA} = \rho_{FL} \cdot g \cdot H_U + \rho_{Oil} \cdot g \cdot H_1$$

$$\text{Full-scale: } p_{ME} = \rho_{FL} \cdot g \cdot H_O + \rho_{Oil} \cdot g \cdot H_1$$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
ρ_{FL}	Density of medium in vessel
ρ_{Oil}	Density of filling oil in the capillary to the remote seal
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value
H_1	Distance between vessel flange and pressure trans.

Types of installation for absolute level measurements (closed vessels)Installation type C₁Installation type C₂

Pressure transmitter for absolute pressure always below the measuring point: $H_1 \geq 200 \text{ mm (7.9 inch)}$

Installation type C₁ and C₂

$$\text{Start-of-scale: } p_{MA} = p_{START} + \rho_{Oil} \cdot g \cdot H_1$$

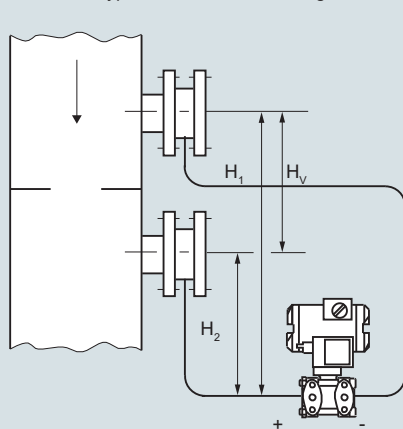
$$\text{Full-scale: } p_{ME} = p_{END} + \rho_{Oil} \cdot g \cdot H_1$$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
p_{START}	Start-of-scale value
p_{END}	Full-scale value
ρ_{Oil}	Density of filling oil in the capillary to the remote seal
g	Local acceleration due to gravity
H_1	Distance between vessel flange and pressure trans.

Type of installation for differential pressure and flow measurements

Installation type D Filter monitoring



Installation type D

$$\text{Start-of-scale: } p_{MA} = p_{START} - \rho_{Oil} \cdot g \cdot H_V$$

$$\text{Full-scale: } p_{ME} = p_{END} - \rho_{Oil} \cdot g \cdot H_V$$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
p_{START}	Start-of-scale value
p_{END}	Full-scale value
ρ_{Oil}	Density of filling oil in the capillary to the remote seal
g	Local acceleration due to gravity
H_V	Distance between the measuring points (spigots)

Pressure Measurement

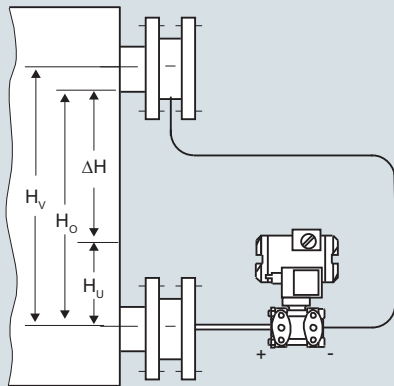
Remote seals for transmitters and pressure gauges
SITRANS P320/P420

1

Measuring setups with remote seals

Types of installation for level measurements (closed vessels)

Installation type E



Installation type E

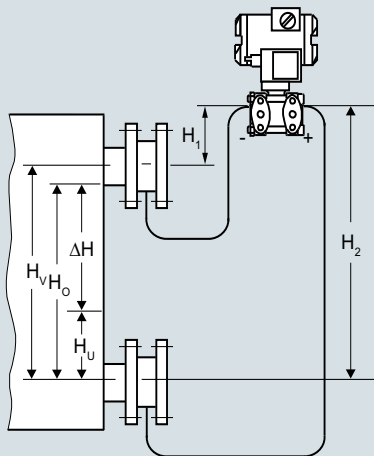
Start-of-scale: $p_{MA} = \rho_{FL} \cdot g \cdot H_U - \rho_{OIL} \cdot g \cdot H_V$

Full-scale: $p_{ME} = \rho_{FL} \cdot g \cdot H_O - \rho_{OIL} \cdot g \cdot H_V$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
ρ_{FL}	Density of medium in vessel
ρ_{OIL}	Density of filling oil in the capillary to the remote seal
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value
H_V	Distance between the measuring points (spigots)

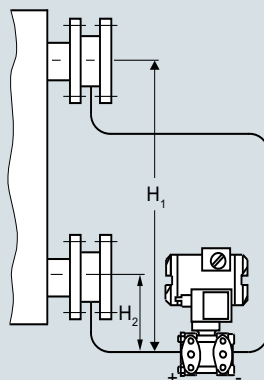
Installation type G



Pressure transmitter for differential pressure above the upper measuring point, no vacuum

$H_2 \leq 7 \text{ m (23 ft)}$, with halocarbon oil as filling liquid only $H_1 \leq 4 \text{ m (13.1 ft)}$

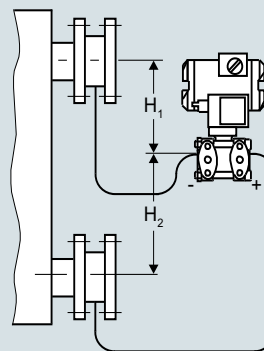
Installation type H



below the lower measuring point

Installation type for vacuum applications

Installation type J



between the measuring points, no vacuum

$H_2 \leq 7 \text{ m (23 ft)}$, with halocarbon oil as filling liquid only $H_2 \leq 4 \text{ m (13.1 ft)}$

Installation type G, H and J

Start-of-scale: $p_{MA} = \rho_{FL} \cdot g \cdot H_U - \rho_{OIL} \cdot g \cdot H_V$

Full-scale: $p_{ME} = \rho_{FL} \cdot g \cdot H_O - \rho_{OIL} \cdot g \cdot H_V$

Legend

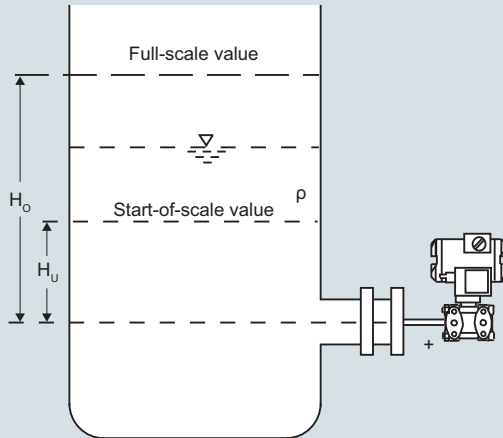
p_{MA}	Start-of-scale value to be set	g	Local acceleration due to gravity
p_{ME}	Full-scale value to be set	H_U	Start-of-scale value
ρ_{FL}	Density of medium in vessel	H_O	Full-scale value
ρ_{OIL}	Density of filling oil in the capillary to the remote seal	H_V	Distance between the measuring points (spigots)

Overview**Notes**

- For the separation layer measurement, the separation layer has to be positioned between the two spigots.

Also you must make sure that the level in the container is always above the top spigot.

- When measuring density, make sure that the level of the medium remains constant. The level should be above the top spigot

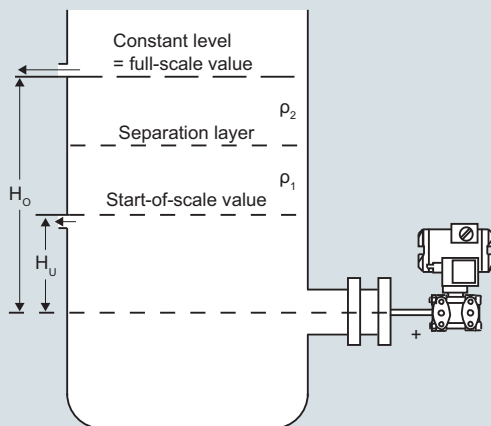
Dimensional drawings**Pressure transmitters for differential pressure, for flanging**Measuring setups for open containers**Level measurement**

$$\text{Start-of-scale: } p_{MA} = \rho \cdot g \cdot H_U$$

$$\text{Full-scale: } p_{ME} = \rho \cdot g \cdot H_O$$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
ρ	Density of medium in vessel
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value

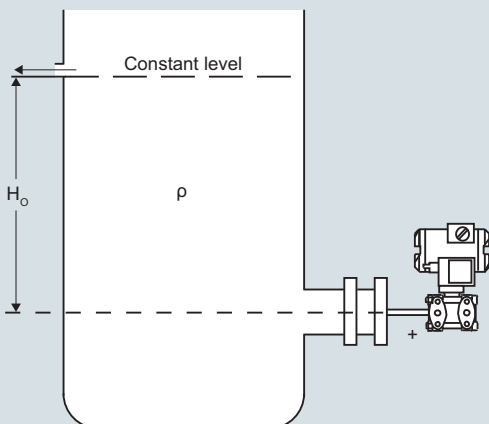
**Separation layer measurement**

$$\text{Start-of-scale: } p_{MA} = g \cdot (H_U \cdot \rho_1 + (H_O - H_U) \cdot \rho_2)$$

$$\text{Full-scale: } p_{ME} = \rho_1 \cdot g \cdot H_O$$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
ρ_1	Density of heavier liquid
ρ_2	Density of lighter liquid
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value

**Density measurement**

$$\text{Start-of-scale: } p_{MA} = \rho_{MIN} \cdot g \cdot H_O$$

$$\text{Full-scale: } p_{ME} = \rho_{MAX} \cdot g \cdot H_O$$

Legende

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
ρ_{MIN}	Minimum density of medium in vessel
ρ_{MAX}	Maximum density of medium in vessel
g	Local acceleration due to gravity
H_O	Full-scale value in m

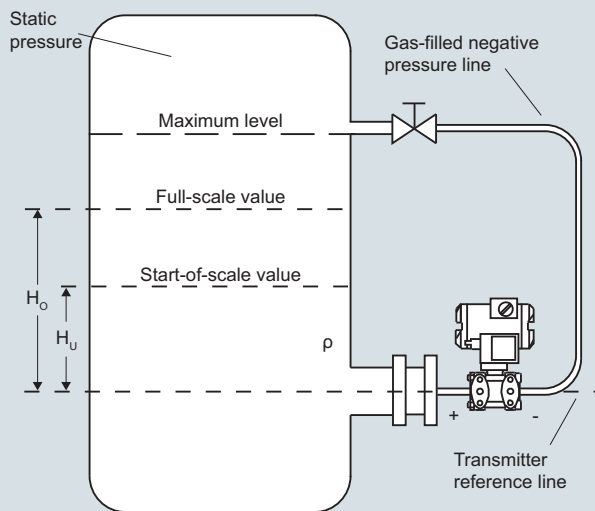
Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

1

Measuring setups without remote seals

Measuring setups for closed containers



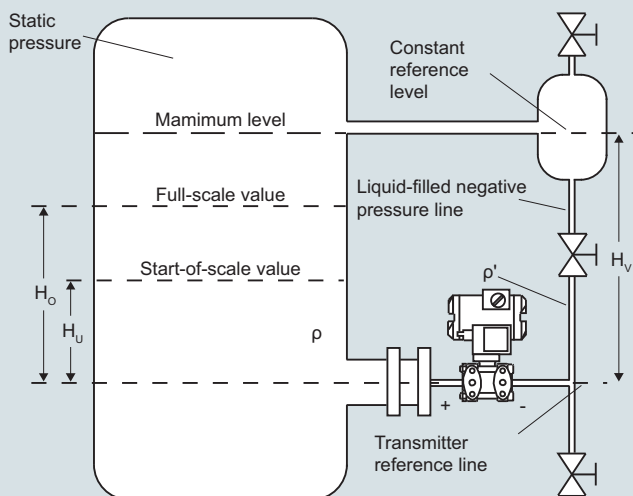
Level measurement, Version 1

$$\text{Start-of-scale: } \Delta p_{MA} = \rho \cdot g \cdot H_U$$

$$\text{Full-scale: } \Delta p_{ME} = \rho \cdot g \cdot H_O$$

Legend

Δp_{MA}	Start-of-scale value to be set
Δp_{ME}	Full-scale value to be set
ρ	Density of medium in vessel
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value



Level measurement, Version 2

$$\text{Start-of-scale: } \Delta p_{MA} = g \cdot (H_U \cdot \rho - H_V \cdot \rho')$$

$$\text{Full-scale: } \Delta p_{ME} = g \cdot (H_O \cdot \rho - H_V \cdot \rho')$$

Legend

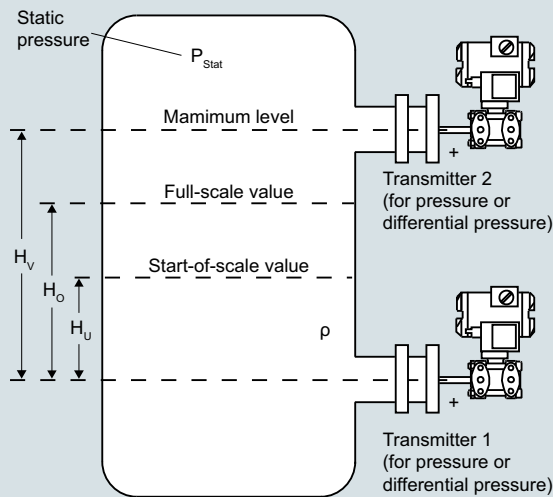
Δp_{MA}	Start-of-scale value to be set
Δp_{ME}	Full-scale value to be set
ρ	Density of medium in vessel
ρ'	Density of liquid in the negative pressure line (corresponding to the temperature existing there)
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value
H_V	Distance between the measuring points (spigots)

Pressure Measurement

Remote seals for transmitters and pressure gauges
SITRANS P320/P420

Measuring setups without remote seals

1



Level measurement, Version 3

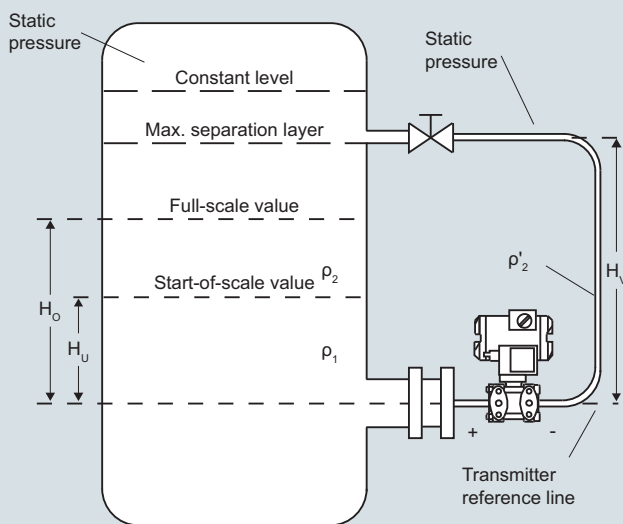
$$\text{Start-of-scale: } \Delta p_{MA} = \underbrace{P_{Stat} + \rho \cdot g \cdot H_U}_{\text{Transmitter 1}} - \underbrace{P_{Stat}}_{\text{Transmitter 2}}$$

$$\text{Full-scale: } \Delta p_{ME} = \underbrace{P_{Stat} + \rho \cdot g \cdot H_O}_{\text{Transmitter 1}} - \underbrace{P_{Stat}}_{\text{Transmitter 2}}$$

Legend

Δp_{MA}	Start-of-scale value to be set
Δp_{ME}	Full-scale value to be set
ρ	Density of medium in vessel
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value
H_V	Distance between the measuring points (spigots)

The pressure measuring range (\pm level) will be calculated by subtraction of measuring range of transmitter 1 minus measuring range of transmitter 2 in the process control system.



Separation layer measurement

$$\text{Start-of-scale: } \Delta p_{MA} = g \cdot (H_U \cdot \rho_1 + (H_O - H_U) \cdot \rho_2 - H_V \cdot \rho'_2)$$

$$\text{Full-scale: } \Delta p_{ME} = g \cdot (H_O \cdot \rho_1 - H_V \cdot \rho'_2)$$

Legend

Δp_{MA}	Start-of-scale value to be set
Δp_{ME}	Full-scale value to be set
ρ_1	Density of heavier liquid with separation layer in vessel
ρ_2	Density of lighter liquid with separation layer
ρ'_2	Density of liquid in the negative pressure line (corresponding to the temperature existing there)
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value
H_V	Distance between the measuring points (spigots)

Pressure Measurement

Remote seals for transmitters and pressure gauges

Technical description

Application

The remote seals 7MF48.. can be fitted to SITRANS P transmitters for

- **pressure** (SITRANS P300, P310, DSIII and P410),
- **absolute pressure** (SITRANS P300 and DSIII) and
- **differential pressure and flow** (SITRANS P310, DSIII, P410 and P500).

Design and mode of operation

A remote seal system consists of a transmitter, one or two remote seals, an appropriate transmission liquid, and a connection between the transmitter and remote seal (direct mounting or capillary).

The volume in contact with the measured medium is defined by an flexible diaphragm. The volume between this diaphragm and the pressure transmitter is completely filled with a transmission fluid. If a pressure is now applied to the remote seal, this is transmitted via the flexible diaphragm and the fill fluid to the pressure transmitter.

In many cases, a capillary is located between the remote seal and the pressure transmitter in order e.g. to minimize temperature effects from the hot medium on the latter. However, the capillary line influences the response time and the temperature response of the complete remote seal system. When fitting remote seals to differential pressure transmitters, two capillaries of the same length must always be used.

Fields of use

Remote seal systems should be used if a separation between the measured medium and the measuring instrument is appropriate or essential for the following reasons:

- The **temperature of the medium** is outside the limits specified for the transmitter.
- The medium is **corrosive** and requires diaphragm materials in the transmitter which are not available.
- The medium is **highly viscous** or **contains solids** which would block the measuring chambers of the transmitter.
- The medium may freeze in the measuring chambers or impulse line.
- The medium is **heterogeneous** and **fibrous**.
- The medium tends towards polymerization or crystallization.
- The process requires **quick-release** remote seals, as necessary e.g. in the food industry for fast cleaning.
- The process requires cleaning of the measuring site, e.g. in a batch process.

Constructional designs

A differentiation is made between diaphragm seals and inline seals.

With the diaphragm seals, the pressure is measured via a flat convoluted diaphragm welded to a convoluted backup.

With the inline seals, the pressure is measured via a cylindrical diaphragm positioned in a pipe, and transmitted to the transmitter via the filling liquid.

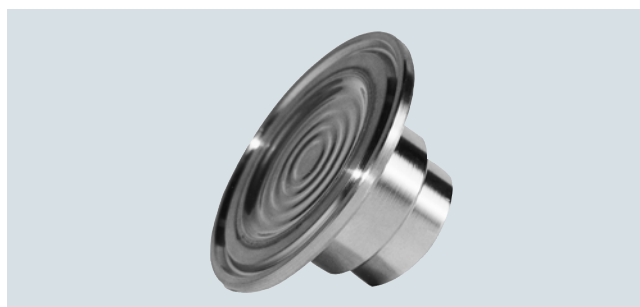
The inline seal is a special design for flowing media. It consists of a cylindrical pipe in which a cylindrical diaphragm is embedded. Since it is completely integrated in the process pipe, no turbulences, dead volumes or other obstructions to the flow occur.



Diaphragm seal of pancake design, and also with extended diaphragm (extension)



Diaphragm seal of flush flange design, and also with extended diaphragm (extension)



Tri-Clamp sanitary remote seal

Diaphragm seals

The following types of diaphragm seals exist:

- Pancake design, and pancake design with extended diaphragm (extension) to DIN or ANSI which are secured using a backup blind flange.
- Flush flange design, and flange design with extended diaphragm (extension) to DIN or ANSI which are installed by using holes in the flange.
- Sanitary remote seals, e.g. to DIN 11851, Cherry Burrell, APC connection, Tri-clamp connection, etc.

The sanitary remote seals are common designs in the food industry. Their design means that the measured medium cannot accumulate in dead volumes. The sanitary clamp present on the remote seal means that quick dismounting is possible for cleaning.

- Button diaphragm seal with male thread for screwing into tapped holes.
- Remote seals with customer-specific process connections.

Clamp-on seals

The following types of clamp-on seals exist:

- Sanitary inline seals, e.g. to DIN 11851, Cherry Burrell, tri-clamp connection etc.
The sanitary facility enables the seal to be removed quickly for cleaning purposes.
- Inline seals for positioning between DIN or ANSI flanges.
- Inline seals with customer-specific process connections.

Transmission response

Temperature errors occur if the fill fluid in the remote seal and in the capillaries expands or contracts as a result of temperature effects. The temperature error depends on the diaphragm characteristic, the influence of the fill fluid, and the influence of the fill fluid under the process flanges or in the flanges on the transmitter (volume minimized for remote seals).

Diaphragm characteristic

The characteristic of the remote seal is of great importance. The larger the diaphragm diameter, the softer it is. In comparison to a smaller diaphragm, this means that it can respond far easier to temperature-based expansions of the filling liquid.

The result is that low measuring ranges are only possible with large diaphragm diameters. In addition, the diaphragm thickness, its material, and any coatings which may be present must also be considered.

Fill fluid

All fill fluids expand or contract when the temperature varies. Temperature-independent errors can be minimized by selecting a suitable filling liquid, but it must also be ensured that the filling liquid is appropriate for the temperature limits and operating pressure. For food and beverage as well as pharmaceutical applications see reference for FDA approved fill fluids.

Since the fill fluid is present under the remote seal diaphragm, in the capillaries and under the process flanges of the transmitter, the temperature error must be calculated separately for each combination.

Response time

The response time depends on the internal diameter of the capillaries, the viscosity of the filling liquid, the capillary extension length, and the pressure in the measuring system:

Internal diameter:

The response time decreases as the internal diameter increases, but the temperature error increases due to increased oil volume.

Viscosity:

The response time increases as the viscosity increases.

Capillary length:

The capillary length has a proportional effect on the response time and the temperature error.

Measuring system pressure:

The response time decreases as the pressure in the measuring system increases.

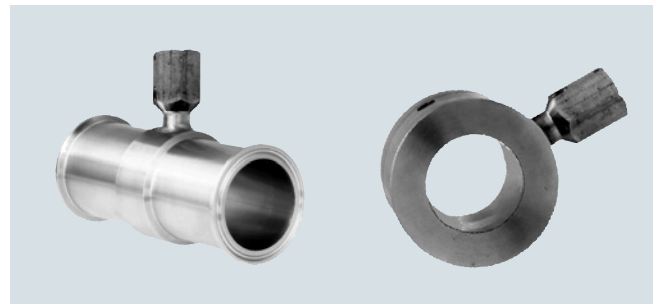
Recommendations

The following should be observed to obtain an optimum combination of transmitter and remote seal:

- The remote seal diameter, and thus the effective diameter of the diaphragm, should be selected as large as possible in order to keep the temperature-dependent errors as low as possible.
- The capillaries should be selected as short as possible in order to keep the response time and the temperature-dependent errors as low as possible.



Button diaphragm seal with diaphragm flush with front



Sanitary tri-clamp seal and for flange pancake mounting

- A filling liquid should be selected which has the lowest viscosity and the lowest coefficient of expansion, and which simultaneously fulfills the process requirements with respect to pressure/vacuum and temperature. The filling liquid must also be compatible with the process medium.
- When installing the equipment for vacuum applications, the transmitter must always be located below the lowest tap.
- It should also be noted that some of the filling liquids are very limited with respect to the permissible temperature of the medium for vacuum applications.
- When operating permanently at a vacuum, the remote seal must be designed in the version resistant to those vacuum applications.
- Recommendations on the minimum span can be found in the tables on pages 1/424 and 1/425.

Note

The remote seals listed in this catalog are a selection of the most common designs. As a result of the large variety of process connections, it may nevertheless be the case that certain remote seals which are not listed in the catalog are still available.

Other versions could be:

- Other process connections, standards
- Aseptic or sterile connections
- Other sizes
- Other nominal pressures
- Special diaphragm materials, including coatings
- Other sealing faces
- Other fill fluids
- Other capillary lengths
- Sheathing of capillaries with protective coat
- Calibration at higher/lower temperatures etc.

Please contact your Siemens Regional Office for more information.

Pressure Measurement

Remote seals for transmitters and pressure gauges

Technical description

Technical specifications

Nominal diameter, nominal pressure, pressure connection	See Ordering data	Sealing material in the transmitter pressure flanges	
Sealing face (only for pancake and flanged remote seals)	To ANSI B16.5 RF 250 RMS for stainless steel or solid materials or ANSI B16.5 RFSF (smooth finish) for other materials	<ul style="list-style-type: none"> For absolute pressure transmitters and vacuum applications For other applications 	Copper Viton
Materials		Max. pressure	See nominal pressure of remote seal and transmitter
<ul style="list-style-type: none"> Main body for pancake and flange remote seals Wetted parts materials Housing and diaphragm for Inline seals 	Stainless steel, mat. No. 1.4435/316L See Ordering data Stainless steel, mat. No. 1.4435/316L or stainless steel, 7MF4880-... and 7MF4883-... Stainless steel, mat. No. 1.4571/316Ti Spiral sheath made of stainless steel, mat. No. 304	Capillary	Max. 30 ft. longer lengths on inquiry
<ul style="list-style-type: none"> Capillary Armor 		<ul style="list-style-type: none"> Length Internal bore Smallest bending radius 	0.079 inch 6.0 inch
		Fill fluid	
		<ul style="list-style-type: none"> For pancake and flange remote seals For sanitary remote seals 	See Ordering data Neobee M20 (food oil)
		Ambient temperature	See transmitter and filling liquid
		Certificates and approvals	
		Classification according to pressure equipment directive (DGRL 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)

Measuring errors based on physical properties always result when using remote seals

Temperature errors of diaphragm seals when connected to pressure, absolute pressure or level transmitters, and with single-sided connection to differential pressure transmitters

	Nominal diameter/ design	Effective diaphragm diameter [in]	Temperature error of remote seal [inH ₂ O/25 °F]	Temperature error of capillary [inH ₂ O/25 °F/3 ft]	Temperature error of transmitter flange connection [inH ₂ O/25 °F]	Recommended values, min. spans (observe temperature error) [psi]
Flange to ANSI B16.5	2" flush flanged	2.32	1.69	2.04	2.04	7.5
	2" with extension	1.89	2.81	5.1	5.1	7.5
	3" flush flanged	3.5	0.23	0.21	0.21	1.5
	3" with extension	2.83	0.58	0.53	0.53	3.5
	4" flush flanged	3.5	0.23	0.21	0.21	1.5
	4" with extension	3.5	0.23	0.21	0.21	1.5
	5" flush flanged	4.88	0.12	0.07	0.07	0.3
	5" with extension	4.88	0.12	0.07	0.07	0.3
Flange to DIN 2501	DN 50 flush flanged	2.32	1.69	2.04	2.04	7.5
	DN 50 with extension	1.89	2.81	5.1	5.1	7.5
	DN 80 flush flanged	3.5	0.23	0.21	0.21	1.5
	DN 80 with extension	2.83	0.58	0.53	0.53	3.5
	DN 100 flush flanged	3.5	0.23	0.21	0.21	1.5
	DN 100 with extension	3.5	0.23	0.21	0.21	1.5
	DN 125 flush flanged	4.88	0.12	0.07	0.07	0.3
	DN 125 with extension	4.88	0.12	0.07	0.07	0.3
Sanitary Tri-Clamp	1 1/2"	1.26	9.51	35.73	35.73	60
	2"	1.57	3.93	7.67	7.67	30
	2 1/2"	2.32	1.69	2.57	2.57	7.5
	3"	2.83	0.58	0.53	0.53	3.5
	4"	3.5	0.23	0.21	0.21	1.5
Button Seal	1 NPT-male	0.98	13.97	81.7	81.7	90
	1 1/2 NPT-male	1.57	3.93	7.67	7.67	30
	2" NPT-male	2.05	2.23	2.57	2.57	7.5

Temperature errors of diaphragm seals (part 1)

Remarks:

- Values apply to fill fluid: silicone oil DC 200, high-temperature oil, halocarbon oil and Neobee M20.
- Values apply to stainless steel as the diaphragm material.

Temperature errors of diaphragm seals with double-sided connection to differential pressure transmitters

	Nominal diameter/ design	Effective diaphragm diameter [in]	Temperature error of remote seal [inH ₂ O/25 °F]	Temperature error of capillary [inH ₂ O/25 °F/3 ft]	Temperature error of transmitter flange connection [inH ₂ O/25 °F]	Recommended values, min. spans (observe tempera- ture error) [psi]
Flange to ANSI B16.5	2" flush flanged	2.32	0.384	0.42	0.42	3.5
	2" with extension	1.89	0.692	1.051	1.051	3.5
	3" flush flanged	3.5	0.077	0.042	0.042	1
	3" with extension	2.83	0.154	0.126	0.126	1.5
	4" flush flanged	3.5	0.077	0.042	0.042	1
	4" with extension	3.5	0.077	0.042	0.042	1
	5" flush flanged	4.88	0.038	0.017	0.017	0.3
	5" with extension	4.88	0.038	0.017	0.017	0.3
Flange to DIN 2501	DN 50 flush flanged	2.32	0.384	0.42	0.42	3.5
	DN 50 with extension	1.89	0.692	1.051	1.051	3.5
	DN 80 flush flanged	3.5	0.077	0.042	0.042	1
	DN 80 with extension	2.83	0.154	0.126	0.126	1.5
	DN 100 flush flanged	3.5	0.077	0.042	0.042	1
	DN 100 with extension	3.5	0.077	0.042	0.042	1
	DN 125 flush flanged	4.88	0.038	0.017	0.017	0.3
	DN 125 with extension	4.88	0.038	0.017	0.017	0.3
Sanitary Tri-Clamp	2"	1.57	0.961	1.849	1.849	30
	2 ½"	2.32	0.384	0.42	0.42	3.5
	3"	2.83	0.154	0.126	0.126	1.5
	4"	3.5	0.077	0.042	0.042	1

Temperature errors of diaphragm seals (part 2)

Remarks:

- Values apply to fill fluids: silicone oil DC 200, high-temperature oil, halocarbon oil and Neobee M20.
- Values apply to stainless steel as the diaphragm material.

Temperature errors of clamp-on seals when connected to pressure or absolute pressure transmitters, and with single-sided connection to differential pressure transmitters

Nominal diameter/design	Temperature error of remote seal [inH ₂ O/25 °F]	Temperature error of cap- illary [inH ₂ O/25 °F/3 ft]	Temperature error of transmitter flange con- nection [inH ₂ O/25 °F]	Recommended values, min. spans (observe tem- perature error) [psi]
1 inch	3.345	5.17	5.17	14.5
1 ½ inch	2.499	2.732	2.732	3.5
2 inch	2.23	1.849	1.849	1.5
3 inch	5.305	3.068	3.068	1.5
4 inch	0.461	1.849	1.849	1.5

Temperature errors of clamp-on seals with double-sided connection to differential pressure transmitters

Nominal diameter/design	Temperature error of remote seal [inH ₂ O/25 °F]	Temperature error of cap- illary [inH ₂ O/25 °F/3 ft]	Temperature error of transmitter flange con- nection [inH ₂ O/25 °F]	Recommended values, min. spans (observe tem- perature error) [psi]
1 inch	1.269	1.093	1.093	14.5
1 ½ inch	0.461	0.168	0.168	3.5
2 inch	0.154	0.084	0.084	1.5
3 inch	1.692	0.294	0.294	1.5
4 inch	0.577	0.084	0.084	1.5

Temperature errors of clamp-on seals

Remarks:

- Values apply to fill fluids: silicone oil DC 200, high-temperature oil, halocarbon oil and Neobee M20.
- Values apply to stainless steel as the diaphragm material.
- Diaphragm thickness: 1" & 1 ½" & 2": 0.002 inch
3" & 4": 0.004 inch

Pressure Measurement

Remote seals for transmitters and pressure gauges

Technical description

Calculation of temperature error for remote seals

The following equation is used to calculate the temperature error for remote seals:

$$dp = (t_{RS} - t_{Cal}) \cdot f_{RS} + (t_{Cap} - t_{Cal}) \cdot l_{Cap} \cdot f_{Cap} + (t_{TR} - t_{Cal}) \cdot f_{PF}$$

dp	Additional temperature error (inH ₂ O)
t _{RS}	Temperature on remote seal diaphragm (generally corresponds to temperature of medium)
t _{Cal}	Reference (calibration) temperature 68 °F
f _{RS}	Temperature error of remote seal (see tables on pages 1/424 and 1/425)
t _{Cap}	Ambient temperature on the capillaries
l _{Cap}	Capillary extension length (error given per 3 ft)
f _{Cap}	Temperature error of capillaries (see tables on pages 1/424 and 1/425)
t _{TR}	Ambient temperature on transmitter
f _{PF}	Temperature error of oil filling in process flanges of transmitter (see tables on pages 1/424 and 1/425)

Example of calculation of temperature error for remote seals

Existing conditions:

SITRANS P transmitter for differential pressure, 100 inH ₂ O, set to 0 to 40 inH ₂ O with 3 in flush flanged remote seal, diaphragm made of stainless steel, mat. No. 1.4535/316L	f _{RS} = 0.054 inH ₂ O/25 °F
Capillary 2 x 15 ft	l _{Cap} = 2 x 15 ft
Capillaries fitted on both sides	f _{Cap} = 0.042 inH ₂ O/25 °F/3 ft
Filled with silicone oil DC 200-10	f _{PF} = 0.042 inH ₂ O/25 °F
Temperature of medium 212 °F	t _{RS} = 212 °F
Temperature on capillaries 122 °F	t _{Cap} = 122 °F
Temperature on transmitter 122 °F	t _{TR} = 122 °F

Required:

Additional temperature error of remote seal: dp

Calculation:

$$dp = (212\text{ °F} - 68\text{ °F}) \cdot 0.077\text{ inH}_2\text{O}/25\text{ °F} + (122\text{ °F} - 68\text{ °F}) \cdot 15\text{ ft} \cdot 2 \cdot 0.042\text{ inH}_2\text{O}/25\text{ °F} / 3\text{ ft} + (122\text{ °F} - 68\text{ °F}) \cdot 0.042\text{ inH}_2\text{O}/25\text{ °F}$$

$$dp = 0.444\text{ inH}_2\text{O} + 0.907\text{ inH}_2\text{O} + 0.091\text{ inH}_2\text{O}$$

Result:

dp = 1.442 inH₂O (corresponds to 3.605 % of set span)

Note:

The temperature error determined above only applies to the error resulting from connection of the remote seal.

The transmission response of the respective transmitter is not included in this consideration. It must be calculated separately, and the resulting error added to the error determined above from connection of the remote seal.

Dependence of temperature error on diaphragm material

The errors listed in the tables on pages 1/424 and 1/425 refer to the use of stainless steel as the diaphragm material. If a different material is used, the listed values change by the amount shown in the following table.

Diaphragm material	Change in temperature error of remote seal
Stainless steel	Values as specified in tables on pages 1/424 and 1/425
Hastelloy C4, mat. No. 2.4610	Increase in values by 50%
Hastelloy C276, mat. No. 2.4819	Increase in values by 50%
Monel 400, mat. No. 2.4360	Increase in values by 60%
Tantalum	Increase in values by 50%
Titanium	Increase in values by 50%
Gold coating on stainless steel diaphragm	Increase in values by 40%

Response times (approximate)

The listed values are the response times (in seconds, per meter of capillary extension) for a change in pressure which corresponds to the set span.

The listed values must be multiplied by the respective length of the capillary extension, or with transmitters for differential pressure and flow by the total length of both capillary extensions.

The response times are independent of the set span within the range of the respective transmitter. The response times are of insignificant importance for spans above 145 psi (10 bar). The response time of the transmitter has not been considered.

Pressure Measurement

Remote seals for transmitters and pressure gauges

Technical description

1

Filling liquid	Density		Temperature on capillary		Response time in s/m (s/ft) with max. span of transmitter					
	kg/dm ³		°C	(°F)	250 mbar	(3.63 psi)	600 mbar	(8.7 psi)	1600 mbar	(23.2 psi)
Silicone oil DC 200-10	0.934	(0.033)	+60 +20 - 20	(140) (68) (-4)	0.06 0.11 0.3	(0.018) (0.034) (0.091)	0.02 0.02 0.12	(0.006) (0.006) (0.037)	0.01 0.02 0.05	(0.003) (0.006) (0.015)
Silicone oil DC 200-50	0.966	(0.035)	+60 +20 - 20	(140) (68) (-4)	0.6 0.61 1.69	(0.183) (0.186) (0.515)	0.25 0.26 0.71	(0.076) (0.079) (0.216)	0.09 0.1 0.27	(0.027) (0.030) (0.082)
Syltherm 800	0.935	(0.034)	+60 +20 - 20	(140) (68) (-4)	0.06 0.11 0.3	(0.018) (0.034) (0.091)	0.02 0.02 0.12	(0.006) (0.006) (0.37)	0.01 0.02 0.05	(0.003) (0.006) (0.015)
Silicone oil DC704	1.07	(0.039)	+60 +20 -10	(140) (68) (14)	0.14 0.65 3.96	(0.043) (0.198) (1.207)	0.06 0.27 1.65	(0.018) (0.082) (0.503)	0.02 0.1 0.62	(0.006) (0.030) (0.189)
Halocarbon oil	1.968	(0.071)	+60 +20 - 20	(140) (68) (68)	0.07 0.29 2.88	(0.021) (0.088) (0.878)	0.03 0.12 1.2	(0.009) (0.037) (0.366)	0.01 0.05 0.45	(0.003) (0.015) (0.137)
Fluorolube	1.866	(0.068)	+60 +20 - 20	(140) (68) (68)	0.07 0.29 2.88	(0.021) (0.088) (0.878)	0.03 0.12 1.2	(0.009) (0.037) (0.366)	0.01 0.05 0.45	(0.003) (0.015) (0.137)
Neobee M20	0.917	(0.033)	+60 +20 - 20	(140) (68) (68)	0.18 0.43 1.19	(0.055) (0.131) (0.363)	0.08 0.18 0.5	(0.024) (0.055) (0.152)	0.03 0.07 0.18	(0.009) (0.021) (0.055)
Glycerine/water	1.22	(0.044)	+60 +20 0	(140) (68) (32)	0.13 0.76 9.72	(0.040) (0.232) (2.963)	0.05 0.32 4.05	(0.015) (0.098) (12.34)	0.02 0.12 1.51	(0.006) (0.037) (0.460)

Technical specifications of filling liquid

When selecting the filling liquid, check that it is suitable with respect to the permissible temperature of the medium and the process pressure. Also check the compatibility with the measured medium. For example, only food grade filling liquids may be used in the food industry. A special case are oxygen and chlorine as the measured media; the fill fluid must not react with them, otherwise an explosion or fire may occur if there is a leak in the remote seal.

Filling liquid	Permissible temperature of medium				Density at 20 °C (68 °F)		Viscosity at 20 °C (68 °F)		Expansion coefficient	
	P _{abs} <1 bar	(P _{abs} <14.5 psi)	P _{abs} >1 bar	(P _{abs} >14.5 psi)	kg/dm ³	(lb/in ³)	m ² /s·10 ⁶	(ft ² /s·10 ⁶)	1/°C	(1/°F)
	°C	(°F)	°C	(°F)						
Silicone oil DC200-10	-40 to +121	(-40 to +248)	-40 to +200	(-40 to +392)	0.934	(0.03)	10	(107.6)	0.00108	(0.00060)
Silicone oil DC 200-50	-20 to +150	(-4 to +302)	-20 to +250	(-4 to +482)	0.96	(0.03)	50	(538)	0.00104	(0.00058)
Syltherm 800	-40 to +121	(-40 to +250)	-40 to +205	(-40 to +400)	0.935	(0.034)	10.03	(107.9)	0.00109	(0.00061)
Silicone oil DC704	-10 to +200	(+14 to +392)	-10 to +350	(+14 to +662)	1.07	(0.04)	39	(420)	0.0008	(0.00044)
Halocarbon oil	-40 to +80	(-40 to +176)	-40 to +175	(-40 to +347)	1.968	(0.07)	14	(151)	0.00086	(0.00048)
Fluorolube	Not possible	Not possible	-40 to +175	(-40 to +347)	1.866	(0.068)	15.5	(167)	0.000864	(0.00048)
Neobee M20	10 to +90	(+14 to +195)	-10 to +200	(+14 to +392)	0.917	(0.03)	9.8	(105)	0.00082	(0.00045)
Glycerine/water	Not possible	Not possible	-10 to +120	(+14 to +248)	1.22	(0.04)	88	(947)	0.0005	(0.00028)

Maximum temperature of medium

The following maximum temperatures of the medium apply depending on the wetted parts materials:

Material	p _{abs} < 1 bar (14.5 psi)		p _{abs} > 1 bar (14.5 psi)	
	°C	(°F)	°C	(°F)
Stainless steel, mat. No. 1.4571/316Ti	200	(392)	350	(662)
Hastelloy C4, mat. No. 2.4610	200	(392)	350	(662)
Hastelloy C276, mat. No. 2.4819	200	(392)	350	(662)
Monel 400, mat. No. 2.4360	200	(392)	350	(662)
Tantalum	200	(392)	300	(572)

Maximum capillary length (guidance values for diaphragm seals and inline seals)

Nominal diameter		Max. length of capillary			
		Diaphragm seal		Inline seal	
DN 25	(1 inch)	2.5 m	(8.2 ft)	2.5 m	(8.2 ft)
DN 32	(1¼ inch)	2.5 m	(4.9 ft)	2.5 m	(8.2 ft)
DN 40	(1½ inch)	4 m	(13.1 ft)	6 m	(19.7 ft)
DN 50	(2 inch)	6 m	(19.7 ft)	10 m	(32.8 ft)
DN 65	(2½ inch)	8 m	(26.2 ft)	10 m	(32.8 ft)
DN 80	(3 inch)	10 m	(32.8 ft)	10 m	(32.8 ft)
Size	4 inch		(30.0 ft)	–	
Size	5 inch		(30.0 ft)	–	

Pressure Measurement

Remote seals for transmitters and pressure gauges

Pancake type diaphragm seal with flexible capillary tube

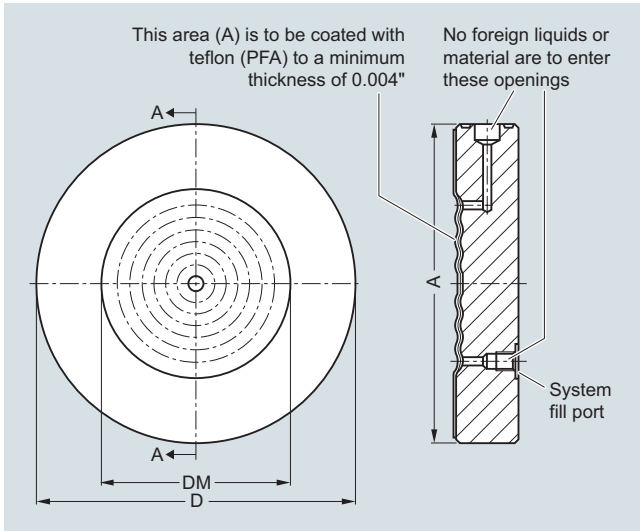
1

Overview



Pancake type diaphragm seal

Dimensions (Connection to ASME B16.5)



Pancake type diaphragm seal, dimensions

Size	Class	D	DM	F	A [in ²]
2"	150 - 2500	3.94	2.32	0.79	12.2
3"		5.28	3.50	0.79	21.9
4"		6.22	3.50	0.79	30.4
5"		7.32	4.80	0.87	42.1

Size = Nominal pipe size

DM = Effective diaphragm diameter

Class = Flange rating per ASME B16.5

All dimensions in inches unless otherwise noted

Selection and Ordering data

Pancake type diaphragm seal

with flexible capillary extension, connected to a SITRANS P transmitter (order separately)

for pressure 7MF40 ■■ or 7MF42 ■■

for absolute pressure 7MF43 ■■

for differential pressure 7MF44 ■■

• dual seals for DP

➔ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

- 2 inch class 150 ... 2500
- 3 inch class 150 ... 2500
- 4 inch class 150 ... 2500
- 5 inch class 150 ... 2500

Special design, customer information to be supplied

Materials and wetted parts

- SST 316L
- Monel 400, mat. No. 2.4360
- Hastelloy C276, mat. No. 2.4819
- Tantal

Special design, customer information to be supplied

Extension length (316SS standard)

Without extension (standard version)

Special design, customer information to be supplied for extension

System fill

- Silicone oil DC 200-10
- Silicone oil DC 200-50
- Halocarbon (for O₂-application)
- Silicone oil M5
- Syltherm 800
- DC704 silicone oil
- Fluorolube

Special design, customer inform. to be supplied

Length of capillary

- 3 ft
- 5 ft
- 10 ft
- 15 ft
- 20 ft
- 25 ft
- 30 ft

Special design, customer inform. to be supplied

Further designs

Please add „-Z“ to Article No. and specify Order code

for 7MF4800

Integrated flame path restriction

Certificate of calibration N.I.S.T. (20% steps)

Material conformance certificate

Vacuum service (must be specified with HT oil)

Calculation of span of transmitter (completed questionnaire to be attached)

for 7MF4801

Integrated flame path restriction

Certificate of calibration N.I.S.T. (20% steps)

Material conformance certificate

Calculation of span of transmitter (completed questionnaire to be attached)

for 7MF4803

Integrated flame path restriction

Certificate of calibration N.I.S.T. (20% steps)

Material conformance certificate

Vacuum service (must be specified with HT oil)

Calculation of span of transmitter (completed questionnaire to be attached)

Article No. Order code

7 M F 4 8 0 0 -

7 M F 4 8 0 1 -

7 M F 4 8 0 3 -

1 ■ ■ ■ ■ - ■ B ■ ■ ■

➔

E

H

L

N

Z

A

G

J

K

Z

0

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1

2

4

5

6

7

8

9

2

3

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6

7

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9

A 0 1

C 1 1

C 1 2

V 0 1

Y 0 5

A 0 1

C 1 1

C 1 2

Y 0 5

A 0 2

C 1 1

C 1 2

V 0 3

Y 0 5

Pressure Measurement

Remote seals for transmitters and pressure gauges

Flange-type diaphragm seal directly connected

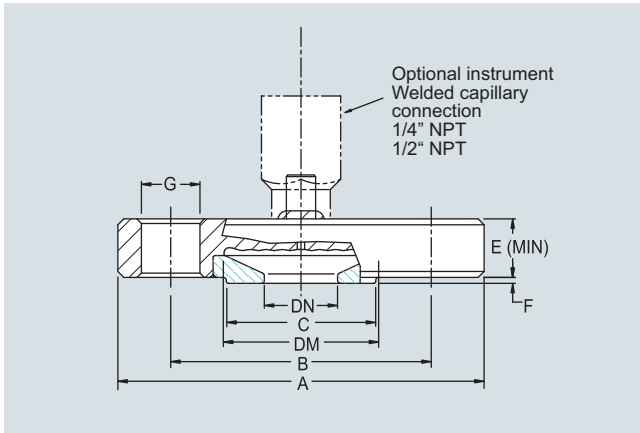
1

Overview

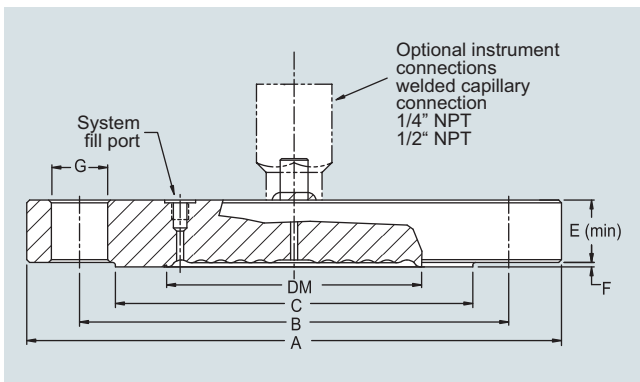


Flange-type diaphragm seal, without extension

Dimensions (connection to ASME B16.5)



Flange-type diaphragm seal without extension for flanges ≤ 1"



Flange-type diaphragm seal without extension for flanges ≥ 1.5"

Size DN	Class	A	B	C	DM	E	F	G	X	Weight lbs
1/2"	150	3.50	2.38	1.38	1.3	0.85	0.06	0.62	4	2.2
	300	3.75	2.62	1.38	1.6	0.85	0.06	0.62	4	2.2
3/4"	150	3.88	2.75	1.69	1.6	0.85	0.06	0.62	4	2.4
	300	4.62	3.25	1.69	1.6	0.85	0.06	0.75	4	3.5
1"	150	4.25	3.12	2.00	2.1	0.85	0.06	0.62	4	3.1
	300	4.88	3.50	2.00	2.1	0.85	0.06	0.75	4	3.7
1.5"	150	5.00	3.55	2.88	1.9	0.69	0.06	0.62	4	3.5
	300	6.12	4.50	2.88	1.9	0.81	0.06	0.88	4	5.5
	600	6.12	4.50	2.88	1.9	1.13	0.25	0.88	4	7.3
	1500	7.00	4.88	2.88	1.9	1.50	0.25	1.12	4	13.0
	2500	8.00	5.75	2.88	1.9	2.00	0.25	1.25	4	22.9
2"	150	6.00	4.75	3.62	2.4	0.75	0.06	0.75	4	5.9
	300	6.50	5.00	3.62	2.4	0.88	0.06	0.75	8	8.1
	600	6.50	5.00	3.62	2.4	1.25	0.25	0.75	8	12.5
	1500	8.50	6.50	3.62	2.4	1.75	0.25	1.00	8	29.0
	2500	9.25	6.75	3.62	2.4	2.25	0.25	1.12	8	43.6
3"	150	7.50	6.00	5.00	3.5	0.94	0.06	0.75	4	11.7
	300	8.25	6.62	5.00	3.5	1.12	0.06	0.88	8	17.2
	600	8.25	6.62	5.00	3.5	1.50	0.25	0.88	8	24.2
	900	9.50	7.50	5.00	3.5	1.75	0.25	1.00	8	36.7
	1500	10.53	8.00	5.00	3.5	2.13	0.25	1.25	8	53.9
4"	2500	12.01	9.00	5.00	3.5	2.87	0.25	1.38	8	93.9
	150	9.00	7.50	6.19	3.5	0.94	0.06	0.75	8	16.9
	300	10.04	7.88	6.19	3.5	1.25	0.06	0.88	8	27.9
	400	10.4	7.88	6.19	3.5	1.63	0.25	1.00	8	38.3
	600	10.83	8.50	6.19	3.5	1.75	0.25	1.00	8	47.3
	900	11.51	9.25	6.19	3.5	2.00	0.25	1.25	8	60.9
	1500	12.30	9.50	6.19	3.5	2.37	0.25	1.38	8	81.4
	2500	14.00	10.75	6.19	3.5	3.25	0.25	1.62	8	144.5

DN = Nominal pipe size

DM = Effective diaphragm diameter

Class = Flange rating per ASME B16.5

X = Number of bolt holes

All dimensions in inches unless otherwise noted

Flange-type diaphragm seal, without extension, dimensions

Pressure Measurement

Remote seals for transmitters and pressure gauges

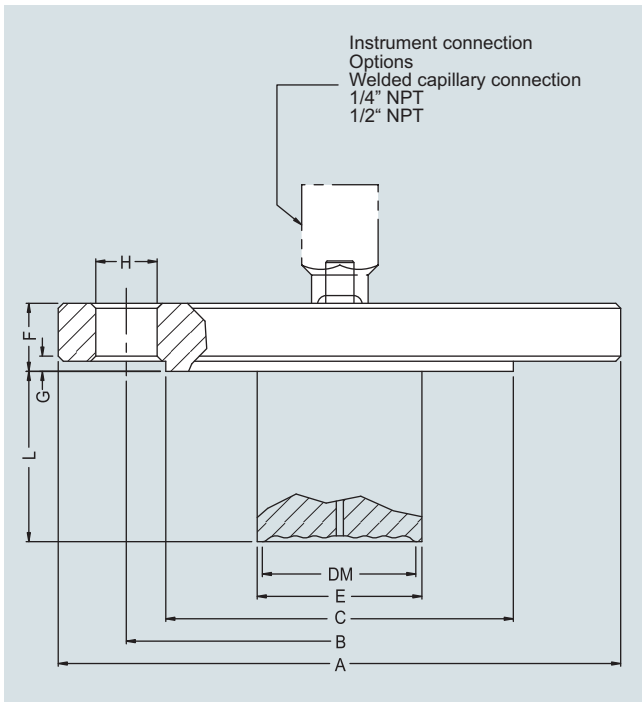
Flange-type diaphragm seal with extension

Overview



Flange-type diaphragm seal, with extension

Dimensions



Size DN	Class	A	B	C	DM	E ¹⁾	F	G	H	X	L			
2"	150	6.00	4.75	3.62	1.8	1.90	0.75		0.75	4				
	300	6.50	5.00				0.88		0.75	8				
3"	150	7.50	6.00	5.00	2.8	2.99	0.94	0.06	0.75	4	2.0	3.0	4.0	6.0
	300	8.25	6.62				1.12		0.88	8				
4"	150	9.00	7.50	6.19	3.5	3.70	0.94		0.75	8				
	300	10.04	7.88				1.25		0.88	8				

¹⁾ based on schedule 40

DN = Nominal pipe size

DM = Effective diaphragm diameter

Class = Flange rating per ASME B16.5

X = Number of bolt holes

All dimensions in inches unless otherwise noted

Flange-type diaphragm seal, with extension, dimensions

Selection and Ordering data

Article No. Order code

Flange-type diaphragm seal

directly connected to a
SITRANS P 7MF40 ■■ or 7MF42 ■■
(order separately)

➔ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Process connection

vertical (transmitter upright)
horizontal

Size and class

- 2 inch class 150
- 2 inch class 300
- 2 inch class 600
- 2 inch class 1500
- 3 inch class 150
- 3 inch class 300
- 3 inch class 600
- 4 inch class 150
- 4 inch class 300
- 4 inch class 400

Special design, customer information to be supplied

Materials and wetted parts

- SST 316L
- Monel 400, mat. No. 2.4360
- Hastelloy C276, mat. No. 2.4819
- Tantal

Special design, customer information to be supplied

Extension length (316SS standard)

Without extension (standard version)

- 2"
- 4"
- 6"
- 8"

Special design, customer information to be supplied for extension

System fill

- Silicone oil DC 200-10
- Silicone oil DC 200-50
- Halocarbon (for O₂-application)
- Silicone oil M5
- Syltherm 800
- DC704 silicone oil
- Fluorolube

Special design, customer information to be supplied

Further designs

Please add „-Z“ to Article No. and specify Order code

Integrated flame path restriction

Rotatable Flange

Certification of calibration N.I.S.T. (20% steps)

Material conformance certificate

Vacuum service (must be specified with HT oil)

Calculation of span of transmitter (completed questionnaire to be attached)

7 M F 4 8 1 0 -

0
2

L
M
N
P
Q
R
S
T
U
V
Z

J 1 Y

A
G
J
K
Z

K 1 Y

0
1
2
3
4
9

L 1 Y

1
2
4
5
6
7
8
9

M 1 Y

A 0 1

B 0 1

C 1 1

C 1 2

V 0 1

Y 0 5

Flange-type diaphragm seal with extension

Selection and Ordering data			Article No. Order code															
Mounting flange																		
directly mounted at SITRANS P for Level 7MF46 ■ ■ (order separately)			7 M F 4 8 1 2 -															
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			3 ■															

Selection and Ordering data			Article No.	Order code
Mounting flange at High-Side, Flange-Type Seal, w/o extension Flange-type seal via capillary extension on low-side without extension			7 M F 4 8 1 3 - 1	B
for SITRANS P for differential pressure 7MF44 (order separately)				
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.				
Flange	Size	Class		
ANSI B16.5	2 inch	150		
		300		
	3 inch	150		
		300		
	4 inch	150		
		300		
Special design, customer information to be supplied				
Materials and wetted parts				
<ul style="list-style-type: none"> SST 316L Monel 400, mat. No. 2.4360 Hastelloy C276, mat. No. 2.4819 Tantal 				
Special design, customer information to be supplied				
Extension length (316SS standard)				
Without extension (standard version, 0 mm)				
2"	50 mm			
4"	100 mm			
6"	150 mm			
8"	200 mm			
Special design, customer information to be supplied for extension				
System fill				
<ul style="list-style-type: none"> Silicone oil DC 200-10 Silicone oil DC 200-50 Halocarbon (for O₂-application) Silicone oil M5 Syltherm 800 DC704 silicone oil Fluorolube 				
Special design, customer information to be supplied				
Capillary length at low-side				
<ul style="list-style-type: none"> 3 ft 5 ft 10 ft 15 ft 20 ft 25 ft 30 ft 				
Special design, customer information to be supplied				
Further designs				
Please add „-Z“ to Article No. and specify Order code				
Integrated flame path restriction				A 0 2
Rotatable Flange				B 0 1
Certification of calibration N.I.S.T. (20% steps)				C 1 1
Material conformance certificate				C 1 2
Vacuum service (must be specified with HT oil)				V 0 4
Calculation of span of transmitter (completed questionnaire to be attached)				Y 0 5

Pressure Measurement

Remote seals for transmitters and pressure gauges

Diaphragm seal "flanged off-line low-pressure type", directly connected

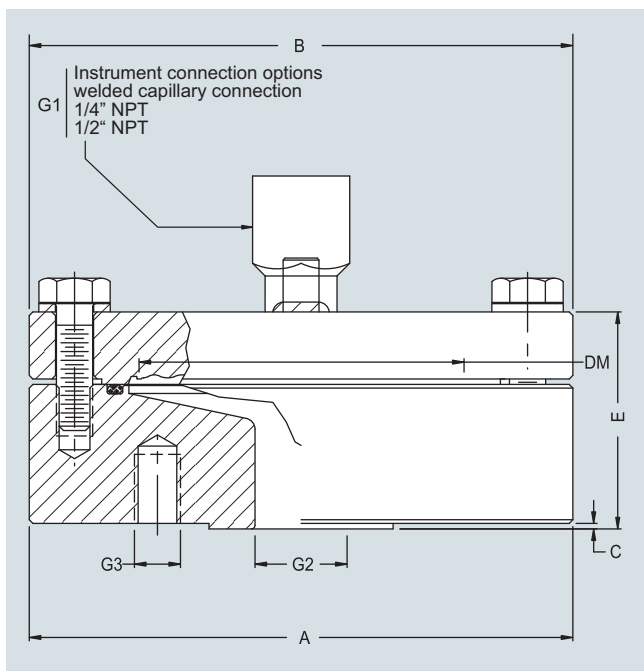
Overview



Diaphragm seal "flanges off-line low-pressure type"

DM = Effective diaphragm diameter
 G1 = Instrument connection
 G2 = Process connection
 G3 = Threaded bolt hole
 X = Number of bolt holes
 Class = Flange rating per ASME B16.5
 Size = Nominal pipe size
 All dimensions in inches unless otherwise noted

Dimensions (Connection to ASME B16.5)



G2		G3	X	A	B	C	DM	E
Size	Class							
1/2"	150#	1/2"-13UNC	4	5.91	5.91	0.06	3.5	2.36
1/2"	300#	1/2"-13UNC	4	5.91		0.06		2.36
1/2"	600#	1/2"-13UNC	4	5.91		0.25		2.55
3/4"	150#	1/2"-13UNC	4	5.91		0.06		2.36
3/4"	300#	5/8"-11UNC	4	5.91		0.06		2.36
3/4"	600#	5/8"-11UNC	4	5.91		0.25		2.55
1"	150#	1/2"-13UNC	4	5.91		0.06		2.36
1"	300#	5/8"-11UNC	4	5.91		0.06		2.36
1"	600#	5/8"-11UNC	4	5.91		0.25		2.55
1 1/2"	150#	1/2"-13UNC	4	5.91		0.06		2.36
1 1/2"	300#	3/4"-10UNC	4	6.12		0.06		2.46
1 1/2"	600#	3/4"-10UNC	4	6.12		0.25		2.65
2"	150#	5/8"-11UNC	4	6.00	6.50	0.06		2.36
2"	300#	5/8"-11UNC	8	6.50		0.06		2.36
2"	600#	5/8"-11UNC	8	6.50		0.25		2.55

[illegible]

Pressure Measurement

Remote seals for transmitters and pressure gauges

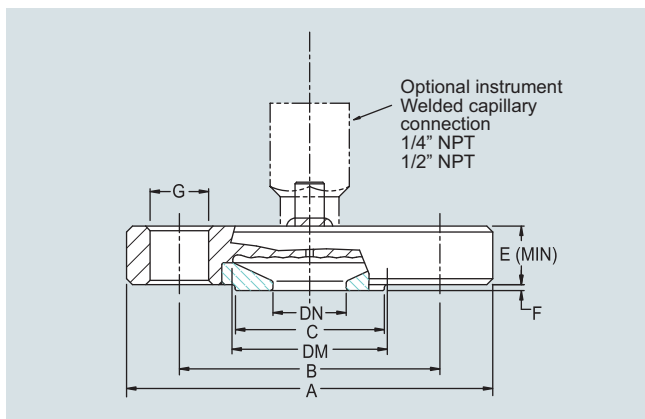
Flange-type diaphragm seal with flexible capillary tube

Overview

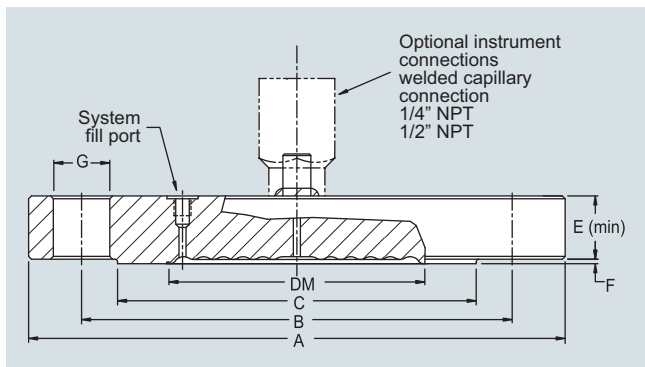


Flange-type diaphragm seal with flexible capillary extension

Dimensions (Connection to ASME B16.5)



Flange-type diaphragm seal for flanges ≤ 1"



Flange-type diaphragm seal for flanges ≥ 1.5"

Connection to ASME B16.5

Size DN	Class	A	B	C	DM	E	F	G	X	Weight lbs
1/2"	150	3.50	2.38	1.38	1.3	0.85	0.06	0.62	4	2.2
	300	3.75	2.62	1.38	1.6	0.85	0.06	0.62	4	2.2
3/4"	150	3.88	2.75	1.69	1.6	0.85	0.06	0.62	4	2.4
	300	4.62	3.25	1.69	1.6	0.85	0.06	0.75	4	3.5
1"	150	4.25	3.12	2.00	2.1	0.85	0.06	0.62	4	3.1
	300	4.88	3.50	2.00	2.1	0.85	0.06	0.75	4	3.7
1.5"	150	5.00	3.55	2.88	1.9	0.69	0.06	0.62	4	3.5
	300	6.12	4.50	2.88	1.9	0.81	0.06	0.88	4	5.5
	600	6.12	4.50	2.88	1.9	1.13	0.25	0.88	4	7.3
	1500	7.00	4.88	2.88	1.9	1.50	0.25	1.12	4	13.0
	2500	8.00	5.75	2.88	1.9	2.00	0.25	1.25	4	22.9
2"	150	6.00	4.75	3.62	2.4	0.75	0.06	0.75	4	5.9
	300	6.50	5.00	3.62	2.4	0.88	0.06	0.75	8	8.1
	600	6.50	5.00	3.62	2.4	1.25	0.25	0.75	8	12.5
	1500	8.50	6.50	3.62	2.4	1.75	0.25	1.00	8	29.0
	2500	9.25	6.75	3.62	2.4	2.25	0.25	1.12	8	43.6
3"	150	7.50	6.00	5.00	3.5	0.94	0.06	0.75	4	11.7
	300	8.25	6.62	5.00	3.5	1.12	0.06	0.88	8	17.2
	600	8.25	6.62	5.00	3.5	1.50	0.25	0.88	8	24.2
	900	9.50	7.50	5.00	3.5	1.75	0.25	1.00	8	36.7
	1500	10.53	8.00	5.00	3.5	2.13	0.25	1.25	8	53.9
4"	2500	12.01	9.00	5.00	3.5	2.87	0.25	1.38	8	93.9
	150	9.00	7.50	6.19	3.5	0.94	0.06	0.75	8	16.9
	300	10.04	7.88	6.19	3.5	1.25	0.06	0.88	8	27.9
	400	10.4	7.88	6.19	3.5	1.63	0.25	1.00	8	38.3
	600	10.83	8.50	6.19	3.5	1.75	0.25	1.00	8	47.3
	900	11.51	9.25	6.19	3.5	2.00	0.25	1.25	8	60.9
	1500	12.30	9.50	6.19	3.5	2.37	0.25	1.38	8	81.4
	2500	14.00	10.75	6.19	3.5	3.25	0.25	1.62	8	144.5

DN = Nominal pipe size

DM = Effective diaphragm diameter

Class = Flange rating per ASME B16.5

X = Number of bolt holes

All dimensions in inches unless otherwise noted

Selection and Ordering data	Article No.	Order code
Flange-type diaphragm seal		
with flexible capillary extension, connected to a SITRANS P transmitter (order separately)		
for pressure 7MF40 ■■ or 7MF42 ■■	7 M F 4 8 2 0 -	
for absolute pressure 7MF43 ■■	7 M F 4 8 2 1 -	
for differential pressure 7MF44 ■■	7 M F 4 8 2 3 -	
• dual seals for DP	1 ■■ ■■ - B ■■ ■■	
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Size and class		
• 2 inch class 150	L	
• 2 inch class 300	M	
• 2 inch class 600	N	
• 2 inch class 1500	P	
• 3 inch class 150	Q	
• 3 inch class 300	R	
• 3 inch class 600	S	
• 4 inch class 150	T	
• 4 inch class 300	U	
• 4 inch class 400	V	
• 5 inch class 150	W	
• 5 inch class 300	X	
• 5 inch class 400	Y	
Special design, customer information to be supplied	Z	J 1 Y
Materials and wetted parts		
• SST 316L	A	
• Monel 400, mat. No. 2.4360	G	
• Hastelloy C276, mat. No. 2.4819	J	
• Tantal	K	
Special design, customer information to be supplied	Z	K 1 Y
Extension length (316SS standard)		
Without extension (standard version)	0	
Special design, customer information to be supplied for extension	9	L 1 Y
System fill		
• Silicone oil DC 200-10	1	
• Silicone oil DC 200-50	2	
• Halocarbon (for O ₂ -application)	4	
• Silicone oil M5	5	
• Syltherm 800	6	
• DC704 silicone oil	7	
• Fluorolube	8	
Special design, customer information to be supplied	9	M 1 Y
Length of capillary		
• 3 ft	2	
• 5 ft	3	
• 10 ft	4	
• 15 ft	5	
• 20 ft	6	
• 25 ft	7	
• 30 ft	8	
Special design, customer information to be supplied	9	N 1 Y

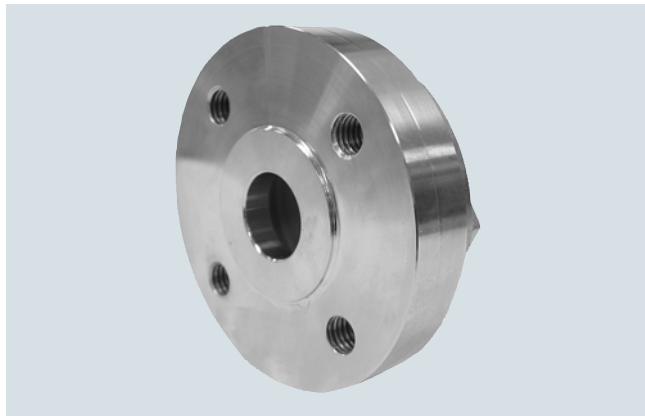
Selection and Ordering data	Order code
Further designs	
Please add „-Z“ to Article No. and specify Order code	
for 7MF4820	
Integrated flame path restriction	A 0 1
Rotatable Flange	B 0 1
DP "H" flange service	B 0 2
Certificate of calibration N.I.S.T. (20 % steps)	C 1 1
Material conformance certificate	C 1 2
Vacuum service (must be specified with HT oil)	V 0 1
Calculation of span of transmitter (completed questionnaire to be attached)	Y 0 5
for 7MF4821	
Integrated flame path restriction	A 0 1
Rotatable Flange	B 0 1
Certificate of calibration N.I.S.T. (20 % steps)	C 1 1
Material conformance certificate	C 1 2
Calculation of span of transmitter (completed questionnaire to be attached)	Y 0 5
for 7MF4823	
Integrated flame path restriction	A 0 2
Rotatable Flange	B 0 1
Certificate of calibration N.I.S.T. (20 % steps)	C 1 1
Material conformance certificate	C 1 2
Vacuum service (must be specified with HT oil)	V 0 3
Calculation of span of transmitter (completed questionnaire to be attached)	Y 0 5

Pressure Measurement

Remote seals for transmitters and pressure gauges

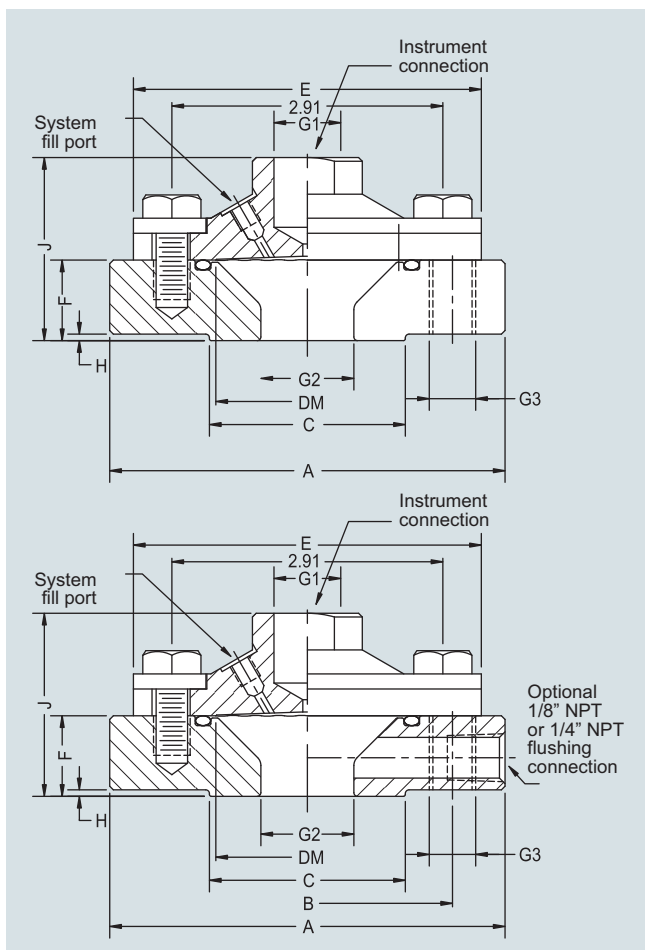
Diaphragm seal "flanged off-line type"

Overview



Diaphragm seal "flanged off-line type"

Dimensions (Connection to ASME B16.5)



G1	G2	G3	A	B	C	DM	E
1/4"-NPT or 1/2"-NPT	1/2" 150#	4 x 1/2"-13UNC	3.75	2.38	1.38	2.1	3.74
	1/2" 300#	4 x 1/2"-13UNC	3.75	2.62			
	1/2" 600#	4 x 1/2"-13UNC	3.75	2.62			
	1" 150#	4 x 1/2"-13UNC	4.25	3.12	2.00		
	1" 300#	4 x 5/8"-11UNC	4.88	3.50			
	1" 600#	4 x 5/8"-11UNC	4.88	3.50			
	1 1/2" 150#	4 x 1/2"-13UNC	5.00	3.88	2.88		
	1 1/2" 300#	4 x 3/4"-10UNC	6.12	4.50			
	1 1/2" 600#	4 x 3/4"-10UNC	6.12	4.50			
	2" 150#	4 x 5/8"-11UNC	6.00	4.75	3.62		
	2" 300#	8 x 0.75	6.50	5.00			
	2" 600#	8 x 0.75	6.50	5.00			

G1	G2	G3	F	H	J	Weight lbs
1/4"-NPT or 1/2"-NPT	1/2" 150#	4 x 1/2"-13UNC	1.10	0.06	2.20	4.3
	1/2" 300#	4 x 1/2"-13UNC	1.10	0.06	2.20	4.3
	1/2" 600#	4 x 1/2"-13UNC	1.26	0.25	2.36	4.4
	1" 150#	4 x 1/2"-13UNC	0.87	0.06	1.97	4.4
	1" 300#	4 x 5/8"-11UNC	0.87	0.06	1.97	8.5
	1" 600#	4 x 5/8"-11UNC	1.26	0.25	2.36	8.5
	1 1/2" 150#	4 x 1/2"-13UNC	0.87	0.06	1.97	5.0
	1 1/2" 300#	4 x 3/4"-10UNC	0.87	0.06	1.97	6.6
	1 1/2" 600#	4 x 3/4"-10UNC	1.26	0.25	2.36	9.1
	2" 150#	4 x 5/8"-11UNC	0.87	0.06	1.97	6.1
	2" 300#	8 x 0.75	0.89	0.06	1.99	8.5
	2" 600#	8 x 0.75	1.28	0.25	2.38	10.0

DM = Effective diaphragm diameter

G1 = Instrument connection

G2 = Process connection

G3 = Threaded bolt hole

All dimensions in inches unless otherwise noted

Diaphragm seal "flanged off-line type", dimensions

Pressure Measurement

Remote seals for transmitters and pressure gauges

Diaphragm seal "flanged off-line type"

1

Selection and Ordering data	Article No.	Order code	Selection and Ordering data	Article No.	Order code
Diaphragm seal "flanged off-line type" MAWP depends on flange with flexible armored capillary, 316 stainless steel upper housing SITRANS P for 7MF40 ■ ■ and 7MF42 ■ ■ (order separately) Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7 M F 4 8 2 6 -		Further designs Please add „-Z“ to Article No. and specify Order code		
Seal design Stud mount All-welded stud mount Through-hole flange mount	1 2 3		Integrated flame path restriction DP "H" flange service Certification of calibration N.I.S.T. (20 % steps) Material conformance certificate Vacuum service (must be specified with HT oil) Calculation of span of transmitter (completed questionnaire to be attached)	A 0 1 B 0 2 C 1 1 C 1 2 V 0 1 Y 0 5	
Size and class <ul style="list-style-type: none"> • ½ inch class 150#RF • ½ inch class 300#RF • ½ inch class 600#RF • ¾ inch class 150#RF • ¾ inch class 300#RF • ¾ inch class 600#RF • 1 inch class 150#RF • 1 inch class 300#RF • 1 inch class 600#RF • 1 ½ inch class 150#RF • 1 ½ inch class 300#RF • 1 ½ inch class 600#RF • 2 inch class 150#RF • 2 inch class 300#RF • 2 inch class 600#RF Special design, customer information to be supplied	A B C E F G J K L N P Q S T U Z	J 1 Y			
Materials and wetted parts <ul style="list-style-type: none"> • SST 316L • Monel 400, mat. No. 2.4360 • Hastelloy C276, mat. No. 2.4819 • Tantal Special design, customer information to be supplied	A G J K Z	K 1 Y			
Flushing port(s) None 1 x ¼"NPT-female (available w/ SS, HC or MO) 2 x ¼"NPT-female (available w/ SS, HC or MO) Special design, customer information to be supplied	0 2 4 9	L 1 Y			
System fill <ul style="list-style-type: none"> • Silicone oil DC 200-10 • Silicone oil DC 200-50 • Halocarbon (for O₂-application) • Silicone oil M5 • Syltherm 800 • DC704 silicone oil • Fluorolube Special design, customer information to be supplied	1 2 4 5 6 7 8 9	M 1 Y			
Length of capillary <ul style="list-style-type: none"> • Direct mount • 3 ft • 5 ft • 10 ft • 15 ft • 20 ft • 25 ft • 30 ft Special design, customer information to be supplied	0 2 3 4 5 6 7 8 9	N 1 Y			

Pressure Measurement

Remote seals for transmitters and pressure gauges

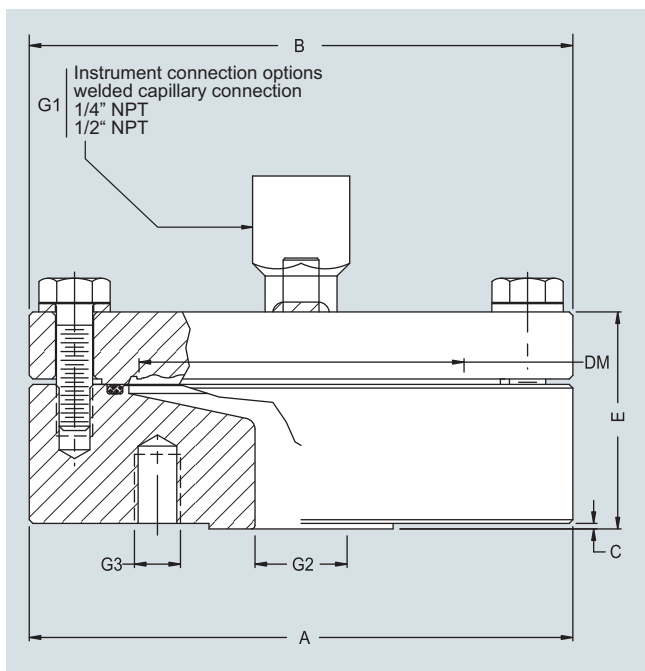
Diaphragm seal "flanged off-line low-pressure type"

Overview



Diaphragm seal "flanged off-line low-pressure type"

Dimensions (Connection to ASME B16.5)



G2		G3	X	A	B	C	DM	E
Size	Class							
1/2"	150#	1/2"-13UNC	4	5.91	5.91	0.06	3.5	2.36
1/2"	300#	1/2"-13UNC	4	5.91		0.06		2.36
1/2"	600#	1/2"-13UNC	4	5.91		0.25		2.55
3/4"	150#	1/2"-13UNC	4	5.91		0.06		2.36
3/4"	300#	5/8"-11UNC	4	5.91		0.06		2.36
3/4"	600#	5/8"-11UNC	4	5.91		0.25		2.55
1"	150#	1/2"-13UNC	4	5.91		0.06		2.36
1"	300#	5/8"-11UNC	4	5.91		0.06		2.36
1"	600#	5/8"-11UNC	4	5.91		0.25		2.55
1 1/2"	150#	1/2"-13UNC	4	5.91		0.06		2.36
1 1/2"	300#	3/4"-10UNC	4	6.12		0.06		2.46
1 1/2"	600#	3/4"-10UNC	4	6.12		0.25		2.65
2"	150#	5/8"-11UNC	4	6.00	6.50	0.06	3.5	2.36
2"	300#	5/8"-11UNC	8	6.50		0.06		2.36
2"	600#	5/8"-11UNC	8	6.50		0.25		2.55

DM = Effective diaphragm diameter

G2 = Process connection

G3 = Threaded bolt hole

X = Number of bolt holes

Class = Flange rating per ASME B16.5

Size = Nominal pipe size

All dimensions in inches unless otherwise noted

Diaphragm seal "flanged off-line low-pressure type", dimensions

Pressure Measurement

Remote seals for transmitters and pressure gauges

Diaphragm seal "flanged off-line low-pressure type"

Selection and Ordering data		Article No.		Order code	
Diaphragm seal "flanged off-line low-pressure type"					
with flexible armored capillary, 316 stainless steel upper housing SITRANS P for 7MF40 ■■ and 7MF42 ■■ (order separately)		7 M F 4 8 2 7 -			
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		1 ■■ ■■ - B ■■ ■■			
Size and class					
• ½ inch	class 150#RF	A			
• ½ inch	class 300#RF	B			
• ½ inch	class 600#RF	C			
• ¾ inch	class 150#RF	E			
• ¾ inch	class 300#RF	F			
• ¾ inch	class 600#RF	G			
• 1 inch	class 150#RF	J			
• 1 inch	class 300#RF	K			
• 1 inch	class 600#RF	L			
• 1 ½ inch	class 150#RF	N			
• 1 ½ inch	class 300#RF	P			
• 1 ½ inch	class 600#RF	Q			
• 2 inch	class 150#RF	S			
• 2 inch	class 300#RF	T			
• 2 inch	class 600#RF	U			
Special design, customer information to be supplied		Z		J 1 Y	
Materials and wetted parts					
• SST 316L		A			
• Monel 400, mat. No. 2.4360		G			
• Hastelloy C276, mat. No. 2.4819		J			
• Tantal		K			
Special design, customer information to be supplied		Z		K 1 Y	
Flushing port(s)					
None		0			
1 x ¼"NPT-female (available w/ SS, HC or MO)		2			
2 x ¼"NPT-female (available w/ SS, HC or MO)		4			
Special design, customer information to be supplied		9		L 1 Y	
System fill					
• Silicone oil DC 200-10		1			
• Silicone oil DC 200-50		2			
• Halocarbon (for O ₂ -application)		4			
• Silicone oil M5		5			
• Syltherm 800		6			
• DC704 silicone oil		7			
• Fluorolube		8			
Special design, customer information to be supplied		9		M 1 Y	
Length of capillary					
• Direct mount		0			
• 3 ft		2			
• 5 ft		3			
• 10 ft		4			
• 15 ft		5			
• 20 ft		6			
• 25 ft		7			
• 30 ft		8			
Special design, customer information to be supplied		9		N 1 Y	
Further designs					
Please add „-Z“ to Article No. and specify Order code					
Integrated flame path restriction		A 0 1			
DP "H" flange service		B 0 2			
Certification of calibration N.I.S.T. (20 % steps)		C 1 1			
Material conformance certificate		C 1 2			
Vacuum service (must be specified with HT oil)		V 0 1			
Calculation of span of transmitter (completed questionnaire to be attached)		Y 0 5			

Selection and Ordering data		Article No.		Order code	
Diaphragm seal "flanged off-line low-pressure type"					
with flexible armored capillary, 316 stainless steel upper housing SITRANS P for 7MF44 ■■ (order separately)		7 M F 4 8 2 8 -			
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		1 ■■ ■■ - B ■■ ■■			
Size and class					
• ½ inch	class 150#RF	A			
• ½ inch	class 300#RF	B			
• ½ inch	class 600#RF	C			
• ¾ inch	class 150#RF	E			
• ¾ inch	class 300#RF	F			
• ¾ inch	class 600#RF	G			
• 1 inch	class 150#RF	J			
• 1 inch	class 300#RF	K			
• 1 inch	class 600#RF	L			
• 1 ½ inch	class 150#RF	N			
• 1 ½ inch	class 300#RF	P			
• 1 ½ inch	class 600#RF	Q			
• 2 inch	class 150#RF	S			
• 2 inch	class 300#RF	T			
• 2 inch	class 600#RF	U			
Special design, customer information to be supplied		Z		J 1 Y	
Materials and wetted parts					
• SST 316L		A			
• Monel 400, mat. No. 2.4360		G			
• Hastelloy C276, mat. No. 2.4819		J			
• Tantal		K			
Special design, customer information to be supplied		Z		K 1 Y	
Flushing port(s)					
None		0			
1 x ¼"NPT-female (available w/ SS, HC or MO)		2			
2 x ¼"NPT-female (available w/ SS, HC or MO)		4			
Special design, customer information to be supplied		9		L 1 Y	
System fill					
• Silicone oil DC 200-10		1			
• Silicone oil DC 200-50		2			
• Halocarbon (for O ₂ -application)		4			
• Silicone oil M5		5			
• Syltherm 800		6			
• DC704 silicone oil		7			
• Fluorolube		8			
Special design, customer information to be supplied		9		M 1 Y	
Length of capillary					
• 3 ft		2			
• 5 ft		3			
• 10 ft		4			
• 15 ft		5			
• 20 ft		6			
• 25 ft		7			
• 30 ft		8			
Special design, customer information to be supplied		9		N 1 Y	
Further designs					
Please add „-Z“ to Article No. and specify Order code					
Integrated flame path restriction				A 0 2	
Certification of calibration N.I.S.T. (20 % steps)				C 1 1	
Material conformance certificate				C 1 2	
Vacuum service (must be specified with HT oil)				V 0 1	
Calculation of span of transmitter (completed questionnaire to be attached)				Y 0 5	

Pressure Measurement

Remote seals for transmitters and pressure gauges

Flushing rings

Overview



Flushing ring

Flushing rings are required for flange-mounted and pancake type remote seals (Article No. 7MF4800 ... 7MF4823) if the danger exists that the process conditions and the geometry of the connection could cause the process to form deposits or blockages.

The flushing ring is clamped between the process flange and the remote seal.

Deposits can be flushed away from the diaphragm through the holes in the side, or the pressure volume can be vented. Different nominal diameters and forms permit adaptation to the respective process flange.

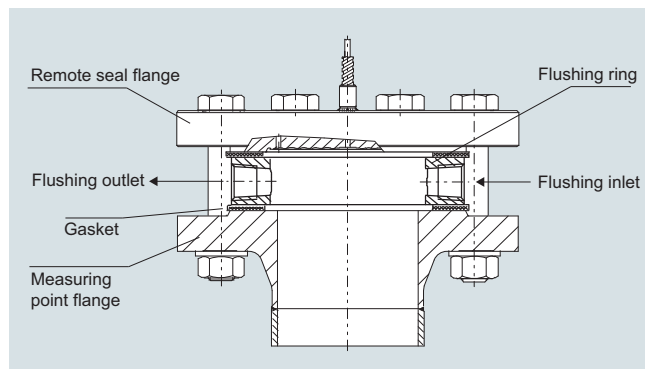
Process connection

For flanges to EN and ASME:
DN 50, 80, 100, 125; PN 16 ... 100 or
DN 2 inch, 3 inch, 4 inch, 5 inch; Class 150 ... 600

Standard design

Material: CrNi-Stahl, mat. No. 1.4404/316L
Sealing faces and flushing holes: See Ordering data

Design



Installation example

Technical specifications

Flushing ring for remote seals of pancake and flange design

Nom. diam.	Nom. press.
• DN 50	PN 16 ... PN 100
• DN 80	PN 16 ... PN 100
• DN 100	PN 16 ... PN 100
• DN 125	PN 16 ... PN 100
• 2 inch	Class 150 ... class 600
• 3 inch	Class 150 ... class 600
• 4 inch	Class 150 ... class 600
• 5 inch	Class 150 ... class 600
Sealing face	
• To EN 1092-1	Form B1 Form B2 Form D/Form D Form C/Form C Form C/Form C Form E Form F
• To ASME B16.5	RF 125 ... 250 AA RFSF RJT ring groove

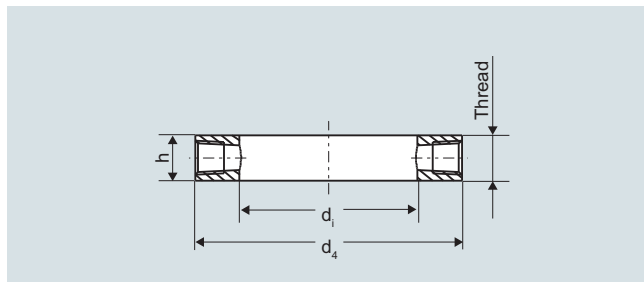
Flushing holes (2 off), female thread:

- G $\frac{1}{4}$
- G $\frac{1}{2}$
- $\frac{1}{4}$ -18 NPT
- $\frac{1}{2}$ -14 NPT

Material

Stainless steel 1.4404/316L

Dimensional drawings



Connection to EN 1092-1

DN	PN	d ₄	d _i	h	Weight
(mm)	(bar)	(mm)	(mm)	(mm)	(kg)
50	16 ... 100	102	62	30	1.10
80	16 ... 100	138	92	30	1.90
100	16 ... 100	162	92	30	3.15
125	16 ... 100	188	126	30	3.50

Connection to ASME B 16.5

DN	Class	d ₄		d _i		h		Weight	
inch		mm	(inch)	mm	(inch)	mm	(inch)	kg	(lb)
2	150 ... 600	92	(3.62)	62	(2.44)	30	(1.18)	0.60	(1.32)
3	150 ... 600	127	(5)	92	(3.62)	30	(1.18)	1.05	(2.31)
4	150 ... 600	157	(6.18)	92	(3.62)	30	(1.18)	2.85	(6.28)
5	150 ... 600	185.5	(7.3)	126	(4.96)	30	(1.18)	3.30	(7.28)

Flushing ring, dimension drawing

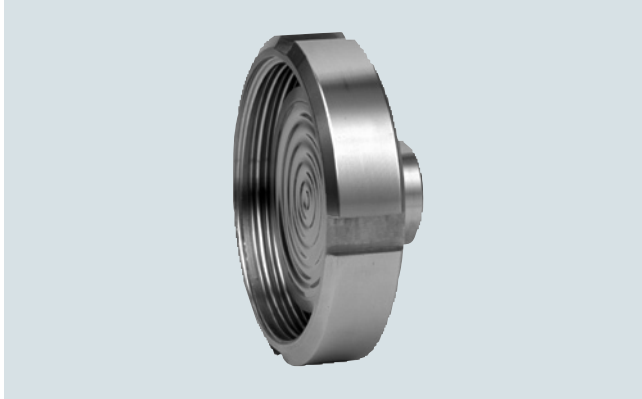
Selection and Ordering data		Article No. Ord. code	
Flushing ring		7 M F 4 8 2 5 -	
for remote seals 7MF4900 to 7MF4923		1	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Nom. diam.	Nom. press.		
• 2 inch	Class 150 ... 600	G	
• 3 inch	Class 150 ... 600	H	
• 4 inch	Class 150 ... 600	J	
• 5 inch	Class 150 ... 600	K	
Other version		Z	J 1 Y
Add Order code and plain text: Nominal diameter: ...; Nominal pressure: ...			
Sealing face			
• ASME B16.5			
- RF 125 ... 250 AA		M	
- RFSF		Q	
- RJT ring groove		R	
Other version		Z	K 1 Y
Add Order code and plain text: Sealing face: ...			
Flushing holes (2 off)			
• Female thread G $\frac{1}{4}$		1	
• Female thread G $\frac{1}{2}$		2	
• Female thread $\frac{1}{4}$ -18 NPT		3	
• Female thread $\frac{1}{2}$ -14 NPT		4	
Material			
• Stainless steel 316L		0	
Other version		9	M 1 Y
Add Order code and plain text: Material: ...			
Further designs			
Please add „-Z“ to Article No. and specify Order code			
Acceptance test certificate B			
to EN 10204, section 3.1.B		C 1 2	

Pressure Measurement

Remote seals for transmitters and pressure gauges

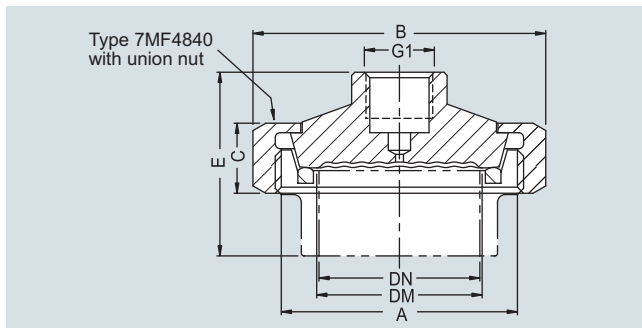
Diaphragm seal with quick connection

Overview



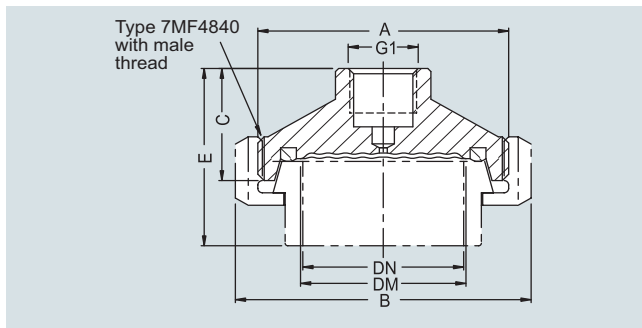
Diaphragm seal with quick connection, with slotted union nut

Dimensions (connection to ASME B16.5)



DN [mm]	MAWP [psi]	A [mm]	B	C	DM	E	G1	Weight [lbs]
25	600	Rd 52 x 1/6	2.48	0.83	1.0	2.36	1/4"-NPT or 1/2"-NPT female	1.3
32	600	Rd 58 x 1/6	2.76	0.83	1.3	2.72		1.6
40	600	Rd 65 x 1/6	3.07	0.83	1.6	2.17		2.5
50	360	Rd 78 x 1/6	3.62	0.87	2.1	2.32		2.8

Diaphragm seal with quick connection, with slotted union nut

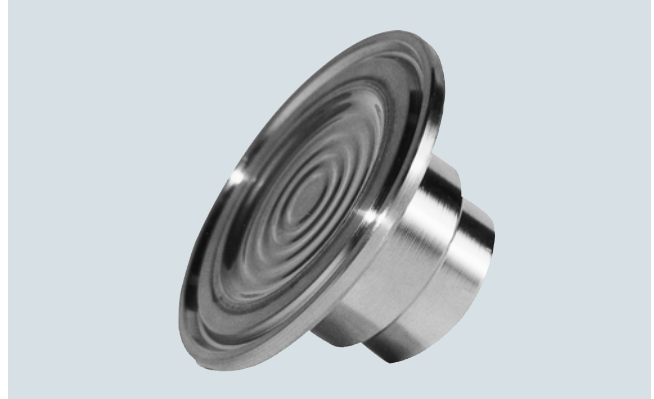


DN [mm]	MAWP [psi]	A [mm]	B	C	DM	E	G1	Weight [lbs]
40	600	Rd 65 x 1/6	3.07	1.12	1.6	2.17	1/4"-NPT or 1/2"-NPT female	2.8
50	360	Rd 78 x 1/6	3.62	1.42	2.1	2.24		3.0

DM = Effective diaphragm diameter
MAWP = Maximum Working Pressure @ 250 °F
G1 = Instrument connection
DN = Nominal pipe size
All dimensions in inches unless otherwise noted

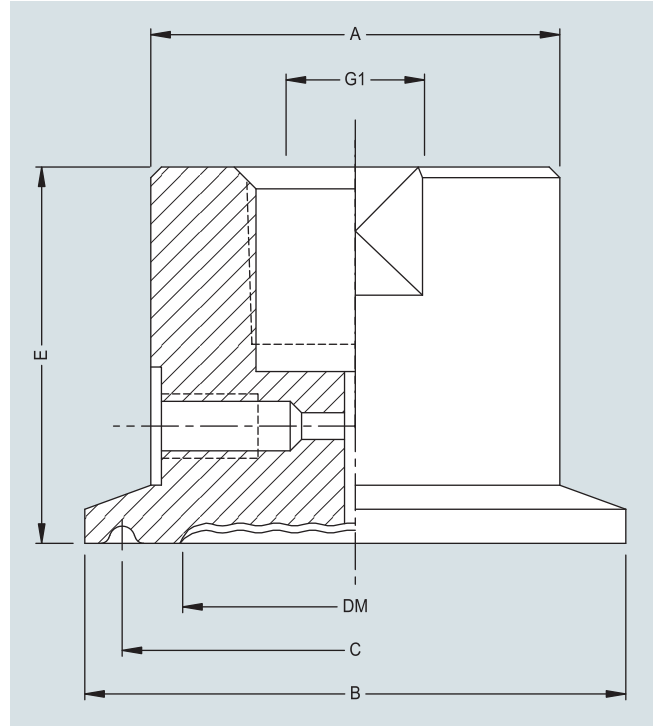
Diaphragm seal with quick connection, with male thread, dimensions

Overview



Diaphragm seal with quick connection, Tri-Clamp connection

Dimensions (connection to ASME B16.5)

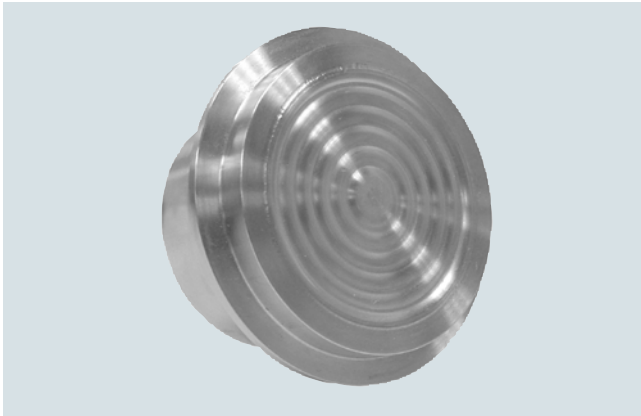


Size [in]	MAWP [psi]	A	B	C	DM	E	G1	Weight [lbs]
1.5	600	1.50	1.97	1.71	1.0	1.38	1/4"-NPT or 1/2"-NPT female	1.3
2	550	1.50	2.52	2.22	1.6			1.7
2.5	450	2.52	3.05	2.78	2.0			2.0
3	350	2.31	3.58	3.28	2.8			2.4
4	250	2.31	4.68	4.34	3.5			2.7

DM = Effective diaphragm diameter
MAWP = Maximum Working Pressure @ 250 °F, higher rating with appropriate clamping device
G1 = Instrument connection
Size = Nominal pipe size
All dimensions in inches unless otherwise noted

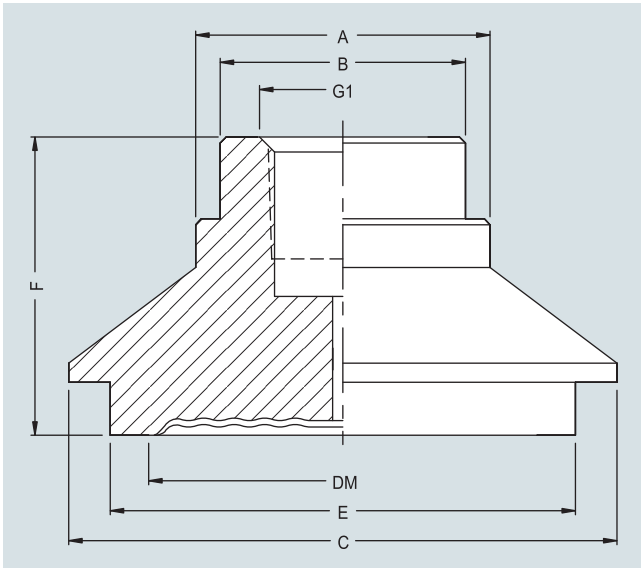
Diaphragm seal with quick connection, Tri-Clamp connection, dimensions

Overview



Diaphragm seal with quick connection, "i"-line (Cherry Burrel - male)

Dimensions (connection to ASME B16.5)



Size [in]	MAWP [psi]	A	B	C	DM	E	F	G1	Weight [lbs]
1.5	500	1.42	1.18	2.00	1.3	1.74	1.38	¼"-NPT	1.3
2	450		1.18	2.64	1.8	2.24	1.44	or ½"-NPT	1.7
3	350		1.30	3.87	2.8	3.30	1.59	female	2.4

DM = Effective diaphragm diameter
MAWP = Maximum Working Pressure @ 250 °F, higher rating with appropriate clamping device
G1 = Instrument connection
Size = Nominal pipe size
All dimensions in inches unless otherwise noted

Diaphragm seal with quick connection, "i"-line (Cherry Burrel - male), dimensions

Selection and Ordering data

Article No. Order code

Diaphragm seal

with quick connection for gage pressure transmitter SITRANS P 7MF40 ■■ and 7MF42 ■■ (order separately) made of 316 SS

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

7 M F 4 8 4 0 -

■ A 0 ■ - ■ B ■■

Process connection

DIN 11 851 with slotted union nut

DN 25/PN 40

DN 32/PN 40

DN 40/PN 40

DN 50/PN 25

DN 65/PN 25

DN 80/PN 25

1 B

1 C

1 D

1 E

1 F

1 G

DIN 11 851 with screw necks

DN 25/PN 40

DN 32/PN 40

DN 40/PN 40

DN 50/PN 25

DN 65/PN 25

DN 80/PN 25

2 B

2 C

2 D

2 E

2 F

2 G

Tri-Clamp Connection

1 ½" 600 psi

2" 550 psi

2 ½" 450 psi

3" 350 psi

Varivent (Tuchenhagen)

Size 25132

Size 40150

Sanitary (4" Tank Spud)

2" extension

6" extension

"I"-Line (Cherry Burrell - male)

1 ½" 500 psi

2" 450 psi

3" 350 psi

Special design, customer information to be supplied

4 L

4 M

4 N

4 P

5 C

5 E

6 B

6 D

5 U

5 V

5 W

9 Z

H 1 Y

+ J 1 Y

System fill

- Vegetable oil
- Glycerin/Water 86.5/13.5 %
- Neobee M20
- Mineral oil

Special design, customer information to be supplied

1

2

3

4

9

M 1 Y

Length of capillary

- Direct Mount
- 3 ft
- 5 ft
- 10 ft
- 15 ft
- 20 ft
- 25 ft
- 30 ft

Special design, customer information to be supplied

0

2

3

4

5

6

7

8

9

N 1 Y

Further designs

Please add „Z“ to Article No. and specify Order code

Certification of calibration N.I.S.T. (20 % steps)

C 1 1

Material conformance certificate

C 1 2

Vacuum service (must be specified with vegetable oil)

V 0 1

Calculation of span of transmitter (completed questionnaire to be attached)

Y 0 5

Tank Spud accessories

Sanitary Tank Spud Clamp (1 pc.)

P 1 0

Sanitary Tank Spud O-ring (1 pc.)

P 1 1

Sanitary Tank Spud Weldolet 2" extension (1 pc.)

P 1 2

Sanitary Tank Spud Weldolet 6" extension (1 pc.)

P 1 3

Pressure Measurement

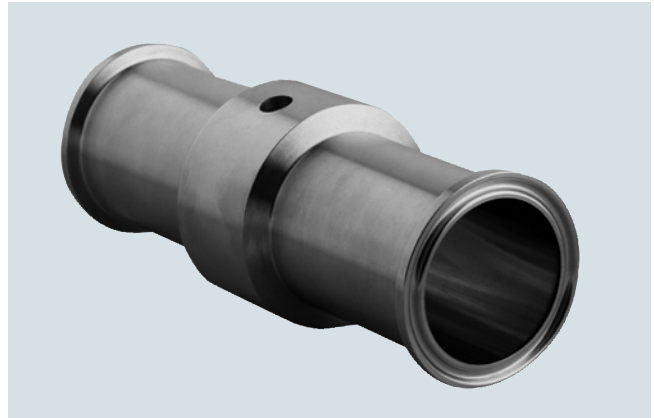
Remote seals for transmitters and pressure gauges

Inline diaphragm seal with quick connection

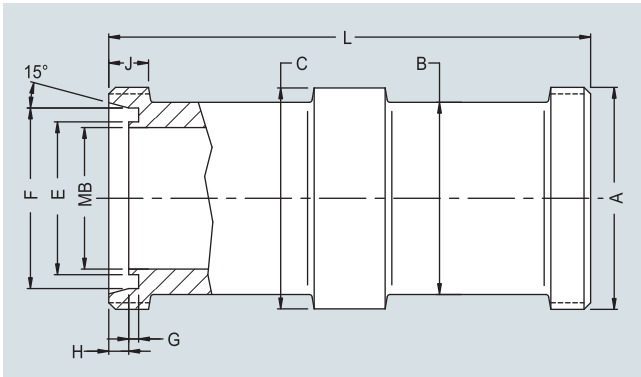
1

Overview

Inline diaphragm seal with quick connector, DIN 11851 with thread

Overview

Inline diaphragm seal with quick connection, Tri-clamp

Dimensions (connection to ASME B16.5)

DN [mm]	MAWP [psi]	A	B	C	E	G	H	J	L	MB
15	600	Rd34x1/8	1.10	1.57	0.71	0.12	0.16	0.47	4.1	0.63
25	600	Rd52x1/6	1.50	2.05	1.18	0.14	0.28	0.55	5.0	1.02
40	600	Rd65x1/6	2.17	2.56	1.65	0.14	0.28	0.55	6.3	1.50
50	360	Rd78x1/6	2.68	3.07	2.13	0.14	0.28	0.55	6.7	1.97
65	360	Rd95x1/6	3.35	3.74	2.80	0.14	0.31	0.63	7.2	2.60
80	360	Rd110x1/4	4.33	4.33	3.35	0.14	0.31	0.79	7.2	3.19
100	360	Rd130x1/4	5.12	5.12	4.09	0.16	0.39	0.79	7.2	3.94

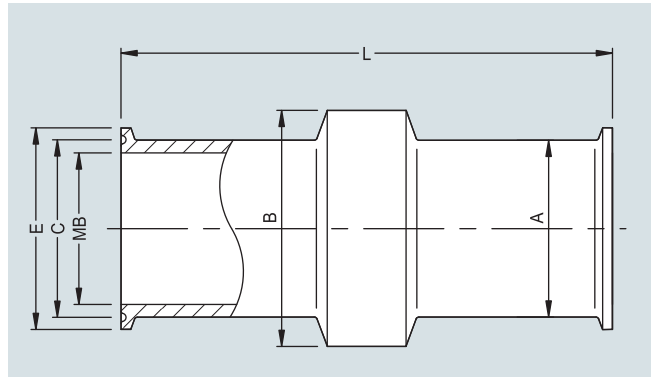
MB = Internal diameter

MAWP = Maximum Working Pressure @ 250 °F, higher rating with appropriate clamping device

DN = Nominal pipe size

All dimensions in inches unless otherwise noted

Inline diaphragm seal with quick connector, DIN 11851 with thread, dimensions

Dimensions (connection to ASME B16.5)

Size	MAWP [psi]	A	B	C	E	L	MB
¾"	600	0.7	1.34	0.8	0.98	3.8	0.6
1"	600	1.4	1.97	1.7	1.97	4.5	1.0
1.5"	600	1.7	1.97	1.7	1.97	5.7	1.5
2"	550	2.2	2.50	2.2	2.50	6.1	1.9
2.5"	450	2.7	3.10	2.8	3.10	6.1	2.4
3"	350	3.2	3.60	3.3	3.60	6.1	2.9
3.5"	350	3.7	4.20	3.8	4.20	6.1	3.3
4"	250	4.3	4.70	4.3	4.70	6.1	3.8

MB = Internal diameter

MAWP = Maximum Working Pressure @ 250 °F, higher rating with appropriate clamping device

Size = Nominal pipe size

All dimensions in inches unless otherwise noted

Inline diaphragm seal with quick connection, Tri-clamp, dimensions

Pressure Measurement

Remote seals for transmitters and pressure gauges

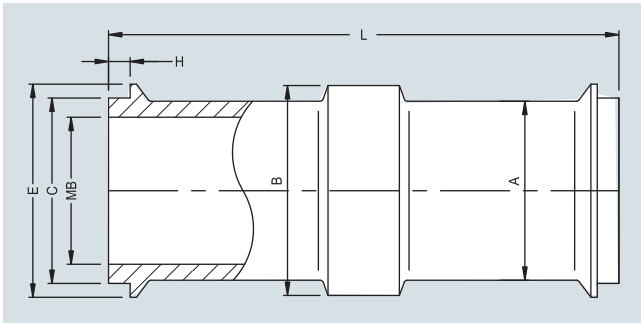
Inline diaphragm seal with quick connection

Overview



Inline diaphragm seal with quick connection, "I"-Line (Cherry Burrell - male/male)

Dimensions (connection to ASME B16.5)



Size	MAWP [psi]	A	B	C	E	H	L	MB
1.5"	500	1.68	1.97	1.74	2.00	0.203	4.79	1.38
2"	450	2.25	2.50	2.24	2.64	0.258	5.54	1.88
2.5"	350	2.75	3.10	2.74	3.31	0.312	6.38	2.37

MB = Internal diameter

MAWP = Maximum Working Pressure @ 250 °F, higher rating with appropriate clamping device

Size = Nominal pipe size

All dimensions in inches unless otherwise noted

Inline diaphragm seal with quick connection, "I"-Line (Cherry Burrell - male/male), dimensions

Selection and Ordering data

Inline diaphragm seal

with quick connection for transmitter
SITRANS P for 7MF40 ■■ and 7MF42 ■■
(order separately) made of 316 SS

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Process connection

DIN 11 851 with thread [C]

DN 25/PN 40

DN 40/PN 40

DN 50/PN 25

DN 65/PN 25

DN 80/PN 25

DN100/PN 25

Tri-Clamp Connection

1" 600 psi

1 ½" 600 psi

2" 550 psi

2 ½" 450 psi

3" 350 psi

"I"-Line (Cherry Burrell - male/male)

1" 500 psi

1 ½" 500 psi

2" 450 psi

3" 350 psi

Special design, customer information to be supplied

System fill

- Vegetable oil
- Glycerin/Water 86.5/13.5 %
- Neobee M20
- Mineral oil

Special design, customer information to be supplied

Length of capillary

- Direct mount
- 3 ft
- 5 ft
- 10 ft
- 15 ft
- 20 ft
- 25 ft
- 30 ft

Special design, customer information to be supplied

Further designs

Please add „-Z“ to Article No. and specify Order code

Certification of calibration N.I.S.T. (20 % steps)

Material conformance certificate

Vacuum service (must be specified with vegetable oil)

Calculation of span of transmitter (completed questionnaire to be attached)

Article No. Order code

7 M F 4 8 5 0 -

■ A 0 ■ - ■ B ■ ■ ■ ■

2 B

2 D

2 E

2 F

2 G

2 H

4 K

4 L

4 M

4 N

4 P

5 R

5 U

5 V

5 W

9 Z

H 1 Y

+ J 1 Y

1

2

3

4

9

M 1 Y

0

2

3

4

5

6

7

8

9

N 1 Y

C 1 1

C 1 2

V 0 3

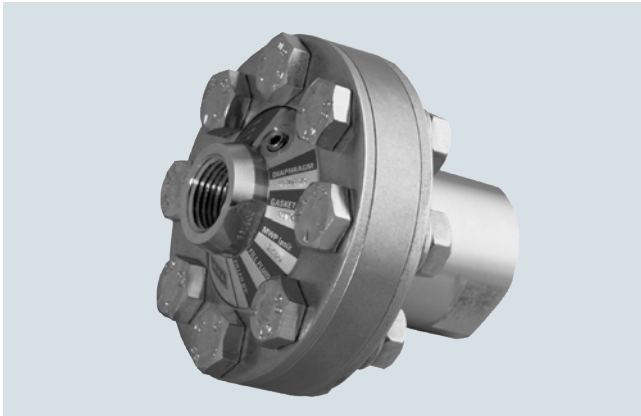
Y 0 5

Pressure Measurement

Remote seals for transmitters and pressure gauges

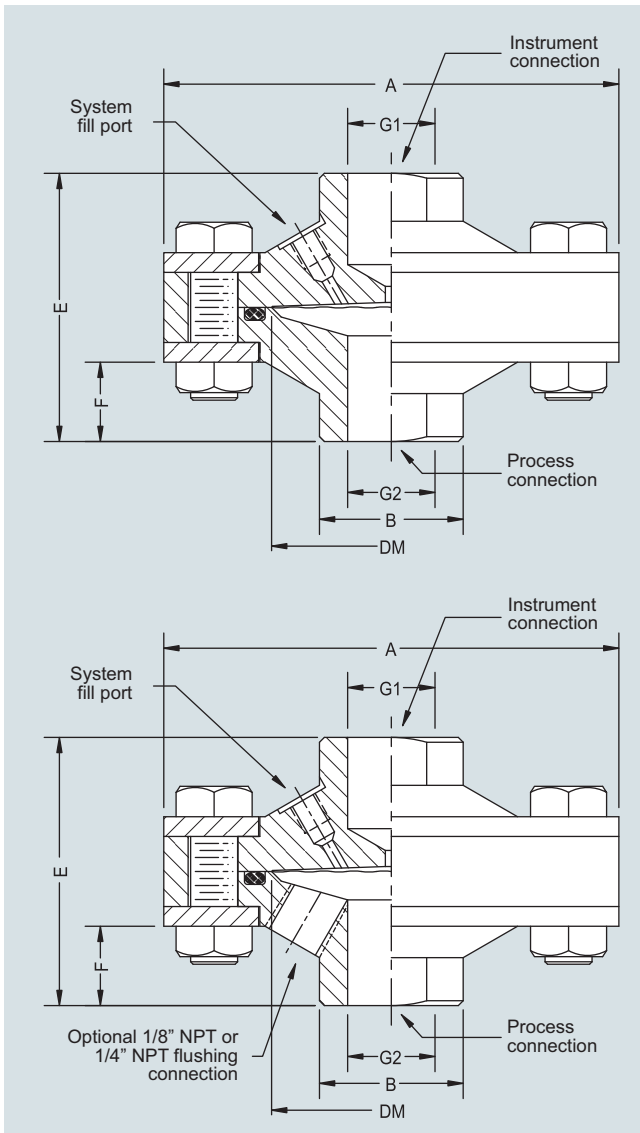
Diaphragm seal "threaded design"

Overview



Diaphragm seal "threaded design"

Dimensions (Connection to ASME B16.5)



G1	G2	A	B	DM	E	F	Weight [lbs]
1/4"-NPT or 1/2"-NPT	1/4"-NPT or 1/2"-NPT	3.74	1.18	2.1	2.20	0.63	3.0
	3/4"-NPT		1.41	2.1	2.36	0.79	3.4
	1"-NPT		1.77	2.1	3.46	1.89	3.6

G1 = Instrument connection, G2 = Process connection

DM = Effective diaphragm diameter

All dimensions in inches unless otherwise noted

Diaphragm seal "threaded design"

Selection and Ordering data

Article No. Order code

Diaphragm seal "threaded design"
MAWP 3675 psi

with flexible armored capillary, 316 stainless steel upper housing SITRANS P for 7MF40 and 7MF42 pressure (order separately)

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

7 M F 4 8 6 1 -

1 - B

Size and class

- 1/4"NPT-female
- 1/2"NPT-female
- 3/4"NPT-female
- 1"NPT-female

Special design, customer information to be supplied

Materials and wetted parts

- SST 316L
- SST 316L with Hastelloy C276 diaphragm
- SST 316L with PFA coated diaphragm (good upto 500 °F)
- Monel 400, mat. No. 2.4360
- Hastelloy C276, mat. No. 2.4819
- Hastelloy C276 lower housing with Tantalum diaphragm

Special design, customer inform. to be supplied

Flushing port(s)

- None
- 1 x 1/4"NPT-female
- 2 x 1/4"NPT-female

Special design, customer inform. to be supplied

System fill

- Silicone oil DC 200-10
- Silicone oil DC 200-50
- Halocarbon (for O₂-application)
- Silicone oil M5
- Syltherm 800
- DC704 silicone oil
- Fluorolube

Special design, customer inform. to be supplied

Length of capillary

- Direct mount
- 3 ft
- 5 ft
- 10 ft
- 15 ft
- 20 ft
- 25 ft
- 30 ft

Special design, customer inform. to be supplied

Further designs

Please add „Z“ to Article No. and specify Order code

Integrated flame path restriction
DP "H" flange service
Certification of calibration N.I.S.T. (20 % steps)
Material conformance certificate
Vacuum service (must be specified with HT oil)
Calculation of span of transmitter (completed questionnaire to be attached)

A
B
C
D
Z

A
F
D
G
J
K
Z

0
2
4
9

1
2
4
5
6
7
8
9

0
2
3
4
5
6
7
8
9

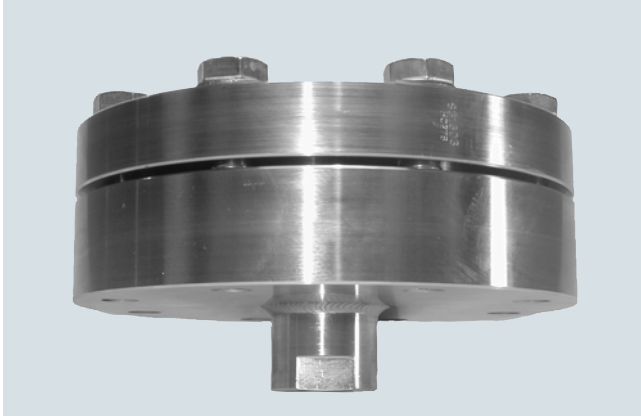
A 0 1
B 0 2
C 1 1
C 1 2
V 0 1
Y 0 5

Pressure Measurement

Remote seals for transmitters and pressure gauges

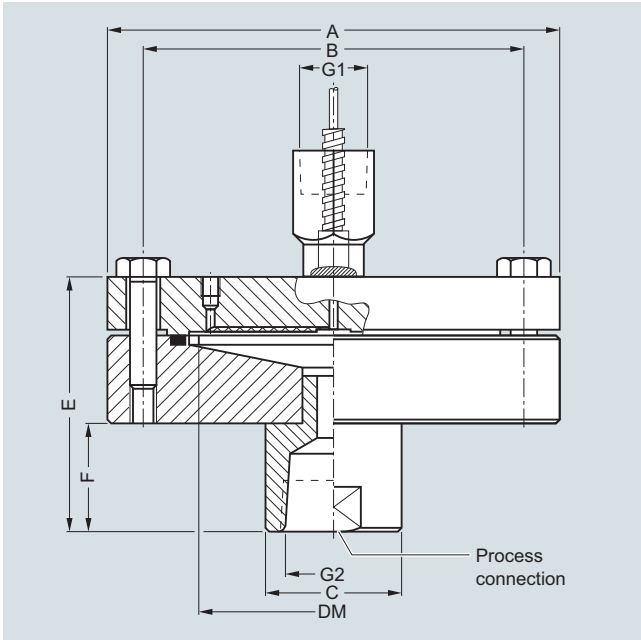
Diaphragm seal "threaded, low-pressure design"

Overview



Diaphragm seal "threaded, low-pressure design"

Dimensions (Connection to ASME B16.5)



Diaphragm seal "threaded, low-pressure design, dimensions

G1	G2	A	B	C	DM	E	F	Weight [lbs]
1/4"-NPT	1/4"-NPT	5.91	4.92	1.25	3.5	3.00	0.90	14.0
or 1/2"-NPT	1/2"-NPT			1.25		3.00	0.90	14.0
	3/4"-NPT			1.38		3.20	1.10	14.2
	1"-NPT			1.75		3.50	1.40	14.5

G1 = Instrument connection

G2 = Process connection

DM = Effective diaphragm diameter

All dimensions in inches unless otherwise noted

Selection and Ordering data

Article No. Order code

Diaphragm seal "threaded, low-pressure design" MAWP 1,500 psi

with flexible armored capillary, 316 stainless steel upper housing SITRANS P for 7MF40 and 7MF42 pressure (order separately)

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

7 M F 4 8 6 2 -

1 B

Size and class

- 1/4"NPT-female
- 1/2"NPT-female
- 3/4"NPT-female
- 1"NPT-female

Special design, customer information to be supplied

A
B
C
D
Z J 1 Y

Materials and wetted parts

- SST 316L
- SST 316L with Hastelloy C276 diaphragm
- SST 316L with PFA coated diaphragm
- Monel 400, mat. No. 2.4360
- Hastelloy C276, mat. No. 2.4819
- Hastelloy C276 lower housing with Tantalum diaphragm

Special design, customer information to be supplied

A
F
D
G
J
K
Z K 1 Y

Flushing port(s)

- None
- 1 x 1/4"NPT-female
- 2 x 1/4"NPT-female

Special design, customer information to be supplied

0
2
4
9 L 1 Y

System fill

- Silicone oil DC 200-10
- Silicone oil DC 200-50
- Halocarbon (for O₂-application)
- Silicone oil M5
- Syltherm 800
- DC704 silicone oil
- Fluorolube

Special design, customer information to be supplied

1
2
4
5
6
7
8
9 M 1 Y

Length of capillary

- Direct mount
- 3 ft
- 5 ft
- 10 ft
- 15 ft
- 20 ft
- 25 ft
- 30 ft

Special design, customer information to be supplied

0
2
3
4
5
6
7
8
9 N 1 Y

Further designs

Please add „-Z“ to Article No. and specify Order code

Integrated flame path restriction

Certification of calibration N.I.S.T. (20 % steps)

Material conformance certificate

Vacuum service (must be specified with HT oil)

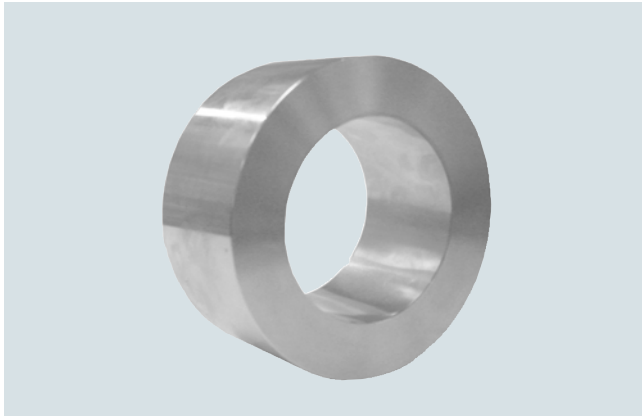
Calculation of span of transmitter (completed questionnaire to be attached)

A 0 1
C 1 1
C 1 2
V 0 1
Y 0 5

Selection and Ordering data	Article No.	Order code
Diaphragm seal "threaded, low-pressure design" MAWP 1,500 psi with flexible armored capillary, 316 stainless steel upper housing SITRANS P for 7MF44 (order separately) Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7 M F 4 8 6 3 - 1	B
Size and class <ul style="list-style-type: none"> • ¼"NPT-female • ½"NPT-female • ¾"NPT-female • 1"NPT-female Special design, customer information to be supplied	A B C D Z	J 1 Y
Materials and wetted parts <ul style="list-style-type: none"> • SST 316L • SST 316L with Hastelloy C276 diaphragm • SST 316L with PFA coated diaphragm (good upto 500 °F) • Monel 400, mat. No. 2.4360 • Hastelloy C276, mat. No. 2.4819 • Hastelloy C276 lower housing with Tantalum diaphragm Special design, customer information to be supplied	A F D G J K Z	K 1 Y
Flushing port(s) None 1 x ¼"NPT-female 2 x ¼"NPT-female Special design, customer information to be supplied	0 2 4 9	L 1 Y
System fill <ul style="list-style-type: none"> • Silicone oil DC 200-10 • Silicone oil DC 200-50 • Halocarbon (for O₂-application) • Silicone oil M5 • Syltherm 800 • DC704 silicone oil • Fluorolube Special design, customer information to be supplied	1 2 4 5 6 7 8 9	M 1 Y
Length of capillary <ul style="list-style-type: none"> • 3 ft • 5 ft • 10 ft • 15 ft • 20 ft • 25 ft • 30 ft Special design, customer information to be supplied	2 3 4 5 6 7 8 9	N 1 Y
Further designs Please add „-Z“ to Article No. and specify Order code		
Integrated flame path restriction		A 0 2
Certification of calibration N.I.S.T. (20 % steps)		C 1 1
Material conformance certificate		C 1 2
Vacuum service (must be specified with HT oil)		V 0 3
Calculation of span of transmitter (completed questionnaire to be attached)		Y 0 5

Remote seals for transmitters and pressure gauges

Overview



Inline diaphragm seal, wafer for pressure

Optional instruments connections
welded capillary connection
1/4" NPT
1/2" NPT

The drawing shows a front view (left) and a side view (right) of the MB 1000 pressure transmitter. The front view includes a central process connection and two side ports. Dimensions are indicated: 'L' for the total width, 'A' for the total height, and 'MB' for the distance from the bottom flange to the center of the process connection. The side view shows the profile of the device with a central capillary connection.

Size	Class	A	MB	L	Weight [lbs]
1"	150# - 2500#	2.4	1.12	2.36	3.1
1.5"		3.3	1.69		4.8
2"		3.7	2.15		5.5
3"		5.1	3.25		8.8
4"		5.9	4.21		10.3
5"		7.3	5.20		15.0
6"		8.5	6.26		20.9

MB = Effective internal diameter
Class = Flange rating per ASME B16.5
Size = Nominal pipe size
All dimensions in inches unless otherwise noted

Inline diaphragm seal, wafer for pressure, dimensions

Article No. Order code

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

- 1 inch class 150 to 2500
- 1 ½ inch class 150 to 2500
- 2 inch class 150 to 2500
- 3 inch class 150 to 2500
- 4 inch class 150 to 2500

Special design, customer information to be supplied

- SST 316L
- SST 316L with PFA-Coating
(good up to 500 °F)
- Monel 400, mat. No. 2.4360
- Hastelloy C276, mat. No. 2.4819
- Tantal

Special design, customer information to be supplied

- Silicone oil DC 200-10
- Silicone oil DC 200-50
- Halocarbon (for O₂-application)
- Silicone oil M5
- DC704 silicone oil
- Fluorolube

Special design, customer information to be supplied

- Direct mount
- 3 ft
- 5 ft
- 10 ft
- 15 ft
- 20 ft
- 25 ft
- 30 ft

Special design, customer information to be supplied

Please add „-Z“ to Article No. and specify
Order code

Integrated flame path restriction
Certification of calibration N.I.S.T. (20 % steps)
Material conformance certificate
Vacuum service (must be specified with HT oil)
Calculation of span of transmitter (completed
questionnaire to be attached)

[illegible]

Selection and Ordering data	Article No.	Order code
Inline diaphragm seals wafer assembled to		
SITRANS P for 7MF44 (order separately)	7 M F 4 8 8 3 -	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	1 0 - B	
Size and class		
• 1 inch class 150 to 2500	L	
• 1 ½ inch class 150 to 2500	M	
• 2 inch class 150 to 2500	N	
• 3 inch class 150 to 2500	P	
• 4 inch class 150 to 2500	Q	
Special design, customer information to be supplied	Z	J 1 Y
Materials and wetted parts		
• SST 316L	A	
• SST 316L with PFA-Coating (good up to 500 °F)	D	
• Monel 400, mat. No. 2.4360	G	
• Hastelloy C276, mat. No. 2.4819	J	
• Tantal	K	
Special design, customer information to be supplied	Z	K 1 Y
System fill		
• Silicone oil DC 200-10	1	
• Silicone oil DC 200-50	2	
• Halocarbon (for O ₂ -application)	4	
• Silicone oil M5	5	
• DC704 silicone oil	7	
• Fluorolube	8	
Special design, customer information to be supplied	9	M 1 Y
Length of capillary		
• 3 ft	2	
• 5 ft	3	
• 10 ft	4	
• 15 ft	5	
• 20 ft	6	
• 25 ft	7	
• 30 ft	8	
Special design, customer information to be supplied	9	N 1 Y
Further designs		
Please add „-Z“ to Article No. and specify Order code		
Integrated flame path restriction		A 0 2
Certification of calibration N.I.S.T. (20 % steps)		C 1 1
Material conformance certificate		C 1 2
Vacuum service (must be specified with HT oil)		V 0 3
Calculation of span of transmitter (completed questionnaire to be attached)		Y 0 5

Pressure Measurement

Remote seals for transmitters and pressure gauges

Diaphragm seal, saddle

Overview



Diaphragm seal, saddle

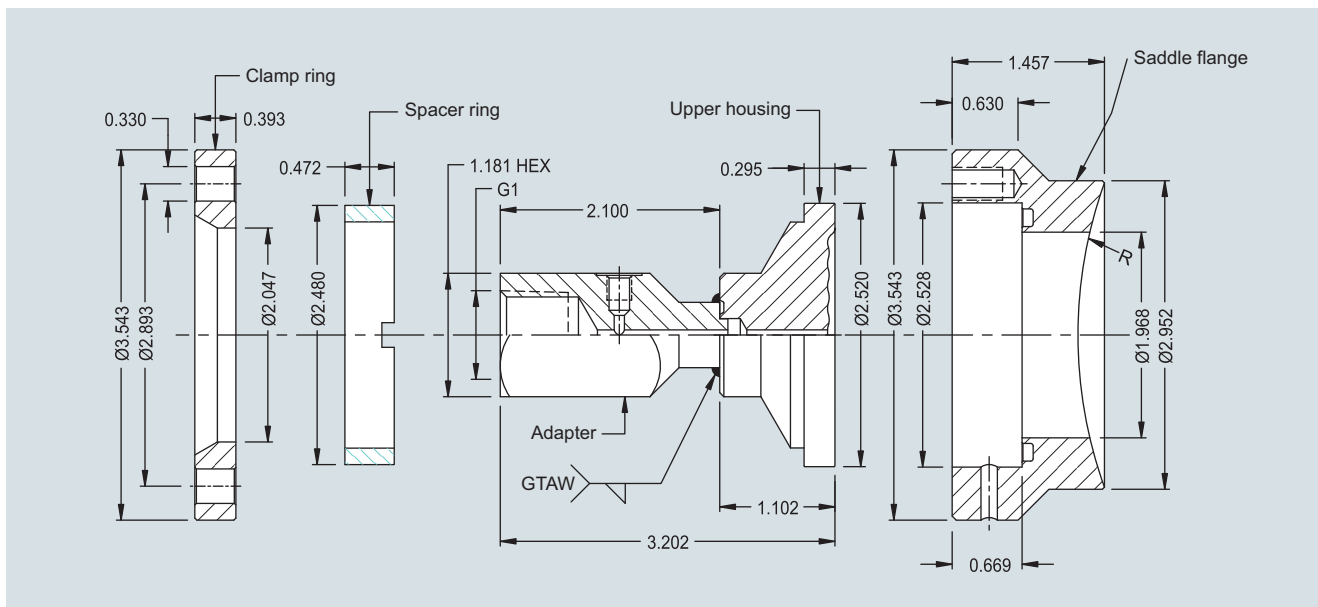
Dimensions (Connection to ASME B16.5)

Radius R	To fit Pipe size	Pipe O.D.	G1
1.49	2.5	3.00	¼"-NPT or ½"-NPT female
1.77	3.0	3.50	
2.24	4.0	4.50	
2.76	5.0	5.50	
3.35	6.0	6.63	
4.311	8.0	8.625	
5.374	10.0	10.75	
6.378	12.0	12.75	
7.0	14.0	14.75	

G1 = Instrument connection

All dimensions in inches unless otherwise noted

Diaphragm seal, saddle, dimensions



Selection and Ordering data	Article No.	Order code
Diaphragm seal, saddle, MAWP 1,500 psi with flexible armored capillary or direct mount, 316 stainless steel upper housing and assembly hardware SITRANS P for 7MF40 ■ ■ or 7MF42 ■ ■ (order separately) ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7 M F 4 8 9 0 - 1 ■ ■ ■ ■ - ■ B ■ ■ ■ ■	
Nominal pipe size • Not applicable (Retrofit for existing 7MF48 ■ ■) • 2.5" • 3" • 4" • 5" • 6" • 8" • Retrofit 3" Conoflow (6 bolt pattern) • Retrofit 3" M&G style (8 bolt pattern) • Retrofit 4" Conoflow (6 bolt pattern) • Retrofit 4" M&G style (8 bolt pattern) Special design, customer information to be supplied	N A B C D E G P Q R S Z	J 1 Y
Diaphragm material • SST 316L • SST 316L with PFA coated diaphragm (good upto 500 °F) • Monel 400, mat. No. 2.4360 • Hastelloy C276, mat. No. 2.4819 • Tantal Special design, customer information to be supplied	A D G J K Z	K 1 Y
Saddle Material None (Retrofit order) Carbon steel, Ni plated SST 316L Hastelloy C276, mat. No. 2.4819 Special design, customer information to be supplied	0 1 2 4 9	L 1 Y
System fill • Silicone oil DC 200-10 • Silicone oil DC 200-50 • Halocarbon (for O ₂ -application) • Silicone oil M5 • DC704 silicone oil • Fluorolube Special design, customer information to be supplied	1 2 4 5 7 8 9	M 1 Y
Length of capillary • Direct mount • 3 ft • 5 ft • 10 ft • 15 ft • 20 ft • 25 ft • 30 ft Special design, customer information to be supplied	0 2 3 4 5 6 7 8 9	N 1 Y
Further designs Please add „-Z“ to Article No. and specify Order code		
Integrated flame path restriction		A 0 1
Certification of calibration N.I.S.T. (20 % steps)		C 1 1
Material conformance certificate		C 1 2
Vacuum service (must be specified with HT oil)		V 0 1
Calculation of span of transmitter (completed questionnaire to be attached)		Y 0 5

Pressure Measurement

Remote seals for transmitters and pressure gauges

1

Measuring setups

Measuring setups

The following pages show examples of typical measuring setups for use of SITRANS P transmitters with and without remote seals, such as:

- Setups for transmitters with connection of remote seals, with associated equations for calculation.
- [Questionnaires](#)
Checking of combination between transmitter and remote seal
- Setups for transmitters without remote seals, with associated equations for calculation
- [Questionnaires](#)
For hydrostatic level measurements

Installation

Remote seals of pancake design are fitted between the connection flange of the measuring point and a blind flange. Remote seals of flanged design are fitted directly on the connection flange of the measuring point. The respective pressure rating of the blind flange or the flanged remote seal must be observed. The transmitter should always be installed below the connection flange, and below the lower connection flange in the case of differential pressure transmitters. When measuring at pressures above atmospheric, the transmitter can also be installed above the connection flange. When measuring at pressures below atmospheric, the transmitter must always be installed below the connection flange, and below the lower connection flange in the case of differential pressure transmitters.

Offset of measuring range

If there is a difference in height between the two connection flanges when measuring with two remote seals, an additional differential pressure results from the oil filling of the remote seal capillaries. This results in an offset of the actual measuring range and must be taken into account when adjusting the transmitter. An offset in the measuring range also occurs when combining a remote seal with a transmitter if the latter is not installed at the same height as the former.

Transmitter output

If the level, separation layer or density increase in closed vessels, the differential pressure and the output signal of the transmitter also increase. If an inverted relationship is desired between the differential pressure and the output signal, the start-of-scale and full-scale values of the SITRANS P must be interchanged.

With open vessels, an increasing pressure is usually assigned to an increasing level, separation layer or density.

Influence of ambient temperature

The capillaries between the remote seal and the transmitter should be kept as short as possible to obtain the good transmission response. Temperature differences between the individual capillaries or between the individual remote seals should be avoided.

If the complete setup is exposed to temperature variations, errors result from the thermal expansion of the filling liquid in the capillaries, in the remote seals and in the connection units of the transmitters.

Notes

- When measuring separation layers, ensure that the layer is positioned between the two spigots. Also ensure that the level in the vessel is always above the top spigot.
- When measuring density, make sure that the level of the medium remains constant. The level is usually above the top spigot.

Possible combinations of transmitter and remote seal

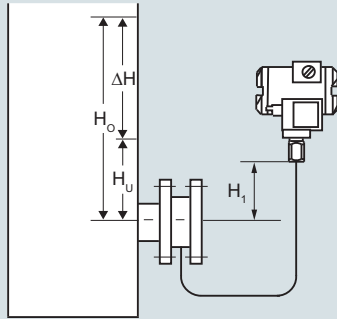
Installation type	Transmitter	Remote seal
A/B	7MF4033 and 7MF4034	7MF4800, 7MF4810, 7MF4820, 7MF4826, 7MF4827, 7MF4840, 7MF4850, 7MF4861, 7MF4862, 7MF4880 and 7MF4890
C1/C2	7MF4233 and 7MF4234	7MF4800, 7MF4810, 7MF4820, 7MF4826, 7MF4827, 7MF4840, 7MF4850, 7MF4861, 7MF4862, 7MF4880 and 7MF4890
	7MF4333 and 7MF4334	7MF4801 and 7MF4821
D	7MF4433, 7MF4434, 7MF5403 and 7MF5413	7MF4803, 7MF4823, 7MF4828, 7MF4843, 7MF4863 and 7MF4883
E	7MF4433, 7MF4434, 7MF5403 and 7MF5413	7MF4813
G/H/J	7MF4433, 7MF4434, 7MF5403 and 7MF5413	7MF4803, 7MF4823, 7MF4828, 7MF4843, 7MF4863 and 7MF4883

(vacuum-proof design required)

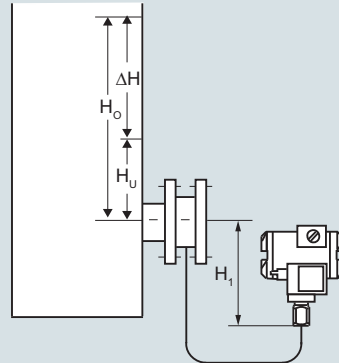
Dimensional drawings

Types of installation for pressure and level measurements (open vessels)

Installation type A

Pressure transmitter
above the measuring point

Installation type B

Pressure transmitter
below the measuring point

$H_1 \leq 7 \text{ m (23 ft)}$, with halocarbon oil as filling liquid only $H_1 \leq 4 \text{ m (13.1 ft)}$

Installation type A

$$\text{Start-of-scale: } p_{MA} = \rho_{FL} \cdot g \cdot H_U - \rho_{Oil} \cdot g \cdot H_1$$

$$\text{Full-scale: } p_{ME} = \rho_{FL} \cdot g \cdot H_O - \rho_{Oil} \cdot g \cdot H_1$$

Installation type B

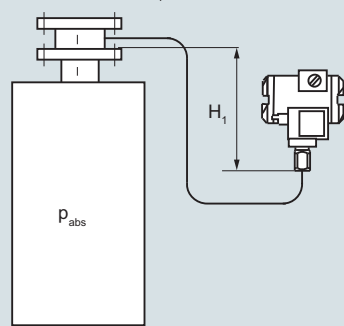
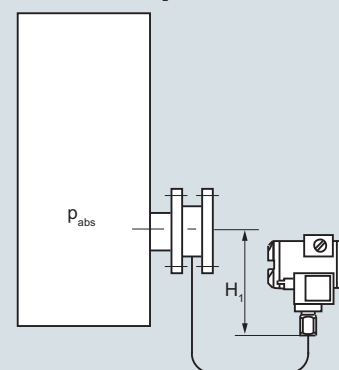
$$\text{Start-of-scale: } p_{MA} = \rho_{FL} \cdot g \cdot H_U + \rho_{Oil} \cdot g \cdot H_1$$

$$\text{Full-scale: } p_{ME} = \rho_{FL} \cdot g \cdot H_O + \rho_{Oil} \cdot g \cdot H_1$$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
ρ_{FL}	Density of medium in vessel
ρ_{Oil}	Density of filling oil in the capillary to the remote seal
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value
H_1	Distance between vessel flange and pressure trans.

Types of installation for absolute level measurements (closed vessels)

Installation type C₁Installation type C₂

Pressure transmitter for absolute pressure always below the measuring point: $H_1 \geq 200 \text{ mm (7.9 inch)}$

Installation type C₁ and C₂

$$\text{Start-of-scale: } p_{MA} = p_{START} + \rho_{Oil} \cdot g \cdot H_1$$

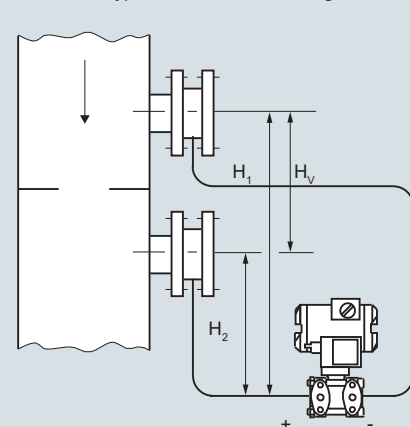
$$\text{Full-scale: } p_{ME} = p_{END} + \rho_{Oil} \cdot g \cdot H_1$$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
p_{START}	Start-of-scale value
p_{END}	Full-scale value
ρ_{Oil}	Density of filling oil in the capillary to the remote seal
g	Local acceleration due to gravity
H_1	Distance between vessel flange and pressure trans.

Type of installation for differential pressure and flow measurements

Installation type D Filter monitoring



Installation type D

$$\text{Start-of-scale: } p_{MA} = p_{START} - \rho_{Oil} \cdot g \cdot H_V$$

$$\text{Full-scale: } p_{ME} = p_{END} - \rho_{Oil} \cdot g \cdot H_V$$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
p_{START}	Start-of-scale value
p_{END}	Full-scale value
ρ_{Oil}	Density of filling oil in the capillary to the remote seal
g	Local acceleration due to gravity
H_V	Distance between the measuring points (spigots)

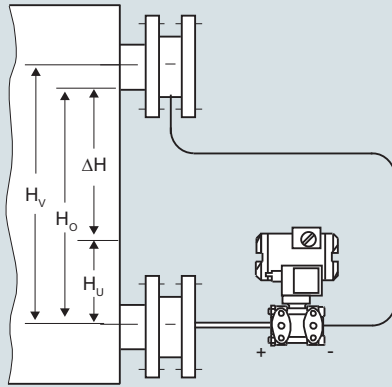
Pressure Measurement

Remote seals for transmitters and pressure gauges

Measuring setups with remote seals

Types of installation for level measurements (closed vessels)

Installation type E



Installation type E

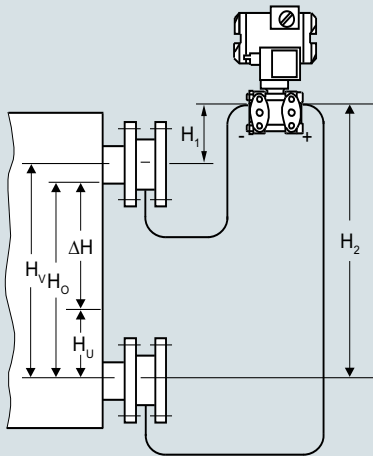
$$\text{Start-of-scale: } p_{MA} = \rho_{FL} \cdot g \cdot H_U - \rho_{Oil} \cdot g \cdot H_V$$

$$\text{Full-scale: } p_{ME} = \rho_{FL} \cdot g \cdot H_O - \rho_{Oil} \cdot g \cdot H_V$$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
ρ_{FL}	Density of medium in vessel
ρ_{Oil}	Density of filling oil in the capillary to the remote seal
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value
H_V	Distance between the measuring points (spigots)

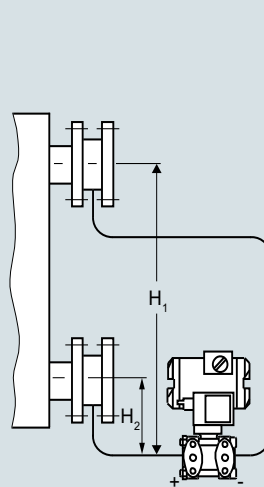
Installation type G



Pressure transmitter for differential pressure above the upper measuring point, no vacuum

$H_2 \leq 7 \text{ m (23 ft)}$, with halocarbon oil as filling liquid only $H_1 \leq 4 \text{ m (13.1 ft)}$

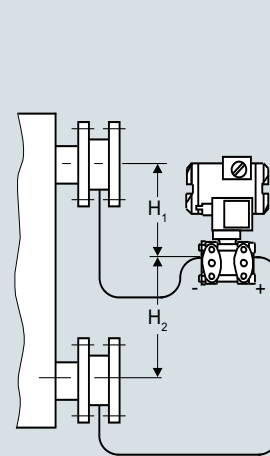
Installation type H



below the lower measuring point

Installation type for vacuum applications

Installation type J



between the measuring points, no vacuum

$H_2 \leq 7 \text{ m (23 ft)}$, with halocarbon oil as filling liquid only $H_2 \leq 4 \text{ m (13.1 ft)}$

Installation type G, H and J

$$\text{Start-of-scale: } p_{MA} = \rho_{FL} \cdot g \cdot H_U - \rho_{Oil} \cdot g \cdot H_V$$

$$\text{Full-scale: } p_{ME} = \rho_{FL} \cdot g \cdot H_O - \rho_{Oil} \cdot g \cdot H_V$$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
ρ_{FL}	Density of medium in vessel
ρ_{Oil}	Density of filling oil in the capillary to the remote seal

g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value
H_V	Distance between the measuring points (spigots)

Overview

Notes

- For the separation layer measurement, the separation layer has to be positioned between the two spigots.

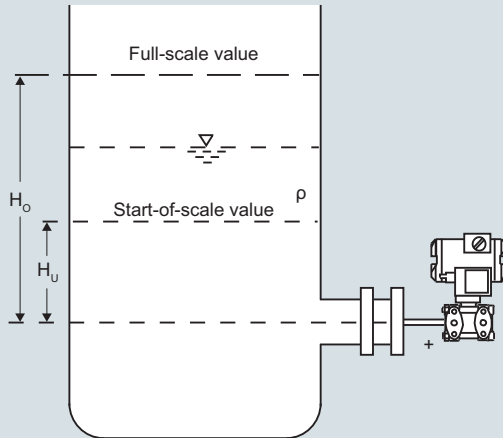
Also you must make sure that the level in the container is always above the top spigot.

- When measuring density, make sure that the level of the medium remains constant. The level should be above the top spigot

Dimensional drawings

Pressure transmitters for differential pressure, for flanging

Measuring setups for open containers



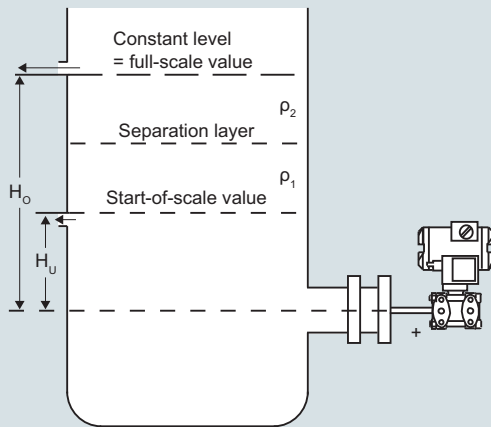
Level measurement

$$\text{Start-of-scale: } p_{MA} = \rho \cdot g \cdot H_U$$

$$\text{Full-scale: } p_{ME} = \rho \cdot g \cdot H_O$$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
ρ	Density of medium in vessel
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value



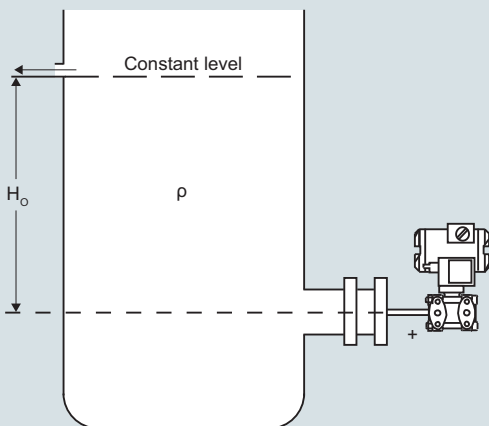
Separation layer measurement

$$\text{Start-of-scale: } p_{MA} = g \cdot (H_U \cdot \rho_1 + (H_O - H_U) \cdot \rho_2)$$

$$\text{Full-scale: } p_{ME} = \rho_1 \cdot g \cdot H_O$$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
ρ_1	Density of heavier liquid
ρ_2	Density of lighter liquid
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value



Density measurement

$$\text{Start-of-scale: } p_{MA} = \rho_{MIN} \cdot g \cdot H_O$$

$$\text{Full-scale: } p_{ME} = \rho_{MAX} \cdot g \cdot H_O$$

Legende

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
ρ_{MIN}	Minimum density of medium in vessel
ρ_{MAX}	Maximum density of medium in vessel
g	Local acceleration due to gravity
H_O	Full-scale value in m

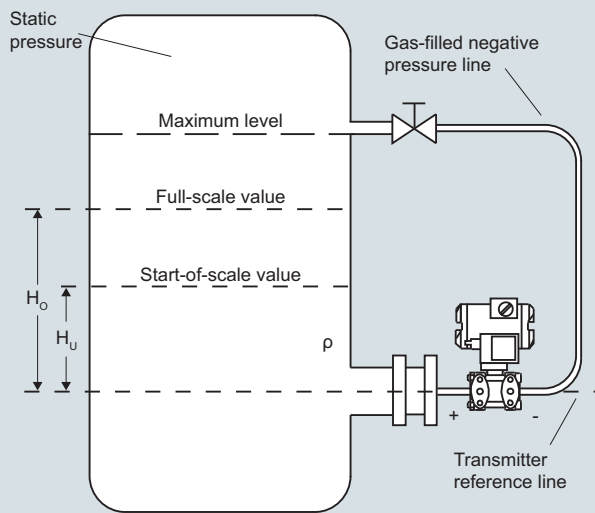
Pressure Measurement

Remote seals for transmitters and pressure gauges

1

Measuring setups without remote seals

Measuring setups for closed containers



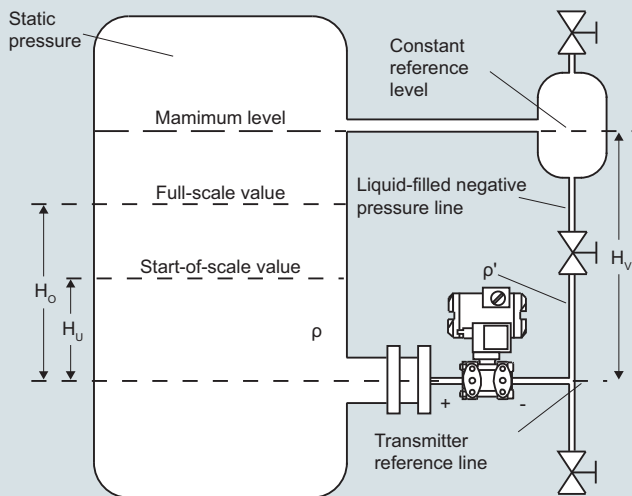
Level measurement, Version 1

$$\text{Start-of-scale: } \Delta p_{MA} = \rho \cdot g \cdot H_U$$

$$\text{Full-scale: } \Delta p_{ME} = \rho \cdot g \cdot H_O$$

Legend

Δp_{MA}	Start-of-scale value to be set
Δp_{ME}	Full-scale value to be set
ρ	Density of medium in vessel
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value



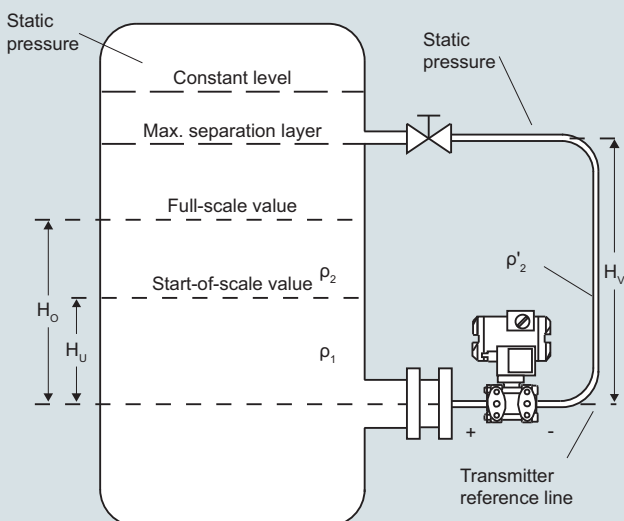
Level measurement, Version 2

$$\text{Start-of-scale: } \Delta p_{MA} = g \cdot (H_U \cdot \rho - H_V \cdot \rho')$$

$$\text{Full-scale: } \Delta p_{ME} = g \cdot (H_O \cdot \rho - H_V \cdot \rho')$$

Legend

Δp_{MA}	Start-of-scale value to be set
Δp_{ME}	Full-scale value to be set
ρ	Density of medium in vessel
ρ'	Density of liquid in the negative pressure line (corresponding to the temperature existing there)
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value
H_V	Distance between the measuring points (spigots)



Separation layer measurement

$$\text{Start-of-scale: } \Delta p_{MA} = g \cdot (H_U \cdot \rho_1 + (H_O - H_U) \cdot \rho_2 - H_V \cdot \rho'_2)$$

$$\text{Full-scale: } \Delta p_{ME} = g \cdot (H_O \cdot \rho_1 - H_V \cdot \rho'_2)$$

Legend

Δp_{MA}	Start-of-scale value to be set
Δp_{ME}	Full-scale value to be set
ρ_1	Density of heavier liquid with separation layer in vessel
ρ_2	Density of lighter liquid with separation layer
ρ'_2	Density of liquid in the negative pressure line (corresponding to the temperature existing there)
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value
H_V	Distance between the measuring points (spigots)

Order date: _____

Processing date: _____

Ordering code (customer): _____

Ordering code (supplier): _____

Customer reference: _____

Measuring point: _____

Position: _____

Dimensions: _____

Pressure: bar

Temperature: K °C

Measuring range: ☐ cm ☐ m
(please mark with cross)

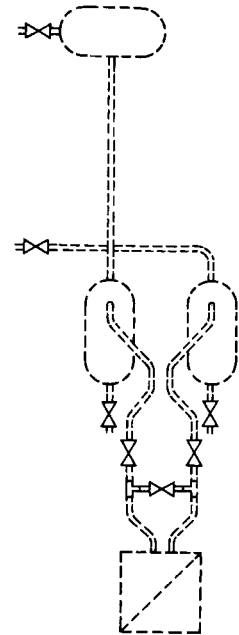
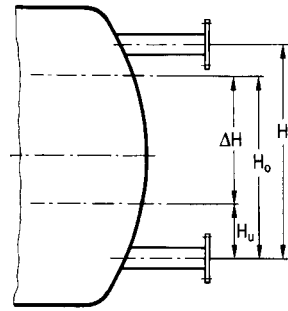
Article No. of transmitter SITRANS P DS III/P300/P310/P410¹⁾:

7 M F 4 - -Z

Y01

Article No. of transmitter SITRANS P500¹⁾):

7 M F 5 - 0



The different pressures and temperatures (densities) in the vessel and in the reference column result in an offset in the start-of-scale and full-scale values.

The calibration data are determined in addition.

It is also checked whether – as a result of the range offset – the ordered transmitter is suitable for this measurement.

Please supply the following characteristic data so that we can calculate the measuring range, start-of-scale value, full-scale value and calibration data:

Please mark type of boiler with a cross:		Closed ¹⁾	<input type="checkbox"/>
		Open or not under pressure ²⁾	<input type="checkbox"/>
Medium _____			
Licensed boiler pressure (absolute)		_____	bar
Operating pressure (absolute)	Lowest	_____	bar
	Normal ³⁾	_____	bar
	Highest	_____	bar
Temperature of reference column (cold)		_____	K
Distance between measuring points (dimension according to sketch) H_V		= _____ m	
Measuring range ⁴⁾ = start-of-scale value to full-scale value			
	Start-of-scale value	H_U = _____	m
	Full-scale value	H_O = _____	m
Position of equalizing vessel above bottom measuring point if different from H_V		_____	m
Please mark pressure correction of level with a cross:		No	<input type="checkbox"/>
		Yes ⁴⁾	<input type="checkbox"/>

1) Reference line filled with condensation! Falling differential pressure with increasing level.

2) Reference line without gas or filled with gas (air). Rising differential pressure with increasing level.

3) If not specified otherwise, this value is assumed as the calculation pressure of the level meter.

The input signal (differential pressure) depends on the density (pressure and temperature).
The influence is practically negligible for a lowest liquid level of 20 to 30% of the distance between the measuring points.

4) If a pressure correction of the level is required, the **measuring range must be the same as the distance between the measuring points**, and the transmitter is designed for the calculation pressure of 1 bar (absolute). Pressure correction means: the static pressure and the temperature are measured separately and calculated by a correction computer or measured-value computer.

Overview

All shut-off fittings can be secured onto walls, racks (72 mm grid) and vertical and horizontal pipes.

This offers the advantage when assembling a plant that the shut-off fittings can be secured first and the lines for the medium and differential pressure connected to them. It is then possible to check all connections for leaks and to blow out or flush the pipes in order to remove dirt (welding residues, shavings etc.).



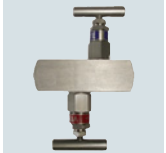

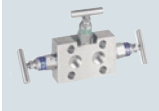
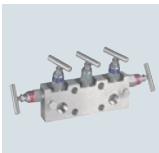
The measuring instruments can be screwed onto the shut-off fittings right at the end when all piping has been completed.

If an instrument has to be removed for maintenance, the fittings and pipes remain as they are. It is only necessary to close the valves – the instrument can then be removed, and refitted following maintenance.

Material acceptance test certificate to EN 10204-3.1

If a material acceptance test certificate to EN 10204-3.1 is required when ordering valve manifolds or shut-off fittings, please note that a single certificate is sufficient for each ordered item type. This means that you will only be charged for one certificate in the cost calculations.

Selection of available shut-off valves

Transmitters	Shut-off valves for general applications	Page		Shut-off valves for special applications	Page	
Relative and absolute pressure transmitters with process connection G½" male thread e.g. <ul style="list-style-type: none"> • SITRANS P200 7MF1565-... • SITRANS P210 7MF1566-... • SITRANS P220 7MF1567-... • SITRANS P300 7MF802-...0-.... • SITRANS P DS III series 7MF403-...0-.... and 7MF423-...0-.... 				Double shut-off valve DN 5 for crossover ½-NPT-F to G½ nipple connection 7MF9011-4EA	1/462	
Relative and absolute pressure transmitter with G½"-14 NPT female thread e.g. <ul style="list-style-type: none"> • SITRANS P200 7MF1565-... • SITRANS P210 7MF1566-... • SITRANS P220 7MF1567-... • SITRANS P300 7MF802-...1-.... • SITRANS P DS III series 7MF403-...1-.... and 7MF423-...1-.... 	Double shut-off valve DN 5 7MF9011-4FA and 7MF9011-4GA	1/462		Double shut-off valve DN 5 for process connection ½-NPT 7MF9011-4DA	1/462	
Absolute pressure transmitter with process connection to IEC 61518 e.g. <ul style="list-style-type: none"> • SITRANS P DS III series 7MF433-... 	2-spindle valve manifold DN 5 7MF9411-5A.	1/464				
Differential pressure transmitter with process connection to IEC 61518 e.g. <ul style="list-style-type: none"> • SITRANS P DS III series 7MF443-... and 7MF453-... • SITRANS P500 7MF54-... 	For 3-/5-spindle valve manifold DN 5 7MF9411-5B. and 7MF9411-5C.	1/464	 			

Pressure Measurement

Fittings

1

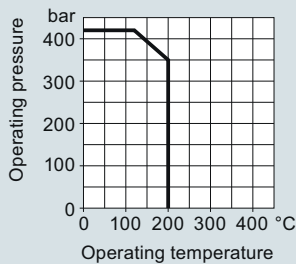
Double shut-off valves

Overview

The double shut-off valves DN 5 are suitable for pressure gauges and pressure transmitters and available in 5 versions:

- Sleeve-nipple
- Sleeve-sleeve
- Sleeve-collar
- Collar-collar
- Collar-sleeve

Characteristic curves



420 bar (6092 psi) at 120 °C
(248 °F)
350 bar (5076 psi) at 200 °C
(392 °F)

Permissible operating pressure as a function of the permissible operating temperature

Selection and Ordering data

Double shut-off valves DN 5

Material: X 6 CrNiMoTi 17 13 2 (mat. No. 1.4404/316L), max. permissible working pressure 420 bar (6092 psi)

- Sleeve-nipple connection
- Sleeve-sleeve
- Sleeve-collar
- Collar-collar
- Collar-sleeve

Article No.

7MF9011-4EA

7MF9011-4HA

7MF9011-4FA

7MF9011-4GA

7MF9011-4KA

Double shut-off valve acc. ASME B31.1, max. permissible working pressure class 2500

- Sleeve-collar

7MF9011-4FB

Accessories

Factory test certificate EN 10204-2.2

7MF9000-8AB

Material acceptance test certificate EN 10204-3.1

7MF9000-8AD

Further designs

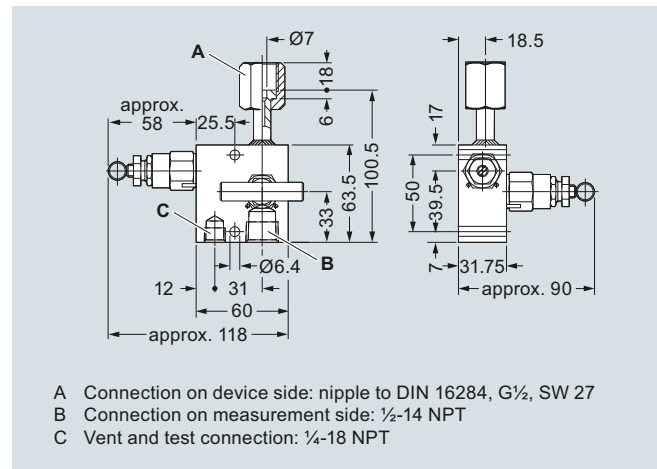
Order code

Add "-Z" to Article No. and specify Order Code.

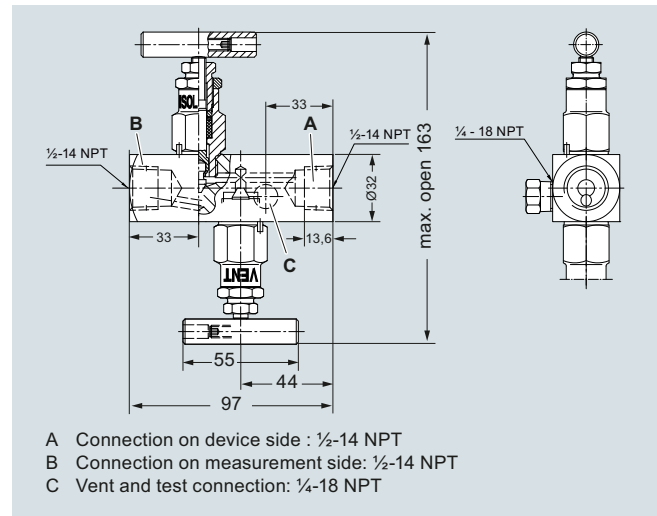
Oil- and grease-free cleaning for oxygen cleaning applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F)

S12

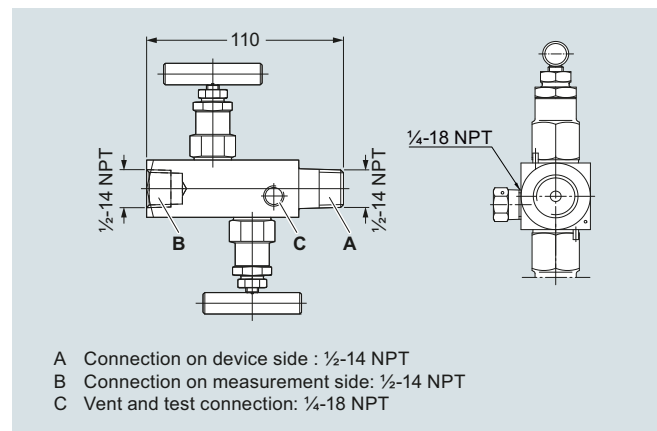
Dimensional drawings



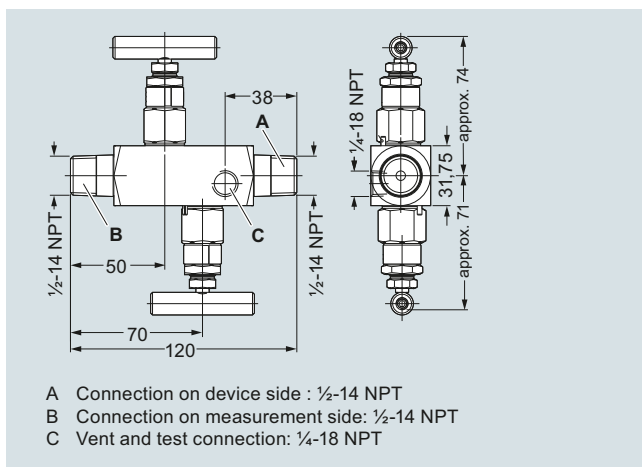
Double shut-off valve DN 5 (sleeve-nipple) 7MF9011-4EA, dimensions in mm



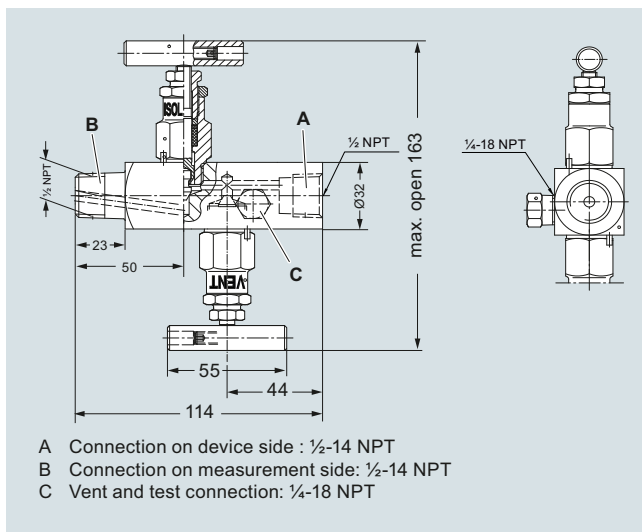
Double shut-off valve DN 5 (sleeve-sleeve) 7MF9011-4HA, dimensions in mm



Double shut-off valve DN 5 (sleeve-collar) 7MF9011-4FA, dimensions in mm



Double shut-off valve DN 5 (collar-collar) 7MF9011-4GA,
 dimensions in mm



Double shut-off valve DN 5 (collar-sleeve) 7MF9011-4KA,
 dimensions in mm

Pressure Measurement

Fittings - Shut-off valves for differential pressure transmitters

2-, 3- and 5-spindle valve manifolds DN 5

1

Overview



The 2-spindle, 3-spindle and 5-spindle valve manifolds 7MF9411-5.. are for pressure transmitters for absolute pressure or differential pressure.

The valve manifolds are used to shut off the differential pressure lines and to check the pressure transmitter zero.

The 2-spindle and the 5-spindle valve manifold enable in addition venting on the transmitter side and checking of the pressure transmitter characteristic.

Benefits

- Max. working pressure 420 bar (6092 psi)
- Each available in version for oxygen

Application

The spindle valve manifolds DN 5 are designed for liquids and gases.

Each is available in a version for oxygen on request.

Design

All versions of the valve manifolds have a process connection 1/2-14 NPT. The connection for the pressure transmitter is always designed as a flange connection to EN 61518, form B. The 2-spindle and the 5-spindle valve manifold have in addition a vent and test connection 1/4-18 NPT.

The valves have an external spindle thread.

Materials used

Component	Material	Mat. No.
Housing	X 2 CrNiMo 17 13 2	1.4404/316L
Cones	X 6 CrNiMoTi 17 12 2	1.4571/316Ti
Spindles	X 2 CrNiMo 18 10	1.4404/316L
Head parts	X 5 CrNiMo 18 10	1.4401/316
Packings	PTFE	-

Function

Functions of all valve manifolds:

- Shutting off the differential pressure lines
- Checking the pressure transmitter zero

Additional functions of the 2-spindle and 5-spindle valve manifolds through the vent and test connection:

- Venting on the transmitter side
- Checking the pressure transmitter characteristic

Selection and Ordering data

Article No.

Valve manifolds DN 5

7MF9411-5A

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

for liquids and gases, for flanging to pressure transmitters for absolute and differential pressure, max. working pressure 420 bar (6092 psi) (order accessory set with Order code), without certificate

- 2-spindle valve manifold

5A

- 3-spindle valve manifold

5B

- 5-spindle valve manifold

5C

Valve manifold acc. ASME B31.1, max. permissible working pressure class 2500

- 3-spindle valve manifold

8B

- 5-spindle valve manifold

8C

Accessories

Factory test certificate EN 10204-2.2

7MF9000-8AB

Material acceptance test certificate EN 10204-3.1

7MF9000-8AD

Selection and Ordering data

Order code

Article No.

Further designs¹⁾

Please add "-Z" to Article No. and specify Order code.

Accessory set to EN

(connection between valve manifold and pressure transmitter)
for valve manifold 7MF9411-5A.

2x screws 7/16-20 UNF x 1 1/4 inch to ASME B18.2.1; chromized steel
1x gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)

K35

7MF9411-7DB

2x screws 7/16-20 UNF x 1 1/4 inch to ASME B18.2.1; **stainless steel**
1x gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)

K45

7MF9411-7DC

for valve manifold 7MF9411-5B. and -5C.

4x screws 7/16-20 UNF x 1 1/4 inch to ASME B18.2.1; chromized steel
2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)

K36

7MF9411-5DB

4x screws 7/16-20 UNF x 1 1/4 inch to ASME B18.2.1; **stainless steel**
2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)

K46

7MF9411-5DC

Bolt kit for ASME B31.1 manifolds

4x screws 7/16-20 UNF x 1 1/4 inch to ASME B18.2.1; chromized steel
2x flat gaskets made of graphite

K34

7MF9411-5DB

Selection and Ordering data	Order code	Article No.	Selection and Ordering data	Order code	Article No.
Further designs¹⁾ Please add "-Z" to Article No. and specify Order code.			Further designs¹⁾ Please add "-Z" to Article No. and specify Order code.		
Accessory set to DIN²⁾ (connection between valve manifold and pressure transmitter) <u>for valve manifold 7MF9411-5A.</u> 2x screws M10x45 to DIN EN 24014; chromized steel, 2x washers Ø 10.5 mm to DIN 125; 1x gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) 2x screws M10x45 to DIN EN 24014; stainless steel 2x washers Ø 10.5 mm to DIN 125, stainless steel ; 1x gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) <u>for valve manifolds 7MF9411-5B. and -5C.</u> 4x screws M10x45 to DIN EN 24014; chromized steel, 4x washers Ø 10.5 mm to DIN 125; 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) Flange connection with M10 screws only permissible up to PN 160. 4x screws M10x45 to DIN EN 24014; stainless steel 4x washers Ø 10.5 mm to DIN 125, stainless steel ; 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) Flange connection with M10 screws only permissible up to PN 160.	K15	7MF9411-7BB	NACE MR-0175-certified incl. acceptance test certificate 3.1 to EN 10204	D07	
	K25	7MF9411-7BC			
	K16	7MF9411-6BB			
	K26	7MF9411-6BC			
Mounting plate • for valve manifold, made of electrogalvanized sheet-steel - for wall mounting or for securing on rack (72 mm grid), weight 0.5 kg Scope of delivery: 1 mounting plate with bolts for mounting on valve manifold - for pipe mounting , weight 0.7 kg Scope of delivery: 1x mounting plate M11, 2x pipe brackets with nuts and washers (for pipe with max. Ø 60.3 mm) and fastening screws for mounting on valve manifold • for valve manifold, made of stainless steel - for wall mounting or for securing on rack (72 mm grid), weight 0.5 kg Scope of delivery: 1 mounting plate with bolts for mounting on valve manifold - for pipe mounting , weight 0.7 kg Scope of delivery: 1x mounting plate M11, 2x pipe brackets with nuts and washers (for pipe with max. Ø 60.3 mm)	M11	7MF9006-6EA			
	M12	7MF9006-6GA			
	M21	7MF9006-6EC			
	M22	7MF9006-6GC			
Valve manifold 100 bar Oil- and grease-free cleaning for oxygen applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F) • for 7MF9411-5A. • for 7MF9411-5B. • for 7MF9411-5C.	S12 S13 S14				

- ¹⁾ When ordering accessory set or mounting together with the valve manifolds, please use Order code; otherwise use Article No.
²⁾ Flange connections to DIN 19213 only permissible up to 160!

Pressure Measurement

Fittings - Shut-off valves for differential pressure transmitters

2-, 3- and 5-spindle valve manifolds DN 5

Accessories

Accessory set for 2-, 3- and 5-spindle valve manifolds

2-spindle valve manifold DN 5

- K35: 2 screws $\frac{7}{16}$ -20 UNF x 1 $\frac{3}{4}$ inch to ASME B18.2.1, 1 flat gasket
- K15: 2 screws M10x45 to DIN EN 24014, 2 washers, 1 flat gasket

3-spindle and 5-way valve manifold DN 5

- K36: 4 screws $\frac{7}{16}$ -20 UNF x 1 $\frac{3}{4}$ inch to ASME B18.2.1, 2 flat gaskets
- K16: 4 screws M10x45 to DIN EN 24014, 4 washers, 2 flat gaskets

Washers Ø 10.5 to DIN 125

Flat gaskets made of PTFE, max. 420 bar (6092 psi), 80 °C (176 °F)

Note: Flange connection with M10 screws only permissible up to PN 160!

Mounting plate

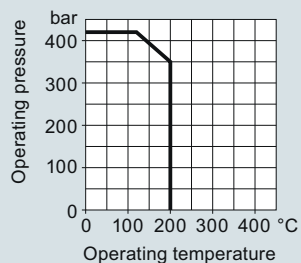
Made of electrogalvanized sheet-steel

- M11: For wall mounting or for securing on rack (72 mm grid)
Scope of delivery:
- 1 mounting plate with bolts for mounting on valve manifold
- M12: For pipe mounting
Scope of delivery:
- 1 mounting plate M11
- 2 pipe brackets with nuts and washers for pipes with max. Ø 60.3 mm

Valve manifold 100 bar, suitable for oxygen

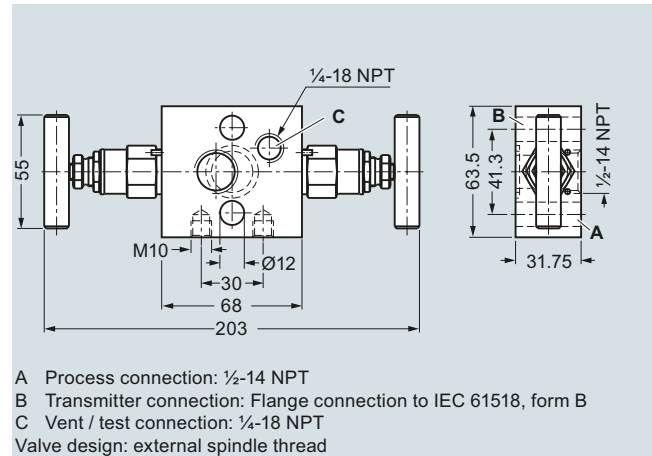
- S12: For 2-way valve manifold
- S13: For 3-way valve manifold
- S14: For 5-way valve manifold

Characteristic curves

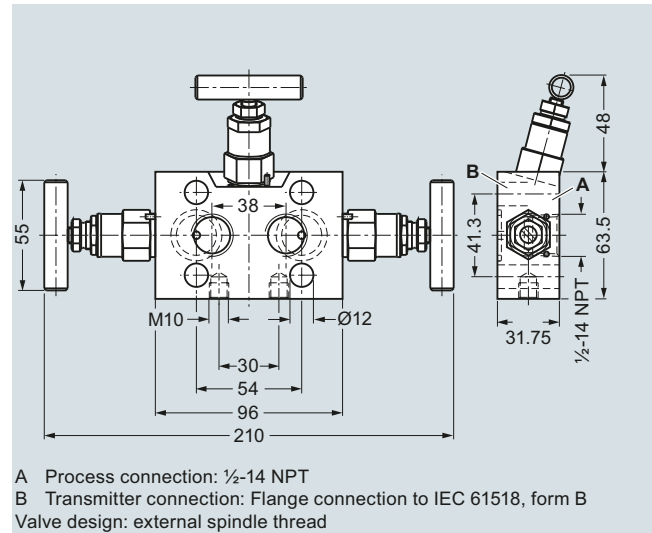


Valve manifolds PN 5 (7MF9411-5..), permissible working pressure as a function of the permissible working temperature

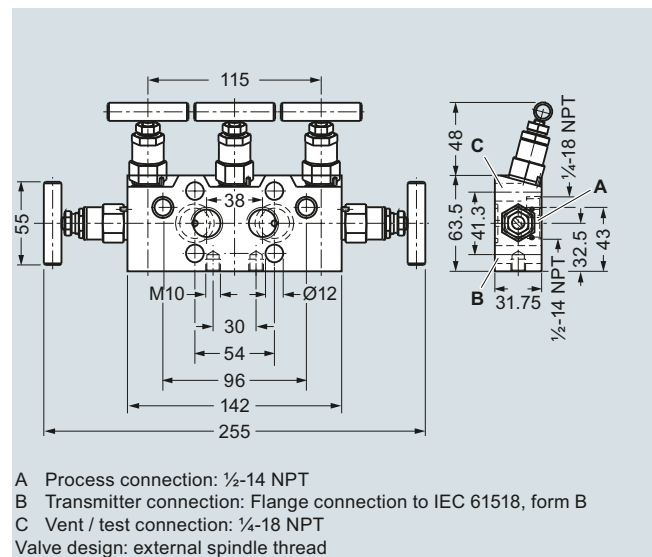
Dimensional drawings



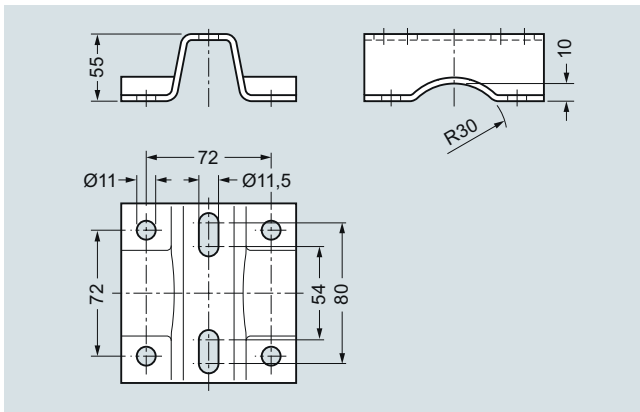
2-spindle valve manifold DN 5 (7MF9411-5A.), dimensions in mm



3-spindle valve manifold DN 5 (7MF9411-5B.), dimensions in mm

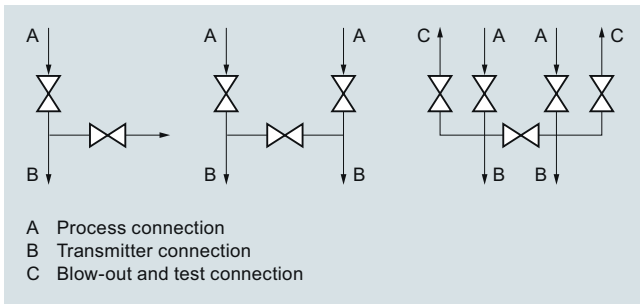


5-spindle valve manifold DN 5 (7MF9411-5C.), dimensions in mm



Mounting plate 7MF9006-6.. (M11, M12) for valve manifold, dimensions in mm

Schematics



2-spindle, 3-spindle and 5-spindle valve manifold DN 5, connections

Pressure Measurement

Fittings - Accessories

1

Oval flange

Overview



The oval flange 7MF9408-2C, for pressure transmitters for absolute pressure and differential pressure has a 1/2-14 NPT female thread and is designed for max. operating pressure 400 bar.

Accessories

Accessory set for oval flange

- E36: 2 screws $7/16$ -20 UNF x 1 1/2 inch to ASME B18.2.1, 1 flat gasket
- E34: 2 screws $7/16$ -20 UNF x 1 1/2 inch to ASME B18.3, 1 O-ring (FPM 90)
- E13: 2 screws M10x40 to DIN EN 4762, 2 washers, 1 O-ring (FPM 90)
- E16: 2 screws M10x40 to DIN EN ISO 4762, 2 washers, 1 flat gasket

Washers Ø 10.5 to DIN 125

Flat gaskets made of PTFE, max. 420 bar (6092 psi), 80 °C (176 °F)

O-ring to DIN 3771, 20 x 2.65 – S – FPM90, max. 420 bar, 120 °C

Note: M10 screws only permissible up to PN 160!

Selection and Ordering data

Article No.

Oval flange

with female thread 1/2-14 NPT, max. working pressure 420 bar (6092 psi) flange connection to DIN EN 61518, form A

Material

P250GH, mat. No.: 1.0460

X 2 CrNiMo 17 13 2, mat. No. 1.4404/316L

7MF9408-2CE

7MF9408-2CL

Selection and Ordering data

Order code

Article No.

Further designs¹⁾

Please add **"-Z"** to Article No. and specify Order code.

Accessory set to EN

2x screws $7/16$ -20 UNF x 1 1/2 inch to ASME B 18.2.3; chromized steel
1x flat gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)

E36

7MF9408-5DA

2x screws $7/16$ -20 UNF x 1 1/2 inch to ASME B 18.2.3; chromized steel
1x O-ring to DIN 3771, 20 x 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)

E34

7MF9408-5CA

Accessory set to DIN

2x screws M10x40 to DIN EN ISO 4762; chromized steel
2x washers Ø 10.5 mm to DIN 125;
1x O-ring to DIN 3771, 20 x 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)²⁾

E13

7MF9408-6AA

2x screws M10x40 to DIN EN ISO 4762; chromized steel
2x washers Ø 10.5 mm to DIN 125;
1x flat gasket made of PTFE, max. permissible 80 °C (176 °F)²⁾

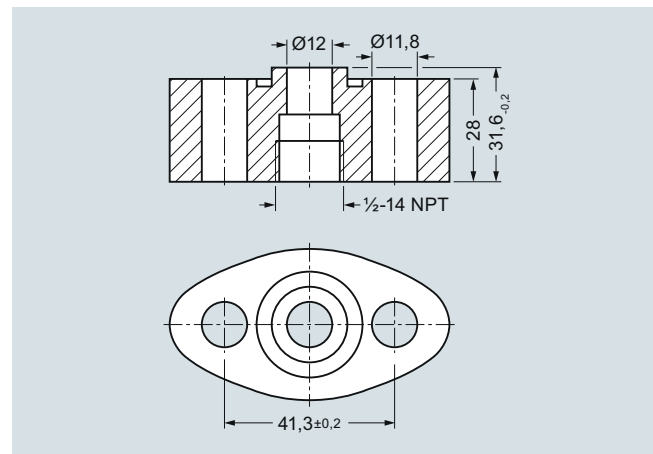
E16

7MF9408-6BA

¹⁾ When ordering accessory set together with the oval flange, please use Order code; otherwise use Article No.

²⁾ Flange connections with M10 screws only permissible up to PN 160

Dimensional drawings



Oval flange 7MF9408-2C., dimensions in mm

Temperature Measurement



2/2	Product overview
2/5	Transmitters in a compact design SITRANS TH100 Slim (Pt100)
2/8	Transmitters for mounting in sensor head SITRANS TH100 (Pt100)
2/12	SITRANS TH200 (Universal)
2/19	SITRANS TH300 (Universal, HART)
2/26	SITRANS TH320 (HART)
2/35	SITRANS TH400 fieldbus transmitter
2/41	SITRANS TH420 (HART)
2/51	Transmitters for rail mounting SITRANS TR200, two-wire system, Universal
2/58	SITRANS TR300, two-wire system, Universal, HART
2/65	SITRANS TR320, two-wire system, HART
2/74	SITRANS TR420, two-wire system, HART
2/84	SITRANS TW, four-wire system, Universal, HART
2/96	Transmitters for field mounting SITRANS TF280 WirelessHART
2/101	SITRANS TF two-wire system
2/110	SITRANS TF fieldbus transmitter
2/101	Field indicator SITRANS TF Field indicator for 4 to 20 mA
2/117	Multipoint temperature transmitter SITRANS TO500
2/120	Accessories Further accessories for assembly, connection and transmitter configuration
2/121	SITRANS TS500 Technical Description
2/123	- Types ST, SS, SR threaded process connection
2/125	- Types FT, FS, FR flanged process connection
2/126	- Types SWT, SWS, SWR socketwell process connection
2/128	- Type GP general purpose no thermowell
2/128	- Type GP
2/133	Selection and Ordering Data
2/137	Schematics








You can download all instructions, catalogs and certificates for SITRANS T free of charge at the following Internet address:
www.usa.siemens.com/temperature

Temperature Measurement

Product overview

Overview





	Application	Mounting of transmitter with Ex protection		Page	Software for parameterization
		Transmitter	Sensor		
Temperature transmitter in a compact design					
	SITRANS TH100 Slim For temperature measurement in combination with Pt100 compact resistance thermometers	-	-	2/5	SIPROM T
Temperature transmitter for head mounting					
	SITRANS TH100 Transmitters for Pt100	Zone 2, zone 1, zone 0, zone 21, zone 20, DIV 1, DIV 2	Zone 2, zone 1, zone 0, zone 21, zone 20, DIV 1, DIV 2	2/8	SIPROM T
	SITRANS TH200 Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V <ul style="list-style-type: none">• Two-wire system• Universal	Zone 2, zone 1, zone 0, zone 21, zone 20, DIV 1, DIV 2	Zone 2, zone 1, zone 0, zone 21, zone 20, DIV 1, DIV 2	2/12	SIPROM T
	SITRANS TH300 Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V <ul style="list-style-type: none">• Two-wire system• Universal• HART	Zone 2, zone 1, zone 0, zone 21, zone 20, DIV 1, DIV 2	Zone 2, zone 1, zone 0, zone 21, zone 20, DIV 1, DIV 2	2/19	SIMATIC PDM
	SITRANS TH320 NEW Transmitters with one input for connection to resistance thermometers, linear resistors, potentiometers, thermocouples and DC voltages up to 1.7 V <ul style="list-style-type: none">• Two-wire system• HART 7• SIL2/3 according to IEC 61508	Zone 2, zone 1, zone 0, zone 21, zone 20, M1, DIV 1, DIV 2	Zone 2, zone 1, zone 0, zone 21, zone 20, M1, DIV 1, DIV 2	2/26	SIMATIC PDM
	SITRANS TH400 Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages <ul style="list-style-type: none">• Fieldbus transmitters• PROFIBUS PA• FOUNDATION fieldbus	Zone 2, zone 1, zone 0, zone 21, zone 20, DIV 1, DIV 2	Zone 2, zone 1, zone 0, zone 21, zone 20, DIV 1, DIV 2	2/35	SIMATIC PDM for TH 400 with PROFIBUS PA
	SITRANS TH420 NEW Transmitters with two inputs for connection to resistance thermometers, linear resistors, potentiometers, thermocouples and DC voltages up to 1.7 V <ul style="list-style-type: none">• Two-wire system• HART 7• SIL2/3 according to IEC 61508• High input availability	Zone 2, zone 1, zone 0, zone 21, zone 20, M1, DIV 1, DIV 2	Zone 2, zone 1, zone 0, zone 21, zone 20, M1, DIV 1, DIV 2	2/41	SIMATIC PDM

Application	Mounting of transmitter with Ex protection	Page		Software for parameterization
		Transmitter	Sensor	
Temperature transmitters for rail mounting				
	SITRANS TR200 <ul style="list-style-type: none">Two-wire systemUniversal	Zone 2, zone 1, zone 0, zone 21	Zone 2, zone 1, zone 0, zone 21, zone 20	2/51 SIPROM T
	SITRANS TR300 <ul style="list-style-type: none">Two-wire systemUniversalHART	Zone 2, zone 1, zone 0, zone 21	Zone 2, zone 1, zone 0, zone 21, zone 20	2/58 SIMATIC PDM
	SITRANS TR320 NEW Transmitters with one input for connection to resistance thermometers, linear resistors, potentiometers, thermocouples and DC voltages up to 1.7 V <ul style="list-style-type: none">Two-wire systemHART 7SIL2/3 according to IEC 61508	Zone 2, zone 1, zone 0, zone 21, zone 20, M1, DIV 1, DIV 2	Zone 2, zone 1, zone 0, zone 21, zone 20, M1, DIV 1, DIV 2	2/65 SIMATIC PDM
	SITRANS TR420 NEW Transmitters with two inputs for connection to resistance thermometers, linear resistors, potentiometers, thermocouples and DC voltages up to 1.7 V <ul style="list-style-type: none">Two-wire systemHART 7SIL2/3 according to IEC 61508High input availability	Zone 2, zone 1, zone 0, zone 21, zone 20, M1, DIV 1, DIV 2	Zone 2, zone 1, zone 0, zone 21, zone 20, M1, DIV 1, DIV 2	2/74 SIMATIC PDM
	SITRANS TW <ul style="list-style-type: none">Four-wire systemUniversalHART	Safe area	Zone 1, zone 0, zone 21, zone 20	2/84 SIMATIC PDM
Temperature transmitters for field mounting				
	SITRANS TF280 Transmitter for connection to resistance-based sensor <ul style="list-style-type: none">In field enclosure for heavy industrial usebattery-operatedWirelessHART	-	-	2/96 Local operation via buttons SIMATIC PDM local with HART modem and wireless via WirelessHART
	SITRANS TF Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V <ul style="list-style-type: none">In field enclosure for heavy industrial useHART, Universal	Zone 2, zone 1; zone 21, DIV 1, DIV 2	Zone 2, zone 1, zone 0	2/101 Depending on the installed TH200/TH300 transmitter

Temperature Measurement

Product overview

2

Application		Mounting of transmitter with Ex protection		Page	Software for parameterization
		Transmitter	Sensor		
	SITRANS TF Fieldbus transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 0.8 V <ul style="list-style-type: none">• In field enclosure for heavy industrial use• PROFIBUS PA• FOUNDATION fieldbus	Zone 2, zone 1; zone 21, DIV 1, DIV 2	Zone 2 zone 1, zone 0	2/110	SIMATIC PDM for PROFIBUS PA
Field indicator for 4 to 20 mA signals					
	SITRANS TF Field indicator for 4 to 20 mA signals Display of units can be user-defined	Zone 2, zone 1, zone 21, DIV 1, DIV 2	-	2/101	-
Multipoint temperature transmitter					
	SITRANS TO500 Multipoint temperature transmitter for measuring temperatures and temperature profiles using fiber optic Multipoint temperature measurement lances.		Zone 0, Zone 20	2/117	Via Ethernet with the supplied parameter assignment software
Type		Description			Page
Temperature sensors					
	SITRANS TS500 Temperature Sensor Assemblies Include thermowell, sensor, head and transmitters	<ul style="list-style-type: none">• Integrated temperature assemblies• Include thermowell, sensor, head and transmitter in single model number.• Various options include configuration, calibration and certificates.			2/121

Supplied product documentation on DVD and safety instructions



The scope of delivery of the Siemens products for process instrumentation includes a multilingual instruction sheet with **safety instructions** as well as a uniform **mini DVD – Process Instrumentation and Weighing Systems**.

This DVD contains the most important manuals and certificates for the Siemens process instrumentation and weighing technology portfolio. The delivery may also contain product-specific or order-specific printed materials.

For additional information, refer to the Annex on page 10/3.

Temperature Measurement

Transmitters in a compact design

SITRANS TH100 Slim (Pt100)

Overview



SITRANS TH100 Slim is particularly suited for the production of compact thermometers with integrated transmitter.

Its cylindrical stainless steel enclosure is simply welded to the basic body of the compact thermometer.

Its compact design makes the SITRANS TH100 Slim the ideal solution for manufacturers from a wide variety of industries.

For the parameterization, the SIPROM T software is used in combination with the modem for SITRANS TH100/TH200.

Benefits

- Transmitter in two-wire technology with M12 device plug for installation on compact thermometer.
- Solution for easy and space-saving temperature measurements in a variety of industries.
- Programmable; as a result, the sensor connection, measuring range and much more is programmable.

Application

The SITRANS TH100 Slim transmitter can be used in combination with Pt100 compact resistance thermometers for temperature measurement in all industries. Thanks to its compact design, it can be attached to all kinds of designs.

The output signal is a load-independent direct current of 4 to 20 mA which is proportional to the temperature.

Parameterization is implemented over the PC using the parameterization software SIPROM T and the modem for SITRANS TH100/TH200. If you already have a "Modem for SITRANS TK" (article number 7NG3190-6KB), you can continue to use this for parameterization of the SITRANS TH100.

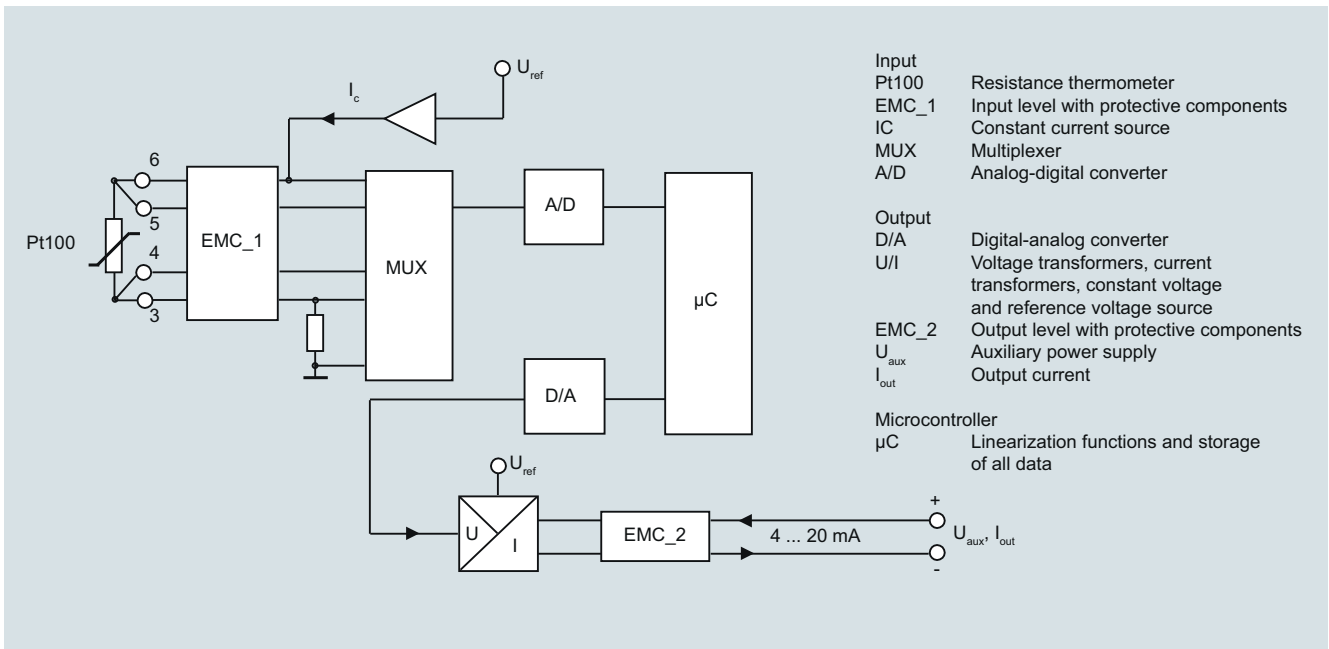
Function

Mode of operation

The measured signal supplied by a Pt100 resistance thermometer (2, 3 or 4-wire system) is amplified in the input stage. The voltage, which is proportional to the input variable, is then converted into digital signals by a multiplexer in an analog-to-digital converter. They are converted in the microcontroller in accordance with the sensor characteristics and further parameters (measuring range, damping, ambient temperature, etc.).

The signal prepared in this way is converted in an analog-to-digital converter into a load-independent direct current of 4 to 20 mA.

An EMC filter protects the input and output circuits against electromagnetic interferences.



SITRANS TH100 Slim, function block diagram

Temperature Measurement

Transmitters in a compact design

SITRANS TH100 Slim (Pt100)

Technical specifications

SITRANS TH100 Slim	
Input	
<u>Resistance thermometer</u>	
Measured variable	Temperature
Sensor type	PT100 to IEC 60751
Characteristic curve	Temperature-linear
Type of connection	2-, 3- or 4-wire circuit
Resolution	14 bit
Measuring accuracy	< 0.25 °C (0.45 °F)
Repeatability	< 0.1 °C (0.18 °F)
Measuring current	Approx. 0.4 mA
Measuring cycle	< 0.7 s
Measuring range	-60 ... +160 °C (-76 ... +320 °F)
Measuring span	25 ... 220 °C (45 ... 396 °F)
Unit	°C or °F
Offset	Programmable: -100 ... +100 °C (-180 ... +180 °F)
Line resistance	Max. 20 Ω (total from feeder and return conductor)
Noise rejection	50 and 60 Hz
Output	
Output signal	4 ... 20 mA, two-wire
Auxiliary power	8.5 ... 36 V DC (30 V for Ex)
Max. load	(U _{aux} - 8.5 V)/0.023 A
Overrange	3.6 ... 23 mA, infinitely adjustable (factory setting: 3.84 ... 20.5 mA)
Error signal (in the event of sensor breakage)	3.6 ... 23 mA, infinitely adjustable (factory setting: 3.6 mA or 22.8 mA)
Damping time	0 ... 30 s
Protection	Against reverse polarity
Resolution	12 bit
Accuracy at 23 °C (73.4 °F)	< 0.1 % of span
Temperature effect	< 0.13 %/10 °C (0.13 %/18 °F)
Effect of auxiliary power	< 0.02 % of span/V
Effect of load impedance	< 0.055 % of max. span/100 Ω
Long-term drift	<ul style="list-style-type: none"> < 0.025 % of max. span in the first month < 0.035 % of max. span after one year < 0.05 % of max. span after 5 years
Ambient conditions	
Ambient temperature range	-40 ... +85 °C (-40 ... +185 °F)
Storage temperature range	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	98 %, with condensation
Electromagnetic compatibility	According to EN 61326 and NAMUR NE21
Design	
Weight	42 g
Dimensions	See dimensional drawing
Material	316L stainless steel
Degree of protection according to IEC 60529	
• Enclosure	IP67

Software requirements for SIPROM T

PC operating system

Windows ME, 2000 and XP; also Windows 95, 98 and 98SE, but only in connection with RS232 modem

Factory setting:

- Pt100 (IEC 751) with 3-wire system
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Error signal in the event of sensor breakage: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Selection and Ordering data

Article No.

SITRANS TH100 Slim temperature transmitters for Pt100

For welding to compact thermometers
Two-wire system, 4 ... 20 mA, programmable, without electrical isolation

- Without explosion protection

7NG3150-0NN00

Accessories

Modem for SITRANS TH100 and TH200 incl. SIPROM T parameterization software

With USB connection

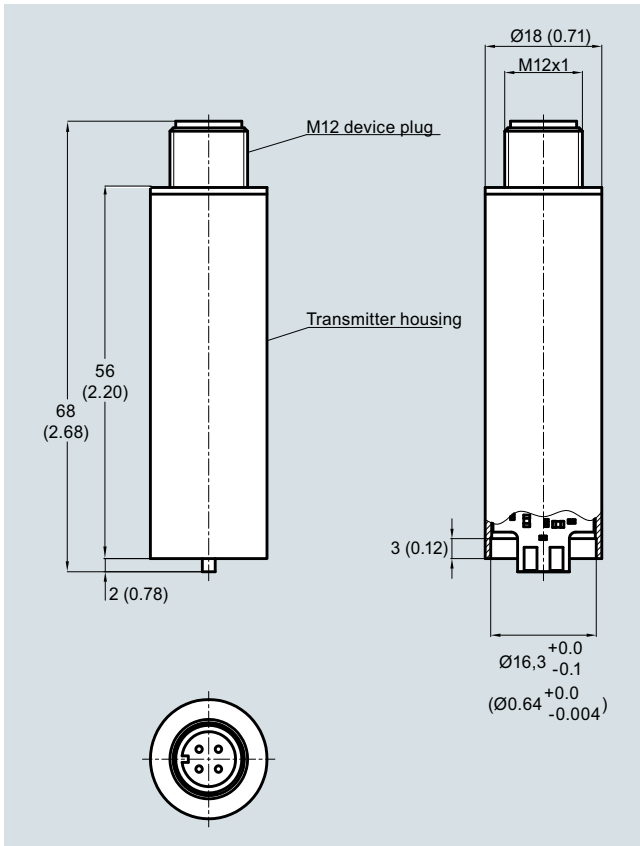
7NG3092-8KN

Temperature Measurement

Transmitters in a compact design

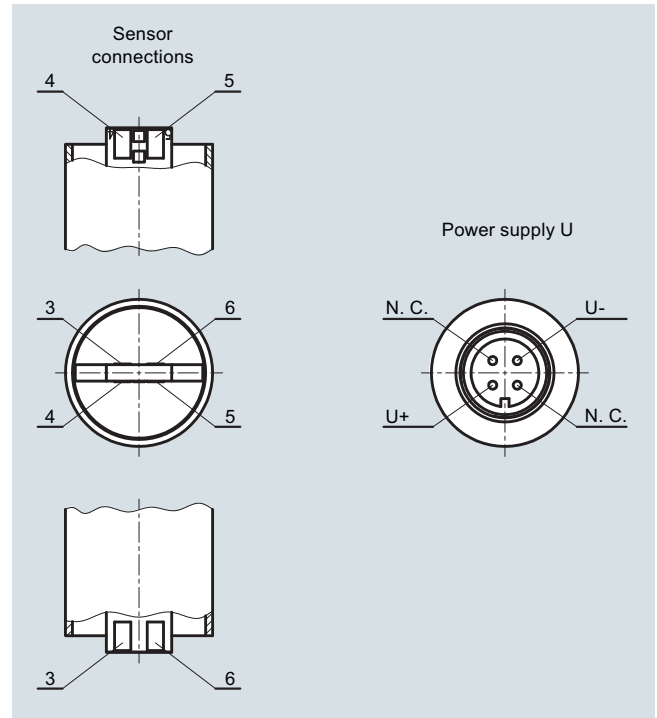
SITRANS TH100 Slim (Pt100)

Dimensional drawings

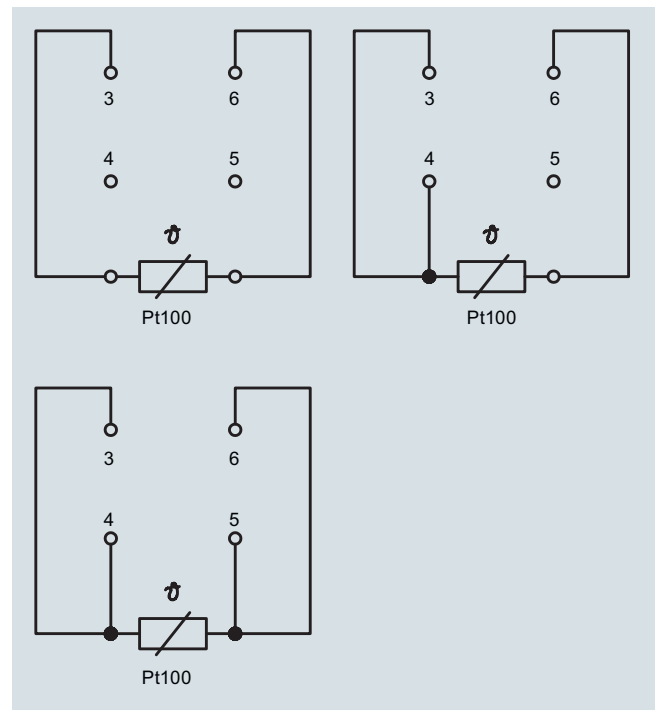


SITRANS TH100 Slim, dimensions in mm (inch)

Schematics



SITRANS TH100 Slim, auxiliary power and sensor connection



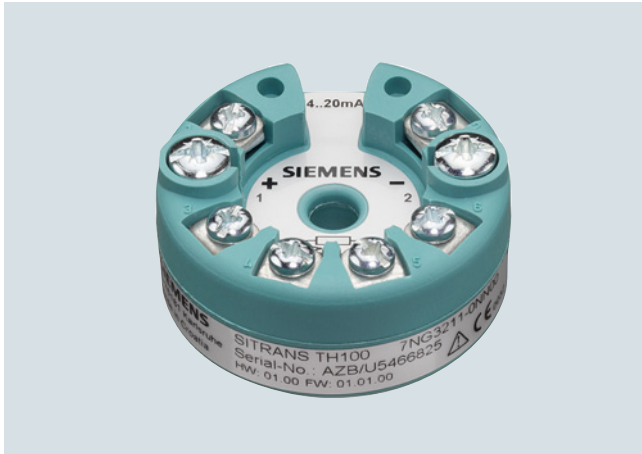
SITRANS TH100 Slim, sensor connection assignment

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH100 (Pt100)

Overview



The SITRANS TH100 dispenses with electrical isolation and universal sensor connection to provide a low-cost alternative for Pt100 measurements.

For the parameterization, the SIPROM T software is used in combination with the modem for SITRANS TH100/TH200.

Its extremely compact design makes the SITRANS TH100 ideal for the retrofitting of measuring points or for the use of analog transmitters.

The transmitter is available as a non-Ex version as well as for use in potentially explosive atmospheres.

Benefits

- Two-wire transmitter
- Assembly in connection head type B (DIN 43729) or larger, or on a standard DIN rail
- Can be programmed, which means that the sensor connection, measuring range, etc. can also be programmed
- Intrinsically-safe version for use in potentially explosive areas

Application

Used in conjunction with Pt100 resistance thermometers, the SITRANS TH100 transmitters are ideal for measuring temperatures in all industries. Due to its compact size it can be installed in the connection head type B (DIN 43729) or larger.

The output signal is a direct current from 4 to 20 mA that is proportional to the temperature.

Parameterization is implemented over the PC using the parameterization software SIPROM T and the modem for SITRANS TH100/TH200. If you already have a "modem for SITRANS TK" (Article No. 7NG3190-6KB), you can continue using this to parameterize the SITRANS TH100.

Transmitters of the "intrinsically-safe" type of protection can be installed within potentially explosive atmospheres. The devices comply with the Directive 2014/34/EU (ATEX), as well as FM and CSA regulations.

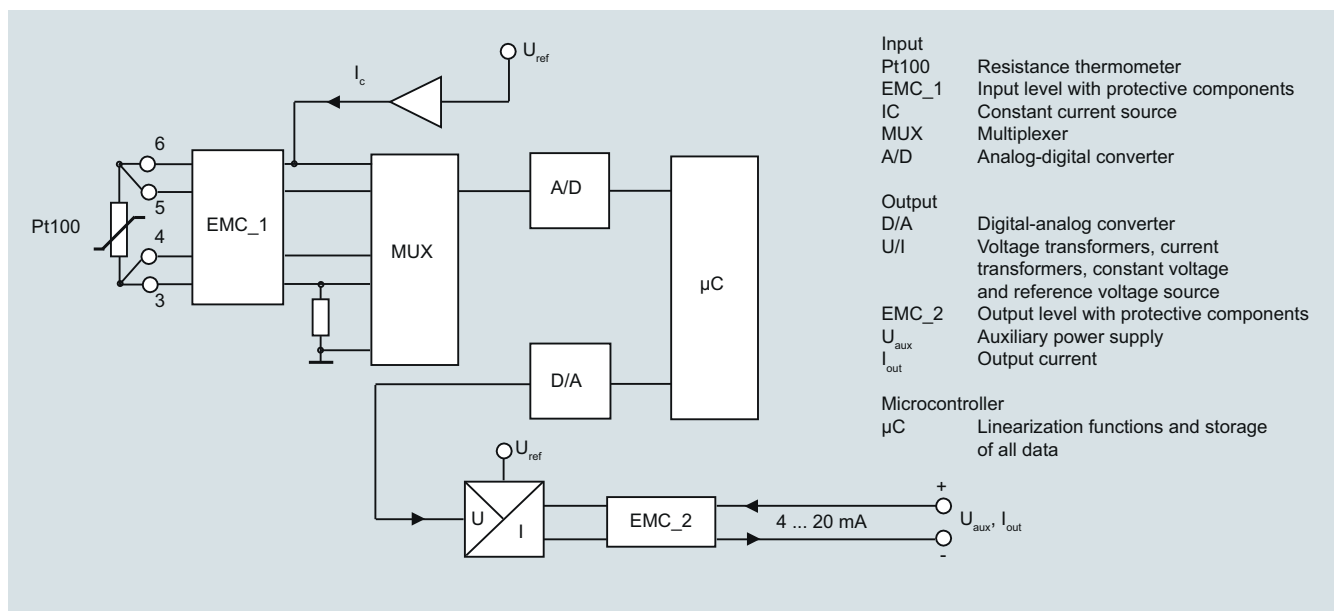
Function

Mode of operation

The measured signal supplied by a Pt100 resistance thermometer (2, 3 or 4-wire system) is amplified in the input stage. The voltage, which is proportional to the input variable, is then converted into digital signals by a multiplexer in an analog/digital converter. They are converted in the microcontroller in accordance with the sensor characteristics and further parameters (measuring range, damping, ambient temperature etc.).

The signal prepared in this way is converted in a digital/analog converter into a load-independent direct current of 4 to 20 mA.

An EMC filter protects the input and output circuits against electromagnetic interferences.



SITRANS TH100, function diagram

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH100 (Pt100)

Technical specifications

Input		Construction	
Resistance thermometer		Weight	50 g
Measured variable	Temperature	Dimensions	See dimensional drawing
Sensor type	PT100 to IEC 60751	Material	Molded plastic
Characteristic curve	Temperature-linear	Cross-section of cables	Max. 2.5 mm ² (AWG 13)
Type of connection	2-, 3- or 4-wire circuit	Degree of protection to IEC 60529	
Resolution	14 bit	• Enclosure	IP40
Measuring accuracy		• Terminals	IP00
• Span <250 °C (450 °F)	< 0.25 °C (0.45 °F)	Certificates and approvals	
• Span >250 °C (450 °F)	< 0.1 % of span	Explosion protection ATEX	
Repeatability	< 0.1 °C (0.18 °F)	EC type test certificate	PTB 05 ATEX 2049X
Measuring current	approx. 0.4 mA	• "Intrinsic gas safety" type of protection	II 1 G Ex ia IIC T6/T4 II (1) 2 G Ex ib [ia Ga] IIC T6/T4 Gb II (1) 3 G Ex ic [ia Ga] IIC T6/T4 Gc II 3 G Ex ic IIC T6/T4 Gc
Measuring cycle	< 0.7 s	• "Non-sparking" type of protection	II 3 G Ex nA IIC T6/T4 Gc II 3 G Ex nA[ic] IIC T6/T4 Gc
Measuring range	-200 ... +850 °C -328 ... +1562 °F)	• "Intrinsic dust safety" type of protection	II 1 D Ex ia IIIC T115 °C Da
Measuring span	25 ... 1050 °C (77 ... 1922 °F)	Explosion protection FM for USA	
Unit	°C or °F	• FM approval	FM 3024169
Offset	programmable: -100 ... +100 °C (-180 ... +180 °F)	• Degree of protection	IS / CI I, II, III / Div 1 / GP ABCDEFG T6, T5, T4 CI I / ZN 0 / AEx ia IIC T6, T5, T4 NI / CI I / Div 2 / GP ABCDFG T6, T5, T4 NI / CI I / ZN 2 / IIC T6, T5, T4
Line resistance	Max. 20 Ω (total from feeder and return conductor)	Explosion protection FM for Canada (cFM _{US})	
Noise rejection	50 and 60 Hz	• FM approval	FM 3024169C
Output		• Degree of protection	IS / CI I, II, III / Div 1 / GP ABCDEFG T6, T5, T4 NI / CI I / DIV 2 / GP ABCD T6, T5, T4 NIFW / CI I, II, III / DIV 2 / GP ABCDFG T6, T5, T4 DIP / CI II, III / Div 2 / GP FG T6, T5, T4 CI I / ZN 0 / Ex ia IIC T6, T5, T4 CI I / ZN 2 / Ex nA nL IIC T6, T5, T4
Output signal	4 ... 20 mA, two-wire	Other certificates	EAC Ex(GOST), NEPSI
Auxiliary power	8.5 ... 36 V DC (30 V for Ex ia and ib; 32 V for Ex nL/ic; 35 V for Ex nA)	Software requirements for SIPROM T	
Max. load	(U _{aux} - 8.5 V)/0.023 A	PC operating system	Windows ME, 2000, XP, Win 7 and Win 8; can also be used in connection with RS 232 modem under Windows 95, 98 and 98SE
Overrange	3.6 ... 23 mA, infinitely adjustable (default range: 3.84 ... 20.5 mA)		
Error signal (following sensor fault) (conforming to NE43)	3.6 ... 23 mA, infinitely adjustable (default range: 3.6 mA or 22.8 mA)		
Damping time	0 ... 30 s (default value: 0 s)		
Protection	Against reversed polarity		
Resolution	12 bit		
Accuracy at 23 °C (73.4 °F)	< 0.1 % of span		
Temperature effect	< 0.1 %/10 °C (0.1 %/18 °F)		
Effect of auxiliary power	< 0.01 % of span/V		
Effect of load impedance	< 0.025 % of max. span/100 Ω		
Long-term drift	<ul style="list-style-type: none"> < 0.025 % of the max. span in the first month < 0.035 % of the max. span after one year < 0.05 % of the max. span after 5 years 		
Ambient conditions			
Ambient temperature range	-40 ... +85 °C (-40 ... +185 °F)		
Storage temperature range	-40 ... +85 °C (-40 ... +185 °F)		
Relative humidity	98 %, with condensation		
Electromagnetic compatibility	According to EN 61326 and NAMUR NE21		

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH100 (Pt100)

Selection and Ordering data

Article No.

SITRANS TH100 temperature transmitters for Pt100

for installation in connection head, type B (DIN 43729), two-wire system, 4 ... 20 mA, programmable, without electrical isolation

- Without explosion protection
- With explosion protection "Intrinsic safety" type of protection and for zone 2
 - to ATEX
 - to FM (cFMUS)

7NG3211-0NN00

7NG3211-0AN00
7NG3211-0BN00

Further designs

Order code

Add **"-Z"** to Article No. and specify Order code(s)

Test report (5 measuring points)

C11

Customer-specific programming

Add **"-Z"** to Article No. and specify Order code(s)

Measuring range to be set
Specify in plain text (max. 5 digits):
Y01: ... to ... °C, °F

Y01¹⁾

Measuring point no. (TAG), max. 8 characters

Y17²⁾

Measuring point descriptor, max. 16 characters

Y23²⁾

Pt100 (IEC) 2-wire, $R_L = 0 \Omega$

U02³⁾

Pt100 (IEC) 3-wire

U03³⁾

Pt100 (IEC) 4-wire

U04³⁾

Special differing customer-specific programming, specify in plain text

Y09⁴⁾

Fail-safe value 3.6 mA (instead of 22,8 mA)

U36²⁾

Accessories

Further accessories for assembly, connection and transmitter configuration, see page 2/120.

Article No.

Modem for SITRANS TH100, TH200, TR200 and TF with TH200 incl. SIPROM T parameterization software

With USB connection

7NG3092-8KN

DIN rail adapters for head transmitters

(Quantity delivered: 5 units)

7NG3092-8KA

Connecting cable

4-wire, 150 mm, for sensor connections when using head transmitters in the high hinged cover (set with 5 units)

7NG3092-8KC

- 1) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
- 2) For this selection, Y01 or Y09 must also be selected.
- 3) For this selection, Y01 must also be selected.
- 4) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Supply units see Chapter "Supplementary Components".

Ordering example

7NG3211-0NN00-Z Y01+Y23+U03

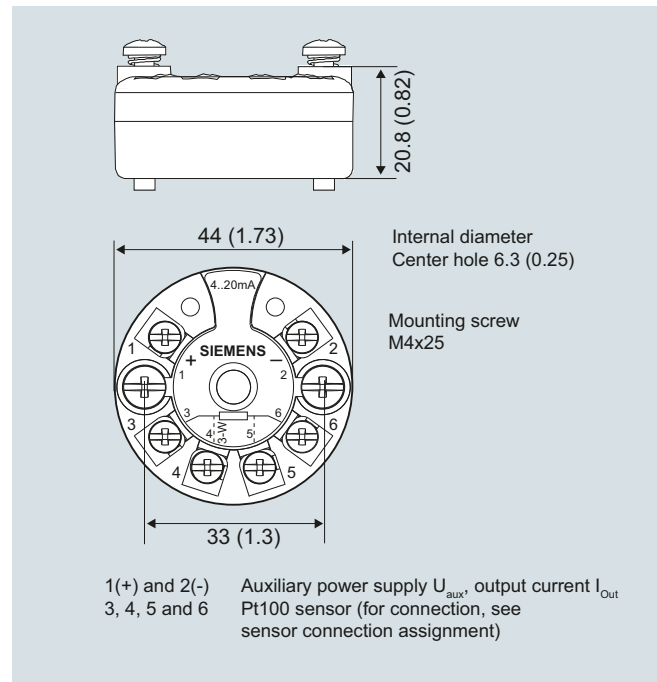
Y01: -10 ... +100 °C

Y23: TICA1234HEAT

Factory setting:

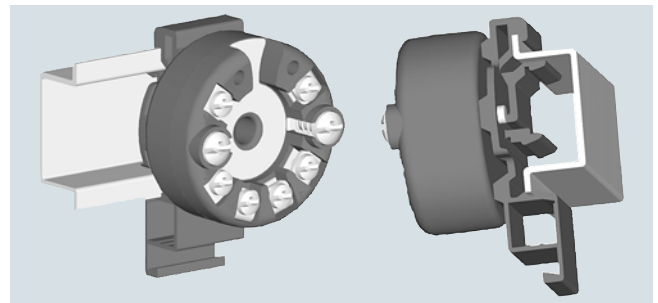
- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °C)
- Error signal in the event of sensor breakage: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Dimensional drawings

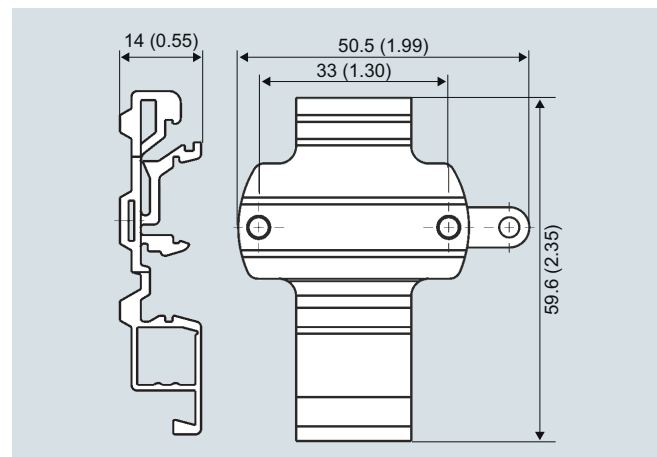


SITRANS TH100, dimensions in mm (inch)

Mounting on DIN rail

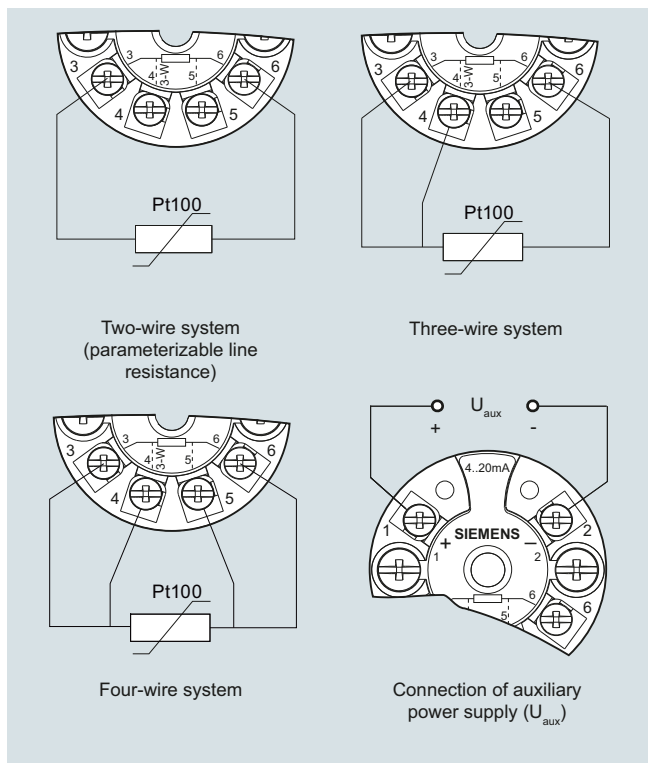


SITRANS TH100, mounting of transmitter on DIN rail



DIN rail adaptor, dimensions in mm (inch)

Schematics



SITRANS TH100, sensor connection assignment

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH200 (Universal)

Overview



Ultra flexible - with the universal SITRANS TH200 transmitter

- Two-wire devices for 4 to 20 mA
- Mounting in the connection head of the temperature sensor
- Universal input for virtually any type of temperature sensor
- Configurable over PC

Benefits

- Compact design
- Flexible mounting and center hole allow you to select your preferred type of installation
- Electrically isolated
- Test sockets for multimeters
- Diagnostics LED (green/red)
- Sensor monitoring open circuits and short-circuits
- Self-monitoring
- Configuration status stored in EEPROM
- SIL2 (with Order code C20), SIL2/3 (with C23)
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility to EN 61326 and NE21

Application

SITRANS TH200 transmitters can be used in all industrial sectors. Due to their compact size they can be installed in the connection head type B (DIN 43729) or larger. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometers (2, 3 or 4-wire system)
- Thermocouples
- Resistance-based sensors and DC voltage sources

The output signal is a direct current from 4 to 20 mA in accordance with the sensor characteristic.

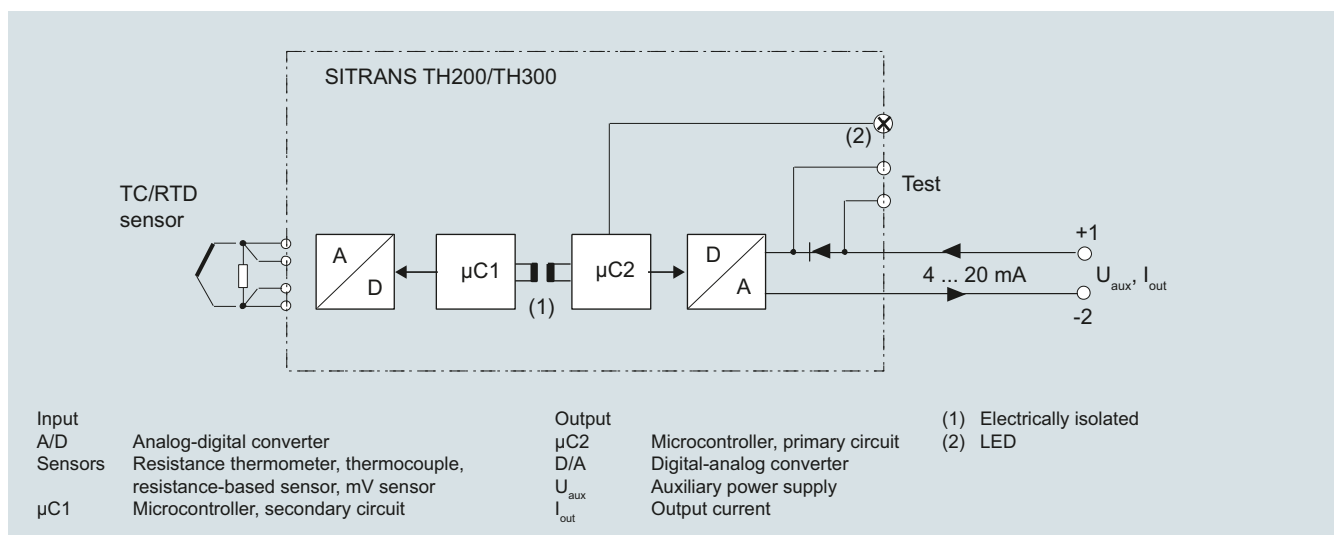
Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices comply with the Directive 2014/34/EU (ATEX), as well as FM and CSA regulations.

Function

The SITRANS TH200 is configured over a PC. A USB or RS 232 modem is linked to the output terminals for this purpose. The configuration data can now be edited using the SIPROM T software tool. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

Once the sensors and power supply have been correctly connected, the transmitter outputs a temperature-linear output signal and the diagnostics LED displays a green light. In the case of a sensor short-circuit, the LED flashes red, an internal device fault is indicated by a steady red light.

The test socket can be used to connect an ammeter at any time for monitoring purposes and plausibility checks. The output current can be read without any interruption, or even without opening the current loop.



SITRANS TH200 function diagram

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH200 (Universal)

Technical specifications

Input		Response time	
<u>Resistance thermometer</u>		≤ 250 ms for 1 sensor with open-circuit monitoring	
Measured variable	Temperature	Open-circuit monitoring	Always active (cannot be disabled)
Sensor type		Short-circuit monitoring	can be switched on/off (default value: OFF)
• to IEC 60751	Pt25 ... Pt1000	Measuring range	parameterizable max. 0 ... 2200 Ω (see table "Digital measuring errors")
• To JIS C 1604; $\alpha = 0.00392 \text{ K}^{-1}$	Pt25 ... Pt1000	Min. measured span	5 Ω ... 25 Ω (see Table "Digital measuring errors")
• to IEC 60751	Ni25 ... Ni1000	Characteristic curve	Resistance-linear or special characteristic
• Special type	over special characteristic (max. 30 points)	<u>Thermocouples</u>	
Sensor factor	0.25 ... 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 ... 1000)	Measured variable	Temperature
Units	°C or °F	Sensor type (thermocouples)	
Connection		• Type B	Pt30Rh-Pt6Rh to DIN IEC 584
• Standard connection	1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire system	• Type C	W5 %-Re acc. to ASTM 988
• Generation of average value	2 identical resistance thermometers in 2-wire system for generation of average temperature	• Type D	W3 %-Re acc. to ASTM 988
• Generation of difference	2 identical resistance thermometers (RTD) in 2-wire system (RTD 1 – RTD 2 or RTD 2 – RTD 1)	• Type E	NiCr-CuNi to DIN IEC 584
Interface		• Type J	Fe-CuNi to DIN IEC 584
• Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)	• Type K	NiCr-Ni to DIN IEC 584
• Three-wire system	No balancing required	• Type L	Fe-CuNi to DIN 43710
• Four-wire system	No balancing required	• Type N	NiCrSi-NiSi to DIN IEC 584
Sensor current	≤ 0.45 mA	• Type R	Pt13Rh-Pt to DIN IEC 584
Response time	≤ 250 ms for 1 sensor with open-circuit monitoring	• Type S	Pt10Rh-Pt to DIN IEC 584
Open-circuit monitoring	Always active (cannot be disabled)	• Type T	Cu-CuNi to DIN IEC 584
Short-circuit monitoring	can be switched on/off (default value: ON)	• Type U	Cu-CuNi to DIN 43710
Measuring range	parameterizable (see table "Digital measuring errors")	Units	°C or °F
Min. measured span	10 °C (18 °F)	Connection	
Characteristic curve	Temperature-linear or special characteristic	• Standard connection	1 thermocouple (TC)
<u>Resistance-based sensors</u>		• Generation of average value	2 thermocouples (TC)
Measured variable	Actual resistance	• Generation of difference	2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1)
Sensor type	Resistance-based, potentiometers	Response time	≤ 250 ms for 1 sensor with open-circuit monitoring
Units	Ω	Open-circuit monitoring	Can be switched off
Connection		Cold junction compensation	
• Normal connection	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire system	• Internal	With integrated Pt100 resistance thermometer
• Generation of average value	2 resistance-based sensors in 2-wire system for generation of average value	• External	With external Pt100 IEC 60751 (2-wire or 3-wire connection)
• Generation of difference	2 resistance thermometers in 2-wire system (R1 – R2 or R2 – R1)	• External fixed	Cold junction temperature can be set as fixed value
Interface		Measuring range	Parameterizable (see table "Digital measuring errors")
• Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)	Min. measured span	Min. 40 ... 100 °C (72 ... 180 °F) (see table "Digital measuring errors")
• Three-wire system	No balancing required	Characteristic curve	Temperature-linear or special characteristic
• Four-wire system	No balancing required	<u>mV sensor</u>	
Sensor current	≤ 0.45 mA	Measured variable	DC voltage
		Sensor type	DC voltage source (DC voltage source possible over an externally connected resistor)
		Units	mV
		Response time	≤ 250 ms for 1 sensor with open-circuit monitoring
		Open-circuit monitoring	Can be switched off
		Measuring range	-10 ... +70 mV-100 ... +1100 mV

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH200 (Universal)

Min. measured span	2 mV or 20 mV
Overload capability of the input	-1.5 ... +3.5 V DC
Input resistance	≥ 1 MΩ
Characteristic curve	Voltage-linear or special characteristic
Output	
Output signal	4 ... 20 mA, 2-wire
Auxiliary power	11 ... 35 V DC ((to 30 V for Ex ia and ib; to 32 V for Ex nA / nL / ic)
Max. load	(U _{aux} - 11 V)/0.023 A
Overrange	3.6 ... 23 mA, infinitely adjustable (default range: 3.80 mA ... 20.5 mA)
Error signal (e.g. following sensor fault) (conforming to NE43)	3.6 ... 23 mA, infinitely adjustable (default value: 22.8 mA)
Sample cycle	0.25 s nominal
Damping	Software filter 1st order 0 ... 30 s (parameterizable)
Protection	Against reversed polarity
Electrically isolated	Input against output (1 kV _{eff})
Measuring accuracy	
Digital measuring errors	See table "Digital measuring errors"
Reference conditions	
• Auxiliary power	24 V ± 1 %
• Load	500 Ω
• Ambient temperature	23 °C
• Warming-up time	> 5 min
Error in the analog output (digital/analog converter)	< 0.025 % of span
Error due to internal cold junction	< 0.5 °C (0.9 °F)
Influence of ambient temperature	
• Analog measuring error	0.02 % of span/10°C (18 °F)
• Digital measuring errors	
- with resistance thermometers	0.06 °C (0.11 °F)/10°C (18 °F)
- with thermocouples	0.6 °C (1.1 °F)/10°C (18 °F)
Auxiliary power effect	< 0.001 % of span/V
Effect of load impedance	< 0.002 % of span/100 Ω
Long-term drift	
• In the first month	< 0.02 % of span
• After one year	< 0.2 % of span
• After 5 years	< 0.3 % of span
Conditions of use	
<u>Ambient conditions</u>	
Ambient temperature range	-40 ... +85 °C (-40 ... +185 °F)
Storage temperature range	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	< 98 %, with condensation
Electromagnetic compatibility	acc. to EN 61326 and NE21
Construction	
Material	Molded plastic
Weight	50 g (0.11 lb)
Dimensions	See "Dimensional drawings"
Cross-section of cables	Max. 2.5 mm ² (AWG 13)
Degree of protection to IEC 60529	
• Enclosure	IP40
• Terminals	IP00

Certificates and approvals

Explosion protection ATEX

EC type test certificate

• "Intrinsic safety" type of protection

• "Operating equipment that is non-ignitable and has limited energy" type of protection

Explosion protection: FM for USA

• FM approval

• Degree of protection

Explosion protection to FM for Canada (cFM_{US})

• FM approval

• Degree of protection

Other certificates

Software requirements for SIPROM T

PC operating system

Factory setting:

- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

PTB 05 ATEX 2040X

II 1 G Ex ia IIC T6/T4
II 2 (1) G Ex ia/ib IIC T6/T4
II 3(1) G Ex ia/ic IIC T6/T4
II 1D Ex iaD 20 T115 °C

II 3 G Ex nL IIC T6/T4
II 3 G Ex nA IIC T6/T4

FM 3024169

IS / CI I, II, III / Div 1 / GP ABC-DEFG T6, T5, T4
CI I / ZN 0 / AEx ia IIC T6, T5, T4
NI / CI I / Div 2 / GP ABCDFG T6, T5, T4
NI / CI I / ZN 2 / IIC T6, T5, T4

FM 3024169C

IS / CI I, II, III / Div 1 / GP ABCDEFG T6, T5, T4
NI / CI I / DIV 2 / GP ABCD T6, T5, T4
NIFW / CI I, II, III / DIV 2 / GP ABCDFG T6, T5, T4
DIP / CI II, III / Div 2 / GP FG T6, T5, T4
CI I / ZN 0 / Ex ia IIC T6, T5, T4
CI I / ZN 2 / Ex nA nL IIC T6, T5, T4

EAC Ex(GOST), NEPSI, IEC, EXPOLABS

Windows ME, 2000, XP, Win 7 and Win 8; can also be used in connection with RS 232 modem under Windows 95, 98 and 98SE

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH200 (Universal)

Digital measuring errors

Resistance thermometer

Input	Measuring range	Min. mea- sured span		Digital accuracy	
	°C / (°F)	°C	(°F)	°C	(°F)
to IEC 60751					
Pt25	-200 ... +850 (-328 ... +1562)	10	(18)	0.3	(0.54)
Pt50	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +850 (-328 ... +1562)	10	(18)	0.1	(0.18)
Pt500	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
to JIS C1604-81					
Pt25	-200 ... +649 (-328 ... +1200)	10	(18)	0.3	(0.54)
Pt50	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +649 (-328 ... +1200)	10	(18)	0.1	(0.18)
Pt500	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
Ni 25 ... Ni1000	-60 ... +250 (-76 ... +482)	10	(18)	0.1	(0.18)

Resistance-based sensors

Input	Measuring range	Min. mea- sured span		Digital accuracy	
	Ω	Ω		Ω	
Resistance	0 ... 390	5		0.05	
Resistance	0 ... 2200	25		0.25	

Thermocouples

Input	Measuring range	Min. mea- sured span		Digital accuracy	
	°C/(°F)	°C	(°F)	°C	(°F)
Type B	100 ... 1820 (212 ... 3308)	100	(180)	2 ¹⁾	(3.6) ¹⁾
Type C (W5)	0 ... 2300 (32 ... 4172)	100	(180)	2	(3.6)
Type D (W3)	0 ... 2300 (32 ... 4172)	100	(180)	1 ²⁾	(1.8) ²⁾
Type E	-200 ... +1000 (-328 ... +1832)	50	(90)	1	(1.8)
Type J	-200 ... +1200 (-328 ... +2192)	50	(90)	1	(1.8)
Type K	-200 ... +1370 (-328 ... +2498)	50	(90)	1	(1.8)
Type L	-200 ... +900 (-328 ... +1652)	50	(90)	1	(1.8)
Type N	-200 ... +1300 (-328 ... +2372)	50	(90)	1	(1.8)
Type R	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.6)
Type S	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.6)
Type T	-200 ... +400 (-328 ... +752)	40	(72)	1	(1.8)
Type U	-200 ... +600 (-328 ... +1112)	50	(90)	2	(3.6)

¹⁾ The digital accuracy in the range 100 to 300 °C (212 to 572 °F) is 3 °C (5.4 °F).

²⁾ The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

mV sensor

Input	Measuring range	Min. measured span		Digital accuracy	
	mV	mV		μV	
mV sensor	-10 ... +70	2		40	
mV sensor	-100 ... +1100	20		400	

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value.

An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0.025 % of the set span (digital-analog error).

The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of cold junction errors in the case of thermocouple measurements).

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH200 (Universal)

Selection and Ordering data

Article No.

Temperature transmitter SITRANS TH200

for installation in connection head, type B (DIN 43729), two-wire system, 4 ... 20 mA, programmable, with electrical isolation

- Without explosion protection
- With explosion protection
 - to ATEX
 - to FM (cFM_{US})

7NG3211-1NN00

7NG3211-1AN00

7NG3211-1BN00

Further designs

Order code

Add "-Z" to Article No. and specify Order code(s)

With test protocol (5 measuring points)

C11

Functional safety SIL2

C20

Functional safety SIL2/3

C23

Customer-specific programming

Add "-Z" to Article No. and specify Order code(s)

Measuring range to be set
Specify in plain text (max. 5 digits):
Y01: ... to ... °C, °F

Y01¹⁾

Measuring point no. (TAG), max. 8 characters

Y17²⁾

Measuring point descriptor, max. 16 characters

Y23²⁾

Measuring point message, max. 32 characters

Y24²⁾Pt100 (IEC) 2-wire, R_L = 0 ΩU02³⁾

Pt100 (IEC) 3-wire

U03³⁾

Pt100 (IEC) 4-wire

U04³⁾

Thermocouple type B

U20³⁾⁴⁾

Thermocouple type C (W5)

U21³⁾⁴⁾

Thermocouple type D (W3)

U22³⁾⁴⁾

Thermocouple type E

U23³⁾⁴⁾

Thermocouple type J

U24³⁾⁴⁾

Thermocouple type K

U25³⁾⁴⁾

Thermocouple type L

U26³⁾⁴⁾

Thermocouple type N

U27³⁾⁴⁾

Thermocouple type R

U28³⁾⁴⁾

Thermocouple type S

U29³⁾⁴⁾

Thermocouple type T

U30³⁾⁴⁾

Thermocouple type U

U31³⁾⁴⁾

With TC: CJC external (Pt100, 3-wire)

U41

With TC: CJC external with fixed value, specify in plain text

Y50

Special differing customer-specific programming, specify in plain text

Y09⁵⁾

Fail-safe value 3.6 mA (instead of 22,8 mA)

U36²⁾

Cable extension
Transmitter with installed cable extension
150 mm (5.91 inch),
for Pt100 in four-wire system

W01

Accessories

Further accessories for assembly, connection and transmitter configuration, see page 2/120.

Article No.

Modem for SITRANS TH100, TH200, TR200 and TF with TH200 incl. SIPROM T parameterization software
With USB connection

7NG3092-8KN

DIN rail adapters for head transmitters
(Quantity delivered: 5 units)

7NG3092-8KA

Connecting cable
4-wire, 150 mm, for sensor connections when using head transmitters in the high hinged cover (set with 5 units)

7NG3092-8KC

- 1) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
- 2) For this selection, Y01 or Y09 must also be selected.
- 3) For this selection, Y01 must also be selected.
- 4) Internal cold junction compensation is selected as the default for TC.
- 5) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Supply units see Chapter "Supplementary Components".

Ordering example 1:

7NG3211-1NN00-Z Y01+Y17+U03
Y01: -10 ... +100 °C
Y17: TICA123

Ordering example 2:

7NG3211-1NN00-Z Y01+Y23+U25
Y01: -10 ... +100 °C
Y23: TICA1234HEAT

Factory setting:

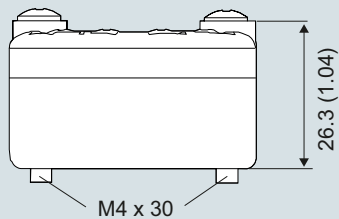
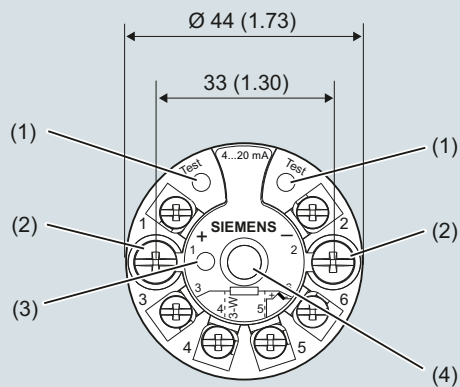
- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH200 (Universal)

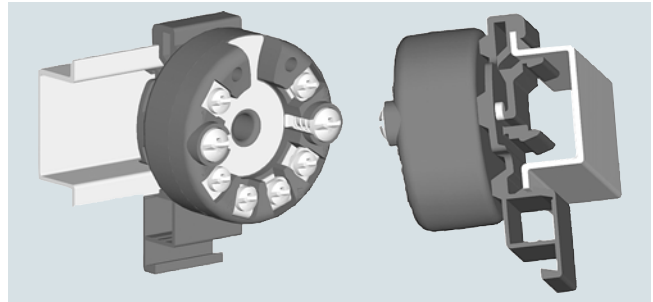
Dimensional drawings



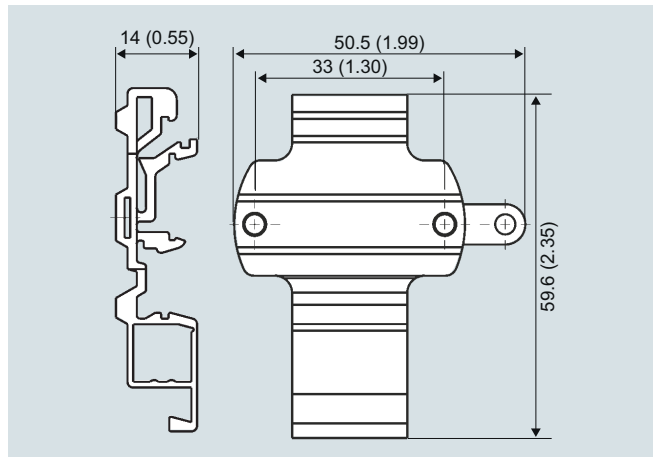
- | | |
|--------------------|--|
| 1(+) | Auxiliary power supply U_{aux} |
| 2(-) | output current I_{out} |
| 3, 4, 5 and 6 | Pt100 sensor (for connections, see Sensor connection assignment) |
| Test (+), Test (-) | Measurement of the output current with a multimeter |
| (1) | Test terminal |
| (2) | Mounting screw M4x30 |
| (3) | LED for operation indication |
| (4) | Internal diameter of center hole 6.3 (0.25) |

SITRANS TH200, dimensions and pin assignment, dimensions in mm (inch)

Mounting on DIN rail



SITRANS TH200, mounting of transmitter on DIN rail



DIN rail adapter, dimensions in mm (inch)

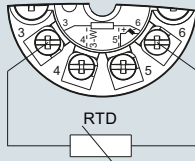
Temperature Measurement

Transmitters for mounting in sensor head

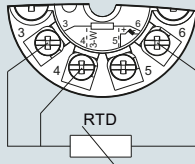
SITRANS TH200 (Universal)

Schematics

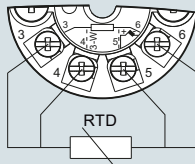
Resistance thermometer



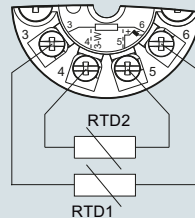
Two-wire system ¹⁾



Three-wire system



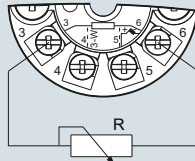
Four-wire system



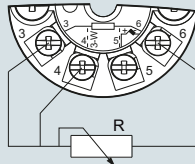
Generation of average value / difference ¹⁾

¹⁾ Programmable line resistance for the purpose of correction.

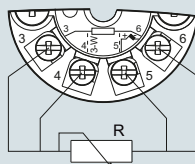
Resistance



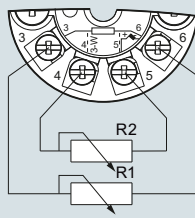
Two-wire system ¹⁾



Three-wire system

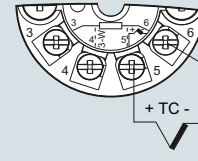


Four-wire system

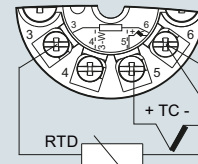


Generation of average value / difference ¹⁾

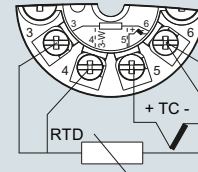
Thermocouple



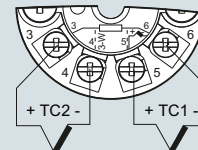
Cold junction compensation
Internal/fixed value



Cold junction compensation with
external Pt100 in two-wire system ¹⁾

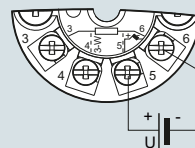


Cold junction compensation with
external Pt100 in three-wire system

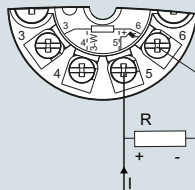


Generation of average value / difference
with internal cold junction compensation

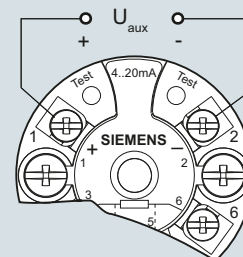
Voltage measurement



Current measurement



Connection of auxiliary power supply (U_{aux})



SITRANS TH200, sensor connection assignment

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH300 (Universal, HART)

Overview



"HART" to beat - the universal SITRANS TH300 transmitter

- Two-wire devices for 4 to 20 mA, HART
- Mounting in the connection head of the temperature sensor
- Universal input for virtually any type of temperature sensor
- Configurable over HART

Benefits

- Compact design
- Flexible mounting and center hole allow you to select your preferred type of installation
- Electrically isolated
- Test sockets for multimeters
- Diagnostics LED (green/red)
- Sensor monitoring open circuits and short-circuits
- Self-monitoring
- Configuration status stored in EEPROM
- SIL2 (with Order code C20), SIL2/3 (with C23)
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility to EN 61326 and NE21

Application

SITRANS TH300 transmitters can be used in all industrial sectors. Due to their compact size they can be installed in the connection head type B (DIN 43729) or larger. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometers (2, 3 or 4-wire system)
- Thermocouples
- Resistance-based sensors and DC voltage sources

The output signal is a direct current from 4 to 20 mA in accordance with the sensor characteristic, superimposed by the digital HART signal.

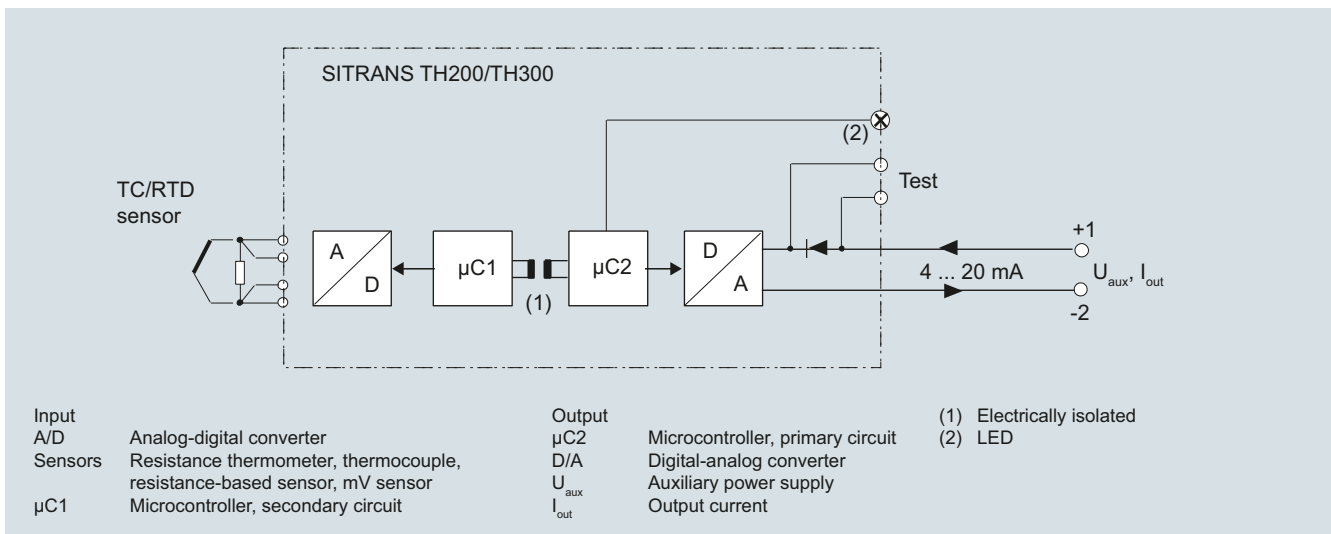
Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices comply with the Directive 2014/34/EU (ATEX), as well as FM and CSA regulations.

Function

The SITRANS TH300 is configured over HART. This can be done using a handheld communicator or even more conveniently with a HART modem and the SIMATIC PDM parameterization software. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

Once the sensors and power supply have been correctly connected, the transmitter outputs a temperature-linear output signal and the diagnostics LED displays a green light. In the case of a sensor short-circuit, the LED flashes red, an internal device fault is indicated by a steady red light.

The test socket can be used to connect an ammeter at any time for monitoring purposes and plausibility checks. The output current can be read without any interruption, or even without opening the current loop.



SITRANS TH 300 function diagram

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH300 (Universal, HART)

Technical specifications

Input

Resistance thermometer

Measured variable	Temperature
Sensor type	
• To IEC 60751	Pt25 ... Pt1000
• To JIS C 1604; $\alpha = 0.00392 \text{ K}^{-1}$	Pt25 ... Pt1000
• To IEC 60751	Ni25 ... Ni1000
• Special type	over special characteristic (max. 30 points)
Sensor factor	0.25 ... 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 ... 1000)
Units	°C or °F
Connection	
• Standard connection	1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire system
• Generation of average value	2 identical resistance thermometers in 2-wire system for generation of average temperature
• Generation of difference	2 identical resistance thermometers (RTD) in 2-wire system (RTD 1 – RTD 2 or RTD 2 – RTD 1)
Interface	
• Two-wire system	Parameterizable line resistance $\leq 100 \Omega$ (loop resistance)
• Three-wire system	No balancing required
• Four-wire system	No balancing required
Sensor current	$\leq 0.45 \text{ mA}$
Response time	$\leq 250 \text{ ms}$ for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Always active (cannot be disabled)
Short-circuit monitoring	can be switched on/off (default value: ON)
Measuring range	parameterizable (see table "Digital measuring errors")
Min. measured span	10 °C (18 °F)
Characteristic curve	Temperature-linear or special characteristic

Resistance-based sensors

Measured variable	Actual resistance
Sensor type	Resistance-based, potentiometers
Units	Ω
Connection	
• Normal connection	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire system
• Generation of average value	2 resistance-based sensors in 2-wire system for generation of average value
• Generation of difference	2 resistance thermometers in 2-wire system (R1 – R2 or R2 – R1)
Interface	
• Two-wire system	Parameterizable line resistance $\leq 100 \Omega$ (loop resistance)
• Three-wire system	No balancing required
• Four-wire system	No balancing required
Sensor current	$\leq 0.45 \text{ mA}$

Response time	$\leq 250 \text{ ms}$ for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Always active (cannot be disabled)
Short-circuit monitoring	can be switched on/off (default value: OFF)
Measuring range	parameterizable max. 0 ... 2200 Ω (see table "Digital measuring errors")
Min. measured span	5 ... 25 Ω (see table "Digital measuring errors")
Characteristic curve	Resistance-linear or special characteristic
<u>Thermocouples</u>	
Measured variable	Temperature
Sensor type (thermocouples)	
• Type B	Pt30Rh-Pt6Rh to DIN IEC 584
• Type C	W5 %-Re acc. to ASTM 988
• Type D	W3 %-Re acc. to ASTM 988
• Type E	NiCr-CuNi to DIN IEC 584
• Type J	Fe-CuNi to DIN IEC 584
• Type K	NiCr-Ni to DIN IEC 584
• Type L	Fe-CuNi to DIN 43710
• Type N	NiCrSi-NiSi to DIN IEC 584
• Type R	Pt13Rh-Pt to DIN IEC 584
• Type S	Pt10Rh-Pt to DIN IEC 584
• Type T	Cu-CuNi to DIN IEC 584
• Type U	Cu-CuNi to DIN 43710
Units	°C or °F
Connection	
• Standard connection	1 thermocouple (TC)
• Generation of average value	2 thermocouples (TC)
• Generation of difference	2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1)
Response time	$\leq 250 \text{ ms}$ for 1 sensor with open-circuit monitoring
Open-circuit monitoring	can be switched off
Cold junction compensation	
• Internal	With integrated Pt100 resistance thermometer
• External	With external Pt100 IEC 60751 (2-wire or 3-wire connection)
• External fixed	Cold junction temperature can be set as fixed value
Measuring range	parameterizable (see table "Digital measuring errors")
Min. measured span	Min. 40 ... 100 °C (72 ... 180 °F) (see table "Digital measuring errors")
Characteristic curve	Temperature-linear or special characteristic
<u>mV sensor</u>	
Measured variable	DC voltage
Sensor type	DC voltage source (DC voltage source possible over an externally connected resistor)
Units	mV
Response time	$\leq 250 \text{ ms}$ for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Can be switched off

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH300 (Universal, HART)

Measuring range	-10 ... +70 mV -100 ... +1100 mV	Construction	Molded plastic
Min. measured span	2 mV or 20 mV	Material	50 g (0.11 lb)
Overload capability of the input	-1.5 ... +3.5 V DC	Weight	See "Dimensional drawings"
Input resistance	≥ 1 MΩ	Dimensions	Max. 2.5 mm ² (AWG 13)
Characteristic curve	Voltage-linear or special characteristic	Cross-section of cables	
		Degree of protection to IEC 60529	
Output		• Enclosure	IP40
Output signal	4 ... 20 mA, 2-wire with communication acc. to HART Rev. 5.9	• Terminals	IP00
Auxiliary power	11 ... 35 V DC (to 30 V for Ex ia and ib; to 32 V for Ex nA/nL/ic)	Certificates and approvals	
Max. load	(U _{aux} - 11 V)/0.023 A	Explosion protection ATEX	
Overrange	3.6 ... 23 mA, infinitely adjustable (default range: 3.80 mA ... 20.5 mA)	EC type test certificate	PTB 05 ATEX 2040X
Error signal (e.g. following sensor fault) (conforming to NE43)	3.6 ... 23 mA, infinitely adjustable (default value: 22.8 mA)	• "Intrinsic safety" type of protection	II 1 G Ex ia IIC T6/T4 II 2 (1) G Ex ia/ib IIC T6/T4 II 3(1) G Ex ia/ic IIC T6/T4 II 1D Ex iaD 20 T115 °C
Sample cycle	0.25 s nominal	• "Operating equipment that is non-ignitable and has limited energy" type of protection	II 3 G Ex nL IIC T6/T4 II 3 G Ex nA IIC T6/T4
Damping	Software filter 1st order 0 ... 30 s (parameterizable)	Explosion protection: FM for USA	
Protection	Against reversed polarity	• FM approval	FM 3024169
Electrically isolated	Input against output (1 kV _{eff})	• Degree of protection	IS / CI I, II, III / Div 1 / GP ABC-DEFG T6, T5, T4 CI I / ZN 0 / AEx ia IIC T6, T5, T4 NI / CI I / Div 2 / GP ABCDFG T6, T5, T4 NI / CI I / ZN 2 / IIC T6, T5, T4
Measuring accuracy		Explosion protection to FM for Canada (cFM _{US})	
Digital measuring errors	See Table "Digital measuring errors"	• FM approval	FM 3024169C
Reference conditions		• Degree of protection	IS / CI I, II, III / Div 1 / GP ABC-DEFG T6, T5, T4 NI / CI I / DIV 2 / GP ABCD T6, T5, T4 NIFW / CI I, II, III / DIV 2 / GP ABCDFG T6, T5, T4 DIP / CI II, III / Div 2 / GP FG T6, T5, T4 CI I / ZN 0 / Ex ia IIC T6, T5, T4 CI I / ZN 2 / Ex nA nL IIC T6, T5, T4
• Auxiliary power	24 V ± 1 %	Other certificates	EAC Ex(GOST), NEPSI, IEC, EXPOLABS
• Load	500 Ω		
• Ambient temperature	23 °C		
• Warming-up time	> 5 min		
Error in the analog output (digital/analog converter)	< 0.025 % of span		
Error due to internal cold junction	< 0.5 °C (0.9 °F)		
Influence of ambient temperature			
• Analog measuring error	0.02 % of span/10°C (18 °F)		
• Digital measuring errors			
- with resistance thermometers	0.06 °C (0.11 °F)/10°C (18 °F)		
- with thermocouples	0.6 °C (1.1 °F)/10°C (18 °F)		
Auxiliary power effect	< 0.001 % of span/V		
Effect of load impedance	< 0.002 % of span/100 Ω		
Long-term drift			
• In the first month	< 0.02 % of span		
• After one year	< 0.2 % of span		
• After 5 years	< 0.3 % of span		
Conditions of use		Factory setting:	
<u>Ambient conditions</u>		• Pt100 (IEC 751) with 3-wire circuit	
Ambient temperature range	-40 ... +85 °C (-40 ... +185 °F)	• Measuring range: 0 ... 100 °C (32 ... 212 °F)	
Storage temperature range	-40 ... +85 °C (-40 ... +185 °F)	• Fault current: 22.8 mA	
Relative humidity	< 98 %, with condensation	• Sensor offset: 0 °C (0 °F)	
Electromagnetic compatibility	acc. to EN 61326 and NE21	• Damping 0.0 s	

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH300 (Universal, HART)

Digital measuring errors

Resistance thermometer

Input	Measuring range	Min. mea- sured span		Digital accuracy	
	°C/(°F)	°C	(°F)	°C	(°F)
to IEC 60751					
Pt25	-200 ... +850 (-328 ... +1562)	10	(18)	0.3	(0.54)
Pt50	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +850 (-328 ... +1562)	10	(18)	0.1	(0.18)
Pt500	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
to JIS C1604-81					
Pt25	-200 ... +649 (-328 ... +1200)	10	(18)	0.3	(0.54)
Pt50	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +649 (-328 ... +1200)	10	(18)	0.1	(0.18)
Pt500	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
Ni 25 ... Ni1000	-60 ... +250 (-76 ... +482)	10	(18)	0.1	(0.18)

Resistance-based sensors

Input	Measuring range Ω	Min. mea- sured span Ω	Digital accuracy Ω
Resistance	0 ... 390	5	0.05
Resistance	0 ... 2200	25	0.25

Thermocouples

Input	Measuring range °C/(°F)	Min. mea- sured span		Digital accuracy	
		°C	(°F)	°C	(°F)
Type B	100 ... 1820 (212 ... 3308)	100	(180)	2 ¹⁾	(3.6) ¹⁾
Type C (W5)	0 ... 2300 (32 ... 4172)	100	(180)	2	(3.6)
Type D (W3)	0 ... 2300 (32 ... 4172)	100	(180)	1 ²⁾	(1.8) ²⁾
Type E	-200 ... +1000 (-328 ... +1832)	50	(90)	1	(1.8)
Type J	-200 ... +1200 (-328 ... +2192)	50	(90)	1	(1.8)
Type K	-200 ... +1370 (-328 ... +2498)	50	(90)	1	(1.8)
Type L	-200 ... +900 (-328 ... +1652)	50	(90)	1	(1.8)
Type N	-200 ... +1300 (-328 ... +2372)	50	(90)	1	(1.8)
Type R	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.6)
Type S	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.6)
Type T	-200 ... +400 (-328 ... +752)	40	(72)	1	(1.8)
Type U	-200 ... +600 (-328 ... +1112)	50	(90)	2	(3.6)

1) The digital accuracy in the range 100 to 300 °C (212 to 572 °F) is 3 °C (5.4 °F).

2) The digital accuracy in the range 1750 to 2300 (3182 to 4172 °F) is 2 °C (3.6 °F).

mV sensor

Input	Measuring range mV	Min. mea- sured span mV	Digital accuracy μV
mV sensor	-10 ... +70	2	40
mV sensor	-100 ... +1100	20	400

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value.

An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0.025 % of the set span (digital-analog error).

The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of cold junction errors in the case of thermocouple measurements).

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH300 (Universal, HART)

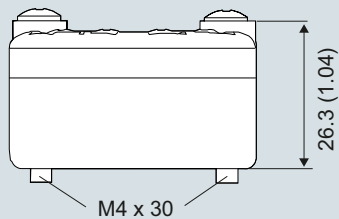
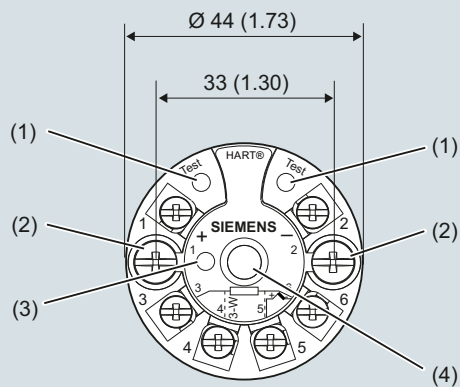
Selection and Ordering data		Article No.	Accessories	Article No.
Temperature transmitter SITRANS TH300			Further accessories for assembly, connection and transmitter configuration, see page 2/120.	
for installation in connection head, type B (DIN 43729), two-wire system 4 ... 20 mA, communication capable to HART, with galvanic isolation			HART modem	
<ul style="list-style-type: none"> Without explosion protection 		7NG3212-0NN00	<ul style="list-style-type: none"> With USB connection 	7MF4997-1DB
<ul style="list-style-type: none"> With explosion protection <ul style="list-style-type: none"> to ATEX to FM (C_{FMUS}) 		7NG3212-0AN00 7NG3212-0BN00	SIMATIC PDM operating software	See Section 8
Further designs		Order code	DIN rail adapters for head transmitters	7NG3092-8KA
Add "-Z" to Article No. and specify Order code(s)			(Quantity delivered: 5 units)	
with test protocol (5 measuring points)		C11	Connecting cable	7NG3092-8KC
Functional safety SIL2		C20	4-wire, 150 mm, for sensor connections when using head transmitters in the high hinged cover (set with 5 units)	
Functional safety SIL2/3		C23	<ol style="list-style-type: none"> For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here. For this selection, Y01 or Y09 must also be selected. For this selection, Y01 must also be selected. Internal cold junction compensation is selected as the default for TC. For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here. 	
Customer-specific programming			Supply units see Chapter "Supplementary Components".	
Add "-Z" to Article No. and specify Order code(s)			<u>Ordering example 1:</u>	
Measuring range to be set		Y01¹⁾	7NG3212-0NN00-Z Y01+Y17+U03	
Specify in plain text (max. 5 digits):			Y01: -10 ... +100 °C	
Y01: ... to ... °C, °F			Y17: TICA123	
Measuring point no. (TAG), max. 8 characters		Y17²⁾	<u>Ordering example 2:</u>	
Measuring point descriptor, max. 16 characters		Y23²⁾	7NG3212-0NN00-Z Y01+Y23+U25	
Measuring point message, max. 32 characters		Y24²⁾	Y01: -10 ... +100 °C	
Pt100 (IEC) 2-wire, R _L = 0 Ω		U02³⁾	Y23: TICA1234HEAT	
Pt100 (IEC) 3-wire		U03³⁾	<u>Factory setting:</u>	
Pt100 (IEC) 4-wire		U04³⁾	<ul style="list-style-type: none"> Pt100 (IEC 751) with 3-wire circuit Measuring range: 0 ... 100 °C (32 ... 212 °F) Fault current: 22.8 mA Sensor offset: 0 °C (0 °F) Damping 0.0 s 	
Thermocouple type B		U20³⁾⁴⁾		
Thermocouple type C (W5)		U21³⁾⁴⁾		
Thermocouple type D (W3)		U22³⁾⁴⁾		
Thermocouple type E		U23³⁾⁴⁾		
Thermocouple type J		U24³⁾⁴⁾		
Thermocouple type K		U25³⁾⁴⁾		
Thermocouple type L		U26³⁾⁴⁾		
Thermocouple type N		U27³⁾⁴⁾		
Thermocouple type R		U28³⁾⁴⁾		
Thermocouple type S		U29³⁾⁴⁾		
Thermocouple type T		U30³⁾⁴⁾		
Thermocouple type U		U31³⁾⁴⁾		
With TC: CJC external (Pt100, 3-wire)		U41		
With TC: CJC external with fixed value, specify in plain text		Y50		
Special differing customer-specific programming, specify in plain text		Y09⁵⁾		
Fail-safe value 3.6 mA (instead of 22,8 mA)		U36²⁾		
Cable extension		W01		
Transmitter with installed cable extension 150 mm (5.91 inch), for Pt100 in four-wire system				

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH300 (Universal, HART)

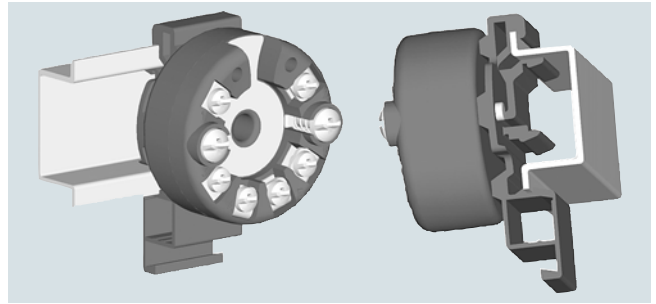
Dimensional drawings



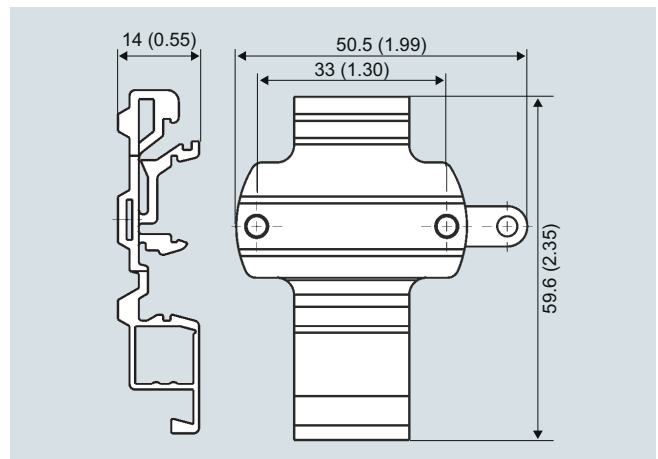
- | | |
|--------------------|--|
| 1(+) and 2(-) | Auxiliary power supply U_{aux} , output current I_{out} |
| 3, 4, 5 and 6 | Pt100 sensor (for connections, see Sensor connection assignment) |
| Test (+), Test (-) | Measurement of the output current with a multimeter |
| (1) | Test terminal |
| (2) | Mounting screw M4x30 |
| (3) | LED for operation indication |
| (4) | Internal diameter of center hole 6.3 (0.25) |

SITRANS TH300, dimensions and pin assignment, dimensions in mm (inch)

Mounting on DIN rail



SITRANS TH300, mounting of transmitter on DIN rail



DIN rail adapter, dimensions in mm (inch)

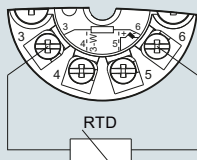
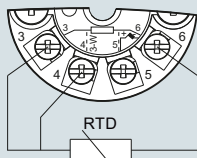
Temperature Measurement

Transmitters for mounting in sensor head

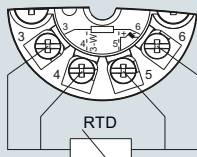
SITRANS TH300 (Universal, HART)

Schematics

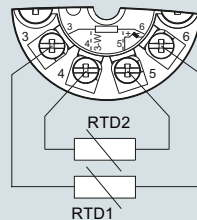
Resistance thermometer

Two-wire system ¹⁾

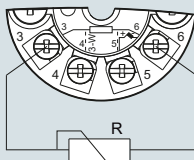
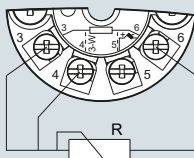
Three-wire system



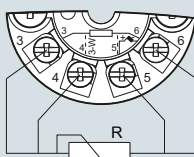
Four-wire system

Generation of average value / difference ¹⁾¹⁾ Programmable line resistance for the purpose of correction.

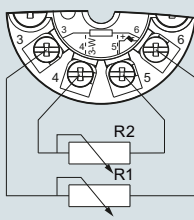
Resistance

Two-wire system ¹⁾

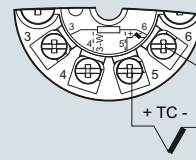
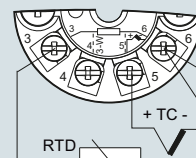
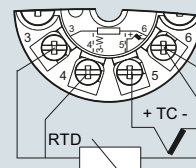
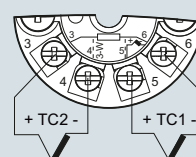
Three-wire system



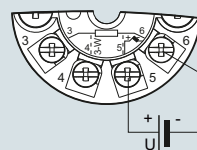
Four-wire system

Generation of average value / difference ¹⁾

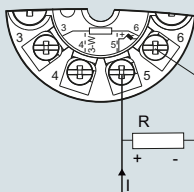
Thermocouple

Cold junction compensation
Internal/fixed valueCold junction compensation with
external Pt100 in two-wire system ¹⁾Cold junction compensation with
external Pt100 in three-wire systemGeneration of average value / difference
with internal cold junction compensation

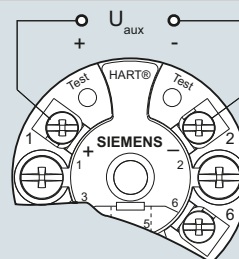
Voltage measurement



Current measurement



Connection of auxiliary power supply (U_{aux})



SITRANS TH300, sensor connection assignment

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH320 (HART)

Overview



- 2-wire temperature transmitter with HART communication interface
- Mounting in the connection head of the temperature sensor
- Universal input for virtually any type of temperature sensor
- HART 7

Benefits

- Compact design
- Flexible mounting and center hole allow you to select your preferred type of installation
- Electrical isolation
- Test terminals for ammeter
- Diagnostics LED (green/red)
- Input monitoring
Wire break and short-circuit
- Self-monitoring
- Configuration status stored in EEPROM
- SIL2/3 (with order note C20)
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility according to DIN EN 61326 and NE21

Application

SITRANS TH320 transmitters can be used in all sectors. Due to their compact size they can be installed in the connection head type B (DIN 43729) or larger. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometer (2-wire, 3-wire, 4-wire connection)
- Thermocouples
- Linear resistance, potentiometer and DC voltage sources

With HART communication interface:

- The output signal is a load-independent direct current from 4 to 20 mA in accordance with the input characteristic, superimposed by the digital HART signal.

Transmitters of the "intrinsically safe or Zone 2 increased safety" type of protection can be installed in hazardous areas. The device meets the requirements of the EU Directive 2014/34/EU (ATEX), the FM and CSA regulations as well as other national approvals.

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH320 (HART)

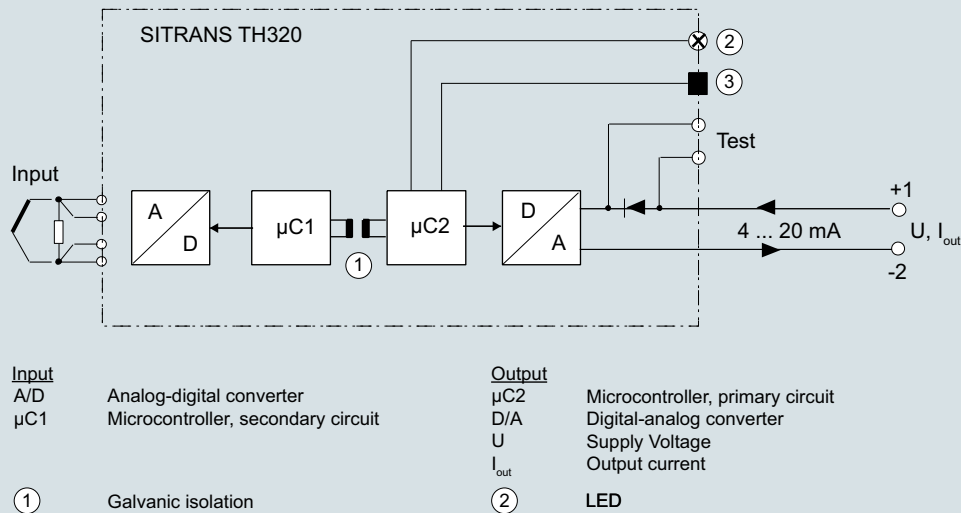
Function

With HART communication interface:

- The SITRANS TH320 is configured via HART. The configuration can be carried out using a handheld communicator or, more conveniently, with a HART modem and the SIMATIC PDM configuration software. The configuration data is then permanently stored in the non-volatile memory (EEPROM).

After correct connection of input and supply voltage, the transmitter outputs a temperature-linear output signal and the diagnostics LED is green. In case of external errors, e.g. sensor short circuit or interruption, the LED flashes red; an internal error is indicated by a permanent red light.

An ammeter can be connected at any time for checking and plausibility via the test terminals. The output current can be read without any interruption, or even without opening the current loop.



SITRANS TH320 function block diagram

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH320 (HART)

Technical specifications

General

Supply voltage ^{1) 2)}	
• Without explosion protection (non-Ex)	7.5 ... 48 V DC
• with explosion protection (Ex i)	7.5 ... 30 V DC
Additional minimum supply voltage when using test terminals	0.8 V
Maximum power loss	≤ 850 mW
Minimum load resistance at supply voltage > 37 V	(V _{supply} - 37 V)/23 mA
Insulation voltage, test/operation	
• Without explosion protection (non-Ex)	2.5 kV AC/55 V AC
• with explosion protection (Ex i)	2.5 kV AC/42 V AC
Polarity protection	All inputs and outputs
Write protection	Open circuits or software
Warming-up time	< 5 min
Starting time	< 2.75 s
Programming	HART
Signal-to-noise ratio	> 60 dB
Long-term stability	Better than: • ± 0.05% of measuring span/year • ± 0.18% of measuring span/5 years
Response time	4 ... 20 mA: ≤ 55 ms HART: ≤ 75 ms (typically 70 ms)
Programmable damping	0 ... 60 s
Signal dynamic	
• Input	24 bit
• Output	18 bit
Influence of change in supply voltage	< 0.005% of measuring span/V DC

Input

Resistance thermometer (RTD)

Input type	
• Pt10 ... 10000	• IEC 60751 • JIS C 1604-8 • GOST 6651_2009 • Callendar-Van Dusen
• Ni10 ... 10000	• DIN 43760-1987 • GOST 6651-2009 / OIML R84:2003
• Cu5 ... 1000	• Edison Copper Winding No. 15 • GOST 6651-2009 / OIML R84:2003
Type of connection	2-wire, 3-wire or 4-wire
Line resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the line resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• Pt1000, Pt10000 (IEC 60751 and JIS C 1604-8)	Max. 30 nF
• All other input types	Max. 50 nF
Fault detection, programmable	None, short-circuited, defective, short-circuited or defective
	Note When the low limit for the configured input type is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time (RTD)	≤ 75 ms (typically 70 ms)
Fault detection time (for 3-wire and 4-wire)	≤ 2000 ms

Thermocouples (TC)

Input type	
• B	IEC 60584-1
• E	IEC 60584-1
• J	IEC 60584-1
• K	IEC 60584-1
• L	DIN 43710
• Lr	GOST 3044-84
• N	IEC 60584-1
• R	IEC 60584-1
• S	IEC 60584-1
• T	IEC 60584-1
• U	DIN 43710
• W3	ASTM E988-96
• W5	ASTM E988-96
• LR	GOST 3044-84
Cold junction compensation (CJC)	Constant, internal or external over Pt100 or Ni100 RTD
• Temperature range internal CJC	-50 ... +100 °C (-+58 ... +212 °F)
• Connection external CJC	2-wire or 3-wire
• External CJC, line resistance per wire (for 3-wire and 4-wire connections)	50 Ω
• Effect of the line resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
• Input current external CJC	< 0.15 mA
• Temperature range external CJC	-50 ... +135 °C (-58 ... +275 °F)
• Cable, wire-wire capacity	Max. 50 nF
• Total line resistance	Max. 10 kΩ
• Fault detection, programmable	None, short-circuited, defective, short-circuited or defective
	Note The short-circuited fault detection only applies to the CJC input.
• Fault detection time (TC)	≤ 75 ms (typically 70 ms)
• Fault detection time, external CJC (for 3-wire and 4-wire)	≤ 2000 ms

Linear resistance

Input range	0 ... 100 kΩ
Minimum measuring span	25 Ω
Type of connection	2-wire, 3-wire or 4-wire
Line resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the line resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF
Fault detection, programmable	None, defective

Potentiometers

Input range	0 ... 100 kΩ
Minimum measuring span	25 Ω
Type of connection	3-wire or 4-wire
Line resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the line resistance (with 4-wire and 5-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH320 (HART)

2

Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note When the configured potentiometer size is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time, wiper arm (no short-circuit detection)	≤ 75 ms (typically 70 ms)
Fault detection time, element	≤ 2000 ms
Fault detection time (for 4-wire and 5-wire)	≤ 2000 ms
Voltage input	
Measuring range	
• Unipolar	-100 ... 1700 mV
• Bipolar	-800 ... +800 mV
Minimum measuring span	2.5 mV
Input resistance	10 MΩ
Cable, wire-wire capacity	
• Input range: -100 ... 1700 mV	Max. 30 nF
• Input range: -20 ... 100 mV	Max. 50 nF
Fault detection, programmable	None, defective
Fault detection time	≤ 75 ms (typically 70 ms)
Output and HART communication	
Normal range, programmable	3.8 ... 20.5 mA/20.5 ... 3.8 mA
Extended range (output limits), programmable	3.5 ... 23 mA/23 ... 3.5 mA
Programmable input/output limits	
• Fault current	Enable/disable
• Fault current setting	3.5 ... 23 mA
Update time	10 ms
Load (with current output)	≤ (V _{Supply} - 7.5)/0.023 Ω
Load stability	< 0.01% of meas. span/100 Ω (measuring span = currently selected range)
Input fault detection, programmable (detection of input short circuits is ignored with TC and voltage inputs)	3.5 ... 23 mA
NAMUR NE43 Upscale	> 21 mA
NAMUR NE43 Downscale	< 3.6 mA
HART protocol versions	HART 7
Measuring accuracy	
Input accuracy	See "Input accuracy" table
Output accuracy	See "Output accuracy" table
Rated conditions	
Ambient temperature (operation)	
• Standard	-50 ... +85 °C (-58 ... +185 °F)
• SIL	-40 ... +80 °C (-40 ... +176 °F)
Storage temperature	-50 ... +85 °C (-58 ... +185 °F)
Calibration temperature	24 °C ±1.0 °C (75.2 °F ±1.8 °F)
Relative humidity	< 99% (no condensation)
Degree of protection	
• Enclosure of the transmitter	IP68
• Terminals	IP00

Design	
Weight	50 g (0.11 lb)
Maximum cable cross-section	1 x 1.5 mm ² (stranded wire)
Tightening torque for clamping screws	0.4 Nm
Vibrations	IEC 60068-2-6
• 2 ... 25 Hz	± 1.6 mm (0.07 inch)
• 25 ... 100 Hz	± 4 g
Certificates and approvals	
<u>Explosion protection ATEX/IECEx and others</u>	
Certificates ³⁾	DEKRA 17ATEX0116 X IECEx DEK 17.0054X A5E43700604A-2018X
"Intrinsic safety ia/ib" type of protection	For use in Zone 0, 1, 2, 20, 21, 22
• ATEX	II 1 G Ex ia IIC T6 ... T4 Ga II 2(1) G Ex ib [ia Ga] IIC T6 ... T4 Gb II 1 D Ex ia IIIC Da I M1 Ex ia I Ma
• IECEx and others	Ex ia IIC T6 ... T4 Ga Ex ib [ia Ga] IIC T6 ... T4 Gb Ex ia IIIC Da Ex ia I Ma
"Intrinsic safety ic" type of protection	For use in Zones 2 and 22
• ATEX	II 2 G Ex ic IIC T6 ... T4 Gc II 2 D Ex ic IIIC Dc
• IECEx and others	Ex ic IIC T6 ... T4 Gc Ex ic IIIC Dc
"Non-sparking/increased safety nA/ec" type of protection	For use in Zones 2 and 22
• ATEX	II 2 G Ex nA IIC T6 ... T4 Gc II 2 G Ex ec IIC T6 ... T4 Gc
• IECEx and others	Ex nA IIC T6 ... T4 Gc Ex ec IIC T6 ... T4 Gc
<u>Explosion protection CSA /FM for Canada and USA</u>	
Certificates	CSA 1861385 FM18CA0024 FM18US0046
"Intrinsic safety ia" type of protection	IS, CL I, Div 1, GP ABCD, T6 ... T4 Ex ia IIC T6 ... T4 Ga AEx ia IIC T6 ... T4 Ga or: Ex ib [ia Ga] IIC T6 ... T4 Gb AEx ib [ia Ga] IIC T6 ... T4 Gb
"Non incandive field wiring NIFW" type of protection	NIFW, CL I, Div 2, GP ABCD T6 ... T4
"Non incandive NI" type of protection	NI, CL I, Div 2, GP ABCD T6 ... T4 Ex nA IIC T6 ... T4 Gc AEx nA IIC T6 ... T4 Gc

1) Note that the minimum supply voltage must correspond to the value measured at the terminals of the SITRANS TH320.
All external voltage drops must be taken into consideration.

2) Protect the device from overvoltage with the help of a suitable power supply or suitable overvoltage protection equipment.

3) Additional available certificates are listed on the Internet at <http://www.siemens.com/processinstrumentation/certificates>

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH320 (HART)

Measuring ranges/Minimum measuring span

RTD

Input type	Standard	Measuring range in °C (°F)	α_0 in °C ⁻¹ (°F ⁻¹)	Minimum measuring span in °C (°F)
Pt10 ... 10000	IEC 60751	-200 ... +850 (-328 ... +1562)	0.003851 (0.002139)	10 (50)
	JIS C 1604-8	-200 ... +649 (-328 ... +1200)	0.003916 (0.002176)	10 (50)
	GOST 6651_2009	-200 ... +850 (-328 ... +1562)	0.003910 (0.002172)	10 (50)
	Callendar-Van Dusen	-200 ... +850 (-328 ... +1562)	-	10 (50)
Ni10 ... 10000	DIN 43760-1987	-60 ... +250 (-76 ... +482)	0.006180 (0.003433)	10 (50)
	GOST 6651-2009 / OIML R84:2003	-60 ... +180 (-76 ... +356)	0.006170 (0.003428)	10 (50)
Cu5 ... 1000	Edison Copper Winding No. 15	-200 ... +260 (-328 ... +500)	0.004270 (0.002372)	100 (212)
	GOST 6651-2009 / OIML R84:2003	-180 ... +200 (-292 ... +392)	0.004280 (0.002378)	100 (212)
	GOST 6651-94	-50 ... +200 (-58 ... +392)	0.004260 (0.002367)	100 (212)

TC

Input type	Standard	Measuring range in °C (°F)	Minimum measuring span in °C (°F)
B	IEC 60584-1	0 (85) ... 1 820 (32 (185) ... 3 308)	100 (212)
E	IEC 60584-1	-200 ... +1 000 (-392 ... +1 832)	50 (122)
J	IEC 60584-1	-100 ... +1200 (-212 ... +2192)	50 (122)
K	IEC 60584-1	-180 ... +1372 (-356 ... +2502)	50 (122)
L	DIN 43710	-200 ... +900 (-392 ... +1652)	50 (122)
Lr	GOST 3044-84	-200 ... +800 (-392 ... +1472)	50 (122)
N	IEC 60584-1	-180 ... +1300 (-356 ... +2372)	50 (122)
R	IEC 60584-1	-50 ... +1760 (-122 ... +3200)	100 (212)
S	IEC 60584-1	-50 ... +1760 (-122 ... +3200)	100 (212)
T	IEC 60584-1	-200 ... +400 (-392 ... +752)	50 (122)
U	DIN 43710	-200 ... +600 (-392 ... +1112)	50 (122)
W3	ASTM E988-96	0 ... 2300 (32 ... 4172)	100 (212)
W5	ASTM E988-96	0 ... 2300 (32 ... 4172)	100 (212)
LR	GOST 3044-84	-200 ... +800 (-392 ... +1472)	50 (122)

Input accuracy

Basic values

Input type	Basic accuracy	Temperature coefficient ¹⁾
RTD		
Pt10	≤ ±0.8 °C (1.44 °F)	≤ ±0.020 °C/°C (°F/°F)
Pt20	≤ ±0.4 °C (0.72 °F)	≤ ±0.010 °C/°C (°F/°F)
Pt50	≤ ±0.16 °C (0.288 °F)	≤ ±0.004 °C/°C (°F/°F)
Pt100	≤ ±0.04 °C (0.072 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt200	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt500	T _{max.} < 180 °C (356 °F) = ≤ ±0.08 °C (0.144 °F) T _{max.} < 180 °C (356 °F) = ≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt1000	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt2000	T _{max.} < 300 °C (572 °F) = ≤ ±0.08 °C (0.144 °F) T _{max.} < 300 °C (572 °F) = ≤ ±0.4 °C (0.72 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt10000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Ni10	≤ ±1.6 °C (2.88 °F)	≤ ±0.020 °C/°C (°F/°F)
Ni20	≤ ±0.8 °C (1.44 °F)	≤ ±0.010 °C/°C (°F/°F)
Ni50	≤ ±0.32 °C (0.576 °F)	≤ ±0.004 °C/°C (°F/°F)
Ni100	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni120	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni200	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni500	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni1000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni2000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH320 (HART)

Input type	Basic accuracy	Temperature coefficient ¹⁾
Ni10000	$\leq \pm 0.32\text{ °C}$ (0.576 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Ni x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Cu5	$\leq \pm 1.6\text{ °C}$ (2.88 °F)	$\leq \pm 0.040\text{ °C/°C}$ (°F/°F)
Cu10	$\leq \pm 0.8\text{ °C}$ (1.44 °F)	$\leq \pm 0.020\text{ °C/°C}$ (°F/°F)
Cu20	$\leq \pm 0.4\text{ °C}$ (0.72 °F)	$\leq \pm 0.010\text{ °C/°C}$ (°F/°F)
Cu50	$\leq \pm 0.16\text{ °C}$ (0.288 °F)	$\leq \pm 0.004\text{ °C/°C}$ (°F/°F)
Cu100	$\leq \pm 0.08\text{ °C}$ (0.144 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Cu200	$\leq \pm 0.08\text{ °C}$ (0.144 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Cu500	$\leq \pm 0.16\text{ °C}$ (0.288 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Cu1000	$\leq \pm 0.08\text{ °C}$ (0.144 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Cu x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Linear resistance		
0 ... 400 Ω	$\leq \pm 40\text{ m}\Omega$	$\leq \pm 2\text{ m}\Omega/\text{°C}$ (1.11 m Ω /°F)
0 ... 100 k Ω	$\leq \pm 4\text{ }\Omega$	$\leq \pm 0.2\text{ }\Omega/\text{°C}$ (0.11 Ω /°F)
Potentiometers		
0 ... 100%	< 0.05%	< $\pm 0.005\%$
Voltage input		
mV: -20 ... 100 mV	$\leq \pm 5\text{ }\mu\text{V}$	$\leq \pm 0.2\text{ }\mu\text{V/°C}$ (0.11 $\mu\text{V/°F}$)
mV: -100 ... 1700 mV	$\leq \pm 0.1\text{ mV}$	$\leq \pm 36\text{ }\mu\text{V/°C}$ (20 $\mu\text{V/°F}$)
mV: $\pm 800\text{ mV}$	$\leq \pm 0.1\text{ mV}$	$\leq \pm 32\text{ }\mu\text{V/°C}$ (17.8 $\mu\text{V/°F}$)
TC		
E	$\leq \pm 0.2\text{ °C}$ (0.36 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
J	$\leq \pm 0.25\text{ °C}$ (0.45 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
K	$\leq \pm 0.25\text{ °C}$ (0.45 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
L	$\leq \pm 0.35\text{ °C}$ (0.63 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
N	$\leq \pm 0.4\text{ °C}$ (0.72 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
T	$\leq \pm 0.25\text{ °C}$ (0.45 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
U	$< 0\text{ °C}$ (32 °F) $\leq \pm 0.8\text{ °C}$ (1.44 °F) $\geq 0\text{ °C}$ (32 °F) $\leq \pm 0.4\text{ °C}$ (0.72 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
Lr	$\leq \pm 0.2\text{ °C}$ (0.36 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
R	$< 200\text{ °C}$ (392 °F) $\leq \pm 0.5\text{ °C}$ (0.9 °F) $\geq 200\text{ °C}$ (392 °F) $\leq \pm 1\text{ °C}$ (1.8 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
S	$< 200\text{ °C}$ (392 °F) $\leq \pm 0.5\text{ °C}$ (0.9 °F) $\geq 200\text{ °C}$ (392 °F) $\leq \pm 1\text{ °C}$ (1.8 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
W3	$\leq \pm 0.6\text{ °C}$ (1.08 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
W5	$\leq \pm 0.4\text{ °C}$ (0.72 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
B ²⁾	$\leq \pm 1\text{ °C}$ (1.8 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
B ³⁾	$\leq \pm 3\text{ °C}$ (5.4 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
B ⁴⁾	$\leq \pm 8\text{ °C}$ (14.4 °F)	$\leq \pm 0.8\text{ °C/°C}$ (°F/°F)
B ⁵⁾	Not specified	Not specified
CJC (internal)	$\leq \pm 0.5\text{ °C}$ (0.9 °F)	Included in basic accuracy
CJC (external)	$\leq \pm 0.08\text{ °C}$ (0.144 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)

¹⁾ Temperature coefficients correspond to the specified values or 0.002% of the input span, depending on which value is greater.

²⁾ Accuracy of the specification range > 400 °C (752 °F)

³⁾ Accuracy of the specification range > 160 °C (320 °F) < 400 °C (752 °F)

⁴⁾ Accuracy of the specification range > 85 °C (185 °F) < 160 °C (320 °F)

⁵⁾ Accuracy of the specification range > 85 °C (185 °F)

Output accuracy

Output type	Basic accuracy	Temperature coefficient
Analog output	$\leq \pm 1.6\text{ }\mu\text{A}$ (0.01% of the full output span)	$\leq \pm 0.48\text{ }\mu\text{A/K}$ ($\leq \pm 0.003\%$ of the full output span/K)

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH320 (HART)

Selection and ordering data

	Article No.	Options	Order code
Temperature transmitter SITRANS TH320 with 1 input	7NG031	Add "-Z" to article no. and specify order code.	
Click on the Article no. for the online configuration in the PIA Life Cycle Portal.		Certificates for functional safety	
		Functional safety SIL2/3 (IEC 61508)	C20
Communication		Special features of enclosure/packaging	
With HART	0	Without labeling of the measuring range on the TAG label	D41
Primary value output		Jumper plug set on device for write protection	D81
Input 1	0	Jumper plug set on device for fault current > 21 mA (instead of < 3.6 mA) (only non-SIL)	D82
Input 1, type		Input 1: TC	
RTD		Type C W5	V01
• Pt100 (IEC), 3-wire	B	Type D W3	V02
• Pt100 (IEC), 4-wire	C	Type U	V03
• Pt1000 (IEC), 3-wire	D	Type Lr	V04
• Pt1000 (IEC), 4-wire	E		
TC		Input 1: RTD	
• Type B	F	Pt x (IEC), 3-wire, define RTD factor x in option Y21	V61
• Type E	G	Pt x (IEC), 4-wire, define RTD factor x in option Y21	V62
• Type J	H	Pt x (JIS C1604-81), 3-wire, define RTD factor x in option Y21	V64
• Type K	J	Pt x (JIS C1604-81), 4-wire, define RTD factor x in option Y21	V65
• Type L	K	Pt x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V67
• Type N	L	Pt x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V68
• Type R	N	Ni x (DIN 43760-87), 3-wire, define RTD factor x in option Y21	V70
• Type S	P	Ni x (DIN 43760-87), 4-wire, define RTD factor x in option Y21	V71
• Type T	Q	Ni x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V73
Potentiometer, 4-wire	R	Ni x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V74
Input 1, type customer-specific		Cu x (ECW-15), 3-wire, define RTD factor x in option Y21	V76
Define customer-specific input configurations in V options	Y	Cu x (ECW-15), 4-wire, define RTD factor x in option Y21	V77
Input 2, type		Cu x (GOST 6651-94), 2-wire, define line resistance value in option Y51 and RTD factor x in option Y21	V78
Without input 2	A	Cu x (GOST 6651-94), 3-wire, define RTD factor x in option Y21	V79
CJC configuration for TC		Cu x (GOST 6651-94), 4-wire, define RTD factor x in option Y21	V80
Without CJC	0	Cu x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V82
Internal CJC	1	Cu x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V83
External CJC Pt100 (IEC), 2-wire, define line resistance value in option Y53	2		
External CJC Pt100 (IEC), 3-wire	3		
External CJC Ni100 (DIN), 2-wire, define line resistance value in option Y53	5		
External CJC Ni100 (DIN), 3-wire	6		
Materials not in contact with media			
None	0		
Type of protection			
General safety (non-Ex); CE, RCM, FM, CSA, KCC	A		
Ex i, Ex nA (ec) (Zone)/IS, NIFW, NI (Division); ATEX, IECEx, CSA, FM, NEPSI	N		
Electrical connection/cable entry			
None	A		
Local HMI			
Without display	0		

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH320 (HART)

Selection and ordering data

Customer-specific device settings

Customer-specific device settings	Order code
Add "-Z" to article no., specify order code and plain text or drop-down list selection.	
Measuring range setting temperature input: Start of scale value (max. 5 characters), full scale value (max. 5 characters), unit (°C, °F, °Ra, K)	Y01
Plant designation (TAG, device parameters, max. 32 characters)	Y15
Measuring point message (device message and device parameters, max. 32 characters)	Y16
Input 1: RTD factor; e.g. factor "200" = Pt200	Y21

Accessories

Accessories	Article No.
Further accessories for assembly, connection and transmitter configuration, see page 2/120.	
HART modem With USB interface	7MF4997-1DB
SIMATIC PDM parameterization software	See Catalog FI 01 section 8
DIN rail adapter for temperature transmitter for head mounting (Quantity delivered: 5 units)	7NG3092-8KA
Connecting cable 4-wire, 200 mm, for input connection with temperature transformers for head mounting in the high hinged cover (set with 5 units)	7NG3092-8KC

Ordering example

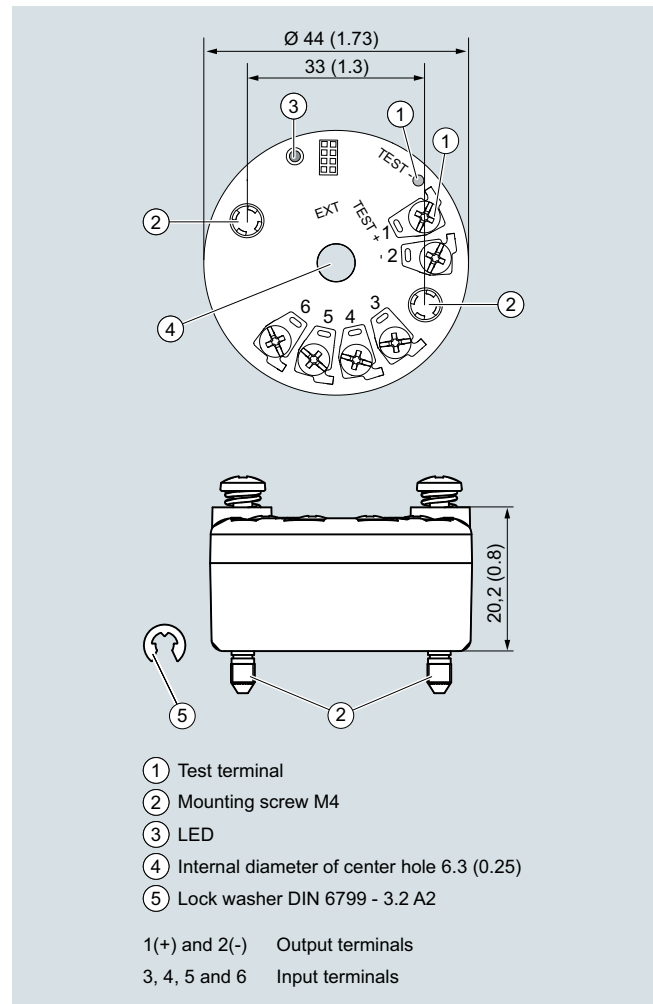
7NG0310-0BA00-0AA0-Z Y01

Y01: -10 ... +100 °C

Factory setting

- Pt100 (IEC 60751) with 3-wire system
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current
 - Device error: < 3.6 mA
 - Input circuit wire break: 22.8 mA
 - Input circuit short circuit: 22.4 mA
 - Input monitoring wire break and short-circuit
- No trimming of input and output (offset)
- Damping 0.0 s

Dimensional drawings



SITRANS TH320, dimensions and pin assignment, dimensions in mm (inch)

Temperature Measurement

Transmitters for mounting in sensor head

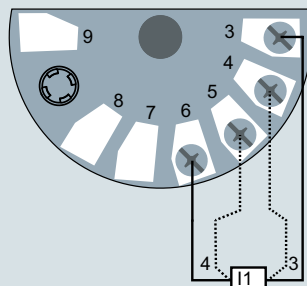
SITRANS TH320 (HART)

Circuit diagrams

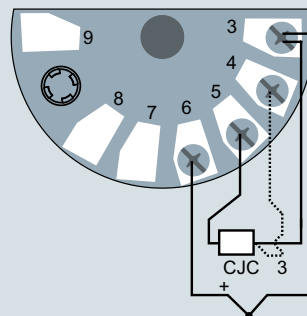
Connections

Input connection

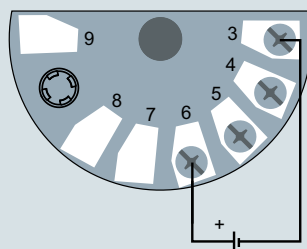
2



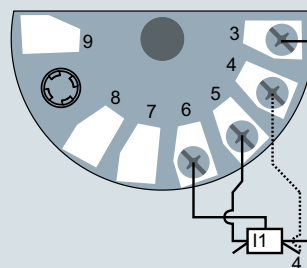
2-wire, 3-wire or 4-wire RTD or linear resistance



TC (internal CJC or external 2-wire or 3-wire CJC)



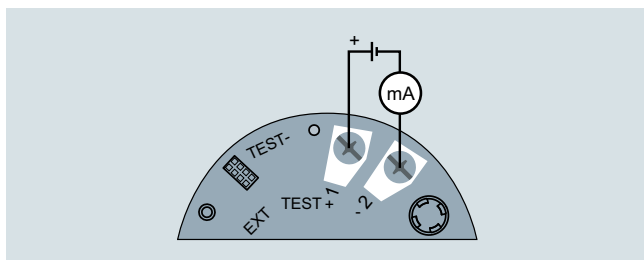
Voltage input (unipolar or bipolar)



3-wire or 4-wire potentiometer

SITRANS TH320, input connection assignment

Output connection



SITRANS TH320, output connection assignment

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH400 fieldbus transmitter

Overview



SITRANS TH400 fieldbus transmitters

Versions:

- For FOUNDATION fieldbus
- For PROFIBUS PA

The SITRANS TH400 temperature transmitter is a small field bus transmitter for mounting in the connection head of form B. Extensive functionality enables the temperature transmitter to be precisely adapted to the plant's requirements. Operation is very simple in spite of the numerous setting options. Thanks to its universal concept it can be used in all industries and is easy to integrate in the context of Totally Integrated Automation applications.

Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices comply with the Directive 2014/34/EU (ATEX), as well as FM and CSA regulations.

Installing SITRANS TH400 in temperature sensors turns them into complete, bus-capable measuring points; compact - and in a single device.

Application

- Linearized temperature measurement with resistance thermometers or thermal elements
- Differential, mean-value or redundant temperature measurement with resistance thermometers or thermal elements
- Linear resistance and bipolar millivolt measurements
- Differential, mean-value or redundant resistance and bipolar millivolt measurements

Function

Features

- Mounting in connection head, type B, to DIN 43729, or larger
- Polarity-neutral bus connection
- 24-bit analog-digital converter for high resolution
- Electrically isolated
- Intrinsically-safe version for use in potentially explosive areas
- Special characteristic
- Sensor redundancy

With PROFIBUS PA communication

- Function blocks: 2 x analog

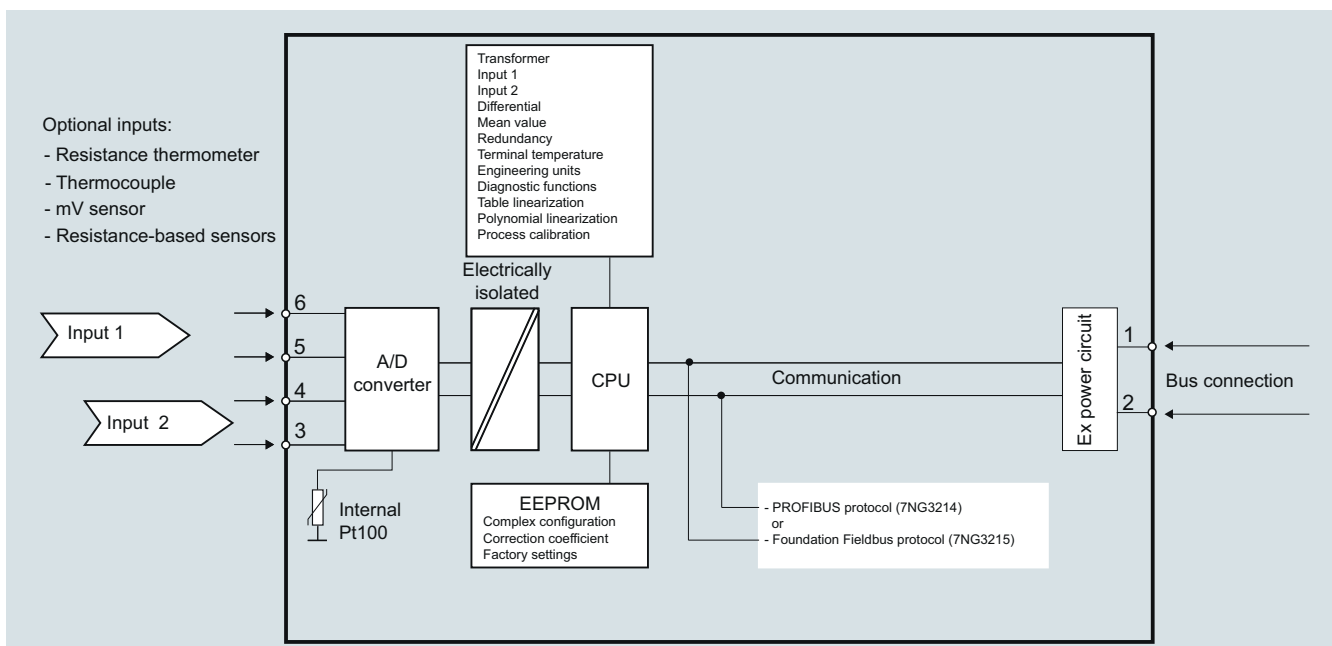
With FOUNDATION fieldbus communication

- Function blocks: 2 x analog and 1 x PID
- Functionality: Basic or LAS

Mode of operation

The following function diagram explains the mode of operation of the transmitter.

The only difference between the two versions of the SITRANS TH400 (7NG3214-... and 7NG3215-...) is the type of fieldbus protocol used (PROFIBUS PA or FOUNDATION fieldbus).



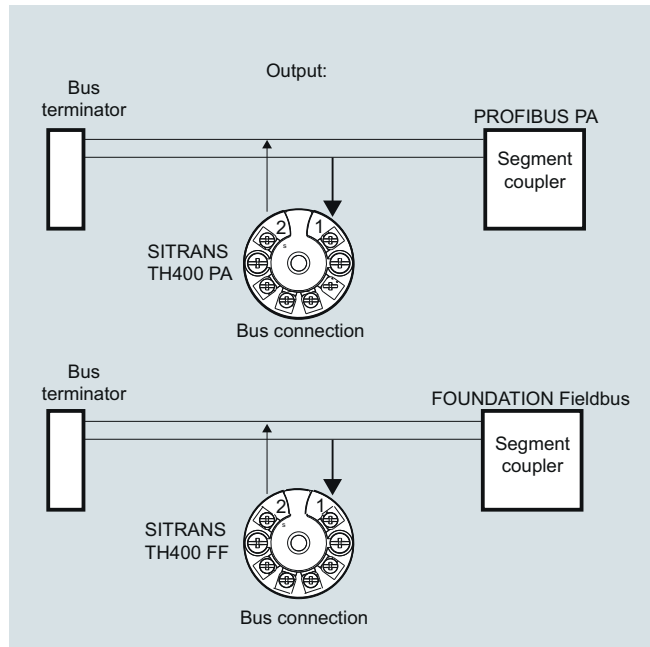
SITRANS TH400, function diagram

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH400 fieldbus transmitter

System communication



SITRANS TH400, communication interface

Technical specifications

Input

Analog-to-digital conversion

- Measurement rate < 50 ms
- Resolution 24-bit

Resistance thermometer

Pt25 ... Pt1000 to IEC 60751/JIS C 1604

- Measuring range -200 ... +850 °C (-328 ... +1562 °F)

Ni25 ... Ni1000 to DIN 43760

- Measuring range -60 ... +250 °C (-76 ... +482 °F)

Cu10 ... Cu1000, $\alpha = 0.00427$

- Measuring range -50 ... +200 °C (-58 ... +392 °F)

Line resistance per sensor cable

Max. 50 Ω

Sensor current

Nominal 0.2 mA

Sensor fault detection

- Sensor break detection Yes
- Sensor short-circuit detection Yes, < 15 Ω

Resistance-based sensors

Measuring range

0 Ω ... 10 k Ω

Line resistance per sensor cable

Max. 50 Ω

Sensor current

Nominal 0.2 mA

Sensor fault detection

- Sensor break detection Yes
- Sensor short-circuit detection Yes, < 15 Ω

Thermocouple

to IEC 584

- Type B
- Type E
- Type J
- Type K
- Type N
- Type R
- Type S
- Type T

to DIN 43710

- Type L
- Type U

to ASTM E988-90

- Type W3
- Type W5

External cold junction compensation

Sensor fault detection

- Sensor break detection
- Sensor short-circuit detection
- Sensor current in the event of open-circuit monitoring

mV sensor - voltage input

Measuring range

-800 ... +800 mV

Input resistance

10 M Ω

Output

Filter time (programmable)

0 ... 60 s

Update time

< 400 ms

Measuring accuracy

Accuracy is defined as the higher value of general values and basic values.

General values

Type of input

Absolute accuracy

Temperature coefficient

All

$\leq \pm 0.05$ % of the measured value

$\leq \pm 0.002$ % of the measured value/°C

Basic values

Type of input

Basic accuracy

Temperature coefficient

Pt100 and Pt1000

$\leq \pm 0.1$ °C

$\leq \pm 0.002$ °C/°C

Ni100

$\leq \pm 0.15$ °C

$\leq \pm 0.002$ °C/°C

Cu10

$\leq \pm 1.3$ °C

$\leq \pm 0.02$ °C/°C

Resistance-based sensors

$\leq \pm 0.05$ Ω

$\leq \pm 0.002$ Ω /°C

Voltage source

$\leq \pm 10$ μ V

$\leq \pm 0.2$ % μ V/°C

Thermocouple, type:

E, J, K, L, N, T, U

$\leq \pm 0.5$ °C

$\leq \pm 0.01$ °C/°C

Thermocouple, type:

B, R, S, W3, W5

$\leq \pm 1$ °C

$\leq \pm 0.025$ °C/°C

Cold junction compensation

$\leq \pm 0.5$ °C

Reference conditions

Warming-up time

30 s

Signal-to-noise ratio

Min. 60 dB

Calibration condition

20 ... 28 °C (68 ... 82 °F)

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH400 fieldbus transmitter

Conditions of use

Ambient conditions

Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F)
Permissible storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	≤ 98 %, with condensation
Insulation resistance	
• Test voltage	500 V AC for 60 s
Mechanical testing	
• Vibrations (DIN class B) to	IEC 60068-2-6 and IEC 60068-2-64 4 g/2 ... 100 Hz

Electromagnetic compatibility

EMC noise voltage influence	< ± 0.1 % of span
Extended EMC noise immunity: NAMUR NE 21, criterion A, Burst	< ± 1 % of span
EMC 2014/30/EU Emission and Noise Immunity to	EN 61326

Construction

Material	Molded plastic
Weight	55 g (0.12 lb)
Dimensions	See Dimensional drawings
Cross-section of cables	Max. 2.5 mm ² (AWG 13)
Degree of protection	
• Transmitter enclosure	IP40
• Terminal	IP00

Auxiliary power

Power supply	
• Standard, Ex "nA", Ex "nL", NI	9.0 ... 32 V DC
• ATEX, FM, UL and CSA	9.0 ... 30 V DC
• In FISCO/FNICO installations	9.0 ... 17.5 V DC
Power consumption	< 11 mA
Max. increase in power consumption in the event of a fault	< 7 mA

Certificates and approvals

Explosion protection ATEX	
EC type test certificate	KEMA 06 ATEX 0264
• "Intrinsic safety" type of protection	II 1 G Ex ia IIC T4...T6 II 2(1) G Ex ib[ia] IIC T4...T6 II 1 D Ex iaD
EC type test certificate	KEMA 06 ATEX 0263 X
• Type of protection for "equipment is non-arcing"	II 3 GD Ex nA[nL] IIC T4...T6 II 3 GD Ex nL IIC T4...T6 II 3 GD Ex nA[ic] IIC T4...T6 II 3 GD Ex ic IIC T4...T6
Explosion protection: FM for USA	
• FM approval	FM 3027985
• Degree of protection	• IS Class I, Div 1, Groups A, B, C, D T4/T5/T6, FISCO • IS Class I, Zone 0, AEx ia, IIC T4/T5/T6, FISCO • NI Class I, Div 2, Groups A, B, C, D T4/T5/T6, FNICO
Explosion protection CSA for Canada	
• CSA approval	CSA 1861385
• Degree of protection	• IS Class I, Div 1, Groups A, B, C, D T4/T5/T6 • Ex ia IIC T4/T5/T6 and Ex ib [ia] IIC T4/T5/T6 • NI Class I, Div 2, Groups A, B, C, D T4/T5/T6 • Ex nA II T4/T5/T6
Other certificates	EAC Ex(GOST), NEPSI, IECEx

Communication

Parameterization interface	
• PROFIBUS PA connection	
- Protocol	Profile 3.0
- Address (for delivery)	126
• FOUNDATION fieldbus connection	
- Protocol	FF protocol
- Functionality	Basic or LAS
- Version	ITK 4.6
- Function blocks	2 x analog and 1 x PID

Factory setting

only for SITRANS TH400 PA

Sensor	Pt100 (IEC)
Type of connection	3-wire circuit
Unit	°C
Failure mode	Last valid value
Filter time	0 s
PA address	126
PROFIBUS Ident No.	Manufacturer-specific

only for SITRANS TH400 FF

Sensor	Pt100 (IEC)
Type of connection	3-wire circuit
Unit	°C
Failure mode	Last valid value
Filter time	0 s
Node address	22

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH400 fieldbus transmitter

Selection and Ordering data	Article No.
Temperature transmitter SITRANS TH400 for installation in connection head, with electrical isolation, order operating instructions separately. <ul style="list-style-type: none"> Bus-compatible to PROFIBUS PA <ul style="list-style-type: none"> No explosion protection or Zone 2/Div 2 to ATEX/FM/CSA/IECEX/NEPSI With explosion protection "Intrinsically safe to ATEX/FM/CSA/IECEX/NEPSI" Bus-compatible to FOUNDATION Fieldbus <ul style="list-style-type: none"> No explosion protection or Zone 2/Div 2 to ATEX/FM/CSA/IECEX/NEPSI With explosion protection "Intrinsically safe to ATEX/FM/CSA/IECEX/NEPSI" 	7NG3214-0NN00 7NG3214-0AN00 7NG3215-0NN00 7NG3215-0AN00
Further designs	Order code
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
With test protocol (5 measuring points)	C11
Customer-specific programming	
Add "-Z" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... °C, °F	Y01¹⁾
Measuring point no. (TAG), max. 8 characters	Y17²⁾
Measuring point descriptor, max. 16 characters	Y23²⁾
Measuring point message, max. 32 characters	Y24²⁾
Bus address, specify in plain text	Y25²⁾
Pt100 (IEC) 2-wire, $R_L = 0 \Omega$	U02³⁾
Pt100 (IEC) 3-wire	U03³⁾
Pt100 (IEC) 4-wire	U04³⁾
Thermocouple type B	U20³⁾⁴⁾
Thermocouple type C (W5)	U21³⁾⁴⁾
Thermocouple type D (W3)	U22³⁾⁴⁾
Thermocouple type E	U23³⁾⁴⁾
Thermocouple type J	U24³⁾⁴⁾
Thermocouple type K	U25³⁾⁴⁾
Thermocouple type L	U26³⁾⁴⁾
Thermocouple type N	U27³⁾⁴⁾
Thermocouple type R	U28³⁾⁴⁾
Thermocouple type S	U29³⁾⁴⁾
Thermocouple type T	U30³⁾⁴⁾
Thermocouple type U	U31³⁾⁴⁾
With TC: CJC external (Pt100, 3-wire)	U41
With TC: CJC external with fixed value, specify in plain text	Y50
Special differing customer-specific programming, specify in plain text	Y09⁵⁾

Accessories

Further accessories for assembly, connection and transmitter configuration, see page 2/120.

SIMATIC PDM operating software	See Chapter 8
DIN rail adapters for head transmitters (Quantity delivered: 5 units)	7NG3092-8KA
Connecting cable 4-wire, 150 mm, for sensor connections when using head transmitters in the high hinged cover (set with 5 units)	7NG3092-8KC
for additional PA components	See Catalog IK PI

- For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
- For this selection, Y01 or Y09 must also be selected.
- For this selection, Y01 must also be selected.
- Internal cold junction compensation is selected as the default for TC.
- For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Ordering example 1:

7NG3214-0NN00-Z Y01+Y17+U03
 Y01: 0...100 °C
 Y17: TICA1234HEAT

Ordering example 2:

7NG3214-0NN00-Z Y01+Y17+Y25+U25
 Y01: 0...500 °C
 Y17: TICA5678HEAT
 Y25: 33

Factory setting:

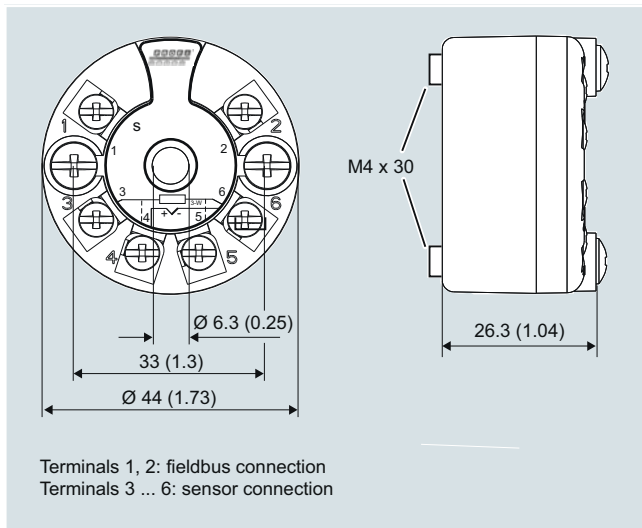
- For SITRANS TH400 PA:
 - Pt100 (IEC 751) with 3-wire circuit
 - Unit: °C
 - Failure mode: Last valid value
 - Filter time: 0 s
 - PA address: 126
 - PROFIBUS Ident No.: Manufacturer-specific
- For SITRANS TH400 FF:
 - Pt100 (IEC 751) with 3-wire circuit
 - Unit: °C
 - Failure mode: Last valid value
 - Filter time: 0 s
 - Node address: 22

Temperature Measurement

Transmitters for mounting in sensor head

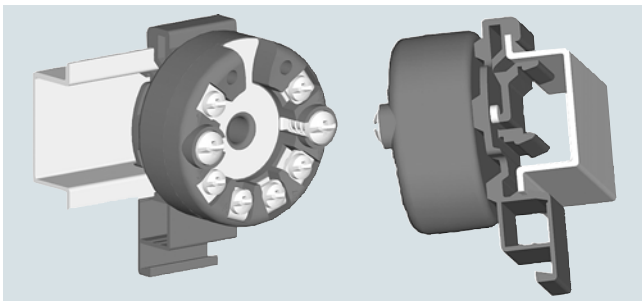
SITRANS TH400 fieldbus transmitter

Dimensional drawings

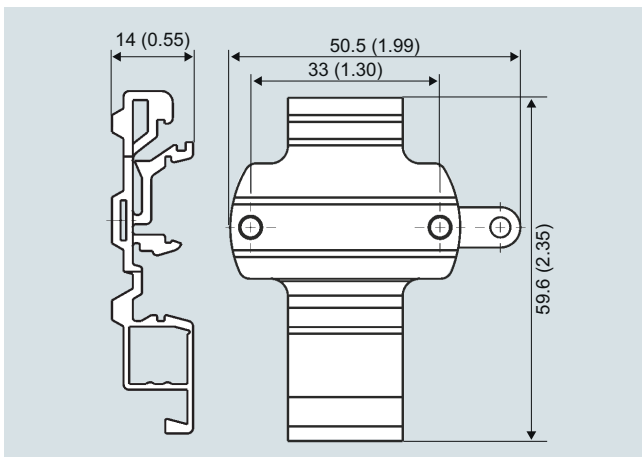


SITRANS TH400 dimensions in mm (inches) and connections

Mounting on DIN rail



SITRANS TH400, mounting of transmitter on DIN rail



DIN rail adaptor, dimensions in mm (inch)

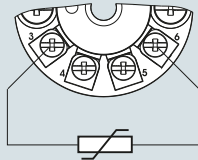
Temperature Measurement

Transmitters for mounting in sensor head

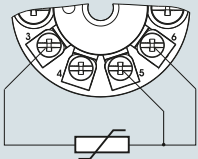
SITRANS TH400 fieldbus transmitter

Schematics

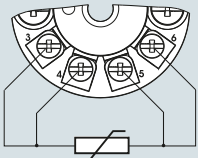
Resistance thermometer



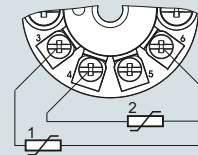
Two-wire system ¹⁾



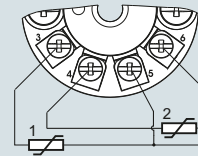
Three-wire system



Four-wire system

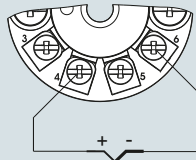


Mean-value/differential or redundancy generation
2 x two-wire system ¹⁾

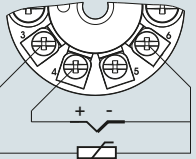


Mean-value/differential or redundancy generation
1 sensor in two-wire system ¹⁾
1 sensor in three-wire system

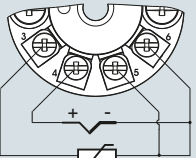
Thermocouple



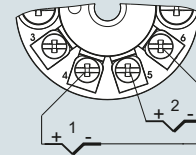
Internal cold junction compensation



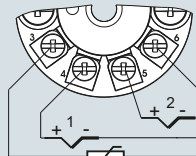
Cold junction compensation with external Pt100 in two-wire system ¹⁾



Cold junction compensation with external Pt100 in three-wire system

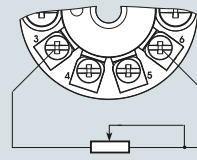


Mean value, differential or redundancy generation with internal cold junction compensation

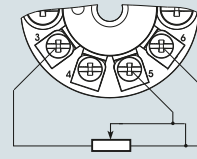


Mean value, differential or redundancy generation and cold junction compensation with internal Pt100 in two-wire system ¹⁾

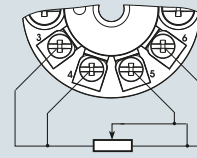
Resistance



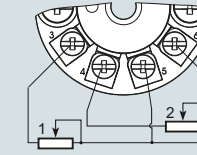
Two-wire system ¹⁾



Three-wire system

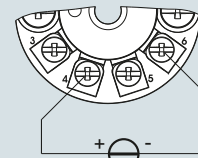


Four-wire system

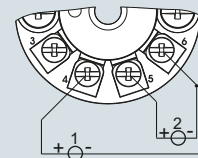


Mean value, differential or redundancy generation
1 resistor in two-wire system ¹⁾
1 resistor in three-wire system

Voltage measurement



One voltage source



Measurement of mean value, differential and redundancy with 2 voltage sources

¹⁾ Programmable line resistance for the purpose of correction.

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH420 (HART)

Overview



- 2-wire temperature transmitter with HART communication interface
- Mounting in the connection head of the temperature sensor
- Universal input for virtually any type of temperature sensor
- Connection of two independent input circuits for redundant operation (high input availability)
- Input drift detection
- Configurable over HART

Benefits

- Compact design
- Connection of two independent input circuits for redundant operation (high input availability)
- Flexible mounting and center hole allow you to select your preferred type of installation
- Electrical isolation
- Test terminals for ammeter
- Diagnostics LED (green/red)
- Input monitoring wire break, short circuit and drift
- Self-monitoring
- Configuration status stored in EEPROM
- SIL2/3 (with order note C20)
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility according to DIN EN 61326 and NE21

Application

The SITRANS TH420 transmitter with two inputs can be used in all sectors. Its compact size means that it can be installed in connection heads of type B (DIN 43729) or larger. Due to its universal input module, the following sensors and signal sources can be connected in redundant operation (high input availability):

- 2 resistance thermometers (2-wire, 3-wire, 4-wire connection)
- 2 thermocouples
- 2 linear resistors, potentiometer and DC voltage sources

The output signal is a load-independent direct current from 4 to 20 mA in accordance with the input characteristic, superimposed by the digital HART signal.

The dual input mode also supports drift detection of the inputs, whereby maintenance intervals can be more easily planned.

Transmitters of the "intrinsically safe or Zone 2 increased safety" type of protection can be installed in hazardous areas. The device meets the requirements of the EU Directive 2014/34/EU (ATEX), the FM and CSA regulations as well as other national approvals.

Temperature Measurement

Transmitters for mounting in sensor head

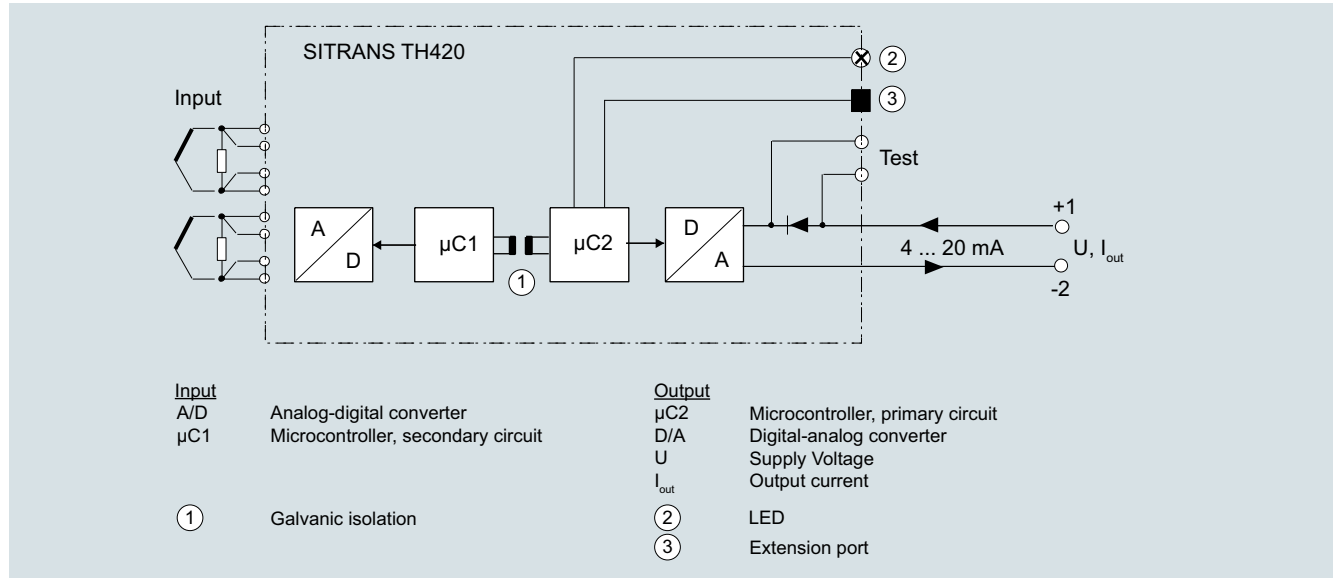
SITRANS TH420 (HART)

Function

The SITRANS TH420 is configured via HART. The configuration can be carried out using a handheld communicator or, more conveniently, with a HART modem and the SIMATIC PDM configuration software. The configuration data is then permanently stored in the non-volatile memory (EEPROM).

After correct connection of input and supply voltage, the transmitter outputs a temperature-linear output signal and the diagnostics LED is green. In case of external errors, e.g. sensor short circuit or interruption, the LED flashes red; an internal error is indicated by a permanent red light.

An ammeter can be connected at any time for checking and plausibility via the test terminals. The output current can be read without any interruption, or even without opening the current loop.



SITRANS TH420, function block diagram

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH420 (HART)

Technical specifications

General

Supply voltage ^{1) 2)}	
• Without explosion protection (non-Ex)	7.5 ... 48 V DC
• with explosion protection (Ex i)	7.5 ... 30 V DC
Additional minimum supply voltage when using test terminals	0.8 V
Maximum power loss	≤ 850 mW
Minimum load resistance at supply voltage > 37 V	(V _{supply} - 37 V)/23 mA
Insulation voltage, test/operation	
• Without explosion protection (non-Ex)	2.5 kV AC/55 V AC
• with explosion protection (Ex i)	2.5 kV AC/42 V AC
Polarity protection	All inputs and outputs
Write protection	Open circuits or software
Warming-up time	< 5 min
Starting time	< 2.75 s
Programming	HART
Signal-to-noise ratio	> 60 dB
Long-term stability	Better than: • ± 0.05% of measuring span/year • ± 0.18% of measuring span/5 years
Response time	≤ 75 ms (typically 70 ms)
Programmable damping	0 ... 60 s
Signal dynamic	
• Input	24 bit
• Output	18 bit
Influence of change in supply voltage	< 0.005% of measuring span/V DC

Input

Resistance thermometer (RTD)

Input type	
• Pt10 ... 10000	<ul style="list-style-type: none"> • IEC 60751 • JIS C 1604-8 • GOST 6651_2009 • Callendar-Van Dusen
• Ni10 ... 10000	<ul style="list-style-type: none"> • DIN 43760-1987 • GOST 6651-2009 / OIML R84:2003
• Cu5 ... 1000	<ul style="list-style-type: none"> • Edison Copper Winding No. 15 • GOST 6651-2009 / OIML R84:2003
Type of connection	2-wire, 3-wire or 4-wire
Line resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the line resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• Pt1000, Pt10000 (IEC 60751 and JIS C 1604-8)	Max. 30 nF
• All other input types	Max. 50 nF
Fault detection, programmable	None, short-circuited, defective, short-circuited or defective
	Note When the low limit for the configured input type is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time (RTD)	≤ 75 ms (typically 70 ms)
Fault detection time (for 3-wire and 4-wire)	≤ 2000 ms

Thermocouples (TC)

Input type	
• B	IEC 60584-1
• E	IEC 60584-1
• J	IEC 60584-1
• K	IEC 60584-1
• L	DIN 43710
• Lr	GOST 3044-84
• N	IEC 60584-1
• R	IEC 60584-1
• S	IEC 60584-1
• T	IEC 60584-1
• U	DIN 43710
• W3	ASTM E988-96
• W5	ASTM E988-96
• LR	GOST 3044-84
Cold junction compensation (CJC)	Constant, internal or external over Pt100 or Ni100 RTD
• Temperature range internal CJC	-50 ... +100 °C (-+58 ... +212 °F)
• Connection external CJC	2-wire, 3-wire or 4-wire
• External CJC, line resistance per wire (for 3-wire and 4-wire connections)	50 Ω
• Effect of the line resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
• Input current external CJC	< 0.15 mA
• Temperature range external CJC	-50 ... +135 °C (-58 ... +275 °F)
• Cable, wire-wire capacity	Max. 50 nF
• Total line resistance	Max. 10 kΩ
• Fault detection, programmable	None, short-circuited, defective, short-circuited or defective
	Note The short-circuited fault detection only applies to the CJC input.
• Fault detection time (TC)	≤ 75 ms (typically 70 ms)
• Fault detection time, external CJC (for 3-wire and 4-wire)	≤ 2000 ms

Linear resistance

Input range	0 ... 100 kΩ
Minimum measuring span	25 Ω
Type of connection	2-wire, 3-wire or 4-wire
Line resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the line resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF
Fault detection, programmable	None, defective
Potentiometers	
Input range	0 ... 100 kΩ
Minimum measuring span	25 Ω
Type of connection	3-wire, 4-wire or 5-wire
Line resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the line resistance (with 4-wire and 5-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH420 (HART)

Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note When the configured potentiometer size is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time, wiper arm (no short-circuit detection)	≤ 75 ms (typically 70 ms)
Fault detection time, element	≤ 2000 ms
Fault detection time (for 4-wire and 5-wire)	≤ 2000 ms
Voltage input	
Measuring range	
• Unipolar	-100 ... 1700 mV
• Bipolar	-800 ... +800 mV
Minimum measuring span	2.5 mV
Input resistance	10 MΩ
Cable, wire-wire capacity	
• Input range: -100 ... 1700 mV	Max. 30 nF
• Input range: -20 ... 100 mV	Max. 50 nF
Fault detection, programmable	None, defective
Fault detection time	≤ 75 ms (typically 70 ms)
Output and HART communication	
Normal range, programmable	3.8 ... 20.5 mA/20.5 ... 3.8 mA
Extended range (output limits), programmable	3.5 ... 23 mA/23 ... 3.5 mA
Programmable input/output limits	
• Fault current	Enable/disable
• Fault current setting	3.5 ... 23 mA
Update time	10 ms
Load (with current output)	≤ (V _{Supply} - 7.5)/0.023 Ω
Load stability	< 0.01% of meas. span/100 Ω (measuring span = currently selected range)
Input fault detection, programmable (detection of input short circuits is ignored with TC and voltage inputs)	3.5 ... 23 mA
NAMUR NE43 Upscale	> 21 mA
NAMUR NE43 Downscale	< 3.6 mA
HART protocol versions	HART 7
Measuring accuracy	
Input accuracy	See "Input accuracy" table
Output accuracy	See "Output accuracy" table
Rated conditions	
Ambient temperature (operation)	
• Standard	-50 ... +85 °C (-58 ... +185 °F)
• SIL	-40 ... +80 °C (-40 ... +176 °F)
Storage temperature	-50 ... +85 °C (-58 ... +185 °F)
Calibration temperature	24 °C ±1.0 °C (75.2 °F ±1.8 °F)
Relative humidity	< 99% (no condensation)
Degree of protection	
• Enclosure of the transmitter	IP68
• Terminals	IP00

Design	
Weight	50 g (0.11 lb)
Maximum cable cross-section	1 x 1.5 mm ² (stranded wire)
Tightening torque for clamping screws	0.4 Nm
Vibrations	IEC 60068-2-6
• 2 ... 25 Hz	± 1.6 mm (0.07 inch)
• 25 ... 100 Hz	± 4 g
Certificates and approvals	
<u>Explosion protection ATEX/IECEx and others</u>	
Certificates ³⁾	DEKRA 17ATEX0116 X IECEx DEK 17.0054X A5E43700604A-2018X
"Intrinsic safety ia/ib" type of protection	For use in Zone 0, 1, 2, 20, 21, 22
• ATEX	II 1 G Ex ia IIC T6 ... T4 Ga II 2(1) G Ex ib [ia Ga] IIC T6 ... T4 Gb II 1 D Ex ia IIIC Da I M1 Ex ia I Ma
• IECEx and others	Ex ia IIC T6 ... T4 Ga Ex ib [ia Ga] IIC T6 ... T4 Gb Ex ia IIIC Da Ex ia I Ma
"Intrinsic safety ic" type of protection	For use in Zones 2 and 22
• ATEX	II 2 G Ex ic IIC T6 ... T4 Gc II 2 D Ex ic IIIC Dc
• IECEx and others	Ex ic IIC T6 ... T4 Gc Ex ic IIIC Dc
"Non-sparking/increased safety nA/ec" type of protection	For use in Zones 2 and 22
• ATEX	II 2 G Ex nA IIC T6 ... T4 Gc II 2 G Ex ec IIC T6 ... T4 Gc
• IECEx and others	Ex nA IIC T6 ... T4 Gc Ex ec IIC T6 ... T4 Gc
<u>Explosion protection CSA /FM for Canada and USA</u>	
Certificates	CSA 1861385 FM18CA0024 FM18US0046
"Intrinsic safety ia" type of protection	IS, CL I, Div 1, GP ABCD, T6 ... T4 Ex ia IIC T6 ... T4 Ga AEx ia IIC T6 ... T4 Ga or: Ex ib [ia Ga] IIC T6 ... T4 Gb AEx ib [ia Ga] IIC T6 ... T4 Gb
"Non incensive field wiring NIFW" type of protection	NIFW, CL I, Div 2, GP ABCD T6 ... T4
"Non incensive NI" type of protection	NI, CL I, Div 2, GP ABCD T6 ... T4 Ex nA IIC T6 ... T4 Gc AEx nA IIC T6 ... T4 Gc

1) Note that the minimum supply voltage must correspond to the value measured at the terminals of the SITRANS TH420.
All external voltage drops must be taken into consideration.

2) Protect the device from overvoltage with the help of a suitable power supply or suitable overvoltage protection equipment.

3) Additional available certificates are listed on the Internet at <http://www.siemens.com/processinstrumentation/certificates>

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH420 (HART)

Measuring ranges/Minimum measuring span

RTD

Input type	Standard	Measuring range in °C (°F)	α_0 in °C ⁻¹ (°F ⁻¹)	Minimum measuring span in °C (°F)
Pt10 ... 10000	IEC 60751	-200 ... +850 (-328 ... +1562)	0.003851 (0.002139)	10 (50)
	JIS C 1604-8	-200 ... +649 (-328 ... +1200)	0.003916 (0.002176)	10 (50)
	GOST 6651_2009	-200 ... +850 (-328 ... +1562)	0.003910 (0.002172)	10 (50)
	Callendar-Van Dusen	-200 ... +850 (-328 ... +1562)	-	10 (50)
Ni10 ... 10000	DIN 43760-1987	-60 ... +250 (-76 ... +482)	0.006180 (0.003433)	10 (50)
	GOST 6651-2009 / OIML R84:2003	-60 ... +180 (-76 ... +356)	0.006170 (0.003428)	10 (50)
Cu5 ... 1000	Edison Copper Winding No. 15	-200 ... +260 (-328 ... +500)	0.004270 (0.002372)	100 (212)
	GOST 6651-2009 / OIML R84:2003	-180 ... +200 (-292 ... +392)	0.004280 (0.002378)	100 (212)
	GOST 6651-94	-50 ... +200 (-58 ... +392)	0.004260 (0.002367)	100 (212)

TC

Input type	Standard	Measuring range in °C (°F)	Minimum measuring span in °C (°F)
B	IEC 60584-1	0 (85) ... 1 820 (32 (185) ... 3 308)	100 (212)
E	IEC 60584-1	-200 ... +1 000 (-392 ... +1 832)	50 (122)
J	IEC 60584-1	-100 ... +1200 (-212 ... +2192)	50 (122)
K	IEC 60584-1	-180 ... +1372 (-356 ... +2502)	50 (122)
L	DIN 43710	-200 ... +900 (-392 ... +1652)	50 (122)
Lr	GOST 3044-84	-200 ... +800 (-392 ... +1472)	50 (122)
N	IEC 60584-1	-180 ... +1300 (-356 ... +2372)	50 (122)
R	IEC 60584-1	-50 ... +1760 (-122 ... +3200)	100 (212)
S	IEC 60584-1	-50 ... +1760 (-122 ... +3200)	100 (212)
T	IEC 60584-1	-200 ... +400 (-392 ... +752)	50 (122)
U	DIN 43710	-200 ... +600 (-392 ... +1112)	50 (122)
W3	ASTM E988-96	0 ... 2300 (32 ... 4172)	100 (212)
W5	ASTM E988-96	0 ... 2300 (32 ... 4172)	100 (212)
LR	GOST 3044-84	-200 ... +800 (-392 ... +1472)	50 (122)

Input accuracy

Basic values

Input type	Basic accuracy	Temperature coefficient ¹⁾
RTD		
Pt10	$\leq \pm 0.8$ °C (1.44 °F)	$\leq \pm 0.020$ °C/°C (°F/°F)
Pt20	$\leq \pm 0.4$ °C (0.72 °F)	$\leq \pm 0.010$ °C/°C (°F/°F)
Pt50	$\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.004$ °C/°C (°F/°F)
Pt100	$\leq \pm 0.04$ °C (0.072 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt200	$\leq \pm 0.08$ °C (0.144 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt500	$T_{\max.} < 180$ °C (356 °F) = $\leq \pm 0.08$ °C (0.144 °F) $T_{\max.} < 180$ °C (356 °F) = $\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt1000	$\leq \pm 0.08$ °C (0.144 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt2000	$T_{\max.} < 300$ °C (572 °F) = $\leq \pm 0.08$ °C (0.144 °F) $T_{\max.} < 300$ °C (572 °F) = $\leq \pm 0.4$ °C (0.72 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt10000	$\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Pt x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Ni10	$\leq \pm 1.6$ °C (2.88 °F)	$\leq \pm 0.020$ °C/°C (°F/°F)
Ni20	$\leq \pm 0.8$ °C (1.44 °F)	$\leq \pm 0.010$ °C/°C (°F/°F)
Ni50	$\leq \pm 0.32$ °C (0.576 °F)	$\leq \pm 0.004$ °C/°C (°F/°F)
Ni100	$\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Ni120	$\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Ni200	$\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Ni500	$\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Ni1000	$\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)
Ni2000	$\leq \pm 0.16$ °C (0.288 °F)	$\leq \pm 0.002$ °C/°C (°F/°F)

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH420 (HART)

Input type	Basic accuracy	Temperature coefficient ¹⁾
Ni10000	$\leq \pm 0.32\text{ °C}$ (0.576 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Ni x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Cu5	$\leq \pm 1.6\text{ °C}$ (2.88 °F)	$\leq \pm 0.040\text{ °C/°C}$ (°F/°F)
Cu10	$\leq \pm 0.8\text{ °C}$ (1.44 °F)	$\leq \pm 0.020\text{ °C/°C}$ (°F/°F)
Cu20	$\leq \pm 0.4\text{ °C}$ (0.72 °F)	$\leq \pm 0.010\text{ °C/°C}$ (°F/°F)
Cu50	$\leq \pm 0.16\text{ °C}$ (0.288 °F)	$\leq \pm 0.004\text{ °C/°C}$ (°F/°F)
Cu100	$\leq \pm 0.08\text{ °C}$ (0.144 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Cu200	$\leq \pm 0.08\text{ °C}$ (0.144 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Cu500	$\leq \pm 0.16\text{ °C}$ (0.288 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Cu1000	$\leq \pm 0.08\text{ °C}$ (0.144 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Cu x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Linear resistance		
0 ... 400 Ω	$\leq \pm 40\text{ m}\Omega$	$\leq \pm 2\text{ m}\Omega/\text{°C}$ (1.11 m Ω /°F)
0 ... 100 k Ω	$\leq \pm 4\text{ }\Omega$	$\leq \pm 0.2\text{ }\Omega/\text{°C}$ (0.11 Ω /°F)
Potentiometers		
0 ... 100%	< 0.05%	< $\pm 0.005\%$
Voltage input		
mV: -20 ... 100 mV	$\leq \pm 5\text{ }\mu\text{V}$	$\leq \pm 0.2\text{ }\mu\text{V/°C}$ (0.11 $\mu\text{V/°F}$)
mV: -100 ... 1700 mV	$\leq \pm 0.1\text{ mV}$	$\leq \pm 36\text{ }\mu\text{V/°C}$ (20 $\mu\text{V/°F}$)
mV: $\pm 800\text{ mV}$	$\leq \pm 0.1\text{ mV}$	$\leq \pm 32\text{ }\mu\text{V/°C}$ (17.8 $\mu\text{V/°F}$)
TC		
E	$\leq \pm 0.2\text{ °C}$ (0.36 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
J	$\leq \pm 0.25\text{ °C}$ (0.45 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
K	$\leq \pm 0.25\text{ °C}$ (0.45 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
L	$\leq \pm 0.35\text{ °C}$ (0.63 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
N	$\leq \pm 0.4\text{ °C}$ (0.72 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
T	$\leq \pm 0.25\text{ °C}$ (0.45 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
U	$< 0\text{ °C}$ (32 °F) $\leq \pm 0.8\text{ °C}$ (1.44 °F) $\geq 0\text{ °C}$ (32 °F) $\leq \pm 0.4\text{ °C}$ (0.72 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
Lr	$\leq \pm 0.2\text{ °C}$ (0.36 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
R	$< 200\text{ °C}$ (392 °F) $\leq \pm 0.5\text{ °C}$ (0.9 °F) $\geq 200\text{ °C}$ (392 °F) $\leq \pm 1\text{ °C}$ (1.8 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
S	$< 200\text{ °C}$ (392 °F) $\leq \pm 0.5\text{ °C}$ (0.9 °F) $\geq 200\text{ °C}$ (392 °F) $\leq \pm 1\text{ °C}$ (1.8 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
W3	$\leq \pm 0.6\text{ °C}$ (1.08 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
W5	$\leq \pm 0.4\text{ °C}$ (0.72 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
B ²⁾	$\leq \pm 1\text{ °C}$ (1.8 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
B ³⁾	$\leq \pm 3\text{ °C}$ (5.4 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
B ⁴⁾	$\leq \pm 8\text{ °C}$ (14.4 °F)	$\leq \pm 0.8\text{ °C/°C}$ (°F/°F)
B ⁵⁾	Not specified	Not specified
CJC (internal)	$\leq \pm 0.5\text{ °C}$ (0.9 °F)	Included in basic accuracy
CJC (external)	$\leq \pm 0.08\text{ °C}$ (0.144 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)

¹⁾ Temperature coefficients correspond to the specified values or 0.002% of the input span, depending on which value is greater.

²⁾ Accuracy of the specification range > 400 °C (752 °F)

³⁾ Accuracy of the specification range > 160 °C (320 °F) < 400 °C (752 °F)

⁴⁾ Accuracy of the specification range > 85 °C (185 °F) < 160 °C (320 °F)

⁵⁾ Accuracy of the specification range > 85 °C (185 °F)

Output accuracy

Output type	Basic accuracy	Temperature coefficient
Average value measurement	Average of accuracy of input 1 and input 2	Average of temperature coefficient of input 1 and input 2
Differential measurement	Sum of accuracy of input 1 and input 2	Sum of temperature coefficient of input 1 and input 2
Analog output	$\leq \pm 1.6\text{ }\mu\text{A}$ (0.01% of the full output span)	$\leq \pm 0.48\text{ }\mu\text{A/K}$ ($\leq \pm 0.003\%$ of the full output span/K)

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH420 (HART)

Selection and ordering data

	Article No.										Order code
Temperature transmitter SITRANS TH420 with 2 inputs	7NG041										
	-										- 0
Click on the Article no. for the online configuration in the PIA Life Cycle Portal.											
Communication											
With HART	0										
Primary value output											
Input 1	0										
Input 1, input 2 as redundancy	1										
Input 2, input 1 as redundancy	2										
Average input 1 and input 2, both as redundancy	3										
Minimum input 1 and input 2, both as redundancy	4										
Maximum input 1 and input 2, both as redundancy	5										
Difference input 1 - input 2	6										
Difference input 2 - input 1	7										
Absolute difference	8										
Primary value output, customer-specific											
Minimum input 1 and input 2, without redundancy	9										H 1 A
Maximum input 1 and input 2, without redundancy	9										H 1 B
Average input 1 and input 2, without redundancy	9										H 1 C
Input 2	9										H 1 D
Input 1, type											
RTD											
• Pt100 (IEC), 3-wire		B									
• Pt100 (IEC), 4-wire		C									
• Pt1000 (IEC), 3-wire		D									
• Pt1000 (IEC), 4-wire		E									
TC											
• Type B		F									
• Type E		G									
• Type J		H									
• Type K		J									
• Type L		K									
• Type N		L									
• Type R		N									
• Type S		P									
• Type T		Q									
Potentiometer, 4-wire		R									
Input 1, type customer-specific											
Define customer-specific input configurations in V options		Y									

	Article No.										Order code
Temperature transmitter SITRANS TH420 with 2 inputs	7NG041										
	-										- 0
Input 2, type											
Without input 2		A									
RTD											
• Pt100 (IEC), 3-wire		B									
• Pt100 (IEC), 4-wire		C									
• Pt1000 (IEC), 3-wire		D									
• Pt1000 (IEC), 4-wire		E									
TC											
• Type B		F									
• Type E		G									
• Type J		H									
• Type K		J									
• Type L		K									
• Type N		L									
• Type R		N									
• Type S		P									
• Type T		Q									
Potentiometer, 4-wire		R									
Input 2, type customer-specific											
Define customer-specific input configurations in W options		Y									
CJC configuration for TC											
Input 1: no CJC; input 2: no CJC		0									
Input 1: internal CJC; input 2: internal CJC		1									
Input 1: external CJC; input 2: external CJC; define type in option Jxx		2									
Input 1: external CJC; define type in option Jxx; input 2: internal CJC		3									
Input 1: internal CJC; input 2: external CJC; define type in option Jxx		4									
Input 1: Internal CJC; Input 2: No CJC		5									
Input 1: External CJC (define type in option Jxx); input 2: No CJC		6									
Materials not in contact with media											
None		0									
Type of protection											
General safety (non-Ex); CE, RCM, FM, CSA, KCC										A	
Ex i, Ex nA (ec) (Zone)/IS, NIFW, NI (Division); ATEX, IECEx, CSA, FM, NEPSI										N	
Electrical connection/cable entry											
None										A	
Local HMI											
Without display											0

Temperature Measurement

Transmitters for mounting in sensor head

SITRANS TH420 (HART)

Selection and ordering data

Options	Order code
Add "-Z" to article no. and specify order code.	
Certificates for functional safety	
Functional safety SIL2/3 (IEC 61508)	C20
Special features of enclosure/packaging	
Without labeling of the measuring range on the TAG label	D41
Jumper plug set on device for write protection	D81
Jumper plug set on device for fault current > 21 mA (instead of < 3.6 mA) (only non-SIL)	D82
External CJC types	
Pt100, IEC 60751, 3-wire	J02
Pt100, IEC 60751, 4-wire	J03
Ni100, DIN 43760-87, 3-wire	J05
Ni100, DIN 43760-87, 4-wire	J06
Input 1: TC	
Type C W5	V01
Type D W3	V02
Type U	V03
Type Lr	V04
Input 1: Potentiometers	
Potentiometer, 5-wire	V31
Input 1: RTD	
Pt x (IEC), 3-wire, define RTD factor x in option Y21	V61
Pt x (IEC), 4-wire, define RTD factor x in option Y21	V62
Pt x (JIS C1604-81), 3-wire, define RTD factor x in option Y21	V64
Pt x (JIS C1604-81), 4-wire, define RTD factor x in option Y21	V65
Pt x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V67
Pt x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V68
Ni x (DIN 43760-87), 3-wire, define RTD factor x in option Y21	V70
Ni x (DIN 43760-87), 4-wire, define RTD factor x in option Y21	V71
Ni x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V73
Ni x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V74
Cu x (ECW-15), 3-wire, define RTD factor x in option Y21	V76
Cu x (ECW-15), 4-wire, define RTD factor x in option Y21	V77
Cu x (GOST 6651-94), 3-wire, define RTD factor x in option Y21	V79
Cu x (GOST 6651-94), 4-wire, define RTD factor x in option Y21	V80
Cu x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V82
Cu x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V83
Input 2: TC	
Type C W5	W01
Type D W3	W02
Type U	W03
Type Lr	W04

Customer-specific device settings	Order code
Add "-Z" to article no., specify order code and plain text or drop-down list selection.	
Measuring range setting temperature input: Start of scale value (max. 5 characters), full scale value (max. 5 characters), unit (°C, °F, °Ra, K)	Y01
Plant designation (TAG, device parameters, max. 32 characters)	Y15
Measuring point message (device message and device parameters, max. 32 characters)	Y16
Input 1: RTD factor; e.g. factor "200" = Pt200	Y21
Accessories	Article No.
Further accessories for assembly, connection and transmitter configuration, see page 2/120.	
HART modem	7MF4997-1DB
With USB interface	
SIMATIC PDM parameterization software	See Catalog FI 01 section 8
DIN rail adapter for temperature transmitter for head mounting (Quantity delivered: 5 units)	7NG3092-8KA
Connecting cable	7NG3092-8KC
4-wire, 200 mm, for input connection with temperature transformers for head mounting in the high hinged cover (set with 5 units)	

Ordering example

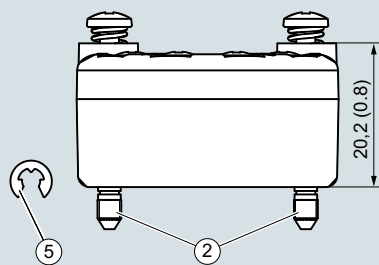
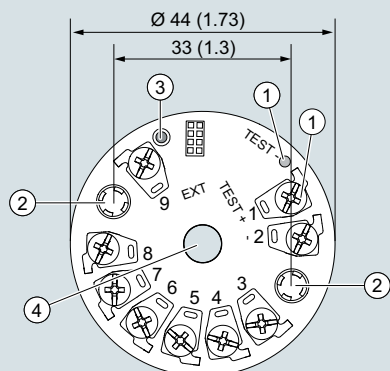
7NG0410-0BA00-0AA0-Z Y01

Y01: -10 ... +100 °C

Factory setting

- Input 1: Pt100 (IEC 751); 3-wire connection
- Input 2: not configured (inactive)
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current
 - Device error: < 3.6 mA
 - Input circuit wire break: 22.8 mA
 - Input circuit short circuit: 22.4 mA
 - Input circuit drift: 22 mA (active when input 2 is active)
 - Input monitoring wire break and short-circuit
- No trimming of input and output (offset)
- Damping 0.0 s

Dimensional drawings



- ① Test terminal
- ② Mounting screw M4
- ③ LED
- ④ Internal diameter of center hole 6.3 (0.25)
- ⑤ Lock washer DIN 6799 - 3.2 A2

1(+) and 2(-) Output terminals

3, 4, 5, 6, 7, 8 and 9 Input terminals

SITRANS TH420, dimensions and pin assignment, dimensions in mm (inch)

Temperature Measurement

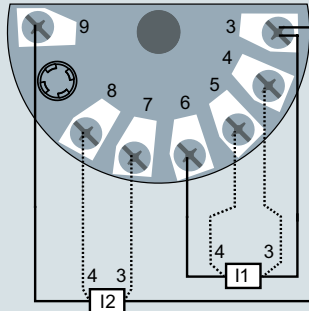
Transmitters for mounting in sensor head

SITRANS TH420 (HART)

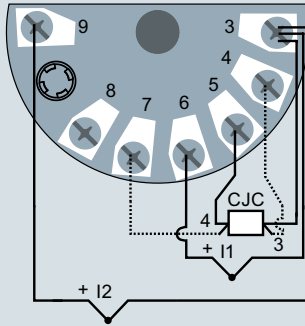
Circuit diagrams

Connections

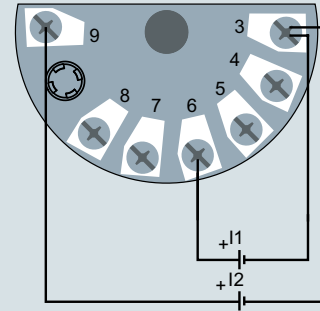
Input connection



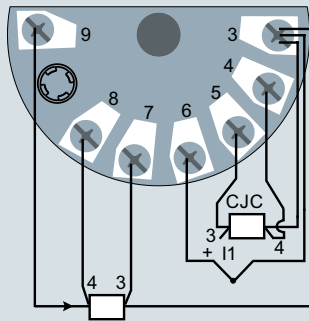
Input 1 and/or input 2:
2-wire, 3-wire or 4-wire RTD or
linear resistance



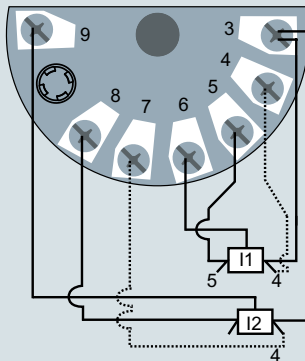
Input 1 and/or input 2:
TC (internal CJC or
external 2-wire, 3-wire or
4-wire CJC)



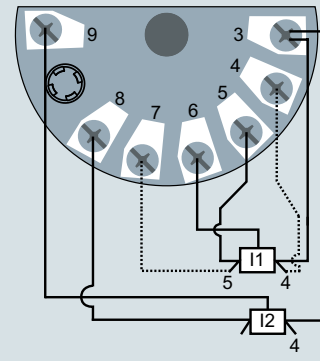
Input 1 and/or input 2:
Voltage input
(unipolar or bipolar)



Input 1: TC (internal CJC or
external 2-wire or 3-wire CJC)
Input 2: 2-wire, 3-wire or 4-wire RTD



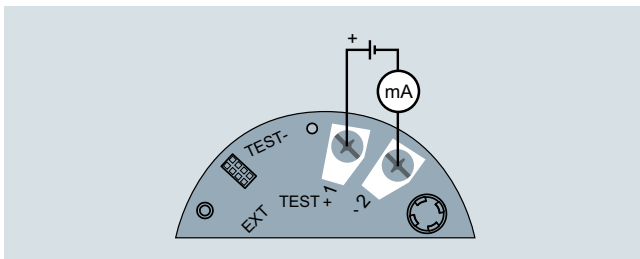
Input 1 and/or Input 2:
3-wire or 4-wire potentiometer



Input 1: 5-wire potentiometer
Input 2: 3-wire potentiometer

SITRANS TH420, input connection assignment

Output connection



SITRANS TH420, output connection assignment

Temperature Measurement

Transmitters for rail mounting

SITRANS TR200, two-wire system, Universal

Overview



Ultra flexible - with the universal SITRANS TR200 transmitter

- Two-wire devices for 4 to 20 mA
- Enclosure for rail mounting
- Universal input for virtually any type of temperature sensor
- Configurable over PC

Benefits

- Compact design
- Electrically isolated
- Test sockets for multimeters
- Diagnostics LED (green/red)
- Sensor monitoring open circuits and short-circuits
- Self-monitoring
- Configuration status stored in EEPROM
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility to EN 61326 and NE21
- SIL2 (with Order code C20), SIL2/3 (with C23)

Application

SITRANS TR200 transmitters can be used in all industrial sectors. Their compact design enables simple mounting on standard DIN rails on-site in protective boxes or in control cabinets. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometers (2, 3 or 4-wire system)
- Thermocouples
- Resistance-based sensors and DC voltage sources

The output signal is a direct current from 4 to 20 mA in accordance with the sensor characteristic.

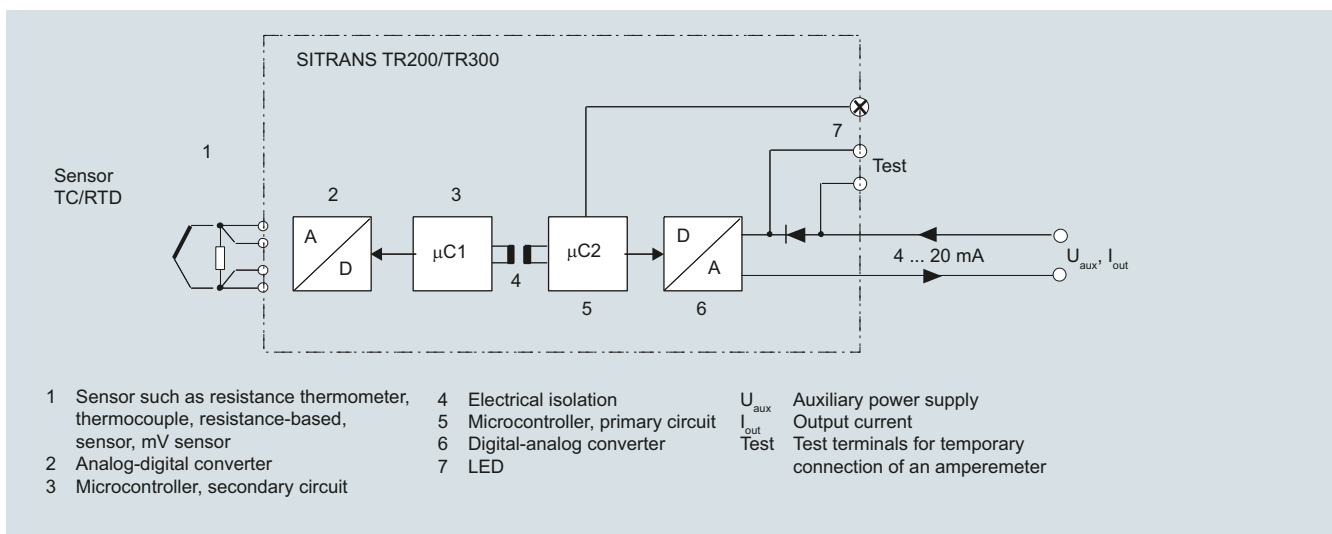
Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices comply with the Directive 2014/34/EU (ATEX).

Function

The SITRANS TR200 is configured over a PC. A USB or RS 232 modem is linked to the output terminals for this purpose. The configuration data can now be edited using the SIPROM T software tool. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

Once the sensors and power supply have been correctly connected, the transmitter outputs a temperature-linear output signal and the diagnostics LED displays a green light. In the case of a sensor short-circuit, the LED flashes red, an internal device fault is indicated by a steady red light.

The test socket can be used to connect an ammeter at any time for monitoring purposes and plausibility checks. The output current can be read without any interruption, or even without opening the current loop.



SITRANS TR200 function diagram

Temperature Measurement

Transmitters for rail mounting

SITRANS TR200, two-wire system, Universal

Technical specifications

Input

Resistance thermometer

Measured variable	Temperature
Sensor type	<ul style="list-style-type: none"> to IEC 60751 to JIS C 1604; $\alpha=0.00392 \text{ K}^{-1}$ to IEC 60751 Special type
Sensor factor	0.25 ... 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 ... 1000)
Units	°C or °F
Connection	
• Standard connection	1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire system
• Generation of average value	2 resistance thermometers in 2-wire system for generation of average temperature
• Generation of difference	2 resistance thermometers (RTD) in 2-wire system (RTD 1 – RTD 2 or RTD 2 – RTD 1)
Interface	
• Two-wire system	Parameterizable line resistance $\leq 100 \Omega$ (loop resistance)
• Three-wire system	No balancing required
• Four-wire system	No balancing required
Sensor current	$\leq 0.45 \text{ mA}$
Response time T_{63}	$\leq 250 \text{ ms}$ for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Always active (cannot be disabled)
Short-circuit monitoring	can be switched on/off (default value: ON)
Measuring range	parameterizable (see table "Digital measuring errors")
Min. measured span	10 °C (18 °F)
Characteristic curve	Temperature-linear or special characteristic

Resistance-based sensors

Measured variable	Actual resistance
Sensor type	Resistance-based, potentiometers
Units	Ω
Connection	
• Normal connection	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire system
• Generation of average value	2 resistance-based sensors in 2-wire system for generation of average value
• Generation of difference	2 resistance thermometers in 2-wire system (R1 – R2 or R2 – R1)
Interface	
• Two-wire system	Parameterizable line resistance $\leq 100 \Omega$ (loop resistance)
• Three-wire system	No balancing required
• Four-wire system	No balancing required
Sensor current	$\leq 0.45 \text{ mA}$
Response time T_{63}	$\leq 250 \text{ ms}$ for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Always active (cannot be disabled)

Short-circuit monitoring

Measuring range

Min. measured span

Characteristic curve

Thermocouples

Measured variable

Sensor type (thermocouples)

- Type B
- Type C
- Type D

- Type E
- Type J
- Type K

- Type L
- Type N
- Type R

- Type S
- Type T
- Type U

Units

Connection

- Standard connection
- Generation of average value
- Generation of difference

Response time T_{63}

Open-circuit monitoring

Cold junction compensation

- Internal

- External

- External fixed

Measuring range

Min. measured span

Characteristic curve

mV sensor

Measured variable

Sensor type

Units

Response time T_{63}

Open-circuit monitoring

Measuring range

Min. measured span

Overload capability of the input

Input resistance

Characteristic curve

can be switched on/off (default value: OFF)

parameterizable max. 0 ... 2200 Ω (see table "Digital measuring errors")

5 ... 25 Ω (see table "Digital measuring errors")

Resistance-linear or special characteristic

Temperature

Pt30Rh-Pt6Rh to DIN IEC 584
W5 %-Re acc. to ASTM 988
W3 %-Re acc. to ASTM 988

NiCr-CuNi to DIN IEC 584
Fe-CuNi to DIN IEC 584
NiCr-Ni to DIN IEC 584

Fe-CuNi to DIN 43710
NiCrSi-NiSi to DIN IEC 584
Pt13Rh-Pt to DIN IEC 584

Pt10Rh-Pt to DIN IEC 584
Cu-CuNi to DIN IEC 584
Cu-CuNi to DIN 43710

°C or °F

1 thermocouple (TC)

2 thermocouples (TC)

2 thermocouples (TC)
(TC1 – TC2 or TC2 – TC1)

$\leq 250 \text{ ms}$ for 1 sensor with open-circuit monitoring

Can be switched off

With integrated Pt100 resistance thermometer

With external Pt100 IEC 60751 (2-wire or 3-wire connection)

Cold junction temperature can be set as fixed value

parameterizable (see table "Digital measuring errors")

Min. 40 ... 100 °C (72 ... 180 °F) (see table "Digital measuring errors")

Temperature-linear or special characteristic

DC voltage

DC voltage source (DC voltage source possible over an externally connected resistor)

mV

$\leq 250 \text{ ms}$ for 1 sensor with open-circuit monitoring

Can be switched off

parameterizable max. -100 ... 1100 mV

2 mV or 20 mV

-1.5 ... +3.5 V DC

$\geq 1 \text{ M}\Omega$

Voltage-linear or special characteristic

Temperature Measurement

Transmitters for rail mounting

SITRANS TR200, two-wire system, Universal

2

Output	
Output signal	4 ... 20 mA, 2-wire
Auxiliary power	11 ... 35 V DC (to 30 V for Ex i/ic; to 32 V for Ex nA)
Max. load	($U_{aux} - 11$ V)/0.023 A
Overrange	3.6 ... 23 mA, infinitely adjustable (default range: 3.84 mA ... 20.5 mA)
Error signal (e.g. following sensor fault) (conforming to NE43)	3.6 ... 23 mA, infinitely adjustable (default value: 22.8 mA)
Sample cycle	0.25 s nominal
Damping	Software filter 1st order 0 ... 30 s (parameterizable)
Protection	Against reversed polarity
Electrically isolated	Input against output 2.12 kV DC (1.5 kV _{eff} AC)

Measuring accuracy	
Digital measuring errors	See Table "Digital measuring errors"
Reference conditions	
• Auxiliary power	24 V ± 1 %
• Load	500 Ω
• Ambient temperature	23 °C
• Warming-up time	> 5 min
Error in the analog output (digital/analog converter)	< 0.025 % of span
Error due to internal cold junction	< 0.5 °C (0.9 °F)
Influence of ambient temperature	
• Analog measuring error	0.02 % of span/10 °C (18 °F)
• Digital measuring errors	
- With resistance thermometer	0.06 °C (0.11 °F)/10 °C (18 °F)
- with thermocouples	0.6 °C (1.1 °F)/10 °C (18 °F)
Auxiliary power effect	< 0.001 % of span/V
Effect of load impedance	< 0.002 % of span/100 Ω
Long-term drift	
• In the first month	< 0.02 % of span in the first month
• After one year	< 0.2 % of span after one year
• After 5 years	< 0.3 % of span after 5 years

Conditions of use	
<u>Ambient conditions</u>	
Ambient temperature range	-40 ... +85 °C (-40 ... +185 °F)
Storage temperature range	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	< 98 %, with condensation
Electromagnetic compatibility	acc. to EN 61326 and NE21

Construction	
Material	Plastic, electronic module potted
Weight	122 g
Dimensions	See "Dimensional drawings"
Cross-section of cables	Max. 2.5 mm ² (AWG 13)
Degree of protection to IEC 60529	
• Enclosure	IP20

Certificates and approvals	
Explosion protection ATEX	
EC type test certificate	PTB 07 ATEX 2032X
• "Intrinsic safety" type of protection	II 2(1) G Ex ia/ib IIC T6/T4 II 3(1) G Ex ia/ic IIC T6/T4 II 3 G Ex ic IIC T6/T4 II 2(1) D Ex iaD/ibD 20/21 T115 °C
• Type of protection, "equipment is non-arcing"	II 3 G Ex nA IIC T6/T4
Other certificates	NEPSI and EAC Ex
Software requirements for SIPROM T	
PC operating system	Windows ME, 2000, XP, Win 7 and Win 8; can also be used in connection with RS 232 modem under Windows 95, 98 and 98SE

Factory setting:

- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Error signal in the event of sensor breakage: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Digital measuring errors

Resistance thermometer

Input	Measuring range	Min. mea- sured span		Digital accuracy	
	°C/(°F)	°C	(°F)	°C	(°F)
to IEC 60751					
Pt25	-200 ... +850 (-328 ... +1562)	10	(18)	0.3	(0.54)
Pt50	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +850 (-328 ... +1562)	10	(18)	0.1	(0.18)
Pt500	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
to JIS C1604-81					
Pt25	-200 ... +649 (-328 ... +1200)	10	(18)	0.3	(0.54)
Pt50	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +649 (-328 ... +1200)	10	(18)	0.1	(0.18)
Pt500	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
Ni 25 ... Ni1000	-60 ... +250 (-76 ... +482)	10	(18)	0.1	(0.18)

Temperature Measurement

Transmitters for rail mounting

SITRANS TR200, two-wire system, Universal

Resistance-based sensors

Input	Measuring range	Min. mea- sured span	Digital accuracy
	Ω	Ω	Ω
Resistance	0 ... 390	5	0.05
Resistance	0 ... 2200	25	0.25

Thermocouples

Input	Measuring range	Min. mea- sured span	Digital accuracy
	$^{\circ}\text{C}/(^{\circ}\text{F})$	$^{\circ}\text{C}$ $(^{\circ}\text{F})$	$^{\circ}\text{C}$ $(^{\circ}\text{F})$
Type B	100 ... 1820 (212 ... 3308)	100 (180)	2 ¹⁾ (3.6) ¹⁾
Type C (W5)	0 ... 2300 (32 ... 4172)	100 (180)	2 (3.6)
Type D (W3)	0 ... 2300 (32 ... 4172)	100 (180)	1 ²⁾ (1.8) ²⁾
Type E	-200 ... +1000 (-328 ... +1832)	50 (90)	1 (1.8)
Type J	-200 ... +1200 (-328 ... +2192)	50 (90)	1 (1.8)
Type K	-200 ... +1370 (-328 ... +2498)	50 (90)	1 (1.8)
Type L	-200 ... +900 (-328 ... +1652)	50 (90)	1 (1.8)
Type N	-200 ... +1300 (-328 ... +2372)	50 (90)	1 (1.8)
Type R	-50 ... +1760 (-58 ... +3200)	100 (180)	2 (3.6)
Type S	-50 ... +1760 (-58 ... +3200)	100 (180)	2 (3.6)
Type T	-200 ... +400 (-328 ... +752)	40 (72)	1 (1.8)
Type U	-200 ... +600 (-328 ... +1112)	50 (90)	2 (3.6)

¹⁾ The digital accuracy in the range 100 to 300 °C (212 to 572 °F) is 3 °C (5.4 °F).

²⁾ The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

mV sensor

Input	Measuring range	Min. measured span	Digital accuracy
	mV	mV	μV
mV sensor	-10 ... +70	2	40
mV sensor	-100 ... +1100	20	400

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value.

An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0.025 % of the set span (digital-analog error).

The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of cold junction errors in the case of thermocouple measurements).

Temperature Measurement

Transmitters for rail mounting

SITRANS TR200, two-wire system, Universal

Selection and Ordering data	Article No.
Temperature transmitter SITRANS TR200	
For mounting on a standard DIN rail, two-wire system, 4 to 20 mA, programmable, with electrical isolation	
• Without explosion protection	7NG3032-0JN00
• With explosion protection to ATEX	7NG3032-1JN00
Further designs	Order code
Please add "-Z" to Article No. with and specify Order codes(s).	
With test protocol (5 measuring points)	C11
Functional safety SIL2	C20
Functional safety SIL2/3	C23
Customer-specific programming	
Add "-Z" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... °C, °F	Y01¹⁾
Measuring point no. (TAG), max. 8 characters	Y17²⁾
Measuring point descriptor, max. 16 characters	Y23²⁾
Measuring point message, max. 32 characters	Y24²⁾
Text on front label, max. 16 characters	Y29²⁾³⁾
Pt100 (IEC) 2-wire, $R_L = 0\ \Omega$	U02⁴⁾
Pt100 (IEC) 3-wire	U03⁴⁾
Pt100 (IEC) 4-wire	U04⁴⁾
Thermocouple type B	U20⁴⁾⁵⁾
Thermocouple type C (W5)	U21⁴⁾⁵⁾
Thermocouple type D (W3)	U22⁴⁾⁵⁾
Thermocouple type E	U23⁴⁾⁵⁾
Thermocouple type J	U24⁴⁾⁵⁾
Thermocouple type K	U25⁴⁾⁵⁾
Thermocouple type L	U26⁴⁾⁵⁾
Thermocouple type N	U27⁴⁾⁵⁾
Thermocouple type R	U28⁴⁾⁵⁾
Thermocouple type S	U29⁴⁾⁵⁾
Thermocouple type T	U30⁴⁾⁵⁾
Thermocouple type U	U31⁴⁾⁵⁾
With TC: CJC external (Pt100, 3-wire)	U41
With TC: CJC external with fixed value, specify in plain text	Y50
Special differing customer-specific programming, specify in plain text	Y09⁶⁾
Fail-safe value 3.6 mA (instead of 22.8 mA)	U36²⁾

Accessories

Further accessories for assembly, connection and transmitter configuration, see page 2/120.

Modem for SITRANS TH100, TH200, TR200 and TF with TH200 incl. SIPROM T parameterization software

With USB connection

Article No.

7NG3092-8KN

- 1) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
- 2) For this selection, Y01 or Y09 must also be selected.
- 3) Text on front plate is not saved in the device.
- 4) For this selection, Y01 must also be selected.
- 5) Internal cold junction compensation is selected as the default for TC.
- 6) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Supply units see Chapter "Supplementary Components".

Ordering example 1:

7NG3032-0JN00-Z Y01+Y17+Y29+U03
Y01: -10 ... +100 °C
Y17: TICA123
Y29: TICA123

Ordering example 2:

7NG3032-0JN00-Z Y01+Y17+Y23+Y29+U25
Y01: -10 ... +100 °C
Y17: TICA123
Y23: TICA123HEAT
Y29: TICA123HEAT

Factory setting:

- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

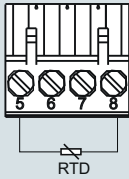
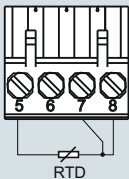
Temperature Measurement

Transmitters for rail mounting

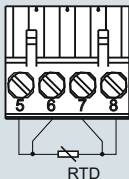
SITRANS TR200, two-wire system, Universal

2

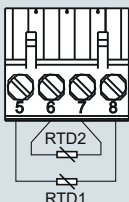
Resistance thermometer

Two-wire system ¹⁾

Three-wire system

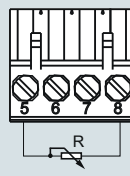
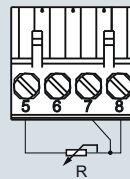


Four-wire system

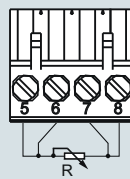
Generation of average value/difference ¹⁾

¹⁾ Programmable line resistance for the purpose of correction.

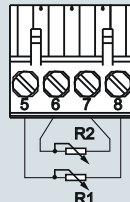
Resistance

Two-wire system ¹⁾

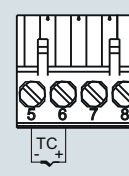
Three-wire system



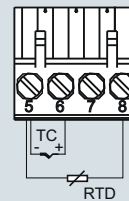
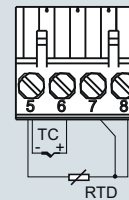
Four-wire system

Generation of average value/difference ¹⁾

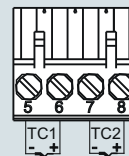
Thermocouple



Cold junction compensation internal/fixed value

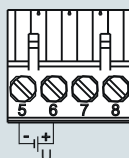
Cold junction compensation with external Pt100 in two-wire system ¹⁾

Cold junction compensation with external Pt100 in three-wire system

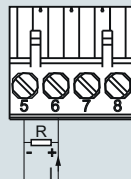


Generation of average value / difference with internal cold junction compensation

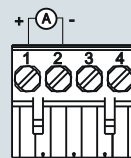
Voltage measurement



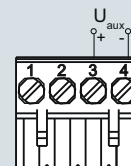
Current measurement



Test terminals



Power supply/ 4 ... 20 mA (U_{aux})



SITRANS TR200, sensor connection assignment

Temperature Measurement

Transmitters for rail mounting

SITRANS TR300, two-wire system, Universal, HART

Overview



"HART" to beat - the universal SITRANS TR300 transmitter

- Two-wire devices for 4 to 20 mA, HART
- Device for rail mounting
- Universal input for virtually any type of temperature sensor
- Configurable over HART

Benefits

- Compact design
- Electrically isolated
- Test sockets for multimeters
- Diagnostics LED (green/red)
- Sensor monitoring open circuits and short-circuits
- Self-monitoring
- Configuration status stored in EEPROM
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility to EN 61326 and NE21
- SIL2 (with Order code C20), SIL2/3 (with C23)

Application

SITRANS TR300 transmitters can be used in all industrial sectors. Their compact design enables simple mounting on standard DIN rails on-site in protective boxes or in control cabinets. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometers (2, 3 or 4-wire system)
- Thermocouples
- Resistance-based sensors and DC voltage sources

The output signal is a direct current from 4 to 20 mA in accordance with the sensor characteristic, superimposed by the digital HART signal.

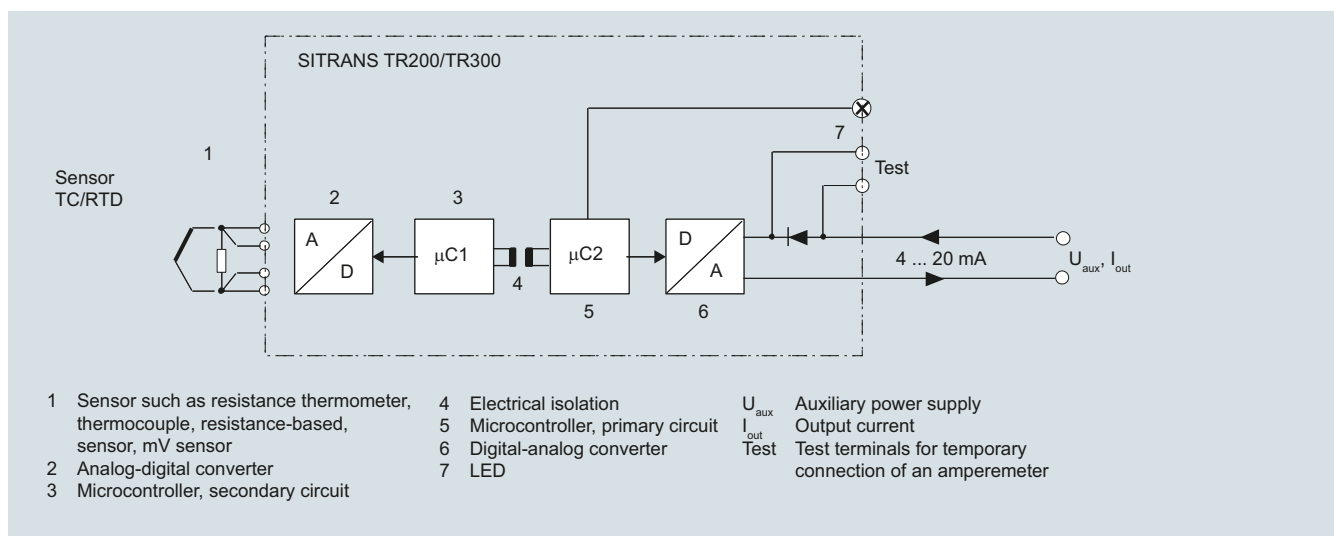
Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices comply with the Directive 2014/34/EU (ATEX).

Function

The SITRANS TR300 is configured over HART. This can be done using a handheld communicator or even more conveniently with a HART modem and the SIMATIC PDM parameterization software. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

Once the sensors and power supply have been correctly connected, the transmitter outputs a temperature-linear output signal and the diagnostics LED displays a green light. In the case of a sensor short-circuit, the LED flashes red, an internal device fault is indicated by a steady red light.

The test socket can be used to connect an ammeter at any time for monitoring purposes and plausibility checks. The output current can be read without any interruption, or even without opening the current loop.



SITRANS TR300 function diagram

Temperature Measurement

Transmitters for rail mounting

SITRANS TR300, two-wire system, Universal, HART

Technical specifications

Input

Resistance thermometer

Measured variable	Temperature
Sensor type	
• to IEC 60751	Pt25 ... Pt1000
• to JIS C 1604; $\alpha=0.00392 \text{ K}^{-1}$	Pt25 ... Pt1000
• to IEC 60751	Ni25 ... Pt1000
• Special type	over special characteristic (max. 30 points)
Sensor factor	0.25 ... 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 ... 1000)
Units	°C or °F
Connection	
• Standard connection	1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire system
• Generation of average value	2 identical resistance thermometers in 2-wire system for generation of average temperature
• Generation of difference	2 identical resistance thermometers (RTD) in 2-wire system (RTD 1 – RTD 2 or RTD 2 – RTD 1)
Interface	
• Two-wire system	Parameterizable line resistance $\leq 100 \Omega$ (loop resistance)
• Three-wire system	No balancing required
• Four-wire system	No balancing required
Sensor current	$\leq 0.45 \text{ mA}$
Response time T_{63}	$\leq 250 \text{ ms}$ for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Always active (cannot be disabled)
Short-circuit monitoring	can be switched on/off (default value: ON)
Measuring range	parameterizable (see table "Digital measuring errors")
Min. measured span	10 °C (18 °F)
Characteristic curve	Temperature-linear or special characteristic

Resistance-based sensors

Measured variable	Actual resistance
Sensor type	Resistance-based, potentiometers
Units	Ω
Connection	
• Normal connection	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire system
• Generation of average value	2 resistance-based sensors in 2-wire system for generation of average value
• Generation of difference	2 resistance thermometers in 2-wire system (R1 – R2 or R2 – R1)
Interface	
• Two-wire system	Parameterizable line resistance $\leq 100 \Omega$ (loop resistance)
• Three-wire system	No balancing required
• Four-wire system	No balancing required
Sensor current	$\leq 0.45 \text{ mA}$

Response time T_{63}	$\leq 250 \text{ ms}$ for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Always active (cannot be disabled)
Short-circuit monitoring	can be switched on/off (default value: OFF)
Measuring range	parameterizable max. 0 ... 2200 Ω (see table "Digital measuring errors")
Min. measured span	5 ... 25 Ω (see table "Digital measuring errors")
Characteristic curve	Resistance-linear or special characteristic
<u>Thermocouples</u>	
Measured variable	Temperature
Sensor type (thermocouples)	
• Type B	Pt30Rh-Pt6Rh to DIN IEC 584
• Type C	W5 %-Re acc. to ASTM 988
• Type D	W3 %-Re acc. to ASTM 988
• Type E	NiCr-CuNi to DIN IEC 584
• Type J	Fe-CuNi to DIN IEC 584
• Type K	NiCr-Ni to DIN IEC 584
• Type L	Fe-CuNi to DIN 43710
• Type N	NiCrSi-NiSi to DIN IEC 584
• Type R	Pt13Rh-Pt to DIN IEC 584
• Type S	Pt10Rh-Pt to DIN IEC 584
• Type T	Cu-CuNi to DIN IEC 584
• Type U	Cu-CuNi to DIN 43710
Units	°C or °F
Connection	
• Standard connection	1 thermocouple (TC)
• Generation of average value	2 thermocouples (TC)
• Generation of difference	2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1)
Response time T_{63}	$\leq 250 \text{ ms}$ for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Can be switched off
Cold junction compensation	
• Internal	With integrated Pt100 resistance thermometer
• External	With external Pt100 IEC 60751 (2-wire or 3-wire connection)
• External fixed	Cold junction temperature can be set as fixed value
Measuring range	parameterizable (see table "Digital measuring errors")
Min. measured span	Min. 40 ... 100 °C (72 ... 180 °F) (see table "Digital measuring errors")
Characteristic curve	Temperature-linear or special characteristic
<u>mV sensor</u>	
Measured variable	DC voltage
Sensor type	DC voltage source (DC voltage source possible over an externally connected resistor)
Units	mV
Response time T_{63}	$\leq 250 \text{ ms}$ for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Can be switched off

Temperature Measurement

Transmitters for rail mounting

SITRANS TR300, two-wire system, Universal, HART

Measuring range	parameterizable max. -100 ... 1100 mV	Conditions of use	
Min. measured span	2 mV or 20 mV	<u>Ambient conditions</u>	
Overload capability of the input	-1.5 ... +3.5 V DC	Ambient temperature range	-40 ... +85 °C (-40 ... +185 °F)
Input resistance	≥ 1 MΩ	Storage temperature range	-40 ... +85 °C (-40 ... +185 °F)
Characteristic curve	Voltage-linear or special characteristic	Relative humidity	< 98 %, with condensation
		Electromagnetic compatibility	acc. to EN 61326 and NE21
Output		Design	
Output signal	4 ... 20 mA, 2-wire with communication acc. to HART Rev. 5.9	Material	Plastic, electronic module potted
Auxiliary power	11 ... 35 V DC (to 30 V for Ex i/ic; to 32 V for Ex nA)	Weight	122 g
Max. load	(U _{aux} - 11 V)/0.023 A	Dimensions	See "Dimensional drawings"
Overrange	3.6 ... 23 mA, infinitely adjustable (default range: 3.84 ... 20.5 mA)	Cross-section of cables	Max. 2.5 mm ² (AWG 13)
Error signal (e.g. following sensor fault) (conforming to NE43)	3.6 ... 23 mA, infinitely adjustable (default value: 22.8 mA)	Degree of protection to IEC 60529	
Sample cycle	0.25 s nominal	• Enclosure	IP20
Damping	Software filter 1st order 0 ... 30 s (parameterizable)	Certificates and approvals	
Protection	Against reversed polarity	Explosion protection ATEX	
Electrical isolation	Input against output (1 kV _{eff})	EC type test certificate	PTB 07 ATEX 2032X
Measuring accuracy		• "Intrinsic safety" type of protection	II 2(1) G Ex ia/ib IIC T6/T4 II 3(1) G Ex ia/ic IIC T6/T4 II 3 G Ex ic IIC T6/T4 II 2(1) D Ex iaD/ibD 20/21 T115 °C
Digital measuring errors	see table "Digital measuring errors"	• Type of protection, "equipment is non-arcing"	II 3 G Ex nA IIC T6/T4
Reference conditions		Other certificates	EAC Ex(GOST) and NEPSI
• Auxiliary power	24 V ± 1 %	<u>Factory setting:</u>	
• Load	500 Ω	• Pt100 (IEC 751) with 3-wire circuit	
• Ambient temperature	23 °C	• Measuring range: 0 ... 100 °C (32 ... 212 °F)	
• Warming-up time	> 5 min	• Error signal in the event of sensor breakage: 22.8 mA	
Error in the analog output (digital/analog converter)	< 0.025 % of span	• Sensor offset: 0 °C (0 °F)	
Error due to internal cold junction	< 0.5 °C (0.9 °F)	• Damping 0.0 s	
Ambient temperature effect			
• Analog measuring errors of span	< 0.2 % of max. span/10 °C (18 °F)		
• Digital measuring errors			
- at resistance thermometers	0.06 °C (0.11 °F)/10 °C (18 °F)		
- at thermocouples	0.6 °C (1.1 °F)/10 °C (18 °F)		
Auxiliary power effect	< 0.001 % of span/V		
Effect of load impedance	< 0.002 % of span/100 Ω		
Long-term drift			
• In the first month	< 0.02 % of span in the first month		
• After one year	< 0.2 % of span after one year		
• After 5 years	< 0.3 % of span after 5 years		

Temperature Measurement

Transmitters for rail mounting

SITRANS TR300, two-wire system, Universal, HART

Digital measuring errors

Resistance thermometer

Input	Measuring range	Min. mea- sured span		Digital accuracy	
	°C / (°F)	°C	(°F)	°C	(°F)
to IEC 60751					
Pt25	-200 ... +850 (-328 ... +1562)	10	(18)	0.3	(0.54)
Pt50	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +850 (-328 ... +1562)	10	(18)	0.1	(0.18)
Pt500	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
to JIS C1604-81					
Pt25	-200 ... +649 (-328 ... +1200)	10	(18)	0.3	(0.54)
Pt50	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +649 (-328 ... +1200)	10	(18)	0.1	(0.18)
Pt500	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
Ni 25 ... Ni1000	-60 ... +250 (-76 ... +482)	10	(18)	0.1	(0.18)

Resistance-based sensors

Input	Measuring range	Min. mea- sured span		Digital accuracy	
	Ω	Ω		Ω	
Resistance	0 ... 390	5		0.05	
Resistance	0 ... 2200	25		0.25	

Thermocouples

Input	Measuring range	Min. mea- sured span		Digital accuracy	
	°C / (°F)	°C	(°F)	°C	(°F)
Type B	100 ... 1820 (212 ... 3308)	100	(180)	2 ¹⁾	(3.6) ¹⁾
Type C (W5)	0 ... 2300 (32 ... 4172)	100	(180)	2	(3.6)
Type D (W3)	0 ... 2300 (32 ... 4172)	100	(180)	1 ²⁾	(1.8) ²⁾
Type E	-200 ... +1000 (-328 ... +1832)	50	(90)	1	(1.8)
Type J	-200 ... +1200 (-328 ... +2192)	50	(90)	1	(1.8)
Type K	-200 ... +1370 (-328 ... +2498)	50	(90)	1	(1.8)
Type L	-200 ... +900 (-328 ... +1652)	50	(90)	1	(1.8)
Type N	-200 ... +1300 (-328 ... +2372)	50	(90)	1	(1.8)
Type R	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.6)
Type S	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.6)
Type T	-200 ... +400 (-328 ... +752)	40	(72)	1	(1.8)
Type U	-200 ... +600 (-328 ... +1112)	50	(90)	2	(3.6)

1) The digital accuracy in the range 100 to 300 °C (212 to 572 °F) is 3 °C (5.4 °F).

2) The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

mV sensor

Input	Measuring range	Min. mea- sured span		Digital accuracy	
	mV	mV		μV	
mV sensor	-10 ... +70	2		40	
mV sensor	-100 ... +1100	20		400	

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value.

An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0,025 % of the set span (digital-analog error).

The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of cold junction errors in the case of thermocouple measurements).

Temperature Measurement

Transmitters for rail mounting

SITRANS TR300, two-wire system, Universal, HART

Selection and Ordering data

Article No.

Temperature transmitter SITRANS TR300

For mounting on a standard DIN rail, two-wire system, 4 ... 20 mA, HART, with electrical isolation

- Without explosion protection
- With explosion protection to ATEX

7NG3033-0JN00**7NG3033-1JN00**

Further designs

Please add **"-Z"** to Article No. with and specify Order codes(s).

Order code

With test protocol (5 measuring points)

C11

Functional safety SIL2

C20

Functional safety SIL2/3

C23

Customer-specific programming

Add **"-Z"** to Article No. and specify Order code(s)

Measuring range to be set
Specify in plain text (max. 5 digits):
Y01: ... to ... °C, °F

Y01¹⁾

Measuring point no. (TAG), max. 8 characters

Y17²⁾

Measuring point descriptor, max. 16 characters

Y23²⁾

Measuring point message, max. 32 characters

Y24²⁾

Text on front label, max. 16 characters

Y29²⁾³⁾

Pt100 (IEC) 2-wire, $R_L = 0 \Omega$

U02⁴⁾

Pt100 (IEC) 3-wire

U03⁴⁾

Pt100 (IEC) 4-wire

U04⁴⁾

Thermocouple type B

U20⁴⁾⁵⁾

Thermocouple type C (W5)

U21⁴⁾⁵⁾

Thermocouple type D (W3)

U22⁴⁾⁵⁾

Thermocouple type E

U23⁴⁾⁵⁾

Thermocouple type J

U24⁴⁾⁵⁾

Thermocouple type K

U25⁴⁾⁵⁾

Thermocouple type L

U26⁴⁾⁵⁾

Thermocouple type N

U27⁴⁾⁵⁾

Thermocouple type R

U28⁴⁾⁵⁾

Thermocouple type S

U29⁴⁾⁵⁾

Thermocouple type T

U30⁴⁾⁵⁾

Thermocouple type U

U31⁴⁾⁵⁾

With TC: CJC external (Pt100, 3-wire)

U41

With TC: CJC external with fixed value, specify in plain text

Y50

Special differing customer-specific programming, specify in plain text

Y09⁶⁾

Fail-safe value 3.6 mA (instead of 22.8 mA)

U36²⁾

Accessories

Further accessories for assembly, connection and transmitter configuration, see page 2/120.

Article No.

HART modem

- With USB connection

7MF4997-1DB

SIMATIC PDM operating software

See Section 8

- 1) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
- 2) For this selection, Y01 or Y09 must also be selected.
- 3) Text on front plate is not saved in the device.
- 4) For this selection, Y01 must also be selected.
- 5) Internal cold junction compensation is selected as the default for TC.
- 6) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Supply units see Chapter "Supplementary Components".

Ordering example 1:

7NG3033-0JN00-Z Y01+Y17+Y29+U03

Y01: -10 ... +100 °C

Y17: TICA123

Y29: TICA123

Ordering example 2:

7NG3033-0JN00-Z Y01+Y17+Y23+Y29+U25

Y01: -10 ... +100 °C

Y17: TICA123

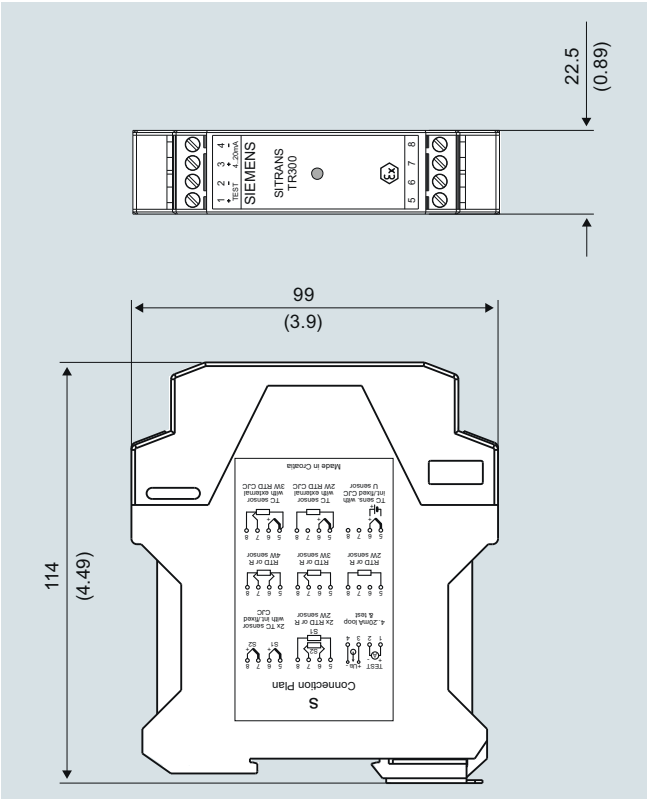
Y23: TICA123HEAT

Y29: TICA123HEAT

Factory setting:

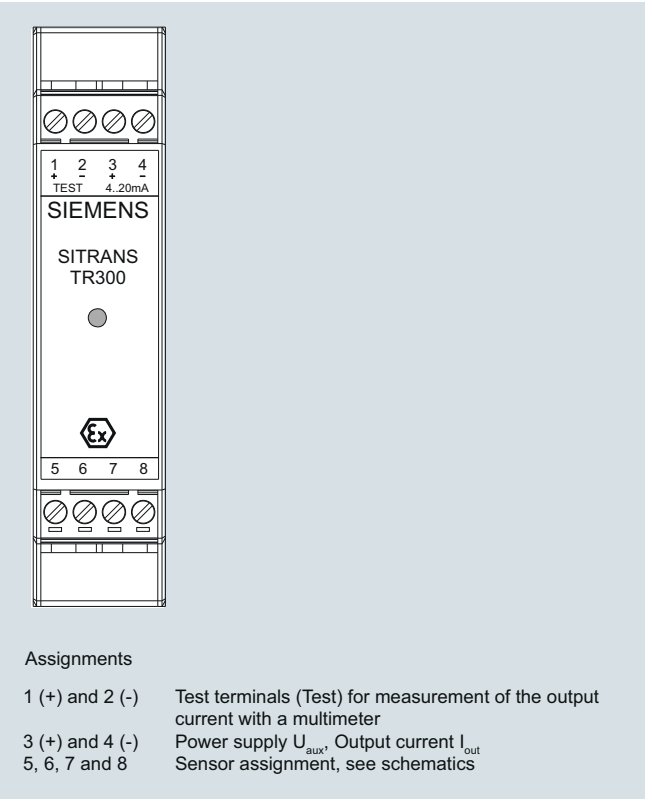
- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Error signal in the event of sensor breakage: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Dimensional drawings



SITRANS TR300, dimensions in mm (inch)

Schematics



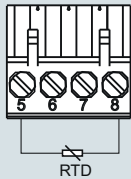
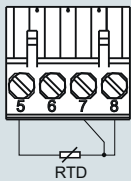
SITRANS TR300, pin assignment

Temperature Measurement

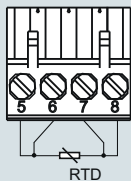
Transmitters for rail mounting

SITRANS TR300, two-wire system, Universal, HART

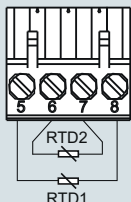
Resistance thermometer

Two-wire system ¹⁾

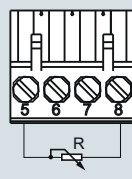
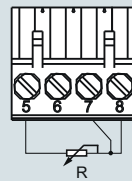
Three-wire system



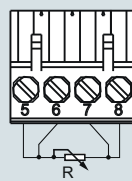
Four-wire system

Generation of average value/difference ¹⁾

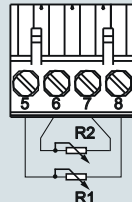
Resistance

Two-wire system ¹⁾

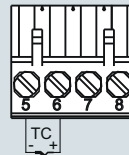
Three-wire system



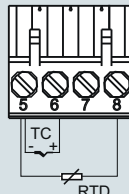
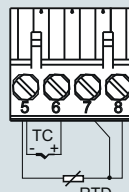
Four-wire system

Generation of average value/difference ¹⁾

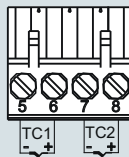
Thermocouple



Cold junction compensation internal/fixed value

Cold junction compensation with external Pt100 in two-wire system ¹⁾

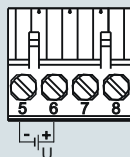
Cold junction compensation with external Pt100 in three-wire system



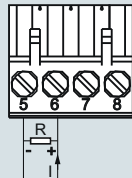
Generation of average value / difference with internal cold junction compensation

¹⁾ Programmable line resistance for the purpose of correction.

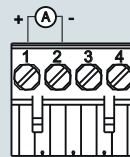
Voltage measurement



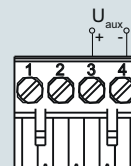
Current measurement



Test terminals



Power supply/ 4 ... 20 mA (U_{aux})



SITRANS TR300, sensor connection assignment

Temperature Measurement

Transmitters for rail mounting

SITRANS TR320, two-wire system, HART

Overview



- 2-wire temperature transmitter with HART communication interface
- Enclosure for rail mounting
- Universal input for virtually any type of temperature sensor
- HART 7

Benefits

- Compact design
- Electrical isolation
- Test terminals for ammeter
- Diagnostics LED (green/red)
- Input monitoring
Wire break and short-circuit
- Self-monitoring
- Configuration status stored in EEPROM
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility according to DIN EN 61326 and NE21
- SIL2/3 (with order note C20)

Application

SITRANS TR320 transmitters can be used in all sectors. Their compact design enables simple mounting on standard DIN rails on-site in protective boxes or in control cabinets. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometer (2-wire, 3-wire, 4-wire connection)
- Thermocouples
- Linear resistance, potentiometer and DC voltage sources

With HART communication interface:

- The output signal is a load-independent direct current from 4 to 20 mA in accordance with the input characteristic, superimposed by the digital HART signal.

Transmitters of the "intrinsically safe or Zone 2 increased safety" type of protection can be installed in hazardous areas. The device meets the requirements of the EU Directive 2014/34/EU (ATEX), the FM and CSA regulations as well as other national approvals.

Temperature Measurement

Transmitters for rail mounting

SITRANS TR320, two-wire system, HART

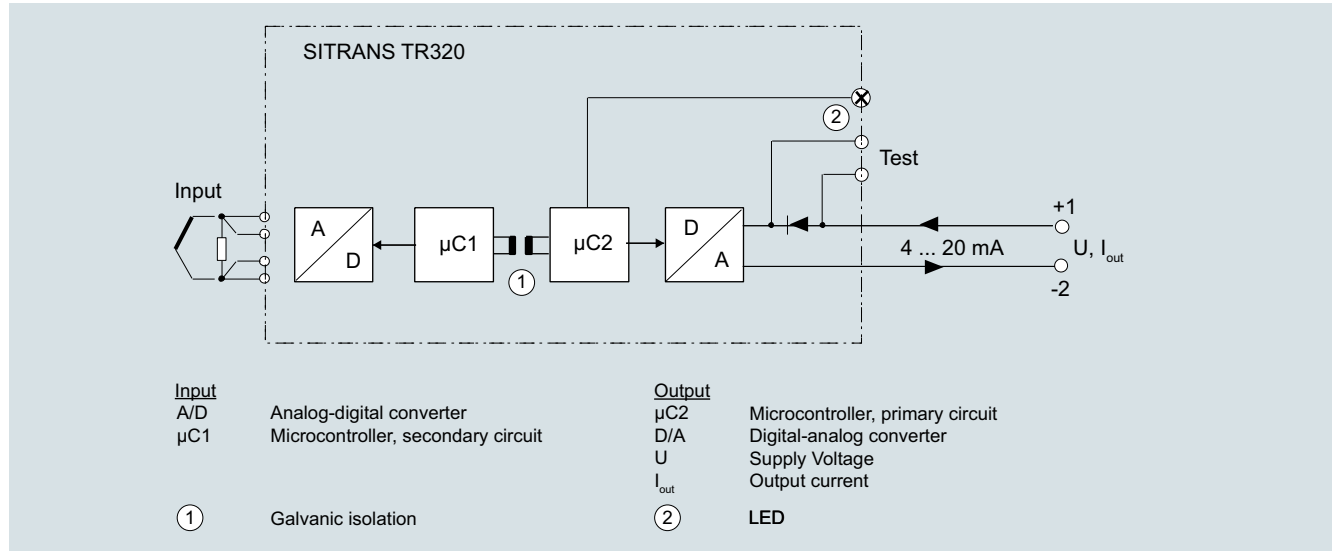
Function

With HART communication interface:

- The SITRANS TR320 is configured via HART. The configuration can be carried out using a handheld communicator or, more conveniently, with a HART modem and the SIMATIC PDM configuration software. The configuration data is then permanently stored in the non-volatile memory (EEPROM).

After correct connection of input and supply voltage, the transmitter outputs a temperature-linear output signal and the diagnostics LED is green. In case of external errors, e.g. sensor short circuit or interruption, the LED flashes red; an internal error is indicated by a permanent red light.

An ammeter can be connected at any time for checking and plausibility via the test terminals. The output current can be read without any interruption, or even without opening the current loop.



SITRANS TR320 function block diagram

Technical specifications

General

Supply voltage ^{1) 2)}	
• Without explosion protection (non-Ex)	7.5 ... 48 V DC
• with explosion protection (Ex i)	7.5 ... 30 V DC
Additional minimum supply voltage when using test terminals	0.8 V
Maximum power loss	≤ 850 mW
Minimum load resistance at supply voltage > 37 V	(V _{supply} - 37 V)/23 mA
Insulation voltage, test/operation	
• Without explosion protection (non-Ex)	2.5 kV AC/55 V AC
• with explosion protection (Ex i)	2.5 kV AC/42 V AC
Polarity protection	All inputs and outputs
Write protection	Open circuits or software
Warming-up time	< 5 min
Starting time	< 2.75 s
Programming	HART
Signal-to-noise ratio	> 60 dB
Long-term stability	Better than: • ± 0.05% of measuring span/year • ± 0.18% of measuring span/5 years
Response time	4 ... 20 mA: ≤ 55 ms HART: ≤ 75 ms (typically 70 ms)
Programmable damping	0 ... 60 s
Signal dynamic	
• Input	24 bit
• Output	18 bit
Influence of change in supply voltage	< 0.005% of measuring span/V DC

Input

Resistance thermometer (RTD)

Input type	
• Pt10 ... 10000	<ul style="list-style-type: none"> • IEC 60751 • JIS C 1604-8 • GOST 6651-2009 • Callendar-Van Dusen • DIN 43760-1987 • GOST 6651-2009 / OIML R84:2003
• Ni10 ... 10000	<ul style="list-style-type: none"> • DIN 43760-1987 • GOST 6651-2009 / OIML R84:2003
• Cu5 ... 1000	<ul style="list-style-type: none"> • Edison Copper Winding No. 15 • GOST 6651-2009 / OIML R84:2003
Type of connection	2-wire, 3-wire or 4-wire
Line resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the line resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• Pt1000, Pt10000 (IEC 60751 and JIS C 1604-8)	Max. 30 nF
• All other input types	Max. 50 nF
Fault detection, programmable	None, short-circuited, defective, short-circuited or defective
	Note When the low limit for the configured input type is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time (RTD)	≤ 75 ms (typically 70 ms)
Fault detection time (for 3-wire and 4-wire)	≤ 2000 ms

Thermocouples (TC)

Input type	
• B	IEC 60584-1
• E	IEC 60584-1
• J	IEC 60584-1
• K	IEC 60584-1
• L	DIN 43710
• Lr	GOST 3044-84
• N	IEC 60584-1
• R	IEC 60584-1
• S	IEC 60584-1
• T	IEC 60584-1
• U	DIN 43710
• W3	ASTM E988-96
• W5	ASTM E988-96
• LR	GOST 3044-84
Cold junction compensation (CJC)	Constant, internal or external over Pt100 or Ni100 RTD
• Temperature range internal CJC	-50 ... +100 °C (-+58 ... +212 °F)
• Connection external CJC	2-wire or 3-wire
• External CJC, line resistance per wire (for 3-wire and 4-wire connections)	50 Ω
• Effect of the line resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
• Input current external CJC	< 0.15 mA
• Temperature range external CJC	-50 ... +135 °C (-58 ... +275 °F)
• Cable, wire-wire capacity	Max. 50 nF
• Total line resistance	Max. 10 kΩ
• Fault detection, programmable	None, short-circuited, defective, short-circuited or defective
	Note The short-circuited fault detection only applies to the CJC input.
• Fault detection time (TC)	≤ 75 ms (typically 70 ms)
• Fault detection time, external CJC (for 3-wire and 4-wire)	≤ 2000 ms

Linear resistance

Input range	0 ... 100 kΩ
Minimum measuring span	25 Ω
Type of connection	2-wire, 3-wire or 4-wire
Line resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the line resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF
Fault detection, programmable	None, defective
Potentiometers	
Input range	0 ... 100 kΩ
Minimum measuring span	25 Ω
Type of connection	3-wire or 4-wire
Line resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the line resistance (with 4-wire and 5-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF

Temperature Measurement

Transmitters for rail mounting

SITRANS TR320, two-wire system, HART

Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note When the configured potentiometer size is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time, wiper arm (no short-circuit detection)	≤ 75 ms (typically 70 ms)
Fault detection time, element	≤ 2000 ms
Fault detection time (for 4-wire and 5-wire)	≤ 2000 ms
Voltage input	
Measuring range	
• Unipolar	-100 ... 1700 mV
• Bipolar	-800 ... +800 mV
Minimum measuring span	2.5 mV
Input resistance	10 MΩ
Cable, wire-wire capacity	
• Input range: -100 ... 1700 mV	Max. 30 nF
• Input range: -20 ... 100 mV	Max. 50 nF
Fault detection, programmable	None, defective
Fault detection time	≤ 75 ms (typically 70 ms)
Output and HART communication	
Normal range, programmable	3.8 ... 20.5 mA/20.5 ... 3.8 mA
Extended range (output limits), programmable	3.5 ... 23 mA/23 ... 3.5 mA
Programmable input/output limits	
• Fault current	Enable/disable
• Fault current setting	3.5 ... 23 mA
Update time	10 ms
Load (with current output)	≤ (V _{Supply} - 7.5)/0.023 Ω
Load stability	< 0.01% of meas. span/100 Ω (measuring span = currently selected range)
Input fault detection, programmable (detection of input short circuits is ignored with TC and voltage inputs)	3.5 ... 23 mA
NAMUR NE43 Upscale	> 21 mA
NAMUR NE43 Downscale	< 3.6 mA
HART protocol versions	HART 7
Measuring accuracy	
Input accuracy	See "Input accuracy" table
Output accuracy	See "Output accuracy" table
Rated conditions	
Ambient temperature (operation)	
• Standard	-50 ... +85 °C (-58 ... +185 °F)
• SIL	-40 ... +80 °C (-40 ... +176 °F)
Storage temperature	-50 ... +85 °C (-58 ... +185 °F)
Calibration temperature	24 °C ±1.0 °C (75.2 °F ±1.8 °F)
Relative humidity	< 99% (no condensation)
Degree of protection	
• Enclosure of the transmitter	IP20
• Terminals	IP20

Design	
Weight	122 g (0.27 lb)
Maximum cable cross-section	2.5 mm² (AWG 13)
Tightening torque for clamping screws	0.5 ... 0.6 Nm
Vibrations	IEC 60068-2-6
• 2 ... 25 Hz	± 1.6 mm (0.07 inch)
• 25 ... 100 Hz	± 4 g
Certificates and approvals	
<u>Explosion protection ATEX/IECEx and others</u>	
Certificates ³⁾	DEKRA 17ATEX0116 X IECEx DEK 17.0054X A5E43700604A-2018X
"Intrinsic safety ia/ib" type of protection	For use in Zone 0, 1, 2, 20, 21, 22
• ATEX	II 1 G Ex ia IIC T6 ... T4 Ga II 2(1) G Ex ib [ia Ga] IIC T6 ... T4 Gb II 1 D Ex ia IIIC Da I M1 Ex ia I Ma
• IECEx and others	Ex ia IIC T6 ... T4 Ga Ex ib [ia Ga] IIC T6 ... T4 Gb Ex ia IIIC Da Ex ia I Ma
"Intrinsic safety ic" type of protection	For use in Zones 2 and 22
• ATEX	II 2 G Ex ic IIC T6 ... T4 Gc II 2 D Ex ic IIIC Dc
• IECEx and others	Ex ic IIC T6 ... T4 Gc Ex ic IIIC Dc
"Non-sparking/increased safety nA/ec" type of protection	For use in Zones 2 and 22
• ATEX	II 2 G Ex nA IIC T6 ... T4 Gc II 2 G Ex ec IIC T6 ... T4 Gc
• IECEx and others	Ex nA IIC T6 ... T4 Gc Ex ec IIC T6 ... T4 Gc
<u>Explosion protection CSA /FM for Canada and USA</u>	
Certificates	CSA 1861385 FM18CA0024 FM18US0046
"Intrinsic safety ia" type of protection	IS, CL I, Div 1, GP ABCD, T6 ... T4 Ex ia IIC T6 ... T4 Ga AEx ia IIC T6 ... T4 Ga or: Ex ib [ia Ga] IIC T6 ... T4 Gb AEx ib [ia Ga] IIC T6 ... T4 Gb
"Non incandive field wiring NIFW" type of protection	NIFW, CL I, Div 2, GP ABCD T6 ... T4
"Non incandive NI" type of protection	NI, CL I, Div 2, GP ABCD T6 ... T4 Ex nA IIC T6 ... T4 Gc AEx nA IIC T6 ... T4 Gc

1) Note that the minimum supply voltage must correspond to the value measured at the terminals of the SITRANS TR320.
All external voltage drops must be taken into consideration.

2) Protect the device from overvoltage with the help of a suitable power supply or suitable overvoltage protection equipment.

3) Additional available certificates are listed on the Internet at <http://www.siemens.com/processinstrumentation/certificates>

Temperature Measurement

Transmitters for rail mounting

SITRANS TR320, two-wire system, HART

Measuring ranges/Minimum measuring span

RTD

Input type	Standard	Measuring range in °C (°F)	α_0 in °C ⁻¹ (°F ⁻¹)	Minimum measuring span in °C (°F)
Pt10 ... 10000	IEC 60751	-200 ... +850 (-328 ... +1562)	0.003851 (0.002139)	10 (50)
	JIS C 1604-8	-200 ... +649 (-328 ... +1200)	0.003916 (0.002176)	10 (50)
	GOST 6651_2009	-200 ... +850 (-328 ... +1562)	0.003910 (0.002172)	10 (50)
	Callendar-Van Dusen	-200 ... +850 (-328 ... +1562)	-	10 (50)
Ni10 ... 10000	DIN 43760-1987	-60 ... +250 (-76 ... +482)	0.006180 (0.003433)	10 (50)
	GOST 6651-2009 / OIML R84:2003	-60 ... +180 (-76 ... +356)	0.006170 (0.003428)	10 (50)
Cu5 ... 1000	Edison Copper Winding No. 15	-200 ... +260 (-328 ... +500)	0.004270 (0.002372)	100 (212)
	GOST 6651-2009 / OIML R84:2003	-180 ... +200 (-292 ... +392)	0.004280 (0.002378)	100 (212)
	GOST 6651-94	-50 ... +200 (-58 ... +392)	0.004260 (0.002367)	100 (212)

TC

Input type	Standard	Measuring range in °C (°F)	Minimum measuring span in °C (°F)
B	IEC 60584-1	0 (85) ... 1 820 (32 (185) ... 3 308)	100 (212)
E	IEC 60584-1	-200 ... +1 000 (-392 ... +1 832)	50 (122)
J	IEC 60584-1	-100 ... +1200 (-212 ... +2192)	50 (122)
K	IEC 60584-1	-180 ... +1372 (-356 ... +2502)	50 (122)
L	DIN 43710	-200 ... +900 (-392 ... +1652)	50 (122)
Lr	GOST 3044-84	-200 ... +800 (-392 ... +1472)	50 (122)
N	IEC 60584-1	-180 ... +1300 (-356 ... +2372)	50 (122)
R	IEC 60584-1	-50 ... +1760 (-122 ... +3200)	100 (212)
S	IEC 60584-1	-50 ... +1760 (-122 ... +3200)	100 (212)
T	IEC 60584-1	-200 ... +400 (-392 ... +752)	50 (122)
U	DIN 43710	-200 ... +600 (-392 ... +1112)	50 (122)
W3	ASTM E988-96	0 ... 2300 (32 ... 4172)	100 (212)
W5	ASTM E988-96	0 ... 2300 (32 ... 4172)	100 (212)
LR	GOST 3044-84	-200 ... +800 (-392 ... +1472)	50 (122)

Input accuracy

Basic values

Input type	Basic accuracy	Temperature coefficient ¹⁾
RTD		
Pt10	≤ ±0.8 °C (1.44 °F)	≤ ±0.020 °C/°C (°F/°F)
Pt20	≤ ±0.4 °C (0.72 °F)	≤ ±0.010 °C/°C (°F/°F)
Pt50	≤ ±0.16 °C (0.288 °F)	≤ ±0.004 °C/°C (°F/°F)
Pt100	≤ ±0.04 °C (0.072 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt200	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt500	T _{max.} < 180 °C (356 °F) = ≤ ±0.08 °C (0.144 °F) T _{max.} < 180 °C (356 °F) = ≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt1000	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt2000	T _{max.} < 300 °C (572 °F) = ≤ ±0.08 °C (0.144 °F) T _{max.} < 300 °C (572 °F) = ≤ ±0.4 °C (0.72 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt10000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Ni10	≤ ±1.6 °C (2.88 °F)	≤ ±0.020 °C/°C (°F/°F)
Ni20	≤ ±0.8 °C (1.44 °F)	≤ ±0.010 °C/°C (°F/°F)
Ni50	≤ ±0.32 °C (0.576 °F)	≤ ±0.004 °C/°C (°F/°F)
Ni100	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni120	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni200	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni500	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni1000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni2000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)

Temperature Measurement

Transmitters for rail mounting

SITRANS TR320, two-wire system, HART

Input type	Basic accuracy	Temperature coefficient ¹⁾
Ni10000	$\leq \pm 0.32\text{ °C}$ (0.576 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Ni x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Cu5	$\leq \pm 1.6\text{ °C}$ (2.88 °F)	$\leq \pm 0.040\text{ °C/°C}$ (°F/°F)
Cu10	$\leq \pm 0.8\text{ °C}$ (1.44 °F)	$\leq \pm 0.020\text{ °C/°C}$ (°F/°F)
Cu20	$\leq \pm 0.4\text{ °C}$ (0.72 °F)	$\leq \pm 0.010\text{ °C/°C}$ (°F/°F)
Cu50	$\leq \pm 0.16\text{ °C}$ (0.288 °F)	$\leq \pm 0.004\text{ °C/°C}$ (°F/°F)
Cu100	$\leq \pm 0.08\text{ °C}$ (0.144 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Cu200	$\leq \pm 0.08\text{ °C}$ (0.144 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Cu500	$\leq \pm 0.16\text{ °C}$ (0.288 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Cu1000	$\leq \pm 0.08\text{ °C}$ (0.144 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Cu x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Linear resistance		
0 ... 400 Ω	$\leq \pm 40\text{ m}\Omega$	$\leq \pm 2\text{ m}\Omega/\text{°C}$ (1.11 m Ω /°F)
0 ... 100 k Ω	$\leq \pm 4\text{ }\Omega$	$\leq \pm 0.2\text{ }\Omega/\text{°C}$ (0.11 Ω /°F)
Potentiometers		
0 ... 100%	< 0.05%	< $\pm 0.005\%$
Voltage input		
mV: -20 ... 100 mV	$\leq \pm 5\text{ }\mu\text{V}$	$\leq \pm 0.2\text{ }\mu\text{V/°C}$ (0.11 $\mu\text{V/°F}$)
mV: -100 ... 1700 mV	$\leq \pm 0.1\text{ mV}$	$\leq \pm 36\text{ }\mu\text{V/°C}$ (20 $\mu\text{V/°F}$)
mV: $\pm 800\text{ mV}$	$\leq \pm 0.1\text{ mV}$	$\leq \pm 32\text{ }\mu\text{V/°C}$ (17.8 $\mu\text{V/°F}$)
TC		
E	$\leq \pm 0.2\text{ °C}$ (0.36 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
J	$\leq \pm 0.25\text{ °C}$ (0.45 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
K	$\leq \pm 0.25\text{ °C}$ (0.45 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
L	$\leq \pm 0.35\text{ °C}$ (0.63 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
N	$\leq \pm 0.4\text{ °C}$ (0.72 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
T	$\leq \pm 0.25\text{ °C}$ (0.45 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
U	$< 0\text{ °C}$ (32 °F) $\leq \pm 0.8\text{ °C}$ (1.44 °F) $\geq 0\text{ °C}$ (32 °F) $\leq \pm 0.4\text{ °C}$ (0.72 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
Lr	$\leq \pm 0.2\text{ °C}$ (0.36 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
R	$< 200\text{ °C}$ (392 °F) $\leq \pm 0.5\text{ °C}$ (0.9 °F) $\geq 200\text{ °C}$ (392 °F) $\leq \pm 1\text{ °C}$ (1.8 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
S	$< 200\text{ °C}$ (392 °F) $\leq \pm 0.5\text{ °C}$ (0.9 °F) $\geq 200\text{ °C}$ (392 °F) $\leq \pm 1\text{ °C}$ (1.8 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
W3	$\leq \pm 0.6\text{ °C}$ (1.08 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
W5	$\leq \pm 0.4\text{ °C}$ (0.72 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
B ²⁾	$\leq \pm 1\text{ °C}$ (1.8 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
B ³⁾	$\leq \pm 3\text{ °C}$ (5.4 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
B ⁴⁾	$\leq \pm 8\text{ °C}$ (14.4 °F)	$\leq \pm 0.8\text{ °C/°C}$ (°F/°F)
B ⁵⁾	Not specified	Not specified
CJC (internal)	$\leq \pm 0.5\text{ °C}$ (0.9 °F)	Included in basic accuracy
CJC (external)	$\leq \pm 0.08\text{ °C}$ (0.144 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)

¹⁾ Temperature coefficients correspond to the specified values or 0.002% of the input span, depending on which value is greater.

²⁾ Accuracy of the specification range > 400 °C (752 °F)

³⁾ Accuracy of the specification range > 160 °C (320 °F) < 400 °C (752 °F)

⁴⁾ Accuracy of the specification range > 85 °C (185 °F) < 160 °C (320 °F)

⁵⁾ Accuracy of the specification range > 85 °C (185 °F)

Output accuracy

Output type	Basic accuracy	Temperature coefficient
Analog output	$\leq \pm 1.6\text{ }\mu\text{A}$ (0.01% of the full output span)	$\leq \pm 0.48\text{ }\mu\text{A/K}$ ($\leq \pm 0.003\%$ of the full output span/K)

Temperature Measurement

Transmitters for rail mounting

SITRANS TR320, two-wire system, HART

Selection and ordering data

	Article No.	Options	Order code
Temperature transmitter SITRANS TR320 with 1 input	7NG032	Add "-Z" to article no. and specify order code.	
Click on the Article no. for the online configuration in the PIA Life Cycle Portal.		Certificates for functional safety	
		Functional safety SIL2/3 (IEC 61508)	C20
Communication		Special features of enclosure/packaging	
With HART	0	Without labeling of the measuring range on the TAG label	D41
Primary value output		Input 1: TC	
Input 1	0	Type C W5	V01
Input 1, type		Type D W3	V02
RTD		Type U	V03
<ul style="list-style-type: none"> Pt100 (IEC), 3-wire Pt100 (IEC), 4-wire Pt1000 (IEC), 3-wire Pt1000 (IEC), 4-wire 	B C D E	Type Lr	V04
TC		Input 1: RTD	
<ul style="list-style-type: none"> Type B Type E Type J Type K Type L Type N Type R Type S Type T 	F G H J K L N P Q R	Pt x (IEC), 3-wire, define RTD factor x in option Y21	V61
Potentiometer, 4-wire		Pt x (IEC), 4-wire, define RTD factor x in option Y21	V62
Input 1, type customer-specific		Pt x (JIS C1604-81), 3-wire, define RTD factor x in option Y21	V64
Define customer-specific input configurations with V options	Y	Pt x (JIS C1604-81), 4-wire, define RTD factor x in option Y21	V65
Input 2, type		Pt x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V67
Without input 2	A	Pt x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V68
CJC configuration for TC		Ni x (DIN 43760-87), 3-wire, define RTD factor x in option Y21	V70
Without CJC	0	Ni x (DIN 43760-87), 4-wire, define RTD factor x in option Y21	V71
Internal CJC	1	Ni x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V73
External CJC Pt100 (IEC), 2-wire, define line resistance value in option Y53	2	Ni x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V74
External CJC Pt100 (IEC), 3-wire	3	Cu x (ECW-15), 3-wire, define RTD factor x in option Y21	V76
External CJC Ni100 (DIN), 2-wire, define line resistance value in option Y53	5	Cu x (ECW-15), 4-wire, define RTD factor x in option Y21	V77
External CJC Ni100 (DIN), 3-wire	6	Cu x (GOST 6651-94), 3-wire, define RTD factor x in option Y21	V79
Materials not in contact with media		Cu x (GOST 6651-94), 4-wire, define RTD factor x in option Y21	V80
None	0	Cu x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V82
Type of protection		Cu x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V83
General safety (non-Ex); CE, RCM, FM, CSA, KCC	A		
Ex i, Ex nA (ec) (Zone)/IS, NIFW, NI (Division); ATEX, IECEx, CSA, FM, NEPSI	N		
Electrical connection/cable entry			
None	A		
Local HMI			
Without display	0		

Temperature Measurement

Transmitters for rail mounting

SITRANS TR320, two-wire system, HART

Selection and ordering data

Customer-specific device settings

Add **"-Z"** to article no., specify order code and plain text or drop-down list selection.

Measuring range setting temperature input: Start of scale value (max. 5 characters), full scale value (max. 5 characters), unit (°C, °F, °Ra, K)

Order code

Y01

Plant designation (TAG, device parameters, max. 32 characters)

Y15

Measuring point message (device message and device parameters, max. 32 characters)

Y16

Plant designation short (TAG, device parameters, max. 8 characters) on front plate, only for SITRANS TR320/SITRANS TR420

Y19

Input 1: RTD factor; e.g. factor "200" = Pt200

Y21

Accessories

Article No.

Further accessories for assembly, connection and transmitter configuration, see page 2/120.

HART modem

With USB interface

7MF4997-1DB

SIMATIC PDM parameterization software

See Catalog FI 01 section 8

Ordering example

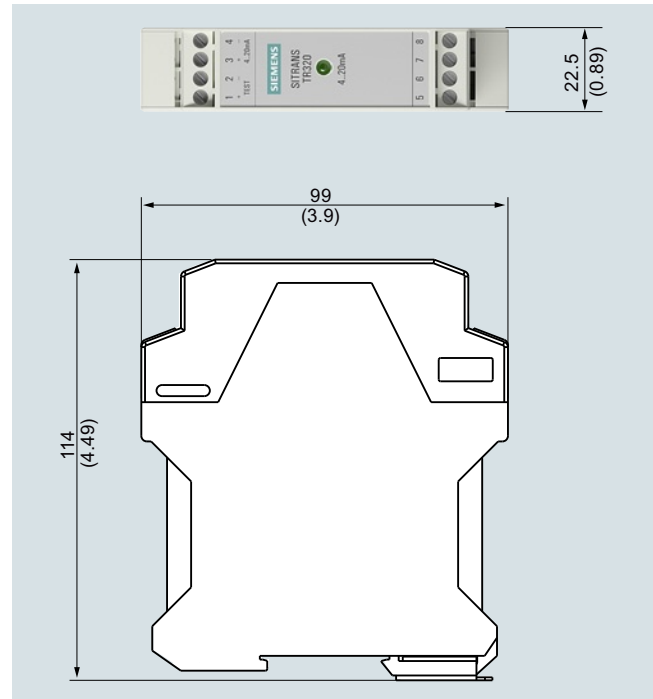
7NG0320-0BA00-0AA0-Z Y01

Y01: -10 ... +100 °C

Factory setting

- Pt100 (IEC 751); 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current
 - Device error: < 3.6 mA
 - Input circuit wire break: 22.8 mA
 - Input circuit short circuit: 22.4 mA
 - Input monitoring wire break and short-circuit
- No trimming of input and output (offset)
- Damping 0.0 s

Dimensional drawings



SITRANS TR320, dimensions in mm (inch)

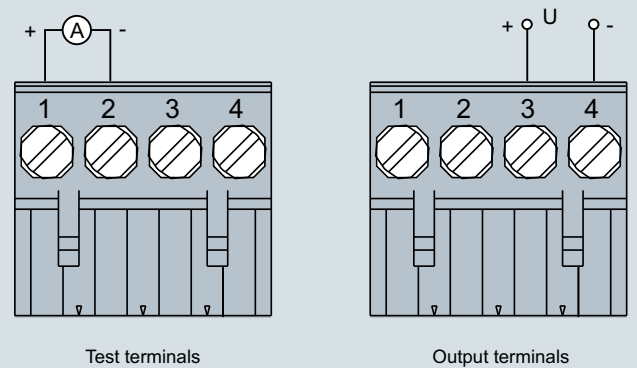
Circuit diagrams

Connections



- 1 (+) and 2 (-) Test terminals for measurement of the output current with an amperemeter
- 3 (+) and 4 (-) Output terminals
- 5, 6, 7 and 8 Input terminals

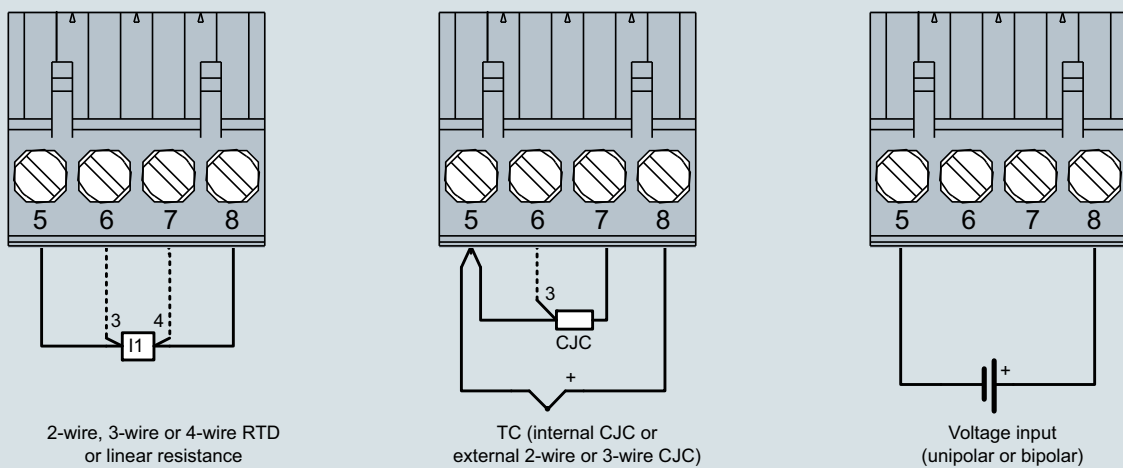
Output and test connection



SITRANS TR320, output connection assignment

SITRANS TR320, connector assignment

Input connection



SITRANS TR320, input connection assignment

Temperature Measurement

Transmitters for rail mounting

SITRANS TR420, two-wire system, HART

Overview



- 2-wire temperature transmitter with HART communication interface
- Device for rail mounting
- Universal input for virtually any type of temperature sensor
- Connection of two independent input circuits for redundant operation (high input availability)
- Input drift detection
- Configurable over HART

Benefits

- Compact design
- Connection of two independent input circuits for redundant operation (high input availability)
- Electrical isolation
- Test terminals for ammeter
- Diagnostics LED (green/red)
- Input monitoring
Wire break and short-circuit
- Self-monitoring
- Configuration status stored in EEPROM
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility according to DIN EN 61326 and NE21
- SIL2/3 (with order note C20)

Application

SITRANS TR420 transmitters with two inputs can be used in all sectors. Their compact design enables simple mounting on standard DIN rails on-site in protective boxes or in control cabinets. The following sensors/signal sources can be connected over their universal input module:

- 2 resistance thermometers (2-wire, 3-wire, 4-wire connection)
- 2 thermocouples
- 2 linear resistors, potentiometer and DC voltage sources

The output signal is a load-independent direct current from 4 to 20 mA in accordance with the input characteristic, superimposed by the digital HART signal.

The dual input mode also supports drift detection of the inputs, whereby maintenance intervals can be more easily planned.

Transmitters of the "intrinsically safe or Zone 2 increased safety" type of protection can be installed in hazardous areas. The device meets the requirements of the EU Directive 2014/34/EU (ATEX), the FM and CSA regulations as well as other national approvals.

Temperature Measurement

Transmitters for rail mounting

SITRANS TR420, two-wire system, HART

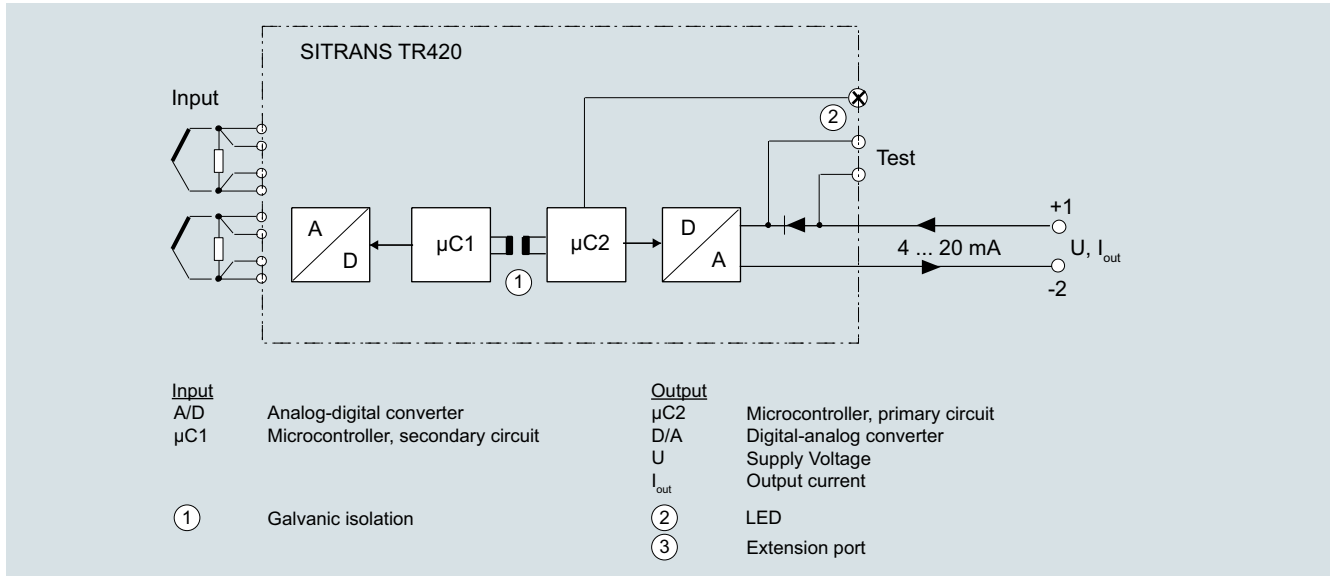
Function

The SITRANS TR420 is configured via HART. The configuration can be carried out using a handheld communicator or, more conveniently, with a HART modem and the SIMATIC PDM configuration software. The configuration data is then permanently stored in the non-volatile memory (EEPROM).

After correct connection of input and supply voltage, the transmitter outputs a temperature-linear output signal and the diagnostics LED is green. In case of external errors, e.g. sensor short circuit or interruption, the LED flashes red; an internal error is indicated by a permanent red light.

An ammeter can be connected at any time for checking and plausibility via the test terminals. The output current can be read without any interruption, or even without opening the current loop.

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SITRANS TR420, function block diagram

Temperature Measurement

Transmitters for rail mounting

SITRANS TR420, two-wire system, HART

Technical specifications

General

Supply voltage ^{1) 2)}	
• Without explosion protection (non-Ex)	7.5 ... 48 V DC
• with explosion protection (Ex i)	7.5 ... 30 V DC
Additional minimum supply voltage when using test terminals	0.8 V
Maximum power loss	≤ 850 mW
Minimum load resistance at supply voltage > 37 V	(V _{supply} - 37 V)/23 mA
Insulation voltage, test/operation	
• Without explosion protection (non-Ex)	2.5 kV AC/55 V AC
• with explosion protection (Ex i)	2.5 kV AC/42 V AC
Polarity protection	All inputs and outputs
Write protection	Open circuits or software
Warming-up time	< 5 min
Starting time	< 2.75 s
Programming	SIPROM T and HART
Signal-to-noise ratio	> 60 dB
Long-term stability	Better than: • ± 0.05% of measuring span/year • ± 0.18% of measuring span/5 years
Response time	≤ 75 ms (typically 70 ms)
Programmable damping	0 ... 60 s
Signal dynamic	
• Input	24 bit
• Output	18 bit
Influence of change in supply voltage	< 0.005% of measuring span/V DC

Input

Resistance thermometer (RTD)

Input type	
• Pt10 ... 10000	<ul style="list-style-type: none"> • IEC 60751 • JIS C 1604-8 • GOST 6651_2009 • Callendar-Van Dusen • DIN 43760-1987 • GOST 6651-2009 / OIML R84:2003 • Edison Copper Winding No. 15 • GOST 6651-2009 / OIML R84:2003
• Ni10 ... 10000	
• Cu5 ... 1000	
Type of connection	2-wire, 3-wire or 4-wire
Line resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the line resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• Pt1000, Pt10000 (IEC 60751 and JIS C 1604-8)	Max. 30 nF
• All other input types	Max. 50 nF
Fault detection, programmable	None, short-circuited, defective, short-circuited or defective
	Note When the low limit for the configured input type is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time (RTD)	≤ 75 ms (typically 70 ms)
Fault detection time (for 3-wire and 4-wire)	≤ 2000 ms

Thermocouples (TC)

Input type	
• B	IEC 60584-1
• E	IEC 60584-1
• J	IEC 60584-1
• K	IEC 60584-1
• L	DIN 43710
• Lr	GOST 3044-84
• N	IEC 60584-1
• R	IEC 60584-1
• S	IEC 60584-1
• T	IEC 60584-1
• U	DIN 43710
• W3	ASTM E988-96
• W5	ASTM E988-96
• LR	GOST 3044-84
Cold junction compensation (CJC)	Constant, internal or external over Pt100 or Ni100 RTD
• Temperature range internal CJC	-50 ... +100 °C (-+58 ... +212 °F)
• Connection external CJC	2-wire, 3-wire or 4-wire
• External CJC, line resistance per wire (for 3-wire and 4-wire connections)	50 Ω
• Effect of the line resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
• Input current external CJC	< 0.15 mA
• Temperature range external CJC	-50 ... +135 °C (-58 ... +275 °F)
• Cable, wire-wire capacity	Max. 50 nF
• Total line resistance	Max. 10 kΩ
• Fault detection, programmable	None, short-circuited, defective, short-circuited or defective
	Note The short-circuited fault detection only applies to the CJC input.
• Fault detection time (TC)	≤ 75 ms (typically 70 ms)
• Fault detection time, external CJC (for 3-wire and 4-wire)	≤ 2000 ms

Linear resistance

Input range	0 ... 100 kΩ
Minimum measuring span	25 Ω
Type of connection	2-wire, 3-wire or 4-wire
Line resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the line resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF
Fault detection, programmable	None, defective
Potentiometers	
Input range	0 ... 100 kΩ
Minimum measuring span	25 Ω
Type of connection	3-wire, 4-wire or 5-wire
Line resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the line resistance (with 4-wire and 5-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF

Temperature Measurement

Transmitters for rail mounting

SITRANS TR420, two-wire system, HART

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Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note When the configured potentiometer size is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.	Design	
Detection limit for short-circuited input	15 Ω	Weight	122 g (0.27 lb)
Fault detection time, wiper arm (no short-circuit detection)	≤ 75 ms (typically 70 ms)	Maximum cable cross-section	2.5 mm² (AWG 13)
Fault detection time, element	≤ 2000 ms	Tightening torque for clamping screws	0.5 ... 0.6 Nm
Fault detection time (for 4-wire and 5-wire)	≤ 2000 ms	Vibrations	IEC 60068-2-6 • 2 ... 25 Hz • 25 ... 100 Hz
<u>Voltage input</u>		Certificates and approvals	
Measuring range		<u>Explosion protection ATEX/IECEx and others</u>	
• Unipolar	-100 ... 1700 mV	Certificates ³⁾	DEKRA 17ATEX0116 X IECEx DEK 17.0054X A5E43700604A-2018X
• Bipolar	-800 ... +800 mV	"Intrinsic safety ia/ib" type of protection	For use in Zone 0, 1, 2, 20, 21, 22
Minimum measuring span	2.5 mV	• ATEX	II 1 G Ex ia IIC T6 ... T4 Ga II 2(1) G Ex ib [ia Ga] IIC T6 ... T4 Gb II 1 D Ex ia IIC Da I M1 Ex ia I Ma
Input resistance	10 MΩ	• IECEx and others	Ex ia IIC T6 ... T4 Ga Ex ib [ia Ga] IIC T6 ... T4 Gb Ex ia IIC Da Ex ia I Ma
Cable, wire-wire capacity		"Intrinsic safety ic" type of protection	For use in Zones 2 and 22
• Input range: -100 ... 1700 mV	Max. 30 nF	• ATEX	II 2 G Ex ic IIC T6 ... T4 Gc II 2 D Ex ic IIC Dc
• Input range: -20 ... 100 mV	Max. 50 nF	• IECEx and others	Ex ic IIC T6 ... T4 Gc Ex ic IIC Dc
Fault detection, programmable	None, defective	"Non-sparking/increased safety nA/ec" type of protection	For use in Zones 2 and 22
Fault detection time	≤ 75 ms (typically 70 ms)	• ATEX	II 2 G Ex nA IIC T6 ... T4 Gc II 2 G Ex ec IIC T6 ... T4 Gc
Output and HART communication		• IECEx and others	Ex nA IIC T6 ... T4 Gc Ex ec IIC T6 ... T4 Gc
Normal range, programmable	3.8 ... 20.5 mA/20.5 ... 3.8 mA	<u>Explosion protection CSA /FM for Canada and USA</u>	
Extended range (output limits), programmable	3.5 ... 23 mA/23 ... 3.5 mA	Certificates	CSA 1861385 FM18CA0024 FM18US0046
Programmable input/output limits		"Intrinsic safety ia" type of protection	IS, CL I, Div 1, GP ABCD, T6 ... T4 Ex ia IIC T6 ... T4 Ga AEx ia IIC T6 ... T4 Ga or: Ex ib [ia Ga] IIC T6 ... T4 Gb AEx ib [ia Ga] IIC T6 ... T4 Gb
• Fault current	Enable/disable	"Non incandive field wiring NIFW" type of protection	NIFW, CL I, Div 2, GP ABCD T6 ... T4
• Fault current setting	3.5 ... 23 mA	"Non incandive NI" type of protection	NI, CL I, Div 2, GP ABCD T6 ... T4 Ex nA IIC T6 ... T4 Gc AEx nA IIC T6 ... T4 Gc
Update time	10 ms		
Load (with current output)	≤ (V _{Supply} - 7.5)/0.023 Ω		
Load stability	< 0.01% of meas. span/100 Ω (measuring span = currently selected range)		
Input fault detection, programmable (detection of input short circuits is ignored with TC and voltage inputs)	3.5 ... 23 mA		
NAMUR NE43 Upscale	> 21 mA		
NAMUR NE43 Downscale	< 3.6 mA		
HART protocol versions	HART 7		
Measuring accuracy			
Input accuracy	See "Input accuracy" table		
Output accuracy	See "Output accuracy" table		
Rated conditions			
Ambient temperature (operation)			
• Standard	-50 ... +85 °C (-58 ... +185 °F)		
• SIL	-40 ... +80 °C (-40 ... +176 °F)		
Storage temperature	-50 ... +85 °C (-58 ... +185 °F)		
Calibration temperature	24 °C ±1.0 °C (75.2 °F ±1.8 °F)		
Relative humidity	< 99% (no condensation)		
Degree of protection			
• Enclosure of the transmitter	IP20		
• Terminals	IP20		

- Note that the minimum supply voltage must correspond to the value measured at the terminals of the SITRANS TR420.
All external voltage drops must be taken into consideration.
- Protect the device from overvoltage with the help of a suitable power supply or suitable overvoltage protection equipment.
- Additional available certificates are listed on the Internet at <http://www.siemens.com/processinstrumentation/certificates>

Temperature Measurement

Transmitters for rail mounting

SITRANS TR420, two-wire system, HART

Measuring ranges/Minimum measuring span

RTD

Input type	Standard	Measuring range in °C (°F)	α_0 in °C ⁻¹ (°F ⁻¹)	Minimum measuring span in °C (°F)
Pt10 ... 10000	IEC 60751	-200 ... +850 (-328 ... +1562)	0.003851 (0.002139)	10 (50)
	JIS C 1604-8	-200 ... +649 (-328 ... +1200)	0.003916 (0.002176)	10 (50)
	GOST 6651_2009	-200 ... +850 (-328 ... +1562)	0.003910 (0.002172)	10 (50)
	Callendar-Van Dusen	-200 ... +850 (-328 ... +1562)	-	10 (50)
Ni10 ... 10000	DIN 43760-1987	-60 ... +250 (-76 ... +482)	0.006180 (0.003433)	10 (50)
	GOST 6651-2009 / OIML R84:2003	-60 ... +180 (-76 ... +356)	0.006170 (0.003428)	10 (50)
Cu5 ... 1000	Edison Copper Winding No. 15	-200 ... +260 (-328 ... +500)	0.004270 (0.002372)	100 (212)
	GOST 6651-2009 / OIML R84:2003	-180 ... +200 (-292 ... +392)	0.004280 (0.002378)	100 (212)
	GOST 6651-94	-50 ... +200 (-58 ... +392)	0.004260 (0.002367)	100 (212)

TC

Input type	Standard	Measuring range in °C (°F)	Minimum measuring span in °C (°F)
B	IEC 60584-1	0 (85) ... 1 820 (32 (185) ... 3 308)	100 (212)
E	IEC 60584-1	-200 ... +1 000 (-392 ... +1 832)	50 (122)
J	IEC 60584-1	-100 ... +1200 (-212 ... +2192)	50 (122)
K	IEC 60584-1	-180 ... +1372 (-356 ... +2502)	50 (122)
L	DIN 43710	-200 ... +900 (-392 ... +1652)	50 (122)
Lr	GOST 3044-84	-200 ... +800 (-392 ... +1472)	50 (122)
N	IEC 60584-1	-180 ... +1300 (-356 ... +2372)	50 (122)
R	IEC 60584-1	-50 ... +1760 (-122 ... +3200)	100 (212)
S	IEC 60584-1	-50 ... +1760 (-122 ... +3200)	100 (212)
T	IEC 60584-1	-200 ... +400 (-392 ... +752)	50 (122)
U	DIN 43710	-200 ... +600 (-392 ... +1112)	50 (122)
W3	ASTM E988-96	0 ... 2300 (32 ... 4172)	100 (212)
W5	ASTM E988-96	0 ... 2300 (32 ... 4172)	100 (212)
LR	GOST 3044-84	-200 ... +800 (-392 ... +1472)	50 (122)

Input accuracy

Basic values

Input type	Basic accuracy	Temperature coefficient ¹⁾
RTD		
Pt10	≤ ±0.8 °C (1.44 °F)	≤ ±0.020 °C/°C (°F/°F)
Pt20	≤ ±0.4 °C (0.72 °F)	≤ ±0.010 °C/°C (°F/°F)
Pt50	≤ ±0.16 °C (0.288 °F)	≤ ±0.004 °C/°C (°F/°F)
Pt100	≤ ±0.04 °C (0.072 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt200	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt500	T _{max} < 180 °C (356 °F) = ≤ ±0.08 °C (0.144 °F) T _{max} < 180 °C (356 °F) = ≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt1000	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt2000	T _{max} < 300 °C (572 °F) = ≤ ±0.08 °C (0.144 °F) T _{max} < 300 °C (572 °F) = ≤ ±0.4 °C (0.72 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt10000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Ni10	≤ ±1.6 °C (2.88 °F)	≤ ±0.020 °C/°C (°F/°F)
Ni20	≤ ±0.8 °C (1.44 °F)	≤ ±0.010 °C/°C (°F/°F)
Ni50	≤ ±0.32 °C (0.576 °F)	≤ ±0.004 °C/°C (°F/°F)
Ni100	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni120	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni200	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni500	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni1000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni2000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)

Temperature Measurement

Transmitters for rail mounting

SITRANS TR420, two-wire system, HART

Input type	Basic accuracy	Temperature coefficient ¹⁾
Ni10000	$\leq \pm 0.32\text{ °C}$ (0.576 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Ni x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Cu5	$\leq \pm 1.6\text{ °C}$ (2.88 °F)	$\leq \pm 0.040\text{ °C/°C}$ (°F/°F)
Cu10	$\leq \pm 0.8\text{ °C}$ (1.44 °F)	$\leq \pm 0.020\text{ °C/°C}$ (°F/°F)
Cu20	$\leq \pm 0.4\text{ °C}$ (0.72 °F)	$\leq \pm 0.010\text{ °C/°C}$ (°F/°F)
Cu50	$\leq \pm 0.16\text{ °C}$ (0.288 °F)	$\leq \pm 0.004\text{ °C/°C}$ (°F/°F)
Cu100	$\leq \pm 0.08\text{ °C}$ (0.144 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Cu200	$\leq \pm 0.08\text{ °C}$ (0.144 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Cu500	$\leq \pm 0.16\text{ °C}$ (0.288 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Cu1000	$\leq \pm 0.08\text{ °C}$ (0.144 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)
Cu x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Linear resistance		
0 ... 400 Ω	$\leq \pm 40\text{ m}\Omega$	$\leq \pm 2\text{ m}\Omega/\text{°C}$ (1.11 m Ω /°F)
0 ... 100 k Ω	$\leq \pm 4\text{ }\Omega$	$\leq \pm 0.2\text{ }\Omega/\text{°C}$ (0.11 Ω /°F)
Potentiometers		
0 ... 100%	< 0.05%	< $\pm 0.005\%$
Voltage input		
mV: -20 ... 100 mV	$\leq \pm 5\text{ }\mu\text{V}$	$\leq \pm 0.2\text{ }\mu\text{V/°C}$ (0.11 $\mu\text{V/°F}$)
mV: -100 ... 1700 mV	$\leq \pm 0.1\text{ mV}$	$\leq \pm 36\text{ }\mu\text{V/°C}$ (20 $\mu\text{V/°F}$)
mV: $\pm 800\text{ mV}$	$\leq \pm 0.1\text{ mV}$	$\leq \pm 32\text{ }\mu\text{V/°C}$ (17.8 $\mu\text{V/°F}$)
TC		
E	$\leq \pm 0.2\text{ °C}$ (0.36 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
J	$\leq \pm 0.25\text{ °C}$ (0.45 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
K	$\leq \pm 0.25\text{ °C}$ (0.45 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
L	$\leq \pm 0.35\text{ °C}$ (0.63 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
N	$\leq \pm 0.4\text{ °C}$ (0.72 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
T	$\leq \pm 0.25\text{ °C}$ (0.45 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
U	$< 0\text{ °C}$ (32 °F) $\leq \pm 0.8\text{ °C}$ (1.44 °F) $\geq 0\text{ °C}$ (32 °F) $\leq \pm 0.4\text{ °C}$ (0.72 °F)	$\leq \pm 0.025\text{ °C/°C}$ (°F/°F)
Lr	$\leq \pm 0.2\text{ °C}$ (0.36 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
R	$< 200\text{ °C}$ (392 °F) $\leq \pm 0.5\text{ °C}$ (0.9 °F) $\geq 200\text{ °C}$ (392 °F) $\leq \pm 1\text{ °C}$ (1.8 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
S	$< 200\text{ °C}$ (392 °F) $\leq \pm 0.5\text{ °C}$ (0.9 °F) $\geq 200\text{ °C}$ (392 °F) $\leq \pm 1\text{ °C}$ (1.8 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
W3	$\leq \pm 0.6\text{ °C}$ (1.08 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
W5	$\leq \pm 0.4\text{ °C}$ (0.72 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
B ²⁾	$\leq \pm 1\text{ °C}$ (1.8 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
B ³⁾	$\leq \pm 3\text{ °C}$ (5.4 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
B ⁴⁾	$\leq \pm 8\text{ °C}$ (14.4 °F)	$\leq \pm 0.8\text{ °C/°C}$ (°F/°F)
B ⁵⁾	Not specified	Not specified
CJC (internal)	$\leq \pm 0.5\text{ °C}$ (0.9 °F)	Included in basic accuracy
CJC (external)	$\leq \pm 0.08\text{ °C}$ (0.144 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°F/°F)

1) Temperature coefficients correspond to the specified values or 0.002% of the input span, depending on which value is greater.

2) Accuracy of the specification range > 400 °C (752 °F)

3) Accuracy of the specification range > 160 °C (320 °F) < 400 °C (752 °F)

4) Accuracy of the specification range > 85 °C (185 °F) < 160 °C (320 °F)

5) Accuracy of the specification range > 85 °C (185 °F)

Output accuracy

Output type	Basic accuracy	Temperature coefficient
Average value measurement	Average of accuracy of input 1 and input 2	Average of temperature coefficient of input 1 and input 2
Differential measurement	Sum of accuracy of input 1 and input 2	Sum of temperature coefficient of input 1 and input 2
Analog output	$\leq \pm 1.6\text{ }\mu\text{A}$ (0.01% of the full output span)	$\leq \pm 0.48\text{ }\mu\text{A/K}$ ($\leq \pm 0.003\%$ of the full output span/K)

Temperature Measurement

Transmitters for rail mounting

SITRANS TR420, two-wire system, HART

Selection and ordering data

	Article No.	
Temperature transmitter SITRANS TR420 with 2 inputs	7NG042	Order code
	- - - - - 0 - - - - -	
Click on the Article no. for the online configuration in the PIA Life Cycle Portal.		
Communication		
With HART	0	
Primary value output		
Input 1	0	
Input 1, input 2 as redundancy	1	
Input 2, input 1 as redundancy	2	
Average input 1 and input 2, both as redundancy	3	
Minimum input 1 and input 2, both as redundancy	4	
Maximum input 1 and input 2, both as redundancy	5	
Difference input 1 - input 2	6	
Difference input 2 - input 1	7	
Absolute difference	8	
Primary value output, customer-specific		
Minimum input 1 and input 2, without redundancy	9	H 1 A
Maximum input 1 and input 2, without redundancy	9	H 1 B
Average input 1 and input 2, without redundancy	9	H 1 C
Input 2	9	H 1 D
Input 1, type		
RTD		
• Pt100 (IEC), 3-wire	B	
• Pt100 (IEC), 4-wire	C	
• Pt1000 (IEC), 3-wire	D	
• Pt1000 (IEC), 4-wire	E	
TC		
• Type B	F	
• Type E	G	
• Type J	H	
• Type K	J	
• Type L	K	
• Type N	L	
• Type R	N	
• Type S	P	
• Type T	Q	
Potentiometer, 4-wire	R	
Input 1, type customer-specific		
Define customer-specific input configurations in V options	Y	

	Article No.	
Temperature transmitter SITRANS TR420 with 2 inputs	7NG042	Order code
	- - - - - 0 - - - - -	
Input 2, type		
Without input 2	A	
RTD		
• Pt100 (IEC), 3-wire	B	
• Pt100 (IEC), 4-wire	C	
• Pt1000 (IEC), 3-wire	D	
• Pt1000 (IEC), 4-wire	E	
TC		
• Type B	F	
• Type E	G	
• Type J	H	
• Type K	J	
• Type L	K	
• Type N	L	
• Type R	N	
• Type S	P	
• Type T	Q	
Potentiometer, 4-wire	R	
Input 2, type customer-specific		
Define customer-specific input configurations in W options	Y	
CJC configuration for TC		
Input 1: no CJC; input 2: no CJC	0	
Input 1: internal CJC; input 2: internal CJC	1	
Input 1: external CJC; input 2: external CJC; define type in option Jxx	2	
Input 1: external CJC; define type in option Jxx; input 2: internal CJC	3	
Input 1: internal CJC; input 2: external CJC; define type in option Jxx	4	
Input 1: Internal CJC; Input 2: No CJC	5	
Input 1: External CJC (define type in option Jxx); input 2: No CJC	6	
Materials not in contact with media		
None	0	
Type of protection		
General safety (non-Ex); CE, RCM, FM, CSA, KCC		A
Ex i, Ex nA (ec) (Zone)/IS, NIFW, NI (Division); ATEX, IECEx, CSA, FM, NEPSI		N
Electrical connection / cable entry		
None		A
Local HMI		
Without display		0

Temperature Measurement

Transmitters for rail mounting

SITRANS TR420, two-wire system, HART

Selection and ordering data

Options	Order code
Add "-Z" to article no. and specify order code.	
Certificates for functional safety	
Functional safety SIL2/3 (IEC 61508)	C20
Special features of enclosure/packaging	
Without labeling of the measuring range on the TAG label	D41
External CJC types	
Pt100, IEC 60751, 3-wire	J02
Pt100, IEC 60751, 4-wire	J03
Ni100, DIN 43760-87, 3-wire	J05
Ni100, DIN 43760-87, 4-wire	J06
Input 1: TC	
Type C W5	V01
Type D W3	V02
Type U	V03
Type Lr	V04
Input 1: Potentiometers	
Potentiometer, 5-wire	V31
Input 1: RTD	
Pt x (IEC), 3-wire, define RTD factor x in option Y21	V61
Pt x (IEC), 4-wire, define RTD factor x in option Y21	V62
Pt x (JIS C1604-81), 3-wire, define RTD factor x in option Y21	V64
Pt x (JIS C1604-81), 4-wire, define RTD factor x in option Y21	V65
Pt x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V67
Pt x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V68
Ni x (DIN 43760-87), 3-wire, define RTD factor x in option Y21	V70
Ni x (DIN 43760-87), 4-wire, define RTD factor x in option Y21	V71
Ni x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V73
Ni x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V74
Cu x (ECW-15), 3-wire, define RTD factor x in option Y21	V76
Cu x (ECW-15), 4-wire, define RTD factor x in option Y21	V77
Cu x (GOST 6651-94), 3-wire, define RTD factor x in option Y21	V79
Cu x (GOST 6651-94), 4-wire, define RTD factor x in option Y21	V80
Cu x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V82
Cu x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V83
Input 2: TC	
Type C W5	W01
Type D W3	W02
Type U	W03
Type Lr	W04

Customer-specific device settings	Order code
Add "-Z" to article no., specify order code and plain text or drop-down list selection.	
Measuring range setting temperature input: Start of scale value (max. 5 characters), full scale value (max. 5 characters), unit (°C, °F, °Ra, K)	Y01
Plant designation (TAG, device parameters, max. 32 characters)	Y15
Measuring point message (device message and device parameters, max. 32 characters)	Y16
Plant designation short (TAG, device parameters, max. 8 characters) on front plate, only for SITRANS TR320/SITRANS TR420	Y19
Input 1: RTD factor; e.g. factor "200" = Pt200	Y21
Accessories	Article No.
Further accessories for assembly, connection and transmitter configuration, see page 2/120.	
HART modem With USB interface	7MF4997-1DB
SIMATIC PDM parameterization software	See Catalog FI 01 section 8

Ordering example

7NG0420-0BA00-0AA0-Z Y01

Y01: -10 ... +100 °C

Factory setting

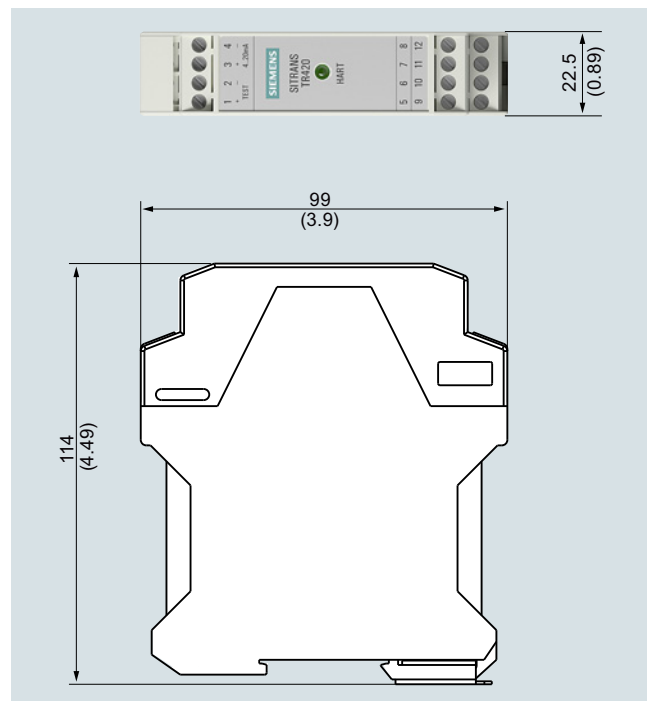
- Input 1: Pt100 (IEC 751); 3-wire connection
- Input 2: not configured (inactive)
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current
 - Device error: < 3.6 mA
 - Input circuit wire break: 22.8 mA
 - Input circuit short circuit: 22.4 mA
 - Input circuit drift: 22 mA (active when input 2 is active)
 - Input monitoring wire break and short-circuit
- No trimming of input and output (offset)
- Damping 0.0 s

Temperature Measurement

Transmitters for rail mounting

SITRANS TR420, two-wire system, HART

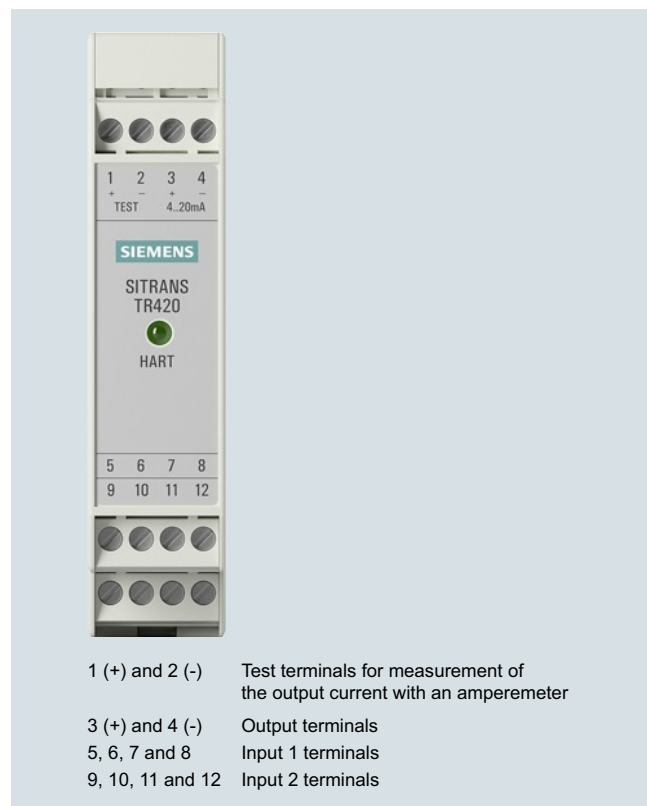
Dimensional drawings



SITRANS TR420, dimensions in mm (inch)

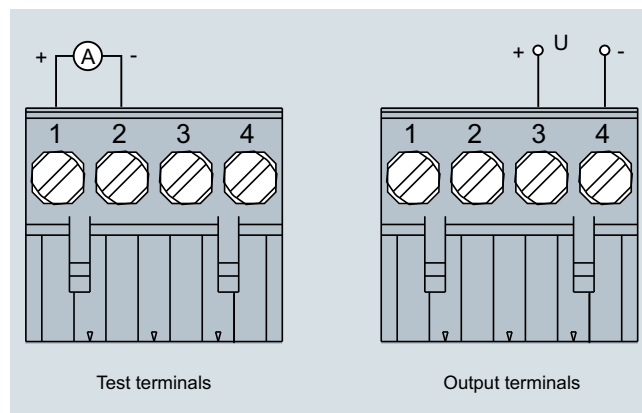
Circuit diagrams

Connections



SITRANS TR420, connector assignment

Output and test connection



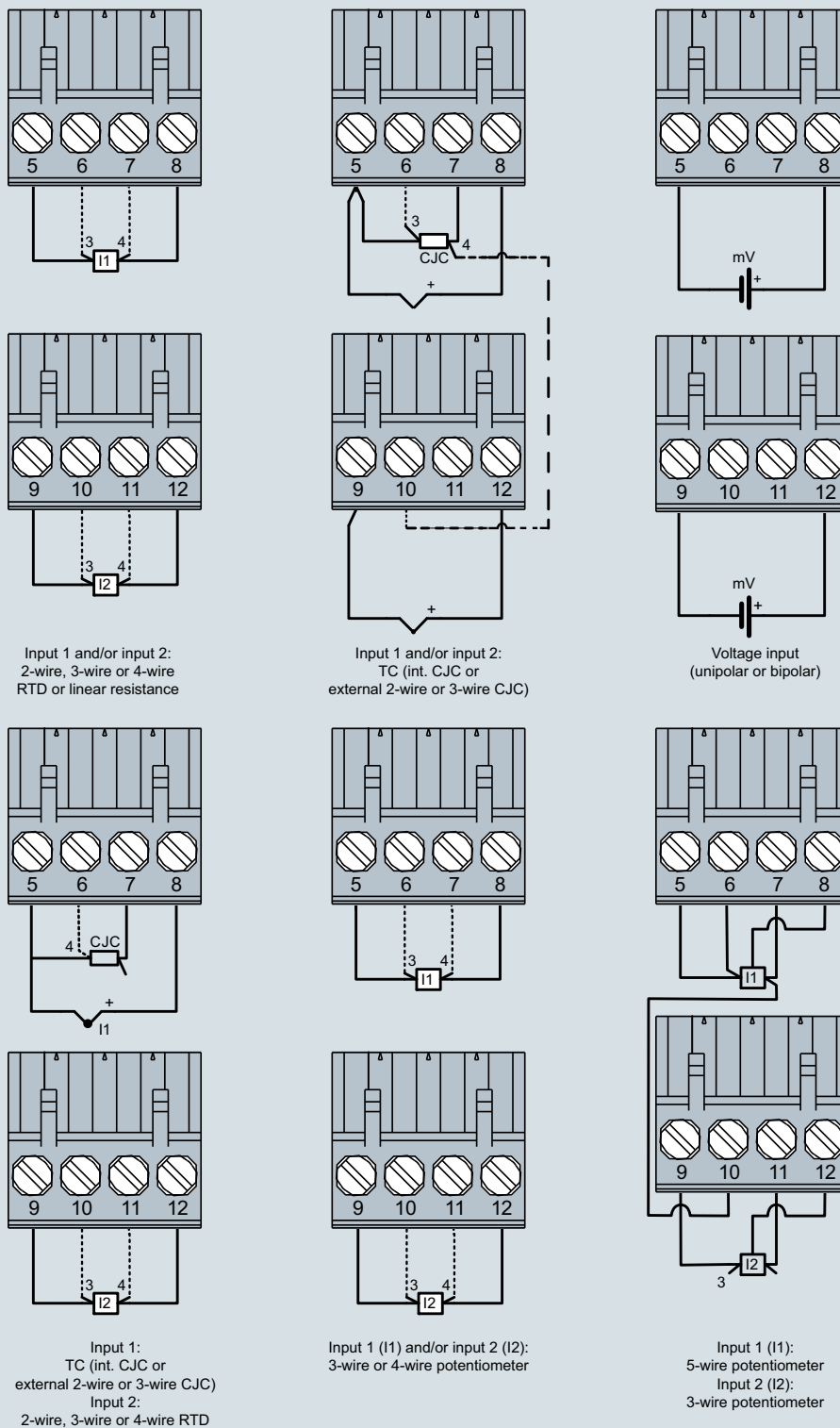
SITRANS TR420, output connection assignment

Temperature Measurement

Transmitters for rail mounting

SITRANS TR420, two-wire system, HART

Input connection



SITRANS TR420, input connection assignment

Temperature Measurement

Transmitters for rail mounting

SITRANS TW, four-wire system, Universal, HART

Overview



The user-friendly transmitters for the control room

The SITRANS TW universal transmitter is a further development of the service-proven SITRANS T for the 4-wire system in a mounting rail housing. With numerous new functions it sets new standards for temperature transmitters.

With its diagnostics and simulation functions the SITRANS TW provides the necessary insight during commissioning and operation. And using its HART interface the SITRANS TW can be conveniently adapted with SIMATIC PDM to every measurement task.

All SITRANS TW control room devices are available in a non-intrinsically safe version as well as in an intrinsically safe version for use with the most stringent requirements.

Application

The SITRANS TW transmitter is a four-wire rail-mounted device with a universal input circuit for connection to the following sensors and signal sources:

- Resistance thermometer
- Thermocouples
- Resistance-based sensors/potentiometers
- mV sensors
- As special version:
 - V sources
 - Current sources

The 4-wire rail-mounted SITRANS TW transmitter wire is designed for control room installation. It must not be mounted in potentially explosive atmospheres.

All SITRANS TW control room devices are available in a non-intrinsically safe version as well as in an intrinsically safe version for use with the most stringent requirements.

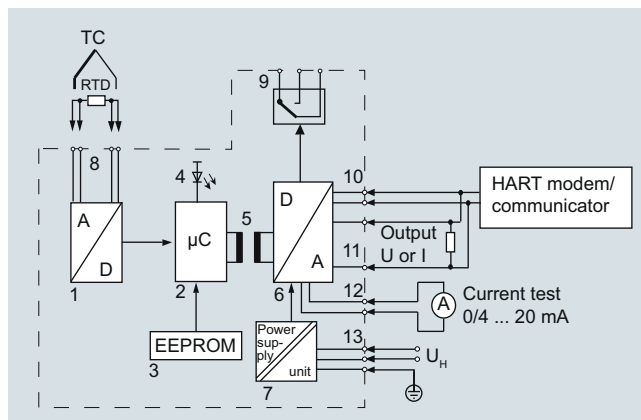
Function

Features

- Transmitter in four-wire system with HART interface
- Housing can be mounted on 35 mm rail or 32 mm G rail
- Screw plug connector
- All circuits electrically isolated
- Output signal: 0/4 to 20 mA or 0/2 to 10 V
- Power supplies: 115/230 V AC/DC or 24 V AC/DC
- Explosion protection [Ex ia] or [Ex ib] for measurements with sensors in the hazardous area
- Temperature-linear characteristic for all temperature sensors

- Temperature-linear characteristic can be selected for all temperature sensors
- Automatic correction of zero and span
- Monitoring of sensor and cable for open-circuit and short-circuit
- Sensor fault and/or limit can be output via an optional sensor fault/limit monitor
- Hardware write protection for HART communication
- Diagnostic functions
- Slave pointer functions
- SIL1

Mode of operation



The signal output by a resistance-based sensor (two-wire, three-wire, four-wire system), voltage source, current source or thermocouple is converted by the analog-to-digital converter (1, function diagram) into a digital signal. This is evaluated in the microcontroller (2), corrected according to the sensor characteristic, and converted by the digital-to-analog converter (6) into an output current (0/4 to 20 mA) or output voltage (0/2 to 10 V). The sensor characteristics as well as the electronics data and the data for the transmitter parameters are stored in the non-volatile memory (3).

AC or DC voltages can be used as the power supply (13). Any terminal connections are possible for the power supply as a result of the bridge rectifier in the power supply unit. The PE conductor is required for safety reasons.

A HART modem or a HART communicator permit parameterization of the transmitter using a protocol according to the HART specification. The transmitter can be directly parameterized at the point of measurement via the HART output terminals (10).

The operation indicator (4) identifies a fault-free or faulty operating state of the transmitter. The limit monitor (9) enables the signaling of sensor faults and/or limit violations. In the case of a current output, the current can be checked on a meter connected to test socket (12).

Diagnosis and simulation functions

The SITRANS TW comes with extensive diagnosis and simulation functions.

Physical values can be defined with the simulation function. It is thus possible to check the complete signal path from the sensor input to inside the control system without additional equipment. The slave pointer functions are used to record the minimum and maximum of the plant's process variable.

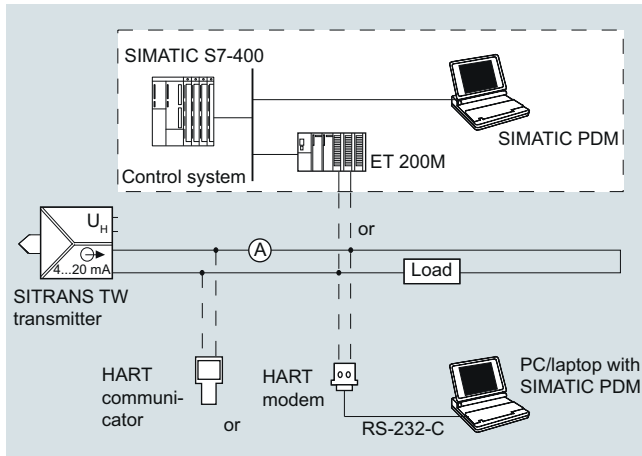
Temperature Measurement

Transmitters for rail mounting

SITRANS TW, four-wire system, Universal, HART

Integration

System configuration



Possible system configurations

The SITRANS TW transmitter as a four-wire rail-mounted device can be used in a number of system configurations: as a stand-alone version or as part of a complex system environment, e.g. with SIMATIC S7. All device functions are available via HART communication.

Communication options through the HART interface:

- HART communicator
- HART modem connected to PC/laptop on which the appropriate software is available, e.g. SIMATIC PDM
- HART-compatible control system (e.g. SIMATIC S7-400 with ET 200M)

Technical specifications

Input

Selectable filters to suppress the line frequency

50 Hz, 60 Hz, also 10 Hz for special applications (line frequency filter is similar with measuring frequency)

Resistance thermometer

Measured variable

Temperature

Measuring range

Parameterizable

Measuring span

min. 25 °C (45 °F) x 1/scaling factor

Sensor type

- Acc. to IEC 751
- Acc. to JIS C 1604-81
- to DIN 43760
- Special type ($R_{RTD} \leq 500 \Omega$)

Pt100 (IEC 751)

Pt100 (JIS C1604-81)

Ni100 (DIN 43760)

Multiples or parts of the defined characteristic values can be parameterized (e.g. Pt500, Ni120)

Characteristic curve

Temperature-linear, resistance-linear or customer-specific

Type of connection

- Normal connection
- Sum or parallel connection
- Mean-value or differential connection

Interface

2, 3 or 4-wire circuit

Measuring range limits

Depending on type of connected thermometer (defined range of resistance thermometer)

Sensor breakage monitoring

Monitoring of all connections for open-circuit (function can be switched off)

Sensor short-circuit monitoring

Parameterizable response threshold (function can be switched off)

Resistance-based sensor, potentiometer

Measured variable

Actual resistance

Measuring range

Parameterizable

Measuring span

min. 10 Ω

Characteristic curve

Resistance-linear or customer-specific

Type of connection

- Normal connection
- Differential connection
- Mean-value connection

Interface

2, 3 or 4-wire circuit

Input range

0 ... 6000 Ω ; with mean-value and difference circuits: 0 ... 3000 Ω

Sensor breakage monitoring

Monitoring of all connections for open-circuit (function can be switched off)

Sensor short-circuit monitoring

Parameterizable response threshold (function can be switched off)

Temperature Measurement

Transmitters for rail mounting

SITRANS TW, four-wire system, Universal, HART

<u>Thermocouples</u>		<u>µA-, mA sources</u>	
Measured variable	Temperature	Measured variable	DC voltage
Measuring range	Parameterizable	Measuring range	Parameterizable
Measuring span	min. 50 °C (90 °F) x 1/scaling factor	Characteristic curve	Current-linear or customer-specific
Measuring range limits	Depend. on type of thermocouple element	Input range/min. span	
Thermocouple element	Type B: Pt30 %Rh/Pt6 %Rh (DIN IEC 584) Type C: W5 %-Re (ASTM 988) Type D: W3 %-Re (ASTM 988) Type E: NiCr/CuNi (DIN IEC 584) Type J: Fe/CuNi (DIN IEC 584) Type K: NiCr/Ni (DIN IEC 584) Type L: Fe-CuNi (DIN 43710) Type N: NiCrSi-NiSi (DIN IEC 584) Type R: Pt13 %Rh/Pt (DIN IEC 584) Type S: Pt10 %Rh/Pt (DIN IEC 584) Type T: Cu/CuNi (DIN IEC 584) Type U: Cu/CuNi (DIN 43710) Special type (-10 mV ≤ UTC ≤ 100 mV)	<ul style="list-style-type: none"> Devices with 7NG3242-xxxx4 Devices with 7NG3242-xxxx5 Devices with 7NG3242-xxxx6 Devices with 7NG3242-xxxx7 or 7NG3242-xxxx0 with U/I plug Devices with 7NG3242-xxxx8 	-12 ... +100 µA/0.4 µA -120 ... +1000 µA/4 µA -1.2 ... +10 mA/0.04 mA -12 ... +100 mA/0.4 mA -120 ... +1000 mA/4 mA Not possible
Characteristic curve	Temperature-linear, voltage-linear or customer-specific	<u>Output</u>	
Type of connection	<ul style="list-style-type: none"> Normal connection Averaging connection Mean-value connection Differential connection 	<u>Output signal</u>	Load-independent direct current 0/4 ... 20 mA, can be switched to load-independent DC voltage 0/2 ... 10 V using plug-in jumpers
Cold junction compensation	None, internal measurement, external measurement or pre-defined fixed value	Current 0/4 ... 20 mA	
Sensor breakage monitoring	Function can be switched off	<ul style="list-style-type: none"> Overrange 	-0.5 ... +23.0 mA, continuously adjustable
<u>mV sensors</u>		<ul style="list-style-type: none"> Output range following sensor fault (conforming to NE43) 	-0.5 ... +23.0 mA, continuously adjustable
Measured variable	DC voltage	<ul style="list-style-type: none"> Load No-load voltage 	≤ 650 Ω ≤ 30 V
Measuring range	Parameterizable	Voltage 0/2 ... 10 V	
Measuring span	min. 4 mV	<ul style="list-style-type: none"> Overrange 	-0.25 ... +10.75 V, continuously adjustable
Input range	-120 ... +1000mV	<ul style="list-style-type: none"> Output range following sensor fault 	-0.25 ... +10.75 V, continuously adjustable
Characteristic curve	Voltage-linear or customer-specific	<ul style="list-style-type: none"> Load resistance Load capacitance Short-circuit current 	≥ 1 kΩ ≤ 10 nF ≤ 100 mA (not permanently short-circuit-proof)
Overload capacity of inputs	max. ± 3.5 V	<ul style="list-style-type: none"> Electrical damping - adjustable time constant T_{63} Current source/voltage source 	0 ... 100 s, in steps of 0.1 s Continuously adjustable within the total operating range
Input resistance	≥ 1 MΩ	<u>Sensor fault/limit signalling</u>	By operation indicator, relay output or HART interface
Sensor current	Approx. 180 µA	Operation indicator	Flashing signal
Sensor breakage monitoring	Function can be switched off	<ul style="list-style-type: none"> Limit violation Sensor fault monitoring 	Flashing frequency 5 Hz Flashing frequency 1 Hz
<u>V sources</u>		Relay outputs	Either as NO or NC contact with 1 changeover contact
Measured variable	DC voltage	<ul style="list-style-type: none"> Switching capacity Switching voltage Switching current 	≤ 150 W, ≤ 625 VA ≤ 125 V DC, ≤ 250 V AC ≤ 2.5 A DC
Measuring range	Parameterizable	Sensor fault monitoring	Signalling of sensor or line breakage and sensor short-circuit
Characteristic curve	Voltage-linear or customer-specific	Limit monitoring	
Input range/min. span		<ul style="list-style-type: none"> Operating delay Monitoring functions of limit module 	0 ... 10 s <ul style="list-style-type: none"> Sensor fault (breakage and/or short-circuit) Lower and upper limit Window (combination of lower and upper limits) Limit and sensor fault detection can be combined
<ul style="list-style-type: none"> Devices with 7NG3242-xxxx1 or 7NG3242-xxxx0 with U/I plug Devices with 7NG3242-xxxx2 Devices with 7NG3242-xxxx3 	-1.2 ... + 10 V/0.04 V -12 ... +100 V/0.4 V -120 ... +140 V/4.0 V	<ul style="list-style-type: none"> Hysteresis 	Parameterizable between 0 and 100 % of measuring range
Sensor breakage monitoring	Not possible		

Temperature Measurement

Transmitters for rail mounting

SITRANS TW, four-wire system, Universal, HART

Auxiliary power Universal power supply unit Tolerance range for power supply <ul style="list-style-type: none"> With 115/230 V AC/DC PSU With 24 V AC/DC PSU Tolerance range for mains frequency Power consumption with <ul style="list-style-type: none"> 230 V AC 230 V DC 24 V AC 24 V DC 		Certificates and approvals Intrinsic safety <ul style="list-style-type: none"> for 7NG3242-xAxxx for 7NG3242-xBxxx EC type-examination certificate Other certificates		II (1) G [Ex ia Ga] IIC II (1) D [Ex ia Da] IIIC TÜV (German Technical Inspectorate) 01 ATEX 1675 EAC Ex(GOST)
Electrically isolated Electrically isolated circuits Working voltage between all electrically isolated circuits		Conditions of use <u>Installation conditions</u> Location (for devices with explosion protection) <ul style="list-style-type: none"> Transmitters Sensor 		Outside the potentially explosive atmosphere Within the potentially explosive atmosphere zone 1 (also in zone 0 in conjunction with the prescribed protection requirements for the sensor)
Measuring accuracy Accuracy <ul style="list-style-type: none"> Error in the internal cold junction Error of external cold junction terminal 7NG3092-8AV Digital output Analog output I_{AN} or U_{AN} Influencing effects (referred to the digital output) <ul style="list-style-type: none"> Temperature drift Long-term drift Influencing effects referred to the analog output I_{AN} or U_{AN} <ul style="list-style-type: none"> Temperature drift Power supply Load with current output Load with voltage output Long-term drift (start-of-scale value, span) Response time (T_{63} without electrical damping)		<u>Ambient conditions</u> Permissible ambient temperature Permissible storage temperature Climatic class <ul style="list-style-type: none"> Relative humidity 		The voltage U_{rms} between any two terminals must not exceed 300 V The voltage U_{rms} between any two terminals must not exceed 300 V Compared to the max. span: $\leq 3\text{ °C} \pm 0.1\text{ °C} / 10\text{ °C}$ $(\leq 5.4\text{ °F} \pm 0.18\text{ °F} / 18\text{ °F})$ $\leq 0.5\text{ °C} \pm 0.1\text{ °C} / 10\text{ °C}$ $(\leq 0.9\text{ °F} \pm 0.18\text{ °F} / 18\text{ °F})$ See "Digital error" $\leq 0.05\%$ of the span plus digital error Compared to the max. span: $\leq 0.08\% / 10\text{ °C} (\leq 0.08\% / 18\text{ °F})$ $\leq 0.2\%$ in the range $-10\text{ °C} \dots +60\text{ °C} (14\text{ °F} \dots 140\text{ °F})$ $\leq 0.1\% / \text{year}$ Compared to the span: $\leq 0.08\% / 10\text{ °C} (\leq 0.08\% / 18\text{ °F})$ $\leq 0.2\%$ in the range $-10\text{ °C} \dots +60\text{ °C} (14\text{ °F} \dots 140\text{ °F})$ $\leq 0.05\% / 10\text{ V}$ $\leq 0.05\%$ on change from 50 Ω to 650 Ω $\leq 0.1\%$ on change in the load current from 0 mA to 10 mA $\leq 0.03\% / \text{month}$ $\leq 0.2\text{ s}$
Design Weight Enclosure material Degree of protection to IEC 529 Degree of protection to VDE 0100 Type of installation Electrical connection / process connection		Parameterization interface Protocol Load with connection of <ul style="list-style-type: none"> HART communicator HART modem Software for PC/laptop		Approx. 0.24 kg (0.53 lb) PBT, glass-fibre reinforced IP20 Protection class I 35-mm DIN rail (1.38 inch) (EN 50022) or 32-mm G-type rail (1.26 inch) (EN 50035) Screw device plugs, max. 2.5 mm ² (0.01 inch ²) HART, version 5.9 230 ... 650 Ω 230 ... 500 Ω SIMATIC PDM version V5.1 and later
Insulation tests Auxiliary power relative to input and output Input relative to output and limit monitor Output relative to limit monitor PE/ground conductor relative to auxiliary power, input, output, and limit monitor		Electromagnetic compatibility		3.54 kV DC; 2 s 2.13 kV DC; 2 s 2.13 kV DC; 2 s 0.71 kV AC; 2 s According to EN 61 326 and NAMUR NE21

Temperature Measurement

Transmitters for rail mounting

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Digital error

Resistance thermometer

Input	Measuring range °C / (°F)	Max. permissible line resistance Ω	Digital error °C / (°F)
IEC 751			
• Pt10	-200 ... +850 (-328 ... +1562)	20	3.0 (5.4)
• Pt50	-200 ... +850 (-328 ... +1562)	50	0.6 (1.1)
• Pt100	-200 ... +850 (-328 ... +1562)	100	0.3 (0.5)
• Pt200	-200 ... +850 (-328 ... +1562)	100	0.6 (1.1)
• Pt500	-200 ... +850 (-328 ... +1562)	100	1.0 (1.8)
• Pt1000	-200 ... +850 (-328 ... +1562)	100	1.0 (1.8)
JIS C 1604-81			
• Pt10	-200 ... +649 (-328 ... +1200)	20	3.0 (5.4)
• Pt50	-200 ... +649 (-328 ... +1200)	50	0.6 (1.1)
• Pt100	-200 ... +649 (-328 ... +1200)	100	0.3 (0.5)
DIN 43760			
• Ni50	-60 ... +250 (-76 ... +482)	50	0.3 (0.5)
• Ni100	-60 ... +250 (-76 ... +482)	100	0.3 (0.5)
• Ni120	-60 ... +250 (-76 ... +482)	100	0.3 (0.5)
• Ni1000	-60 ... +250 (-76 ... +482)	100	0.3 (0.5)

Resistance-based sensors

Input	Measuring range Ω	Max. permissible line resistance Ω	Digital error Ω
Resistance (linear)	0 ... 24	5	0.08
	0 ... 47	15	0.06
	0 ... 94	30	0.06
	0 ... 188	50	0.08
	0 ... 375	100	0.1
	0 ... 750	100	0.2
	0 ... 1500	75	1.0
	0 ... 3000	100	1.0
	0 ... 6000	100	2.0

Thermocouples

Input	Measuring range °C / (°F)	Digital error ¹⁾ °C (°F)
Type B	100 ... 1820 (212 ... 3308)	3 (5.4)
Type C	0 ... 2300 (32 ... 4172)	2 (3.6)
Type D	0 ... 2300 (32 ... 4172)	1 (1.8)
Type E	-200 ... +1000 (-328 ... +1832)	1 (1.8)
Type J	-200 ... +1200 (-328 ... +2192)	1 (1.8)
Type K	-200 ... +1372 (-328 ... +2501)	1 (1.8)
Type L	-200 ... +900 (-328 ... +1652)	2 (3.6)
Type N	-200 ... +1300 (-328 ... +2372)	1 (1.8)
Type R	-50 ... +1760 (-58 ... +3200)	2 (3.6)
Type S	-50 ... +1760 (-58 ... +3200)	2 (3.6)
Type T	-200 ... +400 (-328 ... +752)	1 (1.8)
Type U	-200 ... +600 (-328 ... +1112)	2 (3.6)

¹⁾ Accuracy data refer to the largest error in the complete measuring range

Voltage/current sources

Input	Measuring range	Digital error
mV sources (linear)	mV	μV
	-1 ... +16	35
	-3 ... +32	20
	-7 ... +65	20
	-15 ... +131	50
	-31 ... +262	100
	-63 ... +525	200
	-120 ... +1000	300
V sources (linear)	V	mV
	-1.2 ... +10	3
	-12 ... +100	30
μA/mA sources (linear)	μA/mA	μA
	-12 ... +100 μA	0.05
	-120 ... +1000 μA	0.5
	-1.2 ... +10 mA	5
	-12 ... +100 mA	50
	-120 ... +1000 mA	500

Temperature Measurement

Transmitters for rail mounting

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Ordering examples

Desired transmitter	Parameter:		Ordering design
	Standard	Special	
Example 1: SITRANS TW, transmitter in four-wire system <ul style="list-style-type: none"> • with explosion protection ATEX • 230 V AC/DC power supply • current output • without sensor fault/limit monitor <ul style="list-style-type: none"> - Sensor PT100, three-wire circuit - Measuring range 0 ... 150 °C - Temperature-linear characteristic - Filter time 1 s - Output 4 ... 20 mA, line filter 50 Hz - Output driven to full-scale in event of like breakage 	X		7NG3242-1AA00 (stock item)
Example 2: SITRANS TW, transmitter in four-wire system <ul style="list-style-type: none"> • without explosion protection • 24 V AC/DC power supply • Voltage output • Sensor fault/limit monitor <ul style="list-style-type: none"> - Rating plate in English - Sensor NiCr/Ni, type K - Cold junction internal - Measuring range 0 ... 950 °C - Temperature-linear characteristic - Filter time 1 s - Output 0 ... 10 V, line filter 50 Hz - Output driven to full-scale in event of like breakage - Limit monitoring switched off 	X	S76 A05 Y30 H10	7NG3242-0BB10-Z Y01 + S76 + A05 + Y30 + H10 Y01: see Order code Y30: MA=0; ME= 950; D=C
Example 3: SITRANS TW, transmitter in four-wire system <ul style="list-style-type: none"> • without explosion protection • 24 V AC/DC power supply • Current output • without sensor fault/limit monitor <ul style="list-style-type: none"> - Voltage input, measuring range -1.2 V ... +10 V - Measuring range 0 ... 5 V - Source-proportional characteristic - Filter time 10 s - Output 0 ... 20 mA, line filter 60 Hz - No monitoring for sensor fault 	X (X)	A40 Y32 G07 H11 J03	7NG3242-0BA01-Z Y01 + A40 + Y32 + G07 + H11 + J03 Y01: see Order code Y32: MA=0; ME= 5; D=V

Ordering information

The article number structure shown below is used to specify a fully functioning transmitter. The selection of the operating data (type of source, measuring range, characteristic etc.) is made according to the following rules:

- Operating data already set in factory to default values:
The default settings can be obtained from the list of parameterizable operating data (see "Special operating data"). The presets can be modified by the customer to match the requirements precisely.
- Operating data set on delivery according to customer requirements:
Supplement the Article No. by "-Z" and add the Order code "Y01". The operating data to be set can be obtained from the list of parameterize operating data. The Order codes A ■■ to K ■■ for operating data to be set need only be specified in the order if they deviate from the default setting.
The default setting is used if no Order code is specified for operating data.

The selected parameters are printed on the transmitter's rating plate.

Temperature Measurement

Transmitters for rail mounting

SITRANS TW, four-wire system, Universal, HART

Selection and Ordering data	Article No.
SITRANS TW universal transmitter for rail mounting, in four-wire system (order instruction manual separately) Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7 NG 3 2 4 2 -
Explosion protection	
Without	0
For inputs [Ex ia] or [Ex ib]	1
Power supply	
115/230 V AC/DC	A
24 V AC/DC	B
Output signal	
0/4 ... 20 mA (can be switched to 0/2 ... 10 V)	A
0/2 ... 10 V (can be switched to 0/4 ... 20 mA)	B
Sensor fault/limit monitor	
Without (retrofitting not possible)	0
Relay with changeover contact	1
Input for	
Temperature sensor, resistance-based sensor and mV sensor with measuring range -120 ... +1000 mV DC and with U/I plug Voltage input (V sources) ¹⁾	0
Measuring range:	
• -1.2 ... +10 V DC	1
• -12 ... +100 V DC (not Ex version)	2
• -120 ... +140 V DC (not Ex version)	3
Current input (μA, mA sources) ¹⁾	
Measuring range:	
• -12 ... +100 μA DC	4
• -120 ... +1000 μA DC	5
• -1.2 ... +10 mA DC	6
• -12 ... +100 mA DC	7
• -120 ... +1000 mA DC	8
Further designs	Order code
Please add "-Z" to Article No. and specify Order code(s) (see "List of parameterizable operating data").	
Customer-specific setting of operating data (see "List of parameterizable operating data")	Y01
Note: specify in plain text: „see Order code"	
Meas. point description (max. 16 char.)	Y23
Text on front of device (max. 32 char.)	Y24
HART tag (max. 8 characters)	Y25
With test report	P01
With shorting plug to HART communication for 0 mA or 0 V	S01
With plug for external cold junction compensation	S02
With U/I plug (-1.2 ... +10 V DC or -12 ... +100 mA)	S03
Language of rating plate (together with Y01 Order code only)	
• Italian	S72
• English	S76
• French	S77
• Spanish	S78

¹⁾ Observe max. values with Ex version.

Selection and Ordering data	Article No.
Accessories	
Cold junction terminal	7NG3092-8AV
U/I plug (-1.2 ... +10 V DC pr -12 ... +100 mA)	7NG3092-8AW
SIMATIC PDM operating software	see Chapter 8
HART modem With USB interface	7MF4997-1DB

Article No. with Order code: 7NG3242 - ■■■■■-Z Y01

Thermocouples		Connection		Cold junction compensation		Measuring ranges		
Type	Temperature range							
B: Pt30 %Rh/Pt6 %Rh	0 ... 1820 °C	A 0 0	Standard	B 0 1	None	C 0 0	-30 ... +60 °C	E 0 0
C: W5 %Re	0 ... 2300 °C	A 0 1	Sum n ¹⁾	B 0 2	Internal	C 1 0	-20 ... +20 °C	E 0 1
D: W3 %Re	0 ... 2300 °C	A 0 2	n = 2		Fixed val.	C 2 0	0 ... 40 °C	E 0 2
E: NiCr/CuNi	-200 ... +1000 °C	A 0 3	...	B 1 0	0 °C	C 2 2	0 ... 60 °C	E 0 3
J: Fe/CuNi (IEC)	-200 ... +1200 °C	A 0 4	n = 10	B 3 1	20 °C	C 2 5	0 ... 80 °C	E 0 4
K: NiCr/Ni	-200 ... +1372 °C	A 0 5	Diff1	B 3 2	50 °C	C 2 6	0 ... 100 °C	E 0 5
L: Fe/CuNi (DIN)	-200 ... +900 °C	A 0 6	Diff2		60 °C	C 2 7	0 ... 120 °C	E 0 6
N: NiCrSi/NiSi	-200 ... +1300 °C	A 0 7	Mean-val. ²⁾ MW	B 4 1	70 °C	Y 1 0	0 ... 150 °C	E 0 7
R: Pt13 %Rh/Pt	-50 ... +1760 °C	A 0 8			Special value ⁷⁾	Y 1 1	0 ... 200 °C	E 0 8
S: Pt10 %Rh/Pt	-50 ... +1760 °C	A 0 9			External meas.		0 ... 250 °C	E 0 9
T: Cu/CuNi (IEC)	-200 ... +400 °C	A 1 0			(through Pt100		0 ... 300 °C	E 1 0
U: Cu/CuNi (DIN)	-200 ... +600 °C	A 1 1			DIN IEC 751) ⁷⁾		0 ... 350 °C	E 1 1

Pt100 (DIN IEC)	-200 ... +850 °C	A 2 0	Standard	B 0 1	2-wire-system	C 3 2	0 Ω	D 0 0	0 ... 700 °C	E 1 6
Pt100 (JIS)	-200 ... +649 °C	A 2 1	Sum n ⁴⁾ n = 2	B 0 2	3-wire-system	C 3 3	10 Ω	D 1 0	0 ... 800 °C	E 1 7
Ni100 (DIN)	-60 ... +250 °C	A 2 2	...	B 1 0	4-wire-system	C 3 4	20 Ω	D 2 0	0 ... 900 °C	E 1 8
			n = 10	B 1 0			50 Ω	D 5 0	0 ... 1000 °C	E 1 9
			Parallel n ⁵⁾ n = 0.1	B 2 1			Special val. ⁷⁾	Y 2 0	0 ... 1200 °C	E 2 0
			n = 0.2	B 2 2					0 ... 1400 °C	E 2 1
			n = 0.5	B 2 5					0 ... 1600 °C	E 2 2
			Special value ⁶⁾ ⁷⁾	Y 0 0					0 ... 1800 °C	E 2 3
			Difference ²⁾ Diff1	B 5 1					50 ... 100 °C	E 2 4
			Diff2	B 5 2					50 ... 150 °C	E 2 5
			Mean-val. ²⁾ MW	B 6 1					100 ... 200 °C	E 2 6
									100 ... 300 °C	E 2 7
									100 ... 400 °C	E 2 8
									200 ... 300 °C	E 2 9
									200 ... 400 °C	E 3 0
									200 ... 500 °C	E 3 1
									300 ... 600 °C	E 3 2
									500 ... 1000 °C	E 3 3
									600 ... 1200 °C	E 3 4
									800 ... 1600 °C	E 3 5
									Special range ⁷⁾	Y 3 0

(or max. permissible line resistance see „Technical specifications“)	A 30			B 01	2-wire-system	C 32	0 Ω	D 00	0 ... 100 Ω	E 40
		Difference 2 ⁾	Diff1	B 51	3-wire-system	C 33	10 Ω	D 10	0 ... 200 Ω	E 41
			Diff2	B 52	4-wire-system	C 34	20 Ω	D 20	0 ... 500 Ω	E 42
		Mean val. 2 ⁾	MW	B 61			50 Ω	D 50	0 ... 1000 Ω	E 43
							Special val. 7 ⁾	Y 20	0 ... 2500 Ω	E 44
									0 ... 5000 Ω 8 ⁾	E 45
									0 ... 6000 Ω 8 ⁾	E 46
									Special range 7 ⁾	Y 31

1) n = number of thermocouple elements to be connected in series	0	-120 ... +1000 mV
2) See „Circuit diagrams“ for meaning of type circuit	1	-1,2 ... +10 V ¹⁰⁾
3) Line resistance of channels 1 and 2, for max. permissible line resistance see „Technical specifications“ (only with C32, not with C33 and C34)	2	-12 ... +100 V ¹⁰⁾
4) n = number of resistance thermometers to be connected in series	3	-120 ... +140 V ¹⁰⁾
5) 1/n = number of resistance thermometers to be connected in parallel	4	-12 ... +100 µA ¹⁰⁾
6) Combination of series and parallel connection of resistance thermometers	5	-120 ... +1000 µA ¹⁰⁾
7) Operating data: see „Special operating data“	6	-1,2 ... +10 mA ¹⁰⁾
8) Special range	7	-12 ... +100 mA ¹⁰⁾
	8	-120 ... +1000 mA ¹⁰⁾
		Special range ⁷⁾

Y 3 2

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Temperature Measurement

Transmitters for rail mounting

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List of parameterizable operating data (Order codes F ■ ■ ■ ... K ■ ■ ■)

Operating data according to default setting		Article No. with Order code: 7NG3242 - -Z Y01										
Order codes: F ... K			+		+		+		+			
Sensor												
Thermocouple elements			Voltage measurement		Filter time ¹⁾		Output signal and line filter ²⁾		Failure signal		Limit monitor ³⁾	
Type	Temperature range											
B: Pt30 %Rh/ C:W5 %Re	0 ... 1820 °C	A 0 0	Temperature-linear	F 0 0	0 s	G 0 0	4 ... 20 mA/		with line break- age/fault:		Limit monitor- ing ineffective (but sensor fault signalling with closed- circuit opera- tion)	K 0 0
D:W3 %Re	0 ... 2300 °C	A 0 1		0.1 s	G 0 1	2 ... 10 V						
E:NiCr/CuNi	-200 ... +1000 °C	A 0 2	Voltage-linear	F 1 0	0.2 s	G 0 2	with line filter:		to full scale	J 0 0		
J:Fe/CuNi (IEC)	-200 ... +1200 °C	A 0 3		0.5 s	G 0 3	50 Hz	H 0 0	to start of scale	J 0 1			
K:NiCr/Ni	-200 ... +1372 °C	A 0 4	1 s	G 0 4	60 Hz	H 0 1	hold last value	J 0 2				
		A 0 5	2 s	G 0 5	10 Hz ⁴⁾	H 0 2						
L: Fe/CuNi (DIN)	-200 ... +900 °C	A 0 6			5 s	G 0 6	0 ... 20 mA/		no monitoring	J 0 3	Effective ⁵⁾	Y 7 0
N:NiCrSi/NiSi	-200 ... +1300 °C	A 0 7	10 s	G 0 7	0 ... 10 V							
R:Pt13 %Rh/Pt	-50 ... +1760 °C	A 0 8	20 s	G 0 8	with line filter:							
S:Pt10 %Rh/Pt	-50 ... +1760 °C	A 0 9	50 s	G 0 9	50 Hz	H 1 0	Safety value ⁵⁾	Y 6 0				
T:Cu/CuNi (IEC)	-200 ... +400 °C	A 1 0	100 s	G 1 0	60 Hz	H 1 1						
U:Cu/CuNi (DIN)	-200 ... +600 °C	A 1 1	Special time ⁵⁾	Y 5 0	10 Hz	H 1 2						
Resistance thermometer (max. permissible line resistances see „Technical specifications“)			Voltage measurement		Filter time ¹⁾		Output signal and line filter ²⁾		Failure signal		Limit monitor ³⁾	
Pt100 (DIN IEC)	-200 ... +850 °C	A 2 0	Temperature-linear	F 0 0	same as for thermocou- ple ele- ments		same as for thermocou- ple elements		with line break- age/fault:		same as for thermocouple elements	
Pt100 (JIS)	-200 ... +649 °C	A 2 1										
Ni100 (DIN)	-60 ... +250 °C	A 2 2	Resistance-linear	F 2 0					to full scale	J 0 0		
									to start of scale	J 0 1		
									hold last value	J 0 2		
									no monitoring	J 0 3		
									Safety value ⁵⁾	Y 6 0		
									with line break- age or short-cir- cuit/fault:			
									to full scale	J 1 0		
									to start of scale	J 1 1		
									hold last value	J 1 2		
									no monitoring	J 1 3		
									Safety value ⁵⁾	Y 6 1		
Resistance-based sensors, potenti- meters			Voltage measurement		Filter time ¹⁾		Output signal and line filter ²⁾		Failure signal		Limit monitor ³⁾	
(max. permissible line resistances see „Technical specifications“)		A 3 0	Resistance-linear	F 2 0	same as for thermocou- ple ele- ments		same as for thermocou- ple elements		with line break- age/fault:		same as for thermocouple elements	
									to start of scale	J 0 1		
									hold last value	J 0 2		
									no monitoring	J 0 3		
									Safety value ⁵⁾	Y 6 0		
mV, V and µA, mA sources		A 4 0	Voltage measurement		Filter time ¹⁾		Output signal and line filter ²⁾				Limit monitor ³⁾	
			Source pro- portional	F 3 0	same as for thermocou- ple ele- ments		same as for thermocou- ple elements				same as for thermocouple elements	

¹⁾ Software filter to smooth the result

²⁾ Filter to suppress line disturbances on the measured signal.

³⁾ If signalling relay present

⁴⁾ for special applications

⁵⁾ Operating data: see „Special operating data“

Special operating data

Order code	Plain text required	Options
Y00	N=□□.□□	Factor N for multiplication with the characteristic values of resistance thermometers Range of values: 0.10 to 10.00 1. Example: 3 x Pt500 parallel: N = 5/3 = 1.667; 2. Example: Ni120: N = 1.2
Y10	TV=□□□□.□□ D=□	Temperature TV of the fixed cold junction Dimension; range of values: C, K, F, R
Y11	RL=□□□□.□□	Line resistance RL in Ω for compensation of cold junction line of external Pt100 DIN IEC 751 Range of values: 0.00 to 100.00
Y20	RL1=□□□□.□□ RL2=□□□□.□□	Line resistances RL of channel 1 (RL1) and channel 2 (RL2) in Ω if the resistance thermometer or the resistance-based sensor is connected in a two-wire system Range of values depending on type of sensor: 0.00 to 100.00
Y30	MA=□□□□.□□ ME=□□□□.□□ D=□	Start-of-scale value MA and full-scale value ME for thermocouples and resistance thermometers (Range of values depending on type of sensor) Dimension, range of values: C, K, F, R)
Y31	MA=□□□□.□□ ME=□□□□.□□	Start-of-scale value MA and full-scale value ME for resistance-based sensors or potentiometers in Ω Range of values: 0.00 to 6,000.00
Y32	MA=□□□□.□□ ME=□□□□.□□ D=□□	Start-of-scale value MA and full-scale value ME for mV, V, μ A and mA sources Range of values depending on type of sensor: -120.00 to 1,000.00 Dimension (mV entered as MV, V as V, μ A as UA, mA as MA)
Y50	T63=□□□.□	Response time T63 of software filter in s Range of values: 0.0 to 100.0 Safety value S of signal output in mA or in V corresponding to the set type of output. Range of values - with current output: -0.50 to 23.00 - with voltage output: -0.25 to 10.75
Y60	S=□□.□□	Safety value S with line breakage of sensor
Y61	S=□□.□□	Safety value S with line breakage or short-circuit of sensor
Y70	UG=□□□□.□□ OG=□□□□.□□ H=□□□□.□□ K=□ A=□ T=□□.□	Lower limit value (dimension as defined by measuring range) Upper limit value (dimension as defined by measuring range) Hysteresis (dimension as defined by measuring range) Switch on/off combination of limit function and sensor fault detection; J=on; N=off (standard: J) Type of relay output: A=open-circuit operation; R=closed-circuit operation (standard: R) Switching delay T of relay output in s Range of values: 0.0 to 10.0 (standard: 0.0)

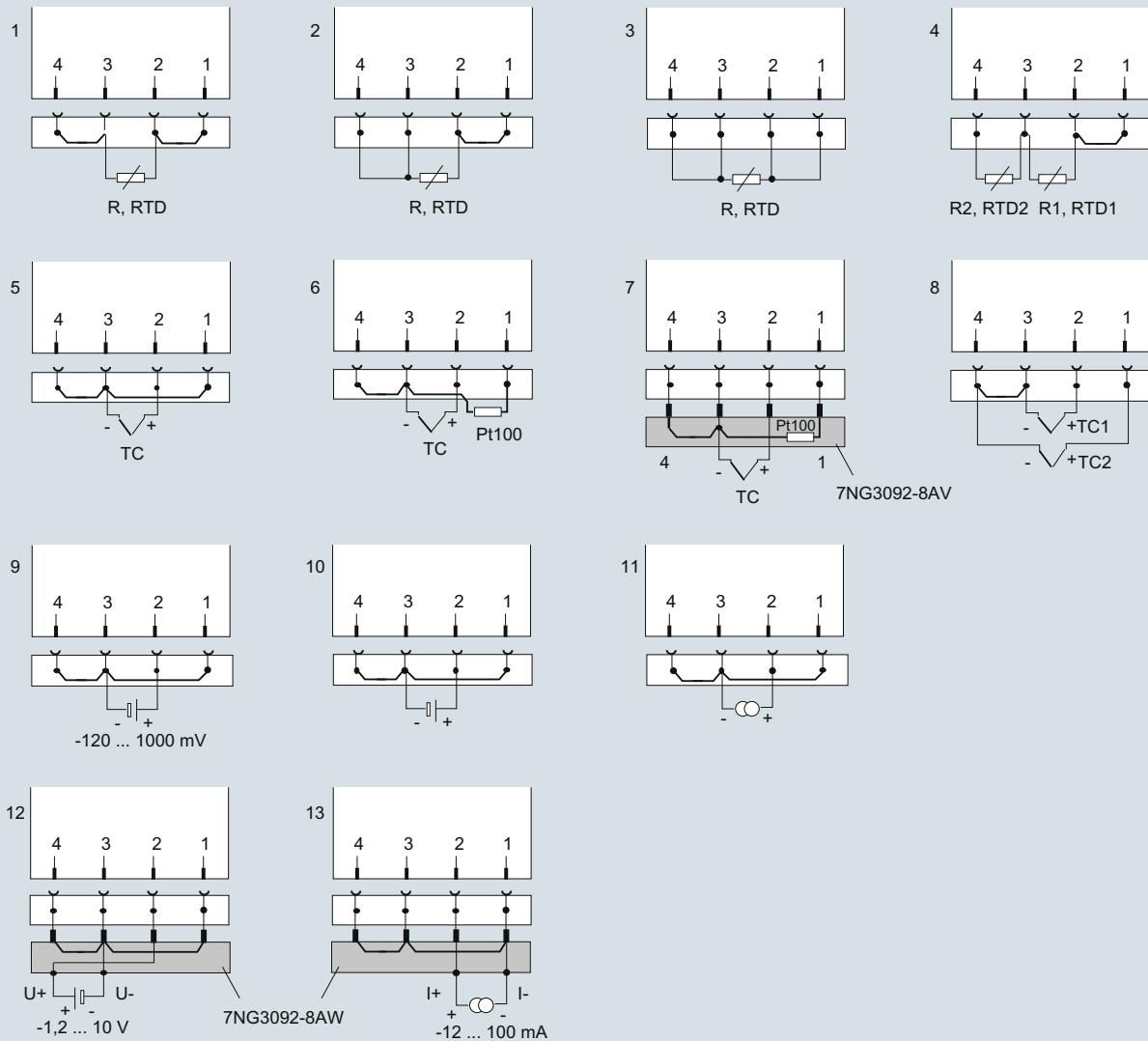
Temperature Measurement

Transmitters for rail mounting

SITRANS TW, four-wire system, Universal, HART

Schematics

Sensor input connections



Resistance thermometers, resistance-based sensors, potentiometers:

- 1 Two-wire system; resistance can be parameterized for line compensation
- 2 Three-wire system
- 3 Four-wire system
- 4 Difference/mean-value circuit; 2 resistors can be parameterized for line compensation

Thermocouples:

- 5 Determination of cold junction temperature using built-in Pt100 or fixed reference temperature
- 6 Determination of cold junction temperature using external Pt100; resistance can be parameterized for line compensation
- 7 Determination of cold junction temperature using cold junction terminal 7NG3092-8AV
- 8 Difference/mean-value circuit with internal cold junction temperature

Further sources:

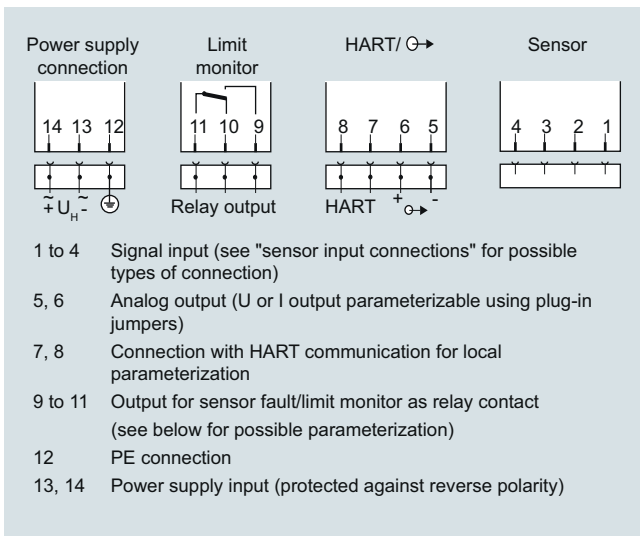
- 9 mV sources with two-wire system (7NG3242-xxxx0)
- 10 V sources with two-wire system (7NG3242-xxxx[1-3])
- 11 mA/mA sources with two-wire system (7NG3242-xxxx[4-8])
- 12 Voltage measurement -1,2 to 10 V with U/I plug 7NG3092-8AW (7NG3242-xxxx0)
- 13 Current measurement -12 to 100 mA with U/I plug 7NG3092-8AW (7NG3242-xxxx0)

Connection diagram for the input signal

Channel 1 is the measured variable between the terminals 2 and 3 on the input plug. With a difference or mean-value circuit, the calculation of the measured value is defined by the type of measurement. Otherwise the measured value is determined via channel 1. The following code is used for the type of measurement:

type of measurement	Calculation of measured value
Single channel	Channel 1
Differential connection 1	Channel 1 - Channel 2
Differential connection 2	Channel 2 - Channel 1
Mean-value 1	$\frac{1}{2} \cdot (\text{Channel 1} + \text{Channel 2})$

The short-circuit jumpers shown in the circuits must be inserted in the respective system on site.

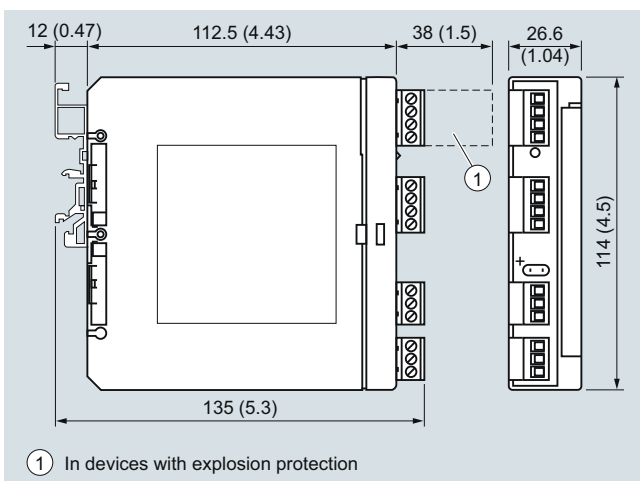


Connection diagram for power supply, input and outputs

Relay outputs

	Connected terminals
Closed-circuit operation (relay opens when error)	
• Device switched off	10 and 11
• Device switched on and no error	9 and 11
• Device switched on and error	10 and 11
Open-circuit operation (relay closes when error)	
• Device switched off	10 and 11
• Device switched on and no error	10 and 11
• Device switched on and error	9 and 11

Dimensional drawings



Dimensions for control room mounting, rail mounting in mm (inches)

Temperature Measurement

Transmitters for field mounting

SITRANS TF280 WirelessHART

Overview



SITRANS TF280 for flexible and cost-effective temperature measurements

- Supports the WirelessHART standard (HART V 7.1)
- Very high security level for wireless data transmission
- Built-in local user interface (LUI) with 3-button operation
- Optimum representation and readability using graphical display (104 x 80 pixels) with integrated backlight
- Stand-by (deep sleep phase) mode can be turned on and off with push of a button
- Battery power supply
- Battery life time up to 5 years
- Extend battery life time with HART modem interface which can be switch off
- Optimized power consumption through new design, and increase in battery life time
- Simple configuration thanks to SIMATIC PDM
- Housing meets IP65 degree of protection
- Supports all Pt100 sensors as per IEC 751/DIN EN 60751

Benefits

The SITRANS TF280 is a temperature transmitter that features WirelessHART as the standard communication interface.

Also available is a wired interface to connect a HART modem:

- Flexible temperature measurement
- Save costs on wiring at difficult installation conditions. Wireless technology offers cost advantages in cases where extensive wiring costs would normally apply.
- It enables additional hitherto unfeasible measuring points, particularly for monitoring purposes
- Easy installation also on moveable equipment parts
- Enables cost-effective temporary measurements, for example for process optimizations.
- Optimum solution in addition to wired communication and for system solutions in process automation

Application

The SITRANS TF280 is a WirelessHART field device for temperature measurement with a Pt100 sensor.

This sensor can be installed directly on the field device, or connected at an offset with a cable connection. On the wireless communication side, the transmitter supports the WirelessHART standard. A HART modem can be connected to the transmitter particularly for initial parameterization. Alternatively the device can be commissioned comfortably by means of the local push-buttons w/o any additional handset devices.

It can be used in all industries and applications in non-explosive areas.

Design

The SITRANS TF280 has a robust aluminum enclosure and is suitable for outside use. It conforms with the IP65 safety class.

The operation temperature range is -40 to +80 °C (-40 to +176 °F). Power supply is provided through an integrated battery, which is available as an accessory. The device is only approved for operation with this battery.

The antenna features a rotatable joint which can be used for directional alignment. Wireless signals can thus be optimally received and transmitted.

A special highlight is the possibility to operate directly on the device with 3 push buttons. It perfectly matches the strategy of all new Siemens field devices.

Using the device's push buttons, it is easy to turn the HART modem interface of the device on and off. The device can be put to passive status and reactivated at any time. This helps to extend the life time of the battery.

The SITRANS TF280 transmitter features a cable gland or a Pt100 sensor including protective piping.

Function

The SITRANS TF280 can join to a WirelessHART network. It can be parameterized and operated through this network. Measured process values are transmitted via the network to a WirelessHART-Gateway.

Field device data received by the WirelessHART-Gateway is transmitted to the connected systems, for example the process control system SIMATIC PCS 7. For an introduction of WirelessHART, please see the FI 01 catalogue Sec. 8 or www.siemens.com/wirelesshart.

Integration

Connecting to SIMATIC PCS 7

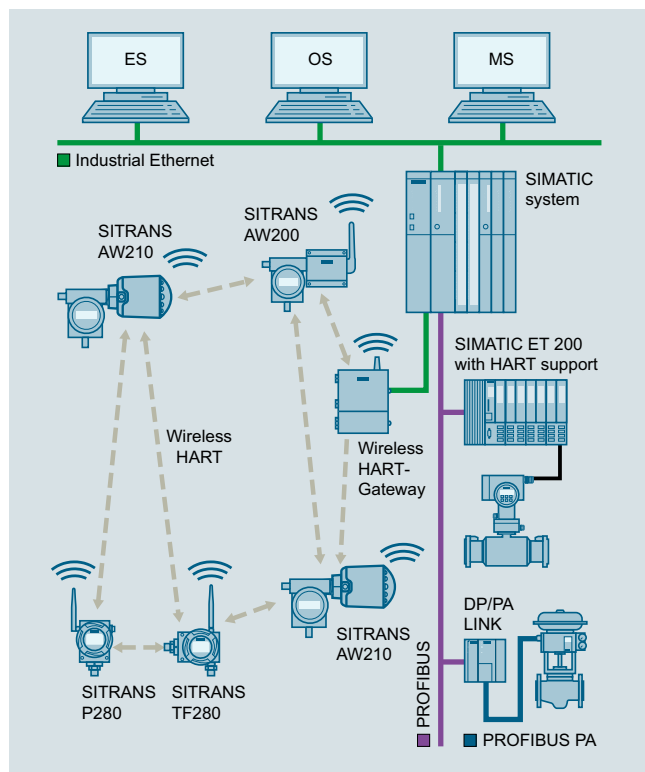
The integration of field devices in SIMATIC PCS 7 and other process control systems can be now done seamlessly and cost-effectively with wireless technology, especially in situations where high wiring costs may be expected. Of particular interest are measuring points which are to be added and for which no wiring is available.

Where larger distances between the IE/WSN-PA LINK and control systems need to be overcome, this connection can also be implemented on a wireless and cost-effective basis using the SCALANCE W series of products. Siemens WirelessHART devices operate with optimum coexistence to SCALANCE W family products.

Temperature Measurement

Transmitters for field mounting

SITRANS TF280 WirelessHART



Integration of a meshed network into SIMATIC PCS 7

Configuration

Configuration of the SITRANS TF280 transmitter may be carried out as follows:

- Initial commissioning for the SITRANS TF280 with SIMATIC PDM is generally carried out via a HART modem or the integrated local user interface, since the network ID and join Key must be set up on the device before it can be accepted and integrated into the WirelessHART network.
- Once it is integrated into the network, the device can be conveniently operated with the WirelessHART network or onsite with a HART modem or via the local user interface.

Technical specifications

The SITRANS TF280 can be mechanically installed in two ways:

- Direct at the measuring point with a M20x1.5 thread. A connection to other threads can be done via the adapter.
- Remotely from the Pt100 sensor, which is connected to the transmitter via a cable.

The data in the following table refer to the transmitter only excluding a connected sensor, except as noted otherwise.

Input	
Sensor	
• Sensor type	Pt100 as per IEC 751/DIN EN 60751 ¹⁾
• Connection	Two, three or four-wire system
• Measuring range	-200 ... +850 °C (-328 ... 1560 °F)
Cable length SITRANS TF280 and Pt100 sensor element	≤ 3 m
Measuring accuracy ²⁾	
Accuracy	< 0.04 % of the measuring range
Long-term drift	< 0.035 % of the measuring range in first year
Ambient temperature effect	max. 0.1 °C/10 K
Rated conditions	
Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	< 95%
Climatic class	4K4H in accordance with EN 60721-3-4 (stationary use at locations not protected against weather)
Degree of protection	IP65/NEMA 4
Max. permissible temperature at transmitter for directly mounted Pt100	80 °C (176 °F)
Design	
Enclosure	Die-cast aluminum
Shock resistance	in accordance with DIN EN 60068-2-29 / 03.95
Resistance to vibration	DIN EN 60068-2-6/12.07
Weight	
• without battery	1.5 kg (3.3 lb)
• with battery	1.6 kg (3.5 lb)
Dimensions (W x H x D)	See "Dimensional drawing"
Thread for cable gland/sensor connection	M20x1.5 other threads via adapter
Material of protective tubes and process connection (only for pre-mounted sensor pipe)	Stainless steel 1.4404 (AISI 316L, UNS S 31603, X2CrNiMo17-12-2)
Cable between transmitter and sensor element	≤ 3 m für two-, three- or four-wire connections Cable resistance < 1 Ω (setting range in mΩ 0...9999)
Sensor break	Recognized

Temperature Measurement

Transmitters for field mounting

SITRANS TF280 WirelessHART

Displays and controls

Display (with illumination)

- Size of display 104 x 80 pixels
- Number of digits Adjustable
- Number of spaces after comma Adjustable
- Setting options
 - on site with 3 push buttons
 - with SIMATIC PDM or HART Communicator

Auxiliary power

Battery 3.6 V DC

Communication

- Wireless standard WirelessHART V7.1 conforming
- Transmission frequency band 2.4 GHz (ISM-Band)
- Range under reference conditions
 - Up to 250 m (line of sight) in outside areas
 - Up to 50 m (greatly dependent on obstacles) in Inside areas
- Communication interfaces
 - HART communication with HART modem
 - WirelessHART

Certificates and approvals

- Wireless communication approvals R&TTE, FCC
- General Product Safety CSA_{US/C}, CE, UL
- Pressure equipment directive

This device is not included in the pressure device guideline; classification according to pressure device guideline (PED 2014/68/EU), Directive 1/40; article 1, paragraph 2.1.4

¹⁾ Pre-mounted Pt100: Class A (maximum MES: $0.15 + 0.002 \cdot |t|$ °C)

²⁾ Calculation for errors:
 Probable total error = $\sqrt{(\text{MES}^2 + \text{AET}^2 + \text{LTD}^2 + \text{ATE}^2)}$
 Max. error = MES + AET + LTD + ATE
 |t|: Absolut value of measured temperature
 MES: Measurement error of sensor
 AET: Accuracy error transmitter
 LTD: Long term drift
 ATE: Ambient temperature drift

Selection and Ordering data

SITRANS TF280 WirelessHART Temperature transmitter

(Required battery not included with delivery, see accessories)

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Connections/cable entry

Cable gland M20x1.5¹⁾
 Sensor pipe with Pt100, G½" male thread, pre-mounted and connected

Display

Digital display, visible

Enclosure

Die-cast aluminum

Explosion protection

Not included

Antenna

Variable, attached to device

Further designs

Please add **"-Z"** to Article No. and specify Order code(s) and plain text.

Measuring point number (TAG Nr.)
 max. 16 digits entered in plain text
 Y15:

Measuring point message
 max. 27 characters entered in plain text:
 Y16:

Accessories

Further accessories for assembly, connection and transmitter configuration, see page 2/120.

Lithium battery for SITRANS TF280/P280

Mounting bracket, steel

Mounting bracket, stainless steel

Cover, die-cast aluminum, without window

Cover, die-cast aluminum, with window

Thread adapter M20x1.5 (male thread) on ½-14 NPT (female thread)

Thread adapter M20x1.5 (male thread) on G½ (female thread)

HART modem with USB interface

SIMATIC PDM

¹⁾ Please order sensor separately.

Article No.

7MP1110 - 0A - 000

C
D
1
1
A
A

Order code

Y15

Y16

Article No.

7MP1990-0AA00

7MF4997-1AC

7MF4997-1AJ

7MF4997-1BB

7MF4997-1BE

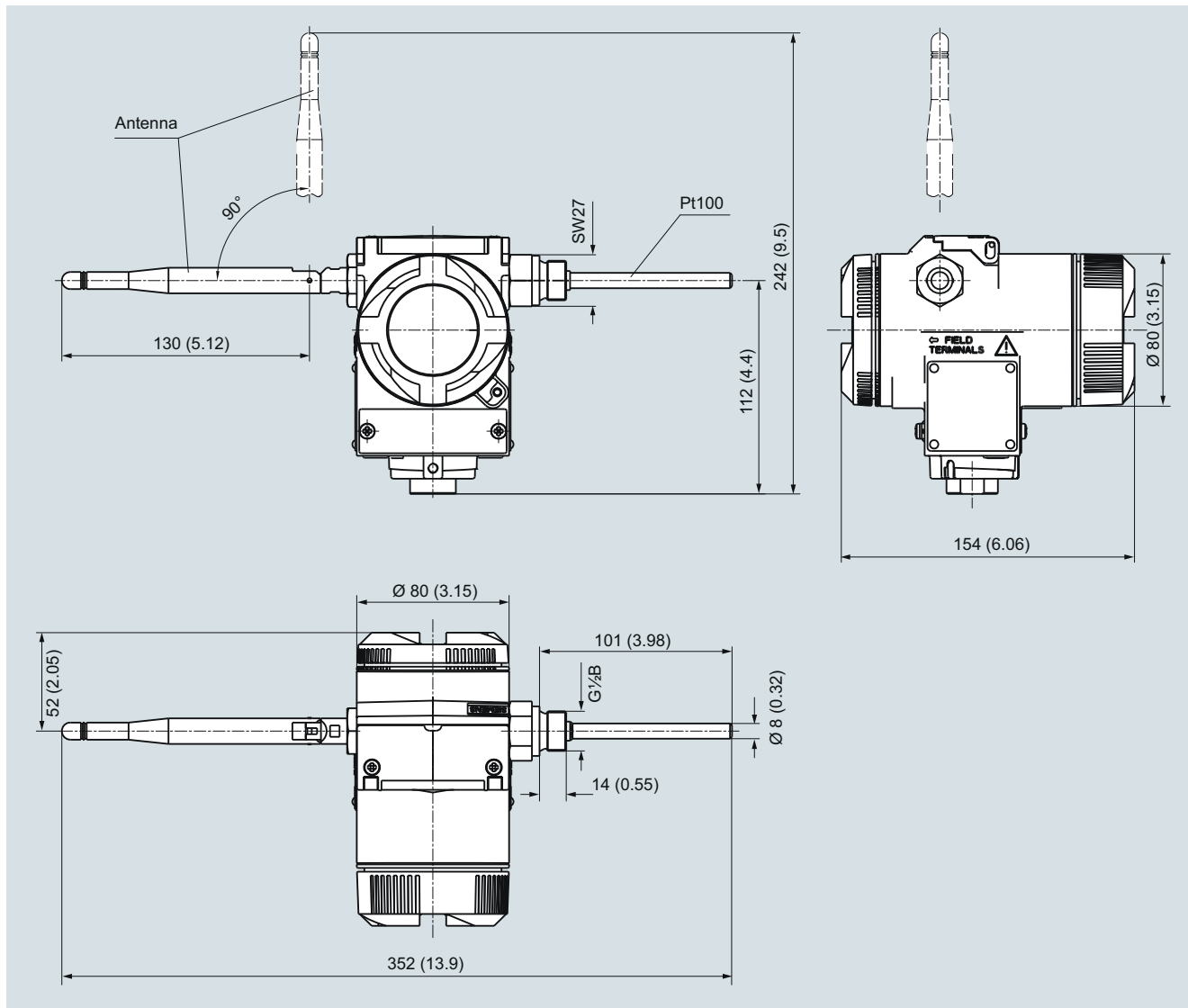
7MP1990-0BA00

7MP1990-0BB00

7MF4997-1DB

see Sec. 8

Dimensional drawings



SITRANS TF280 WirelessHART temperature transmitter with Pt100, dimensions in mm (inch).

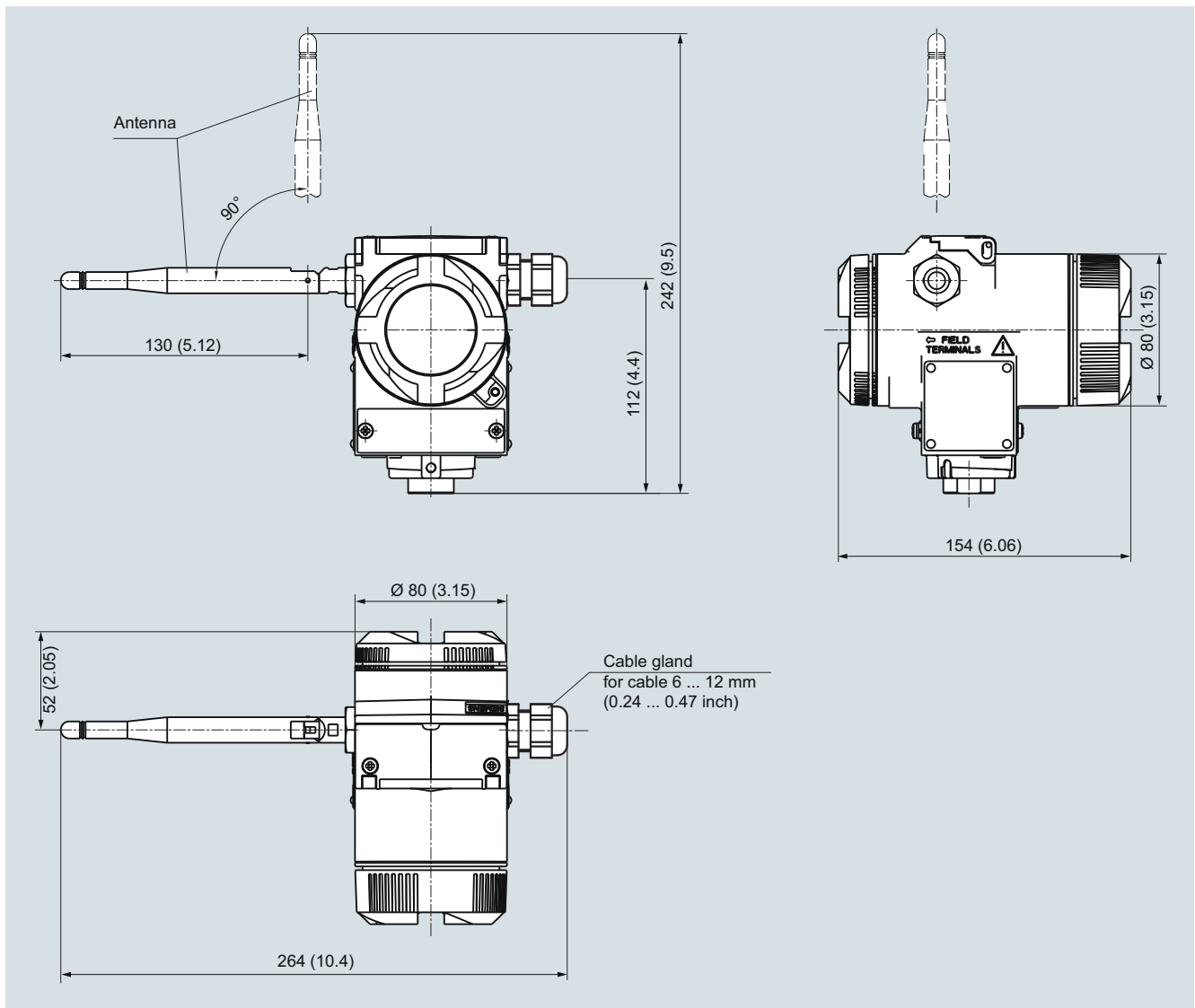
The dimension drawing of the mounting bracket is available in the section "Pressure measurement" - "SITRANS P DS III" - "Accessories/spare parts".

Temperature Measurement

Transmitters for field mounting

SITRANS TF280 WirelessHART

2



SITRANS TF280 WirelessHART temperature transmitter, dimensions in mm (inch)

The dimension drawing of the mounting bracket is available in the section "Pressure measurement" - "SITRANS P DS III" - "Accessories/spare parts".

Temperature Measurement

Transmitter for field mounting/field indicator

SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Overview



Our field devices for heavy industrial use

- HART, Universal
- 4 to 20 mA, universal
- Field indicator for 4 to 20 mA signals

The temperature transmitter SITRANS TF works where others feel uncomfortable.

Benefits

- Universal use
 - as transmitter for resistance thermometer, thermocouple element, Ω or mV signal
 - as field indicator for any 4 to 20 mA signals
- Local sensing of measured values over digital display
- Rugged two-chamber enclosure in die-cast aluminium or stainless steel
- Degree of protection IP66/67/68
- Test terminals for direct read-out of the output signal without breaking the current loop
- Can be mounted elsewhere if the measuring point
 - is hard to access,
 - is subject to high temperatures,
 - is subject to vibrations from the system,
 - or if you want to avoid long neck tubes and/or protective tubes.
- Can be mounted directly on American-design sensors
- Wide range of approvals for use in potentially explosive atmospheres. "Intrinsically safe, non-sparking and flameproof" type of protections, for Europe and USA.
- SIL2 (with Order code C20), SIL2/3 (with C23)

Application

SITRANS TF can be used everywhere where temperatures need to be measured under particularly adverse conditions, or where a convenient local display is ideal. For that reasons users from all industries have opted for this field device. The rugged enclosure protects the electronics. The stainless steel model is almost completely resistant to sea water and other aggressive elements. The inner workings offer high measuring accuracy, universal input and a wide range of diagnostic options.

Function

Configuration

The communication capability over the HART protocol V 5.9 of the SITRANS TF with an integrated SITRANS TH300 permits parameterization using a PC or HART communicator (hand-held communicator). The SIMATIC PDM makes it easy.

Parameterization is carried out using a PC for SITRANS TF with the integrated and programmable SITRANS TK. Available for this purpose are a special modem and the software tool SIPROM T.

Mode of operation

Mode of operation of SITRANS TF as temperature transmitter

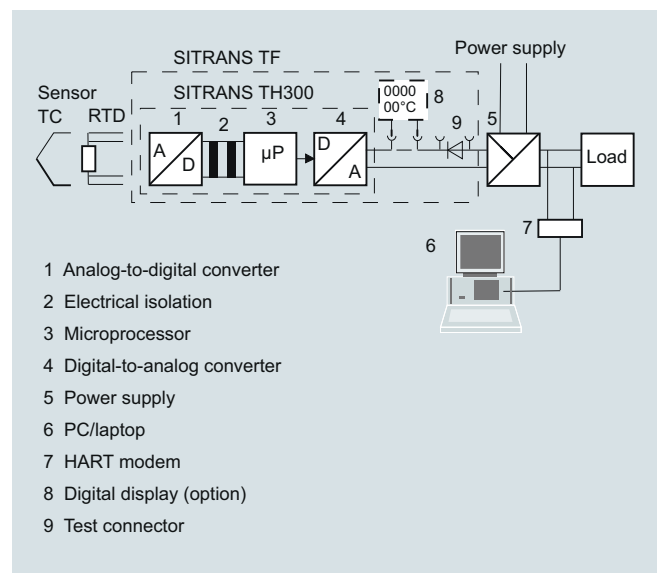
The sensor signal, whether resistance thermometer, thermocouple element or Ω or mV signal, is amplified and linearized. Sensor and output side are electrically isolated. An internal cold junction is integrated for measurements with thermocouple elements.

The device outputs a temperature-linear direct current of 4 to 20 mA. As well as the analog transmission of measured values from 4 to 20 mA, the HART version also supports digital communication for online diagnostics, measured value transmission and configuration.

SITRANS TF automatically detects when a sensor should be interrupted or is indicating a short-circuit. The practical test terminals allow direct measurement of 4 to 20 mA signals over an ammeter without interrupting the output current loop.

Mode of operation of SITRANS TF as field indicator

Any 4 to 20 mA signal can be applied to the generous terminal block. As well as a range of predefined measurement units, the adjustable indicator also supports the input of customized units. This means that any 4 to 20 mA signal can be represented as any type of unit, e.g. pressure, flow rate, filling level or temperature.



Mode of operation: SITRANS TF with integrated transmitter and digital display

Temperature Measurement

Transmitter for field mounting/field indicator

SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Technical specifications

Input		Measuring range	parameterizable max. 0 ... 2200 Ω (see table "Digital measuring errors")
<u>Resistance thermometer</u>		Min. measured span	5 ... 25 Ω (see Table "Digital measuring errors")
Measured variable	Temperature	Characteristic curve	Resistance-linear or special characteristic
Sensor type		<u>Thermocouples</u>	Temperature
• to IEC 60751	Pt25 ... Pt1000	Measured variable	
• to JIS C 1604; a=0.00392 K-1	Pt25 ... Pt1000	Sensor type (thermocouples)	
• to IEC 60751	Ni25 ... Ni1000	• Type B	Pt30Rh-Pt6Rh to DIN IEC 584
Units	°C and °F	• Type C	W5 %-Re acc. to ASTM 988
Connection		• Type D	W3 %-Re acc. to ASTM 988
• Normal connection	1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire system	• Type E	NiCr-CuNi to DIN IEC 584
• Generation of average value	Series or parallel connection of several resistance thermometers in a two-wire system for the generation of average temperatures or for adaptation to other device types	• Type J	Fe-CuNi to DIN IEC 584
• Generation of difference	2 resistance thermometers (RTD) in 2-wire system (RTD 1 – RTD 2 or RTD 2 – RTD 1)	• Type K	NiCr-Ni to DIN IEC 584
Interface		• Type L	Fe-CuNi to DIN 43710
• Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)	• Type N	NiCrSi-NiSi to DIN IEC 584
• Three-wire system	No balancing required	• Type R	Pt13Rh-Pt to DIN IEC 584
• Four-wire system	No balancing required	• Type S	Pt10Rh-Pt to DIN IEC 584
Sensor current	≤ 0.45 mA	• Type T	Cu-CuNi to DIN IEC 584
Response time	≤ 250 ms for 1 sensor with open-circuit monitoring	• Type U	Cu-CuNi to DIN 43710
Open-circuit monitoring	Always active (cannot be disabled)	Units	°C or °F
Short-circuit monitoring	can be switched on/off (default value: ON)	Connection	
Measuring range	parameterizable (see table "Digital measuring errors")	• Normal connection	1 thermocouple (TC)
Min. measured span	10 °C (18 °F)	• Generation of average value	2 thermocouples (TC)
Characteristic curve	Temperature-linear or special characteristic	• Generation of difference	2 thermocouples (TC) (TC 1 – TC 2 or TC 2 – TC 1)
<u>Resistance-based sensors</u>		Response time	≤ 250 ms for 1 sensor with open-circuit monitoring
Measured variable	Actual resistance	Open-circuit monitoring	Can be switched off
Sensor type	Resistance-based, potentiometers	Cold junction compensation	
Units	Ω	• Internal	With integrated Pt100 resistance thermometer
Connection		• External	With external Pt100 IEC 60751 (2-wire or 3-wire connection)
• Normal connection	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire system	• External fixed	Cold junction temperature can be set as fixed value
• Generation of average value	2 resistance-based sensors in 2-wire system for generation of average value	Measuring range	parameterizable (see table "Digital measuring errors")
• Generation of difference	2 resistance-based sensor in 2-wire system (R 1 – R 2 or R 2 – R 1)	Min. measured span	Min. 40 ... 100 °C (72 ... 180 °F) (see table "Digital measuring errors")
Interface		Characteristic curve	Temperature-linear or special characteristic
• Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)	<u>mV sensor</u>	
• Three-wire system	No balancing required	Measured variable	DC voltage
• Four-wire system	No balancing required	Sensor type	DC voltage source (DC voltage source possible over an externally connected resistor)
Sensor current	≤ 0.45 mA	Units	mV
Response time	≤ 250 ms for 1 sensor with open-circuit monitoring	Response time	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Can be switched off	Open-circuit monitoring	Can be switched off
Short-circuit monitoring	Can be switched off (value is adjustable)	Measuring range	-10 ... +70 mV -100 ... +1100 mV
		Min. measured span	2 mV or 20 mV
		Overload capability of the input	-1.5 ... +3.5 V DC
		Input resistance	≥ 1 MΩ
		Characteristic curve	Voltage-linear or special characteristic

Temperature Measurement

Transmitter for field mounting/field indicator

SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Output Output signal Communication with SITRANS TH300		Auxiliary power Without digital display With digital display Electrically isolated • Test voltage	
Digital display Digital display (optional) Display Digit height Display range Units Setting: Zero point, full-scale value and unit Load voltage		11 ... 35 V DC (30 V for Ex ib; 32 V for Ex ic and Ex nA) 13.1 ... 5 V DC (30 V for Ex ib; 32 V for Ex ic and Ex nA) Between input and output $U_{eff} = 1 \text{ kV}, 50 \text{ Hz}, 1 \text{ min}$	
Measuring accuracy Digital measuring errors Reference conditions • Auxiliary power • Load • Ambient temperature • Warming-up time Error in the analog output (digital/analog converter) Error due to internal cold junction Influence of ambient temperature • Analog measuring error • Digital measuring errors - with resistance thermometers - with thermocouples Auxiliary power effect Effect of load impedance Long-term drift • In the first month • After one year • After 5 years		Certificates and approvals Explosion protection ATEX • "Intrinsic safety" type of protection - EC type test certificate • "Operating equipment that is non-ignitable and has limited energy for zone 2" type of protection - EC type test certificate • "Flame-proof enclosure" type of protection - EC type test certificate Explosion protection to FM • Identification (XP, DIP, NI, S) Other certificates	
Conditions of use <u>Ambient conditions</u> Storage temperature Condensation Electromagnetic compatibility Degree of protection to EN 60529		with digital display: II 2 (1) G Ex ib [ia Ga] IIC T4 Gb II 2 G Ex ib IIC T4 Gb II 1D Ex ia IIIC T100 °C Da without digital display: II 2 (1) G Ex ib [ia Ga] IIC T6 Gb II 2 G Ex ib IIC T6 Gb II 1D Ex ia IIIC T100 °C Da ZELM 11 ATEX 0471 X II 3 G Ex ic IIC T6/T4 Gc II 3 G Ex nA IIC T6/T4 Gc II 3 G Ex nA [ic] IIC T6/T4 Gc ZELM 11 ATEX 0471 X II 2 G Ex d IIC T6/T5 Gb II 2 D Ex tb IIIC T100 °C Db ZELM 11 ATEX 0472 X Certificate of Compliance 3017742 • XP/II/1/BCD/T5 Ta = 85 °C (185 °F), T6 Ta = 60 °C (140 °F), Type 4X • DIP/II, III/1/EFG/T5 Ta = 85 °C (185 °F), T6 Ta = 60 °C (140 °F), Type 4X • NI/II/2/ABCD/T5 Ta = 85 °C (185 °F), T6 Ta = 60 °C (140 °F), Type 4X • S/II, III/2/FG/T5 Ta = 85 °C (185 °F), T6 Ta = 60 °C (140 °F), Type 4X IECEx, EAC Ex(GOST), INMETRO, NEPSI, KOSHA	
Construction Weight Dimensions Enclosure material Electrical connection, sensor connection Mounting bracket (optional)		Hardware and software requirements • For the parameterization software SIPROM T for SITRANS TF with TH200 - Personal computer - PC operating system • For the parameterization software SIMATIC PDM for SITRANS TH300 Communication Load for HART connection • Two-core shielded • Multi-core shielded Protocol Factory setting (transmitter): • Pt100 (IEC 751) with 3-wire circuit • Measuring range: 0 ... 100 °C (32 ... 212 °F) • Error signal in the event of sensor breakage: 22.8 mA • Sensor offset: 0 °C (0 °F) • Damping 0.0 s	

Temperature Measurement

Transmitter for field mounting/field indicator

SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Digital measuring errors

Resistance thermometer

Input	Measuring range	Min. mea- sured span		Digital accuracy	
	°C / (°F)	°C	(°F)	°C	(°F)
to IEC 60751					
Pt25	-200 ... +850 (-328 ... +1562)	10	(18)	0.3	(0.54)
Pt50	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +850 (-328 ... +1562)	10	(18)	0.1	(0.18)
Pt500	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
to JIS C1604-81					
Pt25	-200 ... +649 (-328 ... +1200)	10	(18)	0.3	(0.54)
Pt50	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +649 (-328 ... +1200)	10	(18)	0.1	(0.18)
Pt500	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
Ni 25 ... Ni1000	-60 ... +250 (-76 ... +482)	10	(18)	0.1	(0.18)

Resistance-based sensors

Input	Measuring range	Min. mea- sured span		Digital accuracy	
	Ω	Ω		Ω	
Resistance	0 ... 390	5		0.05	
Resistance	0 ... 2200	25		0.25	

Thermocouples

Input	Measuring range	Min. mea- sured span		Digital accuracy	
	°C / (°F)	°C	(°F)	°C	(°F)
Type B	100 ... 1820 (212 ... 3308)	100	(180)	2 ¹⁾	(3.6) ¹⁾
Type C (W5)	0 ... 2300 (32 ... 4172)	100	(180)	2	(3.6)
Type D (W3)	0 ... 2300 (32 ... 4172)	100	(180)	1 ²⁾	(1.8) ²⁾
Type E	-200 ... +1000 (-328 ... +1832)	50	(90)	1	(1.8)
Type J	-200 ... +1200 (-328 ... +2192)	50	(90)	1	(1.8)
Type K	-200 ... +1370 (-328 ... +2498)	50	(90)	1	(1.8)
Type L	-200 ... +900 (-328 ... +1652)	50	(90)	1	(1.8)
Type N	-200 ... +1300 (-328 ... +2372)	50	(90)	1	(1.8)
Type R	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.6)
Type S	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.6)
Type T	-20 ... +400 (-328 ... +752)	40	(72)	1	(1.8)
Type U	-200 ... +600 (-328 ... +1112)	50	(90)	2	(3.6)

1) The digital accuracy in the range 100 to 300 °C (212 to 572 °F) is 3 °C (5.4 °F).

2) The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

mV sensor

Input	Measuring span	Min. mea- sured span		Digital accuracy	
	mV	mV		μV	
mV sensor	-10 ... +70	2		40	
mV sensor	-100 ... +1100	20		400	

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value.

An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0.025 % of the set span (digital-analog error).

The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of cold junction errors in the case of thermocouple measurements).

Temperature Measurement

Transmitter for field mounting/field indicator

SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Selection and Ordering data	Article No.	Further designs	Order code
Temperature transmitter in field housing Two-wire system 4 ... 20 mA, with electrical isolation, with documentation on MiniDVD Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7 NG 3 1 3 - - - -	Please add "Z" to Article No. and specify Order code(s) and plain text. Test protocol (5 measuring points) Functional safety SIL2 Functional safety SIL2/3 Explosion protection	C11 C20 C23
Integrated transmitter SITRANS TH200, programmable <ul style="list-style-type: none"> Without Ex protection With Ex ia (ATEX + IECEx) With Ex nAL for zone 2 (ATEX + IECEx) Total device SITRANS TF Ex d (ATEX + IECEx)¹⁾ Total device SITRANS TF according to FM (XP, DIP, NI, S)¹⁾ SITRANS TH300, communication capability according to HART V 5.9 <ul style="list-style-type: none"> Without Ex-protection With Ex ia (ATEX + IECEx) With Ex nAL for zone 2 (ATEX + IECEx) Total device SITRANS TF Ex d (ATEX + IECEx)¹⁾ Total device SITRANS TF according to FM (XP, DIP, NI, S)¹⁾ 	5 0 5 1 5 2 5 4 5 5 6 0 6 1 6 2 6 4 6 5	<ul style="list-style-type: none"> Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG313.-1....) Explosion protection Ex d to INMETRO (Brazil) (only with 7NG313.-4....) Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG313.-2....) Explosion protection Ex i to NEPSI (China) (only with 7NG313.-1....) Explosion protection Ex d to NEPSI (China) (only with 7NG313.-4....) Explosion protection Ex nA to NEPSI (China) (only with 7NG313.-2....) Explosion protection Ex d to KOSHA (Korea) (only with 7NG313.-4....) Explosion protection Ex i according to EAC (Russia/Belarus/Kazakhstan) (only for 7NG313.-1....) Explosion protection Ex d according to EAC (Russia/Belarus/Kazakhstan) (only for 7NG313.-4....) Explosion protection Ex nA according to EAC (Russia/Belarus/Kazakhstan) (only for 7NG313.-2....) 	E25 ²⁾ E26 ²⁾ E27 ²⁾ E55 ²⁾ E56 ²⁾ E57 ²⁾ E70 ²⁾ E81 ²⁾ E82 ²⁾ E83 ²⁾
Enclosure Die-cast aluminium Stainless steel precision casting	A E		
Connections/cable inlet Screwed glands M20x1.5 Screwed glands 1/2-14 NPT	B C		
Digital indicator Without With	0 1		
Mounting bracket and securing parts Without Made of steel Made of stainless steel	0 1 2	Marine approvals <ul style="list-style-type: none"> Det Norske Veritas Germanischer Lloyd (DNV GL) Bureau Veritas (BV) Lloyd's Register of Shipping (LR) American Bureau of Shipping (ABS) Two coats of lacquer on casing and cover (PU on epoxy) Transient protection Cable gland CAPRI 1/2 NPT ADE 4F, nickel-plated brass (CAPRI 848694 and 810634) included Cable gland 1/2 NPT ADE 1F, cable diam. 6 ... 12 (CAPRI 818694 and 810534) included Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included Cable gland 1/2 NPT ADE 1F, cable diam. 4 ... 8.5 (CAPRI 818674 and 810534) included	D01 D02 D04 D05 G10 J01 D57 D58 D59 D60

Temperature Measurement

Transmitter for field mounting/field indicator

SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Selection and Ordering data	Order code
Customer-specific programming Add "-Z" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... °C, °F	Y01³⁾
Measuring point no. (TAG), max. 8 characters	Y17⁴⁾
Meas. point descriptor, max. 16 characters	Y23⁵⁾
Meas. point message, max. 32 characters	Y24⁵⁾
Only inscription on measuring point label: specify in plain text: Measuring range	Y22⁵⁾
Pt100 (IEC) 2-wire, $R_L = 0 \Omega$	U02⁶⁾
Pt100 (IEC) 3-wire	U03⁶⁾
Pt100 (IEC) 4-wire	U04⁶⁾
Thermocouple type B	U20⁶⁾7)
Thermocouple type C (W5)	U21⁶⁾7)
Thermocouple type D (W3)	U22⁶⁾7)
Thermocouple type E	U23⁶⁾7)
Thermocouple type J	U24⁶⁾7)
Thermocouple type K	U25⁶⁾7)
Thermocouple type L	U26⁶⁾7)
Thermocouple type N	U27⁶⁾7)
Thermocouple type R	U28⁶⁾7)
Thermocouple type S	U29⁶⁾7)
Thermocouple type T	U30⁶⁾7)
Thermocouple type U	U31⁶⁾7)
With TC: CJC external (Pt100, 3-wire)	U41
With TC: CJC external with fixed value, specify in plain text	Y50
Special differing customer-specific programming, specify in plain text	Y09⁸⁾
Fail-safe value 3.6 mA (instead of 22.8 mA)	U34⁴⁾

Supply units see Chapter "Supplementary Components".

1) Without cable gland.

2) Option does not include ATEX/IECEx approval, only country-specific approval.

3) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
For specification on TAG plate, please select Y22.

4) For this selection, Y01 or Y09 must also be selected.
For specification on TAG plate, please select Y23.

5) If only Y22, Y23 or Y24 are ordered and the label only has to be on the tag plate, Y01 does not have to be specified.

6) For this selection, Y01 must also be selected.

7) Internal reference junction compensation is selected as the default for TC.

8) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Selection and Ordering data	Article No.
Accessories Further accessories for assembly, connection and transmitter configuration, see page 2/120.	
Modem for SITRANS TH100, TH200, TR200 and TF with TH200 incl. parameterization software T with USB interface	7NG3092-8KN
HART modem With USB interface	7MF4997-1DB
SIMATIC PDM parameterization software also for SITRANS TH300	see chapter 8
Mounting bracket and securing parts Made of steel for 7NG313.-..B.. Made of steel for 7NG313.-..C.. Made of stainless steel for 7NG313.-..B.. Made of stainless steel for 7NG313.-..C..	7MF4997-1AC 7MF4997-1AB 7MF4997-1AJ 7MF4997-1AH
Digital indicator¹⁾	7MF4997-1BS
Connection board	A5E02226423

1) It is not possible to upgrade devices with Ex protection

Ordering example 1:

7NG3135-0AB11-Z Y01+Y23+U03

Y01: -10 ... +100 °C

Y23: TICA1234HEAT

Ordering example 2:

7NG3136-0AC11-Z Y01+Y23+Y24+U25

Y01: -10 ... +100 °C

Y23: TICA 1234 ABC

Y24: HEATING BOILER 56789

Factory setting (transmitter):

- Pt100 (IEC 751) with three-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Temperature Measurement

Transmitter for field mounting/field indicator

SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Selection and Ordering data	Article No.
SITRANS TF field indicator for 4 ... 20 mA signals	7NG3130 -
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Without Ex-protection	0 1
With Ex ia (ATEX + IECEx)	1 1
With Ex nAL for zone 2 (ATEX + IECEx)	2 1
Total device SITRANS TF Ex d (ATEX + IECEx) ¹⁾	4 1
Total device SITRANS TF according to FM (XP, DIP, NI, S) ¹⁾	5 1
Enclosure	
Die-cast aluminium	A
Stainless steel precision casting	E
Connections/cable inlet	
Screwed glands M20x1.5	B
Screwed glands 1/2-14 NPT	C
Digital indicator	
With	1
Mounting bracket and securing parts	
Without	0
Made of steel	1
Made of stainless steel	2
Further designs	Order code
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Test protocol (5 measuring points)	C11
Explosion protection	
• Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG313.-1....)	E25²⁾
• Explosion protection Ex d to INMETRO (Brazil) (only with 7NG313.-4....)	E26²⁾
• Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG313.-2....)	E27²⁾
• Explosion protection Ex i to NEPSI (China) (only with 7NG313.-1....)	E55²⁾
• Explosion protection Ex d to NEPSI (China) (only with 7NG313.-4....)	E56²⁾
• Explosion protection Ex nA to NEPSI (China) (only with 7NG313.-2....)	E57²⁾
• Explosion protection Ex d to KOSHA (Korea) (only with 7NG313.-4....)	E70²⁾
• Explosion protection Ex i according to EAC (Russia/Belarus/Kazakhstan) (only for 7NG313.-1....)	E81²⁾
• Explosion protection Ex d according to EAC (Russia/Belarus/Kazakhstan) (only for 7NG313.-4....)	E82²⁾
• Explosion protection Ex nA according to EAC (Russia/Belarus/Kazakhstan) (only for 7NG313.-2....)	E83²⁾
Marine approvals	
• Det Norske Veritas Germanischer Lloyd (DNV GL)	D01
• Bureau Veritas (BV)	D02
• Lloyd's Register of Shipping (LR)	D04
• American Bureau of Shipping (ABS)	D05
Two coats of lacquer on casing and cover (PU on epoxy)	G10
Transient protection	J01
Cable gland CAPRI 1/2 NPT ADE 4F, nickel-plated brass (CAPRI 848694 and 810634) included	D57
Cable gland 1/2 NPT ADE 1F, cable diam. 6 ... 12 (CAPRI 818694 and 810534) included	D58
Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included	D59
Cable gland 1/2 NPT ADE 1F, cable diam. 4 ... 8.5 (CAPRI 818674 and 810534) included	D60

Selection and Ordering data	Order code
Customer-specific programming Add "-Z" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... °C, °F	Y01³⁾
Only inscription on TAG plate: specify in plain text: Measuring range	Y22⁴⁾
Only inscription on TAG plate: Measuring point descriptor, max. 16 characters	Y23⁴⁾
Only inscription on TAG plate: Measuring point message, max. 27 characters	Y24⁴⁾
Special differing customer-specific programming, specify in plain text	Y09⁵⁾
Supply units see Chapter "Supplementary Components".	
1) Without cable gland.	
2) Option does not include ATEX/IECEx approval, only country-specific approval.	
3) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.	
4) If only Y22, Y23 or Y24 are ordered and the label <u>only</u> has to be on the tag plate, Y01 does not have to be specified.	
5) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.	

Selection and Ordering data	Article No.
Accessories Further accessories for assembly, connection and transmitter configuration, see page 2/120.	
Mounting bracket and securing parts	
Made of steel for 7NG313.-.B..	7MF4997-1AC
Made of steel for 7NG313.-.C..	7MF4997-1AB
Made of stainless steel for 7NG313.-.B..	7MF4997-1AJ
Made of stainless steel for 7NG313.-.C..	7MF4997-1AH
Digital indicator¹⁾	7MF4997-1BS
Connection board	A5E02226423

1) It is not possible to upgrade devices with Ex protection

Ordering example 1:

7NG3130-0AB10-Z Y01+Y23
Y01: -5...100 °C
Y23: TICA1234HEAT

Ordering example 2:

7NG3130-0AC10-Z Y01+Y23+Y24
Y01: 0 ... 20 BAR
Y23: PICA 1234 ABC
Y29: HEATING BOILER 67890

Factory setting (field indicator):

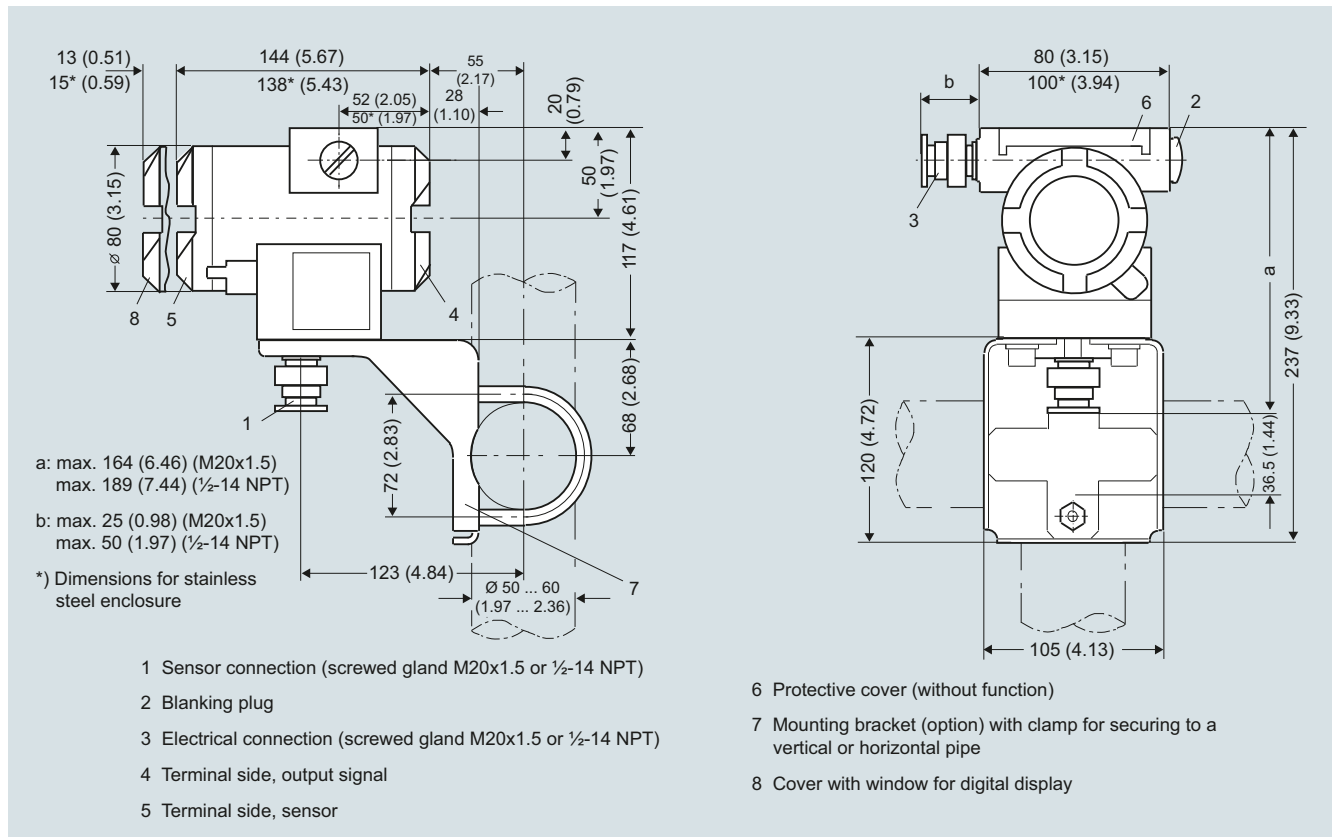
4 ... 20 mA

Temperature Measurement

Transmitter for field mounting/field indicator

SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Dimensional drawings



SITRANS TF, dimensions in mm (inches)

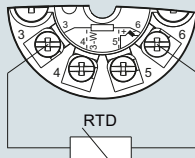
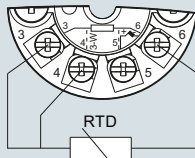
Temperature Measurement

Transmitter for field mounting/field indicator

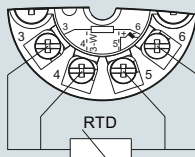
SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Schematics

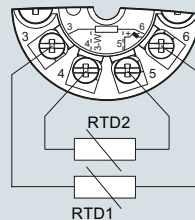
Resistance thermometer

Two-wire system ¹⁾

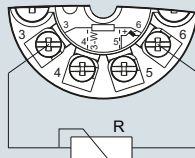
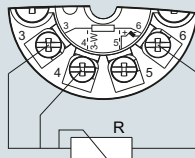
Three-wire system



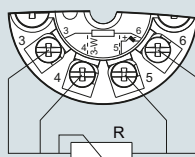
Four-wire system

Generation of average value / difference ¹⁾¹⁾ Programmable line resistance for the purpose of correction.

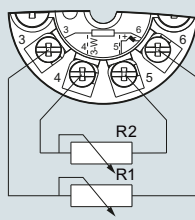
Resistance

Two-wire system ¹⁾

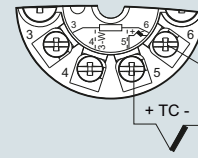
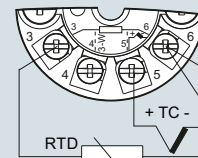
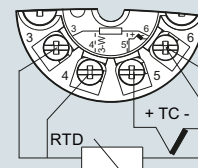
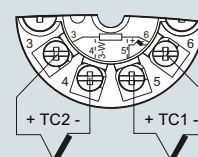
Three-wire system



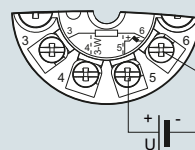
Four-wire system

Generation of average value / difference ¹⁾

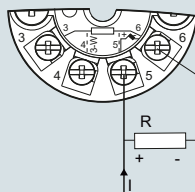
Thermocouple

Cold junction compensation
Internal/fixed valueCold junction compensation with
external Pt100 in two-wire system ¹⁾Cold junction compensation with
external Pt100 in three-wire systemGeneration of average value / difference
with internal cold junction compensation

Voltage measurement



Current measurement



SITRANS TF, sensor connection assignment

Temperature Measurement

Transmitters for field mounting

SITRANS TF fieldbus transmitter

Overview



Our field devices for heavy industrial use

- FOUNDATION fieldbus
- PROFIBUS PA

The SITRANS TF temperature transmitter works where others can't cope.

Benefits

- For universal use as a transmitter for resistance thermometers, thermocouple elements, Ω or mV signals
- Rugged two-chamber enclosure in die-cast aluminium or stainless steel
- Degree of protection IP66/67/68
- Can be mounted elsewhere if the measuring point
 - is hard to access,
 - is subject to high temperatures,
 - is subject to vibrations from the system,
 - or if you want to avoid long neck tubes and/or protective tubes.
- Can be mounted directly on American-design sensors
- Wide range of approvals for use in potentially explosive atmospheres. "Intrinsically safe, non-sparking and flameproof" type of protection, for Europe and USA

Application

The SITRANS TF can be used everywhere where temperatures need to be measured under particularly harsh conditions. For that reasons users from all industries have opted for this field device.

The rugged enclosure protects the electronics. The stainless steel model is almost completely resistant to sea water and other aggressive elements.

The inner workings offer high measuring accuracy, universal input and a wide range of diagnostic options.

Function

Features

- Polarity-neutral bus connection
- 24-bit analog-digital converter for high resolution
- Electrically isolated
- Version for use in hazardous areas
- Special characteristic
- Sensor redundancy

Transmitter with PROFIBUS PA communication

- Function blocks: 2 x analog

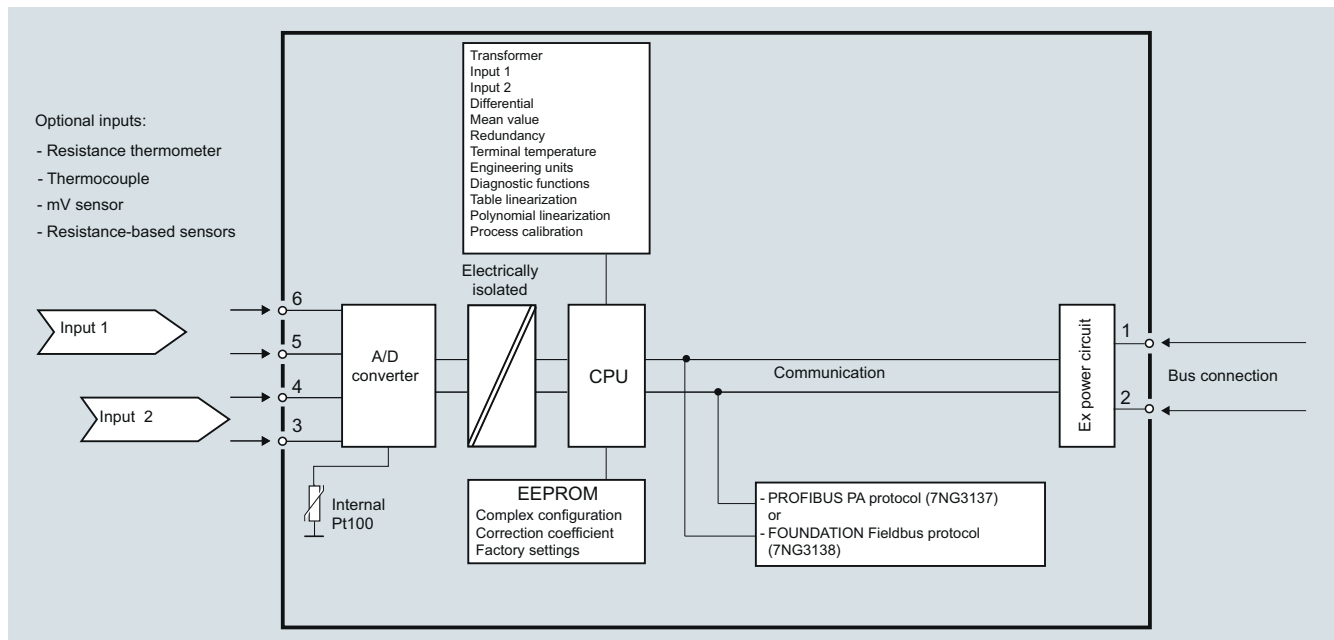
Transmitter with FOUNDATION fieldbus communication

- Function blocks: 2 x analog and 1 x PID
- Functionality: Basic or LAS

Mode of operation

The following function diagram explains the mode of operation of the transmitter.

The only difference between the two versions of the SITRANS TF (7NG3137-... and 7NG3138-...) is the type of field bus protocol used (PROFIBUS PA or FOUNDATION fieldbus).



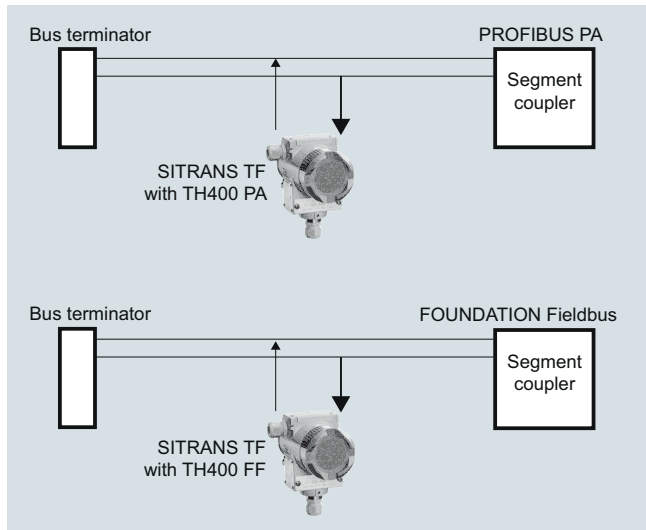
SITRANS TF with TH400, function diagram

Temperature Measurement

Transmitters for field mounting

SITRANS TF fieldbus transmitter

System communication



SITRANS TF with TH400, communication interface

Technical specifications

Input

Analog/digital conversion

- Measurement rate < 50 ms
- Resolution 24-bit

Resistance thermometer

Pt25 ... 1000 to IEC 60751/JIS C 1604

- Measuring range -200 ... +850 °C (-328 ... +1562 °F)

Ni25 ... 1000 to DIN 43760

- Measuring range -60 ... +250 °C (-76 ... +482 °F)

Cu10 ... 1000, $\alpha = 0.00427$

- Measuring range -50 ... +200 °C (-58 ... +392 °F)

Line resistance per sensor cable

Max. 50 Ω

Sensor current

Nominal 0.2 mA

Sensor fault detection

- Sensor break detection Yes
- Sensor short-circuit detection Yes, < 15 Ω

Resistance-based sensors

Measuring range 0 ... 10 k Ω

Line resistance per sensor cable

Max. 50 Ω

Sensor current

Nominal 0.2 mA

Sensor fault detection

- Sensor break detection Yes
- Sensor short-circuit detection Yes, < 15 Ω

Thermocouple

to IEC 584

- Type B
- Type E

- Type J

- Type K

- Type N

- Type R

- Type S

- Type T

to DIN 43710

- Type L

- Type U

to ASTM E988-90

- Type W3

- Type W5

External cold junction compensation

Sensor fault detection

- Sensor break detection Yes
- Sensor short-circuit detection Yes, < 3 mV
- Sensor current in the event of open-circuit monitoring 4 μ A

mV sensor - voltage input

Measuring range

-800 ... +800 mV

Input resistance

10 M Ω

Output

Filter time (programmable)

0 ... 60 s

Update time

< 400 ms

Measuring accuracy

Accuracy is defined as the higher value of general values and basic values.

General values

Type of input

Absolute accuracy

Temperature coefficient

All

 $\leq \pm 0.05$ % of the measured value $\leq \pm 0.002$ % of the measured value/°C

Basic values

Type of input

Basic accuracy

Temperature coefficient

Pt100 and Pt1000

 $\leq \pm 0.1$ °C $\leq \pm 0.002$ °C/°C

Ni100

 $\leq \pm 0.15$ °C $\leq \pm 0.002$ °C/°C

Cu10

 $\leq \pm 1.3$ °C $\leq \pm 0.02$ °C/°C

Resistance-based sensors

 $\leq \pm 0.05$ Ω $\leq \pm 0.002$ Ω /°C

Voltage source

 $\leq \pm 10$ μ V $\leq \pm 0.2$ μ V/°C

Thermocouple, type:

E, J, K, L, N, T, U

 $\leq \pm 0.5$ °C $\leq \pm 0.01$ °C/°C

Thermocouple, type:

B, R, S, W3, W5

 $\leq \pm 1$ °C $\leq \pm 0.025$ °C/°C

Cold junction compensation

 $\leq \pm 0.5$ °C

Reference conditions

Warming-up time

30 s

Signal-to-noise ratio

Min. 60 dB

Calibration condition

20 ... 28 °C (68 ... 82 °F)

Temperature Measurement

Transmitters for field mounting

SITRANS TF fieldbus transmitter

Conditions of use

Ambient conditions

Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F)
Permissible storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	≤ 98 %, with condensation

Insulation resistance

• Test voltage	500 V AC for 60 s
• Continuous operation	50 V AC/75 V DC

Electromagnetic compatibility

NAMUR	NE21
EMC 2014/30/EU Emission and Noise Immunity	EN 61326-1, EN 61326-2-5

Construction

Weight	Approx. 1.5 kg (3.3 lb) without options
Dimensions	See "Dimensional drawings"
Enclosure materials	<ul style="list-style-type: none"> • Die-cast aluminum, low in copper, GD-AlSi 12 or stainless steel • Polyester-based lacquer for GD AlSi 12 enclosure • Stainless steel rating plate
Electrical connection, sensor connection	<ul style="list-style-type: none"> • screw terminals • Cable inlet via M20 x 1.5 or ½ -14 NPT screwed gland • Bus connection with M12 device plug (optional)
Mounting bracket (optional)	Steel, galvanized and chrome-plated or stainless steel
Degree of protection	IP66/67 to EN 60529

Auxiliary power

Power supply	
• Standard, Ex "d", Ex "nA", Ex "nL", XP, NI	10.0 ... 32 V DC
• Ex "ia", Ex "ib"	10.0 ... 30 V DC
• In FISCO/FNICO installations	10.0 ... 17.5 V DC
Power consumption	< 11 mA
Max. increase in power consumption in the event of a fault	< 7 mA

Certificates and approvals

Explosion protection ATEX

EC type test certificate

- Type of protection "intrinsic safety i" (version: 7NG313x-1xxxx)

Conformity statement

- "Operating equipment that is non-ignitable and has limited energy" type of protection (version: 7NG313x-2xxxx)

EC type test certificate

- "Flame-proof enclosure" type of protection (version: 7NG313x-4xxxx)

Explosion protection: FM for USA

- FM approval
- Type of protection XP, DIP, NI and S (version 7NG313x-5xxxx)

Other certificates

Communication

Parameterization interface

- PROFIBUS PA connection

- Protocol
- Protocol
- Address (for delivery)
- Function blocks

- FOUNDATION fieldbus connection

- Protocol
- Protocol
- Functionality
- Version
- Function blocks

Factory setting

for SITRANS TH400 PA

Sensor	Pt100 (IEC)
Type of connection	3-wire circuit
Unit	°C
Failure mode	Last valid value
Filter time	0 s
PA address	126
PROFIBUS Ident No.	Manufacturer-specific
for SITRANS TH400 FF	
Sensor	Pt100 (IEC)
Type of connection	3-wire circuit
Unit	°C
Failure mode	Last valid value
Filter time	0 s
Node address	22

ZELM 11 ATEX 0471 X
 II 2 (1) G Ex ib [ia Ga] IIC T6 Gb
 II 2 G Ex ib IIC T6 Gb
 II 1D Ex ia IIIC T100 °C Da

ZELM 11 ATEX 0471 X
 II 3 G Ex ic IIC T6/T4 Gc
 II 3 G Ex nA IIC T6/T4 Gc
 II 3 G Ex nA [ic] IIC T6/T4 Gc

ZELM 11 ATEX 0472 X
 II 2 G Ex d IIC T6/T5 Gb
 II 2 D Ex tb IIIC T100 °C Db

FM 3017742
 XP / I / 1 / BCD / T5,T6; Type 4X
 DIP / II, III / 1 / EFG / T5,T6; Type 4X
 NI / I / 2 / ABCD / T5,T6; Type 4X
 S / II, III / 2 / FG T5,T6; Type 4X
 EAC Ex(GOST), INMETRO, NEPSI, KOSHA

A&D profile, Version 3.0
 EN 50170 Volume 2
 126
 2 x analog

FF protocol
 FF design specifications
 Basic or LAS
 ITK 4.6
 2 x analog and 1 x PID

Temperature Measurement

Transmitters for field mounting

SITRANS TF fieldbus transmitter

Selection and Ordering data		Article No.	Order code
Temperature transmitter in field enclosure with fieldbus communication and electrical isolation		7 NG 3 1 3 - - - 0	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Integrated transmitter			
SITRANS TH400 with PROFIBUS PA			
<ul style="list-style-type: none"> Without Ex protection 		7 0	
<ul style="list-style-type: none"> With Ex ia (ATEX) 		7 1	
<ul style="list-style-type: none"> With Ex nAL for zone 2 (ATEX) 		7 2	
<ul style="list-style-type: none"> Total device SITRANS TF Ex d (ATEX + IECEx)¹⁾ 		7 4	
<ul style="list-style-type: none"> Total device SITRANS TF according to FM (XP, DIP, NI, S)¹⁾ 		7 5	
SITRANS TH400, with FOUNDATION fieldbus			
<ul style="list-style-type: none"> Without Ex protection 		8 0	
<ul style="list-style-type: none"> With Ex ia (ATEX) 		8 1	
<ul style="list-style-type: none"> With Ex nAL for zone 2 (ATEX) 		8 2	
<ul style="list-style-type: none"> Total device SITRANS TF Ex d (ATEX + IECEx)¹⁾ 		8 4	
<ul style="list-style-type: none"> Total device SITRANS TF according to FM (XP, DIP, NI, S)¹⁾ 		8 5	
Enclosure			
Die-cast aluminium			A
Stainless steel precision casting			E
Connections/cable inlet			
Screwed glands M20x1.5			B
Screwed glands 1/2-14 NPT			C
Mounting bracket and fastening parts			
None			0
Made of steel			1
Stainless steel			2
Further designs			
Please add "-Z" to Article No. and specify Order code(s) and plain text.			
Test report (5 measuring points)			C11
Bus connection			
<ul style="list-style-type: none"> M12 device plug (metal), without mating connector 			M00²⁾
<ul style="list-style-type: none"> M12 device plug (metal), with mating connector 			M01²⁾
Explosion protection			
<ul style="list-style-type: none"> Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG313.-1....) 			E25³⁾
<ul style="list-style-type: none"> Explosion protection Ex d to INMETRO (Brazil) (only with 7NG313.-4....) 			E26³⁾
<ul style="list-style-type: none"> Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG313.-2....) 			E27³⁾
<ul style="list-style-type: none"> Explosion protection Ex i to NEPSI (China) (only with 7NG313.-1....) 			E55³⁾
<ul style="list-style-type: none"> Explosion protection Ex d to NEPSI (China) (only with 7NG313.-4....) 			E56³⁾
<ul style="list-style-type: none"> Explosion protection Ex nA to NEPSI (China) (only with 7NG313.-2....) 			E57³⁾
<ul style="list-style-type: none"> Explosion protection Ex d to KOSHA (Korea) (only with 7NG313.-4....) 			E70³⁾
<ul style="list-style-type: none"> Explosion protection Ex i according to EAC (Russia/Belarus/Kazakhstan) (only for 7NG313.-1....) 			E81³⁾
<ul style="list-style-type: none"> Explosion protection Ex d according to EAC (Russia/Belarus/Kazakhstan) (only for 7NG313.-4....) 			E82³⁾
<ul style="list-style-type: none"> Explosion protection Ex nA according to EAC (Russia/Belarus/Kazakhstan) (only for 7NG313.-2....) 			E83³⁾
Marine approvals			
<ul style="list-style-type: none"> Det Norske Veritas Germanischer Lloyd (DNV GL) 			D01
<ul style="list-style-type: none"> Bureau Veritas (BV) 			D02
<ul style="list-style-type: none"> Lloyd's Register of Shipping (LR) 			D04
<ul style="list-style-type: none"> American Bureau of Shipping (ABS) 			D05
Two coats of lacquer on casing and cover (PU on epoxy)			G10
Transient protection			J01
Cable gland CAPRI 1/2 NPT ADE 4F, nickel-plated brass (CAPRI 848694 and 810634) included			D57
Cable gland 1/2 NPT ADE 1F, cable diam. 6 ... 12 (CAPRI 818694 and 810534) included			D58
Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included			D59
Cable gland 1/2 NPT ADE 1F, cable diam. 4 ... 8.5 (CAPRI 818674 and 810534) included			D60

Temperature Measurement

Transmitters for field mounting

SITRANS TF fieldbus transmitter

Selection and Ordering data	Order code.
Customer-specific programming	
Add "-Z" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... °C, °F	Y01⁴⁾
Meas. point no. (TAG), max. 8characters	Y15⁵⁾
Meas. point descriptor, max. 16 characters	Y23⁵⁾
Meas. point message, max. 32 characters	Y24⁶⁾
Bus address, specify in plain text	Y25⁵⁾
Pt100 (IEC) 2-wire, $R_L = 0 \Omega$	U02⁷⁾
Pt100 (IEC) 3-wire	U03⁷⁾
Pt100 (IEC) 4-wire	U04⁷⁾
Thermocouple type B	U20⁷⁾⁸⁾
Thermocouple type C (W5)	U21⁷⁾⁸⁾
Thermocouple type D (W3)	U22⁷⁾⁸⁾
Thermocouple type E	U23⁷⁾⁸⁾
Thermocouple type J	U24⁷⁾⁸⁾
Thermocouple type K	U25⁷⁾⁸⁾
Thermocouple type L	U26⁷⁾⁸⁾
Thermocouple type N	U27⁷⁾⁸⁾
Thermocouple type R	U28⁷⁾⁸⁾
Thermocouple type S	U29⁷⁾⁸⁾
Thermocouple type T	U30⁷⁾⁸⁾
Thermocouple type U	U31⁷⁾⁸⁾
With TC: CJC: external (Pt100, 3-wire)	U41
With TC: CJC: external with fixed value, specify in plain text	Y50
Special differing customer-specific programming, specify in plain text	Y09⁹⁾

1) Without cable gland

2) Not available for explosion protection Ex d or XP.

3) Option does not include ATEX/IECEx approval, only country-specific approval.

4) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.

5) If only Y15, Y23 or Y25 are ordered and the label only has to be on the tag plate, Y01 does not have to be specified.

6) For this selection, Y01 or Y09 must also be selected.

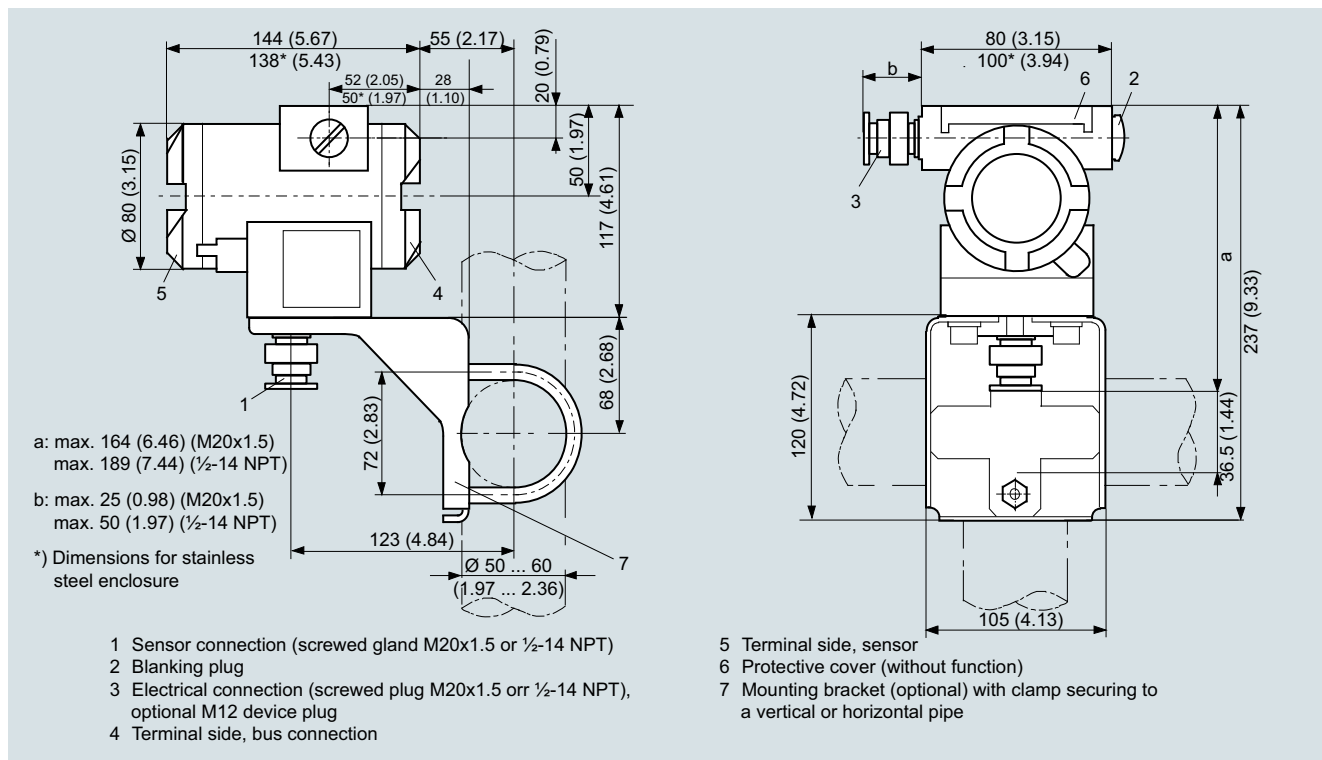
7) For this selection, Y01 must also be selected.

8) Internal cold junction compensation is selected as the default for TC

9) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here

Selection and Ordering data	Article No.
Accessories Further accessories for assembly, connection and transmitter configuration, see page 2/120.	
SIMATIC PDM parameterization software also for SITRANS TF with TH400 PA	see Sec. 8
Mounting bracket and fastening parts Made of steel for 7NG313.-..B.. Made of steel for 7NG313.-..C.. Made of stainless steel for 7NG313.-..B.. Made of stainless steel for 7NG313.-..C..	7MF4997-1AC 7MF4997-1AB 7MF4997-1AJ 7MF4997-1AH
Connection board Ordering example 1: 7NG3137-0AB01-Z Y01+Y15+Y25+U03 Y01: -10 ... +100 °C Y15: TICA1234HEAT Y25: 33 Ordering example 2: 7NG3137-0AC01-Z Y01+Y15+Y25+U25 Y01: -10 ... +100 °C Y15: TICA 1234 ABC 5678 Y25: 35 Factory setting: <ul style="list-style-type: none"> for SITRANS TH400 PA: <ul style="list-style-type: none"> Pt100 (IEC) with 3-wire circuit Unit: °C Failure mode: last valid value Filter time: 0 s PA address: 126 PROFIBUS Ident No.: manufacturer-specific for SITRANS TH400 FF: <ul style="list-style-type: none"> Pt100 (IEC) with 3-wire circuit Unit: °C Failure mode: last valid value Filter time: 0 s Node address: 22 	A5E02391790

Dimensional drawings



SITRANS TF with TH400, dimensions in mm (inches)

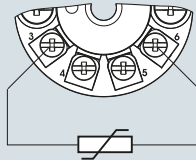
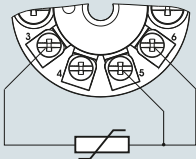
Temperature Measurement

Transmitters for field mounting

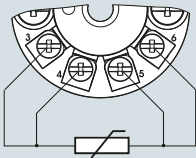
SITRANS TF fieldbus transmitter

Schematics

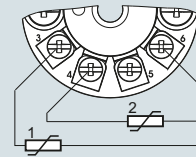
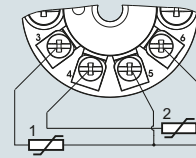
Resistance thermometer

Two-wire system ¹⁾

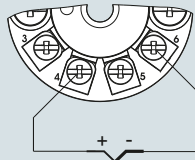
Three-wire system



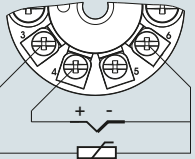
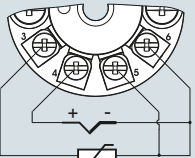
Four-wire system

Mean-value/differential or redundancy generation
2 x two-wire system ¹⁾Mean-value/differential or redundancy generation
1 sensor in two-wire system ¹⁾
1 sensor in three-wire system

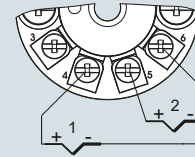
Thermocouple



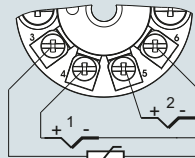
Internal cold junction compensation

Cold junction compensation with external Pt100 in two-wire system ¹⁾

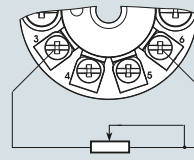
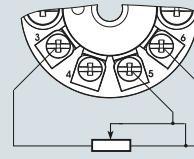
Cold junction compensation with external Pt100 in three-wire system



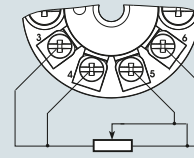
Mean value, differential or redundancy generation with internal cold junction compensation

Mean value, differential or redundancy generation and cold junction compensation with internal Pt100 in two-wire system ¹⁾

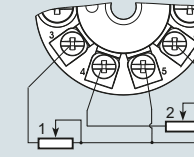
Resistance

Two-wire system ¹⁾

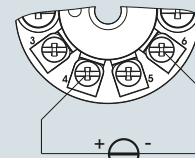
Three-wire system



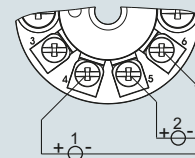
Four-wire system

Mean value, differential or redundancy generation
1 resistor in two-wire system ¹⁾
1 resistor in three-wire system

Voltage measurement



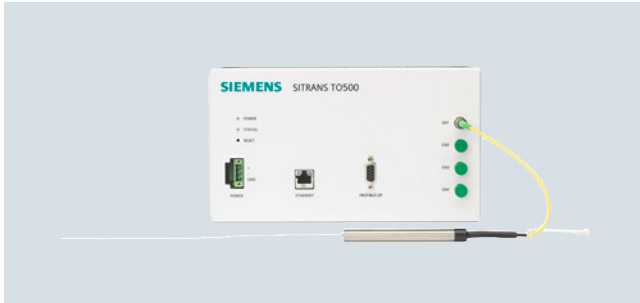
One voltage source



Measurement of mean value, differential and redundancy with 2 voltage sources

¹⁾ Programmable line resistance for the purpose of correction.

Overview



SITRANS TO500 is a multipoint temperature transmitter for measuring temperatures and temperature profiles using fiber optic multipoint temperature measurement lances.

Benefits

- Evaluation of a large number of sensors (fiber Bragg grating (FBG)) in one temperature transmitter
- Low space requirement of the measurement lances
- 4 measuring lance channels per transmitter
- Easy to install
- PROFIBUS DP - Simple integration into control system
- Fast response to temperature changes
- Exact, no recalibration required due to internal reference
- Also suitable for high process temperatures

Application

The SITRANS TO500 is used for evaluating a large number of sensors arranged on a fiber optic multipoint temperature measurement lance.

Up to 4 measurement lances with up to 48 sensors (fiber Bragg grating (FBG)) each can be processed simultaneously by a SITRANS TO500.

Accurate and fast determination of temperature profiles enables process optimization in terms of service life, quality and output.

Locations of excessive temperature rise are quickly and accurately detected, thereby preventing damage to the process, equipment and environment.

Wherever temperature profiles must be determined and installation space is limited, the SITRANS TO500 with fiber-optic temperature measurement is the right choice.

Design

The SITRANS TO500 multipoint temperature transmitter is located in the control cabinet in a compact aluminum enclosure for mounting onto DIN rails.

The connectors are easy to access on the front:

- 4 x connector for measurement lances
- 1 x connector for power supply
- 1 x connector PROFIBUS DP
- 1 x connector Ethernet

The status displays are also located on the front.

Mode of operation

In the SITRANS TO500 multipoint temperature transmitter, light is generated in the wavelength of 1500 to 1600 nm and output to the measurement lance by means of a continuously tunable laser light. Fiber Bragg gratings (FBG) are mounted at defined measurement points on the measurement lances. Each FBG reflects light of a defined wavelength. The wavelength reflected by the FBGs varies as a function of temperature. The reflection at the FBG is thus a measure of the temperature at the respective measurement point. Up to 48 FBGs gratings per channel can be evaluated, depending on the temperature range.

A gas cell with fixed absorption line serves as a reference in the SITRANS TO500 and the wavelength determination is continuously adjusted by it.

Function

The SITRANS TO500 has 4 channels which are evaluated simultaneously. The wavelength reflected at each sensor in the multipoint temperature measurement lance depends on the temperature, and this wavelength is output in the multipoint temperature transmitter. The temperature can be determined and displayed accurately at up to 48 sensors per channel. The positions of the sensors can be specified by the customer. This leads to a flexible and application-specific solution for the customer.

The measured temperatures are transferred to the control system via PROFIBUS DP. The parameters of the SITRANS TO500 are set via the integrated Ethernet interface.

Temperature Measurement

Multipoint temperature transmitter

SITRANS TO500

Technical specifications

Input	
Channels	4
Measured variable	Temperature
Input type	Max. 48 sensors (FBGs) per channel
Characteristics	Temperature-linear
Resolution	0.1 K
Measuring accuracy	< 0.5 K
Repeatability	< 0.5 K
Measuring cycle	< 1 s
Measuring range	-180 ... +800 °C (-292 ... +1472 °F) depending on the measurement lance
Unit	°C
Power supply	24 V DC + 20 %
Power consumption	Max. 15 W
Protection	Against reverse polarity
Measuring velocity	
• Measurement rate	1 Hz independent of the number of FBGs
Output	
Output signal	PROFIBUS DP
Optical power	≤ 1 mW per channel
Laser protection class	Class 1
Rated conditions	
Ambient conditions	
Ambient temperature	0 ... 50 °C (32 ... 122 °F)
Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	< 80%, non condensing at 50 °C (122 °F)
Electromagnetic compatibility	According to EN 61326 and NAMUR NE21
Degree of protection to EN 60529	
Enclosure	IP20
Design	
Weight	2.4 kg (5.3 lb)
Dimensions	See "Dimensional drawings"
DIN rail adapter	Rear-mounted
Material	Aluminum
Displays and control elements	
LEDs	"Power-on" (continuous light) "Status" (flashing during startup; otherwise continuous light)
Pushbutton	"Reset" (system restart or address reset)

Selection and Ordering data

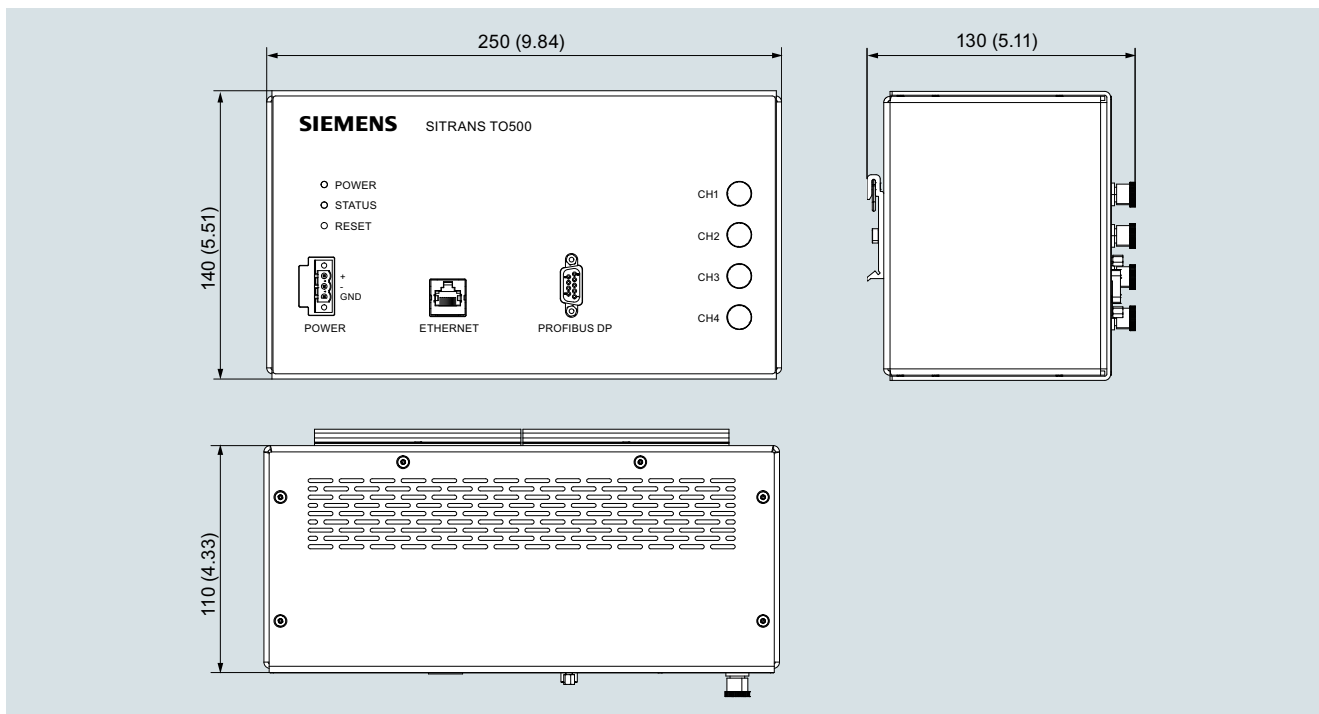
Article-No.

SITRANS TO500 multipoint temperature transmitter

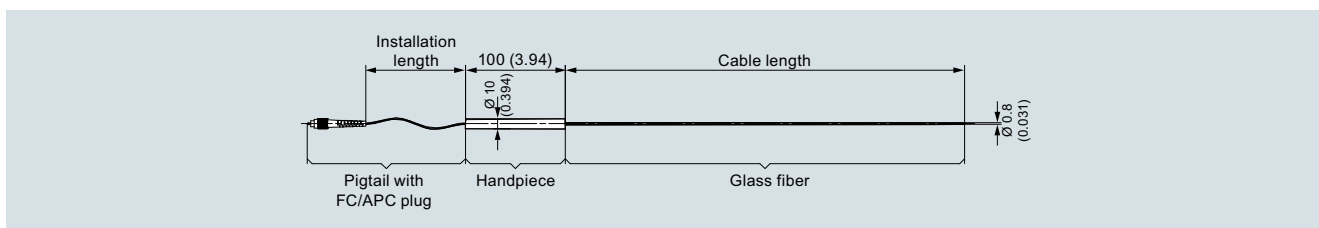
7NG9551-4AA00-0AA0

Communication: PROFIBUS DP
Channels: 4
Power supply: 24 V DC
Optical connection: FC/APC plug
Enclosure: Aluminum, IP20

Dimensional drawings

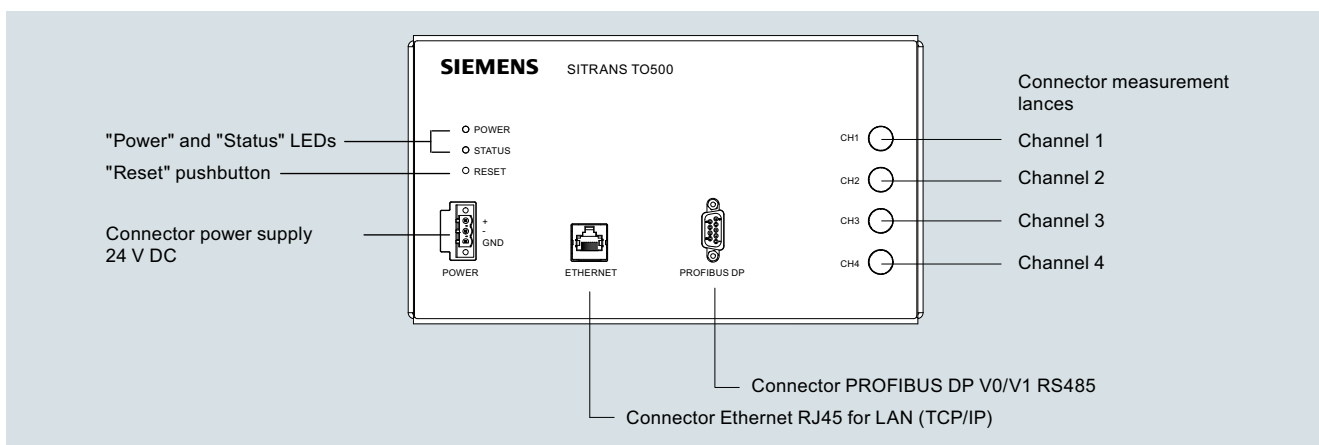


SITRANS TO500, front, rear and side view; dimensions in mm (inch)



Measuring lance with FC/APC connector, pigtail and handpiece; dimensions in mm (inch)

Schematics



SITRANS TO500, connector assignment

Temperature Measurement

Accessories

Further accessories for assembly, connection and transmitter configuration

Transmitter configuration for SITRANS TH / TR / TF and SITRANS TS

Selection and Ordering data	Article No.
Modem for SITRANS TH100, TH200, TR200 and TF, with TH200 including SITPROM T parameter assignment software; 4 ... 20 mA	7NG3092-8KN
• with USB interface	
HART modem for all HART devices including SITRANS TH300, TH 320, TH 420, TR 300, TR 320, TR 420, TF in HART	7MF4997-1DB
• with USB interface	siehe Kap. 8
SIMATIC PDM parameter assignment software for SITRANS TH300, TR300, TH400, TF in HART / PROFIBUS PA / FOUNDATION Fieldbus	
IE/PB LINK PN IO	siehe Kap. 7

Cable glands and adapters for SITRANS TF and SITRANS TS

Selection and Ordering data	Article No.
M20 x 1.5 nickel-plated brass; with Ex-d approval	7MF4997-2FR
½-NPT nickel-plated brass; with Ex-d approval	7MF4997-2FU
CAPRI screw connection, M20 x 1.5 nickel-plated brass; with Ex-d approval	7MF4997-2LA
CAPRI screw connection, M20 x 1.5 stainless steel; with Ex-d approval	7MF4997-2LB
CAPRI screw connection ½-14 NPT nickel-plated brass; with Ex-d approval	7MF4997-2LC
CAPRI screw connection ½-14 NPT stainless steel; with Ex-d approval	7MF4997-2LD
Thread adapter M20x1.5 (male thread) to ½-14 NPT (female thread)	7MP1990-0BA00
Thread adapter M20x1.5 (male thread) to G½ (female thread)	7MP1990-0BB00

Lightning protection for SITRANS TF (SITRANS TS on request)

Selection and Ordering data	Article No.
Transient protector M20 x 1.5 (lightning protection)	7MF4997-2DU
Transient protector ½-14 NPT (lightning protection)	7MF4997-2DV

Connectors for SITRANS TF and SITRANS TS

Selection and Ordering data	Article No.
Han 7D device plug made of plastic	7MF4997-2FB
Han 7D device plug made of metal	7MF4997-2FC
M12 socket angled for 4 ... 6 mm cable diameter, -25 ... +85 °C (-13 ... 185 °F)	3RK1902-4CA00-4AA0

Indicator for SITRANS TS500

Selection and Ordering data	Article No.
Digital indicator loop-powered HW05 for SITRANS TS500	A5E33119275

Connection and mounting accessories for SITRANS TH

Selection and Ordering data	Article No.
Mounting rail adapter for head-mounted transmitters (delivery quantity: 5 units)	7NG3092-8KA
Connecting cable 4-wire, 150 mm, for the sensor connection for head transmitters in the high hinged lid (set of 5)	7NG3092-8KC

Connection and mounting accessories for field transmitter SITRANS TF

Selection and Ordering data	Article No.
Mounting bracket and fastening parts	7MF4997-1AC
• made of steel for 7NG313...B.. and 7MP1110	
• made of steel for 7NG313...C..	7MF4997-1AB
• made of stainless steel 304 for 7NG313...B.. and 7MP1110	7MF4997-1AJ
• made of stainless steel 304 for 7NG313...C..	7MF4997-1AH
• made of stainless steel 316L for 7NG313...B..	7MF4997-1AQ
• made of stainless steel 316L for 7NG313...C..	7MF4997-1AP
Digital indicator for SITRANS TF ¹⁾	7MF4997-1BS
Connection board for SITRANS TF	A5E02391790
Lithium battery for SITRANS TF280/P280	7MP1990-0AA00
Cover, die-cast aluminium, without inspection window	7MF4997-1BB
Cover, die-cast aluminium, with inspection window	7MF4997-1BE

¹⁾ It is not possible to upgrade devices with Ex protection.

Measurement inserts for SITRANS TS500

Measurement inserts: see SITRANS TSinsert page 2/137.

Overview

Temperature sensors of the SITRANS TS500 product family are used to measure temperatures in industrial equipment.

Benefits

The modular design makes it possible to customize the temperature sensor for most applications, while still being able to use many standardized individual components.

SITRANS TS500 Temperature sensors as a modular system

Due to their modular design, temperature sensors of the SITRANS TS500 series are well suited to a large number of applications.

The replaceable measuring insert makes it possible to conduct maintenance work even during ongoing operations. These devices are used particularly frequently in vessels and pipelines of the following industries:

- Power plants
- Chemical industry
- Petrochemical industry
- General process engineering
- Water, waste water

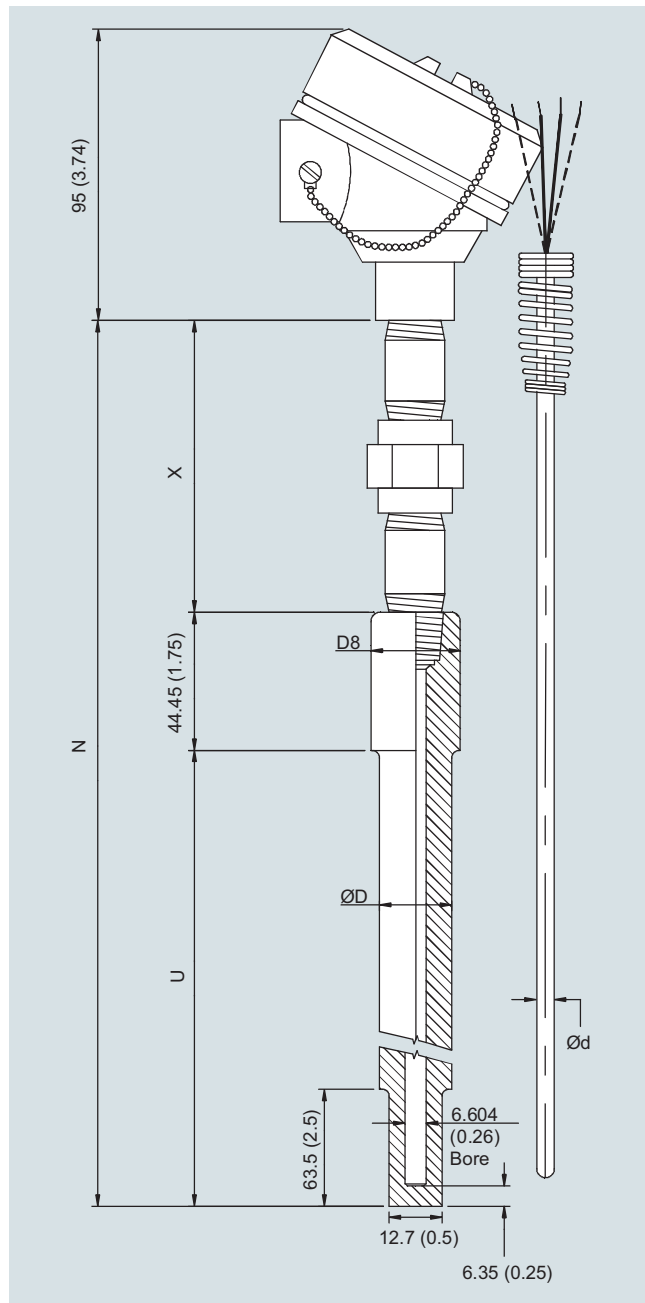
Temperature Measurement

SITRANS TS500

Technical description

Design

SITRANS TS500 7MC65xx



SITRANS TS500, type SWR, socket reduced well, dimensions in mm (inch)

The temperature sensors of the SITRANS TS500 series are available in four different designs:

- General Purpose without Thermowell
- Threaded Thermowell
- Flanged Thermowell
- Socket Thermowell

Function

A complete measuring point consists of a measuring insert which contains the basic sensors, the protective fitting and an optional transmitter.

The basic sensors are:

- Resistance thermometers:
Temperature measurement is based on the temperature dependency of the installed measuring resistor.
- Thermocouples:
Temperature measurement is based on the Seebeck effect. A thermocouple which subjected to a temperature drop produces thermoelectric voltage that can be measured.

Transmitters:

The optional Siemens transmitters assume the following functions:

- Optimum measurement processing
- Strengthening of weak sensor signals directly on site
- Transmits standardized signals
- Protects against electromagnetic interferences
- Support enhanced diagnosis options

The resistance thermometer is intended for installation in containers and pipelines.

- Modular design consisting of thermowell, measuring insert, connection head and optional transmitter.
- Transmitter can be integrated (4 to 20 mA, PROFIBUS PA or FOUNDATION Fieldbus)

Configuration

Components: Process connections

Flanges

The different properties of the flanges are as follows:

- Standard series EN 1092, ASME 16.5,...
- Nominal pressure
- Nominal diameter
- Sealing face

This information is stamped into the flange, as well as the material code and batch number for "3.1 Material".

Components: Thermowell

Thermowells fulfill two basic functions:

- They protect the measuring insert from aggressive media
- They make it possible to replace units during ongoing operations

This catalog is limited to the standard versions. Special versions are available on request.

- Barstock thermowells

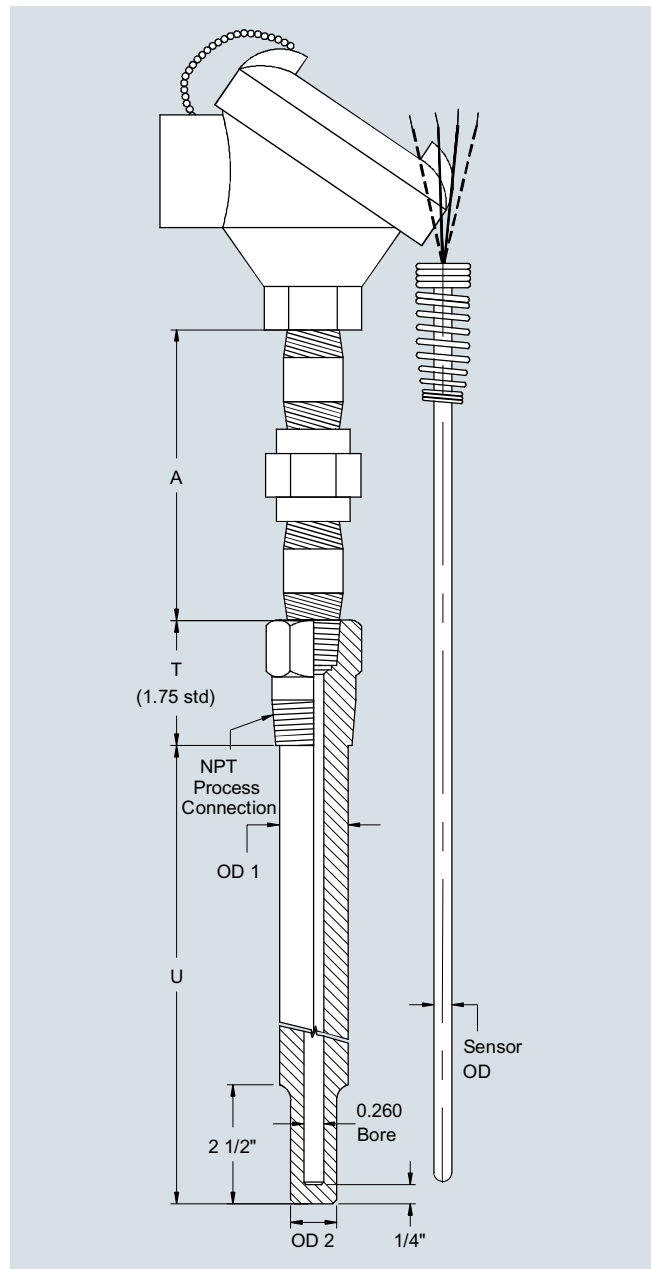
Where process loads are too high, or where thermowells with welded seams are not allowed, deep hole drilled barstock thermowells are used.

Components: Extension (neck tube)

The extension is the section from the lower edge of the connection head to the fixed point of the process connection or thermowell. There is a variety of terms for this components, e.g. neck tube. For this reason the term extension has been selected as a standardized term for the different designs. Function is the deciding factor:

- Thermal decoupling of connection head from process temperature
- Installation of connection head over existing insulation
- Simple standardization of measuring inserts: In general, the length of the extension may be freely selected. However, when using standardized insertion lengths ensures that measuring inserts are quickly available can be used.
- The extension takes the spring load of the sensor.
- Depending on the design, the extension can also be used to achieve an alignment of the connection head.

Step down threaded well assemblies



Process NPT	OD1	OD2
1/2"	0.68"	5/8"
3/4"	7/8"	5/8"
1"	1 1/16"	5/8"
1 1/4"	1 1/8"	3/4"
1 1/2"	1 1/8"	3/4"

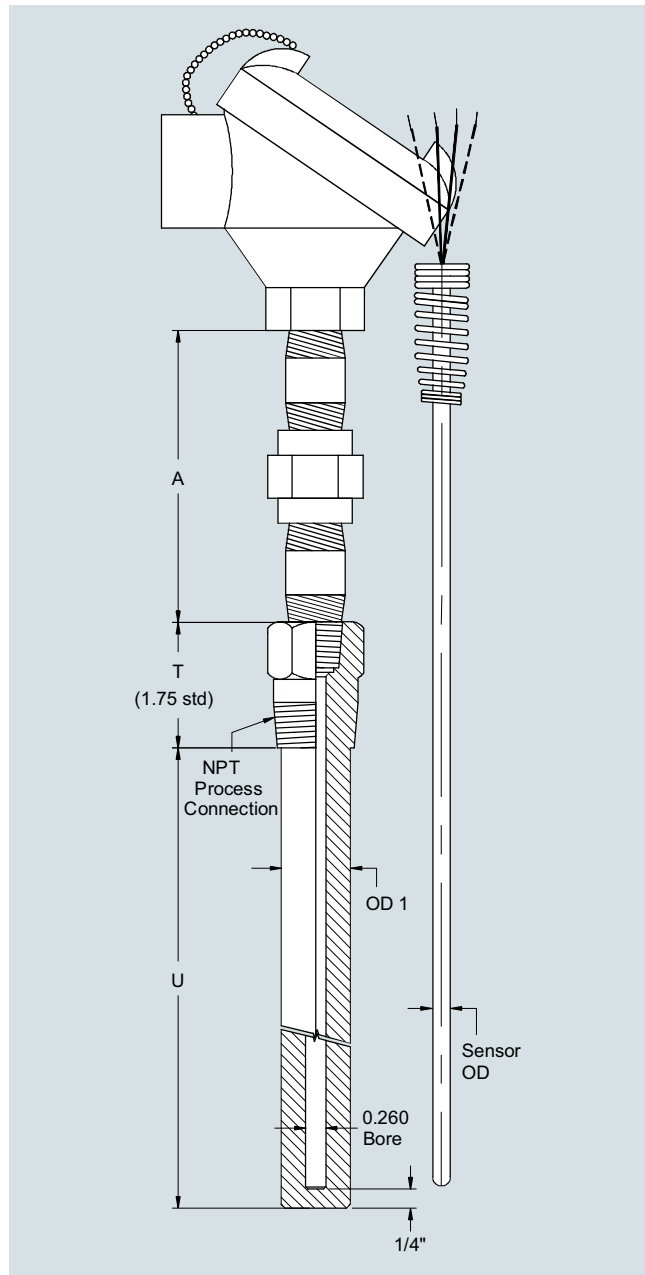
Dimensions in inch

Temperature Measurement

SITRANS TS500

Technical description

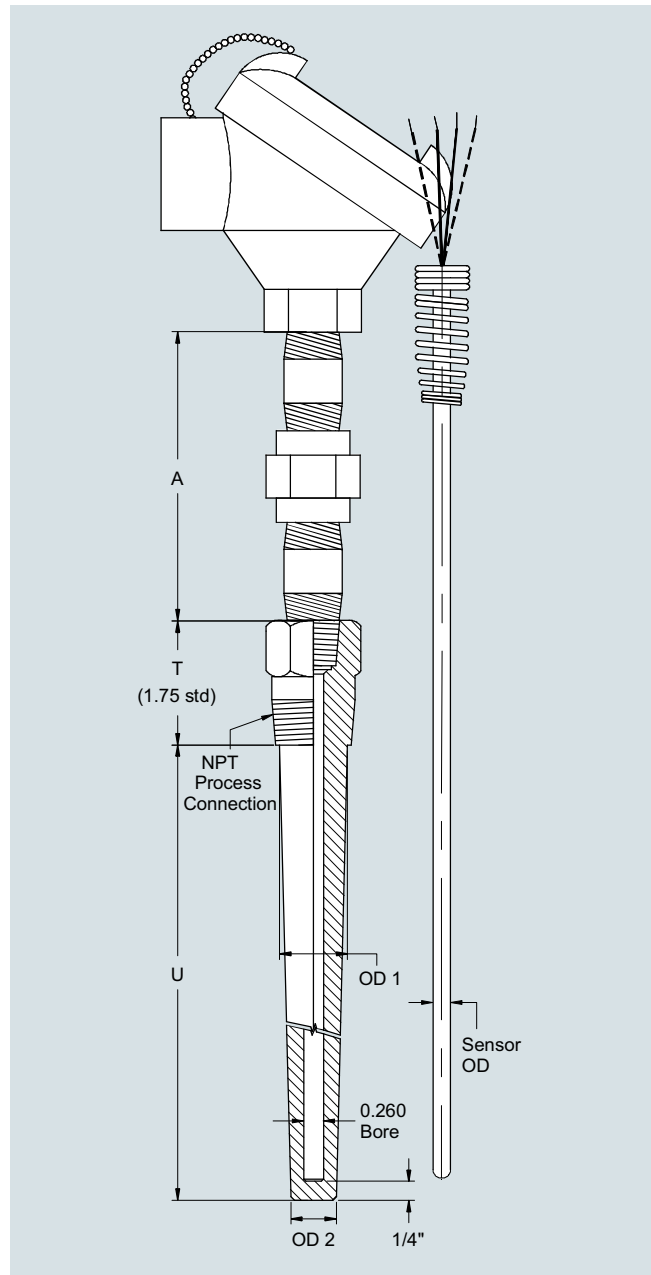
Straight threaded well assemblies



Process NPT	OD1
1/2"	0.68"
3/4"	3/4"
1"	7/8"
1 1/4"	1 1/8"
1 1/2"	1 1/8"

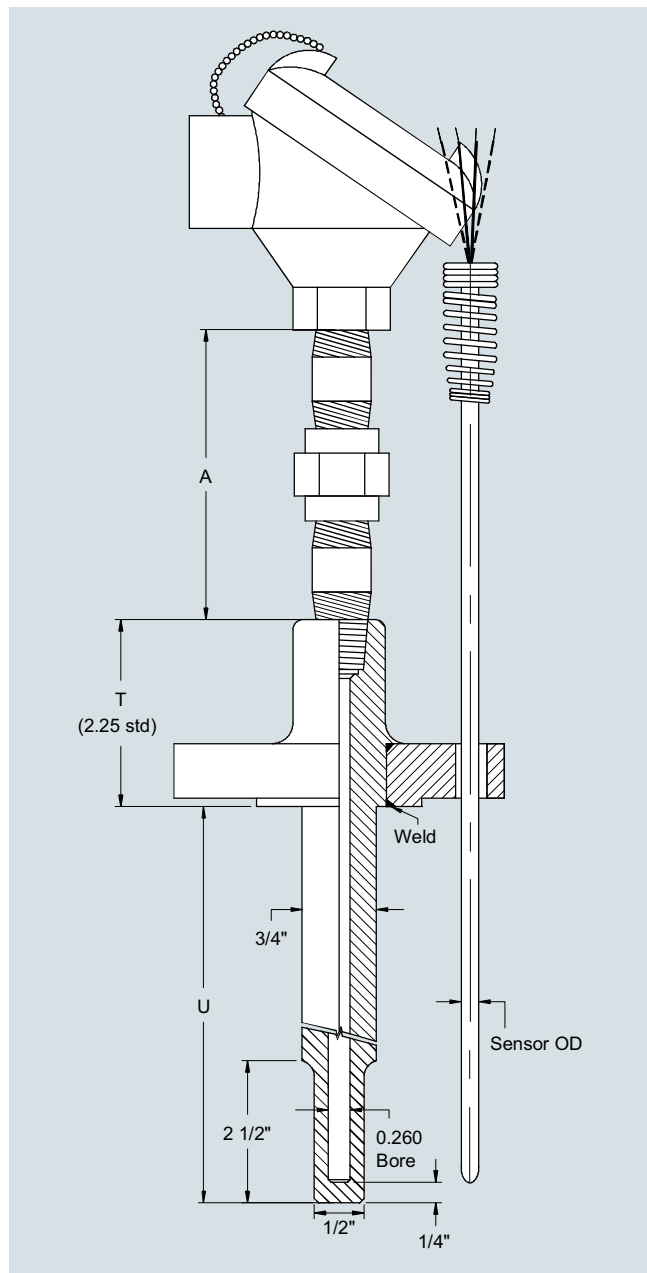
Dimensions in inch

Tapered threaded well assemblies

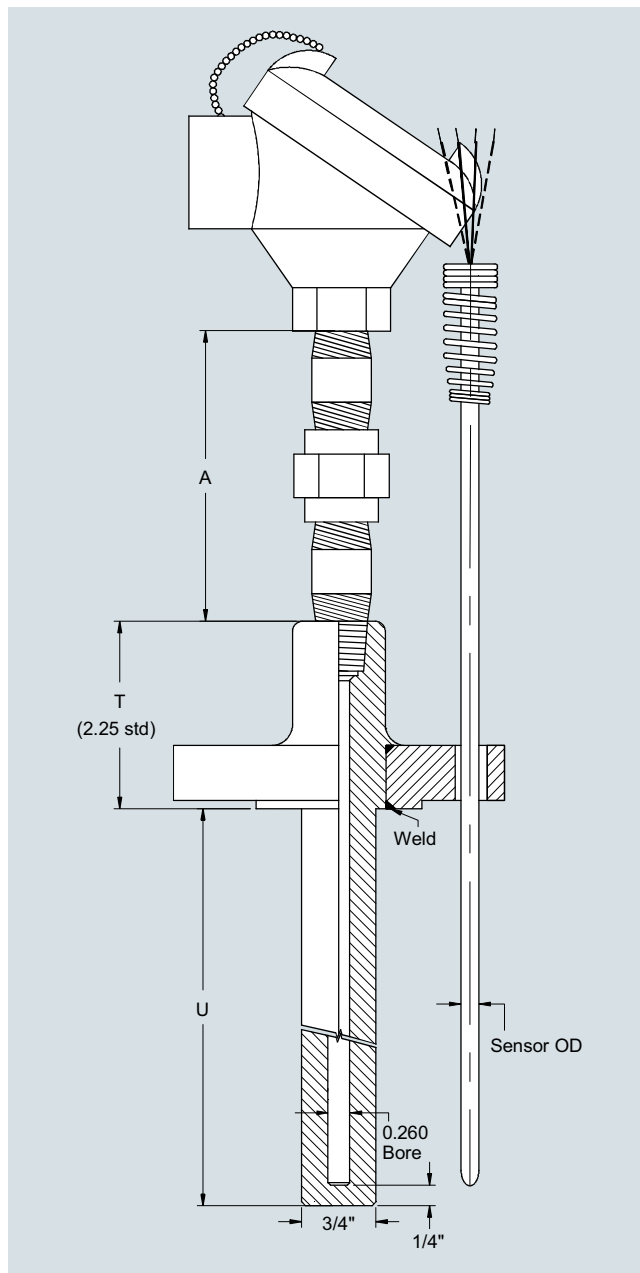


Process NPT	OD1	OD2
1/2"	0.68"	5/8"
3/4"	7/8"	5/8"
1"	1 1/16"	5/8"
1 1/4"	1 1/8"	3/4"
1 1/2"	1 1/8"	3/4"

Dimensions in inch

Step down flanged well assemblies

Dimensions in inch

Straight flanged well assemblies

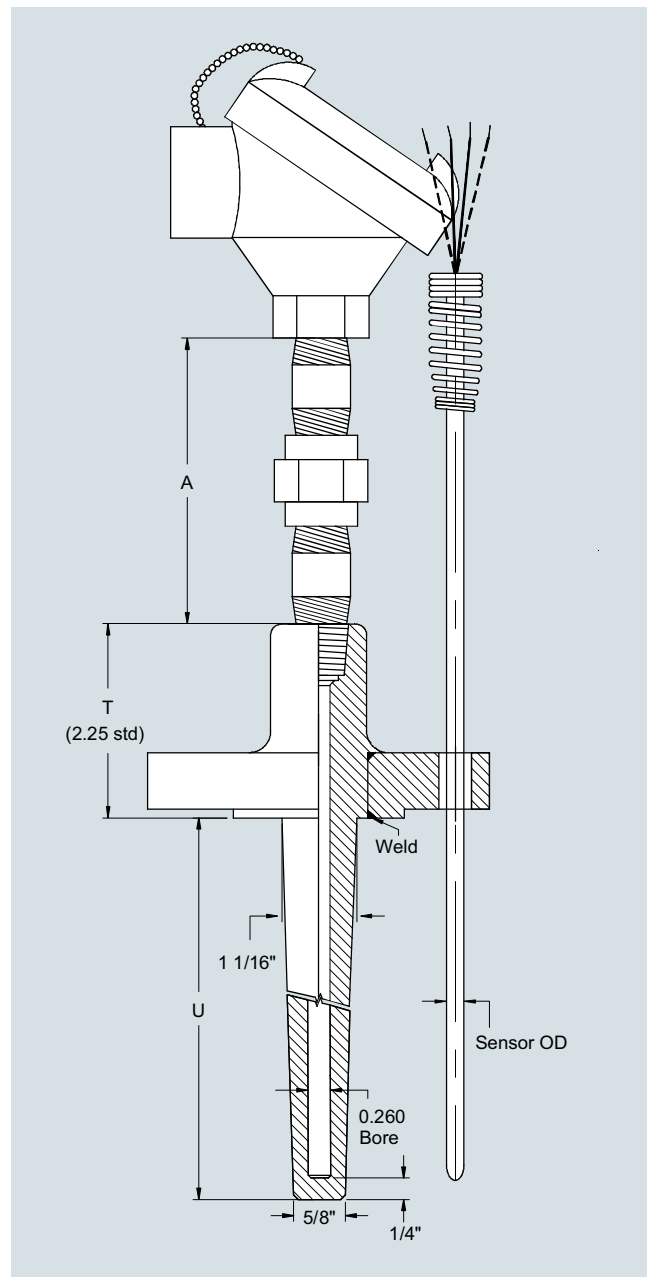
Dimensions in inch

Temperature Measurement

SITRANS TS500

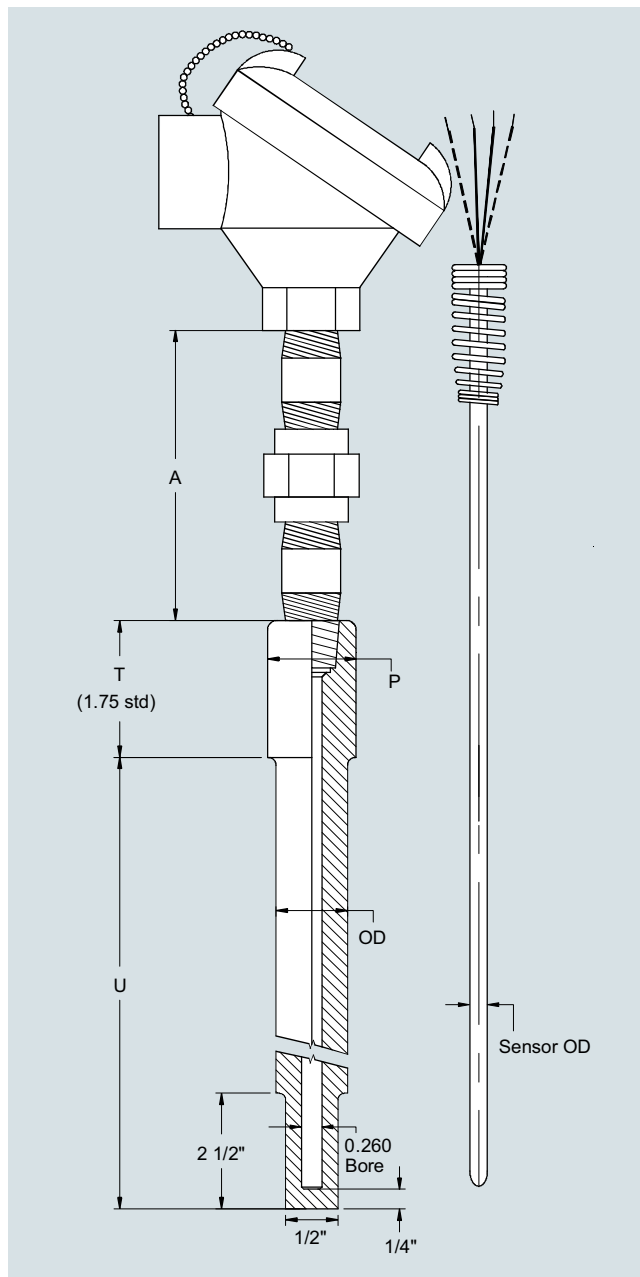
Technical description

Tapered flanged well assemblies

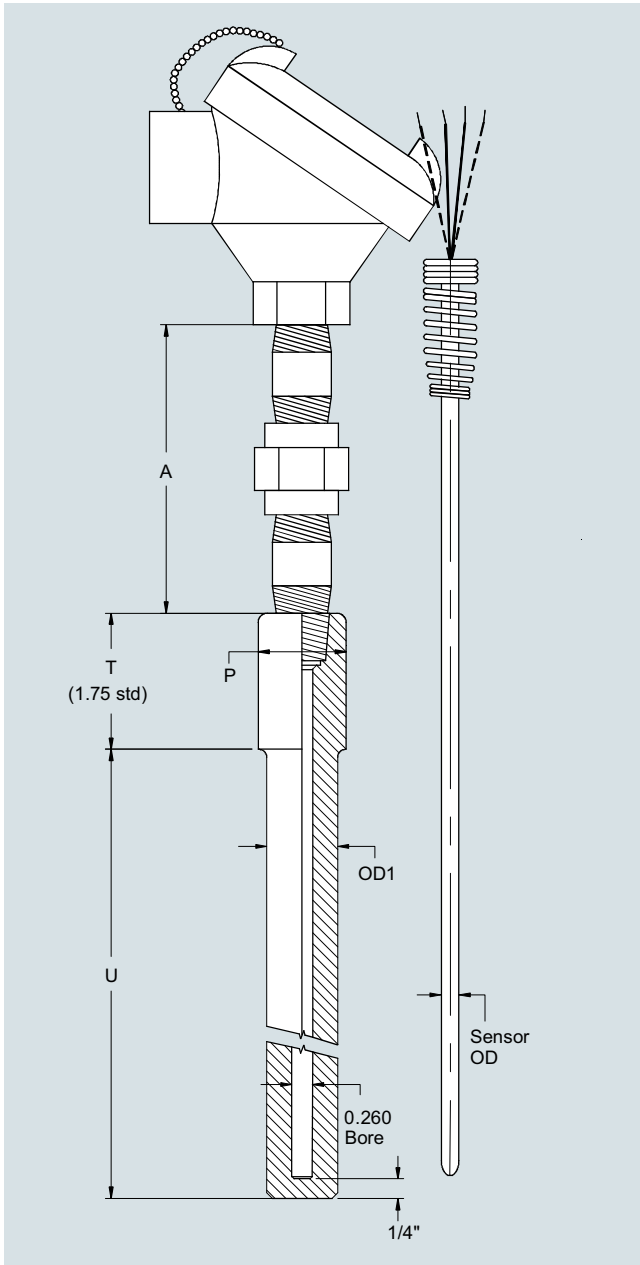


Dimensions in inch

Step down socket well assemblies

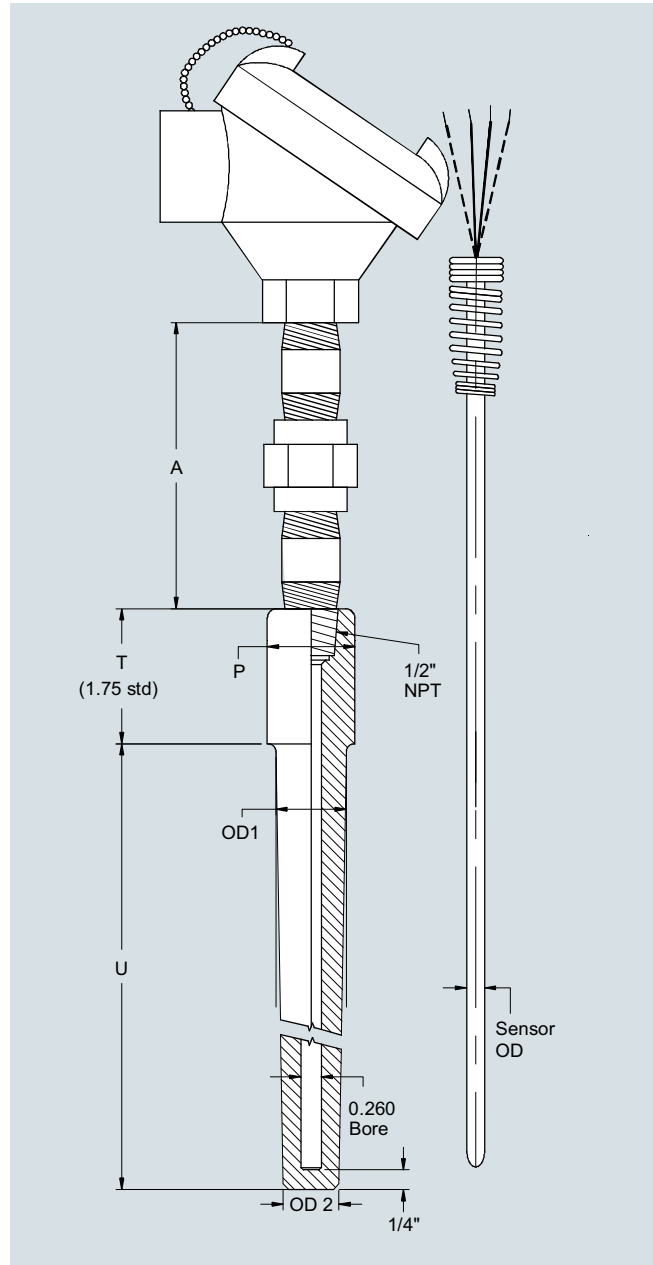


Dimensions in inch

Straight socket well assemblies

Process NPT	OD1
1/2"	0.68"
3/4"	3/4"
1"	7/8"
1 1/4"	1 1/8"
1 1/2"	1 1/8"

Dimensions in inch

Tapered socket well assemblies

Process NPT	OD1	OD2
1/2"	0.68"	5/8"
3/4"	7/8"	5/8"
1"	1 1/16"	5/8"
1 1/4"	1 1/8"	3/4"
1 1/2"	1 1/8"	3/4"

Dimensions in inch

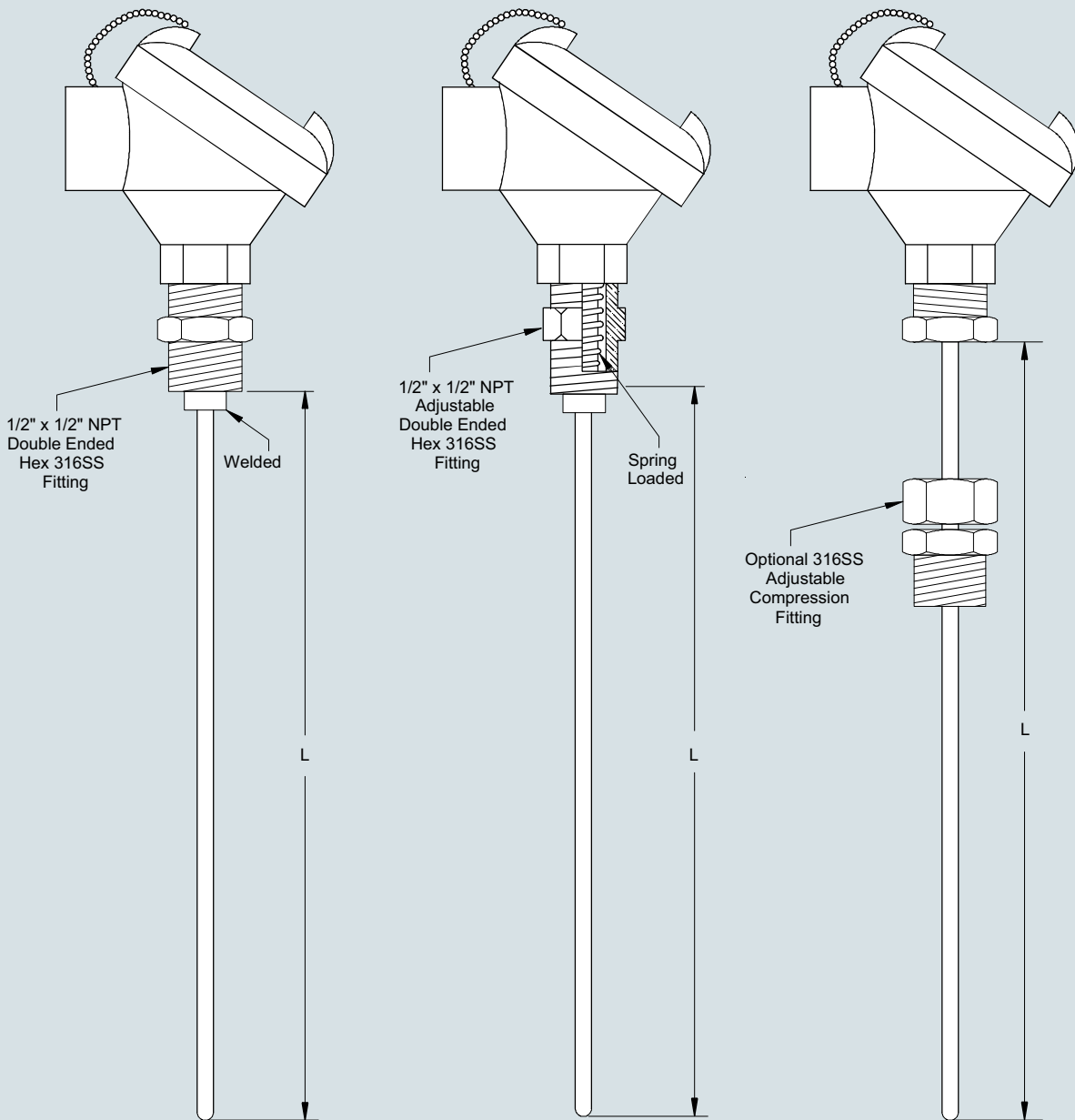
Temperature Measurement

SITRANS TS500

Technical description

General purpose sensors

2



Dimensions in inch

Components: Connection head

Connection head

The connection head protects the wiring connections. The connection head features sufficient room for mounting a terminal block or transmitter.

Different connection heads are used depending on the application and preference.

Components: Measuring insert

Measuring inserts feature a large spring range. These measuring inserts are ideal for use with NPT threads with the typical loose tolerances. In this configuration, the extension function is partially or fully integrated (nipple-union-nipple). Moreover it is also possible to directly attach field devices, e.g. SITRANS TF.

Components: Transmitters

SITRANS TH head transmitters process the weak non-linear sensor signals and transmit a stable and temperature-linear standard signal, thereby minimizing sensor signal disruptions.

The transmitters constantly monitor the temperature sensors and transmit diagnostic data to superordinate systems.

Because of the low energy feed of the SITRANS TH head transmitters, self-heating of the temperature sensors can be maintained at minimal levels.

The electrical isolation and integrated cold junction ensure that temperature sensors with thermocouples provide reliable measurements at a low cost.

SITRANS TH product family

For detailed technical data on the SITRANS TH transmitters, please refer to the catalog FI 01.

- TH100 - the basic device
 - Output 4 to 20mA
 - for Pt100
 - can be configured using simple software
- TH200 - the universal device
 - Output 4 to 20mA
 - Resistance thermometer, thermocouples
 - can be configured using simple software
- TH300 - HART universal
 - Output 4 to 20 mA/HART
 - Resistance thermometer, thermocouples
 - HART conforming
 - Diagnostic functions
- TH400 - Fieldbus PA and FF
 - Output PROFIBUS PA or FOUNDATION Fieldbus
 - Resistance thermometer, thermocouples
 - Diagnostic functions; for detailed technical description of the SITRANS TH transmitter please refer to the related chapter of this catalog.

Measuring technology: Sensor elements

The diverse application spectrum for industrial temperature measuring technology requires different sensor technologies.

Resistance thermometer

Sensor elements made of other basic materials with different nominal resistances or different underlying standards are available on request. Resistance thermometers can be classified as follows:

- Basic design:
The sensor element is built with thin layer technology. The resistance material is applied in the form of a thin layer on a ceramic carrier material.
- Versions featuring increased vibration-resistance:
In addition to the basic design, the vibration resistance is improved through extra measures.
- Versions with expanded measuring range:
Elements in wire-wound design. The wire winding is embedded in a ceramic body.

Thermocouples

Other thermocouples based on other thermo couples or underlying standards are available upon request.

The most common base metal thermocouples include:

- Type K (NiCr-Ni) more stable than type J, but drifts in upper range.
- Type J (Fe-CuNi) narrow application band

Measuring technology: Measuring range

The measuring range describes the temperature limits within which the thermometer can be used in a way that is meaningful for measurement purposes. Depending on the loads present, the thermowell materials and the desired accuracy levels, the actual application range for the thermometer may be smaller.

Resistance thermometer [°C (°F)]

Basic version and increased vibration resistance	-50 ... +400 (-58 ... +752)
Expanded measuring range	-196 ... +600 (-320.8 ... +1112)

Thermocouple [°C (°F)]

Type K	-40 ... +1000 (-40 ... +1132)
Type J	-40 ... +750 (-40 ... +1382)

Temperature Measurement

SITRANS TS500

Technical description

Measuring technology: Measuring accuracy

Resistance thermometer

The tolerance classes of the resistance thermometers correspond with IEC 751/EN 60751:

Tolerance	Δt
Basic accuracy, Class B	$\pm(0.30\text{ °C} + 0.0050 t [\text{°C}])$ $\pm(0.54\text{ °F} + 0.0050 t [\text{°F}-32])$
Increased accuracy, Class A	$\pm(0.15\text{ °C} + 0.0020 t [\text{°C}])$ $(\pm(0.27\text{ °F} + 0.0020 t [\text{°F}-32]))$
High degree of accuracy, Class A+ (1/3 B)	$\pm(0.10\text{ °C} + 0.0017 t [\text{°C}])$ $(\pm(0.18\text{ °F} + 0.0017 t [\text{°F}-32]))$

The following tables provide an overview of the scope of these tolerances. If you exceed the specified limits with a resistance thermometer, the values of the next lower accuracy class apply:

Resistance thermometer Basic version [°C (°F)]	
Tolerance	Range
Basic accuracy, Class B	-50 ... +400 (-58 ... +752)
Increased accuracy, Class A	-30 ... +300 (-22 ... +572)
High degree of accuracy, Class A+ (1/3 B)	0 ... 150 (32 ... 302)

Resistance thermometer Increased vibration-resistance [°C (°F)]	
Tolerance	Range
Basic accuracy, Class B	-50 ... +400 (-58 ... +752)
Increased accuracy, Class A	-30 ... +300 (-22 ... +572)
High degree of accuracy, Class A+ (1/3 B)	0 ... 150 (32 ... 302)

Resistance thermometer Expanded measuring range [°C (°F)]	
Tolerance	Range
Basic accuracy, Class B	-196 ... +600 (-321 ... +1112)
Increased accuracy, Class A	-100 ... +450 (-148 ... +842)

Thermocouples

The tolerance classes of the thermocouples correspond with IEC 584/EN 60584:

Catalog versions

Type	Basic accuracy, Class 2	Increased accuracy, Class 1
K	-40 °C ... +333 °C $\pm 2.5\text{ °C}$ (-40 °F ... +631 °F $\pm 4.5\text{ °F}$) 333 °C ... 1000 °C $\pm 0.0075x t [\text{°C}]$ (631 °F ... 1832 °F $\pm 0.0075x t [\text{°F}-32]$)	-40 °C ... +375 °C $\pm 1.5\text{ °C}$ (-40 °F ... +707 °F $\pm 2.7\text{ °F}$) 375 °C ... 1000 °C $\pm 0.004x t [\text{°C}]$ (707 °F ... 1832 °F $\pm 0.004x t [\text{°F}-32]$)
J	-40 °C ... +333 °C $\pm 2.5\text{ °C}$ (-40 °F ... +631 °F $\pm 4.5\text{ °F}$) 333 °C ... 750 °C $\pm 0.0075x t [\text{°C}]$ (631 °F ... 1382 °F $\pm 0.0075x t [\text{°F}-32]$)	-40 °C ... +375 °C $\pm 1.5\text{ °C}$ (-40 °F ... +707 °F $\pm 2.7\text{ °F}$) 375 °C ... 750 °C $\pm 0.004x t [\text{°C}]$ (707 °F ... 1382 °F $\pm 0.004x t [\text{°F}-32]$)

Other thermocouples, ignoble

Type	Basic accuracy, Class 2	Increased accuracy, Class 1
T	-40 °C ... 133 °C $\pm 1\text{ °C}$ (-40 °F ... +271 °F $\pm 1.8\text{ °F}$) 133 °C ... 350 °C $\pm 0.0075x t [\text{°C}]$ (271 °F ... 662 °F $\pm 0.0075x t [\text{°F}-32]$)	-40 °C ... +125 °C $\pm 0.5\text{ °C}$ (-40 °F ... +257 °F $\pm 0.9\text{ °F}$) 125 °C ... 350 °C $\pm 0.004x t [\text{°C}]$ (257 °F ... 662 °F $\pm 0.004x t [\text{°F}-32]$)
E	-40 °C ... +333 °C $\pm 2.5\text{ °C}$ (-40 °F ... +631 °F $\pm 4.5\text{ °F}$) 333 °C ... 900 °C $\pm 0.0075x t [\text{°C}]$ (631 °F ... 1652 °F $\pm 0.0075x t [\text{°F}-32]$)	-40 °C ... +375 °C $\pm 1.5\text{ °C}$ (-40 °F ... +707 °F $\pm 2.7\text{ °F}$) 375 °C ... 800 °C $\pm 0.004x t [\text{°C}]$ (707 °F ... 1472 °F $\pm 0.004x t [\text{°F}-32]$)

Other thermocouples, noble

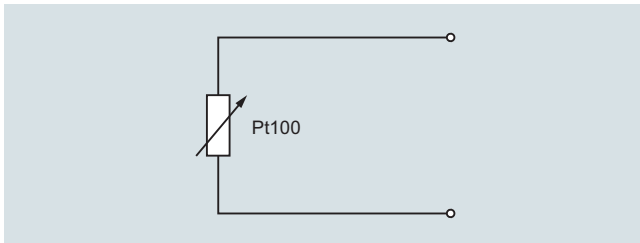
Type	Basic accuracy, Class 2	Increased accuracy, Class 1
R and S	0 °C ... 600 °C $\pm 1.5\text{ °C}$ (32 °F ... 1112 °F $\pm 2.7\text{ °F}$) 600 °C ... 1600 °C $\pm 0.0025\text{ x } t $ (1112 °F ... 2912 °F $\pm 0.0025\text{ x } t $)	0 °C ... 1100 °C $\pm 1\text{ °C}$ (32 °F ... 2012 °F $\pm 1.8\text{ °F}$) 1100 °C ... 1600 °C $\pm [1 + 0.003(t - 1100)]\text{ °C}$ (2112 °F ... 2912 °F $\pm [1.8 + 0.003(t - 2112)]\text{ °F}$)
B	600 °C ... 1700 °C $\pm 0.0025\text{ x } t $ (1112 °F ... 3092 °F $\pm 0.0025\text{ x } t $)	

Measuring technology: Connection types

In the case of resistance thermometers, the type of sensor connection directly affects the level of accuracy:

Two-wire system

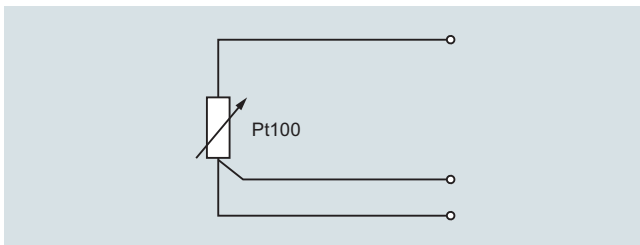
The resistance of sensor lines are included in the measurement result as an error. Adjustments are recommended in this case.



Pt100 Two-wire system

Three-wire system

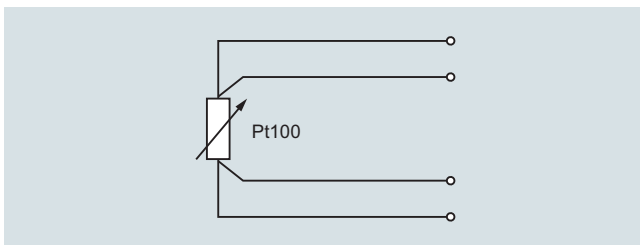
Line resistance is not included in the measurement result. Requirements: all terminal and line resistances (corrosion) are at the same level, and terminals are at the same temperature level.



Pt100 Three-wire system

Four-wire system

Line resistance is not included in the measurement result. This type of connection is the most secure and most accurate.



Pt100 Four-wire system

Siemens measuring inserts can be used to implement all types of connections for 1 x Pt100 devices. In the case of 2 x Pt100 versions, two- and three-wire systems are also possible. For measurement-related reasons, we always recommend a 1 x four-wire or 2 x 3-wire connection.

Temperature Measurement

SITRANS TS500

Technical description

Thermowell calculation

Properly applied load diagrams will provide a sufficient degree of safety for the most common thermowell configurations.

However, there are cases in which operating conditions deviate too greatly from standard parameters. In this case, a customized thermowell calculation may be required.

Another reason for doing this calculation is the fact that flowing media can create turbulence at the tip of the thermowell under certain conditions. The thermowell will then vibrate and may even be destroyed if not configured correctly. This is the most frequent cause of thermowell failure.

SIEMENS offers the two recognized methods for calculating the thermowell:

- DIN/Dittrich method
- ASME/Murdock method
This method also takes into account turbulence formation on a mathematical level.

Both methods provide a high degree of safety with regard to thermowell configuration, however, they do not provide a guarantee against breakdowns.

Materials

Material descriptions/Standards comparison				Max. temperature [°C (°F)] (unloaded)	Properties	Applications
Mat. No.:	AISI/Trade name:	EN 10028-2:	Description			
1.4404 or 1.4435	AISI 316 L	X2CrNiMo17-12-2	Austenitic stainless steel	600 (1112)	Good acid resistance, resistant against grain boundary corrosion	Chemical industry, waste treatment, paper and cellulose industry, food industry
2.4816	Inconel 600	NiCr15Fe	Nickel-Chrome alloy	1150 (2102)	Resistant at high temperatures, resistant against chlorine-induced cold crack corrosion	Chemical industry, petrochemical industry, food industry
1.4876	Incoloy 800	X10NiCrAlTi32-21	Austenitic heat-resistant stainless steel	1100 (2012)	Excellent resistance against oxidation and carbonization at high temperatures, good corrosion resistance	O&G industry, waste gas treatment, power plants (steam boiler, heat exchanger), applications using aggressive fluids
2.4819	Hastelloy C 276	NiMo16Cr15W	Nickel-Chrome-Molybdenum alloy	1100 (2012)	Resistant at high temperatures, in oxidizing and reducing atmosphere, resistant against pitting and crevice corrosion, good corrosion resistance after welding	Chemicals industry, paper and cellulose industry, waste treatment, waste incinerators, emissions controls, shipbuilding and offshore industry
2.4360	Monel 400	NiCu30Fe	Nickel-Copper alloy	500 (932)	Excellent corrosion resistance, particularly against chlorine-induced cold crack corrosion	Chemical industry, offshore industry, nuclear technology, petrochemical industry

Where cost-intensive materials are used with flange thermowells, cost savings can be achieved by using a so-called flanged wheel. A thin disc of the material which comes into contact with media is applied prior to the flange (ordinary stainless steel).

Vibration resistance of measuring insert, cable sensor

Similar to the thermowell, inner (Karman vortices) and outer (plant) vibrations also affect the measuring insert. For this reason, a special assembly of measurement elements is required. Other than a few exceptions for cable and compact thermometers, Siemens only produces sensors based on a mineral-insulated cable. Together with precautions taken when installing the measuring element, the Siemens basic version already exceeds EN 60751 by more than a factor of 3. Pursuant to the measurement methods of this standard, the following values are obtained (tip-tip):

- 10 g: Basic version and expanded measuring range
- 60 g: Increased vibration-resistance and thermocouple

Electrical stability

Insulation resistance

The insulation resistance between each measuring circuit and the fitting is tested at a voltage of 500 V DC at room temperature.

$$R_{iso} \geq 100 \text{ M}\Omega$$

Due to the property of the mineral-insulated cable, the insulation resistance decreases as temperature increases. Because of the special production method, it is, however, possible to achieve very good values even at high temperatures.

Line resistance

When connected to two-wire systems, the line resistance is included in the measurement result. The following rule of thumb can be used:

- Ø Measuring insert 6 mm (0.24 in) 2.8 Ω /m or 44.78 (44.78)

For this reason a connection to three- or four-wire systems is highly recommended.

Temperature Measurement

SITRANS TS500

Selection and Ordering data

Selection and Ordering data	Article No.	Ord. Code	Selection and Ordering data	Article No.	Ord. Code
SITRANS TS500	7MC650		SITRANS TS500	7MC650	
Threaded sensor assembly (no thermowell)	- - - - - 0		Threaded sensor assembly (no thermowell)	- - - - - 0	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Sheath Material			Connection Head		
316L Stainless Steel	2		Cast Aluminum	J	
310 Stainless Steel	4		Cast Stainless Steel	S	
Alloy 600	7		Flip-Top Aluminum	B	
Form			Explosion Proof Aluminum (FM [XP]/CSA/ATEX [Ex d])	G	
Adjustable Compression Fitting	2		Explosion Proof SS	U	
Fixed Welded	3		Without Head (for TF/display, use option A80-A83)	N	
Spring-Loaded	4		Other	Z	P 1 Y
Process Connection Size			Sensor Type		
½" NPT	J		RTD		
Insertion length (U-Length)			Standard RTDs are 3-wire, 100 Ohm Platinum, 500 F		
1"	P 0		Class B	A 1	
1.5"	P 1		Class A	A 2	
2"	P 2		Class AA (4-wire)	A 3	
2.5"	P 3		Class B Dual	A 5	
3"	P 4		Class A Dual	A 6	
3.5"	P 5		High Vibration RTD (900 F) - Class B	B 1	
4"	P 6		RTD high temp (900 F) - Class B	C 1	
4.5"	P 7		Thermocouple		
5"	P 8		Standard thermocouples are ungrounded		
5.5"	Q 0		Type J	J 1	
6"	Q 1		Type J dual	J 5	
6.5"	Q 2		Type K	K 1	
7"	Q 3		Type K dual	K 5	
7.5"	Q 4		Type T	T 1	
8"	Q 5		Type T dual	T 5	
8.5"	Q 6		Type E	E 1	
9"	Q 7		Type E dual	E 5	
9.5"	Q 8		Other	Z 0	Q 1 Y
10"	R 0				
10.5"	R 1				
11"	R 2				
11.5"	R 3				
12"	R 4				
12.5"	R 5				
13"	R 6				
13.5"	R 7				
14"	R 8				
14.5"	S 0				
15"	S 1				
15.5"	S 2				
16"	S 3				
16.5"	S 4				
17"	S 5				
17.5"	S 6				
18"	S 7				
18.5"	S 8				
19"	T 0				
19.5"	T 1				
20"	T 2				
20.5"	T 3				
21"	T 4				
21.5"	T 5				
22"	T 6				
22.5"	T 7				
23"	T 8				
23.5"	U 0				
24"	U 1				
Other, specify U length	Z 0	K 1 Y			
Sensor Diameter					
¼"	7				

Temperature Measurement

SITRANS TS500

Selection and Ordering data

Selection and Ordering data	Order Code
Options Add "-Z" to Article No. and add options, separate extensions with "+".	
Explosion protection	
ATEX Intrinsic safety "ia", "ic"	E01
ATEX Flameproof enclosure "d"	E02
ATEX Non sparking "n"	E03
cFMus intrinsic safety	E11
cFMus explosion proof	E13
Transmitter mounted in head Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100 No Approvals	T10
SITRANS TH100 ATEX (Ex ia, Ex n)	T11
SITRANS TH100 FM (IS)	T13
SITRANS TH200 No Approvals	T20
SITRANS TH200 ATEX (Ex ia, Ex n)	T21
SITRANS TH200 FM (IS)	T23
SITRANS TH300 No Approvals	T30
SITRANS TH300 ATEX (Ex ia, Ex n)	T31
SITRANS TH300 FM (IS)	T33
SITRANS TH400 PA No Approvals	T40
SITRANS TH400 PA FM (IS), ATEX (Ex ia, Ex n)	T41
SITRANS TH400 FF No Approvals	T45
SITRANS TH400 FF FM (IS), ATEX (Ex ia, Ex n)	T46
Transmitter with display - SITRANS TF <u>With SITRANS TH200 (SIPROM T communication)</u>	
General Purpose [7NG3135-0AC10]	A81
XP FM/CSA (XP) [7NG3135-5AC10]	A82
<u>With SITRANS TH300 (HART Communication)</u>	
General Purpose [7NG3136-0AC10]	A83
XP FM/CSA (XP) [7NG3136-5AC10]	A84
Other temperature transmitter (TF280, TF PA, etc) Mounting of transmitter - Ordered separately	A80
Transmitter Configuration	
Specify measuring range in plain text	Y01
Specify HART-address (max. 8 characters) in plain text	Y17
Tag Number (max. 16 characters) - TF only	Y23
Tag Description (max. 27 characters) - TF only	Y24
Specify bus address in plain text	Y25
Fail-safe value 3.6 mA (instead of 22.8 mA)	U36
Certificates	
Material certificate for wetted parts	C12
Cert SIL 2	C20
Cert SIL 2/3	C23
Factory calibration - sensor only	Y33
Factory cal - matched pair	C15
Factory cal - sensor/transmitter assembly	Y35
Sensor options	
Grounded T/C (std = ungrounded)	G31
4-wire RTD (std = 3-wire)	R04
Further options	
SS tag plate - wired to sensor assembly (connection head only)	Y15
Special option (define in plain text: "Y99:...")	Y99

Temperature Measurement

SITRANS TS500

Selection and Ordering data

Selection and Ordering data	Article No.	Ord. Code	Selection and Ordering data	Article No.	Ord. Code
SITRANS TS500	7MC652		SITRANS TS500	7MC652	
Barstock Thermowell Assembly	- - - - -		Barstock Thermowell Assembly	- - - - -	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Well Material					
316 SS	2		18.5"	5 3	
Special Version (Y99 required)	8		19"	5 4	
			19.5"	5 5	
Thermowell Process Connection Type & Size			20"	5 6	
<u>Threaded Thermowell</u>			20.5"	5 7	
½" NPT	1 J		21"	6 0	
¾" NPT	1 K		21.5"	6 1	
1" NPT	1 L		22"	6 2	
			22.5"	6 3	
<u>Flanged Thermowell</u>			23"	6 4	
1.0" 150# RF	2 E		23.5"	6 5	
1.0" 300# RF	2 F		24"	6 6	
1.5" 150# RF	2 G		24.5"	6 7	
1.5" 300# RF	2 H		Other, specify U length	Z 8 8	K 1 Y
2.0" 150# RF	2 J		Extension (A-length)		
2.0" 300# RF	2 K		None	0	
3.0" 150# RF	2 P		3" Hex nipple-union-nipple, SS (HUNS)	7	
3.0" 300# RF	2 Q		3" Nipple, SS (NS)	9	N 0 G
<u>Socket Weld Thermowell</u>			3" Nipple-union-nipple, galv. steel (NUN)	9	N 0 M
¾" Socket Weld	0 K		3" Nipple-union-nipple, SS (NUNS)	9	N 0 N
1" Socket Weld	0 L		6" Nipple-union-nipple, galv. steel (NUN)	9	N 9 M
<u>Other design</u>			6" Nipple-union-nipple, SS (NUNS)	9	N 9 N
Customer-specified connection (Specify in plain text)	9 X	H 1 Y	6" Hex nipple-union-nipple, SS (HUNS)	9	N 9 H
			Other	9	N 8 Y
Thermowell Form			Connection Head		
Straight	S		Cast Aluminum	J	
Tapered	T		Cast Stainless Steel	S	
Step-Down (Reduced)	U		Flip-Top Aluminum	B	
Other, Specify thermowell form, U-length and T-Length	Z 8 8	K 1 Y	Explosion Proof Aluminum (FM [XPJ]/CSA/ATEX [Ex d])	G	
			Explosion Proof SS	U	
Insertion length (U-Length), with standard T-length (1.75")			Without Head (for TF/display, use option A80)	N	
2"	1 2		Other	Z	P 1 Y
2.5"	1 3		Sensor Type		
3"	1 4		RTD		
3.5"	1 5		Standard RTDs are 3-wire, 100 Ohm		
4"	1 6		Platinum, 500 F		
4.5"	1 7		Class B	A 1	
5"	2 0		Class A	A 2	
5.5"	2 1		Class AA (4-wire)	A 3	
6"	2 2		Class B Dual	A 5	
6.5"	2 3		Class A Dual	A 6	
7"	2 4		High Vibration RTD (900 F) - Class B	B 1	
7.5"	2 5		RTD high temp (900 F) - Class B	C 1	
8"	2 6		<u>Thermocouple</u>		
8.5"	2 7		Standard thermocouples are ungrounded		
9"	3 0		Type J	J 1	
9.5"	3 1		Type J dual	J 5	
10"	3 2		Type K	K 1	
10.5"	3 3		Type K dual	K 5	
11"	3 4		Type T	T 1	
11.5"	3 5		Type T dual	T 5	
12"	3 6		Type E	E 1	
12.5"	3 7		Type E dual	E 5	
13"	4 0		<u>Other Sensor</u>		
13.5"	4 1		Other, Specify type (Q1Y = ...)	Z 0	Q 1 Y
14"	4 2		<u>No Sensor</u>		
14.5"	4 3		For well-only configurations	N 0	
15"	4 4				
15.5"	4 5				
16"	4 6				
16.5"	4 7				
17"	5 0				
17.5"	5 1				
18"	5 2				

Temperature Measurement

SITRANS TS500

Selection and Ordering data

Selection and Ordering data

Order Code

Options

Add "-Z" to Article No. and add options, separate extensions with "+".

Transmitter mounted in head

Measuring range to be set must be specified with plain text data "Y01".

SITRANS TH100 No Approvals

T10

SITRANS TH100 ATEX (Ex ia, Ex n)

T11

SITRANS TH100 FM (IS)

T13

SITRANS TH200 No Approvals

T20

SITRANS TH200 ATEX (Ex ia, Ex n)

T21

SITRANS TH200 FM (IS)

T23

SITRANS TH300 No Approvals

T30

SITRANS TH300 ATEX (Ex ia, Ex n)

T31

SITRANS TH300 FM (IS)

T33

SITRANS TH400 PA No Approvals

T40

SITRANS TH400 PA FM (IS), ATEX (Ex ia, Ex n)

T41

SITRANS TH400 FF No Approvals

T45

SITRANS TH400 FF FM (IS), ATEX (Ex ia, Ex n)

T46

Transmitter with display - SITRANS TF

With SITRANS TH200 (SIPROM T communication)

General Purpose [7NG3135-0AC10]

A81

XP FM/CSA (XP) [7NG3135-5AC10]

A82

With SITRANS TH300 (HART Communication)

General Purpose [7NG3136-0AC10]

A83

XP FM/CSA (XP) [7NG3136-5AC10]

A84

Other temperature transmitter (TF280, TF PA, etc)

Mounting of transmitter - Ordered separately

A80

Transmitter Configuration

Specify measuring range in plain text

Y01

Specify HART-address (max. 8 characters) in plain text

Y17

Specify measuring point description (max. 16 characters) in plain text

Y23

Specify measuring point text (max. 32 characters) in plain text

Y24

Specify bus address in plain text

Y25

Fail-safe value 3.6 mA (instead of 22.8 mA)

U36

Certificates

Material certificate for wetted parts

C12

Cert SIL 2

C20

Cert SIL 2/3

C23

Hydrostatic pressure test

C31

Thermowell NACE cert

C50

Oxygen-cleaned (ISO 9001 grease-free for oxygen service)

C51

Inspection certificate Thermowell calculation according ASME PTC 19.3 (Murdock)

C37

Factory calibration - sensor only

Y33

Factory cal - matched pair

C15

Factory cal - sensor/transmitter assembly

Y35

Selection and Ordering data

Order Code

Full Penetration Welding for Flanged Process Connections

Full penetration weld

G02

X-ray test certificate for full penetration weld

C41

Ultrasonic test certificate for full penetration weld

C44

Sensor options

Grounded T/C (std = ungrounded)

G31

4-wire RTD (std = 3-wire)

R04

Further options

SS tag plate

Y15

Special option (define in plain text: "Y99:...")

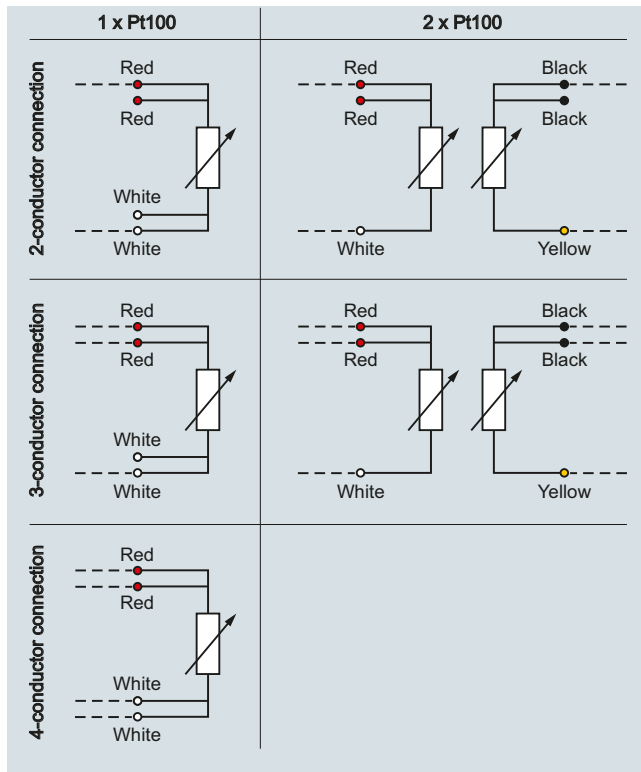
Y99

Schematics

Resistance thermometer

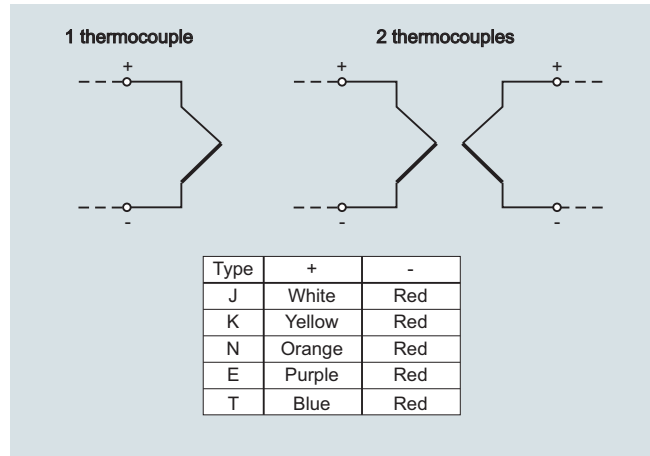
SITRANS TSinsert measuring inserts are designed as a four-wire system for single Pt100 if not mentioned differently. This makes it possible to implement all of the aforementioned connection types.

Double Pt100 measuring inserts (for 6 mm OD only) are designed as a three-wire system.



Schematics 1 x Pt100-2W up to 2 x Pt100-4W

Thermocouples



Circuit diagram for thermocouple

Where thermocouples are used, the use of head transmitters offers particular advantages: The cold junction is already integrated into the universal transmitter. There is no need for expensive thermo or extension cable. This also removes a number of possible error sources. The weak millivolt signal of the thermocouple is already converted into a stable and temperature-linear DC or bus signal on site. This drastically reduces the effects of electromagnetic factors on the measurement result.

If a head transmitter is not installed, the sensor feed line consists either of the appropriate thermo or extension leads. The thermo line is made from the thermo material of the relevant thermocouple, while the extension lead uses a cost-effective substitute material. The extension cable behaves similar to a thermo line at an electrical level, within a limited temperature range of up to 200°C.

A wide spectrum of color coding is available for thermocouples on an international level. This must be taken into account during the electrical connecting.

Temperature Measurement

SITRANS TS500

Schematics

Country	International/ Germany			North America			UK/ Czech Republic		
Standard	Not intrinsically safe ¹⁾			Extension lead ²⁾			BS 1843		
	Jacket	+	-	Jacket	+	-	Jacket	+	-
N	PN	PN	WH	OG	OG	RD	OG	OG	BU
K	GN	GN	WH	YE	YE	RD	RD	BR	BU
J	BK	BK	WH	BK	WH	RD	BK	YE	BU
T	BR	BR	WH	BU	BU	RD	BU	WH	BU
E	VT	VT	WH	VT	VT	RD	BR	BR	BU
R+S	OG	OG	WH		BK	RD	GN	WH	BU
B	GY	GY	WH	GY	GY	RD	-	-	-

¹⁾ With an intrinsically safe line as per IEC 584-3, the sheath is always blue.

²⁾ For thermo lines as per ANSI MC96, the sheath is always blue.

Country	Netherlands			Japan			France		
Standard	DIN 43714			ISC 1610-198			NF C42-323		
	Jacket	+	-	Jacket	+	-	Jacket	+	-
N	GN	RD	GN	BU	RD	WH	VT	VT	YE
K	BU	RD	BU	YE	RD	WH	BK	BK	YE
J	BR	RD	BR	BR	RD	WH	BU	BU	YE
T	BK	RD	BK	VT	RD	WH	OG	OG	YE
E	WH	RD	WH	BK	RD	WH	GN	GN	YE
R+S	GY	RD	GY	GY	RD	WH	-	-	-
B	GN	RD	GN	BU	RD	WH	VT	VT	YE

Abbreviation for colors

BK: black	BR: brown	BU: blue	GD: gold	GN: green
GY: gray	OG: orange	PN: pink	RD: red	SR: silver
TQ: turquoise	VT: violet	WH: white	YE: yellow	

Transmitters

In addition, our transmitters also allow for a large number of other possible connections (e.g. difference, average, two sensors). More information can be obtained at:

<http://www.usa.siemens.com/temperature>

Flow Measurement



3/2 Product overview

Introduction

- 3/9 Criteria for selection of flowmeter
- 3/10 Communication solutions

SITRANS F M (electromagnetic)

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- 3/29 SITRANS F M Vericator Transmitters
 - 3/31 - MAG 5000/6000
 - 3/43 - MAG 6000 I/6000 I Ex
- Flow sensors
 - 3/48 - MAG 1100 and MAG 1100 HT
 - 3/56 - MAG 1100 F
 - 3/67 - MAG 3100 and MAG 3100 HT
 - 3/83 - MAG 3100 P
 - 3/90 - MAG 5100 W
- 3/103 Transmitter TRANSMAG 2 with sensor 911/E
- 3/113 Battery-operated water meter MAG 8000
- 3/120 - MAG 8000 for abstraction and distribution network applications (7ME6810)
- 3/124 - MAG 8000 CT for revenue and bulk metering (7ME6820)
- 3/130 - MAG 8000 for irrigation appl. (7ME6880)

SITRANS F C (Coriolis)

- 3/139 System information
- Flowmeter
 - 3/149 - Transmitter SITRANS FCT030
 - 3/155 - Flowmeter - Accessories/Spare parts
 - 3/160 - Flow sensor SITRANS FCS300
 - 3/169 - Flowmeter SITRANS FC330
 - 3/174 - Flowmeter SITRANS FC310
 - 3/178 - Flowmeter SITRANS FC410 and FC430 for OEM customers
- 3/180 SITRANS F C sensors with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter
 - 3/180 - MASS 2100 DI 1.5
 - 3/183 - FC300 DN 4
 - 3/187 - MASS 2100 DI 3, DI 6 and DI 15
- 3/199 SITRANS F C sensors MASS 2100/FC300 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitters (Low flow program)
- Transmitters
 - 3/205 - MASS 6000 IP67 compact/remote
 - 3/210 - MASS 6000 for 19" insert/19" wall mounting
 - 3/219 - MASS 6000 Ex d compact/remote
 - 3/224 - SIFLOW FC070
- Flow sensor SITRANS FCS200
- 3/228 SITRANS F C sensors with SITRANS MASS 6000 and SIFLOW FC070 transmitter
 - 3/233 - MASS 2100 DI 1.5
 - 3/234 - FC300 DN 4
 - 3/235 - MASS 2100 DI 3, DI 6 and DI 15

SITRANS F US (ultrasonic)

- 3/238 Inline ultrasonic flowmeters
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 - 3/277 - SONOKIT (with FUS060 or FUS080)
 - 3/288 - SITRANS FUS380 standard
 - 3/294 - SITRANS FUE380 with CT approval
 - 3/303 - SITRANS FUS380 and FUE380
- Dimensional drawings and Schematics
- Energy calculator
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SITRANS F S (ultrasonic)

- 3/317 Clamp-on ultrasonic flowmeters FS230
- 3/318 System information
- 3/319 Ultrasonic flow sensor SITRANS FSS200
- 3/324 Transmitter SITRANS FST030, wall mount housing
- Ultrasonic flowmeter SITRANS FS230
 - 3/328 - Ordering data
 - 3/332 - Accessories/Spare parts
- 3/338 Clamp-on ultrasonic flowmeters FS220
- 3/339 Ultrasonic flow sensor SITRANS FSS200
- 3/344 Ultrasonic flow transmitter SITRANS FST020, wall mount housing
- Ultrasonic flowmeter SITRANS FS220
 - 3/346 - Ordering data
 - 3/348 - Accessories/Spare parts
 - 3/352 Thickness gauge

SITRANS F X (vortex)

- 3/353 SITRANS FX300
- 3/371 SITRANS FX330


You can download all instructions, catalogs and certificates for SITRANS F free of charge at the following Internet address:
www.siemens.usa.com/flow

Flow Measurement

Product overview

Overview






	Application	Description	Catalog page	Software for parameterization
SITRANS F M electromagnetic flowmeters - Pulsed DC magnetic flowmeter				
	Designed in robust IP67 polyamide enclosures for compact or remote mounting. 19", back of panel and front of panel enclosure program.	Transmitter MAG 5000/6000 <ul style="list-style-type: none"> • Superior signal resolution for optimum turn down ratio • Comprehensively self-diagnostic, for error indication and logging • Multi-lingual display and keypad interface • Communication modules: HART, Modbus, PROFIBUS, FOUNDATION Fieldbus, DeviceNet • Custody transfer approval: PTB K7.2, OIML R 117, OIML R 49 and MI-001 	3/31	SIMATIC PDM
	Designed in robust die-cast aluminum enclosures for demanding applications and where explosion proof protection is necessary.	Transmitter MAG 6000 I/6000 I Ex <ul style="list-style-type: none"> • Remote and compact mounting with all sensors • Communication modules: HART, Modbus, PROFIBUS, FOUNDATION Fieldbus, DeviceNet • Ex Approval: ATEX, IECEx, FM, UL, CSA • Multi-lingual display and touchpad keypad • Comprehensively self-diagnostic 	3/43	SIMATIC PDM
	Designed for the general industry environment The obstructionless performance of this sensor is unaffected by the suspended solids, viscosity and temperature challenges.	Flow sensor MAG 1100 <ul style="list-style-type: none"> • Metering tube DN 2 ... DN 100 (1/12" ... 4") flangeless design. • Corrosion-resistant AISI 316 stainless steel housing. • Highly resistant liner (ceramic or PFA) and electrodes fitting most extreme process media. • Temperature rating up to 200 °C (390 °F) • Ex Approval: ATEX, FM 	3/48	
	Specially designed for the food & beverage and pharmaceutical industry 	Flow sensor MAG 1100 F <ul style="list-style-type: none"> • AISI 316 stainless steel enclosure • Hygienic seal, 3A and EHEDG • Easy to clean • Supplied with connections according to your specification • Ex Approval: ATEX, FM 	3/56	
	The MAG 3100 series with its flexibility in the choice of liner, electrode and flange material allows the measurement of even the most extreme process media.	Flow sensor MAG 3100 <ul style="list-style-type: none"> • For a wide range of pipe dimensions: DN 15 ... DN 2000 (1/2" ... 78") • Wide range of liner and electrode materials • High-temperature version for application with temperatures up to 180 °C (355 °F) • High-pressure solutions • Custody transfer approval: PTB, OIML R 117 	3/67	






	Application	Description	Catalog page	Software for parameterization
	Designed for all water and waste water applications in water plants and industrial applications	Flow sensor MAG 5100 W <ul style="list-style-type: none"> • Metering tube DN 15 ... DN 1200 (DN 2000) (½" ... 48" (78")) • Hard Rubber or EPDM lining • Integral grounding electrodes as standard • Increased low flow accuracy for water leak detection • Drinking water approvals and custody transfer approvals, OIML R 49, MI-001 and PTB K7.2 	3/90	
SITRANS F M electromagnetic flowmeters - High-power AC magnetic flowmeter				
	Designed for heavy-duty applications like pulp & paper stock over 3 %; heavy mining slurries and mining slurries with magnetic particles	Transmitter TRANSMAG 2 <ul style="list-style-type: none"> • Magnetic flowmeter with a very strong pulsed AC magnetic field • PROFIBUS PA or HART communication • Comprehensive self-test function 	3/103	SIMATIC PDM
	Designed for heavy-duty applications like pulp & paper stock over 3 %; heavy mining slurries and mining slurries with magnetic particles	Flow sensor 911/E <ul style="list-style-type: none"> • Metering tube: DN 15 ... DN 1000 (½" ... 40") • Metering tube liner: Hard Rubber, Linatex, Soft rubber, PTFE and Novolak • Integral smartPLUG for storing of calibration values • Multi-lingual display and touchpad keypad • Only remote version 	3/103	
SITRANS F M electromagnetic flowmeters - Battery-operated magnetic water meter				
	Battery-operated electromagnetic water meter for water applications within abstraction, distribution network, revenue metering and irrigation	Water meter MAG 8000 <ul style="list-style-type: none"> • Battery- and/or mains power operated water meter • Metering tube DN 25 ... DN 1200 (1" ... 48") • Remote and compact installation IP68/ NEMA 6P enclosure • Custody transfer approval: PTB K7.2, OIML R 49 and MI-001 • Drinking water approvals • Communication modules: GSM/GPRS, Modbus, Encoder 	3/113	SIMATIC PDM and Flow Tool
SITRANS F C mass flowmeters				
	<p>Designed for a variety of liquid and gas applications in the general Process Industry.</p> <p>Measurement of mass flow, density, temperature and fraction.</p>	Flowmeters FC330 NEW (Dual tube design) <ul style="list-style-type: none"> • DN 15, DN 25, DN 50, DN 80, DN 100 and DN 150 • Flow from 0.2 ... 860 000 kg/h (0.4 ... 1 895 976 lb/h) - water • Pipe material: AISI 316L or Nickel-Alloy C4 • Accuracy, typically: Flow: ± 0.1 % or 0.2 % version, Density: down to ± 0.002 g/cm³ • Liquid temperature/pressure: -50 ... +205 °C (-58 ... +400 °F)/up to 100 bar (1450 psi) • Approvals: ATEX, IECEx, cCSAus, CRN, PED (depending on configuration) 	3/169	

Flow Measurement

Product overview

3





	Application	Description	Catalog page	Software for parameterization
	<p>Designed for a variety of liquid and gas applications</p> <p>Measurement of mass flow, density, temperature</p> <p>Modbus RS 485 RTU communication for direct integration into skids, OEM and pre-assembled plant packages</p>	<p>Flowmeters FC310 NEW (Dual tube design)</p> <ul style="list-style-type: none"> • DN 15, DN 25, DN 50, DN 80, DN 100 and DN 150 • Flow from 0.2 ... 860 000 kg/h (0.4 ... 1 895 976 lb/h) • Pipe material: AISI 316L or Nickel-Alloy C4 • Accuracy, typically: Flow: $\pm 0.1\%$ or 0.2% version, Density: down to $\pm 0.002\text{ g/cm}^3$ • Liquid temperature/pressure: $-50 \dots +205\text{ }^{\circ}\text{C}$ ($-58 \dots +300\text{ }^{\circ}\text{F}$)/up to 100 bar (1450 psi) • Approvals: ATEX, IECEx, cCSAus, Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping (depending on configuration) 	3/174	
	<p>Designed for a variety of liquid and gas applications</p> <p>Measurement of mass flow, density, temperature and fraction</p> <p></p>	<p>Flowmeters FC430 (Dual tube design)</p> <ul style="list-style-type: none"> • DN 15, DN 25, DN 50, DN 80, DN 100 and DN 150 • Flow from 0.2 ... 860 000 kg/h (1 895 976 lb/h) - water • Pipe material: AISI 316L, Hastelloy • Accuracy, typically: Flow: $\pm 0.1\%$, Density: $\pm 0.005\text{ g/cm}^3$ (depending on size) • Liquid temp./pressure: $-50 \dots +200\text{ }^{\circ}\text{C}$ ($-58 \dots +392\text{ }^{\circ}\text{F}$)/up to 100 bar (1450 psi) • Approvals: ATEX, IECEx, EAC Ex, FM, CSA, NEPSI, INMETRO, KCs, OIML R 117, NTEP, CPA, CT-KZ, SIL 2/3, EHEDG, 3A, CRN, PED (depending on configuration) 	3/178	
	<p>Designed for a variety of liquid and gas applications</p> <p>Measurement of mass flow, density, temperature</p> <p>Modbus RS 485 RTU communication for direct integration into skids, OEM and pre-assembled plant packages</p>	<p>Flowmeters FC410 (Dual tube design)</p> <ul style="list-style-type: none"> • DN 15, DN 25, DN 50, DN 80, DN 100 and DN 150 • Flow from 0.2 ... 860 000 kg/h (0.4 ... 1 895 976 lb/h) • Pipe material: AISI 316L or Hastelloy C22 • Accuracy, typically: Flow: $\pm 0.1\%$, Density: $\pm 0.005\text{ g/cm}^3$ (depending on size) • Liquid temperature/pressure: $-50 \dots +200\text{ }^{\circ}\text{C}$ ($-58 \dots +392\text{ }^{\circ}\text{F}$)/up to 160 bar (2321 psi) • Approvals: ATEX, IECEx, EAC Ex, FM, CSA, NEPSI, INMETRO, EHEDG, 3A, Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping (depending on configuration) 	3/178	
	<p>Designed for accurate mass flow measurement of gases in high pressure applications</p>	<p>Flow sensor FCS200</p> <ul style="list-style-type: none"> • DN 10, DN 15, DN 25 • Flow from 0 ... 30 000 kg/h • Pipe material: Hastelloy C22 • Accuracy: $\pm 0.5\%$ of rate • Process temperature: $-40 \dots +125\text{ }^{\circ}\text{C}$ ($-40 \dots 257\text{ }^{\circ}\text{F}$) • Pressure: Up to 350 bar • Approvals: ATEX, IECEx, EAC Ex, c-FM-us, NEPSI, NTEP 	3/228	




	Application	Description	Catalog page	Software for parameterization
	<p>Designed for a variety of liquid and gas applications</p>	<p>Flow sensors MASS 2100 (Single tube design) and FC300</p> <ul style="list-style-type: none"> MASS 2100: DI 1.5, DI 3, DI 6, DI 15 FC300: DN 4 Flow from 0.1 ... 52 000 kg/h (114 640 lb/h) Pipe material: Stainless steel AISI 316L/ 1.4435; Hastelloy C22/2.4602 Accuracy, typically: <ul style="list-style-type: none"> Flow: $\leq 0.1\%$ of flow rate Density: $\leq 0.0005 \text{ g/cm}^3$ Liquid temp./pressure: -50 ... +180°C (-58 ... +356 °F) / Up to 410 bar (5946 psi) Approvals: ed according to ATEX, EAC Ex, c-UL-us, CRN, PED 	3/180, 3/183	
	<p>Measurement of liquids and gases</p> <p>Multiparameter transmitter for remote or compact mounting measuring mass flow, density, temperature and fraction e.g. °Brix and °Plato</p> <p>For sensor MASS 2100, FC300 and FC200</p> <p>Note: Due to EU-RoHs directives active from July 22nd 2017, MASS 6000 transmitters of any model and variants are not for sale within EU, EU candidate countries, Norway, Switzerland, Iceland, Croatia, and Turkey.</p>	<p>Transmitters MASS 6000 (IP67, 19", Ex d)</p> <ul style="list-style-type: none"> Superior signal resolution for optimum turn down ratio Comprehensively self-diagnostic, for error indication and logging Adaptive batch function Multi-lingual display and keypad interface Approvals: ATEX, EAC Ex Communication modules: HART, Modbus, PROFIBUS, FOUNDATION Fieldbus, DeviceNet 	3/205, 3/210	SIMATIC PDM
	<p>Measurement of liquids and gases</p> <p>Multiparameter transmitter for remote or compact mounting measuring mass flow, density, temperature and fraction e.g. °Brix and °Plato</p> <p>For sensor MASS 2100, FC300 and FC200</p>	<p>Transmitters SIFLOW FC070 Standard and Ex CT</p> <ul style="list-style-type: none"> Digital signal processing measuring 30 times a second. 3 current, 2 freq. and 2 relay outputs Adaptive batch function SENSORPROM memory unit making it easy to start up the flowmeter. Direct integration into SIMATIC S7 and SIMATIC PCS7 Automation systems Approvals: ATEX, IECEx, EAC Ex, c-FM-us, NEPSI, c-CSA-us, NTEP 	3/224	SIMATIC PDM SIMATIC STEP 7 SIMATIC PCS 7
SITRANS F US ultrasonic inline flowmeters				
	<p>SITRANS FUS060 is a time-based transmitter designed for ultrasonic flowmetering in pipes for the F US inline industry series up to DN 3000</p>	<p>SITRANS FUS060 transmitter</p> <ul style="list-style-type: none"> Die cast aluminum enclosure Ex approved according to ATEX HART communication + 1 analog output, 1 digital output for frequency or pulse and 1 relay output for alarms and flow direction PROFIBUS PA communication with 1 digital output for frequency or pulse Multi-functional output for process control Easy menu based local operation with two-line display 	3/246	SIMATIC PDM
	<p>SITRANS FUS080 is a time-based transmitter designed for ultrasonic flowmetering in pipes for the SONOKIT, FUS380 and FUE380 series up to DN 1200</p>	<p>SITRANS FUS080/FUE080 transmitter</p> <ul style="list-style-type: none"> Battery or mains-powered Easy one-button operation Bidirectional measuring IrDA optical eye communication Robust polyamide enclosure 	3/253	SIMATIC PDM

Flow Measurement

Product overview

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	Application	Description	Catalog page	Software for parameterization
	<p>The main application for SONO 3300 ultrasonic flowmeters is to measure the volume flow of:</p> <ul style="list-style-type: none"> • Water and treated waste water • Oil and liquefied gases • Hot water/cooling systems 	<p>SONO 3300/FUS060</p> <ul style="list-style-type: none"> • ATEX-approved • DN 50 ... DN 300 (2" ... 12") steel pipes • PN 10 ... PN 40 or class 150 ... class 300 pressure rates • Flow 0.3 ... 3200 m³/h (1.3 ... 14 089 GPM) • No pressure drop • FUS060 transmitter for separate mounting • Signal cables from sensor to transducer are highly protected from aggressive environment by stainless steel pipes 	3/262	SIMATIC PDM
	<p>The main application for SONO 3100 ultrasonic flowmeters is to measure the volume flow of:</p> <ul style="list-style-type: none"> • Water and treated waste water • Oil and liquefied gases • Liquid cryogenic application • District heating systems 	<p>SONO 3100/FUS060</p> <ul style="list-style-type: none"> • DN 100 ... DN 600 (4" ... 24") • Pipe in carbon steel • Transducers can be replaced under pressure • FUS060 transmitter for separate mounting • ATEX-approved • Measure of all liquids less than 350 Cst, conductive or non-conductive • No pressure drop • 1-path, 2-path; 4-path on request • Special material on request 	3/268	SIMATIC PDM
	<p>Installation of one, two or four transducer sets in existing concrete or steel pipes. Typically installed in pipes with large diameters or in hot/cold water applications</p>	<p>SONOKIT</p> <ul style="list-style-type: none"> • FUS060 or FUS080 transmitter for separate mounting • DN 100 ... DN 3000 (4" ... 120") • Control and display unit • Temperature of medium: -20 ... +200 °C (-4 ... +395 °F) • Installation on empty pipes or pipes under pressure (hot-tap installation) • Standard 1-path or 2-path (4-path on request) 	3/277	SIMATIC PDM
	<p>Battery or mains-powered ultrasonic flowmeter for use within water-based district heating, cooling systems and utility.</p> <p>The FUS380 can also be used for water irrigation systems.</p> <p>SITRANS FUS380/FUE380 are designed to work with the SITRANS FUE950 energy calculator.</p>	<p>FUS380/FUE380</p> <ul style="list-style-type: none"> • FUS380/FUE380: DN 50 ... DN 1200 (2" ... 48") • FUE380: Approved for custody transfer for MID MI004 (according to EN 1434 Class 2, OIML R 75) • FUS380/FUE380: Red brass or painted carbon steel flanges and metering tube. AISI transducers • Water temperatures 2 ... 200 °C (35.6 ... 392 °F) • Battery or mains-powered 	3/288, 3/294	SIMATIC PDM
	<p>Universal thermal energy calculator for district heating and cooling applications.</p>	<p>SITRANS FUE950</p> <ul style="list-style-type: none"> • Battery or mains-powered • 24 periods memory • 2 ports for plug-in modules as data output, extra input, M-Bus, RS 232/RS 485, current output • Complete set with temperature sensors and pockets • MID heating approval, PTB K7.2 cooling approval, MI004 type approval 	3/306	

Application	Description	Catalog page	Software for parameterization
SITRANS F S ultrasonic clamp-on flowmeters			
 <p>SITRANS F S clamp-on ultrasonic flowmeters provide highly accurate measurement while minimizing installation time and maintenance expense. These dedicated flowmeters are suitable for a wide variety of liquid applications, including those in the:</p> <ul style="list-style-type: none"> • Water Industry • Wastewater Industry • HVAC Industry • Power Industry • Processing Industry • Hydrocarbon Industry 	<p>SITRANS FS230</p> <ul style="list-style-type: none"> • Suitable for virtually any liquid, even those with high aeration or suspended solids • Hydrocarbon functions are ideal for applications carrying crude oil, refined petroleum or liquefied gas • Choice of single and dual path versions to suit your operating conditions and requirements. • Easy installation; no need to cut pipe or stop flow • Minimal maintenance; external sensors do not require periodic cleaning • Easy to read display with intuitive menu system • Designed for hazardous area approvals for ATEX Zone 2, IECEx Zone 2 FMc Class I Div. 2 	3/317	
 <p>SITRANS FS220 basic is a fast-to-install clamp-on ultrasonic flowmeter for accurate measurements with minimal maintenance. Based on latest technology, this flow meter is ideal suitable for applications like:</p> <ul style="list-style-type: none"> • Water Industry • Wastewater Industry • HVAC Industry • Power Industry • Process controls 	<p>SITRANS FS220 NEW</p> <ul style="list-style-type: none"> • Easy installation during process condition, no need to cut pipe or stop flow • Minimal maintenance; external sensors do not require periodic cleaning • No media-contacting parts, no wear, no pressure drop, no energy loss • Wide turn-down ratio, very sensitive in low flow condition • Optional WideBeam technology ensures high performance • Compatible with all previously fielded transit time sensors 	3/338	
SITRANS F US ultrasonic clamp-on flowmeters			
 <p>The thickness gauge can be used in any field application where there is a need for flow measurement. Including but not limited to:</p> <ul style="list-style-type: none"> • Water and waste water • Energy measurement • Oil and gas industries 	<p>Thickness gauge</p> <p>The hand-held micro-processor controlled gauge is designed to measure the thickness of various metallic or non-metallic pipes.</p> <ul style="list-style-type: none"> • Materials include steel, aluminum, titanium, plastics and ceramics • Measurements shown in millimeter or inches • Simple-to-read 4-digit LCD display • Weights 150 g (5.3 oz) • Battery operation for 250 h 	3/352	

Flow Measurement

Product overview

3

	Application	Description	Catalog page	Software for parameterization
SITRANS F X vortex flowmeter				
	Measurement of steam, gases and liquids in: <ul style="list-style-type: none"> • Chemical • HVAC/Power plants • Oil & Gas • Food & Beverage • Pharma 	SITRANS FX300 <ul style="list-style-type: none"> • Flange DN 15 ... DN 300 (½" ... 12") • Sandwich DN 15 ... DN 100 (½" ... 4") • 2-wire device 4 ... 20 mA, with integrated temperature and pressure sensors for compensation • HART communication • Medium temp.: -40 ... +240 °C (-40 ... +464 °F) • Medium pressure: up to 100 bar (1450 psi) • Hazardous area approvals: FM, CSA, ATEX • Compact or remote mounted transmitter 	3/353	
	Very versatile and flexible for use in many process applications. Flow meter combines flow, pressure and temperature measurement into one user-friendly, two-wire device. <ul style="list-style-type: none"> • Measurement of saturated steam and superheated steam • Heat metering of steam and hot water • Measurement of consumption in compressed air systems • Evaluation of Free Air Delivery (FAD) • SIP and CIP processes in the food, beverage and pharmaceutical industries • Measurement of conductive and non-conductive liquids • Safety-related measurement in SIL applications (SIL2) 	SITRANS FX330 <ul style="list-style-type: none"> • Integrated pressure and temperature compensation • Temperature compensation for saturated steam included as standard • SIL2 certified according to IEC 61508 Edition 2 • Use in hazardous areas • Integrated reduction of nominal diameter for space-saving and economic installation • Exchange of electronics without loss of calibration and configuration data • Gross and net heat calculation to support energy management • Remote version with cable length up to 50 m (164 ft) 	3/371	

Supplied product documentation on DVD and safety instructions



The scope of delivery of the Siemens products for process instrumentation includes a multilingual instruction sheet with **safety instructions** as well as a uniform **mini DVD – Process Instrumentation and Weighing Systems**.

This DVD contains the most important manuals and certificates for the Siemens process instrumentation and weighing technology portfolio. The delivery may also contain product-specific or order-specific printed materials.

For additional information, refer to the Annex on page 10/3.

Overview

Criteria for selection of flowmeter

Each method for measuring flow has specific properties, and each flow measuring point is characterized by specific requirements. The table shown below compares the properties of the various measuring instruments and thus provides assistance in selection of the optimum device.

This section of the field device catalog includes the following instruments for measuring flow:

- Electromagnetic
- Coriolis mass flow
- Ultrasonic
- Vortex volumetric- and mass flow
- Variable area meter
- Orifice plate

Measuring principle	Electromagnetic	Coriolis	Ultrasonic (inline)	Ultrasonic (clamp-on)	Vortex	Variable area meter	Orifice plate
Medium	Liquid (conductive)	Liquid or gas	Liquid	Liquid or gas	Steam/vapor, gases, liquid	Liquid or gas	Liquid, vapor, gas
Nominal diameter	DN 2 ... 2000 (0.08" ... 78")	1.5 ... 150 mm (0.06" ... 6")	DN 50 ... 3000 (2" ... 120")	6.4 mm ... 9.14 m (0.25" ... 360")	DN 15 ... 300 (½" ... 12")	DN 10 ... 100 (0.4" ... 4") G½" ... G3"	DN 10 ... 1000 (0.4" ... 40")
Temperature range °C (°F)	-40 ... +200 (-40 ... +392)	-50 ... +205 (-58 ... +400)	-20 ... +200 (-4 ... +392)	-40 ... +120 (-40 ... +248)	-40 ... +240 (-40 ... +464)	-20 ... +300 (-4 ... +572)	-200 ... +500 (-328 ... +932)
Max. pressure bar (psi)	160 (2 320), optional higher	Up to 410 (Up to 5 950)	40 (580)	Unlimited	100 (1 450)	100 (1 450)	315 (4 569)
Accuracy %	± 0.2 or ± 0.4	± 0.1, 0.15 or ± 0.2	± 0.5 ... ± 2	0.5 ... 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s)	± 0.75 ... ± 1	± 1.6 ... ± 2.0	± 0.5 ... ± 2
Repeatability %	0.1/0.2	0.05	0.25	0.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s)	0.1	0.5	0.5
Dynamic response range	1:100	1:100	1:100	1:100	1:25	1:10	1:6
Start-of-scale value m/s (ft/s)	0 (0)	0 (0)	0 (0)	0 (0)	0.4 (1.31) 2.0 (6.56)	0.2 (0.66)	Re > 500
Full-scale value				± 36/120			Re < 10 ⁸
• For liquids m/s (ft/s)	0.25 ... 10 (0.825 ... 32.8)	10 (32.8)	10 (32.8)	± 12/40	10 (32.8)	3.5 (11.4)	3 (9.8)
• For steam/vapor, gases m/s (ft/s)		Approx. 300 (1000) or Mach < 0.30		± 12/40	80 (262.5)	60 (197)	50/25 (164/82)
Measured values							
• Volume flow	•	•	•	•	•	•	•
• Sound velocity			•	•			
• Sound amplitude			•	•			
• Density		•		•			
• Mass flow		•	•	•	•		
• Bidirectional measurement	•	•	•	•			•
Use							
• For custody transfer	•	•	•				
• As batching system	•	•		•			
• In viscosity range mPa·s (cp)	0.1 ... 100 000 (0.1 ... 100 000)	0 ... 100 000 (0 ... 100 000)	0 ... 350 (0 ... 350)	0.5 ... 2800 (0.5 ... 2800)	0 ... 10 (0 ... 10)	0.5 ... 100 (0.5 ... 100)	0 ... 10 (0 ... 10)
Power supply	Mains or battery	Mains	Mains or battery	90 ... 240 V AC, 50 ... 60 Hz, 15 VA or 9 ... 36 V DC, 10 W	2-wire	non	2-wire

Flow Measurement

Introduction

Communication solutions

Communication solutions

Transmitter	HART	PROFIBUS PA	PROFIBUS DP	FOUNDATION Fieldbus H1	DeviceNet	Modbus RTU	GSM/GPRS
SITRANS F M MAG 5000	• 1) 2) 4)						
SITRANS F M MAG 6000	• 1) 2) 4) 5)	• 1) 5) 6) 7)	• 1) 5) 6) 7)	• 2) 4) 5)	• 5)	• 1) 5) 10)	
SITRANS F M MAG 5000/6000 CT ⁸⁾							
SITRANS F M MAG 6000 I	• 1) 2) 4) 5)	• 1) 5) 6) 7)	• 1) 5) 6) 7)	• 2) 4) 5)	• 5)	• 1) 5) 10)	
SITRANS F M MAG 6000 I Ex	• 1) 2) 4) 5)	• 1) 5) 6) 7)		• 2) 4) 5)			
SITRANS F M TRANSMAG 2	• 1) 4)	• 1) 6)					
SITRANS F M MAG 8000						• 1) 3) 10) 11) 12)	• 14)
SITRANS F C FCT010						• 1) 10)	
SITRANS F C FCT030	• 1) 2) 4) 8)	• 1) 2) 4) 8)	• 1) 2) 4) 8)			• 1) 2) 4) 8)	
SITRANS F C MASS 6000	• 1) 2) 4) 5)	• 1) 5) 6) 7)	• 1) 5) 6) 7)	• 2) 4) 5)	• 5)	• 1) 10)	
SITRANS F C MASS 6000 Ex d	• 1) 2) 4) 5)	• 1) 5) 6) 7)		• 2) 4) 5)	• 5)		
SIFLOW FC070			• 13)			• 1) 10) 11)	
SITRANS FUS060	• 1)	• 1) 6)					
SITRANS FUS080	•	• 1) 8) 12)					
SITRANS FST030	•					• 1) 9) 10)	
SITRANS FST020	•					• 1) 10)	
SITRANS FX300	• 1)						
SITRANS FX330	• 1)						
SITRANS P DS III Differential pressure and flow	• 1) 2)	• 1) 2) 7)		• 2)			

- 1) Supports SIMATIC PDM
 2) Supports AMS
 3) Supports Siemens Flow Tool
 4) Supports HH275/375
 5) Pluggable add-on modules
 6) Profile 2
 7) Profile 3

- 8) CT versions are not approved with communication modules.
 9) All wall mount models
 10) RS 485
 11) RS 232
 12) IrDA (Infrared)
 13) Connected to ET200M PROFIBUS interface
 14) Only with 7ME6810

Overview

SITRANS F M electromagnetic flowmeters are designed for measuring the flow of electrically conductive mediums.

The full SITRANS F M program consists of three different types of flowmeters making Siemens unique in that it covers all possible applications where electromagnetic flowmeters are a suitable match:

Modular pulsed DC flowmeters cover all ordinary applications within all industries. The wide variety of combinations and versions from the modular system means that ideal adaptation is possible to each measuring task and application.

High-powered flowmeters are used for difficult applications where other flowmeters cannot stand up to the task. This flowmeter can handle liquids and heavy slurries in industries such as mining, cement and pulp and paper.



SITRANS F M products

Battery-operated water meters (fully electronic) are the perfect match for drinking water applications like network distribution, revenue metering and irrigation where mains power is not available. In addition, it complies with the MID (EU) and OIML R 49 water meter standards and has the MCERTS certificate.



SITRANS F M MAG 8000



SITRANS F M 911/TRANSMAG 2

Flow Measurement

SITRANS F M

System information SITRANS F M Electromagnetic flowmeters

Benefits



Greater flexibility

- Wide product program
- Compact or remote installation using the same transmitter and sensor
- USM II communication platform for easy integration with all systems

Easier commissioning of MAG 5000, 6000, 6000 I

All SITRANS F M pulsed DC electromagnetic flowmeters feature a unique SENSORPROM memory unit which stores sensor calibration data and transmitter settings for the lifetime of the product.

At commissioning the flowmeter commences measurement without any initial programming.

The factory settings matching the sensor size are stored in the SENSORPROM unit. Also customer specified settings are downloaded to the unit. Should the transmitter be replaced, the new transmitter will upload all previous settings and resume measurement without any need for reprogramming.

Further, the „fingerprint“ used in connection with the SITRANS F M Vericator is stored during the initial sensor calibration.

Easier service

Transmitter replacement requires no programming. SENSORPROM automatically updates all settings after initialization.

Room for growth

USM II the Universal Signal Module with "plug & play" simplicity, makes it easy to access and integrate the flow measurement with almost any system and bus-protocol and it ensures the flowmeter will be easy to upgrade to future communication/bus platforms.

Application

Electromagnetic flowmeters are suitable for measuring the flow of almost all electrically conductive liquids, pastes and slurries.

A prerequisite is that the medium must have a minimum conductivity. The temperature, pressure, density and viscosity have no influence on the result.

The main applications of the electromagnetic flowmeters can be found in the following sectors:

- Water and waste water
- Chemical industries
- Pharmaceutical industries
- Food and beverage industry
- Mining, aggregates and cements industries
- Pulp and paper industry
- Steel industry
- Power; utility and chilled water industry

The wide variety of combinations and versions from the modular system means that ideal adaptation is possible to each measuring task.

System information SITRANS F M Electromagnetic flowmeters

Please see product selector on the Internet, because some constraints might be related to some of the features:

www.pia-portal.automation.siemens.com



MAG 1100	MAG 1100 HT	MAG 1100 F	MAG 3100	MAG 3100 HT	MAG 3100 P	MAG 5100 W		911/E	MAG 8000/ MAG 8000 CT	MAG 8000 Irrigation
7ME6110	7ME6120	7ME6140	7ME6310	7ME6320	7ME6340	7ME6520	7ME6580	7ME5610	7ME6810 7ME6820	7ME6880

Industry

Water / waste water	XX			XX		X	XXX	XXX	X	XXX ¹⁾	XXX ¹⁾
Chemical	XXX	XXX	XX	XXX	XXX	XXX	X	X		X	
Pharmaceutical	XX	XX	XXX	XX	XX	XX	X	X		X	
Food and beverage	XX		XXX	X	X	X	X	X		X	
Mining, aggregates and cement	XX			XXX			X	X	XXX	X	
HPI	XX	X		XX	X	XX	X	X		X	
Other	XX	XX	XX	XX	XX	XX	XX	XX	XXX	X	

Design

Compact	•		•	•	•	•	•	•		•	•
Remote	•	•	•	•	•	•	•	•	•	•	•
Constant field (DC)	•	•	•	•	•	•	•	•		•	•
Alternating field (AC)									•		
Battery-operated constant field (DC)										•	•

Size

DN 2 (1/12")	•										
DN 3 (1/8")	•										
DN 6 (1/4")	•										
DN 10 (3/8")	•		•								
DN 15 (1/2")	•	•	•	•	•	•	•		•		
DN 25 (1")	•	•	•	•	•	•	•	•	•	•	
DN 32 (1 1/4")			• ²⁾								
DN 40 (1 1/2")	•	•	•	•	•	•	•	•	•	•	
DN 50 (2")	•	•	•	•	•	•	•	•	•	•	•
DN 65 (2 1/2")	•	•	•	•	•	•	•	•	•	•	•
DN 80 (3")	•	•	•	•	•	•	•	•	•	•	•
DN 100 (4")	•	•	•	•	•	•	•	•	•	•	•
DN 125 (5")				•	•	•	•	•	•	•	•
DN 150 (6")				•	•	•	•	•	•	•	•
DN 200 (8")				•	•	•	•	•	•	•	•
DN 250 (10")				•	•	•	•	•	•	•	•
DN 300 (12")				•	•	•	•	•	•	•	•
DN 350 (14")				•			•	•	•	•	•
DN 400 (16")				•			•	•	•	•	•
DN 450 (18")				•			•	•	•	•	•
DN 500 (20")				•			•	•	•	•	•
DN 600 (24")				•			•	•	•	•	•
DN 700 (28")				•			•	•	•	•	•
DN 750 (30")				•			•	•	•	•	•
DN 800 (32")				•			•	•	•	•	•
DN 900 (36")				•			•	•	•	•	•
DN 1000 (40")				•			•	•	•	•	•
DN 1050 (42")				•			•	•		•	•
DN 1100 (44")				•			•	•		•	•
DN 1200 (48")				•			•	•		•	•

• = available, X = can be used, XX = often used, XXX = most often used

¹⁾ Not suitable for wastewater applications

²⁾ Only in combination with DN 32 adapter A5E02054637, A5E02218297, FDK:083G2120 and FDK:083G2160

Flow Measurement

SITRANS F M

System information SITRANS F M Electromagnetic flowmeters

Please see product selector on the Internet, because some constraints might be related to some of the features:

www.pia-portal.automation.siemens.com



MAG 1100	MAG 1100 HT	MAG 1100 F	MAG 3100	MAG 3100 HT	MAG 3100 P	MAG 5100 W	911/E	MAG 8000/ MAG 8000 CT	MAG 8000 Irrigation	
7ME6110	7ME6120	7ME6140	7ME6310	7ME6320	7ME6340	7ME6520	7ME6580	7ME5610	7ME6810 7ME6820	7ME6880

Size (continued)

DN 1400 (54")				•				•		
DN 1500 (60")				•				•		
DN 1600 (66")				•				•		
DN 1800 (72")				•				•		
DN 2000 (78")				•				•		

Process connection

Wafer design	•	•								
Sanitary process connections			•							
Flanges				•	•	•	•	•	•	• ²⁾

Flange norms

EN 1092-1				•	•	•	•	•	•	• ²⁾
ANSI B 16.5 class 150				•	•	•	•	•	•	• ²⁾
ANSI B 16.5 class 300				•	•			•		
ASME B 16.47 class 150				•						
AWWA class D				•			•	•	•	
AS 2129				•	•					• ²⁾
AS 4087, PN 16				•	•		•	•	•	
AS 4087, PN 21				•	•					
AS 4087, PN 35				•	•					
JIS 10K				•			•	•		
JIS 20K				•						

Pressure rating¹⁾

PN 6				•				•		
PN 10				•	•	•	•	•	•	
PN 16	•		•	•	•	•	•	•	•	
PN 25				•	•			•		
PN 40	•	•	•	•	•	•	•	•	•	
PN 63				•						
PN 100				•						

Accuracy

Flow error ± 0.2 % of rate	•	•	•	•	•	•	•	•	•	
Flow error ± 0.4 % of rate	•	•	•	•	•	•	•	•	•	
Flow error ± 0.5 % of rate								•		
Flow error ± 0.8 % of rate										•

Repeatability⁴⁾

0.1 %	•	•	•	•	•	•	•	•	•	•
0.2 %								•		

Grounding electrodes, incl.

•³⁾•³⁾

•

•

(•)

•

Grounding rings premounted from factory

•

• = available

¹⁾ Pressure may be limited by the liner material chosen

²⁾ Drilled pattern flange max. 7 bar (107 psi).

³⁾ Optional on PFA

⁴⁾ Of actual flow for $v \geq 0.5$ m/s (1.5 ft/s) and conductivity $> 10 \mu\text{S/cm}$

System information SITRANS F M Electromagnetic flowmeters

Please see product selector on the Internet, because some constraints might be related to some of the features:

www.pia-portal.automation.siemens.com



MAG 1100	MAG 1100 HT	MAG 1100 F	MAG 3100	MAG 3100 HT	MAG 3100 P	MAG 5100 W	911/E	MAG 8000/ MAG 8000 CT	MAG 8000 Irrigation	
7ME6110	7ME6120	7ME6140	7ME6310	7ME6320	7ME6340	7ME6520	7ME6580	7ME5610	7ME6810 7ME6820	7ME6880

Materials/temperature:Liner material/max. temperatures

NBR Hard Rubber: 70 °C (158 °F)							•			
EPDM: 70 °C (158 °F)			•			•			•	
Soft rubber: 70 °C (158 °F)			•					•		
PTFE: 100 °C (212 °F)			•							
PTFE: 130 °C (266 °F)				•	•			•		
PTFE: 180 °C (356 °F)				•				(•) ¹⁾		
Ebonite Hard Rubber: 95 °C (203 °F)			•				• ³⁾	•		• ³⁾
Linatex: 70 °C (158 °F)			•					•		
Ceramic: 150 °C (302 °F)	•		•							
Ceramic: 200 °C (392 °F)		• ²⁾								
PFA: 100 °C (212 °F)			•							
PFA: 150 °C (302 °F)	•		•	•	•					
Novolak: 130 °C (266 °F)								•		

Electrodes

Stainless steel			•	•				•		•
Hastelloy C	•		•	•	•	•	•	•	•	
Platinum	•	•	•	•	•			•		
Titanium			•	•				•		
Tantalum			•	•				•		

Flange/housing material

Carbon steel			•	•	•	•	•	•	•	•
Stainless steel / carbon steel			•	•				•		
Polished stainless steel	•	•	•	•	•					

ApprovalsCustody transfer

Cold water - MI-001 (EU)						•			•	
Cold water approval - OIML R 49/OIML R 49 MAA									• ⁴⁾	
NMI 10 (Australia)										•
Chilled water pattern approval PTB K 7.2						• ⁴⁾			• ⁴⁾	
OE12/C 040 (Austria)						•				
Chilled water pattern approval						•				
KIWA water approval						•			•	

Marine

ABS						•				
Bureau Veritas						•				
DNV						•				
GL						•				
Lloyd's Register						•				

• = available

¹⁾ 150 °C (302 °F)

²⁾ Ex sensor: 180 °C (356 °F)

³⁾ 70 °C (158 °F)

⁴⁾ For verification submit Product Variation Request (PVR)

Flow Measurement

SITRANS F M

System information SITRANS F M Electromagnetic flowmeters

Please see product selector on the Internet, because some constraints might be related to some of the features:

www.pia-portal.automation.siemens.com



MAG 1100	MAG 1100 HT	MAG 1100 F	MAG 3100	MAG 3100 HT	MAG 3100 P	MAG 5100 W	911/E	MAG 8000/ MAG 8000 CT	MAG 8000 Irrigation	
7ME6110	7ME6120	7ME6140	7ME6310	7ME6320	7ME6340	7ME6520	7ME6580	7ME5610	7ME6810 7ME6820	7ME6880

Approvals (continued)

<u>Hazardous areas</u>										
ATEX - 2 GD (Zone 1/21)	•	•	•	•	•	•				
IECEX Zone 1/21				•	•	•				
FM Class I/II/III, Div 1				• ⁸⁾	• ⁸⁾	• ⁸⁾				
FM Class I, Zone 1/21				•	•	•				
FM Class I, Div 2	•	•	•	•	•	•	•	•		
FM Class I, Zone 2	•	•	•	•	•	•	•	•		
CSA Class I, Zone 1/21				•	•	•				
CSA Class I, Div 2				•	•	•	•	•		
NEPSI Zone 1				•	•	•				
EAC Ex	•	•	•	•	•	•				
<u>Hygienic</u>										
EHEDG			•							
3A			•							
EC 1935:2004 European food contact material			•							
<u>Drinking water</u>										
WRAS (WRc) - (GB)				•		• ⁴⁾	•		•	•
ANSI/NSF 61 (US) ⁷⁾				• ⁴⁾		•	•		•	•
ACS (FR) EPDM liner				•		•			•	
Belgaqua (B) EPDM liner				•		•			•	
DVGW-W270 (D) EPDM liner				•		•			•	
KIWA (NL) EPDM liner						•				
<u>Other</u>										
CRN (Canada)	• ⁹⁾			•	•	•	•	•	•	
FM Fire Service (class number 1044)						• ⁶⁾			• ⁶⁾	
MCERTS (GB environmental)				• ⁵⁾		• ³⁾			•	
EAC (Russia, Belarus and Kazakhstan)	•	•	•	•	•	•	•	•	•	
CMC/CPA (China)				•			•			•
PED 2014/68/EU	•	•	•	•	•	•	•	•	•	
VdS						• ²⁾				
Verifactor compatible	• ¹⁾	• ¹⁾	• ¹⁾	• ¹⁾	• ¹⁾	• ¹⁾	• ¹⁾	• ¹⁾		

• = available

¹⁾ Only in combination with MAG 5000 and MAG 6000 transmitters.

²⁾ Only valid for DN 50 to DN 300 (2" to 12")

³⁾ EPDM liner

⁴⁾ Only EPDM with Hastelloy electrodes

⁵⁾ EPDM or PTFE liner with AISI 316 or Hastelloy electrodes.

⁶⁾ Sizes: DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") with ANSI B16.5 Class 150 flanges

⁷⁾ Including Annex G

⁸⁾ Only DN 15 to DN 300 (½" to 12") with MAG 6000 I Ex, compact mounted

⁹⁾ Only PFA liner

System information SITRANS F M Electromagnetic flowmeters

Please see Product selector on the Internet, because some constraints might be related to some of the features:

www.pia-portal.automation.siemens.com



	MAG 5000	MAG 6000	MAG 6000 I	MAG 6000 I Ex	MAG 6000 + Ex Safety barrier	TRANSMAG 2	MAG 8000/ MAG 8000 CT	MAG8000 Irrigation
	7ME6910	7ME6920	7ME6930	7ME6930	7ME6920	7ME5034	7ME6810 7ME6820	7ME6880
Industry								
Water / waste water	XXX	XXX	XX	X		X	XXX	XXX
Chemical	X	XX	XX	XXX	X		X	
Pharmaceutical	X	XXX	XX	XXX	X		X	
Food and beverage	XX	XXX	XX				X	
Mining, aggregates and cement	XX	X	XX	X		XXX	X	
HPI	X	X	X	XX			X	
Other	XX	XX	XX	XX		XX	X	
Design								
Compact	•	•	•	•			•	•
Remote	•	•	•	•	•	•	•	•
Constant field (DC)	•	•	•	•	•		•	•
Alternating field (AC)						•		
Battery-operated constant field (DC)							•	•
Enclosure transmitter								
Polyamide, IP67	•	•						
Die-cast aluminum			•	•		•		
Stainless steel		•					• ¹⁾	• ¹⁾
19" rack	•	•			•			
Front panel mounting	•	•			•			
Panel mounting	•	•			•			
IP66 wall mounting	•	•	•	•	•			
Accuracy								
Flow error ± 0.2 % of rate		•	•	•	•		•	
Flow error ± 0.4 % of rate	•						•	
Flow error ± 0.5 % of rate						•		
Flow error ± 0.8 % of rate								•
Repeatability³⁾								
0.1 %	•	•	•	•	•		•	•
0.2 %						•		
Communication								
HART	•	•	•	•	•	•		
PROFIBUS PA		•	•	•	•	•		
PROFIBUS DP		•	•		•			
FOUNDATION Fieldbus H1		•	•	•	•			
DeviceNet		•	•		•			
Modbus RTU/RS 485		•	•		•		• ²⁾	• ²⁾
Encoder interface module (Sensus protocol) for Itron 200WP radio							•	•
GSM/GPRS module							•	
Batching		•	•	•	•			

• = available, X = can be used, XX = often used, XXX = most often used

¹⁾ IP68 enclosure

²⁾ Modbus RTU also as serial RS 232

³⁾ Of actual flow for $v \geq 0.5$ m/s (1.5 ft/s) and conductivity $> 10 \mu\text{S/cm}$

Flow Measurement

SITRANS F M

System information SITRANS F M Electromagnetic flowmeters

Please see Product selector on the Internet, because some constraints might be related to some of the features:

www.pia-portal.automation.siemens.com



	MAG 5000	MAG 6000	MAG 6000 I	MAG 6000 I Ex	MAG 6000 + Ex Safety barrier	TRANSMAG 2	MAG 8000/ MAG 8000 CT	MAG8000 Irrigation
	7ME6910	7ME6920	7ME6930	7ME6930	7ME6920	7ME5034	7ME6810 7ME6820	7ME6880
Power supply								
24 V	● ¹⁾	● ¹⁾	●	●			● ^{1) 2)}	● ^{1) 2)}
115 V - 230 V	●	●	●	●	●	●	● ²⁾	● ²⁾
Battery							●	
Approvals								
<u>Custody transfer</u>								
Cold water - MI-001 (EU)	●	●					●	
Cold water approval - OIML R 49/OIML R 49 MAA							●	
Chilled water pattern approval PTB K 7.2	● ⁵⁾	● ⁵⁾					● ⁵⁾	
OE12/C 040 (Austria)	●	●						
Chilled water pattern approval								
KIWA water approval		●					●	
<u>Marine</u>								
ABS	●	●						
Bureau Veritas	●	●						
DNV	●	●						
GL	●	●						
Lloyd's Register	●	●						
<u>Hazardous areas</u>								
ATEX - 2 GD (Zone 1/21)				●	(●) ³⁾			
IECEx Gb Zone 1/21				●				
FM Class I/II/III, Div 1				● ⁴⁾				
FM Class I, Zone 1/21				●				
FM Class I, Div 2	●	●	●					
FM Class I, Zone 2	●	●	●					
CSA Class I, Zone 1/21				●				
CSA Class I, Div 2	●	●	●					
UL / C-UL- general safety	●	●			●			
NEPSI Zone 1				●				
EAC Ex				●	●			
<u>Other</u>								
FM Fire Service (1044)	●	●					●	
C - tick (Australia)	●	●	●	●	●			
EAC (Russia, Belarus and Kazakhstan)	●	●	●	●	●	●	●	
CMC/CPA (China)	●	●	●	●				●
VdS	●	●						
Other national approvals, see internet	●	●	●	●	●	●	●	●
Verificator compatible	●	●						

● = available

¹⁾ 12/24 V AC/DC

²⁾ Main power with battery backup

³⁾ Only sensor in hazardous area

⁴⁾ Only with sensors sizes DN 15 to DN 300 (1/2" to 12") compact

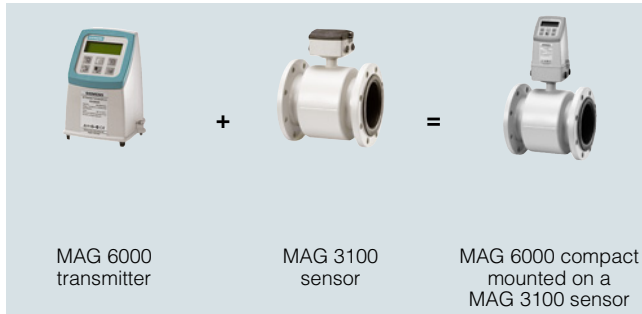
⁵⁾ For verification submit Product Variation Request (PVR)

For more national approvals please check our internet page

<http://support.automation.siemens.com/WW/view/en/10806954/134200>

Practical examples of ordering

SITRANS F M compact installation



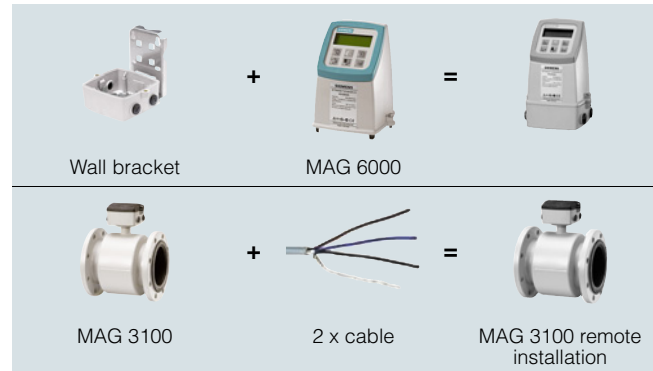
Example

Sensor	7ME6310-3TC11-1JA1
Pipe size	DN 100
Liner	Soft rubber
Electrodes	SS 316
Flanges	EN 1092-1, PN 16
Transmitter	MAG 6000, Polyamide, 115 ... 230 V AC
Accuracy	$\pm 0.2\% \pm 1 \text{ mm/s}$
Supply	230 V AC

Note:

MAG 5000/6000 transmitters, sensors and communication modules are packed in separate boxes, the final assembly takes place during installation at the customer's place.

SITRANS F M remote installation



Example

Sensor	7ME6310-3TC11-1AA1
Pipe size	DN 100
Liner	Soft rubber
Electrodes	SS 316
Flanges	EN 1092-1, PN 16
Transmitter	7ME6920-1AA10-0AA0
Accuracy	$\pm 0.2\% \pm 1 \text{ mm/s}$
Supply	230 V AC
Wall mounting kit	FDK:085U1018
Cable kit with sensor cable and electrode cable	A5E01181647

Flow Measurement

SITRANS F M

System information SITRANS F M Electromagnetic flowmeters

Technical specifications

Flowmeter Calibration and traceability

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability).

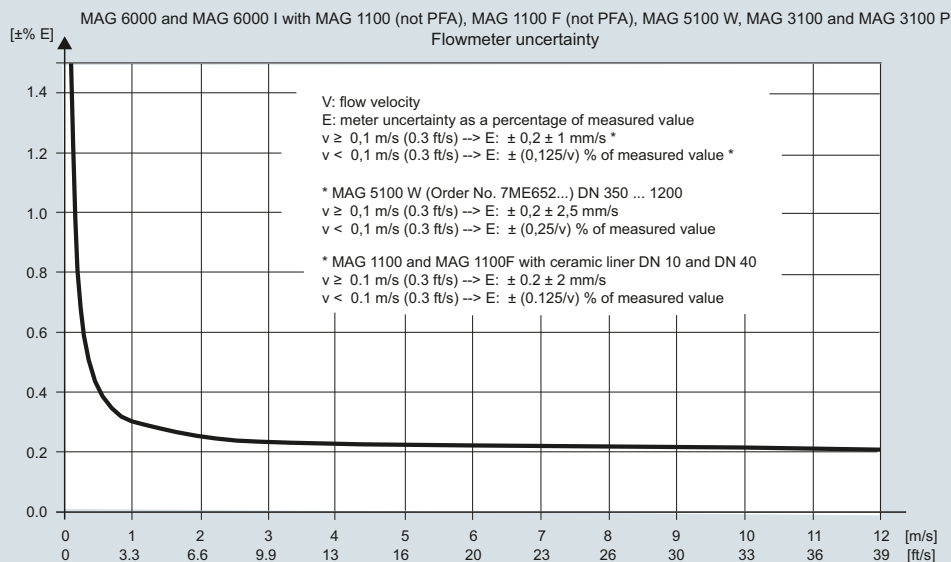
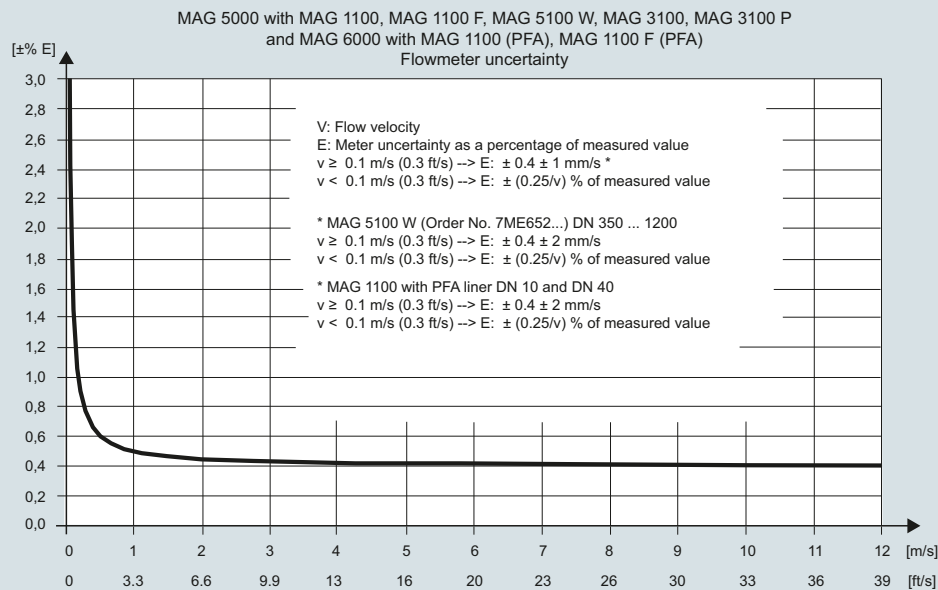
Siemens offers accredited calibrations assured to ISO 17025 in the flow range from 0.0001 m³/h to 10 000 m³/h.

The calibration follows the ISO 4185 performing calibrations under two methods: Static Weighing and Reference meter. Providing a measurement uncertainty of $\pm 0.1\%$.

Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

A calibration certificate is shipped with every sensor and calibration data are stored in the SENSORPROM memory unit.

Flowmeter uncertainty



Calibration reference conditions**Reference conditions (ISO 9104 and DIN EN 29104)**

Temperature medium	20 °C ± 10 K (68 °F ± 18 °F)
Temperature ambient	25 °C ± 10 K (77 °F ± 18 °F)
Supply voltage	$U_n \pm 1\%$
Warming-up time	30 minutes
Incorporation in conductive pipe section	
• Inlet section	10 x DN (DN ≤ 1200/48") 5 x DN (DN > 1200/48")
• Outlet section	5 x DN (DN ≤ 1200/48") 3 x DN (DN > 1200/48")
Flow conditions	Developed flow profile

Additions in the event of deviations from reference conditions

Current output	As pulse output ($\pm 0.1\%$ of actual flow + 0.05 % FSO)
Effect of ambient temperature	
• Display / frequency / pulse output	$< \pm 0.003\%/\text{K act.}$
• Current output	$< \pm 0.005\%/\text{K act.}$
Effect of supply voltage	$< 0.005\%$ of measuring value on 1% change
Repeatability	$\pm 0.1\%$ of actual flow for $v \geq 0.5\text{ m/s}$ (1.5 ft/s) and conductivity $> 10\text{ }\mu\text{S/cm}$

Certificates

• EN 10204-2.1	Certificate of conformity, stating that the delivered parts are made of the material quality that was ordered. Available as Z option C15.
• EN 10204-2.2	Test report certificate, a non batch specific material analysis of the ordered material. Available as Z option C14.
• EN 10204-3.1	Material analysis certificate, a batch specific analysis of the material issued by an independent inspector. Certification covers all pressure containing and wetted parts. Available as Z option C12.

Flow Measurement

SITRANS F M

System information SITRANS F M Electromagnetic flowmeters

Technical specifications

General specifications

PROFIBUS device profile	3.00 Class B
Certified	No
MS0 connections	1
MS1 connections	1
MS2 connections	2

Electrical specification DP

Physical layer specifications

Applicable standard	IEC 61158/EN 50170
Physical Layer (Transmission technology)	RS 485
Transmission speed	≤ 1.5 Mbits/s
Number of stations	Up to 32 per line segment, (maximum total of 126)

Cable specification (Type A)

Cable design	Two-wire twisted pair
Shielding	CU shielding braid or shielding braid and shielding foil
Impedance	35 up to 165 Ω at frequencies from 3 ... 20 MHz
Cable capacity	< 30 pF per meter
Core diameter	> 0.34 mm ² , corresponds to AWG 22
Resistance	< 110 Ω per km
Signal attenuation	Max. 9 dB over total length of line section
Max. bus length	200 m at 1500 kbit/s, up to 1.2 km at 93.75 kbit/s. Extendable by repeaters

Electrical specification PA

Physical layer specifications

Applicable standard	IEC 61158/EN 50170
Physical Layer (Transmission technology)	IEC-61158-2
Transmission speed	31.25 Kbits/second
Number of stations	Up to 32 per line segment, (maximum total of 126)
Max. basic current [I _B]	14 mA
Fault current [I _{FDE}]	0 mA
Bus voltage	9 ... 32 V (non Ex)

Preferred cable specification (Type A)

Cable design	Two-wire twisted pair
Conductor area (nominal)	0.8 mm ² (AWG 18)
Loop resistance	44 Ω/km
Impedance	100 Ω ± 20 %
Wave attenuation at 39 kHz	3 dB/km
Capacitive asymmetry	2 nF/km
Bus termination	Passive line termination at both
Max. bus length	Up to 1.9 km. Extendable by repeaters

IS (Intrinsic Safety) data

Required sensor electronics	Compact or remote mounted SITRANS F M MAG 6000 I Ex
FISCO	Yes
Max. U _I	17.5 V
Max. I _I	380 mA
Max. P _I	5.32 V
Max. L _I	0 μH
Max. C _I	0 nF

FISCO cable requirements

Loop resistance R _C	15 ... 150 Ω/km
Loop inductance L _C	0.4 ... 1 mH/km
Capacitance C _C	80 ... 200 nF/km
Max. Spur length in IIC and IIB	30 m
Max. Trunk length in IIC	1 km
Max. Trunk length in IIB	5 km

PROFIBUS parameter support

The following parameters are accessible using a MS0 relationship from a Class 1 Master.
MS0 specifies cyclic Data Exchange between a Master and a Slave.

Cyclic services

Input (Master view)	Parameter	MAG 6000/MAG 6000 I
	Mass flow	
	Volume flow	✓
	Temperature	
	Density	
	Fraction A	
	Fraction B	
	Pct Fraction A	
	Totalizer 1	✓
	Totalizer 2 ¹⁾	✓
	Batch progress ¹⁾	✓
	Batch setpoint	✓
	Batch compensation	✓
	Batch status (running ...)	✓
Output (Master view)	Set Totalizer 1+2	✓
	Set Mode Totalizer 1+2	✓
	Batch control (start, stop ...)	✓
	Batch setpoint	✓
	Batch compensation	✓

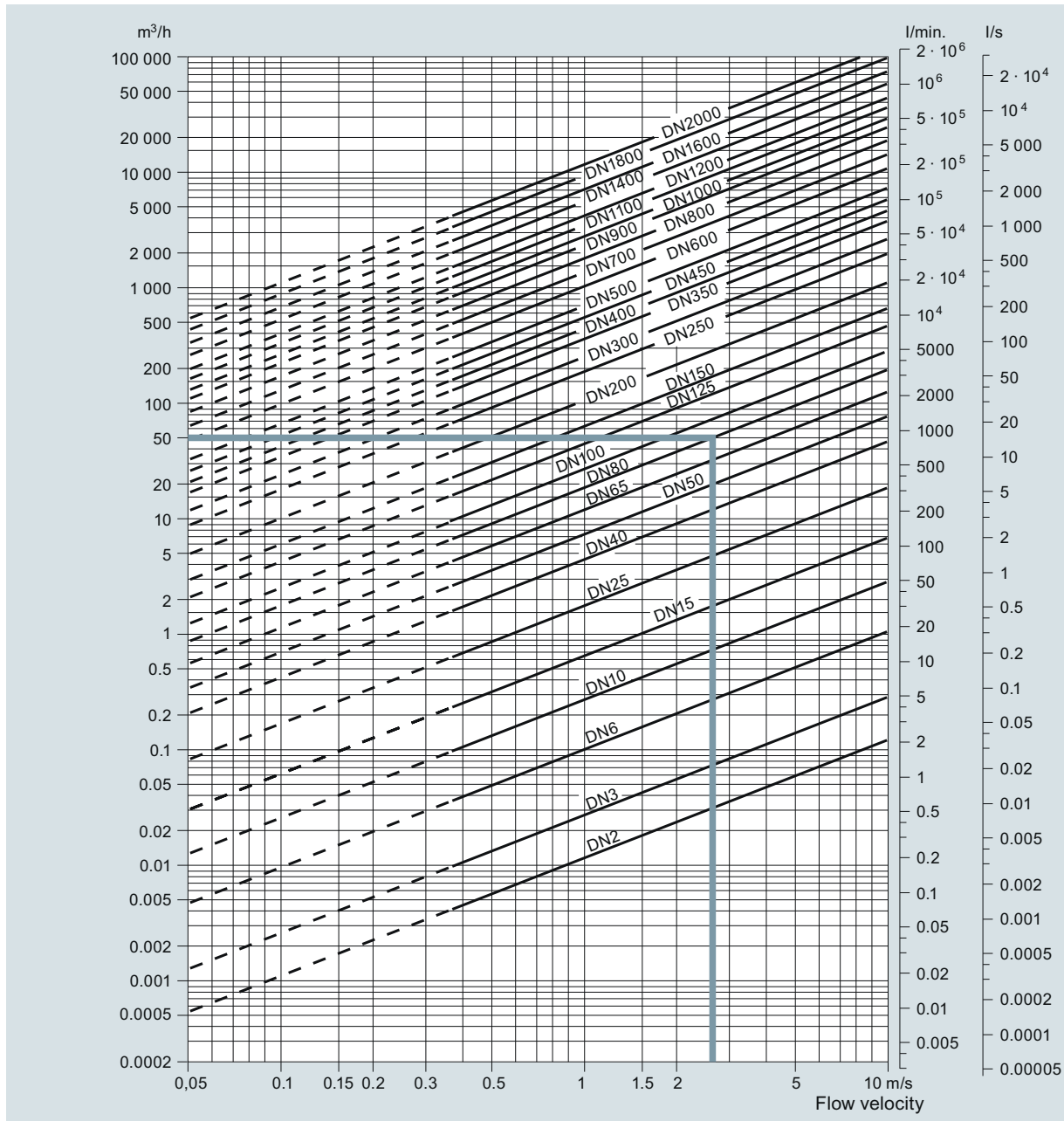
¹⁾ Value returned is dependent on the BATCH function.

When ON, Batch progress is returned.

When OFF, TOTALIZER 2 is returned.

Flow and speed chart

Metric



Sizing table (DN 2 ... DN 2000)

The table shows the relationship between flow velocity v , flow quantity Q and sensor dimension DN .

Guidelines for selection of sensor

Min. measuring range: 0 to 0.25 m/s

Max. measuring range: 0 to 10 m/s

Normally the sensor size is selected so that the nominal flow velocity v lies within the recommended measuring range of 1 to 3 m/s.

Example:

Flow quantity of 50 m³/h and a sensor dimension of DN 80 gives a flow velocity of 2.7 m/s, which is within the recommended measuring range of 1 to 3 m/s.

Flow velocity calculation formula Units

$$v = 1273.24 \cdot Q / DN^2 \text{ or}$$

$$v = 353.68 \cdot Q / DN^2$$

 v : [m/s], Q : [l/s], DN : [mm]

 v : [m/s], Q : [m³/h], DN : [mm]

Link to "Sizing program":

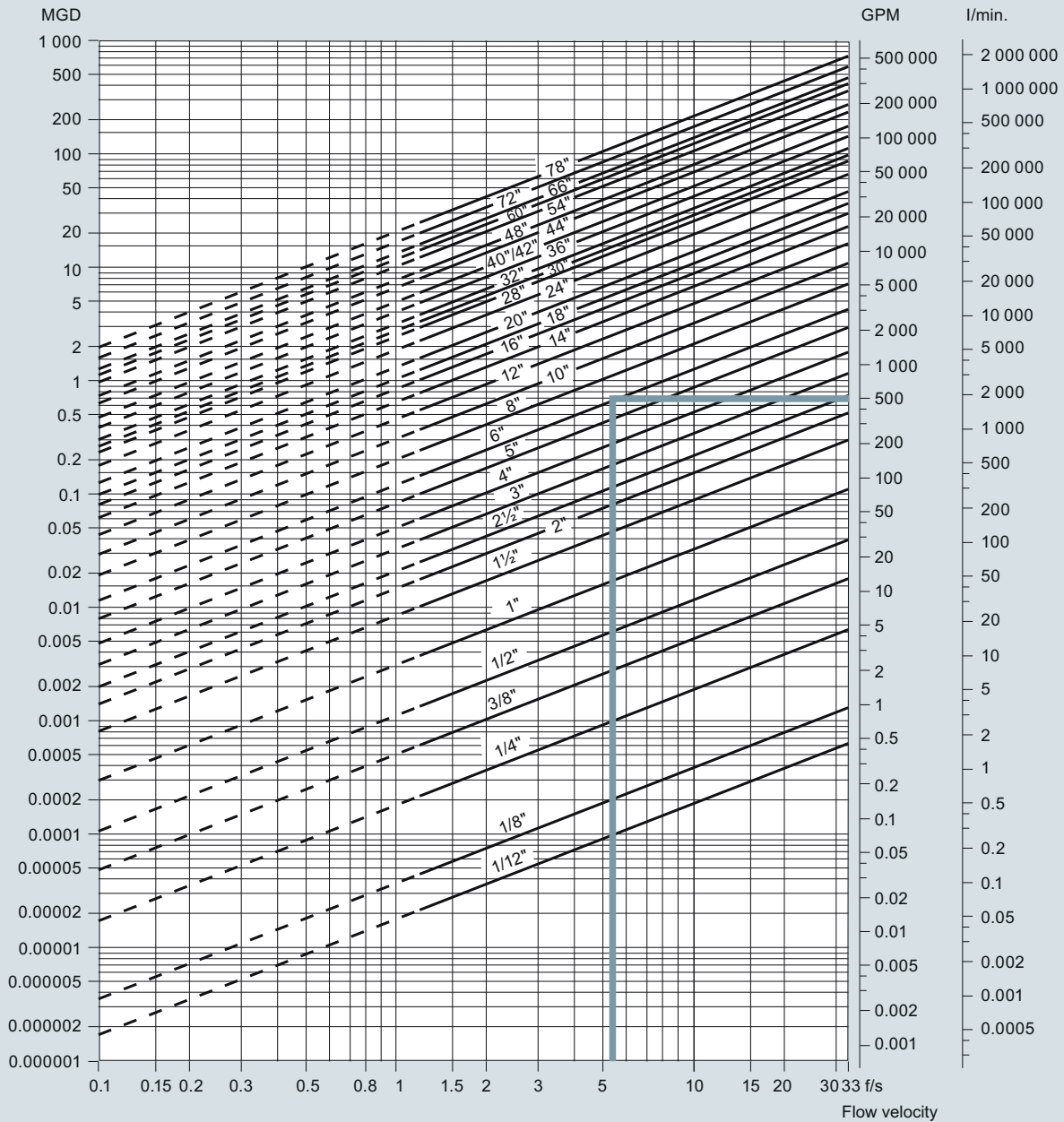
<https://pia.khe.siemens.com/index.aspx?nr=11501>

Flow Measurement

SITRANS F M

System information SITRANS F M Electromagnetic flowmeters

Imperial



Sizing table ($1/12''$... 78'')

The table shows the relationship between flow velocity v , flow quantity Q and sensor dimension size.

Guidelines for selection of sensor

Min. measuring range: 0 to 0.8 ft/s

Max. measuring range: 0 to 33 ft/s

Normally the sensor size is selected so that the nominal flow velocity v lies within the measuring range 3 to 10 ft/s.

Example:

Flow quantity of 500 GPM and a sensor dimension of 6" gives a flow velocity of 5.6 ft/s, which is within the recommended measuring range of 3 to 10 ft/s.

Flow velocity calculation formula Units

$$v = 0.408 \cdot Q / (\text{Pipe I.D.})^2 \text{ or}$$

$$v = 283.67 \cdot Q / (\text{Pipe I.D.})^2$$

v : [ft/s], Q : [GPM], Pipe I.D. : [inch]

v : [ft/s], Q : [MGD], Pipe I.D. : [inch]

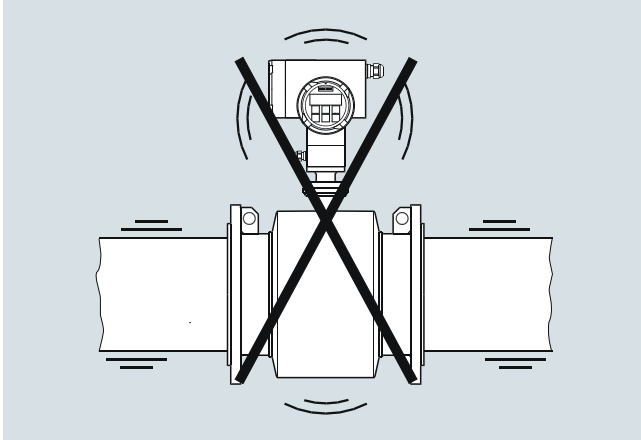
Link to "Sizing program":

<https://pia.khe.siemens.com/index.aspx?nr=11501>

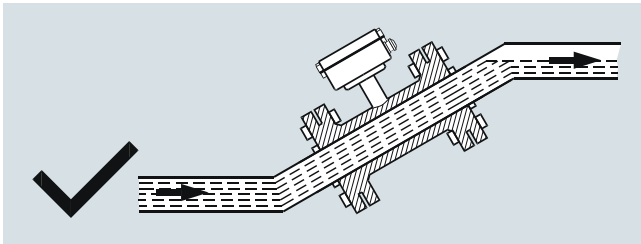
System information SITRANS F M Electromagnetic flowmeters
Installation conditions
Vibrations

Strong vibrations should be avoided.

In applications with strong vibrations, remote mounting of the transmitter is recommended.



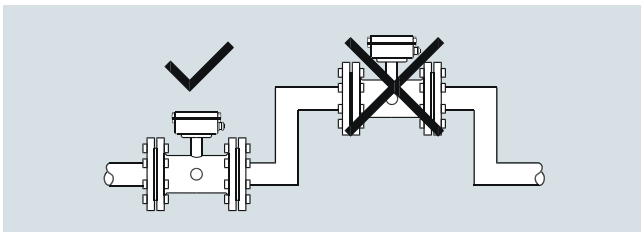
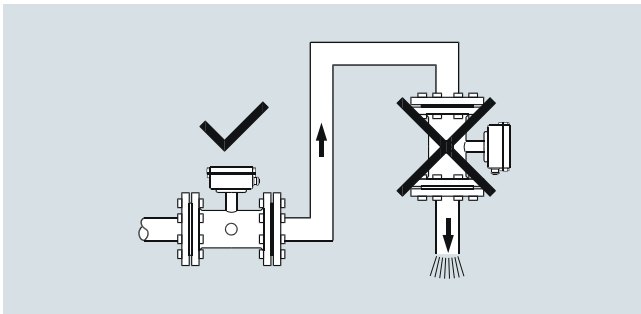
The sensor must always be completely filled with liquid.



Install in pipelines which are always full

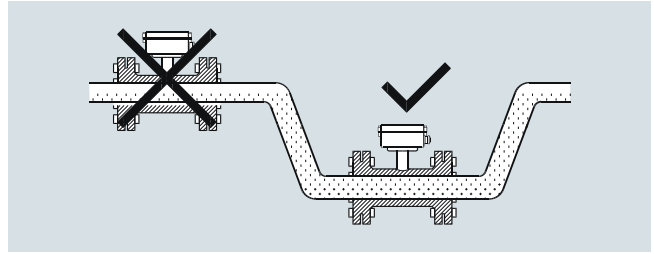
The sensor must always be completely filled with liquid. Therefore avoid:

- Installation at the highest point in the pipe system
- Installation in vertical pipes with free outlet



Do not install in pipelines which can run empty

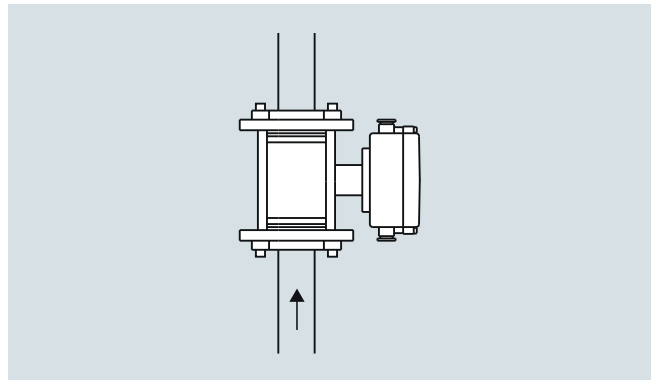
For partially filled pipes or pipes with downward flow and free outlet the flowmeter should be located in a U-Tube.



Install in U-tubes when pipe is partially filled

Installation in vertical pipes

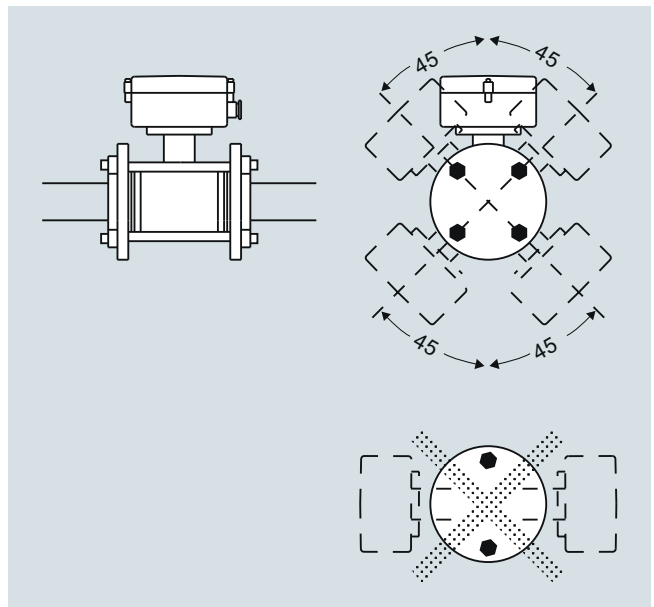
Recommended flow direction: upwards. This minimizes the effect on the measurement of any gas/air bubbles in the liquid.



Install in vertical pipes with upward flow direction

Installation in horizontal pipes

The sensor must be mounted as shown in the below figure. Do not mount the sensor as shown in the lower figure. This will position the electrodes at the top where there is possibility for air bubbles and at the bottom where there is possibility for mud, sludge, sand etc.



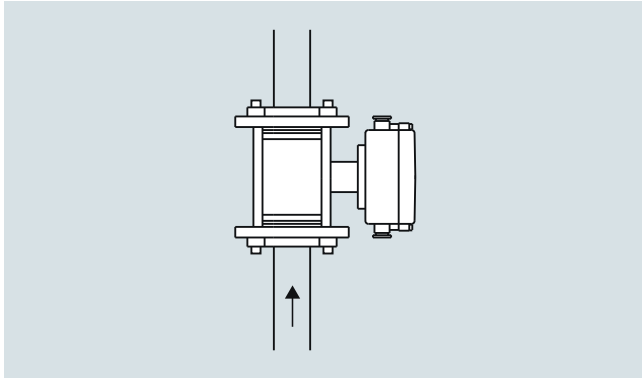
Flow Measurement

SITRANS F M

System information SITRANS F M Electromagnetic flowmeters

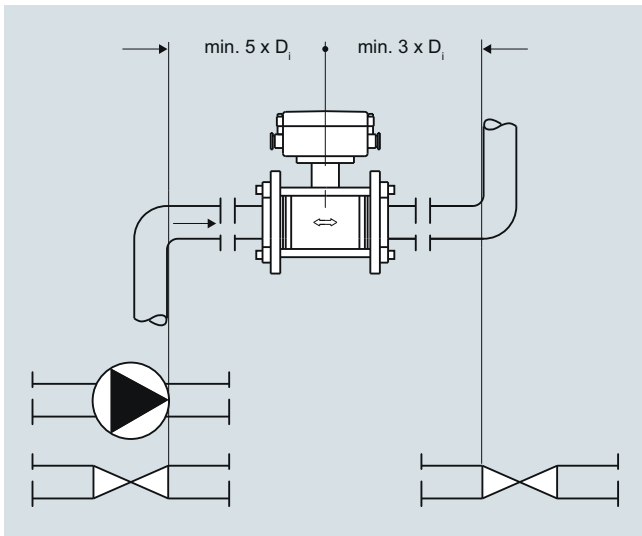
Measuring abrasive liquids and liquids containing particles

Recommended installation is in a vertical/inclined pipe to minimize the wear and deposits in the sensor.



Install in vertical pipelines with upward flow direction if measuring abrasive liquids

Inlet and outlet conditions



Recommended straight pipe lengths up and downstream for installations between elbows, pumps and valves.

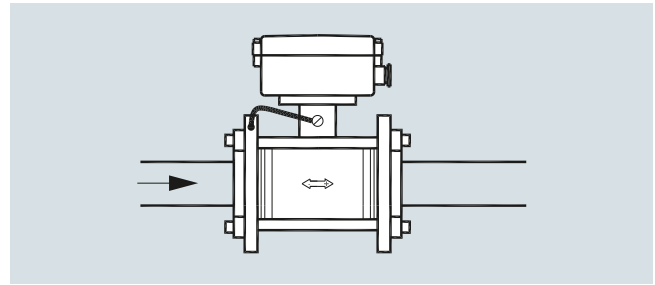
To achieve maximum accurate flow measurement it is essential to have straight pipe lengths up and downstream. Practical experience has proved that the MAG 5100 W and MAG 8000 are capable to operate in non-optimal piping arrangements and still provide acceptable accuracy even with zero diameters upstream and downstream of straight run pipe.

It is also important to center the flowmeter in relation to pipe flange and gaskets.

Ambient temperature-Installation

Temperature changes can cause expansion or contraction in the pipe system. To avoid damage on the sensor use of proper gasket and torque should be ensured. For more information see sensor instruction.

Potential equalization

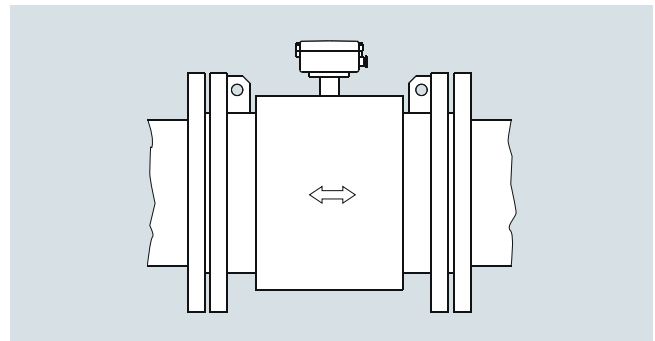


Potential equalization

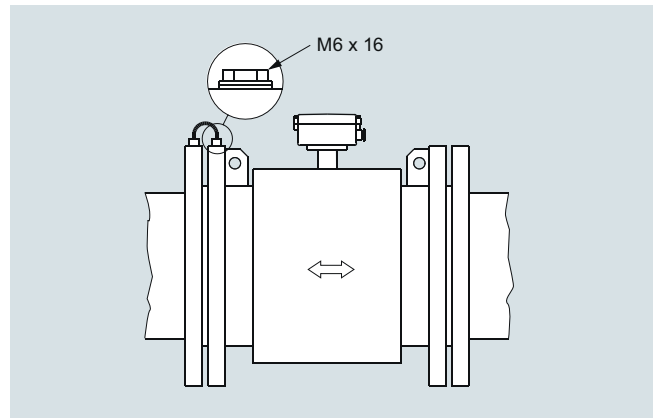
The electrical potential of the liquid must always be equal to the electrical potential of the sensor. This can be achieved in different ways depending on the application:

- Wire jumper between sensor and adjacent flange (MAG 1100, MAG 3100)
- Direct metallic contact between sensor and fittings (MAG 1100 F)
- Built-in grounding electrodes (MAG 3100, MAG 5100 W)
- Optional grounding/protection flanges/rings (MAG 1100, MAG 3100, MAG 8000)
- Optional graphite gaskets on MAG 1100 (standard for MAG 1100 High Temperature)
- MAG 8000 installed in plastic or coated pipes: two grounding rings to be used.

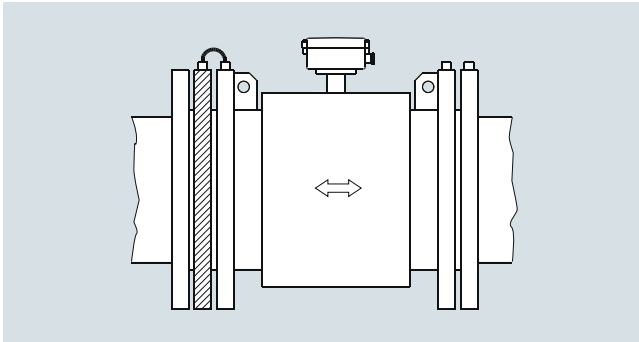
Grounding



MAG 3100 and MAG 5100 W: with grounding electrodes in conductive and non-conductive pipes (no further action necessary)



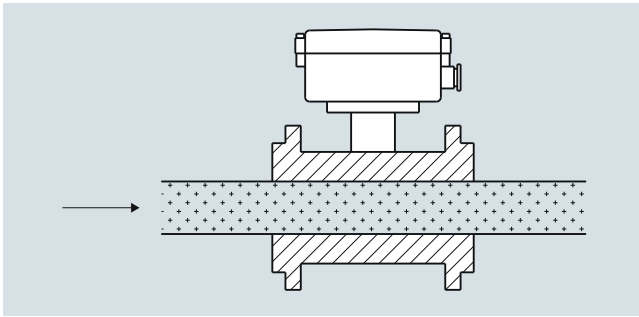
MAG 1100 and MAG 3100: without grounding electrodes in conductive pipes (MAG 1100 use graphite gasket)



Without grounding electrodes in non-conductive pipes use grounding ring (MAG 1100 use graphite gasket)

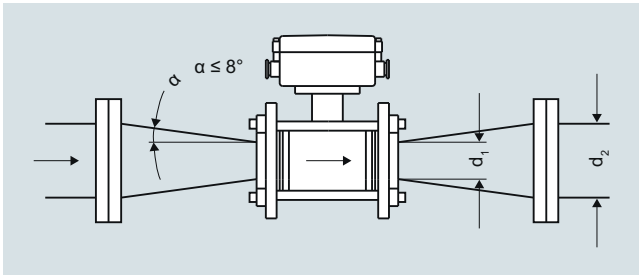
MAG 1100 F grounding via process connections. MAG 8000 grounding see MAG 8000 pages.

Vacuum



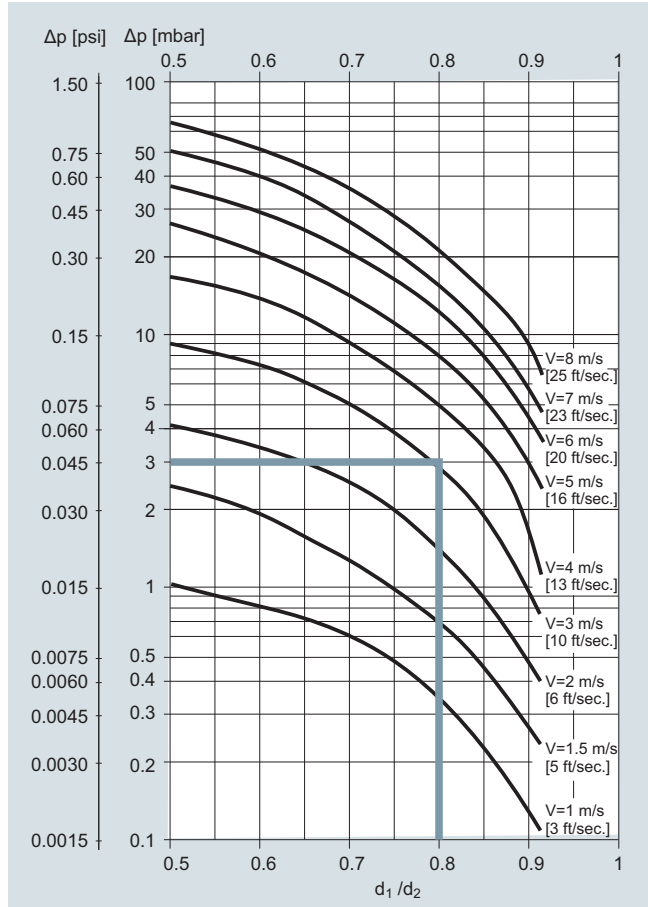
In order to prevent damages of liner when operating meters under vacuum please take note of the information "Operating pressure" given in section "Technical specification".

Installation in large pipes



Reduction in nominal pipe diameter

The flowmeter can be installed between two reducers (e.g. DIN 28545). Assuming that at 8° the following pressure drop curve applies. The curves are applicable to water.

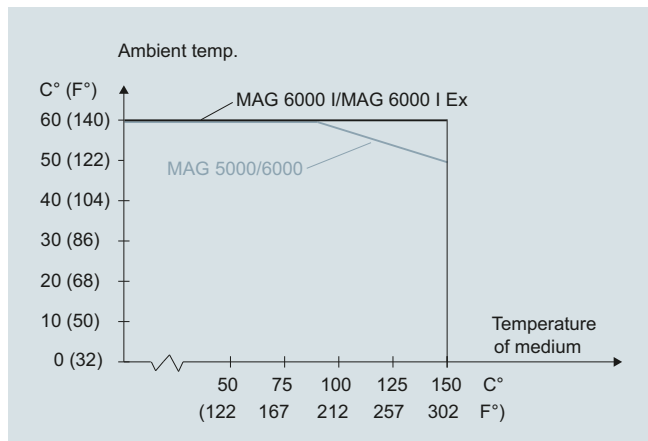


Pressure drop as function of diameter reduction between reducers

Example:

Flow velocity (v) of 3 m/s (10 ft/s) in a sensor with a diameter reduction DN 100 (4") to DN 80 (3") ($d_1/d_2 = 0.8$) gives a pressure drop of 2.9 mbar (0.04 psi).

Ambient temperature



Max. ambient temperature as a function of temperature of medium

The transmitter can be installed either compact or remote.

With compact installation the temperature of medium must be according to the graph.

Flow Measurement

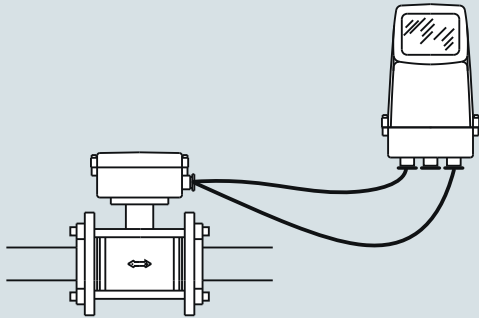
SITRANS F M

System information SITRANS F M Electromagnetic flowmeters

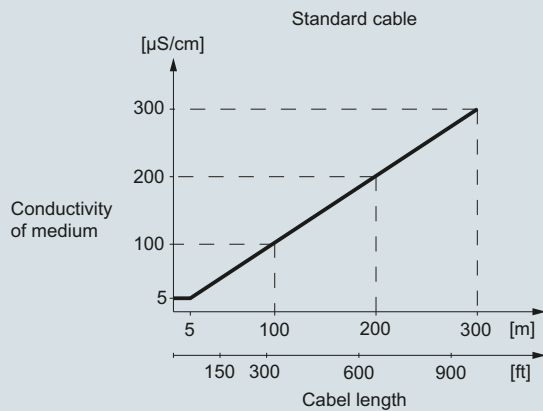
Sensor cables and conductivity of medium

Compact installation:

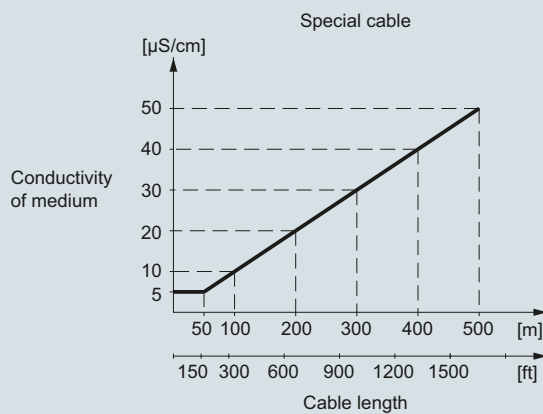
Liquids with an electrical conductivity $\geq 5 \mu\text{S/cm}$.



Remote installation



Minimum conductivity of medium (using standard electrode cable)



Minimum conductivity of medium (using special electrode cable)

Empty pipe detection

The installation has to fulfill the following limitations for usage of the empty pipe detection function:

- media conductivity $\geq 20 \mu\text{S/cm}$
- length of cable at remote installation $\leq 50 \text{ m}$ (150 ft)
- special shield cable must be used

Note for MAG 1100 sizes DN 2 and DN 3:

- empty pipe detection is not available
- the media conductivity must be $\geq 30 \mu\text{S/cm}$

Note for MAG 5000/6000 CT:

- empty pipe detection is not available

Function

All electromagnetic flowmeters are based on Faraday's law of induction:

$$U_M = B \cdot v \cdot d \cdot k$$

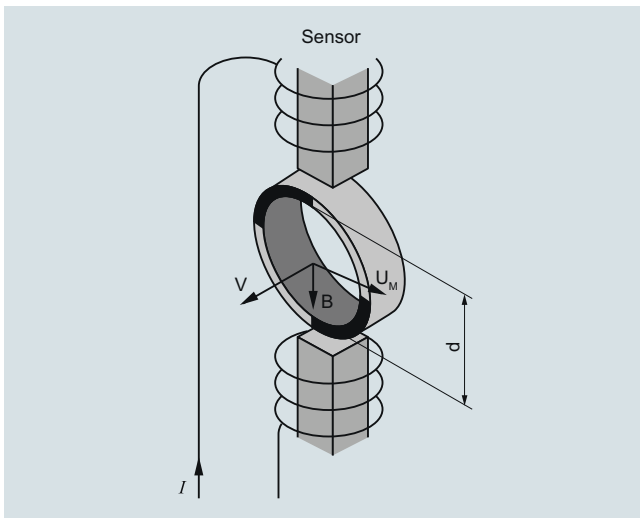
U_M = Measured voltage induced in the medium perpendicular to the magnetic field and the flow direction. The voltage is tapped at two point electrodes.

B = Magnetic flux density which permeates the flowing medium perpendicular to the flow direction.

v = flow velocity of medium

d = internal diameter of metering tube

k = proportionality factor or sensor constant



Function and measuring principle of electromagnetic measurement

An electromagnetic flowmeter generally consists of a magnetically non-conducting metering tube with an internal electrically non-conducting surface, magnet coils connected in series and mounted diametrically on the tube, and at least two electrodes which are inserted through the pipe wall and are in contact with the measured medium. The magnet field coils through which the current passes generate a pulsed electromagnetic field with the magnetic flux density B perpendicular to the pipe axis.

This magnetic field penetrates the magnetically non-conducting metering tube and the medium flowing through it, which must have a minimum electrical conductivity.

According to Faraday's law of induction, a voltage U_M is generated in an electrically conducting medium, and is proportional to the flow velocity v of the medium, the magnetic flux density B , and the distance between the electrodes d (internal diameter of pipe).

The signal voltage U_M is tapped by the electrodes which are in contact with the medium, and passed through the insulating pipe wall. The signal voltage U_M which is proportional to the flow velocity is converted by an associated transmitter into appropriate standard signals such as 4 to 20 mA.

SITRANS F M diagnostics

The diagnostic functions are all internal tools in the meter:

- Identification in clear text and error log
- Error categories: function; warning; permanent and fatal errors
- Transmitter self-check including all outputs and the accuracy
- Sensor check: coil and electrode circuit test
- Overflow
- Empty pipe: partial filling; low conductivity; electrode fouling

SITRANS F M Verificator (MAG 5000 and 6000)

The SITRANS F M Verificator is an external tool designed for MAG 5000 and MAG 6000 with MAG 1100, MAG 1100 F, MAG 3100, MAG 3100 P or MAG 5100 W sensors to verify the entire product, the installation and the application.

The goal is to improve operation, reduce downtime and maintain measurement accuracy as long as possible.

The SITRANS F M Verificator is highly advanced and carries out the complex verification and performance check of the entire flowmeter system, according to unique Siemens patented principles. The whole verification test is automated and easy to operate so there is no opportunity for human error or influence. The system is traceable to international standards and tested by WRc (Water Research Council).



SITRANS F M Verificator

- Stand alone Verificator to measure a number of selected parameters in the flow sensor and a transmitter which affects the integrity of the flow measurement
- Up to 20 measurements can be stored in the Verificator
- The Verificator can be connected via a serial cable to a PC enabling download of the data. A Windows program enables printing and management of vericator reports.

Verification - Steps

Verification of a SITRANS F M flowmeter consists of the following test routines:

1. Transmitter test
2. Flowmeter and cable insulation test
3. Sensor magnetism test

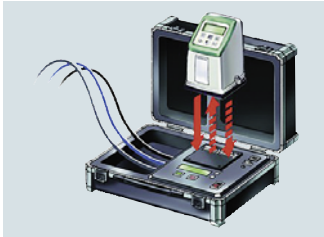
Flow Measurement

SITRANS F M

SITRANS F M Vericator

1. Transmitter test

The transmitter test is the traditional way of on-site testing on the market and checks the complete electronic system from signal input to output.

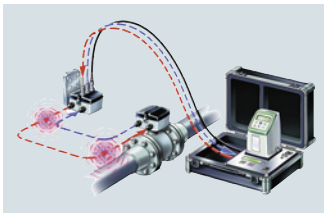


Transmitter test

Using the excitation power output, which is generated to drive the magnetic field of the sensor, the vericator simulates flow signal to the transmitter input. By measuring the transmitter outputs the vericator calculates its accuracy against defined values. Test includes:

- Excitation power to drive the magnetic field
- Signal function from signal input to output
- Signal processing – gain, offset and linearity
- Test of analogue and frequency output

2. Insulation test



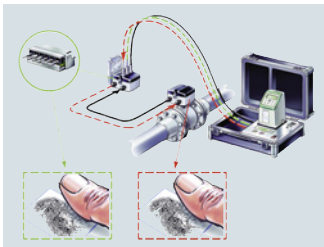
Flowmeter insulation test

The verification test of the flowmeter insulation is a „cross talk“ test of the entire flowmeter which ensures that the flow signal generated in the sensor is not affected by any external influences.

In the "cross-talk" test the vericator generates a high voltage disturbance within the coil circuit and then looks for any "cross-talk" induced in the flow signal circuit. By generating dynamic disturbances close-coupled to the flow signal, the flowmeter is tested for noise immunity to a maximum level:

- EMC influence on the flow signal
- Moisture in sensor, connection and terminal box
- Non-conductive deposit coating the electrodes within the sensor
- Missing or poor grounding, shielding and cable connection.

3. Sensor magnetism test



Sensor magnetism test

The verification of the sensor magnetism is a "boost" test of the magnetic field coil. The test ensures that the magnetism behaviour is like the first time, by comparing the current sensor magnetism with the "fingerprint" which was determined during initial calibration and stored in the SENSORPROM memory unit. In the "boost" test the vericator changes the magnetic field in certain pattern and with high voltage to get quick stable magnetic condition. This unique test is fulfilled without any interference or compensation of surrounding temperature or interconnecting cabling.

- Changes in dynamic magnetic behaviour
- Magnetic influence inside and outside the sensor
- Missing or poor coil wire and cable connection

Certificate

The test certificate generated by a PC contains:

- Test result with passed or failed
- Installation specification
- Flowmeter specification and configuration
- Vericator specification with date of calibration ensuring traceability to international standards.

MAGFLO® Verification Certificate									
Customer:					MAGFLO® Identification:				
Name _____					TAG No./Name 0				
Address _____					Sensor Code No. 7ME634				
					Sensor Serial No. 057701H142				
Phone _____					Transmitter Code No. 7ME692				
Email _____					Transmitter Serial No. 109418N080				
					Location _____				
Results:									
Verification file name or No. FT-103FT2801									
Transmitter Passed									
Sensor Insulation Passed									
Magnetic Circuit Passed									
Velocity		Current Output			Frequency Output				
Theoretical	Theoretical	Actual	Deviation	Theoretical	Actual	Deviation			
0.5m/s	4.800mA	4.802mA	0.25%	0.500kHz	0.501kHz	0.11%			
1.0m/s	5.600mA	5.601mA	0.08%	1.000kHz	1.001kHz	0.07%			
3.0m/s	8.800mA	8.804mA	0.08%	3.000kHz	3.004kHz	0.14%			
Current Output 4-20mA				Frequency Output 0-10kHz					
Transmitter Settings:					Sensor Details:				
Basic Qmax. 2.00000 m³/h					Size DN 15 1/2 IN				
Flow Direction Positive					Cal. Factor 0.16531426				
Low flow Cut-off 1.50%					Correction Factor 1.0				
Empty Pipe ON					Excitation Freq. 12.5Hz				
Output Current Output ON (4-20mA)									
Time Constant 5.0 Sec.									
Relay Output Error Level									
Digital Output Pulse									
Frequency Range N/A									
Time Constant N/A									
Volume/pulse 1.0 l/p									
Pulse width 0.51999998 sec.									
Pulse polarity Positiv									
Totalizer 1 value before test 819442.93213 l					Vericator Details (083F5060)				
Totalizer 1 value after test 819458.92334 l					Serial No. 107920N490				
Totalizer 2 value before test 693.87579 l					Device No. 94683				
Totalizer 2 value after test 693.88145 l					Software Version 1.40				
Operating time in days 1068					PC-Software Version 5.01				
					Cal. date 2015.10.26				
					ReCal. date 2016.10.26				
Comments									
These tests verify that the flowmeter is functioning within 2% deviation of the original test parameters.									
Verification is traceable to National and International Standards.									
Date and signature _____									
2016.10.26									

Description

SITRANS F M Vericator

- 11 ... 30 V DC, 11 ... 24 V AC, 115 ... 230 V, 50 Hz
- 11 ... 30 V DC, 11 ... 24 V AC, 115 ... 230 V, 60 Hz

Article No.

FDK:083F5060

FDK:083F5061

Note:

It is mandatory to have the Vericator returned to the factory once a year for check and re-verification.

Overview



Transmitter MAG 5000/6000 compact version (left) and 19" insert version (right)

The MAG 5000 and 6000 are transmitters engineered for high performance, easy installation, commissioning and maintenance. The transmitters evaluate the signals from the SITRANS F M sensors type MAG 1100, MAG 1100 F, MAG 3100, MAG 3100 P and MAG 5100 W.

Transmitter types:

- MAG 5000: Max. measuring error $\pm 0.4 \% \pm 1 \text{ mm/s}$ (incl. sensor)
- MAG 6000: Max. measuring error $\pm 0.2 \% \pm 1 \text{ mm/s}$ (incl. sensor, see also sensor specifications) and with additional features such as: "plug & play" add-on bus modules; integrated batch functions.

Benefits

- Superior signal resolution for optimum turn down ratio
- Digital signal processing with many possibilities
- Automatic reading of SENSORPROM data for easy commissioning
- User configurable operation menu with password protection.
- 3 lines, 20 characters display in 11 languages.
- Flow rate in various units
- Totalizer for forward, reverse and net flow as well as additional information available
- Multiple functional outputs for process control, minimum configuration with analogue, pulse/frequency and relay output (status, flow direction, limits)
- Comprehensive self-diagnostic for error indication and error logging (see under SITRANS F M diagnostics)
- Batch control (MAG 6000 only)
- Custody transfer approval: PTB, OIML R 117, OIML R 49, MI-001, PTB K 7.2 and OE12/C 040 for chilled water
- MAG 6000 with add-on bus modules for HART, FOUNDATION Fieldbus H1, DeviceNet, Modbus RTU/RS 485, PROFIBUS PA and DP

Application

The SITRANS F M flowmeters are suitable for measuring the flow of almost all electrically conductive liquids, pastes and slurries. The main applications can be found in:

- Water and waste water
- Chemical and pharmaceutical industries
- Food and beverage industries
- Power generation and utility

Design

The transmitter is designed as either IP67 NEMA 4X/6 enclosure for compact or wall mounting or 19" version as a 19" insert as a base to be used in:

- 19" rack systems
- Front panel mounting IP65/NEMA 2
- Panel mounting IP20/NEMA 1
- Wall mounting IP66/NEMA 4X

Several options on 19" versions are available such as:

- Transmitters mounted in safe area for Ex ATEX approved flow sensors (incl. barriers)
- Transmitters with electrode cleaning unit on request

Function

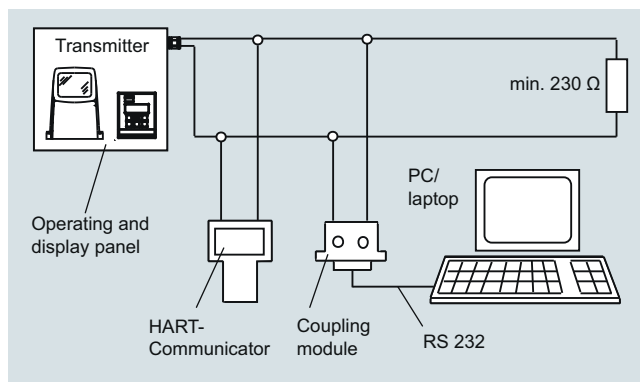
The MAG 5000/6000 are transmitters with a built-in alphanumeric display in several languages. The transmitters evaluate the signals from the associated electromagnetic sensors and also fulfil the task of a power supply unit which provides the magnet coils with a constant current.

Further information on connection, mode of operation and installation can be found in the data sheets for the sensors.

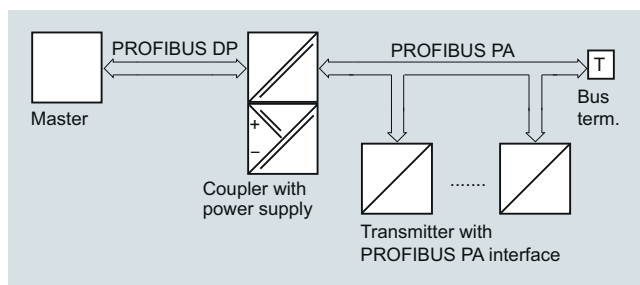
Displays and controls

Operation of the transmitter can be carried out using:

- Control and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS or Modbus communication



HART communication



PROFIBUS PA communication

Flow Measurement

SITRANS F M

Transmitter MAG 5000/6000

Technical specifications

Mode of operation and design	
Measuring principle	Electromagnetic with pulsed constant field
Empty pipe	Detection of empty pipe (special cable required in remote mounted installation)
Excitation frequency	Depend on sensor size
Electrode input impedance	$> 1 \times 10^{14} \Omega$
Input	
Digital input	11 ... 30 V DC, $R_i = 4.4 \text{ K}\Omega$
• Activation time	50 ms
• Current	$I_{11 \text{ V DC}} = 2.5 \text{ mA}$, $I_{30 \text{ V DC}} = 7 \text{ mA}$
Output	
Current output	
• Signal range	0 ... 20 mA or 4 ... 20 mA
• Load	$< 800 \Omega$
• Time constant	0.1 ... 30 s, adjustable
Digital output	
• Frequency	0 ... 10 kHz, 50 % duty cycle (uni/bidirectional)
• Pulse (active)	24 V DC, 30 mA, $1 \text{ K}\Omega \leq R_i \leq 10 \text{ K}\Omega$, short-circuit-protected (power supplied from flowmeter)
• Pulse (passive)	3 ... 30 V DC, max. 110 mA, $200 \Omega \leq R_i \leq 10 \text{ K}\Omega$ (powered from connected equipment)
• Time constant	0.1 ... 30 s, adjustable
Relay output	
• Time constant	Changeover relay, same as current output
• Load	42 V AC/2 A, 24 V DC/1 A
Low flow cut off	0 ... 9.9 % of maximum flow
Galvanic isolation	All inputs and outputs are galvanically isolated.
Max. measuring error (incl. sensor and zero point)¹⁾	
• MAG 5000	0.4 % $\pm 1 \text{ mm/s}$
• MAG 6000	0.2 % $\pm 1 \text{ mm/s}$
Rated operation conditions	
Ambient temperature	
• Operation	<ul style="list-style-type: none"> Display version: -20 ... +60 °C (-4 ... +140 °F) Blind version: -20 ... +60 °C (-4 ... +140 °F) MI-001 version: -25 ... +55 °C (-13 ... +131 °F) Custody transfer (CT) version: -20 ... +50 °C (-4 ... +122 °F)
• Storage	-40 ... +70 °C (-40 ... +158 °F)
Mechanical load (vibration)	
Compact version	18 ... 1000 Hz, 3.17 g RMS, sinusoidal in all directions to IEC 60068-2-36
19" insert	1 ... 800 Hz, 1 g, sinusoidal in all directions to IEC 60068-2-36
Degree of protection	
Compact version	IP67/NEMA 4X/6 to IEC 529 and DIN 40050 (1 mH ₂ O 30 min.)
19" insert	IP20/NEMA 1 to IEC 529 and DIN 40050
EMC performance	IEC/EN 61326-1 (all environments) IEC/EN 61326-2-5

Display and keypad	
Totalizer	Two eight-digit counters for forward, net or reverse flow
Display	Background illumination with alphanumeric text, 3 x 20 characters to indicate flow rate, totaled values, settings and faults; Reverse flow indicated by negative sign
Time constant	Time constant as current output time constant
Design	
Enclosure material	Fiber glass reinforced polyamide; stainless steel AISI 316/1.4436 (IP65)
• Compact version	Standard 19" insert of aluminum/steel (DIN 41494), width: 21 TE, height: 3 HE
• 19" insert	IP20/NEMA 1; Aluminum
• Back of panel	IP20/NEMA 1 (prepared for IP65/NEMA 2 display side); ABS plastic
• Panel mounting	IP66/NEMA 4X; ABS plastic
• Wall mounting	
Dimensions	
Compact version	See dimensional drawings
19" insert	See dimensional drawings
Weight	
Compact version	0.75 kg (2 lb)
19" insert	See dimensional drawings
Power supply	<ul style="list-style-type: none"> 115 ... 230 V AC +10 % -15 %, 50 ... 60 Hz 11 ... 30 V DC or 11 ... 24 V AC
Power consumption	<ul style="list-style-type: none"> 230 V AC: 17 VA 24 V AC: 9 VA, $I_N = 380 \text{ mA}$, $I_{ST} = 8 \text{ A}$ (30 ms) 12 V DC: 11 W, $I_N = 920 \text{ mA}$, $I_{ST} = 4 \text{ A}$ (250 ms) 24 V DC: 8.4 VA, $I_N = 350 \text{ mA}$, $I_{ST} = 4 \text{ A}$ (10 ms) <p>$I_{ST} = 4 \text{ A}$ (250 ms): For solar panel please secure stable current supply</p>
Certificates and approvals	
General purpose	<ul style="list-style-type: none"> CE (LVD, EMC, PED, RoHS) UL (c-UL-us)
Hazardous areas	<ul style="list-style-type: none"> FM, CSA - NI Class I Div. 2 Groups A, B, C, D
Custody transfer	<ul style="list-style-type: none"> Cold water: MI-001 Chilled water - PTB K 7.2 (Germany) - OE12/C 040 (Austria) - TS 27.02 008 (Denmark)
Marine	<ul style="list-style-type: none"> ABS Bureau Veritas DNV GL Lloyd' s Register of Shipping
(only for remote version with MAG 5100 W, DN 50 ... DN 300)	<ul style="list-style-type: none"> CMC/CPA (China) C-TICK (Australia and New Zealand EMC) EAC (Russia, Belarus, Kazakhstan) KCC (South Korea)
Others	

Communication

Standard

- MAG 5000

- MAG 6000

Optional (MAG 6000 only)

- MAG 5000/6000 CT

Without serial communication or HART as option
 Prepared for client-mounted add-on modules
 HART, Modbus RTU/RS 485, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS PA, PROFIBUS DP as add-on modules
 No communication modules approved

1) For detailed accuracy specifications, see page 3/20

Safety barrier (e/ia)


Application	For use with MAG 5000/6000 19" and MAG 1100 Ex/MAG 3100 Ex		
Ex approval	MAG 1100 Ex [EEx e ia] IIB ATEX, EAC Ex MAG 3100 Ex [EEx e ia] IIC ATEX, EAC Ex		
Cable parameter	Group	Capacity in μF	Inductance in mH
Electrode	IIC	≤ 4.1	≤ 80
	IIB	≤ 45	≤ 87
	IIA	≤ 45	≤ 87
Ambient temperature			
• During operation	-20 ... +50 °C (-4 ... +122 °F)		
• During storage	-20 ... +70 °C (-4 ... +158 °F)		
Enclosure			
• Material	Standard 19" insert in aluminum/steel (DIN 41494)		
• Width	21 TE (4.75")		
• Height	3 HE (5.25")		
• Rating	IP20 / NEMA 1 to EN 60529		
• Mechanical load	1 g, 1 ... 800 Hz sinusoidal in all directions to EN 60068-2-36		





Flow Measurement

SITRANS F M






Transmitter MAG 5000/6000






Selection and Ordering data

Transmitter MAG 5000

Description	Article No.	
Transmitter MAG 5000 Blind for compact and wall mounting; IP67/NEMA 4X/6, fibre glass reinforced polyamide		
• 11 ... 30 V DC/ 11 ... 24 V AC	7ME6910-1AA30-0AA0	
• 115 ... 230 V AC, 50/60 Hz	7ME6910-1AA10-0AA0	
Transmitter MAG 5000 Display for compact and wall mounting; IP67/NEMA 4X/6, fibre glass reinforced polyamide		
• 11 ... 30 V DC/ 11 ... 24 V AC	7ME6910-1AA30-1AA0	
• 115 ... 230 V AC, 50/60 Hz	7ME6910-1AA10-1AA0	
• 115 ... 230 V AC, 50/60 Hz, with HART	7ME6910-1AA10-1BA0	
Transmitter MAG 5000 CT for compact and wall mounting, approved for custody transfer, without verification (no approval marks - only a complete flowmeter can be verified, i.e. sensor together with the transmitter); IP67/NEMA 4X/6, fibre glass reinforced polyamide		
• 11 ... 30 V DC/ 11 ... 24 V AC	7ME6910-1AA30-1AD0	
• 115 ... 230 V AC, 50/60 Hz	7ME6910-1AA10-1AD0	
Transmitter MAG 5000 for 19" rack and wall mounting		
• 11 ... 30 V DC/ 11 ... 24 V AC	7ME6910-2CA30-1AA0	
• 115 ... 230 V AC, 50/60 Hz	7ME6910-2CA10-1AA0	

Transmitter MAG 6000

Description	Article No.	
Transmitter MAG 6000 Blind for compact and wall mounting; IP67/NEMA 4X/6, fibre glass reinforced polyamide		
• 11 ... 30 V DC/ 11 ... 24 V AC	7ME6920-1AA30-0AA0	
• 115 ... 230 V AC, 50/60 Hz	7ME6920-1AA10-0AA0	
Transmitter MAG 6000 for compact and wall mounting; IP67/NEMA 4X/6, fibre glass reinforced polyamide		
• 11 ... 30 V DC/ 11 ... 24 V AC	7ME6920-1AA30-1AA0	
• 115 ... 230 V AC, 50/60 Hz	7ME6920-1AA10-1AA0	
Transmitter MAG 6000 for compact and wall mounting; IP65/NEMA 4, stainless steel AISI 316/1.4436 (only for sensor with stainless steel terminal box) (for remote version order stainless steel terminal box separately)		
• 11 ... 30 V DC/ 11 ... 24 V AC	7ME6920-1QA30-1AA0	
• 115 ... 230 V AC, 50/60 Hz	7ME6920-1QA10-1AA0	
Transmitter MAG 6000 CT for compact and wall mounting, approved for custody transfer, without verification (no approval marks - only a complete flowmeter can be verified, i.e. sensor together with the transmitter); IP67/NEMA 4X/6, fibre glass reinforced polyamide		
• 11 ... 30 V DC/ 11 ... 24 V AC	7ME6920-1AA30-1AD0	
• 115 ... 230 V AC, 50/60 Hz	7ME6920-1AA10-1AD0	
<u>Spare part transmitter for CT systems produced before 12/2016 or with firmware version 3.03</u>		
• 11 ... 30 V DC/ 11 ... 24 V AC	7ME6920-1AA30-1AB0	
• 115 ... 230 V AC, 50/60 Hz	7ME6920-1AA10-1AB0	
Transmitter MAG 6000 SV for compact and wall mounting; special excitation frequency 44 Hz for Batch application DN ≤ 25/1" IP67/NEMA 4X/6, fibre glass reinforced polyamide		
11 ... 30 V DC/ 11 ... 24 V AC	7ME6920-1AB30-1AA0	
115 ... 230 V AC, 50/60 Hz	7ME6920-1AB10-1AA0	


Description	Article No.	
Transmitter MAG 6000 for 19" rack and wall mounting		
• 11 ... 30 V DC/ 11 ... 24 V AC	7ME6920-2CA30-1AA0	
• 115 ... 230 V AC, 50/60 Hz	7ME6920-2CA10-1AA0	
Transmitter MAG 6000 SV for 19" rack and wall mounting; special excitation frequency 44 Hz for Batch application DN ≤ 25/1"		
• 11 ... 30 V DC/ 11 ... 24 V AC	7ME6920-2CB30-1AA0	
• 115 ... 230 V AC, 50/60 Hz	7ME6920-2CB10-1AA0	
MAG 6000 19" insert, complete mounted with IP66/ NEMA 4X wall mounting enclosure in ABS plastic; 115 ... 230 V AC, 50/60 Hz; cable gland PG13.5	7ME6920-2EA10-1AA0	
MAG 6000 19" insert with safety barrier for Ex-approved sensors, complete mounted with IP66/NEMA 4X wall mounting enclosure in ABS plastic; 115 ... 230 V AC, 50/60 Hz; cable gland PG13.5		
• For ATEX 2G D sensors	7ME6920-2MA11-1AA0	
MAG 6000 SV 19" insert, complete mounted with IP66/NEMA 4X wall mounting enclosure in ABS plastic, special excitation frequency 44 Hz for Batch application DN ≤ 25/1"; cable gland PG13.5		
• 11 ... 30 V DC, 11 ... 24 V AC	7ME6920-2EB30-1AA0	
• 115 ... 230 V AC, 50/60 Hz	7ME6920-2EB10-1AA0	

Operating instructions for SITRANS F M MAG 5000/6000

Description	Article No.	
For SITRANS F M MAG 5000/6000 IP67		
• English	A5E02338368	
• German	A5E02944982	
For SITRANS F M MAG 5000/6000 19"		
• English	A5E02082880	

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Communication modules for MAG 6000



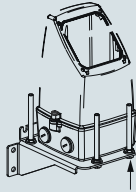


Description	Article No.	
HART (not for MAG 6000 I)	FDK:085U0226	
Modbus RTU/RS 485	FDK:085U0234	
PROFIBUS PA Profile 3	FDK:085U0236	
PROFIBUS DP Profile 3	FDK:085U0237	
DeviceNet	FDK:085U0229	
FOUNDATION Fieldbus H1	A5E02054250	

Operating instructions for SITRANS F add-on modules

Description	Article No.	
HART		
• English	A5E03089708	
PROFIBUS PA/DP		
• English	A5E00726137	
• German	A5E01026429	
Modbus		
• English	A5E00753974	
• German	A5E03089262	
FOUNDATION Fieldbus		
• English	A5E02318728	
• German	A5E02488856	
DeviceNet		
• English	A5E03089720	

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Accessories for MAG 5000 and MAG 6000




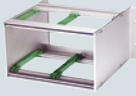
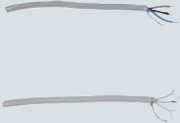









Description	Article No.	
Accessory kit for remote use of sensor with two 5-pin terminal blocks	A5E34827189	
Wall mounting unit for MAG 5000/6000 IP67/NEMA 4X/6, terminal box in polyamide ¹⁾		
• 4 x M20 cable glands	FDK:085U1018	
• 4 x 1/2" NPT cable glands	FDK:085U1053	
Special wall mounting unit for MAG 5000/6000 IP67/ NEMA 4X/6, mounting bracket in stainless steel AISI 316 (1.4401), terminal box in polyamide		
• 4 x M20 cable glands	A5E36699702	
• 4 x 1/2" NPT cable glands	A5E36699938	
Sun lid for MAG 5000/6000 transmitter (Frame and lid)	A5E02328485	
Standard coil or electrode cable, 3 x 1.5 mm ² / 18 gage, single shielded with PVC jacket, Temp. range: -30 ... +70 °C (-22 ... +158 °F)		
• 5 m (16.5 ft)	A5E02296523	
• 10 m (33 ft)	FDK:083F0121	
• 20 m (65 ft)	FDK:083F0210	
• 30 m (98 ft)	A5E02297309	
• 40 m (131 ft)	FDK:083F0211	
• 50 m (164 ft)	A5E02297317	
• 60 m (197 ft)	FDK:083F0212	
• 100 m (328 ft)	FDK:083F0213	
• 150 m (492 ft)	FDK:083F3052	
• 200 m (656 ft)	FDK:083F3053	
• 500 m (1640 ft)	FDK:083F3054	

¹⁾ For stainless steel wall mounting kit, order:
- M20: FDK:085U1018 and A5E00836867
- 1/2" NPT: FDK:085U1053 and A5E00836868

Flow Measurement

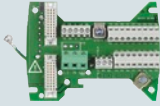







SITRANS F M











Transmitter MAG 5000/6000

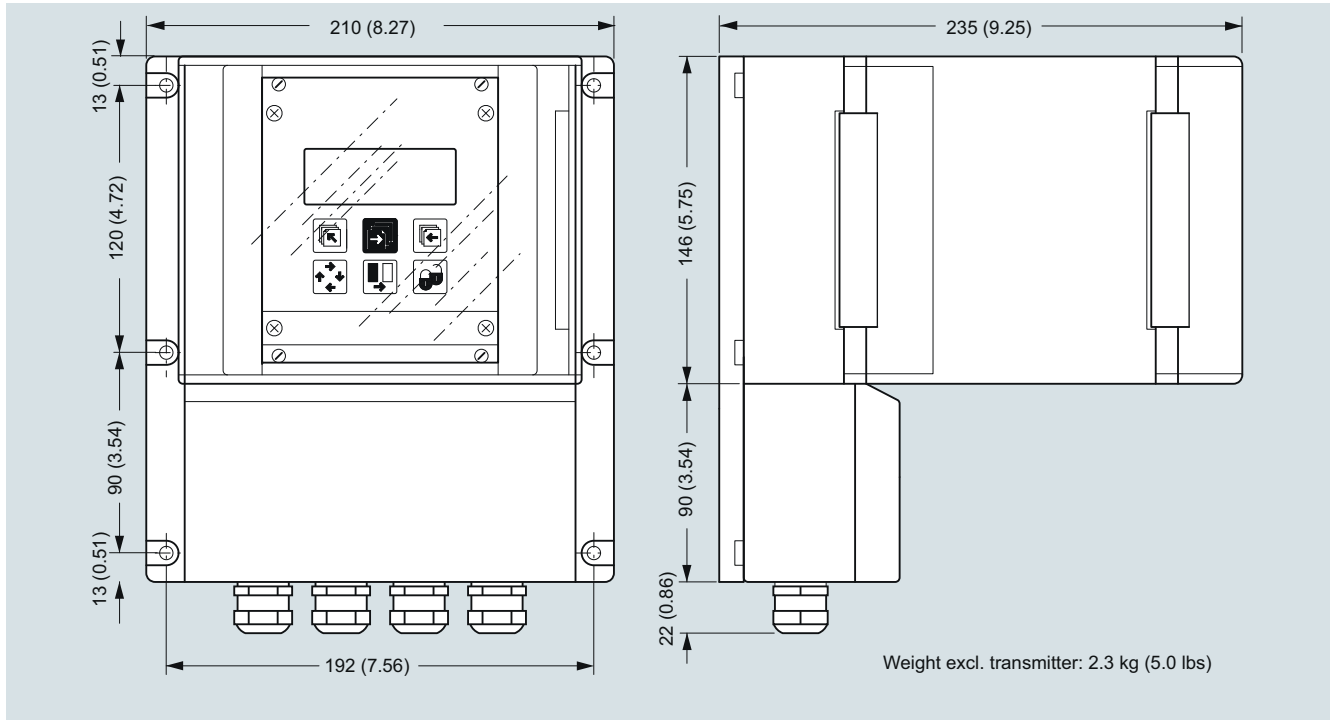
Description	Article No.		Description	Article No.	
Special electrode cable ¹⁾ (empty pipe detection or low conductivity), 3 x 0.25 mm ² , double shielded with PVC jacket; Temperature range : -30 ... +70 °C (-22 ... +158 °F)			Panel mounting enclosure IP20/NEMA 1 in aluminium for 19" insert (21 TE)	FDK:083F5032	
• 10 m (33 ft)	FDK:083F3020				
• 20 m (65 ft)	FDK:083F3095				
• 40 m (131 ft)	FDK:083F3094				
• 60 m (197 ft)	FDK:083F3093				
• 100 m (328 ft)	FDK:083F3092				
• 150 m (492 ft)	FDK:083F3056				
• 200 m (656 ft)	FDK:083F3057				
• 500 m (1640 ft)	FDK:083F3058				
Low-noise electrode coax cable for low conductivity and high vibration levels, 3 x 0.13 mm ² ; Temp. range: -25 ... +85 °C (-13 ... +185 °F)			Panel mounting enclosure IP20/NEMA 1 in aluminium for 19" insert (42 TE)	FDK:083F5033	
• 2 m (6.6 ft)	A5E02272692				
• 5 m (16.5 ft)	A5E02272723				
• 10 m (33 ft)	A5E02272730				
Cable kit including standard coil cable (3 x 1.5 mm ² / 18 gage, single shielded with PVC jacket) and special electrode cable ¹⁾ (3 x 0.25 mm ² , double shielded with PVC jacket); Temperature range: -30 ... +70 °C (-22 ... +158 °F)			Wall mounting enclosure IP66/NEMA 4X in ABS plastic for 19" insert (cable glands and connection board not included)	FDK:083F5037	
• 5 m (16.5 ft)	A5E02296329		• 21 TE	FDK:083F5037	
• 10 m (33 ft)	A5E01181647		• 42 TE	FDK:083F5038	
• 15 m (49 ft)	A5E02296464				
• 20 m (65 ft)	A5E01181656				
• 25 m (82 ft)	A5E02296490				
• 30 m (98 ft)	A5E02296494				
• 40 m (131 ft)	A5E01181686				
• 50 m (164 ft)	A5E02296498				
• 60 m (197 ft)	A5E01181689				
• 100 m (328 ft)	A5E01181691				
• 150 m (492 ft)	A5E01181699				
• 200 m (656 ft)	A5E01181703				
• 500 m (1640 ft)	A5E01181705				
Potting kit for IP68/NEMA 6P sealing of sensor junction box	FDK:085U0220		Front cover (7TE) for panel mounting enclosure	FDK:083F4525	
19" safety barrier (21 TE) ¹⁾ [Ex e ia] IIC for MAG 1100 Ex sensors and MAG 3100 Ex sensors 12 ... 24 V, 115 ... 230 V, incl. back plate (A5E02559810)	FDK:083F5034		Sun shield for MAG 5000/6000 transmitters in remote design	A5E01209496	
Front panel mounting enclosure IP65/NEMA 2 in ABS plastic for 19" insert (21 TE)	FDK:083F5030		Sun Shield for MAG 5000/6000 transmitter in compact design on MAG 3100 (DN 15 ... 2000/1/2" ... 78") or MAG 5100 W (DN 150 ... 1200/6" ... 48")	A5E01209500	
Front panel mounting enclosure IP65/NEMA 2 in ABS plastic for 19" insert (42 TE)	FDK:083F5031				

¹⁾ Special cables cannot be used with 19" safety barrier

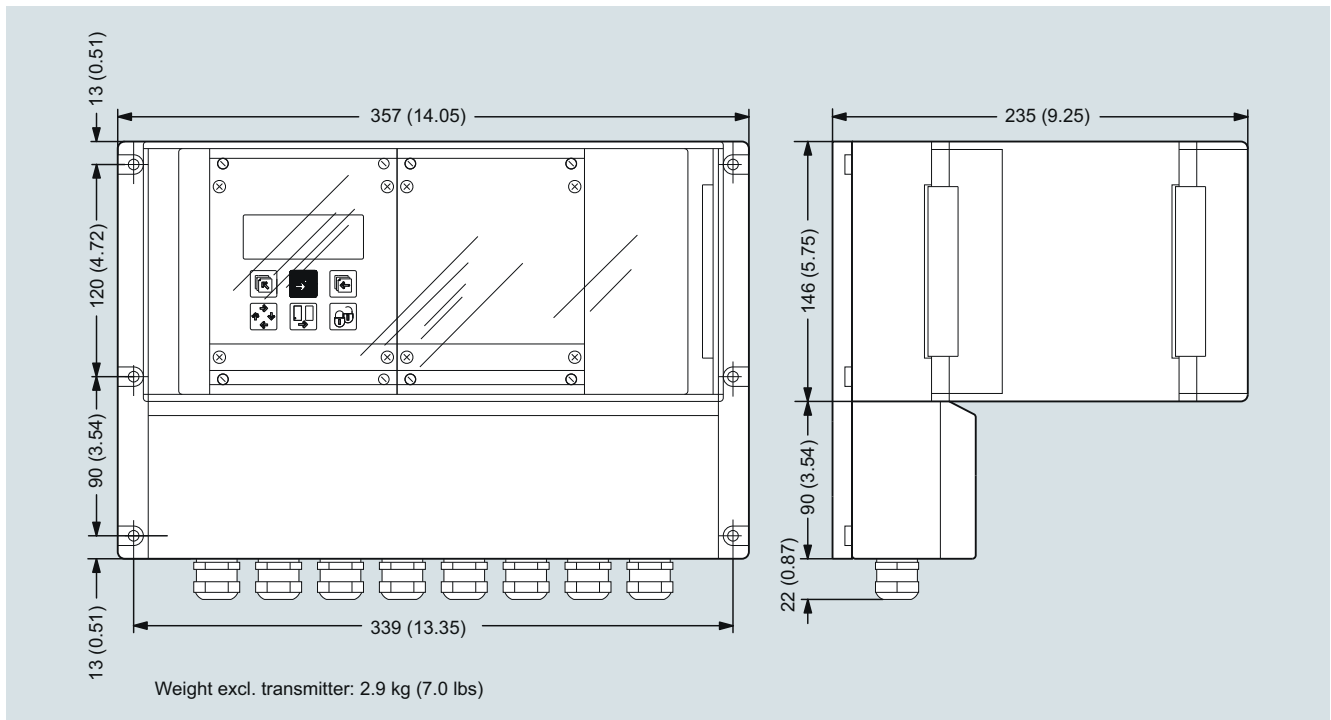
Spare parts

Description	Article No.	
Connection board (for polyamide terminalbox)		
• 12 ... 24 V	A5E02559817	
• 115 ... 230 V	A5E02559816	
Connection board (for stainless steel terminalbox)		
• 12 ... 24 V	A5E02604280	
• 115 ... 230 V	A5E02604272	
Connection board MAG 5000/6000 19" insert for panel mounting enclosure, 12 ... 24 V/115 ... 230 V	A5E02559809	
Connection board MAG 5000/6000 19" insert with safety barrier for panel mount- ing enclosure, 12 ... 24 V/115 ... 230 V	A5E02559810	
Connection board MAG 5000/6000 19" insert with safety barrier for panel mount- ing enclosure, 12 ... 24 V/115 ... 230 V (only for sensors produced before October 2007)	A5E02559811	
Connection board MAG 5000/6000 19" insert with cleaning unit for panel mount- ing enclosure, 12 ... 24 V/115 ... 230 V	FDK:083F4123	
SENSORPROM memory unit (Sensor code and serial num- bers must be specified on order)		
• 2 kB (for MAG 5000/6000/ MAG 6000 I)	FDK:085U1005	
- 1 pc.	FDK:083F5052	
- 10 pcs.	FDK:085U1008	
• 250 B (for MAG 2500/3000)		
Display unit for MAG 5000/6000		
• Black neutral front	FDK:085U1038	
• Siemens front	FDK:085U1039	
HW key	On request	
Cable glands (polyamide), 4 pcs.		
• M20	A5E00822490	
• ½" NPT	A5E00822501	
• PG 13.5, 2 pcs.	FDK:083G0228	½" NPT M20

Description	Article No.	
Sealing screws for sensor/ transmitter, 2 pcs	FDK:085U0221	
Terminal box, in polyamide, inclusive lid, terminal blocks, gasket and screws		
• M20	FDK:085U1050	
• ½" NPT	FDK:085U1052	
Terminal box lid, in polyamide	FDK:085U1003	
Terminal box, in stainless steel, inclusive lid, terminal blocks, gasket and screws, for MAG 6000 in stainless steel and for all Ex sensors,		
• M20	A5E00836867	
• ½" NPT	A5E00836868	
Terminal box (3A) for MAG 1100 F in polyamide, inclusive lid, terminal blocks, gasket and screws		
• M20	A5E00822478	
• ½" NPT	A5E00822479	
Gasket for terminal box lid in polyamide or for MAG 5000/ 6000 IP67/ NEMA 4X/6 enclo- sure in polyamide (5 pcs.)	A5E37086797	
Spare part kit for remote use of sensor with 20 pcs. 5-pin ter- minal blocks	A5E34346873	
Display frame in polyamide for MAG 5000/6000 IP67/ NEMA 4X/6 (5 pcs.)	A5E43491675	
Connection board MAG 5000/6000 19" insert for wall mounting enclosure, 12 ... 24 V / 115 ... 230 V	A5E02559813	
Connection board MAG 5000/ 6000 19" insert with safety bar- rier for wall mounting enclosure, 12 ... 24 V/115 ... 230 V	A5E02559814	
Connection board MAG 5000/ 6000 19" insert with safety bar- rier for wall mounting enclo- sure, 12 ... 24 V/115 ... 230 V (only for sensors produced before October 2007)	A5E02559812	
Connection board MAG 5000/ 6000 19" insert with cleaning unit for wall mounting enclo- sure, 12 ... 24 V/115 ... 230 V	A5E02559815	
SENSORPROM programmer with RS 232 interface	FDK:083H4246	

Transmitter, wall mounting IP66/NEMA 4X, 21 TE


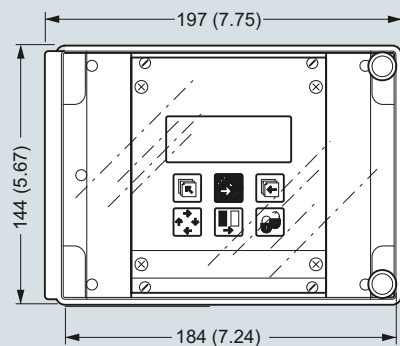
Dimensions in mm (inch)

Transmitter, wall mounting IP66/NEMA 4X, 42 TE


Dimensions in mm (inch)

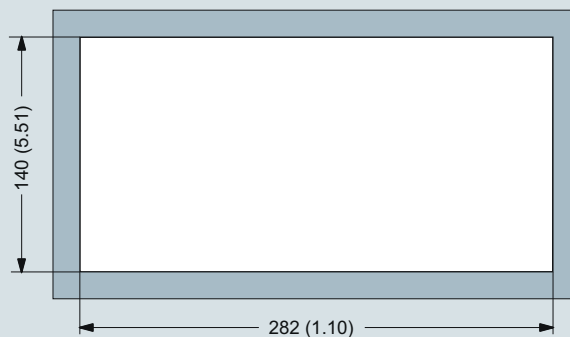
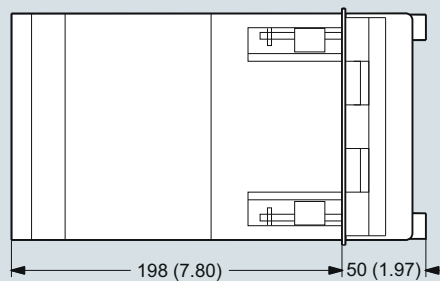
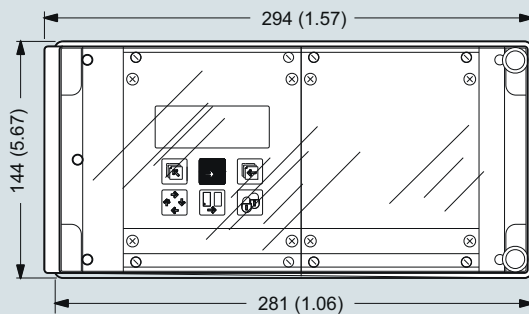
Flow Measurement

SITRANS F M

Transmitter MAG 5000/6000**Transmitter, panel front IP20/NEMA 1, 21 TE**

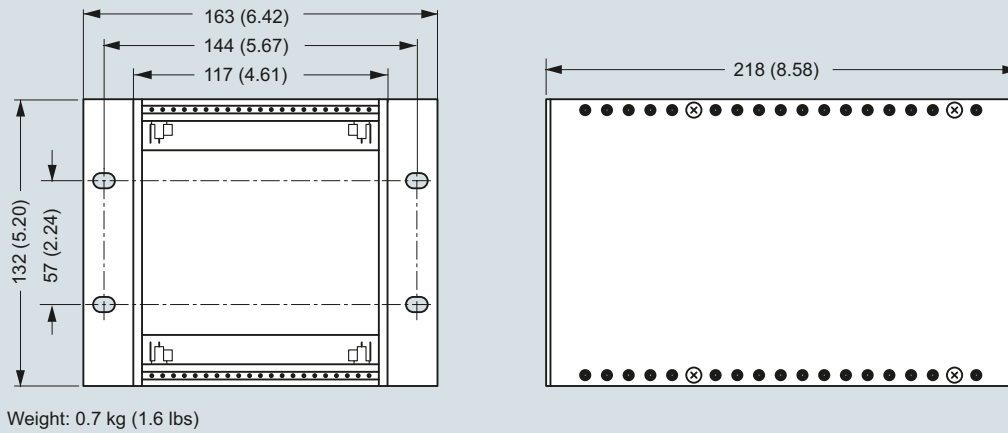
Weight excl. transmitter: 1.2 kg (2.7 lbs)

Dimensions in mm (inch)

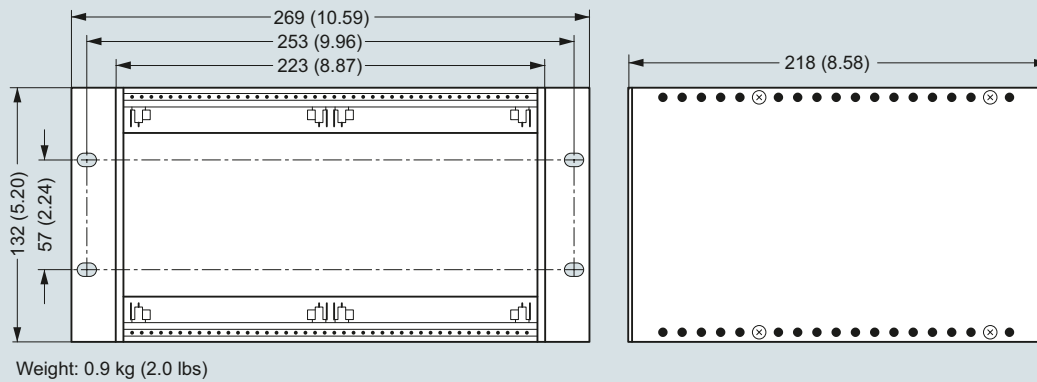
Transmitter, panel front IP20/NEMA 1, 42 TE

Weight excl. transmitter: 1.6 kg (3.5 lbs)

Dimensions in mm (inch)

Transmitter, back of panel IP20/NEMA 1, 21 TE


Dimensions in mm (inch)

Transmitter, back of panel IP20/NEMA 1, 42 TE


Dimensions in mm (inch)

Transmitter MAG 5000/6000

Electrical connection

PE must be connected due to safety class 1 power supply.

When mounting a mechanical counter to terminals 57 and 58 (active output), a 1000 μ F capacitor must be connected to the terminals 56 and 58. Capacitor + is connected to terminal 56 and capacitor - to terminal 58.

If the output cable length is long in noisy environment, we recommend to use shielded cable.



Overview



The SITRANS F M MAG 6000 I/MAG 6000 I Ex transmitter is designed for the demands in the process industry. The robust die cast aluminum housing provides superb protection, even in the most harsh industrial environments. Full input and output functionality is given even in the Ex version.

Benefits

- Full range of Ex-rated flowmeters with intrinsically safe rated input and outputs
- For compact or remote installation
- HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS PA and DP, Modbus RTU/RS 485 add-on communication modules available
- Superior signal resolution for optimum turn down ratio
- Digital signal processing with many possibilities
- Automatic reading of SENSORPROM data for easy commissioning
- User configurable operation menu with password protection
 - 3 lines, 20 characters display in 11 languages
 - Flow rate in various units
 - Totalizer for forward, reverse and net flow as well as much more information available.
- Multiple functional outputs for process control, minimum configuration with analogue, pulse/frequency and relay output (status, flow direction, limits)
- Comprehensive self-diagnostic for error indication and error logging
- Batch control
- MAG 6000 I NAMUR: compliant with NAMUR NE 21, NE 32, NE 43, NE 53 and NE 70

Design

The transmitter is designed for either compact or remote installation in non-hazardous or hazardous areas (compact mounted transmitter to be ordered together with the sensors).

Function

The following functions are available:

- Flow rate
- 2 measuring ranges
- 2 totalizers
- Low flow cut-off
- Flow direction
- Error system
- Operating time
- Uni-/bidirectional flow

- Limit switches and pulse output
- Batch control

The MAG 6000 I/6000 I Ex is a microprocessor-based transmitter with a built-in alphanumeric display in several languages. The transmitters evaluate the signals from the associated electromagnetic sensors and also fulfil the task of a power supply unit which provides the magnet coils with a constant current.

Further information on connection, mode of operation and installation can be found in the data sheets for the sensors.

Displays and keypads

Operation of the transmitter can be carried out using:

- Keypad and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS or Modbus communication

Technical specifications

Mode of operation and design	
Measuring principle	Electromagnetic with pulsed constant field
Empty pipe	Detection of empty pipe (special cable required in remote mounted installation)
Excitation frequency	Depend on sensor size
Electrode input impedance	$> 1 \times 10^{14} \Omega$
Input	
Digital input	11 ... 30 V DC, $R_i = 4.4 \text{ k}\Omega$
• Activation time	50 ms
• Current	$I_{11 \text{ V DC}} = 2.5 \text{ mA}$, $I_{30 \text{ V DC}} = 7 \text{ mA}$
Output	
Current output	
• Signal range	4 ... 20 mA (active/ passive)
• Load	$< 560 \Omega$
• Time constant	0.1 ... 30 s, adjustable
Digital output	
• Frequency	0 ... 10 kHz, 50 % duty cycle (uni-/bidirectional)
• Time constant	0.1 ... 30 s, adjustable
• Pulse (passive)	3 ... 30 V DC, max 110 mA (30 mA Ex version), $200 \Omega \leq R_i \leq 10 \text{ k}\Omega$ (powered from connected equipment)
• Time constant	0.1 ... 30 s, adjustable
Relay output	
• Time constant	Changeover relay, same as current output
• Load	42 V AC/2 A, 24 V DC/1 A
Low flow cut off	0 ... 9.9 % of maximum flow
Galvanic isolation	All inputs and outputs are galvanic isolated
Max. measuring error	
MAG 6000 I/MAG 6000 I Ex (incl. sensor)	$\pm 0.2 \% \pm 1 \text{ mm/s}$

Flow Measurement

SITRANS F M

Transmitter MAG 6000 I/6000 I Ex

Rated operation conditions

Ambient temperature

• Operation

- MAG 6000 I
- MAG 6000 I Ex

• Storage

Mechanical load

Degree of protection

EMC performance

-20 ... +60 °C (-4 ... +140 °F)

-20 ... +60 °C (14 ... 140 °F)

-40 ... +70 °C (-40 ... +158 °F)

18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36

Transmitter: 1.14 g RMS

IP67/NEMA 4X to IEC 529 and DIN 40050 (1 mH₂O 30 min.)IEC/EN 61326-1 (all environments)
IEC/EN 61326-2-5
NAMUR NE 21

Display and keypad

Totalizer

Display

Keypad

Time constant

Two eight-digit counters for forward, net or reverse flow

Background illumination with alphanumeric text, 3 x 20 characters to indicate flow rate, totalized values, settings and faults; Reverse flow indicated by negative sign

Capacitive touch keypad with LED light for feedback indication

Time constant as current output time constant

Design

Enclosure material

• Wall mounting

Dimensions

Weight

Die cast aluminum, with corrosion resistant Basic Polyester powder coating (min. 60 µm)

Wall mounting bracket enclosed for remote version

See dimensional drawings

See dimensional drawings

Power supply

- Standard transmitter: 18 ... 90 V DC; 115 ... 230 V AC +10 %/-15 %; 50 ... 60 Hz
- Ex transmitter: 18 ... 30 V DC
- Ex transmitter: 115 ... 230 V AC; 50 ... 60 Hz
- Ex transmitter NAMUR: 18 ... 30 V DC; 115 ... 230 V AC; 50 ... 60 Hz

Power consumption

- 230 V AC: 20 VA
- 24 V DC: 9.6 W, I_N = 0.4 A, I_{ST} = 1 A (3 ms)

Certificates and approvals

General purpose

Hazardous areas

- CE (LVD, EMC, PED, RoHS)
- ATEX, IECEx, FM, CSA, EAC Ex, NEPSI
 - Zone 1 Ex d e [ia] ia IIC T6 Gb
- ATEX, IECEx, CSA
 - Zone 21 Ex tD A21 IP67 T85 °C
- FM
 - XP IS Class I Div. 1 Groups A, B, C, D
 - DIP Class II+III Div. 1 Groups E, F, G

Others

- CMC/CPA (China)
- C-TICK (Australia and New Zealand EMC)
- EAC (Russia, Belarus, Kazakhstan)
- KCC (South Korea)

Cable entries

MAG 6000 I

MAG 6000 I Ex ATEX 2G D

Remote installation

2 x M25 (for supply/output) and 2 x M16 (for sensor connection) or 2 x ½" NPT (for supply/output) and 2 x M16 (for sensor connection)

2 x M20 (for supply/output) and 2 x M16 (for sensor connection)

Communication

Standard versions

HART, Modbus RTU/RS 485, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS PA, PROFIBUS DP add-on modules

Ex versions

HART, PROFIBUS PA,

1) Applicable for: Compact mounted MAG 6000 I Ex on MAG 3100 (sizes DN 15 ... DN 300 (½" ... 12"))

Selection and Ordering data

Article No.

SITRANS F M Transmitter MAG 6000 I

7ME6930-

Remote with standard wall mounting bracket, local display, die cast aluminum

2BA-1A

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Supply voltage

Standard transmitter:
18 ... 90 V DC; 115 ... 230 V AC, 50 ... 60 Hz

Standard transmitter (NAMUR):
18 ... 30 V DC; 115 ... 230 V AC, 50 ... 60 Hz

Ex transmitter: 18 ... 30 V DC

Ex transmitter: 115 ... 230 V AC, 50 ... 60 Hz

Ex transmitter (NAMUR):
18 ... 30 V DC; 115 ... 230 V AC, 50 ... 60 Hz

2

3

4

5

6

Ex approval

Standard sensor: FM Class I, Div 2, CSA Class I, Div 2

0

Ex sensor: Hazardous area (ATEX 2G D; FM Class I, Zone 1; CSA Class I, Zone 1)

2

Communication

None

HART

PROFIBUS PA Profile 3

PROFIBUS DP Profile 3 (not for Ex version)

Modbus RTU/RS 485 (not for Ex version)

FOUNDATION Fieldbus H1

A
B
F
G
E
J

Cable gland entries

Metric
½" NPT0
2

Selection and Ordering data

Order code

Further design

Please add "-Z" to Article No. and specify Order code(s) and plain text.

Tag name plate, stainless steel (specify in plain text)

Y17

Tag name plate, plastic (self adhesive)

Y18

Special version (specify in plain text)

Y99

Operating instructions for SITRANS F M MAG 6000 I

Description

Article No.

• English

A5E02083319

• German

A5E02210835

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Communication modules for MAG 6000 I
(All standard outputs can still be used)

Description	Article No.
HART (only for MAG 6000 I/Ex)	FDK:085U0321
Modbus RTU/RS 485 ¹⁾	FDK:085U0234
PROFIBUS PA Profile 3	FDK:085U0236
PROFIBUS DP Profile 3 ¹⁾	FDK:085U0237
DeviceNet ¹⁾	FDK:085U0229
FOUNDATION Fieldbus H1	A5E02054250

¹⁾ Not for Ex versions**Operating instructions for SITRANS F add-on modules**

Description	Article No.
HART, English	A5E03089708
PROFIBUS PA/DP	
• English	A5E00726137
• German	A5E01026429
Modbus	
• English	A5E00753974
• German	A5E03089262
FOUNDATION Fieldbus	
• English	A5E02318728
• German	A5E02488856
DeviceNet, English	A5E03089720

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Accessories MAG 6000 I/MAG 6000 I Ex

Description	Article No.
Standard coil or electrode cable, 3 x 1.5 mm ² /18 gage, single shielded with PVC jacket, Temperature range: -30 ... +70 °C (-22 ... +158 °F)	
• 5 m (16.5 ft)	A5E02296523
• 10 m (33 ft)	FDK:083F0121
• 20 m (65 ft)	FDK:083F0210
• 30 m (98 ft)	A5E02297309
• 40 m (131 ft)	FDK:083F0211
• 50 m (164 ft)	A5E02297317
• 60 m (197 ft)	FDK:083F0212
• 100 m (328 ft)	FDK:083F0213
• 150 m (492 ft)	FDK:083F3052
• 200 m (656 ft)	FDK:083F3053
• 500 m (1640 ft)	FDK:083F3054
Special electrode cable (empty pipe detection or low conductivity), 3 x 0.25 mm ² , double shielded with PVC jacket, Temperature range: -30 ... +70 °C (-22 ... +158 °F)	
• 10 m (33 ft)	FDK:083F3020
• 20 m (65 ft)	FDK:083F3095
• 40 m (131 ft)	FDK:083F3094
• 60 m (197 ft)	FDK:083F3093
• 100 m (328 ft)	FDK:083F3092
• 150 m (492 ft)	FDK:083F3056
• 200 m (656 ft)	FDK:083F3057
• 500 m (1640 ft)	FDK:083F3058



Description	Article No.
Cable kit including standard coil cable (3 x 1.5 mm ² /18 gage, single shielded with PVC jacket) and special electrode cable (3 x 0.25 mm ² , double shielded with PVC jacket); Temperature range: -30 ... +70 °C (-22 ... +158 °F)	
• 5 m (16.5 ft)	A5E02296329
• 10 m (33 ft)	A5E01181647
• 15 m (49 ft)	A5E02296464
• 20 m (65 ft)	A5E01181656
• 25 m (82 ft)	A5E02296490
• 30 m (98 ft)	A5E02296494
• 40 m (131 ft)	A5E01181686
• 50 m (164 ft)	A5E02296498
• 60 m (197 ft)	A5E01181689
• 100 m (328 ft)	A5E01181691
• 150 m (492 ft)	A5E01181699
• 200 m (656 ft)	A5E01181703
• 500 m (1640 ft)	A5E01181705
Low noise electrode coax cable for low conductivity and high vibration levels, 3 x 0.13 mm ² ; Temperature range: -25 ... +85 °C (-13 ... +185 °F)	
• 2 m (6.6 ft)	A5E02272692
• 5 m (16.5 ft)	A5E02272723
• 10 m (33 ft)	A5E02272730

**Spare parts**



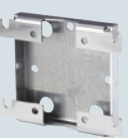
Description	Article No.
Display unit	FDK:085U3122
Accessory bag including cable gland inserts and connectors for sensor cables	FDK:085U3144
Display lid (Ex) in die-cast aluminum, with corrosion resistant coating (min. 60 µm).	7ME5933-0AC01
Blind lid for sensor cables connection compartment (only remote version) in die-cast aluminum, with corrosion resistant coating (min. 60 µm) incl. O-ring seal.	7ME5933-0AC02
Blind lid (mains supply, input/outputs) in die-cast aluminum, with corrosion resistant coating (min. 60 µm).	7ME5933-0AC03



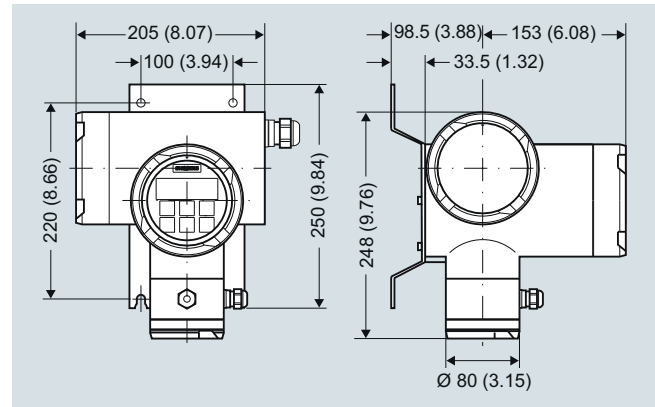
Flow Measurement

SITRANS F M

Transmitter MAG 6000 I/6000 I Ex


Description	Article No.	
Safety clamp	7ME5933-0AC06	
Standard wall-mounting bracket, stainless steel AISI 316L/1.4404	7ME5933-0AC04	
Special wall-mounting bracket, BI 2.5 DIN59382 X6Cr17	7ME5933-0AC05	

Dimensional drawings



SITRANS F M transmitter MAG 6000 I with wall-mounting bracket, dimensions in mm (inch)

Complete spare part PCB unit

Description	Article No.	
MAG 6000 I std. (not for Ex) 18 ... 30 V DC; 115 ... 230 V AC Spare PCBA	FDK:085U3123	
MAG 6000 I std. (NAMUR), 18 ... 30 V DC; 115 ... 230 V AC Spare PCBA	A5E31426892	
MAG 6000 I Ex (NAMUR), 18 ... 30 V DC; 115 ... 230 V AC Spare PCBA for use with Ex sensors with increased safety e (For Ex sensors: 7ME6110, 7ME6120, 7ME6140, 7ME6310, 7ME6320, 7ME6340) (For 7ME6330 > DN300)	A5E31426877¹⁾	
MAG 6000 I Ex d 115 ... 230 V AC Spare PCBA for use with ATEX sensors with increased safety e	A5E01013127	
MAG 6000 I Ex d 18 ... 30 V DC Spare PCBA for use with ATEX sensors with increased safety e	A5E01013340	

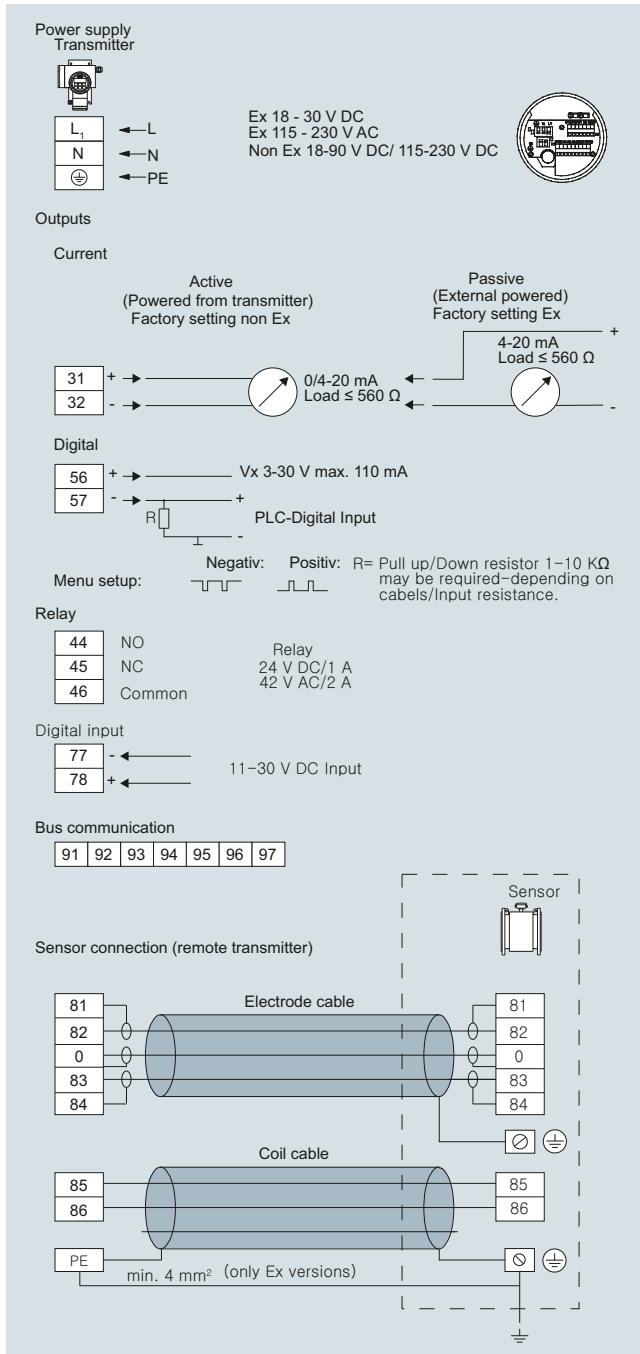
¹⁾ Ex spare parts may only be exchanged by authorized personnel from Siemens.

Please use online Product selector to get latest updates.

Product selector link:

www.pia-portal.automation.siemens.com

Schematics



Flow Measurement

SITRANS F M

Flow sensor MAG 1100 and MAG 1100 HT

Overview



The SITRANS F M MAG 1100 is an electromagnetic flow sensor in a compact wafer design designed for flow applications in the process industry.

Benefits

- Sensor sizes: DN 2 to 100 (1/12" to 4")
- Compact wafer design meets EN 1092, DIN and ANSI flange standards
- Corrosion resistant AISI 316 stainless steel sensor housing
- Highly resistant liner and electrodes fitting most extreme process media
- Temperature rating up to 200 °C (392 °F)
- Hose proof IP67/NEMA 4X enclosure rating
- Designed that patented in-situ verification can be conducted. Using SENSORPROM fingerprints.

Application

The main applications of the SITRANS F M electromagnetic flow sensors can be found in the following fields:

- Process industry
- Chemical industry
- Pharmaceutical industry
- Water treatment like e.g. chemical dosing

Design

- Compact or remote mounting possible
- Easy "plug & play" field changeability of transmitter
- Simple on site upgrade to IP68/NEMA 6P terminal box
- ATEX 2G D version
- FM Class I, Div 2

Mode of operation

The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

Integration

The complete flowmeter consists of a flow sensor and an associated transmitter SITRANS F M MAG 5000, 6000 or 6000 I. The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS DP and PA, Modbus RTU/RS 485.

Technical specifications

Version	MAG 1100	MAG 1100 HT (High temperature)
Measuring principle	Electromagnetic induction	Electromagnetic induction
Excitation frequency (Mains supply: 50 Hz/60 Hz)	DN 2 ... 65 (1/12" ... 2 1/2"): 12.5 Hz/15 Hz DN 80, 100 (3", 4"): 6.25 Hz/7.5 Hz	DN 15 ... 50 (1/2" ... 2"): 12.5 Hz/15 Hz DN 80, 100 (3", 4"): 6.25 Hz/7.5 Hz
Process connection		
Nominal size		
• MAG 1100 (Ceramic)	DN 2 ... DN 100 (1/12" ... 4")	DN 15 ... DN 100 (1/2" ... 4")
• MAG 1100 (PFA)	DN 10 ... DN 100 (3/8" ... 4")	
Mating flanges	EN 1092-1 (DIN 2501), ANSI B 16.5 class 150 and 300 or equivalent Option: DN 2 ... 10 (1/12" ... 3/8"): G 1/2" / NPT 1/2" pipe connection adapters	EN 1092-1 (DIN 2501), ANSI B 16.5 class 150 and 300 or equivalent
Rated operating conditions		
<u>Ambient conditions</u>		
Ambient temperature		
• Standard sensor	-40 ... +100 °C (-40 ... +212 °F)	-40 ... +100 °C (-40 ... +212 °F)
• Ex sensor	-20 ... +60 °C (-4 ... +140 °F)	-20 ... +60 °C (-4 ... +140 °F)
• Compact with transmitter MAG 5000/6000	-20 ... +60 °C (-4 ... +140 °F)	
• Compact with transmitter MAG 6000 I	-20 ... +60 °C (-4 ... +140 °F)	
• Compact with transmitter MAG 6000 I Ex	-20 ... +60 °C (-4 ... 140 °F)	
<u>Temperature of medium</u>		
• MAG 1100 (Ceramic)	-20 ... +150 °C (-4 ... +302 °F)	-20 ... +200 °C (-4 ... +392 °F)
• MAG 1100 Ex (Ceramic)	-20 ... +150 °C (-4 ... +302 °F)	-20 ... +180 °C (-4 ... +356 °F)
• MAG 1100 (PFA)	-30 ... +130 °C (-22 ... +266 °F) Suitable for steam sterilization at 150 °C (302 °F)	
<u>Temperature shock</u>		
• MAG 1100 (Ceramic)		
- Duration ≤ 1 min, followed by 10 min rest	<ul style="list-style-type: none"> • DN 2, 3 (1/12", 1/8") No limitations • DN 6, 10, 15, 25: Max. $\Delta T \leq 80$ °C/min (1/4", 3/8", 1/2", 1": Max. $\Delta T \leq 144$ °F/min) • DN 40, 50, 65: Max. $\Delta T \leq 70$ °C/min (1 1/2", 2", 2 1/2": Max. $\Delta T \leq 126$ °F/min) • DN 80, 100: Max. $\Delta T \leq 60$ °C/min (3", 4": Max. $\Delta T \leq 108$ °F/min) 	<ul style="list-style-type: none"> • DN 15, 25: Max. $\Delta T \leq 80$ °C/min (1/2", 1": Max. $\Delta T \leq 144$ °F/min) • DN 40, 50: Max. $\Delta T \leq 70$ °C/min (1 1/2", 2": Max. $\Delta T \leq 126$ °F/min) • DN 80, 100: Max. $\Delta T \leq 60$ °C/min (3", 4": Max. $\Delta T \leq 108$ °F/min)
• MAG 1100 (PFA)	Max. ± 100 °C (212 °F) momentarily	
<u>Operating pressure</u>		
• MAG 1100 (Ceramic)	<ul style="list-style-type: none"> • DN 2 ... 65: 40 bar (1/12" ... 2 1/2": 580 psi) • DN 80: 37.5 bar (3": 540 psi) • DN 100: 30 bar (4": 435 psi) Vacuum: 1×10^{-6} bar _{abs} (1.5×10^{-5} psi _{abs})	<ul style="list-style-type: none"> • DN 15 ... 50: 40 bar (1/2" ... 2": 580 psi) • DN 80: 37.5 bar (3": 540 psi) • DN 100: 30 bar (4": 435 psi) Vacuum: 1×10^{-6} bar _{abs} (1.5×10^{-5} psi _{abs})
• MAG 1100 (PFA)	20 bar (290 psi) Vacuum: 0.02 bar _{abs} (0.3 psi _{abs}) DN 80 ... DN 100: CO ₂ pressure max. 7 bar (101.5 psi)	
<u>Mechanical load (vibration)</u>		
	<ul style="list-style-type: none"> • 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 • Sensor: 3.17 g RMS • Sensor with compact MAG 5000/ 6000 mounted transmitter: 3.17 g RMS • Sensor with compact MAG 6000 I/ 6000 I Ex mounted transmitter: 1.14 g RMS • For compact installation with the MAG 6000 I, transmitter to be supported to avoid tension on sensor part. 	<ul style="list-style-type: none"> • 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 • Sensor: 3.17 g RMS
<u>Enclosure rating (standard)</u>	IP67 to EN 60529 (NEMA 4X), 1 mH ₂ O for 30 min	IP67 to EN 60529 (NEMA 4X), 1 mH ₂ O for 30 min
EMC	2014/30/EU	2014/30/EU

Flow Measurement

SITRANS F M

Flow sensor MAG 1100 and MAG 1100 HT

Version	MAG 1100	MAG 1100 HT (High temperature)
Design		
Weight	See Dimensional drawings	See Dimensional drawings
Material		
• Enclosure		
- MAG 1100	Stainless steel AISI 316L/1.4404	Stainless steel AISI 316L/1.4404
• Terminal box		
- Standard	Fibre glass reinforced polyamide (not for Ex)	Stainless steel AISI 316/1.4436
- Option	Stainless steel AISI 316/1.4436	
• Fixing studs	Stainless steel AISI 304/1.4301, Number and size to EN 1092-1:2001	Stainless steel AISI 304/1.4301, Number and size to EN 1092-1:2001
• Gaskets		
- Standard	EPDM (max. 150 °C, PN 40 (max. 302 °F, 600 psi))	Graphite (max. 200 °C, PN 40 (max. 392 °F, 600 psi))
- Option	• Graphite (max. 200 °C, PN 40 (max. 392 °F, 600 psi)) • PTFE (max. 130 °C, PN 25 (max. 266 °F, 300 psi))	
• Pipe connection adapters: DN 2, 3, 6 and 10 (1/12", 1/8", 1/4" and 3/8")	• Stainless steel, AISI 316/1.4436 • Hastelloy C22/2.4602 • PVDF	
Liner		
• MAG 1100 (Ceramic)	• DN 2, 3 (1/12", 1/8"): Zirconium oxide (ZrO ₂) (ceramic) • DN 6 ... 100 (1/4" ... 4"): Aluminum oxide Al ₂ O ₃	DN 15 ... 100 (1/2" ... 4"): Aluminum oxide Al ₂ O ₃
• MAG 1100 (PFA)	Reinforced PFA (not for Ex)	
Electrodes		
• MAG 1100 (Ceramic)	• DN10 ... 100 (3/8" ... 4") : Platinum with gold / Titanium brazing alloy • DN 2 ... 6 (1/12" ... 1/4"): Platinum	Platinum with gold / Titanium brazing alloy
• MAG 1100 (PFA)	• DN 10 ... 15 (3/8" ... 1/2"): Hastelloy C276/2.4819 • DN 25 ... 100 (1" ... 4"): Hastelloy C22/2.4602	
Cable entries	• Remote installation 2 x M20 or 2 x 1/2" NPT • Compact installation - MAG 5000/MAG 6000: 4 x M20 or 4 x 1/2" NPT - MAG 6000 I: 2 x M25 (for supply/output) - MAG 6000 I Ex: 2 x M25 (for supply/output)	Remote installation 2 x M20 or 2 x 1/2" NPT
Certificates and approvals		
Calibration		
• Standard production calibration	Zero-point, 2 x 25 %, 2 x 90 %	Zero-point, 2 x 25 %, 2 x 90 %
• Special calibration	5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory Q _{max} 10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q _{max} Matched-pair calibration: default, 5-point or 10-point	
Hazardous areas		
• MAG 1100 F (Ceramic)		
- Ex sensor in compact or remote version with MAG 6000 I Ex	ATEX, EAC Ex - Zone 1 Ex d e ia IIB T6 Gb ATEX - Zone 21 Ex tD A21 IP67	ATEX, EAC Ex - Zone 1 Ex d e ia IIB T6 Gb ATEX - Zone 21 Ex tD A21 IP67
- Standard sensor in compact or remote version with MAG 5000/6000/6000 I	FM - NI Class I Div. 2 Groups A, B, C, D	FM - NI Class I Div. 2 Groups A, B, C, D
• MAG 1100 F (PFA)		
- Standard sensor in compact or remote version with MAG 5000/6000/6000 I	FM - NI Class I Div. 2 Groups A, B, C, D	
Hygienic		
• MAG 1100 F (Ceramic)	3A (remote version with Polyamide terminal box)	
• MAG 1100 F (PFA)	3A (remote version with Polyamide terminal box) EHEDG (remote version with Polyamide terminal box, DN 25 ... 100/1 ... 4") Hygienic EC 1935:2004 European food contact material	
Pressure Equipment	PED - 2014/68/EU CRN (only PFA)	PED - 2014/68/EU
Others	EAC (Russia, Belarus, Kazakhstan) KCC (South Korea)	EAC (Russia, Belarus, Kazakhstan) KCC (South Korea)

For technical specification for transmitter - see transmitter pages.

Selection and Ordering data		Article No.	Selection and Ordering data		Order code
Sensor SITRANS F M MAG 1100 EPDM gaskets included		7ME6110-	Additional information		
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		A0-	Please add "-Z" to Article No. and specify Order code(s) and plain text.		
Diameter			Certificates		
DN 2 (1/12")		1 D	• Material certificate according to EN 10204-3.1		C12
DN 3 (1/8")		1 H	• Factory certificate according to EN 10204-2.2		C14
DN 6 (1/4")		1 M	• Factory certificate according to EN 10204-2.1		C15
DN 10 (3/8")		1 R	Special calibration		
DN 15 (1/2")		1 V	• 5-point calibration ¹⁾		D01
DN 25 (1")		2 D	• 10-point calibration ²⁾		D06
DN 40 (1 1/2")		2 R	• Default (2 x 25 % and 2 x 90 %) matched-pair calibration		D11
DN 50 (2")		2 Y	• 5-point, matched-pair calibration ¹⁾		D15
DN 65 (2 1/2")		3 F	• 10-point, matched-pair calibration ²⁾		D18
DN 80 (3")		3 M	Terminal blocks		
DN 100 (4")		3 T	• Factory mounted terminal blocks		N02
Liner material			Region/customer specific labels		
PFA - DN 10 ... 100 (3/8" ... 4")		1	• KCC label (South Korea)		W28
Ceramic		2	Tag name plate, stainless steel (specify in plain text)		Y17
Electrode material			Tag name plate, plastic (self adhesive)		Y18
Hastelloy C (only with PFA liner)		1	Customer-specific transmitter setting		Y20
Platinum (only with ceramic liner)		2	Sensor cables wired (specify Article No. for sensor cables and order cables separately)		Y40
Transmitter			Sensor cables wired and IP68 sealing (specify Article No. for sensor cables and order cables separately)		Y41
Standard sensor for remote transmitter (order transmitter separately)		A	Special version (specify in plain text)		Y99
Ex sensor for remote transmitter (order transmitter separately)		B	Additional calibrations		
MAG 6000 I, Aluminum 18 ... 90 V DC, 115 ... 230 V AC		C	• Accredited Siemens Flow Instruments matched pair Calibration acc. to ISO/IEC 17025: 2005		On request³⁾
MAG 6000 I, Aluminum 18 ... 30 V DC, Ex		D	• Customer-specified calibration up to 10 points		On request³⁾
MAG 6000 I, Aluminum 115 ... 230 V AC, Ex		E	• Customer-witnessed calibration		On request³⁾
MAG 6000 Polyamide, 11 ... 30 V DC/ 11 ... 24 V AC		H	Any of above calibration		
MAG 6000, Polyamide, 115 ... 230 V AC		J	1) 20 %, 40 %, 60 %, 80 %, 100 % of factory Q _{max}		
MAG 5000, Polyamide, 11 ... 30 V DC/ 11 ... 24 V AC		K	2) Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q _{max}		
MAG 5000, Polyamide, 115 ... 230 V AC		L	3) Product Variation Request (PVR)		
Communication			Operating instructions for SITRANS F M MAG 1100		
No communication, add-on possible		A	Description		Article No.
HART		B	• English		A5E02435647
PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)		F	All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation		
PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I)		G	Accessories		
Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I)		E	Description		Article No.
FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)		J	Potting kit for IP68/ NEMA 6P sealing of sensor junction box		FDK:085U0220
Cable glands/terminal box					
Metric: Polyamide terminal box or MAG 6000 I compact		1			
1/2" NPT: Polyamide terminal box or MAG 6000 I compact		2			
Metric: Stainless steel terminal box		3			
1/2" NPT: Stainless steel terminal box		4			

1) Quick ship only in combination with Ceramic liner

Flow Measurement

SITRANS F M

Flow sensor MAG 1100 and MAG 1100 HT

Selection and Ordering data	Article No.
Sensor SITRANS F M	
MAG 1100 HT High Temperature	7 ME 6 1 2 0 -
Ceramic liner, Platinum electrode, Graphite gaskets included	A 2 0 - 2 A
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 15 (½")	1 V
DN 25 (1")	2 D
DN 40 (1½")	2 R
DN 50 (2")	2 Y
DN 80 (3")	3 M
DN 100 (4")	3 T
Transmitter	
Standard sensor for remote transmitter (order trans- mitter separately)	A
Ex sensor for remote transmitter (order transmitter separately)	B
Cable glands/terminal box	
Metric: Stainless steel terminal box	3
½" NPT: Stainless steel terminal box	4

Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificates	
• Material certificate according to EN 10204-3.1	C12
• Factory certificate according to EN 10204-2.2	C14
• Factory certificate according to EN 10204-2.1	C15
Special calibration	
• 5-point calibration ¹⁾	D01
• 10-point calibration ²⁾	D06
• Default (2 x 25 % and 2 x 90 %) matched-pair calibration	D11
• 5-point, matched-pair calibration ¹⁾	D15
• 10-point, matched-pair calibration ²⁾	D18
Terminal blocks	
• Factory mounted terminal blocks	N02
Region/customer specific labels	
• KCC label (South Korea)	W28
Tag name plate, stainless steel (specify in plain text)	Y17
Tag name plate, plastic (self adhesive)	Y18
Customer-specific transmitter setting	Y20
Sensor cables wired (specify Article No. for sensor cables and order cables separately)	Y40
Sensor cables wired and IP68 sealing (specify Article No. for sensor cables and order cables separately)	Y41
Special version (specify in plain text)	Y99
Additional calibrations	
• Accredited Siemens Flow Instruments matched pair Calibration acc. to ISO/IEC 17025: 2005	On request³⁾
• Customer-specified calibration up to 10 points	On request³⁾
• Customer-witnessed calibration Any of above calibration	On request³⁾

¹⁾ 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}


²⁾ Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}





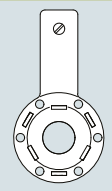




³⁾ Product Variation Request (PVR)

Operating instructions for SITRANS F M MAG 1100

Description	Article No.
• English	A5E02435647
All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation	
Please use online Product selector to get latest updates.	
Product selector link: www.pia-portal.automation.siemens.com	

Accessories

Description	Article No.
Potting kit for IP68/NEMA 6P sealing of sensor junction box	FDK:085U0220
	

Accessories for MAG 1100 sensor	Article No.	Accessories for MAG 1100 sensor	Article No.
Pipe connection ½" external thread For DN 2 ... 10 (1/12" ... 3/8") sensor, material: Stainless steel AISI 316L 2 pcs. pipe connections, 2 pcs. EPDM gaskets, 12 pcs. M4x12 screws 	FDK:083G0080 FDK:083G4330	Grounding ring (Stainless steel) Material: AISI 316/1.4436; each set includes: 1 pc. grounding ring ¹⁾ , 3 pcs. PTFE gaskets, 1 pc. grounding wire, 1 pc. M6 screw 	FDK:083G0686 FDK:083G0687 FDK:083G0689 FDK:083G0691 FDK:083G0692 FDK:083G0693 FDK:083G0694 FDK:083G0695
<ul style="list-style-type: none"> • ½" G, ISO 7-1 tapered thread, AISI 316L • ½" NPT thread, AISI 316L For DN 2 ... 10 (1/12" ... 3/8") sensor, material: Hastelloy C 2 pcs. pipe connections, 2 pcs. PTFE gaskets, 12 pcs. M4x14 screws <ul style="list-style-type: none"> • ½" G, ISO 7-1 tapered thread • ½" NPT thread For DN 2 ... 10 (1/12" ... 3/8") sensor 2 pcs. PVDF pipe connections (Max. 70 °C, PN 8 bar/max 158 °F, 116 PSI), 1 pc. grounding ring ¹⁾ , 1 pc. grounding wire, 3 pcs. PTFE gas- kets, 2 pcs. space rings, 6 pcs. M4x12 and 6 pcs. M4x20 screws <ul style="list-style-type: none"> • ½" G, ISO 7-1 tapered thread PVDF incl. grounding ring Hastelloy C22/2.4602 • ½" NPT thread PVDF incl. grounding ring Hastelloy C22/2.4602 	FDK:083G4332 FDK:083G4331 A5E01018395 A5E01018400	<ul style="list-style-type: none"> • DN 2 ... 10 (1/12" ... 3/8") • DN 15 (½") • DN 25 (1") • DN 40 (1½") • DN 50 (2") • DN 65 (2½") • DN 80 (3") • DN 100 (4") Grounding ring (Hastelloy C) Material: Hastelloy C22/2.4602; each set includes: 1 pc. grounding ring ¹⁾ , 3 pcs. PTFE gaskets, 1 pc. grounding wire, 1 pc. M6 screw 	FDK:083G3256 FDK:083G3257 FDK:083G3259 FDK:083G3261 FDK:083G3262 FDK:083G3263 FDK:083G3264 FDK:083G3265
EPDM gaskets Material: EPDM; each set includes: 2 pcs. EPDM gaskets, 1 pc. grounding wire, 1 pc. M6 screw, 1 pc. nut, 1 pc. washer, 1 pc. bolt grounding plate 	FDK:083G3116 FDK:083G3117 FDK:083G3119 FDK:083G3121 FDK:083G3122 FDK:083G3123 FDK:083G3124 FDK:083G3125	<ul style="list-style-type: none"> • DN 2 ... 10 (1/12" ... 3/8") • DN 15 (½") • DN 25 (1") • DN 40 (1½") • DN 50 (2") • DN 65 (2½") • DN 80 (3") • DN 100 (4") Grounding ring (Tantalum) Material: Tantalum; each set includes: 1 pc. grounding ring ¹⁾ , 3 pcs. PTFE gaskets, 1 pc. grounding wire, 1 pc. M6 screw 	FDK:083G3256 FDK:083G3257 FDK:083G3259 FDK:083G3261 FDK:083G3262 FDK:083G3263 FDK:083G3264 FDK:083G3265
PTFE gaskets Material: PTFE; each set includes: 2 pcs. gaskets, 2 pcs. grounding wires, 3 pcs. M6 screws (DN 2 ... DN 10: 12 pcs. M4x14) 	FDK:083G0156 FDK:083G0157 FDK:083G0159 FDK:083G0161 FDK:083G0162 FDK:083G0163 FDK:083G0164 FDK:083G0165	<ul style="list-style-type: none"> • DN 2 ... 10 (1/12" ... 3/8") 	A5E01181599 
<ul style="list-style-type: none"> • DN 2 ... 10 (1/12" ... 3/8") • DN 15 (½") • DN 25 (1") • DN 40 (1½") • DN 50 (2") • DN 65 (2½") • DN 80 (3") • DN 100 (4") 		<ul style="list-style-type: none"> • DN 15 (½") • DN 25 (1") • DN 40 (1½") • DN 50 (2") • DN 65 (2½") • DN 80 (3") • DN 100 (4") 	A5E01181606 A5E01181610 A5E01181613 A5E01181615 A5E01181616 A5E01181619 A5E01181622
Graphite gaskets Material: Graphite; conductive, each set includes: 2 pcs. gaskets (can also be used as grounding ring) <ul style="list-style-type: none"> • DN 2 ... 10 (1/12" ... 3/8") • DN 15 (½") • DN 25 (1") • DN 40 (1½") • DN 50 (2") • DN 65 (2½") • DN 80 (3") • DN 100 (4") 	FDK:083G0116 FDK:083G0117 FDK:083G0119 FDK:083G0121 FDK:083G0122 FDK:083G0123 FDK:083G0124 FDK:083G0125	Studs and nuts for DN 100 PN 25/40, 8 pcs. M20 studs, 16 pcs. M20 nuts 	FDK:083G0226
		Material: AISI 304/1.4305 <ul style="list-style-type: none"> • DN 100 (4") 	

¹⁾ Thickness of grounding ring is 2 mm (0.08 inch)

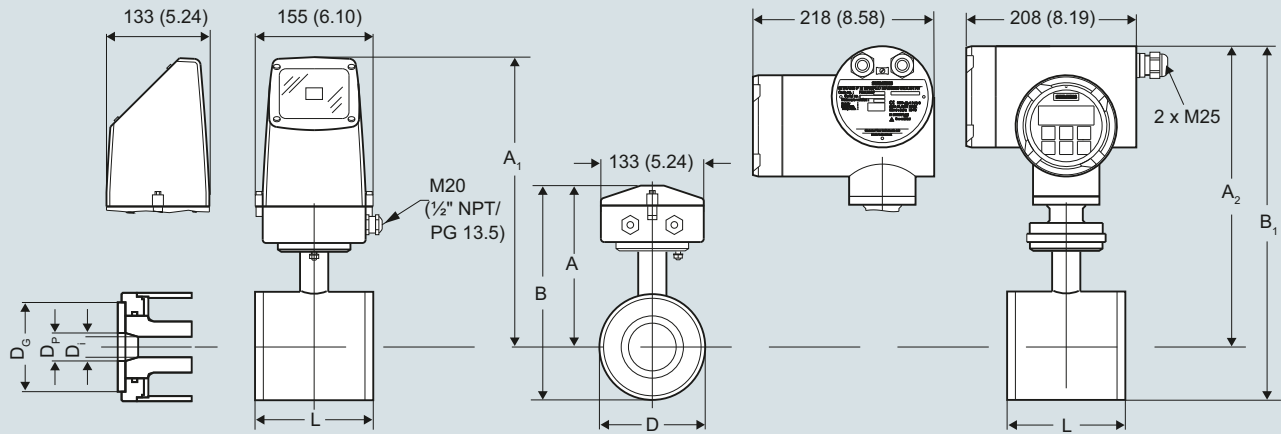
Flow Measurement

SITRANS F M

Flow sensor MAG 1100 and MAG 1100 HT

Dimensional drawings

Sensor MAG 1100, compact/remote



Dimensions in mm (inch)

Important note: For compact installation with MAG 6000 I/Ex - transmitter to be supported to avoid tension on the sensor part

Size DN	A ¹⁾ [mm]	B ¹⁾ [mm]	A ₁ /A ₂ ³⁾ [mm]	B ₁ [mm]	D [mm]	D _i [mm]	D _i (PFA) [mm]	D _p [mm]	D _G [mm]	Weight ²⁾ [kg]
2	161	186	315	340	48.7	2		17.3	34	2.2
3	161	186	315	340	48.7	3		17.3	34	2.2
6	161	186	315	340	48.7	6		17.3	34	2.2
10	161	186	315	340	48.7	10	10	13.6	34	2.2
15	161	186	315	340	48.7	15	16	17.3	40	2.2
25	169	201	323	354	63.5	25	26	28.5	56	2.7
40	179	221	333	375	84.0	40	38	43.4	75	3.4
50	188	239	342	393	101.6	50	50	54.5	90	4.2
65	198	258	351	412	120.9	65	66	68.0	112	5.5
80	204	270	357	424	133.0	80	81	82.5	124	7.0
100	217	296	370	450	159.0	100	100	107.1	150	10.0

Size [inch]	A ¹⁾ [inch]	B ¹⁾ [inch]	A ₁ /A ₂ ³⁾ [inch]	B ₁ [inch]	D [inch]	D _i [inch]	D _i (PFA) [inch]	D _p [inch]	D _G [inch]	Weight ²⁾ [lb]
1/12	6.34	7.33	12.40	13.39	1.92	0.08		0.68	1.34	4.8
1/8	6.34	7.33	12.40	13.39	1.92	0.12		0.68	1.34	4.8
1/4	6.34	7.33	12.40	13.39	1.92	0.24		0.68	1.34	4.8
3/8	6.34	7.33	12.40	13.39	1.92	0.39	0.39	0.53	1.34	4.8
1/2	6.34	7.33	12.40	13.39	1.92	0.59	0.63	0.68	1.57	4.8
1	6.66	7.92	12.72	13.94	2.50	0.98	1.02	1.12	2.20	4.9
1 1/2	7.05	8.70	13.11	14.76	3.31	1.57	1.50	1.71	2.95	7.5
2	7.40	9.41	13.47	15.47	4.00	1.97	1.97	2.15	3.54	9.2
2 1/2	7.80	10.16	13.82	16.22	4.76	2.56	2.60	2.68	4.41	12
3	8.03	10.63	14.06	16.70	5.24	3.15	3.19	3.25	4.88	15
4	8.54	11.65	14.57	17.72	6.26	3.94	3.94	4.22	5.91	22

¹⁾ 14.5 mm/0.571" shorter when the stainless steel terminal box is used (Ex or high temperature 200 °C (392 °F) version)

²⁾ With transmitter MAG 5000 or MAG 6000 installed, weight is increased by approximately 0.8 kg (1.8 lb).

With MAG 6000 I weight is increased with 5.5 kg (12.1 lb).

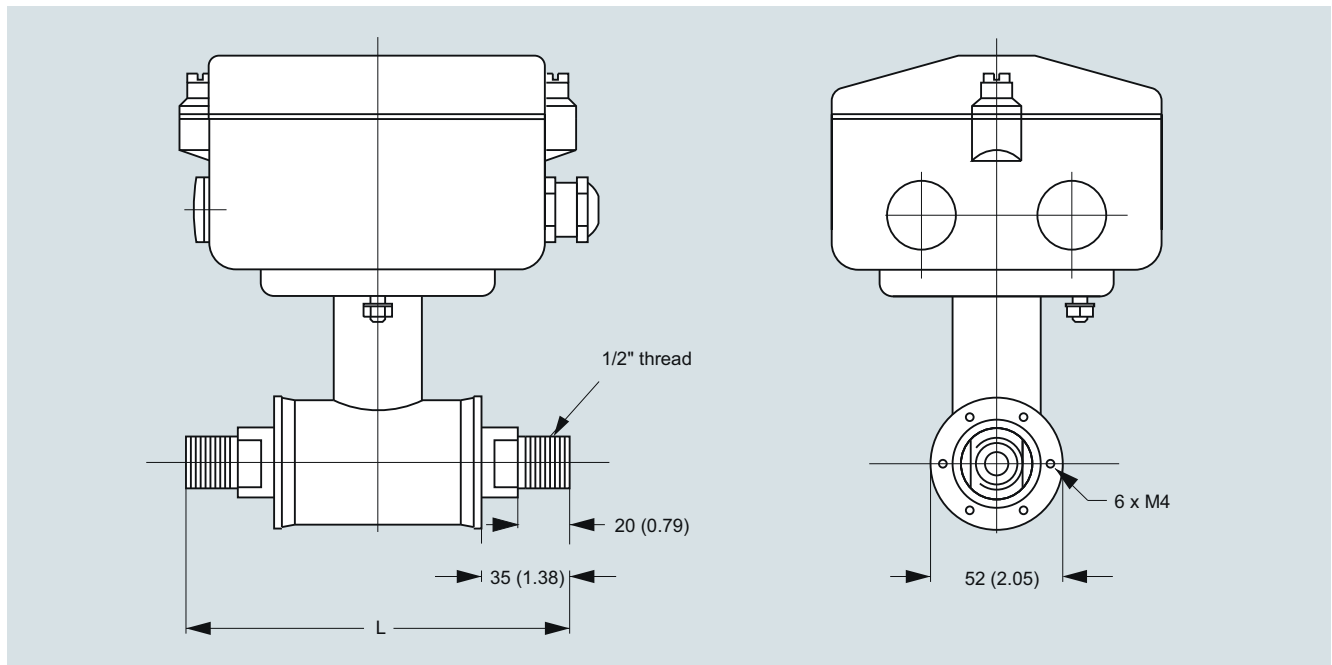
³⁾ A₂ is 3 mm (0.12") shorter than A₁

The total built-in length "L" [mm]/[inch] before assembling depends on the gasket selected

Size		EPDM		Graphite		PTFE (Teflon)		Without gasket		Grounding ring	
DN	inch	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
2 ... 10 ¹⁾	1/12 ... 3/8	64	2.52	66	2.60	70	2.75	64	2.52	77	3.03
15	1/2	65	2.56	66	2.60	70	2.75	64	2.52	77	3.03
25	1	80	3.15	81	3.19	85	3.35	79	3.10	92	3.62
40	1 1/2	95	3.74	96	3.78	100	3.94	94	3.70	107	4.21
50	2	105	4.13	106	4.17	110	4.33	104	4.05	117	4.61
65	2 1/2	130	5.12	131	5.15	135	5.31	129	5.05	142	5.60
80	3	155	6.10	156	6.14	160	6.30	154	6.00	167	6.57
100	4	185	7.28	186	7.31	190	7.48	184	7.20	197	7.76

¹⁾ Mounting between two flanges

Sensor MAG 1100 DN 2 ... 10 (1/12" ... 3/8") with adapters



The MAG 1100 DN 2, 3, 6 and 10 (1/12", 1/8", 1/4" and 3/8") are prepared for assembly with the 1/2" pipe connections. Dimensions in mm (inch)

The length "L" varies dependent on the gasket choice.

Stainless steel and Hastelloy pipe connections								PVDF pipe connections	
Without gasket		EPDM		Graphite		PTFE		PTFE	
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
150	5.9	150	5.9	152	6.0	156	6.1	133	5.2

Important note:

For compact installation with the MAG 6000 I, transmitter to be supported to avoid tension on sensor part.

Flow Measurement

SITRANS F M

Flow sensor MAG 1100 F

Overview



The electromagnetic sensor SITRANS F M MAG 1100 F is designed to meet applications in the food and beverage industry.

Benefits

- Sensor sizes: DN 10 to DN 100 (3/8" to 4")
- AISI 316 stainless steel enclosure
- Sensor: Hygienic connection, 3A approval and EHEDG certified
- Sanitary design for CIP / SIP cleaning
- Easy commissioning, the SENSORPROM unit automatically updates settings
- Hose proof IP67/NEMA 4X enclosure rating
- Designed that patented in-situ verification can be conducted. Using SENSORPROM fingerprints

Application

The main applications of the SITRANS F M electromagnetic sensors can be found in the following fields:

- Food industry
- Beverage industry
- Pharmaceutical industry

Design

- Unique mechanical design with a wide range of customer specified sanitary connection
- Compact or remote mounting possible easy "plug & play" field changeable
- Simple on site upgrade to IP68/NEMA 6P terminal box
- ATEX 2G D version for hazardous areas (ceramic liner)

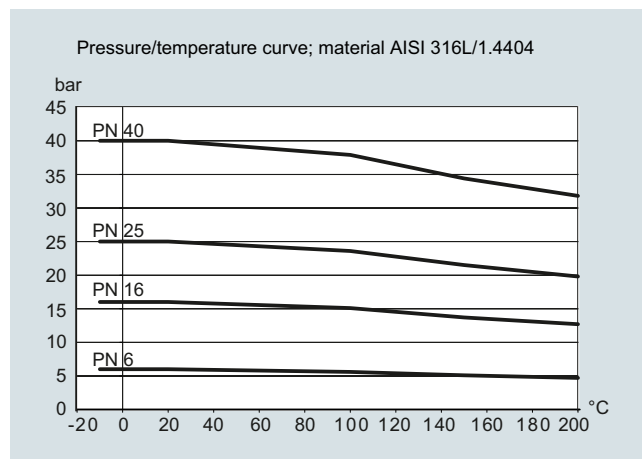
Mode of operation

The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

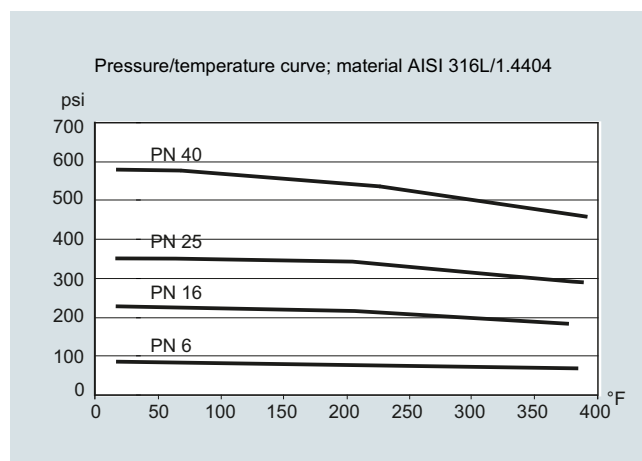
Integration

The complete flowmeter consists of a sensor and an associated transmitter SITRANS F M MAG 5000, 6000 and 6000 I. The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as PROFIBUS DP and PA, Modbus RTU/RS 485, HART, FOUNDATION Fieldbus H1, DeviceNet.

Pressure/temperature curve; material AISI 316L/1.4404



Pressure/temperature curve; material AISI 316L/1.4404



For further information on the PED standard and requirements, see page 10/15.

Flow Measurement

SITRANS F M

Flow sensor MAG 1100 F

Accessories

Weld-in adapter

Adapter for welding onto dairy pipe, stainless steel 1.4404

- DN 10, 15, 25, 40, 50 and 65 (3/8", 1/2", 1", 1 1/2", 2" and 2 1/2")
- DN 80 and DN 100 (3" and 4")

Tri-Weld, ISO 2037, DIN 11850, SMS 3008, BS 4825-1

PN 40 (600 psi)

PN 25 (350 psi)

Clamp adapter

DN 10, 15, 25, 40 and 50 (3/8", 1/2", 1", 1 1/2", and 2")

Tri-Clamp, ISO 2852, DIN 32676, SMS 3016, BS 4825-3

PN 16 (200 psi)

DN 65, 80 and 100 (2 1/2", 3" and 4")

PN 10 (150 psi)

Thread adapter

DIN 11851

- DN 10, 15, 25, and 40 (3/8", 1/2", 1", and 1 1/2")
- DN 50, 65, 80 and 100 (2", 2 1/2", 3" and 4")

PN 40 (600 psi)

PN 25 (350 psi)

ISO 2853, BS 4825-4

- DN 10, 15, 25, 40, 50, 65 and 80 (3/8", 1/2", 1", 1 1/2", 2", 2 1/2" and 3")

PN 16 (200 psi)

SMS 1145

- DN 25, 40, 50, 65 and 80 (1", 1 1/2", 2", 2 1/2" and 3")

PN 6 (80 psi)

Design

Material

Adapter

Stainless steel AISI 316/1.4436

Gasket

- MAG 1100 F (Ceramic)

FKM/FPM with stainless steel insert (AISI 304/1.4301) (-20 ... +150 °C (-4 ... +302 °F))

EPDM (-20 ... +150 °C (-4 ... +302 °F))

- MAG 1100 F (PFA)

EPDM (-20 ... +150 °C (-4 ... +302 °F))

NBR (-20 ... +100 °C (-4 ... +212 °F))

Note:

When combined sensor and adapter, the operating pressure is the lower rated of the pair.

Selection and Ordering data

Article No.

Sensor SITRANS F M MAG 1100 F

7ME6140-

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Diameter

DN 10 (3/8")

1 R

DN 15 (1/2")

1 V

DN 25 (1")

2 D

DN 40 (1 1/2")

2 R

DN 50 (2")

2 Y

DN 65 (2 1/2")

3 F

DN 80 (3")

3 M

DN 100 (4")

3 T

Process connections

None (not suitable for 3A approval)

A

Weld in

DIN 11850

B

ISO 2037 (SMS 3008)

C

Tri-Weld/BS 4825-1

D

Clamp type

DIN 32676

G

ISO 2852 (SMS 3016)

H

Tri-Clamp/BS 4825-3

J

Threaded type

DIN 11851

M

SMS 1145¹⁾

N

Liner material

PFA

1

Ceramic

2

Gasket material¹⁾

EPDM flat gasket (3A)

0

FPM/FKM (3A) (only with ceramic liner)

2

EPDM-P gasket (only for PFA) (EHEDG, 3A)

3

Electrode material

Hastelloy C (only with PFA liner)

1

Platinum (only with ceramic liner)

2

Transmitter

Standard sensor for remote transmitter (order transmitter separately), 3A approved

A

Ex sensor for remote transmitter (order transmitter separately) 3A approved

B

MAG 6000 I, Alu.18 ... 90 V DC, 115 ... 230 V AC

C

MAG 6000 I, Aluminum 18 ... 30 V DC, Ex

D

MAG 6000 I, Aluminum 115 ... 230 V AC, Ex

E

MAG 6000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC

H

MAG 6000, Polyamide, 115 ... 230 V AC

J

MAG 5000, Polyamide, 11 ... 30 V DC/

K

11 ... 24 V AC

L

MAG 5000, Polyamide, 115 ... 230 V AC

Communication

No communication, add-on possible

A

HART

B

PROFIBUS PA Profile 3

F

(only MAG 6000/MAG 6000 I)

PROFIBUS DP Profile 3 (not for Ex)

G

(only MAG 6000/MAG 6000 I)

Modbus RTU/RS 485 (not for Ex)

E


(only MAG 6000/MAG 6000 I)

FOUNDATION Fieldbus H1

J

(only MAG 6000/MAG 6000 I)

¹⁾ SMS 1145 standard is not approved by 3A

Selection and Ordering data	Article No.
Sensor SITRANS F M MAG 1100 F	7ME 6 1 4 0 -
	
Cable glands/terminal box	
Metric: Polyamide terminal box or MAG 6000 I compact	1
½" NPT: Polyamide terminal box or MAG 6000 I compact	2
Metric: Stainless steel terminal box	3
½" NPT: Stainless steel terminal box	4


Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificates	
Pressure test certificate according to EN 10204-3.1	C01
Material certificate according to EN 10204-3.1	C12
Factory certificate according to EN 10204-2.2	C14
Factory certificate according to EN 10204-2.1	C15
Terminal blocks	
• Factory mounted terminal blocks	N02
Region/customer specific labels	
• KCC label (South Korea)	W28
Tag name plate, stainless steel (specify in plain text)	Y17
Tag name plate, plastic (self adhesive)	Y18
Customer-specific transmitter setting	Y20
Sensor cables wired (specify Article No. for sensor cables and order cables separately)	Y40
Sensor cables wired and IP68 sealing (specify Article No. for sensor cables and order cables separately)	Y41
Special version (specify in plain text)	Y99
Additional calibrations	
• Matched pair - (Standard production calibration where sensor and transmitter is calibrated together)	On request¹⁾
• Accredited Siemens Flow Instruments matched pair Calibration acc. to ISO/IEC 17025: 2005	On request¹⁾
• Customer-specified calibration up to 10 points	On request¹⁾
• Customer-witnessed calibration	On request¹⁾
Any of above calibration	

¹⁾ Product Variation Request (PVR)

Operating instructions for SITRANS F M MAG 1100F

Description	Article No.
• English	A5E02435647
All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation	
Please use online Product selector to get latest updates. Product selector link: www.pia-portal.automation.siemens.com	

Accessories

Description	Article No.
Potting kit for IP68/ NEMA 6P sealing of sensor junction box	FDK:085U0220
	

Flow Measurement

SITRANS F M

Flow sensor MAG 1100 F

Accessories for MAG 1100 F sensor

Article No.

Weld-in connection fittings for use with P gaskets (Stainless steel)

Material: AISI 316L (1.4404)

Only for liner PFA

2 pcs. fittings

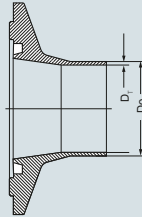
2 pcs. clamps (to join flow sensor and fitting),

P gaskets not included

DIN 11850¹⁾

Adapter

DN (mm)	D _o (mm)	D _T (mm)	Sensor DN (mm)
---------	---------------------	---------------------	-------------------



10 ²⁾	13	1.5	10	A5E02054630
15 ²⁾	19	1.5	15	A5E02054633
20	23	1.5	15	A5E02054634
25	29	1.5	25	A5E02054635
32	35	1.5	25	A5E02054637
40	41	1.5	40	A5E02054638
50	53	1.5	50	A5E02054640
65	70	2.0	65	A5E02054643
80	85	2.0	80	A5E02054644
100	104	2.0	100	A5E02054646

ISO 2037¹⁾

Adapter

DN (mm)	D _o (mm)	D _T (mm)	Sensor DN (mm)
---------	---------------------	---------------------	-------------------

12.7	12.7	1.0	10	A5E03727946
17.2	17.2	1.0	15	A5E03728098
25	25	1.6	25	A5E02196073
33	33.7	1.6	25	A5E02196074
38	38	1.6	40	A5E02196075
40	40	1.6	40	A5E02196076
51	51	1.6	50	A5E02196077
63.5	63.5	1.6	65	A5E02196078
76.1	76.1	1.6	80	A5E02196080
101.6	101.6	2.0	100	A5E02196082

Tri-Weld (BS 4825-1)¹⁾

Adapter

DN (mm)	D _o (mm)	D _T (mm)	Sensor DN (mm)
---------	---------------------	---------------------	-------------------

12.7	12.7	1.2	10	A5E02199113
19.05	19.05	1.2	15	A5E02199114
25.4	25.4	1.6	25	A5E02199115
38.1	38.1	1.6	40	A5E02199116
50.8	50.8	1.6	50	A5E02199117
63.5	63.5	1.6	65	A5E02199118
76.2	76.2	1.6	80	A5E02199119
101.6	101.6	2.0	100	A5E02199120

Accessories for MAG 1100 F sensor

Article No.

Clamp-type connection fittings for use with P gaskets (Stainless steel)

Material: AISI 316L (1.4404)

Only for liner PFA

2 pcs. fittings

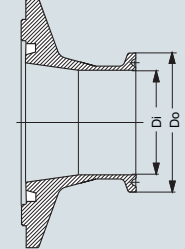
2 pcs. clamps (to join flow sensor and fitting),

P gaskets not included

DIN 32676¹⁾

Adapter

DN (mm)	D _o (mm)	D _i (mm)	Sensor DN (mm)
---------	---------------------	---------------------	-------------------



10	34	10	10	A5E02211143
15	34	16	15	A5E02211144
25	50.5	22.6	25	A5E02211146
40	50.5	38	40	A5E02211147
50	64	50	50	A5E02211148
65	91	66	65	A5E02211151
80	106	81	80	A5E02211152
100	119	100	100	A5E02211153

ISO 2852¹⁾

Adapter

DN (mm)	D _o (mm)	D _i (mm)	Sensor DN (mm)
---------	---------------------	---------------------	-------------------

25	50.5	22.6	25	A5E02213581
33.7	50.5	31.3	25	A5E02213582
38	50.5	35.6	40	A5E02213583
51	64	48.6	50	A5E02213584
63.5	77.5	60.3	65	A5E02213585
76.1	91	72.9	80	A5E02213586
101.6	119	97.6	100	A5E02213587

Tri-Clamp (BS 4825-3)¹⁾

Adapter

DN (mm)	D _o (mm)	D _i (mm)	Sensor DN (mm)
---------	---------------------	---------------------	-------------------

12.7	25.4	9.5	10	A5E02213596
19.05	25.4	15.85	15	A5E02213597
25.4	50.5	22.2	25	A5E02213598
38.1	50.5	34.9	40	A5E02213599
50.8	64	47.6	50	A5E02213600
63.5	77.5	60.3	65	A5E02213601
76.2	91	73	80	A5E02213602
101.6	119	97.6	100	A5E02213603

D_o: Outer diameterD_i: Inner diameter¹⁾ Suitable for EHEDG²⁾ Not suitable for EHEDG

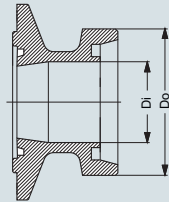
Accessories for MAG 1100 F sensor Article No.

Threaded type connection fittings for use with P gaskets (Stainless steel)

Material: AISI 316L (1.4404)
 Only for liner PFA
 2 pcs. fittings
 2 pcs. clamps (to join flow sensor and fitting),
 P gaskets not included

DIN 11851¹⁾

<u>Adapter</u>			<u>Sensor</u>
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)



10	28	10	10	A5E02218293
15	34	16	15	A5E02218294
20	44	20	15	A5E02218295
25	52	26	25	A5E02218296
32	58	32	25	A5E02218297
40	65	38	40	A5E02218298
50	78	50	50	A5E02218299
65	95	66	65	A5E02218300
80	110	81	80	A5E02218301
100	130	100	100	A5E02218302

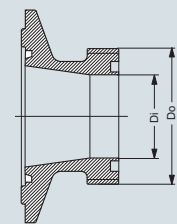
Accessories for MAG 1100 F sensor Article No.

Threaded type connection fittings for use with P gaskets (Stainless steel)

Material: AISI 316L (1.4404)
 Only for liner PFA
 2 pcs. fittings
 2 pcs. clamps (to join flow sensor and fitting),
 P gaskets not included

SMS 1145¹⁾

<u>Adapter</u>			<u>Sensor</u>
DN (mm)	D _o (mm)	D _i (mm)	DN (mm)



25	40	22.6	25	A5E02218310
38	60	35.6	40	A5E02218312
51	70	48.6	50	A5E02218313
63.5	85	60.3	65	A5E02218314
76	98	72	65	A5E02218315

D_o: Outer diameter

D_i: Inner diameter

¹⁾ Suitable for EHEDG

Flow Measurement

SITRANS F M

Flow sensor MAG 1100 F

Accessories for MAG 1100 F sensor

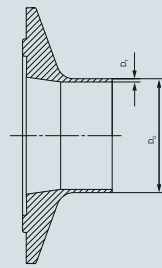
Article No.

Weld-in connection fittings for use with flat gaskets (Stainless steel)

Material: AISI 316L (1.4404)
For liner PFA and ceramic
2 pcs. fittings
2 pcs. clamps (to join flow sensor and fitting),
Flat gaskets not included

DIN 11850¹⁾

Adapter			Sensor
DN (mm)	D _O (mm)	D _T (mm)	DN (mm)



10	13	1.5	10	FDK:083G2116
15	19	1.5	15	FDK:083G2117
20	23	1.5	15	FDK:083G2118
25	29	1.5	25	FDK:083G2119
32	35	1.5	25	FDK:083G2120
40	41	1.5	40	FDK:083G2121
50	53	1.5	50	FDK:083G2122
65	70	2.0	65	FDK:083G2123
80	85	2.0	80	FDK:083G2124
100	104	2.0	100	FDK:083G2125

ISO 2037¹⁾

Adapter			Sensor
DN (mm)	D _O (mm)	D _T (mm)	DN (mm)
12.7	12.7	1.0	10
17.2	17.2	1.0	15
25	25.6	1.6	25
33.7	33.7	1.6	25
38	38	1.6	40
40	40	1.6	40
51	51	1.6	50
63.5	63.5	1.6	65
76.1	71.1	1.6	80
101.6	101.6	2.0	100
114.3	118.3	2.0	100

Tri-Weld (BS 4825-1)¹⁾

Adapter			Sensor
DN (mm)	D _O (mm)	D _T (mm)	DN (mm)
12.7	12.7	1.2	10
19.05	19.05	1.2	15
25.4	25.4	1.6	25
38	38.1	1.6	40
50.8	50.8	1.6	50
63.5	63.5	1.6	65
76.2	76.2	1.6	80
101.6	101.6	2.0	100

Accessories for MAG 1100 F sensor

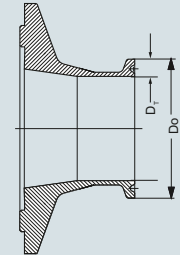
Article No.

Clamp-type connection fittings for use with flat gaskets (Stainless steel)

Material: AISI 316L (1.4404)
For liner PFA and ceramic
2 pcs. fittings
2 pcs. clamps (to join flow sensor and fitting),
Flat gaskets not included

DIN 32676¹⁾

Adapter			Sensor
DN (mm)	D _O (mm)	D _T (mm)	DN (mm)



10	34	10	10	FDK:083G2186
15	34	16	15	FDK:083G2187
25	50.5	26	25	FDK:083G2179
40	50.5	38	40	FDK:083G2181
50	64	50	50	FDK:083G2182
65	91	66	65	FDK:083G2183
80	106	81	80	FDK:083G2184
100	119	100	100	FDK:083G2185

ISO 2852¹⁾

Adapter			Sensor
DN (mm)	D _O (mm)	D _T (mm)	DN (mm)
25	50.5	22.6	25
33.7	50.5	31.3	25
38	50.5	35.6	40
51	64	48.6	50
63.5	77.5	60.3	65
76.1	91	72.9	80
101.6	119	97.6	100

Tri-Clamp (BS 4825-3)¹⁾

Adapter			Sensor
DN (mm)	D _O (mm)	D _T (mm)	DN (mm)
12.7	25.4	9.5	10
19.05	25.4	15.85	15
25.4	50.5	22.2	25
38.1	50.5	34.9	40
50.8	64	47.6	50
63.5	77.5	60.3	65
76.2	91	73	80
101.6	119	97.6	100

D_O: Outer diameterD_T: Inner diameter¹⁾ Suitable for 3A

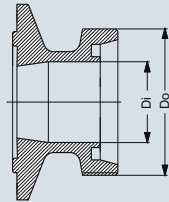
Accessories for MAG 1100 F sensor Article No.

Threaded type connection fittings for use with flat gaskets (Stainless steel)

Material: AISI 316L (1.4404)
For liner PFA and ceramic
2 pcs. fittings
2 pcs. clamps (to join flow sensor and fitting),
Flat gaskets not included

DIN 11851¹⁾

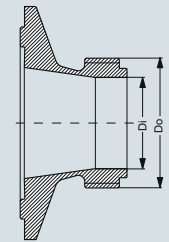
Adapter			Sensor
DN (mm)	D _O (mm)	D _I (mm)	DN (mm)



10	28	10	10	FDK:083G2156
15	34	16	15	FDK:083G2157
20	44	20	15	FDK:083G2158
25	52	26	25	FDK:083G2159
32	58	32	25	FDK:083G2160
40	65	38	40	FDK:083G2161
50	78	50	50	FDK:083G2162
65	95	66	65	FDK:083G2163
80	110	81	80	FDK:083G2164
100	130	100	100	FDK:083G2165

ISO 2853¹⁾

Adapter			Sensor
DN (mm)	D _O (mm)	D _I (mm)	DN (mm)



25	37	22.6	25	FDK:083G2149
38	51	35.6	40	FDK:083G2151
51	64	48.6	50	FDK:083G2152
63.5	78	60.3	65	FDK:083G2153
76.1	91	72.9	80	FDK:083G2154

BS 4825-4¹⁾

Adapter			Sensor
DN (mm)	D _O (mm)	D _I (mm)	DN (mm)

101.6	126	97.6	100	FDK:083G2145
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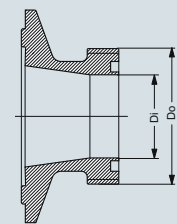
Accessories for MAG 1100 F sensor Article No.

Threaded type connection fittings for use with flat gaskets (Stainless steel)

Material: AISI 316L (1.4404)
For liner PFA and ceramic
2 pcs. fittings
2 pcs. clamps (to join flow sensor and fitting),
Flat gaskets not included

SMS 1145²⁾

Adapter			Sensor
DN (mm)	D _O (mm)	D _I (mm)	DN (mm)



25	40	22.6	25	FDK:083G2139
38	60	35.6	40	FDK:083G2141
51	70	48.6	50	FDK:083G2142
63.5	85	60.3	65	FDK:083G2143
76	98	72	65	FDK:083G2144

D_O: Outer diameter

D_I: Inner diameter

¹⁾ Suitable for 3A

²⁾ Not suitable for 3A

Flow Measurement

SITRANS F M

Flow sensor MAG 1100 F

Spare parts for MAG 1100 F sensor

Article No.

Gaskets

(delivered in pairs, to be placed between flow sensor and adapter)

MAG 1100 F (PFA) - P gaskets

Rubber: EPDM

• DN 10	A5E02055286
• DN 15	A5E02055287
• DN 25	A5E02055290
• DN 40	A5E02055291
• DN 50	A5E02055292
• DN 65	A5E02055293
• DN 80	A5E02055295
• DN 100	A5E02055297

MAG 1100 F (ceramic) - Flat gaskets

Rubber: FKM/FPM

• DN 10	A5E00915707
• DN 15	A5E00915764
• DN 25	A5E00915771
• DN 40	A5E00915773
• DN 50	A5E00915775
• DN 65	A5E00915780
• DN 80	A5E00915782
• DN 100	A5E00915784

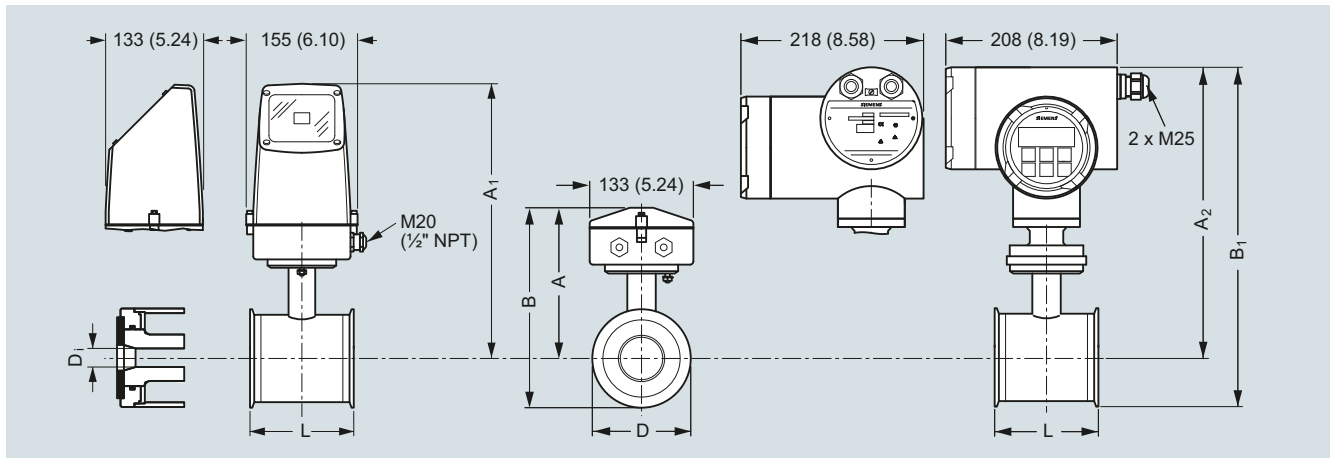
MAG 1100 F (PFA, ceramic) - Flat gaskets

Rubber: EPDM

• DN 10	FDK:083G2206
• DN 15	FDK:083G2207
• DN 25	FDK:083G2209
• DN 40	FDK:083G2211
• DN 50	FDK:083G2212
• DN 65	FDK:083G2213
• DN 80	FDK:083G2214
• DN 100	FDK:083G2215

Rubber: NBR

• DN 10	FDK:083G2216
• DN 15	FDK:083G2217
• DN 25	FDK:083G2219
• DN 40	FDK:083G2221
• DN 50	FDK:083G2222
• DN 65	FDK:083G2223
• DN 80	FDK:083G2224
• DN 100	FDK:083G2225

Dimensional drawings
Sensor MAG 1100 F compact/remote


Dimensions in mm (inch)

Important note:
For compact installation with MAG 6000 I/Ex - Supports the transmitter to avoid tension on the sensor part.

Size	L	A	A ₁ ³⁾	B ²⁾	B ₁	D	D _i (Al ₂ O ₃)	D _i PFA	Weight ¹⁾
DN	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
10	64	161	315	193.7	344.7	64.0	10	10	2.2
15	64	161	315	193.7	344.7	64.0	15	16	2.2
25	79	169	323	207.5	359.0	77.5	25	26	2.7
40	94	179	333	228.0	379.0	91.0	40	38	3.4
50	104	188	342	247.7	398.7	119.0	50	50	4.2
65	131	197.5	351	262.6	413.6	130.0	65	66	5.5
80	156	204	357	281.0	432.0	155.0	80	81	7.0
100	186	217	370	308.0	459.0	183.0	100	100	10.0

Size	L	A	A ₁ ³⁾	B ²⁾	B ₁	D	D _i (Al ₂ O ₃)	D _i PFA	Weight ¹⁾
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[lb]
3/8	2.52	6.34	12.40	7.62	13.57	2.52	0.39	0.39	4.8
1/2	2.52	6.34	12.40	7.62	13.57	2.52	0.59	0.63	4.8
1	3.11	6.66	12.72	8.17	14.13	3.05	0.98	1.02	4.9
1 1/2	3.70	7.05	13.11	8.98	14.92	3.58	1.57	1.50	7.5
2	4.09	7.40	13.47	9.75	15.70	4.68	1.97	1.97	9.2
2 1/2	5.16	7.78	13.82	10.34	16.28	5.12	2.56	2.60	12.0
3	6.14	8.03	14.06	11.06	17.01	6.10	3.15	3.19	15.0
4	7.32	8.54	14.57	12.13	18.07	7.20	3.94	3.94	22.0

¹⁾ With transmitter MAG 5000 or MAG 6000 compact, weight is increased by approximately 0.8 kg (1.8 lb)
 With MAG 6000 I weight is increased with 5.5 kg (12.1 lb)

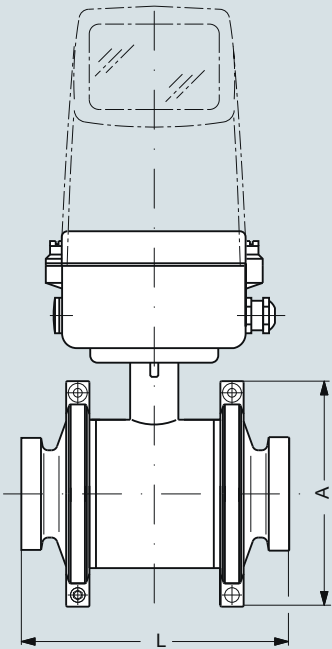
²⁾ 14.5 mm (0.571") shorter when the stainless steel terminal box is used (always Ex version)

³⁾ A₂ is 3 mm (0.12") shorter than A₁

Flow Measurement
SITRANS F M

Flow sensor MAG 1100 F

Sensor MAG 1100 F compact/separate – built-in length



Size		A		L ¹⁾	
DN	inch	[mm]	[inch]	[mm]	[inch]
10	3/8	99	3.90	146	5.75
15	1/2	99	3.90	146	5.75
25	1	113	4.45	161	6.34
40	1 1/2	126	4.96	176	6.93
50	2	154	6.06	186	7.32
65	2 1/2	165	6.50	223	8.78
80	3	200	7.87	258	10.16
100	4	225	8.86	288	11.34

¹⁾ The total built-in length "L" is independent of the adapter type selected.

Overview



The SITRANS F M MAG 3100 is an electromagnetic flow sensor in a large variety that meets the demands of almost every flow application.

Benefits

- Wide range of sizes: DN 15 to DN 2000 (½" to 78")
- The flexible design is for all applications not covered by the standard industry-specific sensors: MAG 1100, MAG 1100 F, MAG 3100 P and MAG 5100 W
- Wide pressure range: PN 6 to PN 100
ANSI Class 150/300, AS 2129, AS 4087, JIS K10 and K20. On request up to 690 bar (10 000 psi)
- Wide range of electrode and liner material to fit even the most extreme process media
- Fully welded construction provides a ruggedness that suits the toughest applications and environments
- Easy commissioning, the SENSORPROM unit automatically updates settings.
- Designed to allow patented SITRANS F M in-situ verification using the SENSORPROM fingerprints.

Application

The main applications of the SITRANS F M electromagnetic flow sensors can be found in the following fields:

- Process industry
- Chemical industry
- Steel industry
- Mining
- Utility
- Power generation and distribution
- Oil and gas / HPI
- Water and waste water

Design

- Compact or remote mounting possible
- Easy "plug & play" field changeability of transmitter
- ATEX and FM/CSA versions
- High temperature sensor for applications with temperatures up to 180 °C (356 °F)
- Meets EEC directives: PED, 2014/68/EU pressure directive for EN1092-1 flanges
- Built-in length according to ISO 13359, the standard includes sizes up to DN 400
- Onsite or factory upgrade to IP68/NEMA 6P of a standard sensor.

Mode of operation

The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

Integration

The complete flowmeter consists of a flow sensor and an associated transmitter MAG 5000, 6000 and 6000 I.

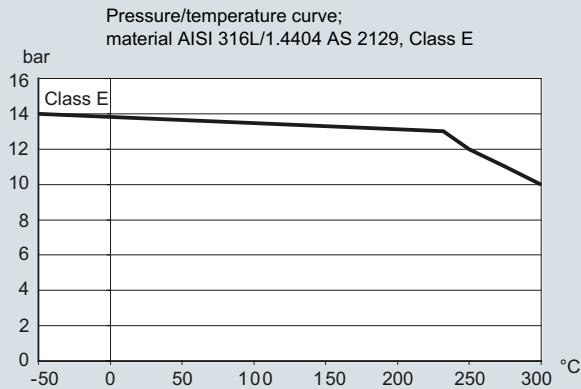
The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS DP and PA, Modbus RTU/RS 485.

Flow Measurement

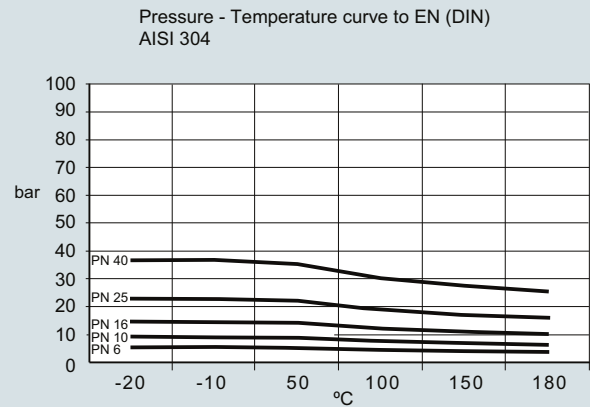
SITRANS F M

Flow sensor MAG 3100 and MAG 3100 HT

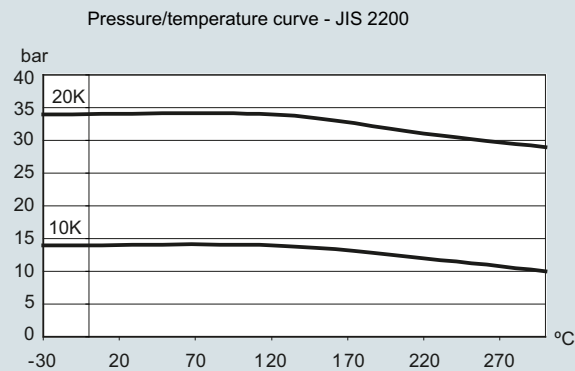
Pressure/temperature curve;
material AISI 316L/1.4404 AS 2129, Class E



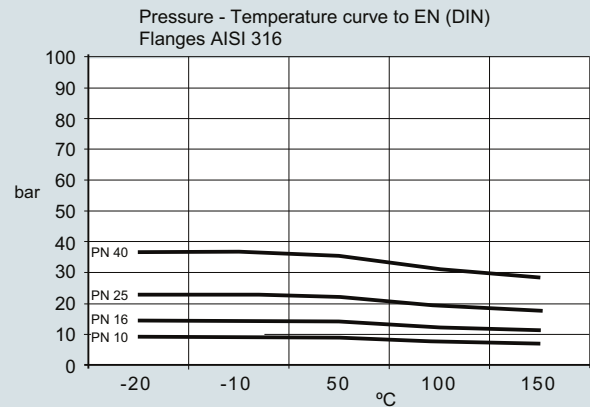
Pressure/temperature curve to EN (DIN) flanges AISI 304



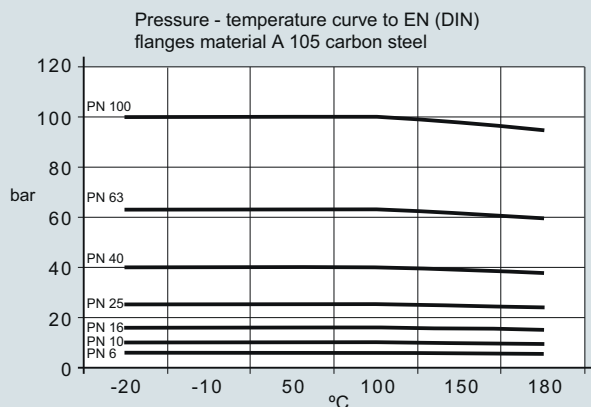
Pressure/temperature curve - JIS 2200



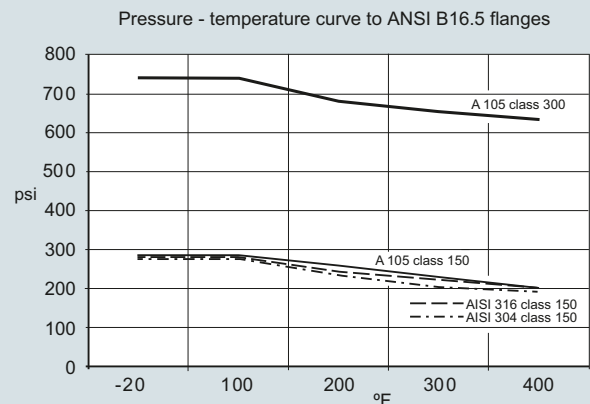
Pressure/temperature curve to EN (DIN) flanges AISI 316



Pressure/temperature curve to EN (DIN) flanges,
material A 105 carbon steel



Pressure/temperature curve to ANSI B16.5 flanges



Note: The pressure-temperature curves only assist in the selection of a system. No responsibility is taken for the correctness of the information. For further information on the PED standard and requirements, see page 10/15.

Technical specifications

Version	MAG 3100	MAG 3100 HT (High Temperature)
Product characteristic	Flexible product program	Flexible product program
Nominal size	DN 15 ... DN 2000 (½" ... 78")	DN 15 ... DN 300 (½" ... 12")
Measuring principle	Electromagnetic induction	Electromagnetic induction
Excitation frequency (Mains supply: 50 Hz/60 Hz)	<ul style="list-style-type: none"> • DN 15 ... 65 (½" ... 2½"): 12.5 Hz/15 Hz • DN 80 ... 150 (3" ... 6"): 6.25 Hz/7.5 Hz • DN 200 ... 1200 (8" ... 48"): 3.125 Hz/3.75 Hz • DN 1400 ... 2000 (54" ... 78"): 1.5625 Hz/1.875 Hz 	<ul style="list-style-type: none"> • DN 15 ... 65 (½" ... 2½"): 12.5 Hz/15 Hz • DN 80 ... 150 (3" ... 6"): 6.25 Hz/7.5 Hz • DN 200 ... 300 (8" ... 12"): 3.125 Hz/3.75 Hz
Process connection		
Flanges	EN 1092-1, raised face ¹⁾ (EN 1092-1, DIN 2501 and BS 4504 have the same mating dimensions) <ul style="list-style-type: none"> • DN 65 ... 2000 (2½" ... 78"): PN 6 (87 psi) • DN 200 ... 2000 (8" ... 78"): PN 10 (145 psi) • DN 65 ... 2000 (2½" ... 78"): PN 16 (232 psi) • DN 200 ... 600 (8" ... 24"): PN 25 (362 psi) • DN 15 ... 600 (½" ... 24"): PN 40 (580 psi) • DN 50 ... 300 (2" ... 12"): PN 63 (913 psi) • DN 25 ... 300 (1" ... 12"): PN 100 (1450 psi) ANSI B16.5 (~BS 1560), raised face <ul style="list-style-type: none"> • ½" ... 24": Class 150 (19 bar (275 psi)) • ½" ... 24": Class 300 (50 bar (725 psi)) AWWA C-207, flat face 28" ... 78": Class D (10 bar) AS 2129, raised face ½" ... 48": Table E AS 4087, raised face: <ul style="list-style-type: none"> • PN 16 (DN 50 ... 1200, 16 bar (232 psi)) • PN 21 (DN 50 ... 600, 21 bar (304 psi)) • PN 35 (DN 50 ... 600, 35 bar (508 psi)) JIS B 2220:2004 <ul style="list-style-type: none"> • K10 (1" ... 24") • K20 (1" ... 24") Other flanges and pressure ratings on request	EN 1092-1, raised face (EN 1092-1, DIN 2501 and BS 4504 have the same mating dimensions) <ul style="list-style-type: none"> • DN 15 ... 300 (½" ... 12"): PN 40 (580 psi) • DN 65 ... 300 (2½" ... 12"): PN 16 (232 psi) • DN 200 ... 300 (8" ... 12"): PN 10 (145 psi) • DN 200 ... 300 (8" ... 12"): PN 25 (362 psi) ANSI B16.5 (~BS 1560), raised face: <ul style="list-style-type: none"> • ½" ... 12": Class 150 (19 bar (275 psi)) • ½" ... 12": Class 300 (50 bar (725 psi)) AS 2129, raised face ½" ... 12": Table E
Rated operation conditions		
Ambient temperature (conditions also dependent on liner characteristics)		
<ul style="list-style-type: none"> • Standard sensor • Ex sensor 	-40 ... +100 °C (-40 ... +212 °F) -20 ... +60 °C (-4 ... +140 °F)	-40 ... +100 °C (-40 ... +212 °F) For medium temperature up to 150 °C (302 °F): -20 ... +60 °C (-4 ... +140 °F) For medium temperature 150 ... 180 °C (302 ... 356 °F): -20 ... +50 °C (-4 ... +122 °F)
<ul style="list-style-type: none"> • Compact with transmitter <ul style="list-style-type: none"> - MAG 5000/6000 - MAG 6000 I - MAG 6000 I Ex 	-20 ... +60 °C (-4 ... +140 °F) -20 ... +60 °C (-4 ... +140 °F) -20 ... +60 °C (-4 ... +140 °F)	-20 ... +60 °C (-4 ... +140 °F) -20 ... +60 °C (-4 ... +140 °F) -20 ... +60 °C (-4 ... +140 °F)

Flow Measurement

SITRANS F M

Flow sensor MAG 3100 and MAG 3100 HT

Version	MAG 3100	MAG 3100 HT (High Temperature)
Operating pressure [abs. bar] (maximum operating pressure decreases with increasing operating temperature and with stainless steel flanges)	<ul style="list-style-type: none"> Soft rubber 0.01 ... 100 bar (0.15 ... 1450 psi) EPDM 0.01 ... 40 bar (0.15 ... 580 psi) Linatex 0.01 ... 40 bar (0.15 ... 580 psi) Ebonite 0.01 ... 100 bar (0.15 ... 1450 psi) PTFE <ul style="list-style-type: none"> - DN ≤ 300 (≤ 12"): 0.3 ... 50 bar (4 ... 725 psi) - 350 ≤ DN ≤ 600 (14" ≤ DN ≤ 24"): 0.3 ... 40 bar (4 ... 580 psi) PFA <ul style="list-style-type: none"> - DN 15 ... 150 (½" ... 6"): Vacuum 0.02 ... 50 bar (0.29 ... 725 psi) 	<ul style="list-style-type: none"> PTFE Teflon <ul style="list-style-type: none"> - DN 15 ... 300 (½" ... 12"): 0.3/0.6 ... 50 bar (4/8 ... 725 psi) (180 °C (356 °F)) Factory mounted grounding rings type E in stainless steel and stainless steel terminal box. Can only be used with remote transmitter. PFA <ul style="list-style-type: none"> - DN 15 ... 150 (½" ... 6"): Vacuum 0.02 ... 50 bar (0.29 ... 725 psi)
Enclosure rating	IP67 to EN 60529/NEMA 4X/6, 1 mH ₂ O for 30 min Option: IP68 to EN 60529/NEMA 6P, 10 mH ₂ O cont.	IP67 to EN 60529/NEMA 4X/6, 1 mH ₂ O for 30 min Option: IP68 to EN 60529/NEMA 6P, 10 mH ₂ O cont.
Pressure drop at 3 m/s	As straight pipe	
Test pressure	1.5 x PN (where applicable)	
Mechanical load (vibration)	<ul style="list-style-type: none"> 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 Sensor: 3.17 g RMS Sensor with compact MAG 5000/ 6000 mounted transmitter: 3.17 g RMS Sensor with compact MAG 6000 I/ 6000 I Ex mounted transmitter: 1.14 g RMS 	<ul style="list-style-type: none"> 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 Sensor: 3.17 g RMS Sensor with compact MAG 5000/ 6000 mounted transmitter: 3.17 g RMS Sensor with compact MAG 6000 I/ 6000 I Ex mounted transmitter: 1.14 g RMS
Temperature of medium	<ul style="list-style-type: none"> Soft rubber 0 ... +70 °C (32 ... 158 °F) EPDM -10 ... +70 °C (14 ... 158 °F) Linatex (rubber) -40 ... +70 °C (-40 ... +158 °F) (for temperatures below -20 °C (-4 °F) AISI 304 or 316 flanges must be used) Ebonite 0 ... 95 °C (32 ... 203 °F) PTFE -20 ... +100 °C (-4 ... +212 °F) PFA -20 ... +100 °C (-4 ... +212 °F) 	<ul style="list-style-type: none"> PTFE -20 ... +150 °C (-4 ... +302 °F) PTFE -20 ... +180 °C (-4 ... +356 °F) Factory mounted grounding rings type E in stainless steel and stainless steel terminal box. Can only be used with remote transmitter. PFA -20 ... +150 °C (-4 ... +300 °F)
EMC	2014/30/EU	2014/30/EU
Design		
Weight	See dimensional drawings	
Flange and housing material	Carbon steel ASTM A 105, with corrosion resistant coating Corrosivity category C4, according to ISO 12944-2 or Stainless steel AISI 304/1.4301 flanges and carbon steel housing, with corrosion resistant coating Corrosivity category C4, according to ISO 12944-2 or Stainless steel AISI 316L/1.4404 flanges and housing, polished	Carbon steel ASTM A 105, with corrosion resistant coating Corrosivity category C4, according to ISO 12944-2 or Stainless steel AISI 304/1.4301 flanges and carbon steel housing, with corrosion resistant coating Corrosivity category C4, according to ISO 12944-2 or Stainless steel AISI 316L/1.4404 flanges and housing, polished
Electrode material	<ul style="list-style-type: none"> Stainless steel AISI 316Ti/1.4571 Hastelloy C276/2.4819 (PFA: Hastelloy C22/2.4602) Platinum/Iridium Titanium Tantalum 	<ul style="list-style-type: none"> Stainless steel AISI 316Ti/1.4571 Hastelloy C276/2.4819 (PFA: Hastelloy C22/2.4602) Platinum/Iridium Titanium Tantalum
Grounding electrode material	<ul style="list-style-type: none"> Soft rubber, EPDM, Linatex, Ebonite: available with grounding electrodes in stainless steel AISI 316Ti/1.4571 or Hastelloy PTFE: no grounding electrodes PFA: optional in Hastelloy, Tantalum or Platinum 	<ul style="list-style-type: none"> PTFE: no grounding electrodes PFA: optional in Hastelloy, Tantalum or Platinum

Flow sensor MAG 3100 and MAG 3100 HT

Version	MAG 3100	MAG 3100 HT (High Temperature)
Design (continued)		
Terminal box (remote version only)	<ul style="list-style-type: none"> Standard fibre glass reinforced polyamide Option Stainless steel AISI 316/1.4436 Ex Stainless steel AISI 316/1.4436 	<ul style="list-style-type: none"> Standard fibre glass reinforced polyamide (max. 150 °C (302 °F)) Stainless steel AISI 316/1.4436 Ex Stainless steel AISI 316/1.4436
Cable entries	<ul style="list-style-type: none"> Remote installation 2 x M20 or 2 x ½" NPT Compact installation <ul style="list-style-type: none"> MAG 5000/MAG 6000: 4 x M20 or 4 x ½" NPT MAG 6000 I: 2 x M25 or 2 x ½" NPT (for supply/output) MAG 6000 I Ex: 2 x M25 or 2 x ½" NPT (for supply/output) 	<ul style="list-style-type: none"> Remote installation 2 x M20 or 2 x ½" NPT
Certificates and approvals		
Calibration		
<ul style="list-style-type: none"> Standard production calibration Special calibration 	Zero-point, 2 x 25 % and 2 x 90 % 5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory Q _{max} 10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q _{max} Matched-pair calibration: default, 5-point or 10-point	Zero-point, 2 x 25 % and 2 x 90 %
Hazardous areas ²⁾		
<ul style="list-style-type: none"> Ex sensor in compact or remote version with MAG 6000 I Ex 	ATEX, FM, CSA, IECEx, EAC Ex, NEPSI - Zone 1 Ex d e ia IIC T6 Gb ⁴⁾ - Zone 1 Ex e ia IIC T6 Gb ⁵⁾ ATEX, FM, CSA, IECEx - Zone 21 Ex tD A21 IP67 FM - XP IS Class I Div. 1 Groups A, B, C, D ⁶⁾ - DIP Class II+III Div. 1 Groups E, F, G ⁶⁾	ATEX, FM, CSA, IECEx, EAC Ex - Zone 1 Ex d e ia IIC T6 Gb ⁴⁾ - Zone 1 Ex e ia IIC T6 Gb ⁵⁾ ATEX, FM, CSA, IECEx - Zone 21 Ex tD A21 IP67 FM - XP IS Class I Div. 1 Groups A, B, C, D ⁶⁾ - DIP Class II+III Div. 1 Groups E, F, G ⁶⁾
<ul style="list-style-type: none"> Standard sensor with/without MAG 5000/6000/6000 I 	FM - NI Class I Div. 2 Groups A, B, C, D - NI Class I Zone 2 Groups IIC	FM - NI Class I Div. 2 Groups A, B, C, D - NI Class I Zone 2 Groups IIC
Drinking water	EPDM liner: <ul style="list-style-type: none"> WRAS (WRc, BS690 cold water, GB) NSF/ANSI Standard 61⁷⁾ (Cold water, US) ACS listed (F) DVGW W270 (D) Belgaqua (B) MCERTS (GB) (EPDM or PTFE lining with AISI 316 or Hastelloy electrodes) 	
Pressure equipment	<ul style="list-style-type: none"> PED conforming: All EN 1092-1 flanges - 2014/68/EU³⁾ CRN 	<ul style="list-style-type: none"> PED conforming: All EN 1092-1 flanges - 2014/68/EU³⁾ CRN
Others	<ul style="list-style-type: none"> EAC (Russia, Belarus, Kazakhstan) KCC (South Korea) CMC/CPA (China) 	<ul style="list-style-type: none"> EAC (Russia, Belarus, Kazakhstan) KCC (South Korea)

Technical specification for transmitter - see transmitter pages.

¹⁾ PN 6-40: DN ≤ 600 type 01 (SORF); DN > 600 type 11 (WNRF); PN 63-100: type 11 (WNRF)

²⁾ Not for sensor with 300 µm coating.

³⁾ For sizes larger than 600 mm (24") in PN 16 PED conformity is available as a cost-added option. The basic unit will carry the LVD (Low Voltage Directive) and EMC approval. All products sold outside of EU and EFTA are excluded from the Pressure Equipment directive, also products sold into certain market sectors are excluded. These include:

a) Meters used in networks for the supply, distribution and discharge of water.

b) Meters used in pipelines for the conveyance of any fluid from offshore to onshore.

c) Meters used in the extraction of petroleum or gas, including christmas tree and manifold equipment.

d) Any meter mounted on a ship or mobile offshore platform. For further information on the PED standard and requirements see page 10/15.

⁴⁾ In remote version with sensor size DN 15 ... DN 300 (½" ... 12")

⁵⁾ In remote version with sensor size DN 350 ... DN 2000 (14" ... 78")


⁶⁾ In compact version with sensors size DN 15 ... 300 (½" ... 12").


⁷⁾ Including Annex G

Flow Measurement

SITRANS F M

Flow sensor MAG 3100 and MAG 3100 HT

Selection and Ordering data	Article No.
Sensor SITRANS F M MAG 3100	7 ME 6 3 1 0 -
	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 15 (½") (PTFE and PFA liner)	1 V
DN 25 (1")	2 D
DN 40 (1½")	2 R
DN 50 (2")	2 Y
DN 65 (2½")	3 F
DN 80 (3")	3 M
DN 100 (4")	3 T
DN 125 (5")	4 B
DN 150 (6")	4 H
DN 200 (8")	4 P
DN 250 (10")	4 V
DN 300 (12")	5 D
DN 350 (14")	5 K
DN 400 (16")	5 R
DN 450 (18")	5 Y
DN 500 (20")	6 F
DN 600 (24")	6 P
DN 700 (28")	6 Y
DN 750 (30") (AWWA and AS 2129 only)	7 D
DN 800 (32")	7 H
DN 900 (36")	7 M
DN 1000 (40")	7 R
DN 1050 (42") (AWWA only)	7 U
DN 1100 (44") (AWWA only)	7 V
DN 1200 (48")	8 B
DN 1400 (54")	8 F
DN 1500 (60")	8 K
DN 1600 (66")	8 P
DN 1800 (72")	8 T
DN 2000 (78")	8 Y
Flange norm and pressure rating	
EN 1092-1	
PN 6 (DN 65 ... 2000 (2½" ... 78"))	A
PN 10 (DN 200 ... 2000 (8" ... 78"))	B
PN 16 (DN 65 ... 1200 (2½" ... 48"))	C
PN 16, non-PED (DN 700 ... 2000 (28" ... 78"))	D
PN 25 (DN 200 ... 600 (8" ... 24"))	E
PN 40 (DN 15 ... 600 (½" ... 24"))	F
PN 63 (DN 50 ... 300 (2" ... 12"))	G
PN 100 (DN 25 ... 300 (1" ... 12"))	H
ANSI B16.5	
Class 150 (½" ... 24")	J
Class 300 (½" ... 24")	K
AWWA C-207	
Class D (28" ... 78")	L
AS	
2129, table E	M
4087, PN 16 (DN 50 ... 1200 (2" ... 48")) (Not PTFE and PFA)	N
4087, PN 21 (DN 50 ... 600 (2" ... 24")) (Not PTFE and PFA)	P
4087, PN 35 (DN 50 ... 600 (2" ... 24")) (Not PTFE and PFA)	Q
JIS B 2220:2004	
K10 (1" ... 24")	R
K20 (1" ... 24")	S

Selection and Ordering data	Article No.
Sensor SITRANS F M MAG 3100	7 ME 6 3 1 0 -
	
Flange material and coating	
Carbon steel flanges ASTM A 105, corrosion-resistant coating of category C4	1
Stainless steel flanges, AISI 304/1.4301, corrosion-resistant coating of category C4	2
Stainless steel flanges and sensor body, AISI 316L/1.4404, polished	3
Carbon steel flanges ASTM A 105, 300 µm corrosion-resistant coating of category C4	4
Stainless steel flanges, AISI 304/1.4301, 300 µm corrosion-resistant coating of category C4	5
Liner material	
Soft rubber	1
EPDM	2
PTFE (DN ≤ 300, PN ≤ 50 bar / ≤ 12", PN ≤ 725 psi), PTFE (350 ≤ DN ≤ 600, PN ≤ 40 bar / 14" ≤ DN ≤ 24", PN ≤ 580 psi)	3
Ebonite	4
Linatex (PN ≤ 40 bar (580 psi) DN ≤ 600 (24"))	5
PFA (DN 15 ... 150 (½" ... 6")) (PN ≤ 40 bar (580 psi))	7
Electrode material	
(Grounding electrodes not for PTFE liner or pressure rating PN 100)	
AISI 316Ti/1.4571 (not for PFA)	1
Hastelloy C276/2.4819 (PFA liner: Hastelloy C22/2.4602)	2
Platinum (DN ≤ 300 (12")) (not for Ebonite)	3
Titanium (not for PFA) (DN ≤ 600/24")	4
Tantalum (DN ≤ 600/24") (not for Ebonite)	5
Hastelloy C incl. grounding electrodes (only PFA)	6
Platinum incl. grounding electrodes (only PFA)	7
Tantalum incl. grounding electrodes (only PFA)	8
Transmitter with display	
Standard sensor for remote transmitter (order transmitter separately)	A
Ex sensor for remote transmitter (order transmitter separately)	B
MAG 6000 I, Alu. 18 ... 90 V DC, 115 ... 230 V AC	C
MAG 6000 I Alu. 18 ... 30 V DC, Ex	D
MAG 6000 I Alu. 115 ... 230 V, Ex	E
MAG 6000 Polyamide, 11... 30 V DC / 11...24 V AC	H
MAG 6000, Polyamide, 115 ... 230 V AC	J
MAG 5000, Polyamide, 11... 30 V DC / 11...24 V AC	K
MAG 5000, Polyamide, 115 ... 230 V AC	L
Communication	
No communication, add-on possible	A
HART	B
PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)	F
PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I)	G
Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I)	E
FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)	J
Cable glands/terminal box	
Metric: Polyamide terminal box or MAG 6000 I compact	1
½" NPT: Polyamide terminal box or MAG 6000 I compact	2
Metric: Stainless steel terminal box	3

Selection and Ordering data	Order code
Additional information	
Please add “-Z” to Article No. and specify Order code(s) and plain text.	
Certificates	
• Pressure test certificate according to EN 10204-3.1	C01
• Material certificate according to EN 10204-3.1	C12
• Factory certificate according to EN 10204-2.2	C14
• Factory certificate according to EN 10204-2.1	C15
Special calibration	
• 5-point calibration for DN 15 ... DN 200 ¹⁾	D01
• 5-point calibration for DN 250 ... DN 600 ¹⁾	D02
• 5-point calibration for DN 700 ... DN 1200 ¹⁾	D03
• 10-point calibration for DN 15 ... DN 200 ²⁾	D06
• 10-point calibration for DN 250 ... DN 600 ²⁾	D07
• 10-point calibration for DN 700 ... DN 1200 ²⁾	D08
• Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 15 ... DN 200	D11
• Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 250 ... DN 600	D12
• Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 700 ... DN 1200	D13
• 5-point, matched-pair calibration for DN 15 ... DN 200 ¹⁾	D15
• 5-point, matched-pair calibration for DN 250 ... DN 600 ¹⁾	D16
• 5-point, matched-pair calibration for DN 700 ... DN 1200 ¹⁾	D17
• 10-point, matched-pair calibration for DN 15 ... DN 200 ²⁾	D18
• 10-point, matched-pair calibration for DN 250 ... DN 600 ²⁾	D19
• 10-point, matched-pair calibration for DN 700 ... DN 1200 ²⁾	D20
Terminal blocks	
• Factory mounted terminal blocks	N02
Region/customer specific labels	
• Chinese label	W06
• KCC label (South Korea)	W28
Tag name plate, stainless steel (specify in plain text)	Y17
Tag name plate, plastic (self adhesive)	Y18
Customer-specific transmitter setting	Y20
Sensor cables wired (specify Article No. for sensor cables and order cables separately)	Y40
Sensor cables wired and IP68 sealing (specify Article No. for sensor cables and order cables separately)	Y41
Special version (specify in plain text)	Y99
Additional calibrations	
• Accredited Siemens Flow Instruments matched pair Calibration acc. to ISO/IEC 17025: 2005	On request³⁾
• Customer-specified calibration up to 10 points	On request³⁾
• Customer-witnessed calibration	On request³⁾
Any of above calibration	

¹⁾ 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

²⁾ Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

³⁾ Product Variation Request (PVR).

Operating instructions for SITRANS F M MAG 3100

Description	Article No.
• English	A5E03005599
• German	A5E03086288

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Accessories

Description	Article No.
Potting kit for IP68/ NEMA 6P sealing of sensor junction box	FDK:085U0220



Please use online Product selector to get latest updates.

Product selector link:

www.pia-portal.automation.siemens.com

Flow Measurement

SITRANS F M

Flow sensor MAG 3100 and MAG 3100 HT

Selection and Ordering data	Article No.
Sensor SITRANS F M MAG 3100 HT (High Temperature)	7 ME 6 3 2 0 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 15 (½")	1 V
DN 25 (1")	2 D
DN 40 (1½")	2 R
DN 50 (2")	2 Y
DN 65 (2½")	3 F
DN 80 (3")	3 M
DN 100 (4")	3 T
DN 125 (5")	4 B
DN 150 (6")	4 H
DN 200 (8")	4 P
DN 250 (10")	4 V
DN 300 (12")	5 D
Flange norm and pressure rating	
EN 1092-1	
PN 10 (DN 200 ... 300 (8" ... 12"))	B
PN 16 (DN 65 ... 300 (2½" ... 12"))	C
PN 25 (DN 200 ... 300 (8" ... 12"))	E
PN 40 (DN 15 ... 300 (½" ... 12"))	F
ANSI B16.5	
Class 150 (½" ... 12")	J
Class 300 (½" ... 12")	K
AS	
2129, table E	M
Flange material	
Carbon steel flanges ASTM A 105	1
Stainless steel flanges, AISI 304/1.4301	2
Stainless steel flanges and sensor body, AISI 316L/1.4404, polished	3
Liner material	
PTFE (150 °C (302 °F))	2
PTFE including type E protection rings AISI 316/1.4436 (180 °C (356 °F))	3
PFA (150 °C (302 °F)) (DN 15 ... 150 (½" ... 6"))	7
Electrode material	
AISI 316Ti/1.4571 (not for PFA)	1
Hastelloy C276/2.4819 (PFA liner: Hastelloy C22/2.4602)	2
Platinum	3
Titanium (not for PFA)	4
Tantalum	5
Hastelloy C22/2.4602 incl. grounding electrodes (only PFA)	6
Platinum incl. grounding electrodes (only PFA)	7
Tantalum incl. grounding electrodes (only PFA)	8
Transmitter with display	
Standard sensor for remote transmitter (Order transmitter separately)	A
Ex sensor for remote transmitter (Order transmitter separately)	B
MAG 6000 I, Alu. 18 ... 90 V DC, 115 ... 230 V AC	C
MAG 6000 I, Alu. 18 ... 30 V DC, Ex	D
MAG 6000 I, Alu. 115 ... 230 V AC, Ex	E
MAG 6000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC	H
MAG 6000, Polyamide, 115 ... 230 V AC	J
MAG 5000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC	K
MAG 5000, Polyamide, 115 ... 230 V AC	L

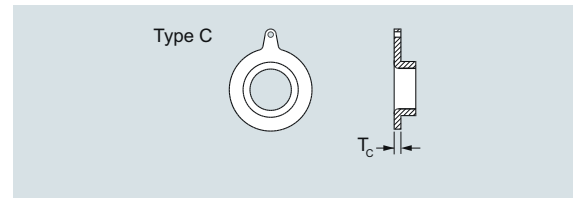
Selection and Ordering data	Article No.
Sensor SITRANS F M MAG 3100 HT (High Temperature)	7 ME 6 3 2 0 -
Communication	
No communication, add-on possible	A
HART	B
PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)	F
PROFIBUS DP Profile 3 (only MAG 6000/MAG 6000 I)	G
Modbus RTU/RS 485 (only MAG 6000/MAG 6000 I)	E
FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)	J
Cable glands/terminal box	
Metric: Polyamide terminal box (PTFE 130 °C (266 °F)) or MAG 6000 I compact	1
½" NPT: Polyamide terminal box (PTFE 130 °C (266 °F)) or MAG 6000 I compact	2
Metric: Stainless steel terminal box	3
½" NPT: Stainless steel terminal box	4

Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Certificates	
• Pressure test certificate according to EN 10204-3.1	C01
• Material certificate according to EN 10204-3.1	C12
• Factory certificate according to EN 10204-2.2	C14
• Factory certificate according to EN 10204-2.1	C15
Terminal blocks	
• Factory mounted terminal blocks	N02
Region/customer specific labels	
• KCC label (South Korea)	W28
Tag name made, stainless steel (specify in plain text)	Y17
Tag name plate, plastic (self adhesive)	Y18
Customer-specific transmitter setting	Y20
Sensor cables wired (specify Article No. for sensor cables and order cables separately)	Y40
Sensor cables wired and IP68 sealing (specify Article No. for sensor cables and order cables separately)	Y41
Special version (specify in plain text)	Y99
Additional calibrations	
• Matched pair - (Standard production calibration where sensor and transmitter is calibrated together)	On request ¹⁾
• Accredited Siemens Flow Instruments matched pair Calibration acc. to ISO/IEC 17025: 2005	On request ¹⁾
• Customer-specified calibration up to 10 points	On request ¹⁾
• Customer-witnessed calibration Any of above calibration	On request ¹⁾

¹⁾ Product Variation Request (PVR).

Accessories for MAG 3100 and MAG 3100 HT sensor**Grounding and protection ring - Type C (Stainless steel)¹⁾**

Material AISI 304
For all liners except PTFE and PFA
1 pc.



DN	PN 6 Article No.	PN 10 Article No.	PN 16 Article No.	PN 25 Article No.	PN 40 Article No.	AS 2129 Table E Article No.
DN 25					FDK:083N8361	FDK:083N8361
DN 40					FDK:083N8362	FDK:083N8362
DN 50					FDK:083N8344	FDK:083N8344
DN 65	FDK:083N8345		FDK:083N8345		FDK:083N8345	FDK:083N8346
DN 80	FDK:083N8347		FDK:083N8347		FDK:083N8347	FDK:083N8347
DN 100	FDK:083N8070		FDK:083N8025		FDK:083N8025	FDK:083N8025
DN 125	FDK:083N8071		FDK:083N8071		FDK:083N8071	FDK:083N8071
DN 150	FDK:083N8072		FDK:083N8008		FDK:083N8073	FDK:083N8008
DN 200	FDK:083N8074	FDK:083N8011	FDK:083N8011	FDK:083N8011	FDK:083N8075	FDK:083N8011
DN 250	FDK:083N8078	FDK:083N8013	FDK:083N8013	FDK:083N8013	FDK:083N8079	FDK:083N8013
DN 300	FDK:083N8080	FDK:083N8012	FDK:083N8012	FDK:083N8081	FDK:083N8082	FDK:083N8012
DN 350	FDK:083N8083	FDK:083N8039	FDK:083N8039	FDK:083N8084	FDK:083N8085	FDK:083N8039
DN 400	FDK:083N8099	FDK:083N8100	FDK:083N8100	FDK:083N8101	FDK:083N8102	FDK:083N8100
DN 450	FDK:083N8103	FDK:083N8103	FDK:083N8104	FDK:083N8104	FDK:083N8105	FDK:083N8104
DN 500	FDK:083N8107	FDK:083N8107	FDK:083N8108	FDK:083N8108	FDK:083N8109	FDK:083N8108
DN 600	FDK:083N8111	FDK:083N8111	FDK:083N8112	FDK:083N8112		FDK:083N8113
DN 700	FDK:083N8300	FDK:083N8294	FDK:083N8294			FDK:083N8372
DN 800	FDK:083N8303	FDK:083N8304	FDK:083N8304			FDK:083N8373
DN 900	FDK:083N8306	FDK:083N8307	FDK:083N8307			FDK:083N8396
DN 1000	FDK:083N8309	FDK:083N8310	FDK:083N8310			FDK:083N8397
DN 1100		FDK:083N8367	FDK:083N8367			FDK:083N8367
DN 1200	FDK:083N8312	FDK:083N8313	FDK:083N8313			FDK:083N8398
DN 1400	FDK:083N8467	FDK:083N8468	FDK:083N8469			
DN 1500	FDK:083N8471	FDK:083N8472	FDK:083N8473			
DN 1600	FDK:083N8475	FDK:083N8476	FDK:083N8477			
DN 1800	FDK:083N8479	FDK:083N8480	FDK:083N8481			
DN 2000	FDK:083N8483	FDK:083N8484	FDK:083N8485			

¹⁾ Also for MAG 5100 W (7ME6520 > DN 300 and 7ME6580)

Size	ANSI Class 150 Article No.	Class 300 Article No.	JIS K10 Article No.	JIS K20 Article No.	Size	AWWA C-207 Article No.
1"	FDK:083N8361	FDK:083N8361	FDK:083N8361	FDK:083N8361	28"	FDK:083N8302
1½"	FDK:083N8362	FDK:083N8362	FDK:083N8362	FDK:083N8362	30"	FDK:083N8366
2"	FDK:083N8344	FDK:083N8344	FDK:083N8344	FDK:083N8344	32"	FDK:083N8305
2½"	FDK:083N8345	FDK:083N8345	FDK:083N8345	FDK:083N8345	36"	FDK:083N8308
3"	FDK:083N8347	FDK:083N8347	FDK:083N8347	FDK:083N8347	40"	FDK:083N8311
4"	FDK:083N8025	FDK:083N8025	FDK:083N8070	FDK:083N8025	42"	FDK:083N8394
5"	FDK:083N8071	FDK:083N8071	FDK:083N8071	FDK:083N8071	44"	FDK:083N8395
6"	FDK:083N8008	FDK:083N8073	FDK:083N8008	FDK:083N8008	48"	FDK:083N8314
8"	FDK:083N8011	FDK:083N8076	FDK:083N8011	FDK:083N8011	54"	FDK:083N8470
10"	FDK:083N8013	FDK:083N8079	FDK:083N8013	FDK:083N8079	60"	FDK:083N8474
12"	FDK:083N8012	FDK:083N8082	FDK:083N8012	FDK:083N8081	66"	FDK:083N8478
14"	FDK:083N8039	FDK:083N8085	FDK:083N8083	FDK:083N8039	72"	FDK:083N8482
16"	FDK:083N8100	FDK:083N8102	FDK:083N8100	FDK:083N8101	78"	FDK:083N8486
18"	FDK:083N8104	FDK:083N8106	FDK:083N8103	FDK:083N8104		
20"	FDK:083N8107	FDK:083N8110	FDK:083N8107	FDK:083N8108		
24"	FDK:083N8113	FDK:083N8114	FDK:083N8111	FDK:083N8112		

¹⁾ Also for MAG 5100 W (7ME6520 > 12 inch and 7ME6580)

Flow Measurement

SITRANS F M

Flow sensor MAG 3100 and MAG 3100 HT

Accessories for MAG 3100 and MAG 3100 HT sensor

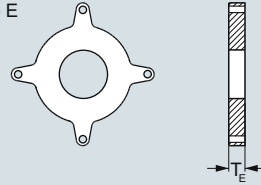
Grounding and protecting ring - Type E (Stainless steel)

Material: AISI 316
For all PTFE liners
1 pc. incl. straps and screws

Note:

For MAG 3100 HT High temperature version 7ME6320... for PTFE 180 °C (356 °C) versions - grounding ring type E is included and factory mounted.

Type E



DN	PN 6 Article No.	PN 10 Article No.	PN 16 Article No.	PN 25 Article No.	PN 40 Article No.
DN 15 DN 25 DN 40					FDK:083N8365 FDK:083N8271 FDK:083N8278
DN 50 DN 65 DN 80	FDK:083N8284 FDK:083N8288		FDK:083N8285 FDK:083N8289		FDK:083N8282 FDK:083N8286 FDK:083N8290
DN 100 DN 125 DN 150	FDK:083N8116 FDK:083N8120 FDK:083N8124		FDK:083N8117 FDK:083N8121 FDK:083N8125		FDK:083N8118 FDK:083N8122 FDK:083N8126
DN 200 DN 250 DN 300	FDK:083N8129 FDK:083N8135 FDK:083N8144	FDK:083N8130 FDK:083N8136 FDK:083N8144	FDK:083N8130 FDK:083N8137 FDK:083N8145	FDK:083N8131 FDK:083N8138 FDK:083N8146	FDK:083N8132 FDK:083N8139 FDK:083N8147
DN 350 DN 400 DN 450	FDK:083N8152 FDK:083N8160 FDK:083N8168	FDK:083N8153 FDK:083N8161 FDK:083N8169	FDK:083N8154 FDK:083N8162 FDK:083N8170	FDK:083N8155 FDK:083N8163 FDK:083N8171	FDK:083N8156 FDK:083N8164 FDK:083N8172
DN 500 DN 600	FDK:083N8177 FDK:083N8186	FDK:083N8178 FDK:083N8187	FDK:083N8179 FDK:083N8188	FDK:083N8180 FDK:083N8189	FDK:083N8181

For use as protection ring order 2 pcs.
For use as grounding ring order 1 pc.

Size	ANSI	Class 150 Article No.	Class 300 Article No.	JIS K10 Article No.	JIS K20 Article No.
1/2"		FDK:083N8365	FDK:083N8365		
1"		FDK:083N8272	FDK:083N8272	FDK:083N8271	FDK:083N8271
1 1/2"		FDK:083N8279	FDK:083N8279	FDK:083N8278	FDK:083N8278
2"		FDK:083N8283	FDK:083N8283	FDK:083N8282	FDK:083N8282
2 1/2"		FDK:083N8287	FDK:083N8287	FDK:083N8285	FDK:083N8285
3"		FDK:083N8291	FDK:083N8292	FDK:083N8288	FDK:083N8289
4"		FDK:083N8118	FDK:083N8119	FDK:083N8116	FDK:083N8117
5"		FDK:083N8122	FDK:083N8123	FDK:083N8121	FDK:083N8122
6"		FDK:083N8126	FDK:083N8127	FDK:083N8125	FDK:083N8126
8"		FDK:083N8370	FDK:083N8133	FDK:083N8130	FDK:083N8370
10"		FDK:083N8140	FDK:083N8141	FDK:083N8137	FDK:083N8139
12"		FDK:083N8148	FDK:083N8149	FDK:083N8144	FDK:083N8146
14"		FDK:083N8157	FDK:083N8158	FDK:083N8152	FDK:083N8154
16"		FDK:083N8165	FDK:083N8166	FDK:083N8160	FDK:083N8165
18"		FDK:083N8173	FDK:083N8174	FDK:083N8169	FDK:083N8171
20"		FDK:083N8182	FDK:083N8183	FDK:083N8178	FDK:083N8180
24"		FDK:083N8190	FDK:083N8191	A5E32709738	A5E32710253

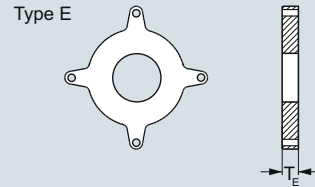
For use as protection ring order 2 pcs.
For use as grounding ring order 1 pc.

AS2129, Table E	Article No.
DN	
DN 15 DN 25 DN 40	FDK:083N8365 FDK:083N8272 FDK:083N8280
DN 50 DN 65 DN 80	FDK:083N8281 FDK:083N8284 FDK:083N8293
DN 100 DN 125 DN 150	FDK:083N8117 FDK:083N8121 FDK:083N8128
DN 200 DN 250 DN 300	FDK:083N8134 FDK:083N8143 FDK:083N8151
DN 350 DN 400 DN 450	FDK:083N8153 FDK:083N8161 FDK:083N8176
DN 500 DN 600	FDK:083N8185 A5E32710253

For use as protection ring order 2 pcs.
For use as grounding ring order 1 pc.

Accessories for MAG 3100 and MAG 3100 HT sensor**Grounding and protecting ring - Type E (Hastelloy)**

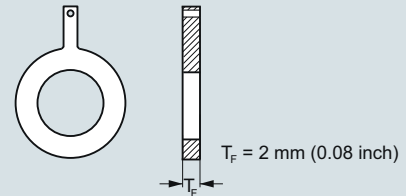
Material: Hastelloy C276
For all PTFE liners
1 pc. incl. straps and screws



DN	PN 6	PN 16	PN 40	Size	ANSI Class 150 Article No.	Class 300 Article No.
	Article No.	Article No.	Article No.			
DN 15			FDK:083N8487	1/2"	FDK:083N8487	FDK:083N8487
DN 25			FDK:083N8488	1"	FDK:083N8489	FDK:083N8489
DN 40			FDK:083N8490	1 1/2"	FDK:083N8491	FDK:083N8491
DN 50			FDK:083N8492	2"	FDK:083N8493	FDK:083N8493
DN 65	FDK:083N8494	FDK:083N8495	FDK:083N8496	2 1/2"	FDK:083N8497	FDK:083N8497
DN 80	FDK:083N8498	FDK:083N8499	FDK:083N8500	3"	FDK:083N8501	FDK:083N8502
DN 100	FDK:083N8503	FDK:083N8504	FDK:083N8505	4"	FDK:083N8506	FDK:083N8507

Accessories for MAG 3100 and MAG 3100 HT sensor**Grounding ring - Type Flat ring (Stainless steel)¹⁾**

Material: AISI 316
For all liners (PTFE max. 130 °C (266 °F))
1 pc. incl. straps and screws



DN	PN 10	PN 16	PN 40	Size	ANSI Class 150 Article No.	Class 300 Article No.
	Article No.	Article No.	Article No.			
DN 15			A5E01191969	1/2"	TGX:001F0005	
DN 25			A5E01150880	1"	TGX:001F0010	A5E01150378
DN 40			A5E01191952	1 1/2"	TGX:001F0015	
DN 50		A5E01192006	A5E01150918	2"	TGX:001F0020	A5E01151194
DN 65		A5E01191940	A5E01191954	2 1/2"	TGX:001F0025	
DN 80		A5E01152876	A5E01152876	3"	TGX:001F0030	A5E01153422
DN 100		A5E01158875	A5E01159072	4"	TGX:001F0040	A5E01159628
DN 125		A5E01191941	A5E01191956	5"	TGX:001F0050	
DN 150		A5E01191943	A5E01191957	6"	TGX:001F0060	
DN 200	A5E01191951	A5E01191944	A5E01191958	8"	TGX:001F0080	
DN 250	A5E01191950	A5E01191946	A5E01191959	10"	TGX:001F0100	
DN 300	A5E01191949	A5E01191947	A5E01191960	12"	TGX:001F0120	

¹⁾ Also for MAG 5100 W (7ME6580)

Flow Measurement

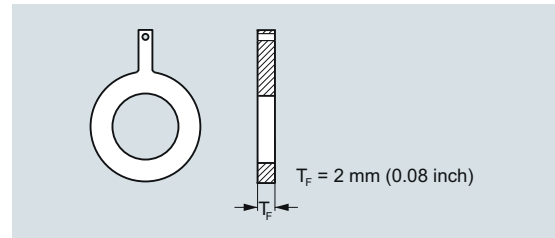
SITRANS F M

Flow sensor MAG 3100 and MAG 3100 HT

Accessories for MAG 3100 and MAG 3100 HT sensor

Grounding ring - Type Flat ring (Hastelloy)

Material: Hastelloy C276
For all liners (PTFE max. 130 °C (266 °F))
1 pc. incl. straps and screws

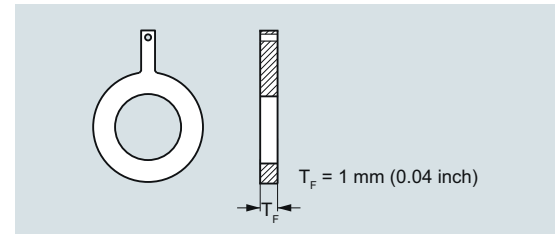


DN	PN 10	PN 16	PN 40	Size	ANSI Class 150	Class 300
	Article No.	Article No.	Article No.		Article No.	Article No.
DN 15			A5E01191981	1/2"	TGX:002F0005	
DN 25			A5E01150882	1"	TGX:002F0010	A5E01150379
DN 40			A5E01191982	1 1/2"	TGX:002F0015	
DN 50			A5E01150922	2"	TGX:002F0020	A5E01151197
DN 65		A5E01191971	A5E01191983	2 1/2"	TGX:002F0025	
DN 80		A5E01152889	A5E01152889	3"	TGX:002F0030	A5E01153424
DN 100		A5E01158886	A5E01159074	4"	TGX:002F0040	A5E01159629
DN 125		A5E01191973	A5E01191984	5"	TGX:002F0050	
DN 150		A5E01191974	A5E01191985	6"	TGX:002F0060	
DN 200	A5E01191978	A5E01191975	A5E01191986	8"	TGX:002F0080	
DN 250	A5E01191979	A5E01191976	A5E01191987	10"	TGX:002F0100	
DN 300	A5E01191980	A5E01191977	A5E01191988	12"	TGX:002F0120	

Accessories for MAG 3100 and MAG 3100 HT sensor

Grounding ring - Type Flat ring (Tantalum)

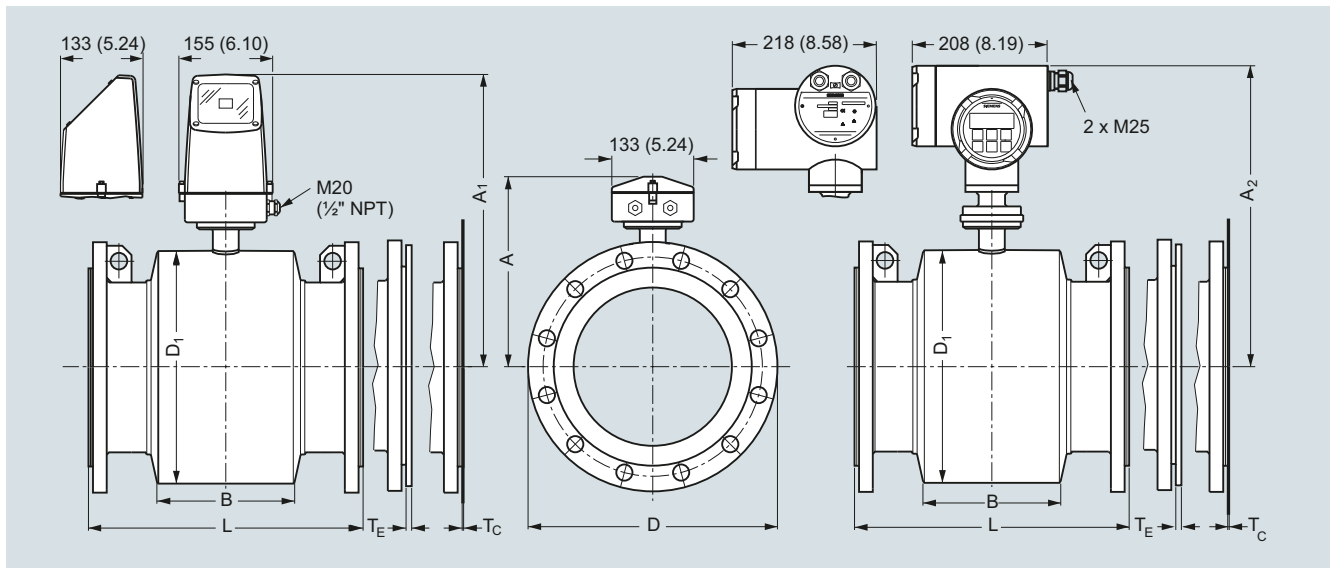
Material: Tantalum
For all liners (PTFE max. 130 °C (266 °F))
1 pc. incl. straps and screws



DN	PN 16	PN 40	Size	ANSI Class 150	Class 300
	Article No.	Article No.		Article No.	Article No.
DN 15		A5E01192007	1/2"	TGX:003F0005	
DN 25		A5E01150883	1"	TGX:003F0010	A5E01150381
DN 40		A5E01192008	1 1/2"	TGX:003F0015	
DN 50		A5E01150926	2"	TGX:003F0020	A5E01151199
DN 65	A5E01192005	A5E01192009	2 1/2"	TGX:003F0025	
DN 80	A5E01152890	A5E01152890	3"	TGX:003F0030	A5E01153427
DN 100	A5E01158891	A5E01159076	4"	TGX:003F0040	A5E01159631

Dimensional drawings

MAG 3100 and MAG 3100 HT sensor with compact or remote transmitter



Dimensions in mm (inch)

Metric

DN	A ¹⁾	A ₁	A ₂	B	D ₁	L ²⁾ 3) EN 1092-1-201						ANSI 16.5	
						PN 6, 10	PN 16/ PN 16 non-PED	PN 25	PN 40	PN 63	PN 100	Class 150	Class 300
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
15	187	341	338	59	104	-	-	-	200	-	-	200	200
25	187	341	338	59	104	-	-	-	200	-	260	200	200
40	197	351	348	82	124	-	-	-	200	-	280	200	200
50	205	359	356	72	139	-	-	-	200	276	300	200	200
65	212	366	363	72	154	200	200/-	-	200	320	350	200	272
80	222	376	373	72	174	200	200/-	-	272 ⁴⁾	323	340	272 ⁴⁾	272 ⁴⁾
100	242	396	393	85	214	250	250/-	-	250	380	400	250	310
125	255	409	406	85	239	250	250/-	-	250	420	450	250	335
150	276	430	427	85	282	300	300/-	-	300	415	450	300	300
200	304	458	455	137	338	350	350/-	350	350	480	530	350	350
250	332	486	483	157	393	450	450/-	450	450	550	620	450	450
300	357	511	508	157	444	500	500/-	500	500	600	680	500	500
350	362	516	513	270	451	550	550/-	550	550	-	-	550	550
400	387	541	538	270	502	600	600/-	600	600	-	-	600	600
450	418	572	569	310	563	600	600/-	600	600	-	-	600	640
500	443	597	594	350	614	600	600/-	625	680	-	-	600	730
600	494	648	645	320	715	600	600/-	750	800	-	-	600	860
700	544	698	695	450	816	700	875/700	800	-	-	-	800	-
750	571	725	722	556	869	-	-/-	-	-	-	-	950	-
800	606	760	757	560	927	800	1000/800	900	-	-	-	900	-
900	653	807	804	630	1032	900	1125/900	1000	-	-	-	1100	-
1000	704	858	855	670	1136	1000	1250/1000	1100	-	-	-	1100	-
1050	704	858	855	670	1136	-	-/-	-	-	-	-	-	-
1100	755	904	901	770	1238	-	-/-	-	-	-	-	-	-
1200	810	964	961	792	1348	1200	1500/1200	1300	-	-	-	1400	-
1400	925	1079	1076	1000	1574	1400	-/1400	-	-	-	-	-	-
1500	972	1126	1123	1020	1672	1500	-/1500	-	-	-	-	-	-
1600	1025	1179	1176	1130	1774	1600	-/1600	-	-	-	-	-	-
1800	1123	1277	1274	1250	1974	1800	-/1800	-	-	-	-	-	-
2000	1223	1377	1374	1375	2174	2000	-/2000	-	-	-	-	-	-

¹⁾ 14.5 mm shorter with stainless steel terminal box (Ex and high temperature version)

2) When grounding rings are used, the thickness of the grounding ring must be added to the built-in length

3) Tolerances on built-in length (PN 6, PN 10, PN 16, PN 25 and PN 40):

DN 15 to DN 200: $\pm 0/-3$ mm, DN 250 to DN 400 : $\pm 0/-5$ mm, DN 450 to DN 600 : $\pm 5/-5$ mm, DN 700 to DN 2000 : $\pm 10/-10$ mm

Tolerances on built in length (PN 63 and PN 100): All sizes: +8/-8 mm

4) Not according to ISO 13359

Flow Measurement

SITRANS F M

Flow sensor MAG 3100 and MAG 3100 HT

DN	L ^{1) 2)}				T _C ³⁾	T _E ³⁾	T _F ³⁾	Weight ⁴⁾
	AS 2129 E AS 4087 PN 16, 21, 35	AWWA C-207 Class D	JIS K10	JIS K20				
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
15	200	-	200	200	-	6	2	4
25	200	-	200	200	1.2	6	2	5
40	200	-	200	240	1.2	6	2	8
50	200	-	200	240	1.2	6	2	9
65	200	-	200	272	1.2	6	2	11
80	200 ⁵⁾	-	200 ⁹⁾	272 ⁹⁾	1.2	6	2	12
100	250	-	250	310	1.2	6	2	16
125	250	-	250	335	1.2	6	2	19
150	300	-	300	300	1.2	6	2	27
200	350	-	350	350	1.2	8	2	40
250	450	-	450	450	1.2	8	2	60
300	500	-	500	500	1.6	8	2	80
350	550	-	550	550	1.6	8	-	110
400	600	-	600	600	1.6	10	-	125
450	600	-	600	640	1.6	10	-	175
500	600 ⁶⁾	-	600	680	1.6	10	-	200
600	600 ⁷⁾	-	600	800	1.6	10	-	287
700	700 ⁸⁾	700	-	-	2.0	-	-	330
750	750 ⁸⁾	750	-	-	2.0	-	-	360
800	800 ⁸⁾	800	-	-	2.0	-	-	450
900	900 ⁸⁾	900	-	-	2.0	-	-	530
1000	1000 ⁸⁾	1000	-	-	2.0	-	-	660
1050	-	1050	-	-	2.0	-	-	660
1100	-	1100	-	-	2.0	-	-	1140
1200	1200 ⁶⁾	1200	-	-	2.0	-	-	1180
1400	-	1400	-	-	2.0	-	-	1600
1500	-	1500	-	-	3.0	-	-	2460
1600	-	1600	-	-	3.0	-	-	2525
1800	-	1800	-	-	3.0	-	-	2930
2000	-	2000	-	-	3.0	-	-	3665

1) When grounding rings are used, the thickness of the grounding ring must be added to the built-in length

2) Tolerances on built-in length (PN 6, PN 10, PN 16, PN 25 and PN 40):

DN 15 to DN 200: +0/-3 mm, DN 250 to DN 400 : +0/-5 mm, DN 450 to DN 600 : +5/-5 mm, DN 700 to DN 2000 : +10/-10 mm

Tolerances on built-in length (PN 63 and PN 100):

All sizes: +8/-8 mm

3) T_C = Protection ring Type C, T_E = Grounding ring Type E (included and factory mounted for 180 °C PTFE liner), T_F = Grounding ring Type Flat ring

4) Weights are approx. (for PN 16) without transmitter

5) PN 35 DN 80 = 272 mm (not according to ISO 13359)

6) PN 35 DN 500 = 680 mm

7) PN 35 DN 600 = 750 mm

8) Not AS 4087 PN 21 or PN 35

9) Not according to ISO 13359

D = Outside diameter of flange, see flange tables

MAG 3100 and MAG 3100 HT sensor with compact or remote transmitter

Imperial

Size	A ¹⁾	A ₁	A ₂	B	D ₁	L ^{2) 3)}						ANSI 16.5/ASME B16.47 ⁴⁾		
						EN 1092-1-201						ANSI 16.5/ASME B16.47 ⁴⁾		
						PN 6, 10	PN 16/ PN 16 non PED	PN 25	PN 40	PN 63	PN 100	Class 150	Class 300	Class 600
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]
½	7.36	13.31	13.25	2.32	4.09	-	-	-	7.87	-	-	7.87	7.87	-
1	7.36	13.31	13.25	2.32	4.09	-	-	-	7.87	-	10.24	7.87	7.87	11.02
1½	7.76	13.70	13.64	3.23	4.88	-	-	-	7.87	-	11.02	7.87	7.87	12.60
2	8.07	14.01	13.95	2.83	5.47	-	-	-	7.87	10.87	11.81	7.87	7.87	12.99
2½	8.35	14.29	14.23	2.83	6.06	7.87	7.87/-	-	7.87	12.60	13.78	7.87	10.71	on request
3	8.74	14.69	14.63	2.83	6.85	7.87	7.87/-	-	10.71 ⁵⁾	12.72	13.39	10.71 ⁵⁾	10.71 ⁵⁾	13.78
4	9.53	15.47	15.41	3.35	8.43	9.84	9.84/-	-	9.84	14.96	-	9.84	12.20	18.11
5	10.04	15.98	15.92	3.35	9.41	9.84	9.84/-	-	9.84	16.54	-	9.84	13.10	18.90
6	10.87	16.81	16.75	5.39	11.10	11.81	11.81/-	-	11.81	16.34	-	11.81	11.81	19.68
8	11.97	17.91	17.85	5.39	13.31	13.78	13.78/-	13.78	13.78	18.90	-	13.78	13.78	23.62
10	13.07	19.02	18.96	6.18	15.47	17.72	17.72/-	17.72	17.72	-	-	17.72	17.72	23.62
12	14.05	20.00	19.94	6.18	17.48	19.69	19.69/-	19.69	19.69	-	-	19.69	19.69	27.56
14	14.25	20.20	20.14	10.63	17.76	21.65	21.65/-	21.65	21.65	-	-	21.65	21.65	-
16	15.24	21.18	21.12	10.63	19.76	23.62	23.62/-	23.62	23.62	-	-	23.62	23.62	-
18	16.45	22.40	22.34	12.20	22.16	23.62	23.62/-	23.62	23.62	-	-	23.62	23.62	-
20	17.44	23.39	23.33	13.78	24.17	23.62	23.62/-	24.61	26.77	-	-	23.62	28.70	-
24	19.45	25.39	25.33	12.59	28.15	23.62	23.62/-	29.53	31.50	-	-	23.62	33.80	-
28	21.42	27.36	27.30	17.72	32.13	27.56	34.45/27.56	31.50	-	-	-	31.50	-	-
30	22.48	28.43	28.37	21.89	34.21	-	-/-	-	-	-	-	37.41	-	-
32	23.86	29.80	29.74	22.05	36.50	31.50	39.37/31.50	35.44	-	-	-	35.44	-	-
36	25.71	31.65	31.59	24.80	40.63	35.43	44.29/35.43	39.38	-	-	-	43.32	-	-
40	27.72	33.85	33.79	26.38	44.72	39.37	49.21/39.37	43.32	-	-	-	43.32	-	-
42	27.72	33.85	33.79	26.38	44.72	-	-/-	-	-	-	-	-	-	-
44	29.72	35.67	35.61	30.31	48.74	-	-/-	-	-	-	-	-	-	-
48	31.89	37.83	37.77	31.18	53.07	47.24	59.06/47.24	51.19	-	-	-	55.12	-	-
54	36.42	42.36	42.30	39.37	61.97	55.12	-/55.12	-	-	-	-	-	-	-
60	38.27	44.21	44.15	40.15	65.83	59.06	59.06/59.06	-	-	-	-	-	-	-
66	40.35	46.30	46.24	44.49	69.84	62.99	-/62.99	-	-	-	-	-	-	-
72	44.21	50.16	50.10	49.21	77.72	70.87	-/70.87	-	-	-	-	-	-	-
78	48.15	54.09	54.03	54.13	85.59	78.74	-/78.74	-	-	-	-	-	-	-

¹⁾ 0.571 inch shorter with stainless steel terminal box (Ex and high temperature version)²⁾ When grounding rings are used, the thickness of the grounding ring must be added to the built-in length³⁾ Tolerances on built-in length (PN 6, PN 10, PN 16, PN 25 and PN 40):

½" to 8": +0/-0.12", 10" to DN 16": +0/-0.20", 18" to DN 24": +0.20/-0.20", 28" to DN 78": +0.39/-0.39"

Tolerances on built-in length (PN 63 and PN 100):

All sizes: +0.31/-0.31"

⁴⁾ ANSI 16.5 for DN ≤ 24"; ASME B16.47 for DN ≥ 28"⁵⁾ Not according to ISO 13359

Flow Measurement

SITRANS F M

Flow sensor MAG 3100 and MAG 3100 HT

Size	L ^{1) 2)}				T _C ³⁾	T _E ³⁾	T _F ³⁾	Weight ⁴⁾
	AS 2129 E AS 4087 PN 16, 21, 35	AWWA C-207 Class D	JIS K10	JIS K20				
[in.]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[lb]
½	7.87	-	7.87	7.87	-	0.24	0.08	9
1	7.87	-	7.87	7.87	0.05	0.24	0.08	11
1½	7.87	-	7.87	9.44	0.05	0.24	0.08	17
2	7.87	-	7.87	9.44	0.05	0.24	0.08	20
2½	7.87	-	7.87	10.70	0.05	0.24	0.08	24
3	7.87 ⁵⁾	-	7.87 ⁸⁾	10.70 ⁹⁾	0.05	0.24	0.08	26
4	9.84	-	9.84	12.20	0.05	0.24	0.08	35
5	9.84	-	9.84	13.18	0.05	0.24	0.08	42
6	11.81	-	11.81	11.81	0.05	0.24	0.08	60
8	13.78	-	13.77	13.77	0.05	0.31	0.08	88
10	17.72	-	17.71	17.71	0.05	0.31	0.08	132
12	19.69	-	19.68	19.68	0.06	0.31	0.08	176
14	21.65	-	21.65	21.65	0.06	0.31	-	242
16	23.62	-	23.62	23.62	0.06	0.39	-	275
18	23.62	-	23.62	25.19	0.06	0.39	-	385
20	23.62 ⁶⁾	-	23.62	26.77	0.06	0.39	-	440
24	23.62 ⁷⁾	-	23.62	31.49	0.06	0.39	-	633
28	27.56 ⁸⁾	27.56	-	-	0.08	-	-	728
30	29.53 ⁸⁾	29.52	-	-	0.08	-	-	794
32	31.50 ⁸⁾	31.50	-	-	0.08	-	-	992
36	35.43 ⁸⁾	35.43	-	-	0.08	-	-	1168
40	39.37 ⁸⁾	39.37	-	-	0.08	-	-	1455
42	-	39.37	-	-	0.08	-	-	1455
44	-	43.31	-	-	0.08	-	-	2513
48	47.24 ⁸⁾	47.24	-	-	0.08	-	-	2601
54	-	55.12	-	-	0.12	-	-	3528
60	-	59.06	-	-	0.12	-	-	5423
66	-	63.00	-	-	0.12	-	-	5566
72	-	70.87	-	-	0.12	-	-	6460
78	-	78.74	-	-	0.12	-	-	8080

¹⁾ When grounding rings are used, the thickness of the grounding ring must be added to the built-in length

²⁾ Tolerances on built-in length (PN 6, PN 10, PN 16, PN 25 and PN 40):

½" to 8": +0/-0.12", 10" to DN 16": +0/-0.20", 18" to DN 24": +0.20/-0.20", 28" to DN 78": +0.39/-0.39"

Tolerances on built-in length (PN 63 and PN 100):

All sizes: +0.31/-0.31"

³⁾ T_C = Protection ring Type C, T_E = Grounding ring Type E (included and factory mounted for 356 °F PTFE liner), T_F = Grounding ring Type Flat ring

⁴⁾ Weights are for ANSI 150 without transmitter

⁵⁾ PN 35 DN 80 = 10.70 inch

⁶⁾ PN 35 DN 500 = 26.77 inch

⁷⁾ PN 35 DN 600 = 29.53 inch

⁸⁾ Not AS 4087 PN 21 or PN 35

⁹⁾ Not according to ISO 13359

D = Outside diameter of flange, see flange tables

Overview



The SITRANS F M MAG 3100 P is designed to meet the most common specifications within chemical and process industries.

Benefits

- DN 15 to DN 300 (½" to 12")
- Included in Quick Ship Program (delivery time see PIA LCP)
- Most used flowmeter in the chemical and process industries with PTFE/PFA liner and Hastelloy electrodes
- Excellent chemical resistance
- Full scope of global approvals for hazardous areas:
 - ATEX, FM, CSA, IECEx
 - 24 V and 115/230 V Ex compact and remote
 - intrinsically safe ia analog output
- Comprehensive self-diagnostic for error indication and error logging
- Fully welded construction provides a ruggedness that suits the toughest applications and environments
- Easy commissioning, the SENSORPROM unit automatically updates settings.
- MAG 6000 I full NAMUR compliance
 - compliant with NE 21, NE 32, NE 43, NE 53 and NE 70

Application

The main applications of the SITRANS F M electromagnetic flow sensors can be found in the following fields:

- Chemical industry
- Process industry
- Pulp and paper
- Industrial waste water

Design

- Compact or remote mounting possible
- Easy "plug & play" field changeability of transmitter
- High temperature sensor for applications with temperatures up to 150 °C (302 °F)
- Meets EEC directives: PED, 2014/68/EU pressure directive for EN1092-1 flanges
- Built-in length according to ISO 13359
- Onsite or factory upgrade to IP68/NEMA 6P of a standard sensor.

Mode of operation

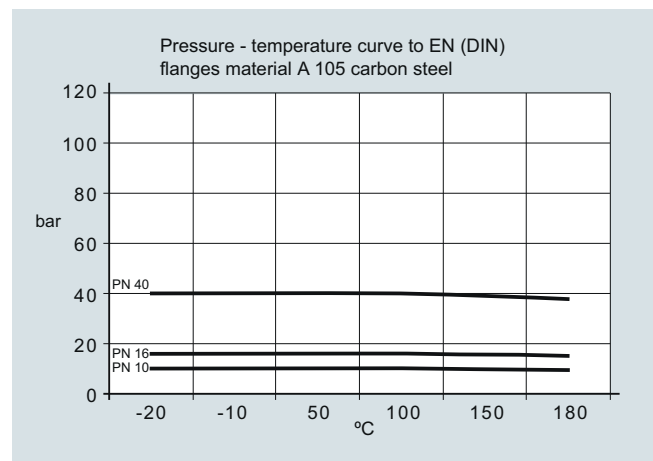
The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

Integration

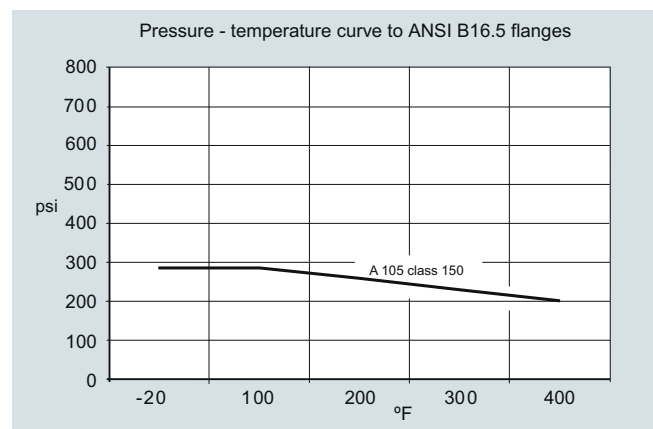
The complete flowmeter consists of a flow sensor and an associated transmitter MAG 5000, 6000 and 6000 I.

The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS DP and PA, Modbus RTU/RS 485.

Pressure/temperature curve to EN (DIN) flanges, material A 105 carbon steel



Pressure/temperature curve to ANSI B16.5 flanges



Note: The pressure-temperature curves only assist in the selection of a system. No responsibility is taken for the correctness of the information. For further information on the PED standard and requirements, see page 10/15.

Flow Measurement

SITRANS F M


Flow sensor MAG 3100 P

Technical specifications

Product characteristic	Chemical and process industry-oriented (Included in Quick Ship Program)
Nominal size	<ul style="list-style-type: none"> PTFE: DN 15 ... 300 (½" ... 12") PFA: DN 15 ... 150 (½" ... 6")
Measuring principle	Electromagnetic induction
Excitation frequency (Mains supply: 50 Hz/60 Hz)	<ul style="list-style-type: none"> DN 15 ... 65 (½" ... 2½"): 12.5 Hz/15 Hz DN 80 ... 150 (3" ... 6"): 6.25 Hz/7.5 Hz DN 200 ... 300 (8" ... 12"): 3.125 Hz/3.75 Hz
Process connection	
Flanges	EN 1092-1, raised face ¹⁾ (EN 1092-1, DIN 2501 and BS 4504 have the same mating dimensions) <ul style="list-style-type: none"> DN 15 ... 50 (½" ... 2"): PN 40 (580 psi) DN 65 ... 300 (2½" ... 12"): PN 16 (232 psi) DN 200 ... 300 (8" ... 12"): PN 10 (145 psi) ANSI B16.5 (~BS 1560), raised face <ul style="list-style-type: none"> ½" ... 12": Class 150 (19 bar (275 psi))
Rated operation conditions	
Ambient temperature (conditions also dependent on liner characteristics)	
<ul style="list-style-type: none"> Standard sensor Ex sensor Compact with transmitter 	-40 ... +100 °C (-40 ... +212 °F) -20 ... +60 °C (-4 ... +140 °F)
- MAG 5000/6000 - MAG 6000 I - MAG 6000 I Ex	-20 ... +60 °C (-4 ... +140 °F) -20 ... +60 °C (-4 ... +140 °F) -20 ... +60 °C (-4 ... +140 °F)
Operating pressure [abs. bar] (maximum operating pressure decreases with increasing operating temperature and with stainless steel flanges)	<ul style="list-style-type: none"> PTFE Teflon <ul style="list-style-type: none"> DN 15 ... 300 (½" ... 12"): 0.3 ... 40 bar (4 ... 580 psi) PFA <ul style="list-style-type: none"> DN 15 ... 150 (½" ... 6"): Vacuum 0.02 ... 50 bar (0.29 ... 725 psi)
Enclosure rating	IP67 to EN 60529/NEMA 4X/6, 1 mH ₂ O for 30 min Option: IP68 to EN 60529/NEMA 6P, 10 mH ₂ O cont. (not for Ex)
Pressure drop at 3 m/s	As straight pipe
Test pressure	1.5 x PN (where applicable)
Mechanical load (vibration)	<ul style="list-style-type: none"> 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 Sensor: 3.17 g RMS Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 g RMS Sensor with compact MAG 6000 I/6000 I Ex mounted transmitter: 1.14 g RMS
Temperature of medium	<ul style="list-style-type: none"> PTFE -20 ... +150 °C (-4 ... +302 °F) PFA -20 ... +150 °C (-4 ... +302 °F)
EMC	2014/30/EU
Design	
Weight	See dimensional drawings
Flange and housing material	Carbon steel ASTM A 105, with corrosion resistant coating Corrosivity category C4, according to ISO 12944-2
Electrode material	PTFE: Hastelloy C276/2.4819 PFA: Hastelloy C22/2.4602
Grounding electrode material	PTFE: No grounding electrodes PFA: Hastelloy
Terminal box (remote version only)	<ul style="list-style-type: none"> Standard fibre glass reinforced polyamide Option Stainless steel AISI 316/1.4436 Ex sensor: Stainless steel AISI 316/1.4436
Cable entries	<ul style="list-style-type: none"> Remote installation 2 x M20 or 2 x ½" NPT Compact installation <ul style="list-style-type: none"> MAG 5000/MAG 6000: 4 x M20 or 4 x ½" NPT MAG 6000 I: 2 x M25 or 2 x ½" NPT (for supply/output) MAG 6000 I Ex: 2 x M25 or 2 x ½" NPT (for supply/output)
Certificates and approvals	
Calibration	
Standard production calibration	Zero-point, 2 x 25 % and 2 x 90 %
Hazardous area	
Ex-sensor in compact or remote version with MAG 6000 I Ex	<ul style="list-style-type: none"> ATEX, FM, CSA, IECEx, EAC Ex, NEPSI <ul style="list-style-type: none"> Zone 1 Ex d e ia IIC T6 Gb ATEX, FM, CSA, IECEx, EAC Ex <ul style="list-style-type: none"> Zone 21 Ex tD A21 IP67 FM <ul style="list-style-type: none"> XP IS Class I Div. 1 Groups A, B, C, D²⁾ DIP Class II+III Div. 1 Groups E, F, G²⁾ FM <ul style="list-style-type: none"> NI Class I Div. 2 Groups A, B, C, D NI Class I Div. 2 Groups IIC
Ex-sensor with/without MAG 5000/6000/6000 I	
Pressure equipment	PED, CRN
Others	EAC (Russia, Belarus, Kazakhstan) KCC (South Korea)

¹⁾ DN ≤ 600 type 01 (SORF); DN > 600 type 11 (WNRFF)

²⁾ In compact version only

Selection and Ordering data	Article No.	Selection and Ordering data	Order code
Sensor SITRANS F M MAG 3100 P (Short delivery time)	7ME6340-	Additional information	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Diameter		Certificates	
DN 15 (½")	1 V	• Factory certificate according to EN 10204-2.2	C14
DN 25 (1")	2 D	• Factory certificate according to EN 10204-2.1	C15
DN 40 (1½")	2 R	Terminal blocks	
DN 50 (2")	2 Y	• Factory mounted terminal blocks	N02
DN 65 (2½")	3 F	Region/customer specific labels	
DN 80 (3")	3 M	• KCC label (South Korea)	W28
DN 100 (4")	3 T	Tag name plate, stainless steel (specify in plain text)	Y17
DN 125 (5")	4 B	Tag name plate, plastic (self adhesive)	Y18
DN 150 (6")	4 H	Customer-specific transmitter setting	Y20
DN 200 (8")	4 P	Sensor cable wired (specify Article No. for sensor cables and order cables separately)	Y40
DN 250 (10")	4 V	Sensor cables wired and IP68 sealing (Article No. for sensor cables and order cables separately)	Y41
DN 300 (12")	5 D	Special version (specify in plain text)	Y99
Flange norm and pressure rating		Additional calibrations	
EN 1092-1		• Matched pair - (Standard production calibration where sensor and transmitter is calibrated together)	On request¹⁾
PN 10 (DN 200 ... 300 (8" ... 12"))	B	• Accredited Siemens Flow Instruments matched pair Calibration acc. to ISO/IEC 17025: 2005	On request¹⁾
PN 16 (DN 65 ... 300 (2½" ... 12"))	C	• Customer-specified calibration up to 10 points	On request¹⁾
PN 40 (DN 15 ... 50 (½" ... 2"))	F	• Customer-witnessed calibration Any of above calibration	On request¹⁾
ANSI B16.5			
Class 150 (½" ... 12")	J		
Flange material			
Carbon steel flanges ASTM A 105	1		
Liner material			
PTFE (150 °C (302 °F))	3		
PFA (150 °C (302 °F)) (DN 15 ... 150 (½" ... 6"))	7		
Electrode material			
Hastelloy C	2		
Hastelloy C incl. grounding electrodes (only PFA)	6		
Transmitter			
Standard sensor for remote transmitter (Order transmitter separately)	A		
Ex sensor for remote transmitter (Order transmitter separately)	B		
MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC	C		
MAG 6000 I, Aluminum, 18 ... 30 V DC, Ex	D		
MAG 6000 I, Aluminum, 115 ... 230 V AC, Ex	E		
MAG 6000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC	H		
MAG 6000, Polyamide, 115 ... 230 V AC	J		
MAG 5000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC	K		
MAG 5000, Polyamide, 115 ... 230 V AC	L		
Communication			
No communication, add-on possible	A		
HART	B		
PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)	F		
PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I)	G		
Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I)	E		
FOUNDATION Fieldbus H1 (only MAG 6000/6000 I)	J		
Cable glands/terminal box			
Metric: Polyamide terminal box or MAG 6000 I compact	1		
½" NPT: Polyamide terminal box or MAG 6000 I compact	2		
Metric: Stainless steel terminal box	3		
½" NPT: Stainless steel terminal box	4		
		Operating instructions for SITRANS F M MAG 3100 P	
		Description	Article No.
		• English	A5E03005599
		• German	A5E03086288
		All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation	
		Accessories	
		Description	Article No.
		Potting kit for IP68/NEMA 6P sealing of sensor junction box	FDK:085U0220
			
		Please use online Product selector to get latest updates. Product selector link: www.pia-portal.automation.siemens.com	

Flow Measurement

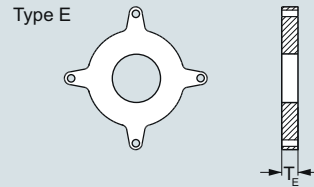
SITRANS F M

Flow sensor MAG 3100 P

Accessories for MAG 3100 P sensor

Grounding and protection ring - Type E (Stainless steel)

Material: AISI 316
For liner PTFE
1 pc. incl. straps and screws



DN	PN 10 Article No.	PN 16 Article No.	PN 40 Article No.	ANSI ¹⁾	Class 150 Article No.
DN 15			FDK:083N8365	1/2"	FDK:083N8365
DN 25			FDK:083N8271	1"	FDK:083N8272
DN 40			FDK:083N8278	1 1/2"	FDK:083N8279
DN 50			FDK:083N8282	2"	FDK:083N8283
DN 65		FDK:083N8285		2 1/2"	FDK:083N8287
DN 80		FDK:083N8289		3"	FDK:083N8291
DN 100		FDK:083N8117		4"	FDK:083N8118
DN 125		FDK:083N8121		5"	FDK:083N8122
DN 150		FDK:083N8125		6"	FDK:083N8126
DN 200	FDK:083N8130	FDK:083N8130		8"	FDK:083N8370
DN 250	FDK:083N8136	FDK:083N8137		10"	FDK:083N8140
DN 300	FDK:083N8144	FDK:083N8145		12"	FDK:083N8148

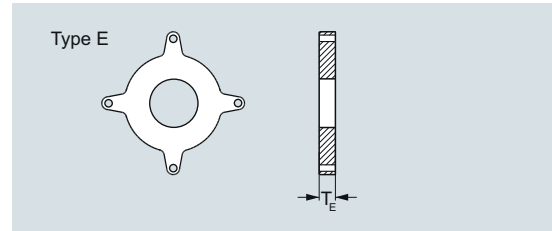
For use as protection ring order 2 pcs.

For use as grounding ring order 1 pc.

Accessories for MAG 3100 P sensor

Grounding and protection ring - Type E (Hastelloy)

Material: Hastelloy C276
For liner PTFE
1 pc. incl. straps and screws

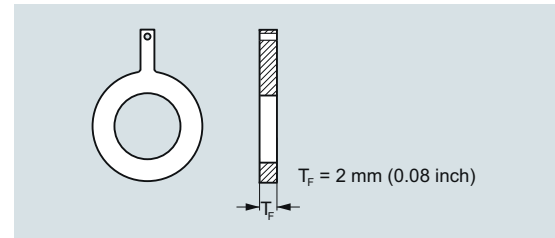


DN	PN 16 Article No.	PN 40 Article No.	Size	ANSI ¹⁾ Class 150 Article No.
DN 15		FDK:083N8487	1/2"	FDK:083N8487
DN 25		FDK:083N8488	1"	FDK:083N8489
DN 40		FDK:083N8490	1 1/2"	FDK:083N8491
DN 50		FDK:083N8492	2"	FDK:083N8493
DN 65	FDK:083N8495		2 1/2"	FDK:083N8497
DN 80	FDK:083N8499		3"	FDK:083N8501
DN 100	FDK:083N8504		4"	FDK:083N8506

¹⁾ For dimensions of MAG 3100 P see table on page 3/88

Accessories for MAG 3100 P sensor**Grounding ring - Type Flat ring (Stainless steel)**

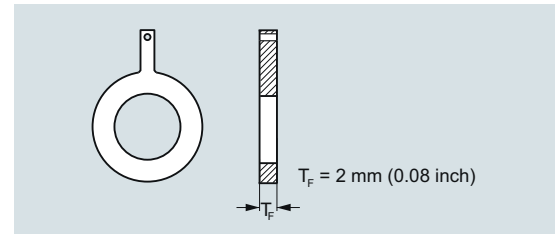
Material: AISI 316
For liner PTFE and PFA
1 pc. incl. straps and screws



DN	PN 10 Article No.	PN 16 Article No.	PN 40 Article No.	Size	ANSI ¹⁾ Class 150 Article No.
DN 15			A5E01191968	1/2"	TGX:001F0005
DN 25			A5E01150880	1"	TGX:001F0010
DN 40			A5E01191952	1 1/2"	TGX:001F0015
DN 50			A5E01150918	2"	TGX:001F0020
DN 65		A5E01191940		2 1/2"	TGX:001F0025
DN 80		A5E01152876		3"	TGX:001F0030
DN 100		A5E01158875		4"	TGX:001F0040
DN 125		A5E01191941		5"	TGX:001F0050
DN 150		A5E01191943		6"	TGX:001F0060
DN 200	A5E01191951	A5E01191944		8"	TGX:001F0080
DN 250	A5E01191950	A5E01191946		10"	TGX:001F0100
DN 300	A5E01191949	A5E01191947		12"	TGX:001F0120

Accessories for MAG 3100 P sensor**Grounding ring - Type Flat ring (Hastelloy)**

Material: Hastelloy C276
For liner PTFE and PFA
1 pc. incl. straps and screws



DN	PN 10 Article No.	PN 16 Article No.	PN 40 Article No.	Size	ANSI ¹⁾ Class 150 Article No.
DN 15			A5E01191981	1/2"	TGX:002F0005
DN 25			A5E01150882	1"	TGX:002F0010
DN 40			A5E01191982	1 1/2"	TGX:002F0015
DN 50			A5E01150922	2"	TGX:002F0020
DN 65		A5E01191971		2 1/2"	TGX:002F0025
DN 80		A5E01152889		3"	TGX:002F0030
DN 100		A5E01158886		4"	TGX:002F0040
DN 125		A5E01191973		5"	TGX:002F0050
DN 150		A5E01191974		6"	TGX:002F0060
DN 200	A5E01191978	A5E01191975		8"	TGX:002F0080
DN 250	A5E01191979	A5E01191976		10"	TGX:002F0100
DN 300	A5E01191980	A5E01191977		12"	TGX:002F0120

¹⁾ For dimensions of MAG 3100 P see table on page 3/88

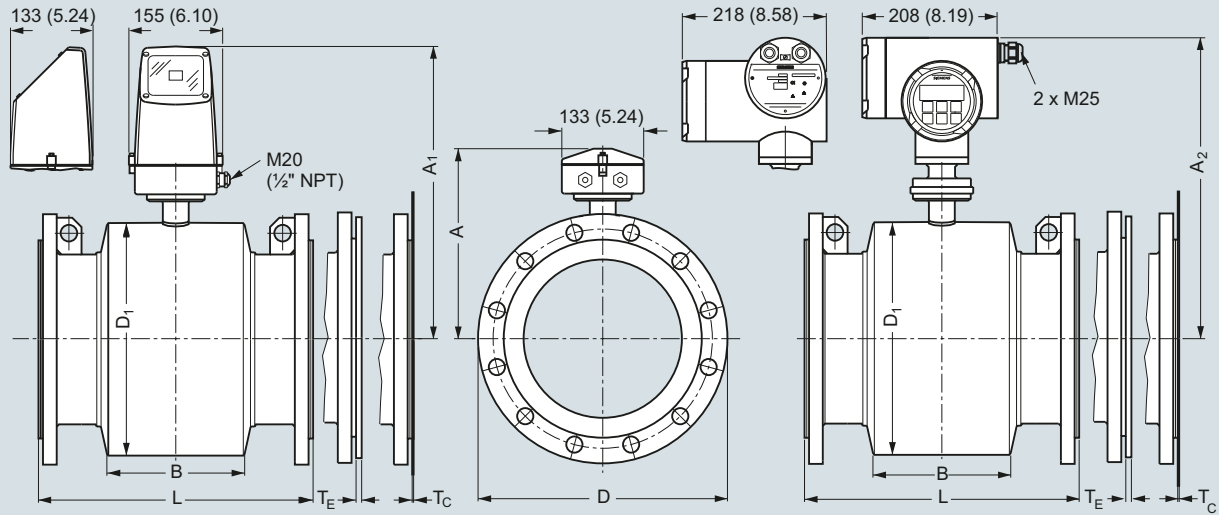
Flow Measurement

SITRANS F M

Flow sensor MAG 3100 P

Dimensional drawings

MAG 3100 P sensor with compact or remote transmitter



Dimensions in mm (inch)

Metric

DN	A ¹⁾	A ₁	A ₂	B	D ₁	L ²⁾				T _E ³⁾	T _F ³⁾	Weight ⁴⁾
						EN 1092-1-201						
						PN 10	PN 16	PN 40	ANSI 16.5			
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	Class 150	[mm]	[mm]	[kg]
15	187	341	338	59	104	-	-	200	200	6	2	4
25	187	341	338	59	104	-	-	200	200	6	2	5
40	197	351	348	82	124	-	-	200	200	6	2	8
50	205	359	356	72	139	-	-	200	200	6	2	9
65	212	369	366	72	154	-	200/-	-	200	6	2	11
80	222	376	373	72	174	-	200/-	-	272 ⁵⁾	6	2	12
100	242	396	393	85	214	-	250/-	-	250	6	2	16
125	255	409	406	85	239	-	250/-	-	250	6	2	19
150	276	430	427	85	282	-	300/-	-	300	6	2	27
200	304	458	455	137	338	350	350/-	-	350	8	2	40
250	332	486	483	157	393	450	450/-	-	450	8	2	60
300	357	511	508	157	444	500	500/-	-	500	8	2	80

¹⁾ 14.5 mm shorter with stainless steel terminal box (Ex and high temperature version)

²⁾ When grounding rings are used, the thickness of the grounding ring must be added to the built-in length

³⁾ T_E = Grounding ring Type E, T_F = Grounding ring Type Flat ring

⁴⁾ Weights are approx. (for PN 16) without transmitter

⁵⁾ Not according to ISO 13359

D = Outside diameter of flange, see flange tables

MAG 3100 P sensor with compact or remote transmitter

Imperial

Size	A ¹⁾	A ₁	A ₂	B	D ₁	L ²⁾				T _E ³⁾	T _F ³⁾	Weight ⁴⁾
						EN 1092-1-201		ANSI 16.5				
						PN 10	PN 16	PN 40	Class 150			
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[lb]
½	7.36	13.4	13.34	2.32	4.09	-	-	7.87	7.87	0.24	0.08	9
1	7.36	13.4	13.34	2.32	4.09	-	-	7.87	7.87	0.24	0.08	11
1½	7.76	13.8	13.74	3.23	4.88	-	-	7.87	7.87	0.24	0.08	17
2	8.07	14.1	14.04	2.83	5.47	-	-	7.87	7.87	0.24	0.08	20
2½	8.35	14.4	14.34	2.83	6.06	-	7.87/-	-	7.87	0.24	0.08	24
3	8.74	14.8	14.74	2.83	6.85	-	7.87/-	-	10.71 ⁵⁾	0.24	0.08	26
4	9.53	15.6	15.54	3.35	8.43	-	9.84/-	-	9.84	0.24	0.08	35
5	10.04	16.1	16.04	3.35	9.41	-	9.84/-	-	9.84	0.24	0.08	42
6	10.87	16.9	16.84	3.35	11.10	-	11.81/-	-	11.81	0.24	0.08	60
8	11.97	18.0	17.94	5.39	13.31	13.78	13.78/-	-	13.78	0.31	0.08	88
10	13.07	19.1	19.04	6.18	15.47	17.72	17.72/-	-	17.72	0.31	0.08	132
12	14.05	20.1	20.04	6.18	17.48	19.69	19.69/-	-	19.69	0.31	0.08	176

¹⁾ 0.571 inch shorter with stainless steel terminal box (Ex and high temperature version)

²⁾ When grounding rings are used, the thickness of the grounding ring must be added to the built-in length

³⁾ T_E = Grounding ring Type E, T_F = Grounding ring Type Flat ring

⁴⁾ Weights are for ANSI 150 without transmitter

⁵⁾ Not according to ISO 13359

D = Outside diameter of flange, see flange tables

Flow Measurement

SITRANS F M

Flow sensor MAG 5100 W

Overview



The SITRANS F M MAG 5100 W is an electromagnetic flow sensor designed to meet ground water, drinking water, waste water, sewage or sludge applications.

Benefits

- DN 15 to DN 1200/2000 (½" to 48"/78")
- Stock program of MAG 5100 W secures short delivery time
- Connection flanges EN 1092-1 (DIN 2501), ANSI, AWWA, AS and JIS.
- NBR Hard Rubber and Ebonite Hard Rubber liner for all water applications
- EPDM liner with drinking water approvals
- Hastelloy integrated grounding and measuring electrodes
- Increased low flow accuracy for water leak detection, due to coned liner design.
- Drinking water approvals
- Suitable for direct burial and constant flooding
- Custody transfer approvals
- Built-in length according to ISO 13359; the standard includes sizes up to DN 400.
- Easy commissioning, SENSORPROM unit automatically uploads calibration values and settings.
- Designed so patented in-situ verification can be conducted. Using SENSORPROM fingerprint.
- Custody transfer option for water billing, with type approval after OIML R 49 and verified according to MI-001 - OD inlet/OD outlet installation
 - Pattern approval OIML R 49
 - Conform to ISO 4064 and EN 14154 for mechanical flowmeters
 - PTB K7.2
 - Kiwa water approval
- FM Fire Service Meter (Class Number 1044) for automatic fire protection systems
- Meets EEC directives: PED 2014/68/EU pressure directive for EN1092-1 flanges
- Simple onsite or factory upgrade to IP68/NEMA 6P of a standard sensor
- Type approval of marine equipment (ABS, Bureau Veritas, DNV, GL, Lloyd's Register)

Application

The main applications of the SITRANS F M electromagnetic flow sensors can be found in the following fields:

- Water abstraction
- Water treatment
- Water distribution network (leak detection management)
- Custody transfer water meters
- Irrigation
- Waste water treatment
- Filtration plant (e.g. reverse osmosis and ultra filtration)
- Industrial water applications

Mode of operation

The flow measuring principle is based on Faradays law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

Integration

The complete flowmeter consists of a flow sensor and an associated transmitter SITRANS F M MAG 5000, MAG 6000 or MAG 6000 I.

The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems, e.g. HART, DeviceNet, PROFIBUS DP and PA, FOUNDATION Fieldbus H1 or Modbus RTU/RS 485.

Technical specifications

Product characteristic	MAG 5100 W (7ME6520) Mainly for the European market EPDM or NBR lining	MAG 5100 W (7ME6580) Mainly for the non-European market Ebonite lining
Design and nominal size	Coned sensor (octagon liner): DN 15 ... 40 (½" ... 1½") Coned sensor: DN 50 ... 300 (2" ... 12") Full bore sensor: DN 350 ... 1200 (14" ... 48")	Full bore sensor: DN 25 ... 2000 (1" ... 78")
Measuring principle	Electromagnetic induction	Electromagnetic induction
Excitation frequency (Mains supply: 50/60 Hz)	DN 15 ... 65 (½" ... 2½"): 12.5 Hz/15 Hz DN 80 ... 150 (3" ... 6"): 6.25 Hz/7.5 Hz DN 200 ... 300 (8" ... 12"): 3.125 Hz/3.75 Hz DN 350 ... 1200 (14" ... 48"): 1.5625 Hz/1.875 Hz	DN 25 ... 65 (1" ... 2½"): 12.5 Hz/15 Hz DN 80 ... 150 (3" ... 6"): 6.25 Hz/7.5 Hz DN 200 ... 1200 (8" ... 48"): 3.125 Hz/3.75 Hz DN 1400 ... 2000 (54" ... 78"): 1.5625 Hz/1.875 Hz
Process connection		
Flanges ¹⁾		
• EN 1092-1	PN 10 (145 psi): DN 200 ... 300 (8" ... 12") Flat face PN 10 (145 psi): DN 350 ... 1200 (14" ... 48") Raised face ²⁾ PN 16 (232 psi): DN 50 ... 300 (2" ... 12") Flat face ³⁾ PN 16 (232 psi): DN 350 ... 1200 (14" ... 48") Raised face PN 40 (580 psi): DN 15 ... 40 (½" ... 1½") Flat face	Raised face ³⁾ (EN 1092-1, DIN 2501 and BS 4504 have the same mating dimensions) PN 6 (87 psi): DN 1400 ... 2000 (54" ... 78") PN 10 (145 psi): DN 200 ... 2000 (8" ... 78") PN 16 (232 psi): DN 65 ... 600 (2½" ... 24") PN 40 (580 psi): DN 25 ... 50 (1" ... 2")
• ANSI B16.5	Class 150: ½" ... 12" Flat face; 14" ... 24" Raised face	Class 150: 1" ... 24"; Raised face
• AWWA C-207	Class D: 28" ... 48", Flat face	Class D: 28" ... 78", Flat face
• AS4087	PN 16 (232 psi): DN 15 ... DN 300 (2" ... 12") Flat Face; DN 350 ... DN 1200 (14" ... 48") Raised face	PN 16 (232 psi): DN 50 ... DN 1200 (2" ... 48") Raised face
• JIS B 2220:2004	-	K10 (1" ... 24")
Rated Operation conditions		
Ambient temperature		
• Sensor	-40 ... +70 °C (-40 ... +158 °F)	-20 ... +70 °C (-4 ... +158 °F)
• Compact with transmitter MAG 5000/6000 ⁴⁾	-20 ... +60 °C (-4 ... +140 °F)	-20 ... +60 °C (-4 ... +140 °F)
Operating pressure (Abs) [abs. bar] (Maximum operating pressure depending on flange standard, decreases with increasing operating temperature)	DN 15 ... 40 (½" ... 1½"): 0.01 ... 40 bar (0.15 ... 580 psi) DN 50 ... 300 (2" ... 12"): 0.01 ... 19 bar (0.15 ... 276 psi) DN 350 ... 1200 (14" ... 48"): 0.01 ... 16 bar (0.15 ... 232 psi)	DN 25 ... 50 (1" ... 2"): 0.01 ... 40 bar (0.15 ... 580 psi) DN 65 ... 1200 (2½" ... 48"): 0.01 ... 19 bar (0.15 ... 276 psi) DN 1400 ... 2000 (54" ... 78"): 0.01 ... 10 bar (0.15 ... 145 psi)
Enclosure rating		
• Standard	IP67 to EN 60529/NEMA 4X/6 (1 mH ₂ O for 30 min)	IP67 to EN 60529/NEMA 4X/6 (1 mH ₂ O for 30 min)
• Option	IP68 to EN 60529/NEMA 6P (10 mH ₂ O continuously)	IP68 to EN 60529/NEMA 6P (10 mH ₂ O continuously)
Pressure drop	DN 15 and 25 (½" and 1"): Max. 20 mbar (0.29 psi) at 1 m/s (3 ft/s) DN 40 ... 300 (1½" ... 12"): Max 25 mbar (0.36 psi) at 3 m/s (10 ft/s) DN 350 ... 1200 (14" ... 48"): Insignificant	Insignificant
Test pressure	1.5 x PN (where applicable) FM Fire Service: 2 x PN	1.5 x PN (where applicable)
Mechanical load (vibration)	18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 Sensor: 3.17 g RMS Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 g RMS Sensor with compact MAG 6000 I mounted transmitter: 1.14 g RMS	18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 Sensor: 3.17 g RMS Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 g RMS Sensor with compact MAG 6000 I mounted transmitter: 1.14 g RMS

Flow Measurement

SITRANS F M

Flow sensor MAG 5100 W

Product characteristic	Mainly for the European market (7ME6520) EPDM or NBR lining	Mainly for the non-European market (7ME6580) Ebonite lining
<u>Medium conditions</u>		
Temperature of medium		
• NBR	-10 ... +70 °C (14 ... 158 °F)	-
• EPDM	-10 ... +70 °C (14 ... 158 °F)	-
• EPDM/NBR (MI-001)	0.1 ... 30 °C (32 ... 76 °F)	-
• Ebonite	-	-10 ... +70 °C (14 ... 158 °F)
EMC	2014/30/EU	2014/30/EU
Design		
Material		
• Housing and flanges	Carbon steel ASTM A 105, with corrosion-resistant coating Corrosivity category C4, according to ISO 12944-2	Carbon steel ASTM A 105, with corrosion-resistant coating Corrosivity category C4, according to ISO 12944-2
• Electrode	Hastelloy C276	Hastelloy C276
• Grounding electrode	Hastelloy C276	Hastelloy C276
• Terminal box	Fibre glass reinforced polyamide	Fibre glass reinforced polyamide
Certificates and approvals		
Calibration		
• Standard production calibration	Zero-point, 2 x 25 % and 2 x 90 %	Zero-point, 2 x 25 % and 2 x 90 %
• Special calibration	5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory Q _{max} 10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q _{max} Matched-pair calibration: default, 5-point or 10-point	5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory Q _{max} 10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q _{max} Matched-pair calibration: default, 5-point or 10-point
Custody transfer	<ul style="list-style-type: none"> MI-001 cold water (EU): DN 50 ... DN 1200 (2" ... 48") Kiwa water approval (NL): DN 50 ... DN 1200 (2" ... 48") Chilled water pattern approval PTB K 7.2 DN 50 ... DN 300 (Germany)⁵⁾ 	-
Drinking water	EPDM liner: <ul style="list-style-type: none"> WRAS (WRc, BS690 cold water, GB) NSF/ANSI Standard 61⁶⁾ (Cold water, US) ACS listed (F) DVGW W270 (D) Belgaqua (B) MCERTS (GB environmental) 	<ul style="list-style-type: none"> WRAS (WRc, BS690 cold water, GB) NSF/ANSI Standard 61⁶⁾ (Cold water, US)
Marine ⁷⁾	<ul style="list-style-type: none"> American Bureau of Shipping (ABS) Bureau Veritas Det Norske Veritas (DNV) Germanischer Lloyd (GL) Lloyd's Register of Shipping 	
Hazardous areas ⁸⁾		
• Standard sensor with/without MAG 5000/6000/6000 I	<ul style="list-style-type: none"> FM - NI Class I Div. 2 Groups A, B, C, D - NI Class I Zone 2 Groups IIC 	<ul style="list-style-type: none"> FM - NI Class I Div. 2 Groups A, B, C, D - NI Class I Zone 2 Groups IIC
Pressure equipment	<ul style="list-style-type: none"> PED conforming: All EN1092-1 flanges and ANSI Class 150 (< DN 300 /<12") – 2014/68/EU⁹⁾ CRN 	<ul style="list-style-type: none"> PED conforming: All EN1092-1 flanges (< DN 600 /<24") – 2014/68/EU⁹⁾ CRN
Others	<ul style="list-style-type: none"> EAC (Russia, Belarus, Kazakhstan) KCC (South Korea) FM Fire Service Approval acc. to class 1044⁸⁾ VdS: Extinguishing systems DN 50 ... 300 	<ul style="list-style-type: none"> EAC (Russia, Belarus, Kazakhstan) CMC/CPA (China)

¹⁾ DN 750, DN 1050 and DN 1100 (30", 42" and 44") not available with EN 1092-1 (PN 10 and PN 16) and AS4087 flanges

²⁾ Type 01 (SORF)

³⁾ DN ≤ 600 type 01 (SORF); DN > 600 type 11

⁴⁾ Compact with transmitter MAG 5000 CT/6000 CT -20 ... +50 °C (-4 ... +122 °F)

⁵⁾ For verification submit Product Variation Request

⁶⁾ Including Annex G

⁷⁾ In remote version with sensor size DN 50 ... DN 300 (2" ... 12")

⁸⁾ For sizes larger than 600 mm (24") in PN 16 PED conformity is available as a cost-added option. The basic unit will carry the LVD (Low Voltage Directive) and EMC approval. All products sold outside of EU and EFTA are excluded from the directive, also products sold into certain market sectors are excluded. These include:

a) Meters used in networks for the supply, distribution and discharge of water.

b) Meters used in pipelines for the conveyance of any fluid from offshore to onshore.

c) Meters used in the extraction of petroleum or gas, including Christmas tree and manifold equipment.

d) Any meter mounted on a ship or mobile offshore platform. For further information on the PED standard and requirements see page 10/15.

⁹⁾ Not for sensors with 300 µm coating.

**MAG 5100 W (7ME6520) with MAG 6000 CT
(Revenue program) MI-001**

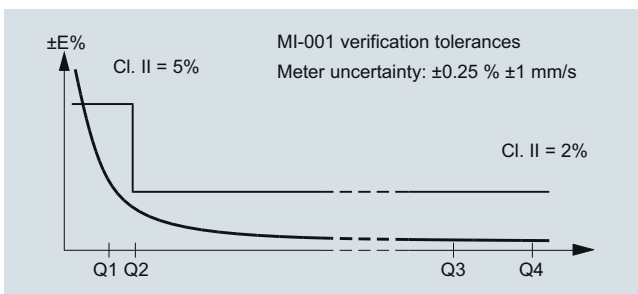
MAG 5100 W CT program is type approved according to international water meter standard OIML R 49. Since the first November 2006 the MI-001 water meter directive is in force, which means that all water meters can be sold across the EU borders if the water meters contain a MI-001 label.

The MAG 5100 W MI-001 verified and labeled products are a Class II approval according to Directive 2014/32/EU of the European Parliament and Council of 26 February, 2014 on measuring instruments, Annex VI Thermal Energy Meters (MI-004) in the sizes from DN 50 to DN 1200 (Article No. 7ME6520).

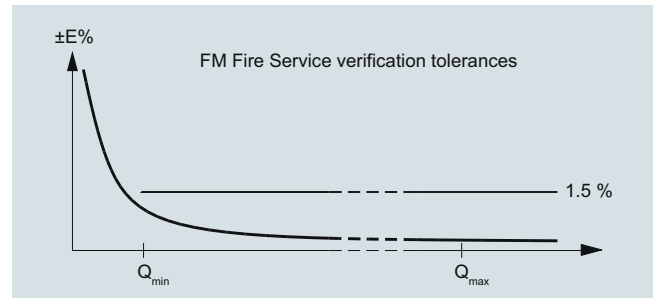
The MID certification is obtained as a modul B + D module approval according to the above mentioned directive.

Module B : Type approval according to OIML R 49

Module D : Quality insurance approval of production

**MAG 5100 W (7ME6520) with MAG 5000/MAG 6000 or
MAG 6000 CT for Fire Service applications**

MAG 5100 W (7ME6520) is FM Fire Service approved for automatic fire protection systems. The approval is applicable for the sizes DN 50, DN 80, DN 100, DN 150, DN 200, DN 250 and DN 300 (2", 3", 4", 6", 8", 10" and 12") with ANSI B16.5 Class 150 flanges. The FM Fire Service approved product can be ordered via the Z-options P20, P21 and P22.



Flow Measurement

SITRANS F M

Flow sensor MAG 5100 W

MAG 5100 W (7ME6520) MI-001 verified and labeled products at a given Q3 and Q3/Q4 = 1.25 and Q2/Q1 = 1.6 measuring ranges see table below:

Order code: P11	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
„R“ Q3/Q1	40	40	40	40	40	40	40	40	40
Q4 [m³/h]	20	31.25	50	78.75	125	200	312.5	500	787.5
Q3 [m³/h]	16	25	40	63	100	160	250	400	630
Q2 [m³/h]	0.64	1.0	1.6	2.52	4.0	6.4	10.0	16.0	25.2
Q1 [m³/h]	0.4	0.63	1.0	1.58	2.5	4.0	6.25	10.0	15.75

Order code: P12	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
„R“ Q3/Q1	63	63	63	63	63	63	63	63	63
Q4 [m³/h]	20	31.25	50	78.75	125	200	312.5	500	787.5
Q3 [m³/h]	16	25	40	63	100	160	250	400	630
Q2 [m³/h]	0.41	0.63	1.02	1.6	2.54	4.06	6.35	10.2	16.0
Q1 [m³/h]	0.25	0.40	0.63	1.00	1.59	2.54	3.97	6.35	10.0

Order code: P13	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
„R“ Q3/Q1	80	80	80	80	80	80	80	80	80
Q4 [m³/h]	20	31.25	50	78.75	125	200	312.5	500	787.5
Q3 [m³/h]	16	25	40	63	100	160	250	400	630
Q2 [m³/h]	0.32	0.5	0.8	1.26	2.0	3.2	5.0	8.0	12.6
Q1 [m³/h]	0.20	0.31	0.50	0.79	1.25	2.00	3.13	5.00	7.9

Order code: P16	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
„R“ Q3/Q1	160	160	160	160	160	160	160	160	160
Q4 [m³/h]	50	78.75	125	200	312.5	500	787.5	1250	2000
Q3 [m³/h]	40	63	100	160	250	400	630	1000	1600
Q2 [m³/h]	0.4	0.63	1.0	1.6	2.5	4.0	6.3	10.0	16.0
Q1 [m³/h]	0.25	0.39	0.63	1.0	1.56	2.5	3.94	6.3	10.0

Order code: P17	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
„R“ Q3/Q1	200	200	200	200	200	200	200	200	200
Q4 [m³/h]	50	78.75	125	200	312.5	500	787.5	1250	2000
Q3 [m³/h]	40	63	100	160	250	400	630	1000	1600
Q2 [m³/h]	0.32	0.50	0.80	1.28	2.0	3.2	5.0	8.0	12.8
Q1 [m³/h]	0.2	0.32	0.5	0.8	1.25	2.0	3.15	5.0	8.0

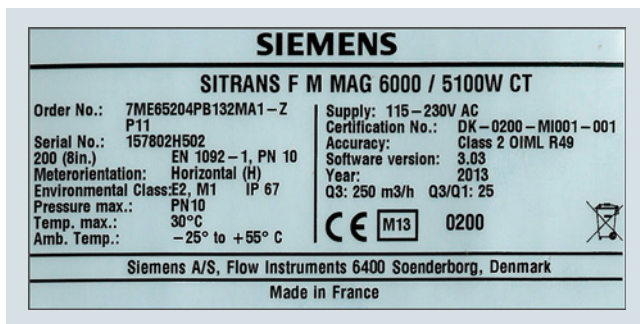
Order code: P18	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")
„R“ Q3/Q1	250	250	250	250	250	250	250	250	250
Q4 [m³/h]	50	78.75	125	200	312.5	500	787.5	1250	2000
Q3 [m³/h]	40	63	100	160	250	400	630	1000	1600
Q2 [m³/h]	0.26	0.4	0.64	1.02	1.6	2.56	4.0	6.4	10.24
Q1 [m³/h]	0.16	0.25	0.4	0.64	1.0	1.6	2.52	4.0	6.4

Order code: P24	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
„R“ Q3/Q1	40	40	40	40	40
Q4 [m³/h]	1250	1250	2000	2000	3125
Q3 [m³/h]	1000	1000	1600	1600	2500
Q2 [m³/h]	40.0	40.0	64.0	64.0	100.0
Q1 [m³/h]	25.0	25.0	40.0	40.0	62.5

Order code: P25	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
„R“ Q3/Q1	63	63	63	63	63
Q4 [m³/h]	1250	2000	3125	3125	5000
Q3 [m³/h]	1000	1600	2500	2500	4000
Q2 [m³/h]	25.4	40.63	63.49	63.49	101.6
Q1 [m³/h]	15.9	25.4	39.7	39.7	63.49

Order code: P26	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")	
„R“ Q3/Q1	80	80	80	80	80	
Q4 [m³/h]	2000	3125	5000	5000	7875	
Q3 [m³/h]	1600	2500	4000	4000	6300	
Q2 [m³/h]	32.0	50.0	80.0	80.0	126.0	
Q1 [m³/h]	20.0	31.25	50.0	50.0	78.75	
Order code: P27	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")	
„R“ Q3/Q1	100	100	100	100	100	
Q4 [m³/h]	3125	3125	5000	5000	7875	
Q3 [m³/h]	2500	2500	4000	4000	6300	
Q2 [m³/h]	40.0	40.0	64.0	64.0	100.8	
Q1 [m³/h]	25.0	25.0	40.0	40.0	63.0	
Order code: P29	DN 700 (28")	DN 750 (30")	DN 800 (32")	DN 900 (36")	DN 1000 (40")	DN 1200 (48")
„R“ Q3/Q1	40	40	40	40	40	40
Q4 [m³/h]	5000	5000	5000	7875	7875	7875
Q3 [m³/h]	4000	4000	4000	6300	6300	6300
Q2 [m³/h]	160.0	160.0	160.0	252.0	252.0	252.0
Q1 [m³/h]	100.0	100.0	100.0	157.5	157.5	157.5
Order code: P30	DN 700 (28")	DN 750 (30")	DN 800 (32")	DN 900 (36")	DN 1000 (40")	DN 1200 (48")
„R“ Q3/Q1	63	63	63	63	63	-
Q4 [m³/h]	5000	5000	5000	7875	7875	-
Q3 [m³/h]	4000	4000	4000	6300	6300	-
Q2 [m³/h]	101.6	101.6	101.6	160.0	160.0	-
Q1 [m³/h]	63.5	63.5	63.5	100.0	100.0	-
Order code: P31	DN 700 (28")	DN 750 (30")	DN 800 (32")	DN 900 (36")	DN 1000 (40")	DN 1200 (48")
„R“ Q3/Q1	80	80	80	80	80	-
Q4 [m³/h]	5000	5000	5000	7875	7875	-
Q3 [m³/h]	4000	4000	4000	6300	6300	-
Q2 [m³/h]	80.0	80.0	80.0	126.0	126.0	-
Q1 [m³/h]	50.0	50.0	50.0	78.75	78.75	-

The label is placed on the transmitter housing. An example of the product label is shown below:



OIML R 49/MI-001 approvals valid for:

- DN 50 to DN 1200 (2" to 48")
- Horizontal and vertical installation
- Compact or remote with max. 500 m cable
- Power supply 115 to 230 V AC, 12 to 24 V AC/DC
- With or without communication module

Other restrictions may apply (see certificate).

Special OIML / MI-001 settings:

- Unit: m³
- Qmax: Q3
- Low flow cut-off: 0.1 %
- Digital output: Frequency

For other factory settings, see Operating Instructions.

Flow Measurement

SITRANS F M

Flow sensor MAG 5100 W

Selection and Ordering data

Article No. Order Code

Sensor SITRANS F M MAG 5100 W

7 ME 6 5 2 0 -

Hastelloy electrodes, carbon steel flanges,
EU water markets and low flow applications

■ ■ ■ ■ ■ - 2 ■ ■ ■ ■ ■

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Diameter

DN 15 (½")
DN 25 (1")
DN 40 (1½")
DN 50 (2")
DN 65 (2½")
DN 80 (3")
DN 100 (4")
DN 125 (5")
DN 150 (6")
DN 200 (8")
DN 250 (10")
DN 300 (12")
DN 350 (14")
DN 400 (16")
DN 450 (18")
DN 500 (20")
DN 600 (24")
DN 700 (28")
DN 750 (30")
DN 800 (32")
DN 900 (36")
DN 1000 (40")
(42")
(44")
DN 1200 (48")

1 V
2 D
2 R
2 Y
3 F
3 M
3 T
4 B
4 H
4 P
4 V
5 D
5 K
5 R
5 Y
6 F
6 P
6 Y
7 D
7 H
7 M
7 R
7 U
7 V
8 B

Flange norm and pressure rating

EN 1092-1

PN 10 (DN 200 ... 1200/8" ... 48")
PN 16 (DN 50 ... 1200/2" ... 48")
PN 16, non PED (DN 700 ... 1200/28" ... 48")
PN 40 (DN 15 ... 40/½" ... 1½")

B
C
D
F

ANSI B16.5

class 150 (½" ... 24")

J

AWWA C-207

Class D (28" ... 48")

L

AS 4087

PN 16 (DN 50 ... 1200/2" ... 48")

N

Flange material and coating

Carbon steel flanges ASTM A 105,
corrosion-resistant coating of category C4
Carbon steel flanges ASTM A 105, 300 µm
corrosion-resistant coating of category C4

1
4

Liner material

EPDM
NBR Hard Rubber

2
3

Selection and Ordering data

Article No. Order Code

Sensor SITRANS F M MAG 5100 W

7 ME 6 5 2 0 -

Hastelloy electrodes, carbon steel flanges,
EU water markets and low flow applications

■ ■ ■ ■ ■ - 2 ■ ■ ■ ■ ■

Transmitter

Sensor for remote transmitter (Order transmitter separately)

A

MAG 6000 I, Aluminum, 18 ... 90 V DC,
115 ... 230 V AC

C

MAG 6000, Polyamid,
11 ... 30 V DC/11 ... 24 V AC

H

MAG 6000, Polyamid, 115 ... 230 V AC

J

MAG 5000, Polyamid,
11 ... 30 V DC/11 ... 24 V AC

K

MAG 5000, Polyamid, 115 ... 230 V AC

L

MAG 6000 CT, Polyamid, 115 ... 230 V AC

M

MAG 6000 CT, Polyamid,
11 ... 30 V DC/11 ... 24 V AC

R

Transmitter including wall-mounting kit for
remote design

MAG 5000, Polyamid, 115 ... 230 V AC,
incl. special wall-mounting unit (approved
marine equipment)

• M20x1.5 cable glands

Z

P 0 C

• ½" NPT cable glands

Z

P 0 D

MAG 6000, Polyamid, 115 ... 230 V AC,
incl. special wall-mounting unit (approved
marine equipment)

• M20x1.5 cable glands

Z

P 0 G

• ½" NPT cable glands

Z

P 0 H

MAG 6000 CT, Polyamid, 11 ... 30 V DC/
11 ... 24 V AC, incl. wall-mounting unit

• M20x1.5 cable glands

Z

P 0 J

• ½" NPT cable glands

Z

P 0 K

MAG 6000 CT, Polyamid, 115 ... 230 V AC,
incl. wall-mounting unit

• M20x1.5 cable glands

Z

P 0 L

• ½" NPT cable glands

Z

P 0 M

Communication

None

A

HART

B

PROFIBUS PA Profile 3 (only MAG 6000/
MAG 6000 I)

F

PROFIBUS DP Profile 3 (only MAG 6000/
MAG 6000 I)

G

Modbus RTU/RS 485 (only MAG 6000/
MAG 6000 I)

E

FOUNDATION Fieldbus H1 (only MAG 6000/
MAG 6000 I)

J

Cable glands/terminal box

Metric: Polyamide terminal box or
MAG 6000 I compact

1

Selection and Ordering data		Order code	Selection and Ordering data		Order code
Additional information					
Please add “-Z” to Article No. and specify Order code(s) and plain text.			• Without verification according to OIML R 49 (DN 350 ... DN 600)		P23
			• MI-001 Q3/Q1 = 40 (DN 350 ... DN 600)		P24
			• MI-001 Q3/Q1 = 63 (DN 350 ... DN 600)		P25
			• MI-001 Q3/Q1 = 80 (DN 350 ... DN 600)		P26
			• MI-001 Q3/Q1 = 100 (DN 350 ... DN 600)		P27
Certificates			• Without verification according to OIML R 49 (DN 700 ... DN 1200)		P28
• Pressure test certificate according to EN 10204-3.1		C01	• MI-001 Q3/Q1 = 40 (DN 700 ... DN 1200)		P29
• Material certificate according to EN 10204-3.1		C12	• MI-001 Q3/Q1 = 63 (DN 700 ... DN 1200)		P30
• Factory certificate according to EN 10204-2.2		C14	• MI-001 Q3/Q1 = 80 (DN 700 ... DN 1200)		P31
• Factory certificate according to EN 10204-2.1		C15	FM Fire Service Approval (with ANSI B16.5 Class 150 flanges)		
Special calibration			• DN 50, DN 80 and DN 100 (2", 3" and 4")		P20
• 5-point calibration for DN 15 ... DN 200 ¹⁾		D01	• DN 150 and DN 200 (6" and 8")		P21
• 5-point calibration for DN 250 ... DN 600 ¹⁾		D02	• DN 250 and DN 300 (10" and 12")		P22
• 5-point calibration for DN 700 ... DN 1200 ¹⁾		D03	Region/customer specific labels		
• 10-point calibration for DN 15 ... DN 200 ²⁾		D06	• Chinese label		W06
• 10-point calibration for DN 250 ... DN 600 ²⁾		D07	• KCC label (South Korea)		W28
• 10-point calibration for DN 700 ... DN 1200 ²⁾		D08	• FP2E label (France)		H20
• Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 15 ... DN 200		D11	Tag name plate, stainless steel (specify in plain text)		Y17
• Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 250 ... DN 600		D12	Tag name plate, plastic (self-adhesive)		Y18
• Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 700 ... DN 1200		D13	Customer-specific transmitter setting		Y20
• 5-point, matched-pair calibration for DN 15 ... DN 200 ¹⁾		D15	Factory mounted sensor cables		
• 5-point, matched-pair calibr. for DN 250 ... DN 600 ¹⁾		D16	• Sensor cables wired (specify Article No. for sensor cables and order cables separately or specify K-option)		Y40
• 5-point, matched-pair calibr. for DN 700 ... DN 1200 ¹⁾		D17	• Sensor cables wired and IP68 sealing (specify Article No. for sensor cables and order cables separately or specify K-option)		Y41
• 10-point, matched-pair calibration for DN 15 ... DN 200 ²⁾		D18	Special version (specify in plain text)		Y99
• 10-point, matched-pair calibr. for DN 250 ... DN 600 ²⁾		D19	Additional calibrations		
• 10-point, matched-pair calibr. for DN 700 ... DN 1200 ²⁾		D20	• Accredited Siemens Flow Instruments matched pair calibration acc. to ISO/IEC 17025:2005		On request ⁴⁾
Country of origin			• Customer-witnessed calibration		On request ⁴⁾
• France		F55	Any of above calibration		
Sensor cables			1) 20 %, 40 %, 60 %, 80 %, 100 % of factory Q _{max}		
• Standard coil and electrode cable, PVC jacket			2) Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q _{max}		
- 5 m (16 ft)		K01	3) For more details and references of the ranges please see the tables on page 3/94.		
- 10 m (33 ft)		K02	4) Product Variation Request (PVR).		
- 20 m (65 ft)		K04	Operating instructions for SITRANS F M MAG 5100 W		
- 30 m (98 ft)		K06	Description		Article No.
- 40 m (131 ft)		K07	• English		A5E03063678
- 50 m (164 ft)		K08	• German		A5E03376527
- 60 m (197 ft)		K09	All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation		
- 100 m (328 ft)		K10	Accessories		
- 150 m (492 ft)		K11	Description		Article No.
- 200 m (656 ft)		K12	Potting kit for IP68/NEMA 6P sealing of sensor junction box		FDK:085U0220
- 500 m (1640 ft)		K13			
• Standard coil and special electrode cable, PVC jacket					
- 5 m (16 ft)		K51			
- 10 m (33 ft)		K52			
- 20 m (65 ft)		K54			
- 30 m (98 ft)		K56			
- 40 m (131 ft)		K57			
- 50 m (164 ft)		K58			
- 60 m (197 ft)		K59			
- 100 m (328 ft)		K60			
- 150 m (492 ft)		K61			
- 200 m (656 ft)		K62			
- 500 m (1640 ft)		K63			
Terminal blocks					
• Factory mounted terminal blocks		N02			
Approval/Verification ³⁾					
• Without verification acc. to OIML R 49 (DN 50 ... DN 300)		P10			
• MI-001 Q3/Q1 = 40 (DN 50 ... DN 300)		P11			
• MI-001 Q3/Q1 = 63 (DN 50 ... DN 300)		P12			
• MI-001 Q3/Q1 = 80 (DN 50 ... DN 300)		P13			
• MI-001 Q3/Q1 = 160 (DN 50 ... DN 300)		P16			
• MI-001 Q3/Q1 = 200 (DN 50 ... DN 300)		P17			
• MI-001 Q3/Q1 = 250 (DN 50 ... DN 300)		P18			

Flow Measurement

SITRANS F M

Flow sensor MAG 5100 W

Selection and Ordering data

Article No.

Sensor SITRANS F M MAG 5100 W

7 ME 6 5 8 0 -

Hastelloy electrodes, carbon steel flanges,
Non EU water markets

➤ Click on the Article No. for the online configuration
in the PIA Life Cycle Portal.

Diameter

DN 25 (1")
DN 40 (1½")
DN 50 (2")
DN 65 (2½")
DN 80 (3")
DN 100 (4")
DN 125 (5")
DN 150 (6")
DN 200 (8")
DN 250 (10")
DN 300 (12")
DN 350 (14")
DN 400 (16")
DN 450 (18")
DN 500 (20")
DN 600 (24")
DN 700 (28")
DN 750 (30")
DN 800 (32")
DN 900 (36")
DN 1000 (40")
(42")
(44")
DN 1200 (48")
DN 1400 (54")
DN 1500 (60")
DN 1600 (66")
DN 1800 (72")
DN 2000 (78")

2 D
2 R
2 Y
3 F
3 M
3 T
4 B
4 H
4 P
4 V
5 D
5 K
5 R
5 Y
6 F
6 P
6 Y
7 D
7 H
7 M
7 R
7 U
7 V
8 B
8 F
8 K
8 P
8 T
8 Y

Flange norm and pressure rating

EN 1092-1

PN 6 (DN 1400 ... 2000 (54" ... 78"))¹⁾
PN 10 (DN 200 ... 2000 (8" ... 78"))¹⁾
PN 16 (DN 65 ... 600 (2½" ... 24"))
PN 16, non-PED (DN 700 ... 2000 (28" ... 78"))
PN 40 (DN 25 ... 50 (1" ... 2"))

ANSI B16.5

class 150 (1" ... 24")

AWWA C-207

Class D (28" ... 78")¹⁾

AS 4087

PN 16 (DN 50 ... 1200 (2" ... 48"))

JIS

B 2220:2004 K10 (1" ... 24")

Flange material and coating

Carbon steel flanges ASTM A 105,
corrosion-resistant coating of category C4
Carbon steel flanges ASTM A 105, 300 µm
corrosion-resistant coating of category C4

Liner material

Ebonite Hard Rubber

Electrode material

Hastelloy

2

Selection and Ordering data

Article No.

Sensor SITRANS F M MAG 5100 W

7 ME 6 5 8 0 -

Hastelloy electrodes, carbon steel flanges,
Non EU water markets

Transmitter with display

Sensor for remote transmitter (Order transmitter separately)

MAG 6000, Polyamid, 11 ... 30 V DC/11 ... 24V AC
MAG 6000, Polyamid, 115 ... 230 V AC
MAG 5000, Polyamid, 11 ... 30 V DC/11 ... 24V AC
MAG 5000, Polyamid, 115 ... 230 V AC

Communication

No communication, add-on possible
HART
PROFIBUS PA Profile 3 (only MAG 6000)
PROFIBUS DP Profile 3 (only MAG 6000)
Modbus RTU/RS 485 (only MAG 6000)
FOUNDATION Fieldbus H1 (only MAG 6000)

Cable glands/terminal box

Metric: Polyamide terminal box or MAG 6000 I compact
½" NPT: Polyamide terminal box or MAG 6000 I compact

¹⁾ DN 1400 to DN 2000 (54" to 78") do not conform to PED or CRN.

A
H
J
K
L
A
B
F
G
E
J

1
2

Selection and Ordering data	Order code
Additional information	
Please add “-Z” to Article No. and specify Order code(s) and plain text.	
Certificates	
Pressure test certificate according to EN 10204-3.1	C01
Factory certificate according to EN 10204-2.2	C14
Factory certificate according to EN 10204-2.1	C15
Special calibration	
• 5-point calibration for DN 15 ... DN 200 ¹⁾	D01
• 5-point calibration for DN 250 ... DN 600 ¹⁾	D02
• 5-point calibration for DN 700 ... DN 1200 ¹⁾	D03
• 10-point calibration for DN 15 ... DN 200 ²⁾	D06
• 10-point calibration for DN 250 ... DN 600 ²⁾	D07
• 10-point calibration for DN 700 ... DN 1200 ²⁾	D08
• Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 15 ... DN 200	D11
• Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 250 ... DN 600	D12
• Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 700 ... DN 1200	D13
• 5-point, matched-pair calibration for DN 15 ... DN 200 ¹⁾	D15
• 5-point, matched-pair calibration for DN 250 ... DN 600 ¹⁾	D16
• 5-point, matched-pair calibration for DN 700 ... DN 1200 ¹⁾	D17
• 10-point, matched-pair calibration for DN 15 ... DN 200 ²⁾	D18
• 10-point, matched-pair calibration for DN 250 ... DN 600 ²⁾	D19
• 10-point, matched-pair calibration for DN 700 ... DN 1200 ²⁾	D20
Terminal blocks	
• Factory mounted terminal blocks	N02
Region/customer specific labels	
• Chinese label	W06
• KCC label (South Korea)	W28
Tag name plate, stainless (specify in plain text)	Y17
Tag name plate, plastic (self-adhesive)	Y18
Customer-specific transmitter setting	Y20
Sensor cables wired (specify Article No. for sensor cables and order cables separately)	Y40
Sensor cables wired and IP68 sealing (specify Article No. for sensor cables and cables cable separately)	Y41
Special version (specify in plain text)	Y99

¹⁾ 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

²⁾ Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

Operating instructions for SITRANS F M MAG 5100 W

Description	Article No.
• German	A5E03376527
• English	A5E03063678

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Accessories

Description	Article No.
Potting kit for IP68/ NEMA 6P sealing of sensor junction box	FDK:085U0220



MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer's site.

Communication module will be pre-mounted in the transmitter.

Please use online Product selector to get latest updates.

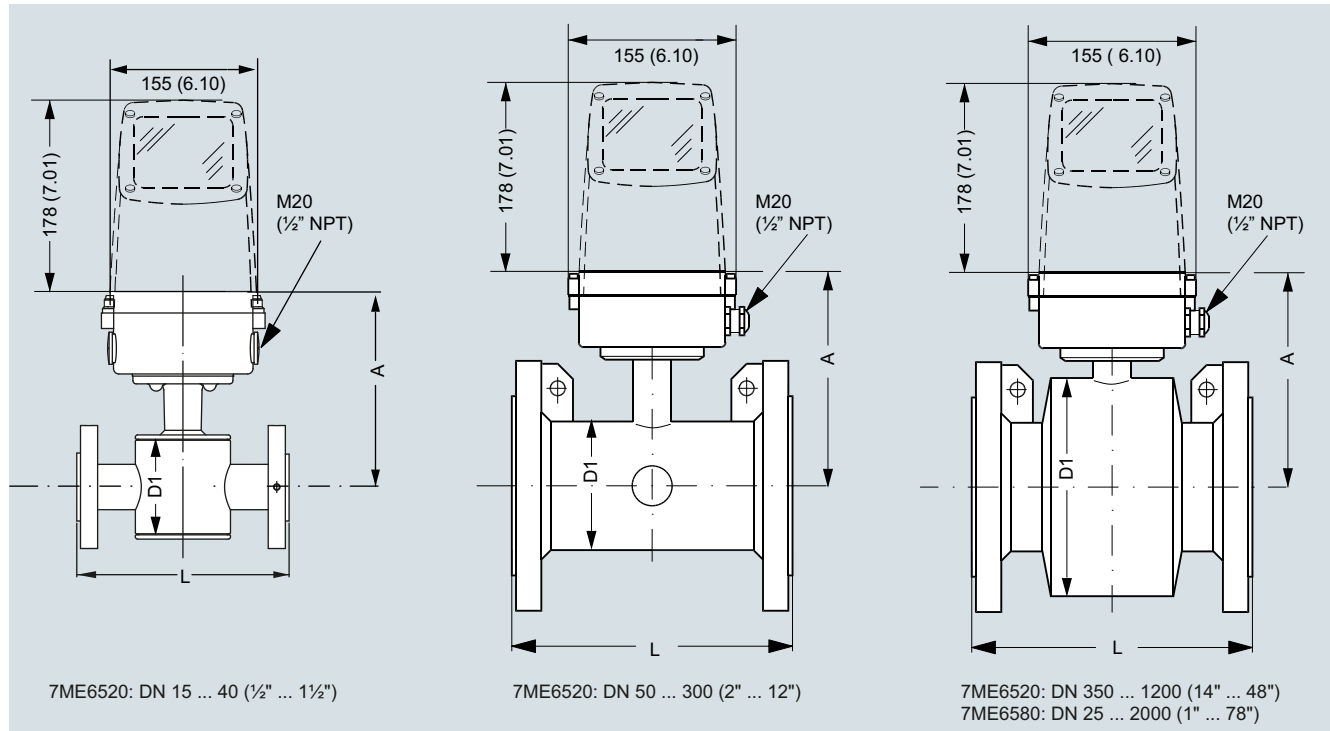
Product selector link: www.pia-portal.automation.siemens.com

Flow Measurement

SITRANS F M

Flow sensor MAG 5100 W

Dimensional drawings



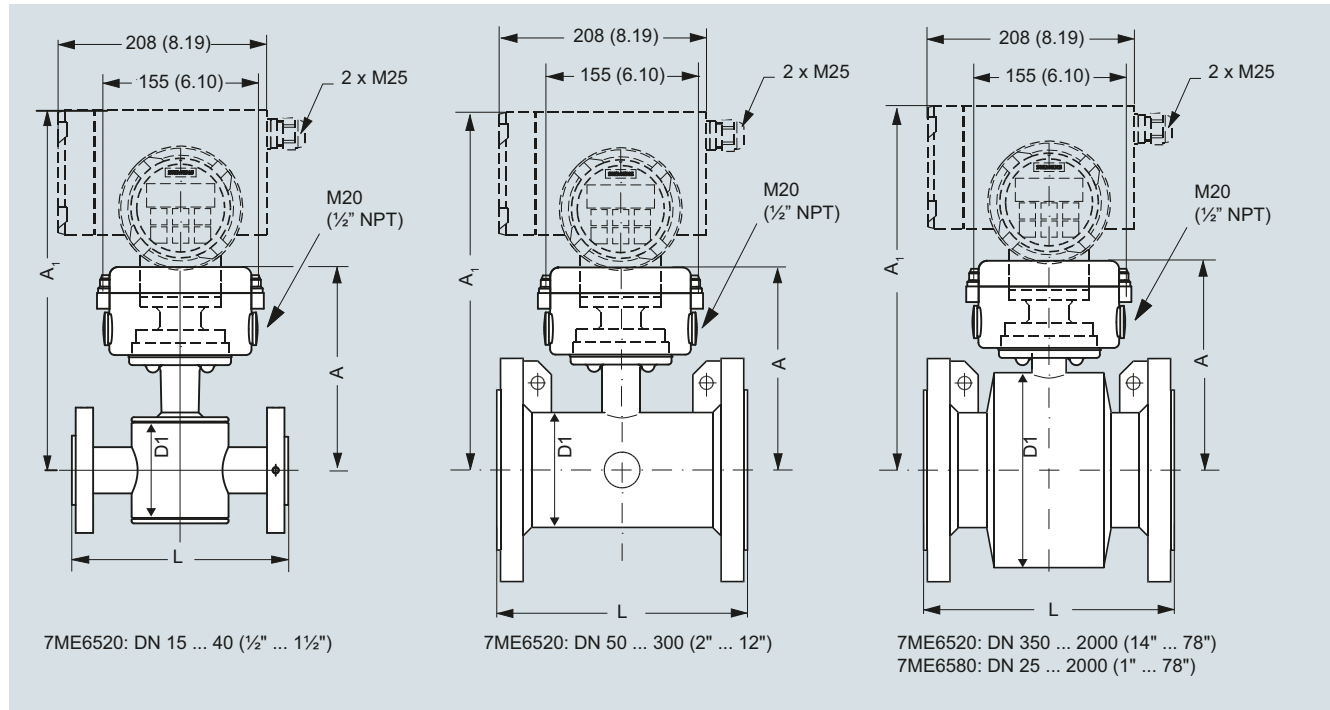
7ME6520 NBR or EPDM liner						7ME6580 Ebonite liner					
Nominal size A		D1				A		D1		L ¹⁾	
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
15	½	177	7.0	77	3.0	-	-	-	-	200	7.9
25	1	187	7.4	96	3.8	187	7.4	104	4.09	200	7.9
40	1½	202	8.0	127	5.0	197	7.8	124	4.88	200	7.9
50	2	188	7.4	76	3.0	205	8.1	139	5.47	200	7.9
65	2½	194	7.6	89	3.5	212	8.3	154	6.06	200	7.9
80	3	200	7.9	102	4.0	222	8.7	174	6.85	200	7.9
100	4	207	8.1	114	4.5	242	9.5	214	8.43	250	9.8
125	5	217	8.5	140	5.5	255	10.0	239	9.41	250	9.8
150	6	232	9.1	168	6.6	276	10.9	282	11.1	300	11.8
200	8	257	10.1	219	8.6	304	12.0	338	13.31	350	13.8
250	10	284	11.2	273	10.8	332	13.1	393	15.47	450	17.7
300	12	310	12.2	324	12.8	357	14.1	444	17.48	500	19.7
350	14	382	15.0	451	17.8	362	14.3	451	17.76	550	21.7
400	16	407	16.0	502	19.8	387	15.2	502	19.76	600	23.6
450	18	438	17.2	563	22.2	418	16.5	563	22.16	600	23.6
500	20	463	18.2	614	24.2	443	17.4	614	24.17	600	23.6
600	24	514	20.2	715	28.2	494	19.4	715	28.15	600	23.6
700	28	564	22.2	816	32.1	544	21.4	816	32.13	700	27.6
750	30	591	23.3	869	34.2	571	22.5	869	34.21	750	29.5
800	32	616	24.3	927	36.5	606	23.9	927	36.5	800	31.5
900	36	663	26.1	1032	40.6	653	25.7	1032	40.63	900	35.4
1000	40	714	28.1	1136	44.7	704	27.7	1136	44.72	1000	39.4
	42	714	28.1	1136	44.7	704	27.7	1136	44.72	1000	39.4
	44	765	30.1	1238	48.7	755	29.7	1238	48.74	1100	43.3
1200	48	820	32.3	1348	53.1	810	31.9	1348	53.07	1200	47.2
1400	54	-	-	-	-	925	36.4	1574	65.94	1400	55.1
1500	60	-	-	-	-	972	38.2	1672	65.83	1500	59.1
1600	66	-	-	-	-	1025	40.4	1774	75.39	1600	63
1800	72	-	-	-	-	1123	44.2	1974	77.72	1800	70.9
2000	78	-	-	-	-	1223	48.1	2174	85.59	2000	78.7

¹⁾ Tolerances on built-in length:

DN 15 to DN 200 (½" to 8"): +0/-3 mm (+0/-0.12"), DN 250 to DN 400 (10" to 16"): +0/-5 mm (+0/-0.20"),

DN 450 to DN 600 (18" to 24"): +5/-5 mm (+0.20/-0.20"), DN 700 to DN 2000 (28" to 78"): +10/-10 mm (+0.39/-0.39")

MAG 5100 W/6000 | Compact



7ME6520 NBR or EPDM liner								7ME6580 Ebonite liner								L ¹⁾	
Nominal size		A		A1		D1		A		A1		D1					
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]		
15	½	177	7.0	331	13.0	77	3.0	187	7.4	-	-	-	-	200	7.9		
25	1	187	7.4	341	13.4	96	3.8	187	7.4	341	13.4	104	4.09	200	7.9		
40	1½	202	8.0	356	14.0	127	5.0	197	7.8	351	13.8	124	4.88	200	7.9		
50	2	188	7.4	342	13.5	76	3.0	205	8.1	359	14.1	139	5.47	200	7.9		
65	2½	194	7.6	348	13.7	89	3.5	212	8.3	366	14.4	154	6.06	200	7.9		
80	3	200	7.9	354	14.0	102	4.0	222	8.7	376	14.8	174	6.85	200	7.9		
100	4	207	8.1	361	14.2	114	4.5	242	9.5	396	15.6	214	8.43	250	9.8		
125	5	217	8.5	371	14.6	140	5.5	255	10.0	409	16.1	239	9.41	250	9.8		
150	6	232	9.1	386	15.2	168	6.6	276	10.9	430	16.9	282	11.1	300	11.8		
200	8	257	10.1	411	16.2	219	8.6	304	12.0	458	18.0	338	13.31	350	13.8		
250	10	284	11.2	438	17.2	273	10.8	332	13.1	486	19.1	393	15.47	450	17.7		
300	12	310	12.2	464	18.3	324	12.8	357	14.1	511	20.1	444	17.48	500	19.7		
350	14	382	15.0	536	21.1	451	17.8	362	14.3	516	20.3	451	17.76	550	21.7		
400	16	407	16.0	561	22.1	502	19.8	387	15.2	541	21.3	502	19.76	600	23.6		
450	18	438	17.2	592	23.3	563	22.2	418	16.5	572	22.5	563	22.16	600	23.6		
500	20	463	18.2	617	24.3	614	24.2	443	17.4	597	23.5	614	24.17	600	23.6		
600	24	514	20.2	668	26.3	715	28.2	494	19.4	648	25.5	715	28.15	600	23.6		
700	28	564	22.2	718	28.3	816	32.1	544	21.4	698	27.5	816	32.13	700	27.6		
750	30	591	23.3	745	29.3	869	34.2	571	22.5	725	28.5	869	34.21	750	29.5		
800	32	616	24.3	770	30.3	927	36.5	606	23.9	760	29.9	927	36.5	800	31.5		
900	36	663	26.1	817	32.2	1032	40.6	653	25.7	807	31.8	1032	40.63	900	35.4		
1000	40	714	28.1	868	34.2	1136	44.7	704	27.7	858	33.8	1136	44.72	1000	39.4		
	42	714	28.1	868	34.2	1136	44.7	704	27.7	858	33.8	1136	44.72	1000	39.4		
	44	765	30.1	919	36.2	1238	48.7	755	29.7	904	35.6	1238	48.74	1100	43.3		
1200	48	820	32.3	974	38.3	1348	53.1	810	31.9	964	38.0	1348	53.07	1200	47.2		
1400	54	-	-	-	-	-	-	925	36.4	1079	42.5	1574	61.97	1400	55.1		
1500	60	-	-	-	-	-	-	972	38.2	1126	44.3	1672	65.83	1500	59.1		
1600	66	-	-	-	-	-	-	1025	40.4	1179	46.4	1774	69.84	1600	63.0		
1800	72	-	-	-	-	-	-	1123	44.2	1277	50.3	1974	77.72	1800	70.9		
2000	78	-	-	-	-	-	-	1223	48.1	1377	54.2	2174	85.59	2000	78.7		

1) Tolerances on built-in length:

DN 15 to DN 200 (½" to 8"): +0/-3 mm (+0/-0.12"), DN 250 to DN 400 (10" to 16"): +0/-5 mm (+0/-0.20"),

DN 450 to DN 600 (18" to 24"): +5/-5 mm (+0.20/-0.20"), DN 700 to DN 2000 (28" to 78"): +10/-10 mm (+0.39/-0.39")

Flow Measurement

SITRANS F M

Flow sensor MAG 5100 W

Weight

Nominal size		7ME6520 NBR or EPDM liner										7ME6580 Ebonite liner	
		PN 10		PN 16		PN 40		Class 150/AWWA		AS		PN 16	
[mm]	[inch]	[kg]	[lb]	[kg]	[lb]	[kg]	[lb]	[kg]	[lb]	[kg]	[lb]	[kg]	[lb]
15	½	-	-	-	-	4	9	4	9	4	9	5	11
25	1	-	-	-	-	6	12	5	11	4	9	5	11
40	1½	-	-	-	-	8	18	7	15	7	15	8	17
50	2	-	-	9	20	-	-	8	20	9	20	9	20
65	2½	-	-	10.7	24	-	-	11	24	10.7	24	11	24
80	3	-	-	11.6	26	-	-	13	28	11.6	26	12	26
100	4	-	-	15.2	33	-	-	19	41	15.2	33	16	35
125	5	-	-	20.4	45	-	-	24	52	-	-	19	42
150	6	-	-	26	57	-	-	29	64	26	57	27	60
200	8	48	106	48	106	-	-	56	124	48	106	40	88
250	10	64	141	69	152	-	-	79	174	69	152	60	132
300	12	76	167	86	189	-	-	110	243	86	189	80	176
350	14	104	229	125	274	-	-	139	307	115	254	110	242
400	16	119	263	143	314	-	-	159	351	125	277	125	275
450	18	136	299	173	381	-	-	182	400	141	311	175	385
500	20	163	359	223	491	-	-	225	495	189	418	200	440
600	24	236	519	338	744	-	-	320	704	301	664	287	633
700	28	270	595	314	692	-	-	273	602	320	704	330	728
750	30	-	-	-	-	-	-	329	725	-	-	360	794
800	32	346	763	396	873	-	-	365	804	428	944	450	992
900	36	432	951	474	1043	-	-	495	1089	619	1362	530	1168
1000	40	513	1130	600	1321	-	-	583	1282	636	1399	660	1455
	42	-	-	-	-	-	-	687	1512	-	-	-	-
	44	-	-	-	-	-	-	763	1680	-	-	1140	2513
1200	48	643	1415	885	1948	-	-	861	1896	813	1789	1180	2601
1400	54	1592	3510	-	-	-	-	-	-	-	-	1600	3528
1500	60	-	-	-	-	-	-	-	-	-	-	2460	5423
1600	66	2110	4652	-	-	-	-	-	-	-	-	2525	5566
1800	72	2560	5644	-	-	-	-	-	-	-	-	2930	6460
2000	78	3640	8025	-	-	-	-	-	-	-	-	3665	8080

With transmitter MAG 5000 and MAG 6000 compact, weight is increased by approximately 0.8 kg (1.8 lb), with MAG 6000 I, weight is increased by 5.5 kg (12.1 lb).

Overview



SITRANS F M TRANSMAG 2 with the SITRANS F M 911/E sensor is a pulsed alternating field magnetic flowmeter where the magnetic field strength is much higher than conventional DC pulsed magnetic flowmeters.

Benefits

- Wide range of sizes DN 15 to DN 1000 (½" to 40")
- Broad range of liner and electrode materials for extreme process medias
- Fully welded construction provides a ruggedness that suits the toughest applications and environments.
- Automatic reading of SmartPLUG for easy commissioning
- Simple menu operation with two-line display
- Comprehensive self-diagnostic with selfmonitoring and internal simulation

Application

The main applications of the SITRANS F M transmitter TRANSMAG 2 can be found in the following sectors:

- Pulp and Paper industry
- Mining industry

The pulse alternating field technology is ideal for difficult applications like:

- High concentrated paper stock > 3 %
- Heavy mining slurries up to 70 % solid concentration
- Mining slurries with magnetic particles.
- Low conductive medias $\geq 1 \mu\text{S}/\text{cm}$ ($0.1 \mu\text{S}/\text{cm}$ depending on medium)

Design

- Available for remote mounting
- PROFIBUS PA (profile 2.0) / HART communication
- Analog output and digital outputs for pulses, device status, limits, flow direction, frequency output

Mode of operation

The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

Function

The TRANSMAG 2 is a microprocessor-based transmitter with a built-in alphanumeric display in several languages. The transmitters evaluate the signals from the associated electromagnetic sensors and also fulfill the task of a power supply unit which provides the magnet coils with a constant current.

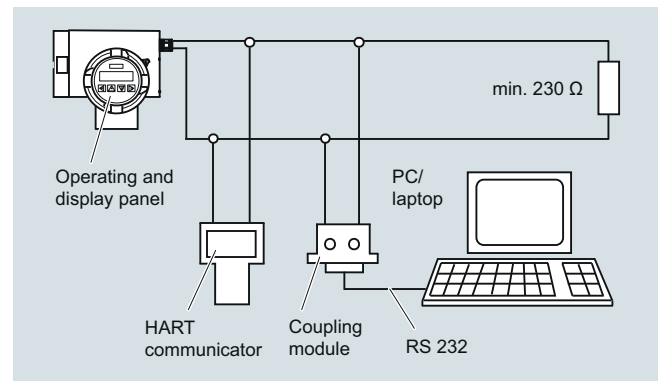
The magnetic flux density in the sensor is additionally monitored by reference coils.

Further information on connection, mode of operation and installation can be found in the data sheets for the sensors.

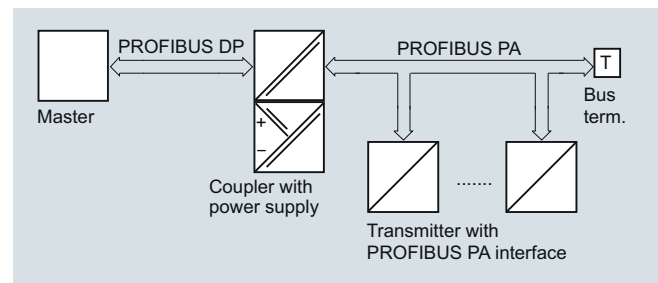
Displays and keypad

Operation of the transmitter can be carried out using:

- Keypad and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS PA communication



HART communication



PROFIBUS PA communication

Flow Measurement

SITRANS F M

Transmitter TRANSMAG 2 with sensor 911/E

Technical specifications

Transmitter TRANSMAG 2

Mode of operation and design

Measuring principle	Electromagnetic with pulsed alternating field (PAC)
Magnetic field excitation	Automatic power supply synchronization
- 50 Hz AC power supply	Bipolar (16.7 Hz) Bipolar with prepulse (10 Hz) Unipolar (8.33 Hz)
- 60 Hz AC power supply	Bipolar (20 Hz) Bipolar with prepulse (12 Hz) Unipolar (10 Hz)

Accuracy under reference conditions

Measuring tolerance of pulse output	
• With $v > 0.25$ m/s (0.82 ft/s)	$\leq \pm 0.5$ % of measured value ± 1.2 mm/s (0.05 inch/s)
• With $v < 0.25$ m/s (0.82 ft/s)	± 2.5 mm/s (0.1 inch/s)
Measuring tolerance of analog output	As pulse output plus ± 0.1 % conversion error ± 20 μ A
Repeatability	0.2 % of measured value

Reference conditions

• Process temperature	25 °C \pm 5 °C (77 °F \pm 9 °F)
• Ambient temperature	25 °C \pm 5 °C (77 °F \pm 9 °F)
• Warm-up time	Min. 30 min
• Installation conditions	Inlet pipe section $\geq 10 \times$ DN Outlet pipe section $\geq 5 \times$ DN Installed centered in pipe
• Medium	Water without gaseous or solid components

Calibration

Standard production calibration, calibration report shipped with sensor	2 x 20 %, 2 x 50 % and 2 x 100 %
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Output

Electrical isolation	Outputs electrically isolated from one another and from the power supply, max. 60 V permissible against PE/equipotential bonding
----------------------	--

Current output

• Signal	0/4 ... 20 mA (7ME5034-0.... or 7ME5034-2....)
- Upper limit	0/4 ... 20 mA, selectable
- Failure	20 ... 22.5 mA, optional 3.6; 20 or 24 mA
• Load	
- Output	max. 600 Ω , max. load voltage 15 V DC
- For HART communication	≥ 250 Ω

Communication

• Protocol	Via analog output with PC coupling module or HART communicator
• Digital output	HART, version 5.1

Digital output

Signal	
• Output	Configurable as active or passive signals
- Active signal	24 V DC, ≤ 24 mA, $R_i = 170$ Ω
- Passive signal	Open collector, max. 30 V DC, 200 mA

Output configuration

• Pulse	
- Pulse significance	≤ 5000 pulses/s
- Pulse width	≥ 0.1 ms
• Limit frequency	≤ 10000 Hz
• Limits	Limits for flow and quantity, flow direction, alarm

Digital output 2 (relay)

(only 7ME5034-0....)

Relay

• Rating	NC or NO function Max. 5 W, max. 50 V AC/DC, max. 200 mA
• Output configuration	Limits for flow and quantity, flow direction, alarm

Digital input (optional to digital output 2)

(only 7ME5034-2....)

• Input function configurable as high-active or low-active	Set measured value to zero or reset totalizer
• Signal voltage	Max. 30 V DC, $R_i = 3$ k Ω : High level: +11 ... +30 V DC Low level: -30 ... +5 V DC

For PROFIBUS devices

PROFIBUS PA (for PROFIBUS-devices 7ME5034-1....)

• Communication	Layer 1 and 2 according to PROFIBUS PA Transmission according to IEC 1158-2 Layer 7 (protocol layer) according to PROFIBUS PA and DP V1 (EN 50170) Device class B, device profile 2.0 Max. 4 simultaneous C2 connections
• Bus voltage	9 ... 32 V DC permissible
• Current consumption from bus	10 mA; limited to ≤ 15 mA in event of fault by electrical current limitation

Rated operating conditions

Installation conditions	See also sensor
Ambient temperature	
• Operation	-20 ... +60 °C (-4 ... +140 °F)
• Display module	0 ... 50 °C (32 ... 122 °F)
Storage	-25 ... +80 °C (-13 ... +176 °F)
Degree of protection	IP67/NEMA 4X
Electromagnetic compatibility (EMC)	
• Emitted interference	To IEC/EN 61326 for use in industrial areas
• Noise immunity	To IEC/EN 61326 for use in industrial areas

Transmitter TRANSMAG 2 with sensor 911/E

Medium conditions	
• Process temperature	-20 ... +150 °C (-4 ... 302 °F) depending on the liner
Minimum conductivity of medium	
• With SITRANS F M 911/E sensors	≥ 1 µS/cm (0.1 µS/cm depending on medium)
Design	
Weight of transmitter	4.4 kg (9.7 lb)
Remote version	Transmitter must be connected to sensor using shielded cable
Maximum cable length	100 m (328 ft)
Housing	Die-cast aluminum, painted
Displays and keypad	
General display	LCD, backlit, two lines with 16 characters each
Multi-display for	Flow, totalizer, flow velocity
Keypad	4 keys for entering parameters
Power supply	
corresponding to rating plate	
• AC supply	100 ... 250 V AC ± 15 %, 47 ... 63 Hz
• Power consumption	Approx. 120 ... 630 VA, depending on sensor
Line fuse	100 ... 230 V AC: T1.6A
Magnet current fuse	F5A/250 V

Sensor cables between sensor and transmitter

Sufficient shielding must be provided, as well as fixed routing of the signal cables (electrode and coil cable).

Signal cables must be routed free of vibration, and protected against strong magnetic and stray fields. In case of doubt, the sensor cables must be routed in grounded steel conduit. The cable length between the sensor and transmitter must not exceed 100 m (328 ft).

Selection and Ordering data	Article No.
SITRANS F M Transmitter TRANSMAG 2 Remote with standard wall mounting bracket, local display, die cast aluminum	7ME5034-AA11-AA0
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Output/communication	
4 ... 20 mA with HART	0
PROFIBUS PA	1
4 ... 20 mA with HART and digital input	2
Cable glands	
M20 x 1.5	1
½" NPT	2

Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Special mounting bracket for wall and pipeline installation	A02
Transmitter setting for parameter "TAG number" (specify in plain text, max. 8 characters)	Y15
Transmitter setting for parameter "TAG descriptor" (specify in plain text, max. 16 characters)	Y16
Tag name plate, stainless steel (specify in plain text)	Y17
Special version (specify in plain text)	Y99

Operating instructions for SITRANS F M TRANSMAG 2

Description	Article No.
• English	A5E00102775
• German	A5E00102774




All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Flow Measurement









SITRANS F M

Transmitter TRANSMAG 2 with sensor 911/E

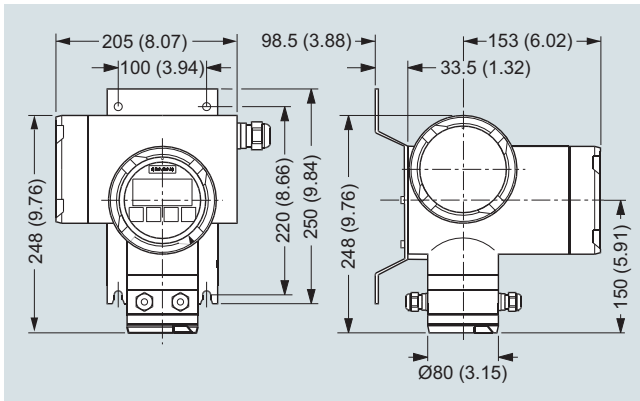
Accessories

Description	Article No.	
Standard wall-mounting bracket, stainless steel AISI 316L/1.4404	7ME5933-0AC04	
Special wall-mounting bracket, BI 2.5 DIN 59382 X6Cr17	7ME5933-0AC05	
Potting kit for IP68/ NEMA 6P sealing of sensor junction box	FDK:085U0220	

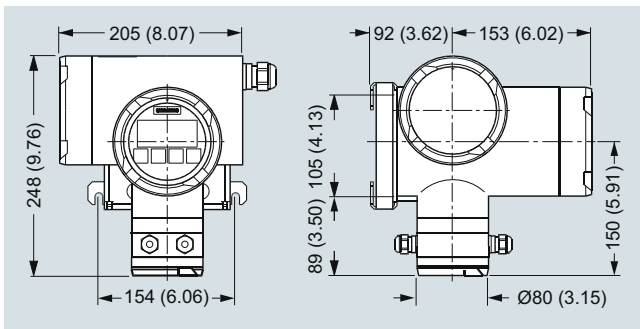
Spare parts

Description	Article No.	
Display unit	7ME5933-0AC00	
Display lid (Ex) in die-cast aluminum, with corrosion resistant coating (min. 60 µm)	7ME5933-0AC01	
Blind lid for sensor cables connection compartment (only remote version) in die-cast aluminum, with corrosion resistant coating (min. 60 µm) incl. O-ring seal	7ME5933-0AC02	
Blind lid (mains supply, input/outputs) in die-cast aluminum, with corrosion resistant coating (min. 60 µm)	7ME5933-0AC03	
Safety clamp for electronic cover with glass plate (7ME5933-0AC01)	7ME5933-0AC06	
M20 cable gland set for power and output connection, gray PA plastic, 2 pcs. • cables Ø 6 ... 12 mm (0.24" ... 0.47") • -40 ... +100 °C (-40 ... +212 °F)	A5E02246350	
1/2" NPT cable gland set for power and output connection, gray PA plastic, 2 pcs. • cables Ø 6 ... 12 mm (0.24" ... 0.47") • -40 ... +100 °C (-40 ... +212 °F)	A5E02246396	
M16 x 1.5 cable gland set for sensor connection, brass chrome, 2 pcs. and 2 pcs. blind • cables Ø 5 ... 9 mm (0.20" ... 0.35") • -20 ... +105°C (-4 ... +221 °F)	A5E02246369	

Dimensional drawings

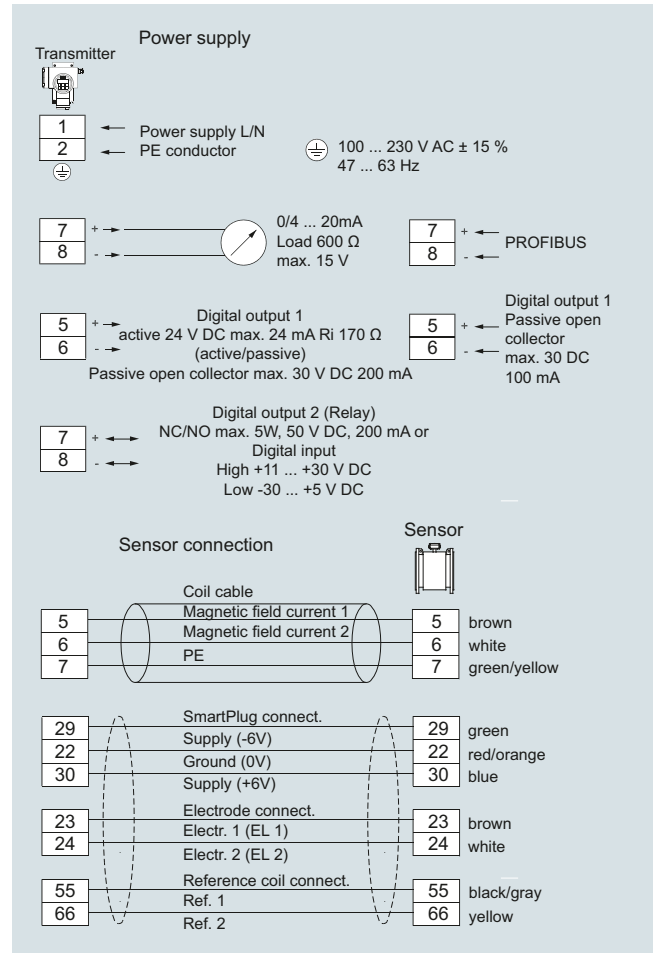


SITRANS F M transmitter TRANSMAG 2 with wall-mounting bracket, dimensions in mm (inch)



SITRANS F M transmitter TRANSMAG 2 with special wall-mounting bracket, dimensions in mm (inch)

Schematics



SITRANS F M transmitter TRANSMAG 2, connection diagram

Flow Measurement

SITRANS F M

Transmitter TRANSMAG 2 with sensor 911/E

911/E sensor

Process connection

Nominal diameters	DN 15 ... 1000 (½" ... 40")
Metering tube connections	EN 1092-1, ANSI B16.5, AWWA C-207 and JIS 10 K

Rated operating conditions

Installation conditions

• Soft rubber liner	0 ... 70 °C (32 ... 158 °F)
• Hard rubber liner	0 ... 90 °C (32 ... 194 °F) Option: 100 °C (212 °F)
• PTFE liner	<ul style="list-style-type: none"> • -20 ... +150 °C (-4 ... +302 °F) at 25 bar (363 psi) • -20 ... +100 °C (-4 ... +212 °F) at 40 bar (580 psi)
• Linatex (rubber) liner	-40 ... +70 °C (-40 ... +158 °F) (for temperatures below -20 °C (-4 °F) AISI 316L/1.4404 flanges must be used)
• Novolak liner	130 °C (266 °F) at 40 bar (580 psi)
Degree of protection	IP67/NEMA 4X Optional IP68/NEMA 6

Medium conditions

Maximum flow velocity	12 m/s (39.4 ft/s)
Full scale value of flow velocity	0.15 ... 12 m/s (0.49 ... 39.4 ft/s)

Design

Weight	See dimensional drawings
Flange and housing material	Carbon steel ASTM A 105, with corrosion resistant coating Corrosivity category C3 according to ISO 12944-2 or AISI 316L/1.4404 flanges and carbon steel housing ASTM A 105, with corrosion resistant coating Corrosivity category C3, according to ISO 12944-2
Measuring pipe material	Stainless steel AISI 304 or higher
Electrode material	<ul style="list-style-type: none"> • AISI 316/1.4571 • Hastelloy C276/2.4819 • Platinum • Titanium • Tantalum
Grounding electrode material	Defined via the Order code

Protection ring



Function	To protect the edges of liners from abrasion (e.g. gravel, sand etc.). Used mainly with soft rubber liners and for PTFE liners at high temperatures from 100 to 150 °C (212 to 302 °F).
Contact with medium	Yes, please always check resistance to measured medium.
Material	Stainless steel AISI 316/1.4571, optionally Hastelloy C276/2.4819
Material thickness	The overall length of the sensor is increased by <ul style="list-style-type: none"> • 6 mm for DN 15 to DN 150 (0.24" for ½" to 6") or • 10 mm for DN 200 to DN 600 (0.4" for 8" to 24")
Standard	Optional for all liners. Must be ordered separately.
Article No.	7ME5942-...

Grounding ring



Function	Electrical reference and grounding of the medium. Required if the pipelines are not electrically conducting or are lined (plastic pipelines, concrete pipelines etc.). All grounding rings must be connected to the grounding screw present on the sensor.
Contact with medium	Yes, please always check resistance to measured medium.
Material	Stainless steel AISI 316/1.4571 or Hastelloy C4/2.4610
Material thickness	The overall length of the sensor is increased by 2 mm (0.08") per grounding ring.
Standard	Optional for all liners. Required between the medium and sensor for equipotential bonding between non-conducting pipelines or lined pipelines.
Article No.	7ME5943-...

Important:

The rings must be ordered together with the sensor. Gaskets are not included. In case of replacement please include the sensor MLFB code on the order.

Notes on pressure equipment directive

The devices are designed for liquids of danger group "Gases of fluid group 1". The categories differ according to the version, and are listed in the table below.


For further information on the PED standard and requirements, see page 10/15.

Classification according to pressure equipment directive (PED 2014/68/EU)					
Nominal diameter		Nominal pressure		Permissible media	Category
DN	(inch)	PN	(MWP psi)		
15 ... 25	(½" ... 1")	40	(580)	Gases fluid group 1 and liquids fluid group 1	Article 4.3
200 ... 300	(8" ... 12")	10	(145)	Gases fluid group 1 and liquids fluid group 1	II
65 ... 250	(2½" ... 10")	16	(232)	Gases fluid group 1 and liquids fluid group 1	II
40 ... 100	(1½" ... 4")	40	(580)	Gases fluid group 1 and liquids fluid group 1	II
350 ... 1000	(14" ... 40")	10	(145)	Gases fluid group 1 and liquids fluid group 1	III
300 ... 1000	(12" ... 40")	16	(232)	Gases fluid group 1 and liquids fluid group 1	III
200 ... 600	(8" ... 24")	25	(363)	Gases fluid group 1 and liquids fluid group 1	III
125 ... 600	(5" ... 24")	40	(580)	Gases fluid group 1 and liquids fluid group 1	III


Flow Measurement

SITRANS F M

Transmitter TRANSMAG 2 with sensor 911/E

Selection and Ordering data	Article No.
Flowsensor SITRANS F M 911/E	7ME5610 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Nominal diameter	
DN 15 (½")	1 V
DN 25 (1")	2 D
DN 40 (1½")	2 R
DN 50 (2")	2 Y
DN 65 (2½")	3 F
DN 80 (3")	3 M
DN 100 (4")	3 T
DN 125 (5")	4 B
DN 150 (6")	4 H
DN 200 (8")	4 P
DN 250 (10")	4 V
DN 300 (12")	5 D
DN 350 (14")	5 K
DN 400 (16")	5 R
DN 450 (18")	5 Y
DN 500 (20")	6 F
DN 600 (24")	6 P
DN 700 (28")	6 Y
DN 800 (32")	7 H
DN 900 (36")	7 M
DN 1000 (40")	7 R
Flange norm and pressure rating	
EN 1092-1, PN 10 (DN 200 ... 1000 (8" ... 40"))	B
EN 1092-1, PN 16 (DN 65 ... 1000 (2½" ... 40"))	C
EN 1092-1, PN 25 (DN 200 ... 1000 (8" ... 40"))	E
EN 1092-1, PN 40 (DN 15 ... 1000 (½" ... 40"))	F
ANSI B16.5, Class 150 (½" ... 24") ¹⁾	J
ANSI B16.5, Class 300 (½" ... 24") ²⁾	K
AWWA C-207 Class D (28" ... 40")	L
JIS 10 K (½" ... 24")	R
Flange material	
Mid steel flanges 1.0460/1.0570	1
Stainless steel flanges, AISI 316L/1.4404	3
Liner material	
Soft rubber (DN 25 to DN 1000)	1
PTFE (DN 15 to DN 600)	3
Hardrubber (DN 15 to DN 1000)	4
Linatex (DN 25 to DN 1000)	5
Novolak (sealing material FFKM) (DN 50 to DN 1000)	6
Electrode material	
AISI 316Ti/1.4571	1
Hastelloy C276/2.4819	2
Platinum	3
Titanium	4
Tantalum	5
Cable glands/terminal box	
Metric: Polyamide terminal box	1
½" NPT: Polyamide terminal box	2
Metric: Stainless steel terminal box	3
½" NPT: Stainless steel terminal box	4

Selection and Ordering data	Order Code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Two grounding electrodes made of stainless steel AISI 316Ti/1.4571	A02
Two grounding electrodes made of Hastelloy C276/2.4819	A04
Two grounding electrodes made of Platinum	A05
Two grounding electrodes made of Titanium	A06
Two grounding electrodes made of Tantalum	A07
Factory certificate to EN 10204-2.2	C14
Material certificate according to EN 10204-3.1	C16
Power supply 110 V/60 Hz	P01
Flow range setting: Specify upper flow range value	Y01
Pulse output setting: Specify pulse value (1 pulse/unit)	Y02
Silicon-free version	Y04
Tag name plate, stainless steel (specify in plain text)	Y17
Special version (specify in plain text)	Y99
1) 20 °C (68 °F), max. 19.6 bar (285 psi) for steel flanges and max. 15.9 bar (231 psi) for stainless steel flanges	
2) 20 °C (68 °F), max. 51.1 bar (741 psi) for steel flanges and max. 41.4 bar (600 psi) for stainless steel flanges	

Selection and Ordering data	Article No.	Order code
SITRANS F M TRANSMAG 2 and sensor 911/E	7ME5930 -	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Cable		
Cable kit for sensor 911/E with alternating field, Magnet current cable 3 x 1.0 mm ² (3 x 0.0016 inch ²), electrode/reference cable 7 x 0.5 mm ² (7 x 0.0008 inch ²) with shield PVC		
• Length: 5 m (16.4 ft)	B	
• Length: 10 m (32.8 ft)	C	
• Length: 20 m (65.6 ft)	D	
• Length: 30 m (98.4 ft)	E	
• Length: 40 m (131 ft)	F	
• Length: 50 m (164 ft)	G	
• Length: 60 m (197 ft)	H	
• Length: 80 m (260 ft)	J	
• Length: 100 m (328 ft)	K	
• Other length (specify in plain text)	Z	J 1 Y

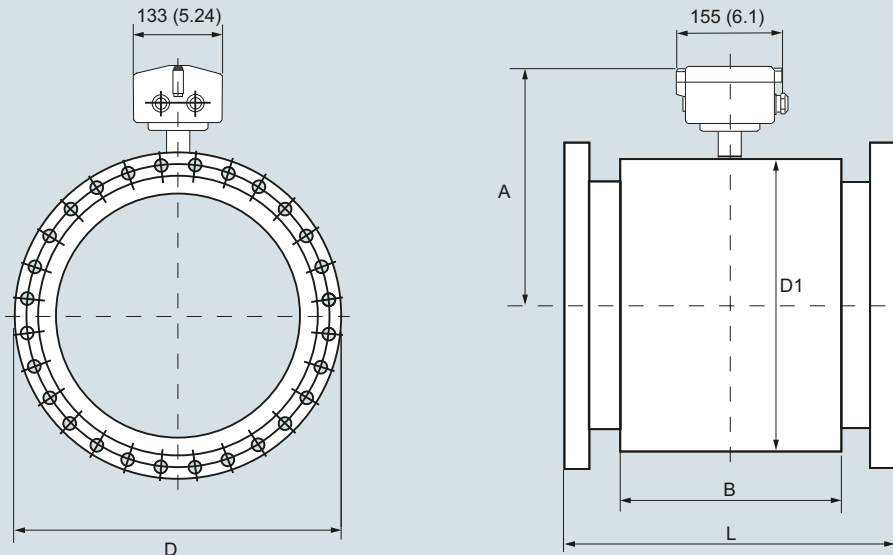
Selection and Ordering data		Article No.
SITRANS F M electromagnetic flowmeter		
Protection ring for 911/E sensor (2 pcs.)	7 ME 5 9 4 2 -	
Grounding ring for 911/E sensor (1 pc.)	7 ME 5 9 4 3 -	
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Nominal diameter		
DN 15 (½")		1 V
DN 25 (1")		2 D
DN 40 (1½")		2 R
DN 50 (2")		2 Y
DN 65 (2½")		3 F
DN 80 (3")		3 M
DN 100 (4")		3 T
DN 125 (5")		4 B
DN 150 (6")		4 H
DN 200 (8")		4 P
DN 250 (10")		4 V
DN 300 (12")		5 D
DN 350 (14")		5 K
DN 400 (16")		5 R
DN 450 (18")		5 Y
DN 500 (20")		6 F
DN 600 (24")		6 P
DN 700 (28")		6 Y
DN 800 (32")		7 H
DN 900 (36")		7 M
DN 1000 (40")		7 R
Flange design		
EN 1092-1, PN10		B
EN 1092-1, PN16		C
EN 1092-1, PN25		E
EN 1092-1, PN40		F
AISI B16.5, class 150		J
AISI B16.5, class 300		K
AWWA C-207, class D		L
JIS B2220, 10K		R
Material		
Stainless steel AISI 316/1.4571		1
Hastelloy C4/2.4610		2
Liner		
Soft rubber		1
PTFE		3
Hard rubber		4
Linatex		5
Novolak		6

Flow Measurement

SITRANS F M

Transmitter TRANSMAG 2 with sensor 911/E

Dimensional drawings



SITRANS F M flow sensor 911/E, remote version, dimensions in mm (inch)

Built-in length 911/E [in mm and inch]

Nominal diameter	DN 15 ½"	DN 25 1"	DN 40 1 ½"	DN 50 2"	DN 65 2 ½"	DN 80 3"	DN 100 4"	DN 125 5"	DN 150 6"	DN 200 8"	DN 250 10"
Built-in length L ¹⁾											
Hard rubber version	270 (10.63)		280 (11.02)		330 (12.99)		340 (13.39)		370 (14.57)	410 (16.14)	470 (18.50)
Linatex/soft rubber version	270 (10.63)		280 (11.02)		330 (12.99)		340 (13.39)		370 (14.57)	410 (16.14)	470 (18.50)
PTFE-liner without protection rings	270 (10.63)		280 (11.02)		330 (12.99)		340 (13.39)		370 (14.57)	410 (16.14)	470 (18.50)
Novolak-version	-		275 (10.83)		325 (12.79)	335 (13.19)	333 (13.11)		362 (14.25)	401 (15.79)	460 (18.11)
Dimensions of sensor housing											
Housing width B	170 (6.69)									240 (9.45)	
Height A	206 (8.11)		222 (8.74)	229 (9.02)	262 (10.32)	274 (10.79)	286 (11.26)	299 (11.78)		334 (13.15)	358 (14.10)
Housing diameter D ₁	135 (5.35)		167 (6.58)	182 (7.17)	247 (9.73)	272 (10.71)	296 (11.65)	322 (12.68)		392 (15.43)	440 (17.32)
Weight of PN16 version in kg (MWP 232 psi version in lb) approx.	8.0 (17.64)	8.5 (18.74)	11.5 (25.35)	25.0 (55.12)	26 (57.32)	27 (59.53)	28 (61.73)	34 (74.95)	38 (83.78)	68 (149.9)	81 (178.6)
Nominal diameter	DN 300 12"	DN 350 14"	DN 400 16"	DN 450 18"	DN 500 20"	DN 600 24"	DN 700 28"	DN 750 30"	DN 800 32"	DN 900 36"	DN 1000 40"
Built-in length L ¹⁾											
Hard rubber version	500 (19.68)	550 (21.65)	600 (23.62)	650 (25.59)	650 (25.59)	780 (30.71)	910 (35.83)		1040 (40.95)	1170 (46.06)	1300 (51.18)
Linatex/soft rubber version	500 (19.68)	550 (21.65)	600 (23.62)	660 (25.98)	650 (25.59)	780 (30.71)					
PTFE-liner without protection rings	500 (19.68)	550 (21.65)	600 (23.62)	660 (25.98)	650 (25.59)	780 (30.71)					
Novolak-version	489 (19.25)	538 (21.18)	592 (23.31)	638 (25.12)	638 (25.12)	772 (30.39)	903 (35.55)		1033 (40.63)	1163 (45.79)	1293 (50.91)
Dimensions of sensor housing											
Housing width B	240 (9.45)	225 (8.86)	250 (9.84)	270 (10.63)	300 (11.81)	360 (14.17)	420 (16.54)		500 (19.69)	560 (22.05)	620 (24.41)
Height A	383 (15.08)	375 (14.76)	400 (15.75)	433 (17.05)	453 (17.84)	505 (19.88)	558 (21.97)	590 (23.23)	608 (23.94)	658 (25.91)	713 (28.07)
Housing diameter D ₁	490 (19.29)	474 (18.66)	524 (20.63)	591 (23.26)	629 (24.76)	734 (28.90)	839 (33.03)	904 (35.59)	939 (36.97)	1039 (40.91)	1150 (45.28)
Weight of PN10 Version in kg (MWP 145 psi version in lb) approx.	95 (209.4)	118 (260.2)	161 (354.9)	185 (407.9)	233 (513.7)	401 (884.1)	420 (925.9)	450 (992.1)	500 (1102.3)	560 (1234.6)	620 (1366.9)

¹⁾ Tolerance for built-in length: L + 0.0/-4.0 mm (+0.00/-0.157 inch)

With protection rings for > DN25 + 6.0 mm, > DN200 + 10.0 mm (> 1" + 0.236 inch, > 8" + 0.394 inch)

Overview



MAG 8000 is a comprehensive meter which intelligent information and high performance measurement as well as the easy to install concept take cost of ownership and customer service to a new level for water meter.

Benefits

Easy to install

- Compact or remote solution with factory mounted cable and customer setting from factory
- IP68/NEMA 6P enclosure. Sensor can be buried
- Flexible power supply - internal or external battery pack or mains power supply with battery back-up possibilities
- Superior measurement
- Down to 0.2 % maximum uncertainty
- OIML R 49 type approval
- PTB K7.2
- FM Fire Service Approval
- Bi-directional measurement

Long lasting performance/Low cost of Ownership

- No moving parts means less wear and tear
- Up to 6 to 10 years maintenance-free operation in typical revenue application
- Robust construction built for the application

Intelligent information, easy to access

- Embedded self-testing and alarm/fault detection feature
- Internal data logger
- Advanced statistics and diagnostics
- Various Add-on communication modules

Application

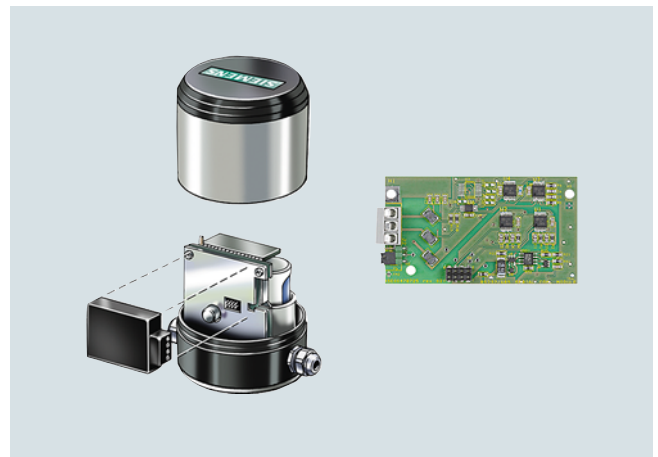
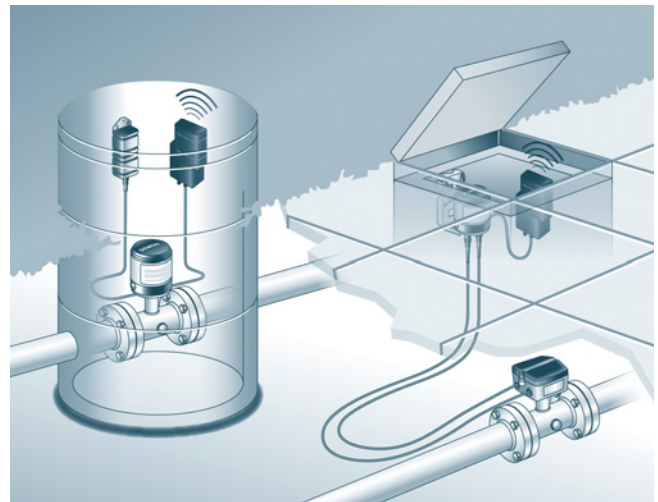
The following MAG 8000 versions are available as stand-alone water meters:

- MAG 8000 (7ME6810) for abstraction and distribution network
- MAG 8000 CT (7ME6820) for revenue and bulk metering
- MAG 8000 (7ME6880) for irrigation

Design

MAG 8000 is designed to minimize power consumption. The product program consists of

- Basic and advanced version
- Sensor sizes from DN 25 to 1200 (1" to 48")
- Compact and remote installation in IP68/NEMA 6P enclosure and factory-mounted cable
- SIMATIC PDM and Flow Tool PC configuration softwares



Modbus/Encoder module

Flow Measurement

SITRANS F M

Battery-operated water meter MAG 8000



3G/UMTS module



PC-IrDA connection

MAG 8000 3G/UMTS Wireless Communication Module

The 3G/UMTS wireless communication module is a compact built-in solution which can be installed in the existing MAG 8000 with SW version 3.02 and higher, supporting HSDPA cat.8/HSUPA Cat.6 at 5 UMTS bands, with flexibility of backward compatible to GSM/GPRS network.

The 3G/UMTS module collects comprehensive measurement data from MAG 8000 at an interval down to 1 minute, allows for data transmission via numerous protocols including SMS, email via SMTP, email via SMTPS (TLS/SSL-based encryption), FTP, and FTPS (TLS/SSL-based encryption), with a customer configurable transmission interval (down to 1 hour). This provides customers with the flexibility to receive data via email, FTP or text message for the monitoring and control systems anywhere in the world.

TLS/SSL based data encryption provides a high level information security to protect customers data privacy.

The 3G/UMTS module offers

- Remote Qualification Certificate feature to enable the offsite diagnostic and audit on devices installed anywhere in the world
- 2-channel analog input measurement for external ratiometric pressure transmitter, transmission together with flow measurement (2-in-1 solution)
- 4-20 mA alarm signal detection and realtime SMS alarm for tamper protection and flooding situations
- Real-time clock synchronization with internet NTP server, ensuring that all measurement data is accurately time-stamped
- Data transmission at customer-specified points in time, allowing for synchronization of information from multiple MAG 8000 devices

The OPC server specifically designed for the MAG 8000 3G/UMTS module is offered free of charge. With this value-added package, the opportunity for measurement data collection and further processing/analyzing for system integration and automation is offered.

Function

MAG 8000 is a microprocessor-based water meter with graphical display and key for optimum customer operation and information on site. The transmitter drives the magnetic field in the sensor, evaluates the flow signal from the sensor and calculates the volume passing through. It delivers the required information via the integrated pulse output or communication interfaces as part of a system solution. Its intelligent functionality, information and diagnostics ensure optimum meter performance and information to optimize water supply and billing.



MAG 8000 can be ordered as a Basic or an Advanced version.

Features / Version	MAG 8000 Basic/ MAG 8000 Irrigation	MAG 8000 Advanced
Measuring frequency in battery power mode (Manually selected) ¹⁾	1/15, 1/30 or 1/60 Hz	from 6.25 to 1/60 Hz depending of sensor size
Output MAG 8000	2 FW/RV/AI/CA (max. 50 Hz pulse rate)	2 FW/RV/AI/CA (max. 100 Hz pulse rate)
Communication	Add-on	Add-on
Data logger	Yes	Yes
Insulation test	Yes	Yes
Leakage detection	No	Yes
Meter utilization	No	Yes
Statistics	No	Yes
Tariff	No	Yes
Settle date (Revenue)	No	Yes

¹⁾ Excitation frequency settings with mains power supply, see technical specifications for each version

Some information is accessible via the display whereas all information is accessible via the IrDA communication interface with the PDM software. Data and parameters are registered in a EEPROM. They can all be read, but changing the information demands a software password or a hardware key attached to the printed circuit board.

The SIMATIC PDM tool gives the possibility of testing and verifying the flowmeter on site and creating a printed "Qualification Certificate" with all specific data that define the quality status of the measurement.

The Qualification Certificate consists of two pages with information about the actual status of the sensor:

Part 1 provides general settings, sensor and battery info, totalizer values and pulse output settings.

Part 2 provides detailed information about electronic and sensor functionality and a main parameter list for evaluating the functionality of the MAG 8000 water meter.



SIMATIC PDM

Details about the SIMATIC PDM tool can be found in chapter "Communication and Software" (see page 8/5).

Flow Measurement

SITRANS F M

Battery-operated water meter MAG 8000

Technical specifications

Transmitter	
Installation	Compact (integral) Remote with factory-mounted cable 5, 10, 20 or 30 m (16.4, 32.8, 65.6 or 98.4 ft)
Enclosure	Stainl. steel top housing (AISI 316) and coated brass bottom. Remote wall mount bracket in stainless steel (AISI 304).
Cable entries	2 x M20 (one gland for one cable of size 6 ... 8 mm (0.02 ... 0.026 ft) is included in the standard delivery)
Display	Display with 8 digits for main information. Index, menu and status symbols for dedicated information
Resolution	Totalized information can be displayed with 1, 2 or 3 decimals or automatic adjustment (default)
Flow unit	
Europe	Volume in m ³ and flow rate in m ³ /h
US	Volume in Gallon and flow rate in GPM
Australia	Volume in MI and flow rate as MI/d
Optional display units	Volume: m ³ x 100, l x 100, G x 100, G x 1000, MG, CF x 100, CF x 1000, AF, Al, kl, BBL42 Flow: m ³ /min, m ³ /d, l/s, l/min, GPS, GPH, GPD, MGD, CFS, CFM, CFH, BBL42/s, BBL42/min, BBL42/h, BBL42/d
Digital output	2 passive outputs (MOS), individual galvanically isolated Maximum load ± 35 V DC, 50 mA short circuit protected Programmable as pulse volume – forward – reverse – forward/net – reverse/net
Output A function	Programmable as pulse volume (like output A), alarm
Output B function	Max. pulse rate of 50 Hz (only Basic version) and 100 Hz (only Advanced version), pulse width of 5, 10, 50, 100, 500 ms
Output	
Communication	IrDA: Standard integrated infrared communication interface with Modbus RTU protocol
Add-on modules	<ul style="list-style-type: none"> • RS 232 serial interface with Modbus RTU (Rx/Tx/GND), point to point with max. 15 m cable • RS 485 serial interface with Modbus RTU (+/-/GND), multidrop with up to 32 devices with max. 1000 m cable • Encoder interface module (for Itron 200WP) "Sensus protocol" • 3G/UMTS module with or without analog input cable
Power supply	Auto detection of power source with display symbol for operation power.
Internal battery pack	1 D-Cell 3.6 V/16.5 Ah
External battery pack	2 D-Cell 3.6 V/33 Ah 4 D-Cell 3.6 V/66 Ah

Mains power supply

Cable

- 12 ... 24 V AC/DC (10 ... 32 V) 2 VA
 - 115 ... 230 V AC (85 ... 264 V) 2 VA
- Both mains power supply systems are upgradable for battery backup via internal D-Cell (3.6 V 16.5 Ah) or external battery pack.
3 m (9.8 ft) for external connection to mains supply (without cable plug)

Battery-operated water meter MAG 8000

Features	
Application identification	Tag number up to 15 characters
Time and date	Device embedded Real Time Clock (Synchronization with NTP server if 3G/UMTS module connected)
Totalizer MAG 8000	Totalizer 1 and Totalizer 2: Configurable to Forward, Reverse and Bidirectional netflow Totalizer3 (following totalizer 1 setting) resetable via display key
Measurement Low flow cut-off • 7ME6810 • 7ME6820 • 7ME6880 Empty pipe detection Data logger	Cut-off at 15 mm/s Cut-off at 15 mm/s 1 % of Qmax (adjustable) Symbolised in display Logging of 26 records: selectable as daily, weekly or monthly logging
Alarm	Active alarm is indicated on the display
Data protection	All data stored in an EEPROM. Totalizers 1 and 2 are backed up every 10 min, statistic every hour and power consumption and temperature measurement every 4 hour. Password protection of all parameters and hardware protection of calibration and revenue parameters.
Battery power management	Optimal battery information on remaining capacity. Calculated capacity includes all consuming elements and available battery capacity is adjusted related to change in ambient temperature. Numbers of power-ups Date and time registered for first and last time power alarm.
Diagnostic Continuous self test including Alarm statistics and logging for fault analyzing	Coil current to drive the magnetic field Signal input circuit Data calculation, handling and storing Electrode impedance to check actual media contact Flow simulation to check pulse and communication signal chain for correct scaling Number of sensor measurements (excitations) Transmitter temperature (battery capacity calculation) Low impedance alarm for change in media Flow alarm when defined high flow exceeds Verification mode for fast measure performance check

Insulation test	Test of signal immunity against disturbance and bad installation. Test interval is selectable and measurement is interrupted during the test period of 4 min.
Leakage detection (only Advanced version)	Monitoring the lowest flow or volume during selected time window within 24 hours. Leakage is detected over a selectable period where monitored value exceed the possible leakage level. Min and max values are stored with date registration. Last store value visible on the display.
Meter Utilization (only Advanced version)	6 registers for monitoring total time the meter has operated in different flow intervals. Registered intervals are free selectable as % of Q _n (Q3)
Tariff (only Advanced version)	6 tariff registers count the volume delivered within the selected tariff windows, based on time of day or flow rates or a combination. Tariff can also be used for consumption profile where consumption is related to different time intervals or flow rates. Tariff values visible on the display.
Settling date (only Advanced version)	On a predefined date the totalizer 1 index value is stored. Old values are stored to show the latest two totalized 1 index values. Settling values visible on the display.
Statistic (only Advanced version)	Min. flow rate with time and date registration Max. flow rate with time and date registration Min. daily consumption with date registration Max. daily consumption with date registration Latest 7 days total and daily consumption Actual month consumption Latest month consumption
PC Configuration Software PDM	<ul style="list-style-type: none"> • Meter configuration – online and offline mode • Own parameter settings • Parameter documentation • Print and export of data and parameters • PDM 9.0 Service Pack 1

Flow Measurement

SITRANS F M

Battery-operated water meter MAG 8000

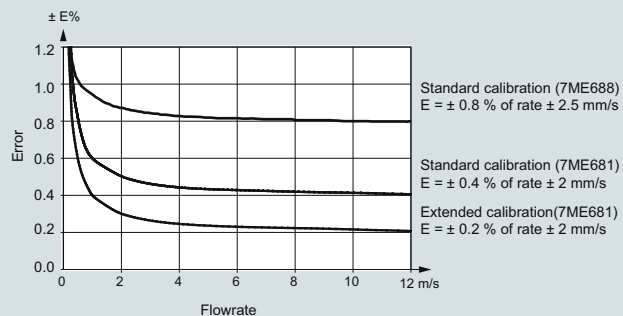
MAG 8000 water meter uncertainty

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability).

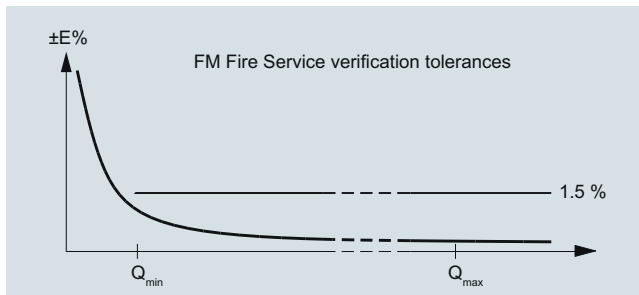
Siemens offers accredited calibrations assured to ISO 17025 in the flow range from 0.0001 m³/h to 10 000 m³/h. Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

The selected calibration determines the accuracy of the meter. A standard calibration results in max. $\pm 0.4\%$ uncertainty and an extended calibration $\pm 0.2\%$ (for MAG 8000 irrigation $\pm 0.8\%$). A calibration certificate follows every sensor and calibration data are stored in the meter unit.



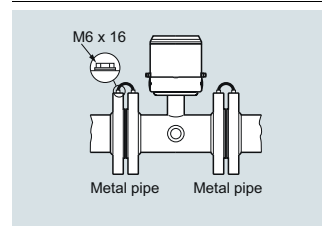
MAG 8000 (7ME6810) for Fire Service applications

MAG 8000 (7ME6810) is FM Fire Service approved for automatic fire protection systems according to the Fire Service Meters Standard, Class Number 1044. The approval is applicable for the sizes DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") with ANSI B16.5 Class 150 flanges. The FM Fire Service approved product can be ordered via the Z-options P20, P21 and P22



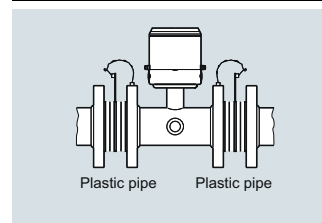
Grounding

The sensor body must be grounded using grounding straps and/or grounding rings to protect the flow signal against stray electrical noise. This ensures that the noise is carried through the sensor body and a noise-free measuring area within the sensor body. For MAG 8000 Irrigation grounding rings on both sides are factory-mounted.



Metal pipes

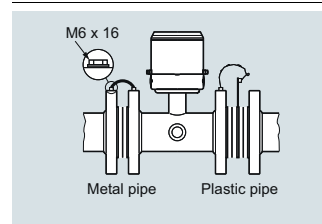
On metal pipes, connect the straps to both flanges.



Plastic pipes

On plastic pipes and lined metal pipes, optional grounding rings must be used at both ends.

Grounding rings has to be ordered separately see „Grounding ring kit“



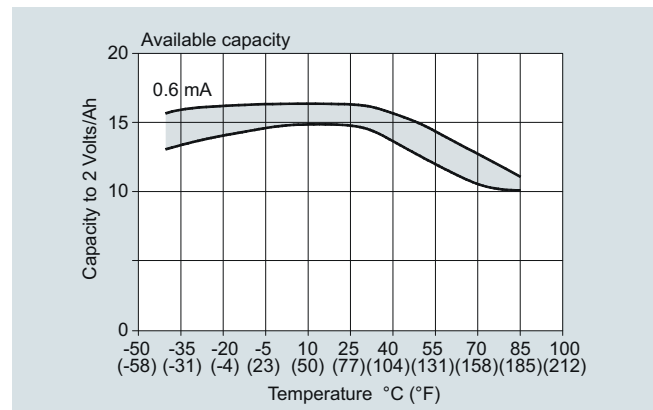
Combination of metal and plastic pipes

A combination of metal and plastic requires straps for metal pipe and grounding rings for plastic pipe.

Battery operation time and calculation

The battery operation time depends on the connected battery pack as well as the operation condition of the meter.

MAG 8000 calculates the remaining capacity every 4 hours and includes all consuming elements. Calculation compensates for temperature influence on battery capacity.



The graphic shows the effect from other temperatures. A variation in temperature from 15 °C to 55 °C (59 to 131 °F) reduces the capacity by 17 % from 15 Ah to 12.5 Ah.

At typical revenue scenario of expected battery operation time can be seen in the table below.

The measurement for calculating the rest capacity of the battery life time is only completed if the system has no active fatal faults or the empty pipe is active. Maximum battery specification is 10 years operation.

Scenario - Revenue application

Output A	Pulse rate max. 10 Hz
Output B	Alarm or call-up
Meter dialog	1 hour per month
Add-com	None
Temperature	<ul style="list-style-type: none"> • 5 % at 0 °C (32 °F) • 80 % at 15 °C (59 °F) • 15 % at 50 °C (122 °F)

Battery lifetime (subject to the assumptions mentioned above)

MAG 8000 for abstraction and distribution network applications (7ME6810) and MAG 8000 CT for revenue and bulk metering (7ME6820)								
Excitation frequency (24 h operation)		1/60 Hz	1/30 Hz	1/15 Hz	1/5 Hz	1.5625 Hz	3.125 Hz	6.25 Hz
2 D-Cell battery 33 Ah Internal battery pack	DN 25 ... 150 (1" ... 6")	9 years	9 years	7 years	43 months	8 months	3 months	2 months
	DN 200 ... 600 (8" ... 24")	9 years	6 years	4 years	22 months	3 months	1 month	N/A
	DN 700 ... 1 200 (28" ... 48")	7 years	4 years	2 years	12 months	1 month	N/A	N/A
4 D-Cell battery 66 Ah External battery pack	DN 25 ... 150 (1" ... 6")	15 years	15 years	14 years	86 months	16 months	7 months	4 months
	DN 200 ... 600 (8" ... 24")	15 years	13 years	8 years	44 months	7 months	3 months	N/A
	DN 700 ... 1 200 (28" ... 48")	14 years	9 years	5 years	24 months	3 months	N/A	N/A

MAG 8000 for irrigation applications (7ME6880)								
Excitation frequency (24 h operation)		1/60 Hz	1/30 Hz	1/15 Hz	1/5 Hz	1.5625 Hz	3.125 Hz	
1 D-Cell battery Internal battery pack	DN 25 ... 600 (1" ... 24")	52 months	3 years	25 months	12 months	2 months	1 month	
	DN 700 ... 1 200 (28" ... 48")	3 years	2 years	1 years	6 months	1 month	N/A	
2 D-Cell battery 33 Ah Internal battery pack	DN 50 ... 600 (2" ... 24")	8 years	6 years	4 years	22 months	3 months	2 months	
	DN 700 ... 1 200 (28" ... 48")	6 years	4 years	2 years	12 months	1 month	N/A	
4 D-Cell battery 66 Ah External battery pack	DN 50 ... 600 (2" ... 24")	10 years	10 years	8 years	44 months	7 months	4 months	
	DN 700 ... 1 200 (28" ... 48")	10 years	8 years	5 years	24 months	3 months	N/A	

Typical battery lifetime scenario for MAG 8000 with 3G module

Transmission once a day and MAG 8000 factory settings

2 D-Cell battery 33 Ah Internal battery pack	3 ... 4 years
4 D-Cell battery 66 Ah External battery pack	7 ... 8 years

External battery pack can be used as battery backup for mains power supply (if two cable entries in one cable gland are needed, order cable glands with two entries, see accessories on page 3/136).

Serial RS 232/RS 485 add-on communication modules are designed for mains powered systems as the battery operation time will be reduced. At 1 hour communication per month (all meter data collected 2 times per day) and the module is connected, the operation time is reduced to:

- RS 232:
 - Switched on constantly:
 - 6.4 months for 2 D-cell internal battery pack / 12.8 months for 4 D-cell ext. battery pack
 - Switched on 2 s/day:
 - 39 months for 2 D-cell internal battery pack / 78 months for 4 D-cell ext. battery pack
- RS 485:
 - With the termination resistor on:
 - 2.3 months for 2 D-cell internal battery pack / 4.6 months for 4 D-cell ext. battery pack
 - With the termination resistor off:
 - 39 months for 2 D-cell internal battery pack / 78 months for 4 D-cell ext. battery pack, in case the entire communication time is less than 4 hours/day

Flow Measurement

SITRANS F M

MAG 8000 for abstraction and distribution network applications (7ME6810)

Overview



Benefits

Easy to install

- Compact or remote solution with factory mounted cable
- IP68/NEMA 6P enclosure. Sensor can be buried.
- Flexible power supply - internal or external battery pack or mains power supply with battery back-up possibilities

Long-term stability/Low cost of ownership

- No moving parts in a robust construction means less wear and tear
- Basic and advanced transmitter versions with different optional add-on communication modules fulfil various customer requirements for high cost efficiency
- Up to 0.2 % maximum uncertainty
- Bi-directional measurement with an outstanding low flow performance
- Up to 10 years maintenance-free operation in typical applications

Intelligent information, easy to access

- Advanced information on site
- Advanced statistics and diagnostics
- Optional high-performance 3G/UMTS module offers an efficient solution for remote measurement and monitor via wireless networks.

Technical specifications

Meter	
Accuracy	Standard calibration: ± 0.4 % of rate ± 2 mm/s Extended calibration DN 50 ... DN 300 (2" ... 12"): ± 0.2 % of rate ± 2 mm/s
Low flow cut-off (default)	15 mm/s
Media conductivity	Clean water > 20 µs/cm
Temperature	
Ambient	-20 ... +60 °C (-4 ... +140 °F)
Media	0 ... 70 °C (32 ... 158 °F)
Storage	-40 ... +70 °C (-40 ... +158 °F)
Enclosure rating	
Remote sensor	IP68 to EN 60529/NEMA 6P, 10 mH ₂ O cont.
Compact version	IP68 to EN 60529/NEMA 6P, 3 mH ₂ O for six months
Certificates and approvals	
Calibration	
• Standard calibration	2 x 25 % and 2 x 90 % (default)
• Special calibration	5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory Q _{max} 10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q _{max} Matched-pair calibration: default, 5-point, 10-point
Material certificate EN 10204-3.1	Available when ordering together with meter ¹⁾
Drinking water approvals	<ul style="list-style-type: none"> • NSF/ANSI Standard 61²⁾ (cold water) USA • WRAS (BS 6920 cold water) UK • ACS Listed France • DVGW W270 Germany • Belgaqua (B) • MCERTS (GB)
Fire Service Approvals	FM Fire Service Meter (Class Number 1044) ³⁾
Conformity	<ul style="list-style-type: none"> • PED: 97/23EC⁴⁾ For pressure/temperature curves see MAG 3100 on page 3/68. <ul style="list-style-type: none"> • EMC: IEC/EN 61326
Sensor version	DN 25 ... 1200 (1" ... 48")
Sensor material	Carbon steel ASTM A 105, with corrosion resistant two-component epoxy coating (150 µm/300 µm) Corrosivity category C4M, according to ISO 12944
Measuring principle	Electromagnetic induction
Excitation frequency	
Basic version	
• Battery-powered	DN 25 ... 150 (1" ... 6"): 1/15 Hz DN 200 ... 600 (8" ... 24"): 1/30 Hz DN 700 ... 1200 (28" ... 48"): 1/60 Hz
• Mains-powered	DN 25 ... 150 (1" ... 6"): 6.25 Hz DN 200 ... 600 (8" ... 24"): 3.125 Hz DN 700 ... 1200 (28" ... 48"): 1.5625 Hz

MAG 8000 for abstraction and distribution network applications (7ME6810)

Advanced version	
• Battery-powered	DN 25 ... 150 (1" ... 6"): 1/15 Hz (adjustable up to 6.25 Hz; reduced battery lifetime) DN 200 ... 600 (8" ... 24"): 1/30 Hz (adjustable up to 3.125 Hz; reduced battery lifetime) DN 700 ... 1200 (28" ... 48"): 1/60 Hz (adjustable up to 1.5625 Hz; reduced battery lifetime)
• Mains-powered	DN 25 ... 150 (1" ... 6"): 6.25 Hz DN 200 ... 600 (8" ... 24"): 3.125 Hz DN 700 ... 1200 (28" ... 48"): 1.5625 Hz
Flanges	
EN 1092-1 (DIN 2501)	DN 25 and DN 40 (1" and 1½"): PN 40 (580 psi) DN 50 ... 150 (2" ... 6"): PN 16 (232 psi) DN 200 ... 1200 (8" ... 48"): PN 10 or PN 16 (145 psi or 232 psi)
ANSI 16.5 Class 150	1" ... 24": 20 bar (290 psi)
AWWA C-207	28" ... 48": PN 10 (145 psi)
AS 4087	DN 50 ... 1200 (2" ... 48"): PN 16 (232 psi)
Liner	EPDM
Electrode and grounding electrodes	Hastelloy C276/2.4819
Grounding straps	Grounding straps are premounted from the factory on each side of the sensor.

¹⁾ Has to be ordered with the meter. It is not possible to order the certificate afterwards.

²⁾ Including Annex G

³⁾ Not for sensors with 300 µm coating.

⁴⁾ For further information on the PED standard and requirements see page 10/15.

Flow Measurement

SITRANS F M

MAG 8000 for abstraction and distribution network applications (7ME6810)

Selection and Ordering data	Article No.
SITRANS F M MAG 8000 water meter	7ME6810 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 25 (1")	2 D
DN 40 (1½")	2 R
DN 50 (2")	2 Y
DN 65 (2½")	3 F
DN 80 (3")	3 M
DN 100 (4")	3 T
DN 125 (5")	4 B
DN 150 (6")	4 H
DN 200 (8")	4 P
DN 250 (10")	4 V
DN 300 (12")	5 D
DN 350 (14")	5 K
DN 400 (16")	5 R
DN 450 (18")	5 Y
DN 500 (20")	6 F
DN 600 (24")	6 P
DN 700 (28") ¹⁾	6 Y
DN 750 (30") ¹⁾	7 D
DN 800 (32") ¹⁾	7 H
DN 900 (36") ¹⁾	7 M
DN 1000 (40") ¹⁾	7 R
DN 1050 (42") ¹⁾	7 U
DN 1100 (44") ¹⁾	7 V
DN 1200 (48") ¹⁾	8 B
Flange norm and pressure rating	
EN 1092-1	
PN 10 (DN 200 ... 1200 (8" ... 48"))	B
PN 16 (DN 50 ... 1200 (2" ... 48"))	C
PN 16 non-PED (DN 700 ... 1200 (28" ... 48"))	D
PN 40 (DN 25 ... 40 (1" ... 1½"))	F
ANSI B16.5	
Class 150	J
AWWA C-207	
Class D (28" ... 48")	L
AS4087	
PN 16 (DN 50 ... 1200 (2" ... 48"))	N
Sensor version	
EPDM liner and Hastelloy electrodes, 150 µm coating	3
EPDM liner and Hastelloy electrodes, 300 µm coating	4
Calibration	
Standard ± 0.4 % of rate ± 2 mm/s	1
Extended ± 0.2 % of rate ± 2 mm/s DN 50... 300 (2" ... 12")	2
Region version	
Europe (m³, m³/h, 50 Hz)	1
USA (Gallon, GPM, 60 Hz)	2
Australia (ML, ML/d, 50 Hz)	3
Transmitter type and installation	
Basic version integral on sensor	A
Basic version, remote cables mounted on sensor with IP68/NEMA 6P plugs:	
• 5 m (16.4 ft)	B
• 10 m (32.8 ft)	C
• 20 m (65.6 ft)	D
• 30 m (98.4 ft)	E
Advanced version integral on sensor	K

Selection and Ordering data	Article No.
SITRANS F M MAG 8000 water meter	7ME6810 -
Advanced version, remote cables mounted on sensor with IP68/NEMA 6P plugs:	
• 5 m (16.4 ft)	L
• 10 m (32.8 ft)	M
• 20 m (65.6 ft)	N
• 30 m (98.4 ft)	P
Communication interface	
No additional "add-on" communication module installed	A
Serial RS 485 with Modbus RTU (Terminated as end device)	B
Serial RS 232 with Modbus RTU	C
Encoder interface with Sensus protocol	D
3G/UMTS communication module with remote antenna; 5 m (16.4 ft) cable	S
3G/UMTS communication module with analog inputs and remote antenna; 5 m (16.4 ft) cable	T
Power supply	
Internal battery (no battery included)	0
Internal battery pack installed ²⁾	1
Power cable (1.5 m (4.9 ft)) with IP68/NEMA 6P plugs for external battery (no battery included)	2
12/24 V AC/DC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)	3
115 ... 230 V AC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)	4
¹⁾ The Diameter DN 700 (28") to DN 1200 (48") is only available as remote transmitter type installation. ²⁾ Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.	

Operating instructions for SITRANS F M MAG 8000

Description	Article No.
• English	A5E03071515
• German	A5E00740986

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Operating instructions for MAG 8000 3G/UMTS communication module

Description	Article No.
• English	A5E03644134

MAG 8000 for abstraction and distribution network applications (7ME6810)

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Additional information		Additional information	
Please add “-Z” to Article No. and specify Order code(s) and plain text.		Please add “-Z” to Article No. and specify Order code(s) and plain text.	
Certificate		G x 1000	L49
Material certificate according to EN 10204-3.1	C12¹⁾	CF x 1000	L50
Special calibration		AI	L51
5-point calibration for DN 15 ... DN 200 ²⁾	D01	kl	L52
5-point calibration for DN 250 ... DN 600 ²⁾	D02	BBL42 (US oil barrel, 1 barrel = 42 US gallons)	L54
5-point calibration for DN 700 ... DN 1200 ²⁾	D03	Pulse set up	
10-point calibration for DN 15 ... DN 200 ³⁾	D06	(default pulse A = forward and pulse B = Alarm, pulse width = 50 ms)	
10-point calibration for DN 250 ... DN 600 ³⁾	D07	A function = RV, reverse flow	L62
10-point calibration for DN 700 ... DN 1200 ³⁾	D08	A function = FWnet, forward net flow	L63
Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 15 ... DN 200	D11	A function = RVnet, reverse net flow	L64
Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 250 ... DN 600	D12	A function = Off	L65
Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 700 ... DN 1200	D13	Volume per pulse A = x 0.0001 ⁴⁾	L70
5-point, matched-pair calibration for DN 15 ... DN 200 ²⁾	D15	Volume per pulse A = x 0.001 ⁴⁾	L71
5-point, matched-pair calibr. for DN 250 ... DN 600 ²⁾	D16	Volume per pulse A = x 0.01 ⁴⁾	L72
5-point, matched-pair calibr. for DN 700 ... DN 1200 ²⁾	D17	Volume per pulse A = x 0.1 ⁴⁾	L73
10-point, matched-pair calibr. for DN 15 ... DN 200 ³⁾	D18	Volume per pulse A = x 1 ⁴⁾	L74
10-point, matched-pair calibr. for DN 250 ... DN 600 ³⁾	D19	B function = FW, forward flow	L80
10-point, matched-pair calibr. for DN 700 ... DN 1200 ³⁾	D20	B function = RV, reverse flow	L81
Flow unit		B function = FWnet, forward net flow	L82
l/s	L00	B function = RVnet, reverse net flow	L83
MGD	L01	B function = Alarm	L84
CFS	L02	B function = Call up	L85
l/min	L03	Volume per pulse B = x 0.0001 ⁴⁾	L90
m ³ /min	L04	Volume per pulse B = x 0.001 ⁴⁾	L91
GPM	L05	Volume per pulse B = x 0.01 ⁴⁾	L92
CFM	L06	Volume per pulse B = x 0.1 ⁴⁾	L93
l/h	L07	Volume per pulse B = x 1 ⁴⁾	L94
m ³ /h	L08	Data logger set up (default month logging)	
GPH	L09	DataloggerInterval = Daily	M31
CFH	L10	DataloggerInterval = Weekly	M32
GPS	L11	Factory mounted cables	
MI/d	L12	5 m (16.4 ft) pulse cable A+B	M81
m ³ /d	L13	5 m (16.4 ft) communication cable RS 232/RS 485 terminated as end device	M82
GPD	L14	20 m (65.6 ft) pulse cable A+B	M84
BBL42/s	L15	20 m (65.6 ft) communication cable RS 232/RS 485 terminated as end device	M85
BBL42/min	L16	Cello 2 channel, input cable 3 m (9.84 ft) with Brad Harrison micro-change 3 way connector	M87
BBL42/h	L17	Cello 2 channel, input cable 5 m (16.4 ft) with MIL-C-26482 spec. connectors	M89
BBL42/d	L18	Encoder interface cable with connector for ITRON 200WP radio, length 25 ft	M90
Totalizer		Encoder interface cable with connector for ITRON 200WP radio, length 5 ft	M91
Volume calculation (default totalizer 1 = forward and totalizer 2 = reverse)		SOFREL cable 2 m for LS42 data logger	M92
Totalizer 1 = RV, reverse flow	L20	SOFREL cable 2 m for LS-Flow data logger	M97
Totalizer 1 = NET, net flow	L22	FM Fire Service Approval	
Totalizer 2 = FW, forward flow	L30	(with ANSI B16.5 Class 150 flanges)	
Totalizer 2 = NET, net flow	L31	DN 50, DN 80 and DN 100 (2", 3" and 4")	P20
Volume unit		DN 150 and DN 200 (6" and 8")	P21
m ³	L40	DN 250 and DN 300 (10" and 12")	P22
MI	L41	Region/customer specific labels	
G	L42	KCC label (South Korea)	W28
AF	L43	DIN 43863 label ¹⁾	H21
l x 100	L44	DIN 43863 label with SWM mark ¹⁾	H22
m ³ x 100	L45		
G x 100	L46		
CF x 100	L47		
MG	L48		

1) Under preparation

2) 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}3) Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

4) Pulse width = 10 ms

Flow Measurement

SITRANS F M

MAG 8000 CT for revenue and bulk metering (7ME6820)

Overview



Benefits

Approvals

- MI-001, OIML R 49/OIML R 49 MAA
- PTB K7.2
- FM Fire Service

Easy to install

- Compact or remote solution with factory mounted cable and customer setting from factory
- IP68/NEMA 6P enclosure. Sensor can be buried
- Flexible power supply - internal or external battery pack or mains power supply with battery back-up possibilities

Long-term stability/Low cost of ownership

- No moving parts in a robust construction means less wear and tear
- Basic and advanced transmitter versions with different optional add-on communication modules fulfil various customer requirements for high cost efficiency
- Bi-directional measurement with an outstanding low flow performance
- Up to 10 years maintenance-free operation in typical applications
- Insignificant pressure drop

Intelligent information, easy to access

- Advanced information on site
- Advanced statistics and diagnostics
- Connectable to common AMR systems

Technical specifications

Meter	
Accuracy	OIML R 49/OIML R 49 MAA for DN 50 ... DN 300 (2" ... 12"), Class I and II with turn down up to Q3/Q1 = 400 at Q2/Q1 = 1.6 MI-001 verification for DN 50 ... DN 600 (2" ... 24"), Class II with turn down ratio Q3/Q1 = 250, Q3/Q1 = 200 or Q3/Q1 = 160 at Q2/Q1 = 1.6 FM Fire Service for DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") ± 1.5% (Q _{min} to Q _{max})
Low flow cut-off (default)	15 mm/s
Media conductivity	Clean water > 20 µs/cm
Temperature	
Ambient	-20 ... +60 °C (-4 ... +140 °F) MI-001: -25 ... +55 °C (-13 ... +131 °F)
Media	0.1 ... 50 °C (32 ... 122 °F)
Storage	-40 ... +70 °C (-22 ... +158 °F)
Enclosure rating	
Remote sensor	IP68 to EN 60529/NEMA 6P, 10 mH ₂ O cont.
Compact version	IP68 to EN 60529/NEMA 6P, 3 mH ₂ O for six months
Certificates and approvals	
Calibration (standard)	2 x 25 % and 2 x 90 %
Material certificate EN 10204 3.1	Available when ordering together with meter ¹⁾
Drinking water approvals	<ul style="list-style-type: none"> • NSF/ANSI Standard 61²⁾ (cold water) USA • WRAS (BS 6920 cold water) UK • ACS Listed France • DVGW W270 Germany • Belgaqua (B) • MCERTS (GB)
Fire Service approval	FM Fire Service (1044) ³⁾
Custody transfer approval	<ul style="list-style-type: none"> • OIML R 49 and OIML R 49 MAA approval (DN 50 ... DN 300 (2" ... 12")) • MI-001 approval (DN 50 ... DN 600 (2" ... 24")) (DK-0200-MI-001-011) • PTB K7.2
Conformity	<ul style="list-style-type: none"> • CEN EN 14154, ISO 4064 • PED: 2014/68/EU⁴⁾ • EMC: IEC/EN 61326
Sensor version	DN 50 ... 600 (2" ... 24")
Sensor material	Carbon steel ASTM A 105, with corrosion resistant two-component epoxy coating (150 µm/300 µm) Corrosivity category C4M, according to ISO 12944
Measuring principle	Electromagnetic induction
Excitation frequency	
Basic version	
• Battery-powered	DN 50 ... 150 (2" ... 6"): 1/15 Hz DN 200 ... 600 (8" ... 24"): 1/30 Hz
• Mains-powered	DN 50 ... 150 (2" ... 6"): 6.25 Hz DN 200 ... 600 (8" ... 24"): 3.125 Hz

MAG 8000 CT for revenue and bulk metering (7ME6820)

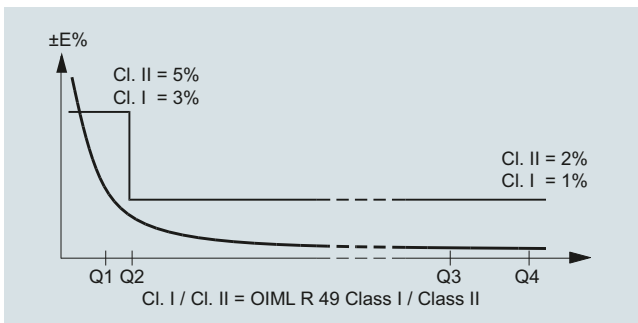
Advanced version	
• Battery-powered	DN 50 ... 150 (2" ... 6"): 1/15 Hz (adjustable up to 6.25 Hz; reduced battery lifetime) DN 200 ... 600 (8" ... 24"): 1/30 Hz (adjustable up to 3.125 Hz; reduced battery lifetime)
• Mains-powered	DN 50 ... 150 (2" ... 6"): 6.25 Hz DN 200 ... 600 (8" ... 24"): 3.125 Hz
Flanges	
EN 1092-1 (DIN 2501)	DN 50 ... 150 (2" ... 6"): PN 16 (232 psi) DN 200 ... 300 (8" ... 12"): PN 10 or PN 16 (145 psi or 232 psi) up to DN 600 (24") in preparation
ANSI 16.5 Class 150	2" ... 12": 20 bar (290 psi) up to DN 600 (24") in preparation
AWWA C-207	28" ... 48": PN 10 (145 psi)
AS 4087	DN 50 ... 300 (2" ... 12"): PN 16 (232 psi) up to DN 600 (24") in preparation
Liner	EPDM
Electrode and grounding electrodes	Hastelloy C276/2.4819
Grounding straps	Grounding straps are premounted from the factory on each side of the sensor

- 1) Has to be ordered with the meter. It is not possible to order the certificate afterwards.
- 2) Including Annex G
- 3) Not for sensors with 300 µm coating.
- 4) For further information on the PED standard and requirements see page 10/15.

3

MAG 8000 CT (Revenue program) water meter type approval

MAG 8000 CT program is type approved and verified according to international water meter standard OIML R 49. The custody transfer program is approved as Class I and Class II, for the sensor program from DN 50 to DN 300, at different Q3 and Q3/Q1. Q2/Q1 = 1.6 and follows OIML R 49 specification.



OIML R 49/2006-DK2-10.01 Revision 1 approval specification for Class I (1 %)¹⁾

Size	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
„R“ Q3/Q1	250	250	250	250	250	250	250	250	125	-	-	-	-	-
Q1 [m³/h]	0.25	0.40	0.63	1.00	160	2.50	4.00	6.40	12.8	-	-	-	-	-
Q2 [m³/h]	0.40	0.64	1.00	1.60	2.60	4.00	6.40	10.24	20.48	-	-	-	-	-
Q3 [m³/h]	63	100	160	250	400	630	1000	1600	1600	-	-	-	-	-
Q4 [m³/h]	78.75	125	200	312.5	500	787.5	1250	2000	2000	-	-	-	-	-

OIML R 49/2006-DK2-10.01 Revision 1 approval specification for Class II (2 %)¹⁾

Size	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
„R“ Q3/Q1	400	400	400	400	400	400	400	400	200	-	-	-	-	-
Q1 [m³/h]	0.16	0.25	0.40	0.63	1.00	1.60	2.50	4.00	10.00	-	-	-	-	-
Q2 [m³/h]	0.25	0.40	0.63	1.00	1.60	2.50	4.00	6.40	16.00	-	-	-	-	-
Q3 [m³/h]	63	100	160	250	400	630	1000	1600	1600	-	-	-	-	-
Q4 [m³/h]	78.75	125	200	312.5	500	787.5	1250	2000	2000	-	-	-	-	-

¹⁾ The product will be delivered according to requested specifications, which may deviate from the specifications of the approval frame described in tables below.

Flow Measurement

SITRANS F M

MAG 8000 CT for revenue and bulk metering (7ME6820)

MAG 8000 CT (Revenue program) MI-001

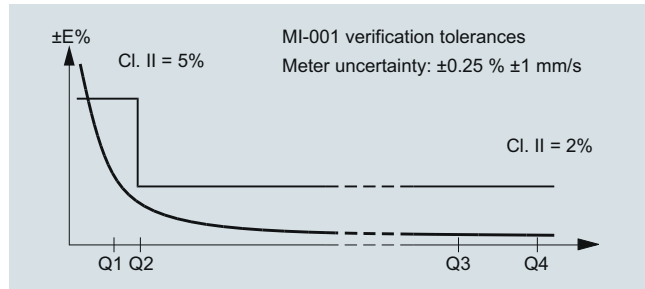
MAG 8000 CT program is type approved according to international water meter standard OIML R 49. Since the first November 2006 the MI-001 water meter directive is in force, which means that all water meters can be sold across the EU borders if the water meters contain a MI-001 label.

The MAG 8000 CT MI-001 verified and labeled products are a Class II approval according to Directive 2014/32/EU of the European Parliament and Council of 26 February, 2014 on measuring instruments, Annex VI Thermal Energy Meters (MI-004) in the sizes from DN 50 to DN 400.

The MID certification is obtained as a B + D module approval according to the above mentioned directive.

Module B : Type approval according to OIML R 49

Module D : Quality insurance approval of production



MAG 8000 CT MI-001 verified and labeled products at a given Q3 and Q4/Q3 = 1.25 and Q2/Q1 = 1.6 measuring ranges see below table:

7ME6820-xxxx1	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
„R“ Q3/Q1	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Q4 [m³/h]	20	31.25	50	78.75	125	200	312.5	500	787.5	1250	1250	1250	2000	3125
Q3 [m³/h]	16	25	40	63	100	160	250	400	630	630	1000	1000	1600	1600
Q2 [m³/h]	0.96	1.60	2.60	4.03	6.40	10.24	16	25.60	40.3	64	64	64	102.4	160
Q1 [m³/h]	0.60	1	1.60	2.52	4	6.40	10	16	25.2	40	40	40	64	100

7ME6820-xxxx2	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
„R“ Q3/Q1	63	63	63	63	63	63	63	63	63	63	63	63	63	63
Q4 [m³/h]	20	31.25	50	78.75	125	200	312.5	500	750	1250	1250	3125	3125	5000
Q3 [m³/h]	16	25	40	63	100	160	250	400	630	1000	1000	2500	2500	4000
Q2 [m³/h]	0.41	0.63	1.02	1.60	2.54	4.06	6.35	10.16	16	25.4	25.4	63.49	63.49	101.6
Q1 [m³/h]	0.25	0.40	0.63	1	1.59	2.54	3.97	6.35	10	15.9	15.9	39.68	39.68	63.49

7ME6820-xxxx3	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
„R“ Q3/Q1	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Q4 [m³/h]	20	31.25	50	78.75	125	200	312.5	500	1250	2000	2000	5000	5000	7875
Q3 [m³/h]	16	25	40	63	100	160	250	400	1000	1600	1600	4000	4000	6300
Q2 [m³/h]	0.32	0.50	0.80	1.20	2	3.20	5	8	20	32	32	80	80	126
Q1 [m³/h]	0.20	0.31	0.50	0.75	1.25	2	3.13	5	12.50	20	20	50	50	78.75

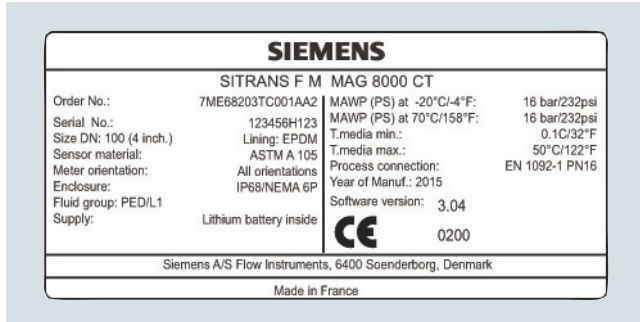
7ME6820-xxxx4	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
„R“ Q3/Q1	160	160	160	160	160	160	160	160	160	160	160	160	160	-
Q4 [m³/h]	50	78.75	125	200	312.5	500	787.5	1250	2000	2000	2000	7875	7875	-
Q3 [m³/h]	40	63	100	160	250	400	630	1000	1600	1600	1600	6300	6300	-
Q2 [m³/h]	0.40	0.63	1	1.60	2.50	4	6.30	10	16	16	16	63	63	-
Q1 [m³/h]	0.25	0.39	0.63	1	1.56	2.50	3.94	6.25	10	10	10	39	39	-

7ME6820-xxxx5	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
„R“ Q3/Q1	200	200	200	200	200	200	200	200	200	-	-	-	-	-
Q4 [m³/h]	50	78.75	125	200	312.5	500	787.5	1250	2000	-	-	-	-	-
Q3 [m³/h]	40	63	100	160	250	400	630	1000	1600	-	-	-	-	-
Q2 [m³/h]	0.32	0.50	0.80	1.28	2	3.20	5.04	8	12.8	-	-	-	-	-
Q1 [m³/h]	0.20	0.32	0.50	0.80	1.25	2	3.15	5	8	-	-	-	-	-

MAG 8000 CT for revenue and bulk metering (7ME6820)

7ME6820- xxx6	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
„R“ Q3/Q1	250	250	250	250	250	250	250	250	-	-	-	-	-	-
Q4 [m³/h]	50	78.75	125	200	312.5	500	787.5	1250	-	-	-	-	-	-
Q3 [m³/h]	40	63	100	160	250	400	630	1000	-	-	-	-	-	-
Q2 [m³/h]	0.26	0.40	0.64	1.02	1.60	2.56	4	6.40	-	-	-	-	-	-
Q1 [m³/h]	0.16	0.25	0.40	0.64	1	1.60	2.52	4	-	-	-	-	-	-

The Label is placed on the side of the encapsulation.
An example of the product label is shown below:



Installation conditions

Please refer to "System information SITRANS F M electromagnetic flowmeters".

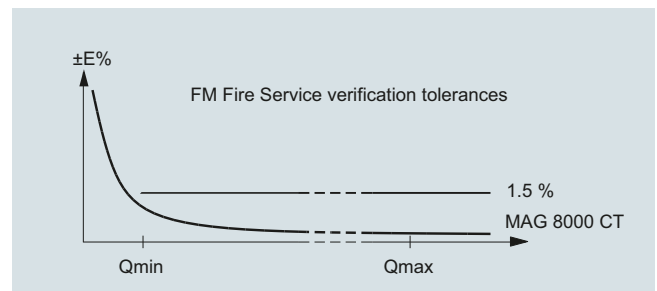
Battery operation time and calculation

The battery operation time depends on the connected battery pack as well as the operation condition of the meter.

MAG 8000 calculates the remaining capacity every 4 hours and includes all consuming elements. Calculation compensates for temperature influence on battery capacity (drawing).

MAG 8000 CT (7ME6820) for Fire Service applications

MAG 8000 CT (7ME6820) is FM Fire Service approved for automatic fire protection systems according to the Fire Service Meters Standard, Class Number 1044. The approval is applicable for the sizes DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") with ANSI B16.5 Class 150 flanges. The FM Fire Service approved product can be ordered via the Z-options P20, P21 and P22.



Flow Measurement

SITRANS F M

MAG 8000 CT for revenue and bulk metering (7ME6820)

Selection and Ordering data	Article No.
SITRANS F M	
MAG 8000 CT water meter with EPDM liner and Hastelloy electrodes	7 ME 6 8 2 0 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 50 (2")	2 Y
DN 65 (2½")	3 F
DN 80 (3")	3 M
DN 100 (4")	3 T
DN 125 (5")	4 B
DN 150 (6")	4 H
DN 200 (8")	4 P
DN 250 (10")	4 V
DN 300 (12")	5 D
DN 350 (14") ¹⁾	5 K
DN 400 (16") ¹⁾	5 R
DN 450 (18") ¹⁾	5 Y
DN 500 (20") ¹⁾	6 F
DN 600 (24") ¹⁾	6 P
Flange norm and pressure rating	
EN 1092-1	
PN 16	C
ANSI B16.5	
Class 150	J
AS4087	
PN 16	N
Sensor version	
EPDM liner and Hastelloy electrodes, 150 µm coating	0
EPDM liner and Hastelloy electrodes, 300 µm coating	4
Approval/Verification³⁾	
Without verification according to OIML R 49 ⁴⁾	0
MI-001 Q3/Q1 = 25	1
MI-001 Q3/Q1 = 63	2
MI-001 Q3/Q1 = 80	3
MI-001 Q3/Q1 = 160	4
MI-001 Q3/Q1 = 200	5
MI-001 Q3/Q1 = 250	6
Without verification calibrated to OIML R 49-Class II (Q3/Q1 = 100)	7
Without verification calibrated to OIML R 49-Class II (Q3/Q1 = 250)	8
Region version	
Europe (m ³ , m ³ /h, 50 Hz)	1
USA (m ³ , m ³ /h, 60 Hz)	2
Transmitter type and installation	
Basic version integral on sensor	A
Basic version, remote cables mounted on sensor with IP68/NEMA 6P plugs	
5 m (16.4 ft)	B
10 m (32.8 ft)	C
20 m (65.6 ft)	D
30 m (98.4 ft)	E
Advanced version integral on sensor	K
Advanced version, remote cables mounted on sensor with IP68/NEMA 6P plugs	
5 m (16.4 ft)	L
10 m (32.8 ft)	M
20 m (65.6 ft)	N
30 m (98.4 ft)	P

Selection and Ordering data	Article No.
SITRANS F M	
MAG 8000 CT water meter with EPDM liner and Hastelloy electrodes	7 ME 6 8 2 0 -
Communication interface	
No additional "add-on" communication module installed	A
Serial RS 485 with Modbus RTU (Terminated as end device)	B
Serial RS 232 with Modbus RTU	C
Encoder interface for ITRON 200WP radio with "Sensus" protocol	D
3G/UMTS communication module with remote antenna; 5 m (16.4 ft) cable	S
3G/UMTS communication module with analog inputs and remote antenna; 5 m (16.4 ft) cable	T
Power supply	
Internal battery (no battery included)	0
Internal battery pack installed ²⁾	1
Power cable (1.5 m (4.9 ft)) with IP68/NEMA 6P plugs for external battery (no battery included)	2
12/24 V AC/DC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)	3
115 ... 230 V AC power supply with battery backup and 3 m (9.8 ft) power cable for external connection. (no battery included)	4
¹⁾ Under preparation. ²⁾ Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs. ³⁾ For more details and references of the ranges please see the tables on pages 3/125 to 3/127. ⁴⁾ Standard calibration or according to FM Fire Service requirements if P20, P21 or P22 is selected as Z option.	

Operating instructions for SITRANS F M MAG 8000

Description	Article No.
• English	A5E03071515
• German	A5E00740986

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Operating instructions for MAG 8000 3G/UMTS communication module

Description	Article No.
• English	A5E03644134

MAG 8000 CT for revenue and bulk metering (7ME6820)

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Additional information		Additional information	
Please add “-Z” to Article No. and specify Order code(s) and plain text.		Please add “-Z” to Article No. and specify Order code(s) and plain text.	W28 H20 H21 H22
Material certificate according to EN 10204-3.1	C12 ¹⁾	Region/customer specific label	
FP2E marking (France only)	C17	KCC label (South Korea)	
Totalizer		FP2E label (France)	
Volume calculation (default totalizer 1= forward and totalizer 2 = reverse)		DIN 43863 label ¹⁾	
Totalizer 1 = RV, reverse flow	L20	DIN 43863 label with SWM mark ¹⁾	
Totalizer 1 = NET, net flow	L22		
Totalizer 2 = FW, forward flow	L30		
Totalizer 2 = NET, net flow	L31		
Pulse set up			
(default pulse A = forward and pulse B = Alarm, pulse width = 50 ms)		1) Under preparation	
		2) Pulse width = 10 ms	
A function = RV, reverse flow	L62		
A function = FWnet, forward net flow	L63		
A function = RVnet, reverse net flow	L64		
A function = Off	L65		
Volume per pulse A = x 0.001 ²⁾	L71		
Volume per pulse A = x 0.01 ²⁾	L72		
Volume per pulse A = x 0.1 ²⁾	L73		
Volume per pulse A = x 1 ²⁾	L74		
B function = FW, forward flow	L80		
B function = RV, reverse flow	L81		
B function = FWnet, forward net flow	L82		
B function = RVnet, reverse net flow	L83		
B function = Alarm	L84		
B function = Call up	L85		
Volume per pulse B = x 0.001 ²⁾	L91		
Volume per pulse B = x 0.01 ²⁾	L92		
Volume per pulse B = x 0.1 ²⁾	L93		
Volume per pulse B = x 1 ²⁾	L94		
Data logger set up (default month logging)			
DataloggerInterval = Daily		M31	
DataloggerInterval = Weekly		M32	
Factory mounted cables			
5 m (16.4 ft) pulse cable A+B	M81		
5 m (16.4 ft) communication cable RS 232/RS 485 terminated as end device	M82		
20 m (65.6 ft) pulse cable A+B	M84		
20 m (65.6 ft) communication cable RS 232/RS 485 terminated as end device	M85		
Cello 2 channel, input cable 3 m (9.84 ft) with Brad Harrison micro-change 3 way connector	M87		
Cello 2 channel, input cable 5 m (16.4 ft) with MIL-C-26482 spec. connectors	M89		
5 ft. Encoder interface cable with connector for ITRON 200WP radio	M91		
25 ft. Encoder interface cable with connector for ITRON 200WP radio	M90		
SOFREL cable 2 m for LS42 data logger	M92		
SOFREL cable 2 m for LS-Flow data logger	M97		
FM Fire Service Approval			
(with ANSI B16.5 Class 150 flanges)			
DN 50, DN 80 and DN 100 (2", 3" and 4")	P20		
DN 150 and DN 200 (6" and 8")	P21		
DN 250 and DN 300 (10" and 12")	P22		

Flow Measurement

SITRANS F M

MAG 8000 for irrigation applications (7ME6880)

Overview



Benefits

- IP68/NEMA 6P rating with tamper proof
- Flexible power supply - internal or external battery pack or mains power supply with battery back-up possibilities
- No moving parts in a robust construction means less wear and tear
- Up to 8 years maintenance-free operation in typical application
- Connectable to AMR systems
- Adaptor for conduit installation to provide a clean, protected pathway for device cables

Technical specifications

Meter	
Accuracy	± 0.8 % ± 2.5 mm/s ± 0.4 % ± 2.5 mm/s NMI (class 2.5)
Low flow cut-off (default)	1.0 %
Media conductivity	Clean water > 20 µs/cm

Temperature	
Ambient	-20 ... +60 °C (-4 ... +140 °F)
Media	0 ... 70 °C (32 ... 158 °F)
Storage	-40 ... +70 °C (-40 ... +158 °F)
Enclosure rating	
Remote sensor	IP68 to EN 60529/NEMA 6P, 10 mH ₂ O cont.
Compact version	IP68 to EN 60529/NEMA 6P, 3 mH ₂ O for six months
Approvals	
Drinking water approvals	<ul style="list-style-type: none"> • ANSI/NSF 61¹⁾ (cold water) USA • WRAS (BS 6920 cold water) UK
Custody transfer approval	NMI M 10 Australia (DN 50 to DN 1200)
Sensor material	Carbon steel ASTM A 105, with corrosion resistant two-component epoxy coating (150 µm/300 µm) Corrosivity category C4M, according to ISO 12944
Conformity	IEC/EN 61326
Flanges	
EN 1092-1 (DIN 2501) PN 10 drilled pattern	DN 50 ... 600 (2" ... 24") (max. pressure 7 bar (101.5 psi))
ANSI 16.5 Class 150 drilled pattern	2" ... 24" (max. pressure 7 bar (101.5 psi))
AS 2091-1 Table D drilled pattern	DN 50 ... 600 (2" ... 24") (max. pressure 7 bar (101.5 psi))
AS 2129 Table E	DN 25, DN 40, DN 125 (1", 1½", 5")
AS 4087 PN 16	DN 50 ... DN 1200 (2" ... 48")
Excitation frequency	
Battery-powered	DN 50 ... 600 (2" ... 24"): 1/15 Hz DN 700 ... 1200 (28" ... 48"): 1/60 Hz
Mains-powered	DN 50 ... 600 (2" ... 24"): 3.125 Hz DN 700 ... 1200 (28" ... 48"): 1.5625 Hz
Liner	Ebonite
Electrodes	Stainless steel AISI 316Ti/1.4571



¹⁾ Including Annex G

NMI M 10 measuring range

7ME6880	DN 25 (1")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")
„R“ Q3/Q1	10	10	10	10	10	10	10	10	10	10	10	10
Q4 [m³/h]	11.25	28.75	43.75	75	112.5	175	275	375	687.5	750	1625	2125
Q3 [m³/h]	9	23	35	60	90	140	220	300	550	600	1300	1700
Q1 [m³/h]	0.9	2.3	3.5	6	9	14	22	30	55	60	130	170

7ME6880	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")	DN 700 (28")	DN 750 (30")	DN 800 (32")	DN 900 (36")	DN 1000 (40")	DN 1050 (42")	DN 1100 (44")	DN 1200 (48")
„R“ Q3/Q1	10	10	10	10	10	10	10	10	10	10	10	10
Q4 [m³/h]	2125	2250	2250	2250	4375	4375	5000	5000	5000	5000	5000	5000
Q3 [m³/h]	1700	1800	1800	1800	3500	3500	4000	4000	4000	4000	4000	4000
Q1 [m³/h]	170	180	180	180	350	350	400	400	400	400	400	400

MAG 8000 for irrigation applications (7ME6880)

Selection and Ordering data		Article No.	
SITRANS F M MAG 8000 water meter including factory-mounted grounding rings		7 ME 6 8 8 0 -	
 Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Diameter			
DN 25 (1")		2 D	
DN 40 (1½")		2 R	
DN 50 (2")		2 Y	
DN 65 (2½")		3 F	
DN 80 (3")		3 M	
DN 100 (4")		3 T	
DN 125 (5")		4 B	
DN 150 (6")		4 H	
DN 200 (8")		4 P	
DN 250 (10")		4 V	
DN 300 (12")		5 D	
DN 350 (14")		5 K	
DN 400 (16")		5 R	
DN 450 (18")		5 Y	
DN 500 (20")		6 F	
DN 600 (24")		6 P	
DN 700 (28")		6 Y	
DN 750 (30")		7 D	
DN 800 (32")		7 H	
DN 900 (36")		7 M	
DN 1000 (40")		7 R	
DN 1050 (42")		7 U	
DN 1100 (44")		7 V	
DN 1200 (48")		8 B	
Flange norm and pressure rating			
EN 1092-1 drilled pattern PN 10/max. 7 bar (101 psi)		B	
ANSI B16.5 drilled pattern Cl 150/max. 7 bar (101 psi)		J	
AS2129 drilled pattern table D/max. 7 bar (101 psi)		M	
AS2129 table E (DN 25, DN 40, DN 125)		G	
AS4087 PN 16 (DN 50 ... DN 1200)		N	
Sensor version			
Ebonite liner and stainless steel electrodes		4	
Calibration			
± 0.8 %, ± 2.5 mm/s		0	
± 0.4 %, ± 2.5 mm/s		1	
NMI (2.5 %)		3	
Region version			
Europe (m³, m³/h, 50 Hz)		1	
USA (Gallon, GPM, 60 Hz)		2	
Australia (ML, ML/d, 50 Hz)		3	
Transmitter type and installation			
Basic version integral on sensor		A	
Basic version, remote cables mounted on sensor with IP68/NEMA 6P plugs			
2 m (6.56 ft)		T	
5 m (16.4 ft)		B	
10 m (32.8 ft)		C	
20 m (65.6 ft)		D	
30 m (98.4 ft)		E	

Selection and Ordering data		Article No.	
SITRANS F M MAG 8000 water meter including factory-mounted grounding rings		7 ME 6 8 8 0 -	
Communication interface			
No additional "add-on" communication module installed		A	
Serial RS 485 with Modbus RTU (Terminated as end device)		B	
Serial RS 232 with Modbus RTU		C	
Encoder interface		D	
3G/UMTS communication module with remote antenna and 5 m (16.4 ft) cable		S	
3G/UMTS communication module with analog input, remote antenna and 5 m (16.4 ft) cable		T	
Power supply			
Internal battery (no battery included)		0	
Internal battery pack installed 2 D-cell ^{1) 2)}		1	
Power cable (1.5 m (4.9 ft)) with IP68/NEMA 6P plugs for external battery (no battery included)		2	
12/24 V AC/DC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)		3	
115 ... 230 V AC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)		4	
Internal battery pack installed 1 D-cell ^{1) 2)}		5	

¹⁾ Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

²⁾ Can be ordered by US region only.

Operating instructions for SITRANS F M MAG 8000

Description	Article No.
• English	A5E03071515
• German	A5E00740986

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Flow Measurement

SITRANS F M

MAG 8000 for irrigation applications (7ME6880)

Selection and Ordering data

Order code

Additional information

Please add “-Z” to Article No. and specify Order code(s) and plain text.

Flow unit

l/s	L00
MGD	L01
CFS	L02
l/min	L03
m ³ /min	L04
GPM	L05
CFM	L06
l/h	L07
m ³ /h	L08
GPH	L09
CFH	L10
GPS	L11
MI/d	L12
m ³ /d	L13
GPD	L14

Totalizer

Volume calculation (default totalizer 1 = forward and totalizer 2 = reverse)

Totalizer 1 = RV, reverse flow	L20
Totalizer 1 = NET, net flow	L22
Totalizer 2 = FW, forward flow	L30
Totalizer 2 = NET, net flow	L31

Volume unit

m ³	L40
MI	L41
G	L42
AF	L43
l x 100	L44
m ³ x 100	L45
G x 100	L46
CF x 100	L47
MG	L48
G x 1000	L49
CF x 1000	L50
AI	L51
kl	L52

Pulse set up

(default pulse A = forward and pulse B = Alarm, pulse width = 50 ms)

A function = RV, reverse flow	L62
A function = FWnet, forward net flow	L63
A function = RVnet, reverse net flow	L64
A function = Off	L65
Volume per pulse A = x 0.0001 ¹⁾	L70
Volume per pulse A = x 0.001 ¹⁾	L71
Volume per pulse A = x 0.01 ¹⁾	L72
Volume per pulse A = x 0.1 ¹⁾	L73
Volume per pulse A = x 1 ¹⁾	L74
Pulse A pulse width 5 ms (volume per pulse x 1)	L75
Pulse A pulse width 10 ms (volume per pulse x 1)	L76
Pulse A pulse width 50 ms (volume per pulse x 1)	L77
Pulse A pulse width 100 ms (volume per pulse x 1)	L78
Pulse A pulse width 500 ms (volume per pulse x 1)	L79
B function = FW, forward flow	L80
B function = RV, reverse flow	L81
B function = FWnet, forward net flow	L82
B function = RVnet, reverse net flow	L83
B function = Alarm	L84
B function = Call up	L85

Selection and Ordering data

Order code

Additional information

Please add “-Z” to Article No. and specify Order code(s) and plain text.

Volume per pulse B = x 0.0001 ¹⁾	L90
Volume per pulse B = x 0.001 ¹⁾	L91
Volume per pulse B = x 0.01 ¹⁾	L92
Volume per pulse B = x 0.1 ¹⁾	L93
Volume per pulse B = x 1 ¹⁾	L94

Device operation

Only operator menu activated	M11
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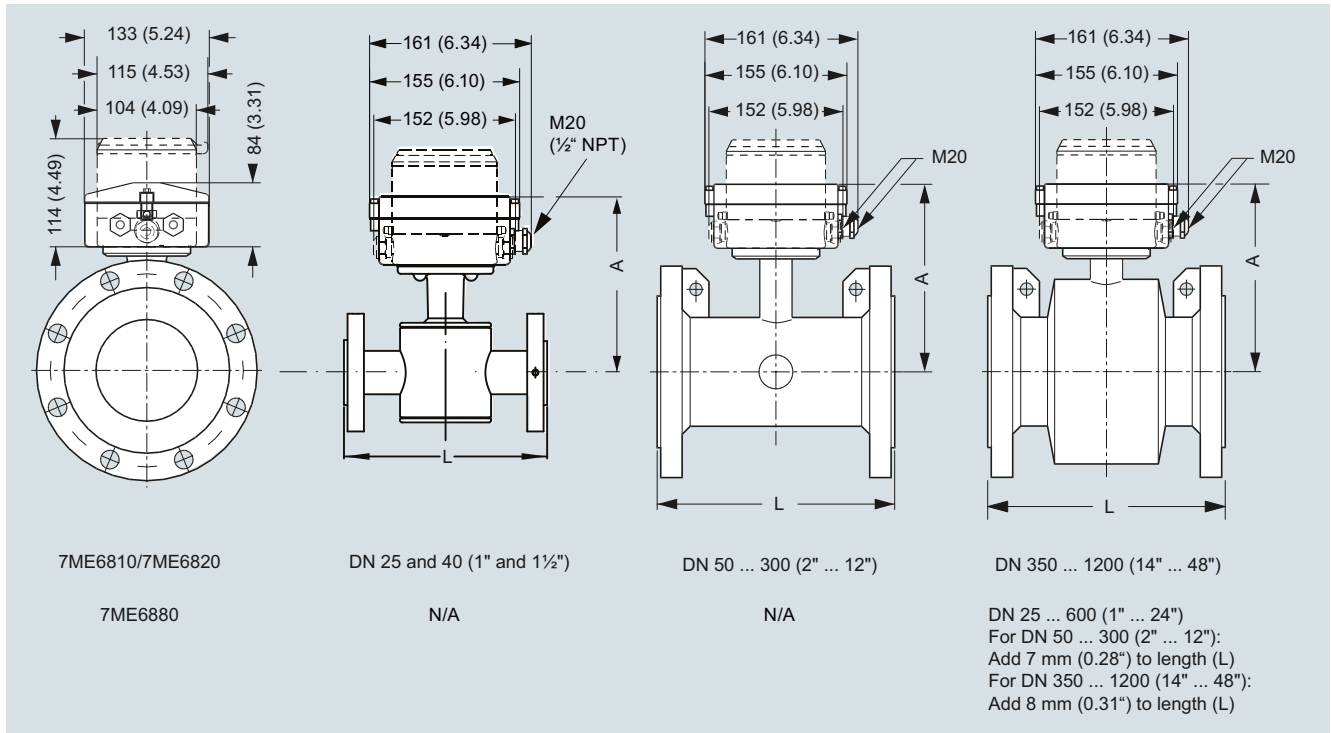
Data logger set up (default month logging)

DataloggerInterval = Daily	M31
DataloggerInterval = Weekly	M32

Factory mounted cables

5 m (16.4 ft) pulse cable A+B	M81
5 m (16.4 ft) communication cable RS 232/RS 485 terminated as end device	M82
20 m (65.6 ft) pulse cable A+B	M84
20 m (65.6 ft) communication cable RS 232/RS 485 terminated as end device	M85
Cello 2 channel, input cable 3 m (9.84 ft) with Brad Harrison micro-change 3 way connector	M87
Cello 2 channel, input cable 5 m (16.4 ft) with MIL-C-26482 spec. connectors	M89
5 ft Encoder interface cable with connector for ITRON 200WP radio	M91
25 ft Encoder interface cable with connector for ITRON 200WP radio	M90
SOFREL cable 2 m for LS42 data logger	M92
SOFREL cable 2 m for LS-Flow data logger	M97
Adaptors for conduit installation	M94

¹⁾ Pulse width = 10 ms

Dimensional drawings


Dimensions in mm (inch)

Nominal DN size	A	L, lengths ¹⁾							Weight ²⁾	
	EPDM (7ME6810 and 7ME6820)	EN 1092-1 PN 10	EN 1092-1 PN 16/ PN 16 non-PED	EN 1092-1 PN 40	ANSI 16.5 Class 150	AS 4087 PN 16	AWWA C-207 Class D	AS 2129 Table E		
mm (inch)	mm (inch)	mm	mm	mm	inch	mm	mm	mm	kg	lb
25 (1)	188 (7.4)	-	-	200	7.9	200	-	200	6	13
40 (1½)	203 (8.0)	-	-	200	7.9	200	-	200	9	20
50 (2)	178 (7.0)	-	200	-	7.9	200	-	-	11	25
65 (2½)	181 (7.1)	-	200	-	7.9	200	-	-	13	29
80 (3)	191 (7.5)	-	200	-	7.9	200	-	-	15	34
100 (4)	197 (7.8)	-	250	-	9.8	250	-	-	17	38
125 (5)	210 (8.3)	-	250	-	9.8	250	-	250	22	50
150 (6)	224 (8.8)	-	300	-	11.8	300	-	-	28	63
200 (8)	249 (9.8)	350	350	-	13.8	350	-	-	50	113
250 (10)	276 (10.9)	450	450	-	17.7	450	-	-	71	160
300 (12)	303 (11.9)	500	500	-	19.7	500	-	-	88	198
350 (14)	365 (14.4)	550	550	-	21.7	550	-	-	127	279
400 (16)	391 (15.4)	600	600	-	23.6	600	-	-	145	318
450 (18)	421 (16.6)	600	600	-	23.6	600	-	-	175	384
500 (20)	447 (17.6)	600	600	-	26.8	600	-	-	225	494
600 (24)	497 (19.6)	600	600	-	32.3	600	-	-	340	747
700 (28)	548 (21.6)	700	875/700	-	N/A	700	700	-	316	694
750 (30)	573 (22.6)	N/A	N/A	-	N/A	N/A	750	-	N/A	N/A
800 (32)	603 (23.7)	800	1000/800	-	N/A	800	800	-	398	1045
900 (36)	656 (25.8)	900	1125/900	-	N/A	900	900	-	476	1045
1000 (40)	708 (27.9)	1000	1250/1000	-	N/A	1000	1000	-	602	1322
1050 (42)	708 (27.9)	N/A	N/A	-	N/A	N/A	1050	-	N/A	N/A
1100 (44)	759 (29.9)	N/A	N/A	-	N/A	N/A	1100	-	N/A	N/A
1200 (48)	814 (32.0)	1200	1500/1200	-	N/A	1200	1200	-	887	1996

¹⁾ Tolerances on built-in length:

 DN 15 to DN 200 (½" to 8"): +0/-3 mm (+0/-0.12"), DN 250 to DN 400 (10" to 16"): +0/-5 mm (+0/-0.20"),
 DN 450 to DN 600 (18" to 24"): +5/-5 mm (+0.20/-0.20"), DN 700 to DN 1200 (28" to 48"): +10/-10 mm (+0.39/-0.39")

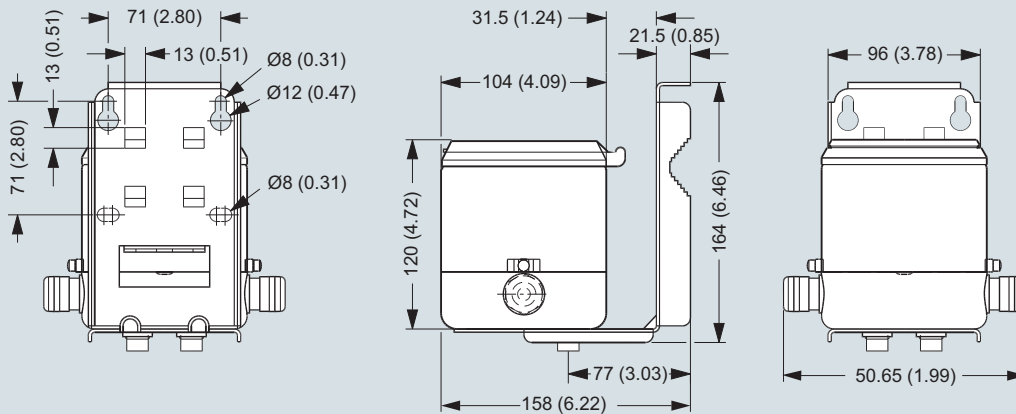
²⁾ For remote version the sensor weight is reduced with 2 kg (4.5 lb)

Flow Measurement

SITRANS F M

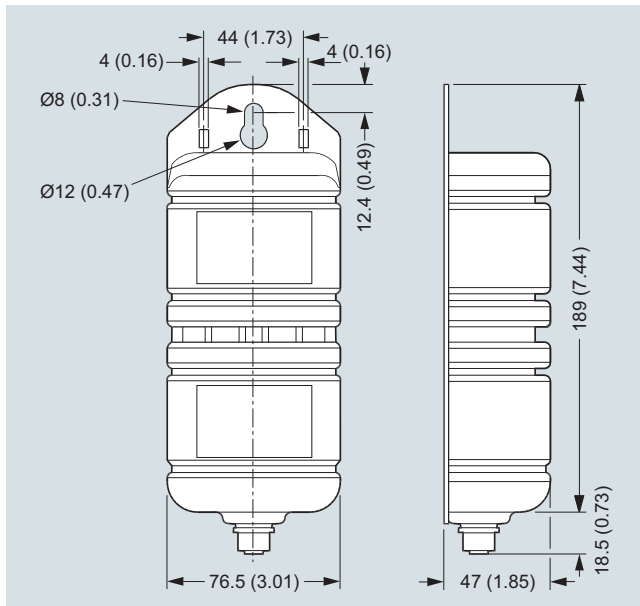
Battery-operated water meter MAG 8000

Remote version



Dimensions in mm (inch), weight 3.5 kg (8 lb)

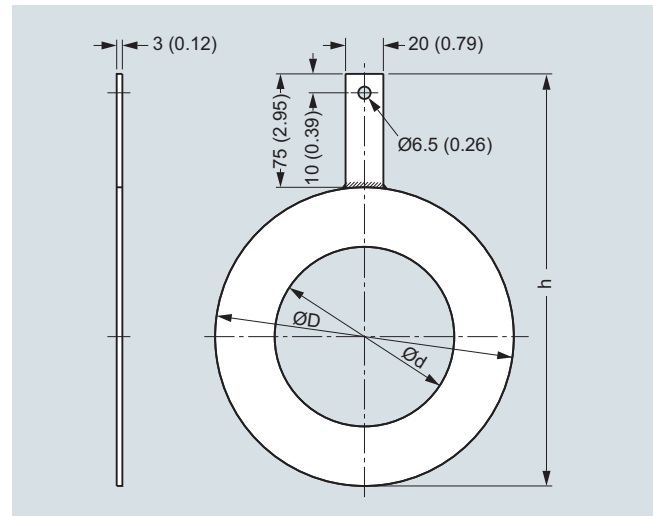
External battery pack



Dimensions in mm (inch), weight 2.0 kg (4.5 lb)

Battery pack has to be mounted in upwards position to ensure maximum battery capacity.

Grounding rings

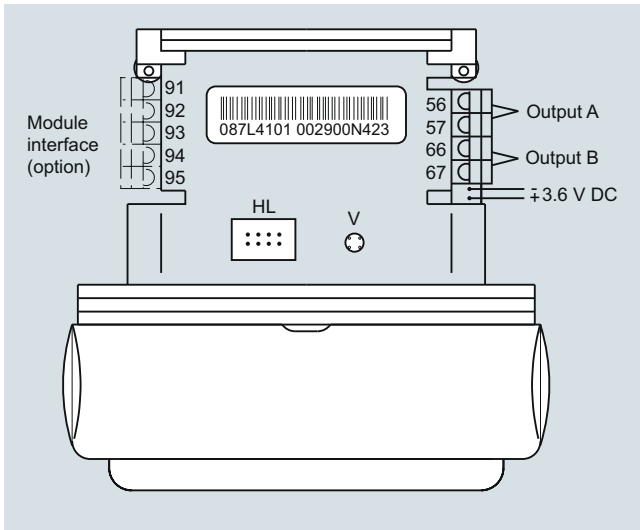


Dimensions in mm (inch) for grounding rings MAG 8000 with EPDM lining (7ME6810 and 7ME6820) DN 25 to DN 300

Dimension	Internal diameter (d)	Outside diameter (D)	h
DN 25	27	68	143
DN 40	38	88	163
DN 50	52	100	175
DN 65	64	120	195
DN 80	79	133	208
DN 100	95	158	233
DN 125	115	188	263
DN 150	145	216	291
DN 200	193	268	343
DN 250	246	324	399
DN 300	295	374	449

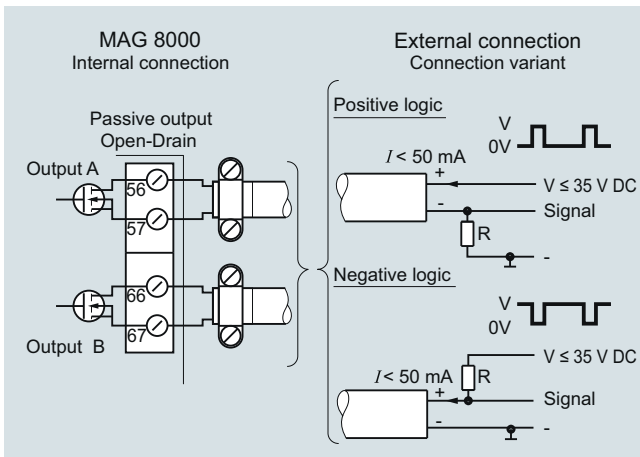
Schematics

Electrical installation and pulse output – Connection diagram



HL = Hardware lock key connection
V = Push button for verification mode

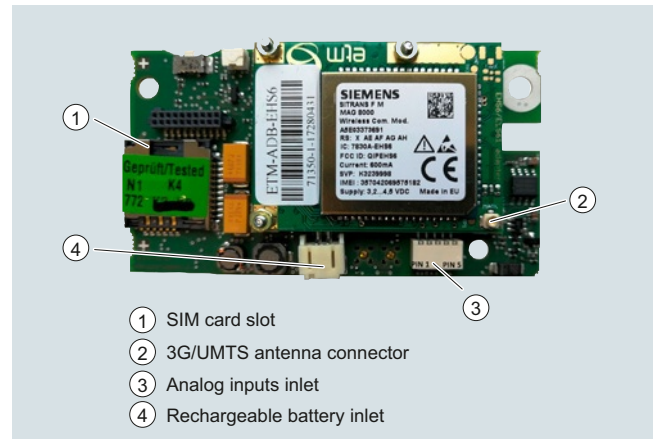
Pulse wire connection



The pulse output can be configured as volume, alarm or call-up. The output can be connected as positive or negative logic. R = pull up/down is selected in relation to the Vx power supply and with a max. current I of 50 mA.

Use shielded cable to avoid EMC problems. Make sure the shield is correctly mounted under the cable clamp (no pig tail).

Electrical installation of 3G/UMTS module












- ① SIM card slot
- ② 3G/UMTS antenna connector
- ③ Analog inputs inlet
- ④ Rechargeable battery inlet


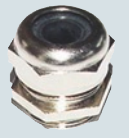






Flow Measurement

SITRANS F M



Battery-operated water meter MAG 8000

Accessories

Description	Article No.	
PC Flow Tool on CD (Download for free from www.siemens.com/flow)	FDK:087L6001	
IrDA infrared interface adapter with USB for data acquisition with 1.2 m (3.9 ft) cable	FDK:087L4163	
Battery backup for mains power supply, 1 pc. D-cell (3.6 V, 16.5 Ah) ¹⁾	A5E03354392	
Rechargeable Lithium battery for MAG 8000 3G/UMTS communication module ¹⁾	A5E03436686	
Internal battery pack, one set of 2 D-cell (3.6 V, 33 Ah) and accessories for replacement ¹⁾ , incl. NBR O-ring	FDK:087L4150	
External battery pack IP68/NEMA 6P with connector, 4 D-cell (3.6 V, 66 Ah) ¹⁾ . Order cable FDK:087L4152 separately.	FDK:087L4151	
Mains power supply 12 ... 24 V AC/DC (average power consumption during line ≤ 0.1 VA) with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included) Temperature range: Fixed laying: -40 ... +90 °C (-40 ... +194 °F) Flexible application: -30 ... +80 °C (-22 ... +176 °F)	FDK:087L4210	
Mains power supply 115 ... 230 V AC, 50/60 Hz, with battery backup up and 3 m (9.8 ft) power cable for external connection (no battery included)	FDK:087L4211	
RS 232 add-on module, point to point communication interface with Modbus RTU protocol	FDK:087L4212	
RS 485 add-on module, multi-drop communication interface with Modbus RTU protocol	FDK:087L4213	
Encoder interface module, with "Sensus" protocol for ITRON 200WP and 100W radio	A5E02475650	
MAG 8000 3G/UMTS module. Rechargeable battery, antenna and analog cable input must be ordered separately	A5E41011589	

Description	Article No.	
One cable entry 2 ... 5 mm (0.08 ... 0.20 ") M12 brass glands with M20 reduction ²⁾ , package of 10 pcs, for 3G/UMTS module antenna cable, power cable of external battery pack, encoder card cable	FDK:087L4154	
One cable entry 6 ... 8 mm (0.24 ... 0.31 ") M20 brass glands package ²⁾ (10 pcs), for pulse output cable or Modbus cable, Cello cable or mains power supply	FDK:087L4155	
One cable entry 8 ... 11 mm (0.31 ... 0.43 ") M20 brass glands package ²⁾ (10 pcs), for SOFREL cable	FDK:087L4156	
One cable entry 11 ... 15 mm (0.43 ... 0.59 ") M20 brass glands package ²⁾ (10 pcs)	FDK:087L4157	
Two cable entries 3.5 ... 5 mm (0.14 ... 0.20 ") M20 brass glands package ²⁾ (10 pcs)	FDK:087L4158	
Two cable entries 5.5 ... 7.5 mm (0.22 ... 0.30 ") M20 brass glands package ²⁾ (10 pcs)	FDK:087L4159	
High gain antenna for MAG 8000 3G/UMTS (PVC, IP68, cable length 5 m (16.4 ft), with SMA male connector (type RG 58) and internal antenna adaptor cable, and single entry cable gland)	A5E40957990	
Analog input cable for MAG 8000 3G/UMTS (2.5 m (8.2 ft)) cable with M12 connector A-Coding female 5 pins, and two-entry cable gland)	A5E03436698	
Potting kit for terminal box of flow sensors for IP68/NEMA 6P	FDK:085U0220	
MAG 8000 Hardware key to access protected parameters	FDK:087L4165	
MAG 8000 demo - training unit pack operating on Alkaline batteries. Transmitter with Flow tool CD, IrDA interface adapter and hardware key (No dangerous goods limitations)	FDK:087L4080	
Antenna adaptor cable for 3G/UMTS module (2 pieces)	A5E41896494	

Battery-operated water meter MAG 8000


Description	Article No.	
Service adaptor for 3G/UMTS module	A5E03436699	
Alkaline battery for MAG 8000 demo transmitter (3 V 13 Ah) (No dangerous goods limitations)	FDK:087L4142	

¹⁾ Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.



²⁾ For cable connection through MAG 8000 transmitter bottom part.







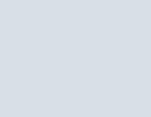
When MAG 8000 (7ME6810 and 7ME6820) is installed in PVC or coated pipelines, grounding rings must be installed additionally.

Grounding rings, type C must be used for the 7ME6810 and 7ME6820 routes (sizes > DN 300). Please see grounding rings in the section MAG 3100 Grounding rings and be aware that the mentioned MLFB codes include only 1 grounding ring. Grounding rings DN 25 to DN 300 in stainless steel are packed in pairs and sold as a "grounding ring kit".

Dimension	Article No.	
DN 25	A5E01002946	
DN 40	A5E01002947	
DN 50	A5E01002948	
DN 65	A5E01002950	
DN 80	A5E01002952	
DN 100	A5E01002953	
DN 125	A5E01002954	
DN 150	A5E01002955	
DN 200	A5E01002957	
DN 250	A5E01002958	
DN 300	A5E01002962	

Spare parts



Description	Article No.	
MAG 8000 transmitter compact replacement kit ¹⁾ . No battery included. With original product label. System number specified by ordering.	FDK:087L4166	
MAG 8000 transmitter remote replacement kit ¹⁾ . No battery included. With original product label. System number specified by ordering.	FDK:087L4202	

Description	Article No.	
MAG 8000 (Advanced version) transmitter compact replacement kit ¹⁾ . No battery included. With blank product label. No system number required.	FDK:087L4203	
MAG 8000 (Advanced version) transmitter remote replacement kit ¹⁾ . No battery included. No system number required.	FDK:087L4204	
MAG 8000 (Basic version) transmitter PCB replacement kit ¹⁾ . No system number required.	A5E01171569	
MAG 8000 (Advanced version) transmitter PCB replacement kit ¹⁾ . No system number required.	FDK:087L4168	
Enclosure top including plastic lid, screws, O-ring and blank product label	FDK:087L4167	
Power cable (1.5 m (4.9 ft)) with IP68/NEMA 6P plugs for external battery (no battery included); PE jacket, ambient temperature: -20 ... +60 °C (-4 ... +140 °F)	FDK:087L4152	
152,4 cm (5 ft.) Encoder interface cable with IP68/NEMA 6P plugs included, for ITRON 200WP and 100W radio; 22 AWG stranded TC conductors, polypropylene insulation, twisted pair, overall Beldfoil shield, 22 AWG stranded TC drain wire, PVC jacket	A5E02551263	
762 cm (25 ft.) Encoder interface cable with IP68/NEMA 6P plugs included, for ITRON 200WP radio; 22 AWG stranded TC conductors, polypropylene insulation, twisted pair, overall Beldfoil shield, 22 AWG stranded TC drain wire, PVC jacket	A5E02551182	

Flow Measurement

SITRANS F M

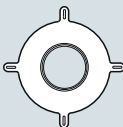
Battery-operated water meter MAG 8000

Description	Article No.	
Service tool kit package with various component for service and replacement. Content: 10 plastic top lids 20 screws 10 wire holders 10 battery cups 10 greased O-rings 20 clamp kits 10 IrDA adaptor holding rings	FDK:087L4162	
Remote cable set 5 m (16.4 ft) with IP68/NEMA 6P plugs - PG 13.5 ²⁾	FDK:087L4108	
Remote cable set 5 m (16.4 ft) with IP68/NEMA 6P plugs - M20	A5E00862482	
Remote cable set 10 m (32.8 ft) with IP68/NEMA 6P plugs - PG 13.5 ²⁾	FDK:087L4109	
Remote cable set 10 m (32.8 ft) with IP68/NEMA 6P plugs - M20	A5E00862487	
Remote cable set 20 m (65.6 ft) with IP68/NEMA 6P plugs - PG 13.5 ²⁾	FDK:087L4110	
Remote cable set 20 m (65.6 ft) with IP68/NEMA 6P plugs - M20	A5E00862492	
Remote cable set 30 m (98.4 ft) with IP68/NEMA 6P plugs - PG 13.5 ²⁾	FDK:087L4111	
Remote cable set 30 m (98.4 ft) with IP68/NEMA 6P plugs - M20	A5E00862497	
10 m cable set with pre-mounted conduit adaptor	A5E33400834	
20 m cable set with pre-mounted conduit adaptor	A5E33400836	

¹⁾ Not applicable to custody transfer (CT) verified systems without re-verification

²⁾ For sensors produced before October 2007.

MAG 8000 (7ME6880) grounding ring service kit, consisting of 2 pcs. grounding rings (AISI 304/1.4301), screws and gaskets

Dimension		Article No.	
Drilled pattern flanges (7 bar)			
DN 50	2"	A5E03082907	
DN 65	2½"	A5E03082908	
DN 80	3"	A5E03082909	
DN 100	4"	A5E03082910	
DN 125	5"	A5E03082911	
DN 150	6"	A5E32877967	
DN 200	8"	A5E03082913	
DN 250	10"	A5E03082914	
DN 300	12"	A5E03082915	
DN 350	14"	A5E03082916	
DN 400	16"	A5E03082917	
DN 450	18"	A5E03082918	
DN 500	20"	A5E03082919	
DN 600	24"	A5E03082920	
AS 2191 table E flanges			
DN 25	1"	A5E33474999	
DN 40	1½"	A5E33475000	
DN 125	5"	A5E33475006	
AS 4087 PN 16 flanges			
DN 50	2"	A5E33475001	
DN 65	2½"	A5E33475002	
DN 80	3"	A5E33475003	
DN 100	4"	A5E33475004	
DN 150	6"	A5E33475007	
DN 200	8"	A5E33475008	
DN 250	10"	A5E33475009	
DN 300	12"	A5E33475010	
DN 350	14"	A5E33475011	
DN 400	16"	A5E33475012	
DN 450	18"	A5E34240921	
DN 500	20"	A5E33475013	
DN 600	24"	A5E33475014	
DN 700	28"	A5E33414889	
DN 800	32"	A5E33414890	
DN 900	36"	A5E33414891	
DN 1000	40"	A5E33414892	
DN 1200	48"	A5E33414893	

Overview



SITRANS F C Coriolis mass flowmeters are designed for measurement of a variety of liquids and gases. The meter offers accurate measurement of mass flow, volume flow, density, temperature and fraction.

Compatibility between transmitters and sensors

Transmitter	Page	Compact	Remote	Ex-Approval	Sensor	Page
FCT030	3/149	Yes	Yes	Yes	FCS300 Standard, DN 15 ... DN 150	3/160
		No	Yes	Yes	MASS 2100, DI 1.5	3/180
		Yes	Yes	Yes	MASS 2100, DI 3, DI 6, DI 15	3/187
		No	Yes	Yes	FC300, DN 4	3/183
FCT010	3/174	Yes	No	Yes	FCS300 Standard, DN 15 ... DN 150	3/160
		No	Yes	Yes	MASS 2100, DI 1.5	3/180
		Yes	Yes	Yes	MASS 2100, DI 3, DI 6, DI 15	3/187
		No	Yes	Yes	FC300, DN 4	3/183
MASS 6000 IP67 Polyamide enclosure	3/205	No	Yes	No	FCS200, DN 10 ... DN 25	3/228
		No	Yes	No	FC300, DN 4	3/183
		No	Yes	No	MASS 2100, DI 1.5	3/180
		Yes	Yes	No	MASS 2100, DI 3 ... DI 15	3/187
MASS 6000 19"	3/210	No	Yes	No	FCS200, DN 10 ... DN 25	3/228
		No	Yes	No	FC300, DN 4	3/183
		No	Yes	No	MASS 2100, DI 1.5	3/180
		No	Yes	No	MASS 2100, DI 3 ... DI 15	3/187
MASS 6000 Ex 19"	3/210	No	Yes	Yes	FCS200, DN 10 ... DN 25	3/228
		No	Yes	Yes	FC300, DN 4	3/183
		No	Yes	Yes	MASS 2100 Ex, DI 1.5	3/180
		No	Yes	Yes	MASS 2100 Ex, DI 3 ... DI 15	3/187
MASS 6000 Ex d Stainless steel enclosure	3/219	No	Yes	Yes	FCS200, DN 10 ... DN 25	3/228
		No	Yes	Yes	FC300, DN 4	3/183
		No	Yes	Yes	MASS 2100 Ex, DI 1.5	3/180
		Yes	Yes	Yes	MASS 2100 Ex, DI 3 ... DI 15	3/187
SIFLOW FC070 Standard	3/224				FCS200, DN 10 ... DN 25	3/228
		No	Yes	No	FC300, DN 4	3/183
					MASS 2100, DI 1.5	3/180
					MASS 2100, DI 3 ... DI 15	3/187
SIFLOW FC070 Ex CT	3/224				FCS200, DN 10 ... DN 25	3/228
		No	Yes	Yes	FC300, DN 4	3/183
					MASS 2100, DI 1.5	3/180
					MASS 2100, DI 3 ... DI 15	3/187

Flow Measurement

SITRANS F C

System information SITRANS F C Coriolis mass flowmeters

Benefits

Greater flexibility

- Wide product program
- High performance and top-end flowmeters
- Compact or remote installation using the same transmitters and sensors within their flowmeter series

Easier commissioning

All SITRANS F C Coriolis flowmeters feature a sensor related memory unit SENSORPROM or SensorFlash which stores calibration data and transmitter settings for the lifetime of the product.

At commissioning the flowmeter commences measurement without any initial programming.

Easier service

- Comprehensive self-diagnosis and service menu enhances troubleshooting and meter verification.
- Transmitter replacement requires no programming. SENSORPROM automatically updates all settings after initialization.

Room for growth

- FC330/FC310:
Digital platform allows for any sensor in the range to be matched in compact or remote.
- MASS 2100/FC300 sensors with FCT digital platform allows all sensors from DI1,5 to DI 15 to be matched with the FCT010 and FCT030 transmitters.
Both analog and digital connections are available.
- MASS 6000:
Available for MASS 2100, FC200 and FC300. USM II the Universal Signal Module with "plug & play" simplicity makes it easy to access and integrate the flowmeter with almost any system and bus-protocol and it ensures the flowmeter will be easy to upgrade to future communication/bus platforms.
- SIFLOW:
Available for MASS 2100, FC200 and FC300.
Direct integration into SIMATIC S7-300 systems or as stand-alone transmitter as a flowmeter specific I/O module ensures fast and smooth startup, seamless integration, fast operation.

Application

Coriolis flowmeters are generally suitable for measuring liquids and gases. The flow measurement is independent of changes in process conditions/parameters such as temperature, density, pressure, viscosity, conductivity and flow profile.

Due to this versatility the meter is easy to install and use. The Coriolis flowmeter is recognized for its high accuracy over a wide turn-down ratio.

The main applications of the Coriolis flowmeter can be found in all industries, such as:

Chemical and pharma	Detergents, bulk chemicals, pharmaceuticals, acids, alkalis, filling and dosing
Food and beverage	Dairy products, beer, wine, soft-drinks, °Plato/°Brix, fruit juices and pulps, bottling, CO ₂ dosing, CIP-liquids
Automotive	Fuel injection nozzle and pump testing, filling of AC units, engine consumption measurement, paint robots
Oil and gas	Filling of gas bottles, furnace control, CNG-dispensers, test separators, LPG, well-head water-cut monitoring
Water and waste water	Dosing of chemicals for water treatment

System information SITRANS F C Coriolis mass flowmeters

Please see Product selector www.pia-selector.automation.siemens.com on the Internet, since some constraints might be related to some of the features



	FC330	FC310	MASS 2100 DI 1.5	MASS 2100 DI 3 to DI 15	FC300 DN 4	FCS200 DN 10 to DN 25	MASS 6000 IP67	MASS 6000 19"	MASS 6000 Ex d	SIFLOW FC070 Std/Ex CT	MASS 2100/FC300 with FCT010	MASS 2100/FC300 with FCT030
	7ME4633	7ME4631	7ME4100	7ME4100	7ME4400	7ME4500	7ME4110	7ME4110	7ME4110	7ME4120	7ME4811	7ME4813
Design												
Compact	•	•		•			•		•		• ³⁾	• ³⁾
Remote	•		•	•	•	•	•	•	•	•	•	•
Transmitter enclosure												
Polyamide, IP67/NEMA 6							•					
Noryl (SIMATIC S7-300), IP20/NEMA 2										•		
Stainless steel IP67/NEMA 6									•			
19" rack IP20/NEMA 2 aluminum								•				
Back of panel IP20 aluminum								•				
Wall mounting IP65 ABS plastic								•				
Front of panel IP65 ABS plastic								•				
Aluminum IP67 Field mounting enclosure	•	•									•	•
Aluminum IP67 Wall mounting enclosure	•											•
Communication												
HART	•						•	•	•			•
PROFIBUS PA	•						•	•	•			•
PROFIBUS DP	•						•	•				•
Modbus RTU/RS 485	•	•					•	•		•	•	•
Modbus RTU/RS 232										•		
FOUNDATION Fieldbus H1							•	•	•			
DeviceNet							•	•				
Supply voltage												
24 V DC	•	•								•	•	•
24 V AC/DC							•	•	•			
115/230 V AC	•						•	•				•
Pipe size												
DI 1.5 (1/16")			•								•	•
DI 3 (1/8")				•							•	•
DN 4 (1/6")					•						•	•
DI 6 (1/4")				•							•	•
DN 10 (3/8")						•						
DI 15 (1/2")				•							•	•
DN 15 (1/2")	•	•				•						
DN 25 (1")	•	•										
DN 50 (2")	•	•										
DN 80 (3")	•	•										
DN 100 (4")	•	•										
DN 150 (6")	•	•										
Process connection norms and pressure												
Pipe thread												
NPT ANSI/ASME B.20.1; PN 100	•	•	•	•	•						•	•
NPT ANSI/ASME B.20.1; PN 350						•						
VCO						•						
ISO 228/1; PN 100	•	•	•	•	•						•	•

• = available

Flow Measurement

SITRANS F C

System information SITRANS F C Coriolis mass flowmeters

Please see Product selector www.pia-selector.automation.siemens.com on the Internet, since some constraints might be related to some of the features



Flange

	FC330	FC310	MASS 2100 DI 1.5	MASS 2100 DI 3 to DI 15	FC300 DN 4	FCS200 DN 10 to DN 25	MASS 6000 IP67	MASS 6000 19"	MASS 6000 Ex d	SIFLOW FC070 Std/Ex CT	MASS 2100/FC300 with FCT010	MASS 2100/FC300 with FCT030
	7ME4633	7ME4631	7ME4100	7ME4100	7ME4400	7ME4500	7ME4110	7ME4110	7ME4110	7ME4120	7ME4811	7ME4813
EN 1092-1 PN 16	•	•										
EN 1092-1 PN 40	•	•		•							•	•
EN 1092-1 PN 63	•	•										
EN 1092-1 PN 100	•	•		•							•	•
ANSI B16.5 Class 150	•	•		•							•	•
ANSI B16.5 Class 300	•	•										
ANSI B16.5 Class 600	•	•		•							•	•
ANSI B16.5 Class 900 ⁵⁾	•	•										
ANSI B16.5 Class 1500 ⁵⁾	•	•										
JIS B2220 10K	•	•										
JIS B2220 20K	•	•										

Dairy

DIN 11851	•	•		•							•	•
DIN 11851 PN 40				•							•	•
Clamp ISO 2852 PN 16				•							•	•
ISO 2853 PN 16				•							•	•
DIN 32676 (ISO) clamp serie A	•	•										
SMS 1145	•	•										
Others on request	•	•	•	•	•						•	•

Pipe material

Stainless steel AISI 316L/ 1.4435/1.4404	•	•	•	•	•						•	•
Nickel-Alloy C4	•	•										
Hastelloy C22/2.4602			•	•	•	• ⁴⁾					•	•

With heating jacket

Internal U-tube											•	•
-----------------	--	--	--	--	--	--	--	--	--	--	---	---

Pressure rating

PN 16	•	•										
PN 40	•	•		•							•	•
PN 63	•	•										
PN 100	•	•	•	•	•						•	•
PN 160											•	•
PN 214						•					•	•
PN 350						•					•	•
High-pressure version ¹⁾			•	•	•						•	•

Accuracy

Flow error ≤ 0.1 % of rate ⁶⁾	•	•	•	•	•						•	•
Flow error ≤ 0.2 % of rate ⁶⁾	•	•										
Flow error ≤ 0.5 % of rate ⁶⁾						•						
Density error ≤ 0.0005 g/cm ³				•							•	•
Density error ≤ 0.001 g/cm ³			•								•	•
Density error ≤ 0.002 g/cm ³	•	•										
Density error ≤ 0.010 g/cm ³	•	•										
Density error ≤ 0.0015 g/cm ³				• ²⁾	•							

Cable glands

PG 13.5								• ³⁾				
½" NPT	•	•					•				•	•
M20	•	•					•		•		•	•

• = available

¹⁾ See technical specifications.

²⁾ DI 3, DI 6 and DI 15

³⁾ Only when mounted in enclosure.

⁴⁾ Process connectors in AISI 316Ti/1.4571

⁵⁾ Sensor pressure and temperature limited to ANSI class 600 rating

⁶⁾ For reference conditions: ISO 9104 and DIN/EN 29104. Increased error can be expected for gas mass flow measurement.

System information SITRANS F C Coriolis mass flowmeters

Please see Product selector www.pia-selector.automation.siemens.com on the Internet, since some constraints might be related to some of the features

**Approvals**Custody transfer

NTEP	● ⁹⁾					●						
Other media than water pattern approval - OIML R 117 (DN 25 to DN 150)	● ⁹⁾											

Hazardous locations

ATEX zone 1	●	●	●	●	●	●	●	●	●	● ³⁾⁴⁾	●	●
IECEX zone 1	●	●				●				● ⁴⁾	●	●
EAC Ex zone 1	● ⁹⁾	● ⁹⁾	●	●	●	●		●	●	● ³⁾⁴⁾		
US /CSA) Div 1	●	●									●	●
Canada (CSA) zone 1	●	●									●	●
FM						●				●		
UL			● ¹⁾	● ¹⁾	●						●	●
CSA										● ⁴⁾		
NEPSI	● ⁹⁾	● ⁹⁾				●						
INMETRO	● ⁹⁾	● ⁹⁾										

Ordinary locations

UL listed (us, ca) c-UL-us Flowmeter						● ²⁾	● ⁷⁾					
UL recognized (us, ca) Flowmeter						● ²⁾⁵⁾	● ⁵⁾⁶⁾					

PED

Fluid group 1 Category III, gas	PED Directive 2014/68/EU	●	●									
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CRN

Category F OF10769.5C	CRN	● ⁹⁾	● ⁹⁾	●	● ⁸⁾	●					● ⁸⁾	● ⁸⁾
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F&B/Pharma

EHEDG		● ⁹⁾¹⁰⁾	● ⁹⁾¹⁰⁾									
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Marine

SITRANS FC310: Germanischer Lloyd/ det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping, Rina, CCS		● ⁹⁾	● ⁹⁾									
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Note: Special conditions for safe use might be specified in certificates or operating instructions.

● = available

¹⁾ Sensor pressure max. 100 bar (1450 psi)

²⁾ Only remote version

³⁾ Can be placed in zone 2 if mounted in minimum IP54 cabinet

⁴⁾ Only Ex version

⁵⁾ 24 V; IP20

⁶⁾ 115 ... 230 V; IP20

⁷⁾ 115 ... 230 V; IP65

⁸⁾ Only DI 6 is CRN

⁹⁾ In preparation

¹⁰⁾ DN 25 to DN 80

Flow Measurement

SITRANS F C

System information SITRANS F C Coriolis mass flowmeters

Function

The flow measuring principle is based on the Coriolis effect. The flowmeter consists of a system FC310 or FC330 or a combination of a sensor type MASS 2100/FC300/FCS200 and a transmitter type MASS 6000/SIFLOW FC070/FCT010 and FCT030.

The SITRANS F C sensors are energized by an electro-mechanical driver circuit which oscillates the pipe at its resonant frequency.

Two pick-ups, 1 and 2 are placed symmetrically on both sides of the driver. When liquid or gas flows through the sensor, Coriolis force will act on the measuring pipe and cause a pipe deflection which can be measured as a phase shift on pick-up 1 and 2. The phase shift is proportional to the mass flow rate.

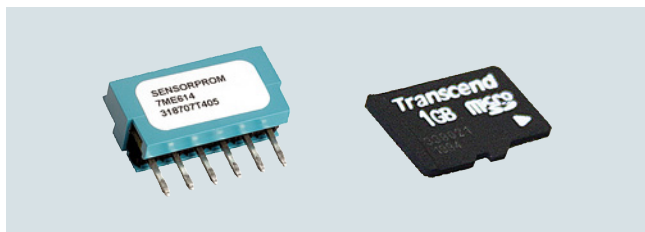
The amplitude of the driver is automatically regulated to ensure a stable output from the 2 pick-ups.

The temperature of the sensor is measured by a Pt1000.

The flow-proportional signal from the 2 pick-ups, the temperature measurement and the driver frequency are fed into the SITRANS F C transmitter for calculations of mass, volume, fraction, temperature and density.

The signal transfer function is based on a DFT technology (Discrete Fourier Transformation).

The transmitter has a built-in noise filter, which can be used to improve the meter's performance if the installation and application conditions are not ideal. Typically influence from process noise such as pump pulsations, mechanical vibrations, oscillating valves can be reduced considerably.



SENSORPROM and SensorFlash flow memory units

FC310 flow transmitters communicate via Modbus RTU and FC330 via HART/Modbus/PROFIBUS DP/ PROFIBUS PA.

Integration

Installation requirements/System design information

The SITRANS F C mass flowmeter is suitable for in- and outdoor installations. The standard instrument meets the requirements of Protection Class IP67/NEMA 4x or IP65. The flowmeter is bidirectional and can be installed in any orientation, however, the sensor is not self-emptying in all positions.

It is important to ensure that the meter tubes are always completely filled with homogeneous fluid. Otherwise measuring errors may occur.

The corrosion resistance of the fluid-wetted materials must be evaluated.

The pressure drop through the sensor is a function of the properties of the fluid and the flow rate. The **Sizing Program** (download from www.siemens.com) can be used to calculate the pressure drop.

The preferred flow direction is indicated by the arrow on the flowmeter. Flow in this direction will be indicated as positive.

Installation orientation

- FCS300 – sensors
The optimal installation orientation is vertical with flow upwards (liquids) and up to 10° off vertical for self-draining.
- MASS 2100/FC300 – sensors
The optimal installation orientation is horizontal.

Supports

- In order to support the weight of the flowmeter and to ensure reliable measurements when external effects exist (e.g. vibrations), the sensor should be installed in well-supported pipelines. Supports or hangers should be installed symmetrically and stress-free in close proximity to the process connections.

Shut-off devices

- To conduct a system zero adjustment, shut-off devices are required in the pipeline:
 - In horizontal installations at the outlet for FC300 and the inlet for MASS 2100.
 - In vertical installations at the inlet.
- When possible, shut-off devices should be installed both up- and downstream of the flowmeter. A bypass valve is recommended where regular zero adjustment is planned to avoid disruption of the flowing system.

Installation: straight run requirements

- The mass flowmeter does not require any flow condition or straight inlet sections. Care should be exercised to ensure that any valves, gates, sight glasses etc. do not cavitate and are not set into vibration by the flowmeter.

System design information

- The presence of gas bubbles in the fluid may result in erroneous measurements, particularly in the density measurement. Therefore the flowmeter should not be installed at the highest point in the system where bubbles are possibly largest.
- Long drop lines downstream from the flowmeter should be avoided to prevent the meter tube from draining during operation.
- The flowmeter should not come into contact with any other objects. Avoid attachments to the housing.
- When the cross-section of the connecting pipeline is larger than the sensor size, suitable standard reducers may be installed.
- If strong vibrations exist in the pipeline, they should be damped using elastic pipeline elements. The damping devices must be installed outside the supported flowmeter section and outside the section between the shut-off devices.
- Make sure that any dissolved gases, which are present in many liquids, do not outgas. The back pressure at the outlet should be at least 0.2 bar (3 psi).
- Assure that operation below the vapor pressure cannot occur when a vacuum exists in the meter tube or for fluids which boil readily.
- The sensor should not be installed in the vicinity of strong electromagnetic fields, e.g. near motors, pumps, transformers etc.
- When operating more than one meter in one or multiple interconnected pipelines, the sensors should be spaced distant from each other or the pipelines should be decoupled to prevent cross talk.

Zero adjustment

- In order to adjust the zero under operating conditions it must be possible to reduce the flow rate to „ZERO“ while the meter tube is completely filled. It is important for accurate measurements that during the zero adjustment there are no gas bubbles in the flowmeter. It is also important that the pressure and temperature in the meter tube be the same as that which exists during operation.

Technical specifications**Flowmeter uncertainty/specifications**

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at flow facilities accredited according to ISO/IEC 17025 by an accreditation body.

The accreditation body has signed the ILAC MRA agreement (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement). Therefore the accreditation ensures international traceability and recognition of the test results in 39 countries worldwide, including the US (NIST traceability).

A calibration certificate is shipped with every sensor and calibration data are stored in the SENSORPROM memory unit. FC310 and FC330 meters have the calibration data written to the front end section. A backup of all calibrations and PDF copies of all certificates are stored in the SensorFlash.

FC3300 sensors: for liquids

	Q_{min} at 1% accuracy water		Q_{nom}¹⁾		100 % (Q_{max})²⁾	
	kg/h	(lb/min)	kg/h	(lb/min)	kg/h	(lb/min)
DN 15 (½")	70	(2.57)	4 500	(165.3)	8 000	(293.9)
DN 25 (1")	240	(8.92)	20 500	(753.2)	35 000	(1 286)
DN 50 (2")	800	(29.4)	49 000	(1 800)	90 000	(3 307)
DN 80 (3")	2 000	(73.5)	122 000	(4 483)	250 000	(9 186)
DN 100 (4")	4 000	(147)	273 000	(10 031)	520 000	(19 108)
DN 150 (6")	6 900	(253)	459 200	(16 873)	860 000	(31 600)

MASS 2100 and FC300 sensors: for liquids

	Q_{min} at 1% accuracy water		Q_{nom}¹⁾		100 % (Q_{max})²⁾	
	kg/h	(lb/h)	kg/h	(lb/h)	kg/h	(lb/h)
DI 1.5 (1/16")	0.1	(0.22)	15	(33)	30	(66)
DI 3 (1/8")	1.0	(2.2)	125	(275)	250	(550)
DN 4 (1/6")	1	(2.2)	175	(386)	350	(770)
DI 6 (¼")	0	(11)	500	(1 102)	1 000	(2 200)
DI 15 (½")	5	(44)	2 800	(6 173)	5 600	(12 345)

¹⁾ Q_{nom} = Δ 1 barg @ water 20 °C.

²⁾ Q_{max} = 10 m/sec @ water 20 °C at inlet (up to 30 m/s in the flowtubes).

For gas applications the massflow rate is depending on the gas type. The max. flowrate is calculated with the Mach-Number to be Ma = 0.3.

- For flow > 5 % of the sensors max. flow rate, the error can be read directly from the curve below.
- For flow < 5 % of the sensors max. flow rate, use the formula to calculate the error.
- The error curve is plotted from the formula:

$$E = \pm \sqrt{(\text{Cal.})^2 + \left(\frac{Z \times 100}{q_m}\right)^2}$$

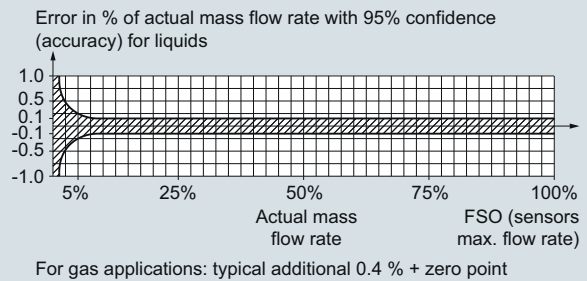
E = Error [%]

Z = Zero point error [kg/h]¹⁾

q_m = Mass flow [kg/h]

Cal. = Calibrated flow accuracy: 0.10, 0.15 or 0.20

¹⁾ Zero point error for each sensor is shown in the tables below.

**Reference conditions for flow calibrations (ISO 9104 and DIN/EN 29104)**

Flow conditions	Fully developed flow profile
Temperature, medium	25 °C (77 °F) ± 5 K
Temperature, ambient	25 °C (77 °F) + 10/-5 K
Liquid pressure	2 ± 1 bar
Density	0.997 g/cm ³
Brix	40 °Brix
Supply voltage	U _n ± 1 %
Warming-up time	30 min.
Cable length	5 m between transmitter and sensor

Additions in the event of deviations from reference conditions

Current output	As pulse output ± (0.1% of actual flow + 0.05 % FSO)
Effect of ambient temperature	<ul style="list-style-type: none"> • Display/frequency/pulse output: < ± 0.003%/K act. • Current output: < ± 0.005 %/K act.
Effect of supply voltage	< 0.005 % of measuring value on 1 % alteration

Flow Measurement

SITRANS F C

System information SITRANS F C Coriolis mass flowmeters

Sensor type		FC300	MASS 2100			
Sensor size		DN 4 (1/6")	DI 1.5 (1/16")	DI 3 (1/8")	DI 6 (1/4")	DI 15 (1/2")
Number of measuring pipes		1	1	1	1	1
Mass flow						
Linearity error ¹⁾	% of rate	0.10	0.10	0.10	0.10	0.10
Repeatability error	% of rate	0.05	0.05	0.05	0.05	0.05
Max. zero point error	[kg/h]	0.010	0.001	0.010	0.050	0.200
Density						
Density error ²⁾	[g/cm ³]	0.0025 ³⁾	0.001	0.0015	0.0015	0.0005
Repeatability error	[g/cm ³]	0.0002	0.0002	0.0002	0.0002	0.0001
Range	[g/cm ³]	0 ... 2.9	0 ... 2.9	0 ... 2.9	0 ... 2.9	0 ... 2.9
Temperature						
Error	[°C (°F)]	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)
Brix						
Error	[°Brix]	0.3	0.2	0.3	0.3	0.1

¹⁾ For reference conditions: ISO 9104 and DIN/EN 29104. Increased error can be expected for gas mass flow measurement (For gas measurement typically additional +0.40 % error).

²⁾ Accuracy is only valid when sensor is density-calibrated.

³⁾ Hastelloy C22 version.

Sensor type		FCS300					
Sensor size		DN 15 (1/2")	DN 25 (1")	DN 50 (2")	DN 80 (3")	DN 100 (4")	DN 150 (6")
Number of measuring pipes		2	2	2	2	2	2
Mass flow:							
Linearity error ¹⁾	% of rate Standard	0.1	0.1	0.1	0.1	0.1	0.1
	% of rate Medium	0.2	0.2	0.2	0.2	0.2	0.2
Repeatability of flowrate at rates > 5 % of Q _{max}	% of rate	0.05	0.05	0.05	0.05	0.1	0.1
Max. zero point error	0.1 % [kg/h (lb/min)]	0.4 (0.0147) ²⁾	1.35 (0.0495) ²⁾	4.5 (0.165) ²⁾	20.0 (0.735)	41.6 (1.628)	68.8 (2.528)
	0.2 % [kg/h (lb/min)]	0.6 (0.0235)	2.16 (0.0792)	7.2 (0.264)	20.0 (0.735)	41.6 (1.628)	68.8 (2.528)
Density							
Density error	(Standard) [g/cm ³]	0.010	0.010	0.010	0.010	0.010	0.010
	(Extended) [g/cm ³]	0.002 ³⁾	0.002 ³⁾	0.002 ³⁾	0.002 ³⁾	0.002 ³⁾	0.002 ³⁾
Range	[kg/dm ³]	0.001 ... 5.0	0.001 ... 5.0	0.001 ... 5.0	0.001 ... 5.0	0.001 ... 5.0	0.001 ... 5.0
Repeatability error	[kg/m ³]	± 0.25	± 0.25	± 0.25	± 0.25	± 0.25	± 0.25
Temperature							
Error	[°K]	0.5	0.5	0.5	0.5	0.5	0.5

¹⁾ For reference conditions: ISO 9104 and DIN/EN 29104. Increased error can be expected for gas mass flow measurement (For gas measurement typically additional +0.4 % error).

²⁾ In preparation: currently as for 0.2 % accuracy class.

³⁾ In preparation: 0.0005 g/cm³

Technical specifications PROFIBUS PA/DP for FCT030**General specifications**

PROFIBUS device profile	Profile V 4.0 and compatible to V 3.x
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Electrical specification DP**Physical layer specifications**

Applicable standard	IEC 61158/EN 50170
Physical Layer (Transmission technology)	RS 485
Transmission speed	≤ 12 Mbit/s
Number of stations	Up to 32 per line segment (maximum total of 126)

Cable specification (Type A)

Cable design	Two wire twisted pair
Shielding	CU shielding braid or shielding braid and shielding foil
Impedance	35 up to 165 Ω at frequencies from 3 ... 20 MHz
Cable capacity	< 30 pF per meter
Core diameter	> 0.34 mm ² , corresponds to AWG 22
Resistance	< 110 Ω per km
Signal attenuation	Max. 9 dB over total length of line section
Max. bus length	100 m at 12 Mbit/s, up to 1.2 km at 93.75 kbit/s. Extendable by repeaters

Electrical specification PA**Physical layer specifications**

Applicable standard	IEC 61158/EN 50170
Physical Layer (Transmission technology)	IEC-61158-2
Transmission speed	31.25 kbit/s
Number of stations	Up to 32 per line segment (maximum total of 126)
Max. basic current [I _B]	14 mA
Fault current [I _{FDE}]	0 mA
Bus voltage	9 ... 32 V (non Ex)

Preferred cable specification (Type A)

Cable design	Two wire twisted pair
Conductor area (nominal)	0.8 mm ² (AWG 18)
Loop resistance	44 Ω/km
Impedance	100 Ω ± 20 %
Wave attenuation at 39 kHz	3 dB/km
Capacitive asymmetry	2 nF/km
Bus termination	Passive line terminated at both ends
Max. bus length	Up to 1.9 km. Extendable by repeaters

IS (Intrinsic Safety) data

Required sensor electronics	Compact mounted SITRANS FCT030
FISCO	Yes
Max. U _I	17.5 V
Max. I _I	380 mA
Max. P _I	5.32 V
Max. L _I	10 μH
Max. C _I	5 nF
Max. U _O	1.3 V
Max. I _O	50 μA

FISCO cable requirements

Loop resistance R _C	15 ... 150 Ω/km
Loop inductance L _C	0.4 ... 1 mH/km
Capacitance C _C	80 ... 200 nF/km
Max. Spur length in IIC and IIB	30 m
Max. Trunk length in IIC	1 km
Max. Trunk length in IIB	5 km

PROFIBUS parameter support

The following parameters are accessible using a Class 1 Master.

Cyclic services:

Input (Master view)	Parameter	FCT030
	Mass flow	✓
	Volume flow	✓
	Media temperature	✓
	Frame temperature	✓
	Standard volume flow	✓
	Density	✓
	Fraction A ¹⁾	✓
	Fraction B ¹⁾	✓
	Pct Fraction A ¹⁾	✓
	Pct Fraction B ¹⁾	✓
	Totalizer 1	✓
	Totalizer 2	✓
	Totalizer 3	✓
	Digital dosing control	✓
	Analog dosing control	✓
	Dosing status	✓
Output (Master view)	Control totalizer 1+2+3	✓
	Control commands as Zero point adjustment	✓

¹⁾ Requires a flowmeter ordered with fraction option.

Flow Measurement

SITRANS F C

System information SITRANS F C Coriolis mass flowmeters

Technical specifications PROFIBUS PA/DP for MASS 6000

General specifications

PROFIBUS device profile	3.00 class B
Certified	Yes, according to Profile for process control devices V3.00.
MS0 connections	1
MS1 connections	1
MS2 connections	2

Electrical specification DP

Physical layer specifications

Applicable standard	IEC 61158/EN 50170
Physical Layer (Transmission technology)	RS 485
Transmission speed	≤ 1.5 Mbit/s
Number of stations	Up to 32 per line segment (maximum total of 126)

Cable specification (Type A)

Cable design	Two wire twisted pair
Shielding	CU shielding braid or shielding braid and shielding foil
Impedance	35 up to 165 Ω at frequencies from 3 ... 20 MHz
Cable capacity	< 30 pF per meter
Core diameter	> 0.34 mm ² , corresponds to AWG 22
Resistance	< 110 Ω per km
Signal attenuation	Max. 9 dB over total length of line section
Max. bus length	200 m at 1500 kbit/s, up to 1.2 km at 93.75 kbit/s. Extendable by repeaters

Electrical specification PA

Physical layer specifications

Applicable standard	IEC 61158/EN 50170
Physical Layer (Transmission technology)	IEC-61158-2
Transmission speed	31.25 kbit/s
Number of stations	Up to 32 per line segment (maximum total of 126)
Max. basic current [I _B]	14 mA
Fault current [I _{FDE}]	0 mA
Bus voltage	9 ... 32 V (non Ex)

Preferred cable specification (Type A)

Cable design	Two wire twisted pair
Conductor area (nominal)	0.8 mm ² (AWG 18)
Loop resistance	44 Ω/km
Impedance	100 Ω ± 20 %
Wave attenuation at 39 kHz	3 dB/km
Capacitive asymmetry	2 nF/km
Bus termination	Passive line terminated at both ends
Max. bus length	Up to 1.9 km. Extendable by repeaters

IS (Intrinsic Safety) data

Required sensor electronics	Compact mounted SITRANS F C MASS 6000 Ex d
FISCO	Yes
Max. U _I	17.5 V
Max. I _I	380 mA
Max. P _I	5.32 V
Max. L _I	10 μH
Max. C _I	5 nF
Max. U _o	1.3 V
Max. I _o	50 μA

FISCO cable requirements

Loop resistance R _C	15 ... 150 Ω/km
Loop inductance L _C	0.4 ... 1 mH/km
Capacitance C _C	80 ... 200 nF/km
Max. Spur length in IIC and IIB	30 m
Max. Trunk length in IIC	1 km
Max. Trunk length in IIB	5 km

PROFIBUS parameter support

The following parameters are accessible using a MS0 relationship from a Class 1 Master.
MS0 specifies cyclic Data Exchange between a Master and a Slave.

Cyclic services:

Input (Master view)	Parameter	MASS 6000
	Mass flow	✓
	Volume flow	✓
	Temperature	✓
	Density	✓
	Fraction A ¹⁾	✓
	Fraction B ¹⁾	✓
	Pct Fraction A ¹⁾	✓
	Totalizer 1	✓
	Totalizer 2 ²⁾	✓
	Batch progress ²⁾	✓
	Batch setpoint	✓
	Batch compensation	✓
	Batch status (running ...)	✓
Output (Master view)	Set Totalizer 1+2	✓
	Set Mode Totalizer 1+2	✓
	Batch control (start, stop ...)	✓
	Batch setpoint	✓
	Batch compensation	✓

¹⁾ Requires a SENSORPROM containing valid fraction data.

²⁾ Value returned is dependent on the BATCH function.

When ON, Batch progress is returned.

When OFF, TOTALIZER 2 is returned.

Overview



FCT030 is based on the latest developments within digital signal processing technology – engineered for high measuring performance, fast response to step changes in flow, fast dosing applications, high immunity against process noise, easy to install commission and maintain.

The FCT030 transmitter delivers true multi-parameter measurements i.e. massflow, volumeflow, standard volume flow, density, temperature and fraction.

The FCT030 IP67 transmitter can be remote connected or compact mounted with all sensors of type FCS300, sizes DN 15 to DN 150, MASS 2100 DI 1.5, DI 3, DI 6, DI 15 and FC300 DN 4.

Fraction

The transmitter FCT030 can be set up at works to measure and report various fraction concentrations of two-part mixtures or solutions. Where a discrete relationship exists between concentration and density at particular temperatures a calculation is performed and the percentage concentration by volume or mass of Part A or Part B (100 % minus Part A) is measured. For solutions and some mixtures the total mass, or dry weight, is also available.

In some industries, a selection of standard density scales has been adopted to represent the density or relative density of the process fluid.

If "Standard fractions" option is chosen at ordering, the following fraction or standard density scales can be selected in the setup menu:

- | | |
|--------------------|-------------------------------|
| • API number | • Twaddell |
| • Balling | • %HFCS42 |
| • °Baumé light | • %HFCS55 |
| • °Baumé heavy | • %HFCS90 |
| • °Brix | • Ethanol-Water 0 % to 20 % |
| • °Oeschlé | • Ethanol-Water 15 % to 35 % |
| • Plato | • Ethanol-Water 30 % to 55 % |
| • Specific Gravity | • Ethanol-Water 50 % to 100 % |

Application

SITRANS FCT030 transmitters are suitable for applications within the entire process industry where there is a demand for accurate flow measurement. The meter is capable of measuring both liquid and gas flow.

Coriolis flowmeters can be applied in all industries, such as:

- Chemical & Pharma: detergents, bulk chemicals, acids, alkalis, paint mixing systems, solvents and resins, pharmaceuticals, blood products, vaccines, insulin production
- Food & Beverage: dairy products, beer, wine, soft drinks, °Brix/°Plato, fruit juices and pulps, bottling, CO₂ dosing, CIP/SIP-liquids, mixture recipe control
- Automotive: fuel injection nozzle & pump testing, filling of AC units, engine consumption
- Oil & Gas: filling of gas bottles, furnace control, test separators
- Hydrocarbon processing: oil refining, derivatives manufacturing, polymerisation
- Water & Waste Water: dosing of chemicals for water treatment

The multiple outputs and bus communication mean that all of the process information can be read either instantaneously (10 ms update) or periodically as plant operation requires.

Benefits

Flow calculation and measurement

- Dedicated mass flow calculation with DSP technology
- Fast dosing and flow step response with maximum 10 ms response time
- 100 Hz update rate to all outputs
- Maximum data age from pickup to output is 20 ms (two update cycles)
- Independent low flow cut-off settings for mass and volume flowrates
- Automatic zero-point adjustment on command from discrete input or host system
- Empty pipe monitoring

Operation and display

- User-configurable operation display
 - Full graphical display 240 x 160 pixels with up to 6 programmable views
 - Self-explaining alarm handling/log in clear text
 - Help text for all parameters appears automatically in the configuration menu
 - Keypad can be used for controlling dosing as start/stop/hold/reset
- SensorFlash technology stores production specific system documentation and provides removable memory of all flowmeter setups and functions
 - Calibration certificates
 - Pressure and material test certificates (as ordered)
 - Non-volatile memory backup of operational data
 - Transfer of user configuration to other flowmeters
 - Alarm history log
 - Parameter change log
 - Logging of min and max process values
 - Data logging of process values and parameter (Version 4.0)

Alarms and safety

- Advanced diagnosis and service menu enhances troubleshooting and meter validation
- Configurable upper and lower alarm and warning limits for all process values
- Alarm handling can be selected between Siemens and NAMUR standard configurations
- FCT030 is in preparation to be certified for integrated safety in accordance with IEC 61508 and IEC 61511 as a compact FC330.
 - SIL 2 (single-channel operation) in preparation
 - SIL 3 (dual-channel operation) in preparation

Outputs and control

- Built-in dosing controller with compensation and monitoring comprising 3 built-in totalizers
- Multi-parameter outputs, individually configurable for mass-flow, volume flow, standard volume flow, density, temperature or fraction flow such as °Brix or °Plato

Flow Measurement

SITRANS F C

Transmitter SITRANS FCT030

Up to four I/O channels are configured as follows:

Channel 1

Channel 1 is 4 to 20 mA analog output with HART 7.5, PROFIBUS PA, PROFIBUS DP and Modbus RS485 RTU. The current signal can be configured for massflow, volumeflow or density, standard volume flow, medium temperature, Fraction A and B and Fraction A% and B%.

Channel 2

Channel 2 is a signal output which can be freely configured for any process variable.

- Analog current (0/4 to 20 mA)
- 3 stage analog valve dosing control
- Frequency or pulse
- Digital one or two-valve dosing control in combination with channel 3 or 4
- Operational and alarm status

Channels 3 and 4

Channels 3 and 4 can be ordered with signal (freely configured for any process variable) or relay outputs, or signal input.

Signal

Signal output can be user configured to:

- Analog current (0/4 to 20 mA)
- 3 stage analog valve dosing control
- Frequency or pulse
- Redundant frequency or pulse (linked to Channel 2)
- Digital one or two-valve dosing control
- Operational and alarm status

Relay

Relay output(s) can be user configured to:

- Digital one or two-valve dosing control
- Operation status including flow direction
- Alarm status

Signal input

Signal input can be user-configured for

- Dosing control
- Totalizer reset functions
- Force or freeze output(s)
- Initiate automatic zero point adjustment

Signal outputs and inputs for non hazardous areas can be changed for active or passive operations by dip switch.

For hazardous areas Signal outputs and inputs can't be changed by dip switch, and has to be selected individually by ordering.

During service and maintenance all outputs can be forced to a preset value for simulation, verification or calibration purposes.

Approvals and certificates

The FCT030 Coriolis flowmeter program was designed from the ground up to comply with or exceed the requirements of international standards and regulations.

Design

The transmitter SITRANS FCT030 is designed in an IP67/NEMA 4X aluminum enclosure with corrosion resistant coating. It can be remote connected or compact mounted with an sensor

- FCS300 DN 15, DN 25, DN 50, DN 80, DN 100 and DN 150,
- MASS 2100 DI 1.5, DI 3, DI 6, DI 15 and
- FC300 DN 4.

FCT030 is available with current output HART 7.5, Modbus RS485 RTU, PROFIBUS DP or PROFIBUS PA as standard on Channel 1.

The transmitter has a modular design with discrete, replaceable electronic modules and connection boards to maintain separation between functions and facilitate field service. All modules are fully traceable and their provenance is included in the transmitter setup.

SensorFlash

SensorFlash is a standard, 4 GByte micro SD card with the ability to be updated by PC. It is supplied with each sensor with the complete set of certification documents including calibration report. Material, pressure test, factory conformance certificates are optional at ordering.

The Siemens SensorFlash memory unit offers the following features and benefits:

- Automatically program any similar transmitter in seconds to the operation standard
- Transmitter replacement in less than 5 minutes
- True "plug & play" provided by integrated cross-checking data consistency and HW/SW version verification
- Permanent memory of operational and functional information from the moment that the flowmeter is switched on
- New firmware updates can be downloaded from the SIEMENS internet portal for Product Support and placed onto SensorFlash (unmounted from the transmitter and inserted into a PC's SD card slot). The firmware is then inserted into the existing flowmeter and the complete system upgraded.
- Storing of alarm history log
- Storing of parameter change log
- Storing of process peak values log

Datalogging on SensorFlash

The following functions are available:

- Logging of process values
- Logging of parameter settings
- Selectable logging interval

Function

The following functions are available:

- Mass flowrate, volume flowrate, density, process temperature, frame temperature, fraction flow
- Up to four output/input channels selected at ordering
- Outputs can be individually configured with mass, volume, density etc.
- Three built-in totalizers which can count forward, backward or forward and backward
- Low flow cut-off, adjustable
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction adjustable
- Alarm system consisting of alarm-log, alarm pending menu
- Internal data logger is updated each 10 minutes with operational data such as system health, totalizer values, all configurations and data needed for custody transfer requirements to OIML R 117 and NTEP
- Display of operating time with real-time clock. Daylight saving time is not implemented
- Uni/bidirectional flow measurement
- Flowrate outputs are freely configurable between maximum negative and maximum positive flows according to the sensor capacity
- Limit switches programmable for flow, density, temperature or fraction process values. Limit points can be graded as warning and alarm for values both above and below nominal process conditions
- Process noise filter for optimization of measurement performance under non-ideal application conditions. 5-stage pumping filter compensates for flow fluctuations caused by e.g. single acting piston pumps
- Full dosing controller with 5 user-configurable recipes
- Automatic zero adjustment menu, with zero point evaluation display
- Full service menu for effective and straight forward application and meter troubleshooting
- Precise temperature measurement ensures optimum accuracy on massflow, density and fraction flow.
- Fraction flow computation is based on a 5th-order algorithm matching known applications.
- Audit trail information, stores parameters changes with time stamp information
- Simulation of process values, status information and alarms
- Aerated flow filtering system, for advanced filtering of fluids with gas or air bubbles
- Datalogging of process values and parameter changes on SensorFlash

Flow Measurement

SITRANS F C

Transmitter SITRANS FCT030

Technical specifications

Process media	<ul style="list-style-type: none"> Fluid Group 1 (suitable for dangerous fluids) Aggregate state: Paste/light slurry, liquid and gas
Number of process variables	7
Measurement of	<ul style="list-style-type: none"> Mass flow Volume flow Density Process media temperature Standard volume flow Reference density Fraction A flow Fraction B flow Fraction A % Fraction B %
Current output	
Current	0 ... 20 mA or 4 ... 20 mA (Channel 1 only 4 ... 20 mA)
Load	< 500 Ω per channel
Time constant	0 ... 100 s adjustable
Digital output¹⁾	
Pulse	41.6 μs ... 5 s pulse duration
Frequency	0 ... 12.5 kHz, 50 % duty cycle, 120 % overscale provision
Time constant	0 ... 100 s adjustable
Active	0 ... 24 V DC, 110 mA, short-circuit-protected
Passive	3 ... 30 V DC, max. 110 mA
Relay	
Type	Change-over voltage-free relay contact
Load	30 V AC/100 mA
Functions	Alarm level, alarm number, limit, flow direction
Digital input¹⁾	
Voltage	15 ... 30 V DC (2 ... 15 mA)
Functionality	Start/stop/hold/continue dosing, reset totalizer 1 and 2, force output, freeze output
Galvanic isolation	All inputs and outputs are galvanically isolated, isolation voltage 500 V.
Cut-off	
Low-flow	0 ... 9.9 % of maximum flow
Limit function	Mass flow, volume flow, fraction, density, sensor temperature
Totalizer	Three eight-digit counters for forward, net or reverse flow
Display	<ul style="list-style-type: none"> Background illumination with alphanumerical text, 3 × 20 characters to indicate flow rate, totalized values, settings and faults. Time constant as current output 1 Reverse flow indicated by negative sign
Zero point adjustment	Via keypad or remote via digital input

Ambient temperature	
Operation	
• Transmitter	-40 ... +60 °C (-40 ... +140 °F), (humidity max. 95 %)
• Display	-20 ... +60 °C (-4 ... +140 °F)
Storage	
• Transmitter	-40 ... +70 °C (-40 ... +158 °F) (Humidity max. 95 %)
• Display	-20 ... +70 °C (-4 ... +158 °F)
Communication Ch1	HART 7.5 PROFIBUS PA PROFIBUS DP Modbus RS485 RTU
Enclosure	
Material	Aluminum
Rating	IP67/NEMA 4X to IEC 529 and DIN 40050 (1 mH ₂ O for 30 min.)
Mechanical load	18 ... 400 Hz random, 3.17 g RMS, in all directions
Supply voltage	
Supply	20 ... 27 V DC ± 10%; 100 ... 240 V AC ± 10 %, 47 ... 63 Hz
Fluctuation	No limit
Power consumption	7.5 W/15 VA
EMC performance	
Emission	EN 55011/CISPR-11 (Class A)
Immunity	EN/IEC 61236-1 (Industry)
NAMUR	Within the value limits according to "General requirements" with error criteria A in accordance with NE 21
Environment	
Environmental conditions acc. to IEC/EN/UL 61010-1	<ul style="list-style-type: none"> Altitude up to 2000 m Pollution degree 2
Maintenance	The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis.
Cable glands	<p>Cable gland are available in Nylon, Nickel plated brass or stainless steel (316L/W1.4404) in the following dimensions:</p> <ul style="list-style-type: none"> 1 × M25, 2 × M20 3 × ½" NPT
Digital cable connection	Standard industrial signal cable up to 75 m long with 2 x screened pairs or 4-wire overall screen can be laid between the sensor and transmitter. Siemens offers cables in a selection of pre-cut lengths and prepared for either gland or plug connection.
Analog cable connection (MASS 2100/FC300)	<p>Standard industrial cable up to 15 m distance between sensor and transmitter.</p> <p>PVC insulated 5 × 2 × Ø 0.34 mm, twisted and screened in pairs, temperature range -20 ... +105 °C</p> <p>Siemens offers cables in a selection of pre-cut lengths and with two M20 connectors mounted.</p>

¹⁾ With 300 Ω internal impedance. For coil switching use the passive output option.

Approvals

Hazardous area

- ATEX, IECEx, cCSAus (Class 1 Div 1), EAC Ex, cCSAus Zone 1, NEPSI, INMETRO (depending on version and configuration)

Custody transfer (in preparation)

- Zone 1:
Ex d e ia [ia Ga] IIC T6 Gb
- OIML R 117 type approval to a wide variety of liquids other than water (in preparation)

Pressure equipment

- NTEP for US and Canada (in preparation)

Hygienic applications (in preparation)

- PED
- CRN (in preparation)
- EHEDG (in preparation) for hygienic variant sensors (DN 25 ... DN 80)
- External cleanability satisfies EHEDG

Certificates

Safety Integration Level (in preparation)

- SIL 3 for software (in preparation)
- SIL 2 for hardware (in preparation)
- SIL 3 for redundant hardware systems (in preparation)

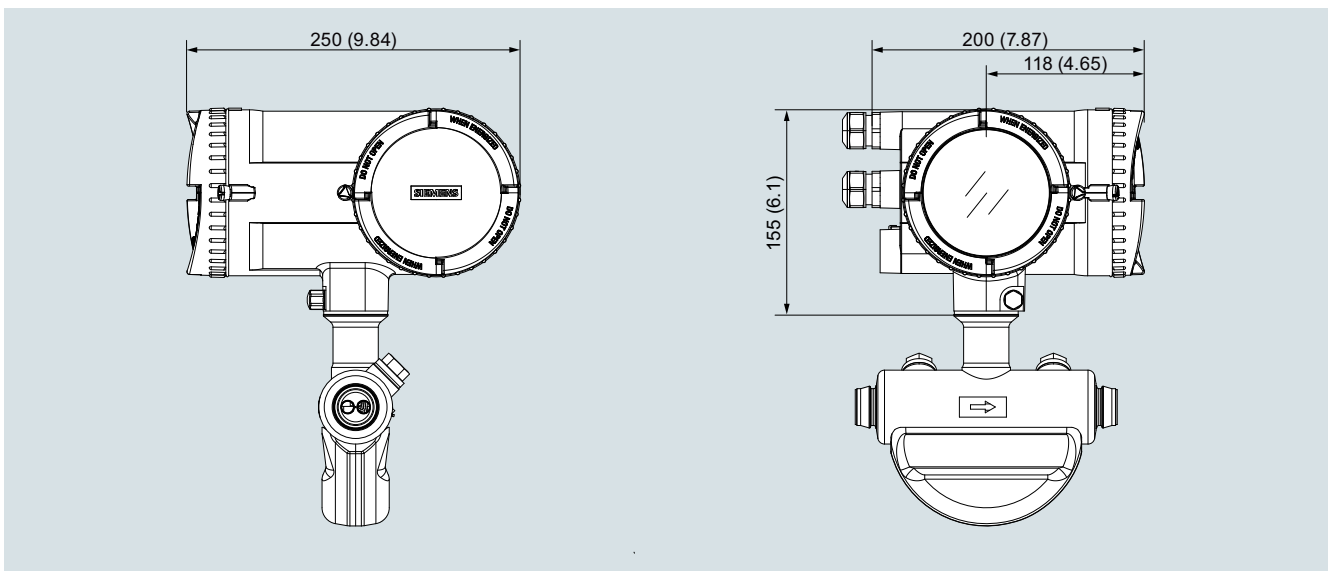
CE mark

- Pressure equipment
- Low voltage directive

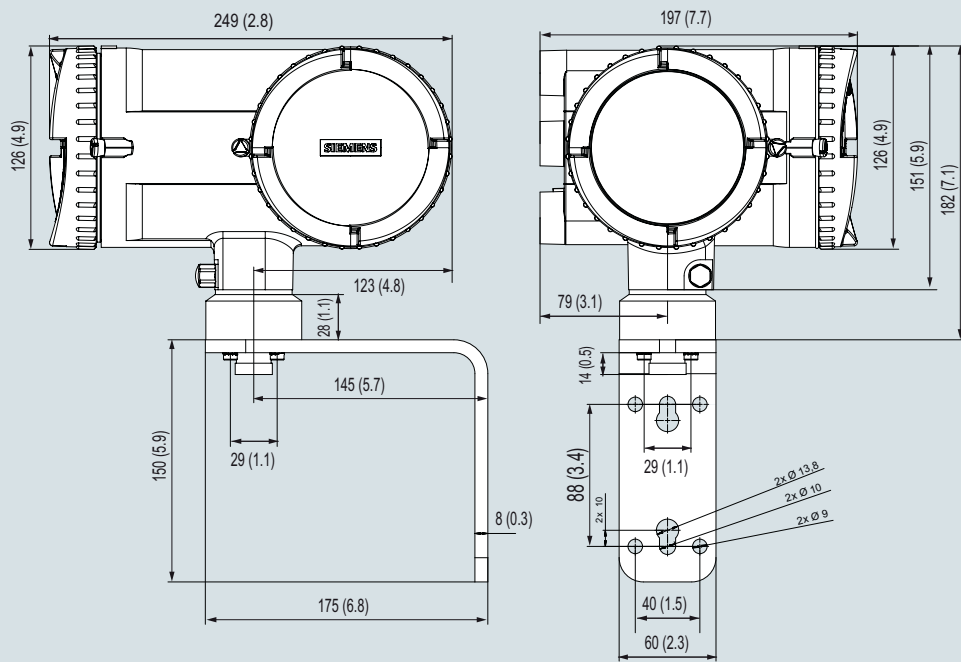
Regional certifications (depending on configuration)

- WEEE
- RoHS
- C-TICK (Australia and New Zealand EMC)
- EAC (Belarus, Armenia, Kazakhstan, Russia)
- KCC (South Korea)

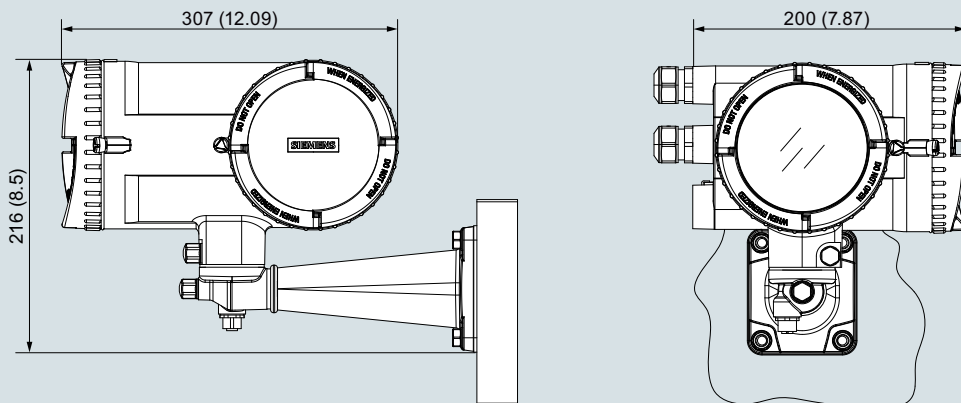
Dimensional drawings



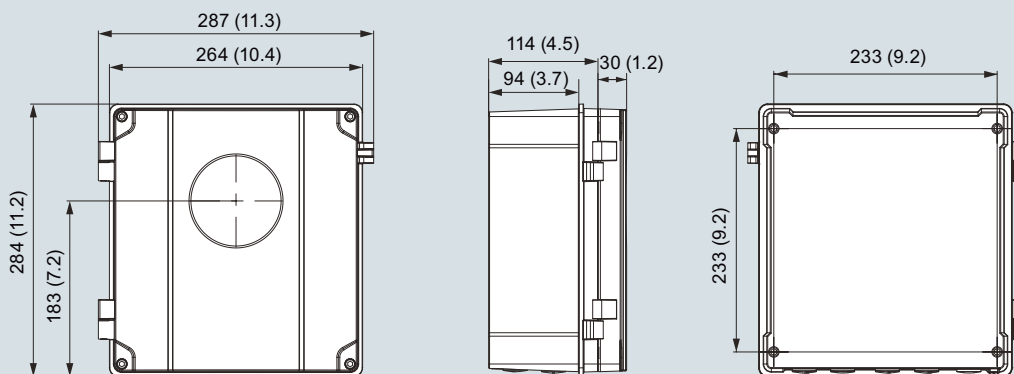
SITRANS FCT030, compact version, dimensions in mm (inch)

Flow Measurement**SITRANS F C****Transmitter SITRANS FCT030**

SITRANS FCT030, field mount version for low flow MASS2100/FC300 sensors with analog cable and M20 plug connection, dimensions in mm (inch)















SITRANS FCT030, field mount version for sensors with digital cable and M12 plug connection, dimensions in mm (inch)



SITRANS FCT030, wall mount version, dimensions in mm (inch)

Accessories

Description	Article No.	
CT connector Tamper cover for CT locking. Fits over the M12 connector at both sensor and transmitter ends of the remote system cable (2 pcs.)	A5E31478498	
Bag of glands (metric) in black plastic ¹⁾	A5E03907414	
Bag of glands (metric) in gray plastic Ex e/i ¹⁾	A5E03907424	
Bag of glands (metric) in AISI 316 SS Ex e/i ¹⁾	A5E03907429	
Bag of glands (metric) in Ni-plated brass Ex e/i ¹⁾	A5E03907430	
Bag of glands (NPT) in black plastic ²⁾	A5E03907435	
Bag of glands (NPT) in gray plastic Ex e/i ²⁾	A5E03907451	
Bag of glands (NPT) in AISI 316 SS Ex e/i ²⁾	A5E03907467	
Bag of glands (NPT) in Ni-plated brass Ex e/i ²⁾	A5E03907473	
Standard cable (non-Ex) with M12 connectors, PO insulation and PUR sleeve, gray, -40 ... +80 °C (-40 ... +176 °F)		
• 5 m (16.4 ft)	A5E03914805	
• 10 m (32.8 ft)	A5E03914850	
• 25 m (82 ft)	A5E03914853	
• 50 m (164 ft)	A5E03914859	
• 75 m (246 ft)	A5E03914861	
• 150 m (492 ft)	A5E03914874	
Standard cable (non-Ex) for termination, PO insulation and PUR sleeve, gray, -40 ... +80 °C (-40 ... +176 °F)		
• 5 m (16.4 ft)	A5E03914833	
• 10 m (32.8 ft)	A5E03914849	
• 25 m (82 ft)	A5E03914854	
• 50 m (164 ft)	A5E03914856	
• 75 m (246 ft)	A5E03914864	
• 150 m (492 ft)	A5E03914873	

Description	Article No.	
Standard cable (Ex) with M12 connectors, PO insulation and PUR sleeve, blue, -40 ... +80 °C (-40 ... +176 °F)		
• 5 m	A5E03914929	
• 10 m	A5E03914962	
• 25 m	A5E03914995	
• 50 m	A5E03915004	
• 75 m	A5E03915074	
• 150 m	A5E03915088	
Standard cable (Ex) for termination, PO insulation and PUR sleeve, blue, -40 ... +80 °C (-40 ... +176 °F)		
• 5 m	A5E03914945	
• 10 m	A5E03914973	
• 25 m	A5E03914984	
• 50 m	A5E03915015	
• 75 m	A5E03915057	
• 150 m	A5E03915100	
Analog signal cable For analog cable connection between MASS 2100/ FC300 sensor and FCT010/030 transmitters. 5 x 2 x Ø 0.34 mm screened and twisted in pairs. Blue PVC insulation and sleeve. With two M20 connectors, female/female. -20 ... 105 °C (-4 ... +221 °F), Ex		
• 1 m	A5E42815465	
• 2 m	A5E42521862	
• 5 m	A5E42522447	
• 10 m	A5E42523233	
• 15 m	A5E42523347	

¹⁾ 2 pcs M20; 1 pce M25 with single and dual cable inserts




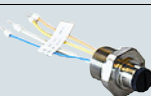
²⁾ 2 pcs ½" NPT; 1 pce ½" NPT with single and dual cable inserts

Flow Measurement







SITRANS F C

Flowmeter - Accessories/Spare parts


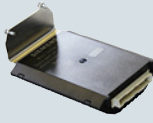



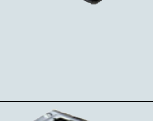



Spare parts - sensor FCS400/FCS300

Description	Article No.	
Blind lid in painted aluminum with silicone o-ring seal	A5E03549295	
Sensor housing <ul style="list-style-type: none"> • metric • NPT 	A5E03549313 A5E03906080	
Bag of loose parts for sensor; including cable strain relief components, washer, seals, silicone o-rings, and assorted screws	A5E03549324	
M12 option for sensor housing in stainless steel. Pre-wired and potted to replace M12 socket in DSL housing	A5E03906095	

Spare parts - Transmitter FCT030 Field mount enclosure (all FW versions)




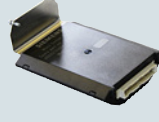
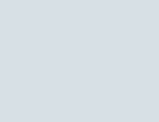




Description	Article No.	
Display lid in painted aluminum with Ex glass plate and silicone o-ring seal Ex and Non-Ex	A5E03549344	
Blind lid in painted aluminum with silicone o-ring seal	A5E03549429	
Bag of loose spare parts; including cable strain relief components, mounting tool, seals and gasket, assorted screws and washers, hex cap nut, blind connectors, and silicone o-rings	A5E03549396	
Mounting bracket - FCT030 field mount; in painted aluminum for pipe or wall mounting of transmitter FCT030 remote version. Including lock ring, pressure pads and seal cap	A5E03906091	
M12 option - remote - in painted aluminum. Pre-wired and potted replacement M12 connection for FCT030 field mount transmitter remote version	A5E03906104	
Remote terminal house painted aluminum for sensor cable termination at FCT030 transmitter remote version. Pre-wired and potted <ul style="list-style-type: none"> • M20 • NPT 	A5E03906112 A5E03906130	

Spare parts - Transmitter FCT030 (FW 3.1)

Description	Article No.	
Display and keypad assembly for field mount enclosure, with Siemens logo. For HW 2 and FW 3.1 version	A5E03548971	
Sensor cassette (Compact) (HW version 2, FW 3.1.X)	A5E03549142	
Sensor cassette (Remote) (HW version 2, FW 3.1.X)	A5E03549098	
Frontend cassette Spare part frontend cassette for remote version of FC430 and cassette for FC410 For firmware V 2.x	A5E03549191	
Power supply for field mount enclosure 100 ... 240 V AC, 47 ... 63 Hz 24 ... 90 V DC (HW version 2 and FW 3.1.x)	A5E03549413	
Transmitter cassette (active) 4 ... 20 mA output and HART 7.2 (HW version 2 and FW 3.1.x)	A5E03549357	
Transmitter cassette (passive), 4 ... 20 mA output and HART 7.2 (HW version 2 and FW 3.1.x)	A5E03549383	
I/O assembly Advise Order code F40 to F97 Selection and Ordering data ¹⁾	A5E03939114	
SensorFlash (micro SD card 1G)	A5E03915258	

¹⁾ The I/O configuration must be stated in the "Remark" field. The I/O configuration is found in the F option of the ordering code. e.g. code "F40" for ordering Ch2 Active Current/Freq/Pulse, Ch3 Active Current/Freq/Pulse, Ch4 Active Input




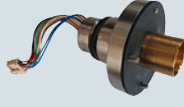
Spare parts FCT030 - Fieldmount enclosure (FW 4.0)

Description	Article No.	
Display and keypad assembly <ul style="list-style-type: none"> From firmware 4.0, with Siemens logo 	A5E37705139	
<ul style="list-style-type: none"> From firmware 4.0, neutral version - no company logo 	A5E39844362	
Power supply for field mount enclosure FCT030 V 4.0 Fieldmount 100 ... 240 V AC, 47 ... 63 Hz 19.2 ... 28.8 V DC	A5E38264471	
Sensor cassette (compact) for systems without DSL and for systems with analog sensor connection, HW version 3, FW version 4.0	A5E41526318	
Sensor cassette (remote) Ex barrier module digital sensor connection (HW version 3, FW version 4.0)	A5E03549098	
Sensor cassette (remote) for systems with DSL, HW version 3, FW version 4.0	A5E03549098	
Frontend cassette Spare part frontend DSL for remote version . For firmware V 4.0	A5E41526286	
SensorFlash (micro SD card 4G)	A5E38288507	
Transmitter cassette for firmware 4.0 <ul style="list-style-type: none"> Ch1 E02: I/O and comm (active/passive) 4 ... 20 mA output and HART 7.5, Non-Ex Ch1 E06: I/O and comm (active) 4 ... 20 mA output and HART 7.5, Ex Ch1 E07: I/O and comm (passive) 4 ... 20 mA output and HART 7.5, Ex Ch1 E10: Communication PROFIBUS PA, Non-Ex & Ex Ch1 E11: Communication PROFIBUS DP, Non-Ex Ch1: Communication Modbus RTU 485, Ex Ch1: Communication Modbus RTU 485, Non-Ex 	A5E38013040 A5E38012278 A5E38013025 A5E41216315 A5E41216042 A5E38013054 A5E38013069	




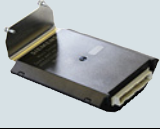




Flow Measurement


SITRANS F C

Flowmeter - Accessories/Spare parts

Description	Article No.		Description	Article No.	
I/O Cassette for firmware 4.0			Adapter cable for FCS400 sensor with new transmitter DSL/FCT010/FCT030 Version 4.0	TBD	
• Ch2: Current/Frequ./Pulse, Ch3: None, Ch4: None F01, Non-Ex	A5E38006256		Remote adapter for wall bracket M20 cable connection		
• Ch2: Current/Frequ./Pulse, Ch3: Current/Frequ./Pulse, Ch4: None, F02, Non-Ex	A5E38006558		• Ex	A5E42404417	
• Ch2: Current/Frequ./Pulse, Ch3: Current/Frequ./Pulse, Ch4: Current/Frequ./Pulse F03, Non-Ex	A5E38006598		• Non-Ex	A5E42846478	
• Ch2: Current/Frequ./Pulse, Ch3: Current/Frequ./Pulse, Ch4: Relay, F04, Non-Ex	A5E38006896		Wall bracket for FCT030 for M20 analog cable connector	A5E42404426	
• Ch2: Current/Frequ./Pulse, Ch3: Relay, Ch4: Relay, F05, Non-Ex	A5E38000690		Wall bracket for FCT010 for M20 analog cable connector	A5E42404447	
• Ch2: Current/Frequ./Pulse, Ch3: Relay, Ch4: None, F06, Non-Ex	A5E38011432		Compact adapter for DSL/FCT030 For upgrade from MASS 2100 DI3, DI6, DI15 with MASS 6000 compact to DSL/FCT030		
• Ch2: Current/Frequ./Pulse, Ch3: None, Ch4: None, F11, Ex-passive	A5E38011478		• Ex	A5E42846758	
• Ch2: Current/Frequ./Pulse, Ch3: Current/Frequ./Pulse, Ch4: None, F12, Ex-passive	A5E38011509		• Non-Ex	A5E42846760	
• Ch2: Current/Frequ./Pulse, Ch3: Current/Frequ./Pulse, Ch4: Current/Frequ./Pulse, F13, Ex-passive	A5E38011541		Compact adapter for DSL/FCT030 FCS300 and FCS400 (DN 100 and DN 150 sensor) adapter for compact mount DSL, FCT010 or FCT030 Ex and Non-Ex	TBD	
• Ch2: Current/Frequ./Pulse, Ch3: Current/Frequ./Pulse, Ch4: Relay, F14, Ex-passive	A5E38011600				
• Ch2: Current/Frequ./Pulse, Ch3: Relay, Ch4: Relay, F15, Ex-passive	A5E38011618				
• Ch2: Current/Frequ./Pulse, Ch3: Relay, Ch4: None, F16, Ex-passive	A5E38011908				
• Ch2: Current/Frequ./Pulse, Ch3: None, Ch4: None, F21, Ex-active	A5E38012039				
• Ch2: Current/Frequ./Pulse, Ch3: Current/Frequ./Pulse, Ch4: None, F22, Ex-active	A5E38012056				
• Ch2: Current/Frequ./Pulse, Ch3: Current/Frequ./Pulse, Ch4: Current/Frequ./Pulse, F23, Ex-active	A5E38012121				
• Ch2: Current/Frequ./Pulse, Ch3: Relay, Ch4: Relay, F24, Ex-active	A5E38019235				
• Ch2: Current/Frequ./Pulse, Ch3: Current/Frequ./Pulse, Ch4: Relay, F25, Ex-active	A5E38019263				
• Ch2: Current/Frequ./Pulse, Ch3: Relay, Ch4: None, F26, Ex-active	A5E38019378				

Spare parts - FCT030 Wall mount enclosure

Description	Article No.	
Display and keypad assembly <ul style="list-style-type: none"> For wall mount enclosure, Siemens logo 	A5E37697615	
<ul style="list-style-type: none"> For wall mount enclosure, neutral version 	A5E39844261	
Power supply for wall mount 100 ... 240 V AC, 47 ... 63 Hz 19.2 ... 28.8 V DC	A5E38263021	
Sensor cassette for FCT030 wall mounting enclosure	TBD	
Foam insert set for wall mount with connectors	A5E38287828	
Wall mount enclosure front blind, Siemens version	A5E38287882	
Wall mount enclosure front blind, Neutral version - no company logo	A5E38287965	
Wall mount enclosure front with glass	A5E38288007	
Wall mount enclosure bracket for pipe mounting	A5E38288020	
Wall bracket panel mounting	A5E38288032	
Bag of loose spare parts for wall mount including cable strain relief components, mounting tool, seals and gasket, assorted screws and washers, hex cap nut, blind connectors and O-rings	A5E38288072	
Metal kit PSU cover back pane for wall mount enclosure	A5E38415145	

Description	Article No.	
Power input cover plate for wall mount enclosure	A5E38415205	

Flow Measurement

SITRANS F C

Flow sensor SITRANS FCS300

Overview



The flow measuring principle is based on the Coriolis Effect. The FCS300 sensor's measuring tubes are energized by an electro-mechanical driver circuit which oscillates them at their resonance frequency.

Two pick-ups are placed symmetrically upstream and downstream of the central driver. When a process fluid passes through the sensor, the Coriolis Effect will act on the vibrating tubes and cause deflection which can be measured as a phase shift between pick-ups 1 and 2. The phase shift is proportional to the mass flow rate.

The amplitude of the driver is automatically regulated to ensure a stable output from both of the pickups.

The temperatures of the sensor tubes are measured with high precision to provide compensation for changes with temperature in the measuring properties.

The sensor signals are analyzed for flow, density and fluid temperature in the sensor front end. The digital signal is controlled to conform to high Safety Integrated Level (SIL) and sent digitally to the transmitter via standard cable. The FCT030 further calculates total mass and volume, fraction, dosing control and many other functions.

The front-end module has a process noise filter, which can be used to improve the meter's performance when installation and application conditions are not ideal. Typical interferences from process conditions such as pump pulsations, mechanical vibrations, oscillating valves can be reduced considerably.

Integration

The SITRANS FCS300 Massflow sensor is suitable for both indoor and outdoor installation and meets the requirements of Protection Class IP67/NEMA 4X. Optionally the sensor can be ordered with hazardous certification to Zone 1 (ATEX, IECEx, cCSAus, EAC Ex, NEPSI, INMETRO).

The flowmeter is bidirectional and can be installed in any orientation. The sensor is self-draining in many positions, with vertical mounting preferred.

It is important to ensure that the sensor tubes are always completely filled with homogeneous fluid; otherwise measuring errors may occur. Suitable fluids are clean liquids, pastes, light slurries or gases. Condensing vapours, aerated liquids or slush are not recommended.

The materials in contact with the process medium must be evaluated for corrosion and erosion resistances for long sensor life.

The pressure drop through the sensor is a function of the properties of the fluid and the flow rate. A pressure loss and accuracy calculator can be found on the Siemens Internet site www.siemens.com

The preferred flow direction is indicated by an arrow on the sensor. Flow in the direction of the arrow will be measured as positive. The flow direction can be adjusted at the transmitter to compensate for reverse installation.

Installation orientation

The optimal installation orientation is vertical with the flow upwards. This ensures that suspended solids or bubbles are completely pushed through the sensor. A drain valve below the sensor will allow the pipe and sensor to drain completely.

Supports

In order to support the weight of the flowmeter and to ensure reliable measurements when external effects exist (e.g. plant vibrations), the sensor should be installed in rigidly supported pipelines.

Supports or hangers should be installed symmetrically and stress-free in close proximity to both of the process connections.

Shut-off devices

To conduct a system zero adjustment, secure shut-off devices are required in the pipeline.

Where possible, shut-off devices should be installed both upstream and downstream of the flowmeter.

System design

- The sensor design consists of process connections, inlet and outlet manifolds mounted in a stiff frame and two parallel tubes equally sharing the process medium flow.
- The sensing tubes are curved in the CompactCurve shape which gives high sensitivity and low pressure loss. The CompactCurve shape was selected to ensure that the smallest flows are measured with optimal signal to noise ratio.
- Careful mounting of the pipeline with regard to minimizing vibration at the meter will ensure a secure measurement environment.

Installation guidelines

- The mass flowmeter does not require any flow conditioning or straight inlet pipe sections. Care should be exercised however to ensure that any upstream valves, gates, sight glasses etc. do not cavitate and are not set into vibration by the flow.
- It is always preferred to place the flowmeter upstream of any control valve or other pipeline component which may cause flashing, cavitation or vibrations.
- The presence of gas bubbles in the fluid may result in erroneous measurements, particularly in the density measurement. Therefore the flowmeter should not be installed at the lowest pressure point in the liquid piping system or where vapour can collect. Install the meter in pipeline sections with high pressure to maintain system pressure and compress any bubbles.
- Drop lines downstream from the flow sensor should be avoided to prevent the meter tube from draining during flowing conditions. A back-pressure device or orifice is recommended to ensure that flow does not separate within the flow sensor but the metering section remains at positive pressure at all times while there is flow.
- The flowmeter should not come into contact with any other objects. Avoid making attachments to the housing except for the pressure guard components (if required).
- When the connecting pipeline is larger than the sensor size, suitable standard reducers may be installed. A selection of oversize and undersize connections can be ordered - refer to the sizes tables below.

- The flow sensor may be supported at the junction between process connection and the manifold, but should not be used to support adjacent piping. Ensure that the piping is also supported on both sides so that connection stresses are neutral.
- If strong vibrations exist in the pipeline, they should be damped using elastic pipeline elements. The damping devices must be installed outside the supported flowmeter section. Direct connection of flexible elements to the sensor should be avoided.
- Make sure that any dissolved gases, which are present in many liquids, do not outgas. The back pressure at the outlet should be at least 0.2 bar (3 psi) above the vapour pressure of the process fluid.
- Assure that operation below the vapour pressure cannot occur particularly for fluids with low latent heat of vaporisation.
- The sensor should not be installed in the vicinity of strong electromagnetic fields, e.g. near motors, pumps, variable frequency drives, transformers etc.
- When operating meters on a common mounting base the sensors should be mounted and spaced separate from each other to avoid cross-talk and other vibration interferences.
- When operating meters in interconnected pipelines the pipes should be decoupled to prevent cross talk.

Remote system cabling

The system is designed so that standard instrumentation cable with four cores and overall screen or two screened pairs can be used, or cable sets can be ordered with the flowmeter. The cable can be ordered in various set lengths and terminated in the field.

Be aware of maximum sensor length cable depending on product selection, currently 75 m. Data transmission speed and process variable update rates may be affected by the cable characteristics. For best results, choose a cable with the following electrical characteristics:

Property	Unit	Value
Resistance	[Ω/km]	59
Characteristic impedance	[Ω]	100 @ 1 MHz
Insulation resistance	[MΩ/km]	200
Maximum voltage	[V]	300

The flowmeter system applies maximum 15 V DC in operation and is certified intrinsically safe. The complete system is insulation tested to 1500 V in production.

Cabling solutions which can be ordered with the flowmeter are as follows:

1. High performance plugged cable using M12 connectors into prepared sockets
2. Cable glands for either metric or NPT threaded terminal housings
3. Plain cable in set lengths to be passed through flexible and rigid conduit (not supplied) for metric or NPT threaded terminal housings

Cable for items 1, 2 and 3 are available either gray for standard applications or light blue for Ex applications to identify the circuit as intrinsically safe.

Insulation and heating

For applications where pipeline insulation is required for personnel protection or process temperature maintenance, the SITRANS FCS300 flow sensor may also be insulated. The form and material of insulation is not prescribed and entirely depends on the practices at the application location or plant.

Insulation must not be crowded around the sensor pedestal but shaped at a 45° cone to allow the pedestal to radiate excess heat and maintain a suitable working temperature within the front-end housing.

Calibration

To ensure accurate measurement all flowmeters must be initially calibrated. The calibration of each SITRANS FCS300 Coriolis sensor is conducted at an accredited according to ISO/IEC 17025 flow calibration facility. A calibration certificate for every sensor is stored on the SensorFlash SD card. The accreditation body has signed the ILAC MRA agreement (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement). Therefore the accreditation ensures international traceability and recognition of the test results in 39 countries worldwide, including the US (NIST traceability).

Flow Measurement

SITRANS F C

Flow sensor SITRANS FCS300

Technical specifications

Flow sensor FCS300		
Parameter	Unit	Value
Process pressure range	[barg (psi)]	The maximum permissible operating pressure is determined by the respective process connection and the temperature of the medium. 316L: 0 ... 100 (0 ... 1450) Nickel-alloy C4 (2.4610) ³⁾ : 0 ... 100 (0 ... 1450)
Process temperature range	[°C (°F)]	The maximum permissible process temperature is determined by the respective process connection -50 ... +205 (-58 ... +400)
Ambient temperature range	[°C (°F)]	-40 ... +70 (-40 ... +158)
Transport temperature range	[°C (°F)]	-40 ... +70 (-40 ... +158)
Density range	[kg/m ³ (lb/ft ³)]	1 ... 5000 (0.062 ... 312.2)
Process media	Fluid group	1 (suitable for dangerous fluids)
	Form	Light slurry, liquid and non-condensing gas
No. of process values		
• Primary process values		<ul style="list-style-type: none"> • Mass flow • Density • Process medium temperature
• Derived process values		<ul style="list-style-type: none"> • Volume flow • Standard volume flow (with reference density) • Fraction A:B • Fraction % A:B

Performance specifications		Sensor					
Parameter	Unit	DN 15	DN 25	DN 50	DN 80	DN 100	DN 150
Max. zero point error	0.2 % [kg/h (lb/min)]	0.6 (0.0235)	2.16 (0.0792)	7.2 (0.264)	20 (0.735)	41.6 (1.628)	68.8 (2.528)
	0.1 % [kg/h (lb/min)]	0.4 (0.0147) ⁴⁾	1.35 (0.0025) ⁴⁾	4.5 (0.165) ⁴⁾	20 (0.735)	41.6 (1.628)	68.8 (2.528)
Qmin (1 % error)	[kg/h (lb/min)]	70 (2.57)	240 (8.92)	800 (29.4)	2 000 (73.5)	4 000 (146.9)	6 900 (253.5)
Qnom (1 bar pressure)	[kg/h (lb/min)]	4 500 (163.3)	20 500 (753.2)	49 000 (1 800)	122 000 (4 483)	273 000 (10 031)	459 200 (16 873)
Qmax ²⁾	[kg/h (lb/min)]	8 000 (293.9.2)	35 000 (1 286)	90 000 (3 307)	250 000 (9 186)	520 000 (19 107)	860 000 (31 600)
Linearity error mass flow							
• for liquids ¹⁾	[%] standard	± 0.1	± 0.1	± 0.1	± 0.1	± 0.1	± 0.1
	[%] medium	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2
• for gases (additional)	[%]	± 0.40	± 0.40	± 0.40	± 0.40	± 0.40	± 0.40
Repeatability mass flow	[%]	± 0.05	± 0.05	± 0.05	± 0.05	± 0.05	± 0.05
Density accuracy with standard 0.2% calibration	[kg/m ³ (lb/ft ³)]	± 10 (± 0.62)	± 10 (± 0.62)	± 10 (± 0.62)	± 10 (± 0.62)	± 10 (± 0.62)	± 10 (± 0.62)
Density accuracy with extended 0.1% calibration	[kg/m ³ (lb/ft ³)]	± 2 (± 0.124) ⁵⁾	± 2 (± 0.124) ⁵⁾	± 2 (± 0.124) ⁵⁾	± 2 (± 0.124) ⁵⁾	± 2 (± 0.124) ⁵⁾	± 2 (± 0.124) ⁵⁾
Temperature error	[°K]	± 0.5	± 0.5	± 0.5	± 0.5	± 0.5	± 0.5

¹⁾ For reference conditions: ISO 9104 and DIN/EN 29104. Increased error can be expected for gas mass flow measurement (For gas measurement typically + 0.40 % error).

²⁾ For gas applications the max. flowrate is calculated at Mach-Number = 0.3.

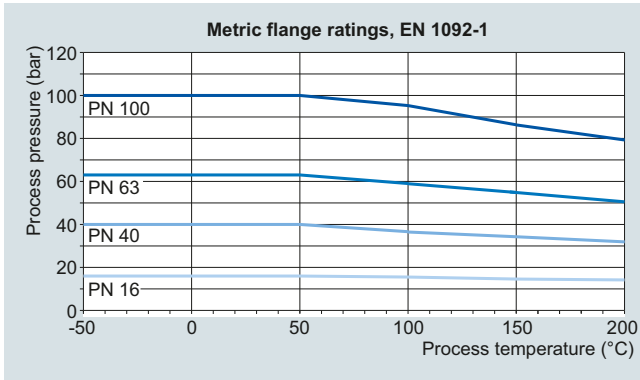
³⁾ Hastelloy C is a registered trademark of Haynes International. C4 nickel alloys are equivalent to Hastelloy C4 .

⁴⁾ In preparation: currently as for 0.2 % accuracy class.

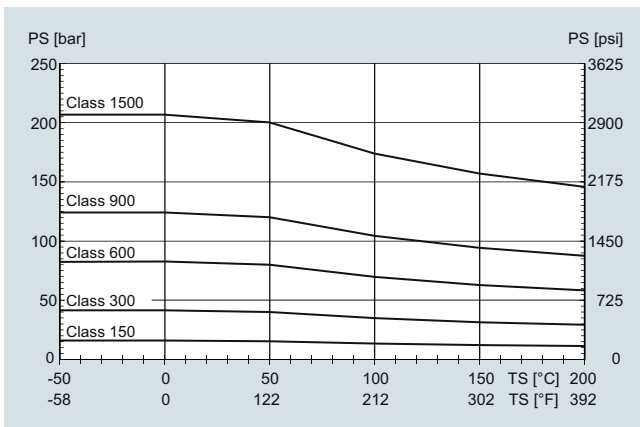
⁵⁾ In preparation: 0.5 kg/m³.

Pressure/temperature curves

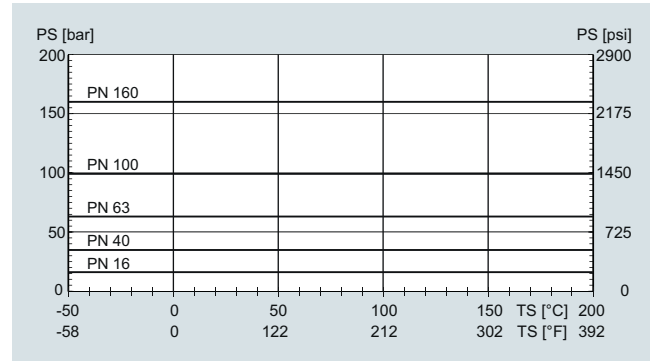
With two major exceptions, the pressure rating of the flow sensors is independent of the process medium temperature. Design rules for flange connections in both the EN1092-1 and ASME B16.5 standards dictate pressure derating with increasing temperature. The charts below show the effect of process medium temperature on the pressure ratings for the flanges within the FCS300 product program.



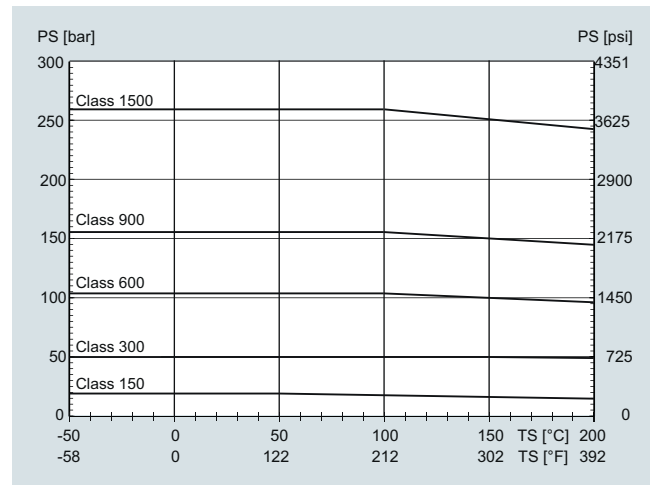
EN1092-1 flanged sensors in AISI 316L



Stainless steel ASME flange 1.4571/1.4404 (AISI 316Ti/316L) up to DN200 (8")



Nickel alloy DIN flange C4 (2.4610) or nickel alloy C22 (2.4602) up to DN200 (8")



Nickel alloy ASME flange C4 (2.4610) or nickel alloy C22 (2.4602) up to DN200 (8")

Sanitary connection

Design	Nominal diameter	PS _{max}		TS _{max}		TS _{min}	
		[bar]	[psi]	[°C]	[°F]	[°C]	[°F]
Pipe fitting DIN 11851	DN 15 ... 40 (½ ... 1½")	40	580	140	284	-40	-40
	DN 50 ... 100 (2 ... 4")	25	363	140	284	-40	-40
Pipe fitting SMS 1145	DN 25 ... 80 (1 ... 3")	6	87	140	284	-40	-40
Clamp DIN 32676	DN 15 ... 50 (½ ... 2")	16	232	120	248	-40	-40
	DN 65 ... 100 (2½ ... 4")	10	145	120	248	-40	-40

Flow Measurement

SITRANS F C

Flow sensor SITRANS FCS300

Sensor variants

SITRANS FCS300 sensors are available in a wide range of process connections. The available combinations of type, sensor size and connection size are shown in the tables below.

Standard variants

Sensor	Connection	EN 1092-1 B1, PN 16	EN 1092-1 B1, PN 40	EN 1092-1 B2, PN 63	EN 1092-1 B2, PN 100	EN 1092-1 D, PN 40	ANSI B16.5-2009, class 150	ANSI B16.5-2009, class 300	ANSI B16.5-2009, class 600	ANSI B16.5-2009, class 900	ANSI B16.5-2009, class 1500	ISO 228-1 G female pipe thread	ASME B1.20.1 NPT female pipe thread	DIN 11851 hygienic screwed	DIN 32676 (ISO) clamp serie A	SMS 1145 hygienic screwed	JIS B2220:2004/10K	JIS B2220:2004/20K	EN 1092-1 PN 16, NAMUR length	EN 1092-1 PN 40, NAMUR length
Standard: 7ME463.-...																				
DN 15 (½")	DN 10 (¾")		●				●	●	●	● ¹⁾	● ¹⁾	●		●	●		●	●		
	DN 15 (½")		●	●	●	●	●	●	●	● ¹⁾	● ¹⁾	●	●	●	●		●	●		●
	DN 20 (¾")		●				●							●	●		●	●		
DN 25 (1")	DN 20 (¾")		●				●							●	●		●	●		
	DN 25 (1")		●	●	●	●	●	●	●	● ¹⁾	● ¹⁾			●	●	●	●	●		●
	DN 40 (1½")		●	●	●		●	●	●					●	●	●	●	●		
DN 50 (2")	DN 40 (1½")		●	●	●		●	●	●	●	●			●	●	●	●	●		
	DN 50 (2")		●	●	●	●	●	●	●	● ¹⁾	● ¹⁾			●	●	●	●	●		●
	DN 65 (2½")		●	●			●		●	● ¹⁾	● ¹⁾			●	●	●	●	●		
DN 80 (3")	DN 65 (2½")		●	●	●		●	●	●	● ¹⁾	● ¹⁾			●	●	●	●	●		
	DN 80 (3")		●	●	●	●	●	●	●	● ¹⁾	● ¹⁾			●	●	●	●	●		●
	DN 100 (4")	●	●	●	●		●	●	●	● ¹⁾	● ¹⁾			●	●		●	●		
DN 100 (4")	DN 80 (3")	●	●	●	●		●		●	● ¹⁾	● ¹⁾						●	●		
	DN 100 (4")	●	●	●	●		●	●	●	● ¹⁾	● ¹⁾						●	●	●	
	DN 150 (6")	●	●	●	●		●	●	●	● ¹⁾	● ¹⁾						●	●		
DN 150 (6")	DN 100 (4")	●	●	●	●		●		●	● ¹⁾	● ¹⁾							●		
	DN 150 (6")	●	●	●	●		●	●	●	● ¹⁾	● ¹⁾							●	●	
	DN 200 (8")	●	●	●	●		●	●	●	● ¹⁾	● ¹⁾							●		

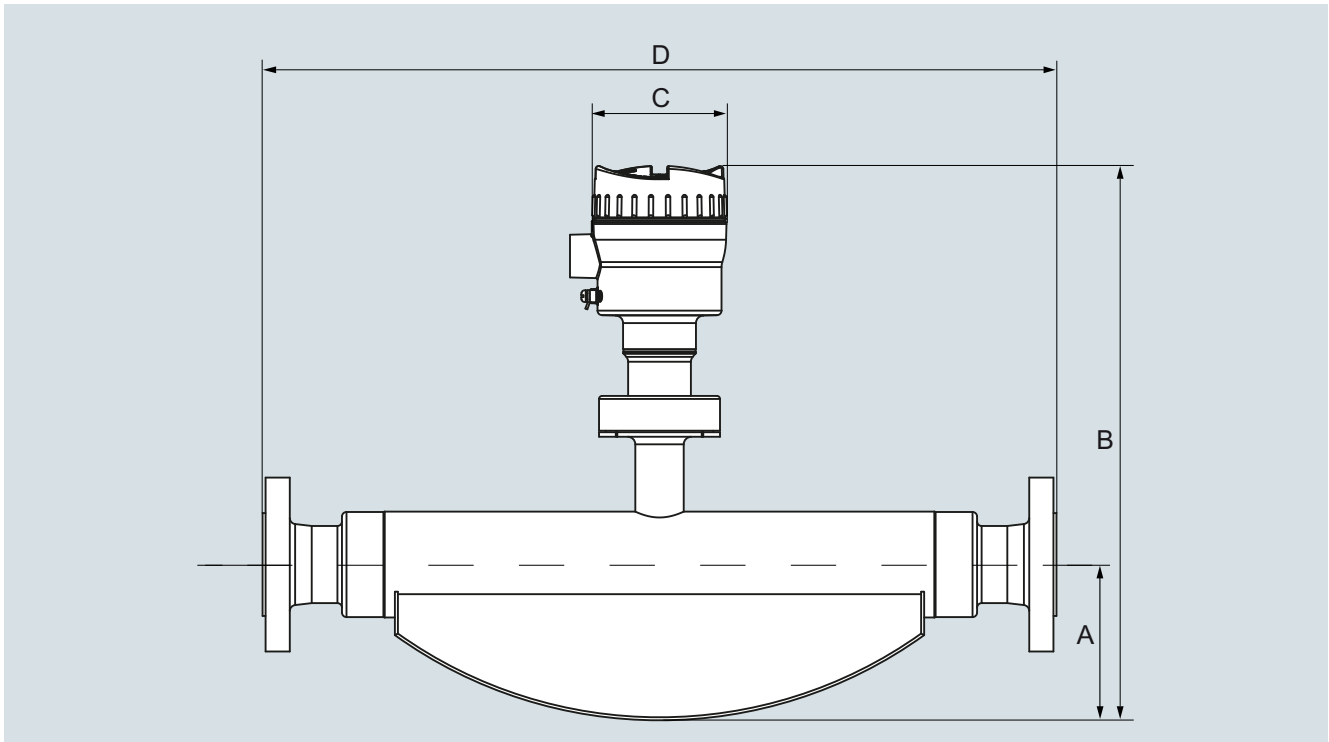
¹⁾ Apply class 600 p and t ratings for class 900 and class 1500 flanges.

Hygienic sensor variants

The hygienic sensors will have to be ordered with stainless steel tubes 316L/1.4435/1.4404 (polished). Hygienic sensors are offered with process connection conforming to various international quick-connect clamps or threaded connectors. Pressure ratings are according to the relevant standard and the sensor size.

NAMUR sensor variants

The NAMUR variants have built-in lengths according to NAMUR recommendation NE 132. The recommendations of NE 132 are stated for sensors with flanges the same size as the sensor nominal size, and for flanges to EN1092-1 PN 40 with B1 flange facing. For DN 100 and DN 150 flanges to PN 16.

Dimensional drawings
Sensor dimensions


Sensor [DN]	[inch]	A		B		C		Weight	
		[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[kg]	[lb]
15	½	80	3.15	358	14.09	90	3.54	4.6	10.1
25	1	103	4.06	398	15.67	90	3.54	7.9	17.4
50	2	126	4.96	435	17.13	90	3.54	25.7	56.7
80	3	181	7.13	525	20.67	90	3.54	66.5	147
100	4	262	10.31	622	24.49	90	3.54	128	282
150	6	317	12.48	714	28.11	90	3.54	207	456

SITRANS FCS300, dimensions in mm (inch), weights in kg (lb), for a EN 1092 PN 40 flanged version.

The built-in length D depends on the flange.

Flow Measurement

SITRANS F C

Flow sensor SITRANS FCS300

Overall length

The overall length (built-in length (D)) of each sensor depends on the connection standard and the pressure rating. The tables below summarize the dimensions available at the time of publishing. Please contact Siemens for further information about our desired process connection specification.

Sensor in AISI 316L: 7ME463.-...

Sensor AISI 316L	DN 15 (½")			DN 25 (1")			DN 50 (2")		
Connection	DN 10 (¾")	DN 15 (½")	DN 20 (¾")	DN 20 (¾")	DN 25 (1")	DN 40 (1½")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")
EN 1092-1 B1, PN 16									
EN 1092-1 B1, PN 40	385	385	421	576	525	576	763	715	763
EN 1092-1 B2, PN 63		403			564	572	745	745	
EN 1092-1 B2, PN 100		403			564	576	745	745	
EN 1092-1 D, PN 40		385			525			715	
ASME B16.5, class 150		435	421	575	575	576	763	715	756
ASME B16.5, class 300		421			576	576	756	763	
ASME B16.5, class 600		421			576		756	773	
ASME B16.5, class 900		421			576		780	790	800
ASME B16.5, class 1500		421					780	790	800
ISO 228-1 G female pipe thread		450							
ASME B1.20.1 NPT female pipe thread		450							
DIN 11851 Hygienic screwed	413	413	413	590	590	590	763	740	740
DIN 32676 (ISO) Hygienic clamp	413	413	413	590	590	590	763	740	740
SMS 1145 Hygienic screwed					590	590	763	740	740
JIS B2220/10K	385	385	421	576	525	576	763	715	763
JIS B2220/20K	385	385	421	576	525	576	763	715	763
EN 1092-1 PN 16, NAMUR length									
EN 1092-1 PN 40, NAMUR length		510			600			715	

Sensor	DN 80 (3")			DN 100 (4")			DN 150 (6")		
Connection	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 80 (3")	DN 100 (4")	DN 150 (6")	DN 100 (4")	DN 150 (6")	DN 200 (8")
EN 1092-1 B1, PN 16		870	875	1222	1122	1260	1569	1421	
EN 1092-1 B1, PN 40	910	870	875	1222	1144	1260	1599	1461	1650
EN 1092-1 B2, PN 63	910	910	1060	1234	1304				
EN 1092-1 B2, PN 100	910	910	1080	1234	1334				
EN 1092-1 D, PN 40		870							
ASME B16.5, class 150		880	880	1244	1144	1330	1630	1485	1650
ASME B16.5, class 300	920	895	1075		1324			1505	1670
ASME B16.5, class 600	920	920	1100	1244	1354		1675	1555	
ASME B16.5, class 900	965	1100	1130	1470	1380		1705	1605	
ASME B16.5, class 1500	965	1300	1150	1500	1400		1725	1665	
ISO 228-1 G female pipe thread									
ASME B1.20.1 NPT female pipe thread									
DIN 11851 Hygienic screwed	990	940	940						
DIN 32676 (ISO) Hygienic clamp	950	910	910						
SMS 1145 Hygienic screwed	990	940							
JIS B2220/10K	910	870		1275	1150	1300			
JIS B2220/20K	910	870		1275	1150	1300			
EN 1092-1 PN 16, NAMUR length					1400			1700	
EN 1092-1 PN 40, NAMUR length		915							

SITRANS FCS300, overall length (D), dimensions in mm

Sensor	DN 15 (½")			DN 25 (1")			DN 50 (2")		
Connection	DN 10 (¾")	DN 15 (½")	DN 20 (¾")	DN 20 (¾")	DN 25 (1")	DN 40 (1½")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")
EN 1092-1 B1, PN 16									
EN 1092-1 B1, PN 40	15.16	15.16	16.57	22.68	20.67	22.68	30.04	28.15	30.04
EN 1092-1 B2, PN 63		15.87			22.20	22.52	29.33	29.33	
EN 1092-1 B2, PN 100		15.87			22.20	22.68	29.33	29.33	
EN1092-1 D, PN 40		15.16			20.67			28.15	
ASME B16.5, class 150		17.13	16.57	22.64	22.64	22.68	30.04	28.15	29.76
ASME B16.5, class 300		16.57			22.68	22.68	29.76	30.04	
ASME B16.5, class 600		16.57			22.68	22.68	29.76	30.43	
ASME B16.5, class 900		16.57			22.68		30.71	31.10	31.50
ASME B16.5, class 1500		16.57			22.68		30.71	31.10	31.50
ISO 228-1 G female pipe thread		17.72							
ASME B1.20.1 NPT female pipe thread		17.72							
DIN 11851 Hygienic screwed	16.26	16.26	16.26	23.23	23.23	23.23	30.04	29.13	29.13
DIN 32676 (ISO) Hygienic clamp	16.26	16.26	16.26	23.23	23.23	23.23	30.04	29.13	29.13
SMS 1145 Hygienic screwed					23.23	23.23	30.04	29.13	29.13
JIS B2220/10K	15.16	15.16	16.57	22.68	20.67	22.68	30.04	28.15	30.04
JIS B2220/20K	15.16	15.16	16.57	22.68	20.67	22.68	30.04	28.15	30.04
EN 1092-1 PN 16, NAMUR length									
EN 1092-1 PN 40, NAMUR length		20.08			23.62			28.15	

Sensor	DN 80 (3")			DN 100 (4")			DN 150 (6")		
Connection	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 80 (3")	DN 100 (4")	DN 150 (6")	DN 100 (4")	DN 150 (6")	DN 200 (8")
EN 1092-1 B1, PN 16		34.25	34.45	48.11	44.17	49.61	61.77	55.94	
EN 1092-1 B1, PN 40	35.83	34.25	34.45	48.11	45.04	49.61	62.95	57.52	64.96
EN 1092-1 B2, PN 63	35.83	35.83	41.73	48.58	51.34				
EN 1092-1 B2, PN 100	35.83	35.83	42.52	48.58	52.52				
EN1092-1 D, PN 40		34.25							
ASME B16.5, class 150		34.65	34.65	48.98	45.04	52.36	64.17	58.46	64.96
ASME B16.5, class 300	36.22	35.24	42.32		52.13			59.25	65.75
ASME B16.5, class 600	36.22	36.22	43.31	48.98	53.31		65.94	61.22	
ASME B16.5, class 900	37.99	43.31	44.49	57.87	54.33		67.13	63.19	
ASME B16.5, class 1500	37.99	51.18	45.28	59.06	55.12		67.91	65.55	
ISO 228-1 G female pipe thread									
ASME B1.20.1 NPT female pipe thread									
DIN 11851 Hygienic screwed	38.98	37.01	37.01						
DIN 32676 (ISO) Hygienic clamp	37.40	35.83	35.83						
SMS 1145 Hygienic screwed	38.98	37.01							
JIS B2220/10K	35.83	34.25		50.20	45.28	50.20			
JIS B2220/20K	35.83	34.25		50.20	45.28	50.20			
EN 1092-1 PN 16, NAMUR length					55.12			66.93	
EN 1092-1 PN 40, NAMUR length		36.02							

SITRANS FCS300, overall length (D), dimensions in inch

Flow Measurement

SITRANS F C

Flow sensor SITRANS FCS300

Sensor in Nickel-Alloy C4: 7ME463.-...

Sensor Nickel-Alloy C4	DN 15 (½")			DN 25 (1")			DN 50 (2")		
Connection	DN 10 (¾")	DN 15 (½")	DN 20 (¾")	DN 20 (¾")	DN 25 (1")	DN 40 (1½")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")
EN 1092-1 B1, PN 40	449	442	428	646	614	576	814	764	819
EN 1092-1 B2, PN 63	449	442	428	646	614	576	814	764	819
EN 1092-1 B2, PN 100	449	442	428	646	614	576	814	764	819
ANSI B16.5, class 150		442	428	646	614	576	814	764	819
ANSI B16.5, class 300		442	428	646	614	576	814	764	819
ANSI B16.5, class 600		442	428	646	614	576	814	764	819
JIS B2220/10K		442	428	646	614	576	814	764	819

Sensor	DN 80 (3")			DN 100 (4")			DN 150 (6")		
Connection	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 80 (3")	DN 100 (4")	DN 150 (6")	DN 100 (4")	DN 150 (6")	DN 200 (8")
EN 1092-1 B1, PN 16			971	1357	1280	1261	1592	1502	
EN 1092-1 B1, PN 40	1021	971	971	1357	1280	1261	1592	1502	
EN 1092-1 B2, PN 63	1021		971	1357	1280	1261	1632	1542	
EN 1092-1 B2, PN 100	1021	971	971	1357	1280	1261	1632	1542	
ANSI B16.5, class 150	1021	971	971	1357	1280	1261	1592	1502	
ANSI B16.5, class 300	1021	971	971	1357	1280	1261	1632	1542	
ANSI B16.5, class 600	1021	971	971	1357	1280	1261	1632	1542	
JIS B2220/10K	1021	971	971	1357	1280	1261	1592	1502	

SITRANS FCS300, overall length (D), dimensions in mm

Sensor	DN 15 (½")			DN 25 (1")			DN 50 (2")		
Connection	DN 10 (¾")	DN 15 (½")	DN 20 (¾")	DN 20 (¾")	DN 25 (1")	DN 40 (1½")	DN 40 (1½")	DN 50 (2")	DN 65 (2½")
EN 1092-1 B1, PN 40	17.7	17.4	16.9	25.4	24.2	22.7	32.0	30.1	32.2
EN 1092-1 B2, PN 63	17.7	17.4	16.9	25.4	24.2	22.7	32.0	30.1	32.2
EN 1092-1 B2, PN 100	17.7	17.4	16.9	25.4	24.2	22.7	32.0	30.1	32.2
ANSI B16.5, class 150		17.4	16.9	22.6	22.6	22.7	32.0	30.1	31.2
ANSI B16.5, class 300		17.4	16.9	25.4	24.2	22.7	32.0	30.1	31.2
ANSI B16.5, class 600		17.4	16.9	25.4	24.2	22.7	32.0	30.1	31.2
JIS B2220/10K		17.4	16.9	25.4	24.2	22.7	32.0	30.1	32.2

Sensor	DN 80 (3")			DN 100 (4")			DN 150 (6")		
Connection	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 80 (3")	DN 100 (4")	DN 150 (6")	DN 100 (4")	DN 150 (6")	DN 200 (8")
EN 1092-1 B1, PN 16			38.2	53.4	50.4	49.6	62.7	59.1	
EN 1092-1 B1, PN 40	40.2	38.2	38.2	53.4	50.4	49.6	62.7	59.1	
EN 1092-1 B2, PN 63	40.2		38.2	53.4	50.4	49.6	64.3	59.1	
EN 1092-1 B2, PN 100	40.2	38.2	38.2	53.4	50.4	49.6	64.3	59.1	
ANSI B16.5, class 150	40.2	38.2	38.2	53.4	50.4	49.6	62.7	59.1	
ANSI B16.5, class 300	40.2	38.2	38.2	53.4	50.4	49.6	64.3	59.1	
ANSI B16.5, class 600	40.2	38.2	38.2	53.4	50.4	49.6	64.3	59.1	
JIS B2220/10K	35.83	34.25	41.73	53.4	50.4	49.6	62.7	59.1	

SITRANS FCS300, overall length (D), dimensions in inch

Overview



The complete flowmeter system SITRANS FC330 can be ordered for standard, hygienic or NAMUR service.

The flowmeter is based on the latest developments within digital signal processing technology – engineered for high measuring performance:

- Fast response to rapid changes in flow
- Fast dosing applications
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain

FC330 is available with current output HART 7.5, Modbus RS485 RTU, PROFIBUS DP or PROFIBUS PA as standard on Channel 1. Additional functions can be freely configured for analog, pulse, frequency, relay or status output or binary input.

The transmitter comes with a user-configurable graphical display and SensorFlash, a micro SD card for configuration backup, firmware update and data storage.

The SITRANS FC330 flowmeter system consists of a SITRANS FCS300 sensor and a SITRANS FCT030 transmitter.

Benefits

- It is compact and light, fitting neatly into dense piping arrangements
- Easy maintenance because modules can be exchanged rapidly
- Effective separation of measurement from plant vibration
- Highly secure operation in safety critical applications
- Non-volatile memory of all setup and operation data
- Reliable measurements due to high signal to noise ratio
- Secure, digital transfer of measurement data from the sensor
- Short overall length; easy drop-in replacement into most existing installations

Flow Measurement

SITRANS F C

Flowmeter SITRANS FC330

Technical specifications

Sizes	DN 15 (½") DN 25 (1") DN 50 (2") DN 80 (3") DN 100 (4") DN 150 (6")	Process connections	
Accuracy	± 0.10 % or 0.20 % for liquids additional ±0.40 for gases	• Flanges	EN 1092-1 B1, EN 1092-1 B2, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220
Repeatability	± 0.05 %	• Pipe threads	ASME B1.20 (NPT) female pipe thread, ISO228-1 G female pipe thread (BSPP)
Flow range (liquids) (water @ 1 bar pressure loss) (Q _{nom})		• Hygienic threads	DIN 11851, SMS 1145
• DN 15	4 500 kg/h (163.3 lb/min)	• Hygienic clamps	DIN 32676 serie A
• DN 25	20 500 kg/h (753.2 lb/min))	Approvals	
• DN 50	49 000 kg/h (1 800 lb/min)	• Hazardous area (zone 1)	ATEX, IECEx, EAC Ex, CSA, cCSAus (NEPSI, INMETRO, EAC (in preparation)
• DN 80	122 000 kg/h (4 483 lb/min)	• Pressure equipment	PED, CRN (in preparation)
• DN 100	273 000 kg (10 031 lb/min)	• Hygienic	EHEDG (DN 25 ... DN 80) (in preparation)
• DN 150	459 200 kg/h (16 873 lb/min)	• Custody transfer	OIML R 117, NTEP (in preparation)
Architecture	Compact or remote configuration	• Operational safety (compact system only NAMUR 7ME471)	SIL 2 Single (in preparation) SIL 3 Redundant system (in prepa- ration)
Display	Full graphical display, 240 x 160 pixels with selection of 6 languages	NAMUR	NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132)
Power supply	20 ... 27 V DC ± 10%; 100 ... 240 V AC ± 10 %, 47 ... 63 Hz ± 10%	I/O	Up to 4 channels combining ana- log, relay or digital outputs and binary input
Weight	4.6 ... 212 kg	Communication	HART PROFIBUS PA PROFIBUS DP Modbus RTU (RS 485)
Material		EMC performance	
• Sensor		Emission	EN 55011/CISPR-11 (Class A)
- Wetted parts	316L stainless steel or Nickel Alloy C4	Immunity	EN/IEC 61326-1 (Industry)
- Enclosure	304 stainless steel	Mechanical load	18 to 400 Hz random
• Transmitter	Aluminum with corrosion-resistant coating		The flow meter will mechanically tol- erate 3.17 g RMS in all directions. Flow accuracy cannot be guaran- teed under all conditions.
Enclosure rating	IP67		
Pressure ratings			
• Measuring tubes			
- 316L	100 bar (1450 psi)		
- Nickel Alloy C4 (DN 15 ... 50)	100 bar (1450 psi)		
• Sensor enclosure	No pressure containment		
Temperature ratings			
• Process medium	-50 ... +205 °C (-58 ... +400 °F)		
• Ambient	-40 ... +60 °C (-40 ... +140 °F) ¹⁾		
• Display	-20 ... +60 °C (-4 ... +140 °F)		

¹⁾ If operating outdoors, avoid direct sunlight, particularly in warm climatic regions.

Selection and Ordering data	Article No.	Order code
SITRANS FC330 Digital Coriolis flowmeter with SITRANS FCS300 standard flow sensor compact or remote mounting with FCT030 transmitter	7 ME 4 6 3 3 -	-
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Sensor size, connector size		
DN 15, DN 10 (½", 3/8")	3 F	
DN 15, DN 15 (½", ½")	3 G	
DN 15, DN 20 (½", ¾")	3 H	
DN 25, DN 20 (1", ¾")	3 K	
DN 25, DN 25 (1", 1")	3 L	
DN 25, DN 40 (1", 1½")	3 N	
DN 50, DN 40 (2", 1½")	4 B	
DN 50, DN 50 (2", 2")	4 C	
DN 50, DN 65 (2", 2½")	4 D	
DN 80, DN 65 (3", 2½")	4 J	
DN 80, DN 80 (3", 3")	4 K	
DN 80, DN 100 (3", 4")	4 L	
DN 100, DN 80 (4", 3")	5 M	
DN 100, DN 100 (4", 4")	5 N	
DN 100, DN 150 (4", 6")	5 Q	
DN 150, DN 100 (6", 4")	6 D	
DN 150, DN 150 (6", 6")	6 F	
DN 150, DN 200 (6", 8")	6 H	
Process connection		
EN 1092-1 B1, PN 16	A 0	
EN 1092-1 B1, PN 40	A 1	
EN 1092-1 B2, PN 63	A 2	
EN 1092-1 B2, PN 100	A 3	
EN 1092-1 D, PN 40	A 5	
ASME B16.5 RF, class 150	D 1	
ASME B16.5 RF, class 300	D 2	
ASME B16.5 RF, class 600	D 3	
ASME B16.5 RF, class 900 (p- and t-rating as class 600)	D 4	
ASME B16.5 RF, class 1500 (p- and t-rating as class 600)	D 5	
ISO 228-1G female pipe thread	E 1	
ASME B1.20.1 NPT female pipe thread	E 3	
DIN 11851 hygienic screwed	F 1	
DIN 32676 (ISO) clamp serie A	G 2	
SMS 1145 hygienic screwed	K 1	
JIS B2220/10K	L 2	
JIS B2220/20K	L 4	
EN 1092-1, PN 16, NAMUR length	N 1	
EN 1092-1, PN 40, NAMUR length	N 2	
Wetted parts material		
AISI 316L/1.4435/1.4404	1	
AISI 316L/1.4435/1.4404 (polished)	2	
Nickel-alloy C4	3	
Calibration/Accuracy class		
0.2 % flow, 10 kg/m³ density	0	
0.1 % flow, 2 kg/m³ density	1	
Standard fraction (with density 2 kg/m³)	8	
Customer selected fraction	9	N O Y

Flow Measurement

SITRANS F C

Flowmeter SITRANS FC330

Selection and Ordering data	Article No.	Order code
SITRANS FC330 Digital Coriolis flowmeter with SITRANS FCS300 standard flow sensor compact or remote mounting with FCT030 transmitter	7 ME 4 6 3 3 -	
Mounting style, transmitter housing and material		
None (replacement sensor)		A
Compact, IP67 fieldmount, aluminum		D
Remote, IP67 fieldmount, aluminum, M12		G
Remote, IP67 fieldmount, aluminum, T/Box		K
Remote, IP67, wall mount, aluminium		U
Ex approval (depending on variant)		
Non-Ex		A
ATEX (zone 1)		C
IECEX (zone 1)		F
US (cCSAus), Div 1		L
Canada (cCSAus), zone 1		M
NEPSI (in preparation)		N
INMETRO (in preparation)		P
KCs (in preparation)		Q
EAC (in preparation)		U
Local User Interface		
None (replacement sensor, DSL only)		0
Blind		1
Graphical, 240 x 160 pxl		3

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Further designs		I/O configuration Ch2, Ch3 and Ch4	
Please add "-Z" to Article No. and specify Order code(s).		None	F00
Cable glands		Non Ex: Sig O, None, None	F01
None (replacement sensor)	A00	Non Ex: Sig O, Sig I/O, None	F02
Metric, no glands	A01	Non Ex: Sig O, Sig I/O, Sig I/O	F03
Metric, Nylon, limited to -20 °C/-4 °F	A02	Non Ex: Sig O, Sig I/O, R	F04
Metric, brass/Ni plated	A05	Non Ex: Sig O, R, R	F05
Metric, stainless steel	A06	Non Ex: Sig O, R, None	F06
NPT, no glands	A11	Ex: pSig O, None, None	F11
NPT, Nylon, limited to -20 °C/-4 °F	A12	Ex: pSig O, pSig I/O, None	F12
NPT, brass/Ni plated	A15	Ex: pSig O, pSig I/O, pSig I/O	F13
NPT, stainless steel	A16	Ex: pSig O, pSig I/O, R	F14
Metric thread with M12 socket fitted	A20	Ex: pSig O, R, R	F15
Software functions and CT approvals		Ex: pSig O, R, None	F16
None (replacement sensor)	B10	Ex: aSig O, None, None	F21
Standard	B11	Ex: aSig O, aSig I/O, None	F22
CT OIML R 117 (in preparation)	B31	Ex: aSig O, aSig I/O, aSig I/O	F23
CT NTEP (in preparation)	B52	Ex: aSig O, aSig I/O, R	F24
I/O configuration Ch1		Ex: aSig O, R, R	F25
No output channel	E00	Ex: aSig O, R, None	F26
4 ... 20 mA HART Active/Passive (non-Ex)	E02		
Ca 4 ... 20 mA HART active (Ex)	E06	Notes on I/O configurations:	
Ca 4 ... 20 mA HART passive (Ex)	E07	a or p suffix: The I/O module is selected at ordering with either active or passive function.	
PROFIBUS PA	E10	Signal: The output can be selected for Current (0 or 4 to 20 mA), frequency or pulse function in the menu.	
PROFIBUS DP (non-Ex)	E11	I: Discrete status input to the flowmeter. Functions are selected in the menu including 'Freeze output', 'Reset totalizer' (only CH3&4).	
Modbus RTU RS 485	E14	R: Relay output for discrete status reporting. Function is selected in the menu, including 'Error', 'High flow warning'.	
		The MLFB structure for FC430 systems must be filled to this level , including "-Z" options A., B., E.. and F..	

Selection and Ordering data	Order code
Add-on options and accessories	
Please add "-Z" to Article No. and specify Order code(s).	
Certificates	
Factory certificate to EN 10204 -2.2	C01
Material certificate EN 10204-3.1 with inspection	C02
Material certificate EN 10204-3.2 with inspection	C03
NACE MR0175/EN 10204-3.1	C04
Declaration of conformity certificate EN 10204-2.1	C05
Inspection certificate EN 10204-3.1 incl. dimension and function test	C06
Inspection certificate EN 10204-3.1 with PMI	C07
Pressure test acc. AD2000	C08
Test package (Pressure, NDT, WPS, WPQS)	C09
Inspection certificate to EN 10204 3.1/NDE-weld	C10
Certificate of accuracy acc. EN 10204 2.1	C11
Inspection certificate to EN 10204 3.1 with PMI (including heat analysis)	C12
Customer selected calibration	
DN 15 ... 50: Multi-point (5 flows x 1 pass)	D60
DN 15 ... 50: Multi-point (10 flows x 1 pass)	D61
DN 80: Multi-point (5 flows x 1 pass)	D62
DN 80: Multi-point (10 flows x 1 pass)	D63
DN 100: Multi-point (5 flows x 1 pass)	D64
DN 100: Multi-point (10 flows x 1 pass)	D65
DN 150: Multi-point (5 flows x 1 pass)	D66
DN 150: Multi-point (8 flows x 1 pass)	D67
Cable	
None	L50
5 m (16.4 ft), standard with M12 connectors fitted	L51
5 m (16.4 ft), standard	L52
10 m (32.8 ft) standard with M12 connectors fitted	L55
10 m (32.8 ft), standard, without plugs	L56
25 m (82 ft), standard with M12 connectors fitted	L59
25 m (82 ft), standard, without plugs	L60
50 m (164 ft), standard with M12 connectors fitted	L63
50 m (164 ft), standard, without plugs	L64
75 m (246 ft), standard with M12 connectors fitted	L67
75 m (246 ft), standard, without plugs	L68
Sensor options	
FCS300 Marine approval (in preparation)	S22
SD-Card accessibility via USB (not allowed in USA by Patent)	
Mass storage enabled	S30
Region-specific approvals and certificates	
South Korea (KCC) (in preparation)	W28
Additional data	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	Y17

Operating instructions for SITRANS FC330

Description	Article No.
English	A5E44030648
• for firmware V 4.0 and on-wards	
German	TBD
• for firmware V 4.0 and on-wards	

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Flow Measurement

SITRANS F C

Flowmeter SITRANS FC310

Overview



The compact flowmeter SITRANS FC310 can be ordered for industrial, hygienic or NAMUR service.

Intended for integration into OEM skids, machines or pre-assembled plant systems, the flowmeter is based on the latest developments within digital signal processing technology - engineered for high measuring performance:

- Fast response to rapid changes in flow
- Fast dosing applications with control in host system
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain

With all global marine approvals the FC310 is ideal for integration in ship fuel efficiency and environmental measurement systems as well as bunkering solutions.

The FCT010 transmitter delivers true multi-parameter measurements i.e. massflow, density, temperature.

FC410 is available with Modbus RTU (RS 485) multi-drop serial communication.

The flowmeter is supplied with SensorFlash, a micro SD card containing all relevant certificates.

The SITRANS FC310 flowmeter system consists of a SITRANS FCS300 sensor and a SITRANS FCT010 transmitter always compact mounted.

Benefits

- It is compact and light, fitting neatly into dense piping arrangements
- Effective separation of measurement from plant vibration
- Reliable measurements due to high signal to noise ratio
- Short overall length; easy drop-in replacement into most existing installations
- Direct connection to host with high-speed Modbus simplifies machine or skid construction and set-up
- Modbus RS485 RTU allows simple and easy integration with all Modbus masters with fast update rate of process values

Technical specifications

Sizes	DN 15 (½") DN 25 (1") DN 50 (2") DN 80 (3") DN 100 (4") DN 150 (6")	Process connections	
Accuracy	± 0.10 % or ± 0.20 % Additional ± 0.40 % for gases	• Flanges	EN 1092-1 B1, EN 1092-1 B2, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220
Repeatability	± 0.05 %	• Pipe threads	ASME B1.20 (NPT) female pipe thread, ISO228-1 G female pipe thread (BSPP)
Flow range (water @ 1 bar pressure loss)		• Hygienic threads	DIN 11851, SMS 1145
• DN 15	4 500 kg/h (163.3 lb/min)	• Hygienic clamps	DIN 32676 serie A
• DN 25	20 500 kg/h (753.2 lb/min)	Approvals	
• DN 50	49 000 kg/h (1 800 lb/min)	• Hazardous area (zone 1)	ATEX, IECEx, EAC Ex, cCSAus (NEPSI, INMETRO, EAC in prepa- ration)
• DN 80	122 000 kg/h (4 483 lb/min)	• Pressure equipment	PED, CRN (in preparation)
• DN 100	273 000 kg (10 031 lb/min)	• Hygienic	EHEDG (DN 25 ... 80) (in preparation)
• DN 150	459 200 kg/h (16 873 lb/min)	• Marine (in preparation)	Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping, RINA (Italy)
Power supply	24 V DC ± 20 %; 110 mA	NAMUR	NAMUR-compliant (e.g. NE 21, NE 41 and NE 132)
Weight	4.6 ... 207 kg	Communication	Modbus RS 485 RTU
Material		EMC performance	
• Sensor		Emission	EN 55011/CISPR-11 (Class B)
- Measuring tubes	316L stainless steel or Nickel Alloy C4	Immunity	EN/IEC 61326-1 (Industry)
- Enclosure	304 stainless steel	Mechanical load	18 to 400 Hz random The flow meter will mechanically tolerate 3.17 g RMS in all direc- tions. Flow accuracy cannot be guaranteed under all conditions.
• Transmitter	Aluminum with corrosion-resis- tant coating		
Enclosure rating	IP67		
Pressure ratings			
• Measuring tubes			
- 316L	100 bar (1450 psi)		
- Nickel-Alloy C4	100 bar (1450 psi)		
• Sensor enclosure	No pressure containment		
Temperature ratings			
• Process medium	-50 ... +205 °C (-58 ... +400 °F)		
• Ambient	-40 ... +60 °C (-40 ... +140 °F)		

Flow Measurement

SITRANS F C

Flowmeter SITRANS FC310

Selection and Ordering data	Article No.	Order code
SITRANS FC310 Digital Coriolis flowmeter with SITRANS FCS300 standard flow sensor with hygienic and flange/pipe thread connections and compact mounting with FCT010 transmitter	7 ME 4 6 3 1 -	
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Sensor size, connector size		
DN 15, DN 10 (½", 3/8")	3 F	
DN 15, DN 15 (½", ½")	3 G	
DN 15, DN 20 (½", ¾")	3 H	
DN 25, DN 20 (1", ¾")	3 K	
DN 25, DN 25 (1", 1")	3 L	
DN 25, DN 40 (1", 1½")	3 N	
DN 50, DN 40 (2", 1½")	4 B	
DN 50, DN 50 (2", 2")	4 C	
DN 50, DN 65 (2", 2½")	4 D	
DN 80, DN 65 (3", 2½")	4 J	
DN 80, DN 80 (3", 3")	4 K	
DN 80, DN 100 (3", 4")	4 L	
DN 100, DN 80 (4", 3")	5 M	
DN 100, DN 100 (4", 4")	5 N	
DN 100, DN 150 (4", 6")	5 Q	
DN 150, DN 100 (6", 4")	6 D	
DN 150, DN 150 (6", 6")	6 F	
DN 150, DN 200 (6", 8")	6 H	
Process connection		
EN 1092-1 B1, PN 16	A 0	
EN 1092-1 B1, PN 40	A 1	
EN 1092-1 B2, PN 63	A 2	
EN 1092-1 B2, PN 100	A 3	
EN 1092-1 D, PN 40	A 5	
ASME B16.5 RF, class 150	D 1	
ASME B16.5 RF, class 300	D 2	
ASME B16.5 RF, class 600	D 3	
ASME B16.5 RF, class 900 (p- and t-rating as class 600)	D 4	
ANSI B16.5-2009, class 1500 (p- and t-rating as class 600)	D 5	
ISO 228-1G female pipe thread	E 1	
ASME B1.20.1 NPT female pipe thread	E 3	
DIN 11851 hygienic screwed	F 1	
DIN 32676 (ISO) hygienic clamp serie A	G 1	
SMS 1145 hygienic screwed	K 1	
JIS B2220/10K	L 2	
JIS B2220/20K	L 4	
EN 1092-1, PN 16, NAMUR length	N 1	
EN 1092-1, PN 40, NAMUR length	N 2	
Wetted parts material		
AISI 316L/1.4435/1.4404	1	
AISI 316L/1.4435/1.4404 (polished)	2	
Nickel-Alloy C4	3	
Calibration/Accuracy class		
0.2 % flow, 10 kg/m³ density	0	
0.1 % flow, 2 kg/m³ density	1	
Mounting style, transmitter housing and material		
Compact, IP67, aluminum	D	
Ex approval		
Non-Ex		A
ATEX II 2G zone 1		C
IECEx Gb (zone 1)		F
US (cCSAus), Div 1		L
Canada (cCSAus), class I, zone 1		M
NEPSI (in preparation)		N
INMETRO (in preparation)		P
KCs (in preparation)		Q
EAC (in preparation)		U
Local User Interface		
Blind		1

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Further designs		Add-on options and accessories	
Please add "-Z" to Article No. and specify Order code(s).		Please add "-Z" to Article No. and specify Order code(s).	
Cable glands		Certificates	
None (replacement sensor)	A00	Factory certificate to EN 10204 -2.2	C01
Metric, no glands	A01	Material certificate EN 10204-3.1 with inspection	C02
Metric, plastic	A02	Material certificate EN 10204-3.2 with inspection	C03
Metric, brass/Ni plated	A05	NACE MR0175/EN 10204-3.1	C04
Metric, stainless steel	A06	Declaration of conformity certificate EN 10204-2.1	C05
NPT, no glands	A11	Inspection certificate EN 10204-3.1 incl. dimension and function test	C06
NPT, plastic	A12		
NPT, brass/Ni plated	A15	Inspection certificate EN 10204-3.1 with PMI	C07
NPT, stainless steel	A16	Pressure test acc. AD2000	C08
Metric thread with M12 socket fitted	A20	Test package (Pressure, NDT, WPS, WPQS)	C09
Software functions and CT approvals		Inspection certificate to EN 10204 3.1/NDE-weld	C10
Standard	B11	Certificate of accuracy acc. EN 10204 2.1	C11
I/O configuration Ch1		Inspection certificate to EN 10204 3.1 with PMI (including heat analysis)	C12
Modbus RTU RS 485	E14		
I/O configuration Ch2, Ch3 and Ch4		Customer selected calibration	
None	F00	DN 15 ... 50, multi-point, 5 flows x 1 pass	D60
		DN 15 ... 50, multi-point, 10 flows x 1 pass	D61
		DN 80, multi-point, 5 flows x 1 pass	D62
		DN 80, multi-point, 10 flows x 1 pass	D63
		DN 100, multi-point, 5 flows x 1 pass	D64
		DN 100, multi-point, 10 flows x 1 pass	D65
		DN 150, multi-point, 5 flows x 1 pass	D66
		DN 150, multi-point, 8 flows x 1 pass	D67
		Cable	
		(M12 versions of cable have a connector on both ends)	
		None	L50
		5 m (16.4 ft), standard with M12 connectors fitted	L51
		5 m (16.4 ft), standard, without plugs	L52
		10 m (32.8 ft) standard with M12 connectors fitted	L55
		10 m (32.8 ft), standard, without plugs	L56
		25 m (82 ft), standard with M12 connectors fitted	L59
		25 m (82 ft), standard, without plugs	L60
		50 m (164 ft), standard with M12 connectors fitted	L63
		50 m (164 ft), standard, without plugs	L64
		75 m (246 ft), standard with M12 connectors fitted	L67
		75 m (246 ft), standard, without plugs	L68
		Sensor options	
		FCS300 Marine approval	S22
		Additional data	
		Please add "-Z" to Article No. and specify Order code(s) and plain text.	
		Tag name	
		Tag name plate, stainless steel	Y17

Operating instructions for SITRANS FC310

Description	Article No.
English	
• for firmware V 4.0 and onwards	A5E39789214
German	
• for firmware V 4.0 and onwards	TBD

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Flow Measurement

SITRANS F C

Flowmeter SITRANS FC410 and FC430 for OEM customers

Overview



The complete flowmeter system SITRANS FC consist of a new FCS400 sensor in sizes DN 15 to DN50 mm and a FCT030 multichannel/multifunctional in compact or remote versions, or a single Modbus-channel FCT010 transmitter in compact version. The flowmeter is based on the latest developments within digital signal processing technology – engineered for high measuring performance:

- Fast response to rapid changes in flow
- Fast dosing applications
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain
- Aerated flow filtering system, for advanced filtering of fluids with gas or air bubbles
- Build in Data logger for all process variables and status messages (FCT030)
- Build in Batch functionality (FCT030)

The SITRANS FC430 is available with current output HART 7.5, Modbus RS485 RTU, PROFIBUS DP or PROFIBUS PA as standard on Channel 1. Additional I/O functions can be freely configured for analog, pulse, frequency, relay or status output, or binary input.

The transmitter comes with a user configurable graphical display and SensorFlash, a micro SD card for configuration backup, firmware update and data storage.

The SITRANS FC410 is available with a Modbus RTD output transferring all process values to a any PLC or DCS system like SIMATIC S7-1200; S7-1500 or PCS7. True multi-parameter measurements i.e. massflow, density, temperature.

The SITRANS FC410 is available with MODBUS RTU (RS 485) multi-drop serial communication.

Benefits

- It is truly compact and light, fitting neatly into dense piping arrangements
- Easy maintenance because modules can be exchanged rapidly
- Effective separation of measurement from plant vibration
- Highly secure operation in safety critical applications
- Non-volatile memory of all setup and operation data
- Reliable measurements due to high signal to noise ratio
- Secure, digital transfer of measurement data from the sensor
- Shortest overall length; easy drop-in replacement into most existing installations

Application

SITRANS FCS400 mass flowmeters are especially suitable for applications for machinebuilder, skid manufacturer and OEM's in general for the process industry where there is a demand for accurate flow measurement. The meter is capable of measuring both liquid and gas flow.


Coriolis flowmeters can be applied in all industries, such as:

- Chemical: detergents, bulk chemicals, acids, alkalis, paint mixing systems, solvents and resins, fertilizer, technical gases
- Oil & Gas Processing Up- Mid- Down stream: Well-head monitoring, oil separators, refineries control, furnace control
- Hydrocarbon processing: oil refining, derivatives manufacturing, polymerization
- Power industry processing
- Marine Application: Fuel management & consumption; bunkering solutions; Boiler control
- Food & Beverage: dairy products, beer, wine, Alcohol / spirit, soft drinks, °Brix/°Plato, fruit juices and pulps, bottling, CO₂ dosing, CIP/SIP-liquids, mixture recipe control

The multiple outputs and bus communication mean that all of the process information can be read either instantaneously (10 ms update) or periodically as plant operation requires.

Flowmeter SITRANS FC410 and FC430 for OEM customers

Technical specifications

Flowmeter	SITRANS FC430	SITRANS FC410
		
Sizes	DN 15 (½") DN 25 (1") DN 50 (2")	
Accuracy	• Massflow $\pm 0.10\%$ for liquids additional ± 0.25 for gases • Density $\pm 5 \text{ kg/m}^3$ or 0.5 kg/m^3 (in preparation)	
Repeatability	• Massflow $\pm 0.05\%$	
Flow range (liquids) Q_{nom} (water @ 1 bar pres- sure loss) $(Q_{\text{max}}$ approx. $2 \times Q_{\text{nom}}$)	• DN 15 (½") 3 700 kg/h (8 200 lb/h) • DN 25 (1") 11 500 kg/h (25 300 lb/h) • DN 50 (2") 52 000 kg/h (115 000 lb/h)	
Installation	Compact or remote	Compact
Display	Full graphical display, 240 x 160 pixels with selection of 6 languages	No display
Totalizer	Three eight-digit counters for forward, net or reverse flow	One Totalizer
Process values	Mass, volume, corrected volume, temperature, density, fraction e.g. Brix, Plato % Alc., concentration	Mass, volume, temperature, density
Power supply	20 ... 27 V DC $\pm 10\%$; 100 ... 240 V AC $\pm 10\%$; 47 ... 63 Hz $\pm 10\%$	24 V DC $\pm 20\%$; 110 mA

Flowmeter	SITRANS FC430	SITRANS FC410
Materials	• Sensor - Wetted parts - Enclosure • Transmitter 316L stainless steel 304 stainless steel Aluminum with corrosion-resistant coating	
Enclosure rating	IP67	
Pressure ratings	• Measuring tubes - 316L • Sensor enclosure 100 bar (1450 psi) 20 bar (DN 15, DN 25) 17 bar (DN 50) Burst pressure > 100 bar	
Temperature ratings	• Process medium - DN 15 ... DN 50 -40 ... +60 °C (-40 ... +140 °F) • Ambient -40 ... +60 °C (-40 ... +140 °F) • Display -20 ... +60 °C -4 ... +140 °F	
Process connections	• Flanges EN 1092-1 B1, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220, DIN 11864-2 • Pipe threads ASME B1.20 (NPT) male pipe thread, ISO228-1 G male pipe thread, VCO Quick-connect • Hygienic threads DIN 11851, DIN 11864-1A, ISO 2853, SMS 1145 • Hygienic clamps DDIN 11864-3A, DIN 32676, ISO 2852	
Approvals	• Hazardous area (zone 1 / 21) • Pressure equipment ATEX, IECEx, cCSA us PED, CRN	
NAMUR	NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132)	
I/O	Up to 4 channels combining analog, relay or digital outputs and binary input	-
Communication	HART PROFIBUS PA PROFIBUS DP Modbus RTU (RS 485)	Modbus RTU (RS 485)

Selection and Ordering data (please contact Siemens sales office)

SITRANS FC430 Digital Coriolis flowmeter with SITRANS FCS400 sensor compact or remote mounting with FCT030 transmitter

Article No.

7ME4613 -



SITRANS FC410 Digital Coriolis flowmeter with SITRANS FCS400 sensor compact mounting FCT010 transmitter

7ME4611 -



Flow Measurement

SITRANS F C

SITRANS F C sensor MASS 2100 DI 1,5 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

Overview



MASS 2100 DI 1.5 is suitable for low flow measurement applications of a variety of liquids and gases.

The sensor offers superior performance in terms of flow accuracy, turn-down ratio and density accuracy. The ease of installation through a "plug & play" mechanical and electrical interface ensures optimum performance and operation.

The sensor delivers true multi-parameter measurements i.e.: Mass flow, volume flow, density, temperature and fraction.

Benefits

- High accuracy better than 0.1 % of mass flow rate
- Large dynamic turn-down ratio better than 500:1, from 30 kg/h to below 100 g/h
- Densitometer performance available through a density accuracy better than 0.001 g/cm³ with a repeatability better than 0.0002 g/cm³.
- Single continuous tube design, with no internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food and beverage and pharmaceutical applications.
- Market's biggest wall thickness, ensuring optimal life-time and corrosion resistance and high-pressure durability
- Balanced pipe design with little mechanical energy-loss, ensures optimal performance and stability under non-ideal and unstable process conditions (pressure, temperature, density-changes etc.).
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Multi-plug electrical connector and SENSORPROM enables true "plug & play". Installation and commissioning in less than 10 minutes
- Intrinsically safe Ex ia design as standard
- Sensor pipe available in high-quality stainless steel AISI 316L/1.4435 or Hastelloy C22/2.4602 offering optimum corrosion resistance
- Dual-drive pick-up and driver construction facilitate ultra low-weight pipe construction giving the markets' smallest and most stable zero point.
- Rugged and space-saving sensor design in stainless steel matching all environments
- High-pressure program as standard
- The sensor calibration factor is also valid for gas measurement.

Application

In many industries such as the food and beverage or pharmaceutical industry, accurate recipe control means everything. The MASS 2100 DI 1.5 has demonstrated superior performance in numerous applications and field trials relating to accuracy and turn-down ratio. It is today the preferred meter for research and development and mini-plant applications for liquid or gas measurement, where measuring small quantities is important.

The main applications for the MASS 2100 DI 1.5 sensor can be found in:

Chemical industry	Liquid and gas measurement within Miniplant and R & D, dosing of additives and catalysts
Cosmetic industry	Dosing of essence and fragrances
Pharmaceutical industry	High-speed dosing and coating of pills, filling of ampuls/injectors
Food and beverage industry	Dosing of flavourings, colours and additives, density measurement, inline measurement of liquid or gaseous CO ₂
Automotive industry	Fuel injection nozzle and pump testing, filling of AC units, engine consumption, paint robots, ABS test-beds

Design

The MASS 2100 sensor consists of a single bent tube in a double omega pipe configuration, welded directly to the process connectors at each end.

The sensor is available in 2 material configurations, AISI 316L/1.4404 or Hastelloy C22/2.4602 with 1/4" NPT or 1/4" ISO process connections.

The enclosure is made in stainless steel AISI 316L/1.4404 with a grade of encapsulation of IP65/NEMA 4.

The sensor is available in either a standard version with a maximum liquid temperature of 125 °C (257 °F) or a high-temperature version, with raised electrical connector for 180 °C (356 °F).

The sensor can be installed in horizontal or vertical position. The enclosed single quick release clamp fitting which, along with its compact design and single multi-plug electrical connector, will keep installation costs and time to a minimum as shown below.



SITRANS F C sensor MASS 2100 DI 1,5 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

Function

The measuring principle is based on the Coriolis effect. See "System information SITRANS F C Coriolis mass flowmeters".

Integration

The sensor can be connected to FCT010, FCT030, SIFLOW and MASS 6000 (non CE) transmitters for remote installation only.

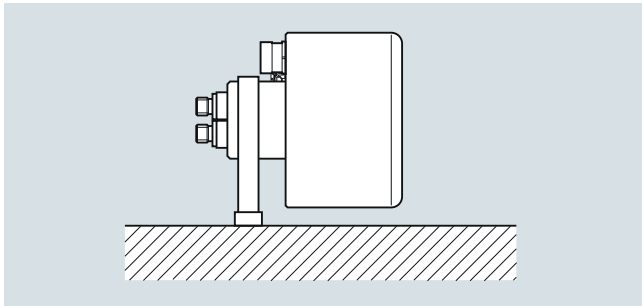
All sensors are delivered with a Sensor Flash or SENSORPROM containing all information about calibration data, identity and factory pre-programming of transmitter settings

Installation guidelines MASS 2100 DI 1.5 (1/16")

Installation of MASS 2100 sensor

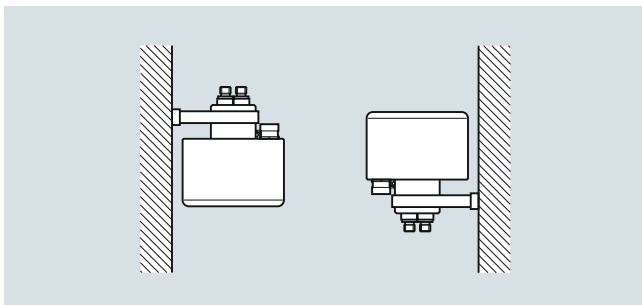
- The optimal installation is horizontal. If vertical mounting is necessary, upward flow is recommended to facilitate the removal of air bubbles. To remove the air from the sensor the flow speed in the sensor must be at least 1 m/s. If there are solid particles in the liquid, especially in connection with low flow, it is recommended that the sensor be mounted horizontally with inlet flange uppermost so that particles are more easily flushed out. To ensure that the sensor does not become partially empty, there must be sufficient counter-pressure on the unit min. 0.2 bar (2.9 psi).
- Mount the sensor on a vibration-free wall or steel frame.
- Locate the sensor low in the system in order to avoid an under-pressure in the sensor separating air/gas in the liquid.
- Ensure that the sensor is not emptied of liquid (during normal operation) otherwise incorrect measurement will occur.

Horizontal



Liquid and gas application

Vertical



Liquid application (left), gas application (right)

Technical specifications

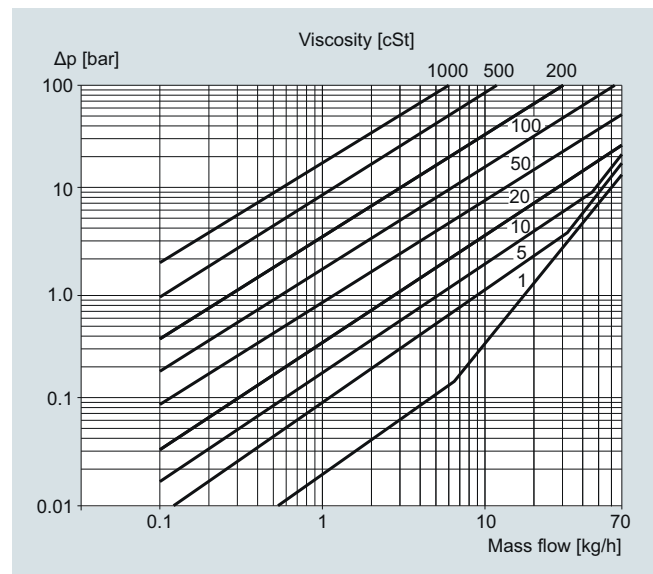
Inside pipe diameter (sensor consists of one continuous pipe)	1.5 mm (0.06")
Pipe wall thickness	0.25 mm (0.010")
Mass flow measuring range	0 ... 30 kg/h (0 ... 66 lb/h)
Density	0 ... 2.9 g/cm ³ (0 ... 0.10 lb/inch ³)
Fraction e.g.	0 ... 100 °Brix
Media temperature	
Standard	-50 ... +125 °C (-58 ... +257 °F)
High-temperature version	-50 ... +180 °C (-58 ... +356 °F)
Ambient temperature	-20 ... +50 °C (-4 ... +122 °F)
Liquid pressure measuring pipe¹⁾	
Stainless steel	230 bar (3336 psi) at 20 °C (68 °F)
Hastelloy C22/2.4602	365 bar (5294 psi) at 20 °C (68 °F)
Materials	
Measuring pipe and connection	Stainless steel AISI 316L/1.4435 Hastelloy C22/2.4602
Enclosure and enclosure material²⁾	IP65 and stainless steel AISI316L/1.4404
Connection thread	
ISO 228/1	G1/4" male
ANSI/ASME B1.20.1	1/4" NPT male
Cable connection	Multiple plug connection to sensor 5 x 2 x 0.35 mm ² twisted and screened in pairs, ext. Ø 12 mm
Ex-version	II 1G Ex ia IIC T3-T6, DEMKO 03 ATEX 135252X c-UL-us Ex ia IIC T3-T6 EAC Ex TC RU C- DE.MIO62.B.02013 0Ex ia IIC T3...T6 Gb UL WYMG.E232147
Weight approx.	2.6 kg (5.73 lb)

¹⁾ According to DIN 2413, DIN 17457

²⁾ Housing is not rated for pressure containment.

For accuracy specifications see "System information SITRANS F C".

Pressure drop



MASS 2100 DI 1.5 (1/16"), pressure drop for density = 1000 kg/m³

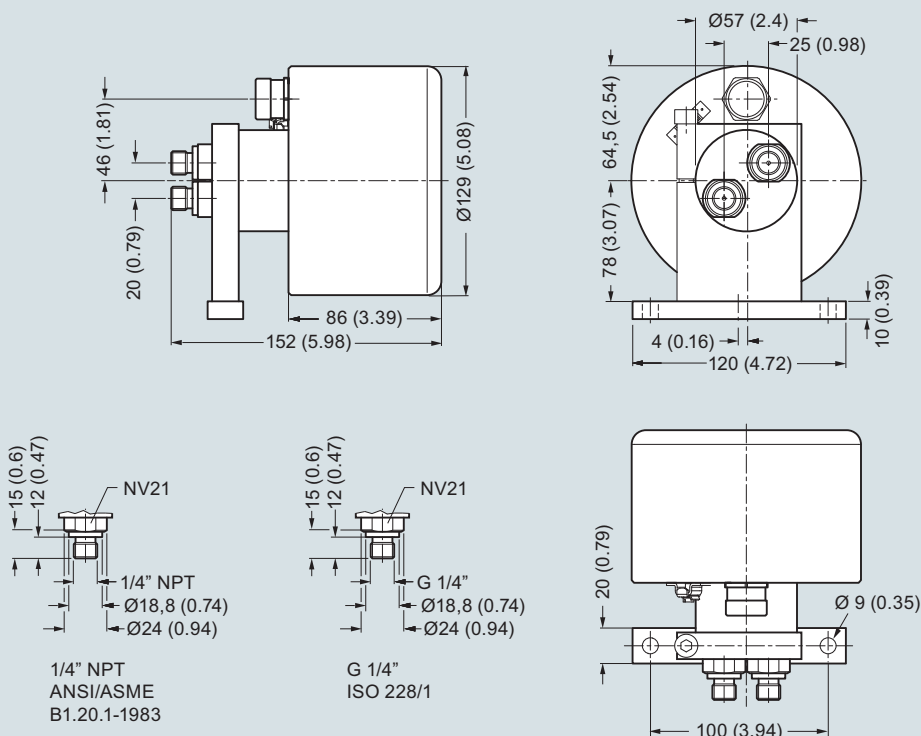
Flow Measurement

SITRANS F C

SITRANS F C sensor MASS 2100 DI 1,5 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

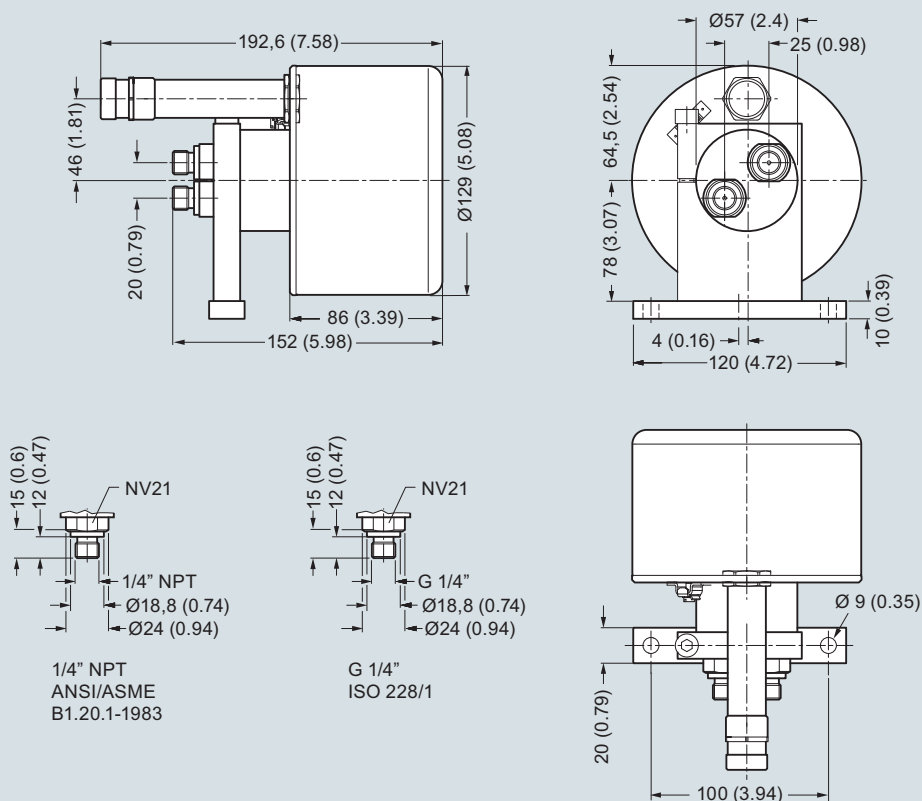
Dimensional drawings

MASS 2100 DI 1.5 (1/16")



Dimensions in mm (inch)

MASS 2100 DI 1.5 High-temperature version to 180 °C (356 °F)



Dimensions in mm (inch)

SITRANS F C sensor FC300 DN 4 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

Overview



SITRANS FC300 is a compact Coriolis mass sensor suitable for flow measurement of a variety of liquids and gases.

The sensor offers superior performance in terms of flow accuracy, turn-down ratio and density accuracy. The ease of installation through a „plug & play“ interface ensures optimum performance and operation.

A new designed encapsulation in stainless steel with a surprisingly low weight of only 3.5 kg (7.7 lb), ensures a rigid and robust sensor performance for a wide range of applications.

Benefits

- High accuracy better than 0.1 % of mass flow rate
- Large dynamic turn-down ratio better than 500:1
- Densitometer performance available through a density accuracy as follows:
 - For 316L/1.4404 version better than 0.007 g/cm³ (0.00025 lb/inch³) with repeatability better than 0.0002 g/cm³ (0.0000072 lb/inch³)
 - For C22/2.4602 version better than 0.0025 g/cm³ (0.000090 lb/inch³) with repeatability better than 0.0002 g/cm³ (0.0000072 lb/inch³)
- One tube without internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food and beverage and pharmaceutical applications
- Larger wall thickness, ensures optimal life-time and corrosion resistance and high-pressure durability
- Balanced pipe design with little mechanical energy loss, ensures optimal performance and stability under non-ideal and unstable process conditions (pressure, temperature, density-changes etc.).
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Multi-plug electrical connector and SENSORPROM enable true „plug & play“. Installation and commissioning in less than 10 minutes.
- Intrinsically safe Ex design ia IIC as standard
- Sensor pipe available in high-quality stainless steel AISI 316L/1.4435 or Hastelloy C22/2.4602 offering optimum corrosion resistance.
- Rugged and space-saving sensor design in stainless steel matching all applications.
- High-pressure program as standard
- The sensor calibration factor is also valid for gas measurement.

Application

The industry today has an increasing demand for mass flowmeters with a reduced physical size without loss of performance. The meters must be suitable for installation in traditional process industry environment as well as OEM equipment for instance within automotive or appliance industry. Independent of industry application the meter must deliver accurate and reliable measurements. The new and versatile design of the FC300 offers this flexibility.

The main applications for the SITRANS FC300 DN 4 can be found in:

Chemical industry	Liquid and gas measurement in normal as well as corrosive environments
Cosmetic industry	Dosing of essence and fragrances
Pharmaceutical industry	High-speed dosing and coating of pills, filling of ampuls/injectors
Food and beverage industry	Filling, dosing of flavorings, colors and additives, inline density measurement Measurement and dosing of liquid or gaseous CO ₂
Automotive industry	Fuel injection nozzle and pump testing, filling of AC units, engine consumption, paint robots, ABS test-beds

Design

The FC300 sensor consists of a single tube bent in double omega pipe geometry, welded directly to the process connectors at each end. The sensor is available in 2 material configurations, AISI 316L/1.4404 or Hastelloy C22/2.4602 with 1/4"-NPT or G1/4"-ISO process connections.

The enclosure is made of stainless steel AISI 316L/1.4409 with a grade of encapsulation of IP67/NEMA 4. The enclosure has a very robust design and with an overall size of 130 x 200 x 60 mm (5.12" x 7.87" x 2.36") the sensor is very compact and requires only little installation space.

The sensor can be delivered in a standard version with a maximum liquid temperature of 115 °C (239 °F) or a high-temperature version, with raised electrical connector for 180 °C (356 °F).

The sensor can be installed in horizontal or vertical position. The sensor can be mounted directly on any given plane surface or if desired with the enclosed quick release clamp fitting which, along with its compact design and multi-plug electrical connector, will keep installation costs and time to a minimum.

Function

The measuring principle is based on the Coriolis effect. See "System information SITRANS F C Coriolis mass flowmeters".

Integration

The sensor can be connected to all FCT010, FCT030, SIFLOW and MASS 6000 (non CE) transmitters for remote installation only.

All sensors are delivered with a Sensor Flash or SENSORPROM containing all information about calibration data, identity and factory pre-programming of transmitter settings.

Flow Measurement

SITRANS F C

SITRANS F C sensor FC300 DN 4 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

Installation guidelines for SITRANS FC300 sensor

Horizontal installation as shown in figure A is recommended with gas or liquid applications.

This installation is also recommended when the flow velocity is low (< 1 m/s) or the liquid contains solid particles or air bubbles.

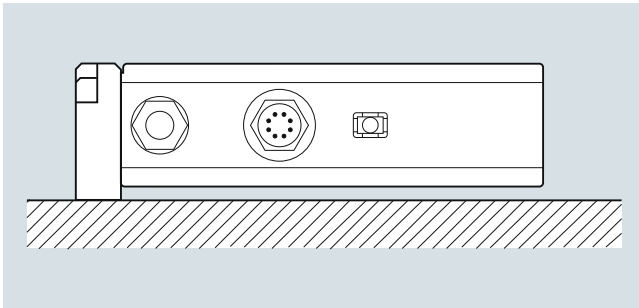
Vertical installation as shown in figure B can be used for liquid or gas applications.

For liquid applications upwards flow is recommended to facilitate the removal of air bubbles and to avoid partly emptying of the sensor.

For gas applications we recommend to place the flow inlet on the sensor high and the outlet low to remove impurities and oil films.

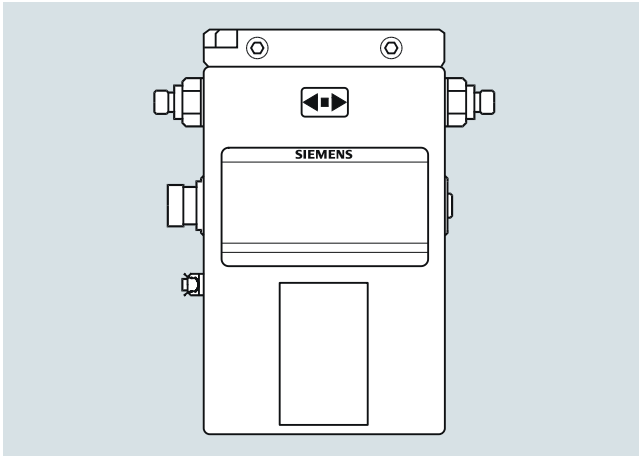
- To ensure that the sensor does not become partly empty, there must be a sufficient counter-pressure on the unit min. 0.2 bar (2.9 psi).
- Mount the sensor on a vibration-free and plane wall or steel frame.
- Locate the sensor low in the system in order to avoid under-pressure in the sensor separating air/gas in the liquid.
- Ensure that the sensor is not emptied of liquid (during normal operation) otherwise incorrect measurement will occur.

Horizontal mounting (recommended) (fig. A)



Liquid or gas (low to high flow)

Vertical mounting (fig. B)



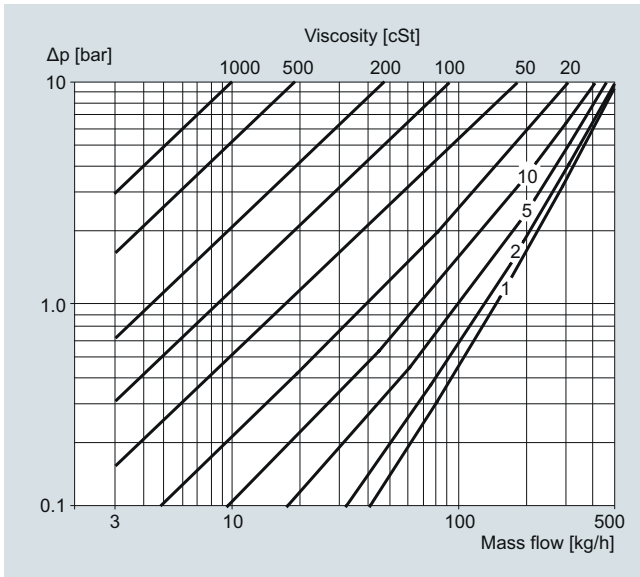
Liquid or gas (medium to high flow)

Technical specifications

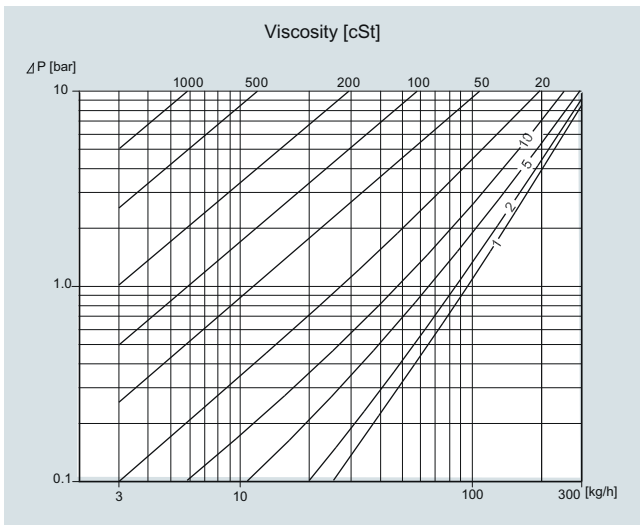
Sensor size	DN 4 (1/6")
Mass flow	
Measuring range	0 ... 350 kg/h (0 ... 772 lb/h)
Accuracy, mass flow	0.1 % of rate
Repeatability	0.05 % of rate
Max. zero point error	0.010 kg/h (0.022 lb/h)
Density	
Density range	0 ... 2.9 g/cm ³ (0 ... 0.105 lb/inch ³)
Density error	
• Stainless steel	0.007 g/cm ³ (0.00025 lb/inch ³)
• Hastelloy C22/2.4602	0.0025 g/cm ³ (0.00009 lb/inch ³)
Repeatability error	0.0002 g/cm ³ (0.0000072 lb/inch ³)
Media temperature	
Standard	-40 ... +115 °C (-40 ... +239 °F)
High-temperature version	-40 ... +180 °C (-40 ... +356 °F)
Temperature error	0.5 °C (0.9 °F)
Ambient temperature	-20 ... +50 °C (-4 ... +122 °F)
Brix	
Measuring range	0 ... 100 °Brix
Brix error	0.3 °Brix
Inside pipe diameter	
Stainless steel version	3.5 mm (0.14")
Hastelloy version	3.0 mm (0.12")
Pipe wall thickness	
Stainless steel version	0.25 mm (0.0098")
Hastelloy version	0.5 mm (0.0196")
Liquid pressure measuring pipe¹⁾	
Stainless steel	130 bar (1885 psi) at 20 °C (68 °F)
Hastelloy C22/2.4602	410 bar (5945 psi) at 20 °C (68 °F)
Materials	Stainless steel AISI 316L/1.4435
Measuring pipe and connection	Hastelloy C22/2.4602
Enclosure²⁾	
Material	Stainless steel AISI 316L/1.4404
Enclosure grade	IP67/NEMA4
Connection thread	
ISO 228/1	G1/4" male
ANSI/ASME B1.20.1	1/4" NPT male
Ex approval	Ex ia IIC T3-T6 05ATEX138072X EAC Ex TC RU C- DE.MIO62.B.02013 0Ex ia IIC T3...T6 Gb c-UL-us Class 1 Div. 1, Gr. A, B, C, D
Weight	3.5 kg (7.7 lb)
Dimensions	135 x 205 x 58 mm (5.31" x 8.07" x 2.28")

¹⁾ According to DIN 2413, DIN 17457

²⁾ Housing is not rated for pressure containment.

Characteristic curves
Pressure drop


Stainless steel 316L/1.4404



Hastelloy C22/2.4602

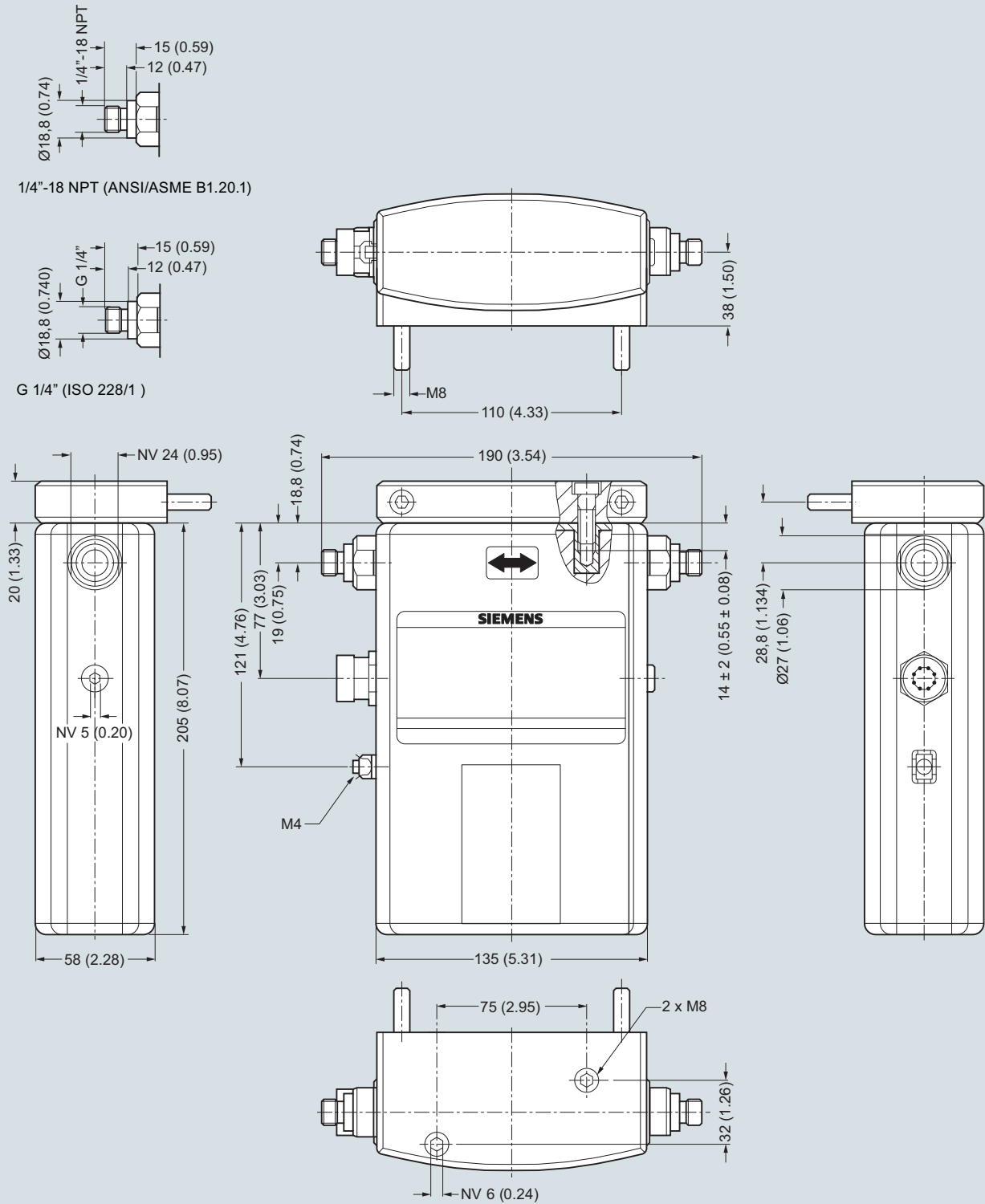
Flow Measurement

SITRANS F C

SITRANS F C sensor FC300 DN 4 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

Dimensional drawings

SITRANS FC300 DN 4



SITRANS FC300, dimensions in mm (inch)

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

Overview



MASS 2100 DI 3 to DI 15 is suitable for accurate mass flow measurement of a variety of liquids and gases.

The sensor offers superior performance in terms of flow accuracy, turn-down ratio and density accuracy. The ease of installation through a "plug & play" mechanical and electrical interface ensures optimum performance and operation.

The sensor delivers true multi-parameter measurements i.e.: Mass flow, volume flow, density, temperature and fraction.

Benefits

- High accuracy better than 0.1 % of mass flow rate
- Large dynamic turn-down ratio better than 500:1
- Densitometer performance available through density accuracy (depending upon sensor size) ranging from 0.0005 to 0.0015 g/cm³ with a typical repeatability better than 0.0001 to 0.0002 g/cm³
- Single continuous tube design, with no internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanliness for food and beverage and pharmaceutical applications
- Markets' thickest sensor walls ensure optimal life-time and corrosion resistance and high-pressure durability
- Full bore design provides lower pressure loss due to same internal diameter throughout the entire sensor
- Balanced pipe design with little mechanical energy loss, ensures optimal performance and stability under non-ideal and unstable process conditions (pressure, temperature, density changes etc.)
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Multi-plug electrical connector and Sensor Flash/SENSORPROM enables true "plug & play". Installation and commissioning in less than 10 minutes
- Intrinsically safe Ex design ia IIC as standard, making service in hazardous area possible without having to demount the sensor if a compact Ex d transmitter needs service
- Sensor pipe available in high-quality stainless steel AISI 316L/1.4435 or Hastelloy C22/2.4602 offering optimum corrosion resistance
- Centre-block design decouples process noise from the environment such as vibrations, pulsations, pressure shocks etc. making installation flexible and versatile
- Rugged and space-saving sensor design in stainless steel matching all environments
- High-pressure program as standard
- The sensor calibration factor is also valid for gas measurement
- Uniform sensor interface matching all transmitter versions at the same time whether it is compact IP67/NEMA 6, compact Ex d or remote installation, one sensor fits all

Application

Coriolis mass flowmeters are suitable for measuring all liquids and gases. The measurement is independent of changes in process conditions/parameters such as temperature, density, pressure, viscosity, conductivity and flow profile.

Due to this versatility the meter is easy to install and the Coriolis flowmeter is recognized for its high accuracy in a wide turn-down ratio which is a paramount in many applications.

The main applications of the Coriolis flowmeter can be found in all industries, such as:

Chemical and pharma	Detergents, bulk chemicals, pharmaceuticals, acids, alkalis
Food and beverage	Dairy products, beer, wine, soft-drinks, Brix/Plato, fruit juices and pulps, bottling, CO ₂ dosing, CIP-liquids
Automotive	Fuel injection nozzle and pump testing, filling of AC units, engine consumption, paint robots
Oil and gas	Filling of gas bottles, furnace control, test separators, LPG
Water and waste water	Dosing of chemicals for water treatment

The wide variety of combinations and versions from the modular system means that ideal adaptation is possible to each measuring task.

Design

The MASS 2100 sensor consists of a single bent tube in a double bent pipe configuration, welded directly to the process connectors at each end.

The centre-block is brazed onto the sensor pipes from the outside acting as a mechanical low pass filter.

The sensor is available in 2 material configurations, AISI 316L/1.4404 or Hastelloy C22/2.4602 with a wide variety of process connections.

The enclosure is made in stainless steel AISI 316L/1.4404 with a grade of encapsulation of IP67.

The sensor is as standard Ex ia approved, intrinsically safe.

The sensor can be installed in horizontal or vertical position. In horizontal position the sensor is self draining.

Heating: All the sensors MASS 2100, DI 3 to DI 15, can optionally be equipped with a heating coil to avoid solidification of sensitive fluids during down-time or period between discontinuing processes. This feature gives the user an alternative to the costly electrical heating normally used, as it gives the freedom to choose either hot water, superheated steam or hot oil, to maintain a constant temperature inside the sensor.

Flow Measurement

SITRANS F C

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

Function

The measuring principle is based on the Coriolis effect. See "System information SITRANS F C Coriolis mass flowmeters".

Integration

The sensor can be connected to FCT010, FCT030 and MASS 6000 (none CE) transmitters for compact and remote installation as well as SIFLOW FC070 standard and Ex type transmitters.

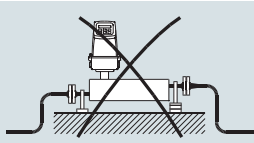
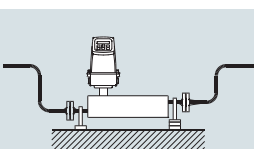
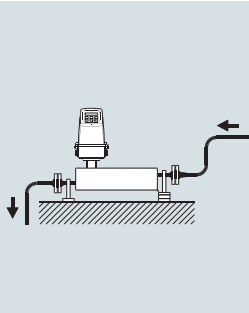
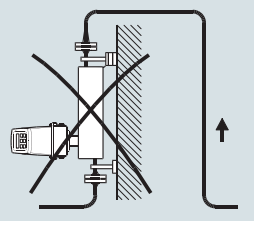
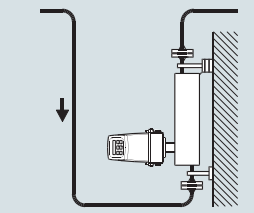
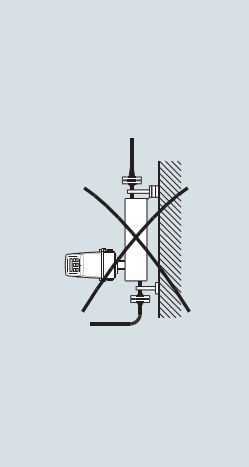
All sensors are delivered with a Sensor Flash or SENSORPROM containing all information about calibration data, identity and factory pre-programming of transmitter settings.

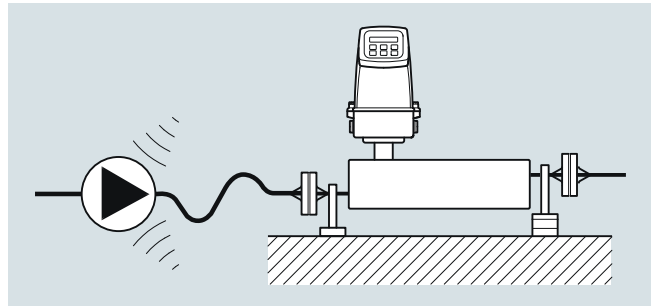
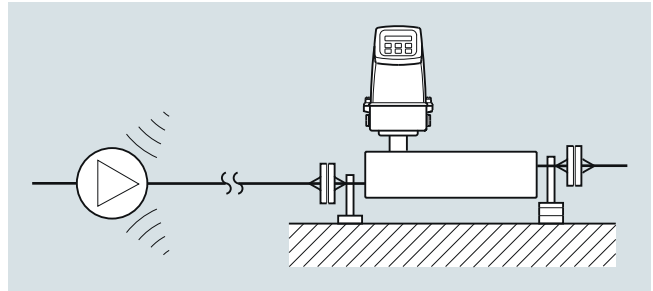
Installation guidelines MASS 2100 DI 3 ... DI 15 (1/8" ... 1/2")

Installation of sensor

In order to perform according to given specifications for flow and density accuracy, the sensor must be installed using rigid mounting brackets as shown in the installation examples.

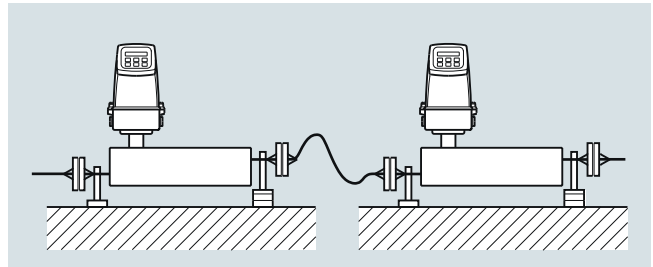
If the liquid is volatile or contains solid particles, vertical mounting is not recommended.

	Liquid	Gas
Horizontal	 	
Vertical	 	



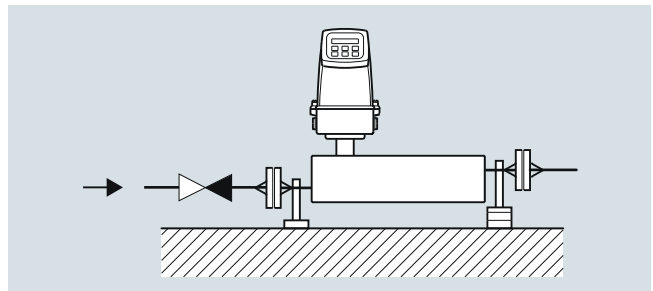
Vibration

Always locate the flowmeter as far away as possible from components that generate mechanical vibration in the piping.



Cross talk

Cross talk between sensors mounted close to each other may disturb the measurement. To avoid cross talk never mount more than one meter on each frame and mount flexible hose connections between the sensors as shown.



Zero point adjustment

To facilitate zero point adjustment a shut-off valve should always be mounted in connection with the sensor as a proper zero point setting is essential for a good accuracy.

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter
Technical specifications

Versions (mm (inch))		DI 3 (1/8)	DI 6 (¼)	DI 15 (5/8)
Inside pipe diameter (sensor consists of one continuous pipe)	mm (inch)	3.0 (0.12)	6.0 (0.24)	14.0 (0.55)
Pipe wall thickness	mm (inch)	0.5 (0.02)	1.0 (0.04)	1.0 (0.04)
Mass flow measuring range (liquids)	kg/h (lb/h)	0 ... 250 (0 ... 550)	0 ... 1000 (0 ... 2200)	0 ... 5600 (0 ... 12345)
Density	g/cm ³ (lb/inch ³)	0 ... 2.9 (0 ... 0.10)		
Fraction e.g.	°Brix	0 ... 70 (applicable temperature range: 10 ... 99 °C (50 ... 210.2 °F))		
Temperature				
Media temperature	°C (°F)	-50 ... +180 °C (-58 ... +356 °F)		
Ambient temperature	°C (°F)	-20 ... +50 °C (-4 ... +122 °F)		
Liquid pressure measuring pipe¹⁾				
Stainless steel	bar (psi)	230 (3336)	265 (3844)	130 (1885)
Hastelloy C22/2.4602	bar (psi)	350 (5076)	410 (5946)	200 (2900)
Materials				
Measuring pipe, flange and thread connection		Stainless steel AISI 316L/1.4435 Hastelloy C22/2.4602		
Enclosure and enclosure material		IP67 (NEMA 4) and stainless steel AISI 316L/1.4404, The housing is not rated for pressure containment		
Process connections²⁾				
Flange				
EN 1092-1, PN 40			DN 10	DN 15
ANSI B16.5, Class 150			½"	½"
ANSI B16.5, Class 600 (Class 300)			½"	½"
Dairy screwed connection (PN 16/25/40) ³⁾				
DIN 11851			DN 10	DN 15
ISO 2853/BS 4825 part 4 (SS3351)			25 mm	25 mm
Dairy clamp connection (PN 16) ³⁾				
ISO 2852/BS 4825 part 3 (SMS3016)			25 mm	25 mm
Thread				
ISO 228/1, PN 100		G¼" female	G¼" male	G½" male
ANSI/ASME B1.20.1, PN 100		¼" NPT female	¼" NPT male	½" NPT male
Cable connection		Multiple plug connection to sensor 5 x 2 x 0.35 mm ² twisted and screened in pairs, ext. Ø 12 mm		
Ex-version				
ATEX, EAC Ex, c-UL-us		Zone 0: Ex ia IIC T3...T6 Ga		
UL (c-UL-us)		Class I, Div. 1: Grp. A, B, C, D		
Weight approx.	kg (lb)	4 (8.8)	8 (17.6)	12 (26.5)

¹⁾ Max. at 20 °C (68 °F), DIN 2413, DIN 17457

²⁾ Other connections to order, see "Selection and Ordering data"

³⁾ Material, AISI 316/1.4401 or corresponding

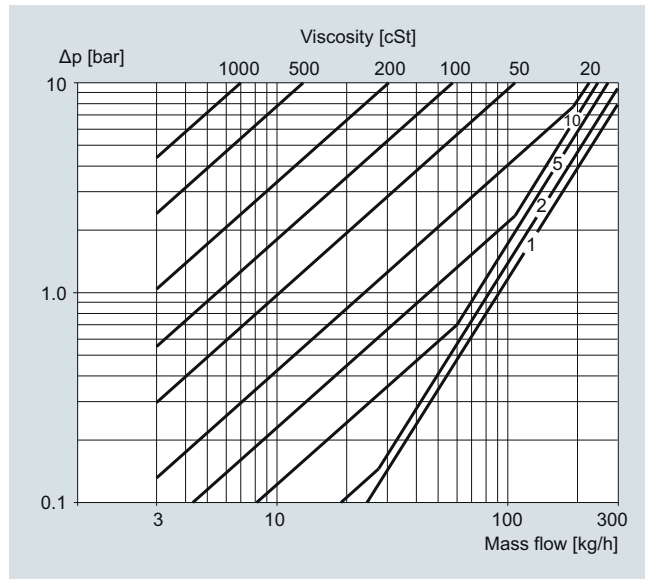
For accuracy specification see "System information SITRANS F C".

Flow Measurement

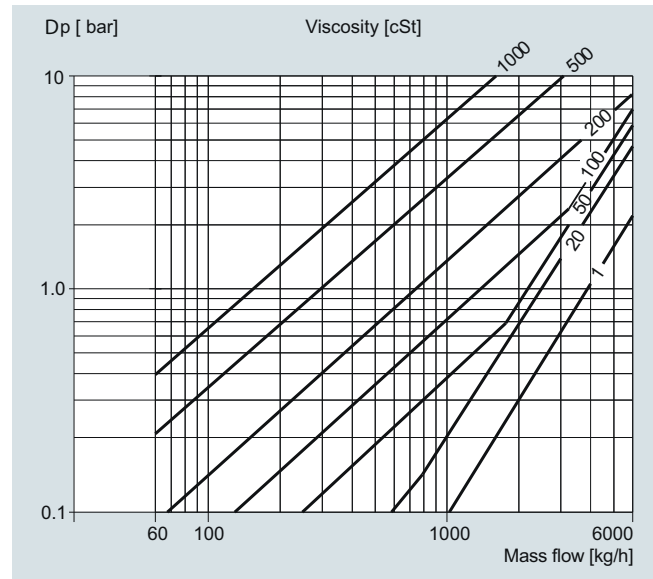
SITRANS F C

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

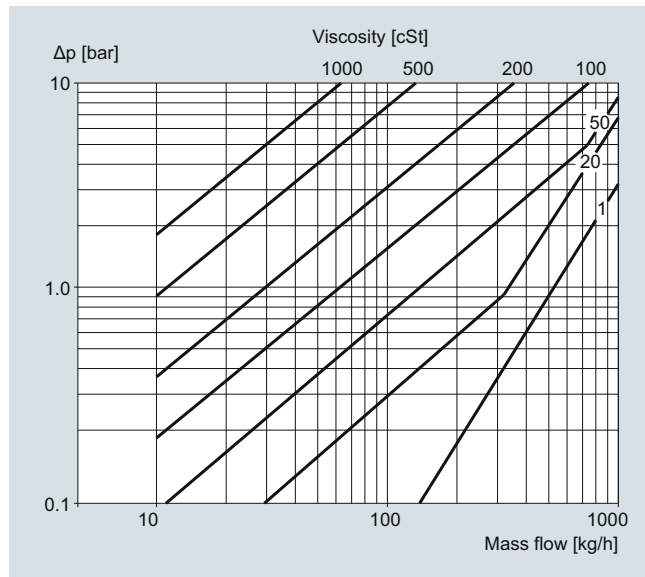
Pressure drop



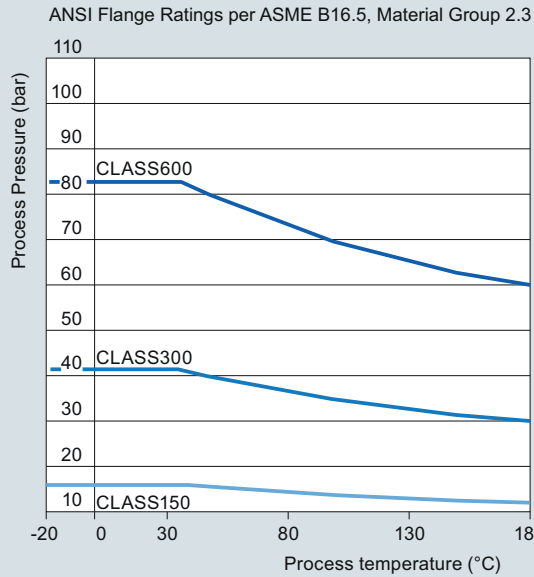
MASS 2100 DI 3 (1/8"), pressure drop for density = 1000 kg/m³



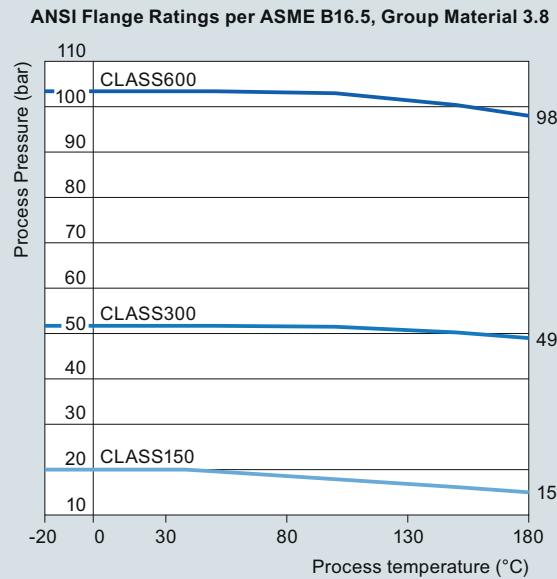
MASS 2100 DI 15 (1/2"), pressure drop for density = 1000 kg/m³



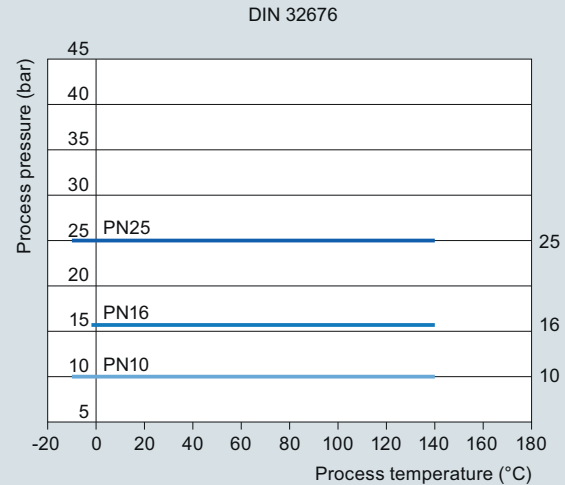
MASS 2100 DI 6 (1/4"), pressure drop for density = 1000 kg/m³

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter
Pressure/temperature curves


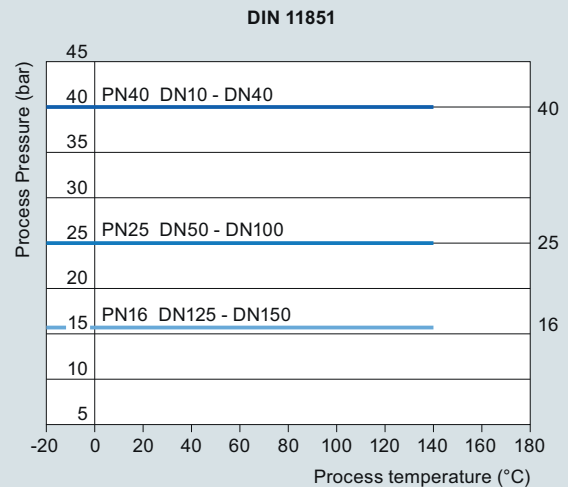
ASME flanges B16.5 stainless steel



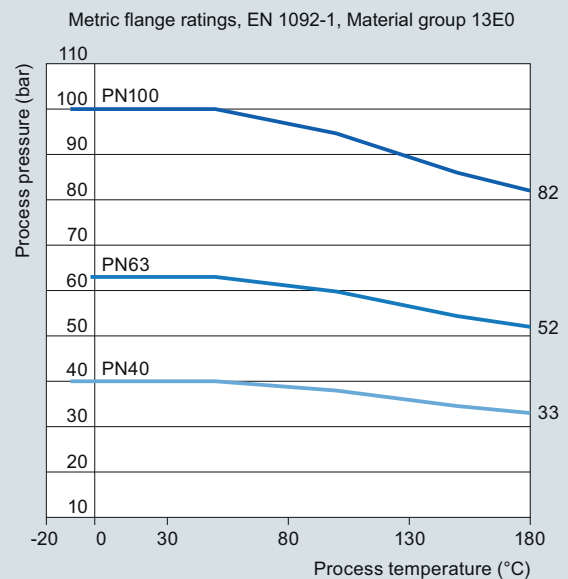
ASME flanges B16.5 Hastelloy C22/2.4602



DIN 32676 flanges stainless steel (PN 10 ... PN 25)



DIN 11851 flanges stainless steel (PN 25 ... PN 40)

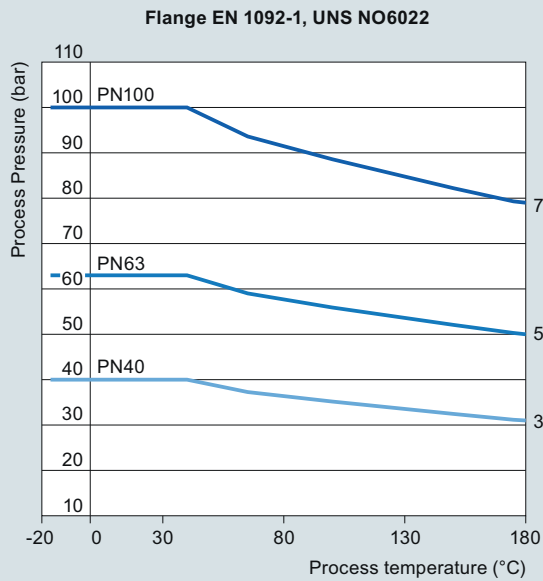


Flow Measurement

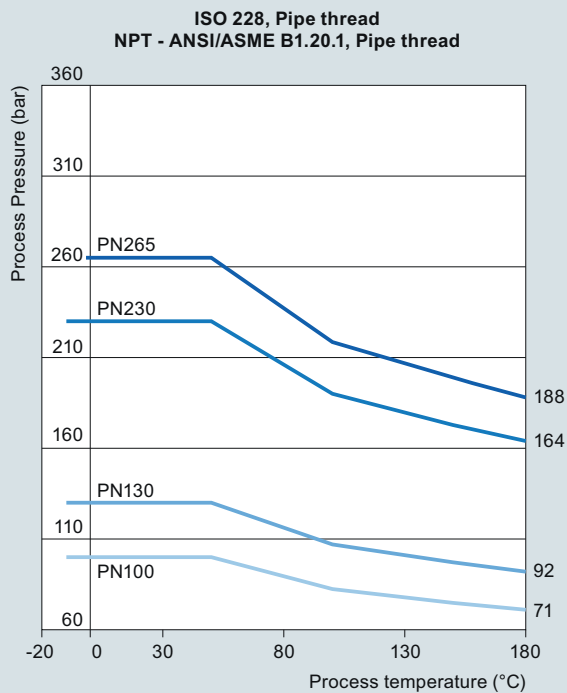
SITRANS F C

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

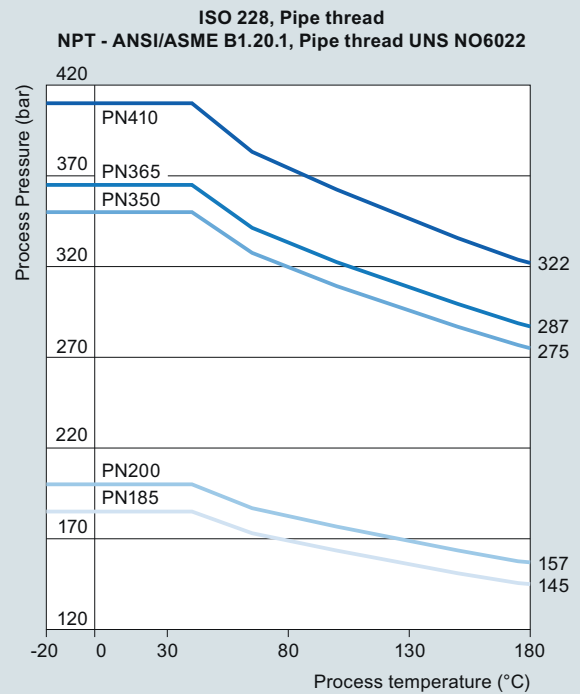
EN 1092 flanges stainless steel (PN 40 ... PN 100)



EN 1092 flanges Hastelloy C22/2.4602 (PN 40 ... PN 100)



ISO 228 and NPT pipe thread stainless steel (PN 100 ... PN 265)



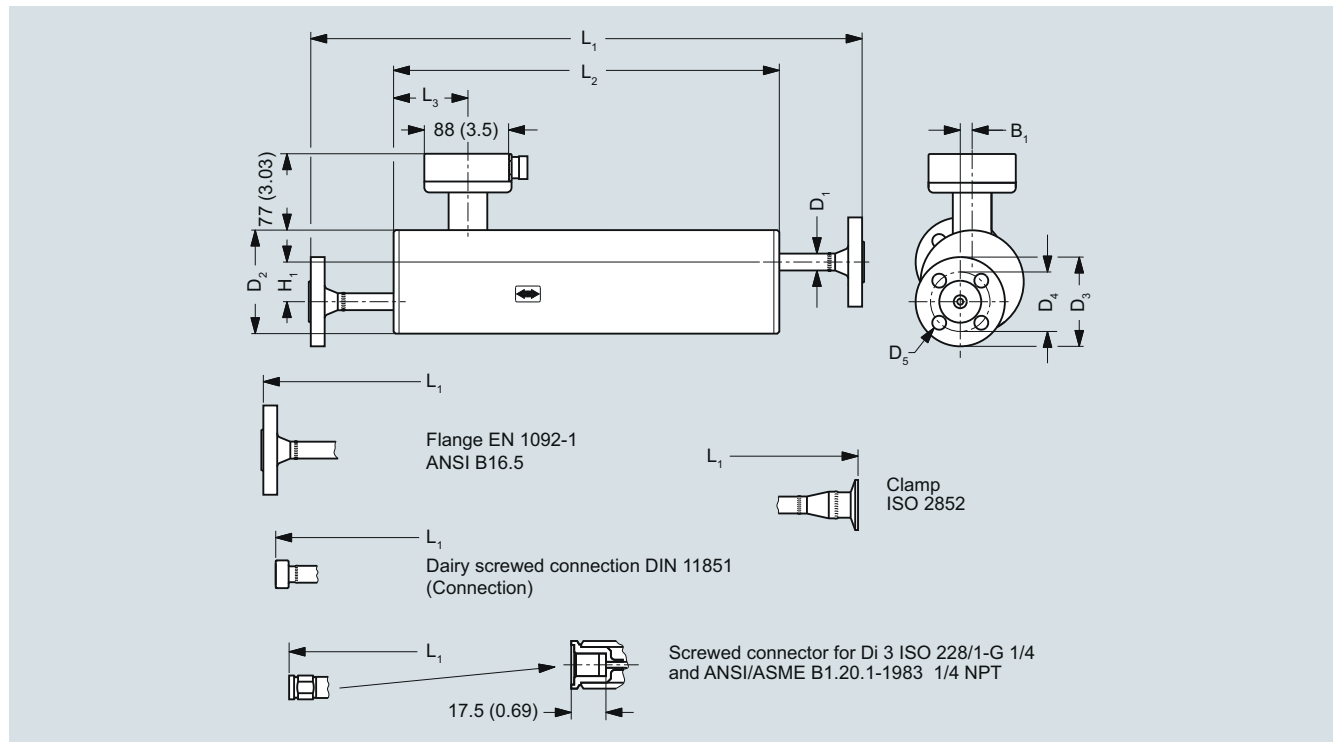
ISO 218 and NPT pipe thread stainless steel (PN 185 ... PN 410)

For further information on the PED standard and requirements, see page 10/15.

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

Dimensional drawings

MASS 2100 sensor for analog cable connection



Dimension in mm (inch)

For not listed variants please contact product support

Sensor size	Connections			L1 mm	L2 mm	L3 mm	H1 mm	B1 mm	D1 mm	D2 mm	D3 mm	D4 mm	D5 mm
DI (inch)	Type	Pressure rating	Size										
DI 3 (1/8)	Pipe thread ISO 228/1 - G 1/4	PN 100	1/4"	400	280	75.5	60	0	21.3	104	-	-	-
	Pipe thread ANSI/ASME B 1.20.1 - 1/4" NPT	PN 100	1/4"	400	280	75.5	60	0	21.3	104	-	-	-
DI 6 (1/4)	Flange EN 1092-1	PN 100	DN 10	580	390	62.0	40	12	17.0	104	100	70.0	14.0
	Flange EN 1092-1	PN 40	DN 10	560	390	62.0	40	12	17.0	104	90.0	60.0	14.0
	Flange ANSI B16.5	Class 150	1/2"	624	390	62.0	40	12	17.0	104	88.9	60.5	15.7
	Flange ANSI B16.5	Class 600	1/2"	608	390	62.0	40	12	17.0	104	95.3	66.5	15.7
	Screwed connection DIN 11851	PN 40	DN 10	532	390	62.0	40	12	17.0	104	-	-	-
	Clamp ISO 2852	PN 16	25 mm	570	390	62.0	40	12	17.0	104	-	-	-
DI 15 (1/2)	Flange EN 1092-1	PN 100	DN 15	634	444	75.5	44	20	21.3	129	105	75.0	14.0
	Flange EN 1092-1	PN 40	DN 15	620	444	75.5	44	20	21.3	129	95.0	65.0	14.0
	Flange ANSI B16.5	Class 150	1/2"	639	444	75.5	44	20	21.3	129	88.9	60.5	15.7
	Flange ANSI B16.5	Class 600	1/2"	660	444	75.5	44	20	21.3	129	95.3	66.5	15.7
	Screwed connection DIN 11851	PN 40	DN 15	586	444	75.5	44	20	21.3	129	-	-	-
	Clamp ISO 2852	PN 16	25 mm	624	444	75.5	44	20	21.3	129	-	-	-

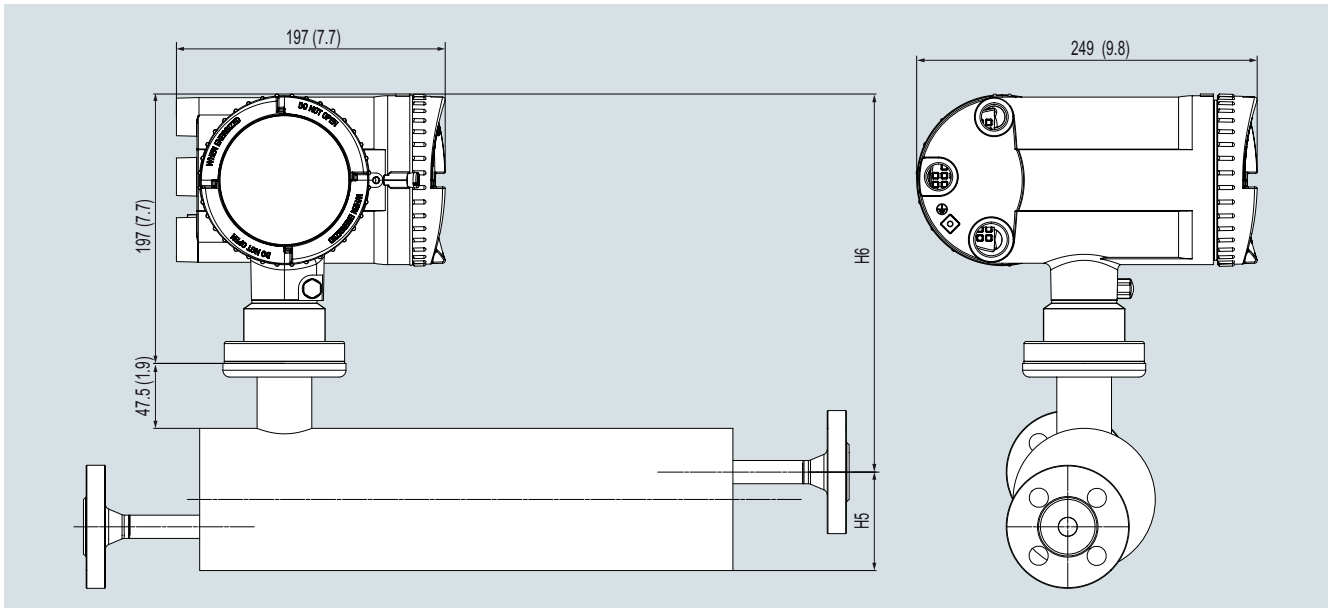
Flow Measurement

SITRANS F C

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

For not listed variants please contact product support.

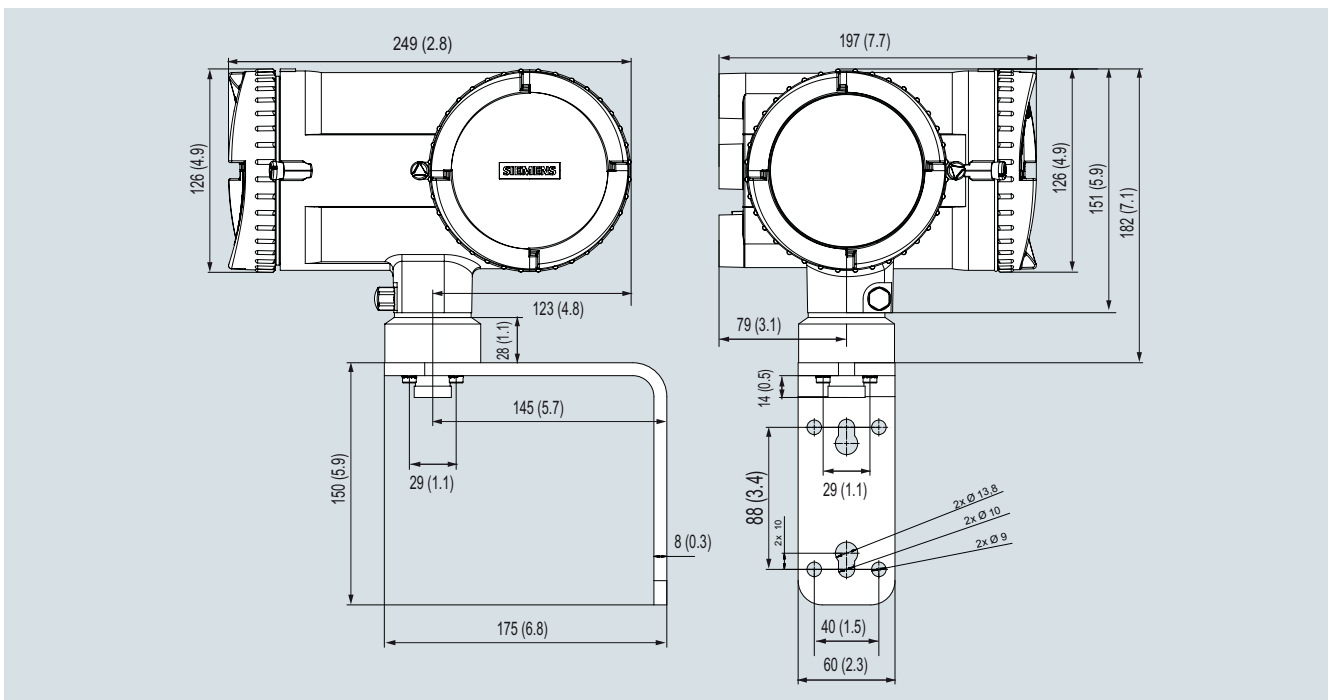
Sensor size	Connections			L1	L2	L3	H1	B1	D1	D2	D3	D4	D5
DI (inch)	Type	Pressure rating	Size	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch
DI 3 (1/8)	Pipe thread ISO 228/1 - G $\frac{1}{4}$	PN 100	$\frac{1}{4}$ "	15.75	11.02	2.97	2.36	0	0.84	4.09	-	-	-
	Pipe thread ANSI/ASME B 1.20.1 - $\frac{1}{4}$ " NPT	PN 100	$\frac{1}{4}$ "	15.75	11.02	2.97	2.36	0	0.84	4.09	-	-	-
DI 6 ($\frac{1}{4}$)	Flange EN 1092-1	PN 100	DN 10	22.83	15.35	2.44	1.57	0.47	0.67	4.09	3.94	2.76	0.55
	Flange EN 1092-1	PN 40	DN 10	22.05	15.35	2.44	1.57	0.47	0.67	4.09	3.54	2.36	0.55
	Flange ANSI B16.5	Class 150	$\frac{1}{2}$ "	24.57	15.35	2.44	1.57	0.47	0.67	4.09	3.5	2.38	0.62
	Flange ANSI B16.5	Class 600	$\frac{1}{2}$ "	23.94	15.35	2.44	1.57	0.47	0.67	4.09	3.75	2.62	0.62
	Screwed connection DIN 11851	PN 40	DN 10	20.94	15.35	2.44	1.57	0.47	0.67	4.09	-	-	-
	Clamp ISO 2852	PN 16	25 mm	22.44	15.35	2.44	1.57	0.47	0.67	4.09	-	-	-
DI 15 ($\frac{1}{2}$)	Flange EN 1092-1	PN 100	DN 15	24.96	17.48	2.97	1.73	0.79	0.84	5.08	2.95	4.13	0.55
	Flange EN 1092-1	PN 40	DN 15	24.41	17.48	2.97	1.73	0.79	0.84	5.08	3.74	2.56	0.55
	Flange ANSI B16.5	Class 150	$\frac{1}{2}$ "	25.16	17.48	2.97	1.73	0.79	0.84	5.08	3.5	2.38	0.62
	Flange ANSI B16.5	Class 600	$\frac{1}{2}$ "	25.98	17.48	2.97	1.73	0.79	0.84	5.08	3.75	2.62	0.62
	Screwed connection DIN 11851	PN 40	DN 15	23.07	17.48	2.97	1.73	0.79	0.84	5.08	-	-	-
	Clamp ISO 2852	PN 16	25 mm	24.57	17.48	2.97	1.73	0.79	0.84	5.08	-	-	-

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter
Compact with FCT030


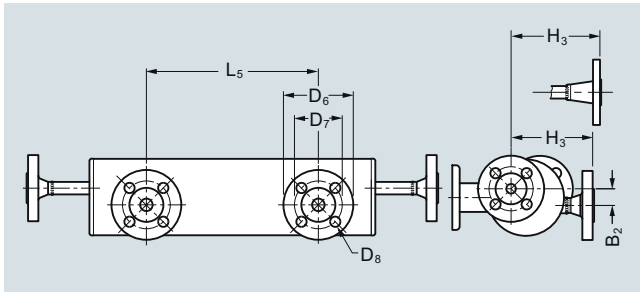
Dimensions in mm (inch)

MASS 2100 with FCT030 transmitter compact

Sensor size [DI (inch)]	L ₃ [mm (inch)]	H ₅ [mm (inch)]	H ₆ [mm (inch)]	H ₅ + H ₆ [mm (inch)]
3 (1/8)	75.5 (2.97)	82 (3.23)	267 (10.51)	349 (13.74)
6 (1/4)	62 (2.44)	72 (2.83)	277 (10.91)	349 (13.74)
15 (1/2)	75.5 (2.97)	86.5 (3.41)	287 (11.3)	373.5 (14.71)

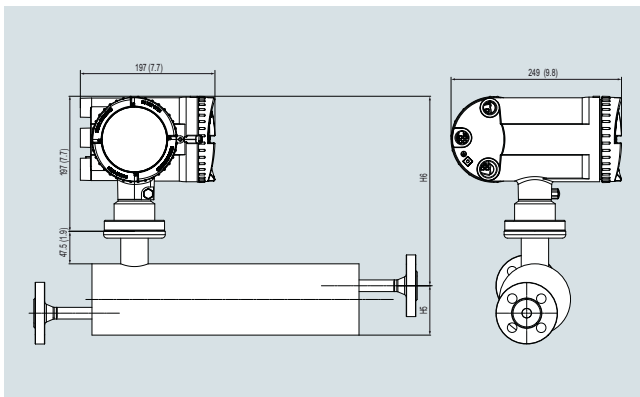
Transmitter FCT030 remote field mount for M20 analog cable connection


Dimensions in mm (inch)

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter
MASS 2100 sensor with “heating jacket”


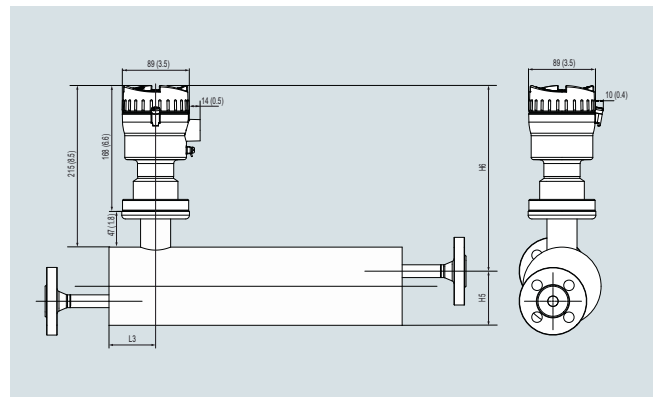
Dimensions in mm (inch)

Sensor size	Connections heated			L5	H3	B2	D6	D7	D8
DI (inch)	Type	Pressure rating	Size	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
DI 3 (1/8)	EN 1092-1	PN 40	DN 15	234 (9.21)	122 (4.8)	22 (0.87)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	½"	234 (9.21)	131.6 (5.18)	22 (0.87)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)
DI 6 (¼)	EN 1092-1	PN 40	DN 15	234 (9.21)	112 (4.41)	22.7 (0.89)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	½"	234 (9.21)	121.6 (4.79)	22.7 (0.89)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)
DI 15 (½)	EN 1092-1	PN 40	DN 15	234 (9.21)	126.5 (4.98)	31.5 (1.24)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	½"	234 (9.21)	136.1 (5.36)	31.5 (1.24)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)

MASS 2100 and FCT030 compact version


MASS 2100 and FCT030 compact version, dimensions in mm (inch)

Sensor size	L ₃	H ₅	H ₆	H ₅ + H ₆
[DI (inch)]	[mm (inch)]	[mm (inch)]	[mm (inch)]	[mm (inch)]
3 (1/8)	75.5 (2.97)	82 (3.23)	267 (10.51)	349 (13.74)
6 (¼)	62 (2.44)	72 (2.83)	277 (10.91)	349 (13.74)
15 (½)	75.5 (2.97)	86.5 (3.41)	287 (11.30)	373.5 (14.70)

MASS 2100 and FCT010 compact version


MASS 2100 and FCT010 compact version, dimensions in mm (inch)

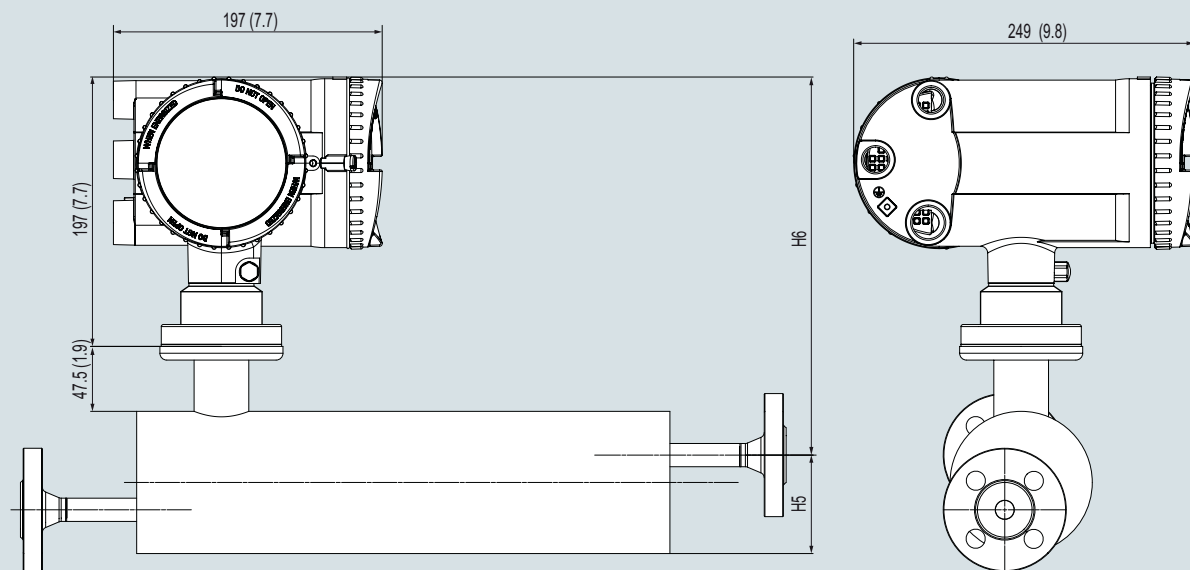
Sensor size	L ₃	H ₅	H ₆	H ₅ + H ₆
[DI (inch)]	[mm (inch)]	[mm (inch)]	[mm (inch)]	[mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	237 (9.33)	319 (12.56)
6 (¼)	62 (2.44)	72 (2.83)	247 (9.72)	319 (12.56)
15 (½)	75 (2.95)	87 (3.43)	257 (10.11)	343.5 (13.52)

Flow Measurement

SITRANS F C

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

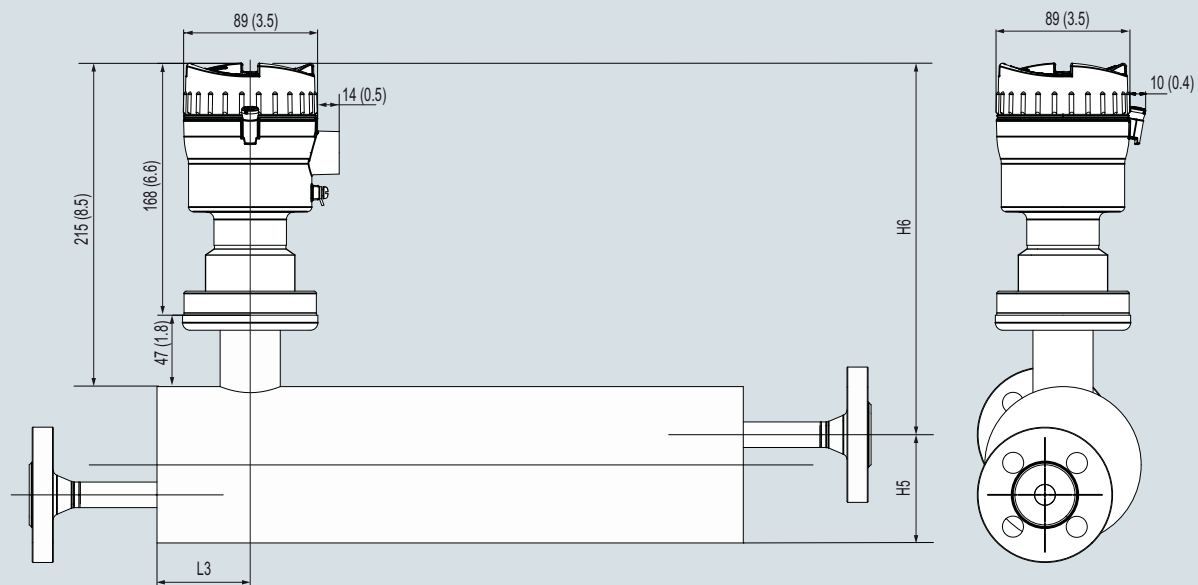
MASS 2100 and FCT030 compact version



MASS 2100 and FCT030 compact version, dimensions in mm (inch)

Sensor size [DI (inch)]	L ₃ [mm (inch)]	H ₅ [mm (inch)]	H ₆ [mm (inch)]	H ₅ + H ₆ [mm (inch)]
3 (1/8)	75.5 (2.97)	82 (3.23)	267 (10.51)	349 (13.74)
6 (1/4)	62 (2.44)	72 (2.83)	277 (10.91)	349 (13.74)
15 (1/2)	75.5 (2.97)	86.5 (3.41)	287 (11.30)	373.5 (14.70)

MASS 2100 and FCT010 compact version



MASS 2100 and FCT010 compact version, dimensions in mm (inch)

Sensor size [DI (inch)]	L ₃ [mm (inch)]	H ₅ [mm (inch)]	H ₆ [mm (inch)]	H ₅ + H ₆ [mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	237 (9.33)	319 (12.56)
6 (1/4)	62 (2.44)	72 (2.83)	247 (9.72)	319 (12.56)
15 (1/2)	75 (2.95)	87 (3.43)	257 (10.11)	343.5 (13.52)

SITRANS F C sensors MASS 2100/FC300 with FCT010, FCT030 and SIFLOW FC070 transmitters (Low flow program)

Selection and Ordering data	Article No.	Ord. code	Selection and Ordering data	Article No.	Ord. code
SITRANS F C sensors MASS 2100/FC300 with FCT010 transmitter	7ME4811-		SITRANS F C sensors MASS 2100/FC300 with FCT010 transmitter	7ME4811-	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			Tube material (wetted) and max. operational temperature		
Sensor type and connector size			AISI 316L/EN 1.4435, Max 115 °C	1	
MASS 2100 DI 1.5, 1/4"	1 G		AISI 316L/EN 1.4435, Max 125 °C	2	
MASS 2100 DI 3, 1/4"	3 A		AISI 316L/EN 1.4435, Max 180 °C	3	
MASS 2100 DI 3, 1/4" Heated w. DIN	3 B		Hastelloy C22/UNS N06022/EN 2.4602, Max. 115 °C	5	
MASS 2100 DI 3, 1/4" Heated w. ANSI	3 C		Hastelloy C22/UNS N06022/EN 2.4602, Max. 125 °C	6	
FC300 DN 4, 1/4"	4 A		Hastelloy C22/UNS N06022/EN 2.4602, Max. 180 °C	7	
MASS 2100 DI 6, 1/4"	6 A		Calibration		
MASS 2100 DI 6, 1/4" Heated w. EN	6 B		Mass flow calibration	1	
MASS 2100 DI 6, 1/4" Heated w. ANSI	6 C		Mass flow calibration and density calibration	4	
MASS 2100 DI 6, DN 10	6 D		Mounting style, Transmitter Housing and Material		
MASS 2100 DI 6, DN 10 Heated w. EN	6 E		Compact mounted, IP67, Aluminium transmitter housing (DI 3, DI 6 and DI 15 only)	D	
MASS 2100 DI 6, DN 10 Heated w. ANSI	6 F		Remote mounted, IP67, Aluminium transmitter housing, analog cable connection with M20 connectors	Z	P 0 D
MASS 2100 DI 6, DN 15 (1/2")	6 G		Ex approvals		
MASS 2100 DI 6, DN 15 (1/2") Heated w. EN	6 H		Non-Ex		
MASS 2100 DI 6, DN 15 (1/2") Heated w. ANSI	6 J		ATEX Zone 1	A	
MASS 2100 DI 6, DN 20 (3/4")	6 K		IECEx Zone 1	C	
MASS 2100 DI 6, DN 20 (3/4") Heated w. EN	6 L		USA (FM, CSA, UL), Zone 1/Div1	F	
MASS 2100 DI 6, DN 20 (3/4") Heated w. ANSI	6 M		Canada (CSA, UL), Zone 1/Div1	H	
MASS 2100 DI 6, DN 25 (1")	6 N		Local User Interface	M	
MASS 2100 DI 6, DN 25 (1") Heated w. EN	6 P		Blind		1
MASS 2100 DI 6, DN 25 (1") Heated w. ANSI	6 Q				
MASS 2100 DI 15, DN 15 (1/2")	7 A				
MASS 2100 DI 15, DN 15 (1/2") Heated w. EN	7 B				
MASS 2100 DI 15, DN 15 (1/2") Heated w. ANSI	7 C				
MASS 2100 DI 15, DN 20 (3/4")	7 D				
MASS 2100 DI 15, DN 20 (3/4") Heated w. EN	7 E				
MASS 2100 DI 15, DN 20 (3/4") Heated w. ANSI	7 F				
MASS 2100 DI 15, DN 25 (1")	7 G				
MASS 2100 DI 15, DN 25 (1") Heated w. EN	7 H				
MASS 2100 DI 15, DN 25 (1") Heated w. ANSI	7 J				
Process connection/Pressure					
No connections (spare part transmitter)	A 0				
EN1092-1 B1, PN40	A 1				
EN1092-1 B1, PN100	A 3				
ASME B16.5, RF, Class 150	D 1				
ASME B16.5, RF, Class 600	D 3				
DIN 11851 Screwed connection	F 1				
ISO2852 Hyg. Clamped	J 1				
ISO2853 Hyg. Screwed	J 5				
ISO 228-1 Pipe thread, PN 100	C 1				
ISO 228-1 Pipe thread, PN 130	C 2				
ISO 228-1 Pipe thread, PN 200	C 3				
ISO 228-1 Pipe thread, PN 230	C 4				
ISO 228-1 Pipe thread, PN 265	C 5				
ISO 228-1 Pipe thread, PN 350	C 6				
ISO 228-1 Pipe thread, PN 365	C 7				
ISO 228-1 Pipe thread, PN 410	C 8				
NPT ASME B 1.20.1 Pipe thread, PN 100	N 1				
NPT ASME B 1.20.1 Pipe thread, PN 130	N 2				
NPT ASME B 1.20.1 Pipe thread, PN 200	N 3				
NPT ASME B 1.20.1 Pipe thread, PN 230	N 4				
NPT ASME B 1.20.1 Pipe thread, PN 265	N 5				
NPT ASME B 1.20.1 Pipe thread, PN 350	N 6				
NPT ASME B 1.20.1 Pipe thread, PN 365	N 7				
NPT ASME B 1.20.1 Pipe thread, PN 410	N 8				

Flow Measurement

SITRANS F C

SITRANS F C sensors MASS 2100/FC300 with FCT010, FCT030 and SIFLOW FC070 transmitters (Low flow program)

Selection and Ordering data

Order code

Further designs

Please add **"-Z"** to Article No. and specify Order code(s).

Cable glands

None (mechanical sensor)

A00

Metric, no glands

A01

Metric, plastic

A02

Metric, brass/Ni plated

A05

Metric, stainless steel

A06

NPT, no glands

A11

NPT, plastic

A12

NPT, brass/Ni plated

A15

NPT, stainless steel

A16

Integral M12 socket

A20

SW functions & CT approvals

Standard

B11

I/O configuration Ch1

Modbus RTU RS 485

E14

I/O configuration Ch2, Ch3 and Ch4

None

F00

Certificates

Press test certificate CRN

C01

Press test certificate PED

C02

Material certificate EN 10204-3.1

C12

Welding inspection report

C13

Factory certificate according to EN 10204 2.2

C14

Factory certificate according to EN 10204 2.1

C15

Cleaning for oil and grease/ASTM-A380

C50

Cleaned according to PWIS

C51

Sensor data storage

Sensor with SensorFlash for FCT

S20

Sensor with SensorProm for MASS 6000

S21

Cable sensor-transmitter

None

L50

5 m, standard, M12 connectors

L51

5 m, standard, without connectors

L52

10 m, standard, M12 connectors

L55

10 m, standard, without connectors

L56

25 m, standard, M12 connectors

L59

25 m, standard, without connectors

L60

50 m, standard, M12 connectors

L63

50 m, standard, without connectors

L64

75 m, standard, M12 connectors

L67

75 m, standard, without connectors

L68

2 m cable, analog, with two M20 connectors

L85

5 m cable, analog, with two M20 connectors

L86

10 m cable, analog, with two M20 connectors

L87

15 m cable, analog, with two M20 connectors

L88

Selection and Ordering data

Order code

Additional data

Please add **"-Z"** to Article No. and specify Order code(s) and plain text.

Tag name

Tag name plate, stainless steel

Y17

Extended calibration

Multi-point high, (5 flows x 2 passes),
10 ... 100 % of Q_{nom}

Y61

Multi-point high, (10 flows x 1 pass),
10 ... 100 % of Q_{nom}

Y63

SITRANS F C sensors MASS 2100/FC300 with FCT010, FCT030 and SIFLOW FC070 transmitters (Low flow program)

Selection and Ordering data	Article No.	Ord. code	Selection and Ordering data	Article No.	Ord. code
SITRANS F C sensors MASS 2100/FC300 with FCT030 transmitter	7 ME 4 8 1 3 -		SITRANS F C sensors MASS 2100/FC300 with FCT030 transmitter	7 ME 4 8 1 3 -	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			Tube material (wetted) and max. operational temperature		
Sensor type and connector size			AISI 316L/EN 1.4435, Max 115 °C	1	
MASS 2100 DI 1.5, 1/4"	1 G		AISI 316L/EN 1.4435, Max 125 °C	2	
MASS 2100 DI 3, 1/4"	3 A		AISI 316L/EN 1.4435, Max 180 °C	3	
MASS 2100 DI 3, 1/4" Heated w. DIN	3 B		Hastelloy C22/UNS N06022/EN 2.4602, Max. 115 °C	5	
MASS 2100 DI 3, 1/4" Heated w. ANSI	3 C		Hastelloy C22/UNS N06022/EN 2.4602, Max. 125 °C	6	
FC300 DN 4, 1/4"	4 A		Hastelloy C22/UNS N06022/EN 2.4602, Max. 180 °C	7	
MASS 2100 DI 6, 1/4"	6 A		Calibration		
MASS 2100 DI 6, 1/4" Heated w. EN	6 B		Mass flow calibration	1	
MASS 2100 DI 6, 1/4" Heated w. ANSI	6 C		Mass flow calibration and density calibration	4	
MASS 2100 DI 6, DN 10	6 D		Standard fraction	8	
MASS 2100 DI 6, DN 10 Heated w. EN	6 E		Mounting style, Transmitter Housing and Material		
MASS 2100 DI 6, DN 10 Heated w. ANSI	6 F		Compact mounted, IP67, Aluminium transmitter housing (DI 3, DI 6 and DI 15 only)	D	
MASS 2100 DI 6, DN 15 (1/2")	6 G		Remote field mounted, IP67, Aluminium housing, M12 socket for digital cable connection (DI 3, DI 6 and DI 15 only)	G	
MASS 2100 DI 6, DN 15 (1/2") Heated w. EN	6 H		Remote field mount, IP67, Aluminium housing, terminal box for digital cable connection (DI 3, DI 6 and DI 15 only)	K	
MASS 2100 DI 6, DN 15 (1/2") Heated w. ANSI	6 J		Wall mount aluminum transmitter housing, M12 socket for digital cable connection (DI 3, DI 6 and DI 15 only)	U	
MASS 2100 DI 6, DN 20 (3/4")	6 K		Remote field mount, IP67, Aluminium transmitter housing, analog cable connection with M20 connectors	Z	P 0 D
MASS 2100 DI 6, DN 20 (3/4") Heated w. EN	6 L		Remote wall mount, IP67, aluminum transmitter housing, analog cable connection with M20 connectors	Z	P 0 E
MASS 2100 DI 6, DN 20 (3/4") Heated w. ANSI	6 M		Ex approvals		
MASS 2100 DI 6, DN 25 (1")	6 N		Non-Ex	A	
MASS 2100 DI 6, DN 25 (1") Heated w. EN	6 P		ATEX Zone 1	C	
MASS 2100 DI 6, DN 25 (1") Heated w. ANSI	6 Q		IECEx Zone 1	F	
MASS 2100 DI 15, DN 15 (1/2")	7 A		USA (FM, CSA, UL), Zone 1/Div1	H	
MASS 2100 DI 15, DN 15 (1/2") Heated w. EN	7 B		Canada (CSA, UL), Zone 1/Div1	M	
MASS 2100 DI 15, DN 15 (1/2") Heated w. ANSI	7 C		Local User Interface		
MASS 2100 DI 15, DN 20 (3/4")	7 D		Blind	1	
MASS 2100 DI 15, DN 20 (3/4") Heated w. EN	7 E		Graphical, 240 x 160 pixels, glass lid	3	
MASS 2100 DI 15, DN 20 (3/4") Heated w. ANSI	7 F				
MASS 2100 DI 15, DN 25 (1")	7 G				
MASS 2100 DI 15, DN 25 (1") Heated w. EN	7 H				
MASS 2100 DI 15, DN 25 (1") Heated w. ANSI	7 J				
Process connection/Pressure					
No connections (spare part transmitter)	A 0				
EN1092-1 B1, PN40	A 1				
EN1092-1 B1, PN100	A 3				
ASME B16.5, RF, Class 150	D 1				
ASME B16.5, RF, Class 600	D 3				
DIN 11851 Screwed connection	F 1				
ISO2852 Hyg. Clamped	J 1				
ISO2853 Hyg. Screwed	J 5				
ISO 228-1 Pipe thread, PN 100	C 1				
ISO 228-1 Pipe thread, PN 130	C 2				
ISO 228-1 Pipe thread, PN 200	C 3				
ISO 228-1 Pipe thread, PN 230	C 4				
ISO 228-1 Pipe thread, PN 265	C 5				
ISO 228-1 Pipe thread, PN 350	C 6				
ISO 228-1 Pipe thread, PN 365	C 7				
ISO 228-1 Pipe thread, PN 410	C 8				
NPT ASME B 1.20.1 Pipe thread, PN 100	N 1				
NPT ASME B 1.20.1 Pipe thread, PN 130	N 2				
NPT ASME B 1.20.1 Pipe thread, PN 200	N 3				
NPT ASME B 1.20.1 Pipe thread, PN 230	N 4				
NPT ASME B 1.20.1 Pipe thread, PN 265	N 5				
NPT ASME B 1.20.1 Pipe thread, PN 350	N 6				
NPT ASME B 1.20.1 Pipe thread, PN 365	N 7				
NPT ASME B 1.20.1 Pipe thread, PN 410	N 8				

Flow Measurement

SITRANS F C

SITRANS F C sensors MASS 2100/FC300 with FCT010, FCT030 and SIFLOW FC070 transmitters (Low flow program)

Selection and Ordering data

Order code

Further designs

Please add **"-Z"** to Article No. and specify Order code(s).

Cable glands

None (mechanical sensor)

A00

Metric, no glands

A01

Metric, plastic

A02

Metric, brass/Ni plated

A05

Metric, stainless steel

A06

NPT, no glands

A11

NPT, plastic

A12

NPT, brass/Ni plated

A15

NPT, stainless steel

A16

Integral M12 socket

A20

SW functions & CT approvals

Standard

B11

I/O configuration Ch1

None (replacement sensor)

E00

4 ... 20 mA, HART, active/passive output (non-Ex)

E02

4 ... 20 mA, HART, active Ex

E06

4 ... 20 mA, HART, passive Ex

E07

PROFIBUS PA (non-Ex)

E10

PROFIBUS DP

E11

Modbus RTU RS 485

E14

I/O configuration Ch2, Ch3 and Ch4

None

F00

Non Ex: Sig O, None, None

F01

Non Ex: Sig O, Sig I/O, None

F02

Non Ex: Sig O, Sig I/O, Sig I/O

F03

Non Ex: Sig O, Sig I/O, R

F04

Non Ex: Sig O, R, R

F05

Non Ex: Sig O, R, None

F06

Ex: pSig O, None, None

F11

Ex: pSig O, pSig I/O, None

F12

Ex: pSig O, pSig I/O, pSig I/O

F13

Ex: pSig O, pSig I/O, R

F14

Ex: pSig O, R, R

F15

Ex: pSig O, R, None

F16

Ex: aSig O, None, None

F21

Ex: aSig O, aSig I/O, None

F22

Ex: aSig O, aSig I/O, aSig I/O

F23

Ex: aSig O, aSig I/O, R

F24

Ex: aSig O, R, R

F25

Ex: aSig O, R, None

F26

Certificates

Press test certificate CRN

C01

Press test certificate PED

C02

Material certificate EN 10204-3.1

C12

Welding inspection report

C13

Factory certificate according to EN 10204 2.2

C14

Factory certificate according to EN 10204 2.1

C15

Cleaning for oil and grease/ASTM-A380

C50

Cleaned according to PWIS

C51

Selection and Ordering data

Order code

Sensor data storage

Sensor with SensorFlash for FCT

S20

Sensor with SensorProm for MASS 6000 (in preparation)

S21

SD-Card accessibility via USB

(not allowed in USA by Patent)

Mass storage enabled

S30

Cable sensor-transmitter

None

L50

5 m, standard, M12 connectors

L51

5 m, standard, without connectors

L52

10 m, standard, M12 connectors

L55

10 m, standard, without connectors

L56

25 m, standard, M12 connectors

L59

25 m, standard, without connectors

L60

50 m, standard, M12 connectors

L63

50 m, standard, without connectors

L64

75 m, standard, M12 connectors

L67

75 m, standard, without connectors

L68

2 m cable, analog with two M20 connectors

L85

5 m cable, analog with two M20 connectors

L86

10 m cable, analog with two M20 connectors

L87

15 m cable, analog with two M20 connectors

L88

Additional data

Please add **"-Z"** to Article No. and specify Order code(s) and plain text.

Tag name

Tag name plate, stainless steel

Y17

Extended calibration

Multi-point high, (5 flows x 2 passes),

10 ... 100 % of Q_{nom}

Y61

Multi-point high, (10 flows x 1 pass),

10 ... 100 % of Q_{nom}

Y63

SITRANS F C sensors MASS 2100/FC300 with FCT010, FCT030 and SIFLOW FC070 transmitters (Low flow program)

Selection and Ordering data	Article No.	Ord. code	Selection and Ordering data	Article No.	Ord. code
SITRANS F C sensors MASS 2100/FC300 with SIFLOW FC070 transmitter¹⁾	7ME4818 -		SITRANS F C sensors MASS 2100/FC300 with SIFLOW FC070 transmitter¹⁾	7ME4818 -	
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			Tube material (wetted) and max. operational temperature		
Sensor type and connector size			AISI 316L/EN 1.4435, Max 115 °C	1	
MASS 2100 DI 1.5, 1/4"	1 G		AISI 316L/EN 1.4435, Max 125 °C	2	
MASS 2100 DI 3, 1/4"	3 A		AISI 316L/EN 1.4435, Max 180 °C	3	
MASS 2100 DI 3, 1/4" Heated w. DIN	3 B		Hastelloy C22/UNS N06022/EN 2.4602, Max. 115 °C	5	
MASS 2100 DI 3, 1/4" Heated w. ANSI	3 C		Hastelloy C22/UNS N06022/EN 2.4602, Max. 125 °C	6	
FC300 DN 4, 1/4"	4 A		Hastelloy C22/UNS N06022/EN 2.4602, Max. 180 °C	7	
MASS 2100 DI 6, 1/4"	6 A		Calibration		
MASS 2100 DI 6, 1/4" Heated w. EN	6 B		Mass flow calibration	1	
MASS 2100 DI 6, 1/4" Heated w. ANSI	6 C		Mass flow calibration and density calibration	4	
MASS 2100 DI 6, DN 10	6 D		Standard fraction calibration	8	
MASS 2100 DI 6, DN 10 Heated w. EN	6 E		Mounting style, Transmitter Housing and Material		
MASS 2100 DI 6, DN 10 Heated w. ANSI	6 F		SIFLOW FC070 Standard DIN rail	W	
MASS 2100 DI 6, DN 15 (1/2")	6 G		Ex approvals		
MASS 2100 DI 6, DN 15 (1/2") Heated w. EN	6 H		Non-Ex		A
MASS 2100 DI 6, DN 15 (1/2") Heated w. ANSI	6 J		ATEX Zone 1		C
MASS 2100 DI 6, DN 20 (3/4")	6 K		IECEx Zone 1		F
MASS 2100 DI 6, DN 20 (3/4") Heated w. EN	6 L		USA (FM, CSA, UL), Zone 1/Div1		H
MASS 2100 DI 6, DN 20 (3/4") Heated w. ANSI	6 M		Canada (CSA, UL), Zone 1/Div1		M
MASS 2100 DI 6, DN 25 (1")	6 N		Local User Interface		
MASS 2100 DI 6, DN 25 (1") Heated w. EN	6 P		Blind	1	
MASS 2100 DI 6, DN 25 (1") Heated w. ANSI	6 Q				
MASS 2100 DI 15, DN 15 (1/2")	7 A				
MASS 2100 DI 15, DN 15 (1/2") Heated w. EN	7 B				
MASS 2100 DI 15, DN 15 (1/2") Heated w. ANSI	7 C				
MASS 2100 DI 15, DN 20 (3/4")	7 D				
MASS 2100 DI 15, DN 20 (3/4") Heated w. EN	7 E				
MASS 2100 DI 15, DN 20 (3/4") Heated w. ANSI	7 F				
MASS 2100 DI 15, DN 25 (1")	7 G				
MASS 2100 DI 15, DN 25 (1") Heated w. EN	7 H				
MASS 2100 DI 15, DN 25 (1") Heated w. ANSI	7 J				
Process connection/Pressure					
No connections (spare part transmitter)	A 0				
EN1092-1 B1, PN40	A 1				
EN1092-1 B1, PN100	A 3				
ASME B16.5, RF, Class 150	D 1				
ASME B16.5, RF, Class 600	D 3				
DIN 11851 Screwed connection	F 1				
ISO2852 Hyg. Clamped	J 1				
ISO2853 Hyg. Screwed	J 5				
ISO 228-1 Pipe thread, PN 100	C 1				
ISO 228-1 Pipe thread, PN 130	C 2				
ISO 228-1 Pipe thread, PN 200	C 3				
ISO 228-1 Pipe thread, PN 230	C 4				
ISO 228-1 Pipe thread, PN 265	C 5				
ISO 228-1 Pipe thread, PN 350	C 6				
ISO 228-1 Pipe thread, PN 365	C 7				
ISO 228-1 Pipe thread, PN 410	C 8				
NPT ASME B 1.20.1 Pipe thread, PN 100	N 1				
NPT ASME B 1.20.1 Pipe thread, PN 130	N 2				
NPT ASME B 1.20.1 Pipe thread, PN 200	N 3				
NPT ASME B 1.20.1 Pipe thread, PN 230	N 4				
NPT ASME B 1.20.1 Pipe thread, PN 265	N 5				
NPT ASME B 1.20.1 Pipe thread, PN 350	N 6				
NPT ASME B 1.20.1 Pipe thread, PN 365	N 7				
NPT ASME B 1.20.1 Pipe thread, PN 410	N 8				

¹⁾ SITRANS F C sensors MASS 2100/FC300 with SIFLOW FC070 transmitter (7ME4818-) are in preparation.

Flow Measurement

SITRANS F C

SITRANS F C sensors MASS 2100/FC300 with FCT010, FCT030 and SIFLOW FC070 transmitters (Low flow program)

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s).	
SW functions & CT approvals	
Standard	B11
Certificates	
Press test certificate CRN	C01
Press test certificate PED	C02
Material certificate EN 10204-3.1	C12
Welding inspection report	C13
Factory certificate according to EN 10204 2.2	C14
Factory certificate according to EN 10204 2.1	C15
Cleaning for oil and grease/ASTM-A380	C50
Cleaned according to PWIS	C51
Sensor data storage	
Sensor with SensorFlash for FCT	S20
Sensor with SensorProm for MASS 6000 and SIFLOW FC070 (in preparation)	S21
Cable sensor-transmitter	
None	L50
5 m cable for SIFLOW FC070	L79
10 m cable for SIFLOW FC070	L80
25 m cable for SIFLOW FC070	L81
50 m cable for SIFLOW FC070	L82
75 m cable for SIFLOW FC070	L83
150 m cable for SIFLOW FC070	L84
Additional data Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	Y17
Extended calibration	
Multi-point high, (5 flows x 2 passes), 10 ... 100 % of Q_{nom}	Y61
Multi-point high, (10 flows x 1 pass), 10 ... 100 % of Q_{nom}	Y63

Transmitter MASS 6000 IP67 compact/remote
Overview


MASS 6000 is based on digital signal processing technology – engineered for high performance, fast flow step response, fast batching applications, high immunity against process noise, easy to install, commission and maintain.

The MASS 6000 transmitter delivers true multiparameter measurements i.e. mass flow, volume flow, density, temperature and fraction.

The MASS 6000 IP67 transmitter can be compact mounted on all sensors of type MASS 2100 DI 3 to DI 15, and can be used in remote version for all types of MASS 2100 and FC300 sensors.

Note

Due to RoHs directives active from July 22nd 2017, MASS 6000 transmitters of any model and variants are not for sale within EU, EU candidate countries, Norway, Switzerland, Iceland, Croatia, and Turkey.

Replacement products: 7ME461.-..., 7ME462.-..., 7ME471.-... and 7ME481.-...

Repair parts for MASS 6000 (all models and variants) are available. See spare part list.

Benefits

- Dedicated mass flow chip with the latest ASIC technology
- Fast batching and flow step response with an update rate of true 30 Hz
- Superior noise immunity due to a DFT (Discrete Fourier Transformation) algorithm.
- Front end resolution better than 0.35 ns improves zero point stability and enhances dynamic turn-down ratio on flow and density accuracy.
- Advanced diagnosis and service menu enhances troubleshooting and meter verification.
- Built-in batch controller with compensation and monitoring comprising 2 built-in totalizers
- Multi-parameter outputs, individual configurable for mass flow, volume flow, density, temperature or fraction flow such as Brix or Plato
- Digital input for batch control, remote zero adjust or forced output mode
- All outputs can be forced to preset value for simulation, verification or calibration purposes.
- User-configurable operation menu with password protection
 - 3 lines, 20 characters display in 11 languages
 - Self-explaining error handling/log in text format
 - Keypad can be used for controlling batch as start/stop/hold/reset

- SENSORPROM technology automatically configures transmitter at start-up providing:
 - Factory pre-programming with calibration data, pipe size, sensor type, output settings
 - Any values or settings changed by users are stored automatically
 - Automatically re-programming any new transmitter without loss of accuracy
 - Transmitter replacement in less than 5 minutes.
 - True "plug & play"
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow.
- Fraction flow computation based on a 3rd-order algorithm matching all applications.
- USM II platform enables fitting of add-on bus modules without loss of functionality.
 - All modules can be fitted through true "plug & play"
 - Module and transmitter are automatically configured through the SENSORPROM.
- Installation of the transmitter to the sensor is simple "plug & play" via the sensor pedestal.

Application

SITRANS F C mass flowmeters are suitable for all applications within the entire process industry, where there is a demand for accurate flow measurement. The meter is capable of measuring both liquid and gas flow.

The main applications for the MASS 6000 IP67 transmitter can be found in:

- Food and beverage industries
- Pharmaceutical industries
- Automotive industry
- Oil and gas industry
- Power generation and utility industry
- Water and waste water industry

Design

The transmitter is designed in an IP67/NEMA 6 compact polyamide enclosure which can be compact mounted on the MASS 2100 sensor range DI 3 to DI 15 (1/8" to 1/2") and remote mounted for the entire sensor series.

The MASS 6000 IP67 is available as standard with 1 current, 1 frequency/pulse and 1 relay output and can be fitted with add-on modules for bus communication.

Function

The following functions are available:

- Mass flow rate, volume flow rate, density, temperature, fraction flow
- 1 current output, 1 frequency/pulse output, 1 relay output, 1 digital input
- All outputs can be individually configured with mass, volume, density etc.
- 2 built-in totalizers which can count positive, negative or net
- Low flow cut-off
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction adjustable
- Error system consisting of error-log, error pending menu
- Display of operating time
- Uni/bidirectional flow measurement
- Limit switches with 1 or 2 limits, programmable for flow, density or temperature
- Noise filter setting for optimization of measurement performance under non-ideal application conditions
- Full batch controller
- Automatic zero adjustment menu, with zero point evaluation feed back
- Full service menu for effective and straight forward application and meter troubleshooting

Flow Measurement

SITRANS F C

Transmitter MASS 6000 IP67 compact/remote

Technical specifications

Measurement of	Mass flow [kg/s (lb/min)], volume flow [l/s (gpm)], fraction [%], °Brix, density [kg/m ³ , (lb/ft ³)], temperature [°C (°F)]	Enclosure	
Current output		Material	Fibre glass reinforced polyamide
Current	0 ... 20 mA or 4 ... 20 mA	Rating	IP67/NEMA 6
Load	< 800 Ω	Mechanical load	18 ... 1000 Hz random, 3.17 g RMS, in all directions
Time constant	0 ... 99.9 s adjustable	Supply voltage	
Digital output		24 V version	
Frequency	0 ... 10 kHz, 50 % duty cycle	• Supply	18 ... 30 V DC 20 ... 30 V AC
Time constant	0 ... 99.9 s adjustable	230 V version	
Active	24 V DC, 30 mA, 1 KΩ ≤ R _{load} ≤ 10 KΩ, short-circuit-protected	• Supply	87 ... 253 V AC, 50 ... 60 Hz
Passive	3 ... 30 V DC, max. 110 mA, 250 Ω ≤ R _{load} ≤ 10 KΩ	Power consumption	
Relay		24 V DC	6 W
Type	Change-over relay	24 V AC	10 VA
Load	42 V/2 A peak	230 V AC	9 VA
Functions	Error level, error number, limit, flow direction	Fuse	
Digital input		230 V version	T 400 mA, T 250 V (IEC 127) - not replaceable by operator
Functionality	11 ... 30 V DC (R _i = 13.6 kΩ) Start/hold/continue batch, zero point adjust, reset totalizer 1/2, force output, freeze output	24 V version	T 1 A, T 250 V (IEC 127) - not replaceable by operator
Galvanic isolation		EMC performance	
	All inputs and outputs are galva- nically isolated. Isolation voltage: • 500 V to supply • 50 V between outputs	Emission	EN 55011/CISPR-11 (Class A)
Cut-off		Immunity	EN/IEC 61326-1 (Industry)
Low-flow	0 ... 9.9 % of maximum flow	NAMUR	Within the value limits according to "General requirements" with error criteria A in accordance with NE 21
Limit function		Environment	
	Mass flow, volume flow, fraction, density, sensor temperature	Environmental conditions acc. to IEC/EN/UL 61010-1:	• Altitude up to 2000 m • POLLUTION DEGREE 2
Totalizer		Maintenance	The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis.
	Two eight-digit counters for for- ward, net or reverse flow	Cable glands	Two types of cable gland are available in polyamide in the fol- lowing dimensions: M20 or ½" NPT
Display		Note	
	• Background illumination with alphanumeric text, 3 × 20 characters to indicate flow rate, totalized values, settings and faults. Time constant as current output 1 • Reverse flow indicated by nega- tive sign	Due to RoHs directives active from July 22 nd 2017, MASS 6000 transmitters of any model and variants are not for sale within EU, EU candidate countries, Norway, Switzerland, Iceland, Croatia, and Turkey.	
Zero point adjustment		Replacement products: 7ME461.-..., 7ME462.-..., 7ME471.-... and 7ME481.-...	
	Via keypad or remote via digital input	Repair parts for MASS 6000 (all models and variants) are avail- able. See spare part list.	
Ambient temperature			
Operation	-20 ... +50 °C (-4 ... +122 °F), max. rel. humidity 80 % at 31 °C (87.8 °F) decreasing to 50 % at 40 °C (104 °F) according to IEC/EN/UL 61010-1		
Storage	-40 ... +70 °C (-40 ... +158 °F) (Humidity max. 95 %)		
Communication			
	Add-on modules: HART, PROFIBUS PA and DP, Modbus RTU RS 485, DeviceNet, FOUNDATION Fieldbus H1		

Selection and Ordering data

Article No.

SITRANS F C MASS 6000 transmitter

Transmitter for wall mounting with wall mounting bracket, fibre glass reinforced polyamide (1 current output, 1 frq./pulse output, 1 relay output and connection board/PCB)

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Version

Remote IP67/NEMA 6 enclosure

Supply voltage

115/230 V AC, 50 ... 60 Hz
24 V AC/DC

Display/Keypad

with display

Serial communication

No communication

HART

PROFIBUS PA Profile 3

PROFIBUS DP Profile 3

Modbus RTU RS 485

DeviceNet

FOUNDATION Fieldbus H1

Cable glands

M20

½" NPT

7ME4110-

AA 0 - A

2

1

2

1

A

B

F

G

E

H

J

1

2

Add-on module

Description

Article No.

HART¹⁾

FDK:085U0226

PROFIBUS PA Profile 3¹⁾

FDK:085U0236

PROFIBUS DP Profile 3

FDK:085U0237

Modbus RTU RS 485

FDK:085U0234

FOUNDATION Fieldbus H1¹⁾

A5E02054250

DeviceNet

FDK:085U0229



¹⁾ Modules are rated Ex i when used with MASS 6000 Ex d.

Operating instructions for SITRANS F add-on modules

Description

Article No.

HART

• English

A5E03089708

PROFIBUS PA/DP

• English

• German

A5E00726137

A5E01026429

Modbus

• English

• German

A5E00753974

A5E03089262

FOUNDATION Fieldbus

• English

• German

A5E02318728

A5E02488856

DeviceNet

• English

A5E03089720

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Operating instructions for SITRANS F C MASS 6000 IP67

Description

Article No.

• English

A5E03071936

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Accessories

Description

Article No.

Cable glands, screwed entries type in polyamide (100 °C (212 °F)) black, 2 pcs.

• M20

• ½" NPT

A5E00822490

A5E00822501



Sun lid for MASS 6000 transmitter (Frame and lid)

A5E02328485



Spare parts for compact or remote IP67 version

Description

Article No.

MASS 6000 transmitter IP67/NEMA 6

Fibre glass reinforced polyamide and without connection board

1 current output
1 frq./pulse output
1 relay output

• 115/230 V AC, 50/60 Hz

• 24 V AC/DC

7ME4110-1AA10-1AA0

7ME4110-1AA20-1AA0



Wall mounting unit for IP67/NEMA 6 version with wall bracket, without connection board but with

• 4 x M20 cable glands

• 4 x ½" NPT cable glands

FDK:085U1018

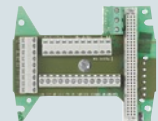
A5E01164211



Connection board/PCB

FDK:083H4260


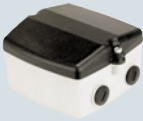


Supply voltage:
115/230 V/24 V AC/DC



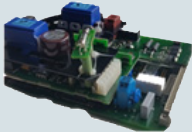


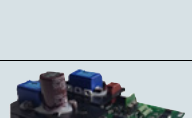

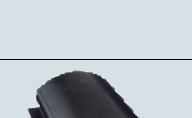






Flow Measurement

SITRANS F C

Transmitter MASS 6000 IP67 compact/remote

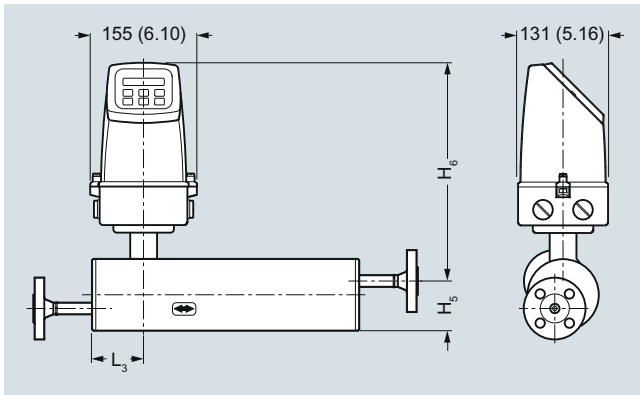
Description	Article No.	
Terminal box kit with <ul style="list-style-type: none"> • M20 cable glands • ½" NPT cable glands <p>Change from remote to safe area compact mounting of MASS 6000 IP67/NEMA 6 with MASS 2100. The kit consists of a terminal box in polyamide incl. connection board, cable and connector between PCB and sensor pedestal, PCB, seal and screws (4 pcs.) for mounting on sensor.</p> <p>Not approved for hazardous locations</p>	A5E00832338 A5E00832342	
Terminal box, in polyamide, inclusive lid <ul style="list-style-type: none"> • M20 cable glands • ½" NPT cable glands <p>Not approved for hazardous locations</p>	FDK:085U1050 FDK:085U1052	
Terminal box – lid in polyamide	FDK:085U1003	
Display and keypad <ul style="list-style-type: none"> • Siemens Front 	FDK:085U1039	

Add-on spare parts required due to RoHs directives and EoL for EU and EU related countries

Description	Article No.	
MASS 6000 IP67 Spare part PCB main <ul style="list-style-type: none"> • 230 V • 24 V 	A5E41718138 A5E41718346	 
MASS 6000 19"/IP20 Spare part PCB main <ul style="list-style-type: none"> • 1 current output 230 V • 3 current outputs 230 V • 1 current output 24V • 3 current outputs 24 V 	A5E43226138 A5E43226145 A5E43226154 A5E43226168	 
MASS 6000 19"/IP20 Ex Spare part PCB main <ul style="list-style-type: none"> • 1 current output 230 V • 3 current outputs 230 V • 1 current output 24V • 3 current outputs 24 V 	A5E43226277 A5E43226342 A5E43226441 A5E43226455	 
MASS 6000 Ex d, Spare part PCB Stainless steel, without module	FDK:083H3061	
MASS 6000 Ex d, Spare part barriere Stainless steel	A5E41718720	
MASS 6000 19"/IP20, Barriere PCB, Ex	A5E41718669	
MASS 6000 Ex d, Connection board Stainless steel	A5E41718522	
MASS 6000 IP20, Front plate Without display	A5E41718695	
MASS 6000 IP20, Front plate, Ex Without display	A5E41718706	

Dimensional drawings

Compact with MASS 6000 IP67

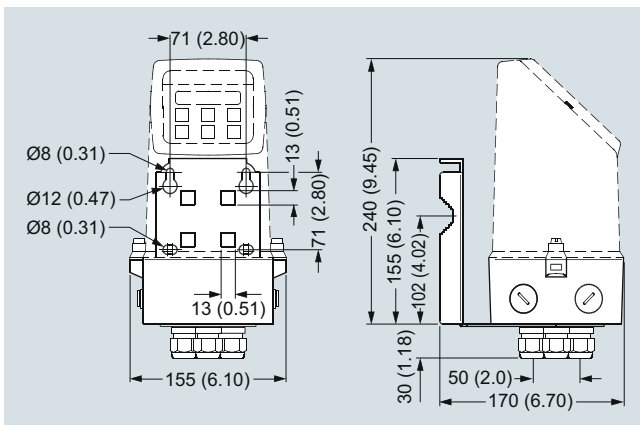


Dimensions in mm (inch)

MASS 2100 with MASS 6000 IP67 compact

Sensor size [DI (inch)]	L ₃ [mm (inch)]	H ₅ [mm (inch)]	H ₆ [mm (inch)]	H ₅ + H ₆ [mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	306 (12.04)	388 (15.28)
6 (1/4)	62 (2.44)	72 (2.83)	316 (12.44)	388 (15.28)
15 (1/2)	75 (2.95)	87 (3.43)	326 (12.83)	413 (16.26)

Transmitter MASS 6000 IP67 wall mounted



Dimensions in mm (inch)

Schematics

Electrical connection

Grounding

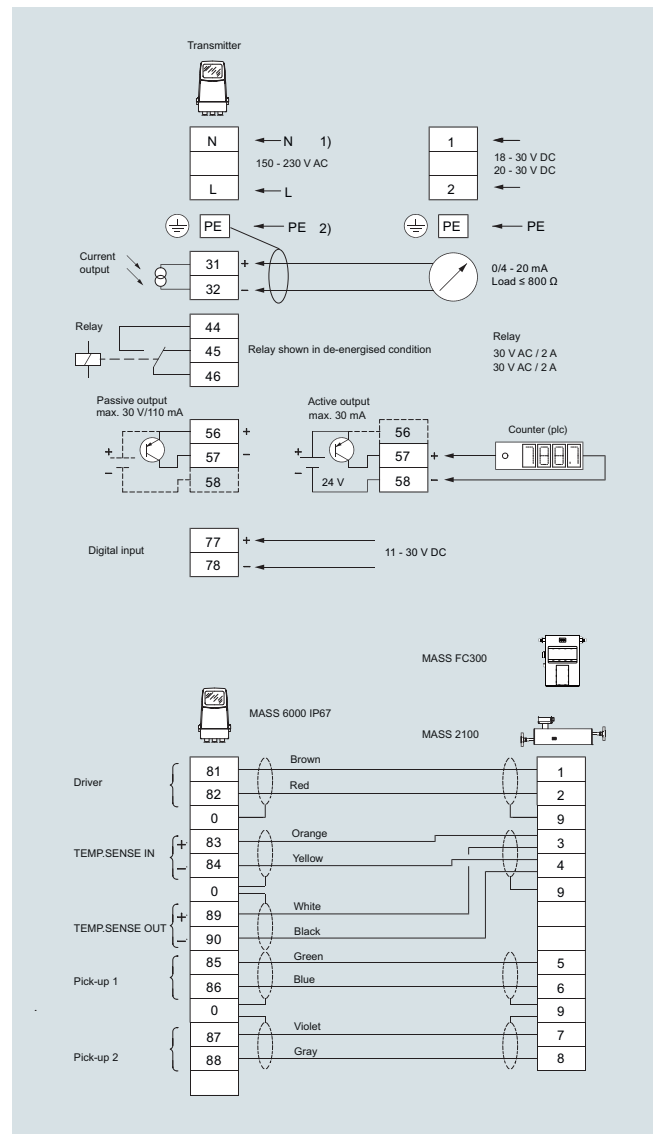
PE must be connected due to safety class 1 power supply.

Mechanical counters

When mounting a mechanical counter to terminals 57 and 58 (active output), a 1000 µF min. 35 V electrolytic capacitor must be connected to the terminals 56 and 58. Capacitor + is connected to terminal 56 and capacitor - to terminal 58.

Output cables

If long cables are used in a noisy environment, it is recommended to use shielded cables.



Flow Measurement

SITRANS F C

Transmitter MASS 6000 for 19" insert/19" wall mounting

Overview



MASS 6000 is based on digital signal processing technology – engineered for high performance, fast flow step response, fast batching applications, high immunity against process noise, easy to install, commission and maintain. The MASS 6000 transmitter delivers true multi parameter measurements i.e.: Mass flow, volume flow, density, temperature and fraction.

The MASS 6000 19" transmitter can be connected to all sensors of types MASS 2100/FC300/FCS200 and are available in different versions depending of number of output facilities, Ex protection and grade of enclosure.

Benefits

- Dedicated mass flow chip with the latest ASIC technology
- Fast batching and flow step response with an update rate of true 30 Hz
- Superior noise immunity due to a DFT (Discrete Fourier Transformation) algorithm.
- Front end resolution better than 0.35 ns improves zero point stability and enhances dynamic turn-down ratio on flow and density accuracy.
- Advanced diagnosis and service menu enhances troubleshooting and meter verification.
- Built-in batch controller with compensation and monitoring comprising 2 built-in totalizers
- Multi-parameter outputs, individual configurable for mass flow, volume flow, density, temperature or fraction flow such as Brix or Plato
- Many output capacities, up to 3 current, 2 frequency/pulse and 2 relay outputs (excludes the possibility of an add-on module)
- Digital input for batch-control, remote zero adjust or forced output mode
- All outputs can be forced to preset value for simulation, verification or calibration purposes.
- User-configurable operation menu with password protection
 - 3 lines, 20 characters display in 11 languages
 - Self-explaining error handling/log in text format
 - Keypad can be used for controlling batch as start/stop/hold/reset
- SENSORPROM technology automatically configures transmitter at start-up providing:
 - Factory pre-programming with calibration data, pipe size, sensor type, output settings
 - Any values or settings changed by users are stored automatically
 - Automatically re-programming any new transmitter without loss of accuracy
 - Transmitter replacement in less than 5 minutes. True "plug & play"
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Fraction flow computation based on a 3rd-order algorithm matching all applications
- USM II platform enables fitting of add-on bus modules without loss of functionality.
 - All modules can be fitted as true "plug & play"
 - Module and transmitter automatically configured through the SENSORPROM.
- Transmitter available with Ex approvals
- All electrical connections are easily accessible on the large back plane PCB

Application

SITRANS F C Coriolis mass flowmeters are suitable for all applications within the entire process industry, where there is a demand for accurate flow measurement. The meter can measure both liquids and gases.

The main applications for the MASS 6000 19" transmitter can be found in:

- Chemical and pharmaceutical industries
- Food and beverage industries
- Automotive industry
- Oil and gas industry
- Power generation and utility industry
- Water and waste water industry

Design

The transmitter is designed as a 19" insert as base to be used in:

- 19" rack system
- Panel mounting IP65
- Back of panel mounting IP20
- Wall mounting IP66

The MASS 6000 19" is available as standard or as Ex-approved transmitter which is to be mounted in the safe area.

Note

Due to RoHS directives active from July 22nd 2017, MASS 6000 transmitters of any model and variants are not for sale within EU, EU candidate countries, Norway, Switzerland, Iceland, Croatia, and Turkey.

Replacement products: 7ME461.-..., 7ME462.-..., 7ME471.-... and 7ME481.-...

Repair parts for MASS 6000 (all models and variants) are available. See spare part list.

Transmitter MASS 6000 for 19" insert/19" wall mounting

Function

The following functions are available:

- Mass flow rate, volume flow rate, density, temperature, fraction flow
- 2 output versions available as standard:
 - 1 current output, 1 frequency/pulse output, 1 relay output, 1 digital input
 - 3 current outputs, 2 frequency/pulse outputs, 2 relay outputs, 1 digital input
- All outputs can be individually configured with mass, volume, density etc.
- 2 built-in totalizers which can count positive, negative or net
- Low flow cut-off
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction
- Error system consisting of error-log, error pending menu
- Operating time
- Uni/bidirectional flow measurement
- Limit switches with 1 or 2 limits, programmable for flow, density or temperature
- Noise filter setting for optimization of measurement performance under non-ideal application conditions
- Full batch controller
- Automatic zero adjustment menu, with zero point evaluation feed-back
- Full service menu for effective and straight forward application and meter troubleshooting

Technical specifications

Measurement of	Mass flow [kg/s (lb/min)], volume flow [l/s (gpm)], fraction [%], °Brix, density [kg/m ³ (lb/ft ³)], temperature [°C (°F)]
Current output	
Current	0 ... 20 mA or 4 ... 20 mA
Load	< 800 Ω
Time constant	0 ... 99.9 s adjustable
Digital output	
Frequency	0 ... 10 kHz, 50 % duty cycle
Time constant	0 ... 30 s adjustable
Active	24 V DC, 30 mA, 1 KΩ ≤ R _{load} ≤ 10 KΩ, short-circuit-protected
Passive	3 ... 30 V DC, max. 110 mA, 250 Ω ≤ R _{load} ≤ 10 KΩ
Relay	
Type	Change-over relay
Load	42 V/2 A peak
Functions	Error level, error number, limit, direction
Digital input	
Functionality	11 ... 30 V DC Start/hold/continue batch, zero point adjust, reset totalizer 1/2, force output, freeze output
Galvanic isolation	All inputs and outputs are galvanically isolated. Isolation voltage: • 500 V to supply • 50 V between outputs
Cut-off	
Low-flow	0 ... 9.9 % of maximum flow

Limit function	Mass flow, volume flow, fraction, density, sensor temperature
Totalizer	Two eight-digit counters for forward, net or reverse flow
Display	<ul style="list-style-type: none"> • Background illumination with alphanumeric text, 3 × 20 characters to indicate flow rate, totalized values, settings and faults • Reverse flow indicated by negative sign
Zero point adjustment	Via keypad or remote via digital input
Ambient temperature	
Operation	-20 ... +50 °C (-4 ... +122 °F)
Storage	-40 ... +70 °C (-40 ... +158 °F) (Humidity max. 95 %)
Communication	Add-on modules: HART, PROFIBUS PA and DP, Modbus RTU RS 485, DeviceNet, FOUNDATION Fieldbus H1
Enclosure 19"	
Material	Aluminum/steel (DIN 41494)
Rating	IP20
Mechanical load	18 ... 1000 Hz random, 3.17 g RMS, in all directions
Supply voltage	
24 V version	
• Supply	24 V DC/AC, 50 ... 60 Hz
• Fluctuation	18 ... 30 V DC 20 ... 30 V AC
• Power consumption	6 W I _N = 250 mA, I _{ST} = 2 A (30 ms)
230 V version	
• Supply	87 ... 253 V AC, 50 ... 60 Hz
• Power consumption	9 VA
Fuse	
230 V version	T 400 mA, T 250 V (IEC 127) - not replaceable by operator
24 V version	T 1 A, T 250 V (IEC 127) - not replaceable by operator
EMC performance	
Emission	EN 55011/CISPR-11 (Class A)
Immunity	EN/IEC 61236-1 (Industry)
Ex approval	ATEX, EAC Ex: [Ex ia] IIC
Maintenance	The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis.
Cable	<ul style="list-style-type: none"> • Max. 300 m • C: max. 300 [pF/m]; L_C/R_C: max. 100 [μH/Ω] • The total cable capacity must be max. 200 nF.
Cable glands	The cable gland is available in polyamide, in dimension: PG 13.5

Note

Due to RoHs directives active from July 22nd 2017, MASS 6000 transmitters of any model and variants are not for sale within EU, EU candidate countries, Norway, Switzerland, Iceland, Croatia, and Turkey.

Replacement products: 7ME461.-..., 7ME462.-..., 7ME471.-... and 7ME481.-...

Repair parts for MASS 6000 (all models and variants) are available. See spare part list.

Transmitter MASS 6000 for 19" insert/19" wall mounting


Operating instructions for SITRANS F C MASS 6000 19"

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Enclosure (without PCB, connection board)

Enclosure

Cable glands

Description	Article No.	
Cable gland, screwed entry, type M20 , in polyamide (100 °C (212 °F)) black, 2 pcs.	A5E00822490	

Transmitter MASS 6000 for 19" insert/19" wall mounting

Add-on module

Note:

Only possible to connect to MASS 6000 versions with 1 current output.

Description	Article No.
HART (Ex-i)	FDK:085U0226
PROFIBUS PA Profile 3 (Ex-i)	FDK:085U0236
PROFIBUS DP Profile 3	FDK:085U0237
Modbus RTU RS 485	FDK:085U0234
FOUNDATION Fieldbus H1 (Ex-i)	A5E02054250
DeviceNet	FDK:085U0229

**Operating instructions for SITRANS F add-on modules**

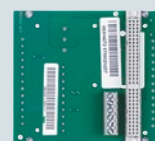
Description	Article No.
HART • English	A5E03089708
PROFIBUS PA/DP • English • German	A5E00726137 A5E01026429
Modbus • English • German	A5E00753974 A5E03089262
FOUNDATION Fieldbus • English • German	A5E02318728 A5E02488856
DeviceNet • English	A5E03089720

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentationConnection boards/PCB for MASS 6000 and MASS 2100 sensors

Description	Version	Article No.
Connection board MASS 6000 for 19" IP20 rack mounting version	24 V 115/230 V	FDK:083H4272
Connection board MASS 6000 Ex [ia] IIC for 19" IP20 rack mounting version	24 V 115/230 V	FDK:083H4273
Connection board MASS 6000 for 19" wall mounting version, for enclosure FDK:083F5037/FDK:083F5038	24 V 115/230 V	FDK:083H4274
Connection board MASS 6000 Ex [ia] IIC for 19" wall mounting version, for enclosure FDK:083F5037/FDK:083F5038	24 V 115/230 V	FDK:083H4275

Connection boards/PCB for MASS 6000 and MC2 sensors

Description	Version	Article No.
Connection board MASS 6000 for 19" IP20 rack mounting version	24 V 115/230 V	FDK:083H4272
Connection board MASS 6000 for Ex application ¹⁾ and 19" IP20 rack mounting version (connection board MASS 6000 to MC2 sensors Ex-approved)	24 V 115/230 V	FDK:083H4294
Connection board MASS 6000 for 19" wall mounting version, for enclosure FDK:083F5037/FDK:083F5038	24 V 115/230 V	FDK:083H4274
Connection board MASS 6000 for Ex application ¹⁾ and 19" wall mounting version (connection board MASS 6000 to MC2 sensors Ex-approved), for enclosure FDK:083F5037/FDK:083F5038	24 V 115/230 V	FDK:083H4295

¹⁾ Attention (Ex application): MC2 Ex version sensors must only be connected to connection board FDK:083H4294 or FDK:083H4295.

Description	Article No.
Wall mounting enclosure in ABS plastic IP65 with connection board/PCB for Ex application connected to MC2 Ex sensors	FDK:083H4296






Flow Measurement

SITRANS F C

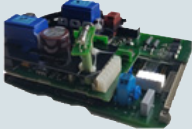






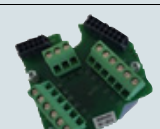


Transmitter MASS 6000 for 19" insert/19" wall mounting

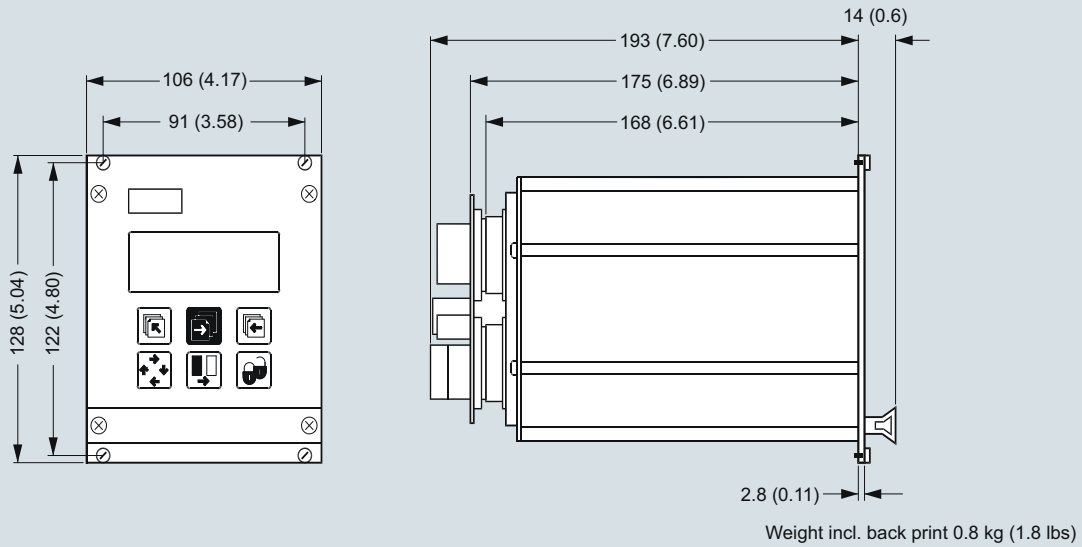
Spare parts 19" versions

Enclosure (without PCB, connection board)

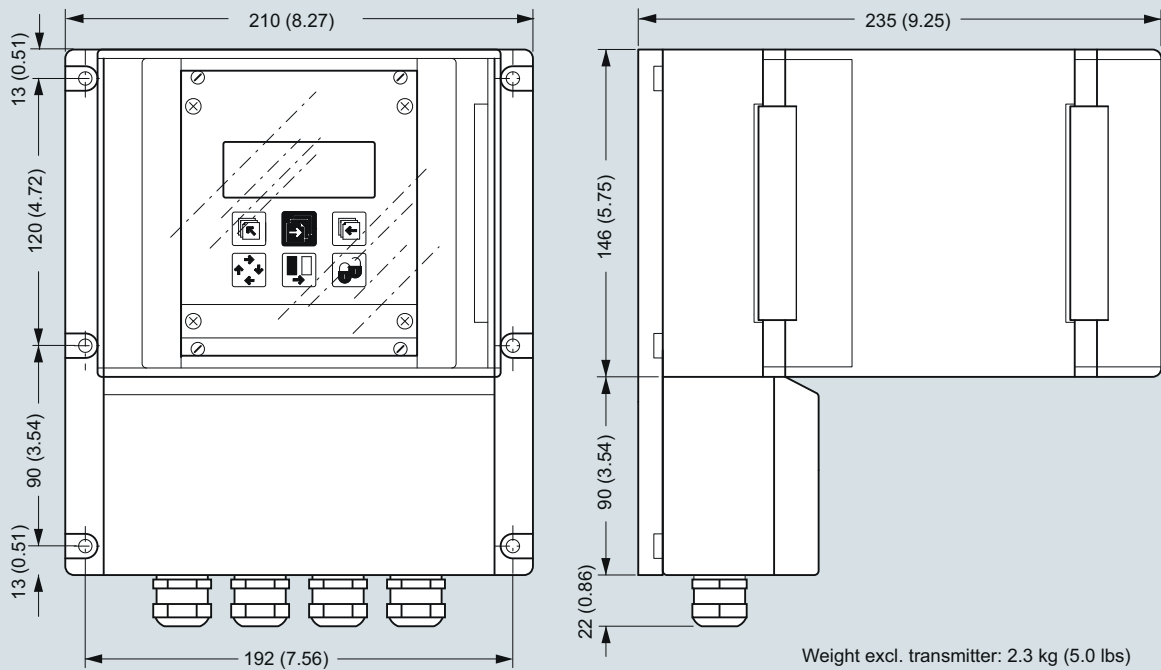
Description	Article No.	
IP66/NEMA 4X, wall mounting enclosure for 19" inserts (without back plates). Use with PCB A5E02559813 or A5E02559814		
• 21 TE	FDK:083F5037	
• 42 TE	FDK:083F5038	
Display unit for 19" versions Order the Display and Keypad accessory from MASS 6000 IP67 compact/remote (FDK:085U1039) and use the display part only for replacement	FDK:085U1039	

Add-on spare parts required due to RoHs directives and EoL for EU and EU related countries

Description	Article No.	
MASS 6000 IP67 Spare part PCB main		
• 230 V	A5E41718138	
• 24 V	A5E41718346	
MASS 6000 19"/IP20 Spare part PCB main		
• 1 current output 230 V	A5E43226138	
• 3 current outputs 230 V	A5E43226145	
• 1 current output 24V	A5E43226154	
• 3 current outputs 24 V	A5E43226168	
MASS 6000 19"/IP20 Ex Spare part PCB main		
• 1 current output 230 V	A5E43226277	
• 3 current outputs 230 V	A5E43226342	
• 1 current output 24V	A5E43226441	
• 3 current outputs 24 V	A5E43226455	
MASS 6000 Ex d, Spare part PCB	FDK:083H3061	
Stainless steel, without module		
MASS 6000 Ex d, Spare part barriere	A5E41718720	
Stainless steel		
MASS 6000 19"/IP20, Barriere PCB, Ex	A5E41718669	
MASS 6000 Ex d, Connection board	A5E41718522	
Stainless steel		
MASS 6000 IP20, Front plate	A5E41718695	
Without display		
MASS 6000 IP20, Front plate, Ex	A5E41718706	
Without display		

Dimensional drawings
Transmitter 19" insert


Dimensions in mm (inch)

Transmitter 19" wall mounting


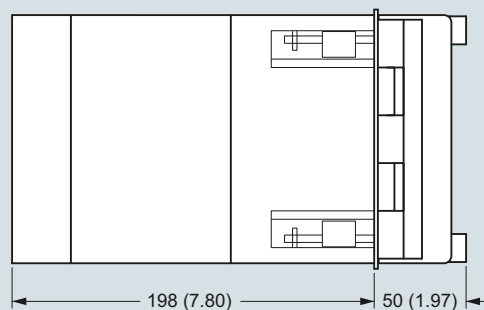
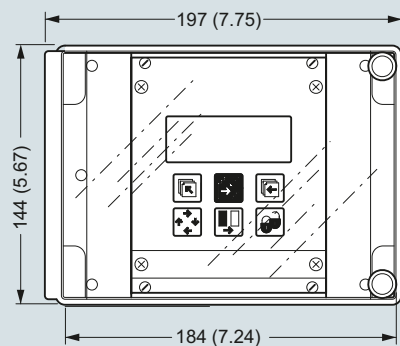
Dimensions in mm (inch)

Flow Measurement

SITRANS F C

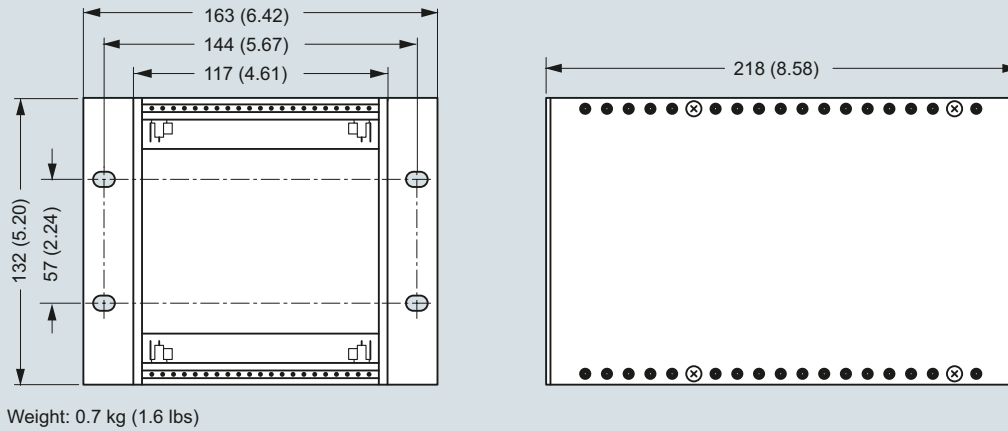
Transmitter MASS 6000 for 19" insert/19" wall mounting

Transmitter 19" front of panel

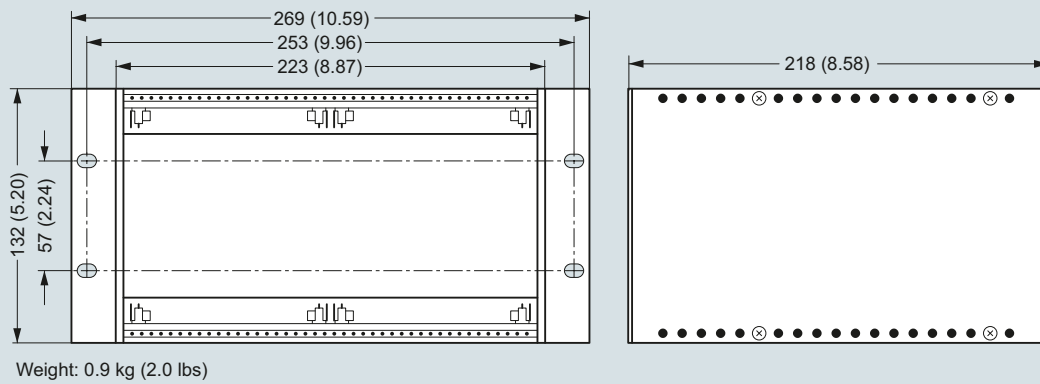


Weight excl. transmitter: 1.2 kg (2.7 lbs)

Dimensions in mm (inch)

Transmitter, back of panel IP20/NEMA 1, 21 TE

Dimensions in mm (inch)

Transmitter, back of panel IP20/NEMA 1, 42 TE

Dimensions in mm (inch)

Flow Measurement

SITRANS F C

Transmitter MASS 6000 for 19" insert/19" wall mounting

Schematics

Electrical connection

Grounding

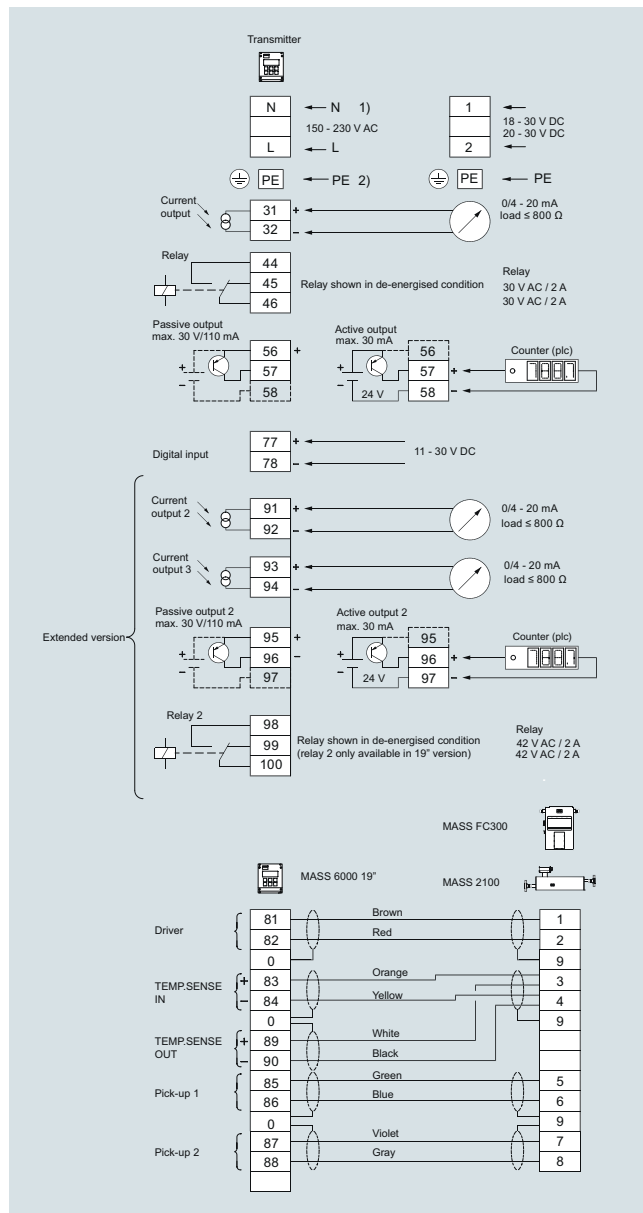
PE must be connected due to safety class 1 power supply.

Mechanical counters

When mounting a mechanical counter to terminals 57 and 58 (active output), a 1000 μF min. 35 V electrolytic capacitor must be connected to the terminals 56 and 58. Capacitor + is connected to terminal 56 and capacitor - to terminal 58.

Output cables

If long cables are used in noisy environment, it is recommended to use shielded cables.



Transmitter MASS 6000 Ex d compact/remote

Overview



MASS 6000 is based on digital signal processing technology – engineered for high performance, fast flow step response, fast batching applications, high immunity against process noise, easy to install, commission and maintain.

The MASS 6000 transmitter delivers true multiparameter measurements i.e.: Mass flow, volume flow, density, temperature and fraction flow.

The MASS 6000 Ex d transmitter is manufactured in stainless steel (AISI 316L/1.4404) and able to withstand harsh installation conditions in hazardous applications within the process and chemical industry. The conservative choice of material guarantees the user a low cost of ownership and a long trouble-free lifetime.

The Ex d can be compact mounted on all sensors of type MASS 2100 DI 3 to DI 15, and can be used in remote version for all types of MASS 2100.

Benefits

- Fully stainless steel flameproof Ex d enclosure, ensuring optimum cost of ownership
- Intrinsically safe keypad and display directly programmable in hazardous area
- Ex-approved transmitter which can be mounted in hazardous area Zone 1 or Zone 2.
- Sensor and transmitter interface intrinsically safe Ex ia IIC
- Exchange of transmitter directly in hazardous area without shut-down of process pipe line due to ia IIC sensor/transmitter interface.
- Dedicated mass flow chip with the latest ASIC technology
- Fast batching and flow step response with an update rate of true 30 Hz
- Superior noise immunity due to a DFT (Discrete Fourier Transformation) algorithm
- Front end resolution better than 0.35 ns improves zero point stability and enhances dynamic turn-down ratio on flow and density accuracy.
- Advanced diagnosis and service menu enhances troubleshooting and meter verification.
- Built-in batch controller with compensation and monitoring comprising 2 built-in totalizers
- Multi-parameter outputs, individual configurable for mass flow, volume flow, density, temperature or fraction flow such as Brix or Plato
- 1 current output, 1 frequency/pulse and 1 relay as standard output
- Current output can be selected as passive or active output

- Digital input for batch-control, remote zero adjust or forced output mode
- All outputs can be forced to preset value for simulation, verification or calibration purposes.
- User-configurable operation menu with password protection
 - 3 lines, 20 characters display in 11 languages
 - Self-explaining error handling/log in text format
 - Keypad can be used for controlling batch as start/stop/hold/reset
- SENSORPROM technology automatically configures transmitter at start-up providing:
 - Factory pre-programming with calibration data, pipe size, sensor type, output settings
 - Any values or settings changed by users are stored automatically
 - Automatically re-programming any new transmitter without loss of accuracy
 - Transmitter replacement in less than 5 minutes. True "plug & play"
- Fraction flow computation based on a 3rd-order algorithm matching all applications
- USM II platform enables fitting of add-on bus modules without loss of functionality:
 - All modules can be fitted as true "plug & play"
 - Module and transmitter automatically configured through the SENSORPROM
- Installation of the transmitter to the sensor is simple "plug & play" via the sensor pedestal.

Application

SITRANS F C mass flowmeters are suitable for all applications within the entire process industry where there is a demand for accurate flow measurement in hazardous area. The meter can measure both liquids and gases.

The main applications for the MASS 6000 Ex d transmitter can be found in:

- Chemical process industry
- Pharmaceutical industries
- Automotive industry
- Oil and gas industry
- Power generation and utility industry

Design

The transmitter is designed in an Ex d compact stainless steel enclosure which can be compact mounted on the MASS 2100 sensor range DI 3 to DI 15, and remote mounted for the entire sensor series.

The MASS 6000 Ex d is available as standard with 1 current, 1 frequency/pulse and 1 relay output and can be fitted with add-on modules for bus communication.

- Flameproof „d“ enclosure
- Enclosure stainless steel, IP67/NEMA 6 as compact and IP65 as remote
- Supply voltage 24 V AC/DC
- MASS 6000 Ex d is Ex-approved together with all MASS 2100 sensors, but can **not** be used together with MC2 Ex versions

Note

Due to RoHs directives active from July 22nd 2017, MASS 6000 transmitters of any model and variants are not for sale within EU, EU candidate countries, Norway, Switzerland, Iceland, Croatia, and Turkey.

Replacement products: 7ME461.-..., 7ME462.-..., 7ME471.-... and 7ME481.-...

Repair parts for MASS 6000 (all models and variants) are available. See spare part list.

Flow Measurement

SITRANS F C

Transmitter MASS 6000 Ex d compact/remote

Function

The following functions are available:

- Mass flow rate, volume flow rate, density, temperature, fraction flow
- 1 current output, 1 frequency/pulse output, 1 relay output, 1 digital input
- All outputs can be individually configured with mass, volume, density etc.
- 2 built-in totalizers which can count positive, negative or net
- Low flow cut-off
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction
- Error system consisting of error-log, error pending menu
- Operating time
- Uni/bidirectional flow measurement
- Limit switches with 1 or 2 limits, programmable for flow, density or temperature
- Noise filter setting for optimization of measurement performance under non-ideal application conditions
- Full batch controller
- Automatic zero adjustment menu, with zero point evaluation feed back
- Full service menu for effective and straight forward application and meter troubleshooting

Technical specifications

Measurement of	Mass flow [kg/s (lb/min)], volume flow [l/s (gpm)], fraction [%], °Brix, density [kg/m ³ (lb/ft ³)], temperature [°C (°F)]
Current output	Classified Ex ia, selectable as active or passive outputs. Default setting is active mode.
Current	0 ... 20 mA or 4 ... 20 mA
Load	< 350 Ω
Time constant	0 ... 99.9 s adjustable
Current characteristics	
Active mode	U _o = 24 V, I _o = 82 mA, P _o = 0.5 W, C _o = 125 nF, L _o = 2.5 mH
Passive mode (max input from external barrier)	U _i = 30 V, I _i = 100 mA, P _i = 0.75 W, C _i = 52 nF, L _i = 100 μH
Digital output	
Frequency	0 ... 10 kHz, 50 % duty cycle
Time constant	0.1 ... 30 s adjustable
Passive	6 ... 30 V DC, max. 110 mA, 1 kΩ ≤ R _{load} ≤ 10 kΩ
<u>Output characteristics</u>	
Active mode	Not available
Passive mode (max input from external barrier)	U _i = 30 V, I _i = 100 mA, P _i = 0.75 W, C _i = 52 nF, L _i = 100 μH
Relay	
Type	Change-over relay
Load	30 V/100 mA
Functionality	Error level, error number, limit, direction
Output characteristics	U _i = 30 V, I _i = 100 mA, P _i = 0.75 W, C _i = 0 nF, L _i = 0 mH

Digital input

Functionality

11 ... 30 V DC (R_i = 13.6 kΩ)

Start/hold/continue batch, zero
point adjust, reset totalizer 1/2,
force output, freeze output

Output characteristics

U_i = 30 V, I_i = 3.45 mA,
P_i = 0.10 W, C_i = 0 nF, L_i = 0 mH

Galvanic isolation

All inputs and outputs are galva-
nically isolated.

Isolation voltage:

- 500 V to supply
- 50 V between outputs

Cut-off

Low-flow

0 ... 9.9 % of maximum flow

Empty pipe

Detection of empty sensor

Density

0 ... 2.9 g/cm³

Totalizer

Two eight-digit counters for for-
ward, net or reverse flow

Display

- Background illumination with al-
phanumerical text, 3 × 20 char-
acters to indicate flow rate,
totalized values, settings and
faults. Time constant as current
output

- Reverse flow indicated by nega-
tive sign

Zero point adjustment

Via keypad or remote via digital
input

Ambient temperature

Operation

-20 ... +50 °C (-4 ... +122 °F)

Storage

-40 ... +70 °C (-40 ... +158 °F)
(Humidity max. 95 %)

Communication

Add-on modules: HART,
PROFIBUS PA,
FOUNDATION Fieldbus H1

HART

Active mode

U_o = 6.88 V, I_o = 330 mA,
P_o = 0.57 W, C_o = 20 nF,
L_o = 100 μH

Passive mode (max input from
external barrier)

U_i = 10 V, I_i = 200 mA, P_i = 0.5 W,
C_i = 0 nF, L_i = 0 μH

PROFIBUS PA

Active mode

Not available

Passive mode

U_i = 17.5 V, I_i = 380 mA,
P_i = 5.32 W, C_i = 5 nF, L_i = 10 μH

FOUNDATION Fieldbus H1

Active mode

Not available

Passive mode

U_i = 17.5 V, I_i = 380 mA

Enclosure

Material

Stainless steel AISI 316/1.4435

Rating

- Compact mounted on sensor:
IP67/NEMA 4X
- Remote mounted: IP65

Load

18 ... 1000 Hz random,
1.14 g RMS, in all directions

Transmitter MASS 6000 Ex d compact/remote

Supply voltage	
24 V AC	
• Range	20 ... 30 V AC
• Power consumption	6 VA $I_N = 250$ mA, $I_{ST} = 2$ A (30 ms)
• Power supply	The power supply shall be from a safety isolating transformer. Maximal cable core is 1.5 mm ² .
24 V DC	
• Range	18 ... 30 V DC
• Power consumption	6 W $I_N = 250$ mA, $I_{ST} = 2$ A (30 ms)
• Power supply	The power supply shall be from a safety isolating transformer. Maximal cable core is 1.5 mm ² .
EMC performance	
Emission	EN 55011/CISPR-11 (Class A)
Immunity	EN/IEC 61326-1 (Industry)
NAMUR	
	Within the value limits according to "Allgemeine Anforderung" with error criteria A in accordance with NE 21
Ex approval	
	ATEX, EAC Ex: Ex d e ib [ia Ga] IIC T4 Gb

Note

Due to RoHS directives active from July 22nd 2017, MASS 6000 transmitters of any model and variants are not for sale within EU, EU candidate countries, Norway, Switzerland, Iceland, Croatia, and Turkey.

Replacement products: 7ME461.-..., 7ME462.-..., 7ME471.-... and 7ME481.-...

Repair parts for MASS 6000 (all models and variants) are available. See spare part list.

Selection and Ordering data	Article No.
SITRANS F C MASS 6000 transmitter Transmitter Ex d for remote mounting inclusive of wall mounting kit	7ME 4 1 1 0 -
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	2 - A
Enclosure Ex d SS with 5 m (16.5 ft) cable Ex d SS with 10 m (32.8 ft) cable Ex d SS with 25 m (82.0 ft) cable	G H J
Output configuration 1 current, 1 frequency, 1 relay	A
Supply voltage 24V AC/DC	2
Ex approvals Ex	1
Display/Keypad With display	1
Serial communication No communication HART PROFIBUS PA Profile 3 FOUNDATION Fieldbus H1	A B F J
Cable gland M20	1

Operating instructions for SITRANS F C MASS 6000 Ex d

Description	Article No.
• English	A5E02944883

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Note:

Only communication modules with Ex approvals are allowed.

Flow Measurement

SITRANS F C

Transmitter MASS 6000 Ex d compact/remote

Selection and Ordering data

Accessories

Add-on module for remote and compact MASS 6000 Ex d

Description	Article No.
HART (Ex-i)	FDK:085U0226
PROFIBUS PA Profile 3 (Ex-i)	FDK:085U0236
FOUNDATION Fieldbus H1 (Ex-i)	A5E02054250



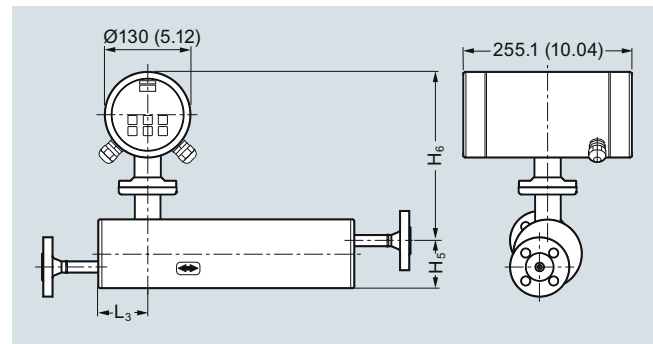
Operating instructions for SITRANS F add-on modules

Description	Article No.
HART	
• English	A5E03089708
PROFIBUS PA/DP	
• English	A5E00726137
• German	A5E01026429
FOUNDATION Fieldbus	
• English	A5E02318728
• German	A5E02488856

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Dimensional drawings

MASS 6000 Ex d compact version

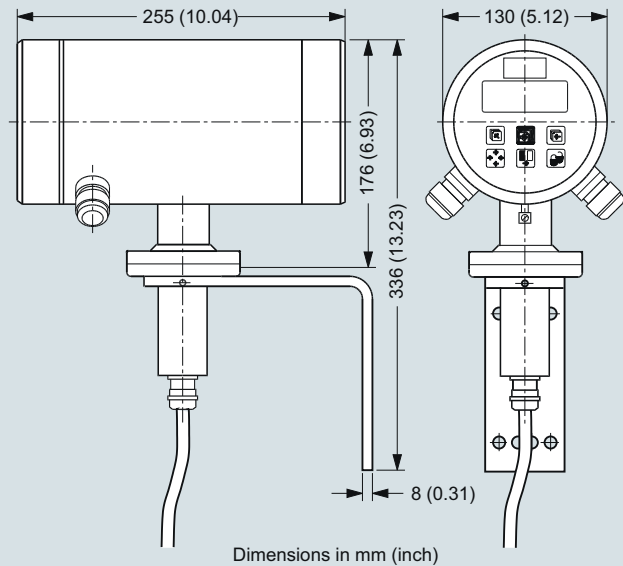
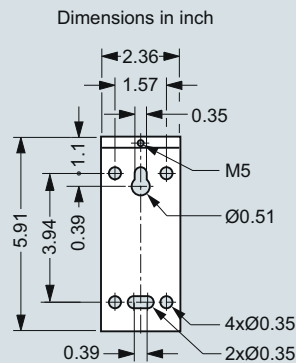
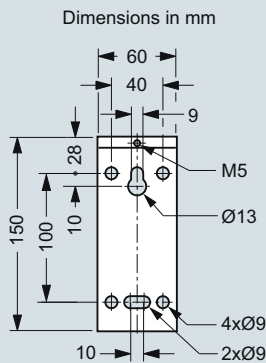


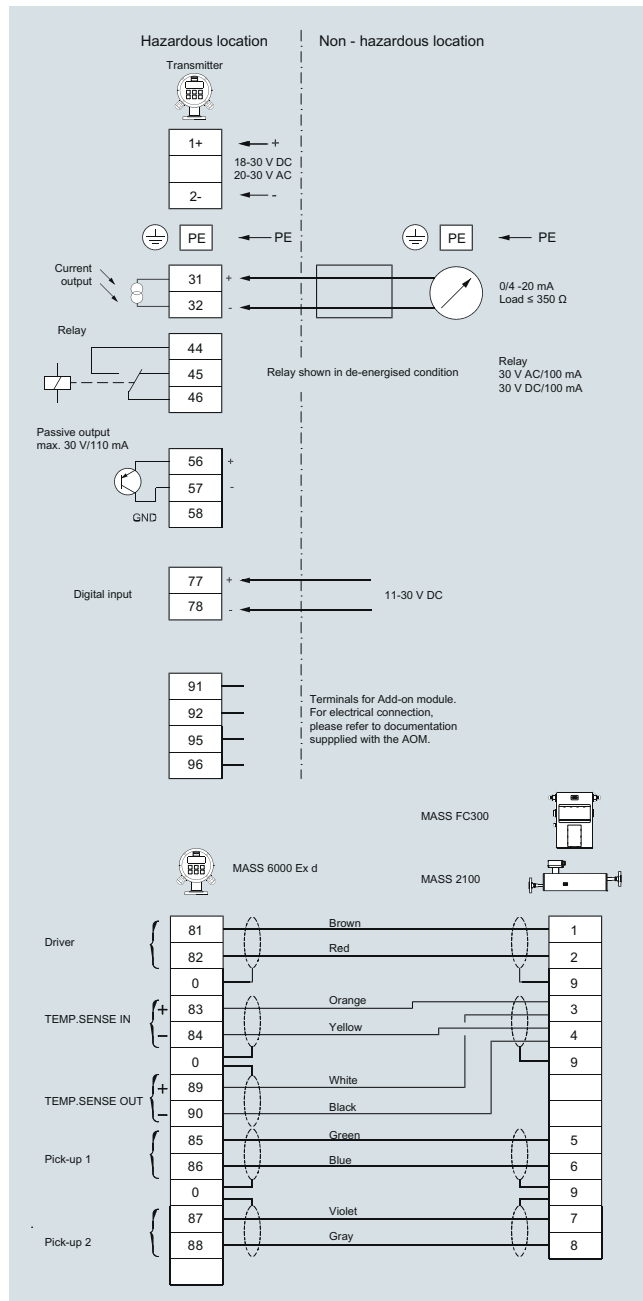
Dimensions in mm (inch)

Sensor size [DI (inch)]	L ₃ [mm (inch)]	H ₅ [mm (inch)]	H ₆ [mm (inch)]	H ₅ + H ₆ [mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	247 (9.72)	329 (12.95)
6 (1/4)	62 (2.44)	72 (2.83)	257 (10.12)	329 (12.95)
15 (1/2)	75 (2.95)	87 (3.43)	267 (10.51)	354 (13.94)
25 (1)	75 (2.95)	173 (6.81)	271 (10.67)	444 (17.48)
40 (1 1/2)	75 (2.95)	227 (8.94)	271 (10.67)	498 (19.61)

MASS 6000 Ex d remote version

Weight: 3 kg (6.6 lbs)



Schematics
Electrical connection compact or remote


Flow Measurement

SITRANS F C

Transmitter SIFLOW FC070

Overview



SIFLOW FC070 is based on the latest developments within the digital processing technology – engineered for high performance, fast flow step response, immunity against process generated noise, easy to install, commission and maintain.

SIFLOW FC070 is available in two versions:

- SIFLOW FC070 Standard
- SIFLOW FC070 Ex CT

The SIFLOW FC070 transmitter delivers true multi-parameter measurements i.e. mass flow, volume flow, density, temperature and fraction.

SIFLOW FC070 is designed for integration in a variety of automation systems, i.e.:

- Central mounted in S7-300, C7
- Decentralized in ET 200M for use with S7-300 and S7-400 as PROFIBUS DP/PROFINET masters
- Decentralized in ET 200M for use with any automation system using standardized PROFIBUS DP/PROFINET masters
- Stand-alone via a Modbus RTU master, i.e. SIMATIC PDM

The SIFLOW FC070 transmitter can be connected to all sensors of types MASS 2100, FCS200 and FC300.

Benefits

- Easy integration in SIMATIC S7 and PCS 7
- Support of SIMATIC PDM configuration tool via Modbus
- Dedicated mass flow chip with high-performance ASIC technology
- True 30 Hz update rate securing fast batching and step response
- Superior noise immunity due to a DFT (Discrete Fourier Transformation) algorithm
- Front end resolution better than 0.35 ns improves zero point stability and enhances dynamic turn-down ratio on flow and density accuracy.
- Advanced diagnostics enhancing troubleshooting and meter verification
- Built-in batch controller with two-stage control and compensation
- Digital outputs for direct batch control, frequency/pulse
- Modbus RTU RS 232/RS 485 interface for connection to SIMATIC PDM or any other Modbus master

- Digital input for batch control, zero adjust
- Extensive simulation options for measurement values, I/O and errors easy communication/fault-finding
- Multiple LED's for easy indication of flow, error and I/O state
- SENSORPROM technology automatically configures the transmitter during start-up providing:
 - Factory pre-programming with calibration data, pipe size, sensor type and I/O settings
 - Any values or settings changed by the user is stored automatically
 - Automatically re-programming of a new transmitter, without loss of settings and accuracy
 - Transmitter replacement in less than 30 seconds
- Four-wire Pt1000 measurement ensuring optimum accuracy mass flow, density and fraction flow
- Fraction flow computation based on a 3rd-order algorithm matching all applications
- SIFLOW FC070 Ex CT can be used for custody transfer approved application. (Compressed gaseous fuel measuring systems for vehicles), when using the redundant digital output or the encrypted ActiveX component for SIMATIC touch panels. The approval will have to be done locally at the customer.
- Free of charge ActiveX component for SIMATIC touch panels, enables encrypted sensor process values to be communicated between SIFLOW FC070 Ex CT and SIMATIC touch panels

Application

SIFLOW FC070 mass flowmeters are suitable for all applications within the entire process industry, where there is a demand for accurate flow measurement. The meters are suitable for measuring on liquid and gas.

The main applications for the SIFLOW FC070 transmitter can be found in the following industries:

- Food and beverage
- Pharmaceutical
- Automotive
- Oil and gas
- Power generation and utility
- Water and waste water

Design

SIFLOW FC070 is designed in an IP20 SIMATIC S7-300 enclosure and for use in central and de-central cabinets where sensors: FCS200, FC300 and MASS 2100 are remotely mounted.

Function

The following key functionalities are available:

- Mass flow rate, volume flow rate, density, temperature and fraction flow
- Two built-in totalizers which can freely be set for counting mass, volume or fraction
- 1 frequency/pulse output
- 1 phase shifted 90°/180° frequency/pulse output
- Two-stage batch controller
- 1 digital input
- Low flow cut-off
- Empty pipe detection
- Noise filter settings for different applications
- Simulation
- Automatic zero point adjustment with zero point evaluation feed back
- Configurable upper and lower alarm and warning limits for all process values
- Comprehensive status and error reporting

Technical specifications

Measurement of	Mass flow, volume flow, density, sensor temperature, fraction A flow, fraction B flow, fraction A in %
Measurement functions	
• Totalizer 1	Totalization of mass flow, volume-flow, fraction A, fraction B
• Totalizer 2	Totalization of mass flow, volume-flow, fraction A, fraction B
• Single and 2-stage batch function	Batching function with the use of one or two outputs for dosing in high and low speed
• 4 programmable limits	4 programmable high/low limits for mass flow, volume flow, density, sensor temperature, fraction A flow, fraction B flow, fraction A in %. Limits will generate an alarm if reached.
Digital input	
Functions	Start batch, stop batch, start/stop batch, hold/continue batch, reset totalizer 1, reset totalizer 2, reset totalizer 1 and 2, zero adjust, force frequency output, freeze frequency output
High signal	<ul style="list-style-type: none"> Nominal voltage: 24 V DC Lower limit: 15 V DC Upper limit: 30 V DC Current: 2 ... 15 mA
Low signal	<ul style="list-style-type: none"> Nominal voltage: 0 V DC Lower limit: -3 V DC Upper limit: 5 V DC Current: -15 ... +15 mA
Input	Approx. 10 k Ω
Switching	Max. 100 Hz.
Digital output 1 and 2	
Functions	<ul style="list-style-type: none"> Output 1: Pulse, frequency, redundancy pulse, redundancy frequency 2-stage batch, batch Output 2: Redundancy pulse, redundancy frequency, 2-stage batch
Voltage supply	3 ... 30 V DC (passive output)
Switching current	Max. 30 mA at 30 V DC
Voltage drop	≤ 3 V DC at max. current
Leakage current	≤ 0.4 mA at max. voltage 30 V DC
Load resistance	1 ... 10 k Ω
Switching frequency	0 ... 12 kHz 50 % duty cycle
Functions	Pulse, frequency, redundancy pulse, redundancy frequency 2-stage batch, batch
Communication	
Modbus RS 232C	<ul style="list-style-type: none"> Max. baud rate: 115 200 baud Max. line length: 15 m at 115 200 baud Signal level: according to EIA-RS 232C
Modbus RS 485	<ul style="list-style-type: none"> Max. baud rate: 115 200 baud Max. line length: 1200 m at 115 200 baud Signal level: according to EIA-RS 485 Bus termination: Integrated. Can be enabled by inserting wire jumpers.
Galvanic isolation	All inputs, outputs and communication interfaces are galvanically isolated. Isolation voltage: 500 V

Power	
Supply	24 V DC nominal
Tolerance	20.4 V DC ... 28.8 V DC
Consumption	Max. 7.2 W
Fuse	T1 A/125 V, not replaceable by operator
Environment	
Ambient temperature	<ul style="list-style-type: none"> Storage -40 ... +70 °C (-40 ... +158 °F)
Operation conditions	Horizontally mounted rail. For SIFLOW FC070 Std.: 0 ... 60 °C (32 ... 140 °F) For SIFLOW FC070 Ex CT: -40 ... +60 °C (-40 ... +140 °F) Vertically mounted rail For SIFLOW FC070 Std.: 0 ... 45 °C (32 ... 113 °F) For SIFLOW FC070 Ex CT: -40 ... +45 °C (-40 ... +113 °F)
Altitude	<ul style="list-style-type: none"> Operation: -1000 ... 2000 m (pressure 795 ... 1080 hPa)
Enclosure	
Material	Noryl, color: anthracite
Rating	IP20/NEMA 2 according to IEC 60529
Mechanical load	According to SIMATIC standards (S7-300 devices)
Ex approvals	
SIFLOW FC070 Standard	ATEX: II 3G Ex nA II T4
SIFLOW FC070 Ex CT	<ul style="list-style-type: none"> ATEX, IECEx, EAC Ex, FM, CSA, INMETRO - Zone 2: Ex nA [ia] IIC T4 • FM - Class I, Div. 2: Grp. A, B, C, D (interface to Class I+II+III, Div. 1)
Custody transfer approvals	
SIFLOW FC070 Ex CT	Compressed gaseous fuel measuring systems for vehicles NTEP for USA and Canada, approval no: 97-111A3
EMC performance	
Emission	EN 55011/CISPR-11
Immunity	EN/IEC 61326-1
Certification	
CE mark	Low voltage directive RoHS
NAMUR	Within the limits according to "General recommendations" with error criteria A in accordance with NE 21
Programming tools	
SIMATIC S7	Configuration through backplane P-BUS, PLC program and WinCC flexible
SIMATIC PCS7	Configuration through backplane P-BUS and PLC/WinCC faceplates, certified driver
SIMATIC PDM	Through Modbus port RS 232C and RS 485, certified driver

Flow Measurement

SITRANS F C

Transmitter SIFLOW FC070

Selection and Ordering data






Description	Article No.
SIFLOW FC070 flow transmitter Remember to order 40 pin front plug connector.	7ME4120-2DH20-0EA0
40 pin front connector with screw contacts	6ES7392-1AM00-0AA0
40 pin connector with spring contacts	6ES7392-1BM01-0AA0
SIFLOW FC070 Ex CT flow transmitter Remember to order 20 pin front plug connector.	7ME4120-2DH21-0EA0
20 pin plug with spring contacts	6ES7392-1BJ00-0AA0
20 pin front connector with screw contacts	6ES7392-1AJ00-0AA0

Operating instructions for SITRANS F C SIFLOW FC070

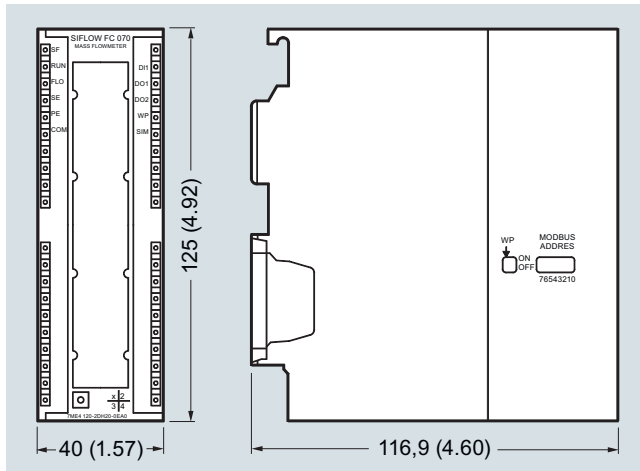
Description	Article No.
SIFLOW FC070 system manual	
• English	A5E00924779
• German	A5E00924776
SIFLOW FC070 with S7	
• English	A5E02254228
• German	A5E02665536
SIFLOW FC070 with PCS7	
• English	A5E03694109

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

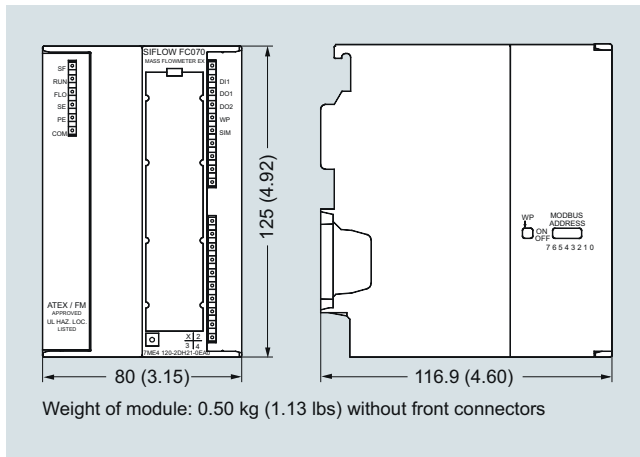
Accessories

Description	Article No.	
Cable with multiplug for connecting MASS 2100, FCS200 and FC300 sensors, 5 x 2 x 0.34 mm ² twisted and screened in pairs. Temperature range -20 ... +110°C (-4 ... +230 °F)		
• 5 m (16.4 ft)	FDK:083H3015	
• 10 m (32.8 ft)	FDK:083H3016	
• 25 m (82 ft)	FDK:083H3017	
• 50 m (164 ft)	FDK:083H3018	
• 75 m (246 ft)	FDK:083H3054	
• 150 m (492 ft)	FDK:083H3055	
Cable without multiplug for connecting MC2 sensors, 5 x 2 x 0.34 mm ² twisted and screened in pairs. Temperature range -20 ... +110°C (-4 ... +230 °F)		
• 10 m (32.8 ft)	FDK:083H3001	
• 25 m (82 ft)	FDK:083H3002	
• 75 m (246 ft)	FDK:083H3003	
• 150 m (492 ft)	FDK:083H3004	
SIMATIC S7-300 rail The mechanical mounting rack of the SIMATIC S7-300		
• 160 mm (6.3")	6ES7390-1AB60-0AA0	
• 482 mm (18.9")	6ES7390-1AE80-0AA0	
• 530 mm (20.8")	6ES7390-1AF30-0AA0	
• 830 mm (32.7")	6ES7390-1AJ30-0AA0	
• 2000 mm (78.7")	6ES7390-1BC00-0AA0	
SIFLOW FC070 Demo suitcase with MASS 2100 DI 1.5 sensor and SIMATIC HMI TP 177B touch panel	A5E01075465	
SIMATIC S7-300, stabilized power supply PS307 Input: 120/230 V AC Output: 24 V DC/2 A	6ES7307-1BA01-0AA0	

Dimensional drawings

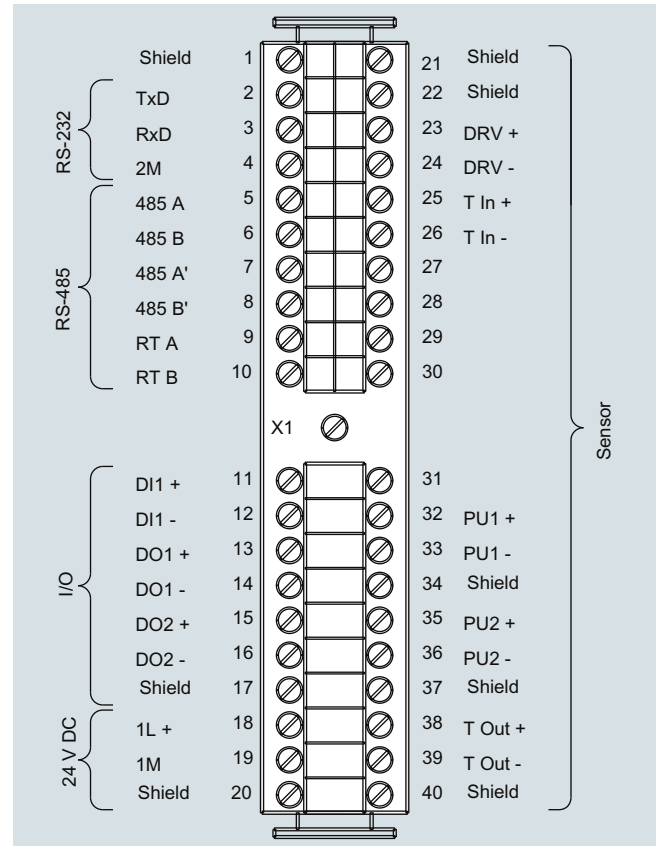


SIFLOW FC070, dimensions in mm (inch)

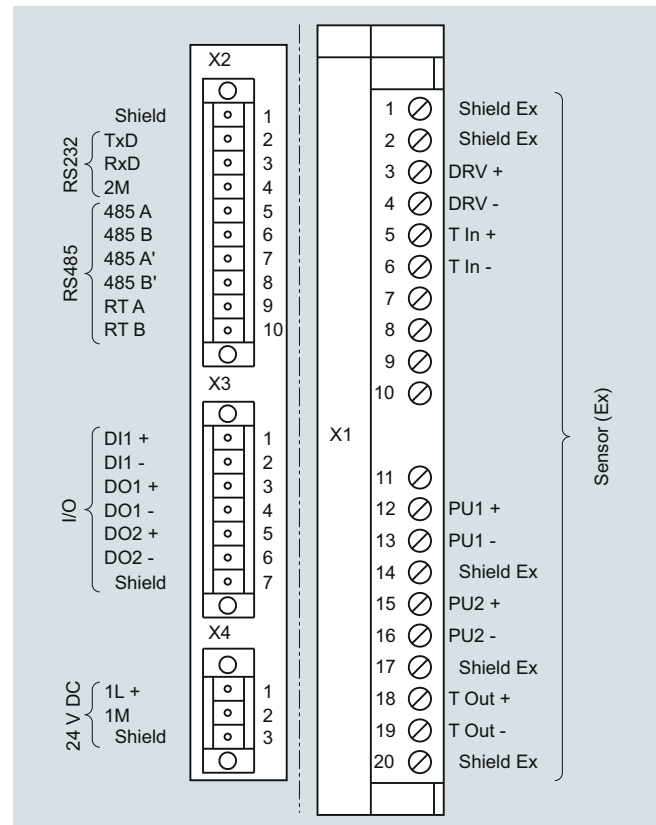


SIFLOW FC070 Ex CT, dimensions in mm (inch)

Schematics



SIFLOW FC070, electrical connection



SIFLOW FC070 Ex CT, electrical connection

Flow Measurement

SITRANS F C

Flow sensor SITRANS FCS200

Overview



SITRANS FCS200 (DN10, DN 15 and DN 25) is a Coriolis sensor specialized for accurate mass flow measurement of gases.

The sensor offers superior performance in terms of flow accuracy and turn down ratio. The ultra compact sensor design makes installation, replacement and commissioning very straight forward and easy.

Benefits

- High accuracy gas measurement
- Approved for use in hazardous area
- DN 10 and DN 15 is custody transfer approved, according to NTEP (Compressed gaseous fuel measuring systems for vehicles). For custody transfer applications SIFLOW FC070 Ex CT must be used.
- Self-draining in vertical orientation
- Pt1000 temperature measurement for optimum accuracy
- SENSORPROM enabling true "plug & play"
- Rigid enclosure design reducing influence from pipeline vibration and thermal stress
- High-pressure measurement up to 350 bar (5076 psi)
- Ultra compact sensor design with space-saving split flow

Application

SITRANS FCS200 is designed for measurement of gases and is suitable for use in the oil and gas industry:

- Filling of gas bottles
- CNG dispensers
- Metering of general gas applications

Design

SITRANS FCS200 is available in DN 10, DN 15 and DN 25.

The sensor consists of 2 parallel measuring pipes, welded directly onto a flow splitter at each end of the sensor to eliminate a direct coupling to the process connectors and significantly reduce effects from external vibrations. The flow-splitters are welded directly onto a rigid sensor housing which acts as a mechanical low pass filter.

The SITRANS FCS200 DN 10 and DN 15 wetted parts material is Hastelloy C22, and the DN 25 wetted parts material is AISI 316Ti/1.4571. The enclosure is made of stainless steel AISI 316L/1.4404 with a grade of encapsulation of IP67.

The two black rupture discs are designed to protect the enclosure from overpressure.

Function

The flow measuring principle is based on the Coriolis effect. See "System information SITRANS F C".

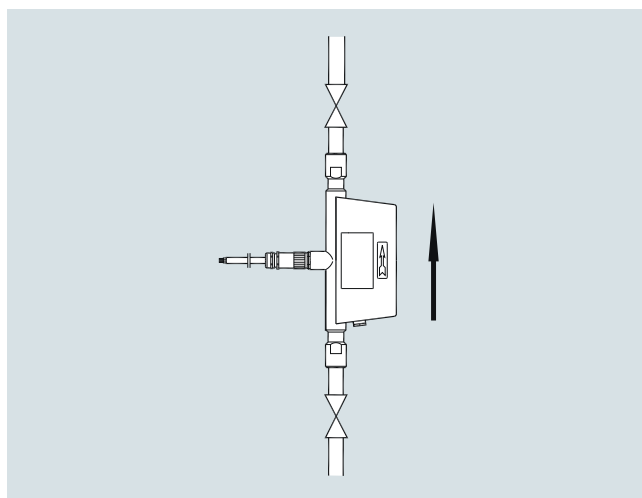
Integration

The complete flowmeter consists of the sensor (SITRANS FCS200) and a transmitter SITRANS F C MASS 6000 or SIFLOW FC070. All communication options are available for MASS 6000.

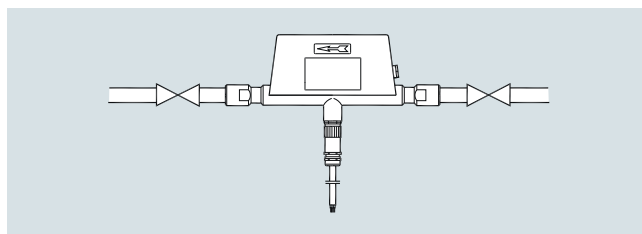
The sensor is shipped with a SENSORPROM memory unit containing all information about calibration data, device identity and factory pre-programming of transmitter settings.

Installation guidelines

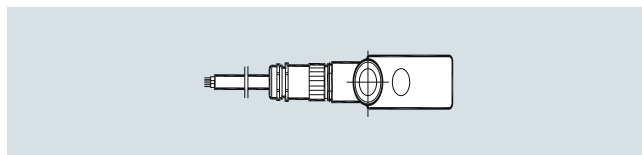
Siemens Flow Instruments recommends installing the sensor in one of the following ways:



Vertical orientation with an upwards flow



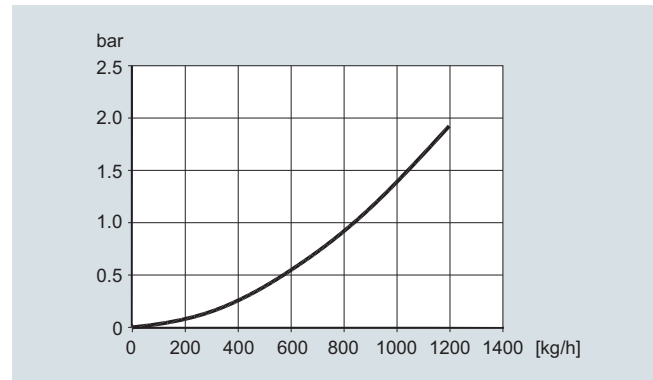
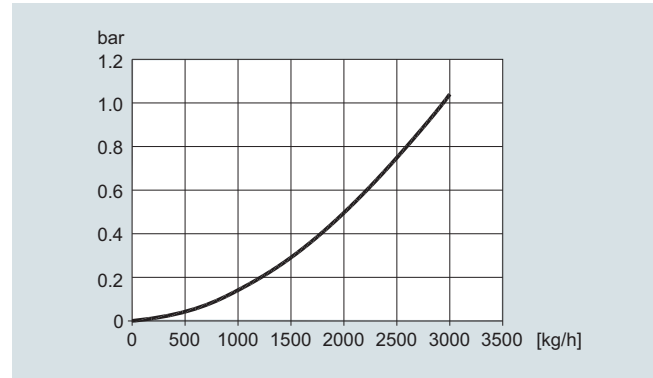
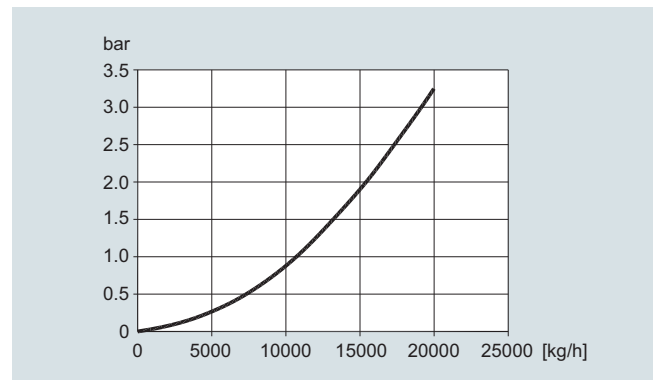
Horizontal installation, tubes up



Horizontal installation, tubes sideways

Technical specifications

Sensor size	DN 10	DN 15	DN 25
Mass Flow			
Accuracy [% of rate]		± 0.5	
Repeatability [% of rate]		± 0.25	
Max. zero point error [kg/h (lb/h)]	0.25 (0.55)	1.2 (2.65)	3.0 (6.6)
Measuring range [kg/min (lb/min)]	0 ... 42 (0 ... 92.6)	0 ... 200 (0 ... 440.9)	0 ... 500 (0 ... 1102.3)
Process temperature	-40 ... +125 °C (-40 ... +257 °F)		
Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)		
Temperature error	0.5 °C (0.9 °F)		
Pressure [bar (psi)]	350 (5076)	350 (5076)	214 (3104)
Enclosure grade	IP66/IP67 (EN 60529)		
Material			
Measuring pipe	Hastelloy C22/2.4602	Hastelloy C22/2.4602	Stainless steel AISI 316L/1.4571
Splitter	Hastelloy C22/2.4602	Stainless steel AISI 316L/1.4571	Stainless steel AISI 316L/1.4571
Enclosure and connection (flanges)	Stainless steel		
Connection thread			
	¼" NPT ½" NPT ½" VCO	½" NPT ¾" NPT 1" NPT ¾" VCO	1" NPT 1½" NPT 1" VCO
Weight approx.			
	2.8 kg (6.2 lb)	6.0 kg (13.2 lb)	11 kg (24.2 lb)
Ex approvals			
ATEX	II 1/2 G Ex ia IIC T5/T4 Ga/Gb		
IECEX	Ex ia IIC T5/T4 Ga/Gb		
EAC Ex	0Ex ia IIC T4/T5 Gb		
FM	Class I, Div 1, Groups A, B, C and D		
Custody transfer approvals			
DN 10/DN 15	Compressed gaseous fuel measuring systems for vehicles NTEP for USA and Canada, approval no: 97-111A3		

Characteristic curves
DN 10

DN 15

DN 25


The pressure drop as a function of capacity for CNG with a pressure of 200 bar (2900 psi) and an ambient temperature of 20 °C (68 °F).

Flow Measurement

SITRANS F C

Flowsensor SITRANS FCS200

Selection and Ordering data	Article No.
SITRANS F C Flow sensors	
SITRANS FCS200 sensor, without heating jacket	7 ME 4 5 0 0 -
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Sensor size and material	
DN 10, Hastelloy C22/2.4602	2 D
DN 15, Hastelloy C22/2.4602	2 E
DN 25, Stainless steel AISI 316Ti/1.4571	1 F
Pressure	
PN 214 (DN 25)	K
PN 350 (DN 10 and DN 15)	N
Process connection/flange	
1/2" VCO	7 1
3/4" VCO	7 2
1" VCO	7 3
1/4" NPT pipe thread	8 1
1/2" NPT pipe thread	8 2
3/4" NPT pipe thread	8 3
1" NPT pipe thread	8 4
1 1/2" NPT pipe thread	8 5
Configuration	
PTB custody transfer approval	1
NTEP custody transfer approval	2
Transmitter	
None	A
Cable	
No cable	A
Calibration	
Standard calibration	1
Extended calibration	8

Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 2014/68/EU	C11
Material certificate EN 10204-3.1	C12
NDT-Penetrant inspection report ISO 3452	C13
Factory certificate according to EN 10204 2.2	C14
Factory certificate according to EN 10204 2.1	C15
Tag name plate, stainless steel	Y17

Accessories

Description	Article No.
Cable with multiple connector	
5 m (16.4 ft)	FDK:083H3015
Standard blue cable between	
SIFLOW FC070/MASS 6000 and	10 m (32.8 ft) FDK:083H3016
FCS200,	25 m (82 ft) FDK:083H3017
5 x 2 x 0.34 mm ² twisted and screened	50 m (164 ft) FDK:083H3018
in pairs.	75 m (246 ft) FDK:083H3054
Temperature range -20 °C ... +110 °C	150 m (492 ft) FDK:083H3055
(-4 °F ... +230 °F)	

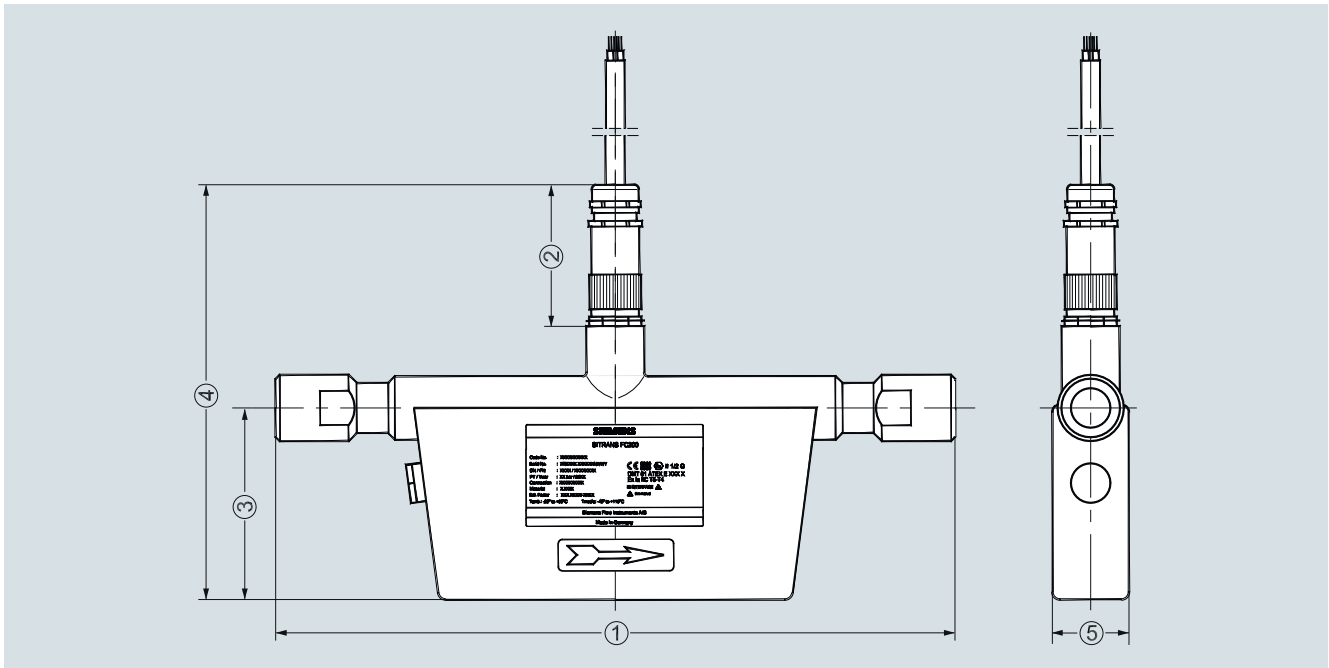
Operating instructions for SITRANS FCS200

Description	Article No.
• English	A5E02508199
• German	A5E03082574

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Spare parts

Description	Article No.
Multiple connector for cable mounting	FDK:083H5056
2 kB SENSORPROM unit	FDK:083H4410
(Sensor Serial No. and Article No. must be specified by ordering)	

Dimensional drawings
SITRANS FCS200, DN 10 ... DN 15


SITRANS FCS200, DN 10 ... DN 15, dimensions in mm (inch)

Position	DN 10 with NPT connectors mm (inch)	DN 10 with VCO connectors mm (inch)	DN 15 mm (inch)
(1)	350 (13.78)	330 (12.99)	450 (17.72)
(2)	72 (2.84)	72 (2.84)	72 (2.84)
(3)	100 (3.94)	100 (3.94)	148 (5.83)
(4)	204 (8.03)	204 (8.03)	253 (9.96)
(5)	40 (1.57)	40 (1.57)	48 (1.89)

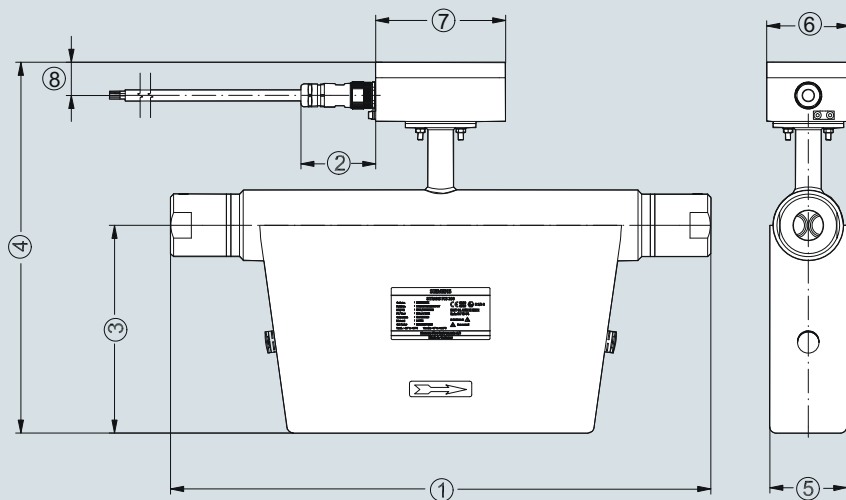
Flow Measurement

SITRANS F C

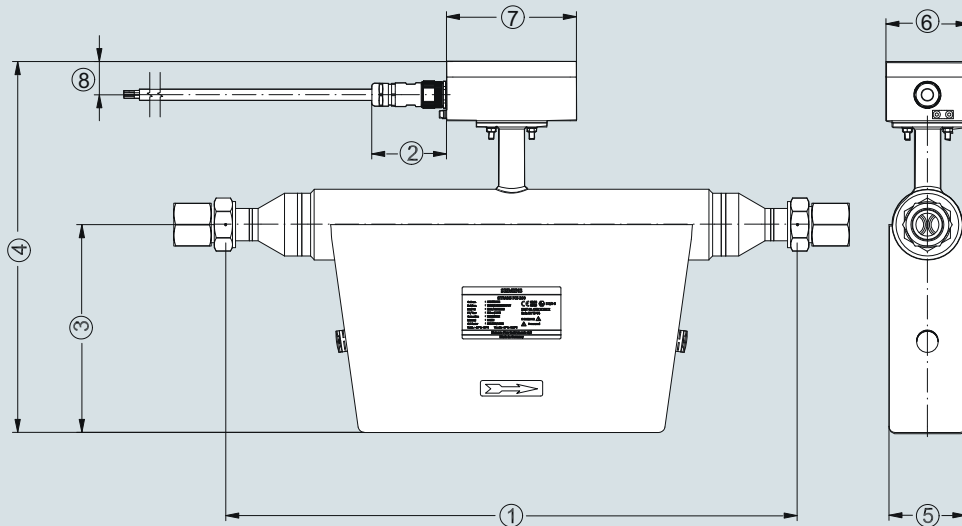
Flowsensor SITRANS FCS200

SITRANS FCS200, DN 25

DN 25 - NPT



DN 25 - VCO



SITRANS FCS200, DN 25, dimensions in mm (inch)

Position	DN 25 with NPT connection mm (inch)	DN 25 with VCO connection mm (inch)
(1)	520 (20.47)	550 (21.65)
(2)	72 (2.84)	72 (2.84)
(3)	200 (7.87)	200 (7.87)
(4)	357 (14.77)	357 (14.77)
(5)	74 (2.91)	74 (2.91)
(6)	80 (3.15)	80 (3.15)
(7)	125 (4.92)	125 (4.92)
(8)	32 (1.26)	32 (1.26)

SITRANS F C sensor MASS 2100 DI 1.5 with SITRANS MASS 6000 and SIFLOW FC070 transmitter

Note: Technical specification see page 3/180 to 3/182.

Selection and Ordering data	Article No.	Ord. code
SITRANS F C Flow sensors	7ME4100-	
MASS 2100 DI 1.5 (1/16") sensor		
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Diameter		
Stainless steel AISI 316L/1.4435		
DI 1.5, max. 125 °C (257 °F)	1 A	
DI 1.5, max. 180 °C (356 °F)	1 B	
Hastelloy C22/2.4602		
DI 1.5, max. 125 °C (257 °F)	2 A	
DI 1.5, max. 180 °C (356 °F)	2 B	
Pressure		
PN 100	D	
PN 230 (AISI 316L/1.4404)	L	
PN 365 (C22/2.4602)	P	
Process connection/flange		
Pipe thread		
G 1/4" male	1 0	
1/4" NPT male	1 1	
Configuration		
Standard	1	
Density	2	
Brix/Plato	3	
Fraction (specification required)	9	N O Y
Transmitter		
No transmitter, sensor and adapter only	A	
MASS 6000, Ex d, stainless steel enclosure, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC with Ex d e ib [ia Ga] IIC T4 Gb Ex-approval.	B	
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC.	C	
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz	D	
MASS 6000, IP67, Polyamide enclosure, cable glands 1/2" NPT, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC	E	
MASS 6000, IP67, Polyamide enclosure, cable glands 1/2" NPT, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz, 1/2" NPT	F	
Cable		
No cable	A	
5 m (16.4 ft) cable	B	
10 m (32.8 ft) cable	C	
25 m (82 ft) cable	D	
50 m (164 ft) cable	E	
75 m (246 ft) cable	F	
150 m (492 ft) cable	G	
Calibration		
Standard calibration 3 flow x 2 points	1	
Standard calibration matched pair 3 flow x 2 points	2	
Accredited calibration matched pair 5 flow x 2 points	3	
Extended calibration customer-specified select Y60, Y61, Y62 or Y63 (see additional information)	8	

Selection and Ordering data

Order code

Additional information

Please add "-Z" to Article No. and specify Order code(s) and plain text.

Pressure testing certificate PED: 2014/68/EU

C11

Material certificate EN 10204-3.1

C12

Welding certificate NDT-Penetrant: ISO 3452

C13

Factory certificate according to EN 10204 2.2

C14

Factory certificate according to EN 10204 2.1

C15

Tag name plate, stainless steel

Y17

Tag name plate, plastic

Y18

Customer-specific transmitter setup

Y20

Customer-specified, matched pair (5 x 2)

Y60

Customer-specified calibration (5 x 2)

Y61

Customer-specified, matched pair (10 x 1)

Y62

Customer-specified calibration (10 x 1)

Y63

Cleaned for oil and grease

Y80

Special version

Y99

Operating instructions for SITRANS F C MASS 2100 DI 1.5

Description

Article No.

- English

A5E03089952

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Accessories

Description

Article No.

Cable with multiple connector

Standard blue cable between MASS 6000 and MASS 2100, 5 x 2 x 0.34 mm² twisted and screened in pairs. Temperature range -20 °C ... +110 °C (-4 °F ... +230 °F)

- 5 m (16.4 ft)
- 10 m (32.8 ft)
- 25 m (82 ft)
- 50 m (164 ft)
- 75 m (246 ft)
- 150 m (492 ft)

FDK:083H3015
FDK:083H3016
FDK:083H3017
FDK:083H3018
FDK:083H3054
FDK:083H3055



Spare parts

Description

Article No.

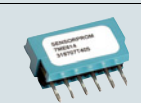
Multiple connector for cable mounting

FDK:083H5056



2 kB SENSORPROM unit (Sensor Serial No. and Article No. must be specified by ordering)

FDK:083H4410



Bracket

A5E02590427

Mounting bracket for flow sensor MASS 2100 DI 1.5



Flow Measurement

SITRANS F C

SITRANS F C sensor FC300 DN 4 with SITRANS MASS 6000 and SIFLOW FC070 transmitter

Note: Technical specification see page 3/183 to 3/186.

Selection and Ordering data	Article No.	Order code
SITRANS F C Flow sensors	7ME4400-	
SITRANS FC300 DN 4 (1/6") sensor		
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Pipe material and temperature		
Stainless steel AISI 316L/1.4435		
115 °C (239 °F)	1 G	
180 °C (356 °F)	1 H	
Hastelloy C22/2.4602		
115 °C (239 °F)	2 G	
180 °C (356 °F)	2 H	
Pressure		
PN 100	D	
PN 130 (316L/C22)	G	
PN 410 (C22)	Q	
Process connection		
Pipe thread		
G 1/4" male	1 0	
1/4" NPT male	1 1	
Configuration		
Standard	1	
Density	2	
Brix/Plato	3	
Fraction (specification required)	9	N O Y
Transmitter		
No transmitter, sensor and adapter only	A	
MASS 6000, Ex d, stainless steel enclosure, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC with Ex d e i b [ia Ga] IIC T4 Gb Ex-approval	B	
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC	C	
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz	D	
MASS 6000, IP67, Polyamide enclosure, cable glands 1/2" NPT, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC	E	
MASS 6000, IP67, Polyamide enclosure, cable glands 1/2" NPT, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz, 1/2" NPT	F	
Cable		
No cable	A	
Cable with one M20 connector and one end for terminal connect		
• 5 m (16.4 ft)	B	
• 10 m (32.8 ft)	C	
• 25 m (82 ft)	D	
• 50 m (164 ft)	E	
• 75 m (246 ft)	F	
• 150 m (492 ft)	G	
Calibration		
Standard calibration 3 flow x 2 points	1	
Standard calibration matched pair 3 flow x 2 points	2	
Accredited calibration matched pair 5 flow x 2 points	3	
Extended calibration customer-specified select Y60, Y61, Y62 or Y63 (see additional information)	8	

Selection and Ordering data

Order code

Additional information

Please add "-Z" to Article No. and specify Order code(s) and plain text.

Pressure testing certificate PED: 2014/68/EU

C11

Material certificate EN 10204-3.1

C12

Welding certificate NDT-Penetrant: ISO 3452

C13

Factory certificate according to EN 10204 2.2

C14

Factory certificate according to EN 10204 2.1

C15

Tag name plate, stainless steel

Y17

Tag name plate, plastic

Y18

Customer-specific transmitter setup

Y20

Customer-specified, matched pair (5 x 2)

Y60

Customer-specified calibration (5 x 2)

Y61

Customer-specified, matched pair (10 x 1)

Y62

Customer-specified calibration (10 x 1)

Y63

Cleaned for oil and grease

Y80

Special version

Y99

Operating instructions for SITRANS F C FC300

Description	Article No.
• English	A5E00698213
• German	A5E00728101

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Accessories

Description	Article No.
Cable with M20 connector Standard blue cable between MASS 6000 and MASS 2100, 5 x 2 x 0.34 mm ² twisted and screened in pairs. Cable mounted with one M20 connector and one end for terminal connections. Temperature range: -20 ... +110 °C (-4 ... +230 °F)	
• 5 m (16.4 ft)	FDK:083H3015
• 10 m (32.8 ft)	FDK:083H3016
• 25 m (82 ft)	FDK:083H3017
• 50 m (164 ft)	FDK:083H3018
• 75 m (246 ft)	FDK:083H3054
• 150 m (492 ft)	FDK:083H3055



Spare parts

Description	Article No.
Multiple connector for cable mounting	FDK:083H5056
2 kB SENSORPROM unit (Sensor Serial No. and Article No. must be specified by ordering)	FDK:083H4410
Mounting bracket FC300, AISI 304	A5E02590439



SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS MASS 6000 and SIFLOW FC070 transmitter

Note: Technical specification see page 3/187 to 3/198.

Selection and Ordering data		Article No.	Ord. code
SITRANS F C sensors		7ME4100 -	
MASS 2100 without heating jacket			
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Diameter			
Stainless steel AISI 316L/1.4435			
DI 3 (PN 100/PN 230)		1 C	
DI 6		1 D	
DI 15		1 E	
Hastelloy C22/2.4602			
DI 3 (PN 100/PN 350)		2 C	
DI 6		2 D	
DI 15		2 E	
Pressure			
PN 16 (DI 6, DI 15)		A	
PN 25 (DI 6, DI 15)		B	
PN 40 (DI 6, DI 15)		C	
PN 100 (DI 3, DI 6, DI 15)		D	
PN 130 (DI 15, ½", AISI 316L/1.4404)		G	
PN 200 (DI 15, ½", Hastelloy C22/2.4602)		K	
PN 230 (DI 3, ¼", AISI 316L/1.4404)		L	
PN 265 (DI 6, ¼", AISI 316L/1.4404)		M	
PN 350 (DI 3, ¼", Hastelloy C22/2.4602)		N	
PN 410 (DI 6, ¼", Hastelloy C22/2.4602)		Q	
Class 150 (DI 6, DI 15)		R	
Class 600 (DI 6, DI 15)		S	
Process connection/flange			
Pipe thread			
G ¼"		1 0	
¼" NPT		1 1	
G ½"		1 2	
½" NPT		1 3	
G 1		1 4	
1" NPT		1 5	
G 2"		1 6	
2" NPT		1 7	
Flange EN1092-1 Form B			
DN 10 (PN 40/PN 100)		2 0	
DN 15 (PN 40/PN 100)		2 1	
DN 25 (PN 40/PN 100)		2 2	
Flange ASME/ANSI B 16.5			
½" (class 150/class 600)		3 0	
Selection and Ordering data		Article No.	Ord. code
SITRANS F C sensors		7ME4100 -	
MASS 2100 without heating jacket			
Dairy screwed connection DIN 11851			
DN 10 (PN 40)		4 0	
DN 15 (PN 40)		4 1	
DN 25 (PN 40)		4 2	
Dairy clamp connection ISO 2852 (DIN 32676)			
Cone down the sensor in order to obtain self-drainage with connectors ISO 2852			
25 mm (PN 16)		5 0	
38 mm (PN 16)		5 1	
51 mm (PN 16)		5 2	
Dairy screwed connection ISO 2853			
25 mm (PN 16)		6 0	
38 mm (PN 16)		6 1	
51 mm (PN 16)		6 2	
Configuration/calibration type			
Standard		1	
Density		2	
Brix/Plato		3	
Fraction (specification required)		9	N O Y
Transmitter compact mounted on sensor			
No transmitter, sensor and adapter only		A	
MASS 6000, Ex d, stainless steel enclosure, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC with Ex d e ib [ia Ga] IIC T4 Gb Ex-approval		B	
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC		C	
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz		D	
MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC		E	
MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz		F	
Cable			
No cable		A	
Cable with one M20 connector and one end for terminal connect		B	
• 5 m (16.4 ft)		B	
• 10 m (32.8 ft)		C	
• 25 m (82 ft)		D	
• 50 m (164 ft)		E	
• 75 m (246 ft)		F	
• 150 m (492 ft)		G	
Calibration/verification			
Standard calibration 3 flow x 2 points		1	
Stand. calibration matched pair 3 flow x 2 points		2	
Accredited calibration matched pair 5 flow x 2 points (ISO 17025)		3	
Extended calibration customer-specified select Y60, Y61, Y62 or Y63 (see additional information)		8	

Flow Measurement

SITRANS F C

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS MASS 6000 and SIFLOW FC070 transmitter

Dairy MLFB example

MASS 2100

Sensor size DI 15,
AISI 316L/1.4435

PN 40

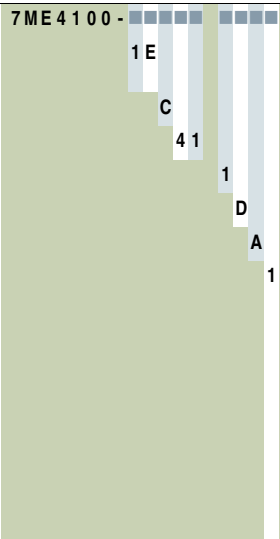
DN 15 connector

Standard configuration/calibration

MASS 6000 IP67 compact mounted

No cable

Standard calibration, 3 flow x 2 points



Selection and Ordering data

Order code

Additional information

Please add "-Z" to Article No. and specify Order code(s) and plain text.

Pressure testing certificate PED: 2014/68/EU

Material certificate EN 10204-3.1

NDT- X-ray inspection report: EN 1435
DI3 sensor only: NDT-Penetrant inspection report
ISO 3452.

Factory certificate according to EN 10204 2.2

Factory certificate according to EN 10204 2.1

Tag name plate, stainless steel

Tag name plate, plastic

Customer-specific transmitter setup

Customer-specified, matched pair (5 x 2)

Customer-specified calibration (5 x 2)

Customer-specified, matched pair (10 x 1)

Customer-specified calibration (10 x 1)

Cleaned for oil and grease

Special version

C11

C12

C13

C14

C15

Y17

Y18

Y20

Y60

Y61

Y62

Y63

Y80

Y99

Operating instructions for

SITRANS F C MASS 2100 DI 3 to DI 40

Description	Article No.
• English	A5E02896535
• German	A5E03073519

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Selection and Ordering data

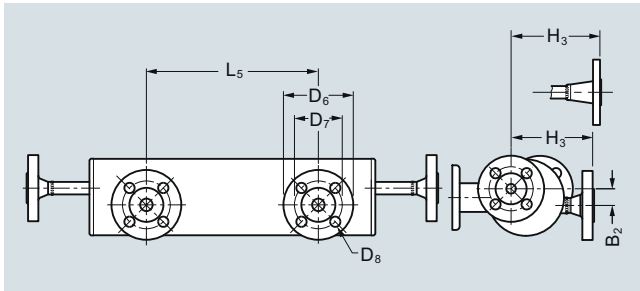
Accessories

Description	Dimension	Article No.
Mating parts for hygienic fittings DIN 11851 (AISI 316L)		
Includes: • 2 unions • 2 mating parts (for welding in) • 2 EPDM gaskets		
	DN 10	FDK:085U1016
	DN 15	FDK:085U1017
	DN 25	FDK:085U1019
Mating parts for hygienic clamp ISO 2852 (AISI 316L)		
Includes: • 2 clamps • 2 mating parts • 2 EPDM gaskets		
	25 mm	FDK:085U1029
2 EPDM gaskets with collar for mounting set DIN 11851		
	DN 10	FDK:085U1006
	DN 15	FDK:085U1007
	DN 25	FDK:085U1009

Description	Length	Article No.
Cable with M20 connector Standard blue cable between MASS 6000 and MASS 2100, 5 x 2 x 0.34 mm ² twisted and screened in pairs.		
Cable mounted with one M20 con- nector and one end for terminal connections.	5 m (16.4 ft)	FDK:083H3015
Temperature range -20 ... +110 °C (-4 ... +230 °F)	10 m (32.8 ft)	FDK:083H3016
	25 m (82 ft)	FDK:083H3017
	50 m (164 ft)	FDK:083H3018
	75 m (246 ft)	FDK:083H3054
	150 m (492 ft)	FDK:083H3055

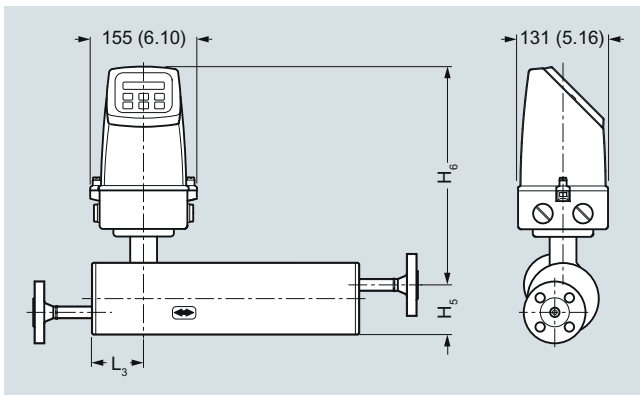
Spare parts

Description	Article No.
Adapter for MASS 2100 M20 electrical adapter for MASS 2100 DI 3, 6, 15, 25 and 40	FDK:083L8889
M20 connector for cable mounting	FDK:083H5056
2 kB SENSORPROM unit, includ- ing programming (Sensor Serial No. and Article No. must be specified by ordering)	FDK:083H4410

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS MASS 6000 and SIFLOW FC070 transmitter
MASS 2100 sensor with "heating jacket"


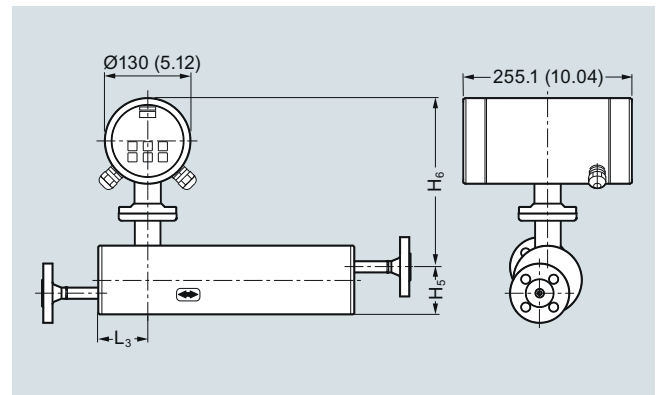
Dimensions in mm (inch)

Sensor size	Connections heated			L5	H3	B2	D6	D7	D8
DI (inch)	Type	Pressure rating	Size	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
DI 3 (1/8)	EN 1092-1	PN 40	DN 15	234 (9.21)	122 (4.8)	22 (0.87)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	½"	234 (9.21)	131.6 (5.18)	22 (0.87)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)
DI 6 (¼)	EN 1092-1	PN 40	DN 15	234 (9.21)	112 (4.41)	22.7 (0.89)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	½"	234 (9.21)	121.6 (4.79)	22.7 (0.89)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)
DI 15 (½)	EN 1092-1	PN 40	DN 15	234 (9.21)	126.5 (4.98)	31.5 (1.24)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	½"	234 (9.21)	136.1 (5.36)	31.5 (1.24)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)

MASS 2100 and MASS 6000 IP67 compact version


MASS 2100 and MASS 6000 IP67 compact version, dimensions in mm (inch)

Sensor size	L3	H5	H6	H5 + H6
[DI (inch)]	[mm (inch)]	[mm (inch)]	[mm (inch)]	[mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	306 (12.04)	388 (15.28)
6 (¼)	62 (2.44)	72 (2.83)	316 (12.44)	388 (15.28)
15 (½)	75 (2.95)	87 (3.43)	326 (12.83)	413 (16.26)

MASS 2100 and MASS 6000 Ex d compact version


MASS 2100 and MASS 6000 Ex d compact version, dimensions in mm (inch)

Sensor size	L3	H5	H6	H5 + H6
[DI (inch)]	[mm (inch)]	[mm (inch)]	[mm (inch)]	[mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	247 (9.72)	329 (12.95)
6 (¼)	62 (2.44)	72 (2.83)	257 (10.12)	329 (12.95)
15 (½)	75 (2.95)	87 (3.43)	267 (10.51)	354 (13.94)

Flow Measurement

SITRANS F US Inline

Inline ultrasonic flowmeters

Overview

Siemens offers two types of ultrasonic flowmeters, inline flowmeters and clamp-on flowmeters. This offers the end user the maximum flexibility to choose the technology that best fits his needs. This chapter shows the inline versions.



SITRANS F US inline ultrasonic flowmeters measure flow of electrically conductive and non-conductive liquids.

Application

Inline ultrasonic flowmeters are suitable for measuring the flow of liquids with good acoustic permeability, independent of conductivity, viscosity, temperature, density and pressure.

- max. 3 % solids
- max. 3 % air and gas
- max. 350 cSt

The main applications can be found in the following sectors:

- Raw water intake for water treatment plants
- Treated waste water
- Power generation and utility
- Oil industry and petrochemical industry
- Irrigation systems
- Cooling water plants within the industry and in power stations
- Plants transporting non-conductive liquids
- Custody transfer - district heating (MID-004)
- Cryogenic fluids
- HART/4 to 20 mA output
- PROFIBUS PA
- ATEX

Benefits

- Greater flexibility:
 - Sensor sizes from DN 50 to DN 3000 mm (2" to 120")
 - Inline retrofit as 1-path and 2-path up to DN 3000 (120")
 - Compact and remote transmitter installation
 - HART and PROFIBUS PA communication
 - Mains or battery powered solutions
 - Dedicated transmitter portfolio for HVAC, power generation, utility and general industry as well as more demanding applications
- Easier service:
 - Comprehensive self-diagnostic for error indication and logging
 - Exchange of the transducers without interrupting operation
 - Battery lifetime of up to 6 years
- Approvals/certificates:
 - Custody transfer approvals within district heating
 - ATEX
 - Standard with calibration certificate

System information SITRANS F US Inline ultrasonic flowmeters

Please see Product selector on the Internet, since some constraints might be related to some of the features:
www.pia-portal.automation.siemens.com



	SONO 3300/ FUS060	SONO 3100/ FUS060	SONOKIT/ FUS060 FUS080	FUE380	FUS380
	7ME3300...	7ME3100...	7ME3210.../ 7ME3220...	7ME3410...	7ME3400...
Industry					
Water, treated waste water	XXX	XX	XXX		XXX
Irrigation	XX	XX	XXX		XXX
Utility, district heating water, cooling	XXX	XX	XXX	XXX	XXX
Utility, district heating, CT approvals required				XXX	
Oil	XX	XXX	XX		X
Cryogenic fluids (only on request)		XXX			
Onshore and Offshore applications	XX	XXX	XX		X
Chemical	XXX	XXX	X		
Design					
Compact transmitter mounted on pipe				●	●
Remote transmitter - Sensor up to 100 m	●	●	●	●	●
Transducers can be replaced under pressure		●	●		
Retrofit on existing steel pipes/non-weldable			●		
Transmitter enclosure					
Polyamid, IP67			●	●	●
Die-cast aluminum (painted), IP65	●	●	●		
Communication					
HART	●	●	●		
PROFIBUS PA	●	●	●		
Power supply					
3.6 V Battery			●	●	●
115 ... 230 V AC	●	●	●	●	●
115 ... 230 V AC and 3.6 V battery backup			●	●	●
24 V AC/DC	●	●	●		
Accuracy					
0.25 % (with 4-path system on request)		●			
0.50 %	●	●	●	●	●
Sensor design					
1-path ultrasonic measurement		●	●		
2-path ultrasonic measurement	●	●	●	●	●
4-path ultrasonic measurement (special request)		● (DN 200 ... 1200)	● (DN 200 ... 1500)		
Dimension					
DN 50	2"	●	U-pipe, on request	Die cast bronze	Die cast bronze
DN 65	2½"	●	U-pipe, on request	Die cast bronze	Die cast bronze
DN 80	3"	●	U-pipe, on request	Die cast bronze	Die cast bronze
DN 100	4"	●	●	1-path only	●
DN 125	5"	●	●	1-path only	●
DN 150	6"	●	●	1-path only	●
DN 200	8"	●	●	●	●
DN 250	10"	●	●	●	●
DN 300	12"	●	●	●	●
DN 350	14"	●	●	●	●
DN 400	16"	●	●	●	●
DN 500	20"	●	●	●	●
DN 600	24"	●	●	●	●
DN 700	28"		On request	●	●
DN 800	32"		On request	●	●
DN 900	36"		On request	●	●
DN 1000	40"		On request	●	●
DN 1200	48"		On request	●	●
DN 1400 ... 2400	54" ... 96"		●		
DN 2500 ... 3000	100" ... 120"		2-path only		
> DN 1200	> 48"		FUS060 only		

X = can be used, XX = often used, XXX = most often used, ● = available

Flow Measurement

SITRANS F US Inline

System information SITRANS F US Inline ultrasonic flowmeters

Please see Product selector on the Internet, since some constraints might be related to some of the features:
www.pia-portal.automation.siemens.com

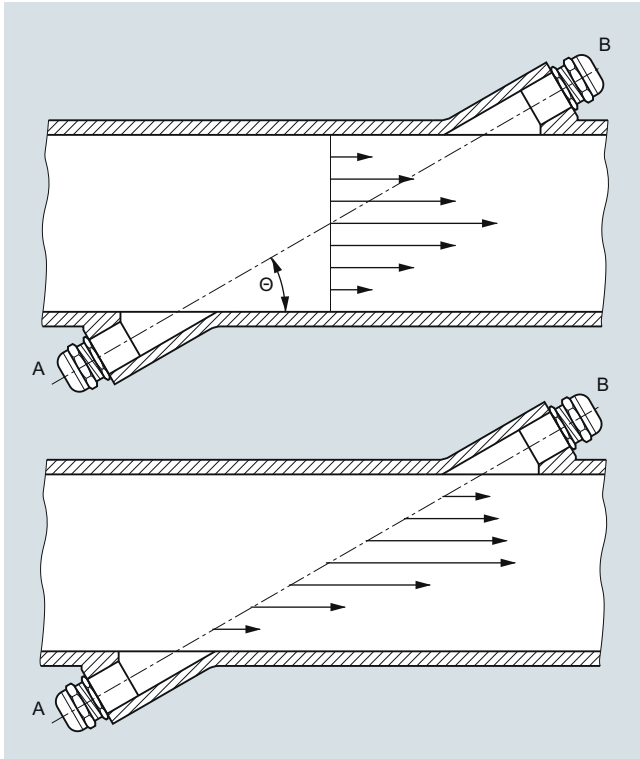


	SONO 3300/ FUS060	SONO 3100/ FUS060	SONOKIT/ FUS060 FUS080	FUE380	FUS380
	7ME3300...	7ME3100...	7ME3210.../ 7ME3220...	7ME3410...	7ME3400...
Process connection					
Flanges	●	●		●	●
Flangeless (for weld-in)		●			
Flanges Norm					
EN 1092-1	●	●		●	●
EN 1759-1	●	●			
ANSI B16.5		●			
Pressure rating					
PN 6			●		
PN 10	●	●	●		
PN 16	●	●	●	●	●
PN 25		●	●	●	●
PN 40	●	●	●	●	●
Class 150	●	●			
Class 300	●	●			
Pipe, flange					
Carbon steel	●	●	●	●	●
Die cast bronze (DN 50, 65, 80)				●	●
Media temperature					
°C					
-20		●	●		
-10	●	●	●		
+2	●	●	●	Min. 5 °C (41 °F)	●
+60	●	●	●	●	●
+120	●	●	●	Compact	Compact
+150	●	●	●	Die cast bronze	Die cast bronze
+160	●	●	●	●	●
+190		●	●	●	●
+200		●	●	●	●
-200 ... +100		-328 ... +212	Cryogenic		
Measuring principle					
Transit time principle	●	●	●	●	●
Approvals					
<u>Custody transfer approval</u>					
MID, MI-004, EN 1434 (European energy meter standard)				●	
Other country-specific type approval available for:					
• Russia	●	●	●	●	●
• China (CPA/CMC)				●	
• Korea KC	●	●	●	●	●
<u>Ex approval</u>					
Ex d ATEX		●	●		
Ex i ATEX	●	●	●		

● = available

Function

Physical principle (single path)



Velocity distribution along sound path

A sound wave traveling in the same direction as the liquid flow arrives at point B from point A in a shorter time than the sound wave traveling against the direction of flow (from point B to A). The difference in sound transit time indicates the flow velocity in the pipe.

Since delay time is measured at short intervals both in and against flow direction, viscosity and temperature have no influence on measurement accuracy.

Measuring principle

In SITRANS F US flowmeters the two ultrasonic transducers are placed at an angle θ in relation to the pipe axis. The transducers function as transmitters and receivers of the ultrasonic signals. Measurement is performed by determining the time the ultrasonic signal takes to travel with and against the flow. The principle can be expressed as follows:

$$v = K \cdot (t_{B,A} - t_{A,B}) / (t_{A,B} \cdot t_{B,A}) = K \cdot \Delta t / t^2$$

v = Average flow velocity

t = Transit time

K = Proportional pipe geometry factor

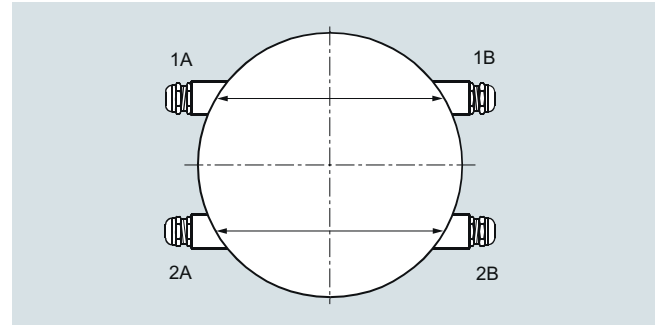
This measuring principle offers the advantage that it is independent of variations in the actual sound velocity of the liquid, i.e. independent of the temperature.

Proportional factor K is determined by wet calibration.

Direct signal processing

The ultrasonic signal is sent directly between the transducers. The advantage gained sending signals from point to point is an extremely good signal strength.

2-path solution



Ultrasonic 2-path flowmeter with 4 transducers. In the upper path transducers 1A / 1B and in the lower path 2A / 2B are displayed.

The accuracy of ultrasonic flowmeters depends on the pipe geometry before and after the flowmeter and the number of ultrasonic measuring paths.

When water flows through a pipe, it has a tendency to swirl and/or flow with different velocities inside the pipe, depending on the pipe design.

A 2-path ultrasonic flowmeter offers:

- less sensitivity to upstream obstruction like bends, pumps or valves.
- high security in the measurements as the meter continues to measure even if, for some reason, one path stops working.

Typical straight inlet requirements are upstream $10 \times D_i$ (D_i = diameter of the flowmeter) and downstream $3 \times D_i$.

Typical accuracy that can be reached with 2-path ultrasonic flowmetering is $\pm 0.5\%$ with installations according to above demands.

4-path ultrasonic flowmeters

Some applications require accuracy under extreme short inlet conditions and swirl that cannot be obtained with 2-path solutions.

For these applications we can offer a 4-path solution – customer-specified – according to actual inlet conditions.

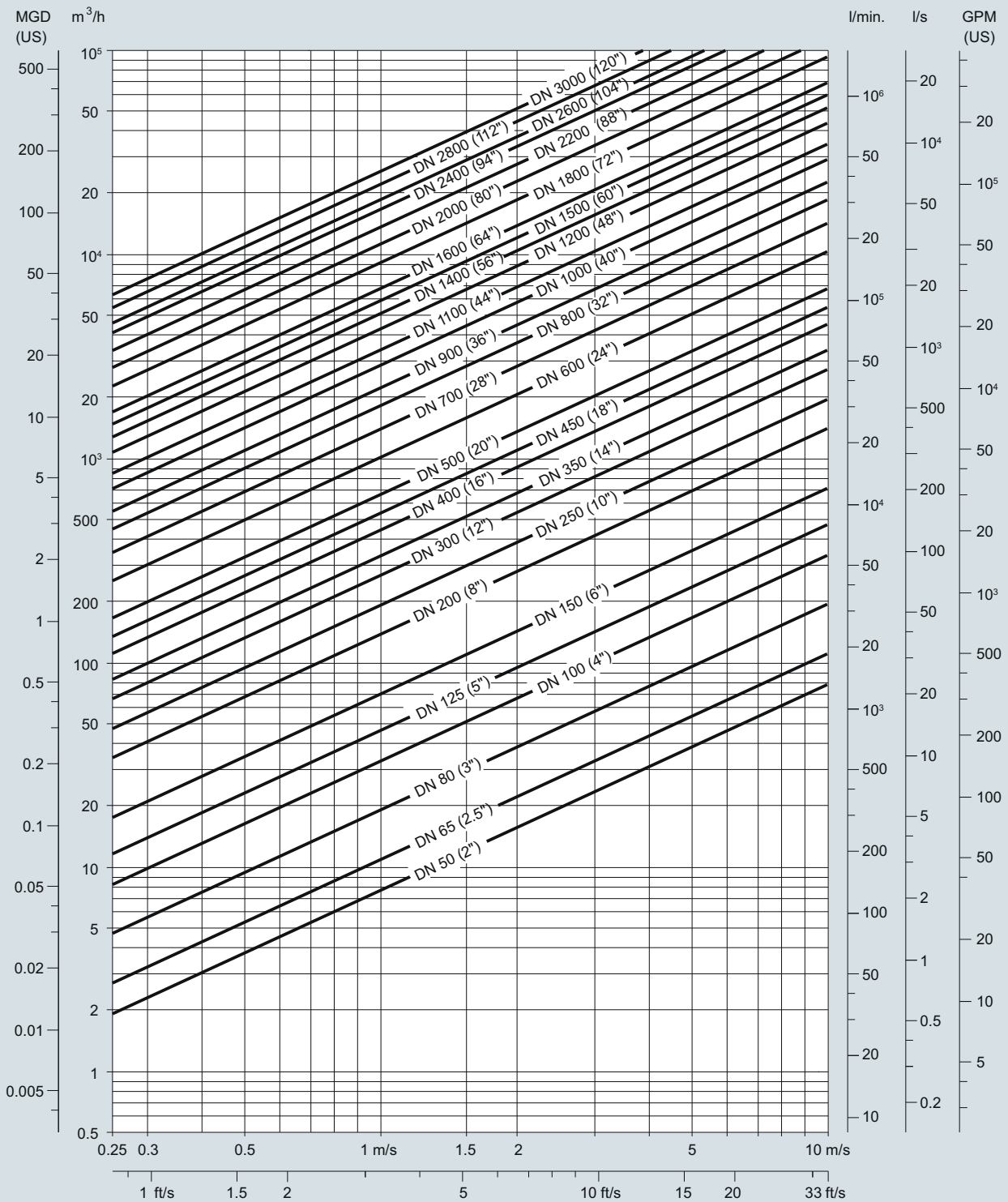
Please contact Siemens Flow Instruments for specific applications.

Flow Measurement

SITRANS F US Inline

System information SITRANS F US Inline ultrasonic flowmeters

Technical specifications



Nominal size and flow

Guidelines for selection of sensor

- Min. measuring range: 0 ... 1 m/s
- Max. measuring range: 0 ... 10 m/s

Nominal flow velocity:

- Normal: 1 ... 3 m/s
- Minimum: not permanently below 0.5 m/s
- Maximum: up to 8 m/s

Flow velocity calculation formula:

- $v = (4 \times Q_{\max}) / (\pi \times D_i^2 \times 3600)$
- v in m/s, Q_{\max} in m³/h, D_i in m

Additional to the flow velocity check it is recommended to observe the Reynolds number (Re):

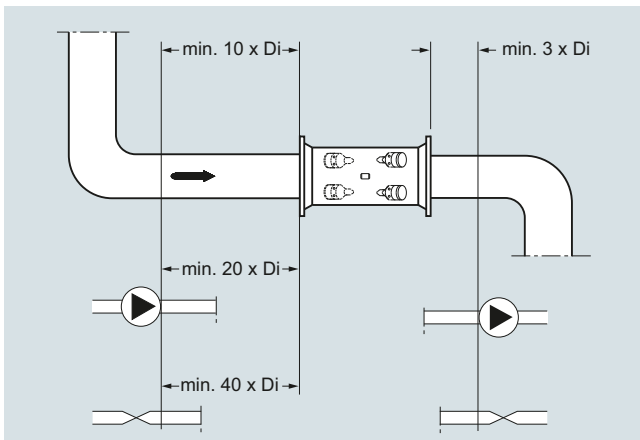
The optimal performance of the flowmeter is with a Re above 10 000, which is typical for flow velocities (water) above 0.5 m/s. Avoid an Re value between 2000 and 5000. In order to observe this and to be above the recommended 0.5 m/s flow velocity limit the sensor size must be reduced.

Re formula: $Re = V \times D_i / \text{Viscosity}$

V in m/s, D_i in m, Viscosity in cSt ($X \times E^{-6} \text{ m}^2/\text{s}$)

Example: Viscosity for water at 20 °C = $1 \times E^{-6} \text{ m}^2/\text{s}$

Inlet and outlet conditions



Recommended inlets and outlets

To maximize performance inlet and outlet must be straight. There must be a certain distance between flowmeter and bends, pumps and valves. It is also important to centre the flowmeter in relation to pipe flanges and gaskets.

Valves must always be installed after the flowmeter. The only exception is installation of the sensor in a vertical pipe. In this case a valve below the sensor is necessary to allow zero point adjustment. It is important to select a valve which does not alter the flow when fully open.

Recommended inlet/outlet	SONO 3300, SONO 3100, SONOKIT 2-path		
	SONO 3300, SONO 3100, SONOKIT 2-path	FUS380/FUE380 ¹⁾	SONOKIT 1-path
90° bend	10 x D_i	10 x D_i	20 x D_i
Fully opened valve	10 x D_i	10 x D_i	20 x D_i
Partially opened valve	40 x D_i	40 x D_i	40 x D_i
2 x 90° bends in same plane	15 x D_i	15 x D_i	25 x D_i
2 x 90° bends in two planes	20 x D_i	20 x D_i	40 x D_i
Reductions (Outlet 0 x D_i)	10 x D_i	10 x D_i	20 x D_i
Pumps	20 x D_i	20 x D_i	40 x D_i
Outlet	3 x D_i	3 x D_i	3 x D_i

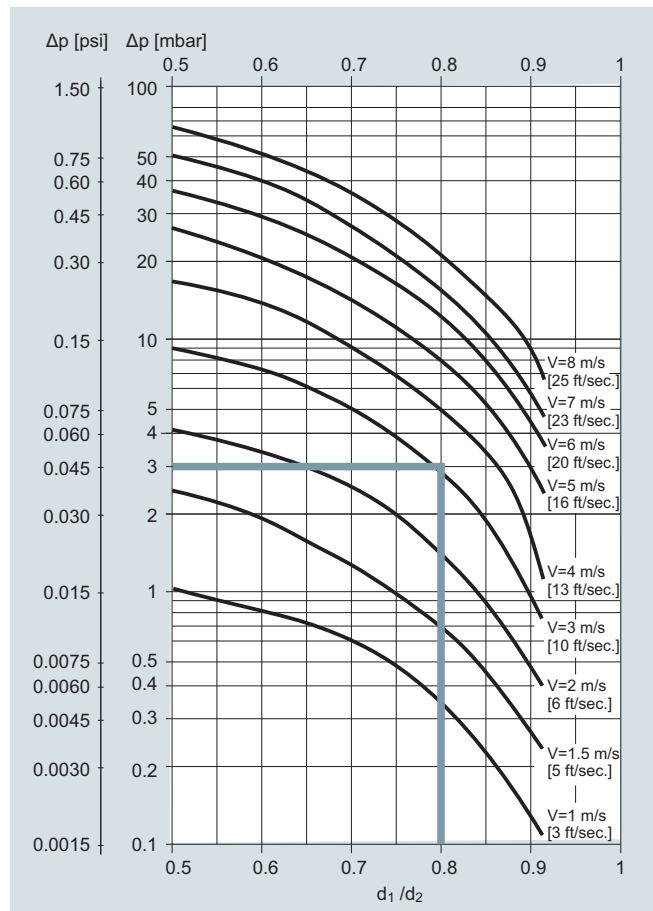
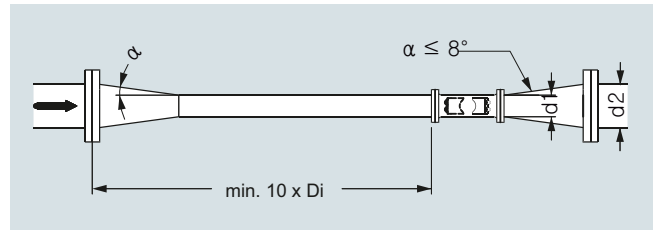
¹⁾ Inlet for FUE380 approved systems: Minimum straight inlet pipe: 1.5 m, but note further recommendations above.

Reductions

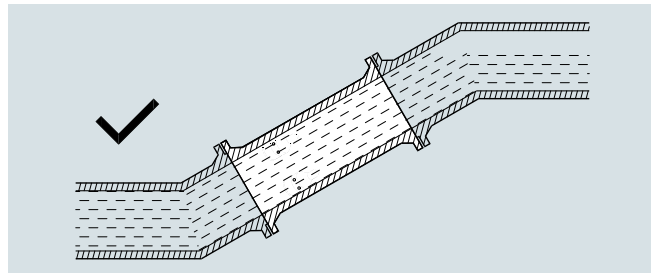
The flowmeter can be installed between two reducers (e.g. DIN 28545). At 8° the pressure drop curve below applies.

Example:

A flow velocity of 3 m/s (V) in a sensor with a diameter reduction from DN 250 to DN 200 ($d_1/d_2 = 0.8$) gives a pressure drop of 3 mbar.



The sensor must always be completely filled with liquid:



The following installations must be avoided:

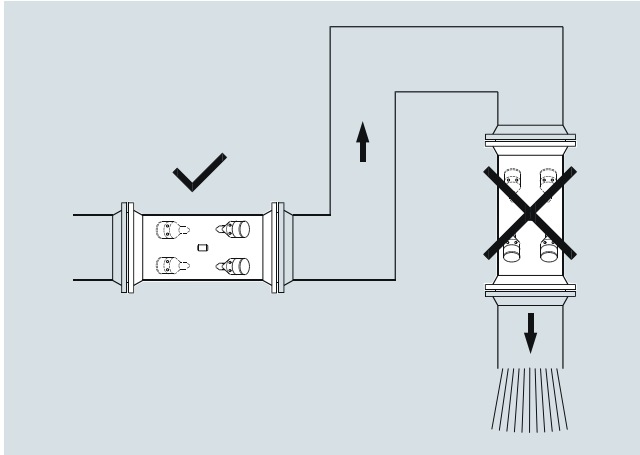
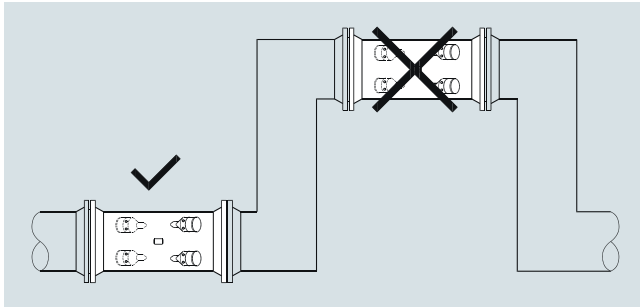
- Installation at the highest point of the pipe system
- Installation in vertical pipes with free outlet

Flow Measurement

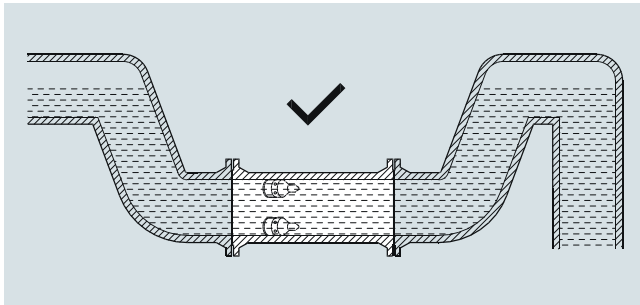
SITRANS F US Inline

System information SITRANS F US Inline ultrasonic flowmeters

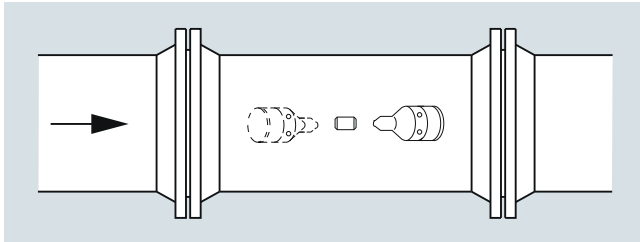
3



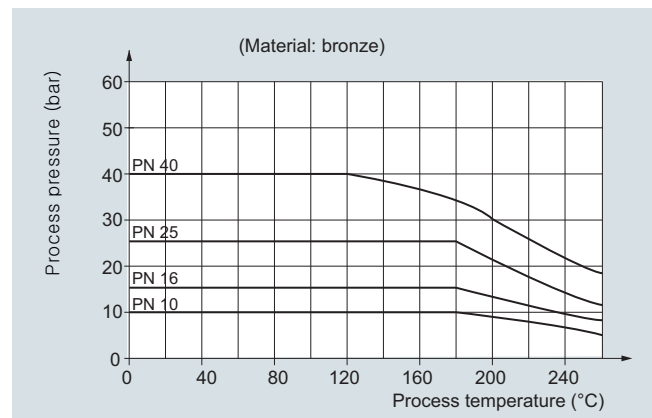
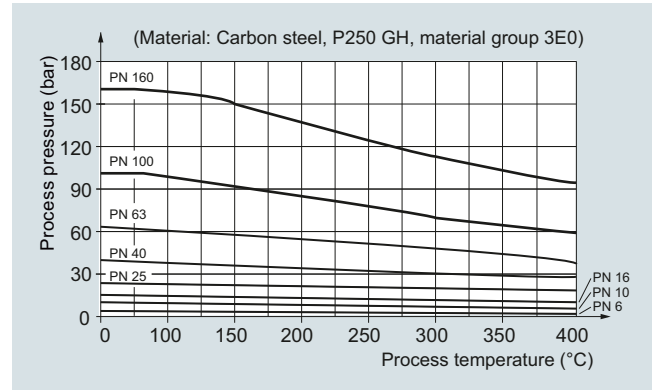
With partially full pipes or pipes with free outlet the flowmeter should be located in a U-shaped tube:



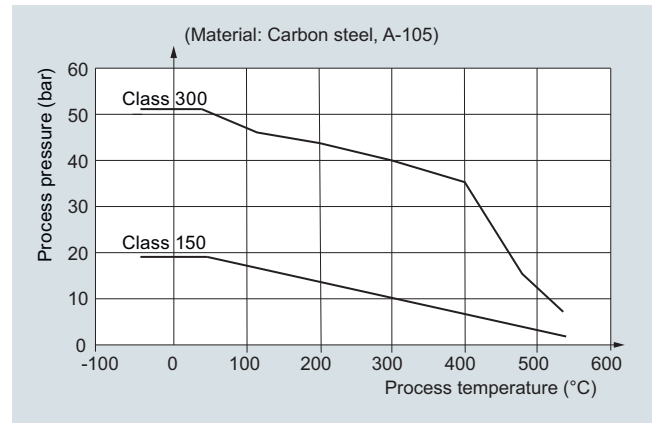
Installing the transducers in horizontal position is recommended:



Pressure/temperature curve to EN (DIN) flanges



Pressure/temperature curve to ANSI B16.5 flanges



Note: The pressure/temperature curves only assist in the selection of a system. No responsibility is taken for the correctness of the information. For further information on the PED standard and requirements, see page 10/15.

Reference conditions

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

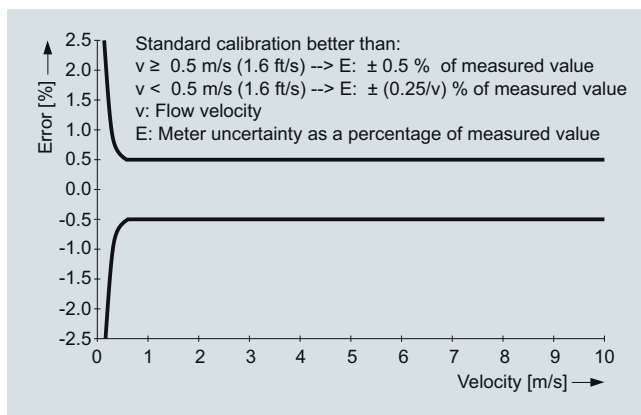
Therefore the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability).

Siemens offer accredited calibrations assured to ISO 17025. Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

Flowmeter calibration data are stored in the internal EEPROM of the transmitters FUS060 or FUS080.

The system accuracy refers to the following systems:

SONO 3300/FUS060, SONO 3100/FUS060¹⁾ which are typically calibrated on the frequency output.



Typical calibration reference conditions:

Fluid	Water
Fluid temperature	$22 \pm 5 \text{ }^{\circ}\text{C}$
Ambient temperature	$22 \pm 5 \text{ }^{\circ}\text{C}$
Supply voltage	115/230 V AC +10 ... -15 % 24 V DC +25 ... -15 %, 24 V AC $\pm 15 \%$
Straight inlet length	$20 \times D_i$
Outlet	$3 \times D_i$
Rangeability	0 ... 1 m/s to 0 ... 10 m/s
Repeatability	Better than 0.25 % in the range 0.5 ... 10 m/s
Linearity (for water)	
• Reynolds number 1000 < Re < 5000	Better than 1 %
• Reynolds number > 5000	Better than 0.5 %

¹⁾ Only systems with transmitter FUS060. For systems with transmitter FUS080 see chapter on FUS380 and FUE380.

Additional effects of deviations from reference conditions

- Current output: As frequency output ($\pm 0.1 \%$ of actual flow +0.05 % FSO)
- Effect of ambient temperature: Frequency/pulse output: < 0.005 % SPAN/K; Current output: < $\pm 0.0075 \% \text{ SPAN/K}$
- Effect of supply voltage: 0.005 % of measuring value at 1 % change

Flow Measurement

SITRANS F US Inline

Transmitter SITRANS FUS060

Overview



SITRANS FUS060 is a transit time based transmitter designed for ultrasonic flowmetering with dedicated sensors in the FUS inline series up to DN 3000. SITRANS FUS060 is engineered for high performance and is suitable for 1-path, 2-path and 4-path flowmeters.

Benefits

- Superior signal resolution for optimum turn down ratio
- Simple menu-based local operation with two-line display and four optical input elements, for unlimited use in potentially explosive atmospheres
- Self-monitoring and diagnostic
- Operate up to 4 paths
- ATEX II 2 G Ex dem [ia/ib] IIC T6/T4/T3 Gb
- Remote installation up to 120 m from sensor
- 1 analog output (4 to 20 mA) standard with HART-protocol, 1 digital frequency or pulse output, 1 relay output for limit, alarms, flow direction
- PROFIBUS PA Profile 2, 1 digital frequency or pulse output

Design

The transmitter type FUS060 is designed for remote installation in non-hazardous or hazardous areas.

The transmitter is designed for use in a flowmeter system together with sensors type SONOKIT, SONO 3300 and SONO 3100.

The FUS060 is ordered as part of a complete flowmeter system. It can be ordered separately as spare part and manually programmed with the sensor data.

Application

The main application for flowmeters with the transmitter SITRANS FUS060 is measurement volume of flow within the general, petrochemical and chemical industries, power engineering and water and waste water, as well as various types of oils and liquid gases.

Integration

The transmitter output is often used as input for an automation system or as input for systems of remote reading.

The SITRANS FUS060 transmitter offers current, pulse and relay outputs as standard output functions and supports HART or Profibus PA communication.

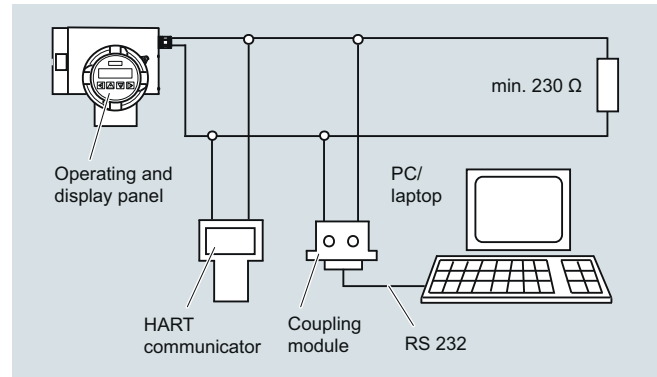
The settings of the transmitter output functions are individually programmed via keypad and display menu.

Function

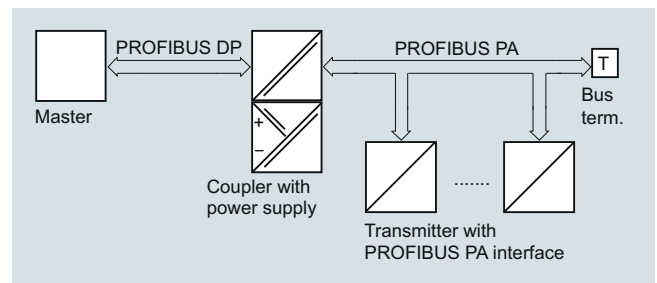
Displays and keypad

Operation of the SITRANS FUS060 transmitter can be carried out using:

- Keypad and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS PA communication

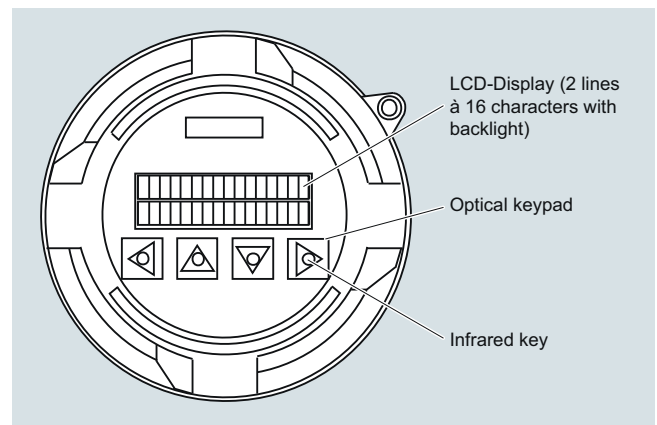


HART communication



PROFIBUS PA communication

The operating and display panel permits simple operation without supplementary equipment. It is not necessary to open the housing. All changes to a setting can therefore also be carried out in the potentially explosive atmosphere.



Operating and display panel

The individual functions and parameters are selected using a hierarchical, multi-language input menu and four infrared keys. The parameters can be specifically selected and modified using codes, e.g.:

- Operating parameters such as measuring range, physical dimensions, device information
- Limits for flow, totalizer, ultrasonic velocity or ultrasonic amplitude
- Noise suppression using damping, error stages and hysteresis
- Display parameters (freely-configurable display)
- Display in volume or mass dimensions
- Density as constant input value for conversion of volume into mass dimensions
- Forward/backward measurement
- Flow direction
- Diagnostics functions and control values
- Functions of the PROFIBUS PA output: flow, net quantity (volume or mass), ultrasonic velocity, ultrasonic amplitude, forward quantity (volume or mass), backward quantity (volume or mass)
- Functions of the analog output: flow, ultrasonic velocity or ultrasonic amplitude
- Functions of digital output 1: pulse output, frequency output, limit, flow direction or device status
- Functions of digital output 2: limit, flow direction or device status
- Simulation of output signal via analog output, digital output 1 and digital output 2

The HART protocol is implemented via the analog output (current output). Using this communication facility, the device can be parameterized with a PC/laptop and SIMATIC PDM software in addition to local operation.

In the version with PROFIBUS PA, the analog output is replaced by the digital PROFIBUS PA output. The device can then be parameterized via PROFIBUS communication and with SIMATIC PDM in addition to local operation.

Technical specifications

Input

Measurement

Flow by measuring the transit time difference of ultrasonic signals through ultrasonic transducers in DN 100 (4") ... 3000 (120") 2-path sensor pipes (depending on selected size, 1-path or 4-path special solutions are possible).

Nominal diameters and number of paths

2-path DN 100 (4") ... DN 3000 (120") (depending on size, optionally also 1-path and 4-path)

Max. cable length

120 m (395 ft) (shielded coaxial cable). For Ex version the transducer cable length is restricted to 3 m (9.84 ft) in order to meet requirements for electrical immunity. For systems with sizes \geq DN 1500 (60") cable length is recommended to be max. 30 m (98.4 ft).

Analog output

Function

Current output programmable for flow, sound velocity or amplitude level.

Active current output ($13.2\text{ V} < \text{open loop voltage} < 15.8\text{ V}$)

4 ... 20 mA

20 ... 22.5 mA, adjustable

3.6 mA, 22 mA, or 24 mA

Max. $600\ \Omega$; for non Ex version $\geq 230\ \Omega$ for HART communication $\leq 330\ \Omega$ for Ex-version

- Only PROFIBUS PA version:

Analog output omitted, is replaced by digital PROFIBUS PA interface

Digital output 1

Function

Pulse, frequency or status output - programmable for pulses, frequency, alarm, limit or status.

- Active or passive signal, can be configured with positive or negative logic

Active: $24\text{ V DC}, \leq 24\text{ mA}$, $R_i = 300\ \Omega$
Passive: open collector, $30\text{ V DC}, \leq 200\text{ mA}$

- For explosion protection (ATEX version) and PROFIBUS PA version

Only passive: open collector $30\text{ V DC}, \leq 100\text{ mA}$

- Output function, configurable

Pulse output

- Adjustable pulse significance $\leq 5000\text{ pulses/s}$
- Adjustable pulse width $\geq 0.1\text{ ms}$

Frequency response

- f_{END} selectable up to 10 kHz

Limit for flow, totalizers, ultrasonic velocity or ultrasonic amplitude device status, flow direction

Flow Measurement

SITRANS F US Inline

Transmitter SITRANS FUS060

Digital output 2

Function

- Relay, NC or NO contact

- For explosion protection (ATEX version)

- Output function, configurable

- Only PROFIBUS PA version:

Relay output - programmable for alarm, limit or status indication. Switching capacity max. 5 W Max. 50 V DC, max. 200 mA DC Self-resetting fuse, $R_i = 9 \Omega$

Max. 30 V DC, max. 100 mA DC, 50 mA AC (cf. EC-Type Examination certificate)

Limit for flow, ultrasonic velocity or ultrasonic amplitude
flow direction
device status
Digital output 2 omitted

Communication via analog output 4 ... 20 mA

- PC/laptop or HART communicator with SITRANS F flowmeter

- Load with connection of coupling module

- Load with connection of HART communicator

- Cable

- Protocol

min. 230 Ω
(max. 330 Ω for Ex-version)

min. 230 Ω

2-wire shielded
 ≤ 3 km (≤ 1.86 miles)
Multi-core shielded
 ≤ 1.5 km (≤ 0.93 miles)

HART, version 5.1

Communication via PROFIBUS PA interface

- Power supply

- Current consumption from bus

Layers 1 + 2 according to PROFIBUS PA
Communication system according to IEC 61158/EN 50170

Separate supply, four-wire device
Permissible bus voltage 9 ... 32 V
See certificates and approvals

10 mA; ≤ 15 mA in event of error with electronic current limiting

Electrical isolation

Outputs electrically isolated from power supply and from one another

Accuracy

Error in measurement (at reference conditions)

- Pulse output

$\leq \pm 0.5$ % of measured value at 0.5 ... 10 m/s or
 $\leq \pm 0.25/V[m/s]$ % of measured value at flow < 0.5 m/s

- Analog output 4 ... 20 mA

As pulse output plus ± 0.1 % of measured value, $\pm 20 \mu A$

- Repeatability

$\leq \pm 0.25$ % of measured value at 0.5 ... 10 m/s

Reference conditions (water)

- Process temperature in the connected sensor

25 °C ± 5 °C (77 °F ± 9 °F)

- Ambient temperature at the transmitter

25 °C ± 5 °C (77 °F ± 9 °F)

- Transmitter warming-up time

30 min.

Installation conditions of connected sensor

Upstream section $> 10 \times DN$ and downstream section $> 5 \times DN$

Rated operation conditions

Ambient conditions

Ambient temperature

- Operation
- In potentially explosive atmospheres
- Storage

Enclosure rating

Electromagnetic compatibility

- Emitted interference
- Noise immunity

Medium conditions

- Process temperature

- Gases/solids

-20 ... +50 °C (-4 ... +122 °F)

Observe temperature classes

-25 ... +80 °C (-13 ... +176 °F)

IP65 (NEMA 4)

For use in industrial environments

To EN 55011/CISPR-11

To EN/IEC 61326-1 (Industry)

The measuring media must be ultrasonic signal compatible. It must be homogeneous and not two-phased to transfer the acoustic ultrasonic signals.

-200 ... +250 °C (-328 ... +482 °F)
(not directly influenced by medium temperature)

Influence accuracy of measurement (approx. max. 3 % gases or solids)

Design

Separate version

Transmitter is connected to the transducers via 3 ... 120 m (9.8 ... 395 ft) long specially shielded cables (coaxial cable)
For ATEX versions mounted in the Ex area only with 3 m (9.8 ft) long cables.

Enclosure material

Wall mounting bracket (standard and special)

Weight of transmitter

Electrical connection

Die-cast aluminum, painted
Stainless steel (standard: always incl.)

4.4 kg (9.7 lb)

Cable glands (always incl.)

- Power supply and outputs
 - 2 x M20 (HART)/M25 (PROFIBUS) or
 - 2 x 1/2"-NPT (HART)
- Transducers/sensor
 - 2/4 x M16 or
 - 2/4 x 1/2" NPT

Displays and controls

Display

- Multi-display:
2 freely-selectable values are displayed simultaneously in two lines

Operation

LCD, two lines with 16 characters each

Flow, volume, mass flow, mass, flow velocity, speed of sound, ultrasonic signal information, current, frequency, alarm information

4 infrared keys, hierarchical menu shown with codes

Power supply

Supply voltage

- Standard version

120 ... 230 V AC ± 15 %
(50/60 Hz) or 19 ... 30 V DC/
21 ... 26 V AC

- Ex version

19 ... 30 V DC/21 ... 26 V AC

Power failure

No effect for at least 1 period
(> 20 ms)

Power consumption

Approx. 10 VA/10 W

Certificates and approvals

Explosion protection

ATEX II 2 G Ex dem [ia/ib] IIC
T6/T4/T3 Gb
T6 for media < 85 °C (185 °F)
T5 for media < 100 °C (212 °F)
T4 for media < 135 °C (275 °F)
T3 for media < 200 °C (392 °F)

Coaxial cable**Standard Coaxial cable (75 Ω)**

Coaxial cable with SMB straight plug on one end for connection to the FUS060

Pre-terminated, can be shortened on sensor side

Outside diameter Ø 5.8 mm

Length 3, 15, 30, 60, 90, 120 m (9.84, 49.21, 98.43, 196.85, 295.28, 393.70 ft) between sensor and transmitter

Material (outside jacket) black PE

Ambient temperature -10 ... +70 °C (14 ... 158 °F)

**High temperature Coaxial cable (75 Ω)**

Coaxial cable with SMB straight plug on one end for the connection to FUS060

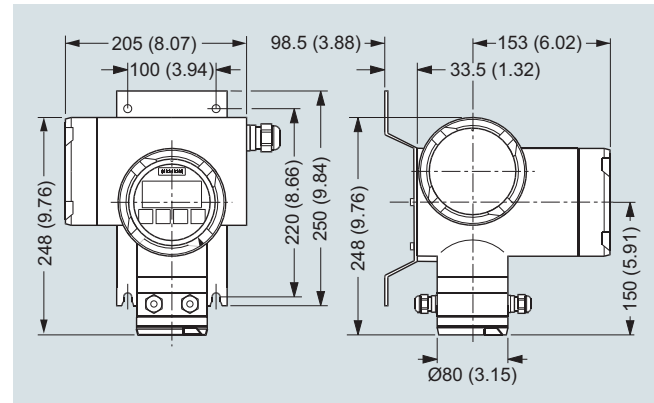
Fix terminated, can NOT be shortened

Outside diameter Ø 5.13 mm (first 0.3 m (0.98 ft) part to the transducer), Ø 5.8 mm (for remaining cable to the transmitter - with SMB plug at the end) and between these is a black hot melt junction Ø 16 mm (length 70 mm)

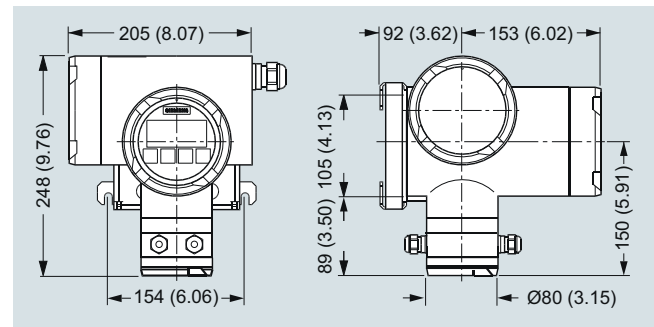
Length 3, 15, 30 m (9.84, 49.21, 98.43 ft) between sensor and transmitter (max 3 m 9.84 ft) transducer cable length for Ex area mounted transmitters)

Material (outside jacket) Brown PTFE (0.3 m (0.98 ft) part) and black PE (for remaining cable)

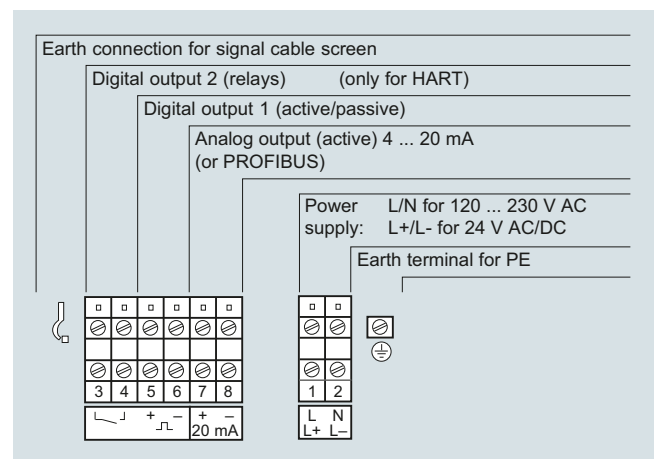
Ambient temperature -200 ... +200 °C (-328 ... +392 °F) (brown PTFE transducer part) and -10 ... +70 °C (14 ... 158 °F) (black PE for remaining transmitter cable part)

Dimensional drawings

SITRANS FUS060 with standard mounting bracket, dimensions in mm (inch)



SITRANS FUS060 with optional special mounting bracket, dimensions in mm (inch)

Schematics

Electrical connection SITRANS FUS060

Flow Measurement

SITRANS F US Inline

Transmitter SITRANS FUS060


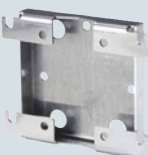

Transmitter FUS060 operating instructions, accessories and spare parts

Operating instructions


Description	Article No.
• English	A5E01204521
• German	A5E02123845

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Accessories

Description	Article No.	
Standard wall mounting bracket	7ME5933-0AC04	
Special wall-/pipe mounting bracket kit	7ME5933-0AC05	
Safety clamp for electronic cover with glass plate (7ME5933-0AC01)	7ME5933-0AC06	

Process Device Manager SIMATIC PDM

SIMATIC PDM Details about the SIMATIC PDM tool can be found on page 8/5, chapter "Communication and Software"	See page 8/13, chapter "Communication and Software"	
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HART modem for communication with FUS060 HART, PC and SIMATIC PDM

HART modem With USB connection	7MF4997-1DB	
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Spare parts

SITRANS FUS060 transmitter, available standard and Ex versions

The transmitter configuration is made in the flowmeter Order codes (together with the sensors). The information below is for spare part ordering only and with fixed standardized pre-settings for a DN 2000 2-path system.

Description	Version	Enclosure	Supply	Article No.	
FUS060, 230 V, HART, Metric cable glands	Transmitter for remote connection	IP65 (NEMA 4)	115 ... 230 V AC 50/60 Hz	7ME3050-2BA10-1BA1	
FUS060, 230 V, HART, Imperial cable glands	Transmitter for remote connection	IP65 (NEMA 4)	115 ... 230 V AC 50/60 Hz	7ME3050-2BA10-1BA2	
FUS060, 230 V, PROFIBUS, Metric cable glands	Transmitter for remote connection	IP65 (NEMA 4)	115 ... 230 V AC 50/60 Hz	7ME3050-2BA10-1DA1	
FUS060, 230 V, PROFIBUS, Imperial cable glands	Transmitter for remote connection	IP65 (NEMA 4)	115 ... 230 V AC 50/60 Hz	7ME3050-2BA10-1DA2	
FUS060, 24 V, HART, Metric cable glands	Transmitter for remote connection	IP65 (NEMA 4)	19 ... 30 V DC/ 21 ... 26 V AC	7ME3050-2BA20-1BA1	
FUS060, 24 V, HART, Imperial cable glands	Transmitter for remote connection	IP65 (NEMA 4)	19 ... 30 V DC/ 21 ... 26 V AC	7ME3050-2BA20-1BA2	
FUS060, 24 V, PROFIBUS, Metric cable glands	Transmitter for remote connection	IP65 (NEMA 4)	19 ... 30 V DC/ 21 ... 26 V AC	7ME3050-2BA20-1DA1	
FUS060, 24 V, PROFIBUS, Imperial cable glands	Transmitter for remote connection	IP65 (NEMA 4)	19 ... 30 V DC/ 21 ... 26 V AC	7ME3050-2BA20-1DA2	
FUS060, ATEX, 24 V, HART, Metric cable glands	Transmitter for remote connection	IP65 (NEMA 4) ATEX approval	19 ... 30 V DC/ 21 ... 26 V AC	7ME3050-2BA21-1CA1	

Ordering of pre-configured FUS060 spare transmitters only via PVR (product variation request - special request)

Description	Article No.		Description	Article No.	
Operating/Display module	7ME5933-0AC00		M20 cable gland set for FUS060 ATEX version power and output connection, PA plastic, 1 x in blue (ATEX Ex i) and 1 x gray (ATEX Ex-e) • cables Ø 5 ... 9 mm (0.20" ... 0.35") • -20 ... +95 °C (-4 ... +203 °F)	A5E02246356	
Electronics cover with glass plate (non Ex) . Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm)	7ME5933-0AC01		1/2" NPT cable gland set for FUS060 (NPT) power and output connection, gray PA plastic, 2 pcs. • cables Ø 6 ... 12 mm (0.24" ... 0.47") • -40 ... +100 °C (-40 ... +212 °F)	A5E02246396	
Cover for sensor cable and gasket. Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm)	7ME5933-0AC02		M25 cable gland set for the FUS060 PA (M25) power and output connection, gray PA plastic, 2 pcs. • cables Ø 9 ... 16 mm (0.35" ... 0.63") • -40 ... +100 °C (-40 ... +212 °F)	A5E02246378	
Cover for mains supply/communication. Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm)	7ME5933-0AC03		M16x1.5 cable gland set for FUS060 (M16) sensor connection, gray PA plastic, 2 pcs. and 2 pcs. blind. • cables Ø 5 ... 9 mm (0.20" ... 0.35") • -40 ... +100 °C (-40 ... +212 °F)	A5E02593526	
FUS060 Sensor connection PCBA, Standard versions only, 1 pc.	A5E02551331		M16 x 1.5 cable gland set for FUS060 (M16) sensor connection, brass chrome, 2 pcs. and 2 pcs. blind • cables Ø 5 ... 9 mm (0.20" ... 0.35") • -20 ... +105 °C (-4 ... +221 °F)	A5E02246369	
FUS060 Sensor connection PCBA, ATEX version only, 1 pc.	A5E02551334		1/2" NPT cable gland set for FUS060 (NPT) sensor connection, 4 pcs. M16 bush to 1/2" NPT and 4 pcs. 1/2" NPT gray PA plastic glands • cables Ø 5 ... 9 mm (0.20" ... 0.35") • -20 ... +100 °C (-4 ... +212 °F)	A5E02247877	
M20 cable gland set for FUS060 (M20) power and output connection, gray PA plastic, 2 pcs. • cables Ø 6 ... 12 mm (0.24" ... 0.47") • -40 ... +100 °C (-40 ... +212 °F)	A5E02246350				

Flow Measurement

SITRANS F US Inline

Transmitter SITRANS FUS060

Cables for FUS060

Description	Length m (ft)	Article No.
Coaxial cable for FUS060, (75 Ω , max. 70 °C (158 °F), black PVC) (2 pcs.)	3 (9.84)	A5E00875101
	15 (49.21)	A5E00861432
	30 (98.43)	A5E01278662
	60 (196.85)	A5E01278682
	90 (295.28)	A5E01278687
	120 (393.70)	A5E01278698
High temp. coaxial cable for FUS060; with 0.3 m brown PTFE high temp. transducer part, max. 200 °C (392 °F) and black PVC for remaining transmitter part with SMB plug, max. 70 °C (158 °F), impedance 75 Ω (2 pcs.)	3 (9.84)	A5E00875105
	15 (49.21)	A5E00861435
	30 (98.43)	A5E01196952
Special coaxial cable sets for low temperature cryogenic systems; with SMB plug for transmitter SITRANS FUS060, PTFE material, temp. -200 ... +200 °C (-328 ... +392 °F), impedance 75 Ω (2 pcs.)	10 (32.84)	A5E02085593
	15 (49.21)	A5E03262088
	30 (98.43)	A5E02085644
	40 (131.23)	A5E02085649



Overview



SITRANS FUS080 is a transit time based transmitter designed for ultrasonic flow metering with any sensor in the FUS inline series SONOKIT, FUS380 and FUE380 up to DN 1200.

The ultrasonic flowmeter transmitter SITRANS FUS080 comes as battery or mains powered version. The SITRANS FUS080 is designed to measure flow water applications.

The SONOKIT retrofit flowmeter series are shown from page 3/277. The standard flowmeter series SITRANS FUS380 is described from page 3/288. The type approved flowmeter series for flow metering in energy meter custody transfer systems are named SITRANS FUE380 - see page 3/294.

Benefits

- Battery-powered up to 6 years
- 115/230 V mains-powered with back-up battery option in case of mains power failure
- Fast measuring frequency 15 Hz/0.5 Hz (230 V AC/Battery)
- Easy one button straight forward display
- IrDA optical interface for local communication
- 2-path measuring principle for optimum accuracy
- Compact or remote mounting
- Measures on all district water qualities and water conductivities
- No pressure drop
- Long-term stability
- 2 galvanic isolated digital outputs for easy connection to a calculator (potential free)
- 1 analog 4 to 20 mA output
- Bidirectional measurement, with 2 totalizers and outputs
- Dynamic range Q_i (min) : Q_s (max) up to 1:400
- Compact version with triax cables for highest EMC-protection

Application

The main application for flowmeters with the transmitter SITRANS FUS080 is measurement of water flow in district heating plants, local networks, boiler stations, substations, chiller plants, irrigations plants and other general water applications.

Design

The transmitter type SITRANS FUS080 is designed with fiber-glass reinforced polyamide enclosure for remote or compact installation in normal areas. The remote versions are available with up to 30 meter distance from flowmeter to transmitter. When ordering as a compact version in the series FUS380 and FUE380 the transducer cables are pre-mounted at the sensor.

The transmitter is available in an IP67/NEMA 4X/6 enclosure and is designed for use in the flowmeters series:

- SONOKIT (1-path or 2-path)
- FUS380 (2-path)
- FUE380 (2-path)

The transmitter FUS080 is always ordered as part of a complete flowmeter system.

It can be manually ordered separately as spare part preprogrammed with the given sensor data.

Integration

The flowmeter pulse output is often used as input for an energy meter or as input for digital systems for remote reading.

SITRANS FUS380 has two pulse outputs, with functions that can be individually selected.

The settings of the transmitter, eg. flow and pulse output rate, are defined when ordering the complete flowmeter.

If the flowmeter forms part of an energy meter system for custody transfer, no further approvals are needed, except eventually local approvals on the flowmeter.

Technical specifications

Input	
Measurement	Flow by measuring the transit time difference of ultrasonic signals through ultrasonic transducers in the sensor pipes. Supporting of 1-path or 2-path sensors in sizes DN 50 ... 1200 measuring on water.
Measuring rate	
• Battery mode	0.5 Hz
• Mains supply	Up to 15 Hz
• Back-up mode	0.5 Hz (at mains supply drop)
Flow rate	0.02 ... 9 m/s (0.065 ... 29.5 ft/s), bidirectional flow metering
Output	
	2 pulse or status outputs (A and B), individual galvanically isolated MOS relay outputs, passive mode, max. ± 35 V AC/DC, max. 50 mA
Max. pulse frequency	100 Hz at Q_s (Q_{max})
Pulse value and length	Selectable with the ordering of the flowmeter
Output A function	Pulse: forward, reverse, forward net, reverse net (preset: forward)
Output B function	Pulse: forward, reverse, forward net, reverse net (preset: forward) or alarm indication or call-up indication (preset: alarm)
Pulse value A and B	0.1 l/p, 0.25 l/p, 0.5 l/p, 1 l/p, 2.5 l/p, 10 l/p, 25 l/p, 50 l/p, 100 l/p, 250 l/p, 500 l/p, 1 m ³ /p, 2.5 m ³ /p, 5 m ³ /p, 10 m ³ /p, 25 m ³ /p, 50 m ³ /p, 100 m ³ /p, 250 m ³ /p, 500 m ³ /p, 1 000 m ³ /p
Pulse length (depending on Q_{max} by DN selection)	5, 10, 20, 50, 100, 200, 500 ms (standard 5 ms)
Alarm indication	Path 1 (F1), path 2 (F2) internal, failure (F3, F4), powers supply warning or low battery indication (F5), Q_{max} overflow (F6), pulse overflow (F7, F8), internal data logger warning (F9)
Analog output	Passive current output 4 ... 20 mA Data span pre-selectable depending on pipe size

Flow Measurement

SITRANS F US Inline

Transmitter SITRANS FUS080/FUE080

Rated operation conditions

Ambient conditions

Ambient temperature

- Operation -10 ... +60 °C (14 ... 140 °F) (MID version: max. +55 °C (131 °F))
- Storage -40 ... +85 °C (-40 ... +185 °F) (battery included)

Enclosure rating

IP67/NEMA 4X/6 to EN 60529 and DIN 40050

Electromagnetic compatibility

- Emitted interference To EN 55011/CISPR-11
- Immunity To EN/IEC 61326-1 (Industry)
- MID approved (FUE380 series) Environment class E2 and M1

Mechanical vibration

2 g, 1 ... 800 Hz sinusoidal in all directions according to IEC 68-2-6

Weight of transmitter

Approx. 1.5 kg (3.3 lb)

Design

Enclosure material

Fibre-glass reinforced polyamide, light gray color

Wall mounting kit

IP67/NEMA 4X/6 terminal box for the wall mounting of the transmitter, fiber-glass reinforced polyamide with stainless steel bracket, cable glands entries: 2 x 2 M20 or PG 13.5 for power supply and outputs and 2 x M20 or PG 13.5 for the sensor cables, glands (supply and outputs and double cable entries for sensor cables) are included.

Sensor cable

Coaxial cable sets for remote transmitter up to 30 m (98.4 ft) long transducer cable, 75 Ω impedance, cables sets are prepared for the connection to the sensors

Triax cables for integral version

Display and controls

Display

LCD, 8 digits, additional 2 digits and symbols for status information

Resolution

Totalized information can be displayed with 1, 2 or 3 decimals or automatic adjustment (default)

Display setting

Flow unit: Preset: m³/h
Volume unit: Preset: m³

Push button

One push button for menu selection and display information

Communication (IrDA optical eye)

IrDA – optical communication and control interface with Modbus RTU protocol for read or write transmitter settings and data via PC and PDM tool

Power supply

Battery

D-cell battery pack, 3.6 V LiSOCl (Lithium Thionyl Chloride, 34 Ah), replaceable, life- and working-time up to 6 years

Mains

87 ... 265 V AC (50 ... 60 Hz) or 87 ... 265 V AC (50 ... 60 Hz) with D-cell single battery backup, 2.6 V LiSOCl (Lithium Thionyl Chloride, 17 Ah), replaceable, life time up to 8 years

Power consumption

Mains version

Approx. 2.5 VA

SONOKIT, FUS380, FUE380

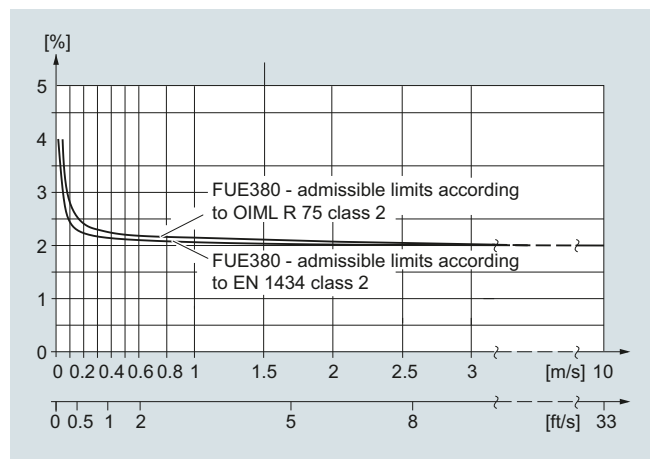
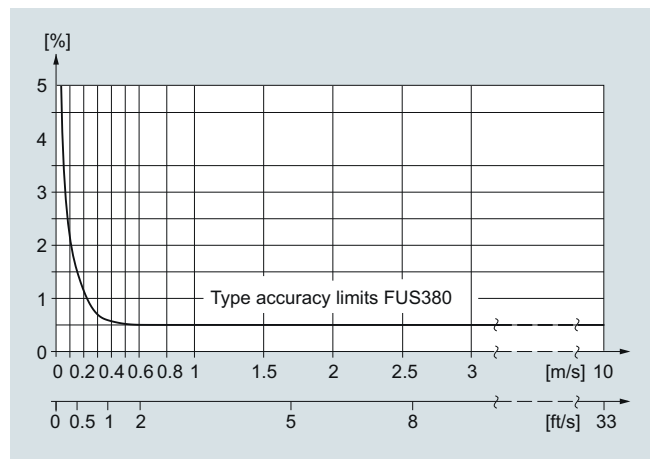
The flow values and settings are predefined according to dimension selection.

The transmitter settings are changeable by using the SW tool PDM (for FUE380 series some of the setting are only readable, restriction of the approval requirements).

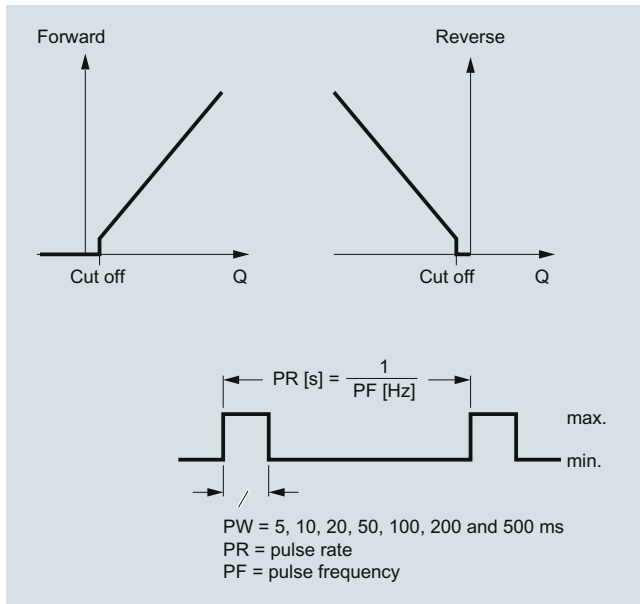
Accuracy/Error in measurement:

(at reference conditions for FUS380 and FUE380 series, SONOKIT series will differ in the accuracy)

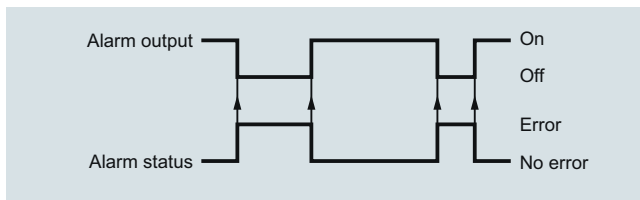
- Pulse output
 - $\leq \pm 0.5$ % of measured value at 0.5 ... 10 m/s or
 - $\leq \pm 0.25/V$ [m/s] % of measured value at flow < 0.5 m/s
- Repeatability ≤ 0.25 % of measured value at 0.5 ... 10 m/s
- Reference conditions
 - Process temperature and ambient temperature: 25 °C \pm 5 °C (77 °F \pm 9 °F)
 - Transmitter warming-up time 30 min.
 - Installation conditions of the sensor: Upstream section > 10 x DN and downstream section > 5 DN



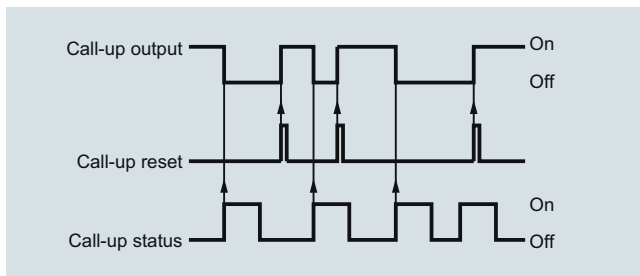
Output configuration



Pulse volume: output A/B configured as volume per pulse, calculated on forward/reverse or net forward/reverse flow. The volume per pulse is free scaleable (via PDM software).

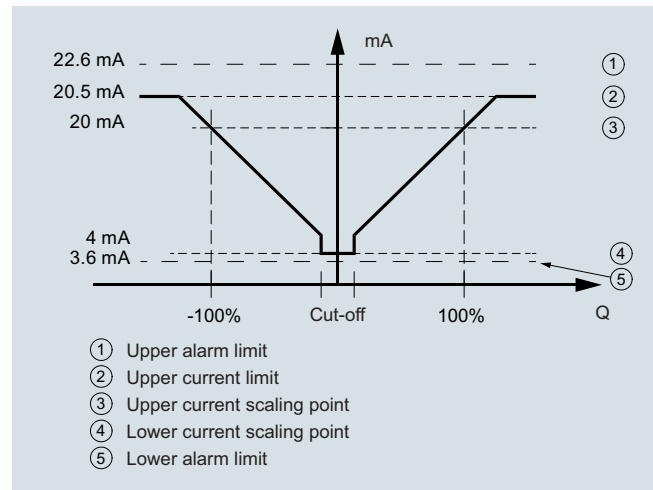


Pulse output B can be used as stated above or as alarm or call-up function.

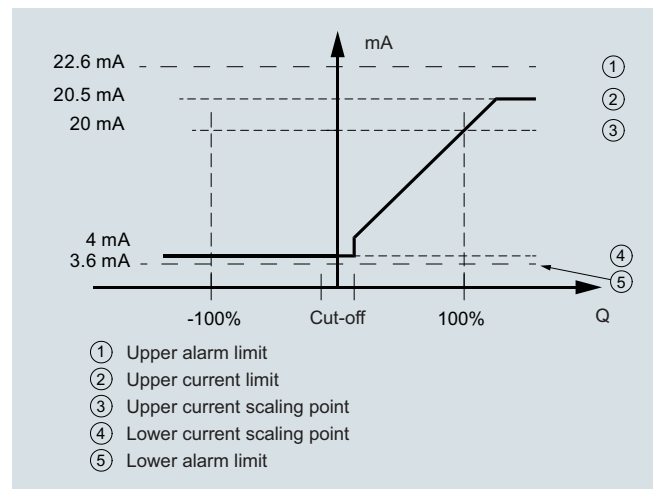


Call-up: the call-up output is active until manually reset by use of PDM tool. The call-up function is activated when an alarm is activated.

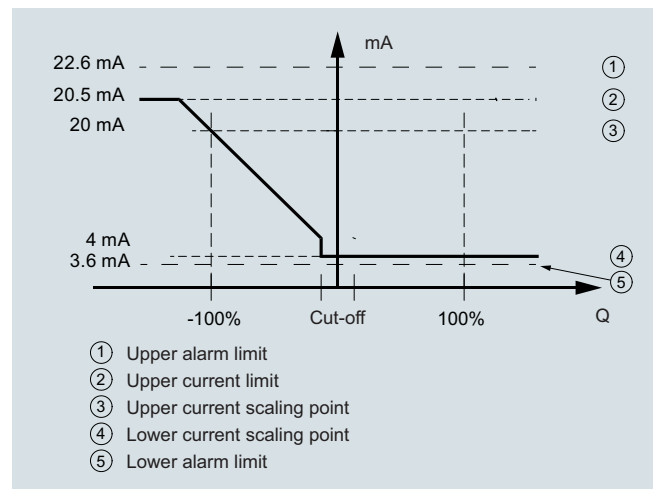
Current output



Bidirectional flow



Positive flow



Negative flow

Flow Measurement

SITRANS F US Inline

Transmitter SITRANS FUS080/FUE080

Sensor coaxial cable for SONOKIT series with FUS080

Coaxial cable

Standard coaxial cable (75 Ω)

Outside diameter	Ø 5.8 mm
Length	15, 30 m (49.2, 98.4 ft) between sensor and transmitter
Material (outside jacket)	Black PE
Ambient temperature	-10 ... +70 °C (14 ... 158 °F)



Sensor coaxial cable for FUS380/FUE380 series

Coaxial cable

High temperature coaxial cable (75 Ω)

	With special designed glands for connection in the sensor/transducer
Outside diameter	Ø 5.13 mm (first 0.3 m (0.98 ft) part to the transducer), Ø 5.8 mm (for remaining cable to the transmitter – black holt melt junction part between (Ø 16 mm, length 70 mm)
Length	Up to 30 m (98.4 ft) between sensor and transmitter
Material (outside jacket)	Brown PTFE (0.3 m (9.84 ft) part) and black PE (for remaining cable)
Ambient temperature	-200 ... +200 °C (-328 ... +392 °F) (brown PTFE transducer part) and -10 ... +70 °C (14 ... 158 °F) (black PE for remaining transmitter cable part)



Transmitter FUS080 operating instructions, accessories and spare parts
Operating instructions

Description	Article No.
for use with SONOKIT • English	A5E03059912
integrated in FUS/FUE380 • English • German	A5E00730100 A5E00740611

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Accessories

Description	Article No.
Sun lid for FUS080 transmitter (frame and lid)	A5E02328485
Brace (holder) for optical IrDA eye	A5E00695277
IrDA infrared interface adapter with USB for data acquisition with 1.2 m (3.9 ft) cable	FDK:087L4163

Process Device Manager SIMATIC PDM

SIMATIC PDM Details about the SIMATIC PDM tool can be found on page 8/5, chapter "Communication and Software"	See page 8/13, chapter "Communication and Software"
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Spare parts

A spare part transmitter can be ordered for a specific system. In the description of the following spare part transmitters the related transmitter Article No. found on the device silver front label is noted.

Spare part transmitter for FUS380 systems (7ME3400)

Description	Article No.
FUS080 transmitter 3.6 V battery (no battery included, to be ordered separate) as spare part transmitter for FUS380 flowmeter series. Transmitter Article No. 7ME3450-0AA10-2AA0	A5E02729700
FUS080 transmitter 3.6 V battery (battery included) as spare part transmitter for FUS380 flowmeter series ¹⁾ . Transmitter Article No. 7ME3450-0AA20-2AA0	A5E02729035
FUS080 transmitter 230 V mains as spare part transmitter for FUS380 flowmeter series. Transmitter Article No. 7ME3450-0AA30-2AA0	A5E02699309
FUS080 transmitter 230 V mains with backup-battery as spare part transmitter for FUS380 flowmeter series. Transmitter Article No. 7ME3450-0AA40-2AA0	A5E02729610

When ordering: Inform on flowmeter Article No. and flowmeter serial no. (e.g. 7ME3400-xxxx-xxxx-Z, XX.... and xxxxxHxxx)

Spare part transmitter for FUE380 approved systems (7ME3410)

(only with MID approval marks, no MID verification – only a complete flowmeter can be MID-verified, i.e. sensor together with the transmitter)

Description	Article No.
FUE080 transmitter 3.6 V battery (no battery included, to be ordered separate) as spare part transmitter for FUE380 flowmeter series. Transmitter Article No. 7ME3450-0AA10-2AB0	A5E02734600
FUE080 transmitter 3.6 V battery (battery included) as spare part transmitter for FUE380 flowmeter series ¹⁾ . Transmitter Article No. 7ME3450-0AA20-2AB0	A5E02734568
FUE080 transmitter 230 V mains as spare part transmitter for FUE380 flowmeter series. Transmitter Article No. 7ME3450-0AA30-2AB0	A5E02734539
FUE080 transmitter 230 V mains with backup-battery as spare part transmitter for FUE380 flowmeter series. Transmitter Article No. 7ME3450-0AA40-2AB0	A5E02734585



When ordering: Inform on flowmeter Article No. and flowmeter serial no. (e.g. 7ME3410-xxxx-xxxx-Z, XX.... and xxxxxHxxx)

Spare part transmitter for SONOKIT systems (7ME3210/7ME3220)

Description	Article No.
FUS080 transmitter 3.6V battery (no battery included, to be ordered separate) as spare part transmitter for SONOKIT flowmeters. Transmitter Article No. 7ME3450-0AA10-2AA0	A5E03048726
FUS080 transmitter 3.6V battery (battery included) as spare part transmitter for SONOKIT flowmeters ¹⁾ . Transmitter Article No. 7ME3450-0AA20-2AA0	A5E03048714
FUS080 transmitter 230V mains as spare part transmitter for SONOKIT flowmeters. Transmitter Article No. 7ME3450-0AA30-2AA0	A5E03048701
FUS080 transmitter 230V mains with backup-battery as spare part transmitter for SONOKIT flowmeters. Transmitter Article No. 7ME3450-0AA40-2AA0	A5E03048719



When ordering: Inform on flowmeter Article No. and flowmeter serial no. (e.g. 7ME3220-xxxx-xxxx-Z, XX.... and xxxxxHxxx)



¹⁾ Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.









Flow Measurement

SITRANS F US Inline

Transmitter SITRANS FUS080/FUE080

Spare part transmitter for FUS880 retrofitting systems (7ME3440)


Description	Article No.	
Sparepart FUS080 transmitter 3.6 V, incl. 3.6V dual batterie pack, USA version Transmitter Article No.: 7ME3450-0AA20-1CA0; Label, 0: Siemens FUS080 transmitter; Version, 0: Without connection box; Enclosure, A: IP67/NEMA 4X/6; Code A: Standard; Supply Voltage, 2: 3.6V DC battery; Ex. Approval, 0: no Ex approval; Display, 1: With display and unit label; Region version, C: USA: AcFt,CFS; Application, A: Standard FUS080 (for SITRANS Retrofit - 7ME344); Code, 0: Standard	A5E03412669	
FUS080 transmitter for FUS880 retrofit systems, USA version, incl. wall-mounting kit, 2 transducers and 2 pcs. 60 ft (20 m) of cables. Label, 0: Siemens FUS080 transmitter; Diameter, 0A: None; Wall Thickness, A: None; Pipe Material, 0: No Pipe; Track configuration, 1: 1-Track; Region version, 2: USA: AcFt,CFS; Transmitter, D: FUS080,IP67, Battery, Remote, unit label; Template, A: None; Transducer coax cable, 4: 20 m with gland	7ME3440-0AA01-2DA4	
FUS080 transmitter for FUS880 retrofit systems, USA version, incl. wall-mounting kit, 4 transducers and 4 pcs. 60 ft (20 m) of cables: Label, 0: Siemens FUS080 transmitter; Diameter, 0A: None; Wall Thickness, A: None; Pipe Material, 0: No Pipe; Track configuration, 3: 2-Track (X-Configuration); Region version, 2: USA: AcFt,CFS; Transmitter, D: FUS080 ,IP67, Battery, Remote,unit label; Template, A: None; Transducer coax cable, 4: 20 m with gland	7ME3440-0AA03-2DA4	

Description	Article No.	
Internal battery pack, one set of 2 D-cell (3.6 V 34 Ah) ¹⁾ • 1 pc. pack • 24 pcs. pack	A5E02679676 A5E02896941	
Single battery back-up to main supply (17 Ah) ¹⁾	A5E02679923	
Battery cover for transmitter FUS080	A5E00694468	
PG 13.5 cable gland set for FUS080 power and output connection, black PA plastic, 2 pcs. • cables Ø 6 ... 12 mm (0.24" ... 0.47") • -40 ... +100 °C (-40 ... +212 °F)	FDK:083G0228	
PG 13.5 cable gland set (two cable entries) for FUS080 sensor connection, black PA plastic, 2 pcs. • cables Ø 6 ... 12 mm (0.24" ... 0.47") • -40 ... +100 °C (-40 ... +212 °F)	A5E00694500	
SITRANS FUS/FUE380 wall mounting kit for remote transmitter mounting, including connection plate (DN 50 ... DN 1200/2" ... 48")	A5E00694509	
SITRANS FUS/FUE380 terminal box for compact transmitter mounting, including connection plate, (bronze sensors only, DN 50 ... DN 80/2" ... 3")	A5E01208138	
SITRANS FUS/FUE380 terminal box for compact transmitter mounting, including connection plate, (steel sensors only, DN 100 ... DN 1200/4" ... 48")	A5E00694660	
FUS080 display and keypad with Siemens logo	A5E00873496	
FUS080 display and keypad neutral (without logo)	A5E33147123	


¹⁾ Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

Transmitter SITRANS FUS080/FUE080


Sensor cables for FUS380/FUE380 flowmeters

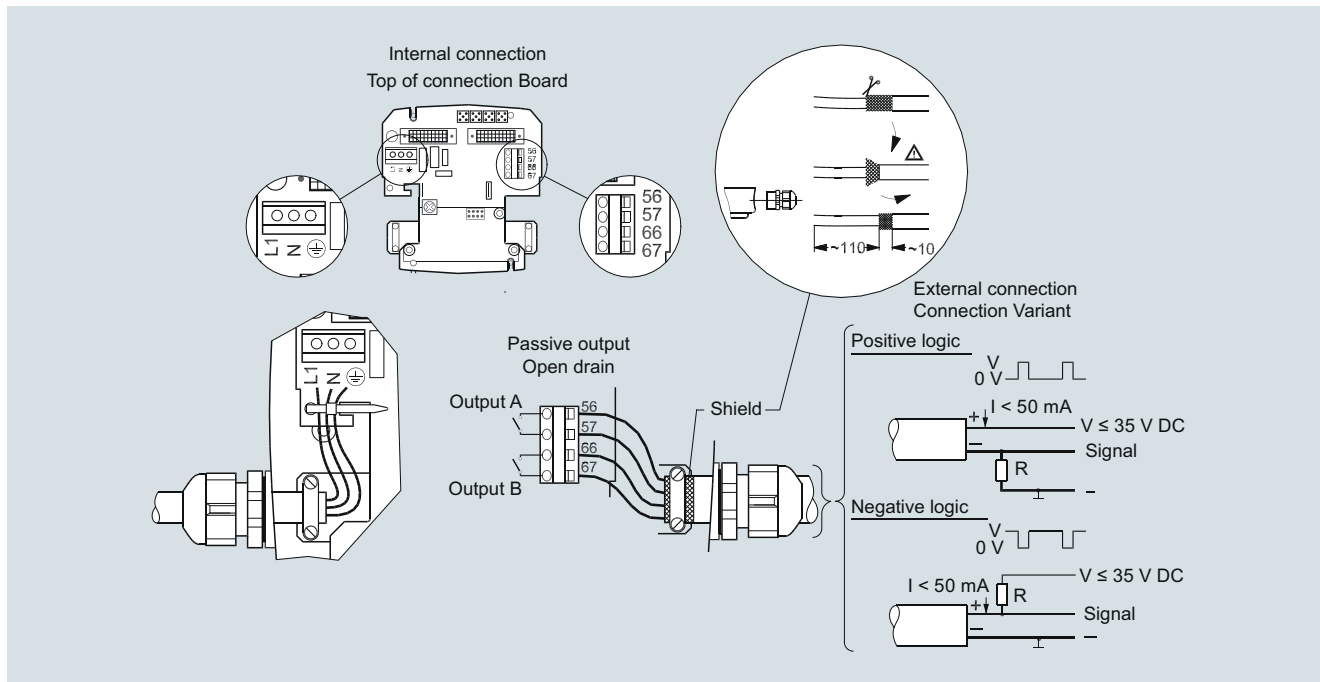
Description	Article No.	
DN 50 to 80 flowmeters		
Coaxial cable for FUS080; with 0.3 m brown PTFE high temp. transducer part, max. 200 °C (392 °F) and black PVC for remaining transmitter part, max. 70 °C (158 °F); impedance 75 Ω		
5 m (16.4 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2" ... 3") remote mounting	A5E01208092	
10 m (32.8 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2" ... 3") remote mounting	A5E01208114	
20 m (65.6 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2" ... 3") remote mounting	A5E01208117	
30 m (98.4 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2" ... 3") remote mounting	A5E01208121	
0.5 m (1.64 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2" ... 3") for compact version of FUS380/FUE380	A5E01208126	
DN 100 to 1200 flowmeters		
Coaxial cable for FUS080; with 0.3 m brown PTFE high temp. transducer part, max. 200 °C (392 °F) and black PVC for remaining transmitter part, max. 70 °C (158 °F); impedance 75 Ω		
5 m (16.4 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4" ... 48") remote mounting	A5E00695476	
10 m (32.8 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4" ... 48") remote mounting	A5E00695479	
20 m (65.6 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4" ... 48") remote mounting	A5E00695480	
30 m (98.4 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4" ... 48") remote mounting	A5E00695483	
1 m (3.28 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4" ... 48") for compact version of FUS380/FUE380	A5E00695486	

Sensor cables for SONOKIT flowmeter with FUS080

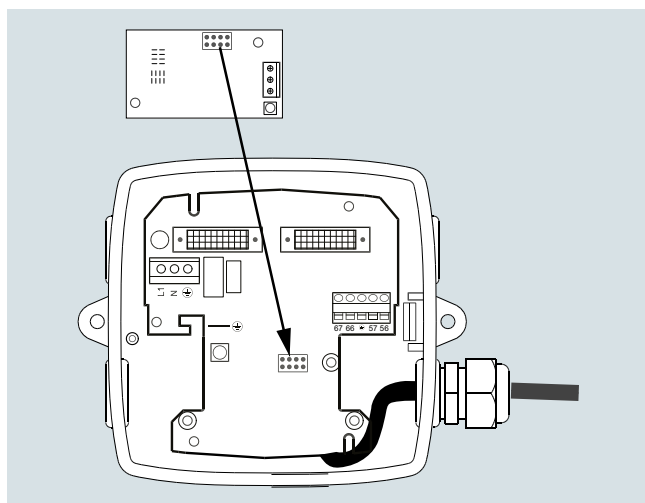
Description	Article No.	
15 m (49.2 ft) cable set (2 pcs.) remote mounting with SONOKIT flowmeters	A5E02478541	
30 m (98.4 ft) cable set (2 pcs.) remote mounting with SONOKIT flowmeters	A5E02478751	

Sensor cables for FUS880 retrofitting systems (7ME3440)

Description	Article No.	
Coaxial cable with transducer connection		
for use in FUS880 and SONO 3300 sensors; with 0.3 m brown PTFE high temperature transducer part, max. 200 °C (392 °F) and black PVC for the remaining transmitter part, max. 70 °C (158 °F); cable impedance 75 Ω		
• 1 x 10 m (32.8 ft)	FDK:085L2400	
• 1 x 20 m (65.6 ft)	FDK:085L2401	
• 1 x 30 m (98.4 ft)	FDK:085L2402	
Transducer spare part set of two transducers with gaskets for STRANS FUS880 retrofitting systems	FDK:087H3007	

Schematics


Electrical connection of SITRANS FUS080



Analog module SITRANS FUS080

Flow Measurement

SITRANS F US Inline

Flowmeter SONO 3300/FUS060

Overview



The combination of SONO 3300 sensor and FUS060 transmitter is ideal for applications within the general industry. Measurements are independent of liquid temperature, density, pressure and conductivity. Transducers cannot be replaced.

Benefits

- Robust remote transmitter FUS060
- Robust design for industrial applications
- Measures all liquids less than 350 cSt, conductive or non-conductive
- No pressure drop
- Reliable and accurate flow measurements
- Long-time stability
- ATEX approval

Application

The main application for SONO 3300/FUS060 ultrasonic flowmeter is measurement of volume.

SONO 3300/FUS060 can be used for water and treated waste water, oil, hot water/cooling systems.

Design

The SONO 3300/FUS060 consists of a casted sensor (DN 50 to 80 (2" to 3")), welded pipes (DN 100 to 300 (4" to 12")) and a transmitter FUS060.

The transmitter can only be mounted separately.

The internal signal cables from transducers to sensor connection box are protected from an aggressive environment by stainless steel pipes.

Sensor installation

See system information.

Technical specifications

The transmitter related to this system is the SITRANS FUS060. Technical specifications to the FUS060 see page 3/247.

2-path sensor with flanges and inline transducers

Error in measurement	
Error in measurement at reference conditions	$v > 0.5 \dots 10 \text{ m/s}$, $< \pm 0.5 \%$ of rate (v =flow speed)
Max. flow velocity	10 m/s (32 ft/s)
Nominal size	
	DN 50, DN 65, DN 80, DN 100, DN 125, DN 150, DN 200, DN 250, DN 300 (2" ... 12")
Media temperature	Separate version: $-10 \dots +160 \text{ }^{\circ}\text{C}$ (14 ... 320 $^{\circ}\text{F}$)
Ambient temperature (sensor)	Separate version: $-20 \dots +60 \text{ }^{\circ}\text{C}$ (-4 ... +140 $^{\circ}\text{F}$) Storage: $-40 \dots +85 \text{ }^{\circ}\text{C}$ (-40 ... +185 $^{\circ}\text{F}$)
Enclosure	Standard version: IP67 (NEMA 4X/NEMA 6) ATEX version: As standard, but with ATEX approval (see below)
Process connections	
PN designated EN 1092-1, type 11 (B)	<ul style="list-style-type: none"> • DN 50 ... 300 (2" ... 12"), PN 40 • DN 100 ... 300 (4" ... 12"), PN 16 • DN 200 ... 300 (8" ... 12"), PN 10
Class designated EN 1759-1	<ul style="list-style-type: none"> • DN 50 ... 300 (2" ... 12"), class 150 • DN 50 ... 300 (2" ... 12"), class 300
Transducer	Inline version welded into pipe
Materials	
Pipe	<ul style="list-style-type: none"> • DN 50 ... 80 (2" ... 3"): Cast steel EN 1.1131-GS-15Mn5 • DN 100 ... 300 (4" ... 12"): Carbon steel EN 1.0345-P235GH
Flange	<ul style="list-style-type: none"> • DN 50 ... 300 (2" ... 12"): EN 1.0025-S235JRG2
Class	ASTM A105
Transducer	Stainless steel AISI 316 or similar

Certificates and approvals

Conformity certificate	The devices are supplied as standard with a Siemens Certificate of Conformity on DVD
Material certificate	Material certificate according to EN 10204-3.1 is optionally available
NDT examination report	Extended material certificate is available on special request (PVR)
Calibration report	A standard calibration report is shipped with each flowmeter.
Extended accredited ISO/IEC 17025 calibration certificates	Optionally available
Approvals	No custody transfer approvals
Ex approval	System ATEX approval for SONO 3300 with remote transmitter FUS060-Ex (ATEX II 2 G Ex dem [ia/ib] IIC T6/T4/T3 Gb) For Ex version the transducer cable length is restricted to 3 m (9.84 ft), in order to meet requirements.

The sensors are approved according to EU directive 2014/68/EU dated 27 June 2014 regarding fluid group 1, classified in category III. Design according to EN 13480 (PED Directive).

Coaxial cable between sensor SONO 3300 and transmitter FUS060

Standard Coaxial cable (75 Ω)	Coaxial cable with SMB straight plug on one end for the FUS060 connector
Outside diameter	Ø 5.8 mm
Length	3, 15, 30, 60, 90, 120 m (9.84, 49.21, 98.43, 196.85, 295.28, 393.70 ft) between sensor and transmitter
Material (outside jacket)	black PE
Ambient temperature	-10 ... +70 °C (14 ... 158 °F)
High temperature Coaxial cable (75 Ω)	Coaxial cable with SMB straight plug on one end for the FUS060 connector
Outside diameter	Ø 5.13 mm (first 0.3 m (0.98 ft) part to the transducer), Ø 5.8 mm (for remaining cable to the transmitter - with SMB plug at the end) and between these is a black hot melt junction Ø 16 mm (length 70 mm)
Length	3, 15, 30, 60, 90, 120 m (9.84, 49.21, 98.43, 196.85, 295.28, 393.70 ft) between sensor and transmitter (max. 3 m (9.84 ft)) transducer cable length for Ex area mounted transmitters)
Material (outside jacket)	Brown PTFE (0.3 m (0.98 ft) part) and black PE (for remaining cable)
Ambient temperature	-200 ... +200 °C (-328 ... +392 °F) (brown PTFE transducer part) and -10 ... +70 °C (14 ... 158 °F) (black PE for remaining transmitter cable part)



Flow Measurement

SITRANS F US Inline

Flowmeter SONO 3300/FUS060

Selection and Ordering data		Article No.	Order code
Sensor SONO 3300 with transmitter FUS060		7ME3300-	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Diameter	Qn setting [m³/h]		
DN 50 (2")	10	1 A	
DN 50 (2")	26	1 B	
DN 50 (2")	60	1 D	
DN 65 (2½")	15	1 E	
DN 65 (2½")	42	1 F	
DN 65 (2½")	100	1 H	
DN 80 (3")	20	1 J	
DN 80 (3")	60	1 K	
DN 80 (3")	150	1 M	
DN 100 (4")	36	1 N	
DN 100 (4")	100	1 P	
DN 100 (4")	230	1 R	
DN 125 (5")	50	1 S	
DN 125 (5")	150	1 T	
DN 125 (5")	360	1 V	
DN 150 (6")	80	2 A	
DN 150 (6")	220	2 B	
DN 150 (6")	500	2 D	
DN 200 (8")	120	2 E	
DN 200 (8")	380	2 F	
DN 200 (8")	900	2 H	
DN 250 (10")	200	2 J	
DN 250 (10")	600	2 K	
DN 250 (10")	1400	2 M	
DN 300 (12")	300	2 N	
DN 300 (12")	850	2 P	
DN 300 (12")	2200	2 R	
Flange norm and pressure rating (All sizes are not available in all pressure ratings)			
EN 1092-1			
PN 10 (DN 200 ... 300 (8" ... 12"))		B	
PN 16 (DN 80 ... 300 (3" ... 12"))		C	
PN 40 (DN 50 ... 300 (2" ... 12"))		E	
ANSI B16.5			
class 150 (DN 50 ... 300 (2" ... 12"))		H	
class 300 (DN 50 ... 300 (2" ... 12"))		J	
Sensor type (approval) and transmitter mounting			
IP67 standard, remote transmitter		1	
IP67 Ex-version (ATEX), remote transmitter (Ex-version)		3	
Cable gland entries in FUS060 and SONO 3300			
Cable glands M20 in sensor and in transmitter M25/20/16 x 1.5		1	
Transmitter version of SITRANS FUS060			
IP65 (NEMA 4), 120/230 V AC		N	
IP65 (NEMA 4), 24 V AC/DC		P	
IP65 (NEMA 4), 24 V AC/DC, Ex-version (ATEX)		Q	

Selection and Ordering data	Article No.	Order code
Sensor SONO 3300 with transmitter FUS060	7ME3300-	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
FUS060 output module		
HART, 4 ... 20 mA, 1 pulse output, 1 relay	B	
HART, Ex version, 4 ... 20 mA, 1 pulse output, 1 relay	C	
PROFIBUS PA, 1 pulse/frequency	D	
Transducer coaxial cable		
4 x 3 m, max. 70 °C (158 °F), the only option for Ex i	0	
4 x 15 m, max. 70 °C (158 °F)	1	
4 x 30 m, high temp. max.200 °C (392 °F)	2	
4 x 30 m, max. 70 °C (158 °F)	3	
4 x 60 m, max. 70 °C (158 °F)	4	
4 x 90 m, max. 70 °C (158 °F)	5	
4 x 120 m, max. 70 °C (158 °F)	6	
4 x 3 m, high temp. max. 200 °C (392 °F), the only option for Ex i	7	
4 x 15 m, high temp. max. 200 °C (392 °F)	8	

Selection and Ordering data	Order code
Additional information	
Please add „-Z“ to Article No. and specify Order code(s) and plain text.	
<u>Calibration</u>	
Production calibration DN 50 ... DN 300 (with certificate, 2 x 3 points in 10 %, 25 % and 100 % Qn)	Included
Accredited Siemens ISO/IEC 17025 calibration for DN 50 to DN 200 with Qn as selected in Diameter. Calibration certificate: 2 x 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 630 m³/h).	D20
Accredited Siemens ISO/IEC 17025 calibration for DN 200 to DN 300 with Qn as selected in Diameter. Calibration certificate: 2 x 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 2000 m³/h).	D21
<u>Material certificate</u>	
EN 10204-3.1	F10
<u>Tag name plate</u>	
Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 ... 10 characters, 4 mm for 11 ... 20 characters (specify in plain text).	Y17



Please use online Product selector to get latest updates. Product selector link:

www.pia-portal.automation.siemens.com


Flowmeter SONO 3300 with FUS060 operating instructions, accessories and spare parts
Operating instructions

Description	Article No.
SITRANS FUS060	
• English	A5E01204521
• German	A5E02123845
SITRANS F US SONO 3300	
• English	A5E01365400
• German	A5E02690975

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation


Accessories
Potting kit

Description	Article No.
Potting kit for terminal box of SONO 3200 transducers for IP68/NEMA 6P (not for Ex sensors)	FDK:085L2403



Cable connection boxes

(Optional for the connection of individually transducer cables with the FUS060 transducer cables)


Description	Article No.
Junction box for coaxial cable	
• IP65 metal box for 4 coaxial cables (2 pair)	FDK:085B1361


Spare parts
Cables for SONO 3300 with FUS060 (only as spare parts)

Description	Length m (ft)	Article No.
Coaxial cable for FUS060, (75 Ω, max. 70 °C (158 °F), black PVC) (2 pcs.)	3 (9.84)	A5E00875101
	15 (49.21)	A5E00861432
	30 (98.43)	A5E01278662
	60 (196.85)	A5E01278682
	90 (295.28)	A5E01278687
	120 (393.70)	A5E01278698
High temp. coaxial cable for FUS060; with 0.3 m brown PTFE high temp. transducer part (max. 200 °C (392 °F)) and black PVC transmitter part with SMB plug (max. 70 °C (158 °F)); impedance 75 Ω (2 pcs.)	3 (9.84)	A5E00875105
	15 (49.21)	A5E00861435
	30 (98.43)	A5E01196952


Cable glands (for the SONO 3300 terminal box) (only as spare parts)





Type	Material	Temperature range [°C (°F)]	Article No.
M20	Nickel-plated brass, 2x cables Ø 5 ... 6 mm (2 pcs.)	-25 ... +200 (-13 ... +392)	A5E02246329



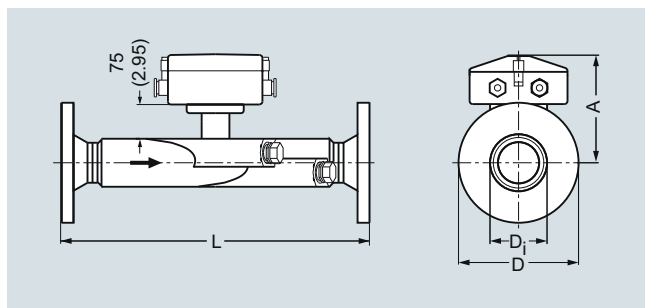
Flow Measurement

SITRANS F US Inline

Flowmeter SONO 3300/FUS060

Description	Article No.		Description	Article No.	
SONO 3300 terminal box lid, in stainless steel painted black (1 pc.)	FDK:085U1505		SONO 3300 stainless steel terminal box (1 pc.), M20 cable gland version, incl. lid in stainless steel (painted black) and gasket in EPDM	A5E00836867	
Gasket for SONO 3300 terminal lid in EPDM (1 pc.)	FDK-085U1820		Coax cable connecting plate (1 pc.) for SONO 3300 terminal box and use with transmitter type FUS060	A5E02593568	

Dimensional drawings



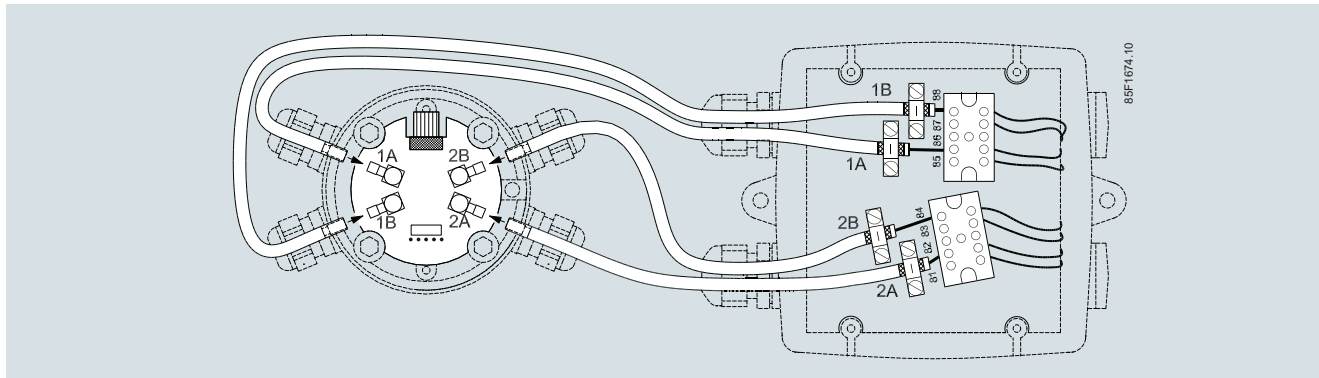
Sensor SONO 3300, dimensions in mm (inch)

DN	EN 1092-1																	
	PN 10						PN 16						PN 40					
	L ¹⁾		D		D _i		L ¹⁾		D		D _i		L ¹⁾		D		D _i	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
50													475	18.70	165	6.50	52.60	2.07
65													475	18.70	185	7.28	62.70	2.47
80							380	14.96	200	7.87	78.00	3.07	400	15.75	200	7.87	78.00	3.07
100							375	14.76	220	8.66	102.40	4.00	400	15.75	235	9.25	102.40	4.00
125							375	14.76	250	9.84	128.30	5.05	400	15.75	270	10.63	128.30	5.05
150							360	14.17	285	11.22	154.20	6.07	400	15.75	300	11.81	154.20	6.07
200	400	15.75	340	13.39	207.30	8.16	400	15.75	340	13.39	207.30	8.16	450	17.72	375	14.76	206.50	8.13
250	400	15.75	395	15.55	260.40	10.25	400	15.75	405	15.94	260.40	10.25	500	19.69	450	17.72	258.80	10.19
300	400	15.75	445	17.52	309.70	12.19	420	16.54	460	18.11	309.70	12.19	500	19.69	515	20.28	307.90	12.12

DN	ANSI												EN and ANSI		Weight ²⁾			
	150 lb						300 lb								EN		ANSI	
	L ¹⁾		D		D _i		L ¹⁾		D		D _i		A	kg	lb	kg	lb	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	kg	lb	kg	lb
50 mm/2"	510	20.08	152	5.98	52.6	2.07	520	20.47	165	6.50	52.6	2.07	180	7.09	14	30.9	17	37.5
65 mm/2½"	510	20.08	178	7.01	62.7	2.47	520	20.47	190	7.48	62.7	2.47	186	7.32	16	35.3	20	44
80 mm/3"	420	16.54	191	7.52	78.0	3.07	440	17.32	210	8.27	78.0	3.07	193	7.60	19	42	23	51
100 mm/4"	420	16.54	229	9.01	102.4	4.03	440	17.32	254	10	102.4	4.03	205	8.07	25	55	35	78
125 mm/5"	440	17.32	254	10.00	128.3	5.05	460	18.11	279	10.98	128.3	5.05	218	8.58	29	64	40	89
150 mm/6"	430	16.93	279	10.98	154.2	6.07	450	17.71	318	12.52	154.2	6.07	232	9.13	35	78	50	111
200 mm/8"	480	18.90	343	13.50	202.7	7.98	500	19.69	381	15	202.7	7.98	256	10.08	54	119	72	160
250 mm/10"	490	19.29	406	15.98	254.5	10.02	520	20.47	444	17.48	254.5	10.03	283	11.14	85	189	98	217
300 mm/12"	550	21.65	483	19.02	306.3	12.06	580	22.83	521	20.51	306.3	12.06	309	12.17	115	256	142	322

¹⁾ Length tolerance (mm): DN 50 ... 100 +2/-3, DN 125 ... 200 +3/-4, DN 250 ... 300 +4/-5

²⁾ Approximate weights without transmitter FUS060 - weight of FUS060 is 4.4 kg (9.7 lb)

Schematics

Electrical connection of SITRANS FUS060 and SONO 3300

Flow Measurement

SITRANS F US Inline

Flowmeter SONO 3100/FUS060

Overview



The combination of the SONO 3100 sensor and the FUS060 transmitter is ideal for applications where process shut-down is impossible during service and where there is a need for extreme high/low temperatures and pressures.

Transducers can be changed without interrupting operation. SONO 3100 can optionally be delivered as a 4-path solution for absolute best performance and accuracy.

Benefits

- Transducers can be replaced under pressure
- Measurement of all liquids less than 350 Cst, conductive or non-conductive
- No pressure drop
- Reliable and accurate flow measurements
- Long-time stability
- On request as special versions:
 - Special sensor material, e.g. Duplex, stainless steel
 - High/low temperature sensor version: +250 °C (+482 °F)/ -200 °C (-328 °F) sensors
 - Pressure rating 430 bar (6235 psi)
 - Special sensor sizes down to DN 25
 - 1-path or 2-path sensor technology

Application

The main application for SONO 3100 in combination with transmitter type FUS060 is to measure volume flow within:

- Petrochemical industry
- Power engineering
- Water and waste water
- Oil and liquefied gases

SITRANS FUS060 holds ATEX for hazardous areas, HART and PROFIBUS PA. SONO 3100 holds ATEX Ex approval.

Design

The SONO 3100 in combination with FUS060 consists of a SONO 3100 sensor, SONO 3200 transducers with O-rings or flanges depending on selection - and a FUS060 transmitter.

SONO 3100 is basically supplied in a 2-path solution with flanges in sizes from DN 100 to DN 600 and without flanges in sizes from DN 100 to DN 300.

2 path standard, 1-path or 4-path special versions are available on request, depending on size (DN 25 to DN 1200).

SONO 3100 is as standard available in carbon steel from DN 100 to DN 600.

FUS060 is designed for remote wall mounting only.

Technical specifications

The transmitter related to this system is the SITRANS FUS060. Technical specifications to the FUS060 see page 3/247.

2-path sensor fitted with four SONO 3200 transducers

Error in measurement

Error in measurement at reference conditions	$v > 0.5 \dots 10 \text{ m/s}$, $< \pm 0.5 \% \text{ of rate}$ ($v = \text{flow velocity}$)
Max flow velocity	10 m/s (32 ft/s)
Nominal size	DN 100 ... 600 (4" ... 24")
Media temperature	<ul style="list-style-type: none"> • Standard -10 ... +200 °C (14 ... 392 °F) • ATEX Ex d version -20 ... +180 °C (-4 ... +356 °F) • ATEX Ex i version -10 ... +190 °C (14 ... 374 °F) • Specials -200 °C (-328 °F) or up to 250 °C (482 °F)
Ambient temperature	<ul style="list-style-type: none"> • Standard and Ex-i version -20 ... +60 °C (-4 ... +140 °F) • Ex d version -20 ... +180 °C (-4 ... +356 °F)
Enclosure	IP67 (NEMA 4X/6)/IP68 (NEMA 6P) and ATEX (see below)

Process connections

<u>PN designated, EN 1092-1, type 11 (B)</u>	<ul style="list-style-type: none"> • DN 200 ... 600 (8" ... 24"), PN 10 • DN 100 ... 600 (4" ... 24"), PN 16 • DN 200 ... 600 (8" ... 24"), PN 25 • DN 100 ... 500 (4" ... 20"), PN 40
Pipe material carbon steel	
<u>Class designated, EN 1759-1</u>	<ul style="list-style-type: none"> • DN 100 ... 600 (4" ... 24") Class 150 • DN 100 ... 300 (4" ... 12") Class 300
Pipe material carbon steel	
<u>Without flanges (EN 10217), (weld-in version)</u>	<ul style="list-style-type: none"> • DN 350 ... 600 (14" ... 24"), PN 10 • DN 100 ... 600 (4" ... 24"), PN 16 • DN 200 ... 600 (8" ... 24"), PN 25 • DN 100 ... 500 (4" ... 20"), PN 40
only in carbon steel	
Transducer SONO 3200	O-ring or flange versions

Materials

Pipe	Steel EN 1.0345-P235GH
Flange	
PN	EN 10025-S235JRG2, 1E1
Class	ASTM A105, 1,1
Transducer body	Stainless steel AISI 316 or similar
Transducer terminal house	Stainless steel AISI 316 or plastic PA 6.6

Certificates and approvals

System ATEX approval for SONO 3100 together with transmitter FUS060-Ex

ATEX II 2G Ex dem [ia/ib] IIC T6/T4/T3 Gb or
ATEX II 2G Ex d IIC T3-T6 Gb with SONO 3200 Exd transducers (for standard FUS060 transmitter, installed outside of Ex zone)

For FUS060 Ex version the transducer cable length is restricted to 3 m (9.84 ft), in order to meet requirements for electrical immunity.

Conformity certificate CE

The devices are supplied as standard with a Siemens Certificate of Conformity on DVD

Material certificate

Material certificate according to EN 10204-3.1 is optionally available

NDT examination report

Extended material certificate is optionally available

Pressure certificate

Pressure test according to EN 10204-2.3 optionally available

Calibration report

A standard calibration report is shipped with each flowmeter.

Optionally available:
Extended accredited ISO/IEC 17025 calibration certificates

Approvals

No custody transfer approvals

The sensor SONO 3100 with transmitter FUS060 conforms to Product Family Standard EN 61326/A3 appendix A (Title: Electrical Equipment for Measurement control and laboratory use – EMC requirements).

The sensors are approved according to EU directive 2014/68/EU dated 27 June 2014 regarding fluid group 1, classified in category III. Design according to EN 13480 (PED Directive).

The SONO 3100 as weld-in version does not include the flanges. Thus, it can neither be tested nor approved according to PED. After the installation, all installation-related activities (welding, pressure test etc.) are the responsibility of the customer.

Selection and Ordering data

Article No. Order code

SITRANS F US SONO 3100 sensor 2-path

7ME3100-

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Diameter Qn setting [m³/h]

DN 100 (4")	28
DN 100 (4")	100
DN 100 (4")	220
DN 125 (5")	44
DN 125 (5")	150
DN 125 (5")	350
DN 150 (6")	64
DN 150 (6")	220
DN 150 (6")	500
DN 200 (8")	110
DN 200 (8")	380
DN 200 (8")	900
DN 250 (10")	180
DN 250 (10")	600
DN 250 (10")	1300
DN 300 (12")	250
DN 300 (12")	850
DN 300 (12")	2000
DN 350 (14")	350
DN 350 (14")	1000
DN 350 (14")	2800 ¹⁾
DN 400 (16")	450
DN 400 (16")	1300
DN 400 (16")	3600
DN 500 (20")	1300
DN 500 (20")	2200
DN 500 (20")	4200 ⁿ⁾
DN 600 (24")	1300
DN 600 (24")	3200
DN 600 (24")	4200 ⁿ⁾

1 N
1 P
1 R
1 S
1 T
1 V
2 A
2 B
2 D
2 E
2 F
2 H
2 J
2 K
2 M
2 N
2 P
2 R
2 S
2 T
2 V
3 A
3 B
3 D
3 J
3 K
3 M
3 S
3 T
3 V

Flange norm and pressure rating

(All sizes are not available in all pressure ratings)

EN 1092-1

PN 10 (DN 200 ... DN 600)	B
PN 16 (DN 100 ... DN 600)	C
PN 25 (DN 200 ... DN 600)	D
PN 40 (DN 100 ... DN 500)	E

ANSI B16.5

class 150 (DN 100 ... DN 600)	H
class 300 (DN 100 ... DN 300)	J

Pipe without flanges (EN 10217) (weld-in version)²⁾

PN 10 (DN 200 ... DN 600)	P
PN 16 (DN 100 ... DN 600)	Q
PN 25 (DN 200 ... DN 600)	R
PN 40 (DN 100 ... DN 500)	S

Flow Measurement

SITRANS F US Inline

Flowmeter SONO 3100/FUS060

Selection and Ordering data

SITRANS F US SONO 3100 sensor 2-path

Article No. Order code

7ME3100-

Pipe and flange material

Carbon steel (DN 100 ... 1200)

Transducer type and approval

IP67 (NEMA 4X/6) PA housing, PN 40, O-ring, 50 mm, 100 °C (212 °F) (DN 100 ... 600)

IP68 SS housing, PN 40, O-ring, 50 mm, 200 °C (392 °F) (DN 100 ... 600)

IP68 SS housing, PN 40, O-ring, 50 mm, 180 °C (356 °F), Ex d ATEX approval (only with standard FUS060) (DN 100 ... 600)

IP67 (NEMA 4X/6) PA housing, PN 40, flange, 88 mm, 100 °C (212 °F) (DN 100 ... 300)

IP68 SS housing, PN 40, flange, 88 mm, 200 °C (392 °F) (DN 100 ... 300)

IP68 SS housing, PN 40, flange, 88 mm, 180 °C (356 °F), Ex d ATEX approval (only with standard FUS060) (DN 100 ... 300)

IP67 SS housing, PN 40, O-ring, 50 mm, 190 °C (374 °F), Ex i ATEX approval (only with FUS060 Ex-version) (DN 100 ... 600)

IP67 SS housing, PN 40, flange, 88 mm, 190 °C (374 °F), Ex i ATEX approval (only with FUS060 Ex-version) (DN 100 ... 300)

Cable gland entries

Cable glands M20 in transducers and in transmitter M25/20/16 x 1.5

Cable glands ½" NPT in transducers and in transmitter

Transmitter version of SITRANS FUS060

IP65 (NEMA 4), 120/230 V AC

IP65 (NEMA 4), 24 V AC/DC

IP65 (NEMA 4), 24 V AC/DC ATEX Ex version

FUS060 output module

HART, 1 pulse output, 1 relay

HART Ex, 1 pulse output, 1 relay

PROFIBUS PA, 1 pulse/frequency

Transducer coaxial cable

4 x 3 m, max. 70 °C (158 °F), the only option for Ex i

4 x 15 m, max. 70 °C (158 °F)

4 x 30 m, high temp. max. 200 °C (392 °F)

4 x 30 m, max. 70 °C (158 °F)

4 x 60 m, max. 70 °C (158 °F)

4 x 90 m, max. 70 °C (158 °F)

4 x 120 m, max. 70 °C (158 °F)

4 x 3 m, high temp. max. 200 °C (392 °F), the only option for Ex i

4 x 15 m, high temp. max. 200 °C (392 °F)

Selection and Ordering data

Order code

Additional information

Please add „-Z“ to Article No. and specify Order code(s) and plain text.

Calibration

Production calibration DN 100 ... DN 600 (with certificate)

Included

Accredited Siemens ISO/IEC 17025 calibration for DN 100 to DN 200 with Qn as selected in diameter. Calibration certificate: 2 x 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 630 m³/h).

D20

Accredited Siemens ISO/IEC 17025 calibration for DN 200 to DN 600 with Qn as selected in diameter. Calibration certificate: 2 x 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 2800 m³/h).

D21

Accredited Siemens ISO/IEC 17025 calibration for DN 400 to DN 600 with Qn as selected in diameter. Calibration certificate: 2 x 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 8000 m³/h).

D22

Material certificate

EN 10204-3.1

EN 10204-3.1 and 100 % NDT on weldings, DN 100 ... DN 400

F10**F11**

EN 10204-3.1 and 100 % NDT on weldings, DN 500 ... DN 600

F12

Pressure certificate

EN 10204-2.3

F21

Tag name plate

Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 ... 10 characters, 4 mm for 11 ... 20 characters (specify in plain text).

Y17

Please use online Product selector to get latest updates. Product selector link:

www.pia-portal.automation.siemens.com

- 1) Reduced Q value during calibration (Qn setting unchanged).
 2) For weld-in sensor versions according to EN 10217 (flangeless sensors 7ME3100-xxYxx-xxxx, Y = P, Q, R, S) the tube roundness shall be agreed via the PVR process (only if the factor of Du / Wxx > 100).

Flowmeter SONO 3100 with FUS060 operating instructions, accessories and spare parts
Operating instructions

Description	Article No.
SITRANS FUS060	
• English	A5E01204521
• German	A5E02123845
SITRANS F US SONO 3100	
• English	A5E00814513

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Accessories

Description	Article No.
Potting kit for terminal box of SONO 3200 transducer for IP68/NEMA 6P (not for Ex sensors)	FDK:085L2403

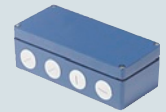


Description	Transducer length	Article No.
Extraction tool for replacement of SONO 3200 O-ring transducers under pressure and for hot-tapping (working conditions: typically water, max. 40 bar and max. 60 °C (max. 580 psi and max. 140 °F))	50 mm (1.97") transducers	FDK:085B5331



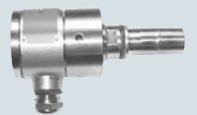
Cable connection boxes
(For the connection of individually transducer cables with the FUS060 transducer cables)

Description	Article No.
Junction box for coaxial cable	
• IP65 metal box for 4 coaxial cables (2 pair)	FDK:085B1361
• IP65 EEx e plastic box for 4 coaxial cables (2 pair), no ATEX approval	FDK:085B1363


Spare parts

Transducer SONO 3200 spare parts, complete units

Type	Material	Gasket	Press. rating	Terminal housing	Approv.	Temp. range [°C (°F)]	Length mm (inch)	Article No.
O-ring	316 SS	O-ring	PN 40	Plastic, PA 6.6 M20		-20 ... +100 (-4 ... +212)	50 (1.97)	FDK:085B5453
O-ring	316 SS	O-ring	PN 40	316 SS M20		-20 ... +200 (-4 ... +392)	50 (1.97)	FDK:085B5450
O-ring	316 SS	O-ring	PN 40	316 SS M20	Ex d ¹⁾	-20 ... +180 (-4 ... +356)	50 (1.97)	FDK:085B5451
O-ring	316 SS	O-ring	PN 40	316 SS M20	Ex i ²⁾	-10 ... +190 (14 ... 374)	50 (1.97)	A5E00836448
O-ring	316 SS	O-ring	PN 40	Plastic, PA 6.6 ½" NPT		-20 ... +100 (-4 ... +212)	50 (1.97)	A5E00839472
O-ring	316 SS	O-ring	PN 40	316 SS ½" NPT		-20 ... +200 (-4 ... +392)	50 (1.97)	A5E00839431
Flange	316 SS	Graphite	PN 40	Plastic, PA 6.6 M20		-20 ... +100 (-4 ... +212)	88 (3.47)	FDK:085B5461
Flange	316 SS	Graphite	PN 40	316 SS M20		-20 ... +200 (-4 ... +392)	88 (3.47)	FDK:085B5462
Flange	316 SS	Graphite	PN 40	316 SS M20	Ex d ¹⁾	-20 ... +180 (-4 ... +356)	88 (3.47)	FDK:085B5463
Flange	316 SS	Graphite	PN 40	316 SS M20	Ex i ²⁾	-10 ... +190 (14 ... 374)	88 (3.47)	A5E00836465
Flange	316 SS	Graphite	PN 40	Plastic, PA 6.6 ½" NPT		-20 ... +100 (-4 ... +212)	88 (3.47)	A5E00839479
Flange	316 SS	Graphite	PN 40	316 SS ½" NPT		-20 ... +200 (-4 ... +392)	88 (3.47)	A5E00839440
Flange	316 SS	Copper ring	PN 40	316 SS PG13.5 (cryogenic version)		-200 ... +100 (-328 ... +212)	88 (3.47)	FDK:085B5416
Flat flange	316 SS	Flat gasket	PN 40	316 SS M20 (cryogenic version)		-200 ... +100 (-328 ... +212)	88 (3.47)	A5E02593524



¹⁾ ATEX (Ex) IIC 2G Ex d IIC T3-T6 Gb


²⁾ For systems with FUS060 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3

Flow Measurement

SITRANS F US Inline

Flowmeter SONO 3100/FUS060


Terminal housing for SONO 3200 sensor

Type	Pressure rating	Material	Temp. range [°C (°F)]	Article No.	
Terminal housing (M20 cable gland)	N/A	PA 6.6	-20 ... +100 (-4 ... +212)	FDK:085B5501	
Terminal housing (M20 cable gland)	N/A	ASTM 316	-20 ... +200 (-4 ... +392)	FDK:085B5504	
Terminal housing (½" NPT cable gland)	N/A	PA 6.6	-20 ... +100 (-4 ... +212)	A5E00839460	
Terminal housing (½" NPT cable gland)	N/A	ASTM 316	-20 ... +200 (-4 ... +392)	A5E00839427	
Ex d ¹⁾ terminal housing (M20 cable gland)	N/A	ASTM 316	-20 ... +180 (-4 ... +356)	FDK:085B5505	
Ex i ²⁾ terminal housing (M20 cable gland)	N/A	ASTM 316	-10 ... +190 (14 ... 374)	A5E00835255	

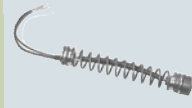
1) ATEX (Ex) IIC 2G EEx d IIC T3 ... T6

2) For systems with FUS060 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3



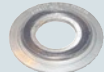
SONO 3200 spare parts, transducer body without terminal housing, including insert

Type	Material	Gasket	Pressure rating	Temp. range [°C (°F)]	Length mm (inch)	Article No.	
O-ring	316 SS	O-ring	PN 40	-20 ... +200 (-4 ... +392)	50 (1.97)	FDK:085B1405	
Flange	316 SS	Graphite	PN 40	-20 ... +200 (-4 ... +392)	88 (3.47)	FDK:085B1464	

SONO 3200 spare parts, transducer insert

Type	Temp. range [°C (°F)]	Length mm (inch)	Article No.	
Insert	-20 ... +200 (-4 ... +392)	50 (1.97)	FDK:085B1411	
Insert	-20 ... +200 (-4 ... +392)	88 (3.47)	FDK:085B1459	


Transducer SONO 3200 gaskets

Type	Pressure rating	Material	Temperature range [°C (°F)]	Article No.	
Gasket O-ring (3 pcs. for o-ring transducers)	PN 40	FKM	-20 ... +200 (-4 ... +392)	FDK:085B1089	
Gasket flange	PN 40/160	Graphite	-20 ... +200 (-4 ... +392)	FDK:085B1080	
Gasket and 12 mm (0.47") bolts and nuts for flange transducers (4 pcs.)	PN 40	AISI 316 or equal	-20 ... +200 (-4 ... +392)	FDK:085B1083	
Gasket and 16 mm (0.63") bolts and nuts for flange transducers (4 pcs.)	PN 160	Graphite, 316 SS	-20 ... +200 (-4 ... +392)	FDK:085B1084	
Gasket for cryogenics transducer with flat flange (2 pcs.)	PN 40	Graphite/metal composite	-200 ... +100 (-328 ... +212)	A5E02593522	

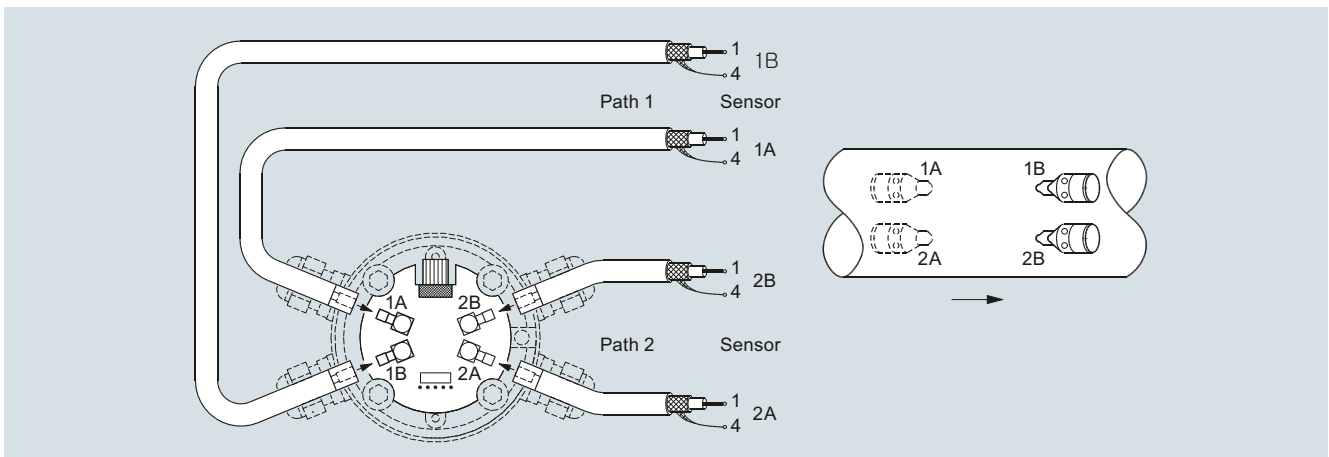
SONO 3200 cable glands

Type/description	Temperature range [°C (°F)]	Appr.	Article No.	
black PA plastic, cable Ø 5 ... 13 mm (1 pc.)	-20 ... 100 (-4 ... +212)		A5E02246304	
½" NPT gray PA plastic, cable Ø 5 ... 9 mm (1 pc.)	-20 ... 100 (-4 ... +212)		A5E02246309	
½" NPT chrome-plated brass, cable Ø 5 ... 9 mm (1 pc.)	-40 ... 100 (-40 ... +212)		A5E02246258	
M20 stainless steel, cable Ø 4 ... 6 mm (1 pc.)	-25 ... 200 (-13 ... +392)	Ex i	A5E02246194	
M20 Stainless steel, cable Ø 5 ... 8 mm (1 pc.)	-60 ... 180 (-76 ... +356)	Ex d	A5E02246311	

Cables for SONO 3100 with FUS060

Description	Length m (ft)	Article No.	
Coaxial cable for FUS060, (75 Ω, max. 70 °C (158 °F), black PVC) (2 pcs.)	3 (9.84)	A5E00875101	
	15 (49.21)	A5E00861432	
	30 (98.43)	A5E01278662	
	60 (196.85)	A5E01278682	
	90 (295.28)	A5E01278687	
	120 (393.7)	A5E01278698	
High temp. coaxial cable for FUS060; with 0.3 m brown PTFE high temp. transducer part, max. 200 °C (392 °F) and black PVC for remaining transmitter part with SMB plug, max. 70 °C (158 °F); (impedance 75 Ω) (2 pcs.)	3 (9.84)	A5E00875105	
	15 (49.21)	A5E00861435	
	30 (98.43)	A5E01196952	
SITRANS F US special coaxial cable sets for low temperature cryogenic systems, with SMB-plug for transmitter SITRANS FUS060, PTFE material, temp. -200 ... +200 °C (-328 ... +392 °F), impedance 75 Ω (2 pcs.)	10 (32.84)	A5E02085593	
	15 (49.21)	A5E03262088	
	30 (98.43)	A5E02085644	
	40 (131.23)	A5E02085649	

Schematics



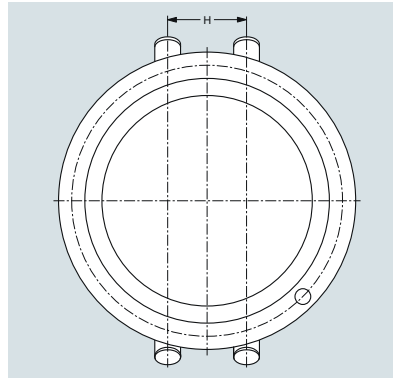
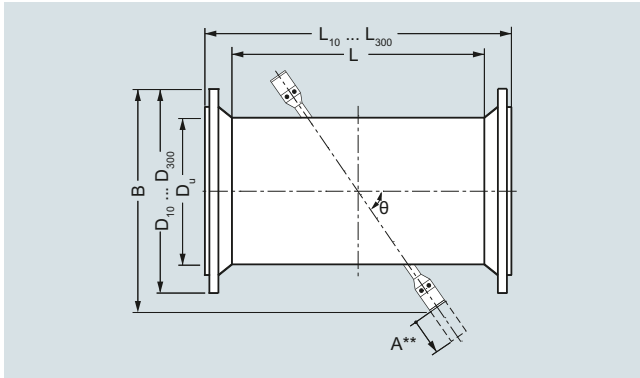
Electrical connection of SITRANS FUS060 and SONO 3100

Flow Measurement

SITRANS F US Inline

Flowmeter SONO 3100/FUS060

Dimensional drawings of sensor SONO 3100



Sensor SONO 3100 with EN norm

DN	D _U	L ^{1) 4)}	B ⁵⁾	θ	H	PN 10	PN 16	PN 25	PN 40
	[mm]	[mm]	[mm]	[°]	[mm]	W _{min} ²⁾ D ₁₀ L ₁₀ ¹⁾	W _{min} ²⁾ D ₁₆ L ₁₆ ¹⁾	W _{min} ²⁾ D ₂₅ L ₂₅ ¹⁾	W _{min} ²⁾ D ₄₀ L ₄₀ ¹⁾
100	114.3	860	305	45 ³⁾	42.8	- - -	3.6 220 960	- - -	3.6 235 990
125	139.7	862	325	45 ³⁾	64.5	- - -	4.0 250 970	- - -	4.0 270 990
150	168.3	862	350	45 ³⁾	78.1	- - -	4.5 285 970	- - -	4.5 300 1010
200	219.1	668	430	45 ³⁾	102.1	6.3 340 790	6.3 340 790	6.3 360 820	6.3 375 840
250	273.0	714	480	45 ³⁾	127.6	6.3 395 850	6.3 405 850	7.1 425 890	7.1 450 920
300	323.9	607	525	45 ³⁾	151.8	7.1 445 740	7.1 460 760	8.0 485 790	8.0 515 830
350	355.6	639	550	45 ³⁾	166.4	8.0 505 770	8.0 520 800	8.0 555 840	8.8 580 880
400	406.4	703	600	45 ³⁾	191.3	8.0 565 850	8.0 580 875	8.8 620 925	11.1 660 975
500	508.0	797	690	45 ³⁾	241.1	7.1 670 950	8.0 715 980	10.0 730 1050	14.2 755 1080
600	610.0	912	830	60	294.8	7.1 780 1075	8.8 840 1105	11.0 845 1165	- - -

¹⁾ Length tolerance (mm): DN 100 +2/-3, DN 125 ... 200 +3/-4, DN 250 ... 400 +4/-5, DN 500 ... 600 +5/-6

²⁾ Wall thickness for pressure rates PN 6 ... 40. For weld-in sensor versions according EN10217 (flangeless sensors 7ME3100-xxYxx-xxxx, Y=P, Q, R, S) the tube roundness shall be agreed via the PVR process (only if the factor of Du/Wxx > 100).
W_{min} wall thickness are min. values. The delivered sensor can have larger wall thicknesses to meet the selected pressure rate. Any specific required wall thickness must be ordered as PVR.

³⁾ For all sensors with flange transducers path angle are 60°

⁴⁾ L is the length of sensor versions without flanges (weld-in version). For weld-in sensor versions according to EN 10217 (flangeless sensors 7ME3100-xxYxx-xxxx, Y = P, Q, R, S) the tube roundness shall be agreed via the PVR process (only if the factor of Du/Wxx > 100).

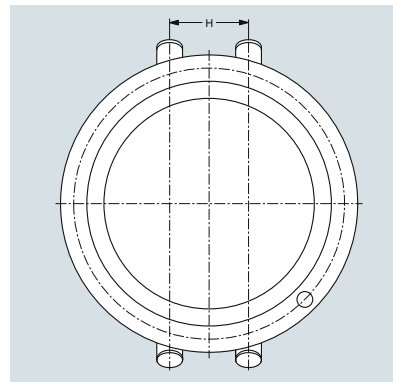
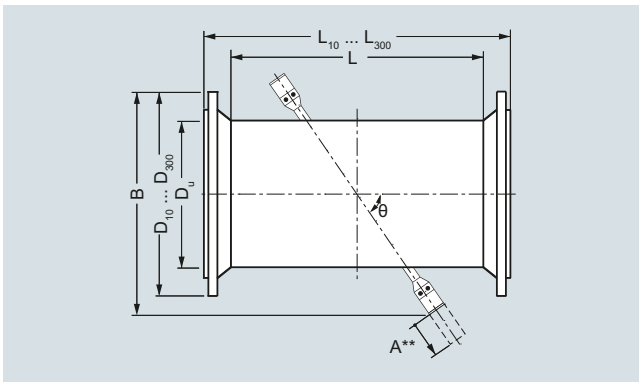
⁵⁾ B dimension value is an approximate information and may differ a little by flange pressure rate.

A**) Space required for replacement of transducer min. 230 mm (9.1 inch). For replacement with special tool (extraction tool) see more information on page 3/271.

SONO 3100, 2-path

Nominal diam.	Flange type - Weight [kg (lb)]			
DN	PN 10	PN 16	PN 25	PN 40
100 (4")	-	32 (70.5)	-	35 (77.2)
125 (5")	-	38 (83.8)	-	44 (97.0)
150 (6")	-	45 (99.2)	-	52 (114.6)
200 (8")	59 (130.0)	58 (127.9)	70 (154.3)	79 (174.2)
250 (10")	73 (161.0)	75 (163.3)	96 (211.6)	117 (257.9)
300 (12")	83 (183.0)	92 (202.8)	114 (251.3)	151 (332.9)
350 (14")	98 (216.0)	113 (249.1)	145 (322.9)	191 (421.1)
400 (16")	119 (262.4)	141 (310.9)	191 (421.1)	275 (606.3)
500 (20")	153 (337.3)	207 (456.4)	284 (626.0)	379 (836.0)
600 (24")	193 (425.5)	276 (608.5)	363 (800.3)	-

Weight of system incl. process flanges and standard O-ring transducers. For sensors with flange transducer please add approx. 10 kg (22.05 lb). For SS terminal housings instead of the standard PA housing add approx. 5 kg (11.03 lb).

**Sensor SONO 3100 with ANSI norm**

Size (DN)	D _u	L ^{1) 4)}	B ⁵⁾	θ	H	Class 150			Class 300		
						W _{min} ²⁾	D ₁₅₀	L ₁₅₀ ¹⁾	W _{min} ²⁾	D ₃₀₀	L ₃₀₀ ¹⁾
inch (mm)	[inch]	[inch]	[inch]	[°]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]
4 (100)	4.50	33.86	12.01	45 ³⁾	1.69	0.14	9.00	39.86	0.25	10.00	40.62
5 (125)	5.50	33.94	12.80	45 ³⁾	2.54	0.15	10.00	40.94	0.27	11.00	41.70
6 (150)	6.63	33.94	13.78	45 ³⁾	3.07	0.16	11.00	40.94	0.30	12.50	41.70
8 (200)	8.63	26.30	16.93	45 ³⁾	4.02	0.16	13.50	34.30	0.29	15.00	35.06
10 (250)	10.75	28.11	18.90	45 ³⁾	5.02	0.18	16.00	36.11	0.34	17.50	37.35
12 (300)	12.75	23.90	20.67	45 ³⁾	5.98	0.20	19.00	32.90	0.39	20.50	34.14
14 (350)	14.00	25.16	21.65	45 ³⁾	6.55	0.21	21.00	35.16	-	-	-
16 (400)	16.00	27.68	23.62	45 ³⁾	7.53	0.22	23.50	33.74	-	-	-
20 (500)	20.00	31.38	27.17	45 ³⁾	9.49	0.26	27.50	42.76	-	-	-
24 (600)	24.00	35.91	32.68	60	11.61	0.30	32.00	47.91	-	-	-

¹⁾ Length tolerance (mm): 4" +0.08"/-0.12" (+2/-3mm), 5" ... 8" +0.12"/-0.16" (+3/-4mm), 10" to 16" +0.16"/-0.20" (+4/-5mm), 20" ... 24" +0.20"/-0.24" (+5/-6mm)

²⁾ Minimum wall thickness for pressure rates Class 150 or Class 300. For weld-in sensor versions according to EN 10217 (flangeless sensors 7ME3100-xxYxx-xxxx, Y = P, Q, R, S) the tube roundness shall be agreed via the PVR process (only if the factor of D_u/W_{xx} > 100). W_{min} wall thickness are min. values. The delivered sensor can have larger wall thicknesses to meet the selected pressure rate. Any specific required wall thickness must be ordered as PVR.

³⁾ For all sensors with flange transducers path angle are 60°

⁴⁾ L is the length of sensor versions without flanges (weld-in version)

For weld-in sensor versions according to EN 10217 (flangeless sensors

7ME3100-xxYxx-xxxx, Y = P, Q, R, S) the tube roundness shall be agreed via the PVR process (only if the factor of D_u/W_{xx} > 100).

⁵⁾ B dimension value is an approximate information and may differ a little by flange pressure rate.

A**) Space required for replacement of transducer min. 230 mm (9.1 inch). For replacement with special tool (extraction tool) see more information in „Sensor SONO 3100 accessories and spare parts“ on page 3/271.

Flow Measurement

SITRANS F US Inline

Flowmeter SONO 3100/FUS060

Approximate weights for SONO 3100 sensor with ANSI B16.5 flanges

Nominal diameter		Weight [kg (lb)] ¹⁾			
DN	DN	CL150		CL300	
[inch]	[mm]	[kg]	[lb]	[kg]	[lb]
4	100	32	70.5	35	77.2
5	125	38	83.8	44	97.0
6	150	45	99.2	52	114.6
8	200	58	127.9	79	174.2
10	250	75	165.3	117	257.9
12	300	92	202.8	151	332.9
14	350	113	249.1	-	-
16	400	141	310.9	-	-
20	500	207	456.4	-	-
24	600	276	608.5	-	-

¹⁾ Weight of system incl. process flanges and standard O-ring transducers. For sensors with flange transducer please add approx. 10 kg (22.05 lb). For SS terminal housings instead of the standard PA housing add approx. 5 kg (11.03 lb).

Overview



SONOKIT is a transit time based ultrasonic flowmeter for retrofitting on existing pipelines.

The kit offers all necessary parts and special tools to make the installation as 1-path or 2-path flowmeter.

The set is made for installation on empty pipes or pipes under pressure without process shut-down (hot-tap).

Please contact Siemens for further information on hot-tap tools and instructions.

SONOKIT has inline transducers (in contact with media) which assure superior accuracy and performance.

Benefits

- Cost-effective solution – contains all the necessary components for retrofitting
- SONOKIT is easy to install in pipeline sizes DN 200 to DN 3000 (8" to 120") 1-path DN 100 to DN 2400 (4" to 96").
- No bypass installation necessary – withstands pressures up to 40 bar (580 psi) and media temperatures between -20 °C and +200 °C (-4 °F and +392 °F)
- High accuracy – the bigger the pipe, the more accurate the result
- Solid construction and no moving parts for a 100 % maintenance and obstruction-free flowmeter
- The SONOKIT comes with transducers in IP68 enclosure
- Available in a robust version that can be buried and withstands constant flooding
- Inline transducers assure superior accuracy and performance
- Automatic calculation of the calibration factor when pipe geometry data are entered in the transmitter
- FUS060 transmitter versions with HART or PROFIBUS PA
- FUS080 transmitter, battery or mains-powered

Application

- Raw water intake for water treatment plants
- Water distribution systems
- Irrigation systems
- Power generation (energy and water)
- District heating plants
- Cooling water plants within the industry and in power stations
- Systems within the oil and refinery business
- Sewage treatment plants
- Plants transporting non-conductive liquids

Design

The SONOKIT package box contains all necessary parts to build an ultrasonic flowmeter on existing pipes depending on choices at ordering:

- Papers to wrap around pipes for alignment of sensors
- Transducer alignment tools
- Mounting plates, transducer holders and SONO 3200 transducers
- Transducer cables
- SITRANS FUS060 or FUS080 transmitter for wall mounting
- 4-path version (up to DN 1500 (60")) is available on special request (PVR)

Technical specifications

The transmitter related to this system is the SITRANS FUS080 or FUS060.

Technical specifications to the FUS060 see page 3/247 and to FUS080 see page 3/253.

Accuracy

Typical, depending on accuracy of measurements of installation

- 2-path: $\pm (0.5 \dots 1.5 \%)$
- 1-path: $\pm (1 \dots 3 \%)$

Note:

Accuracy depends on the accuracy of the measurements taken at location. This means that inaccurate measurements of angles, distance between transducers, wall thickness and pipe diameter have a direct effect on the accuracy. Values measured are entered into the memory of the FUS060 or FUS080 transmitter.

Requirements for pipes

Size	FUS060: DN 100 ... DN 3000 (4" ... 120") FUS080: DN 100 ... DN 1200 (4" ... 48") max. 40 bar (580 psi)
Line pressure	
Media temperature	
• Standard	-10 ... +200 °C (14 ... 392 °F)
• ATEX Ex d version	-20 ... +180 °C (-4 ... +356 °F)
• ATEX Ex i version	-10 ... +190 °C (14 ... 374 °F)
Ambient temperature (sensor)	
• Standard and Ex-i version	-20 ... +60 °C (-4 ... +140 °F)
• Ex d version	-20 ... +180 °C (-4 ... +356 °F)
Transducer enclosure/ approvals/certificates	
Standard version	IP67 (NEMA 6)/IP68 (NEMA 6P)
Ex approval	System ATEX approval for SONO 3200 Ex i transducers together with transmitter FUS060-Ex: ATEX II 2 G Ex dem [ia/ib] IIC T6/T4/T3 Gb or ATEX II 2G Ex d IIC T3-T6 Gb with SONO 3200 Ex d transducers (for standard FUS060 transmitter, installed outside of Ex zone)
Material certificates	EN 10204-3.1 material certificate on transducer mounting parts
Transducer materials	
Terminal housing	Standard version: PA 6.6, 100 °C (212 °F) or stainless steel AISI 316, 200 °C (392 °F)
Transducer body	Standard version: Stainless steel AISI 316, 200 °C (392 °F)

Flow Measurement

SITRANS F US Inline

Flowmeter SONOKIT (with FUS060 or FUS080)

Materials of existing pipeline

Steel	Transducer holder: EN 10273 or EN 10216 (P235GH) Mounting plates ¹⁾ : EN 10273 or EN 10216 (P235GH)
Concrete	Transducer holder: Stainless steel AISI 316 or similar Mounting plates ¹⁾ : (not included)
Stainless steel	Transducer holder: Stainless steel AISI 316 or similar Mounting plates ¹⁾ : Stainless steel AISI 316 or similar

Pipe wall thickness

Steel pipe (AISI 316 and St. 37.2 or corresponding material)	Transducer and holder available in length L = 160, allowing a pipe wall thickness up to 20 mm (0.79")
Concrete pipe	Transducer and holder available in length L = 230, allowing a pipe wall thickness up to 200 mm (7.9") and pipe sizes \geq DN 600

Dimension of the package box (L x W x H, approx.)

856 x 390 x 344 mm
(33.7" x 15.4" x 13.5")

Weight example of a package (standard 2-path with FUS060)

approx. 53 kg (116.8 lb)

Certificates and approvals

Conformity certificate

The devices are supplied as standard with a Siemens Certificate of Conformity on a DVD

Material certificate

Material certificate for the transducer parts according to EN 10204-3.1 is optionally available

Approvals

No custody transfer approvals

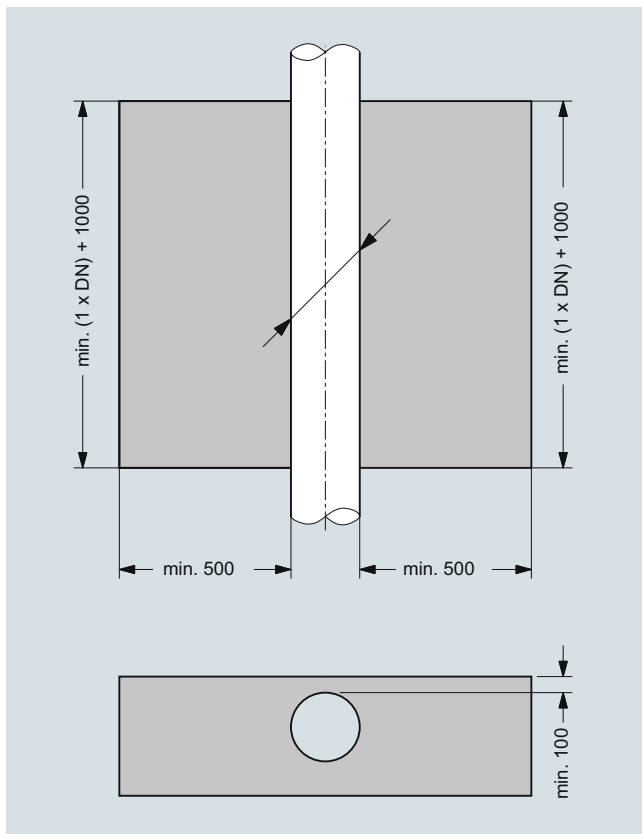
Information on PED approval:

The SONOKIT includes the pipe mounting parts only and therefore it cannot be PED-approved. After the installation, all installation-related activities (welding, pressure test etc.) are the responsibility of the customer.

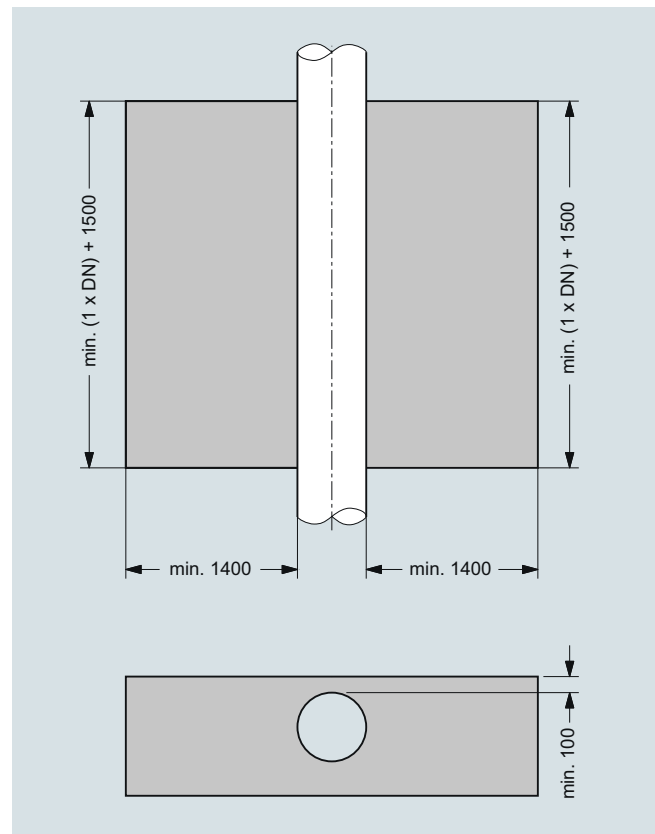
¹⁾ Mounting plates are only included for empty pipe installation types (refer to selection "A"). For hot tap mounting the mounting plates are not included (refer to selection "B").

Installation requirements

The space requirements (in mm) around the pipe for retrofitting a SITRANS F US ultrasonic flowmeter type SONOKIT are given below in mm:



Empty pipe installation



Hot-tap installation

Flowmeter SONOKIT (with FUS060 or FUS080)

Selection and Ordering data		Article No.	Ord. code	Selection and Ordering data		Article No.	Ord. code
SITRANS F US SONOKIT		7ME3210 -		SITRANS F US SONOKIT		7ME3210 -	
1-path sensor				1-path sensor			
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.				IP68 SS housing, Sylgard potting kit, PN 40, O-ring, 200 °C (392 °F), no approval		4	
				IP67 SS housing, PN 40, O-ring, 190 °C (374 °F), Ex i type, ATEX approval (only with FUS060 Ex)		5	
Diameter	Qn setting [m³/h]			Cable gland entries			
DN 100 (4")	100	1 P		Cable glands M20 in transducers and in transmitter M25/20/16 x 1.5 (FUS080 only M20)		1	
DN 125 (5")	150	1 T		Cable glands ½" NPT in transducers and in transmitter (only with FUS060)		2	
DN 150 (6")	220	2 B		Transmitter version of SITRANS FUS060			
DN 200 (8")	380	2 F		(only DN 100 ... 2400 (4" ... 96"))			
DN 250 (10")	600	2 K		IP65 (NEMA 4), 120/230 V AC		N	
DN 300 (12")	850	2 P		IP65 (NEMA 4), 24 V AC/DC		P	
DN 350 (14")	1000	2 T		IP65 (NEMA 4), 24 V AC/DC Ex version		Q	
DN 400 (16")	1300	3 B		Transmitter version of SITRANS FUS080			
DN 450 (18")	1700	3 F		(only DN 100 ... 1200 (4" ... 48"))			
DN 500 (20")	2200	3 K		PDM software tool and IrDA-adaptor, which are needed for settings update, to be ordered separately, see FUS080 accessories			
DN 550 (22")	2600	3 P		IP67/NEMA 4X/6 115 ... 230 V AC		U	
DN 600 (24")	3200	3 T		IP67/NEMA 4X/6 3.6 V battery version, incl. dual battery pack		V	
DN 650 (26")	3600	4 B		IP67/NEMA 4X/6 115 ... 230 V AC, incl. 3.6 V single battery backup		W	
DN 700 (28")	4200	4 F		IP67/NEMA 4X/6 3.6 V battery version (no battery pack included) ²⁾		X	
DN 750 (30")	4800	4 K		Transmitter output module			
DN 800 (32")	5500	4 P		Transmitter SITRANS FUS080:			
DN 900 (36")	7500	5 B		Pulse and/or alarm output (standard for FUS080).		A	
DN 1000 (40")	9000	5 K		Transmitter SITRANS FUS060:			
DN 1100 (44")	10000	5 P		HART, 1 pulse output, 1 relay		B	
DN 1200 (48")	13200	5 T		HART Ex version, 1 pulse output, 1 relay		C	
Only for FUS060				PROFIBUS PA, 1 pulse/frequency		D	
DN 1300 (52")	14000	6 A		Transducer coaxial cables			
DN 1400 (56")	16800	6 C		(with FUS080 only, 15 and 30 m, 70 °C (158 °F) cable types)			
DN 1500 (60")	19000	6 E		2 x 3 m, max. 70 °C (158 °F), the only option for Ex i		0	
DN 1600 (64")	22800	6 G		2 x 15 m, max. 70 °C (158 °F)		1	
DN 1700 (68")	25000	6 J		2 x 30 m, high temp. max. 200 °C (392 °F)		2	
DN 1800 (72")	27600	6 L		2 x 30 m, max. 70 °C (158 °F)		3	
DN 1900 (76")	31000	6 N		2 x 60 m, max. 70 °C (158 °F)		4	
DN 2000 (80")	36000	6 Q		2 x 90 m, max. 70 °C (158 °F)		5	
DN 2100 (84")	37000	6 S		2 x 120 m, max. 70 °C (158 °F)		6	
DN 2200 (88")	42000	6 U		2 x 3 m, high temp. max. 200 °C (392 °F), the only option for Ex i		7	
DN 2300 (92")	45000	6 W		2 x 15 m, high temp. max. 200 °C (392 °F)		8	
DN 2400 (96")	51000	7 A		Special version (add Order code):			
Installation method¹⁾				No transducer cable, cable length 2 x 3 m, the only option for Ex i		9 R 0 A	
Empty pipe (incl. transducer holder and mounting plates). Alignment rods and tools must be ordered as accessories.		A		No transducer cable, cable length 2 x 15 m		9 R 0 B	
Hot tap, mounting under pressure (mounting plates not incl.). Special mounting tools to be ordered separately.		B		No transducer cable, cable length 2 x 30 m		9 R 0 C	
Transducer holder				No transducer cable, cable length 2 x 60 m		9 R 0 D	
Carbon steel, length = 160 mm, mounting plates in carbon steel		1		No transducer cable, cable length 2 x 90 m		9 R 0 E	
Stainless steel, length = 160 mm, mounting plates in stainless steel		2		No transducer cable, cable length 2 x 120 m		9 R 0 F	
Stainless steel, length = 230 mm, for concrete pipe (DN 600 ... DN 2400)		3					
Transducer type and approval							
IP67 (NEMA 4X/6) PA housing, PN 40, O-ring, 100 °C (212 °F), no approval		1					
IP68 SS housing, PN 40, O-ring, 180 °C (356 °F), Ex d, ATEX approval (only with standard FUS060)		2					
IP68 PA housing, Sylgard potting kit, PN 40, O-ring, 100 °C (212 °F), no approval		3					

¹⁾ Mounting tools must be ordered separately as "-Z"-options.

²⁾ Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.*

Flow Measurement

SITRANS F US Inline

Flowmeter SONOKIT (with FUS060 or FUS080)

Selection and Ordering data

Order code

Additional information

Please add „**Z**“ to Article No. and specify Order code(s) and plain text.

Material certificate

EN 10204-3.1, transducer body material
EN 10204-3.1, transducer holder material
EN 10204-3.1, mounting plate material

Regional specific approval

KCC marking for Korea

Tag name plate

Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 ... 10 characters, 4 mm for 11 ... 20 characters (specify in plain text).

Accessories

Alignment rods-set for DN 100 ... 650 (4" ... 26")
Ø = 25 mm, L = 500 mm, 3 pcs.

Alignment rods-set for DN 700 ... 1900 (28" ... 76")
Ø = 25 mm, L = 500 mm, 6 pcs.

Alignment rods-set for DN 2000 ... 2400 (80" ... 96")
Ø = 25 mm, L = 500 mm, 8 pcs.

Spanner key for transducer mounting type SONO 3200 O-ring type

Tool set with various mounting/spare parts for SONOKIT installation

F30
F31
F32

W28

Y17

S10

S11

S12

T11

T12

Operating instructions

Description

Article No.

SITRANS FUS060

- English
- German

A5E01204521

A5E02123845

SITRANS FUS080

- English
- German

A5E03059912

A5E31628428

SITRANS F US SONOKIT 1-path

- English
- German

A5E00814557

A5E02610428

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www.pia-portal.automation.siemens.com

3

1) Mounting tools must be orderd separately as "-Z" options

Flow Measurement

SITRANS F US Inline

Flowmeter SONOKIT (with FUS060 or FUS080)

Selection and Ordering data	Article No.	Ord. code
SITRANS F US SONOKIT 2-path sensor	7ME3220 -	
Transducer coaxial cables (with FUS080 only, 15 and 30 m, 70°C (158 °F) cable types)		
4 x 3 m, max. 70 °C (158 °F), the only option for Ex i		0
4 x 15 m, max. 70 °C (158 °F)		1
4 x 30 m, high temp. max. 200 °C (392 °F)		2
4 x 30 m, max. 70 °C (158 °F)		3
4 x 60 m, max. 70 °C (158 °F) (up to DN 3000)		4
4 x 90 m, max. 70 °C (158 °F) (up to DN 3000)		5
4 x 120 m, max. 70 °C (158 °F) (up to DN 3000)		6
4 x 3 m, high temp. max. 200 °C (392 °F), the only option for Ex i		7
4 x 15 m, high temp. max. 200 °C (392 °F)		8
Special version (add Order code):		
No transducer cable, cable length 4 x 3 m, the only option for Ex i	9	R0A
No transducer cable, cable length 4 x 15 m	9	R0B
No transducer cable, cable length 4 x 30 m	9	R0C
No transducer cable, cable length 4 x 60 m (up to DN 3000)	9	R0D
No transducer cable, cable length 4 x 90 m (up to DN 3000)	9	R0E
No transducer cable, cable length 4 x 120 m (up to DN 3000)	9	R0F

Selection and Ordering data	Order code
Additional information	
Please add „-Z“ to Article No. and specify Order code(s) and plain text.	
Material certificate	
EN 10204-3.1, transducer body material	F30
EN 10204-3.1, transducer holder material	F31
EN 10204-3.1, mounting plate material	F32
Tag name plate	
Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 ... 10 characters, 4 mm for 11 ... 20 characters (specify in plain text).	Y17
Regional specific approval	
KCC marking for Korea	W28
Accessories	
Alignment rods-set for DN 100 ... 750 (4" ... 30") Ø = 25 mm, L = 500 mm, 3 pcs.	S10
Alignment rods-set for DN 800 ... 2100 (32" ... 84") Ø = 25 mm, L = 500 mm, 6 pcs.	S11
Alignment rods-set for DN 2200 ... 3000 (88" ... 120") Ø = 25 mm, L = 500 mm, 8 or 10 pcs.	S12
Spanner key for transducer mounting type SONO 3200 O-ring type	T11
Tool set with various mounting/spare parts for SONOKIT installation	T12

Operating instructions

Description	Article No.
SITRANS FUS060	
• English	A5E01204521
• German	A5E02123845
SITRANS FUS080	
• English	A5E03059912
• German	A5E31628428
SITRANS F US SONOKIT 2-path	
• English	A5E02445496
• German	A5E02554972


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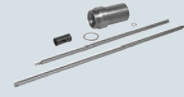

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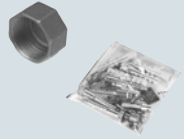
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Flowmeter SONOKIT accessories and spare parts
Accessories
Potting kit for SONO 3200 terminal housing

Description	Article No.	
Potting kit for terminal box of SONO 3200 transducers for IP68/NEMA 6P (not for Ex sensors)	FDK:085L2403	

Tools for SONO 3200 transducers and SONOKIT

Description	Article No.	
Extraction tool for replacement of SONO 3200 O-ring transducers under pressure and for hot-tapping (working conditions: typically water, max. 40 bar and max. 60 °C (max. 580 psi and max. 140 °F)) For transducer length:		
• Up to 160 mm (6.3")	FDK:085B5333	
• Up to 230 mm (9.1")	FDK:085B5335	
Angle measurement tool for SONOKIT	FDK:085B5330	
Hot-tap drilling tool for SONOKIT, the extraction tool is required, max. pressure 40 bar (580 psi)	FDK:085B5392	
Alignment tool for SONOKIT (typically for hot-tapping) For use on pipe sizes in the range DN 300 to DN 1200.	FDK:085B5393	

Description	Article No.	
Alignment rods-set for DN 100 ... 650 (4" ... 26"), Ø = 25 mm, L = 500 mm, 3 pcs.	A5E02609214	
Alignment rods-set for DN 700 ... 1900 (28" ... 76"), Ø = 25 mm, L = 500 mm, 6 pcs.	A5E02609215	
Alignment rods-set for DN 2000 ... 3000 (80" ... 120"), Ø = 25 mm, L = 500 mm, 10 pcs.	A5E02609216	
Spanner key for transducer mounting type SONO 3200 O-ring type	A5E02609218	
Tool set with various mounting/spare parts for SONOKIT installation	A5E02609219	

Flow Measurement

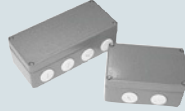
SITRANS F US Inline

Flowmeter SONOKIT (with FUS060 or FUS080)

Cable connection boxes

(For the connection of individual transducer cables with the FUS060 transducer cables)

Description	Article No.
Junction box for coaxial cable	
• IP65 metal box for 2 coaxial cables	FDK:085B1360
• IP65 metal box for 4 coaxial cables	FDK:085B1361
• IP65 EEx e plastic box for 2 coaxial cables, no ATEX approval	FDK:085B1362
• IP65 EEx e plastic box for 4 coaxial cables, no ATEX approval	FDK:085B1363



Spare parts

Transducer SONO 3200 spare parts, complete transducer with ½"-NPT cable glands

Transducer type	Material	Gasket	Pressure rating	Terminal housing	Approval	Temperature range [°C (°F)]	Length [mm (inch)]	Article No.
O-ring	316 SS	O-ring	PN 40	Plastic PA 6.6		-20 ... +100 (-4 ... +212)	160 (6.3)	A5E00839476
O-ring	316 SS	O-ring	PN 40	316 SS		-20 ... +200 ¹⁾ (-4 ... +392)	160 (6.3)	A5E00839435
O-ring	316 SS	O-ring	PN 40	Plastic PA 6.6		-20 ... +100 (-4 ... +212)	230 (9.41)	A5E00839477
O-ring	316 SS	O-ring	PN 40	316 SS		-20 ... +200 ¹⁾ (-4 ... +392)	230 (9.41)	A5E00839437

¹⁾ 316 SS housing for -20 ... +200 °C (-4 ... +392 °F) media temp. but cable glands only for -20 ... +100 °C (-4 ... +212 °F) ambient temp.

Transducer SONO 3200 spare parts, complete transducer with M20 cable glands

Transducer type	Material	Gasket	Pressure rating	Terminal housing	Approval	Temperature range [°C (°F)]	Length [mm (inch)]	Article No.
O-ring	316 SS	O-ring	PN 40	Plastic PA 6.6		-20 ... +100 (-4 ... +212)	160 (6.3)	FDK:085B5454
O-ring	316 SS	O-ring	PN 40	316 SS		-20 ... +200 ¹⁾ (-4 ... +392)	160 (6.3)	FDK:085B5455
O-ring	316 SS	O-ring	PN 40	Plastic PA 6.6		-20 ... +100 (-4 ... +212)	230 (9.41)	FDK:085B5458
O-ring	316 SS	O-ring	PN 40	316 SS	Ex d ²⁾	-20 ... +180 (-4 ... +356)	160 (6.3)	FDK:085B5452
O-ring	316 SS	O-ring	PN 40	316 SS	Ex i ³⁾	-10 ... +190 (14 ... 374)	160 (6.3)	A5E00836462
O-ring	316 SS	O-ring	PN 40	316 SS		-20 ... +200 ²⁾ (-4 ... +392)	230 (9.41)	FDK:085B5459

¹⁾ 316 SS housing for -20 ... +200 °C (-4 ... +392 °F) media temp. but cable glands only for -20 ... +100 °C (-4 ... +212 °F) ambient temp.

²⁾ ATEX (Ex) IIC 2G Ex d IIC T3-T6 Gb

³⁾ For systems with FUS060 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3

Transducer SONO 3200 spare parts, transducer terminal housing with M20 cable glands


Type	Article No.
Material: PA 6.6, Temperature range: -20 ... +100 °C (-4 ... +212 °F)	FDK:085B5501
Material: AISI 316, Temperature range: -20 ... +200 °C (-4 ... +392 °F)	FDK:085B5504
Material: AISI 316, Ex d ¹⁾ , Temperature range: -20 ... +180 °C (-4 ... +356 °F)	FDK:085B5505
Material: AISI 316, Ex i ²⁾ , Temperature range: -10 ... +190 °C (14 ... 374 °F)	A5E00835255

¹⁾ ATEX (Ex) IIC 2G Ex d IIC T3-T6 Gb


²⁾ For systems with FUS060 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3



Flowmeter SONOKIT (with FUS060 or FUS080)
Transducer SONO 3200 spare parts, transducer terminal housing with ½"-NPT cable glands

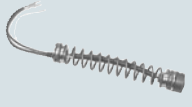
Type	Article No.	
Material: PA 6.6, Temperature range: -20 ... +100 °C (-4 ... +212 °F)	A5E00839460	
Material: AISI 316, Temperature range: -20 ... +200 °C (-4 ... +392 °F)	A5E00839427	

Transducer SONO 3200 spare parts transducer body with insert as well as insert only


Temperature range [°C (°F)]	Gasket	Length [mm (inch)]	Article No.	
-20 ... +200 (-4 ... +392)	O-ring (FFKM O-ring material) ¹⁾	160 (6.3)	FDK:085B1406	
-20 ... +200 (-4 ... +392)	O-ring (FKM 602 O-ring material) ²⁾	160 (6.3)	FDK:085B5510	
-20 ... +200 (-4 ... +392)	O-ring	230 (9.41)	FDK:085B5511	

¹⁾ Chemical resistant O-ring material. Body specially for Ex-approved transducers.


²⁾ Body specially for standard transducers.

Temperature range [°C (°F)]	Length [mm (inch)]	Article No.	
-20 ... +200 (-4 ... +392)	160 (6.3)	FDK:085B1419	
-20 ... +200 (-4 ... +392)	230 (9.41)	FDK:085B1420	


Transducer SONO 3200 gasket

Type	Pressure rating	Material	Temperature range [°C (°F)]	Article No.	
Gasket O-ring (3 pcs. for O-ring transducers)	PN 40	FKM	-20 ... +200 (-4 ... +392)	FDK:085B1089	

Cables for SONOKIT SONO 3200 transducers with FUS060

Description	Length [m (ft)]	Article No.	
Coaxial cable for FUS060, (75 Ω, max. 70 °C (158 °F), black PVC) (2 pcs.)	3 (9.84)	A5E00875101	
	15 (49.21)	A5E00861432	
	30 (98.43)	A5E01278662	
	60 (196.85)	A5E01278682	
	90 (295.28)	A5E01278687	
	120 (393.70)	A5E01278698	
High temp. coaxial cable for FUS060; with 0.3 m brown PTFE high temp. transducer part, max. 200 °C (392 °F) and black PVC transmitter part with SMB plug, max. 70 °C (158 °F); (impedance 75 Ω) (2 pcs.)	3 (9.84)	A5E00875105	
	15 (49.21)	A5E00861435	
	30 (98.43)	A5E01196952	

Cables for SONOKIT SONO 3200 transducers with FUS080

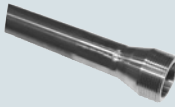
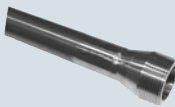
Description	Length [m (ft)]	Article No.	
Coaxial cable for FUS080, (75 Ω, max. 70 °C (158 °F), black PVC) (2 pcs.)	15 (49.21)	A5E02478541	
	30 (98.43)	A5E02478751	

Flow Measurement

SITRANS F US Inline

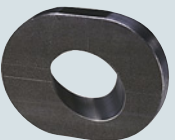
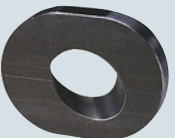
Flowmeter SONOKIT (with FUS060 or FUS080)

Transducer holder for SONOKIT SONO 3200 transducers

Description	Article No.	
1-path (each incl. 1 pc.)		
• 160 mm (6.3") stainless steel 45°, DN 100 ... DN 150 (4" ... 6")	FDK:085L1103	
• 160 mm (6.3") carbon steel 45°, DN 100 ... DN 150 (4" ... 6")	FDK:085L1102	
• 230 mm (9.1") for concrete pipe 60°, DN 600 ... DN 2400 (24" ... 96")	FDK:085L1107	
• 160 mm (6.3") stainless steel 60°, DN 200 ... DN 2400 (8" ... 96")	FDK:085L1105	
• 160 mm (6.3") carbon steel 60°, DN 200 ... DN 2400 (8" ... 96")	FDK:085L1104	
2-path (each incl. 1 pc.)		
• 230 mm (9.1") for concrete pipe 60°, DN 600 ... DN 3000 (24" ... 120")	FDK:085L1111	
• 160 mm (6.3") stainless steel 60°, DN 200 ... DN 3000 (8" ... 120")	FDK:085L1109	
• 160 mm (6.3") carbon steel 60°, DN 200 ... DN 3000 (8" ... 120")	FDK:085L1108	

The other transducer holder parts are either completely in stainless steel for the concrete and stainless steel pipes (AISI 316L/1.4404 or similar). For carbon pipes the part welded onto the pipe is in carbon steel (St.37 or similar). Thread part is stainless steel (AISI 316L/1.4404 or similar).

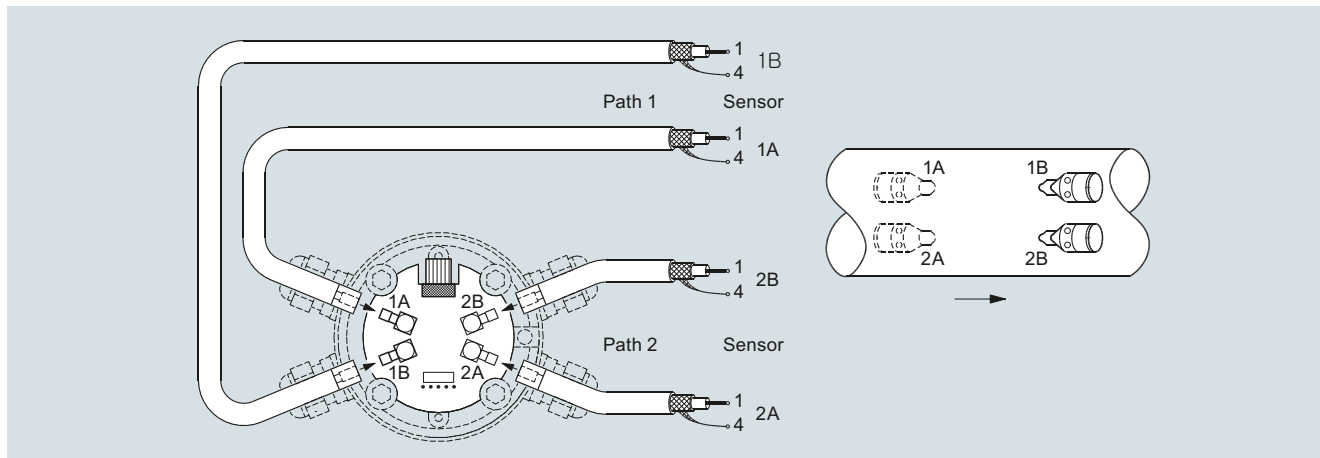
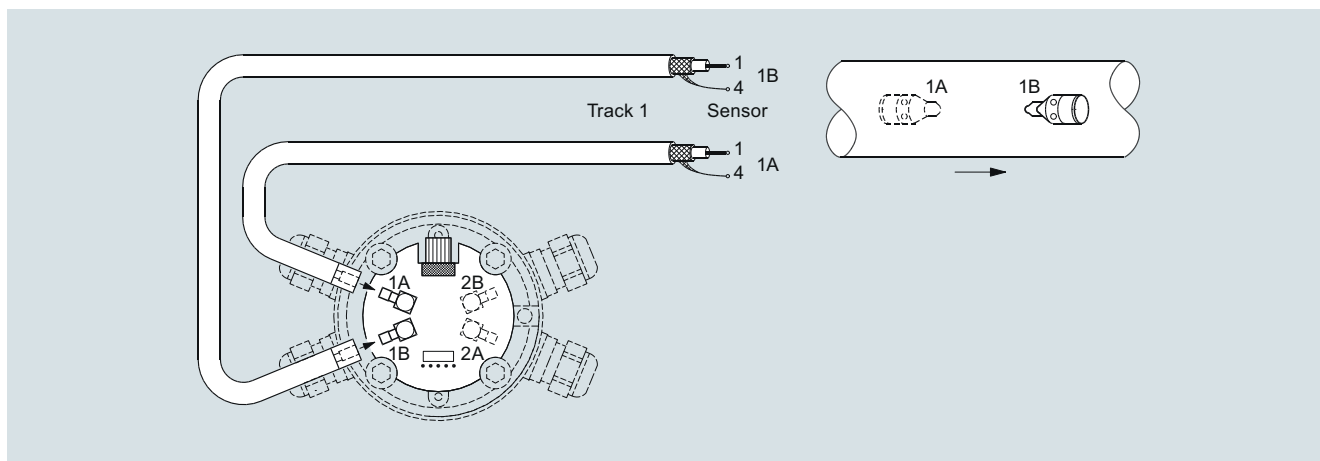
Mounting plate for SONOKIT SONO 3200 transducers

Description	Article No.	
1-path (each incl. 1 pc.)		
• Stainless steel plate, 45°, DN 100 ... DN 150 (4" ... 6")	FDK:085L1113	
• Carbon steel plate, 45°, DN 100 ... DN 150 (4" ... 6")	FDK:085L1112	
• Stainless steel plate, 60°, DN 200 ... DN 2400 (8" ... 96")	FDK:085L1115	
• Carbon steel plate, 60°, DN 200 ... DN 2400 (8" ... 96")	FDK:085L1114	
2-path (each incl. 1 pc.)		
• Stainless steel plate, 60°, DN 200 ... DN 3000 (8" ... 120")	FDK:085L1119	
• Carbon steel plate, 60°, DN 200 ... DN 3000 (8" ... 120")	FDK:085L1118	

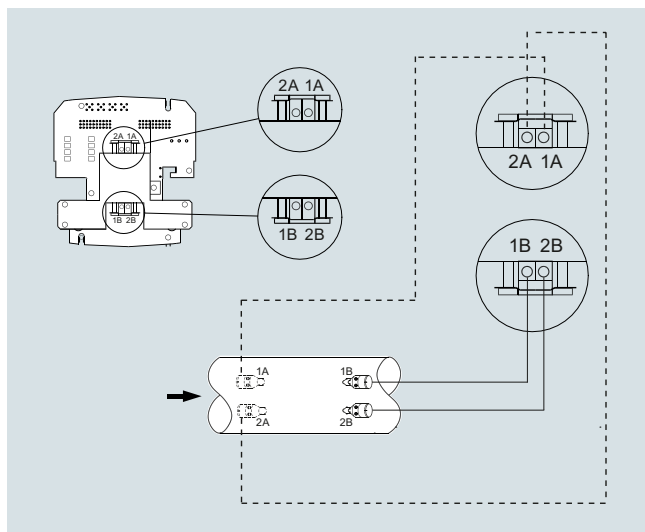
The mounting plates are either in stainless steel (AISI 316L/1.4404 or similar) or carbon steel (St.37 or similar).

SONO 3200 cable glands

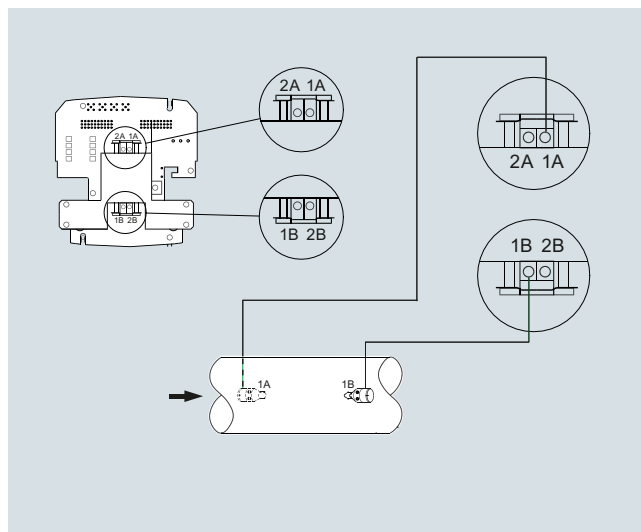
Type/ description	Tempera- ture range [°C (°F)]	Appr	Article No.	
black PA plastic, cable Ø 5 ... 13 mm (1 pc.)	-20 ... 100 (-4 ... +212)		A5E02246304	
½" NPT gray PA plastic, cable Ø 5 ... 9 mm (1 pc.)	-20 ... 100 (-4 ... +212)		A5E02246309	
½" NPT chrome-plated brass, cable Ø 5 ... 9 mm (1 pc.)	-40 ... 100 (-40 ... +212)		A5E02246258	
M20 stainless steel, cable Ø 4 ... 6 mm (1 pc.)	-25 ... 200 (-13 ... +392)	Ex i	A5E02246194	
M20 stainless steel, cable Ø 5 ... 8 mm (1 pc.)	-60 ... 180 (-76 ... +356)	Ex d	A5E02246311	

Schematics

 Electrical connection of SITRANS FUS060 and SONOKIT 2-path. Max. 30 m transducer cable length for sizes \geq DN 3000.


Electrical connection of SITRANS FUS060 and SONOKIT 1-path



Electrical connection of SITRANS FUS080 and SONOKIT 2-path



Electrical connection of SITRANS FUS080 and SONOKIT 1-path

Flow Measurement

SITRANS F US Inline

Flowmeter SITRANS FUS380 standard

Overview



The 2-path flowmeter SITRANS FUS380 comes as battery or mains-powered and is designed to measure water flow in district heating plants local networks, boiler stations, substations, chiller plants (including glycol mixes), and other general water applications.

The type-approved flowmeter version is named SITRANS FUE380 - see page 3/294.

Technically, the meter types SITRANS FUS380 and SITRANS FUE380 are completely identical, only difference is the calibration limit and the type approval for custody transfer.

Benefits

- Battery-powered up to 6 years
- 115/230 V mains-powered with back-up battery option in case of mains power failure
- Fast measuring frequency 15 Hz/0.5 Hz (230 V AC/Battery)
- Easy one-button straight forward display
- 2-path measuring principle for optimum accuracy
- Compact or remote mounting
- Measures on most district water qualities and water conductivities
- No pressure drop
- Long-term stability
- 2 galvanically isolated digital outputs for easy connection to a calculator (potential-free)
- Analog output 4 to 20 mA
- Bidirectional measurement, with 2 totalizers and outputs
- Dynamic range Q_i (min) : Q_s (max) up to 1:400

Application

The main application for SITRANS FUS380 is measurement of water flow or water flow in energy meter systems in district heating networks or chilled water (including glycol mixes).

Design

The 2-path design of SITRANS FUS380 ensures maximum accuracy under short inlet conditions. The flowmeter consists of a flow sensor pipe, 4 transducers/transducer cables and a transmitter SITRANS FUS080.

The unit is available in a compact or a remote version. Both versions are pre-mounted with short coax-cables. Remote transmitter up to a distance of 30 m by one Sensor link cable (SSL).

Compact mounting is only possible up to 120 °C (248 °F). The sensor must be isolated to protect transmitter from heat. The transmitter is available in an IP67/NEMA 4X/6 enclosure.

Integration

The flowmeter digital output is often used as input for an energy meter or as input for digital systems for remote reading.

SITRANS FUS380 has two digital output functions that can be individually selected.

Pulse output rate is defined when ordering. To get optimal benefit the pulse value must be selected as low as possible.

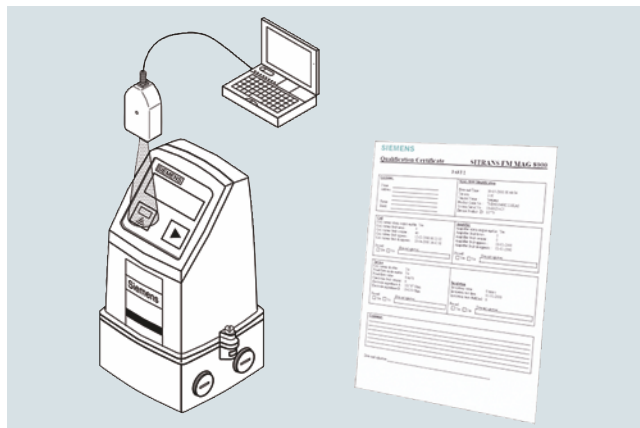
If the flowmeter forms part of an energy meter system for custody transfer, no further approvals are needed, except possible local approvals on the flowmeter.

Function

Together with the SIMATIC PDM tool the FUS380 offers the possibility of testing and verifying the flowmeter on site and creating a printed "Qualification Certificate" with specific data that defines the quality status of the measurement.

The Qualification Certificate shows information about the actual status of the flowmeter:

- General settings, flowmeter and battery information, totalizer values, and pulse output settings
- Detailed information about the transmitter and the sensor functionality, and a main parameter list for evaluating the functionality of the flowmeter



Configuration SITRANS FUS380
Selection guide SITRANS FUS380, standard version

DN	Q _s (m³/h)	Q _{max} (m³/h) (105 % of Q _s)	Q _p (m³/h)	Q _i (m³/h) (1:100 of Q _p)	Cut-off (m³/h)	Cut-off (% of Q _{max})	Typical pulse value ¹⁾ (l/pulse)
50	15	15.75	15	0.15	0.075	0.48	1
50	45	47.25	15	0.15	0.075	0.16	1
50	45	47.25	30	0.3	0.150	0.32	1
65	25	26.25	25	0.25	0.125	0.48	1
65	72	75.6	25	0.25	0.125	0.17	1
65	72	75.6	50	0.5	0.250	0.33	1
80	40	42	40	0.4	0.200	0.48	2.5
80	120	126	40	0.4	0.200	0.16	2.5
80	120	126	80	0.8	0.400	0.32	2.5
100	60	63	60	0.6	0.300	0.48	2.5
100	180	189	60	0.6	0.300	0.16	2.5
100	240	252	120	1.2	0.600	0.24	2.5
125	10	10.5	100	1	0.500	4.76	2.5
125	280	294	100	1	0.500	0.17	2.5
125	400	420	200	2	1.000	0.24	2.5
150	150	157.5	150	1.5	0.750	0.48	10
150	420	441	150	1.5	0.750	0.17	10
150	560	588	300	3	1.500	0.26	10
200	250	262.5	250	2.5	1.250	0.48	10
200	700	735	250	2.5	1.250	0.17	10
200	900	945	500	5	2.500	0.26	10
250	400	420	400	4	2.000	0.48	10
250	1 120	1 176	400	4	2.000	0.17	10
250	1 400	1 470	800	8	4.000	0.27	10
300	560	588	560	5.6	2.800	0.48	50
300	1 560	1 638	560	5.6	2.800	0.17	50
300	2 100	2 205	1 120	11.2	5.600	0.25	50
350	750	787.5	750	7.5	3.750	0.48	50
350	2 100	2 205	750	7.5	3.750	0.17	50
350	2 800	2 940	1 500	15	7.500	0.26	50
400	950	9 97.5	950	9.5	4.750	0.48	50
400	2 660	2 793	950	9.5	4.750	0.17	50
400	3 600	3 780	1 900	19	9.500	0.25	50
500	1 475	1 548.75	1 475	14.75	7.375	0.48	100
500	4 130	4 336.5	1 475	14.75	7.375	0.17	100
500	5 500	5 775	2 950	29.5	14.750	0.26	100
600	2 150	2 257.5	2 150	21.5	10.750	0.48	100
600	6 020	6 321	2 150	21.5	10.750	0.17	100
600	8 000	8 400	4 300	43	21.500	0.26	100
700	2 900	3 045	2 900	29	14.500	0.48	100
700	8 120	8 526	2 900	29	14.500	0.17	100
700	10 800	11 340	5 800	58	29.000	0.26	100
800	3 800	3 990	3 800	38	19.000	0.48	100
800	10 640	11 172	3 800	38	19.000	0.17	100
800	14 200	14 910	7 600	76	38.000	0.25	100
900	5 000	5 250	3 800	38	19.000	0.36	100
900	14 000	14 700	5 000	50	25.000	0.17	100
900	20 000	21 000	5 000	50	25.000	0.12	100
1 000	6 000	6 300	3 800	38	19.000	0.30	100
1 000	16 800	17 640	6 000	60	30.000	0.17	100
1 000	24 000	25 200	12 000	120	60.000	0.24	100
1 200	9 000	9 450	3 800	38	19.000	0.20	100
1 200	25 200	26 460	9 000	90	45.000	0.17	100
1 200	36 000	37 800	18 000	180	90.000	0.24	100

The values Q_i, Q_p and Q_s are shown on the system label of the FUS380. Q_i (Q_{min}) means the minimal and Q_p (Q_{nom}) the nominal flow rate. Q_s is the highest operatable flow rate. The maximum flow rate (Q_{max}) is 105 % of Q_s. The low flow cut-off is 50 % of Q_i.

In order to obtain best pulse output resolution in the range Q_{min} to Q_s of approx. 100 Hz at Q_s, two or three flow values for every dimension can be selected at ordering. Therefore the ordering data table also shows Q_p (Q_n). This flow rate is between Q_i (Q_{min}) and Q_s and indicates the normal or typical flow.

To get optimal benefit of the pulses the pulse value and pulse length shall be selected as low as possible. The following calculation formula can be used for determining the shortest pulse value at a pulse length of 5 ms: L/pulse > Q_s (m³/h) / 360.

For example Q_s = 300 m³/h; L/pulse > 300/360; L/pulse > 0.83; therefore the pulse value must be 1 l/pulse

¹⁾ Typical pulse values for SITRANS FUS380 with pulse length 5 ms. Other values are possible - please see the selections at the 7ME340 Order codes.

Flow Measurement

SITRANS F US Inline

Flowmeter SITRANS FUS380 standard

Technical specifications

Sensor design	2-path sensor with flanges and inline transducers wet-calibrated from factory
Nominal size (DN 50 ... DN 80 in bronze)	DN 50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 500, 600, 700, 800, 900, 1000, 1200
Pressure rate	PN 16, PN 25, PN 40 EN 1092-1 flanges: • type 01 (B): DN 100 to DN 125 • type 11 (B): DN 150 to DN 1200 • type 11 (B) 'design': DN 50 to DN 80
Pipe material	• DN 100 ... DN 1200: Carbon Steel EN 1.0345/P235 GH, painted in light-gray. • DN 50 ... 80: Die-cast bronze G-CuSn10/W2.1050.01 (EN 1982)
Transducer design	• DN 100 ... DN 1200: Inline version and welded onto the pipe • DN 50 ... DN 80: Screwed into the pipe
Transducer material	Stainless steel (AISI 316/1.4404)/brass (CuZn ₃₆ Pb ₂ As)

Sensor operating conditions

Ambient temperature	
• Operation	-10 ... +60 °C (14 ... 140 °F) (MID version: -10 ... +55 °C (14 ... 131 °F))
• Storage	-40 ... +85 °C (-40 ... +185 °F)
Measured media	Heating water, according to VDI-2035 (pH 8.2 - 10.5), industrial VdTUV information sheet 1466 and AGFW information sheet FW 510.
Media/surface temperature	
• DN 100 ... DN 1200	Remote: 2 ... 200 °C (35.6 ... 392 °F)
• DN 50 ... DN 80	Remote: 2 ... 150 °C (35.6 ... 302 °F)
• DN 50 ... DN 1200	Compact: 2 ... 120 °C (35.6 ... 248 °F)
Degree of protection	Sensor connection IP67/NEMA 4X/6
Max. flow velocity	DN 50 ... DN 1200: 9 m/s (29.5 ft/s)
Electromagnetic compatibility	
• Emitted interference	To EN 55011/CSPRI-11
• Noise immunity	To EN/IEC 61236-1 (Industry)

Transmitter

The transmitter related to this system is the SITRANS FUS080. Technical specifications to the FUS080 see page 3/253 ff.

Sensor cable

Transducer cable length	Pre-mounted with short coax-cables
Sensor link cable length (SSL)	5, 10, 20, 30 m (16.4, 32.8, 65.6, 98.4 ft)

Certificates and approvals

Conformity certificate (CE)	The devices are supplied as standard with a Siemens Certificate of Conformity on DVD
Material certificate	Material certificate according EN 3.1 is optionally available
Calibration report	A standard calibration report is shipped with every flowmeter. Extended accredited ISO/IEC 17025 calibration certificates optionally available
Approvals	No custody transfer approvals

The sensors are approved according to EU directive 2014/68/EU dated 27 June 2014 regarding fluid group 1, classified in category III. Design according to EN 13480 (PED Directive).

SITRANS FUS380 uncertainty

	FUS380
Flow value setting	Predefined settings according to dimension
Approval	No approval
Flow rate v_f	0.02 ... 9 m/s (0.065 ... 29.5 ft/s)
Output A	Pulse: forward, reverse, forward net, reverse net (Preset: forward)
Output B	Pulse (forward, reverse, forward net, reverse net, alarm, call-up (Preset: alarm))
Pulse value A & B (depending on DN value)	0.1 l/p, 0.25 l/p, 0.5 l/p, 1 l/p, 2.5 l/p, 10 l/p, 25 l/p, 50 l/p, 100 l/p, 250 l/p, 500 l/p, 1 m ³ /p, 2.5 m ³ /p, 5 m ³ /p, 10 m ³ /p, 25 m ³ /p, 50 m ³ /p, 100 m ³ /p, 250 m ³ /p, 500 m ³ /p, 1000 m ³ /p
Pulse width	5/10/20/50/100/200/500 ms
Flow unit setup	Preset: m ³ /h
Volume unit setup	Preset: m ³

Flowmeter Calibration and traceability

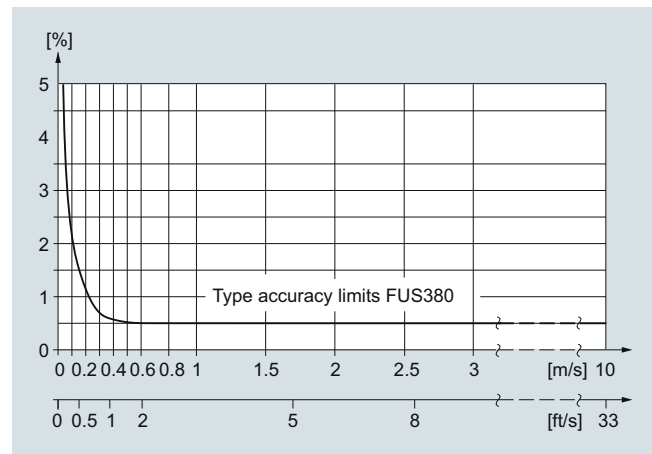
To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability). Siemens offers accredited calibrations assured to ISO 17025 in the flow range from 0.0001 m³/h to 10 000 m³/h. Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

A standard calibration certificate with Q_n as selected flow is shipped with each SITRANS FUS380. This production calibration protocol consists of 2 x 3 points at Q_i , 10 % Q_p and Q_p (max. 4 200 m³/h).

Accuracy SITRANS FUS380:

$\pm 0.5 \%$ for $0.5 \text{ m/s} < v < 10 \text{ m/s}$ and $\pm 0.25/V_{\text{act.}} [\%]$ below 0.5 m/s



Selection and Ordering data

Article-No.

Order code

Flowmeter SITRANS FUS380 (standard)

7ME3400 - 0 - A

[Click on the Article No. for the online configuration in the PIA Life Cycle Portal.](#)

Diameter	Approval	Pressure rating	Flow setting [m³/h]																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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Flow Measurement

SITRANS F US Inline

Flowmeter SITRANS FUS380 standard

Selection and Ordering data					Article-No.	Order code									
Flowmeter SITRANS FUS380 (standard)					7ME3400	-									
Diameter	Approval	Pressure rating	Flow setting [m³/h] Qp (Qn)	Qs											
<u>Remote only</u>															
DN 900 (36")	EN 1434	PN16, PN 25	5 000	5 000	5 A										
DN 900 (36")	EN 1434	PN16, PN 25	5 000	14 000	5 C										
DN 900 (36")	OIML R75	PN16, PN 25	10 000	20 000	5 D										
DN 1 000 (40")	EN 1434	PN16, PN 25	6 000	6 000	5 J										
DN 1 000 (40")	EN 1434	PN16, PN 25	6 000	16 800	5 L										
DN 1 000 (40")	OIML R75	PN16, PN 25	12 000	24 000	5 M										
DN 1 200 (48")	EN 1434	PN16	9 000	9 000	5 S										
DN 1 200 (48")	EN 1434	PN16	9 000	25 200	5 U										
DN 1 200 (48")	OIML R75	PN16	18 000	36 000	5 V										
Flange norm and pressure rating															
System without sensor - only a transmitter FUS080 as spare part - settings as defined with this Article No.					A										
<u>EN 1092-1 Flanges</u>															
PN 16 (DN 100 ... DN 1 200)					C										
PN 25 (DN 200 ... DN 1 000)					D										
PN 40 (DN 50 ... DN 250)					E										
Compact/remote connection															
Note: Sensor cable always firmly connected to connection box.															
Compact version, Liquid max. 120 °C (248 °F)					0										
<u>Remote version, Liquid max. 150/200 °C (302/392 °F)</u>															
Sensor link cable (SSL)															
• 5 m (16.4 ft)					2										
• 10 m (32.8 ft)					3										
• 20 m (65.6 ft)					4										
• 30 m (98.4 ft)					5										
Pulse output value setup															
To get optimal benefit of the pulses the pulse value and pulse length shall be selected as low as possible. The following calculation formula can be used for determining the shortest pulse value at a pulse length of 5 ms: $L/pulse > Q_s (m^3/h) / 360$. For example $Q_s = 300 m^3/h$; $L/pulse > 300/360$; $L/pulse > 0.83$; therefore the pulse value must be 1 l/pulse															
Pulse value															
• 0.1 l/pulse					1										
• 1 l/pulse					2										
• 2.5 l/pulse					3										
• 10 l/pulse					4										
• 50 l/pulse					5										
• 100 l/pulse					6										
• 250 l/pulse					7										
• 1 m³/pulse					8										
• 0.25 l/pulse					9										N 0 A
• 0.5 l/pulse					9										N 0 B
• 5 l/pulse					9										N 0 C
• 25 l/pulse					9										N 0 D
• 500 l/pulse					9										N 0 E
• 2.5 m³/pulse					9										N 0 F
• 5 m³/pulse					9										N 0 G
• 10 m³/pulse					9										N 0 H
• 25 m³/pulse					9										N 0 J
• 50 m³/pulse					9										N 0 K
• 100 m³/pulse					9										N 0 L
• 250 m³/pulse					9										N 0 M
• 500 m³/pulse					9										N 0 N
• 1000 m³/pulse					9										N 0 P

Selection and Ordering data	Article-No.	Order code
Flowmeter SITRANS FUS380 (standard)	7ME3400 -	0 - A
Transmitter variant FUS080 power/analog output		
115 ... 230 V AC		B
3.6 V Lithium battery, dual pack is included		D
115 ... 230 V AC, backup 3.6 V DC Lithium battery, single pack is included		E
3.6 V battery version (no battery pack included)		G
Option with 4 ... 20 mA analog output module		R
• 115 ... 230 V AC		U
• 115 ... 230 V AC, backup 3.6 V DC, Lithium battery, single pack is included		
Note: Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.		
Pulse width setup		
Pulse width		
• 5 ms (standard)		2
• 10 ms		3
• 20 ms		4
• 50 ms		5
• 100 ms		6
• 200 ms		7
• 500 ms		8

Selection and Ordering data	Order code
Additional information	
Please add „-Z“ to Article No. and following add-on code(s) with plain text.	
Calibration/certificate FUS380	
Production calibration for DN 50 ... DN 1200 with Q_n as selected in diameter. Incl. Calibration protocol: 2 x 3 points, Q_i , 10 % Q_p and Q_p (max. 8000 m ³ /h).	Included
Accredited Siemens ISO/IEC 17025 calibration for DN 50 ... DN 200 with Q_n as selected in diameter. Certificate: 2 x 5 points, Q_i , 5 %, 10 %, 50 % and 100 % of Q_p (max. 630 m ³ /h).	D20
Accredited Siemens ISO/IEC 17025 calibration for DN 250 ... DN 600 with Q_n as selected in diameter. Certificate: 2 x 5 points, 5 %, 10 %, 50 % and 100 % of Q_p (max. 2800 m ³ /h).	D21
Accredited Siemens ISO/IEC 17025 calibration, DN 500 ... DN 1200 with Q_n as selected in diameter. Certificate: 2 x 5 points, Q_i , 5 %, 10 %, 50 % and 100 % of Q_p (max. 8000 m ³ /h).	D22
Output B as reverse flow pulses. No calibration/verification of this function.	E21
Material certificate	
EN 10204-3.1 (pipe material)	C12
Regional specific approval	
KCC marking for Korea	W28
Tag name plate	
Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 ... 10 characters, 4 mm for 11 ... 20 characters (specify in plain text).	Y17

Flowmeter SITRANS FUS380 operating instructions, accessories and spare parts

Operating instructions

Description	Article No.
• English	A5E00730100
• German	A5E00740611

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

For accessories and spare parts see chapter of transmitter SITRANS FUS080/FUE080 on page 3/257.



Please use online Product selector to get latest updates. Product selector link:

www.pia-portal.automation.siemens.com

Flow Measurement

SITRANS F US Inline

Flowmeter SITRANS FUE380 with CT approval

Overview



The 2-path flowmeter SITRANS FUE380 comes as battery or mains-powered and is designed to measure water flow in district heating plants, local networks, boiler stations, substations, chiller plants (including glycol mixes without type approval) and other general water applications.

The flowmeter FUE380 is approved according to energy meter standards EN 1434 class 2, OIML R 75 class 2 and MID class 2. Metrological parameters are protected against manipulation. The type-approved flowmeter version is named SITRANS FUE380. For a standard flowmeter type FUS380 without a type approval, see separate FUS380 chapter.

Technically, the meter types SITRANS FUS380 and SITRANS FUE380 are completely identical, only difference is the calibration limit and the type approval for custody transfer.

Benefits

- Battery-powered up to 6 years
- 115/230 V mains-powered with back-up battery option in case of mains power failure
- Fast measuring frequency 15 Hz/0.5 Hz (230 V AC/Battery)
- Easy one-button straight forward display
- 2-path measuring principle for optimum accuracy
- Compact or remote mounting
- Measures on most district water qualities and water conductivities
- No pressure drop
- Long-term stability
- 2 galvanically isolated digital outputs for easy connection to a calculator (potential-free)
- Analog output 4 to 20 mA
- Bidirectional measurement, with 2 totalizers and outputs
- Dynamic range $Q_i:Q_p$ up to 1:50/100 or max. range $Q_i:Q_s$ up to 1:400

Application

The main application for SITRANS FUE380 is measurement of water flow or water flow in energy meter systems for custody transfer in district heating networks or chilled water (including glycol mixes without type approval).

Combined with an energy calculator and a pair of temperature sensors, SITRANS FUE380 can be used as part of an energy meter system. For this purpose Siemens offers energy calculator SITRANS FUE950.

Design

The 2-path design of SITRANS FUE380 ensures maximum accuracy under short inlet conditions. The approved flowmeter consists of a flow sensor pipe, 4 transducers/transducer cables and a transmitter SITRANS FUE080.

The unit is available in a compact or a remote version. Both versions are pre-mounted with short coax-cables. Remote transmitter up to a distance of 30 m by one Sensor link cable (SSL).

Compact mounting is only possible up to 120 °C (248 °F). The sensor must be isolated to protect transmitter from heat. The transmitter is available in an IP67/NEMA 4X/6 enclosure.

FUE380 MI-004 approval

The SITRANS FUE380 program is type-approved according to international energy meter standard EN 1434. On 1 November 2006 the MI-004 energy meter directive became effective providing that all energy meters with a MI-004 verification label can be sold across the EU borders.

The FUE380 are MI-004 verified and labeled products according to Directive 2014/32/EU of the European Parliament and Council of 26 February, 2014 on measuring instruments, Annex VI Thermal Energy Meters (MI-004), in sizes from DN 50 to DN 1200.

The MID certification is obtained as module B + module D approvals according to the above-mentioned directive.

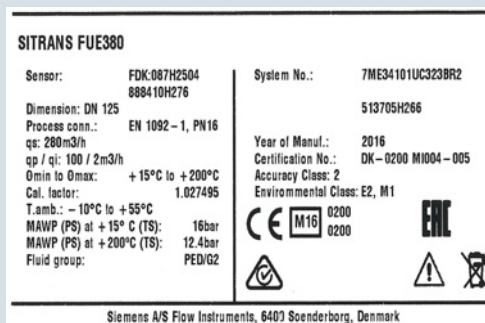
Module B: MI-004 Type MID approval according to EN 1434: 2007 (approved for media water)

Module D: Quality insurance MID approval of production

The MID system label with the approval information is placed on the side of the transmitter and on the sensor. An example of the product label is shown below:



FUE380 transmitter label (with MID first verification)



FUE380 sensor label (with MID first verification)

Integration

The flowmeter digital output is often used as input for an energy meter or as input for digital systems for remote reading. SITRANS FUE380 has two digital output functions that can be individually selected.

Pulse output rate is defined when ordering. To get optimal benefit the pulse value must be selected as low as possible.

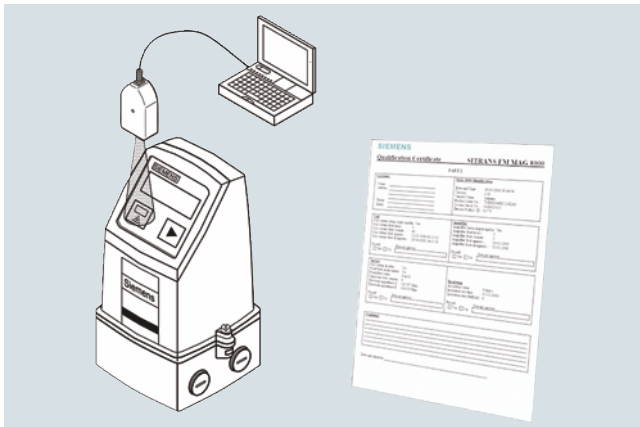
If the flowmeter forms part of an energy meter system for custody transfer, no further approvals are needed, except possible local approvals on the flowmeter.

Function

Together with the SIMATIC PDM tool the FUE380 offers the possibility of testing and verifying the flowmeter on site and creating a printed "Qualification Certificate" with specific data that defines the quality status of the measurement.

The Qualification Certificate shows information about the actual status of the flowmeter:

- general settings, flowmeter and battery information, totalizer values, and pulse output settings
- detailed information about the transmitter and the sensor functionality, and a main parameter list for evaluating the functionality of the flowmeter



Flow Measurement

SITRANS F US Inline

Flowmeter SITRANS FUE380 with CT approval

Configuration SITRANS FUE380 type-approved

Selection guide SITRANS FUE380, type-approved flowmeter

DN	Q _s (m ³ /h)	Q _{max} (m ³ /h) (105 % of Q _s)	Q _p (m ³ /h)	Q _i (m ³ /h) (1:50 of Q _p) EN 1434/MID	Q _i (m ³ /h) (1:100 of Q _p) OIML R 75/MID	Cut-off (m ³ /h)	Cut-off (% of Q _{max})	Typical pulse value (l/pulse)
50	30	31.5	15	0.3	-	0.075	0.24	1
50	45	47.25	15	0.3	-	0.075	0.16	1
50	45	47.25	30	-	0.30	0.150	0.32	1
65	50	52.5	25	0.5	-	0.125	0.24	1
65	72	75.6	25	0.5	-	0.125	0.17	1
65	72	75.6	50	-	0.50	0.250	0.33	1
80	80	84	40	0.8	-	0.200	0.24	2.5
80	120	126	40	0.8	-	0.200	0.16	2.5
80	120	126	80	-	0.80	0.400	0.32	2.5
100	120	126	60	1.2	-	0.300	0.24	2.5
100	180	189	60	1.2	-	0.300	0.16	2.5
100	180	189	120	-	1.20	0.600	0.32	2.5
125	200	210	100	2.0	-	0.500	0.24	2.5
125	280	294	100	2.0	-	0.500	0.17	2.5
125	280	294	200	-	2.00	1.000	0.34	2.5
150	300	315	150	3.0	-	0.750	0.24	10
150	420	441	150	3.0	-	0.750	0.17	10
150	420	441	300	-	3.00	1.500	0.34	10
200	500	525	250	5.0	-	1.250	0.24	10
200	700	735	250	5.0	-	1.250	0.17	10
200	700	735	500	-	5.00	2.500	0.34	10
250	800	840	400	8.0	-	2.000	0.24	10
250	1 120	1 176	400	8.0	-	2.000	0.17	10
250	1 120	1 176	800	-	8.00	4.000	0.34	10
300	1 120	1 176	560	11.2	-	2.800	0.24	50
300	1 560	1 638	560	11.2	-	2.800	0.17	50
300	1 560	1 638	1120	-	11.20	5.600	0.34	50
350	1 500	1 575	750	15.0	-	3.750	0.24	50
350	2 100	2 205	750	15.0	-	3.750	0.17	50
350	2 100	2 205	1 500	-	15.00	7.500	0.34	50
400	1 900	1 995	950	19.0	-	4.750	0.24	50
400	2 660	2 793	950	19.0	-	4.750	0.17	50
400	2 660	2 793	1 900	-	19.00	9.500	0.34	50
500	2 950	3 097.5	1 475	29.5	-	7.375	0.24	100
500	4 130	4 336.5	1 475	29.5	-	7.375	0.17	100
500	4 130	4 336.5	2 950	-	29.50	14.75	0.34	100
600	4 300	4 515	2 150	43.0	-	10.75	0.24	100
600	6 020	6 321	2 150	43.0	-	10.75	0.17	100
600	6 020	6 321	4 300	-	43.00	21.50	0.34	100
700	5 800	6 090	2 900	58.0	-	14.50	0.24	100
700	8 120	8 526	2 900	58.0	-	14.50	0.17	100
700	8 120	8 526	5 800	-	58.00	29.00	0.34	100
800	7 600	7 980	3 800	76.0	-	19.00	0.24	100
800	10 640	11 172	3 800	76.0	-	19.00	0.17	100
800	10 640	11 172	7 600	-	76.00	38.00	0.34	100
900	10 000	10 500	5 000	100.0	-	25.00	0.24	100
900	14 000	14 700	5 000	100.0	-	25.00	0.17	100
900	14 000	14 700	10 000	-	100.00	50.00	0.34	100

Flowmeter SITRANS FUE380 with CT approval

DN	Q_s (m ³ /h)	Q_{max} (m ³ /h) (105 % of Q_s)	Q_p (m ³ /h)	Q_i (m ³ /h) (1:50 of Q_p) EN 1434/MID	Q_i (m ³ /h) (1:100 of Q_p) OIML R 75/MID	Cut-off (m ³ /h)	Cut-off (% of Q_{max})	Typical pulse value (l/pulse)
1 000	12 000	12 600	6 000	120.0	-	30.00	0.24	100
1 000	16 800	17 640	6 000	120.0	-	30.00	0.17	100
1 000	16 800	17 640	12 000	-	120.00	60.00	0.34	100
1 200	18 000	18 900	9 000	180.0	-	45.00	0.24	100
1 200	25 200	26 460	9 000	180.0	-	45.00	0.17	100
1 200	25 200	26 460	18 000	-	180.00	90.00	0.34	100

Dynamic range $Q_i:Q_p$: better than 1:100 or 1:50 according to OIML R 75 class 2 and MID EN 1434 class 2.

Q_i (Q_{min}) means the minimal and Q_p (Q_{nom}) the nominal flow rate according to the approval requirements.

Q_s is the highest operatable flow rate. The maximum flow rate (Q_{max}) is 105 % of Q_s . The low flow cut-off is 50 % of Q_i .

Q_i , Q_p and Q_s are shown on the system nameplate of the FUE380.

In order to obtain best pulse output resolution in the range Q_{min} to Q_s of approx. 100 Hz at Q_s , two or three flow values for every dimension can be selected at ordering. Therefore the ordering data table also shows Q_p (Q_n). This flow rate is between Q_i (Q_{min}) and

Note:

The minimum flow (Q_i) should be checked in the PIA-portal or product master data base (PMD)

To get optimal benefit of the pulses the pulse value and pulse length shall be selected as low as possible. The following calculation formula can be used for determining the shortest pulse value at a pulse length of 5 ms: $L/pulse > Q_s$ (m³/h) / 360.

For example $Q_s = 300$ m³/h; $L/pulse > 300/360$; $L/pulse > 0.83$; therefore the pulse value must be 1 l/pulse

Flow Measurement

SITRANS F US Inline

Flowmeter SITRANS FUE380 with CT approval

Technical specifications

Pipe design	2-path sensor with flanges and inline transducers wet-calibrated from factory
Nominal size welded version (DN 50 ... DN 80 in bronze)	DN 50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 500, 600, 700, 800, 900, 1000, 1200
Pressure rate	PN 16, PN 25, PN 40 EN 1092-1 flanges: • type 01 (B): DN 100 to DN 125 • type 11 (B): DN 150 to DN 1200 • type 11 (B) 'design': DN 50 to DN 80
Pipe material	• DN 100 ... DN 1200: Carbon Steel EN 1.0345/P235 GH, painted in light-gray. • DN 50 ... DN 80: Die-cast bronze G-CuSn10/W2.1050.01 (EN 1982)
Transducer design	• DN 100 ... DN 1200: Inline version and welded onto the pipe • DN 50 ... DN 80: Screwed into the pipe
Transducer material	Stainless steel (AISI 316/1.4404)/brass (CuZn ₃₆ Pb ₂ As)
Sensor operating conditions	
Ambient temperature	
• Operation	-10 ... +60 °C (14 ... 140 °F) (MID version: -10 ... +55 °C (14 ... 131 °F))
• Storage	-40 ... +85 °C (-40 ... +185 °F)
Measured media	Heating water, according to VDI-2035 (pH 8.2 - 10.5), industrial VdTUV information sheet 1466 and AGFW information sheet FW 510.
Media/surface temperature	
• DN 100 ... DN 1200	Remote: 2 ... 200 °C (35.6 ... 392 °F) MID: min. +15 °C/+59 °F
• DN 50 ... DN 80	Remote: 2 ... 150 °C (35.6 ... 302 °F) MID: min. +15 °C/+59 °F
• DN 50 ... DN 1200	Compact: 2 ... 120 °C (35.6 ... 248 °F) MID: min. +15 °C/+59 °F
Degree of protection	Sensor connection IP67/NEMA 4X/6
Electromagnetic compatibility	
• Emitted interference	To EN 55011/CISPR-11
• Noise immunity	To EN/IEC 61326-1 (Industry)
• MID	Environment class E2 and M1
Max. flow velocity at Q _s	DN 50 ... DN 1200: 9 m/s (29.5 ft/s)

Transmitter

The transmitter related to this system is the SITRANS FUE080.
Technical specifications to the FUE080 see page 3/253 ff.

Sensor cable

Transducer cable length	Pre-mounted with short coax-cables
Sensor link cable length (SSL)	5, 10, 20, 30 m (16.4, 32.8, 65.6, 98.4 ft)

Certificates and approvals

Conformity certificate (CE)	The devices are supplied as standard with a Siemens Certificate of Conformity on DVD
Material certificate	Material certificate according EN 10204-3.1 is optionally available
Calibration report	A standard calibration report is shipped with every flowmeter. Extended accredited ISO/IEC 17025 calibration certificates optionally available
Approvals	<ul style="list-style-type: none"> Approval standards: EN 1434 and OIML R 75 Class 2 Type approval: MID, MI-004, class 2 approval and certification (according to EN 1434) CPA/CMC (China)

The sensors are approved according to EU directive 2014/68/EU dated 27 June 2014 regarding fluid group 1, classified in category III. Design according to EN 13480 (PED Directive).

Type-dependent settings

Flow value	Predefined according to EN 1434/OIML R 75/MID
Approval	Country specific
Flow rate v _f	0.02 ... 9 m/s (0.065 ... 29.5 ft/s)
Output A	Preset: Forward pulses
Output B	Preset: Alarm
Pulse value A & B (depending on DN value)	Preset: See scheme - previous page Preset for SITRANS FUE950 or free selectable depending on flow rate (Q _s)
Pulse width	Preset: 5 ms
Flow unit setup	Preset: m ³ /h
Volume unit setup	Preset: m ³

Flowmeter Calibration and traceability

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability). Siemens offers accredited calibrations assured to ISO 17025 in the flow range from 0.0001 m³/h to 10 000 m³/h. Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

A standard calibration certificate with Q_n as selected flow is shipped with each SITRANS FUE380. This production calibration protocol consists of 2 x 3 points at Q_i, 10 % Q_p and Q_p (max. 4 200 m³/h).

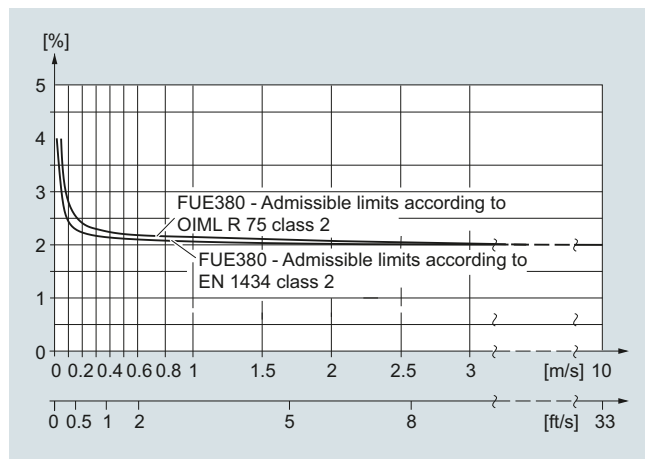
Typical accuracy SITRANS FUE380:

$$\pm(0.5 + 0.02 Q_p/Q) [\%]$$

Q_p according to EN 1434/OIML requirements.

Example: DN 100, $Q_p = 60 \text{ m}^3/\text{h}$ at $Q = 1.2 \text{ m}^3/\text{h}$:

Accuracy at $1.2 \text{ m}^3/\text{h}$ = typical 1.5 %



SITRANS FUE380 fulfils the requirements

$E_f = \pm (2 + 0.02 Q_p/Q_i)$ max. $\pm 5 \%$, according to EN 1434 and OIML R 75, class 2 or MID class 2 requirements.

Flowmeter SITRANS FUE380 with CT approval

3/300

3/301

Flow Measurement

SITRANS F US Inline

Flowmeter SITRANS FUE380 with CT approval

Selection and Ordering data

Article No. Order code

Flowmeter SITRANS FUE380 (type-approved)

7ME3410 - - - - -

Transmitter variant FUE080 power/analog output

- 115 ... 230 V AC
 3.6 V Lithium battery, dual pack is included
 115 ... 230 V AC, backup 3.6 V DC Lithium battery, single pack is included
 3.6 V battery version (no battery pack included)
 Option with 4 ... 20 mA analog output module
 • 115 ... 230 V AC
 • 115 ... 230 V AC, backup 3.6 V DC, Lithium battery, single pack is included

Note:

Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

Country specific design

Neutral, no approval mark
 China, PA 2008-T222
 Russia, EN 1434/OIML R75
 MID-Approval (MI004), Language on name plate English
 MID-Approval (MI004), Language on name plate German
 MID-Approval (MI004), Language on name plate Polish
 MID-Approval (MI004), Language on name plate French

Pulse width setup

Pulse width

- 5 ms (standard)
- 10 ms
- 20 ms
- 50 ms
- 100 ms
- 200 ms
- 500 ms

B
D
E
G

R
U

A
C
M
R
S
T
U2
2
3
4
5
6
7
8

Selection and Ordering data

Order code

Additional information

Please add „-Z“ to Article No. and following add-on code(s) with plain text.

Calibration/certificate FUE380

Approval, verification and approval sealing as defined with the article number. See Order code.

Production calibration for DN 50 ... DN 1200 with Q_n as selected in diameter
 Incl. Calibration protocol: 2 x 3 points, Q_i , 10 % Q_p and Q_p (max. 8000 m³/h).

3.1 Inspection certificate (EN 10204-3.1) - pipe material

Accredited Siemens ISO/IEC 17025 calibration for DN 50 ... DN 200 with Q_n as selected in diameter.
 Certificate: 2 x 5 points, Q_i , 5 %, 10 %, 50 % and 100 % of Q_p (max. 630 m³/h).

Accredited Siemens ISO/IEC 17025 calibration for DN 250 ... DN 600 with Q_n as selected in diameter.
 Certificate: 2 x 5 points, Q_i , 5 %, 10 %, 50 % and 100 % of Q_p (max. 2800 m³/h).

Accredited Siemens ISO/IEC 17025 calibration, DN 500 ... DN 1200 with Q_n as selected in diameter.
 Certificate: 2 x 5 points, Q_i , 5 %, 10 %, 50 % and 100 % of Q_p (max. 8000 m³/h).

Output B as reverse flow pulses.
 No calibration/verification of this function.

Tag name plate

Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed. Font size depends on text length:
 8 mm for 1 ... 10 characters, 4 mm for 11 ... 20 characters (specify in plain text).

Included

C12

D20

D21

D22

E21

Y17

Flowmeter SITRANS FUE380 operating instructions, accessories and spare parts

Operating instructions

Description

Article No.

- English

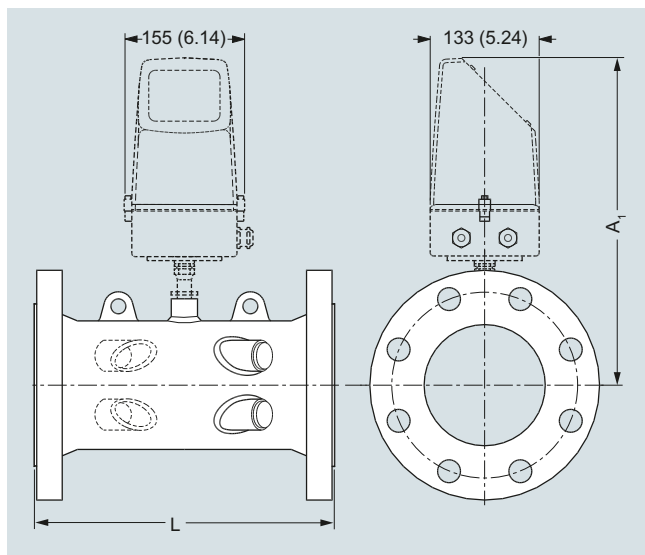
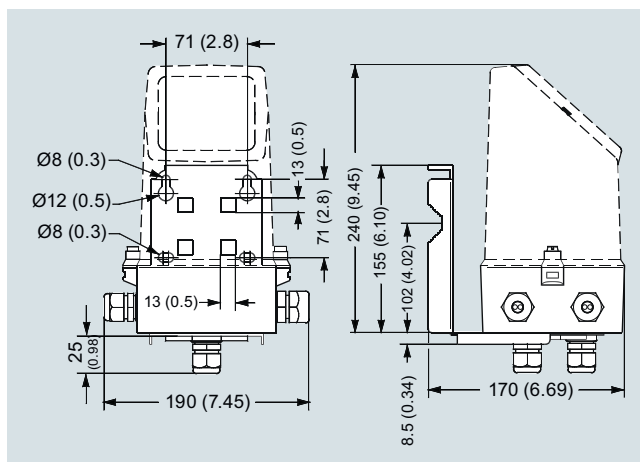
A5E00730100

- German

A5E00740611

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

For accessories and spare parts on page 3/257 see chapter of transmitter FUS080/FUE080.

Dimensional drawings

Transmitter IP67/NEMA 4X/6, wall mounting


Dimensions in mm (inch)

Sensor dimensions for FUS380 and FUE380

Size	PN 16		PN 25		PN 40		A ₁	Lift hug
DN	L mm	Weight kg	L mm	Weight kg	L mm	Weight kg		
50	-	-	-	-	300 +0/-2	10	350	No
65	-	-	-	-	300 +0/-2	15	363	No
80	-	-	-	-	350 +0/-2	18	370	No
100	350 +0/-2	15	-	-	350 +0/-2	18	372	No
125	350 +0/-2	18	-	-	350 +0/-2	24	385	No
150	500 +0/-3	28	-	-	500 +0/-3	34	399	No
200	500 +0/-3	38	500 +0/-3	47	500 +0/-3	55	425	Yes
250	600 +0/-3	60	600 +0/-3	76	600 +0/-3	91	452	Yes
300	500 +0/-3	66	500 +0/-3	81	-	-	478	Yes
350	550 +0/-3	94	550 +0/-3	121	-	-	495	Yes
400	600 +0/-3	124	600 +0/-3	153	-	-	520	Yes
500	625 +0/-3	194	625 +0/-3	231	-	-	570	Yes
600	750 +0/-3	303	750 +0/-3	365	-	-	622	Yes
700	875 +0/-3	361	875 +0/-3	553	-	-	673	Yes
800	1000 +0/-3	494	1000 +0/-3	770	-	-	724	Yes
900	1230 +0/-6	535	1300 +0/-6	835	-	-	775	Yes
1000	1300 +0/-6	594	1370 +0/-6	1000	-	-	826	Yes
1200	1360 +0/-6	732	-	-	-	-	928	Yes

Notes:

- Weight for transmitter/electronics 1.5 kg (compact version) or approximately 3 kg (remote version including 10 m cable set)
- - Means not available
- All weights are **approximate**
- For flange values - see norm EN 1092-1

Flow Measurement

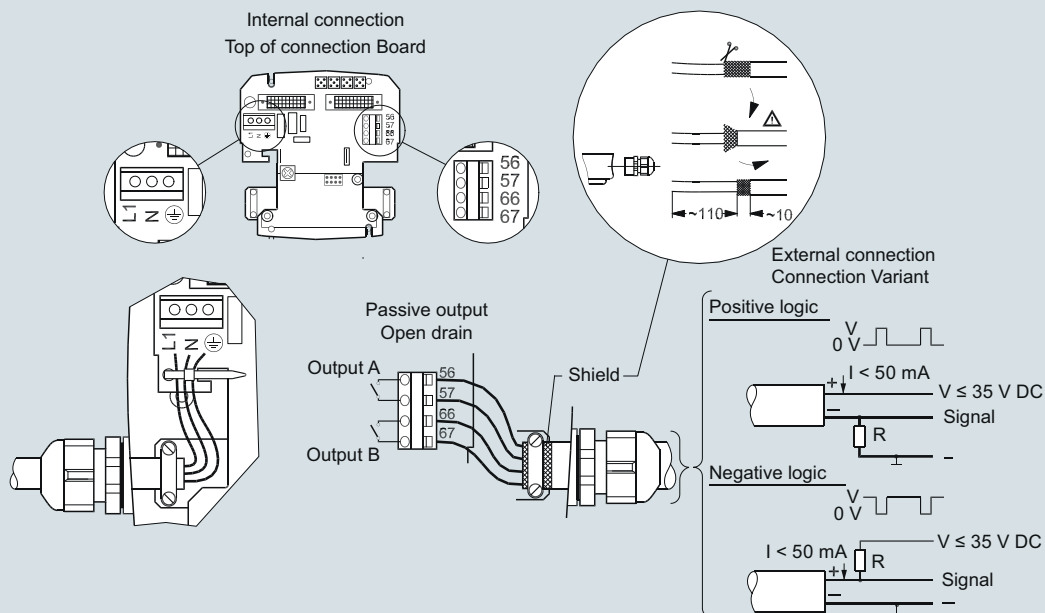
SITRANS F US Inline

Flowmeter SITRANS FUS380 and FUE380

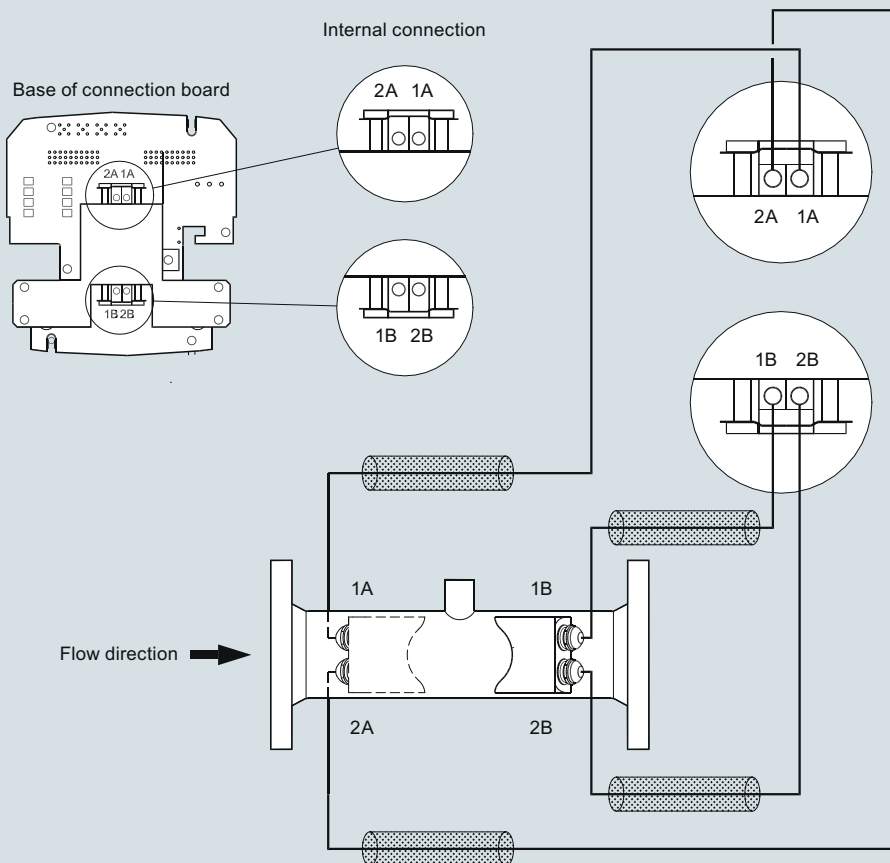
Size	PN 16	Weight	PN 25	Weight	PN 40	Weight	A ₁	Lift hug
inch	L inch	lb	L inch	lb	L inch	lb	inch	
2	-	-	-	-	11.81 +0/-0.08	22	13.78	No
2½	-	-	-	-	11.81 +0/-0.08	33	14.30	No
3	-	-	-	-	13.78 +0/-0.08	40	14.57	No
4	13.78 +0/-0.08	33	-	-	13.78 +0/-0.08	40	14.65	No
5	13.78 +0/-0.08	40	-	-	13.78 +0/-0.08	53	15.16	No
6	19.68 +0/-0.12	62	-	-	19.68 +0/-0.12	75	15.71	No
8	19.68 +0/-0.12	84	19.68 +0/-0.12	104	19.68 +0/-0.12	121	16.74	Yes
10	23.62 +0/-0.12	132	23.62 +0/-0.12	168	23.62 +0/-0.12	201	17.80	Yes
12	19.68 +0/-0.12	146	19.68 +0/-0.12	179	-	-	18.82	Yes
14	21.65 +0/-0.12	207	21.65 +0/-0.12	267	-	-	19.49	Yes
16	23.62 +0/-0.12	273	23.62 +0/-0.12	337	-	-	20.48	Yes
20	24.61 +0/-0.12	428	24.61 +0/-0.12	509	-	-	22.45	Yes
24	29.53 +0/-0.12	668	29.53 +0/-0.12	805	-	-	24.49	Yes
28	34.45 +0/-0.12	796	34.45 +0/-0.12	1246	-	-	26.50	Yes
32	39.37 +0/-0.12	1089	39.37 +0/-0.12	1698	-	-	28.51	Yes
36	48.43 +0/-0.24	1179	51.18 +0/-0.24	1841	-	-	30.52	Yes
40	51.18 +0/-0.24	1310	53.94 +0/-0.24	2205	-	-	32.52	Yes
48	53.54 +0/-0.24	1614	-	-	-	-	36.54	Yes

Notes:

- Weight for transmitter/electronics 3.3 lb (compact version) or approximately 6.6 lb (remote version including 32.8 ft cable set)
- - Means not available
- All weights are **approximate**
- For flange values - see norm EN 1092-1

Schematics


Electrical connection of transmitter SITRANS FUS/FUE380



Electrical connection of sensor SITRANS FUS/FUE380

Flow Measurement

SITRANS F US Inline

SITRANS FUE950 energy calculator

Overview



SITRANS FUE950 is a universal thermal energy calculator, which meets the requirements EN 1434 and has the MID and PTB K7.2 approval for energy metering with the media water.

SITRANS FUE950 has been developed for the SITRANS FUS380/ FUE380 and alternatively MAG 5000/6000 or FST020. SITRANS FUE950 is modular in construction and can by order be fitted with optional modules depending on the application. The FUE950 supports none of the SITRANS FX, FC products and only some of the FUS clamp-on products.

Benefits

Basic functions

- Prepared for heating, cooling measurement
- Approval for MID for heat metering and PTB K7.2 for cooling
- High-accuracy thermal energy metering, meets EN1434 requirements
- Measured temperature range -20 ... +190 °C (-4 ... +374 °F)
- Instantaneous values for energy/volume flow
- Battery or mains powered
- Battery version with battery lifetime of typically up to 10 years
- Optical data interface
- Real date and time
- Auto-detection of 2-wire or 4-wire temperature sensors

Additional functions

- Individual tariff functions
- Advanced functions for cooling/heating applications or the combination
- Memory for 24 periods (months, weeks, days)
- Data logger function
- Expandable functionality with 2 optional plug and play add-on modules
- Communication over M-Bus, RS 485 or RS 232

Add-on modules

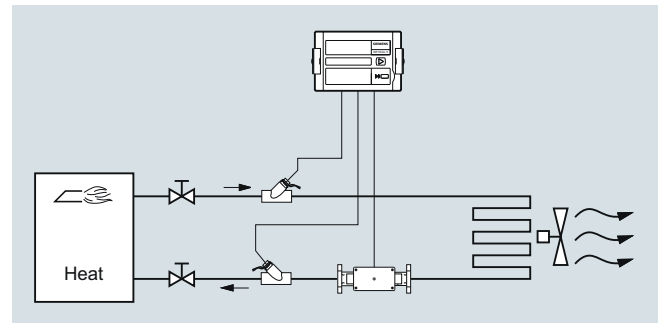
- Plug-in module with 2 extra pulse inputs
- Plug-in module with 2 pulse outputs
- Plug-in module with combination of input and output pulses
- Plug-in module for M-Bus communication
- Plug-in module for RS 232 or RS 485 communication
- Plug-in module with 2 passive current outputs (4 ... 20 mA)

Application

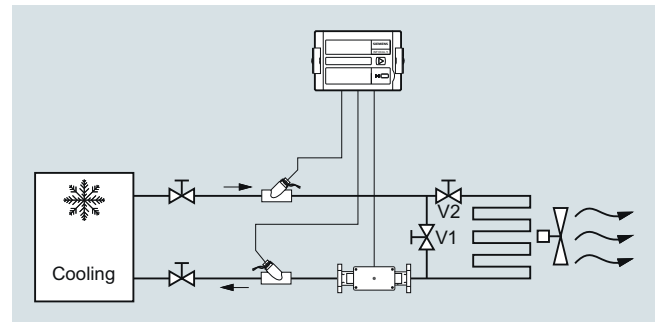
The SITRANS FUE950 is able to handle 3 kinds of applications, means energy calculation in:

- District heating applications
- Chilled water applications
- Combined cooling/heating applications

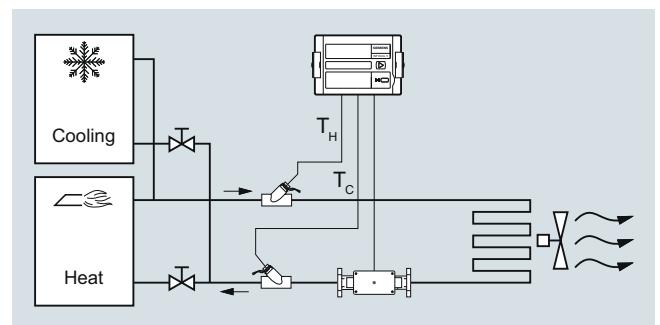
Energy metering in heating, hot water applications (code "A" and "B")



Energy metering in cooling, chilled water applications (code "C" and "D")



Energy metering in combined cooling/heating applications (code "E" and "F")



Design

SITRANS FUE950 has an easy-read 8-digit LCD display with associated pictograms for the various functions. As the display has been made for several applications, some figures/symbols not used for normal district heating applications will be shown.

SITRANS FUE950 has a push button for simple operation and provides user-friendly control via the various display menu loops. The display will always be configured for the application chosen, and for the selected display settings.

The integrator has an IP54 plastic housing and is designed for wall or panel mounting. The housing comes with prepared rubber gaskets cable entries for fast and easy installation.

Operation menu loop structure

The FUE950 display has six menu loops and the menus are numbered in the display from 1 to 6. Some display menus consist of two values (to maximum seven) that are shown alternately at 4-second intervals.

The main menu loop no. 1 with the current data, e.g. for energy, volume, flow rate and temperature, is preprogrammed as default setting.

In the combined heating/cooling configuration the menu loop no. 5 (tariff menu loop) will be activated additionally.

Display and output pulses

Units: MWh, GJ, Gcal, MBtu, m³, gal, m³/h, GPM, °C, °F and kW; all decimal points are statically (the unit "gal" is shown with factor x 100).

The display unit and the last fractional digit are typical used for the pulse outputs.

Function**Technical principle**

Calculation of energy is based on the following formula:

$$\text{Energy} = \text{Volume} \times (T_{\text{Hot}} - T_{\text{Cold}}) \times K_{\text{factor}} (T_i)$$

Volume: Volume [m³] of a given amount of volume pulses

T_{Hot} : Measured temperature in the hot line

T_{Cold} : Measured temperature in the cold line

$K_{\text{factor}} (T_i)$: Thermal coefficient of media enthalpy and heat content

The energy calculation is made by a counter and depends on temperature difference, pulse input frequency and legal requirements.

The calculator always carries out at least one energy calculation every 2 seconds. If the connected flowmeter has not sent enough pulses the energy calculation and flow indication is also based on the 8 seconds value.

Data memory

The FUE950 has a history memory of 24 periods (months, weeks, days). The following values are stored monthly, weekly or daily in the EEPROM on the programmed day of 1...31 (via software tool).

• Date/Time	• Volume
• Energy	• Error day counter
• Tariff energy 1	• Maximum monthly flow rate
• Tariff energy 2	• Maximum monthly power
• Tariff definition 1	• Date of maximum monthly flow rate
• Tariff definition 2	• Date of maximum monthly power
• Pulse counter input 1	• Pulse counter input 2
• Operation hours	

Data logger memory (LOG)

The LOG of the calculator is stored every 24 hours with all cumulative values in the EEPROM. The storage frequency can be selected from various storage intervals (5, 6, 10, 12, 15, 20, 30, 60 minutes or the default setting of 24 hours). The data which are stored in the LOG could be read out using a software tool and can be used for evaluations.

Extract of possible LOG settings

Storage interval	Values	Number of data records	Recording period
5 minutes	• Error status	440	36.6 hours
15 minutes	• Overload time temperature	440	110 hours
1 hour	• Overload time flow rate	440	18.3 days
24 hours (default setting)	• Forward temperature • Return temperature • Date and time • Energy • Tariff energy 1 • Tariff energy 2 • Tariff definition 1 • Tariff definition 2 • Volume • Error day counter	440	440 days

Maximal Values

The integrator creates max. values for power and flow rate based on consumption time, which are stored in the EEPROM. The integration intervals are adjustable to 6, 15, 30 or 60 minutes and 24h. Default setting is 60 minutes.

Tariff/Accounting date function

The calculator includes two independent memories in which the accumulated energy at two programmable tariff dates are stored.

- Last accounting date
- Last but one accounting date

Values stored

- Energy
- Volume
- Tariff counter 1
- Tariff counter 2
- Pulse counter 1
- Pulse counter 2
- Date

The integrator offers two optional tariff memories for monitoring plant load states. Here it concerns threshold value tariffs. Extensive tariff conditions make it possible to adapt the calculator individually to the required customer-specific applications.

Both tariffs are separately configurable and independent from each other. Energy or time can be measured alternatively per tariff register dependent on the tariff mode adjusted in each case.

With the "time triggered tariff function" the switch-on time and the switch-off time are adjustable independent from each other for each day of the week in steps of 15 minutes.

Flow Measurement

SITRANS F US Inline

SITRANS FUE950 energy calculator

The following tariff limit types of the tariff function are possible: (This example applies to the display at 1 fractional digits after comma)

Type	Description	Limit	Limit resolution
dT	Temperature difference	1 ... 190 °C	1 °C
-dT	Negative temperature difference	1 ... 190 °C	1 °C
TR	Return temperature (low)	1 ... 190 °C	1 °C
TV	Forward temperature (high)	1 ... 190 °C	1 °C
P	Power	10 ... 2 500 kW	10 kW
Q	Flow	1 ... 255 m ³ /h	1 m ³ /h
FE	"Theoretically forward energy" with return temperature of 0 °C		
Z	"Time triggered" counting energy		
E	"External" counting energy		

Error handling and memory

Events such as changes and faults are stored in a non-volatile memory with a capacity of up to 127 entries. The following events are recorded:

- Checksum error
- Temperature measurement error
- Error hours
- Start and end of test mode

If SITRANS FUE950 records an error, this will be automatically indicated by a "alarm symbol" on the display.

To protect the reading data, all the relevant data are saved in a non-volatile memory (EEPROM). This memory saves the measured values, device parameters and types of error at regular intervals.

The following events are recorded:

- Temperature sensor error
- Swapped hot and cold temperature sensors
- Battery low warning
- Power supply failure
- Optical communication warning
- RAM checksum error

Outputs/Inputs/Communication

Communication interfaces:

SITRANS FUE950 is fitted with an optical infra-red send/receive port in accordance with EN1434/IEC 61107, protocol standard, EN 1434/EN 60870-3 (M-Bus protocol).

A specific optical head with a permanent magnet (IrDA-adaptor) in accordance with EN 1434 can be used for readout data or communication with the parameterization software.

2 ports for optionally plug-in modules

The calculator features 2 ports for the plug-in modules.

One slot is for the function modules and the other for the communication modules.

Communication modules

The following communication modules are available as options: RS 232 module, RS 485 module and M-Bus module. The RS 232 and RS 485 communication modules are serial interfaces and permit data exchange with the calculator. For this purpose a special data cable is necessary.

The M-Bus module is a serial interface for communication with external devices (M-Bus Master/Centre). According to the M-Bus structure a number of calculators can be connected to a control centre.

Pulse input module

Two pulse inputs are available. The pulse value and the unit is configurable for energy, water, gas or electrical meter by parameterization software. Data are separate cumulated in different registers and are also stored on the two accounting day's (Tariff registers).

Combined Pulse Input/Output module

Two pulse inputs combined with one pulse output are available on one module. The pulse inputs are configurable with value and the unit by parameterization software.

The pulse output is also programmable using the parameterization software.

Pulse output

The calculator provides levels for two optional external pulse outputs, which can be freely programmed using the parameterization software tool.

Default setting is one pulse which occurs per change in the least significant digit in the display with the unit and resolution selected by the device ordering.

Possible pulse output values

- Energy (default setting)
- Volume (default setting)
- Tariff energy 1
- Tariff energy 2
- Tariff condition 1, limit switch
- Tariff condition 2, limit switch
- Energy error
- Volume error
- Volume with specific resolution (0.1, 1.0, 10 or 100)
- Energy with specific resolution (0.1, 1.0, 10 or 100)

Combined current output module

Optional module with 2 passive 4 ... 20 mA outputs.

Possible output values:

- Power (default setting for output #1)
- Flow (default setting for output #2)
- Hot, cold or difference temperature

The settings can be configured by parameterization software. The current output module occupies both ports, means no other plug-in module will possible to plug in.

Module combinations

The calculator has a group of extension modules for communication and another group of extension modules for additional functionality. These modules are available first selected within the calculator, or for retrofitting in the field.

One single function module as well as one single communication module out of following modules is selectable.

Function modules:

- Pulse input module, 2 inputs
- Pulse output module, 2 outputs
- Combined pulse module 2 inputs, 1 output
- Combined current output module, 2 x passive 4 ... 20 mA (occupies both ports)

Communication modules:

- M-Bus (M-Bus protocol according EN 1434-3)
- RS 232 (M-Bus protocol according EN 1434-3)
- RS 485 (M-Bus protocol according EN 1434-3)

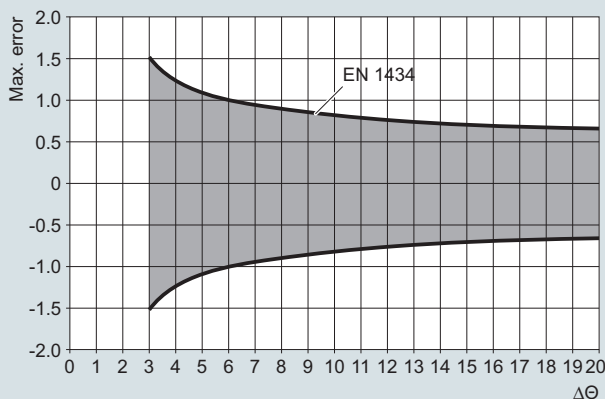
Integration

SITRANS FUE950 is a multi-purpose energy calculator for media water which meets the requirements of EN 1434. Further, the energy calculator has been specially developed to process volume pulses from SITRANS FUS380/FUE380 or alternatively MAG 5000/6000 or FST020 transmitter.

Technical specifications

Approval	MID approved in accordance with energy meter EN 1434 and PTB K7.2 (German national cooling approval)																						
Approved temperature range																							
• Heating	0 ... 180 °C (32 ... 356 °F)																						
• Cooling	0 ... 105 °C (32 ... 221 °F)																						
Absolute temperature range	-20 ... +190 °C (-4 ... -374 °F)																						
Differential temperature																							
• Heating	3 ... 177 K (starting at 0.1 K)																						
• Cooling	3 ... 102 K																						
Measuring accuracy	Meets requirements of EN 1434 Typically max. $\pm (0.5 + 3K/\Delta\Theta)$ [%] of measured value																						
Measuring rates																							
• Battery type D-cell	Volume: 1 s, temperature: 4 s																						
• Mains versions	Volume: 1/8 s, temperature: 2 s																						
Flow range	Depends on pulse input value (IN0), see "Selection and Ordering data".																						
Power range value	Depends on pulse input value as follows:																						
	<table> <tr> <th>Pulse input value (I/P or gal/P)</th><th>Max power [kW]</th></tr> <tr><td>1</td><td>15 000</td></tr> <tr><td>2.5</td><td>15 000</td></tr> <tr><td>5</td><td>15 000</td></tr> <tr><td>10</td><td>150 000</td></tr> <tr><td>25</td><td>150 000</td></tr> <tr><td>50</td><td>150 000</td></tr> <tr><td>100</td><td>1 500 000</td></tr> <tr><td>250 *)</td><td>1 500 000</td></tr> <tr><td>500 *)</td><td>1 500 000</td></tr> <tr><td>1 000 *)</td><td>15 000 000</td></tr> </table>	Pulse input value (I/P or gal/P)	Max power [kW]	1	15 000	2.5	15 000	5	15 000	10	150 000	25	150 000	50	150 000	100	1 500 000	250 *)	1 500 000	500 *)	1 500 000	1 000 *)	15 000 000
Pulse input value (I/P or gal/P)	Max power [kW]																						
1	15 000																						
2.5	15 000																						
5	15 000																						
10	150 000																						
25	150 000																						
50	150 000																						
100	1 500 000																						
250 *)	1 500 000																						
500 *)	1 500 000																						
1 000 *)	15 000 000																						
	*) not available for gal/pulse																						

Typical accuracy of FUE950



User interface (always included)

Display	8-digit LCD display with associated pictograms/symbols
Units	MWh, GJ, Gcal, MBtu, m ³ , m ³ /h, GPM, gal, °C, °F, kW, MBtu/h (gal is shown with factor x 100)
Totalizer value range	99 999 999 or 9 999 999.9 (0 and 1 digit after comma). Display digits: Flow in 6 digits; Volume, power and energy in 8 digits
Values	Power, energy, volume, flow rate, temperatures
Push button	Single push button for the menu controlling
Optical interface IrDA interface	ZVEI optical interface with M-Bus protocol as per EN 1434, connection via separate IrDA-adaptor baud rate: 300 or 2400

Rated operation conditions

Enclosure	IP54 in accordance with IEC 529
Material	
• Housing	C Lexan 141R (or similar); colors: light gray (top part) and black (bottom part)
• Pipe/wall fitting	PA 6.6 GF25 (or similar)
• Other plastic parts	ABS Cyclocac GPM500 (or similar)
• Gaskets	Neoprene and rubber cable bushings: EPDM 50
• Rubber cable bushings	EPDM 50
Temperature	
• Ambient	5 ... 55 °C (41 ... 131 °F)
• Storage	-25 ... +70 °C (-13 ... +158 °F) Relative ambient humidity < 93 %
Environment class	
• Mechanic class	M1/M2
• Electromagnetic class	E1/E2 (MID) or C (DIN EN 1434)

Temperature input (always included)

Function	The temperature sensors must be connected to terminals 1-5 and 6-2 (TH) and 3-7 and 8-4 (TC) depending on cable type (2-wire or 4-wire).
Temperature range	-20 ... 190 °C (-4 ... 374 °F) for T _H and T _C
Absolute measuring range	Start 0.1 K, min. 3 K, max. 177 K
Temperature difference	0.125 K 16-bit digital resolution AD converter
Measurement cut-off	T _H and T _C : 0.1 K, ΔT: 0.1 K
Display resolution	Pt100 or Pt500 as 2-wire or 4-wire; Standard is Pt500. Sensor cable length: up to 10 m (according EN 1434 and MID-type approval).
Sensor types	4-wire or 2-wire; auto detection of connection version
Sensor connection	

Flow input (IN0) (always included)

Function	Used as standard for flow input of the external flowmeter. The input is marked as 10 (+ Flow Pulse), 11 (- Gnd) on the terminal strip. Note: The pulse input value selection must be the same as the pulse output setting of the flowmeter.
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Flow Measurement

SITRANS F US Inline

SITRANS FUE950 energy calculator

Pulse value	1 ... 1 000 l/pulse or 1 ... 100 gal/pulse, selection by corresponding Order code. Will be shown at the device label	Possible pulse output selection	<ul style="list-style-type: none"> • Energy (default setting for 'Out1') • Volume (default setting for 'Out2') • Tariff energy 1 • Tariff energy 2 • Tariff condition 1 (limit switch) • Tariff condition 2 (limit switch) • Energy error • Volume error • Volume with specific display resolution (or with factor 0, 1, 10 or 100 thereof) • Energy with specific display resolution (or factor 0.1 thereof)
Pulse frequency	≤ 100 Hz (200 Hz)		
Pulse ON-time	≥ 3 ms		
Pulse OFF-time	≥ 2 ms		
Type	Active pulse input		
Terminal voltage	3.6 V DC (supplied internally by FUE950)		
Flowmeter installation place	The flowmeter installation place can be in the hot line or cold line ("forward or return pipe") selected by corresponding Order code. The "installation place" will be shown at the device display and nameplate		
Connected cable	Max. 10 m (shielded cables are highly recommended)		
Ports for option modules		Pulse input	
Type	The calculator features 2 ports for optional plug-in modules.	Function	Add-on module for two additional counters. The pulse input 1 is marked as I1, 'gnd' and the input 2 as I2, 'gnd' on the terminal strip and indicated in the display as separate registers IN1 and IN2 and can also be transferred via the communication modules.
Function modules (Port 1 or 2)	<ul style="list-style-type: none"> • Pulse input module, 2 inputs (In1, In2) • Pulse output module, 2 outputs (Out1, Out2) • Combination module of 2 inputs (In1, In2) and 1 output (Out1) 	Type	Passive "open collector" pulse inputs, outputs not potential isolated to each other, data are separate cumulated in different registers and are also stored on the two accounting day's.
Current output module (Port 1)	2 passive 4 ... 20 mA (#1, #2) (occupies both port 1 and 2)	Pulse value	Pulse value and the unit are configurable for energy, water, gas or electrical meter by a software tool Default: Pulse input 0.1 m ³ or 1 gal (if unit 'gal' is ordered with the Z-option "L05")
Communication modules (Port 1 or 2)	M-Bus, RS 232 or RS 485 (M-Bus protocol, according EN 1434-3)		
Pulse output		Pulse frequency	≤ 8 Hz
Function	The module contains connections for 2 pulse outputs, which can be programmed as desired using a software tool. The pulse outputs are marked as standard as O1, 'gnd' and O2, 'gnd' on the terminal strip and Out1 respectively Out2 in the display.	Pulse length	≥ 10 ms
Type	Passive "open collector" pulse output, outputs potential isolated to each other	External voltage supply	3 V DC (supplied internally by FUE950)
Pulse value	Last significant digits of the display (unit/pulse), selection by corresponding Order code and setting can be read via display menu, settings changeable via software tool	Current	based on $R_i = 2.2 \text{ M}\Omega$
Pulse output 1		Cable length	< 10 m connection limit
• Pulse frequency	≤ 4 Hz	Current output module	
• Pulse width	125 ms ± 10 %	Function	The module contains connections for 2 passive current outputs, which can be programmed individually using the software tool. The outputs are marked „#1" and „#2" with corresponding polarity „+" and „-" on the terminal strip. The module will be connected on port 1 only, but both ports are occupied by the module.
• Pulse duration	125 ms ± 10 %	Terminal voltage	External supply: 10 ... 30 V DC (passive output)
• Pulse break	≥ 125 ms -10 %	Signal range	4 ... 20 mA; 4 mA = 0 value and 20 mA = default maximum values (for #1: Power in kW and for #2: Flow with the max. values and selected unit). Defaults: For power it is the max. selectable value x 100 000 the last digit of display (e. g. 20 mA = 10 000 kW (1 digit res.) or 100 000 kW (0 digit res.). For flow it is the max. selectable value x 10 000 the last digit of display (e. g. 20 mA = 1 000.0 m ³ /h (1 digit res.) or 10 000 m ³ /h (0 digit res.).
Pulse output 2			
• Pulse frequency	≤ 100 Hz, depending on the selected pulse length		
• Ratio	Pulse duration/pulse break ~1:1		
Pulse length	5, 10, 50, 100 ms (default: 5 ms)		
External voltage supply	3 ... 30 V DC		
Current	≤ 20 mA with a residual voltage of ≤ 0.5 V		

SITRANS FUE950 energy calculator

Load	Max. 800 Ω
Upper limit	Up to 20.5 mA (exceed causes the error current value)
Signal on alarm	Errors are indicated with 3.5 mA or 22.6 mA (programmable, default: 3.5 mA)
Output values	Power, flow, temperature (configuring via software tool; default: for #1: Power and for #2: Flow)

M-Bus output

Type	The optional M-Bus plug-in module is a serial interface for communication with external devices (M-Bus Repeater)
Protocol	M-Bus according EN 1434-3
Connection	The connection is not polarity-conscious and is electrically isolated, connection of 2 x max. 2.5 mm ² wires, 300 or 2400 baud (auto baud detection), current drawn: one M-Bus load. M-Bus address: Each port has its own primary M-Bus address (Prim1 = the last two digits of the serial number; Prim2 = 0). The secondary address is unique for each calculator and is factory-set to equal the serial number.

RS 232 output

Type	The optional module RS 232 is a serial interface for data transmission with external devices, e.g. PC; baud rate: 300 or 2400. The module contains a 3-pole terminal strip with terminals marked 62 (TX), 63 (RX) and 64 (GND). For this purpose a special data cable is necessary.
Protocol	M-Bus according EN 1434-3
Connection	The module contains a 3-pole terminal strip with terminals marked 62, 63, 64 (max. 2.5 mm ²); Connected cable length: max 10 m; For communication with a PC a special adapter cable is required (Article No. A5E02611774).

RS 485 output

Function	The optional RS 485 module is a serial interface for data transmission with external devices, e.g. PC; baud rate: 2400. The module contains a 4-pole terminal strip with terminals marked D+, D-, Vcc and GND.
Protocol	M-Bus protocol according EN 1434-3
Connection	Terminals D+ and D-; electrically isolated; 2400 baud only. An external supply of 12 V DC \pm 5 V (<5 W) is needed for the module (terminals Vcc and GND). The module terminals are max. for 2.5 mm ² wires. Connected cable length: max. 10 m

Power consumption

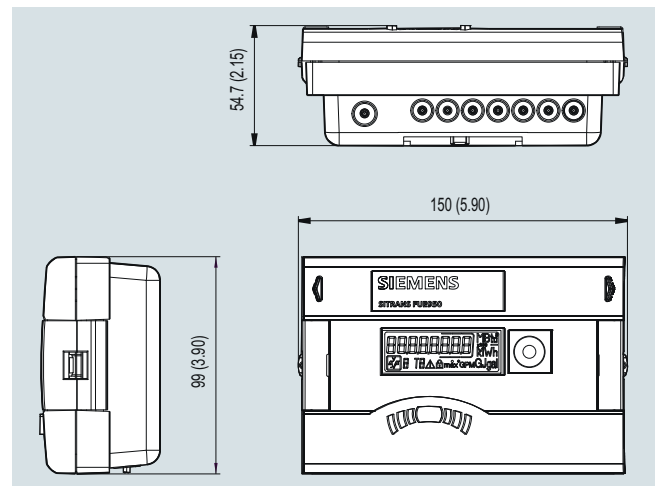
230 V and 24 V versions	Typical current appr. 0.15 VA
3.6 V D-cell battery	Typical battery lifetime 10 years under normal conditions (no add-on modules, max. 40 °C ambient temperature)
Supply data	Internal voltage 3.6 V by the battery or plug-in power supply module
Battery, 3.6 V type (option)	3.6 V lithium D-cell, battery lifetime typically 16 years with independently powered flowmeter
230 V AC module (option)	Plug-in module for 230 V AC (195 ... 253 V AC), 50/60 Hz (incl. battery backup)
24 V AC module (option)	Plug-in module for 24 V AC (12 ... 30 V AC) (incl. battery backup)
Battery backup (option)	Only with mains supply modules by internal 3.0 V lithium battery (type CR 2032) Displayed values, date and time are still updated, but the measuring functions have stopped, including the flow rate measurement. Communication via optional modules M-Bus, RS 485, RS 232 or optical interface is maintained, affecting the backup battery lifetime.

Accessories/Software

The parameterization software based on the M-Bus is a convenient tool for handling the calculator. It runs on Windows and is used for configuration of the calculator functionality, reading out different memories, printing out calculator logs. For further details please contact your local Siemens representative.

A specific optical head with a permanent magnet in (IrDA adapter with bluetooth) accordance with EN 1434 can be used for programming/altering programming of readout data, configuration data, etc. The reader head can also be used to change measuring data.

Dimensional drawings

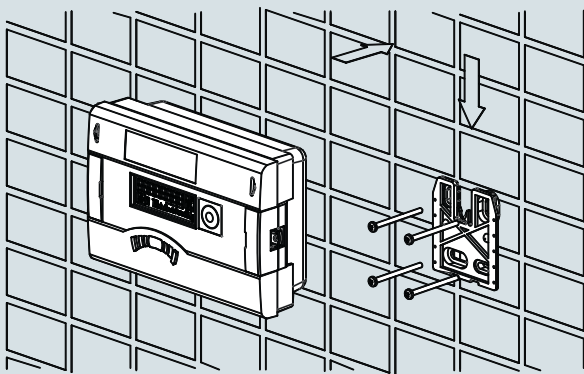


SITRANS FUE950, dimensions in mm (inch)

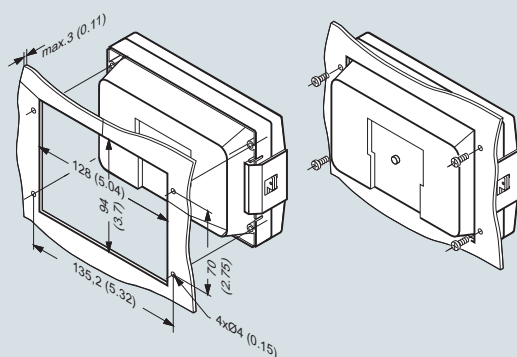
Flow Measurement

SITRANS F US Inline

SITRANS FUE950 energy calculator



Wall mounting



Panel mounting, dimensions in mm (inch)

Pt500 temperature sensor pairs

Application

The temperature sensor set is designed for use with the Siemens energy calculator type SITRANS FUE950 for measurement of the energy consumption in a district heating or cooling net.

Temperature sensors are one of the integral components of every thermal energy meter in heating or cooling applications. They are used for determining temperature changes in fluids due to energy taken from or supplied to the loop. The temperature is thus measured by mounting temperature sensors upstream and downstream from the point where the exchange in the thermal energy of the system is.

To ensure an accurate measurement of the temperature difference according to MID (EN 1434) or PTB K7.2 the sensors are delivered as matched pairs.

By selection with the corresponding Order code the Pt500 sensor pair sets can be delivered with heating approval or with approvals for combined heating/cooling applications.

Technical specifications

Temperature sensor pairs:

2-wire Pt500

Pt500 2-wire temperature sensor pair (EN 1434)	
Measuring insert	Pt500 temperature sensor, EN 60751, tolerance class B, 2-wire
Pairing	Paired to EN 1434 (10 ... 130 °C/14 ... 266 °F)
Media temperature	0...150 °C (32 ... 302 °F)
Response time $T_{0.5}$	See sensor pocket specifications
Medium	Typically heating water
Pressure rating	See sensor pocket specifications
Protection	IP65
Pipe material	AISI 304Ti/1.4303
Dimension	Ø 6 mm
Sensor tube length	50 mm
Cable length	Up to 10 m (32.8 ft), fixed connected silicon cable, 2 connection wire terminals, terminal sleeves to DIN 46228

4-wire Pt500

Pt500 4-wire temperature sensor pair (with MID and PTB K7.2 approval)	
Measuring insert	Pt500 temperature sensor, EN 60751, tolerance class to ISO 751 Class B; 4-wire
Pairing	Matched paired according to EN 1434 at 10, 75 and 140 °C (50, 167 and 284 °F)
Type approval	MID (DE-06-MI004-PTB011) and PTB K7.2 (PTB 22.77/09.01). Only to be mounted with related sensor pockets according to the type approvals.
Media temperature	0...150 °C (32 ... 302 °F)
Permissible temp. pair range for ΔT	
• Heating	3 ... 150 K
• Cooling	3 ... 85 K
Medium	Approved for heating/cooling water
Protection	IP65
Environment	
• Mechanic class	M3
• Electromagnetic class	E1 (MID)
Pressure rating	See sensor pocket specifications
Material	
• Protective tube	Stainless steel AISI 304Ti/1.4571 (or similar), diameter of protective tube: 6 mm
• Connector cable	Silicon cable, 4 connection wire terminals, terminal sleeves to DIN 46228
Sensor tube length	140 or 230 mm (5.51 or 9.06 inch)
Cable length	5 m (16.4 ft), fixed connected

Sensor pockets

Stainless steel sensor pocket (for 4-wire Pt500 types only - standard)

Media temperature	0 ... 150 °C (32 ... 302 °F)
Approval	Approved only together with 4-wire sensors
Medium	Approved for heating/cooling water; up to max. 5 m/s flow velocity
Pressure rating	PN 40
Length	Face-to-face length 120/135 and 210/225 mm (4.72"/5.23" and 8.27"/8.86")
External diameter	Protective tube 8/11 mm (0.32"/0.43")
Internal diameter	Protective tube 6 mm (0.24")
Pipe connection	Thread G 1/2" (with sealing screw for sensor)
Material	Protective tube AISI 316Ti/1.4571 (or similar)
Use	<ul style="list-style-type: none"> • Use with related 4-wire Pt500 sensors only (according type approval) • For flow velocities up to 5 m/s • Recommended to install with welded sleeve (according to EU standard)

Stainless steel sensor pocket (for 2-wire Pt500 types only - some only available as spare part)

Media temperature	0 ... 180 °C (32 ... 356 °F)				
Medium	Approved for heating water				
Response time T _{0.5}	Typically 13 s at 0.4 m/s without pasta Typically 5 s at 0.4 m/s with pasta				
Pressure rating	PN 25				
Length	L1 (mm)	92	127	168	223
	L (mm)	82	117	155	210
Material	Stainless steel: AISI 316Ti/1.4571				
Use	For 2-wire Pt500 types only				

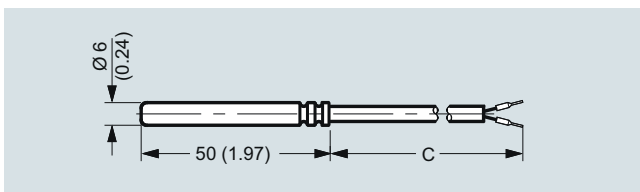
Brass sensor pocket (for 2-wire Pt500 types only - some only available as spare part)

Media temperature	0 ... 150 °C (32 ... 302 °F)			
Medium	Approved for heating water			
Response time T _{0.5}	Typically 9 s at 0.4 m/s without pasta Typically 5 s at 0.4 m/s with pasta			
Pressure rating	PN 16			
Length	L1 (mm)	47	92	127
	L (mm)	40	82	117
Material	Brass: CuZn ₄₀ Pb ₂ (Ms58)			
Use	For 2-wire Pt500 types only			

Dimensional drawings

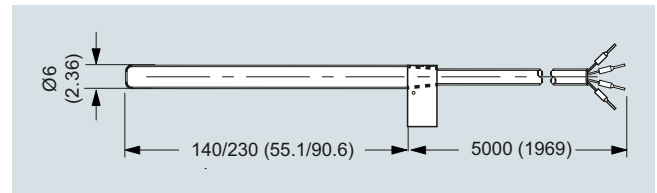
Pt500 2-wire temperature sensor pair (EN 1434)

Cable length 2, 3, 5 or 10 m ('C' at the dimensional drawing)



Pt500 2-wire temperature sensor, dimensions in mm (inch)

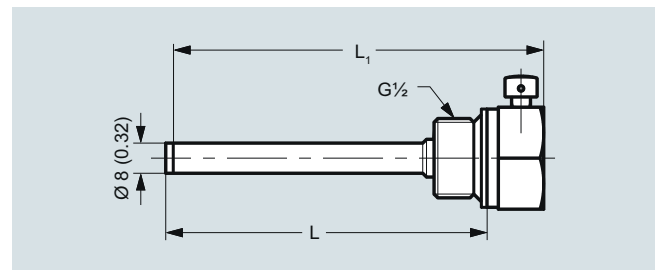
Pt500 4-wire temperature sensor pair (with MID and PTB K7.2 approval)



Pt500 4-wire temperature sensor, dimensions in mm (inch)

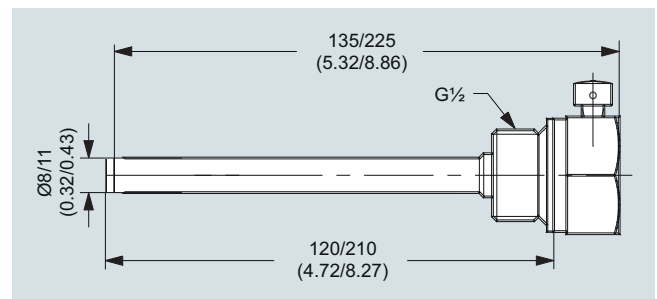
Stainless steel sensor pocket (for 2-wire Pt500 types only)

Length	L1 (mm)	92	127	168	223
	L (mm)	82	117	155	210



Sensor pocket (for 2-wire Pt500 types only), stainless steel, dimensions in mm (inch)

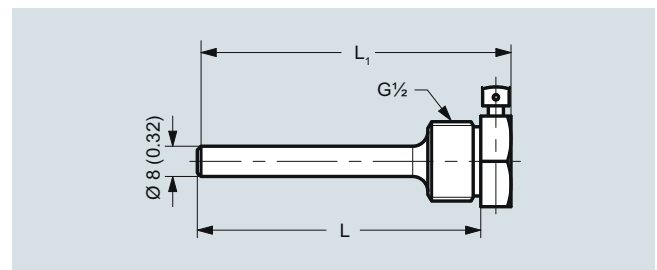
Stainless steel sensor pocket (for 4-wire Pt500 types only)



Stainless steel sensor pocket, dimensions in mm (inch)

Brass sensor pocket (for 2-wire Pt500 types only)

Length	L1 (mm)	47	92	127
	L (mm)	40	82	117



Sensor pocket, brass (for 2-wire Pt500 types only), dimensions in mm (inch)

Flow Measurement

SITRANS F US Inline

SITRANS FUE950 energy calculator

Selection and Ordering data

Article No.

Order code

Energy calculator SITRANS FUE950, MID or PTB K7.2 custody transfer approved

7ME3480-

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Flow input setting (IN0)

The pulse input value selection must be the same as the pulse output setting of the selected flowmeter. To get optimal function and performance the pulse value must be selected as low as possible according to the maximum flow rate.

The following calculation formula can be used for determining the lowest pulse value at a pulse length of 5 ms: $L/\text{pulse} > Q_{\max} (\text{m}^3/\text{h})/360$.

For example $Q_{\max} = 300 \text{ m}^3/\text{h}$; $L/\text{pulse} > 300/360$; $L/\text{pulse} > 0.83$; therefore the pulse value must be 1 l/pulse.

Pulse input in l/pulse or in gal/pulse (with option L05)	Flow limit Q_{\max} in m^3/h	Flow limit Q_{\max} in GPM *) (with option L05)
1	360	6 000
2.5	900	15 000
5	1 800	30 000
10	3 600	60 000
25	9 000	150 000
50	18 000	300 000
100	36 000	600 000
250	90 000	-
500	180 000	-
1 000	360 000	-

*) GPM = Gallons per minute

Calculator application/Flowmeter installation place

For heating, flowmeter in return pipe (cold pipe), typical standard

For heating, flowmeter in forward pipe (hot pipe)

For cooling, media water, flowmeter in forward pipe (cold pipe)

For cooling, media water, flowmeter in return pipe (hot pipe)

For combined cooling/heating, flowmeter in forward pipe (hot pipe as heating)
(MID conformity declaration for heating)

For combined cooling/heating, flowmeter in return pipe (cold pipe as heating)
(MID conformity declaration for heating)

Temperature sensor type

Pt500 setup, no sensor pair included (standard)

Pt500 setup and Pt500 sensor pair (6/140 mm), 4-wire with 5 m connection cable, 6 mm sensor diameter and 140 mm sensor length. MID approved DE-06-MI004-PTB011, PTB approved 22.77/09.01, incl. factory test report (mentioned approvals are only valid if temp. sensors are used with the applicable temperature sensor pockets).

Pt500 setup and Pt500 sensor pair (6/230 mm), 4-wire with 5 m connection cable, 6 mm sensor diameter and 230 mm sensor length. MID approved DE-06-MI004-PTB011, PTB approved 22.77/09.01, incl. factory test report (mentioned approvals are only valid if temp. sensors are used with the applicable temperature sensor pockets).

Pt100 setup, no sensor pair included

Pt 500 setup and PT500 sensor pair (6/50 mm), 2-wire type incl. 5 m cable, 6 mm sensor diameter and 50 mm length, with MID approval (only for use with the applicable temperature sensor pockets)

Pt 500 setup and PT500 sensor pair (6/50 mm), 2-wire type incl. 10 m cable, 6 mm sensor diameter and 50 mm length, with MID approval (only for use with the applicable temperature sensor pockets)

Temperature sensor pocket sets: (for 6 mm sensor diameter)

No pockets (standard)

Brass pockets for 6 mm 2-wire sensors, length 82/92 mm, G½ inch, max. PN 16 (2 pcs.)

Stainless steel pocket, 120/135 mm length for 6 mm sensor diameter, max. PN 40 and max. 5 m/s (2 pcs. for 140 mm 4-wire sensors above)

Stainless steel pockets for 6 mm 2-wire sensors, length 117/127 mm, G½ inch, max. PN 25 (2 pcs.)

Stainless steel pocket, 210/225 mm length for 6 mm sensor diameter, max. PN 40 and max 5 m/s (2 pcs. for 230 mm 4-wire sensors above)

Stainless steel pockets for 6 mm 2-wire sensors, length 155/168 mm, G½ inch, max. PN 25 (2 pcs.)

Voltage supply

Battery 3.6 V DC (Lithium D-cell type) (standard)

Mains power module for 230 V AC supply (incl. back-up battery)

Mains power module for 24 V AC supply (incl. back-up battery)

No power supply module (power supply ordering separate)

2 A
2 B
2 C
3 A
3 B
3 C
4 A
4 B
4 C
5 A

A
B
C
D
E
F

0
3
4
5
6
7

0
2
5
6
7
8

1
2
3
4

Selection and Ordering data	Article No.	Order code
Energy calculator SITRANS FUE950, MID or PTB K7.2 custody transfer approved	7ME3480	
Option modules		
No module (standard)		A
<u>1 module (communication module)</u>		
M-Bus module		B
RS 232 module (M-Bus protocol)		C
RS 485 module (M-Bus protocol)		D
<u>1 module (function module)</u>		
Pulse output, 2x output (Out1 "Energy" and Out2 "Volume")		E
Pulse input, 2x input (In1 and In2)		F
Pulse out-/input combination, 2x input and 1x output		G
<u>Combination of 2 modules (communication and function module)</u>		
M-Bus module and Pulse output, 2x output (Out1 "Energy" and Out2 "Volume")		H
M-Bus module and Pulse input, 2x input (In1 and In2)		J
M-Bus module and Pulse out-/input combination, 2x input and 1x output		K
RS 232 module (M-Bus) and Pulse output, 2x output (Out1 "Energy" and Out2 "Volume")		L
RS 232 module (M-Bus) and Pulse input, 2x input (In1 and In2)		M
RS 232 module (M-Bus) and Pulse out-/input combination, 2x input and 1x output		N
RS 485 module (M-Bus) and Pulse output, 2x output (Out1 "Energy" and Out2 "Volume")		P
RS 485 module (M-Bus) and Pulse input, 2x input (In1 and In2)		Q
RS 485 module (M-Bus) and Pulse out-/input combination, 2x input and 1x output		R
Combination current output module, 2x passive 4 ... 20 mA (Out 1 "Power", Out 2 "Flow") (occupies both module Ports 1 and 2)		S
Display units and resolutions		
MWh & kW, m ³ , m ³ /h in 2 digit resolution; Temperature: no decimal figures		C
MWh & kW, m ³ , m ³ /h in 1 digit resolution; Temperature: no decimal figures		D
MWh & kW, m ³ , m ³ /h in 0 digit resolution; Temperature: no decimal figures		E
GJ & kW, m ³ , m ³ /h in 2digit resolution; Temperature: no decimal figures		H
GJ & kW, m ³ , m ³ /h in 1 digit resolution; Temperature: no decimal figures		J
GJ & kW, m ³ , m ³ /h in 0 digit resolution; Temperature: no decimal figures		K
Gcal & kW, m ³ , m ³ /h in 2 digit resolution; Temperature: no decimal figures		M
Gcal & kW, m ³ , m ³ /h in 1 digit resolution; Temperature: no decimal figures		N
Gcal & kW, m ³ , m ³ /h - in 0 digit resolution; Temperature: no decimal figures		P
MBTU & MBTU/h, m ³ , m ³ /h in 2 digit resolution; Temperature: no decimal figures		Q
MBTU & MBTU/h, m ³ , m ³ /h in 1 digit resolution; Temperature: no decimal figures		R
MBTU & MBTU/h, m ³ , m ³ /h - in 0 digit resolution; Temperature: no decimal figures		S
Verification/Approval		
Without type approval mark, neutral label (standard))		0
With MID type approval mark (only for heating combinations, selection "A, B, E and F")		1
With MID approval mark and first MID verification (only for heating, selection A, B, E and F")		2
Cooling approval mark, German national cooling approval according PTB-TR-K7.2 (only for cooling and media water, selection "C and D")		7
Cooling approval mark, German national cooling approval according PTB-TR-K7.2 and first verification (only for cooling and media water, selection "C and D")		8
Further designs		
Please add "-Z" to Article No. and specify Order code		
Certificate		
Including factory test report (certificate) of FUE950	ALWAYS INCLUDED	
Cooling, setup for non water		
Water/glycol setting for media type "Tyfocor LS (R)" (only with neutral label, no verification and approval)		C 0 2
Optional settings/programming		
Tariff function settings (specify in clear text, up to max. 20 characters)		D 0 2
Pulse output setting of option module (specify in clear text, up to max. 20 characters)		D 0 6
Pulse input setting of option module (specify in clear text, up to max. 20 characters)		D 0 8
Pulse input setting of 4 ... 20 mA option module (please specify 20 mA related type and value in clear text, up to max. 20 characters)		D 1 0
Special display units		
Flow in 'GPM' and Volume in 'gal' (x100) (digits/resolution as selected above, only with 0 digit resolution)		L 0 5
Temperature in deg. F (digit resolution as selected above)		L 3 1

Flow Measurement

SITRANS F US Inline

SITRANS FUE950 energy calculator

Flowmeter SITRANS FUE950 operating instructions, accessories and spare parts

Operating instructions

Description	Article No.
• English	A5E03424739

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Accessories

Description	Article No.
Infrared optical head (Bluetooth type) for data acquisition & programming of FUE950	A5E02611768
Bracket for SITRANS FUE950 wall mounting (20 pcs.)	A5E02611769
Cable for data acquisition via RS 232 PC/D-sub 9F/3 wire	A5E02611774

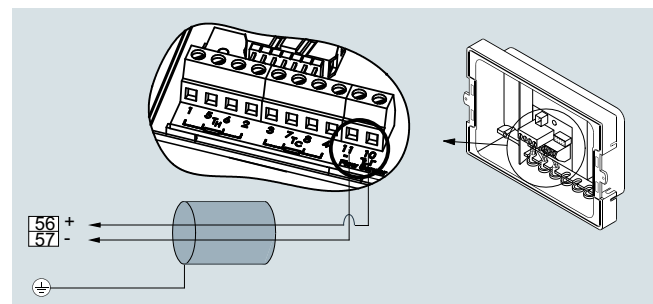
Spare parts

Description	Article No.
Add-on modules for FUE950 (only for 7ME348 versions)	
Pulse input module (2 inputs)	A5E03461432
Pulse output module (2 outputs)	A5E03461436
Combined pulse in-/output module (2 inputs and 1 output)	A5E03461437
RS 232 module (M-Bus protocol)	A5E03461459
RS 485 module (M-Bus protocol)	A5E03461512
M-Bus module	A5E03461516
Combined current output module, 2 x passive 4 ... 20 mA	A5E03461583
Connection cable for option modules (types: Pulse, RS 232/RS 485, M-Bus, mA) (special connection cable with 2 plugs)	A5E03461585
Power supply for FUE950 (only for 7ME348 versions)	
3.6 V D-cell battery for SITRANS FUE950	A5E03461708
230 V AC supply module (incl. internal fuse T50 mA L 250 V and back-up battery) for SITRANS FUE950	A5E03461717
24 V AC supply module for SITRANS FUE950, incl. back-up battery	A5E03461719
Pocket for temperature sensors Pt500 (for related 4-wire Pt500 type only, 1 pc.)	
Stainless steel pocket (1 pc.), 135 mm length for 6 mm sensor diameter, max. PN 40 and max. 5 m/s (recommended for 140 mm sensor length).	A5E03462868
Stainless steel pocket (1 pc.), 225 mm length for 6 mm sensor diameter, max. PN 40 and max. 5 m/s (recommended for 230 mm sensor length).	A5E03462870

Description	Article No.
Pt500 4-wire temperature sensor pair, with MID MI004 and PTB K7.2 approvals and verification (for related 4-wire sensor pocket types only)	
Pt500 sensor pair (6/140 mm), 4-wire with 5 m connection cable, 6 mm sensor diameter and 140 mm sensor length. MID approved DE-06-MI004-PTB011, PTB approved 22.77/09.01 (mentioned approvals are only valid if temp. sensors are used with the applicable temperature sensor pockets).	A5E03462872
Pt500 sensor pair (6/230 mm), 4-wire with 5 m connection cable, 6 mm sensor diameter and 230 mm sensor length. MID approved DE-06-MI004-PTB011, PTB approved 22.77/09.01 (mentioned approvals are only valid if temp. sensors are used with the applicable temperature sensor pockets).	A5E03462878
FUE950 enclosure (only for 7ME348 versions)	
Bottom part of FUE950 enclosure (1 pc.)	A5E03461508
Snap fit for FUE950 enclosure (1 pc.)	A5E030461731
Pocket for Pt500 temperature sensors (for corresponding 2-wire Pt500 types only, 1 pc.)	
Brass pocket 6 mm, G½B x 40 mm (PN 16), 1 pc.	A5E02611778
Brass pocket 6 mm, G½B x 85 mm (PN 16), 1 pc.	A5E02611779
Brass pocket 6 mm, G½B x 120 mm (PN 16), 1 pc.	A5E02611780
Stainless steel 6 mm, G½B x 85 mm (PN 25), 1 pc.	A5E02611781
Stainless steel 6 mm, G½B x 120 mm (PN 25), 1 pc.	A5E02611783
Stainless steel 6 mm, G½B x 155 mm (PN 25), 1 pc.	A5E02611792
Stainless steel 6 mm, G½B x 210 mm (PN 25), 1 pc.	A5E02611793
Pt500 temperature sensor pair, 2-wire cable, 6 mm sensor diameter, with MID/EN-approval (for corresponding 2-wire sensor pocket types only)	
Cable length:	
2 m	A5E02611794
3 m	A5E02611795
5 m	A5E02611796
10 m	A5E02611798

Schematics

Electrical connection for SITRANS FUS380/FUE380/FUE950 and MAG 5000/6000/FUE950



The diagram shows the connection between SITRANS FUE950 (terminals 10 and 11) and FUS380/FUE380 and MAG 5000/6000 (terminals 56 and 57). Temperature sensors must be connected to terminals 5 (1) and 6 (2) (T_H) and 7 (3) and 8 (4) (T_C).

Note:

The right flowmeter pulse output value must be equal to the FUE950 pulse input value and must be checked via the user menu of the transmitter MAG 5000/6000 or nameplate of FUE380 or FUS380.

Overview



SITRANS F S clamp-on ultrasonic flowmeters provide highly accurate measurement while minimizing installation time and maintenance expense.

Benefits

- Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- No moving parts to foul or wear
- No pressure drop or energy loss
- Wide turn-down ratio
- Choice of single and dual path versions to suit your operating conditions and requirements.

System performance

Pending approvals	<ul style="list-style-type: none"> • ATEX Zone 2 • IECEx Zone 2 • FM Class I Div. 2 • FMc Class I Div. 2
Accuracy	± 0.5 ... 1 % for velocities above 0.3 m/s and >10 diameters straight run
Repeatability	± 0.25 % (based on ISO 11631)
Pipe size range	12.7 ... 10 m (0.5 ... 394")
Wall Thickness Range	0.64 ... 76.2 mm (0.025 ... 3.0")
Pipe material	Any sonically conductive material (steel, plastic, aluminum, glass, cement, ductile iron, copper)

Applications

SITRANS FS230 standard functions are suitable for a wide variety of liquid applications, including the following:

- Water industry
 - Raw water
 - Potable water
 - Chemicals
- Wastewater industry
 - Raw sewage
 - Effluent
 - Sludges
 - Mixed liquor
 - Chemicals
- HVAC industry
 - Condensers
 - Hot and cold water systems
- Power industry
 - Nuclear
 - Fossil
 - Hydroelectric
- Processing industry
 - Process control
 - Batching
 - Rate indication
 - Volumetric and mass measurement

SITRANS FS230 hydrocarbon functions are ideal for applications carrying crude oil, refined petroleum or liquefied gas.

Standard volume (high end system)

- Standard (net) volume flow measurement
- Suitable for use in leak detection systems
- Mass flow output measurement
- Chemical and petrochemical processing
- Precise identification of interfaces on multi-liquid pipelines
- Product identification
- Standard density indication
- Applications with multiple liquids having a wide viscosity range
- Automatic gross volume compensation due to viscosity

Flow Measurement

SITRANS F S Clamp-on

System information SITRANS F S Clamp-on ultrasonic flowmeters

System information and selection guide

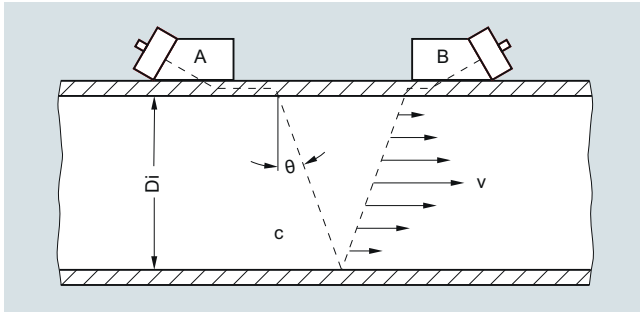
SITRANS F S clamp-on flowmeters	FS230 (Standard)	FS230 (Hydrocarbon)
Industry/Applications		
Water and aqueous solutions	X	
Utility district heating, cooling	X	
Chemical	X	
Hydrocarbons/petrochemical, multiple products or varying viscosity, liquefied gases, net and gross volume		X
Hydrocarbons (single product with limited viscosity range) gross volume	X	X
Very low flow (< 0.1 m/s) in small pipes	X	
High temperature applications < 232 °C (450 °F)	X	X
Refrigeration liquids	X	
Food products	X	
Design		
Field clamp-on (non-intrusive)	X	X
Standard volume or mass flow; per API MPMS chapter 11.1		X
Interface detection		X
Standard density output		X
Temperature measurement	X	X
Analog input	X	X
Large graphical display	X	X
Configuration and diagnostic software PDM compatible	X	X
Number of acoustic paths and channels		
1-path	X	X
2-path	X	X
Size		
12.7 ... 10000 mm (0.5" ... 394")	X	
38 ... 10000 mm (1.5" ... 394")		X
Pending approvals		
FM/FMc ¹⁾	X	X
ATEX	X	X
UL/ULc	X	X
IECEx	X	X

¹⁾ NEMA 4X associated equipment in DIV 2 connected to DIV 1 sensors.

Function

Operating Principle

The SITRANS F S system is a transit-time ultrasonic meter that provides exceptional performance using a non-intrusive clamp-on approach. Ultrasonic sensors transmit and receive acoustic signals directly through the existing pipe wall, where the fluid refraction angle is governed by Snell's law of refraction.



Clamp-on sensor mounted in a reflect configuration

The beam refraction angle is calculated as follows:

$$\sin \theta = c / V_{\phi}$$

c = Velocity of sound in fluid

V_{ϕ} = Phase velocity (a constant in the pipe wall)

The flowmeter automatically compensates for any change in fluid sound velocity (or beam angle) in response to variations in the average transit time between sensors A and B. By subtracting the computed fixed times (within the sensors and pipe wall) from the measured average transit time, the meter can then infer the required transit time in the fluid (T_{Fluid}).

The sound waves traveling in the same direction as the flow ($T_{A,B}$) arrive earlier than sound waves traveling against the direction of flow ($T_{B,A}$). This time difference (Δt) is used to compute the line integrated flow velocity (v) as shown in the equation below:

$$v = V_{\phi} / 2 \cdot \Delta t / T_{\text{Fluid}}$$

Once the raw flow velocity is determined, the fluid Reynolds Number (Re) must be determined to properly correct for fully developed flow profile. This requires the entry of the fluid's kinematic viscosity (visc) as shown in the equations below, where Q represents the final flow profile compensated volumetric flow rate.

$$Re = D_i \cdot v / \text{visc} \cdot Q = K(Re) \cdot (\pi / 4 \cdot D_i^2) \cdot v$$

v = Flow velocity

$\text{visc} = \mu / \rho$ = (dynamic viscosity / density)

$K(Re)$ = Reynolds flow profile compensation

In wetted type ultrasonic flowmeters the meter constants are configured prior to leaving the factory. As this is not possible with clamp-on meters, the settings must be made by the customer at the time of installation. These settings include pipe diameter, wall thickness, liquid viscosity, etc.

SITRANS clamp-on flowmeters that include temperature sensing can be configured to dynamically infer changes in fluid viscosity for the purpose of computing the most accurate flow profile compensation (K_{Re}).

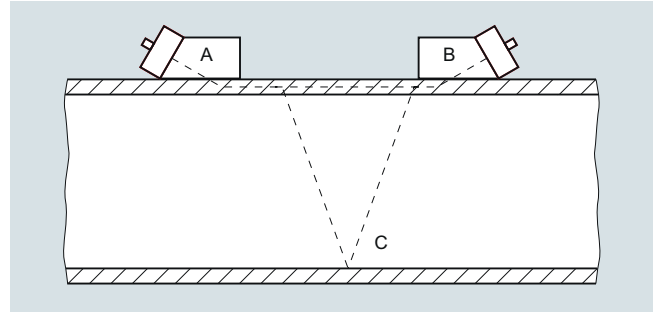
Ultrasonic sensor types

Two basic types of clamp-on sensors can be selected for use with the SITRANS F S flowmeter. The lower cost "universal" sensor is the most common type in the industry and is suitable for most single liquid applications where the sound velocity does not vary much. This sensor type can be used on any sonically conductive pipe material (including steel) making it well suited for portable survey applications. Universal sensors are selected

based on the pipe diameter range alone, so wall thickness is less important to the selection process.

The second sensor type is the "WideBeam" sensor (called high precision), which utilizes the pipe wall as a kind of waveguide to optimize the signal to noise ratio and provide a wider area of vibration. This makes this kind of sensor less sensitive to any change in the fluid medium.

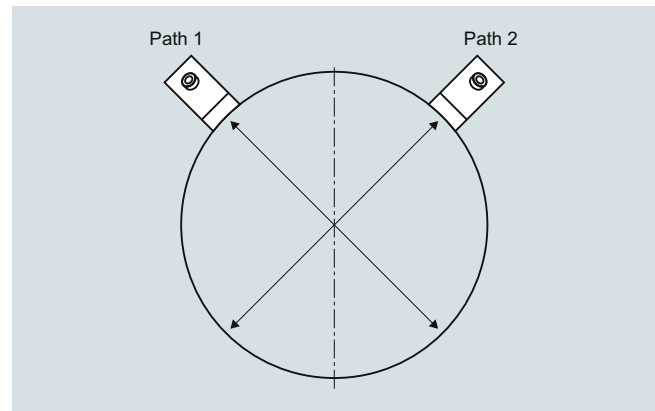
The WideBeam sensor is designed for steel pipes, but can also be used with aluminum and titanium. It is the preferred sensor for HPI applications. Note that unlike the universal type, this sensor selection is dependent only on the pipe's wall thickness.



Multi-path flowmeters

For improved flow profile averaging, redundancy or better cost per measurement, clamp-on meters can be supplied with 1 or 2 path measurement systems.

In the standard FS230 systems, these can be installed on a single pipe as shown below (two paths on same pipe).



Dual path installation example

Flow Measurement

SITRANS F S Clamp-on

Ultrasonic flow sensor SITRANS FSS200

SITRANS meter family description

SITRANS FS230 clamp-on flowmeters

The FS230 system is a basic function, permanent (or dedicated) Clamp-on meter that is available with a full range of safety approvals and I/Os. This meter can be used in a wide range of applications.

FST030 transmitter standard flow functions

When configured with standard flow functions, the FST030 transmitter is typically programmed with a fixed viscosity and specific gravity entry, which can limit the mass flow and volumetric flow accuracy when highly variable (multi-product) liquid properties flow through the same pipeline.

It will have the ability to accommodate clamp-on RTDs, or analog input from a temperature transmitter.

FST030 hydrocarbon flow functions

When configured with hydrocarbon functions, the FST030 can be used for applications that will flow a wide range of viscosity with a standard volume (mass) and interface detection functions available. All functions rely on a variable referred to as "Liquident (TM)", which is used to infer the liquid's viscosity and density. This variable represents the measured liquid sonic velocity compensated by the operating temperature and pressure, so for a given liquid product the measured Liquident (TM) output will remain constant over a wide range of pressure or temperature.

Standard volume description:

This Liquident (TM) variable can also be used to identify the liquid flowing through the pipe as well as its physical properties (density, viscosity and compressibility) at base conditions. With this information the meter can be configured to output a temperature and pressure compensated (standard) volume flow rate using the API MPMS chapter 11.2.1 methods as shown below.

Correction for temperature:

Compute thermal expansion coefficient (α_b):

$$\alpha_b = KO / \rho_b^2 + K1 / \rho_b$$

where: KO and K1 are constants dependent on type of liquid and ρ_b is the liquid density at base conditions

Compute temperature correction factor (K_T):

$$K_T = \rho_b * \text{EXP}(-\alpha_b \Delta T (1 + 0.8 \alpha_b \Delta T))$$

where: $\Delta T = (T - \text{base temperature})$

Correction for pressure:

Compute compressibility factor (F):

$$F = \text{EXP}(A + B T + (C + D T) / \rho_b^2)$$

where: A, B, C and D are constants, and "T" is liquid temperature

Compute pressure correction factor (K_p):

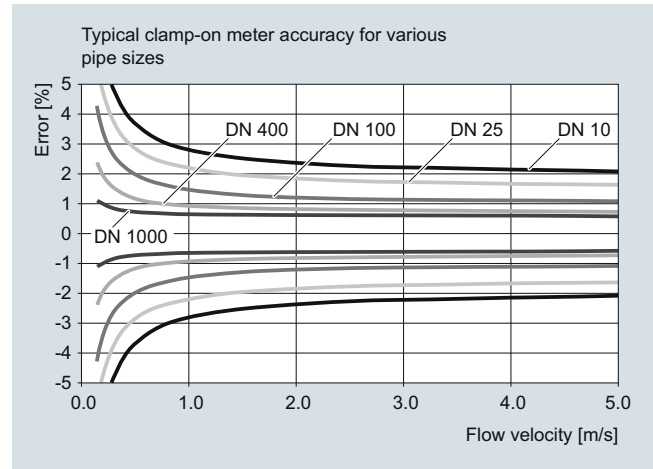
$$K_p = 1 / (1 - F (P_{\text{act}} - P_{\text{base}}) * 10^{-4})$$

Final volume correction: $Q_{\text{std}} = Q_{\text{act}} * K_t * K_p$

Available outputs from this meter include: API, standard density, mass flowrate, standard volume flowrate and liquid identification.

General installation guidelines for transit time clamp-on sensor

- Minimum measuring range: 0 to ± 0.3 m/s velocity (see meter accuracy graph below for more detail)
- Maximum measuring range: 0 to ± 12 m/s (± 30 m/s for high precision sensors). Final flow range determination requires application review



- Pipe must be completely full within the sensor installation volume for accurate flow measurement
- Typical MINIMUM straight pipe requirements are: 10 Diameters upstream/5 Diameters downstream. Additional straight run is required for double out-of-plane elbows and partially open valves.
- Sensors should be installed at least 20° off vertical for horizontal pipes. This reduces the chance of beam interference from gas buildup at the top of the pipe
- Operation inside the Reynolds transition region, between $1000 < Re < 5000$ should be avoided for best accuracy
- Submersible and direct burial installations can be accommodated. Consult sales representative for details
- Ultrasonic coupling compound is provided with all sensor orders. Insure that a permanent coupling compound is used for long term installations
- Refer to the "Sensor type selection guide" to insure proper application of the equipment

Sensor type selection guide

Standard sensor supported in MLFB

Considerations for sensor selection	High precision	Universal	Notes
Media			
General survey (clean liquids) on non-steel pipes		X	
General survey (clean liquids) on a limited range of steel pipes	X		
Moderately aerated liquid or slurry, up to 121 °C (250 °F)	X		
Permanent installation on steel pipe (clean liquids)	X		
Installation in offshore or corrosive environment	X ¹⁾	X ²⁾	Sensor size C/D/E come standard as corrosion resistant. Size A and B optional stainless steel
Liquid temperature greater than 120 °C (248 °F)	O	X	FSS200 high temperature metal block sensors (up to 232 °C (450 °F))
Operation on single pipeline flowing multiple products	X	O	
Pipe material			
Steel	X		
Steel pipe with diameter/wall thickness ratio <10	O	X	
Non-steel pipe material (copper, ductile iron, cast iron, etc.)	O	X	High precision sensors can also be used on plastic and aluminum pipes in special cases
Wall thickness > 31.75 mm (1.25")	O	X	

O = not suitable X = preferred choice

¹⁾ For steel and stainless steel pipes only

²⁾ Not preferred for steel pipes

Definitions

Sensor chart	Description
FSS200	Formerly 1011 clamp-on sensors of the 1010 systems
Standard	Standard system sensor, selectable as part of a configured product
Special	Sensors available for non-standard applications and pipes. Contact tech support for application use
Corrosion resistant	Stainless steel metal parts on all Size C, D and E and all high temperature sensors
Aluminum	Aluminum metal parts on all HP and Universal size A and B (Corrosion resistant on request for size B)
Spare	Not available as part of a configured product, must be ordered separately
CE	Transmitter and sensors certified for sale in the EU
Trackless mount	Sensors fixed only by straps, no other mounting (spacer bar as an option) - not recommended
Tracks	Permanent installation for universal size A/B, high precision size A/B and all sizes of high temperature. Tracks always come as dual-part for either direct or reflect mounting, and always with straps.
Frames	Three sizes, for permanent installation for universal size C/ D/ E, and for high precision size C/D. For universal and high precision size B available for pipes > 125 OD (Spare)
T1	Usable from -40 ... +120 °C (-40 ... +248 °F), but best for Ø temperature below 80 °C (< 176 °F), standard
T2	Usable from -40 ... +120 °C (-40 ... +248 °F), but best for Ø temperature above 80 °C (> 176 °F)
Submersible	Sensors can be used submerged; adding Denso for supplemental protection is recommended

Flow Measurement

SITRANS F S Clamp-on

Ultrasonic flow sensor SITRANS FSS200

Sensor availability guide

Sensor models	Availability											
	Standard	Spare only	ATEX/FM/IECEX	Corrosion resistant	Trackless	Tracks	Frames	High precision mount	T1 best use < 80 °C (176 °F)	T2 best use > 80 °C (176 °F)	Submersible	Catalog
FSS200 Universal Sensor -40 ... 120 °C (-40 ... +248 °F) Polyetherimide - stainless steel housing CE IP68												
A1 Universal for pipe OD – 5.8 ... 50.8 mm (0.23" ... 2")		X	X	X	X ¹⁾	X					X	
A2 Universal for pipe OD – 12.7 ... 50.8 mm (0.5" ... 2")	X		X	X	X ¹⁾	X					X	X
B1 Universal for pipe OD – 12.7 ... 76 mm (0.5" ... 3")		X	X	X	X ¹⁾	X	X				X	
B2 Universal for pipe OD – 12.7 ... 76 mm (0.5" ... 3")		X	X	X	X ¹⁾	X	X				X	
B3 Universal for pipe OD – 19 ... 127 mm (0.75" ... 5")	X		X	X	X ¹⁾	X	X				X	X
C1 Universal for pipe OD – 51 ... 254 mm (2" ... 10")		X	X	X	X		X				X	
C2 Universal for pipe OD – 51 ... 254 mm (2" ... 10")		X	X	X	X		X				X	
C3 Universal for pipe OD – 51 ... 305 mm (2" ... 12")	X		X	X	X		X				X	X
D1 Universal for pipe OD – 102 ... 508 mm (4" ... 20")		X	X	X	X		X				X	
D2 Universal for pipe OD – 152 ... 610 mm (6" ... 24")		X	X	X	X		X				X	
D3 Universal for pipe OD – 203 ... 610 mm (8" ... 24")	X		X	X	X		X				X	X
*E1 Universal for pipe OD – 254 ... 3048 mm (10" ... 120")		X	X	X	X		X				X	
*E2 Universal for pipe OD – 254 ... 6096 mm (10" ... 240")	X		X	X	X		X				X	X
*E3 Universal for pipe OD – 304 ... 10007 mm (12" ... 394")		X	X	X	X		X	X			X	
FSS200 High Precision Sensor -40 ... +120 °C (-40 ... +248 °F) Polyetherimide - stainless steel housing T1/T2 CE IP68												
A1H (High Precision) for pipe WT - 0.64 ... 1.0 mm (0.025" ... 0.04")		X	X	X	X ¹⁾	X			X		X	X
A2H (High Precision) for pipe WT - 1.0 ... 1.5 mm (0.04" ... 0.06")	X		X	X	X ¹⁾	X			X		X	X
A3H (High Precision) for pipe WT - 1.5 ... 2.0 mm (0.06" ... 0.08")	X		X	X	X ¹⁾	X			X		X	X
B1H (High Precision) for pipe WT - 2.0 ... 3.0 mm (0.08" ... 0.12")	X		X	X	X ¹⁾	X	X		X	X	X	X
B2H (High Precision) for pipe WT - 3.0 ... 4.1 mm (0.12" ... 0.16")	X		X	X	X ¹⁾	X	X		X	X	X	X
B3H (High Precision) for pipe WT - 2.7 ... 3.3 mm (0.106" ... 0.128")		X	X	X	X ¹⁾	X	X		X	X	X	X
C1H (High Precision) for pipe WT - 4.1 ... 5.8 mm (0.16" ... 0.23")	X		X	X	X		X	X	X	X	X	X
C2H (High Precision) for pipe WT - 5.8 ... 8.1 mm (0.23" ... 0.32")	X		X	X	X		X	X	X	X	X	X
* D1H (High Precision) for pipe WT - 8.1 ... 11.2 mm (0.32" ... 0.44")	X		X	X	X		X	X	X	X	X	X
* D2H (High Precision) for pipe WT - 11.2 ... 15.7 mm (0.44" ... 0.62")	X		X	X	X		X	X	X	X	X	X
* D3H (High Precision) for pipe WT - 7.4 ... 9.0 mm (0.293" ... 0.354")		X	X	X	X		X	X	X	X	X	X
* D4H (High Precision) for pipe WT - 15.7 ... 31.8 mm (0.62" ... 1.25")	X		X	X	X		X	X	X	X	X	X
FSS200 High Temperature Universal Sensor -40 ... +230 °C (-40 ... +446 °F)												
High Temperature size 1 ... 230 °C (Ø 12.7 ... 100 mm)		X	X	X		X						
High Temperature size 2 ... 230 °C (Ø 30 ... 200 mm)	X		X	X		X						X
High Temperature size 3 ... 230 °C (Ø 150 ... 610 mm)	X		X	X		X						X
High Temperature size 4 ... 230 °C (Ø 400 ... 1200 mm)	X		X	X		X						X
High Temperature size 2A ... 230 °C (Ø 30 ... 200 mm)		X	X	X		X						
High Temperature size 3A ... 230 °C (Ø 150 ... 610 mm)		X	X	X		X						
High Temperature size 4A ... 230 °C (Ø 400 ... 1200 mm)		X	X	X		X						

¹⁾ Usable, but not recommended for selection.

Sensor mounting availability guide

	Sensor		
	FSS200 Dedicated Universal	FSS200 Dedicated High precision	FSS200 High temperature Universal
Mounting			
Trackless ¹⁾	X	X	
Tracks universal dedicated	X		
Tracks HP dedicated		X	
Frames universal dedicated	X		
Frames HP dedicated		X	
Tracks high temperature universal			X
High precision mounting single enclosure		X	
High precision mounting dual enclosure		X	
SpacerBar	X	X	
Straps	X	X	X
Chains EZ-Clamp 1	Size C, D	Size C	
Chains EZ-Clamp 2	Size E	Size D	
Denso	X	X	

¹⁾ Usable but not recommended

Flow Measurement

SITRANS F S Clamp-on

Transmitter SITRANS FST030, wall mount housing

Overview



FST030 is based on the latest developments within Digital Signal Processing (DSP) technology – engineered for high measuring performance, fast response to step changes in flow, high immunity against process noise, easy to install commission and maintain.

The FST030 transmitter delivers true multi-parameter measurements i.e. volume flow, standard volume flow, density, mass flow, fluid sound velocity and temperature.

The multiple outputs and bus communication mean that all primary process information can be read either instantaneously (10 ms update) or periodically as required by plant operations.

Process values

- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Standard volume flow (hydrocarbon variant only)
- Density
- Kinematic viscosity
- Pressure
- Medium temperature
- Specific gravity (hydrocarbon variant only)
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Standard density (hydrocarbon variant only)
- Standard specific gravity (hydrocarbon variant only)
- Standardizing factor (hydrocarbon variant only)
- Liquident (hydrocarbon variant only)
- API gravity (hydrocarbon variant only)
- Standard API gravity (hydrocarbon variant only)
- Standard kinematic viscosity (hydrocarbon variant only)
- Liquid identifier (hydrocarbon variant only)

Benefits

Flow calculation and measurement

- Dedicated volume flow calculation with DSP technology
- 100 Hz update rate for all output on all primary process values
- Maximum data age from sensor to output is 20 ms
- Independent low flow cut-off settings for volume and mass flow, standard volume flow and velocity
- Zero-point adjustment on command from discrete input or host system

Operation and display

- User-configurable operation display
 - Full graphical display 240 x 160 pixels with up to 6 programmable views
 - Self-explaining alarm handling/log in clear text
 - Help text for all parameters appears automatically in the configuration menu
- SensorFlash technology stores production specific system documentation and provides removable memory of all flowmeter setups and functions
 - Calibration certificates (with ordered calibration)
 - Non-volatile memory backup of operational data
 - Transfer of user configuration to other flowmeters
 - 4GB SD card for storage and data logging
 - Audit trail of all parameter changes
 - Alarm logging

Alarms and safety

- Advanced diagnosis and service menu enhances troubleshooting and meter validation
- Configurable upper and lower alarm and warning limits for all process values
- Alarm handling can be selected between Siemens and NAMUR standard configurations

Outputs and control

- Monitoring comprising of 3 individually configurable totalizers
- Multi-parameter outputs, configurable outputs assigned individually to any of the following parameters:
 - Volume flow
 - Standard volume flow
 - Mass flow
 - Flow velocity
 - Sound velocity
 - Density
 - Process viscosity
 - Process pressure
 - Process/medium temperature

Up to six I/O channels are configured as follows.

Channel 1

Channel 1 is 4 to 20 mA analog output with HART 7.5. The current signal can be configured for massflow, volumeflow and includes the availability of active or passive function selected by wiring on the non-Ex terminals. Alternative Modbus RTU RS 485 is available.

Channel 2

Channel 2 is a signal output which can be freely configured for any process variable.

- Analog current (0/4 to 20 mA)
- Frequency or pulse
- Operational and alarm status

Channels 3 and 4

Channels 3 and 4 can be ordered with signal (freely configured for any process variable) or relay outputs, or signal input.

Signal output

Signal output can be user configured to:

- Analog current (0/4 to 20 mA)
- Frequency or pulse
- Redundant frequency or pulse (linked to channel 2)
- Operational and alarm status

Signal input

Signal input can be user-configured for:

- Totalizer reset functions
- Force outputs or freeze process values
- Initiate automatic zero point adjustment

Relay

Relay output(s) can be user configured to:

- Alarm status

4-20 mA signal outputs and inputs are ordered as active or passive for Ex versions, active and passive for non-Ex versions - function selected by wiring on the terminals.

During initial commissioning of the flowmeter, all outputs can be forced to a preset value for simulation, verification or calibration purposes.

Channels 5 and 6

- RTD temperature inputs for 1000, 500 or 100 Ω RTD's - 2, 3 or 4 wire RTD's supported

Approvals and certificates

The SITRANS FST030 transmitter was designed to comply with or exceed the requirements of international standards and regulations.

Function

The following functions are available:

- Up to four configurable outputs and 2 RTD input channels selected at ordering
- Outputs can be individually configured for mass flow, volume flow etc.
- Three built-in totalizers which can count positive, negative or net flows
- Independent low flow cut-offs, adjustable
- Uni/bidirectional flow measurement
- Flow direction adjustable
- Alarm system consisting of alarm-log, alarm pending menu
- Change log, logs all changes made to menu parameters or via communications
- Internal data logger
- Display of operating time with real-time clock
- Flowrate outputs are freely configurable between maximum negative and maximum positive flows according to the sensor capacity
- Limit switches programmable for flow, density and temperature. Limit points can be graded as warning and alarm for values both above and below nominal process conditions
- Zero adjustment menu, with zero point evaluation display
- Full service menu for effective and straight forward application and meter troubleshooting
- Precise temperature measurement ensures optimal accuracy on massflow and density
- Fully compatible with Siemens PDM version 8.2 service pack 1 or higher

Design

The SITRANS FST030 is designed in an IP67/NEMA 4X aluminum enclosure with corrosion resistant coating. It can be wall or pipe mounted and the enclosure can be locked with a padlock or wired with lead security seals. Includes all flow and DSL functions integrated into one unit.

The FST030 is available as standard with one current, HART 7.5 output and can be ordered with additional input/output functions.

The transmitter has a modular design with discrete, replaceable electronic modules and connection boards to maintain separation between functions and facilitate field service. All modules are fully traceable and their provenance is included in the transmitter setup.

SensorFlash

SensorFlash is a standard, 4 GB micro SD card with the ability to be updated by PC. It is supplied with each transmitter and comes with a complete set of certification documents including report if ordered. Factory conformance certificates are optional at ordering.

The Siemens SensorFlash memory unit offers the following features and benefits:

- Copy site setups to SD card for easy transfer to other similar transmitters
- Permanent database of operational and functional information from the moment that the flowmeter is switched on
- New firmware updates can be downloaded from the Siemens internet portal for Product Support and placed onto SensorFlash (unmounted from the transmitter and inserted into a PC's SD card slot). The firmware is then inserted into the existing flowmeter for system/firmware upgrade.

Flow Measurement

SITRANS F S Clamp-on

Transmitter SITRANS FST030, wall mount housing

Technical specifications

Process media	<ul style="list-style-type: none"> • Suitable for virtually any sonically conductive fluid, including hazardous liquids • Aggregate state: Light slurry and liquid 	Galvanic isolation	All inputs and outputs are galvanically isolated, isolation voltage 500 V
Process variables	<ul style="list-style-type: none"> • Volume flow • Mass flow • Flow velocity • Sound velocity • Standard volume flow (hydrocarbon variant only) • Density • Kinematic viscosity • Pressure • Medium temperature • Specific gravity (hydrocarbon variant only) • Totalizer 1 • Totalizer 2 • Totalizer 3 • Standard density (hydrocarbon variant only) • Standard specific gravity (hydrocarbon variant only) • Standardizing factor (hydrocarbon variant only) • Liquident (hydrocarbon variant only) • API gravity (hydrocarbon variant only) • Standard API gravity (hydrocarbon variant only) • Standard kinematic viscosity (hydrocarbon variant only) • Liquid identifier (hydrocarbon variant only) 	Alarm and warning limit	Available for all process values
Current output		Totalizer	Three counters for forward, net and reverse flow
Current	0 ... 20 mA or 4 ... 20 mA (channel 1 only 4 ... 20 mA)	Display	<ul style="list-style-type: none"> • Background illumination with alpha-numerical text to indicate flow rate, totaled values, settings and faults • Adjustable damping constant of 0 ... 100 s • Reverse flow indicated by negative sign
Load	< 500 Ω per channel	SD card functions	<ul style="list-style-type: none"> • Parameter change log • Configurable data logger • FW update log • Diagnostic log • Error and alarm log • Parameter backup
Time constant	0 ... 100 s adjustable	Ambient temperature	
Digital output¹⁾		Operation	
Pulse	41.6 μ s ... 5 s pulse duration	• Transmitter	-40 ... +60 °C (-40 ... +140 °F), (humidity max. 95 %)
Frequency	0 ... 10 kHz, 50 % duty cycle, 120 % overscale provision	• Display	-20 ... +60 °C (-4 ... +140 °F)
Time constant	0 ... 100 s adjustable	Storage	
Active	0 ... 22 V DC, 30 mA, short-circuit-protected	• Transmitter	-40 ... +70 °C (-40 ... +158 °F) (humidity max. 95 %)
Passive	3 ... 30 V DC, max. 110 mA	Communication	HART 7.5 Modbus RTU RS 485
Relay		Enclosure	
Type	SPDT dry contact relay	Material	Aluminum
Load	30 V AC/100 mA	Rating	IP66/67, NEMA 4X to IEC 529 and DIN 40050 (1 mH ₂ O for 30 min.)
Functions	Alarm level, alarm number, limit, flow direction	Mechanical load	18 ... 400 Hz random, 3.17 g RMS, in all directions
Digital input		Power supply	
Voltage	15 ... 30 V DC (2 ... 15 mA)	Universal	20 ... 27 V DC 100 ... 240 V AC, 47 ... 63 Hz
Current	4 ... 20 mA	Fluctuation	No limit
Functionality	Reset totalizer 1, 2 and 3, force output, freeze process values, zero point adjustment	Power consumption	20 W/22 VA
		NAMUR	NAMUR requirements fulfilled when using Triax cable. Within the value limits according to "General requirements" with error criteria A in accordance with NE 21. Icons according to NE 107 status.
		Environment	
		Environmental conditions acc. to IEC/EN/UL 61010-1	<ul style="list-style-type: none"> • Altitude up to 2000 m • Pollution degree 2 • Overvoltage category II
		Maintenance	The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis
		Cable glands	Cable glands are available in nylon, nickel plated brass or stainless steel (316L/W1.4404)

Transmitter SITRANS FST030, wall mount housing

Approvals

For non-hazardous area	No approval required
For hazardous area (transmitter pending)	
<ul style="list-style-type: none"> • ATEX <ul style="list-style-type: none"> - Sensor - Transmitter with integrated DSL 	Zone 0, 1, 2 Zone 2
<ul style="list-style-type: none"> • FM <ul style="list-style-type: none"> - Sensor - Transmitter 	Class 1, Div 1, 2 Class 1, Div 2
<ul style="list-style-type: none"> • FM Canada <ul style="list-style-type: none"> - Sensor - Transmitter with integrated DSL 	Class 1, Div 1, 2 (Zone 0, 1, 2) Class 1, Div 2 (Zone 2)
<ul style="list-style-type: none"> • Combination Approval: ATEX, IECEx, FM, FM Canada <ul style="list-style-type: none"> - Sensor - Transmitter with integrated DSL 	Zone 0, 1, 2 (Div 1,2) Zone 2 (Div 2)

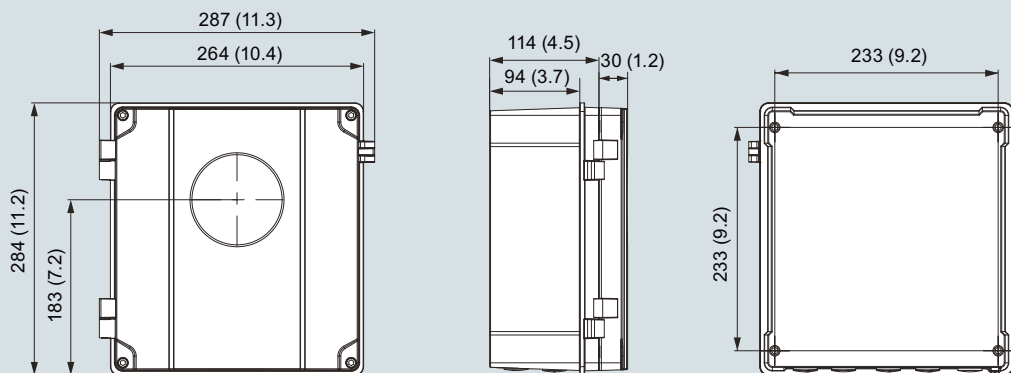
Certificates

CE conformity marking	<ul style="list-style-type: none"> • Low voltage directive • WEEE • RoHS
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EMC performance

Emission	CISPR 11:2009/A1:2010 and EN 55011:2009/A1:2010
Immunity	IEC/EN 61326-1:2013

Dimensional drawing



SITRANS FST030, wall mount version, dimensions in mm (inch)

Flow Measurement

SITRANS F S Clamp-on

Ultrasonic flowmeter SITRANS FS230 - Ordering data

Selection and Ordering data

Article No.

Ord. code

SITRANS FS230 clamp-on flowmeter

7ME372 - - - - -

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Transmitter model

No transmitter, external DSL only

Transmitter FST030

Pipe material/temperature

Transmitter only - no sensor

Steel (stainless steel, carbon steel), temperature range: best use < 80 °C (176 °F)

Steel (stainless steel, carbon steel), temperature range: best use > 80 °C (176 °F)

Plastic (PVC) (for liquid applications), temperature: -40 ... +121 °C (-40 ... 250 °F)

Any material, temperature: -40 ... +121 °C (-40 ... 250 °F)

Any material, very high temperature: -40 ... +230 °C (-40 ... 446 °F)

Pipe outer diameter range

Transmitter only - no sensor

13 ... 19 mm (0.5 ... 0.75")

19.3 ... 30.5 mm (0.76 ... 1.20")

30.7 ... 50.8 mm (1.21 ... 2.00")

51 ... 76 mm (2.01 ... 3.00")

78 ... 127 mm (3.1 ... 5.0")

129 ... 203 mm (5.1 ... 8.0")

206 ... 305 mm (8.1 ... 12.0")

307 ... 508 mm (12.1 ... 20.0")

510 ... 813 mm (20.1 ... 32.0")

815 ... 9144 mm (32.1 ... 360")

Pipe wall thickness range

Transmitter only - no sensor

0.635 ... 1.016 mm (0.025 ... 0.04")

1.016 ... 1.524 mm (0.04 ... 0.06")

1.524 ... 2.032 mm (0.06 ... 0.08")

2.032 ... 3.048 mm (0.08 ... 0.12")

3.048 ... 4.064 mm (0.12 ... 0.16")

4.064 ... 5.842 mm (0.16 ... 0.23")

5.842 ... 8.128 mm (0.23 ... 0.32")

8.128 ... 11.176 mm (0.32 ... 0.44")

11.176 ... 15.748 mm (0.44 ... 0.62")

15.748 ... 31.75 mm (0.62 ... 1.25")

31.75 ... 50.8 mm (1.25 ... 2.00")

Sensor mounting

Transmitter only - no sensor

Mounting straps only

Standard frames and tracks

Magnetic - no straps

Magnetic - with straps

High precision mount (single enclosure)

High precision mount (dual enclosure)

Number of paths (sensor pairs)

Transmitter only - no sensor

One path

Two path

Environment

Standard

0

3

0

1

2

6

7

8

A

B

C

D

E

F

G

H

J

K

L

A

B

C

D

E

F

G

H

J

K

L

M

0

1

2

4

6

7

8

0

1

2

1

Flow Measurement

SITRANS F S Clamp-on

Ultrasonic flowmeter SITRANS FS230 - Ordering data

Selection and Ordering data	Article No.	Ord. code
SITRANS FS230 clamp-on flowmeter	7ME372 - - - - -	
Transmitter/DSL material and mounting style		
Wallmount transmitter, internal DSL, transmitter: aluminum wallbox, NEMA 4X, DSL: none, direct connected sensor cables, (max 2-path, max. 20 meter sensor cable)		U
Ex approvals		
Non-Ex		A
ATEX, wallbox enclosure (pending)		B
FM, wallbox enclosure (pending)		G
FMc, wallbox enclosure (pending)		L
ATEX, IECEx, FM, FMc, wallbox (pending)		P
Local User Interface		
Blind version transmitter		1
Graphical local user interface, 240 x 160 pixels		3

Flow Measurement

SITRANS F S Clamp-on

Ultrasonic flowmeter SITRANS FS230 - Ordering data

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Further designs		Ex Passive	
Please add "-Z" to Article No. and specify Order code(s).		• Ch2: current/freq./pulse, Ch3: none, Ch4: none	F21
Cable glands - transmitter, DSL (not for sensor cables)		• Ch2: current/freq./pulse, Ch3: current/freq./pulse Ch4: None	F22
No glands, metric threads on transmitter	A01	• Ch2:current/freq./pulse, Ch3: current/freq./pulse Ch4:current/freq./pulse	F23
No glands, metric thread with NPT thread adapters, stainless steel: quantity based on selection "U" in data place 14	A60	• Ch2: current/freq./pulse, Ch3: current/freq./pulse Ch4: relay	F24
No glands, metric thread with NPT thread adapters, nickel plated brass: quantity based on selection "U" in data place 14	A61	• Ch2: current/freq./pulse, Ch3: relay, Ch4: relay	F25
Nickel plated brass glands: quantity based on selection "U" in data place 14	A62	• Ch2: current/freq./pulse, Ch3: relay, Ch4: none	F26
Plastic glands: quantity based on selection "U" in data place 14	A64	Temperature sensors and pockets	
Stainless steel glands: quantity based on selection "U" in data place 14	A66	1000 Ω platinum standard clamp-on RTD	J61
Software functions and CT approvals		1000 Ω platinum submersible clamp-on RTD	J62
Software: for standard industry applications	B11	Sensor to transmitter cables	
Software including hydrocarbon process values	B39	10 m (32.8 ft) standard/submersible coax sensor cable pair with nylon glands	K24
I/O configuration Ch1		20 m (65.6 ft) standard/submersible coax sensor cable pair with nylon glands	K25
Non-Ex, 4 ... 20 mA HART, menu selected pas- sive/active	E02	10 m (32.8 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	K29
Ex, 4 ... 20 mA HART, active	E06	20 m (65.6 ft) standard/submersible coax sensor cable pair with nickel plated brass glands	K30
Ex, 4 ... 20 mA HART, passive	E07	10 m (32.8 ft) standard/submersible coax sensor cable pair with stainless steel glands	K34
Modbus RTU 485	E14	20 m (65.6 ft) standard/submersible coax sensor cable pair with stainless steel glands	K35
I/O configuration Ch2, Ch3 and Ch4		20 m (65.6 ft) plenum rated coax sensor cable pair with nylon glands	K37
None	F00	20 m (65.6 ft) plenum rated coax sensor cable pair with nickel plated brass glands	K39
Non-Ex		20 m (65.6 ft) plenum rated coax sensor cable pair with stainless steel glands	K41
• Ch2: current/freq./pulse, Ch3: none Ch4: none. Active/passive menu selected	F01	10 m (32.8 ft) armored sensor cable pair with nickel plated brass glands	K53
• Ch2: current/freq./pulse, Ch3: current/freq./pulse Ch4: none. Active/passive menu selected	F02	20 m (65.6 ft) armored sensor cable pair with nickel plated brass glands	K54
• Ch2:current/freq./pulse, Ch3: current/freq./pulse Ch4:current/freq./pulse. Active/passive menu selected	F03		
• Ch2:current/freq./pulse, Ch3: current/freq./pulse Ch4: relay. Active/passive menu selected	F04		
• Ch2: current/freq./pulse, Ch3: relay Ch4: relay. Ac- tive/passive menu selected	F05		
• Ch2: current/freq./pulse, Ch3: relay Ch4: none. Ac- tive/passive menu selected	F06		
Ex Active			
• Ch2: current/freq./pulse, Ch3: none Ch4: none	F11		
• Ch2: current/freq./pulse, Ch3: current/freq./pulse Ch4: none	F12		
• Ch2: current/freq./pulse, Ch3: current/freq./pulse Ch4: current/freq./pulse	F13		
• Ch2: current/freq./pulse, Ch3: current/freq./pulse, Ch4: relay	F14		
• Ch2: current/freq./pulse, Ch3: relay, Ch4: relay	F15		
• Ch2: current/freq./pulse, Ch3: relay, Ch4: none	F16		

Selection and Ordering data	Order code
RTD cable (clamp temperature sensor to transmitter)	
6 m (20 ft) standard RTD cable	R50
15 m (50 ft) standard RTD cable	R51
30 m (100 ft) standard RTD cable	R52
46 m (150 ft) standard RTD cable	R53
61 m (200 ft) standard RTD cable	R54
91 m (300 ft) standard RTD cable	R55
6 m (20 ft) submersible RTD cable	R56
15 m (50 ft) submersible RTD cable	R57
30 m (100 ft) submersible RTD cable	R58
46 m (150 ft) submersible RTD cable	R59
61 m (200 ft) submersible RTD cable	R60
91 m (300 ft) submersible RTD cable	R61
RTD cable (insert temperature sensor to transmitter)	
15 m (50 ft) RTD cable with nickel plated gland	R74
15 m (50 ft) RTD cable with stainless steel gland	R75
30 m (100 ft) RTD cable with nickel plated gland	R76
30 m (100 ft) RTD cable with stainless steel gland	R77
91 m (300 ft) RTD cable with nickel plated gland	R78
91 m (300 ft) RTD cable with stainless steel gland	R79
15 m (50 ft) insert RTD cable with nickel plated gland	R80
15 m (50 ft) insert RTD cable with stainless steel gland	R81
30 m (100 ft) insert RTD cable with nickel plated gland	R82
30 m (100 ft) insert RTD cable with stainless steel gland	R83
91 m (300 ft) insert RTD cable with nickel plated gland	R84
91 m (300 ft) insert RTD cable with stainless steel gland	R85
Tag plate	
Tag plate for transmitter, stainless steel	Y15
Tag name plate, stainless steel	Y17

Flow Measurement

SITRANS F S Clamp-on

Ultrasonic flowmeter SITRANS FS230 - Accessories/Spare parts

Selection and Ordering data

Article No.

System spare parts

Tool kits and loose parts

"F" connector tool kit, 2 per

Bag of loose spare parts; for wallmount, including cable strain relief components, mounting tool, seals and gasket, assorted screws and washers, hex cap nut, blind plugs, and O-rings

A5E38145699

A5E38288072

Electronics assemblies and modules

Wall box

- Display and keypad assembly
- Digital Sensor Link (DSL), internal, for wall box
- SensorFlash (4 GB micro SD card) -40 °C ... +85 °C
- Power supply, for wall box, (240 V AC, 47 ... 63 Hz), (24 ... 90 V DC)
- Foam insert for wall box with connectors

A5E37697615

A5E38014726

A5E38288507

A5E38263021

A5E38287828

Cassettes, I/O configuration and communication

Ex

- Ch1: I/O and comm (active) 4 ... 20 mA output and HART 7.2
- Ch1: I/O and comm (passive) 4 ... 20 mA output and HART 7.2
- Ch1: communication Modbus RTU 485

A5E38012278

A5E38013025

A5E38013054

Non Ex

- Ch1: I/O and comm (active/passive) 4 ... 20 mA output and HART 7.2
- Ch1: communication Modbus RTU 485
- Ch2: current/freq./pulse, Ch3: None Ch4: none. Menu select active/passive
- Ch2: current/freq./pulse, Ch3: current/freq./pulse Ch4: none. Menu select active/passive
- Ch2: current/freq./pulse, Ch3: current/freq./pulse Ch4: current/Freq./Pulse. Menu select active/passive
- Ch2: current/freq./pulse, Ch3: current/freq./pulse Ch4: relay. Menu select active/passive
- Ch2: current/freq./pulse, Ch3: relay Ch4: relay. Menu select active/passive
- Ch2: current/freq./pulse, Ch3: relay Ch4: none. Menu select active/passive

A5E38013040

A5E38013069

A5E38006256

A5E38006558

A5E38006598

A5E38006896

A5E38006900

A5E38011432

Ex Passive

- Ch2: current/freq./pulse, Ch3: None Ch4: none
- Ch2: current/freq./pulse, Ch3: current/freq./pulse Ch4: none
- Ch2: current/freq./pulse, Ch3: current/freq./pulse Ch4: current/freq./pulse
- Ch2: current/freq./pulse, Ch3: current/freq./pulse Ch4: relay
- Ch2: current/freq./pulse, Ch3: relay Ch4: relay
- Ch2: current/freq./pulse, Ch3: relay Ch4: none

A5E38012039

A5E38012056

A5E38012121

A5E38019235

A5E38019263

A5E38019378

Ex Active

- Ch2: current/freq./pulse, Ch3: none Ch4: none
- Ch2: current/freq./pulse, Ch3: current/freq./pulse Ch4: none
- Ch2: current/freq./pulse, Ch3: current/freq./pulse Ch4: current/freq./pulse
- Ch2: current/freq./pulse, Ch3: current/freq./pulse Ch4: relay
- Ch2: current/freq./pulse, Ch3: relay Ch4: relay
- Ch2: current/freq./pulse, Ch3: relay Ch4: none

A5E38011478

A5E38011509

A5E38011541

A5E38011600

A5E38011618

A5E38011908

Miscellaneous parts

Wall bracket "pipe mounting"

Wall bracket "panel mounting"

Metal kit: PSU cover, back plane

Power input cover plate

Blind plug brass-nickel 10 pcs (Ex version)

Blind plug stainless steel 10 pcs (Ex version)

F connectors, 4 pcs

A5E38288020

A5E38288032

A5E38415145

A5E38415205

A5E38145685

A5E38145689

A5E38268608

Ultrasonic flowmeter SITRANS FS230 - Accessories/Spare parts

Article No./Sensor Crossreference

Steel (T1)			Steel (T2)			Plastic (liquid)		
Data place 8,9,10 of 7ME372-... combination	Sensor part number	Sensor Size Code	Data place 8,9,10 of 7ME372-... combination	Sensor part number	Sensor Size Code	Data place 8,9,10 of 7ME372-... combination	Sensor part number	Sensor Size Code
1BB	7ME3950-5LG01	A1HT1	2BB	7ME3950-5LB11	A1	6BB	7ME3950-5LB01	A2
1BC	7ME3950-5LH01	A2HT1	2BC	7ME3950-5LB01	A2	6BC	7ME3950-5LB01	A2
1BD	7ME3950-5LB11	A1	2BD	7ME3950-5LB11	A1	6BD	7ME3950-5LB01	A2
1BE	7ME3950-5LB01	A2	2BE	7ME3950-5LB01	A2	6BE	7ME3950-5LB01	A2
1BF	7ME3950-5LB11	A1	2BF	7ME3950-5LB11	A1	6BF	7ME3950-5LB01	A2
1CB	7ME3950-5LG01	A1HT1	2CB	7ME3950-5LB11	A1	6CB	7ME3950-5LB01	A2
1CC	7ME3950-5LH01	A2HT1	2CC	7ME3950-5LB01	A2	6CC	7ME3950-5LB01	A2
1CD	7ME3950-5LJ01	A3HT1	2CD	7ME3950-5LB11	A1	6CD	7ME3950-5LB01	A2
1CE	7ME3950-5GK01	B1HT1	2CE	7ME3950-5GK21	B1HT2	6CE	7ME3950-5LB01	A2
1CF	7ME3950-5LB11	A1	2CF	7ME3950-5LB11	A1	6CF	7ME3950-5LB01	A2
1CG	7ME3950-5LB11	A1	2CG	7ME3950-5LB11	A1	6CG	7ME3950-5LB01	A2
1DB	7ME3950-5LG01	A1HT1	2DB	7ME3950-5LC11	B1	6DC	7ME3950-5LC01	B3
1DC	7ME3950-5LH01	A2HT1	2DC	7ME3950-5LC21	B2	6DD	7ME3950-5LC01	B3
1DD	7ME3950-5LJ01	A3HT1	2DD	7ME3950-5LC11	B1	6DE	7ME3950-5LC01	B3
1DE	7ME3950-5GK01	B1HT1	2DE	7ME3950-5GK21	B1HT2	6DF	7ME3950-5LC01	B3
1DF	7ME3950-5GL01	B2HT1	2DF	7ME3950-5GL21	B2HT2	6DG	7ME3950-5LC01	B3
1DG	7ME3950-5LC01	B3	2DG	7ME3950-5LC01	B3	6DH	7ME3950-5LC01	B3
1DH	7ME3950-5LC21	B2	2DH	7ME3950-5LC21	B2	6EC	7ME3950-5LC01	B3
1EB	7ME3950-5LG01	A1HT1	2EB	7ME3950-5LC11	B1	6ED	7ME3950-5LC01	B3
1EC	7ME3950-5LH01	A2HT1	2EC	7ME3950-5LC21	B2	6EE	7ME3950-5LC01	B3
1ED	7ME3950-5LJ01	A3HT1	2ED	7ME3950-5LC11	B1	6EF	7ME3950-5LC01	B3
1EE	7ME3950-5GK01	B1HT1	2EE	7ME3950-5GK21	B1HT2	6EG	7ME3950-5LC01	B3
1EF	7ME3950-5GL01	B2HT1	2EF	7ME3950-5GL21	B2HT2	6EH	7ME3950-5LC01	B3
1EG	7ME3950-5GM00	C1HT1	2EG	7ME3950-5GM20	C1HT2	6EJ	7ME3950-5LC01	B3
1EH	7ME3950-5GN00	C2HT1	2EH	7ME3950-5GN20	C2HT2	6EK	7ME3950-5LC01	B3
1EJ	7ME3950-5LC01	B3	2EJ	7ME3950-5LC01	B3	6FE	7ME3950-5LD00	C3
1EK	7ME3950-5LC01	B3	2EK	7ME3950-5LC01	B3	6FF	7ME3950-5LD00	C3
1FC	7ME3950-5LH01	A2HT1	2FC	7ME3950-5LD10	C1	6FG	7ME3950-5LD00	C3
1FD	7ME3950-5LJ01	A3HT1	2FD	7ME3950-5LD10	C1	6FH	7ME3950-5LD00	C3
1FE	7ME3950-5GK01	B1HT1	2FE	7ME3950-5GK21	B1HT2	6FJ	7ME3950-5LD00	C3
1FF	7ME3950-5GL01	B2HT1	2FF	7ME3950-5GL21	B2HT2	6FK	7ME3950-5LD00	C3
1FG	7ME3950-5GM00	C1HT1	2FG	7ME3950-5GM20	C1HT2	6GF	7ME3950-5LD00	C3
1FH	7ME3950-5GN00	C2HT1	2FH	7ME3950-5GN20	C2HT2	6GG	7ME3950-5LD00	C3
1FJ	7ME3950-5GP00	D1HT1	2FJ	7ME3950-5GP20	D1HT2	6GH	7ME3950-5LD00	C3
1FK	7ME3950-5LD10	C1	2FK	7ME3950-5LD10	C1	6GJ	7ME3950-5LD00	C3
1GD	7ME3950-5LJ01	A3HT1	2GD	7ME3950-5LD10	C1	6GK	7ME3950-5LD00	C3
1GE	7ME3950-5GK01	B1HT1	2GE	7ME3950-5GK21	B1HT2	6GL	7ME3950-5LD00	C3
1GF	7ME3950-5GL01	B2HT1	2GF	7ME3950-5GL21	B2HT2	6HG	7ME3950-5LE00	D3
1GG	7ME3950-5GM00	C1HT1	2GG	7ME3950-5GM20	C1HT2	6HH	7ME3950-5LE00	D3
1GH	7ME3950-5GN00	C2HT1	2GH	7ME3950-5GN20	C2HT2	6HJ	7ME3950-5LE00	D3
1GJ	7ME3950-5GP00	D1HT1	2GJ	7ME3950-5GP20	D1HT2	6HK	7ME3950-5LE00	D3
1GK	7ME3950-5GQ00	D2HT1	2GK	7ME3950-5GQ20	D2HT2	6HL	7ME3950-5LE00	D3
1GL	7ME3950-5LD00	C3	2GL	7ME3950-5LD00	C3	6HM	7ME3950-5LE00	D3
1HE	7ME3950-5GK01	B1HT1	2HE	7ME3950-5GK21	B1HT2	6JJ	7ME3950-5LE00	D3
1HF	7ME3950-5GL01	B2HT1	2HF	7ME3950-5GL21	B2HT2	6JK	7ME3950-5LE00	D3
1HG	7ME3950-5GM00	C1HT1	2HG	7ME3950-5GM20	C1HT2	6JL	7ME3950-5LE00	D3
1HH	7ME3950-5GN00	C2HT1	2HH	7ME3950-5GN20	C2HT2	6JM	7ME3950-5LE00	D3
1HJ	7ME3950-5GP00	D1HT1	2HJ	7ME3950-5GP20	D1HT2	6KK	7ME3950-5LF00	E2
1HK	7ME3950-5GQ00	D2HT1	2HK	7ME3950-5GQ20	D2HT2	6KL	7ME3950-5LF00	E2
1HL	7ME3950-5GR00	D4HT1	2HL	7ME3950-5GR20	D4HT2	6KM	7ME3950-5LF00	E2
1JG	7ME3950-5GM00	C1HT1	2JG	7ME3950-5GM20	C1HT2	6LM	7ME3950-5LF00	E2
1JH	7ME3950-5GN00	C2HT1	2JH	7ME3950-5GN20	C2HT2			
1JJ	7ME3950-5GP00	D1HT1	2JJ	7ME3950-5GP20	D1HT2			
1JK	7ME3950-5GQ00	D2HT1	2JK	7ME3950-5GQ20	D2HT2			
1JL	7ME3950-5GR00	D4HT1	2JL	7ME3950-5GR20	D4HT2			
1KH	7ME3950-5GN00	C2HT1	2KH	7ME3950-5GN20	C2HT2			
1KJ	7ME3950-5GP00	D1HT1	2KJ	7ME3950-5GP20	D1HT2			
1KK	7ME3950-5GQ00	D2HT1	2KK	7ME3950-5GQ20	D2HT2			
1KL	7ME3950-5GR00	D4HT1	2KL	7ME3950-5GR20	D4HT2			
1LJ	7ME3950-5GP00	D1HT1	2LJ	7ME3950-5GP20	D1HT2			
1LK	7ME3950-5GQ00	D2HT1	2LK	7ME3950-5GQ20	D2HT2			
1LL	7ME3950-5GR00	D4HT1	2LL	7ME3950-5GR20	D4HT2			

Flow Measurement

SITRANS F S Clamp-on

Ultrasonic flowmeter SITRANS FS230 - Accessories/Spare parts

Other (Univ)			Other (VH)		
Data place 8,9,10 of 7ME372-... combination	Sensor part number	Sensor Size Code	Data place 8,9,10 of 7ME372-... combination	Sensor part number	Sensor Size Code
7BB	7ME3950-5LB01	A2	8BB	7ME3950-5LA13	1
7BC	7ME3950-5LB01	A2	8BC	7ME3950-5LA13	1
7BD	7ME3950-5LB01	A2	8BD	7ME3950-5LA13	1
7BE	7ME3950-5LB01	A2	8BE	7ME3950-5LA13	1
7BF	7ME3950-5LB01	A2	8BF	7ME3950-5LA13	1
7CB	7ME3950-5LB01	A2	8CB	7ME3950-5LA13	1
7CC	7ME3950-5LB01	A2	8CC	7ME3950-5LA13	1
7CD	7ME3950-5LB01	A2	8CD	7ME3950-5LA13	1
7CE	7ME3950-5LB01	A2	8CE	7ME3950-5LA13	1
7CF	7ME3950-5LB01	A2	8CF	7ME3950-5LA13	1
7CG	7ME3950-5LB01	A2	8CG	7ME3950-5LA13	1
7DB	7ME3950-5LC01	B3	8DB	7ME3950-5LA13	1
7DC	7ME3950-5LC01	B3	8DC	7ME3950-5LA13	1
7DD	7ME3950-5LC01	B3	8DD	7ME3950-5LA13	1
7DE	7ME3950-5LC01	B3	8DE	7ME3950-5LA13	1
7DF	7ME3950-5LC01	B3	8DF	7ME3950-5LA13	1
7DG	7ME3950-5LC01	B3	8DG	7ME3950-5LA13	1
7DH	7ME3950-5LC01	B3	8DH	7ME3950-5LA13	1
7EB	7ME3950-5LC01	B3	8EB	7ME3950-5LA13	1
7EC	7ME3950-5LC01	B3	8EC	7ME3950-5LA13	1
7ED	7ME3950-5LC01	B3	8ED	7ME3950-5LA13	1
7EE	7ME3950-5LC01	B3	8EE	7ME3950-5LA13	1
7EF	7ME3950-5LC01	B3	8EF	7ME3950-5LA13	1
7EG	7ME3950-5LC01	B3	8EG	7ME3950-5LA13	1
7EH	7ME3950-5LC01	B3	8EH	7ME3950-5LA13	1
7EJ	7ME3950-5LC01	B3	8EJ	7ME3950-5LA13	1
7EK	7ME3950-5LC01	B3	8EK	7ME3950-5LA13	1
7FC	7ME3950-5LD00	C3	8FC	7ME3950-5LA23	2
7FD	7ME3950-5LD00	C3	8FD	7ME3950-5LA23	2
7FE	7ME3950-5LD00	C3	8FE	7ME3950-5LA23	2
7FF	7ME3950-5LD00	C3	8FF	7ME3950-5LA23	2
7FG	7ME3950-5LD00	C3	8FG	7ME3950-5LA23	2
7FH	7ME3950-5LD00	C3	8FH	7ME3950-5LA23	2
7FJ	7ME3950-5LD00	C3	8FJ	7ME3950-5LA23	2
7FK	7ME3950-5LD00	C3	8FK	7ME3950-5LA23	2
7GD	7ME3950-5LD00	C3	8GD	7ME3950-5LA23	2
7GE	7ME3950-5LD00	C3	8GE	7ME3950-5LA23	2
7GF	7ME3950-5LD00	C3	8GF	7ME3950-5LA23	2
7GG	7ME3950-5LD00	C3	8GG	7ME3950-5LA23	2
7GH	7ME3950-5LD00	C3	8GH	7ME3950-5LA23	2
7GJ	7ME3950-5LD00	C3	8GJ	7ME3950-5LA23	2
7GK	7ME3950-5LD00	C3	8GK	7ME3950-5LA23	2
7GL	7ME3950-5LD00	C3	8GL	7ME3950-5LA23	2
7HE	7ME3950-5LE00	D3	8HE	7ME3950-5LA43	3
7HF	7ME3950-5LE00	D3	8HF	7ME3950-5LA43	3
7HG	7ME3950-5LE00	D3	8HG	7ME3950-5LA43	3
7HH	7ME3950-5LE00	D3	8HH	7ME3950-5LA43	3
7HJ	7ME3950-5LE00	D3	8HJ	7ME3950-5LA43	3
7HK	7ME3950-5LE00	D3	8HK	7ME3950-5LA43	3
7HL	7ME3950-5LE00	D3	8HL	7ME3950-5LA43	3
7HM	7ME3950-5LE00	D3	8HM	7ME3950-5LA43	3
7JG	7ME3950-5LE00	D3	8JG	7ME3950-5LA43	3
7JH	7ME3950-5LE00	D3	8JH	7ME3950-5LA43	3
7JJ	7ME3950-5LE00	D3	8JJ	7ME3950-5LA43	3
7JK	7ME3950-5LE00	D3	8JK	7ME3950-5LA43	3
7JL	7ME3950-5LE00	D3	8JL	7ME3950-5LA43	3
7JM	7ME3950-5LE00	D3	8JM	7ME3950-5LA43	3
7KH	7ME3950-5LF00	E2	8KH	7ME3950-5LA73	4
7KJ	7ME3950-5LF00	E2	8KJ	7ME3950-5LA73	4
7KK	7ME3950-5LF00	E2	8KK	7ME3950-5LA73	4
7KL	7ME3950-5LF00	E2	8KL	7ME3950-5LA73	4
7KM	7ME3950-5LF00	E2	8KM	7ME3950-5LA73	4
7LJ	7ME3950-5LF00	E2	8LJ	7ME3950-5LA73	4
7LK	7ME3950-5LF00	E2	8LK	7ME3950-5LA73	4
7LL	7ME3950-5LF00	E2	8LL	7ME3950-5LA73	4
7LM	7ME3950-5LF00	E2	8LM	7ME3950-5LA73	4


Ultrasonic flowmeter SITRANS FS230 - Accessories/Spare parts


Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
Spare parts (system)		Spare parts (system)	
SITRANS FS230 IP65/IP66 (NEMA 4X)	7ME 3 9 5 0 -	SITRANS FS230 IP65/IP66 (NEMA 4X)	7ME 3 9 5 0 -
Approvals		High temperature universal liquid sensors	
All, FM/FMc, ATEX, IECEX - Flow sensors	5	Very high temperature up to 230 °C (446 °F)	
All, FM/FMc, ATEX, IECEX - Temperature sensors	1	• Size 1 (Ø 12.7 ... 100 mm (0.47 ... 3.94"))	5 LA 1 3
Spare sensor code		• Size 2 (Ø 30 ... 200 mm (1.18 ... 7.87"))	5 LA 2 3
For liquid flow sensors pipe ranges please refer to catalog sensor selection chart in the FSS200 section		• Size 2A (Ø 30 ... 200 mm (1.18 ... 7.87"))	5 LA 3 3
Flow sensors for use with mounting frames or tracks		• Size 3 (Ø 150 ... 610 mm (5.9 ... 24.0"))	5 LA 4 3
Suitable for pipes other than steel or stainless steel.		• Size 3A (Ø 150 ... 610 mm (5.9 ... 24.0"))	5 LA 6 3
Temperature -40 ... +121 °C (-40 ... +250 °F)		• Size 4 (Ø 400 ... 1200 mm (16.75 ... 47.24"))	5 LA 7 3
• A1 Universal	5 LB 1 1	• Size 4A (Ø 400 ... 1200 mm (16.75 ... 47.24"))	5 LA 8 3
• A2 Universal	5 LB 0 1	Standard RTD temperature sensors	
• B1 Universal	5 LC 1 1	Standard clamp-on RTD	1 TA 0 0
• B2 Universal	5 LC 2 1	Submersible clamp-on RTD	1 TB 0 0
• B3 Universal	5 LC 0 1	Insertion style RTD (size 1), 140 mm (5.5")	1 TJ 0 0
• C1 Universal	5 LD 1 0	Insertion style RTD (size 2), 216 mm (8.5")	1 TJ 0 1
• C2 Universal	5 LD 2 0	Insertion style RTD (size 3), 292 mm (11.5")	1 TJ 0 2
• C3 Universal	5 LD 0 0	Insertion style RTD (size 4), 368 mm (14.5")	1 TJ 0 3
• D1 Universal	5 LE 1 0		
• D2 Universal	5 LE 2 0		
• D3 Universal	5 LE 0 0		
• E1 Universal	5 LF 1 0		
• E2 Universal	5 LF 0 0		
• E3 Universal	5 LF 2 0		
Gas and liquid sensors for use with mounting frames or tracks			
Suitable for steel or stainless steel pipes			
Temperature T1			
• A1H high precision	5 LG 0 1		
• A2H high precision	5 LH 0 1		
• A3H high precision	5 LJ 0 1		
• B1H high precision	5 GK 0 1		
• B2H high precision	5 GL 0 1		
• B3H high precision	5 GT 0 1		
• C1H high precision	5 GM 0 0		
• C2H high precision	5 GN 0 0		
• D1H high precision	5 GP 0 0		
• D2H high precision	5 GQ 0 0		
• D3H high precision	5 GU 0 0		
• D4H high precision	5 GR 0 0		
Temperature T2			
• A1H high precision	5 LG 2 1		
• A2H high precision	5 LH 2 1		
• A3H high precision	5 LJ 2 1		
• B1H high precision	5 GK 2 1		
• B2H high precision	5 GL 2 1		
• B3H high precision	5 GT 2 1		
• C1H high precision	5 GM 2 0		
• C2H high precision	5 GN 2 0		
• D1H high precision	5 GP 2 0		
• D2H high precision	5 GQ 2 0		
• D3H high precision	5 GU 2 0		
• D4H high precision	5 GR 2 0		

Flow Measurement

SITRANS F S Clamp-on

Ultrasonic flowmeter SITRANS FS230 - Accessories/Spare parts

Selection and Ordering data	Article No.
Spare parts (Miscellaneous)	
SITRANS F S Clamp-on	7ME3960 - 
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
FS230 dedicated sensor mounting hardware	
Sensor mounting frames for	
• Universal sensor size B (for pipes > 125 mm (5 inch))	CQO:1012FN-PB
• Universal sensor size C	0MC00
• Universal sensor size D	0MC01
• Universal sensor size E	0MC01
• High precision sensor size B (For pipes > 125 mm (5 inch))	CQO:1012FNH-PB
• High precision sensor size C	3MD00
• High precision sensor size D	3MD01
• Magnetic mounting frames for size C, D, E, universal and high precision sensors	3MD02
Spacer bars (for indexing sensors on pipe)	
Spacer bar for pipes to 200 mm/8 inch (liquid), 600 mm/24 inch (gas)	3MS10
Spacer bar for pipes to 500 mm/20 inch (liquid), DN 1200/48 inch (gas)	3MS20
Spacer bar for pipes to 800 mm/32 inch (liquid)	3MS30
Spacer bar for pipes to 1200 mm/48 inch (liquid). Must be used with 7ME39600SM30	3MS40
Mounting straps (slotted stainless steel)	
For pipes	
DN 50 ... DN 150	0SM00
DN 50 ... DN 300	0SM10
DN 300 ... DN 600	0SM20
DN 600 ... DN 1200	0SM30
DN 1200 ... DN 1500	0SM40
DN 1500 ... DN 2100	0SM50
DN 2100 ... DN 3000	0SM60
High precision mounting enclosures for sensors	
Stainless steel mounts for high precision size "C" sensors, single enclosure	0WS50
Stainless steel mounts for high precision size "D/E" sensors, single enclosure	0WS60
Stainless steel mounts for high precision size "C" sensors, dual enclosure	0WD50
Stainless steel mounts for high precision size "D/E" sensors, dual enclosure	0WD60
Stainless steel bands for high precision mounting enclosures	
Mounting strap for pipe diameter to	
• 300 mm (13")	0SM01
• 600 mm (24")	0SM11
• 1200 mm (48")	0SM21
• 1500 mm (60")	0SM31
• 2130 mm (84")	0SM41
• 3050 mm (120")	0SM51
• 5486 mm (216")	0SM61
ADAPTER, MTG STRAP, TEMP COMP	CQO-1012WSM-A2
Sensor mounting tracks (aluminum with mounting straps) for pipes < 125 mm (5 inch)	

Selection and Ordering data	Article No.
Spare parts (Miscellaneous)	
SITRANS F S Clamp-on	7ME3960 - 
Universal sensor size A or B	0MA00
High precision sensor size A or B	0MB00
Stainless mounting tracks for high temperature 991 sensors	
Size 1 high temperature sensor pair	CQO: 992MTNHMSH-1
Size 2 high temperature sensor pair	CQO: 992MTNHMSH-2
Size 3 high temperature sensor pair	CQO: 992MTNHMSH-3
Size 4 high temperature sensor pair	CQO: 992MTNHMSH-4
Clamp-on RTD mounting hardware for dedicated systems	
RTD mounting hardware for dedicated system	
• 1152 ... 610 mm (6 ... 24")	0MR00
• 12.7 ... 50.8 mm (0.5 ... 2")	0MR01
• 31.8 ... 203.2 mm (1.25 ... 8")	0MR02
• 508 ... 1219 mm (20 ... 48")	0MR04
Junction box for clamp on RTD's	CQO:992ECJ
Insert RTD thermowells	
Thermowell standard duty	
• Uninsulated pipe 140 mm (5.5")	CQO:1012TW-1
• Uninsulated pipe 216 mm (8.5")	CQO:1012TW-2
• Uninsulated pipe: 292 mm (11.5")	CQO:1012TW-3
• With lagging 140 mm (5.5")	CQO:1012TW-1L
• With lagging 216 mm (8.5")	CQO:1012TW-2L
• With lagging 292 mm (11.5")	CQO:1012TW-3L
Sensor cables	
Coax (CE mark)	
• 10 m (32.8 ft) armored sensor cable pair with nickel plated brass glands	A5E38028474004
• 20 m (65.6 ft) armored sensor cable pair with nickel plated brass glands	A5E38028474005
• 10 m (32.8 ft) standard/submersible Coax sensor cable pair with Nylon glands	A5E39669934004
• 20 m (65.6 ft) standard/submersible Coax sensor cable pair with Nylon glands	A5E39669934005
• 10 m (32.8 ft) standard/submersible Coax sensor cable pair with nickel plated brass glands	A5E39669934009
• 20 m (65.6 ft) standard/submersible Coax sensor cable pair with nickel plated brass glands	A5E39669934010
• 10 m (32.8 ft) standard/submersible Coax sensor cable pair with stainless steel glands	A5E39669934014
• 20 m (65.6 ft) standard/submersible Coax sensor cable pair with stainless steel glands	A5E39669934015
• 20 m (65.6 ft) plenum rated Coax sensor cable pair with Nylon glands	A5E39669934020
• 20 m (65.6 ft) plenum rated Coax sensor cable pair with nickel plated brass glands	A5E39669934025
• 20 m (65.6 ft) plenum rated Coax sensor cable pair with stainless steel glands	A5E39669934030

Ultrasonic flowmeter SITRANS FS230 - Accessories/Spare parts

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
Spare parts (Miscellaneous)		Spare parts (Miscellaneous)	
SITRANS F S Clamp-on	7ME3960 -	SITRANS F S Clamp-on	7ME3960 -
Cable glands and adapters		Universal sensor test blocks	
Cable gland set M20, nylon	A5E38145321	Test block for size A and B universal sensors	0TB10
Cable gland set M20, nickel/brass	A5E38145323	Test block for size C and D universal sensors	0TB20
Cable gland set M20, stainless steel	A5E38145327		
Iris glands, set of 2, nickel plated brass	A5E38635890	Thickness gauge	
Iris glands, set of 2, stainless steel	A5E38635986	Stand alone thickness gauge	7ME39510TG20
M20xNPT adapters, set of 8, brass/nickel	A5E38145635		
M20xNPT adapters, set of 8, brass/nickel, Ex	A5E38309159		
M20xNPT adapters, set of 8, stainless steel	A5E38145643		
RTD temperature sensor cables			
6 m (20 ft) standard RTD cable	0CR50		
15 m (50 ft) standard RTD cable	0CR51		
30 m (100 ft) standard RTD cable	0CR52		
46 m (150 ft) standard RTD cable	0CR53		
61 m (200 ft) standard RTD cable	0CR54		
91 m (300 ft) standard RTD cable	0CR55		
6 m (20 ft) submersible RTD cable	0CR56		
15 m (50 ft) submersible RTD cable	0CR57		
30 m (100 ft) submersible RTD cable	0CR58		
46 m (150 ft) submersible RTD cable	0CR59		
61 m (200 ft) submersible RTD cable	0CR60		
91 m (300 ft) submersible RTD cable	0CR61		
Dedicated cable termination kits for:			
Standard, plenum sensor cable (NEMA 4X and NEMA 7 wall)	0CT01		
Submersible sensor cable (NEMA 4X and NEMA 7 wall)	0CT11		
Clamp-on RTD cable termination kit for standard RTD	0CT21		
Clamp-on RTD cable termination kit for submersible RTD	0CT31		
Insert RTD cable termination kit	0CT41		
Termination kit for armored cable	CQO:1012CNFX-TK		
Ultrasonic couplants			
Temporary water based for portable systems: 350 ml (12 oz): -34 ... +38 °C (-30 ... +100 °F)	0UC10		
Permanent synthetic polymer based: 90 ml (3 oz) -40 ... +190 °C (-40 ... +375 °F)	0UC10		
Dry coupling pad kit (10 pieces)	0UC10		
Permanent high temperature fluoroether: 163 ml (5.5 oz): -40 ... +230 °C (-40 ... +450 °F)	0UC10		
Permanent vulcanizing silicone rubber cou- plant: 90 ml (3 oz): -40...+120C (-40...+250F)	CQO:CC112		
Permanent high temperature silicone grease: 12 ml (0.4 oz): -40 ... +230 °C (-40 ... +450 °F)	CQO:CC117B		
Permanent high temperature silicone grease: 150 ml (5 oz): -40 ... +230 °C (-40 ... +450 °F)	CQO:CC117A		
Couplant for submersible sensor applications	CQO:CC120		
Pipe damping films			
B1, B2, B3, C1 and C2 sensors	0DM10		
D1 and D3 sensors	0DM20		
D2 sensor	0DM30		
D4 sensor	0DM40		

Flow Measurement

SITRANS F S Clamp-on

Ultrasonic flowmeter SITRANS FS220

Overview



The SITRANS FS220 is a clamp-on ultrasonic flow system consisting of an FST020 transmitter and FSS200 clamp-on sensors.

The transmitter classification FST020 describes a basic clamp-on ultrasonic flowmeter for basic application requirements. Based on the same digitalized platform as the FST030 this system provides the same accuracy and similar functions on a lower cost level. This system is ideal for water measurement and any application not requiring temperature or viscosity compensation.

Benefits

- Easy installation at any time; no production stop, no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- No moving parts to foul or wear. No contact with media
- No pressure drop or energy loss
- Wide turn-down ratio, bidirectional and high stability at zero flow conditions
- Anomaly compensation tool for correction of non-ideal straight pipe runs. Automatic compensation during backflow
- Optional WideBeam technology ensures highest performance and accuracy
- Compatible with all previously installed transit time sensors

Applications

The SITRANS FS220 can be used for the following application conditions:

- Pipe sizes from 10 mm to 10 m
- Pipe materials: ideal for all metals, glass, FRP and most PVC variants; NOT for concrete pipes and special compound pipes
- Pipe wall thickness from 1 to 35 mm; specials on request up to 65 mm
- Media temperatures from -40 to 121 °C; universal high temperature sensors for up to 230 °C max.
- Underground/submerged locations, non-ideal environments, strong pipe vibrations

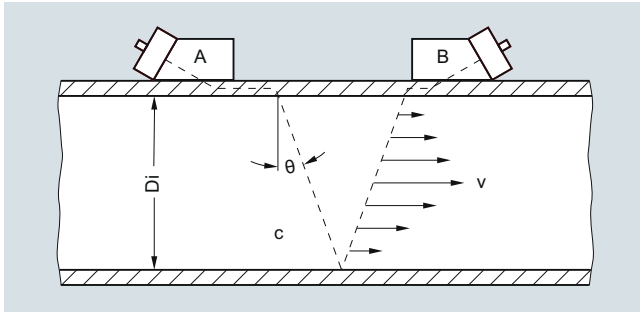
SITRANS FS220 flowmeters are suitable for most clean liquid applications, including the following:

- Water and wastewater industry
 - Potable water
 - Water and aqueous solutions
 - Wastewater, influent & effluent
 - Processed sewage, sludge
- Chemical feed industry
 - Sodium hypochlorite
 - Sodium hydroxide
- HVAC and power industries
 - Coolant flow
 - Fuel flow
 - Utility district heating, cooling
 - Refrigeration liquids
- Process control
 - Chemicals
 - Pharmaceuticals
 - Food products
 - Very low flow sensitivity (< 0.1 m/s)
 - High temperature liquids > 120 °C (248 °F).

Function

Operating Principle

The SITRANS F S system is a transit-time ultrasonic meter that provides exceptional performance using a non-intrusive clamp-on approach. Ultrasonic sensors transmit and receive acoustic signals directly through the existing pipe wall, where the fluid refraction angle is governed by Snell's law of refraction.



Clamp-on sensor mounted in a reflect configuration

The beam refraction angle is calculated as follows:

$$\sin \theta = c / V_{\phi}$$

c = Velocity of sound in fluid

V_{ϕ} = Phase velocity (a constant in the pipe wall)

The flowmeter automatically compensates for any change in fluid sound velocity (or beam angle) in response to variations in the average transit time between sensors A and B. By subtracting the computed fixed times (within the sensors and pipe wall) from the measured average transit time, the meter can then infer the required transit time in the fluid (T_{Fluid}).

The sound waves traveling in the same direction as the flow ($T_{A,B}$) arrive earlier than sound waves traveling against the direction of flow ($T_{B,A}$). This time difference (Δt) is used to compute the line integrated flow velocity (v) as shown in the equation below:

$$v = V_{\phi} / 2 \cdot \Delta t / T_{\text{Fluid}}$$

Once the raw flow velocity is determined, the fluid Reynolds Number (Re) must be determined to properly correct for fully developed flow profile. This requires the entry of the fluid's kinematic viscosity ($visc$) as shown in the equations below, where Q represents the final flow profile compensated volumetric flow rate.

$$Re = Di \cdot v / visc \cdot Q = K(Re) \cdot (\pi / 4 \cdot Di^2) \cdot v$$

v = Flow velocity

$visc = \mu / \rho$ = (dynamic viscosity / density)

$K(Re)$ = Reynolds flow profile compensation

In wetted type ultrasonic flowmeters the meter constants are configured prior to leaving the factory. As this is not possible with clamp-on meters, the settings must be made by the customer at the time of installation. These settings include pipe diameter, wall thickness, liquid viscosity, etc.

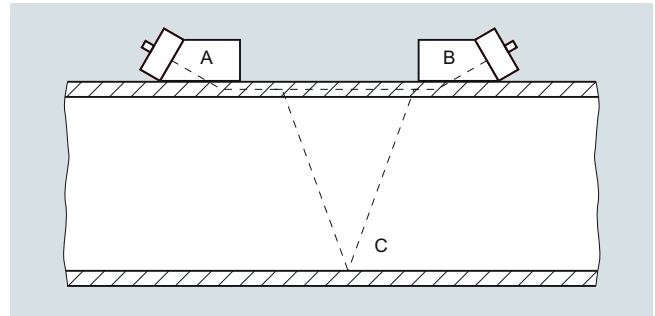
SITRANS clamp-on flowmeters that include temperature sensing can be configured to dynamically infer changes in fluid viscosity for the purpose of computing the most accurate flow profile compensation (K_{Re}).

Ultrasonic sensor types

Two basic types of clamp-on sensors can be selected for use with the SITRANS F S flowmeter. The lower cost "universal" sensor is the most common type in the industry and is suitable for most single liquid applications where the sound velocity does not vary much. This sensor type can be used on any sonically conductive pipe material (including steel) making it well suited for temporary survey applications. Universal sensors are selected based on the pipe diameter range alone, so wall thickness is less important to the selection process.

The second sensor type is the "WideBeam" sensor (called high precision), which utilizes the pipe wall as a kind of waveguide to optimize the signal to noise ratio and provide a wider area of vibration. This makes this kind of sensor less sensitive to any change in the fluid medium.

The WideBeam sensor is designed for steel pipes, but can also be used with aluminum, titanium and plastic pipe. It is the preferred sensor for HPI and gas applications. Note that unlike the universal type, this sensor selection is dependent only on the pipe's wall thickness.



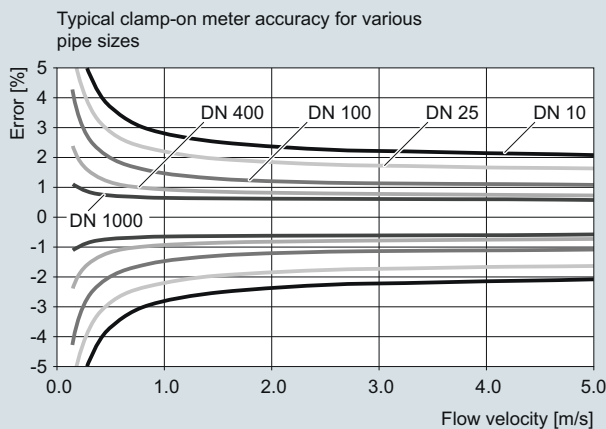
General installation guidelines for SITRANS FSS200 clamp-on sensors

- Minimum measuring range: 0 to ± 0.3 m/s velocity (see meter accuracy graph on next page for more detail)
- Maximum measuring range: 0 to ± 12 m/s (± 30 m/s for high precision sensors). Final flow range determination requires application review

Flow Measurement

SITRANS F S Clamp-on

Ultrasonic flow sensor SITRANS FSS200



- Pipe must be completely full within the sensor installation volume for accurate flow measurement
- Typical MINIMUM straight pipe requirements are: 10 Diameters upstream/5 Diameters downstream. Additional straight run is required for double out-of-plane elbows and partially open valves.
- Sensors should be installed at least 20° off vertical for horizontal pipes. This reduces the chance of beam interference from gas buildup at the top of the pipe
- Operation inside the Reynolds transition region, between $1000 < Re < 5000$ should be avoided for best accuracy
- Submersible and direct burial installations can be accommodated. Consult sales representative for details
- Ultrasonic coupling compound is provided with all sensor orders. Insure that a permanent coupling compound is used for long term installations
- Refer to the "Sensor type selection guide" to insure proper application of the equipment

Sensor type selection guide



Standard sensor supported in MLFB

Application condition	High precision	Universal	Notes
Note all that apply before making selection.			
Media			
General survey (clean liquids) on non-steel pipes		X	
General survey (clean liquids) on a limited range of steel pipes	X		
Moderately aerated liquid or slurry, up to 121 °C (250 °F)	X		
Permanent installation on steel pipe (clean liquids)	X		
Installation in offshore or corrosive environment	X		With optional stainless steel mounting
Liquid temperature greater than 120 °C (248 °F)	O	X	High temperature metal block sensors available to 230 °C (446 °F)
Operation on single pipeline flowing multiple products	X	O	
Pipe material			
Steel	X		
Steel pipe with diameter/wall thickness ratio <10	O	X	
Non-steel pipe material (copper, ductile iron, cast iron, etc.)	O	X	High precision sensors can also be used on plastic and aluminum pipes in special cases

O = not suitable X = preferred choice

Definitions

Sensor chart	Description
FSS200	Formerly 1011 clamp-on sensors of the 1010 systems
Standard	Standard system sensor, selectable as part of a configured product
Special	Sensors available for non-standard applications and pipes. Contact tech support for application use
Corrosion resistant	Stainless steel metal parts on all Size C, D and E and all high temperature sensors
Aluminum	Aluminum metal parts on all HP and Universal size A and B (Corrosion resistant on request for size B)
Spare	Not available as part of a configured product, must be ordered separately
CE	Transmitter and sensors certified for sale in the EU
Trackless mount	Sensors fixed only by straps, no other mounting (spacer bar as an option) - not recommended
Tracks	Permanent installation for universal size A/B, high precision size A/B and all sizes of high temperature. Tracks always come as dual-part for either direct or reflect mounting, and always with straps.
Frames	Three sizes, for permanent installation for universal size C/ D/ E, and for high precision size C/D. For universal and high precision size B available for pipes > 125 OD (Spare)
T1	Usable from -40 ... +120 °C (-40 ... +248 °F), but best for Ø temperature below 80 °C (< 176 °F), standard
T2	Usable from -40 ... +120 °C (-40 ... +248 °F), but best for Ø temperature above 80 °C (> 176 °F)
Submersible	Sensors can be used submerged; adding Denso for supplemental protection is recommended

Flow Measurement

SITRANS F S Clamp-on

Ultrasonic flow sensor SITRANS FSS200

Sensor availability guide

Sensor models	Availability								
	Standard	Spare only	Corrosion resistant	Trackless	Tracks	Frames	T1 best use below 80 °C (176 °F)	T2 best use 80 ... 120 °C (176 ... 248 °F)	Submersible
Universal Sensor -40 ... 120 °C (-40 ... +248 °F) housing CE IP68									
A1 Universal for pipe OD – 5.8 ... 50.8 mm (0.23" ... 2")		X			X				X
A2 Universal for pipe OD – 12.7 ... 50.8 mm (0.5" ... 2")	X				X				X X
B1 Universal for pipe OD – 12.7 ... 76 mm (0.5" ... 3")		X			X	X			X
B2 Universal for pipe OD – 12.7 ... 76 mm (0.5" ... 3")		X			X	X			X
B3 Universal for pipe OD – 19 ... 127 mm (0.75" ... 5")	X				X	X			X X
C1 Universal for pipe OD – 51 ... 254 mm (2" ... 10")		X	X	X		X			X
C2 Universal for pipe OD – 51 ... 254 mm (2" ... 10")		X	X	X		X			X
C3 Universal for pipe OD – 51 ... 305 mm (2" ... 12")	X		X	X		X			X X
D1 Universal for pipe OD – 102 ... 508 mm (4" ... 20")		X	X	X		X			X
D2 Universal for pipe OD – 152 ... 610 mm (6" ... 24")		X	X	X		X			X
D3 Universal for pipe OD – 203 ... 610 mm (8" ... 24")	X		X	X		X			X X
E1 Universal for pipe OD – 254 ... 3048 mm (10" ... 120")		X	X	X		X			X
E2 Universal for pipe OD – 254 ... 6096 mm (10" ... 240")	X		X	X		X			X X
E3 Universal for pipe OD – 304 ... 9144 mm (12" ... 360")		X	X	X		X			X
High Precision Sensor -40 ... +120 °C (-40 ... +248 °F) T1 (T2) CE IP68									
A1H (High Precision) for pipe WT - 0.64 ... 1.0 mm (0.025" ... 0.04")		X			X		X		X X
A2H (High Precision) for pipe WT - 1.0 ... 1.5 mm (0.04" ... 0.06")	X				X		X		X X
A3H (High Precision) for pipe WT - 1.5 ... 2.0 mm (0.06" ... 0.08")	X				X		X		X X
B1H (High Precision) for pipe WT - 2.0 ... 3.0 mm (0.08" ... 0.12")	X				X	X	X	X	X X
B2H (High Precision) for pipe WT - 3.0 ... 4.1 mm (0.12" ... 0.16")	X				X	X	X	X	X X
B3H (High Precision) for pipe WT - 2.7 ... 3.3 mm (0.106" ... 0.128")		X			X	X	X	X	X X
C1H (High Precision) for pipe WT - 4.1 ... 5.8 mm (0.16" ... 0.23")	X		X	X		X	X	X	X X
C2H (High Precision) for pipe WT - 5.8 ... 8.1 mm (0.23" ... 0.32")	X		X	X		X	X	X	X X
D1H (High Precision) for pipe WT - 8.1 ... 11.2 mm (0.32" ... 0.44")	X		X	X		X	X	X	X X
D2H (High Precision) for pipe WT - 11.2 ... 15.7 mm (0.44" ... 0.62")	X		X	X		X	X	X	X X
D3H (High Precision) for pipe WT - 7.4 ... 9.0 mm (0.293" ... 0.354")		X	X	X		X	X	X	X X
D4H (High Precision) for pipe WT - 15.7 ... 31.8 mm (0.62" ... 1.25")	X		X	X		X	X	X	X X
High Temperature Universal Sensor -40 ... +230 °C (-40 ... +446 °F)									
High Temperature size 1 ... 230 °C (Ø 12.7 ... 100 mm)		X	X		X				X
High Temperature size 2 ... 230 °C (Ø 30 ... 200 mm)	X		X		X				X
High Temperature size 3 ... 230 °C (Ø 150 ... 610 mm)	X		X		X				X
High Temperature size 4 ... 230 °C (Ø 400 ... 1200 mm)	X		X		X				X
High Temperature size 2A ... 230 °C (Ø 30 ... 200 mm)		X	X		X				
High Temperature size 3A ... 230 °C (Ø 150 ... 610 mm)		X	X		X				
High Temperature size 4A ... 230 °C (Ø 400 ... 1200 mm)		X	X		X				

Sensor mounting availability guide

	Sensor (Dedicated)		
	Universal	High Precision	High Temperature universal
Mounting			
Trackless (straps only)	X	X	
Tracks universal dedicated	X		
Tracks HP dedicated		X	
Frames universal dedicated	X		
Frames HP dedicated		X	
Tracks high temperature universal			X
High precision mount single enclosure for one pair sensors		X	
High precision mount dual enclosure for one pair sensors		X	
Spacer Bar	X	X	
Straps	X	X	X
Denso	X	X	

Flow Measurement

SITRANS F S Clamp-on

Ultrasonic flow transmitter SITRANS FST020

Overview



The SITRANS FST020 is the basic device for simple and cost-effective clamp-on applications. As a single-path device, it is suitable for flow measurement on liquids that do not require temperature or viscosity consideration and where highest accuracies are not required.

Historically, the FST020 comes from the clamp-on family of analog FUS1010 transmitters. Since the revision in 2017, the updated transmitter is now part of a digital platform based on the latest developments within Digital Signal Processing (DSP) technology - engineered for high measuring performance, fast response to step changes in flow, high immunity against process noise and simplicity in installation, commissioning and maintenance.

The FST020 transmitter delivers standard parameter measurements i.e. volume flow, flow speed or sound velocity by analog outputs and Modbus communication.

Process values

- Volume flow
- Flow velocity
- Sound velocity
- Totalizer 1, 2 and 3

Benefits

Flow calculation and measurement

- Dedicated volume flow calculation with DSP technology
- 100 Hz update rate for all primary process values
- Maximum data age from sensor to output is 20 ms
- Independent low flow cut-off settings for volume flow and velocity
- Zero-point adjustment on command from discrete input or host system

Operation and display

- User-configurable operation display
 - Fully graphical display 240 x 160 pixel display with up to 6 programmable views
 - Self-explaining alarm handling/log in clear text
 - Help text for all parameters appears automatically in the configuration menu
- SensorFlash technology stores production specific system documentation and provides removable memory of all flowmeter setups and functions
 - Calibration certificates (with ordered calibration)
 - Non-volatile memory backup of operational data
 - Transfer of user configuration to other flowmeters
 - 4GB SD card for storage and data logging
 - Audit trail of all parameter changes
 - Alarm logging

Alarms and safety

- Advanced diagnosis and service menu enhances troubleshooting and meter validation
- Configurable upper and lower alarm and warning limits for all process values

Outputs and control

- Monitoring comprised of 3 individually configurable totalizers
- Single parameter outputs that can be assigned individually to any of the following parameters:
 - Volume flow
 - Flow velocity
 - Sound velocity
 - Flow direction

Channel 1 is 4 to 20 mA analog output. The current signal can be configured for passive volume flow.

Relay output(s) can be user configured to Alarm status or warning.

Modbus RTU RS 485 comes as standard.

Signal input

The signal input can be user-configured for:

- Totalizer reset functions
- Forcing outputs or freezing process values
- Initiating automatic zero point adjustment

Approvals and certificates

The SITRANS FST020 transmitter was designed to comply with or exceed the requirements of international standards and regulations.

Design

- Field clamp-on (non-intrusive)
- Single path, for only one pair of sensors on one pipe
- IP65 (NEMA 4X) wall mount housing, constructed of polycarbonate
- Available AC or DC power, 100 to 240 V AC, 11.5 to 28.5 V DC

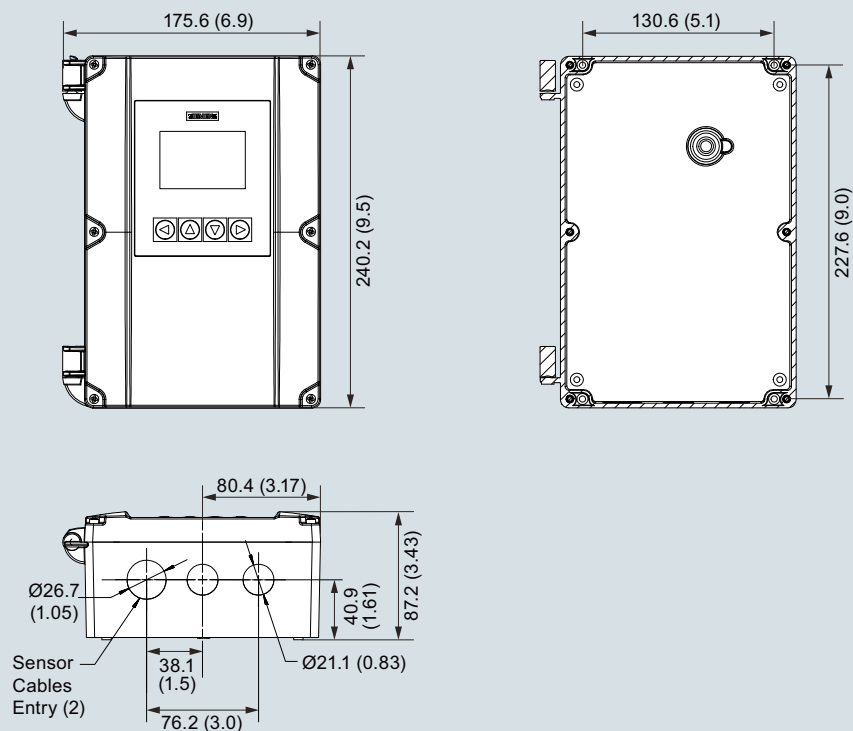
Function

- 240 x 160 pixel graphical display with 4 key navigation and backlight
- 6 user programmable views for individual process and diagnostic information
- Modbus RTU communication
- 100 Hz update rate for all primary process values
- Independent low flow cut-off settings for volume and flow velocity
- Fully compatible with Siemens PDM version 8.2 service pack 1 or higher
- Bidirectional flow operation
- Menus available in English and German

Technical specifications

Rangeability		Accuracy	
Flow range	±12 m/s (±40 ft/s), depending on pipe size higher or lower	Repeatability	For velocities above 0.3 m/s (1 ft/s), ±1.0 % of flow
Flow direction	bi-directional	Zero Drift	± 0.25 % (according to ISO 11631)
Flow sensitivity	0.001 m/s (0.003 ft/s) flow rate independent	Data refresh rate	0.1 % of rate; < ±0.001 m/s (±0.003 ft/s)
Digital inputs		Transmitter conditions	
Totalizer Hold	Optically isolated diode Activated On: Input voltage: 2 ... 10 V DC	Operating temperature	-10 ... +50 °C (14 ... 122 °F)
Totalizer Reset	Optically isolated diode Activated On: Input voltage: 2 ... 10 V DC	Storage temperature	-20 ... +60 °C (-4 ... +140 °F)
Output Channel 1		Degree of protection	IP65, NEMA 4X
Current	4 ... 20 mA (isolated) Externally powered 10 ... 30 V DC	Design	
Relay	30 V DC, 3 V AC max.	Weight	1.4 kg (3.0 lb)
Pulse rate	Optically isolated transistor 10 mA, 30 V DC max. Pulse: 41.6 ms ... 5 s pulse duration Frequency: 0 ... 12.5 kHz (50 % duty cycle)	Dimensions (W x H x D)	176 x 240 x 87 mm (6.9 x 9.5 x 3.4 inch)
		Enclosure material	Polycarbonate
		Power supply	
		100 ... 240 V AC @ 20 VA or 11.5 ... 28.5 V DC @ 10 W	
		Certificates and approvals	
		Unclassified locations	
		• General Safety	
		UL, ULc, CE	

Dimensional drawings



SITRANS FST020 IP65 (NEMA 4X), wall mount enclosure, dimensions in mm (inch)

Flow Measurement

SITRANS F S Clamp-on

Ultrasonic flow transmitter SITRANS FST020, wall mount housing - Ordering data

Selection and Ordering data				Article No.	Ord. code
Transmitter SITRANS FST020 (Basic), IP65 (NEMA 4X)				7ME3570-	40-0
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Number of ultrasonic paths					
Single path				1	
Flowmeter functions and I/O configurations					
With display, keypad, 1x 4 ... 20 mA, 1x relay, 1x pulse/frequency, 2x digital input, Modbus RTU				J	
Power supply					
100 ... 240 V AC				A	
11.5 ... 28.5 V DC				B	
Sensor FSS200¹⁾					
When ordering a flow system, sensors always come automatically with suitable mounting equipment. Smaller sensor sizes A & B come with mounting tracks, while sensor sizes C, D & E are supplied with frames and spacer bars. Straps provided are for the indicated maximum OD listed below. Strap kits are available to accommodate larger pipes (refer to spare part list). Refer to "Sensor Selection Charts" to find the most suitable sensors for specific pipe sizes and wall thicknesses.					
No sensor					A
For the following Universal sensors, temperature range is -40 ... +121 °C (-40 ... +250 °F), FSS200 Universal: select according to outer pipe diameter					
FSS 200 Universal	A2	12.7 ... 50 mm (0.5 ... 2")	Track mount and straps provided up to 75 mm (3")		B
FSS 200 Universal	B3	19 ... 127 mm (0.75 ... 5")	Track mount and straps provided up to 125 mm (5")		C
FSS 200 Universal	C3	51 ... 305 mm (2 ... 12")	Mounting frame, straps and spacer bar provided up to 330 mm (13")		D
FSS 200 Universal	D3	203 ... 610 mm (8 ... 24")	Mounting frame and straps and spacer bar provided up to 600 mm (24")		E
FSS 200 Universal	E2	304 ... 9144 mm (12 ... 360")	Mounting frame and straps and spacer bar provided up to 1200 mm (48")		F
For the following High Precision sensors T1, temperature range is -40 ... +120 °C (-40 ... +248 °F), FSS200 High Precision: select according to pipe wall thickness					
FSS200 HP	A1H	0.6 ... 1.0 mm (0.025 ... 0.4")	Track mount and straps provided up to 75 mm (3")		G
FSS200 HP	A2H	1.0 ... 1.5 mm (0.04 ... 0.06")	Track mount and straps provided up to 75 mm (3")		H
FSS200 HP	A3H	1.5 ... 2.0 mm (0.06 ... 0.08")	Track mount and straps provided up to 75 mm (3")		J
FSS200 HP	B1H	2.0 ... 3.0 mm (0.08 ... 0.12")	Track mount and straps provided up to 125 mm (5")		K
FSS200 HP	B2H	3.0 ... 4.1 mm (0.12 ... 0.16")	Track mount and straps provided up to 125 mm (5")		L
FSS200 HP	C1H	4.1 ... 5.8 mm (0.16 ... 0.23")	Mounting frame, straps and spacer bar provided up to 600 mm (24")		M
FSS200 HP	C2H	5.8 ... 8.1 mm (0.23 ... 0.32")	Mounting frame, straps and spacer bar provided up to 600 mm (24")		N
FSS200 HP	D1H	8.1 ... 11.2 mm (0.32 ... 0.44")	Mounting frame, straps and spacer bar provided up to 1200 mm (48") ¹⁾		P
FSS200 HP	D2H	11.2 ... 15.7 mm (0.44 ... 0.62")	Mounting frame, straps and spacer bar provided up to 1200 mm (48") ¹⁾		Q
FSS200 HP	D4H	15.7 ... 31.8 mm (0.62 ... 1.25")	Mounting frame, straps and spacer bar provided up to 1200 mm (48") ¹⁾		R
For the following High Temperature sensors, temperature range is -40 ... +230 °C (-40 ... +446 °F), FSS200 High Temperature: select according to outer diameter					
FSS200 HT	Size 2	30 ... 200 mm (1 ... 8")	Mounting track and straps provided up to 250 mm (10")	Z	P 1 A
FSS200 HT	Size 3	150 ... 610 mm (6 ... 24")	Mounting track and straps provided up to 650 mm (26")	Z	P 2 A
FSS200 HT	Size 4	400 ... 1200 mm (16 ... 48")	Mounting track and straps provided bar provided up to 1250 mm (50")	Z	P 3 A

Ultrasonic flow transmitter SITRANS FST020, wall mount housing - Ordering data

Selection and Ordering data	Article No.	Ord. code
Transmitter SITRANS FST020 (Basic), IP65 (NEMA 4X)	7ME3570 - 40 - 0	
Sensor cable (pair - terminated)		
No sensor cable		A
Sensor cable, HDPE jacket, submersible, length		P
• 5 m (16.4 ft)		Q
• 10 m (32.8 ft)		R
• 20 m (65.6 ft)		
Approvals		1
UL, ULc, CE		
1) Supplied spacer bar supports pipes up to 1050 mm (42"). For pipes larger than 1050 mm (42") purchase also, spare part 7ME3960-OMS40 (1012BN-4)		
2) Made of stainless steel construction.		

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s).	
Cable termination kit for customer supplied sensor cable pair	
Sensor cable termination for standard and plenum cable	T01
Tag and name plates	
Tag plate, transmitter and sensor	Y19

MLFB example

Application example

A basic clamp-on meter is required for a DN 150 - 168.3 x 4.5 mm (6" schedule 40) carbon steel wastewater line. Meter electronics are to be located in an instrumentation shed with available AC power. 10 m (32 ft) of sensor cable is needed to reach pipe location.

MLFB Article No.: **7ME3570-1JA40-0MQ1**










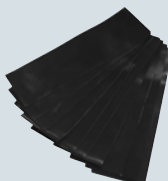
Selection and Ordering data	Article No.	Ord. code
SITRANS FST020 (Basic) IP65 (NEMA 4X)	7ME3570 - 40 - 0	
Single channel	1	
Standard I/O option	J	
100 ... 240 V AC power option	A	
Sensor FSS200 HP C1H		M
Sensor cable: HDPE jacket, submersible, length 10 m (32 ft)		Q
UL, ULc, CE		1

Flow Measurement

SITRANS F S Clamp-on

Ultrasonic flowmeter SITRANS FS220 - Accessories/Spare parts





Accessories/Spare parts for clamp-on ultrasonic flowmeters


Description	Article No.		Description	Article No.	
FSS200 Universal Sensors Selected for general purpose measurement. Since they are selected based on diameter only, a wide range of pipe sizes and materials can be covered with a minimum number of sensors. These can also be selected for cost savings on applications where standard accuracy is sufficient.	7ME3950-...		Magnetic mounting frames Magnetic mounting frames are designed to simplify clamp-on sensor installation on pipelines 8 inches (DN 200) and larger by eliminating the need for straps to secure them. They feature powerful magnets to ensure quick and accurate setup. Compatible with all C, D and E universal and high-precision sensors belonging to the SITRANS FSS200 clamp-on family. Magnetic mounting frames are constructed in aluminum for a high level of durability. Ideal use on temporary installations.	7ME3960-0MD02	
FSS200 High Precision Sensors Selected for increased performance on steel pipes. They provide the highest accuracy achievable by the meters and therefore should be selected whenever higher accuracy / repeatability is required primarily based on pipe wall thickness.	7ME3950-...		Test Block Used for checking operation of a meter and sensors prior to a field installation, or as a troubleshooting tool. Selected by sensor size, each block accommodates 2 sensor sizes. Available only for universal sensors.	7ME3960-...	
FSS200 High Temperature Sensors Selected whenever pipe temperature will exceed 250 °F (120 °C) up to a maximum of 450 °F (232 °C). They are universal type and can therefore be used on any pipe material and are selected by pipe diameter. Constructed in stainless steel. Connection junction box included.	7ME3950-...		Straps Used to fasten sensors or mounting frames to pipe for dedicated meter installations. Stainless steel construction for corrosion resistance.	7ME3960-...	
Mounting tracks Typically used on smaller pipes for easier and more stable mounting of dedicated universal style sensor size A or B; also available for dedicated high precision sensor size A or B.	7ME3960-...		Cable Gland Kit Cable gland kit for use with SITRANS FST020 transmitters housed in IP65 NEMA 4X wall mount enclosures. Kit contains two single port glands for power and one dual port gland for sensor cables.	A5E41693895	
Mounting Frames These items are useful in simplifying sensor installation. They are strapped to the pipe first and then the sensors are installed, making the installation less cumbersome and more precise. They also enable easy repeated mounting of the sensors assuring alignment to the original sensor positioning. They may be left in place at each measurement location where periodic flow surveys are conducted to simplify subsequent installations and ensure repeatable results.	7ME3960-...		Ultrasonic Couplant Fills any voids between sensor emitting surface and pipe wall to allow maximum energy transfer between sensor and pipe. Several different types of couplants are employed as determined by the application conditions and type of installation (Temporary or permanent).	7ME3960-...	
			Dry Couplant The dry coupling pad is intended for use in any liquid, clamp-on transit time or Doppler applications that require a more durable coupling material. Installation is easy by simply placing one strip of material between sensor and pipe. Not intended for clamp-on gas where damping material is used. The temperature range is -34 to +200 °C (-30 to +392 °F).	7ME3960-...	

Flow Measurement

SITRANS F S Clamp-on

Ultrasonic flowmeter SITRANS FS220 - Ordering data

Description	Article No.	
Termination Kit (Flow Sensors) Termination kit for one pair of sensor cables. These can be provided in cases where users will be purchasing bulk cable directly and cutting to length at site, or when existing cable length is to be altered. Selected by cable type.	7ME3960-...	
FST020 Transmitter module Main transmitter module for FST020 including SD-card and firmware load	A5E41693884	
FST020 Transmitter module cover AC Cover for FST020 Main transmitter module for AC powered units; includes label and screws	A5E41693888	
FST020 Transmitter module cover DC Cover for FST020 Main transmitter module for DC powered units; includes label and screws	A5E41693889	
FST020 Enclosure cover Enclosure lid for FST020; includes display module, connection label and screws	A5E38846901	
FST020 Power Supply AC Power supply module for FST020, AC power	7ML1830-1MD	
FST020 Power Supply DC Power supply module for FST020, DC power	7ML1830-1ME	
SensorFlash SD-card 4 GB micro SD card -40 °C ... +85 °C for FST020 or FST030 for data storage, firmware and back-up	A5E38288507	
Hardware kit Various nuts, screws, and grounding strap for FST020 transmitter	A5E41944763	
Sensor cable pair, 5 m Sensor cable for connection between FSS200 sensors and FST020 transmitter, 5 meters in length	A5E39669934 031	
Sensor cable pair, 10 m Sensor cable for connection between FSS200 sensors and FST020 transmitter, 10 meters in length	A5E39669934 032	

Sensor cable pair, 20 m Sensor cable for connection between FSS200 sensors and FST020 transmitter, 20 meters in length	A5E39669934 033	
Enclosure mounting kit Mounting kit to fix enclosure on a 2" stanchion pipe	QCB: 1012NMB-1	

Flow Measurement

SITRANS F S Clamp-on

Ultrasonic flowmeter SITRANS FS220 - Ordering data

Selection and Ordering data	Article No.
<i>Spare parts (FSS200 sensors)</i>	
SITRANS F US clamp-on	7ME3950-5
Temperature range for all sensors is unless otherwise noted -40 °C ... +120 °C (-40 °F ... +248 °F)	
Ideal operating temperatures as follows:	
T1: -40 ... +80 °C (-40 ... +176 °F)	0
T2: 80 ... 121 °C (176 ... 250 °F)	2
Spare sensor code (Stainless steel construction)	
<u>Liquid flow sensors for use with mounting frames or tracks</u>	
FSS200 A2 universal	LB01
FSS200 B3 universal	LC01
FSS200 C3 universal	LD00
FSS200 D3 universal	LE00
FSS200 E2 universal	LF00
FSS200 A1H (high precision)	LG01
FSS200 A2H (high precision)	LH01
FSS200 A3H (high precision)	LJ01
FSS200 B1H (high precision)	GK 1
FSS200 B2H (high precision)	GL 1
FSS200 B3H (high precision)	GT 1
FSS200 C1H (high precision)	GM 0
FSS200 C2H (high precision)	GN 0
FSS200 D1H (high precision)	GP 0
FSS200 D2H (high precision)	GQ 0
FSS200 D3H (high precision)	GU 0
FSS200 D4H (high precision)	GR 0
<u>High temperature universal liquid sensors up to 230 °C (446 °F)</u>	
FSS200 High temp. sensor size 1 for 12.7 to 100 mm diam.	LA13
FSS200 High temp. sensor size 2 for 30 to 200 mm diam.	LA23
FSS200 High temp. sensor size 3 for 150 to 600 mm diam.	LA43
FSS200 High temp. sensor size 4 for 400 to 1200 mm diam.	LA73

Selection and Ordering data	Article No.
<i>Spare parts (Miscellaneous)</i>	
SITRANS F US clamp-on	7ME3960-
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Dedicated sensor mounting hardware	
Sensor mounting tracks (dual part aluminum with mounting straps) for pipes < 125 mm (5 inch)	
• Tracks for Universal sensor pair size A or B	0MA00
• Tracks for High precision sensor pair size A or B	0MB00
Sensor mounting frames pair with mounting straps	
• Frames for Universal sensor size B (for pipes > 125 mm (5 inch))	CQO:1012FN-PB
• Frames for Universal sensor size C	0MC00
• Frames for Universal sensor size D	0MC01
• Frames for Universal sensor size E	0MC02
• Frames for High precision sensor size B (for pipes > 125 mm (5 inch))	CQO:1012FNH-PB
• Frames for High precision sensor size C	0MD00
• Frames for High precision sensor size D	0MD01
Mounting straps for mounting frames (slotted stainless steel)	
• Straps for pipes from DN 50 to DN 150	0SM00
• Straps for pipes from DN 50 to DN 300	0SM10
• Straps for pipes from DN 300 to DN 600	0SM20
• Straps for pipes from DN 600 to DN 1200	0SM30
• Straps for pipes from DN 1200 to DN 1500	0SM40
• Straps for pipes from DN 1500 to DN 2100	0SM50
• Straps for pipes from DN 2100 to DN 3000	0SM60
Spacer bars (for indexing sensors on pipe)	
• Spacer bar for pipes to 200 mm/8 inch (liquid), 600 mm/24 inch (gas)	0MS10
• Spacer bar for pipes to 500 mm/20 inch (liquid), DN 1200/48 inch (gas)	0MS20
• Spacer bar for pipes to 800 mm/32 inch (liquid)	0MS30
• Spacer bar-extension for pipes to 1200 mm/ 48 inch (liquid) Only use in conjunction with 7ME3960-0MS30	0MS40
High precision mounting enclosures. Spacer bar is included; straps should be ordered separately	
• Stainless steel mounts for high precision size "C" sensor pair, single enclosure (each)	0WS50
• Stainless steel mounts for high precision size "D/E" sensor pair, single enclosure (each)	0WS60
• Stainless steel mounts for high precision size "C" sensor pair, dual enclosure (pair)	0WD50
• Stainless steel mounts for high precision size "D/E" sensor pair, dual enclosure (pair)	0WD60

Selection and Ordering data	Article No.
Spare parts (Miscellaneous)	
SITRANS F US clamp-on	7ME 3 9 6 0 -
Stainless steel straps for weld seal enclosure mounting (2 x required for dual enclosures)	
Mounting strap for pipe diameter to 300 mm (13 inch)	0 SM 0 1
Mounting strap for pipe diameter to 600 mm (24 inch)	0 SM 1 1
Mounting strap for pipe diameter to 1200 mm (48 inch)	0 SM 2 1
Mounting strap for pipe diameter to 1500 mm (60 inch)	0 SM 3 1
Mounting strap for pipe diameter to 2130 mm (84 inch)	0 SM 4 1
Mounting strap for pipe diameter to 3050 mm (120 inch)	0 SM 5 1
Stainless mounting tracks for High temp. 991 sensors, with straps, dual part for direct and reflect mount, incl. straps	
Size 1 high temp sensor pair	CQO:992MTNHMSH-1
Size 2 high temp sensor pair	CQO:992MTNHMSH-2
Size 3 high temp sensor pair	CQO:992MTNHMSH-3
Size 4 high temp sensor pair	CQO:992MTNHMSH-4
Sensor cables FSS220 (IP65 NEMA 4X) wall mount	
Sensor cable pair, terminated, 5 m	A5E39669934031
Sensor cable pair, terminated, 10 m	A5E39669934032
Sensor cable pair, terminated, 20 m	A5E39669934033
Dedicated cable termination kits	
For externally supplied sensor cables, standard and plenum	0 CT 0 1
Cable gland kit (normally supplied with transmitter) for IP65 NEMA 4X enclosures	A5E41693895
Ultrasonic couplant	
Temporary water based for portable systems: 350 ml (12 oz): -34 ... +38 °C (-30 ... +100 °F)	0 UC 1 0
Permanent synthetic polymer based: 90 ml (3 oz): -40 ... +190 °C (-40 ... +375 °F)	0 UC 2 0
Permanent high temp fluoroether: -40 ... +230 °C (-40 ... +450 °F)	0 UC 3 0
Permanent vulcanizing silicone rubber couplant: 90 ml (3 oz): -40 ... +120 °C (-40 ... +250 °F)	CQO:CC112
Permanent high temp silicone grease: 12 ml (0.4 oz): -40 ... +230 °C (-40 ... +450 °F)	CQO:CC117
Permanent high temp silicone grease: 150 ml (5 oz): -40 ... +230 °C (-40 ... +450 °F)	CQO:CC117A
Couplant for submersible sensor applications	CQO:CC120
Dry coupling pads (qty of 10): -34 to +200 °C (-30 to +392 °F)	0 UC 4 0
Universal Sensor Test Blocks	
Test block for size A and B universal sensors	0 TB 1 0
Test block for size C and D universal sensors	0 TB 2 0

Flow Measurement

SITRANS F US Clamp-on

Thickness gauge

Overview



The thickness gauge is used to measure the wall thickness of the pipe that a clamp-on ultrasonic flowmeter is installed on. The wall thickness value is a vital factor in the flow computation model and a prerequisite for precise clamp-on ultrasonic flow measurement. When measuring any pipe wall thickness the thickness gauge can also be used as a stand-alone tool used to measure the wall thickness of any metallic or non-metallic pipe materials capable of acting as an ultrasonic wave conductor.

Benefits

The thickness gauge is an indispensable tool in accurate clamp-on ultrasonic flow measurement. For a flowmeter to measure correctly it needs to know the exact wall thickness of the pipe it is measuring on. Since even the smallest miscalculation can have a major effect on the flow reading, the pipe thickness gauge has to be extremely precise. This is why the standard probe operates at a 5 MHz frequency making it capable of measuring pipe thickness ranging from 0.1 to 200 mm (0.03" to 7.9") with a very high resolution of up to 0.1 mm (0.004").

Application

The thickness gauge can be used in any field application where there is a need for flow measurement.

Design

The hand-held micro-processor controlled gauge is designed to measure the thickness of various metallic or non-metallic pipe. Such materials include steel, aluminum, titanium, plastics and ceramics. Measurement results are shown in either inches or millimeter; only a simple pre-calibration to a known thickness or sound velocity is required. The simple-to-read 4-digit LCD display featuring a basic user friendly menu is easily navigable with only three conveniently located push buttons. The lightweight computing unit weighs a mere 150 g (5.3 oz) making it ideal for quick and easy on-site pipe wall thickness measurement and with two AAA alkaline batteries trouble-free operation is ensured for 250 hours.

Function

The thickness gauge measurement is based on the transit time ultrasonic wave propagation principle: a high frequency ultrasonic beam is transmitted into the pipe being measured through a probe acting as a sender and receiver. When the probe subsequently retrieves that same signal, an internal counter calculates the time taken for the signals to be sent and received through the pipe. This value is used to evaluate the speed of sound through the pipe and consequently, the thickness of the pipe wall.

Technical specifications

Display type	4-digit LCD
Display resolution	0.1 mm (0.004")
Measurement units	Metric and imperial
Sound velocity range	1 000 ... 9 999 m/s (3 280 ... 32 805 ft/s)
Operating temperature	-10 ... +50 °C (14 ... 122 °F)
Probe/pipe temperature	70 °C (158 °F)
Update rate	4 Hz
Frequency	5 MHz
Power source	2 x 1.5 V AAA dry cells
Power consumption	Working current is less than 3 mA
Battery life	Approx. 250 h on a set of batteries
Dimensions (W x H x D)	61 x 108 x 28 mm (2.4 x 4.3 x 1.1")
Weight	150 g (5.3 oz)

Selection and Ordering data

Article No.

Thickness gauge

7ME3951-0TG20

Overview



SITRANS F X vortex flowmeters provide accurate volumetric and mass flow measurement of steam, gases and liquids as an all-in-one solution with integrated temperature and pressure compensation.

Benefits

- 2-wire technology with HART communication
- Integrated temperature compensation for saturated steam as standard feature
- Integrated temperature and pressure compensation enabling direct measurement of mass, standard volume flow rate and energy
- One instrument for measuring pressure, temperature and flow. No additional installation of pressure and temperature sensors
- Maximum process reliability thanks to Intelligent Signal Processing (ISP) - stable readings, free of external disturbances
- Fully welded stainless steel construction with high corrosion, pressure and temperature resistance
- Maintenance-free design
- Ready to use due to plug & play feature
- Minimal pressure drop
- Compact or remote design
- Free Air Delivery (FAD) measurement of a compressor

Application

The SITRANS FX300 is a flowmeter in a single or dual transmitter version, suitable for measuring industrial steam, gases, as well as conductive and non-conductive liquids, e.g. steam (saturated steam, superheated steam), industrial gases (compressed air, nitrogen, liquefied gases, flue gases), and conductive and non-conductive liquids (demineralized water, boiler feed water, solvents, heat transfer oil).

The main applications of SITRANS FX300 can be found in the following sectors:

- Chemical
- Petrochemical
- Oil & Gas
- Power plants
 - Air
 - Heating
 - Cooling
 - Chilling
- Food & beverage
 - Pharmaceutical
 - Sugar refineries
 - Dairies
 - Breweries
 - Production of soft drinks
- Pulp & paper
- Water & waste water

System Overview

Version	Flange	Sandwich	Dual transmitter
Compact			
Remote			

Design

SITRANS FX300 vortex flowmeters are available in the following variants:

SITRANS FX300 Single transmitter

The single transmitter variant exists in flange or sandwich design. In flange design the SITRANS FX300 offers a sensor with integrated nominal diameter reduction up to two nominal diameter sizes. That ensures best results in accuracy and optimal measuring ranges even in pipelines with large diameters, designed for low pressure loss. By forgoing complex pipeline reduction installations, space and cost saving installations can be realized. At the same time the number of potential leakages is reduced to a minimum.

The flowmeters in sandwich design will be supplied with additional optimised centring rings. With installation of the centring rings the SITRANS FX300 can be aligned centrically and eliminates any offset between the sensor and the pipeline.

The SITRANS FX300 is also available as a remote version. This feature allows separating the transmitter from the sensor up to a distance of 15m (49 ft). The remote mounted transmitter allows easy operation and optimal readability.

Flow Measurement

SITRANS F X

SITRANS FX300

The following configurations can be selected for the single transmitter variant:

- **Basic version**
Suitable for liquids and gases, integrated temperature compensation included as standard for saturated steam
- **With integrated pressure compensation**
Version with integrated temperature and pressure compensation for gases, wet gases, gas mixtures or steam (energy measurement optional)
- **With integrated pressure compensation and isolation valve**
Allowing the pressure sensor to be shut off for the purpose of pressure and leak testing of the pipeline or for being exchanged without interrupting the process.
- **Remote version**
With this version transmitter and sensor are locally separated. In addition, it offers the same features as the compact version (integrated temperature and pressure compensation, isolation valve).

SITRANS FX300 Dual transmitter

This is a genuine redundant system with two independent sensors and transmitters providing twofold functional reliability and availability of the measurement. This variant is optimally suited for measurements in multi-product pipelines.

The dual transmitter version is available as:

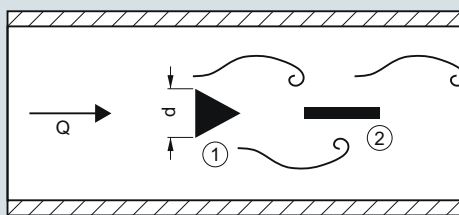
- **Basic version**
Suitable for liquids and gases, temperature compensation integrated as standard for saturated steam

Function

Operating Principle

SITRANS F X vortex flowmeters measure flow rate by detecting the frequency at which alternating vortices are shed from a bluff body inserted into the flow stream. This principle of measurement is derived from the Karman phenomenon of vortex shedding. The frequency of the alternating vortices is proportional to the flow rate.

The passage of a vortex causes a slight stress on a pick-up sensor placed downstream of the bluff body. The stress is detected by piezo-electric crystals placed inside the pick-up sensor.



① = Bluff Body, ② = Pick-up

The flowmeter calculates the flow velocity using the following equation:

$$Q = A \cdot V = A \cdot d / St \cdot f = 101.93 \cdot f / K \text{ [m}^3/\text{h]}$$

Where:

Q = flow rate [m³/h]
f = vortex shedding frequency [Hz]
K = calibration constant [pulses/m³]
d = width of the bluff body [m]
St = Strouhal Number
A = cross-section area [m²]
V = flow velocity [m/s]

Requirements

In order to generate the vortex streets, the medium must have a minimum velocity:

- For steam and gases, the flow velocity must be 2 to 80 m/s (6.6 to 262 ft/s)
- For liquids the flow velocity must be 0.4 to 10 m/s (1.3 to 32.8 ft/s)

Technical specifications

Input	
Measuring range limits	See „Dimensional Drawings“
Media pressure	1 ... 100 bar (14.5 ... 1450 psi) (Higher pressures on request)
Output	
Current output	
• Measuring range	4 ... 20 mA
• Over range	20.8 mA ± 1 % (105 % ± 1 %)
• Load	
- min.	100 Ω
- max.	$R_{\max} = (U_{\text{Power Supply}} - 14 \text{ V}) / 22 \text{ mA}$
• Error signal	NAMUR NE 43
• Maximum output	22 mA (112.5 %)
• Multidrop mode	4 mA
Digital output	
• Communication	HART
• Physical layer	FSK
• Device category	Transmitter
Pulse output	
Passive pulse output, setting pulse value (meter factor) for totalized flow or heat quantity (energy) with option Y47 (e.g.: 1 pulse/kg or 1 pulse/kWh)	
• Pulse frequency	Max. 0.5 Hz
• Power supply	Min. 24 V DC as NAMUR or
• Non-Ex version	open < 1 mA, max. 36 V, closed 100 mA, $U < 2 \text{ V}$
• Ex version	open < 1 mA, max. 30 V, closed 100 mA, $U < 2 \text{ V}$
Accuracy	
Standard version	
• For liquids	
- $Re \geq 20\,000$	± 0.75 %
• For steam and gases	
- $Re \geq 20\,000$	± 1 %
• For steam, gases and liquids	
- $10\,000 < Re < 20\,000$	± 2 %
Pressure and temperature-compensated version	
• For liquids	
- $10\,000 < Re < 20\,000$	± 2 %
- $Re \geq 20\,000$	± 0.75 %
• For gases and steam	
- $10\,000 < Re < 20\,000$	± 2.5 %
- $Re \geq 20\,000$	± 1.5 %
Repeatability	± 0.1 %
Installation conditions	
(At different conditions, e.g. installation after control valve, bends or reductions, please refer to the operating instructions.)	
• Inlet run	≥ 20 x DN
• Outlet run	≥ 5 x DN

Software

Uncompensated for liquids and gases, density-compensated by temperature for saturated steam	Order option 1
Density-compensated by temperature and pressure for superheated steam	Order option 4
Gross heat meter	
When the thermal energy of steam is to be measured	Order option 5
Following information is required at option Y51 to Y56	<ul style="list-style-type: none"> • Y51 Variable current output: Flow rate, power • Y52 Power unit Select one of the following units: kJ/h, MJ/h, GJ/h, Btu/h, kcal/h, kW, MW or special (custom) • Y53 Fullscale value power • Y54 Variable pulse output: Totalized flow, energy • Y55 Totalizer on/off • Y56 Energy unit Select one of the following units: kJ, MJ, GJ, Btu th, kcal, kWh, MWh or special (custom).
Density compensated by temperature and pressure for gases, wet gases	Order option 7
Wet gases	Select Y49 and enter relative humidity of process medium in %
FAD - Free Air Delivery	
When the delivered air of a compressor is to be measured	Order option 8
In Y81 to Y87 add information regarding:	<ul style="list-style-type: none"> • Y81 Inlet suction temperature • Y82 Atmospheric pressure • Y83 Pressure drop at inlet suction filter • Y84 Inlet relative humidity • Y85 Actual compressor rotation (rpm) • Y86 Rated compressor rotation (rpm) • Y87 Relative humidity at compressor output
Mixed gases	When fluid is a gas mixture, specify the single gas components and their amount/concentration in %.
Rated operation conditions	
Ambient temperature	
• Non-Ex version	-40 ... +85 °C (-40 ... +185 °F)
• Ex version	-40 ... +65 °C (-40 ... +149 °F)
Storage temperature	-50 ... +85 °C (-58 ... +185 °F)
Media temperature	-40 ... +240 °C (-40 ... +464 °F)
Density	Taken into consideration when dimensioning
Viscosity	<10 cP
Reynolds number	10 000 ... 2 300 000
Media pressure limit	Max. 100 bar (1450 psi) Higher pressure on request (contact your local Siemens representative)

Design

Material	
• Sensor/Pick-up	AISI 316L (1.4404)/ AISI 316L (1.4435) Hastelloy C22/2.4602 available on request (contact your local Siemens representative)
• Transmitter housing	Aluminum
• Sensor gaskets (Pick-up/Pressure sensor)	AISI 316L (1.4435) / FPM or FFKM
Process connections	FPM (Viton) for steam and non-aggressive gases. FFKM (Kalrez) for chlorine and other aggressive gases. (The meter is fitted with FPM/FFKM gasket only when configured with pressure sensor)
• Flange version	Flange norm EN 1092-1 form B1/B2 or ANSI B16.5 RF.
• Sandwich version	Other flanges on request (contact your local Siemens representative)
Degree of protection	DN 15 ... 300 (½ ... 12") DN 15 ... 100 (½ ... 4")
Dimensions and weights	IP66/IP67 See "Dimensional Drawings"
Display and operating interface	
Local display	2 lines, 10 characters per line
Languages	German, English, French
Power supply	
• Standard version	14 ... 36 V DC
• Ex version	14 ... 30 V DC
Certificates and approvals	
Explosion protection	
• ATEX	II 2G EEx d ia [ia] IIC T6
• FM US/C	Class I, II, III, Div. 1 and 2
Calibration	All flowmeters will be delivered with a 3 point calibration certificate
Material Certificate	Certificate of compliance, pressure test, material certificate, material in acc. of NACE and PMI of pressure bearing metal parts.
Cleaning	Choose Cleaning Class1 when fluid is oxygen or contains chloride.
Certificates	X-ray and dye penetration test on pressure bearing weldings

Flow Measurement

SITRANS F X

SITRANS FX300

Valid combinations of sensor/connections size with flange norm/nominal pressure are shown in the following table.

Sensor size	Connection size	EN 1092-1, Form B1/B2, PN 10	EN 1092-1, Form B1/B2, PN 16	EN 1092-1, Form B1/B2, PN 25	EN 1092-1, Form B1/B2, PN 40	EN 1092-1, Form B1/B2, PN 63	EN 1092-1, Form B1/B2, PN 100	ANSI B16.5, class 150	ANSI B16.5, class 300	ANSI B16.5, class 600
SITRANS FX Flanged - Single transmitter (7ME2600-...)										
DN 15	DN 15	-	-	-	●	-	●	●	●	●
	DN 25	-	-	-	●	-	●	●	●	●
	DN 40	-	-	-	●	-	●	●	●	●
DN 25	DN 25	-	-	-	●	-	●	●	●	●
	DN 40	-	-	-	●	-	●	●	●	●
	DN 50	-	●	-	●	●	●	●	●	●
DN 40	DN 40	-	-	-	●	-	●	●	●	●
	DN 50	-	●	-	●	●	●	●	●	●
	DN 80	-	●	-	●	●	●	●	●	●
DN 50	DN 50	-	●	-	●	●	●	●	●	●
	DN 80	-	●	-	●	●	●	●	●	●
	DN 100	-	●	-	●	●	●	●	●	●
DN 80	DN 80	-	●	-	●	●	●	●	●	●
	DN 100	-	●	-	●	●	●	●	●	●
	DN 150	-	●	-	●	●	●	●	●	●
DN 100	DN 100	-	●	-	●	●	●	●	●	●
	DN 150	-	●	-	●	●	●	●	●	●
	DN 200	●	●	●	●	-	-	●	●	-
DN 150	DN 150	-	●	-	●	●	●	●	●	●
	DN 200	●	●	●	●	-	-	●	●	-
	DN 250	●	●	●	●	-	-	●	●	-
DN 200	DN 200	●	●	●	●	-	-	●	●	-
	DN 250	●	●	●	●	-	-	●	●	-
	DN 300	●	●	●	●	-	-	●	●	-
DN 250	DN 250	●	●	●	●	-	-	●	●	-
	DN 300	●	●	●	●	-	-	●	●	-
DN 300	DN 300	●	●	●	●	-	-	●	●	-

● available
- not available

Selection and Ordering data		Article No.	Ord. code	Selection and Ordering data		Article No.	Ord. code
SITRANS FX300 Flanged Single transmitter and T_{max} = 240 °C (464 °F)		7ME2600-		SITRANS FX300 Flanged Single transmitter and T_{max} = 240 °C (464 °F)		7ME2600-	
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.				Approval and cable gland			
Sensor size	Connection size			Non-Ex, M20 x 1.5		1	
DN 15 (½")	DN 15 (½")	1 A		Non-Ex, ½" NPT		2	
	DN 25 (1")	1 B		FM approval Class 1 Div. 2, M20 x 1.5		3	
	DN 40 (1½")	1 C		ATEX, M20 x 1.5		4	
DN 25 (1")	DN 25 (1")	2 B		ATEX, ½" NPT		5	
	DN 40 (1½")	2 C		FM approval Class 1 Div. 1, M20 x 1.5		6	
	DN 50 (2")	2 D		FM approval Class 1 Div. 1, 1/2" NPT		7	
DN 40 (1½")	DN 40 (1½")	2 K		FM approval Class 1 Div. 2, 1/2" NPT		8	
	DN 50 (2")	2 L		<u>Further approvals and cable glands</u>			
	DN 80 (3")	2 M		IEC Ex with M20 x 1.5		9	N 0 A
DN 50 (2")	DN 50 (2")	2 R		IEC Ex with ½" NPT		9	N 0 B
	DN 80 (3")	2 S		Transmitter, display and communication			
	DN 100 (4")	2 T		With display, HART		A	
DN 80 (3")	DN 80 (3")	3 L		Pressure sensor and isolation valve			
	DN 100 (4")	3 M		Without pressure sensor		A	
	DN 150 (6")	3 R		With pressure sensor, range:			
DN 100 (4")	DN 100 (4")	3 S		4 bar (58 psi)		B	
	DN 150 (6")	3 T		6 bar (87 psi)		D	
	DN 200 (8")	3 Q		10 bar (145 psi)		E	
DN 150 (6")	DN 150 (6")	4 M		16 bar (232 psi)		G	
	DN 200 (8")	4 P		25 bar (363 psi)		H	
	DN 250 (10")	4 Q		40 bar (580 psi)		K	
DN 200 (8")	DN 200 (8")	4 T		60 bar (870 psi)		L	
	DN 250 (10")	4 U		100 bar (1450 psi)		N	
	DN 300 (12")	4 V		With isolation valve and pressure sensor, range:			
DN 250 (10")	DN 250 (10")	4 W		4 bar (58 psi)		P	
	DN 300 (12")	4 Y		6 bar (87 psi)		Q	
DN 300 (12")	DN 300 (12")	5 E		10 bar (145 psi)		R	
				16 bar (232 psi)		S	
				25 bar (363 psi)		U	
				40 bar (580 psi)		V	
				60 bar (870 psi)		W	
				100 bar (1450 psi)		Y	
Flange norm and nominal pressure				Software			
Form B1/B2	EN 1092-1			Uncompensated for liquids and gases, density compensated by temperature for saturated steam		1	
PN 10	DN 200 ... 300	A		Density compensation for superheated steam		4	
PN 16	DN 50 ... 300	B		Density compensated by temperature and pressure for superheated steam, gross heat meter - setting of energy metering at option Y51 ... Y56		5	
PN 25	DN 200 ... 300	C		Density compensation for gases, wet gases and mixed gases - setting of relative humidity at option Y49		7	
PN 40	DN 15 ... 300	D		Density compensation for gases, wet gases and mixed gases, Free air delivery (FAD) - setting of FAD at option Y81 ... Y87 and relative humidity at option Y49		8	
PN 63	DN 50 ... 150	E					
PN 100	DN 15 ... 150	F					
RF	ANSI B16.5						
class 150	½ ... 12"	J					
class 300	½ ... 12"	K					
class 600	½ ... 6"	L					
Sensor material/Gasket							
St. steel AISI 316L (1.4404)/AISI 316L (1.4435)/FPM		1					
St. steel AISI 316L (1.4404)/AISI 316L (1.4435)/FFKM		5					
Transmitter design							
Compact version - no cable		1					
Remote version:							
5 m (16.4 ft)		2					
10 m (32.8 ft)		3					
15 m (49.2 ft)		4					

Flow Measurement

SITRANS F X

SITRANS FX300

Selection and Ordering data

Additional information

Please add “-Z” to Article No. and specify as minimum Order code Y40, Y41, Y42 and Y45 and plain text.

Input process data

Medium: Specify medium (Liquid, gas, steam or customer-specific)	Y40
Temperature: Specify operating temperature with unit	Y41
Pressure: Specify operating pressure with unit	Y42
Density (only for customer-specified medium): Specify density with unit	Y43
Viscosity (only for customer-specified medium): Specify viscosity with unit	Y44
Flow rate: Specify max. flow rate with units	Y45
Setting of pulse output: Specify pulse value (meter factor) for totalized flow or energy (1 pulse/unit)	Y47
Relative humidity of process medium in %	Y49

Settings of gross heat

Variable current output: Flow rate, power	Y51
Power unit (specify: kJ/h, MJ/h, GJ/h, Btu/h, kcal/h, kW, MW or special (custom))	Y52
Fullscale value power	Y53
Variable pulse output: Totalized flow, energy	Y54
Totalizer on/off	Y55
Energy unit (specify: kJ, MJ, GJ, Btu th, kcal, kWh, MWh or special (custom))	Y56

Settings of FAD

Inlet suction temperature ¹⁾	Y81
Atmospheric pressure ¹⁾	Y82
Pressure drop at inlet suction filter ²⁾	Y83
Inlet relative humidity ¹⁾	Y84
Actual compressor rotation (rpm) ²⁾	Y85
Rated compressor rotation (rpm) ²⁾	Y86
Relative humidity at compressor outlet ²⁾	Y87

¹⁾ Required information from customer.

²⁾ Required information from compressor manufacturer (data sheet).

Operating instructions

Description	Article No.
English	A5E2100423
German	A5E02171807

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Selection and Ordering data

Further designs

Please add “-Z” to Article No. and specify Order code.

Converter housing material

Aluminum for increased requirement, color: petrol green	A10
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Material certificate

Certificate of compliance EN 10204-2.1	C10
Pressure test + 3.1 accordance EN 10204	C11
Material certificate of pressure bearing parts + certificate 3.1	C12
Material in accordance with NACE MR 0175-01	C13
PMI of pressure bearing metal parts + certificate 3.1	C14
Material certificate of pressure bearing parts + PMI + certificate 3.1	C15

Calibration certificate FX300

As standard the flow device has a 3-point calibration certificate.

5-point calibration certificate	D11
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Hardness test

Hardness test on pressure bearing parts + certificate 3.1	H30
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Cleaning

Cleaning class 1	K46
Cleaning class 1 + certificate 3.1 acc. EN 10204	K48

Certificates

X-ray test on pressure bearing weldings	M56
Dye penetration test on pressure bearing weldings	M58

Tag name plate

Stainless steel tag with 3 mm characters, max. 2 x 8 characters (40 x 20 mm, add plain text)	Y17
Stainless steel tag with 2.5 mm characters, max. 8 x 40 characters (120 x 46 mm, add plain text)	Y18

Selection and Ordering data		Article No.	Ord. code
SITRANS FX300 Sandwich Single transmitter and T_{max} = 240 °C (464 °F)		7ME2700 -	
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Sensor size	Connection size		
DN 15 (½")	DN 15 (½")	1 A	
DN 25 (1")	DN 25 (1")	2 B	
DN 40 (1½")	DN 40 (1½")	2 K	
DN 50 (2")	DN 50 (2")	2 R	
DN 80 (3")	DN 80 (3")	3 L	
DN 100 (4")	DN 100 (4")	3 S	
Nominal pressure			
Form B1/B2	EN 1092-1		
PN 16	DN 50 ... 100	B	
PN 40	DN 15 ... 100	D	
PN 63	DN 50 ... 100	E	
PN 100	DN 15 ... 100	F	
RF	ANSI B16.5		
class 150	½ ... 4"	J	
class 300	½ ... 4"	K	
class 600	½ ... 4"	L	
Sensor material/Gasket			
St. steel AISI 316L (1.4404)/AISI 316L (1.4435)/FPM		1	
St. steel AISI 316L (1.4404)/AISI 316L (1.4435)/FFKM		5	
Transmitter design			
Compact version - no cable		1	
Remote version:			
5 m (16.4 ft)		2	
10 m (32.8 ft)		3	
15 m (49.2 ft)		4	
Approval and cable gland			
Non-Ex, M20 x 1.5		1	
Non-Ex, ½" NPT		2	
FM approval Class 1 Div. 2, M20 x 1.5		3	
ATEX, M20 x 1.5		4	
ATEX, ½" NPT		5	
FM approval Class 1 Div. 1, M20 x 1.5		6	
FM approval Class 1 Div. 1, 1/2" NPT		7	
FM approval Class 1 Div. 2, 1/2" NPT		8	
Further approvals and cable glands			
IEC Ex with M20 x 1.5		9	N 0 A
IEC Ex with ½" NPT		9	N 0 B
Transmitter, display and communication			
With display, HART		A	

Selection and Ordering data		Article No.	Ord. code
SITRANS FX300 Sandwich Single transmitter and T_{max} = 240 °C (464 °F)		7ME2700 -	
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Pressure sensor and isolation valve			
Without pressure sensor		A	
With pressure sensor, range:			
4 bar (58 psi)		B	
6 bar (87 psi)		D	
10 bar (145 psi)		E	
16 bar (232 psi)		G	
25 bar (363 psi)		H	
40 bar (580 psi)		K	
60 bar (870 psi)		L	
100 bar (1450 psi)		N	
With isolation valve and pressure sensor, range:			
4 bar (58 psi)		P	
6 bar (87 psi)		Q	
10 bar (145 psi)		R	
16 bar (232 psi)		S	
25 bar (363 psi)		U	
40 bar (580 psi)		V	
60 bar (870 psi)		W	
100 bar (1450 psi)		Y	
Software			
Uncompensated for liquids and gases, density compensated by temperature for saturated steam		1	
Density compensation for superheated steam		4	
Density compensated by temperature and pressure for superheated steam, gross heat meter - setting of energy metering at option Y51 ... Y56		5	
Density compensation for gases, wet gases and mixed gases - setting of relative humidity at option Y49		7	
Density compensation for gases, wet gases and mixed gases, Free air delivery (FAD) - setting of FAD at option Y81 ... Y87 and relative humidity at option Y49		8	

Flow Measurement

SITRANS F X

SITRANS FX300

Selection and Ordering data

Additional information

Please add "-Z" to Article No. and specify as minimum Order code Y40, Y41, Y42 and Y45 and plain text.

Input process data

Medium: Specify medium (Liquid, gas, steam or customer-specific)	Y40
Temperature: Specify operating temperature with unit	Y41
Pressure: Specify operating pressure with unit	Y42
Density (only for customer-specified medium): Specify density with unit	Y43
Viscosity (only for customer-specified medium): Specify viscosity with unit	Y44
Flow rate: Specify max. flow rate with units	Y45
Setting of pulse output: Specify pulse value (meter factor) for totalized flow or energy (1 pulse/unit)	Y47
Relative humidity of process medium in %	Y49

Settings of gross heat

Variable current output: Flow rate, power	Y51
Power unit (specify: kJ/h, MJ/h, GJ/h, Btu/h, kcal/h, kW, MW or special (custom))	Y52
Fullscale value power	Y53
Variable pulse output: Totalized flow, energy	Y54
Totalizer on/off	Y55
Energy unit (specify: kJ, MJ, GJ, Btu th, kcal, kWh, MWh or special (custom))	Y56

Settings of FAD

Inlet suction temperature ¹⁾	Y81
Atmospheric pressure ¹⁾	Y82
Pressure drop at inlet suction filter ²⁾	Y83
Inlet relative humidity ¹⁾	Y84
Actual compressor rotation (rpm) ²⁾	Y85
Rated compressor rotation (rpm) ²⁾	Y86
Relative humidity at compressor outlet ²⁾	Y87

¹⁾ Required information from customer.

²⁾ Required information from compressor manufacturer (data sheet).

Operating instructions

Description	Article No.
English	A5E2100423
German	A5E02171807

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Selection and Ordering data

Further designs

Please add "-Z" to Article No. and specify Order code.

Converter housing material

Aluminum for increased requirement, color: petrol green	A10
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Material certificate

Certificate of compliance EN 10204-2.1	C10
Pressure test + 3.1 accordance EN 10204	C11
Material certificate of pressure bearing parts + certificate 3.1	C12
Material in accordance with NACE MR 0175-01	C13
PMI of pressure bearing metal parts + certificate 3.1	C14
Material certificate of pressure bearing parts + PMI + certificate 3.1	C15

Calibration certificate FX300

As standard the flow device has a 3-point calibration certificate.

5-point calibration certificate	D11
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Hardness test

Hardness test on pressure bearing parts + certificate 3.1	H30
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Cleaning

Cleaning class 1	K46
Cleaning class 1 + certificate 3.1 acc. EN 10204	K48

Certificates

X-ray test on pressure bearing weldings	M56
Dye penetration test on pressure bearing weldings	M58

Tag name plate

Stainless steel tag with 3 mm characters, max. 2 x 8 characters (40 x 20 mm, add plain text)	Y17
Stainless steel tag with 2.5 mm characters, max. 8 x 40 characters (120 x 46 mm, add plain text)	Y18

Selection and Ordering data		Article No.	Ord. code
SITRANS FX300 Flanged Dual transmitter and T_{max} = 240 °C (464 °F)		7ME2800-	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Sensor size	Connection size		
DN 40 (1½")	DN 40 (1½")	2 K	
DN 50 (2")	DN 50 (2")	2 R	
DN 80 (3")	DN 80 (3")	3 L	
DN 100 (4")	DN 100 (4")	3 S	
DN 150 (6")	DN 150 (6")	4 M	
DN 200 (8")	DN 200 (8")	4 T	
DN 250 (10")	DN 250 (10")	4 W	
DN 300 (12")	DN 300 (12")	5 E	
Flange norm and nominal pressure			
Form B1/B2	EN 1092-1		
PN 10	DN 200 ... 300	A	
PN 16	DN 50 ... 300	B	
PN 25	DN 200 ... 300	C	
PN 40	DN 40 ... 300	D	
PN 63	DN 50 ... 150	E	
PN 100	DN 40 ... 150	F	
RF	ANSI B16.5		
class 150	1½ ... 12"	J	
class 300	1½ ... 12"	K	
class 600	1½ ... 6"	L	
Sensor material/Gasket			
Stainless steel AISI 316L (1.4404)/AISI 316L (1.4435)/FPM		1	
Stainless steel AISI 316L (1.4404)/AISI 316L (1.4435)/FFKM		5	
Transmitter design			
Compact version - no cable		1	
Remote version:			
5 m (16.4 ft)		2	
10 m (32.8 ft)		3	
15 m (49.2 ft)		4	
Approval and cable gland			
Non-Ex, M20 x 1.5		1	
Non-Ex, ½" NPT		2	
FM approval Class 1 Div. 2, M20 x 1.5		3	
ATEX, M20 x 1.5		4	
ATEX, ½" NPT		5	
FM approval Class 1 Div. 1, M20 x 1.5		6	
FM approval Class 1 Div. 1, 1/2" NPT		7	
FM approval Class 1 Div. 2, 1/2" NPT		8	
Further approvals and cable glands			
IEC Ex with M20 x 1.5		9	N 0 A
IEC Ex with ½" NPT		9	N 0 B
Transmitter, display and communication			
With display, HART		A	
Pressure sensor and isolation valve			
Without pressure sensor		A	
Software			
Uncompensated for liquids and gases, density-compensated by temperature for saturated steam		1	



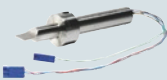


Selection and Ordering data		Order code
Additional information		
Please add "-Z" to Article No. and specify as minimum Order code Y40, Y41, Y42 and Y45 and plain text.		
Input process data		
Specify medium (Liquid, gas, steam or customer-specific)		Y40
Temperature: Specify operating temperature with unit		Y41
Pressure: Specify operating pressure with unit		Y42
Density (only for customer-specified medium): Specify density with unit		Y43
Viscosity (only for customer-specified medium): Specify viscosity with unit		Y44
Flow rate: Specify max. flow rate with units		Y45
Setting of pulse output: Specify pulse value (meter factor) for totalized flow (1 pulse/unit)		Y47
Relative humidity of process medium in %		Y49
Operating instructions for SITRANS FX300		
Description	Article No.	
English	A5E2100423	
German	A5E02171807	
All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation		
Selection and Ordering data		Order code
Further designs		
Please add "-Z" to Article No. and specify Order code.		
Converter housing material		
Aluminum for increased requirement, color: petrol green		A10
Material certificate		
Certificate of compliance EN 10204-2.1		C10
Pressure test + 3.1 accordance EN 10204		C11
Material certificate of pressure bearing parts + certificate 3.1		C12
Material in accordance with NACE MR 0175-01		C13
PMI of pressure bearing metal parts + certificate 3.1		C14
Material certificate of pressure bearing parts + PMI + certificate 3.1		C15
Calibration certificate FX300		
As standard the flow device has a 3-point calibration certificate.		
5-point calibration certificate		D11
Hardness test		
Hardness test on pressure bearing parts + certificate 3.1		H30
Cleaning		
Cleaning class 1		K46
Cleaning class 1 + certificate 3.1 acc. EN 10204		K48
Certificates		
X-ray test on pressure bearing weldings		M56
Dye penetration test on pressure bearing weldings		M58
Tag name plate		
Stainless steel tag with 3 mm characters, max. 2 x 8 characters (40 x 20 mm, add plain text)		Y17
Stainless steel tag with 2.5 mm characters, max. 8 x 40 characters (120 x 46 mm, add plain text)		Y18

Flow Measurement

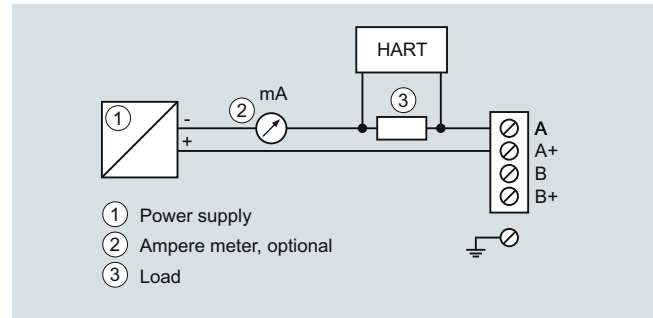
SITRANS F X

SITRANS FX300

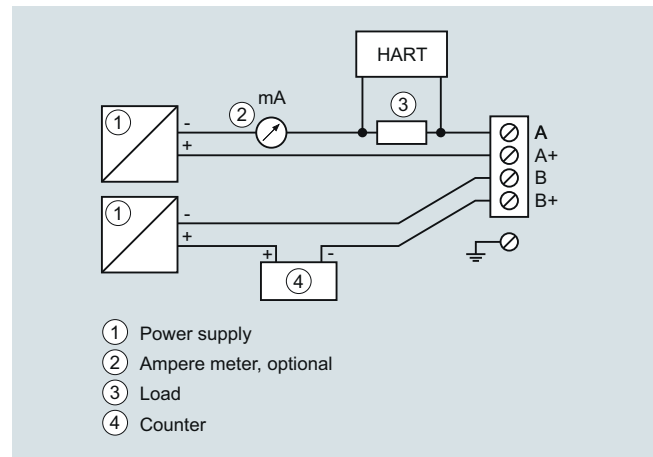
SITRANS FX300 spare parts

Description	Article No.	
Electronic		
• Basic D-HART	A5E02181531	
• Steam D-HART	A5E02181541	
• Gas D-HART	A5E02181544	
Serial number of flow meter must be specified on order.	A5E02181544	
Display	A5E02181558	
Sensor replacement (incl. seal disc, pickup, O-rings for pickup, and pressure screw)		
• DN 15 (incl. 1/2" socket)	A5E02181087	
• DN 25 (incl. 1" socket)	A5E02181116	
• DN 40 ... 100	A5E02181152	
• DN 150 ... 300	A5E02275105	
Pressure sensor replacement (Incl. pressure sensor, DUBOX plug, 2 O-rings and calibration certificate)		
• 4 bar (58 psi)	A5E02181157	
• 6 bar (87 psi)	A5E02181175	
• 10 bar (145 psi)	A5E02181180	
• 16 bar (232 psi)	A5E02181221	
• 25 bar (363 psi)	A5E02181307	
• 40 bar (580 psi)	A5E02181316	
• 60 bar (870 psi)	A5E02181322	
• 100 bar (1450 psi)	A5E02181437	
Service Toolbox for programming software (basic, steam and gas); for changing settings and diagnostics Note: Dedicated service training is required. Please contact Customer Support.	A5E02375819	
Connection cable for remote mounting		
• 15 m (49 ft)	A5E36832003	

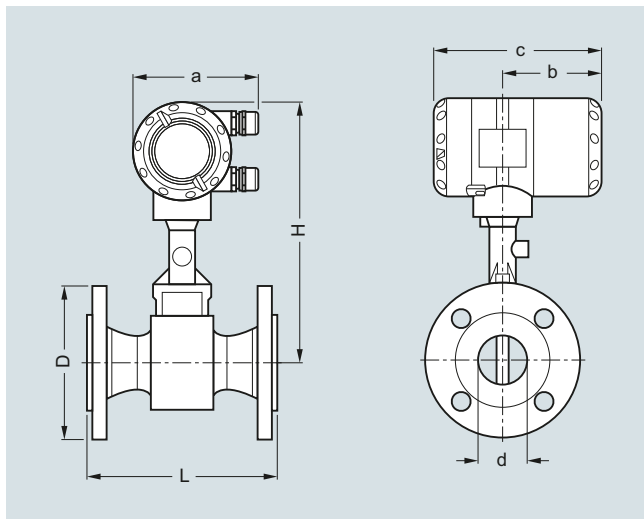
Schematics



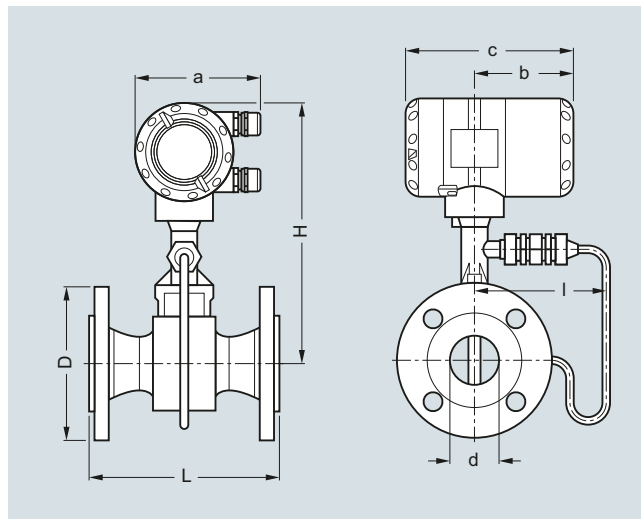
Connection power supply and HART communication



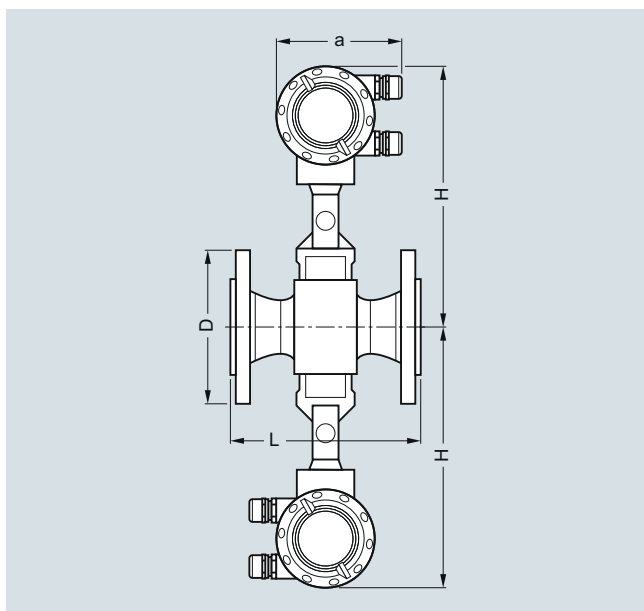
Connection pulse output

Dimensional drawings
Compact version


Flange version



Flange version with pressure sensor



Flange version, dual converter

Flow Measurement

SITRANS F X

SITRANS FX300

Flange version EN1092-1

Size DN	Pres- sure rating PN	Dimensions [mm (inch)] a = 135 (5.32), b = 108 (4.26), c = 184 (7.25)							Weight [kg (lb)] ¹⁾	
		d	d FR ²⁾	d F2R ³⁾	D	L	H	I	Flowmeter (without pres- sure sensor)	Flowmeter (with pressure sensor)
15	40	17.3 (0.68)	-	-	95 (3.74)	200 (7.87)	315 (12.40)	144 (5.67)	5.5 (12.13)	6.1 (13.45)
15	100	17.3 (0.68)	-	-	105 (4.13)	200 (7.87)	315 (12.40)	144 (5.67)	6.5 (14.33)	7.1 (15.65)
25	40	28.5 (1.12)	17.3 (0.68)	-	115 (4.53)	200 (7.87)	315 (12.40)	144 (5.67)	7.3 (16.09)	7.9 (17.42)
25	100	28.5 (1.12)	17.3 (0.68)	-	140 (5.51)	200 (7.87)	315 (12.40)	144 (5.67)	9.3 (20.50)	9.9 (21.83)
40	40	43.1 (1.70)	28.5 (1.12)	17.3 (0.68)	150 (5.91)	200 (7.87)	320 (12.60)	144 (5.67)	10.2 (22.49)	10.8 (23.81)
40	100	42.5 (1.67)	28.5 (1.12)	17.3 (0.68)	170 (6.69)	200 (7.87)	320 (12.60)	144 (5.67)	14.2 (31.31)	14.8 (32.63)
50	16	54.5 (2.15)	42.5 (1.67)	28.5 (1.12)	165 (6.50)	200 (7.87)	325 (12.80)	144 (5.67)	12.1 (26.68)	12.7 (28.00)
50	40	54.5 (2.15)	42.5 (1.67)	28.5 (1.12)	165 (6.50)	200 (7.87)	325 (12.80)	144 (5.67)	12.3 (27.12)	12.9 (28.44)
50	63	54.5 (2.15)	42.5 (1.67)	28.5 (1.12)	180 (7.09)	200 (7.87)	325 (12.80)	144 (5.67)	16.3 (35.94)	16.9 (37.26)
50	100	53.9 (2.12)	42.5 (1.67)	28.5 (1.12)	195 (7.68)	200 (7.87)	325 (12.80)	144 (5.67)	17.8 (39.24)	18.4 (40.57)
80	16	82.5 (3.25)	54.5 (2.15)	42.5 (1.67)	200 (7.87)	200 (7.87)	340 (13.39)	154 (6.06)	16.8 (37.04)	17.4 (38.36)
80	40	82.5 (3.25)	54.5 (2.15)	42.5 (1.67)	200 (7.87)	200 (7.87)	340 (13.39)	154 (6.06)	18.8 (41.45)	19.4 (42.77)
80	63	81.7 (3.22)	54.5 (2.15)	42.5 (1.67)	215 (8.46)	200 (7.87)	340 (13.39)	154 (6.06)	22.8 (50.27)	23.4 (51.59)
80	100	80.9 (3.19)	54.5 (2.15)	42.5 (1.67)	230 (9.06)	200 (7.87)	340 (13.39)	154 (6.06)	26.8 (59.08)	27.4 (60.41)
100	16	107.1 (4.22)	80.9 (3.19)	54.5 (2.15)	220 (8.66)	250 (9.84)	360 (14.17)	164 (6.46)	21.4 (47.18)	22 (48.50)
100	40	107.1 (4.22)	80.9 (3.19)	54.5 (2.15)	235 (9.25)	250 (9.84)	360 (14.17)	164 (6.46)	24.4 (53.79)	25 (55.12)
100	63	106.3 (4.19)	80.9 (3.19)	54.5 (2.15)	250 (9.84)	250 (9.84)	360 (14.17)	164 (6.46)	29.4 (64.82)	30 (66.14)
100	100	104.3 (4.11)	80.9 (3.19)	54.5 (2.15)	265 (10.43)	250 (9.84)	360 (14.17)	164 (6.46)	35.4 (78.04)	36 (79.37)
150	16	159.3 (6.27)	107.1 (4.22)	80.9 (3.19)	285 (11.22)	300 (11.81)	375 (14.76)	174 (6.85)	35.2 (77.60)	35.8 (78.93)
150	40	159.3 (6.27)	107.1 (4.22)	80.9 (3.19)	300 (11.81)	300 (11.81)	375 (14.76)	174 (6.85)	41.2 (90.83)	41.8 (92.15)
150	63	157.1 (6.19)	107.1 (4.22)	80.9 (3.19)	345 (13.58)	300 (11.81)	375 (14.76)	174 (6.85)	59.2 (130.51)	59.8 (131.84)
150	100	154.1 (6.07)	107.1 (4.22)	80.9 (3.19)	355 (13.98)	300 (11.81)	375 (14.76)	174 (6.85)	67.2 (148.15)	67.8 (149.47)
200	10	206.5 (8.13)	159.3 (6.27)	107.1 (4.22)	340 (13.39)	300 (11.81)	400 (15.75)	194 (7.64)	37.8 (83.33)	38.4 (84.66)
200	16	206.5 (8.13)	159.3 (6.27)	107.1 (4.22)	340 (13.39)	300 (11.81)	400 (15.75)	194 (7.64)	37.8 (83.33)	38.4 (84.66)
200	25	206.5 (8.13)	159.3 (6.27)	107.1 (4.22)	360 (14.17)	300 (11.81)	400 (15.75)	194 (7.64)	46.8 (103.18)	47.4 (104.50)
200	40	206.5 (8.13)	159.3 (6.27)	107.1 (4.22)	375 (14.76)	300 (11.81)	400 (15.75)	194 (7.64)	54.8 (120.81)	55.4 (122.14)
250	10	260.4 (10.25)	206.5 (8.13)	159.3 (6.27)	395 (15.55)	380 (14.96)	420 (16.54)	224 (8.82)	57.4 (126.55)	58.0 (127.87)
250	16	260.4 (10.25)	206.5 (8.13)	159.3 (6.27)	405 (15.94)	380 (14.96)	420 (16.54)	224 (8.82)	58.4 (128.75)	59.0 (130.07)
250	25	258.8 (10.19)	206.5 (8.13)	159.3 (6.27)	425 (16.73)	380 (14.96)	420 (16.54)	224 (8.82)	74.4 (164.02)	75.0 (165.35)
250	40	258.8 (10.19)	206.5 (8.13)	159.3 (6.27)	450 (17.72)	380 (14.96)	420 (16.54)	224 (8.82)	92.4 (203.71)	93.0 (205.03)
300	10	309.7 (12.19)	260.4 (10.25)	206.5 (8.13)	445 (17.52)	450 (17.72)	445 (17.52)	244 (9.61)	75.7 (166.89)	76.3 (168.21)
300	16	309.7 (12.19)	260.4 (10.25)	206.5 (8.13)	460 (18.11)	450 (17.72)	445 (17.52)	244 (9.61)	82.2 (181.22)	82.8 (182.54)
300	25	307.9 (12.12)	260.4 (10.25)	206.5 (8.13)	485 (19.09)	450 (17.72)	445 (17.52)	244 (9.61)	98.7 (217.60)	99.3 (218.92)
300	40	307.9 (12.12)	260.4 (10.25)	206.5 (8.13)	515 (20.28)	450 (17.72)	445 (17.52)	244 (9.61)	127.5 (281.09)	128.1 (282.41)

¹⁾ For dual converter: specified weight + 2.80 kg (6.17 lb).

²⁾ FR - single reduction

³⁾ F2R - double reduction

Flange version ANSI B16.5

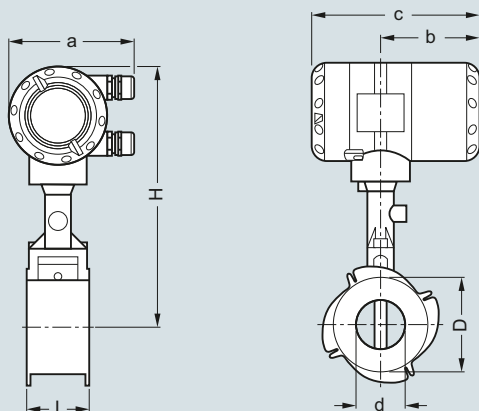
Size DN	Pressure rating Class	Dimensions [mm (inch)] a = 135 (5.32), b = 108 (4.26), c = 184 (7.25)							Weight [kg (lb)] ¹⁾	
		d	d FR ²⁾	d F2R ³⁾	D	L	H	I	Flowmeter (without pressure sensor)	Flowmeter (with pressure sensor)
½	150	15.8 (0.62)	-	-	90 (3.54)	200 (7.87)	315 (12.40)	144 (5.67)	4.5 (9.92)	5.1 (11.24)
½	300	15.8 (0.62)	-	-	95 (3.74)	200 (7.87)	315 (12.40)	144 (5.67)	4.9 (10.80)	5.5 (12.13)
½	600	13.9 (0.55)	-	-	95 (3.74)	200 (7.87)	315 (12.40)	144 (5.67)	5.1 (11.24)	5.7 (12.57)
1	150	26.6 (1.05)	15.8 (0.62)	-	110 (4.33)	200 (7.87)	315 (12.40)	144 (5.67)	6.2 (13.67)	6.8 (14.99)
1	300	26.6 (1.05)	15.8 (0.62)	-	125 (4.92)	200 (7.87)	315 (12.40)	144 (5.67)	7.2 (15.87)	7.8 (17.20)
1	600	24.3 (0.96)	15.8 (0.62)	-	125 (4.92)	200 (7.87)	315 (12.40)	144 (5.67)	7.5 (16.53)	8.1 (17.86)
1½	150	40.9 (1.61)	26.6 (1.05)	15.8 (0.62)	125 (4.92)	200 (7.87)	320 (12.60)	144 (5.67)	8.3 (18.30)	8.9 (19.62)
1½	300	40.9 (1.61)	26.6 (1.05)	15.8 (0.62)	155 (6.10)	200 (7.87)	320 (12.60)	144 (5.67)	10.4 (22.93)	11 (24.25)
1½	600	38.1 (1.50)	26.6 (1.05)	15.8 (0.62)	155 (6.10)	200 (7.87)	320 (12.60)	144 (5.67)	11.4 (25.13)	12 (26.46)
2	150	52.6 (2.07)	40.9 (1.61)	26.6 (1.05)	150 (5.91)	200 (7.87)	325 (12.80)	144 (5.67)	11 (24.25)	11.6 (25.57)
2	300	52.6 (2.07)	40.9 (1.61)	26.6 (1.05)	165 (6.50)	200 (7.87)	325 (12.80)	144 (5.67)	12.4 (27.34)	13 (28.66)
2	600	49.3 (1.94)	40.9 (1.61)	26.6 (1.05)	165 (6.50)	200 (7.87)	325 (12.80)	144 (5.67)	13.9 (30.64)	14.5 (31.97)
3	150	78 (3.07)	52.6 (2.07)	40.9 (1.61)	190 (7.48)	200 (7.87)	340 (13.39)	154 (6.06)	19.8 (43.65)	20.4 (44.97)
3	300	78 (3.07)	52.6 (2.07)	40.9 (1.61)	210 (8.27)	200 (7.87)	340 (13.39)	154 (6.06)	22.8 (50.27)	23.4 (51.59)
3	600	73.7 (2.90)	52.6 (2.07)	40.9 (1.61)	210 (8.27)	200 (7.87)	340 (13.39)	154 (6.06)	23.8 (52.47)	24.4 (53.79)
4	150	102.4 (4.03)	78 (3.07)	52.6 (2.07)	230 (9.06)	250 (9.84)	360 (14.17)	164 (6.46)	23.4 (51.59)	24 (52.91)
4	300	102.4 (4.03)	78 (3.07)	52.6 (2.07)	255 (10.04)	250 (9.84)	360 (14.17)	164 (6.46)	31.4 (69.23)	32 (70.55)
4	600	97.2 (3.83)	78 (3.07)	52.6 (2.07)	275 (10.83)	250 (9.84)	360 (14.17)	164 (6.46)	40.4 (89.07)	41 (90.39)
6	150	154.2 (6.07)	102.4 (4.03)	78 (3.07)	280 (11.02)	300 (11.81)	375 (14.76)	174 (6.85)	36.2 (79.81)	36.8 (81.13)
6	300	154.2 (6.07)	102.4 (4.03)	78 (3.07)	320 (12.60)	300 (11.81)	375 (14.76)	174 (6.85)	51.2 (112.88)	51.8 (114.20)
6	600	146.3 (5.76)	102.4 (4.03)	78 (3.07)	355 (13.98)	300 (11.81)	375 (14.76)	174 (6.85)	46.2 (101.85)	76.8 (169.31)
8	150	202.7 (7.98)	154.2 (6.07)	102.4 (4.03)	345 (13.58)	300 (11.81)	400 (15.75)	194 (7.64)	50.0 (110.23)	50.6 (111.55)
8	300	202.7 (7.98)	154.2 (6.07)	102.4 (4.03)	380 (14.96)	300 (11.81)	400 (15.75)	194 (7.64)	74.8 (164.91)	75.4 (166.23)
10	150	254.5 (10.02)	202.7 (7.98)	154.2 (6.07)	405 (15.94)	380 (14.96)	420 (16.54)	224 (8.82)	74.4 (164.02)	75.0 (165.35)
10	300	254.5 (10.02)	202.7 (7.98)	154.2 (6.07)	455 (17.91)	380 (14.96)	420 (16.54)	224 (8.82)	106.4 (234.57)	107.0 (235.89)
12	150	304.8 (12.00)	254.5 (10.02)	202.7 (7.98)	485 (19.09)	450 (17.72)	445 (17.52)	244 (9.61)	106.3 (234.35)	106.9 (235.67)
12	300	304.8 (12.00)	254.5 (10.02)	202.7 (7.98)	520 (20.47)	450 (17.72)	445 (17.52)	244 (9.61)	151.3 (333.56)	151.9 (334.88)

¹⁾ For dual converter: specified weight + 2.80 kg (6.17 lb).²⁾ FR - single reduction³⁾ F2R - double reduction

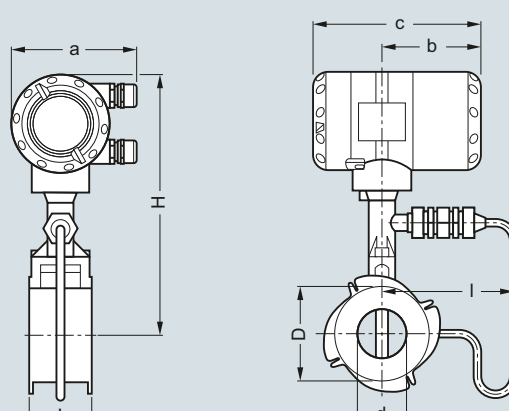
Flow Measurement

SITRANS F X

SITRANS FX300



Sandwich version



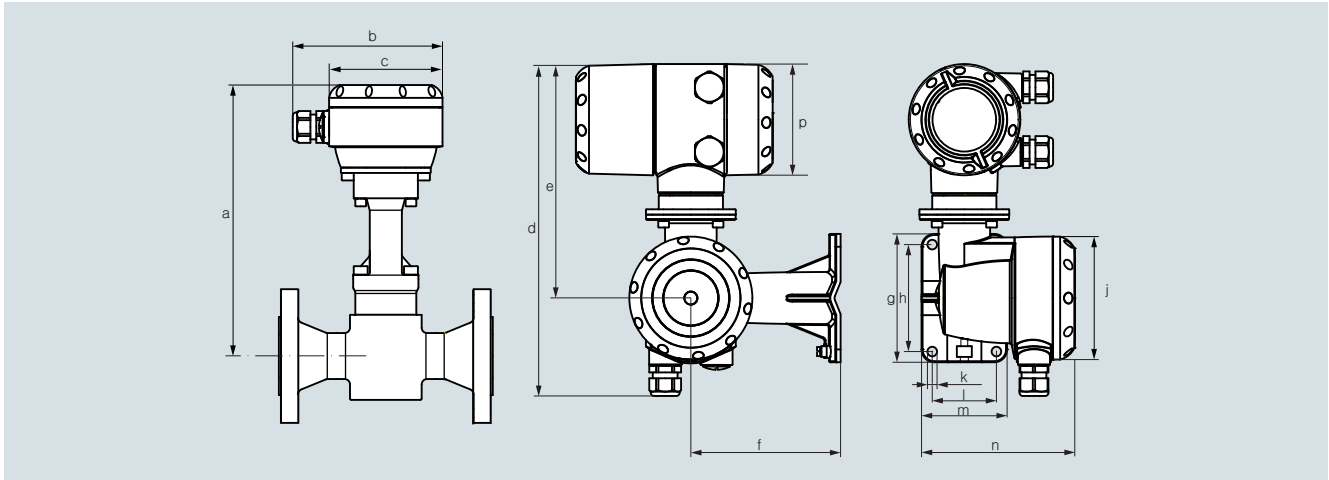
Sandwich version with pressure sensor

Sandwich version EN

Size DN	Pressure rating PN	Dimensions [mm (inch)]								Weight [kg (lb)]	
		a	b	c	d	D	L	H	I	Flowmeter (without pressure sensor)	Flowmeter (with pres- sure sensor)
15	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	16 (0.63)	45 (1.77)	65 (2.56)	265 (10.43)	144 (5.67)	3.5 (7.72)	4.1 (9.04)
25	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	24 (0.94)	65 (2.56)	65 (2.56)	265 (10.43)	144 (5.67)	4.3 (9.48)	4.9 (10.80)
40	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	38 (1.50)	82 (3.23)	65 (2.56)	270 (10.63)	144 (5.67)	4.9 (10.80)	5.5 (12.13)
50	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	50 (1.97)	102 (4.02)	65 (2.56)	275 (10.83)	144 (5.67)	6 (13.23)	6.6 (14.55)
80	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	74 (2.91)	135 (5.31)	65 (2.56)	290 (11.42)	155 (6.10)	8.2 (18.08)	8.8 (19.40)
100	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	97 (3.82)	158 (6.22)	65 (2.56)	310 (12.20)	164 (6.46)	9.5 (20.94)	10.1 (22.27)

Sandwich version ANSI

Size DN	Pressure rating Class	Dimensions [inch]								Weight [lb]	
		a	b	c	d	D	L	H	I	Flowmeter (without pressure sensor)	Flowmeter (with pres- sure sensor)
½"	150, 300, 600	5.24	4.13	7.05	0.63	1.77	2.56	10.43	5.67	7.72	9.04
1"	150, 300, 600	5.24	4.13	7.05	0.94	2.56	2.56	10.43	5.67	9.48	10.80
1½"	150, 300, 600	5.24	4.13	7.05	1.50	3.23	2.56	10.63	5.67	10.80	12.13
2"	150, 300, 600	5.24	4.13	7.05	1.97	4.02	2.56	10.83	5.67	13.23	14.55
3"	150, 300, 600	5.24	4.13	7.05	2.91	5.31	2.56	11.42	6.10	18.08	19.40
4"	150, 300, 600	5.24	4.13	7.05	3.82	6.22	2.56	12.20	6.46	20.94	22.27

Remote version**Flanged version**

DN	15	25	40	50	80	100	150	200	250	300
	½"	1"	1½"	2"	3 "	4 "	6"	8"	10"	12"
	a									
[mm]	248	248	253	258	273	293	308	333	353	378
[inch]	9.77	9.77	9.97	10.2	10.8	11.5	12.1	13.1	13.9	14.9

	b	c	d	e	f	g	h	j	k	l	m	n	p
[mm]	140	Ø106	310	219	140	120	100	Ø115	Ø9 (4x)	60	80	144	104
[inch]	5.52	Ø4.18	12.2	8.63	5.52	4.73	3.94	Ø4.53	Ø0.36 (4x)	2.36	3.15	5.67	4.09

Sandwich version

DN	15	25	40	50	80	100
	½"	1"	1½"	2"	3 "	4 "
	a					
[mm]	248	248	253	258	273	293
[inch]	9.77	9.77	9.97	10.2	10.8	11.5

	b	c	d	e	f	g	h	j	k	l	m	n	p
[mm]	140	Ø106	310	219	140	120	100	Ø115	Ø9 (4x)	60	80	144	104
[inch]	5.52	Ø4.18	12.2	8.63	5.52	4.73	3.94	Ø4.53	Ø0.36 (4x)	2.36	3.15	5.67	4.09

Flow Measurement

SITRANS F X

SITRANS FX300

Flow tables

Measuring Range Limits

Water

Size DN to EN 1092-1	DN to ANSI B16.5	Q _{min} EN 1092-1 [m³/h]	Q _{max} EN 1092-1 [m³/h]	Q _{min} ANSI B16.5 [m³/h]	Q _{max} ANSI B16.5 [m³/h]
15	½"	0.45	5.07	0.44	4.94
25	1"	0.81	11.40	0.81	11.40
40	1½"	2.04	28.58	2.04	28.58
50	2"	3.53	49.48	3.53	49.48
80	3"	7.74	108.37	7.74	108.37
100	4"	13.30	186.22	13.30	186.21
150	6"	30.13	421.86	30.13	421.86
200	8"	56.60	792.42	56.60	792.42
250	10"	90.48	1 266.8	90.48	1 266.8
300	12"	131.41	1 839.8	131.41	1 839.8

Values based on water at 20 °C (68 °F)

Air

Size DN to EN 1092-1	DN to ANSI B16.5	Q _{min} EN 1092-1 [m³/h]	Q _{max} EN 1092-1 [m³/h]	Q _{min} ANSI B16.5 [m³/h]	Q _{max} ANSI B16.5 [m³/h]
15	½"	6.80	25.33	6.72	24.70
25	1"	10.20	81.43	10.20	81.43
40	1½"	25.35	326.63	25.35	326.63
50	2"	43.89	565.49	43.89	565.49
80	3"	96.14	1 238.64	96.14	1 238.60
100	4"	165.19	2 128.27	165.19	2 128.27
150	6"	374.23	4 821.60	374.23	4 821.60
200	8"	702.95	9 056.8	702.95	9 056.8
250	10"	1 123.7	14 478.0	1 123.7	14 478.0
300	12"	1 632.1	21 028.0	1 632.1	21 028.0

Values based on air at 20 °C (68 °F) and 1.013 bar_{abs} (14.7 psi_{abs})

Flow rate limits

Product	Nominal diameters to EN	to ANSI	Minimum flow rates [m/s]	Maximum flow rates [m/s]
Liquids	DN 15 ... DN 300	DN ½"...DN 12"	$0.5 \times (998/\rho)^{0.5 \ 1)}$	$7 \times (998/\rho)^{0.47 \ 1)}$
Gas, steam/vapor	DN 15 ... DN 300	DN ½"...DN 12"	$6 \times (1.29/\rho)^{0.5 \ 2)}$	$7 \times (998/\rho)^{0.47 \ 3)}$

ρ = operating density [kg/m³]

¹⁾ Minimum flow rate 0.3 m/s (0.984 ft/s), maximum flow rate 7 m/s (23 ft/s)

²⁾ Minimum flow rate 2 m/s (6.6 ft/s)

³⁾ Maximum flow rate 80 m/s (262 ft/s); DN 15: 45 m/s (148 ft/s) and DN 25: 70 m/s (230 ft/s)

Measuring range saturated steam: 1 to 7 bar

Overpressure [bar]		1		3.5		5.2		7	
Density [kg/m³]		1.13498		2.4258		3.27653		4.16732	
Temperature [°C]		120.6		148.2		160.4		170.6	
Flow [kg/h]		min.	max.	min.	max.	min.	max.	min.	max.
DN to EN 1092-1	DN to ANSI B16.5								
15	½"	5.87	28.75	7.68	61.46	8.93	83.01	10.06	105.57
25	1"	11.82	92.42	17.28	197.53	20.09	266.81	22.66	339.35
40	1½"	29.64	370.71	43.33	792.33	50.63	1 070.2	56.8	1 361.2
50	2"	51.31	641.82	75.02	1 371.8	87.19	1 852.8	98.33	2 356.6
80	3"	112.41	1 405.8	164.33	3 004.7	191	4 058.4	215.39	5 161.8
100	4"	193.14	2 415.5	282.36	5 162.7	328.16	6 973.3	370.09	8 869.2
150	6"	437.56	5 472.4	639.69	11 696	743.45	15 798	838.44	20 093
200	8"	821.9	10 279.0	1 201.6	21 970.0	1 396.5	29 675.0	1 574.9	37 743
250	10"	1 313.9	16 433.0	1 920.9	35 122.0	2 232.5	47 439.0	2 517.7	60 337
300	12"	1 908.3	23 866.0	2 789.8	51 010.0	3 242.4	68 899.0	3 656.6	87 630

Measuring range saturated steam: 10.5 to 20 bar

Overpressure [bar]		10.5		14		17.5		20	
Density [kg/m³]		5.88803		7.60297		9.31702		10.5442	
Temperature [°C]		186.2		198.5		208.7		215	
Flow [kg/h]		min.	max.	min.	max.	min.	max.	min.	max.
DN to EN 1092-1	DN to ANSI B16.5								
15	½"	12.78	149.17	16.51	192.61	20.23	236.04	22.89	267.12
25	1"	26.93	479.46	30.6	619.11	33.87	758.69	36.04	858.62
40	1½"	67.51	1 878.2	76.72	2 150.7	84.93	2 395.3	90.35	2 557.7
50	2"	116.89	3 251.7	132.82	3 723.4	147.03	4 147	156.42	4 428.1
80	3"	256.03	7 122.4	290.93	8 155.8	322.06	9 083.7	342.62	9 699.3
100	4"	439.91	12 238	499.9	14 013	553.38	15 608	588.69	16 666
150	6"	996.62	27 725	1 132.5	31 747	1 253.7	35 359	1 333.7	37 756
200	8"	1 872.1	52 079	2 127.3	59 634	2 354.9	66 419	2 505.2	70 921
250	10"	2 992.7	83 254	3 400.7	95 333	3 764.6	106 180	4 004.9	113 380
300	12"	4 346.5	120 920	4 939.1	138 460	5 467.5	154 210	5 816.5	164 660

Flow Measurement

SITRANS F X

SITRANS FX300

Measuring range saturated steam: 15 to 100 psig

Overpressure [psig]		15		50		75		100	
Density [lb/ft³]		0.0719		0.1497		0.2036		0.2569	
Temperature [°F]		249.98		297.86		320.36		338.184	
Flow [lb/h]		min.	max.	min.	max.	min.	max.	min.	max.
DN to EN 1092-1	DN to ANSI B16.5								
15	½"	12.95	64.35	16.83	133.87	19.62	182.02	22.04	229.63
25	1"	26.25	206.83	37.86	430.3	44.15	585.06	49.59	738.09
40	1½"	65.81	829.61	94.92	1 726	110.68	2 346.7	124.32	2 960.5
50	2"	113.94	1 436.3	164.34	2 988	191.63	4 062.9	215.23	5 125.6
80	3"	249.57	3 146.1	360	6 545.3	419.74	8 899.4	471.45	11 227
100	4"	428.81	5 405.7	618.51	11 246	721.21	15 291	810.06	19 291
150	6"	971.47	12 246	1 401.2	25 478	1 633.9	34 642	1 835.2	43 703
200	8"	1 824.8	23 004	2 632.1	47 859	3 069.1	65 072	3 447.2	82 092
250	10"	2 917.2	36 774	4 207.7	76 508	4 906.4	104 030	5 510.8	131 230
300	12"	4 236.8	53 410	6 111.1	111 120	7 125.8	151 080	8 003.6	190 600

Measuring range saturated steam: 150 to 300 psig

Overpressure [psig]		150		200		250		300	
Density [lb/ft³]		0.3627		0.4681		0.5735		0.6792	
Temperature [°F]		366.08		388.04		406.22		422.06	
Flow [lb/h]		min.	max.	min.	max.	min.	max.	min.	max.
DN to EN 1092-1	DN to ANSI B16.5								
15	½"	27.79	324.21	35.86	418.47	43.94	512.66	52.04	607.12
25	1"	58.93	1 042.1	66.94	1 345.1	74.1	1 647.8	80.63	1 951.5
40	1½"	147.72	4 107.2	167.83	4 702.8	185.76	5 237	202.15	5 728
50	2"	255.75	7 111.9	290.56	8 141.9	321.6	9 066.8	350	9 917
80	3"	560.19	15 578	636.44	17 834	704.43	19 860	766.6	21 722
100	4"	962.54	26 766	1 093.5	30 643	1 210.4	34 124	1 317.2	37 324
150	6"	2 180.6	60 639	2 477.4	69 421	2 742.1	77 307	2 984	84 556
200	8"	4 096.1	113 900	4 653.6	130 400	5 150.7	145 210	5 605.2	158 830
250	10"	6 548.1	182 090	7 439.3	208 460	8 234.1	232 140	8 960.6	253 910
300	12"	9 510.2	264 460	10 805	302 760	11 959	337 150	13 014	368 770

Overview

SITRANS FX vortex flowmeters are designed for use in industrial applications and optimally suited to the demands in auxiliary supply systems.

The proven principle of vortex flowmeters is suitable for measurement of liquids, gases and vapors unaffected by conductivity, viscosity, temperature and pressure.

Benefits

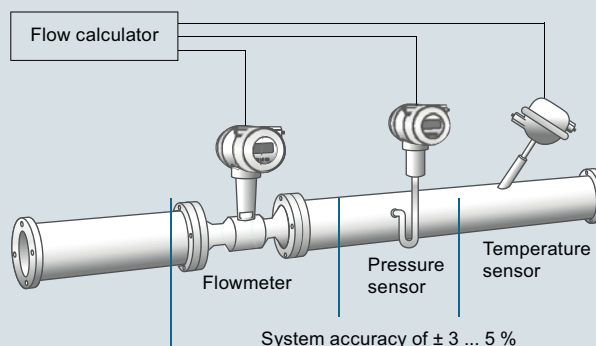
- Integrated pressure and temperature compensation
- Temperature compensation for saturated steam included as standard
- High measuring accuracy
- Maintenance-free sensor
- Non-wearing, fully welded stainless steel construction with high resistance to corrosion, pressure and temperature
- SIL2 certified according to IEC 61508 Edition 2
- Use in hazardous areas
- Integrated reduction of nominal diameter for space-saving and economic installation and large measuring ranges
- Redundant data management: Easy exchange of electronics without loss of calibration and configuration data
- FAD (Free Air Delivery) functionality
- Gross and net heat calculation to support advanced energy management
- Remote version with cable length up to 50 m (164 ft) (in preparation)

Even the basic version of the vortex flowmeter SITRANS FX330 is equipped with temperature compensation for saturated steam applications. With the optional pressure sensor the SITRANS FX330 has integrated density compensation for calculation of corrected volume and mass (online density compensation). The density compensation for calculation of corrected volume and mass is based on the standards of NIST for gases and IAPWS for steam.

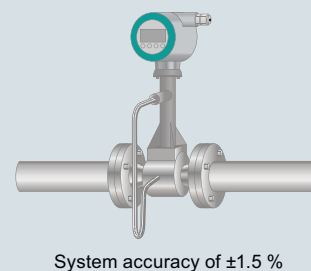
Higher measuring accuracy with the use of compact measuring systems

With the classic installation of a vortex flowmeter and separate pressure and temperature sensor as well as flow calculator, all errors occurring in the measuring chain must be taken into account when determining system accuracy. This can result in a measuring error between ± 3 to 5 %.

Using a vortex flowmeter with integrated pressure and temperature compensation such as the SITRANS FX330 allows you not only to lower installation costs but also increase the measuring accuracy of the measuring point. In this case the accuracy is ± 1.5 % of the measured value.

classic*integrated*

Flowmeter with integrated pressure and temperature compensation



The SITRANS FX330 in flanged design is available with integrated reduction of nominal diameter for space-saving installations and large measuring spans. About 90% of all vortex flowmeters are ordered one size smaller than the line diameter in order to increase the flow speed and to get a wider measuring range. Here, the line has to be reduced before and widened after the sensor, typically including 20x DN inlet and 5x DN outlet run. With the reduction and widening of nominal diameter included in the sensor, it is no longer necessary. To compensate the non-existent straight inlet run between reduction and the vortex bluff body, these devices are specially calibrated and linearized.

A new feature of the SITRANS FX330 is the advanced signal processing and filtering called AVFD (Advanced Vortex Frequency Detection): Interferences and disturbances in the measuring signal are suppressed, signals outside of the relevant frequency band are filtered out.

Redundant data management prevents loss of calibration and configuration data when changing electronics or display.

By default, all SITRANS FX330 meters are factory-calibrated (traceable to international standards) and pre-set according to customer specifications. The SITRANS FX330 also comes with an installation wizard to ease installation; e.g. in a steam application it will only show related settings.

Developed according to the standard IEC 61508 edition 2, the SITRANS FX330 can be used in safety-related application with classification SIL2 for continuous volume flow measurement.

Flow Measurement

SITRANS F X

SITRANS FX330

Application

- Measurement of saturated steam and superheated steam
- Steam boiler monitoring
- Heat metering of steam and hot water
- Measurement of consumption of industrial gases
- Measurement of consumption in compressed air systems
- Monitoring of compressor output
- Evaluation of Free Air Delivery (FAD)
- SIP and CIP processes in the food, beverage and pharmaceutical industries
- Measuring of conductive and non-conductive liquids
- Safety-related measurement in SIL applications (SIL2)

Gross and net heat quantity calculation

The SITRANS FX330 was designed for applications in auxiliary and supply service lines, such as internal monitoring of energy flows for saturated and superheated steam or hot water.

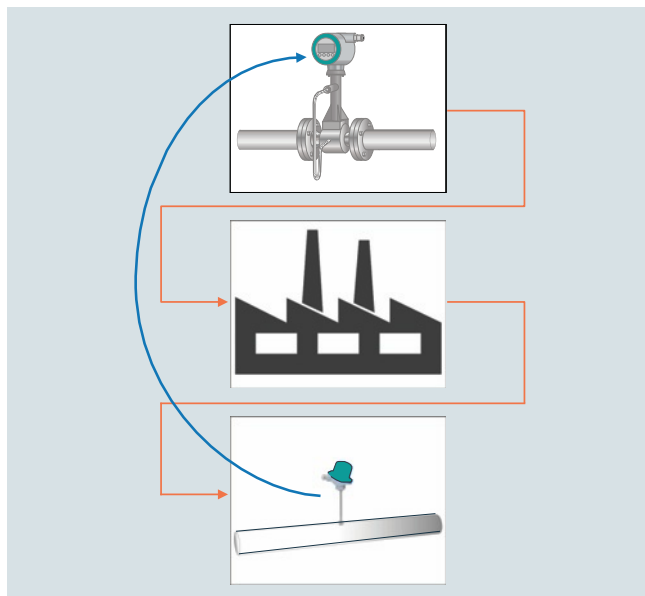
Equipped with temperature sensor as standard, the device can be installed as heat meter in the feed line directly connected with an external temperature sensor in the return line. The gross and net heat calculation can be fed into a DCS to support advanced energy management.

When it comes to energy, the most accurate measurement of consumption is essential. By combining flow, temperature and pressure measurements in one device, SITRANS FX330 provides the basis for a precise mass flow calculation.



In steam applications, the software even determines the enthalpy - the heat content - of the steam. Therefore, SITRANS FX330 is able to calculate the gross heat quantity.

In case net heat quantity consumption of process is asked for, a single temperature sensor can be added to the return line. SITRANS FX330 uses the readings to calculate the amount of heat consumed.

The SITRANS FX330 thereby proves itself to be a reliable partner.



Design

SITRANS FX330 Flange	SITRANS FX330 Sandwich
	
Flanged version with integrated temperature compensation as standard for saturated steam and optional pressure compensation for superheated steam, gases and wet gases.	All advantages of the flanged version in a space-saving sandwich design; centering rings guarantee an easy installation without any offset.
Integrated reduction of nominal diameter for space-saving and economic installations plus large measuring ranges.	Integrated reduction of nominal diameter not available
Also in remote design with field housing and connection cable up to 50 m/164 ft (in preparation)	

With shut-off valve allowing

- exchange and calibration of pressure sensor
- pressure and leak testing of pipeline without interrupting the process

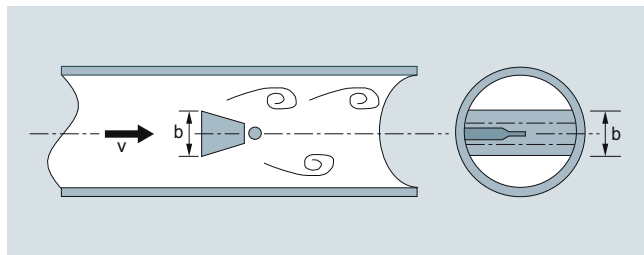
Function

Vortex flowmeters are used to measure the flow of gases, vapors and liquids in completely filled pipes. The measuring principle is based on the principle of the Karman vortex street. Inside the measuring sensor vortices are shed from a bluff body and are detected by a sensor located behind. The frequency f of the vortex shedding is proportional to the flow velocity v .

The nondimensional Strouhal number S describes the relationship between vortex frequency f , width b of the bluff body and the mean flow velocity v :

$$f = (S \cdot v) / b$$

The vortex frequency is recorded at the sensor and evaluated at the converter.



Functional principle

Technical data

Range of application	Flow measurement of liquids, gases and vapors	
Mode of operation		
Measuring principle	Karman vortex street	
Primary measured value	<ul style="list-style-type: none"> • Volume flow • Mass flow • Corrected volume flow • Density • Temperature • Pressure • Heat energy 	
Design		
Transmitter		
• Compact and remote version	Cable length up to 50 m (164 ft) (in preparation)	
Sensor	Flanged version	Sandwich version
• Integrated temperature measurement	•	•
• Reduction of nominal diameter	•	•
• Pressure and temperature compensation	•	•
• Isolation valve	•	•
• Dual measuring device	•	•
Display	4-line graphical display (backlit) with control keys	
Operation	<ul style="list-style-type: none"> • Via local display (languages: German, English, French) • Via SIMATIC PDM 	
Accuracy		
Volume flow		
• Liquids		
- $Re \geq 20\,000$	$\pm 0.75\%$ of measured value	
- $10\,000 < Re < 20\,000$	$\pm 2.0\%$ of measured value	
• Gases and vapors		
- $Re \geq 20\,000$	$\pm 1.0\%$ of measured value	
- $10\,000 < Re < 20\,000$	$\pm 2.0\%$ of measured value	
Mass flow/Corrected volume flow		
• Gases and vapors		
- $Re \geq 20\,000$	$\pm 1.5\%$ of measured value	
- $10\,000 < Re < 20\,000$	$\pm 2.5\%$ of measured value	
Mass flow		
• Liquids/water		
- $Re \geq 20\,000$	$\pm 1.5\%$ of measured value	
- $10\,000 < Re < 20\,000$	$\pm 2.5\%$ of measured value	
Repeatability (Volume flow)	$\pm 0.1\%$ of measured value	

Operating conditions

Temperature ratings	
• Medium	-40 ... +240 °C (-40 ... +465 °F)
• Ambient	
- Non-Ex	-40 ... +85 °C (-40 ... +185 °F)
- Ex	-40 ... +65 °C (-40 ... +140 °F)
• Storage	-50 ... +85 °C (-58 ... +185 °F)
Pressure ratings	Max. 100 bar (1450 psi), higher pressure rates on request
Max. allowable test pressure	
• With integrated pressure sensor and isolation valve (closed)	1.5 x PN
• With integrated pressure sensor and without isolation valve	2 times the measuring range of pressure sensor
Process medium	
• Density	Taken into consideration when sizing
• Viscosity	< 10 cP
• Reynold's number	> 10000
Recommended flow velocities	
• Liquids	0.3 ... 7 m/s (0.98 ... 23 ft/s)
• Gases and vapors	2.0 ... 80 m/s (6.6 ... 262.5 ft/s)
DN 15:	3.0 ... 45 m/s (9.8 ... 148 ft/s)
DN 25:	2.0 ... 70 m/s (6.6 ... 230 ft/s)
	For detailed information see operating instructions "Intended use"

Installation conditions

Inlet run	
• For undisturbed flow profile, after pipe section with reducer, after 1 x 90° pipe bend	$\geq 15 \times DN$
• After 2 x 90° pipe bend	$\geq 30 \times DN$
• After 2 x 90° three-dimensional pipe bend	$\geq 40 \times DN$
• After control valves	$\geq 50 \times DN$
• Before flow conditioner	$\geq 2 \times DN$
• After flow conditioner	$\geq 8 \times DN$
Outlet run	$\geq 5 \times DN$

Material

Sensor and process connections	
• Standard	1.4404/316L
• Option	Hastelloy C22 (on request)
Transmitter housing	
• Standard	Aluminum die-cast, two-layer coating (epoxy/polyester)
• Option	Die-cast aluminum with finish for advanced requirements
Pressure sensor gasket	
• Standard	FPM
• Option	FFKM
Sensor gasket (Pick-up)	
• Standard	1.4435/316L
• Option	Hastelloy C276

Process connections

DIN EN 1092-1	DN 15 ... DN 300/PN 16 ... PN 100
ANSI B16.5	½" ... 12"/150 ... 600 lb
	For valid combinations of connection size and pressure rating see table "Sensor variants"

Flow Measurement

SITRANS F X

SITRANS FX330

Enclosure rating	
Standard	Compact and remote version: IP66/IP67
Option	Remote version: IP66/IP68 for sensor
Power supply	
Non-Ex version	12 ... 36 V DC
Ex version	12 ... 30 V DC
Inputs/Outputs	
Current output	4 ... 20 mA, HART
Binary output	Pulse/Frequency/Status/Limit switch
Current input	4 ... 20 mA, passive
Communication	
HART 7	
Calibration	
Standard calibration	3-point calibration: 3 x 15 %, 3 x 50 %, 3 x 80 %
Special calibration	5-point calibration: 3 x 15 %, 3 x 30 %, 3 x 50 %, 3 x 60 %, 3 x 80 %
Certificates and approvals	
Ex approvals	ATEX, QPS, IECEx
CE declaration of conformity	PED 2014/68/EU EMC 2014/30/EU
Safety integration level (SIL)	SIL2 according to IEC 61508

Available combinations of sensor and connection size for SITRANS FX330 in flanged design are shown in the table below.

Sensor size	Connection size	EN 1092-1, Form B1/B2, PN 10	EN 1092-1, Form B1/B2, PN 16	EN 1092-1, Form B1/B2, PN 25	EN 1092-1, Form B1/B2, PN 40	EN 1092-1, Form B1/B2, PN 63	EN 1092-1, Form B1/B2, PN 100	ANSI B16.5, Class 150	ANSI B16.5, Class 300	ANSI B16.5, Class 600
SITRANS FX330 Flanged (7ME2610-...)										
DN 15	DN 15	-	-	-	●	-	●	●	●	●
	DN 25	-	-	-	●	-	●	●	●	●
	DN 40	-	-	-	●	-	●	●	●	●
DN 25	DN 25	-	-	-	●	-	●	●	●	●
	DN 40	-	-	-	●	-	●	●	●	●
	DN 50	-	●	-	●	●	●	●	●	●
DN 40	DN 40	-	-	-	●	-	●	●	●	●
	DN 50	-	●	-	●	●	●	●	●	●
	DN 80	-	●	-	●	●	●	●	●	●
DN 50	DN 50	-	●	-	●	●	●	●	●	●
	DN 80	-	●	-	●	●	●	●	●	●
	DN 100	-	●	-	●	●	●	●	●	●
DN 80	DN 80	-	●	-	●	●	●	●	●	●
	DN 100	-	●	-	●	●	●	●	●	●
	DN 150	-	●	-	●	●	●	●	●	●
DN 100	DN 100	-	●	-	●	●	●	●	●	●
	DN 150	-	●	-	●	●	●	●	●	●
	DN 200	●	●	●	●	-	-	●	●	-
DN 150	DN 150	-	●	-	●	●	●	●	●	●
	DN 200	●	●	●	●	-	-	●	●	-
	DN 250	●	●	●	●	-	-	●	●	-
DN 200	DN 200	●	●	●	●	-	-	●	●	-
	DN 250	●	●	●	●	-	-	●	●	-
	DN 300	●	●	●	●	-	-	●	●	-
DN 250	DN 250	●	●	●	●	-	-	●	●	-
	DN 300	●	●	●	●	-	-	●	●	-
DN 300	DN 300	●	●	●	●	-	-	●	●	-

● available
- not available

Flow Measurement

SITRANS F X

SITRANS FX330

Selection and Ordering data		Article No.	Ord. code
SITRANS FX330 Flanged			
• Not approved for SIL2 safety applications		7 ME 2 6 1 0 -	
• Approved for SIL2 safety applications		7 ME 2 6 1 1 -	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Sensor size	Connection size		
DN 15 (½")	DN 15 (½")	1 A	
	DN 25 (1")	1 B	
	DN 40 (1½")	1 C	
DN 25 (1")	DN 25 (1")	2 B	
	DN 40 (1½")	2 C	
	DN 50 (2")	2 D	
DN 40 (1½")	DN 40 (1½")	2 K	
	DN 50 (2")	2 L	
	DN 80 (3")	2 M	
DN 50 (2")	DN 50 (2")	2 R	
	DN 80 (3")	2 S	
	DN 100 (4")	2 T	
DN 80 (3")	DN 80 (3")	3 L	
	DN 100 (4")	3 M	
	DN 150 (6")	3 R	
DN 100 (4")	DN 100 (4")	3 S	
	DN 150 (6")	3 T	
	DN 200 (8")	3 Q	
DN 150 (6")	DN 150 (6")	4 M	
	DN 200 (8")	4 P	
	DN 250 (10")	4 Q	
DN 200 (8")	DN 200 (8")	4 T	
	DN 250 (10")	4 U	
	DN 300 (12")	4 V	
DN 250 (10")	DN 250 (10")	4 W	
	DN 300 (12")	4 Y	
DN 300 (12")	DN 300 (12")	5 E	
Process connection and pressure rate			
EN 1092-1 Form B1			
PN 10	DN 200 ... 300	A	
PN 16	DN 50 ... 300	B	
PN 25	DN 200 ... 300	C	
PN 40	DN 15 ... 300	D	
PN 63	DN 50 ... 150	E	
PN 100	DN 15 ... 150	F	
ANSI B16.5 RF			
Class 150	½ ... 12"	J	
Class 300	½ ... 12"	K	
Class 600	½ ... 6"	L	
System design			
Compact version	No cable	0	
Remote version	Cable length with	1	
(in preparation)	Order code L..		
Transmitter housing			
Aluminum		0	
Aluminum, silicon free		1	
Dual version, aluminum		6	
Dual version, aluminum, silicon free		7	

Selection and Ordering data		Article No.	Ord. code
SITRANS FX330 Flanged			
• Not approved for SIL2 safety applications		7 ME 2 6 1 0 -	
• Approved for SIL2 safety applications		7 ME 2 6 1 1 -	
Communication			
HART		0	
PROFIBUS PA (in preparation)		1	
FOUNDATION Fieldbus (in preparation)		2	
Ex approval			
Without Ex approval		A	
ATEX II2 G Ex ia		B	
ATEX II2 G Ex d		C	
ATEX II3 G Ex nA		D	
ATEX II2 D Ex tb		E	
QPS IS Class I Div.1		F	
QPS XP Class I Div.1		G	
QPS NI Class I Div. 2		H	
QPS DIP Class I, III Div. 1		J	
IECEX II2 G Ex ia		K	
IECEX II2 G Ex d		L	
IECEX II3 G Ex nA		M	
IECEX II2 D Ex tb		N	
Pressure sensor and gasket material			
Without pressure sensor		A	
With pressure sensor and gasket material			
FPM (Viton), Range:			
1 bar (14.5 psi)		B	
2 bar (29 psi)		C	
4 bar (58 psi)		D	
6 bar (87 psi)		E	
10 bar (145 psi)		F	
16 bar (232 psi)		G	
25 bar (363 psi)		H	
40 bar (580 psi)		J	
60 bar (870 psi)		K	
100 bar (1450 psi)		L	
With pressure sensor and gasket material			
FFKM (Kalrez), Range:			
1 bar (14.5 psi)		M	
2 bar (29 psi)		N	
4 bar (58 psi)		P	
6 bar (87 psi)		Q	
10 bar (145 psi)		R	
16 bar (232 psi)		S	
25 bar (363 psi)		T	
40 bar (580 psi)		U	
60 bar (870 psi)		V	
100 bar (1450 psi)		W	
Software version			
Standard - Uncompensated for gases, steam and liquids including temperature compensation for saturated steam		0	
Standard + Heat meter for saturated steam and water		1	
Density compensation for steam + Heat meter for saturated and superheated steam		2	
Density compensation for gases, wet gases and mixed gases + FAD		3	

Selection and Ordering data	Order code
Additional information Please add “-Z” to Article No. and specify as minimum Order code Y40, Y41, Y42 and Y45 and plain text.	
Application data	
Medium: Specify medium (Liquid, gas, steam or customer-specific)	Y40
Temperature: Specify operating temperature with unit	Y41
Pressure: Specify operating pressure with unit	Y42
Density (only for customer-specified medium): Specify density with unit	Y43
Viscosity (only for customer-specified medium): Specify viscosity with unit	Y44
Flow rate: Specify max. flow rate with units	Y45
Pulse output setting: Specify pulse value (1 pulse/unit)	Y47

Operating instruction

Description	Article No.
English	A5E2100423
All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation	

Selection and Ordering data	Order code
Further designs Please add “-Z” to Article No. and specify Order code.	
Cable connection	
Without cable glands	A01
M20x1.5 cable glands made of plastic, grey	A02
• 3 pcs.	A12
• 2 pcs.	A22
• 1 pc.	
M20x1.5 cable glands made of plastic, blue	A03
• 3 pcs.	A13
• 2 pcs.	A23
• 1 pc.	
M20x1.5 cable glands made of brass, Ex-d/t approved	A04
• 3 pcs.	A14
• 2 pcs.	A24
• 1 pc.	
M20x1.5 cable glands made of brass, Ex-nA approved	A05
• 3 pcs.	A15
• 2 pcs.	A25
• 1 pc.	
M20x1.5 cable glands in stainless steel, Ex-d/t approved	A06
• 3 pcs.	A16
• 2 pcs.	A26
• 1 pc.	
1/2" NPT conduit connection in plastic (cable glands not included)	A07
• 3 pcs.	A17
• 2 pcs.	A27
• 1 pc.	

Selection and Ordering data	Order code
Isolation valve	
With isolation valve	B10
Certificates	
Certificate of compliance according to EN 10204-2.1	C10
Pressure test + Inspection certificate according to EN 10204-3.1	C11
Material certification of pressure bearing metal parts according to EN 10204-3.1	C12
Material in accordance with NACE MR0175/ISO 15156	C13
PMI of pressure bearing metal parts + Inspection certificate according to EN 10204-3.1	C14
Material certificate of pressure bearing metal parts according to EN 10204-3.1 + PMI	C15
Dye penetration test of wetted welds	C16
X-ray test of wetted welds	C17
Calibration	
5-point calibration with certificate	D11
Cleaning	
Free of oil and grease (wetted parts)	K46
Free of oil and grease (wetted parts) + Inspection certificate according to EN 10204-3.1	K48
Cable length for remote version (in preparation)	
5 m (16 ft)	L01
10 m (32 ft)	L02
15 m (49 ft)	L03
20 m (65 ft)	L04
25 m (82 ft)	L05
30 m (98 ft)	L06
35 m (114 ft)	L07
40 m (131 ft)	L08
45 m (147 ft)	L09
50 m (164 ft)	L10
Tag name plate	
TAG name plate in stainless steel 40 x 20mm (Add plain text)	Y17
TAG name plate in stainless steel tag 120 x 46 mm (Add plain text)	Y18

Flow Measurement

SITRANS F X

SITRANS FX330

Selection and Ordering data		Article No.	Ord. code
SITRANS FX330 Sandwich			
• Not approved for SIL2 safety applications		7 ME 2 7 1 0 -	
• Approved for SIL2 safety applications		7 ME 2 7 1 1 -	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Sensor size			
DN 15 (½")		1 A	
DN 25 (1")		2 B	
DN 40 (1½")		2 K	
DN 50 (2")		2 R	
DN 80 (3")		3 L	
DN 100 (4")		3 S	
Pressure rating			
EN 1092-1			
PN 16	DN 15 ... 100	B	
PN 25	DN 15 ... 100	C	
PN 40	DN 15 ... 100	D	
PN 63	DN 15 ... 100	E	
PN 100	DN 15 ... 100	F	
ANSI B16.5			
Class 150	½ ... 4"	J	
Class 300	½ ... 4"	K	
Class 600	½ ... 4"	L	
System design			
Compact version	No cable	0	
Remote version (in preparation)	Cable length with Order code L...	1	
Transmitter housing			
Aluminum		0	
Aluminum, silicon free		1	

Selection and Ordering data		Article No.	Ord. code
SITRANS FX330 Sandwich			
• Not approved for SIL2 safety applications		7 ME 2 7 1 0 -	
• Approved for SIL2 safety applications		7 ME 2 7 1 1 -	
Communication			
HART		0	
PROFIBUS PA (in preparation)		1	
FOUNDATION Fieldbus (in preparation)		2	
Ex approval			
Without Ex approval			
ATEX II2 G Ex ia		A	
ATEX II2 G Ex d		B	
ATEX II3 G Ex nA		C	
ATEX II2 D Ex tb		D	
QPS IS Class I Div.1		E	
QPS XP Class I Div.1		F	
QPS NI Class I Div. 2		G	
QPS DIP Class I, III Div. 1		H	
IECEX II2 G Ex ia		J	
IECEX II2 G Ex d		K	
IECEX II3 G Ex nA		L	
IECEX II2 D Ex tb		M	
Pressure sensor and gasket material			
Without pressure sensor			
With pressure sensor and gasket material		A	
FPM (Viton), Range:			
1 bar (14.5 psi)		B	
2 bar (29 psi)		C	
4 bar (58 psi)		D	
6 bar (87 psi)		E	
10 bar (145 psi)		F	
16 bar (232 psi)		G	
25 bar (363 psi)		H	
40 bar (580 psi)		J	
60 bar (870 psi)		K	
100 bar (1450 psi)		L	
With pressure sensor and gasket material			
FFKM (Kalrez), Range:			
1 bar (14.5 psi)		M	
2 bar (29 psi)		N	
4 bar (58 psi)		P	
6 bar (87 psi)		Q	
10 bar (145 psi)		R	
16 bar (232 psi)		S	
25 bar (363 psi)		T	
40 bar (580 psi)		U	
60 bar (870 psi)		V	
100 bar (1450 psi)		W	
Software version			
Standard - Uncompensated for gases, steam and liquids including temperature compensation for saturated steam		0	
Standard + Heat meter for saturated steam and water		1	
Density compensation for steam + Heat meter for saturated and superheated steam		2	
Density compensation for gases, wet gases and mixed gases + FAD		3	

Selection and Ordering data	Order code
Additional information Please add “-Z” to Article No. and specify as minimum Order code Y40, Y41, Y42 and Y45 and plain text.	
Application data	
Medium: Specify medium (Liquid, gas, steam or customer-specific)	Y40
Temperature: Specify operating temperature with unit	Y41
Pressure: Specify operating pressure with unit	Y42
Density (only for customer-specified medium): Specify density with unit	Y43
Viscosity (only for customer-specified medium): Specify viscosity with unit	Y44
Flow rate: Specify max. flow rate with units	Y45
Pulse output setting: Specify pulse value (1 pulse/unit)	Y47

Operating instruction

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English	A5E2100423
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Selection and Ordering data	Order code
Further designs Please add “-Z” to Article No. and specify Order code.	
Cable connection	
Without cable glands	A01
M20x1.5 cable glands made of plastic, grey	
• 3 pcs.	A02
• 2 pcs.	A12
• 1 pc.	A22
M20x1.5 cable glands made of plastic, blue	
• 3 pcs.	A03
• 2 pcs.	A13
• 1 pc.	A23
M20x1.5 cable glands made of brass, Ex-d/t approved	
• 3 pcs.	A04
• 2 pcs.	A14
• 1 pc.	A24
M20x1.5 cable glands made of brass, Ex-nA approved	
• 3 pcs.	A05
• 2 pcs.	A15
• 1 pc.	A25
M20x1.5 cable glands in stainless steel, Ex-d/t approved	
• 3 pcs.	A06
• 2 pcs.	A16
• 1 pc.	A26
1/2" NPT conduit connection in plastic (cable glands not included)	
• 3 pcs.	A07
• 2 pcs.	A17
• 1 pc.	A27

Selection and Ordering data	Order code
Isolation valve	
With isolation valve	B10
Certificates	
Certificate of compliance according to EN 10204-2.1	C10
Pressure test + Inspection certificate according to EN 10204-3.1	C11
Material certification of pressure bearing metal parts according to EN 10204-3.1	C12
Material in accordance with NACE MR0175/ISO 15156	C13
PMI of pressure bearing metal parts + Inspection certificate according to EN 10204-3.1	C14
Material certificate of pressure bearing metal parts according to EN 10204-3.1 + PMI	C15
Dye penetration test of wetted welds	C16
X-ray test of wetted welds	C17
Calibration	
5-point calibration with certificate	D11
Cleaning	
Free of oil and grease (wetted parts)	K46
Free of oil and grease (wetted parts) + Inspection certificate according to EN 10204-3.1	K48
Cable length for remote version (in preparation)	
5 m (16 ft)	L01
10 m (32 ft)	L02
15 m (49 ft)	L03
20 m (65 ft)	L04
25 m (82 ft)	L05
30 m (98 ft)	L06
35 m (114 ft)	L07
40 m (131 ft)	L08
45 m (147 ft)	L09
50 m (164 ft)	L10
Tag name plate	
TAG name plate in stainless steel 40 x 20mm (Add plain text)	Y17
TAG name plate in stainless steel tag 120 x 46 mm (Add plain text)	Y18

Flow Measurement

SITRANS F X

SITRANS FX330

SITRANS FX330 spare parts

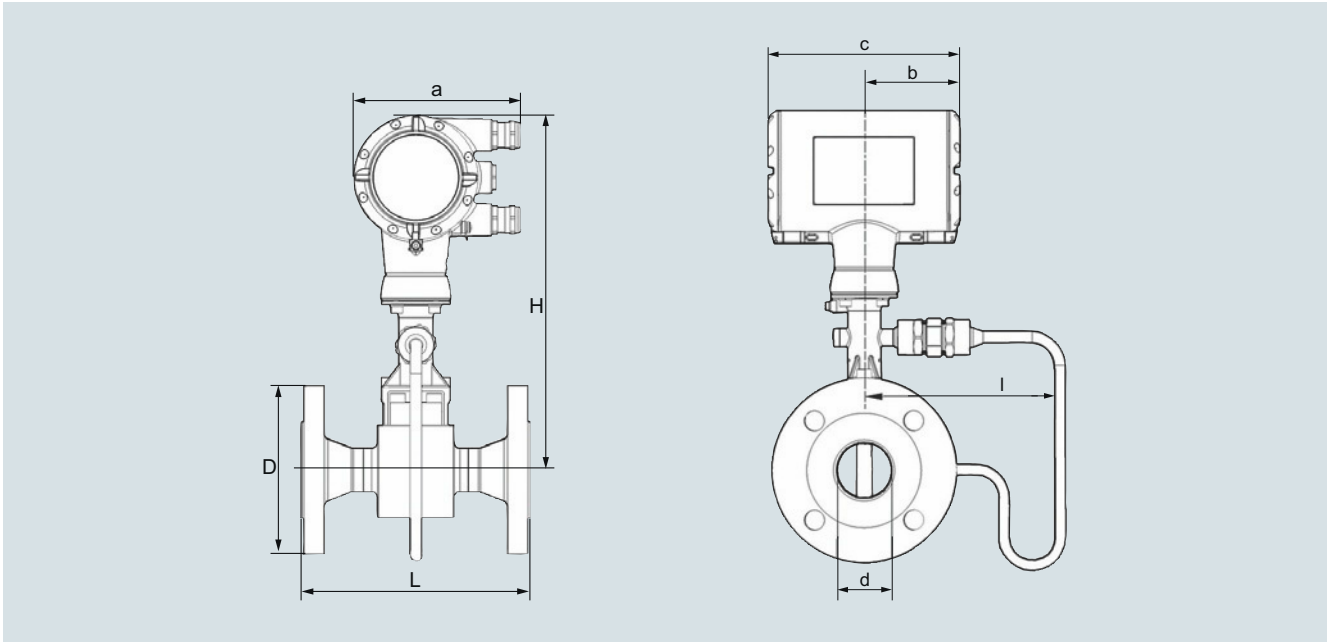
Description	Article No.
Transmitter electronic for SITRANS FX330	
• FXT030 in compact design with HART (non-Ex/Ex-i)	A5E38663070
• FXT030 in compact design with HART (Ex-d)	A5E38663398
• FXT030 in remote design with HART (non-Ex/Ex-i)	A5E38663422
• FXT030 in remote design with HART (Ex-d)	A5E38663454
Sensor electronic for SITRANS FX330 in remote design (non-Ex/Ex-i/Ex-d)	A5E38663481
Display lid (non Ex) in painted aluminum with O-ring seal	A5E38663502
Display lid (Ex) in painted aluminum with O-ring seal	A5E38663517
Blind lid in painted aluminum with O-ring seal	A5E38663529
Display with HMI and data memory	A5E38663613
Sensor cable, grey (non-Ex)	
• 5 m (16 ft)	A5E38663641
• 10 m (32 ft)	A5E38663753
• 15 m (49 ft)	A5E38663838
• 20 m (65 ft)	A5E38663871
• 25 m (82 ft)	A5E38663887
• 30 m (98 ft)	A5E38663900
• 40 m (131 ft)	A5E38663912
• 50 m (164 ft)	A5E38663947
Sensor cable, blue (Ex)	
• 5 m (16 ft)	A5E38664060
• 10 m (32 ft)	A5E38664087
• 15 m (49 ft)	A5E38667790
• 20 m (65 ft)	A5E38667850
• 25 m (82 ft)	A5E38668087
• 30 m (98 ft)	A5E38668128
• 40 m (131 ft)	A5E38668158
• 50 m (164 ft)	A5E38668945
Sensor replacement kit including seal disc, socket, pickup and O-rings (for pickup and pressure screw)	
• DN 15	A5E38669012
• DN 25	A5E38669021
• DN 40 ... DN 100	A5E38669057
• DN 150 ... DN 300	A5E38669134
Pressure sensor replacement kit including pressure sensor with calibration certificate, DUBOX plug and O-rings	
• 1 bar	A5E38669157
• 2 bar	A5E38669183
• 4 bar	A5E38669194
• 6 bar	A5E02181175
• 10 bar	A5E02181180
• 16 bar	A5E02181221
• 25 bar	A5E02181307
• 40 bar	A5E02181316
• 60 bar	A5E02181322
• 100 bar	A5E02181437

Description	Article No.
SITRANS FX300 upgrade kit (transmitter housing included) ¹⁾	
• FXT030 in compact design with HART (non-Ex/Ex-i)	A5E38669219
• FXT030 in compact design with HART (Ex-d)	A5E38669227
• FXT030 in remote design with HART (non-Ex/Ex-i)	A5E38669236
• FXT030 in remote design with HART (Ex-d)	A5E38669287

¹⁾ Please specify serial number of FX300 when placing order.

Selection and Ordering data	Article No.	Ord. code
SITRANS FX330 Flow Straightener	7ME2900-	00
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Material		
Stainless steel 1.4404 (316L)		1
Nominal diameter		
DN 15 / ANSI ½"		A
DN 25 / ANSI 1"		B
DN 40 / ANSI 1½"		C
DN 50 / ANSI 2"		D
DN 80 / ANSI 3"		E
DN 100 / ANSI 4"		F
DN 150 / ANSI 6"		G
DN 200 / ANSI 8"		H
DN 250 / ANSI 10"		J
DN 300 / ANSI 12"		K
Pressure rating		
PN 10		A
PN 16		B
PN 25		C
PN 40		D
PN 63		E
PN 100		F
Class 150		J
Class 300		K
Class 600		L

Selection and Ordering data	Order code
Additional information	
Please add "-Z" to Article No. and specify Order code.	
Certificates	
Certificate of compliance to EN 10204-2.1	C10
Material certification of pressure bearing parts to EN 10204-3.1	C12
Material in accordance with NACE MR0175/ISO 15156	C13
PMI of pressure bearing parts + Inspection certificate according to EN 10204-3.1	C14
Material certificate of pressure bearing parts according to EN 10204-3.1 + PMI	C15
Cleaning	
Free of oil and grease (wetted parts)	K46
Free of oil and grease (wetted parts) + Inspection certificate according to EN 10204-3.1	K48

Dimensional drawingsCompact version

Flanged version with pressure sensor

Flow Measurement

SITRANS F X

SITRANS FX330

Flanged version EN 1092-1

Size ¹⁾ Pres- sure rating		Dimensions [mm (inch)] a = 148.5 (5.85), b = 85.8 (3.38), c = 171.5 (6.76)							Weight [kg (lb)]	
DN	PN	d	d FR ¹⁾	d F2R ²⁾	D	L	H	I	Flowmeter (without pres- sure sensor)	Flowmeter (with pres- sure sensor)
15	40	17.3 (0.68)	-	-	95 (3.74)	200 (7.87)	358.8 (14.2)	169.3 (6.67)	5.5 (12.13)	6.1 (13.45)
15	100	17.3 (0.68)	-	-	105 (4.13)	200 (7.87)	358.8 (14.2)	169.3 (6.67)	6.5 (14.33)	7.1 (15.65)
25	40	28.5 (1.12)	17.3 (0.68)	-	115 (4.53)	200 (7.87)	358.4 (14.1)	169.3 (6.67)	7.3 (16.09)	7.9 (17.42)
25	100	28.5 (1.12)	17.3 (0.68)	-	140 (5.51)	200 (7.87)	358.4 (14.1)	169.3 (6.67)	9.3 (20.50)	9.9 (21.83)
40	40	43.1 (1.70)	28.5 (1.12)	17.3 (0.68)	150 (5.91)	200 (7.87)	362.3 (14.3)	169.5 (6.67)	10.2 (22.49)	10.8 (23.81)
40	100	42.5 (1.67)	28.5 (1.12)	17.3 (0.68)	170 (6.69)	200 (7.87)	362.3 (14.3)	169.5 (6.67)	14.2 (31.31)	14.8 (32.63)
50	16	54.5 (2.15)	42.5 (1.67)	28.5 (1.12)	165 (6.50)	200 (7.87)	368.3 (14.5)	169.3 (6.67)	12.1 (26.68)	12.7 (28.00)
50	40	54.5 (2.15)	42.5 (1.67)	28.5 (1.12)	165 (6.50)	200 (7.87)	368.3 (14.5)	169.3 (6.67)	12.3 (27.12)	12.9 (28.44)
50	63	54.5 (2.15)	42.5 (1.67)	28.5 (1.12)	180 (7.09)	200 (7.87)	368.3 (14.5)	169.3 (6.67)	16.3 (35.94)	16.9 (37.26)
50	100	53.9 (2.12)	42.5 (1.67)	28.5 (1.12)	195 (7.68)	200 (7.87)	368.3 (14.5)	169.3 (6.67)	17.8 (39.24)	18.4 (40.57)
80	16	82.5 (3.25)	54.5 (2.15)	42.5 (1.67)	200 (7.87)	200 (7.87)	380.3 (15.0)	169.3 (6.67)	16.8 (37.04)	17.4 (38.36)
80	40	82.5 (3.25)	54.5 (2.15)	42.5 (1.67)	200 (7.87)	200 (7.87)	380.3 (15.0)	169.3 (6.67)	18.8 (41.45)	19.4 (42.77)
80	63	81.7 (3.22)	54.5 (2.15)	42.5 (1.67)	215 (8.46)	200 (7.87)	380.3 (15.0)	169.3 (6.67)	22.8 (50.27)	23.4 (51.59)
80	100	80.9 (3.19)	54.5 (2.15)	42.5 (1.67)	230 (9.06)	200 (7.87)	380.3 (15.0)	169.3 (6.67)	26.8 (59.08)	27.4 (60.41)
100	16	107 (4.21)	80.9 (3.19)	54.5 (2.15)	220 (8.66)	250 (9.84)	396.8 (15.7)	171.5 (6.75)	21.4 (47.18)	22 (48.50)
100	40	107 (4.21)	80.9 (3.19)	54.5 (2.15)	235 (9.25)	250 (9.84)	396.8 (15.7)	171.5 (6.75)	24.4 (53.79)	25 (55.12)
100	63	106 (4.17)	80.9 (3.19)	54.5 (2.15)	250 (9.84)	250 (9.84)	396.8 (15.7)	171.5 (6.75)	29.4 (64.82)	30 (66.14)
100	100	104 (4.09)	80.9 (3.19)	54.5 (2.15)	265 (10.43)	250 (9.84)	396.8 (15.7)	171.5 (6.75)	35.4 (78.04)	36 (79.37)
150	16	159 (6.26)	107 (4.21)	80.9 (3.19)	285 (11.22)	300 (11.81)	416.3 (16.4)	191.5 (7.54)	35.2 (77.60)	35.8 (78.93)
150	40	159 (6.26)	107 (4.21)	80.9 (3.19)	300 (11.81)	300 (11.81)	416.3 (16.4)	191.5 (7.54)	41.2 (90.83)	41.8 (92.15)
150	63	157 (6.18)	107 (4.21)	80.9 (3.19)	345 (13.58)	300 (11.81)	416.3 (16.4)	191.5 (7.54)	59.2 (130.51)	59.8 (131.84)
150	100	154 (6.06)	107 (4.21)	80.9 (3.19)	355 (13.98)	300 (11.81)	416.3 (16.4)	191.5 (7.54)	67.2 (148.15)	67.8 (149.47)
200	10	207 (8.15)	159 (6.26)	107 (4.21)	340 (13.39)	300 (11.81)	442.1 (17.4)	202.8 (7.98)	37.8 (83.33)	38.4 (84.66)
200	16	207 (8.15)	159 (6.26)	107 (4.21)	340 (13.39)	300 (11.81)	442.1 (17.4)	202.8 (7.98)	37.8 (83.33)	38.4 (84.66)
200	25	207 (8.15)	159 (6.26)	107 (4.21)	360 (14.17)	300 (11.81)	442.1 (17.4)	202.8 (7.98)	46.8 (103.18)	47.4 (104.50)
200	40	207 (8.15)	159 (6.26)	107 (4.21)	375 (14.76)	300 (11.81)	442.1 (17.4)	202.8 (7.98)	54.8 (120.81)	55.4 (122.14)
250	10	260 (10.24)	207 (8.15)	159 (6.26)	395 (15.55)	380 (14.96)	468.8 (18.5)	229.5 (9.04)	57.4 (126.55)	58.0 (127.87)
250	16	260 (10.24)	207 (8.15)	159 (6.26)	405 (15.94)	380 (14.96)	468.8 (18.5)	229.5 (9.04)	58.4 (128.75)	59.0 (130.07)
250	25	259 (10.20)	207 (8.15)	159 (6.26)	425 (16.73)	380 (14.96)	468.8 (18.5)	229.5 (9.04)	74.4 (164.02)	75.0 (165.35)
250	40	259 (10.20)	207 (8.15)	159 (6.26)	450 (17.72)	380 (14.96)	468.8 (18.5)	229.5 (9.04)	92.4 (203.71)	93.0 (205.03)
300	10	310 (12.20)	260 (10.24)	207 (8.15)	445 (17.52)	450 (17.72)	492.8 (19.4)	255 (10.04)	75.7 (166.89)	76.3 (168.21)
300	16	310 (12.20)	260 (10.24)	207 (8.15)	460 (18.11)	450 (17.72)	492.8 (19.4)	255 (10.04)	82.2 (181.22)	82.8 (182.54)
300	25	308 (12.13)	260 (10.24)	207 (8.15)	485 (19.09)	450 (17.72)	492.8 (19.4)	255 (10.04)	98.7 (217.60)	99.3 (218.92)
300	40	308 (12.13)	260 (10.24)	207 (8.15)	515 (20.28)	450 (17.72)	492.8 (19.4)	255 (10.04)	127.5 (281.09)	128.1 (282.41)

FR - single reduction

²⁾ F2R - double reduction

Flanged version ANSI B16.5

Size DN	Pres- sure rating Class	Dimensions [mm (inch)] a = 148.5 (5.85), b = 85.8 (3.38), c = 171.5 (6.76)							Weight [kg (lb)]	
		d	d FR ¹⁾	d F2R ²⁾	D	L	H	I	Flowmeter (without pres- sure sensor)	Flowmeter (with pres- sure sensor)
½	150	16 (0.63)	-	-	90 (3.5)	200 (7.9)	358.8 (14.2)	169.3 (6.67)	4.5 (9.92)	5.1 (11.24)
½	300	16 (0.63)	-	-	95 (3.7)	200 (7.9)	358.8 (14.2)	169.3 (6.67)	4.9 (10.80)	5.5 (12.13)
½	600	14 (0.55)	-	-	95 (3.7)	200 (7.9)	358.8 (14.2)	169.3 (6.67)	5.1 (11.24)	5.7 (12.57)
1	150	27 (1.1)	15.8 (0.62)	-	110 (4.3)	200 (7.9)	358.4 (14.1)	169.3 (6.67)	6.2 (13.67)	6.8 (14.99)
1	300	27 (1.1)	15.8 (0.62)	-	125 (4.9)	200 (7.9)	358.4 (14.1)	169.3 (6.67)	7.2 (15.87)	7.8 (17.20)
1	600	24 (1.0)	15.8 (0.62)	-	125 (4.9)	200 (7.9)	358.4 (14.1)	169.3 (6.67)	7.5 (16.53)	8.1 (17.86)
1½	150	41 (1.6)	26.6 (1.1)	15.8 (0.6)	125 (4.9)	200 (7.9)	362.3 (14.3)	169.5 (6.67)	8.3 (18.30)	8.9 (19.62)
1½	300	41 (1.6)	26.6 (1.1)	15.8 (0.6)	155 (6.1)	200 (7.9)	362.3 (14.3)	169.5 (6.67)	10.4 (22.93)	11 (24.25)
1½	600	38 (1.5)	26.6 (1.1)	15.8 (0.6)	155 (6.1)	200 (7.9)	362.3 (14.3)	169.5 (6.67)	11.4 (25.13)	12 (26.46)
2	150	53 (2.1)	40.9 (1.6)	26.6 (1.1)	150 (5.9)	200 (7.9)	368.3 (14.5)	169.5 (6.67)	11 (24.25)	11.6 (25.57)
2	300	53 (2.1)	40.9 (1.6)	26.6 (1.1)	165 (6.5)	200 (7.9)	368.3 (14.5)	169.5 (6.67)	12.4 (27.34)	13 (28.66)
2	600	49 (1.9)	40.9 (1.6)	26.6 (1.1)	165 (6.5)	200 (7.9)	368.3 (14.5)	169.5 (6.67)	13.9 (30.64)	14.5 (31.97)
3	150	78 (3.1)	52.6 (2.1)	40.9 (1.6)	190 (7.5)	200 (7.9)	380.3 (15.0)	169.3 (6.67)	19.8 (43.65)	20.4 (44.97)
3	300	78 (3.1)	52.6 (2.1)	40.9 (1.6)	210 (8.3)	200 (7.9)	380.3 (15.0)	169.3 (6.67)	22.8 (50.27)	23.4 (51.59)
3	600	74 (2.9)	52.6 (2.1)	40.9 (1.6)	210 (8.3)	200 (7.9)	380.3 (15.0)	169.3 (6.67)	23.8 (52.47)	24.4 (53.79)
4	150	102 (4.0)	78 (3.1)	52.6 (2.1)	230 (9.1)	250 (9.8)	396.8 (15.7)	171.5 (6.76)	23.4 (51.59)	24 (52.91)
4	300	102 (4.0)	78 (3.1)	52.6 (2.1)	255 (10)	250 (9.8)	396.8 (15.7)	171.5 (6.76)	31.4 (69.23)	32 (70.55)
4	600	97 (3.8)	78 (3.1)	52.6 (2.1)	275 (11)	250 (9.8)	396.8 (15.7)	171.5 (6.76)	40.4 (89.07)	41 (90.39)
6	150	154 (6.1)	102 (4.0)	78.0 (3.1)	280 (11)	300 (12)	416.3 (16.4)	191.5 (7.54)	36.2 (79.81)	36.8 (81.13)
6	300	154 (6.1)	102 (4.0)	78.0 (3.1)	320 (13)	300 (12)	416.3 (16.4)	191.5 (7.54)	51.2 (112.88)	51.8 (114.20)
6	600	146 (5.8)	102 (4.0)	78.0 (3.1)	355 (14)	300 (12)	416.3 (16.4)	191.5 (7.54)	76.2 (167.99)	76.8 (169.31)
8	150	203 (8.0)	154 (6.1)	102 (4.0)	345 (14)	300 (12)	442.1 (17.4)	202.8 (8.0)	50.0 (110.23)	50.6 (111.55)
8	300	203 (8.0)	154 (6.1)	102 (4.0)	380 (15)	300 (12)	442.1 (17.4)	202.8 (8.0)	74.8 (164.91)	75.4 (166.23)
10	150	255 (10.0)	203 (8.0)	154 (6.1)	405 (16)	380 (15)	468.8 (18.5)	229.5 (9.04)	74.4 (164.02)	75.0 (165.35)
10	300	255 (10.0)	203 (8.0)	154 (6.1)	455 (18)	380 (15)	468.8 (18.5)	229.5 (9.04)	106.4 (234.57)	107.0 (235.89)
12	150	305 (12.0)	255 (10.0)	203 (8.0)	485 (19)	450 (18)	492.8 (19.4)	255 (10.0)	106.4 (234.35)	107.0 (235.67)
12	300	305 (12.0)	255 (10.0)	203 (8.0)	520 (21)	450 (18)	492.8 (19.4)	255 (10.0)	151.4 (333.56)	152.0 (334.88)

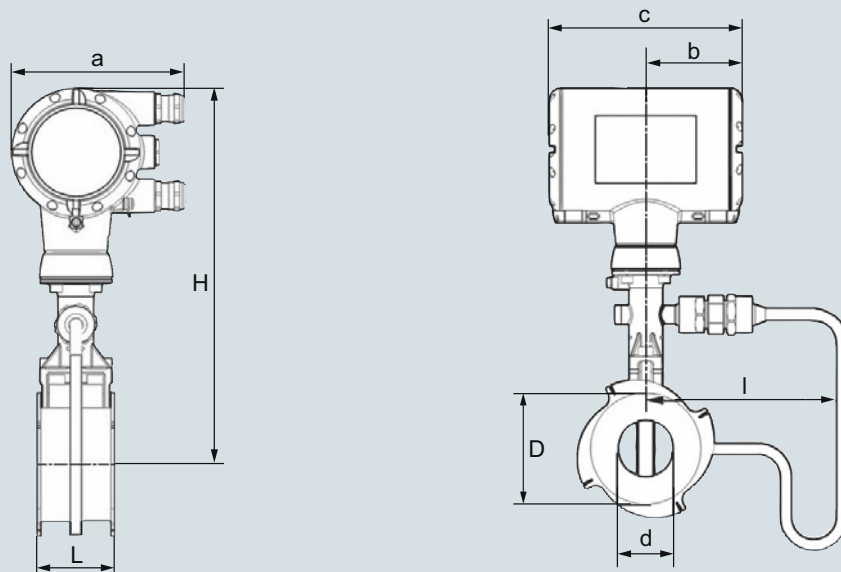
1) FR - single reduction

2) F2R - double reduction

Flow Measurement

SITRANS F X

SITRANS FX330



Sandwich version with pressure sensor

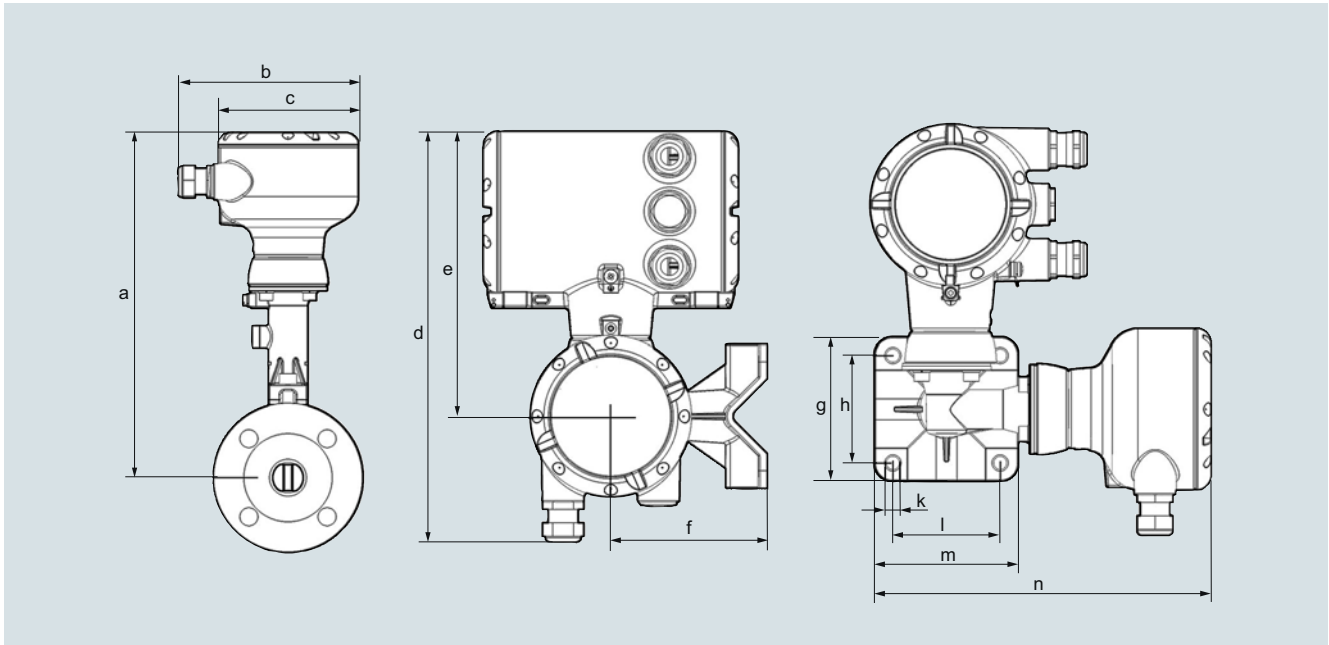
Sandwich version EN

Size DN	Pressure rating PN	Dimensions [mm (inch)]								Weight [kg (lb)]	
		a	b	c	d	D	L	H	I	Flowmeter (without pressure sensor)	Flowmeter (with pres- sure sen- sor)
15	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	16 (0.63)	45 (1.77)	65 (2.56)	265 (10.43)	174.25 (6.86)	3.5 (7.72)	4.1 (9.04)
25	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	24 (0.94)	65 (2.56)	65 (2.56)	265 (10.43)	174.25 (6.86)	4.3 (9.48)	4.9 (10.80)
40	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	38 (1.50)	82 (3.23)	65 (2.56)	270 (10.63)	174.5 (6.87)	4.9 (10.80)	5.5 (12.13)
50	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	50 (1.97)	102 (4.02)	65 (2.56)	275 (10.83)	174.5 (6.87)	6 (13.23)	6.6 (14.55)
80	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	74 (2.91)	135 (5.31)	65 (2.56)	290 (11.42)	174.25 (6.86)	8.2 (18.08)	8.8 (19.40)
100	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	97 (3.82)	158 (6.22)	65 (2.56)	310 (12.20)	176.5 (6.95)	9.5 (20.94)	10.1 (22.27)

Sandwich version ANSI

Size DN	Pressure rating Class	Dimensions [inch]								Weight [lb]	
		a	b	c	d	D	L	H	I	Flowmeter (without pressure sensor)	Flowmeter (with pres- sure sensor)
½"	150, 300	5.32	4.26	7.25	0.63	1.77	2.56	10.43	6.82	7.72	9.04
½"	600	5.32	4.26	7.25	0.55	1.77	2.56	10.43	6.82	7.72	9.04
1"	150, 300, 600	5.32	4.26	7.25	0.94	2.56	2.56	10.43	6.82	9.48	10.80
1½"	150, 300, 600	5.32	4.26	7.25	1.50	3.23	2.56	10.63	6.87	10.80	12.13
2"	150, 300, 600	5.32	4.26	7.25	1.97	4.02	2.56	10.83	6.87	13.23	14.55
3"	150, 300, 600	5.32	4.26	7.25	2.91	5.31	2.56	11.42	6.82	18.08	19.40
4"	150, 300, 600	5.32	4.26	7.25	3.82	6.22	2.56	12.20	6.95	20.94	22.27

Remote version



Dimension a

	Flanged and Sandwich version						Flanged version			
DN	15	25	40	50	80	100	150	200	250	300
	½"	1"	1½"	2"	3"	4"	6"	8"	10"	12"
[mm]	265.7	265.2	269.2	275.2	287.2	303.7	323.2	348.9	375.7	399.7
[inch]	10.5	10.4	10.6	10.8	11.3	12.0	12.7	13.7	14.8	15.7

Dimension a F1/2R

	Flanged version									
DN	15	25	40	50	80	100	150	200	250	300
	½"	1"	1½"	2"	3"	4"	6"	8"	10"	12"
F1R ¹⁾ [mm]	-	315.7	315.2	319.2	325.2	337.2	353.7	373.2	398.9	425.7
F1R ¹⁾ [inch]	-	12.4	12.4	12.6	12.8	13.3	13.9	14.7	15.7	16.8
F2R ²⁾ [mm]	-	-	315.7	315.2	319.2	325.2	337.2	353.7	373.2	398.9
F2R ²⁾ [inch]	-	-	12.4	12.4	12.6	12.8	13.3	13.9	14.7	15.7

1) FR - single reduction

2) F2R - double reduction

Dimension b ... n

	b	c	d	e	f	g	h	j	k	l	m	n
[mm]	139	108	276	191	105	97	72	108	9	72	97	226
[inch]	5.46	4.25	10.9	7.53	4.14	3.82	2.84	4.25	0.35	2.84	3.82	8.90

Flow Measurement

SITRANS F X

SITRANS FX330

Flow tables

Measuring Range Limits

Water

Size DN to EN 1092-1	DN to ANSI B16.5	Q _{min} EN 1092-1 [m ³ /h]	Q _{max} EN 1092-1 [m ³ /h]	Q _{min} ANSI B16.5 [m ³ /h]	Q _{max} ANSI B16.5 [m ³ /h]
15	½"	0.45	5.07	0.44	4.94
25	1"	0.81	11.40	0.81	11.40
40	1½"	2.04	28.58	2.04	28.58
50	2"	3.53	49.48	3.53	49.48
80	3"	7.74	108.37	7.74	108.37
100	4"	13.30	186.22	13.30	186.21
150	6"	30.13	421.86	30.13	421.86
200	8"	56.60	792.42	56.60	792.42
250	10"	90.48	1 266.8	90.48	1 266.8
300	12"	131.41	1 839.8	131.41	1 839.8

Values based on water at 20 °C (68 °F)

Air

Size DN to EN 1092-1	DN to ANSI B16.5	Q _{min} EN 1092-1 [m ³ /h]	Q _{max} EN 1092-1 [m ³ /h]	Q _{min} ANSI B16.5 [m ³ /h]	Q _{max} ANSI B16.5 [m ³ /h]
15	½"	6.80	25.33	6.72	24.70
25	1"	10.20	81.43	10.20	81.43
40	1½"	25.35	326.63	25.35	326.63
50	2"	43.89	565.49	43.89	565.49
80	3"	96.14	1 238.64	96.14	1 238.6
100	4"	165.19	2 128.27	165.19	2 128.27
150	6"	374.23	4 821.60	374.23	4 821.6
200	8"	702.95	9 056.8	702.95	9 056.8
250	10"	1 123.7	14 478.0	1 123.7	14 478.0
300	12"	1 632.1	21 028.0	1 632.1	21 028.0

Values based on air at 20 °C (68 °F) and 1.013 bar_{abs} (14.7 psi_{abs})

Measuring range saturated steam: 1 to 7 bar

Overpressure [bar]		1		3.5		5.2		7	
Density [kg/m ³]		1.13498		2.4258		3.27653		4.16732	
Temperature [°C]		120.6		148.2		160.4		170.6	
Flow [kg/h]		min.	max.	min.	max.	min.	max.	min.	max.
DN to EN 1092-1	DN to ANSI B16.5								
15	½"	5.87	28.75	7.68	61.46	8.93	83.01	10.06	105.57
25	1"	11.82	92.42	17.28	197.53	20.09	266.81	22.66	339.35
40	1½"	29.64	370.71	43.33	792.33	50.63	1 070.2	56.80	1 361.2
50	2"	51.31	641.82	75.02	1 371.8	87.19	1 852.8	98.33	2 356.6
80	3"	112.41	1 405.8	164.33	3 004.7	191.00	4 058.4	215.39	5 161.8
100	4"	193.14	2 415.5	282.36	5 162.7	328.16	6 973.3	370.09	8 869.2
150	6"	437.56	5 472.4	639.69	11 696.0	743.45	15 798.0	838.44	20 093.0
200	8"	821.9	10 279.0	1 201.6	21 970.0	1 396.5	29 675.0	1 574.9	37 743.0
250	10"	1 313.9	16 433.0	1 920.9	35 122.0	2 232.5	47 439.0	2 517.7	60 337.0
300	12"	1 908.3	23 866.0	2 789.8	51 010.0	3 242.4	68 899.0	3 656.6	87 630.0

Measuring range saturated steam: 10.5 to 20 bar

Overpressure [bar]		10.5		14.0		17.5		20.0	
Density [kg/m ³]		5.88803		7.60297		9.31702		10.5442	
Temperature [°C]		186.2		198.5		208.7		215.0	
Flow [kg/h]		min.	max.	min.	max.	min.	max.	min.	max.
DN to EN 1092-1	DN to ANSI B16.5								
15	½"	12.78	149.17	16.51	192.61	20.23	236.04	22.89	267.12
25	1"	26.93	479.46	30.60	619.11	33.87	758.69	36.04	858.62
40	1½"	67.51	1 878.2	76.72	2 150.7	84.93	2 395.3	90.35	2 557.7
50	2"	116.89	3 251.7	132.82	3 723.4	147.03	4 147	156.42	4 428.1
80	3"	256.03	7 122.4	290.93	8 155.8	322.06	9 083.7	342.62	9 699.3
100	4"	439.91	12 238	499.90	14 013	553.38	15 608.0	588.69	16 666
150	6"	996.62	27 725.0	1 132.5	31 747	1 253.7	35 359.0	1 333.7	37 756
200	8"	1 872.1	52 079.0	2 127.3	59 634	2 354.9	66 419.0	2 505.2	70 921
250	10"	2 992.7	83 254.0	3 400.7	95 333	3 764.6	106 180.0	4 004.9	113 380
300	12"	4 346.5	120 920.0	4 939.1	138 460	5 467.5	154 210	5 816.5	164 660

Flow Measurement

SITRANS F X

SITRANS FX330

Measuring range saturated steam: 15 to 100 psig

Overpressure [psig]		15		50		75		100	
Density [lb/ft ³]		0.0719		0.1497		0.2036		0.2569	
Temperature [°F]		249.98		297.86		320.36		338.184	
Flow [lb/h]		min.	max.	min.	max.	min.	max.	min.	max.
DN to EN 1092-1	DN to ANSI B16.5								
15	½"	12.95	64.35	16.83	133.87	19.62	182.02	22.04	229.63
25	1"	26.25	206.83	37.86	430.30	44.15	585.06	49.59	738.09
40	1½"	65.81	829.61	94.92	1 726.0	110.68	2 346.7	124.32	2 960.5
50	2"	113.94	1 436.3	164.34	2 988.0	191.63	4 062.9	215.23	5 125.6
80	3"	249.57	3 146.1	360.00	6 545.3	419.74	8 899.4	471.45	11 227.0
100	4"	428.81	5 405.7	618.51	11 246.0	721.21	15 291.0	810.06	19 291.0
150	6"	971.47	12 246.0	1 401.2	25 478.0	1 633.9	34 642.0	1 835.2	43 703.0
200	8"	1 824.8	23 004.0	2 632.1	47 859.0	3 069.1	65 072.0	3 447.2	82 092.0
250	10"	2 917.2	36 774.0	4 207.7	76 508.0	4 906.4	104 030.0	5 510.8	131 230.0
300	12"	4 236.8	53 410.0	6 111.1	111 120.0	7 125.8	151 080.0	8 003.6	190 600.0

Measuring range saturated steam: 150 to 300 psig

Overpressure [psig]		150		200		250		300	
Density [lb/ft ³]		0.3627		0.4681		0.5735		0.6792	
Temperature [°F]		366.08		388.04		406.22		422.06	
Flow [lb/h]		min.	max.	min.	max.	min.	max.	min.	max.
DN to EN 1092-1	DN to ANSI B16.5								
15	½"	27.79	324.21	35.86	418.47	43.94	512.66	52.04	607.12
25	1"	58.93	1 042.1	66.94	1 345.1	74.10	1 647.8	80.63	1 951.5
40	1½"	147.72	4 107.2	167.83	4 702.8	185.76	5 237.0	202.15	5 728.0
50	2"	255.75	7 111.9	290.56	8 141.9	321.60	9 066.8	350.00	9 917.0
80	3"	560.19	15 578.0	636.44	17 834.0	704.43	19 860.0	766.60	21 722.0
100	4"	962.54	26 766.0	1 093.5	30 643.0	1 210.4	34 124.0	1 317.2	37 324.0
150	6"	2 180.6	60 639.0	2 477.4	69 421.0	2 742.1	77 307.0	2 984.0	84 556.0
200	8"	4 096.1	113 900.0	4 653.6	130 400.0	5 150.7	145 210.0	5 605.2	158 830.0
250	10"	6 548.1	182 090.0	7 439.3	208 460.0	8 234.1	232 140.0	8 960.6	253 910.0
300	12"	9 510.2	264 460.0	10 805.0	302 760.0	11 959.0	337 150.0	13 014.0	368 770.0

Level Measurement








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You can download all instructions, catalogs and certificates for SITRANS L free of charge:
www.siemens.usa.com/level

Level Measurement

Product overview

Overview

Application	Device description	Page	Programming Software
Point level measurement - RF Capacitance switches			
	Powerful range of level switches suitable for a variety of industries.	Pointek CLS100/CLS200/CLS300	
	<ul style="list-style-type: none">CLS100: compact 2-wire inverse frequency shift capacitance switch for level detection in constricted spaces, interfaces, solids, liquids, slurries, and foam.	4/10	-
	<ul style="list-style-type: none">CLS200: a versatile inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output, ideal for detection of liquids, solids, slurries, foam, and interfaces; digital version (with PROFIBUS PA) includes a display and provides additional diagnostic features. Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511.	4/16	SIMATIC PDM
	<ul style="list-style-type: none">CLS300: inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present; digital version (with PROFIBUS PA) includes a display and provides additional diagnostic features.	4/40	SIMATIC PDM
Point level measurement - Vibrating switches			
	Reliable vibrating point level switches for liquid and slurry applications across all industries.	SITRANS LVL100/LVL200	
	<ul style="list-style-type: none">LVL100: compact vibrating level switch for use in liquid and slurry applications such as overflow, high, low, and demand level applications. Also ideal for dry run protection.	4/62	-
	<ul style="list-style-type: none">LVL200: advanced vibrating level switch for use in liquid and slurry applications. Suited for most hazardous area applications such as: overflow, high, low, demand, and dry run protection. Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511.	4/69	-
	Reliable vibrating point level switches for bulk solids in a wide variety of applications.	SITRANS LVS100/LVS200	
	<ul style="list-style-type: none">LVS100: vibrating point level switch designed to be impervious to external vibrations and to provide reliable performance in demanding bulk solids applications.	4/94	-
	<ul style="list-style-type: none">LVS200: vibrating point level switch designed to be impervious to external vibrations and to provide reliable performance in demanding bulk solids applications.	4/98	-
Point level measurement - Rotating paddle switches			
	Reliable rotating point level switches for bulk solids in a wide variety of applications.	SITRANS LPS200	
	<ul style="list-style-type: none">Rotating paddle switch for detection of high, low, and demand levels in a wide variety of bulk solids industries. Unique engineering provides long-lasting, reliable performance.Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511.	4/108	-
Point level measurement - Ultrasonic switch			
	Ultrasonic non-contacting switch with two switch points for level detection of bulk solids, liquids and slurries in a wide variety of industries.	Pointek ULS200	
	<ul style="list-style-type: none">Rugged design, no moving parts, and virtually maintenance-free.Transducer available in ETFE or PVDF copolymer and therefore inert to most chemicals.	4/120	-



Application	Device description	Page	Programming Software	
Continuous level measurement - Ultrasonic transmitters				
	SITRANS LU150 and LU180 are short-range integrated ultrasonic level transmitters. These 2-wire, 4 to 20 mA loop powered transmitter are ideal for liquids, slurries, and bulk materials in open or closed vessels to 5 m (16.4 ft).	SITRANS LU150 <ul style="list-style-type: none">• LU150 is approved for general purpose applications.• Easy to install, program, and maintain.• Patented Sonic Intelligence echo processing.	4/126	-
		SITRANS LU180 <ul style="list-style-type: none">• LU180 is approved for intrinsically safe applications.• Easy to install, program, and maintain.• Patented Sonic Intelligence echo processing.	4/131	-
	2-wire loop powered ultrasonic transmitter for level, volume, and flow monitoring of liquids in open channels, storage vessels and simple process vessels.	SITRANS Probe LU <ul style="list-style-type: none">• Continuous level measurement up to 12 m (40 ft) range.• Sonic Intelligence signal processing.• Auto False-Echo Suppression.	4/136	SIMATIC PDM
	Compact level transmitter with integrated transducer for accurate level measurement of liquid applications.	The Probe <ul style="list-style-type: none">• A short-range integrated ultrasonic level transmitter, ideal for liquids and slurries in open or closed vessels.• 3 wire system with mA output and alarm relay.	4/141	-
Continuous level measurement - Ultrasonic controllers				
	The SITRANS LUT400 series controllers are compact, single point, long-range ultrasonic controllers for continuous level or volume measurement of liquids, slurries, and solids, and high accuracy monitoring of open channel flow.	SITRANS LUT420/430/440 <p>In addition to industry leading 1 mm (0.04 inch) accuracy, each of the three models in the series are compatible with our full range of EchoMax transducers and offer varying degrees of pump, alarm, and other control functionality, all from a very compact and easy-to-use interface.</p> <ul style="list-style-type: none">• 1 mm accuracy.• HART communications.• Next Generation Sonic Intelligence.	4/144	SIMATIC PDM
	Versatile short- to medium-range ultrasonic single- and dual-vessel level controller for virtually any application in a wide range of industries.	MultiRanger 100/200 <ul style="list-style-type: none">• Using non-contacting ultrasonic technology, the controller measures the level in short to medium range applications up to 15 m (50 ft) of solids, liquids, or slurries• Auto False-Echo Suppression of false echoes	4/152	SIMATIC PDM
	Ultrasonic level controller for up to six pumps - control, differential control, and open channel flow monitoring.	HydroRanger 200 <ul style="list-style-type: none">• An economical, low-maintenance solution delivering control efficiency and productivity needed to meet today's exacting standards• Auto False-Echo Suppression of false echoes	4/161	SIMATIC PDM

Level Measurement

Product overview

4

Application	Device description	Page	Programming Software
Continuous level measurement - Ultrasonic transducers			
	ST-H: ETFE or PVDF transducer for chemicals XRS-5: Standard transducer for applications to 8 m (26 ft)	ST-H/EchoMax XRS-5 <ul style="list-style-type: none"> ST-H: the narrow design of the ST-H allows the sensor to be mounted using a 2 inch connection XRS-5: narrow beam angle of only 10°, measuring range maximum 8 m (26 ft) for measurement of liquids, solids, and slurries 	4/170 - 4/173 -
	Transducers for liquids and bulk solids XPS series: Hermetically sealed PVDF enclosure for chemical immunity	EchoMax XPS <ul style="list-style-type: none"> XPS series offers versions for various distances up to 30 m (100 ft) and up to a maximum temperature of 95 °C (203 °F) 	4/177 -
Continuous level measurement - Radar transmitters			
	2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft).	SITRANS Probe LR <ul style="list-style-type: none"> Uni-Construction polypropylene rod antenna standard Process Intelligence signal processing Auto False-Echo Suppression of false echoes 	4/192 SIMATIC PDM
	2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft).	SITRANS LR200 <ul style="list-style-type: none"> Program without opening the lid, even in hazardous areas, using patented infrared IS handheld programmer Special Uni-Construction hermetically sealed polypropylene rod antenna has integrated threaded connection Built-in alphanumeric display with support in four languages 	4/196 SIMATIC PDM AMS SITRANS DTM
	2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft); antenna designs ideal for small vessels, low dielectric media, food & beverages and corrosive/aggressive media.	SITRANS LR250 <ul style="list-style-type: none"> Simple operation using the graphical local user interface (LUI) Plug-and-play setup using the intuitive Quick Start Wizard 25 GHz high frequency allows for small horn antennas and easy mounting in nozzles Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions 	4/211 SIMATIC PDM AMS SITRANS DTM
	2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of solids and liquids up to 30 m (98.4 ft); ideal for level measurement with quick response or intrinsically safe requirements.	SITRANS LR260 <ul style="list-style-type: none"> Simple operation using the graphical local user interface (LUI) Plug-and-play setup using the intuitive Quick Start Wizard 25 GHz high frequency allows for small horn antennas and easy mounting in nozzles Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions 	4/269 SIMATIC PDM SITRANS DTM

Application	Device description	Page	Programming Software
 <p>4-wire, 24 GHz FMCW radar level transmitter with extremely high signal-to-noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft); ideal for measurement in extreme dust and high temperature applications</p>	<p>SITRANS LR460</p> <ul style="list-style-type: none"> • Process Intelligence for advanced signal processing and quick and easy adjustment • Self-guided Quick Start Wizard for plug and play start-up • 100 m (328 ft) range for long-range and difficult applications 	4/275	SIMATIC PDM
 <p>2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids and liquids to a range of 100 m (328 ft); easy to install, plug and play, virtually no maintenance</p>	<p>SITRANS LR560</p> <ul style="list-style-type: none"> • Rugged stainless steel design • 78 GHz high frequency provides very narrow beam, virtually no mounting nozzle noise, and optimal reflection from sloped solids • Aimer option to direct beam to area of interest, such as draw point of cone • Air purge connection is included for self-cleaning of extremely sticky solids • Lens antenna is highly resistant to product buildup • Local display interface (LDI) allows local programming and diagnostics 	4/281	SIMATIC PDM AMS SITRANS DTM
Continuous level measurement - Guided wave radar transmitters			
 <p>Guided wave radar transmitters for short- and medium-range level, level/interface, and volume measurement of liquids, slurries, and solids. The four LG models are unaffected by changes in process conditions, high temperatures and pressures, and provide a wide range of hygienic options.</p>	<p>SITRANS LG240/250/260/270</p> <ul style="list-style-type: none"> • Measures accurately on materials with dielectric (dK) as low as 1.4 • Guided wave radar measurement for up to 2 mm (0.08 inch) accuracy • Measures level, level/interface, and volume of solids, slurries, and liquids • 4 button programming for quick setup • Reliable level measurement on harsh applications with pressure up to 400 bar g (40 000 kPa) and temperatures as high as 450 °C (842 °F) 	4/288	SIMATIC PDM SITRANS DTM
Continuous level measurement -Capacitance transmitters			
 <p>For liquids and solids applications, ideal for standard industrial applications in chemical, hydrocarbon processing, food and beverage, and mining, aggregate and cement industries.</p>	<p>SITRANS LC300</p> <ul style="list-style-type: none"> • Sophisticated, but easy-to-adjust microprocessor combined with field-proven probes • Active shield technology ensures measurements are unaffected by vapors, product deposits, dust, and condensation 	4/332	-
Communications			
	<p>SmartLinx Module, Dolphin Plus software</p> <ul style="list-style-type: none"> • Optional communication modules, SmartLinx, provide direct digital connection to popular industrial fieldbus systems • Dolphin Plus for quick and easy configuring, monitoring, tuning, and diagnostics of Siemens devices 	4/348 4/349	- -

Supplied product documentation on DVD and safety instructions



The scope of delivery of the Siemens products for process instrumentation includes a multilingual instruction sheet with **safety instructions** as well as a uniform **mini DVD – Process Instrumentation and Weighing Systems**.

This DVD contains the most important manuals and certificates for the Siemens process instrumentation and weighing technology portfolio. The delivery may also contain product-specific or order-specific printed materials.

For additional information, refer to the Annex on page 10/3.

Level Measurement

Product overview

Level Measurement Selector

Continuous Level						
Conditions	Ultrasonic	Radar	Guided Wave Radar	Capacitance	Gravimetric	Hydrostatic pressure
Measurement						
Level	■	■	■	■	◆	■
Interface (liquid/liquid)			■	◆		■
Interface (liquid/solid)	◆			◆		
Volume	■	■	■	◆	◆	■
Mass					■	■
Flow (open channel)	■	◆				
Level Applications						
Changing density	■	■	■	■		
Changing dielectric	■	■	■	◆	■	■
Aggressive chemicals	■	■	■	■	■	■
Pressure/vacuum		■	■	■	■	■
High temperature		■	■	■	■	■
Cryogenic			■		■	
Turbulence	■	■	◆	◆	■	■
Steam		◆	■	◆	■	■
Hydrocarbon vapors/solvents		■	■	■	■	■
Foam	◆	◆	◆	◆	■	■
Buildup	◆	◆	◆	◆	■	◆
High viscosity	■	■	◆	◆	■	◆
Dust	◆	■	■	■	■	
Solids powders	◆	■	◆	◆	■	
Solids granules/pellets < 25 mm (1 inch)	■	■	◆	◆	■	
Solids > 25 mm (1 inch)	■	■			■	
High angle of repose	◆	■	■	◆	■	
■ preferred ◆ condition dependent						

Point Level				
Conditions	Vibration	Capacitance	Paddle	Ultrasonic
Measurement				
Level	■	■	■	■
Interface (liquid/liquid)		■		
Interface (liquid/solid)	◆			
Volume				
Mass				
Flow (open channel)				
Level Applications				
Changing density	■	■	■	■
Changing dielectric	■	◆	■	■
Aggressive chemicals	■	■	◆	■
Pressure/vacuum	■	■	■	
High temperature	■	■	■	
Cryogenic	■			
Turbulence	◆	◆		■
Steam	■	◆	■	
Hydrocarbon vapors/solvents	■	◆		
Foam	◆	◆		◆
Buildup	◆	◆	■	◆
High viscosity	◆	◆	◆	■
Dust	■	■	■	◆
Solids powders	■	◆	■	◆
Solids granules/pellets < 25 mm (1 inch)	■	◆	■	■
Solids > 25 mm (1 inch)	◆	◆	■	■
High angle of repose	■	■	■	◆
■ preferred ◆ condition dependent				

Level Measurement

Point level measurement
RF Capacitance switches

RF Capacitance

Overview

Introduction

Inverse frequency shift capacitance point level and material detection switches are designed to withstand the harsh environments of high pressure and high temperature applications.

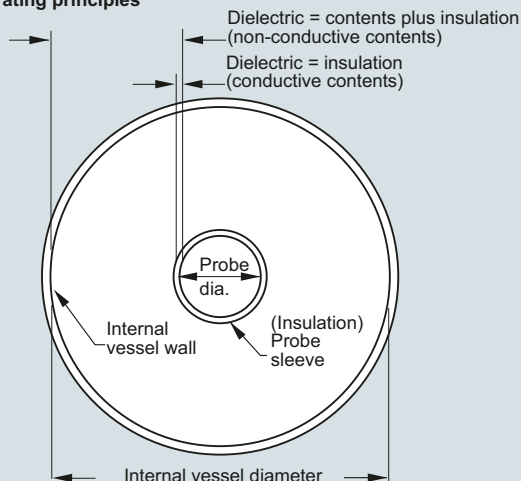
Inverse Frequency Technology

Siemens inverse frequency shift capacitance devices incorporate a unique frequency-based approach to level measurement. The capacitance units monitor the effect of capacitance based on frequency change. The relationship between capacitance and frequency is inverse. Because small level changes result in a large frequency change, the result is excellent resolution and accuracy.

Principle of Operation

Inverse frequency shift capacitance devices require two components: a reference electrode of a variable capacitor and the measurement electrode. In capacitive level measurement, the environment (typically the vessel wall) acts as the reference electrode, while the probe supplies the measurement electrode. The dielectric is composed of the vessel contents and, if the measurement electrode is insulated, the insulating layer.

Operating principles



Inverse frequency shift capacitance operation

Capacitance is affected by the surface area of the electrodes, the separation distance between the electrodes and the dielectric constant of the vessel contents. The dielectric constant is the measure of a material's ability to store energy. The relative dielectric constant of air (vacuum) is 1; all other materials have a higher value.

Mode of operation

Common Terms

Capacitance

The property of a system of conductors and dielectrics that permits the storage of electricity when a potential difference exists between the conductors. Its value is expressed as the ratio of a quantity of electricity to a potential difference and the unit is a Farad.

Capacitor

A device in a circuit that has the potential to store an electric charge. Typically a capacitor has two conductors or electrodes separated by a layer of a non-conducting material called a dielectric. With the conductors on opposite sides of the dielectric layer oppositely charged by a source of voltage, the electrical energy of the charged system is stored in the polarized dielectric.

Dielectric constant

The ability of a dielectric to store electrical potential energy under the influence of an electric field. This is measured by a ratio which compares the capacitance of a condenser with the material as dielectric to its capacitance with a vacuum/dry air as dielectric: the dielectric constant of air is 1.

Active shield

The portion of the probe isolated from the active measurement section. The sensor signal is connected to the active shield portion of the probe, eliminating the electrical potential difference between the shield and the measurement section. So, the shield portion of the probe near the process connection is not affected by changes in vapor concentration, material buildup, dust, or condensation.

Technical specifications

Point Level Measurement			
Criteria	Pointek CLS100	Pointek CLS200	Pointek CLS300
Typical applications	Liquids, slurries, powders, granules, applications in constricted spaces	Liquids, slurries, powders, granules, foam, food, and pharmaceuticals, petrochemicals	Liquids, slurries, powders, granules, relatively high pressure, and temperature, hazardous areas
Max. length including sensor	100 mm (4 inch)	Rod: 5.5 m (18 ft) Cable: up to 30 m (98 ft)	Rod: 1 m (40 inch) Cable: 25 m (82 ft)
Process temperature (Temperature ratings are pressure dependent. See Pressure/Temperature curves for respective product.)	<ul style="list-style-type: none"> Stainless steel process connection: -30 ... +100 °C (22 ... +212 °F) Fully Synthetic (PPS process connection): -10 ... +100 °C (14 ... 212 °F) 	<ul style="list-style-type: none"> -40 ... +85 °C (-40 ... +185 °F) With thermal isolator: -40 ... +125 °C (-40 ... +257 °F) 	<ul style="list-style-type: none"> -40 ... +200 °C (-40 ... +392 °F) HT version: -40 ... +400 °C (-40 ... +752 °F)
Process pressure (Pressure ratings are temperature dependent. See Pressure/Temperature curves for respective product.)	Up to 10 bar g (146 psi g)	<ul style="list-style-type: none"> Rod versions: Up to 25 bar g (365 psi g) Cable version: Up to 10 bar g (146 psi g) 	Up to 35 bar g (511 psi g)
Output	Stainless steel cable or enclosure version: <ul style="list-style-type: none"> 4 ... 20/20 ... 4 mA, 2-wire current loop Solid-state output Fully-synthetic version (PPS) <ul style="list-style-type: none"> Relay output 	Standard: <ul style="list-style-type: none"> 1 SPDT Form C relay, solid-state switch Digital: <ul style="list-style-type: none"> Solid-state switch included 	Standard: <ul style="list-style-type: none"> 1 SPDT Form C relay, solid-state switch Digital: <ul style="list-style-type: none"> Solid-state switch included
Communications		Standard: <ul style="list-style-type: none"> 3 LED indicators Digital: <ul style="list-style-type: none"> PROFIBUS PA; SIMATIC PDM compatible 	Standard: <ul style="list-style-type: none"> 3 LED indicators Digital: <ul style="list-style-type: none"> PROFIBUS PA; SIMATIC PDM compatible
Power Specifications	Standard: <ul style="list-style-type: none"> 12 ... 33 V DC Intrinsically Safe (Stainless steel version only): <ul style="list-style-type: none"> 10 ... 30 V DC 	Standard: <ul style="list-style-type: none"> 12 ... 250 V AC/DC, 0 ... 60 Hz, 2 W max. Digital: <ul style="list-style-type: none"> Bus voltage: 12 ... 30 V DC, IS version: 12 ... 24 V DC Current consumption: 12.5 mA 	Standard: <ul style="list-style-type: none"> 12 ... 250 V AC/DC, 0 ... 60 Hz, 2 W max. Digital: <ul style="list-style-type: none"> Bus voltage: 12 ... 30 V DC, IS version: 12 ... 24 V DC Current consumption: 12.5 mA
Approvals	Stainless steel cable or enclosure version: <ul style="list-style-type: none"> CE, CSA, FM, ATEX, RCM, Lloyds Register, WHG Fully-synthetic version (PPS): <ul style="list-style-type: none"> CSA, FM 	CSA, FM, CE, ATEX, RCM, Lloyds Register, WHG, Vlare II	CSA, FM, CE, ATEX, RCM, Lloyds Register, WHG, Vlare II

Level Measurement

Point level measurement
RF Capacitance switches

Pointek CLS100

Overview



Pointek CLS100 is a compact, 2-wire, inverse frequency shift capacitance switch for level and material detection in constricted spaces, interfaces, solids, liquids, slurries, and foam; with the ability to tune out buildup on probe.

Benefits

- Easy installation with verification by built-in LED
- Low maintenance with no moving parts
- Sensitivity adjustment
- Integrated cable or PBT enclosure versions available
- Intrinsically Safe, Dust Ignition Proof, and General Purpose options available

Application

Pointek CLS100's short insertion length of 100 mm (4 inch) and versatility in various applications and in vessels or pipes makes it a good replacement for traditional capacitance sensors.

Its advanced tip-sensing technology provides accurate, repeatable switchpoint performance. The PPS (Polyphenylene sulfide) probe [optional PVDF (Polyvinylidene Fluoride)] is chemically resistant with an effective process operating temperature range from -30 to +100 °C (-22 to +212 °F) (7ML5501), and -10 to +100 °C (14 to 212 °F) (7ML5610). The fully potted design ensures reliability in a vibrating environment such as agitated tanks up to 4 g. When used with a SensGuard protection cover, the CLS100 is protected from shearing, impact, and abrasion in tough primary processes.

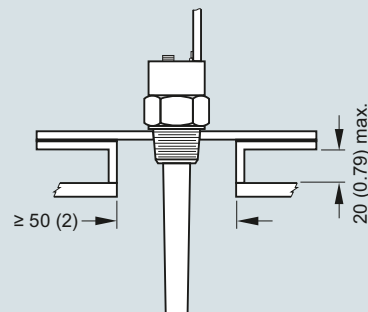
The Pointek CLS100 is available in three versions. The integral cable version has a stainless steel process connection and probe options of PPS or PVDF. The fully synthetic version has a thermoplastic polyester enclosure with a PPS process connection combined with a PPS probe. The standard enclosure version has a thermoplastic polyester enclosure with a stainless steel process connection in combination with a PPS or PVDF probe.

- Key Applications: liquids, slurries, powders, granules, food and pharmaceuticals, chemicals, hazardous areas

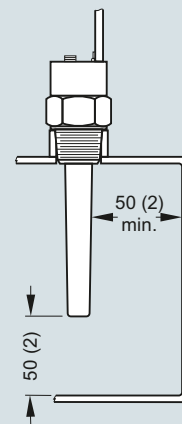
Configuration

Installation

Standpipes



Wall restriction



Pointek CLS100 installation, dimensions in mm (inch)

Technical specifications

	Stainless steel process connection (integral cable or enclosure version) (7ML5501)	Fully synthetic process connection (enclosure version only) (7ML5610)
Mode of operation		
Measuring principle	Inverse frequency shift capacitive level detection	Inverse frequency shift capacitive level detection
Input		
Measured variable	Change in picoFarad (pF)	Change in picoFarad (pF)
Output		
Output signal		
• Alarm output	4 ... 20/20 ... 4 mA 2-wire loop	4 ... 20/20 ... 4 mA 2-wire loop
• Switch output ¹⁾	Solid-state: 30 V DC/30 V AC, max. 82 mA	Max. switching voltage: 60 V DC/30 V AC Max. switching current: 1 A
• Fail-safe mode	Min. or max.	Min. or max.
Accuracy		
Repeatability	2 mm (0.08 inch)	2 mm (0.08 inch)
Rated operating conditions²⁾		
Installation conditions		
• Location	Indoor/outdoor	Indoor/outdoor
Ambient conditions		
• Ambient temperature	-30 ... +85 °C (-22 ... +185 °F)	-10 ... +85 °C (14 ... 185 °F)
• Installation category	I	I
• Pollution degree	4	4
Medium conditions		
• Relative dielectric constant ϵ_r	Min. 1.5	Min. 1.5
• Process temperature	-30 ... +100 °C (-22 ... +212 °F)	-10 ... +100 °C (14 ... 212 °F)
• Pressure (vessel)	-1 ... +10 bar g (-14.6 ... +146 psi g), nominal ²⁾	-1 ... +10 bar g (-14.6 ... +146 psi g), nominal
• Degree of protection		
- Enclosure version	IP68/Type 4/NEMA 4	IP68/Type 4/NEMA 4
- Integral cable version	IP65/Type 4/NEMA 4	Not applicable
• Cable inlet	½" NPT (M20 x 1.5 optional)	½" NPT (M20 x 1.5 optional)
Design	<u>Enclosure/Integral cable version</u>	<u>Fully synthetic version</u>
Material		
• Body (Enclosure version)	Thermoplastic polyester	Thermoplastic polyester
• Lid (Enclosure version)	Transparent thermoplastic polycarbonate (PC)	Transparent thermoplastic polycarbonate (PC)
• Integrated cable body (Integral cable version)	316L stainless steel	Not applicable

	Stainless steel process connection (integral cable or enclosure version) (7ML5501)	Fully synthetic process connection (enclosure version only) (7ML5610)
Sensor length (nominal)	100 mm (4 inch)	100 mm (4 inch)
Process connection material of probe/wetted parts ³⁾	Connection: 316L stainless steel; Process seal: FKM (optional FFKM); Sensor: PPS (optional PVDF) ⁴⁾	PPS process connection and PPS sensor (Uni-Construction)
Connection (Enclosure version)	Internal 5-point terminal block, ½" NPT wiring entrance, M20 x 1.5 optional	Removable internal 5-point terminal block, ½" NPT wiring entrance, M20 x 1.5 optional
Connection (Integral cable version)	4 conductors, 1 m (3.3 ft), 0.5 mm ² (22 AWG), shielded, polyester jacket	Not applicable
Process connection	¾" NPT [(Taper), ANSI/ASME B1.20.1] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	¾" NPT [(Taper), ANSI/ASME B1.20.1] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]
Power supply		
Standard	12 ... 33 V DC	12 ... 33 V DC
Intrinsically Safe	10 ... 30 V DC (Intrinsically Safe barrier required)	Not applicable
Certificates and approvals	<ul style="list-style-type: none"> • General: CE, CSA, FM, RCM • Marine: Lloyds Register of Shipping, categories ENV1, ENV2, and ENV5 Dust Ignition Proof (barrier required): CSA/FM Class II and III, Div. 1, Groups E, F, G T4 • Intrinsically Safe (barrier required): CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G T4 ATEX II 1 GD 1/2GD EEx ia IIC T4 to T6 T107 °C • Overfill protection: WHG (Germany) 	<ul style="list-style-type: none"> • General: CSA, FM

¹⁾ When synthetic process connection version (7ML5610) is used in wet locations, switching voltage of the relay is limited to 35 V DC/16 V AC.

²⁾ When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 4/14.

³⁾ For caustic materials, consult a local sales person for alternative O-rings. For more information, please visit <http://www.usa.siemens.com/level>.

⁴⁾ When FFKM O-ring (Option A22) is selected, process temperature is restricted to -20 °C (-4 °F).

Level Measurement

Point level measurement
RF Capacitance switches

Pointek CLS100

Selection and Ordering data	Article No.
Pointek CLS100, stainless steel process connection Compact 2-wire inverse frequency shift capacitance switch for level and material detection in constricted spaces, interfaces, solids, liquids, slurries and foam, with the ability to tune out buildup on probe. ➔ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5501-
Process connection ¾" NPT [(Taper), ANSI/ASME B1.20.1] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 1" [(BSPP), EN ISO 228-1/PT (JIS-P), JIS B 0202]	A E J
Approvals General Purpose: CE, CSA, FM, RCM CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G T4; ATEX II 1 GD 1/2GD EEx ia IIC T4 ... T6 T107 °C ¹⁾ CSA/FM Class II and III, Div. 1, Groups E, F, G ¹⁾	A C G
Device version Integral cable version (PPS probe) Enclosure version (PPS probe), ½" NPT cable inlet Integral cable version with PVDF probe body Enclosure version with PVDF probe body (½" NPT cable inlet) Enclosure version (PPS probe), M20 x 1.5 cable inlet Enclosure version with PVDF probe body, M20 x 1.5 cable inlet	1 3 5 6 7 8
Overfill protection Not required Required (WHG)	0 1

¹⁾ Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text	Y17
FFKM seal O-ring ¹⁾	A22
Material inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions Note: due to ATEX regulations one Quick start manual is included with every product. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

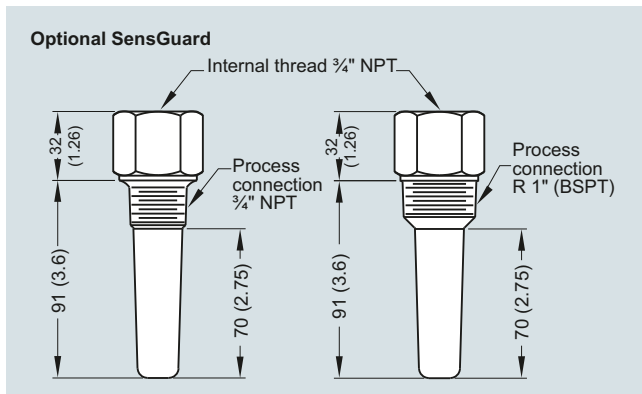
¹⁾ See Temperature restriction on page 4/14

Selection and Ordering data	Article No.
Accessories SensGuard, ¾" NPT (PPS) Only available for CLS100 with ¾" NPT thread SensGuard, R 1" (BSPT) (PPS) Only available for CLS100 with ¾" NPT thread Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosures Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia ½" NPT cable gland, nickel plated brass, fits cable diameter 6 ... 12 mm (0.24 ... 0.47 inch) -40 ... +100 °C (-40 ... +212 °F), IP68 (General Purpose) M20 x 1.5 cable gland, PA polyamide, ATEX II 2G EEx e II, fits cable diameter 7 ... 12 mm (0.28 ... 0.47 inch), -20 ... +70 °C (-4 ... +158 °F), IP68 (General Purpose)	7ML1830-1DL 7ML1830-1DM 7ML1930-1AC 7NG4124-0AA00 7ML1830-1JA 7ML1830-1JC

Selection and Ordering data	Article No.
Pointek CLS100, PPS process connection Compact 2-wire inverse frequency shift capacitance switch for level and material detection in constricted spaces, interfaces, solids, liquids, slurries and foam, with the ability to tune out buildup on foam. ➔ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5610-
Process connection (PPS) ¾" NPT [(Taper), ANSI/ASME B1.20.1] (PPS probe body) R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] (PPS probe body)	A B
Approvals General Purpose: CSA, FM	D
Versions/Options Enclosure version, PPS process connection, ½" NPT cable inlet Enclosure version, PPS process connection, M20 x 1.5	1 2
Overfill protection Not required Required	0 1

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text	Y17
FFKM seal O-ring ¹⁾	A22
Material inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions Note: due to ATEX regulations one Quick start manual is included with every product. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories SensGuard, ¾" NPT (PPS) Only available for CLS100 with ¾" NPT thread SensGuard, R 1" (BSPT) (PPS) Only available for CLS100 with ¾" NPT thread Tag, stainless steel, 12 x 45 mm, (0.47 x 1.77 inch) one text line, suitable for enclosures	Article No. 7ML1830-1DL 7ML1830-1DM 7ML1930-1AC

¹⁾ See Temperature restriction on page 4/14

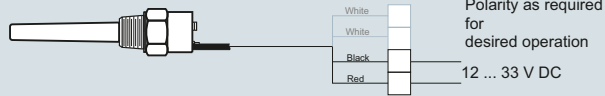
Options

Optional SensGuard, dimensions in mm (inch)

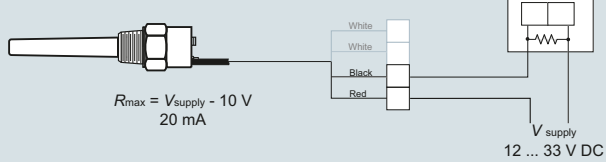
Circuit diagrams

Integral Cable Version - Non Intrinsically Safe only

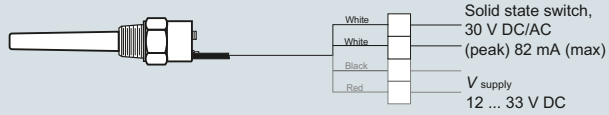
LOW/HIGH Alarm



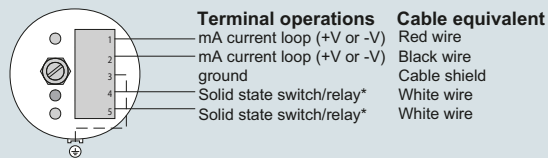
4/20 mA Loop Alarm



Solid State Switch Version



Enclosure and Fully Synthetic Version



* Switch/relay normally open in unpowered state

* Relay not available on Pointek CLS100 IS version (7ML5501)

Note:

When driving an inductive load (for example, an external relay), a protection diode must be connected in the correct polarity to prevent possible switch damage due to inductive spikes generated by switching the inductor (please refer to instruction manual). Intrinsically Safe Models - please follow local regulations and area classifications; refer to instruction manual for more details.

Pointek CLS100 connections

Level Measurement

Point level measurement
RF Capacitance switches

Pointek CLS200 - Standard

Overview



Pointek CLS200 (standard version) is a versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces and has the ability to tune out buildup on the probe.

Benefits

- Potted construction protects signal circuit from shock, vibration, humidity, and/or condensation
- High chemical resistance
- Level detection independent of tank or pipe earth reference
- Insensitive to product buildup due to high frequency oscillation
- 3 LED indicators for sensor status, output status, and power
- Suitable for API 2350

Application

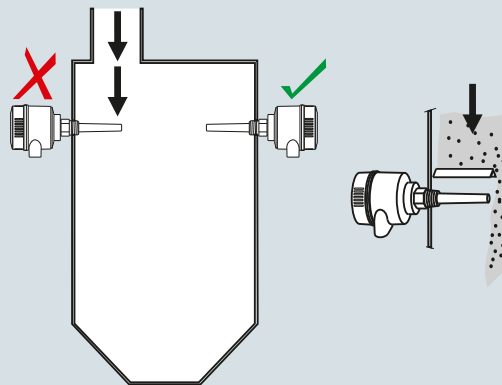
Pointek CLS200 standard version has 3 LED indicators with basic relay and solid-state switch alarms. Universal switch for solids/liquids and interface.

The power supply is galvanically isolated and accepts a wide range of voltages (12 to 250 V AC/DC). When used with thermal isolator, the stainless steel and PPS (PVDF optional) materials used in the probe construction provide a temperature rating up to 125 °C (257 °F) on the process wetted portion of the probe. The switch responds to any material with a dielectric constant of 1.5 or more by detecting a change in oscillating frequency, and it can be set to detect before contact or on contact with the probe. The CLS200 operates independently of the tank wall or pipe so it does not require an external reference electrode for level detection in a non-conductive vessel such as concrete or plastic (EMC regulations applicable in some regions).

- Key Applications: liquids, slurries, powders, granules, pressurized applications, hazardous areas

Configuration

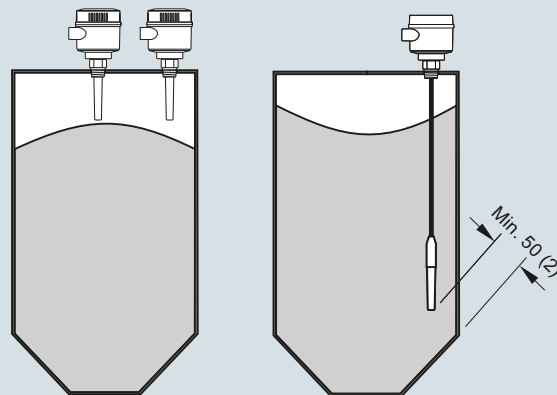
Installation



Keep unit out of path of falling material, or protect probe from falling material.



Avoid areas where material build up occurs.



Install probe at least 50 (2) from tank wall.

Pointek CLS200 installation, dimensions in mm (inch)

Technical specifications

Mode of operation		Design	
Measuring principle	Inverse frequency shift capacitive level detection	Material	Epoxy-coated aluminum with gasket 316L stainless steel
Input		• Enclosure	
Measured variable	Change in picoFarad (pF)	• Optional thermal isolator	
Output		Connection	Removable terminal block, max. 2.5 mm ²
Output signal		Degree of protection	IP65/Type 4/NEMA 4 (optional IP68)
• Relay output	1 SPDT Form C relay	Cable inlet	2 x M20 x 1.5 thread (option: 2 x ½" NPT conduit entry including 1 plugged entry)
- Max. contact voltage	• 30 V DC • 250 V AC	Power supply	
- Max. contact current	• 5 A DC • 8 A AC		
- Max. switching capacity	150 W DC 2 000 VA AC	Certificates and approvals	
- Time delay (ON and/or OFF)	1 ... 60 s	General Purpose	CSA, FM, CE, RCM
• Solid-state output		Dust Ignition Proof	ATEX II 1/2 D T100 °C
- Output	Galvanically isolated	Flameproof Enclosure With IS Probe	ATEX II 1 G EEx d[ia] IIC T6 ... T4 ATEX II 1/2 D T100 °C
- Protection	Against reversed polarity (bipolar)	Dust Ignition Proof with IS Probe	CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
- Max. switching voltage	• 30 V DC • 30 V peak AC	Explosion Proof Enclosure With IS Probe	CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
- Max. load current	82 mA	Marine	Lloyds Register of Shipping, Categories ENV1, ENV2, and ENV5
- Voltage drop	< 1 V, typical at 50 mA	Overfill Protection	WHG (Germany) VLAREM II
- Time delay (pre or post switching)	1 ... 60 s	Others	Pattern Approval (China), SIL
Rated operating conditions¹⁾		¹⁾ When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 4/33. ²⁾ Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F) ³⁾ Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 4/33.	
Installation conditions			
• Location	Indoor/outdoor		
Ambient conditions			
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) ²⁾		
• Installation category	II		
• Pollution degree	4		
Medium conditions	Liquids, bulk solids, slurries and interfaces		
• Relative dielectric constant ϵ_r	Min. 1.5		
• Process temperature			
- Without thermal isolator	-40 ... +85 °C (-40 ... +185 °F) ²⁾		
- With thermal isolator	-40 ... +125 °C (-40 ... +257 °F)		
• Process pressure (rod version)	-1 ... +25 bar g (-14.6 ... +365 psi g) (nominal)		
• Process pressure (cable version) ³⁾	-1 ... +10 bar g (-14.6 ... +150 psi g) (nominal)		
• Process pressure (sliding coupling version)	-1 ... +10 bar g (-14.6 ... +150 psi g) (nominal)		
Electromagnetic compatibility			
		To comply with CE EMC regulations (where applicable); the CLS200 should be installed per the instruction manual.	

Level Measurement

Point level measurement

RF Capacitance switches

Pointek CLS200 - Standard

Design: Probe				
	Rod version	Sanitary version	Cable version	Sliding Coupling version
Max. length	5 500 mm (216.53 inch)	5 500 mm (216.53 inch)	<ul style="list-style-type: none"> • 30 000 mm (1 181.1 inch) liquids and slurries • 5 000 mm (196.85 inch) solids (under loads) 	5 500 mm (216.53 inch)
Process connection	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	1½", 2" sanitary fitting clamp 316L stainless steel	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
Extension material	316L stainless steel optional PFA coated ¹⁾	316L stainless steel	Fluoroethylene propylene (FEP) cable with stainless steel core	316L stainless steel
Sensor wetted parts	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)
O-ring seal material	FKM (optional FFKM) ²⁾	FKM (optional FFKM) ²⁾	FKM (optional FFKM) ²⁾	FKM (optional FFKM) ²⁾
Thermal isolator ³⁾	Optional	Optional	Optional	Optional
Extension	User selected length	User selected length	Cable extension	User selected length

¹⁾ PFA coating (7ML5634 and 7ML5644) has 120 micron thickness

²⁾ For caustic materials, consult a local sales person for alternative O-rings. For more information, please visit <http://www.usa.siemens.com/level>.



³⁾ Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)

Level Measurement

Point level measurement

RF Capacitance switches

Pointek CLS200 - Standard

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
Pointek CLS200 - Standard - Rod Version with Threaded or Flanged process connection Versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out buildup on the probe. ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5630- 	Pointek CLS200 - Standard - Rod Version with Threaded or Flanged process connection Versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out buildup on the probe. Add Order code Y01 and plain text: "Insertion length ... mm"	7ML5630- 
Process connection Threaded, 316L stainless steel 3/4" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1] 1 1/4" NPT [(Taper), ANSI/ASME B1.20.1] 1 1/2" NPT [(Taper), ANSI/ASME B1.20.1] R 3/4" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1 1/2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 3/4" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] G 1 1/2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] Welded flange, 316L stainless steel, raised face 1" ASME, 150 lb 1" ASME, 300 lb 1" ASME, 600 lb 1 1/2" ASME, 150 lb 1 1/2" ASME, 300 lb 1 1/2" ASME, 600 lb 2" ASME, 150 lb 2" ASME, 300 lb 2" ASME, 600 lb 3" ASME, 150 lb 3" ASME, 300 lb 3" ASME, 600 lb 4" ASME, 150 lb 4" ASME, 300 lb 4" ASME, 600 lb Welded flange, 316L stainless steel, Type A flat faced DN 25, PN 16 DN 25, PN 40 DN 40, PN 16 DN 40, PN 40 DN 50, PN 16 DN 50, PN 40 DN 80, PN 16 DN 80, PN 40 DN 100, PN 16 DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	0 A 0 B 0 C 0 D 1 A 1 B 1 D 3 A 3 B 3 D 5 A 5 B 5 C 5 D 5 E 5 F 5 G 5 H 5 J 5 K 5 L 5 M 5 N 5 P 5 Q 6 A 6 B 6 C 6 D 6 E 6 F 6 G 6 H 6 J 6 K	Extended rod, 210 ... 1 000 mm (8.27 ... 39.37 inch) Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch) Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch) Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch) Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch) Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch) Thermal isolator Without thermal isolator With thermal isolator [for process connection temperatures over 85 °C (185 °F)] Remote mount electronics and mounting bracket With 2 m (79 inch) of cable ¹⁾²⁾ With 5 m (197 inch) of cable ¹⁾²⁾ Wetted seals FKM FFKM [for process temperatures above -20 °C (-4 °F)] Probe material 316L stainless steel with PPS probe body 316L stainless steel with PVDF probe body Approvals Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 General Purpose (CSA, FM) General Purpose (CE, RCM) General Purpose (CSA, FM, CE, RCM) with WHG approval Enclosure and lid Aluminum epoxy coated 2 x 1/2" NPT via adapter - cable inlet, IP65 2 x M20 x 1.5 cable inlet IP65 2 x 1/2" NPT via adapter - cable inlet, IP68 2 x M20 x 1.5 cable inlet IP68	M N P Q R S 0 1 2 3 0 1 0 1 C D E F G H J K A B C D
Probe length (length from flange face) (threaded lengths include process thread) Note: No Y01 needed in Order code for standard lengths Compact [threaded 120 mm (4.72 inch), Flanged 98 mm (3.86 inch)] Extended rod, 250 mm (9.84 inch) Extended rod, 350 mm (13.78 inch) Extended rod, 500 mm (19.69 inch) Extended rod, 750 mm (29.53 inch) Extended rod, 1 000 mm (39.37 inch) Extended rod, 1 250 mm (49.21 inch) Extended rod, 1 350 mm (53.15 inch) Extended rod, 1 500 mm (59.06 inch) Extended rod, 1 750 mm (68.90 inch) Extended rod, 2 000 mm (78.74 inch)	A B C D E F G H J K L		

¹⁾ Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

²⁾ Available with Approval options F, G, and H

Level Measurement

Point level measurement

RF Capacitance switches

Pointek CLS200 - Standard

Selection and Ordering data

Order code

Further designs

Please add **"-Z"** to Article No. and specify Order code(s).

Total insertion length: enter the total insertion length in plain text description

Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]:
Measuring-point number/identification
(max. 27 characters) specify in plain text

Manufacturer's test certificate: M to DIN 55350,
Part 18 and ISO 9000

Material inspection Certificate Type 3.1 per
EN 10204

SIL/IEC 61508 Declaration of Conformity
[SIL 2 (overspill)]

Operating Instructions

All literature is available to download for free, in a
range of languages, at [http://www.siemens.com/
processinstrumentation/documentation](http://www.siemens.com/processinstrumentation/documentation)

Accessories

See page 4/32

Selection and Ordering data

Article No.

Pointek CLS200 - Standard - Cable Version with Threaded or Flanged process connection

Versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out buildup on the probe.

➔ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Process connection

Threaded, 316L stainless steel

¾" NPT [(Taper), ANSI/ASME B1.20.1]

1" NPT [(Taper), ANSI/ASME B1.20.1]

1¼" NPT [(Taper), ANSI/ASME B1.20.1]

1½" NPT [(Taper), ANSI/ASME B1.20.1]

R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P),
JIS B 0202]

Welded flange, 316L stainless steel, raised face

1" ASME, 150 lb

1" ASME, 300 lb

1" ASME, 600 lb

1½" ASME, 150 lb

1½" ASME, 300 lb

1½" ASME, 600 lb

2" ASME, 150 lb

2" ASME, 300 lb

2" ASME, 600 lb

3" ASME, 150 lb

3" ASME, 300 lb

3" ASME, 600 lb

4" ASME, 150 lb

4" ASME, 300 lb

4" ASME, 600 lb

Welded flange, 316L stainless steel,
Type A flat faced

DN 25, PN 16

DN 25, PN 40

DN 40, PN 16

DN 40, PN 40

DN 50, PN 16

DN 50, PN 40

DN 80, PN 16

DN 80, PN 40

DN 100, PN 16

DN 100, PN 40

(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)

Probe length

(length from flange face)

(threaded lengths include process thread)

Note: No Y01 needed in Order code for standard lengths

Extended cable, 3 000 mm (118.11 inch), length can be determined by customer on assembly¹⁾

Extended cable, 6 000 mm (236.22 inch), length can be determined by customer on assembly¹⁾

Add Order code Y01 and plain text:

"Insertion length ... mm"

Extended cable, 500 ... 5 000 mm
(19.69 ... 196.85 inch)

Extended cable, 5 001 ... 10 000 mm
(196.89 ... 393.70 inch)

Extended cable, 10 001 ... 15 000 mm
(393.74 ... 590.55 inch)

Extended cable, 15 001 ... 20 000 mm
(590.59 ... 787.4 inch)

Extended cable, 20 001 ... 25 000 mm
(787.44 ... 984.25 inch)

Extended cable, 25 001 ... 30 000 mm
(984.29 ... 1 181.1 inch)

7ML5631-
- 0

0 A
0 B
0 C
0 D
1 A
1 B
1 D
3 A
3 B
3 D

5 A
5 B
5 C
5 D
5 E
5 F
5 G
5 H
5 J
5 K
5 L
5 M
5 N
5 P
5 Q

6 A
6 B
6 C
6 D
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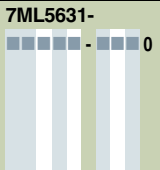
H

Level Measurement

Point level measurement

RF Capacitance switches

Pointek CLS200 - Standard

Selection and Ordering data	Article No.	Selection and Ordering data	Order code
Pointek CLS200 - Standard - Cable Version with Threaded or Flanged process connection Versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out buildup on the probe.	7ML5631- 	Further designs Please add "-Z" to Article No. and specify Order code(s). Total insertion length: enter the total insertion length in plain text description Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000 Material inspection Certificate Type 3.1 per EN 10204 SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)]	
Thermal isolator Without thermal isolator With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	0 1		Y01 Y15
Remote mount electronics and mounting bracket With 2 m (79 inch) of cable ²⁾ With 5 m (197 inch) of cable ²⁾	2 3		C11 C12
Wetted seals FKM and PTFE FFKM and PTFE [for process temperatures above -20 °C (-4 °F)]	0 1	Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	C20
Probe material FEP jacketed cable with PPS probe body FEP jacketed cable with PVDF probe body	0 1	Accessories	See page 4/32
Approvals Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 General Purpose (CSA, FM) General Purpose (CE, RCM) General Purpose (CSA, FM, CE, RCM) with WHG approval	C D E F G H J K		
Enclosure and lid Aluminum epoxy coated 2 x 1/2" NPT via adapter - cable inlet, IP65 2 x M20 x 1.5 cable inlet, IP65 2 x 1/2" NPT via adapter - cable inlet, IP68 2 x M20 x 1.5 cable inlet, IP68	A B C D		


¹⁾ Sensor detached to allow customer to set desired cable length


²⁾ Available with Approvals options F ... H

Level Measurement

Point level measurement
RF Capacitance switches

Pointek CLS200 - Standard

Selection and Ordering data	Article No.
Pointek CLS200 - Standard - Rod with Sanitary process connection Versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out buildup on the probe. ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5632- 
Process connection Sanitary 316L stainless steel 1" sanitary fitting clamp 1½" sanitary fitting clamp 2" sanitary fitting clamp 2½" sanitary fitting clamp 3" sanitary fitting clamp (Note: Sanitary connection dimensionally corresponds to the applicable ISO 2852 standard)	8 A 8 B 8 C 8 D 8 E
Probe length (length from process connection face) Note: No Y01 needed in Order code for standard lengths Compact, 98 mm (3.86 inch) Extended rod, 250 mm (9.84 inch) Extended rod, 350 mm (13.78 inch) Extended rod, 500 mm (19.69 inch) Extended rod, 750 mm (29.53 inch) Extended rod, 1 000 mm (39.37 inch) Extended rod, 1 250 mm (49.21 inch) Extended rod, 1 350 mm (53.15 inch) Extended rod, 1 500 mm (59.06 inch) Extended rod, 1 750 mm (68.90 inch) Extended rod, 2 000 mm (78.74 inch) Add Order code Y01 and plain text: "Insertion length ... mm" Extended rod, 110 ... 350 mm (4.3 ... 13.78 inch) Extended rod, 351 ... 1 000 mm (13.78 ... 39.37 inch) Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch) Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch) Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch) Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch) Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)	A B C D E F G H J K L M N P Q R S T
Thermal isolator Without thermal isolator With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	0 1
Remote mount electronics and mounting bracket Remote mount electronics with 2 m (79 inch) of cable Remote mount electronics with 5 m (197 inch) of cable	2 3
Wetted seals FKM FFKM [for process temperatures above -20 °C (-4 °F)]	0 1
Probe material 316L stainless steel with PPS probe body 316L stainless steel with PVDF probe body	0 1

Selection and Ordering data	Article No.
Pointek CLS200 - Standard - Rod with Sanitary process connection Versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out buildup on the probe.	7ML5632- 
Approvals Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 General Purpose (CSA, FM) General Purpose (CE, RCM) General Purpose (CSA, FM, CE, RCM) with WHG approval	C D E F G H J K
Enclosure and lid Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65 2 x M20 x 1.5 cable inlet, IP65 2 x ½" NPT via adapter - cable inlet, IP68 2 x M20 x 1.5 cable inlet, IP68	A B C D

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204	C12
SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)]	C20
Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	See page 4/32

Level Measurement

Point level measurement

RF Capacitance switches

Pointek CLS200 - Standard

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
Pointek CLS200 - Standard - Sliding Coupling with Threaded process connection Versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out buildup on the probe. ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5633- 	Pointek CLS200 - Standard - Sliding Coupling with Threaded process connection Versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out buildup on the probe.	7ML5633-
Process connection Threaded, 316L stainless steel 3/4" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1] 1 1/4" NPT [(Taper), ANSI/ASME B1.20.1] 1 1/2" NPT [(Taper), ANSI/ASME B1.20.1] R 3/4" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1 1/2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 3/4" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] G 1 1/2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	0 A 0 B 0 C 0 D 1 A 1 B 1 D 3 A 3 B 3 D	Approvals Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 General Purpose (CSA, FM) General Purpose (CE, RCM) General Purpose (CSA, FM, CE, RCM) with WHG approval	C D E F G H J K
Probe length (length from flange face) (threaded lengths include process thread) <u>Note: No Y01 needed in Order code for standard lengths</u> Extended rod, 350 mm (13.78 inch) Extended rod, 500 mm (19.69 inch) Extended rod, 750 mm (29.53 inch) Extended rod, 1 000 mm (39.37 inch) Extended rod, 1 250 mm (49.21 inch) Extended rod, 1 350 mm (53.15 inch) Extended rod, 1 500 mm (59.06 inch) Extended rod, 1 750 mm (68.90 inch) Extended rod, 2 000 mm (78.74 inch)	C D E F G H J K L	Enclosure and lid Aluminum epoxy coated 2 x 1/2" NPT via adapter - cable inlet, IP65 2 x M20 x 1.5 cable inlet, IP65 2 x 1/2" NPT via adapter - cable inlet, IP68 2 x M20 x 1.5 cable inlet, IP68	A B C D
Add Order code Y01 and plain text: "Insertion length ... mm" Extended rod, 350 ... 1 000 mm (13.78 ... 39.37 inch) Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch) Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch) Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch) Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch) Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)	M N P Q R S	1) Available with Approvals options F ... H	
Thermal isolator Without thermal isolator With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	0 1		
Remote mount electronics and mounting bracket With 2 m (79 inch) of cable ¹⁾ With 5 m (197 inch) of cable ¹⁾	2 3		
Wetted seals FKM and PTFE FFKM and PTFE [for process temperatures above -20 °C (-4 °F)]	0 1		
Probe material 316L stainless steel with PPS probe body 316L stainless steel with PVDF probe body	0 1		
		Selection and Ordering data Further designs Please add "-Z" to Article No. and specify Order code(s). Total insertion length: enter the total insertion length in plain text description Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000 Material inspection Certificate Type 3.1 per EN 10204 SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)] Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation Accessories	Order code Y01 Y15 C11 C12 C20 See page 4/32

Level Measurement

Point level measurement
RF Capacitance switches

Pointek CLS200 - Digital

Overview



Pointek CLS200 (digital version) is a versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces and has the ability to tune out buildup on the probe. The digital version includes PROFIBUS PA, an LCD display, and advanced diagnostic features.

Benefits

- Potted construction protects signal circuit from shock, vibration, humidity, and/or condensation
- High chemical resistance
- Level detection independent of tank or pipe earth reference
- Insensitive to product buildup due to high frequency oscillation
- High sensitivity allows installation in a wide range of liquids, solids or slurry applications
- Integral LCD display allows for easy menu-driven setup
- PROFIBUS PA communication (SIMATIC PDM compatible)

Application

Pointek CLS200 digital version provides an integral LCD display for stand-alone use, and also provides PROFIBUS PA communication (Profile version 3.0, Class B) for connection to a network.

The power supply is galvanically isolated and accepts a wide range of voltages (12 to 30 V DC). When used with thermal isolator, the stainless steel and PPS (PVDF optional) materials used in the probe construction provide a temperature rating up to 125 °C (257 °F) on the process wetted portion of the probe. The switch responds to any material with a dielectric constant of 1.5 or more by detecting a change in oscillating frequency, and it can be set to detect before contact or on contact with the probe. The menu-driven setup allows precise control of the switch point signal damping and alarm functions.

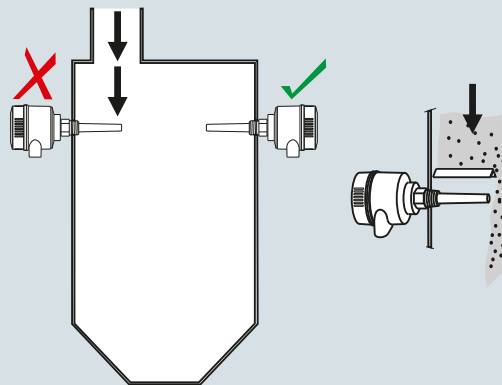
When connected to the PROFIBUS network, advanced diagnostics and set up using SIMATIC PDM are possible.

The CLS200 operates independently of the tank wall or pipe so it does not require an external reference electrode for level detection in a non-conductive vessel such as concrete or plastic (EMC regulations applicable in some regions).

- Key Applications: liquids, slurries, powders, granules, pressurized applications, hazardous areas

Configuration

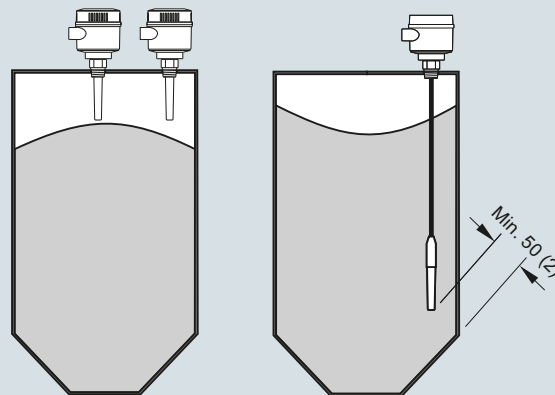
Installation



Keep unit out of path of falling material, or protect probe from falling material.



Avoid areas where material build up occurs.



Install probe at least 50 (2) from tank wall.

Pointek CLS200 installation, dimensions in mm (inch)

Technical specifications

Mode of operation		Power supply	
Measuring principle	Inverse frequency shift capacitive level detection	Bus voltage	Standard: 12 ... 30 V DC Intrinsically Safe: 12 ... 24 V DC
Input		Current consumption	12.5 mA
Measured variable	Change in picoFarad (pF)	Certificates and approvals	
Output		General Purpose	CSA, FM, CE, RCM
Output signal		Dust Ignition Proof	ATEX II 1/2 D T100 °C
• Solid-state output		Dust Ignition Proof with IS Probe	CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
- Output	Galvanically isolated	Flameproof Enclosure with IS Probe	ATEX II 1/2 G EEx d[ia] IIC T6 ... T4 ATEX II 1/2 D T100 °C
- Protection	Against reversed polarity (bipolar)	Explosion Proof with IS Probe	CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
- Max. switching voltage	• 30 V (DC) • 30 V peak (AC)	Intrinsically Safe ⁴⁾	ATEX II 1 G EEx ia IIC T6 ... T4 ATEX II 1/2 D IP6X T100 °C CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
- Max. load current	82 mA	Non-incendive	CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6
- Voltage drop	< 1 V, typical at 50 mA	Non-Sparking	ATEX II 3 G Ex nA II T6 ... T4 ATEX II 2 D IP6X T100 °C
- Time delay (ON and/or OFF)	Programmable by user (0 ... 100 s)	Marine	Lloyds Register of Shipping, Categories ENV1, ENV2, and ENV5
• Fail-safe mode	Min. or max.	Others	Pattern Approval (China)
• Connection	Removable terminal block	Communication	PROFIBUS PA (IEC 61158 CPF3 CP3/2) Bus physical layer: IEC 61158-2 MBP (IS) Device profile: PROFIBUS PA profile for Process Control Devices Version 3.0, Class B FISCO field device
Rated operating conditions¹⁾			
Installation conditions			
• Location	Indoor/outdoor		
Ambient conditions			
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) ²⁾		
• Installation category	II		
• Pollution degree	4		
Medium conditions			
	Liquids, bulk solids, slurries, and interfaces		
• Relative dielectric constant ϵ_r	Min. 1.5		
• Process temperature			
- Without thermal isolator	-40 ... +85 °C (-40 ... +185 °F) ²⁾		
- With thermal isolator	-40 ... +125 °C (-40 ... +257 °F)		
• Process pressure (rod version)	-1 ... +25 bar g (-14.6 ... +365 psi g) (nominal)		
• Process pressure (cable version) ³⁾	-1 ... +10 bar g (-14.6 ... +150 psi g) (nominal)		
• Process pressure (sliding coupling version)	-1 ... +10 bar g (-14.6 ... +150 psi g) (nominal)		
Design			
Material			
• Enclosure	Epoxy-coated aluminum with gasket		
• Optional thermal isolator	316L stainless steel		
Connection	Removable terminal block, max. 2.5 mm ²		
Degree of protection	IP65/Type 4/NEMA 4 (optional IP68)		
Cable inlet	2 x M20 x 1.5 thread (option: 2 x ½" NPT conduit entry including 1 plugged entry)		
Electromagnetic compatibility	To comply with CE EMC regulations (where applicable); the CLS200 should be installed per the instruction manual.		

¹⁾ When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 4/33.

²⁾ Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)

³⁾ Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 4/33.

⁴⁾ Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

Level Measurement

Point level measurement

RF Capacitance switches

Pointek CLS200 - Digital

Design: Probe

	Rod version	Sanitary version	Cable version	Sliding Coupling version
Max. length	5 500 mm (216.53 inch)	5 500 mm (216.53 inch)	<ul style="list-style-type: none"> • 30 000 mm (1 181.1 inch) liquids and slurries • 5 000 mm (196.85 inch) solids (under loads) 	5 500 mm (216.53 inch)
Process connection	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	1½", 2" sanitary fitting clamp 316L stainless steel	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
Extension material	316L stainless steel optional PFA coated ¹⁾	316L stainless steel	Fluoroethylene propylene (FEP) cable with stainless steel core	316L stainless steel
Sensor wetted parts	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)
O-ring seal material	FKM (optional FFKM) ²⁾	FKM (optional FFKM) ²⁾	FKM (optional FFKM) ²⁾	FKM (optional FFKM) ²⁾
Thermal isolator ³⁾	Optional	Optional	Optional	Optional
Extension	User selected length	User selected length	Cable extension	User selected length

¹⁾ PFA coating (7ML5634 and 7ML5644) has 120 micron thickness

²⁾ For caustic materials, consult a local sales person for alternative O-rings. For more information, please visit <http://www.usa.siemens.com/level>.



³⁾ Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F).

Level Measurement

Point level measurement

RF Capacitance switches

Pointek CLS200 - Digital

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
Pointek CLS200 - Digital - Rod with Threaded or Flanged process connection Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out buildup on the probe. Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5640- 	Pointek CLS200 - Digital - Rod with Threaded or Flanged process connection Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out buildup on the probe. Add Order code Y01 and plain text: "Insertion length ... mm"	7ML5640- 
Process connection <u>Threaded, 316L stainless steel</u> 3/4" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1] 1 1/4" NPT [(Taper), ANSI/ASME B1.20.1] 1 1/2" NPT [(Taper), ANSI/ASME B1.20.1] R 3/4" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1 1/2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 3/4" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] G 1 1/2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] <u>Welded flange, 316L stainless steel, raised face</u> 1" ASME, 150 lb 1" ASME, 300 lb 1" ASME, 600 lb 1 1/2" ASME, 150 lb 1 1/2" ASME, 300 lb 1 1/2" ASME, 600 lb 2" ASME, 150 lb 2" ASME, 300 lb 2" ASME, 600 lb 3" ASME, 150 lb 3" ASME, 300 lb 3" ASME, 600 lb 4" ASME, 150 lb 4" ASME, 300 lb 4" ASME, 600 lb <u>Welded flange, 316L stainless steel, Type A flat faced</u> DN 25, PN 16 DN 25, PN 40 DN 40, PN 16 DN 40, PN 40 DN 50, PN 16 DN 50, PN 40 DN 80, PN 16 DN 80, PN 40 DN 100, PN 16 DN 100, PN 40 (Note: flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.) Probe length (length from flange face) (threaded lengths include process thread) Note: No Y01 needed in Order code for standard lengths Compact [threaded 120 mm (4.72 inch), Flanged 98 mm (3.86 inch)] Extended rod, 250 mm (9.84 inch) Extended rod, 350 mm (13.78 inch) Extended rod, 500 mm (19.69 inch) Extended rod, 750 mm (29.53 inch) Extended rod, 1 000 mm (39.37 inch) Extended rod, 1 250 mm (49.21 inch) Extended rod, 1 350 mm (53.15 inch) Extended rod, 1 500 mm (59.06 inch) Extended rod, 1 750 mm (68.90 inch) Extended rod, 2 000 mm (78.74 inch)	0 A 0 B 0 C 0 D 1 A 1 B 1 D 3 A 3 B 3 D 5 A 5 B 5 C 5 D 5 E 5 F 5 G 5 H 5 J 5 K 5 L 5 M 5 N 5 P 5 Q 6 A 6 B 6 C 6 D 6 E 6 F 6 G 6 H 6 J 6 K	Thermal isolator Without thermal isolator With thermal isolator [for process connection temperatures over 85 °C (185 °F)] Remote mount electronics and mounting bracket With 2 m (79 inch) of cable ²⁾ With 5 m (197 inch) of cable ²⁾ Wetted seals FKM FFKM [for process temperatures above -20 °C (-4 °F)] Probe material 316L stainless steel with PPS probe body 316L stainless steel with PVDF probe body Approvals Non-Sparking: CE, RCM, ATEX II 3 G Ex nA II T6 ... T4, ATEX II 2 D IP6X T100 °C Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C Intrinsically Safe: ¹⁾ CE, RCM, ATEX II 1 G EEx ia IIC T6 ... T4, ATEX II 1/2 D IP6X T100 °C Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6 Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 Intrinsically Safe: ¹⁾ CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 General Purpose (CSA, FM) General Purpose (CE, RCM)	M N P Q R S 0 1 2 3 0 1 0 1 B C D E F G H J K L

Level Measurement

Point level measurement
RF Capacitance switches

Pointek CLS200 - Digital

Selection and Ordering data

Article No.

Pointek CLS200 - Digital - Rod with Threaded or Flanged process connection

Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out buildup on the probe.

Enclosure and lid

Aluminum epoxy coated

2 x 1/2" NPT via adapter - cable inlet, IP65

2 x M20 x 1.5 cable inlet, IP65

2 x 1/2" NPT via adapter - cable inlet, IP68

2 x M20 x 1.5 cable inlet, IP68

1) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

2) Available with Approvals options F, G, H, J, and K

Article No.



Selection and Ordering data

Article No.

Pointek CLS200 - Digital - Cable with Threaded or Flanged process connection

Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out buildup on the probe.

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Process connection

Threaded, 316L stainless steel

3/4" NPT [(Taper), ANSI/ASME B1.20.1]

1" NPT [(Taper), ANSI/ASME B1.20.1]

1 1/4" NPT [(Taper), ANSI/ASME B1.20.1]

1 1/2" NPT [(Taper), ANSI/ASME B1.20.1]

R 3/4" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

R 1 1/2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

G 3/4" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

G 1 1/2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

Welded flange, 316L stainless steel, raised face

1" ASME, 150 lb

1" ASME, 300 lb

1" ASME, 600 lb

1 1/2" ASME, 150 lb

1 1/2" ASME, 300 lb

1 1/2" ASME, 600 lb

2" ASME, 150 lb

2" ASME, 300 lb

2" ASME, 600 lb

3" ASME, 150 lb

3" ASME, 300 lb

3" ASME, 600 lb

4" ASME, 150 lb

4" ASME, 300 lb

4" ASME, 600 lb

Welded flange, 316L stainless steel, Type A flat faced

DN 25, PN 16

DN 25, PN 40

DN 40, PN 16

DN 40, PN 40

DN 50, PN 16

DN 50, PN 40

DN 80, PN 16

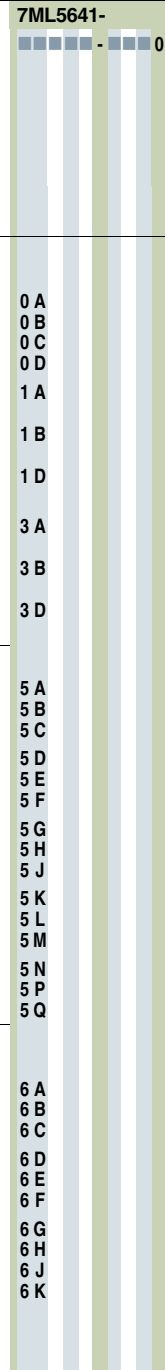
DN 80, PN 40

DN 100, PN 16

DN 100, PN 40

(Note: flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)

Article No.



Selection and Ordering data

Order code

Further designs

Please add "-Z" to Article No. and specify Order code(s).

Total insertion length: enter the total insertion length in plain text description

Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]:
Measuring-point number/identification
(max. 27 characters) specify in plain text

Manufacturer's test certificate: M to DIN 55350,
Part 18 and ISO 9000

Material inspection Certificate Type 3.1 per
EN 10204

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Accessories

See page 4/32

Level Measurement

Point level measurement

RF Capacitance switches

Pointek CLS200 - Digital

Selection and Ordering data		Article No.	
Pointek CLS200 - Digital - Cable with Threaded or Flanged process connection	7ML5641-		

Level Measurement

Point level measurement

RF Capacitance switches

Pointek CLS200 - Digital

Selection and Ordering data

Article No.

Pointek CLS200 - Digital - Rod with Sanitary process connection

Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out buildup on the probe.

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Process connection

Sanitary 316L stainless steel

1" sanitary fitting clamp
1½" sanitary fitting clamp
2" sanitary fitting clamp

2½" sanitary fitting clamp

3" sanitary fitting clamp

(Note: Sanitary connection dimensionally corresponds to the applicable ISO 2852 standard.)

Probe length

(length from process connection face)

Note: No Y01 needed in Order code for

standard lengths

Compact, 98 mm (3.86 inch)

Extended rod, 250 mm (9.84 inch)

Extended rod, 350 mm (13.78 inch)

Extended rod, 500 mm (19.69 inch)

Extended rod, 750 mm (29.53 inch)

Extended rod, 1 000 mm (39.37 inch)

Extended rod, 1 250 mm (49.21 inch)

Extended rod, 1 350 mm (53.15 inch)

Extended rod, 1 500 mm (59.06 inch)

Extended rod, 1 750 mm (68.90 inch)

Extended rod, 2 000 mm (78.74 inch)

Add Order code Y01 and plain text:

"Insertion length ... mm"

Extended rod, 110 ... 350 mm

(4.3 ... 13.78 inch)

Extended rod, 351 ... 1 000 mm

(13.82 ... 39.37 inch)

Extended rod, 1 001 ... 2 000 mm

(39.41 ... 78.74 inch)

Extended rod, 2 001 ... 3 000 mm

(78.78 ... 118.11 inch)

Extended rod, 3 001 ... 4 000 mm

(118.15 ... 157.48 inch)

Extended rod, 4 001 ... 5 000 mm

(157.52 ... 196.85 inch)

Extended rod, 5 001 ... 5 500 mm

(196.89 ... 216.53 inch)

Thermal isolator

Without thermal isolator

With thermal isolator [for process connection temperatures over 85 °C (185 °F)]

Remote mount electronics and mounting bracket

With 2 m (79 inch) of cable²⁾

With 5 m (197 inch) of cable²⁾

Wetted seals

FKM

FFKM [for process temperatures above -20 °C (-4 °F)]

Probe material

316L stainless steel with PPS probe body

316L stainless steel with PVDF probe body

Approvals

Non-Sparking:

CE, RCM, ATEX II 3 G Ex nA II T6 ... T4,
ATEX II 2 D IP6X T100 °C

Dust Ignition Proof:

CE, RCM, ATEX II 1/2 D T100 °C

Intrinsically Safe:¹⁾

CE, RCM, ATEX II 1 G EEx ia IIC T6 ... T4,
ATEX II 1/2 D IP6X T100 °C

Flameproof Enclosure with IS Probe:

CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T4,
ATEX II 1/2 D T100 °C

7ML5642-

0

8 A

8 B

8 C

8 D

8 E

A

B

C

D

E

F

G

H

J

K

L

M

N

P

Q

R

S

T

0

1

2

3

0

1

0

1

B

C

D

E

Selection and Ordering data

Article No.

Pointek CLS200 - Digital - Rod with Sanitary process connection

Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out buildup on the probe.

Non-incendive:

CSA/FM Class I, Div. 2, Groups A, B, C, D

CSA/FM Class II, Div. 2, Groups F, G

CSA/FM Class III T4 or T6

Dust Ignition Proof with IS Probe:

CSA/FM Class II, Div. 1, Groups E, F, G

CSA/FM Class III T4

Intrinsically Safe:¹⁾

CSA/FM Class I, Div. 1, Groups A, B, C, D

CSA/FM Class II, Div. 1, Groups E, F, G

CSA/FM Class III T4

Explosion Proof with IS Probe:

CSA/FM Class I, Div. 1, Groups A, B, C, D

CSA/FM Class II, Div. 1, Groups E, F, G

CSA/FM Class III T4

General Purpose (CSA, FM)

General Purpose (CE, RCM)

Enclosure and lid

Aluminum epoxy coated

2 x ½" NPT via adapter - cable inlet, IP65

2 x M20 x 1.5 cable inlet, IP65

2 x ½" NPT via adapter - cable inlet, IP68

2 x M20 x 1.5 cable inlet, IP68

¹⁾ Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

²⁾ Available with Approvals options F, G, H, J, and K

7ML5642-

0

F

G

H

J

K

L

A

B

C

D

Selection and Ordering data

Order code

Further designs

Please add "-Z" to Article No. and specify Order code(s).

Total insertion length: enter the total insertion length in plain text description

Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]:

Measuring-point number/identification

(max. 27 characters) specify in plain text

Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000

Material inspection Certificate Type 3.1 per EN 10204

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Accessories

See page 4/32

Level Measurement

Point level measurement

RF Capacitance switches

Pointek CLS200 - Digital

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
Pointek CLS200 - Digital - Rod with Sliding coupling with Threaded process connection Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out buildup on the probe. ➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5643- 	Pointek CLS200 - Digital - Rod with Sliding coupling with Threaded process connection Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out buildup on the probe. Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6 Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 Intrinsically Safe: ¹⁾ CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 General Purpose (CSA, FM) General Purpose (CE, RCM)	7ML5643-
Process connection Threaded, 316L stainless steel 3/4" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1] 1 1/4" NPT [(Taper), ANSI/ASME B1.20.1] 1 1/2" NPT [(Taper), ANSI/ASME B1.20.1] R 3/4" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1 1/2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 3/4" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] G 1 1/2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	0 A 0 B 0 C 0 D 1 A 1 B 1 D 3 A 3 B 3 D	Enclosure and lid Aluminum epoxy coated 2 x 1/2" NPT via adapter - cable inlet, IP65 2 x M20 x 1.5 cable inlet, IP65 2 x 1/2" NPT via adapter - cable inlet, IP68 2 x M20 x 1.5 cable inlet, IP68 ¹⁾ Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection ²⁾ Available with Approvals options F, G, H, J, and K	E F G H J K L A B C D
Probe length (length from flange face) (threaded lengths include process thread) Note: No Y01 needed in Order code for standard lengths Extended rod, 350 mm (13.78 inch) Extended rod, 500 mm (19.69 inch) Extended rod, 750 mm (29.53 inch) Extended rod, 1 000 mm (39.37 inch) Extended rod, 1 250 mm (49.21 inch) Extended rod, 1 350 mm (53.15 inch) Extended rod, 1 500 mm (59.06 inch) Extended rod, 1 750 mm (68.90 inch) Extended rod, 2 000 mm (78.74 inch) Add Order code Y01 and plain text: "Insertion length ... mm" Extended rod, 350 ... 1 000 mm (13.82 ... 39.37 inch) Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch) Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch) Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch) Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch) Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)	C D E F G H J K L M N P Q R S	Selection and Ordering data Further designs Please add "-Z" to Article No. and specify Order code(s). Total insertion length: enter the total insertion length in plain text description Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000 Material inspection Certificate Type 3.1 per EN 10204 Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation Accessories	Order code Y01 Y15 C11 C12 See page 4/32
Thermal isolator Without thermal isolator With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	0 1		
Remote mount electronics and mounting bracket With 2 m (79 inch) of cable ²⁾ With 5 m (197 inch) of cable ²⁾	2 3		
Wetted seals FKM and PTFE FFKM and PTFE [for process temperatures above -20 °C (-4 °F)]	0 1		
Probe material 316L stainless steel with PPS probe body 316L stainless steel with PVDF probe body	0 1		
Approvals Non-Sparking: CE, RCM, ATEX II 3 G Ex nA II T6 ... T4, ATEX II 2 D IP6X T100 °C Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C Intrinsically Safe: ¹⁾ CE, RCM, ATEX II 1 G EEx ia IIC T6 ... T4, ATEX II 1/2 D IP6X T100 °C	B C D		

Level Measurement

Point level measurement
RF Capacitance switches

Pointek CLS200 – Standard and Digital

Selection and Ordering data

Article No.

Accessories

SensGuard, 3/4" NPT (PPS)

Only available for CLS200 with 3/4" NPT thread

SensGuard, R 1" (BSPT) (PPS)

Only available for CLS200 with 3/4" NPT thread

One metallic cable gland M20 x 1.5, -40 ... +80 °C (-40 ... +176 °F), Dust Ignition Proof, with integrated shield connection (available for PROFIBUS PA)

General Purpose

1/2" NPT General Purpose Cable Entry IP68/IP69K NEMA6, -40 ... +80 °C (-40 ... +176 °F), Dust Ignition Proof, cable size 6 ... 12 mm (0.236 ... 0.472 inch)

M20 x 1.5 General Purpose Cable Entry IP68/IP69K NEMA6, -40 ... +80 °C (-40 ... +176 °F), Dust Ignition Proof, cable size 7 ... 12 mm (0.275 ... 0.472 inch)

Hazardous Locations

1/2" NPT EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22, and in Gas Groups IIA, IIB and IIC) -60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch)

M20 EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22 and in Gas Groups IIA, IIB and IIC) -60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch)

Blind threaded flanges are available.

Customers interested in a custom designed device should consult a local sales person. For more information, please visit

<http://www.usa.siemens.com/level>.

Pointek Specials

7ML1830-1DL

7ML1830-1DM

7ML1830-1AQ

7ML1830-1JA

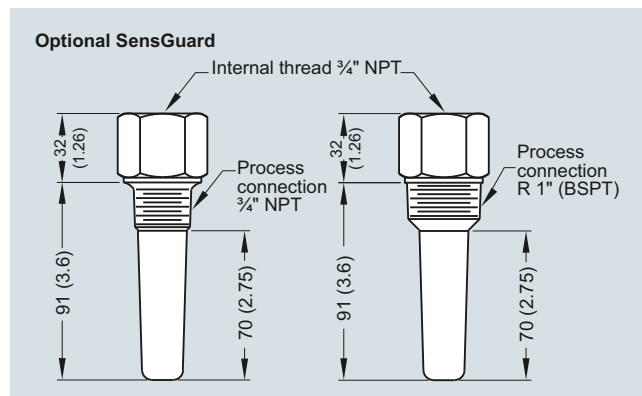
7ML1830-1JC

7ML1830-1JB

7ML1830-1JD

See page 4/60

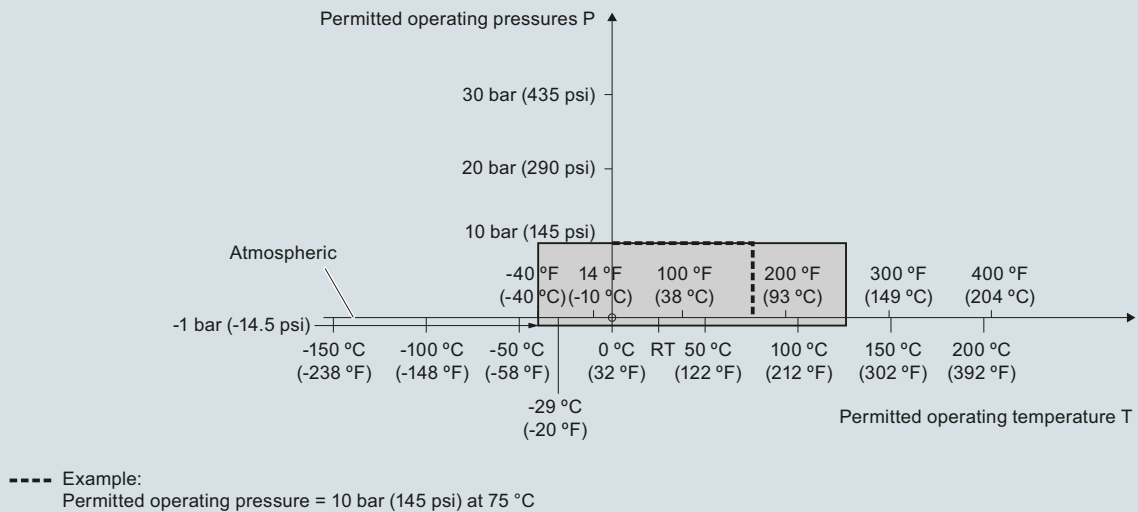
Options



Optional SensGuard, dimensions in mm (inch)

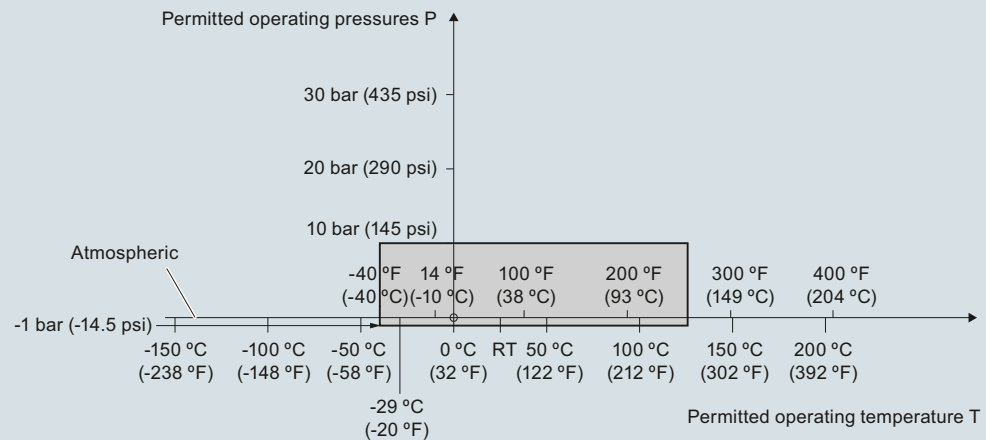
Characteristic curves

Pressure/temperature curve
CLS200 sliding coupling
threaded process connections
(7ML5633 and 7ML5643)



Pointek CLS200 process pressure/temperature derating curves (7ML5633 and 7ML5643)

Pressure/temperature curve
CLS200 cable
Threaded process connections
(7ML5631 and 7ML5641)



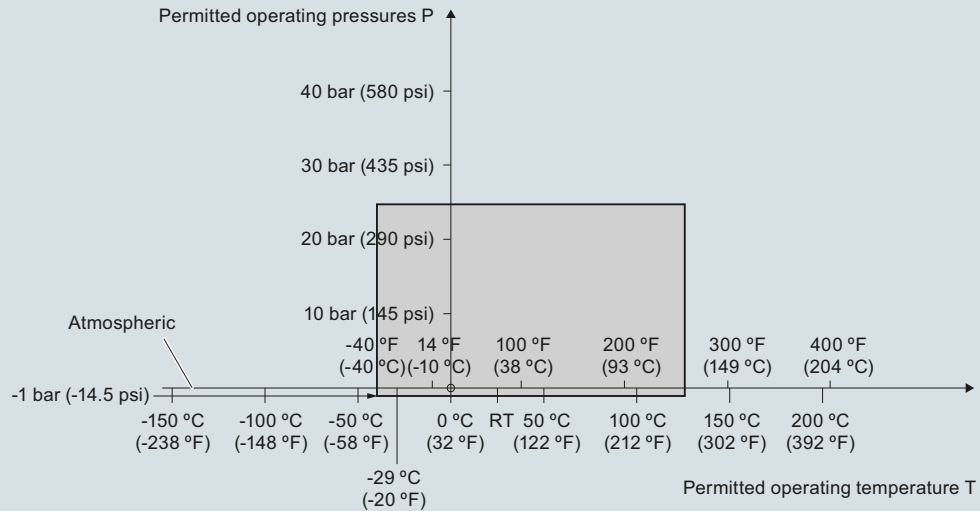
Pointek CLS200 process pressure/temperature derating curves (7ML5631 and 7ML5641)

Level Measurement

Point level measurement
RF Capacitance switches

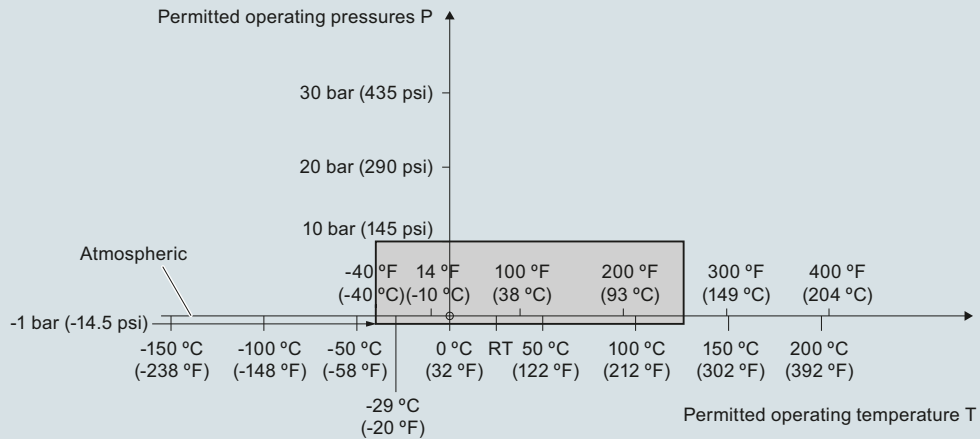
Pointek CLS200 - Standard and Digital

Pressure/temperature curve
CLS200 compact and extended rod
Threaded process connections
(7ML5630 and 7ML5640)



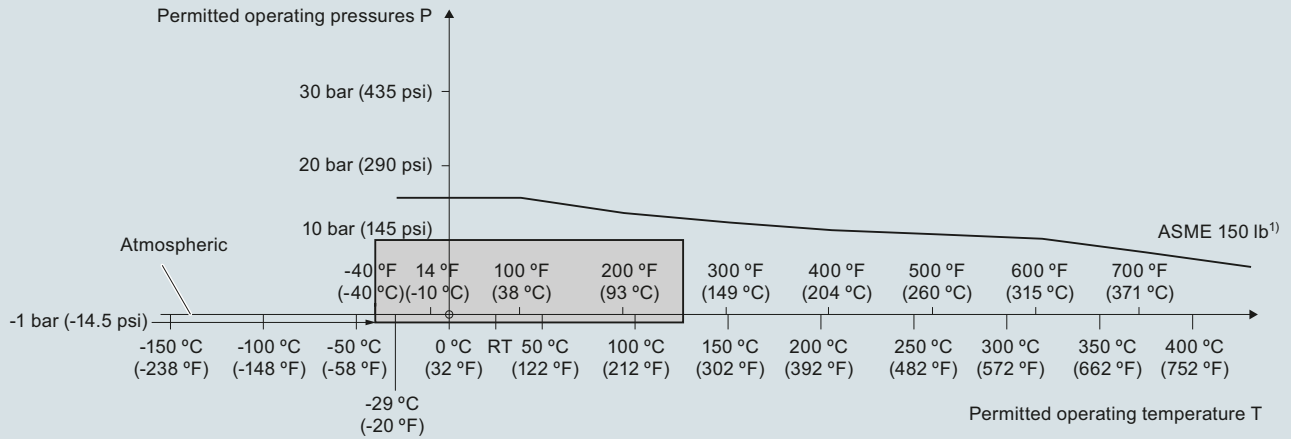
Pointek CLS200 process pressure/temperature derating curves (7ML5630 or 7ML5640)

Pressure/temperature curve
CLS200 compact and extended sanitary type
Sanitary process connections
(7ML5632 and 7ML5642)



Pointek CLS200 process pressure/temperature derating curves (7ML5632 and 7ML5642)

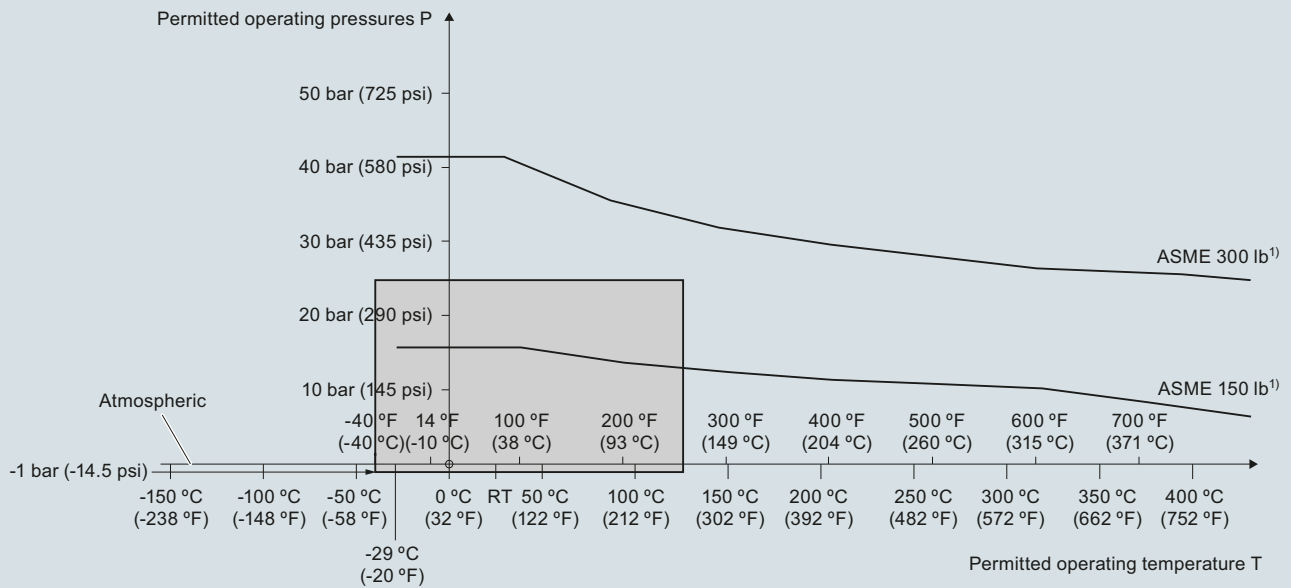
Pressure/temperature curve
CLS200, cable
ASME flanged process connections
(7ML5631 and 7ML5641)



¹¹ The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 process pressure/temperature derating curves (7ML5631 and 7ML5641)

Pressure/temperature curve
CLS200 compact and extended rod
ASME flanged process connections
(7ML5630 and 7ML5640)



¹¹ The curve denotes the minimum allowable flange class for the shaded area below.

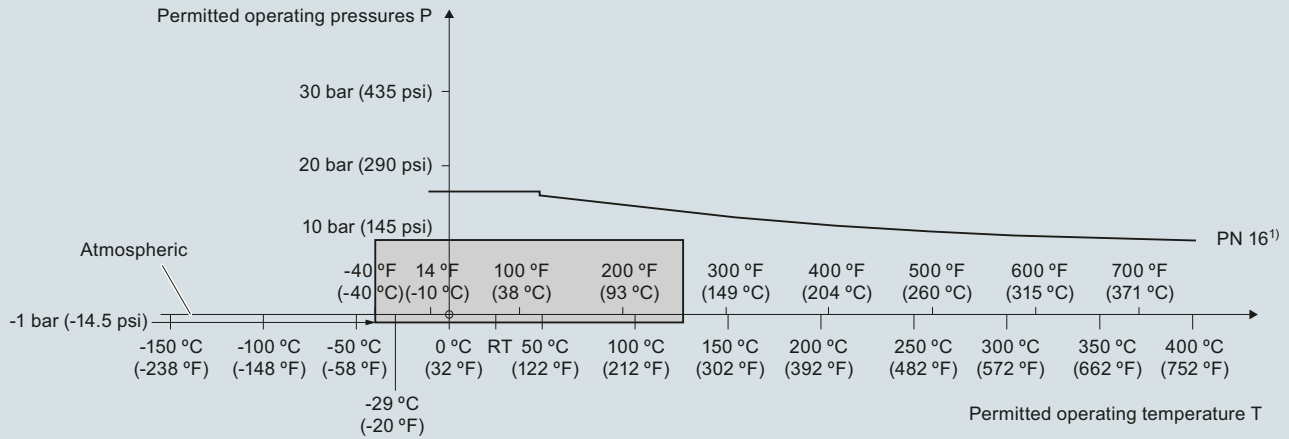
Pointek CLS200 process pressure/temperature derating curves (7ML5630 and 7ML5640)

Level Measurement

Point level measurement
RF Capacitance switches

Pointek CLS200 - Standard and Digital

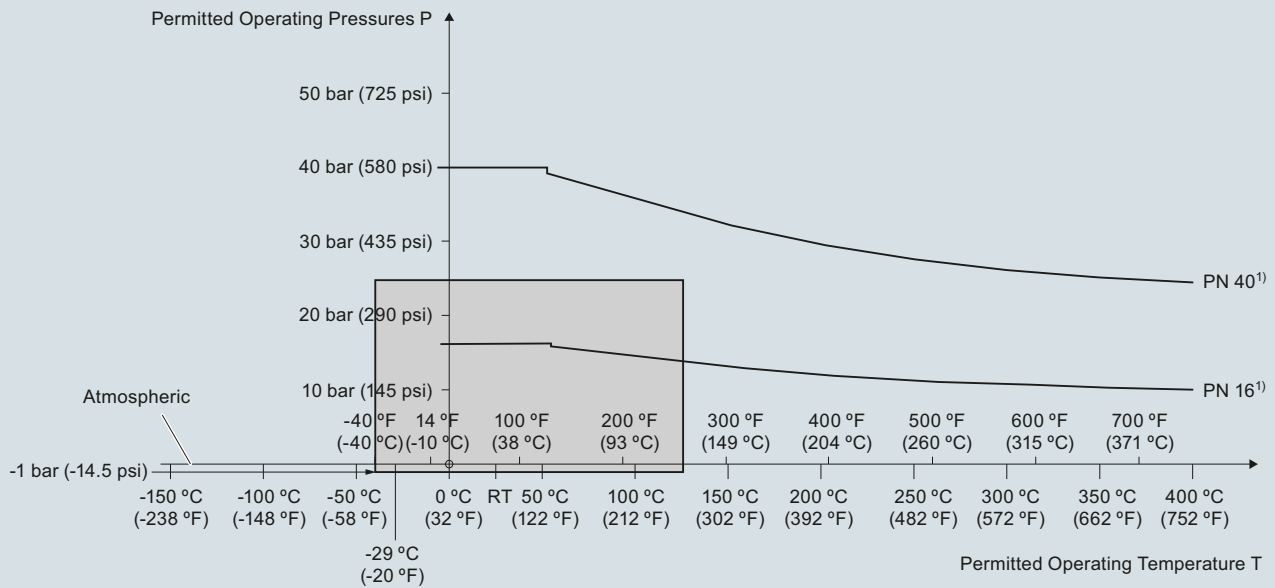
Pressure/temperature curve
CLS200 cable
EN flanged process connections
(7ML5631 and 7ML5641)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 process pressure/temperature derating curves (7ML5631 and 7ML5641)

Pressure/Temperature Curve
CLS200 Compact and Extended Rod
EN Flanged Process Connections
(7ML5630 and 7ML5640)

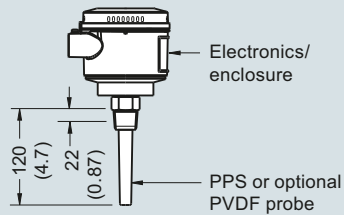


¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

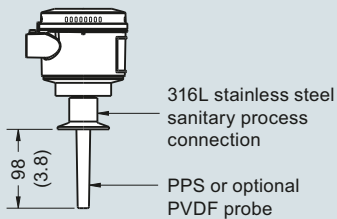
Pointek CLS200 process pressure/temperature derating curves (7ML5630 and 7ML5640)

Dimensional drawings

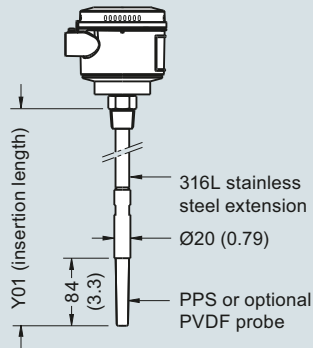
Compact version
Threaded
(7ML5630 and 7ML5640)



Sanitary compact version
Sanitary fitting
(7ML5632 and 7ML5642)

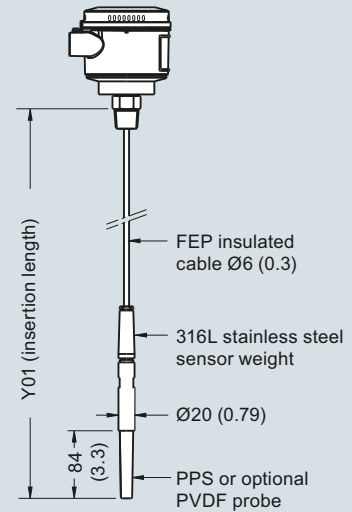


Extended rod version
Threaded
(7ML5630 and 7ML5640)

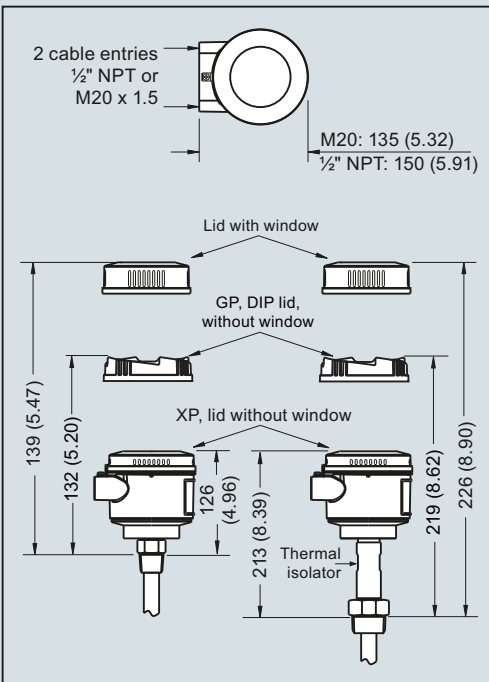


Min. insertion length = 200 (7.87)
Max. insertion length = 5 500 (216)

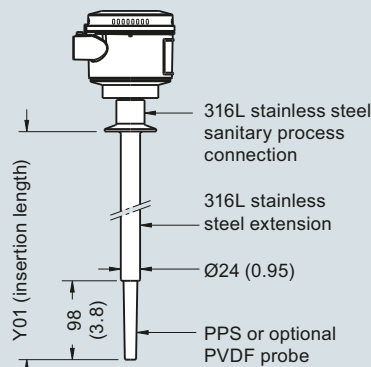
Extended cable version
Threaded
(7ML5631 and 7ML5641)



Min. insertion length = 500 (19.69)
Max. insertion length = 30 000 (1 181)
Applicable for liquids and solids applications. Cable can be shortened on site.

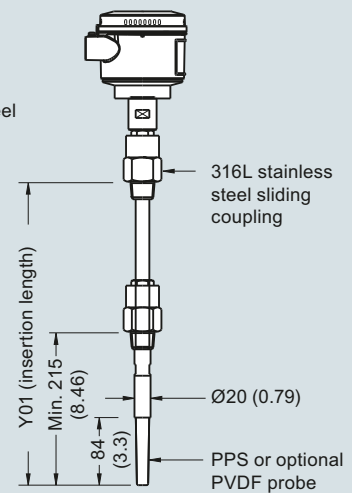


Sanitary extended version
Sanitary fitting
(7ML5632 and 7ML5642)



Min. insertion length = 110 (4.3)
Max. insertion length = 5 500 (216)

Sliding coupling version
Threaded
(7ML5633 and 7ML5643)



Min. insertion length = 350 (13.82)
Max. insertion length = 5 500 (216)

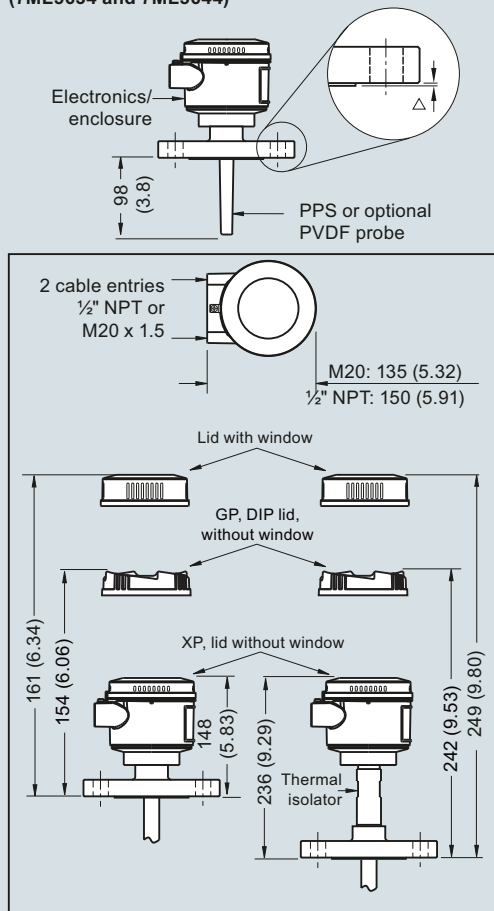
Pointek CLS200 threaded/sanitary process connections, dimensions in mm (inch)

Level Measurement

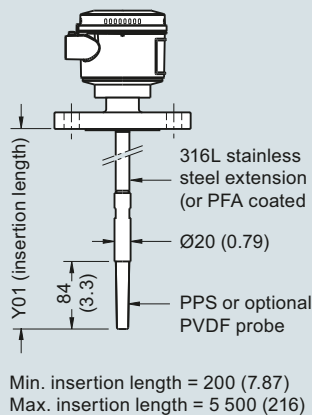
Point level measurement
RF Capacitance switches

Pointek CLS200 - Standard and Digital

Compact version
Welded Flange (7ML5630 and 7ML5640)
Welded Flange, PFA coated
(7ML5634 and 7ML5644)

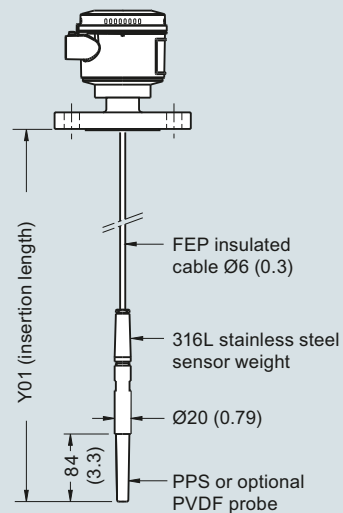


Extended rod version
Welded Flange (7ML5630 and 7ML5640)
Welded Flange, PFA coated
(7ML5634 and 7ML5644)



Min. insertion length = 200 (7.87)
Max. insertion length = 5 500 (216)

Extended cable version
Welded Flange
(7ML5631 and 7ML5641)



Min. insertion length = 500 (19.69)
Max. insertion length = 30 000 (1 181)
Applicable for liquids and solids applications. Cable can be shortened on site.

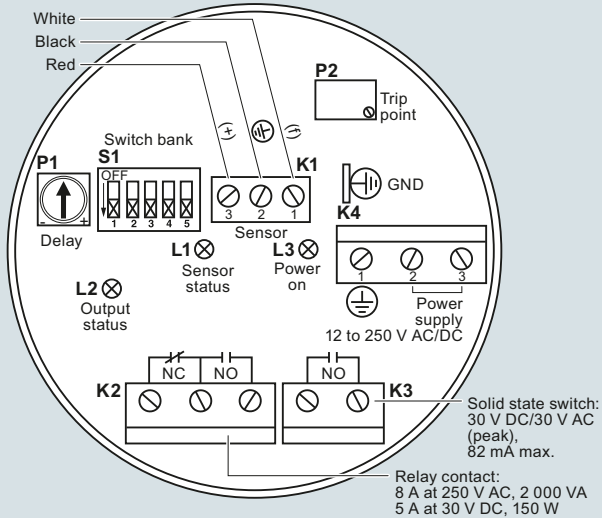
Flange Facing (raised face)	
Flange Class	Facing thickness
△ ASME 150/300	2 (0.08)
△ ASME 600/900	7 (0.28)
△ PN16/40	2 (0.08)

Insertion length does not include any raised face/gasket face dimension
(see Flange Facing Table above)

Pointek CLS200 flanged process connections, dimensions in mm (inch)

Circuit diagrams

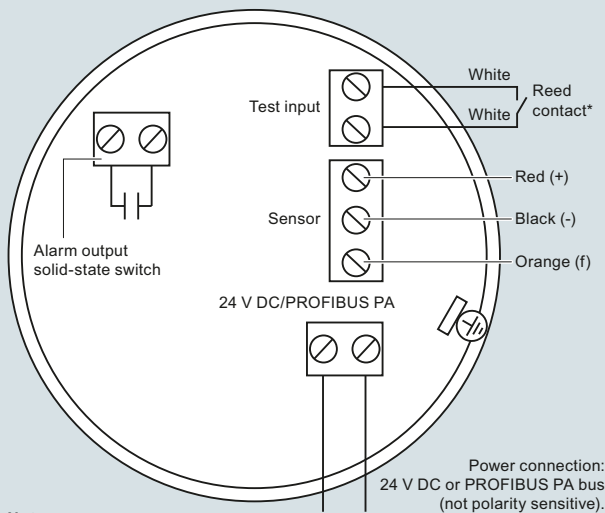
Wiring: Pointek CLS200 standard



Notes:

- Identification label is on underside of lid. Switch and potentiometer settings are for illustration purposes only (refer to operation/setup in manual).
- All field wiring must have insulation suitable for at least 250 V.
- Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
- Maximum working voltage between adjacent relay contacts shall be 250 V.
- Refer to the Instruction Manual or contact Siemens representative for detailed wiring information.

Wiring: Pointek CLS200 Digital



Notes:

Refer to the instruction manual or contact a Siemens representative for detailed wiring information.

*Magnet activated sensor Test

A magnet can be used to test the sensor without opening the lid of the Pointek CLS200 Digital version. Bring the magnet close to the test area indicated on the enclosure. The sensor test starts and finishes automatically after 10 seconds.



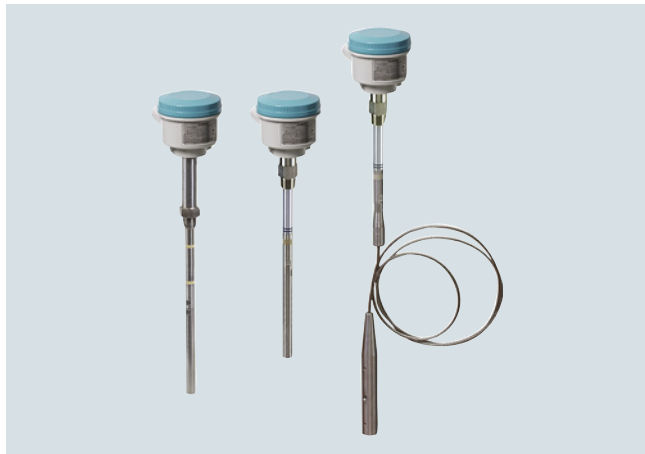
Pointek CLS200 connections

Level Measurement

Point level measurement
RF Capacitance switches

Pointek CLS300 - Standard

Overview



Pointek CLS300 (standard version) is an inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out buildup on the probe.

Benefits

- Active-Shield technology so measurement is unaffected by material buildup or nozzle interference in active shield section
- Performs in extremely abrasive conditions because of solid rod construction
- Three LED indicators for adjustment control, output status, and power
- High-temperature version up to 400 °C (752 °F)

Application

Pointek CLS300 standard version has three LED indicators with basic relay and solid-state switch alarms.

The robust design of CLS300 makes it specifically applicable for heavy solids applications where abrasive materials occur as in the mining industry. The fully potted electronics are unaffected by condensation, dust or vibration.

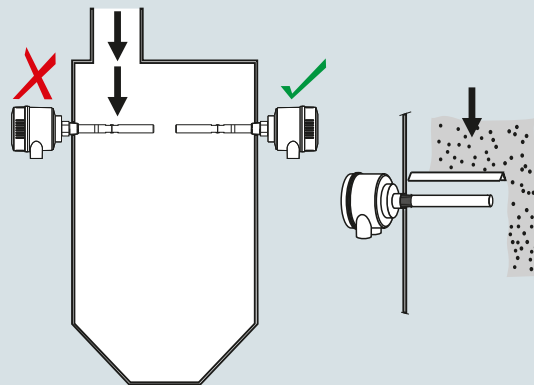
Wetted parts are made of stainless steel with a PFA shield for high chemical resistance, and of ceramic and stainless steel for high temperature version. Materials with low or high dielectric constants can be accurately detected. The unique Active Shield suppresses interference from material buildup or long installation nozzles.

The unique modular design of the Pointek CLS300 provides a wide range of configurations, process connections, extensions and approvals to meet the temperature and pressure requirements of specific applications. The modular design makes ordering easier and reduces stocking requirements. A wide range of probe configurations are available, including rod and cable versions.

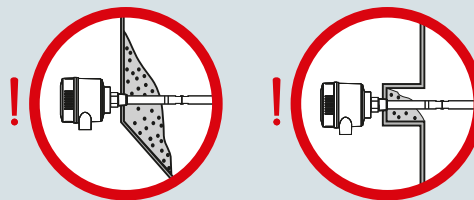
- Key Applications: liquids, slurries, bulk solids, relatively high pressure and temperature, hazardous areas, milling and mining applications

Configuration

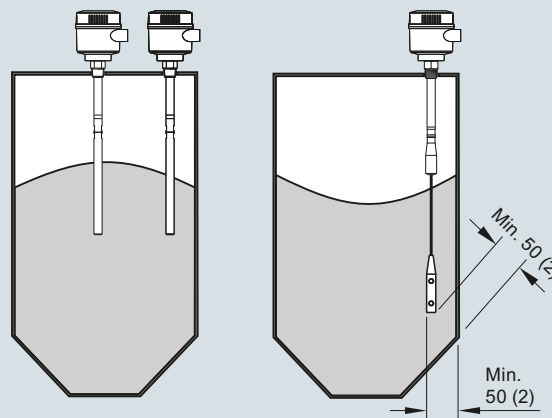
Installation



Keep unit out of path of falling material, or protect probe from falling material.



Build up of material in active shield area does not affect switch operation.



Install probe at least 50 (2) from tank wall.
Note angle of repose and adjust accordingly.

Pointek CLS300 installation, dimensions in mm (inch)

Technical specifications

Mode of operation		Design	
Measuring principle	Inverse frequency shift capacitive level detection	Material (enclosure)	Powder-coated aluminum with gasket
Input		Degree of Protection	Standard: Type 4/NEMA 4/IP65 Optional: Type 4/NEMA 4/IP68
Measured variable	Change in picoFarad (pF)	Cable inlet	2 x M20 x 1.5 thread (option: 2 x 1/2" NPT conduit entry including 1 plugged entry)
Output		Controls and displays	
Output signal		Displays	3 LEDs, for probe status, output status and power supply
• Relay output	1 SPDT Form C relay	Potentiometers	2 potentiometers for time delay and sensitivity
- Max. contact voltage	• 30 V DC • 250 V AC	Switches	5 DIP switches for delay on/off, fail-safe high/low, time delay test/adjust, high/low sensitivity, test delay settings
- Max. contact current	• 5 A (DC) • 8 A (AC)		
- Max. switching capacity	• 150 W (DC) • 2 000 VA (AC)		
- Time delay (ON and/or OFF)	1 ... 60 s		
• Solid-state output			
- Output	Galvanically isolated		
- Protection	Against reversed polarity (bipolar)		
- Max. switching voltage	• 30 V (DC) • 30 V peak (AC)		
- Max. load current	82 mA		
- Voltage drop	< 1 V, typical at 50 mA		
- Time delay (pre or post switching)	1 ... 60 s		
Accuracy		Power supply	
Resolution		Supply	12 ... 250 V AC/DC, 0 ... 60 Hz, galvanically isolated, 2 W
• Min. sensitivity (pF)	1 % change in actual capacitance	Certificates and approvals	
• Max. temperature error	0.2 % of actual capacitance value	General Purpose	CSA, FM, CE, RCM
Rated operating conditions¹⁾		Flameproof Enclosure with IS Probe	ATEX II 1/2 G EEx d[ia] IIC T6 ... T1 ATEX II 1/2 D T100 °C
Installation conditions		Dust Ignition Proof with IS Probe	ATEX II 1/2 D T100 °C CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
• Location	Indoor/outdoor	Explosion Proof Enclosure with IS Probe	CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Ambient conditions		Marine	Lloyds Register of Shipping, Categories ENV1, ENV2, and ENV5
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) ²⁾	Overfill Protection	WHG (Germany) VLAREM II (Belgium)
Medium conditions		Others	Pattern Approval (China)
• Relative dielectric constant ϵ_r	Min. 1.5		
• Process temperature			
- Rod/Cable version	-40 ... +200 °C (-40 ... +392 °F) ²⁾		
- High-temperature version	-40 ... +400 °C (-40 ... +752 °F)		
• Process pressure ³⁾	-1 ... +35 bar g (-14.6 ... +511 psi g)		

¹⁾ When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves starting on page 4/54.

²⁾ Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F).

³⁾ Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves starting on page 4/54.

Design: Probe

	Rod version	High Temperature version	Cable version
Length	Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch)	Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch)	Min. 1 000 mm (40 inch), max. 25 000 mm (984 inch)
Sensor wetted parts	PFA (no insulation on active probe), 316L stainless steel, PEEK isolators	Ceramic (ZrO ₂) ¹⁾ isolators (no insulation on active probe), 316L stainless steel	316 stainless steel, optional PFA, PEEK isolators
O-ring seal material	FKM (optional FFKM) ²⁾	Graphite ²⁾	FKM (optional FFKM) ²⁾
Thermal isolator	Optional	Standard	Optional
Extension	User selectable length	User selectable length	User selectable cable length

¹⁾ Zirconium Oxide

²⁾ For caustic materials, consult a local sales person for alternative O-rings. For more information, please visit <http://www.usa.siemens.com/level>.

Level Measurement

Point level measurement
RF Capacitance switches

Pointek CLS300 - Standard

Selection and Ordering data	Article No.
Pointek CLS300 - Standard - Rod Version with Threaded or Flanged process connection	7ML5650-
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out buildup on the probe.	
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process connection	
<u>Threaded, 316L stainless steel</u>	
¾" NPT [(Taper), ANSI/ASME B1.20.1]	0 A
1" NPT [(Taper), ANSI/ASME B1.20.1]	0 B
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	0 C
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 A
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 B
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 A
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 B
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
<u>Welded flange, 316L stainless steel, raised face</u>	
1" ASME, 150 lb	5 A
1" ASME, 300 lb	5 B
1" ASME, 600 lb	5 C
1½" ASME, 150 lb	5 D
1½" ASME, 300 lb	5 E
1½" ASME, 600 lb	5 F
2" ASME, 150 lb	5 G
2" ASME, 300 lb	5 H
2" ASME, 600 lb	5 J
3" ASME, 150 lb	5 K
3" ASME, 300 lb	5 L
3" ASME, 600 lb	5 M
4" ASME, 150 lb	5 N
4" ASME, 300 lb	5 P
4" ASME, 600 lb	5 Q
<u>Welded flange, 316L stainless steel, Type A flat faced</u>	
DN 25, PN 16	6 A
DN 25, PN 40	6 B
DN 40, PN 16	6 C
DN 40, PN 40	6 D
DN 50, PN 16	6 E
DN 50, PN 40	6 F
DN 80, PN 16	6 G
DN 80, PN 40	6 H
DN 100, PN 16	6 J
DN 100, PN 40	6 K
(Note: flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	
Probe length (length from flange face) (threaded lengths include process thread) <u>Note: No Y01 needed in Order code for standard lengths</u>	
Standard version, rod 350 mm (13.78 inch)	A
Extended rod, length 500 mm (19.69 inch)	B
Extended rod, length 750 mm (29.53 inch)	C
Extended rod, length 1 000 mm (39.37 inch)	D

Selection and Ordering data	Article No.
Pointek CLS300 - Standard - Rod Version with Threaded or Flanged process connection	7ML5650-
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out buildup on the probe.	
Add Order code Y01 and plain text: <u>"Insertion length ... mm"</u>	
Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65 inch)	E
Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49 inch)	F
Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3 inch)	G
Thermal isolator	
Without thermal isolator	0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	1
Wetted seals	
FKM	0
FFKM [for process temperatures above -20 °C (-4 °F)]	1
Probe material	
316L stainless steel with PFA lining and PEEK isolators	0
Approvals	
Dust Ignition Proof with IS Probe: CE, RCM, ATEX II 1/2 D T100 °C	C
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T1, ATEX II 1/2 D T100 °C	D
Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T1, ATEX II 1/2 D T100 °C	E
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	F
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	G
General Purpose (CSA, FM)	H
General Purpose (CE, RCM)	J
General Purpose with WHG approval (CSA, FM, CE, RCM)	K
Enclosure and lid	
<u>Aluminum epoxy coated</u>	
2 x ½" NPT via adapter - cable inlet, IP65	A
2 x M20 x 1.5 cable inlet, IP65	B
2 x ½" NPT via adapter - cable inlet, IP68	C
2 x M20 x 1.5 cable inlet, IP68	D
Active shield length	
Standard length - (125 mm threaded, 105 mm flanged)	0
Extended shield - (250 mm threaded, 230 mm flanged) ¹⁾	1
Extended shield - (400 mm threaded, 380 mm flanged) ²⁾	2
1) Available with Probe version options B ... D, F, G only [≥ 500 mm (19.69 inch)]	
2) Available with Probe version options C, D, and G only [≥ 750 mm (29.53 inch)]	

Level Measurement

Point level measurement

RF Capacitance switches

Pointek CLS300 - Standard

Selection and Ordering data		Order code	Selection and Ordering data	Article No.
Further designs			Pointek CLS300 - Standard - Cable Version with Threaded or Flanged process connection	7ML5651-
Please add "-Z" to Article No. and specify Order code(s).			Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out buildup on the probe.	
Total insertion length: enter the total insertion length in plain text description		Y01	Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text		Y15	Process connection	
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000		C11	<u>Threaded, 316L stainless steel</u>	
Material Inspection Certificate Type 3.1 per EN 10204		C12	1/4" NPT [(Taper), ANSI/ASME B1.20.1]	0 C
Operating Instructions			1 1/2" NPT [(Taper), ANSI/ASME B1.20.1]	0 D
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation			R 1 1/2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D
Accessories		See page 4/53	G 1 1/2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
			<u>Welded flange, 316L stainless steel, raised face</u>	
			1 1/2" ASME, 150 lb	5 D
			1 1/2" ASME, 300 lb	5 E
			1 1/2" ASME, 600 lb	5 F
			2" ASME, 150 lb	5 G
			2" ASME, 300 lb	5 H
			2" ASME, 600 lb	5 J
			3" ASME, 150 lb	5 K
			3" ASME, 300 lb	5 L
			3" ASME, 600 lb	5 M
			4" ASME, 150 lb	5 N
			4" ASME, 300 lb	5 P
			4" ASME, 600 lb	5 Q
			<u>Welded flange, 316L stainless steel, Type A flat faced</u>	
			DN 40, PN 16	6 C
			DN 40, PN 40	6 D
			DN 50, PN 16	6 E
			DN 50, PN 40	6 F
			DN 80, PN 16	6 G
			DN 80, PN 40	6 H
			DN 100, PN 16	6 J
			DN 100, PN 40	6 K
			(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	
			Probe length	
			(length from flange face)	
			(threaded lengths include process thread)	
			<u>Note: No Y01 needed in Order code for standard lengths</u>	
			Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer	A
			Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer	B
			<u>Add Order code Y01 and plain text: "Insertion length ... mm"</u>	
			Extended cable, 500 ... 1 000 mm (19.69 ... 39.37 inch)	E
			Extended cable, 1 001 ... 5 000 mm (39.41 ... 196.85 inch)	F
			Extended cable, 5 001 ... 10 000 mm (196.89 ... 393.70 inch)	G
			Extended cable, 10 001 ... 15 000 mm (393.74 ... 590.55 inch)	H
			Extended cable, 15 001 ... 20 000 mm (590.59 ... 787.40 inch)	J
			Extended cable, 20 001 ... 25 000 mm (787.44 ... 984.25 inch)	K

Level Measurement

Point level measurement

RF Capacitance switches

Pointek CLS300 - Standard

Selection and Ordering data

Article No.

Pointek CLS300 - Standard - Cable Version with Threaded or Flanged process connection

Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out buildup on the probe.

Thermal isolator

Without thermal isolator

With thermal isolator [for process connection temperatures over 85 °C (185 °F)]

Wetted seals

FKM

FFKM [for process temperatures above -20 °C (-4 °F)]

Probe material

Bare 316L stainless steel cable, PEEK isolators and 316L stainless steel cable weight

PFA coated cable, PEEK isolators and 316L stainless steel cable weight

Approvals

Dust Ignition Proof with IS Probe:
CE, RCM, ATEX II 1/2 D T100 °C

Flameproof Enclosure with IS Probe:
CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T1,
ATEX II 1/2 D T100 °C

Flameproof Enclosure with IS Probe,
with WHG approval:
CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T1,
ATEX II 1/2 D T100 °C

Dust Ignition Proof with IS Probe:
CSA/FM Class II, Div. 1, Groups E, F, G
CSA/FM Class III T4

Explosion Proof Enclosure with IS Probe:
CSA/FM Class I, Div. 1, Groups A, B, C, D
CSA/FM Class II, Div. 1, Groups E, F, G
CSA/FM Class III T4

General Purpose (CSA, FM)

General Purpose (CE, RCM)

General Purpose with WHG approval
(CSA, FM, CE, RCM)

Enclosure and lid

Aluminum epoxy coated

2 x 1/2" NPT via adapter - cable inlet, IP65

2 x M20 x 1.5 cable inlet, IP65

2 x 1/2" NPT via adapter - cable inlet, IP68

2 x M20 x 1.5 cable inlet, IP68

Active shield length

Standard length -
(125 mm threaded, 105 mm flanged)

Extended shield -
(250 mm threaded, 230 mm flanged)

Extended shield -
(400 mm threaded, 380 mm flanged)¹⁾

7ML5651-

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Selection and Ordering data

Order code

Further designs

Please add "-Z" to Article No. and specify Order code(s).

Total insertion length: enter the total insertion length in plain text description

Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]:
Measuring-point number/identification
(max. 27 characters) specify in plain text

Manufacturer's test certificate: M to DIN 55350,
Part 18 and to ISO 9000

Material Inspection Certificate Type 3.1 per
EN 10204

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Accessories

See page 4/53

¹⁾ Available with Probe version options A, B, F ... K, only
[≥ 1 000 mm (39.7 inch)].

Level Measurement

Point level measurement

RF Capacitance switches

Pointek CLS300 - Standard

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
Pointek CLS300 - Standard - High Temperature Rod Version with Threaded or Flanged process connection Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out buildup on the probe. Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5652- 	Pointek CLS300 - Standard - High Temperature Rod Version with Threaded or Flanged process connection Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out buildup on the probe. Add Order code Y01 and plain text: "Insertion length ... mm"	7ML5652-
Process connection <u>Threaded, 316L stainless steel</u> ¾" NPT [(Taper), ANSI/ASME B1.20.1] 0 A 1" NPT [(Taper), ANSI/ASME B1.20.1] 0 B 1¼" NPT [(Taper), ANSI/ASME B1.20.1] 0 C 1½" NPT [(Taper), ANSI/ASME B1.20.1] 0 D R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] 1 A R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] 1 B R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] 1 D G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 3 A G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 3 B G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 3 D <u>Welded flange, 316L stainless steel, raised face</u> 1" ASME, 150 lb 5 A 1" ASME, 300 lb 5 B 1" ASME, 600 lb 5 C 1½" ASME, 150 lb 5 D 1½" ASME, 300 lb 5 E 1½" ASME, 600 lb 5 F 2" ASME, 150 lb 5 G 2" ASME, 300 lb 5 H 2" ASME, 600 lb 5 J 3" ASME, 150 lb 5 K 3" ASME, 300 lb 5 L 3" ASME, 600 lb 5 M 4" ASME, 150 lb 5 N 4" ASME, 300 lb 5 P 4" ASME, 600 lb 5 Q <u>Welded flange, 316L stainless steel, Type A flat faced</u> DN 25, PN 16 6 A DN 25, PN 40 6 B DN 40, PN 16 6 C DN 40, PN 40 6 D DN 50, PN 16 6 E DN 50, PN 40 6 F DN 80, PN 16 6 G DN 80, PN 40 6 H DN 100, PN 16 6 J DN 100, PN 40 6 K (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65 inch) Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49 inch) Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3 inch) Wetted seals Graphite Probe material 316L stainless steel with ceramic (ZrO ₂) isolators Approvals Dust Ignition Proof with IS Probe: CE, RCM, ATEX II 1/2 D T100 °C Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T1, ATEXII 1/2 D T100 °C Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T1, ATEX II 1/2 D T100 °C Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 General Purpose (CSA, FM) General Purpose (CE, RCM) General Purpose with WHG approval (CSA, FM, CE, RCM) Enclosure and lid <u>Aluminum epoxy coated</u> 2 x ½" NPT via adapter - cable inlet, IP65 2 x M20 x 1.5 cable inlet, IP65 2 x ½" NPT via adapter - cable inlet, IP68 2 x M20 x 1.5 cable inlet, IP68 Active shield length Standard length - (125 mm threaded, 105 mm flanged) Extended shield - (250 mm threaded, 230 mm flanged) ¹⁾ Extended shield - (400 mm threaded, 380 mm flanged) ²⁾	E F G 0 C D E F G H J K A B C D 0 1 2
Probe length (length from flange face) (threaded lengths include process thread) Note: No Y01 needed in Order code for standard lengths Standard version rod, 350 mm (13.78 inch) A Extended rod, length 500 mm (19.69 inch) B Extended rod, length 750 mm (29.53 inch) C Extended rod, length 1 000 mm (39.37 inch) D			

Level Measurement

Point level measurement
RF Capacitance switches

Pointek CLS300 - Standard

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description ¹⁾	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Material Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/ processinstrumentation/documentation	
Accessories	See page 4/53

¹⁾ Not available with Probe length option B.

Overview



Pointek CLS300 (digital version) is an inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out buildup on the probe. The digital version includes PROFIBUS PA, an LCD display, and advanced diagnostic features.

Benefits

- Active-Shield technology so measurement is unaffected by material buildup or nozzle interference in active shield section
- Performs in extremely abrasive conditions because of solid rod construction
- Push-button calibration, full-function diagnostics
- High sensitivity allows installation in a wide range of liquids, solids or slurry applications
- Integral LCD display allows for easy menu-driven setup
- PROFIBUS PA communication (SIMATIC PDM compatible)

Application

Pointek CLS300 digital version provides an integral LCD display for stand-alone use, with PROFIBUS PA communication (Profile version 3.0, Class B) when required. Solid-state switch alarm is standard.

The robust design of CLS300 makes it specifically applicable for heavy solids applications where abrasive materials occur as in the mining industry.

The fully potted electronics are unaffected by condensation, dust or vibration.

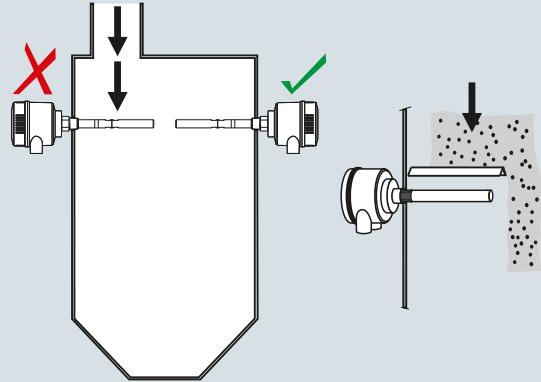
Wetted parts are made of stainless steel with a PFA shield for high chemical resistance, and of ceramic and stainless steel for high temperature version. Materials with low or high dielectric constants can be accurately detected. The unique Active Shield suppresses interference from material buildup or long installation nozzles.

The unique modular design of the Pointek CLS300 provides a wide range of configurations, process connections, extensions and approvals to meet the temperature and pressure requirements of specific applications. The modular design makes ordering easier and reduces stocking requirements. A wide range of probe configurations are available, including rod and cable versions.

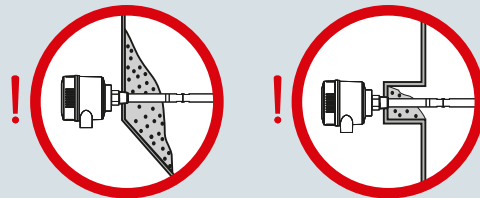
- Key Applications: liquids, slurries, bulk solids, relatively high pressure and temperature, hazardous areas, milling and mining applications

Configuration

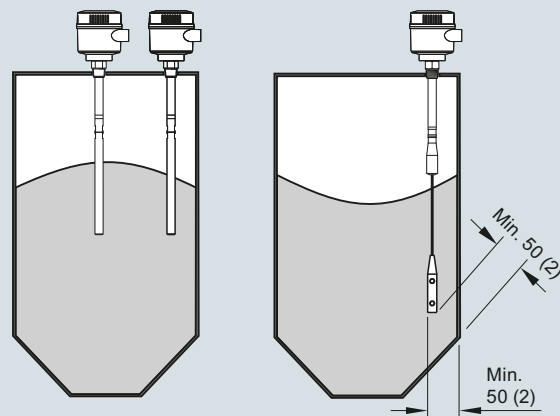
Installation



Keep unit out of path of falling material, or protect probe from falling material.



Build up of material in active shield area does not affect switch operation.



Install probe at least 50 (2) from tank wall.
Note angle of repose and adjust accordingly.

Pointek CLS300 installation, dimensions in mm (inch)

Level Measurement

Point level measurement

RF Capacitance switches

Pointek CLS300 - Digital

Technical specifications

Mode of operation		Power supply	
Measuring principle	Inverse frequency shift capacitive level detection	Bus voltage (at process connection)	<ul style="list-style-type: none"> Standard: 12 ... 30 V DC Intrinsically Safe: 12 ... 24 V DC
Input		Current consumption	12.5 mA
Measured variable	Change in picoFarad (pF)	Certificates and approvals	
Output		General Purpose	CSA, FM, CE, RCM
Solid-state output		Dust Ignition Proof	ATEX II 1/2 D, 2 D IP6X T100 °C
<ul style="list-style-type: none"> Output Protection Max. switching voltage 	Galvanically isolated Against reversed polarity (bipolar) <ul style="list-style-type: none"> 30 V (DC) 30 V peak (AC) 	Flameproof Enclosure With IS Probe	ATEX II 1/2 G EEx d[ia] IIC T6 ... T4 ATEX II 1/2 D T100 °C
<ul style="list-style-type: none"> Max. load current Voltage drop Time delay (pre or post switching) 	82 mA < 1 V, typical at 50 mA Programmable by user (0 ... 100 s)	Dust Ignition Proof With IS Probe	CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Fail-safe mode	Min. or max.	Intrinsically Safe ⁴⁾	ATEX II 1 G EEx ia IIC T6 ... T4 ATEX II 1/2 D, 2 D IP6X T100 °C CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Connection	Removable terminal block	Non-incendive	CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6
Accuracy		Explosion Proof with IS Probe	CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Resolution		Marine	Lloyds Register of Shipping, Categories ENV1, ENV2, and ENV5
<ul style="list-style-type: none"> Min. sensitivity (pF) Max. temperature error 	1 % change in actual capacitance 0.2 % of actual capacitance value	Others	Pattern Approval (China)
Rated operating conditions¹⁾		Communication	
Installation conditions			PROFIBUS PA (IEC 61158 CPF3 CP3/2)
<ul style="list-style-type: none"> Location 	Indoor/outdoor		Bus physical layer: IEC 61158-2 MBP-(IS)
Ambient conditions			Device profile: PROFIBUS PA profile for Process Control Devices Version 3.0, Class B
<ul style="list-style-type: none"> Ambient temperature 	-40 ... +85 °C (-40 ... +185 °F) ²⁾		FISCO field device
Medium conditions			
<ul style="list-style-type: none"> Relative dielectric constant ϵ_r Process temperature - Rod/Cable version - High Temperature version Process pressure³⁾ 	Liquids, bulk solids, slurries, interfaces, and applications with viscous materials Min. 1.5 -40 ... +200 °C (-40 ... +392 °F) ²⁾ -40 ... +400 °C (-40 ... +752 °F) -1 ... +35 bar g (-14.6 ... +511 psi g)		
Design			
Material (enclosure)	Powder-coated aluminum with gasket		
Degree of protection	Standard: Type 4/NEMA 4/IP65 Optional: Type 4/NEMA 4/IP68		
Cable inlet	2 x M20 x 1.5 thread (option: 2 x 1/2" NPT conduit entry including 1 plugged entry)		
Controls and displays			
Local display	LCD		
Configuration	<ul style="list-style-type: none"> Locally, using 3 button keypad (for standalone operation) Remotely, using SIMATIC PDM (for installation on a network) 		

- ¹⁾ When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves starting on page 4/54.
- ²⁾ Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)
- ³⁾ Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves starting on page 4/54.
- ⁴⁾ Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

Design: Probe

	Rod version	High Temperature version	Cable version
Length	Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch)	Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch)	Min. 1 000 mm (40 inch), max. 25 000 mm (984 inch)
Sensor wetted parts	PFA (no insulation on active probe), 316L stainless steel, PEEK isolators	Ceramic (ZrO ₂ ¹⁾) isolators (no insulation on active probe), 316L stainless steel	316 stainless steel, optional PFA, PEEK isolators
O-ring seal material	FKM (optional FFKM) ²⁾	Graphite ²⁾	FKM (optional FFKM) ²⁾
Thermal isolator	Optional	Standard	Optional
Extension	User selectable length	User selectable length	User selectable cable length

¹⁾ Zirconium Oxide

²⁾ For caustic materials, consult a local sales person for alternative O-rings. For more information, please visit <http://www.usa.siemens.com/level>.

Level Measurement

Point level measurement

RF Capacitance switches

Pointek CLS300 - Digital

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
Pointek CLS300 - Digital - Rod with Threaded or Flanged process connection Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out buildup on the probe. Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5660- 	Pointek CLS300 - Digital - Rod with Threaded or Flanged process connection Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out buildup on the probe. Add Order code Y01 and plain text: "Insertion length ... mm"	7ML5660-
Process connection <u>Threaded, 316L stainless steel</u> ¾" NPT [(Taper), ANSI/ASME B1.20.1] 0 A 1" NPT [(Taper), ANSI/ASME B1.20.1] 0 B 1¼" NPT [(Taper), ANSI/ASME B1.20.1] 0 C 1½" NPT [(Taper), ANSI/ASME B1.20.1] 0 D R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] 1 A R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] 1 B R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] 1 D G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 3 A G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 3 B G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 3 D		Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65 inch) E Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49 inch) F Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3 inch) G Thermal isolator Without thermal isolator 0 With thermal isolator [for process connection temperatures over 85 °C (185 °F)] 1 Wetted seals FKM 0 FFKM [for process temperatures above -20 °C (-4 °F)] 1 Probe material 316L stainless steel with PFA lining and PEEK isolators 0	
<u>Welded flange, 316L stainless steel, raised face</u> 1" ASME, 150 lb 5 A 1" ASME, 300 lb 5 B 1" ASME, 600 lb 5 C 1½" ASME, 150 lb 5 D 1½" ASME, 300 lb 5 E 1½" ASME, 600 lb 5 F 2" ASME, 150 lb 5 G 2" ASME, 300 lb 5 H 2" ASME, 600 lb 5 J 3" ASME, 150 lb 5 K 3" ASME, 300 lb 5 L 3" ASME, 600 lb 5 M 4" ASME, 150 lb 5 N 4" ASME, 300 lb 5 P 4" ASME, 600 lb 5 Q		Approvals Dust Ignition Proof: CE, RCM, ATEX II 1/2 D, 2 D IP6X T100 °C Intrinsically Safe ¹⁾ CE, RCM, ATEX II 1 G EEx ia IIC T6 ... T4, ATEX II 1/2 D, 2 D IP6X T100 °C Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 Intrinsically Safe ¹⁾ CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 General Purpose (CSA, FM) H General Purpose (CSA, FM, CE, RCM) J	
<u>Welded flange, 316L stainless steel, Type A flat faced</u> DN 25, PN 16 6 A DN 25, PN 40 6 B DN 40, PN 16 6 C DN 40, PN 40 6 D DN 50, PN 16 6 E DN 50, PN 40 6 F DN 80, PN 16 6 G DN 80, PN 40 6 H DN 100, PN 16 6 J DN 100, PN 40 6 K			
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.) Probe length (length from flange face) (threaded lengths include process thread) Note: No Y01 needed in Order code for standard lengths Standard version, rod 350 mm (13.78 inch) A Extended rod, length 500 mm (19.69 inch) B Extended rod, length 750 mm (29.53 inch) C Extended rod, length 1 000 mm (39.37 inch) D			

Level Measurement

Point level measurement

RF Capacitance switches

Pointek CLS300 - Digital

Selection and Ordering data

Article No.

Pointek CLS300 - Digital - Rod with Threaded or Flanged process connection

Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out buildup on the probe.

Enclosure and Lid

Aluminum epoxy coated

2 x 1/2" NPT via adapter - cable inlet, IP65

2 x M20 x 1.5 cable inlet, IP65

2 x 1/2" NPT via adapter - cable inlet, IP68

2 x M20 x 1.5 cable inlet, IP68

Active shield length

Standard length -

(125 mm threaded, 105 mm flanged)

Extended shield -

(250 mm threaded, 230 mm flanged)²⁾

Extended shield -

(400 mm threaded, 380 mm flanged)³⁾

1) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

2) Available with Probe version options B ... D, F, G only
[≥ 500 mm (19.69 inch)]

3) Available with Probe version options C, D, and G only
[≥ 750 mm (29.53 inch)]

7ML5660-

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Selection and Ordering data

Article No.

Pointek CLS300 - Digital - Cable with Threaded or Flanged process connection

Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out buildup on the probe.

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Process connection

Threaded, 316L stainless steel

1/4" NPT [(Taper), ANSI/ASME B1.20.1]

1/2" NPT [(Taper), ANSI/ASME B1.20.1]

R 1/2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

G 1/2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

Welded flange, 316L stainless steel, raised face

1/2" ASME, 150 lb

1/2" ASME, 300 lb

1/2" ASME, 600 lb

2" ASME, 150 lb

2" ASME, 300 lb

2" ASME, 600 lb

3" ASME, 150 lb

3" ASME, 300 lb

3" ASME, 600 lb

4" ASME, 150 lb

4" ASME, 300 lb

4" ASME, 600 lb

4" ASME, 600 lb

Welded flange, 316L stainless steel,

Type A flat faced

DN 40, PN 16

DN 40, PN 40

DN 50, PN 16

DN 50, PN 40

DN 80, PN 16

DN 80, PN 40

DN 100, PN 16

DN 100, PN 40

(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)

Probe length

(length from flange face)

(threaded lengths include process thread)

Note: No Y01 needed in Order code for standard lengths

Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer
Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer

Add Order code Y01 and plain text:

"Insertion length ... mm"

Extended cable, 500 ... 1 000 mm
(19.69 ... 39.37 inch)

Extended cable, 1 001 ... 5 000 mm
(39.41 ... 196.85 inch)

Extended cable, 5 001 ... 10 000 mm
(196.89 ... 393.70 inch)

Extended cable, 10 001 ... 15 000 mm
(393.74 ... 590.55 inch)

Extended cable, 15 001 ... 20 000 mm
(590.59 ... 787.40 inch)

Extended cable, 20 001 ... 25 000 mm
(787.44 ... 984.25 inch)

7ML5661-

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Selection and Ordering data

Order code

Further designs

Please add "-Z" to Article No. and specify Order code(s).

Total insertion length: enter the total insertion length in plain text description

Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]:
Measuring-point number/identification
(max. 27 characters) specify in plain text

Manufacturer's test certificate: M to DIN 55350,
Part 18 and to ISO 9000

Material inspection Certificate Type 3.1 per
EN 10204

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Accessories

See page 4/53

- 1) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection.
- 2) Available with Probe version options A, B, F ... K, only
[≥ 1 000 mm (39.7 inch)].

Level Measurement

Point level measurement

RF Capacitance switches

Pointek CLS300 - Digital

Selection and Ordering data

Article No.

Pointek CLS300 - Digital - High Temperature Rod version with Threaded or Flanged process connection

7ML5662-

Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out buildup on the probe.

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Process connection

Threaded, 316L stainless steel

¾" NPT [(Taper), ANSI/ASME B1.20.1]

1" NPT [(Taper), ANSI/ASME B1.20.1]

1¼" NPT [(Taper), ANSI/ASME B1.20.1]

1½" NPT [(Taper), ANSI/ASME B1.20.1]

R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

Welded flange, 316L stainless steel, raised face

1" ASME, 150 lb

1" ASME, 300 lb

1" ASME, 600 lb

1½" ASME, 150 lb

1½" ASME, 300 lb

1½" ASME, 600 lb

2" ASME, 150 lb

2" ASME, 300 lb

2" ASME, 600 lb

3" ASME, 150 lb

3" ASME, 300 lb

3" ASME, 600 lb

4" ASME, 150 lb

4" ASME, 300 lb

4" ASME, 600 lb

Welded flange, 316L stainless steel, Type A flat faced

DN 25, PN 16

DN 25, PN 40

DN 40, PN 16

DN 40, PN 40

DN 50, PN 16

DN 50, PN 40

DN 80, PN 16

DN 80, PN 40

DN 100, PN 16

DN 100, PN 40

(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)

Probe length

(length from flange face)

(threaded lengths include process thread)

Note: No Y01 needed in Order code for standard lengths

Standard version rod, 350 mm (13.78 inch)

Extended rod, length 500 mm (19.69 inch)

Extended rod, length 750 mm (29.53 inch)

Extended rod, length 1 000 mm (39.37 inch)

0 A	0 B	0 C	0 D	1 A	1 B	1 D	3 A	3 B	3 D	5 A	5 B	5 C	5 D	5 E	5 F	5 G	5 H	5 J	5 K	5 L	5 M	5 N	5 P	5 Q	6 A	6 B	6 C	6 D	6 E	6 F	6 G	6 H	6 J	6 K	A	B	C	D
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Selection and Ordering data

Article No.

Pointek CLS300 - Digital - High Temperature Rod version with Threaded or Flanged process connection

7ML5662-

Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out buildup on the probe.

Add Order code Y01 and plain text:

"Insertion length ... mm"

Extended rod, factory adjusted length

250 ... 499 mm (9.8 ... 19.65 inch)

Extended rod, factory adjusted length

500 ... 749 mm (19.69 ... 29.49 inch)

Extended rod, factory adjusted length

750 ... 999 mm (29.53 ... 39.3 inch)

Wetted seals

Graphite

Probe material

316L stainless steel with ceramic (ZrO₂) isolators

Approvals

Dust Ignition Proof:

CE, RCM, ATEX II 1/2 D, 2 D IP6X T100 °C

Intrinsically Safe¹⁾

CE, RCM, ATEX II 1 G EEx ia IIC T6 ... T4,

ATEX II 1/2 D, 2 D IP6X T100 °C

Flameproof Enclosure with IS Probe:

CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T4,

ATEX II 1/2 D T100 °C

Intrinsically Safe¹⁾

CSA/FM Class I, Div. 1, Groups A, B, C, D

CSA/FM Class II, Div. 1, Groups E, F, G

CSA/FM Class III T4

Explosion Proof Enclosure with IS Probe:

CSA/FM Class I, Div. 1, Groups A, B, C, D

CSA/FM Class II, Div. 1, Groups E, F, G

CSA/FM Class III T4

General Purpose (CSA, FM)

General Purpose (CSA, FM, CE, RCM)

Enclosure and Lid

Aluminum epoxy coated

2 x ½" NPT via adapter - cable inlet, IP65

2 x M20 x 1.5 cable inlet, IP65

2 x ½" NPT via adapter - cable inlet, IP68

2 x M20 x 1.5 cable inlet, IP68

Active shield length

Standard length -

(125 mm threaded, 105 mm flanged)

Extended shield -

(250 mm threaded, 230 mm flanged)²⁾

Extended shield -

(400 mm threaded, 380 mm flanged)³⁾

¹⁾ Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

²⁾ Available with Probe version options B ... D, F, G only
[≥ 500 mm (19.69 inch)]

³⁾ Available with Probe version options C, D, and G only
[≥ 750 mm (29.53 inch)]

E	F	G	0	0	B	C	D	F	G	H	J	A	B	C	D	0	1	2
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Level Measurement

Point level measurement

RF Capacitance switches

Pointek CLS300 - Standard and Digital

Selection and Ordering data		Selection and Ordering data	
Further designs		Accessories	
Please add "-Z" to Article No. and specify Order code(s).		One metallic cable gland M20 x 1.5, -40 ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA)	7ML1930-1AQ
Total insertion length: enter the total insertion length in plain text description	Y01	<u>General Purpose</u>	
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15	1/2" NPT General Purpose Cable Entry IP68/IP69K NEMA6, -40 ... +100 °C (-40 ... +212 °F), cable size 6 ... 12 mm (0.236 ... 0.472 inch)	7ML1830-1JA
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11	M20 x 1.5 General Purpose Cable Entry IP68/IP69K NEMA6, -40 ... +100 °C (-40 ... +212 °F), cable size 7 ... 12 mm (0.275 ... 0.472 inch)	7ML1830-1JC
Material Inspection Certificate Type 3.1 per EN 10204	C12	<u>Hazardous Locations</u>	
Operating Instructions		1/2" NPT EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22, and in Gas Groups IIA, IIB and IIC) -60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch)	7ML1830-1JB
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation		M20 EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22, and in Gas Groups IIA, IIB and IIC) -60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch)	7ML1830-1JD
Accessories	See page 4/53	Blind threaded flanges are available. Customers interested in a custom designed device should consult a local sales person. For more information, please visit http://www.usa.siemens.com/level .	
		Pointek Specials	See page 4/60

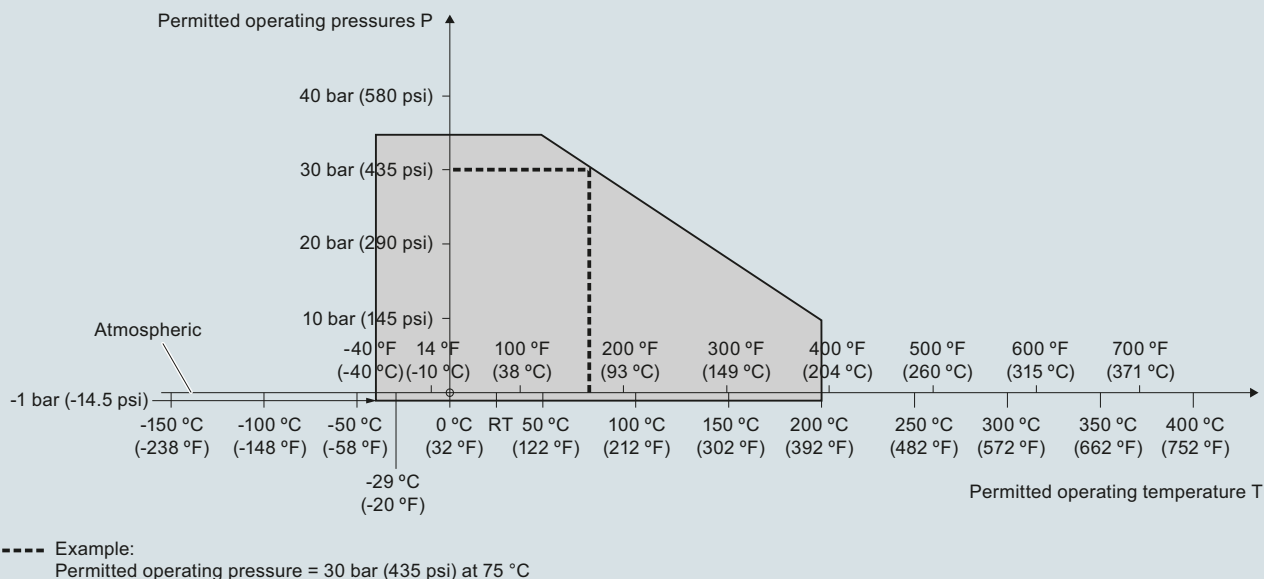
Level Measurement

Point level measurement
RF Capacitance switches

Pointek CLS300 - Standard and Digital

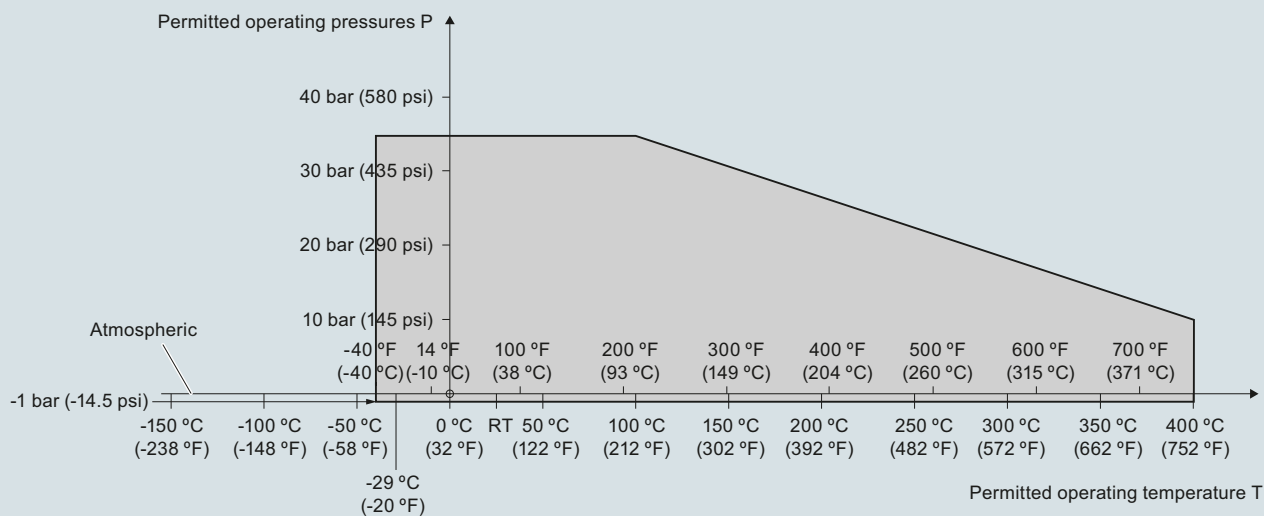
Characteristic curves

Pressure/temperature curve
CLS300 extended rod and cable probes
Threaded process connections
(7ML5650, 7ML5651, 7ML5660 and 7ML5661)



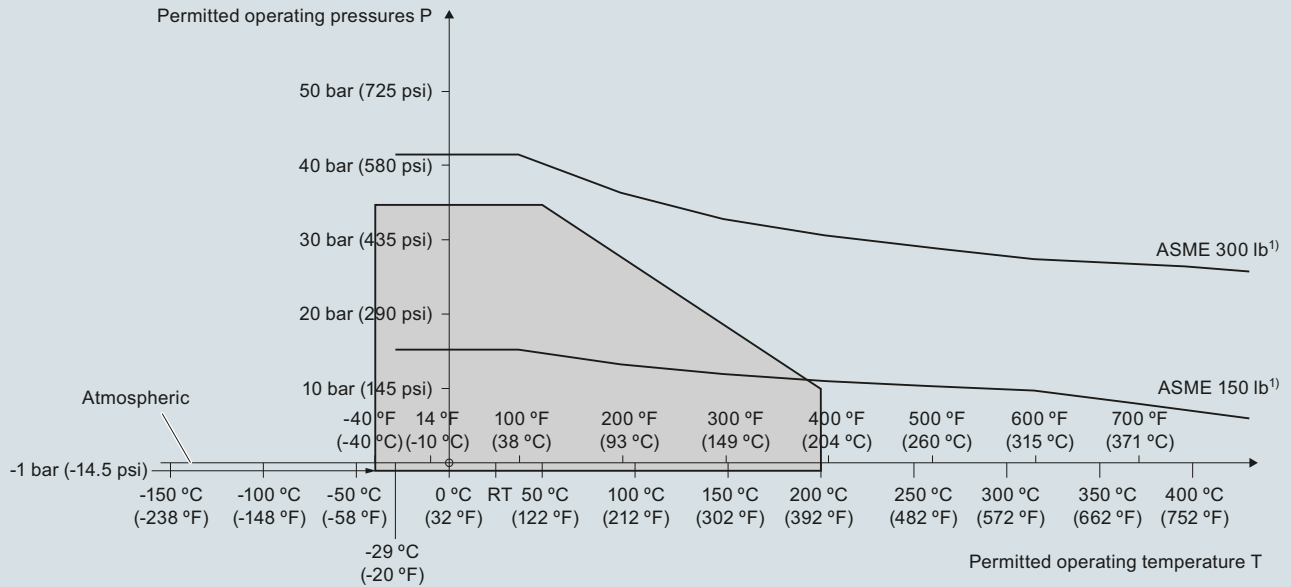
Pointek CLS300 process pressure/temperature derating curves (7ML5650, 7ML5651, 7ML5660 and 7ML5661)

Pressure/temperature curve
CLS300 high temperature rod probes
Threaded process connections
(7ML5652 and 7ML5662)



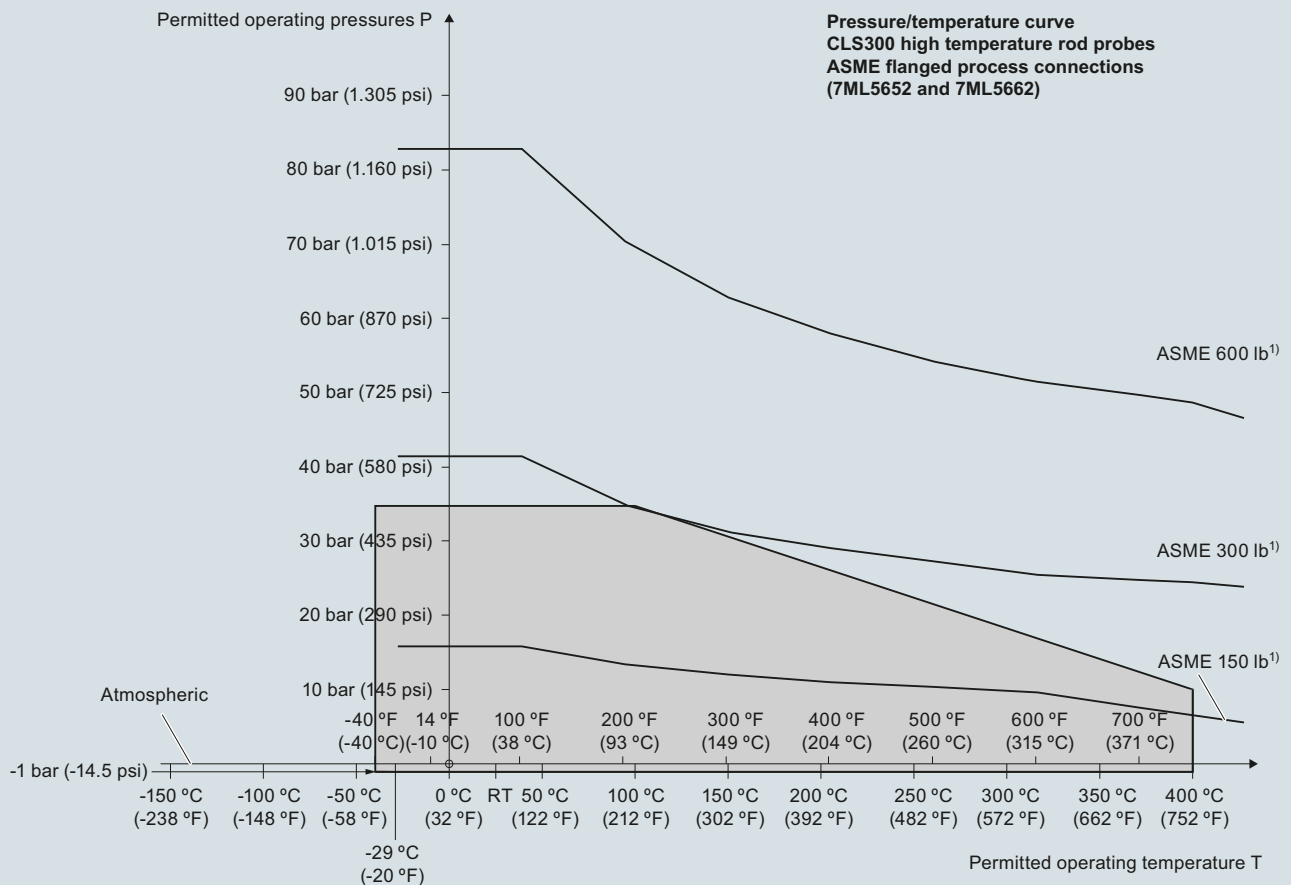
Pointek CLS300 process pressure/temperature derating curves (7ML5652 and 7ML5662)

Pressure/temperature curve
CLS300 extended rod and cable probes
ASME flanged process connections
(7ML5650, 7ML5651, 7ML5660 and 7ML5661)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 process pressure/temperature derating curves (7ML5650, 7ML5651, 7ML5660, and 7ML5661)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

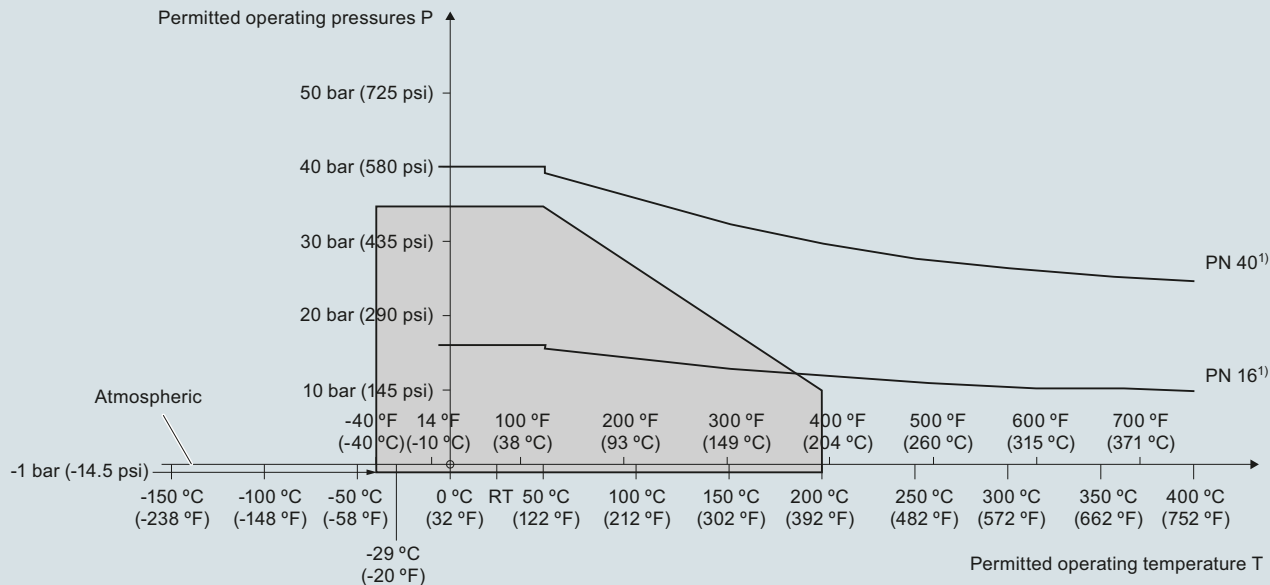
Pointek CLS300 process pressure/temperature derating curves (7ML5652 and 7ML5662)

Level Measurement

Point level measurement
RF Capacitance switches

Pointek CLS300 - Standard and Digital

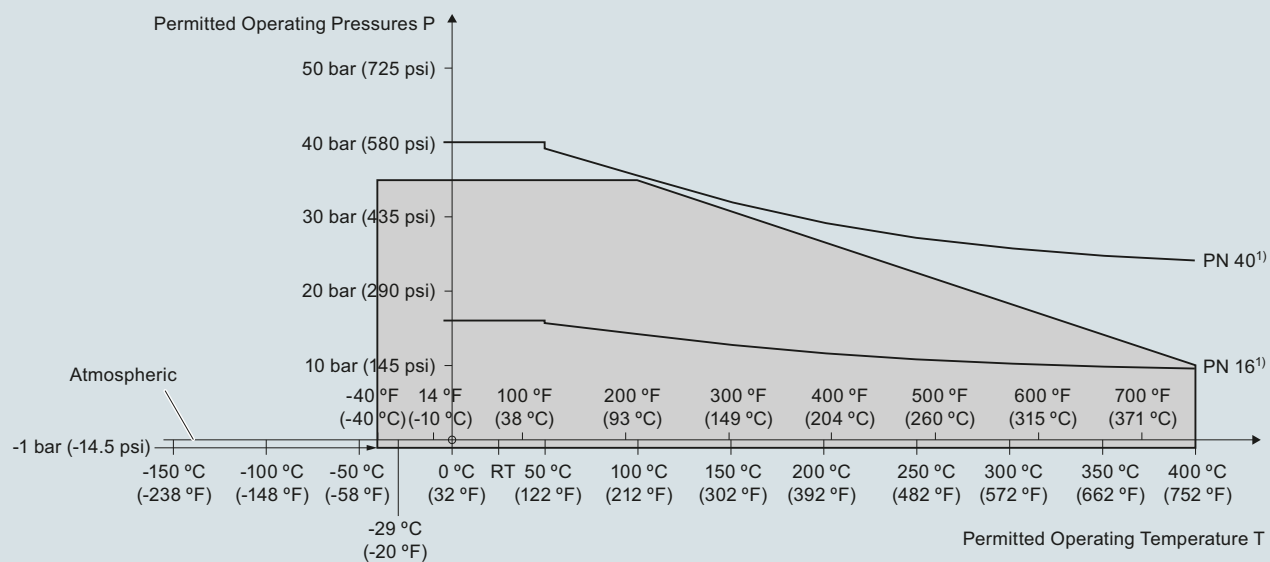
Pressure/temperature curve
CLS300 extended rod and cable probes
EN flanged process connections
(7ML5650, 7ML5651, 7ML5660 and 7ML5661)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 process pressure/temperature derating curves (7ML5650, 7ML5651, 7ML5660 and 7ML5661)

Pressure/Temperature Curve
CLS300 High Temperature Rod Probes
EN Flanged Process Connections (7ML5652 and 7ML5662)

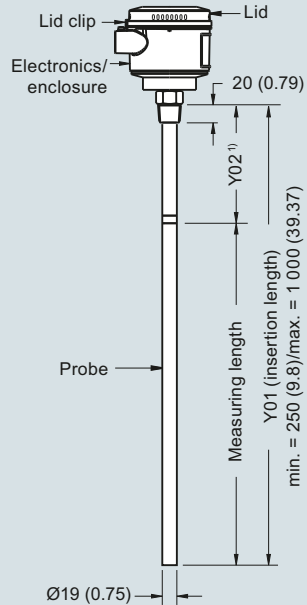


¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

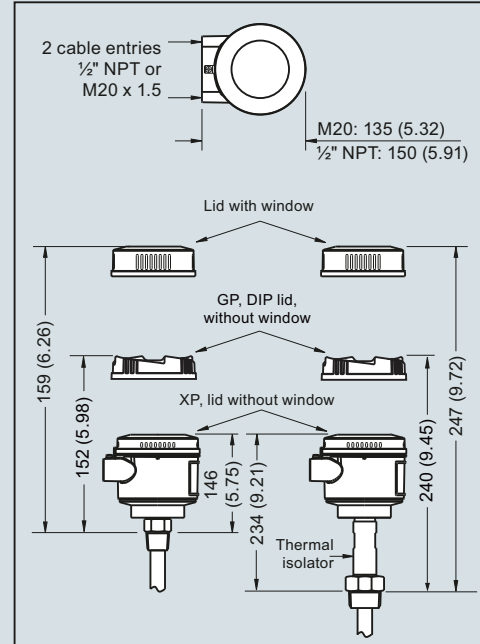
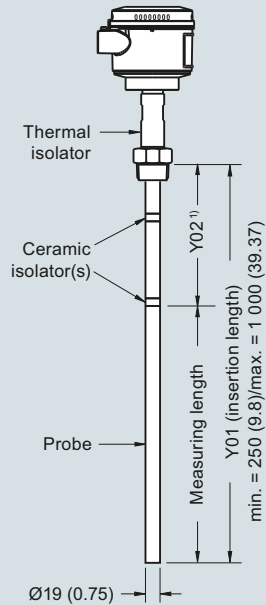
Pointek CLS300 process pressure/temperature derating curves (7ML5652 and 7ML5662)

Dimensional drawings

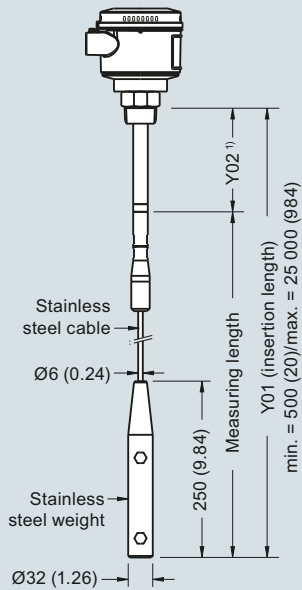
Rod version
Threaded (7ML5650 and 7ML5660)



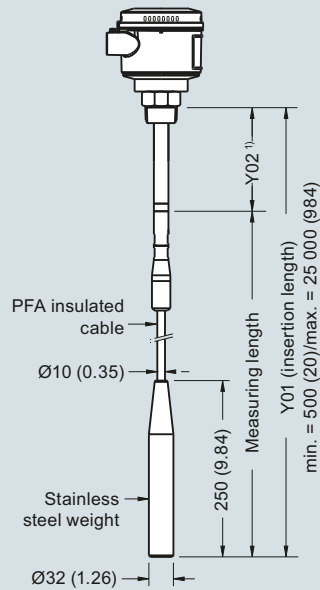
High temperature rod version
Threaded (7ML5652 and 7ML5662)



Cable version, non-insulated
Threaded (7ML5651 and 7ML5661)



Cable version, insulated
Threaded (7ML5651 and 7ML5661)



Note:

¹⁾ Extended Active Shield (Y02): standard length 125 (4.92). Optional active shield lengths: 250 (9.84) or 400 (15.75).

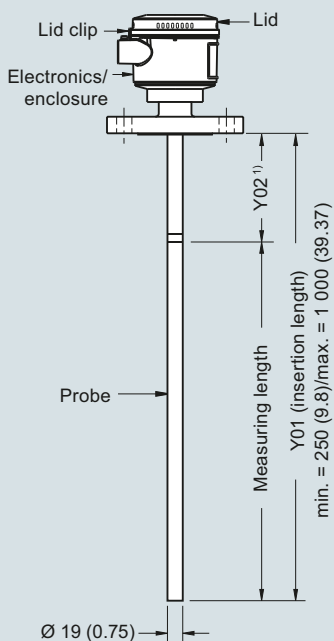
Pointek CLS300 threaded process connections, dimensions in mm (inch)

Level Measurement

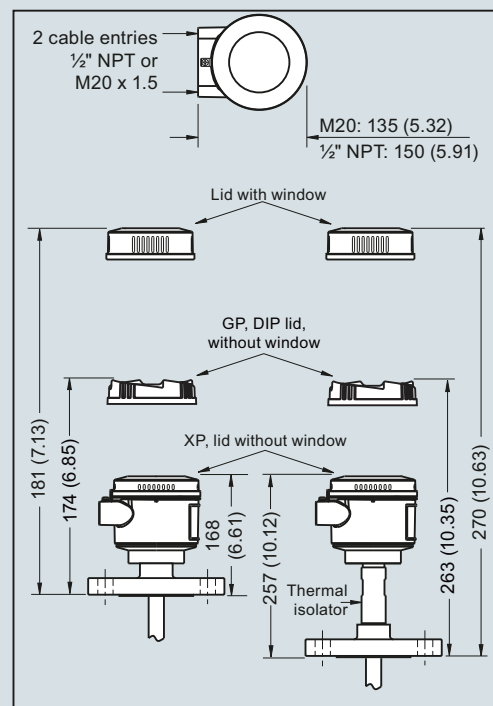
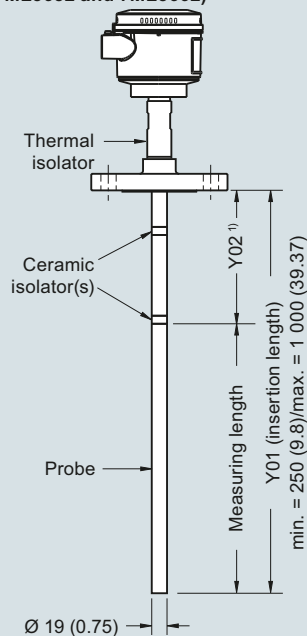
Point level measurement
RF Capacitance switches

Pointek CLS300 - Standard and Digital

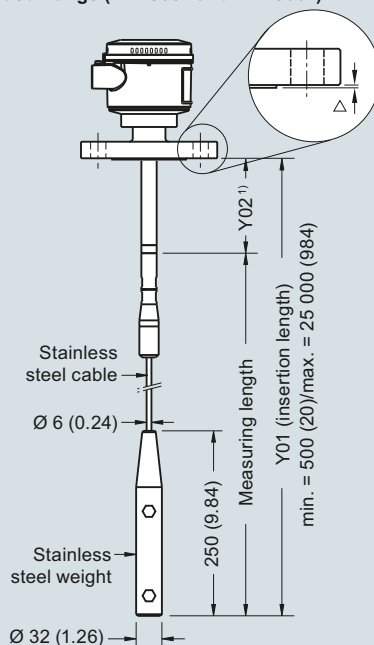
Rod version Welded flange (7ML5650 and 7ML5660)



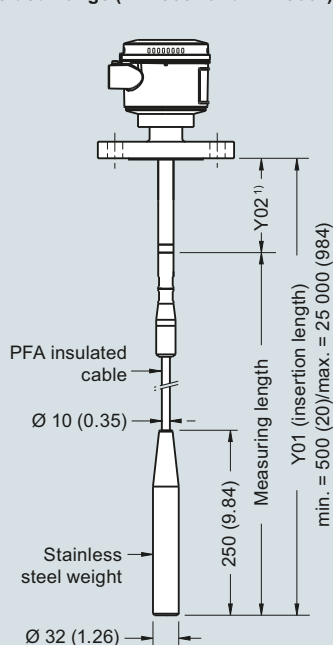
High temperature rod version Welded flange (7ML5652 and 7ML5662)



Cable version, non-insulated Welded flange (7ML5651 and 7ML5661)



Cable version, insulated Welded flange (7ML5651 and 7ML5661)



Flange Facing (raised face)	
Flange Class	Facing thickness
△ ASME 150/300	2 (0.08)
△ ASME 600/900	7 (0.28)
△ PN16/40	2 (0.08)

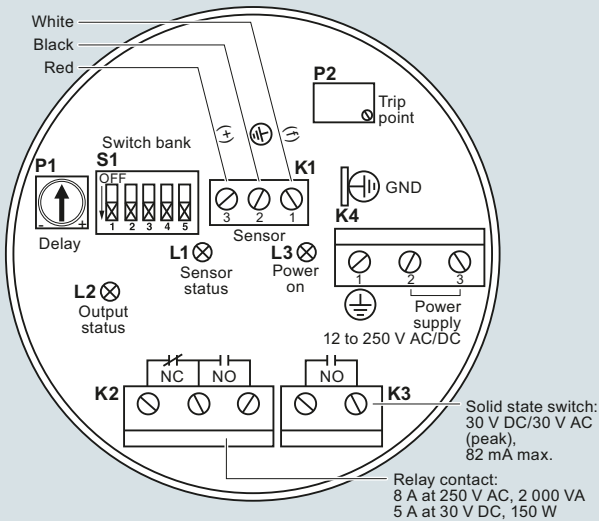
Note:

¹⁾ Extended Active Shield (Y02): standard length 105 (4.13). Optional active shield lengths: 230 (9.06) or 380 (14.96). Insertion length does not include any raised face/gasket face dimension (see Flange Facing Table above)

Pointek CLS300 flanged process connections, dimensions in mm (inch)

Circuit diagrams

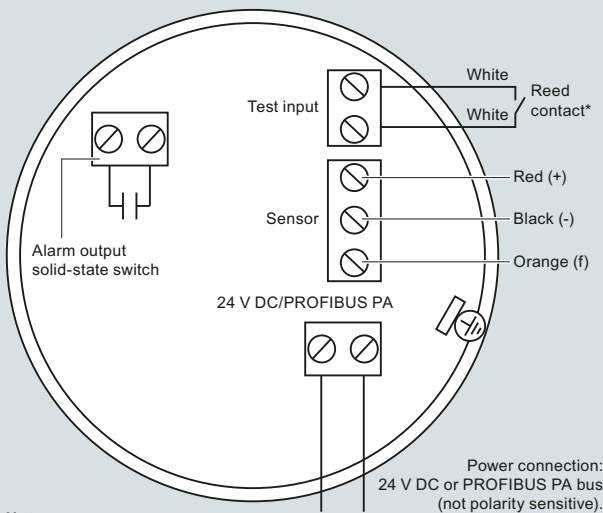
Wiring: Pointek CLS300 standard



Notes:

- Identification label is on underside of lid. Switch and potentiometer settings are for illustration purposes only (refer to operation/setup in manual).
- All field wiring must have insulation suitable for at least 250 V.
- Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
- Maximum working voltage between adjacent relay contacts shall be 250 V.
- Refer to the Instruction manual or contact Siemens representative for detailed wiring information.

Wiring: Pointek CLS300 digital



Notes:

Refer to the instruction manual or contact a Siemens representative for detailed wiring information.

*Magnet activated sensor test

A magnet can be used to test the sensor without opening the lid of the Pointek CLS300 digital version. Bring the magnet close to the test area indicated on the enclosure. The sensor test starts and finishes automatically after 10 seconds.



Pointek CLS300 connections

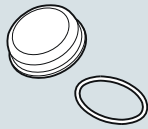

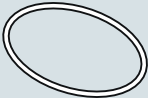
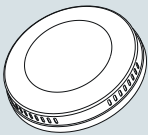
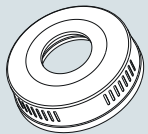

Level Measurement

Point level measurement
RF Capacitance switches

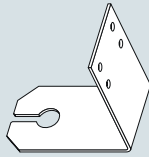


Pointek CLS Specials

Selection and ordering data



Pointek Specials¹⁾

	Article No.
CLS100 Polycarbonate Lid and Gasket, FKM	
	
Kit, Lid and gasket, CLS100 enclosure version	A5E01163671
CLS100 Miscellaneous Parts	
Custom length of cable is available only for 7ML5501-xxx1x and 7ML5501-xxx5x ²⁾	
CLS200 Gasket (IP65), Synprene	
	
Spare gasket, enclosure version (IP65 versions only)	A5E01163672
CLS200 Gasket (IP68), Silicone	
	
Spare gasket, enclosure version (IP68 versions)	A5E01163673
CLS200 Blind Lid	
	
Spare aluminum blind lid (for standard versions only)	A5E01163674
CLS200 Lid with window	
	
Spare aluminum lid with window	A5E01163676
CLS200 Sensor Kit for cable units	
	
Kit, sensor for cable units, PPS, Standard, FKM	A5E01163677

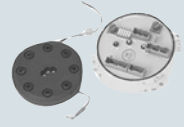

Pointek Specials¹⁾

	Article No.
Kit, sensor for cable units, PPS, digital, FKM	A5E01163678
Kit, sensor for cable units, PPS, standard, FFKM	A5E01163679
Kit, sensor for cable units, PPS, digital, FFKM	A5E01163680
Kit, sensor for cable units, PVDF, standard, FKM	A5E01163681
Kit, sensor for cable units, PVDF, digital, FKM	A5E01163682
Kit, sensor for cable units, PVDF, standard, FFKM	A5E01163683
Kit, sensor for cable units, PVDF, digital, FFKM	A5E01163684
CLS200 Mounting Bracket, 316L stainless steel	
	
Spare mounting bracket	A5E01163685
CLS200 PROFIBUS Connector (IP65)	
	
Spare, PROFIBUS connector (IP65 versions only)	A5E01163686
CLS200 Miscellaneous Parts	
CLS200 with FFKM O-rings (any version) ²⁾	
CLS200 Electronics	
Test magnet, digital version	7ML1830-1JE
Amplifier/power supply kit, standard version	A5E03251681
Amplifier/power supply, digital version	7ML1830-1JF
LCD display, digital version	7ML1830-1JK
CLS300 Cable Extensions, 316L stainless steel	
	
Kit, stainless steel cable extension, 1 m, adjustable by customer	A5E01163688
Kit, stainless steel cable extension, 3 m, adjustable by customer	A5E01163689
Kit, stainless steel cable extension, 5 m, adjustable by customer	A5E01163690
Kit, stainless steel cable extension, 10 m, adjustable by customer	A5E01163691
Kit, stainless steel cable extension, 15 m, adjustable by customer	A5E01163693
Kit, stainless steel cable extension, 20 m, adjustable by customer	A5E01163695

Pointek Specials¹⁾

	Article No.
CLS300 Cable Extensions, 316 stainless steel with PFA coating	
	
Kit, PFA cable extension, 1 m, adjustable by customer	A5E01163697
Kit, PFA cable extension, 3 m, adjustable by customer	A5E01163698
Kit, PFA cable extension, 5 m, adjustable by customer	A5E01163699
Kit, PFA cable extension, 10 m, adjustable by customer	A5E01163700
Kit, PFA cable extension, 15 m, adjustable by customer	A5E01163701
Kit, PFA cable extension, 20 m, adjustable by customer	A5E01163702
CLS300 Rod Kits, 316L stainless steel	
	
Kit, stainless steel rod 180 mm (7.09 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 350 mm (13.78 inch).	A5E01163719
Kit, stainless steel rod 330 mm (12.99 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 500 mm (19.69 inch).	A5E01163720
Kit, stainless steel rod 580 mm (22.83 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 750 mm (29.53 inch).	A5E01163721
Kit, stainless steel rod 830 mm (32.68 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 1 000 mm (39.37 inch).	A5E01163722
Kit, stainless steel rod 1 330 mm (52.36 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 1 500 mm (59.06 inch). ²⁾	
Kit, stainless steel rod 1 830 mm (72.05 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 2 000 mm (78.74 inch). ²⁾	
Kit, stainless steel rod customized length up to 1 m ²⁾	
Kit, stainless steel rod customized length up to 2 m ²⁾	

Pointek Specials¹⁾

	Article No.
CLS300 Electronics Kits with drivers (for rod or cable versions)	
Kit, electronics with driver, standard CLS300. To be used in rod or cable versions with length less than 5 m. ³⁾⁴⁾	A5E01163723
Kit, electronics with driver, digital CLS300. To be used in rod or cable versions with length less than 5 m. ³⁾⁴⁾	A5E01163725
CLS300 Electronics Kits with drivers (for cable versions)	
	
Kit, electronics with driver, standard CLS300. To be used in cable versions with length greater than 5 m. ³⁾⁴⁾	A5E01163724
Kit, electronics with driver, digital CLS300. To be used in cable versions with length greater than 5 m. ³⁾⁴⁾	A5E01163726
CLS300 Electronics	
Test magnet, digital version	7ML1830-1JE
Amplifier/power supply kit, standard version	A5E03251683
Amplifier/power supply, digital version	7ML1830-1JF
LCD display, digital version	7ML1830-1JK
CLS300 Weight Kit, 316L stainless steel	
	
Kit, spare stainless steel weight. To be used in any cable version of CLS300.	A5E01163727

¹⁾ Special flange sizes and facings are available. Please consult a local sales person for details.

²⁾ Please consult a local sales person for part number and pricing

³⁾ For General Purpose approvals only

⁴⁾ To maintain approvals, qualified trained Siemens personnel required for part replacement

Customers interested in a custom designed device should consult a local sales person. For more information, please visit <http://www.usa.siemens.com/level>.

Level Measurement

Point level measurement

Vibrating switches

SITRANS LVL100

Overview



SITRANS LVL100 is a compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low and demand applications, as well as pump protection. It is ideal for use in confined spaces.

Benefits

- Proven vibrating level switch technology for liquids
- Compact insertion length of 40 mm (1.57 inch) for confined space applications
- Available starting at 1/2" threaded process connections
- Fault monitoring for corrosion, loss of vibration, or line break to the piezo drive
- Integrated test function to confirm correct operation

Application

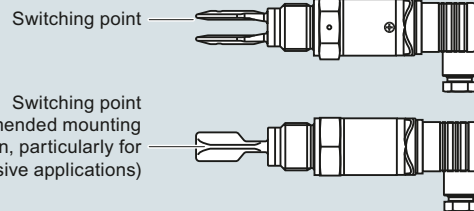
SITRANS LVL100 is a compact level switch designed for industrial use in all areas of process technology and can be used for material detection with liquids and slurries. With an insertion length of only 40 mm (1.57 inch), SITRANS LVL100 can be mounted in small pipes and confined space applications. It is virtually unaffected by the chemical and physical properties of the liquid. The LVL 100 can be used in difficult conditions including turbulence, air bubbles, foam generation, buildup, or external vibration.

The tuning fork is piezoelectrically energized and vibrates at a mechanical resonance frequency of approximately 1 200 Hz. The vibration frequency changes when the tuning fork is covered by the medium. This change is detected by the integrated oscillator and converted into a switching command. The integrated electronics evaluate the level signal and output a switching signal to connected devices.

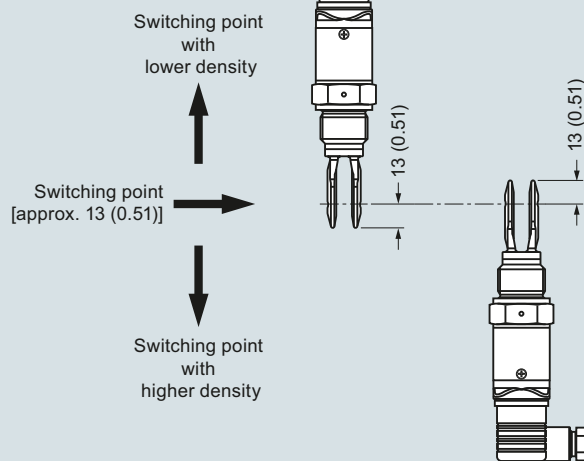
- Key Applications: for use in liquids and slurries, for level measurement, overflow, and dry run protection

Configuration

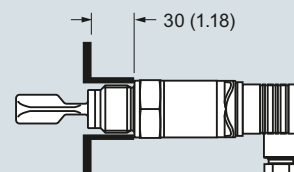
Horizontal mounting



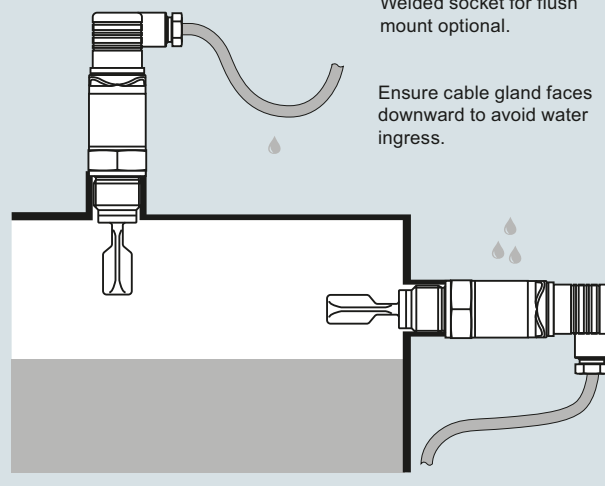
Vertical mounting



Horizontal mounting in viscous or adhesive applications



Moisture protection



SITRANS LVL100 installation, dimensions in mm (inch)

Technical specifications

Mode of operation	
Measuring principle	Vibrating point level switch
Input	
Measured variable	High and low and demand
Output	
Output options	<ul style="list-style-type: none"> • Contactless electronic switch • Transistor output PNP
Measuring accuracy	
Hysteresis	Approx. 2 mm (0.08 inch) with vertical installation
Switching delay	Approx. 500 ms (on/off)
Frequency	Approx. 1 100 Hz
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +70 °C (-40 ... +158 °F)
• Installation category	III
• Pollution degree	2
Medium conditions	
• Temperature	
- Standard	-40 ... +100 °C (-40 ... +212 °F)
- High temperature option	-40 ... +150 °C (-40 ... +302 °F)
• Pressure (vessel)	-1 ... 64 bar g (-14.5 ... 928 psi g)
• Density	0.7 ... 2.5 g/cm ³ (0.025 ... 0.09 lb/in ³)
Design	
Material	
• Enclosure	316L and Plastic PEI
• Tuning fork	316L (1.4404 or 1.4435)
• Process connection (threaded)	316L (1.4404 or 1.4435)
• Process seal	Klingsil C-4400
Process connection	
• Pipe thread, cylindrical (ISO 228 T1)	G ½" A, G ¾" A, or G 1" A
• Pipe thread, tapered	½" NPT, ¾" NPT, or 1" NPT
• Hygienic fittings	Bolting DN 40 PN 40
	Tri-clamp 1", 1½", 2" PN 10
Degree of protection	IP65/Type 4/NEMA 4 (with DIN 43650 valve plug), IP66/67 or IP68 (with M12 connector)
Conduit entry	1 x M12 [IP66/IP67 or IP68 (0.2 bar)]
Weight (housing)	250 g (9 oz)
Power supply	
Supply voltage	20 ... 253 V AC, 50/60 Hz 20 ... 253 V DC
Power consumption	Max. 0.5 W
Certificates and approvals	
	<ul style="list-style-type: none"> • Overfill protection (WHG) • Shipping approvals

Level Measurement

Point level measurement

Vibrating switches

SITRANS LVL100

Selection and Ordering data

Article No.

SITRANS LVL100

Compact vibrating level switch for use in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. Ideal for use in confined spaces.

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Approvals

Without approvals
Shipping approvals⁵⁾
Overfill protection (WHG)¹⁾
Canada/US for Ex-free area (including Ordinary Location Approval)⁷⁾

Process temperature

Standard -40 ... +100 °C (-40 ... +212 °F)²⁾
Extended -40 ... +150 °C (-40 ... +302 °F)²⁾⁶⁾
Hygienic applications -40 ... +150 °C (-40 ... +302 °F)³⁾

Process connection

Thread G $\frac{3}{4}$ " A PN 64/316L
Thread G $\frac{3}{4}$ " A PN 64/316L Ra < 0.8 µm
Thread $\frac{3}{4}$ " NPT PN 64/316L
Thread $\frac{3}{4}$ " NPT PN 64/316L Ra < 0.8 µm
Thread G1" A PN 64/316L
Thread G1" A PN 64/316L Ra < 0.8 µm
Thread 1" NPT PN 64/316L
Thread 1" NPT PN 64/316L Ra < 0.8 µm
Tri-Clamp 1" PN 16 DIN 32676/316L Ra < 0.8 µm
Tri-Clamp 1½" PN 16 DIN 32676/316L Ra < 0.8 µm
Tri-Clamp 2" PN 16 DIN 32676/316L Ra < 0.8 µm
Bolting DN 25 PN 40 DIN 11851/316L Ra < 0.8 µm
Bolting DN 40 PN 40 DIN 11851/316L Ra < 0.8 µm
Bolting DN 50 PN 25 DIN 11851/316L Ra < 0.8 µm
SMS DN 38 PN 6 316L Ra < 0.8 µm
Hygienic fitting with compression nut F40
PN 25/316L Ra < 0.8 µm
Thread G½" (DIN 3852-A) PN 64 / 316L
Thread G½" (DIN 3852-A) PN 64 / 316L Ra < 0.8 µm
Thread ½" NPT (ASME B1.20.1) PN 64/316L
Thread ½" NPT (ASME B1.20.1) PN 64/316L Ra < 0.8 µm
Thread R¾" PN 64, EN 10226-1/316L
R1 Thread R1 PN 64, EN 10226-1/316L
RF Thread R1 PN 64, EN 10226-1/316L (Ra < 0.8 µm)

Electronics

Contactless electronic switch 20 ... 250 V AC/DC⁴⁾
Transistor output PNP 10 ... 35 V DC

Housing

316L

Electrical connection/Protection

M12 x 1/IP67
According to ISO4400 including plug/ IP65
According to DIN 43650 incl. plug with QuickOn connection/IP65
M12 x 1 incl. 5 m cable/IP68 (0.2 bar)

7ML5745-

A 0

1

2

3

4

A

B

C

A 0

A 1

A 2

A 3

A 4

A 5

A 6

A 7

A 8

B 0

B 1

B 2

B 3

B 4

B 5

B 6

C 0

C 1

C 2

C 3

D 0

D 1

D 2

1

2

1

A

B

C

D

Selection and Ordering data

Order code

Further designs

Please add "-Z" to Article No. and specify Order code(s).

Cleaning including certificate (oil, grease and silicone free)

W01

Identification Label, foil laser marking

Y16

Acceptance test Certificate 2.2 for material EN 10204

C15

3.1-Inspection Certificate for instrument with test data (EN 10204)

C25

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Spare Parts

LVL100 Threaded Welded Socket

Article No.

G¾" A/316L with FKM Seal

7ML1930-1EE

G1" A/316L with FKM Seal

7ML1930-1EF

M27 x 1.5/316L with FKM Seal

7ML1930-1EG

G¾" A/316L with EPDM Seal

7ML1930-1EH

G1" A/316L with EPDM Seal

7ML1930-1EJ

M27 x 1.5/316L with EPDM Seal

7ML1930-1EK

¹⁾ Available only with Electronics option 2

²⁾ Available only with process connection A0, A2, A4, A6, C0, C2, D0 and D1

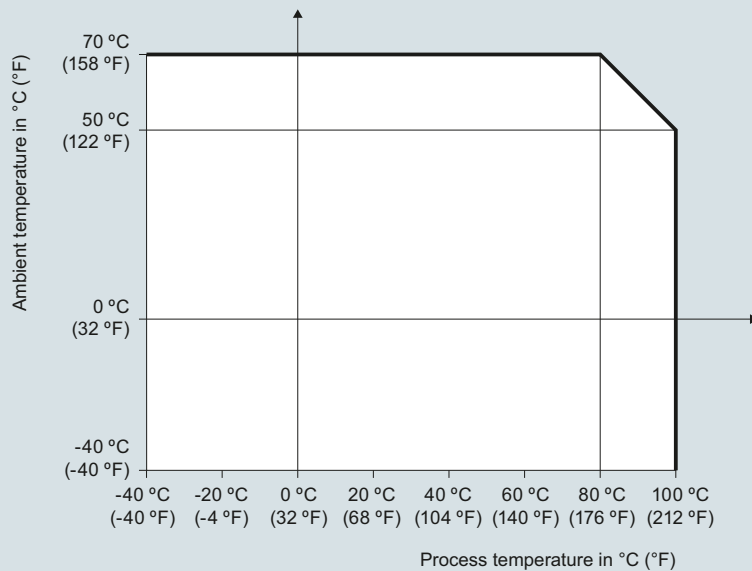
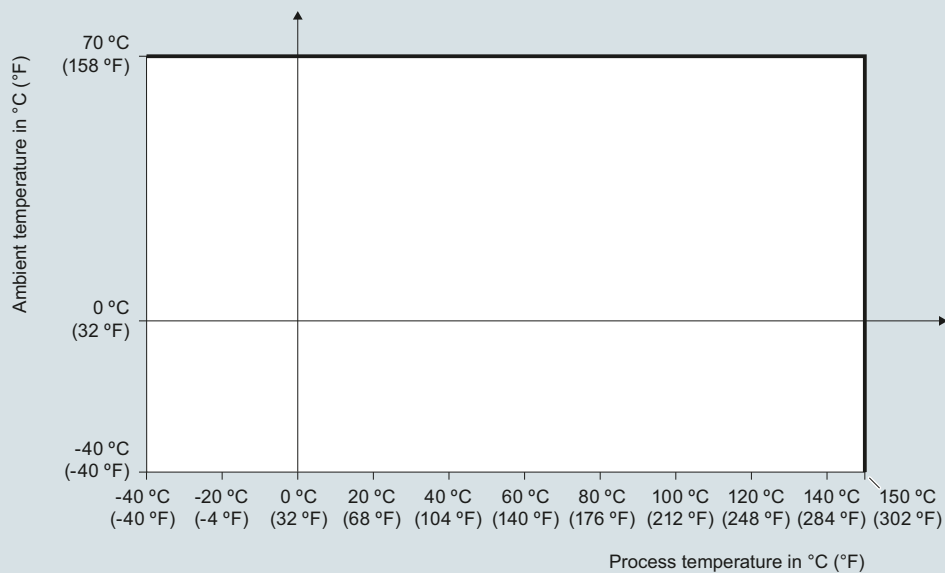
³⁾ Available only with process connection A1, A3, A5, and A7 ... B6, C1, C3 and D2

⁴⁾ Available only with Electrical connection/Protection option B and C

⁵⁾ Available only with Process Temperature options A and B

⁶⁾ Available only with shipping approvals DNV and GL

⁷⁾ Available only with Electrical connection/Protection option B

Characteristic curves
**Ambient temperature to process temperature dependency
(standard version)**

**Ambient temperature to process temperature dependency
(high temperature version)**


SITRANS LVL100 ambient temperature/process temperature derating curves

Level Measurement

Point level measurement

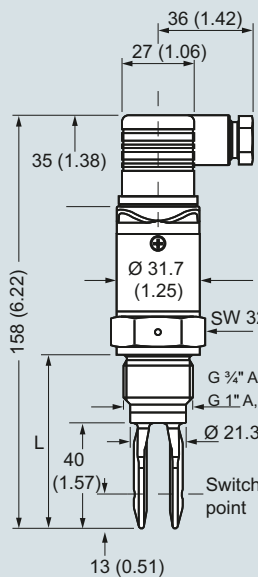
Vibrating switches

SITRANS LVL100

Dimensional drawings

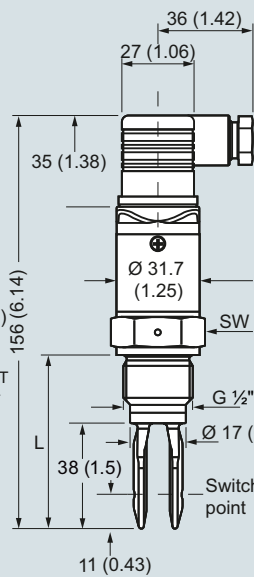
SITRANS LVL100 (standard)

Thread G $\frac{3}{4}$ " A, G 1" A
(DIN ISO 228/1),
 $\frac{3}{4}$ " NPT or 1" NPT
(valve plug ISO 4400)



L =
Length with G $\frac{3}{4}$ " A, $\frac{3}{4}$ " NPT: 66 (2.6)
Length with G 1" A, 1" NPT: 69 (2.7)

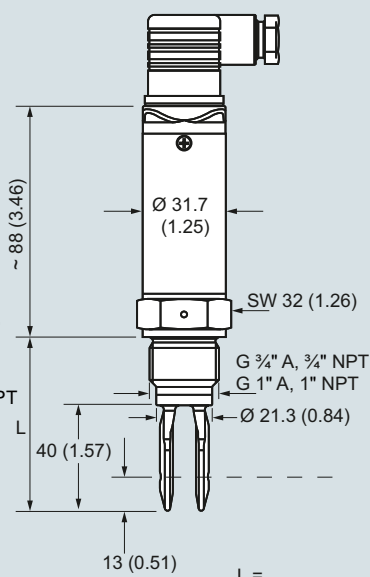
Thread G $\frac{1}{2}$ " A
(DIN ISO 228/1),
 $\frac{1}{2}$ " NPT
(valve plug ISO 4400)



L =
Length with G $\frac{1}{2}$ " A, $\frac{1}{2}$ " NPT: 62 (2.4)

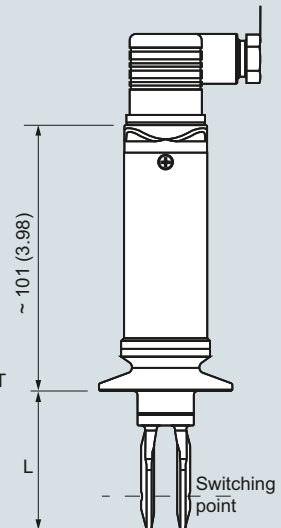
SITRANS LVL100 (extended high temperature)

Thread G $\frac{3}{4}$ " A, G 1" A
(DIN ISO 228/1),
 $\frac{3}{4}$ " NPT or 1" NPT
(valve plug DIN 43650)

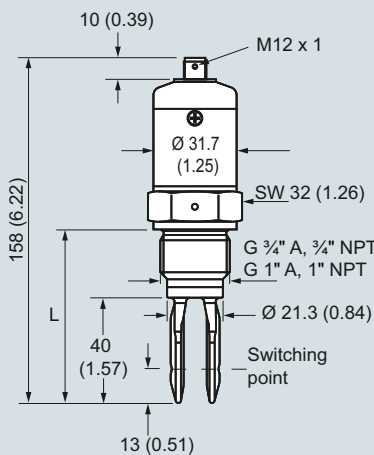


L =
Length with G $\frac{3}{4}$ " A, $\frac{3}{4}$ " NPT: 66 (2.6)
Length with G 1" A, 1" NPT: 69 (2.7)
Length with Tri-clamp: 53 (2.1)

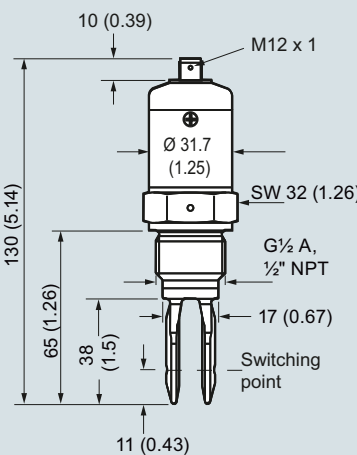
Tri-clamp (valve plug DIN 43650)



SITRANS LVL100 (standard with M12 connector)



L =
Length with G $\frac{3}{4}$ " A, $\frac{3}{4}$ " NPT: 66 (2.6)
Length with G 1" A, 1" NPT: 69 (2.7)

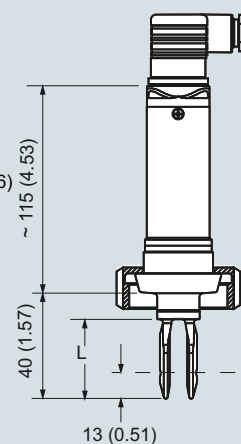


L =
Length with G $\frac{1}{2}$ " A, $\frac{1}{2}$ " NPT: 62 (2.4)

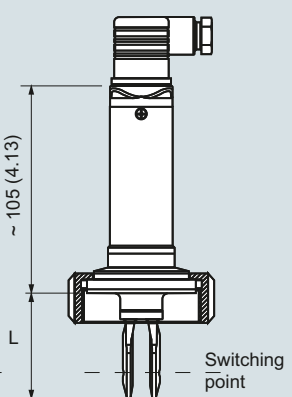
SITRANS LVL100 (extended, high temperature)

Bolting DIN 11851
(valve plug DIN 43650)

SMS 1145
(valve plug DIN 43650)



L =
Length with bolting: 53 (2.1)
Length with SMS 1145: 53 (2)

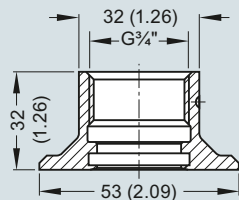


SITRANS LVL100, dimensions in mm (inch)

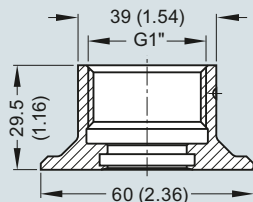
Options

LVL100 threaded welded socket

G $\frac{3}{4}$ " A/316L



G1" A/316L



SITRANS LVL100 welded socket, dimensions in mm (inch)

Level Measurement

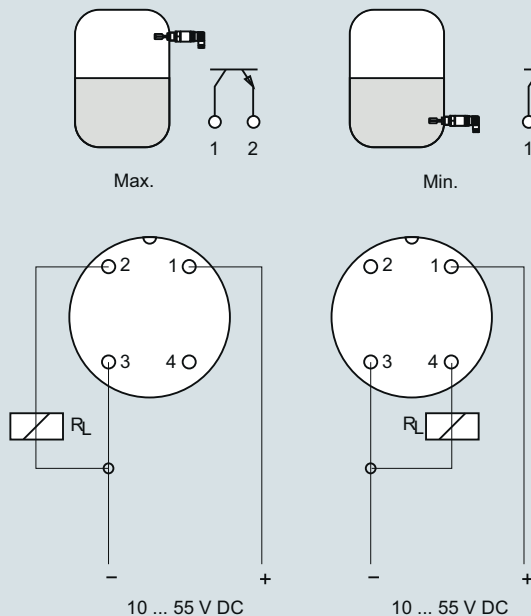
Point level measurement

Vibrating switches

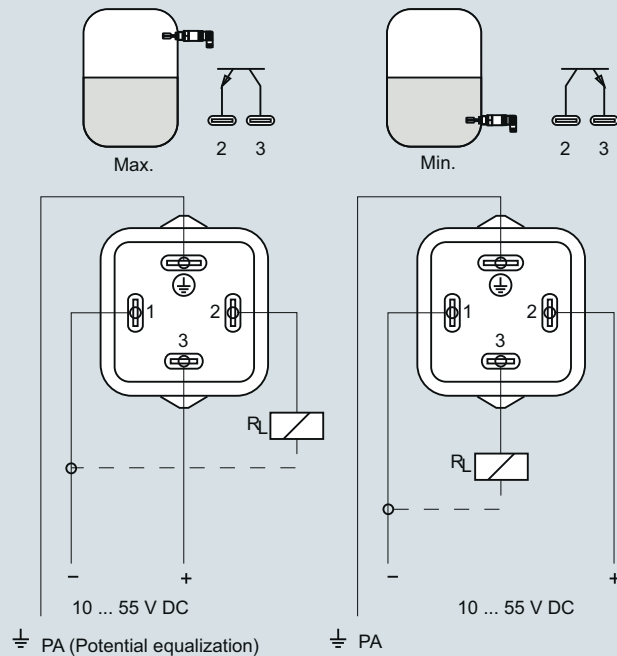
SITRANS LVL100

Circuit diagrams

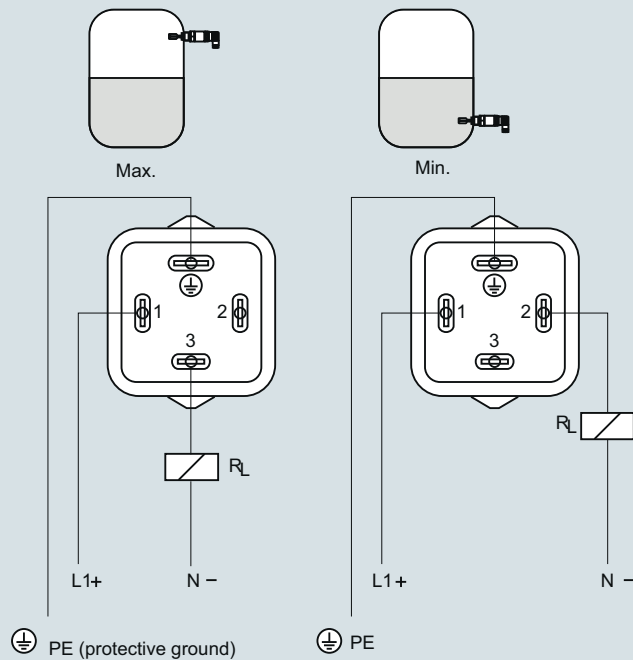
Transistor PNP (M12 x 1 plug connection)



Transistor PNP (with valve plug DIN 43650)



Contactless electronic switch (valve plug DIN 43650)



SITRANS LVL100 connections

Overview



SITRANS LVL200 is a standard vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 applications.

Benefits

- Proven vibrating level switch technology for liquids
- Compact insertion length of 40 mm (1.57 inch) for confined space applications
- Fault monitoring for corrosion, loss of vibration or line break to the piezo drive
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511
- Hygienic process connections
- Suitable for API 2350
- Optional remote test signal conditioner

Application

SITRANS LVL200 is a level switch designed for industrial use in all areas of process technology and can be used with liquids and slurries. With a tuning fork insertion length of only 40 mm (1.57 inch), SITRANS LVL200 can be mounted in small pipes and applications with confined space. The LVL200 can be used to measure products with a minimum density of $> 0.5 \text{ g/cm}^3$ (0.018 lb/in^3). The LVL200 can be used in difficult conditions including turbulence, air bubbles, foam generation, buildup, or external vibration.

SITRANS LVL200 continuously monitors faults via frequency evaluation, providing early detection of strong corrosion or damage on the tuning fork, loss of vibration, or a line break to the piezo drive.

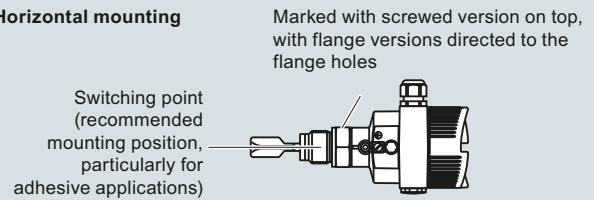
The tuning fork is piezoelectrically energized and vibrates at its mechanical resonance frequency of approximately 1 200 Hz. The vibration frequency changes when the tuning fork is covered by the medium. This change is detected by the integrated oscillator and converted into a switching command. The integrated electronics evaluate the level signal and output a switching signal, directly operating connected devices.

The optional signal conditioner provides a remote test feature to ensure continuous product reliability.

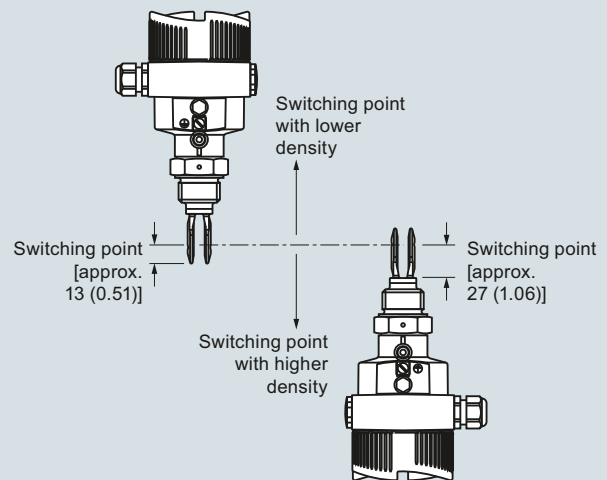
- Key Applications: for use in liquids and slurries, for level measurement, overflow, and dry run protection

Configuration

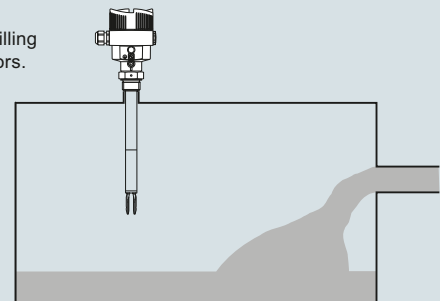
Horizontal mounting



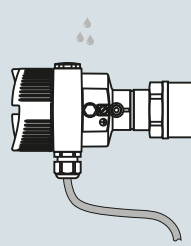
Vertical mounting



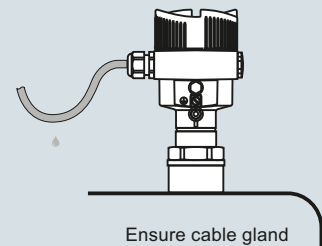
Mount away from filling openings or agitators.



Moisture protection



NOTE:
Welded socket for flush mount optional



Ensure cable gland
faces downward to
avoid water ingress.

SITRANS LVL200 installation, dimensions in mm (inch)

Level Measurement

Point level measurement

Vibrating switches

SITRANS LVL200

Technical specifications

Mode of operation		Design	
Measuring principle	Vibrating point level switch	Material	<ul style="list-style-type: none"> Aluminum die-cast AlSi10Mg, powder-coated, basis: Polyester Stainless steel housing, electropolished 316L Stainless steel housing, precision casting 316L Plastic housing, plastic PBT (Polyester)
Input		• Enclosure	
Measured variable	High and low and demand (via mode switch)		
Output			
Output options	<ul style="list-style-type: none"> Relay output (DPDT), 2 floating SPDTs Contactless electronic switch 2-wire NAMUR signal output Transistor (NPN/PNP) 10 ... 55 V DC 8/16 mA 	<ul style="list-style-type: none"> Tuning fork Extension tube [ø 21.3 mm (0.839 inch)] Process connection: threaded 	316L (1.4404 or 1.4435), Alloy C22 316L (1.4404 or 1.4435), Alloy C22
Measuring accuracy		• Process connection: flange	<ul style="list-style-type: none"> Standard, Extended: 316L (1.4404 or 1.4435), Alloy C22 High temperature: Inconel 718 316L (1.4404 or 1.4435), 316L with Alloy C22, ECTFE, or PFA coating Klingsersil C-4400
Repeatability	0.1 mm (0.004 inch)	• Process seal	
Hysteresis	Approx. 2 mm (0.08 inch) with vertical installation	Process connection	
Switching delay	<ul style="list-style-type: none"> Standard, Extended: approx. 500 ms (on/off) High temperature: approx. 1 s (optionally adjustable at factory) 	<ul style="list-style-type: none"> Pipe thread, cylindrical (ISO 228 T1) Pipe thread, tapered Flanges Hygienic fittings 	G ¾" A, G 1" A ¾" NPT, 1" NPT, 1½" NPT DIN from DN 25, ASME from 1" Bolting DN 40 PN 40, 1, 1½, 2, 2½" Tri-Clamp PN 10, conus DN 25 PN 40, Tuchenhausen Varivent DN 50 PN 10, SMS
Frequency	<ul style="list-style-type: none"> Standard, Extended: Approx. 1 200 Hz High temperature: 1400 Hz 		
Rated operating conditions		Degree of protection	Type 4X/NEMA 4X/IP66/IP67
Installation conditions		Conduit entry	
• Location	Indoor/outdoor		<ul style="list-style-type: none"> 1 x M20 x 1.5 (cable: ø 5 ... 9 mm), 1 x blind stopper M20 x 1.5; attached 1 x M20 x 1.5 cable entry 1 x ½" NPT cable entry, 1 x blind stopper ½" NPT, 1 x ½" NPT cable entry 1 x M12 x 1; 1 x blind stopper M20 x 1.5
Ambient conditions		Weight	
• Ambient temperature	-40 ... +70 °C (-40 ... +158 °F)	• Device weight (dependent on process fitting)	Approx. 0.8 ... 4 kg (0.18 ... 8.82 lb)
• Installation category	III	• Tube extension (extended version)	Approx. 920 g/m (10 oz/ft)
• Pollution degree	2		
Medium conditions		Power supply	
• Temperature		Supply voltage	20 ... 253 V AC, 50/60 Hz, 20 ... 72 V DC [at U > 60 V DC]
- LVL200S Standard	-50 ... +150 °C (-58 ... +302 °F)	• Relay DPDT	
- LVL200S High temperature option	-50 ... +250 °C (-58 ... +482 °F)		
- LVL200E Standard: with 316L/Alloy C22	-50 ... +150 °C (-58 ... +302 °F)	• Contactless	20 ... 253 V AC, 50/60 Hz, 20 ... 253 V DC
- LVL200E High temperature option with 316L/Alloy C22	-50 ... +250 °C (-58 ... +482 °F)	• 2-wire NAMUR	
- LVL200H, High temperature	-196 ... +450 °C (-321 ... +842 °F)	Operating voltage (characteristics according to standard) for connection to an amplifier according to NAMUR	IEC 60947-5-6, approx. 8.2 V Off-load voltage U ₀ approx. 8.2 V Short-circuit current I _U approx. 8.2 mA
Pressure (vessel)	<ul style="list-style-type: none"> Standard, Extended: -1 ... 64 bar g (-14.5 ... 928 psi g) High temperature: instrument version up to 160 bar (2 320 psi g): -1 ... 160 bar/-100 ... 16 000 kPa (-14.5 ... 2 320 psi g) Note: The process pressure is dependent on configuration, including process fitting, e.g. flange	Operating voltage 8/16 mA (via the signal conditioning instrument)	
Density	0.7 ... 2.5 g/cm³ (0.025 ... 0.09 lb/in³); 0.5 ... 2.5 g/cm³ (0.018 ... 0.09 lb/in³) by switching over Density optionally starts at 0.47 cm³ (0.017 lb/in³)	<ul style="list-style-type: none"> Non-Ex instrument Ex-d instrument (ATEX, FM, CSA) Ex-ia instrument (ATEX) Ex-ia instrument (FM, CSA) 	12 ... 36 V DC 12 ... 36 V DC 12 ... 29 V DC 12 ... 31 V DC

Power consumption	<ul style="list-style-type: none"> • Standard, Extended: 1 ... 8 VA (AC), approx. 1.3 W (DC) • High temperature: 3 VA (AC), 1 W (DC)
<ul style="list-style-type: none"> • Relay DPDT • Contactless 	1 ... 8 VA (AC), approx. 1.3 W (DC) Domestic current requirement approx. 3 mA (via load circuit) Load current <ul style="list-style-type: none"> • Min. 10 mA • Max. 400 mA [with $I > 300$ mA the ambient temperature can be max. 60 °C (140 °F)] • Max. 4 A up to 40 ms (not WHG specified)
<ul style="list-style-type: none"> • 8/16 mA, two-wire output 	Output signal <ul style="list-style-type: none"> • Empty (uncovered) <ul style="list-style-type: none"> - 8 mA • Full (covered) <ul style="list-style-type: none"> - 16 mA • Fault message <ul style="list-style-type: none"> - < 1.8 mA Possible signal conditioning instruments: SITRANS SCSC, SITRANS TCSC
<ul style="list-style-type: none"> • 2-wire Namur 	Current consumption <ul style="list-style-type: none"> • Falling characteristics ≥ 2.6 mA uncovered/≤ 0.6 mA covered • ≤ 0.6 mA uncovered/≥ 2.6 mA covered • Failure message ≤ 0.6 mA
<ul style="list-style-type: none"> • Transistor (NPN/PNP) 10 ... 55 V DC 	Output <ul style="list-style-type: none"> • Floating transistor output, permanently shortcircuit-proof Load current <ul style="list-style-type: none"> • < 400 mA Voltage loss <ul style="list-style-type: none"> • < 1 V Switching voltage <ul style="list-style-type: none"> • < 55 V DC Blocking current <ul style="list-style-type: none"> • < 10 μA
Certificates and approvals	<ul style="list-style-type: none"> • CE, CSA • Overfill Protection WHG and VLAREM II • FM (Non-Incendive) Class I, Div. 2, Groups A, B, C, D • FM (Explosion-Proof) Class I, Div. 1, Groups A, B, C, D; (Dust Ignition-Proof) Class II, III, Div. 1, Groups E, F, G1 • IECEx d IIC T6 ... T2 Ga/Gb EHEDG • ATEX II 1/2G, 2G EEx d IIC T6 • ATEX II 1G, 1/2G, 2G EEx ia IIC T6 • Shipping approvals • BR-Ex d IIC T6 ... T2 • FDA, 3A, EHEDG • SIL/IEC61508 Declaration of Conformity [SIL-2 (min/max detection)] Please see configuration section below for full list of approvals.

Level Measurement

Point level measurement

Vibrating switches

SITRANS LVL200

Selection and Ordering data

Article No.

SITRANS LVL200, Standard

Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Electronics

Contactless electronic switch
20 ... 250 V AC/DC¹⁾⁹⁾²⁴⁾
Double relay (DPDT) 20 ... 72 V DC/
20 ... 250 V AC²⁴⁾
NAMUR signal⁹⁾
Transistor (NPN/PNP) 10 ... 55 V DC¹⁾²⁵⁾
Two-wire (8/16 mA) 12 ... 36 V DC

Approvals

Without approvals
Overfill protection (WHG)⁹⁾
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + WHG⁶⁾⁹⁾
ATEX II 1/2G, 2G Ex d IIC T6 + WHG⁵⁾¹⁵⁾
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + shipping approvals⁶⁾¹⁶⁾
ATEX II 1/2G, 2G Ex d IIC T6 + shipping approvals⁵⁾¹⁵⁾
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + ATEX II 1/2 D IP6X T⁶⁾¹⁷⁾¹⁷⁾
IECEx Ex ia IIC T6⁶⁾¹⁸⁾
Shipping approvals¹⁶⁾
ATEX II 3G Ex nA II T5 ... T1 X¹⁴⁾¹⁹⁾
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G⁶⁾²⁰⁾
FM (XP) Class I, Div. 1, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G²⁵⁾¹⁰⁾
FM (NI) Class I, Div. 2, Groups A, B, C, D²¹⁾
IECEx d IIC T6 ... T2 Ga/Gb⁵⁾¹⁵⁾
CSA (XP) Class I, II, III Div. 1, Groups A, B, C, D, E, F, G⁵⁾¹⁵⁾
CSA(NI) Class I, II, III, Div. 2, Groups A, B, C, D, E, F, G²²⁾
BR-Ex d IIC T6 ... T2⁵⁾²³⁾
CSA (IS) Class I, II, III Div. 1, Groups A, B, C, D, E, F, G⁶⁾⁹⁾
ATEX II 1G, 1/2G, 2G Ex ia IIC T6⁶⁾

Process connection

Thread G $\frac{3}{4}$ " A, PN 64/316L A 0 0
Thread G $\frac{3}{4}$ " A, PN 64/316L Ra < 0.8 µm A 0 1
Thread $\frac{3}{4}$ " NPT, PN 64/316L A 0 2
Thread $\frac{3}{4}$ " NPT, PN 64/316L Ra < 0.8 µm A 0 3
Thread $\frac{3}{4}$ " NPT, PN 64/Alloy 400 (2.4360) A 0 4
Thread G $\frac{3}{4}$ " A, PN 64/Alloy C22 (2.4602) A 0 5
Thread $\frac{3}{4}$ " NPT, PN 64/Alloy C22 (2.4602) A 0 6
Thread G1" A, PN 64/316L A 0 7
Thread G1" A, PN 64/316L ECTFE coated MB1982⁴⁾ A 0 8
Thread G1" A, PN 64/ 316L PFA coated⁴⁾ A 1 0
Thread G1" A, PN 64/ Alloy 400 (2.4360) A 1 1
Thread G1" A, PN 64/ 316L Ra < 0.8 µm A 1 2
Thread 1" NPT, PN 64/ 316L A 1 3
Thread 1" NPT, PN 64/ 316L ECTFE coated MB1982⁴⁾ A 1 4
Thread 1" NPT, PN 64 / 316L PFA-coated⁴⁾ A 1 5
Thread 1" NPT, PN 64 / Alloy 400 (2.4360) A 1 6
Thread 1" NPT, PN 64 / 316L Ra < 0.8 µm A 1 7
Thread G1" A, PN 64 / Alloy C22 (2.4602) A 1 8
Thread G1" A, PN 64/Alloy C22 (2.4602) A 2 0
Ra < 0.3 µm
Thread G1 $\frac{1}{2}$ " A, PN 64/316L A 2 1
Thread G1 $\frac{1}{2}$ " A, PN 64/316L Ra < 0.8 µm A 2 2
Thread G1 $\frac{1}{2}$ " A, PN 64/Alloy C22 (2.4602) A 2 3

Selection and Ordering data

Article No.

SITRANS LVL200, Standard

Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.



Thread 1" NPT, PN 64/Alloy C22 (2.4602) A 2 4
Thread 1 $\frac{1}{2}$ " NPT, PN 64/316L A 2 5
Thread 1 $\frac{1}{2}$ " NPT, PN 64/316L Ra < 0.8 µm A 2 6
Thread 1 $\frac{1}{2}$ " NPT, PN 64/Alloy C22 (2.4602) A 2 7
Thread G2" A, PN 64/316L A 2 8
Thread M27 x 1.5, PN 64/316L A 3 0
Conus DN 25, PN 40/316L Ra < 0.3 µm A 3 1
Conus DN 25, PN 40/316L Ra < 0.8 µm A 3 2
Conus DN 25, PN 40/ECTFE (ZB3033)⁴⁾ A 3 3
Conus M52, PN 40/316L A 3 4
Conus M52, PN 40/316L Ra < 0.3 µm A 3 5
Conus M52, PN 40/316L Ra < 0.8 µm A 3 6
Tri-Clamp 1", PN 16/316L Ra < 0.3 µm A 3 7
Tri-Clamp 1", PN 16/Alloy C22 (2.4602) A 3 8
Tri-Clamp 1", PN 16/316L Ra < 0.8 µm A 4 0
Tri-Clamp 1 $\frac{1}{2}$ ", PN 16/316L Ra < 0.3 µm A 4 1
Tri-Clamp 1 $\frac{1}{2}$ ", PN 16/Alloy C22 (2.4602) A 4 2
Tri-Clamp 1 $\frac{1}{2}$ ", PN 16/316L Ra < 0.8 µm A 4 3
Tri-Clamp 2", PN 16/316L Ra < 0.3 µm A 4 4
Tri-Clamp 2", PN 16/Alloy C22 (2.4602) A 4 5
Tri-Clamp 2", PN 16/316L Ra < 0.8 µm A 4 6
Tri-Clamp 2 $\frac{1}{2}$ ", PN 10/316L Ra < 0.3 µm A 4 7
Tri-Clamp 2 $\frac{1}{2}$ ", PN 10/316L Ra < 0.8 µm A 4 8
Tri-Clamp 3", PN 10/316L Ra < 0.3 µm A 5 0
Tri-Clamp 3", PN 10/316L Ra < 0.8 µm A 5 1
Bolting DN 32, PN 40 DIN11851/316L Ra < 0.3 µm A 5 2
Bolting DN 32, PN 40 DIN11851/316L Ra < 0.8 µm A 5 3
Bolting DN 25, PN 40 DIN11851/316L Ra < 0.3 µm A 5 4
Bolting DN 25, PN 40 DIN11851/316L Ra < 0.8 µm A 5 5
Bolting DN 40, PN 40 DIN11851/316L Ra < 0.3 µm A 5 6
Bolting DN 40, PN 40 DIN11851/316L Ra < 0.8 µm A 5 7
Bolting DN 40, PN 40 DIN11864-1 A/316L Ra < 0.8 µm ZB3052 A 5 8
Bolting DN 50, PN 25 DIN11851/316L Ra < 0.3 µm A 6 0
Bolting DN 50, PN 25 DIN11851/316L Ra < 0.8 µm A 6 1
Bolting DN 50, PN 25 DIN11864-1 A/316L Ra < 0.8 µm ZB3052 A 6 2
Hygienic w. compr. nut F40, PN 25/316L A 6 3
Hygienic w. compr. nut F40, PN 25/316L Ra < 0.3 µm A 6 4
Hygienic w. compr. nut F40, PN 25/316L Ra < 0.8 µm A 6 5
Varivent N50-40/316L Ra < 0.3 µm A 6 6
Varivent N50-40/316L Ra < 0.8 µm A 6 7
Varivent N125/100/316L Ra < 0.8 µm A 6 8
DRD flange, PN 40/316L ZB3007 A 7 0
SMS DN 38/316L Ra < 0.8 µm⁴⁾ A 7 1
SMS DN 51, PN 6/316L Ra < 0.8 µm⁴⁾ A 7 2
Swagelok VCR screwing ZG2579, PN 64/316L A 7 3
Neumo biocontrol size 25, PN 16/316L Ra < 0.8 µm A 7 4
Neumo biocontrol size 50, PN 16/316L Ra < 0.8 µm⁴⁾ A 7 5
Neumo biocontrol size 65, PN 16/316L Ra < 0.8 µm A 7 6
Neumo biocontrol size 80, PN 16/316L Ra < 0.8 µm A 7 7
SÜDMO DN 50, PN 10/316L Ra < 0.8 µm A 7 8
Small flange DN 25, PN 1.5 DIN 28403/316L pol. Ra < 0.8 µm A 8 0
Small flange DN 40, PN 1.5 DIN 28403/316L pol. Ra < 0.8 µm A 8 1
Ingold connection, PN16 / 316 L Ra < 0.8 µm (acc. to MB2523) A 8 2

Level Measurement

Point level measurement

Vibrating switches

SITRANS LVL200

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
SITRANS LVL200, Standard Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	7ML5746-  A 0	SITRANS LVL200, Standard Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	7ML5746-  A 0
Ingold connection, PN 16/Alloy C22 (2.4602) Ra < 0.8 µm (acc. to MB6017)	A 83	Flange DN 65, PN 40 Form C, DIN 2501/ Alloy C22 (2.4602)	B 47
Terminal DN 33.7 PN 40 DIN11864-3-A-/316L BN2 Ra < 0.8 µm ⁽⁴⁾	A 84	Flange DN 65, PN 40 Form C, DIN 2501/ECTFE ⁽⁴⁾	B 48
Hygienic fl. DN 50 PN 16 DIN11864-2-A-/316L Ra < 0.8 µm	A 85	Flange DN 65, PN 40 Form C, DIN 2501/PFA ⁽⁴⁾	B 50
Flange DN 25, PN 6 Form C, DIN 2501/316L	A 86	Flange DN 65, PN 40 Form F, DIN 2501/316L	B 51
Flange DN 25, PN 6 Form C, DIN 2501/PFA ⁽⁴⁾	A 87	Flange DN 65, PN 64 Form E, DIN 2501/316L	B 52
Flange DN 25, PN 40 Form C, DIN 2501/316L	A 88	Flange DN 80, PN 40 Form C, DIN 2501/316L	B 53
Flange DN 25, PN 40 Form C, DIN 2501/ Alloy C22 (2.4602)	B 00	Flange DN 80, PN 40 Form C, DIN 2501/ Alloy C22 (2.4602)	B 54
Flange DN 25, PN 40 Form C, DIN 2501/ECTFE ⁽⁴⁾	B 01	Flange DN 80, PN 40 Form C, DIN 2501/ECTFE ⁽⁴⁾	B 55
Flange DN 25, PN 40 Form C, DIN 2501/PFA ⁽⁴⁾	B 02	Flange DN 80, PN 40 Form C, DIN 2501/PFA ⁽⁴⁾	B 56
Flange DN 25, PN 40 Form C, DIN 2501/Enamelled ⁽³⁾	B 03	Flange DN 80, PN 40 Form C, DIN 2501/ Enamelled ⁽³⁾	B 57
Flange DN 25, PN 40 Form D, DIN 2501/316L	B 04	Flange DN 80, PN 40 Form F, DIN 2501/316L	B 58
Flange DN 25, PN 40 Form F, DIN 2501/316L	B 05	Flange DN 80, PN 40 Form N, DIN 2501/316L	B 60
Flange DN 25, PN 40 Form N, DIN 2501/316L	B 06	Flange DN 100, PN 16 Form C, DIN 2501/316L	B 62
Flange DN 25, PN 40 Form N, DIN 2501/ Alloy C22 (2.4602)	B 07	Flange DN 100, PN 16 Form C, DIN 2501/ Alloy C22 (2.4602)	B 63
Flange DN 25, PN 40 Form N, DIN 2501/ Alloy 400 (2.4360) solid	B 08	Flange DN 100, PN 16 Form C, DIN 2501/ECTFE ⁽⁴⁾	B 64
Flange DN 25, PN 40 V13, DIN 2501/316L	B 10	Flange DN 100, PN 16 Form C, DIN 2501/PFA ⁽⁴⁾	B 65
Flange DN 32, PN 40 Form C, DIN 2501/316L	B 11	Flange DN 100, PN 16 Form C, DIN 2501/ Enamelled ⁽³⁾	B 66
Flange DN 32, PN 40 Form C, DIN 2501/ECTFE ⁽⁴⁾	B 12	Flange DN 100, PN 16 Form D, DIN 2501/316L	B 67
Flange DN 40, PN 6 Form C, DIN 2501/316L	B 13	Flange DN 100, PN 16 Form F, DIN 2501/316L	B 68
Flange DN 40, PN 6 Form C, DIN 2501/ECTFE ⁽⁴⁾	B 14	Flange DN 100, PN 16 Form N, DIN 2501/316L	B 70
Flange DN 40, PN 40 Form C, DIN 2501/316L	B 15	Flange DN 100, PN 40 Form C, DIN 2501/316L	B 71
Flange DN 40, PN 40 Form C, DIN 2501/ Alloy C22 (2.4602)	B 16	Flange DN 100, PN 40 Form C, DIN 2501/ECTFE ⁽⁴⁾	B 72
Flange DN 40, PN 40 Form C, DIN 2501/ECTFE ⁽⁴⁾	B 17	Flange DN 100, PN 40 Form C, DIN 2501/PFA ⁽⁴⁾	B 73
Flange DN 40, PN 40 Form C, DIN 2501/PFA ⁽⁴⁾	B 18	Flange DN 100, PN 40 Form C, DIN 2501/ Enamelled ⁽³⁾	B 74
Flange DN 40, PN 40 Form C, DIN 2501/ Enamelled ⁽³⁾	B 20	Flange DN 100, PN 40 Form F, DIN 2501/316L	B 75
Flange DN 40, PN 40 Form F, DIN 2501/316L	B 21	Flange DN 100, PN 40 Form N, DIN 2501/316L	B 76
Flange DN 40, PN 40 Form N, DIN 2501/316L	B 22	Flange DN 100, PN 40 V13, DIN 2501/316L	B 77
Flange DN 40, PN 40 Form E, DIN 2501/316L	B 23	Flange DN 100, PN 64 Form E, DIN 2501/316L	B 78
Flange DN 40, PN 40 V13, DIN 2501/316L	B 24	Flange DN 100, PN 100 Form E, DIN 2501/316L	B 80
Flange DN 50, PN 40 Form C, DIN 2501/316L	B 25	Flange DN 100, PN 100 Form L, DIN 2501/316L	B 81
Flange DN 50, PN 40 Form C, DIN 2501/ Alloy C22 (2.4602)	B 26	Flange DN 125, PN 16 Form F, DIN 2501/316L	B 82
Flange DN 50, PN 40 Form C, DIN 2501/ECTFE ⁽⁴⁾	B 27	Flange DN 125, PN 40 Form C, DIN 2501/316L	B 83
Flange DN 50, PN 40 Form C, DIN 2501/ ECTFE (ZB3108) ⁽⁴⁾	B 28	Flange DN 125, PN 40 Form N, DIN 2512/ 316L	B 84
Flange DN 50, PN 40 Form C, DIN 2501/PFA ⁽⁴⁾	B 30	Flange DN 150, PN 16 Form C, DIN 2501/316L	B 85
Flange DN 50, PN 40 Form D, DIN 2501/316L	B 31	Flange DN 150, PN 16 Form C, DIN 2501/ Alloy C22 (2.4602)	B 86
Flange DN 50, PN 40 Form D, DIN 2501/ Alloy C22 (2.4602)	B 32	Flange DN 150, PN 16 Form C, DIN 2501/ECTFE ⁽⁴⁾	B 87
Flange DN 50, PN 40 Form F, DIN 2501/316L	B 33	Flange DN 150, PN 16 Form C, DIN 2501/PFA ⁽⁴⁾	B 88
Flange DN 50, PN 40 Form N, DIN 2501/316L	B 34	Flange DN 150, PN 16 Form D, DIN 2501/316L	C 00
Flange DN 50, PN 40 Form N, DIN 2501/ Alloy C22 (2.4602)	B 35	Flange DN 150, PN 40 Form C, DIN 2501/316L	C 01
Flange DN 50, PN 40 Form E, DIN 2501/316L	B 36	Flange DN 150, PN 40 Form C, DIN 2501/ Alloy C22 (2.4602)	C 02
Flange DN 50, PN 40 V13, DIN 2501/316L	B 37	Flange DN 150, PN 40 Form F, DIN 2501/316L	C 03
Flange DN 50, PN 40 R13, DIN 2501/316L	B 38	Flange DN 150, PN 40 Form N, DIN 2512/316L	C 04
Flange DN 50, PN 64 Form F, DIN 2501/316L	B 40	Flange DN 200, PN 10 Form C, DIN 2501/ECTFE ⁽⁴⁾	C 05
Flange DN 50, PN 64 Form N, DIN 2501/ Alloy C22 (2.4602)	B 41	Flange DN 200, PN 16 Form C, DIN 2501/316L	C 06
Flange DN 50, PN 64 Form C, DIN 2501/316L	B 42	Flange DN 25, PN 40 Form B1, EN 1092-1/316L	C 07
Flange DN 50, PN 64 Form L, DIN 2501/316L	B 43	Flange DN 25, PN 40 Form B1, EN 1092-1/ Alloy C22 (2.4602)	C 08
Flange DN 50, PN 100 Form E, DIN 2501/316L	B 44	Flange DN 25, PN 40 Form B1, EN/ 316L/ PFA ⁽⁴⁾	C 10
Flange DN 50, PN 100 Form L, DIN 2501/316L	B 45	Flange DN 25, PN 40 Form B1, EN 1092-1/ Enamelled ⁽³⁾	C 11
Flange DN 65, PN 40 Form C, DIN 2501/316L	B 46	Flange DN 25, PN 40 Form B2, EN 1092-1/316L	C 12
		Flange DN 25, PN 40 Form F, EN 1092-1/316L	C 13
		Flange DN 25, PN 63 Form B1, EN 1092-1/316L	C 14

Level Measurement

Point level measurement

Vibrating switches

SITRANS LVL200

Selection and Ordering data

Article No.

SITRANS LVL200, Standard

Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.

7ML5746-

A 0

Flange DN 25, PN 100 Form B2, EN 1092-1/316L	C 15
Flange DN 40, PN 40 Form B1, EN/ 316L	C 16
Flange DN 40, PN 40 Form B1, EN 1092-1/PFA ⁴⁾	C 17
Flange DN 40, PN 40 Form B2, EN/316L	C 18
Flange DN 50, PN 40 Form B1, EN/316L	C 20
Flange DN 50, PN 40 Form B1, EN 1092-1/ Alloy C22 (2.4602)	C 21
Flange DN 50, PN 40 Form B1, EN 1092-1/ Alloy 400 (2.4360) ZB2977	C 22
Flange DN 50, PN 40 Form B1, EN 1092-1/ECTFE ⁴⁾	C 23
Flange DN 50, PN 40 Form B1, EN/ 316L/PFA ⁴⁾	C 24
Flange DN 50, PN 40 Form B1, EN 1092-1/ Enamelled ³⁾	C 25
Flange DN 50, PN 40 Form C, EN 1092-1/316L	C 26
Flange DN 50, PN 40 Form D, EN/316L	C 27
Flange DN 50, PN 40 Form D, EN 1092-1/ Alloy C22 (2.4602)	C 28
Flange DN 50, PN 40 Form B2, EN 1092-1/316L	C 30
Flange DN 50, PN 40 Form E, EN 1092-1/316L	C 31
Flange DN 80, PN 40 Form B1, EN 1092-1/316L	C 32
Flange DN 80, PN 40 Form B1, EN 1092-1/ Alloy C22 (2.4602)	C 33
Flange DN 80, PN 40 Form B1, EN 1092-1/ECTFE ⁴⁾	C 34
Flange DN 80, PN 40 Form B1, EN 1092-1/ Enamelled ³⁾	C 35
Flange DN 80, PN 40 Form B2, EN 1092-1/316L	C 36
Flange DN 100, PN 16 Form B1, EN 1092-1/316L	C 37
Flange DN 100, PN 16 Form B1, EN 1092-1/ Alloy C22 (2.4602)	C 38
Flange DN 100, PN 16 Form B1, EN 1092-1/ Enamelled ³⁾	C 40
Flange DN 100, PN 40 Form B1, EN 1092-1/316L	C 41
Flange DN 100, PN 40 Form B1, EN 1092-1/ Enamelled ³⁾	C 42
Flange DN 100, PN 40 Form C, EN 1092-1/316L	C 43
Flange DN 100, PN 63 Form B2, EN 1092-1/316L	C 44
Flange DN 150, PN 16 Form B1, EN 1092-1/316L	C 45
Flange DN 150, PN 16 Form B1, EN 1092-1/PFA ⁴⁾	C 46
Flange DN 150, PN 40 Form B1, EN 1092-1/316L	C 47
Flange DN 150, PN 40 Form B1, EN 1092-1/ECTFE ⁴⁾	C 48
Flange DN 150, PN 40 Form B2, EN 1092-1/316L	C 50
Flange 1" 150 lb ASME B16.5/316L	C 51
Flange 1" 150 lb RF, ASME B16.5/Alloy C22 (2.4602)	C 52
Flange 1" 150 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977	C 53
Flange 1" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	C 54
Flange 1" 150 lb RF, ASME B16.5/PFA ⁴⁾	C 55
Flange 1" 150 lb RF, ASME B16.5/Enamelled ³⁾	C 56
Flange 1" 300 lb RF, ASME B16.5/316L	C 57
Flange 1" 300 lb RF, ASME B16.5/ECTFE ⁴⁾	C 58
Flange 1" 600 lb RF, ASME B16.5/316L	C 60
Flange 1½" 150 lb RF, ASME B16.5/316L	C 61
Flange 1½" 150 lb RF, ASME B16.5/ Alloy C22 (2.4602)	C 62
Flange 1½" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	C 63
Flange 1½" 150 lb RF, ASME B16.5/PFA ⁴⁾	C 64
Flange 1½" 150 lb RF, ASME B16.5 Enamelled ³⁾	C 65
Flange 1½" 150 lb FF, ASME B16.5/ECTFE ⁴⁾	C 66
Flange 1½" 300 lb RF, ASME B16.5/316L	C 67

Selection and Ordering data

Article No.


SITRANS LVL200, Standard

Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.

7ML5746-

A 0

Flange 1½" 300 lb RF, ASME B16.5/ Alloy 400 (2.4360) ZB2977	C 68
Flange 1½" 300 lb RF, ASME B16.5/ECTFE ³⁾	C 70
Flange 1½" 600 lb RF, ASME B16.5/316L	C 71
Flange 2" 150 lb RF, ASME B16.5/316L	C 72
Flange 2" 150 lb RF, ASME B16.5/Alloy C22 (2.4602)	C 73
Flange 2" 150 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977	C 74
Flange 2" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	C 75
Flange 2" 150 lb RF, ASME B16.5/PFA ⁴⁾	C 76
Flange 2" 150 lb RF, ASME B16.5/Enamelled ³⁾	C 77
Flange 2" 150 lb FF, ASME B16.5/316L	C 78
Flange 2" 150 lb FF, ASME B16.5/ECTFE ⁴⁾	C 80
Flange 2" 150 lb SG (small groove), ASME B16.5/316L	C 81
Flange 2" 300 lb RF, ASME B16.5/316L	C 82
Flange 2" 300 lb RF, ASME B16.5/Alloy C22 (2.4602)	C 83
Flange 2" 300 lb RF, ASME B16.5/ECTFE ⁴⁾	C 85
Flange 2" 300 lb RF, ASME B16.5/PFA ⁴⁾	C 86
Flange 2" 300 lb RF, ASME B16.5 Enamelled ³⁾	C 87
Flange 2" 300 lb RJF, ASME B16.5/316L	C 88
Flange 2" 300 lb ST, ASME B16.5/316L	D 00
Flange 2" 300 lb LG (large groove), ASME B16.5/316L	D 01
Flange 2" 300 lb LT, ASME B16.5/316L	D 02
Flange 2" 600 lb RF, ASME B16.5/316L	D 03
Flange 2" 600 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977	D 04
Flange 2" 600 lb RF, ASME B16.5/ECTFE ⁴⁾	D 05
Flange 2" 600 lb RJF, ASME B16.5/316L	D 06
Flange 2" 600 lb LG, ASME B16.5/316L	D 07
Flange 2" 900 lb RJF, ASME B16.5/316L	D 08
Flange 2½" 150 lb RF, ASME B16.5/316L	D 10
Flange 2½" 300 lb RF, ASME B16.5/316L	D 11
Flange 3" 150 lb RF, ASME B16.5/316L	D 12
Flange 3" 150 lb RF, ASME B16.5/Alloy C22 (2.4602)	D 13
Flange 3" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	D 14
Flange 3" 150 lb RF, ASME B16.5/PFA ⁴⁾	D 15
Flange 3" 150 lb RF, ASME B16.5/Enamelled ³⁾	D 16
Flange 3" 150 lb FF, ASME B16.5/316L	D 17
Flange 3" 150 lb FF, ASME B16.5/ECTFE ⁴⁾	D 18
Flange 3" 150 lb FF, ASME B16.5/PFA ⁴⁾	D 20
Flange 3" 300 lb RF, ASME B16.5/316L	D 21
Flange 3" 300 lb RF, ASME B16.5/Alloy C22 (2.4602)	D 22
Flange 3" 300 lb RF, ASME B16.5/ECTFE ⁴⁾	D 23
Flange 3" 300 lb RF, ASME B16.5/PFA ⁴⁾	D 24
Flange 3" 300 lb RF, ASME B16.5/Enamelled ³⁾	D 25
Flange 3" 600 lb RF, ASME B16.5/316L	D 26
Flange 3½" 150 lb RF, ASME B16.5/316L	D 27
Flange 3½" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	D 28
Flange 4" 150 lb RF, ASME B16.5/316L	D 30
Flange 4" 150 lb RF, ASME B16.5/Alloy C22 (2.4602)	D 31
Flange 4" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	D 32
Flange 4" 150 lb RF, ASME B16.5/PFA ⁴⁾	D 33
Flange 4" 150 lb RF, ASME B16.5/Enamelled ³⁾	D 34

Selection and Ordering data	Article No.
SITRANS LVL200, Standard	7ML5746-
Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	 A 0
Flange 4" 150 lb LT, ASME B16.5/316L	D 3 5
Flange 4" 300 lb RF, ASME B16.5/316L	D 3 6
Flange 4" 300 lb RF, ASME B16.5/Alloy C22 (2.4602)	D 3 7
Flange 4" 300 lb RF, ASME B16.5/ECTFE ⁴⁾	D 3 8
Flange 4" 300 lb RJF, ASME B16.5/316L	D 4 0
Flange 4" 300 lb LG, ASME B16.5/316L	D 4 1
Flange 4" 300 lb LT, ASME B16.5/316L	D 4 2
Flange 4" 600 lb RF, ASME B16.5/316L	D 4 3
Flange 4" 600 lb RJF, ASME B16.5/316L	D 4 4
Flange 6" 150 lb RF, ASME B16.5/316L	D 4 5
Flange 6" 150 lb RF, ASME B16.5/Alloy C22 (2.4602)	D 4 6
Flange 6" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	D 4 7
Flange 6" 150 lb RF, ASME B16.5/PFA ⁴⁾	D 4 8
Flange 6" 150 lb RJF, ASME B16.5/316L	D 5 0
Flange 6" 300 lb RF, ASME B16.5/316L	D 5 1
Flange 8" 150 lb RF, ASME B16.5/316L	D 5 2
Flange 8" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	D 5 3
Flange 1" BS.10 Table E/316L	D 5 4
Flange 1" BS.10 Table E/PFA ⁴⁾	D 5 5
Flange 1½" BS.10 Table E/316L	D 5 6
Flange 3½" BS.10 Table E/316L	D 5 7
Flange 4" BS.10 Table E/ECTFE ⁴⁾	D 5 8
Flange DN 40 10K, JIS/316L	D 6 0
Flange DN 50 10K, JIS/316L	D 6 1
Flange DN 80 10K, JIS/316L	D 6 2
Flange DN 100 10K, JIS/316L	D 6 3
Thread R1 PN 64, EN 10226-1/316L	D 6 5
Flange 2" 900 lb RF, ASME B16.5/316L	D 7 0
Adapter/Process temperature	
Without adapter/-50 ... +150 °C (-58 ... +302 °F)	1
With adapter/-50 ... +200 °C (-58 ... +392 °F) ¹³⁾	2
With adapter/-50 ... +250 °C (-58 ... +482 °F)	3
With gas-tight leadthrough/-50 ... +150 °C (-58 ... +302 °F)	4
With gas-tight leadthrough/-50 ... +250 °C (-58 ... +482 °F)	5
Housing/Cable entry	
Aluminum IP66/IP67/M20 x 1.5	A
Aluminum IP66/IP67/½" NPT	B
316L stainless steel (electropolished) IP66/IP67/M20 x 1.5	C
316L stainless steel (electropolished) IP66/IP67/½" NPT	D
Plastic single chamber IP66/IP67/M20 x 1.5	E
Plastic single chamber IP66/IP67/½" NPT	F
Stainless steel chamber (precision casting) IP66/ IP67/M20 x 1.5	G
Stainless steel chamber (precision casting) IP66/ IP67/½" NPT	H
Aluminum IP66/IP67/M20 x 1.5 Special HARTING plug (bent) according to Tier One (ZB7555) ¹¹⁾	V

Level Measurement

Point level measurement

Vibrating switches

SITRANS LVL200

Selection and Ordering data

Order code

Further designs

Please add **"-Z"** to Article No. and specify Order code(s).

Switching status indication with colors red-green¹²⁾

A21

Cleaning including Certificate (oil, grease, and silicone free)

W01

Identification label (measurement loop) stainless steel: max. 40 characters, add in plain text. To add more than one line, use a comma "," for line break.

Y17

Identification Label (measurement loop) foil: max. 40 characters add in plain text. To add more than one line, use a comma "," for line break.

Y18

NACE0175 to 3.1 Material Certificate for material (EN10204 NACE MR 0175)⁸⁾
Note: not available with Process Connection and Rigid extension coatings PFA, ECTFE, and Enamel. NACE not available with Hygienic process connections.

D07

Material Inspection certificate 3.1 of EN 10204⁸⁾

C05

2.2-Factory certificate for material (EN 10204)⁸⁾

C15

Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511⁸⁾

C20

Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN10204)⁸⁾

C13

X-ray test + 3.1 certificate/instrument⁸⁾

C14

Positive material identification test + 3.1 certificate/instrument⁸⁾

C16

Roughness test + 3.1 certificate/instrument⁸⁾

C18

3.1-Inspection Certificate for instrument with test data (EN 10204)

C25

Quality and test plan

C26

Pressure test + 3.1 certificate/instrument⁸⁾

C31

Helium leak test + 3.1 certificate/instrument⁸⁾

C32

Ferrite measuring accuracy to DIN32514-1 + 3.1 certificate/instrument⁸⁾

C60

Pressure test according to Norsok + 3.1 certificate/instrument⁸⁾

C61

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Spare Parts and Accessories

Article No.

Electronics module SITRANS LVL200 Relay

7ML1830-1NC

Electronics module SITRANS LVL200 Contactless

7ML1930-6AA

NAMUR spare electronics module

A5E35817107

SITRANS SCSC single channel signal conditioner and remote test

7ML5760

SITRANS TCSC two channel signal conditioner and remote test

7ML5761

LVL200 Threaded Welded Socket

• G $\frac{3}{4}$ " A/316L with FKM Seal

7ML1930-1EE

• G1" A/316L with FKM Seal

7ML1930-1EF

• M27 x 1.5/316L with FKM Seal

7ML1930-1EG

• G $\frac{3}{4}$ " A/316L with EPDM Seal

7ML1930-1EH

• G1" A/316L with EPDM Seal

7ML1930-1EJ

• M27 x 1.5/316L with EPDM Seal

7ML1930-1EK

¹⁾ Available only with Adapter/Process temperature options 1, 3, 4, and 5.

²⁾ Available only with Housing/Protection/Cable option B.

³⁾ Available only with Adapter/Process Temperature options 1, 2, and 4.

⁴⁾ Not available with Adapter/Process Temperature options 2, 3, and 5.

⁵⁾ Not available with Adapter/Process Temperature options 2, 4, and 5.

⁶⁾ Available only with Electronics options 4 and 6.

⁷⁾ Not available with ECTFE coated probe options.

⁸⁾ Listed Certificates are not available with all configurations please contact factory for more information.

⁹⁾ Not available with Housing/Protection/Cable Option V.

¹⁰⁾ Not available with PFA and ECTFE coating options.

¹¹⁾ Available only with Approval option A.

¹²⁾ Available only with Relay Electronic options and Non-hazardous Approval options.

¹³⁾ Available only with Enamelled Process connection options.

¹⁴⁾ Available only with Electronic options 4, 5, and 6.

¹⁵⁾ Available only with Aluminum Housing/Protection/Cable options.

¹⁶⁾ Not available with Stainless Steel (electropolished) Housing/Protection/Cable options and certain glands.

¹⁷⁾ Not available with Plastic and Stainless Steel (electropolished) Housing/Protection/Cable options and certain glands.

¹⁸⁾ Not available with Housing/Protection/Cable options D, and V.

¹⁹⁾ Not available with Plastic Housing/Protection/Cable options and certain glands.

²⁰⁾ Not available with Housing/Protection/Cable options A, E, G, and V.



²¹⁾ Available only with Housing/Protection/Cable options B, D, F, and H.

²²⁾ Not available with Housing/Protection/Cable options C and V.

²³⁾ Available only with Housing/Protection/Cable options A, B, and H.

²⁴⁾ Not available with Approval options C, E, G, H, L, N, V, and W.

²⁵⁾ Not available with Approval options C, E, G, H, N, V, and W.

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
SITRANS LVL200, Rigid extension Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications. Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5747- 	SITRANS LVL200, Rigid extension Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	7ML5747- 
Electronics Contactless electronic switch 20 ... 250 V AC/DC ¹⁾⁹⁾¹⁴⁾ Double relay (DPDT) 20 ... 72 V DC/20 ... 250 V AC ¹⁴⁾ NAMUR signal ⁹⁾ Transistor (NPN/PNP) 10 ... 55 V DC ¹⁾¹⁵⁾ Two-wire (8/16 mA) 12 ... 36 V DC	1 2 4 5 6	Thread G1½" A, PN 64/316L Thread G1½" A, PN 64/316L Ra < 0.8 µm Thread G1½" A, PN 64/Alloy C22 (2.4602) Thread 1" NPT, PN 64/Alloy C22 (2.4602) Thread 1½" NPT, PN 64/316L Thread 1½" NPT, PN 64/316L Ra < 0.8 µm Thread 1½" NPT, PN 64/Alloy C22 (2.4602) Thread G2" A, PN 64/316L Thread M27 x 1.5 PN 64/316L Cyl. socket/316Ti/1.4581 ECTFE coated ZB2984 ⁴⁾ Conus DN 25 PN 40/316L Ra < 0.3 µm Conus DN 25 PN 40/316L Ra < 0.8 µm Conus DN 25 PN 40/ECTFE (ZB3033) ⁴⁾ Conus M52 PN 40/316L Conus M52 PN 40/316L Ra < 0.3 µm Conus M52 PN 40/316L Ra < 0.8 µm Tri-Clamp 1" PN 16/316L Ra < 0.3 µm Tri-Clamp 1" PN 16/Alloy C22 (2.4602) Tri-Clamp 1" PN 16/316L Ra < 0.8 µm Tri-Clamp 1½" PN 16/316L Ra < 0.3 µm Tri-Clamp 1½" PN 16/Alloy C22 (2.4602) Tri-Clamp 1½" PN 16/316L Ra < 0.8 µm Tri-Clamp 2" PN 16/316L Ra < 0.3 µm Tri-Clamp 2" PN 16/Alloy C22 (2.4602) Tri-Clamp 2" PN 16/316L Ra < 0.8 µm Tri-Clamp 2½" PN 10/316L Ra < 0.3 µm Tri-Clamp 2½" PN 10/316L Ra < 0.8 µm Tri-Clamp 3" PN 10/316L Ra < 0.3 µm Tri-Clamp 3" PN 10/316L Ra < 0.8 µm Bolting DN 32 PN 40 DIN11851/316L Ra < 0.3 µm Bolting DN 25 PN 40 DIN11851/316L Ra < 0.3 µm Bolting DN 25 PN 40 DIN11851/316L Ra < 0.8 µm Bolting DN 40 PN 40 DIN11851/316L Ra < 0.3 µm Bolting DN 40 PN 40 DIN11851/316L Ra < 0.8 µm Bolting DN 40 PN 40 DIN11864-1 A/316L Ra < 0.8 µm ZB3052 Bolting DN 50 PN 25 DIN11851/316L Ra < 0.3 µm Bolting DN 50 PN 25 DIN11851/316L Ra < 0.8 µm Bolting DN 50 PN 25 DIN11864-1 A/316L Ra < 0.8 µm ZB3052 Hygienic w.compr.nut F40 PN 25/316L Hygienic w.compr.nut F40 PN 25/316L Ra < 0.3 µm Hygienic w.compr.nut F40 PN 25/316L Ra < 0.8 µm Varivent N50-40/316L Ra < 0.3 µm Varivent N50-40/316L Ra < 0.8 µm Varivent N125/100/316L Ra < 0.8 µm DRD flange PN 40/316L ZB3007 SMS DN 38/316L Ra < 0.8 µm ⁴⁾ SMS DN 51 PN 6/316L Ra < 0.8 µm ⁴⁾ Swagelok VCR screwing ZG2579 PN 64/316L Neumo biocontrol size 25 PN 16/316L Ra < 0.8 µm Neumo biocontrol size 50 PN 16/316L Ra < 0.8 µm SÜDMO DN 50 PN 10/316L Ra < 0.8 µm Small flange DN 25 PN 1.5 DIN 28403/316L pol. Ra < 0.8 µm Small flange DN 40 PN 1.5 DIN 28403/316L pol. Ra < 0.8 µm Ingot connection PN 16/316L Ra < 0.8 µm	A 21 A 22 A 23 A 24 A 25 A 26 A 27 A 28 A 30 A 31 A 32 A 33 A 34 A 35 A 36 A 37 A 38 A 40 A 41 A 42 A 43 A 44 A 45 A 46 A 47 A 48 A 50 A 51 A 52 A 53 A 54 A 55 A 56 A 57 A 58 A 60 A 61 A 62 A 63 A 64 A 65 A 66 A 67 A 68 A 70 A 71 A 72 A 73 A 74 A 75 A 76 A 80 A 81 A 82 A 83
Approvals Without approvals Overfill protection (WHG) ⁹⁾ ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + WHG ⁶⁾⁹⁾ ATEX II 1/2G, 2G Ex d IIC T6 + WHG ⁵⁾⁷⁾¹⁶⁾ ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + shipping approvals ⁶⁾¹⁷⁾ ATEX II 1/2G, 2G Ex d IIC T6 + shipping approvals ⁵⁾⁷⁾¹⁶⁾ ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + ATEX II 1/2D IP6X T ⁶⁾⁸⁾¹⁸⁾ IECEx Ex ia IIC T6 ⁶⁾¹⁹⁾ Shipping approvals ¹⁷⁾ ATEX II 3G Ex nA II T5 ... T1 X ¹⁸⁾ FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁶⁾²⁰⁾ FM (XP) Class I, Div. 1, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G ²⁾⁵⁾ FM (NI) Class I, Div. 2, Groups A, B, C, D ²¹⁾ IECEx d IIC T6 ... T2 Ga/Gb ⁵⁾⁷⁾¹⁶⁾ CSA(XP) Class I,II,III Div. 1, Groups A, B, C, D, E, F, G ²⁾⁵⁾⁷⁾ CSA(NI)Class I,II,III, Div. 2, Groups A, B, C, D, E, F, G ²⁾²⁾ BR-Ex d IIC T6 ... T2 ⁵⁾¹⁸⁾ CSA (IS) Class I, II, III Div. 1, Groups A, B, C, D, E, F, G ⁶⁾⁹⁾ ATEX II 1G, 1/2G, 2G Ex ia IIC T6 ⁶⁾	A B C D E F G H K L N P Q R S T U V W		
NOTE: When selecting a Process connection option, process connection coating must match the extension coating and the material and surface roughness type.			
Process connection Thread G¾" A, PN 64/316L Thread G¾" A, PN 64/316L Ra < 0.8 µm Thread ¾" NPT, PN 64/316L Thread ¾" NPT, PN 64/316L Ra < 0.8 µm Thread ¾" NPT, PN 64/Alloy 400 (2.4360) Thread G¾" A, PN 64/Alloy C22 (2.4602) Thread ¾" NPT, PN 64/Alloy C22 (2.4602) Thread G1" A, PN 64/316L Thread G1" A, PN 64/316L ECTFE coated MB1982 ⁴⁾ Thread G1" A, PN 64/316L PFA coated ⁴⁾ Thread G1" A, PN 64/Alloy 400 (2.4360) Thread G1" A, PN 64/316L Ra < 0.8 µm Thread 1" NPT, PN 64/316L Thread 1" NPT, PN 64/316L ECTFE coated MB1982 ⁴⁾ Thread 1" NPT, PN 64/316L PFA coated ⁴⁾ Thread 1" NPT, PN 64/Alloy 400 (2.4360) Thread 1" NPT, PN 64/316L Ra < 0.8 µm Thread G1" A, PN 64/Alloy C22 (2.4602)	A 00 A 01 A 02 A 03 A 04 A 05 A 06 A 07 A 08 A 10 A 11 A 13 A 14 A 15 A 16 A 17 A 18 A 20		

Level Measurement

Point level measurement

Vibrating switches

SITRANS LVL200

Selection and Ordering data

Article No.

SITRANS LVL200, Rigid extension

Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.

Collar clamp connection DN33,7 PN40 Form A, DIN11864-3/1.4435 (BN2, Ra < 0.8 µm)	A 8 4
Collar flange DN50 PN16 Form A, DIN11864-2/316L (Ra < 0.8 µm)	A 8 5
Flange DN 25 PN 6 Form C, DIN 2501/316L	A 8 6
Flange DN 25 PN 6 Form C, DIN 2501/PFA ⁴⁾	A 8 7
Flange DN 25 PN 40 Form C, DIN 2501/316L	A 8 8
Flange DN 25 PN 40 Form C, DIN 2501/Alloy C22 (2.4602) plated	B 0 0
Flange DN 25 PN 40 Form C, DIN 2501/ECTFE ⁴⁾	B 0 1
Flange DN 25 PN 40 Form C, DIN 2501/PFA ⁴⁾	B 0 2
Flange DN 25 PN 40 Form D, DIN 2501/316L	B 0 3
Flange DN 25 PN 40 Form F, DIN 2501/316L	B 0 4
Flange DN 25 PN 40 Form N, DIN 2501/316L	B 0 5
Flange DN 25 PN 40 Form N, DIN 2501/Alloy C22 (2.4602) plated	B 0 6
Flange DN 25 PN 40 Form N, DIN 2501/Alloy 400 (2.4360) solid	B 0 7
Flange DN 25 PN 40 V13, DIN 2501/316L	B 0 8
Flange DN 32 PN 40 Form C, DIN 2501/316L	B 1 0
Flange DN 32 PN 40 Form C, DIN 2501/ECTFE ⁴⁾	B 1 1
Flange DN 40 PN 6 Form C, DIN 2501/316L	B 1 2
Flange DN 40 PN 6 Form C, DIN 2501/ECTFE ⁴⁾	B 1 3
Flange DN 40 PN 40 Form C, DIN 2501/316L	B 1 4
Flange DN 40 PN 40 Form C, DIN 2501/Alloy C22 (2.4602) plated	B 1 5
Flange DN 40 PN 40 Form C, DIN 2501/ECTFE ⁴⁾	B 1 6
Flange DN 40 PN 40 Form C, DIN 2501/PFA ⁴⁾	B 1 7
Flange DN 40 PN 40 Form C, DIN 2501/Enamelled ³⁾	B 1 8
Flange DN 40 PN 40 Form F, DIN 2501/316L	B 2 0
Flange DN 40 PN 40 Form N, DIN 2501/316L	B 2 1
Flange DN 40 PN 40 Form E, DIN 2501/316L	B 2 2
Flange DN 40 PN 40 V13, DIN 2501/316L	B 2 3
Flange DN 50 PN 40 Form C, DIN 2501/316L	B 2 4
Flange DN 50 PN 40 Form C, DIN 2501/Alloy C22 (2.4602) plated	B 2 5
Flange DN 50 PN 40 Form C, DIN 2501/ECTFE ⁴⁾	B 2 6
Flange DN 50 PN 40 Form C, DIN 2501/ECTFE (ZB3108) ⁴⁾	B 2 7
Flange DN 50 PN 40 Form C, DIN 2501/PFA ⁴⁾	B 2 8
Flange DN 50 PN 40 Form D, DIN 2501/316L	B 3 0
Flange DN 50 PN 40 Form D, DIN 2501/Alloy C22 (2.4602)	B 3 1
Flange DN 50 PN 40 Form F, DIN 2501/316L	B 3 2
Flange DN 50 PN 40 Form N, DIN 2501/316L	B 3 3
Flange DN 50 PN 40 Form N, DIN 2501/Alloy C22 (2.4602) solid	B 3 4
Flange DN 50 PN 40 Form E, DIN 2501/316L	B 3 5
Flange DN 50 PN 40 V13, DIN 2501/316L	B 3 6
Flange DN 50 PN 40 R13, DIN 2501/316L	B 3 7
Flange DN 50 PN 64 Form F, DIN 2501/316L	B 3 8
Flange DN 50 PN 64 Form N, DIN 2501/Alloy C22 (2.4602) plated	B 4 0
Flange DN 50 PN 64 Form C, DIN 2501/316L	B 4 1
Flange DN 50 PN 64 Form L, DIN 2501/316L	B 4 2
Flange DN 50 PN 100 Form E, DIN 2501/316L	B 4 3
Flange DN 50 PN 100 Form L, DIN 2501/316L	B 4 4
Flange DN 65 PN 40 Form C, DIN 2501/316L	B 4 5
Flange DN 65 PN 40 Form C, DIN 2501/Alloy C22 (2.4602) plated	B 4 6

Selection and Ordering data

Article No.

SITRANS LVL200, Rigid extension

Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.

Flange DN 65 PN 40 Form C, DIN 2501/ECTFE ⁴⁾	B 4 7
Flange DN 65 PN 40 Form C, DIN 2501/PFA ⁴⁾	B 4 8
Flange DN 65 PN 40 Form F, DIN 2501/316L	B 5 0
Flange DN 65 PN 64 Form E, DIN 2501/316L	B 5 1
Flange DN 80 PN 40 Form C, DIN 2501/316L	B 5 2
Flange DN 80 PN 40 Form C, DIN 2501/Alloy C22 (2.4602) plated	B 5 3
Flange DN 80 PN 40 Form C, DIN 2501/ECTFE ⁴⁾	B 5 4
Flange DN 80 PN 40 Form C, DIN 2501/PFA ⁴⁾	B 5 5
Flange DN 80 PN 40 Form F, DIN 2501/316L	B 5 6
Flange DN 80 PN 40 Form N, DIN 2501/316L	B 5 7
Flange DN 80 PN 40 Form N, DIN 2501/Alloy C22 (2.4602) plated	B 5 8
Flange DN 100 PN 16 Form C, DIN 2501/316L	B 6 0
Flange DN 100 PN 16 Form C, DIN 2501/Alloy C22 (2.4602) plated	B 6 1
Flange DN 100 PN 16 Form C, DIN 2501/ECTFE ⁴⁾	B 6 2
Flange DN 100 PN 16 Form C, DIN 2501/PFA ⁴⁾	B 6 3
Flange DN 100 PN 16 Form D, DIN 2501/316L	B 6 4
Flange DN 100 PN 16 Form F, DIN 2501/316L	B 6 5
Flange DN 100 PN 16 Form N, DIN 2501/316L	B 6 6
Flange DN 100 PN 40 Form C, DIN 2501/316L	B 6 7
Flange DN 100 PN 40 Form C, DIN 2501/ECTFE ⁴⁾	B 6 8
Flange DN 100 PN 40 Form C, DIN 2501/PFA ⁴⁾	B 7 0
Flange DN 100 PN 40 Form C, DIN 2501/Enamelled ³⁾	B 7 1
Flange DN 100 PN 40 Form F, DIN 2501/316L	B 7 2
Flange DN 100 PN 40 Form N, DIN 2501/316L	B 7 3
Flange DN 100 PN 40 V13, DIN 2501/316L	B 7 4
Flange DN 100 PN 64 Form E, DIN 2501/316L	B 7 5
Flange DN 100 PN 100 Form E, DIN 2501/316L	B 7 6
Flange DN 100 PN 100 Form L, DIN 2501/316L	B 7 7
Flange DN 125 PN 16 Form F, DIN 2501/316L	B 7 8
Flange DN 125 PN 40 Form C, DIN 2501/316L	B 8 0
Flange DN 125 PN 40 Form N, DIN 2512/316L	B 8 1
Flange DN 150 PN 16 Form C, DIN 2501/316L	B 8 2
Flange DN 150 PN 16 Form C, DIN 2501/Alloy C22 (2.4602) plated	B 8 3
Flange DN 150 PN 16 Form C, DIN 2501/ECTFE ⁴⁾	B 8 4
Flange DN 150 PN 16 Form C, DIN 2501/PFA ⁴⁾	B 8 5
Flange DN 150 PN 16 Form D, DIN 2501/316L	B 8 6
Flange DN 150 PN 40 Form C, DIN 2501/316L	B 8 7
Flange DN 150 PN 40 Form C, DIN 2501/Alloy C22 (2.4602) plated	B 8 8
Flange DN 150 PN 40 Form F, DIN 2501/316L	C 0 0
Flange DN 150 PN 40 Form N, DIN 2512/316L	C 0 1
Flange DN 200 PN 10 Form C, DIN 2501/ECTFE ⁴⁾	C 0 2
Flange DN 200 PN 16 Form C, DIN 2501/316L	C 0 3
Flange DN 25 PN 40 Form B1, EN 1092-1/316L	C 0 4
Flange DN 25 PN 40 Form B1, EN 1092-1/Alloy C22 (2.4602) plated	C 0 5
Flange DN 25 PN 40 Form B1, EN/316L/PFA ⁴⁾	C 0 6
Flange DN 25 PN 40 Form B1, EN 1092-1/Enamelled ³⁾	C 0 7
Flange DN 25 PN 40 Form B2, EN 1092-1/316L	C 0 8
Flange DN 25 PN 40 Form F, EN 1092-1/316L	C 1 0
Flange DN 25 PN 63 Form B1, EN 1092-1/316L	C 1 1
Flange DN 25 PN 100 Form B2, EN 1092-1/316L	C 1 2
Flange DN 40 PN 40 Form B1, EN/316L	C 1 3
Flange DN 40 PN 40 Form B1, EN 1092-1/PFA ⁴⁾	C 1 4
Flange DN 40 PN 40 Form B2, EN/316L	C 1 5

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
SITRANS LVL200, Rigid extension	7ML5747-	SITRANS LVL200, Rigid extension	7ML5747-
Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.		Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	
Flange DN 50 PN 40 Form B1, EN/316L	C 16	Flange 1½" 600 lb RF, ASME B16.5/316L	C 67
Flange DN 50 PN 40 Form B1, EN 1092-1/ Alloy C22 (2.4602) plated	C 17	Flange 2" 150 lb RF, ASME B16.5/316L	C 68
Flange DN 50 PN 40 Form B1, EN 1092-1/ Alloy 400 (2.4360) ZB2977	C 18	Flange 2" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) plated	C 70
Flange DN 50 PN 40 Form B1, EN 1092-1/ECTFE ⁴⁾	C 20	Flange 2" 150 lb RF, ASME B16.5/ Alloy 400 (2.4360) ZB2977	C 71
Flange DN 50 PN 40 Form B1, EN/316L/PFA ⁴⁾	C 21	Flange 2" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	C 72
Flange DN 50 PN 40 Form B1, EN 1092-1/ Enamelled ³⁾	C 22	Flange 2" 150 lb RF, ASME B16.5/PFA ⁴⁾	C 73
Flange DN 50 PN 40 Form C, EN 1092-1/316L	C 23	Flange 2" 150 lb RF, ASME B16.5/Enamelled ³⁾	C 74
Flange DN 50 PN 40 Form D, EN/316L	C 24	Flange 2" 150 lb FF, ASME B16.5/316L	C 75
Flange DN 50 PN 40 Form D, EN 1092-1/ Alloy C22 (2.4602) plated	C 25	Flange 2" 150 lb FF, ASME B16.5/ECTFE ⁴⁾	C 76
Flange DN 50 PN 40 Form B2, EN 1092-1/316L	C 26	Flange 2" 150 lb SG (small groove), ASME B16.5/316L	C 77
Flange DN 50 PN 40 Form E, EN 1092-1/316L	C 27	Flange 2" 300 lb RF, ASME B16.5/316L	C 78
Flange DN 80 PN 40 Form B1, EN 1092-1/316L	C 28	Flange 2" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) plated	C 80
Flange DN 80 PN 40 Form B1, EN 1092-1/ Alloy C22 (2.4602) plated	C 30	Flange 2" 300 lb RF, ASME B16.5/ECTFE ⁴⁾	C 82
Flange DN 80 PN 40 Form B1, EN 1092-1/ECTFE ⁴⁾	C 31	Flange 2" 300 lb RF, ASME B16.5/PFA ⁴⁾	C 83
Flange DN 80 PN 40 Form B1, EN 1092-1/ Enamelled ³⁾	C 32	Flange 2" 300 lb RJF, ASME B16.5/316L	C 85
Flange DN 80 PN 40 Form B2, EN 1092-1/316L	C 33	Flange 2" 300 lb ST, ASME B16.5/316L	C 86
Flange DN 100 PN 16 Form B1, EN 1092-1/316L	C 34	Flange 2" 300 lb LG (large groove), ASME B16.5/316L	C 87
Flange DN 100 PN 16 Form B1, EN 1092-1/ Alloy C22 (2.4602) plated	C 35	Flange 2" 300 lb LT, ASME B16.5/316L	C 88
Flange DN 100 PN 16 Form B1, EN 1092-1/ Enamelled ³⁾	C 36	Flange 2" 600 lb RF, ASME B16.5/316L	D 00
Flange DN 100 PN 40 Form B1, EN 1092-1/316L	C 37	Flange 2" 600 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977	D 01
Flange DN 100 PN 40 Form B1, EN 1092-1/ Enamelled ³⁾	C 38	Flange 2" 600 lb RF, ASME B16.5/ECTFE ⁴⁾	D 02
Flange DN 100 PN 40 Form C, EN 1092-1/316L	C 40	Flange 2" 600 lb RJF, ASME B16.5/316L	D 03
Flange DN 100 PN 63 Form B2, EN 1092-1/316L	C 41	Flange 2" 600 lb LG, ASME B16.5/316L	D 04
Flange DN 150 PN 16 Form B1, EN 1092-1/316L	C 42	Flange 2" 900 lb RJF, ASME B16.5/316L	D 05
Flange DN 150 PN 16 Form B1, EN 1092-1/PFA ⁴⁾	C 43	Flange 2½" 150 lb RF, ASME B16.5/316L	D 06
Flange DN 150 PN 40 Form B1, EN 1092-1/316L	C 44	Flange 2½" 300 lb RF, ASME B16.5/316L	D 07
Flange DN 150 PN 40 Form B1, EN 1092-1/ECTFE ⁴⁾	C 45	Flange 3" 150 lb RF, ASME B16.5/316L	D 08
Flange DN 150 PN 40 Form B2, EN 1092-1/316L	C 46	Flange 3" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) plated	D 10
Flange 1" 150 lb ASME B16.5/316L	C 47	Flange 3" 150 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977	D 11
Flange 1" 150 lb RF, ASME B16.5/ Alloy C22 (2.4602) plated	C 48	Flange 3" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	D 12
Flange 1" 150 lb RF, ASME B16.5/ Alloy 400 (2.4360) ZB2977	C 50	Flange 3" 150 lb RF, ASME B16.5/PFA ⁴⁾	D 13
Flange 1" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	C 51	Flange 3" 150 lb RF, ASME B16.5/Enamelled ³⁾	D 14
Flange 1" 150 lb RF, ASME B16.5/PFA ⁴⁾	C 52	Flange 3" 150 lb FF, ASME B16.5/316L	D 15
Flange 1" 150 lb RF, ASME B16.5/Enamelled ³⁾	C 53	Flange 3" 150 lb FF, ASME B16.5/ECTFE ⁴⁾	D 16
Flange 1" 300 lb RF, ASME B16.5/316L	C 54	Flange 3" 150 lb FF, ASME B16.5/PFA ⁴⁾	D 17
Flange 1" 300 lb RF, ASME B16.5/ECTFE ⁴⁾	C 55	Flange 3" 300 lb RF, ASME B16.5/316L	D 18
Flange 1" 600 lb RF, ASME B16.5/316L	C 56	Flange 3" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) plated	D 20
Flange 1½" 150 lb RF, ASME B16.5/316L	C 57	Flange 3" 300 lb RF, ASME B16.5/ECTFE ⁴⁾	D 21
Flange 1½" 150 lb RF, ASME B16.5/ Alloy C22 (2.4602) plated	C 58	Flange 3" 300 lb RF, ASME B16.5/PFA ⁴⁾	D 22
Flange 1½" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	C 60	Flange 3" 300 lb RF, ASME B16.5/Enamelled ³⁾	D 23
Flange 1½" 150 lb RF, ASME B16.5/PFA ⁴⁾	C 61	Flange 3" 600 lb RF, ASME B16.5/316L	D 24
Flange 1½" 150 lb RF, ASME B16.5 Enamelled ³⁾	C 62	Flange 3½" 150 lb RF, ASME B16.5/316L	D 25
Flange 1½" 150 lb FF, ASME B16.5/ECTFE ⁴⁾	C 63	Flange 3½" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	D 26
Flange 1½" 300 lb RF, ASME B16.5/316L	C 64	Flange 4" 150 lb RF, ASME B16.5/316L	D 27
Flange 1½" 300 lb RF, ASME B16.5/ Alloy 400 (2.4360) ZB2977	C 65	Flange 4" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) plated	D 28
Flange 1½" 300 lb RF, ASME B16.5/ECTFE ⁴⁾	C 66	Flange 4" 150 lb RF, ASME B16.5/ECTFE ⁴⁾	D 30
		Flange 4" 150 lb RF, ASME B16.5/PFA ⁴⁾	D 31
		Flange 4" 150 lb RF, ASME B16.5/Enamelled ³⁾	D 32
		Flange 4" 150 lb LT, ASME B16.5/316L	D 33

Level Measurement

Point level measurement

Vibrating switches

SITRANS LVL200

Selection and Ordering data

Article No.

SITRANS LVL200, Rigid extension

Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.

Flange 4" 300 lb RF, ASME B16.5/316L
Flange 4" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) plated
Flange 4" 300 lb RF, ASME B16.5/ECTFE⁴⁾

Flange 4" 300 lb RJF, ASME B16.5/316L
Flange 4" 300 lb LG, ASME B16.5/316L
Flange 4" 300 lb LT, ASME B16.5/316L

Flange 4" 600 lb RF, ASME B16.5/316L
Flange 4" 600 lb RJF, ASME B16.5/316L
Flange 5" 150 lb RF, ASME B16.5/316L

Flange 6" 150 lb RF, ASME B16.5/316L
Flange 6" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) plated
Flange 6" 150 lb RF, ASME B16.5/ECTFE⁴⁾

Flange 6" 150 lb RF, ASME B16.5/PFA⁴⁾
Flange 6" 150 lb RJF, ASME B16.5/316L
Flange 6" 300 lb RF, ASME B16.5/316L

Flange 8" 150 lb RF, ASME B16.5/316L
Flange 8" 150 lb RF, ASME B16.5/ECTFE⁴⁾
Flange 1" BS.10 Table E/316L

Flange 1" BS.10 Table E/PFA⁴⁾
Flange 1½" BS.10 Table E/316L
Flange 3½" BS.10 Table E/316L

Flange 4" BS.10 Table E/ECTFE⁴⁾
Flange DN 40 10K, JIS/316L
Flange DN 50 10K, JIS/316L

Flange DN 80 10K, JIS/316L
Flange DN 100 10K, JIS/316L
Thread R1 PN64, EN10226-1/316L¹¹⁾

Flange 2" 900 lb RF, ASME B16.5/316L
Flange 4" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid

Adapter/Process temperature

Without adapter/-50 ... +150 °C
With adapter/-50 ... +200 °C¹³⁾
With adapter/-50 ... +250 °C¹⁰⁾
With gas-tight leadthrough/-50 ... +150 °C
With gas-tight leadthrough/-50 ... +250 °C¹⁰⁾

Housing/Cable entry

Aluminum IP66/IP67/M20 x 1.5
Aluminum IP66/IP67/½" NPT
316L stainless steel (electropolished)
IP66/IP67/M20 x 1.5
316L stainless steel (electropolished)
IP66/IP67/½" NPT
Plastic single chamber IP66/IP67/M20 x 1.5
Plastic single chamber IP66/IP67/½" NPT
Stainless steel chamber (precision casting) IP66/
IP67/M20 x 1.5
Stainless steel chamber (precision casting) IP66/
IP67/½" NPT
Aluminum IP66/IP67/M20 x 1.5 Special HARTING
plug (bent) according to Tier One (ZB7555)

NOTE:

When selecting a Rigid Extension option, extension coating must match the process connection coating and the material and surface roughness type.

Rigid Extension 316L

80 ... 500 mm
501 ... 1 000 mm
1 001 ... 1 500 mm

7ML5747-



D 3 4

D 3 5

D 3 6

D 3 7

D 3 8

D 4 0

D 4 1

D 4 2

D 4 3

D 4 4

D 4 5

D 4 6

D 4 7

D 4 8

D 5 0

D 5 1

D 5 2

D 5 3

D 5 4

D 5 5

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Selection and Ordering data

Article No.

SITRANS LVL200, Rigid extension

Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.

1 501 ... 2 000 mm

2 001 ... 2 500 mm

2 501 ... 3 000 mm

3 001 ... 3 500 mm

3 501 ... 4 000 mm

Rigid Extension ECTFE coated

80 ... 500 mm

501 ... 1 000 mm

1 001 ... 1 500 mm

1 501 ... 2 000 mm

2 001 ... 2 500 mm

2 501 ... 3 000 mm

Rigid Extension PFA coated

80 ... 500 mm

501 ... 1 000 mm

1 001 ... 1 500 mm

1 501 ... 2 000 mm

2 001 ... 2 500 mm

2 501 ... 3 000 mm

3 001 ... 3 500 mm

3 501 ... 4 000 mm

Rigid Extension 316L Ra ≤ 0.8 µm

80 ... 500 mm

501 ... 1 000 mm

1 001 ... 1 500 mm

1 501 ... 2 000 mm

2 001 ... 2 500 mm

2 501 ... 3 000 mm

3 001 ... 3 500 mm

3 501 ... 4 000 mm

Rigid Extension 316L Ra ≤ 0.3 µm

80 ... 500 mm

501 ... 1 000 mm

1 001 ... 1 500 mm

1 501 ... 2 000 mm

2 001 ... 2 500 mm

2 501 ... 3 000 mm

3 001 ... 3 500 mm

3 501 ... 4 000 mm

Rigid Extension Enamelled version

80 ... 250 mm

251 ... 500 mm

501 ... 750 mm

751 ... 1 000 mm

1 001 ... 1 250 mm

1 251 ... 1 500 mm

Rigid Extension Alloy C22 (2.4602)

80 ... 500 mm

501 ... 1 000 mm

1 001 ... 1 500 mm

1 501 ... 2 000 mm

2 001 ... 2 500 mm

2 501 ... 3 000 mm

3 001 ... 3 500 mm

3 501 ... 4 000 mm

3 501 ... 4 000 mm

3 501 ... 4 000 mm

3 501 ... 4 000 mm

3 501 ... 4 000 mm

3 501 ... 4 000 mm

3 501 ... 4 000 mm

3 501 ... 4 000 mm

3 501 ... 4 000 mm

7ML5747-



A 3

A 4

A 5

A 6

A 7

A 7

A 7

A 7

A 7

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Selection and Ordering data	Article No.
SITRANS LVL200, Rigid extension Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	7ML5747-
Rigid Extension Alloy 400 (2.4360)	
80 ... 500 mm	H 0
501 ... 1 000 mm	H 1
1 001 ... 1 500 mm	H 2
1 501 ... 2 000 mm	H 3
2 001 ... 2 500 mm	H 4
2 501 ... 3 000 mm	H 5
Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Switching status indication with colors red-green ¹²⁾	A21
Cleaning including Certificate (oil, grease, and silicone free)	W01
Enter the total insertion length in plain text description, max. 4 000 mm (157.48 inch)	Y01
Identification label (measurement loop) stainless steel: max. 40 characters, add in plain text. To add more than one line, use a comma "," for line break.	Y17
Identification Label (measurement loop) foil: max. 40 characters add in plain text. To add more than one line, use a comma "," for line break.	Y18
NACE0175 to 3.1 Material Certificate for material (EN10204 NACE MR 0175) ⁸⁾ Note: not available with Process connection and Rigid extension coatings PFA, ECTFE, and Enamel. NACE not available with Hygienic process connections.	D07
Material Inspection certificate 3.1 of EN 10204 ⁸⁾	C05
2.2-Factory certificate for material (EN 10204) ⁸⁾	C15
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511 ⁹⁾	C20
Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN 10204) ⁸⁾	C13
X-ray test + 3.1 certificate/instrument ⁸⁾	C14
Positive material identification test + 3.1 certificate/instrument ⁸⁾	C16
Roughness test + 3.1 certificate/instrument ⁸⁾	C18
3.1-Inspection Certificate for instrument with test data (EN 10204)	C25
Quality and test plan	C26
Pressure test + 3.1 certificate/instrument ⁸⁾	C31
Helium leak test + 3.1 certificate/instrument ⁸⁾	C32
Ferrite measuring accuracy to DIN 32514-1 + 3.1 certificate/instrument ⁸⁾	C60
Pressure test according to Norsok + 3.1 certificate/instrument ⁸⁾	C61
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

Selection and Ordering data	Article No.
Spare Parts and Accessories	
Electronics module SITRANS LVL200 Relay	7ML1830-1NC
Electronics module SITRANS LVL200 Contactless	7ML1930-6AA
NAMUR spare electronics module	A5E35817107
SITRANS SCSC single channel signal conditioner and remote test	7ML5760
SITRANS TCSC two channel signal conditioner and remote test	7ML5761
Lock fitting, unpressurized, G1" A/316L	7ML1930-1DQ
Lock fitting, unpressurized, 1" NPT/316L	7ML1930-1DR
Lock fitting, unpressurized, G1 ... 1/2" A/316L	7ML1930-1DS
Lock fitting, unpressurized, 1 ... 1/2" NPT/316L	7ML1930-1DT
Lock fitting, -1 ... 16 bar, G1" A/316L	7ML1930-1DU
Lock fitting, -1 ... 16 bar, 1" NPT/316L	7ML1930-1DV
Lock fitting, -1 ... 16 bar, G1 ... 1/2" A/316L	7ML1930-1DW
Lock fitting, -1 ... 16 bar, 1 ... 1/2" NPT/316L	7ML1930-1DX
Lock fitting, -1 ... 64 bar, G1" A/316L	7ML1930-1EA
Lock fitting, -1 ... 64 bar, 1" NPT/316L	7ML1930-1EB
Lock fitting, -1 ... 64 bar, G1 ... 1/2" A/316L	7ML1930-1EC
Lock fitting, -1 ... 64 bar, 1 ... 1/2" NPT/316L	7ML1930-1ED
1) Available only with Adapter/Process temperature options 1, 3, 4, and 5.	
2) Available only with Housing/Cable entry option B.	
3) Available only with Adapter/Process temperature options 1, 2, and 4.	
4) Not available with Adapter/Process temperature options 2, 3, and 5.	
5) Not available with Adapter/Process temperature options 2, 4, and 5.	
6) Available only with Electronics options 4 and 6.	
7) Available only with rigid extension options less than 3 001 mm.	
8) Listed Certificates are not available with all configurations please contact factory for more information.	
9) Not available with Housing/Protection/Cable option V.	
10) Not available with PFA, ECTFE, and enamelled coating options.	
11) Available only with some 316L extensions.	
12) Available only with relay electronic options and non-hazardous Approval options.	
13) Available only with Enamelled Process connection/Material options.	
14) Not available with Approval options C, E, G, H, L, N, V, and W.	
15) Not available with Approval options C, E, G, H, N, and V.	
16) Only available with Aluminum Housing/Protection/Cable options and certain glands.	
17) Not available with Stainless Steel Electropolish Housing/Protection/Cable options and certain glands.	
18) Not available with Plastic or Stainless Steel Electropolish Housing/Protection/Cable options and certain glands.	
19) Not available with Housing/Protection/Cable options D and V.	
20) Not available with Housing/Protection/Cable options A, E, G, and V.	
21) Not available with some Housing/Protection/Cable gland options.	
22) Not available with Housing/Protection/Cable options A, C, and V.	

Level Measurement

Point level measurement

Vibrating switches

SITRANS LVL200

Selection and Ordering data

Article No.

SITRANS LVL200, High temperature

Rigid extended vibrating level switch for use in aggressive liquids and hazardous applications such as overflow, high, and low demand applications, as well as pump protection. For use in SIL-2 applications.

➔ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Version/Material

Compact version/Inconel 718 (2.4668)¹⁾²⁾

With tube extension/316L and Inconel 718 (2.4668)¹⁾³⁾

With tube extension/Alloy C22 (2.4602) and Inconel 718 (2.4668)⁴⁾

Approvals

Without approvals

Process connection

Thread G1 PN 100, DIN 3852-A/316L

Thread G1 PN 160, DIN 3852-A/

Inconel 718 (2.4668)

Thread 1" NPT PN 100, ASME B1.20.1/316L

Thread 1" NPT PN 160, ASME B1.20.1/

Inconel 718 (2.4668)

Flange DN 50 PN 40 Form C, DIN 2501/316/316

Flange DN 50 PN 40 Form C, DIN 2501/316/316L, with Alloy C22 (2.4602) coating

Flange DN 50 PN 40 Form N, DIN 2501/316/316L

Flange DN 50 PN 40 Form V13, DIN 2501/316/316L

Flange DN 50 PN 40 Form V13, DIN 2501/Alloy C22 (2.4602) solid

Flange DN 50 PN 40 Form V13, DIN 2501/316/316L, with Alloy C22 (2.4602) coating

Flange DN 50 PN 64 Form E, DIN 2501/316/316L

Flange DN 50 PN 100 Form C, DIN 2501/316/316L

Flange DN 50 PN 100 Form F, DIN 2501/316/316L

Flange DN 50 PN 100 Form V13, DIN 2501/316/316L

Flange DN 50 PN 160 Form C, DIN 2501/316/316L

Flange DN 50 PN 160 Form F, DIN 2501/316/316L

Flange DN 65 PN 16 Form C, DIN 2501/316/316L

Flange DN 65 PN 40 Form C, DIN 2501/316/316L

Flange DN 65 PN 100 Form C, DIN 2501/316/316L

Flange DN 80 PN 40 Form C, DIN 2501/316/316L

Flange DN 80 PN 100 Form C, DIN 2501/316/316L

Flange DN 80 PN 160 Form F, DIN 2501/316/316L

Flange DN 80 PN 160 Form L, DIN 2501/316/316L

Flange DN 80 PN 250 Form L, DIN 2501/316/316L

Flange DN 80 PN 250 Form L, DIN 2501/

Alloy C22 (2.4602) solid

Flange DN 100 PN 16 Form C, DIN 2501/316/316L

Flange DN 100 PN 40 Form C, DIN 2501/316/316L

Flange DN 100 PN 100 Form E, DIN 2501/316/316L

Flange DN 100 PN 160 Form L, DIN 2501/316/316L

Flange DN 125 PN 16 Form C, DIN 2501/316/316L

Flange DN 125 PN 40 Form C, DIN 2501/316/316L

Flange DN 150 PN 16 Form C, DIN 2501/316/316L

Flange DN 150 PN 16 Form C, DIN 2501/316/316L, with Alloy C22 (2.4602) coating

Flange DN 150 PN 40 Form C, DIN 2501/316/316L

Flange DN 150 PN 160 Form L, DIN 2501/316/316L

Flange DN 200 PN 16 Form C, DIN 2501/316/316L

Flange DN 200 PN 64 Form C, DIN 2501/316/316L

7ML5748-

1 2 3

A

A0 A1

A2 A3

A4 A5

A6 A7

A8

B0

B1

B2

B3

B4

B5

B6

B7

B8

C0

C1

C2

C3

C4

C5

C6

C7

C8

D0

D1

D2

D3

D4

D5

D6

D7

D8

E0

Selection and Ordering data

Article No.

SITRANS LVL200, High temperature

Rigid extended vibrating level switch for use in aggressive liquids and hazardous applications such as overflow, high, and low demand applications, as well as pump protection. For use in SIL-2 applications.

Flange DN 250 PN 16 Form C, DIN 2501/316/316L

Flange DN 250 PN 64 Form C, DIN 2501/316/316L

Flange DN 50 PN 40 Form B1, EN 1092-1/1.4435

Flange DN 50 PN 40 Form B1, EN 1092-1/316/316L

Flange DN 50 PN 40 Form B1, EN 1092-1/316/316L, with Alloy C22 (2.4602) coating

Flange DN 50 PN 40 Form B2, EN 1092-1/316/316L

Flange DN 50 PN 40 Form C, EN 1092-1/316/316L

Flange DN 50 PN 40 Form D, EN 1092-1/316/316L

Flange DN 50 PN 40 Form E, EN 1092-1/316/316L

Flange DN 50 PN 63 Form B2, EN 1092-1/316/316L

Flange DN 50 PN 63 Form B2, EN 1092-1/316/316L, with Alloy C22 (2.4602) coating

Flange DN 50 PN 63 Form C, EN 1092-1/316/316L

Flange DN 50 PN 63 Form D, EN 1092-1/316/316L

Flange DN 50 PN 100 Form B1, EN 1092-01/316/316L

Flange DN 50 PN 100 Form C, EN 1092-1/316/316L

Flange DN 50 PN 160 Form B1, EN 1092-1/316/316L

Flange DN 50 PN 160 Form B2, EN 1092-1/316/316L

Flange DN 50 PN 250 Form B1, EN 1092-1/316/316L

Flange DN 50 PN 250 Form B2, EN 1092-1/316/316L

Flange DN 65 PN 40 Form B1, EN 1092-1/316/316L

Flange DN 65 PN 63 Form C, EN 1092-1/316/316L

Flange DN 80 PN 40 Form B1, EN 1092-1/316/316L

Flange DN 80 PN 40 Form B2, EN 1092-1/316/316L

Flange DN 80 PN 40 Form C, EN 1092-1/316/316L

Flange DN 80 PN 40 Form D, EN 1092-1/316/316L

Flange DN 80 PN 63 Form B2, EN 1092-1/316/316L

Flange DN 80 PN 160 Form B2, EN 1092-1/316/316L

Flange DN 80 PN 250 Form B1, EN 1092-1/316/316L

Flange DN 100 PN 16 Form D, EN 1092-1/316/316L

Flange DN 100 PN 40 Form B1, EN 1092-1/316/316L

Flange DN 100 PN 40 Form B2, EN 1092-1/316/316L

Flange DN 100 PN 40 Form C, EN 1092-1/316/316L

Flange DN 100 PN 40 Form D, EN 1092-1/316/316L

Flange DN 100 PN 160 Form B2, EN 1092-1/316/316L

Flange DN 125 PN 63 Form C, EN 1092-1/316/316L

Flange DN 125 PN 160 Form B2, EN 1092-1/316/316L

Flange DN 150 PN 40 Form B1, EN 1092-1/316/316L

Flange DN 150 PN 40 Form C, EN 1092-1/316/316L

Flange DN 150 PN 40 Form D, EN 1092-1/316/316L

Flange DN 150 PN 160 Form L, DIN 2501/316/316L

Flange DN 200 PN 16 Form C, DIN 2501/316/316L

Flange DN 200 PN 64 Form C, DIN 2501/316/316L

Flange 1½" 150 lb RJF, ASME B16.5/316/316L

7ML5748-

E1 E2 E3

E4 E5 E6

E7 E8 E9

F0 F1 F2

F3 F4 F5

F6 F7 F8

F9 G0 G1

G2 G3 G4

G5 G6 G7

G8 G9 H0

H1 H2 H3

H4 H5 H6

H7 H8 H9

K0 K1 K2

K3 K4 K5

K6 K7 K8

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
SITRANS LVL200, High temperature Rigid extended vibrating level switch for use in aggressive liquids and hazardous applications such as overflow, high, and low demand applications, as well as pump protection. For use in SIL-2 applications.	7ML5748-	SITRANS LVL200, High temperature Rigid extended vibrating level switch for use in aggressive liquids and hazardous applications such as overflow, high, and low demand applications, as well as pump protection. For use in SIL-2 applications.	7ML5748-
Flange 1½" 300 lb RJF, ASME B16.5/316/316L	L 1	Flange 4" 600 lb RF, ASME B16.5/Alloy C22 (2.4602) solid	T 2
Flange 1½" 1 500 lb RJF, ASME B16.5/316/316L	L 2	Flange 4" 600 lb RJF, ASME B16.5/316/316L	T 3
Flange 2" 150 lb RF, ASME B16.5/316/316L	L 3	Flange 4" 900 lb RF, ASME B16.5/316/316L	T 4
Flange 2" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid	L 4	Flange 4" 900 lb RJF, ASME B16.5/316/316L	T 5
Flange 2" 300 lb RF, ASME B16.5/316/316L	L 5	Flange 4" 900 lb LT, ASME B16.5/316/316L	T 6
Flange 2" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) solid	L 6	Flange 4" 1 500 lb RF, ASME B16.5/316/316L	T 7
Flange 2" 300 lb RF, ASME B16.5/316/316L, with Alloy C22 (2.4602) coating	L 7	Flange 4" 1 500 lb RJF, ASME B16.5/316/316L	T 8
Flange 2" 300 lb ST (small tongue), ASME B16.5/316/316L	L 8	Flange 4" 1 500 lb LT, ASME B16.5/316/316L	U 1
Flange 2" 300 lb RJF, ASME B16.5/316/316L	M 1	Flange 5" 150 lb RF, ASME B16.5/316/316L	U 2
Flange 2" 300 lb LM (large male), ASME B16.5/316/316L	M 2	Flange 5" 300 lb RF, ASME B16.5/316/316L	U 3
Flange 2" 300 lb SG, ASME B16.5/316/316L	M 3	Flange 5" 600 lb RJF, ASME B16.5/316/316L	U 4
Flange 2" 300 lb LG, ASME B16.5/316/316L	M 4	Flange 6" 150 lb RF, ASME B16.5/316/316L	U 5
Flange 2" 600 lb RF, ASME B16.5/316/316L	M 5	Flange 6" 300 lb RF, ASME B16.5/316/316L	U 6
Flange 2" 600 lb RF, ASME B16.5/316/316L, with Alloy C22 (2.4602) coating	M 6	Flange 6" 300 lb LT, ASME B16.5/316/316L	U 7
Flange 2" 600 lb RJF, ASME B16.5/316/316L	M 7	Flange DN 50 30K RF, JIS/316/316L	U 8
Flange 2" 900 lb RF, ASME B16.5/316/316L	M 8	Flange DN 50 40K RF, JIS/316/316L	V 1
Flange 2" 900 lb RJF, ASME B16.5/316/316L	N 1	Flange DN 65 40 K RF, JIS/316/316L	V 2
Flange 2" 1 500 lb RF, ASME B16.5/316/16L	N 2	Mobrey flange PN 16 Form A/316/316L	V 3
Flange 2" 1 500 lb RJF, ASME B16.5/316/316L	N 3	Mobrey flange PN 16 Form E/316/316L	V 4
Flange 2" 1 500 lb LT, ASME B16.5/Alloy C22 (2.4602) solid	N 4		
Flange 2" 1 500 lb LM, ASME B16.5/316/316L	N 5	Adapter/Process temperature	
Flange 2" 2 500 lb RJF, ASME B16.5/316/316L	N 6	With adapter/-196 ... +450 °C (-321 ... +842 °F)	1
Flange 2½" 150 lb RF, ASME B16.5/316/316L	N 7	Without/-196 ... +450 °C (-321 ... +842 °F)	2
Flange 2½" 300 lb RF, ASME B16.5/316/316L	N 8	Electronics	
Flange 2½" 600 lb RF, ASME B16.5/316/316L	P 1	Relay (2 x SPDT) 20 ... 72 V DC/20 ... 253 V AC (5A)	1
Flange 2½" 900 lb RF, ASME B16.5/316/316L	P 2	Transistor (NPN/PNP) 9.6 ... 55 V DC	2
Flange 2½" 2 500 lb RJF, ASME B16.5/316/316L	P 3	Two-wire (8/16 mA) 9.6 ... 35 V DC	3
Flange 3" 150 lb RF, ASME B16.5/316/316L	P 4	Housing/Cable entry	
Flange 3" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid	P 5	Plastic single chamber/IP66/IP67/M20 x 1.5	A
Flange 3" 300 lb RF, ASME B16.5/316/316L	P 6	Plastic single chamber/IP66/IP67/½" NPT	B
Flange 3" 300 lb RJF, ASME B16.5/316/316L	P 7	Aluminum IP66/IP67/M20 x 1.5	C
Flange 3" 300 lb LT, ASME B16.5/316/316L	P 8	Aluminum IP66/IP67/½" NPT	D
Flange 3" 600 lb RF, ASME B16.5/316/316L	R 1	Stainless steel single chamber (precision casting)/IP66/IP67/M20 x 1.5	E
Flange 3" 600 lb RF, ASME B16.5/Alloy C22 (2.4602) solid	R 2	Stainless steel single chamber (precision casting)/IP66/IP67/½" NPT	F
Flange 3" 600 lb RJF, ASME B16.5/316/316L	R 3	Stainless steel single chamber (electropolished)/IP66/IP67/M20 x 1.5	G
Flange 3" 900 lb RF, ASME B16.5/316/316L	R 4	Stainless steel single chamber (electropolished)/IP66/IP67/½" NPT	H
Flange 3" 900 lb RJF, ASME B16.5/316/316L	R 5	Rigid Extension 316L	
Flange 3" 900 lb RF, ASME B16.5/316/316L	R 6	200 ... 500 mm	A 0
Flange 3" 1 500 lb RF, ASME B16.5/316/316L	R 7	501 ... 1 000 mm	A 1
Flange 3" 1500lb RJF, ASME B16.5 / 316/316L	R 8	1 001 ... 1 500 mm	A 2
Flange 3" 2 500 lb RF, ASME B16.5/316/316L	S 1	1 501 ... 2 000 mm	A 3
Flange 3" 2 500 lb RJF, ASME B16.5/316/316L	S 2	2 001 ... 2 500 mm	A 4
Flange 4" 150 lb RF, ASME B16.5/316/316L	S 3	2 501 ... 3 000 mm	A 5
Flange 4" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid	S 4	Rigid Extension Alloy C22	
Flange 4" 150 lb RJF, ASME B16.5/316/316L	S 5	200 ... 500 mm	B 0
Flange 4" 300 lb RF, ASME B16.5/316/316L	S 6	501 ... 1 000 mm	B 1
Flange 4" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) solid	S 7	1 001 ... 1 500 mm	B 2
Flange 4" 300 lb LT, ASME B16.5/316/316L	S 8	1 501 ... 2 000 mm	B 3
Flange 4" 600 lb RF, ASME B16.5/316/316L	T 1	2 001 ... 2 500 mm	B 4
		2 501 ... 3 000 mm	B 5
		75 mm compact version	C 1

Level Measurement

Point level measurement

Vibrating switches

SITRANS LVL200

Selection and Ordering data

Order code

Further designs

Please add **"-Z"** to Article No. and specify Order code(s).

Enter the total insertion length in plain text description.

Y01

Cleaning including Certificate (oil, grease, and silicone free).

W01

Identification label (measurement loop) stainless steel.

Y17

Identification Label (measurement loop) foil.

Y18

Spare Parts and Accessories

SITRANS SCSC single channel signal conditioner and remote test

7ML5760

SITRANS TCSC two channel signal conditioner and remote test

7ML5761

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

¹⁾ Not available with Process Connection options A0 and A2.

²⁾ Available only with Rigid extension option C1.

³⁾ Available only with 316L Process Connection and Rigid extension options.

⁴⁾ Available only with Alloy C22 Rigid extension options.

Selection and Ordering data

Article No.

SITRANS SCSC, single channel, signal conditioner for SITRANS LVL200

7ML5760-

Single channel signal conditioning instrument for level detection with relay output for one LVL vibrating switch with electronics version two-wire 8/16 mA. Provides remote test of LVL200.

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Approvals

For Ex-free area

1 A

ATEX II (1) G/D [Ex ia Ga/Da] IIC/IIIC, I (M1) [Ex ia Ma] I

1 D

ATEX II (1) G/D (Ex ia Ga/Da) IIC/IIIC, I (M1) (Ex ia Ma) I + WHG

1 E

IEC [Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I IEC (Ex ia Ga) IIC, (Ex ia Da) IIIC, (Ex ia Ma) I + WHG

1 H

1 J

SIL qualification

Without

1

With

2

Version

Single-channel (8/16 mA) for level detection

1

Single channel (8/16 mA), level detection with fail safe relay

2

Housing/cable entry

Plastic/IP20

A

Terminal block connection

Detachable 2.5 mm²/ Ex sensor: 2 x blue; output and operating voltage: 2 x black

A

Detachable 2.5 mm²/ sensor: 2 x black; output and operating voltage: 2 x black

B

Language

English

0

German

1

Selection and Ordering data

Order code

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Selection and Ordering data

Article No.

SITRANS TCSC, two channel, signal conditioner for SITRANS LVL200

7ML5761-

Two channel signal conditioning instrument for level detection with relay output for two LVL vibrating switches with electronics version two-wire 8/16 mA. Provides remote test of LVL200.

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Approvals

For Ex-free area¹⁾

1 A

ATEX II (1) G/D [Ex ia Ga/Da] IIC/IIIC, I (M1) [Ex ia Ma] I²⁾

1 D

ATEX II (1) G/D (Ex ia Ga/Da) IIC/IIIC, I (M1) (Ex ia Ma) I + WHG

1 E

IEC [Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I²⁾

1 H

IEC (Ex ia Ga) IIC, (Ex ia Da) IIIC, (Ex ia Ma) I + WHG

1 J

SIL qualification

Without

1

With

2

Version

Double-channel (8/16 mA) for level detection

1

Housing/cable entry

Plastic/IP20

A

Terminal block connection

Detachable 2.5 mm²/ Ex sensor: 2 x blue; output and operating voltage: 2 x black

A

Detachable 2.5 mm²/ sensor: 2 x black; output and operating voltage: 2 x black

B

Language

English

0

German

1

Selection and Ordering data

Order code

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

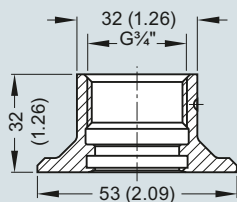
¹⁾ Available only with terminal block connection option B

²⁾ Available only with terminal block connection option A

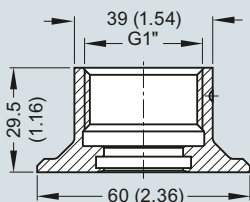
Options

LVL200 threaded welded socket

G $\frac{3}{4}$ " A/316L

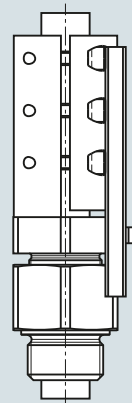


G1" A/316L

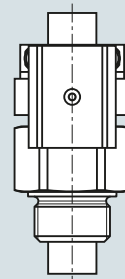


Lock fitting

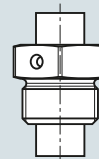
LVL200 extended
64 bar



LVL200 extended
16 bar

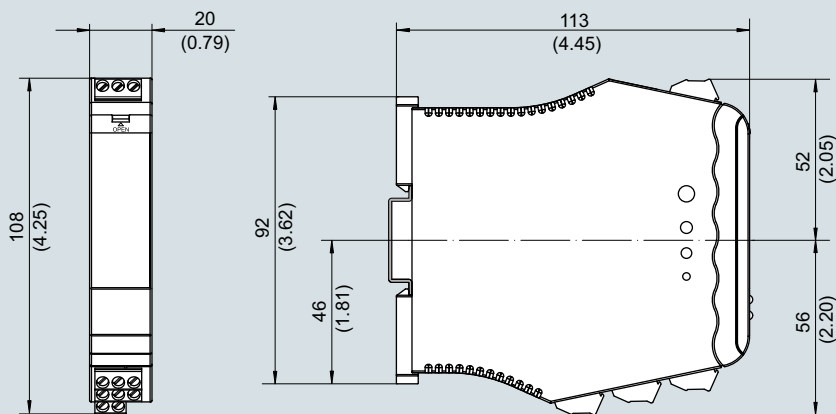


LVL200 extended
unpressurized



SITRANS LVL200 welded socket and lock fitting, dimensions in mm (inch)

SITRANS SCSC and TCSC LVL test conditioner



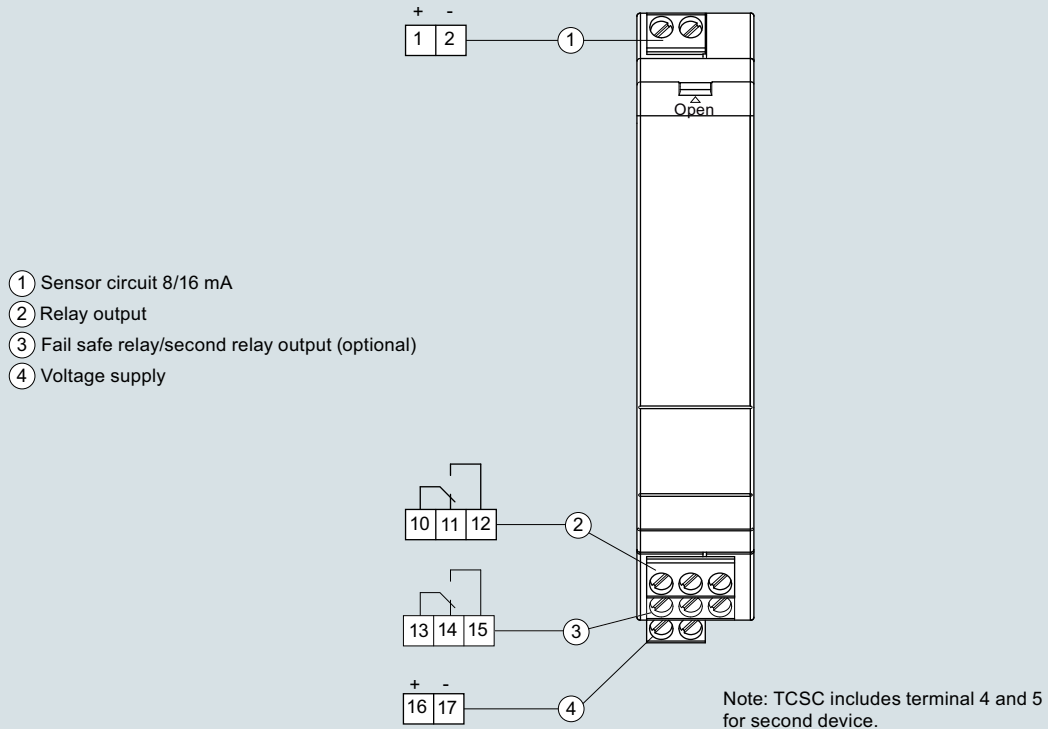
SITRANS SCSC and SITRANS TCSC LVL Test Conditioners, dimensions in mm (inch)

Level Measurement

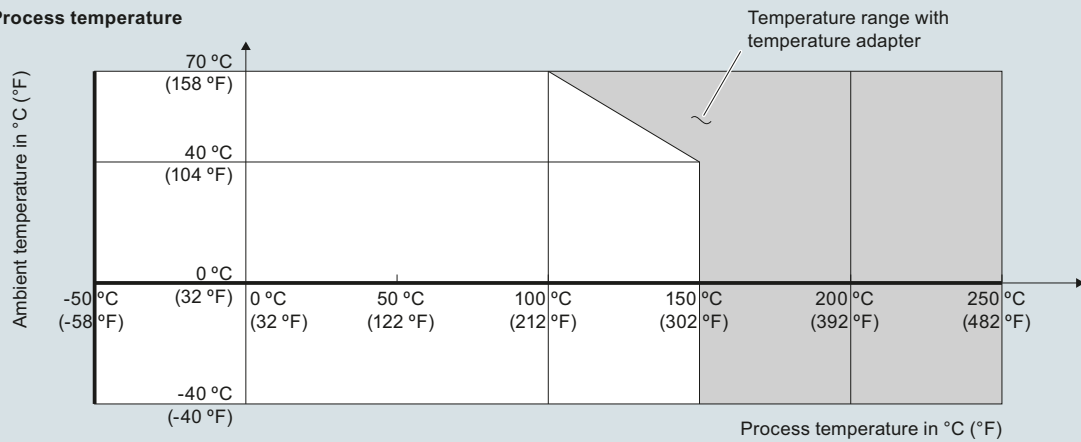
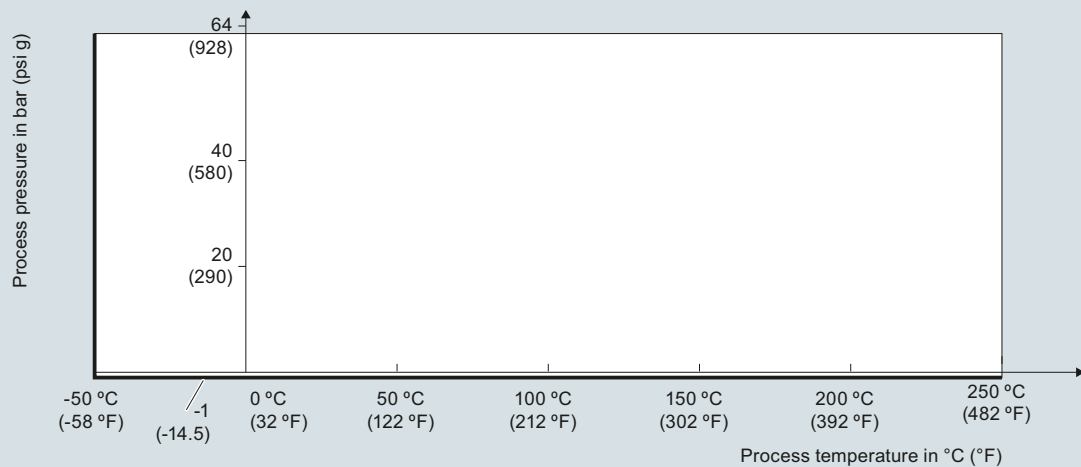
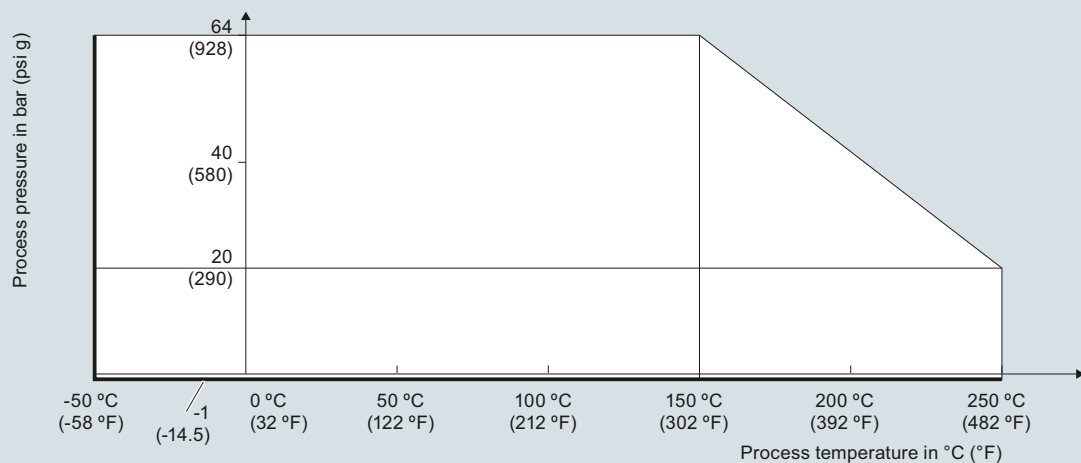
Point level measurement

Vibrating switches

SITRANS LVL200



SITRANS SCSC and SITRANS TCSC LVL Test Conditioner connections

Characteristic curves
Ambient/Process temperature

Process pressure with switch position 0.7 g/cm³ (mode switch)

Process pressure with switch position 0.5 g/cm³ (mode switch)


SITRANS LVL200 process pressure/process temperature/ambient temperature derating curves

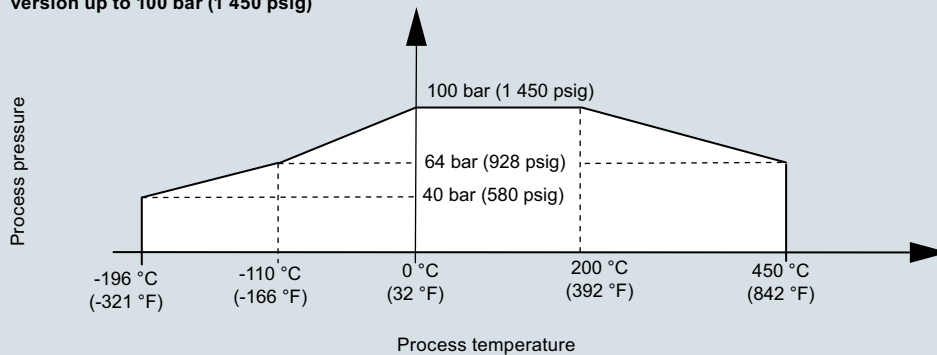
Level Measurement

Point level measurement

Vibrating switches

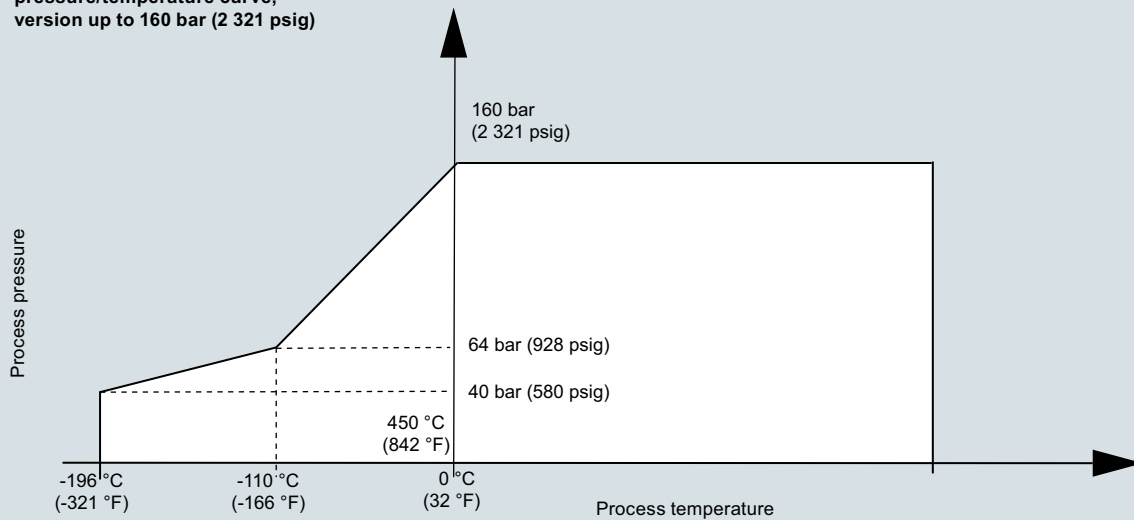
SITRANS LVL200

**SITRANS LVL high temperature
process temperature/process pressure,
version up to 100 bar (1 450 psig)**



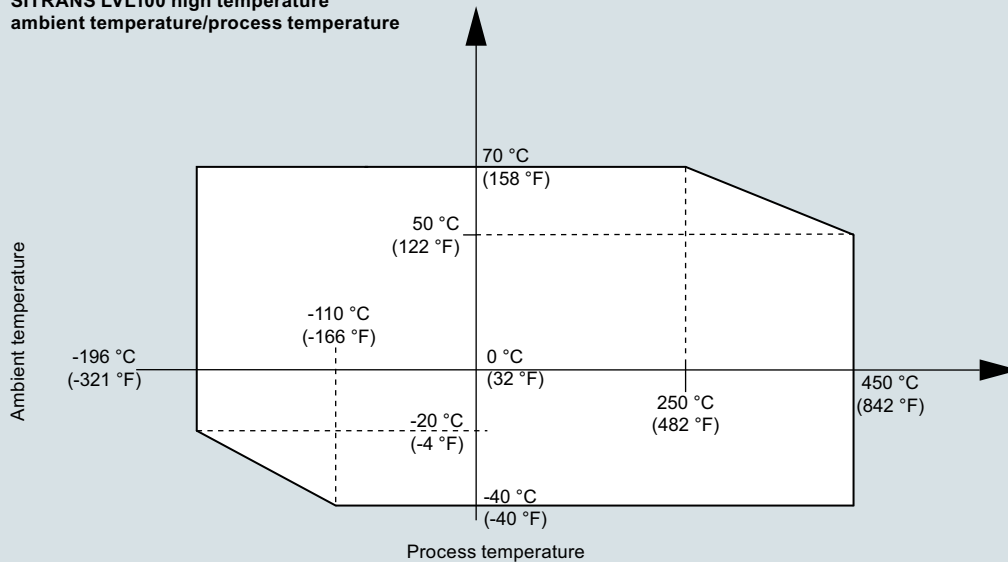
SITRANS LVL200 high temperature, process temperature/process pressure version up to 100 bar (1 450 psig)

**SITRANS LVL200 high temperature
pressure/temperature curve,
version up to 160 bar (2 321 psig)**



SITRANS LVL200 high temperature, pressure/temperature, version up to 160 bar (2 321 psig)

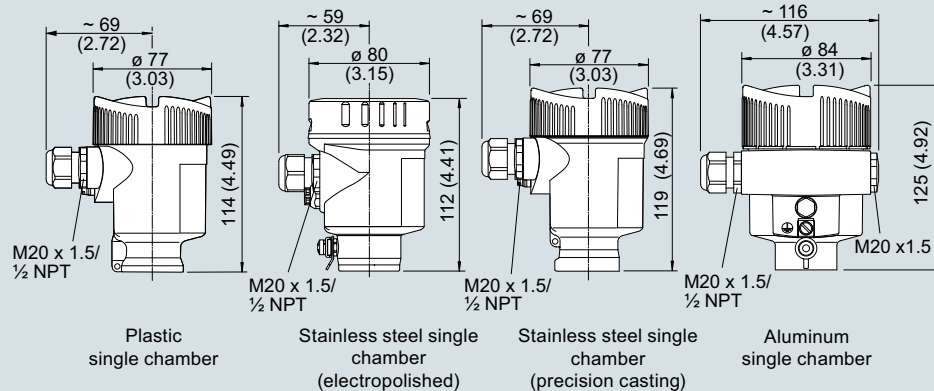
**SITRANS LVL100 high temperature
ambient temperature/process temperature**



SITRANS LVL200 high temperature ambient temperature/process temperature, version up to 100 bar (1 450 psig)

Dimensional drawings

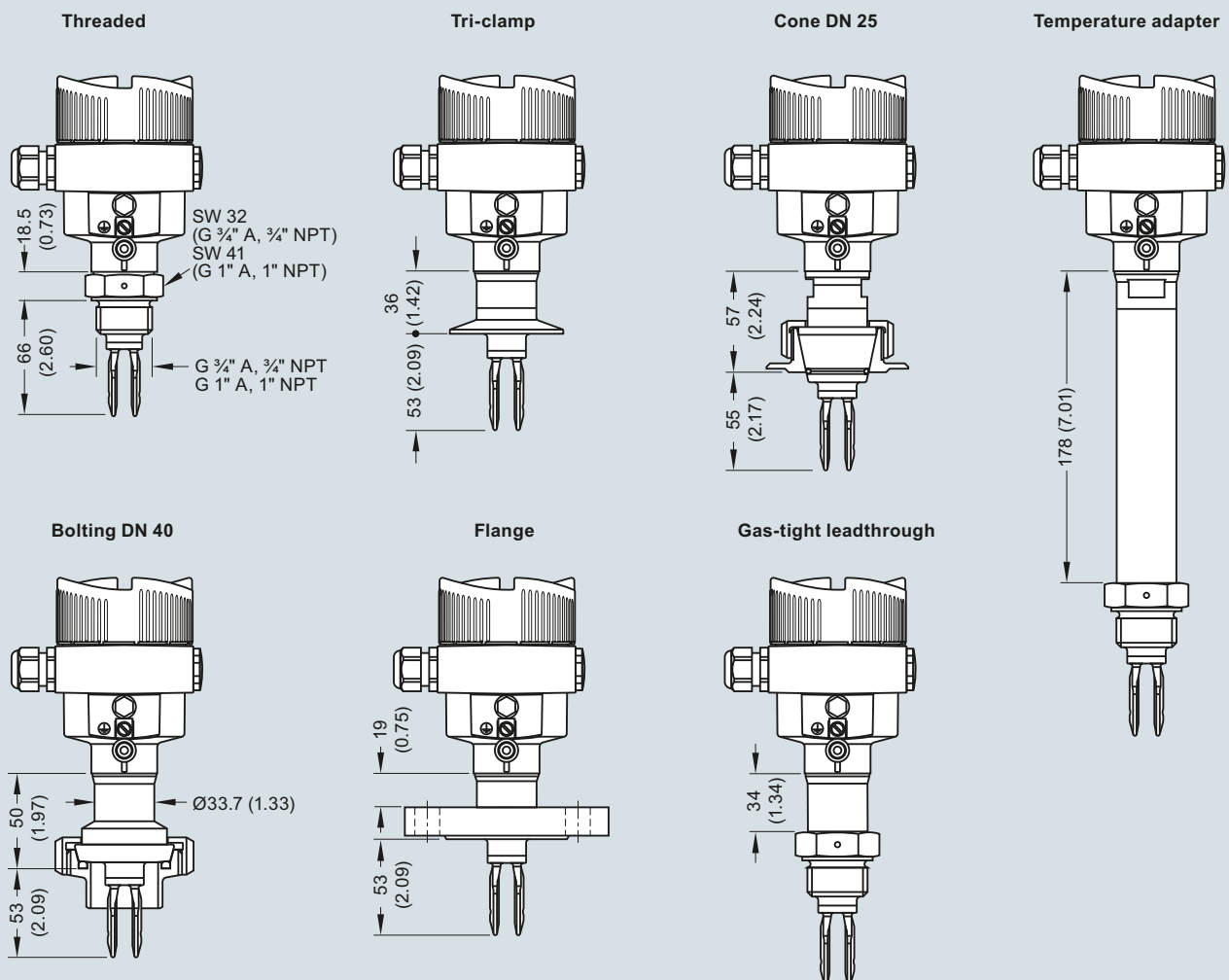
SITRANS LVL200, housing



SITRANS LVL200 housing, dimensions in mm (inch)

4

SITRANS LVL200 standard

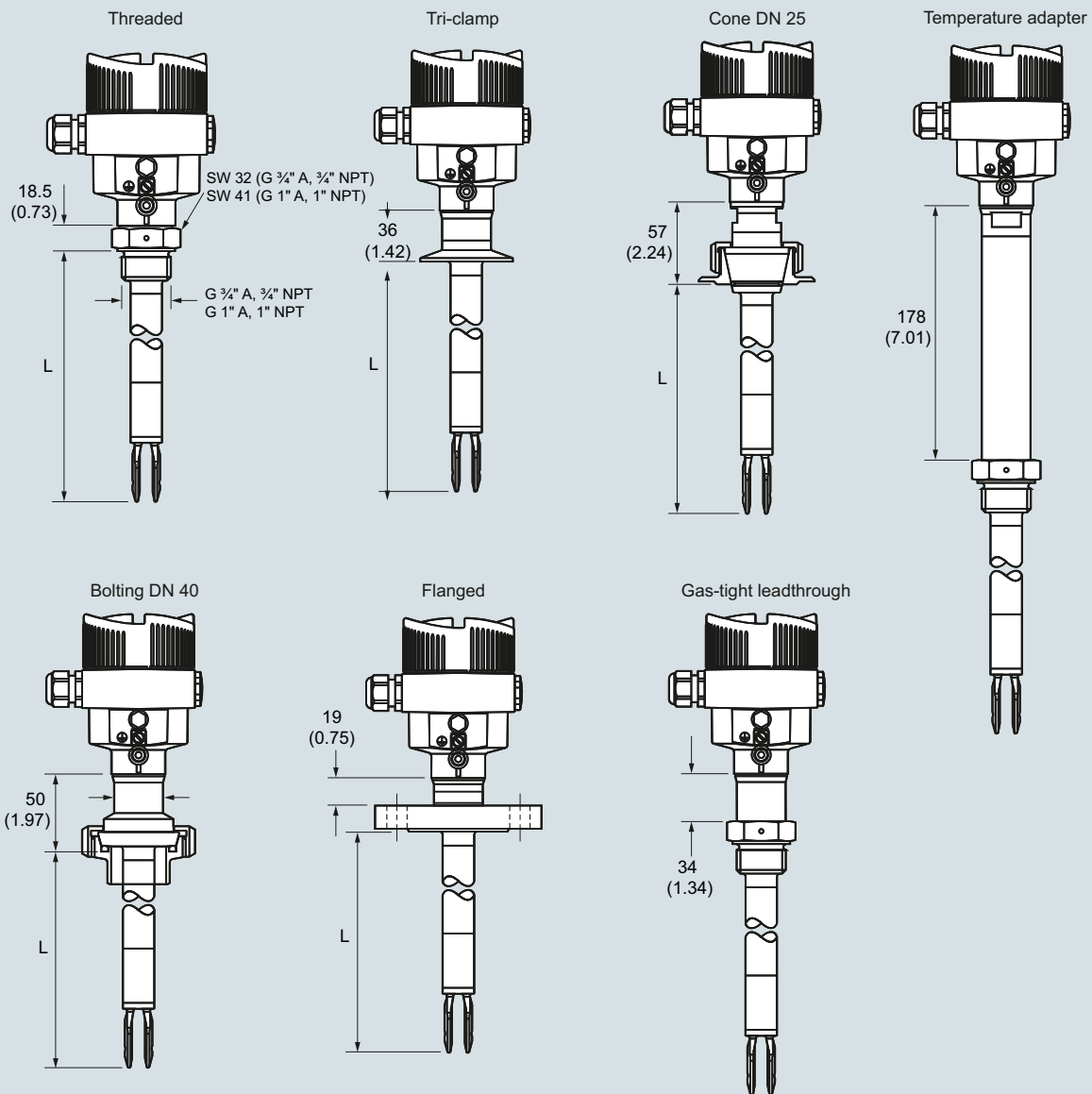


SITRANS LVL200 (standard), dimensions in mm (inch)

Level Measurement

Point level measurement

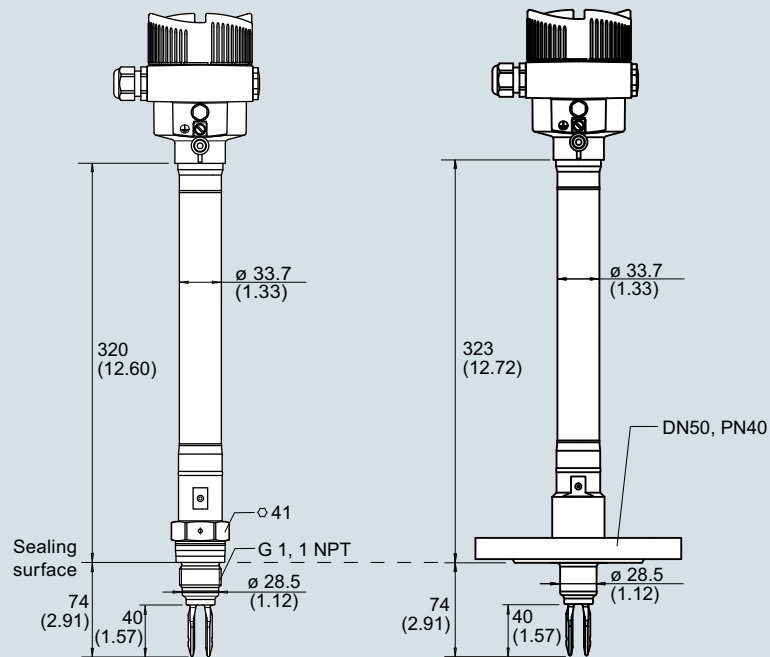
Vibrating switches

SITRANS LVL200**SITRANS LVL200 extended****Sensor length (L)**

316L, Alloy C22 (2.4602)	80 ... 6 000 mm (3.15 ... 236.2 inch)
Enamelled	80 ... 1 500 mm (3.15 ... 59.06 inch)
316L, ECTFE coated	80 ... 3 000 mm (3.15 ... 118.1 inch)
316L, PFA coated	80 ... 4 000 mm (3.15 ... 157.5 inch)

SITRANS LVL200 (extended), dimensions in mm (inch)

SITRANS LVL200 high temperature, compact version

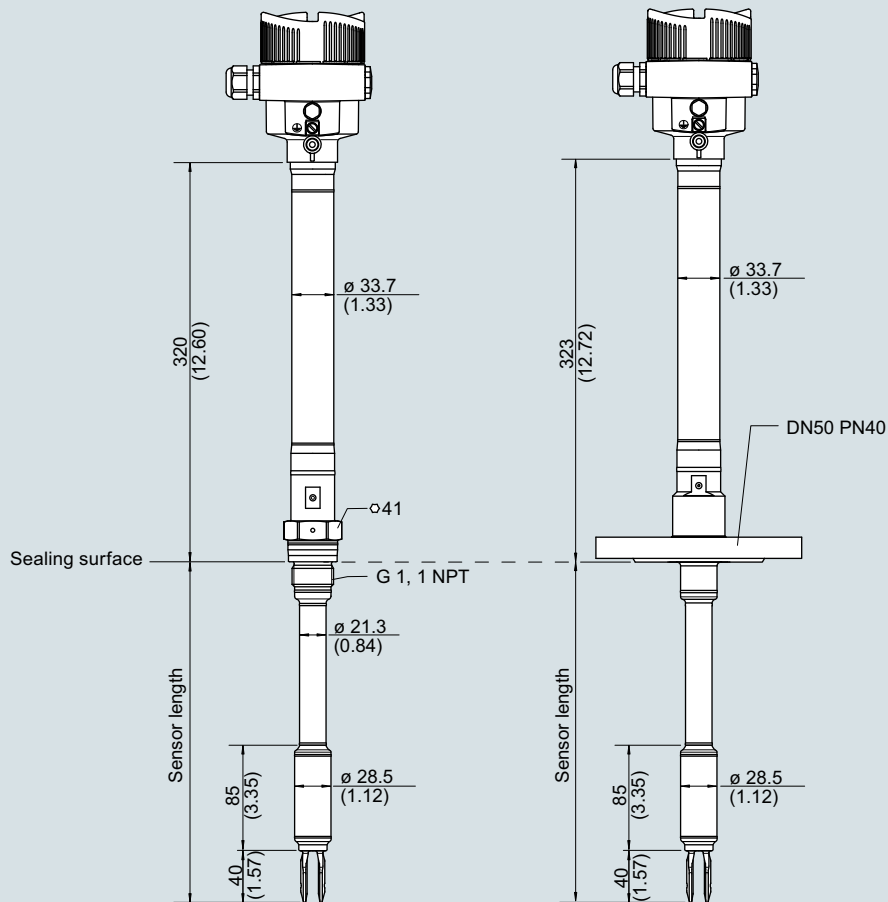


SITRANS LVL200 high temperature (compact version), dimensions in mm (inch)

Level Measurement

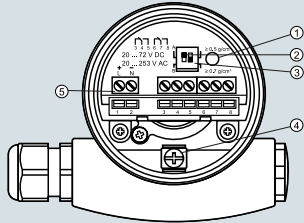
Point level measurement

Vibrating switches

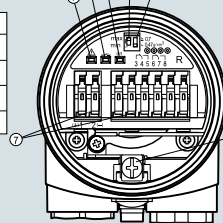
SITRANS LVL200**SITRANS LVL200 high temperature, tube version**

SITRANS LVL200 high temperature (tube version), dimensions in mm (inch)

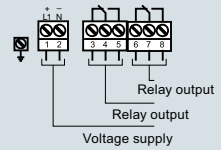
Circuit diagrams

SITRANS LVL200S, LVL200E
Relay (DPDT)

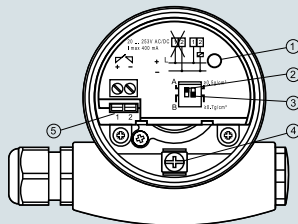
- | | |
|---|---|
| ① | Control lamp |
| ② | DIL switch for characteristics reversal |
| ③ | DIL switch for sensitivity adjustment |
| ④ | Ground terminal |
| ⑤ | Connection terminals |

SITRANS LVL200H
Relay (DPDT)

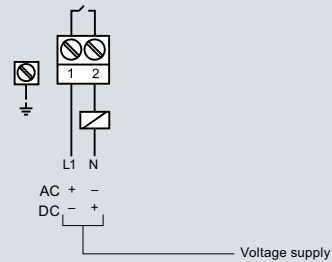
- | | |
|---|---|
| ① | Control lamp - fault indication (red) |
| ② | Control lamp - Switching status (yellow) |
| ③ | Control lamp - Operating status (green) |
| ④ | Mode switch for selecting the switching behaviour (min./max.) |
| ⑤ | DIL switch for sensitivity adjustment |
| ⑥ | Ground terminal |
| ⑦ | Connection terminals |



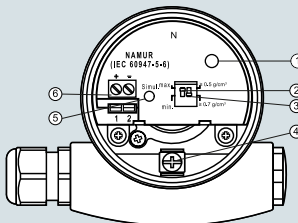
Contactless



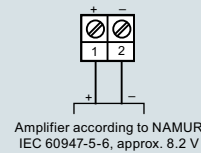
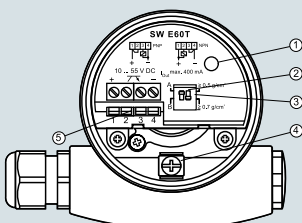
- | | |
|---|---|
| ① | Control lamp |
| ② | DIL switch for mode adjustment |
| ③ | DIL switch for switching point adaptation |
| ④ | Ground terminal |
| ⑤ | Connection terminals |



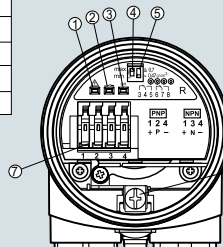
NAMUR



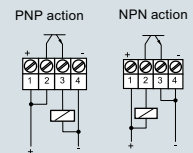
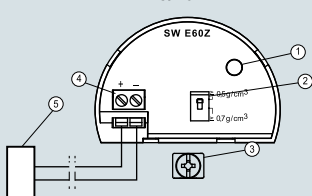
- | | |
|---|---|
| ① | Control lamp |
| ② | DIL switch for characteristics reversal |
| ③ | DIL switch for sensitivity adjustment |
| ④ | Ground terminal |
| ⑤ | Simulation key |
| ⑥ | Connection terminals |

SITRANS LVL200S, LVL200E
Transistor (NPN/PNP)

- | | |
|---|--------------------------------|
| ① | Control lamp |
| ② | DIL switch for mode adjustment |
| ③ | DIL switch for switching point |
| ④ | Ground terminal |
| ⑤ | Connection terminals |

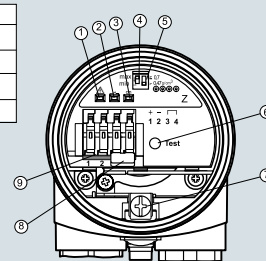
SITRANS LVL200H,
Transistor (NPN/PNP)

- | | |
|---|---|
| ① | Control lamp - fault indication (red) |
| ② | Control lamp - Switching status (yellow) |
| ③ | Control lamp - Operating status (green) |
| ④ | Mode switch for selecting the switching behaviour (min./max.) |
| ⑤ | DIL switch for sensitivity adjustment |
| ⑥ | Ground terminal |
| ⑦ | Connection terminals |

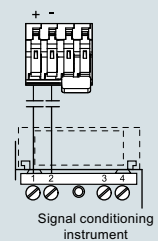
SITRANS LVL200S, LVL200E
8/16 mA

- | | |
|---|---------------------------------------|
| ① | Control lamp |
| ② | DIL switch for sensitivity adjustment |
| ③ | Ground terminal |
| ④ | Connection terminals |
| ⑤ | Processing system or PLC |

SITRANS LVL200H 8/16 mA



- | | |
|---|--|
| ① | Control lamp - fault indication (red) |
| ② | Control lamp - switching status (yellow) |
| ③ | Control lamp - operating status (green) |
| ④ | Mode switch for selecting the switching behavior (min./max.) |
| ⑤ | DIL switch for sensitivity behavior (min./max.) |
| ⑥ | Test key |
| ⑦ | Ground terminal |
| ⑧ | Connector block |
| ⑨ | Connection terminals |



SITRANS LVL200 connections

Level Measurement

Point level measurement

Vibrating switches

SITRANS LVS100

Overview



SITRANS LVS100 is a vibrating point level switch for material detection in bulk solids.

Benefits

- High resistance to mechanical forces
- Sliding sleeve options for adjustable insertion length and ease of cleaning
- Rotatable enclosure for ease of installation and wiring
- Suitable for point level detection of materials starting at a bulk density of 30 g/l (1.9 lb/ft³)
- Customer desired extensions up to 4 000 mm (157.48 inch)

Application

SITRANS LVS100 detects high, low or demand levels of dry bulk solids in bins, silos or hoppers.

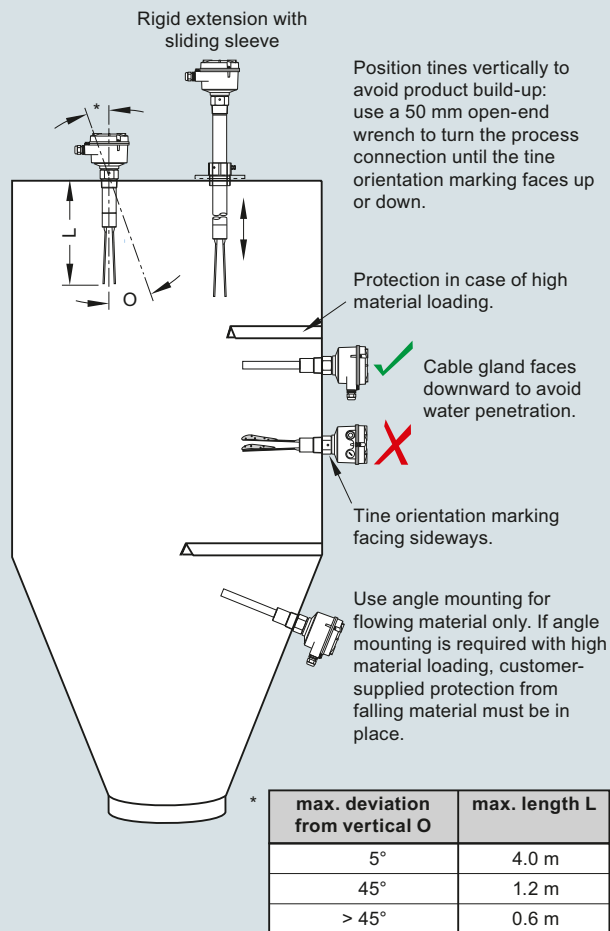
SITRANS LVS100 has a compact design and can be top, side, or angle mounted. The vibrating fork design ensures the tines are kept clean. The unique design of the fork and crystal assembly eliminates false high level readings even if tines become damaged.

A signal from the electronic circuit excites a crystal in the probe causing the fork to vibrate. If the fork is covered by material, the change in vibration is detected by the electronic circuitry which causes the relay to change state after a one second delay. When the fork is free from material pressure, full vibration resumes and the relay reverts to its normal condition.

- Key Applications: dry bulk solids in bins, silos, hoppers

Configuration

Installation



SITRANS LVS100 installation, dimensions in mm (inch)

Technical specifications

Mode of Operation		Design	
Measuring principle	Vibrating point level switch	Material	Epoxy coated aluminum
Input		• Enclosure	
Measured variable	High, low and demand	Process connection	<ul style="list-style-type: none"> • Thread 1¼" NPT [(Taper), ANSI/ASME B1.20.1], R 1½" [(BSPT), EN 10226] • Thread R 1½" [(BSPT), EN 10226], ½" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)] • Thread material: stainless steel 304 (1.4301) or 316L (1.4404) depending on configuration
Measuring frequency	200 Hz		
Output		Tine material	Stainless steel 316L (1.4404)
Relays	DPDT relay	Degree of protection	IP66/Type 4/NEMA 4
Relay delay	From loss of vibration: approximately 1 second From resumption of vibration: approximately 1 ... 2 s	Conduit entry	2 x M20 x 1.5 or 2 x ½" NPT
Signal delay	Probe uncovered to covered: approximately 1 s Probe covered to uncovered: approximately 1 ... 2 s	Weight	Standard version, no extensions: approx. 1.7 kg (3.7 lb)
Relay fail-safe	High or low, switch selectable	Power supply	
Alarm output	Relay 8 A at 250 V AC, non-inductive Relay 5 A at 30 V DC, non-inductive	<ul style="list-style-type: none"> • 19 ... 230 V AC, +10 %, 50 ... 60 Hz, 8 VA • 19 ... 40 V DC, +10 %, 1.5 W 	
Sensitivity		Certificates and approvals	
Rated operating conditions		<ul style="list-style-type: none"> • CSA/FM General Purpose • CE • CSA/FM Dust Ignition Proof • RCM • ATEX II 1/2 D • IECex 	
Installation conditions			
• Location	Indoor/outdoor		
Ambient conditions			
• Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)		
• Installation category	III		
• Pollution degree	2		
Medium conditions			
• Process temperature	-40 ... +150 °C (-40 ... +302 °F)		
• Max. threaded bushing temperature	80 °C (176 °F)		
• Max. enclosure surface temperature (Category 2D)	90 °C (194 °F)		
• Max. extension surface temperature (Category 1D)	150 °C (302 °F)		
• Pressure (vessel)	Max. 10 bar g (145 psi g) European Pressure Directive 2014/68/ EU: Category 1		
Minimum material density	Approx. 30 g/l (1.9 lb/ft³)		

Level Measurement

Point level measurement

Vibrating switches

SITRANS LVS100

Selection and Ordering data

SITRANS LVS100, standard

Vibrating point level switch for high or low level detection of bulk solids. Sensitivity > 30 g/l.

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Input Voltage

DPDT Relay: 19 ... 230 V AC, 19 ... 40 V DC

DPDT Relay: 19 ... 230 V AC, 19 ... 40 V DC (stocked version)¹⁾³⁾

Process temperature

Up to 150 °C (302 °F)

Process connection

Threaded

R 1½" [(BSPT), EN 10226]

1¼" NPT [(Taper), ANSI/ASME B1.20.1]

R 1½" [(BSPT), EN 10226] DIN 2999 thread, sliding sleeve [min. length 500 mm (19.69 inch)]²⁾

1½" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)]²⁾

Extension length

Stainless steel 316L (1.4404)

Standard length, 170 mm (6.69 inch)

Add Order code Y01 and plain text:

"Insertion length ... mm"

Stainless steel 304 (1.4301)

• 230 ... 500 mm (9.05 ... 19.69 inch)

• 501 ... 1 000 mm (19.72 ... 39.37 inch)

• 1 001 ... 1 500 mm (39.41 ... 59.06 inch)

• 1 501 ... 2 000 mm (59.09 ... 78.74 inch)

• 2 001 ... 2 500 mm (78.78 ... 98.43 inch)

• 2 501 ... 3 000 mm (98.46 ... 118.11 inch)

• 3 001 ... 3 500 mm (118.15 ... 137.80 inch)

• 3 501 ... 4 000 mm (137.83 ... 157.48 inch)

Approvals

CSA/FM General Purpose, CE, RCM

CSA/FM Class II, Div. 1, Group E, F, G, Class III,

ATEX II 1/2 D, RCM

IEC-Ex Ex t IIIC T-- Da/Db IP6X

EAC Ex ta/tb IIIC Da/Db

Article No.

7ML5735-

0 A 0

1

2

A

A

B

C

D

11

12

13

14

15

16

17

18

20

Selection and Ordering data

Further Designs

Please add "-Z" to Art. No. and specify Order code(s).

Total insertion length: Enter the total insertion length in plain text description, max. (50 mm increments)

Signal bulb inserted in M20 cable gland¹⁾

Operating Instructions

Multi-language

Note: the Operating Instructions should be ordered as a separate line on the order.

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Spare Parts

Replacement Electronics Module LVS100 DPDT Relay (19 ... 253 V AC, 19 ... 55 V DC)

R 1½" [(BSPT), EN 10226] DIN 2999 thread, sliding sleeve

1½" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)]

¹⁾ Available only with Approval option A

Order code

Y01

A20

Article No.

7ML19985FT63

7ML1830-1NS

7ML1830-1NT

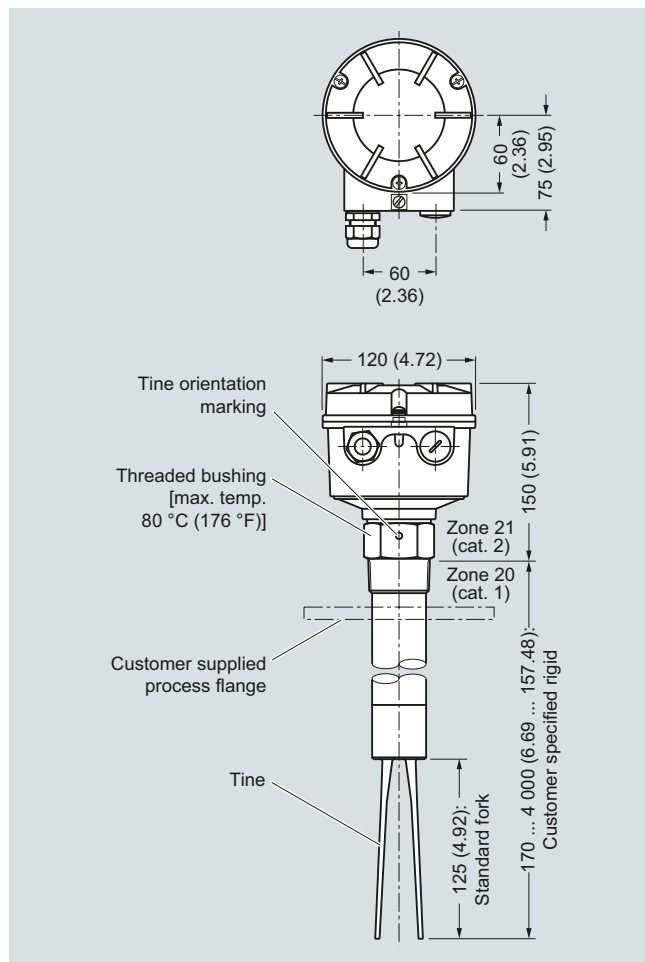
7ML1830-1NU

¹⁾ Only available with the following configurations 7ML5735-2AA11-0AA0 or 7ML5735-2AB11-0AA0

²⁾ Not available with extension length options 11, 12

³⁾ Input voltage 2 not allowed with extension length 16, 17, 18 or 20

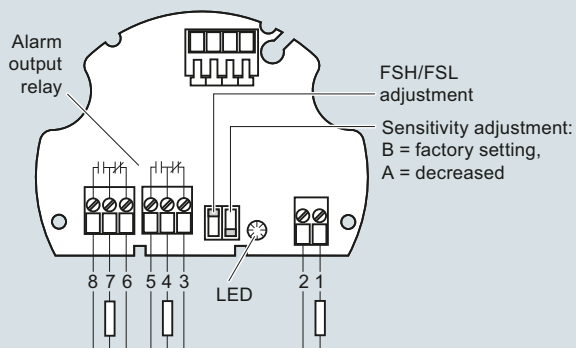
Dimensional drawings



SITRANS LVS100, dimensions in mm (inch)

Circuit diagrams

Universal voltage (DPDT relay)



AC: Terminal 1: L
Terminal 2: N
19 ... 230 V AC, +10 %, 50 ... 60 Hz, 8 VA

DC: Terminal 1: +
Terminal 2: -
19 ... 50 V DC, +10 %, 2 W

SITRANS LVS100 connections

Level Measurement

Point level measurement

Vibrating switches

SITRANS LVS200

Overview



SITRANS LVS200 is a vibrating point level switch for high, low, or demand level detection of bulk solids.

Benefits

- High resistance to mechanical forces
- Strong vibration resistance to high bulk material loads
- Rotatable enclosure for convenient wiring
- Suitable for low density material: standard version, 20 g/l (1.3 lb/ft³); liquid/solid interface version, 50 g/l (3 lb/ft³) and low density option min. 5 g/l (0.3 lb/ft³)
- Customer desired extensions up to 20 000 mm (787 inch)
- Optional detection of solids within liquid
- Durable short fork option with 165 mm (6.5 inch) insertion length

Application

The standard LVS200 detects high, low, or demand levels of dry bulk solids in bins, silos, or hoppers. The liquid/solid interface version can also detect settled solids within liquids or solids within confined spaces such as feed pipes. It is designed to ignore liquids in order to detect the interface between a solid and a liquid.

A pipe extension version is available with either the standard or liquid/solid interface electronics and fork, separated by a customer supplied 1 inch pipe.

SITRANS LVS200 has an optional 4 to 20 mA output for monitoring buildup on the fork to determine when preventative maintenance should be performed in sticky applications.

The LVS200 has a compact design and can be top, side or angle mounted. The vibrating fork design ensures the tines are kept clean. The unique design of the fork and crystal assembly eliminates false high level readings even if tines become damaged.

A signal from the electronic circuit excites a crystal in the probe causing the fork to vibrate. If the fork is covered by material, the change in vibration is detected by the electronic circuitry which causes the relay to change state after a one second delay. When the fork is free from material pressure, full vibration resumes and the relay reverts to its normal condition.

- Key Applications: dry bulk solids in bins, silos, hoppers or settled solids within liquids (interface version)

Technical specifications

Mode of operation		Rated operating conditions	
Measuring principle	Vibrating point level switch	Installation conditions	Indoor/outdoor
Input		• Location	
Measured variable	High, low, and demand	Ambient conditions	
Measuring frequency		• Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)
• Standard	125 Hz	• Installation category	III
• Liquid/solid interface and short fork version	350 Hz	• Pollution degree	2
Output		Medium conditions	
PNP	Open collector: Permanent load max. 0.4 A, short-circuit and overload protected Turn-on voltage: max. 50 V (reverse protection)	• Process temperature	<ul style="list-style-type: none"> • All except CSA Class II, Group G: -40 ... +150 °C (-40 ... +302 °F) • CSA Class II, Group G: -40 ... +140 °C (-40 ... +284 °F), CSA temperature code T3B
2-wire without contact	Load current: <ul style="list-style-type: none"> • Min. 10 mA • Max. 500 mA permanent • Max. 2A < 200 ms • Max. 5A < 50 ms Voltage drop on the electronic module: max. 7 V with closed electric circuit Cut-off current with open electric circuit: max. 5 mA	<ul style="list-style-type: none"> • Max. threaded bushing temperature • Max. enclosure surface temperature (Category 2D) • Max. extension surface temperature (Category 1D) • Pressure (vessel) 	80 °C (176 °F) 90 °C (194 °F) 150 °C (302 °F) Max. 10 bar g (145 psi g) European Pressure Directive 2014/68/EU: Category 1
Relays		• Minimum material density	• Standard version: approx. 20 g/l (1.2 lb/ft³) • Liquid/solid interface version: approx. 50 g/l (3 lb/ft³) • Optional low density version: approx. 5 g/l (0.3 lb/ft³)
• Version with 1 relay	SPDT relay	Design	
• Version with 2 relays	DPDT relay	Material	
Relay delay	<ul style="list-style-type: none"> • From loss of vibration: approximately 1 second • From resumption of vibration: approximately 1 ... 2 seconds 	• Enclosure	Epoxy coated aluminum
Signal delay	<ul style="list-style-type: none"> • Probe uncovered to covered: approximately 1 second • Probe covered to uncovered: approximately 1 ... 2 seconds 	Process connection	<ul style="list-style-type: none"> • Thread 1½" NPT [(Taper), ANSI/ASME B1.20.1], R ½" [(BSPT), EN 10226], and flange options • Optional sliding bushing with 2" NPT [(Taper), ANSI/ASME B1.20.1] or BSP thread • Thread material: stainless steel 303 (1.4301)
Relay fail-safe	High or low, switch selectable	Tine material	Stainless steel 316L (1.4404), PTFE-coated tines are available upon special request
Alarm output	<ul style="list-style-type: none"> • Relay 8 A at 250 V AC, non-inductive • Relay 5 A at 30 V DC, non-inductive 	Degree of protection	IP65/Type 4/NEMA 4
mA output	8/16 mA or 4 ... 20 mA	Conduit entry	2 x M20 x 1.5 or 2 x ½" NPT
• Resolution	4 ... 20 mA ± 0.1 mA	Weight	<ul style="list-style-type: none"> • Standard version, no extensions: approx. 2.0 kg (4.4 lb) • Solids/liquids version, no extensions: approx. 1.9 kg (4.2 lb)
Sensitivity	High or low, switch selectable	Power supply	<ul style="list-style-type: none"> • 19 ... 230 V AC, +10 %, 50 ... 60 Hz, 8 VA • 19 ... 55 V DC, +10 %, 1.5 W
		Certificates and approvals	<ul style="list-style-type: none"> • CSA/FM General Purpose • CE • CSA/FM Dust Ignition Proof • RCM • ATEX II 1/2 D • CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class I, Aex ia IIC, CSA Class I, Ex ia IIC, available only with power supply options 5 and 6 • ATEX II 1G and 1/2 G Eex ia IIC; ATEX II 1D and 1/2 D, available only with power supply option 5

Level Measurement

Point level measurement

Vibrating switches

SITRANS LVS200

Selection and Ordering data

Article No.

SITRANS LVS200, standard

SITRANS LVS200 is a vibrating point level switch for high, low, or demand level detection of bulk solids.

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Power supply

19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)¹⁾

19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT)¹⁾

18 ... 50 V DC PNP¹⁾

19 ... 230 V AC/DC without contact, 2-wire loop powered¹⁾

7 ... 9 V DC (requires NAMUR switch amplifier)

NAMUR IEC 60947-5-6, 2-wire²⁾

8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire³⁾

19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT) basic version⁴⁾

Process temperature

Without temperature isolator

With temperature isolator

Separated enclosure - cable length 1.5 m (4.92 ft)

[max. temperature process 150 °C (302 °F)/
max. temperature electronics 60 °C (140 °F)]

Separated enclosure - cable length 4.0 m (13.12 ft)

[max. temperature process 150 °C (302 °F)/
max. temperature electronics 60 °C (140 °F)]

Process connection

Threaded

R 1½" [(BSPT), EN 10226]

1½" NPT [(Taper), ANSI/ASME B1.20.1]

G 2" [(BSPP), EN ISO 228-1], sliding sleeve
[min. length 500 mm (19.69 inch)]⁶⁾

2" NPT [(Taper), ANSI/ASME B1.20.1],
sliding sleeve [min. length 500 mm (19.69 inch)]⁶⁾

Flanged

DN 100 PN 6, EN 1092-1⁷⁾

DN 100 PN 16, EN 1092-1

2" ASME 150 lb B16.5

3" ASME 150 lb B16.5

4" ASME 150 lb B16.5

2" Tri-clamp (DN 50) ISO 2852

Extension length

Stainless steel 304 (1.4301)

Standard length, 235 mm (9.25 inch)

Add Order code Y01 and plain text:

"Insertion length ... mm"

- 300 ... 500 mm (11.81 ... 19.69 inch) 12
- 501 ... 750 mm (19.72 ... 29.53 inch) 13
- 751 ... 1 000 mm (29.57 ... 39.37 inch) 14
- 1 001 ... 1 250 mm (39.41 ... 49.21 inch) 15
- 1 251 ... 1 500 mm (49.25 ... 59.06 inch) 16
- 1 501 ... 1 750 mm (59.09 ... 68.90 inch) 17
- 1 751 ... 2 000 mm (68.94 ... 78.74 inch) 18
- 2 001 ... 2 250 mm (78.78 ... 88.58 inch) 21
- 2 251 ... 2 500 mm (88.62 ... 98.43 inch) 22
- 2 501 ... 2 750 mm (98.46 ... 108.27 inch) 23
- 2 751 ... 3 000 mm (108.31 ... 118.11 inch) 24
- 3 001 ... 3 250 mm (118.15 ... 127.95 inch) 25
- 3 251 ... 3 500 mm (127.99 ... 137.80 inch) 26
- 3 501 ... 3 750 mm (137.83 ... 147.64 inch) 27
- 3 751 ... 4 000 mm (147.68 ... 157.48 inch) 28

Selection and Ordering data

Article No.

SITRANS LVS200, standard

SITRANS LVS200 is a vibrating point level switch for high, low, or demand level detection of bulk solids.

Stainless steel 316L (1.4404)

Standard length, 235 mm (9.25 inch)

Add Order code Y01 and plain text:

"Insertion length ... mm"

- 300 ... 500 mm (11.81 ... 19.69 inch) 31
- 501 ... 750 mm (19.72 ... 29.53 inch) 32
- 751 ... 1 000 mm (29.57 ... 39.37 inch) 33
- 1 001 ... 1 250 mm (39.41 ... 49.21 inch) 34
- 1 251 ... 1 500 mm (49.25 ... 59.06 inch) 35
- 1 501 ... 1 750 mm (59.09 ... 68.90 inch) 36
- 1 751 ... 2 000 mm (68.94 ... 78.74 inch) 37
- 2 001 ... 2 250 mm (78.78 ... 88.58 inch) 38
- 2 251 ... 2 500 mm (88.62 ... 98.43 inch) 41
- 2 501 ... 2 750 mm (98.46 ... 108.27 inch) 42
- 2 751 ... 3 000 mm (108.31 ... 118.11 inch) 43
- 3 001 ... 3 250 mm (118.15 ... 127.95 inch) 44
- 3 251 ... 3 500 mm (127.99 ... 137.80 inch) 45
- 3 501 ... 3 750 mm (137.83 ... 147.64 inch) 46
- 3 751 ... 4 000 mm (147.68 ... 157.48 inch) 47

Material process connection/extension

Stainless steel threads 304 (1.4301),

flanges 321 (1.4541), Tri-clamp 304 (1.4301)⁸⁾

Stainless steel 316L (1.4404)⁹⁾

Approvals

CSA/FM Dust Ignition Proof, RCM

ATEX II 1/2 D, RCM

CSA/FM General Purpose, RCM, CE

CE, RCM

CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D,

E, F, G, FM Class I, Aex ia IIC, CSA Class I,

Ex ia IIC, RCM

ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and

1/2D, RCM

IEC-Ex t IIIC Da/Db

EAC Ex ta/tb IIIC Da/Db, Ex ta IIIC Da

EAC Ex Ga/Gb Ex ia IIC, 0Ex ia IIC Ga; Ex ta/tb

IIIC Da/Db, Ex ta IIIC Da

¹⁾ Available with Approval options A ... D, G only.

²⁾ Available with Approval options D, E, F only.

³⁾ Available with Approval options B, D, G only.

⁴⁾ Available with configurations 7ML5731-7AA11-1BA0 or 7ML5731-7AB11-1AA0 only.

⁵⁾ Basic version is cost effective and offers fast delivery.

⁶⁾ Not available with extension length options 11, 12, 31, 32.

⁷⁾ Max. 6 bar (87 psi).

⁸⁾ Available with option extension length 11 ... 28.


⁹⁾ Available with option extension length 31 ... 48.

Level Measurement

Point level measurement

Vibrating switches

SITRANS LVS200

Selection and Ordering data		Order code	Selection and Ordering data		Article No.
Further Designs			SITRANS LVS200, short fork for liquids/solids interface		7ML5732-
Please add "-Z" to Article No. and specify Order code(s).			Vibrating point level switch for short insertion and liquids/solids interface applications as well as high load applications with short insertion requirements.		
Total insertion length: Enter the total insertion length in plain text description, max. 4 000 mm (157.48 inch)	Y01		Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14		Power supply		
Enhanced sensitivity > 5 g/l via electronics and increased insertion length of 25 mm (0.98 inch) ³⁾	K05		19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT) ⁶⁾	1	
Enhanced sensitivity < 5 g/l via electronics, increased insertion length of 25 mm (0.98 inch), and increased aluminum fork width ¹⁾³⁾	G01		19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT) ⁶⁾	2	
Signal bulb inserted in M20 cable gland ²⁾	A20		18 ... 50 V DC PNP ⁶⁾	3	
NAMUR 8/16 mA switch amplifiers available, contact factory for pricing			19 ... 230 V AC/DC without contact, 2-wire loop powered ⁶⁾	4	
			8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire ¹⁾	5	
Operating Instructions		Article No.	Process temperature		
Multi-language		7ML19985FT63	Without temperature isolator	A	
Note: the Operating Instructions should be ordered as a separate line on the order.			With temperature isolator	B	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation			Separated enclosure - cable length 1.5 m (4.92 ft) [max. temperature process 150 °C (302 °F)/max. temperature electronics 60 °C (140 °F)]	C	
			Separated enclosure - cable length 4.0 m (13.12 ft) [max. temperature process 150 °C (302 °F)/max. temperature electronics 60 °C (140 °F)]	D	
Spare Parts			Process connection		
Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	7ML1830-1KL		Threaded		
Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, two relay output (DPDT)]	A5E35525363		R 1½" [(BSPT), EN 10226]	A	
Sliding sleeve, 2" BSP (ISO 228)	7ML1830-1JM		1½" NPT [(Taper), ANSI/ASME B1.20.1]	B	
Sliding sleeve, 2" NPT (ASME B1.20.1)	7ML1830-1JN		G 2" [(BSPP), EN ISO 228-1], sliding sleeve [min. length 500 mm (19.69 inch)] ²⁾	C	
Namur Isolator switch amplifier relay output KFD2-SR2-Ex1.W	A5E35667901		2" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)] ²⁾	D	
SITRANS LVS200, standard, power supply 7, process temperature A, process connection B, extension length 11, material process connection/extension 1, and approval B	7ML5731-7AA11-1BA0		Flanged		
SITRANS LVS200, standard, power supply 7, process temperature A, process connection B, extension length 11, material process connection/extension 1, and approval A	7ML5731-7AB11-1AA0		DN 100 PN 6, EN 1092-1 ³⁾	E	
			DN 100 PN 16, EN 1092-1	F	
			2" ASME 150 lb B16.5	G	
			3" ASME 150 lb B16.5	H	
			4" ASME 150 lb B16.5	J	
			2" Tri-clamp (DN 50) ISO 2852	K	
			Extension length		
			Stainless steel 304 (1.4301)		
			Standard length, 165 mm (6.50 inch)	11	
			<u>Add Order code Y01 and plain text:</u>		
			<u>"Insertion length ... mm"</u>		
			200 ... 500 mm (7.87 ... 19.69 inch)	12	
			501 ... 750 mm (19.72 ... 29.53 inch)	13	
			751 ... 1 000 mm (29.57 ... 39.37 inch)	14	
			1 001 ... 1 250 mm (39.41 ... 49.21 inch)	15	
			1 251 ... 1 500 mm (49.25 ... 59.06 inch)	16	
			1 501 ... 1 750 mm (59.09 ... 68.90 inch)	17	
			1 751 ... 2 000 mm (68.94 ... 78.74 inch)	18	
			2 001 ... 2 250 mm (78.78 ... 88.58 inch)	21	
			2 251 ... 2 500 mm (88.62 ... 98.43 inch)	22	
			2 501 ... 2 750 mm (98.46 ... 108.27 inch)	23	
			2 751 ... 3 000 mm (108.31 ... 118.11 inch)	24	
			3 001 ... 3 250 mm (118.15 ... 127.95 inch)	25	
			3 251 ... 3 500 mm (127.99 ... 137.80 inch)	26	
			3 501 ... 3 750 mm (137.83 ... 147.64 inch)	27	
			3 751 ... 4 000 mm (147.68 ... 157.48 inch)	28	

¹⁾ Available only with power supply 1 and Approval C, D and with Process connection flange E ... J.

²⁾ Available with Approval option D only.


³⁾ K05 and G01 are not available together.

Level Measurement

Point level measurement

Vibrating switches

SITRANS LVS200

Selection and Ordering data	Article No.
SITRANS LVS200, short fork for liquids/solids interface	7ML5732-
Vibrating point level switch for short insertion and liquids/solids interface applications as well as high load applications with short insertion requirements.	 A 0
<u>Stainless steel 316L (1.4404)</u>	
Standard length, 165 mm (6.50 inch)	3 1
Add Order code Y01 and plain text:	
<u>"Insertion length ... mm"</u>	
200 ... 500 mm (7.87 ... 19.69 inch)	3 2
501 ... 750 mm (19.72 ... 29.53 inch)	3 3
751 ... 1 000 mm (29.57 ... 39.37 inch)	3 4
1 001 ... 1 250 mm (39.41 ... 49.21 inch)	3 5
1 251 ... 1 500 mm (49.25 ... 59.06 inch)	3 6
1 501 ... 1 750 mm (59.09 ... 68.90 inch)	3 7
1 751 ... 2 000 mm (68.94 ... 78.74 inch)	3 8
2 001 ... 2 250 mm (78.78 ... 88.58 inch)	4 1
2 251 ... 2 500 mm (88.62 ... 98.43 inch)	4 2
2 501 ... 2 750 mm (98.46 ... 108.27 inch)	4 3
2 751 ... 3 000 mm (108.31 ... 118.11 inch)	4 4
3 001 ... 3 250 mm (118.15 ... 127.95 inch)	4 5
3 251 ... 3 500 mm (127.99 ... 137.80 inch)	4 6
3 501 ... 3 750 mm (137.83 ... 147.64 inch)	4 7
3 751 ... 4 000 mm (147.68 ... 157.48 inch)	4 8
Material process connection/extension	
Stainless steel threads 304 (1.4301), flanges 321(1.4541), Tri-clamp 304 (1.4301) ⁴⁾	1
Stainless steel 316L (1.4404) ⁵⁾	2
Approvals	
CSA/FM Dust Ignition Proof, RCM	A
ATEX II 1/2 D, RCM	B
CSA/FM General Purpose, RCM, CE	C
CE, RCM	D
IEC-Ex t IIIC Da/Db	E
ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and 1/2D, CE, RCM	F
EAC Ex ta/tb IIIC Da/Db, Ex ta IIIC Da	G
EAC Ex Ga/Gb Ex ia IIC, 0Ex ia IIC Ga; Ex ta/tb IIIC Da/Db, Ex ta IIIC Da	H

¹⁾ Available with Approval options B, D, E only.

²⁾ Not available with extension length options 11,12, 31, 32.

³⁾ Max. 6 bar (87 psi).

⁴⁾ Available with option extension length 11 ... 28.

⁵⁾ Available with option extension length 31 ... 48.

⁶⁾ Power supply options 1, 2, 3, 4 not allowed with Approvals options F and H.

Selection and Ordering data	Order code
Further Designs	
Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 4 000 mm (147.48 inch)	Y01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Signal bulb inserted in M20 cable gland ¹⁾³⁾	A20
Note: G02 must be ordered for solids/liquids interface detection.	
Adjustable sensitivity (by potentiometer) for solids/liquids interface detection ¹⁾²⁾⁴⁾	G02
Operating Instructions	Article No.
Multi-language	7ML19985FT63
Note: the Operating Instructions should be ordered as a separate line on the order.	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	
Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, two relay output (DPDT)]	A5E35525363
Replacement Electronics Module (350 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	7ML1830-1KM
Sliding sleeve, 2" BSP (ISO 228)	7ML1830-1JM
Sliding sleeve, 2" NPT (ASME B1.20.1)	7ML1830-1JN

¹⁾ Available with Approval option D only.

²⁾ Available with power supply option 1 only.

³⁾ A20 not allowed with power supply options 4 or 5.

⁴⁾ G02 not allowed with process temperature options C or D.

Selection and Ordering data	Article No.	Selection and Ordering data	Order code
SITRANS LVS200, pipe extension Vibrating point level switch for high or low levels of bulk solids Extended using 1" pipe extension (customer supplied) ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5733- A 0	Further Designs Please add "-Z" to Article No. and specify Order code(s). Total insertion length: Enter the total insertion length in plain text description, max. 3 800 mm (149.61 inch) Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text Enhanced sensitivity > 5 g/l via electronics and increased insertion length of 25 mm (0.98 inch) ⁵⁾ Enhanced sensitivity < 5 g/l via electronics, increased insertion length of 25 mm (0.98 inch) and increased aluminum fork width ¹⁾⁴⁾⁵⁾ Adjustable sensitivity (by potentiometer) for solids/liquids interface detection ²⁾³⁾⁴⁾ Signal bulb inserted in M20 cable gland ²⁾⁶⁾	Y01 Y14 K05 G01 G02 A20
Power supply 19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT) ¹⁾ 19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT) ¹⁾ 18 ... 50 V DC PNP ¹⁾ 19 ... 230 V AC/DC without contact, 2-wire loop powered ¹⁾ 7 ... 9 V DC (requires NAMUR switch amplifier) NAMUR IEC 60947-5-6, 2-wire ²⁾ 8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire ³⁾	1 2 3 4 5 6	Operating Instructions Multi-language Note: the Operating Instructions should be ordered as a separate line on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	Article No. 7ML19985FT63
Process temperature Up to 150 °C (302 °F)	A	Spare Parts Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)] Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, two relay output (DPDT)] Replacement Electronics Module (350 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)] NAMUR Isolated switch amplifier Relay output KFD2-SR2-Ex1.W	7ML1830-1KL A5E35525363 7ML1830-1KM A5E35667901
Process connection <u>Threaded</u> R 1½" [(BSPT), EN 10226] 1½" NPT [(Taper), ANSI/ASME B1.20.1] <u>Flanged</u> DN 100 PN 6, EN 1092-1 ⁴⁾ DN 100 PN 16, EN 1092-1 2" ASME 150 lb B16.5 3" ASME 150 lb B16.5 4" ASME 150 lb B16.5 2" Tri-clamp (DN 50) ISO 2852	A B C D E F G K		
Process connection material Stainless steel threads 304 (1.4301), flanges 321 (1.4541), Tri-clamp 304 (1.4301) Stainless steel 316L (1.4404)	1 2		
Extension length Customer supplied 1" pipe extension Length: 300 ... 3 800 mm (11.81 ... 149.61 inch)	1		
Application type Dry bulk solids (125 Hz) Liquids/solids interface (350 Hz)	1 2		
Approvals CSA/FM Dust Ignition Proof, RCM ATEX II 1/2 D, RCM CSA/FM General Purpose, RCM, CE CE, RCM CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class I, Aex ia IIC, CSA Class I, Ex ia IIC, RCM ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and 1/2D, RCM IEC-Ex t IIIC Da/Db EAC Ex ta/tb IIIC Da/Db, Ex ta IIIC Da EAC Ex Ga/Gb Ex ia IIC, 0Ex ia IIC Ga; Ex ta/tb IIIC Da/Db, Ex ta IIIC Da	A B C D E F G H J		

¹⁾ Available with Approval options A, B, C, D, G only.

²⁾ Available with Approval options D, F, J and application type 1 only.

³⁾ Available with Approval options B, D, G only.

⁴⁾ Max. 6 bar (87 psi).

¹⁾ Available only with power supply 1 and Approvals C, D, and with Process connection flange C ... G.

²⁾ Available with Approval options D only.

³⁾ Available with Power supply option 1 only and application type 2.

⁴⁾ Not available with option K05.

⁵⁾ Available with Application type 1 only.


⁶⁾ A20 not allowed with Power supply options 4, 5, and 6.


Level Measurement

Point level measurement

Vibrating switches

SITRANS LVS200

Selection and Ordering data	Article No.
SITRANS LVS200, cable extended Vibrating point level switch for high or low level detection of bulk solids materials	7ML5734-  A 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Power supply	
19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT) ¹⁾	1
19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT) ¹⁾	2
18 ... 50 V DC PNP ¹⁾	3
19 ... 230 V AC/DC without contact, 2-wire loop powered ¹⁾	4
7 ... 9 V DC (requires NAMUR switch amplifier) NAMUR IEC 60947-5-6, 2-wire ²⁾⁵⁾	5
8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire ³⁾	6
Process temperature	A
Up to 80 °C (176 °F)	
Process connection	
Threaded	
R 1½" [(BSPT), EN 10226] (1.4301/304)	A
1½" NPT [(Taper), ANSI/ASME B1.20.1] (1.4301/304)	B
Flanged	
DN 100 PN 6, EN 1092-1 (1.4541/321) ⁴⁾	C
DN 100 PN 16, EN 1092-1 (1.4541/321)	D
2" ASME 150 lb B16.5 (1.4541/321)	E
3" ASME 150 lb B16.5 (1.4541/321)	F
4" ASME 150 lb B16.5 (1.4541/321)	G
Extension length	
750 ... 1 000 mm (29.5 ... 39.4 inch) [max. length 20 000 mm (787.4 inch), not with Power supply option 5 (max. 10 000 mm, 393.7 inch)] ⁶⁾	1 0
Add Order code Y01 and plain text: "Insertion length ... mm"	
1 001 ... 2 000 mm (39.41 ... 78.74 inch)	1 1
2 001 ... 3 000 mm (78.78 ... 118.11 inch)	1 2
3 001 ... 4 000 mm (118.15 ... 157.48 inch)	1 3
4 001 ... 5 000 mm (157.52 ... 196.85 inch)	1 4
5 001 ... 6 000 mm (196.89 ... 236.22 inch)	1 5
6 001 ... 7 000 mm (236.26 ... 275.59 inch)	1 6
7 001 ... 8 000 mm (275.63 ... 314.96 inch) ⁵⁾	1 7
8 001 ... 9 000 mm (315 ... 354.33 inch) ⁵⁾	1 8
9 001 ... 10 000 mm (354.37 ... 393.70 inch) ⁵⁾	2 0
10 001 ... 11 000 mm (393.74 ... 433.07 inch) ⁵⁾⁶⁾	2 1
11 001 ... 12 000 mm (433.11 ... 472.44 inch) ⁵⁾⁶⁾	2 2
12 001 ... 13 000 mm (472.48 ... 511.81 inch) ⁵⁾⁶⁾	2 3
13 001 ... 14 000 mm (511.85 ... 551.18 inch) ⁵⁾⁶⁾	2 4
14 001 ... 15 000 mm (551.22 ... 590.55 inch) ⁵⁾⁶⁾	2 5
15 001 ... 16 000 mm (590.59 ... 629.92 inch) ⁵⁾⁶⁾	2 6
16 001 ... 17 000 mm (629.96 ... 669.29 inch) ⁵⁾⁶⁾	2 7
17 001 ... 18 000 mm (669.33 ... 708.66 inch) ⁵⁾⁶⁾	2 8
18 001 ... 19 000 mm (708.70 ... 748.03 inch) ⁵⁾⁶⁾	3 0
19 001 ... 20 000 mm (748.07 ... 787.40 inch) ⁵⁾⁶⁾	3 1
Application type	
Dry bulk solids (125 Hz)	1
Heavier materials and robust applications (350 Hz) ⁷⁾	2

Selection and Ordering data	Article No.
SITRANS LVS200, cable extended Vibrating point level switch for high or low level detection of bulk solids materials	7ML5734-  A 0
Approvals	
CSA/FM Dust Ignition Proof, RCM	A
ATEX II 1/2 D, RCM	B
CSA/FM General Purpose, RCM, CE	C
CE, RCM	D
CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class I, Aex ia IIC, CSA Class I, Ex ia IIC, RCM	E
ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and 1/2D, RCM ⁶⁾	F
IEC-Ex t IIIC Da/Db	G
EAC Ex ta/tb IIIC Da/Db, Ex ta IIIC Da	H
EAC Ex Ga/Gb Ex ia IIC, 0Ex ia IIC Ga; Ex ta/tb IIIC Da/Db, Ex ta IIIC Da	J
1) Available with Approval options A, B, C, D, G only.	
2) Available with Approval options D, E, and F only. Not available for application type 2 "Liquids/solids interface".	
3) Available with Approval option D only.	
4) Max. 6 bar (87 psi).	
5) Not available with Application type option 2.	
6) Not available with Power supply option 5.	
7) Cable length is limited to 7 000 mm (275.59 inch).	
8) Available with Power supply options 1 ... 4, and 6.	

Selection and Ordering data	Order code
Further Designs	
Please add "-Z" to Article No. and specify Order code(s).	
Enter the total insertion length in plain text description, max. 20 000 mm (787.40 inch)	Y01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Enhanced sensitivity > 5 g/l via electronics and increased insertion length of 25 mm (0.98 inch) ⁵⁾	K05
Enhanced sensitivity < 5 g/l via electronics and increased insertion length of 25 mm (0.98 inch) and increased aluminum fork width ¹⁾⁴⁾	G01
Adjustable sensitivity (by potentiometer) for solids/liquids interface detection ²⁾³⁾⁴⁾	G02
Signal bulb inserted in M20 cable gland ²⁾⁶⁾	A20
Operating Instructions	
Multi-language	Article No. 7ML19985FT63
Note: the Operating Instructions should be ordered as a separate line on the order.	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	
Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	7ML1830-1KL
Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, two relay output (DPDT)]	A5E35525363
Replacement Electronics Module (350 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	7ML1830-1KM
NAMUR Isolated switch amplifier Relay output KFD2-SR2-Ex1.W	A5E35667901

¹⁾ Available only with power supply 1 and Approvals C, D, and with process connection flange C ... G.

²⁾ Available with Approval options D only.

³⁾ Available with Power supply option 1 and application type 2 only.

⁴⁾ Not available with option K05.

⁵⁾ Available with Application type 1 only.

⁶⁾ A20 not allowed with Power supply 4, 5, or 6.

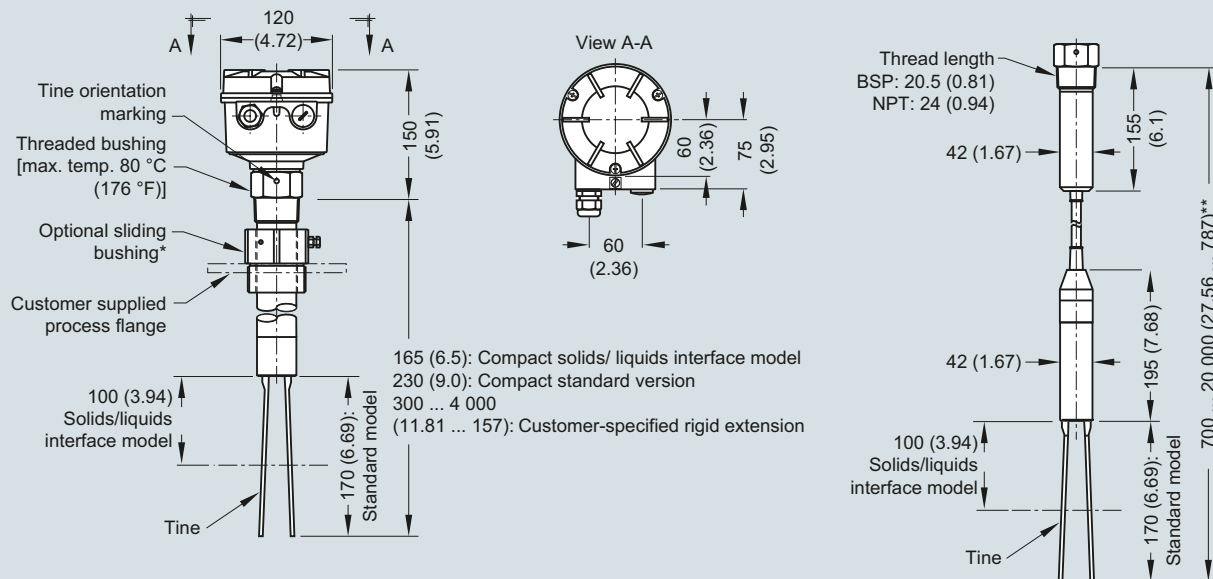
Level Measurement

Point level measurement

Vibrating switches

SITRANS LVS200

Dimensional drawings

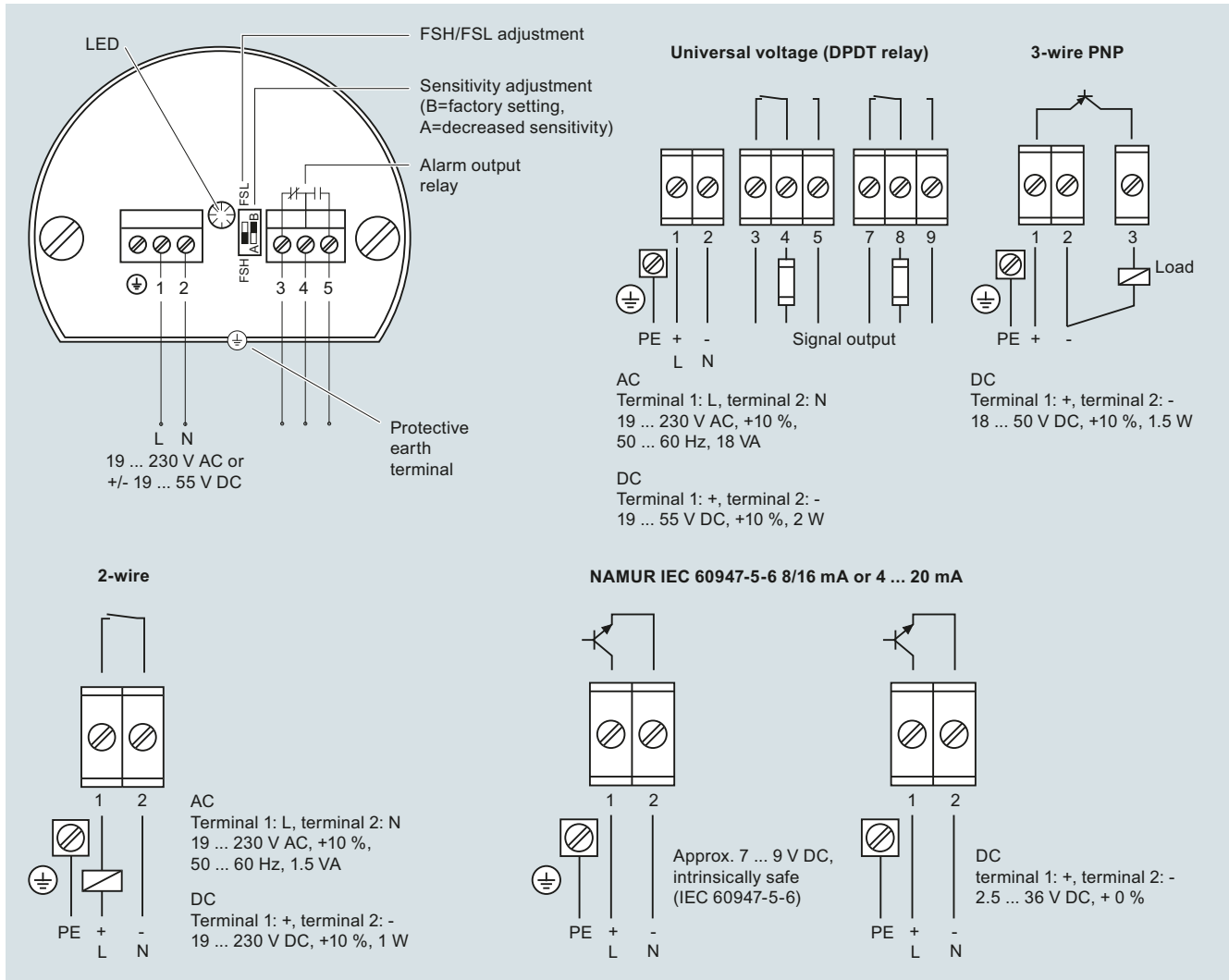


Notes:

- * The clamping screws of the sliding bushing must be tightened to 10 Nm.
- ** Cable version with liquids/solids interface model option length to 7 000 mm (275.59 inch)
- Cable version with NAMUR electronics length to 10 000 mm (393.7 inch) tightened to 10 Nm.
- See manual for pipe extended version details. (Pipe is customer supplied.)

SITRANS LVS200, dimensions in mm (inch)

Circuit diagrams



SITRANS LVS200 connections

Level Measurement

Point level measurement

Rotation paddle switches

SITRANS LPS200

Overview



SITRANS LPS200 is a rotary paddle switch for point level and material detection in bulk solids.

Benefits

- Proven paddle switch technology for bulk solids
- High integrity mechanical seal
- Universal power supply options available
- Unique friction clutch mechanism prevents damage from falling material
- Rotatable enclosure for convenient wiring
- Optional paddles for use with low density materials
- Small paddle makes for simple installation through existing process connection
- High temperature model and optional extension kit available
- Optional fail-safe configuration detects loss of rotation
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511

Application

The paddle switch technology detects full, empty, or demand conditions on materials such as grain, feed, cement, plastic granulate, and wood chips. The paddle switch can handle bulk densities as low as 15.06 g/l (0.94 lb/ft³) with the optional rectangular vane or 100 g/l (6.25 lb/ft³) with the standard measuring vane.

A low revolution geared motor with slip clutch drives a rotating measuring vane which senses the presence of material at the mounted level of the LPS200. As material comes into contact with the rotating paddle, rotation stops, which changes the microswitch state. When the paddle is no longer covered by material, rotation resumes and the relay reverts to its normal condition.

The LPS200 has a rugged design for use in harsh conditions in the solids industry. The sensitivity of the paddle can be adjusted for varying material properties like buildup on the vane.

The LPS200 comes in a variety of configurations including compact, extended and cable extension. It is equipped with a standard vane which is effective in most applications, but can be configured with a hinged or rectangular vane for increased sensitivity for light materials.

- Key Applications: bulk solids such as grain, feed, cement, plastic granulate, wood chips

Technical specifications

Mode of operation	
Measuring principle	Rotating point level switch
Input	
Measured variable	High and low and demand
Output	
Output signal	Microswitch 5 A at 250 V AC, non-inductive Microswitch SPDT contact 4 A at 30 V DC, non-inductive Standard (1 rpm model): approx. 1.3 seconds Optional process applications (5 rpm model): approx. 0.26 seconds
• Alarm output	
• Pickup delay	
Sensitivity	
Adjustable via reset force of spring or geometry of measuring vane	
Rated operating conditions	
Installation conditions	Indoor/outdoor
• Location	
Ambient conditions	
• Ambient temperature	-25 ... +60 °C (-13 ... +140 °F)
• Installation category	III
• Pollution degree	2
Medium conditions	Bulk solids
• Temperature	-25 ... +80 °C (-13 ... +176 °F) -25 ... +600 °C (-13 ... +1 112 °F) Higher temperature version is available. Consult a local sales person for details. For more information, please visit http://www.usa.siemens.com/level .
- Standard	
- Optional	
• Pressure (vessel)	Max. 0.5 bar g (7.25 psi g) Max. 10 bar g (145 psi g)
- Standard	
- Optional	
• Minimum material density	Can detect down to 100 g/l (6.25 lb/ft³)
- Standard measuring vane	
- Optional measuring vane	Can detect down to 15.06 g/l (0.94 lb/ft³)
Design	
Material	Epoxy coated aluminum Stainless steel or aluminum
• Enclosure	
• Process connection, measuring shaft and vane	
Process connection	Thread NPT, BSP, and flange options
Degree of protection	IP65/Type 4/NEMA 4
Conduit entry	2 x M20 x 1.5 or 2 x ½" NPT
Power supply	
AC or DC versions	115 V AC, ± 15 %, 50 ... 60 Hz, 4 VA or 230 V AC, ± 15 %, 50 Hz, 6 VA, or 48 V AC, or 24 V AC, or 24 V DC, ± 15 %, 2.5 W
Universal voltage (DPDT replay)	24 V DC ± 15 % 50 ... 60 Hz, 22 ... 230 V, ± 10 %, max. 10 VA
Certificates and approvals	
• CSA/FM General Purpose • CE • CSA/FM Dust Ignition Proof • ATEX II 1/2 D • RCM • IECex	

Level Measurement

Point level measurement

Rotation paddle switches

SITRANS LPS200

Selection and Ordering data	Article No.	Ord. code	Selection and Ordering data	Article No.	Ord. code
SITRANS LPS200, compact Rotary paddle switch for level and material detection in bulk solids. Compact design for side or top mounted applications. ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5725-		SITRANS LPS200, compact Rotary paddle switch for level and material detection in bulk solids. Compact design for side or top mounted applications.	7ML5725-	
Process temperature Up to 80 °C (176 °F) Up to 150 °C (302 °F) Up to 250 °C (482 °F) Up to 600 °C (1 112 °F) ¹⁾²⁾ Up to 80 °C (176 °F) basic version aluminum ¹⁾³⁾ Up to 80 °C (176 °F) basic version stainless steel ¹⁾⁴⁾	1 2 3 4 5 6		Process pressure Up to 0.5 bar (7.25 psi) Up to 5 bar (72.5 psi) Up to 10 bar (145 psi) Process connection material Aluminum ⁷⁾ Stainless steel, threads 303 (1.4305), flanges 321 (1.4541), Tri-clamp 304 (1.4301) Stainless steel 316L (1.4404) ⁸⁾	1 2 3 1 2 3	
Power supply 230 V AC, 1 rev/min. 230 V AC, 5 rev/min. 115 V AC, 1 rev/min. 115 V AC, 5 rev/min. 48 V AC, 1 rev/min. 24 V AC, 1 rev/min. 24 V DC, 1 rev/min. 24 V DC, 5 rev/min. 48 V AC, 5 rev/min. 24 V AC, 5 rev/min. Universal Voltage, 1 rev/min. Universal Voltage, 1 rev/min., fail-safe Universal Voltage, 5 rev/min. Universal Voltage, 5 rev/min. fail-safe	A C E G J K L N Z Z Z Z Z Z	J 1 B J 1 E J 2 A J 2 B J 2 C J 2 D	Extension length 100 mm (3.94 inch) ⁹⁾ 150 mm (5.91 inch) 200 mm (7.87 inch) 250 mm (9.84 inch) 300 mm (11.81 inch) Measuring vane Boot shaped, 35 x 106 mm (1.38 x 4.17 inch) ¹⁰⁾ Hinged vane, 65 x 200 mm (2.56 x 7.87 inch) ¹⁰⁾¹¹⁾ Boot shaped, 28 x 98 mm (1.10 x 3.86 inch) Rectangular, 50 x 150 mm (1.97 x 5.91 inch) ¹²⁾ Rectangular, 50 x 250 mm (1.97 x 9.84 inch) ¹²⁾ Rectangular, 98 x 150 mm (3.86 x 5.91 inch) ¹¹⁾¹²⁾ Rectangular, 98 x 250 mm (3.86 x 9.84 inch) ¹¹⁾¹²⁾ Rectangular, 50 x 98 mm (1.97 x 3.86 inch) ¹²⁾	1 2 3 4 5 A B C D E F G H	
Process connection Threaded G 1¼" [(BSPP), EN ISO 228-1] G 1" [(BSPP), EN ISO 228-1] G 1½" [(BSPP), EN ISO 228-1] 1" NPT [(Taper), ANSI/ASME B1.20.1] 1¼" NPT [(Taper), ANSI/ASME B1.20.1] 1½" NPT [(Taper), ANSI/ASME B1.20.1] Flanged DN 32 PN 6, EN 1092-1 ⁵⁾ DN 100 PN 6, EN 1092-1 ⁵⁾ DN 100 PN 16, EN 1092-1 2" ASME 150 lb B16.5 3" ASME 150 lb B16.5 4" ASME 150 lb B16.5 2" Tri-clamp (DN 50) ISO 2852 ⁶⁾	A B C D E F G H J K L M N		Approvals CSA/FM Dust Ignition Proof, RCM ATEX II 1/2 D, RCM CSA/FM General Purpose, RCM, CE CE, RCM IEC Ex ta/tb IIIC EAC Ex ta/tb IIIC Da/Db	A B C D E F	

Level Measurement

Point level measurement

Rotation paddle switches

SITRANS LPS200

Selection and Ordering data

Order code

Further Designs

Please add **"-Z"** to Article No. and specify Order code(s).

Heating of enclosure¹³⁾¹⁴⁾

A35

Signal bulb inserted in M20 cable gland¹³⁾

A20

Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing¹⁵⁾

K01

Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text

Y14

Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511.¹⁷⁾¹⁸⁾

C20

Operating Instructions

Article No.

Multi-language

A5E34210883

Note: The Operating Instructions should be ordered as a separate line on the order.

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Spare Parts

Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)

7ML1830-1KH

Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)

7ML1830-1KJ

Rigid extension kit

(Includes spring coupling, rigid tube extension, and required pins)

Extension: 500, 400, 300 mm (19.7, 15.8, 11.8 inch)¹⁶⁾

7ML5711-0AA

Extension: 1 000, 900, 800, 700, 600 mm (39.4, 35.4, 31.5, 27.6, 23.6 inch)¹⁶⁾

7ML5711-1AA

Extension: 1 500, 1 400, 1 300, 1 200, 1 100 mm (59.1, 55.1, 51.2, 47.2, 43.3 inch)¹⁶⁾

7ML5711-2AA

Rope extension kit, 2 m (6.56 ft)

7ML1830-1KK

Selection and Ordering data

Article No.

SITRANS LPS200, compact for up to 80 °C (176 °F), aluminum, with power supply E, process connection E, process pressure 1, process connection material 1, extension length 2, measuring vane A, and approval C

7ML5725-5EE11-2AC0

SITRANS LPS200, compact for up to 80 °C (176 °F), stainless steel, with power supply Z (J2A), process connection C, process pressure 1, process connection material 2, extension length 2, measuring vane A, and approval B

7ML5725-6ZC12-2AB0 J2A

SITRANS LPS200, compact for up to 80 °C (176 °F), stainless steel, with power supply Z (J2A), process connection E, process pressure 1, process connection material 2, extension length 2, measuring vane A, and approval A

7ML5725-6ZE12-2AA0 J2A

- 1) Available with approval options C and D only, up to 0.5 bar.
- 2) Not available with process connections A, B, D, E, and G.
- 3) Only available with the following configurations 7ML5725-5AC11-2AD0 or 7ML5725-5EE11-2AC0.
- 4) Only available with the following configurations 7ML5725-6ZC12-2AB0 J2A or 7ML5725-6ZE12-2AA0 J2A.
- 5) Available with process pressure options 1 and 2 only.
- 6) Available with process temperature option 1 only.
- 7) Available with process connection options A ... F only, process pressure option 1 and process temperature options 1 and 5 only.
- 8) Available with process connection options C, F, H ... N and Measuring vane options A and B.
- 9) Available with measuring vane options A, C, D, E, H only.
- 10) Add 16 mm (0.63 inch) to extension length.
- 11) Available with extension lengths 2, 3, 4, 5.
- 12) Available with process connection options H ... M only.
- 13) Available with approval option D only.
- 14) Available with power supply options A, C, E, G, J, K, L, N, J1B, J1D, J1E, J2A, J2C only.
- 15) Available up to 250 °C (482 °F). This option does not automatically implement a food conform design.
- 16) Pendulum shaft 500 mm/1 000 mm/1 500 mm should be selected with 150 mm standard length 2 and vane A (35 x 106) to get to the desired lengths.
- 17) Available with Power supply options J2A and J2C only.
- 18) Available with Approval options A, B, C, D, and E only. Approvals A and C with FM only.

Level Measurement

Point level measurement

Rotation paddle switches

SITRANS LPS200

Selection and Ordering data		Article No.	Ord. code	Selection and Ordering data		Article No.	Ord. code
SITRANS LPS200, shaft protected		7ML5726-		SITRANS LPS200, shaft protected		7ML5726-	
Rotary paddle switch for level and material detection in bulk solids; ideal for heavy, sticky, or high impact applications. Designed with added protection tube for enhanced shaft protection and protection against buildup on shaft (sidewall buildup).				Rotary paddle switch for level and material detection in bulk solids; ideal for heavy, sticky, or high impact applications. Designed with added protection tube for enhanced shaft protection and protection against buildup on shaft (sidewall buildup).			
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.							
Process temperature				Process pressure			
Up to 80 °C (176 °F)	1			Up to 0.5 bar (7.25 psi)	1		
Up to 150 °C (302 °F)	2			Up to 5 bar (72.5 psi)	2		
Up to 250 °C (482 °F)	3			Up to 10 bar (145 psi)	3		
Up to 600 °C (1 112 °F) ¹²⁾	4			Process connection material			
Up to 80 °C (176 °F) basic version ³⁾	5			Aluminum ⁶⁾	1		
Power supply				Stainless steel, threads 303 (1.4305), flanges 321 (1.4541), Tri-clamp 304 (1.4301) ¹⁸⁾	2		
230 V AC, 1 rev/min.	A			Stainless steel 316L (1.4404) ⁷⁾	3		
230 V AC, 5 rev/min.	C			Extension length			
115 V AC, 1 rev/min.	E			150 mm (5.91 inch) ⁸⁾	1		
115 V AC, 5 rev/min.	G			200 mm (7.87 inch)	2		
48 V AC, 1 rev/min.	J			250 mm (9.84 inch)	3		
24 V AC, 1 rev/min.	K			300 mm (11.81 inch)	4		
24 V DC, 1 rev/min.	L			Extension material (protection tube)			
24 V DC, 5 rev/min.	N			Aluminum ⁹⁾	A		
48 V AC, 5 rev/min.	Z	J 1 B		Stainless steel 303 (1.4305)	B		
24 V AC, 5 rev/min.	Z	J 1 E		Stainless steel 316L (1.4404) ¹⁰⁾	C		
Universal Voltage, 1 rev/min.	Z	J 2 A		Measuring vane			
Universal Voltage, 1 rev/min., fail-safe	Z	J 2 B		Boot shaped, 35 x 106 mm (1.38 x 4.17 inch) ¹¹⁾	A		
Universal Voltage, 5 rev/min.	Z	J 2 C		Hinged vane, 65 x 200 mm (2.56 x 7.87 inch) ¹¹⁾¹²⁾	B		
Universal Voltage, 5 rev/min., fail-safe	Z	J 2 D		Rectangular, 50 x 150 mm (1.97 x 5.91 inch) ¹³⁾	D		
Process connection				Rectangular, 50 x 250 mm (1.97 x 9.84 inch) ¹³⁾	E		
Threaded				Rectangular, 98 x 150 mm (3.86 x 5.91 inch) ¹²⁾¹³⁾	F		
G 1¼" [(BSPP), EN ISO 228-1]	A			Rectangular, 98 x 250 mm (3.86 x 9.84 inch) ¹²⁾¹³⁾	G		
G 1½" [(BSPP), EN ISO 228-1]	B			Rectangular, 50 x 98 mm (1.97 x 3.86 inch) ¹³⁾	H		
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	C			Approvals			
1½" NPT [(Taper), ANSI/ASME B1.20.1]	D			CSA/FM Dust Ignition Proof, RCM	1		
Flanged				ATEX II 1/2 D, RCM	2		
DN 32 PN 6, EN 1092-1 ⁴⁾	E			CSA/FM General Purpose, RCM, CE	3		
DN 100 PN 6, EN 1092-1 ⁴⁾	F			CE, RCM	4		
DN 100 PN 16, EN 1092-1	G			IEC Ex ta/tb IIIC	5		
2" ASME 150 lb B16.5	H			EAC Ex ta/tb IIIC Da/Db	6		
3" ASME 150 lb B16.5	J						
4" ASME 150 lb B16.5	K						
2" Tri-clamp (DN 50) ISO 2852 ⁵⁾	L						

Level Measurement

Point level measurement

Rotation paddle switches

SITRANS LPS200

Selection and Ordering data

Order code

Further Designs

Please add **"-Z"** to Article No. and specify Order code(s).

Heating of enclosure¹⁴⁾¹⁵⁾

A35

Signal bulb inserted in M20 cable gland¹⁴⁾

A20

Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing¹⁶⁾

K01

Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text

Y14

Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511.¹⁷⁾¹⁹⁾

C20

Operating Instructions

Multi-language

Article No.

Note: The Operating Instructions should be ordered as a separate line on the order.

A5E34210883

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Spare Parts

Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)

7ML1830-1KH

Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)

7ML1830-1KJ

SITRANS LPS200, extended for up to 80 °C (176 °F), power supply Z (J2A), process connection B, process pressure 1, process connection material 2, extension length 2, extension material B, measuring vane A, and approval 2

7ML5726-5ZB12-2BA2 J2A

SITRANS LPS200, extended for up to 80 °C (176 °F), power supply Z (J2A), process connection C, process pressure 1, process connection material 2, extension length 2, extension material B, measuring vane A, and approval 1

7ML5726-5ZC12-2BA1 J2A

- 3) Only available with the following configurations 7ML5726-5ZB12-2BA2 J2A or 7ML5726-5ZC12-2BA1 J2A.
- 4) Available with process pressure options 1 and 2 only.
- 5) Available with process temperature option 1 only.
- 6) Available with process connection options A ... E only, available with process pressure option 1 only, and process temperature option 1 only.
- 7) Extension and vane will also change to 316L, only for process connection options B, D, F ... L and vane A.
- 8) Available with measuring vane options A, D, E, H only.
- 9) Available with process pressure option 1 and process temperature option 1 only.
- 10) Available with process connection options B, D, F ... L and vane A.
- 11) Add 16 mm (0.63 inch) to extension length.
- 12) Available with extension length options 2 ... 4 only.
- 13) Available with process connection options F, G, H, J, K only.
- 14) Available with approval option 4 only.
- 15) Available with power supply options A, C, E, G, J, K, L, N, J1B, J1D, J1E, J2A, J2C only.
- 16) Available up to 250 °C (482 °F). This option does not automatically implement a food conform design.
- 17) Available with Power supply options J2A and J2C only.
- 18) Available with Extension material Stainless steel, threads 303 option B only.
- 19) Available with Approval options 1, 2, 3, 4, and 5 only. Approvals 1 and 3 with FM only.

¹⁾ Available with approval options 3 and 4 only and up to max 0.5 bar.

²⁾ Not available with process connection options A, C, E.

Selection and Ordering data		Article No.	Ord. code	Selection and Ordering data		Article No.	Ord. code
SITRANS LPS200, cable extension Rotary paddle switch for level and material detection in bulk solids. Cable extension for increased length in top-mounted applications		7ML5727-		SITRANS LPS200, cable extension Rotary paddle switch for level and material detection in bulk solids. Cable extension for increased length in top-mounted applications		7ML5727-	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.							
Process temperature Up to 80 °C (176 °F)		1		Process pressure Up to 0.5 bar (7.25 psi) Up to 5 bar (72.5 psi) Up to 10 bar (145 psi)		1 2 3	
Up to 150 °C (302 °F)		2		Process connection material Aluminum ⁵⁾ Stainless steel, threads 303 (1.4305), flanges 321 (1.4541)		1 2	
Up to 250 °C (482 °F)		3		Cable extension length Standard cable length, 2 000 mm (78.74 inch) Add Order code Y01 and plain text: "Insertion length ... mm"			
Up to 600 °C (1 112 °F) ¹⁾²⁾		4		500 ... 1 000 mm (19.69 ... 39.37 inch)			0
Up to 80 °C (176 °F) basic version ³⁾		5		Cable length 1 001 ... 2 000 mm (39.41 ... 78.74 inch)			1
Power supply 230 V AC, 1 rev/min.		A		Cable length 2 001 ... 3 000 mm (78.78 ... 118.11 inch)			2
230 V AC, 5 rev/min.		C		Cable length 3 001 ... 4 000 mm (118.15 ... 157.48 inch)			3
115 V AC, 1 rev/min.		E		Cable length 4 001 ... 5 000 mm (157.52 ... 196.85 inch)			4
115 V AC, 5 rev/min.		G		Cable length 5 001 ... 6 000 mm (196.89 ... 236.22 inch)			5
48 V AC, 1 rev/min.		J		Cable length 6 001 ... 7 000 mm (236.26 ... 275.59 inch)			6
24 V AC, 1 rev/min.		K		Cable length 7 001 ... 10 000 mm (275.63 ... 393.70 inch)			7
24 V DC, 1 rev/min.		L		Without extension ¹²⁾			8
24 V DC, 5 rev/min.		N					9
48 V AC, 5 rev/min.		Z	J 1 B				N 1 A
24 V AC, 5 rev/min.		Z	J 1 E				
Universal Voltage, 1 rev/min.		Z	J 2 A				
Universal Voltage, 1 rev/min., fail-safe		Z	J 2 B				
Universal Voltage, 5 rev/min.		Z	J 2 C				
Universal Voltage, 5 rev/min., fail-safe		Z	J 2 D				
Process connection Threaded G 1 1/4" [(BSPP), EN ISO 228-1] G 1 1/2" [(BSPP), EN ISO 228-1] 1 1/4" NPT [(Taper), ANSI/ASME B1.20.1] 1 1/2" NPT [(Taper), ANSI/ASME B1.20.1] Flanged DN 32 PN 6, EN 1092-1 ⁴⁾ DN 100 PN 6, EN 1092-1 ⁴⁾ DN 100 PN 16, EN 1092-1 2" ASME 150 lb B16.5 3" ASME 150 lb B16.5 4" ASME 150 lb B16.5		A B C D E F G H J K		Measuring vane Boot shaped, 35 x 106 mm (1.38 x 4.17 inch) ⁶⁾ Hinged vane, 65 x 200 mm (2.56 x 7.87 inch) ⁶⁾ Boot shaped, 28 x 98 mm (1.10 x 3.86 inch) ⁷⁾ Rectangular, 50 x 150 mm (1.97 x 5.91 inch) ⁷⁾ Rectangular, 50 x 250 mm (1.97 x 9.84 inch) ⁷⁾ Rectangular, 98 x 150 mm (3.86 x 5.91 inch) ⁷⁾ Rectangular, 50 x 98 mm (1.97 x 3.86 inch) ⁷⁾		A B C D E F G	
				Approvals CSA/FM Dust Ignition Proof, RCM ATEX II 1/2 D, RCM CSA/FM General Purpose, RCM, CE CE, RCM IEC Ex ta/tb IIIC EAC Ex ta/tb IIIC Da/Db		A B C D E F	

Level Measurement

Point level measurement

Rotation paddle switches

SITRANS LPS200

Selection and Ordering data	Order code
Further Designs	
Please add *-Z* to Article No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 10 000 mm (393.70 inch)	Y01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Reinforced cable (max. 28 kN pulling force) ⁸⁾	P01
Heating of enclosure ⁹⁾¹⁰⁾	A35
Signal bulb inserted in M20 cable gland ⁹⁾	A20
Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing ¹¹⁾	K01
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511. ¹³⁾¹⁴⁾	C20
Operating Instructions	Article No.
Multi-language	A5E34210883
Note: The Operating Instructions should be ordered as a separate line on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)	7ML1830-1KH
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)	7ML1830-1KJ
SITRANS LPS200, cable extension for up to 80 °C (176 °F), power supply Z (J2A), process connection B, process pressure 1, process connection material 2, extension length 0, measuring vane A, and approval B	7ML5727-5ZB12-0AB0 J2A
SITRANS LPS200, cable extension for up to 80 °C (176 °F), power supply Z (J2A), process connection C, process pressure 1, process connection material 2, extension length 0, measuring vane A, and approval A	7ML5727-5ZC12-0AA0 J2A

1) Available with approval options C and D up to max. 0.5 bar

2) Not available with process connections A, C, E

3) Only available with the following configurations
7ML5727-5ZC12-0AA0 J2A or 7ML5727-5ZB12-0AB0 J2A

4) Available with process pressure options 1 and 2 only

5) Available with process connections A ... E only, process pressure option 1 only and process temperature options 1 and 5 only

6) Add 16 mm (0.63 inch) to extension length

7) Available with process connections F ... K only

8) Available only for process temperature up to 80 °C (176 °F) and process connection material 2

9) Available with approval option D

10) Available with power supply options A, C, E, G, J, K, L, N, J1B, J1D, J1E, J2A, J2C only

11) Available up to 250 °C (482 °F). This option does not automatically implement a food conform design (food conform gaps and radius)

12) Not available with P01 and available with Approval D, mounting kit for rope extension included

13) Available with Power supply options J2A and J2C only

14) Available with Approval options A, B, C, D, and E only. Approvals A and C with FM only.

Level Measurement

Point level measurement

Rotation paddle switches

SITRANS LPS200

Selection and Ordering data		Article No.	Ord. code	Selection and Ordering data	Order code
SITRANS LPS200, angled extension		7ML5728-		Further Designs	
Rotary paddle switch with robust design for level and material detection in bulk solids; ideal for heavy or sticky applications. Angled extension is designed to avoid falling material and rotates horizontally in side mount applications to continue working even with heavy buildup.				Please add "-Z" to Article No. and specify Order code(s).	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.				Heating of enclosure ²⁾³⁾	A35
Process temperature				Signal bulb inserted in M20 cable gland ²⁾	A20
Up to 80 °C (176 °F)		1		Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing ⁴⁾	K01
Up to 150 °C (302 °F)		2		Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Up to 250 °C (482 °F)		3		Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511. ⁵⁾⁶⁾	C20
Power supply				Operating Instructions	Article No.
230 V AC, 1 rev/min.		A		Multi-language	A5E34210883
230 V AC, 5 rev/min.		C		Note: The Operating Instructions should be ordered as a separate line on the order.	
115 V AC, 1 rev/min.		E		All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
115 V AC, 5 rev/min.		G		Spare Parts	
48 V AC, 1 rev/min.		J		Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)	7ML1830-1KH
24 V AC, 1 rev/min.		K		Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)	7ML1830-1KJ
24 V DC, 1 rev/min.		L			
24 V DC, 5 rev/min.		N			
48 V AC, 5 rev/min.		Z	J1B		
24 V AC, 5 rev/min.		Z	J1E		
Universal Voltage, 1 rev/min.		Z	J2A		
Universal Voltage, 1 rev/min., fail-safe		Z	J2B		
Universal Voltage, 5 rev/min.		Z	J2C		
Universal Voltage, 5 rev/min., fail-safe		Z	J2D		
Process connection					
Flanged					
DN 100 PN 6, EN 1092-1 ¹⁾		A			
DN 100 PN 16, EN 1092-1		B			
4" ASME 150 lb B16.5		C			
Process pressure					
Up to 0.5 bar (7.25 psi)		1			
Up to 5 bar (72.5 psi)		2			
Up to 10 bar (145 psi)		3			
Process connection material					
Stainless steel 303/321 (1.4305/1.4541)		1			
Extension length					
125 mm (4.92 inch)		1			
150 mm (5.91 inch)		2			
200 mm (7.87 inch)		3			
250 mm (9.84 inch)		4			
300 mm (11.81 inch)		5			
Measuring vane					
Rectangular vane, 50 x 98 mm (1.97 x 3.86 inch)		A			
Rectangular vane, 50 x 150 mm (1.97 x 5.91 inch)		B			
Rectangular vane, 50 x 250 mm (1.97 x 9.84 inch)		C			
Rectangular vane, 98 x 150 mm (3.86 x 5.91 inch)		D			
Rectangular vane, 98 x 250 mm (3.86 x 9.84 inch)		E			
Hinged vane, 65 x 200 mm (2.56 x 7.87 inch)		F			
Approvals					
CSA/FM Dust Ignition Proof, RCM		A			
ATEX II 1/2 D, RCM		B			
CSA/FM General Purpose, RCM, CE		C			
CE, RCM		D			
IEC Ex ta/tb IIIC		E			
EAC Ex ta/tb IIIC Da/Db		F			

Level Measurement

Point level measurement

Rotation paddle switches

SITRANS LPS200

Selection and Ordering data

Article No. Ord. code

SITRANS LPS200, rigid extension

Rotary paddle switch for top mount point level and material detection in bulk solids

7ML5730-

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Process temperature

Up to 80 °C (176 °F)

1

Up to 150 °C (302 °F)

2

Up to 250 °C (482 °F)

3

Up to 600 °C (1 112 °F)¹⁾²⁾

4

Power supply

230 V AC, 1 rev/min.

A

230 V AC, 5 rev/min.

C

115 V AC, 1 rev/min.

E

115 V AC, 5 rev/min.

G

48 V AC, 1 rev/min.

J

24 V AC, 1 rev/min.

K

24 V DC, 1 rev/min.

L

24 V DC, 5 rev/min.

N

48 V AC, 5 rev/min.

Z

J 1 B

24 V AC, 5 rev/min.

Z

J 1 E

Universal Voltage, 1 rev/min.

Z

J 2 A

Universal Voltage, 1 rev/min., fail-safe

Z

J 2 B

Universal Voltage, 5 rev/min.

Z

J 2 C

Universal Voltage, 5 rev/min., fail-safe

Z

J 2 D

Process connection

Threaded

G 1¼" [(BSPP), EN ISO 228-1]

A

G 1½" [(BSPP), EN ISO 228-1]

B

1¼" NPT [(Taper), ANSI/ASME B1.20.1]

C

1½" NPT [(Taper), ANSI/ASME B1.20.1]

D

Flanged

DN 32 PN 6, EN 1092-1³⁾

E

DN 100 PN 6, EN 1092-1³⁾

F

DN 100 PN 16, EN 1092-1

G

2" ASME 150 lb B16.5

H

3" ASME 150 lb B16.5

J

4" ASME 150 lb B16.5

K

2" Tri-clamp 2" (DN 50) ISO 2852⁴⁾

L

Selection and Ordering data

Article No. Ord. code

SITRANS LPS200, rigid extension

Rotary paddle switch for top mount point level and material detection in bulk solids

7ML5730-

Process pressure

Up to 0.5 bar (7.25 psi)

1

Up to 5 bar (72.5 psi)

2

Up to 10 bar (145 psi)

3

Process connection material

Aluminum⁵⁾

1

Stainless steel, threads 303 (1.4305),

2

flanges 321 (1.4541), Tri-clamp 304 (1.4301)

Stainless steel 316L (1.4404)⁶⁾

3

Extension material (protection tube)

Aluminum⁷⁾⁸⁾

0

Stainless steel 303 (1.4305)⁹⁾

1

Stainless steel 316L (1.4404)¹⁰⁾¹¹⁾²²⁾

2

Extension length

Aluminum

250 ... 500 mm (9.84 ... 19.69 inch)

A

501 ... 750 mm (19.72 ... 29.53 inch)

B

751 ... 1 000 mm (29.57 ... 39.37 inch)

C

1 001 ... 1 250 mm (39.41 ... 42.21 inch)

D

1 251 ... 1 500 mm (49.25 ... 59.06 inch)

E

1 501 ... 1 750 mm (59.09 ... 68.90 inch)

F

1 751 ... 2 000 mm (68.94 ... 78.74 inch)

G

2 001 ... 2 250 mm (78.78 ... 88.58 inch)

H

2 251 ... 2 500 mm (88.62 ... 98.43 inch)

J

2 501 ... 2 750 mm (98.46 ... 108.27 inch)

K

2 751 ... 3 000 mm (108.31 ... 118.11 inch)

L

3 001 ... 3 250 mm (118.15 ... 127.95 inch)

M

3 251 ... 3 500 mm (127.99 ... 137.80 inch)

N

3 501 ... 3 750 mm (137.83 ... 147.64 inch)

P

3 751 ... 4 000 mm (147.67 ... 157.48 inch)

Q

Stainless steel 303 (1.4305)

250 ... 500 mm (9.84 ... 19.69 inch)

R

501 ... 750 mm (19.72 ... 29.53 inch)

S

751 ... 1 000 mm (29.57 ... 39.37 inch)

T

1 001 ... 1 500 mm (39.41 ... 59.05 inch)

U

1 501 ... 2 000 mm (59.09 ... 78.74 inch)

V

2 001 ... 2 500 mm (78.78 ... 98.42 inch)

W

2 501 ... 3 000 mm (98.46 ... 118.11 inch)

X

3 001 ... 4 000 mm (118.15 ... 157.48 inch)

Y

Stainless steel 316L (1.4404)

250 ... 500 mm (9.84 ... 19.69 inch)

Z

501 ... 750 mm (19.72 ... 29.53 inch)

Z

751 ... 1 000 mm (29.57 ... 39.37 inch)

Z

1 001 ... 1 500 mm (39.41 ... 59.05 inch)

Z

1 501 ... 2 000 mm (59.09 ... 78.74 inch)

Z

2 001 ... 2 500 mm (78.78 ... 98.42 inch)

Z

2 501 ... 3 000 mm (98.46 ... 118.11 inch)

Z

3 001 ... 4 000 mm (118.5 ... 157.48 inch)

Z

P 1 A

P 1 B

P 1 C

P 1 D

P 1 E

P 1 F

P 1 G

P 1 H

Level Measurement

Point level measurement

Rotation paddle switches

SITRANS LPS200

Selection and Ordering data	Article No.	Ord. code
SITRANS LPS200, rigid extension Rotary paddle switch for top mount point level and material detection in bulk solids	7ML5730-	
Measuring vane Boot shaped, 35 x 106 mm (1.34 x 4.17 inch) ¹²⁾		A
Hinged vane, 65 x 200 mm (2.56 x 7.87 inch) ¹²⁾		B
Rectangular, 50 x 150 mm (1.97 x 5.91 inch) ¹³⁾		C
Rectangular, 50 x 250 mm (1.97 x 9.84 inch) ¹³⁾		D
Rectangular, 98 x 150 mm (3.86 x 5.91 inch) ¹³⁾		E
Rectangular, 98 x 250 mm (3.86 x 9.84 inch) ¹³⁾		F
Rectangular, 50 x 98 mm (1.97 x 3.86 inch) ¹³⁾		G
Approvals CSA/FM Dust Ignition Proof, RCM ATEX II 1/2 D, RCM CSA/FM General Purpose, RCM, CE CE, RCM IEC Ex ta/tb IIIC EAC Ex ta/tb IIIC Da/Db		1 2 3 4 5 6

Selection and Ordering data	Order code
Further Designs Please add "-Z" to Article No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 4 000 mm (157.48 inch)	Y01
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y14
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511. ²⁰⁾²¹⁾	C20
Heating of enclosure ¹⁴⁾¹⁵⁾	A35
Signal bulb inserted in M20 cable gland ¹⁴⁾	A20
Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing ¹⁶⁾¹⁷⁾	K01
<u>Optional end of shaft seal for stability and ingress protection</u>	
Max. temperature 80 °C (176 °F)	P06
Max. temperature 150 °C (302 °F)	P07
Max. temperature 250 °C (482 °F)	P08
Max. temperature 600 °C (1 112 °F)	P09
Sliding sleeve (standard, max. pressure 0.5 bar) ¹⁴⁾¹⁸⁾	P12
Sliding sleeve (pressure tight, for over-pressure application starting from 1 bar max., dependent on pressure option ordered) ¹⁹⁾	P13
Operating Instructions Multi-language Note: The Operating Instructions should be ordered as a separate line on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	Article No. A5E34210883
Spare Parts Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)	7ML1830-1KH
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)	7ML1830-1KJ

- 1) Available with approval options 3 and 4, up to max 0.5 bar
- 2) Not available with process connections A, C, E.
- 3) Available with process pressure options 1 and 2 only.
- 4) Available with process temperature 1 only.
- 5) Available with process connections A ... E only, with process pressure option 1 and process temperature option 1 only.
- 6) Available with process connection options B, D, F ... L and measuring vane option A.
- 7) Available with process pressure 1 and process temperature 1 only.
- 8) Available with extension length options A ... Q only.
- 9) Available with extension length options R ... Y only.
- 10) Available with process connection options B, D, F ... L and measuring vane A, process connection material 3. Available only with extension length options P1A ... P1H only.
- 11) Only available with seal at tube end options P06 ... P09.
- 12) Add 16 mm (0.63 inch) to extension length.
- 13) Available with process connections F, G, H, J, K only.
- 14) Available with approval option 4 only.
- 15) Available with power supply options A,C, E, G, J, K, L, N, J1B, J1D, J1E, J2A, J2C only.
- 16) Available when ordered with ingress protection seal options P06 ... P09 only.
- 17) Available up to 250 °C (482 °F). This option does not automatically implement a food conform design.
- 18) Available with process pressure option 1 only.
- 19) Available up to 250 °C (482 °F).
- 20) Available with Power supply options J2A and J2C only.
- 21) Available with Approval options 1, 2, 3, 4, and 5 only. Approvals 1 and 3 with FM only.
- 22) Internal probe construction is 1.4305, add seal option P09 to prevent ingress.

Level Measurement

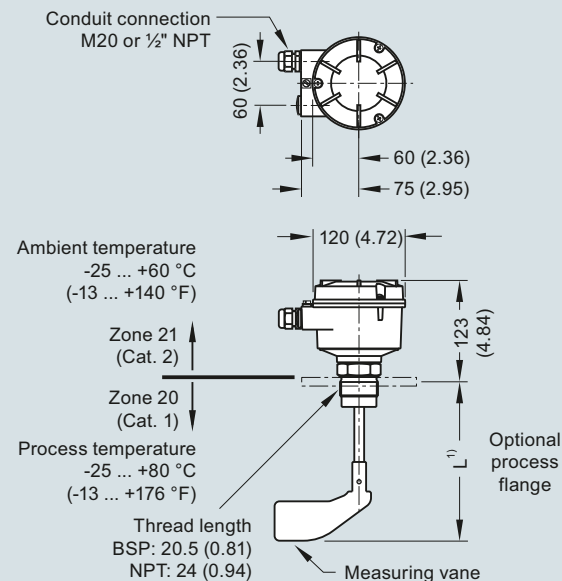
Point level measurement

Rotation paddle switches

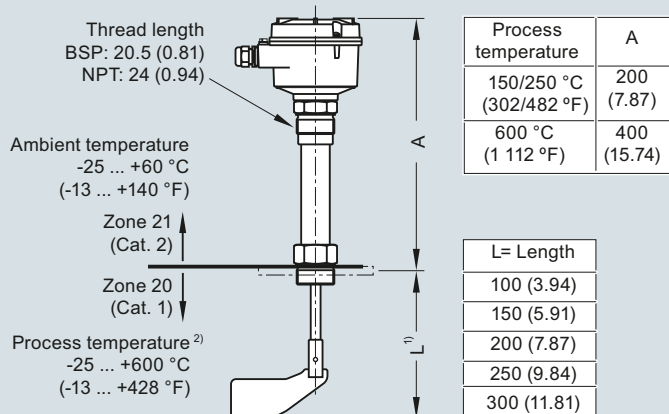
SITRANS LPS200

Dimensional drawings

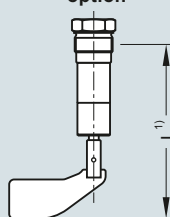
Standard model: compact version



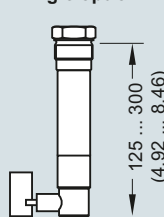
High temperature model: compact version



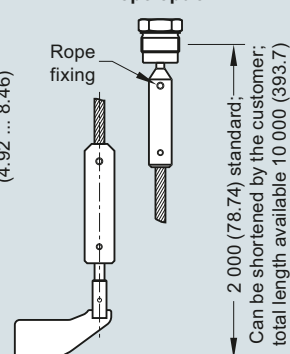
Shaft protected option



Angle option

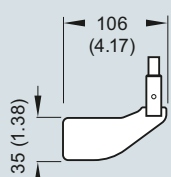


Rope option

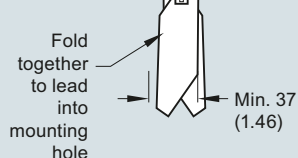


Measuring vanes

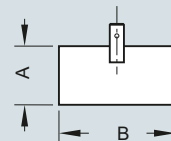
Standard



Hinged



Rectangular



Rectangular vane options

A	B
50 (1.97)	98 (3.86)
50 (1.97)	150 (5.90)
50 (1.97)	250 (9.84)
98 (3.86)	150 (5.90)
98 (3.86)	250 (9.84)

- For 35 x 106 mm boot shaped and 98 x 200 mm hinged measuring vanes, add 16 mm to extension length.
- For use with all approval options except CSA class II. See manual for more details.

Notes

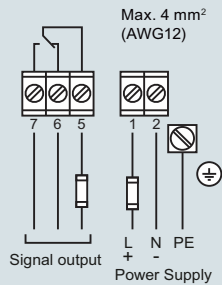
For heavy material, only top mounting of paddle switch is recommended.
Compact LPS200 is recommended for side mounting on bins for low or intermediate material levels.

Vane	Completely covered with material		Covered up to 10 cm (3.93 inch) with material	
	Spring adjustment		Spring adjustment	
	Light	Central (factory setting)	Light	Central (factory setting)
Boot shaped 35 x 106 mm	200 g/l (12.5 lb/ft³)	300 g/l (18.7 lb/ft³)	100 g/l (6.2 lb/ft³)	150 g/l (9.4 lb/ft³)
Boot shaped 28 x 98 mm	300 g/l (18.7 lb/ft³)	500 g/l (31.2 lb/ft³)	150 g/l (9.4 lb/ft³)	150 g/l (9.4 lb/ft³)
Rectangular 50 x 98 mm	300 g/l (18.7 lb/ft³)	500 g/l (31.2 lb/ft³)	150 g/l (9.4 lb/ft³)	250 g/l (15.6 lb/ft³)
Rectangular 50 x 150 mm	80 g/l (5.0 lb/ft³)	120 g/l (7.5 lb/ft³)	40 g/l (2.5 lb/ft³)	60 g/l (3.7 lb/ft³)
Rectangular 50 x 250 mm	30 g/l (1.9 lb/ft³)	50 g/l (3.1 lb/ft³)	15 g/l (0.9 lb/ft³)	25 g/l (1.6 lb/ft³)
Rectangular 98 x 150 mm	30 g/l (1.9 lb/ft³)	50 g/l (3.1 lb/ft³)	15 g/l (0.9 lb/ft³)	25 g/l (1.6 lb/ft³)
Rectangular 98 x 250 mm	20 g/l (1.2 lb/ft³)	30 g/l (1.9 lb/ft³)	15 g/l (0.9 lb/ft³)	15 g/l (0.9 lb/ft³)
Hinged 98 x 200 mm	70 g/l (4.4 lb/ft³)	100 g/l (6.2 lb/ft³)	35 g/l (2.2 lb/ft³)	50 g/l (3.1 lb/ft³)

SITRANS LPS200, dimensions in mm (inch)

Circuit diagrams

AC or DC version



Power supply:

AC version:

24 V or 48 V or 115 V or 230 V 50/60 Hz max. 4 VA
All voltages $\pm 10\%$ ¹⁾
Supply voltage as selected.
External fuse: max 10 A, fast or slow, HBC, 250 V

DC version:

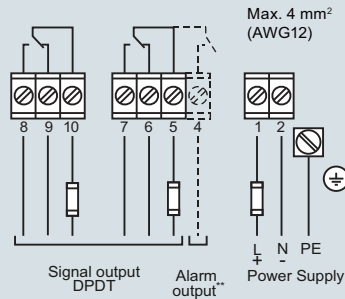
24 V DC $\pm 15\%$ ¹⁾ max. 2.5 W
External fuse: not required

¹⁾ Including $\pm 10\%$ of EN 61010

Signal output:

Micro switch, SPDT contact
max. 250 V AC, 5 A, non inductive
max. 30 V DC, 4 A, non inductive
External fuse: max 10 A, fast or slow, HBC, 250 V

Universal voltage (DPDT relay)*

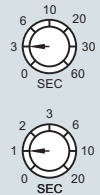


* See manual for universal voltage with SIL.

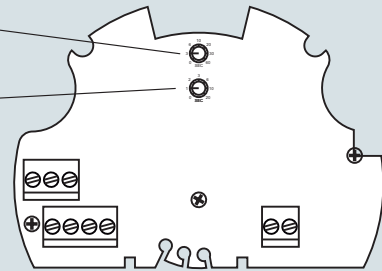
** With option Fail safe alarm (rotation control).
Contact open when de-energised.
Fail safe alarm switching and timing behaviour:
If the vane is not covered, the rotating vane
shaft will send pulses at 20 second intervals.
In case of fault, the pulses are missed.
After 30 seconds, the alarm relay will open.

Signal output: delay

Sensor covered -> free
Factory setting = 3 sec



Sensor covered -> covered
Factory setting = 1 sec



SITRANS LPS200 connections

Level Measurement

Point level measurement

Ultrasonic non-contacting switch

Pointek ULS200

Overview



The Pointek ULS200 is an ultrasonic non-contacting switch with two switch points for level detection of bulk solids, liquids and slurries in a wide variety of industries; ideal for sticky materials.

Benefits

- 2 switch outputs for high-high, high, low, and low-low level alarms or pump up/pump down control
- Integral temperature compensation
- AC or DC power supply
- Electronics provided with fail-safe function
- Threaded and sanitary fitting clamp process connections
- Polycarbonate enclosure, Type 6/NEMA 6/IP67
- Easy, two-button programming

Application

The measuring range for bulk solids is max. 3 m (9.8 ft) and 5 m (16.4 ft) for liquids and slurries. Unlike invasive contacting devices, there is no material buildup on the sensor.

The level switch has a rugged design, combining the transducer and electronics in one durable device. It has no moving parts and is virtually maintenance-free.

The transducer, available in ETFE or PVDF copolymer, is inert to most chemicals. This means the device can be used in the chemical, petrochemical, water, and wastewater industries. A sanitary version of the ULS200, with an industry standard flange option, is easy to remove from the application for cleaning. It thus satisfies the prerequisites for use in the food, beverage, and pharmaceutical industries. The Pointek ULS200 delivers superior performance while reducing maintenance, downtime, and equipment replacement costs.

- Key Applications: liquids, slurries, fluid materials, plugged chute detection, chemical industry

Design

Installation

The Pointek ULS200 should be mounted in an area that is within the temperature range specified and that is suitable to the enclosure rating and materials of construction. The cover should be accessible to allow programming, wiring and display viewing.

It is advisable to keep the Pointek ULS200 away from high voltage or current runs, contactors and SCR control drives.

Locate the Pointek ULS200 so that it has a clear sound path perpendicular to the material surface. The sound path should not intersect the fill path, rough walls, seams, rungs etc.

Mounting and Interconnection

The Pointek ULS200 is available in three thread types: 2" NPT, R 2" (BSPT), EN 10226 or PF2 and can be fitted with the optional 75 mm (3 inch) flange adapter for mating to 3" ASME, DN 65, PN 10, and JIS 10K 3B sized flanges.

Separate cables and conduit may be required to conform to standard instrumentation wiring or electrical codes.

Level Measurement

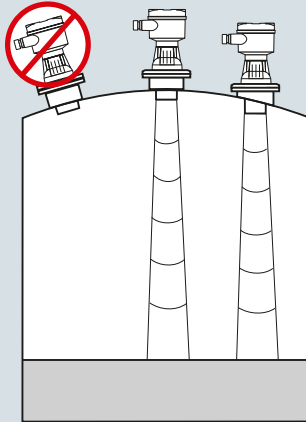
Point level measurement

Ultrasonic non-contacting switch

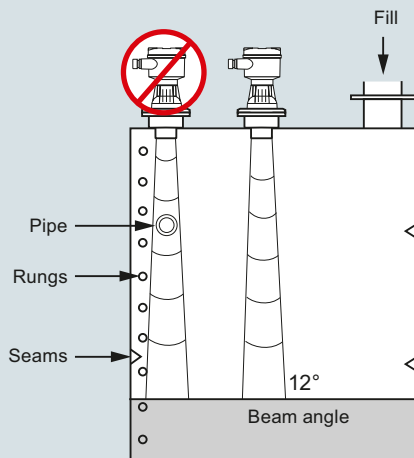
Pointek ULS200

Configuration

Parabolic mounting



Flat mounting and Beam angle



Pointek ULS200 mounting

Technical specifications

Mode of operation

Measuring principle	Ultrasonic level switch
---------------------	-------------------------

Measuring range

Measuring range in liquids	0.25 ... 5 m (0.8 ... 16.4 ft)
Measuring range in bulk solids	0.25 ... 3 m (0.8 ... 9.8 ft)

Output

AC Version (relay)	2 SPDT Form C contacts, rated 5 A at 250 V AC or 30 V DC, resistive load; rated 1 A at 48 V DC resistive load
DC Version (relay)	2 SPDT Form C contacts, rated 5 A at 30 V DC, resistive load; rated 1 A at 48 V DC resistive load
DC Version (transistor)	2 switches, rated max. 100 mA, 48 V DC

Accuracy

AC/DC version	
• Resolution	3 mm (0.1 inch)
• Repeatability	0.25 % of measuring range

Rated operation conditions

Installation conditions	
• Location	Indoors/outdoors
• Beam angle	12°
Ambient conditions	
• Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)
• If mounted in metal threads	-20 ... +60 °C (-5 ... +140 °F)
Medium conditions	
• Process pressure	0.5 bar (7.25 psi) max.

Design

Material	Polycarbonate with gasket
Weight	Approx. 1.5 kg (3.3 lb)
Transducer material	PVDF or ETFE copolymer
Threaded mounting	2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]
• Optional flange adapter	For 3" ASME, DN 65, PN 10, and JIS 10 K3B
Sanitary mounting	4" sanitary fitting clamp

Power supply

AC version	100 ... 230 V AC, $\pm 15\%$, 50/60 Hz, max. 12 VA, 5 W
DC version	18 ... 30 V DC, 3 W

Displays and controls

Display	LCD, three digits, 9 mm (0.35 inch) high, for display of distance between sensor face and material, multi-segment graphic for operating state
Memory	EEPROM, non-volatile
Programming	2 keys

Electronics/enclosure

Connection	terminal block, max. 2.5 mm ² (14 AWG) solid/1.5 mm ² (16 AWG) stranded
Degree of protection	IP67/Type 6/NEMA 6
Cable inlet	2 x 1/2" NPT or 2 x PG 13.5

Certificates and approvals

	CE, CSA _{US/C} , FM
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Level Measurement

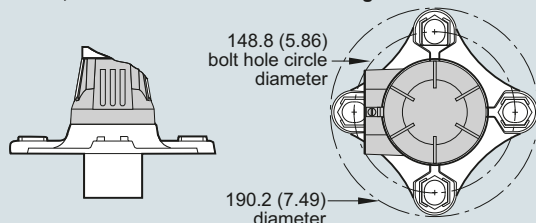
Point level measurement

Ultrasonic non-contacting switch

Pointek ULS200

Options

Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ASME, DN 65 PN 10 and JIS 10K 3B flanges



Pointek ULS200 optional flange adapter, dimensions in mm (inch)

Selection and Ordering data

Article No.

Pointek ULS200

Ultrasonic non-contacting switch with two switch points for level detection of bulk solids, liquids and slurries in a wide variety of industries; ideal for sticky materials

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Power supply

24 V DC, relay output
24 V DC, transistor output
100 ... 230 V AC, relay output

Approvals

CE, RCM, CSA Class I, II, Div. 2¹⁾
CE, RCM, CSA_{US/C}, FM

Transducer/Process connection

ETFE, 2" NPT [(Taper), ANSI/ASME B1.20.1]
ETFE, R 2" [(BSPT), EN 10226]
ETFE, G 2" [(BSPP), EN ISO 228-1]
PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1]
PVDF copolymer, R 2" [(BSPT), EN 10226]
PVDF copolymer, G [(BSPP), EN ISO 228-1]
PVDF copolymer, 4" sanitary mounting²⁾

Enclosure/cable inlet

Polycarbonate

- Cable inlet PG 13.5
- Cable inlet ½" NPT

¹⁾ Available with Enclosure/cable inlet option 2 only

²⁾ Available with Approvals option K only

7ML1510-

0

1
2
3

J
K

A
B
C
E
F
G
J

1
2

Selection and Ordering data

Order code

Further designs

Please add '-Z' to Article No. and specify Order code(s)

Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]:
Measuring-point number/identification
(max. 27 characters) specify in plain text

Y15

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Accessories

Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosures

Universal Box Bracket Mounting Kit

3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT

3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT

2" BSPT Locknut, plastic

2" NPT Locknut

4" sanitary mounting clamp

Spare Parts

Polycarbonate Lid

Article No.

7ML1930-1AC

7ML1830-1BK

7ML1830-1BT

7ML1830-1BU

7ML1830-1DQ

7ML1830-1DT

7ML1830-1BR

7ML1830-1LG

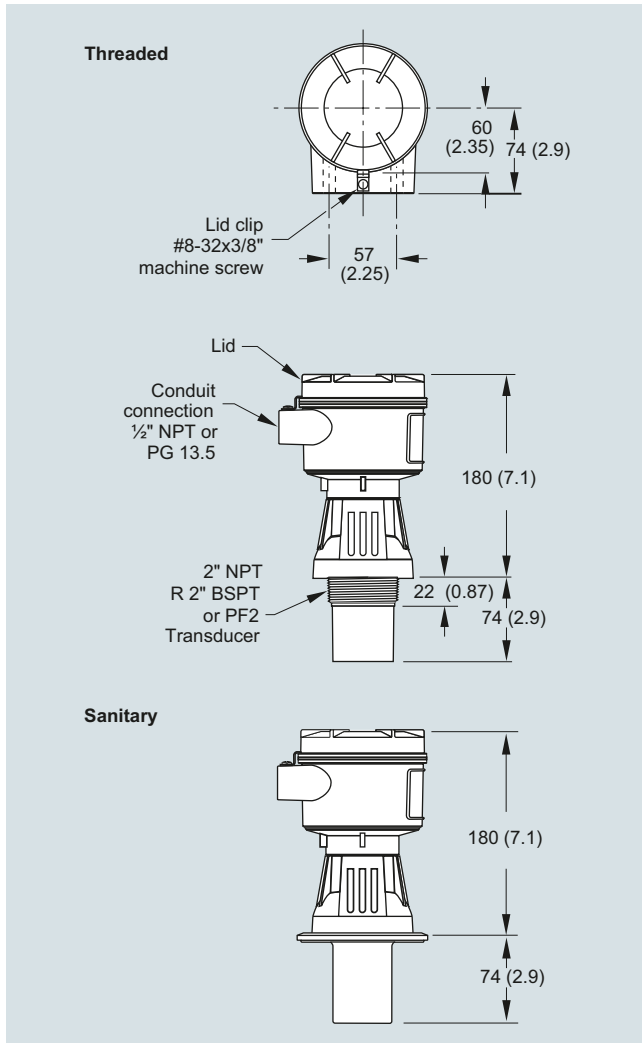
Level Measurement

Point level measurement

Ultrasonic non-contacting switch

Pointek ULS200

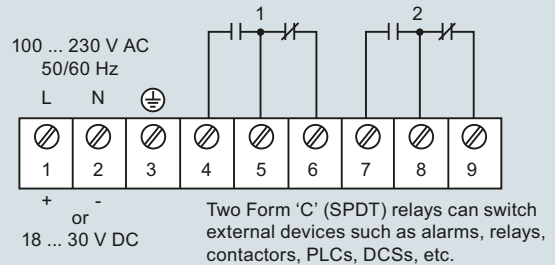
Dimensional drawings



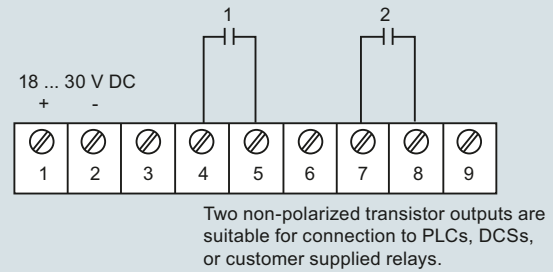
Pointek ULS200, dimensions in mm (inch)

Circuit diagrams

Relay output



Transistor output: DC version only



Pointek ULS200 connections

Level Measurement

Continuous level measurement

Ultrasonic

Ultrasonic

Overview

Introduction

Ultrasonic measurement is based on the speed of sound. Sound can be used as a measurement tool because there is a measurable time lapse between sound generation and the "hearing" of the sound. This time lapse is then converted into usable information. Ultrasonic sensing equipment generates a sound above 20 000 Hz and then interprets the time lapse of the returned echo. The transducer creates the sound and senses the echo and then a transceiver interprets the sound and converts it into information.

Siemens ultrasonic units include Sonic Intelligence, a signal processing technology. Using unique algorithms, Sonic Intelligence differentiates between true echoes from the material and false echoes from obstructions or electrical noise, providing intelligent processing of echo profiles.

Typical System

Ultrasonic level measurement requires two components: one to generate the sound and catch the echo (transducer) and one to interpret the data and derive a measurement (transceiver). Even though some ultrasonic instruments combine the components in one unit, the individual functionality remains distinct. The measurement output is communicated to the unit, PLCs or PCs for process control.

Principle of Operation

A piezoelectric crystal inside the transducer converts an electrical signal into sound energy, firing a burst into the air which travels to the target and then is reflected back to the transducer. The transducer then acts as a receiving device and converts the sonic energy back into an electrical signal contained in the transceiver. An electronic signal processor analyzes the return echo and calculates the distance between the transducer and the target. The time lapse between firing the sound burst and receiving the return echo is directly proportional to the distance between the transducer and the material in the vessel. This basic principle lies at the heart of the ultrasonic measurement technology and is illustrated in the equation:

$$\text{Distance} = (\text{Velocity of Sound} \times \text{Time})/2.$$

Mode of operation

Common Terms

Attenuation

Denotes a decrease in signal magnitude in transmission from one point to another. Attenuation may be expressed as a scalar ratio of the input magnitude to the output magnitude or in decibels.

Beam angle

The diameter of a conical boundary centered around the axis of transmission when the power (radiating perpendicular to the transducer face on the axis of transmission) is reduced by half (-3 dB).

Blanking distance

Specified zone extending downward from the transducer face in which received echoes are ignored by the transceiver. Blanking distance ignores echoes from ringing.

Echo confidence

The recognition of the validity of the echo as material level. A measure of echo reliability.

Ringing

The inherent nature of the transducer to continue vibrating after the transmit pulse has ceased; the decay of the transmit pulse.

Transducer/Transceiver

A transducer provides the initial ultrasonic pulse and receives its echo. An ultrasonic transducer amplifies the sound wave created by the piezoelectric crystal and transmits that sound wave to the face of the transducer while at the same time dampening the sound wave from the other sides of the crystal.

Transceivers analyze the echo from the transducer to determine the required measurement.

Technical specifications

Ultrasonic Transmitter/Controller Selection Guide

Criteria	SITRANS Probe LU	SITRANS LU150/LU180	SITRANS LUT400	HydroRanger 200	MultiRanger 100/200
Range	6 m (20 ft) or 12 m (40 ft)	0.25 ... 5 m (0.8 ... 16.4 ft)	0.3 ... 60 m (1 ... 196 ft), transducer and application dependent	15 m (50 ft) transducer and application dependent	15 m (50 ft) transducer and application dependent
Typical applications	Chemical storage vessels, filter beds, liquid storage vessels	Chemical storage vessels, filter beds, mud pits, liquid storage vessels, food applications	Wet wells, reservoirs, flumes/weirs, chemical storage, liquid storage, hoppers, crusher bins, dry solids storage	Wet wells, flumes/weirs, bar screen control	Wet wells, flumes/weirs, bar screen control, hoppers, chemical storage, liquid storage, crusher bins, dry solids storage
Output	HART model: 4 ... 20 mA/HART PROFIBUS PA model: PROFIBUS	4 ... 20 mA loop powered	4 ... 20 mA/HART 3 relays	6 relays standard, two 4 ... 20 mA outputs (isolated)	1 relay (option on MultiRanger 100) 3 relays standard 6 relays (option) Two 4 ... 20 mA outputs (isolated)
Communications	HART or PROFIBUS PA Options: SIMATIC PDM for remote configuration and diagnostics	N/A	HART 7.0, USB, SIMATIC PDM	Built-in Modbus RTU/ASCII via RS 485 Options: • SIMATIC PDM • SmartLinX (PROFIBUS DP, DeviceNet, Profinet, Ethernet/IP, ModbusTCP/IP)	Built-in Modbus RTU or ASCII via RS 485 Options: • SIMATIC PDM • SmartLinX (PROFIBUS DP, DeviceNet, Profinet, Ethernet/IP, ModbusTCP/IP)
Power specifications	HART: 4 ... 20 mA, 24 V DC nominal, max. 550 Ω, 30 V DC PROFIBUS PA: 12, 13, 15, or 20 mA, dependent on programming	12 ... 30 V DC, 0.1 A surge, max. 600 Ω in the loop at 24 V DC	AC version: 100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA Fuse: 5 x 20 mm, Slow Blow, 0.25 A, 250 V DC version: 10 ... 32 V DC, 10 W Fuse: 5 x 20 mm, Slow Blow, 1.6 A, 125 V	AC version: 100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA/17 W DC version: 12 ... 30 V DC, 20 W	AC version: 100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA/17 W DC version: 12 ... 30 V DC, 20 W
Approvals	CE, CSA _{US/C} , FM, RCM, ATEX, IECEx	CE, CSA _{US/C} , FM, ATEX, RCM, NEPSI, IECEx	CE, CSA _{US/C} , UL Listed, FM, RCM, LR, ABS, MCERTS	CE, CSA _{US/C} , UL Listed, FM, RCM, MCERTS	CE, CSA _{US/C} , UL Listed, FM, RCM

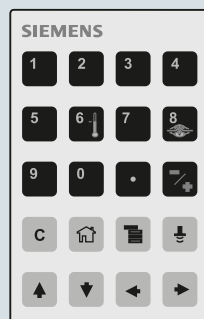
A5E36563512



MultiRanger 100/200
HydroRanger 200
SITRANS Probe LU HART*
SITRANS LU

* **Note:** To order the IS version of this hand programmer, order 7ML5830-2AH.

7ML5830-2AJ



SITRANS Probe LU PROFIBUS

Handheld programmer selection guide

Level Measurement

Continuous level measurement
Ultrasonic transmitters

SITRANS LU150

Overview



SITRANS LU150 is a short-range integrated ultrasonic level transmitter. This general purpose, 2-wire, 4 to 20 mA loop powered transmitter is ideal for liquids, slurries, and bulk materials in open or closed vessels to 5 m (16.4 ft).

Benefits

- Easy to install, program, and maintain
- Accurate and reliable
- Sanitary models available
- Patented Sonic Intelligence echo processing
- Integral temperature compensation

Application

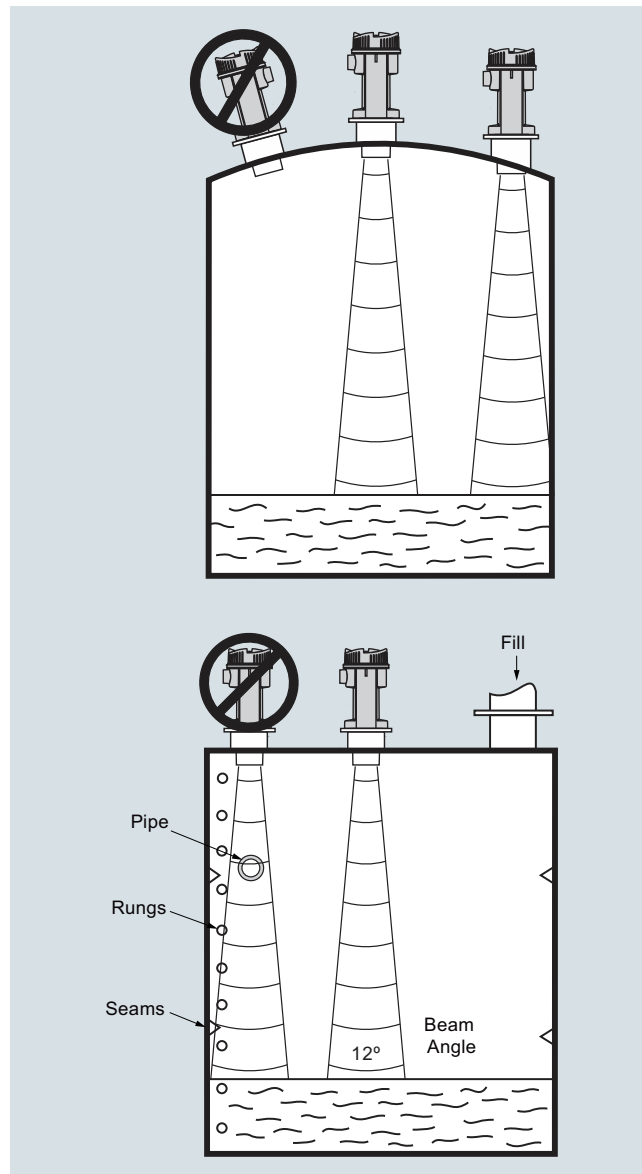
The transducer is available in PVDF copolymer, making the device suitable for use in a wide variety of applications.

SITRANS LU150 is easy to install and maintain, and can be quickly removed for cleaning as required by the food, beverage and pharmaceutical industries.

The reliability of the level data is based on the Sonic Intelligence echo processing algorithms. A filter discriminates between the true echo and false echoes from acoustic or electrical noises and agitator blades in motion. The ultrasonic pulse propagation time to the material and back is temperature-compensated and converted into distance for display, analog output.

- Key Applications: chemical storage vessels, filter beds, mud pits, liquid storage vessels, food applications

Configuration



SITRANS LU150 mounting

Level Measurement

Continuous level measurement

Ultrasonic transmitters

SITRANS LU150

Technical specifications

Mode of Operation	
Measuring principle	Ultrasonic level measurement
Input	
Measuring range	0.25 ... 5 m (0.8 ... 16.4 ft)
Frequency	54 kHz
Output	
mA	4 ... 20 mA
• Span	Proportional/ inversely proportional
• Max. load	600 Ω in the loop at 24 V DC
Power supply	
Supply voltage	12 ... 30 V DC, 0.1 A surge
Max. power consumption	0.75 W (25 mA at 24 V DC)
Certificates and approvals	
CE, CSA _{US/C}	
Accuracy	
Error in measurement	0.25 % of measuring range (in air)
Resolution	3 mm (0.125 inch)
Temperature compensation	Built in
Echo processing	Sonic Intelligence
Rated operation conditions	
Beam angle	12°
Ambient temperature	
• Standard	-30 ... +60 °C (-22 ... +140 °F)
• Metallic mounting	-20 ... +60 °C (-4 ... +140 °F)
Max. static operating pressure	Normal atmospheric pressure
Design	
Weight	1.3 kg (2.9 lb)
Material	
• Electronics enclosure	PBT
• Transducer	PVDF copolymer
Degree of protection	IP68 / NEMA 6 / TYPE 6
Process connection	<ul style="list-style-type: none"> • 2" NPT [(Taper), ANSI/ASME B1.20.1] • R 2" [(BSPT), EN 10226] • G 2" [(BSPP), EN ISO 228-1] • 4" sanitary
Flange adapter	3" Universal, (fits DN 65, PN 10 and 3" ASME)
Cable inlet	1 inlet for M20, optional 1/2" NPT

Selection and Ordering data

SITRANS LU150

Short-range integrated ultrasonic level transmitter, general purpose, 2-wire, 4 to 20 mA loop powered ideal for liquids, slurries, and bulk materials in open or closed vessels to 5 meters (16.4 feet)

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Transducer/Process connection (PVDF)

PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1]
 PVDF copolymer, R 2" [(BSPT), EN 10226]
 PVDF copolymer, G 2" [(BSPP), EN ISO 228-1]
 PVDF copolymer, 4" Sanitary mounting

Cable inlet

M20 x 1.5 [General Purpose cable gland -20 ... +60 °C (-4 ... +140 °F) included]
 1/2" NPT stainless steel entry (no cable gland included)

Article No.

7ML5201-
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Selection and Ordering data

Order code

Further designs

Please add ***-Z** to Article No. and specify Order code(s).

Stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/ identification (max. 20 characters) specify in plain text

Y15

Test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000

C11

Operating Instructions

English

German

Note: Operating instructions should be ordered as a separate line on the order

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Article No.

A5E34590123

A5E36369862

Accessories

Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line

7ML1930-1AC

Universal Box Bracket Mounting kit

7ML1830-1BK

Sanitary 4" mounting clamp

7ML1830-1BR

3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT

7ML1830-1BT

3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT

7ML1830-1BU

2" NPT locknut, plastic

7ML1830-1DT

2" BSPT locknut, plastic

7ML1830-1DQ

Cable Gland - General Purpose -20 ... +60 °C (-4 ... +140 °F)

A5E34457564

Level Measurement

Continuous level measurement

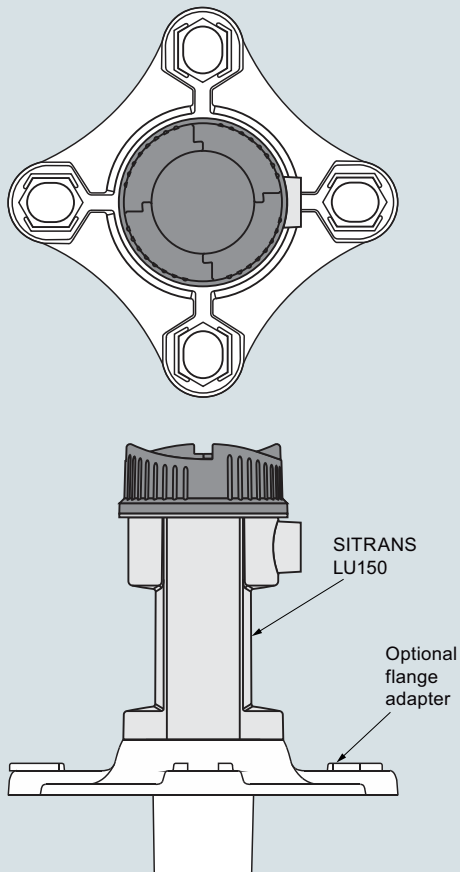
Ultrasonic transmitters

SITRANS LU150

Options

SITRANS LU150, Flange Adapter

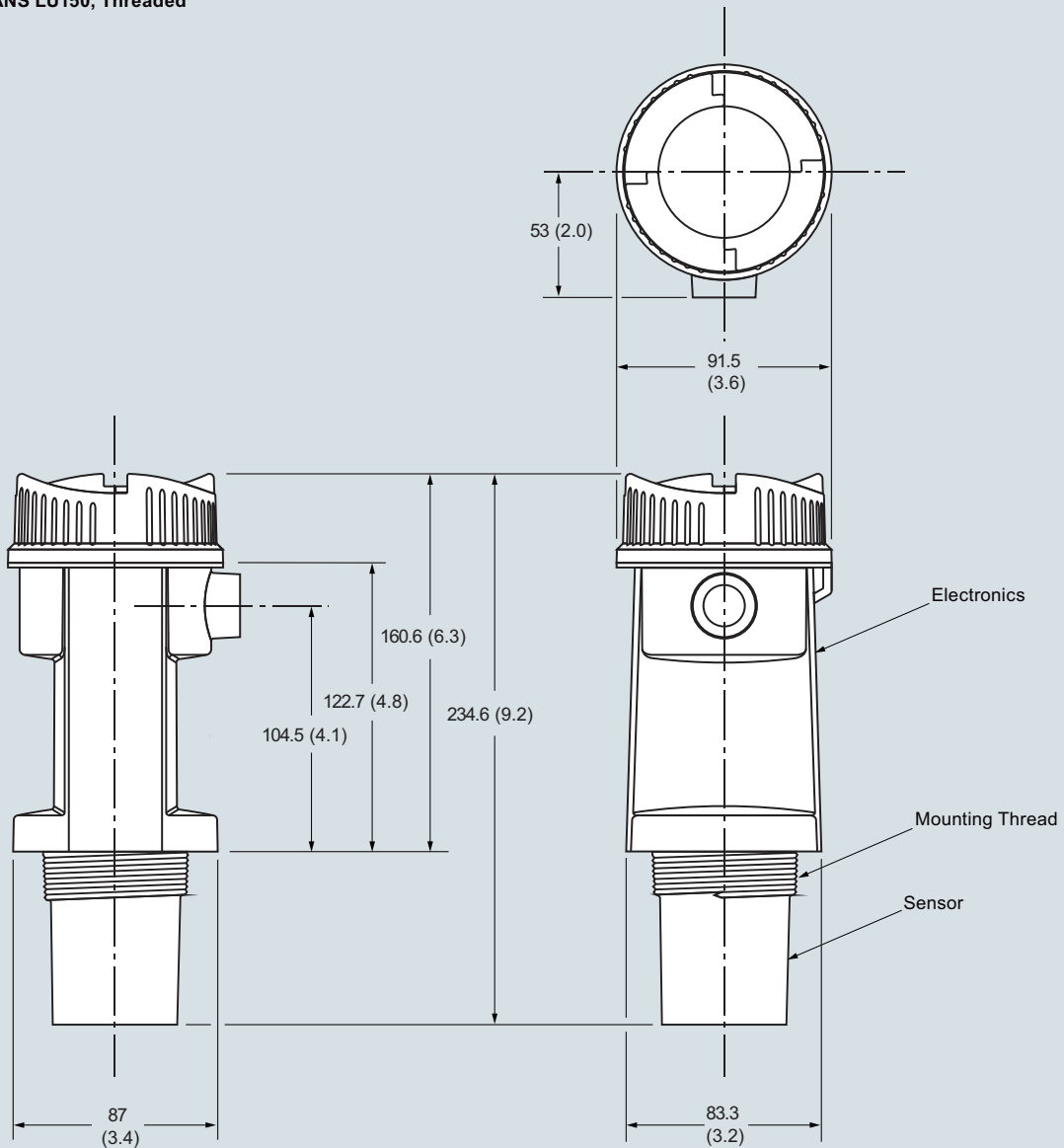
The SITRANS LU150 can be fitted with the optional 75 (3) flange adapter for mating to 3" ANSI, DIN 65 PN10 and JIS 10K3B flanges.



SITRANS LU150 optional flange adapter, dimensions in mm (inch)

Dimensional drawings

SITRANS LU150, Threaded



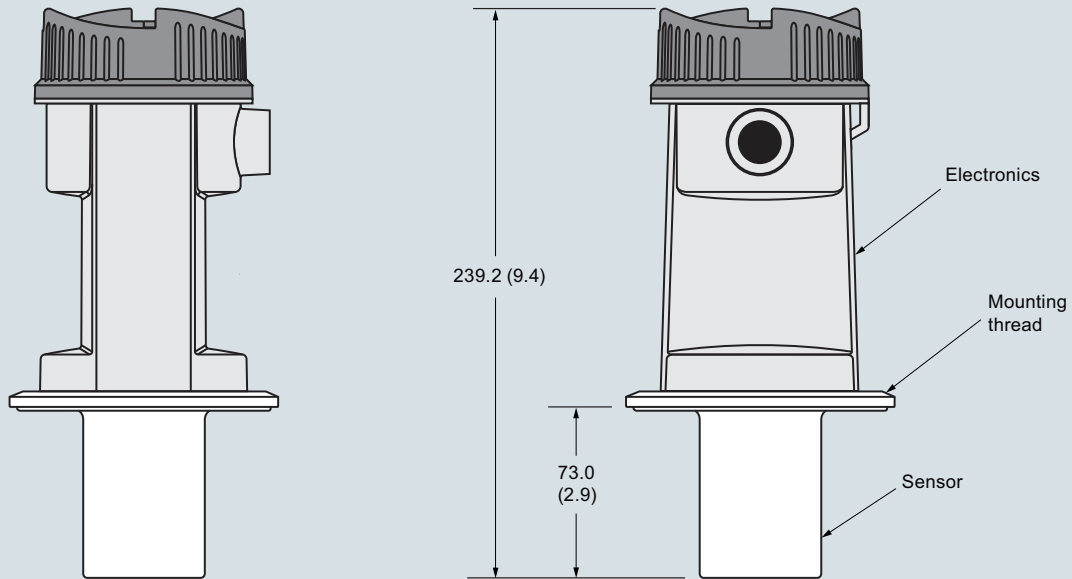
SITRANS LU150, dimensions in mm (inch)

Level Measurement

Continuous level measurement
Ultrasonic transmitters

SITRANS LU150

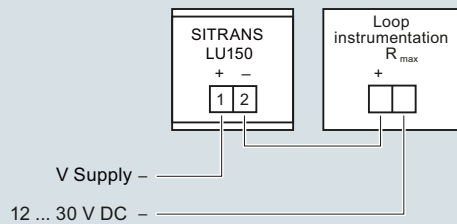
SITRANS LU150, Sanitary



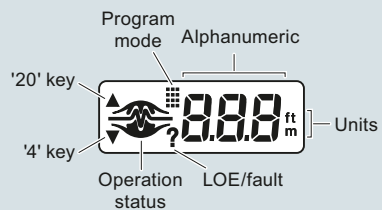
SITRANS LU150, dimensions in mm (inch)

Circuit diagrams

Threaded and Sanitary models



Display



SITRANS LU150 connections

Overview



SITRANS LU180 is a short-range integrated ultrasonic level transmitter. It is intrinsically safe (ATEX, CSA, FM, IECEx, NEPSI), 2 wire, 4 to 20 mA loop powered, ideal for liquids, slurries, and bulk materials in open or closed vessels to 5 meters (16.4 feet).

Benefits

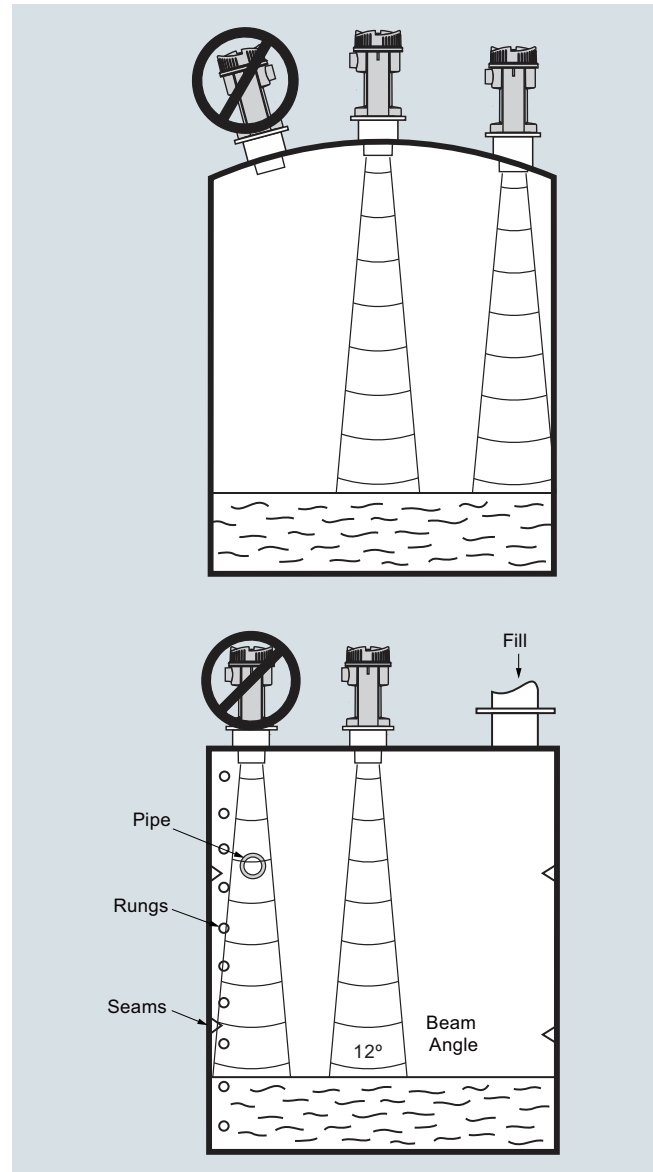
- Easy to install, program, and maintain
- Accurate and reliable
- Sanitary models available
- Patented Sonic Intelligence echo processing
- Integral temperature compensation

Application

The transducer is available in PVDF copolymer, making the device suitable for use in a wide variety of applications. SITRANS LU180 is easy to install and maintain, and can be quickly removed for cleaning as required by the food, beverage and pharmaceutical industries. The reliability of the level data is based on the Sonic Intelligence echo processing algorithms. A filter discriminates between the true echo and false echoes from acoustic or electrical noises and agitator blades in motion. The ultrasonic pulse propagation time to the material and back is temperature compensated and converted into distance for display, analog output.

- Key Applications: chemical storage vessels, filter beds, mud pits, liquid storage vessels, food applications

Configuration



SITRANS LU180 mounting

Level Measurement

Continuous level measurement

Ultrasonic transmitters

SITRANS LU180

Technical specifications

Mode of operation	
Measuring principle	Ultrasonic level measurement
Input	
Measuring range	0.25 ... 5 m (0.8 ... 16.4 ft)
Frequency	54 kHz
Output	
mA	4 ... 20 mA
• Span	Proportional/ inversely proportional
• Max. load	600 Ω in the loop at 24 V DC
Power supply	
Supply voltage	12 ... 30 V DC, 0.1 A surge
Max. power consumption	0.75 W (25 mA at 24 V DC)
Certificates and approvals	
CSA:	
IS/ Class I, II, III, Div. 1, Groups: A, B, C, D, E, F, G T4	
FM:	
IS/ Class I, II, III, Div. 1, Groups: A, B, C, D, E, F, G T4	
ATEX:	
II 1G Ex ia IIC T4 Ga	
IECEX Ex ia IIC T4 Ga	
NEPSI Ex ia IIC T4 Ga	
Accuracy	
Error in measurement	0.25 % of measuring range (in air)
Resolution	3 mm (0.125 inch)
Temperature compensation	Built in
Echo processing	Sonic Intelligence
Rated operation conditions	
Beam angle	12°
Ambient temperature	
• Standard	-40 ... +60 °C (-40 ... +140 °F)
• Metallic mounting	-20 ... +60 °C (-4 ... +140 °F)
Max. static operating pressure	Normal atmospheric pressure
Design	
Weight	1.3 kg (2.9 lb)
Material	
• Electronics enclosure	PBT
• Transducer	PVDF copolymer
Degree of protection	IP68 / NEMA 6 / TYPE 6
Process connection	<ul style="list-style-type: none"> • 2" NPT [(Taper), ANSI/ASME B1.20.1] • R 2" [(BSPT), EN 10226] • G 2" [(BSPP), EN ISO 228-1] • 4" sanitary
Flange adapter	3" Universal (fits DN 65, PN 10 and 3" ASME)
Cable inlet	1 inlet for M20, optional 1/2" NPT

Selection and Ordering data

SITRANS LU180

Short-range integrated ultrasonic level transmitter, intrinsically safe (ATEX, CSA, FM, IECEx, NEPSI), 2 wire, 4 to 20 mA loop powered, ideal for liquids, slurries, and bulk materials in open or closed vessels to 5 meters (16.4 feet).

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Transducer/Process connection

PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1]
 PVDF copolymer, R 2" [(BSPT), EN 10226]
 PVDF copolymer, G 2" [(BSPP), EN ISO 228-1]
 PVDF copolymer, 4" Sanitary mounting

Cable inlet

M20 x 1.5 [General Purpose cable gland -20 ... +60 °C (-4 ... +140 °F) included]
 1/2" NPT stainless steel entry (no cable gland included)

Article No.

7ML5202-

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Selection and Ordering data

Order code

Further designs

Please add "-Z" to Article No. and specify Order code(s).

Stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/ identification (max. 20 characters) specify in plain text

Test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000

Operating Instructions

English

German

Note: Operating instructions should be ordered as a separate line on the order

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Accessories

Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line

Universal box bracket mounting kit

Sanitary 4" mounting clamp

3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT

3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT

2" NPT locknut, plastic

2" BSPT locknut, plastic

Cable Gland, General Purpose -20 ... +60 °C (-4 ... +140 °F)

Y15

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Article No.

A5E37100674

A5E37100685

7ML1930-1AC

7ML1830-1BK

7ML1830-1BR

7ML1830-1BT

7ML1830-1BU

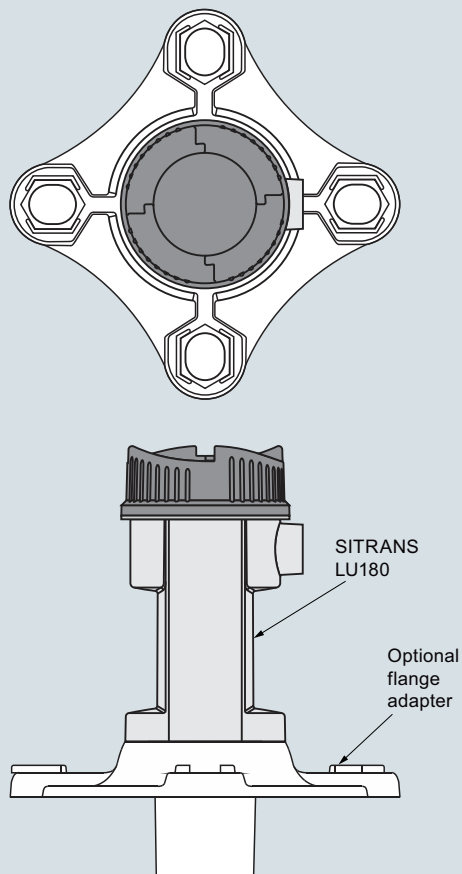
7ML1830-1DT

7ML1830-1DQ

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Options**SITRANS LU180, Flange Adapter**

The SITRANS LU180 can be fitted with the optional 75 (3) flange adapter for mating to 3" ANSI, DIN 65 PN10 and JIS 10K3B flanges.

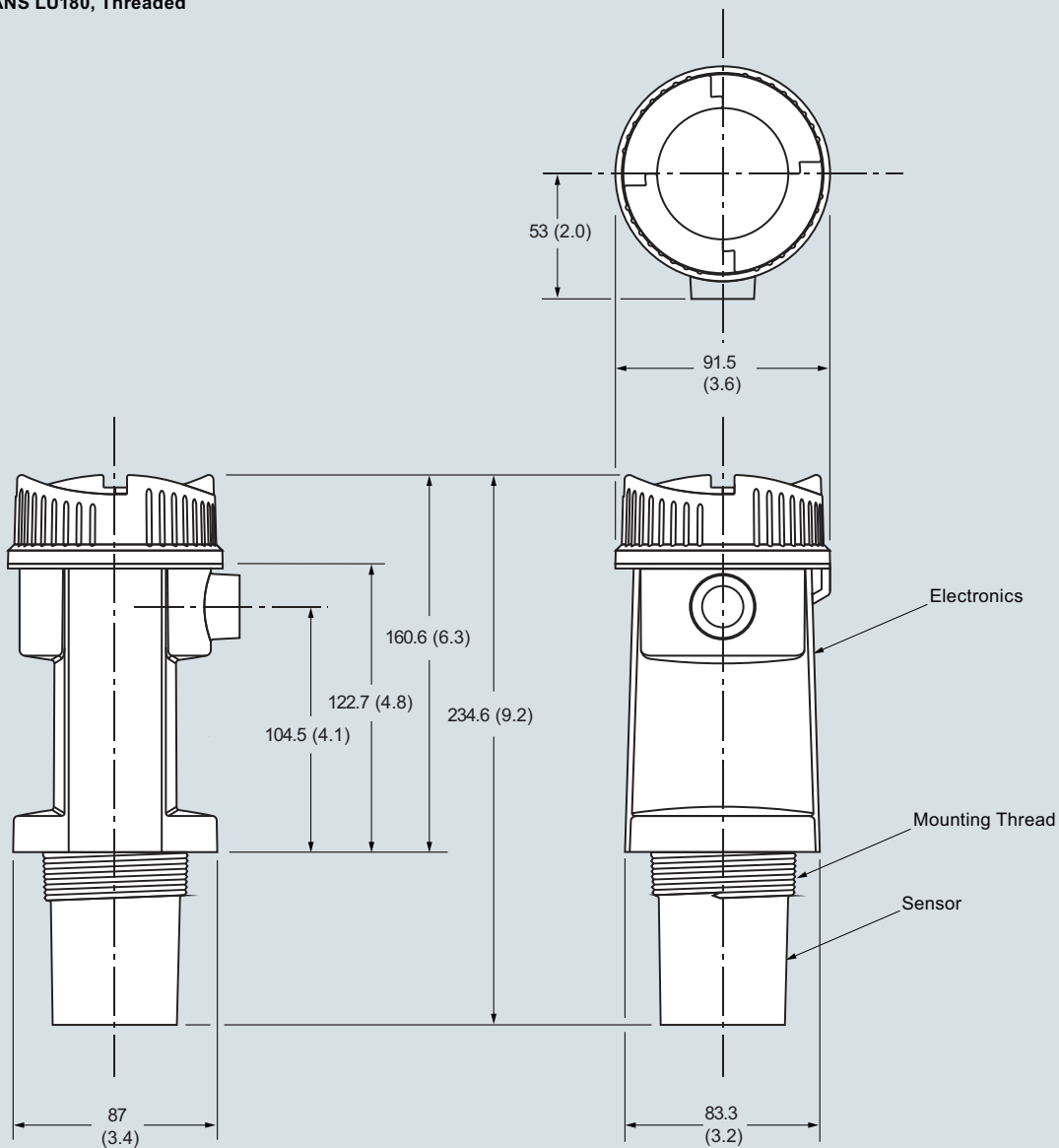


SITRANS LU180 optional flange adapter, dimensions in mm (inch)

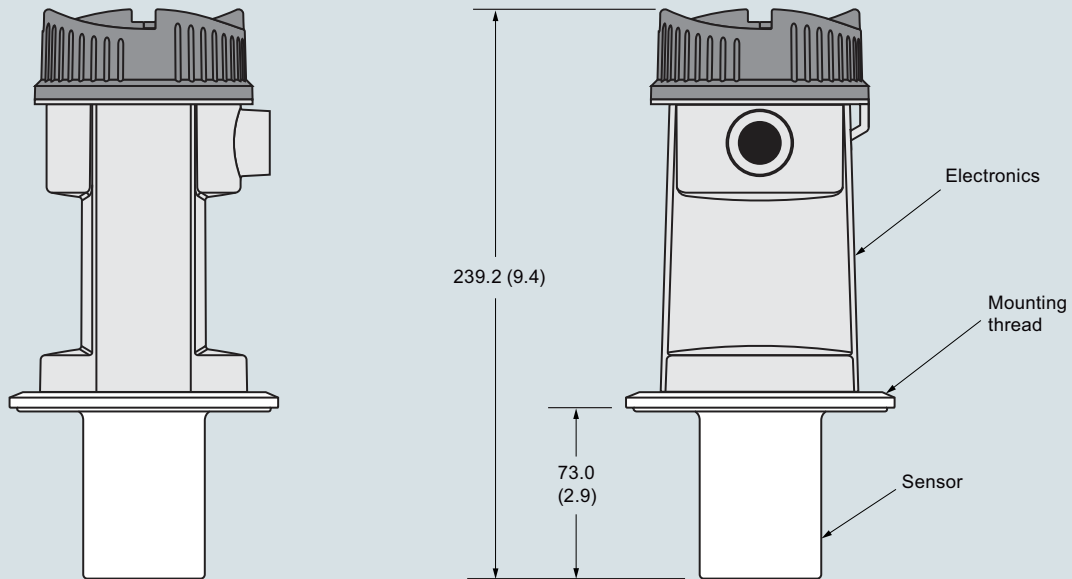
Level Measurement

Continuous level measurement

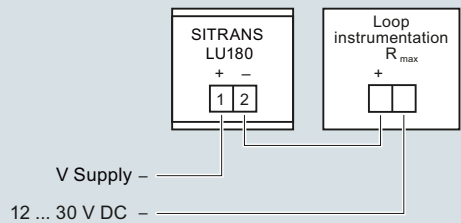
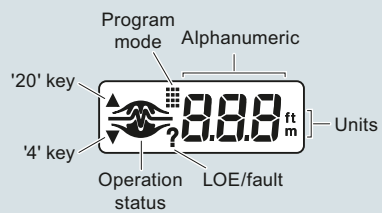
Ultrasonic transmitters

SITRANS LU180**Dimensional drawings****SITRANS LU180, Threaded**

SITRANS LU180, dimensions in mm (inch)

SITRANS LU180, Sanitary

SITRANS LU180, dimensions in mm (inch)

Circuit diagrams**SITRANS LU180, Threaded and sanitary models****Display**

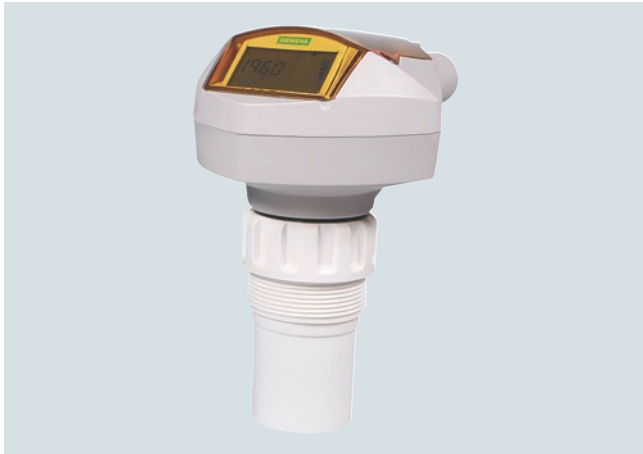
SITRANS LU180 connections

Level Measurement

Continuous level measurement
Ultrasonic transmitters

SITRANS Probe LU

Overview



SITRANS Probe LU is a 2-wire loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels, and simple process vessels.

Benefits

- Continuous level measurement up to 12 m (40 ft) range
- Easy installation and simple startup
- Programming using infrared Intrinsically Safe handheld programmer, SIMATIC PDM or HART Communicator
- Communication using HART or PROFIBUS PA
- ETFE or PVDF transducers for chemical compatibility
- Sonic Intelligence signal processing
- Auto False-Echo Suppression for fixed obstruction avoidance
- Level to volume or level to flow conversion

Application

The SITRANS Probe LU is ideal for level monitoring in the water and wastewater industry, chemical storage vessels, and small bulk hoppers.

The range of SITRANS Probe LU is 6 or 12 m (20 or 40 ft). Using Sonic Intelligence, Auto False Echo Suppression for fixed obstruction avoidance, and accuracy of 0.15 % of range or 6 mm (0.25 inch), the Probe LU provides unmatched reliability.

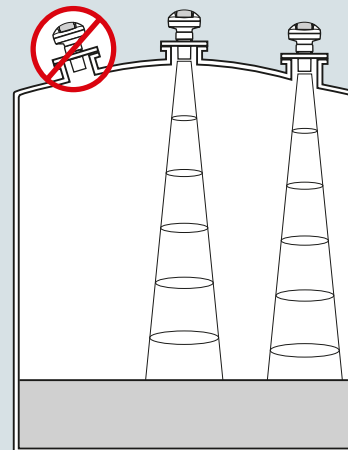
The Probe LU offers two communications options: HART or PROFIBUS PA (Profile version 3.0, Class B).

The transducer on the Probe LU is available as ETFE or PVDF to suit the chemical conditions of your application. As well, for applications with varying material and process temperatures, the Probe LU incorporates an internal temperature sensor to compensate for temperature changes.

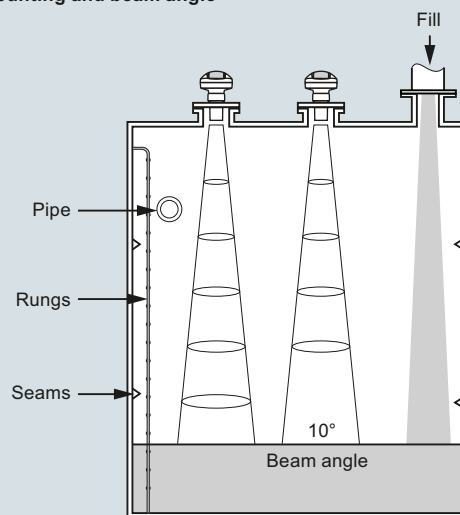
- Key Applications: chemical storage vessels, filter beds, liquid storage vessels

Configuration

Parabolic mounting



Flat mounting and beam angle



SITRANS Probe LU mounting

Technical specifications

Mode of operation		Process connection	
Measuring principle	Ultrasonic level measurement	Threaded connection	2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]
Typical application	Level measurement in storage vessels and simple process vessels	Flange connection	3 inch (80 mm) universal flange
Inputs		Other connection	FMS 200 mounting bracket (see page 4/186) or customer supplied mount
Measuring range		Display and Controls	
• 6 m (20 ft) model	0.25 ... 6 m (10 inch ... 20 ft)	Interface	Local: LCD display with bar graph Remote: Available via HART or PROFIBUS PA
• 12 m (40 ft) model	0.25 ... 12 m (10 inch ... 40 ft)	Configuration	Using Siemens SIMATIC PDM (PC) or HART handheld communicator or Siemens infrared handheld programmer
Frequency	54 kHz	Memory	Non-volatile EEPROM
Outputs		Power supply	
mA/HART		4 ... 20 mA/HART	Nominal 24 V DC with 550 Ω maximum; maximum 30 V DC 4 ... 20 mA
• Range	4 ... 20 mA	PROFIBUS PA	12, 13, 15, or 20 mA depending on programming (General Purpose or Intrinsically Safe version) per IEC 61158-2
• Accuracy	± 0.02 mA	Certificates and Approvals	
PROFIBUS PA	Profile 3, Class B	General	CSA _{US/C} , FM, CE, RCM
Performance		Marine (only applies to HART communication option)	• Lloyd's Register of Shipping • ABS Type Approval
Resolution	≤ 3 mm (0.12 inch)	Hazardous	
Accuracy	\pm the greater of 0.15 % of range or 6 mm (0.24 inch)	• Intrinsically Safe (Europe)	ATEX II 1G Ex ia IIC T4 Ga
Repeatability	≤ 3 mm (0.12 inch)	• Intrinsically Safe (USA/Canada)	CSA/FM, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
Blanking distance	0.25 m (10 inch)	• Intrinsically Safe (International)	SIR 13.0008X Ex ia IIC T4 Ga
Update time	≤ 5 s	• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga
• 4/20 mA/HART version	≤ 5 s at 4 mA	• Non-incendive (USA)	FM Class I, Div. 2, Groups A, B, C, D T4
• PROFIBUS version	≤ 4 s at 15 mA current loop	Handheld Programmer	
Temperature compensation	Built-in to compensate over temperature range	Intrinsically Safe Siemens handheld programmer	Infrared receiver
Beam angle	10°	• Approvals for handheld programmer	ATEX II 1GD / IECEx SIR 09.0073 Ex ia IIC T4 Ga Ex iaD 20 T135 °C FM/CSA Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G T6
Rated operating conditions		Ambient temperature	-20 ... 50 °C (-5 ... 122 °F)
Ambient conditions		Interface	Proprietary infrared pulse signal
• Location	Indoor/outdoor	Power	3 V lithium battery (non-replaceable)
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)		
• Relative humidity/ingress protection	Suitable for outdoor		
• Installation category	I		
• Pollution degree	4		
Medium conditions			
• Temperature at flange or threads	-40 ... +85 °C (-40 ... +185 °F)		
• Pressure (vessel)	0.5 bar g (7.25 psi g)		
Design			
Material (enclosure)	PBT (Polybutylene Terephthalate)		
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6/IP67/IP68 enclosure		
Weight	2.1 kg (4.6 lb)		
Cable inlet	2 x M20 x 1.5 cable gland or 2 x ½" NPT thread or 1 x M20 x 1.5 and 1 x ½" NPT		
Material (transducer)	Buna-N seal with ETFE (Ethylene Tetrafluoroethylene) or PVDF (Polyvinylidene Fluoride)		

Level Measurement

Continuous level measurement
Ultrasonic transmitters

SITRANS Probe LU

Selection and Ordering data

SITRANS Probe LU
2-wire, loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels, and simple process vessels.

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Enclosure/Cable Inlet

Plastic (PBT), 1 x M20 x 1.5 and 1 x 1/2" NPT (no cable glands supplied)
Plastic (PBT), 2 x M20 x 1.5 (includes 1 general purpose cable gland: 7ML1930-1AM)
Plastic (PBT), 2 x 1/2" NPT (no cable glands supplied)

Range/Transducer material

6 m (20 ft), ETFE
6 m (20 ft), PVDF Copolymer
12 m (40 ft), ETFE
12 m (40 ft), PVDF Copolymer

Process connection

2" NPT [(Taper), ANSI/ASME B1.20.1]
R 2" [(BSPT), EN 10226]
G 2" [(BSPP), EN ISO 228-1]

Communication/Output

4 ... 20 mA, HART
PROFIBUS PA

Approvals

General Purpose, FM, CSA_{US/C}, CE, RCM, KCC
Non-incendive, FM Class I, Div. 2, Groups A, B, C, D T5¹⁾
Intrinsically Safe, CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4²⁾
Intrinsically Safe ATEX 1G / JECEX / INMETRO Ex ia IIC T4 Ga, RCM, KCC²⁾
Intrinsically Safe ATEX 1G / JECEX / INMETRO Ex ia IIC T4 Ga, RCM, KCC³⁾
Intrinsically safe, CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4³⁾

¹⁾ Available with Enclosure/Cable Inlet option 2 only.

²⁾ Available with Communication option 2 only.

³⁾ Available with Communication option 1 only.

Article No.

7ML5221-

0 1 2

A B C D

A B C

1 2

1 4 5 6 7 8

Selection and Ordering data

Further designs

Please add **"-Z"** to Article No. and specify Order code(s).

Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]:
Measuring-point number/identification (max. 27 characters) specify in plain text

Operating Instructions for HART/ma device

English

Note: The Operating Instructions should be ordered as a separate item on the order.

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Accessories

Handheld programmer, Intrinsically Safe, EEx ia
Handheld programmer, General Purpose approvals
Handheld programmer, Infrared, Intrinsically Safe, PROFIBUS PA

HART modem/USB
(for use with a PC and SIMATIC PDM)

2" NPT locknut, plastic

2" BSPT locknut, plastic

3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT

3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT

One General Purpose polymeric cable gland M20 x 1.5, rated for -20 ... +80 °C (-4 ... +176 °F)

One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F) for General Purpose or ATEX EEx e installations (available for HART only)

One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA)

Universal box bracket, FMS-200

Probe LU rock guard and sunshield

SITRANS RD100, loop powered display - see Chapter 7

SITRANS RD200, universal input display with Modbus conversion - see Chapter 7

SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7

SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7

For applicable back up point level switch see point level measurement section.

Spare Parts

Plastic lid

Order code

Y15

Article No.

A5E32337695

7ML5830-2AH

A5E36563512

7ML5830-2AJ

7MF4997-1DB

7ML1830-1DT

7ML1830-1DQ

7ML1830-1BT

7ML1830-1BU

7ML1930-1AM

7ML1930-1AP

7ML1930-1AQ

7ML1830-1BK

7ML1930-1GH

7ML5741-...

7ML5740-...

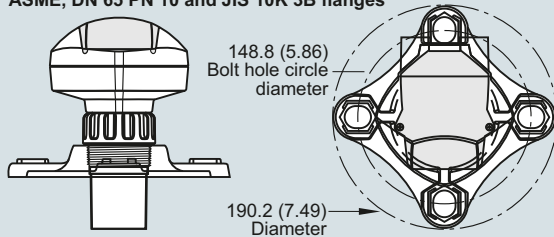
7ML5744-...

7ML5750-...

7ML1830-1KB

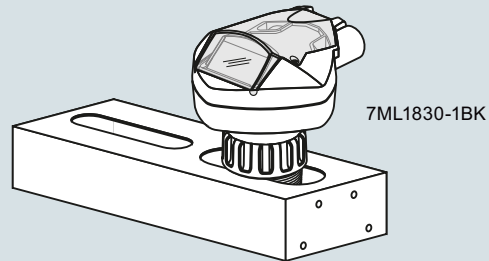
Options

Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ASME, DN 65 PN 10 and JIS 10K 3B flanges



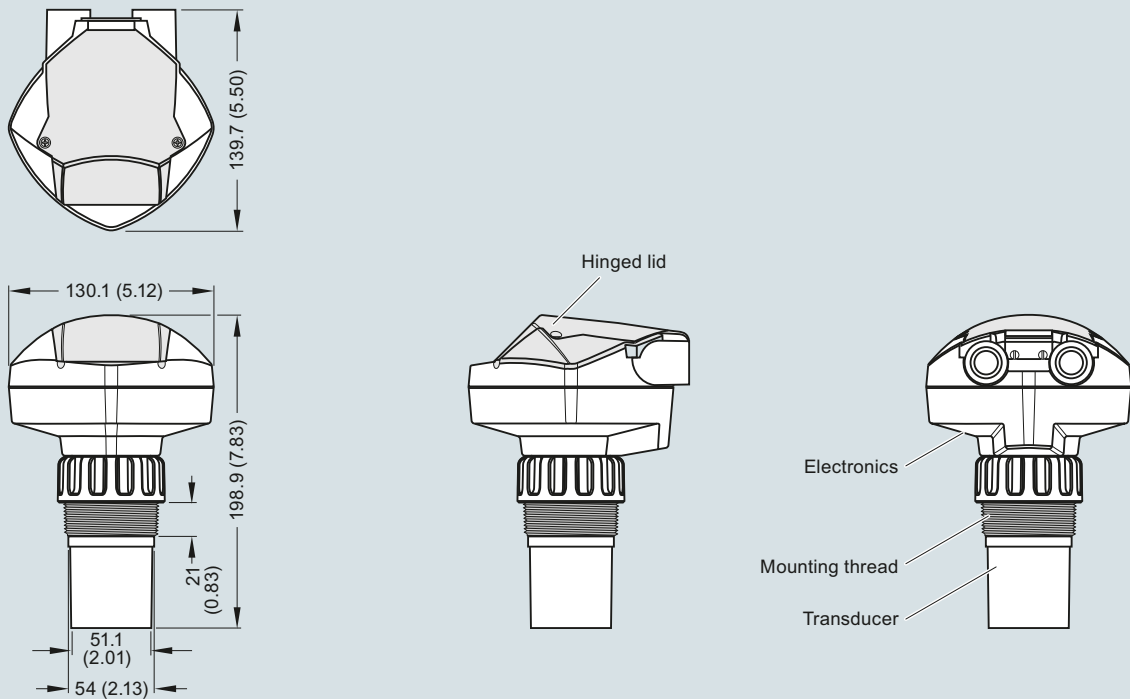
SITRANS Probe LU optional flange adapter, dimensions in mm (inch)

SITRANS Probe LU with FMS 200 universal box bracket



SITRANS Probe LU with optional mounting bracket

Dimensional drawings



Note: Above model is shown without M20 cable glands or 1/2" NPT conduit connectors.

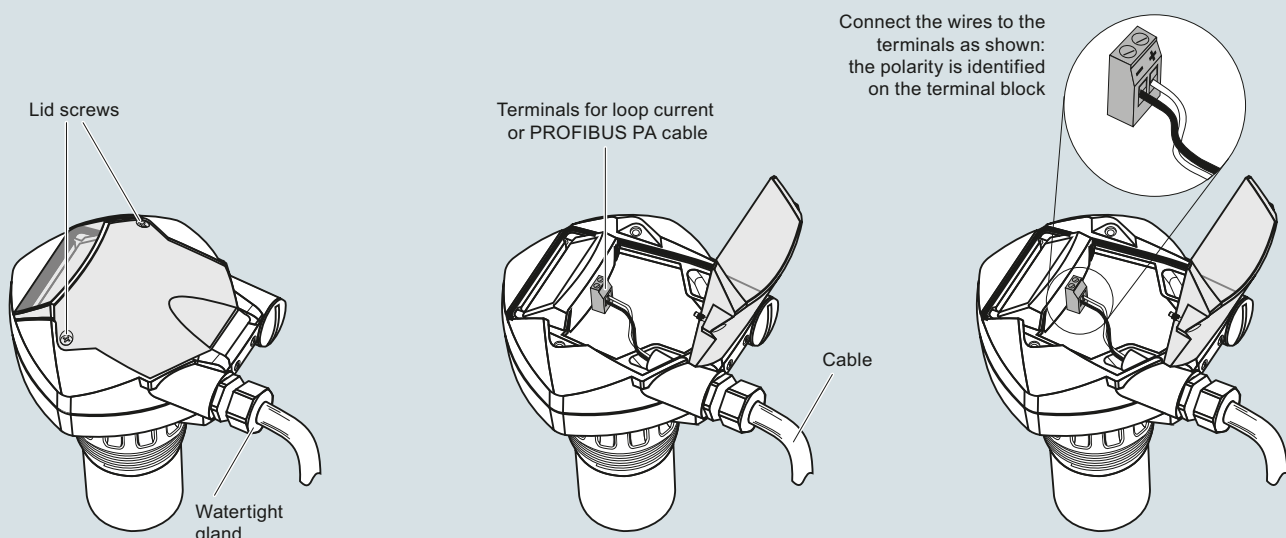
SITRANS Probe LU, dimensions in mm (inch)

Level Measurement

Continuous level measurement
Ultrasonic transmitters

SITRANS Probe LU

Circuit diagrams



Note:

- HART model above is shown with M20 cable glands. 1/2" NPT threaded connection is also available.
- DC terminal shall be supplied from an SELV source in accordance with IEC-1010-1 Annex H.
- All field wiring must have insulation suitable for rated input voltages.
- Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS Probe LU connections

Overview



The Probe is a short-range integrated ultrasonic level transmitter, ideal for liquids and slurries in open or closed vessels.

Benefits

- Easy to install, program, and maintain
- Accurate and reliable
- Sanitary models available
- Sonic Intelligence echo processing
- Integral temperature compensation

Application

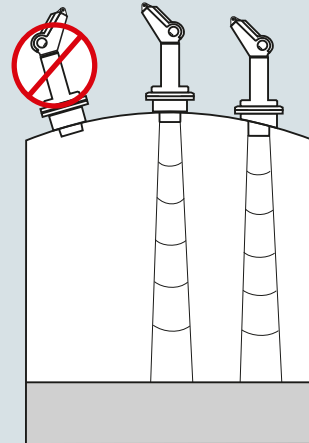
The transducer is available in PVDF copolymer, making the device suitable for use in a wide variety of applications. The Probe is easy to install and maintain, and can be quickly removed for cleaning as required by the food, beverage and pharmaceutical industries.

The reliability of the level data is based on the Sonic Intelligence echo processing algorithms. A filter discriminates between the true echo and false echoes from acoustic or electrical noises and agitator blades in motion. The ultrasonic pulse propagation time to the material and back is temperature-compensated and converted into distance for display, analog output and relay actuation.

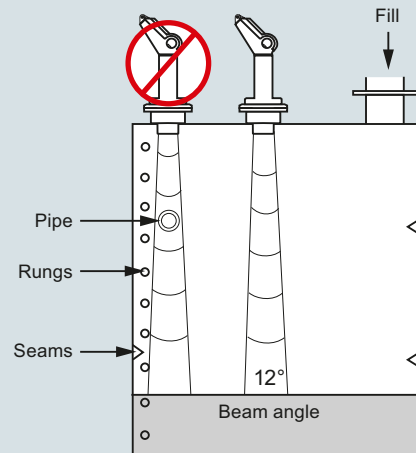
- Key Applications: chemical storage vessels, filter beds, mud pits, liquid storage vessels, food applications

Configuration

Parabolic mounting



Flat mounting and beam angle



The Probe mounting

Level Measurement

Continuous level measurement
Ultrasonic transmitters

The Probe

Technical specifications

3-wire version	
Mode of operation	
Measuring principle	Ultrasonic level measurement
Input	
Measuring range	0.25 ... 5 m (0.8 ... 16.4 ft)
Frequency	54 kHz
Output	
mA	4 ... 20 mA
• Span	Proportional/ inversely proportional
• Max. load	750 Ω at 24 V DC
Relay	For level alarm or fault
Power supply	
Supply voltage	18 ... 30 V DC, max. 0.2 A
Max. power consumption	5 W (200 mA at 24 V DC)
Certificates and approvals	
CE, RCM, CSA _{US/C} , FM	
Accuracy	
Error in measurement	0.25 % of measuring range (in air)
Resolution	3 mm (0.125 inch)
Temperature compensation	Built in
Echo processing	Sonic Intelligence
Rated operation conditions	
Beam angle	12°
Ambient temperature	
• Standard	-40 ... +60 °C (-40 ... +140 °F)
• Metallic mounting	-20 ... +60 °C (-4 ... +140 °F)
Max. static operating pressure	Normal atmospheric pressure
Degree of protection	IP65
Design	
Weight	
• Without flange adapter	1.5 kg (3.3 lb)
• With flange adapter	1.7 kg (3.7 lb)
Material	
• Electronics enclosure	PVC
• Transducer	PVDF copolymer
Degree of protection	IP65
Process connection	<ul style="list-style-type: none"> • 2" NPT [(Taper), ANSI/ASME B1.20.1] • R 2" [(BSPT), EN 10226] • G 2" [(BSPP), EN ISO 228-1] • 4" sanitary
Flange adapter	3" Universal (fits DN 65, PN 10 and 3" ASME)
Cable inlet	2 inlets for PG 16 or ½" NPT cable glands

Selection and Ordering data

The Probe

Short-range integrated ultrasonic level transmitter, ideal for liquids and slurries in open or closed vessels

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Measuring range

5 m (16.40 ft)

Transducer/Process connection

PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1]
PVDF copolymer, R 2" [(BSPT), EN 10226]
PVDF copolymer, G 2" [(BSPP), EN ISO 228-1]
PVDF copolymer, 4" Sanitary mounting

Model/Approval

3-wire, 24 V DC, CE, RCM, CSA, FM

Article No.

7ML1201-

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J

E

Selection and Ordering data

Further designs

Please add "-Z" to Article No. and specify Order code(s).

Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Accessories

Universal Box Bracket Mounting kit

Sanitary 4" mounting clamp

3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT

3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT

2" NPT locknut, plastic

2" BSPT locknut, plastic

Plastic M20 cable gland with metal locknut

SITRANS RD100, loop powered display - see Chapter 7

SITRANS RD200, universal input display with Modbus conversion - see Chapter 7

SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7

SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7

For applicable back up point level switch see point level measurement section.

Order code

Y17

Article No.

7ML1830-1BK

7ML1830-1BR

7ML1830-1BT

7ML1830-1BU

7ML1830-1DT

7ML1830-1DQ

7ML1930-1DB

7ML5741-...

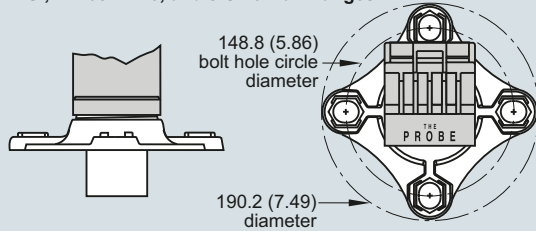
7ML5740-...

7ML5744-...

7ML5750-...

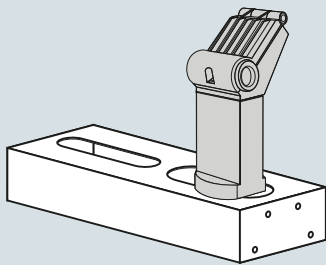
Options

Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ANSI, DN 65 PN10, and JIS 10K 3B flanges



The Probe optional flange adapter, dimensions in mm (inch)

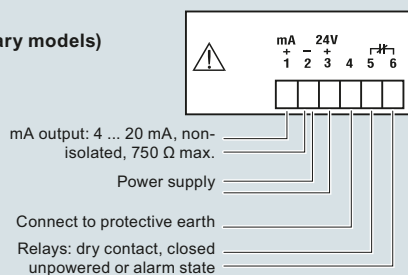
The Probe with FMS 200 mounting bracket



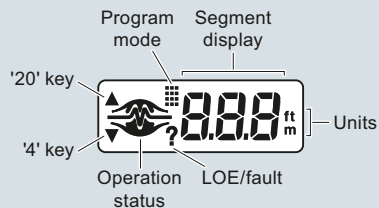
The Probe with optional mounting bracket

Circuit diagrams

3 wire model
(standard and sanitary models)



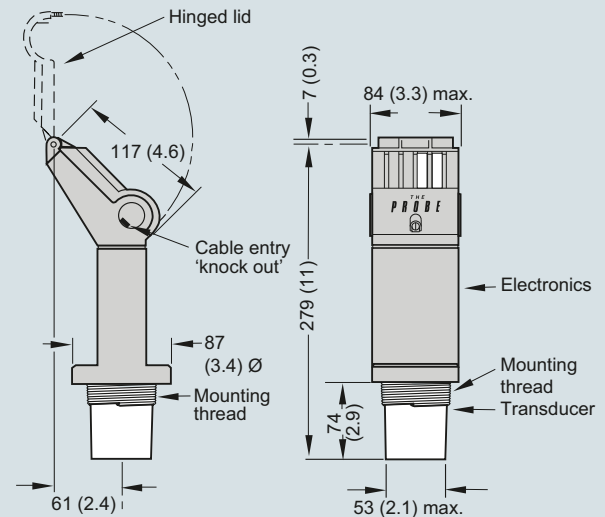
Display



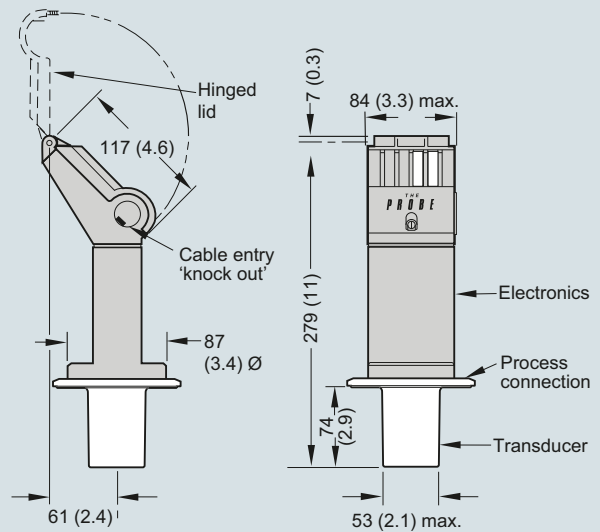
The Probe connections

Dimensional drawings

Standard model



Sanitary model



The Probe, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Ultrasonic controllers

SITRANS LUT400 series

Overview



The SITRANS LUT400 series controllers are compact, single point, long-range ultrasonic controllers for continuous level or volume measurement of liquids, slurries, solids, and high accuracy monitoring of open channel flow.

Application

The SITRANS LUT400 comes in three different models, depending on the application, level of performance and functionality required:

- SITRANS LUT420 Level Controller: Level or volume measurement of liquids, slurries, and solids, as well as basic pump control functions, and basic data logging capability
- SITRANS LUT430 Level, Pump and Flow Controller: Includes all features of the LUT420 plus a full suite of advanced pump control and alarm functionality, open channel flow monitoring, and basic flow data logging capability
- SITRANS LUT440 High Accuracy OCM: Our most featured, highest accuracy model. Includes all features of the LUT430, plus the industry's best accuracy (± 1 mm within 3 m), full suite of advanced control functionality, and enhanced flow logging capability
- Key Applications: wet wells, reservoirs, flumes/weirs, chemical storage, liquid storage, hoppers, crusher bins, dry solids storage

Benefits

- Small 1/2 DIN enclosure [144 h x 144 d x 146 w mm (5.7 x 5.7 x 5.75 inch)] with standard universal mounting bracket for wall, pipe, and DIN rail, plus an optional panel mount
- Easy to use HMI display with local four-button programming, menu-driven parameters, and Wizard support for key applications
- English, German, French, Spanish, Chinese, Italian, Portuguese, and Russian texts on the HMI.
- Level, Volume, OCM Flow monitoring
- Three relays combined with a suite of pump, alarm, and relay control features
- HART Communications
- EDDs for SIMATIC PDM, AMS Device Manager, and Field Communicator 375/475, plus DTMs for FDTs (Field Device Tools)
- Web browser for local programming from an intuitive web-based interface
- Two discrete inputs for backup level override and pump interlock functions
- Echo profile and trend views from the local display
- Patented digital receiver for improved performance in electrically noisy applications (close proximity to VSDs)
- Real time clock with daylight savings time, supporting an integrated datalogger and energy saving algorithms for minimizing pump operation during high cost energy periods
- Removable terminal blocks for ease of wiring
- MCERTS Certified for Open Channel Flow

Technical specifications

Mode of Operation	Ultrasonic level, volume, pump, and open channel flow
Measuring range	0.3 ... 60 m (1 ... 196 ft), transducer dependent
Input	
Discrete	0 ... 50 V DC switching level Logical 0 ≤ 10 V DC Logical 1 = 10 ... 50 V DC Max. 3 mA
Output	
Transducer frequency	10 ... 52 kHz
Ultrasonic transducer	Compatible transducers: All Echo-Max and ST-H series transducers
Relays	<ul style="list-style-type: none"> 1 SPDT Form C, NO or NC relay, rated 1A at 250 V AC, non-inductive and 3A at 30 V DC 2 SPST Form A, NO relays, rated 5A at 250 V AC, non-inductive and 3 A at 30 V DC
mA output	4 ... 20 mA, isolated
Max. load	600 Ω max. in ACTIVE mode, 750 Ω max. in PASSIVE mode
Resolution	0.1 % of range
Accuracy	
Error in measurement	<ul style="list-style-type: none"> Standard operation: ± 1 mm (0.04 inch) plus 0.17 % of measured distance High accuracy OCM: ± 1 mm (0.04 inch), within 3 m (9.84 ft) range
Resolution	<ul style="list-style-type: none"> Standard operation: 0.1 % of range or 2 mm (0.08 inch), whichever is greater High accuracy OCM: 0.6 mm (0.02 inch), within 3 m (9.84 ft) range
Temperature compensation	<ul style="list-style-type: none"> -40 ... +150 °C (-40 ... +300 °F) Integral temperature sensor in transducer External TS-3 temperature sensor (optional) Programmable fixed temperature values
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature (enclosure)	-20 ... +50 °C (-4 ... +122 °F)

Design	
Weight	
• Enclosure with display lid	1.3 kg (2.87 lb)
• Enclosure with blank lid	1.2 kg (2.65 lb)
Material (enclosure)	Polycarbonate
Degree of protection	
• Enclosure with display or blank lid	IP65/Type 4X/NEMA 4X
• Enclosure with blank lid and knock-out removed	IP20
Remote display lid	IP65/Type 3/NEMA 3
Cable	
Transducer and mA output signal	<ul style="list-style-type: none"> Transducer, mA output: 2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 ... 0.75 mm² (22 ... 18 AWG) Relay/power to be copper conductors per local requirements to meet 250 V 5 A contact rating
Max. separation between transducer and transceiver	365 m (1 200 ft)
Displays and controls	60 x 40 mm (2.36 x 1.57 inch) removable LCD, 240 x 160 pixels resolution, operational up to 5 m from enclosure base
Programming	
• Primary	4 Local push buttons
• Secondary	<ul style="list-style-type: none"> PC running SIMATIC PDM PC running Emerson AMS Device Manager PC running a web browser PC running a Field Device Tool (FDT) Field Communicator 375/475 (FC375/FC475)
Memory	<ul style="list-style-type: none"> 512 kB flash EPROM 1.5 MB flash for data logging
Power supply	
AC version	100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA Fuse: 5 x 20 mm, Slow Blow, 0.25 A, 250 V
DC version	10 ... 32 V DC, 10 W Fuse: 5 x 20 mm, Slow Blow, 1.6 A, 125 V
Certificates and approvals	
General	CSA _{US/C} , CE, FM, UL listed, RCM, EAC, KCC, MCERTS certified for Open Channel Flow
Hazardous	
• Non-incendive (Canada)	CSA Class I, Div. 2, Groups A, B, C, D; Class II, Div. 2, Groups F, G; Class III
• Shipping	Lloyd's Register, ABS
Communication	HART 7.0, USB

Level Measurement

Continuous level measurement

Ultrasonic controllers

SITRANS LUT400 series

		SITRANS LUT420	SITRANS LUT430	SITRANS LUT440
Category	Feature	Level Controller	Level, pump and flow controller	High accuracy OCM controller
Operations	Level, space, and distance measurement	✓	✓	✓
	Open channel flow measurement		✓	✓
	Volume conversion	✓	✓	✓
Specifications	Compatible with EchoMax and ST-H transducers	✓	✓	✓
	Standard accuracy: $\pm 1 \text{ mm} + 0.17 \%$ of measured distance	✓	✓	✓
	High accuracy: $\pm 1 \text{ mm}$ within 3 meters			✓
	Mounting options: wall or panel, pipe, DIN-rail	✓	✓	✓
Data logging and communications	HART communications	✓	✓	✓
	4 ... 20 mA output (active and passive)	✓	✓	✓
	Integrated datalogger for measurement value and alarms	✓	✓	✓
	Integrated datalogger for fixed rate flow logging		✓	✓
	Integrated datalogger for variable rate flow logging triggered by changes in flow condition			✓
	Daily data logging for maximum, minimum and average flow, daily totalized volume, and minimum and maximum temperature		✓	✓
Flow monitoring	High accuracy open channel flow measurement			✓
	9 digit daily and running flow totalizers		✓	✓
	High and low flowrate alarms		✓	✓
	External totalizer and sampler control		✓	✓
	MCERTS Class 1 Certification			✓
	MCERTS Class 2 Certification		✓	
Pump control	Energy saving algorithms for pump control		✓	✓
	Wall cling reduction	✓	✓	✓
	Pump run-on functionality		✓	✓
	Pump start and power resumption delays		✓	✓
	Alternate duty pump routines	✓	✓	✓
	Fixed duty and service ratio pump routines		✓	✓
	Pumped volume totalizer		✓	✓
	Submergence detection	✓	✓	✓
	Discrete input pump interlocks		✓	✓
	Time to spill calculation		✓	✓

4/147

Level Measurement

Continuous level measurement
Ultrasonic controllers

SITRANS LUT400 series

Selection and Ordering data

Article No.

SITRANS LUT440

The SITRANS LUT440 is the most accurate and featured model in the LUT400 series. It includes high accuracy open channel monitoring, relay functions for external samplers, totalizers, alarms, and enhanced data logging, as well as all pump and control functions available with other models in the LUT400 series.

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Model

SITRANS LUT440 - High accuracy Open Channel Monitor¹⁾

Enclosure display options

With display

With remote panel mount display [includes panel mount cable extension, 2.5 m (8.2 ft)]
No display (blank lid provided)

Note: Enclosure includes back-plate for wall and pipe mounting, and an integrated clip for DIN-rail mounting. DIN-rail mounting for standard TS35 x 7.5 and TS35 x 15 mm DIN-rail to IEC 60715, EN 60715

Input voltage

100 ... 230 V AC \pm 15 %
10 ... 32 V DC

Cable inlet

3 cable inlets, cable glands not supplied
3 cable inlets, 3 M20 plastic cable glands supplied

Number of measurement points

Single point system (includes one transducer input, one mA output, and one external temperature sensor input)

Communications and I/O

HART, 2 discrete inputs, 3 relays

Approvals

General purpose CE, FM, CSA_{US/C}, UL, RCM, EAC, KCC

Hazardous locations CSA Class I, II, III, Div. 2, Groups A, B, C, D, F, G

¹⁾ Compatible with all EchoMax Transducers. High accuracy OCM performance with the use of an XRS-5 transducer and TS-3 temperature sensor (each sold separately).

Article No.

7ML5050-

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Selection and Ordering data

Article No.

Accessories

Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure

TS-3 Temperature Sensor - see TS-3 on page 4/188

Panel mount cable extension 2.5 m (8.2 ft)

Qty 3 cable glands and retaining nuts

USB cable 2 m (6.56 ft) - Standard USB-A to USB-mini B

HART modem/USB (for use with PC and SIMATIC PDM)

Sunshield, 304 stainless steel

SITRANS RD100, loop powered display - see Chapter 7

SITRANS RD200, universal input display with Modbus conversion - see Chapter 7

SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7

SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7

Spare parts

Panel mount retrofit kit (convert standard unit with display to panel mount version)

Terminal block replacement kit (5 piece kit with one of each removable terminal)

Wall/Pipe mount plate

Enclosure (include blank label)

SITRANS LUT400 Lid (with Display)

SITRANS LUT400 Lid (blank)

Fuse - AC (0.25 A, 250 V, Slow Blow)

Fuse - DC (1.6 A, 125 V, Slow Blow)

Panel mount gasket and fastener kit

DIN-rail clip

LUT440, assembly, DC, board stack with cradle, hazardous

LUT440, assembly, AC, board stack with cradle, hazardous

Article No.

7ML1930-1AC

7ML1813-...

7ML1930-1GF

7ML1930-1GB

7ML1930-1GD

7MF4997-1DB

7ML1930-1GE

7ML5741-...

7ML5740-...

7ML5744-...

7ML5750-...

7ML1830-1PA

7ML1830-1PB

7ML1830-1PC

7ML1830-1PD

7ML1830-1PE

7ML1830-1PF

7ML1830-1PG

7ML1830-1PH

7ML1830-1PK

7ML1830-1PL

A5E42847454

A5E42847456

Selection and Ordering data

Order code

Further designs

Please add "-Z" to Article No. and specify Order code(s).

Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000

Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]:
Measuring-point number/identification (max. 27 characters) specify in plain text

Namur NE43 failsafe setting - device preset to failsafe < 3.6 mA

Operating Instructions

English

German

Note: The Operating Instructions should be ordered as a separate line item on the order.

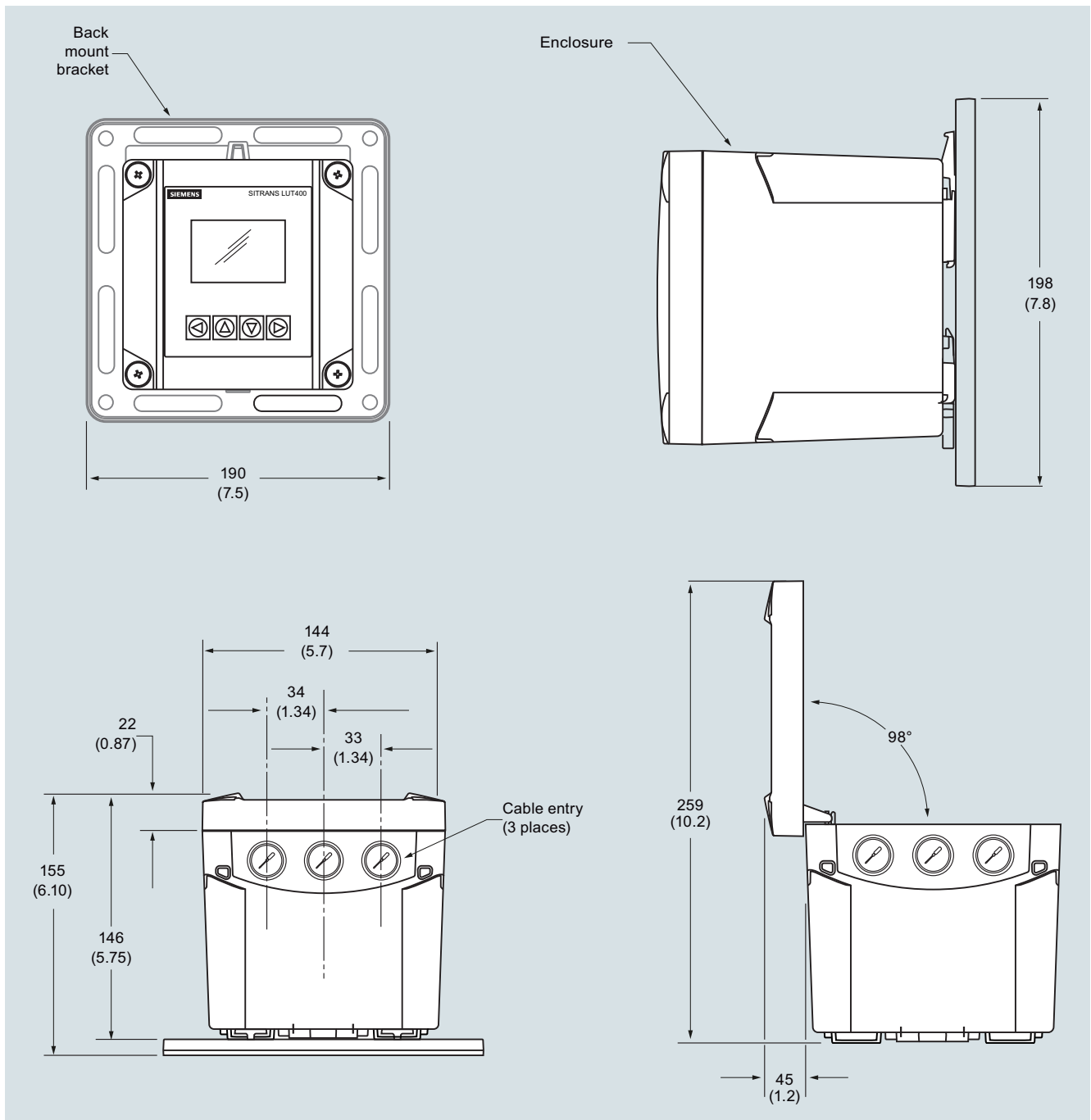
All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Article No.

A5E33329501

A5E35690863

Dimensional drawings

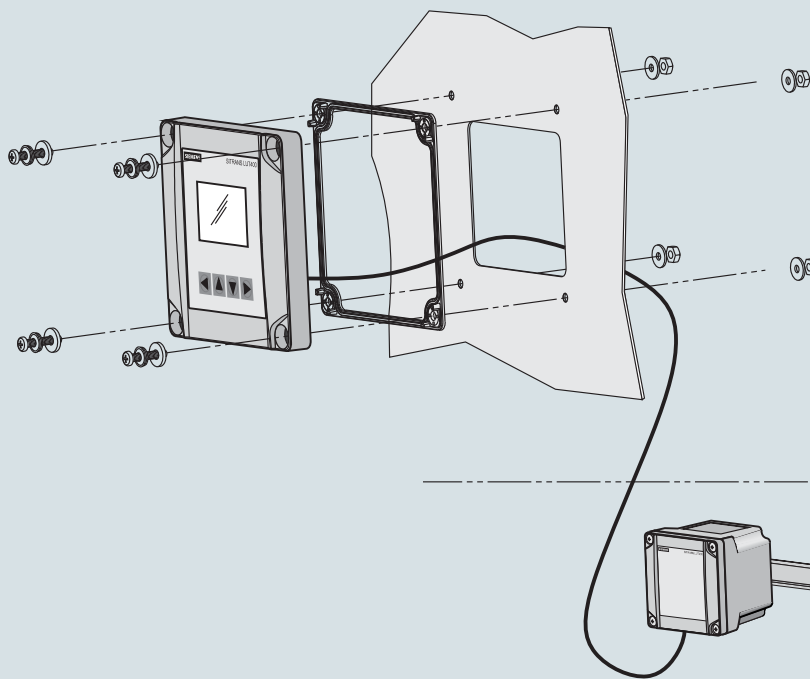
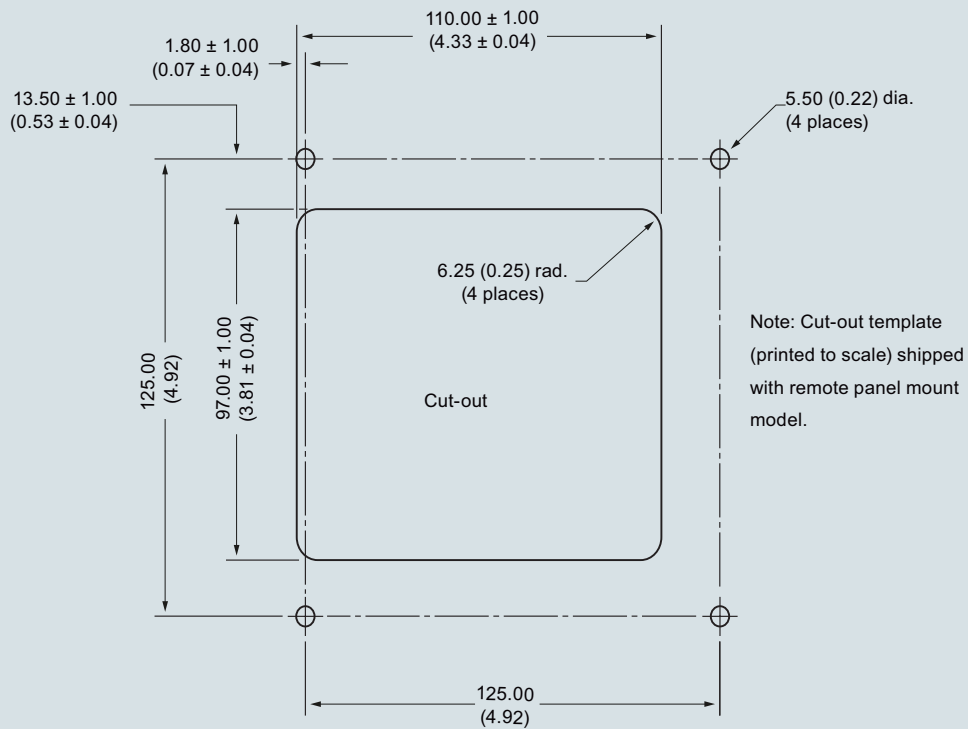


SITRANS LUT400, dimensions in mm (inch)

Level Measurement

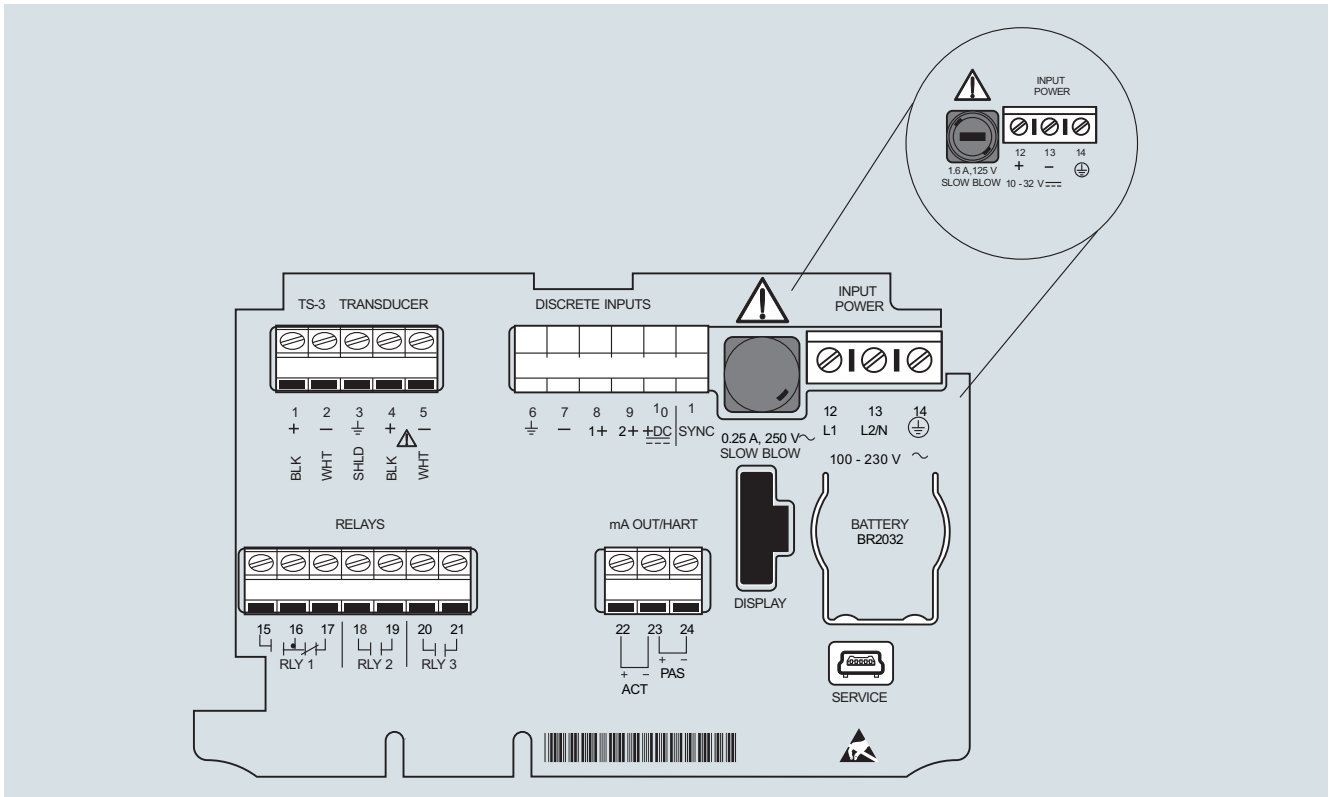
Continuous level measurement

Ultrasonic controllers

SITRANS LUT400 series

SITRANS LUT400, dimensions in mm (inch)

Circuit diagrams



SITRANS LUT400 connections

Level Measurement

Continuous level measurement
Ultrasonic controllers

MultiRanger 200 HMI

Overview



MultiRanger 200 HMI is a versatile short to medium-range ultrasonic single and multi-vessel level monitor/controller for virtually any application in a wide range of industries.

Benefits

- Easy to use HMI display with local four-button programming, menu-driven parameters, and Wizard support for key applications
- English, German, French, Spanish, Chinese, Italian, Portuguese, and Russian texts on the HMI
- Removable terminal blocks for ease of wiring
- Digital input for back-up level override from point level device
- Communication using built-in Modbus RTU via RS 485 and SIMATIC PDM configuration software
- Compatible with SmartLinX system: PROFIBUS DP, ProfiNet (cyclic access of process values only), DeviceNET, Modbus TCP/IP, and Ethernet/IP
- Single or dual point level monitoring
- Auto False-Echo Suppression for fixed obstruction avoidance
- Differential amplifier transceiver for common mode noise reduction and improved signal-to-noise ratio
- Level, volume, and flow measurements in open channels, differential control, extended pump control, and alarm functions
- Wall and panel mounting options

Application

MultiRanger 200 HMI can be used with various materials, including, water, municipal waste, acids, woodchips, or on materials with high angles of repose. MultiRanger 200 HMI offers true dual point monitoring, digital communications with built-in Modbus RTU via RS 485, as well as compatibility with SIMATIC PDM, allowing PC configuration and set-up. MultiRanger 200 HMI features Sonic Intelligence advanced echo-processing software for increased reading reliability.

MultiRanger 200 HMI will monitor open channel flow and features more advanced relay alarming and pump control functions as well as volume conversion.

It is compatible with chemical-resistant EchoMax transducers that are approved for hostile environments.

- Key Applications: wet wells, flumes/weirs, bar screen control, hoppers, chemical storage, liquid storage, crusher bins, dry solids storage

Design

The MultiRanger 200 HMI is available in wall or panel mounting options.

Technical specifications

Mode of Operation		Design	
Measuring principle	Ultrasonic level measurement	Weight	
Measuring range	0.3 ... 15 m (1 ... 50 ft)	<ul style="list-style-type: none">• Wall mount• Panel mount	1.22 kg (2.68 lb) 1.35 kg (2.97 lb)
Measuring points	1 or 2	Material (enclosure)	Polycarbonate
Input		Degree of protection (enclosure)	
Analog	0 ... 20 mA or 4 ... 20 mA, from alternate device, scalable	<ul style="list-style-type: none">• Wall mount• Panel mount	IP65/Type 4X/NEMA 4X IP54/Type 3/NEMA 3
Discrete	10 ... 50 V DC switching level Logical 0 ≤ 0.5 V DC Logical 1 = 10 ... 50 V DC max. 3 mA	Electrical connection	
Output		<ul style="list-style-type: none">• Transducer and mA output signal	2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm² (22 ... 18 AWG), Belden 8760 or equivalent is acceptable
EchoMax transducer	44 kHz	<ul style="list-style-type: none">• Max. separation between transducer and transceiver	365 m (1 200 ft)
Ultrasonic transducer	Compatible transducers: ST-H and EchoMax series XPS-10, XPS-15/15F, and XRS-5	Displays and controls	60 x 40 mm (2.36 x 1.57 inch) LCD 240 x 160 pixels resolution
Relays	Rating 5 A at 250 V AC, non-inductive	Power supply	
mA output	0 ... 20 mA or 4 ... 20 mA	AC version	100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W)
<ul style="list-style-type: none">• Max. load• Resolution	750 Ω, isolated 0.1 % of range	DC version	12 ... 30 V DC (20 W)
Accuracy		Certificates and approvals	<ul style="list-style-type: none">• CE, RCM, EAC, KCC²⁾• FM, CSA_{US/C}, UL• CSA Class I, Div. 2, Groups A, B, C, and D, Class II, Div. 2, Groups F and G, Class III (wall mount only)
Error in measurement	0.25 % of range or 6 mm (0.24 inch), whichever is greater	Communication	<ul style="list-style-type: none">• RS 232 with Modbus RTU or ASCII via RJ-11 connector• RS 485 with Modbus RTU or ASCII via terminal strips• Optional: SmartLinx cards for<ul style="list-style-type: none">- PROFIBUS DPV1, ProfiNet (cyclic access of process values only)- DeviceNet, Modbus TCP/IP, Ethernet/IP
Resolution	0.1 % of measuring range ¹⁾ or 2 mm (0.08 inch), whichever is greater		
Temperature compensation	<ul style="list-style-type: none">• -50 ... +150 °C (-58 ... +302 °F)• Integral temperature sensor• External TS-3 temperature sensor (optional)• Programmable fixed temperature values		
Rated operating conditions			
Installation conditions			
<ul style="list-style-type: none">• Location• Installation category• Pollution degree	Indoor/outdoor II 4		
Ambient conditions			
<ul style="list-style-type: none">• Ambient temperature (housing)	-20 ... +50 °C (-4 ... +122 °F)		

1)

Program range is defined as the empty distance to the face of the transducer plus any range extension

2)

EMC performance available on request

Continuous level measurement

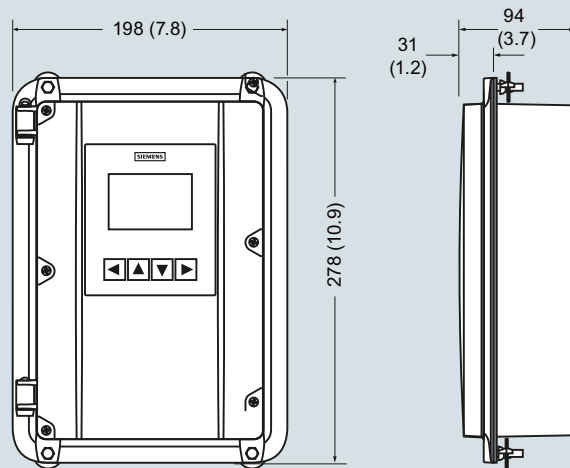
Ultrasonic controllers

Selection and Ordering data

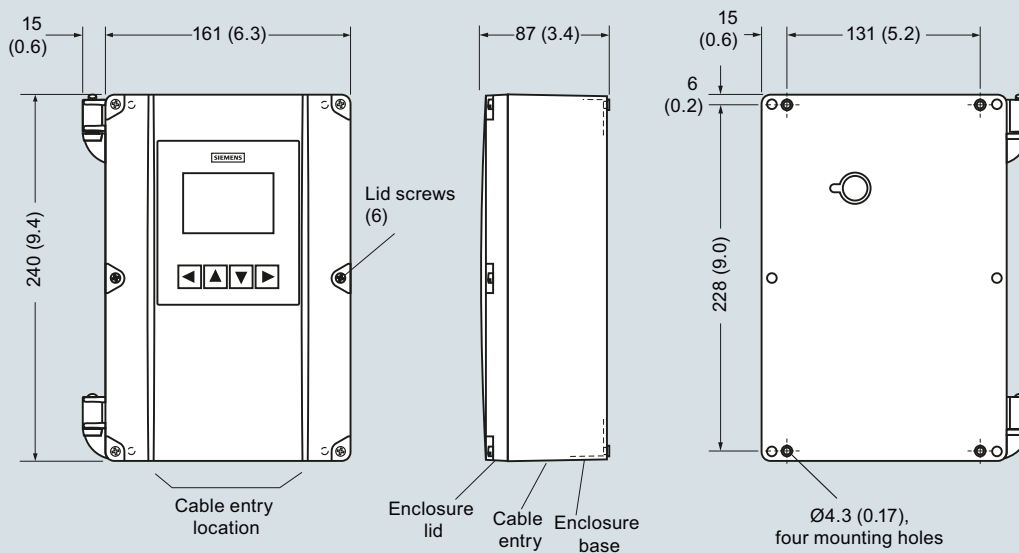
¹⁾ Available with Mounting/Enclosure design options D or E

Dimensional drawings

Panel mount dimensions



Wall mount dimensions



MultiRanger 200 HMI, dimensions in mm (inch)

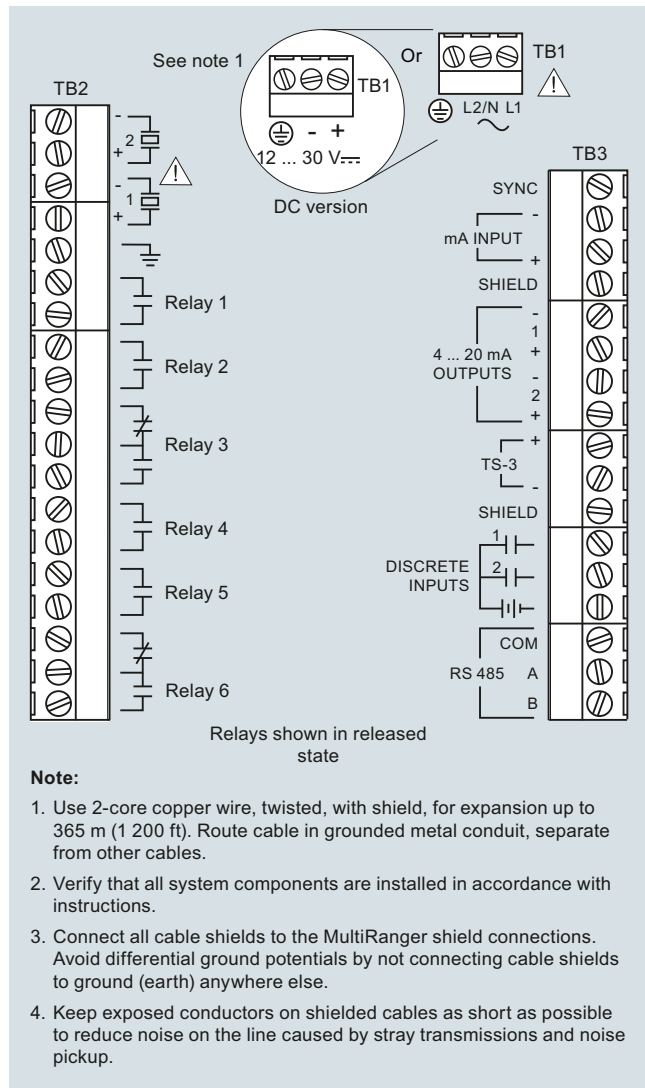
Level Measurement

Continuous level measurement

Ultrasonic controllers

MultiRanger 200 HMI

Circuit diagrams



MultiRanger 200 HMI connections

Overview



MultiRanger is a versatile short to medium-range ultrasonic single and multi-vessel level monitor/controller for virtually any application in a wide range of industries.

Benefits

- Digital input for back-up level override from point level device
- Communication using built-in Modbus RTU via RS 485
- Compatible with SmartLinX communication options or SIMATIC PDM via RS 485
- Single or dual point level monitoring
- Auto False-Echo Suppression for fixed obstruction avoidance
- Differential amplifier transceiver for common mode noise reduction and improved signal-to-noise ratio
- MultiRanger 100: level measurements, simple pump control, and level alarm functions
- MultiRanger 200: level, volume, and flow measurements in open channels, differential control, extended pump control, and alarm functions
- Wall and panel mounting options

Application

MultiRanger can be used on different materials, including fuel oil, municipal waste, acids, woodchips, or on materials with high angles of repose. MultiRanger offers true dual point monitoring, digital communications with built-in Modbus RTU via RS 485, as well as compatibility with SIMATIC PDM, allowing PC configuration and setup. MultiRanger features Sonic Intelligence advanced echo-processing software for increased reading reliability.

MultiRanger 100 offers cost-effective level alarming, as well as on/off and alternating pump control. MultiRanger 200 will monitor open channel flow and features more advanced relay alarming and pump control functions as well as volume conversion.

It is compatible with chemical-resistant EchoMax transducers that can be used in hostile environments at temperatures as high as 145 °C (293 °F).

- Key Applications: wet wells, flumes/weirs, bar screen control, hoppers, chemical storage, liquid storage, crusher bins, dry solids storage

Design

The MultiRanger is available in wall or panel mounting options.

Level Measurement

Continuous level measurement

Ultrasonic controllers

MultiRanger 100/200

Technical specifications

Mode of Operation		Design	
Measuring principle	Ultrasonic level measurement	Weight	
Measuring range	0.3 ... 15 m (1 ... 50 ft)	• Wall mount	1.37 kg (3.02 lb)
Measuring points	1 or 2	• Panel mount	1.50 kg (3.31 lb)
Input		Material (enclosure)	Polycarbonate
Analog (MultiRanger 200 only)	0 ... 20 mA or 4 ... 20 mA, from alternate device, scalable	Degree of protection (enclosure)	
Discrete	10 ... 50 V DC switching level Logical 0 ≤ 0.5 V DC Logical 1 = 10 ... 50 V DC Max. 3 mA	• Wall mount	IP65/Type 4X/NEMA 4X
Output		• Panel mount	IP54/Type 3/NEMA 3
EchoMax transducer	44 kHz	Electrical connection	
Ultrasonic transducer	Compatible transducers: ST-H and EchoMax series XPS-10, XPS 15/15F, and XRS-5	• Transducer and mA output signal	2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm ² (22 ... 18 AWG), Belden 8760 or equivalent is acceptable
Relays	Rating 5 A at 250 V AC, non-inductive	• Max. separation between transducer and transceiver	365 m (1 200 ft)
• Version with 1 relay (MultiRanger 100 only)	1 SPST Form A	Displays and controls	
• Version with 3 relays	2 SPST Form A/1 SPDT Form C	100 x 40 mm (4 x 1.5 inch) multi-block LCD with backlighting	
• Version with 6 relays	4 SPST Form A/2 SPDT Form C	Programming	
mA output	0 ... 20 mA or 4 ... 20 mA	Programming using hand-held programmer, SIMATIC PDM or via PC with Dolphin Plus software	
• Max. load	750 Ω isolated	Power supply	
• Resolution	0.1 % of range	AC version	
Accuracy		100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W)	
Error in measurement	0.25 % of range or 6 mm (0.24 inch), whichever is greater	DC version	
Resolution	0.1 % of measuring range ¹⁾ or 2 mm (0.08 inch), whichever is greater	12 ... 30 V DC (20 W)	
Temperature compensation	<ul style="list-style-type: none"> -50 ... +150 °C (-58 ... +302 °F) Integral temperature sensor External TS-3 temperature sensor (optional) Programmable fixed temperature values 	Certificates and approvals	
Rated operating conditions		<ul style="list-style-type: none"> CE, RCM, EAC, KCC²⁾ Lloyd's Register of Shipping ABS Type Approval FM, CSA_{US/C}, UL listed CSA Class I, Div. 2, Groups A, B, C, and D, Class II, Div. 2, Groups F and G, Class III (wall mount only), ATEX II 3D, EAC Ex 	
Installation conditions		Communication	
• Location	Indoor/outdoor	<ul style="list-style-type: none"> RS 232 with Modbus RTU or ASCII via RJ-11 connector RS 485 with Modbus RTU or ASCII via terminal strips Optional: SmartLinx cards for <ul style="list-style-type: none"> - PROFIBUS DP - DeviceNet 	
• Installation category	II		
• Pollution degree	4		
Ambient conditions			
• Ambient temperature (housing)	-20 ... +50 °C (-4 ... +122 °F)		

¹⁾ Program range is defined as the empty distance to the face of the transducer plus any range extension

²⁾ EMC performance available on request

Level Measurement

Continuous level measurement

Ultrasonic controllers

MultiRanger 100/200

Selection and Ordering data	Article No.	Selection and Ordering data	Order code
MultiRanger 100/200 Versatile short to medium-range ultrasonic single and multi-vessel level monitor/controller for virtually any application in a wide range of industries ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5033- 	Further designs Please add "-Z" to Article No. and specify Order code(s). Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Versions MultiRanger 100, level measurement only MultiRanger 200, level, volume, flow, and differential measurements	1 2	Operating Instructions English German Note: The Operating Instructions should be ordered as a separate item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	Article No. 7ML19985FB06 7ML19985FB36
Mounting, enclosure design Wall mount, standard enclosure Wall mount, 4 entries, 4 M20 cable glands included Panel mount (CE, CSA _{US/C} , FM, UL)	A B C	Accessories Handheld programmer Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure M20 cable gland kit (4 M20 cable glands, 4 M20 nuts, 4 washers) Sunshield kit, 304 stainless steel USB to RS 232 adapter SITRANS RD100, loop powered display - see Chapter 7 SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	A5E36563512 7ML1930-1AC 7ML1930-1FV 7ML1930-1GA 7ML1930-6AK 7ML5741-... 7ML5740-... 7ML5744-... 7ML5750-...
Power supply 100 ... 230 V AC 12 ... 30 V DC	A B	Spare parts Power Supply Board (100 ... 230 V AC) Power Supply Board (12 ... 30 V DC) MultiRanger 100/200/ HydroRanger 200 display, non-HMI Removable terminal blocks	7ML1830-1MD 7ML1830-1ME 7ML1830-1MF A5E38824197
Number of measurement points Single point version Dual point version	0 1		
Communication (SmartLinx) Without module SmartLinx PROFIBUS DP module SmartLinx DeviceNet module See SmartLinx product on page 4/348 for more information.	0 2 3		
Output relays 3 relays (2 Form A, 1 Form C), 250 V AC 6 relays (4 Form A, 2 Form C), 250 V AC 1 relay (1 Form A), 250 V AC (available on MultiRanger 100 model only)	1 2 3		
Approvals General Purpose CE, FM, CSA _{US/C} , UL listed, RCM, EAC, KCC CSA Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III ¹⁾ ATEX II 3D, EAC Ex ²⁾	A B C		

¹⁾ For wall mount applications only

²⁾ For standard enclosure wall mount, option A only

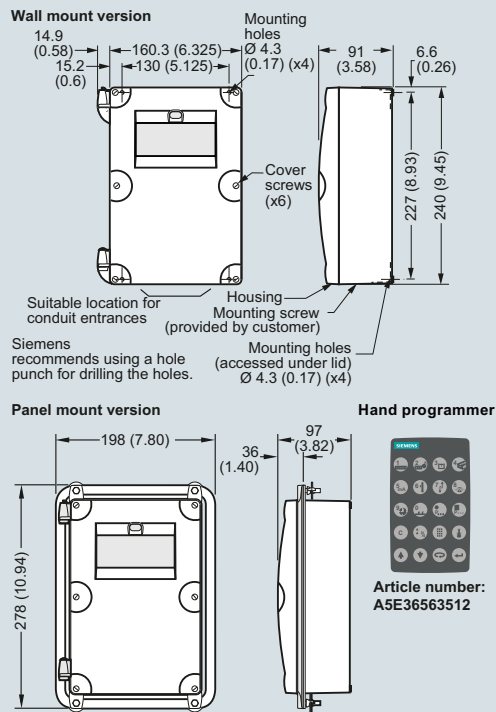
Level Measurement

Continuous level measurement

Ultrasonic controllers

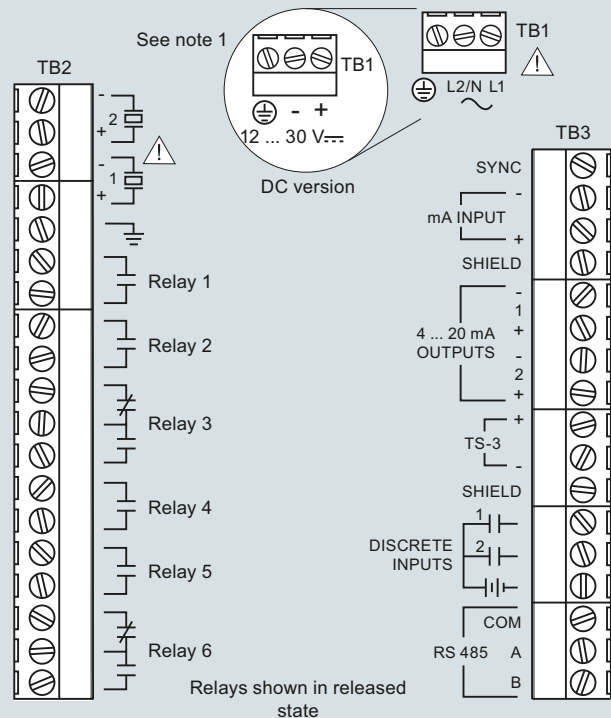
MultiRanger 100/200

Dimensional drawings



MultiRanger 100/200, dimensions in mm (inch)

Circuit diagrams



Note:

1. Use 2-core copper wire, twisted, with shield, for expansion up to 365 m (1 200 ft). Route cable in grounded metal conduit, separate from other cables.
2. Verify that all system components are installed in accordance with instructions.
3. Connect all cable shields to the MultiRanger shield connections. Avoid differential ground potentials by not connecting cable shields to ground (earth) anywhere else.
4. Keep exposed conductors on shielded cables as short as possible to reduce noise on the line caused by stray transmissions and noise pickup.

MultiRanger 100/200 connections

Overview



HydroRanger 200 HMI is an ultrasonic level controller for up to six pumps and provides control, differential control, and open channel flow monitoring.

Benefits

- Easy to use HMI display with local four-button programming, menu-driven parameters, and Wizard support for key applications
- English, German, French, Spanish, Chinese, Italian, Portuguese, and Russian texts on the HMI
- Removable terminal blocks for ease of wiring
- Monitors wet wells, weirs, and flumes
- Communication using built-in Modbus RTU via RS 485 and SIMATIC PDM configuration software
- Compatible with SmartLinx system: PROFIBUS DP, ProfiNet (cyclic access of process values only), DeviceNET, Modbus TCP/IP, and Ethernet/IP
- Single or dual point level monitoring
- 6 relays
- Auto False-Echo Suppression for fixed obstruction avoidance
- Anti-grease ring/tide mark buildup
- Differential amplifier transceiver for common mode noise rejection and improved signal-to-noise ratio
- Wall and panel mounting options

Application

For water authorities, municipal water, and wastewater plants, HydroRanger 200 HMI is an economical, low-maintenance solution delivering control efficiency and productivity needed to meet today's exacting standards. It offers single point monitoring with all models, and optional dual-point monitoring with 6 relay model. As well, it has digital communications with built-in Modbus RTU via RS 485.

The standard 6 relay HydroRanger 200 HMI will monitor open channel flow and features advanced relay alarming and pump control functions as well as volume conversion. It is compatible with SIMATIC PDM, allowing for PC configuration and set-up. Sonic Intelligence advanced echo-processing software provides increased reading reliability.

HydroRanger 200 HMI uses proven continuous ultrasonic echo ranging technology to monitor water and wastewater of any consistency up to 15 m (50 ft) in depth. Achievable resolution is 0.1 % with accuracy to 0.25 % of range. Unlike contacting devices, HydroRanger 200 HMI is immune to problems caused by suspended solids, harsh corrosives, grease or silt in the effluent, reducing downtime.

- Key Applications: wet wells, flumes/weirs, bar screen control

Technical specifications

Mode of Operation	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 ... 15 m (1 ... 50 ft), transducer dependent
Measuring points	1 or 2
Input	
Analog	0 ... 20 mA or 4 ... 20 mA, from alternate device, scalable (6 relay model)
Discrete	10 ... 50 V DC switching level Logical 0 ≤ 0.5 V DC Logical 1 = 10 ... 50 V DC max. 3 mA
Output	
EchoMax transducer	44 kHz
Ultrasonic transducer	Compatible transducers: ST-H and EchoMax series XPS-10, XPS-15/15F, and XRS-5
Relays ¹⁾	Rating 5 A at 250 V AC, non-inductive 4 SPST Form A/2 SPDT Form
• Model with 6 relays	
mA output	0 ... 20 mA or 4 ... 20 mA
• Max. load	750 Ω, isolated
• Resolution	0.1 % of range
Accuracy	
Error in measurement	0.25 % of range or 6 mm (0.24 inch), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08 inch), whichever is greater ²⁾
Temperature compensation	<ul style="list-style-type: none"> • -50 ... +150 °C (-58 ... +302 °F) • Integral temperature sensor in transducer • External TS-3 temperature sensor (optional) • Programmable fixed temperature values
Rated operating conditions	
Installation conditions	
• Location	Indoor / outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature (enclosure)	-20 ... +50 °C (-4 ... +122 °F)
Design	
Weight	
• Wall mount	1.22 kg (2.68 lb)
• Panel mount	1.35 kg (2.97 lb)
Material (enclosure)	Polycarbonate
Degree of protection (enclosure)	
• Wall mount	IP65/Type 4X/NEMA 4X
• Panel mount	IP54/Type 3/NEMA 3
Cable	
• Transducer and mA output signal	2-core copper conductor, twisted, shielded, 300 Vrms, 0.82 mm ² (18 AWG), Belden 8760 or equivalent is acceptable
• Max. separation between transducer and transceiver	365 m (1 200 ft)
Displays and controls	
	60 x 40 mm (2.36 x 1.57 inch) LCD 240 x 160 pixels resolution
Power supply³⁾	
AC version	100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W)
DC version	12 ... 30 V DC (20 W)

Level Measurement

Continuous level measurement

Ultrasonic controllers

HydroRanger 200 HMI

Certificates and approvals	<ul style="list-style-type: none"> • CE, RCM, EAC, KCC⁴⁾ • FM, CSA_{USC}, UL listed • CSA_{USC} Class I, Div. 2, Groups A, B, C and D, Class II, Div. 2, Groups F and G, Class III (wall mount only) • MCERTS Class 2 approved for Open Channel Flow
Communication	<ul style="list-style-type: none"> • RS 232 with Modbus RTU or ASCII via RJ-11 connector • RS 485 with Modbus RTU or ASCII via terminal blocks • Optional: SmartLinx cards for <ul style="list-style-type: none"> - PROFIBUS DPV1, ProfiNet (cyclic access of process values only) - DeviceNet, Modbus TCP/IP, Ethernet/IP

- 1) All relays certified for use with equipment that fails in a state at or under the rated maximums of the relays.
- 2) Program range is defined as the empty distance to the face of the transducer plus any range extension.
- 3) Maximum power consumption is listed
- 4) EMC performance available upon request

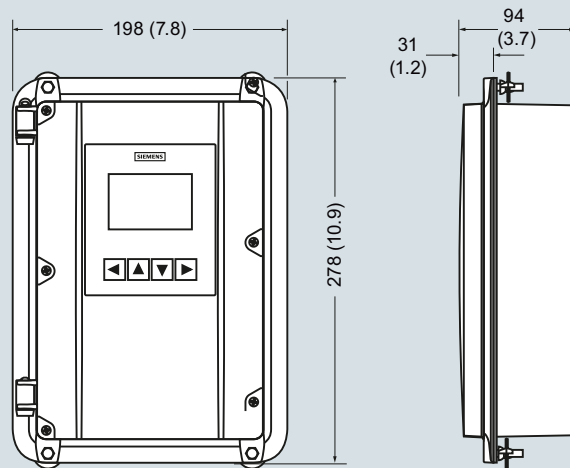
Selection and Ordering data	Article No.
Siemens HydroRanger 200 HMI Ultrasonic level controller for up to six pumps that provides control, differential control and open channel flow monitoring. Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5034-
Mounting, enclosure design	
4 button HMI, Wall mount, standard enclosure	4
4 button HMI, Wall mount, 4 M20 cable glands included	5
4 button HMI, Panel Mount	6
Input voltage	
100 ... 230 V AC	A
12 ... 30 V DC	B
Number of measurement points	
Single point model, 6 relays	A
Dual point model, 6 relays	B
Communication (SmartLinx)	
Without module	0
SmartLinx PROFIBUS DP V0 module	2
SmartLinx DeviceNet module	3
SmartLinx PROFIBUS DPV1 module	4
SmartLinx ProfiNet	5
SmartLinx Ethernet/IP	6
SmartLinx Modbus TCP/IP	7
See SmartLinx product page 4/348 for more information	
Approvals	
General Purpose CE, FM, CSA _{USC} , UL listed, RCM, EAC, KCC	1
CSA Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III ¹⁾	2

¹⁾ Available with Mounting/Enclosure design options 4 or 5

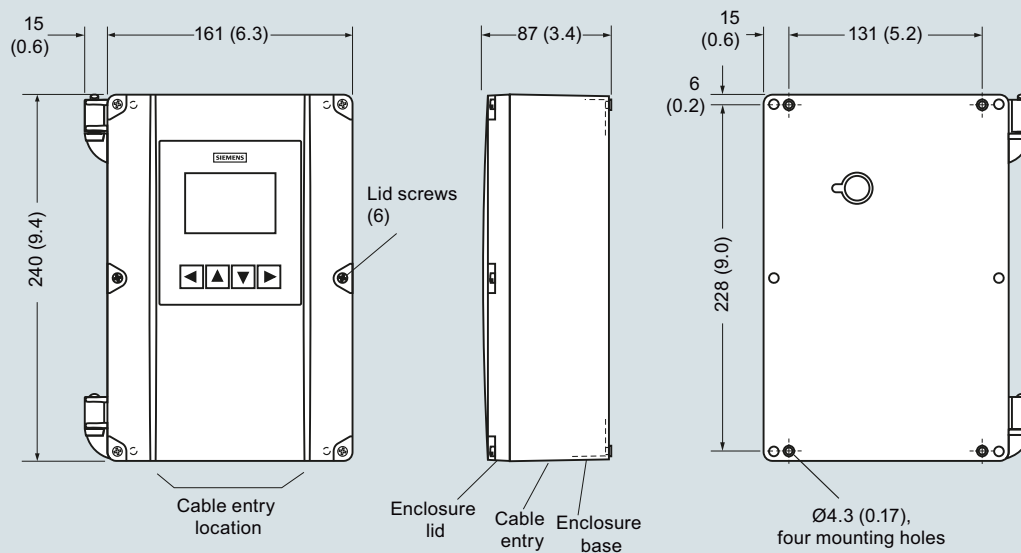
Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters), specify in plain text	Y15
Test Certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000	C11
Operating Instructions	
English	A5E36281317
German	A5E36281391
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	Article No.
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure	7ML1930-1AC
Sunshield kit, 304 stainless steel	7ML1930-1GA
USB to RS 232 adapter	7ML1930-6AK
RS 232 to RJ11 COMMS adapter	7ML1830-1MC
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-...
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-...
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750-...
Spare parts	
Power Supply Board (100 ... 230 V AC)	7ML1830-1MD
Power Supply Board (12 ... 30 V DC)	7ML1830-1ME
Removable terminal blocks	A5E38824197
Spare lid with HMI, MultiRanger 200 HMI/ HydroRanger 200 HMI, wall	A5E35778738
Spare lid with HMI, MultiRanger 200 HMI/ HydroRanger 200 HMI, panel	A5E35778740
SmartLinx DeviceNet module	7ML1830-1HT
SmartLinx PROFIBUS DP V1 module	A5E35778741
SmartLinx ProfiNet IO module	7ML1830-1PM
SmartLinx Modbus TCP/IP, Ethernet/IP module	7ML1830-1PN

Dimensional drawings

Panel mount dimensions



Wall mount dimensions



HydroRanger 200 HMI, dimensions in mm (inch)

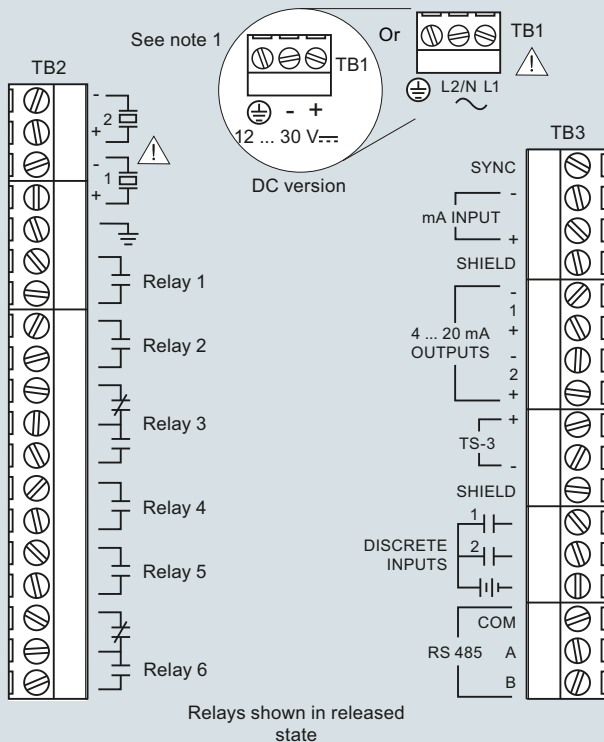
Level Measurement

Continuous level measurement

Ultrasonic controllers

HydroRanger 200 HMI

Circuit diagrams



Note:

1. Use 2-core copper wire, twisted, with shield, for expansion up to 365 m (1 200 ft). Route cable in grounded metal conduit, separate from other cables.
2. Verify that all system components are installed in accordance with instructions.
3. Connect all cable shields to the HydroRanger shield connections. Avoid differential ground potentials by not connecting cable shields to ground (earth) anywhere else.
4. Keep exposed conductors on shielded cables as short as possible to reduce noise on the line caused by stray transmissions and noise pickup.

HydroRanger 200 HMI connections

Overview



HydroRanger 200 is an ultrasonic level controller for up to six pumps and provides control, differential control, and open channel flow monitoring.

Benefits

- Monitors wet wells, weirs and flumes
- Digital communications with built-in Modbus RTU via RS 485
- Compatible with SmartLinX communication options or SIMATIC PDM via RS 485
- Single or dual point level monitoring
- 6 relay (standard), 1 or 3 relay (optional)
- Auto False-Echo Suppression for fixed obstruction avoidance
- Anti-grease ring/tide mark buildup
- Differential amplifier transceiver for common mode noise rejection and improved signal-to-noise ratio
- Wall and panel mounting options

Application

For water authorities, municipal water, and wastewater plants, HydroRanger 200 is an economical, low-maintenance solution delivering control efficiency and productivity needed to meet today's exacting standards. It offers single point monitoring with all models, and optional dual-point monitoring with 6 relay model. As well, it has digital communications with built-in Modbus RTU via RS 485.

The standard 6 relay HydroRanger 200 will monitor open channel flow and features more advanced relay alarming and pump control functions as well as volume conversion. It is compatible with SIMATIC PDM, allowing for PC configuration and setup. Sonic Intelligence advanced echo-processing software provides increased reading reliability. The optional 1 or 3 relay models provide accurate level measurement functions only; these two models do not provide open channel flow, differential level measurement or volume conversion functions.

HydroRanger 200 uses proven continuous ultrasonic echo ranging technology to monitor water and wastewater of any consistency up to 15 m (50 ft) in depth. Achievable resolution is 0.1 % with accuracy to 0.25 % of range. Unlike contacting devices, HydroRanger 200 is immune to problems caused by suspended solids, harsh corrosives, grease or silt in the effluent, reducing downtime.

- Key Applications: wet wells, flumes/weirs, bar screen control

Level Measurement

Continuous level measurement

Ultrasonic controllers

HydroRanger 200

Technical specifications

Mode of Operation	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 ... 15 m (1 ... 50 ft), transducer dependent
Measuring points	1 or 2
Input	
Analogue	0 ... 20 mA or 4 ... 20 mA, from alternate device, scalable (6 relay model)
Discrete	10 ... 50 V DC switching level Logical 0 ≤ 0.5 V DC Logical 1 = 10 ... 50 V DC Max. 3 mA
Output	
EchoMax transducer	44 kHz
Ultrasonic transducer	Compatible transducers: ST-H and EchoMax series XPS-10, XPS 15/15F, and XRS-5
Relays ¹⁾	Rating 5 A at 250 V AC, non-inductive
• Model with 1 relay ²⁾	1 SPST Form A
• Model with 3 relays ²⁾	2 SPST Form A/1 SPDT Form C
• Model with 6 relays	4 SPST Form A/2 SPDT Form C
mA output	0 ... 20 mA or 4 ... 20 mA
• Max. load	750 Ω, isolated
• Resolution	0.1 % of range
Accuracy	
Error in measurement	0.25 % of range or 6 mm (0.24 inch), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08 inch), whichever is greater ³⁾
Temperature compensation	<ul style="list-style-type: none"> • -50 ... +150 °C (-58 ... +302 °F) • Integral temperature sensor in transducer • External TS-3 temperature sensor (optional) • Programmable fixed temperature values
Rated operating conditions	
Installation conditions	
• Location	Indoor / outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature (enclosure)	-20 ... +50 °C (-4 ... +122 °F)

Design	
Weight	
• Wall mount	1.37 kg (3.02 lb)
• Panel mount	1.50 kg (3.31 lb)
Material (enclosure)	Polycarbonate
Degree of protection (enclosure)	
• Wall mount	IP65/Type 4X/NEMA 4X
• Panel mount	IP54/Type 3/NEMA 3
Cable	
• Transducer and mA output signal	2-core copper conductor, twisted, shielded, 300 Vrms, 0.82 mm ² (18 AWG), Belden 8 760 or equivalent is acceptable
• Max. separation between transducer and transceiver	365 m (1 200 ft)
Displays and controls	
	100 x 40 mm (4 x 1.5 inch) multi-block LCD with backlighting
Programming	Programming using handheld programmer or via PC with SIMATIC PDM software
Power supply⁴⁾	
AC version	100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W)
DC version	12 ... 30 V DC (20 W)
Certificates and approvals	
	<ul style="list-style-type: none"> • CE, RCM, EAC, KCC⁵⁾ • Lloyd's Register of Shipping • ABS Type Approval • FM, CSA_{US/C}, UL listed • CSA_{US/C} Class I, Div. 2, Groups A, B, C, and D, Class II, Div. 2, Groups F and G, Class III, EAC Ex (wall mount only) • MCERTS Class 3 approved for Open Channel Flow
Communication	
	<ul style="list-style-type: none"> • RS 232 with Modbus RTU or ASCII via RJ-11 connector • RS 485 with Modbus RTU or ASCII via terminal blocks • Optional: SmartLinx cards for <ul style="list-style-type: none"> - PROFIBUS DP - DeviceNet

¹⁾ All relays certified for use with equipment that fails in a state at or under the rated maximums of the relays

²⁾ This model is level control only; no open channel flow, differential level or volume conversion functions

³⁾ Program range is defined as the empty distance to the face of the transducer plus any range extension

⁴⁾ Maximum power consumption is listed

⁵⁾ EMC performance available upon request

Level Measurement

Continuous level measurement

Ultrasonic controllers

HydroRanger 200

Selection and Ordering data		Article No.	Selection and Ordering data		Order code
Siemens HydroRanger 200 Ultrasonic level controller for up to six pumps that provides control, differential control and open channel flow monitoring. The HydroRanger 200 is also available as a level measurement controller only. Select option from number of measurement points options below.		7ML5034-	Further designs Please add "-Z" to Article No. and specify Order code(s).		
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text		Y15
Mounting Wall mount, standard enclosure Wall mount, 4 entries, 4 M20 cable glands included Panel mount ¹⁾		1 2 3	Operating Instructions English German French Note: The Operating Instructions should be ordered as a separate item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation		Article No. 7ML19985FC03 7ML19985FC33 7ML19985FC11
Power supply 100 ... 230 V AC 12 ... 30 V DC		A B	Accessories Handheld programmer Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure Sunshield kit, 304 stainless steel USB to RS 232 adapter SITRANS RD100, loop powered display - see Chapter 7 SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7		A5E36563512 7ML1930-1AC 7ML1930-1GA 7ML1930-6AK 7ML5741-... 7ML5740-... 7ML5744-... 7ML5750-...
Number of measurement points Single point model, 6 relays Dual point model, 6 relays Single point model, level only, 1 relay ²⁾ Single point model, level only, 3 relays ²⁾		A B C D	Spare parts Power Supply Board (100 ... 230 V AC) Power Supply Board (12 ... 30 V DC) MultiRanger 100/200/ HydroRanger 200 display, non-HMI Siemens FI 01 · 2018 US Edition Removable terminal blocks		7ML1830-1MD 7ML1830-1ME 7ML1830-1MF A5E38824197
Communication (SmartLinX) Without module SmartLinX PROFIBUS DP module SmartLinX DeviceNet module See SmartLinX product on page 4/348 for more information.		0 2 3			
Approvals General Purpose CE, FM, CSA _{US/CA} , UL listed, RCM, EAC, KCC CSA Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III, EAC Ex (for wall mount applications only)		1 2			

¹⁾ Available with approval option 1 only

²⁾ This model is level control only; no open channel flow, differential level, or volume conversion functions.

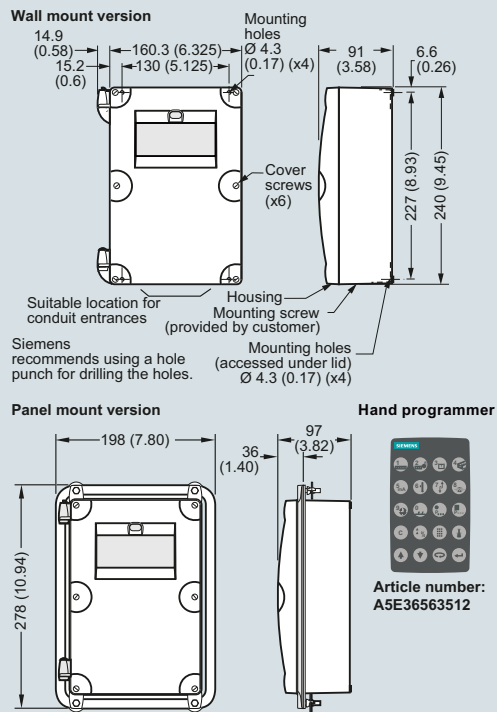
Level Measurement

Continuous level measurement

Ultrasonic controllers

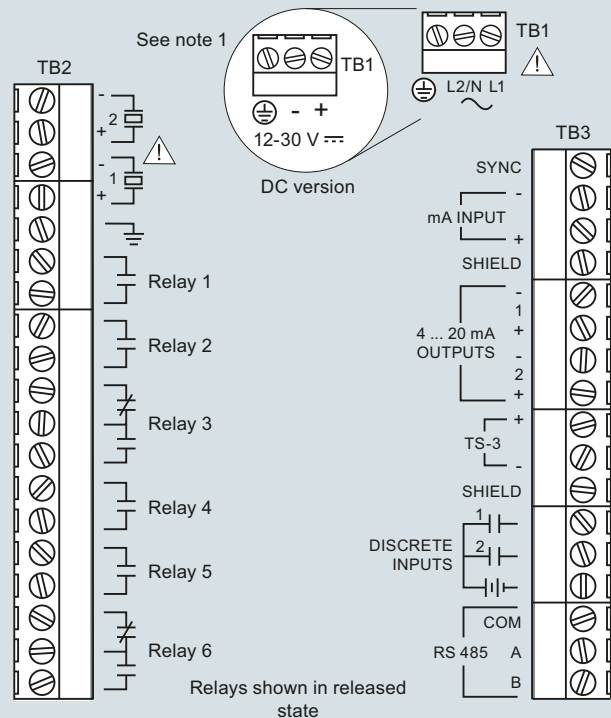
HydroRanger 200

Dimensional drawings



HydroRanger 200, dimensions in mm (inch)

Circuit diagrams



Notes

1. Use 2-core copper wire, twisted, with shield, for expansion up to 365 m (1 200 ft.). Route cable in grounded metal conduit, separate from other cables.
2. Verify that all system components are installed in accordance with instructions.
3. Connect all cable shields to the HydroRanger 200 shield connections. Avoid differential ground potentials by not connecting cable shields to ground (earth) anywhere else.
4. Keep exposed conductors on shielded cables as short as possible to reduce noise on the line caused by stray transmissions and noise pickup.

HydroRanger 200 connections

Overview

Ultrasonic Transducers

Ultrasonic measuring systems are the cost-effective choice for monitoring and control in short- to long-range applications for liquids, slurries, and solids in a wide range of industries. Transducers are impervious to dust, moisture, corrosion, vibration, flooding, and extreme temperature. They are easy to install and virtually maintenance-free. Choose from a wide selection of models designed for short or long range applications on liquids or solids.

Technical specifications

EchoMax Transducers					
	Liquids		Liquids and Solids		
	XRS-5	ST-H	Standard XPS-10	XPS-15	XPS-30
Max. range¹⁾	8 m (26 ft)	10 m (33 ft)	10 m (33 ft)	15 m (50 ft)	30 m (100 ft)
Min. range	0.3 m (1 ft)	0.3 m (1 ft)	0.3 m (1 ft)	0.3 m (1 ft)	0.6 m (2 ft)
Max. temperature	65 °C (149 °F)	73 °C (164 °F)	95 °C (203 °F)	95 °C (203 °F)	95 °C (203 °F)
Min. temperature	-20 °C (-4 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)
Typical Applications	Wet wells and open channels	Chemical storage and liquid tanks	Dusty solids and slurries	Deep wet wells and solids	Powders, pellets and solids
Frequency	44 kHz	44 kHz	44 kHz	44 kHz	30 kHz
Beam angle (-3dB)	10°	12°	12°	6°	6°
Thread size	R 1" [(BSPT), EN 10226] 1" NPT	1" and 2" NPT R 2" [(BSPT), EN 10226] 2" [(BSPP), EN ISO 228-1]	R 1" [(BSPT), EN 10226] 1" NPT	R 1" [(BSPT), EN 10226] 1" NPT	R 1.5" [(BSPT), EN 10226] Universal thread 1.5" NPT
Enclosure	<ul style="list-style-type: none"> PVDF Copolymer CSM Option: Flange with PTFE facing 	<ul style="list-style-type: none"> ETFE Option: PVDF 	<ul style="list-style-type: none"> PVDF Option: foam facing Flange with PTFE facing 	<ul style="list-style-type: none"> PVDF Option: foam facing Flange with PTFE facing 	<ul style="list-style-type: none"> PVDF Option: foam facing Flange with PTFE facing
Compatible with:					
SITRANS LUT400	•	•	•	•	•
HydroRanger 200	•	•	•	•	
MultiRanger 100/200	•	•	•	•	

¹⁾ Application conditions such as extreme dust or angle of repose may reduce the usable maximum range. Consult a local sales person for more details.

Level Measurement

Continuous level measurement
Ultrasonic transducers

ST-H

Overview



ST-H transducers use ultrasonic technology to measure level in chemical storage and liquid tanks.

Benefits

- Can be mounted on a narrow standpipe
- Immune to corrosive and harsh environments
- Integral temperature sensor

Application

The narrow design of the ST-H allows the transducer to be mounted on a narrow standpipe. When mounted correctly, it is completely protected from the process and can even be used in harsh, corrosive environments.

During operation, the ultrasonic transducer emits acoustic pulses in a narrow beam perpendicular to the transducer face. The level transceiver measures the propagation time between pulse emission and reception of the echo to calculate the distance from the transducer to the material. Variations in sound velocity due to changes in temperature within the permissible range are automatically compensated by the integral temperature sensor.

- Key Applications: chemical storage, liquid tanks

Technical specifications

Mode of operation	
Measuring principle	Ultrasonic transducer
Input	
Measuring range	0.3 ... 10 m (1 ... 33 ft)
Output	
Frequency	44 kHz
Beam angle	12°
Accuracy	
Temperature compensation	Compensated by integral temperature sensor
Rated operating conditions	
Pressure	Normal atmospheric pressure
Ambient conditions	
Ambient temperature	-20 ... +60 °C (-5 ... +140 °F) (ATEX approved model) -40 ... +73 °C (-40 ... +163 °F) (CSA/FM approved model)
Design	
Weight ¹⁾	1.4 kg (3 lb)
Material (enclosure)	Base and lid made of ETFE or PVDF (epoxy fitted joint) ²⁾
Process connection	2" NPT [(Taper), ANSI/ASME B1.20.1], R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]
Degree of protection	IP68
Cable connection	2-core shielded/twisted, 0.519 mm ² (20 AWG), PVC sheath
Cable (max. length)	365 m (1 200 ft) with RG 62 A/U coaxial cable
Options	
Flange adapter	3" Universal (fits DN 65, PN 10 and 3" ASME)
Certificates and approvals	
CE, CSA Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G T3 (ETFE only), FM Class I, II, Div. 1, Groups C, D, E, F, G T4A, ATEX II 2G / INMETRO Ex mb IIC T5 Gb, RCM, KCC	

¹⁾ Approximate shipping weight of transducer with standard cable length


²⁾ When measuring chemicals, check compatibility of ETFE or PVDF and epoxy, or mount joint external to process.

Level Measurement

Continuous level measurement

Ultrasonic transducers

ST-H

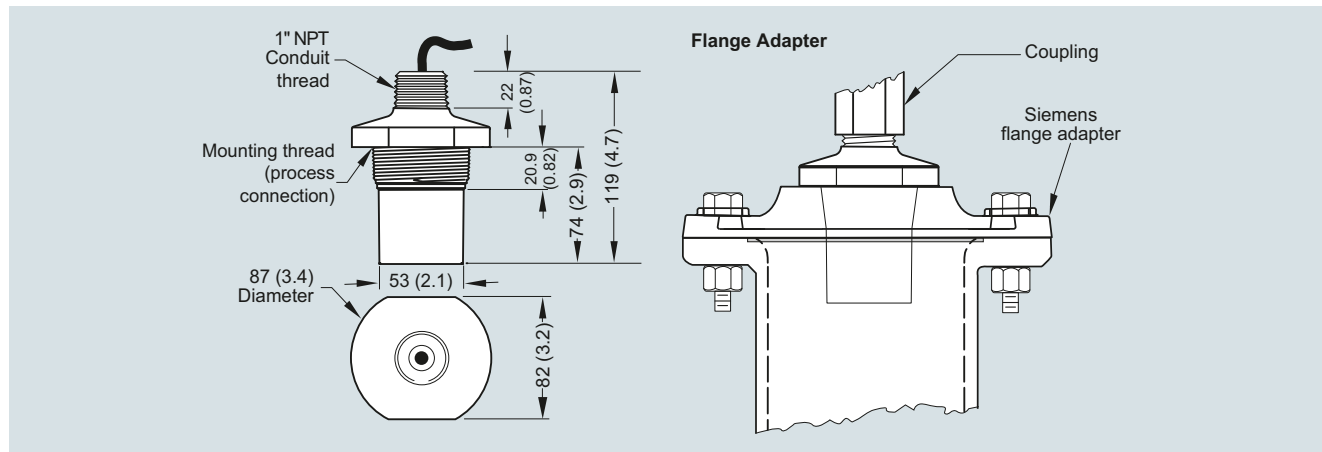
Selection and Ordering data		Article No.	Selection and Ordering data		Order code
EchoMax ST-H ultrasonic transducer		7ML1100-	Further designs		
Level measurement in chemical storage and liquid tanks. The narrow design of the ST-H allows the transducer to be mounted on a 2 inch standpipe. Measuring range: min. 0.3 m (1 ft), max. 10 m (33 ft).			Please add "-Z" to Article No. and specify Order code(s).		
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters) specify in plain text		Y17
Process connection			Accessories		Article No.
ETFE, 2" NPT [(Taper), ANSI/ASME B1.20.1]		0	Universal box bracket, mounting kit		7ML1830-1BK
ETFE, R 2" [(BSPT), EN 10226]		1	3" ASME, DN 65 PN 10, JIS 10K 3B ETFE flange adapter for 2" NPT		7ML1830-1BT
ETFE, G 2" [(BSPP), EN ISO 228-1]		2	3" ASME, DN 65 PN 10, JIS 10K 3B ETFE flange adapter for 2" BSPT		7ML1830-1BU
PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1]		3	Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling		7ML1830-1AQ
PVDF copolymer, R 2" [(BSPT), EN 10226]		4	Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings		7ML1830-1AX
PVDF copolymer, G 2" [(BSPP), EN ISO 228-1]		5	Easy Aimer 304, NPT with 1" stainless steel coupling		7ML1830-1AU
Cable length			Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings		7ML1830-1GN
5 m (16.40 ft)		A	Plastic adapter 1" NPT		7ML1930-1FX
10 m (32.81 ft)		B	Plastic adapter 1" NPT/M20		7ML1830-1EF
30 m (98.43 ft)		C			
50 m (164.04 ft)		D			
100 m (328.08 ft)		E			
Approvals					
CE, FM Class I, II, Div. 1, Groups C,D,E,F,G T4A ³⁾		2			
ATEX 2G / INMETRO Ex mb IIC T5 Gb, RCM, KCC		3			
CSA Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G T3 ¹⁾		4			
CE, ATEX 2G / INMETRO Ex mb IIC T5 Gb, RCM, KCC ²⁾					
Operating Instructions		Article No.			
Multi-language		A5E43390688			
Note: The Operating Instructions should be ordered as a separate line item on the order.					
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation					
¹⁾ Available with Process connection options 0 ... 2 only					
²⁾ Available with Process connection options 3 ... 5 only					
³⁾ Not suitable for Ketone, Hexane, Ester or Ethyl Acetate atmospheres					

Level Measurement

Continuous level measurement
Ultrasonic transducers

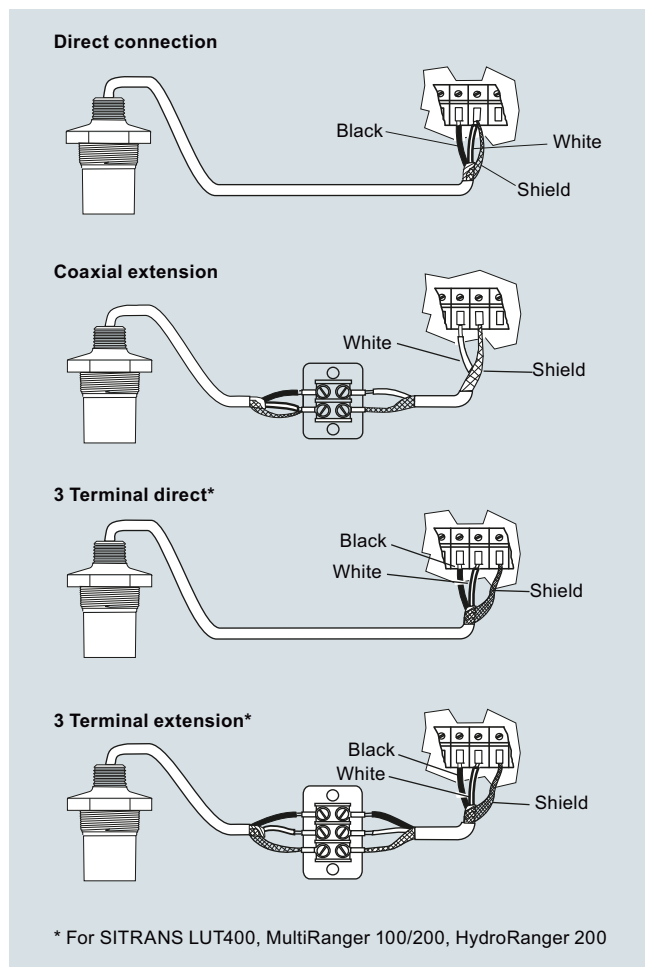
ST-H

Dimensional drawings



ST-H ultrasonic transducer, dimensions in mm (inch)

Circuit diagrams



ST-H ultrasonic transducer connections

Overview



EchoMax XRS-5 ultrasonic transducer provides reliable, continuous level monitoring of liquids and slurries in narrow lift stations/wet wells, flumes, weirs and filter beds using a beam angle of just 10° and a CSM rubber face.

Benefits

- Narrow beam angle of only 10°
- Chemically resistant PVDF copolymer enclosure and CSM rubber face
- Measuring range: 8 m (26 ft) for measurement of liquids and slurries
- Fully submersible: IP68 degree of protection
- Easy installation with 1" NPT or R 1" BSPT connection

Application

The XRS-5 is non-contacting with a measuring range from 0.3 to 8 m (1 to 26 ft). Advanced echo processing ensures reliable data even in conditions with obstructions, turbulence, and foam.

The hermetically sealed CSM rubber face and the PVDF copolymer enclosure are designed for maximum resistance to methane, salt water, caustics, and harsh chemicals common to wastewater installations. With an IP68 degree of protection, this rugged sensor is fully submersible in the event of flood conditions. Use a submergence shield if full submergence is possible in the application. A submergence shield will maintain a high level reading output during submerged conditions.

The low-cost XRS-5 transducer is compatible with a full range of Siemens controllers, from a basic system for high/low alarm or simple pump control, up to advanced control systems with communications, telemetry and SCADA integration capabilities.

- Key Applications: wet wells, flumes, weirs, filter beds

Technical specifications

Mode of operation	
Measuring principle	Ultrasonic transducer
Input	
Measuring range	0.3 ... 8 m (1 ... 26 ft), dependent on application
Output	
Frequency	44 kHz
Beam angle	10°
Accuracy	
Temperature error	Compensated by integral temperature sensor
Rated operating conditions	
Vessel pressure	Normal atmospheric pressure
Ambient Conditions	
• Ambient temperature	-20 ... +65 °C (-4 ... +149 °F)
Design	
Weight (approximate shipping weight of sensor with standard cable length)	1.2 kg (2.6 lb)
Material (enclosure)	PVDF copolymer enclosure and CSM face
Process connection	1" NPT [(Taper), ANSI/ASME B1.20.1] or R 1" [(BSPT), EN 10226]
Degree of protection	IP65/IP68
Cable connection	2-core shielded/twisted, 0.5 mm ² (20 AWG), PVC sheath
Cable (max. length)	<ul style="list-style-type: none"> • 365 m (1 200 ft) with RG 62 A/U coaxial cable • 365 m (1 200 ft) with 2-core twisted pair, foil shield, 0.5 mm² (20 AWG), PVC sheath, only for MultiRanger 100/200
Options	
Flange version	Factory flange with PTFE face for ASME, EN or JIS configuration
Submergence shield	For applications with flooding possible
Certificates and approvals	
CE, RCM, KCC CSA Class I, Div. 2, Groups A, B, C, D, Class II, Div. 1 Groups E, F, G FM Class I, Zone 1, AEx m IIC, T6 Class II, III, Div. 1, Groups E, F, G T6 ATEX II 2GD / IECEx / INMETRO Ex mb IIC T6 Gb, Ex tb IIIC T85 °C Db	

Level Measurement

Continuous level measurement
Ultrasonic transducers

EchoMax XRS-5

Selection and Ordering data

EchoMax XRS-5 transducer

With a beam angle of 10°, the XRS-5 provides reliable, continuous level monitoring of liquids and slurries in narrow lift stations/wet wells, flumes, weirs and filter beds.

Measuring range: min. 0.3 m (1 ft), max. 8 m (26 ft)

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Process connection

1" NPT [(Taper), ANSI/ASME B1.20.1]

R 1" [(BSPT), EN 10226]

Cable length

5 m (16.40 ft)

10 m (32.81 ft)

30 m (98.43 ft)

Facing

Standard (CSM rubber)

PTFE (flange versions)

Approvals

CE, RCM, KCC, CSA Class I, Div. 2, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G FM Class I, Zone 1, AEx m IIC, T6 Class II, III, Div. 1, Groups E, F, G T6 ATEX II 2GD / IECEx / INMETRO Ex mb IIC T6 Gb, Ex tb IIIC T85 °C Db

Mounting flange (flush mount)

None

3" ASME, 150 lb, flat faced

4" ASME, 150 lb, flat faced

6" ASME, 150 lb, flat faced

DN 80, PN 10/16, Type A, flat faced

DN 100, PN 10/16, Type A, flat faced

DN 150, PN 10/16, Type A, flat faced

JIS10K 3B style

JIS10K 4B style

JIS10K 6B style

Note: flange bolting patterns and facings dimensionally correspond to the applicable

ASME B16.5 or EN 1092-1, or JIS B 2220 standard.

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Article No.

7ML1106-

0 - 0

1

2

A

B

C

A

B

2

A

B

C

D

J

K

L

Q

R

S

Selection and Ordering data

Further designs

Please add "-Z" to Article No. and specify Order code(s).

Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters) specify in plain text

Accessories

Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors

Submergence shield kit

Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling

Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings

Easy Aimer 304, NPT with 1" stainless steel coupling

Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings

FMS-200 universal box bracket, mounting kit

FMS-210 channel bracket, wall mount

FMS-220 extended channel bracket, wall mount

FMS-310 channel bracket, floor mount

FMS-320 extended channel bracket, floor mount

FMS-350 bridge channel bracket, floor mount (see Mounting Brackets on page 4/186 for more information)

1" NPT locknut, plastic

1" BSPT locknut, plastic

Plastic adapter 1" BSP - 20 mm

Plastic adapter 1" NPT

Plastic adapter 1" NPT/M20

Order code

Y17

Article No.

7ML1930-1BJ

7ML1830-1BH

7ML1830-1AQ

7ML1830-1AX

7ML1830-1AU

7ML1830-1GN

7ML1830-1BK

7ML1830-1BL

7ML1830-1BM

7ML1830-1BN

7ML1830-1BP

7ML1830-1BQ

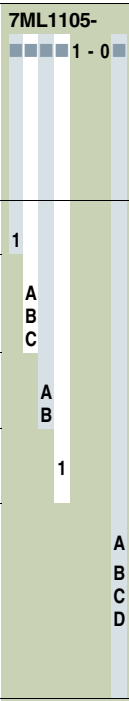
7ML1830-1DS

7ML1830-1DR

7ML1830-1EA

7ML1930-1FX

7ML1830-1EF

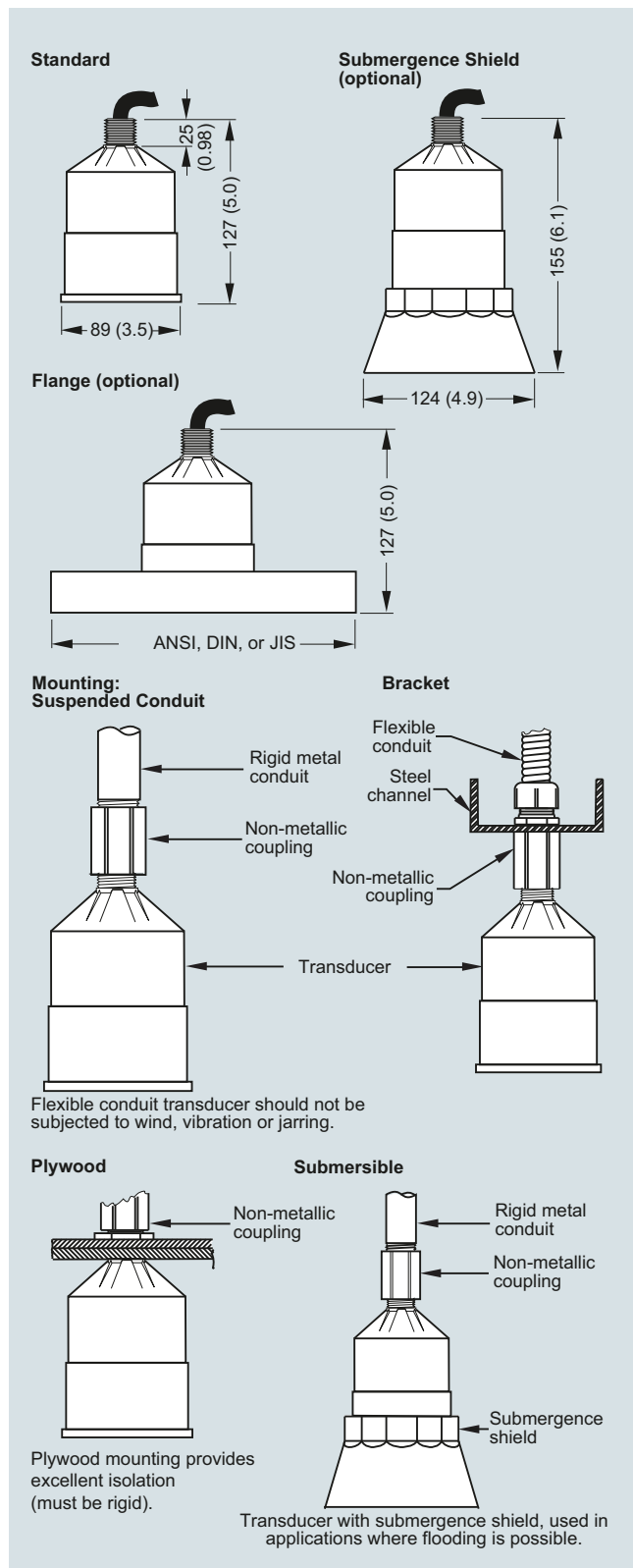
Selection and Ordering data		Article No.	Selection and Ordering data		Order code
EchoMax XRS-5C transducer		7ML1105- 	Further designs		
With a beam angle of 10°, the XRS-5 provides reliable, continuous level monitoring of liquids and slurries in narrow lift stations/wet wells, flumes, weirs and filter beds. Measuring range: min. 0.3 m (1 ft), max. 8 m (26 ft) ➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			Please add "-Z" to Article No. and specify Order code(s). Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters) specify in plain text		
Process connection 1" NPT [(Taper), ANSI/ASME B1.20.1]		1	Accessories		Article No.
Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft)		A B C	Submergence shield kit		7ML1830-1BH
Facing Standard (CSM rubber) PTFE (flange versions)		A B	Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling		7ML1830-1AQ
Approvals CSA Class I Div. 1, Groups A, B, C, D; Class II Div. 1, Groups E, F, G; Class III		1	Easy Aimer 304, NPT with 1" stainless steel coupling		7ML1830-1AU
Mounting flange (flush mount) None 3" ASME, 150 lb, flat faced 4" ASME, 150 lb, flat faced 6" ASME, 150 lb, flat faced Note: flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.		A B C D	FMS-200 universal box bracket, mounting kit		7ML1830-1BK
Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation			FMS-210 channel bracket, wall mount		7ML1830-1BL
			FMS-220 extended channel bracket, wall mount		7ML1830-1BM
			FMS-310 channel bracket, floor mount		7ML1830-1BN
			FMS-320 extended channel bracket, floor mount		7ML1830-1BP
			FMS-350 bridge channel bracket, floor mount (see Mounting Brackets on page 4/186 for more information)		7ML1830-1BQ

Level Measurement

Continuous level measurement
Ultrasonic transducers

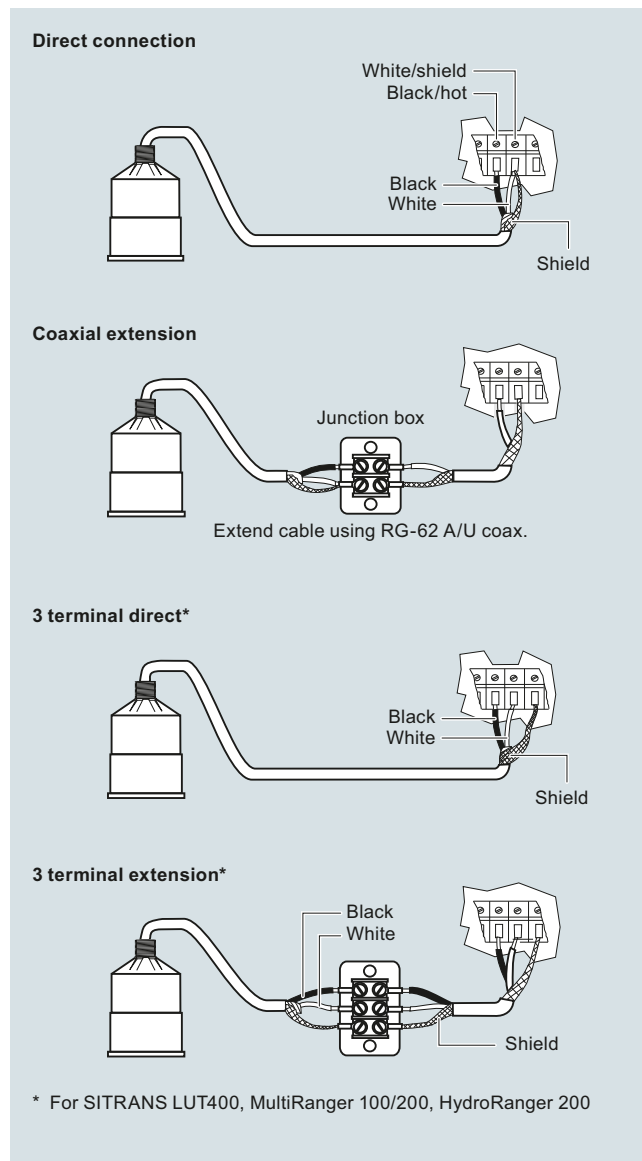
EchoMax XRS-5

Dimensional drawings



XRS-5 ultrasonic transducer, dimensions in mm (inch)

Circuit diagrams



XRS-5 ultrasonic transducer connections

Overview

EchoMax XPS transducers use ultrasonic technology to measure level in a wide range of liquids and solids.

Benefits

- Integral temperature compensation
- Low ringing effect reduces blanking distance
- Optional foam facing for dusty applications
- Self-cleaning and low-maintenance
- Chemically resistant
- Hermetically sealed

Application

XPS transducers can be fully immersed, are resistant to steam and corrosive chemicals, and can be installed without flanges.

The XPS series offers versions for various measuring ranges up to 30 m (100 ft) and up to a max. temperature of 95 °C (203 °F).

During operation, the EchoMax transducers emit acoustic pulses in a narrow beam. The level monitor measures the propagation time between pulse emission and its reflection (echo) to calculate the distance.

Level Measurement


Continuous level measurement
Ultrasonic transducers

EchoMax XPS

Technical specifications

Input	XPS-10	XPS-15 (standard and F models)	XPS-30
Measuring range	0.3 ... 10 m (1 ... 33 ft)	<u>Standard:</u> 0.3 ... 15 m (1 ... 50 ft) <u>XPS-15F:</u> 0.45 ... 15 m (1.5 ... 50 ft)	0.6 ... 30 m (2 ... 100 ft)
Output			
Frequency	44 kHz	44 kHz	30 kHz
Beam angle	12°	6°	6°
Environmental			
Location	Indoors/outdoors		
Ambient temperature	-40 ... +95 °C (-40 ... +203 °F)	<u>Standard:</u> -40 ... +95 °C (-40 ... +203 °F) <u>XPS-15F:</u> -20 ... +95 °C (-4 ... +203 °F)	-40 ... +95 °C (-40 ... +203 °F)
Pollution degree	4		
Pressure	8 bar g (120 psi g) <u>Flanged:</u> 0.5 bar g (7.25 psi g)	8 bar g (120 psi g) <u>Flanged:</u> 0.5 bar g (7.25 psi g)	0.5 bar g (7.25 psi g) <u>Flanged:</u> 0.5 bar g (7.25 psi g)
Design			
Weight	0.8 kg (1.8 lb)	1.3 kg (2.8 lb) <u>Flanged:</u> 2 kg (4.4 lb)	4.3 kg (9.5 lb)
Power supply	Operation of transducer only with approved Siemens controllers		
Material	<u>Standard:</u> PVDF <u>Flanged:</u> PVDF with CPVC flange <u>Option:</u> PTFE face with CPVC flange	<u>Standard:</u> PVDF <u>Flanged:</u> PVDF with CPVC flange <u>Option:</u> PTFE face with CPVC flange	<u>Standard:</u> PVDF <u>Flanged:</u> PVDF with CPVC flange <u>Option:</u> PTFE face with CPVC flange
Color	Blue	<u>Standard:</u> Blue <u>XPS-15F:</u> Gray	Blue
Process connection	1" NPT or 1" BSPT	<u>Standard:</u> 1" NPT or 1" BSPT <u>XPS-15F:</u> 1" NPT	1.5" universal thread (NPT or BSPT)
Degree of protection	IP66/68	IP66/68	IP66/68
Cable	2-wire twisted pair/braided and foil shielded 0.5 mm ² (20 AWG) PVC jacket		
Separation	Max. 365 m (1 200 ft)		
Certificates and approvals	<u>Standard:</u> CE, CSA, FM, ATEX, IECEx	<u>Standard:</u> CE, CSA, FM, ATEX, IECEx <u>XPS-15F:</u> FM Class I, Div. 1, Groups A, B, C, and D, Class II Div. 1, Groups E, F, and G, Class III	CE, CSA, FM, ATEX, IECEx

¹⁾ EMC certificate available on request.

Selection and Ordering data		Article No.	Selection and Ordering data		Order code
EchoMax XPS-10 ultrasonic transducer		7ML1115-	Further designs		
High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Measuring range: min. 0.3 m, max. 10 m			Please add "-Z" to Article No. and specify Order code(s).		
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring point number/ identification (max. 27 characters) specify in plain text		Y15
Mounting thread and facing			Operating Instructions		Article No.
1" NPT [(Taper), ANSI/ASME B1.20.1]		0	Multi-language		A5E43390688
1" NPT [(Taper), ANSI/ASME B1.20.1] with foam facing ¹⁾		1	Note: The Operating Instructions should be ordered as a separate line item on the order.		
1" NPT [(Taper), ANSI/ASME B1.20.1] with PTFE facing ²⁾		2	All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation		
R 1" [(BSPT), EN 10226]		3	Accessories		
R 1" [(BSPT), EN 10226] with foam facing ¹⁾		4	Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors		7ML1930-1BJ
R 1" [(BSPT), EN 10226] with PTFE facing ²⁾		5	Submergence shield kit		7ML1830-1BH
Cable length			Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling		7ML1830-1AQ
5 m (16.40 ft)		B	Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings		7ML1830-1AX
10 m (32.81 ft)		C	Easy Aimer 304, NPT with 1" stainless steel coupling		7ML1830-1AU
30 m (98.43 ft)		E	Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings		7ML1830-1GN
50 m (164.04 ft)		F	Universal box bracket, mounting kit		7ML1830-1BK
100 m (328.08 ft)		K	Channel bracket, wall mount		7ML1830-1BL
Mounting flange			Extended channel bracket, wall mount		7ML1830-1BM
None		A	Channel bracket, floor mount		7ML1830-1BN
3" ASME, 150 lb, flat faced		C	Extended channel bracket, floor mount		7ML1830-1BP
4" ASME, 150 lb, flat faced		D	Bridge channel bracket, floor mount (see Mounting Brackets on page 4/186 for more information)		7ML1830-1BQ
6" ASME, 150 lb, flat faced		E	1" NPT locknut, plastic		7ML1830-1DS
8" ASME, 150 lb, flat faced		F	1" BSPT locknut, plastic		7ML1830-1DR
DN 80, PN 10/16, Type A, flat faced		G	Plastic adapter 1" BSP - 20 mm		7ML1830-1EA
DN 100, PN 10/16, Type A, flat faced		J	Plastic adapter 1" NPT		7ML1930-1FX
DN 150, PN 10/16, Type A, flat faced		L	Plastic adapter 1" NPT/M20		7ML1830-1EF
JIS10K3B Style		M			
JIS10K4B Style		P			
JIS10K6B Style		R			
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)					
Approvals					
ATEX 2GD Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db;		3			
IECEX SIR 13.0009X Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; FM Class I, Div. 2, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III					
CSA Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III ³⁾		4			

1) Not available with flanged versions

2) Available with flanged versions only

3) Valid with mounting thread and facing options 0 ... 2 only

Level Measurement

Continuous level measurement

Ultrasonic transducers

EchoMax XPS

Selection and Ordering data

Article No.

EchoMax XPS-15 ultrasonic transducer

High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor.

Measuring range: min. 0.3 m, max. 15 m

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

7ML1118-

0

Mounting thread and facing

1" NPT [(Taper), ANSI/ASME B1.20.1]

1" NPT [(Taper), ANSI/ASME B1.20.1]
with foam facing¹⁾

1" NPT [(Taper), ANSI/ASME B1.20.1]
with PTFE facing²⁾

R 1" [(BSPT), EN 10226]

R 1" [(BSPT), EN 10226] with foam facing¹⁾

R 1" [(BSPT), EN 10226] with PTFE facing²⁾

0

1

2

3

4

5

Cable length

5 m (16.40 ft)

10 m (32.81 ft)

30 m (98.43 ft)

50 m (164.04 ft)

100 m (328.08 ft)

B

C

E

F

K

Mounting flange

None

6" ASME, 150 lb, flat faced

8" ASME, 150 lb, flat faced

DN 150, PN 10/16, Type A, flat faced

DN 200, PN 10, Type A, flat faced

JIS10K 6B

JIS10K 8B

(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)

A

D

E

J

K

N

P

Approvals

ATEX 2GD Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db;

IECEX SIR 13.0009X Ex mb IIC T4 Gb, Ex tb IIIC

T135 °C Db; FM Class I, Div. 2, Groups A, B, C, D;

Class II, Div. 1, Groups E, F, G; Class III

CSA Class I, Div. 1, Groups A, B, C, D, Class II,

Div. 1, Groups E, F, G, Class III³⁾

3

4

¹⁾ Not available with flanged versions

²⁾ Available with flanged versions only

³⁾ Available with mounting options 0 ... 2 only

Selection and Ordering data

Order code

Further designs

Please add "-Z" to Article No. and specify Order code(s).

Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]:

Measuring point number/ identification (max. 27 characters) specify in plain text

Y15

Operating Instructions

Multi-language

Note: The Operating Instructions should be ordered as a separate line item on the order.

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Article No.

A5E43390688

Accessories

Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors

7ML1930-1BJ

Submergence shield kit

7ML1830-1BJ

Universal box bracket, mounting kit

7ML1830-1BK

Channel bracket, wall mount

7ML1830-1BL

Extended channel bracket, wall mount

7ML1830-1BM

Channel bracket, floor mount

7ML1830-1BN

Extended channel bracket, floor mount

7ML1830-1BP

Bridge channel bracket, floor mount (see Mounting Brackets on page 4/186 for more information)

7ML1830-1BQ

1" NPT locknut, plastic

7ML1830-1DS

1" BSPT locknut, plastic

7ML1830-1DR

Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling

7ML1830-1AQ

Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings

7ML1830-1AX

Easy Aimer 304, NPT with 1" stainless steel coupling

7ML1830-1AU

Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings

7ML1830-1GN

Plastic adapter 1" BSP - 20 mm

7ML1830-1EA

Plastic adapter 1" NPT

7ML1930-1FX

Plastic adapter 1" NPT/M20

7ML1830-1EF

Level Measurement

Continuous level measurement

Ultrasonic transducers

EchoMax XPS

Selection and Ordering data		Article No.
EchoMax XPS-15F ultrasonic transducer High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Measuring range: min. 0.45 m, max. 15 m ➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		7ML1171-0
Mounting thread and facing 1" NPT [(Taper), ANSI/ASME B1.20.1]		1
Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)		B C D E F
Mounting flange, flush mount None 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)		A B C
Approvals FM Class I, Div. 1, Groups A, B, C, and D, Class II Div. 1, Groups E, F, and G, Class III		1
Selection and Ordering data		Order code
Further designs Please add "-Z" to Article No. and specify Order code(s).		
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring point number/ identification (max. 27 characters) specify in plain text		Y15
Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation		
Accessories		Article No.
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors		7ML1930-1BJ
Submergence shield kit		7ML1830-1BJ
Universal box bracket, mounting kit		7ML1830-1BK
Channel bracket, wall mount		7ML1830-1BL
Extended channel bracket, wall mount		7ML1830-1BM
Channel bracket, floor mount		7ML1830-1BN
Extended channel bracket, floor mount		7ML1830-1BP
Bridge channel bracket, floor mount (see Mounting Brackets on page 4/186 for more information)		7ML1830-1BQ
1" NPT locknut, plastic		7ML1830-1DS
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling		7ML1830-1AQ
Easy Aimer 304, NPT with 1" stainless steel coupling		7ML1830-1AU
Selection and Ordering data		Article No.
EchoMax XPS-30 ultrasonic transducer High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. 1½" universal thread compatible with 1½" NPT and R 1½" [(BSPT), EN 10226] Measuring range: min. 0.6 m (1.97 ft), max. 30 m (98.43 ft) ➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		7ML1123-0
Mounting thread and facing 1½" universal thread 1½" universal thread, foam facing ¹⁾ 1½" universal thread, PTFE facing ²⁾		0 1 2
Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)		B C E F K
Mounting flange None 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced DN 150, PN 10/16, Type A, flat faced DN 200, PN 10, Type A, flat faced JIS10K 6B JIS10K 8B (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)		A D E J K N P
Approvals ATEX 2G 1D Ex mb IIC T4 Gb, Ex ta IIIC T135 °C Da; IECEx SIR 13.0009X Ex mb IIC T4 Gb, Ex ta IIIC T135 °C Da		5
¹⁾ Not available with flanged versions ²⁾ Available with flanged versions only		

Level Measurement

Continuous level measurement
Ultrasonic transducers

EchoMax XPS

Selection and Ordering data

Order code

Further designs

Please add **"-Z"** to Article No. and specify Order code(s).

Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: measuring-point number/identification (max. 27 characters) specify in plain text

Y15

Operating Instructions

Multi-language

Note: The Operating Instructions should be ordered as a separate line item on the order.

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Article No.

A5E43390688

Accessories

Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors

7ML1930-1BJ

1½" BSPT locknut, plastic

7ML1830-1DP

Easy Aimer 2, aluminum, NPT with 1½" galvanized coupling

7ML1830-1AN

Easy Aimer 304, NPT with 1½" stainless steel coupling

7ML1830-1AT

Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings

7ML1830-1AX

Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings

7ML1830-1GN

Adapter 1½" BSP

7ML1830-1EB

Selection and Ordering data

Article No.

EchoMax XPS-30C ultrasonic transducer

High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor.

1½" universal thread compatible with 1½" NPT and R 1½" [(BSPT), EN 10226]

Measuring range: min. 0.6 m (1.97 ft), max. 30 m (98.43 ft)

➔ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

7ML1155-**1**

Mounting thread and facing

1½" universal thread

0

1½" universal thread, foam facing¹⁾

1

1½" universal thread, PTFE facing²⁾

2

Cable length

5 m (16.40 ft)

10 m (32.81 ft)

30 m (98.43 ft)

50 m (164.04 ft)

100 m (328.08 ft)

**B
C
E
F
K**

Mounting flange

None

**A
D
E
J
K
N
P**

6" ASME, 150 lb, flat faced

8" ASME, 150 lb, flat faced

DN 150, PN 10/16, Type A, flat faced

DN 200, PN 10, Type A, flat faced

JIS10K 6B

JIS10K 8B

(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)

Approvals

CSA, Class I, Div. 2, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III

4

Selection and Ordering data

Order code

Further designs

Please add **"-Z"** to Article No. and specify Order code(s).

Stainless steel tag [69 mm x 50 mm (2.71 x 1.97 inch)]: Measuring-point number / identification (max. 27 characters) specify in plain text

Y15

Operating Instructions

Multi-language

Note: The Operating Instructions should be ordered as a separate line item on the order.

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Article No.

A5E43390688

Accessories

Easy Aimer 2, aluminum, NPT with 1½" galvanized coupling

7ML1830-1AN

Easy Aimer 304, NPT with 1½" stainless steel coupling

7ML1830-1AT

1½" BSPT locknut, plastic

7ML1830-1DP

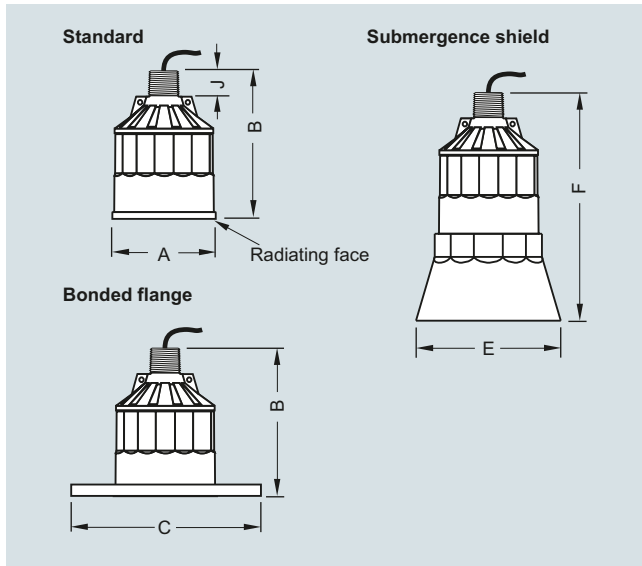
Adapter 1½" BSP

7ML1830-1EB

¹⁾ Not available with flanged version

²⁾ Available for flanged versions only

Dimensional drawings

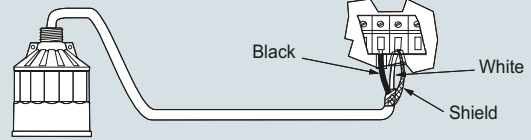


XPS ultrasonic transducer

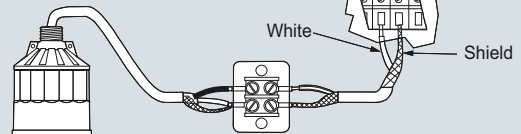
Version			
Dimension	XPS-10	XPS-15	XPS-30
A	88 mm (3.464 inch)	121 mm (4.764 inch)	175 mm (6.890 inch)
B	122 mm (4.803 inch)	132 mm (5.197 inch)	198 mm (7.795 inch)
C	According to ASME, DIN, and JIS		
E	124 mm (4.882 inch)	158 mm (6.220 inch)	n/a
F	152 mm (5.984 inch)	198 mm (7.795 inch)	n/a
J	28 mm (1.1 inch)	28 mm (1.1 inch)	28 mm (1.1 inch)

Circuit diagrams

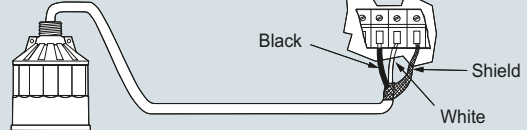
Direct connection



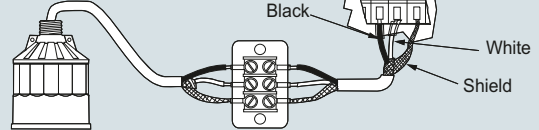
Coaxial connection



3 terminal direct*



3 terminal extension*



* For SITRANS LUT400, MultiRanger 100/200, HydroRanger 200

Mounting

Make particularly sure that the radiating face of the transducer is protected from damage. Mount the transducer so that it is above the maximum material level by at least the blanking value. On liquid applications, the transducer must be mounted so that the axis of transmission is perpendicular to the liquid surface. On solids applications, an Easy Aimer should be used to facilitate aiming the transducer. Consider the optional temperature sensor when mounting the transducer.

Interconnection

Do not route cable openly or near high voltage or current runs, contactors and SCR control drives. For optimum isolation against electrical noise, run cable separately in a grounded metal conduit. Seal all thread connections to prevent ingress of moisture.

XPS ultrasonic transducer connections

Level Measurement

Continuous level measurement
Accessories for ultrasonic

EA aiming devices

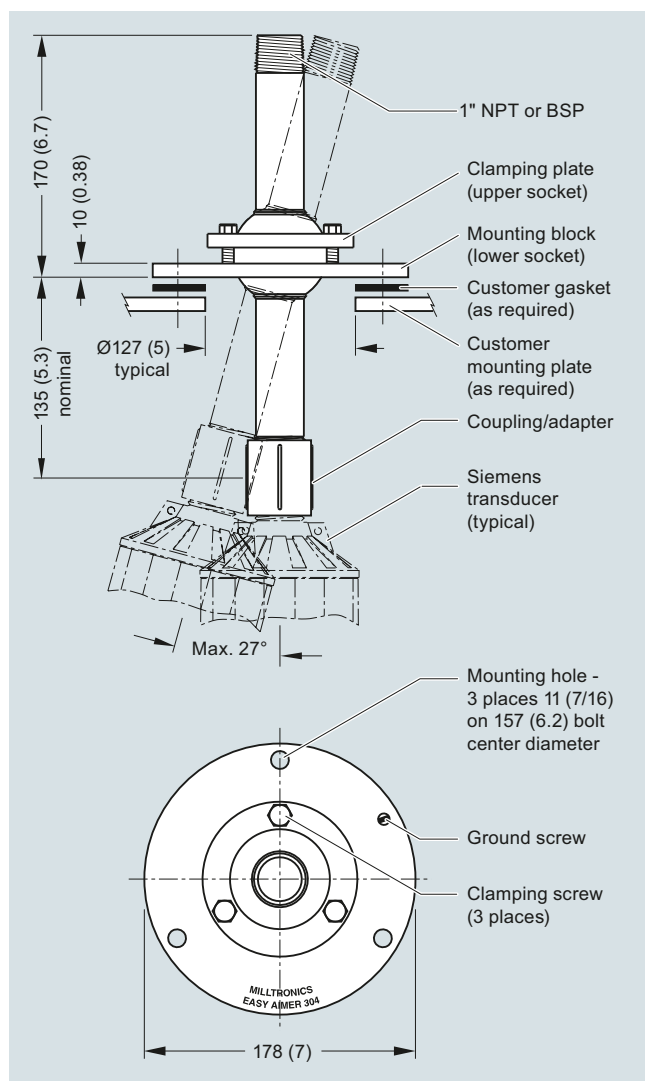
Application

EA 304 aiming device

The Easy Aimer 304 flange is a stainless steel aiming device for alignment of Siemens ultrasonic transducers used for level measurement of bulk solids.

The sensor must be mounted aimed towards the low level draw point in the silo. The sensor can be rotated through 360° and angled at 0 to 27° off vertical. It must be mounted using an access plate with welded studs or a flange in order to isolate the mounting holes from the pressurized environment. When installed properly, the EA 304 aiming device is capable of withstanding pressures up to 0.5 bar (Europe) or 15 psi (North America). It can even be used in corrosive and aggressive environments.

Dimensional drawings



EA 304 aiming device, dimensions in mm (inch)

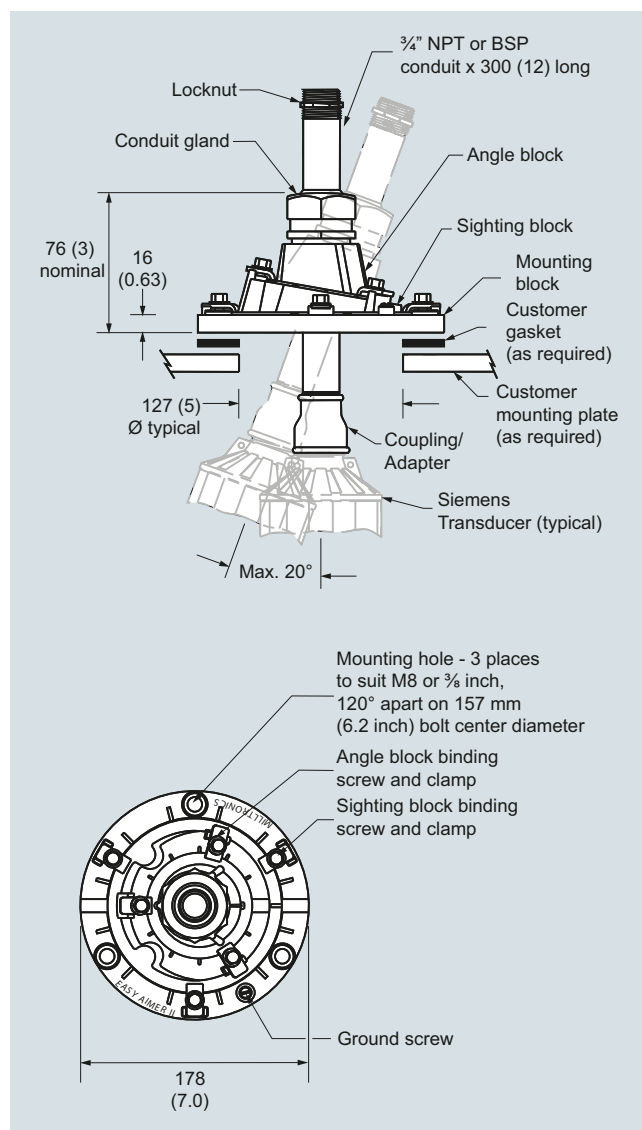
Application

EA 2 aiming device

The Easy Aimer 2 flange is a cast aluminum aiming device for alignment of Siemens ultrasonic transducers.

The flange has graduated adjustments and an adjustable insertion length. When used for applications with bulk solids, the sensor is mounted so that it is aimed towards the lower level draw point in the silo. The sensor can be rotated through 360° and angled at 0 to 20° off vertical. It must be mounted using an access plate with welded studs or a flange in order to isolate the mounting holes from the pressurized environment. When installed properly, the EA 2 aiming device is capable of withstanding pressures up to 0.5 bar (Europe) or 15 psi (North America). It can even be used in corrosive and aggressive environments.

Dimensional drawings



EA 2 aiming device, dimensions in mm (inch)

Selection and Ordering data	Article No.
Easy aimer Used on solids applications to aim transducers for optimal performance. Available in a 304 stainless steel model, or a cast aluminum model.	
Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings	7ML1830-1AX
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings	7ML1830-1GN
Easy Aimer 2, aluminum, BSPT conduit	7ML1830-1AL
Easy Aimer 2, aluminum, NPT with 1½" galvanized coupling ¹⁾	7ML1830-1AN
Easy Aimer 2, aluminum, NPT with 1" galvanized coupling	7ML1830-1AP
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling	7ML1830-1AQ
Easy Aimer 304, BSPT conduit	7ML1830-1AS
Easy Aimer 304, NPT with 1½" stainless steel coupling ¹⁾	7ML1830-1AT
Easy Aimer 304, NPT with 1" stainless steel coupling	7ML1830-1AU
Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

¹⁾ For use with XPS-30 transducers only

Level Measurement

Continuous level measurement

Accessories for ultrasonic

FMS mounting brackets

Application

Siemens mounting brackets permit simple, fast installation of ultrasonic transducers. These rugged, high quality mounting brackets are constructed of 304 (1.4301) stainless steel and are suitable for use indoors and outdoors. They adjust to fit almost any application, saving you the time and expense of building custom brackets. Each kit includes all mounting parts.

FMS-200 **universal box bracket system**

Mounting of units with 1 inch or 2 inch threaded connection.

Distance from sensor to wall or beam: 20 ... 31 cm (8 ... 12 inch).

The unique box design also acts as a sun shield for transducers with 1 inch threaded connections.

FMS-210 **wall mounting set**

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to wall or beam:
12 ... 48 cm (5 ... 19 inch).

FMS-220 **extended wall mounting set**

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to wall or beam:
32 ... 98 cm (13 ... 39 inch).

FMS-310 **floor mounting set**

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to floor: 20 ... 48 cm (8 ... 19 inch).

Distance from mounting support: 5 ... 57 cm (2 ... 22 inch).

FMS-320 **extended floor mounting set**

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to floor: 20 ... 48 cm (8 ... 19 inch).

Distance from mounting support: 41 ... 108 cm (16 ... 43 inch).

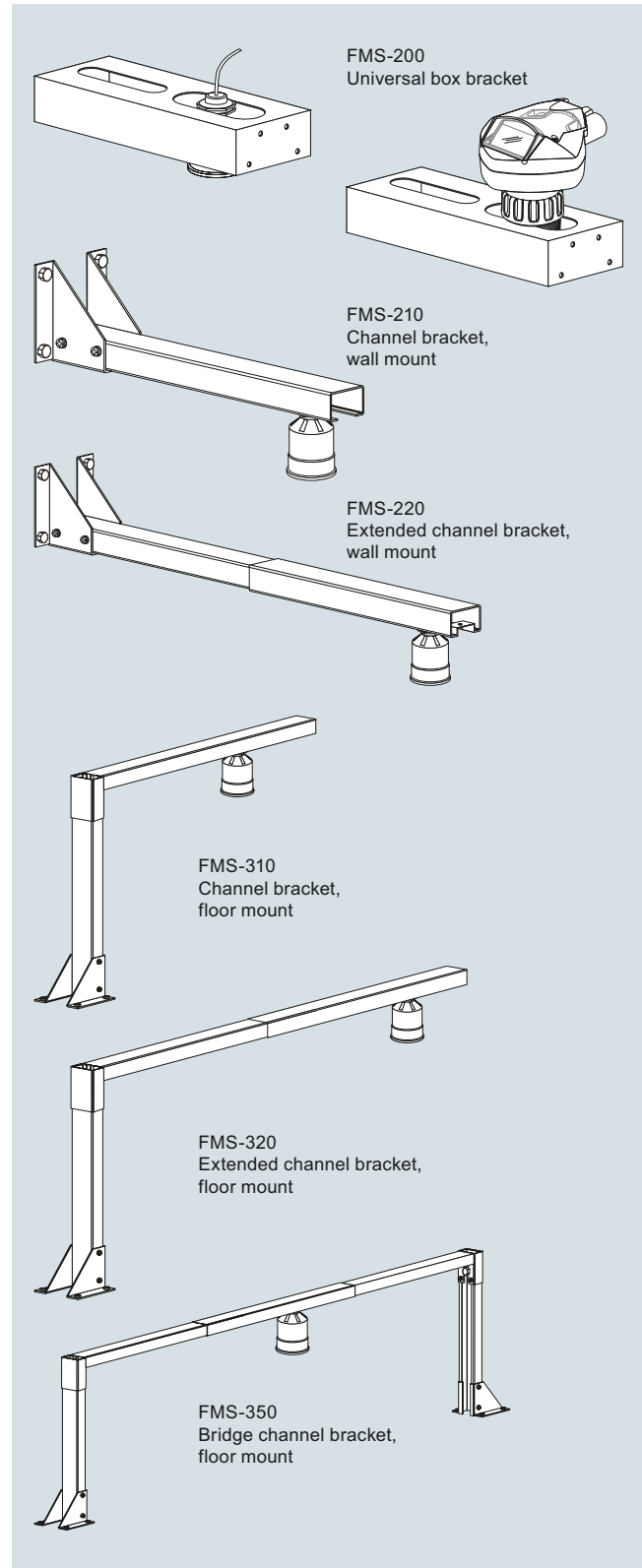
FMS-350 **floor mounting set, bridge**

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to floor: 20 ... 48 cm (8 ... 19 inch),
anywhere along the complete width of the bridge [166 cm
(65 inch)].

This kit is particularly suitable for measurements on open channels (OCM) by providing a very stable mount for the transducer above a flume or weir.

Integration



FMS mounting brackets

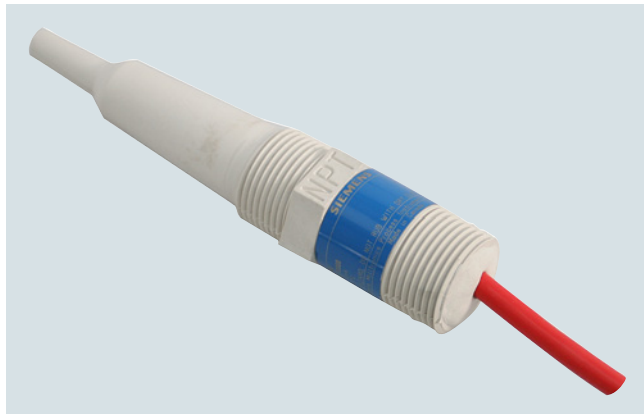
Selection and Ordering data	Article No.
Mounting brackets for XPS-10 sensors	
FMS-200 universal box bracket set	7ML1830-1BK
FMS-210 wall mounting set	7ML1830-1BL
FMS-220 extended wall mounting set	7ML1830-1BM
FMS-310 floor mounting set	7ML1830-1BN
FMS-320 extended floor mounting set	7ML1830-1BP
FMS-350 floor mounting set, bridge	7ML1830-1BQ
<i>Additional Operating Instructions</i>	
FMS-200	7ML1998BK61
FMS-210	7ML19985BL61
FMS-220	7ML19985BM61
FMS-310	7ML19985BN61
FMS-320	7ML19985BP61
FMS-350	7ML19985BQ61
Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

Level Measurement

Continuous level measurement
Accessories for ultrasonic

TS-3 temperature sensor

Overview



The TS-3 temperature sensor provides an input signal for temperature compensation of specific Siemens ultrasonic level controllers.

Benefits

- Chemically resistant ETFE enclosure
- Fast response time
- Approved for use in potentially explosive atmospheres

Application

Temperature compensation is essential in applications where temperature variations of the sound medium are expected.

By installing the temperature sensor close to the sound path of the associated ultrasonic transducer, a signal representative of the sound medium's ambient temperature is obtained. The temperature sensor should not be mounted in direct sunlight.

The TS-3 is used in conjunction with ultrasonic transducers that do not have an integral temperature sensor. It is also recommended in cases where the integral temperature sensor of the transducer cannot be used.

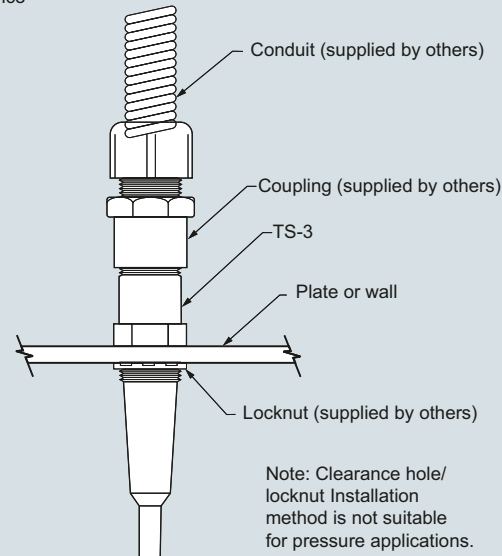
The following conditions are typical for use of the TS-3 sensor: where a fast reaction to temperature variations is required, where a flanged ultrasonic transducer is used, or where high temperatures are encountered.

The TS-3 is not compatible with devices using the TS-2 or LTS-1 temperature sensors. Refer to the associated controller manual for more details.

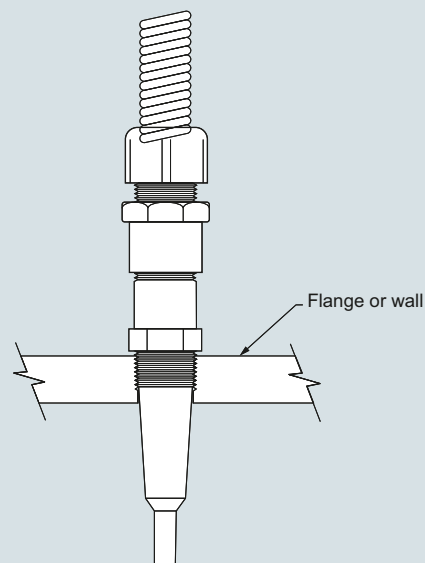
- Key Applications: for use in applications where temperature sensor measurement from transducer does not accurately represent vessel temperature. Used for applications requiring quick temperature response (open channel monitoring).

Design

Clearance



Tapped



TS-3 temperature sensor

Level Measurement

Continuous level measurement

Accessories for ultrasonic

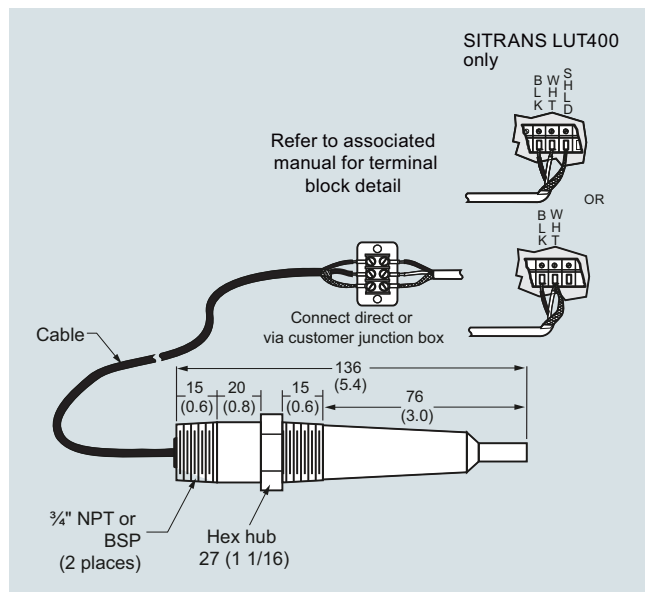
TS-3 temperature sensor

Technical specifications

Mode of operation	
Measuring principle	Temperature sensor
Input	
Measuring range	-40 ... +100 °C (-40 ... +212 °F)
Output	
Response time	
• Forced circulation (temperature variation: 63 %)	55 s
• Flange, forced circulation	90 s
• Natural convection	150 s
Rated operating conditions	
Installation instructions	Mounted indoors/outdoors, but not exposed to direct sunlight
Pressure	Max. 4 bar (60 psi/400 kPa)
Design	
Material (enclosure)	ETFE ¹⁾
Cable connection	2-core, 0.5 mm ² (20 AWG), shielded, silicone sheath
Process connection	¾" NPT [(Taper), ANSI/ASME B1.20.1] R ¾" [(BSPT), EN 10226], totally encapsulated
Certificates and approvals	
	CE, IEC Ex, FM, CSA, ATEX

¹⁾ ETFE is a fluoropolymer inert to most chemicals. For exposure to specific environments, check the chemical compatibility charts before installing the TS-3 in your application.

Dimensional drawings



TS-3 temperature sensor, dimensions in mm (inch)

Selection and Ordering data

TS-3 temperature sensor

TS-3 provides an input signal for temperature compensation of specific Siemens ultrasonic level controllers.

Compensation is essential in applications where variation in temperature of the sound medium is expected.

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Cable length

1 m (3.28 ft)
5 m (16.40 ft)
10 m (32.81 ft)
30 m (98.43 ft)
50 m (164.04 ft)
70 m (229.66 ft)
90 m (295.28 ft)

Process connection

¾" NPT [(Taper), ANSI/ASME B1.20.1]
R ¾" [(BSPT), EN 10226]

Approvals

CSA, FM
CE, ATEX, IEC Ex

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Accessories

¾" NPT locknut, aluminum

Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch) for fastening on sensors

Article No.

7ML1813-

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7ML1930-1BE

7ML1930-1BJ

Level Measurement

Continuous level measurement

Radar transmitters

Radar transmitters

Overview

Radar measurement technology is non-contacting and low maintenance. Because microwaves require no carrier medium, they are virtually unaffected by the process atmosphere (vapor, pressure, dust, or temperature extremes). Siemens offers a variety of models to meet the specific needs of your application.

SITRANS Probe LR is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft).

SITRANS LR200 is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature, pressure, agitation, and turbulence, to a range of 20 m (65 ft).

SITRANS LR250 is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, corrosive or aggressive materials, to a range of 20 m (66 ft). Ideal for small vessels and low dielectric media.

SITRANS LR260 is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of solids and liquids in vessels, to a range of 30 m (98.4 ft). It is ideal for level measurement with quick response or intrinsically safe requirements.

SITRANS LR460 is a 4-wire, 24 GHz FMCW radar level transmitter with extremely high signal to noise ratio and advanced signal processing for continuous monitoring of solids, up to 100 m (328 ft). It is ideal for measurement in extreme dust and high temperature applications.

SITRANS LR560 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids and liquids, to a range of 100 m (328 ft). It is easy to install, plug and play, and there is virtually no maintenance.

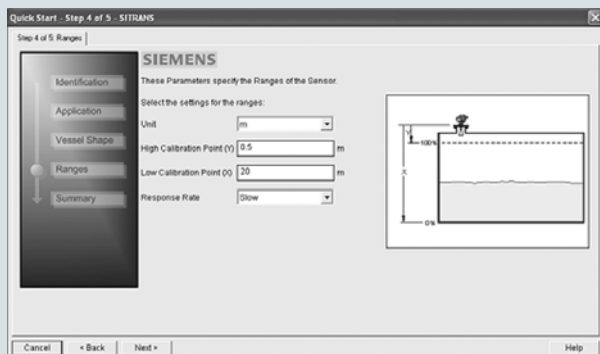
Auto False-Echo Suppression

SITRANS LR instruments offer the unique advantage of Process Intelligence signal processing technology. This in-depth knowledge and experience is built into the software's advanced algorithms to provide intelligent processing of echo profiles. The result is repeatable, fast and reliable measurement.

A special feature of SITRANS radar devices is Auto False-Echo Suppression, an echo processing technique that automatically detects and suppresses false echoes from vessel obstructions. You can implement this feature using two parameters on the local interface or SIMATIC PDM communicating over HART or PROFIBUS PA.



Local display interface – graphically displays echo profiles and diagnostic information (available with LR200, LR250, LR260 and LR560)
Quick to configure – Quick Start Wizard via SIMATIC PDM guides you during setup (available with LR200, LR250, LR260, LR460, LR560)



Mode of operation

Principle of Operation

Radar measurement technology measures the time of flight from the transmitted signal to the return signal. From this time, distance measurement and level are determined.

Unlike ultrasonic measurement, radar technology does not require a carrier medium and travels at the speed of light (300 000 000 m/s). Most industrial radar devices operate from 6 to 78 GHz.

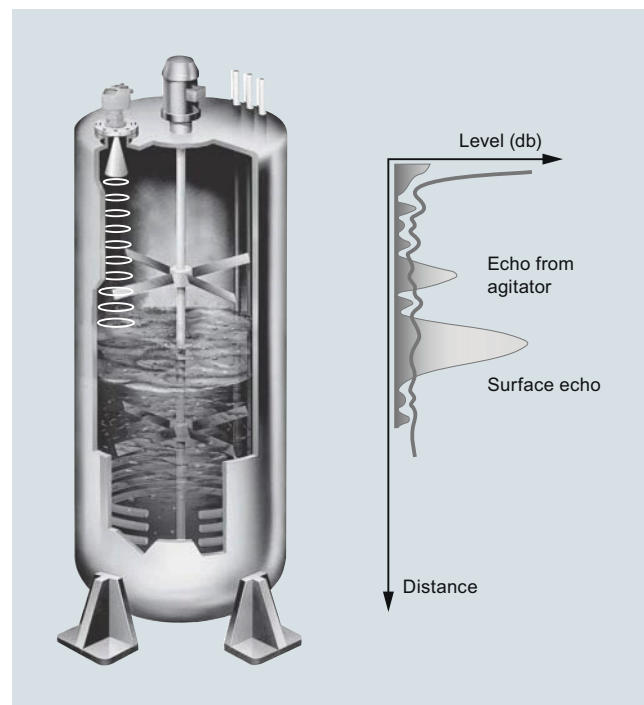
Siemens offers pulse radar transmitters (SITRANS Probe LR, SITRANS LR200, SITRANS LR250, SITRANS LR260) and FMCW (Frequency Modulated Continuous Wave) radar transmitters (SITRANS LR460, SITRANS LR560).

Pulse radar emits a microwave pulse from the antenna at a fixed repetition rate that reflects off the interface between the two materials with different dielectric constants (the atmosphere and the material being monitored).

The echo is detected by a receiver and the transmit time is used to calculate level.

Reflected echoes are digitally converted to an echo profile. The profile is analyzed to determine the distance from the material surface to the reference point on the instrument.

FMCW (Frequency Modulated Continuous Wave) radar devices send microwaves to the surface of the material. The wave frequency is modulated continuously. At the same time, the receiver is also receiving continuously and the difference in frequency between the transmitter and the receiver is directly proportional to the distance to the material.



Radar operation in a reactor vessel

Technical specifications

Radar Selection Guide

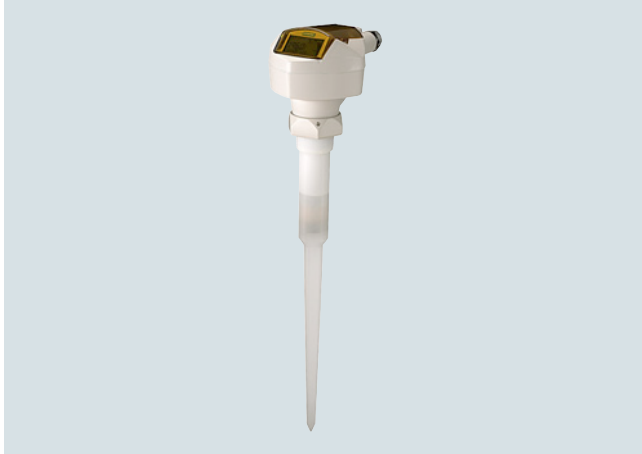
Criteria	SITRANS Probe LR	SITRANS LR200	SITRANS LR250	SITRANS LR260	SITRANS LR460	SITRANS LR560
Typical industries	Chemicals, petrochemicals, water/waste-water, drilling mud	Chemicals, petrochemicals, aluminum, wastewater	Chemicals, petrochemicals, oil and gas, mining, marine, food and beverage, pharmaceutical	Cement, power generation, chemical, petrochemical, food processing, mineral processing, mining	Cement, power generation, food processing, mineral processing, mining	Cement, chemical, power generation, grain, food processing, mineral processing, mining
Typical applications	Liquids, storage vessels, wet wells, drilling mud tanks	Liquids, process vessels with agitators, buildup, high temperatures	Liquids, storage and process vessels with agitators, vaporous liquids, high temperatures, low dielectric media, crude oil produced water	Cement, plastics, grain, flour, coal, fast moving solids, liquids, low dielectric liquids	Cement, fly ash, grain, coal, flour, plastics	Cement, fly ash, chemical fertilizer, grain, coal, flour, plastics, environmental water level monitoring
Range	0.3 ... 20 m (1 ... 65 ft)	0.4 ... 20 m (1.3 ... 65 ft)	50 mm (2 inch) from end of horn to 20 m (65 ft), horn dependent	30 m (98.4 ft)	100 m (328 ft)	40 m (131 ft) 100 m (328 ft)
Frequency	6.3 GHz	6.3 GHz	K-band (25.0 GHz)	K-band (25.0 GHz)	24 ... 25 GHz FMCW	78 ... 79 GHz
Performance accuracy	0.1 % of range or 10 mm (0.4 inch)	0.1 % of range or 10 mm (0.4 inch)	≤ 3 mm (0.118 inch)	<ul style="list-style-type: none"> • 25 mm (1 inch) from minimum detectable distance to 300 mm (11.8 inch) • Remainder of range = 6 mm (0.23 inch) or 0.05 % of spa (whichever is greater) 		5 mm (0.2 inch)
Temperature	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +80 °C (-40 ... +176 °F)	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +200 °C (-40 ... +392 °F), dependent on antenna type	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +200 °C (-40 ... +392 °F), dependent on antenna type	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +200 °C (-40 ... +392 °F), dependent on antenna type	Ambient: 65 °C (149 °F) Process: 200 °C (392 °F)	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +100 °C (-40 ... 212 °F) Optional: 200 °C (392 °F)
Output/communications/remote configuration and diagnostics	<ul style="list-style-type: none"> • 4 ... 20 mA/HART • SIMATIC PDM 	<ul style="list-style-type: none"> • 4 ... 20 mA/HART • PROFIBUS PA • SIMATIC PDM • AMS • SITRANS DTM/FDT for PACTware, Fieldcare, etc. 	<ul style="list-style-type: none"> • 4 ... 20 mA/HART • PROFIBUS PA • FOUNDATION Fieldbus • SIMATIC PDM • AMS • SITRANS DTM/FDT for PACTware, Fieldcare, etc. 	<ul style="list-style-type: none"> • 4 ... 20 mA/HART • PROFIBUS PA • SIMATIC PDM 	<ul style="list-style-type: none"> • 4 ... 20 mA/HART • PROFIBUS PA • SIMATIC PDM 	<ul style="list-style-type: none"> • 4 ... 20 mA/HART • PROFIBUS PA • FOUNDATION Fieldbus • SIMATIC PDM • AMS • SITRANS DTM/FDT for PACTware, Fieldcare, etc.
Power	<ul style="list-style-type: none"> • 24 V DC nominal • Loop powered 	<ul style="list-style-type: none"> • 24 V DC nominal • Loop powered 	<ul style="list-style-type: none"> • 24 V DC nominal • Loop powered 	<ul style="list-style-type: none"> • 24 V DC nominal • Loop powered 	<ul style="list-style-type: none"> • 100 ... 230 V AC, ± 15 %, 50/60 Hz, 6 W • 24 V DC, +25/-20 %, 6 W 	<ul style="list-style-type: none"> • 24 V DC nominal • Loop powered
Approvals	CE, RCM, Lloyds Register of Shipping, ABS, FCC, Industry Canada, RED ATEX, CSA, FM, INMETRO, EAC, IECEx, ANZEx, TIIS	CE, RCM, Lloyds Register of Shipping, ABS, FCC, Industry Canada, RED ATEX, CSA, FM, INMETRO, EAC, IECEx, ANZEx, TIIS, NEPSI	CE, RCM, Lloyds Register of Shipping, ABS, BV, FCC, Industry Canada, RED ATEX, CSA, FM, INMETRO, EAC, IECEx, TIIS, NEPSI Functional safety SIL-2, EHEDG, 3-A, USP Class VI	CE, RCM, FCC, Industry Canada, RED ATEX, CSA, FM, INMETRO, EAC, IECEx	CE, RCM, FCC, Industry Canada, RED ATEX, CSA, FM, INMETRO, IECEx, EAC	CE, RCM, FCC, Industry Canada, RED ATEX, CSA, FM, INMETRO, IECEx, NEPSI, EAC

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS Probe LR

Overview



SITRANS Probe LR is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft).

Benefits

- Uni-Construction polypropylene rod antenna standard
- Easy installation and simple startup
- Programming using Intrinsic Safe handheld programmer, SIMATIC PDM or HART handheld communicator
- Communication using HART
- Process Intelligence signal processing
- Auto False-Echo Suppression of false echoes

Application

The Probe LR is ideal for applications with chemical vapors, temperature gradients, vacuum or pressure, such as simple chemical storage or water treatment vessels. SITRANS Probe LR has a range of 0.3 to 20 m (1 to 65 ft).

Probe LR is designed for safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid. It has a standard Uni-Construction polypropylene rod antenna that offers excellent chemical resistance and is hermetically sealed. The Uni-Construction antenna includes an internal, integrated shield that eliminates vessel nozzle interference.

SITRANS Probe LR incorporates Process Intelligence signal processing. The Probe LR also has a high signal-to-noise ratio leading to improved reliability.

Startup is easy with as few as two parameters for basic operation. Programming is simple using SIMATIC PDM, HART handheld communicator or the Intrinsically Safe handheld programmer.

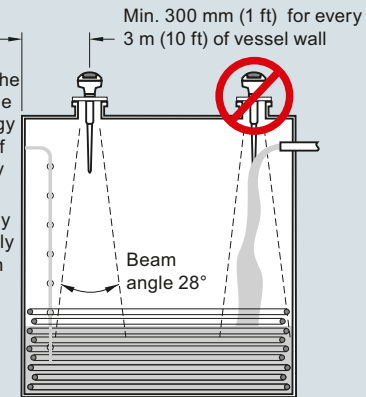
- Key Applications: chemical storage, wastewater wet well, and drilling mud

Configuration

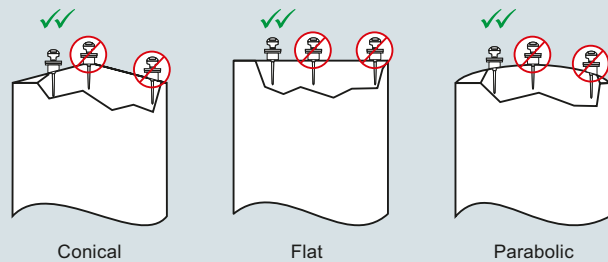
Installation

Note:

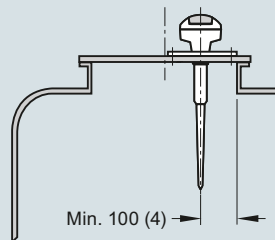
- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the rod antenna.



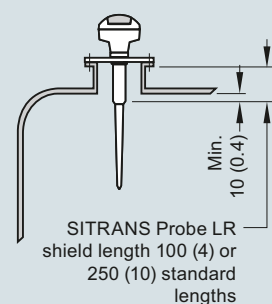
Mounting unit on vessel



Mounting on a manhole cover



Mounting on a nozzle



SITRANS Probe LR installation, dimensions in mm (inch)

Technical specifications

Mode of operation		Power supply	
Measuring principle	Pulse radar level measurement	<ul style="list-style-type: none"> Nominal 24 V DC with max. 550 Ω, maximum 30 V DC 4 ... 20 mA 	
Frequency	C-band, approx. 6 GHz	Certificates and approvals	
Measuring range	0.3 ... 20 m (1.0 ... 65 ft)	General	CSA _{US/C} , CE, FM, RCM
Output		Marine	<ul style="list-style-type: none"> Lloyd's Register of Shipping ABS Type Approval
Analog output	4 ... 20 mA	Radio	FCC, Industry Canada, RED, RCM
Accuracy	± 0.02 mA	Hazardous	
Span	Proportional or inversely proportional	<ul style="list-style-type: none"> Intrinsically Safe (Brazil) Intrinsically Safe (Canada) 	INMETRO Ex ia IIC T4 Ga CSA Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Group G; Class III ATEX II 1G EEx ia IIC T4
Communications	HART	<ul style="list-style-type: none"> Intrinsically Safe (Europe) Intrinsically Safe (International) Intrinsically Safe (Russia/Kazakhstan) Intrinsically Safe (USA) 	IECEx Ex ia IIC T4 EAC Ex ia FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III
Performance (reference conditions)		Programming	
Accuracy	± the greater of 0.1 % of range or 10 mm (0.4 inch)	Handheld programmer	HART communicator 375
<ul style="list-style-type: none"> From end of antenna to 600 mm (23.62 inch) Remainder of range 10 mm (0.4 inch) or 0.1 % of span (whichever is greater) 	40 mm (1.57 inch) 10 mm (0.4 inch) or 0.1 % of span (whichever is greater)	PC	SIMATIC PDM
Influence of ambient temperature	0.003 %/K	Intrinsically safe Siemens handheld programmer (optional)	Infrared receiver
Repeatability	± 5 mm (2 inch)	<ul style="list-style-type: none"> Approvals (handheld programmer) 	ATEX II 1G EEx ia IIC T4 CSA and FM Class I, Div. 1, Groups A, B, C, D, T6 at max. ambient
Fail-safe	mA signal programmable as high, low or hold (LOE)	Display (local)	Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages
Rated operating conditions			
Installation conditions			
<ul style="list-style-type: none"> Location 	Indoor/outdoor		
Ambient conditions (enclosure)			
<ul style="list-style-type: none"> Ambient temperature Installation category Pollution degree 	-40 ... +80 °C (-40 ... +176 °F) I 4		
Medium conditions			
Dielectric constant ϵ_r	> 3.0		
Vessel temperature	-40 ... +80 °C (-40 ... +176 °F)		
Vessel pressure	3 bar g (43.5 psi g)		
Design			
Enclosure			
<ul style="list-style-type: none"> Body construction Lid construction Cable inlet 	PBT (Polybutylene Terephthalate) PEI (Polyether Imide) 2 x M20 x 1.5 or 2 x ½" NPT with adapter		
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68		
Weight	1.97 kg (4.35 lb)		
Antenna			
<ul style="list-style-type: none"> Material Dimensions 	Polypropylene rod, hermetically sealed construction Standard 100 mm (4 inch) shield for maximum 100 mm (4 inch) nozzle or optional 250 mm (10 inch) long shield		
Process connections	1½" NPT [(Taper), ANSI/ASME B1.20.1] R 1½" [(BSPT), EN 10226] G 1½" [(BSPP), EN ISO 228-1]		

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS Probe LR

Selection and Ordering data

SITRANS Probe LR

2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft).

Max. 3 bar g (43.5 psi g) pressure and 80 °C (176 °F)

➔ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Enclosure/Cable inlet

Plastic, (PBT), 2 x 1/2" NPT
Plastic, (PBT), 2 x M20 x 1.5

Antenna type/Material - (max. 3 bar and 80 °C)

Polypropylene Antenna
1 1/2" NPT [(Taper), ANSI/ASME B1.20.1], comes with integral 100 mm shield
R 1 1/2" [(BSPT), EN 10226], comes with integral 100 mm shield
G 1 1/2" [(BSPP), EN ISO 228-1], comes with integral 100 mm shield
1 1/2" NPT [(Taper), ANSI/ASME B1.20.1], comes with integral 250 mm shield
R 1 1/2" [(BSPT), EN 10226], comes with integral 250 mm shield
G 1 1/2" [(BSPP), EN ISO 228-1], comes with integral 250 mm shield

Approvals

General Purpose, CE, RED, RCM
General Purpose, CSA_{US/c}, FM, FCC
CSA Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Group G, Class III, FCC, Intrinsically Safe
FM, Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Intrinsically Safe
IECEX Ex ia IIC T4; ATEX II 1G EEx ia IIC T4, RED, RCM, Intrinsically Safe;
INMETRO Ex ia IIC T4 Ga; EAC

Communication/Output

4 ... 20 mA, HART

Article No.

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Selection and Ordering data

Order code

Further designs

Please add "-Z" to Article No. and specify Order code(s).

Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]:
Measuring-point number/identification
(max. 27 characters) specify in plain text

Manufacturer's test certificate:
M to DIN 55350, Part 18 and to ISO 9000

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Accessories

Handheld programmer, Intrinsically Safe, ATEX II 1G, Ex ia

HART modem/USB
(for use with a PC and SIMATIC PDM)

One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F)

SITRANS RD100, loop powered display - see Chapter 7

SITRANS RD200, universal input display with Modbus conversion - see Chapter 7

SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7

SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7

For applicable back up point level switch - see point level measurement section

Spare parts

Plastic lid

For applicable back up point level switch - see point level measurement section

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Article No.

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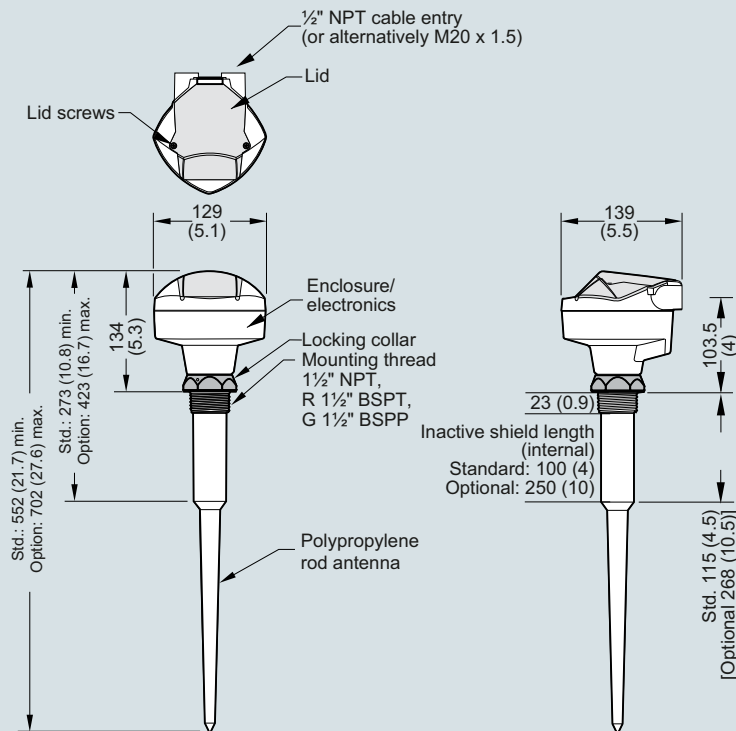
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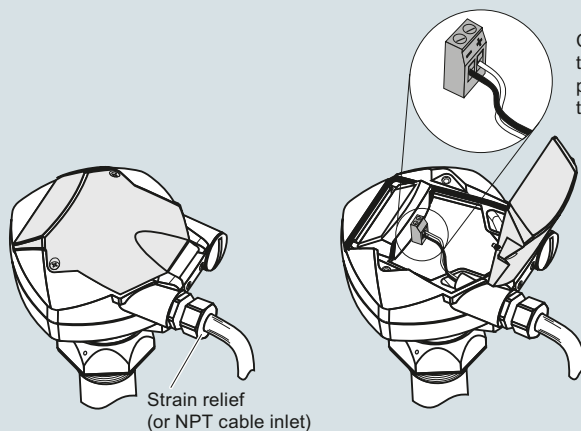
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Dimensional drawings



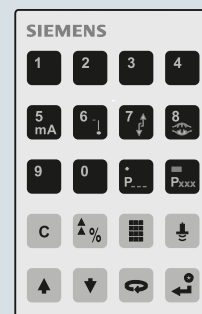
SITRANS Probe LR, dimensions in mm (inch)

Circuit diagrams



Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

Hand Programmer



SITRANS Probe LR
Part number: 7ML5830-2AH

Notes:

- DC terminal shall be supplied from an SELV source in accordance with IEC-1010-1 Annex H.
- All field wiring must have insulation suitable for rated input voltages.
- Use shielded twisted pair cable (14-22 AWG).
- Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS Probe LR connections

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS LR200

Overview



SITRANS LR200 is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature, pressure, agitation, and turbulence to a range of 20 m (65 ft).

Benefits

- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- Communication using HART or PROFIBUS PA
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or SIMATIC PDM

Application

SITRANS LR200's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid. It also features a built-in alphanumeric display in four languages.

The SITRANS LR200 has a standard Uni-Construction polypropylene rod antenna that offers excellent chemical resistance and is hermetically sealed. The Uni-Construction antenna features an internal, integrated shield that eliminates vessel nozzle interference.

Startup is easy with as few as two parameters for basic operation. Installation is simplified as the electronics are mounted on a rotating head that swivels, allowing the instrument to line up with conduit or wiring connections or simply to adjust the position for easy viewing. SITRANS LR200 features Process Intelligence signal-processing technology for superior reliability.

- Key Applications: liquid process vessels with agitators, vaporous liquids, high temperatures, asphalt

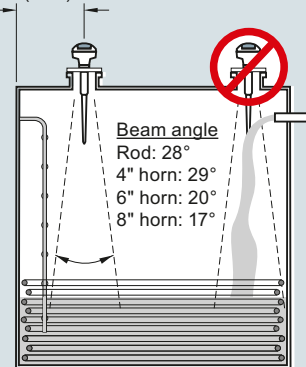
Configuration

Installation

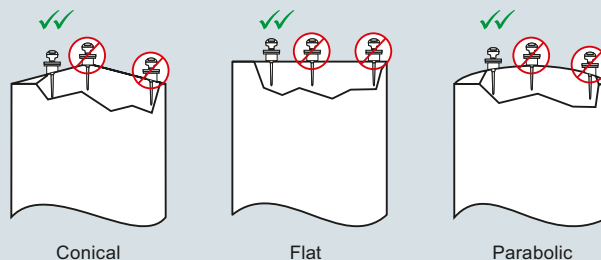
Note:

- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- Beam angle for horn antenna dependent on horn size
- The peak energy density is directly in front of and in line with the rod antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.

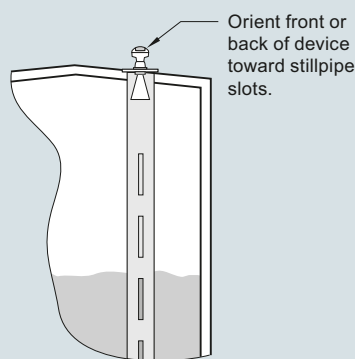
Min. 300 mm (1 ft) for every 3 m (10 ft) of vessel wall.



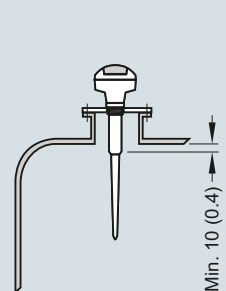
Mounting unit on vessel



Mounting unit on stilling well

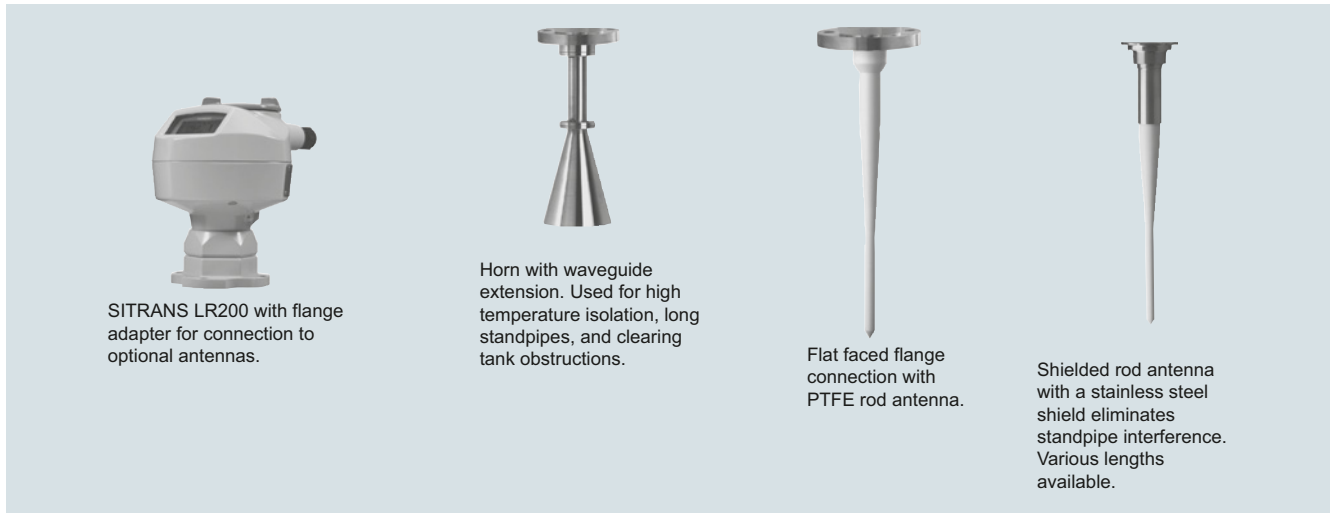


Mounting on a nozzle



SITRANS LR200 installation, dimensions in mm (inch)

Integration



Antenna configurations for SITRANS LR200

Antenna types	Flat Faced Flange with Rod	Shielded Rod	Horn (4", 6", 8" sizes available)
Connection type	Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6 inch)	Threaded 2" NPT, R 2" (BSPT), G 2" (BSPP) or flat faced flange nominal pipe sizes 80, 100 mm (3, 4 inch)	Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6 inch)
Wetted parts	PTFE	PTFE, 316L stainless steel, FKM O-ring	316L stainless steel PTFE, FKM O-ring
Extensions	50 or 100 mm (2 or 4 inch) PTFE or UHMW-PE	100, 150, 200 or 250 mm (4, 6, 8 or 10 inch) standard shield length	Use waveguide for extensions to 6 m (20 ft) long
Dielectric constant	> 3	> 3	> 3
Insertion length (max.)	41 cm (16.3 inch)	Variable	Variable with extension
Purging option (liquid or gas)	No	No	Yes
Sliding waveguide option for digesters¹⁾	Yes	No	Yes
Weight²⁾	6.5 kg (14.3 lb)	5.0 kg (11 lb)	7.5 kg (16.5 lb)

¹⁾ Maximum pressure 0.5 bar g at 60 °C (7.25 psi g at 140 °F)

²⁾ Not including extensions, includes SITRANS LR200 and smallest process connection

Level Measurement

Continuous level measurement

Radar transmitters

SITRANS LR200

Technical specifications

Mode of operation Measuring principle Frequency Measuring range		Radar level measurement C-band, approx. 6 GHz 0.3 ... 20 m (1.0 ... 65 ft)
Output Analog output Accuracy Span Communications Fail-safe		4 ... 20 mA ± 0.02 mA Proportional or inversely proportional HART Optional: PROFIBUS PA (Profile 3.0, Class B) Programmable as high, low or hold (Loss of Echo)
Performance (according to reference conditions IEC60770-1) From end of antenna to 600 mm Remainder of range		40 mm (1.57 inch) 10 mm (0.4 inch) or 0.1 % of span (whichever is greater)
Rated operating conditions Installation conditions • Location Ambient conditions (enclosure) • Ambient temperature • Installation category • Pollution degree		Indoor/outdoor -40 ... +80 °C (-40 ... +176 °F) I 4
Medium conditions Dielectric constant ϵ_r Vessel temperature and pressure		$\epsilon_r > 1.6$ (for $\epsilon_r < 3$, use stillpipe) Varies with connection type; see Pressure/Temperature curves for more information
Design Enclosure • Material • Cable inlet Degree of protection Weight Display (local) Antenna • Material • Dimensions • Optional rods and horn Process connections • Process connection • Flange connection		Aluminum, polyester powder coated 2 x M20 x 1.5 or 2 x 1/2" NPT Type 4X/NEMA 4X, Type 6/ NEMA 6, IP67, IP68 < 2.82 kg (6.21 lb) (polypropylene rod antenna) Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages Polypropylene rod, hermetically sealed construction, optional PTFE Standard 100 mm (4 inch) shield for maximum 100 mm (4 inch) nozzle, or optional 250 mm (10 inch) long shield Refer to SITRANS LR200 Antennas for optional rods and horns 1 1/2" NPT [(Taper), ANSI/ASME B1.20.1] R 1 1/2" [(BSPT), EN 10226], or G 1 1/2" [(BSPP), EN ISO 228-1] (polypropylene rod antenna) Refer to SITRANS LR200 Antennas for more connections
Power supply 4 ... 20 mA/HART • General Purpose, Non-incendive, Intrinsically Safe • Flame proof, Increased safety, Explosion proof PROFIBUS PA		Nominal 24 V DC (max. 30 V DC) with max. 550 Ω Nominal 24 V DC (max. 30 V DC) with max. 250 Ω • 10.5 mA • Per IEC 61158-2
Certificates and approvals General Marine Radio Hazardous • Intrinsically Safe (Brazil) • Explosion Proof (Canada/USA) • Intrinsically Safe (Canada/USA) • Non-incendive (USA) • Flame Proof/Increased Safety (China) • Flame Proof (Europe) • Increased Safety (Europe) • Intrinsically Safe (Europe) • Intrinsically Safe (International) • Intrinsically Safe (Russia/Kazakhstan)		CSA _{US/C} , CE, FM, RCM • Lloyd's Register of Shipping • ABS Type Approval FCC, Industry Canada, and European (RED), RCM INMETRO Ex ia IIC T4 Ga CSA/FM, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, T4 CSA/FM, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, T4 FM, Class I, Div. 2, Groups A, B, C, D, T5 NEPSI Ex d mb ia IIC T4/ Ex e mb ia IIC T4 ATEX II 1/2 G Ex d mb ia IIC T4 Ga/Gb ATEX II 1/2 G Ex e mb ia IIC T4 Ga/Gb ATEX II 1G Ex ia IIC T4 IECEx Ex ia IIC T4 EAC Ex ia
Programming Intrinsically Safe Siemens handheld programmer • Approvals for handheld programmer Handheld communicator PC Display (local)		Infrared receiver IS model: ATEX II 1GD Ex ia IIC T4 Ga Ex iaD 20 T135 °C T _a = -20 ... +50 °C CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G, T6 T _a = +50 °C HART communicator 375 • SIMATIC PDM • AMS • SITRANS DTM (for connecting to FDT such as PACTware or Field-care) Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages

Selection and Ordering data		Article No.	Selection and Ordering data		Order code
SITRANS LR200, Uni-Construction polypropylene rod antenna version		7ML5422-	Further designs		
2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature and pressure, to a range of 20 m (66 ft).			Please add "-Z" to Article No. and specify Order code(s).		
Max. 3 bar g (43.5 psi g) pressure and 80 °C (176 °F)			Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text		Y15
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000		C11
			Namur NE43 compliant, device preset to failsafe < 3.6 mA ¹⁾		N07
Enclosure/Cable inlet			Operating Instructions		
Aluminum, epoxy painted			All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation		
2 x ½" NPT		2	Accessories		Article No.
2 x M20 x 1.5		3	Handheld programmer, Intrinsically safe, EEx ia		7ML1930-1BK
Polypropylene antenna type - (Max. 3 Bar pressure and 80 °C)			HART modem/USB (for use with a PC and SIMATIC PDM)		7MF4997-1DB
1½" NPT [(Taper), ANSI/ASME B1.20.1], c/w integral 100 mm shield		A	One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART ²⁾		7ML1930-1AP
R 1½" [(BSPT), EN 10226], c/w integral 100 mm shield		B	One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA ²⁾		7ML1930-1AQ
G 1½" [(BSPP), EN ISO 228-1], c/w integral 100 mm shield		C	One general purpose polymeric cable gland M20 x 1.5, rated -20 ... +80 °C (-40 ... +176 °F)		7ML1930-1AM
1½" NPT [(Taper), ANSI/ASME B1.20.1], c/w integral 250 mm shield		D	SITRANS RD100, loop powered display - see Chapter 7		7ML5741-...
R 1½" [(BSPT), EN 10226], c/w integral 250 mm shield		E	SITRANS RD200, universal input display with Modbus conversion - see Chapter 7		7ML5740-...
G 1½" [(BSPP), EN ISO 228-1], c/w integral 250 mm shield		F	SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7		7ML5744-...
Approvals			SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7		7ML5750-...
General Purpose, CE, RED, RCM		A	For applicable back up point level switch - see point level measurement section		
General Purpose, CSA, FM, Industry Canada, FCC		B	1) Available with communication option 3 only		
Intrinsically Safe, CSA Class I, II, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada		C	2) Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.		
Intrinsically Safe, FM Class I, II, Div. 1, Groups A, B, C, D, E, F, G, FCC		D			
Intrinsically Safe, IECEx/ATEX II 1G Ex ia IIC T4, INMETRO Ex ia IIC T4, CE, RED, RCM; EAC		E			
Non incandive, FM Class I, Div. 2, Groups A, B, C, D, FCC ¹⁾		F			
Increased Safety, ATEX II 1/2G Ex e mb ia IIC T4 Ga/Gb, CE, RED, RCM; EAC ²⁾³⁾		G			
Flame Proof, ATEX II 1/2G Ex d mb ia IIC T4 Ga/Gb, CE, RED, RCM; EAC ³⁾		H			
Explosion Proof, CSA/FM Class I, II, III, Groups A, B, C, D, E, F, G, Industry Canada, FCC ¹⁾³⁾		J			
Communication/Output					
PROFIBUS PA		2			
4 ... 20 mA, HART, start-up at < 3.6 mA		3			

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS LR200

Selection and Ordering data	Article No.
SITRANS LR200, Flange Adapter/PTFE Rod Antenna Version	7ML5423-
2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature and pressure, to a range of 20 m (66 ft).	
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Antenna material (uses antenna adapter)	1
PTFE, uses antenna adapter and additional process connection below	
Process connection (refer to Pressure/Temperature curves, page 4/204)	
Flanges (316L stainless steel)	
DN 50 PN 16, Type A, flat faced	AA
DN 80 PN 16, Type A, flat faced	BA
DN 100 PN 16, Type A, flat faced	CA
DN 150 PN 16, Type A, flat faced	DA
2" ASME 150 lb, flat faced	FB
3" ASME 150 lb, flat faced	GB
4" ASME 150 lb, flat faced	HB
6" ASME 150 lb, flat faced	JB
DN 50 PN 40, flat faced	AC
DN 80 PN 40, flat faced	BC
DN 100 PN 40, flat faced	CC
DN 150 PN 40, flat faced	DC
2" ASME 300 lb, flat faced, available with Pressure rating option 1 only due to flange hole spacing	FD
3" ASME 300 lb, flat faced	GD
4" ASME 300 lb, flat faced	HD
6" ASME 300 lb, flat faced	JD
JIS DN 50 10K	AE
JIS DN 80 10K	BE
JIS DN 100 10K	CE
JIS DN 150 10K	DE
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)	
Threaded connection (316L stainless steel)	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	LA
2" NPT [(Taper), ANSI/ASME B1.20.1]	MA
R 1½" [(BSPT), EN 10226]	LC
R 2" [(BSPT), EN 10226]	MC
G 1½" [(BSPP), EN ISO 228-1]	LE
G 2" [(BSPP), EN ISO 228-1]	ME
Antenna extensions or Inactive shield length	
No antenna extension	0
50 mm (2 inch) extension, PTFE	1
100 mm (4 inch) extension, PTFE	2
100 mm (4 inch) extension, 316L stainless steel shield ¹⁾	3
150 mm (6 inch) extension, 316L stainless steel shield ¹⁾	4
200 mm (8 inch) extension, 316L stainless steel shield ¹⁾	5
250 mm (10 inch) extension, 316L stainless steel shield ¹⁾	6
Process seal/gasket	
Integral Gasket, for flat faced flange process connections only, not for Antenna extension options 3 ... 6	0
FKM O-ring, not available for combination of flat faced flanges with Antenna extension options 0, 1 or 2	1

Selection and Ordering data	Article No.
SITRANS LR200, Flange Adapter/PTFE Rod Antenna Version	7ML5423-
2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature and pressure, to a range of 20 m (66 ft).	
Enclosure/Cable inlet	
Aluminum, Epoxy painted	
2 x ½" NPT	2
2 x M20 x 1.5	3
Communication/Output	
PROFIBUS PA	B
4 ... 20 mA, HART, start-up at < 3.6 mA	C
Approvals	
General Purpose, CE, RED, RCM	A
General Purpose, CSA FM, Industry Canada, FCC	B
Intrinsically Safe, CSA Class I, II, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada	C
Intrinsically Safe, FM Class I, II, Div. 1, Groups A, B, C, D, E, F, G, FCC	D
Intrinsically Safe, IECEx/ATEX II 1G Ex ia IIC T4, INMETRO Ex ia IIC T4, CE, RED, RCM; EAC	E
Non incensive, FM Class I, Div. 2, Groups A, B, C, D, FCC ²⁾	F
Increased Safety, ATEX II 1/2G Ex e mb ia IIC T4 Ga/Gb, CE, RED, RCM; EAC ^{3/4)}	G
Flame Proof, ATEX II 1/2G Ex d mb ia IIC T4 Ga/Gb, CE, RED, RCM; EAC ⁴⁾	H
Explosion Proof, CSA/FM Class I, II, III, Groups A, B, C, D, E, F, G, Industry Canada, FCC ^{2/4)}	J
Pressure rating	
Rating per Pressure/Temperature curves in manual	0
0.5 bar g (7.25 psi g) maximum	1


¹⁾ Available with process connection options BA, CA, DA, GB, HB, JB, BC, CC, DC, GD, HD, JD, BE, CE, DE, MA, MC, ME only

²⁾ Available with enclosure option 2 only

³⁾ Available with enclosure option 3 only

⁴⁾ Available with communication option C only

Selection and Ordering data	Order code
Further designs	
Please add *-Z* to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]; Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204	C12
Namur NE43 compliant, device preset to failsafe < 3.6 mA ³⁾	N07
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Article No.	
Handheld programmer, Intrinsically safe, EEx ia	7ML1930-1BK
Antenna, rod, PTFE	7ML1830-1HC
Antenna extension, 50 mm (2 inch), PTFE	7ML1830-1CH
Antenna extension, 100 mm (4 inch), PTFE	7ML1830-1CG
HART modem / USB (for use with PC and SIMATIC PDM)	7MF4997-1DB
Metallic cable gland M20 x 1.5, rated -40 °C (-40 °F) ... 80 °C (176 °F), HART (two are required)	7ML1930-1AP
Metallic cable gland M20 x 1.5, rated -40 °C (-40 °F) ... 80 °C (176 °F), PROFIBUS PA (two required)	7ML1930-1AQ
One General Purpose polymeric cable gland M20 x 1.5, rating for -20 °C (-4°F) ... + 80 °C (176 °F)	7ML1930-1AM
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-...
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-...
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750-...
For applicable back up point level switch - see point level measurement section	

Selection and Ordering data		Article No.	Selection and Ordering data		Order code
SITRANS LR200, Flange adapter/Horn Antenna version		7ML5425-	Further designs		
2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature and pressure, to a range of 20 m (66 ft).			Please add "-Z" to Article No. and specify Order code(s).		
Approvals			Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text		Y15
General Purpose, CE, RED, RCM		A	Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000		C11
General Purpose, CSA, FM, Industry Canada, FCC		B	Material inspection Certificate Type 3.1 per EN 10204		C12
Intrinsically Safe, CSA Class I, II, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada		C	Namur NE43 compliant, device preset to failsafe < 3.6 mA ¹⁾		N07
Intrinsically Safe, FM Class I, II, Div. 1, Groups A, B, C, D, E, F, G, FCC		D	Operating Instructions		
Intrinsically Safe, IECEx/ATEX II 1G Ex ia IIC T4, INMETRO Ex ia IIC T4, CE, RED, RCM; EAC		E	All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation		
Non incendive, FM Class I, Div. 2, Groups A, B, C, D, FCC ⁴⁾		F	Accessories		Article No.
Increased Safety, ATEX II 1/2G Ex e mb ia IIC T4 Ga/Gb, CE, RED, RCM; EAC ⁵⁾⁶⁾		G	Handheld programmer, Intrinsically safe, EEx ia		7ML1930-1BK
Flame Proof, ATEX II 1/2G Ex d mb ia IIC T4 Ga/Gb, CE, RED, RCM; EAC ⁶⁾		H	HART modem/USB (for use with a PC and SIMATIC PDM)		7MF4997-1DB
Explosion Proof, CSA/FM Class I, II, III, Groups A, B, C, D, E, F, G, Industry Canada, FCC ⁵⁾⁶⁾		J	One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART ²⁾		7ML1930-1AP
Pressure rating			One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA ³⁾		7ML1930-1AQ
Rating per Pressure/Temperature curves in manual 0.5 bar g (7.25 psi g) maximum		0	One general purpose polymeric cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F)		7ML1930-1AM
1) Available with pressure rating option 1 only		1	SITRANS RD100, loop powered display - see Chapter 7		7ML5741-...
2) Available with Antenna Material options 0 and 1 only			SITRANS RD200, universal input display with Modbus conversion - see Chapter 7		7ML5740-...
3) For stillpipe applications only			SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7		7ML5744-...
4) Available with enclosure option 2 only			SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7		7ML5750-...
5) Available with enclosure option 3 only			For applicable back up point level switch - see point level measurement section		
6) Available with communication option 2 only			1) Available with communication option 2 only		
			2) Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.		
			3) Available with enclosure option 2 only		

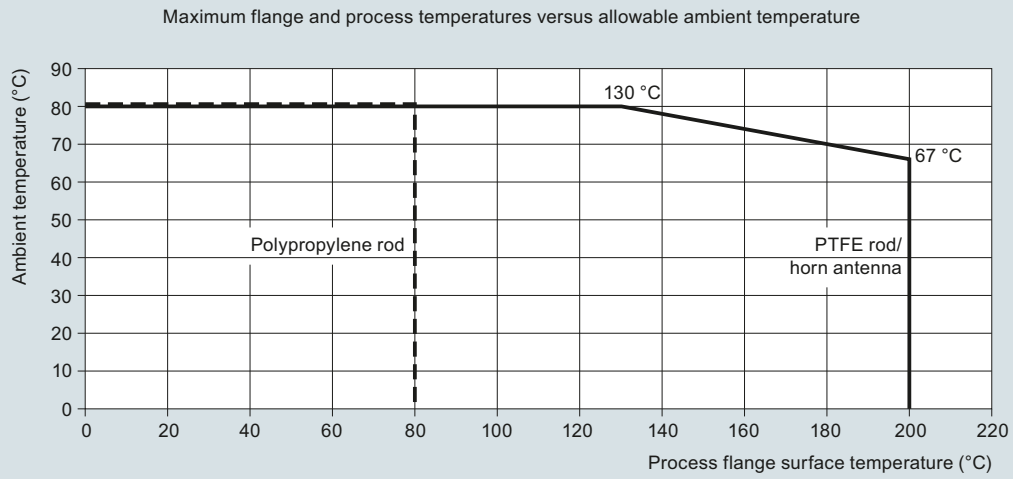
Level Measurement

Continuous level measurement

Radar transmitters

SITRANS LR200

Characteristic curves



SITRANS LR200 ambient/process flange surface temperature curve



SITRANS LR200 process pressure/temperature derating curves

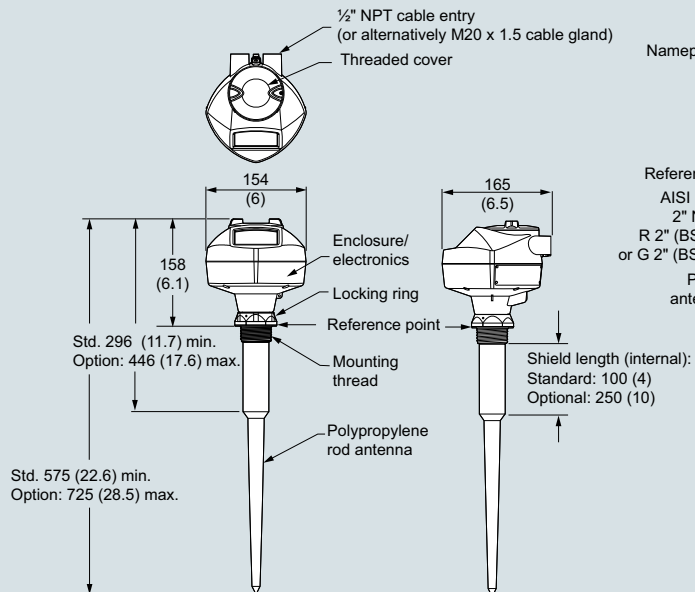
Level Measurement

Continuous level measurement
Radar transmitters

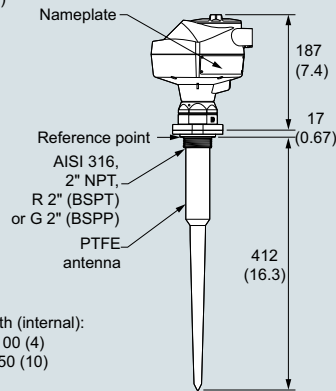
SITRANS LR200

Dimensional drawings

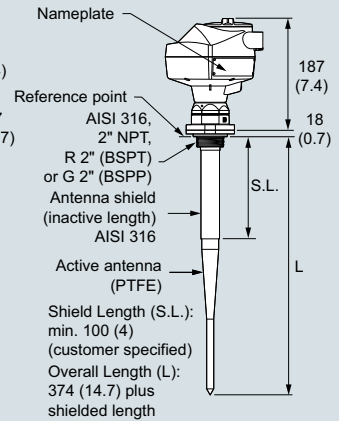
SITRANS LR200 with polypropylene shielded rod antenna



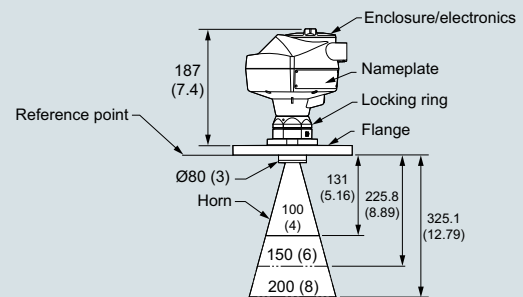
PTFE rod antenna, threaded



**Threaded connection
PTFE rod, external shield**

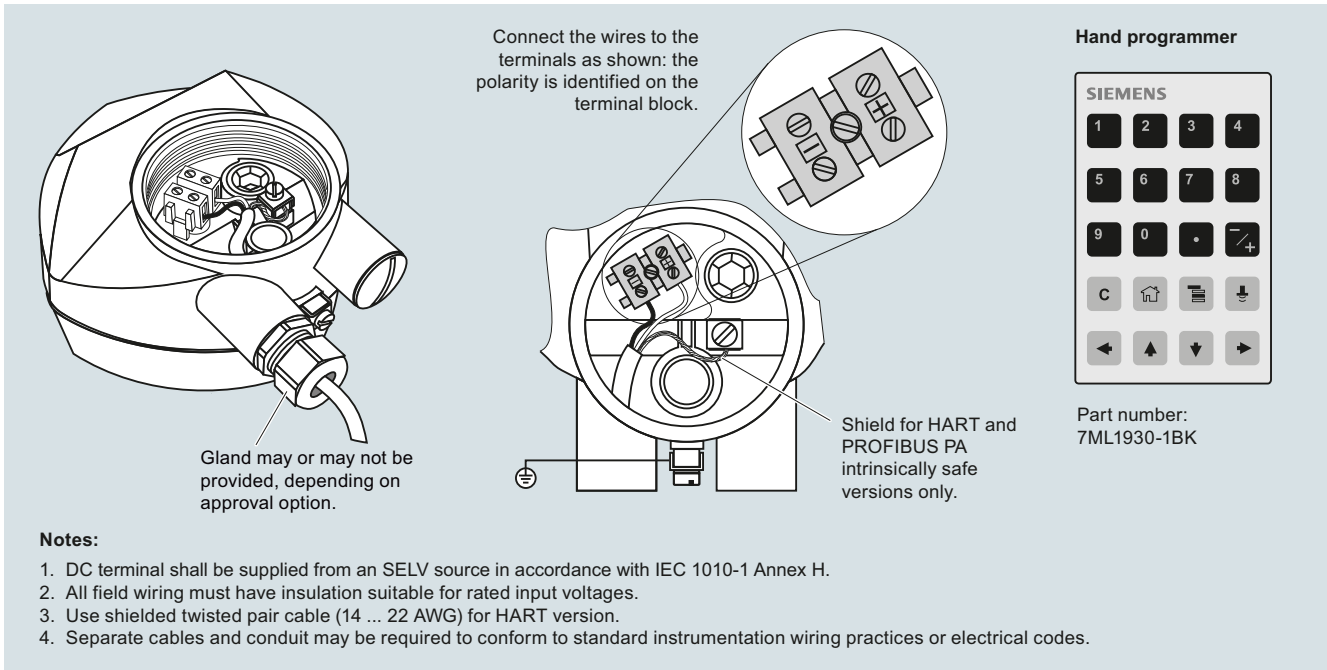


Horn antenna with flat faced flange



SITRANS LR200, dimensions in mm (inch)

Circuit diagrams





SITRANS LR200 connections

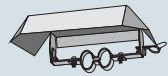

Level Measurement

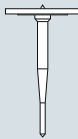
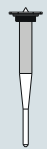

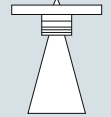

Continuous level measurement
Radar transmitters

SITRANS LR200 Specials

Selection and ordering data

SITRANS LR200 Specials	Article No.
SITRANS LR200 PROFIBUS PA Aluminum Enclosure Kit with electronics and covers (7ML5422, 7ML5423, 7ML5424, 7ML5425), calibrated for use with standard rod antenna 	
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option E, with PROFIBUS PA communication, no process connection.	A5E01483420
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection.	A5E01483440
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection.	A5E01483456
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option C, with PROFIBUS PA communication, no process connection.	A5E01483547
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option E, with PROFIBUS PA communication, no process connection.	A5E01483559
SITRANS LR200 HART aluminum enclosure kit with electronics and covers (7ML5422, 7ML5423, 7ML5424, 7ML5425), calibrated for use with standard rod antenna 	
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection.	A5E02956419
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection.	A5E02956420
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection.	A5E02956421
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection.	A5E02956422


SITRANS LR200 Specials	Article No.
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection.	A5E03617085
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection.	A5E03617086
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection.	A5E03617087
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection.	A5E03617088
Sun shield for SITRANS LR200 enclosure, stainless steel 	A5E39142556
SITRANS LR200 Horn Antenna Kits with mounting screws (no emitter supplied) 	
80 mm (3 inch) horn antenna kit	PBD:25500K02A
100 mm (4 inch) horn antenna kit	PBD:25500K03A
150 mm (6 inch) horn antenna kit	PBD:25500K05A
SITRANS LR200 Extension Kits for Horn Antenna with mounting screws	
100 mm (4 inch) extension kit for horn antenna	PBD:25501K0100A
150 mm (6 inch) extension kit for horn antenna	PBD:25501K0150A
200 mm (8 inch) extension kit for horn antenna	PBD:25501K0200A
250 mm (10 inch) extension kit for horn antenna	PBD:25501K0250A
500 mm (20 inch) extension kit for horn antenna	PBD:25501K0500A
1 000 mm (40 inch) extension kit for horn antenna	PBD:25501K1000A

SITRANS LR200 Specials		SITRANS LR200 Specials	
	Article No.		Article No.
SITRANS LR200 Flanged Rod Antenna Kit with 316L stainless steel flat faced flanges		SITRANS LR200 PTFE Rod Antenna Kit (100 mm shield) with 316L stainless steel 2" pipe thread process connection	
	PBD: 51003K020AAAA		PBD: 51002K0100AAA
	PBD: 51003K050AJAA		PBD: 51002K0100BAA
Flanged PTFE rod antenna kit, 2" ASME, 150 lb. See drawing 51003 on http://www.siemens.com/radar ¹⁾⁴⁾		PTFE rod antenna shielded kit, 2" NPT 316L stainless steel process connection, FKM O-ring, 100 mm 316L stainless steel shield. See drawing 51002 on http://www.siemens.com/radar ³⁾⁴⁾	
Flanged PTFE rod antenna kit, DN 50 PN 16. See drawing 51003 on http://www.siemens.com/radar ¹⁾⁴⁾		PTFE rod antenna shielded kit, R 2" (BSPT), EN 10226 316L stainless steel process connection, FKM O-ring, 100 mm 316L stainless steel shield. See drawing 51002 on http://www.siemens.com/radar ³⁾⁴⁾	
Flanged PTFE rod antenna kit, JIS 10K DN 50. See drawing 51003 on http://www.siemens.com/radar ¹⁾⁴⁾		PTFE rod antenna shielded kit, 2" G 316L stainless steel process connection, FKM O-ring, 100 mm 316L stainless steel shield. See drawing 51002 on http://www.siemens.com/radar ³⁾⁴⁾	
SITRANS LR200 PTFE Rod Antenna Kit with 316L stainless steel 1½" pipe thread process connection		SITRANS LR200 Horn Antenna Kit with 316L stainless steel flat faced flange, with PTFE emitter (without waveguide)	
PTFE rod antenna kit, R 1½" (BSPT), EN 10226 316L stainless steel process connection, FKM O-ring; see drawing 51004 on http://www.siemens.com/radar ⁴⁾	PBD: 51004K2AAA		PBD: 51006K020AAAA
PTFE rod antenna kit, 1½" G 316L stainless steel process connection, FKM O-ring; see drawing 51004 on http://www.siemens.com/radar ⁴⁾	PBD: 51004K3AAA		PBD: 51006K020AABA
SITRANS LR200 PTFE Rod Antenna Kit with 316L stainless steel 2" pipe thread process connection		Horn antenna kit, 2" ASME 316L stainless steel flange 3 inch horn, PTFE emitter ¹⁾⁴⁾	PBD: 51006K020AACA
PTFE rod antenna kit, 2" NPT 316L stainless steel process connection, FKM O-ring; see drawing 51005 on http://www.siemens.com/radar ⁴⁾	PBD: 51005K1AAA	Horn antenna kit, 2" ASME 316L stainless steel flange 4 inch horn, PTFE emitter ¹⁾²⁾	PBD: 51006K020AADA
PTFE rod antenna kit, R 2" (BSPT), EN 10226 316L stainless steel process connection, FKM O-ring; see drawing 51005 on http://www.siemens.com/radar ⁴⁾	PBD: 51005K2AAA	Horn antenna kit, 2" ASME 316L stainless steel flange 6 inch horn, PTFE emitter ¹⁾²⁾	PBD: 51006K050AJAA
PTFE rod antenna kit, 2" G 316L stainless steel process connection, FKM O-ring; see drawing 51005 on http://www.siemens.com/radar ⁴⁾	PBD: 51005K3AAA	Horn antenna kit, 2" ASME 316L stainless steel flange 8 inch horn, PTFE emitter ¹⁾²⁾	PBD: 51006K050AJBA
		Horn antenna kit, DN 50 PN 16 316L stainless steel flange 80 mm horn, PTFE emitter ¹⁾²⁾	PBD: 51006K050AJCA
		Horn antenna kit, DN 50 PN 16 316L stainless steel flange 100 mm horn, PTFE emitter ¹⁾²⁾	PBD: 51006K050AJDA
		Horn antenna kit, DN 50 PN 16 316L stainless steel flange 150 mm horn, PTFE emitter ¹⁾²⁾	
		Horn antenna kit, DN 50 PN 16 316L stainless steel flange 200 mm horn, PTFE emitter ¹⁾²⁾	

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS LR200 Specials

SITRANS LR200 Specials	
	Article No.
SITRANS LR200 PTFE flanged rod antenna kit with 316L stainless steel shield and 316L stainless steel flat faced flange	
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 100 mm 316L stainless steel shield. ¹⁾⁴⁾	PBD: 51014K0100AAA
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 100 mm 316L stainless steel shield. ¹⁾⁴⁾	PBD: 51014K0100EJA
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 150 mm 316L stainless steel shield. ¹⁾⁴⁾	PBD: 51014K0150AAA
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 150 mm 316L stainless steel shield. ¹⁾⁴⁾	PBD: 51014K0150EJA
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 200 mm 316L stainless steel shield. ¹⁾⁴⁾	PBD: 51014K0200AAA
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 200 mm 316L stainless steel shield. ¹⁾⁴⁾	PBD: 51014K0200EJA
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 250 mm 316L stainless steel shield. ¹⁾⁴⁾	PBD: 51014K0250AAA
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 250 mm 316L stainless steel shield. ¹⁾⁴⁾	PBD: 51014K0250EJA
PTFE grease	
Kit, PTFE grease, 5 Dupont 1 GR Polypack	A5E01151626
Cable gland	
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART	7ML1930-1AP
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA	7ML1930-1AQ
Ex-proof plugs	
Ex-proof plugs kit, 1/2" NPT, qty 5	A5E39979991
Ex-proof plugs kit, M20, qty 5	A5E39979992

¹⁾ Available in flange sizes including ASME, DIN and JIS.
Please consult a local sales person for details.

²⁾ Available with no pressure rating.
Please consult a local sales person for details.

³⁾ Available in other shield lengths.
Please consult a local sales person for details.

⁴⁾ Available with Pressure rating.
Please consult a local sales person for details.

Customers interested in a custom designed device should consult a local sales person. For more information, please visit <http://www.usa.siemens.com/level>.

Overview



SITRANS LR250 is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft).

Benefits

- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency allows for small antennas for easy mounting in nozzles
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Short blanking distance for improved minimum measuring range to 50 mm (2 inch) from the end of the antenna
- Communication using HART, PROFIBUS PA, or FOUNDATION Fieldbus
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools such as PACTware or Fieldcare via SITRANS DTM
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511
- 3 mm (0.118 inch) accuracy in accordance with IEC 60770-1
- Suitable for API 2350

Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves setup and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.

The 25 GHz frequency creates a narrow, focused beam allowing for smaller horn antenna options and decreasing sensitivity to obstructions.

SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR250 measures superbly on low dielectric media, and in small vessels, as well as tall and narrow vessels.

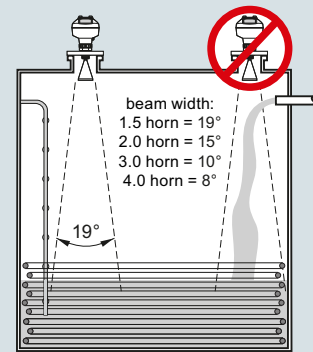
- Key Applications: liquid bulk storage tanks, process vessels, vaporous liquids, high temperatures, low dielectric media and applications with functional safety requirements

Configuration

Installation

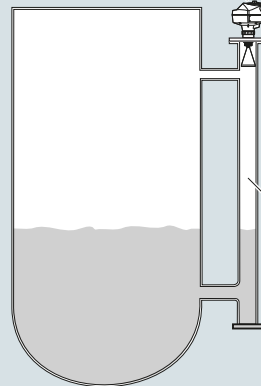
Note:

- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the horn antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.
- Use largest possible antenna.



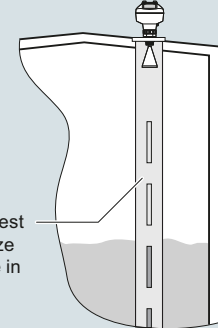
Mounting on bypass

Orient front or back of device toward vent.

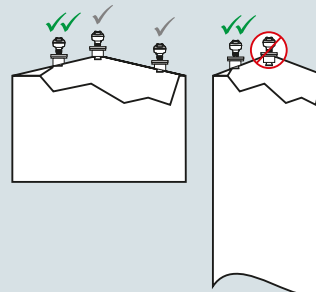


Mounting on stilling well

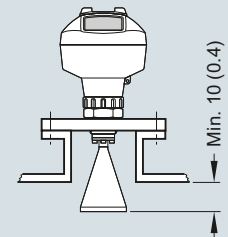
Orient front or back of device toward stillpipe slots.



Mounting on vessel



Mounting on a nozzle



SITRANS LR250 installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS LR250 Horn Antenna

Technical specifications

Mode of operation		Power supply	
Measuring principle	Radar level measurement	4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
Frequency	K-band (25.0 GHz)	PROFIBUS PA	<ul style="list-style-type: none"> 15 mA Per IEC 61158-2
Minimum measuring range	50 mm (2 inch) from end of antenna	FOUNDATION Fieldbus	<ul style="list-style-type: none"> 20.0 mA Per IEC 61158-2
Maximum measuring range	20 m (65 ft), antenna dependent		
Output		Certificates and approvals	
HART	Version 5.1	General	CSA _{US/C} , CE, FM, RCM
• Analog output	4 ... 20 mA	Radio	FCC, Industry Canada, RED, RCM
• Accuracy	± 0.02 mA	Hazardous	
• Fail-safe	<ul style="list-style-type: none"> Programmable as high low or hold (loss of echo) NE 43 programmable 	• Explosion Proof (Brazil)	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
PROFIBUS PA	Profile 3.01	• Increased Safety (Brazil)	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Function blocks	2 Analog Input (AI)	• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
FOUNDATION Fieldbus	H1	• Explosion Proof (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Functionality	Basic or LAS	• Intrinsically Safe (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Version	ITK 5.2.0	• Non-incendive (Canada/USA)	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
• Function blocks	2 Analog Input (AI)	• Flame Proof/Increased Safety (China)	NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C
Performance (according to reference conditions IEC60770-1)		• Intrinsically Safe (China)	NEPSI Ex ia IIC T4 Ga, Ex iaD tD A20 IP67 T100 °C
Maximum measured error	3 mm (0.118 inch)	• Non-sparking (China)	NEPSI Ex nA IIC T4 Gc
Influence of ambient temperature	< 0.003 %/K	• Intrinsically Safe (Europe)	ATEX II 1G Ex ia IIC T4 Ga ATEX II 1D Ex ia IIIC T100 °C Da ATEX II 3G Ex nA IIC T4 Gc
Rated operating conditions		• Non-sparking (Europe)	IECEX/ATEX II 1/2 GD, 1D, 2D, Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIC T100 °C Da
Installation conditions		• Flame Proof (International/Europe)	IECEX/ATEX II 1/2 GD, 1D, 2D, Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Location	Indoor/outdoor	• Increased Safety (International/Europe)	IECEX/ATEX II 1 G Ex ia IIC T4 Ga, IECEX/ATEX II 1D Ex ia ta IIC T100 °C Da
Ambient conditions (enclosure)		• Intrinsically Safe (International)	EAC Ex d
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)	• Explosion Proof (Russia/Kazakhstan)	EAC Ex e
• Installation category	I	• Increased Safety (Russia/Kazakhstan)	EAC Ex ia
• Pollution degree	4	• Intrinsically Safe (Russia/Kazakhstan)	<ul style="list-style-type: none"> Lloyd's Register of Shipping ABS Type Approval Bureau Veritas
Medium conditions		• Marine	SIL-2 suitable in accordance with IEC 61508/61511
Dielectric constant ϵ_r	> 1.6, antenna and application dependent	• Functional Safety	
Process temperature	-40 ... +200 °C (-40 ... +392 °F) (at process connection with FKM O-ring) -20 ... +200 °C (-4 ... +392 °F) (at process connection with FFKM O-ring)		
Process pressure	Up to 40 bar g (580 psi g), process connection and temperature dependent. See Pressure/Temperature curves for more information		
Design			
Enclosure			
• Material	Aluminum, polyester powder-coated		
• Cable inlet	2 x M20 x 1.5 or 2 x 1/2" NPT		
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68		
Weight	< 3 kg (6.6 lb) 3.75 mm (1 1/2 inch) threaded connection with 1 1/2" horn antenna		
Display (local)	Graphic local user interface including quick start wizard and echo profile display		
Antenna			
• Material	316L stainless steel [optional alloy N06022/2.4602 (Hastelloy C-22 or equivalent)]		
• Dimensions (nominal horn sizes)	Standard 1.5 inch (40 mm), 2 inch (48 mm), 3 inch (75 mm), 4 inch (95 mm) horn, and optional 100 mm (4 inch) horn extension		
Process connections			
• Process connection	1 1/2", 2" or 3" NPT [(Taper), ANSI/ASME B1.20.1] R 1 1/2", 2" or 3" [(BSPT), EN 10226] G 1 1/2", 2" or 3" [(BSPP), EN ISO 228-1]		
• Flange connection	2", 3", 4" (ANSI 150, 300 lb), 50, 80, 100 mm (PN 16, 40, JIS 10K)		

Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Approvals for handheld programmer	IS model: ATEX II 1 GD Ex ia IIC T4 Ga Ex ia D 20 T135 °C T _a = -20 ... +50 °C CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, T6 T _a = +50 °C IECEX SIR 09.0073
Handheld communicator	HART communicator 375/475
PC	• SIMATIC PDM • Emerson AMS • SITRANS DTM (for connection into FDT such as PACTware or Field-care)
Display (local)	Graphic local user interface including quick start wizard and echo profile displays

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS LR250 Horn Antenna

Selection and Ordering data

Article No.

SITRANS LR250 horn antenna

7ML5431-

2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft) (antenna dependent). Ideal for small vessels and low dielectric media.

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Process Connection and Antenna Material

316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FKM seal¹⁾ **0**
 316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FFKM seal¹⁾ **1**
 Hastelloy C-22/2.4602 (or equivalent), PTFE emitter, FKM seal²⁾ **2**
 Hastelloy C-22/2.4602 (or equivalent), PTFE emitter, FFKM seal²⁾ **3**

Process Connection Type

Threaded connection 316L

1½" NPT (ASME B1.20.1) (tapered thread)³⁾ **A A**
 R 1½" [(BSPT), EN 10226-1] (tapered thread)³⁾ **A B**
 G 1½" [(BSPP), EN ISO 228-1] (parallel thread)³⁾ **A C**
 2" NPT (ASME B1.20.1) (tapered thread)⁴⁾ **A D**
 R 2" [(BSPT), EN 10226-1] (tapered thread)⁴⁾ **A E**
 G 2" [(BSPP), EN ISO 228-1] (parallel thread)⁴⁾ **A F**
 3" NPT (ASME B1.20.1) (tapered thread)⁴⁾ **A G**
 R 3" [(BSPT), EN 10226-1] (tapered thread)⁴⁾ **A H**
 G 3" [(BSPP), EN ISO 228-1] (parallel thread)⁴⁾ **A J**

Flanged connection 316L⁴⁾

2" Class 150 ASME B16.5, raised face **B D**
 3" Class 150 ASME B16.5, raised face **B E**
 4" Class 150 ASME B16.5, raised face **B F**
 2" Class 300 ASME B16.5, raised face **C D**
 3" Class 300 ASME B16.5, raised face **C E**
 4" Class 300 ASME B16.5, raised face **C F**
 50A 10K JIS B 2220 flat face **F A**
 80A 10K JIS B 2220 flat face **F B**
 100A 10K JIS B 2220 flat face **F C**
 DN 50 PN 16 EN 1092-1 Type B1 raised face **G A**
 DN 80 PN 16 EN 1092-1 Type B1 raised face **G B**
 DN 100 PN 16 EN 1092-1 Type B1 raised face **G C**
 DN 150 PN 16 EN 1092-1 Type B1 raised face **G D**
 DN 50 PN 40 EN 1092-1 Type B1 raised face **H A**
 DN 80 PN 40 EN 1092-1 Type B1 raised face **H B**
 DN 100 PN 40 EN 1092-1 Type B1 raised face **H C**
 DN 150 PN 40 EN 1092-1 Type B1 raised face **H D**

Selection and Ordering data

Article No.

SITRANS LR250 horn antenna

7ML5431-

2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft) (antenna dependent). Ideal for small vessels and low dielectric media.

Flanged connection Hastelloy C⁴⁾

2" Class 150 ASME B16.5 raised face **J A**
 3" Class 150 ASME B16.5 raised face **J B**
 4" Class 150 ASME B16.5 raised face **J C**
 2" Class 300 ASME B16.5 raised face **J D**
 3" Class 300 ASME B16.5 raised face **J E**
 4" Class 300 ASME B16.5 raised face **J F**
 DN 50 PN 16 EN 1092-1 Type B1 raised face **K A**
 DN 80 PN 16 EN 1092-1 Type B1 raised face **K B**
 DN 100 PN 16 EN 1092-1 Type B1 raised face **K C**
 DN 50 PN 40 EN 1092-1 Type B1 raised face **K D**
 DN 80 PN 40 EN 1092-1 Type B1 raised face **K E**
 DN 100 PN 40 EN 1092-1 Type B1 raised face **K F**
 50A 10K JIS B 2220 raised face **L A**
 80A 10K JIS B 2220 raised face **L B**
 100A 10K JIS B 2220 raised face **L C**
 DN 50 PN 16 EN 1092-1 Type B1 raised face **M A**
 DN 80 PN 16 EN 1092-1 Type B1 raised face **M B**
 DN 100 PN 16 EN 1092-1 Type B1 raised face **M C**
 DN 150 PN 16 EN 1092-1 Type B1 raised face **M D**
 DN 50 PN 40 EN 1092-1 Type B1 raised face **M E**
 DN 80 PN 40 EN 1092-1 Type B1 raised face **M F**
 DN 100 PN 40 EN 1092-1 Type B1 raised face **M G**
 DN 150 PN 40 EN 1092-1 Type B1 raised face **M H**

Communication/Output

PROFIBUS PA⁵⁾ **1**
 4 ... 20 mA, HART, start-up at < 3.6 mA **2**
 FOUNDATION Fieldbus⁵⁾ **3**

Enclosure/Cable inlet

Aluminum, Epoxy painted
 2 x ½" NPT
 2 x M20 x 1.5

Antenna

1½" horn **A**
 2" horn (fits 2" ASME or DN 50 nozzles) **B**
 3" horn (fits 3" ASME or DN 80 nozzles) **C**
 4" horn (fits 4" ASME or DN 100 nozzles) **D**
 1½" horn with 100 mm extension **E**
 2" horn with 100 mm extension **F**
 3" horn with 100 mm extension **G**
 4" horn with 100 mm extension **H**
 Hastelloy C22 (or equivalent)
 2" horn (fits 2" ASME or DN 50 nozzles) **J**
 3" horn (fits 3" ASME or DN 80 nozzles) **K**
 4" horn (fits 4" ASME or DN 100 nozzles) **L**
 2" horn (fits 2" ASME or DN 50 nozzles) with 100 mm extension **M**
 3" horn (fits 3" ASME or DN 80 nozzles) with 100 mm extension **N**
 4" horn (fits 4" ASME or DN 100 nozzles) with 100 mm extension **P**

Selection and Ordering data	Article No.
SITRANS LR250 horn antenna	7ML5431-
2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft) (antenna dependent). Ideal for small vessels and low dielectric media.	0 -
Approvals	
General Purpose: CE, CSA, FM, FCC, RED, RCM	A
Intrinsically Safe: CSA/FM Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III T4 FCC, Industry Canada	B
Intrinsically Safe: IECEx/ATEX II 1 G Ex ia IIC T4 Ga, IECEx/ATEX II 1D Ex ia ta IIIC T100 °C Da, INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da, CE, RED, RCM	C
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D T5, FCC, Industry Canada	D
Non Sparking: ATEX II 3G Ex nA IIC T4 Gc, CE, RED, RCM	E
Increased Safety: IECEx/ATEX II 1/2 GD, 1D, 2D Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, RED, RCM ⁶⁾	F
Flameproof: IECEx/ATEX II 1/2 GD 1D, 2D Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, RED, RCM ⁶⁾	G
Explosion proof: CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada ⁶⁾	H
Non Sparking: NEPSI Ex nA IIC T4 Gc	K
Intrinsically Safe: NEPSI Ex ia IIC T4 Ga, Ex iaD tD A20 IP67 T100 °C	L
Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C ⁶⁾	M
Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C ⁶⁾	N
Pressure rating	
Rating per Pressure/Temperature curves in manual	0
0.5 bar g (7.25 psi g) maximum ⁷⁾	1

¹⁾ Available with process connection options AA ... HD and Antenna Versions A ... H only

²⁾ Available with process connection options JA ... MH and Antenna Versions J ... P only

³⁾ Not available with Antenna options B, C, D, F, G, H.

⁴⁾ Not available with Antenna options A and E.

⁵⁾ Available with Approval options A, B, C, D, K, and L

⁶⁾ Available only with Communications option 2.

⁷⁾ Available with Process Connection and Antenna Material 0, 1, 2, and 3 only

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS LR250 Horn Antenna

Selection and Ordering data	Order code	Selection and Ordering data	Article No.
Further designs		Compact Operating Instructions for FOUNDATION Fieldbus device	
Please add "-Z" to Article No. and specify Order code(s).		English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	A5E33472700
Plug M12 with mating Connector ¹⁾²⁾³⁾	A50	English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	A5E33472738
Plug 7/8" with mating Connector ²⁾³⁾⁴⁾	A55	English, Portuguese (Brazil), Chinese	A5E34046626
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y15	Note: The Operating Instructions should be ordered as a separate line item on the order.	
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11	All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Material inspection certificate 3.1 of EN 10204	C12	Other Operating Instructions	
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511 ³⁾⁵⁾	C20	SITRANS LR250 Functional Safety manual, English	A5E32286471
Namur NE43 compliant, device preset to failsafe < 3.6 mA ⁵⁾	N07	Note: The Operating Instructions should be ordered as a separate line item on the order.	
Compact Operating Instructions for HART/ mA device	Article No.	All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	A5E33469191	Accessories	
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	A5E33469171	Handheld programmer, Intrinsically safe, EEx ia	7ML1930-1BK
English, Portuguese (Brazil), Chinese	A5E34046583	HART modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
Note: The Operating Instructions should be ordered as a separate line item on the order.		One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART (two are required)	7ML1930-1AP
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation		One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA and FOUNDATION Fieldbus (two are required) ⁶⁾	7ML1930-1AQ
Compact Operating Instructions for PROFIBUS PA device		FDA approved FKM O-ring for 2" G (BSP) process connections -28 ... +80 °C (-28 ... +176 °F)	7ML1830-3AN
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	A5E33469239	SITRANS RD100, loop powered display - see Chapter 7	7ML5741-...
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	A5E33472685	SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-...
English, Portuguese (Brazil), Chinese	A5E34046624	SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...
Note: The Operating Instructions should be ordered as a separate line item on the order.		SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750-...
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation		For applicable back up point level switch - see point level measurement section	

¹⁾ Available with enclosure option 1 only

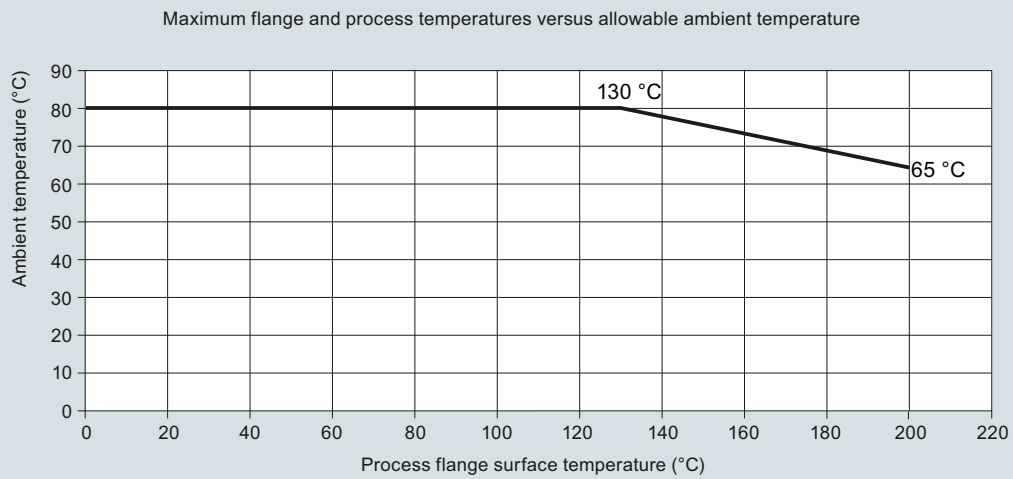
²⁾ To be used with communication options 1 and 3 only. Connector has IP67 rating.

³⁾ Available with approval options A and B. Available with approval option C for use on intrinsically safe applications only. Not rated for dust Ex.

⁴⁾ Available with enclosure option 0 only

⁵⁾ Applicable to communication option 2 only

⁶⁾ For use with communication options 1 and 3 only

Characteristic curves

SITRANS LR250 ambient/process flange surface temperature curve

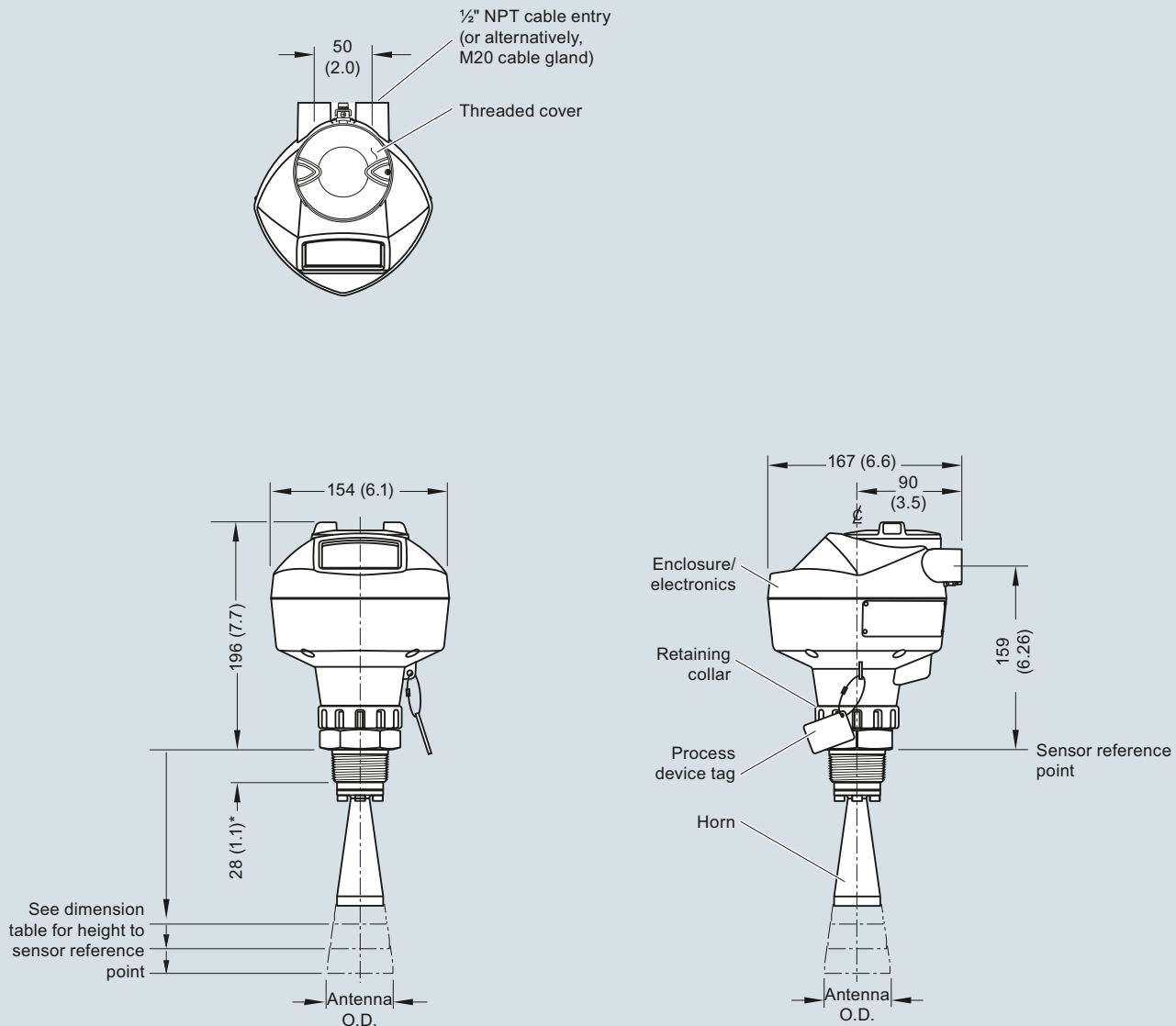
Level Measurement

Continuous level measurement
Radar transmitters

SITRANS LR250 Horn Antenna

Dimensional drawings

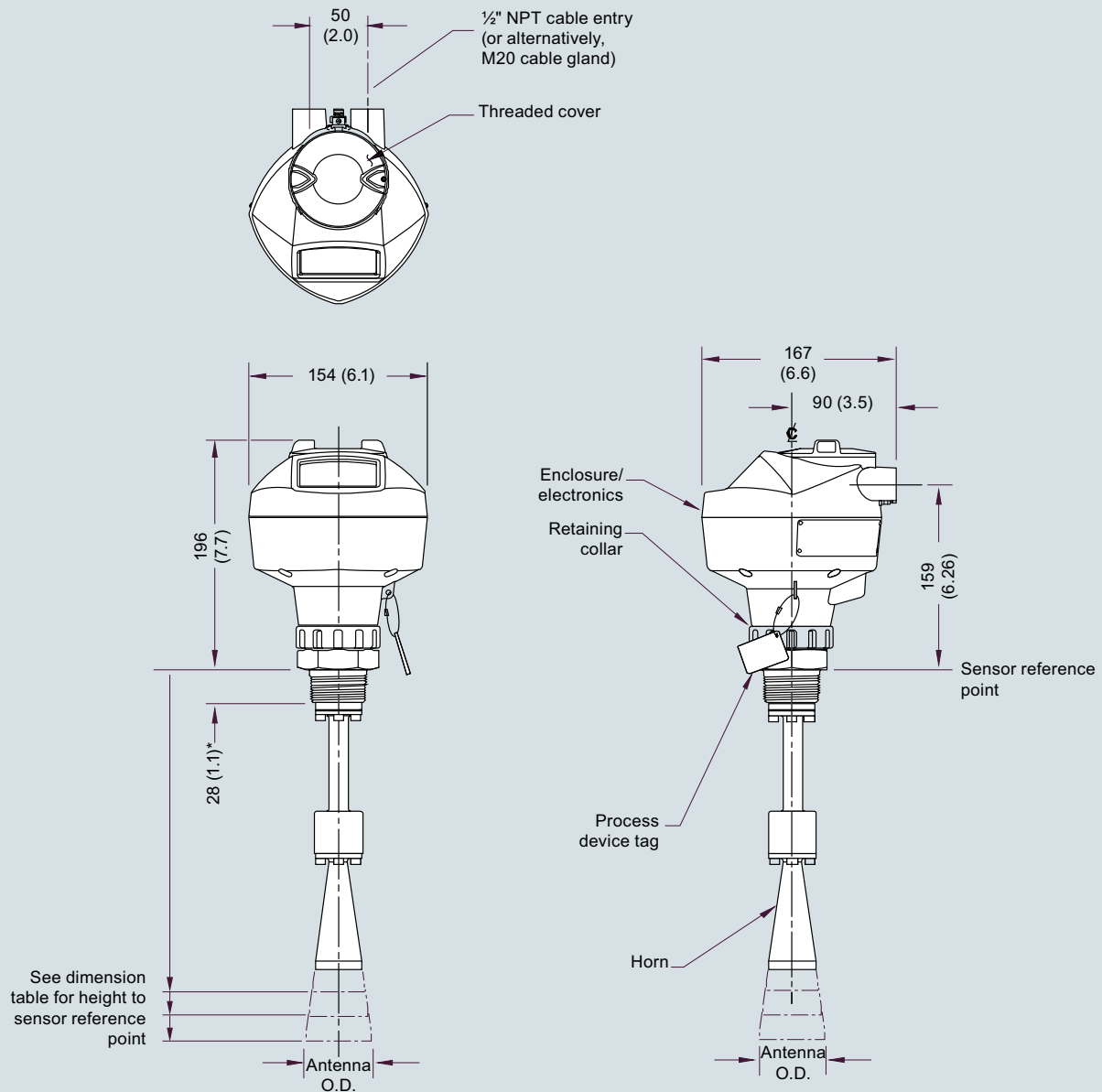
Threaded Horn Antenna



*28 mm (1.1) for 1.5 inch and 2 inch, 42 mm (1.65) for 3 inch

Antenna Type	Antenna O.D.	Height to sensor reference point			Beam angle	Measurement range
		1-1/2" threaded connection	2" threaded connection	3" threaded connection		
1.5" horn	39.8 (1.57)	135 (5.3)	N/A	N/A	19 degrees	10 m (32.8 ft)
2" horn	47.8 (1.88)	N/A	166 (6.55)	180 (7.09)	15 degrees	20 m (65.6 ft)
3" horn	74.8 (2.94)	N/A	199 (7.85)	213 (8.39)	10 degrees	20 m (65.6 ft)
4" horn	94.8 (3.73)	N/A	254 (10)	268 (10.55)	8 degrees	20 m (65.6 ft)

SITRANS LR250 Threaded Horn Antenna, dimensions in mm (inch)

Threaded Horn Antenna with Extension

*28 mm (1.1) for 1.5 inch and 2 inch, 42 mm (1.65) for 3 inch

Antenna Type	Antenna O.D.	Height to sensor reference point			Beam angle	Measurement range
		1-1/2" threaded connection	2" threaded connection	3" threaded connection		
1.5" horn	39.8 (1.57)	235 (9.3)	N/A	N/A	19 degrees	10 m (32.8 ft)
2" horn	47.8 (1.88)	N/A	266 (10.47)	280 (11.02)	15 degrees	20 m (65.6 ft)
3" horn	74.8 (2.94)	N/A	299 (11.77)	313 (12.32)	10 degrees	20 m (65.6 ft)
4" horn	94.8 (3.73)	N/A	354 (13.94)	368 (14.49)	8 degrees	20 m (65.6 ft)

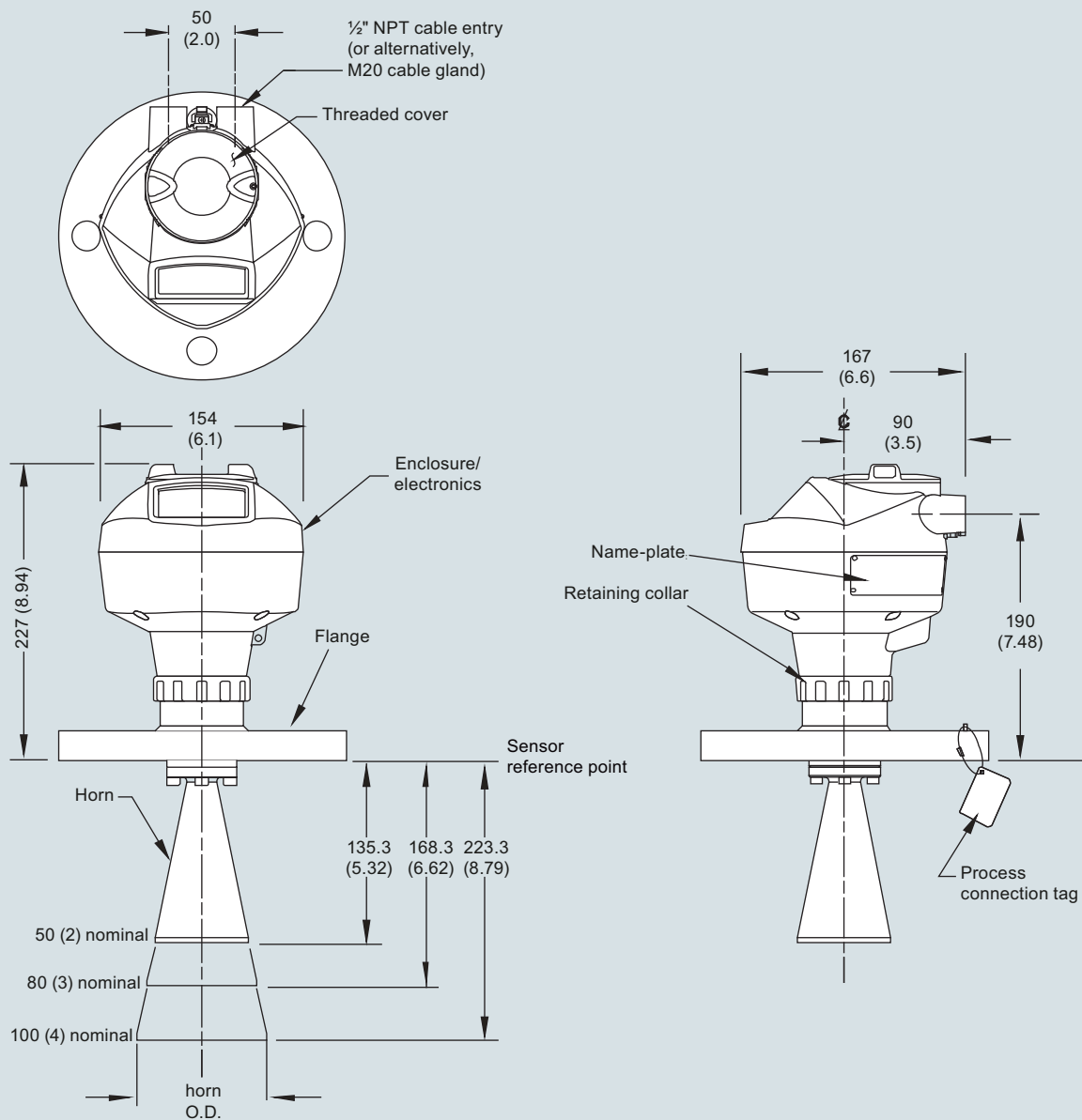
SITRANS LR250 Threaded Horn Antenna with extension, dimensions in mm (inch)

Level Measurement

Continuous level measurement
Radar transmitters

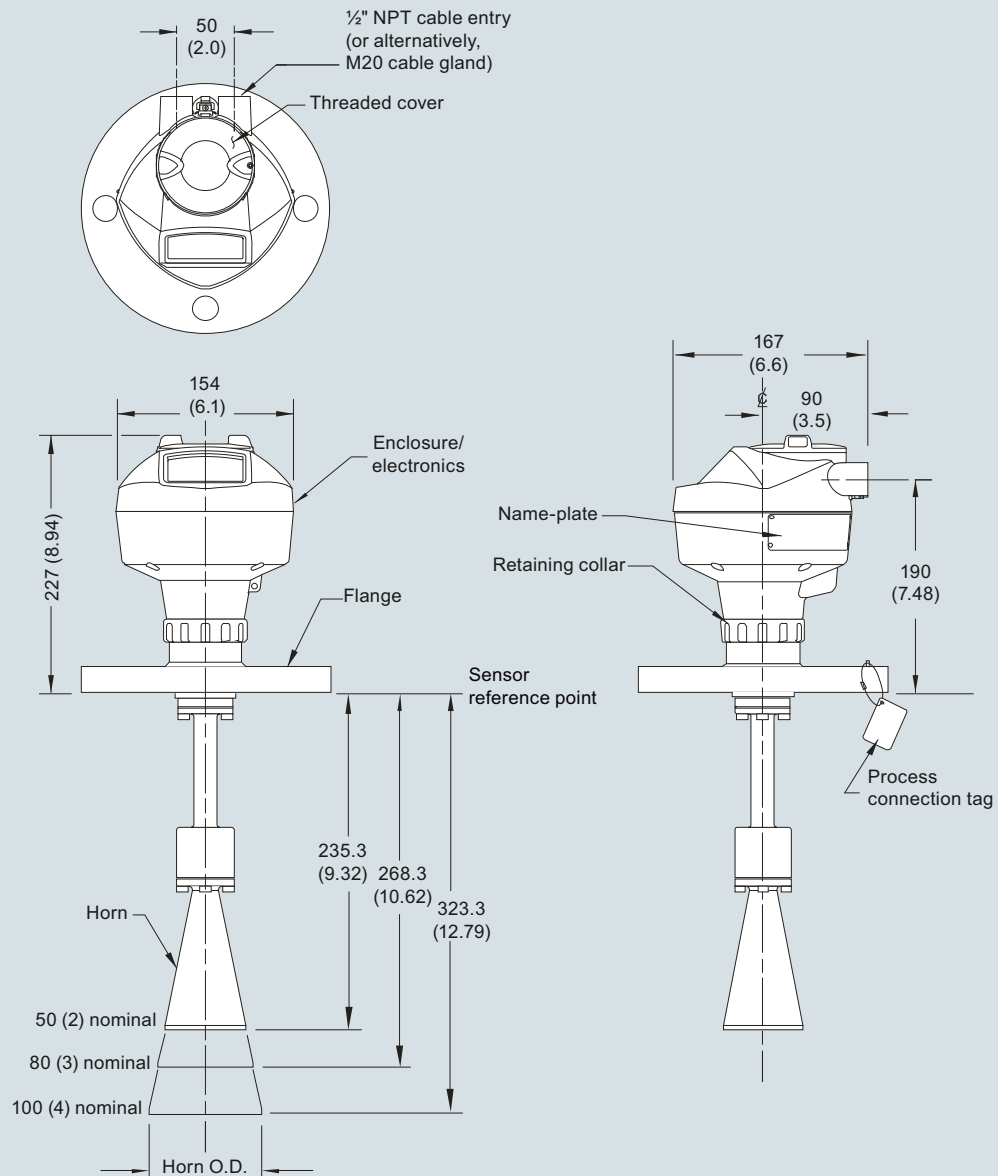
SITRANS LR250 Horn Antenna

Flanged Horn



Nominal Horn Size	Horn O.D.	Height to sensor reference point		Beam angle	Measurement range
		Stainless steel flange raised or flat-faced	Optional alloy flange		
50 (2)	47.8 (1.88)	135.3 (5.32)	138.3 (5.44)	15 degrees	20 m (65.6 ft)
80 (3)	74.8 (2.94)	168.3 (6.62)	171.3 (6.74)	10 degrees	20 m (65.6 ft)
100 (4)	94.8 (3.73)	223.3 (8.79)	226.3 (8.90)	8 degrees	20 m (65.6 ft)

SITRANS LR250 Flanged Horn Antenna, dimensions in mm (inch)

Flanged Horn with Extension

Nominal Horn Size	Horn O.D.	Height to sensor reference point		Beam angle	Measurement range
		Stainless steel flange raised or flat-faced	Optional alloy flange		
50 (2)	47.8 (1.88)	235.3 (9.26)	238.3 (9.38)	15 degrees	20 m (65.6 ft)
80 (3)	74.8 (2.94)	268.3 (10.56)	271.3 (10.68)	10 degrees	20 m (65.6 ft)
100 (4)	94.8 (3.73)	323.3 (12.73)	326.3 (12.85)	8 degrees	20 m (65.6 ft)

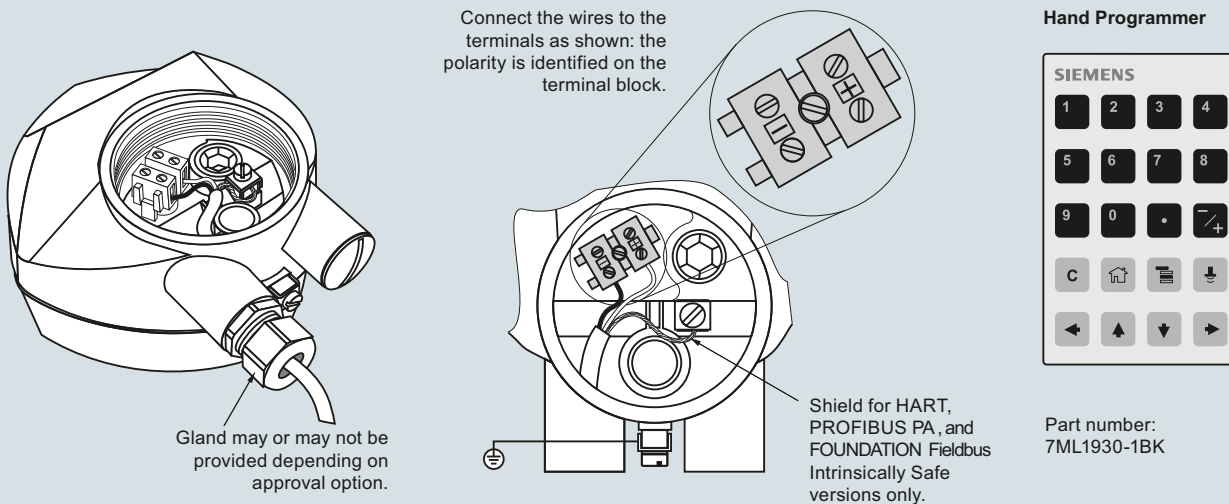
SITRANS LR250 Flanged Horn Antenna with extension, dimensions in mm (inch)

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS LR250 Horn Antenna

Circuit diagrams






Notes:

1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR250 connections

Selection and ordering data

SITRANS LR250 Specials		SITRANS LR250 Specials	
	Article No.		Article No.
NOTE: LR260 head can be supplied with any LR250 process connection or antenna as special order. For LR250, this means a stronger signal and longer measurement range is possible.		SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option C, with FOUNDATION Fieldbus communication, no process connection	A5E02654606
		SITRANS LR250 horn version enclosures (< 3.6 mA start-up HART)	
SITRANS LR250 horn version enclosures (PROFIBUS PA models)			
SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection	A5E01156836	SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	A5E02956317
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection	A5E01156838	SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection	A5E02956319
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option B, with PROFIBUS PA communication, no process connection	A5E01156841	SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection	A5E02956320
SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option C, with PROFIBUS PA communication, no process connection	A5E01156843	SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option F, with HART communication start-up at < 3.6 mA, no process connection	A5E02956322
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection	A5E01156844	SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection	A5E02956323
SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option D, with PROFIBUS communication, no process connection	A5E01156846	SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	A5E03441096
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option D, with PROFIBUS PA communication, no process connection	A5E01156848	SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection	A5E03441097
SITRANS LR250 horn version enclosures (FOUNDATION Fieldbus models)		SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection	A5E03441099
SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option B, with FOUNDATION Fieldbus communication, no process connection	A5E03769538		
SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option D, with FOUNDATION Fieldbus communication, no process connection	A5E03769539		
SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option E, with FOUNDATION Fieldbus communication, no process connection	A5E03769543		
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option C, with FOUNDATION Fieldbus communication, no process connection	A5E02654608		
SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	A5E02653792		
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	A5E02653793		

Level Measurement

Continuous level measurement

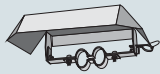
Radar transmitters

SITRANS LR250 Specials

SITRANS LR250 Specials

Article No.

Sun shield for SITRANS LR250 enclosure, stainless steel



A5E39142556

SITRANS LR250 horn antenna and extension kits



38 mm (1.5 inch) horn antenna kit, 1.5" process connections only

A5E01151539

100 mm (4 inch) horn antenna extension kit, 1.5" process connections only

A5E01151553

50 mm (2 inch) stainless steel 316L horn antenna kit

A5E01151569

75 mm (3 inch) stainless steel 316L horn antenna kit

A5E01151571

100 mm (4 inch) stainless steel 316L horn antenna kit

A5E01151573

100 mm (4 inch) horn antenna extension kit, 50 mm (2 inch), 75 mm (3 inch), and 100 mm (4 inch) process connection

A5E01151577

50 mm (2 inch) horn antenna kit, Hastelloy C-22

A5E01151584

75 mm (3 inch) horn antenna kit, Hastelloy C-22

A5E01151585

100 mm (4 inch) horn antenna kit, Hastelloy C-22

A5E01151587

5 Dupont 1Gr Polypack, PTFE grease kit

A5E01151626

SITRANS LR250 lid with O-ring

A5E02465410

Ex-proof plugs

Ex-proof plugs kit, 1/2" NPT, qty 5

A5E39979991

Ex-proof plugs kit, M20, qty 5

A5E39979992

Overview



SITRANS LR250 with threaded PVDF antenna is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including corrosives or aggressive materials, to a range of 10 m (32.8 ft) or 20 m (66 ft) when used in a stilling pipe.

Benefits

- Fully insulated PVDF antenna design for use in chemical and sanitary environments where aggressive and corrosive materials are used
- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency and 50 mm (2 inch) process connection/antenna allow for easy mounting in nozzles
- Communication using HART or PROFIBUS PA, or FOUNDATION Fieldbus
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools such as PACTware or Fieldcare via SITRANS DTM
- Suitable for use in Safety Related Systems in accordance with IEC 61508/61511 (SIL-2)
- 3 mm (0.118 inch) accuracy in accordance with IEC 60770-1

Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves setup and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.

SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR250 measures superbly in small vessels and in tanks/vessels up to 10 m (32 ft) on materials with $dk > 3$ or 20 m (66 ft) when used in a stilling pipe with $dk \geq 1.6$.

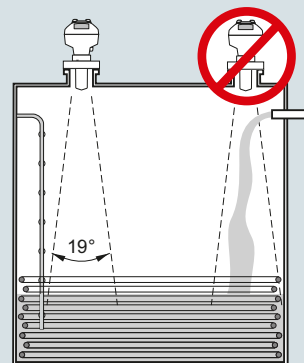
- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, temperatures to 80 °C (176 °F), corrosive and aggressive materials and applications requiring functional safety

Configuration

Installation

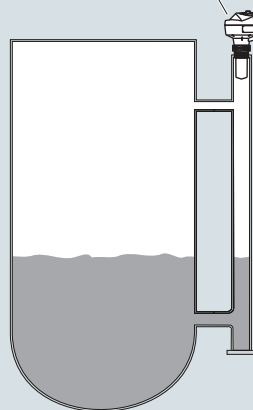
Note:

- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.



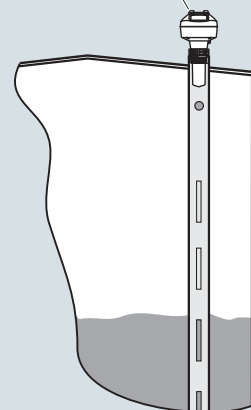
Mounting on bypass

Orient front or back of device toward vent.

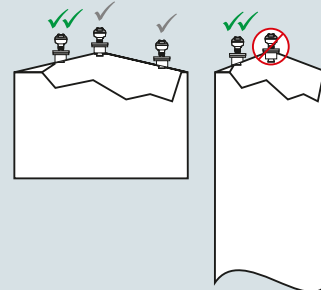


Mounting on stilling well

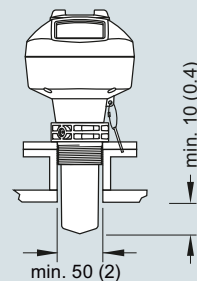
Orient front or back of device toward stillpipe slots.



Mounting on vessel



Mounting on a nozzle



SITRANS LR250 PVDF Antenna installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement

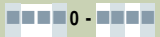
Radar transmitters

SITRANS LR250 Threaded PVDF Antenna

Technical specifications

Mode of operation		Certificates and approvals	
Measuring principle	Radar level measurement	General	CSA _{US/C} , CE, FM, RCM
Frequency	K-band (25.0 GHz)	Radio	FCC, Industry Canada, RED, RCM
Minimum measuring range	50 mm (2 inch) from end of antenna	Hazardous	
Maximum measuring range	10 m (32.8 ft) or 20 m (66 ft) when used in a stilling pipe with dk ≥ 1.6	• Explosion Proof (Brazil)	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
Output		• Increased Safety (Brazil)	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
HART	Version 5.1	• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
• Analog output	4 ... 20 mA	• Explosion Proof (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Accuracy	± 0.02 mA	• Intrinsically Safe (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Fail-safe	• Programmable as high low or hold (loss of echo) • NE 43 programmable	• Non-incendive (Canada/USA)	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
PROFIBUS PA	Profile 3.1	• Flame Proof/Increased Safety (China)	Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T _A 90 °C
• Function blocks	2 Analog Input (AI)	• Intrinsically Safe (China)	Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T _A 90 °C
FOUNDATION Fieldbus	H1	• Non-sparking (China)	NEPSI Ex nA IIC T4 Gc
• Functionality	Basic or LAS	• Intrinsically Safe (Europe)	ATEX II 1G Ex ia IIC T4 Ga ATEX II 1D Ex ia ta IIC T100 °C Da ATEX II 3G Ex nA IIC T4 Gc
• Version	ITK 5.2.0	• Non-sparking/Energy Limited (Europe)	
• Function blocks	2 Analog Input (AI)	• Flame Proof (International/Europe)	IECEX/ATEX II 1/2 GD, 1D, 2D, Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIC T100 °C Da IECEX/ATEX II 1/2 GD, 1D, 2D, Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da IECEX/ATEX II 1 G Ex ia IIC T4 Ga, IECEX/ATEX II 1D Ex ia ta IIC T100 °C Da
Performance (according to reference conditions IEC60770-1)		• Explosion Proof (Russia/Kazakhstan)	EAC Ex d
Maximum measured error	• > 500 mm from sensor reference point: 3 mm (0.118 inch) • < 500 mm from sensor reference point: 25 mm (1 inch)	• Increased Safety (Russia/Kazakhstan)	EAC Ex e
Influence of ambient temperature	< 0.003 %/K	• Intrinsically Safe (Russia/Kazakhstan)	EAC Ex ia
Rated operating conditions		• Marine	• Lloyd's Register of Shipping • ABS Type Approval • Bureau Veritas
Installation conditions		Functional Safety	SIL-2 suitable in accordance with IEC 61508/61511
• Location	Indoor/outdoor	Programming	
Ambient conditions (enclosure)		Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)	• Approvals for handheld programmer	IS model: ATEX II 1 GD Ex ia IIC T4 Ga Ex ia D 20 T135 °C T _A = -20 ... +50 °C CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, T6 T _A = +50 °C IECEX SIR 09.0073
• Installation category	I		Handheld communicator
• Pollution degree	4		PC
Medium conditions			Display (local)
Dielectric constant ϵ_r	≥ 3 (1.6 in stillpipe)		Graphic local user interface including quick start wizard and echo profile displays
Process temperature	-40 ... +80 °C (-40 ... +176 °F) at process connection (Is suitable for CIP at 120 °C for 1/2 hr max.)		
Process pressure	Up to 5 bar g (72 psi g) temperature dependent. See Pressure/Temperature curves for more information		
Design			
Enclosure			
• Material	Aluminum, polyester powder-coated		
• Cable inlet	2 x M20 x 1.5 or 2 x ½" NPT		
Degree of protection	Type 4X/NEMA 4X, Type 6/ NEMA 6, IP67, IP68		
Weight	Approximately 3.3 kg (7.27 lb)		
Display (local)	Graphic local user interface including quick start wizard and echo profile display		
Antenna			
• Material	PVDF (Polyvinylidene fluoride)		
• Dimensions (nominal sizes)	2 inch (48 mm)		
Process connections			
• Process connection	2" NPT [(Taper), ASME B1.20.1] 2" [(BSPT), EN 10226] 2" [(BSPP), EN ISO 228-1]		
Power supply			
4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω		
PROFIBUS PA	• 15 mA • per IEC 61158-2		
FOUNDATION Fieldbus	• 20.0 mA • per IEC 61158-2		

SITRANS LR250 Threaded PVDF Antenna

Selection and Ordering data	Article No.	Selection and Ordering data	Order code
SITRANS LR250 Threaded PVDF Antenna 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including corrosives or aggressive materials, to a range of 10 m (32.8 ft) or 20 m (66 ft) when used in a stilling pipe. ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5431- 	Further designs Please add "-Z" to Article No. and specify Order code(s). Plug M12 with mating Connector ¹⁾²⁾³⁾ Plug 7/8" with mating Connector ²⁾³⁾⁴⁾ Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 Material inspection Certificate Type 3.1 per EN 10204 Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511 ⁵⁾⁶⁾ Namur NE43 compliant, device preset to failsafe < 3.6 mA ⁵⁾	 A50 A55 Y15 C11 C12 C20 N07
Process Connection and Antenna Material Threaded PVDF antenna	4		
Process Connection Type Threaded connections PVDF 2" NPT (ASME B1.20.1) (tapered thread) R 2" [(BSPT), EN 10226-1] (tapered thread) G 2" [(BSPP), EN ISO 228-1] (parallel thread)	PA PB PC		
Communication/Output PROFIBUS PA 4 ... 20 mA, HART, start-up at < 3.6 mA FOUNDATION Fieldbus	1 2 3		
Enclosure/Cable inlet Aluminum, Epoxy painted 2 x 1/2" NPT 2 x M20 x 1.5	0 1		
Antenna 2 inch (50 mm) threaded PVDF antenna	R		
Approvals General Purpose, CE, CSA, FM, FCC, RED, RCM Intrinsically Safe: CSA/FM Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III T4 FCC, Industry Canada Intrinsically Safe: IECEx/ATEX II 1 G Ex ia IIC T4 Ga, IECEx/ATEX II 1D Ex ia ta IIIC T100 °C Da, INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da, CE, RED, RCM Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D T5, FCC, Industry Canada Non Sparking: ATEX II 3G Ex nA IIC T4 Gc, CE, RED, RCM Increased Safety: IECEx/ATEX II 1/2 GD, 1D, 2D Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, RED, RCM ¹⁾ Flameproof: IECEx/ATEX II 1/2 GD 1D, 2D Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, RED, RCM ¹⁾ Explosion proof: CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada ¹⁾ Non Sparking: NEPSI Ex nA IIC T4 Gc Intrinsically Safe: NEPSI Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T _A 90 °C Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T _A 90 °C ¹⁾ Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T _A 90 °C ¹⁾	A B C D E F G H K L M N	English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian English, Portuguese (Brazil), Chinese Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	Article No. A5E33469191 A5E33469171 A5E34046583
Pressure rating Rating per Pressure/Temperature curves in manual	2	Compact Operating Instructions for PROFIBUS PA device English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian English, Portuguese (Brazil), Chinese Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	 A5E33469239 A5E33472685 A5E34046624

¹⁾ Applicable to Communication option 2 only

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS LR250 Threaded PVDF Antenna

Selection and Ordering data

Article No.

Compact Operating Instructions for FOUNDATION Fieldbus device

English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish

A5E33472700

English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian

A5E33472738

English, Portuguese (Brazil), Chinese

A5E34046626

Note: The Operating Instructions should be ordered as a separate line item on the order.

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Other Operating Instructions

SITRANS LR250 Functional Safety manual, English

A5E32286471

Note: The Operating Instructions should be ordered as a separate line item on the order.

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Selection and Ordering data

Article No.

Accessories

Handheld programmer, Intrinsically safe, EEx ia

7ML1930-1BK

HART modem/USB
(for use with a PC and SIMATIC PDM)

7MF4997-1DB

One metallic cable gland M20 x 1.5,
rated -40 ... +80 °C (-40 ... +176 °F), HART

7ML1930-1AP

One metallic cable gland M20 x 1.5,
rated -40 ... +80 °C (-40 ... +176 °F),
PROFIBUS PA and FOUNDATION Fieldbus²⁾

7ML1930-1AQ

FDA approved FKM o-ring for 2" G (BSP) process
connections -28 ... +80 °C (-28 ... +176 °F)

7ML1830-3AN

SITRANS RD100, loop powered display -
see Chapter 7

7ML5741-...

SITRANS RD200, universal input display with
Modbus conversion - see Chapter 7

7ML5740-...

SITRANS RD300, dual line display with totalizer
and linearization curve and Modbus conversion -
see Chapter 7

7ML5744-...

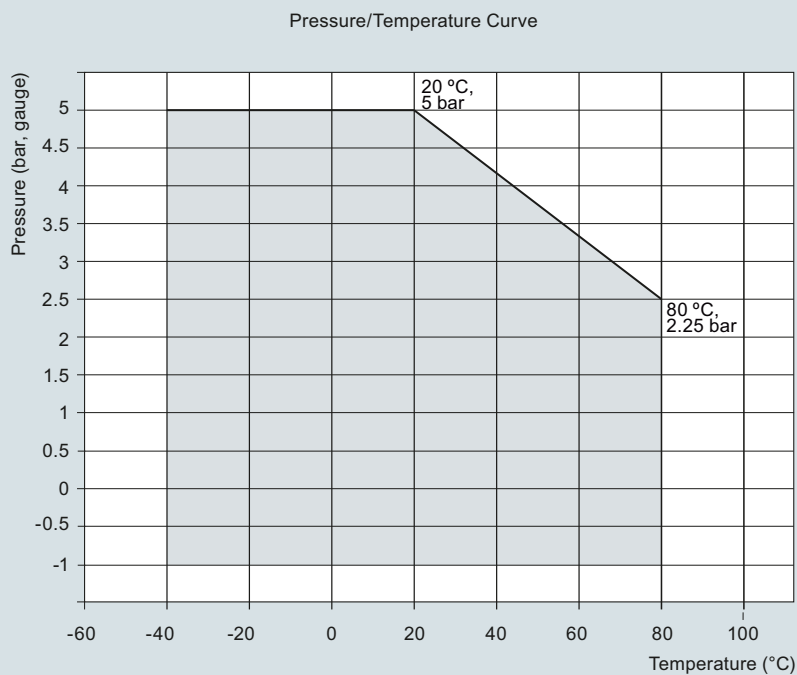
SITRANS RD500 web, universal remote monitoring
solution for instrumentation - see Chapter 7

7ML5750-...

For applicable back up point level switch -
see point level measurement section

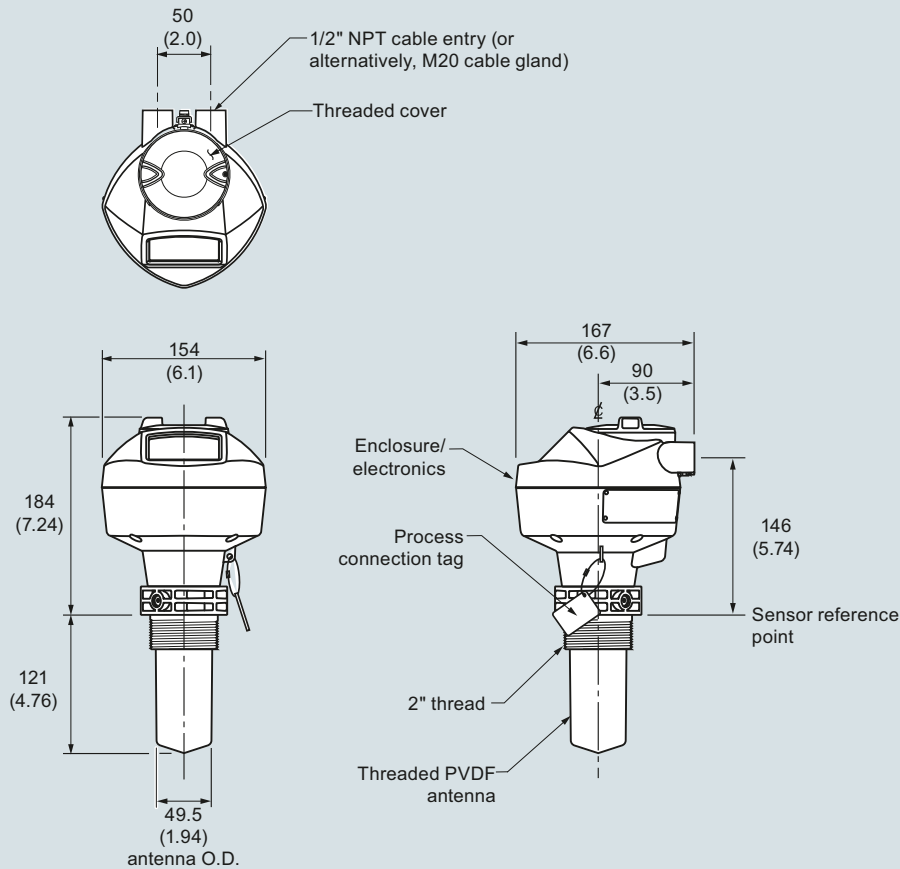
- 1) Available with Enclosure option 1 only
- 2) To be used with Communication options 1 and 3 only.
Connector has IP67 rating.
- 3) Available with Approval options A and B. Available with approval option C
for use on intrinsically safe applications only. Not rated for dust Ex.
- 4) Available with Enclosure option 0 only
- 5) Available with communication option 2 only
- 6) Available with approval options A, B, C, D, E, K, and L only

Characteristic curves



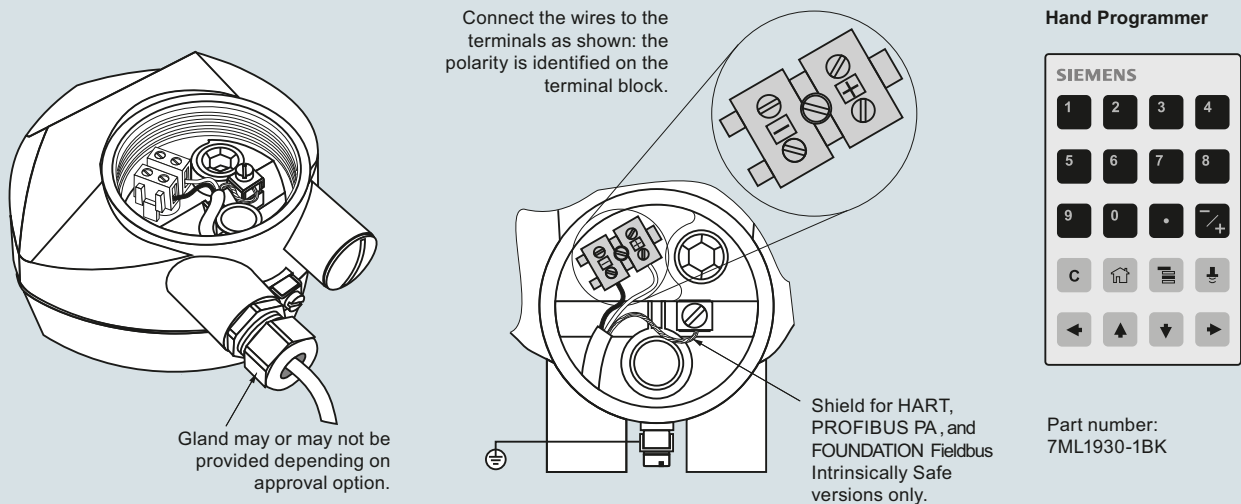
SITRANS LR250 PVDF Antenna pressure/temperature curve

Dimensional drawings



SITRANS LR250 PVDF Antenna, dimensions in mm (inch)

Circuit diagrams



Notes:

1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS LR250 Threaded PVDF Specials

Selection and Ordering data

SITRANS LR250 threaded PVDF Specials

	Article No.
NOTE: LR260 head can be supplied with any LR250 process connection or antenna as special order. For LR250, this means a stronger signal and longer measurement range is possible.	
SITRANS LR250 threaded PVDF antenna version enclosures (PROFIBUS PA models)	
SITRANS LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection	A5E03588171
SITRANS LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection	A5E03588253
SITRANS LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option B, with PROFIBUS PA communication, no process connection	A5E03588512
SITRANS LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection	A5E03589260
SITRANS LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option D, with PROFIBUS PA communication, no process connection	A5E03589262
SITRANS LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option E, with PROFIBUS PA communication, no process connection	A5E03589264
SITRANS LR250 threaded PVDF antenna version enclosures (FOUNDATION Fieldbus models)	
SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	A5E03589266
SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	A5E03589275
SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option B, with FOUNDATION Fieldbus communication, no process connection	A5E03589277
SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option C, with FOUNDATION Fieldbus communication, no process connection	A5E03589280
SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option D, with FOUNDATION Fieldbus communication, no process connection	A5E03589281
SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option E, with FOUNDATION Fieldbus communication, no process connection	A5E03589283

SITRANS LR250 threaded PVDF Specials

	Article No.
SITRANS LR250 threaded PVDF antenna version enclosures (< 3.6 mA start-up HART models)	
SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	A5E03569747
SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	A5E03586807
SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection	A5E03586854
SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection	A5E03586887
SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option D, with HART communication start-up at < 3.6 mA, no process connection	A5E03586961
SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection	A5E03587012
SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option F, with HART communication start-up at < 3.6 mA, no process connection	A5E03587132
SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection	A5E03587223
SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection	A5E03588125
SITRANS LR250 threaded PVDF antenna kits	
Antenna kit 2" NPT threaded PVDF	A5E03528941
Antenna kit 2" R (BSPT) threaded PVDF	A5E03528943
Antenna kit 2" G (BSPP) threaded PVDF	A5E03528947
Kit of hardware parts for LR250 threaded PVDF antenna: consists of O-rings, screws, wavewasher, and loctite	A5E03528948
Ex-proof plugs	
Ex-proof plugs kit, 1/2" NPT, qty 5	A5E39979991
Ex-proof plugs kit, M20, qty 5	A5E39979992

Level Measurement

Continuous level measurement

Radar transmitters

SITRANS LR250 Flanged Encapsulated Antenna

Overview



SITRANS LR250 with flanged encapsulated antenna is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including corrosives or aggressive materials, to a range of 20 m (66 ft) (antenna dependent).

Benefits

- Fully encapsulated horn antenna design with FDA approved TFM 1600 PTFE lens for use in chemical and sanitary environments where aggressive and corrosive materials are used
- Cost effective replacement for transmitters made of exotic materials
- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency and 50 mm (2 inch) process connection/antenna allow for easy mounting
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Short blanking distance for improved minimum measuring range to 50 mm (2 inch) from the end of the antenna
- Communication using HART, PROFIBUS PA, or FOUNDATION Fieldbus
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools such as PACTware or Fieldcare via SITRANS DTM
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511
- Suitable for API 2350

Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves setup and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using Quick Start Wizard with a few parameters required for basic operation.

The 25 GHz frequency creates a narrow, focused beam allowing for smaller antenna options and decreasing sensitivity to obstructions.

SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR250 measures superbly in small vessels and in tanks/vessels up to 20 m (66 ft) on materials with $dk > 1.6$.

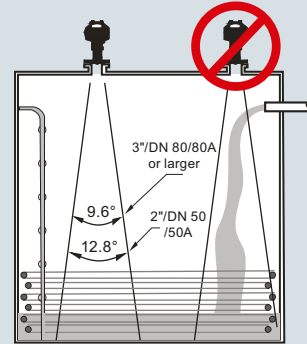
- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, temperatures to 170 °C (338 °F), corrosive and aggressive materials and applications where ease of cleaning is required such as food or fine chemicals

Configuration

Installation

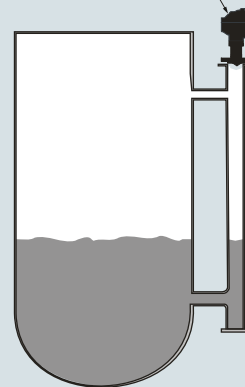
Note:

- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.



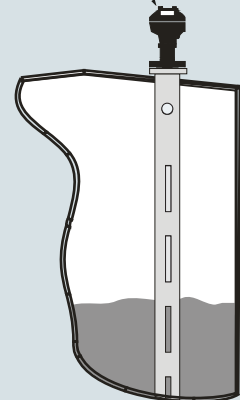
Mounting on bypass

Orient front or back of device toward vent.

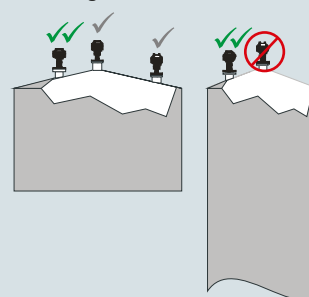


Mounting on stilling well

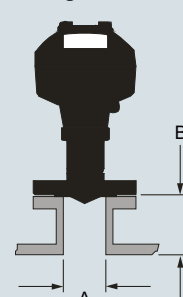
Orient front or back of device toward stillpipe slots.



Mounting on vessel



Mounting on a nozzle



A	B*
ø 50 (2)	500 (20) max.
ø 80 (3)	500 (20) max.
ø 100 (4)	500 (20) max.
ø 150 (6)	500 (20) max.

*Reference conditions

SITRANS LR250 Flanged Encapsulated Antenna installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Radar transmitters

SITRANS LR250 Flanged Encapsulated Antenna

Technical specifications

Mode of operation		Process connections	
Measuring principle	Radar level measurement	Flanged connection	Raised Face
Frequency	K-band (25.0 GHz)		<ul style="list-style-type: none"> 2, 3, 4, 6" Class 150 ASME B16.5 50A, 80A, 100A, 150A 10K JIS B 2220 DN 50, DN 80, DN 100 & DN 150 PN 10/16 EN 1092-1 type B1
Minimum measuring range	50 mm (2 inch) from end of antenna		
Maximum measuring range	20 m (66 ft)		
Output		Power supply	
HART	Version 5.1	4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
<ul style="list-style-type: none"> Analog output Accuracy Fail-safe 	4 ... 20 mA ± 0.02 mA <ul style="list-style-type: none"> Programmable as high low or hold (loss of echo) NE 43 programmable 	PROFIBUS PA	<ul style="list-style-type: none"> 15 mA Per IEC 61158-2
PROFIBUS PA	Profile 3.01	FOUNDATION Fieldbus	<ul style="list-style-type: none"> 20.0 mA Per IEC 61158-2
<ul style="list-style-type: none"> Function blocks 	2 Analog Input (AI)		
FOUNDATION Fieldbus	H1		
<ul style="list-style-type: none"> Functionality Version Function blocks 	Basic or LAS ITK 5.2.0 2 Analog Input (AI)		
Performance (according to reference conditions IEC60770-1)		Certificates and approvals	
Maximum measured error	<ul style="list-style-type: none"> > 500 mm from sensor reference point: 3 mm (0.118 inch) < 500 mm from sensor reference point: 25 mm (1 inch) 	General	CSA _{US/C} , CE, FM, RCM
Influence of ambient temperature	< 0.003 %/K	Radio	FCC, Industry Canada, RED, RCM
Rated operating conditions		Hazardous	
Installation conditions		<ul style="list-style-type: none"> Explosion Proof (Brazil) 	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
<ul style="list-style-type: none"> Location 	Indoor/outdoor	<ul style="list-style-type: none"> Increased Safety (Brazil) 	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
Ambient conditions (enclosure)		<ul style="list-style-type: none"> Intrinsically Safe (Brazil) 	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
<ul style="list-style-type: none"> Ambient temperature 	-40 ... +80 °C (-40 ... +176 °F)	<ul style="list-style-type: none"> Explosion Proof (Canada/USA) 	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
<ul style="list-style-type: none"> Installation category 	I	<ul style="list-style-type: none"> Intrinsically Safe (Canada/USA) 	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
<ul style="list-style-type: none"> Pollution degree 	4	<ul style="list-style-type: none"> Non-incendive (Canada/USA) 	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
Medium conditions		<ul style="list-style-type: none"> Flame Proof/Increased Safety (China) 	NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C
Dielectric constant ϵ_r	≥ 1.6 (antenna dependent)	<ul style="list-style-type: none"> Intrinsically Safe (China) 	NEPSI Ex ia IIC T4 Ga, Ex iaD tD A20 IP67 T100 °C
Process temperature	-40 ... +170 °C (-40 ... +338 °F) at process connection	<ul style="list-style-type: none"> Non-sparking/Energy Limited (China) 	NEPSI Ex nA IIC T4 Gc
Process pressure	See Pressure/Temperature curves for more information (page 4/235)	<ul style="list-style-type: none"> Intrinsically Safe (Europe) 	ATEX II 1G Ex ia IIC T4 Ga
Design		<ul style="list-style-type: none"> Non-sparking/Energy Limited (Europe) 	ATEX II 1D Ex ia ta IIIC T100 °C Da
Enclosure		<ul style="list-style-type: none"> Flame Proof (International/Europe) 	ATEX II 3G Ex nA IIC T4 Gc
<ul style="list-style-type: none"> Material Cable inlet 	Aluminum, polyester powder-coated 2 x M20 x 1.5 or 2 x ½" NPT	<ul style="list-style-type: none"> Increased Safety (-International/Europe) 	IECEX/ATEX II 1/2 GD, 1D, 2D Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIC T100 °C Da
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68	<ul style="list-style-type: none"> Intrinsically Safe (International) 	IECEX/ATEX II 1/2 GD, 1D, 2D, Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
Weight (dependent on process connection)	<ul style="list-style-type: none"> Approx. 7 kg (15.43 lb) for 2" Class 150 ASME B16.5 raised face flange (smallest size) Approx. 17.7 kg (39.02 lb) for 6" Class 150 ASME B16.5 raised face flange (largest size) 		IECEX/ATEX II 1 G Ex ia IIC T4 Ga, IECEX/ATEX II 1D Ex ia ta IIIC T100 °C Da
Display (local)	Graphic local user interface including quick start wizard and echo profile display	<ul style="list-style-type: none"> Explosion Proof (Russia/Kazakhstan) Increased Safety (Russia/Kazakhstan) Intrinsically Safe (Russia/Kazakhstan) Marine 	EAC Ex d
Antenna			EAC Ex e
<ul style="list-style-type: none"> Material 	Stainless Steel 316L (1.4435 or 1.4404) and TFM 1600 PTFE Lens (lens is the only wetted part)		EAC Ex ia
<ul style="list-style-type: none"> Dimensions (nominal sizes) 	48 mm (2 inch), 80 mm (3 inch), 100 mm (4 inch), 150 mm (6 inch)	<ul style="list-style-type: none"> Functional Safety 	<ul style="list-style-type: none"> Lloyd's Register of Shipping ABS Type Approval Bureau Veritas SIL-2 suitable in accordance with IEC 61508/61511

Level Measurement

Continuous level measurement
Radar transmitters

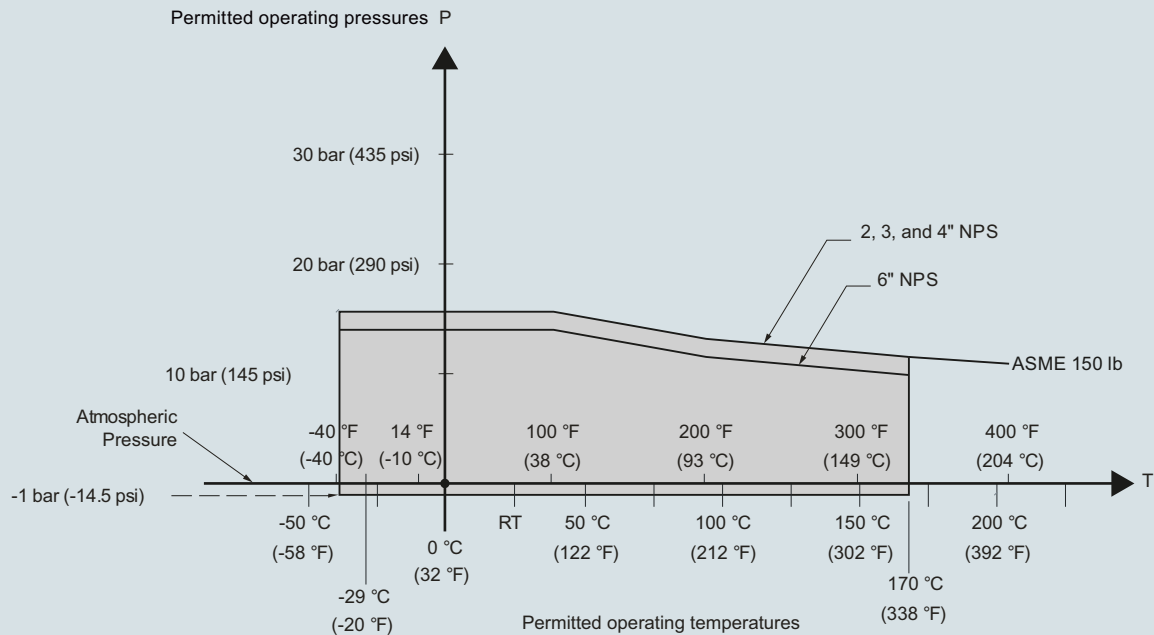
SITRANS LR250 Flanged Encapsulated Antenna

Selection and Ordering data	Order code	Selection and Ordering data	Article No.
Further designs Please add "-Z" to Article No. and specify Order code(s). Plug M12 with mating Connector ¹⁾²⁾³⁾ Plug 7/8" with mating Connector ²⁾³⁾⁴⁾ Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 Material inspection Certificate Type 3.1 per EN 10204 Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511 ⁵⁾⁶⁾ Namur NE43 compliant, device preset to failsafe < 3.6 mA ⁵⁾		Compact Operating Instructions for FOUNDATION Fieldbus device English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian English, Portuguese (Brazil), Chinese Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/ processinstrumentation/documentation	
	A50		A5E33472700
	A55		A5E33472738
	Y15		A5E34046626
	C11		
	C12		
	C20		
	N07		
Compact Operating Instructions for HART/ mA device English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian English, Portuguese (Brazil), Chinese Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/ processinstrumentation/documentation		Other Operating Instructions SITRANS LR250 Functional Safety manual, English Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/ processinstrumentation/documentation	
	Article No		A5E32286471
	A5E33469191		
	A5E33469171		
	A5E34046583		
Compact Operating Instructions for PROFIBUS PA device English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian English, Portuguese (Brazil), Chinese Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/ processinstrumentation/documentation		Accessories Handheld programmer, Intrinsically safe, EEx ia HART modem/USB (for use with a PC and SIMATIC PDM) One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART (2 are required) ⁶⁾ One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA and FOUNDATION Fieldbus (2 are required) ²⁾ SITRANS RD100, loop powered display - see Chapter 7 SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7 For applicable back up point level switch - see point level measurement section	
	A5E33469239		7ML1930-1BK
	A5E33472685		7MF4997-1DB
	A5E34046624		7ML1930-1AP
			7ML1930-1AQ
			7ML5741-...
			7ML5740-...
			7ML5744-...
			7ML5750-...

- ¹⁾ Available with enclosure option 1 only
²⁾ Available with communication options 1 and 3 only
³⁾ Available with approval options A, B, C, and L only
⁴⁾ Available with enclosure option 0 only
⁵⁾ Applicable with communication option 2 only
⁶⁾ Available with approval options A, B, C, D, E, K, and L only

Characteristic curves

Pressure/ temperature curve
LR250 Flanged Encapsulated Antenna
ASME flanged process connections
(7ML5432)



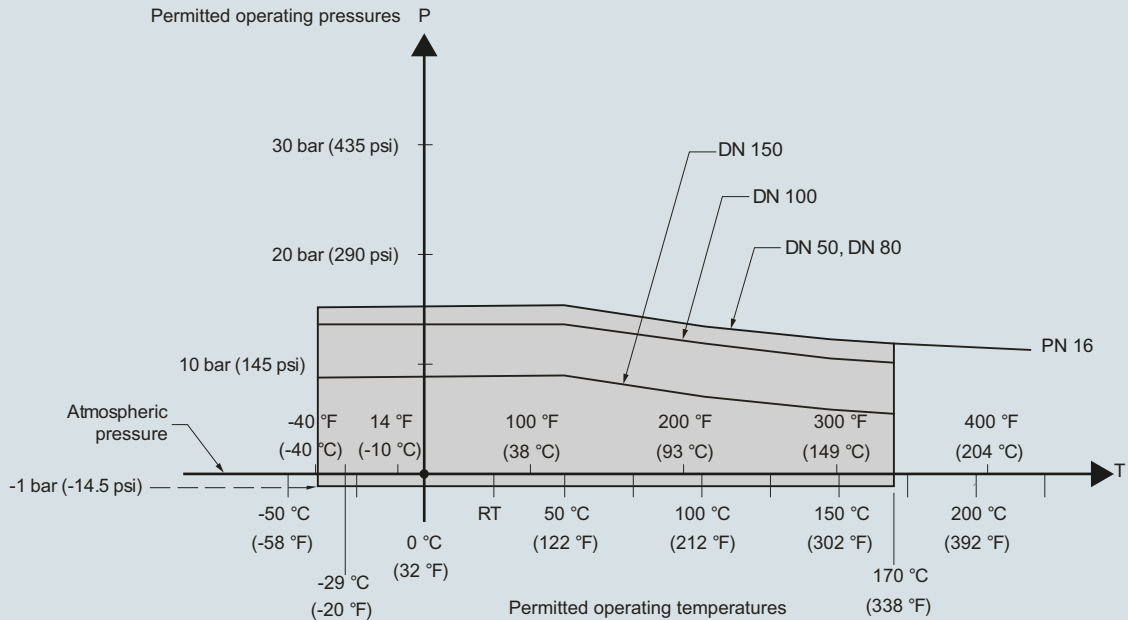
SITRANS LR250 Flanged Encapsulated Antenna pressure/temperature curve

Level Measurement

Continuous level measurement
Radar transmitters

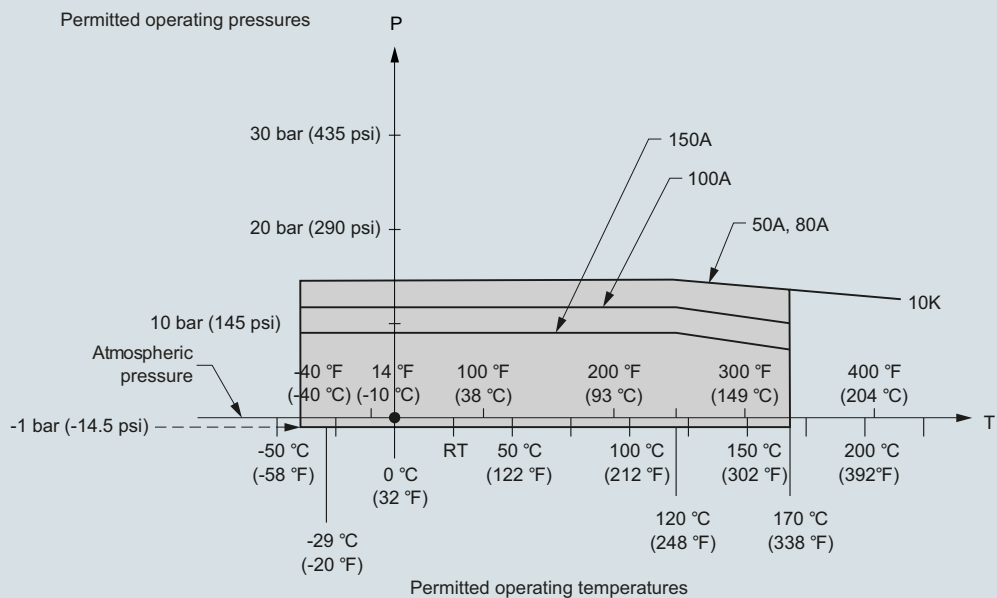
SITRANS LR250 Flanged Encapsulated Antenna

Pressure/ temperature curve
LR250 Flanged Encapsulated Antenna
EN 1092-1 flanged process connections
(7ML5432)



SITRANS LR250 Flanged Encapsulated Antenna pressure/temperature curve

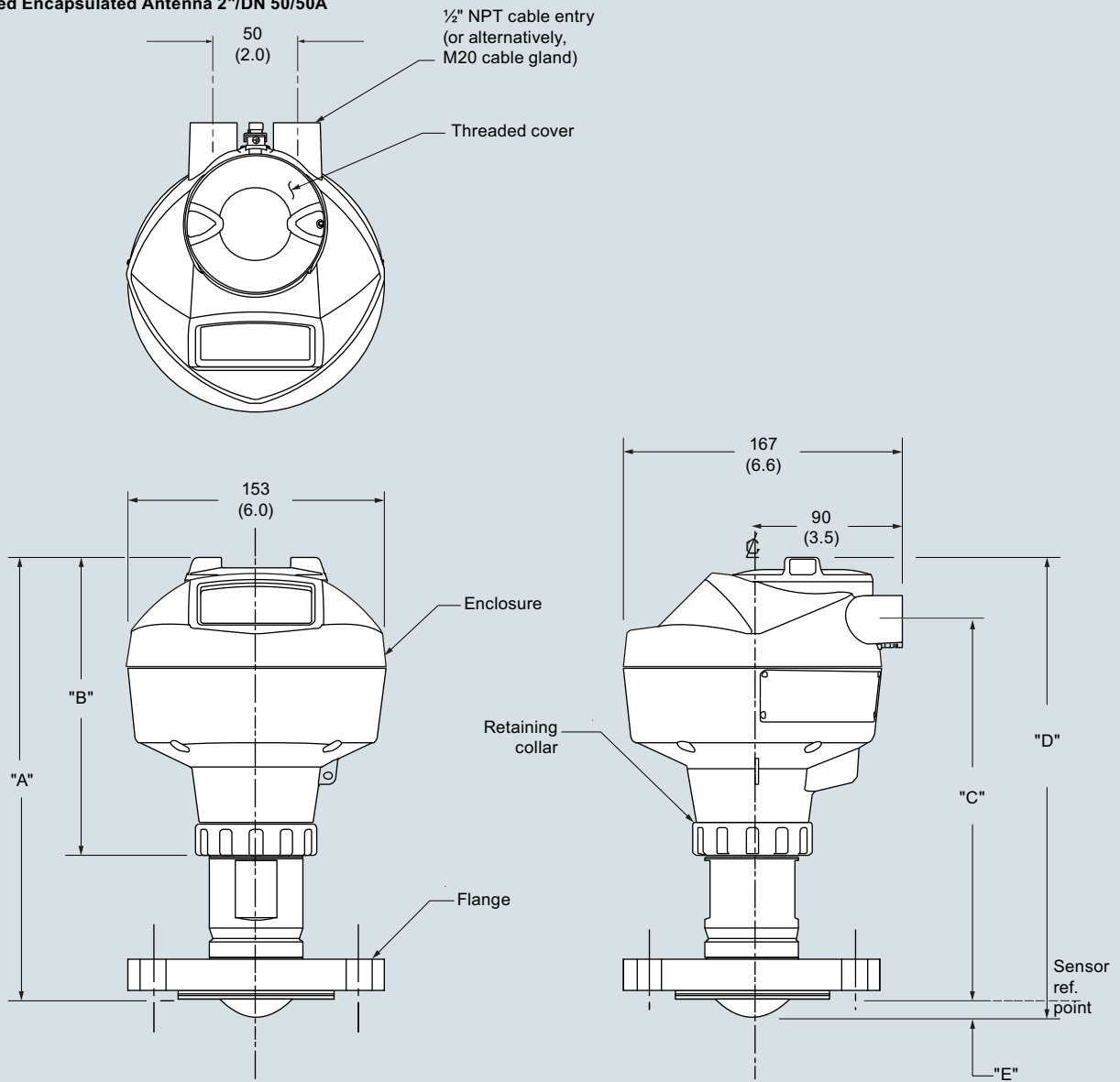
Pressure/ temperature curve
LR250 Flanged Encapsulated Antenna
JIS B 2220 flanged process connections
(7ML5432)



SITRANS LR250 Flanged Encapsulated Antenna pressure/temperature curve

Dimensional drawings

Flanged Encapsulated Antenna 2"/DN 50/50A



Flange Size	Flange Class	Flange O.D.	Antenna aperture size	Height to Sensor reference point dimension E ¹⁾	Beam angle	Measurement Range	Dimension A	Dimension B	Dimension C	Dimension D
2"	150 lb	152 (5.98)	50 (1.97)	11 (0.43)	12.8°	10 m (32.8 ft)	263 (10.35)	178 (7)	223 (8.78)	274 (10.79)
DN 50	PN 10/16	165 (6.50)								
50A	10K	155 (6.10)								

¹⁾ Height from tip of lens to sensor reference point as shown.

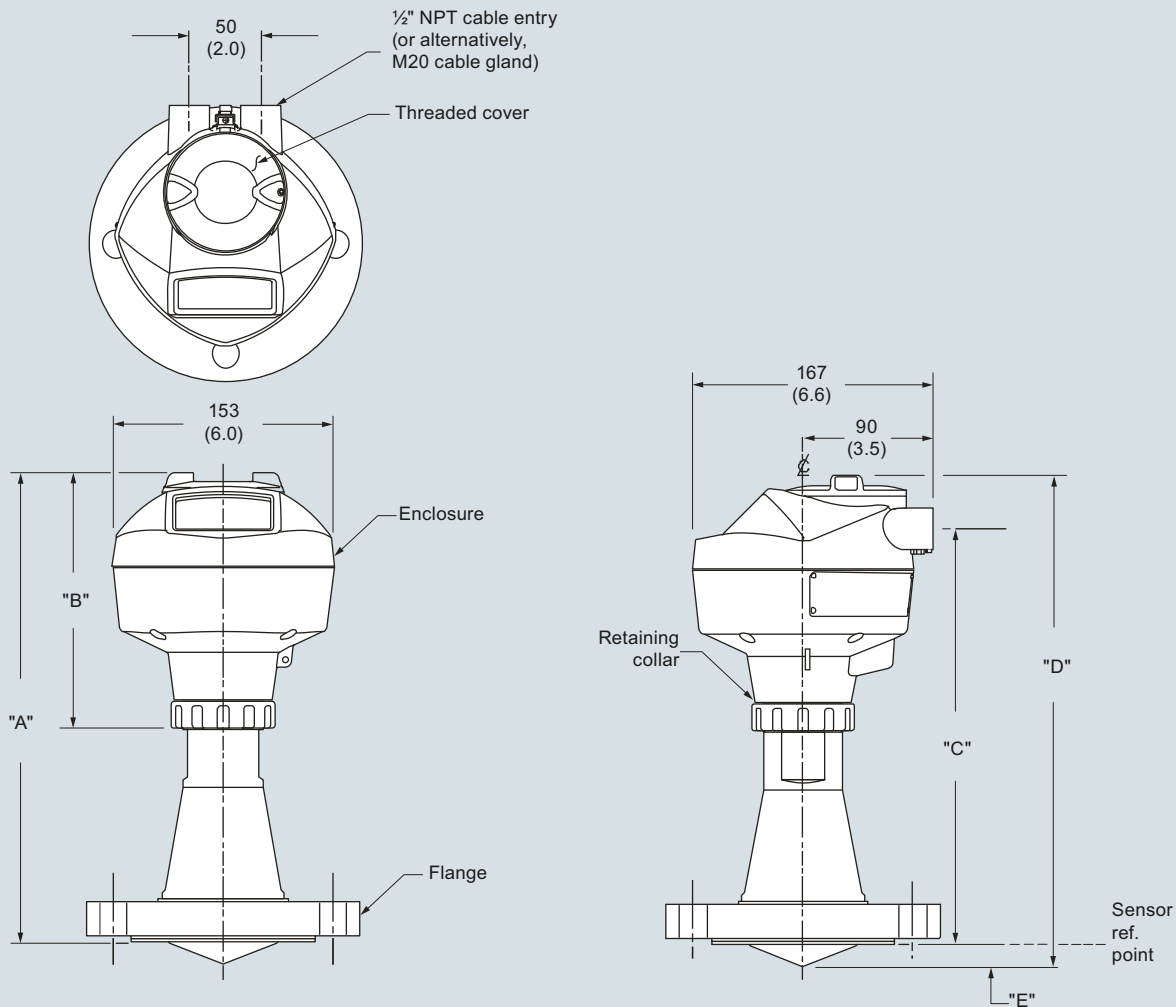
SITRANS LR250 Flanged Encapsulated Antenna, dimensions in mm (inch)

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS LR250 Flanged Encapsulated Antenna

Flanged Encapsulated Antenna 3"/DN 50/80A or greater

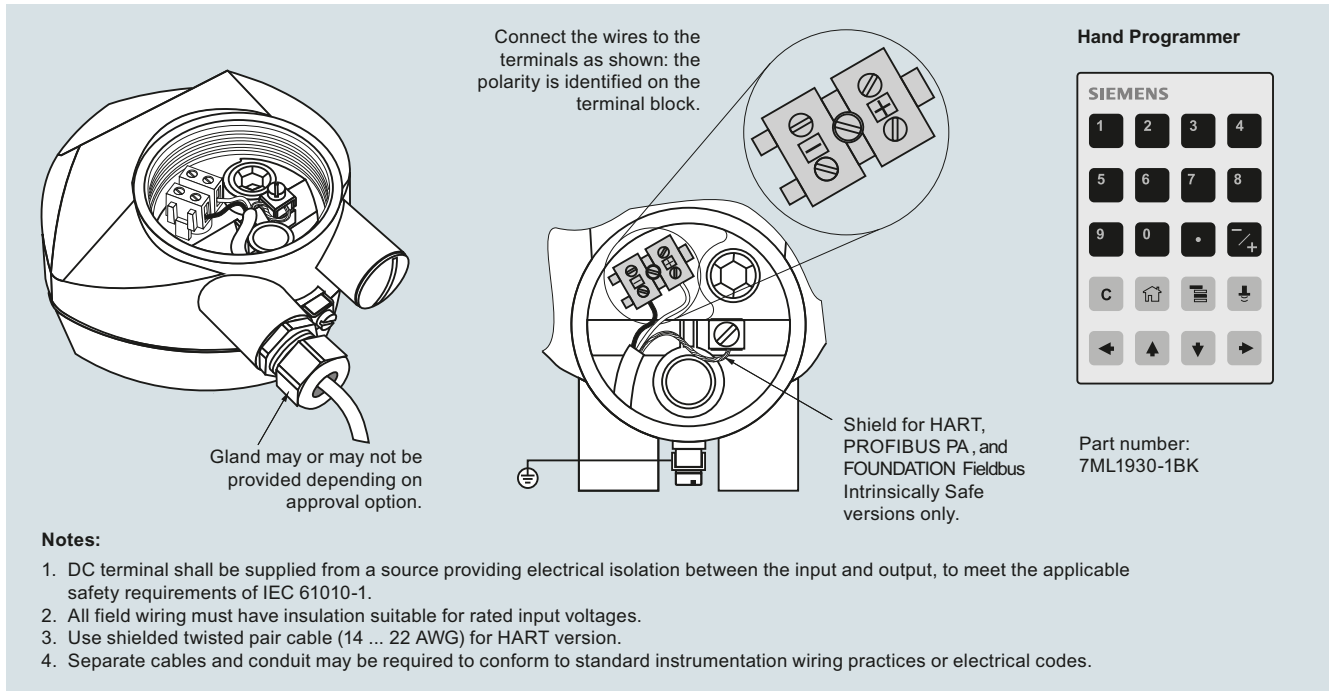


Flange Size	Flange Class	Flange O.D.	Antenna aperture size	Height to Sensor reference point dimension E ¹⁾	Beam angle	Measurement Range	Dimension A	Dimension B	Dimension C	Dimension D
3"	150 lb	190 (7.48)	75 (2.95)	15 (0.59)	9.6°	20 m (65.6 ft)	328 (12.91)	178 (7)	288 (11.34)	343 (13.54)
DN 80	PN 10/16	200 (7.87)								
80A	10K	185 (7.28)								
4"	150 lb	230 (9.06)	75 (2.95)	13 (0.51)	9.6°	20 m (65.6 ft)	328 (12.91)	178 (7)	288 (11.34)	343 (13.50)
DN 100	PN 10/16	220 (8.66)								
100A	10K	210 (8.27)								
6"	150 lb	280 (11.02)	75 (2.95)	15 (0.59)	9.6°	20 m (65.6 ft)	333 (13.11)	178 (7)	293 (11.54)	348 (13.70)
DN 150	PN 10/16	285 (11.25)								
150A	10K	280 (11.02)								

¹⁾ Height from tip of lens to sensor reference point as shown.

SITRANS LR250 Flanged Encapsulated Antenna, dimensions in mm (inch)

Circuit diagrams



SITRANS LR250 connections

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS LR250 Flanged Encapsulated Specials

Selection and ordering data

SITRANS LR250 Flanged Encapsulated Specials

	Article No.
NOTE: LR260 head can be supplied with any LR250 process connection or antenna as special order. For LR250, this means a stronger signal and longer measurement range is possible.	
SITRANS LR250 flanged encapsulated antenna version enclosures (PROFIBUS PA models)	
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection	A5E32462853
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection	A5E32462854
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option B, with PROFIBUS PA communication, no process connection	A5E32462855
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection	A5E32462856
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option D, with PROFIBUS PA communication, no process connection	A5E32462857
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option E, with PROFIBUS PA communication, no process connection	A5E32462858
SITRANS LR250 flanged encapsulated antenna version enclosures (FOUNDATION Fieldbus models)	
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	A5E32462859
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	A5E32462860
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option B, with FOUNDATION Fieldbus communication, no process connection	A5E32462861
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option C, with FOUNDATION Fieldbus communication, no process connection	A5E32462862
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option D, with FOUNDATION Fieldbus communication, no process connection	A5E32462863
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option E, with FOUNDATION Fieldbus communication, no process connection	A5E32462864

SITRANS LR250 Flanged Encapsulated Specials

	Article No.
SITRANS LR250 flanged encapsulated antenna version enclosures (< 3.6 mA start-up HART models)	
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	A5E32462865
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	A5E32462866
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection	A5E32462867
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection	A5E32462868
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option D, with HART communication start-up at < 3.6 mA, no process connection	A5E32462869
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection	A5E32462830
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option F, with HART communication start-up at < 3.6 mA, no process connection	A5E32462831
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection	A5E32462832
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection	A5E32462833

SITRANS LR250 Flanged Encapsulated Specials

	Article No.
SITRANS LR250 flanged encapsulated antenna lens kits	
Replacement TFM 1600 Lens and Spring Washer Kit for 2" Class 150 ASME B16.5 raised face	A5E32462817
Replacement TFM 1600 Lens and Spring Washer Kit for 3" Class 150 ASME B16.5 raised face	A5E32462819
Replacement TFM 1600 Lens and Spring Washer Kit for 4" Class 150 ASME B16.5 raised face	A5E32462820
Replacement TFM 1600 Lens and Spring Washer Kit for 6" Class 150 ASME B16.5 raised face	A5E32462821
Replacement TFM 1600 Lens and Spring Washer Kit for 50A 10K JIS B 2220 raised face	A5E32462822
Replacement TFM 1600 Lens and Spring Washer Kit for 80A 10K JIS B 2220 raised face	A5E32462823
Replacement TFM 1600 Lens and Spring Washer Kit for 100A 10K JIS B 2220 raised face	A5E32462824
Replacement TFM 1600 Lens and Spring Washer Kit for 150A 10K JIS B 2220 raised face	A5E32462825
Replacement TFM 1600 Lens and Spring Washer Kit for DN 50 PN 10/16 EN 1092-1 type B1 raised face	A5E32462826
Replacement TFM 1600 Lens and Spring Washer Kit for DN 80 PN 10/16 EN 1092-1 type B1 raised face	A5E32462827
Replacement TFM 1600 Lens and Spring Washer Kit for DN 100 PN 10/16 EN 1092-1 type B1 raised face	A5E32462828
Replacement TFM 1600 Lens and Spring Washer Kit for DN 150 PN 10/16 EN 1092-1 type B1 raised face	A5E32462829
Ex-proof plugs	
Ex-proof plugs kit, 1/2" NPT, qty 5	A5E39979991
Ex-proof plugs kit, M20, qty 5	A5E39979992

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Overview



The SITRANS LR250 Hygienic Encapsulated Antenna is a 2-wire 25 GHz pulse radar level transmitter with sanitary and hygienic approvals for continuous monitoring of liquids, slurries, and pastes within the food, beverage, chemical, and pharmaceutical industries to a range of 20 m (66 ft) (antenna dependent).

Picture shown with accessories sold separately.

Benefits

- Fully encapsulated horn antenna design with FDA approved and USP Class VI compliant, TFM 1600 PTFE lens
- < 0.8 μ Ra surface finish for maximum cleanability and hygiene requirements commonly required in sanitary environments
- Chemically resistant TFM 1600 PTFE lens is also suitable for aggressive or corrosive materials
- Approved device in accordance with 3-A, EHEDG EL Class I and/or EHEDG EL Aseptic Class I
- Cost effective replacement for transmitters made of exotic materials
- Graphical local user interface (LUI) makes operation simple with plug-and-play set-up using the intuitive Quick Start Wizard
- Industry standard process connections including ISO 2852, DIN 11851, DIN 11864-1, DIN 11864-2, DIN 11864-3, and Tuchenhausen Varivent Type F and N
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency and 2 inch (50 mm) process connection/antenna allow for easy mounting
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Communication using HART, PROFIBUS PA, or FOUNDATION Fieldbus
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools, such as PACTware or Fieldcare via SITRANS DTM.
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511

Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves set-up and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using the Quick Start wizard with few parameters required for basic operation.

The 25 GHz frequency creates a narrow, focused beam allowing for smaller antenna options and decreasing sensitivity to obstructions.

SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR250 measures superbly in small vessels and in tanks/vessels up to 20 m (66 ft) on materials with $dk > 1.6$.

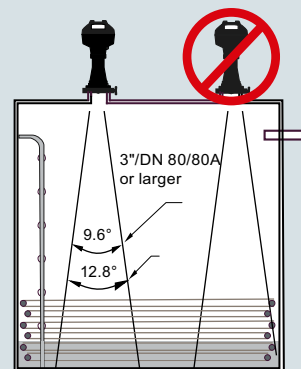
- Key Applications: applications within the food, beverage, chemical and pharmaceutical industries where sanitary, aseptic, or hygienic approvals are required or easy install/clean flush antennas are preferable, such as ice cream, fruit juice, milk, beer, and pharmaceutical or chemical additives and ingredients.

Configuration

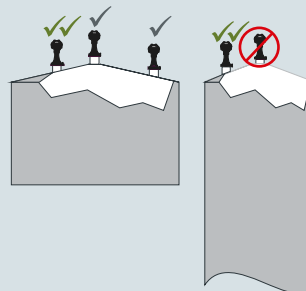
Installation

Note:

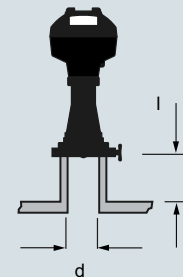
- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.



Mounting on vessel



Mounting on a nozzle



Nozzles should be maximum l/d ratio 1:1 (Eg. 50 mm length, 50 mm diameter)

LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

SITRANS LR250 Hygienic Encapsulated Antenna

Technical specifications

Mode of Operation		Process connections	
Measuring principle	Radar level measurement	Hygienic/Sanitary connections	<ul style="list-style-type: none"> 2", 3" & 4" Sanitary Clamp according to ISO 2852 DN 50, DN 80 & DN 100 Aseptic/Hygienic threaded to DIN 11864-1 [Form A] DN 50, DN 80 & DN 100 Aseptic/Hygienic flanged to DIN 11864-2 [Form A] DN 50, DN 80 & DN 100 Aseptic/Hygienic Clamp according to DIN 11864-3 [Form A] DN 50, DN 80 & DN 100 Hygienic Union according to DIN 11851 Type F (50 mm) & Type N (68 mm) Tuchenhausen Varivent
Frequency	K-band (25.0 GHz)		
Minimum measuring range	50 mm (2 inch) from end of antenna		
Maximum measuring range	20 m (66 ft)		
Output		Power supply	
HART	Version 5.1	4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
• Analog output	4 ... 20 mA	PROFIBUS PA	<ul style="list-style-type: none"> 15 mA Per IEC 61158-2
• Accuracy	± 0.02 mA	FOUNDATION Fieldbus	<ul style="list-style-type: none"> 20.0 mA Per IEC 61158-2
• Fail-safe	<ul style="list-style-type: none"> Programmable as high low or hold (loss of echo) NE 43 programmable 		
PROFIBUS PA	Profile 3.01		
• Function blocks	2 Analog Input (AI)		
FOUNDATION Fieldbus	H1		
• Functionality	Basic or LAS		
• Version	ITK 5.2.0		
• Function blocks	2 Analog Input (AI)		
Performance (according to reference conditions IEC60770-1)		Certificates and approvals	
Maximum measured error	<ul style="list-style-type: none"> > 500 mm from sensor reference point: 3 mm (0.118 inch) < 500 mm from sensor reference point: 25 mm (1 inch) 	General	CSA _{US/C} , CE, FM, RCM
Influence of ambient temperature	< 0.003 %/K	Radio	FCC, Industry Canada, RED, RCM
Rated operating conditions		Hazardous	
Installation conditions		• Explosion Proof (Brazil)	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Location	Indoor/outdoor	• Increased Safety (Brazil)	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
Ambient conditions (enclosure)		• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)	• Explosion Proof (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Installation category	I	• Intrinsically Safe (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Pollution degree	4	• Non-incendive (Canada/USA)	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
Medium conditions		• Flame Proof/Increased Safety (China)	NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C
Dielectric constant ϵ_r	≥ 1.6 (antenna dependent)	• Intrinsically Safe (China)	NEPSI Ex ia IIC T4 Ga, Ex iaD tD A20 IP67 T100 °C
Process temperature	-40 ... +170 °C (-40 ... +338 °F) at process connection	• Non-sparking (China)	NEPSI Ex nA IIC T4 Gc
Process pressure	See Pressure/Temperature curves for more information	• Intrinsically Safe (Europe)	ATEX II 1G Ex ia IIC T4 Ga ATEX II 1D Ex ia ta IIIC T100 °C Da
Design		• Non-sparking (Europe)	ATEX II 3G Ex nA IIC T4 Gc
Enclosure		• Flame Proof (International/Europe)	IECEX/ATEX II 1/2 GD, 1D, 2D Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIC T100 °C Da
• Material	Aluminum, polyester powder coated		IECEX/ATEX II 1 G Ex ia IIC T4 Ga, IECEX/ATEX II 1D Ex ia ta IIIC T100 °C Da
• Cable inlet	2 x M20 x 1.5 or 2 x ½" NPT		EAC Ex d
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68		EAC Ex e
Weight (dependent on process connection)	<ul style="list-style-type: none"> Approx. 4.7 kg (10.4 lb) for 2" ISO 2852 (smallest size) Approx. 7.9 kg (17.4 lb) for DN 100 DIN 11864-2 (largest size) 		EAC Ex ia
Display (local)	Graphic local user interface including quick start wizard and echo profile display		
Antenna			
• Material	Stainless steel 316L (1.4435 or 1.4404) and TFM 1600 PTFE Lens (lens is the only wetted part)		
• Lens surface finish (R_a)	0.8 μm		
		Hygienic/Sanitary	EHEDG EL Class I EHEDG EL Aseptic Class I

Level Measurement
Continuous level measurement
Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Approvals for handheld programmer	IS model: ATEX II 1 GD Ex ia IIC T4 Ga Ex ia D 20 T135 °C Ta = -20 ... +50 °C CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, T6 Ta = 50 °C IECEX SIR 09.0073
Handheld communicator	HART communicator 375/475
PC	• SIMATIC PDM • Emerson AMS • SITRANS DTM (for connection into FDT, such as PACTware or Field-care)
Display (local)	Graphic local user interface including quick start wizard and echo profile displays

Level Measurement

Continuous level measurement

Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
SITRANS LR250 hygienic encapsulated antenna 2-wire, 25 Ghz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, up to a range of 20 m (66 ft) (Antenna dependant). Ideal for Hygienic applications including small vessels and low dielectric media. Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5433- 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Continuous level measurement
Radar transmitters

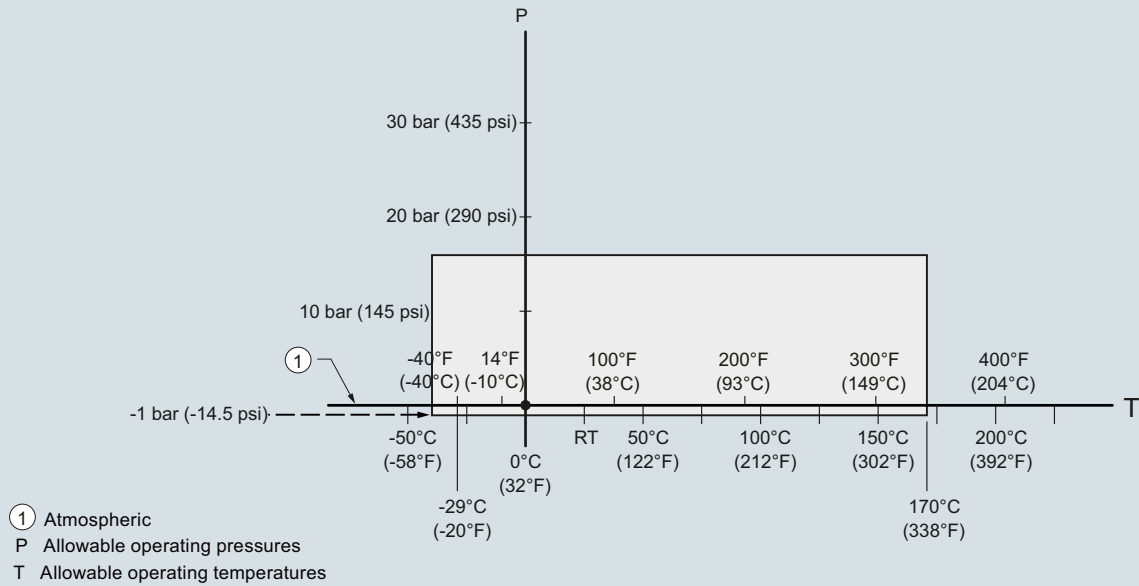
Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
<u>Electrical Connection cable entry:</u>	
Plug M12 (IP 67 rating) with mating connector ²⁾⁷⁾⁸⁾	A50
Plug 7/8" (IP 67 rating) with mating Connector ²⁾⁸⁾⁹⁾	A55
<u>Test Certificates</u>	
Manufacturer's Test Certificate M to DIN 55350, Part 18 and to ISO 9000	C11
Material inspection Certificate 3.1 of EN 10204	C12
<u>Functional Safety</u>	
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511 ⁶⁾¹⁰⁾	C20
<u>Namur</u>	
Namur NE43 compliant, device preset to failsafe < 3.6 mA ⁶⁾	N07
<u>Tapping</u>	
Stainless steel tag [69 mm x 50 mm (2.71 x 1.97 inch)] Measuring-point number / identification (max. 27 characters) specify in plain text	Y15
Compact Operating Instructions for HART/ mA device	Article No.
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	A5E33469191
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	A5E33469171
English, Portuguese (Brazil), Chinese	A5E34046583
Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Compact Operating Instructions for PROFIBUS PA device	
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	A5E33469239
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	A5E33472685
English, Portuguese (Brazil), Chinese	A5E34046624
Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

Selection and Ordering data	Article No.
Compact Operating Instructions for FOUNDATION Fieldbus device	
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	A5E33472700
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	A5E33472738
English, Portuguese (Brazil), Chinese	A5E34046626
Note: The Operating Instructions should be ordered as a separate line item on the order.	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Other Operating Instructions	
SITRANS LR250 Functional Safety manual, English	A5E32286471
Note: The Operating Instructions should be ordered as a separate line item on the order.	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Handheld programmer, Intrinsically safe, EEx ia (LUI enabled)	7ML1930-1BK
HART modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART (two are required) ⁶⁾	7ML1930-1AP
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA and FOUNDATION Fieldbus (two are required) ⁸⁾	7ML1930-1AQ
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-...
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-...
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750-...
For applicable back up point level switch - see point level measurement section	
¹⁾ Available with Process connection options AA ... FB only ²⁾ Available with Approval options A, B, C, L only ³⁾ Available with Process connections FC ... FF only ⁴⁾ Available with Process connection options AA ... EC only ⁵⁾ Max. range 10 m (32.8 ft), dk > 3 [20 m (66 ft) and dk > 1.6 if installed in a stillpipe] ⁶⁾ Applicable with Communication option 2 only ⁷⁾ Available with Enclosure option 1 only ⁸⁾ Available with Communication options 1 and 3 only ⁹⁾ Available with Enclosure option 0 only ¹⁰⁾ Available with Approval options A, B, C, D, E, K, L only	

SITRANS LR250 Hygienic Encapsulated Antenna

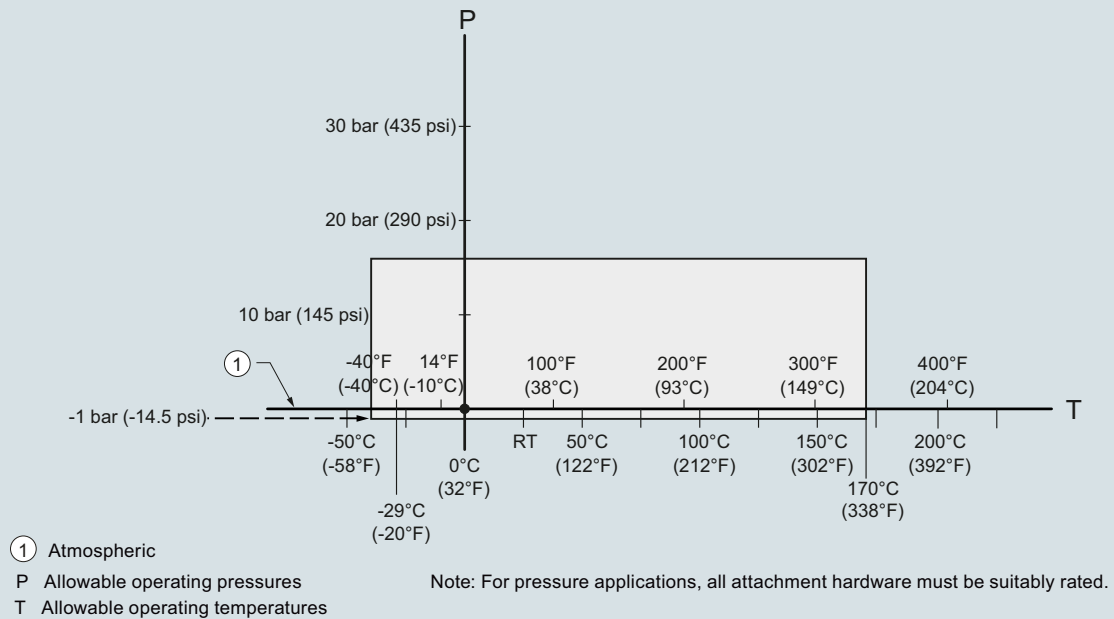
Characteristic curves

DIN 11851 Sanitary/Hygienic nozzle/slotted nut: DN 50, DN 80, and DN 100
DIN 11864-1 Aseptic/Hygienic nozzle/slotted nut: DN 50, DN 80, and DN 100



SITRANS LR250 Hygienic Encapsulated Antenna, process pressure/temperature rating curve

DIN 11864-2 Aseptic/Hygienic flanged: DN 50, DN 80, and DN 100



SITRANS LR250 Hygienic Encapsulated Antenna, process pressure/temperature rating curve

Level Measurement

Continuous level measurement

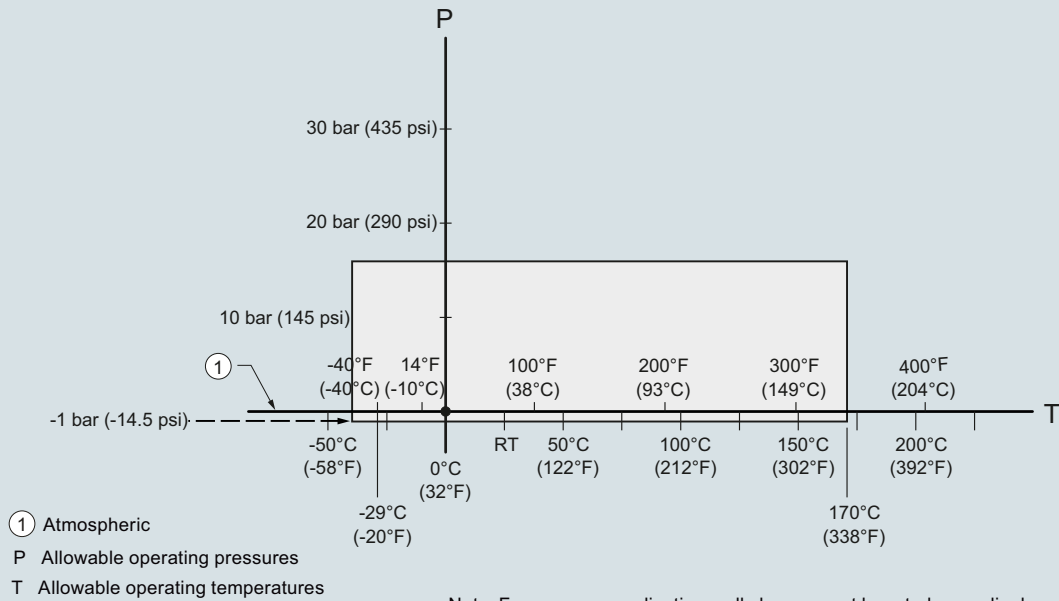
Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

DIN 11864-3 Aseptic/Hygienic clamp: DN 50, DN 80, and DN 100

ISO 2852 Sanitary/Hygienic clamp: 2", 3", and 4"

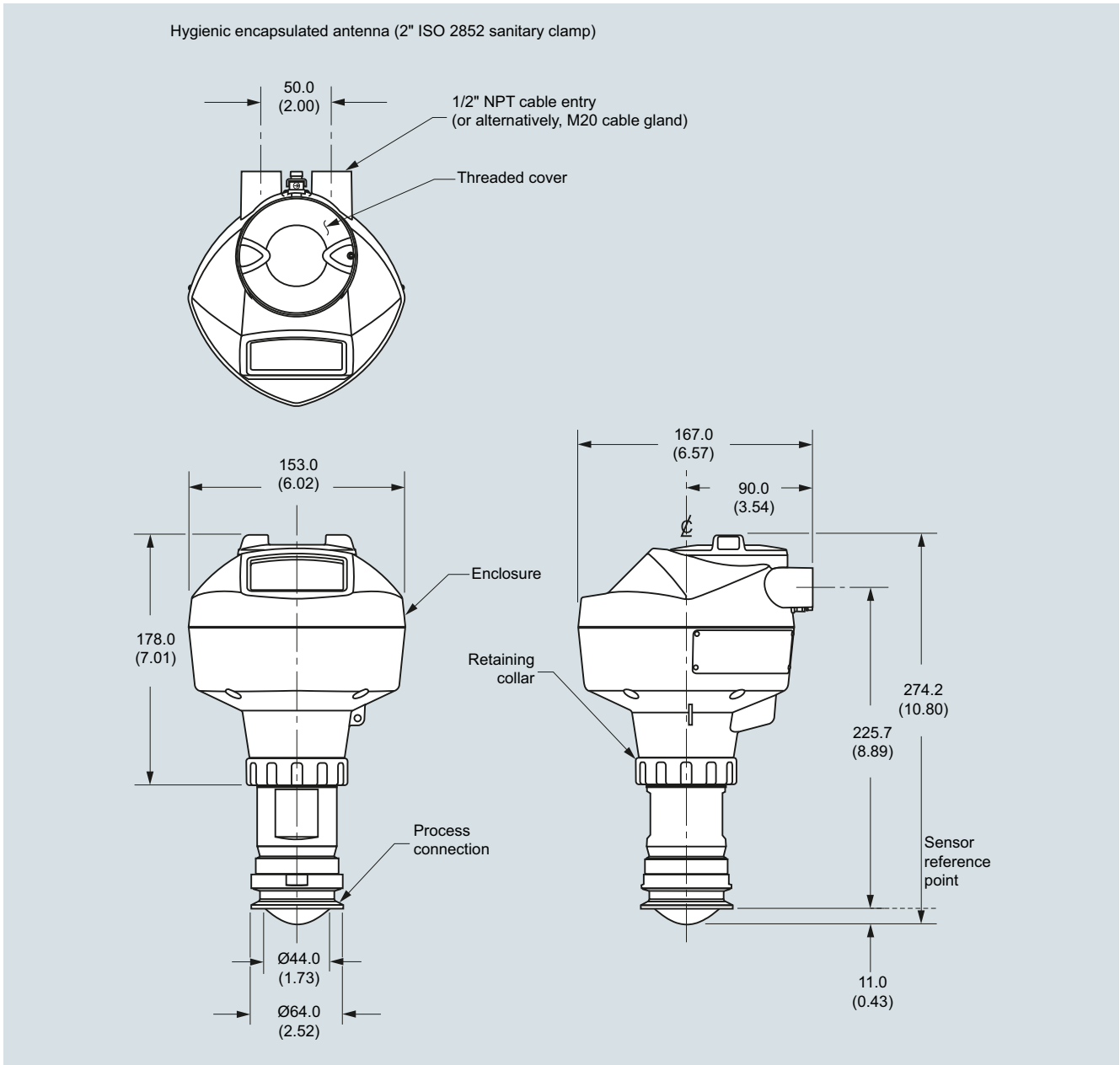
Tuchenhagen Varivent face seal clamp: Type N (68 mm) and Type F (50 mm)



SITRANS LR250 Hygienic Encapsulated Antenna, process pressure/temperature rating curve

SITRANS LR250 Hygienic Encapsulated Antenna

Dimensional drawings



SITRANS LR250 Hygienic Encapsulated Antenna (2" ISO 2852 sanitary clamp), dimensions in mm (inch)

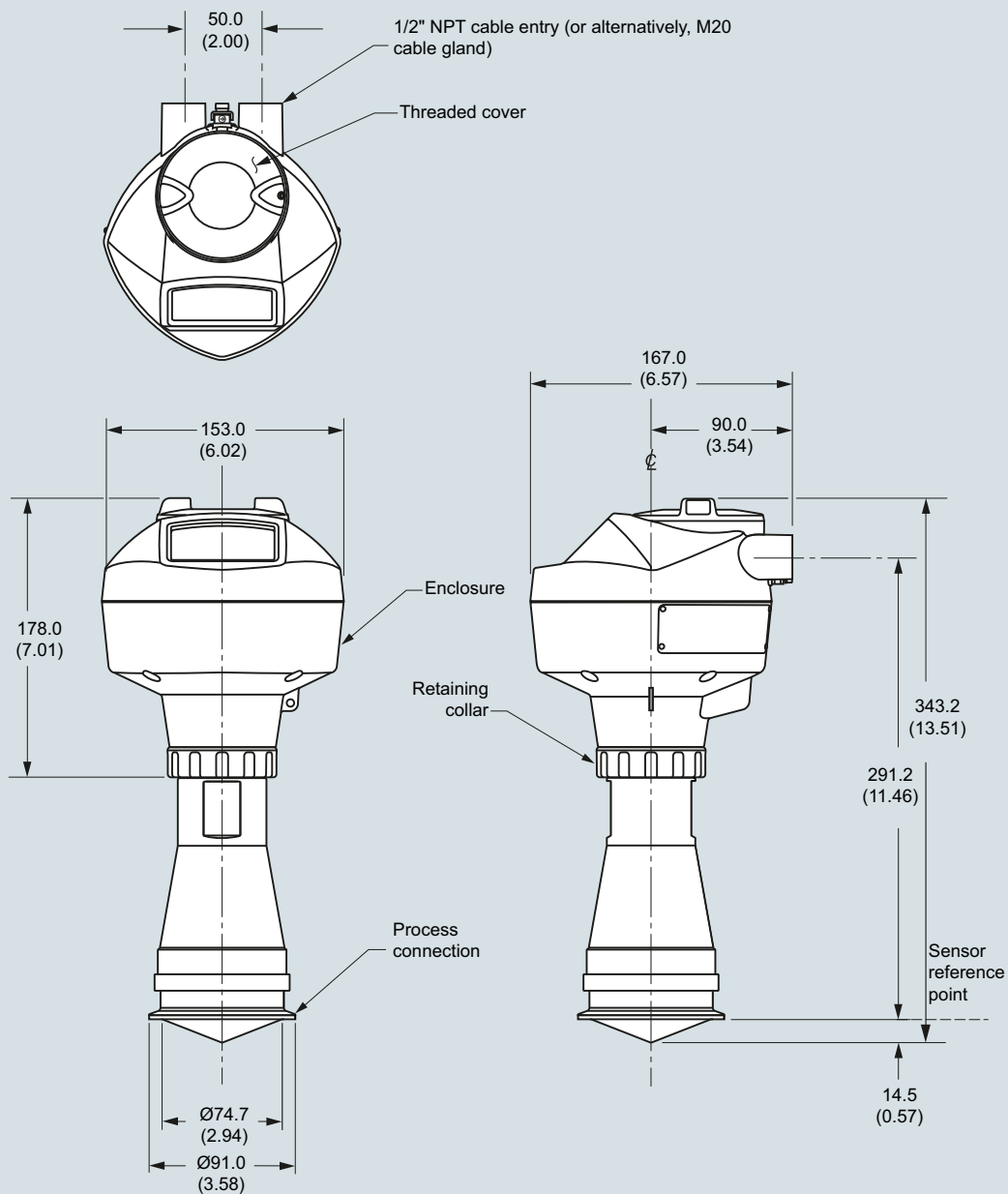
Level Measurement

Continuous level measurement

Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

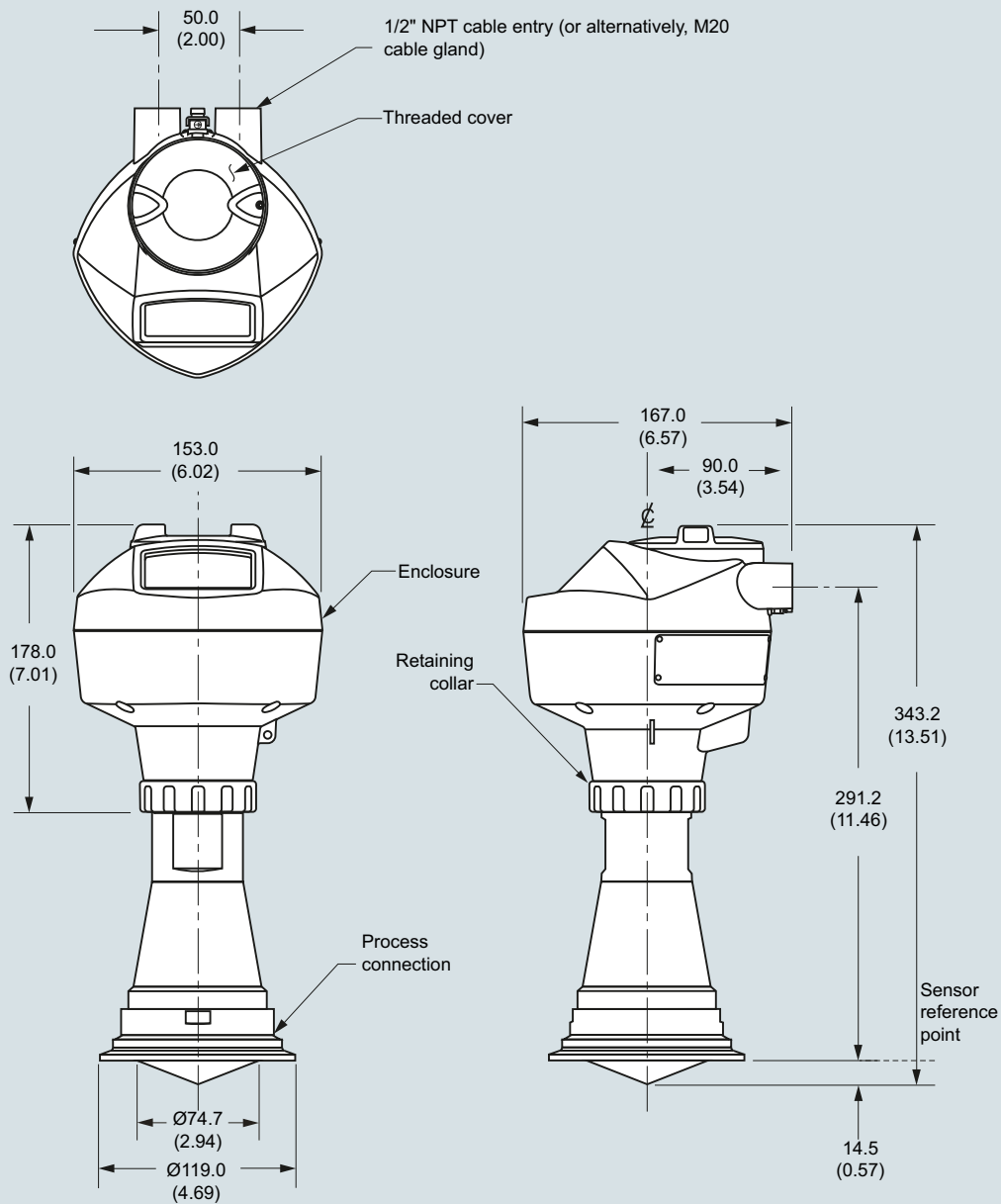
Hygienic encapsulated antenna (3" ISO 2852 sanitary clamp)



SITRANS LR250 Hygienic Encapsulated Antenna (3" ISO 2852 sanitary clamp), dimensions in mm (inch)

SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (4" ISO 2852 sanitary clamp)



SITRANS LR250 Hygienic Encapsulated Antenna (4" ISO 2852 sanitary clamp), dimensions in mm (inch)

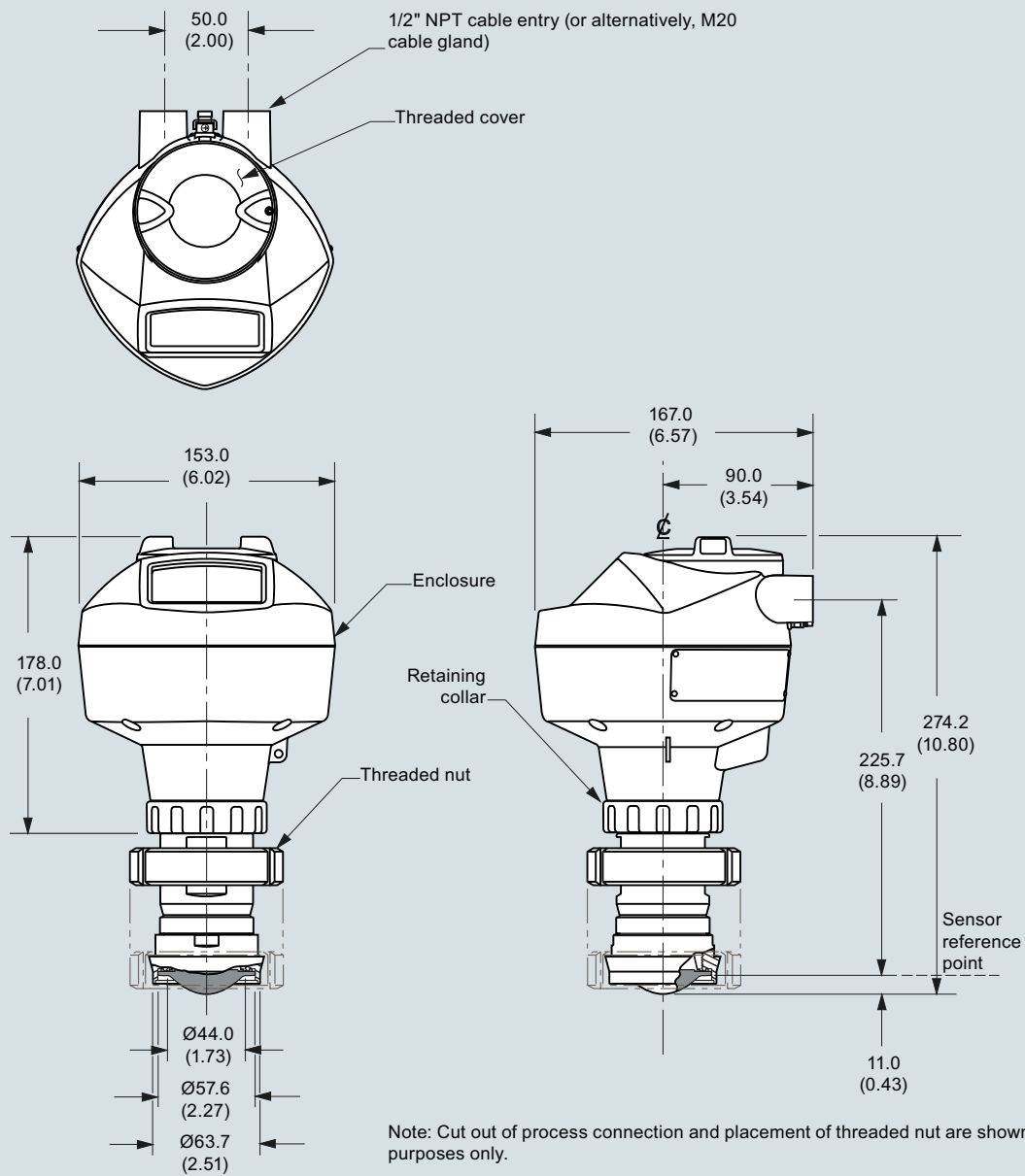
Level Measurement

Continuous level measurement

Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

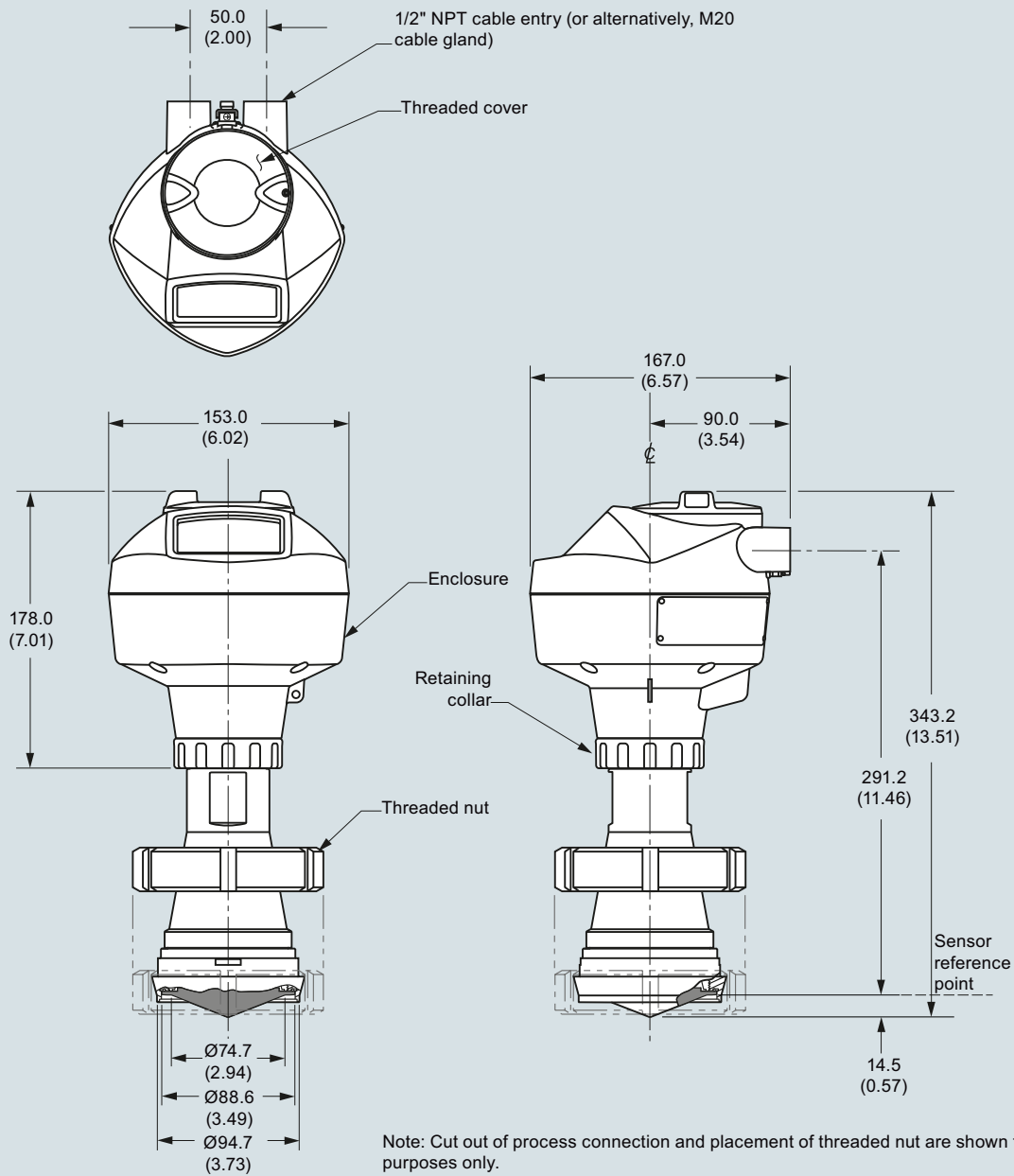
Hygienic encapsulated antenna (DN 50 nozzle/slotted nut to DIN 11851)



SITRANS LR250 Hygienic Encapsulated Antenna (DN 50 nozzle/slotted nut to DIN 11851), dimensions in mm (inch)

SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (DN 80 nozzle/slotted nut to DIN 11851)



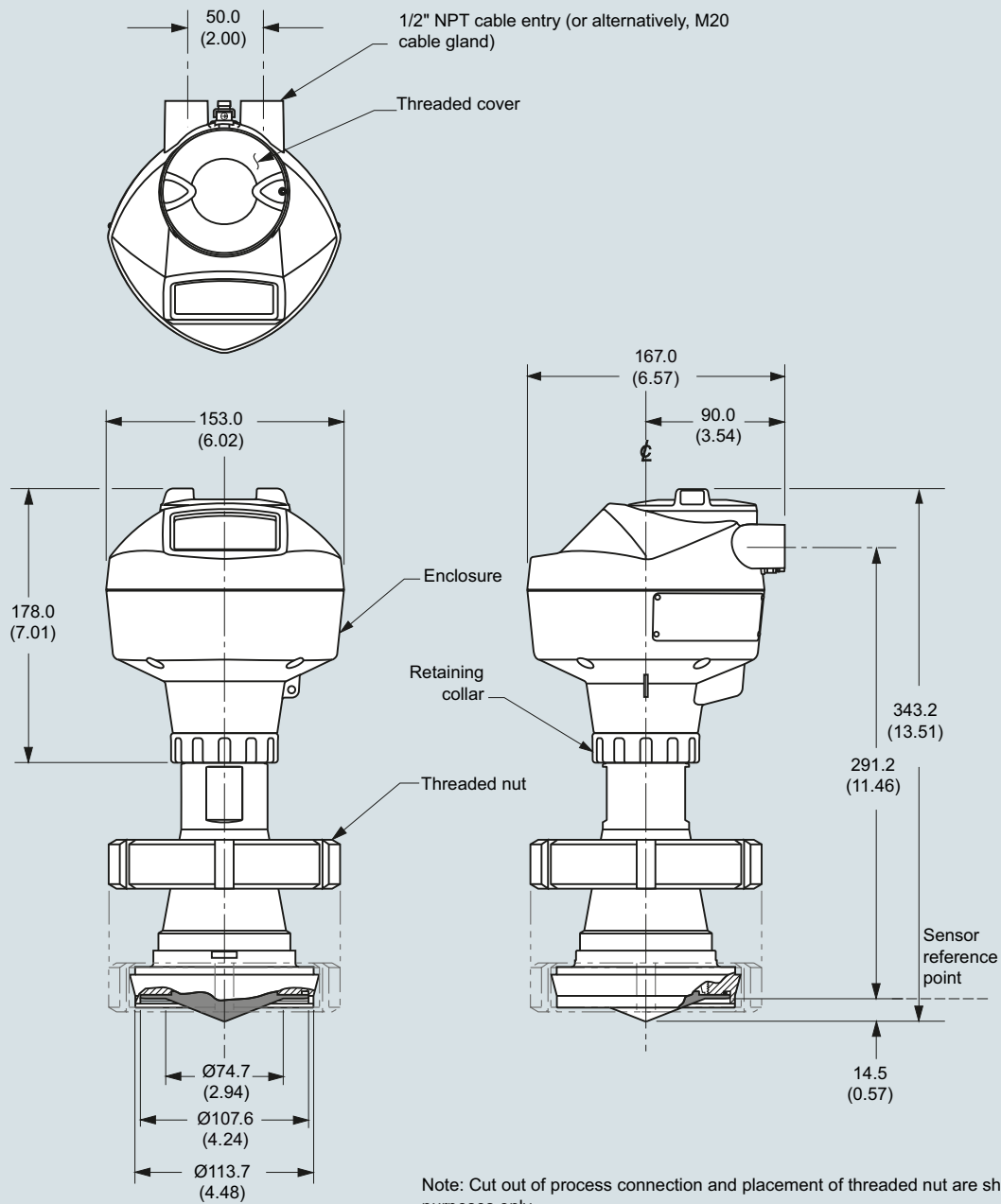
SITRANS LR250 Hygienic Encapsulated Antenna (DN 80 nozzle/slotted nut to DIN 11851), dimensions in mm (inch)

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

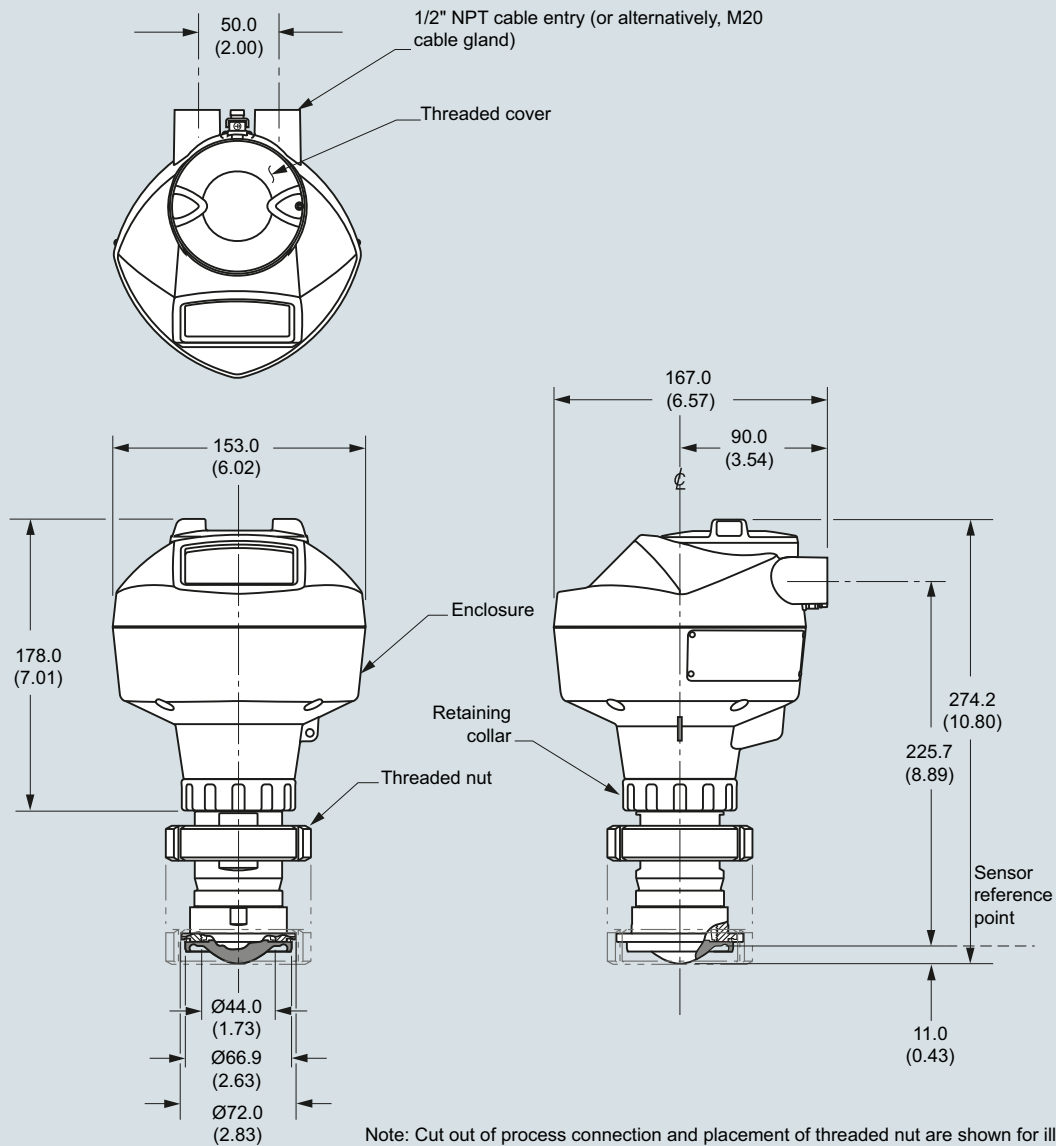
Hygienic encapsulated antenna (DN 100 nozzle/slotted nut to DIN 11851)



SITRANS LR250 Hygienic Encapsulated Antenna (DN 100 nozzle/slotted nut to DIN 11851), dimensions in mm (inch)

SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (DN 50 aseptic clamp to DIN 11864-1)



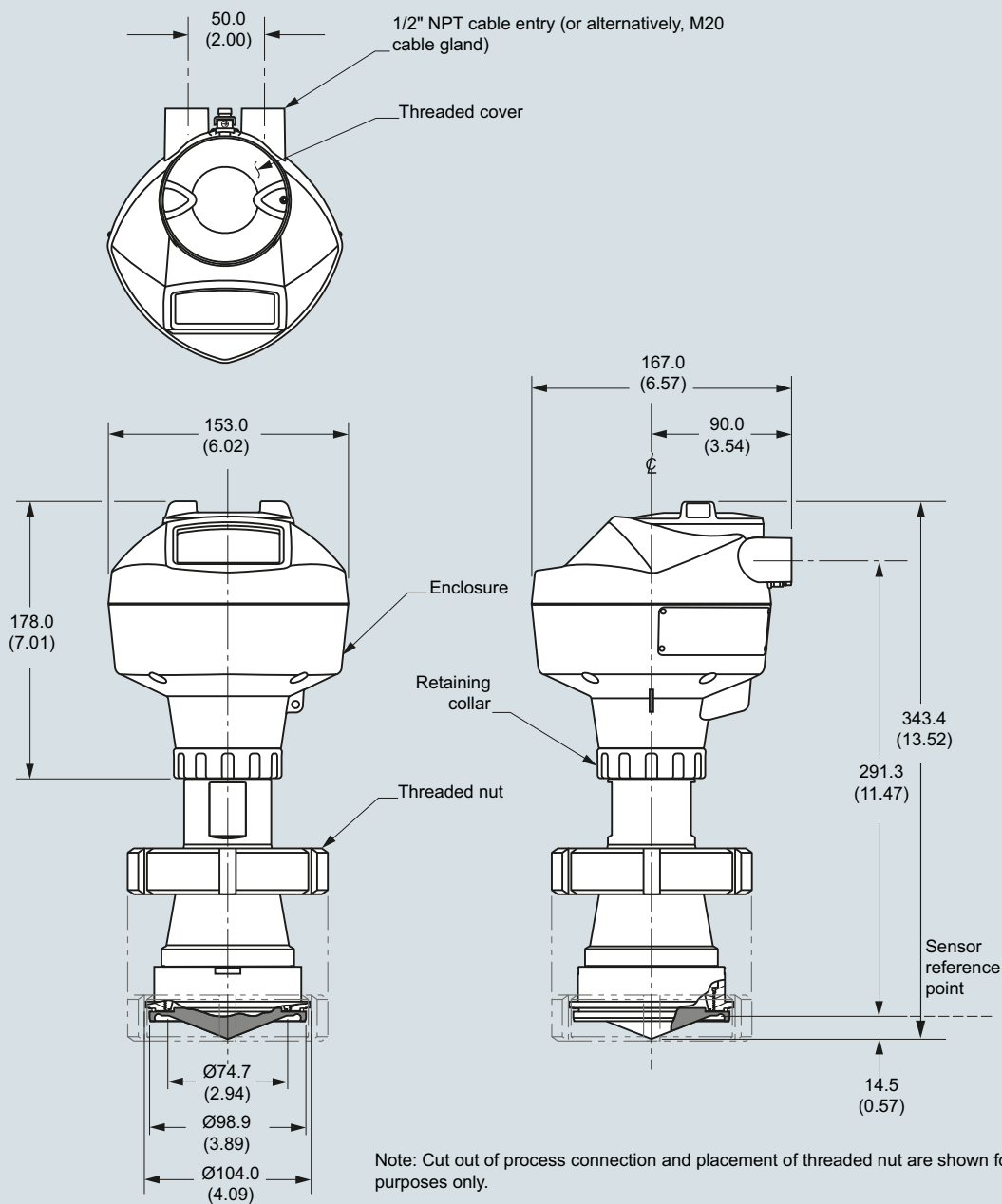
SITRANS LR250 Hygienic Encapsulated Antenna (DN 50 aseptic clamp to DIN 11864-1), dimensions in mm (inch)

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

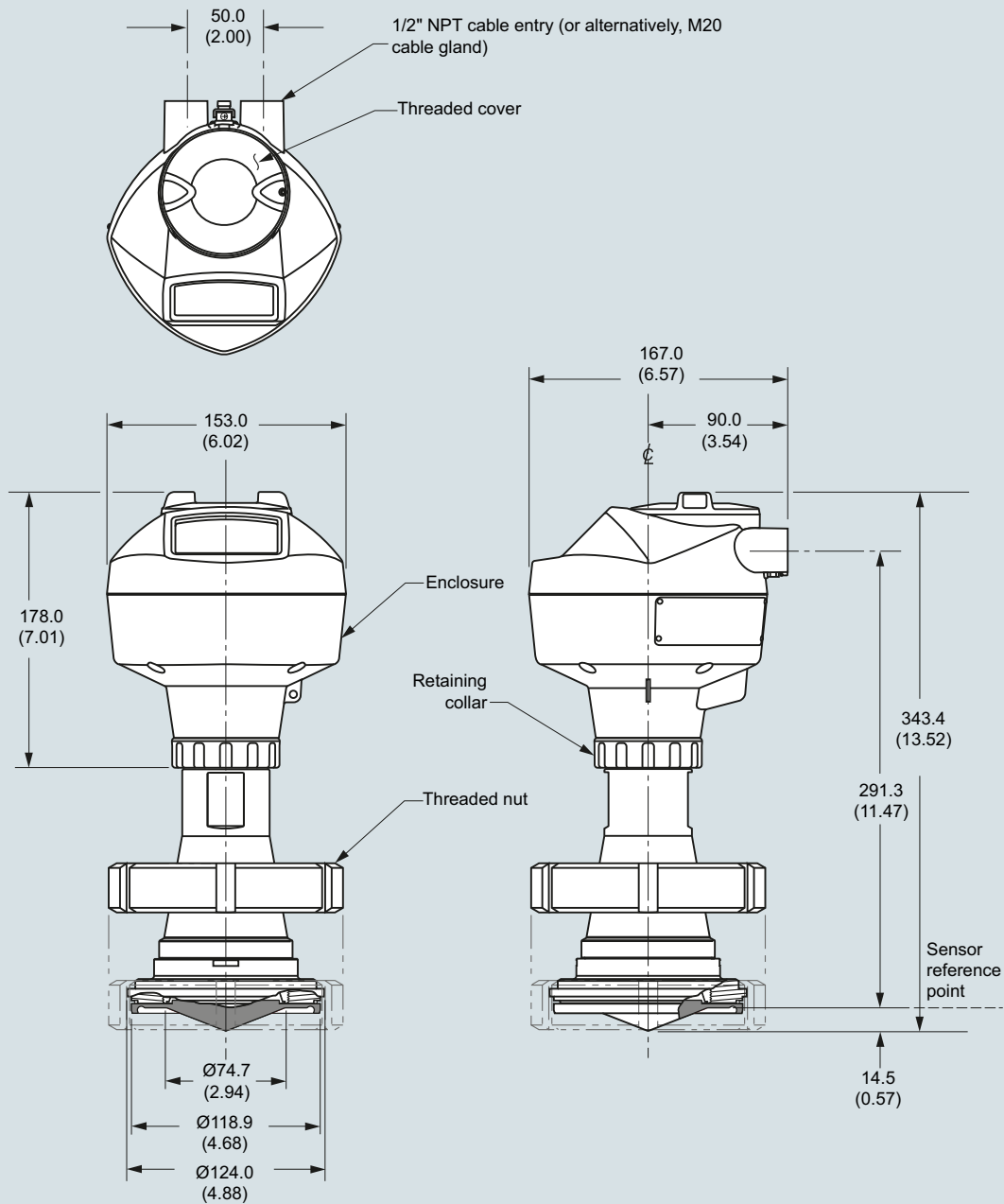
Hygienic encapsulated antenna (DN 80 aseptic clamp to DIN 11864-1)



SITRANS LR250 Hygienic Encapsulated Antenna (DN 80 aseptic clamp to DIN 11864-1), dimensions in mm (inch)

SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (DN 100 aseptic clamp to DIN 11864-1)



Note: Cut out of process connection and placement of threaded nut are shown for illustration purposes only.

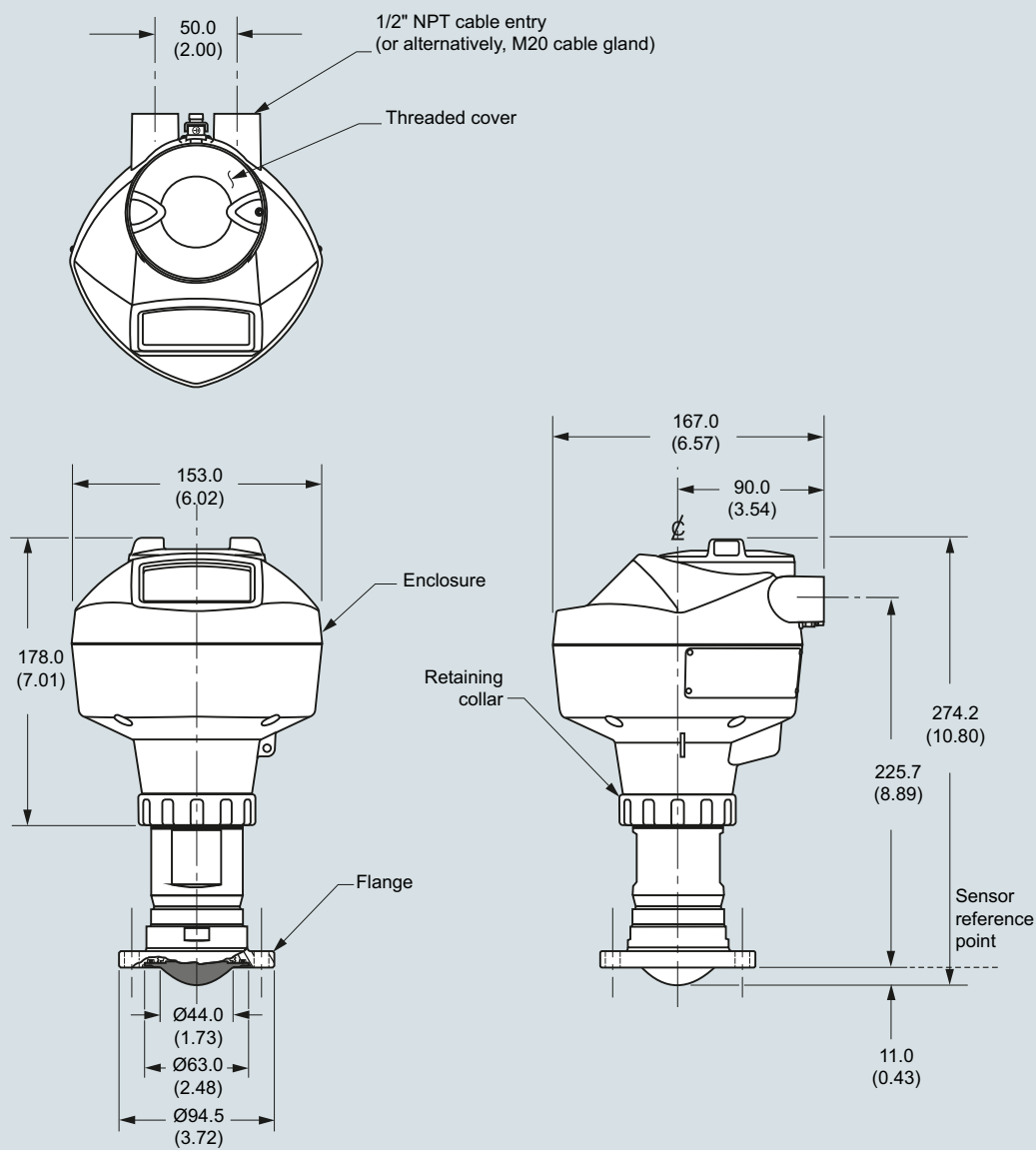
SITRANS LR250 Hygienic Encapsulated Antenna (DN 100 aseptic clamp to DIN 11864-1), dimensions in mm (inch)

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

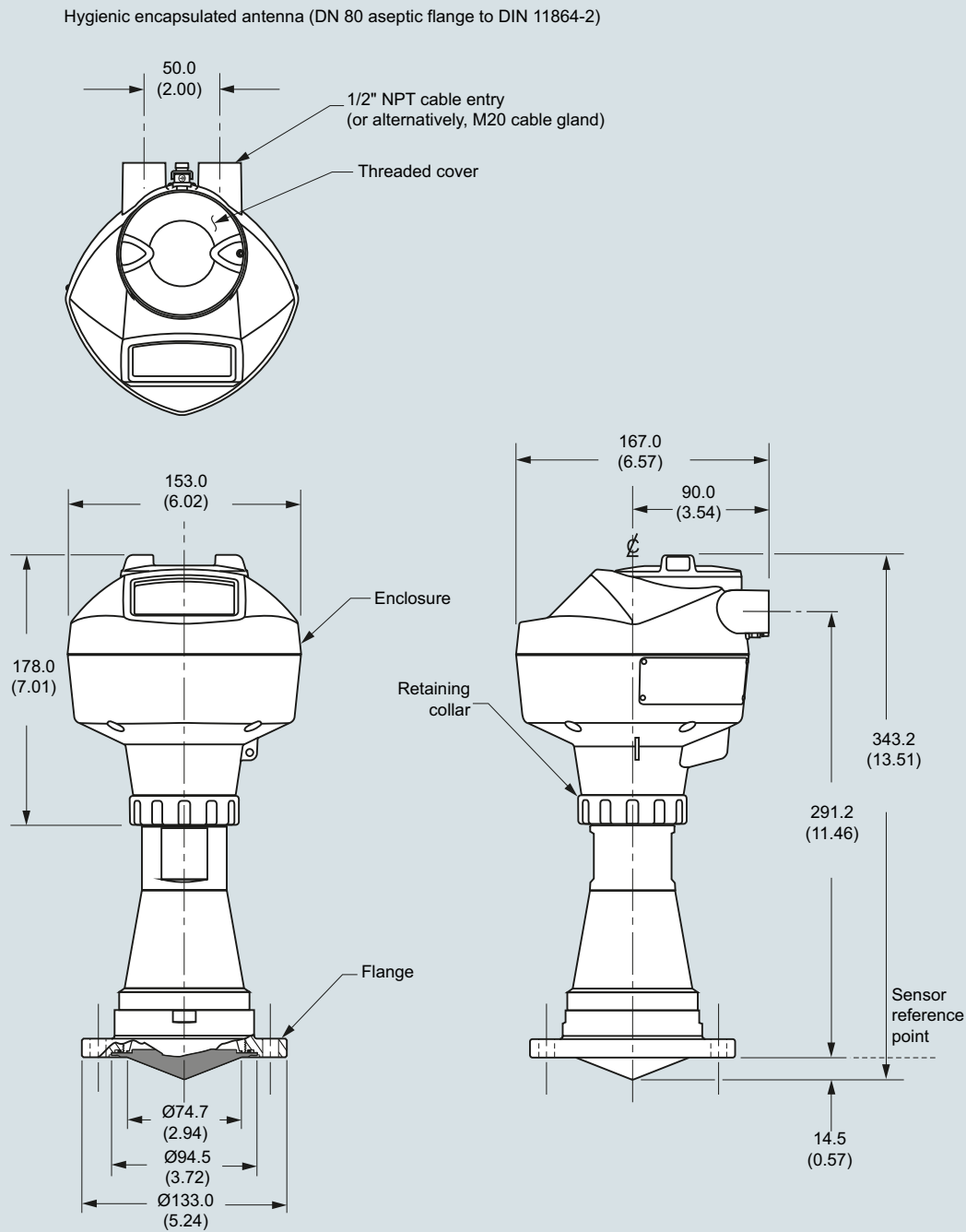
Hygienic encapsulated antenna (DN 50 aseptic flange to DIN 11864-2)



Note: Cut out of process connection and flange are shown for illustration purposes only.

SITRANS LR250 Hygienic Encapsulated Antenna (DN 50 aseptic flange to DIN 11864-2), dimensions in mm (inch)

SITRANS LR250 Hygienic Encapsulated Antenna



SITRANS LR250 Hygienic Encapsulated Antenna (DN 80 aseptic flange to DIN 11864-2), dimensions in mm (inch)

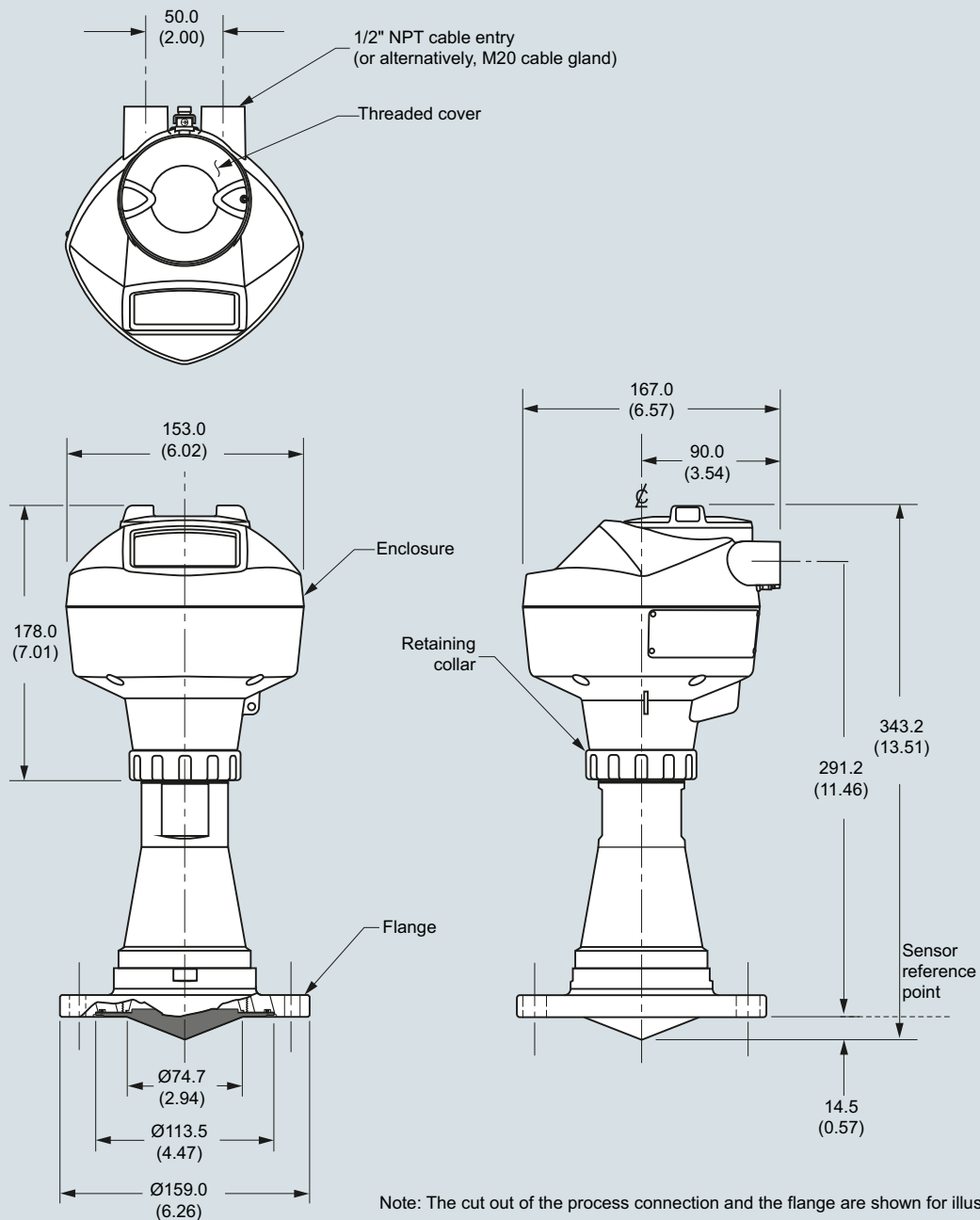
Level Measurement

Continuous level measurement

Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

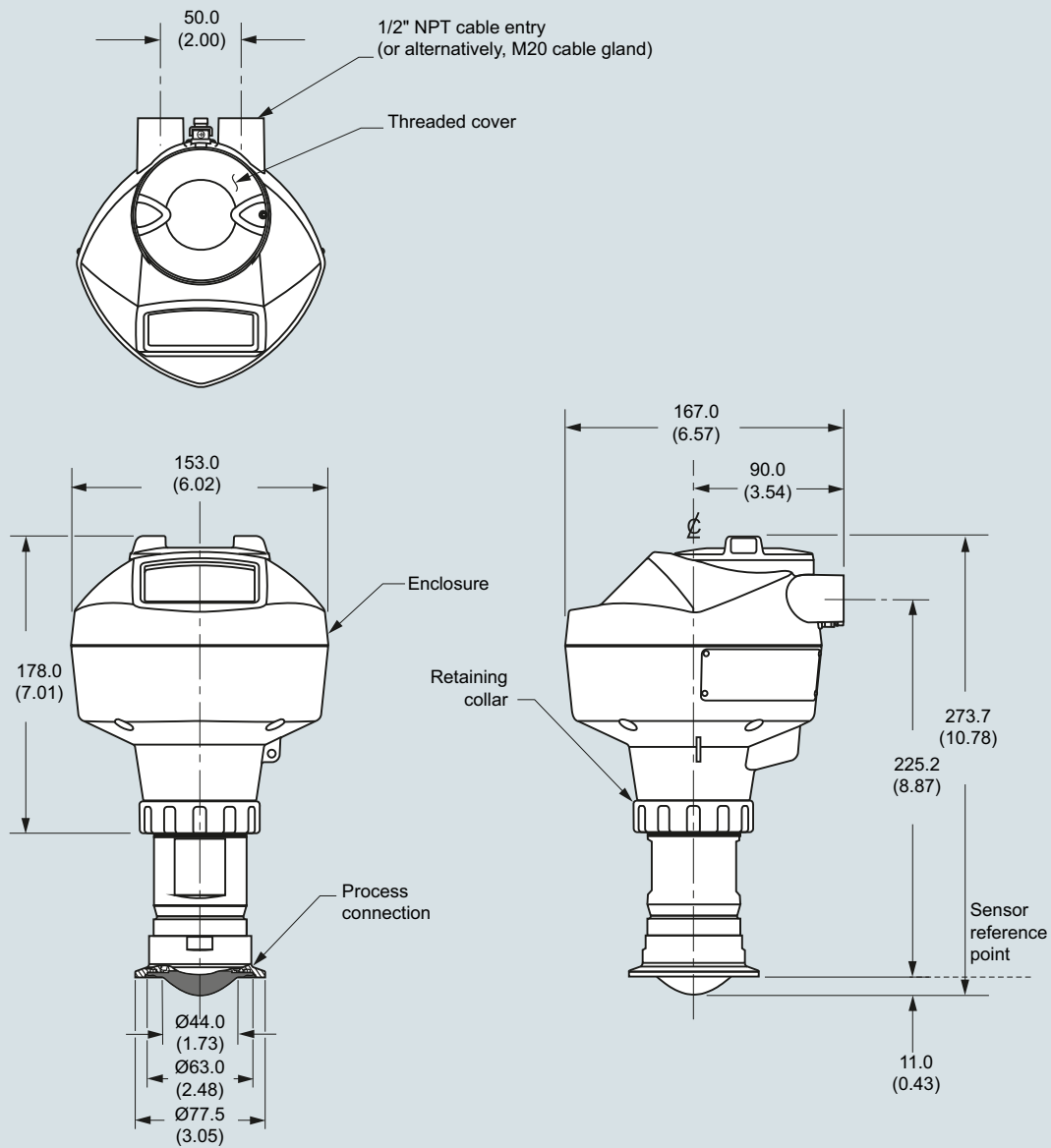
Hygienic encapsulated antenna (DN 100 aseptic flange to DIN 11864-2)



SITRANS LR250 Hygienic Encapsulated Antenna (DN 100 aseptic flange to DIN 11864-2), dimensions in mm (inch)

SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (DN 50 aseptic clamp to DIN 11864-3)



Note: Cut out of process connection is shown for illustration purposes only.

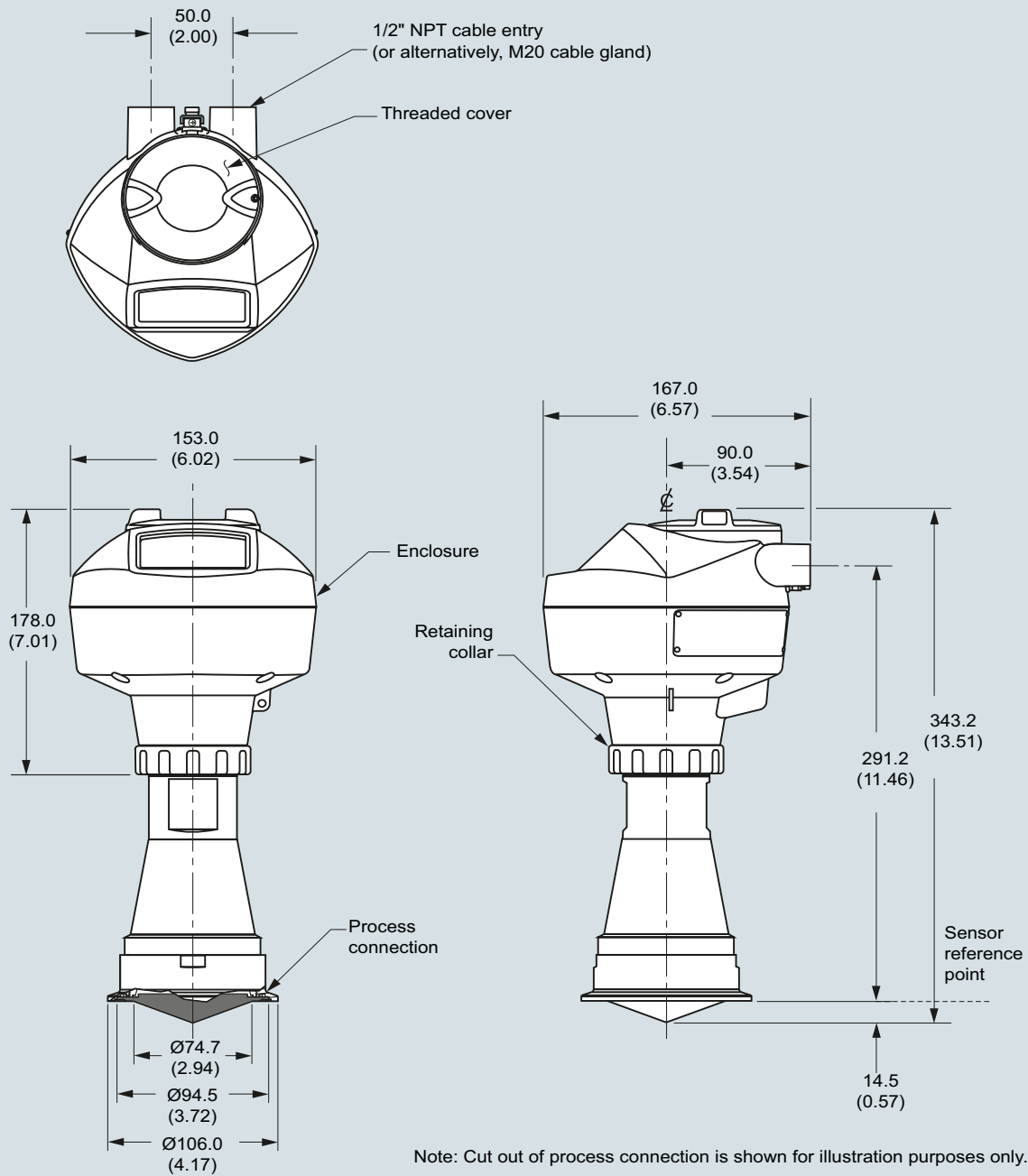
SITRANS LR250 Hygienic Encapsulated Antenna (DN 50 aseptic clamp to DIN 11864-3), dimensions in mm (inch)

Level Measurement

Continuous level measurement
Radar transmitters

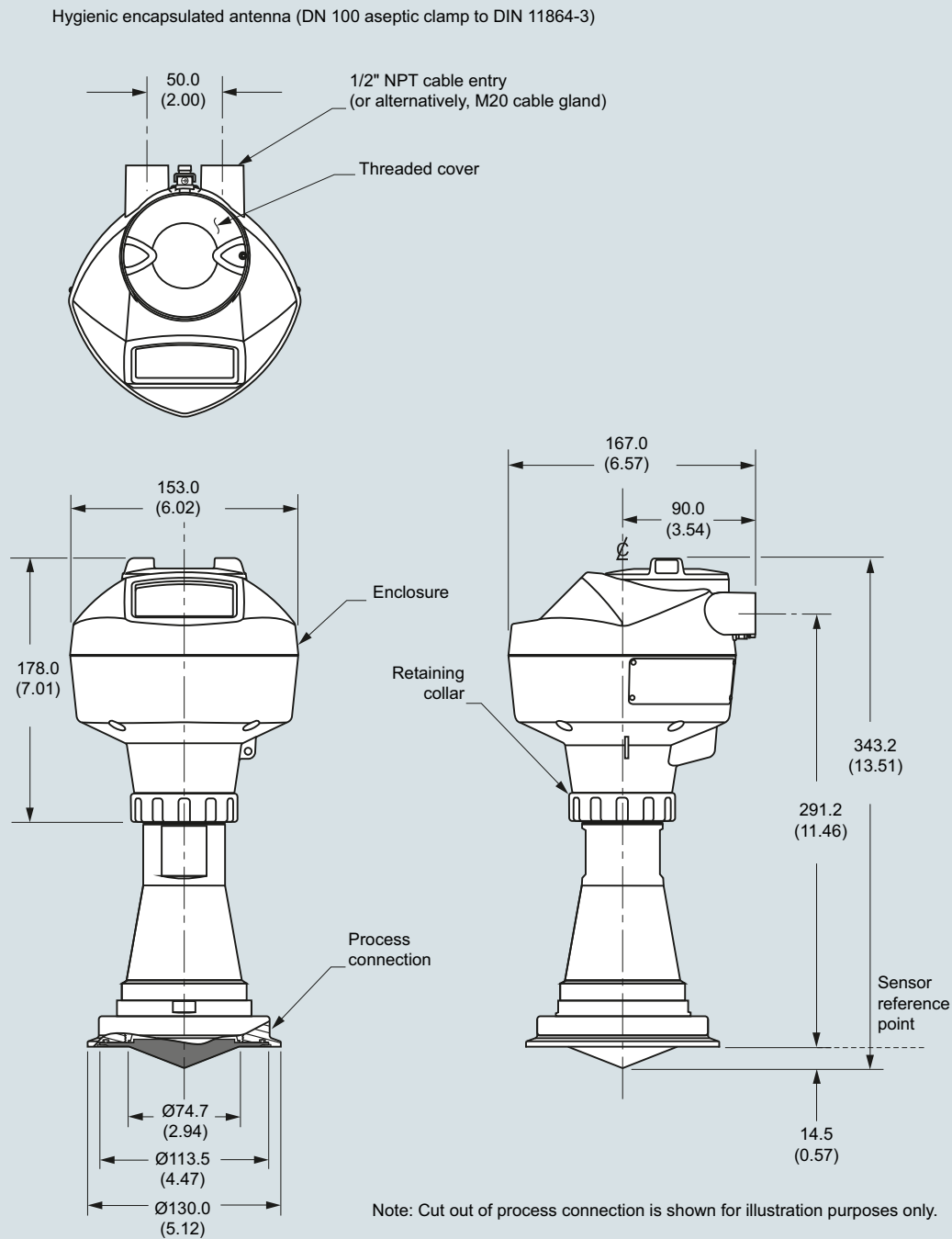
SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (DN 80 aseptic clamp to DIN 11864-3)



SITRANS LR250 Hygienic Encapsulated Antenna (DN 80 aseptic clamp to DIN 11864-3), dimensions in mm (inch)

SITRANS LR250 Hygienic Encapsulated Antenna



SITRANS LR250 Hygienic Encapsulated Antenna (DN 100 aseptic clamp to DIN 11864-3), dimensions in mm (inch)

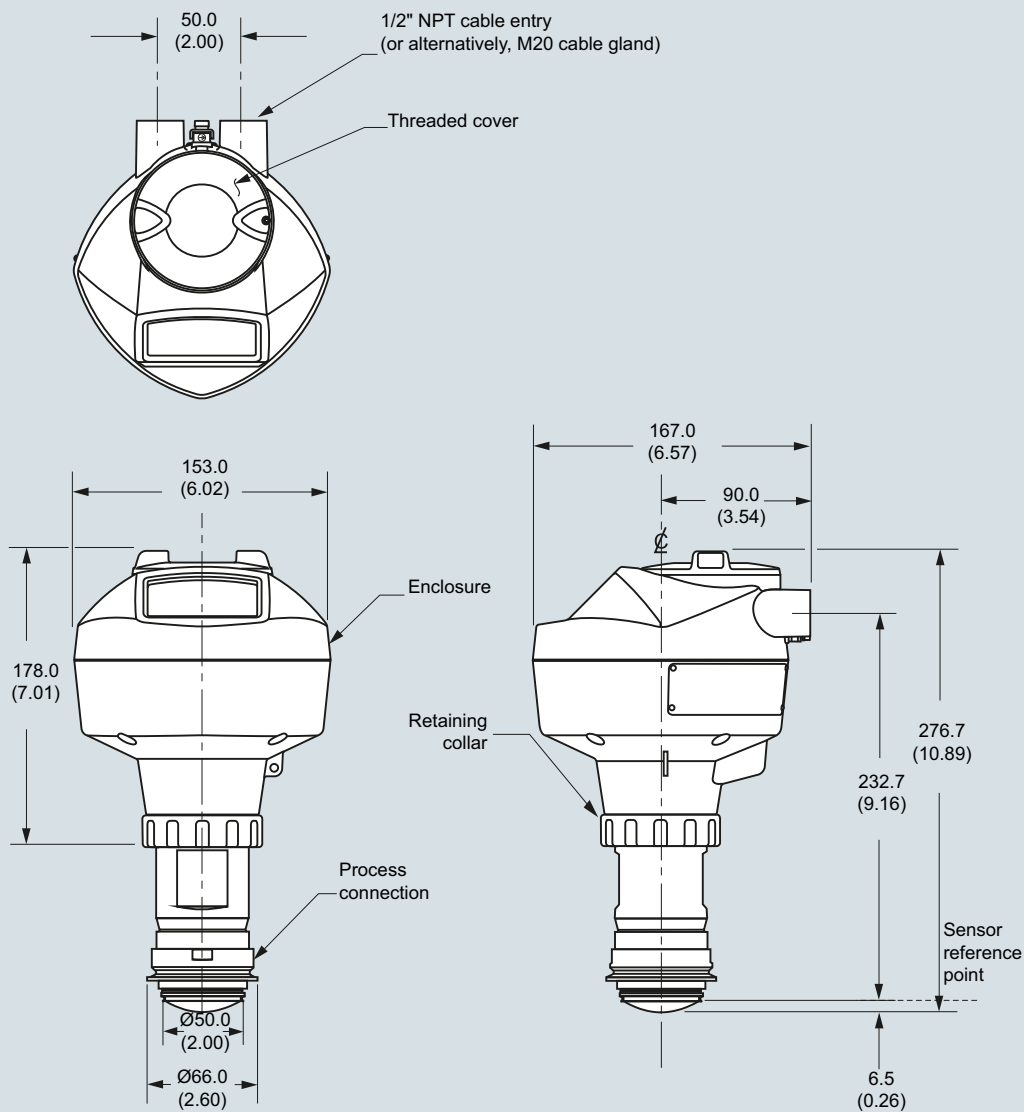
Level Measurement

Continuous level measurement

Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

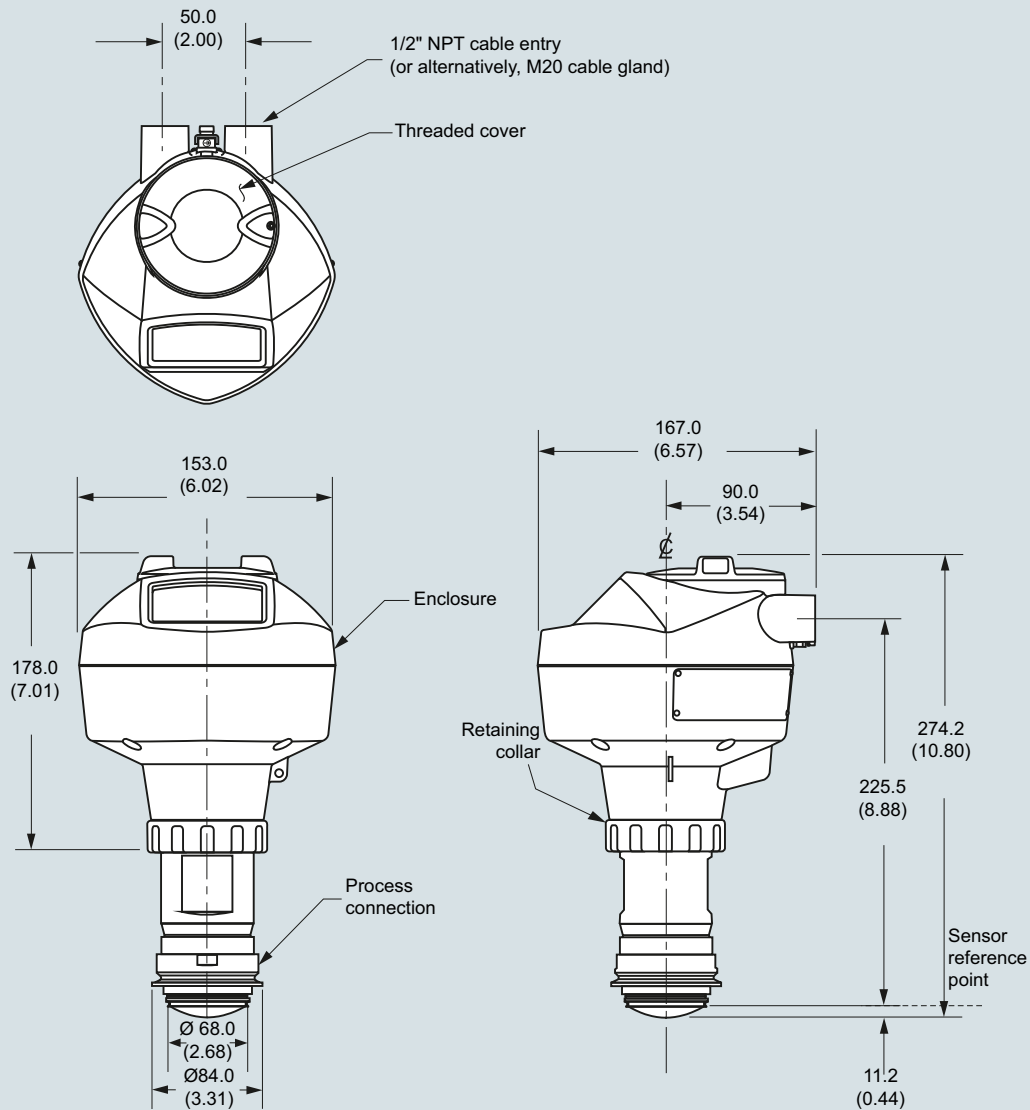
Hygienic encapsulated antenna (Tuchenhagen Type F, 50 mm)



SITRANS LR250 Hygienic Encapsulated Antenna (Tuchenhagen Type F), dimensions in mm (inch)

SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (Tuchenhagen Type N, 68 mm)



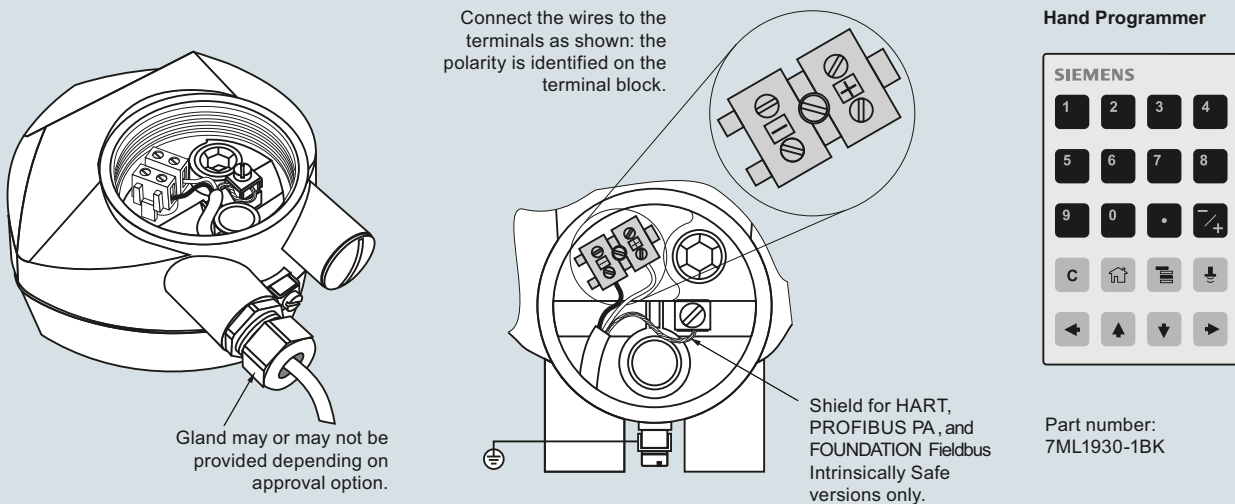
SITRANS LR250 Hygienic Encapsulated Antenna (Tuchenhagen Type N), dimensions in mm (inch)

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Circuit diagrams



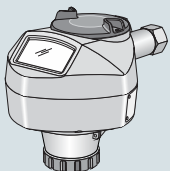
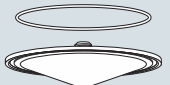
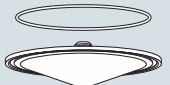
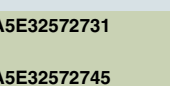
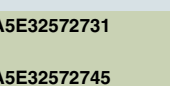
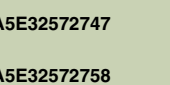
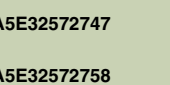
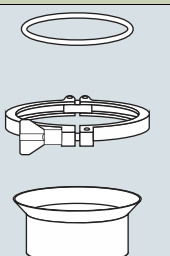
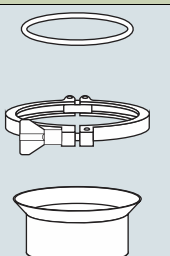
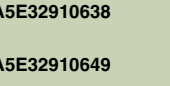
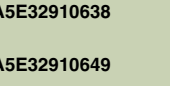
Notes:

1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR250 connections

SITRANS LR250 Hygienic Encapsulated Specials

Selection and ordering data

SITRANS LR250 Hygienic Encapsulated Specials		SITRANS LR250 Hygienic Encapsulated Specials	
	Article No.		Article No.
NOTE: LR260 head can be supplied with any LR250 process connection or antenna as special order. For LR250, this means a stronger signal and longer measurement range is possible. For "Electronics Head only" follow the standard configuration and choose YY option on positions 9 and 10 of the full part number. For example: 7ML5433-1YY20-1AA0 will order an electronics head for the following: EHEDG EL Class 1 approval, 4 ... 20 mA HART, M20 cable entries, General purpose Haz Loc approval, pressure rating as per manual.		Kit, DN80 DIN11864-1 GS Form A tank connection, FKM Seal Class I	A5E32910671
		Kit, DN100 DIN11864-1 GS Form A tank connection, FKM Seal Class I	A5E32910681
Spare Lens Kits (Lens and O-ring) 		Kit 2" ISO2852 tank connection, Clamp, Cleanable EPDM Seal Class II	A5E32910686
		Kit 3" ISO2852 tank connection, Clamp, Cleanable EPDM Seal Class II	A5E32910697
		Kit 4" ISO2852 tank connection, Clamp, Cleanable EPDM Seal Class II	A5E32910708
		Kit 2" ISO2852 tank connection, Clamp, Cleanable FKM Seal	A5E32910718
		Kit 3" ISO2852 tank connection, Clamp, Cleanable FKM Seal	A5E32910723
		Kit 4" ISO2852 tank connection, Clamp, Cleanable FKM Seal	A5E32910734
Kit, 2 inch, ISO 2852, HEA, Lens, silicone secondary O-ring	A5E32572731	Kit DN50 DIN11851 SC Tank connection, EPDM Seal Class II ¹⁾	A5E32910746
Kit, 3 inch, ISO 2852, HEA, Lens, silicone secondary O-ring	A5E32572745	Kit DN80 DIN11851 SC Tank connection, EPDM Seal Class II ¹⁾	A5E32910771
Kit, 4 inch, ISO 2852, HEA, Lens, silicone secondary O-ring	A5E32572747	Kit DN100 DIN11851 SC Tank connection, EPDM Seal Class II ¹⁾	A5E32910780
Kit, DN 50, DIN 11851, HEA, Lens, silicone secondary O-ring	A5E32572758	Kit DN50 DIN11851 SC Tank connection, FKM Seal Class II	A5E32910784
Kit, DN 80, DIN 11851, HEA, Lens, silicone secondary O-ring	A5E32572770	Kit DN80 DIN11851 SC Tank connection, FKM Seal Class II	A5E32910789
Kit, DN 100, DIN 11851, HEA, Lens, silicone secondary O-ring	A5E32572772	Kit DN100 DIN11851 SC Tank connection, FKM Seal Class II	A5E32910790
Kit, DN 50, DIN 11864-1, HEA, Lens, silicone secondary O-ring	A5E32572773	Kit DN50 DIN11864-2 Form A tank connection, M8 Hardware (nut/bolt/washer), EPDM Seal Class II	A5E32910791
Kit, DN 80, DIN 11864-1, HEA, Lens, silicone secondary O-ring	A5E32572779	Kit DN80 DIN11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), EPDM Seal Class II	A5E32910793
Kit, DN 100, DIN 11864-1, HEA, Lens, silicone secondary O-ring	A5E32572782	Kit DN100 DIN11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), EPDM Seal Class II	A5E32910799
Kit, DN 50, DIN 11864-2/3, HEA, Lens, silicone secondary O-ring	A5E32572785	Kit DN50 DIN11864-2 Form A tank connection, M8 Hardware (nut/bolt/washer), FKM Seal Class I	A5E32910805
Kit, DN 80, DIN 11864-2/3, HEA, Lens, silicone secondary O-ring	A5E32572790	Kit DN80 DIN11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), FKM Seal Class I	A5E32910809
Kit, DN 100, DIN11864-2/3, HEA, Lens, silicone secondary O-ring	A5E32572791	Kit DN100 DIN11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), FKM Seal Class I	A5E32910812
Kit, Tuchenhausen, Type F, HEA, Lens, silicone secondary O-ring	A5E32572794	Kit DN50 DIN11864-3 Form A tank connection, Clamp, EPDM Seal Class II	A5E32910813
Kit, Tuchenhausen, Type N, HEA, Lens, silicone secondary O-ring	A5E32572795	Kit DN80 DIN11864-3 Form A tank connection, Clamp, EPDM Seal Class II	A5E32910814
Accessories (customer side process connection and FKM and EPDM seal for each size and type) 		Kit DN100 DIN11864-3 Form A tank connection, Clamp, EPDM Seal Class II	A5E32910815
		Kit DN50 DIN11864-3 Form A tank connection, Clamp, FKM Seal Class I	A5E32910816
		Kit DN80 DIN11864-3 Form A tank connection, Clamp, FKM Seal Class I	A5E32910817
Kit DN50 DIN11864-1 GS Form A tank connection, EPDM Seal Class II	A5E32910638		
Kit, DN80 DIN11864-1 GS Form A tank connection, EPDM Seal Class II	A5E32910649		
Kit, DN100 DIN11864-1 GS Form A tank connection, EPDM Seal Class II	A5E32910657		
Kit DN50 DIN11864-1 GS Form A tank connection, FKM Seal Class I	A5E32910658		

Level Measurement

Continuous level measurement

Radar transmitters

SITRANS LR250 Hygienic Encapsulated Specials

SITRANS LR250 Hygienic Encapsulated Specials	
	Article No.
Kit DN100 DIN11864-3 Form A tank connection, Clamp, FKM Seal Class I	A5E32910818
Kit Type F, Tuchenhausen, Clamp, EPDM Seal Class II (EHEDG only) - no tank connection	A5E33489537
Kit Type N, Tuchenhausen, Clamp, EPDM Seal Class II (EHEDG only) - no tank connection	A5E33489543
Kit Type F, Tuchenhausen, Clamp, FKM Seal Class I (EHEDG only) - no tank connection	A5E33489828
Kit Type N, Tuchenhausen, Clamp, FKM Seal Class I (EHEDG only) - no tank connection	A5E33489830
Ex-proof plugs	
Ex-proof plugs kit, 1/2" NPT, qty 5	A5E39979991
Ex-proof plugs kit, M20, qty 5	A5E39979992

¹⁾ Class II for low fat applications when EPDM seal used on DIN11851

Overview



SITRANS LR260 is a 2-wire 25 GHz pulse radar level transmitter for continuous monitoring of solids and liquids in storage vessels including extreme levels of dust and high temperatures, to a range of 30 m (98.4 ft).

Benefits

- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency allows for small horn antennas mounted easily in nozzles
- Communication using HART or PROFIBUS PA
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or SIMATIC PDM

Application

SITRANS LR260 includes a graphical local user interface (LUI) that improves setup and operation using an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.

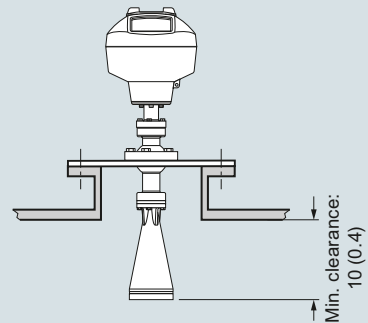
SITRANS LR260's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR260 measures virtually any solids material to a range of 30 m (98.4 ft).

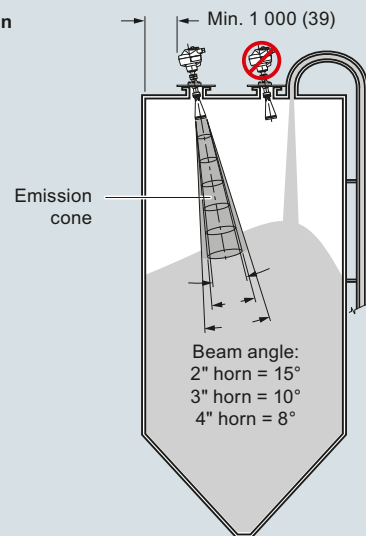
- Key Applications: cement powder, plastic powder/pellets, grain, flour, coal, solids and liquids bulk storage vessels, and other applications

Configuration

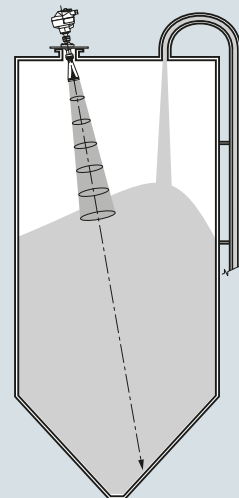
Mounting on a nozzle



Installation



Positioning with easy Aimer



SITRANS LR260 installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Radar transmitters

SITRANS LR260

Technical specifications

Mode of operation		Design	
Measuring principle	Pulse radar level measurement	Enclosure	Aluminum, polyester powder-coated
Frequency	K-band (25.0 GHz)	• Construction	2 x M20 x 1.5 or 2 x 1/2" NPT
Minimum detectable distance	0.05 m (2 inch) from end of horn	• Conduit entry	Type 4X/NEMA 4X, Type 6/ NEMA 6, IP67, IP68
Maximum measuring range ¹⁾		Degree of protection	
Solids	<ul style="list-style-type: none"> • 2" horn: 10 m (32.8 ft) • 3" horn: 20 m (65.6 ft) • 4" horn: 30 m (98.4 ft) 	Weight	< 8.14 kg (17.9 lb) including 4" flange and standard Easy Aimer with 4" horn antenna
Liquids	<ul style="list-style-type: none"> • 2" horn: 20 m (65.6 ft) • 3" horn: 30 m (98.4 ft) • 4" horn: 30 m (98.4 ft) 	Display (local)	Graphic LCD, with bar graph representing level
Output - HART		Flange and horn (easy aimer model)	
Power	4 ... 20 mA (± 0.02 mA accuracy)	• Material	304 stainless steel
Fail signal	Nominal 24 V DC (max. 30 V DC)	• Horn antenna	2" horn 3" horn 4" horn
Load	3.6 mA ... 23 mA; or last value 230 ... 600 Ω	Process connections	
Output - PROFIBUS PA		• Universal flanges ²⁾	2 inch/50 mm, 3 inch/80 mm, 4 inch/100 mm, 6 inch/150 mm
	<ul style="list-style-type: none"> • Per IEC 61158-2 • 15.0 mA • Profile version 3.01, Class B 	Mechanical (Threaded Connection model)	
Performance (according to reference conditions IEC60770-1)		• Threaded connection	2" NPT (ASME B1.20.1), R (BSPT, EN 10226-1), or G (BSPP, EN ISO 228-1) 316L/1.4404 or 316L/1.4435 stainless steel PTFE emitter
Maximum measured error (including hysteresis and non-repeatability)	<ul style="list-style-type: none"> • 25 mm (1 inch) from minimum detectable distance to 300 mm (11.8 inch) • Remainder of range = 6 mm (0.23 inch) or 0.05 % of spa (whichever is greater) 	• Materials	
Rated operating conditions		Certificates and approvals	
Installation conditions		General	CSA _{US/C} , CE, FM
Location	Indoor/outdoor	Radio	Europe (RED), FCC, Industry Canada, RCM
Ambient conditions (enclosure)		Hazardous	CSA/FM Class II, Div. 1, Groups E, F, G, Class III ATEX II 1D, 1/2D, 2D Ex ta IIIC T100 °C Da IECEx/ATEX II 1 GD Ex ia IIC T4 Ga, Ex ta IIIC T100 °C Da CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G SABS ARP0108 Ex ia IIC T4 Ga
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)	Programming	
• Installation category	I	Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Pollution degree	4	• Approvals for handheld programmer	IS model: ATEX II 1GD Ex ia IIC T4 GaEx iaD 20 T135 °C Ta = -20 ... +50 °C CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G, T6 Ta = 50 °C
Medium conditions		Handheld communicator	HART communicator 375
Dielectric constant ϵ_r	$\epsilon_r > 1.6$, antenna and application dependent	PC	SIMATIC PDM
Process temperature	-40 ... +200 °C (-40 ... +392 °F)	Display (local)	Graphic local user interface including quick start wizard and echo profile displays
Process pressure	<ul style="list-style-type: none"> • 0.5 bar g (7.25 psi g) maximum • 3 bar g (43.5 psi g) optional with 80 °C (176 °F) temperature max 		

¹⁾ From sensor reference point

²⁾ Universal flange mates with EN 1092-1 (PN 16)/ASME B16.5 (150 lb)/JIS 2220 (10K) bolt hole pattern

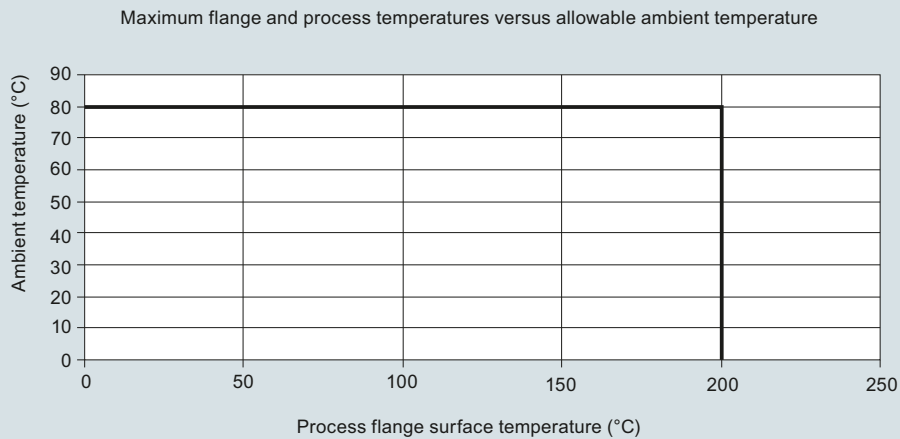
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Level Measurement

Continuous level measurement
Radar transmitters

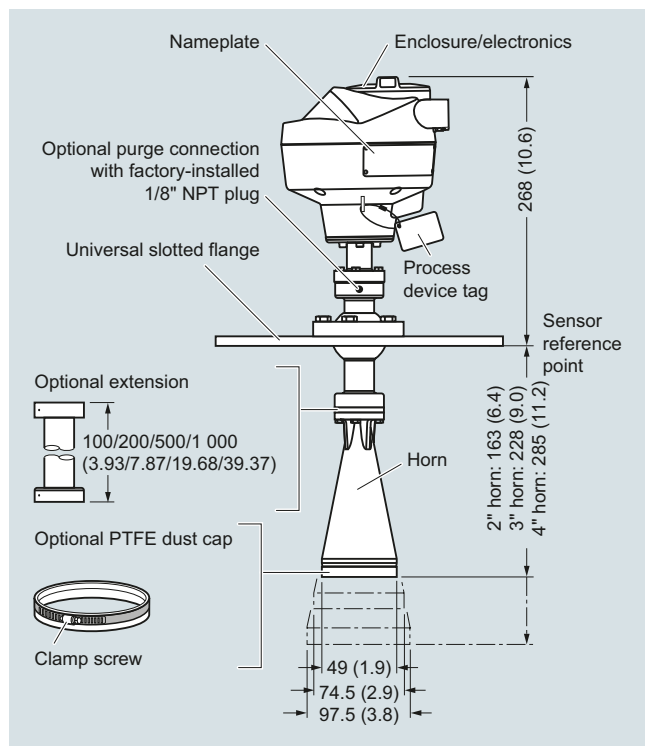
SITRANS LR260

Characteristic curves

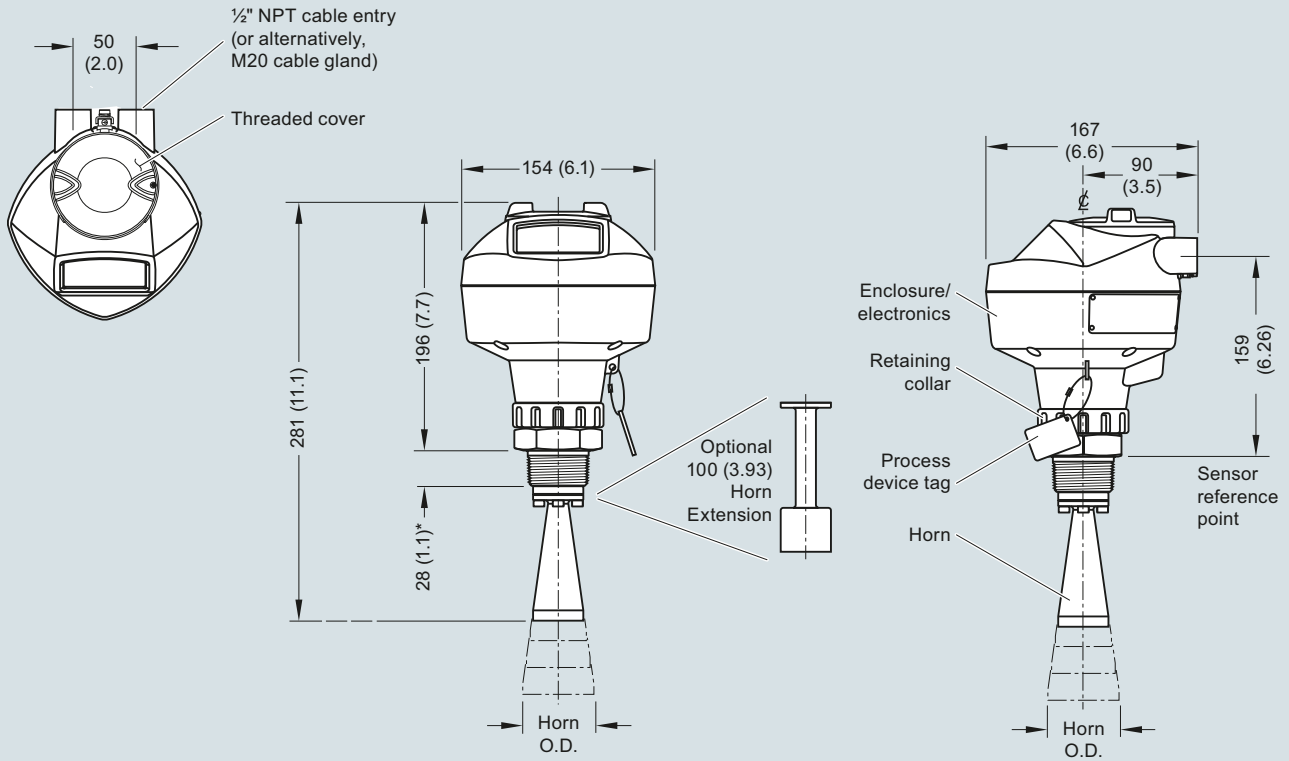


SITRANS LR260 ambient/process flange surface temperature curve

Dimensional drawings



SITRANS LR260, dimensions in mm (inch)

SITRANS LR260

Antenna Type	Antenna O.D.	Height to sensor reference point			Beam angle	Measurement range
		1-1/2" threaded connection	2" threaded connection	3" threaded connection		
2" horn	47.8 (1.88)	N/A	166 (6.55)	180 (7.09)	15 degrees	20 m (65.6 ft)
3" horn	74.8 (2.94)	N/A	199 (7.85)	213 (8.39)	10 degrees	30 m (98.4 ft)
4" horn	94.8 (3.73)	N/A	254 (10)	268 (10.55)	8 degrees	30 m (98.4 ft)

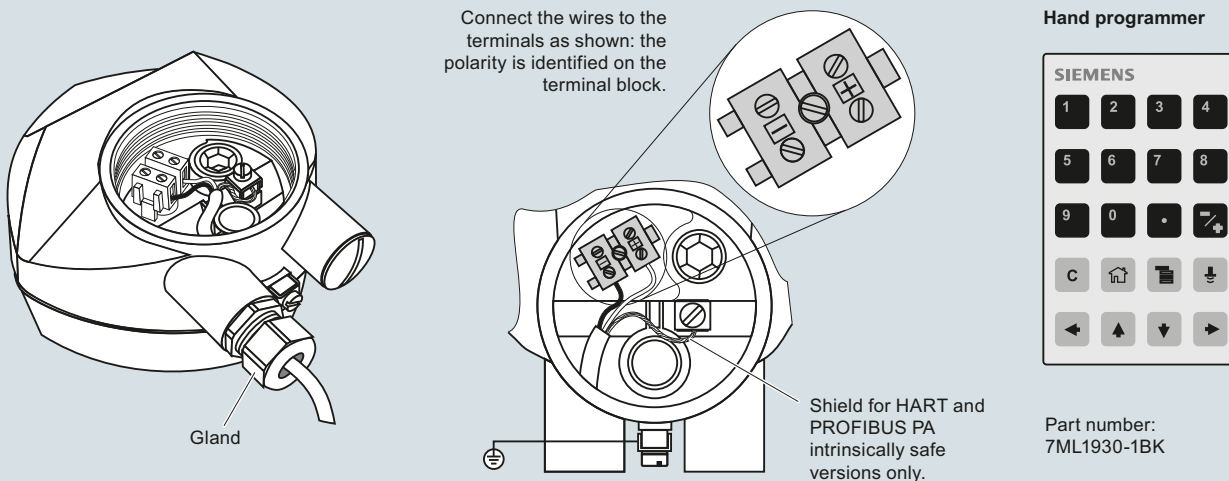
SITRANS LR260, dimensions in mm (inch)

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS LR260

Circuit diagrams



Notes:

1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR260 connections

Overview



The SITRANS LR460 is a 4-wire, 24 GHz FMCW radar level transmitter with extremely high signal-to-noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft). It is ideal for measurement in extreme dust and high temperature.

Benefits

- Process Intelligence for advanced signal processing and quick and easy adjustment
- Self-guided quick start wizard for plug and play startup
- 24 GHz provides superior reflective properties on solids surfaces
- 100 m (328 ft) range for long-range and difficult applications
- Easy Aimer optimizes signal quality on sloped surfaces
- Programming using infrared Intrinsically Safe handheld programmer or with SIMATIC PDM or HART handheld device

Application

SITRANS LR460 provides excellent results even during conditions of extreme dust. The integral Easy Aimer included on the SITRANS LR460 allows for easy positioning for optimum measurement on solids.

Process Intelligence onboard SITRANS LR460 means advanced signal processing is harnessed for reliable operation on both simple and difficult solids application.

SITRANS LR460 features a robust enclosure, flange and horn components. It is virtually unaffected by atmospheric or temperature conditions within the vessel.

An optional dust cap is available for sticky solids. Optional air purging is also available for extremely sticky applications.

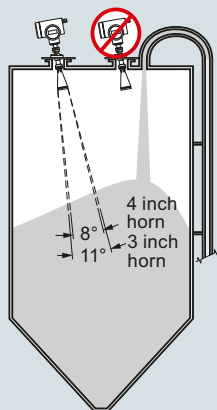
Safe on-site local programming is simple using the Intrinsically Safe handheld programmer. SIMATIC PDM can be used for easy remote programming using HART or PROFIBUS PA.

The characteristics of 24 GHz and high signal-to-noise ratio contribute to exceptional signal reflection, regardless of the dielectric value of the medium.

- Key Applications: long-range dusty applications, cement powder, fly-ash, coal, flour, grain, plastics

Configuration

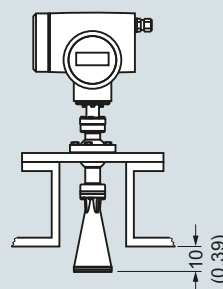
Beam angle



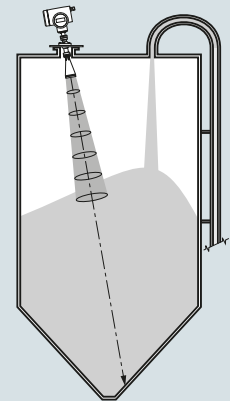
Note: For best signal, always use largest horn size possible.

Mounting unit on vessel

Installation in mounting nozzle



Positioning with Easy Aimer



SITRANS LR460 installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Radar transmitters

SITRANS LR460

Technical specifications

Mode of operation		Programming	
Measuring principle	FMCW radar level measurement	Intrinsically Safe Siemens handheld programmer (ordered separately)	Infrared receiver
Frequency	24.2 ... 25.2 GHz FMCW	• Approvals for handheld programmer	IS model: ATEX II 1G EEx ia IIC T4, CSA/FM Class I, Div. 1, Groups A, B, C, D T6 at max. ambient temperature of 40 °C (104 °F)
Measuring range	0.35 ... 100 m (1.15 ... 328.08 ft)		
Output		Handheld communicator	HART Communicator 375
Analog output (HART)		PC	SIMATIC PDM
• Signal range	Optically isolated	Display (local)	Alphanumeric LCD for readout and entry
• Load	Max. 600 Ω		
• Fail-safe	mA signal programmable as high, low or hold (LOE)		
Communication	HART, optional PROFIBUS PA		
Digital output	Relay, NC or NO function, max. 50 V DC, max. 200 mA, rating 5 W	Power supply	100 ... 230 V AC ± 15 % (50/60 Hz), 6 W (12 VA) or 24 V DC +25/-20 %, 6 W (optional)
PROFIBUS PA protocol	Layer 1 and 2, Class A, Profile 3.01		
Performance (Reference conditions according to IEC 60770-1)		Certificates and approvals	
Non-linearity	Greater of 25 mm (1 inch) or 0.25 % of span (including hysteresis and non-repeatability), over the full ambient temperature range	General	CSA _{US/C} , CE, FM, RCM
Non-repeatability	≤ 10 mm (0.4 inch)	Radio	European Radio (RED), Industry Canada, FCC, RCM
Rated operating conditions		Hazardous Areas	CSA/FM Class II, Div. 1, Groups E, F, and G, Class III ATEX II 1D, 1/2 D, 2D T85 °C INMETRO ExtD A20 IP67 T85 °C EAC Ex DIP A20 T _a 85 °C IP67
Amb. temperature for enclosure	-40 ... +65 °C (-40 ... +149 °F)		
Location	Indoor/outdoor	Optional equipment	
Installation category	II	Dust cap	PTFE
Pollution degree	4	Air purge connection	1/8" NPT
Medium conditions			
Dielectric constant	ε _r > 1.4		
Process temperature range	-40 ... +200 °C (-40 ... +392 °F)		
Vessel pressure	0.5 bar g (7.25 psi g) maximum		
Design			
Weight	Approx. 6.1 kg (13.4 lb) with 3 inch universal flange		
Materials			
• Enclosure	Die-cast aluminum, painted		
• Degree of protection	IP67/Type 4X/NEMA 4X/Type 6/NEMA 6		
• Cable inlet	2 x M20 x 1.5 or ½" NPT		
Process connections			
• Universal flanges, 304 stainless steel, flat faced, with integral Easy Aimer	3 inch/80 mm, 4 inch/100 mm, 6 inch/150 mm (mates with flange EN 1092-1, ASME B16.5, or JIS B2238 bolt pattern), 0.5 bar g (7.25 psi g) max. pressure		

¹⁾ Product shipped with plastic cable gland, rated to -20 °C.
If -40 °C rating required, then metallic cable gland is recommended.

Level Measurement

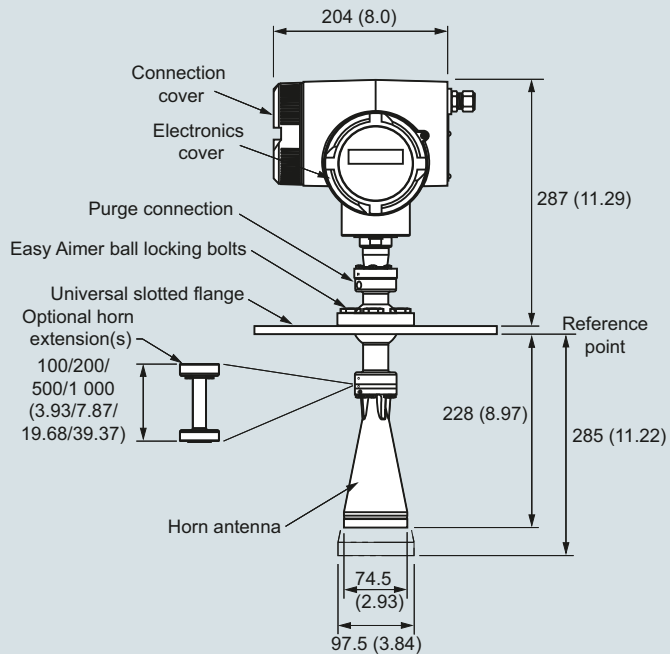
Continuous level measurement

Radar transmitters

SITRANS LR460

Dimensional drawings

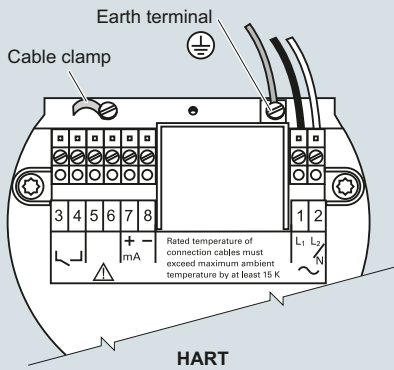
SITRANS LR460 (7ML5426)



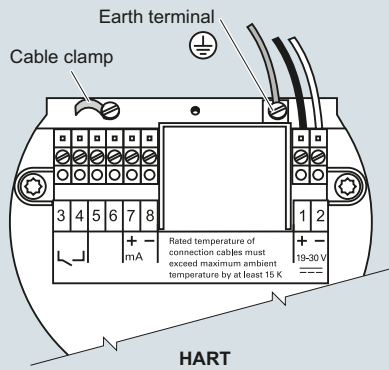
SITRANS LR460, dimensions in mm (inch)

Circuit diagrams

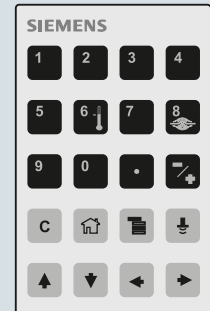
AC version



DC version

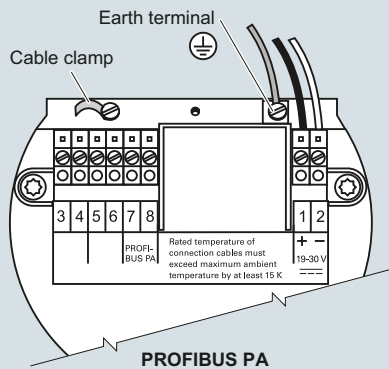
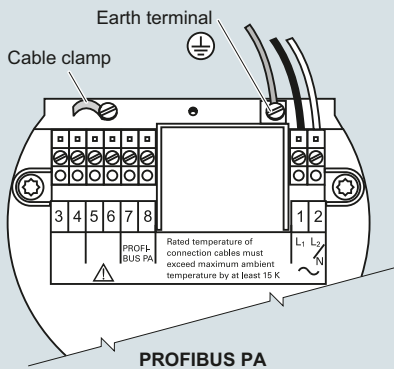


Hand programmer



SITRANS LR460

Part number:
7ML5830-2AJ



Notes

- Recommended torque on terminal clamping screws, 0.5 ... 0.6 Nm
- 4 ... 20 mA, PROFIBUS PA, DC input circuits, 14 ... 20 AWG, shielded copper wire
- AC input circuit, min. 14 AWG copper wire
- All field wiring must have insulation suitable for at least 250 V
- The equipment must be protected by a 15 A fuse or circuit breaker in the building installation

SITRANS LR460 connections

Level Measurement

Continuous level measurement
Radar transmitters

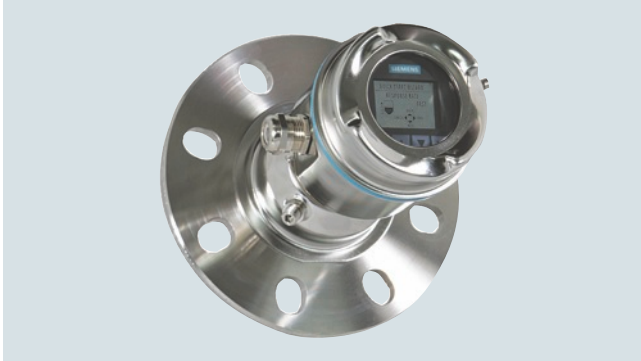
SITRANS LR260/LR460 Specials

Selection and ordering data

SITRANS LR260/LR460 Specials		Article No.
NOTE: LR260 head can be supplied with any LR250 process connection or antenna as special order. For LR250, this means a stronger signal and longer measurement range is possible.		
Process connection part kits - non-pressure-rated		
SITRANS LR260/LR460, 100 mm extension for horn antenna, no purge ¹⁾		A5E01087872
SITRANS LR260/LR460, 200 mm extension for horn antenna, no purge ¹⁾		A5E01091262
SITRANS LR260/LR460, 100 mm extension for horn antenna with purge ¹⁾		A5E01261979
SITRANS LR260/LR460, 200 mm extension for horn antenna with purge ¹⁾		A5E01261981
SITRANS LR260/LR460, horn 2", no purge, no emitter ¹⁾		A5E02083905
SITRANS LR260/LR460, horn 3", no purge, no emitter ¹⁾		A5E01623511
SITRANS LR260/LR460, horn 4", no purge, no emitter ¹⁾		A5E01623512
SITRANS LR260/LR460, horn 2", with purge, no emitter ¹⁾		A5E02083906
SITRANS LR260/LR460, horn 3", with purge, no emitter ¹⁾		A5E01623513
SITRANS LR260/LR460, horn 4", with purge, no emitter ¹⁾		A5E01623514
SITRANS LR260/LR460, 3" universal flat faced flange ¹⁾		A5E02303897
SITRANS LR260/LR460, 4" universal flat faced flange ¹⁾		A5E01259467
SITRANS LR260/LR460, 6" universal flat faced flange ¹⁾		A5E01261834
SITRANS LR260/LR460 O-rings for Easy Aimer ¹⁾		A5E01261836
Kit, Emitter for LR260/LR460 ¹⁾		A5E02360694
SITRANS LR260 lid with O-ring		A5E02465410
Purge conversion kit – non-pressure-rated (no flange or extension included)		
SITRANS LR260/LR460 purge conversion, 2" horn ¹⁾		A5E02083914
SITRANS LR260/LR460 purge conversion, 3" horn ¹⁾		A5E02083915
SITRANS LR260/LR460 purge conversion, 4" horn ¹⁾		A5E02083916
Enclosure with electronics (LR260)		
		
SITRANS LR260 enclosure with board stack, HART communication, M20 cable inlet, approval option A, no process connection		A5E02203605
SITRANS LR260 enclosure with board stack, PROFIBUS PA communication, M20 cable inlet, approval option A, no process connection		A5E02213423
SITRANS LR260 enclosure with board stack, HART communication, NPT cable inlet, approval option A, no process connection		A5E02165924
SITRANS LR260/LR460 Specials		Article No.
SITRANS LR260 enclosure with board stack, PROFIBUS PA communication, NPT cable inlet, approval option A, no process connection		A5E02213428
SITRANS LR260 enclosure with board stack, HART communication, NPT cable inlet, approval option D, no process connection		A5E03934184
SITRANS LR260 enclosure with board stack, HART communication, M20 cable inlet, approval option E, no process connection		A5E03934187
SITRANS LR260 enclosure with board stack, HART communication, M20 cable inlet, approval option F, no process connection		A5E03934191
SITRANS LR260 enclosure with board stack, PROFIBUS PA communication, M20 cable inlet, approval option E, no process connection		A5E37217558
SITRANS LR260 enclosure with board stack, PROFIBUS PA communication, M20 cable inlet, approval option E, no process connection		A5E31820689
Sun shield for SITRANS LR260 enclosure, stainless steel		
		
		A5E39142556
Enclosure with electronics (LR460)		
		
SITRANS LR460 enclosure with board stack, HART communication, AC power, M20 cable inlet, approval option A, no process connection		A5E02182085
SITRANS LR460 enclosure with board stack, PROFIBUS PA communication, AC power, M20 cable inlet, approval option A, no process connection		A5E02212422
SITRANS LR460 enclosure with board stack, HART communication, AC power, NPT cable inlet, approval option A, no process connection		A5E02212423
SITRANS LR460 enclosure with board stack, PROFIBUS PA communication, AC power, NPT cable inlet, approval option A, no process connection		A5E02212424
SITRANS LR460 enclosure with board stack, HART communication, DC power, M20 cable inlet, approval option A, no process connection		A5E02212425
SITRANS LR460 enclosure with board stack, PROFIBUS PA communication, DC power, M20 cable inlet, approval option A, no process connection		A5E02212426
SITRANS LR460 enclosure with board stack, HART communication, DC power, NPT cable inlet, approval option A, no process connection		A5E02212428
SITRANS LR460 enclosure with board stack, PROFIBUS PA communication, DC power, NPT cable inlet, approval option A, no process connection		A5E02212429

¹⁾ Available with no pressure rating, 0.5 bar g maximum.
Customers interested in a custom designed device should consult a local sales person. For more information, please visit <http://www.usa.siemens.com/level>.

Overview



SITRANS LR560 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids and liquids to a range of 100 m (328 ft).

Benefits

- Rugged stainless steel design for industrial applications
- 78 GHz high frequency provides very narrow beam, virtually no mounting nozzle noise, and optimal reflection from sloped solids
- Aimer option to direct beam to area of interest, such as draw point of cone
- Lens antenna is highly resistant to product buildup
- Air purge connection is included for self-cleaning of extremely sticky solids
- Local display interface (LDI) allows local programming and diagnostics

Application

SITRANS LR560's plug and play performance is ideal for most solids applications and long range liquid applications, including those with extreme dust and high temperatures to 200 °C (392 °F). Unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR560 includes an optional graphical local display interface (LDI) that improves setup and operation using an intuitive Quick Start Wizard, and echo profile display for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.

SITRANS LR560 measures practically any solids material to a range of 100 m (328 ft).

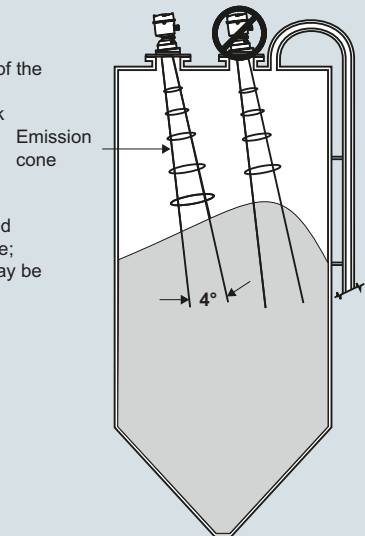
- Key Applications: cement powder, plastic powder/pellets, grain, coal, wood powder, fly ash

Configuration

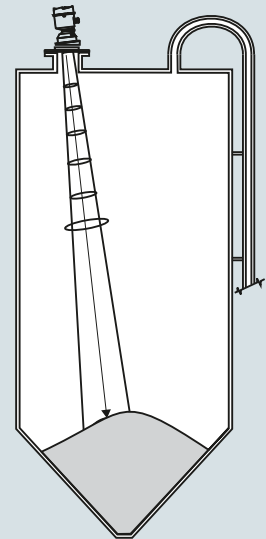
Installation

Note:

- Beam angle is the width of the cone where the energy density is half of the peak energy density
- The peak energy density is directly in front of and in line with the antenna
- There is signal transmitted outside of the beam angle; therefore false targets may be detected



Aiming will assist in measuring material in the cone



SITRANS LR560 installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement

Radar transmitters

SITRANS LR560

Technical specifications

Mode of operation		Power supply	
Measuring principle	Radar level measurement	4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
Frequency	78 GHz FMCW	PROFIBUS PA/ FOUNDATION Fieldbus	13.5 mA 9 ... 32 V DC, per IEC 61158-2
Minimum detectable distance	400 mm (15.75 inch) from sensor reference point	Certificates and approvals	
Maximum measuring range ¹⁾	<ul style="list-style-type: none"> 40 m (131 ft) version 100 m (328 ft) version 	General	CSA _{US/C} , CE, FM
Output		Radio	Europe (RED), FCC, Industry Canada, RCM
Analog output	4 ... 20 mA	Hazardous	
Communications	<ul style="list-style-type: none"> HART Optional: PROFIBUS PA Optional: FOUNDATION Fieldbus 	<ul style="list-style-type: none"> Europe/International 	IECEx SIR 09.0149X ATEX II 1D, 1/2D, 2D Ex ta IIIC T139 °C Da ATEX II 3G Ex nA II T4 Gc Ex nL IIC T4 Gc
Fail-safe	<ul style="list-style-type: none"> Programmable as high, low or hold (Loss of Echo) NE43 programmable 	<ul style="list-style-type: none"> US/Canada 	FM/CSA Class II, Div. 1, Groups E, F, G Class III T4 FM/CSA Class I, Div. 2, Groups A, B, C, D, T4
Performance (according to reference conditions IEC60770-1)		<ul style="list-style-type: none"> China 	NEPSI Ex nA II T4 Ex nL IIC T4 DIP A20 TA, T139 °C
Maximum measured error (including hysteresis and non-repeatability) ²⁾	5 mm (0.2 inch)	<ul style="list-style-type: none"> Brazil 	INMETRO Ex na IIC T4 Gc Ex ta IIIC T139 °C Da
Rated operating conditions (according to reference conditions IEC60770-1)		Programming	
Installation conditions		Intrinsically Safe Siemens handheld programmer	Infrared receiver
<ul style="list-style-type: none"> Location 	Indoor/outdoor	<ul style="list-style-type: none"> Approvals for handheld programmer 	IS model: ATEX II 1GD Ex ia IIC T4 Ga Ex iaD 20 T135 °C T _a = -20 ... +50 °C CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G, T6 T _a = 50 °C
Ambient conditions (enclosure)		Handheld communicator	HART communicator 375/475
<ul style="list-style-type: none"> Ambient temperature Installation category Pollution degree 	-40 ... +80 °C (-40 ... +176 °F) I 4	PC	SIMATIC PDM, AMS, PACTware
Medium conditions		Display (local)	Graphic local user interface including quick start wizard and echo profile displays
Dielectric constant ε _r	> 1.6		
Process temperature and pressure	See chart below		
Design			
Enclosure			
<ul style="list-style-type: none"> Construction Conduit entry Purge inlet Lens material 	316L/1.4404 stainless steel M20 x 1.5, or ½" NPT via adapter 1/8" NPT, 30 cfm at max. 100 psi <ul style="list-style-type: none"> 40 m version: PEI 100 m version: PEEK Damage to lens could result from continuous purging/cleaning (due to abrasive solids). Recommended to purge/clean only a few seconds every hour.		
<ul style="list-style-type: none"> Degree of protection Weight Optional local display interface 	Type 4X/NEMA 4X, Type 6/NEMA 6, IP68 3.15 kg (6.94 lb) including 3 inch flange Graphic LCD, with bar graph representing level		
Process connections			
<ul style="list-style-type: none"> Universal flat-faced flanges³⁾ 	<ul style="list-style-type: none"> 3, 4, 6 inch/80, 100, 150 mm, 304 stainless steel 3, 4, 6 inch/80, 100, 150 mm, 316L/1.4404 or 316L/1.4435 stainless steel 		
<ul style="list-style-type: none"> Aimer flanges³⁾ 	3, 4, 6 inch/80, 100, 150 mm, polyurethane powder-coated cast aluminum		

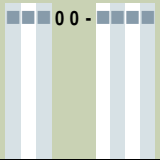
¹⁾ From sensor reference point

²⁾ Under severe EMI/EMC environments per IEC61326-1 or NAMUR NE21, the device error may increase to a maximum of 25 mm (1 inch)

³⁾ Universal flange mates with EN 1092-1 (PN16)/ASME B16.5 (150 lb)/JIS 2220 (10K) bolt hole pattern.

Process temperature and pressure

Version	Stainless steel -1 ... 0.5 bar -1 ... 3.0 bar	Aimer flange: -1 ... 0.5 bar	Aimer flange: -1 ... 3.0 bar
40 m	-40 ... +100 °C (-40 ... +212 °F)	-40 ... +100 °C (-40 ... +212 °F)	-40 ... +100 °C (-40 ... +212 °F)
100 m	-40 ... +200 °C (-40 ... +392 °F)	-40 ... +200 °C (-40 ... +392 °F)	-40 ... +120 °C (-40 ... +248 °F)

Selection and Ordering data	Article No.	Selection and Ordering data	Order code
SITRANS LR560 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids and liquids to a range of 100 m (328 ft). Order handheld programmer separately ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5440- 	Further designs Please add "-Z" to Article No. and specify Order code(s). Plug M12 with mating connector ¹⁾²⁾³⁾ Plug 7/8" with mating connector ¹⁾³⁾⁴⁾ Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 Material inspection Certificate Type 3.1 per EN 10204 ⁵⁾ NAMUR NE43 compliant, device preset to failsafe < 3.6 mA ⁶⁾	 A50 A55 Y15 C11 C12 N07
Measurement and process temperature range 40 m (131 ft) max range, -40 ... +100 °C 100 m (328 ft) max range, -40 ... +200 °C	0 1	Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Process connection Universal flat-faced flange fits ANSI/DIN/JIS flanges 80 mm/3 inch, 304 stainless steel 100 mm/4 inch, 304 stainless steel 150 mm/6 inch, 304 stainless steel 80 mm/3 inch, 316L stainless steel 100 mm/4 inch, 316L stainless steel 150 mm/6 inch, 316L stainless steel 80 mm/3 inch, painted aluminum, with integral aimer ¹⁾ 100 mm/4 inch, painted aluminum, with integral aimer ¹⁾ 150 mm/6 inch, painted aluminum, with integral aimer ¹⁾	A B C D E F G H J	Accessories Hand Programmer, Intrinsically safe Local display interface Sun Shield Cover, 304 stainless steel Housing lid with window One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART ⁷⁾ One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA ⁷⁾ SITRANS RD100, loop powered display - see Chapter 7 SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7 For applicable back up point level switch - see point level measurement section	Article No. 7ML1930-1BK 7ML1930-1FJ 7ML1930-1FK 7ML1930-1FL 7ML1930-1AP 7ML1930-1AQ 7ML5741-... 7ML5740-... 7ML5744-... 7ML5750-...
Enclosure (with cable inlet) Stainless steel, 1 X ½" NPT Stainless steel, 1 X M20 x 1.5 (plastic gland included)	A B		
Pressure rating 0.5 bar g (7.5 psi g) maximum 3 bar g (40 psi g) maximum	0 1		
Output/communication 4 ... 20 mA, HART PROFIBUS PA FOUNDATION Fieldbus	A B C		
Approvals General Purpose, FM, CSA US/CA, Industry Canada, FCC, CE, RED, RCM CSA/FM Class I, Div. 2, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III, Industry Canada, FCC ATEX II 3G Ex nA/nL, 1D, 1/2D, 2D Ex ta, INMETRO CE, RED, RCM	A B C		
Local display interface Without With	1 2		

¹⁾ Rated to 120 °C max. when used with Pressure rating option 1.

- ¹⁾ Available with Approval option A only.
- ²⁾ Available with Enclosure option B only.
- ³⁾ Available with Output/communication options B and C only.
- ⁴⁾ Only available with enclosure option A (NPT thread).
- ⁵⁾ Available with Pressure rating option 1 only.
- ⁶⁾ Available with Output/communication option A only.
- ⁷⁾ Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

Level Measurement

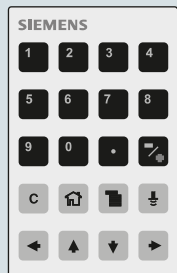
Continuous level measurement
Radar transmitters

SITRANS LR560

Options

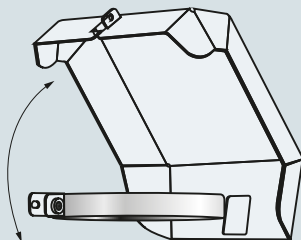
Handheld programmer

Article number:
7ML1930-1BK



Sun shield cover (304 stainless steel)

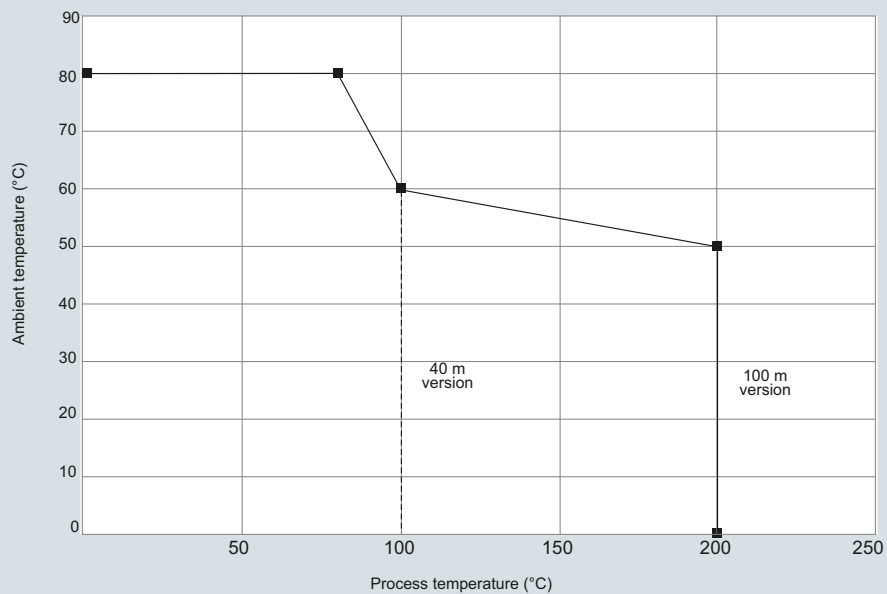
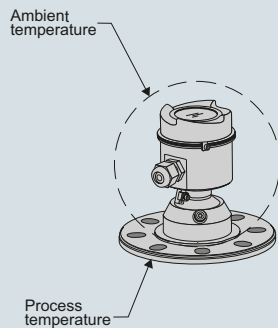
Article number:
7ML1930-1FK



SITRANS LR560 handheld programmer and sun shield cover

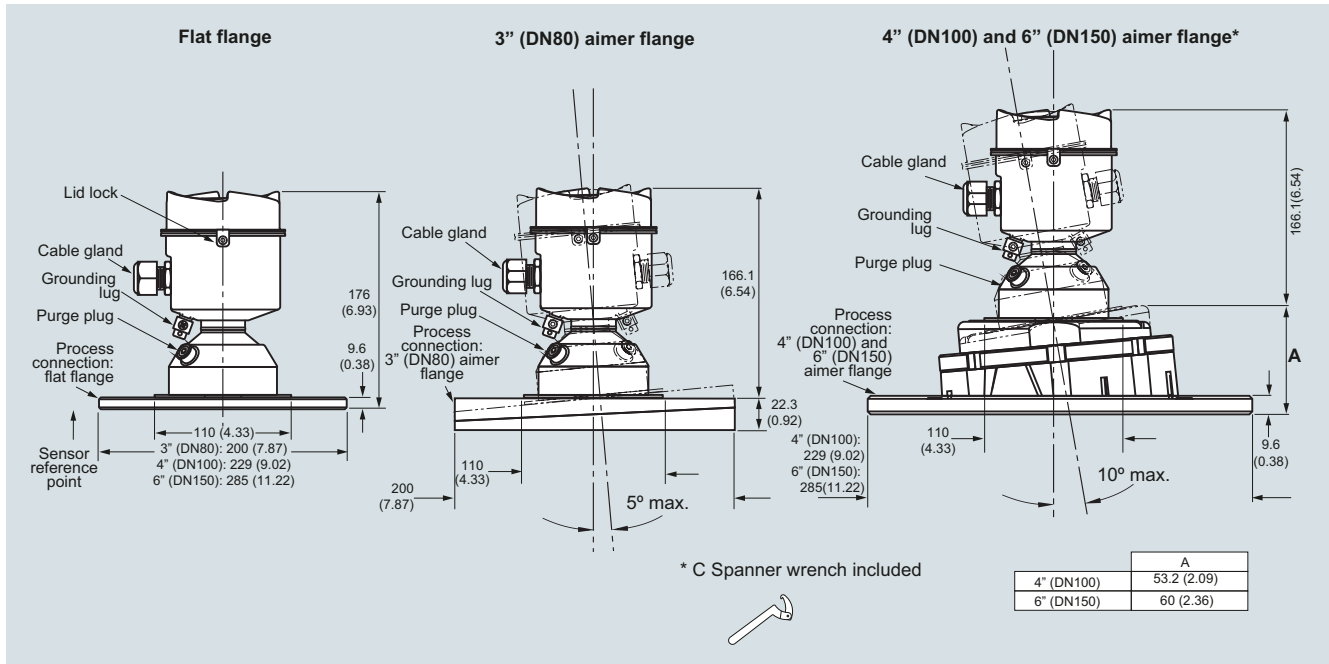
Characteristic curves

Temperature derating curve



SITRANS LR560 temperature derating curve

Dimensional drawings



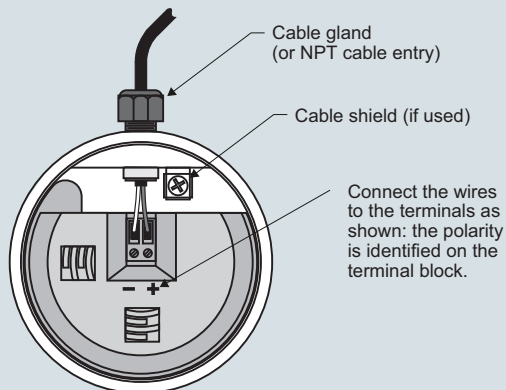
SITRANS LR560, dimensions in mm (inch)

Level Measurement

Continuous level measurement
Radar transmitters

SITRANS LR560 Specials

Circuit diagrams



Notes:

1. Depending on the approval rating, glands and plugs may be supplied with your instrument.
2. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
3. All field wiring must have insulation suitable for rated input voltages.
4. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
5. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR560 connections

Selection and ordering data

SITRANS LR560 Specials

	Article No.
SITRANS LR560 Electronics Modules	
SITRANS LR560 Electronics Module, HART, 100 m range, compatible with 7ML5440-1..00-.A., no enclosure or process connection included.	7ML1830-3AC
SITRANS LR560 Electronics Module, PROFIBUS PA, 100 m range, compatible with 7ML5440-1..00-.B., no enclosure or process connection included.	7ML1830-3AH
SITRANS LR560 Electronics Module, FOUNDATION Fieldbus, 100 m range, compatible with 7ML5440-1..00-.C., no enclosure or process connection included.	7ML1830-3AJ
SITRANS LR560 Electronics Module, HART, 40 m range, compatible with 7ML5440-0..00-.A., no enclosure or process connection included.	7ML1830-3AK
SITRANS LR560 Electronics Module, PROFIBUS PA, 40 m range, compatible with 7ML5440-0..00-.B., no enclosure or process connection included.	7ML1830-3AL
SITRANS LR560 Electronics Module, FOUNDATION Fieldbus, 40 m range, compatible with 7ML5440-0..00-.C., no enclosure or process connection included.	7ML1830-3AM
SITRANS LR560 Miscellaneous Spare Kits	
Kit, lid gasket, EPDM	7ML1830-3AA
Kit, wrench for 4" and 6" Aimers	7ML1830-3AB
Kit, O-rings for 3" Aimer	7ML1830-3AD
Kit, O-rings for 4" Aimer	7ML1830-3AE
Kit, O-rings for 6" Aimer	7ML1830-3AF
Kit, lid screw and purge plug set with hex keys	7ML1830-3AG
Kit, lid, no window	7ML1830-3AP

Customers interested in a custom designed device should consult a local sales person. For more information, please visit <http://www.usa.siemens.com/level>.

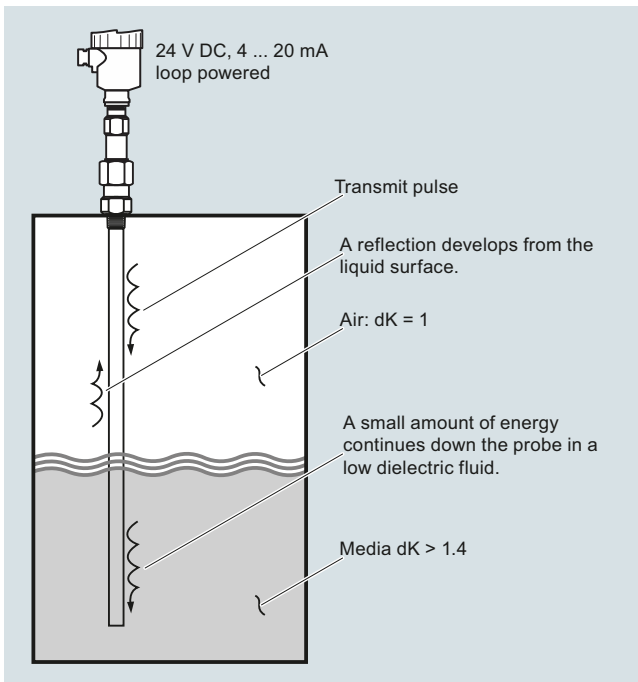
Overview**Introduction**

Guided Wave Radar transmitters use TDR (time domain reflectometry).

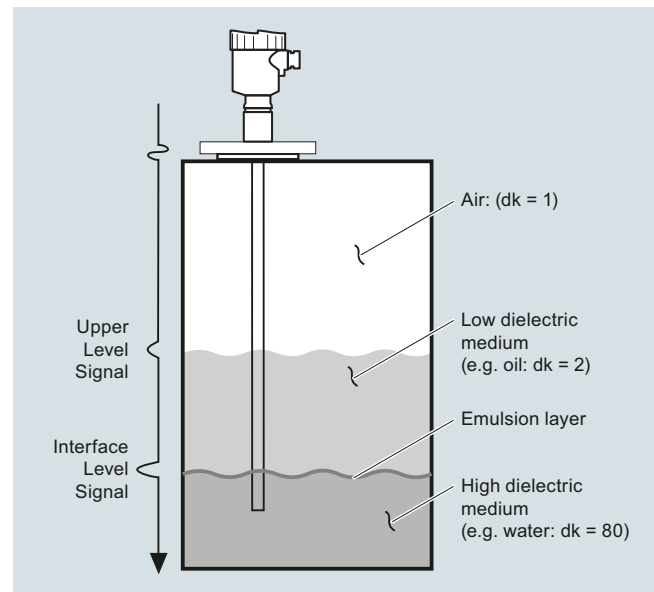
Time Domain Reflectometry (TDR)

TDR uses pulses of electromagnetic (EM) energy to measure distances or levels. When a pulse reaches a dielectric discontinuity (created by media surface), part of the energy is reflected. The greater the dielectric difference, the greater the amplitude (strength) of the reflection.

The SITRANS LG includes a transmitter and waveguide that has a characteristic impedance in air and is used as a probe. When part of the probe is immersed in a material other than air, there is lower impedance due to the increase in the dielectric. When an EM pulse is sent down the probe and meets the dielectric discontinuity, a reflection is generated.

**Mode of operation****Interface Detection**

The SITRANS LG, is a transmitter capable of measuring both an upper level and an interface level. The upper liquid must have a dielectric constant between 1.6 and 10 and the two liquids have a difference in dielectric constants greater than 10. A typical application would be oil over water, with the upper layer of oil being non-conductive with a dielectric constant of approximately 2 and the lower layer of water being very conductive with a dielectric constant of approximately 80. This interface measurement can only be accomplished when the dielectric constant of the upper medium is lower than the dielectric constant of the lower medium.



Level Measurement

Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

Overview



The Siemens SITRANS LG series are guided wave radar transmitters for level, level/interface, and volume measurement of liquids and solids. The SITRANS LG product line can handle changes in process conditions, high temperatures and pressures, and steam.

Benefits

- High accuracy to +/- 2 mm
- Advanced Diagnostics available for high degree of safety
- Simple menu driven display offers ease of setup
- Large range of options offers reliability in most continuous level measurement applications
- Ease of maintenance through module design and field replaceable and adjustable probe options
- Perfect solution for wide range of applications from storage to interface with options for extreme pressure and temperature conditions
- Universally applicable in liquids, interface, slurries and solids
- Highly immune to buildup using auto learn function
- Ability to measure in loss of echo situations with probe end tracking
- Suitable for API 2350
- Convenient access using USB and remote interface accessories

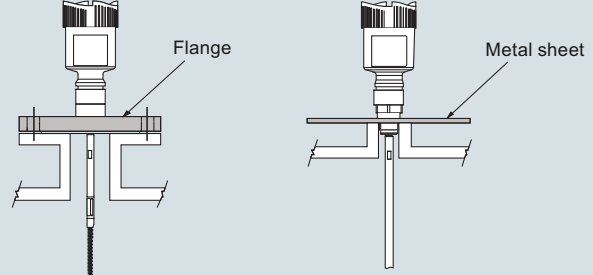
Application

The SITRANS LG series comes in four different models, depending on the applications, level of performance, and functionality required:

- SITRANS LG240 offers configuration options for your hygienic and corrosive application requirements
- SITRANS LG250 Highly flexible solution for liquid level and interface applications. Extremely versatile offering solutions for storage, separation of materials or difficult ammonia applications
- SITRANS LG260 Ideal for measuring level in medium range solids applications including; grains, plastics, and cement
- SITRANS LG270 offers configuration options for extreme conditions including high temperature and high pressure applications such as: harsh applications found in chemical, HPI and energy industries for example, LPG gas tanks, steam boilers and distillation columns

Configuration

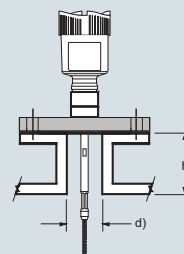
Mounting on nozzle



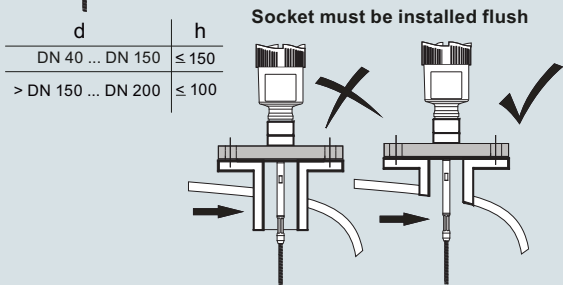
Installation in non-metal vessel

The guided microwave principle requires a metal surface on the process fitting. Therefore, use in plastic vessels etc. an instrument version with flange (from DN 50) or place a metal sheet, Ø > 200 mm (8 inch), beneath the process fitting when screwing it in. Make sure that the plate has direct contact with the process fitting

Mounting socket

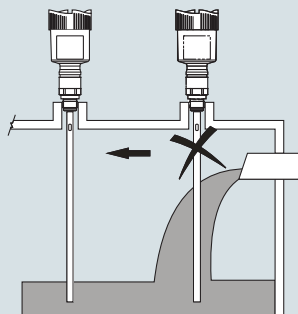


If possible, avoid sockets, mount the sensor flush with the vessel top. If this is not possible, use short sockets with small diameter. Higher sockets or sockets with a bigger diameter can generally be used. They simply increase the upper blocking distance. Check if this is relevant for your measurement. In such cases, always carry out a false signal suppression after installation.



When welding the socket, make sure that the socket is flush to the vessel top.

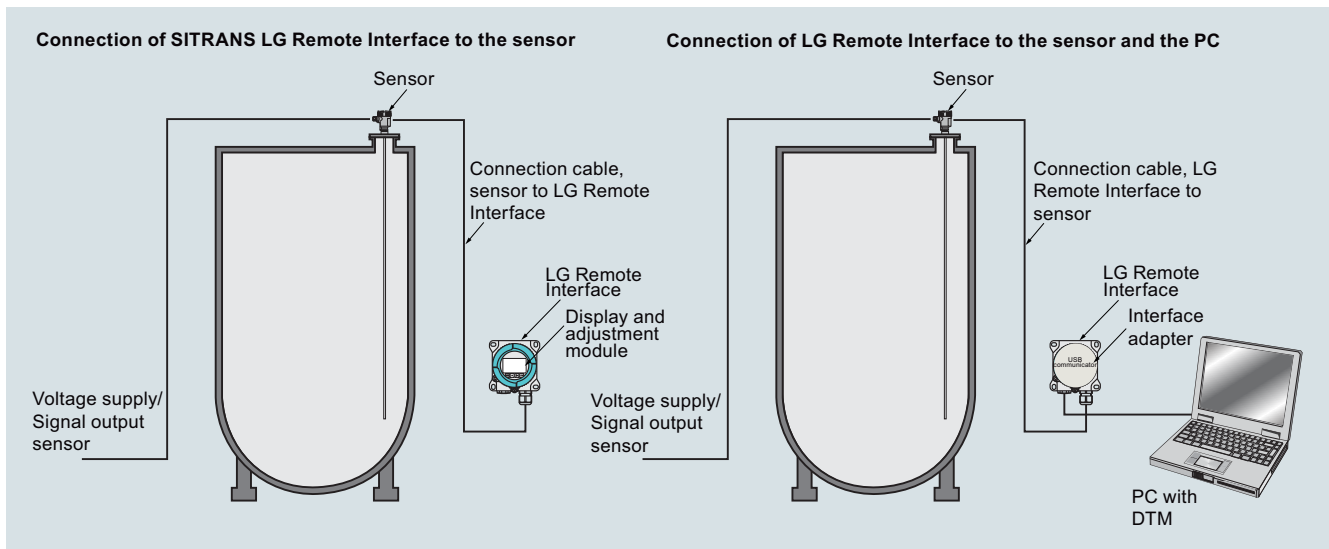
Before beginning the welding work, remove the electronics module from the sensor. By doing this, you avoid damage to the electronics through inductive coupling.



Inflowing medium

Do not mount the instruments in or above the filling stream. Make sure that you detect the product surface, not the inflowing product.

SITRANS LG Series installation



SITRANS LG Remote Interface installation

Level Measurement

Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

Technical specifications

Mode of operation		Medium conditions	
Measuring principle	Guided wave radar measurement	Dielectric constant	dK ≥ 1.4 (configuration dependent)
Measuring range	300 ... 75 000 mm (11.81 ... 2 952.75 inch)	Process temperature range	-196 ... +450 °C (-321 ... +842 °F)
Output		Vessel pressure	-1 ... +400 bar (-100 ... +40 000 kPa)
mA analog output with HART digital signal	4 ... 20 mA/HART (SIL optional)	Design	
Output range	Current: minimum 3.8 mA, maximum 20.5 mA ≤ 10 mA for 5 ms after switching on, ≤ 3.6 mA	Instrument weight (dependent on process fitting) - see manual for further details	Approx. 0.8 ... 8 kg (0.176 ... 17.64 lb)
• Analog		Materials	<ul style="list-style-type: none"> Plastic housing plastic PBT (Polyester) Aluminum die-cast housing, aluminum die-cast AlSi10 mg, powder-coated- basis: polyester Stainless steel housing, precision casting 316L Stainless steel housing, electropolished 316L
• Startup current		• Enclosure	
Diagnostic alarm	Failure signal current output (adjustable): last valid measured value, ≥ 21 mA, ≤ 3.6 mA	• Degree of protection	
Digital communication	HART Version 7 x and multidrop compatible	• Cable inlet	<ul style="list-style-type: none"> Type 4/NEMA 4, IP65 Plastic housing IP66/IP67 Aluminum and stainless steel housings are IP 66/68
Modbus	Modbus RTU, Modbus ASCII	Process connections	2 x M20 x 1.5 or 2 x ½" NPT
PROFIBUS PA	PROFIBUS PA profile 3.02	• Pipe thread, cylindrical (ISO 228 T1)	G¾" A, G1" A, G1½" A according to DIN 3852-A
FOUNDATION Fieldbus	FOUNDATION Fieldbus protocol Physical layer according to IEC 61158-2	• American pipe thread, conical (ASME B1.20.1)	¾" NPT, 1" NPT, 1½" NPT
Performance		• Flanged	DIN from DN 25, ASME from 1"
• Measuring cycle time	Process reference conditions according to DIN EN 61298-1	• Hygienic	Hygienic fittings
• Step response time	< 500 ms	Programming	
• Temperature Effects	≤ 3 s	Local	Four button, menu-driven data entry
Non-linearity	The measurement error from the process conditions is in the specified pressure and temperature range of below 1 %	Handheld communicator	Hart communicator
• Coaxial		PC	SIMATIC PDM, AMS, PACTware
• Single rod probes		Power	
• Interface models	See manual for more details	2-wire Hart version	9.6 ... 35 V DC
Resolution and repeatability	Accuracy +/- 2 mm (0.08 inch)	4-wire versions	9.6 ... 48 V DC, 20 ... 42 V AC, 50/60 Hz, and 90 ... 253 V AC, 50/60 Hz
Accuracy	+/- 2 mm (0.08 inch)	Modbus	8 ... 30 V DC
• Coaxial/rod/cable probes	+/- 5 mm (0.197 inch)	PROFIBUS PA	9 ... 32 V DC
• Interface models	Note: Typical deviation, Interface measurement. See manual for full explanation.	FOUNDATION Fieldbus	9 ... 32 V DC
Rated operating conditions		Note: see manual for specific power based on ordered options	
Ambient temperature for enclosure	-40 ... +80 °C (-40 ... +176 °F)	Certificates and approvals	
LCD readable temperature range	-40 ... +80 °C (-40 ... +176 °F) with display heated option	Hazardous approvals:	ATEX, FM, CSA, IECEx Note: other regional approvals are available
Location	Indoor/outdoor	Hygienic approvals:	EHEDG, FDA
Installation category	II	Overfill protection	WHG, Vlare
Pollution degree	2	Ship approval	ABS, CCS, GL, BV, LR
Relative Humidity	20 ... 85 %		

Level Measurement

Continuous level measurement

Guided wave radar transmitters

SITRANS LG series

Industries	SITRANS LG240 Food, Beverage and Pharmaceutical	SITRANS LG250 Chemical/HPI/Power/General	SITRANS LG260 Cement, power generation, food, processing, mineral processing, mining	SITRANS LG270 Chemical/HPI/Power/General
Applications	Hygienic and corrosive applications	Liquids, storage and process vessels with agitators, vaporous liquids, interface	Cement, fly ash, grain, coal, flour, plastics	Aggressive applications in liquids, storage and process vessels with agitators, vaporous liquids, high temperatures and pressures, low dielectric media
Range	32 m	75 m	60 m	60 m
Performance	± 2 mm	± 2 mm	± 2 mm	± 2 mm
Temperature	-40 ... +150 °C (-40 ... +302 °F)	-40 ... +200 °C (-40 ... +392 °F)	-40 ... +200 °C (-40 ... +392 °F)	-196 ... +450 °C (-320.8 ... +842 °F)
Communications	<ul style="list-style-type: none"> • 4 ... 20 mA/HART • Modbus: Modbus RTU, Modbus ASCII • PROFIBUS PA • FOUNDATION Fieldbus • SIMATIC PDM • DTM/FDT for PACTware • Fieldcare 	<ul style="list-style-type: none"> • 4 ... 20 mA/HART • Modbus: Modbus RTU, Modbus ASCII • PROFIBUS PA • FOUNDATION Fieldbus • SIMATIC PDM • DTM/FDT for PACTware • Fieldcare 	<ul style="list-style-type: none"> • 4 ... 20 mA/HART • Modbus: Modbus RTU, Modbus ASCII • PROFIBUS PA • FOUNDATION Fieldbus • SIMATIC PDM • DTM/FDT for PACTware • Fieldcare 	<ul style="list-style-type: none"> • 4 ... 20 mA/HART • Modbus: Modbus RTU, Modbus ASCII • PROFIBUS PA • FOUNDATION Fieldbus • SIMATIC PDM • DTM/FDT for PACTware • Fieldcare

Level Measurement

Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

Selection and Ordering data	Article No.	Ord. Code
SITRANS LG240	7ML5880-	
Guided Wave Radar sensor for Hygienic and corrosive continuous level and interface measurement of liquids.		
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Approvals		
General purpose (CSA, FM, CE)	0 A	
Overfill protection (WHG; VLAREM) ⁽⁹⁾⁽¹¹⁾	0 C	
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 ⁽¹⁴⁾	0 E	
ATEX II 1G, 1/2G, 2G Ex ia IIC + Overfill (WHG;VLAREM) ⁽¹¹⁾	0 F	
ATEX II 1G, 1/2G 2G Ex ia IIC + ATEX II 1D, 1/2D, 2D IP6x ⁽¹⁾⁽⁹⁾⁽¹⁵⁾⁽¹⁷⁾	0 H	
ATEX II 1/2G, 2G Ex d ia IIC T6 ⁽³⁾⁽¹³⁾⁽¹⁶⁾	0 J	
ATEX II 1/2G, 2G Ex d ia IIC + ATEX II 1/2D, 2D IP6x ⁽³⁾⁽¹³⁾⁽¹⁶⁾⁽¹⁷⁾	0 K	
ATEX II 1D, 1/2D, 2D IP6x ⁽¹⁾⁽⁹⁾⁽¹⁷⁾⁽¹⁸⁾	0 N	
ATEX II 1G, II 1/2G, II 2G Ex ia IIC T6...T1 Ga, Ga/Gb, Gb /IEC Ex ia IIC T6...T1 Ga, Ga/Gb, Gb ⁽¹⁾⁽¹⁴⁾	0 W	
IEC Ex ia IIC T6 ⁽¹⁴⁾	0 P	
IEC Ex ia IIC T6 + IEC IP6x T tD ⁽¹⁾⁽⁹⁾⁽¹⁵⁾⁽¹⁷⁾	0 Q	
IEC Ex d ia IIC T6 ⁽³⁾⁽¹³⁾⁽¹⁶⁾	0 R	
IEC Ex d ia IIC T6 + IEC IP6x T tD ⁽³⁾⁽¹³⁾⁽¹⁶⁾	0 S	
FM (NI) Class I, Div. 2, Groups A, B, C, D ⁽⁹⁾⁽¹²⁾⁽¹⁶⁾	1 A	
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁽⁹⁾⁽¹⁵⁾	1 B	
FM (XP-AIS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁽³⁾⁽¹³⁾⁽¹⁶⁾	1 C	
CSA (NI) Class I, Div. 2, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G ⁽¹⁾⁽⁵⁾⁽¹⁷⁾	1 E	
CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁽¹⁾	1 F	
CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁽³⁾⁽¹³⁾⁽¹⁶⁾	1 G	
NEPSI Ex ia IIC T6 ⁽¹⁴⁾	2 A	
NEPSI Ex ia IIC T6 + DIP A20/21 TA T* ⁽¹⁾⁽⁹⁾⁽¹⁵⁾	2 B	
NERSI Ex d ia IIC T6 ⁽⁹⁾⁽¹³⁾⁽¹⁶⁾	2 C	
NEPSI Ex d ia IIC T6 + DIP A20/21 TA T* ⁽⁹⁾⁽¹³⁾⁽¹⁶⁾	2 D	
NEPSI DIP A20/21 TA T* ⁽¹⁾⁽⁹⁾⁽¹⁶⁾	2 G	
INMETRO Ex ia IIC T6 ... T1 ⁽¹⁴⁾	3 A	
INMETRO Ex t IIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex ia IIC T6, Ga, Ga/Gb ⁽¹⁾⁽⁹⁾⁽¹⁵⁾	3 B	
INMETRO Ex d ia IIC T6 ... T1 ⁽⁹⁾⁽¹³⁾⁽¹⁶⁾	3 C	
INMETRO Ex t IIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex d ia IIC T6 Ga/Gb ⁽⁹⁾⁽¹³⁾⁽¹⁶⁾	3 D	
INMETRO Ex t IIC T* IP6X, Da, Da/Db, Da/Dc, Db ⁽¹⁾⁽¹³⁾⁽¹⁶⁾	3 G	
Korea KC ex free area	6 A	
GOST-R/EAC 0 Ex ia IIC T1 ... T6 X ⁽¹⁴⁾	5 A	
GOST-R/EAC 0 Ex ia IIC T1 ... T6 X + Ex t IIC T ... IP66 ⁽¹⁾⁽¹⁵⁾	5 B	
GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X ⁽⁹⁾⁽¹³⁾⁽¹⁶⁾	5 C	
GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X + Ex t IIC T ... IP66 ⁽⁹⁾⁽¹³⁾⁽¹⁶⁾	5 D	

Selection and Ordering data	Article No.	Ord. Code
SITRANS LG240	7ML5880-	
Guided Wave Radar sensor for Hygienic and corrosive continuous level and interface measurement of liquids.		
Note: Version/Material, Process fitting/Material, and Length options are available only with options of corresponding type.		
Probe version/Material		
Probe cable ø 4 mm (0.16 inch) with gravity weight/PFA ⁽¹⁷⁾	A	
Probe exchangeable rod ø 8 mm (0.31 inch)/ 1.4435 (Bastle standard) ⁽¹⁷⁾	B	
Probe exchangeable rod ø 8 mm (0.31 inch)/ 1.4435 (Bastle standard) can be autoclaved ⁽¹⁷⁾	C	
Probe rod ø 10 mm (0.39 inch)/PFA ⁽¹⁷⁾	D	
Probe exchangeable rod (ø 8 mm) / 1.4435 (BN2), electropolished (Ra < 0.38 µm) ⁽¹⁷⁾	E	
Process fitting/Material		
Clamp 2" PN 16 (ø 64 mm) DIN 32676, ISO2852/1.4435 (BN2)	0 0	
Clamp 2" PN 16 (ø 64 mm) DIN 32676, ISO2852/PTFE-TFM 1600	0 1	
Clamp 2 1/2" PN 10 (ø 77.5 mm) DIN 32676, ISO2852/1.4435 (BN2)	0 2	
Clamp 2 1/2" PN 10 (ø 77.5 mm) DIN 32676, ISO2852/PTFE-TFM 1600	0 3	
Clamp 3" PN 10 (ø 91 mm) D N 32676, ISO2852/1.4435 (BN2)	0 4	
Clamp 3" PN 10 (ø 91 mm) DIN 32676, ISO2852/PTFE-TFM 1600	0 5	
Clamp 4" PN 6 (ø 119 mm) DIN 32676, ISO2852/1.4435(BN2)	0 6	
Clamp 4" PN 6 (ø 119 mm) DIN 32676, ISO2852/PTFE-TFM 1600	0 7	
Clamp 1½" PN 16 (ø 50.5 mm) DIN 32676, ISO2852/1.4435 (BN2)	4 0	
Bolting DN 32, PN 40 DIN 11851/ 1.4435(BN2)	0 8	
Bolting DN 32, PN 40 DIN 11851/PTFE-TFM 1600	1 0	
Bolting DN 40, PN 40 DIN 11851/1.4435 (BN2)	1 1	
Bolting DN 40, PN 40 DIN 11851/PTFE-TFM 1600	1 2	
Bolting DN 50, PN 25 DIN 11851/ 1.4435(BN2)	1 3	
Bolting DN 50, PN 25 DIN 11851/PTFE-TFM 1600	1 4	
Bolting DN 65, PN 25 DIN 11851/PTFE-TFM 1600	1 5	
Flange DN 25, PN 40 Form C, DIN 2501/ PTFE-TFM 1600	2 0	
Flange DN 40, PN 40 Form C, DIN 2501/ PTFE-TFM 1600	2 1	
Flange DN 50, PN 40 Form C, DIN 2501/ PTFE-TFM 1600	2 2	
Flange DN 50, PN 40 Form V13, DIN 2513/ PTFE-TFM 1600	2 3	
Flange DN 65, PN 40 Form C, DIN 2513/ PTFE-TFM 1600	2 4	
Flange DN 80, PN 40 Form C, DIN 2501/ PTFE-TFM 1600	2 5	
Flange DN 100, PN 16 Form C, DIN 2501/ PTFE-TFM 1600	2 6	

Level Measurement

Continuous level measurement
Guided wave radar transmitters


SITRANS LG series

Selection and Ordering data	Article No.	Ord. Code	Selection and Ordering data	Article No.	Ord. Code
SITRANS LG240	7ML5880-		SITRANS LG240	7ML5880-	
Guided Wave Radar sensor for Hygienic and corrosive continuous level and interface measurement of liquids.			Guided Wave Radar sensor for Hygienic and corrosive continuous level and interface measurement of liquids.		
Flange DN 80, PN 40 EN 1092-1 Form B1/PTFE-TFM 1600	2 7		Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel	P	
Flange DN 100, PN 40 EN 1092-1 Form B1/PTFE-TFM 1600	2 8		Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel	Q	
Flange 2" 150 lb RF, ASME B16.5/PTFE-TFM 1600	3 0		Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel	R	
Flange 2" 300 lb RF, ASME B16.5/PTFE-TFM 1600	3 1		Aluminum single chamber / IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated	W	
Flange 3" 150 lb RF, ASME B16.5/PTFE-TFM 1600	3 2		Aluminum double chamber / IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated	X	
Flange 4" 150 lb RF, ASME B16.5/PTFE-TFM 1600	3 3		Stainless steel single chamber (precision casting) / IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated	Y	
Note: The pressure limit for all PTFE coated versions is 16 bar (per manual).			Stainless steel double chamber / IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated	S	
Electronics			Remote stainless steel single chamber housing, electropolished/IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug ¹⁰⁾	Z	Q 2 A
Two-wire 4 ... 20 mA/HART	0		Remote plastic single chamber housing / IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug ¹⁰⁾	Z	Q 2 B
Four-wire Modbus ³⁾¹³⁾	1				
Two-wire 4 ... 20 mA/HART with SIL qualification ⁹⁾	2				
Four-wire 4 ... 20 mA/HART; 90 ... 253 V AC; 50/60 Hz ³⁾¹³⁾	3				
Four-wire 4 ... 20 mA/HART; 9.6 ... 48 V DC; 20 ... 42 V AC ³⁾¹³⁾	4				
PROFIBUS PA ⁹⁾	5				
FOUNDATION Fieldbus ⁹⁾	6				
Seal/Process temperature			Lengths		
Without glass seal/-40 ... +150 °C (-40 ... +302 °F) ²⁾	A		Rod ø 8 mm (0.31 inch)/1.4435 (Basic standard 300 ... 4 000 mm)		
FFKM (Kalrez 6221)/-20 ... 150 °C (-4 ... +302 °F) ⁴⁾	B		300 ... 1 000 mm (11.81 ... 39.37 inch) ⁶⁾	0	
EPDM (Freudenberg 70 EPDM 291)/-20 ... 130 °C (-4 ... +266 °F) ⁴⁾	C		1 001 ... 2 000 mm (39.41 ... 78.74 inch) ⁶⁾	1	
Housing/Protection/Cable			2 001 ... 3 000 mm (78.78 ... 118.11 inch) ⁶⁾	2	
Note: for installation of remote display, 7ML5840, with LG two chamber housing options, contact PVC			3 001 ... 4 000 mm (118.15 ... 157.48 inch) ⁶⁾	3	
Plastic IP66/IP67 M20 x 1.5/blind stopper	A		Rod ø 10 mm (0.24 inch)/PFA (300 ... 4 000 mm)		
Plastic IP66/IP67 1/2" NPT/blind stopper	B		300 mm (11.81 inch) ⁶⁾	9	R 1 A
Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper	C		500 mm (19.69 inch) ⁶⁾	9	R 1 B
Aluminum/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	D		300 ... 1 000 mm (11.81 ... 39.37 inch) ⁶⁾	9	R 1 C
Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper	E		1 001 ... 5 000 mm (39.41 ... 78.74 inch) ⁶⁾	9	R 1 D
Aluminum double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	F		2 001 ... 3 000 mm (78.78 ... 118.11 inch) ⁶⁾	9	R 1 E
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper	G		3 001 ... 4 000 mm (118.15 ... 157.48 inch) ⁶⁾	9	R 1 F
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	H		Cable ø 4 mm (0.16 inch)/PFA (500 ... 32 000 mm)		
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper	J		500 mm (9.69 inch)	9	R 1 G
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	K		501 ... 1 000 mm (19.72 ... 39.37 inch)	9	R 1 H
Stainless steel double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper	L		1 001 ... 2 000 mm (39.41 ... 78.74 inch)	9	R 1 J
Stainless steel double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	M		2 001 ... 4 000 mm (78.78 ... 157.40 inch)	9	R 1 K
Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel	N		4 001 ... 5 000 mm (157.52 ... 196.85 inch)	9	R 1 L
			5 001 ... 10 000 mm (196.89 ... 393.70 inch)	9	R 1 M
			10 001 ... 15 000 mm (393.74 ... 590.55 inch)	9	R 1 N
			15 001 ... 20 000 mm (590.59 ... 787.40 inch)	9	R 1 P
			20 001 ... 25 000 mm (787.44 ... 984.25 inch)	9	R 1 Q
			25 001 ... 32 000 mm (984.29 ... 1 259.52 inch)	9	R 1 R

Level Measurement

Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

Selection and Ordering data	Article No.	Ord. Code
SITRANS LG240	7ML5880-	
Guided Wave Radar sensor for Hygienic and corrosive continuous level and interface measurement of liquids.		
Exchange rod \varnothing 8 mm (0.31 inch)/1.4435 (BN2), electropolished ($R_a < 0.38 \mu\text{m}$)		
300 ... 1 000 mm (11.81 ... 39.37 inch) ⁶⁾		9 R 2 A
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ⁶⁾		9 R 2 B
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ⁶⁾		9 R 2 C
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ⁶⁾		9 R 2 D

Selection and Ordering data	Order code
Further designs (mandatory)	
Please add "-Z" to Article No. and specify Order code(s).	
Supplementary electronics	
Without	A00
Additional current output 4 ... 20 mA ¹⁰⁾	A01
Indicating/adjustment module	
Without	E00
Mounted	E01
Laterally mounted	E02
Language of display	
German	L00
English	L01
French	L02
Dutch	L03
Italian	L04
Spanish	L05
Portuguese	L06
Russian	L07
Chinese	L08
Japanese	L09
Operating instructions	
German	M00
English	M01
French	M02
Spanish	M03

Selection and Ordering data	Order code
Further designs (optional)	
Please add "-Z" to Article No. and specify Order code(s).	
Enter the total insertion length in plain text description	Y01
Enter the total length of rigid part (cable version only) range from 100 ... 1 000 mm	Y02
Cleaning included certificate: oil, grease and silicone free	W01
Remote electronic cable lengths: 2 m (6.6 ft). Only available with Housing options Q2A and Q2B	Y10
Remote electronic cable lengths: 5 m (16.4 ft). Only available with Housing options Q2A and Q2B	Y11
Remote electronic cable lengths: 10 m (32.8 ft). Only available with Housing options Q2A and Q2B	Y12
Identification label (measurement loop) stainless steel, 40 characters max, add in plain text. To add more than one line use a comma ",", for line break.	Y17
Identification Label (measurement loop) foil, 40 characters max, add in plain text. To add more than one line use a comma ",", for line break.	Y18
3.1-Inspection Certificate for instrument (EN 10204) ⁸⁾	C12
NACE0175 to 3.1 Material Certificate for material (EN10204 NACE MR 0175) (NACE not in scope for Hygienic process connections) ^{9),19)}	D07
3.1-Inspection Certificate for instrument with test data (EN 10204) ⁸⁾	C25
2.2-Factory certificate for material (EN 10204) ⁸⁾	C15
Quality and test plan ⁸⁾	C26
Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN10204) ⁸⁾	C13
X-ray test + 3.1 certificate/instrument ⁸⁾	C14
Positive material identification test + 3.1 certificate/instrument ⁸⁾	C16
Roughness test + 3.1 certificate/instrument ⁸⁾	C18
Pressure test + 3.1 certificate/instrument ⁸⁾	C31
Helium leak test + 3.1 certificate/instrument ⁸⁾	C32
Ferrite measuring accuracy to DIN 32514-1 + 3.1 certificate/instrument ⁸⁾	C60
Pressure test according to Norsok + 3.1 certificate/instrument ⁸⁾	C61
5 point calibration certificate (min. length 1 000 mm) ⁸⁾	C62

Selection and Ordering data	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
SITRANS LG, GWR sensor Display Module	A5E34143449
SITRANS LG, two-wire 4 ... 20 mA/HART electronic	A5E35637821
SITRANS LG, USB communicator	A5E35192015
SITRANS LG, Mounting eye M12 x 20	PBD:51041448
SITRANS LG, Mounting spring	PBD:51041449
Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia	7NG4124-0AA00
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-...
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-...
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750-...
For applicable back up point level switch - see point level measurement section	

Note: some configuration options are not available.
For restriction information see the online PIA configuration tool.

- 1) Some approvals are not available with Plastic and Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
- 2) Available only with Rod ø 10 mm/PFA and Cable ø 4 mm/PFA Length options.
- 3) Available only with Supplementary electronic option A00 and Indicating/adjustment module options E00, E01.
- 4) Not available with Remote Housing/Protection/Cable options Q2A and Q2B.
- 5) Not available with Electronic option 5.
- 6) Not available with Y02.
- 7) Available only with Electronic options 0, 2, and 6.
- 8) Listed Certificates are not available with all configurations, please contact factory for more information.
- 9) Available only with Supplementary electronic option A00.
- 10) Not available with Indicating/adjustment module option E02.
- 11) Available only with Electronics options 0, 2, and 5.
- 12) Some approvals are not available with Remote or Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
- 13) Available only with Double chamber, Metallic Housing/Protection/Cable options and certain glands.
- 14) Available only with Electronics options 0, 2, 5, 6.
- 15) Available only with Electronics options 0 and 2.
- 16) Available only with Electronics options 0 ... 4.
- 17) Not available with some Seal/Process Temperature options.
- 18) Available only with Electronic options 0, 2, 3, and 4.
- 19) Available only with 316L Probes. NACE is not available with coated, plated, or hygienic connections.

Note: Please consult manual for further detail.

Level Measurement

Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

Selection and Ordering data	Article No.	Ord. Code	Selection and Ordering data	Article No.	Ord. Code
SITRANS LG250	7ML5881-		SITRANS LG250	7ML5881-	
A guided wave radar sensor for continuous level and interface measurement of liquids.			A guided wave radar sensor for continuous level and interface measurement of liquids.		
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Approvals					
General purpose (CSA, FM, CE)	0 A		CSA (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁽⁹⁾⁽¹⁸⁾⁽¹⁹⁾⁽²⁶⁾	1 H	
Shipping approval ⁽⁴⁾⁽⁶⁾⁽⁷⁾⁽⁸⁾⁽⁹⁾	0 B		CSA (NI) Class I, II, III Div. 2, Groups A, B, C, D, F, G + Ship approval ⁽¹⁾⁽⁶⁾⁽¹⁰⁾	7 K	
Overfill protection (WHG; VLAREM) ⁽⁹⁾⁽¹⁰⁾⁽¹¹⁾⁽¹²⁾	0 C		CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval ⁽⁶⁾⁽¹⁰⁾⁽²²⁾	7 L	
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 ⁽¹²⁾⁽¹³⁾	0 E		CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval ⁽⁶⁾⁽⁹⁾⁽¹⁵⁾⁽⁴⁰⁾	7 M	
ATEX II 1G, 1/2G, 2G Ex ia IIC + Overfill (WHG; VLAREM) ⁽¹⁰⁾⁽¹²⁾	0 F		CSA (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval ⁽⁶⁾⁽⁹⁾⁽¹⁰⁾⁽¹⁹⁾⁽²⁶⁾	7 N	
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + shipping approval ⁽⁴⁾⁽⁶⁾⁽⁸⁾⁽⁹⁾⁽¹⁰⁾⁽¹⁵⁾	0 G		NEPSI Ex ia IIC T6 ⁽⁵⁾⁽¹³⁾	2 A	
ATEX II 1G, 1/2G, 2G Ex ia IIC + ATEX II 1D, 1/2D, 2D IP6x ⁽¹⁾⁽⁹⁾⁽¹⁴⁾	0 H		NEPSI Ex ia IIC T6 + DIP A20/21 TA T* ⁽¹⁾⁽⁹⁾⁽¹⁴⁾	2 B	
ATEX II 1/2G, 2G Ex d ia IIC T6 ⁽²⁾⁽⁹⁾⁽¹⁵⁾⁽¹⁶⁾⁽¹⁷⁾	0 J		NEPSI Ex d ia IIC T6 ⁽²⁾⁽⁹⁾⁽¹⁷⁾	2 C	
ATEX II 1/2G, 2G Ex d ia IIC + ATEX II 1/2D, 2D IP6x ⁽²⁾⁽⁹⁾⁽¹⁵⁾⁽¹⁶⁾⁽¹⁷⁾	0 K		NEPSI Ex d ia IIC T6 + DIP A20/21 TA T* ⁽²⁾⁽⁹⁾⁽¹⁷⁾	2 D	
ATEX II 1/2G, 2G Ex d IIC T6 ⁽¹⁾⁽⁹⁾⁽¹⁸⁾⁽¹⁹⁾	0 L		NEPSI Ex d IIC T6 ⁽⁹⁾⁽¹⁴⁾⁽¹⁹⁾⁽²⁶⁾	2 E	
ATEX II 1/2G, 2G Ex d IIC + ATEX II 1/2D, 2D IP6x ⁽¹⁾⁽⁹⁾⁽¹⁹⁾⁽²⁰⁾	0 M		NEPSI Ex d IIC T6 + DIP A20/21 TA T* ⁽⁹⁾⁽¹⁴⁾⁽¹⁹⁾⁽²⁶⁾	2 F	
ATEX II 1D, 1/2D, 2D IP6x T ⁽¹⁾⁽⁹⁾⁽¹⁷⁾⁽¹⁹⁾	0 N		NEPSI DIP A20/21 TA T* ⁽¹⁾⁽⁹⁾⁽¹⁷⁾⁽¹⁹⁾	2 G	
ATEX II 1G, II 1/2G, II 2G Ex ia IIC T6...T1 Ga, Ga/Gb, Gb / IEC Ex ia IIC T6...T1 Ga, Ga/Gb, Gb ⁽¹³⁾	0 W		INMETRO Ex ia IIC T6 ... T1 ⁽⁵⁾⁽¹³⁾	3 A	
ATEX II 1/2G, II 2G Ex db IIC T6 ... T1 Ga/Gb, Gb / IEC Ex db IIC T6 ... T1 Ga/Gb, Gb ⁽¹⁸⁾⁽¹⁹⁾⁽²⁶⁾	1 K		INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex ia IIC T6, Ga, Ga/Gb ⁽¹⁾⁽⁹⁾⁽¹⁴⁾	3 B	
ATEX II 1/2G, II 2G Ex d ia IIC T6...T1 Ga/Gb, Gb + Ship approval ⁽²⁾⁽⁶⁾⁽⁹⁾⁽¹⁴⁾⁽¹⁵⁾⁽¹⁶⁾	7 A		INMETRO Ex d ia IIC T6 ... T1 ⁽²⁾⁽⁹⁾⁽¹⁷⁾	3 C	
ATEX II 1/2G, II 2G Ex db IIC T6...T1 Ga/Gb, Gb + Ship approval ⁽¹⁾⁽⁶⁾⁽⁹⁾⁽¹⁰⁾⁽¹⁵⁾	7 B		INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex d IIC T6 Ga/Gb ⁽¹⁾⁽⁹⁾⁽¹⁷⁾	3 D	
IEC Ex ia IIC T6 ⁽¹²⁾⁽¹³⁾	0 P		INMETRO Ex d IIC T6 ... T1 ⁽⁹⁾⁽¹³⁾⁽¹⁹⁾⁽²⁶⁾	3 E	
IEC Ex ia IIC T6 + IEC IP6x T d ⁽¹⁾⁽⁹⁾⁽¹⁴⁾⁽¹⁹⁾	0 Q		INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db ⁽⁹⁾⁽¹⁷⁾⁽¹⁹⁾⁽²⁶⁾	3 F	
IEC Ex d ia IIC T6 ⁽²⁾⁽⁹⁾⁽¹⁵⁾⁽¹⁶⁾⁽¹⁷⁾	0 R		INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db ⁽⁹⁾⁽¹⁷⁾⁽¹⁹⁾⁽²⁶⁾	3 G	
IEC Ex d ia IIC T6 + IEC IP6x T d ⁽²⁾⁽⁹⁾⁽¹⁵⁾⁽¹⁶⁾⁽¹⁷⁾⁽²¹⁾	0 S		KOSHA Ex d IIC T6 ... T1 – KE ⁽⁹⁾⁽¹⁴⁾⁽¹⁹⁾⁽²⁶⁾	4 A	
IEC Ex d IIC T6 ⁽¹⁾⁽⁹⁾⁽¹⁸⁾⁽¹⁹⁾	0 T		Korea KC ex free area	6 A	
IEC Ex d IIC T6 + IEC IP6x T d ⁽¹⁾⁽⁹⁾⁽¹⁹⁾	0 U		GOST-R/EAC 0 Ex ia IIC T1 ... T6 X ⁽¹³⁾	5 A	
IEC Ex db IIC T6 ... T1 Ga/Gb, Gb + Ship approval ⁽¹⁾⁽⁶⁾⁽⁹⁾⁽¹⁰⁾⁽¹⁹⁾	7 C		GOST-R/EAC 0 Ex ia IIC T1 ... T6 X + Ex t IIIC T ... IP66 ⁽¹⁾⁽¹⁴⁾	5 B	
IEC Ex ia IIC T6 ... T1 Ga, Ga/Gb, Gb + Ship approval ⁽⁶⁾⁽¹⁰⁾⁽²²⁾	7 D		GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X ⁽²⁾⁽⁹⁾⁽¹⁷⁾	5 C	
IEC Ex d ia IIC T6 ... T1 Ga/Gb, Gb + Ship approval ⁽²⁾⁽⁶⁾⁽⁹⁾⁽¹⁴⁾⁽¹⁵⁾⁽²¹⁾	7 E		GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X + Ex t IIIC T ... IP66 ⁽²⁾⁽⁹⁾⁽¹⁷⁾	5 D	
FM (NI) Class I, Div. 2, Groups A, B, C, D ⁽³⁾⁽⁹⁾⁽¹⁷⁾⁽²³⁾	1 A		GOST-R/EAC 1 Ex d IIC T1 ... T6 X ⁽¹⁴⁾⁽²⁶⁾	5 E	
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F ⁽⁵⁾⁽⁹⁾⁽¹⁴⁾	1 B		GOST-R/EAC 0 Ex d IIC T1 ... T6 X + Ex t IIIC T ... IP66 ⁽¹⁴⁾⁽²⁶⁾	5 F	
FM (XP-AIS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁽²⁾⁽⁹⁾⁽¹⁵⁾⁽¹⁶⁾⁽¹⁷⁾	1 C		GOST-R/EAC Ex t IIIC T ... IP66 ⁽¹⁾⁽¹⁷⁾	5 G	
FM (XP) Class I, Div. 1, Groups A, B, C, D ⁽⁹⁾⁽¹⁹⁾⁽²⁰⁾⁽²⁶⁾	1 D		Note: Version/Material, Process fitting/ Material, and Length options are available only with options of corresponding type.		
FM (NI) Class I, II, III, Div. 2, Groups A, B, C, D, F, G + Ship approval ⁽⁶⁾⁽⁹⁾⁽¹⁴⁾⁽²³⁾⁽⁴¹⁾	7 F		Probe version/Material		
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval ⁽⁶⁾⁽⁹⁾⁽¹⁴⁾⁽²²⁾	7 G		Probe exchangeable cable ø 2 mm (0.08 inch) with gravity weight/316L ⁽¹¹⁾⁽²⁷⁾⁽²⁸⁾	A	
FM (XP-AIS) Class I, Div. 1, Groups A, B, C, D, + Ship approval ⁽⁶⁾⁽⁹⁾⁽¹⁴⁾⁽²²⁾	7 H		Probe exchangeable cable ø 2 mm (0.08 inch) center weight/316L ⁽¹¹⁾⁽²⁸⁾⁽²⁹⁾	B	
M (XP) Class I, Div. 1, Groups A, B, C, D + Ship approval ⁽⁶⁾⁽¹⁴⁾⁽¹⁹⁾⁽²⁶⁾	7 J		Probe exchangeable cable ø 4 mm (0.16 inch) with gravity weight/316L ⁽¹¹⁾⁽²⁷⁾⁽²⁸⁾	C	
CSA (NI) Class I, Div. 2, Groups A, B, C, D (DIP) Class II, III, Div. 1, Groups E, F, G ⁽¹⁾	1 E		Probe exchangeable cable ø 4 mm (0.16 inch) with center weight/316L ⁽¹¹⁾⁽²⁸⁾⁽²⁹⁾	D	
CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁽⁹⁾⁽¹³⁾	1 F		Probe exchangeable rod ø 8 mm (0.31 inch)/316L ⁽¹¹⁾⁽²⁷⁾	E	
CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁽²⁾⁽⁹⁾⁽¹⁵⁾⁽¹⁶⁾⁽¹⁷⁾	1 G		Probe exchangeable rod ø 12 mm (0.47 inch)/316L ⁽¹¹⁾⁽²⁷⁾	F	

Level Measurement

Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

Selection and Ordering data	Article No.	Ord. Code	Selection and Ordering data	Article No.	Ord. Code
SITRANS LG250	7ML5881-		SITRANS LG250	7ML5881-	
A guided wave radar sensor for continuous level and interface measurement of liquids.			A guided wave radar sensor for continuous level and interface measurement of liquids.		
Probe coax version ø 21.3 mm (0.84 inch) with single hole/316L ⁽¹⁾⁽²⁷⁾⁽²⁸⁾	G		Flange 3" 150 lb RF, ASME B16.5/316L	4 0	
Probe coax version ø 21.3 mm (0.84 inch) with multiple hole/316L ⁽²⁷⁾⁽²⁸⁾	H		Flange 3" 300 lb RF, ASME B16.5/316L	4 1	
Probe coax version ø 42.2 mm (1.66 inch) with multiple hole/316L ⁽¹⁾⁽²⁷⁾⁽²⁸⁾	K		Flange 4" 150 lb RF, ASME B16.5/316L	4 2	
Probe exchangeable cable ø 4 mm (0.16 inch) with gravity weight/Alloy C22 (2.4602) ⁽¹¹⁾	L		Flange 4" 300 lb RF, ASME B16.5/316L	4 3	
Probe exchangeable cable ø 4 mm (0.16 inch) with center weight/Alloy C22 (2.4602) ⁽¹¹⁾	M		Flange 6" 150 lb RF, ASME B16.5/316L	4 4	
Probe exchangeable rod ø 8 mm (0.31 inch)/Alloy C22 (2.4602) ⁽¹¹⁾	N		Flange 6" 300 lb RF, ASME B16.5/316L	4 5	
Probe exchangeable rod ø 12 mm (0.47 inch)/Alloy C22 (2.4602) ⁽¹¹⁾	P		Thread G 3/4" PN 40, DIN3852-A / Alloy C22 (2.4602)	4 6	
Probe coax version ø 21.3 mm (0.84 inch) with multiple hole/Alloy C22 (2.4602) ⁽¹¹⁾	Q		Thread G 1" PN 40, DIN 3852-A/ Alloy C22 (2.4602)	4 7	
Probe coax version ø 42.2 mm (1.66 inch) with multiple hole/Alloy C22 (2.4602) ⁽¹¹⁾	R		Thread G 1 1/2" PN 40, DIN 3852-A/ Alloy C22 (2.4602)	4 8	
Probe exchangeable rod ø 8 mm (0.31 inch)/Duplex (1.4462) ⁽¹¹⁾	S		Thread 1 1/2" NPT PN 40, ASME B1.20.1/ Alloy C22 (2.4602)	5 0	
Exchangeable rod ø 12 mm (0.47 inch)/Alloy C22 and 400 (2.4360) ⁽¹¹⁾	T		Flange DN 50 PN 40 Form C, DIN 2501/ 316L with Alloy C22 (2.4602) coating	5 1	
Process fitting/Material			Flange DN 50 PN 40 Form B1, EN 1092-1/ 316L with Alloy C22 (2.4602) coating	5 2	
Thread G 3/4" (DIN 3852-A) PN 6/316L	0 0		Flange DN 80 PN 40 Form B1, EN 1092-1/ 316L with Alloy C22 (2.4602) coating	5 3	
Thread 3/4" NPT (ASME B1.20.1) PN 6/316L	0 1		Flange DN 100 PN 40 Form B1, EN 1092-1/ 316L with Alloy C22 (2.4602) coating	5 4	
Thread G 3/4" (DIN 3852-A) PN 40/316L	0 2		Flange DN 150 PN 16 Form B1, EN 1092-1/ 316L with Alloy C22 (2.4602) coating	5 5	
Thread 3/4" NPT (ASME B1.20.1) PN 40/316L	0 3		Flange DN 200 PN 16 Form B1, EN 1092-1/ 316L with Alloy C22 (2.4602) coating	5 6	
Thread G 3/4" (DIN 3852-A) PN 100 / 316L ⁽³⁰⁾	0 4		Flange 2" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	5 7	
Thread 3/4" NPT (ASME B1.20.1) PN 100/ 316L ⁽³⁰⁾	0 5		Flange 2" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	5 8	
Thread G 1" (DIN 3852-A) PN 40/316L	0 6		Flange 3" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	6 0	
Thread 1" NPT (ASME B1.20.1) PN 40/316L	0 7		Flange 4" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	6 1	
Thread G 1" (DIN 3852-A) PN 100/316L ⁽³⁰⁾	0 8		Flange 4" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	6 2	
Thread 1" NPT (ASME B1.20.1) PN 100/316L ⁽³⁰⁾	1 0		Flange 6" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	6 3	
Thread G 1 1/2" (DIN 3852-A) PN 40/316L	1 1		Flange 6" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	6 4	
Thread 1 1/2" NPT (ASME B1.20.1) PN 40/316L	1 2		Thread G 3/4" (DIN 3852-A) PN 40/Duplex 1.4462	6 5	
Thread G1 1/2" (DIN 3852-A) PN 100/316L ⁽³⁰⁾	1 3		Flange DN 80 PN 40 Form F, DIN 2501/Duplex (1.4462)	6 6	
Thread 1 1/2" NPT (ASME B1.20.1) PN 100/ 316L ⁽³⁰⁾	1 4		Flange DN 50 PN 40 Form B1, EN 1092-1/ Duplex (1.4462)	6 7	
Thread 2 NPT PN 40, ASME B1.20.1/316L ⁽³¹⁾⁽³²⁾	1 5		Flange 1" 150 lb RF, ASME B16.5/Duplex (1.4462)	6 8	
Flange DN 25 PN 40 Form C, DIN 2501/316L	2 0		Flange 1 1/2" 150 lb RF, ASME B16.5/Duplex (1.4462)	7 0	
Flange DN 25 PN 40 Form F, DIN 2501/316L	2 1		Flange 2" 150 lb RF, ASME B16.5/Duplex (1.4462)	7 1	
Flange DN 40 PN 40 Form C, DIN 2501/316L	2 2		Flange 2" 300 lb RF, ASME B16.5/Duplex (1.4462)	7 2	
Flange DN 50 PN 40 Form C, DIN 2501/316L	2 3		Flange 2" 600 lb RF, ASME B16.5/Duplex (1.4462)	7 3	
Flange DN 50 PN 40 Form V13, DIN 2513/316L	2 4		Flange 3" 150 lb RF, ASME B16.5/Duplex (1.4462)	7 4	
Flange DN 80 PN 40 Form C, DIN 2501/316L	2 5		Flange 3" 300 lb RF, ASME B16.5/Duplex (1.4462)	7 5	
Flange DN 80 PN 40 Form V13, DIN 2501/316L	2 6				
Flange DN 100 PN 16 Form C, DIN 2501/316L	2 7				
Flange DN 100 PN 16 Form C, DIN 2501/ 316L	2 8				
Flange DN 100 PN 40 Form C, DIN 2501 /316L	3 0				
Flange DN 100 PN 40 Form V13, DIN 2513/ 316L	3 1				
Flange DN 150 PN 16 Form C, DIN 2501/316L	3 2				
Flange DN 50 PN 40 EN 1092-1 Form B1/316L	3 3				
Flange DN 80 PN 40 EN 1092-1 Form B1/316L	3 4				
Flange 1" 150 lb RF, ASME B16.5/316L	3 5				
Flange 1 1/2" 150 lb RF, ASME B16.5/316L	3 6				
Flange 2" 150 lb RF, ASME B16.5/316L	3 7				
Flange 2" 300 lb RF, ASME B16.5/316L	3 8				

Level Measurement

Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

Selection and Ordering data	Article No.	Ord. Code	Selection and Ordering data	Article No.	Ord. Code
SITRANS LG250	7ML5881-		SITRANS LG250	7ML5881-	
A guided wave radar sensor for continuous level and interface measurement of liquids.			A guided wave radar sensor for continuous level and interface measurement of liquids.		
Flange 4" 150 lb RF, ASME B16.5/Duplex (1.4462)	7 6		Electronics		
Flange 4" 150 lb FF, ASME B16.5/Duplex (1.4462)	7 7		Two-wire 4 ... 20 mA/HART	0	
Flange 4" 300 lb RF, ASME B16.5/Duplex (1.4462)	7 8		Four-wire Modbus ²⁾⁹⁾¹⁵⁾	1	
Flange 4" 600 lb RF, ASME B16.5/Duplex (1.4462)	8 0		Two-wire 4 ... 20 mA/HART with SIL qualification ⁹⁾¹²⁾	2	
Thread 1 1/2" NPT PN 40, ASME B1.20.1/ Alloy 400 (2.4360)	8 1		Four-wire 4 ... 20 mA/HART; 90 ... 253 V AC; 50/60Hz ²⁾⁹⁾¹⁵⁾⁴²⁾	3	
Flange 2" 150 lb RF, ASME B16.5/Alloy 400 (2.4360)	8 2		Four-wire 4 ... 20 mA/HART; 9.6 ... 48 V DC; 20 ... 42 V AC ²⁾⁹⁾¹⁵⁾⁴²⁾	4	
Flange 2" 300 lb RF, ASME B16.5/Alloy 400 (2.4360) solid	8 3		PROFIBUS PA ⁵⁾⁹⁾	5	
Flange 3" 150 lb RF, ASME B16.5/Alloy 400 (2.4360)	8 4		FOUNDATION Fieldbus ⁵⁾⁹⁾	6	
Flange 3" 300 lb RF, ASME B16.5/Alloy 400 (2.4360)	8 5		Seal/Second line of defense/ Process temperature		
Flange 3" 300 lb RJF, ASME B16.5/Alloy 400 (2.4360)	8 6		FKM (SHS FPM 70C3 GLT)/without glass seal/-40 ... +80 °C (-40 ... +176 °F)	A	
Flange 4" 150 lb RF, ASME B16.5/Alloy 400 (2.4360)	8 7		FKM (SHS FPM 70C3 GLT)/without glass seal/-40 ... +150 °C (-40 ... +302 °F)	B	
Flange 4" 300 lb RF, ASME B16.5/Alloy 400 (2.4360)	8 8		FKM (SHS FPM 70C3 GLT)/with glass seal/-40 ... +150 °C (-40 ... +302 °F) ³⁴⁾	C	
Flange DN 25 PN 40 Form C, DIN 2501/ Alloy C22 (2.4602) solid	9 0	L 1 A	EPDM (A+P 75.5/KW75F)/without glass seal/-40 ... +80 °C (-40 ... +176 °F)	D	
Flange DN 25 PN 40 Form B1, EN 1092-1/ Alloy C22 (2.4602) solid	9 0	L 1 B	EPDM (A+P 75.5/KW75F)/with glass seal/-40 ... +150 °C (-40 ... +302 °F) ³⁴⁾	E	
Flange DN 80 PN 40 Form B1, EN 1092-1/ Alloy C22 (2.4602) solid	9 0	L 1 C	FFKM (Kalrez 6375)/with glass seal/-20 ... +200 °C (-4 ... +392 °F) ³⁴⁾	F	
Flange 1" 150 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 D	EPDM (A+P 75.5/KW75F)/without glass seal/-40 ... +80 °C (-40 ... +176 °F)	G	
Flange 1 1/2" 150 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 E	EPDM (A+P 75.5/KW75F)/without glass seal/-40 ... +150 °C (-40 ... +302 °F) ³⁴⁾	H	
Flange 1 1/2" 300 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 F	EPDM (A+P 75.5/KW75F)/with glass seal/-40 ... +150 °C (-40 ... +302 °F) ³⁴⁾	J	
Flange 2" 150 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 G	Silicone FEP coated (A+P FEP-O-SEAL)/ without glass seal/-40 ... +80 °C (-40 ... +176 °F)	K	
Flange 2" 300 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 H	Silicone FEP coated (A+P FEP-O-SEAL)/ without glass seal/-40 ... +150 °C (-40 ... +302 °F)	L	
Flange 2" 600 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 J	Silicone FEP coated (A+P FEP-O-SEAL)/with glass seal/-40 ... +150 °C (-40 ... +302 °F) ³⁴⁾	M	
Flange 2" 1 500 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 K	With borosilicate glass lead through for volatile substances, e.g. ammonia/with glass seal/-60 ... +150 °C (-76 ... +302 °F) ³⁴⁾	N	
Flange 3" 150 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 L	FFKM (Kalrez 6375)/without glass seal/-20 ... +200 °C (-4 ... +392 °F)	P	
Flange 3" 300 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 M	FKM (SHS FPM 70C3 GLT)/with glass seal/-40 ... 80 °C (-40 ... +176 °F) ³⁴⁾	Q	
Flange 3" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	9 0	L 1 N	Housing/Protection/Cable		
Flange 4" 150 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 P	Note: for installation of remote display, 7ML5840, with LG two chamber housing options, contact PVC		
Flange 4" 150 lb FF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 Q	Plastic IP66/IP67 M20 x 1.5/blind stopper ¹⁾¹⁵⁾	A	
Flange 4" 300 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 R	Plastic IP66/IP67 1/2" NPT/blind stopper ⁹⁾¹⁵⁾	B	
Flange 4" 300 lb LT, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 T	Plastic 2-chamber/IP66/IP67/M20 x 1.5/blind stopper	G	
Flange 4" 600 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 U	Plastic 2-chamber/IP66/IP67 /1/2" NPT/blind stopper	H	
Flange 6" 150 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 V	Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/ Blind stopper ⁹⁾¹⁵⁾	C	
Flange 2 1/2" 600 lb RF, Masoneilan/ Alloy C22 (2.4602) solid	9 0	L 1 W	Aluminum/IP66/IP68 (0.2 bar) 1/2" NPT/Blind stopper ⁹⁾¹⁵⁾	D	
Flange 2" 600 lb RF, ASME B16.5/316/316 L ³²⁾	9 0	L 1 X			
Flange 3" 600 lb RF, ASME B16.5/316/316 L ³²⁾³³⁾	9 0	L 1 Y			

Level Measurement

Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

Selection and Ordering data	Article No.	Ord. Code	Selection and Ordering data	Article No.	Ord. Code
SITRANS LG250	7ML5881-		SITRANS LG250	7ML5881-	
A guided wave radar sensor for continuous level and interface measurement of liquids.			A guided wave radar sensor for continuous level and interface measurement of liquids.		
Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5 / Blind stopper		E	Lengths		
Aluminum double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/Blind stopper		F	<u>Rod ø 8 mm/316L</u>		
Stainless Steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/Blind stopper ¹¹⁾¹⁵⁾		L	300 ... 1 000 mm (11.81 ... 39.37 inch) ³⁷⁾	0	
Stainless Steel (precision casting) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/Blind stopper ⁹⁾¹⁵⁾		M	1 001 ... 2 000 mm (39.41 ... 78.74 inch) ³⁷⁾	1	
Stainless Steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/Blind stopper ⁹⁾¹⁵⁾		N	2 001 ... 3 000 mm (78.78 ... 118.11 inch) ³⁷⁾	2	
Stainless Steel (electropolished) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/Blind stopper ⁹⁾¹⁵⁾		P	3 001 ... 4 000 mm (118.15 ... 157.48 inch) ³⁷⁾	3	
Stainless Steel double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/Blind stopper		Q	4 001 ... 5 000 mm (157.52 ... 196.85 inch) ³⁷⁾	4	
Stainless Steel double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/Blind stopper		R	5 001 ... 6 000 mm (196.89 ... 236.22 inch) ³⁷⁾	5	
Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/ Cable gland stainless steel ⁹⁾¹⁵⁾		S	<u>Rod ø 8 mm/Duplex</u>		
Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/Cable gland stainless steel		T	300 ... 1 000 mm (11.81 ... 39.37 inch) ³⁷⁾	9	R1A
Stainless Steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/Cable gland stainless steel ¹⁵⁾³⁶⁾		U	1 001 ... 2 000 mm (39.41 ... 78.74 inch) ³⁷⁾	9	R1B
Stainless Steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/Cable gland stainless steel ¹⁵⁾³⁶⁾		V	2 001 ... 3 000 mm (78.78 ... 118.11 inch) ³⁷⁾	9	R1C
Stainless steel single chamber (precision casting)/IP66/IP68 (0.2 bar) M20 x 1.5/ Cable gland brass nickel-plated		W	3 001 ... 4 000 mm (118.15 ... 157.48 inch) ³⁷⁾	9	R1D
Aluminum single chamber/IP66/IP68 (0.2 bar) M20 x 1.5/Cable gland brass nickel-plated		X	4 001 ... 5 000 mm (157.52 ... 196.85 inch) ³⁷⁾	9	R1E
Stainless steel single chamber (precision casting)/IP66/ IP68 (0.2 bar) M20 x 1.5/ Cable gland brass nickel-plated		Y	5 001 ... 6 000 mm (196.89 ... 236.22 inch) ³⁷⁾	9	R1F
Stainless steel double chamber / IP66/ IP68 (0.2 bar) M20 x 1.5 / Cable gland brass nickel-plated		J	<u>Rod ø 12 mm or ø 12 mm /Alloy C22 and 400</u>		
Aluminum single chamber/IP66/IP68 (0.2 bar) with M20 x 1.5/Plug connector Harting HAN 7D (straight)		Z	300 ... 1 000 mm (11.81 ... 39.37 inch) ³⁷⁾	9	R1J
Aluminum single chamber/IP66/IP68 (0.2 bar) with M20 x 1.5/Special HARTING plug (bent) according to Tier One (ZB7555)		Z	1 001 ... 2 000 mm (39.41 ... 78.74 inch) ³⁷⁾	9	R1K
Remote stainless steel single chamber housing, electropolished/IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug ¹⁵⁾³⁵⁾		Z	2 001 ... 3 000 mm (78.78 ... 118.11 inch) ³⁷⁾	9	R1L
Remote plastic single chamber housing / IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/ blind plug ¹⁵⁾³⁵⁾		Z	3 001 ... 4 000 mm (118.15 ... 157.48 inch) ³⁷⁾	9	R1M
			<u>Cable lengths ø 2 or 4 mm/316L</u>		
			501 ... 1 000 mm (19.72 ... 39.37 inch)	9	R2A
			1 000 ... 5 000 mm (39.37 ... 196.85 inch)	9	R2B
			5 001 ... 10 000 mm (196.89 ... 393.70 inch)	9	R2C
			10 001 ... 15 000 mm (393.74 ... 590.55 inch)	9	R2D
			15 001 ... 20 000 mm (590.59 ... 787.40 inch)	9	R2E
			20 001 ... 25 000 mm (787.44 ... 984.25 inch)	9	R2F
			25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)	9	R2G
			30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)	9	R2H
			35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)	9	R2J
			40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)	9	R2K
			45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)	9	R2L
			50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)	9	R2M
			55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)	9	R2N
			60 001 ... 65 000 mm (2 362.24 ... 2 559.06 inch)	9	R2P
			65 001 ... 70 000 mm (2 559.09 ... 2 755.91 inch)	9	R2Q
			70 001 ... 75 000 mm (2 755.94 ... 2 952.76 inch)	9	R2R
				9	R2S
				9	R2T
				9	R2U
				9	R2V

Level Measurement

Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

Selection and Ordering data	Article No.	Ord. Code	Selection and Ordering data	Order code
SITRANS LG250	7ML5881-		Further designs (mandatory)	
A guided wave radar sensor for continuous level and interface measurement of liquids.			Please add "-Z" to Article No. and specify Order code(s).	
<u>Cable Lengths ø 2 mm or ø 4 mm/Alloy C22</u>			Supplementary electronics	
501 ... 1 000 mm (19.72 ... 39.37 inch)	9	R 4 A	Without	A00
1 001 ... 5 000 mm (39.41 ... 196.85 inch)	9	R 4 B	Additional current output 4 ... 20 mA ¹⁵⁾	A01
5 001 ... 10 000 mm (196.89 ... 393.70 inch)	9	R 4 C	Dimensions centering weight (diameter/height)	
10 001 ... 15 000 mm (393.74 ... 590.55 inch)	9	R 4 D	Without	B00
15 001 ... 20 000 mm (590.59 ... 787.40 inch)	9	R 4 E	ø 40/30 mm	B01
20 001 ... 25 000 mm (787.44 ... 984.25 inch)	9	R 4 F	ø 45/30 mm (for 2 inch tubes)	B02
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)	9	R 4 G	ø 75/30 mm (for 3 inch tubes)	B03
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)	9	R 4 H	ø 95/30 mm (for 4 inch tubes)	B04
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)	9	R 4 J	ø 40 mm/30 mm	B05
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)	9	R 4 K	ø 1.57/1.18 inch (for 2 inch Schedule 160)	B06
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)	9	R 4 L	ø 45 mm/30 mm (for 2 inch tubes)	B07
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)	9	R 4 M	ø 1.77/1.18 inch (for 2 inch Schedule 40/80)	B08
55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)	9	R 4 N	ø 75 mm/30 mm (for 3 inch tubes)	
60 001 ... 65 000 mm (2 362.24 ... 2 559.06 inch)	9	R 4 P	ø 2.95/1.18 inch (for 3 inch Schedule 10/40)	
65 001 ... 70 000 mm (2 559.09 ... 2 755.91 inch)	9	R 4 Q	ø 95 mm/30 mm (for 4 inch tubes)	
70 001 ... 75 000 mm (2 755.94 ... 2 952.76 inch)	9	R 4 R	ø 3.74/1.18 inch (for 4 inch Schedule 80)	
<u>Coax ø 21.3 mm/316L</u>			Rod mounted	
300 ... 1 000 mm (11.81 ... 39.37 inch) ³⁷⁾	9	R 3 A	Without Rod, applicable for coax or cable probe types only	C00
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ³⁷⁾	9	R 3 B	Mounted	C01
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ³⁷⁾	9	R 3 C	Not mounted	C02
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ³⁷⁾	9	R 3 D	Indicating/adjustment module	
4 001 ... 5 000 mm (157.52 ... 196.85 inch) ³⁷⁾	9	R 3 E	Without	E00
5 001 ... 6 000 mm (196.89 ... 236.22 inch) ³⁷⁾	9	R 3 F	Mounted	E01
<u>Coax ø 21.3 mm/Alloy C22</u>			Laterally mounted	E02
300 ... 1 000 mm (11.81 ... 39.37 inch) ³⁷⁾	9	R 5 A	Language of display	
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ³⁷⁾	9	R 5 B	German	L00
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ³⁷⁾	9	R 5 C	English	L01
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ³⁷⁾	9	R 5 D	French	L02
4 001 ... 5 000 mm (157.52 ... 196.85 inch) ³⁷⁾	9	R 5 E	Dutch	L03
5 001 ... 6 000 mm (196.89 ... 236.22 inch) ³⁷⁾	9	R 5 F	Italian	L04
<u>Coax ø 42.2 mm/316L</u>			Spanish	L05
300 ... 1 000 mm (11.81 ... 39.37 inch) ³⁷⁾	9	R 3 G	Portuguese	L06
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ³⁷⁾	9	R 3 H	Russian	L07
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ³⁷⁾	9	R 3 J	Chinese	L08
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ³⁷⁾	9	R 3 K	Japanese	L09
4 001 ... 5 000 mm (157.52 ... 196.85 inch) ³⁷⁾	9	R 3 L	Operating instructions	
5 001 ... 6 000 mm (196.89 ... 236.22 inch) ³⁷⁾	9	R 3 M	German	M00
<u>Coax ø 42.2 mm/Alloy C22</u>			English	M01
300 ... 1 000 mm (11.81 ... 39.37 inch) ³⁷⁾	9	R 5 G	French	M02
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ³⁷⁾	9	R 5 H	Spanish	M03
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ³⁷⁾	9	R 5 J	Further designs (optional)	
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ³⁷⁾	9	R 5 K	Please add "-Z" to Article No. and specify Order code(s).	
4 001 ... 5 000 mm (157.52 ... 196.85 inch) ³⁷⁾	9	R 5 L	Enter the total insertion length in plain text description	Y01
5 001 ... 6 000 mm (196.89 ... 236.22 inch) ³⁷⁾	9	R 5 M	Enter the total length of rigid part (cable version only) range from 100 ... 1 000 mm	Y02
			Remote electronic cable lengths: 2 m (6.6 ft). Only available with Housing options Q2A and Q2B	Y10
			Remote electronic cable lengths: 5 m (16.4 ft). Only available with Housing options Q2A and Q2B	Y11
			Remote electronic cable lengths: 10 m (32.8 ft). Only available with Housing options Q2A and Q2B	Y12
			Identification Label (measurement loop) stainless steel, 40 characters max, add in plain text. To add more than one line use a coma "," for line break.	Y17
			Identification Label (measurement loop) foil, 40 characters max, add in plain text. To add more than one line use a coma "," for line break.	Y18
			3.1-Inspection Certificate for instrument (EN 10204) ³⁸⁾	C12

Level Measurement

Continuous level measurement

Guided wave radar transmitters

SITRANS LG series

4

Selection and Ordering data

Order code

Further designs (optional), continued

Please add **"-Z"** to Article No. and specify Order code(s).

NACE0175 to 3.1 Material Certificate for material (EN10204 NACE MR 0175) (NACE not in scope for Hygienic process connections)^{38/39}

D07

3.1-Inspection Certificate for instrument with test data (EN 10204)³⁸⁾

C25

2.2-Factory certificate for material (EN 10204)³⁸⁾

C15

Quality and test plan³⁸⁾

C26

Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN10204)³⁸⁾

C13

X-ray test + 3.1 certificate/instrument³⁸⁾

C14

Positive material identification test + 3.1 certificate/instrument³⁸⁾

C16

Roughness test + 3.1 certificate/instrument³⁸⁾

C18

Pressure test + 3.1 certificate/instrument³⁸⁾

C31

Helium leak test + 3.1 certificate/instrument³⁸⁾

C32

Pressure test according to Norsok + 3.1 certificate/instrument³⁸⁾

C61

5 point calibration certificate (min. length 1 000 mm)³⁸⁾

C62

Pressure test (acc. to ASME B31.1), incl. 3.1 Inspection certificate³⁸⁾

C63

Certificate suitable for tropical regions with, all attachment parts of metal (2.1 factory certificate)³⁸⁾

C65

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Accessories

Article No.

SITRANS LG, GWR sensor Display Module

A5E34143449

SITRANS LG, two-wire 4 ... 20 mA/HART electronic

A5E35637821

SITRANS LG, USB communicator

A5E35192015

SITRANS LG, Mounting eye M8 x 20

A5E36653574

SITRANS LG, Mounting eye M12 x 20

PBD:51041448

SITRANS LG, Mounting spring

PBD:51041449

Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia

7NG4124-0AA00

SITRANS RD100, loop powered display - see Chapter 7

7ML5741-...

SITRANS RD200, universal input display with Modbus conversion - see Chapter 7

7ML5740-...

SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7

7ML5744-...

SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7

7ML5750-...

For applicable back up point level switch - see point level measurement section

Note: some configuration options are not available. For restriction information see the online PIA configuration tool.

- 1) Not available with Plastic and Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
- 2) Available only with Metallic, Double chamber Housing/Protection/Cable options and certain glands.
- 3) Not available with Remote or Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
- 4) Not available with Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
- 5) Not available with certain glands.
- 6) Not available with Version/Material option K, L, M, N, P, Q, R, S, T.
- 7) Available only with Electronic options 0, 1, 2, and 5.

- 8) Not available with Length options 3, 4, 5, R2C, and R2D.
- 9) Available only with Supplementary electronic option A00.
- 10) Available only with Electronic options 0, 2, and 5.
- 11) Not available with Seal/Second line of defense/Process temperature option N.
- 12) Not available with Housing/Protection/Cable option Q1B.
- 13) Available only with Electronic options 0, 2, 5, and 6.
- 14) Available only with Electronic options 0 and 2.
- 15) Not available with Indicating/adjustment module option E02.
- 16) Not available with Process fitting/Material options 00 and 01.
- 17) Available only with Electronic options 0 ... 4.
- 18) Not available with Modbus Electronic options.
- 19) Available only with Seal/Second line of defense/Process temperature options C, E, F, J, M, N, Q.
- 20) Available only with HART Electronic options.
- 21) Available only with Seal/Second line of defense/Process temperature options C, D, E, F, H, J, M, N, Q.
- 22) Not Available with Housing/Protection/Cable options W, X, Y, J, Q1A, and Q1B.
- 23) Not Available with Seal/Second line of defense/Process temperature option P.
- 25) Available only with Electronic options 0, 2, and 6.
- 26) Available only with Single chamber, Aluminum and Stainless steel (precision casting) Housing/Protection/Cable options.
- 27) Available only with Dimensions centering weight option B00.
- 28) Available only with Rod mounted option C00.
- 29) Not available with Dimensions centering weight option B00.
- 30) Available only with Seal/Second line of defense/Process temperature option N.
- 31) Not available with Version/Material options F, K, L, M, N, P, Q, R, S, and T.
- 32) Not available with Seal/Process temperature options A, G, K, N, and Q.
- 33) Available only with Version/Material options A ... K.
- 34) Not available with Remote Housing/Protection/Cable options.
- 35) Not available with some Seal/Process temperature options including glass.
- 36) Not available with Supplementary electronics options.
- 37) Not available with Y02.
- 38) Listed Certificates are not available with all configurations, please contact factory for more information.
- 39) Available only with 316L Probes. NACE is not available with coated, plated, or hygienic connections.
- 40) Available only with Housing/Protection/Cable options E, F, N, Q, R, T.
- 41) Available only with Housing/Protection/Cable options C, D, E, F, L, M, N, P, Q, R, S, T, U, V, Q2A, and Q2B.
- 42) Available only with Double chamber, Plastic and Metallic Housing/Protection/Cable options and certain glands.

Note: Please consult manual for further details.

Level Measurement

Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

Selection and Ordering data	Article No.	Ord. Code
SITRANS LG260	7ML5882-	
A guided wave radar sensor for level measurement of solids.		
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Approvals		
General purpose (CSA, FM, CE) ⁽⁵⁾⁽⁶⁾	0 A	
Shipping approval ⁽⁴⁾⁽⁵⁾⁽⁷⁾⁽⁸⁾⁽⁹⁾	0 B	
Overfill protection (WHG; VLAREM) ⁽⁵⁾⁽⁹⁾⁽¹⁰⁾	0 C	
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 ⁽⁵⁾⁽¹¹⁾	0 E	
ATEX II 1G, 1/2G, 2G Ex ia IIC + Overfill (WHG; VLAREM) ⁽⁵⁾⁽¹⁰⁾	0 F	
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + shipping approval ⁽⁴⁾⁽⁵⁾⁽⁷⁾⁽⁸⁾⁽⁹⁾⁽¹²⁾	0 G	
ATEX II 1G, 1/2G, 2G Ex ia IIC + II 1D, 1/2D, 1/3D, 2D IP66 ⁽¹⁾⁽⁵⁾⁽⁸⁾⁽⁹⁾	0 H	
ATEX II 1/2G, 2G Ex d ia IIC T6 ⁽²⁾⁽⁵⁾⁽⁹⁾⁽¹²⁾⁽¹³⁾	0 J	
ATEX II 1/2G, 2G Ex d ia IIC + shipping approval ⁽²⁾⁽⁵⁾⁽⁷⁾⁽⁹⁾⁽¹²⁾⁽¹⁴⁾	0 L	
ATEX II 1/2G, 2G Ex d ia IIC + II 1D, 1/2D, 1/3D, 2D IP66 ⁽²⁾⁽⁵⁾⁽⁹⁾⁽¹²⁾⁽¹⁴⁾	0 M	
ATEX II 1/2G, 2G Ex d IIC T6 ⁽¹⁾⁽⁹⁾⁽¹⁵⁾⁽¹⁶⁾	0 N	
ATEX II 1G, II 1/2G, II 2G Ex ia IIC T6...T1 Ga, Ga/Gb, Gb/IEC Ex ia IIC T6...T1 Ga, Ga/Gb, Gb ⁽¹⁾	0 W	
ATEX II 1/2G, 2G Ex d IIC + shipping approval ⁽¹⁾⁽⁷⁾⁽⁸⁾⁽⁹⁾⁽¹²⁾⁽¹⁶⁾	0 Q	
ATEX II 1/2G, 2G Ex d IIC + II 1D, 1/2D, 1/3D, 2D IP66 ⁽¹⁾⁽⁸⁾⁽⁹⁾⁽¹⁶⁾	0 R	
ATEX II 1D, 1/2D, 2D IP66x T ⁽¹⁾⁽⁹⁾⁽¹⁶⁾⁽¹⁷⁾	0 S	
IEC Ex ia IIC T6 ⁽⁵⁾⁽¹¹⁾	0 T	
IEC Ex ia IIC T6...T1 Ga, Ga/Gb, Gb + Ex t IIC T ⁽¹⁾⁽⁸⁾⁽⁹⁾⁽¹⁶⁾	0 U	
IEC Ex d ia IIC T6 ⁽²⁾⁽⁵⁾⁽⁹⁾⁽¹²⁾⁽¹³⁾	1 A	
IEC Ex d ia IIC T6 + IEC IP66x T ⁽²⁾⁽⁵⁾⁽⁹⁾⁽¹²⁾⁽¹⁴⁾	1 B	
IEC Ex db IIC T6 ... T1 Ga/Gb, Gb ⁽¹⁾⁽⁹⁾⁽¹⁵⁾⁽¹⁶⁾	1 C	
IEC Ex db IIC T6 ... T1 Ga/Gb, Gb + IEC Ex t IIC T ⁽⁸⁾⁽⁹⁾⁽¹⁶⁾⁽²⁶⁾	1 D	
FM (NI) Class I, Div. 2, Groups A, B, C, D ⁽³⁾⁽⁵⁾⁽⁹⁾⁽¹³⁾	1 F	
FM (NI) Class I, Div. 2, Groups A, B, C, D + Ship approval ⁽³⁾⁽⁵⁾⁽⁷⁾⁽⁹⁾⁽¹²⁾⁽¹⁴⁾	1 G	
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F ⁽⁵⁾⁽⁸⁾⁽⁹⁾	1 H	
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + shipping approval ⁽⁴⁾⁽⁵⁾⁽⁷⁾⁽⁸⁾⁽⁹⁾⁽¹²⁾	1 J	
FM (XP-AIS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁽²⁾⁽⁵⁾⁽⁹⁾⁽¹²⁾⁽¹³⁾	1 K	
FM (XP-AIS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + shipping approval ⁽²⁾⁽⁵⁾⁽⁷⁾⁽⁹⁾⁽¹²⁾⁽¹⁴⁾	1 L	
FM (XP) Class I, Div. 1, Groups A, B, C, D ⁽⁸⁾⁽⁹⁾⁽¹⁸⁾⁽²⁶⁾	1 M	
CSA (NI) Class I, Div. 2, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G ⁽¹⁾⁽⁵⁾⁽¹⁹⁾	1 N	
CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁽⁵⁾⁽¹⁵⁾	1 P	
CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁽²⁾⁽⁵⁾⁽⁹⁾⁽¹²⁾⁽¹³⁾	1 Q	
CSA (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁽⁹⁾⁽¹⁵⁾⁽¹⁶⁾⁽²⁶⁾	1 R	
NEPSI Ex ia IIC T6 ⁽⁵⁾⁽¹¹⁾	2 A	
NEPSI Ex ia IIC T6 + DIP A20/21 TA T ^{(*)1)(5)(8)(9)}	2 B	
NEPSI Ex d ia IIC T6 ⁽²⁾⁽⁵⁾⁽⁹⁾⁽¹³⁾	2 C	
NEPSI Ex d ia IIC T6 + DIP A20/21 TA T ^{(*)2)(5)(9)(13)}	2 D	
NEPSI Ex d IIC T6 ⁽⁸⁾⁽⁹⁾⁽²⁶⁾	2 E	

Selection and Ordering data	Article No.	Ord. Code
SITRANS LG260	7ML5882-	
A guided wave radar sensor for level measurement of solids.		
NEPSI Ex d IIC T6 + DIP A20/21 TA T ^{(*)8)(9)(26)}	2 F	
NEPSI DIP A20/21 TA T ^{(*)1)(9)(13)(15)}	2 G	
INMETRO Ex ia IIC T6 ... T10 ⁽⁵⁾⁽¹¹⁾	3 A	
INMETRO Ex t IIC T [*] IP6X, Da, Da/Db, Da/Dc, Db + Ex ia IIC T6, Ga, Ga/Gb ⁽¹⁾⁽⁵⁾⁽⁸⁾⁽⁹⁾	3 B	
INMETRO Ex d ia IIC T6 ... T1 ⁽²⁾⁽⁵⁾⁽⁹⁾⁽¹³⁾	3 C	
INMETRO Ex t IIC T [*] IP6X, Da, Da/Db, Da/Dc, Db + Ex d ia IIC T6 Ga/Gb ⁽²⁾⁽⁵⁾⁽⁹⁾⁽¹³⁾	3 D	
INMETRO Ex d IIC T6 ... T1 ⁽⁹⁾⁽¹¹⁾⁽²⁶⁾	3 E	
INMETRO Ex t IIC T [*] IP6X, Da, Da/Db, Da/Dc, Db + Ex d IIC T6 Ga/Gb ⁽⁸⁾⁽⁹⁾⁽²⁶⁾	3 F	
INMETRO Ex t IIC T [*] IP6X, Da, Da/Db, Da/Dc, Db ⁽¹⁾⁽⁵⁾⁽⁹⁾⁽¹³⁾	3 G	
KOSHA Ex d IIC T6 ... T1 – KE ⁽⁸⁾⁽⁹⁾⁽²⁶⁾	4 A	
Korea KC ex free area	6 A	
GOST-R/EAC 0 Ex ia IIC T1 ... T6 X	5 A	
GOST-R/EAC 0 Ex ia IIC T1 ... T6 X + Ex t IIC T ... IP66 ⁽¹⁾⁽⁸⁾	5 B	
GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X ⁽²⁾⁽⁹⁾⁽¹³⁾	5 C	
GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X + Ex t IIC T ... IP66 ⁽²⁾⁽⁹⁾⁽¹³⁾	5 D	
GOST-R/EAC 1 Ex d IIC T1 ... T6 X ⁽⁸⁾⁽²⁶⁾	5 E	
GOST-R/EAC 0 Ex d IIC T1 ... T6 X + Ex t IIC T ... IP66 ⁽⁸⁾⁽²⁶⁾	5 F	
GOST-R/EAC Ex t IIC T ... IP66 ⁽¹⁾⁽¹³⁾	5 G	
Note: Version/Material, Process fitting/Material, and Length options are available only with options of corresponding type.		
Probe version/Material		
Probe exchangeable cable ø 4 mm (0.16 inch) with gravity weight/316 ⁽²⁰⁾⁽²¹⁾	A	
Probe exchangeable cable ø 6 mm (0.24 inch) with gravity weight/316 ⁽²⁰⁾⁽²¹⁾	B	
Probe exchangeable cable ø 6 mm (0.24 inch) with gravity weight/PA coated ⁽²²⁾	C	
Probe exchangeable cable ø 11 mm (0.43 inch) with gravity weight/PA coated ⁽²²⁾	D	
Probe exchangeable rod ø 16 mm (0.63 inch)/316L ⁽²⁰⁾	E	
Process fitting/Material		
Thread G 3/4" (DIN 3852-A) PN 40/316L	0 0	
Thread 3/4" NPT (ASME B1.20.1) PN 40/316L	0 1	
Thread G 1" (DIN 3852-A) PN 40/316L	0 2	
Thread 1" NPT (ASME B1.20.1) PN 40/316L	0 3	
Thread G 1 1/2" (DIN 3852-A) PN 40/316L	0 4	
Thread 1 1/2" NPT (ASME B1.20.1) PN 40/316L	0 5	
Thread G 2" (DIN 3852-A) PN 40/316L	0 6	
Flange DN 50 PN 40 Form C, DIN 2501/316L	1 0	
Flange DN 80 PN 40 Form C, DIN 2501/316L	1 2	
Flange DN 100 PN 16 Form C, DIN 2501/316L	1 3	
Flange DN 100 PN 40 Form C, DIN 2501/316L	1 4	
Flange DN 150 PN 16 Form C, DIN 2501/316L	1 5	
Flange DN 50 PN 40 EN 1092-1 Form B1/316L	1 6	
Flange DN 80 PN 40 EN 1092-1 Form B1/316L	1 7	
Flange DN 100 PN 16 EN 1092-1 Form B1/316L	1 8	
Flange 2" 150 lb RF, ASME B16.5/316L	3 0	
Flange 2" 300 lb RF, ASME B16.5/316L	3 2	
Flange 3" 150 lb RF, ASME B16.5/316L	3 3	

Level Measurement

Continuous level measurement
Guided wave radar transmitters


SITRANS LG series

Selection and Ordering data	Article No.	Ord. Code	Selection and Ordering data	Article No.	Ord. Code
SITRANS LG260	7ML5882-		SITRANS LG260	7ML5882-	
A guided wave radar sensor for level measurement of solids.			A guided wave radar sensor for level measurement of solids.		
Flange 3" 300 lb RF, ASME B16.5/316L	3 4		Stainless steel (precision casting) 316L/IP66/ IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel ⁽⁹⁾⁽¹²⁾	S	
Flange 4" 150 lb RF, ASME B16.5/316L	3 5		Stainless steel (electropolished) 316L/IP66/ IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel ⁽⁹⁾⁽¹²⁾	T	
Flange 4" 300 lb RF, ASME B16.5/316L	3 6		Aluminum single chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated	W	
Flange 6" 150 lb RF, ASME B16.5/316L	3 7		Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated	X	
Electronics			Stainless steel single chamber (precision casting)/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated	Y	
Two-wire 4 ... 20 mA/HART	0		Stainless steel double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated	U	
Four-wire Modbus ⁽²⁾⁽⁹⁾⁽¹²⁾	1		Remote stainless steel single chamber housing, electropolished/IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug ⁽¹²⁾	Z	Q 2 A
Two-wire 4 ... 20 mA/HART with SIL qualification ⁽⁹⁾	2		Remote plastic single chamber housing / IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug ⁽¹²⁾	Z	Q 2 B
Four-wire 4 ... 20 mA/HART; 90 ... 253 V AC; 50/60 Hz ⁽²⁾⁽⁹⁾⁽¹²⁾	3				
Four-wire 4 ... 20 mA/HART; 9.6 ... 48 V DC; 20 ... 42 V AC ⁽²⁾⁽⁹⁾⁽¹²⁾	4		Lengths		
PROFIBUS PA ⁽⁹⁾	5		<u>Rod ø 16 mm/316L</u>		
FOUNDATION Fieldbus ⁽⁹⁾	6		500 mm (19.69 inch)	0	
Seal/Process temperature			501 ... 1 000 mm (19.72 ... 39.37 inch)	1	
FKM (SHS FPM 70C3 GLT)/-40 ... +80 °C (-40 ... +176 °F) ⁽²³⁾	A		1 001 ... 2 000 mm (39.41 ... 78.74 inch)	2	
FKM (SHS FPM 70C3 GLT)/-40 ... +150 °C (-40 ... +302 °F)	B		2 001 ... 3 000 mm (78.78 ... 118.11 inch)	3	
FFKM (Kalrez 6375)/-20 ... +200 °C (-4 ... +392 °F)	C		3 001 ... 4 000 mm (118.15 ... 157.48 inch)	4	
EPDM (A+P 75.5/KW75F)/-40 ... +80 °C (-40 ... +176 °F) ⁽²³⁾	D		4 001 ... 5 000 mm (157.52 ... 196.85 inch)	5	
EPDM (A+P 75.5/KW75F)/without/ -40 ... +150 °C (-40 ... +392 °F)	E		5 001 ... 6 000 mm (196.89 ... 236.22 inch)	6	
Housing/Protection/Cable			<u>Cable lengths ø 4 mm/316</u>		
Note: for installation of remote display, 7ML5840, with LG two chamber housing options, contact PVC			501 ... 1 000 mm (19.72 ... 39.37 inch)	9	R 2 E
Plastic IP66/IP67 M20 x 1.5/blind stopper ⁽⁹⁾⁽¹²⁾	A		1 001 ... 5 000 mm (39.41 ... 196.85 inch)	9	R 2 F
Plastic IP66/IP67 1/2" NPT/blind stopper ⁽⁹⁾⁽¹²⁾	B		5 001 ... 10 000 mm (196.89 ... 393.70 inch)	9	R 2 G
Plastic 2-chamber/IP66/IP67/M20 x 1.5/ blind stopper	C		10 001 ... 15 000 mm (393.74 ... 590.55 inch)	9	R 2 H
Plastic 2-chamber/IP66/IP67/ 1/2" NPT/ blind stopper	D		15 001 ... 20 000 mm (590.59 ... 787.40 inch)	9	R 2 J
Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/ blind stopper ⁽⁹⁾⁽¹²⁾	E		20 001 ... 25 000 mm (787.44 ... 984.25 inch)	9	R 2 K
Aluminum/IP66/IP68 (0.2 bar) 1/2" NPT/ blind stopper ⁽⁹⁾⁽¹²⁾	F		25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)	9	R 2 L
Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper	G		30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)	9	R 2 M
Aluminum double chamber/IP66/ IP68 (0.2 bar) 1/2" NPT/blind stopper	H		35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)	9	R 2 N
Stainless Steel (precision casting) 316L/IP66/ IP68 (0.2 bar) M20 x 1.5/blind stopper ⁽⁹⁾⁽¹²⁾	J		40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)	9	R 2 P
Stainless steel (precision casting) 316L/IP66/ IP68 (0.2 bar) 1/2" NPT/blind stopper ⁽⁹⁾⁽¹²⁾	K		45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)	9	R 2 Q
Stainless steel (electropolished) 316L/IP66/ IP68 (0.2 bar) M20 x 1.5/blind stopper ⁽⁹⁾⁽¹²⁾	L		50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)	9	R 2 R
Stainless steel (electropolished) 316L/IP66/ IP68 (0.2 bar) 1/2" NPT/blind stopper ⁽⁹⁾⁽¹²⁾	M		55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)	9	R 2 S
Stainless steel double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper	N		<u>Cable lengths ø 6 mm/316L</u>		
Stainless steel double chamber/IP66/ IP68 (0.2 bar) 1/2" NPT/blind stopper	P		500 mm (19.69 inch)	9	R 4 A
Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/ cable gland stainless steel ⁽⁹⁾⁽¹²⁾	Q		501 ... 1 000 mm (19.72 ... 39.37 inch)	9	R 4 B
Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel	R		1 001 ... 5 000 mm (39.41 ... 196.85 inch)	9	R 4 C
			5 001 ... 10 000 mm (196.89 ... 393.70 inch)	9	R 4 D

Level Measurement

Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

Selection and Ordering data	Article No.	Ord. Code	Selection and Ordering data	Order code
SITRANS LG260	7ML5882-		Further designs (mandatory)	
A guided wave radar sensor for level measurement of solids.			Please add "-Z" to Article No. and specify Order code(s).	
10 001 ... 15 000 mm (393.74 ... 590.55 inch)		9 R 4 E	Supplementary electronics	
15 001 ... 20 000 mm (590.59 ... 787.40 inch)		9 R 4 F	Without	A00
20 001 ... 25 000 mm (787.44 ... 984.25 inch)		9 R 4 G	Additional current output 4 ... 20 mA ¹²⁾	A01
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)		9 R 4 H	Rod mounted	
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)		9 R 4 J	Without Rod, applicable for coax or cable probe types only	C00
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)		9 R 4 K	Mounted	C01
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)		9 R 4 L	Not mounted	C02
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)		9 R 4 M	Indicating/adjustment module	
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)		9 R 4 N	Without	E00
55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)		9 R 4 P	Mounted	E01
<u>Cable lengths ø 6 mm or ø 11 mm/PA coated</u>			Laterally mounted	E02
501 ... 1 000 mm (19.72 ... 39.37 inch)		9 R 6 A	Language of display	
1 001 ... 5 000 mm (39.41 ... 196.85 inch)		9 R 6 B	German	L00
5 001 ... 10 000 mm (196.89 ... 393.70 inch)		9 R 6 C	English	L01
10 001 ... 15 000 mm (393.74 ... 590.55 inch)		9 R 6 D	French	L02
15 001 ... 20 000 mm (590.59 ... 787.40 inch)		9 R 6 E	Dutch	L03
20 001 ... 25 000 mm (787.44 ... 984.25 inch)		9 R 6 F	Italian	L04
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)		9 R 6 G	Spanish	L05
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)		9 R 6 H	Portuguese	L06
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)		9 R 6 J	Russian	L07
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)		9 R 6 K	Chinese	L08
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)		9 R 6 L	Japanese	L09
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)		9 R 6 M	Operating instructions	
55 001 ... 65 000 mm (2 165.39 ... 2 559.06 inch)		9 R 6 N	German	M00
			English	M01
			French	M02
			Spanish	M03
Selection and Ordering data			Selection and Ordering data	Order code
			Further designs (optional)	
			Please add "-Z" to Article No. and specify Order code(s).	
			Enter the total insertion length in plain text description	Y01
			Remote electronic cable lengths: 2 m (6.6 ft). Only available with Housing options Q2A and Q2B.	Y10
			Remote electronic cable lengths: 5 m (16.4 ft). Only available with Housing options Q2A and Q2B.	Y11
			Remote electronic cable lengths: 10 m (32.8 ft). Only available with Housing options Q2A and Q2B.	Y12
			Identification Label (measurement loop) stainless steel, 40 characters max, add in plain text. To add more than one line use a comma ", " for line break.	Y17
			Identification Label (measurement loop) foil, 40 characters max, add in plain text. To add more than one line use a comma ", " for line break.	Y18
			3.1-Inspection Certificate for instrument (EN 10204) ²⁴⁾	C12
			NACE0175 to 3.1 Material Certificate for material (EN10204 NACE MR 0175) (NACE not in scope for Hygienic process connections) ²⁴⁾²⁵⁾	D07
			3.1-Inspection Certificate for instrument with test data (EN 10204) ²⁴⁾	C25
			2.2-Factory certificate for material (EN 10204) ²⁴⁾	C15
			Quality and test plan ²⁴⁾	C26
			Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN10204) ²⁴⁾	C13
			X-ray test + 3.1 certificate/instrument ²⁴⁾	C14
			Positive material identification test + 3.1 certificate/instrument ²⁴⁾	C16

Level Measurement

Continuous level measurement

Guided wave radar transmitters

SITRANS LG series

Selection and Ordering data	Order code
Roughness test + 3.1 certificate/instrument ²⁴⁾	C18
Pressure test + 3.1 certificate/instrument ²⁴⁾	C31
Helium leak test + 3.1 certificate/instrument ²⁴⁾	C32
Pressure test according to Norsok + 3.1 certificate/instrument ²⁴⁾	C61
5 point calibration certificate (min. length 1 000 mm) ²⁴⁾	C62
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
SITRANS LG, GWR sensor Display Module	Article No. A5E34143449
SITRANS LG, two-wire 4 ... 20 mA/HART electronic	A5E35637821
SITRANS LG, USB communicator	A5E35192015
SITRANS LG, Mounting eye M12 x 20	PBD:51041448
SITRANS LG, Mounting spring	PBD:51041449
Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia	7NG4124-0AA00
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-...
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-...
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750-...
For applicable back up point level switch - see point level measurement section	

Note: some configuration options are not available.
For restriction information see the online PIA configuration tool.

- 1) Not available with Plastic and Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
- 2) Available only with Double chamber, Metallic Housing/Protection/Cable options and certain glands.
- 3) Not available with Remote and Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
- 4) Not available with Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
- 5) Not available with Seal/Process temperature option C.
- 6) Not available with Housing/Protection/Cable options W, X, Y, and U.
- 7) Not available with Probe version/Material option E.
- 8) Available only with Electronic options 0 and 2.
- 9) Available only with Supplementary electronic option A00.
- 10) Available only with Electronic options 0, 2, and 5.
- 11) Available only with Electronic options 0, 2, 5, and 6.
- 12) Not available with Indicating/adjustment module option E02.
- 13) Available only with Electronic options 0 ... 4.
- 14) Available only with Electronic options 0, 1, and 2.
- 15) Available only with Electronic options 0, 2, and 6.
- 16) Not available with Seal/Process temperature options B and E.
- 17) Available only with HART Electronic options.
- 18) Available only with Seal/Process temperature option C.
- 19) Not available with PROFIBUS PA Electronic options.
- 20) Not available with Seal/Process temperature options A and D.
- 21) Available only with Rod mounted option C00.
- 22) Available only with Seal/Process temperature options A and D.
- 23) Not available with Housing/Protection/Cable options Q2A and Q2B.
- 24) Listed Certificates are not available with all configurations, please contact factory for more information.
- 25) Available only with 316L Probes. NACE is not available with coated, plated, or hygienic connections.
- 26) Available only with Single chamber, Aluminum and Stainless steel (precision casting) Housing/Protection/Cable options.

Note: Please consult manual for further details.

Level Measurement

Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

Selection and Ordering data	Article No.	Ord. Code
SITRANS LG270	7ML5883-	
A guided wave radar sensor for continuous level and interface measurement of liquids in aggressive applications		
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Approvals		
General purpose (CSA, FM, CE)	0 A	
Shipping approval ¹⁾³⁾⁴⁾⁵⁾⁶⁾	0 B	
Overfill protection (WHG; VLAREM) ³⁾⁵⁾⁶⁾	0 C	
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 ⁷⁾	0 E	
ATEX II 1G, 1/2G, 2G Ex ia IIC + Overfill (WHG; VLAREM) ³⁾⁶⁾	0 F	
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + shipping approval ¹⁾³⁾⁴⁾⁵⁾⁶⁾⁸⁾	0 G	
ATEX II 1G, 1/2G 2G Ex ia IIC + ATEX II 1D, 1/2D, 2D IP6x ²⁾⁵⁾⁹⁾	0 H	
ATEX II 1/2G, 2G Ex d ia IIC T6 ⁵⁾⁸⁾¹⁰⁾¹¹⁾	0 J	
ATEX II 1/2G, 2G Ex d ia IIC + shipping approval ¹⁾³⁾⁵⁾⁸⁾¹¹⁾¹²⁾	0 L	
ATEX II 1/2G, 2G Ex d ia IIC + ATEX II 1/2D, 2D IP6x ⁵⁾⁸⁾¹⁰⁾¹¹⁾	0 M	
ATEX II 1/2G, 2G Ex d IIC T6 ⁵⁾⁹⁾¹⁷⁾	0 N	
ATEX II 1G, II 1/2G, II 2G Ex ia IIC T6...T1 Ga, Ga/Gb, Gb /IEC Ex ia IIC T6 ... T1 Ga, Ga/Gb, Gb ³⁾⁷⁾	0 W	
ATEX II 1/2G, 2G Ex d IIC + ship approval ¹⁾³⁾⁵⁾⁶⁾⁸⁾⁹⁾	0 Q	
ATEX II 1/2G, 2G Ex d IIC + ATEX II 1/2D, 2D IP6x ⁵⁾⁹⁾¹³⁾	0 R	
ATEX II 1D, 1/2D, 2D IP6x T ⁵⁾⁹⁾¹³⁾	0 S	
IEC Ex ia IIC T6 ⁷⁾	0 T	
IEC Ex ia IIC T6 + IEC IP6x T tD ²⁾⁵⁾⁹⁾	0 U	
IEC Ex d ia IIC T6 ⁵⁾⁸⁾¹⁰⁾¹¹⁾	1 A	
IEC Ex d ia IIC T6 + IEC IP6x T tD ⁵⁾⁸⁾¹⁰⁾¹¹⁾	1 B	
IEC Ex d IIC T6 ³⁾⁵⁾⁹⁾¹⁷⁾	1 C	
IEC Ex d IIC T6 + IEC IP6x T tD ³⁾⁵⁾⁹⁾¹³⁾	1 D	
IEC Ex db IIC T6 ... T1 Ga/Gb, Gb + Ship approval ³⁾⁵⁾⁹⁾¹⁴⁾¹⁷⁾	7 C	
IEC Ex ia IIC T6 ... T1 Ga, Ga/Gb, Gb + Ship approval ⁷⁾¹⁴⁾²⁰⁾	7 D	
IEC Ex d ia IIC T6 ... T1 Ga/Gb, Gb + Ship approval ⁵⁾⁸⁾¹⁰⁾¹¹⁾¹⁴⁾	7 E	
FM (NI) Class I, Div. 2, Groups A, B, C, D ⁵⁾¹⁰⁾¹⁵⁾	1 F	
FM (NI) Class I, Div. 2, Groups A, B, C, D + ship approval ¹⁾³⁾⁵⁾⁸⁾¹¹⁾¹²⁾	1 G	
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F ²⁾⁵⁾	1 H	
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + ship approval ¹⁾²⁾³⁾⁴⁾⁵⁾⁸⁾	1 J	
FM (XP-AIS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ⁵⁾⁸⁾¹⁰⁾¹¹⁾	1 K	
FM (XP-AIS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + shipping approval ¹⁾³⁾⁵⁾⁸⁾¹¹⁾¹²⁾	1 L	
FM (XP) Class I, Div. 1, Groups A, B, C, D ⁵⁾¹³⁾¹⁶⁾	1 M	
CSA (NI) Class I, Div. 2, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G ³⁾⁹⁾	1 N	
CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ³⁾⁷⁾	1 P	
CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ³⁾⁵⁾⁸⁾¹⁰⁾¹¹⁾	1 Q	
CSA (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ³⁾⁵⁾¹⁶⁾¹⁹⁾	1 R	

Selection and Ordering data	Article No.	Ord. Code
SITRANS LG270	7ML5883-	
A guided wave radar sensor for continuous level and interface measurement of liquids in aggressive applications		
CSA (NI) Class I, II, III Div. 2, Groups A, B, C, D, F, G + Ship approval ³⁾⁹⁾¹⁴⁾	7 K	
CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval ¹⁴⁾²⁰⁾	7 L	
CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval ³⁾⁵⁾⁸⁾¹⁰⁾¹¹⁾¹⁴⁾	7 M	
NEPSI Ex ia IIC T6 ³⁾⁷⁾	2 A	
NEPSI Ex ia IIC T6 + DIP A20/21 TA T* ²⁾³⁾⁵⁾⁹⁾	2 B	
NERSI Ex d ia IIC T6 ³⁾⁵⁾¹⁰⁾¹¹⁾	2 C	
NEPSI Ex d ia IIC T6 + DIP A20/21 TA T* ³⁾⁵⁾¹⁰⁾¹¹⁾	2 D	
NEPSI Ex d IIC T6 ²⁾³⁾⁵⁾¹⁶⁾	2 E	
NEPSI Ex d IIC T6 + DIP A20/21 TA T* ²⁾³⁾⁵⁾¹⁶⁾	2 F	
NEPSI DIP A20/21 TA T* ³⁾⁵⁾⁹⁾¹⁰⁾	2 G	
INMETRO Ex ia IIC T6 ... T1 ⁷⁾	3 A	
INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex ia IIC T6, Ga, Ga/Gb ²⁾⁵⁾⁹⁾	3 B	
INMETRO Ex d ia IIC T6 ... T1 ⁵⁾¹⁰⁾¹¹⁾	3 C	
INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex d ia IIC T6 Ga/Gb ⁵⁾¹⁰⁾¹¹⁾	3 D	
INMETRO Ex d IIC T6 ... T1 ⁵⁾⁷⁾¹⁶⁾	3 E	
INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex d IIC T6 Ga/Gb ²⁾⁵⁾¹⁶⁾	3 F	
INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db ⁵⁾⁹⁾¹⁰⁾	3 G	
KOSHA Ex d IIC T6 ... T1 – KE ²⁾³⁾⁵⁾¹⁶⁾	4 A	
Korea KC ex free area	6 A	
GOST-R/EAC 0 Ex ia IIC T1 ... T6 X ³⁾⁷⁾²¹⁾	5 A	
GOST-R/EAC 0 Ex ia IIC T1 ... T6 X + Ex t IIIC T ... IP66 ²⁾³⁾⁹⁾	5 B	
GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X ³⁾⁵⁾¹⁰⁾¹¹⁾	5 C	
GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X + Ex t IIIC T ... IP66 ³⁾⁵⁾¹⁰⁾¹¹⁾	5 D	
GOST-R/EAC 1 Ex d IIC T1 ... T6 X ²⁾³⁾¹⁶⁾	5 E	
GOST-R/EAC 0 Ex d IIC T1 ... T6 X + Ex t IIIC T ... IP66 ²⁾³⁾¹⁶⁾	5 F	
GOST-R/EAC Ex t IIIC T ... IP66 ³⁾¹⁰⁾²²⁾	5 G	
Note: Version/Material, Process fitting/ Material, and Length options are available only with options of corresponding type.		
Version/Material		
Probe exchangeable cable ø 2 mm (0.08 inch) with gravity weight/316 ²³⁾²⁴⁾²⁵⁾	A	
Probe exchangeable cable ø 2 mm (0.08 inch) center weight/316L ²³⁾²⁵⁾²⁶⁾	B	
Probe exchangeable cable ø 4 mm (0.16 inch) with gravity weight/316L ²³⁾²⁴⁾²⁵⁾	C	
Probe exchangeable cable ø 4 mm (0.16 inch) with center weight/316L ²³⁾²⁵⁾²⁶⁾	D	
Probe exchangeable rod ø 16 mm (0.63 inch)/316L ²⁴⁾²⁷⁾²⁸⁾	E	
Probe coax version ø 42.2 mm (1.66 inch) with multiple hole/316L ²⁴⁾²⁵⁾²⁸⁾	F	
Probe coax version ø 42.2 mm (1.66 inch); multiple hole; reference distances/316L ²⁴⁾²⁵⁾²⁸⁾²⁹⁾³⁴⁾	G	
Probe exchangeable cable ø 4 mm (0.16 inch) with gravity weight/ Alloy C22 (2.4602) ³⁰⁾	H	
Probe exchangeable rod ø 16 mm (0.63 inch)/Alloy C22 (2.4602) ³⁰⁾	J	
Coax version ø 42.2 mm (1.66 inch) with multiple hole/Alloy C22 (2.4602) ³⁰⁾	K	

Level Measurement

Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

Selection and Ordering data	Article No.	Ord. Code	Selection and Ordering data	Article No.	Ord. Code
SITRANS LG270	7ML5883-		SITRANS LG270	7ML5883-	
A guided wave radar sensor for continuous level and interface measurement of liquids in aggressive applications			A guided wave radar sensor for continuous level and interface measurement of liquids in aggressive applications		
Exchangeable rod, diameter 8 mm (0.32 inch)/316L ^{27/31}	L		Flange DN 80 PN 63, EN 1092-1 Form B2/316L	6 7	
Coax ø 21.3 mm (0.838 inch) with multiple hole/316L ³¹	M		Flange 4" 600 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	6 8	
Process fitting/Material			Flange 2" 150 lb RF, ASME B16.5/316L	3 0	
Thread G 1 1/2" (DIN 3852-A) PN 400/316L ²⁸	0 0		Flange 2" 300 lb RF, ASME B16.5/316L	3 1	
Thread 1 1/2" NPT (ASME B1.20.1) PN 400/316L ²⁸	0 1		Flange 2" 600 lb RF, ASME B16.5/316L	3 2	
Thread G 1 1/2" PN 400, DIN 3852-A/Alloy C22 (2.4602)	0 2		Flange 2" 1 500 lb RF, ASME B16.5/316L	3 3	
Thread 1 1/2" NPT PN 400, ASME B1.20.1/Alloy C22 (2.4602)	0 3		Flange 3" 150 lb RF, ASME B16.5/316L	3 4	
Flange DN 50 PN 40 Form C, DIN 2501/316L with Alloy C22 (2.4602) coating	0 4		Flange 3" 300 lb RF, ASME B16.5/316L	3 5	
Flange DN 80 PN 40 Form C, DIN 2501/316L with Alloy C22 (2.4602) coating	0 5		Flange 3" 600 lb RF, ASME B16.5/316L	3 6	
Flange DN 100 PN 16 Form C, DIN 2501/316L with Alloy C22 (2.4602) coating	0 6		Flange 3" 900 lb RF, ASME B16.5/316L	3 7	
Flange DN 50 PN 40 Form B1, EN 1092-1/316L with Alloy C22 (2.4602) coating	0 7		Flange 3" 2 500 lb RF, ASME B16.5/316L	3 8	
Flange DN 50 PN 63 Form B1, EN 1092-1/316L with Alloy C22	0 8		Flange 3 1/2" 600 lb RF, ASME B16.5/316L	4 0	
Flange DN 50 PN 40 Form C, DIN 2501/316L	1 0		Flange 4" 150 lb RF, ASME B16.5/316L	4 1	
Flange DN 50 PN 40 form V13, DIN 2513/316L	1 1		Flange 4" 300 lb RF, ASME B16.5/316L	4 2	
Flange DN 65 PN 64 Form V13, DIN 2501/316L	1 2		Flange 4" 600 lb RF, ASME B16.5/316L	4 3	
Flange DN 80 PN 40 Form C, DIN 2501/316L	1 3		Flange 6" 150 lb RF, ASME B16.5/316L	4 4	
Flange DN 80 PN 40 Form V13, DIN 2501/316L	1 4		Flange 6" 300 lb RF, ASME B16.5/316L	4 5	
Flange DN 80 PN 100 Form L, DIN 2501/316L ²⁸	1 5		Flange 6" 600 lb RF, ASME B16.5/316L	4 6	
Flange DN 100 PN 16 Form C, DIN 2501/316L	1 6		Flange 2" 150 lb Fisher special return/316L	4 7	
Flange DN 100 PN 16 Form V13, DIN 2501/316L	1 7		Flange 3" 900 lb RJF, ASME B16.5/Alloy C22 (2.4602)	4 8	
Flange DN 100 PN 40 Form C, DIN 2501/316L	1 8		Flange 2" 900 lb RF, ASME B16.5/316L	5 0	
Flange DN 100 PN 40 Form V13, DIN 2513/316L	2 0		Flange 3" 1 500 lb RF, ASME B16.5/316L	5 1	
Flange DN 150 PN 16 Form C, DIN 2501/316L	2 1		Flange 4" 900 lb RF, ASME B16.5/316L	5 2	
Flange DN 50 PN 40 EN 1092-1 Form B1/316L	2 2		Flange 4" 1 500 lb RF, ASME B16.5/316L	5 3	
Flange DN 100 PN 160 GOST 12815-80.7/316L ²⁸	2 3		Flange 4" 2 500 lb RJF, ASME B16.5/316L ²⁸	5 4	
Flange 2" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	2 4		Flange 4" 1500 lb RJF, ASME B16.5/316L ²⁸	5 5	
Flange 2" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	2 5		Flange 3" 600 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	5 6	
Flange 2" 600 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	2 6		Flange 4" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	5 7	
Flange 3" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	2 7		Flange 4" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	5 8	
Flange 3" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	2 8		Flange 6" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating	7 0	
Flange DN 80 PN 160 Form C, DIN 2501/316L ²⁸	6 0		Flange DN 50 PN 40 Form C, DIN 2501/Alloy C22 (2.4602) solid	7 1	
Flange DN 80 PN 250 Form L, DIN 2501/316L ²⁸	6 1		Flange DN 100 PN 16 Form C, DIN 2501/C22 solid	7 2	
Flange DN 50 PN 160, EN 1092-1 Form B1/316L ²⁸	6 2		Flange DN 100 PN 40 Form N, DIN 2501/Alloy C22 (2.4602) solid	7 3	
Flange DN 50 PN 160, EN 1092-1 Form B2/316L ²⁸	6 3		Flange DN 50 PN 40 Form B1, EN 1092-1/Alloy C22 (2.4602) solid	7 4	
Flange DN 50 PN 32, EN 1092-1 Form B1/316L ²⁸	6 4		Flange 2" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid	7 5	
Flange DN 65 PN 250, EN 1092-1 Form B1/316L ²⁸	6 5		Flange 2" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) solid	7 6	
Flange DN 100 PN 160, EN 1092-1 Form B2/316L ²⁸	6 6		Flange 2" 600 lb RF, ASME B16.5/Alloy C22 (2.4602) solid	7 7	
			Flange 2" 900 lb RJF, ASME B16.5/Alloy C22 (2.4602) solid	7 8	
			Flange 2" 1 500 lb RJF, ASME B16.5/Alloy C22 (2.4602) solid	8 0	
			Flange 3" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid	8 1	
			Flange 3" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) solid	8 2	
			Flange 3" 600 lb RF, ASME B16.5/Alloy C22 (2.4602) solid	8 3	

Level Measurement

Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

Selection and Ordering data	Article No.	Ord. Code	Selection and Ordering data	Article No.	Ord. Code
SITRANS LG270	7ML5883-		SITRANS LG270	7ML5883-	
A guided wave radar sensor for continuous level and interface measurement of liquids in aggressive applications			A guided wave radar sensor for continuous level and interface measurement of liquids in aggressive applications		
Flange 4" 150 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	8 4		Aluminum/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper		D
Flange 4" 300 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	8 5		Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper		E
Flange 3" 600 lb RJF for R31, ASME B16.5/ Alloy C22 (2.4602) solid	8 6		Aluminum double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper		F
Flange 2" 2 500 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 A	Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper		L
Flange 3" 1 500 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 B	Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper		M
Flange 3" 2 500 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 C	Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper		N
Flange 4" 600 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 D	Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper		P
Flange 4" 600 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 E	Stainless steel double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper		Q
Flange 4" 900 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 F	Stainless steel double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper		R
Flange 4" 900 lb RJF, ASME B16.5/ Alloy C22 (2.4602) massiv	9 0	L 1 G	Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/ cable gland stainless steel		S
Flange 4" 1 500 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 H	Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel		T
Flange 4" 2 500 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 J	Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel		U
Flange 8" 300 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid	9 0	L 1 K	Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel		V
Flange 3 1/2" 600 lb Fisher type 249B and 259B/ Alloy C22 (2.4602) solid	9 0	L 1 L	Aluminum single chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated		W
Flange 2 1/2" 300 lb RF, ASME B16.5/316/316L	9 0	L 2 A	Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated		X
Flange 2 1/2" 600 lb RF, ASME B16.5/316/316L	9 0	L 2 B	Stainless steel single chamber (precision casting)/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated		Y
Flange DN 50 PN 40 Form D, EN 1092-1/316/316L ³²⁾	9 0	L 2 C	Stainless steel double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated		J
Flange 2 1/2" 1 500 lb RF, ASME B16.5/316/316L	9 0	L 2 D	Remote stainless steel single chamber housing, electropolished/IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug ⁸⁾	Z	Q 2 A
Thread G 1" (DIN 3852-A) PN 100/316L	9 0	L 3 C	Remote plastic single chamber housing / IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug ⁸⁾	Z	Q 2 B
Thread 1" NPT, ASME B1.20.1/PN 100/316L	9 0	L 3 D			
Thread G 1 1/2" (DIN 3852-A) PN 100/316L	9 0	L 3 E			
Thread 1 1/2" NPT, ASME B1.20.1/PN100/316L	9 0	L 3 F			
Thread 2" NPT, ASME B1.20.1/PN 100/316L	9 0	L 3 G			
Electronics			Lengths		
Two-wire 4 ... 20 mA/HART	0		Rod ø 16 mm/316L		
Four-wire Modbus ⁵⁾⁸⁾¹¹⁾	1		300 mm (11.81 inch) ³³⁾		0
Two-wire 4 ... 20 mA/HART with SIL qualification ⁵⁾	2		500 mm (19.69 inch) ³³⁾		1
Four-wire 4 ... 20 mA/HART; 90 ... 253 V AC; 50/60 Hz ⁵⁾⁸⁾¹¹⁾	3		501 ... 1 000 mm (19.72 ... 39.37 inch) ³³⁾		2
Four-wire 4 ... 20 mA/HART; 9.6 ... 48 V DC; 20 ... 42 V AC ⁵⁾⁸⁾¹¹⁾	4		1 001 ... 2 000 mm (39.41 ... 78.74 inch) ³³⁾		3
PROFIBUS PA ⁵⁾	5		2 001 ... 3 000 mm (78.78 ... 118.11 inch) ³³⁾		4
FOUNDATION Fieldbus ⁵⁾	6		3 001 ... 4 000 mm (118.15 ... 157.48 inch) ³³⁾		5
			4 001 ... 5 000 mm (157.52 ... 196.85 inch) ³³⁾		6
			5 001 ... 6 000 mm (196.89 ... 236.22 inch) ³³⁾		7
Seal/Second line of defense/ Process temperature					
Ceramic-graphite/with glass seal/ -196 ... +280 °C (-321 ... +536 °F)	A				
Ceramic-graphite/with glass seal/ -196 ... +450 °C (-321 ... +842 °F)	B				
Ceramic-graphite/with glass seal/ -196 ... +400 °C (-321 ... +752 °F) ²⁹⁾	C				
PEEK-FFKM (Kalrez 6375) /with glass seal/ -20...+250 °C (-4 ... +482 °F) ²⁹⁾	D				
Housing/Protection/Cable					
Note: for installation of remote display, 7ML5840, with LG two chamber housing options, contact PVC					
Plastic IP66/IP67 M20 x 1.5/blind stopper		A			
Plastic IP66/IP67 1/2" NPT/blind stopper		B			
Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/ blind stopper		C			

Level Measurement

Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

Selection and Ordering data	Article No.	Ord. Code	Selection and Ordering data	Article No.	Ord. Code
SITRANS LG270	7ML5883-		SITRANS LG270	7ML5883-	
A guided wave radar sensor for continuous level and interface measurement of liquids in aggressive applications			A guided wave radar sensor for continuous level and interface measurement of liquids in aggressive applications		
<u>Rod ø 16 mm/C22</u>			<u>Coax ø 42.2 mm/316L</u>		
501 ... 1 000 mm (19.72 ... 39.37 inch) ³³⁾		9 R 1 A	45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)		9 R 4 L
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ³³⁾		9 R 1 B	50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)		9 R 4 M
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ³³⁾		9 R 1 C	55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)		9 R 4 N
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ³³⁾		9 R 1 D			
4 001 ... 5 000 mm (157.52 ... 196.85 inch) ³³⁾		9 R 1 E			
5 001 ... 6 000 mm (196.89 ... 236.22 inch) ³³⁾		9 R 1 F			
<u>Rod ø 8 mm/316L</u>					
300 ... 1 000 mm (11.81 ... 39.37 inch)		9 R 1 H	300 ... 1 000 mm (11.81 ... 39.37 inch) ³³⁾		9 R 3 G
1 001 ... 2 000 mm (39.41 ... 78.74 inch)		9 R 1 J	1 001 ... 2 000 mm (39.41 ... 78.74 inch) ³³⁾³⁴⁾		9 R 3 H
2 001 ... 3 000 mm (78.78 ... 118.11 inch)		9 R 1 K	2 001 ... 3 000 mm (78.78 ... 118.11 inch) ³³⁾		9 R 3 J
3 001 ... 4 000 mm (118.15 ... 157.48 inch)		9 R 1 L	3 001 ... 4 000 mm (118.15 ... 157.48 inch) ³³⁾		9 R 3 K
4 001 ... 5 000 mm (157.52 ... 196.85 inch)		9 R 1 M	4 001 ... 5 000 mm (157.52 ... 196.85 inch) ³³⁾		9 R 3 L
5 001 ... 6 000 mm (196.89 ... 236.22 inch)		9 R 1 N	5 001 ... 6 000 mm (196.89 ... 236.22 inch) ³³⁾		9 R 3 M
<u>Cable lengths ø 2 or 4 mm/316L</u>			<u>Coax ø 21.3 mm/316L</u>		
501 ... 1 000 mm (19.72 ... 39.37 inch)		9 R 2 E	300 ... 1 000 mm (11.81 ... 39.37 inch) ³³⁾		9 R 3 Q
1 000 ... 5 000 mm (39.37 ... 196.85 inch)		9 R 2 F	1 001 ... 2 000 mm (39.41 ... 78.74 inch) ³³⁾³⁴⁾		9 R 3 R
5 001 ... 10 000 mm (196.89 ... 393.70 inch)		9 R 2 G	2 001 ... 3 000 mm (78.78 ... 118.11 inch) ³³⁾		9 R 3 S
10 001 ... 15 000 mm (393.74 ... 590.55 inch)		9 R 2 H	3 001 ... 4 000 mm (118.15 ... 157.48 inch) ³³⁾		9 R 3 T
15 001 ... 20 000 mm (590.59 ... 787.40 inch)		9 R 2 J	4 001 ... 5 000 mm (157.52 ... 196.85 inch) ³³⁾		9 R 3 U
20 001 ... 25 000 mm (787.44 ... 984.25 inch)		9 R 2 K	5 001 ... 6 000 mm (196.89 ... 236.22 inch) ³³⁾		9 R 3 V
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)		9 R 2 L			
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)		9 R 2 M			
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)		9 R 2 N			
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)		9 R 2 P			
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)		9 R 2 Q			
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)		9 R 2 R			
55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)		9 R 2 S			
<u>Cable lengths ø 4 mm/ C22</u>					
501 ... 1 000 m (19.72 ... 39.37 inch)		9 R 4 A			
1 000 ... 5 000 mm (39.37 ... 196.85 inch)		9 R 4 B			
5 001 ... 10 000 mm (196.89 ... 393.70 inch)		9 R 4 C			
10 001 ... 15 000 mm (393.74 ... 590.55 inch)		9 R 4 D			
15 001 ... 20 000 mm (590.59 ... 787.40 inch)		9 R 4 E			
20 001 ... 25 000 mm (787.44 ... 984.25 inch)		9 R 4 F			
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)		9 R 4 G			
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)		9 R 4 H			
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)		9 R 4 J			
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)		9 R 4 K			

Level Measurement

Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Further designs (mandatory)		Further designs (optional)	
Please add "-Z" to Article No. and specify Order code(s).		Please add "-Z" to Article No. and specify Order code(s).	
Supplementary electronics		Enter the total insertion length in plain text description	Y01
Without	A00	Y02 rigid part is 100 mm, only applicable for cable versions	Y02
Additional current output 4 ... 20 mA ⁸⁾	A01	Reference probe G length of reference distance = 260 mm/10.24 inches (note blanking 450 mm required with min. probe 1 000 mm)	Y05
Dimensions centering weight (diameter/height)		Reference probe G length of reference distance = 500 mm/19.69 inches (note blanking 690 mm required with min. probe 1 250 mm)	Y06
Without	B00	Reference probe G length of reference distance = 750 mm/29.53 inches (note blanking 940 mm required with min. probe 1 500 mm)	Y07
ø 40/30 mm	B01	Remote electronic cable lengths: 2 m (6.6 ft). Only available with Housing options Q2A and Q2B	Y10
ø 45/30 mm (for 2 inch tubes)	B02	Remote electronic cable lengths: 5 m (16.4 ft). Only available with Housing options Q2A and Q2B	Y11
ø 75/30 mm (for 3 inch tubes)	B03	Remote electronic cable lengths: 10 m (32.8 ft). Only available with Housing options Q2A and Q2B	Y12
ø 95/30 mm (for 4 inch tubes)	B04	Customer specific adjustment (unit value, 100 % distance from seal, 0 % distance from seal)	Y20
ø 40 mm/30 mm	B05	Cleaning included certificate: oil, grease and silicone free	W01
ø 1.57 inch/1.18 inch (for 2 inch Schedule 160)		Identification Label (measurement loop) stainless steel, 40 characters max, add in plain text. To add more than one line use a coma "," for line break.	Y17
ø 45 mm/30 mm (for 2 inch tubes)	B06	Identification Label (measurement loop) foil, 40 characters max, add in plain text. To add more than one line use a coma "," for line break.	Y18
ø 1.77 inch/1.18 inch (for 2 inch Schedule 40/80)	B07	3.1-Inspection Certificate for instrument (EN 10204) ³⁵⁾	C12
ø 75 mm/30 mm (for 3 inch tubes)	B08	NACE0175 to 3.1 Material Certificate for material (EN10204 NACE MR 0175) (NACE not in scope for Hygienic process connections) ³⁵⁾	D07
ø 2.95 inch/1.18 inch (for 3 inch Schedule 10/40)		3.1-Inspection Certificate for instrument with test data (EN 10204) ³⁵⁾	C25
ø 95 mm/30 mm (for 4 inch tubes)		2.2-Factory certificate for material (EN 10204) ³⁵⁾	C15
ø 3.74 inch/1.18 inch (for 4 inch Schedule 80)		Quality and test plan ³⁵⁾	C26
Rod mounted		Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN10204) ³⁵⁾	C13
Without Rod, applicable for coax or cable probe types only	C00	X-ray test + 3.1 certificate/instrument ³⁵⁾	C14
Mounted	C01	Positive material identification test + 3.1 certificate/ instrument ³⁵⁾	C16
Not mounted	C02	Roughness test + 3.1 certificate/instrument ³⁵⁾	C18
Indicating/adjustment module		Pressure test + 3.1 certificate/instrument ³⁵⁾	C31
Without	E00	Helium leak test + 3.1 certificate/instrument ³⁵⁾	C32
Mounted	E01	Pressure test according to Norsok + 3.1 certificate/ instrument ³⁵⁾	C61
Laterally mounted	E02	5 point calibration certificate (min. length 1 000 mm) ³⁵⁾	C62
Language of display		Pressure test (acc. to ASME B31.1), incl. 3.1 Inspection certificate ³⁶⁾	C63
German	L00	Certificate: Approval for steam boiler according to EN 12952-11, EN 12953-9 ³⁷⁾	C70
English	L01		
French	L02		
Dutch	L03		
Italian	L04		
Spanish	L05		
Portuguese	L06		
Russian	L07		
Chinese	L08		
Japanese	L09		
Operating instructions			
German	M00		
English	M01		
French	M02		
Spanish	M03		

Selection and Ordering data	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
SITRANS LG, GWR sensor Display Module	A5E34143449
SITRANS LG, two-wire 4 ... 20 mA/HART electronic	A5E35637821
SITRANS LG, USB communicator	A5E35192015
SITRANS LG, Mounting eye M12 x 20	PBD:51041448
SITRANS LG, Mounting spring	PBD:51041449
Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia	7NG4124-0AA00
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-...
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-...
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750-...
For applicable back up point level switch - see point level measurement section	

Note: some configuration options are not available.
For restriction information see the online PIA configuration tool.

- 1) Not available with Version/Material options E, F, G, J, and K.
- 2) Available only with Electronic options 0 and 2.
- 3) Not available with Seal/Process temperature option D.
- 4) Not available with Stainless Steel (electropolished) Housing/Protection/Cable options and certain glands.
- 5) Available only with Supplementary electronic option A00.
- 6) Available only with Electronic options 0, 2, and 5.
- 7) Available only with Electronic options 0, 2, 5, and 6.
- 8) Not available with Indicating/adjusting module E02.
- 9) Not available with Plastic and Stainless Steel (electropolished) Housing/Protection/Cable options and certain glands.
- 10) Available only with Electronic options 0 ... 4.
- 11) Available only with Double chamber, Metallic Housing/Protection/Cable options and certain glands.
- 12) Available only with Electronic options 0, 1, and 2.
- 13) Available only with Electronic options 0, 2, 3, and 4.
- 14) Available only with Version/Material options A, B, C, D, and H.
- 15) Not available with Remote and Stainless Steel (electropolished) Housing/Protection/Cable options and certain glands.
- 16) Available only with Single chamber, Aluminum and Stainless steel (precision casting) Housing/Protection/Cable options.
- 17) Not available with Modbus and FOUNDATION Fieldbus Electronic options.
- 18) Available only with Electronic options 0, 2, and 6.
- 19) Not available with Modbus Electronic options.
- 20) Available only with Housing/Protection/Cable options N, P, V, and Q2A.
- 21) Not available with Housing/Protection/Cable options W, X, Y, and J.
- 22) Available only with Housing/Protection/Cable options C, E, L, Q.
- 23) Not available with Seal/Process temperature option C.
- 24) Available only with Dimensions centering weight option B00.
- 25) Available only with Rod mounted option C00.
- 26) Not available with Dimensions centering weight option B00.
- 27) Not available with Rod mounted option C00.
- 28) Not available with Seal/Process temperature options C and D.
- 29) Not available with Remote Housing/Protection/Cable options.
- 30) Not available with Seal/Process temperature options B and D.
- 31) Available only with Seal/Process temperature option D.
- 32) Available only with Seal/Process temperature options A, B, and C.
- 33) Not available with Order code Y02.


34) Accuracy is application dependent, please consult factory.

35) Listed Certificates are not available with all configurations, please contact factory for more information.

36) Available only with ASME Process fitting/Material options.

37) Available with Version/Material options G, L, M and Electronic options 2 and 6.


Note: Please consult manual for further details.

Selection and Ordering data		Article No.	
SITRANS LG Replacement Probes		7ML5841-  0	
<u>Cable Lengths ø 6 mm/316</u>			
501 ... 1 000 mm (19.72 ... 39.37 inch)			BM
1 001 ... 5 000 mm (39.41 ... 196.85 inch)			BN
5 000 ... 10 000 mm (196.89 ... 393.70 inch)			BP
10 001 ... 15 000 mm (393.74 ... 590.55 inch)			BQ
15 001 ... 20 000 mm (590.59 ... 787.40 inch)			BR
20 001 ... 25 000 mm (787.44 ... 984.25 inch)			BS
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)			BT
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)			BU
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)			BV
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)			BW
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)			BX
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)			BY
55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)			CA
60 001 ... 65 000 mm (2 362.24 ... 2 559.06 inch)			CB
65 001 ... 70 000 mm (2 559.09 ... 2 755.91 inch)			CC
70 001 ... 75 000 mm (2 755.94 ... 2 952.76 inch)			CD
Selection and Ordering data		Order code	
Further designs			
Please add "-Z" to Article No. and specify Order code(s).			
Enter the total insertion length in plain text description		Y01	
Total length: Enter the total length of rigid part (range 100 ... 1 000 mm LG270 limited to 100 mm) (cable versions only)		Y02	
1) Available only with Dimension centering weight option 0.			
2) Available only with Dimension centering weight options 1 ... 8.			
3) All Probe types are only available with corresponding Probe lengths.			
4) Available only with Probe type option AQ.			
5) Available only with Process fitting options 2 and 3.			
6) Not available with Probe type options AQ and AW.			
7) Available only with Probe type options AE, AH, and AW.			
8) Not available with Process fitting option 2.			
9) Available only with Probe type options AA, AC, AE, AG, and AW.			
10) Available only with Process fitting options 0 and 3.			
11) Not available with certificate options 1 and 2.			

Level Measurement

Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

Selection and Ordering data	Article No.	
SITRANS LG Spacers	7ML5842-	
	 - 0 0 A A 0	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Instrument		
LG240 ¹⁾	0	
LG250 ²⁾	1	
LG260 ³⁾	2	
LG270 ³⁾	3	
Version/Material		
Cable ø 4 mm/ PFA ⁴⁾	AA	
Rod ø 8 mm including fastening/ PEEK can be shortened ⁵⁾	AB	
Rod ø 10 mm/ PFA ⁴⁾	AC	
Rod ø 12 mm including fastening/ PEEK can be shortened ⁵⁾	AD	
Rod ø 16 mm, cable with gravity weight, including fastening/ PEEK can be shortened ⁵⁾⁷⁾	AE	
Cable ø 2 mm including fastening/ PEEK and 316L	AF	
Rod ø 16 mm including fastening/ 1.4568 (AISI 631) flexible ⁸⁾	AG	
Rod ø 8 mm including fastening/ PTFE can be shortened ⁵⁾	AH	
Rod ø 12 mm including fastening/ 1.4568 (AISI 631) flexible ⁶⁾	AG	
Tube diameter		
50 mm (2 inch) up to 100 mm (4 inch)	1	
49.2 mm (1.9 inch) up to 56.3 mm (2.2 inch)	2	
66.6 mm (2.6 inch) up to 84.9 mm (3.3 inch)	3	

¹⁾ Available only with Version/Material options AA and AC.

²⁾ Available only with Version/Material options AB, AD, AE, AH and AJ.

³⁾ Available only with Version/Material options AE and AG.

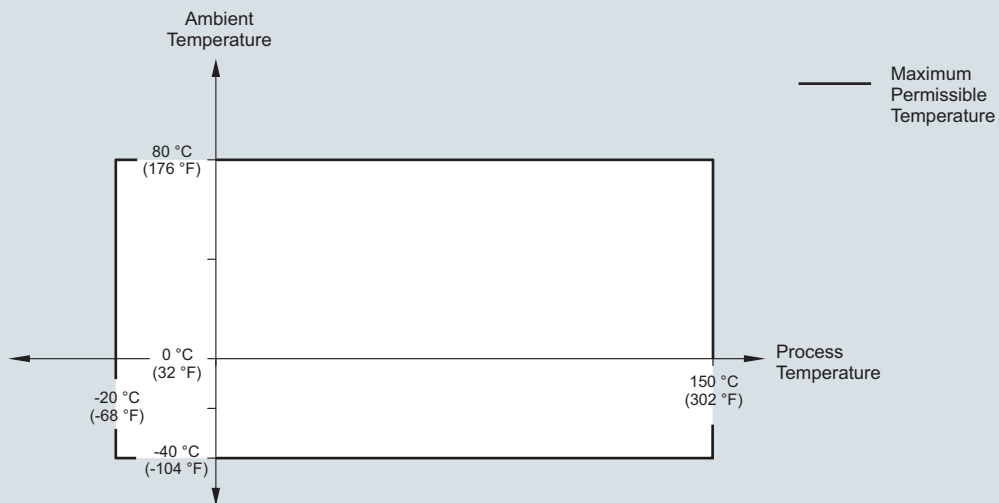
⁴⁾ Available only with Tube Diameter option 1 and LG240.

⁵⁾ Available only with Tube Diameter options 2 and 3 and LG250.

⁶⁾ Available only with Tube Diameter option 1 and LG250.

⁷⁾ Available only with Tube diameter option 1 and LG260 or LG270.

⁸⁾ Available only with Tube Diameter options 2 and 3 and LG260 or LG270.

Characteristic curves**SITRANS LG240, Ambient temperature/process temperature, standard version**

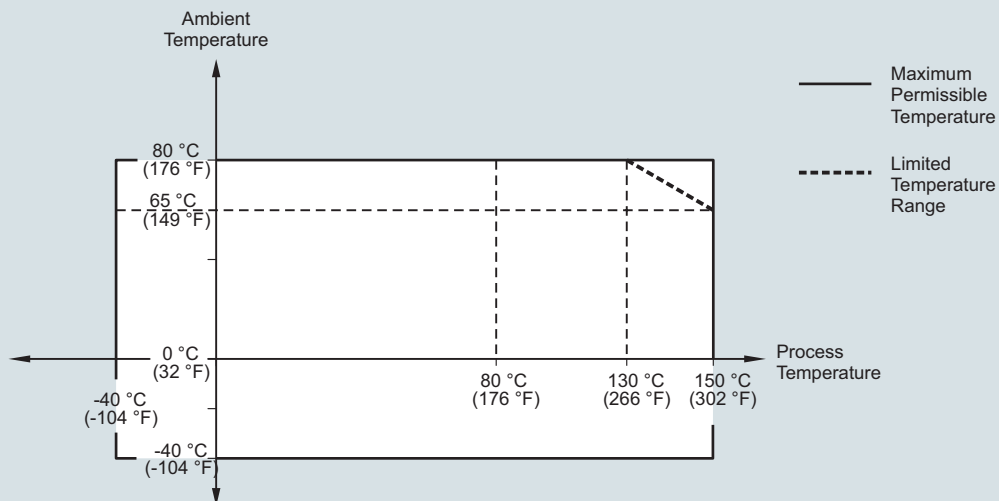
SITRANS LG240, ambient temperature/process temperature curve

Level Measurement

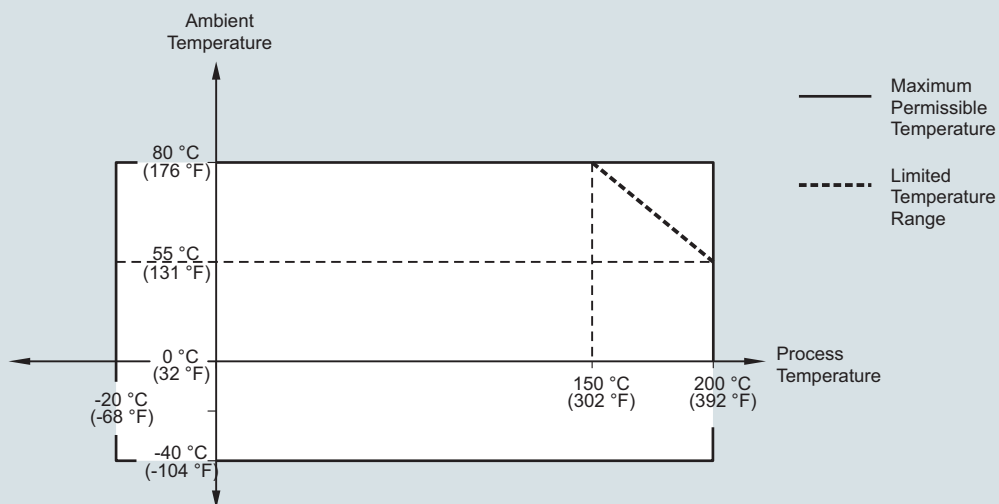
Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

SITRANS LG250, Ambient temperature/process temperature, standard version

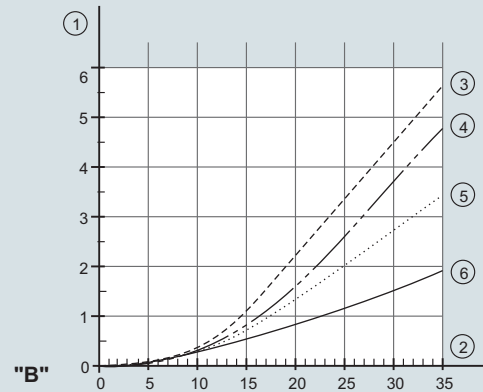
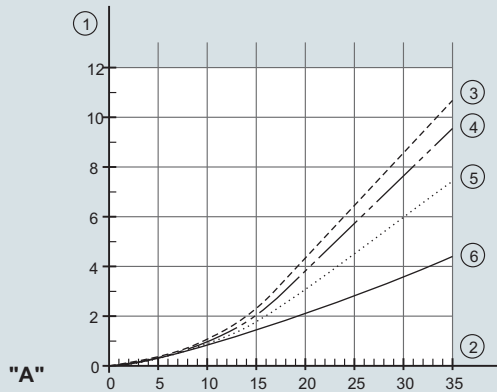


SITRANS LG250, Ambient temperature/process temperature, temperature adapter version



SITRANS LG250, ambient temperature/process temperature curve

SITRANS LG260, Maximum tensile load with cereals and plastic granules - cable: \varnothing 4 mm (0.157 inch)



A. Cereals

B. Plastic granules

1. Tensile force in kN (the determined value must be multiplied with safety factor 2)

2. Cable length in m

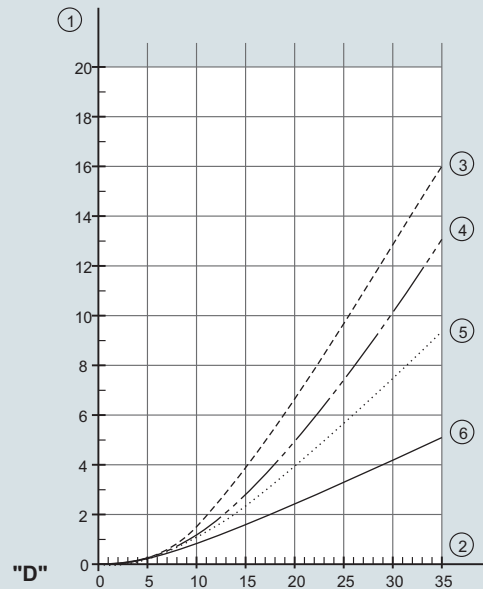
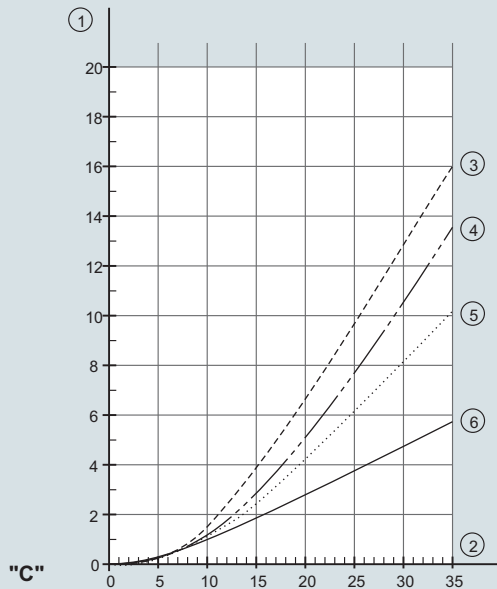
3. Vessel diameter 12 m (39.37 ft)

4. Vessel diameter 9 m (29.53 ft)

5. Vessel diameter 6 m (19.69 ft)

6. Vessel diameter 3 m (9.843 ft)

SITRANS LG260, Maximum tensile load with sand and cement - cable: \varnothing 4 mm (0.157 inch)



C. Sand

D. Cement

1. Tensile force in kN (the determined value must be multiplied with safety factor 2)

2. Cable length in m

3. Vessel diameter 12 m (39.37 ft)

4. Vessel diameter 9 m (29.53 ft)

5. Vessel diameter 6 m (19.69 ft)

6. Vessel diameter 3 m (9.843 ft)

SITRANS LG260, maximum tensile load curves

Level Measurement

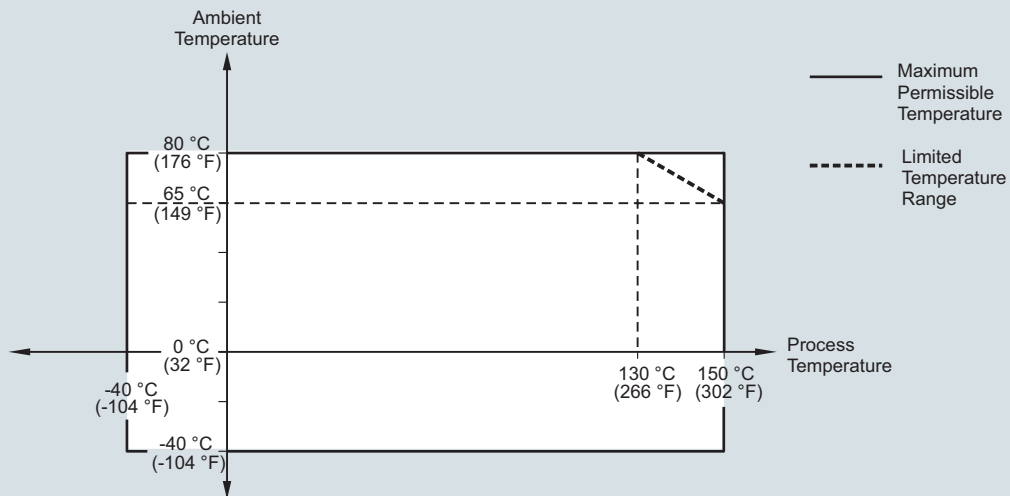
Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

SITRANS LG260, Ambient temperature/process temperature, standard version

Cable version with \varnothing 4 mm (0.157 inch)

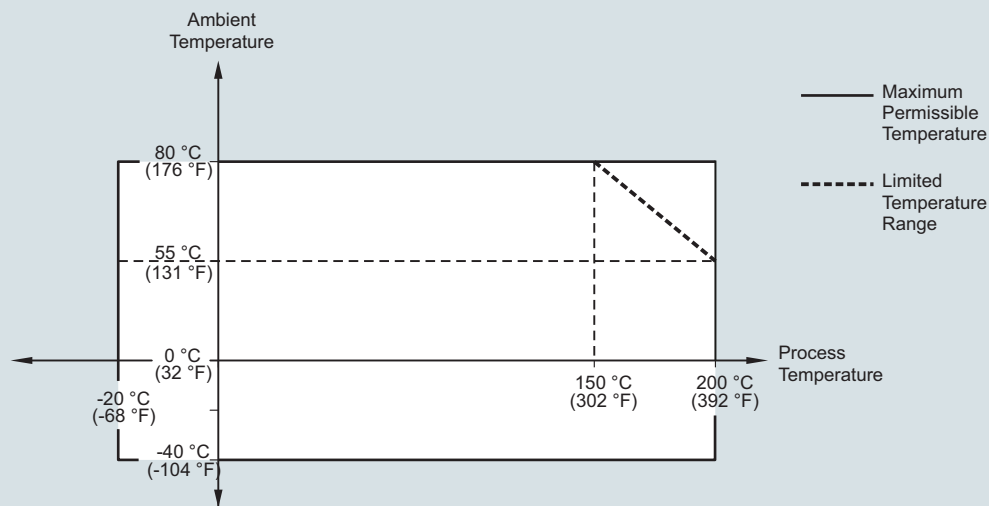
Cable version, PA coated with \varnothing 6 mm (0.236 inch)



SITRANS LG260, Ambient temperature/process temperature, temperature adapter version

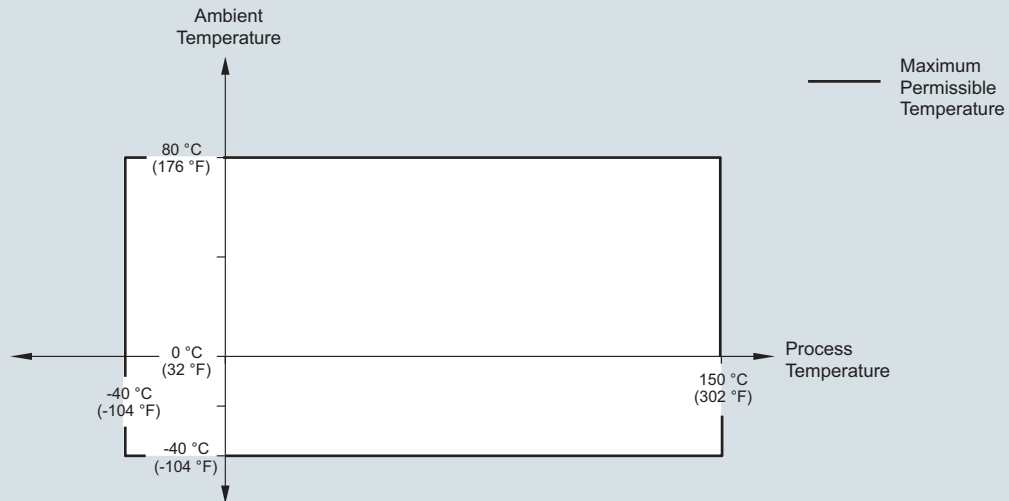
Cable version with \varnothing 4 mm (0.157 inch)

Cable version, PA coated with \varnothing 6 mm (0.236 inch)

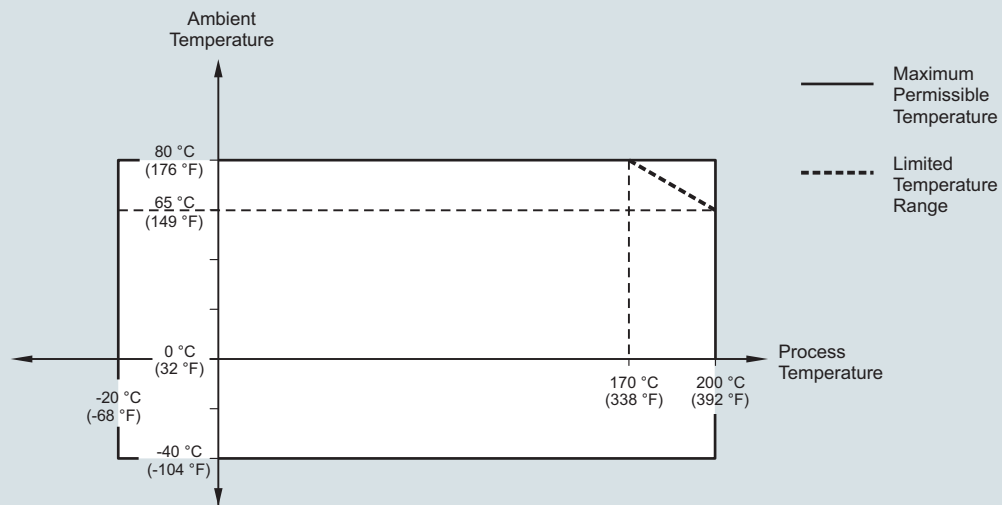


SITRANS LG260, ambient temperature/process temperature curves

SITRANS LG260, Ambient temperature/process temperature, standard version
Cable version with \varnothing 6 mm (0.236 inch)
Cable version, PA coated with \varnothing 11 mm (0.433 inch)



SITRANS LG260, Ambient temperature/process temperature, temperature adapter version
Cable version with \varnothing 6 mm (0.236 inch)
Cable version, PA coated with \varnothing 11 mm (0.433 inch)



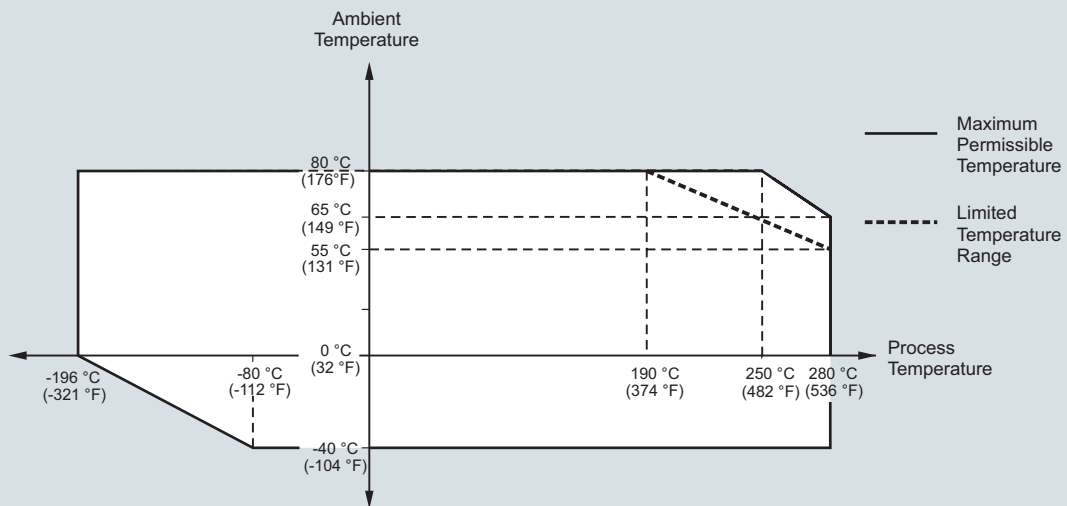
SITRANS LG260, ambient temperature/process temperature curves

Level Measurement

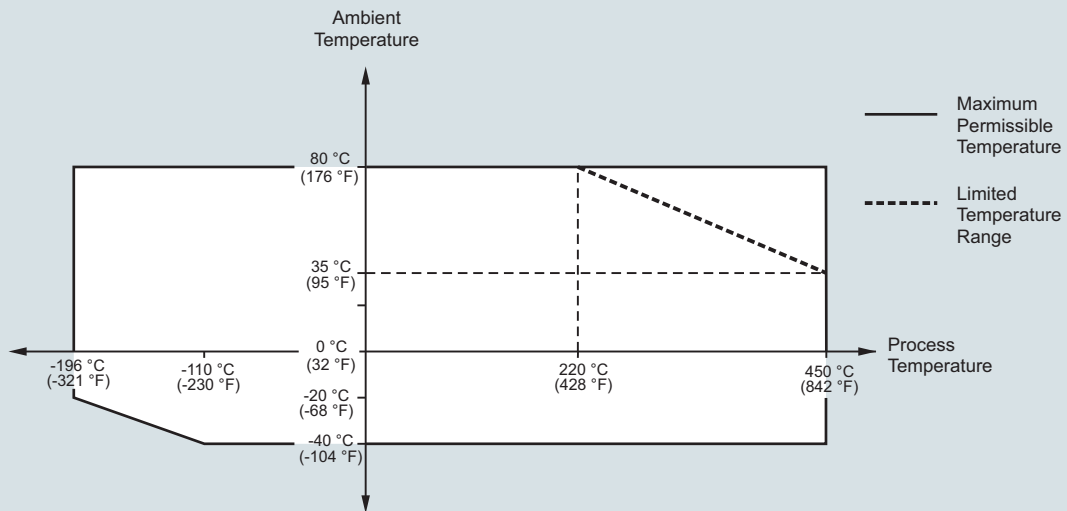
Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

SITRANS LG270, Ambient temperature/process temperature (-196 ... +280 °C/-321 ... +536 °F version)

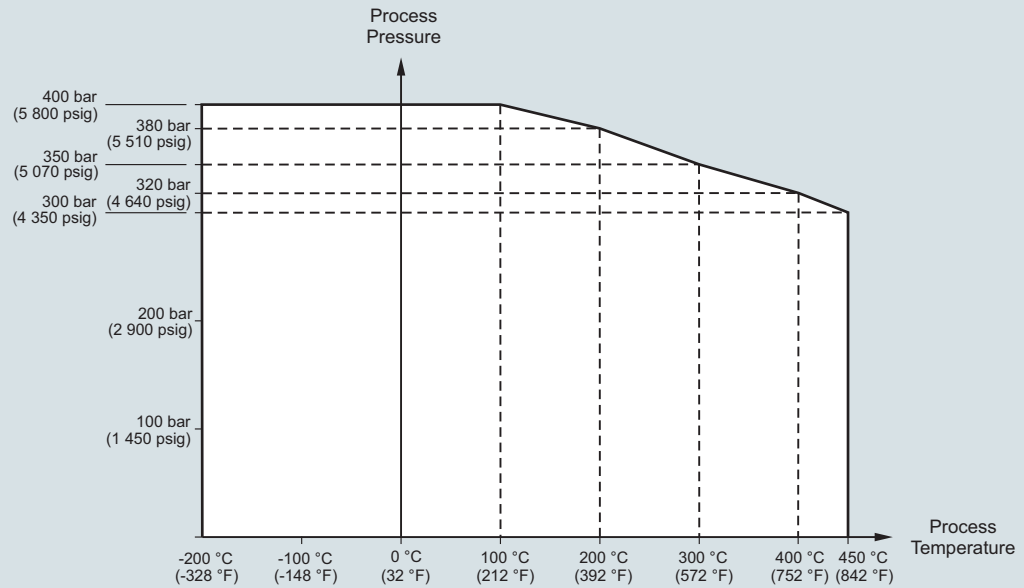


SITRANS LG270, Ambient temperature/process temperature (-196 ... +450 °C/-321 ... +842 °F version)



SITRANS LG270, ambient temperature/process temperature curves

SITRANS LG270, Process pressure/process temperature (-196 ... +450 °C/-321 ... +842 °F version)



SITRANS LG270, process pressure/process temperature curve

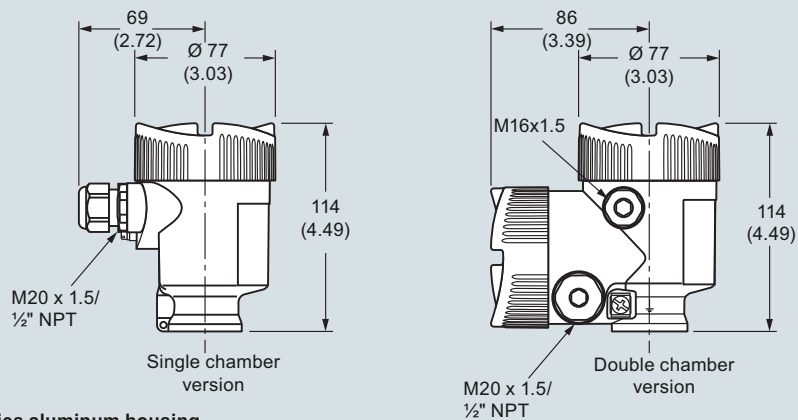
Level Measurement

Continuous level measurement
Guided wave radar transmitters

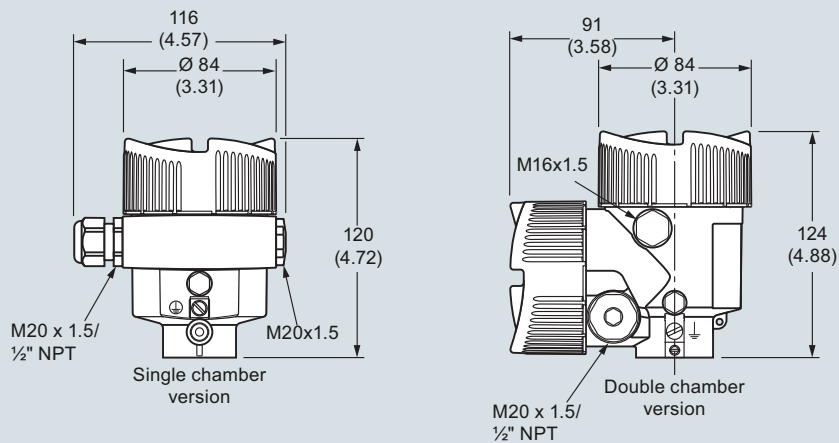
SITRANS LG series

Dimensional drawings

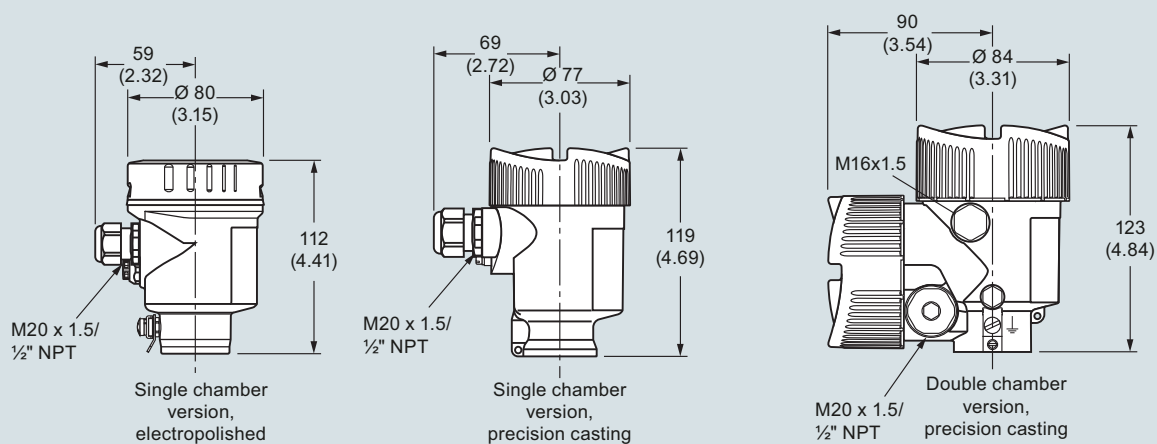
SITRANS LG Series plastic housing



SITRANS LG Series aluminum housing



SITRANS LG Series stainless steel housing

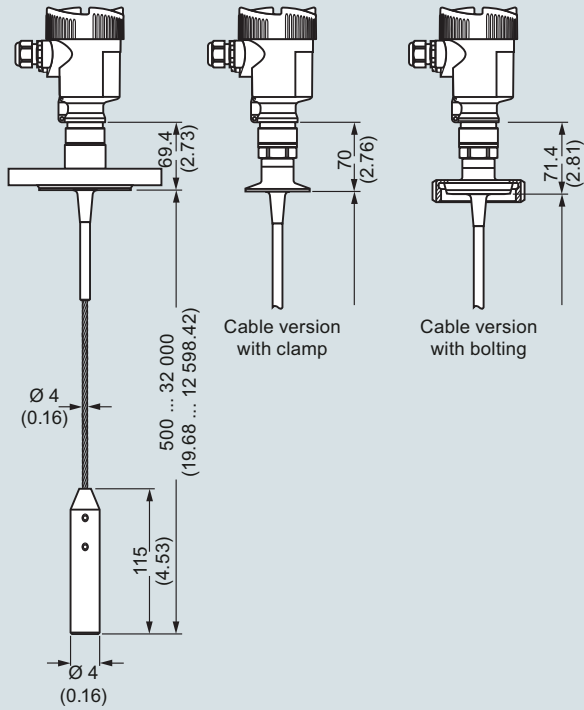


Note: For integrated display and adjustment module the housing is 9 (0.35) higher for all housing options

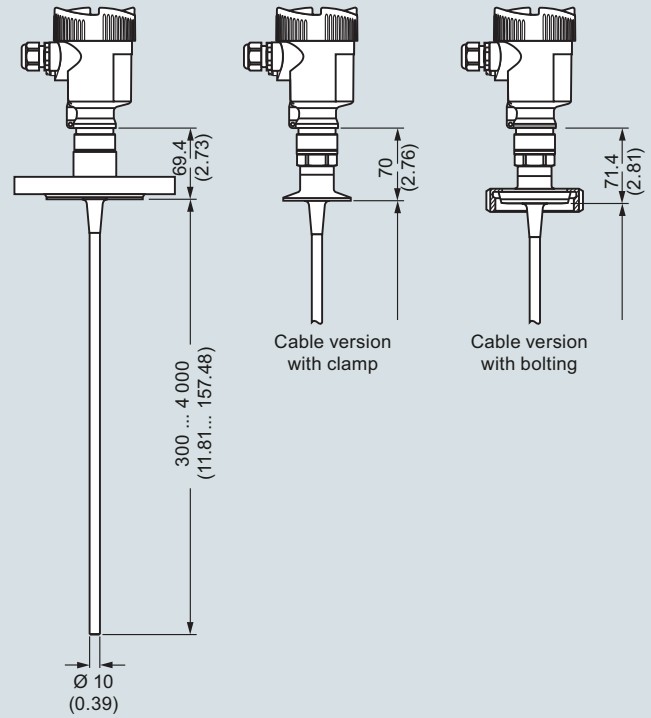
SITRANS LG series, dimensions in mm (inch)

SITRANS LG240

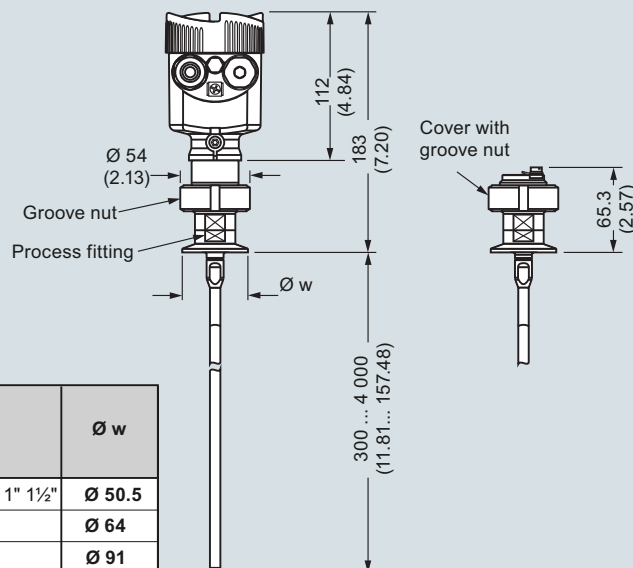
Cable version Ø 4 (0.157), PFA coated

Cable version
with clampCable version
with bolting

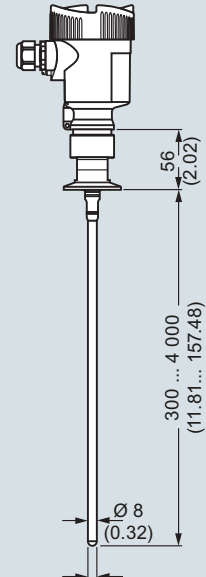
Rod version Ø 10 (0.394), PFA coated

Cable version
with clampCable version
with bolting

Autoclaved version

Groove nut
Process fittingCover with
groove nut

Rod version Ø 8 (0.315), polished



	Ø w
DIN DN 25 DN 32 DN 40/ 1" 1½"	Ø 50.5
DIN DN 50/ 2"	Ø 64
DIN DN 65/ 3"	Ø 91

SITRANS LG240, dimensions in mm (inch)

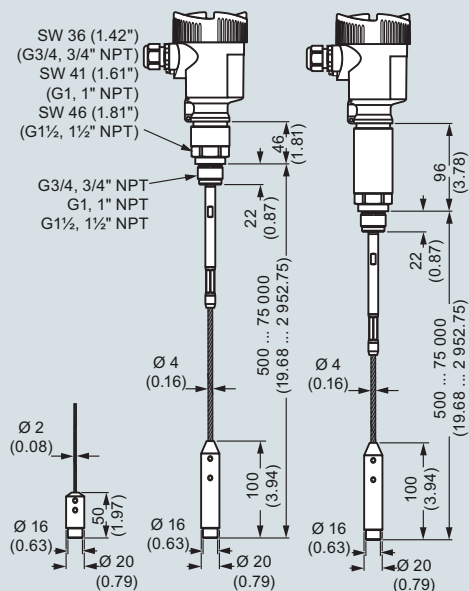
Level Measurement

Continuous level measurement
Guided wave radar transmitters

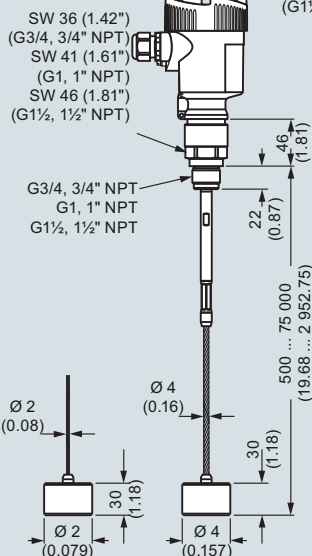
SITRANS LG series

SITRANS LG250

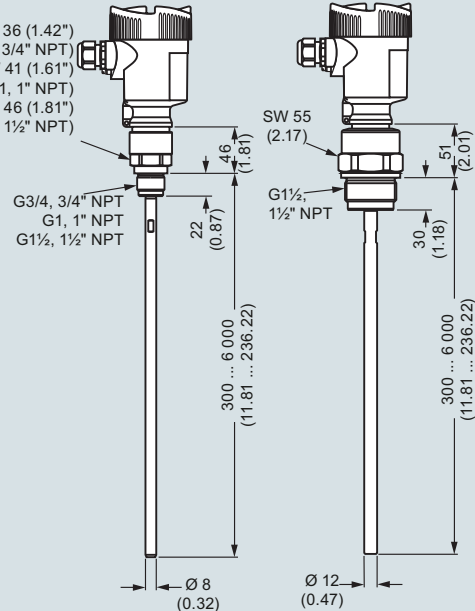
Cable version with gravity weight



Cable version with centering weight



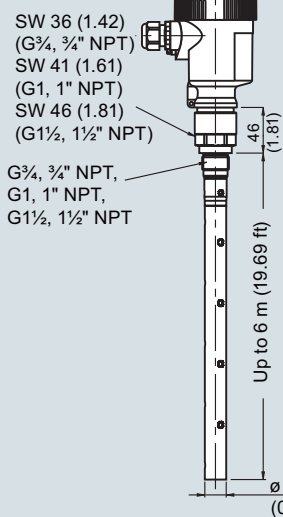
Rod version



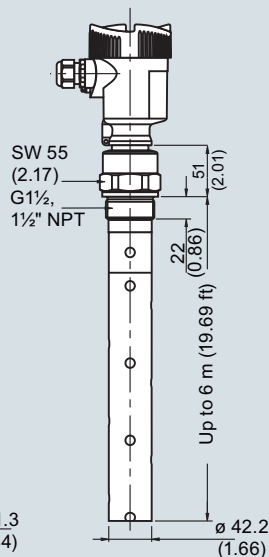
SITRANS LG250, dimensions in mm (inch)

SITRANS LG250, coax version

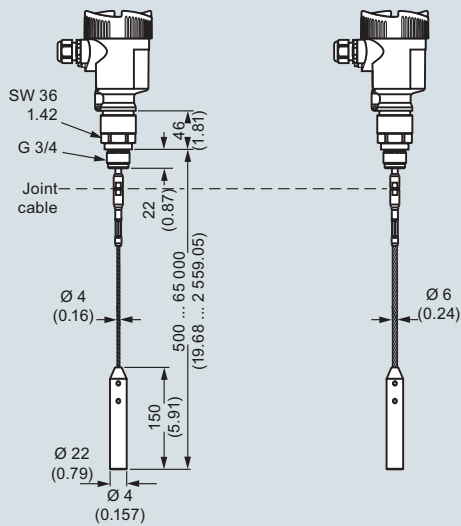
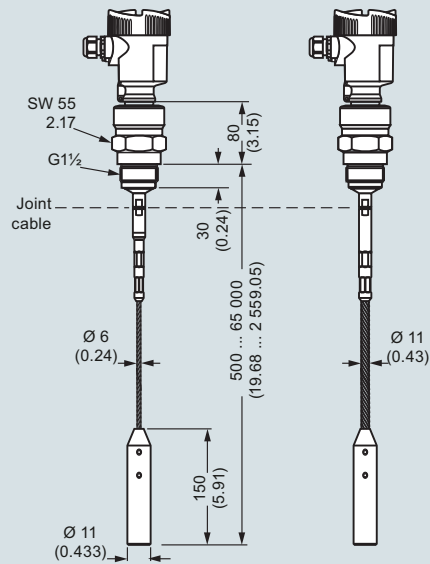
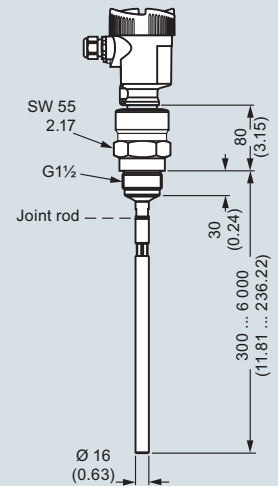
Coaxial version ø 21.3 (0.839)



Coaxial version ø 42.2 (1.661)



SITRANS LG250, dimensions in mm (inch)

SITRANS LG260**Cable version Ø 4 (0.157)/ Ø 6 (0.236)- PA coated****Cable version Ø 6 (0.236)/ Ø 11 (0.433)- PA coated****Rod version Ø 16 (0.63)**

SITRANS LG260, dimensions in mm (inch)

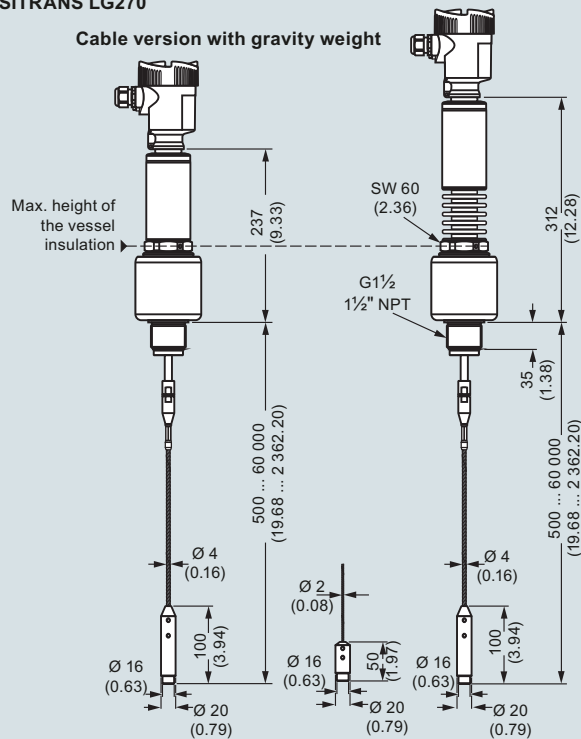
Level Measurement

Continuous level measurement
Guided wave radar transmitters

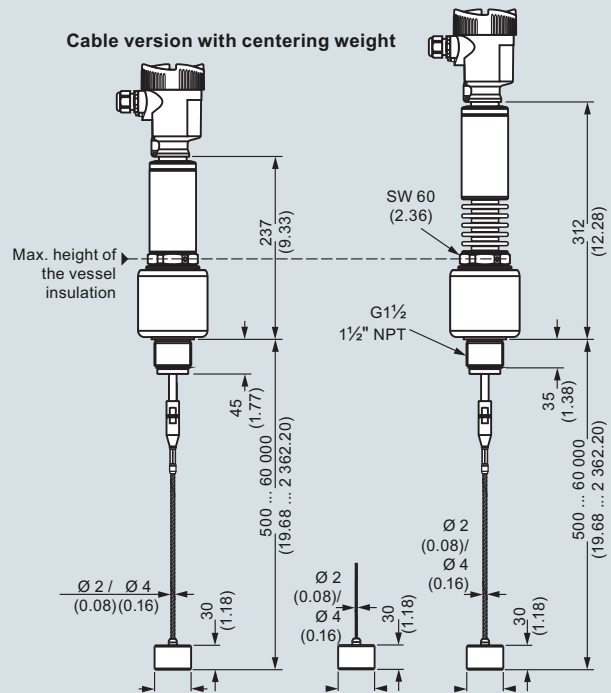
SITRANS LG series

SITRANS LG270

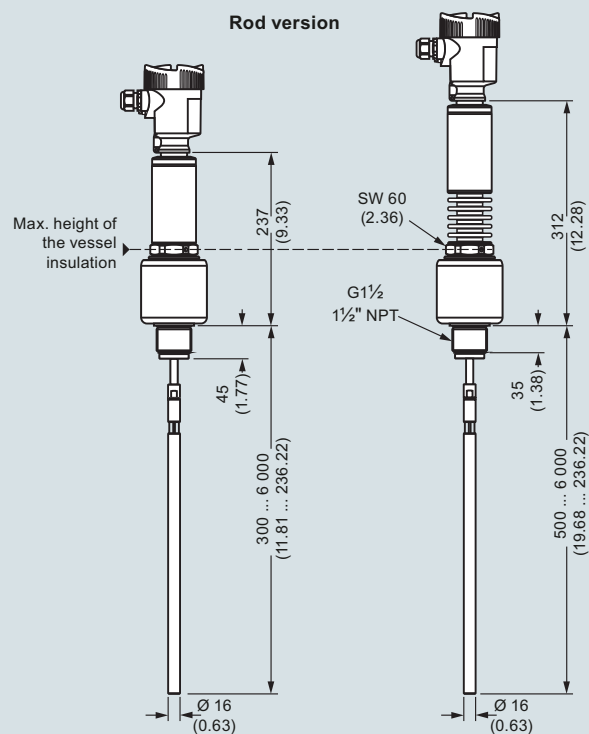
Cable version with gravity weight



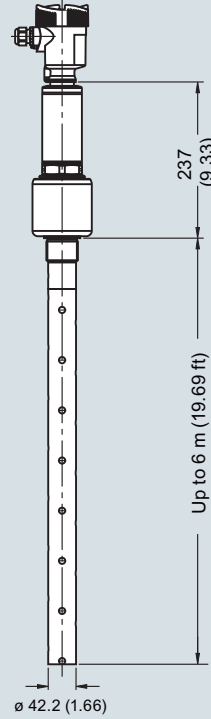
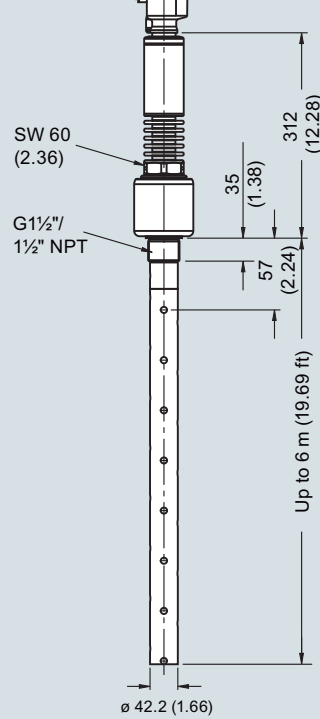
Cable version with centering weight



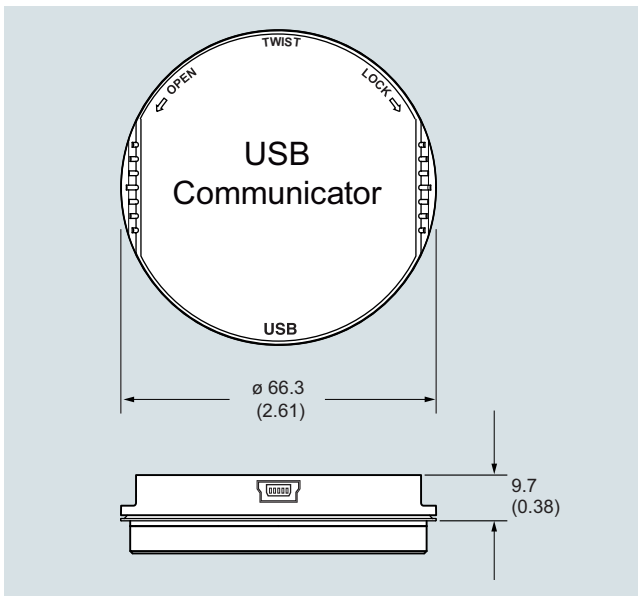
Rod version



SITRANS LG270, dimensions in mm (inch)

SITRANS LG270, coax version**Temperature version**
-196 ... +280 °C (-321 ... 536 °F)**Temperature version**
-196 ... +450 °C (-321 ... 842 °F)

SITRANS LG270, dimensions in mm (inch)



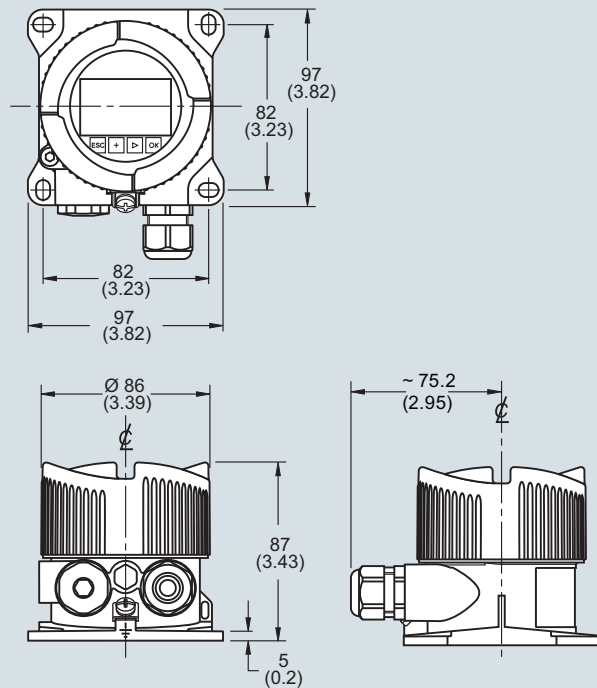
SITRANS LG USB Communicator, dimensions in mm (inch)

Level Measurement

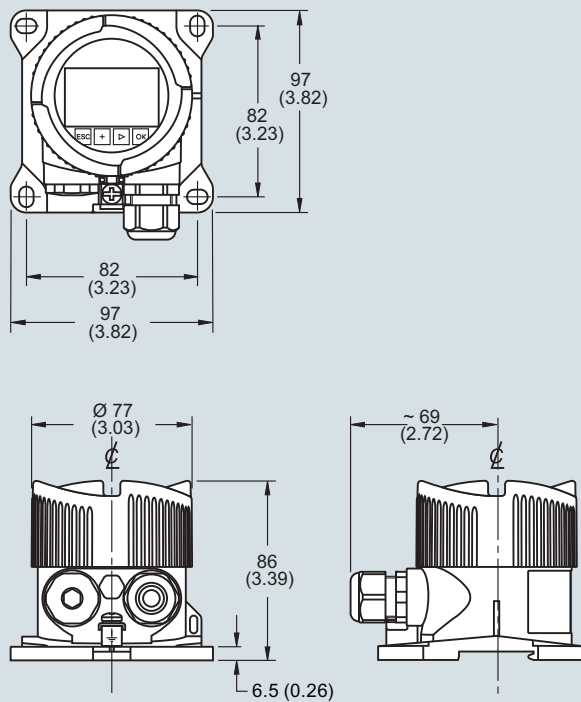
Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

SITRANS LG remote interface, aluminum housing



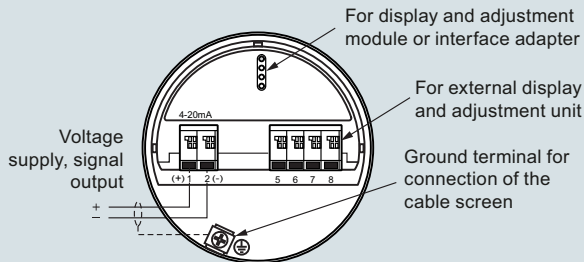
SITRANS LG remote interface, plastic housing



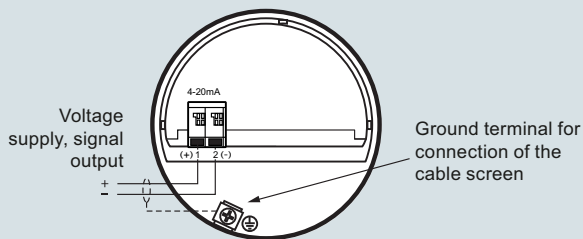
SITRANS LG remote interface, dimensions in mm (inch)

Circuit diagrams

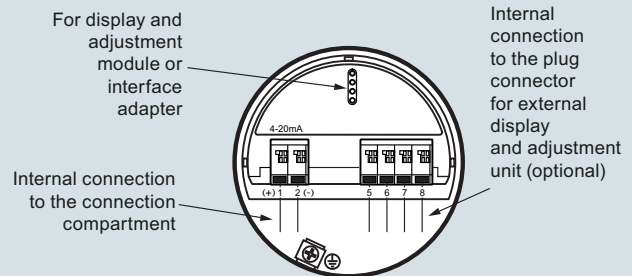
2-wire HART electronic option, electronics and connection compartment, single chamber housing



2-wire HART electronic option, connection compartment, Ex-d-ia double chamber housing



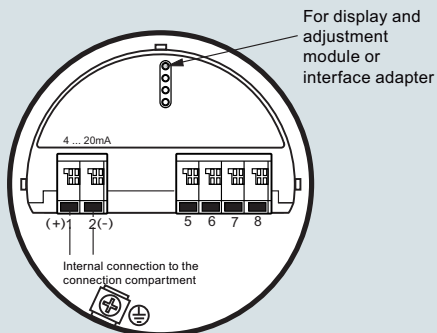
2-wire HART electronic option, electronics compartment, double chamber housing



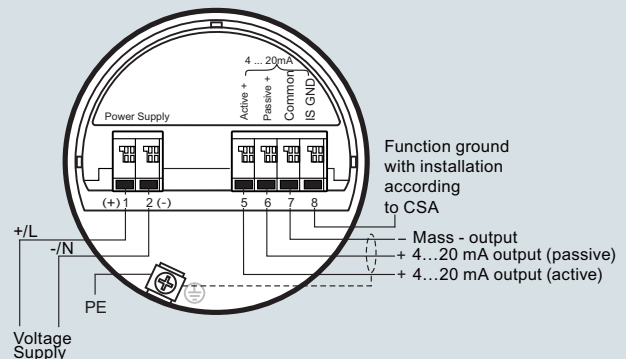
Note: All 2-wire HART connections and electronics are also available with SIL qualification.

SITRANS LG series connections

4-wire HART electronic option, electronics compartment, double chamber housing



4-wire electronic option, connection compartment, double chamber housing with mains voltage



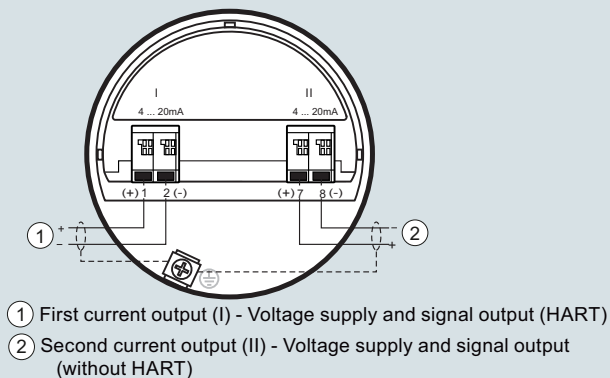
SITRANS LG series connections

Level Measurement

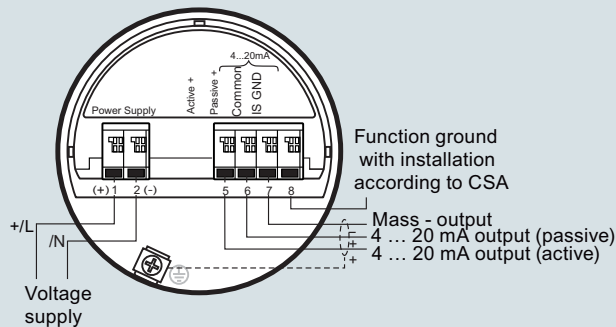
Continuous level measurement
Guided wave radar transmitters

SITRANS LG series

Supplementary electronics

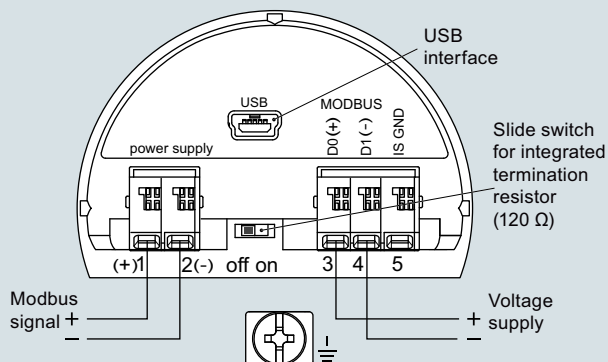


Connection compartment with low voltage

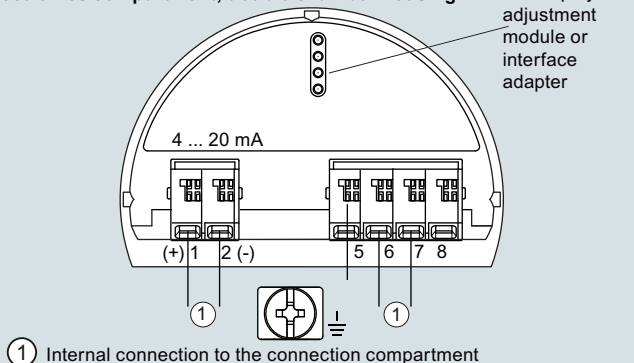


SITRANS LG series connections

Modbus electronic option, connection compartment

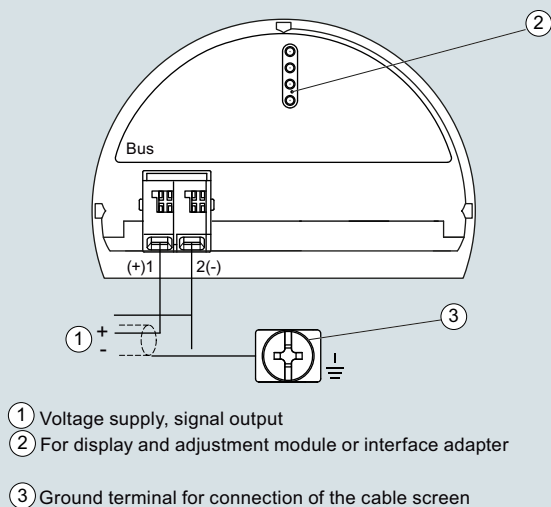


Modbus electronic option, electronics compartment, double chamber housing

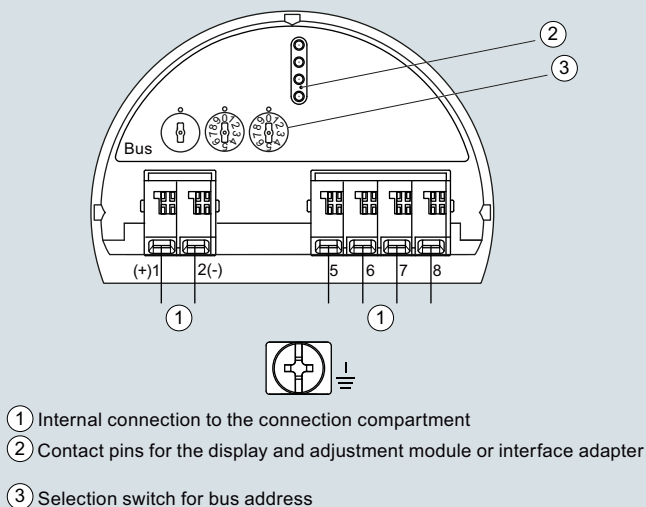


SITRANS LG series connections

PROFIBUS electronic option, connection compartment, double chamber housing

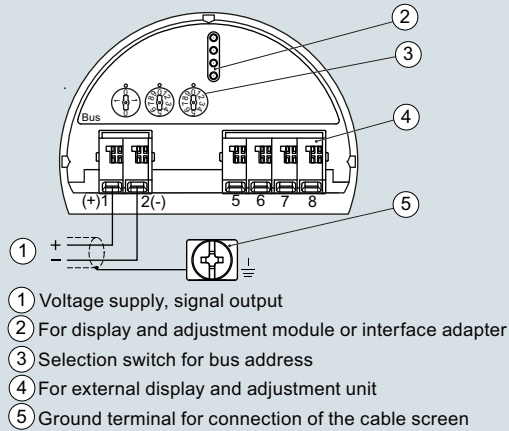


PROFIBUS electronic option, electronics compartment, double chamber housing



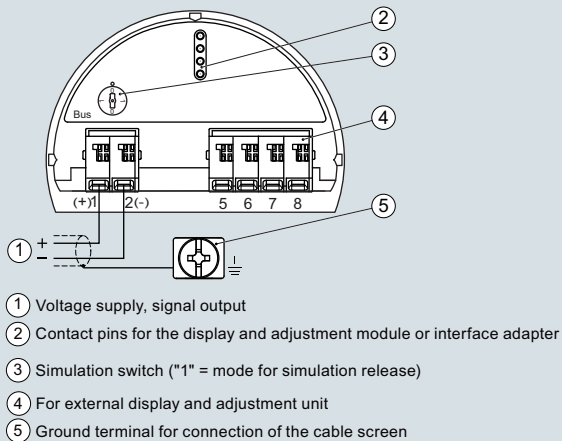
LG series connections

PROFIBUS electronic option, electronics and connection compartment, single chamber housing



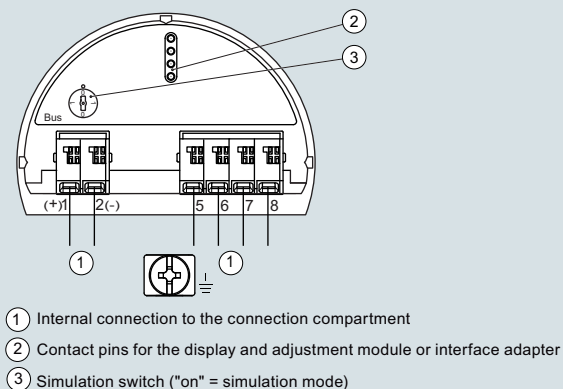
LG series connections

LG series, FOUNDATION Fieldbus electronic option, electronic and terminal compartment, single chamber housing



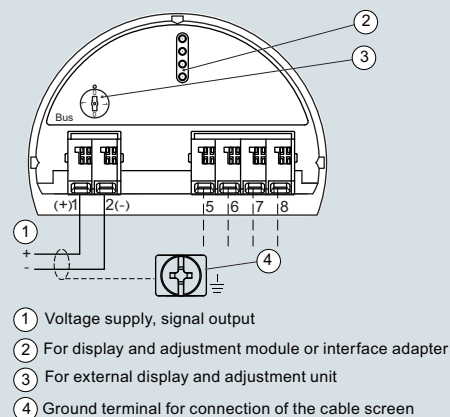
LG series connections

LG series, FOUNDATION Fieldbus electronic option, electronic compartment, double chamber housing



LG series connections

LG series, FOUNDATION Fieldbus electronic option, terminal compartment, double chamber housing



Level Measurement

Continuous level measurement
Capacitance transmitters

SITRANS LC300

Overview



SITRANS LC300 is an inverse frequency shift capacitance continuous level transmitter for liquid, interface, and solid applications. It is ideal for standard industrial applications in chemical, hydrocarbon processing, food and beverage, water, wastewater, mining, aggregate, and cement industries.

Benefits

- Active-Shield technology so measurement is unaffected by material buildup in active shield section
- Highly accurate and reliable PFA-lined probes
- Integrated local LCD display
- 2-wire (4 to 20 mA) current loop design
- Current signaling according to NAMUR NE 43
- Push-button calibration and programming
- Stilling well (ground tube) version for low dielectric media, agitated materials, and non-metallic vessels

Application

SITRANS LC300 is a 2-wire level measurement instrument combining a sophisticated, yet easy-to-adjust microprocessor with field-proven probes. It is available in four versions: rod, rod with stilling well, cable with PFA insulation, and cable without PFA insulation.

Materials with low or high dielectric properties are accurately measured and Active-Shield technology helps in ignoring the effects of buildup or condensation near vessel nozzle.

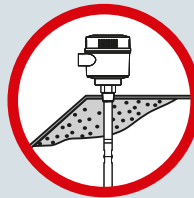
- Key Applications: conductive ($dK \geq 20$) and non-conductive ($dK < 20$) media including: liquids and solids in standard industrial processes, bulk solids applications involving dust, and chemical processes involving vapor

Probe Applications

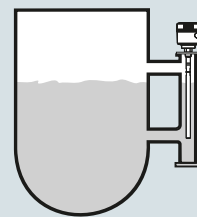
Rod version	Conductive liquids, slurries or solids
Rod version with stilling well	<ul style="list-style-type: none"> • Conductive liquids or slurries in non-conductive tanks • Non-conductive liquids in non-conductive tanks • Tanks with agitation or turbulent liquids • Liquids with a dielectric constant below 2 • Non-linear tanks, such as parabolic or spherical tanks • Interface measurements
Cable version	Non-conductive solids or liquids
PFA coated cable version	Conductive or sticky liquids, slurries or solids

Configuration

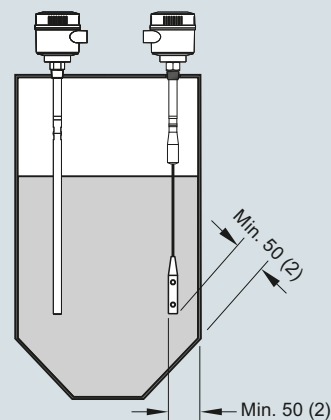
Installation



Build up of material in active shield area does not affect switch operation.



Mounting on a bypass



Install probe at least 50 (2) from tank wall.
Note angle of repose and adjust accordingly.

SITRANS LC300 installation, dimensions in mm (inch)

Technical specifications

Input	
Measuring range	1.66 ... 3 300 pF
Span	Min. 3.3 pF
Output	
Loop current	Continuous signal 4 ... 20 mA/20 ... 4 mA according to NAMUR 43
Accuracy (transmitter)	
Temperature stability	0.25 % of actual capacitance value
Non-linearity and repeatability	< 0.4 % of full scale and actual measurement value
Accuracy	Deviation < 0.5 % of actual measurement value
Rated operating conditions¹⁾	
Ambient conditions	
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) ²⁾³⁾
• Installation category	I
• Pollution degree	4
• Ingress protection	Type 4/NEMA 4/IP65 (optional IP68)
Installation conditions	
• Location	Indoor/outdoor
• Process pressure	-1 ... +35 bar g (-14.6 ... +511 psi g)
• Process temperature	-40 ... +200 °C (-40 ... +392 °F) ⁴⁾
• Min. dielectric constant ϵ_r	1.5
• Min. difference in dielectric constant for interface measurement	5
Design	
Material	
• Enclosure	Aluminum, epoxy-coated
Probe diameter	
• Rod version	19 mm (0.75 inch) with PFA jacket
• Cable version	9 mm (0.35 inch) with PFA jacket, 6 mm (0.24 inch) without PFA jacket
Active shield length	
• Rod version	Threaded: 120 mm (4.72 inch) Flanged: 100 mm (3.94 inch)
• Cable version	Threaded: 125 mm (4.92 inch) Flanged: 105 mm (4.13 inch)
Process connection of probe	
• Threaded rod mounting	$\frac{3}{4}$ ", 1", 1 $\frac{1}{4}$ ", 1 $\frac{1}{2}$ " NPT [(Taper), ANSI/ASME B1.20.1] R $\frac{3}{4}$ ", 1", 1 $\frac{1}{2}$ " [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G $\frac{3}{4}$ ", 1", 1 $\frac{1}{2}$ " [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 1 $\frac{1}{2}$ " NPT [(Taper), ANSI/ASME B1.20.1] R 1 $\frac{1}{2}$ " [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 1 $\frac{1}{2}$ " [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
• Threaded cable mounting	1 ... 4" ASME, DN 25 ... 100
• Flange mounting	
Enclosure cable inlet	2 x $\frac{1}{2}$ " NPT or 2 x M20 x 1.5

Power supply	12 ... 30 V DC any polarity, 2-wire current loop circuit
User Interface	
Display	Local LCD, 4 digit, each 0 ... 9 and limited alpha characters
Safety	
Measurement current signaling	According to NAMUR NE 43, signal 3.8 ... 20.5 mA, fault ≤ 3.6 or ≥ 21 mA (22 mA)
Certificates and approvals	
General	CE, CSA _{US/C} , FM, RCM, KCC, EAC
Dust Ignition Proof (Intrinsically Safe probe circuit)	FM/CSA: Class II, Div. 1, Groups E, F, G Class III T4 ATEX 1/2 D T100 °C
• Canada/USA	
• Europe	ATEX II 1/2 G EEx d [ia] IIC T6 ... T1 ATEX II 1/2 D T100 °C
Flame Proof (Intrinsically Safe probe circuit)	Ex d [ia Ga] IIC T6 ... T4 Gb Ex tb IIIC T85 °C ... T100 °C Db IP65/IP68 EAC Ex
• Europe	
• Brazil	Class I, Div. 1, Groups A, B, C, D Class II, Div. 1, Groups E, F, G Class III T4
• Russia/Kazakhstan	Bureau Veritas Type Approval ABS Type Approval, Lloyds Register, BV
Explosion Proof (Intrinsically Safe probe circuit)	AIB-Vincotte
• Canada/USA	Pattern Approval (AQSIQ, China), CRN, PED
Marine	
Overfill Protection	
Other	

¹⁾ When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 4/341

²⁾ Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)

³⁾ Minimum voltage of 15 V DC is required for use at -40 °C (-40 °F)

⁴⁾ Not suitable for steam environments

Design: Probe			
	Rod version	Stilling well version	Cable version
Length	Min. 300 mm (12 inch), max. 5 000 mm (197 inch)	Min. 300 mm (12 inch), max. 5 000 mm (197 inch)	Min. 1 000 mm (40 inch), max. 25 000 mm (984 inch)
Sensor wetted parts	PFA, 316L stainless steel	PFA, 316L stainless steel	316L stainless steel or 316L stainless steel with PFA insulation
O-ring seal material	FKM or FFKM	FKM or FFKM	FKM or FFKM
Thermal isolator	Optional	Optional	Optional
Options	N/A	N/A	Mounting eye for PFA insulated cable version

Level Measurement

Continuous level measurement
Capacitance transmitters

SITRANS LC300

Selection and Ordering data

Article No.

SITRANS LC300, rod version

7ML5670-

An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Process connection

Threaded, 316L stainless steel

¾" NPT [(Taper), ANSI/ASME B1.20.1]

1" NPT [(Taper), ANSI/ASME B1.20.1]

1¼" NPT [(Taper), ANSI/ASME B1.20.1]

1½" NPT [(Taper), ANSI/ASME B1.20.1]

R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

Welded flange, 316L stainless steel, raised face¹⁾

1" ASME, 150 lb

1" ASME, 300 lb

1" ASME, 600 lb

1½" ASME, 150 lb

1½" ASME, 300 lb

1½" ASME, 600 lb

2" ASME, 150 lb

2" ASME, 300 lb

2" ASME, 600 lb

3" ASME, 150 lb

3" ASME, 300 lb

3" ASME, 600 lb

4" ASME, 150 lb

4" ASME, 300 lb

4" ASME, 600 lb

Welded flange, 316L stainless steel,

Type A flat faced¹⁾

DN 25, PN 16

DN 25, PN 40

DN 40, PN 16

DN 40, PN 40

DN 50, PN 16

DN 50, PN 40

DN 80, PN 16

DN 80, PN 40

DN 100, PN 16

DN 100, PN 40

Sanitary, hastelloy, duplex or other custom process connections available. Please contact a local sales person for details.

For more information, please visit
<http://www.usa.siemens.com/level>.

Selection and Ordering data

Article No.

SITRANS LC300, rod version

7ML5670-

An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.

Probe Length (from flange face or including process thread)

Add Order code Y01 and plain text:

"Insertion length ... mm"

300 ... 1 000 mm (11.81 ... 39.37 inch)

1 001 ... 2 000 mm (39.41 ... 78.74 inch)

2 001 ... 3 000 mm (78.78 ... 118.11 inch)

3 001 ... 4 000 mm (118.15 ... 157.48 inch)

4 001 ... 5 000 mm (157.52 ... 196.85 inch)

Bent probes also available. Please contact a local sales person for details.

For more information, please visit

<http://www.usa.siemens.com/level>.

Thermal isolator

Without thermal isolator

With thermal isolator [for process connection temperatures over 85 °C (185 °F)]

Wetted seals

FKM

FFKM [for process temperatures above -20 °C (-4 °F)]

Probe material

19 mm (0.75 inch) diameter 316L stainless steel, PFA lined rod

Approvals

General Safety (CSA, FM, CE, RCM)

Dust Ignition Proof With IS Probe

CE, RCM, ATEX II 1/2 D T100 °C

Flame Proof Enclosure With IS Probe

CE, RCM, ATEX II 1/2 G EEx d [ia] IIC T6 ... T1, ATEX II 1/2 D T100 °C

Dust Ignition Proof With IS Probe

CSA/FM Class II, Div. 1, Groups E, F, G

CSA/FM Class III T4

Explosion Proof Enclosure With IS Probe

CSA/FM Class I, Div. 1, Groups A, B, C, D

CSA/FM Class II, Div. 1, Groups E, F, G

CSA/FM Class III T4

Enclosure

Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65

Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65

Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68

Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68

Stainless steel, contact local sales person for details.

For more information, please visit

<http://www.usa.siemens.com/level>.


¹⁾ Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.


Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/ processinstrumentation/documentation	
Accessories	
Electronic transmitter kit (includes transmitter and driver)	Article No. 7ML1830-1KN
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-...
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-...
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750-...
For applicable back up point level switch - see point level measurement section	

Level Measurement

Continuous level measurement
Capacitance transmitters

SITRANS LC300

Selection and Ordering data	Article No.
SITRANS LC300, stilling well version	7ML5671-
An inverse frequency shift capacitance continuous level transmitter for liquid applications.	 0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process connection	
Threaded, 316L stainless steel	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
<u>Welded flange, 316L stainless steel, raised face¹⁾</u>	
1½" ASME, 150 lb	5 D
1½" ASME, 300 lb	5 E
1½" ASME, 600 lb	5 F
2" ASME, 150 lb	5 G
2" ASME, 300 lb	5 H
2" ASME, 600 lb	5 J
3" ASME, 150 lb	5 K
3" ASME, 300 lb	5 L
3" ASME, 600 lb	5 M
4" ASME, 150 lb	5 N
4" ASME, 300 lb	5 P
4" ASME, 600 lb	5 Q
<u>Welded flange, 316L stainless steel, Type A flat faced¹⁾</u>	
DN 40, PN 16	6 C
DN 40, PN 40	6 D
DN 50, PN 16	6 E
DN 50, PN 40	6 F
DN 80, PN 16	6 G
DN 80, PN 40	6 H
DN 100, PN 16	6 J
DN 100, PN 40	6 K
Sanitary, hastelloy, duplex or other custom process connections available.	
Please contact a local sales person for details.	
For more information, please visit http://www.usa.siemens.com/level .	
Probe Length (from flange face or including process thread)	
Add Order code Y01 and plain text: "Insertion length ... mm"	
300 ... 1 000 mm (11.81 ... 39.37 inch)	A
1 001 ... 2 000 mm (39.41 ... 78.74 inch)	B
2 001 ... 3 000 mm (78.78 ... 118.11 inch)	C
3 001 ... 4 000 mm (118.15 ... 157.48 inch)	D
4 001 ... 5 000 mm (157.52 ... 196.85 inch)	E
Thermal isolator	
Without thermal isolator	0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	1
Wetted seals	
FKM	0
FFKM [for process temperatures above -20 °C (-4 °F)]	1
Probe material	
35 mm (1.38 inch) diameter stilling well, with 19 mm (0.75 inch) diameter 316L stainless steel, PFA lined rod with PTFE spacers	1
Approvals	
General Safety (CSA, FM, CE, RCM)	A
Dust Ignition Proof With IS Probe	B
CE, RCM, ATEX II 1/2 D T100 °C	
Flame Proof Enclosure With IS Probe	C
CE, RCM, ATEX II 1/2 G EEx d [ia] IIC T6 ... T1, ATEX II 1/2 D T100 °C	

Selection and Ordering data	Article No.
SITRANS LC300, stilling well version	7ML5671-
An inverse frequency shift capacitance continuous level transmitter for liquid applications.	 0
Dust Ignition Proof With IS Probe	D
CSA/FM Class II, Div. 1, Groups E, F, G	
CSA/FM Class III T4	
Explosion Proof Enclosure With IS Probe	E
CSA/FM Class I, Div. 1, Groups A, B, C, D	
CSA/FM Class II, Div. 1, Groups E, F, G	
CSA/FM Class III T4	
Enclosure	
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65	A
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65	B
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68	C
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68	D
Stainless steel, please contact a local sales person for details.	
For more information, please visit http://www.usa.siemens.com/level .	
¹⁾ Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.	



Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	Article No.
Electronic transmitter kit (includes transmitter and driver)	7ML1830-1KN
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-...
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-...
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750-...
For applicable back up point level switch - see point level measurement section	

Level Measurement

Continuous level measurement

Capacitance transmitters

SITRANS LC300

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
SITRANS LC300, cable version	7ML5672-	SITRANS LC300, cable version	7ML5672-
An inverse frequency shift capacitance continuous level transmitter for non-conductive liquids and solids applications.		An inverse frequency shift capacitance continuous level transmitter for non-conductive liquids and solids applications.	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Process connection		Probe material	
Threaded, 316L stainless steel		Bare 316L stainless steel cable and 316L stainless steel cable weight, tinned copper crimp, PTFE backing ring, PEEK isolator and PFA lined active shield	0
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D		
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D		
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D		
Welded flange, 316L stainless steel, raised face ¹⁾		Approvals	
1½" ASME, 150 lb	5 D	General Safety (CSA, FM, CE, RCM)	A
1½" ASME, 300 lb	5 E	Dust Ignition Proof With IS Probe	B
1½" ASME, 600 lb	5 F	CE, RCM, ATEX II 1/2 D T100 °C	
2" ASME, 150 lb	5 G	Flame Proof Enclosure With IS Probe	C
2" ASME, 300 lb	5 H	CE, RCM, ATEX II 1/2 G EEx d [ia] IIC T6 ... T1, ATEX II 1/2 D T100 °C	
2" ASME, 600 lb	5 J	Dust Ignition Proof With IS Probe	D
3" ASME, 150 lb	5 K	CSA/FM Class II, Div. 1, Groups E, F, G	
3" ASME, 300 lb	5 L	CSA/FM Class III T4	
3" ASME, 600 lb	5 M	Explosion Proof Enclosure With IS Probe	E
4" ASME, 150 lb	5 N	CSA/FM Class I, Div. 1, Groups A, B, C, D	
4" ASME, 300 lb	5 P	CSA/FM Class II, Div. 1, Groups E, F, G	
4" ASME, 600 lb	5 Q	CSA/FM Class III T4	
Welded flange, 316L stainless steel, Type A flat faced ¹⁾		Enclosure	
DN 40, PN 16	6 C	Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65	A
DN 40, PN 40	6 D	Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65	B
DN 50, PN 16	6 E	Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68	C
DN 50, PN 40	6 F	Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68	D
DN 80, PN 16	6 G	Stainless steel, please contact a local sales person for details.	
DN 80, PN 40	6 H	For more information, please visit	
DN 100, PN 16	6 J	http://www.usa.siemens.com/level .	
DN 100, PN 40	6 K		
Sanitary, hastelloy, duplex or other custom process connections available.			
Please contact a local sales person for details.			
For more information, please visit			
http://www.usa.siemens.com/level .			
Probe Length			
(from flange face or including process thread)			
Add Order code Y01 and plain text:			
"Insertion length ... mm"			
1 000 ... 2 000 mm (39.37 ... 78.74 inch)	A		
2 001 ... 4 000 mm (78.78 ... 157.48 inch)	B		
4 001 ... 6 000 mm (157.52 ... 236.22 inch)	C		
6 001 ... 8 000 mm (236.26 ... 314.96 inch)	D		
8 001 ... 10 000 mm (315.00 ... 393.70 inch)	E		
10 001 ... 12 000 mm (393.74 ... 472.44 inch)	F		
12 001 ... 14 000 mm (472.48 ... 551.18 inch)	G		
14 001 ... 16 000 mm (551.22 ... 629.92 inch) ²⁾	H		
16 001 ... 18 000 mm (629.96 ... 708.66 inch) ²⁾	J		
18 001 ... 20 000 mm (708.70 ... 787.40 inch) ²⁾	K		
20 001 ... 22 000 mm (787.44 ... 866.14 inch) ²⁾	L		
22 001 ... 24 000 mm (866.18 ... 944.88 inch) ²⁾	M		
24 001 ... 25 000 mm (944.92 ... 984.25 inch) ²⁾	N		
Thermal isolator			
Without thermal isolator	0		
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	1		
Wetted seals			
FKM	0		
FFKM [for process temperatures above -20 °C (-4 °F)]	1		

Level Measurement

Continuous level measurement

Capacitance transmitters

SITRANS LC300

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/ processinstrumentation/documentation	
Accessories	
Electronic transmitter kit (includes transmitter and driver)	Article No. 7ML1830-1KN
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-...
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-...
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750-...
For applicable back up point level switch - see point level measurement section	

Level Measurement

Continuous level measurement

Capacitance transmitters

SITRANS LC300

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
SITRANS LC300, PFA coated cable version	7ML5673-	SITRANS LC300, PFA coated cable version	7ML5673-
An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.		An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Process connection		Probe material	
Threaded, 316L stainless steel		PFA coated cable and 316L stainless steel cable weight, PEEK isolator and PFA lined active shield	1
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D	Approvals	
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D	General Safety (CSA, FM, CE, RCM)	A
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D	Dust Ignition Proof With IS Probe	B
CE, RCM, ATEX II 1/2 D T100 °C		Flame Proof Enclosure With IS Probe	C
<u>Welded flange, 316L stainless steel, raised face¹⁾</u>		CE, RCM, ATEX II 1/2 G EEx d [ia] IIC T6 ... T1, ATEX II 1/2 D T100 °C	
1½" ASME, 150 lb	5 D	Dust Ignition Proof With IS Probe	D
1½" ASME, 300 lb	5 E	CSA/FM Class II, Div. 1, Groups E, F, G	
1½" ASME, 600 lb	5 F	CSA/FM Class III T4	E
2" ASME, 150 lb	5 G	Explosion Proof Enclosure With IS Probe	
2" ASME, 300 lb	5 H	CSA/FM Class I, Div. 1, Groups A, B, C, D	
2" ASME, 600 lb	5 J	CSA/FM Class II, Div. 1, Groups E, F, G	
3" ASME, 150 lb	5 K	CSA/FM Class III T4	
3" ASME, 300 lb	5 L	Enclosure	
3" ASME, 600 lb	5 M	Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65	A
4" ASME, 150 lb	5 N	Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65	B
4" ASME, 300 lb	5 P	Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68	C
4" ASME, 600 lb	5 Q	Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68	D
<u>Welded flange, 316L stainless steel, Type A flat faced¹⁾</u>		Stainless steel, please contact a local sales person for details.	
DN 40, PN 16	6 C	For more information, please visit http://www.usa.siemens.com/level .	
DN 40, PN 40	6 D	Mounting eye	
DN 50, PN 16	6 E	Without Mounting eye	0
DN 50, PN 40	6 F	With mounting eye	1
DN 80, PN 16	6 G		
DN 80, PN 40	6 H		
DN 100, PN 16	6 J		
DN 100, PN 40	6 K		
Sanitary, hastelloy, duplex or other custom process connections available. Please contact a local sales person for details.			
For more information, please visit http://www.usa.siemens.com/level .			
Probe Length			
(from flange face or including process thread)			
Add Order code Y01 and plain text: "Insertion length ... mm"			
1 000 ... 2 000 mm (39.37 ... 78.74 inch)	A		
2 001 ... 4 000 mm (78.78 ... 157.48 inch)	B		
4 001 ... 6 000 mm (157.52 ... 236.22 inch)	C		
6 001 ... 8 000 mm (236.26 ... 314.96 inch)	D		
8 001 ... 10 000 mm (315.00 ... 393.70 inch)	E		
10 001 ... 12 000 mm (393.74 ... 472.44 inch)	F		
12 001 ... 14 000 mm (472.48 ... 551.18 inch)	G		
14 001 ... 16 000 mm (551.22 ... 629.92 inch) ²⁾	H		
16 001 ... 18 000 mm (629.96 ... 708.66 inch) ²⁾	J		
18 001 ... 20 000 mm (708.70 ... 787.40 inch) ²⁾	K		
20 001 ... 22 000 mm (787.44 ... 866.14 inch) ²⁾	L		
22 001 ... 24 000 mm (866.18 ... 944.88 inch) ²⁾	M		
24 001 ... 25 000 mm (944.92 ... 984.25 inch) ²⁾	N		
Thermal isolator			
Without thermal isolator	0		
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	1		
Wetted seals			
FKM	0		
FFKM [for process temperatures above -20 °C (-4 °F)]	1		

¹⁾ Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.

²⁾ Cable lengths from 15 000 mm (590.55 inch) to 25 000 mm (984.25 inch) can be used in non-conductive media. Contact Factory for assistance.

Level Measurement

Continuous level measurement

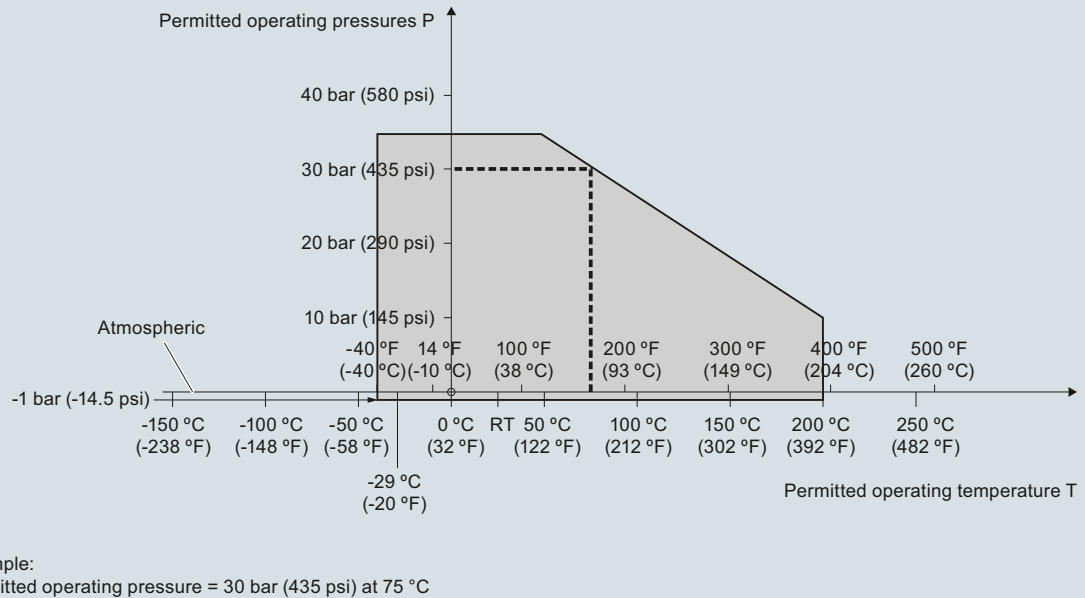
Capacitance transmitters

SITRANS LC300

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	Y01
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Material inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/ processinstrumentation/documentation	
Accessories	
Electronic transmitter kit (includes transmitter and driver)	Article No. 7ML1830-1KN
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-...
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-...
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750-...
For applicable back up point level switch - see point level measurement section	

Characteristic curves

Pressure/temperature curve
LC300 standard, extended rod and cable probes
Threaded process connections
(7ML5670, 7ML5671, 7ML5672 and 7ML5673)



SITRANS LC300 process pressure/temperature derating curves (7ML5670, 7ML5671, 7ML5672, and 7ML5673)

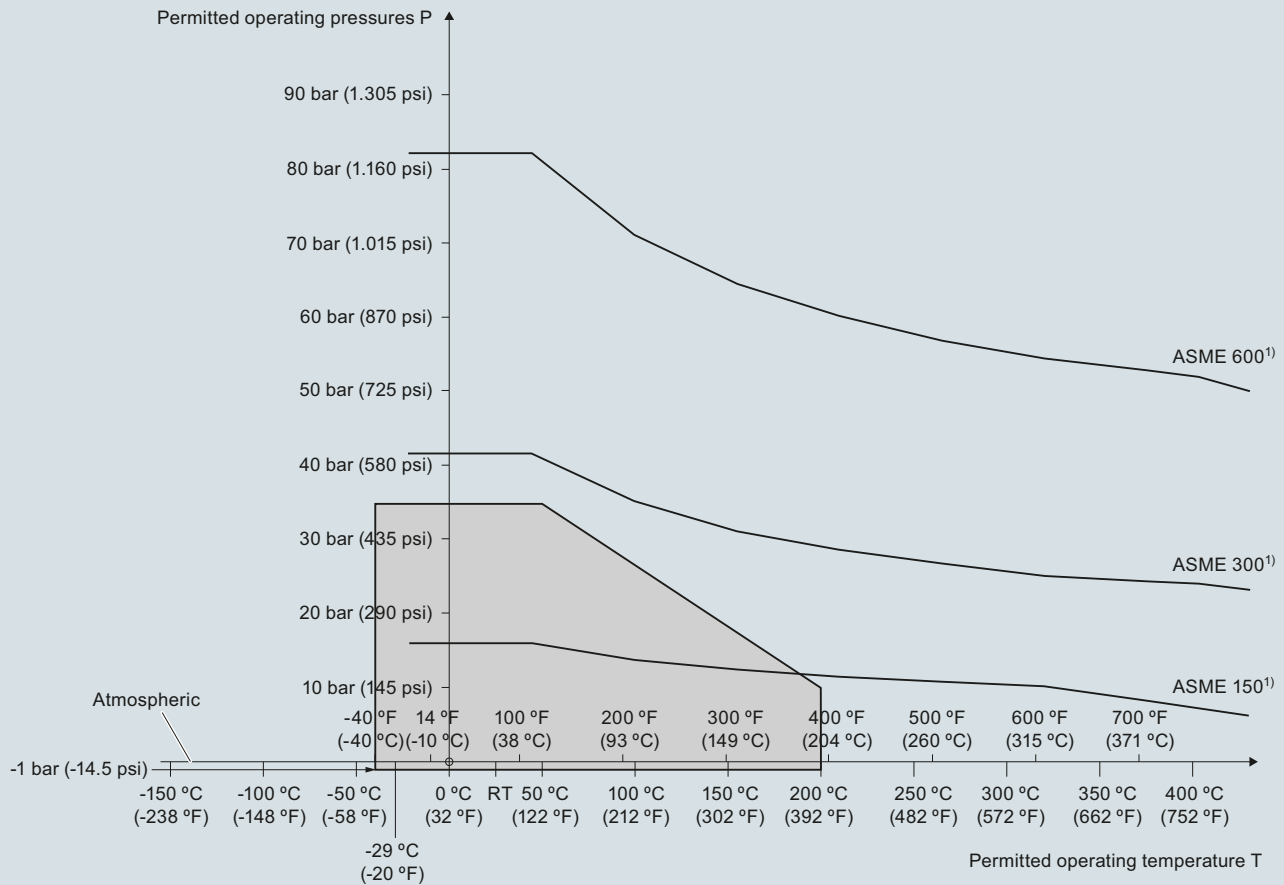
Level Measurement

Continuous level measurement

Capacitance transmitters

SITRANS LC300

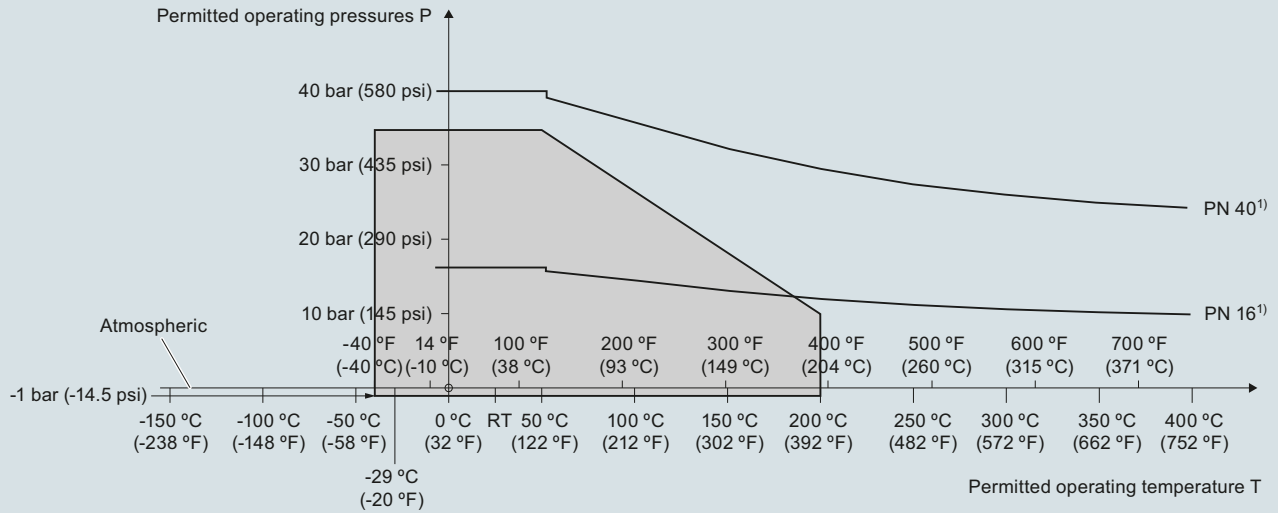
Pressure/temperature curve
LC300 standard, extended rod and cable probes
ASME flanged process connections
(7ML5670, 7ML5671, 7ML5672 and 7ML5673)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC300 process pressure/temperature derating curves (7ML5670, 7ML5671, 7ML5672, and 7ML5673)

Pressure/temperature curve
LC300 standard, extended rod and cable probes
EN flanged process connections
(7ML5670, 7ML5671, 7ML5672 and 7ML5673)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC300 process pressure/temperature derating curves (7ML5670, 7ML5671, 7ML5672, and 7ML5673)

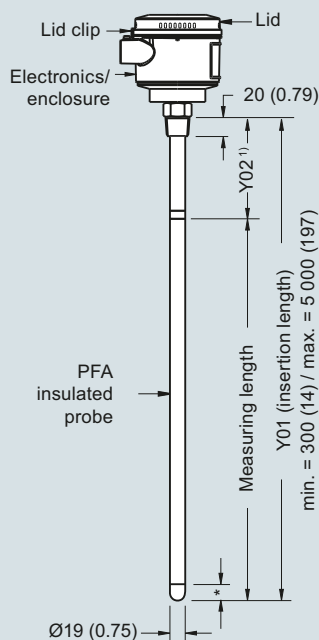
Level Measurement

Continuous level measurement
Capacitance transmitters

SITRANS LC300

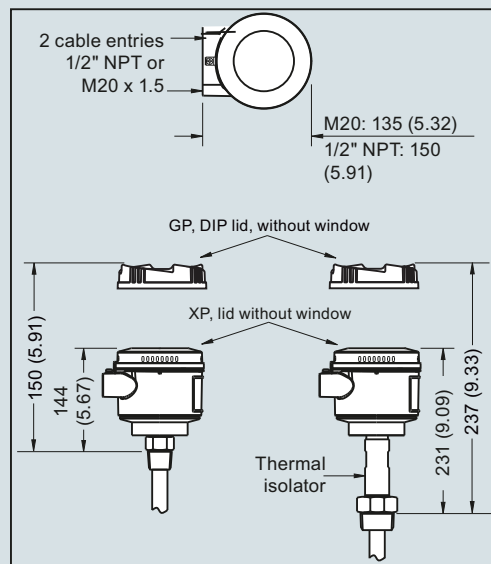
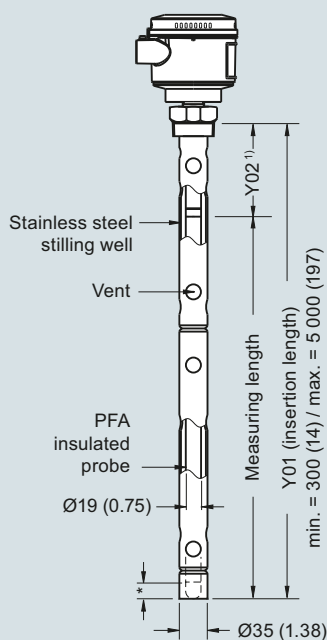
Dimensional drawings

Threaded (7ML5670)



* = 30 (1.18) Inactive tip

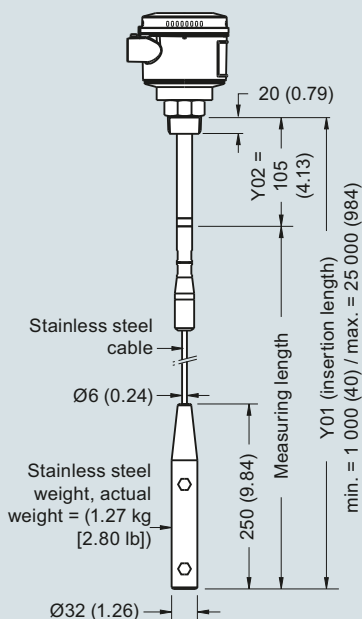
Threaded (7ML5671)



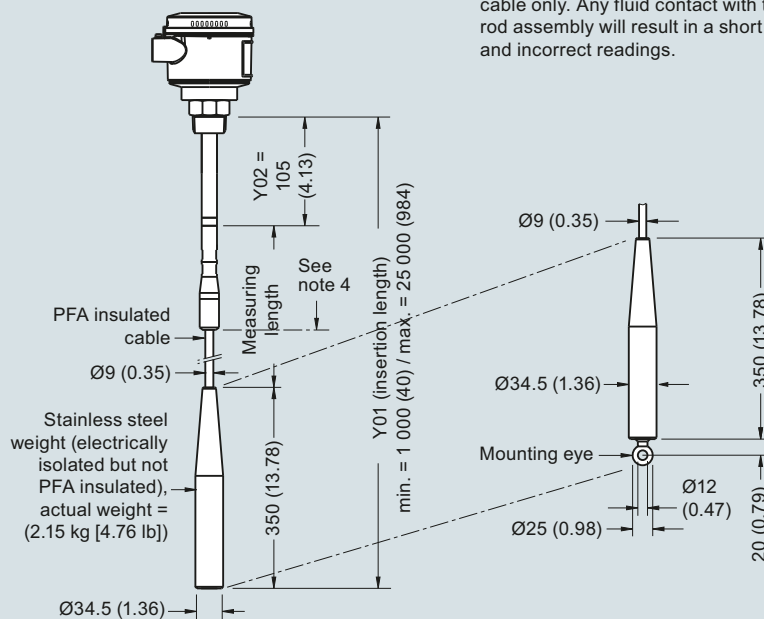
Note:

- 1) Rod version, threaded Y02 (including process connection): shield length = 120 (4.7).
- 2) For non-conductive applications only. Non-insulated cable can be shortened on site. Weight is included in measuring length.
- 3) For liquid and solid applications. Insulated cable cannot be shortened. Weight is **not** included in measuring length.
- 4) For conductive materials, the measuring length includes the exposed PFA insulated cable only. Any fluid contact with the upper rod assembly will result in a short circuit and incorrect readings.

Cable version, non-insulated²⁾
Threaded (7ML5672)



Cable version, insulated³⁾
Threaded (7ML5673)



SITRANS LC300 threaded process connections, dimensions in mm (inch)

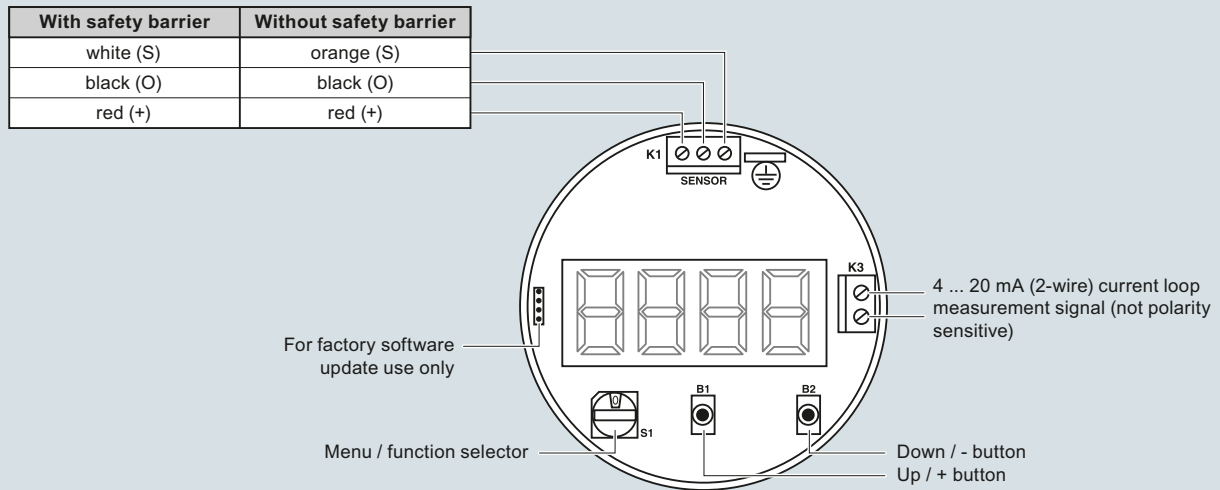
Level Measurement

Continuous level measurement

Capacitance transmitters



SITRANS LC300

Circuit diagrams





SITRANS LC300 connections

Selection and ordering data**LC300 Specials¹⁾**

	Article No.
LC300 Cable Extensions, 316L stainless steel	
	
Kit, stainless steel cable extension, 1 m, adjustable by customer	A5E01163688
Kit, stainless steel cable extension, 3 m, adjustable by customer	A5E01163689
Kit, stainless steel cable extension, 5 m, adjustable by customer	A5E01163690
Kit, stainless steel cable extension, 10 m, adjustable by customer	A5E01163691
Kit, stainless steel cable extension, 15 m, adjustable by customer	A5E01163693
Kit, stainless steel cable extension, 20 m, adjustable by customer	A5E01163695
LC300 Cable Extensions, 316 stainless steel with PFA coating	
	
Kit, PFA cable extension, 1 m	A5E01163709
Kit, PFA cable extension, 3 m	A5E01163710
Kit, PFA cable extension, 5 m	A5E01163711
Kit, PFA cable extension, 10 m	A5E01163712
Kit, PFA cable extension, 15 m	A5E01163713
Kit, PFA cable extension, 20 m	A5E01163714

LC300 Specials¹⁾

	Article No.
LC300 Mounting Eye	
	
Spare mounting eye (LC300 PFA versions only)	A5E01163717
LC300 Weight Kit, 316L stainless steel	
	
Kit, Spare stainless steel weight. To be used in any cable version of CLS300, or stainless steel cable version of LC300.	A5E01163727

¹⁾ Special flange sizes and facings are available.
Please contact a local sales person for details.

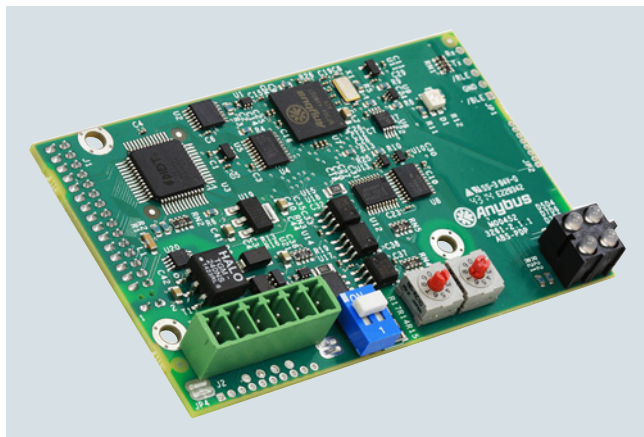
Customers interested in a custom designed device should consult a local
sales person. For more information, please visit
<http://www.usa.siemens.com/level>.

Level Measurement

Communication

SmartLinX module

Overview



SmartLinX modules provide direct digital connection to popular industrial communications buses with true plug-and-play compatibility with products manufactured by Siemens.

Benefits

- Fast, easy installation
- Direct connection: no additional installation required
- Scalable application layer allows for optimized network bandwidth and memory requirements (for PROFIBUS DPV0 and DeviceNet only)
- Modules available for PROFIBUS DPV0, PROFIBUS DPV1, ProfiNet, DeviceNET, Modbus TCP/IP, and Ethernet/IP

Application

With the addition of a SmartLinX module, Siemens instruments can be connected to a variety of industrial communications networks.

They're fast and easy to install, and can be added at any time. The module simply plugs into the socket on any SmartLinX enabled product. They require no secondary private buses or gateways and no separate wiring. There are no extra boxes to connect to your network so there's a minimum load on engineering and maintenance staff.

SmartLinX provides all data from the instrument, including measurement and status, and allows changes to operation parameters to be done over the bus or telemetry link. The user can select which data in the application layer to transfer over the bus. This selection saves bandwidth and memory and optimizes data throughput and speeds up the network, enabling you to connect more instruments to your network.

Selecting a communications module: PROFIBUS DPV0 versus PROFIBUS DPV1

The PROFIBUS DPV1 card was added to MultiRanger 200 HMI and HydroRanger 200 HMI to provide acyclic communication and SIMATIC PDM support over PROFIBUS. For backward compatibility, the PROFIBUS DPV0 card can also be used with MultiRanger 200 HMI and HydroRanger 200 HMI.

MultiRanger 100/200 and HydroRanger 200 are compatible only with the PROFIBUS DPV0 module.

Technical specifications

Module type	PROFIBUS DPV0
Interface	RS 485 (PROFIBUS standard)
Transmission rate	All valid PROFIBUS DP rates from 9 600 Kbps ... 12 Mbps
Slave address	0 ... 99
Connection	Slave
SmartLinX module compatibility	<ul style="list-style-type: none"> • MultiRanger 200 HMI • MultiRanger 100/200 • HydroRanger 200 HMI • HydroRanger 200

Module type	PROFIBUS DPV1
Interface	RS 485 (PROFIBUS standard)
Transmission rate	All valid PROFIBUS DP rates from 9 600 Kbps ... 12 Mbps
Slave address	0 ... 99
Connection	Slave
SmartLinX module compatibility	<ul style="list-style-type: none"> • MultiRanger 200 HMI • HydroRanger 200 HMI

Module type	DeviceNet
Interface	DeviceNet physical layer
Transmission rate in kbps	125, 250, 500
MAC address	0 ... 63
Connection	Slave (group 2)
SmartLinX module compatibility	<ul style="list-style-type: none"> • MultiRanger 200 HMI • MultiRanger 100/200 • HydroRanger 200 HMI • HydroRanger 200

Selection and Ordering data	Article No.
SmartLinX module for: MultiRanger 200 HMI, MultiRanger 100/200, HydroRanger 200 HMI, and HydroRanger 200	
PROFIBUS DPV0 module	7ML1830-1HR
PROFIBUS DPV1 module	A5E35778741
DeviceNet module	7ML1830-1HT
ProfiNet IO module	7ML1830-1PM
Modbus TCP/IP, Ethernet/IP	7ML1830-1PN
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

Overview



Dolphin Plus is instrument configuration software that allows you to quickly and easily configure, monitor, tune and diagnose several Siemens level devices remotely (see list below). Remote access is available using your desktop PC or connected directly in the field using a laptop.

Benefits

- Real-time monitoring and adjustment of parameters
- On-screen visualization of process values
- Saving and visualization of echo profiles for a wide range of Siemens level meters
- Copying of data for programming several devices
- Quick setup and commissioning of device
- Generation of configuration reports within seconds

Note:

The Dolphin Plus software is only available in English.

Application

Dolphin Plus is easy to install and use. Just load the software from the CD. In minutes, you're ready to set up or modify complete parameter configurations for one or more devices.

Following configuration, you can alter parameters, upload and download parameter sets to and from disk, and use parameter sets saved from other instruments. Reading of echo profiles permits fine tuning without the need for special instruments. Built-in quick start wizards and help functions guide you through the entire process.

Compatibility

Dolphin Plus is compatible with Microsoft Windows 95/98/NT4/Me/2000/XP and works with a wide range of Siemens products, including:

- SITRANS LU10
- SITRANS LU02
- SITRANS LU01

Connection to a Siemens instrument may be a direct RS 232 serial connection or via an RS 485 converter or Siemens infrared ComVerter, depending on the instrument being configured.

Meets VDE 2187 user interface requirements.

Most other Siemens level devices use Simatic PDM configuration software.

Selection and Ordering data

Dolphin Plus

Instrument configuration software to quickly and easily configure, monitor, tune and diagnose most Siemens devices remotely, from your desktop PC or connected directly in the field using a laptop.

Dolphin Plus Software includes a software DVD, and a nine pin adapter with a 2.1 m (82.7 inch) cable for connection to a PC serial port.

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

RS 485 to RS 232 converter

No
Yes

ComVerter

No
Yes

Article No.

7ML1841-

AA 0

**0
1**

**0
1**

Selection and Ordering data

Operating Instructions

Connection manual, English:
Included on Dolphin Plus DVD and available at
www.siemens.com/processautomation

Spare parts

Converter, RS 485 to RS 232 (D-Sub)

Kit containing one 9-pin D-Sub to RJ11 Adapter and one 2.1 meter telephone cable with two male jacks

ComVerter, Infrared link

Article No.

7ML1830-1HA

7ML1830-1MC

7ML1830-1MM

Level Measurement

Notes

Positioners



5/2	Product Overview
5/3	SIPART PS2 Technical description Technical specifications
5/8	- all versions
5/10	- SIPART PS2 with and without HART
5/11	- SIPART PS2 with PROFIBUS PA/ with FOUNDATION Fieldbus
5/13	- Option modules Selection and Ordering data
5/17	- SIPART PS2
5/20	- SIPART PS2 for flameproof enclosure
5/23	- Accessories
5/25	Dimensional drawings
5/27	Schematics
5/28	Mounting kit



Sec. 8	Software SIMATIC PDM, for parametrize HART and PROFIBUS PA devices
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You can download all instructions, catalogs and certificates for positioners free of charge at the following Internet address:
www.siemens.com/positioners

Positioners

Product Overview

Overview

	Application	Description	Catalog page	Software for parameterization
Positioners				
	Position control of pneumatic linear or part-turn actuators, also for intrinsically safe operation	SIART PS2 Universal device for positioning pneumatic actuators <ul style="list-style-type: none"> • Connection: 4 to 20 mA • HART, PROFIBUS PA or FOUNDATION Fieldbus • Local manual operation • Binary inputs and outputs • Diagnostic function • Blocking function • Automatic startup 	5/3	SIMATIC PDM
	As above, but in flameproof enclosure for explosion-proof application	SIART PS2 As above, but in flameproof aluminum and stainless steel enclosure	5/3	SIMATIC PDM

Supplied product documentation on DVD and safety instructions



The scope of delivery of the Siemens products for process instrumentation includes a multilingual instruction sheet with **safety instructions** as well as a uniform **mini DVD – Process Instrumentation and Weighing Systems**.

This DVD contains the most important manuals and certificates for the Siemens process instrumentation and weighing technology portfolio. The delivery may also contain product-specific or order-specific printed materials.

For additional information, refer to the Annex on page 10/3.

Overview



Electropneumatic positioner SIPART PS2 in the aluminum enclosure



SIPART PS2 electropneumatic positioner in flameproof aluminum enclosure with manometers



SIPART PS2 in stainless steel enclosure with manometers

The SIPART PS2 electropneumatic positioner is used to control the final control element of pneumatic linear or part-turn actuators. The electropneumatic positioner moves the actuator to a valve position corresponding to the setpoint. Additional function inputs can be used to block the valve or to set a safety position. A binary input is present as standard in the basic device for this purpose.

Benefits

SIPART PS2 positioners offer decisive advantages:

- Simple installation and automatic commissioning (self-adjustment of zero and span)
- Simple operation with
 - Local operation (manual operation) and configuration of the device using three buttons and a user-friendly two-line display
 - Parameterization via SIMATIC PDM
- Very high-quality control thanks to an online adaptation procedure
- Negligible air consumption in stationary operation
- "Tight closing" function (ensures maximum positioning pressure on the valve seat)
- "Fail in place" function: Current position is retained on failure of auxiliary electrical power and/or pneumatic failure (does not apply in conjunction with SIL).

Example: For an actuator with a volume of 8 liters, the typical position stability of a SIPART PS2 with "Fail in Place" is 0.3 % per hour.
- Numerous functions can be activated by simple configuring (e. g. characteristic curves and limits)
- Extensive diagnostic functions for valve and actuator
- Only one device version for linear and part-turn actuators
- Few moving parts, hence insensitive to vibrations
- External non contacting sensor as option for extreme ambient conditions
- "Intelligent solenoid valve": Partial Stroke Test and solenoid valve function in one device
- Partial Stroke Test e. g. for safety valves
- Full Stroke Test, Multi Step Response Test, Valve Performance Test for performance and maintenance evaluation of the valve
- Can also be operated with purified natural gas, carbon dioxide, nitrogen or noble gases
- SIL (Safety Integrity Level) 2

Application

The SIPART PS2 positioner is used, for example, in the following industries:

- Chemical/petrochemical
- Power stations
- Paper and glass
- Water, waste water
- Food and pharmaceuticals
- Offshore plants

The SIPART PS2 positioner can be used with all pneumatic actuators and is available for delivery:

- In various enclosure designs and various materials (polycarbonate, aluminum, and stainless steel)
- For non-hazardous applications
- For hazardous applications in the versions
 - Intrinsic safety type of protection
 - Flameproof enclosure type of protection
 - Non-sparking type of protection
 - Dust protection by enclosure type of protection

and in the versions:

- With 0/4 ... 20 mA control with/without communication through HART signal
- With PROFIBUS PA communication interface
- With FOUNDATION Fieldbus (FF) communications interface

Positioners

SIPART PS2

Technical description

Explosion-proof versions

- Device with protection type "intrinsic safety" for use in Zone 1, 2, 21, 22 or Class I, II, III/Division 1/Groups A-G
- Device with protection type "dust protection with enclosure" for use in Zone 21, 22 or Class II, III/Division 1/Groups E-G
- Device with protection type "non-sparking" for use in Zone 2 or Class I, Division 2, Groups A-D
- Device with protection type "flameproof enclosure" for use in Zone 1 or Class I, Division 1, Groups A-D

Stainless steel enclosure for extreme ambient conditions

The SIPART PS2 is available in a stainless steel enclosure (with no window in the cover) for use in particularly aggressive environments (e.g. offshore operation, chlorine plants etc.). The device functions are the same as for the basic version.

Design

The SIPART PS2 positioner is a digital field device with a highly-integrated microcontroller.

The positioner consists of the following components:

- Enclosure and cover
- PCB with corresponding electronics with or without communication through HART 7 or with electronics for communication in accordance with
 - PROFIBUS PA specification, IEC 61158-2; bus-supplied device, or
 - FOUNDATION Fieldbus (FF) specification, IEC 61158-2, bus-supplied device
- Position detection system
- Terminal housing with screw terminals
- Pneumatic block with piezoelectric valve precontrol.

The pneumatic block is located in the housing, the pneumatic connections for the inlet air and the positioning pressure on the right-hand side. A pressure gauge block and/or a safety solenoid valve can be connected there as options. The SIPART PS2 positioner is fitted to the linear or part-turn actuator using an appropriate mounting kit. The circuit board container in the casing provides slots for separately ordered boards with the following functions:

Position feedback module

- Position feedback as a two-wire signal 4 to 20 mA

Alarm module (3 outputs, 1 input)

- Signaling of two limits of the travel or angle by binary signals. The two limits can be set independently as maximum or minimum values.
- Output of an alarm if the setpoint position of the final control element is not reached in automatic mode or if a device fault occurs.
- Second binary input for alarm signals of for triggering safety reactions, e. g. blocking function or safety position.

Limit signaling through slot-type initiators (SIA module)

Two limits can be signaled redundantly as NAMUR signals (EN 60947-5-6) by slot-type initiators. An alarm output is also integrated in the module (see "Alarm Module").

Limit value signal via mechanical contacts (mechanical limit switch module)

Two limits can be signaled redundantly by switching contacts. An alarm output is also integrated in the module (see "Alarm Module").

Valid for all modules described above:

All signals are electrically isolated from one another and from the basic unit. The outputs indicate self-signaling faults. The modules are easy to retrofit.

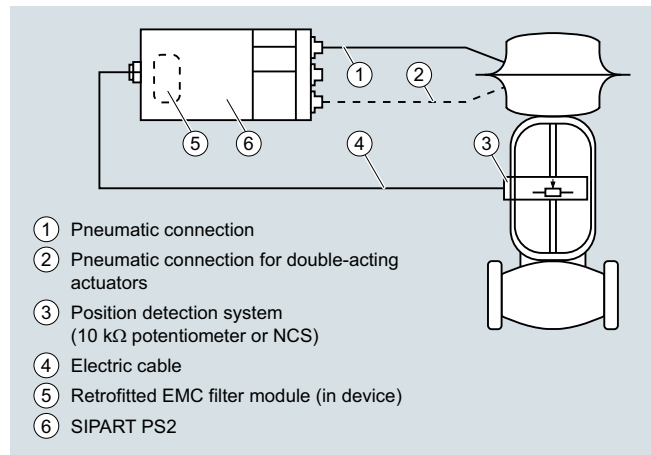
Separate mounting of position detection system and controller unit

The position detection system and controller unit can be connected separately for all casing versions of the SIPART PS2 (except flameproof design). Measurement of the travel or angle is carried out directly on the actuator. The controller unit can then be fitted a certain distance away, e. g. on a mounting pipe or similar, and is connected to the position detection system by an electric cable and to the actuator by one or two pneumatic lines. Such a split design is frequently advantageous if the ambient conditions at the fitting exceed the specified values for the positioner (e. g. strong vibrations).

The following can be used for measuring the travel or angle:

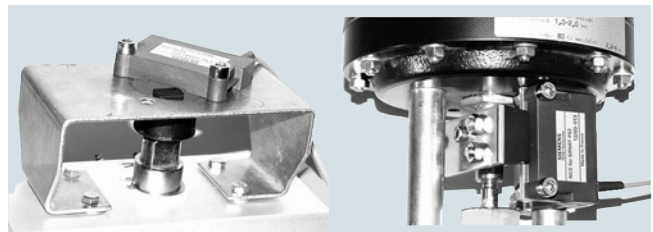
- NCS sensor
- External position detection system C73451-A430-D78
- A commercially available potentiometer (10 k Ω resistance), e. g. for higher application temperatures or customer-specific applications

The use of potentiometers is recommended for very small linear actuators with a short valve travel since, on the one hand, the space required by the potentiometer is very small and, on the other, the transmission characteristic is optimum for a small travel.



Separate mounting of position detection system and controller unit

Non contacting sensor (NCS)



NCS for part-turn actuator (6DR4004-N.10) mounted with mounting console (left) and NCS for linear actuator ≤ 14 mm (0.55 inch) (6DR4004-N.20) mounted with actuator-specific mounting solution (right)



NCS (6DR4004-N.30) for travels > 14 mm (0.55 inch) mounted using mounting kit for NAMUR linear actuator

The NCS sensor consists of a non-contacting position sensor. All coupling elements are omitted such as coupling wheel and driver pin with part-turn actuators or lever and pick-up bracket with linear actuators for up to 14 mm travel.

This results in:

- Even greater resistance to vibration and shock
- No wear of sensor
- Problem-free mounting on very small actuators
- Negligible hysteresis with very small travels.

The sensor does not require an additional power supply, i. e. SIPART PS2 (not for Ex d version) can be operated in a 2-wire system. The NCS (Non Contacting Sensor) consists of a potted sensor housing which must be mounted permanently and a magnet which is mounted on the spindle of linear actuators or on the shaft butt of part-turn actuators. For the version for travels > 14 mm (0.55 inch), the magnet and the NCS are premounted on a stainless steel frame and offer the same interface mechanically as the positioner itself, i. e. they can be mounted using the standard mounting kits 6DR4004-8V, -8VK and -8VL.

The installation of an EMC filter module in the positioner (controller unit) is necessary in order to provide a process boundary when external position sensors are used and to ensure immunity to noise according to the EC Declaration of Conformity (see "Selection and Ordering Data", "EMC Filter Module").

Function

The SIPART PS2 positioner works in a completely different way to normal positioners.

Mode of operation

Comparison of the setpoint and the actual value takes place electronically in a microcontroller. If the microcontroller detects a deviation, it uses a 5-way switch procedure to control the piezoelectric valves, which regulates the flow of air into and from the chambers of the pneumatic actuator or blows it in the opposite direction.

The microcontroller then outputs an electric control command to the piezoelectric valve in accordance with the size and direction of the deviation (deviation between setpoint and actual values). The piezoelectric valve converts the command into a pneumatic positional increment.

The positioner outputs a continuous signal in the area where there is a large system deviation (fast step zone); in areas of moderate system deviation (slow step zone) it outputs a sequence of pulses. No positioning signals are output in the case of a small system deviation (adaptive or variable deadband).

The linear or rotary motion of the actuator is detected by the mounting kit and transferred to a high-quality potentiometer over a shaft and a non-floating gear transmission.

The angular error of the pick-up in cases where the assembly is mounted on a linear actuator is corrected automatically.

When connected in a 2-wire system, the SIPART PS2 draws its power exclusively from the 4 to 20 mA setpoint signal. The electric power is also connected through the 2-wire bus signal with PROFIBUS operation (SIPART PS2 PA). The same applies for the FOUNDATION Fieldbus version.

Pneumatic block with piezoelectric valve precontrol

The piezoelectric valve can release very short control pulses. This helps achieve a high positioning accuracy. The pilot element is a piezoelectric bending converter which switches the pneumatic main controller unit. The pneumatic block is characterized by an extremely long service life.

Local operation

Local operation is performed using the built-in display and the three buttons. Switching between the operating levels Automatic, Manual, Configuring and Diagnosis is possible at the press of a button.

In manual mode the drive can be adjusted over the entire range without interrupting the circuit.

Operation and monitoring with the SIMATIC PDM configuration software

The configuration software SIMATIC PDM permits simple operation, monitoring, configuration and parameterization of the device. The diagnostic information available can be read via SIMATIC PDM from the device. Communication is carried out via the HART protocol or PROFIBUS PA. For the HART protocol, the device can be accessed both via a HART modem and via a HART-compatible input/output module (remote IO). The corresponding device description files, such as GSD and (Enhanced) EDD are available for both types of communication.

In addition, the SITRANS DTM provides software based on tried and tested EDD technology that can be used to parameterize field devices via a DTM (Device Type Manager) using an FDT frame application (e. g. PACTware). SITRANS DTM and the necessary device-specific enhanced EDD are available for download free of charge. The software provides the relevant communication interfaces for HART and PROFIBUS.

Automatic commissioning

With a simple configuration menu the SIPART PS2 can be quickly adapted to the fitting and adjusted by means of an automatic startup function.

During initialization, the microcontroller determines the zero point, full-scale value, the direction of action and the positioning speed of the fitting. From this data it establishes the minimum pulse time and the deadband, thus optimizing the control.

Low air consumption

A hallmark of the SIPART PS2 is its own extremely low consumption of air. Normal air losses on conventional positioners are very costly. Thanks to the use of modern piezoelectric technology, the SIPART PS2 consumes air only when it is needed, which means that it pays for itself within a very short time.

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Comprehensive monitoring functions

The SIPART PS2 has various monitoring functions with which changes on the actuator and valve can be detected and signaled if applicable when a selectable limit has been exceeded. This information may be important for diagnosis of the actuator or valve. The measuring data to be determined and monitored, some of whose limits can be adjusted, include:

- Travel integral
- Number of changes in direction
- Alarm counter
- Self-adjusting deadband
- Valve end limit position (e. g. for detection of valve seat wear or deposits)
- Operating hours (also according to temperature and travel ranges) as well as min./max. temperature
- Operating cycles of piezoelectric valves
- Valve positioning time
- Actuator leakages

At a glance with the Diagnostics Cockpit

With the Diagnostics Cockpit, the HART variants of the SIPART PS2 provide a straightforward way of getting started with the world of diagnostic capabilities. All relevant information (set-point, actual value, control deviation, status of the diagnostic system, etc.) of the valve is available at a glance. Additional facts and details are just a few mouse clicks away from the Diagnostics Cockpit.

Status monitoring with 3-stage alarm concept

The intelligent electropneumatic SIPART PS2 positioner is equipped with additional monitoring functions. The status indications derived from these monitoring functions signal active faults of the unit. The severity of these faults are graded using "traffic light signaling", symbolized by a wrench in the colors green, yellow and red (in SIMATIC PDM and Maintenance Station):

- Need for maintenance (green wrench)
- Urgent need for maintenance (yellow wrench)
- Imminent danger of unit failure or general failure (red wrench)

This allows users to put early measures into action before a serious valve or actuator fault occurs which could result in a system shutdown. The fact that a fault indication is signaled, such as the onset of a diaphragm break in the actuator or the progressive sluggishness of a unit, enables the user to ensure system reliability at any time by means of suitable maintenance strategies.

This three-stage alarm hierarchy also allows early detection and signaling of other faults, such as the static friction of a packing box, the wearing of a valve plug/seating, or precipitations or incrustations on the fittings.

These fault indications can be output either line-conducted over the alarm outputs (see above) of the positioner (max. 3), or via communication over the HART or field bus interfaces. In this case, the HART, PROFIBUS and FF versions of SIPART PS2 permit a differentiation of the various fault indications, as well as a trend representation and histogram function of all key process variables with regard to the fittings.

The device display also displays the graded maintenance requirements, complete with identification of the source of the fault.

Maintenance required for valve

The Full Stroke Test, Step Response Test, Multi Step Response Test and Valve Performance Test provide detailed information about the maintenance required of the valve. With the help of HART communication, you receive comprehensive test results and can identify the extent of the maintenance measures. In order to quantify the performance capability of valves, characteristic values such as step response times (T63, T86, user-selectable Txx), dead times, overshoot, hysteresis, errors of measurement, non-linearity, etc., are determined.

Functional safety acc. to SIL2

The positioner is suitable for use on valves that satisfy the special requirements in terms of functional safety up to SIL 2 in accordance with IEC 61508 or IEC 61511. The variants 6DR5.1.-0....-Z C20 are available for this.

These are single-acting positioners for mounting on pneumatic actuators with spring return.

The positioner vents the valve actuator on demand/in the event of a fault and puts the valve in the preset safety position.

This positioner meets the following requirement:

- Functional safety up to SIL 2 in accordance with IEC 61508 or IEC 61511 for safe venting.

SIPART PS 2 as "intelligent solenoid valve"

Open/Close valves, safety fittings in particular, are generally pneumatically controlled over a solenoid valve. If you use SIPART PS2 instead of this type of solenoid valve, the positioner performs two tasks in a single device (without extra wiring)

- Firstly, it switches the fitting off on demand by venting the actuator (functional safety acc. to SIL 2 (see above))
- Secondly, it can perform a Partial Stroke Test at regular intervals (1 - 365 days), which prevents the blocking of the fitting, e. g. due to corrosion or furring.

As in this case SIPART PS2 is constantly working in normal operation (e. g. 99 % position), it also acts as a permanent test function for the pneumatic output circuit, which is not usually possible when using a solenoid valve.

Solenoid valves on control valves can also not normally be tested during operation. They are therefore not necessary when using SIPART PS 2 with a 4-wire connection system as the venting is carried out on demand by SIPART PS2. This means that on control valves, both the control function and the shut-off function can be carried out by a single device.

Configuring

In configuring mode, the SIPART PS2 positioner can be configured to requirements and include the following settings:

- Input current range 0 to 20 mA or 4 to 20 mA
- Rising or falling characteristic curve at the setpoint input
- Positioning speed limit (setpoint ramp)
- Splitrange operation; adjustable start-of-scale and full-scale values
- Response threshold (deadband); self-adjusting or fixed
- Direction of action; rising or falling output pressure with rising setpoint
- Limits (start-of-scale and full-scale values) of positioning range
- Limits (alarms) of the final control element position; minimum and maximum values
- Automatic "tight closing" (with adjustable response threshold)
- The travel can be corrected in accordance with the valve characteristic curve.
- Function of binary inputs
- Function of alarm output etc.

Configuration of the various SIPART PS2 versions is largely identical.

Positioners

SIPART PS2

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Technical specifications

SIPART PS2 (all versions)

Rated conditions		
Ambient conditions	For indoor and outdoor use	
Ambient temperature	In hazardous areas, observe the maximum permitted ambient temperature according to the temperature class.	
• Permitted ambient temperature for operation ²⁾³⁾	-30 ... +80 °C (-22 ... +176 °F)	
• Altitude	2 000 m above sea level. At altitudes greater than 2 000 m above sea level, use a suitable power supply.	
• Relative humidity	0 ... 100 %	
Degree of protection ¹⁾	IP66 according to IEC/EN 60529/NEMA 4X	
Mounting position	Any; pneumatic connections and exhaust opening not facing up in wet environment	
Vibration resistance		
• Harmonic oscillations (sine-wave) according to EN 60068-2-6/10.2008	3.5 mm (0.14"), 2 ... 27 Hz, 3 cycles/axis 98.1 m/s ² (321.84 ft/s ²), 27 ... 300 Hz, 3 cycles/axis	
• Bumping (half-sine) according to EN 60068-2-27/02.2010	150 m/s ² (492 ft/s ²), 6 ms, 1000 shocks/axis	
• Noise (digitally controlled) according to EN 60068-2-64/04.2009	10 ... 200 Hz; 1 (m/s ²) ² /Hz (3.28 (ft/s ²) ² /Hz) 200 ... 500 Hz; 0.3 (m/s ²) ² /Hz (0.98 (ft/s ²) ² /Hz) 4 hours/axis	
• Recommended continuous duty range of the complete fitting	≤ 30 m/s ² (98.4 ft/s ²) without resonance sharpness	
Climatic class	According to EN 60721-3	
• Storage	1K5, but -40 ... +80 °C (1K5, but -40 ... +176 °F)	
• Transport	2K4, but -40 ... +80 °C (2K4, but -40 ... +176 °F)	
Pneumatic data		
Auxiliary power (air supply)	Compressed air, carbon dioxide (CO ₂), nitrogen (N), noble gases or cleaned natural gas	
• Pressure ⁴⁾	1.4 ... 7 bar (20.3 ... 101.5 psi)	
Air quality to ISO 8573-1		
• Solid particulate size and density	Class 3	
• Pressure dew point	Class 3 (min. 20 K (36 °F) below ambient temperature)	
• Oil content	Class 3	
Unrestricted flow (DIN 1945)		
• Inlet air valve (ventilate actuator) ⁵⁾		
- 2 bar (29 psi)	4.1 Nm ³ /h (18.1 USgpm)	
- 4 bar (58 psi)	7.1 Nm ³ /h (31.3 USgpm)	
- 6 bar (87 psi)	9.8 Nm ³ /h (43.1 USgpm)	
• Outlet air valve (deerate actuator for all versions except fail in place) ⁵⁾		
- 2 bar (29 psi)	8.2 Nm ³ /h (36.1 USgpm)	
- 4 bar (58 psi)	13.7 Nm ³ /h (60.3 USgpm)	
- 6 bar (87 psi)	19.2 Nm ³ /h (84.5 USgpm)	
	<ul style="list-style-type: none"> • Outlet air valve (deerate actuator for fail in place version) <ul style="list-style-type: none"> - 2 bar (29 psi) - 4 bar (58 psi) - 6 bar (87 psi) 	4.3 Nm ³ /h (19.0 USgpm) 7.3 Nm ³ /h (32.2 USgpm) 9.8 Nm ³ /h (43.3 USgpm)
	Restrictor ratio	Adjustable up to ∞ : 1
	Auxiliary power consumption in the controlled state	< 3,6 · 10 ⁻² Nm ³ /h (0.158 USgpm)
	Sound pressure	L _{Aeq} < 75 dB L _{Amax} < 80 dB
Design		
Mode of operation		
• Range of stroke (linear actuators)		3 ... 130 mm (0.12 ... 5.12 inch) (angle of positioner shaft 16 ... 90°) Larger range of stroke on request.
• Angle of rotation range (part-turn actuators)		30 ... 100°
Mounting type		
• On linear actuators		Using mounting kit 6DR4004-8V and where necessary with an additional lever arm 6DR4004-8L on actuators according to IEC 60534-6-1 (NAMUR) with ribs, bars or flat face.
• On part-turn actuators		Using mounting kit 6DR4004-8D or TGX:16300-1556 on actuators with mounting plane according to VDI/VDE 3845 and IEC 60534-6-2. The actuator-specific mounting console can be ordered separately, see the selection and ordering data.
Weight, positioner without option modules or accessories		
• 6DR5..0 Glass-fiber reinforced enclosure made from polycarbonate		Approx. 0.9 kg (1.98 lb)
• 6DR5..1 Aluminum enclosure, single-acting		Approx. 1.3 kg (2.86 lb)
• 6DR5..2 Stainless steel enclosure		Approx. 3.9 kg (8.6 lb)
• 6DR5..3 Aluminum enclosure, single-acting and double-acting		Approx. 1.6 kg (3.53 lb)
• 6DR5..5 Flameproof aluminum enclosure		Approx. 5.2 kg (11.46 lb)
• 6DR5..6 Flameproof stainless steel enclosure		Approx. 8.4 kg (18.5 lb)
Material		
• Enclosure		
- 6DR5..0 Polycarbonate		Glass-fiber reinforced polycarbonate (PC)
- 6DR5..1 Aluminum, single-acting		GD AISi12
- 6DR5..2 Stainless steel		Austenitic stainless steel 316 Cb, mat. No. 1.4581
• 6DR5..3 Aluminum, single-acting and double-acting		GD AISi12
- 6DR5..5 Aluminum, flameproof		GK AISi12
- 6DR5..6 Flameproof stainless steel enclosure		Austenitic stainless steel 316 L, mat. No. 1.4409
• Pressure gauge block		Aluminum AlMgSi, anodized or stainless steel 316

Dimensions	See "Dimensional Drawings" on page 5/25	Explosion protection	
Device versions		Explosion protection according to ATEX/IECEX	
<ul style="list-style-type: none"> In polycarbonate enclosure 6DR5..0 In aluminum enclosure 6DR5..1 In aluminum enclosure 6DR5..3 and 6DR5..5 In stainless steel enclosure 6DR5..2 and 6DR5..6 	Single-acting and double-acting Single-acting Single-acting and double-acting Single-acting and double-acting	<ul style="list-style-type: none"> Intrinsic safety "i" 	For enclosure 6DR5..0/1/2/3-0E; 6DR5..1/2/3-0F/K <ul style="list-style-type: none"> II 2 G Ex ia IIC T6/T4 Gb II 3 G Ex ic IIC T6/T4 Gc For enclosure 6DR5..1/2/3-0E/F/K <ul style="list-style-type: none"> II 2 D Ex ia IIIC T110°C Db
Gauge		<ul style="list-style-type: none"> Dust, protection with "t" enclosure 	For enclosure 6DR5..1/2/3-0D/K; 6DR5..6-0E <ul style="list-style-type: none"> II 2 D Ex tb IIIC T100°C Db
<ul style="list-style-type: none"> Degree of protection - Gauge made of plastic - Gauge made of steel - Gauge made of stainless steel 316 	IP31 IP44 IP54	<ul style="list-style-type: none"> For use in Zone 2 "ec" 	For enclosure 6DR5..1/2/3-0F/G/K <ul style="list-style-type: none"> II 3 G Ex ec IIC T6/T4 Gc
<ul style="list-style-type: none"> Vibration resistance 	According to EN 837-1	<ul style="list-style-type: none"> Flameproof enclosure "d" 	For enclosure 6DR5..5/6 <ul style="list-style-type: none"> II 2 G Ex d IIC T6/T4 Gb
Connections, electrical		Explosion protection in accordance with FM/CSA, suitable for installations according to NEC 500/NEC 505	
<ul style="list-style-type: none"> Screw terminals Cable gland - Without explosion protection as well as with Ex i - With explosion protection Ex d 	2.5 mm ² AWG30-14 M20x1.5 or ½-14 NPT Ex d certified M20x1.5; ½-14 NPT or M25x1.5	<ul style="list-style-type: none"> Intrinsic safety "IS" 	For enclosure 6DR5..0/1/2/3-0E/F; 6DR5..1/2/3-0K <ul style="list-style-type: none"> IS / I, II / 1 / A-D IS / 1 / (A)Ex / Ex ib / IIC, Gb For enclosure 6DR5..1/2/3-0E/F/K <ul style="list-style-type: none"> IS / III / 1 / E-G IS / 21 / (A)Ex / Ex ib / IIIC, Db, T110°C
Connections, pneumatic	Female thread G¼ or ¼-18 NPT	<ul style="list-style-type: none"> Dust, protection with "DIP" enclosure 	For enclosure 6DR5..1/2/3-0D/K; 6DR5..6-0E <ul style="list-style-type: none"> DIP / II, III / 1 / EFG DIP / 21 / (A)Ex tb / IIIC / T100°C / Ta=85°C
Controller		<ul style="list-style-type: none"> For use in Zone 2 / Div. 2 "NI" 	For enclosure 6DR5..1/2/3-0F/G/K; 6DR5..0-0F <ul style="list-style-type: none"> NI / I / 2 / A-D NI / 2 / (A)Ex nA / Ex ic / IIC, Gc
Controller unit		<ul style="list-style-type: none"> Flameproof enclosure "XP" 	For enclosure 6DR5..5/6 FM <ul style="list-style-type: none"> XP, CL.I, DIV.1, GP.ABCD XP, CL.I, ZN. 1, (A)Ex d IIC
<ul style="list-style-type: none"> Five-point switch Deadband - dEbA = Auto - dEbA = 0.1 ... 10 % 	Self-adjusting Self-adjusting Can be set as fixed value		
Analog-to-digital converter			
<ul style="list-style-type: none"> Scan time Resolution Transmission error Temperature influence effect 	10 ms ≤ 0,05 % ≤ 0,2 % ≤ 0.1 %/10 K (≤ 0.1 %/18 °F)		
Certificates and approvals		Natural gas as driving medium	For technical specifications using natural gas as driving medium, see operating instructions.
Classification according to pressure equipment directive (PED 2014/68/EU)	For gases of fluid group 1, complies with requirements of article 4, paragraph 3 (sound engineering practice SEP)		
CE conformity	You can find the appropriate directives and standards, including the relevant versions, in the EC Declaration of Conformity on the Internet.		
UL conformity	You can find the appropriate directives and standards, including the relevant versions, in the UL-CERTIFICATE OF COMPLIANCE on the Internet.		

- 1) Max. impact energy 1 Joule for enclosure with inspection window 6DR5..0 and 6DR5..1 or max. 2 Joule for 6DR5..3.
- 2) At ≤ -10 °C (≤ 14 °F) the display refresh rate of the indicator is limited. When using position feedback module, only T4 is permitted.
- 3) The following applies to order suffix (order code) -Z M40: -40 ... +80 °C (-40 ... +176 °F).
- 4) The following applies to fail in place: 3 ... 7 bar (43.5 ... 101.5 psi).
- 5) With Ex d version (6DR5..5-...) values are reduced by approx. 20 %.

Positioners

SIPART PS2

Technical specifications

SIPART PS2 with and without HART

	Basic electronics without Ex protection	Basic electronics with Ex d explosion protection	Basic electronics with "ia"explosion protection	Basic electronics with explosion protection "ic", "ec", "nA", "t"
Electrical specifications				
Current input I_W				
• Rated signal range			0/4 ... 20 mA	
• Test voltage			840 V DC, 1 s	
• Binary input BIN1 (terminals 9/10; electrically connected to the basic device)		Suitable only for floating contact; max. contact load < 5 μ A at 3 V		
2-wire connection (terminals 6/8) 6DR50.. and 6DR53.. without HART 6DR51.. and 6DR52.. with HART				
Current to maintain the auxiliary power supply			≥ 3.6 mA	
Required load voltage U_B (corresponds to Ω at 20mA)				
• Without HART (6DR50..)				
- Typical	6.36 V (= 318 Ω)	6.36 V (= 318 Ω)	7.8 V (= 390 Ω)	7.8 V (= 390 Ω)
- max.	6.48 V (= 324 Ω)	6.48 V (= 324 Ω)	8.3 V (= 415 Ω)	8.3 V (= 415 Ω)
• Without HART (6DR53..)				
- Typical	7.9 V (= 395 Ω)	-	-	-
- max.	8.4 V (= 420 Ω)	-	-	-
• With HART (6DR51..)				
- Typical	6.6 V (= 330 Ω)	6.6 V (= 330 Ω)	-	-
- max.	6.72 V (= 336 Ω)	6.72 V (= 336 Ω)	-	-
• With HART (6DR52..)				
- Typical	-	8.4 V (= 420 Ω)	8.4 V (= 420 Ω)	8.4 V (= 420 Ω)
- max.	-	8.8 V (= 440 Ω)	8.8 V (= 440 Ω)	8.8 V (= 440 Ω)
• Static destruction limit	± 40 mA	± 40 mA	-	-
Effective internal capacitance C_i				
• Without HART	-	-	11 nF	"ic": 11 nF
• With HART	-	-	11 nF	"ic": 11 nF
Effective internal inductance L_i				
• Without HART	-	-	207 μ H	"ic": 207 μ H
• With HART	-	-	310 μ H	"ic": 310 μ H
For connecting to circuits with the following peak values	-	-	$U_i = 30$ V $I_i = 100$ mA $P_i = 1$ W	"ic": $U_i = 30$ V $I_i = 100$ mA "ec"/"nA"/"t": $U_n \leq 30$ V $I_n \leq 100$ mA
3-/4-wire connection (terminals 2/4 and 6/8) 6DR52.. with HART, explosion-protected 6DR53.. without HART, not explosion-protected)				
Load voltage at 20 mA	≤ 0.2 V (= 10 Ω)	≤ 0.2 V (= 10 Ω)	≤ 1 V (= 50 Ω)	≤ 1 V (= 50 Ω)
Auxiliary power U_{Aux}	18 ... 35 V DC	18 ... 35 V DC	18 ... 30 V DC	18 ... 30 V DC
Current consumption I_H			($U_{Aux} - 7.5$ V)/2.4 k Ω [mA]	
Effective internal capacitance C_i	-	-	22 nF	"ic": 22 nF
Effective internal inductance L_i	-	-	0.12 mH	"ic": 0.12 mH
For connecting to circuits with the fol- lowing peak values	-	-	$U_i = 30$ V DC $I_i = 100$ mA $P_i = 1$ W	"ic": $U_i = 30$ V $I_i = 100$ mA "ec"/"nA"/"t": $U_n \leq 30$ V $I_n \leq 100$ mA
Electrical isolation	between U_{Aux} and I_W	between U_{Aux} and I_W	between U_{Aux} and I_W (2 intrinsically safe cir- cuits)	between U_{Aux} and I_W
HART communication				
HART version			7	
PC parameterization software				SIMATIC PDM; supports all device objects. The software is not included in the scope of delivery.

SIPART PS2 with PROFIBUS PA/with FOUNDATION Fieldbus

	Basic electronics without Ex protection	Basic electronics with Ex d explosion protection	Basic electronics with "ia"explosion protection	Basic electronics with explosion protection "ic", "ec", "nA", "t"
Electrical specifications				
<u>Power supply, bus circuit</u>			Bus-supplied	
Bus voltage	9 ... 32 V	9 ... 32 V	9 ... 24 V	9 ... 32 V
For connecting to circuits with the following peak values				
• Bus connection with FISCO supply unit			U _i = 17.5 V I _i = 380 mA P _i = 5.32 W	"ic": U _i = 17.5 V I _i = 570 mA "ec"/"nA"/"t": U _n ≤ 32 V
• Bus connection with barrier			U _i = 24 V I _i = 250 mA P _i = 1.2 W	"ic": U _i = 32 V "ec"/"nA"/"t": U _n ≤ 32 V
Effective internal capacitance C _i	-	-	Negligibly	Negligibly
Effective internal inductance L _i	-	-	8 µH	"ic": 8 µH
Current consumption			11.5 mA ± 10 %	
Additional error signal			0 mA	
<u>Safety shutdown can be activated with "jumper" (terminals 81/82)</u>			electrically isolated from bus circuit and binary input	
• Input resistance			> 20 kΩ	
• Signal state "0" (shutdown active)			0 ... 4.5 V or unconnected	
• Signal state "1" (shutdown not active)			13 ... 30 V	
For connecting to power supply with the following peak values			U _i = 30 V I _i = 100 mA P _i = 1 W	"ec"/"nA": U _n ≤ 30 V I _n ≤ 100 mA "ic": U _i = 30 V I _i = 100 mA
Effective Internal capacitance and inductance	-	-	Negligibly	Negligibly
Binary input BE1 for PROFIBUS (terminals 9/10); electrically connected to the bus circuit)			Bridged or connection to switching contact. Suitable only for floating contact; max. contact load < 5 µA at 3 V	
Electrical isolation				
• For basic device without Ex protection and for basic device with Ex d			Electrical isolation between basic device and the input for safety shutdown, as well as the outputs of the option modules	
• For basic device Ex "ia"			The basic device and the input to the safety shutdown, as well as the outputs of the option modules, are separate, intrinsically safe circuits.	
• For basic device Ex "ic", "nA", "t"			Electrical isolation between basic device and the input for safety shutdown, as well as the outputs of the option modules	
Test voltage			840 V DC, 1 s	
PROFIBUS PA communication				
Communication			Layers 1 and +2 according to PROFIBUS PA, transmission technology according to IEC 61158-2; slave function; layer 7 (protocol layer) according to PROFIBUS DP, EN 50170 standard with the extended PROFIBUS functions (all data acyclic, manipulated variable, feedbacks and status also cyclic)	
C2 connections			Four connections to master class 2 are supported; automatic connection setup 60 s after break in communication	
Device profile			PROFIBUS PA profile B, version 3.02, more than 150 objects	
Response time to master message			Typically 10 ms	
Device address			126 (when delivered)	
PC parameterization software			SIMATIC PDM; supports all device objects. The software is not included in the scope of delivery.	

Positioners

SIPART PS2

Technical specifications

	Basic electronics without Ex protection	Basic electronics with Ex d explosion protection	Basic electronics with "ia" explosion protection	Basic electronics with explosion protection "ic", "ec", "nA", "t"
FOUNDATION Fieldbus communication				
Communications group and class	According to technical specification of the Fieldbus Foundation for H1 communication			
Function blocks/Functions	Group 3, Class 31PS (Publisher Subscriber) 1 Resource Block (RB2) 1 Analog Output Function Block (AO) 1 PID Function Block (PID) 1 Transducer Block (Standard Advanced Positioner Valve) Link Active Scheduler (LAS)-Funktion			
Execution times of the blocks	AO: 30 ms PID: 40 ms			
Physical layer profile	123, 511			
FF registration	Tested with ITK 6.0			
Device address	22 (when delivered)			

Option modules

	Without Ex protection/ with Ex protection Ex d	With explosion protection "ia"	With explosion protection "ic", "ec", "nA", "t"
Alarm module	6DR4004-8A	6DR4004-6A	6DR4004-6A
3 binary output circuits		<ul style="list-style-type: none"> Alarm output A1: Terminals 41 and 42 Alarm output A2: Terminals 51 and 52 Alarm output: Terminals 31 and 32 	
<ul style="list-style-type: none"> Auxiliary power U_{Aux} Signal state <ul style="list-style-type: none"> High (not activated) Low *) (activated) <p>*) Low is also the status when the basic device is faulty or is without additional electrical power supply.</p> <ul style="list-style-type: none"> For connecting to circuits with the following peak values 	$\leq 35 \text{ V}$ Conductive, $R = 1 \text{ k}\Omega$, $+3/-1 \%$ *) Blocked, $I_R < 60 \mu\text{A}$	- $\geq 2.1 \text{ mA}$ $\leq 1.2 \text{ mA}$ Switching threshold with supply to EN 60947-5-6: $U_{Aux} = 8.2 \text{ V}$, $R_i = 1 \text{ k}\Omega$ $U_i = 15 \text{ V}$ $I_i = 25 \text{ mA}$ $P_i = 64 \text{ mW}$	- $\geq 2.1 \text{ mA}$ $\leq 1.2 \text{ mA}$ Switching threshold with supply to EN 60947-5-6: $U_{Aux} = 8.2 \text{ V}$, $R_i = 1 \text{ k}\Omega$ "ic": $U_i = 15 \text{ V}$ $I_i = 25 \text{ mA}$ "ec"/"nA"/"t": $U_n \leq 15 \text{ V}$
Effective internal capacitance C_i	-	5.2 nF	5.2 nF
Effective internal inductance L_i	-	Negligibly	Negligibly
1 binary output circuit		Binary input BE2: Terminals 11 and 12, terminals 21 and 22 (bridge)	
<ul style="list-style-type: none"> Electrically connected to the basic device <ul style="list-style-type: none"> Signal state 0 Signal state 1 Contact load Electrically isolated from the basic device <ul style="list-style-type: none"> Signal state 0 Signal state 1 Natural resistance 		Floating contact, open Floating contact, closed 3 V, 5 μA	
<ul style="list-style-type: none"> Static destruction limit For connecting to circuits with the following peak values 	$\pm 35 \text{ V}$ -	- $U_i = 25.2 \text{ V}$	- "ic": $U_i = 25.2 \text{ V}$ "ec"/"nA"/"t": $U_n \leq 25.5 \text{ V}$
Effective internal capacitance C_i	-	Negligibly	Negligibly
Effective internal inductance L_i	-	Negligibly	Negligibly
Electrical isolation		The 3 outputs, the input BE2 and the basic device are electrically isolated from each other	
Test voltage		840 V DC, 1 s	
Position feedback module	6DR4004-8J	6DR4004-6J	6DR4004-6J
DC output for position feedback		2-wire connection	
1 current output: Terminals 61 and 62		4 ... 20 mA, short-circuit proof	
Rated signal range		3.6 ... 20.5 mA	
Total operating range			
Auxiliary power U_{Aux}	+12 ... +35 V	+12 ... +30 V	+12 ... +30 V
External loads R_B [k Ω]		$\leq (U_{Aux} [\text{V}] - 12 \text{ V})/I [\text{mA}]$	
Transmission error		$\leq 0,3 \%$	
Temperature influence effect		$\leq 0.1 \%/10 \text{ K}$ ($\leq 0.1 \%/18 \text{ }^\circ\text{F}$)	
Resolution		$\leq 0,1 \%$	
Residual ripple		$\leq 1 \%$	
<ul style="list-style-type: none"> For connecting to circuits with the following peak values 	-	$U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 1 \text{ W}$	"ic": $U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$ "ec"/"nA"/"t": $U_n \leq 30 \text{ V}$, $I_n \leq 100 \text{ mA}$ $P_n \leq 1 \text{ W}$
Effective internal capacitance C_i	-	11 nF	11 nF
Effective internal inductance L_i	-	Negligibly	Negligibly
Electrical isolation		Electrically isolated from the alarm option and safely isolated from the basic device	
Test voltage		840 V DC, 1 s	

Positioners

SIPART PS2

Technical specifications

	Without Ex protection	With explosion protection "ia"	With explosion protection "ic", "ec", "nA", "t"
SIA module	6DR4004-8G	6DR4004-6G	6DR4004-6G
Limit transmitter with slot-type initiators and alarm output			
2 slot-type initiators		<ul style="list-style-type: none"> • Binary output (limit transmitter) A1: Terminals 41 and 42 • Binary output (limit transmitter) A2: Terminals 51 and 52 	
<ul style="list-style-type: none"> • Connection • Signal state High (not activated) • Signal state Low (activated) • 2 slot-type initiators • Function 	2-wire system to EN 60947-5-6 (NAMUR), for switching amplifier to be connected on load side	> 2.1 mA < 1.2 mA Type SJ2-SN NC (normally closed)	
<ul style="list-style-type: none"> • Connecting to circuits with the following peak values 	Rated voltage 8 V current consumption: ≥ 3 mA (limit value not responded), ≤ 1 mA (limit value responded)	$U_i = 15$ V $I_i = 25$ mA $P_i = 64$ mW	"ic": $U_i = 15$ V $I_i = 25$ mA "ec"/"nA": $U_n \leq 15$ V $P_n \leq 64$ mW
Effective internal capacitance C_i	-	161 nF	161 nF
Effective internal inductance L_i	-	120 μ H	120 μ H
1 alarm output		Binary output: Terminals 31 and 32	
<ul style="list-style-type: none"> • Connection • Signal state High (not activated) • Signal state Low (activated) • Auxiliary power U_{Aux} 	On switching amplifier according to EN 60947-5-6: (NAMUR), $U_{Aux} = 8.2$ V, $R_i = 1$ k Ω . $R = 1.1$ k Ω $R = 10$ k Ω $U_{Aux} \leq 35$ V DC $I \leq 20$ mA	> 2.1 mA < 1.2 mA -	> 2.1 mA < 1.2 mA -
<ul style="list-style-type: none"> • Connecting to circuits with the following peak values 	-	$U_i = 15$ V $I_i = 25$ mA $P_i = 64$ mW	"ic": $U_i = 15$ V $I_i = 25$ mA "ec"/"nA": $U_n \leq 15$ V $P_n \leq 64$ mW
Effective internal capacitance C_i	-	5.2 nF	5.2 nF
Effective internal inductance L_i	-	Negligibly	Negligibly
Electrical isolation		The 3 outputs are electrically isolated from the basic device.	
Test voltage		840 V DC, 1 s	

	Without Ex protection	With explosion protection "ia"	With explosion protection "ic", "t"
Mechanical limit switch module	6DR4004-8K	6DR4004-6K	6DR4004-6K
Limit transmitter with mechanical switching contacts			
2 limit value contacts		<ul style="list-style-type: none"> Binary output A1: Terminals 41 and 42 Binary output A2: Terminals 51 and 52 	
<ul style="list-style-type: none"> Max. switching current AC/DC Connecting to circuits with the following peak values 	4 A -	- $U_i = 30\text{ V}$ $I_i = 100\text{ mA}$ $P_i = 750\text{ mW}$	"ic": $U_i = 30\text{ V}$ $I_i = 100\text{ mA}$ "t": $U_n = 30\text{ V}$ $I_n = 100\text{ mA}$
Effective internal capacitance C_i	-	Negligibly	Negligibly
Effective internal inductance L_i	-	Negligibly	Negligibly
<ul style="list-style-type: none"> Max. switching voltage AC/DC 	250 V/24 V	30 V DC	30 V DC
1 alarm output		Binary output: Terminals 31 and 32	
<ul style="list-style-type: none"> Connection 	On switching amplifier according to EN 60947-5-6: (NAMUR), $U_{Aux} = 8.2\text{ V}$, $R_i = 1\text{ k}\Omega$.	-	-
<ul style="list-style-type: none"> Signal state High (not activated) 	$R = 1.1\text{ k}\Omega$	$> 2.1\text{ mA}$	$> 2.1\text{ mA}$
<ul style="list-style-type: none"> Signal state Low (activated) 	$R = 10\text{ k}\Omega$	$< 1.2\text{ mA}$	$< 1.2\text{ mA}$
<ul style="list-style-type: none"> Auxiliary power 	$U_{Aux} \leq 35\text{ V DC}$ $I \leq 20\text{ mA}$	-	-
<ul style="list-style-type: none"> Connecting to circuits with the following peak values 	-	$U_i = 15\text{ V}$ $I_i = 25\text{ mA}$ $P_i = 64\text{ mW}$	"ic": $U_i = 15\text{ V}$ $I_i = 25\text{ mA}$ "t": $U_n = 15\text{ V}$ $I_n = 25\text{ mA}$
Effective internal capacitance C_i	-	5.2 nF	5.2 nF
Effective internal inductance L_i	-	Negligibly	Negligibly
Electrical isolation		The 3 outputs are electrically isolated from the basic device	
Test voltage		3 150 V DC, 2 s	
Rated conditions altitude	Max. 2 000 m NN At altitudes over 2 000 m NN, use a suitable power supply	-	-
	Without Ex protection	With explosion protection "ia", "ic"	With explosion protection "ec", "t", "na"
EMC filter module	EMC filter module type C73451-A430-D23 is required for connecting an electro-sensitive external position measurement, e.g. NCS module type 6DR4004-6N*/-8N* or an external potentiometer type C73451-A430-D78 or 6DR4004-1ES. For devices without explosion protection, other types of potentiometer with a resistance value von 10 kΩ can be connected.		
Resistance of external potentiometer		10 kΩ	
Peak values when powered by the base unit with PA (6DR55) or with FF communication (6DR56)	$U_{max} = 5\text{ V}$	$U_o = 5\text{ V}$ $I_o = 75\text{ mA}$ statisch $I_o = 160\text{ mA}$ kurzfristig $P_o = 120\text{ mW}$ $C_o = 1\text{ }\mu\text{F}$ $L_o = 1\text{ mH}$	$U_{max} = 5\text{ V}$
Peak values when supplied by other basic devices (6DR50/1/2/3)	$U_{max} = 5\text{ V}$	$U_o = 5\text{ V}$ $I_o = 100\text{ mA}$ $P_o = 33\text{ mW}$ $C_o = 1\text{ }\mu\text{F}$ $L_o = 1\text{ mH}$	$U_{max} = 5\text{ V}$
Electrical isolation		Electrically connected to the basic device	

Positioners

SIPART PS2

Technical specifications

	Without Ex protection	With explosion protection "ia"	With explosion protection "ic", "ec", "nA"
NCS sensor			
Position range			
• Linear actuator 6DR4004-.N.20		3 ... 14 mm (0.12 ... 0.55")	
• Linear actuator 6DR4004-.N.30		10 ... 130 mm (0.39 ... 5.12"); up to 200 mm (7.87") on request	
• Part-turn actuator		30° ... 100°	
Linearity for NCS sensor and for internal NCS module 6DR4004-5L/-5LE (after correction by means of positioner)		± 1 %	
Hysteresis for NCS sensor and for internal NCS module 6DR4004-5L/-5LE		± 0,2 %	
Temperature influence (range: rotation angle 120° or stroke 14 mm)		≤ 0,1 %/10 K (≤ 0.1 %/18 °F) for -20 ... +90 °C (-4 ... +194 °F) ≤ 0,2 %/10 K (≤ 0.2 %/18 °F) for -40 ... -20 °C (-40 ... -4 °F)	
Climatic class		According to EN 60721-3	
• Storage		1K5, but -40 ... +90 °C (1K5, but -40 ... +194 °F)	
• Transport		2K4, but -40 ... +90 °C (2K4, but -40 ... +194 °F)	
Vibration resistance			
• Harmonic oscillations (sine) according to IEC 60068-2-6		3.5 mm (0.14"), 2 ... 27 Hz; 3 cycles/axis 98.1 m/s ² (321.84 ft/s ²), 27 ... 300 Hz, 3 cycles/axis	
• Bumping according to IEC 60068-2-29		300 m/s ² (984 ft/s ²), 6 ms, 4 000 shocks/axis	
Degree of protection of enclosure		IP68 according to IEC EN 60529; NEMA 4X / Encl. Type 4X	
• Connecting to circuits with the following peak values	-	U _i = 5 V I _i = 160 mA P _i = 120 mW	U _i = 5 V
Effective internal capacitance C _i	-	180 nF	180 nF
Effective internal inductance L _i	-	922 µH	922 µH
Explosion protection according to ATEX/IECEx	-	Intrinsic safety "ia": II 2 G Ex ia IIC T6/T4 Gb	Intrinsic safety "ic": II 3 G Ex ic IIC T6/T4 Gc Non-sparking "ec": II 3 G Ex ec IIC T6/T4 Gc
Explosion protection according to FM	-	Intrinsic safety "ia": IS, Class I, Division 1, ABCD IS, Class I, Zone 1, AEx ib, IIC	Non-sparking, "ec"/"nA": NI, Class I, Division 2, ABCD NI, Class I, Zone 2, AEx ec, IIC
Permissible ambient temperature			
• ATEX/IECEx	-	T4: -40 ... +90 °C (-40 ... +194 °F) T6: -40 ... +70 °C (-40 ... +158 °F)	
• FM/CSA	-	T4: -40 ... +85 °C (-40 ... +185 °F) T6: -40 ... +70 °C (-40 ... +158 °F)	

Selection and Ordering data SIPART PS2

Selection and ordering data	Article No.	Order code	Selection and ordering data	Article No.	Order code
SIPART PS2 electropneumatic positioner in enclosure made of polycarbonate, aluminum and stainless steel	6 DR 5		SIPART PS2 electropneumatic positioner in enclosure made of polycarbonate, aluminum and stainless steel	6 DR 5	
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Version			Limit monitor		
2-wire (4 to 20 mA)			Installed, incl. 2nd cable gland		
• Without HART	0		Without	0	
• With HART, not explosion-protected	1		Alarm module; electronic (6DR4004-.A)	1	
2-, 3-, 4-wire (0/4 to 20 mA)			SiA module; slot-type initiators (6DR4004-.G)	2	
• With HART, explosion-protected	2		Mechanical limit switch module (mechanical switching contacts (6DR4004-.K)) ⁴⁾	3	
• Without HART, not explosion-protected	3		Internal NCS module (6DR4004-5L.), internal position detection by means of a potentiometer is not included and can be ordered through -Z K11 if needed.	9	L 1 A
PROFIBUS PA connection	5				
FOUNDATION Fieldbus connection	6		Option modules		
For actuator			Installed, incl. 2nd cable gland		
Single-acting	1		Without	0	
Double-acting	2		Position feedback module for position feedback signal (4 ... 20 mA) (6DR4004-.J)	1	
Enclosure			EMC filter module for external position detectors in the SIPART PS2 enclosure, NCS sensor 6DR4004-.N..0 and external position detection by means of a third-party potentiometer is not included and can be ordered through -Z K11 if needed.	2	
Polycarbonate ⁴⁾	0		Position feedback module and EMC filter module for external position sensor, internal position detection by means of a potentiometer is not included and can be ordered through -Z K11 if needed.	3	
Aluminum, only single-acting	1 1				
Stainless steel, without inspection window	2				
Aluminum, single-acting and double-acting	3				
Explosion protection					
Without		N			
With protection type		E			
• Intrinsic safety					
With protection type ¹⁾		D			
• Non-sparking					
• Dust protection via enclosure					
With protection type ²⁾		F			
• Intrinsic safety					
• Non-sparking					
With protection type ²⁾		G			
• Non-sparking					
With protection type ¹⁾		K			
• Intrinsic safety					
• Non-sparking					
• Dust protection via enclosure					
Connection thread electrical/pneumatic					
M20x1.5/G ¹ / ₄		G			
½-14 NPT / ¼-18 NPT		N			
M20x1.5/¼-18 NPT		M			
½-14 NPT / G ¹ / ₄		P			
M12 device plug, A coding/ G ¹ / ₄ ³⁾		R			
M12 device plug, A coding/ ¼-18 NPT ³⁾		S			

1) Enclosure: aluminum single-acting 6DR5..1 or stainless steel 6DR5..2, each without inspection window in the cover. Aluminum, single-acting and double-acting 6DR5..3; Impact energy max. 2 joule.


2) Enclosure: aluminum; Impact energy max. 2 joule on inspection window for enclosure 6DR5..1 or 6DR5..3.

3) M12 device plug mounted and electrically connected in versions 6DR50.., 6DR55.. and 6DR56..
M12 device plug mounted in versions 6DR50.., 6DR51.., 6DR52.. and 6DR53..
Not for protection type "dust protection by enclosure" 6DR5...0D... and 6DR5...0K...

Positioners


SIPART PS2


Selection and Ordering data SIPART PS2

Selection and ordering data	Article No.	Order code
SIPART PS2 electropneumatic positioner in enclosure made of polycarbonate, aluminum and stainless steel	6 DR 5	
		
Brief instructions		
German/English/Chinese		A
French/Spanish/Italian		B
Mounted pressure gauge block		
Without		0
<u>Gauge made of plastic IP31</u>		
Block made of aluminum, single-acting G $\frac{1}{4}$, scaled in MPa and bar		1
Block made of aluminum, double-acting G $\frac{1}{4}$, scaled in MPa and bar		2
Block made of alum., single-acting $\frac{1}{4}$ -18 NPT, scaled in MPa and psi		3
Block made of alum., double-acting $\frac{1}{4}$ -18 NPT, scaled in MPa and psi		4
<u>Gauge made of steel IP44</u>		
block made of aluminum, single-acting G $\frac{1}{4}$, scaled in MPa, bar, psi	9	R 1 A
Block made of aluminum, double-acting G $\frac{1}{4}$, scaled in MPa, bar, psi	9	R 2 A
Block made of aluminum, single-acting $\frac{1}{4}$ -18 NPT, scaled in MPa, bar, psi	9	R 1 B
Block made of aluminum, double-acting $\frac{1}{4}$ -18 NPT, scaled in MPa, bar, psi	9	R 2 B
<u>Gauge made of stainless steel 316 IP54</u>		
Block made of stainl. steel 316, single-acting G $\frac{1}{4}$, scaled in MPa, bar, psi	9	R 1 C
Block made of stainl. steel 316, double-acting G $\frac{1}{4}$, scaled in MPa, bar, psi	9	R 2 C
Block made of stainl. steel 316, single-acting $\frac{1}{4}$ -18 NPT, scaled in MPa, bar, psi	9	R 1 D
Block made of stainless steel 316, double-acting $\frac{1}{4}$ -18 NPT, scaled in MPa, bar, psi	9	R 2 D
Mounted booster		
Single-acting, aluminum, G $\frac{1}{2}$	9	R 1 J
Double-acting, aluminum, G $\frac{1}{2}$	9	R 2 J
Single-acting, aluminum, $\frac{1}{2}$ NPT	9	R 1 K
Double-acting, aluminum, $\frac{1}{2}$ NPT	9	R 2 K

4) Not for protection type "non-sparking"

Selection and Ordering data SIPART PS2

Selection and ordering data	Article No.	Order code
SIPART PS2 electropneumatic positioner in enclosure made of polycarbonate, aluminum and stainless steel	6 DR 5	
Further designs Add "-Z" to Article No. and specify Order Code.		Order code
Version with stainless steel sound absorbers Standard with stainless steel enclosure	A40	
Functional safety (SIL 2) only for 6DR5.1. (single-acting positioners) Device suitable for use according to IEC 61508 and IEC 61511	C20	
M12 device plug (D coding) For the following option modules:		
• for position feedback module	D53	
• for position detection system	D54	
• for alarm module	D55	
• for SIA module	D56	
• for limit contact module	D57	
Can only be ordered in connection with optional module		
Fail in Place Holding function on failure of auxiliary electrical power and/or pneumatic failure	F01	
Optimized control behavior for small drives¹⁾	K10	
Additional position detection by means of a potentiometer	K11	
Pneumatic terminal strip made of stainless steel 316	K18	
OPOS adapter with interface VDI/VE 3847 Blanketing, only for single-acting, not for flameproof enclosures	K20	
Permitted ambient temperature during operation -40 ... 80 °C (-40 ... +176 °F) for 6DR5.11, 6DR5..2, 6DR5..3 (without inspection window)	M40	
Marine approval		
GL (Germanischer Lloyd)	S10	
LR (Lloyds Register)	S11	
BV (Bureau Veritas)	S12	
DNV (Det Norske Veritas)	S13	
ABS (American Bureau of Shipping)	S14	
KR of shipping (Korean Register of Shipping)	S15	
CCS (China Classification Society)	S16	

Selection and ordering data	Article No.	Order code
SIPART PS2 electropneumatic positioner in enclosure made of polycarbonate, aluminum and stainless steel	6 DR 5	
TAG plate made of stainless steel, 3-line Text line 1: Plain text from Y17 Text line 2: Plain text from Y15 Text line 3: Plain text from Y16	A20	
Measuring point description Max. 16 characters for HART, max. 32 characters for PROFIBUS PA, FOUNDATION Fieldbus and 4 ... 20 mA, specify in plain text: Y15:	Y15	
Measuring point text Max. 24 characters for HART, max. 32 characters for PROFIBUS PA, FOUNDATION Fieldbus and 4 ... 20 mA, specify in plain text: Y16:	Y16	
Measuring point number (TAG No.) Max. 32 characters, specify in plain text: Y17:	Y17	
Preset bus address Specify in plain text: Y25: (only for 6DR55.. and 6DR56..)	Y25	
Customer-specific parameter setting Specify in plain text: Y30:	Y30	

¹⁾ Not for following options: 6DR53..; 6DR5..1 and 6DR5..2; C20.

Positioners

SIPART PS2

Selection and ordering data SIPART PS2 for flameproof enclosure

Selection and ordering data	Article No.	Order code
SIPART PS2 electropneumatic positioner, in flameproof aluminum enclosure, without cable gland	6 DR 5	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	5 - 0 E	- 0 A
Version		
2-wire (4 to 20 mA)		
• Without HART	0	
• With HART	1	
2-, 3-, 4-wire (0/4 to 20 mA)		
• With HART	2	
• Without HART	3	
PROFIBUS PA connection	5	
FOUNDATION Fieldbus connection	6	
For actuator		
Single-acting	1	
Double-acting	2	
Connection thread electrical/pneumatic		
M20 x 1.5 / G $\frac{1}{4}$		G
$\frac{1}{2}$ -14 NPT / $\frac{1}{4}$ -18 NPT		N
M20 x 1.5 / $\frac{1}{4}$ -18 NPT		M
$\frac{1}{2}$ -14 NPT / G $\frac{1}{4}$		P
M25x1.5 / G $\frac{1}{4}$		Q
Limit monitor		
Built-in		
Without	0	
Alarm module; electronic (6DR4004-8A)	1	
Internal NCS module (6DR4004-5L.), internal position detection by means of a potentiometer is not included and can be ordered through -Z K11 if needed.	9	L 1 A
Option modules		
Built-in		
Without	0	
Position feedback module for position feedback signal (4 ... 20 mA) (6DR4004-8J)	1	
EMC filter module for external position sensor, internal position detection by means of a potentiometer is not included and can be ordered through -Z K11 if needed.	2	
Position feedback module and EMC filter module for external position sensor, internal position detection by means of a potentiometer is not included and can be ordered through -Z K11 if needed.	3	
Brief instructions		
German/English/Chinese		A
French/Spanish/Italian		B

Selection and ordering data	Article No.	Order code
SIPART PS2 electropneumatic positioner, in flameproof aluminum enclosure, without cable gland	6 DR 5	
5 - 0 E	- 0 A	
Mounted pressure gauge block		
Without		0
<u>Gauge made of plastic IP31</u>		
Block made of aluminum, single-acting G $\frac{1}{4}$, scaled in MPa and bar		1
Block made of aluminum, double-acting G $\frac{1}{4}$, scaled in MPa and bar		2
Block made of aluminum, single-acting $\frac{1}{4}$ -18 NPT, scaled in MPa and psi		3
Block made of aluminum, double-acting $\frac{1}{4}$ -18 NPT, scaled in MPa and psi		4
<u>Gauge made of steel IP44</u>		
Block made of aluminum, single-acting G $\frac{1}{4}$, scaled in MPa, bar, psi	9	R 1 A
Block made of aluminum, double-acting G $\frac{1}{4}$, scaled in MPa, bar, psi	9	R 2 A
Block made of aluminum, single-acting $\frac{1}{4}$ -18 NPT, scaled in MPa, bar, psi	9	R 1 B
Block made of aluminum, double-acting $\frac{1}{4}$ -18 NPT, scaled in MPa, bar, psi	9	R 2 B
<u>Gauge made of stainless steel 316 IP54</u>		
Block made of stainless steel 316, single-acting G $\frac{1}{4}$, scaled in MPa, bar, psi	9	R 1 C
Block made of stainless steel 316, double-acting G $\frac{1}{4}$, scaled in MPa, bar, psi	9	R 2 C
Block made of stainless steel 316, single-acting $\frac{1}{4}$ -18 NPT, scaled in MPa, bar, psi	9	R 1 D
Block made of stainless steel 316, double-acting $\frac{1}{4}$ -18 NPT, scaled in MPa, bar, psi	9	R 2 D
Mounted booster		
Single-acting, aluminum, G $\frac{1}{2}$	9	R 1 P
Double-acting, aluminum, G $\frac{1}{2}$	9	R 2 P
Single-acting, aluminum, $\frac{1}{2}$ NPT	9	R 1 Q
Double-acting, aluminum, $\frac{1}{2}$ NPT	9	R 2 Q

Selection and ordering data SIPART PS2 for flameproof enclosure



Selection and ordering data	Article No.	Order code
SIPART PS2 electropneumatic positioner, in flameproof aluminum enclosure, without cable gland	6 DR 5	
<i>Further designs</i> Add "-Z" to Article No. and specify Order Code.	Order code	
TAG plate made of stainless steel, 3-line Text line 1: Plain text from Y17 Text line 2: Plain text from Y15 Text line 3: Plain text from Y16	A20	
Functional safety (SIL 2) only for 6DR5.1. (single-acting positioners) Device suitable for use according to IEC 61508 and IEC 61511	C20	
Fail in Place Holding function in case of auxiliary electrical power failure	F01	
Optimized control behavior for small drives¹⁾	K10	
Additional position detection by means of a potentiometer	K11	
Pneumatic terminal strip made of stainless steel 316	K18	
Permitted ambient temperature during operation -40 ... 80 °C (-40 ... +176 °F)	M40	
Measuring point description Max. 16 characters for HART, max. 32 characters for PROFIBUS PA and FOUNDATION Fieldbus, specify in plain text: Y15:	Y15	
Measuring point text Max. 24 characters for HART, max. 32 characters for PROFIBUS PA and FOUNDATION Fieldbus, specify in plain text: Y16:	Y16	
Measuring point number (TAG No.) Max. 32 characters, specify in plain text: Y17:	Y17	
Preset bus address Specify in plain text: Y25: only for 6DR55.. and 6DR56..)	Y25	


¹⁾ Not for following options: 6DR53..; 6DR5..1 and 6DR5..2; C20.

Positioners

SIPART PS2

Selection and ordering data SIPART PS2 for flameproof enclosure

Selection and ordering data	Article No.	Order code
SIPART PS2 electropneumatic positioner, in flameproof stainless steel enclosure, without cable gland	6 DR 5	
		
		
Version		
2-wire (4 to 20 mA)		
• Without HART	0	
• With HART	1	
2-, 3-, 4-wire (0/4 to 20 mA)		
• With HART	2	
• Without HART	3	
PROFIBUS PA connection	5	
FOUNDATION Fieldbus connection	6	
For actuator		
Single-acting	1	
Double-acting	2	
Connection thread electrical/pneumatic		
M20 x 1.5 / G¼		G
½-14 NPT / ¼-18 NPT		N
M20 x 1.5 / ¼-18 NPT		M
½-14 NPT / G¼		P
M25x1.5 / G¼		Q
Limit monitor		
Built-in		
Without	0	
Alarm module; electronic (6DR4004-8A)	1	
Internal NCS module (6DR4004-5L.), internal position detection by means of a potentiometer is not included and can be ordered through -Z K11 if needed.	9	L 1 A
Option modules		
Built-in		
Without	0	
Position feedback module for position feedback signal (4 ... 20 mA) (6DR4004-8J)	1	
EMC filter module for external position sensor, internal position detection by means of a potentiometer is not included and can be ordered through -Z K11 if needed.	2	
Position feedback module and EMC filter module for external position sensor, internal position detection by means of a potentiometer is not included and can be ordered through -Z K11 if needed.	3	
Brief instructions		
German/English/Chinese		A
French/Spanish/Italian		B

Selection and ordering data	Article No.	Order code
SIPART PS2 electropneumatic positioner, in flameproof stainless steel enclosure, without cable gland	6 DR 5	
		
Mounted pressure gauge block		
Without		0
Gauge made of stainless steel 316 IP54		
Block made of stainless steel 316, single-acting G¼, scaled in MPa, bar, psi		9 R 1 C
Block made of stainless steel 316, double-acting G¼, scaled in MPa, bar, psi		9 R 2 C
Block made of stainless steel 316, single-acting ¼-18 NPT, scaled in MPa, bar, psi		9 R 1 D
Block made of stainless steel 316, double-acting ¼-18 NPT, scaled in MPa, bar, psi		9 R 2 D
Further designs	Order code	
Add "-Z" to Article No. and specify Order Code.		
TAG plate made of stainless steel, 3-line	A20	
Text line 1: Plain text from Y17		
Text line 2: Plain text from Y15		
Text line 3: Plain text from Y16		
Functional safety (SIL 2) only for 6DR5.1. (single-acting positioners)	C20	
Device suitable for use according to IEC 61508 and IEC 61511		
Fail in Place	F01	
Holding function on failure of auxiliary electrical power and/or pneumatic failure		
Optimized control behavior for small drives¹⁾	K10	
Additional position detection by means of a potentiometer	K11	
Permitted ambient temperature during operation -40 ... 80 °C (-40 ... +176 °F)	M40	
Measuring point description	Y15	
Max. 16 characters for HART, max. 32 characters for PROFIBUS PA and FOUNDATION Fieldbus, specify in plain text: Y15:		
Measuring point text	Y16	
Max. 24 characters for HART, max. 32 characters for PROFIBUS PA and FOUNDATION Fieldbus, specify in plain text: Y16:		
Measuring point number (TAG No.)	Y17	
Max. 32 characters, specify in plain text: Y17:		
Preset bus address	Y25	
Specify in plain text: Y25: only for 6DR55.. and 6DR56..)		

¹⁾ Not for following options: 6DR53..; 6DR5..1 and 6DR5..2; C20.

5

5/23

Positioners

SIPART PS2

Selection and Ordering data Accessories

Mounting kit for NAMUR part-turn actuators

(VDI/VDE 3845, with plastic coupling wheel, without mounting console)

(VDI/VDE 3845, with stainless steel coupling, without mounting console)

SIPART PS2 console for NAMUR installation on part-turn actuators

- 80 x 30 x 20 mm
- 80 x 30 x 30 mm
- 130 x 30 x 30 mm
- 130 x 30 x 50 mm

6DR4004-8D

TGX:16300-1556

6DR4004-1D

6DR4004-2D

6DR4004-3D

6DR4004-4D

Mounting kit for other part-turn actuators

The following mounting consoles can be used together with the NAMUR part-turn actuator mounting kit 6DR4004-8D.

- SPX (DEZURIK) Power Rac, sizes R1, R1A, R2 and R2A
- Masoneilan Camflex II
- Fisher 1051/1052/1061, sizes 30, 40, 60 to 70
- Fisher 1051/1052, size 33

TGX:16152-328

TGX:16152-350

TGX:16152-364

TGX:16152-348

Mounting kit for NAMUR linear actuators

- NAMUR linear actuator mounting kit with short lever (2 ... 35 mm (0.08 ... 1.38 inch))
- Long lever for travels from 35 ... 130 mm (1.38 ... 5.12 inch) without NAMUR mounting bracket
- Reduced mounting kit (like 6DR4004-8V but without fixing angle and U-bracket), with short lever with up to 35 mm travel (1.38 inch)
- Reduced mounting kit (like 6DR4004-8V but without fixing angle and U-bracket), with long lever with > 35 mm travel (1.38 inch)
- Roll and disk made of stainless steel 316 for replacement of the Teflon roll and aluminum disk in the 6DR4004-8, -8VK and -8VL mounting kits for NAMUR linear actuators
- Two terminal strips made of stainless steel 316 for replacement of the aluminum terminal blocks in the 6DR4004-8V, -8VK and -8VL mounting kits for NAMUR linear actuators

6DR4004-8V

6DR4004-8L

6DR4004-8VK

6DR4004-8VL

6DR4004-3N

6DR4004-3M

Mounting kit for other linear actuators

- Masoneilan type 37/38, size 6 to 51 mm (<2 inch)
- Masoneilan type 87/88
- Masoneilan type 37/38, size 51 to 254 mm (>2 inch)
- Fisher type 657/667, size 30 to 80
- Samson actuator type 3277 yoke dimension = 101 mm (integrated connection without tube), not for Ex d

TGX:16152-595

TGX:16152-1210

TGX:16152-1215

TGX:16152-900

6DR4004-8S

OPOS Interface according to VDI/VDE 3847

- OPOS adapter with interface VDI/VDE 3847, blanketing, not for flameproof enclosures

6DR4004-5PB

Connection block, for safety solenoid valve with extended mounting flange to NAMUR

- For mounting to IEC 534-6
- For SAMSON actuator (integrated mounting) see above

6DR4004-1B

6DR4004-1C¹⁾

Documentation

The entire documentation is available for download free-of-charge in various languages at:

<http://www.siemens.com/processinstrumentation/documentation>

SIPART PS2 Compact Instruction Manual

- English, French, German, Spanish, Italian, Dutch

A5E03436620

- Estonian, Latvian, Lithuanian, Polish, Romanian, Croatian

A5E03436655

- Bulgarian, Czech, Finnish, Slovakian, Slovenian

A5E03436664

- Danish, Greek, Portuguese, Swedish, Hungarian

A5E03436683

SITRANS I100 output isolator HART

(see "SITRANS I supply units and isolation amplifiers") with

- 24 V DC auxiliary power

7NG4124-0AA00

SITRANS I200 output isolator HART

(see "SITRANS I supply units and isolation amplifiers") with

- 24 V DC auxiliary power

7NG4131-0AA00

HART modem for connecting to PC or laptop

- with USB interface

7MF4997-1DB

¹⁾ Only together with 6DR4004-8S

Scope of delivery for positioner

- 1 SIPART PS2 positioner as ordered
- 1 DVD with the complete documentation for all versions and accessories
- Getting Started "SIPART PS2 – Operation - a concise overview"

Selection and ordering data

Article No.

NCS-Sensor spare parts

Magnet holder made of fiberglass-reinforced polyester including magnet for non-contacting position detection for part-turn actuators

A5E00078030

Magnet holder made of anodized aluminum including magnet for non-contacting position detection for part-turn actuators

A5E00524070



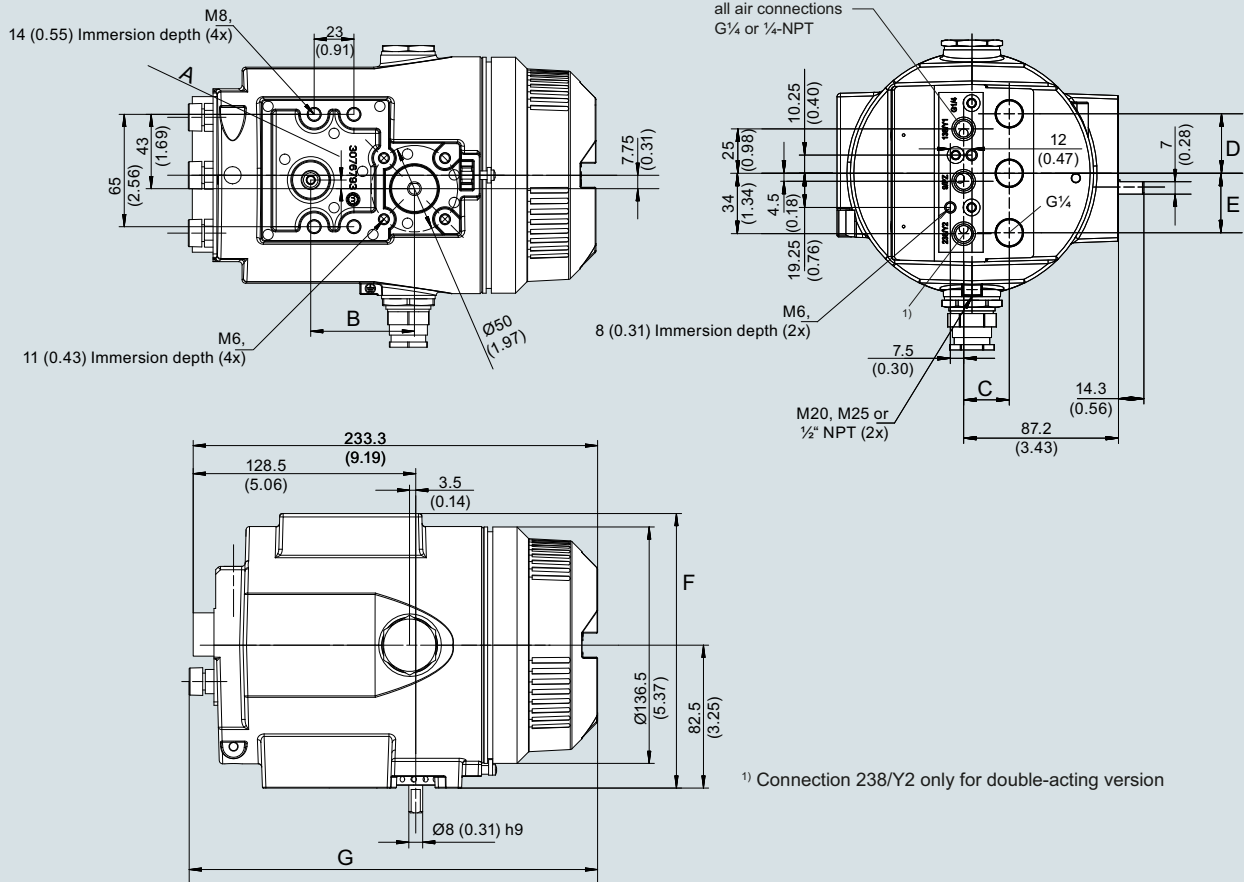
Value	6DR5..0		6DR5..1	6DR5..2	6DR5..3	
	G¼	¼-NPT			G¼	¼-NPT
A	184.5 (7.26)	186.5 (7.34)	185 (7.28)	186.5 (7.34)	186.5 (7.34)	188.5 (7.42)
B	-		-	15 (0.59)		
C	95 (3.74)		84 (3.31)	99 (3.90)	98.6 (3.88)	
D	48 (1.89)		34.5 (1.36)	49.5 (1.95)	48.6 (1.91)	
E	88.5 (3.48)		90.5 (3.56)	88.5 (3.48)	88.8 (3.50)	
F ^{*)}	29.5 (1.16)		-	29.5 (1.16)	29.5 (1.16)	
G	39 (1.54)		44 (1.73)	39 (1.54)	39 (1.54)	
H	14.5 (0.57)		16 (0.63)	16 (0.63)	14.5 (0.57)	
J	96.6 (3.80)		96.6 (3.80)	98.5 (3.88)	103 (4.06)	
K	18.5 (0.73)		22 (0.87)	18.5 (0.73)	18.5 (0.73)	
L	18.5 (0.73)		7 (0.23)	18.5 (0.73)	18.5 (0.73)	
M	-		26.5	41.5	40	
N	-		7.5	7.5	7.5	
O	14.5 (0.57)		14.5 (0.57)	14.5 (0.57)	15.5 (0.61)	

6DR5..3 Aluminum enclosure, single-acting and double-acting; dimensions with pneumatic connection G $\frac{1}{4}$ or $\frac{1}{4}$ NPT

Positioners

SIPART PS2

Dimensional drawings



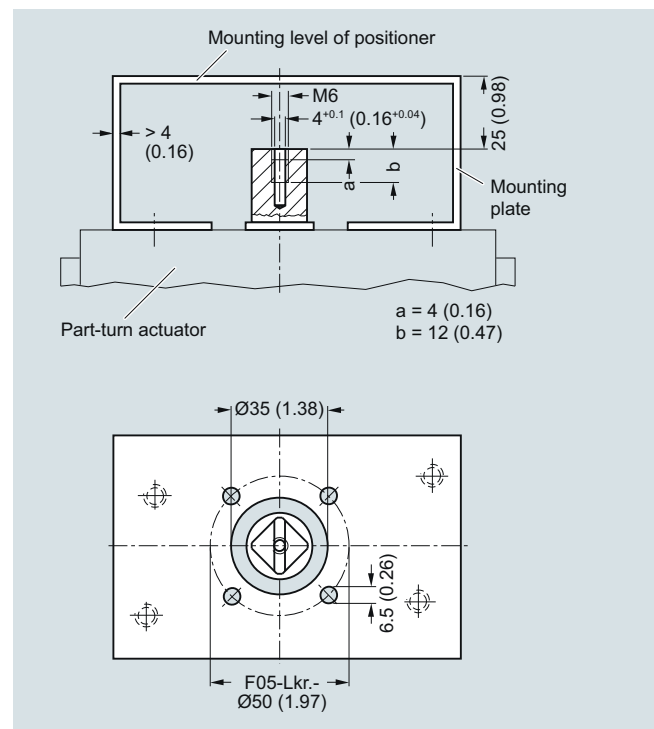
¹⁾ Connection 238/Y2 only for double-acting version

Flameproof enclosure, dimensions in mm (inch)

Maß	6DR5..5	6DR5..6
A	5 (0.2)	-
B	60 (2.36)	-
C	25.7 (1.01)	21.7 (.85)
D	33.5 (1.32)	25 (0.99)
E	33.5 (1.32)	-
F	158.5 (6.24)	160 (6.3)
G	235.3 (9.26)	227.6 (8.96)

6DR5..5 Aluminum enclosure, flameproof; dimensions with pneumatic connection G $\frac{1}{4}$ or $\frac{1}{4}$ NPT

6DR5..6 Stainless steel enclosure, flameproof

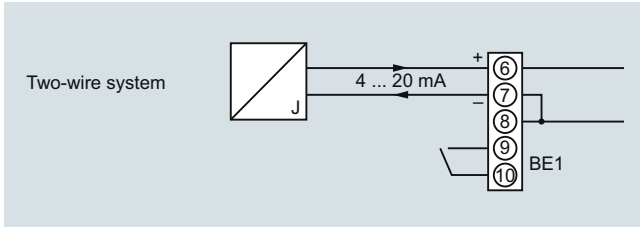


Mounting onto part-turn actuators; mounting consoles (scope of delivery of actuator manufacturer), extract from VDI/VDE 3845, dimensions in mm (inch)

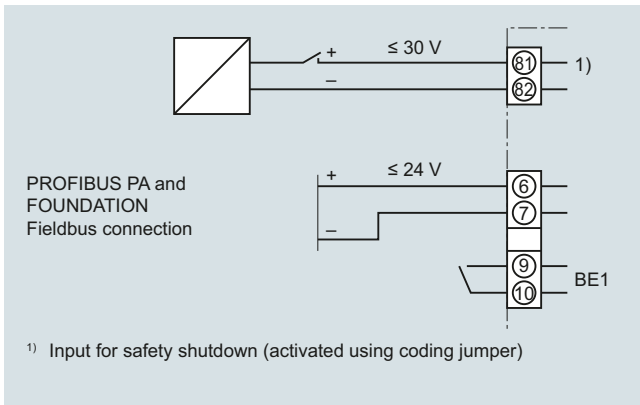
Schematics

Electric connection of 2-wire devices (6DR50.. and 6DR51..)

Devices of types 6DR50.. and 6DR51.. are operated in a 2-wire system.



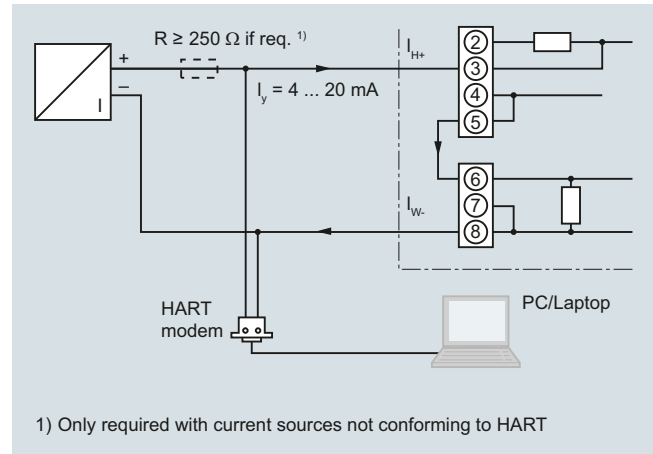
SIPART PS2 electropneumatic positioner, input circuit for 6DR50.. and 6DR51..

Electric connection of PROFIBUS PA device (6DR55..) and FOUNDATION Fieldbus device (6DR56..)

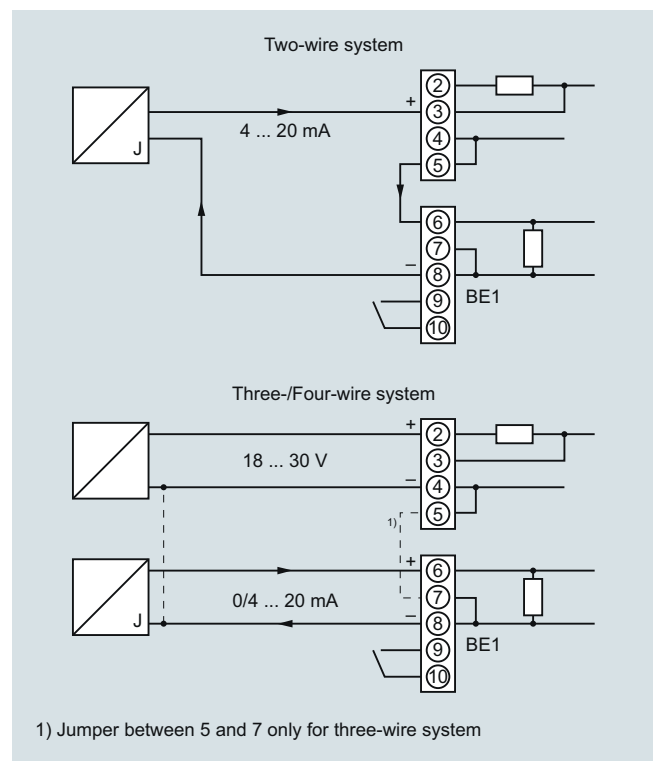
SIPART PS2 PA and SIPART PS2 FF electropneumatic positioner, input circuit for 6DR55.. and 6DR56..

Electric connection of 2-, 3- and 4-wire device (6DR52.. and 6DR53..)

Devices of types 6DR52.. and 6DR53.. can be operated in a 2-, 3- and 4-wire system.



SIPART PS2 electropneumatic positioner, example of connection for communication through HART for 6DR52..



SIPART PS2 electropneumatic positioner, input circuits for 6DR52.. and 6DR53..

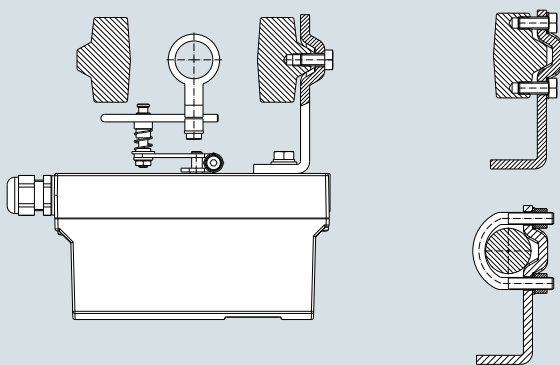
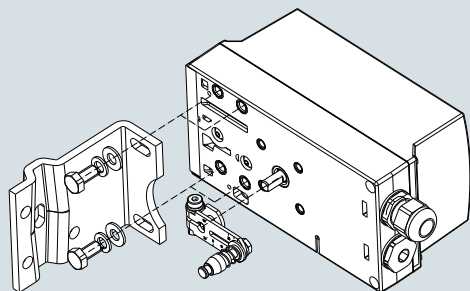
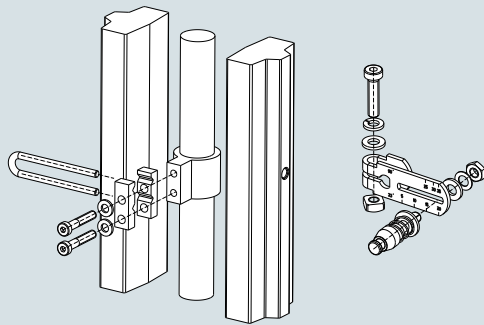
Positioners

SIPART PS2

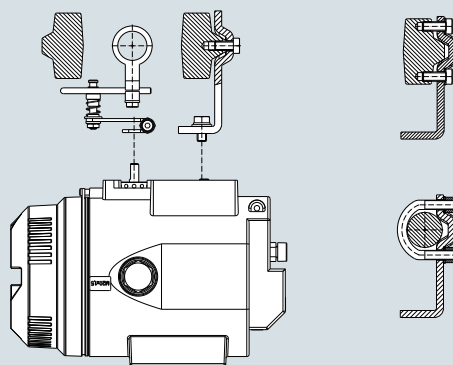
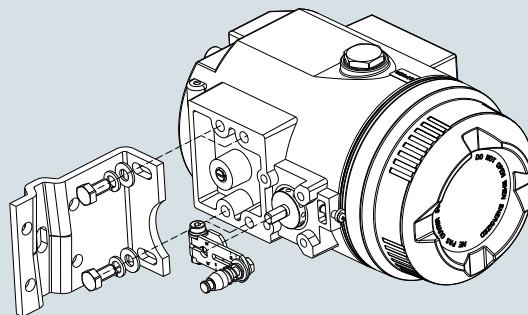
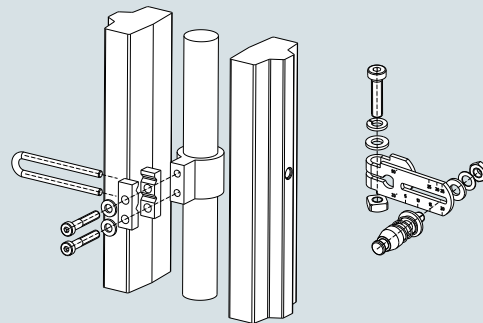
Mounting kit

Mounting kit for NAMUR linear actuators

- 1 mounting bracket
- 2 mounting prisms
- 1 U-bracket
- 1 lever arm with adjustable pick-up roll
- 2 U-bolts
- Various screws and lock washers



Mounting of SIPART PS2 on linear actuators

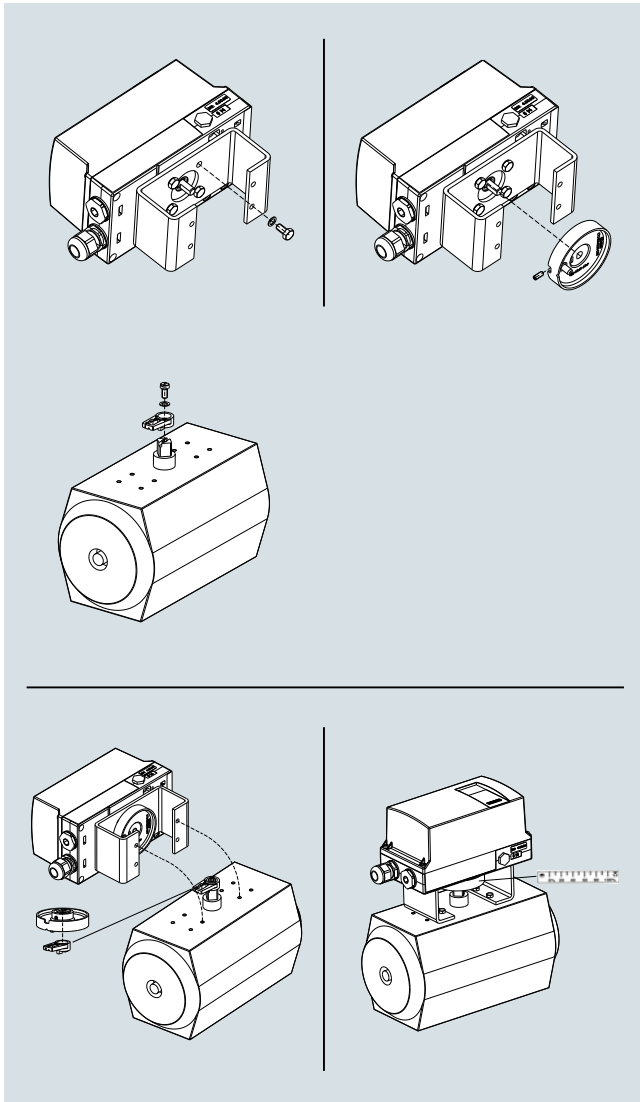


Mounting of SIPART PS2 in flameproof aluminum enclosure on linear actuators

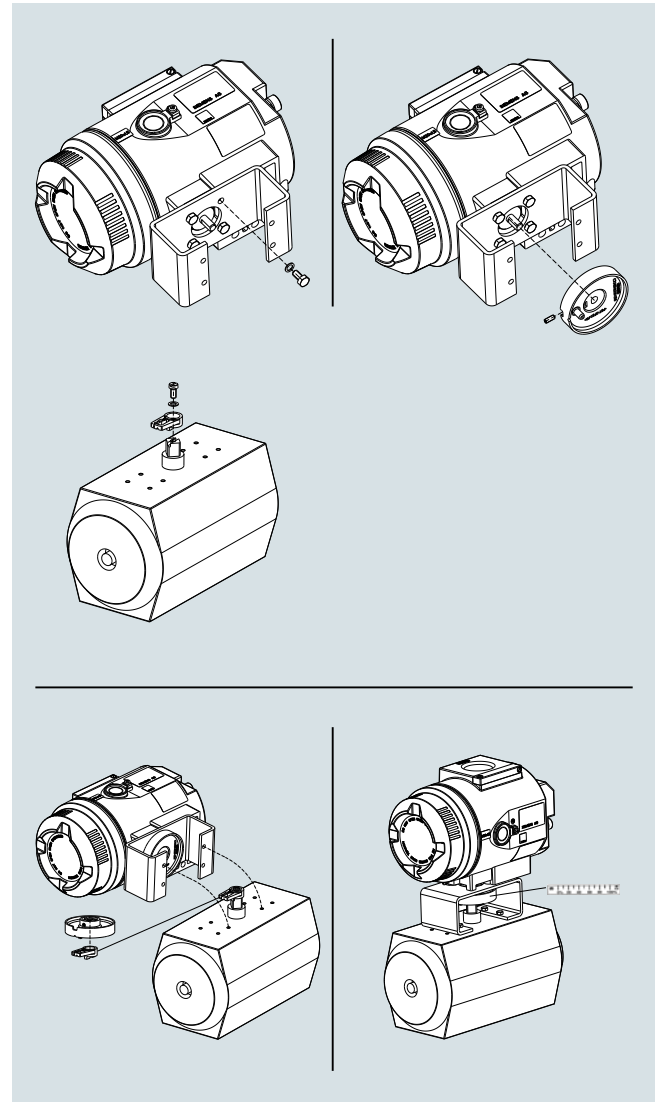
Mounting kit for NAMUR part-turn actuators

- 1 coupling wheel
- 1 driver pin
- 8 scales
- 1 pointer
- Various screws and lock washers

Caution: The mounting consoles and the screws for mounting onto the part-turn actuator are not included in the scope of delivery and must be provided by the customer (see "Technical specifications")



Mounting of SIPART PS2 on part-turn actuators



Mounting of SIPART PS2 in flameproof aluminum enclosure on part-turn actuators

More information**Special versions**

On request

Positioners

SIPART PS2

Notes



6/2	Product overview
6/3	Acoustic and Motion sensing
6/5	Acoustic sensors for pump monitoring SITRANS DA400 acoustic diagnostic unit
6/10 6/14	Acoustic sensors for material flow monitoring SITRANS AS100 Acoustic sensor SITRANS CU02 Control Unit
6/17	Motion sensors Milltronics MFA 4p motion failure alarm controller
6/23	Milltronics MSP-7 motion sensor
6/25	SITRANS WM100 motion sensor

All literature is available to download for free, in a range of languages through Siemens Industry Online Support (SIOS), at <http://www.siemens.com/processinstrumentation/documentation>

Process Protection

Product overview

Overview

	Application	Device description	Page
Acoustic sensor for pump monitoring			
	Acoustic diagnostics unit for flow valve leakage monitoring in oscillating displacement pumps or for material flow monitoring of bulk solids in pipes, conveyors or raceways.	SITRANS DA400 <ul style="list-style-type: none"> • 4 inputs for structure-borne noise sensors • 4 universal inputs • 6 digital outputs • With PROFIBUS DP or PROFIBUS PA • Sensor degree of protection IP66/IP68 	6/5
Acoustic sensors for material flow monitoring			
	Acoustic sensor for solids flow detection.	SITRANS AS100 <ul style="list-style-type: none"> • Non-invasive • Screw in, bolt on, weld, or bond in place • Analog output • High and low sensitivity range of operation 	6/10
	Alarm control unit for use with SITRANS AS100 acoustic sensor to provide reliable continuous protection for bulk solid flow. It processes signals from the sensor, providing relay and analog outputs for interface into a process.	SITRANS CU02 <ul style="list-style-type: none"> • 3 digit LCD display • 4 ... 20 mA output • Two programmable relays • Adjustable independent time delay for each relay • DIN rail mounting provides easy installation 	6/14
Motion sensors			
	Highly sensitive single set point motion sensor alarm unit, used with MSP probes.	Milltronics MFA 4p <ul style="list-style-type: none"> • Probe/target separation up to 100 mm (4 inch) • Minimum velocity of moving ferrous target: 1 cm/sec. (2 fpm) 	6/17
	Heavy duty 3-wire motion sensor that provides an NPN open collector output to PLCs.	Milltronics MSP-7 <ul style="list-style-type: none"> • Up to 100 mm (4 inch) gap between target and probe • Corrosion resistant construction 	6/23
	Heavy-duty zero speed alarm switch.	SITRANS WM100 <ul style="list-style-type: none"> • Detects the absence or presence of motion of rotating or reciprocating or conveying equipment 	6/25

Supplied product documentation on DVD and safety instructions



The scope of delivery of the Siemens products for process instrumentation includes a multilingual instruction sheet with **safety instructions** as well as a uniform **mini DVD – Process Instrumentation and Weighing Systems**.

This DVD contains the most important manuals and certificates for the Siemens process instrumentation and weighing technology portfolio. The delivery may also contain product-specific or order-specific printed materials.

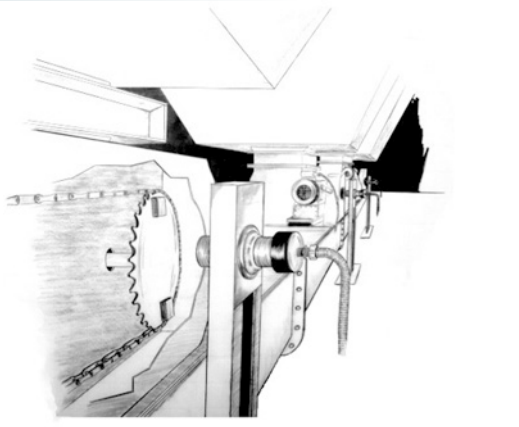
For additional information, refer to the Annex on page 10/3.

Overview

Process protection devices act as early warning systems to avoid costly process interruptions and breakdowns of equipment. Non-contacting motion sensors detect changes in motion and speed of conveying, reciprocating and rotating machinery.

Non-invasive acoustic sensors detect inaudible, high frequency acoustic emissions generated by friction and impact, caused by materials in motion. They can detect conditions of flow/no flow or high/low flow, to warn of blockages, product absence or equipment failure. They are located outside of the process, accurately detecting conditions without wear on the sensor.

Motion sensors can warn in case of equipment malfunction and shut down machinery in case of a slowdown or failure. They are rugged and perform even in harsh industrial conditions. Most of the MFA 4p motion sensing probes, as well as the SITRANS WM100, can be mounted up to 100 mm (4 inch) from the ferrous target, reducing the chance of damage to the probe and the equipment. The probes are not affected by moisture or dust build-up.



Motion sensing on drive shaft of rotary feeder

Mode of operation

Acoustic Sensing

Acoustic sensors monitor high frequency emissions generated by friction and the impact of flowing material or mechanical parts. The sensors can also sense the turbulence of gases or liquids leaking through valves and flanges. When matter vibrates between 0 Hz and 200 kHz, it creates acoustic energy. Sound energy between 20 Hz and 20 kHz can be detected by humans. Acoustic sensors detect high-frequency acoustic energy between 75 kHz and 175 kHz. Acoustic energy travels quickly through dense materials (metal) and poorly through less dense materials (air). Because the acoustic sensors are mounted directly to the external wall of the chute work, other plant noises are well below 75 kHz and effectively ignored by the sensors.

The acoustic sensors contain a specialized piezocrystal and filter circuit that responds effectively to the high-frequency band between 75 kHz and 175 kHz. As the crystal is excited by the acoustic energy, it produces a continuous electrical signal in direct proportion to the level of acoustic energy received. The SITRANS AS100 sensor output of 0 to 10 V DC can be applied to a PLC or to an optional control unit for a programmable alarm relay or 4 to 20 mA signal output.

Motion sensing

Siemens Milltronics probes work on the principle of Faraday's Laws of Electromagnetic Induction. When a ferromagnetic object enters the probe's permanent magnetic field, it distorts the flux, causing its coil windings to generate a voltage. This voltage is proportional to the strength of the magnet and the number of wire turns in the coil (constant in the probes) and the speed at which the ferrous target passes through the flux. The generated voltage is also inversely proportional to the square of the distance between the target and the probe.

The robust motion sensors provide the contacts to shut down machinery whenever under-speed, over-speed or plant equipment failure occurs. On belt, drag and screw conveyors, or on bucket elevators, fans and pumps, the speed alarm option can warn instantly of equipment malfunction. Some probes may be linked to a programmable logic controller to monitor equipment.

Process Protection

Acoustic and Motion sensing

Acoustic and Motion Sensing

Technical specifications

Process Protection Selection Guide

Criteria	SITRANS DA400	SITRANS AS100	Milltronics MFA 4p	Milltronics MSP-7	SITRANS WM100
Typical industries	Mining, water/wastewater, chemicals/petrochemicals and oil & gas industry	Aggregates, grain, cement, food processing, power generation, steel processing	Aggregates, cement, mining, wastewater, grain	General industrial applications	Aggregates, cement, mining
Typical Applications	Oscillating displacement pumps such as diaphragm piston pumps, piston pumps and hose-type diaphragm piston pumps. Monitoring of flowing materials in pipes, conveyors or channels.	Pipes, pneumatic conveyors, aerated gravity flow systems, burst filter bag detection	Tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators	Tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps	Tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators
Operation	Acoustic detection of cavitation, optionally acoustic detection of impact noises of high frequency	Acoustic sensing	Motion sensing	Motion sensing	Motion sensing
Enclosure	Electronics housing, Makrolon IP65, sensor, stainless steel material number W.-Nr. 1.4571 (316Ti SST)	Compact 304 or 303 stainless steel, IP68	Type 4X/NEMA 4X/IP65 polycarbonate	Type 4X/NEMA 4X/IP67 aluminum	Type 4X/NEMA 4X/IP67 aluminum
Sensor mounting	Screw to outside of pump housing. For material flow monitoring on the outside of pipes, channels, chutes or raceways	Sensor non-invasive: glue or weld-on disc, bolt or weld-on tab, drill and tap	Non-contacting probes secured with supplied flange	Non-contacting probe secured with supplied flange	Non-contacting, secured with supplied flange
Operating temperature	Electronics: -20 ... +60 °C (-4 ... +140 °F) Sensor: -20 ... +110 °C (-4 ... +230 °F)	-20 ... +80 °C (-4 ... +176 °F) ¹⁾	-20 ... +50 °C (-4 ... +122 °F) ²⁾	-40 ... +60 °C (-40 ... +140 °F)	-40 ... +60 °C (-40 ... +140 °F)
Power requirements	19 V ... 36 V DC, < 100 mA	20 ... 30 V DC, 18 mA	100/115/200/230 V AC ± 10 % 50/60Hz, 15 VA	21 ... 28 V DC, 40 mA max.	115 or 230 V AC ± 10 % 50/60 Hz, 7 VA
Approvals	CE, PROFIBUS DP, and PROFIBUS PA conform, Ex protection to ATEX 1G or 1D	CE, RCM, CSA/FM Class II, Div. 1, Group E, F, G optional, ATEX II, 2GD, 3D optional, EAC	CSA _{US/C} , CE, RCM	CE, RCM	CSA _{US/C} , CE, RCM

¹⁾ Extended temperature model -40 ... +125 °C (-40 ... +257 °F) available (CE version)

²⁾ Probes available for -40 ... +260 °C (-40 ... +500 °F)

Process Protection

Acoustic sensors for pump monitoring

SITRANS DA400 acoustic diagnostic unit

Overview



The SITRANS DA400 acoustic diagnostic unit acoustically measures the structure-borne noise

- In the version for pump monitoring; on oscillating displacement pumps
- In the version for material flow monitoring; on pipes, conveying equipment or channels.

It comprises an electric diagnostic unit and up to four acoustic sensors.

Benefits

Benefits when pump monitoring

- Increased availability of the system through:
 - Advanced maintenance planning thanks to early recognition of defective components
 - Reduced downtimes (no fault locating necessary)
 - Increased maintenance intervals
 - Greater pump reliability
- Prevention of expensive consequential damage
- Increased safety of critical applications
- Early recognition of a reduction in power
- Increased productivity

Benefits when material flow monitoring

- Detection of insufficient or excessive inflow of material in a liquid or gas flow
- Detection of blockages or clogging
- Reduction of down times
- Increased product quality
- Increased availability
- Guaranteed operational safety
- Increased productivity

Application

In the version for pump monitoring, the SITRANS DA400 allows continuous, simultaneous and independent monitoring of up to four flow control valves in a pump for leaks. In addition, another four inputs are available for monitoring standard signals (e.g. diaphragm and temperature monitoring). This means that the condition of an oscillating displacement pump is monitored in every phase of its operation.

The SITRANS DA400 is used in all industries where an oscillating displacement pump is used.

The version for material flow monitoring monitors the material flow in liquids or gases that is usually as a result of impact or friction, e.g. against the pipe or channel wall.

If the acoustic diagnostic unit is used in potentially explosive areas, the sensors as well as the acoustic diagnostic unit can be installed in the Ex-zone.

If using the unit in potentially explosive areas, you have two options:

- Operation of the sensors over the safety barriers or
- Operation of the sensors over the SITRANS DA400 with explosion protection

Function

Product features

Continuous and independent status monitoring:

- Of the flow control valves, for leaks
- Of the membranes, for material fatigue
- Of the temperature loading of the hydraulic oil
- Of flowing bulk solids in pipes, conveying equipment or channels

Communication of the status to superordinate control systems:

- Via digital outputs
- Digitally, via PROFIBUS DP or PROFIBUS PA

Simple to operate and parameterize:

- Locally, via digital display and keys
- PROFIBUS DP and PROFIBUS PA

Mode of operation

Principle of measurement

Leaks in the flow control valves of oscillating displacement pumps are flows in which cavitation occurs. This results in sound waves that are transmitted to the valve housing, where they are recorded by the structure-borne sound sensor in the SITRANS DA400 on the outside.

The SITRANS DA400 utilizes the fact that with both an open valve and a closed intact valve, no cavitation occurs and the measured sound level thus corresponds to the operating noise of the pump. By contrast, with a closed defective valve cavitation does occur, which can be identified by a period increase in the sound level (see figures). The measured value from the SITRANS DA400 corresponds exactly to this increase in the sound level.

In the version for material flow monitoring, SITRANS DA400 continuously detects high-frequency acoustic oscillations by means of structure-born noise sensors.

Process Protection

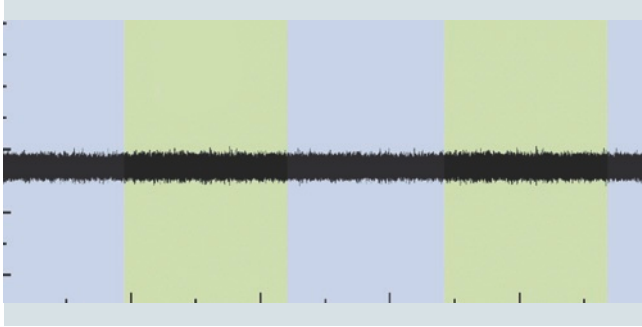
Acoustic sensors for pump monitoring

SITRANS DA400 acoustic diagnostic unit

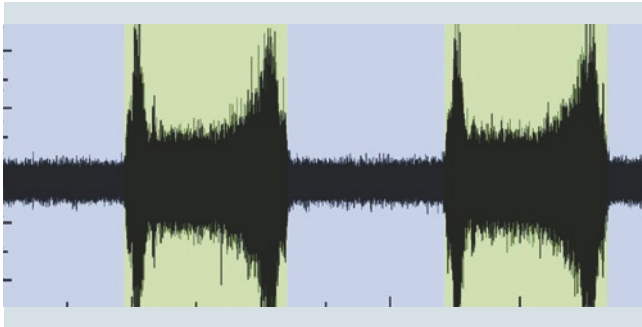
These oscillations are created by:

- Friction and impact of bulk solids in:
 - pipes, raceways or channels
 - chutes
 - conveyors
- Friction and impact of mechanical parts
- Bursting of bubbles
- Cavitation
- Turbulence in gas and liquid flows

The following shows an example of signal levels at an oscillating displacement pump



Signal from structure-borne sound sensor with intact valve



Signal from structure-borne sound sensor with defective valve

Sensor operation

The structure-borne sound sensor works on the piezoelectric principle. The structure-borne sound is injected into the sensor via the sensor base (mounting surface) and inside it is converted into an electrical voltage by a piezo-ceramic element. This is amplified in the sensor and transmitted via the cable.

The sensor frequency range lies in the ultrasonic range (> 20 kHz). The sensor is non-directional, i.e. the angle at which the sound wave impacts on the sensor base is not important.

Mode of operation of the safety barrier

The safety barrier comprises intrinsically-safe circuits. These circuits serve to operate intrinsically-safe components such as sensors and to isolate safety from the non-hazardous area with the SITRANS DA400 diagnostic unit.

Technical specifications

SITRANS DA400	Without Ex protection	With Ex protection
Input		
Acoustic channels		4
• Cycle time		10 ms
Only for connection to intrinsically safe sensors with:		
• Max. voltage U_o	-	$\leq 5.5 \text{ V}$
• Max. current I_o	-	$\leq 70 \text{ mA}$
• Max. power P_o	-	$\leq 100 \text{ mW}$
• Internal capacitance C_i	-	$\leq 1.2 \mu\text{F}$
• Internal inductance L_i	-	Negligible
Universal inputs		4
• Cycle time		80 ms
• Low pass filter time		1 s
Universal analog current input		
• Load	< 105 Ω	< 12 Ω
• Resolution		0.1 %
• Accuracy		0.5 %
• Fault signal		> 21 mA or < 3.6 mA (at 4 ... 20 mA)
• Alarm monitoring hysteresis		0.5 %
• Static destruction limit	40 mA, 4 V	-
For connection with approved intrinsically safe circuits with:		
• Max. supply voltage U_i	-	$\leq 30 \text{ V}$
• Max. short-circuit current I_i	-	$\leq 100 \text{ mA}$
• Max. power P_{oi}	-	$\leq 1 \text{ W}$
• Internal capacitance C_i	-	$\leq 11 \text{ nF}$
• Internal inductance L_i	-	$\leq 70 \mu\text{H}$
Universal input 24 V digital signal		
• Input resistance		> 19 k Ω
• Signal level Low		< 4.5 V or open
• Signal level High		> 7 V
• Hysteresis		> 1 V
• Static destruction limit	$\pm 40 \text{ V}$	-
For connection with approved intrinsically safe circuits with:		
• Max. supply voltage U_i	-	$\leq 30 \text{ V}$
• Max. short-circuit current I_i	-	$\leq 100 \text{ mA}$
• Max. power P_{oi}	-	$\leq 1 \text{ W}$
• Internal capacitance C_i	-	$\leq 11 \text{ nF}$
• Internal inductance L_i	-	$\leq 70 \mu\text{H}$
Universal input closing contact		
• For connection to closing contact with the maximum values:		
- Max. voltage U_o	-	$\leq 10 \text{ V}$
- Max. current I_o	-	$\leq 1 \text{ mA}$
- Max. power P_o	-	$\leq 5 \text{ mW}$
- Internal capacitance C_i	-	$\leq 11 \text{ nF}$
- Internal inductance L_i	-	$\leq 70 \mu\text{H}$
8.2 V source for NAMUR signal (DIN EN 60947-5-6)		
• Open circuit voltage	8.2 V \pm 0.3 V, short-circuit proof	-
• Input resistance	< 950 Ω	-
• Static destruction limit for incorrect wiring	+20 V/-10 V	-

Process Protection

Acoustic sensors for pump monitoring

SITRANS DA400 acoustic diagnostic unit

SITRANS DA400	Without Ex protection	With Ex protection
Output		
Digital outputs	6	6 (applicable for NAMUR switch hardener)
• Semiconductor relay	Individually isolated, short circuit-proof	-
• Switching voltage	24 V AC/36 V DC, any polarity	-
• Destruction limit	35 V AC, 50 V DC	-
• Max. switching current	100 mA	-
• Signal status Low (no response)	-	≤ 1.2 mA (source to DIN 19234)
• Signal status High (response)	-	≥ 2.1 mA (source to DIN 19234)
For connection with an intrinsically safe switching amplifier to DIN 19234 with:		
• Max. supply voltage U_i	-	≤ 15.5 V
• Max. short-circuit current I_i	-	≤ 25 mA
• Max. power P_{oi}	-	≤ 64 mW
• Internal capacitance C_i	-	≤ 5.2 nF
• Internal inductance L_i	-	Negligible
Conditions of use		
Installation conditions	Vertical wall mounting, cables fed in from below	
Climatic class	Class 4K4 according to EN 60721-3-4	
Mounting location	-	Zone 1 or zone 2
Permissible ambient temperature	-20 ... +60 °C (-4 ... +140 °F)	-
• Temperature class T5 ... T1		-20 ... +60 °C (-4 ... +140 °F)
• Temperature class T6		-20 ... +50 °C (-4 ... +122 °F)
Mechanical load	Class 4M3 according to EN 60721-3-4	
Degree of protection to EN 60529	IP65	
Electromagnetic Compatibility		
• Emitted interference and interference immunity	To EN 61326 and NAMUR NE 21	
Usage limits for water		
• Delivery side	≥ 10 bar a	
• Number of strokes	Min. 4 min ⁻¹ , max. 10 ... 500 min ⁻¹	
Design		
Weight (without options)	Approx. 2.5 kg	
Dimensions (W x H x D) in mm (inch)	172 x 320 x 80 (6.8 x 12.6 x 3.2)	
Enclosure material	Macrolon (polycarbonate + 20 % glass fiber)	Makrolon (Polycarbonate + 20 % glass fibers), surface attenuated with CrNi layer and painted
Electrical connection via screw terminals	<ul style="list-style-type: none"> • Rigid 2.5 mm (0.984 inch) • Flexible 1.5 mm (0.59 inch) • Flexible with connector sleeves 1.5 mm (0.59 inch) 	
Cable inlet via plastic cable joints	<ul style="list-style-type: none"> • 2 x Pg 13.5 • 5 x Pg 11 	

SITRANS DA400	Without Ex protection	With Ex protection
Power supply		
Rated voltage	24 V DC	16 V DC
Operating range	19 ... 36 V DC	15 ... 17 V DC
Current consumption	< 100 mA	< 40 mA
For connection with approved intrinsically safe circuits with:		
• Max. supply voltage U_i	-	≤ 17.4 V
• Max. short-circuit current I_i	-	≤ 191 mA
• Max. power P_{oi}	-	≤ 1.35 W
• Internal capacitance C_i	-	≤ 33 nF
• Internal inductance L_i	-	≤ 28 μH
Certificates and approvals		
Explosion protection to EN 50014, EN 50020 and EN 50021		
Intrinsic safety "i"	-	TÜV (German Technical Inspectorate) 06 ATEX 2952
Marking	-	II 2(1) G EEx is [ia] IIC T6
Communication		
PROFIBUS DP	RS 485, switchable terminating resistor	
Protocol	Cyclic with Master C1 and acyclic with Master C2	
Power supply	-	Bus-supplied
Bus voltage	-	9 ... 24 V
Current consumption	-	10.5 mA ± 10 %
Bus connection with FISCO supply unit, ia/ib group IIC or IIB	-	Yes
Layer 1 and 2 from PROFIBUS PA, transfer technology from IEC 1158-2	-	
• C2 connections	-	4 connections are supported in master class 2
• Device profile	-	PROFIBUS PA Profil V3.0 Rev. 1, Class B
• Device address	-	1 ... 126 (126 factory-set)
PC parameterization software	SIMATIC PDM (not included in the scope of delivery)	

Process Protection

Acoustic sensors for pump monitoring

SITRANS DA400 acoustic diagnostic unit

Sensor for SITRANS DA400

Setup	<ul style="list-style-type: none"> Piezoceramic sensor with pre-amplifier Encapsulated electronics 4-wire cable with anti-kink sleeve
--------------	--

Conditions of use

Permissible ambient temperature	-40 ... +110 °C (-40 ... +230 °F)
Degree of protection to EN 60529	P66/IP68
Mechanical load	Class 4M7 according to EN 60721-3-4
Climatic class	Class 4K4 according to EN 60721-3-4

Design

Housing material	Stainless steel 1.4571 (316Ti SST)
Cable	Ends with wire protectors and cable shoe for connection to the SITRANS DA400
Weight	125 g (0.276 lb)
Mounting location	Zone 0/1 or zone 20/21/22
Dimensions (W x H x D) in mm (inch)	26 x 29 x 40 (1.02 x 1.14 x 1.57)

Power Supply	Power fed from device
---------------------	-----------------------

Certificates and approvals

Explosion protection	
Intrinsic safety "i"	TÜV 2005 ATEX 2876 X
Marking	II 1 G EEx ia IIC T6/T5/T4 or II 1 D EEx ia D 20/21/22 T160

Permissible ambient temperature

Category 1G

- Temperature class T4, T5
- Temperature class T6

• Category 2G

- Temperature class T4
- Temperature class T5
- Temperature class T6

• Category 1D or 2D

- Temperature class T160

-20 ... +60 °C (-4 ... +140 °F)
-20 ... +50 °C (-4 ... +122 °F)

-40 ... +110 °C (-40 ... +230 °F)
-40 ... +80 °C (-40 ... +176 °F)
-20 ... +65 °C (-4 ... +149 °F)

-40 ... +110 °C (-40 ... +230 °F)

Ex barriers for sensors

Application area	For the intrinsically safe supply of the acoustic sensors in zone 1; the safety barriers must be installed between the SITRANS DA400 acoustic diagnostic unit and the sensor if only the sensors are being operated in the Ex zone.
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Input	A maximum of two sensors can be connected.
--------------	--

Conditions of use

Degree of protection to EN 60529	IP20
Permissible Ambient Temperature	-20 ... +60 °C (-4 ... +140 °F)

Design

Weight	115 g (0.254 lb)
Housing material	Plastic, polyamide
Type of installation	Installation on mounting rail NS 32 or NS 35/7.5. The acoustic diagnostic unit SITRANS DA400 and the safety barrier must be operated outside the Ex zone.

Dimensions (W x H x D) in mm (inch)	68 x 77 x 42 (2.68 x 3.03 x 1.65)
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Certificates and Approvals

Explosion protection	
Intrinsic safety "i"	TÜV 05 ATEX 2917 X
Marking	II (2) G [EEx ib] IIC

Selection and Ordering data

Article No.

Acoustic diagnostics unit SITRANS DA400 with local programming and display	7MJ2400-	A0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		

Communication

- PROFIBUS DP
- PROFIBUS PA

Explosion protection

- Without
- With EEx ia/ib to ATEX¹⁾

Application software

For continuous condition monitoring of positive displacement pumps

For material flow monitoring in pipes, raceways and conveyors

Acoustic sensors for diagnostics unit SITRANS DA400

[Click on the Article No. for the online configuration in the PIA Life Cycle Portal.](#)

Explosion protection

- Without
- With EEx ia to ATEX

Cable

(incl. pin and allen screw M6)

20 m
40 m
100 m

Safety barriers for sensors

For rail mounting NS 32 and NS35/7.5 in non-hazardous areas
Explosion-protected output circuit EEx ib

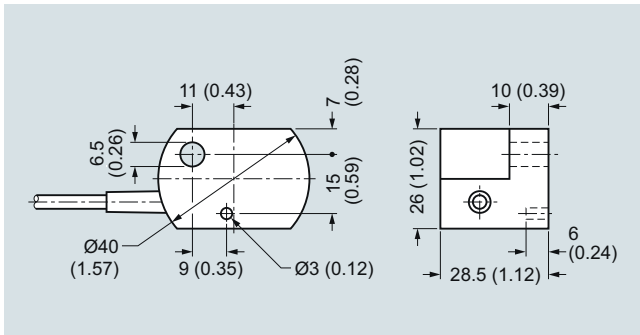
¹⁾ Not in combination with trigger sensor.

Process Protection

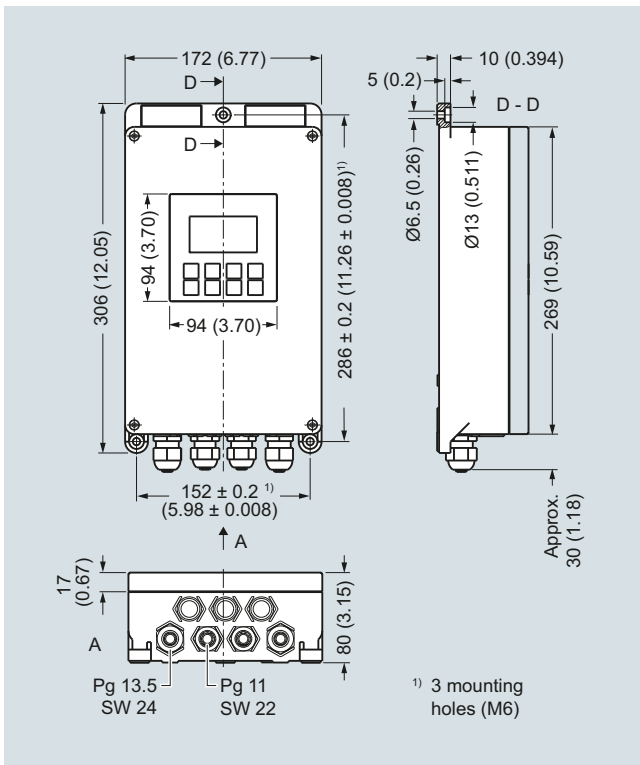
Acoustic sensors for pump monitoring

SITRANS DA400 acoustic diagnostic unit

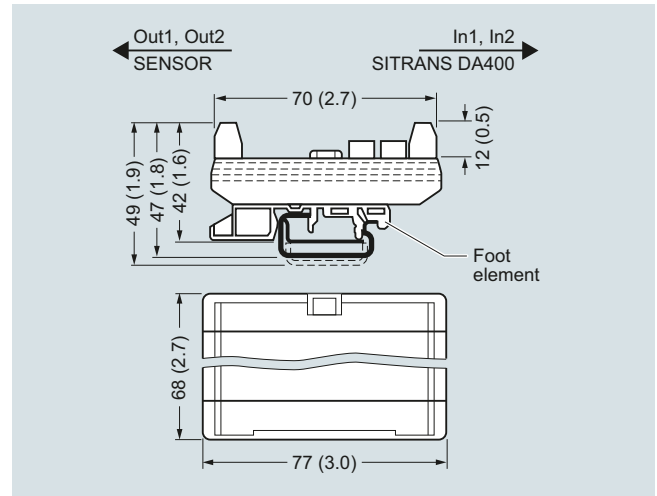
Dimensional drawings



Sensor for SITRANS DA400, dimensions in mm (inch)

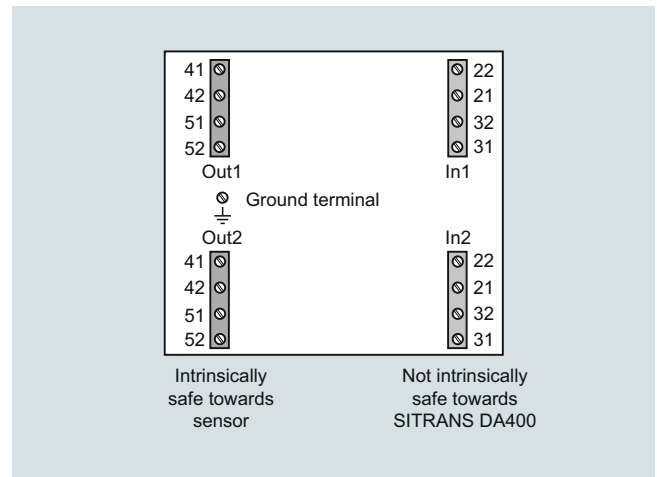


SITRANS DA400, dimensions in mm (inch)



Safety barrier for SITRANS DA400, dimensions in mm (inch)

Circuit diagrams



Safety barrier for SITRANS DA400, terminal assignment

DO 1	DO 2	DO 3	Sens 3	Sens 4	In 3	In 4	PROFIBUS
L+ L- 31 32	41 42	51 52	yl gr br bl 35 36 37 38	yl gr br bl 45 46 47 48	I+ ⊥ DI 8V 75 76 77 78	I+ ⊥ DI 8V 85 86 87 88	A B 93 94
Supply 24V DC	DO 6	DO 5	Sens 1	Sens 2	In 1	In 2	PROFIBUS
11 12	81 82	71 72	yl gr br bl 15 16 17 18	yl gr br bl 25 26 27 28	I+ ⊥ DI 8V 55 56 57 58	I+ ⊥ DI 8V 65 66 67 68	A B 91 92

L+/L- Power supply
(Any polarity with
PROFIBUS PA)
DO Digital output
Sens Sensor

In Input
yl Yellow
gr Green
br Brown
bl Black
I+ Analog current input +

⊥ Ground
DI Digital input
A Signal A (green) with PROFIBUS DP,
any with PROFIBUS PA
B Signal B (red) with PROFIBUS DP,
any with PROFIBUS PA

SITRANS DA400, terminal assignment

Process Protection

Acoustic sensors for material flow monitoring

SITRANS AS100 Acoustic sensor

Overview



SITRANS AS100 is an acoustic sensor used for solids flow detection.

Benefits

- Non-invasive
- Screw in, bolt on, weld, or bond in place
- Analog output
- High and low sensitivity range of operation

Application

SITRANS AS100 detects changes in high frequency sound waves from equipment and materials in motion. It detects and reacts instantly to changes in solids flow to warn of blockages, product absence, or equipment failure such as burst filter bags. This allows an operator to take early preventative action and avoid costly damage.

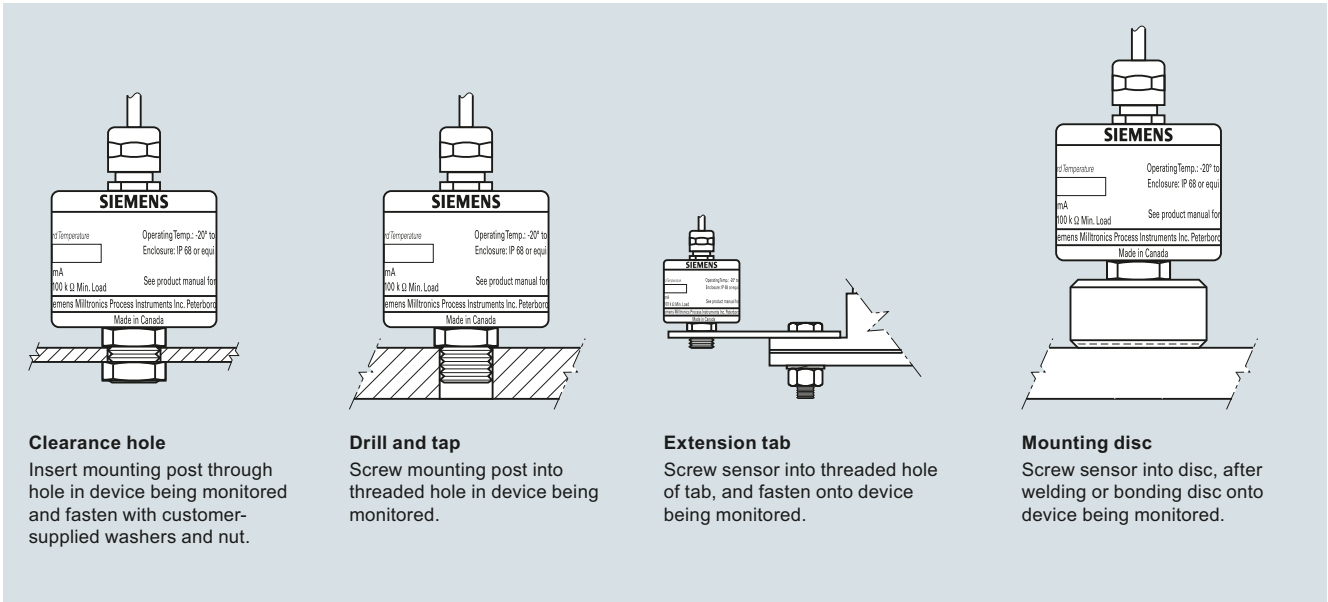
Common applications include pellets, powders and most bulk solids in pipes, chutes, vibratory feeders, pneumatic conveyors or aerated gravity flow systems.

Operating with a SITRANS CU02 control unit, the system detects conditions of high flow, low flow or no flow. It can be added to a control loop via a 4 to 20 mA output. Two relays are fully programmable and independent of each other and can be used to operate an alarm or control device.

With no moving parts and a type 304 or 303 stainless steel enclosure sealed against dust and moisture, this non-invasive unit requires little or no maintenance. With a dual operating range, the sensor offers an exceptionally wide range of application capabilities.

- Key applications: pipes, chutes, vibratory feeders, aerated gravity flow systems, burst filter bag detection

Design



SITRANS AS100 mounting

Process Protection

Acoustic sensors for material flow monitoring

SITRANS AS100 Acoustic sensor

Technical specifications

Mode of Operation	
Operating principle	Acoustic sensing of high frequency emissions caused by impact or friction
Typical application	<ul style="list-style-type: none"> • Detects burst filter bags in dust collection systems • Detects material being conveyed in pneumatic conveyor lines • Route confirmation in chute work
Model	
Standard	Standard operating temperature range
Extended	Extended operating temperature range
Operation	
Relative sensitivity	0.5 %/°C of reading, average over the operating range
Outputs	Analog, 0.08 ... 10 V DC nominal, 100 kΩ minimum load impedance
Rated operating conditions	
Amb. temperature for enclosure	
• Standard	-20 ... +80 °C (-4 ... +176 °F)
• Extended	<ul style="list-style-type: none"> • -40 ... +125 °C (-40 ... +257 °F) (CE only) • -30 ... +120 °C (-22 ... +248 °F) option
Design	
Weight	0.4 kg (1 lb)
Enclosure	Enclosure: 304 (1.4301) stainless steel [303 stainless steel (1.4305) on Class II version, aluminum 231 on 2GD version]
Degree of protection	IP68 (waterproof)
Cable	
• Standard	4 m (13 ft) cable, PVC jacketed, 3 twisted pairs, 24 AWG (0.25 mm ²), shielded
• Extended	4 m (13 ft) cable, thermoplastic elastomer jacketed, 6 conductor, 24 AWG (0.25 mm ²) conductor, shielded
Power supply	
	20 ... 30 V DC, 18 mA (typical)
Certificates and approvals	
	CE, RCM, EAC, KCC CSA/FM Class II, Div. 1, Group E, F, and G (optional), ATEX II 2GD (optional), ATEX II 3D (optional), EAC Ex

Selection and Ordering data

SITRANS AS100 Acoustic Sensor

An acoustic sensor used for solids flow detection.

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Sensor

Standard temperature range

[-20 ... +80 °C (-4 ... +176 °F)]¹⁾

Extended temperature range

[-40 ... +125 °C (-40 ... +257 °F)]²⁾

Extended temperature range

[-30 ... +120 °C (-22 ... +248 °F)]³⁾

Cable Length

4 m (13.12 ft)

Sensor Mounting

None

Mounting disk

Mounting tab

Approvals

CE, RCM, EAC, KCC

CSA/FM Class II, Div. 1, Group E, F, and G (includes ½" NPT female fitting)

CSA Class II, Div. 1, Group E, F, and G (includes ½" NPT female fitting), EAC Ex

CE, RCM, FM/CSA Class II, Div. 1, Group E, F and G, ATEX II 3D (includes M20 female fitting), EAC Ex

ATEX II 2GD, c/w cable gland, EAC Ex⁴⁾

¹⁾ Available with approval options 1, 3, 5, and 6 only

²⁾ Available with approval option 1 only

³⁾ Available with approval option 4 only

⁴⁾ Available with sensor option 1 only and sensor mounting option A only

Article No.

7MH7560-

0

1

3

4

A

A

B

C

1

3

4

5

6

Selection and Ordering data

Order code

Further designs

Please add "-Z" to Article No. and specify Order code(s).

Manufacturer's test certificate: According to EN 10204-2.2

C11

Acrylic coated, stainless steel tag [12 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text

Y17

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Spare Parts

Mounting tab

Article No.

7MH7723-1AA

Mounting disk

7MH7723-1AB

½" NPT adapter kit for standard temperature range sensor, not Class II approved

7MH7723-1BW

M20 adapter kit for standard temperature range sensor, not Class II or ATEX approved

7MH7723-1BV

½" NPT adapter kit for extended temperature range sensor, not Class II approved

7MH7723-1BX

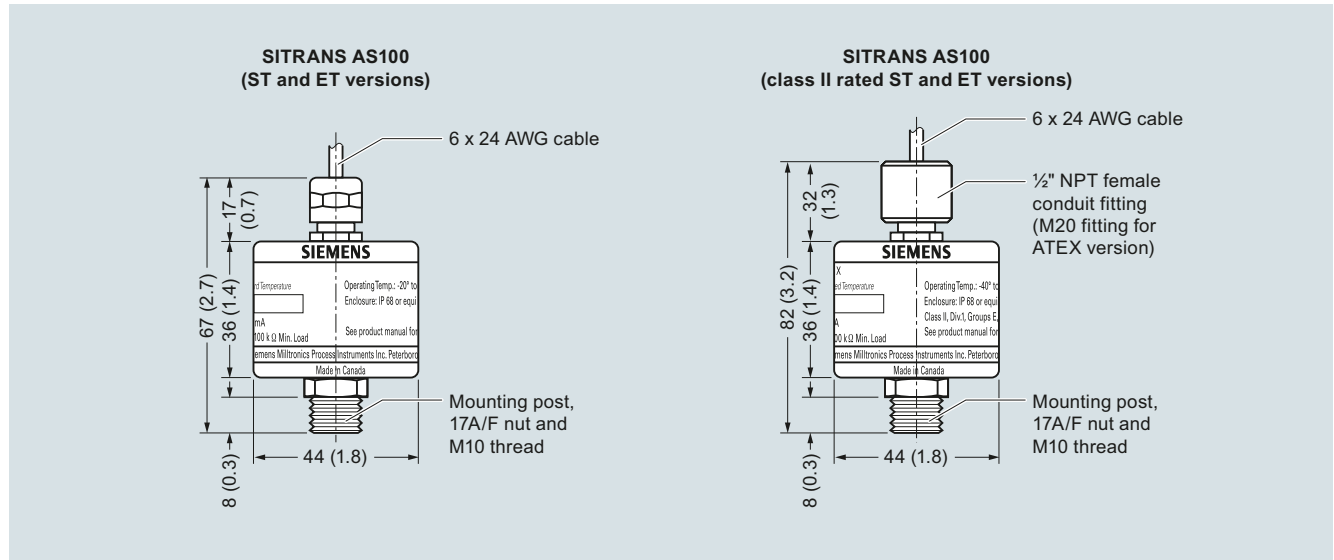
Note: Adapter kits are not CSA Class II approved

Process Protection

Acoustic sensors for material flow monitoring

SITRANS AS100 Acoustic sensor

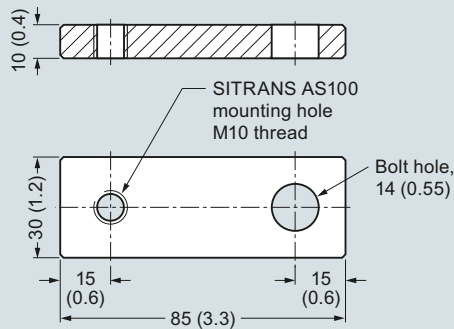
Dimensional drawings



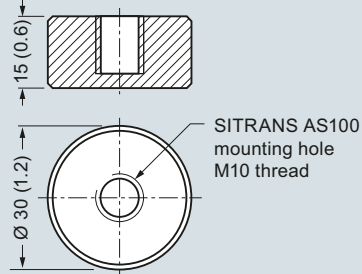
SITRANS AS100, dimensions in mm (inch)

Accessories

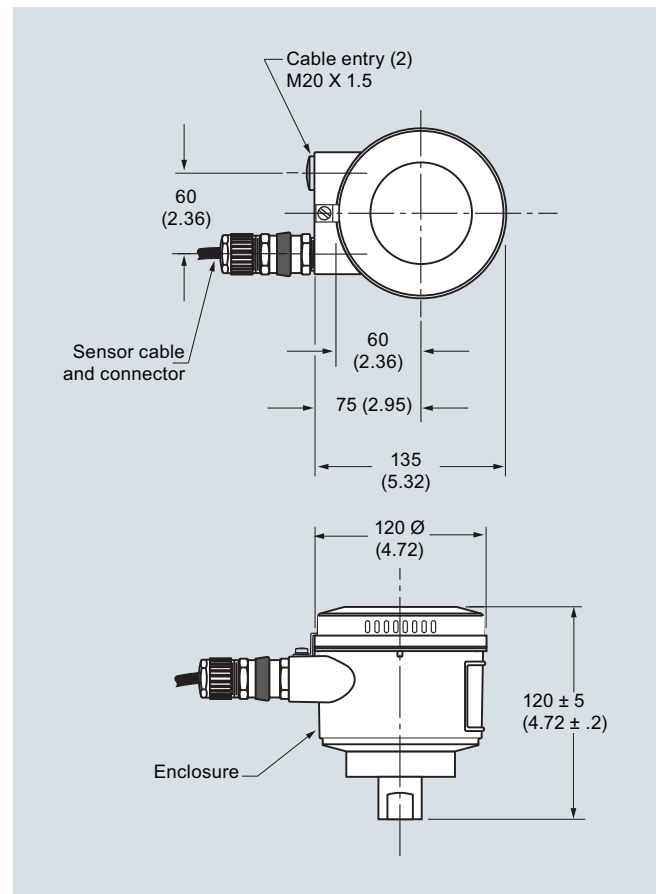
Extension tab - bolt on (304 stainless steel)



Mounting disc - bonded or welded (304 stainless steel)



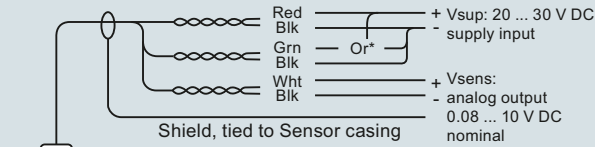
SITRANS AS100 accessories, dimensions in mm (inch)



SITRANS AS100 (2D, 2G, XP version), dimensions in mm (inch)

Circuit diagrams

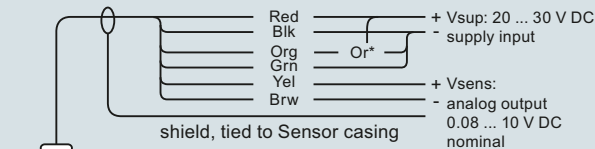
Standard temperature range



* Sensor range selection

High sensitivity range = red and green to Vsup+
Low sensitivity range = red to Vsup+, green to Vsup-

Extended temperature range



* Sensor range selection

High sensitivity range = red and orange to Vsup+
Low sensitivity range = red to Vsup+, orange to Vsup-

Interconnection

The longer the cable, the more susceptible it is to noise and earth loops. It is therefore recommended to use cable with heavy gauge conductors and good RF/electrical shielding (copper braid rather than drain and foil). A proper junction box close to the sensor is an ideal location not only to extend the cable but also to configure the wiring for high or low sensitivity range operation.

The following table provides a guideline for suitable wire gauges where distances are considerable.

Max. distance between sensor and supply
(24 V or Control Unit).

AWG	Wire size		Distance	
	mm	mm ²	meters	feet
24	7 x 0.20	0.25	500	1 600
22	7 x 0.25	0.35	800	2 600
20	10 x 0.25	0.5	1 200	3 900

SITRANS AS100 connections

Process Protection

Acoustic sensors for material flow monitoring

SITRANS CU02 Control Unit

Overview



SITRANS CU02 is an alarm control unit, for use with SITRANS AS100 acoustic sensor, that provides reliable continuous protection for bulk solids flow.

Benefits

- 4 to 20 mA output
- Two programmable relays
- Adjustable independent time delay for each relay
- Adjustable start-up time delay
- DIN rail mounting provides easy installation
- Built-in password protection to parameters

Application

SITRANS CU02 receives a 0 to 10 V DC input signal from the SITRANS AS100 sensor, providing relay and analog outputs for interface into a process.

- Key applications: with SITRANS AS100 for bulk solids flow

Function

The system can be readily configured for set points indicating such conditions as high flow, low flow or no flow. Alternatively, it can be added to a control loop via a 4 to 20 mA isolated output for trend monitoring proportional to the signal from the sensor.

Two relays are fully programmable and independent of each other and can be used to operate an alarm or control device. Alarming may be provided above or below a setpoint or within a band. Readings are also displayed locally by the SITRANS CU02 on its LCD.

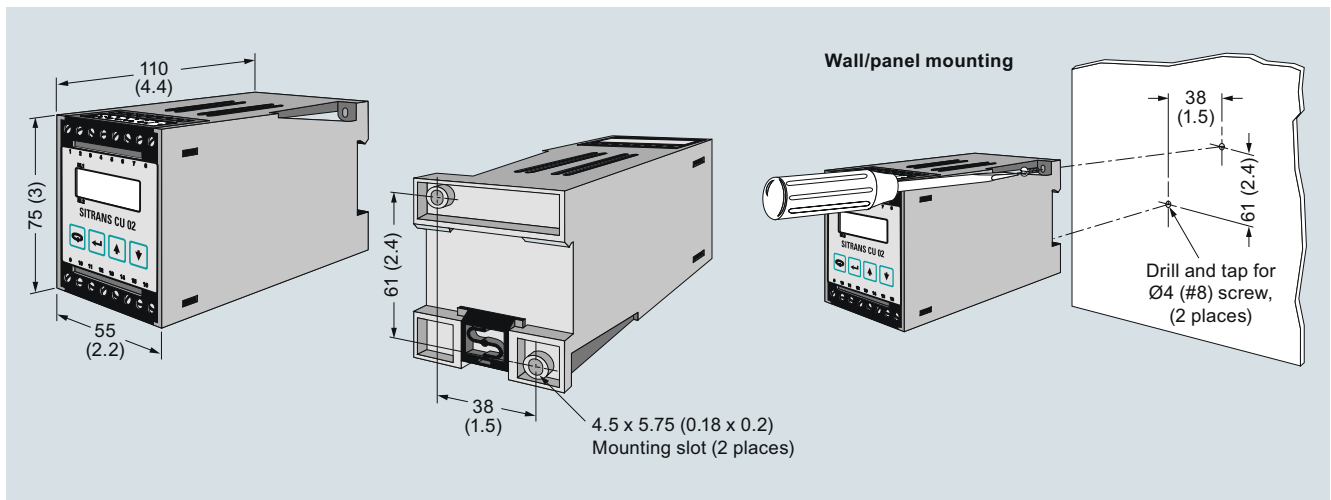
The SITRANS CU02 may be mounted up to 500 m (1 500 ft) from the sensor.

Technical specifications

Mode of operation	
Measuring principle	Controller for acoustic sensing (SITRANS AS100)
Typical application	Connects to SITRANS AS100 to detect burst filter bag
Input	0 ... 10 V DC, from sensor
Output	
Output signal	4 ... 20 mA isolated output, 2 Form C relays - latching or non-latching - 5 A at 250 V AC non-inductive
Sensor excitation	26 V DC
Max. load	750 Ω
Rated operating conditions	
Installation conditions	
• Location	Indoor
Ambient conditions	
• Ambient temperature for enclosure	-20 ... +50 °C (-4 ... +122 °F)
• Relative humidity	80 % for temperatures up to 50 °C (122 °F)
• Degree of protection	IP20
• Installation category	II
• Pollution degree	2
Design	
Weight	550 g (18 oz)
Dimensions (W x H x D)	55 x 75 x 110 mm (2.2 x 3 x 4.4 inch)
Material enclosure	Polycarbonate
Mounting	DIN Rail (DIN 46277 or DIN EN 50022), or wall mount, up to 500 m (1 500 ft) from sensor
Cable	2 twisted pair, 24 AWG (22 mm ²), shielded. Mount up to 500 m (1 500 ft) from sensor
Display	Liquid crystal, three digits, 9 mm (0.35 inch), high and multi-segment graphic symbols for operation status
Power supply	
Supply voltage	100, 115, 200, 230 V AC ± 15 %, 50/60 Hz, factory set
Power consumption	Max. 10 VA
Approvals	CSA _{US/C} , CE, RCM, EAC, KCC

Selection and Ordering data		Article No.	Selection and Ordering data	Order code
SITRANS CU02 Control Unit		7MH7562-	Further designs	
Alarm control unit for use with SITRANS AS100 acoustic sensor to provide reliable continuous protection for bulk solid flow			Please add "-Z" to Article No. and specify Order code(s).	
➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			Manufacturer's test certificate: According to EN 10204-2.2	C11
Power Supply			Acrylic coated, stainless steel tag [38 x 51 mm (1.5 x 2 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text	Y18
100 V AC		1	Operating Instructions	
115 V AC		2		
200 V AC		3		
230 V AC		4		
Enclosure		A	All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Standard DIN Rail		A		
Approvals				
CSA _{US/CA} , CE, RCM, EAC, KCC				

Dimensional drawings



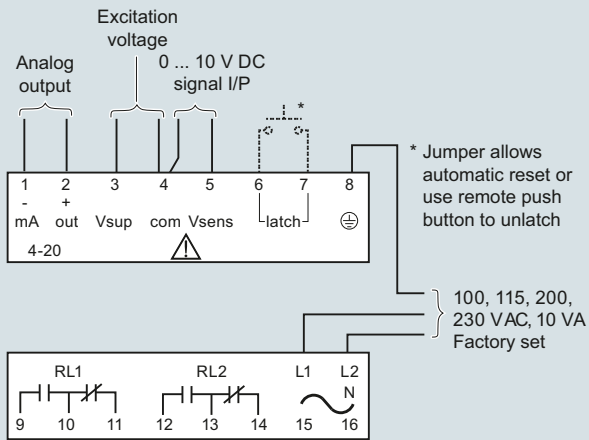
SITRANS CU02, dimensions in mm (inch)

Process Protection

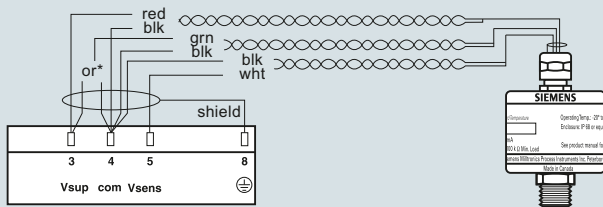
Acoustic sensors for material flow monitoring

SITRANS CU02 Control Unit

Circuit diagrams

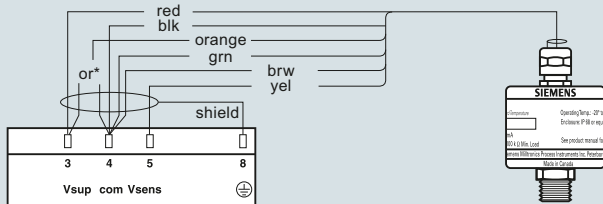


Standard temperature version



* Sensor range selection
High sensitivity range = green to 'Vsup'
Low sensitivity range = green to 'com'

Extended temperature version



* Sensor range selection
High sensitivity range = orange to 'Vsup'
Low sensitivity range = orange to 'com'

Mounting

Installation shall only be performed by qualified personnel and in accordance with local governing regulations.
This product is susceptible to electrostatic shock. Follow proper grounding procedures.

Interconnection

All field wiring must have insulation suitable for at least 250 V. Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V. The maximum allowable working voltage between adjacent relay contacts shall be 250 V. If sensor case is grounded, do not connect shield of cable to SITRANS CU02 ground terminal.

SITRANS CU02 connections

Milltronics MFA 4p motion failure alarm controller

Overview



MFA 4p motion failure alarm controller is a highly sensitive single setpoint motion sensor system, used with Milltronics MSP probes.

Benefits

- Up to 100 mm (4 inch) gap between target and probe
- Switch selectable overspeed or underspeed detection
- Setpoint adjustment 0.15 to 3 000 PPM (pulses/minute)
- Adjustable start-up time delay
- Visual indication of probe operation and relay status
- General purpose, suitable for majority of industrial applications; rugged probe designs provide unmatched reliability

Application

The MFA 4p detects changes in the motion and speed of rotating, reciprocating or conveying equipment. It warns of equipment malfunction and signals through contacts to shut down machinery in case of a slowdown or failure. Its reliability makes it a cost-effective way to protect valuable process equipment.

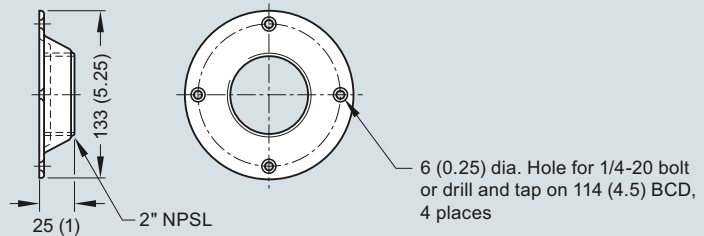
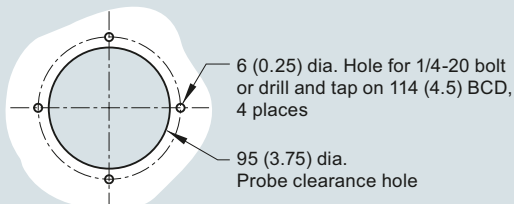
The single setpoint system suits most industrial applications. This versatile unit can be used on tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps.

A special feature is the adjustable 0 to 60 second time delay, allowing the monitored device to accelerate to normal running speed before monitoring begins. A wide range of probes are available to suit specific needs, including high temperatures and corrosive installations. The CE approval allows the MFA 4p to consistently meet the needs of the mining aggregate, cement and other primary and secondary industries.

- Key Applications: tail pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

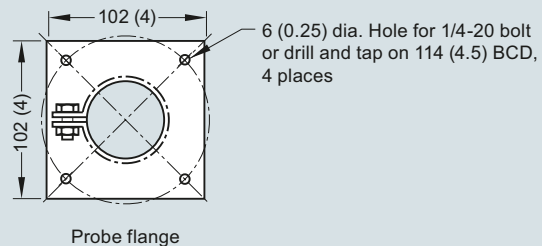
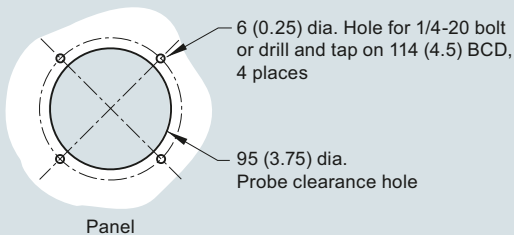
Design

Mounting for Milltronics MSP-12, MSP-3, XPP-5



Note: Mounting flange supplied with probe.

Mounting for Milltronics MSP-9



Milltronics MSP-12, MSP-3, MSP-9, XPP-5 mounting, dimensions in mm (inch)

Process Protection

Motion sensors

Milltronics MFA 4p motion failure alarm controller



Standard Milltronics MSP-12

- Heavy-duty general purpose motion probe
- Long lasting aluminum body with internal amplifier
- Convenient mounting flange and locknut for fast installation and setup
- Temperature rating: -40 ... +60 °C (-40 ... +140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67



Milltronics XPP-5

- CSA hazardous approval (Class I, Div. 1, Groups A, B, C, D; Class II Div. 1, Groups E, F, G; Class III)
- Aluminum body that is fully potted
- Convenient mounting flange and locknut
- 3/4" NPT male hub connection
- Operating temperature from -40 ... 60 °C (-40 ... 140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67



High temperature Milltronics MSP-3

- Heavy-duty, high temperature aluminum probe designed to withstand operating temperatures from -50 ... 260 °C (500 °F)
- Cast aluminum probe with convenient mounting flange and locknut
- 1.5 m (5 ft) of high temperature PTFE cable provided. Up to 30 m (100 ft) may be used.
- Amplifier remote mounted in enclosure 140 x 140 x 100 mm (5.5 x 5.5 x 4 inch), available in cast aluminum (½" NPT conduit entry), painted steel (Type/NEMA 4, IP65 rating), or stainless steel (Type/NEMA 4X, IP65 rating)
- Amplifier temperature rating -40 ... +60 °C (-40 ... +140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67



Stainless high temperature Milltronics MSP-9

- Heavy-duty, high temperature 304 stainless steel probe
- Special construction allows operation of probe in environment from -50 ... 260 °C (500 °F)
- 1.5 m (5 ft) special high temperature PTFE cable provided. Up to 30 m (100 ft) may be used.
- Amplifier remote mounted in enclosure 140 x 140 x 100 mm (5.5 x 5.5 x 4 inch), available in cast aluminum (½" NPT conduit entry), painted steel (Type/NEMA 4, IP65 rating), or stainless steel (Type/NEMA 4X, IP65 rating)
- Enclosure rating: Type/NEMA 4X, 6, IP67
- Amplifier temperature rating -40 ... +60 °C (-40 ... +140 °F)



Milltronics RMA (Remote Mounted Amplifier)

- Available for internal mounting within Probe, or in enclosure for remote mounting
- Enclosures available in cast aluminum (½" NPT entry), painted steel (Type/NEMA 4 rating) or stainless steel (Type/NEMA 4X, IP65 rating)
- Operating temp. from -40 ... +60 °C (-40 ... +140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67

Milltronics motion probes

Technical specifications

Mode of operation	
Measuring principle	Motion monitor and alarm
Typical application	Monitoring loss of motion in tail pulley, screw flights, bucket elevators
Features	
<ul style="list-style-type: none"> • Switch selectable overspeed or underspeed detection • Setpoint adjustment: 0.15 ... 3 000 PPM • Adjustable start-up time delay: 0 ... 60 seconds • Visual indication of probe operation and relay status 	
Output	
2 relays working in unison, each providing 1 SPDT Form C relay contact, rated 8 A at 250 V AC resistive	
Performance	
Repeatability	± 1 %
Dead band	± 0.25 %

Dynamic Range	0 ... 7 200 PPM
Ambient Temperature Range	-20 ... +50 °C (-5 ... +122 °F)
Design	
Enclosure rating	Type 4X/NEMA 4X/IP65 (standard and optional stainless steel) Type 4/NEMA 4/IP65 (optional mild steel)
Enclosure dimensions	160 x 240 x 82 mm (6.3 x 9.5 x 3.2 inch) Optional: mild steel or 304 (1.4301) stainless steel 203 x 254 x 102 mm (8 x 10 x 4 inch)
Enclosure material	Polycarbonate Optional: mild steel or stainless steel
Power Supply	100 ... 240 V AC, 50/60 Hz, 15 VA, ± 10 % of rated voltage
Certificates and approvals	CE, RCM, EAC, KCC, CSA _{US/C} , FM

Milltronics MFA 4p motion failure alarm controller

Selection and Ordering data	Article No.
MFA 4P Motion Failure Alarm Controller A highly sensitive single setpoint motion sensor system, used with MSP probes. ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7MH7144-
Enclosure	
NEMA 4X, polycarbonate enclosure	1
NEMA 4, painted mild steel enclosure	2
NEMA 4X, 304 (1.4301) stainless steel enclosure	3
Input Voltage	
100 ... 240 V AC, ± 10 %, 50/60 Hz, 15 VA	A
Speed detection version	
Standard, underspeed (U/S) or overspeed (O/S), switch selectable	A
Slow speed (S/S), U/S or O/S detection, switch selectable (limit of 15 ppm)	B
Approvals	
CE, RCM, EAC, KCC, CSA _{US/CA} , FM	2

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Manufacturer's test certificate: According to EN 10204-2.2	C11
Acrylic coated, stainless steel tag [69 x 50 mm (2.7 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters), specify in plain text	Y15
Painted mild steel, heated enclosure with viewing window for use down to -50 °C (-58 °F) (finished unit is mounted inside enclosure) [483 x 584 x 203 mm (19 x 23 x 8 inch)]	A35
Stainless steel, sun/weather shield (finished unit is field mounted inside enclosure) [357 x 305 x 203 mm (14 x 12 x 8 inch)]	S50
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	Article No.
Transformer	7MH7723-1DX
Circuit Card, standard	7MH7723-1DU
Circuit Card, Slow speed	7MH7723-1DV
Lid with overlay for MFA 4p	7MH7723-1GY

Selection and Ordering data	Article No.
Milltronics RMA Remote Mounted Amplifier Remote mounted amplifier for Milltronics MSP-3 and MSP-9 motion sensing probes. ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7MH7145-
Enclosure	
Aluminum enclosure, IP65, Type/NEMA 4X, ½" NPT entry	A
Painted steel, Type/NEMA 4, IP65 rating	C
304 (1.4301) stainless steel enclosure, Type/NEMA 4X, IP65 rating	D

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Manufacturer's test certificate: According to EN 10204-2.20	C11
Acrylic coated, stainless steel tag [38 x 51 mm (1.5 x 2 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text	Y18
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Spare Parts	Article No.
Card, RMA	7MH7723-1DT

Process Protection

Motion sensors

Milltronics MFA 4p motion failure alarm controller

Selection and Ordering data

Article No.

Milltronics Motion Sensing Probes

7MH7146-

A series of motion sensing probes used with the MFA 4p.

Milltronics MSP-3: heavy-duty, high temperature aluminum

Milltronics MSP-9: heavy-duty, high temperature stainless steel

Milltronics MSP-12: heavy-duty, general purpose

Milltronics XPP-5: hazardous rated

Note: Milltronics MSP-3 and MSP-9 probes require the use of Milltronics RMA (amplifier)

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Cable Length

Standard length (as described in Model options)¹⁾

Add Order code Y01 and plain text:

"Total cable length ... m"

Extended cable length 2 ... 30 m (6.6 ... 98.4 ft)²⁾

Extended cable length 31 ... 50 m

(101.7 ... 164 ft)⁴⁾

Extended cable length 51 ... 100 m

(167.3 ... 328.1 ft)⁴⁾

Model [standard cable length/type]

MSP-3, ½" NPT cable inlet³⁾

[1.5 m (5 ft) high temperature cable]

MSP-9 [1.5 m (5 ft) high temperature cable]³⁾

MSP-12, ½" NPT cable inlet

XPP-5 [1.5 m (5 ft) cable, (CSA Class I, Groups A, B, C and D; Class II Groups E, F, and G)]

XPP-5 [10 m (32.8 ft) cable, (CSA Class I, Groups A, B, C, and D; Class II Groups E, F, and G)]

XPP-5 [15 m (49.2 ft) cable, (CSA Class I, Groups A, B, C, and D; Class II Groups E, F, and G)]

Approvals

CE, RCM, EAC, KCC

¹⁾ No Y01 needed in Order code for standard length

²⁾ Only available with model options B, D, G, H, J

³⁾ MSP-3 and MSP-9 probes required the use of RMA (amplifier)

⁴⁾ Available with Model options G, H, and J only

Selection and Ordering data

Order code

Further designs

Please add "-Z" to Article No. and specify Order code(s).

Total cable length: enter the total cable length in plain text description

Y01

Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]:
Measuring-point number/identification (max. 16 characters), specify in plain text

Y17

Cable gland kit

A57

Manufacturer's test certificate: According to EN 10204-2.2

C11

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Spare Parts

Locknut, for MSP-3, MSP-7, MSP-12, XPP-5

Article No.

7MH7723-1CR

Mounting flange, for MSP-3, MSP-7, MSP-12, XPP-5

7MH7723-1CS

Mounting bracket for MSP-9

7MH7723-1CT

Lid, 1/2" NPT cable inlet for MSP-3, MSP-7, MSP-12

7MH7723-1CU

Lid for MSP-9

7MH7723-1CV

Lid gasket, for MSP-3, MSP-9

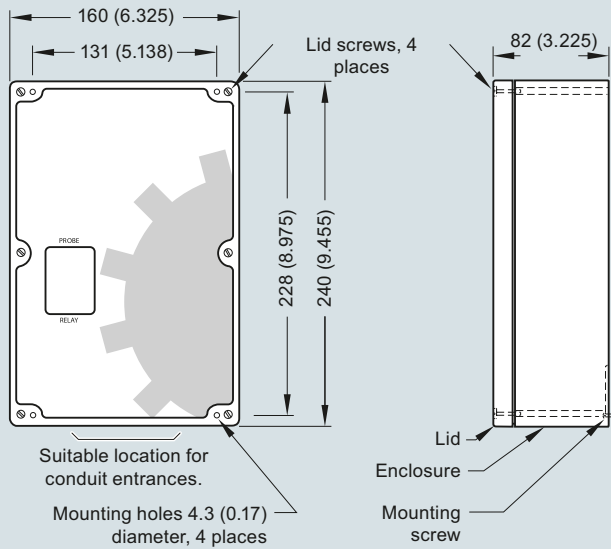
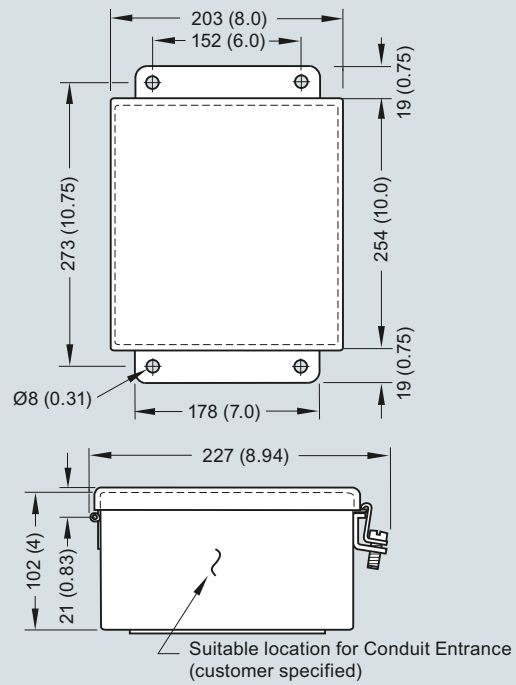
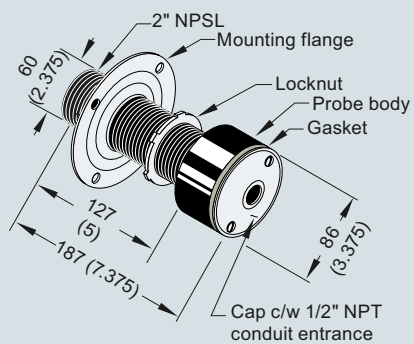
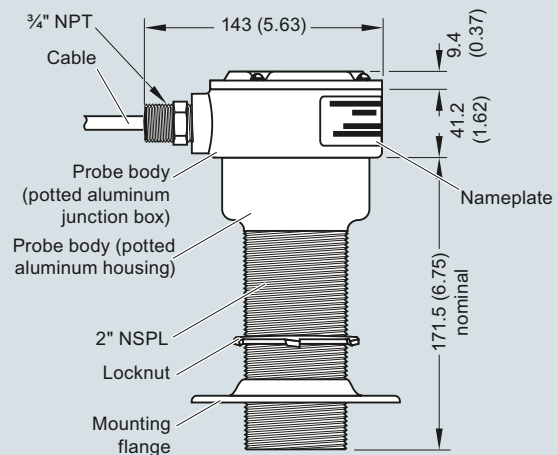
7MH7723-1CW

Lid gasket, for MSP-7, MSP-12

7MH7723-1CX

Motion cable gland adaptor kit

7MH7723-1JU

Dimensional drawings
Type 4X/NEMA 4X/IP65 Polycarbonate Enclosure

Type 4/NEMA 4/IP65 Painted Steel Enclosure & Type 4X/NEMA 4X/IP65 Stainless Steel Enclosure

Standard Probe MSP-12

Hazardous Locations XPP-5


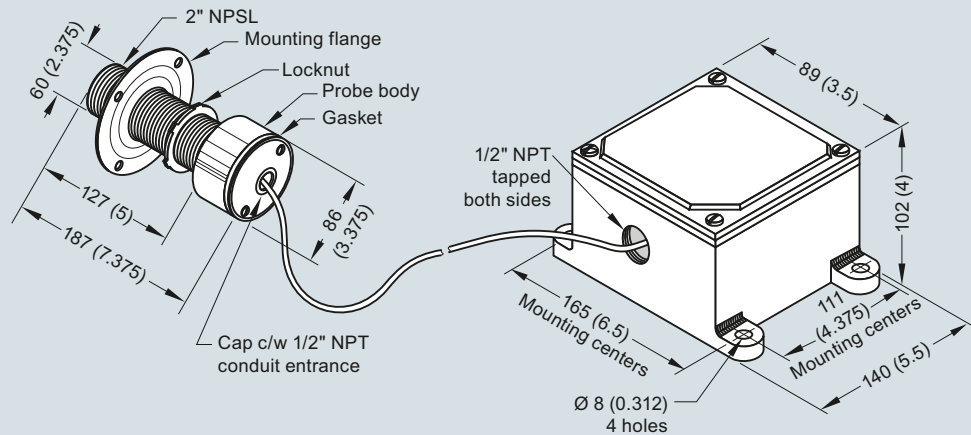
Milltronics MFA 4p and probe, dimensions in mm (inch)

Process Protection

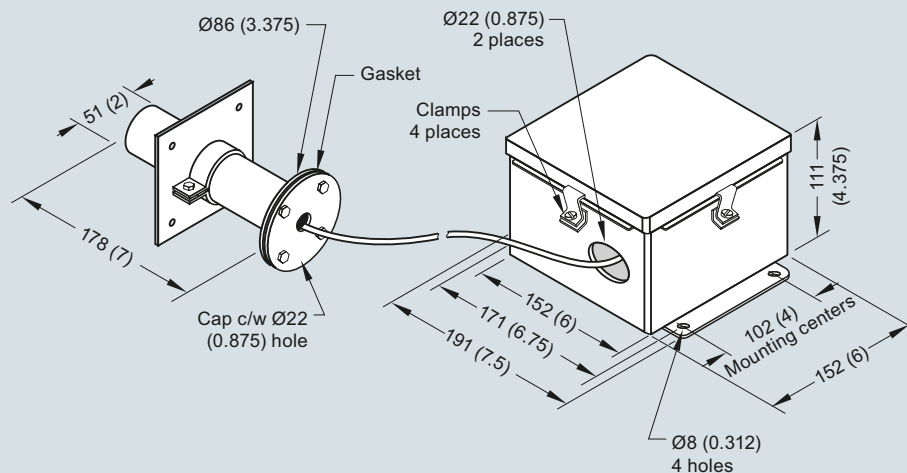
Motion sensors

Milltronics MFA 4p motion failure alarm controller

High temperature probe MSP-3



High temperature stainless steel probe MSP-9



Milltronics probes, dimensions in mm (inch)

Overview


Milltronics MSP-7 is a heavy-duty 3-wire motion sensor that provides an NPN open collector output to PLCs.

Benefits

- Up to 100 mm (4 inch) gap between target and probe
- Corrosion resistant construction
- General purpose, suitable for majority of industrial applications; rugged probe designs provide unmatched reliability

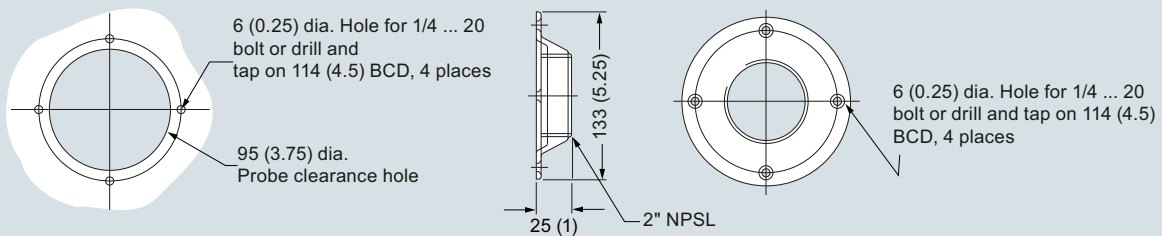
Application

The MSP-7 motion sensing probe can detect changes in the rotation and movement of ferrous equipment. When connected to a PLC it can warn of malfunction and signals to stop or slow down equipment, preventing costly failure or downtime. Its reliability makes it a very cost effective sensor.

The single setpoint system suits most industrial applications. This versatile unit can be used on tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps.

An NPN open collector 3-wire output allows for versatile connection to most PLC models and a large dynamic range ensures that the MSP-7 can detect changes in target speed for a variety of applications.

- Key Applications: tail pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

Design
Mounting for Milltronics MSP-7


Note: Mounting flange supplied with probe.

Mounting for Milltronics MSP-7, dimensions in mm (inch)

Technical specifications

Mode of operation	
Measuring principle	Magnetic
Typical application	Monitoring loss of motion in tail pulley, screw flights, bucket elevators
Features	
<ul style="list-style-type: none"> • Rugged corrosion resistant aluminum body • Low voltage operation • Large dynamic range • Threaded body for finite adjustment 	
Output	
NPN open collector, 2 k Ω pull up to input voltage, 330 Ω impedance, 40 mA max.	
Performance	
Repeatability	$\pm 1 \%$
Dead band	$\pm 0.25 \%$
Dynamic Range	0 ... 7 200 PPM
Ambient Temperature Range	-40 ... +60 °C (-40 ... +140 °F)
Design	
Enclosure rating	Type 4X/NEMA 4X/IP67
Power Supply	21 ... 28 V DC, 40 mA max.
Certificates and approvals	CE, RCM, EAC, KCC

Process Protection

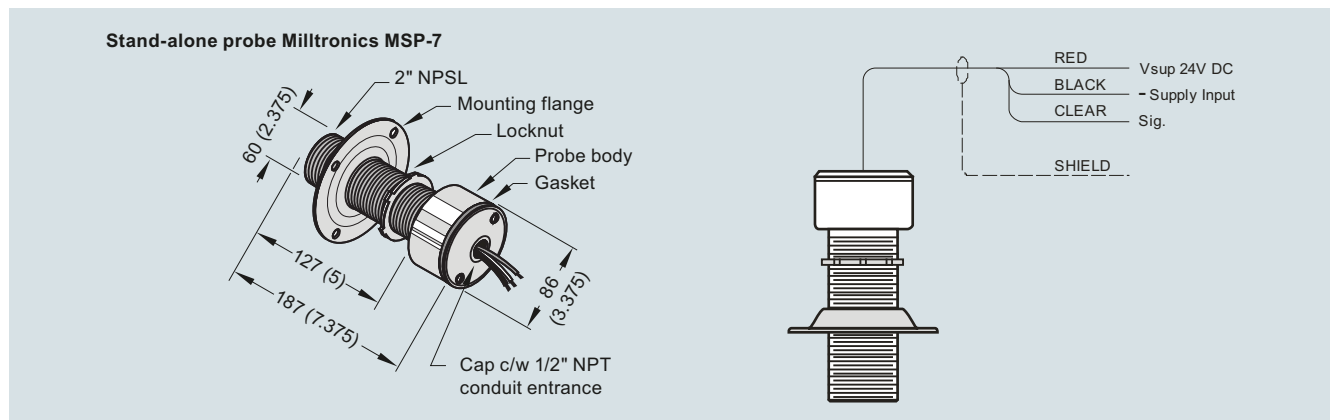
Motion sensors

Milltronics MSP-7 motion sensor

Selection and Ordering data		Article No.	Selection and Ordering data		Order code
Milltronics Motion Sensing Probes		7MH7146-	Further designs		
Milltronics MSP-7: heavy-duty, 3 wire stand-alone			Please add "-Z" to Article No. and specify Order code(s).		
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			Total cable length: enter the total cable length in plain text description		Y01
Cable Length			Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]:		Y17
Standard length (as described in Model options) ¹⁾		0	Measuring-point number/identification (max. 16 characters), specify in plain text		
Add Order code Y01 and plain text: "Total cable length ... m"			Cable gland kit		A57
Extended cable length 2 ... 30 m (6.6 ... 98.4 ft)		1	Manufacturer's test certificate: According to EN 10204-2.2		C11
Model [standard cable length/type]			Operating Instructions		
MSP-7, 1/2" NPT cable inlet [1.5 m (5 ft) cable]		K	All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation		
Approvals		A	Spare Parts		Article No.
CE, RCM, EAC, KCC			Locknut, for MSP-3, MSP-7, MSP-12, XPP-5		7MH7723-1CR
¹⁾ No Y01 needed in Order code for standard length			Mounting flange, for MSP-3, MSP-7, MSP-12, XPP-5		7MH7723-1CS
			Lid, 1/2" NPT cable inlet for MSP-3, MSP-7, MSP-12		7MH7723-1CU
			Lid gasket, for MSP-7, MSP-12		7MH7723-1CX
			Motion cable gland adaptor kit		7MH7723-1JU

6

Dimensional drawings



Overview



SITRANS WM100 is a heavy-duty zero-speed alarm switch. This non-contacting unit provides cost-effective equipment protection even in the harshest conditions.

Benefits

- Up to 100 mm (4 inch) gap between SITRANS WM100 and targets
- Rugged, low maintenance suitable for tough environments
- 1 SPDT Form C relay contact
- Provides cost-effective protection
- Visual indication of target triggered pulse

Application

This rugged unit is impervious to dust, dirt, build-up and moisture and is ideal for such primary industries as mining, aggregate, and cement. Operating where other systems are prone to failure, the non-contacting design eliminates the need for lubricating, cleaning and part replacement. Downtime and clean-up expenses associated with conveying equipment failure are reduced by the SITRANS WM100. It alarms to minimize spillage, prevent extensive damage or even fire caused by belt slippage at the head pulley, and warns against conveyor malfunction.

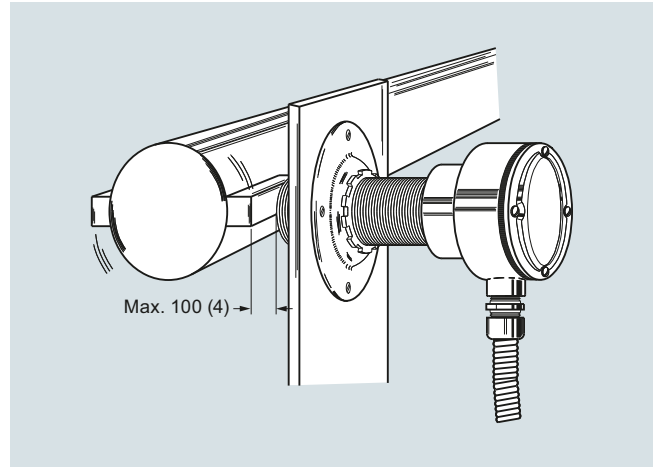
The SITRANS WM100 has built-in selectable start delays and 1 Form C relay contact. With an aluminum body, it operates from -40 to +60 °C (-40 to +140 °F).

- Key Applications: tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

Design

Mounting

The WM100 probe should be mounted, using the supplied mounting flange, onto a vibration-free structure. The gap between the probe and the target should be sufficient such that there is no danger of the target damaging the probe. The maximum allowable gap is 100 mm (4 inch) from the face of the target to the face of the probe for 4.5 x 4.5 mm (3/16 x 3/16 inch) keyway. The WM100 is sensitive to lateral disturbances to its magnetic field. If the WM100 is responding to motion from an interfering target, move the WM100 or install a ferrous plate (steel) as a shield between the WM100 and the interfering target. Where possible, the probe should be mounted such that the cable inlet is pointing downward to avoid accumulation of condensation in the casing. Connection of the probe should be made via flexible conduit for easier removal or adjustment of the probe.



SITRANS WM100 mounting, dimensions in mm (inch)

Technical specifications

Mode of operation	
Measuring principle	Disruption of magnetic field by ferrous target
Typical application	Monitors absence or presence of motion in harsh conditions
Output	
Contact	1 SPDT Form C dry relay contact, rated 5 A at 250 V AC, fail-safe operation
Time delay	Start up: 10 ... 14 seconds (5 ... 7 s with 12 ppm jumper installed)
Zero Speed (selected via a common jumper)	5 seconds ± 1 (minimum speed 10 ... 15 ppm) or 10 seconds ± 2 (minimum speed 5 ... 7.5 ppm)
Rated operating conditions	
Operating temperature	-40 ... +60 °C (-40 ... +140 °F)
Design	
Probe body	Aluminum
Process mounting	2" NPSL
Connection box	Aluminum, 3/4" NPT conduit entrance, 5 screw terminals plus grounding terminal for electrical connection, max. 12 AWG (3.30 mm ²) wire size
Gasketing	Neoprene
Display	Red LED for verification of pulses
Enclosure rating	Type NEMA 4x, 6, IP67
Dynamic range	Minimum 6 or 12 pulses per minute Maximum 3 000 pulses per minute
Shipping weight	2 kg (4.4 lb)
Power supply	<ul style="list-style-type: none"> • 115 V AC/50 ... 60 Hz, 7 VA • 230 V AC/50 ... 60 Hz, 7 VA • ± 10 % of rated voltage
Certificates and approvals	CSA US/C, CE, RCM, EAC, KCC

Process Protection

Motion sensors

SITRANS WM100 motion sensor

Selection and Ordering data

SITRANS WM100

A heavy-duty zero-speed alarm switch that does not require a controller.

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Model

115 V AC

230 V AC

Article No.

7MH7158 -

0 A 0 0

A

B

Selection and Ordering data

Order code

Further designs

Please add "-Z" to Article No. and specify Order code(s).

Manufacturer's Test Certificate: According to EN 10204-2.2

C11

Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text

Y17

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Accessories

Locknut

Mounting flange

Motion cable gland adaptor kit

Article No.

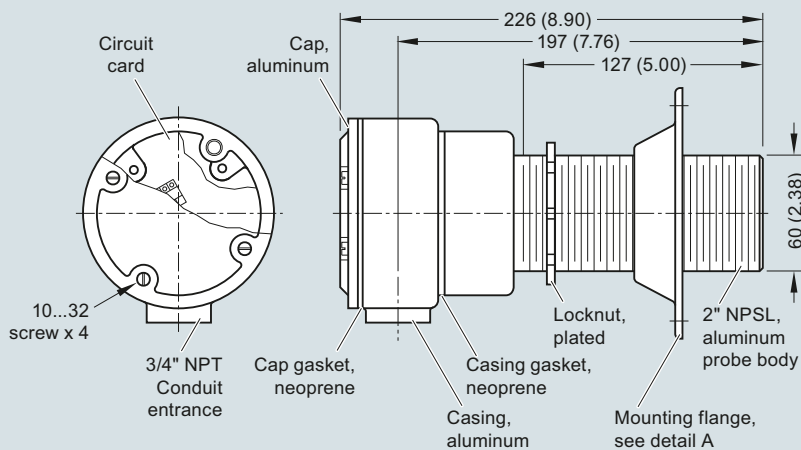
7MH7723-1CR

7MH7723-1CS

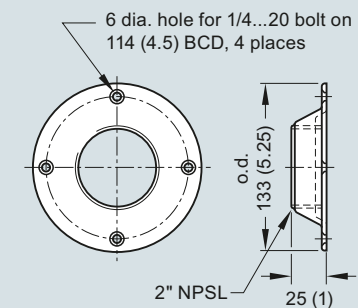
7MH7723-1JN

Dimensional drawings

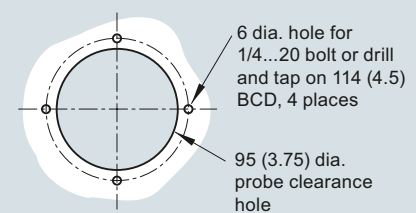
Dimensions



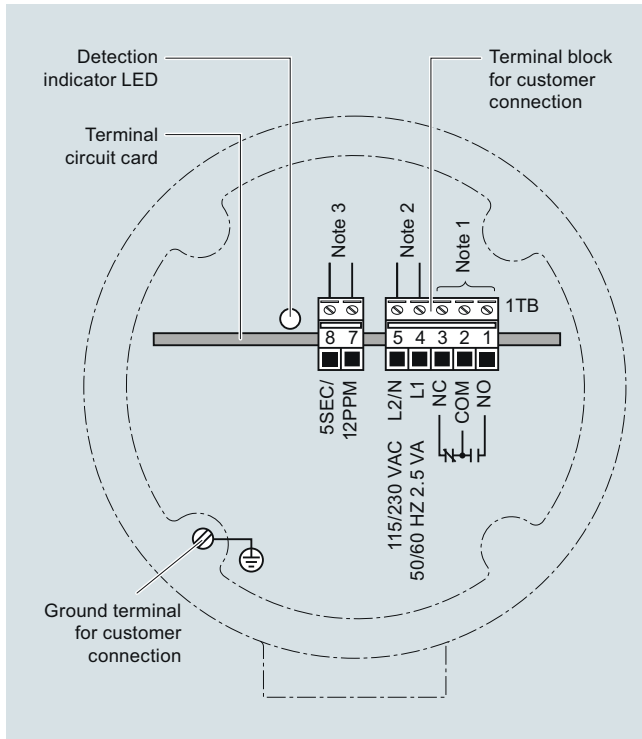
Detail A



Mounting



SITRANS WM100 mounting, dimensions in mm (inch)

Circuit diagrams


SITRANS WM100 wiring

Notes:

1. Dry contacts shown in de-energized (alarm or shelf) state.
2. SITRANS WM100 is manufactured for either 115 or 230 V AC operation. Check WM100 nameplate for applicable voltage. Correct voltage must be supplied. Voltages lower than specified will result in an inoperative condition. Voltages higher than specified will severely damage unit.
3. For 5 second time delay and a minimum 12 ppm range, connect jumper across terminals 7 and 8. Without a jumper, the default is a 10 second time delay and a minimum 6 ppm range.

Process Protection

Notes

Supplementary Components



7/2	Product overview
7/4 7/7	Isolating power supplies and Output isolators SITRANS I100 SITRANS I200
7/10 7/12 7/16	Displays SITRANS RD100 SITRANS RD200 SITRANS RD300
7/20	Remote data manager SITRANS RD500
7/26	Remote Terminal Unit SIMATIC RTU3000C
7/36 7/42	WirelessHART products SITRANS AW200 - WirelessHART adapter SITRANS AW210 - WirelessHART adapter
7/46	Network transitions IE/PB LINK PN IO

You can download all instructions, catalogs and certificates for Supplementary Components free of charge at www.usa.siemens.com/level

Supplementary Components

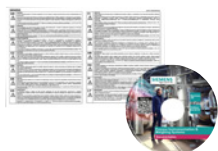
Product overview

Overview

	Application	Description	Catalog page	Programming Software
Isolating power supplies and Output isolators				
	Isolating power supply for supplying 2- and 3-wire transmitters and for connecting mA sources in the hazardous area	SITRANS I100 Isolating power supply with HART for rail mounting, with intrinsically-safe input.	7/4	-
	Output isolator for controlling valve positioners, i/p converters or indicators in the hazardous area	SITRANS I200 Output isolator with HART for rail mounting, with intrinsically-safe output	7/7	-
Displays				
	2-wire loop powered, NEMA 4X enclosed remote digital display for process instrumentation and for hazardous locations	SITRANS RD100 <ul style="list-style-type: none"> Versatile loop-powered meter that displays process variables in level, flow, pressure, temperature and weighing applications FM, CSA, and CE approved device that can be installed in a range of environments, including hazardous areas Large, easy-to-read display Easy to install and set up using quick two-step process 	7/10	-
	A universal input, panel mount remote digital display for process instrumentation. Supports RTD, TC, current and voltage inputs, and supporting software allows for remote configuration and data logging.	SITRANS RD200 <ul style="list-style-type: none"> Universal remote display that accepts various inputs, making it an ideal fit for use with most field instruments Standard panel mount display with optional enclosures Two optional relays for alarm indication or process control applications Meter Copy feature to reduce setup time, cost and errors RD Software supporting remote configuration, monitoring and logging for up to 100 displays 	7/12	-
	A panel mount remote digital display for process instrumentation and acts as a multi-purpose, easy to use, rate/totalizer ideal for flow rate, total and control applications	SITRANS RD300 <ul style="list-style-type: none"> A remote display for level, flow, pressure, weighing, and other process instruments Acts as a multi-purpose, easy to use, rate/totalizer ideal for flow rate, total, and control applications Data can be remotely collected, logged and presented on your local computer using the free downloadable RD software. Accepts a single or dual input of current and voltage and supports math functions such as averaging. 	7/16	-
Remote data manager				
	Remote web display providing integrated web access, alarm event handling, and data capture for instrumentation	SITRANS RD500 <ul style="list-style-type: none"> Supports up to 128 devices with the flexible I/O modules and Modbus RTU and TCP devices, including field instruments Out-of-the-box operation, no software required, works with standard web browser Supports Ethernet, cellular and PSTN communication Data and alarming through FTP, Email, SMS, HTML and Modbus TCP Up to 2 GB of data logging memory 	7/20	-

Application	Description	Catalog page	Programming Software
Remote Terminal Unit			
 <p>The devices of the RTU3000C series are compact telecontrol stations with separate power supply. They collect measured values in applications that are spread over large geographical areas and transmit them to the control center with the help of an external industry router or an integrated UMTS modem.</p> <p>The measured values can be integrated in automation solutions such as SIMATIC PCS 7 TeleControl over industrial communication standards, such as DNP3 or IEC 60870-5-104.</p> <p>The SIMATIC RTU3000C devices are especially suitable for monitoring, simple control tasks or data logging in areas without power supply connection. The connected sensors can be supplied with energy via the RTU.</p>	<p>SIMATIC RTU3000C</p> <ul style="list-style-type: none"> • Energy-optimized operation • Flexible power supply through battery, rechargeable battery, solar panel and/or 12 to 24 V DC • Simple configuration using a standard web browser • Data buffering of process values with time stamps • Secure communication over OpenVPN (SIMATIC RTU3030C only), a secure tunnel of the TeleControl Server Basic or encrypted e-mail • Notifications via text messages • Integrated UMTS modem (SIMATIC RTU3030C only) • Extended temperature range from -40 to +70 °C • Support for various protocols: TeleControl Basic, IEC 60870-5-104, DNP3 and SINAUT ST7 • Additional enclosure protects against floods (IP68) 	7/26	-
WirelessHART products			
 <p>WirelessHART adapter to enable standard 4 ... 20 mA or HART devices to wireless communication</p>	<p>SITRANS AW200 - WirelessHART adapter</p> <ul style="list-style-type: none"> • Makes isolated information in HART field instruments airborne • Permits predictive instead of preventive maintenance strategies • Enables 4 ... 20 mA or HART devices to wireless communication • Up to 4 HART devices can be connected • Power up one connected field instrument 	7/36	<p>SIMATIC PDM</p> <ul style="list-style-type: none"> • Local with HART modem • Wireless via WirelessHART
 <p>Explosion protected WirelessHART adapter to enable standard 4 ... 20 mA or HART devices to wireless communication</p>	<p>SITRANS AW210 - WirelessHART adapter</p> <ul style="list-style-type: none"> • Wireless transfer of the process variable of a 4 to 20 mA device via direct connection • Wireless communication with up to 8 HART field devices in multidrop mode • Suitable for use in explosion-protected areas • Loop-powered or external power supply • Supports burst mode and event notification for adapters and connected devices 	7/42	<p>SIMATIC PDM</p> <ul style="list-style-type: none"> • Local with HART modem • Wireless via WirelessHART
Network transitions			
 <p>As an autonomous component, the IE/PB LINK PN IO provides a seamless transition between Industrial Ethernet and PROFIBUS.</p> <p>The IE/PB LINK PN IO also offers cross-network PG/OP communication by means of S7 routing.</p> <p>In addition, data record routing (PROFIBUS DP) is supported. This means it is possible, for example, to use SIMATIC PDM (on the PC) on Industrial Ethernet to parameterize and diagnose a PROFIBUS field device via the IE/PB LINK PN IO</p>	<p>IE/PB LINK PN IO</p> <ul style="list-style-type: none"> • Compact network transition between PROFINET and PROFIBUS • PROFINET IO proxy; connection of PROFIBUS DP slaves to PROFINET IO controller in accordance with PROFINET standard • Cross-network PG/OP communication by means of S7 routing • Cross-network access to data of S7 stations for visualization by means of S7 OPC server and S7 routing • High plant availability thanks to support of the Media Redundancy Protocol (MRP) • Module replacement without the need for a programming device, using the C-PLUG swap media for backing up the configuration data • Use in networks that support an exchange of devices without PG on the basis of the Link Layer Discovery Protocol (LLDP) • ET200 SP design 	7/46	-

Supplied product documentation on DVD and safety instructions



The scope of delivery of the Siemens products for process instrumentation includes a multilingual instruction sheet with **safety instructions** as well as a uniform **mini DVD – Process Instrumentation and Weighing Systems**.

This DVD contains the most important manuals and certificates for the Siemens process instrumentation and weighing technology portfolio. The delivery may also contain product-specific or order-specific printed materials.

For additional information, refer to the Annex on page 10/3.

Supplementary Components

Isolating power supplies and Output isolators

SITRANS I100

Overview



Analog input 0/4 to 20 mA

The isolating power supplies are used for the intrinsically safe operation of 2- and 3-wire transmitters and for connecting to intrinsically safe mA sources.

The 2- and 3-wire transmitters are supplied with auxiliary power from the transmitter supply unit.

For 2-wire transmitters the isolators transfer the HART communication signal bidirectionally.

Benefits

- Active output 0/4 to 20 mA
- Suitable for 2-, 3-wire transmitters, 2-wire HART transmitters and mA sources
- Intrinsically safe input [Ex ia] IIC
- Galvanic isolation between input, output and auxiliary power
- Open-circuit and short-circuit monitoring and messaging for input and output (can be switched off)
- Installation possible in Zone 2 and Div. 2
- Can be used up to SIL 2 (IEC 61508)

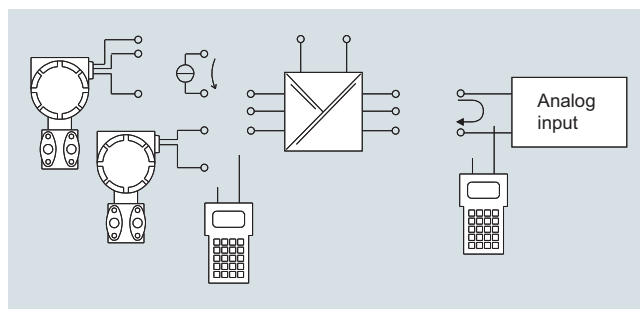
	Zones					
	0	1	2	20	21	22
Ex i interfaces	X	X	X	X	X	X
Installation in			X			X

Design

The HART isolating power supply is comprised of a compact plastic enclosure (IP30) and is equipped with push-in screw terminals.

On the front are a green LED for indicating the power supply status and a red LED for signaling errors.

The auxiliary power supply can be connected individually using push-in screw terminals or jointly for up to 40 units using pac-Bus.



SITRANS I100 isolating power supply, function block diagram

Technical specifications

SITRANS I100 Isolating Power Supplies with HART

Ex i input

Input signal	0/4 ... 20 mA with HART
Functional range	0 ... 24 mA
Max. input current for mA sources	50 mA
Transmitter supply voltage	≥ 16 V at 20 mA (for 2-, 3-wire)
Supply voltage residual ripple	≤ 25 mV _{eff}
No-load voltage	≤ 26 V
Short-circuit current	≤ 35 mA
Input resistance (AC impedance HART)	≈ 500 Ω
Input resistance for mA sources	30 Ω
Communication signal (on 2-wire transmitters)	Bidirectional HART transmission, 0.5 ... 30 kHz

Output

Output signal	0/4 ... 20 mA with HART
Load resistance R _L	0 ... 600 W (terminal 1+/2-) 0 ... 379 W (terminal 3+/2-) (with internal 221 Ω resistance for HART)
Residual ripple	≤ 40 μA _{eff}
No-load voltage	≤ 15.5 V
Communication signal	Bidirectional HART transmission, 0.5 kHz ... 30 kHz
Response time (10 % ... 90 %)	≤ 25 ms
Transfer behavior	1:1
Input/Output	(0 ... 20 mA --> 0 ... 20 mA, 4 ... 20 mA --> 4 ... 20 mA)

Measuring accuracy

Accuracy, typical data expressed as % of calibrated span at U_N, 23 °C

Linearity error	≤ 0.1 %
Offset error	≤ 0.1 %
Temperature influence	≤ 0.1 %/10 K
Power supply effect within voltage range	≤ 0.01 %
Load resistance effect	≤ 0.02 %

Supplementary Components

Isolating power supplies and Output isolators

SITRANS I100

Rated conditions Degree of protection of enclosure IP30 Degree of protection of terminals IP20 Ambient conditions • Ambient temperature -20 ... +60 °C/+70 °C (-4 ... +140 °F/+158 °F) (see "Operating instructions") • Storage temperature -40 ... +80 °C (-40 ... +176 °F) • Relative humidity (no condensation) ≤ 95 % Electromagnetic compatibility Tested under the following standards and regulations: EN 61326-1 Use in the industrial environment		Error detection Ex i input • Open circuit < 2 mA • Short-circuit > 22 mA • Output behavior = Input signal • Output current at $I_{in} = 0$ $I_{out} = 0$ mA Error detection output • Open circuit < 2 mA Error messaging Ex i input/output • Settings (LF switch) Activated/deactivated • Error indication LED red "LF" Error messaging and power supply failure • Contact (30 V/100 mA), closed to ground in case of error • pac-Bus, floating contact (30 V/100 mA)	
Mechanical specifications Screw terminals • One-wire connection - Rigid 0.2 ... 2.5 mm ² (0.00031 ... 0.0039 in ²) - Flexible 0.2 ... 2.5 mm ² (0.00031 ... 0.0039 in ²) - Flexible with end ferrules (without/with plastic ferrule) 0.25 ... 2.5 mm ² (0.00039 ... 0.0039 in ²) • Two-wire connection - Rigid 0.2 ... 1 mm ² (0.00031 ... 0.00155 in ²) - Flexible 0.2 ... 1.5 mm ² (0.00031 ... 0.0023 in ²) - Flexible with end ferrules 0.25 ... 1 mm ² (0.00039 ... 0.00155 in ²) Weight Approx. 160 g (0.35 lb) Type of installation On DIN rail according to EN 50022 (NS35/15; NS35/7.5) Mounting position Vertical or horizontal Enclosure material PA 6.6 Fire protecting class (UL-94) V0		Certificates and approvals Explosion protection ATEX • EC type-examination certificate DMT 03 ATEX E 010 X • Degree of protection II 3 (1) G Ex nA nC [ia] IIC T4 II (1) D [Ex iaD] Installation In Zone 2, Div. 2 and in the safe area Other approvals USA (FM) Canada (CSA) Shipping (DNV)	
Auxiliary power Rated voltage U_N 24 V DC Voltage range 18 ... 31.2 V Residual ripple within voltage range ≤ 3.6 V _{SS} Rated current (U_N , 20 mA) 70 mA Power consumption (U_N , 20 mA) 1.7 W Power loss (at U_N , $R_L = 250 \Omega$) 1.3 W Operation indicator Green "PWR" LED Reverse polarity protection Yes Undervoltage monitoring Yes (no faulty module/output states) Galvanic isolation • Test voltage according to EN 60079-11 - Ex i input to output 1.5 kV AC - Ex i input to auxiliary power 1.5 kV AC - Ex i input to Error contact 1.5 kV AC • Test voltage according to EN 50178 - Output to auxiliary power 350 V AC - Error contact to auxiliary power and output 350 V AC		Safety specifications (CENELEC) • Max. voltage U_o 27 V • Max. current I_o 88 mA • Max. power P_o 576 mW • Max. connectable capacitance C_o for IIC/IIB 90 nF/705 nF • Max. connectable inductance L_o for IIC/IIB 2.3 mH/14 mH • Internal capacitance C_i and inductance L_i Negligible • Insulation voltage U_m 253 V • When connecting mA sources: - Max. output voltage U_o 4.1 V - Max. connectable voltage U_i 30 V - Max. connectable current I_i 100 mA - Internal capacitance C_i and inductance L_i Negligible • For more information and value combinations See "Certification"	

Supplementary Components

Isolating power supplies and Output isolators

SITRANS I100

Selection and Ordering data

Article No.

SITRANS I100 Isolating Power Supply with HART

For rail mounting, for supplying 2-/3-wire transmitters and for mA sources, output 0/4 ... 20 mA, with intrinsically safe input

7NG4124-0AA00

Accessories

pac-Bus basic set

With 5 single elements and 1 terminal set (beginning and end)

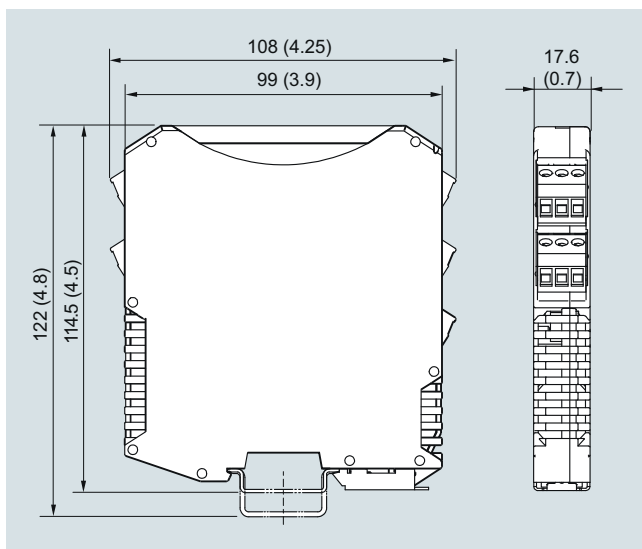
7NG4998-1AA

pac-Bus extension set

With 5 single elements

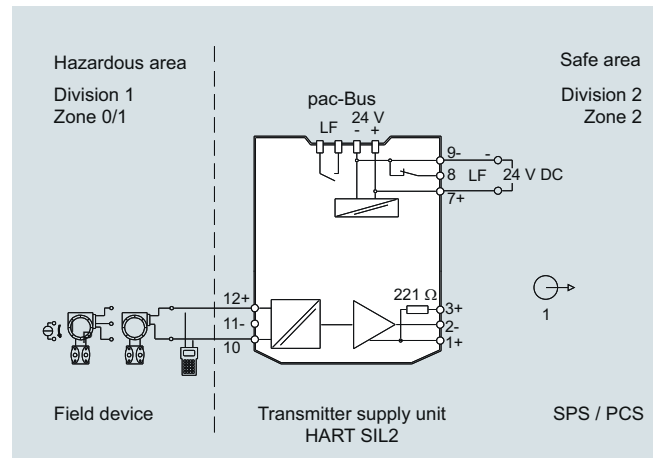
7NG4998-1AB

Dimensional drawings

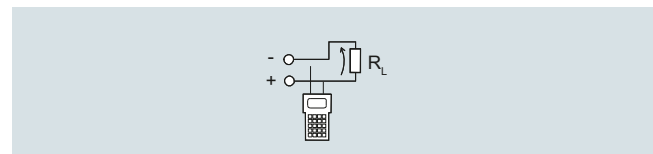


SITRANS I100 isolating power supply with HART, dimensions in mm (inch)

Schematics



SITRANS I100 isolating power supply with HART, connection diagram



SITRANS I100 isolating power supply with HART, output configuration

Overview



Analog output 0/4 to 20 mA for HART

The output isolators are used for the intrinsically safe operation of valve positioners, i/p converters or indicators.

Operation of intrinsically safe HART valve positioners (e.g. SIPART PS2 and SITRANS VP300) is also possible. The units transfer a superimposed HART communication signal bidirectionally.

Benefits

- For HART output signals 0/4 to 20 mA
- Intrinsically safe output [Ex ia] IIC
- Galvanic isolation between input, output and auxiliary power
- Open-circuit and short-circuit monitoring and messaging (can be switched off)
- Installation possible in Zone 2 and Div. 2
- Can be used up to SIL 2 (IEC 61508)

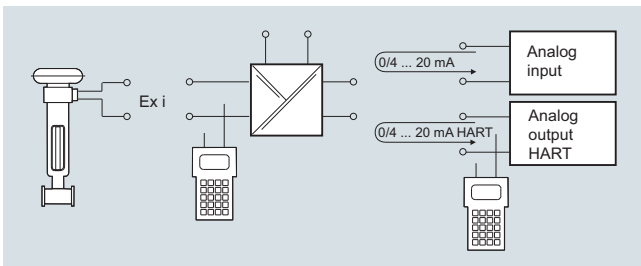
	Zones					
	0	1	2	20	21	22
Ex i interface	X	X	X	X	X	X
Installation in			X			X

Design

The HART output isolator is comprised of a compact plastic housing (IP30) and is equipped with push-in screw terminals.

On the front are a green LED for indicating the power supply status and a red LED for signaling errors.

The auxiliary power supply can be connected individually using push-in screw terminals or jointly for up to 40 units using pac-Bus.



SITRANS I200 output isolator, function block diagram

Technical specifications

SITRANS I200 output isolator with HART

Input

Input signal	0/4 ... 20 mA with HART
Functional range	0 ... 24 mA
Max. input current	50 mA
Input resistance (changeable switch LI)	225 Ω/550 Ω
Communication signal	Bidirectional HART transmission, 0.5 ... 30 kHz

Ex i output

Output signal	0/4 ... 20 mA with HART
Connectable load resistance	0 ... 800 Ω
Min. load resistance for short-circuit monitoring	150 Ω
Residual ripple	≤ 50 mV
No-load voltage	≤ 25.6 V
Response time (10 % ... 90 %)	≤ 25 ms
Transfer behavior Input/Output	1:1 (0 ... 20 mA --> 0 ... 20 mA, 4 ... 20 mA --> 4 ... 20 mA)

Measuring accuracy

Accuracy, typical data expressed as % of calibrated span at U_N , 23 °C

Linearity error	≤ 0.1 %
Offset error	≤ 0.1 %
Temperature influence	≤ 0.1 %/10 K
Power supply effect within voltage range	≤ 0.01 %
Load resistance effect	≤ 0.02 %

Rated conditions

Degree of protection of enclosure	IP30
Degree of protection of terminals	IP20
Ambient conditions	
• Ambient temperature	-20 ... +70 °C (-4 ... +158 °F) (see "Operating instructions")
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Relative humidity (no condensation)	≤ 95 %
Electromagnetic compatibility	Tested under the following standards and regulations: EN 61326-1 Use in the industrial environment

Supplementary Components

Isolating power supplies and Output isolators

SITRANS I200

Mechanical specification

Screw terminals

- One-wire connection

- Rigid 0.2 ... 2.5 mm²
(0.00031 ... 0.0039 in²)

- Flexible 0.2 ... 2.5 mm²
(0.00031 ... 0.0039 in²)

- Flexible with end ferrules
(without/with plastic ferrule) 0.25 ... 2.5 mm²
(0.00039 ... 0.0039 in²)

- Two-wire connection

- Rigid 0.2 ... 1 mm²
(0.00031 ... 0.00155 in²)

- Flexible 0.2 ... 1.5 mm²
(0.00031 ... 0.0023 in²)

- Flexible with end ferrules 0.25 ... 1 mm²
(0.00039 ... 0.00155 in²)

Weight Approx. 160 g (0.35 lb)

Type of installation On DIN rail according to
EN 50022 (NS35/15; NS35/7.5)

Mounting position Vertical or horizontal

Enclosure material PA 6.6

Fire protecting class (UL-94) V0

Auxiliary power

Rated voltage U_N 24 V DC

Voltage range 18 ... 31.2 V

Residual ripple within voltage range $\leq 3.6 V_{SS}$

Rated current (U_N , 20 mA) 80 mA

Power consumption (U_N , 20 mA) 1.3 W

Power loss (at U_N , $R_L = 500 \Omega$) 1.1 W

Operation indicator Green "PWR" LED

Reverse polarity protection Yes

Undervoltage monitoring Yes (no faulty module/output states)

Galvanic isolation

- Test voltage according to
EN 60079-11

- Ex i output to input 1.5 kV AC

- Ex i output to auxiliary power 1.5 kV AC

- Error contact to Ex i output 1.5 kV AC

- Test voltage according to
EN 50178

- Input to auxiliary power 350 V AC

- Error contact to auxiliary power and input 350 V AC

Error detection Ex i output

- Open circuit $> 10 k\Omega$

- Short-circuit $< 15 \Omega$

- Input behavior $> 6 k\Omega$

- Open-circuit detection only for input current $\geq 3.6 mA$

- Settings (LF switch) Activated/deactivated

- Error indication LED red "LF"

- Error messaging and power supply failure
 - Contact (30 V/100 mA), closed to ground in case of error
 - pac-Bus, floating contact (30 V/100 mA)

Certificates and approvals

Explosion protection ATEX

- EC type-examination certificate

- Degree of protection

Installation

Other approvals

Safety specifications (CENELEC)

- Max. voltage U_o

- Max. current I_o

- Max. power P_o

- Max. connectable capacitance C_o for IIC/IIB

- Max. connectable inductance L_o for IIC/IIB

- Internal capacitance C_i and inductance L_i

- Insulation voltage U_m

- For more information and value combinations see "Certification".

DMT 03 ATEX E 012 X

II 3 (1) G Ex nA nC [ia] IIC T4
II (1) D [Ex iaD]

In Zone 2, Div. 2 and in the safe area

USA (FM)

Canada (CSA)

Shipping (DNV)

25.6 V

96 mA

605 mW

103 nF/800 nF

1.9 mH/11 mH

Negligible

253 V

Selection and Ordering data

Article No.

SITRANS I200 output isolator with HART

For rail mounting, input 0/4 ... 20 mA, output 0/4 ... 20 mA, intrinsically safe

7NG4131-0AA00

Accessories

pac-Bus basic set

With 5 single elements and 1 terminal set (beginning and end)

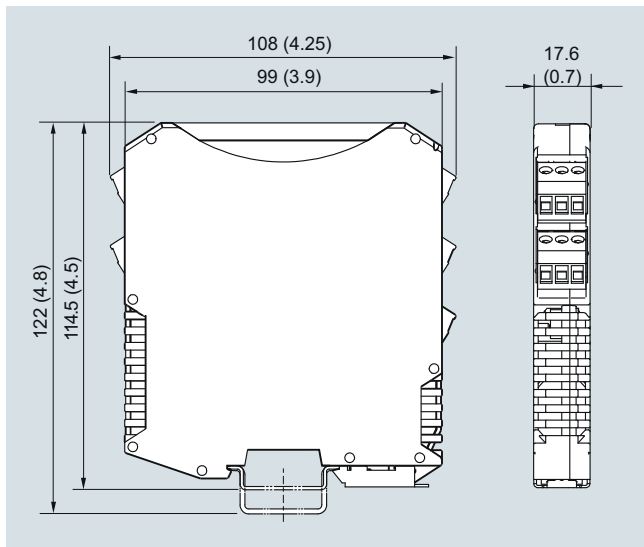
7NG4998-1AA

pac-Bus extension set

With 5 single elements

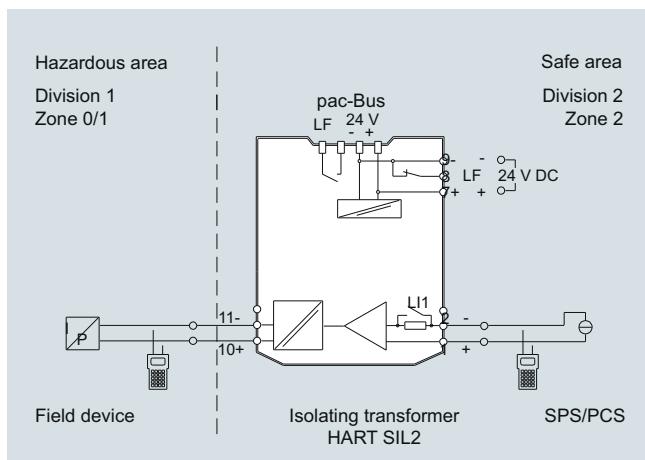
7NG4998-1AB

Dimensional drawings



SITRANS I200 output isolator with HART, dimensions in mm (inch)

Schematics



SITRANS I200 output isolator with HART, connection diagram

Supplementary Components

Displays

SITRANS RD100

Overview



The SITRANS RD100 is a 2-wire loop powered, NEMA 4X enclosed remote digital display for process instrumentation.

Benefits

- Easy setup
- Approved for hazardous locations
- NEMA 4X, IP67 impact-resistant enclosure
- Simple two-step calibration
- Two modes of input allow for easy servicing, with no interruption of loop required

Application

The RD100 is very versatile. It can be installed indoors or outdoors, in hot or cold environments, and in safe or hazardous areas.

It has been approved by FM and CSA as Intrinsically Safe and non-incendive, and operates from -40 to +85 °C (-40 to +185 °F), adding only 1 V to the loop.

Calibration consists of a quick two-step process involving the adjustment of only two non-interacting potentiometers.

- Key Applications: remotely displays process variables in level, flow, pressure, temperature, and weighing applications, in a 4 to 20 mA loop.

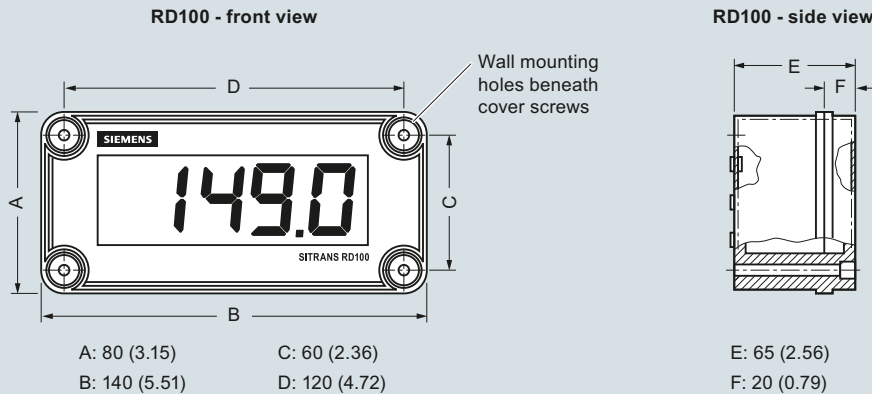
Technical specifications

Mode of operation	
Measuring principle	Analog to digital conversion
Measuring range	4 ... 20 mA
Measuring points	1 instrument only
Accuracy	
± 0.1 % of span ± 1 count	
Rated operating conditions	
Ambient conditions	
• Operating temperature range	-40 ... +85 °C (-40 ... +185 °F)
Design	
Weight	340 g (12 oz)
Material (enclosure)	Impact-resistant glass filled polycarbonate body and clear polycarbonate cover
Degree of protection	NEMA 4X, IP67
Power supply	
External loop power supply	30 V DC max.
Display	
• 1.0 inch (2.54 cm) high LCD	
• Numeric range from -1 000 ... +1 999	
Certificates and approvals	
Non-hazardous	CE
Hazardous	
• Intrinsically Safe	• CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G T4
	• CSA/FM Class I, Zone 0, Group IIC
	• CSA/FM Class I, Div. 2, Groups A, B, C, D
	• CSA/FM Class II and III, Div. 2, Groups F and G
• Non-incendive	
Options	
Mounting	• 2 inch (5.08 cm) pipe mounting kit (zinc plated or stainless steel)
	• Panel mounting kit

Selection and Ordering data	Article No.
SITRANS RD100 A 2-wire loop powered, NEMA 4X enclosed remote digital display for process instrumentation.	7ML5741-
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	A 0 0 - 0
Conduit hole location (½ inch)	
None	1
Bottom	2
Rear	3
Top	4
Approvals	
FM/CSA	A
CE	B

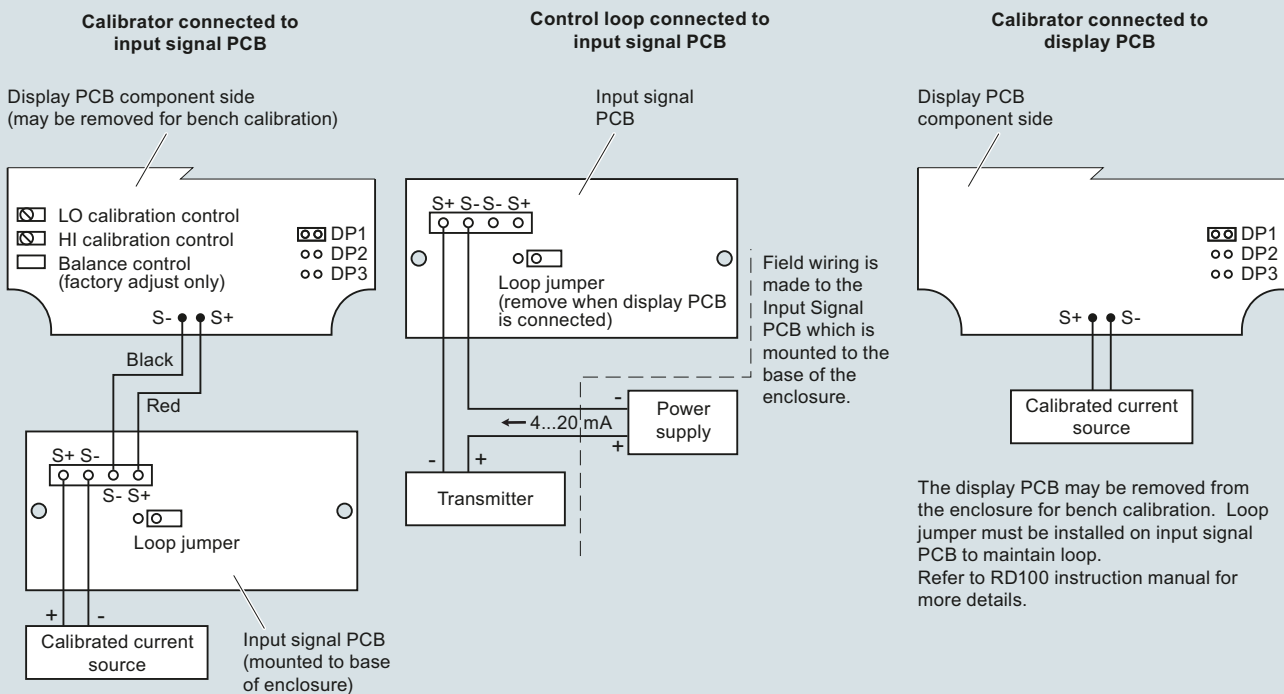
Selection and Ordering data	Article No.
Operating Instructions All literature is available to download for free, in a range of languages, at www.usa.siemens.com/level/documentation	
Accessories	
Panel mount kit	7ML1930-1BN
2 inch (5.08 cm) pipe mounting kit (zinc plated seal)	7ML1930-1BP
2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301)	7ML1930-1BQ

Dimensional drawings



SITRANS RD100, dimensions in mm (inch)

Circuit diagrams



CE version

Figure 1: Calibrator connected to main board with no backlight

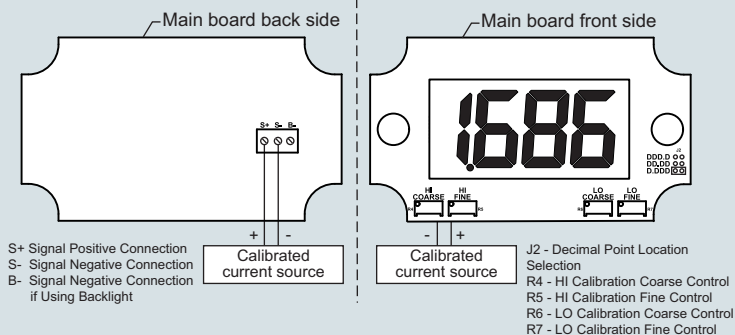
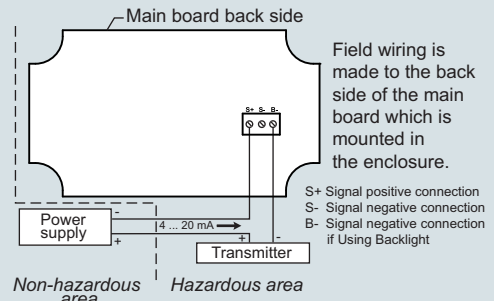


Figure 2: Control loop connected to main board with backlight



SITRANS RD100 connections

Supplementary Components

Displays

SITRANS RD200

Overview



The SITRANS RD200 is a universal input, panel mount remote digital display for process instrumentation.

Benefits

- Easy setup and programming via front panel buttons or remotely using RD software
- Display readable in sunlight
- Universal input: accepts current, voltage, thermocouple, and RTD signals
- Single or dual 24 V DC transmitter power supply
- Serial communication using built in protocol or Modbus RTU
- Two optional relays for alarm indication or process control applications
- Linear or square root function supported
- Meter Copy feature to reduce setup time, cost, and errors
- RD software supports remote configuration, monitoring, and logging for up to 100 displays
- Other features include: 4 to 20 mA analog output option, pump alternation control, and optional NEMA 4 and 4X field enclosures
- 2X option for 30.5 mm (1.2 inch) high, red LED display

Application

The RD200 is a universal remote display for level, flow, pressure, temperature, weighing, and other process instruments.

Data can be remotely collected, logged and presented from as many as 100 displays on your local computer using the free downloadable RD Software.

The display accepts a single input of current, voltage, thermocouple, and RTD. This makes the RD200 an ideal fit for use with most field instruments.

The RD200 can be set up as a standard panel mount, or combined with optional enclosures to allow it to house up to 6 displays.

- Key Applications: tank farms, pump alternation control, local or remote display of level, temperature, flow, pressure and weighing instrument values, PC monitoring, and data logging with RD Software.

Technical specifications

Mode of operation	
Measuring principle	Analog to digital conversion
Measuring points	<ul style="list-style-type: none"> • 1 instrument • Remote monitoring of 100 instruments with PC and RD software
Input	
Measuring range	<ul style="list-style-type: none"> • Current • Voltage • Thermocouple temperature • RTD temperature
4 ... 20 mA, 0 ... 20 mA	<ul style="list-style-type: none"> • 4 ... 20 mA, 0 ... 20 mA • 0 V DC ... 10 V DC, 1 ... 5 V, 0 ... 5 V • Type J: -50 ... +750 °C (-58 ... +1 382 °F) • Type K: -50 ... +1 260 °C (-58 ... +2 300 °F) • Type E: -50 ... +870 °C (-58 ... +1 578 °F) • Type T: -180 ... +371 °C (-292 ... +700 °F) • Type T, 0.1° resolution: -180.0 ... +371 °C (-199.9 ... +700 °F) • 100 Ω RTD: -200 ... +750 °C (-328 ... +1 382 °F)
Output signal	
Output	<ul style="list-style-type: none"> • 4 ... 20 mA (optional) • Modbus RTU
Relays	2 SPDT Form C relays, rated 3 A at 30 V DC or 3 A at 250 V AC, non-inductive, auto-initializing (optional)
Communications	<ul style="list-style-type: none"> • RS 232 with PDC or Modbus RTU • RS 422/485 with PDC or Modbus RTU
Accuracy	
4 ... 20 mA optional output	± 0.1 % FS ± 0.004 mA
Process input	± 0.05 % of span ± 1 count, square root: 10 ... 100 % FS
Thermocouple temperature input	<ul style="list-style-type: none"> • Type J: ± 1 °C (± 2 °F) • Type K: ± 1 °C (± 2 °F) • Type E: ± 1 °C (± 2 °F) • Type T: ± 1 °C (± 2 °F) • Type T, 0.1° resolution: ± 1 °C (± 1.8 °F)
RTD temperature input	• 100 Ω RTD: ± 1 °C (± 1 °F)
Rated operating conditions	
Ambient conditions	
• Storage temperature range	-40 ... +85 °C (-40 ... +185 °F)
• Operating temperature range	-40 ... +65 °C (-40 ... +149 °F)
Design	
Weight	269 g (9.5 oz) (including options)
Material (enclosure)	<ul style="list-style-type: none"> • 1/8 DIN, high impact plastic, UL94V-0, color: gray • Optional plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 enclosures
Degree of protection	Type 4X, NEMA 4X, IP65 (front cover); panel gasket provided
Electrical connection	
mA output signal	2-core copper conductor, twisted, shielded, 0.82 ... 3.30 mm ² (18 ... 12 AWG), Belden 8 760 or equivalent is acceptable
Electrical connection and relay connection	Copper conductor according to local requirements, rated 3 A at 250 V AC

Power supply	
Input voltage option 1	85 ... 265 V AC, 50/60 Hz; 90 ... 265 V DC, 20 W max.
Input voltage option 2	12 ... 36 V DC; 12 ... 24 V AC, 6 W max.
Transmitter power supply	One or two isolated transmitter power supplies (optional)
• Single power supply	One 24 V DC \pm 10 % at 200 mA max.
• Dual power supplies	Two 24 V DC \pm 10 % at 200 mA and 40 mA max.
External loop power supply	35 V DC max.
Output loop resistance	<ul style="list-style-type: none"> • 24 V DC, 10 ... 700 Ω max. • 35 V DC (external), 100 ... 1 200 Ω max.
Displays and controls	
Display	<ul style="list-style-type: none"> • 14 mm (0.56 inch) high LED • 2X option for 30.5 mm (1.2 inch) high, red LED • Numeric range from -1 999 ... +9 999 • Four digits, automatic lead zero blanking • Eight intensity levels
Memory	<ul style="list-style-type: none"> • Non-volatile • Stores settings for minimum of 10 years if power is lost
Programming	<ul style="list-style-type: none"> • Primary: front panel • Secondary: meter copy or PC with SITRANS RD software
Certificates and approvals	
CE, UL, cUL	
Options	
Enclosures	Plastic, steel, and stainless steel (Type 304, EN 1.4301) NEMA 4 and 4X enclosures
Mounting	<ul style="list-style-type: none"> • 2 inch (5.08 cm) pipe mounting kit (zinc plated seal) • 2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301)

Supplementary Components

Displays

SITRANS RD200

Selection and Ordering data

SITRANS RD200

A universal input, panel mount remote digital display for process instrumentation.

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Input voltage

85 ... 265 V AC, 50/60 Hz; 90 ... 265 V DC, 20 W max.

12 ... 36 V DC; 12 ... 24 V AC, 6 W max.

Transmitter supply

None

Single 24 V DC transmitter supply¹⁾

Dual 24 V DC transmitter supply¹⁾²⁾

Output

None

2 relays

4 ... 20 mA output

Communication

Modbus RTU

Approvals

CE, UL, cUL

Display Size

Standard

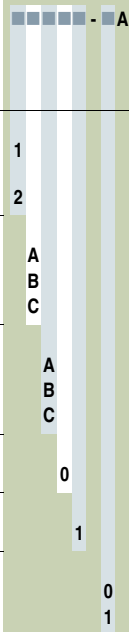
2X option for 30.5 mm (1.2 inch) high, red LED

¹⁾ Available with input voltage option 1 only

²⁾ Available with output option C only

Article No.

7ML5740-



Selection and Ordering data

Article No

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Accessories

SITRANS RD200 copy cable 2.1 m (7 ft)

7ML1930-1BR

SITRANS RD200 RS 232 serial adapter (copy cable included)

7ML1930-1BS

SITRANS RD200 RS 422/485 serial adapter (copy cable included)

7ML1930-1BT

RS 232 to RS 422/485 isolated converter

7ML1930-1BU

RS 232 to RS 422/485 non-isolated converter

7ML1930-1BV

SITRANS RD200 RS 232 and RS 485 isolated multi-input adapter board

7ML1930-1BW

USB to RS 422/485 isolated converter

7ML1930-1BX

USB to RS 422/485 non-isolated converter

7ML1930-1BY

RD200 USB serial adapter

7ML1930-6AH

USB to RS 232 converter

7ML1930-6AK

RD Software CD for 1 ... 100 displays

7ML1930-1CC

Low cost polycarbonate plastic enclosure for 1 display

7ML1930-1CF

2 inch (5.08 cm) pipe mounting kit (zinc plated seal) only available with 7ML1930-1CF

7ML1930-1BP

2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301) only available with 7ML1930-1CF

7ML1930-1BQ

Thermoplastic enclosure

For use with 1 display

7ML1930-1CG

For use with 2 displays

7ML1930-1CH

For use with 3 displays

7ML1930-1CJ

For use with 4 displays

7ML1930-1CK

For use with 5 displays

7ML1930-1CL

For use with 6 displays

7ML1930-1CM

Stainless steel enclosure (Type 304, EN 1.4301)

For use with 1 display

7ML1930-1CN

For use with 2 displays

7ML1930-1CP

For use with 3 displays

7ML1930-1CQ

For use with 4 displays

7ML1930-1CR

For use with 5 displays

7ML1930-1CS

For use with 6 displays

7ML1930-1CT

Steel enclosure

For use with 1 display

7ML1930-1CU

For use with 2 displays

7ML1930-1CV

For use with 3 displays

7ML1930-1CW

For use with 4 displays

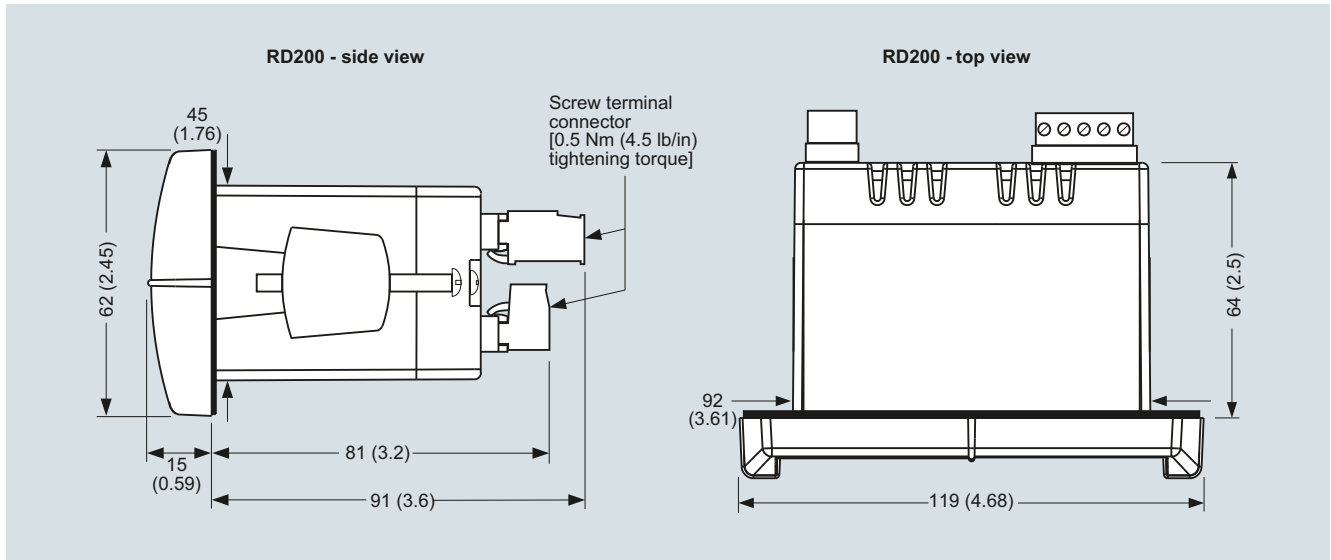
7ML1930-1CX

For use with 5 displays

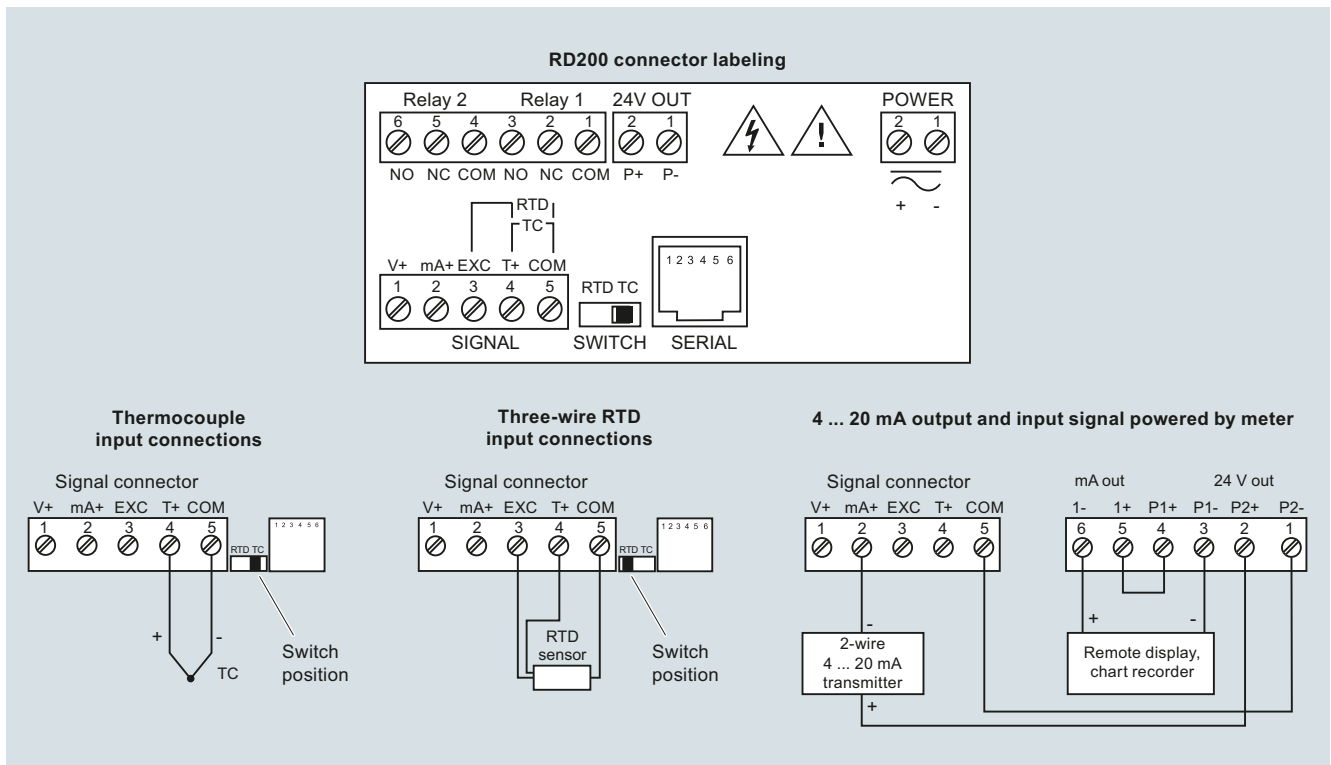
7ML1930-1CY

For use with 6 displays

7ML1930-1DA

Dimensional drawings


SITRANS RD200, dimensions in mm (inch)

Circuit diagrams


SITRANS RD200 connections

Supplementary Components

Displays

SITRANS RD300

Overview



The SITRANS RD300 is a panel mount remote digital display for process instrumentation and acts as a multi-purpose, easy to use, rate/totalizer ideal for flow rate, total, and control applications.

Benefits

- Easy setup and programming via front panel buttons or using free RD software available via USB drive
- Display readable in sunlight
- Input: accepts current and voltage
- Single or dual 24 V DC transmitter power supply
- Serial communication using built in protocol or Modbus RTU
- Supports up to 8 relays and 8 digital I/O for process control and alarming
- 32-Point linearization, square root or exponential linearization
- Multi-pump alternation control
- Supports total, grand total or non-resettable grand total
- 9-digit totalizer with total overflow feature
- Large dual-line, 6-digit display
- Configure, monitor, and datalog from a PC
- Dual-input option with math functions: addition, difference, average, multiplication, division, minimum, maximum, weighted average, ratio, concentration

Application

The RD300 is a remote display for level, flow, pressure, weighing, and other process instruments. This display also acts as a multi-purpose, easy to use rate/totalizer ideal for flow rate, total, and control applications.

Data can be remotely collected, logged and presented on your local computer using the free RD software available via USB drive.

The display accepts a single or dual input of current and voltage. This makes the RD300 an ideal fit for use with most field instruments.

The RD300 can be set up as a standard panel mount, or combined with optional enclosures to allow it to house up to 6 displays.

- Key Applications: tank farms, pump alternation control, local or remote display of level, flow, pressure and weighing instrument values, PC monitoring and data logging with RD Software.

Technical specifications

Mode of operation		Electrical connection	
Measuring principle	Analog to digital conversion	mA output signal	2-core copper conductor, twisted, shielded, 0.82 ... 3.30 mm ² (18 ... 12 AWG), Belden 8 760 or equivalent is acceptable
Measuring points	1 or 2 instruments	Electrical connection and relay connection	Copper conductor according to local requirements, rated 3A at 250 V AC
Input		Power supply	
Measuring range		Input voltage option	85 ... 265 V AC, 50/60 Hz; 90 ... 265 V DC, 20 W max. or jumper selectable 12/24 V DC \pm 10 %, 15 W max.
• Current	4 ... 20 mA, 0 ... 20 mA	Transmitter power supply	Terminals P+ & P-: 24 V DC \pm 10 %, 12/24 V DC powered models selectable for 24, 10, or 5 V DC supply (internal jumper J4), 85 ... 265 V AC models rated at 200 mA max, 12/24 V DC powered models rated at 100 mA max, at 50 mA max for 5 or 10 V DC supply.
• Voltage	0 V DC ... +10 V DC, 1 ... 5 V, 0 ... 5 V	External loop power supply	35 V DC max.
Output signal		Output loop resistance	• 24 V DC, 10 ... 700 Ω max. • 35 V DC (external), 100 ... 1 200 Ω max.
Output	• 4 ... 20 mA (optional) • Modbus RTU	Displays and controls	
Relays	2 or 4 SPDT (Form C) internal and/or 4 SPST (Form A) external; rated 3 A at 30 V DC and 125/250 V AC resistive load; 1/14 HP (50 W) at 125/250 V AC for inductive loads (optional)	Main display	0.6 inch (15 mm) high, red LEDs
Communications	• RS 232 with Modbus RTU • RS 422/485 with Modbus RTU • USB configuration and monitoring port	Second display	0.46 inch (12 mm) high, red LEDs, 6-digits: each (-99 999 ... 999 999)
Accuracy		Memory	• Non-volatile • Stores settings for minimum of 10 years if power is lost
4 ... 20 mA optional output	\pm 0.1 % FS \pm 0.004 mA	Programming	• Primary: front panel • Secondary: Meter Copy or PC with SITRANS RD Software
Process input	\pm 0.05 % of span \pm 1 count, square root: 10 ... 100 % FS	Certificates and approvals	
Rated operating conditions		CE, UL, cUL	
Ambient conditions		Options	
• Storage temperature range	-40 ... +85 °C (-40 ... +185 °F)	Enclosures	Plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 and 4X enclosures
• Operating temperature range	-40 ... +65 °C (-40 ... +149 °F)		
Design			
Weight	269 g (9.5 oz) (including options)		
Material (enclosure)	• 1/8 DIN, high impact plastic, UL94V-0, color: gray • Optional plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 enclosures		
Degree of protection	Type 4X, NEMA 4X, IP65 (front cover); panel gasket provided		

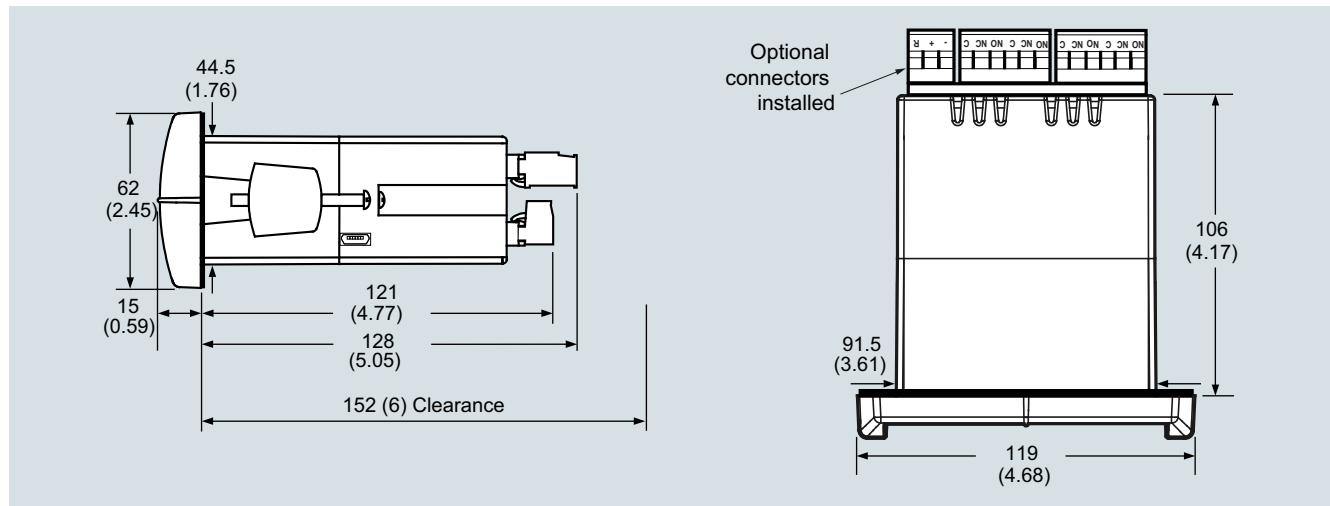
Supplementary Components

Displays

SITRANS RD300

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
SITRANS RD300 Two input multi-line remote display compatible with Process Instrumentation instruments ➔ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5744- - 0 A	Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Input voltage 85 ... 265 V AC, 50/60 Hz; 90 ... 265 V DC, 20 W max. 12 ... 36 V DC; 12 ... 24 V AC, 6 W max.	1 2	Accessories DIN-Rail Mounting Kit 4 Relays Expansion Module 4 Digital I/O Module Dual output 4 ... 20 mA expansion module for dual input meter Meter Copy Cable RS 232 Serial Adapter RS 422/485 Serial Adapter RD300 USB Serial Adapter USB to RS 232 Converter Snubber	7ML1930-6AB 7ML1930-6AC 7ML1930-6AD 7ML1930-6AP 7ML1930-6AE 7ML1930-6AF 7ML1930-6AG 7ML1930-6AJ 7ML1930-6AK 7ML1930-6AL
Output None 2 Relays 4 Relays 4 ... 20 mA output 2 Relays and 4 ... 20 mA output 4 Relays and 4 ... 20 mA output	A B C D E F	Plastic enclosure For 1 meter For 2 meters For 4 meters For 5 meters For 6 meters	7ML1930-6AM 7ML1930-6AN 7ML1930-1CK 7ML1930-1CL 7ML1930-1CM
Type Single input process and flow rate/totalizer Mtr Dual input process Mtr	A B		
Display Standard SunBright	0 1		
Approvals UL, C-UL and CE	0		

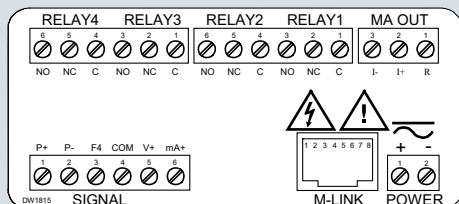
Dimensional drawings



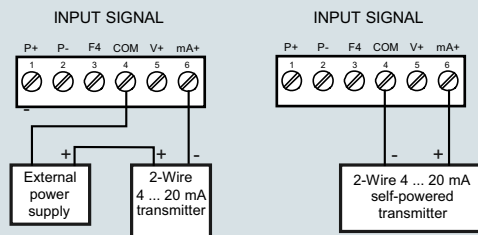
SITRANS RD300, dimensions in mm (inch)

Circuit diagrams

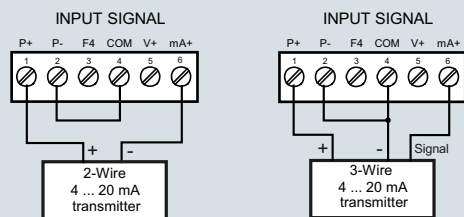
Connector labeling for fully loaded single input meter



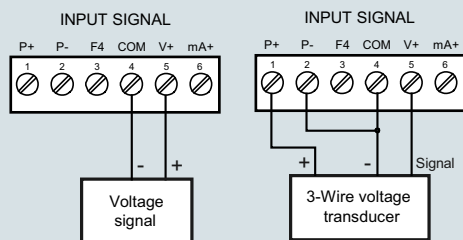
Transmitter powered by external supply or self-powered



Transmitter powered by internal supply



Voltage Input Connections



SITRANS RD300 connections

Supplementary Components

Remote Data Manager

SITRANS RD500

Overview



The SITRANS RD500 is a remote data manager providing remote monitoring through integrated web access, alarm event handling, and data capture for instrumentation and other devices.

Benefits

- RD500 supports report and alarm events via email, SMS, and FTP transfer
- Web provides worldwide access to instrument data and RD500 configuration and setup
- Simple configuration using a standard web browser, no programming or additional software required.
- Offers scalability with optional I/O modules for current (4 to 20 mA), voltage (0 to 10 V), thermocouple (TC), resistance temperature detector (RTD), and digital input, output and counter
- 10 base-TI 100 Base-TX Ethernet and support for GSM, GPRS, 3G, and PSTN provide flexible remote communications options
- Supports up to 128 devices with the flexible I/O modules and supports addressing for Modbus serial devices via RS 232 and RS 485 serial ports
- Integrated FTP server and client support FTP data synchronization to central servers
- Compact flash slot supports up to 2 gigabytes of expandable memory for data capture and storage, 1 gigabyte industrial compact flash card included
- Log files formats are CSV (comma separated values) for data files and HTML for report files
- Supports Modbus TCP via Ethernet and GPRS for easy integration into control systems
- Optional cellular modem offers VPN support

Application

The RD500 is an easy-to-use remote data monitoring solution, using a web-based application and hardware modules. The unique modular approach allows a variety of process signals to be monitored, while the serial ports allow data to be collected from Modbus RTU devices and Modbus TCP via EtherNet.

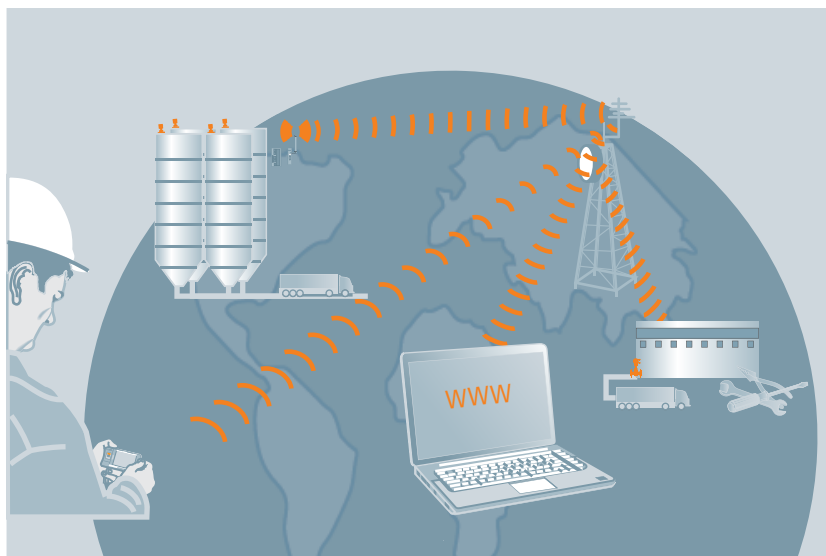
The RD500 comprises a master communications module, and up to 16 slave modules. Various module types are available, allowing up to a maximum of 128 conventional inputs and outputs. The RD500's serial ports can support addressing for Modbus RTU slave devices including field instruments.

The RD500's built-in web server, FTP, and email client allows the process to be monitored remotely. Alarm notifications are communicated through email and SMS text messages to one or more recipients to ensure that appropriate actions are taken by personnel.

The RD500 supports modems, providing flexibility for applications in which cellular or landline connectivity is desired.

The RD500 is configured via a web-based interface - a standard browser is all the software you need to configure your system.

- Key Applications: remote monitoring of inventory, process, and maintenance applications, with web access to field instrumentation



With SITRANS RD500, monitor inventory levels, process, environmental, and remote maintenance applications, and get web access to most types of field instrumentation, including flow, level, pressure, temperature measurement, and weighing.

Technical specifications

Mode of operation	
Measuring principle	Remote data monitor
Measuring points	<ul style="list-style-type: none"> Up to 128 standard inputs (conventional IO, see optional IO modules) Addressing for Modbus devices (Modbus RTU and Modbus TCP)
Input	See SITRANS RD500 module specifications table
Output	See SITRANS RD500 module specifications table
Accuracy	See SITRANS RD500 module specifications table
Rated operating conditions	
Storage temperature range	-30 ... +70 °C (-22 ... +158 °F)
Operating temperature	0 ... 50 °C (32 ... 122 °F)
Operating and storage humidity	80 % max relative humidity, non-condensing, from 0 ... 50 °C (32 ... 122 °F)
Design	
Material (enclosure)	High impact plastic and stainless steel
Installation category	I
Pollution degree	2
Weight	456.4 g (15.1 oz)
Mounting	Snaps onto standard DIN style top hat (T) profile mounting rails according to EN 50022 – 35 x 7.5 and – 35 x 15
Power	24 V DC ± 10 % 400 mA min. (1 module) 3.5 amps max. (16 modules) Must use Class 2 or SELV-rated power supply
Display	
Status LEDs	<ul style="list-style-type: none"> STS - status LED indicates condition of master TX/RX - transmit/receive LEDs show serial activity Ethernet - link and activity LEDs CF - CompactFlash LED indicates card status and read/write activity
Memory	
On-board user memory	4 MB of non-volatile Flash memory
On-board SDRAM	2 MB
Memory card	CompactFlash Type II slot for Type I and Type II cards; 1 GB (optional 2 GB)
Certificates and approvals	
Safety	<ul style="list-style-type: none"> UL listed to U.S. and Canadian safety standards for use in Class I, II, and III, Division 1 and 2 hazardous locations CE, RCM
Communication	
USB/PG port	Adheres to USB specifications 1.1. Device only using Type B connection.
Serial ports	Format and baud rates for each port are individually software programmable up to 115, 200 baud
RS232/PG port	RS 232 port via RJ12
Comms ports	RS 422/485 port via RJ45 and RS 232 port via RJ12
Ethernet port	10 BASE-T/100 BASE-TX; RJ45 jack is wired as a NIC (Network Interface Card)

Supplementary Components

Remote Data Manager

SITRANS RD500

SITRANS RD500 Module Specifications

	8 inputs, 6 solid state outputs	8 inputs, 6 relay outputs	8 channel, 4 ... 20 mA	8 channel ± 10 V	6 channel, RTD	8 channel thermocouple module
Order number	7ML1930-1ES	7ML1930-1ER	7ML1930-1EP	7ML1930-1EQ	7ML1930-1ET	7ML1930-1EU
Application	8 inputs, 6 outputs used to monitor contact or sensor inputs	8 inputs, 6 outputs used to monitor contact or sensor inputs	16 bit analog input module provides high density signal measurement for data monitoring applications and accepts 0/4 ... 20 mA process signals	16 bit analog input module provides high density signal measurement for data monitoring applications and accepts ± 10 V process signals	16 bit analog input module provides high-density signal measurement for data acquisition applications and accepts various RTD inputs	16 bit thermocouple input module provides high density signal measurement for data acquisition applications and accepts wide range of thermocouple types
Accuracy	Not applicable	Not applicable	± 0.1 % of span	± 0.1 % of span	$\pm (0.2$ % of span, 1 °C) $0 \dots 50$ °C ($32 \dots 122$ °F); $\pm (0.1$ % of span, 1 °C) $18 \dots 28$ °C ($64 \dots 82$ °F); includes NIST conformity, A/D conversion errors, temperature coefficient and linearization conformity at 23 °C after 20 minutes warm-up	$\pm (0.3$ % of span, 1 °C); includes NIST conformity, cold junction effect, A/D conversion errors, temperature coefficient and linearization conformity at 23 °C after 20 minute warm-up
Mounting	Snaps onto standard DIN style top hat (T) profile mounting rails according to EN 50022 – 35 x 7.5 and - 35 x 15					
Inputs	Dip switch selectable for sink or source	<ul style="list-style-type: none"> Dip switch selectable for sink or source max. voltage: 30 V DC, reverse polarity protected Off voltage: < 1.2 V On voltage: > 3.8 V Input frequency: <ul style="list-style-type: none"> - Filter switch on: 50 Hz - Filter switch off: 300 Hz 	<ul style="list-style-type: none"> 8 single-ended ranges: $0 \dots 20$ mA or $4 \dots 20$ mA resolution: full 16-bit Sample time: $50 \dots 400$ ms depending on number of enabled inputs 	<ul style="list-style-type: none"> 8 single-ended ranges: $0 \dots 10$ V DC or ± 10 V DC resolution: full 16-bit Sample time: $50 \dots 400$ ms depending on number of enabled inputs 	<ul style="list-style-type: none"> 6 single-ended resolution: full 16-bit Sample time: $67 \dots 400$ ms depending on number of enabled inputs 	<ul style="list-style-type: none"> 8 single-ended resolution: full 16-bit Sample time: $50 \dots 400$ ms depending on number of enabled inputs
Outputs	Solid state output, switched DC, contact rating 1 A DC max.	Form A, NO pairs share common terminals: 1&2, 3&4, 5&6 Current rating by pair: 3 A at 30 V DC/125 V AC resistive 1/10 HP at 125 V AC	Not applicable	Not applicable	Not applicable	Not applicable

Note: in order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept. For more information about industrial security, <http://www.siemens.com/industrialsecurity>

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
SITRANS RD500 The SITRANS RD500 is a remote data manager providing integrated web access, alarm event handling and data capture for instrumentation. Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5750- A 0 0 - 0	Input configuration modules Note: one RD500 supports 16 input modules maximum RD500 8 channel 0 (4) ... 20 mA input module RD500 8 channel \pm 10 V input module RD500 8 digital inputs/pulse counters, 6 relay outputs module RD500 8 digital inputs/pulse counters, 6 solid state outputs module ¹⁾ RD500 6 channel input, RTD module RD500 8 channel thermocouple module	7ML1930-1EP 7ML1930-1EQ 7ML1930-1ER 7ML1930-1ES 7ML1930-1ET 7ML1930-1EU
Communications Connection Ethernet ¹⁾	1	Optional equipment External cellular modem Internal modem card with antenna Industrial CompactFlash card, 2 GB Industrial CompactFlash card, 1 GB RJ11 serial to terminal block RS 232 RJ45 serial to terminal block RS 485 Modem antenna RD500 Spare Module base RD500 Spare End terminator Ethernet Cat 5e Red X/O cable for configuration, 1.52 m (5 ft) USB cable type A/B Remote mount external antenna 17 ft (5 m)	7ML1930-1GJ 7ML1930-1EY 7ML1930-1FB 7ML1930-1FC 7ML1930-1FD 7ML1930-1FE 7ML1930-1FF 7ML1930-1FG 7ML1930-1FH 7ML1930-1FM 7ML1930-1FN 7ML1930-1FY
Digital Communications to Instruments RS 485 Modbus RTU and Modbus TCP	A	Operating Instructions RD500 8 channel 0 (4) ... 20 mA input module manual, English Note: Operating Instructions should be ordered as a separate line item. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	7ML19985MB01
		Accessories SITRANS RD100, loop powered display - see page 7/10 SITRANS RD200, universal input display with Modbus conversion - see page 7/12 SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see page 7/16	7ML5741-... 7ML5740-... 7ML5744-...

¹⁾ Configuration limited to 16 modules.

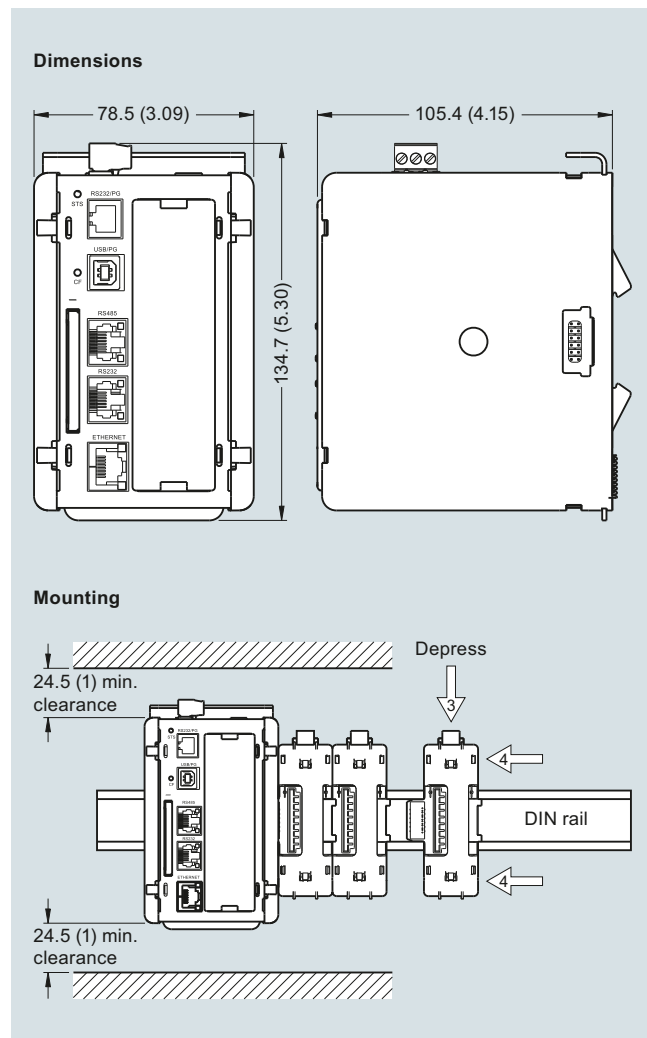
¹⁾ Configuration limited to 16 modules

Supplementary Components

Remote Data Manager

SITRANS RD500

Dimensional drawings



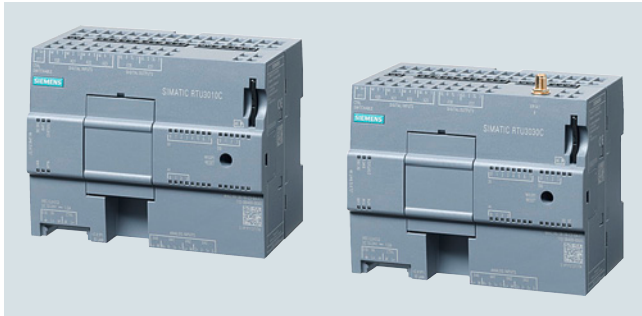
SITRANS RD500, dimensions in mm (inch)

Supplementary Components

Remote Terminal Unit

SIMATIC RTU3000C

Overview



The devices of the RTU3000C series are compact telecontrol stations (RTU: Remote Terminal Unit) for applications with their own power supply. They are particularly well suited for monitoring and control of remote stations that are not connected to a power supply network and can collect data of connected sensors with time stamp independently, preprocess the data, and transfer it to a control center. The RTU3000C is supplied with power by a battery, an accumulator or a solar panel or by a 12 ... 24 V DC power supply unit.

The devices of the RTU3000C series are characterized by the following properties:

- Worldwide data exchange between a remote measuring point and a control center via public or private networks (WAN), e.g. mobile radio networks, Internet.
- Communication with a control center (telecontrol center) with the help of the DNP3, IEC 60870-5-104 or SINAUT ST7 telecontrol protocols
- Connection to a control center with TeleControl Server Basic
- Acquisition of process signals, alarms, count pulses, measured values or output of switching commands by means of integrated inputs as well as digital inputs and outputs
- Pre-processing of the acquired signals by the RTU with 38 different function blocks
- FTP client functionality for transmitting data to an FTP server
- Time synchronization
 - on the basis of NTP (**N**etwork **T**ime **P**rotocol)
 - by means of the partner in the control center
- Automatic alarm transmission per email or text message
- Use as data logger by saving the process values to SD card
- Data buffering in the substations in the event of connection failures
- LED signaling for fast diagnostics
- Compact industrial enclosure in S7-1200 design for mounting on a standard DIN rail
- Use in harsh environment thanks to extended temperature range from -40 to +70 °C and IP68 protection thanks to optional protective enclosure
- Fast commissioning thanks to easy configuration using the integrated web server

Additionally for RTU3030C:

- Integrated UMTS modem for global wireless data exchange between a remote measuring point and a control center based on the mobile radio standard UMTS (**U**niversal **M**obile **T**elecommunications**S**ystem) with data transmission rates of up to 42 Mbps in the downlink (HSDPA) and 5.76 Mbps in the uplink (HSUPA)
- UMTS operation with fixed or dynamic IP addresses, depending on telecommunication contract
- Time synchronization over the mobile radio network:
- Wake-up of station from sleep mode by means of text message or call

Product versions

Different product versions are offered for the various applications:

- **SIMATIC RTU3010C**
Compact RTU for variable power supply using batteries, rechargeable batteries, solar or 10.8 V DC to 28.8 V DC for connection to external industry routers; connection to control center via TeleControl Basic, DNP3, IEC60870-5-104 or SINAUT ST7 protocols, on-board I/O (8 DI, 4 DQ, 4 AI), configuration and diagnostics per web interface
- **SIMATIC RTU3030C**
Compact RTU for variable power supply using batteries, rechargeable batteries, solar or 10.8 V DC to 28.8 V DC with integrated UMTS modem; connection to control center via TeleControl Basic, DNP3, IEC60870-5-104 and SINAUT ST7 protocols, on-board I/O (8 DI, 4 DQ, 4 AI), configuration and diagnostics per web interface; note country-specific approvals!

In conjunction with the "TeleControl Server Basic" control room software, the RTU3000C forms a telecontrol system with additional properties:

- Connection of up to 5 000 telecontrol stations to the control center via OPC UA
- Central status monitoring of the substations
- No special provider services required for fixed IP addresses
- Wireless teleservice access to the substations
- Wake-up of substations by calling or text message

Benefits

- **Flexible location of use**
A flexible power supply concept allows for use of the RTU3000C at different measuring points in a globally distributed network, independent of an existing power supply network.
- **Rugged hardware**
The rugged hardware enables reliable operation even in tough environments with increased temperature range (-40 °C to +70 °C).
- **Flexible connection to control centers**
Thanks to reloadable telecontrol protocols, different applications and connection options to different control centers are supported in one device.
- **Fast and flexible data communication**
A time-driven and event-driven communication ensures that the operating personnel is informed immediately and reliably about alarms, statuses and values in the process.
- **Easy and cost-efficient engineering**
The integrated web server enables easy configuration by means of the standard web browser without additional engineering tool.
- **Fully automatic time stamp**
To enable subsequent and correct archiving of process data in the control system, all data frames are given a time stamp at their place of origin.

• Automatic buffering of process values

The data is buffered in the substations to prevent the loss of data in case of connection failures.

• Secure data transmission

Use of the VPN technology OpenVPN (RTU3030C only) and encrypted emails ensures secure data transmission. For the RTU3010C, an industrial router that can be controlled via the RTU, e.g. SCALANCE M, must be used for encryption by means of VPN connections.

The RTUs also support secure HTTPS access to the web server via the local Ethernet interface and remotely, e.g. via mobile radio. In addition, the FTP file transfer can also be carried out with encryption.

• Time is not lost in case of a power outage

A buffered real time clock ensures that the correct time is available even after a power outage.

• Savings on travel and maintenance

Thanks to web-based management, configuring, diagnostics, control and monitoring can easily be performed remotely.

Application

The telecontrol stations of the RTU3000C family can be used as a substation (Remote Terminal Unit) in telecontrol applications. Typical applications include the acquisition of measured values in plants that are spread over large geographical areas (e.g. level monitoring of water tanks in the water/wastewater industry).

- Data exchange and centralized data monitoring for automation systems spread over large geographical areas
- Connection of difficult-to-access external stations without network infrastructure
- Connection of measuring points at locations without power supply infrastructure

These applications can be found in the most diverse industries:

- Water/wastewater treatment plants
 - Detection of leaks or water loss
 - Monitoring of pumping stations, water towers/reservoirs
 - Acquisition and monitoring of level / pressure / flow / temperature
 - Flood protection
- Inventory management – Monitoring of levels in tanks and silos
- Agriculture monitoring – Monitoring of irrigation systems or greenhouses
- Wind power – Wind measurement for dimensioning of wind turbines

Design

The SIMATIC RTU3000C is a compact module in SIMATIC S7-1200 format:

- Rugged, compact plastic enclosure for the temperature range -40 °C to +70 °C
- Easily accessible connection and diagnostics elements
- Easy mounting on a standard DIN rail
- Four plug-in screw terminals for eight digital inputs (pushbutton/switch/relay contacts) of which the first two inputs can be configured as counter inputs.
- Four plug-in screw terminals for four analog inputs: Current / voltage (0/4...20 mA, 0...10 V, 0...5 V) or temperature measurement (Pt1000)
- Two plug-in screw terminals for four digital outputs designed as relay contacts
- The close-loop (12 V or 24 V can be selected) and switchable controller outputs X10/X11 can be used for the supply of sensors and actuators
- 5-pin, plug-in terminal strip for connection of an 12 ... 24 V DC external supply voltage; connection protected against polarity reversal
- Connection socket for battery module (up to six battery modules can be connected)
- RJ45 socket for connection to Industrial Ethernet at 10/100 Mbps
- Pushbutton for the functions wake-up, shutdown, warm restart or reset to factory settings
- Slot for an SD card (Siemens SMC, SD or SDHC)
- Installed temperature sensor for monitoring of temperature inside enclosure

Additionally for RTU3030C:

- SMA antenna connection for GSM/GPRS/UMTS antenna
- Slot for a mini SIM card

The telecontrol stations of the RTU3000C family can be used in stand-alone operation. The power supply can take place in independent operation by means of battery / accumulator / solar panel. The optional batteries are connected directly on the left side of the device without additional wiring. The power can also be supplied by a 5-pin terminal strip on the bottom of the module, even in combination with battery modules. The SD card tray is located on the front of the module. Removable screw terminals make for quick module replacement because the connected sensors must not be wired again.

Supplementary Components

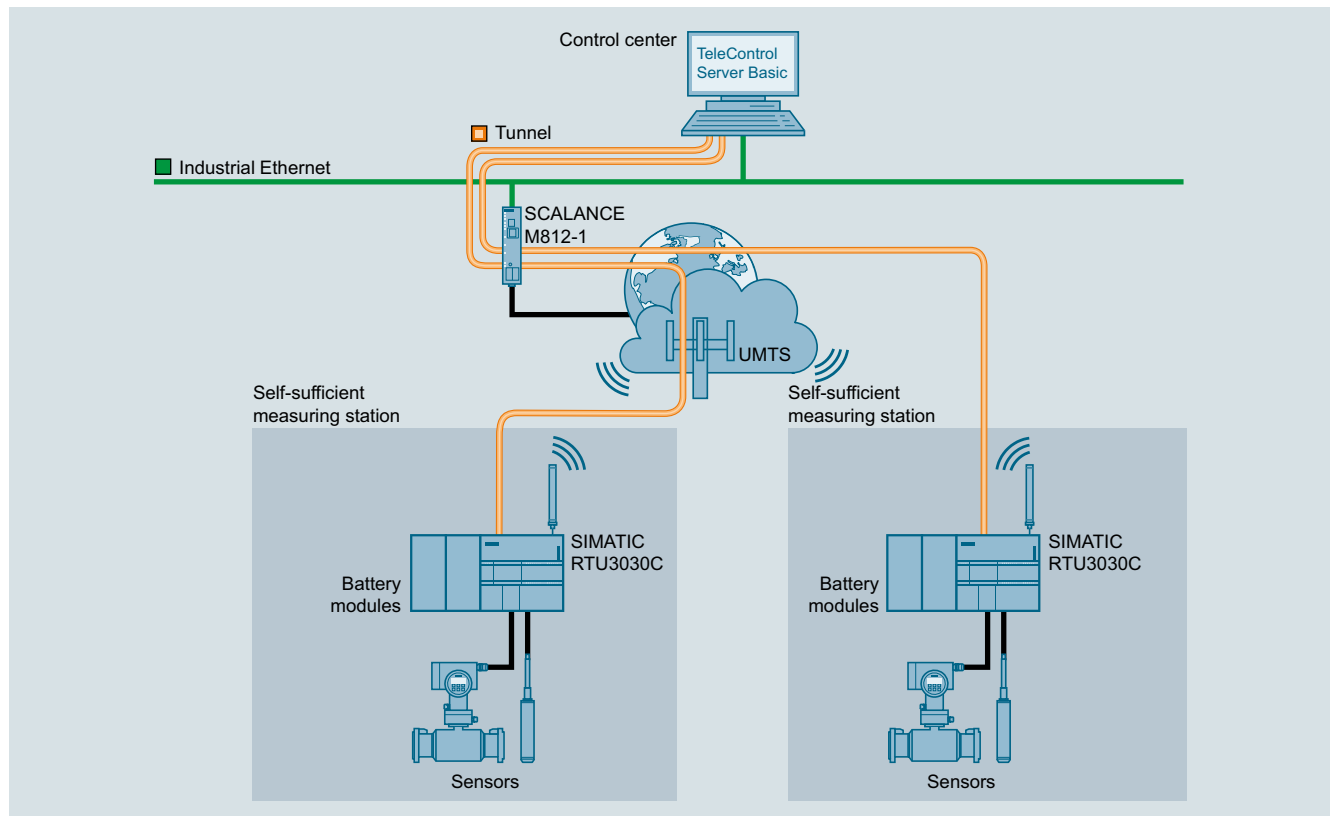
Remote Terminal Unit

SIMATIC RTU3000C

Function

The devices of the RTU3000C family are compact telecontrol stations. They enable connection of remote measuring points to TeleControl Server Basic or another control center and monitoring of these measuring points. To ensure autonomous operation the devices can also switch between four different operating modes:

- **Sleep mode** All inputs and communication functions are turned off so that energy consumption is minimal. Outputs can retain their last value.
- **Update mode** Used to query the inputs and outputs. The query cycle can be configured individually.
- **Communication mode** Mobile wireless connection or connection via LAN interface and external router and communication to the central office are active.
- **Service mode**
Maintenance work can take place without loss of data.



Connection of the SIMATIC RTU3030C to TeleControl Server Basic

Energy-independent mode

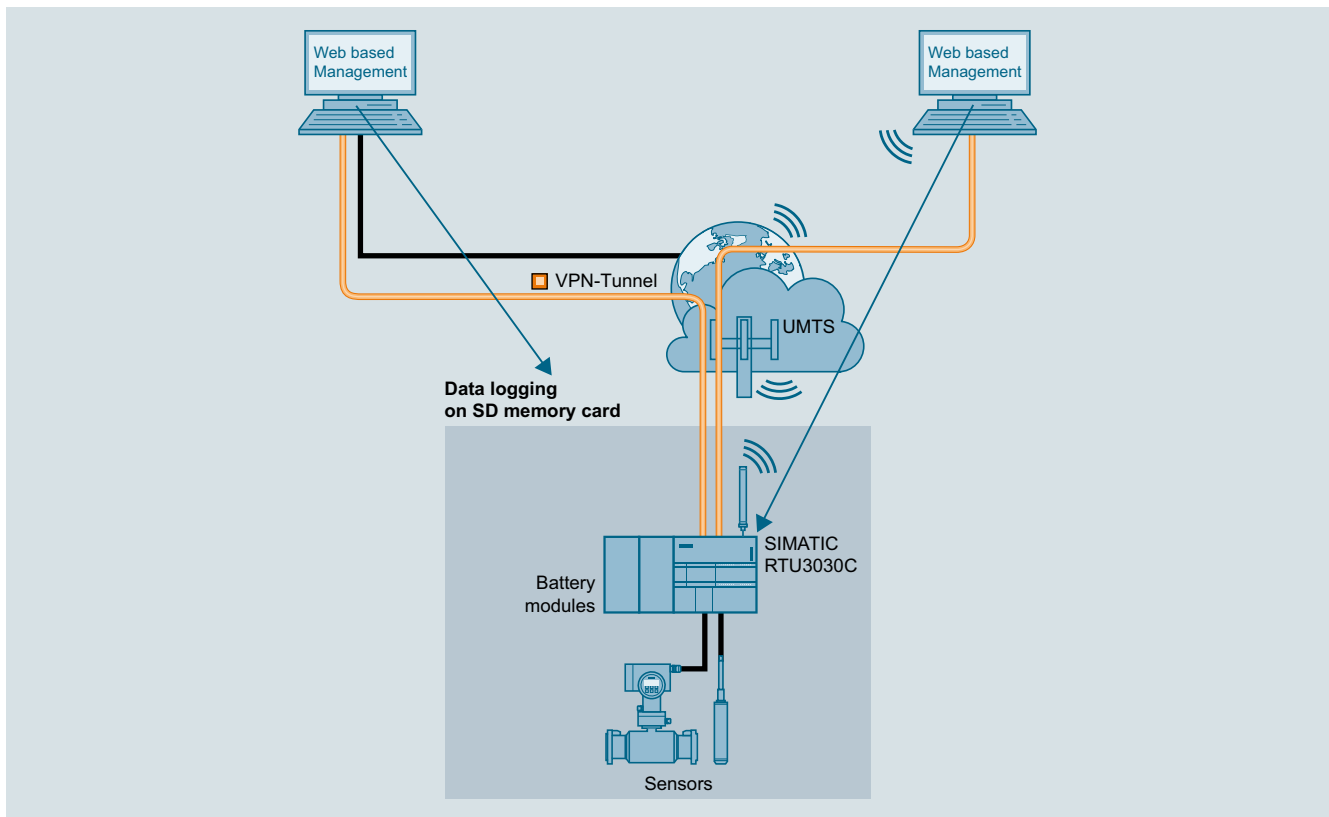
The RTU3000C stations can be operated in energy saving mode. Depending on the communication requirements and the connected type of power supply (e.g. battery, solar accumulator), independent operation can thus be guaranteed for many years to come.

Data backup

Data losses are prevented by the data buffering mechanisms integrated in the product. In the event of a connection failure, time-stamped frames are buffered in the device. When the connection returns, the buffered values are automatically transferred to the control center in the right order.

Data logging

The RTU3000C stations support the backup of process data on SD card. The retentively saved data can be sent cyclically by email and/or FTP or, if necessary, be downloaded directly using web-based management (WBM).



Data logging on SD card

Data point configuration

For data point configuration, the RTUs support a series of data point types: Digital input, digital output, analog input, counter input. The data points can be configured with little effort using the web pages of the RTU3000C stations. A cyclic and/or event-controller transfer of measured values, setpoints or alarms can thus be implemented in only a few operations.

Data preprocessing

Ready-to-use program blocks enable data preprocessing directly in the RTU. The process data can be linked by means of process blocks for basic control jobs. Use of analog and digital bit memories enables buffering of calculation results.

38 different types are supported in the following groups:

- Blocks for logical functions (e.g. AND, OR)
- Blocks for time functions (e.g. ON and OFF delay, astronomical clock)
- Blocks for analog value functions (e.g. threshold value monitoring)
- Counter blocks
- Blocks for messages (text messages, email)
- Block for FTP file transfer
- Relay blocks (latching relay, pulse relay)
- Blocks for silo volume calculation
- Block for rectangular weir overflow calculation

Time synchronization

The RTUs support time synchronization and therefore ensure that historical data is given the correct time stamp. In addition to using the NTP protocol, you can synchronize the time via the telecontrol center or, in the case of RTU3030C, via the mobile wireless provider.

Alarms sent by email or text message

For timely communication of station statuses to service and maintenance personnel, alarm emails or, in the case of RTU3030C, alarm text messages can be configured. When previously defined events (such as threshold violation) occur, application-specific information is sent automatically by email or SMS (directly or via the connected router).

Telecontrol communication using standard protocols

For communication with the control center, the RTUs support the DNP3, IEC 60870-5-104 and SINAUT ST7 telecontrol protocols. The RTUs act as a DNP3 station or as an IEC slave or, in the case of SINAUT ST7, as a station connected to an ST7 node station, e.g. TIM 1531 IRC or ST7 control center. The RTUs can also be connected to the TeleControl Server Basic (TCSB). TCSB enables a connection to any control center software, e.g. WinCC OA over OPC UA.

Remote maintenance

The RTU3000C stations provide remote maintenance access via WBM for access from the control center. The RTU3030C can be woken from sleep mode via text message or a phone call. When using the "TeleControl Basic" communication protocol, the wake-up text message can be generated in the CMT of TCSB. Alternatively, a wake-up test message can be initiated when SINEMA Remote Connect (V1.3 or higher) is used.

Security mechanisms

Access to the RTU3000C stations requires an authorization. Up to 20 different authorized email addresses or phone numbers can be defined in the WBM. Data is sent through an OpenVPN tunnel (for RTU3030C only) or the secure tunnel of the TeleControl Server Basic. Email messages can be encrypted (support of STARTTLS). FTP uploads can be carried out as encrypted uploads via SSL with FTPS.

Supplementary Components

Remote Terminal Unit

SIMATIC RTU3000C

Diagnostics

The RTU3000C provides comprehensive diagnostic options for a quick and informative analysis of the station status. Basic diagnostic information, such as the status of the power supply, the communication connection and the inputs and outputs are signaled directly to the RTU by LEDs. The current status of the LEDs can also be retrieved through WBM.

Using the web server, comprehensive information can be retrieved, such as facts about the connection history, buffer status, and the transferred measured values.

Configuration over web server

The integrated web server is accessed locally for diagnostics from a PC or remotely via the mobile wireless interface or Ethernet interface with upstream industrial router. Configuration, firmware update or configuration changes can therefore be performed remotely without additional software thereby saving time and money.

Technical specifications

Article number	6NH3112-0BA00-0XX0	6NH3112-3BA00-0XX0
Product type designation	RTU3010C	RTU3030C
Operating mode	Standby mode (Sleep mode), Actualization mode, Communication mode	Standby mode (Sleep mode), Actualization mode, Communication mode
Transmission rate		
Transfer rate		
• for Industrial Ethernet	10 ... 100 Mbit/s	10 ... 100 Mbit/s
• for GPRS transmission		
- with downlink maximum		85.6 kbit/s
- with uplink maximum		85.6 kbit/s
• with UMTS transmission		
- with downlink maximum		42 Mbit/s
- with uplink maximum		5.76 Mbit/s
Interfaces		
Number of interfaces acc. to Industrial Ethernet	1	1
Number of electrical connections		
• at the 1st interface acc. to Industrial Ethernet	1	1
• for external antenna(s)		1
• for power supply	1	1
Number of slots		
• for SIM cards		1
• for memory cards	1	1
Type of electrical connection		
• at the 1st interface acc. to Industrial Ethernet	RJ45 port	RJ45 port
• for external antenna(s)		SMA socket (50 ohms)
• for power supply	5-pole plugable terminal block	5-pole plugable terminal block
Type of antenna		
• at port 1 connectable		mobile communications antenna (GSM/UMTS)
Slot version		
• for SIM card		Mini SIM card, with adapter Micro SIM card also
• of the memory card	SD 1.0, SD 1.1, SDHC, Siemens SMC	SD 1.0, SD 1.1, SDHC, Siemens SMC
Storage capacity of the memory card maximum	32 Gbyte	32 Gbyte
design of the removable storage C-PLUG	No	No
Signal-Inputs/outputs		
Number of electrical connections for digital input signals	8	8
Type of electrical connection for digital input signals	pluggable screw terminal block	pluggable screw terminal block
Digital input version	Suitable for open-drain transistor or switch, 2-wire-technique	Suitable for open-drain transistor or switch, 2-wire-technique
Number of electrical connections as counter inputs for digital input signals	2	2
Pulse duration at counter input minimum	0.1 ms	0.1 ms
Pulse frequency at counter input maximum	5 000 Hz	5 000 Hz
Number of electrical connections for digital output signals	4	4
Type of electrical connection for digital output signals	pluggable screw terminal block	pluggable screw terminal block
Digital output version	bistable relay, 2-wire-technique	bistable relay, 2-wire-technique
Output current at digital output	300 mA; Limiting continuous current	300 mA; Limiting continuous current
Number of analog inputs Integrated	4	4
Connector type at the analog input	pluggable screw terminal block	pluggable screw terminal block
Type of analog input	2-/3-/4-wire-technique	2-/3-/4-wire-technique
Product function parameterizable analog inputs	Yes; Current 0/4...20mA, Voltage 0...5/10V, Temperature (Pt1000) -80...+140°C	Yes; Current 0/4...20mA, Voltage 0...5/10V, Temperature (Pt1000) -80...+140°C
A/D resolution at the analog input	12 bit	12 bit

Supplementary Components

Remote Terminal Unit

SIMATIC RTU3000C

Article number	6NH3112-0BA00-0XX0	6NH3112-3BA00-0XX0
Product type designation	RTU3010C	RTU3030C
Wireless technology		
Type of mobile wireless service	No	Yes
• is supported SMS		Yes
• is supported GPRS		GPRS (Multislot Class 10)
• Note		
Type of mobile network is supported		
• GSM		Yes
• UMTS		Yes
• LTE		No
Operating frequency		
• for GSM transmission 850 MHz		Yes
• for GSM transmission 900 MHz		Yes
• for GSM transmission 1800 MHz		Yes
• for GSM transmission 1900 MHz		Yes
• with UMTS transmission 900 MHz		Yes
• with UMTS transmission 2100 MHz		Yes
Supply voltage, current consumption, power loss		
Type of voltage of the supply voltage	DC	DC
Supply voltage external at DC	12 ... 24 V	12 ... 24 V
Supply voltage external at DC rated value	10.8 ... 28.8 V	10.8 ... 28.8 V
Type of output voltage for the supply of external devices	DC 12 V or 24 V	DC 12 V or 24 V
Consumed current Note	without connected consumers	without connected consumers
Consumed current		
• from external supply voltage at 24 V DC		
- in standby mode typical	14 mA	14 mA
- in update mode typical	35 mA	35 mA
- in communication mode typical	55 mA	83 mA
• with battery operation at 7.2 V DC		
- in standby mode typical	0.28 mA	0.28 mA
- in update mode typical	71 mA	71 mA
- in communication mode typical	125 mA	208 mA
Power loss [W] Note	without connected consumers	without connected consumers
Power loss [W] with external supply voltage at 24 V DC		
• in standby mode typical	0.34 W	0.34 W
• in update mode typical	0.85 W	0.85 W
• in communication mode typical	1.25 W	2 W
Power loss [W] with battery operation at 7.2 V DC		
• in standby mode typical	0.002 W	0.002 W
• in update mode typical	0.51 W	0.51 W
• in communication mode typical	0.9 W	1.5 W
Permitted ambient conditions		
Ambient temperature		
• for vertical installation during operation	-40 ... +60 °C	-40 ... +60 °C
• for horizontally arranged busbars during operation	-40 ... +70 °C	-40 ... +70 °C
• during storage	-40 ... +70 °C	-40 ... +70 °C
• during transport	-40 ... +70 °C	-40 ... +70 °C
Relative humidity at 30 °C without condensation during operation maximum	95 %	95 %
Protection class IP	IP20; IP68 with protective housing (see accessories)	IP20; IP68 with protective housing (see accessories)
Design, dimensions and weight		
Module format	Compact module	Compact module
Width	130 mm	130 mm
Height	100 mm	100 mm
Depth	75 mm	75 mm
Net weight	0.34 kg	0.37 kg
Mounting type		
• 35 mm DIN rail mounting	Yes	Yes
• wall mounting	Yes	Yes

Supplementary Components

Remote Terminal Unit

SIMATIC RTU3000C

Article number	6NH3112-0BA00-0XX0	6NH3112-3BA00-0XX0
Product type designation	RTU3010C	RTU3030C
Product properties, functions, components general		
Product function		
• Dynamic DNS		Yes
• no-ip.com client		Yes
Performance data		
Number of users email addresses definable maximum	20	
Number of users/telephone numbers/email addresses definable maximum		20
Number of user groups definable maximum	10	10
Number of program block types	37	38
Number of configurable program blocks	32	32
Performance data IT functions		
Number of possible connections		
• as client by means of FTP maximum	1	1
Number of entries in the FTP buffer maximum	12	12
Number of possible connections		
• as server by means of HTTP maximum	2	2
• as server by means of HTTPS maximum	2	2
• as e-mail client maximum	1	1
Number of free texts for e-mails definable by user	20; maximum of 160 characters per user defined text	20; maximum of 160 characters per user defined text
Number of entries in the e-mail buffer maximum	12	12
Performance data telecontrol		
Suitability for use		
• Node station	No	No
• substation	Yes	Yes
• TIM control center	No	No
Control center connection		
• by means of a permanent connection	supported	supported
• by means of demand-oriented connection	supported	supported
Protocol is supported		
• TCP/IP	Yes	Yes
• DNP3	Yes	Yes
• IEC 60870-5	Yes	Yes
• SINAUT ST1 protocol	No	No
• SINAUT ST7 protocol	Yes	Yes
• Modbus RTU	No	No
Product function data buffering if connection is aborted	Yes	Yes
Amount of data as user data per station in telecontrol mode maximum	256 Kibyte	256 Kibyte
Product feature Buffered message frame memory	Yes	Yes
Performance data Teleservice		
Diagnostics function online diagnostics with SIMATIC STEP 7	No	No
Product function		
• program download with SIMATIC STEP 7	No	No
• Remote firmware update	Yes	Yes
• remote configuration	Yes	Yes
Configuration software		
• required	No, configuration by using the integrated webserver	No, configuration by using the integrated webserver
Product functions Diagnosis		
Product function Web-based diagnostics	Yes	Yes

Supplementary Components

Remote Terminal Unit

SIMATIC RTU3000C

Article number	6NH3112-0BA00-0XX0	6NH3112-3BA00-0XX0
Product type designation	RTU3010C	RTU3030C
Product functions Security		
Suitability for operation Virtual Private Network	No	Yes
Operating mode Virtual Private Network note		OpenVPN-Client
Product function with VPN connection		OpenVPN
Type of authentication procedure with VPN connection		certificate based
Type of authentication with Virtual Private Network PSK		No
Type of hashing algorithms with VPN connection		SHA-1, SHA-224, SHA-256
Number of possible connections with VPN connection		2; one simultaneous productive connection only
Product function		
• password protection for Web applications	Yes	Yes
• password protection for teleservice access	Yes	Yes
• password protection for VPN		No
• encrypted data transmission	Yes	Yes
• switch-off of non-required services	Yes	Yes
Product functions Time		
Protocol is supported		
• NTP	Yes	Yes
Product component Hardware real-time clock	Yes	Yes
Product feature Hardware real-time clock w. battery backup	Yes	Yes
Accuracy of the hardware real-time clock per day maximum	1.8 s	1.8 s
time synchronization		
• from NTP-server	Yes	Yes
• from control center	Yes	Yes
• from mobile network provider		Yes
• PC	Yes	Yes
• manual setting	Yes	Yes

Supplementary Components

Remote Terminal Unit

SIMATIC RTU3000C

Selection and ordering data

	Article No.		Article No.
SIMATIC RTU3010C ¹⁾ Compact RTU for variable power supply by battery, solar or 10.8 to 28.8 V DC for connection of an external industrial router; connection to control center via TeleControl Basic, DNP3, IEC60870-5-104 and SINAUT ST7 protocols, on-board I/O (8 DI, 4 DO, 4 AI), configuration and diagnostics via web interface	6NH3112-0BA00-0XX0	Battery case for SIMATIC RTU 3000C Battery case for accommodating two D cell batteries; suitable for SIMATIC RTU3000C; batteries must be procured externally and are not included in the scope of delivery! Please observe information on the battery type in the manual!	6NH3112-3BA00-1XX2
SIMATIC RTU3030C ¹⁾ Compact RTU for variable power supply by battery, solar or 10.8 to 28.8 V DC with integrated UMTS modem; connection to control center via TeleControl Basic, DNP3, IEC60870-5-104 and SINAUT ST7 protocols, on-board I/O (8 DI, 4 DO, 4 AI), configuration and diagnostics via web interface	6NH3112-3BA00-0XX0	Battery expansion case for SIMATIC RTU3000C Battery expansion case for accommodating two D cell batteries; suitable for SIMATIC RTU3000C; batteries must be procured externally and are not included in the scope of delivery! Please observe information on the battery type in the manual!	6NH3112-3BA00-1XX6
Accessories		Enclosure in IP68 degree of protection For SIMATIC RTU3000C; Note: Cable glands and sealing plugs must be ordered separately in the necessary quantity <ul style="list-style-type: none"> • Aluminum enclosure Temperature range -40 to +80 °C • Stainless steel enclosure Temperature range -60 to +135 °C 	6NH3112-3BA00-1XX3 6NH3112-3BA00-1XX1
TeleControl Server Basic V3.1 Runtime software for monitoring and controlling 8 to 5 000 Remote Terminal Units (RTUs); OPC (UA) server for operating modular RTUs e.g. on the basis of SIMATIC S7-1200 or compact RTUs via mobile wireless network or Ethernet/Internet; connection management for RTUs; routing for connections between S7 stations; Operating systems: Windows 7 Pro, Ultimate Enterprise + SP1 (64-bit) Windows 8.1 Pro (64-bit) Windows 10 Pro, Enterprise (64-bit) Windows Server 2008 R2 Standard + SP1 (64-bit) Windows Server 2012 R2 Standard (64-bit) Windows Server 2016 (64-bit)		PG16 cable gland For IP68 enclosure, temperature range -40 to +100 °C, nickel-plated brass	6NH3112-3BA00-1XX4
<ul style="list-style-type: none"> • TeleControl Server Basic 8 V3.1 Connection management for 8 SIMATIC S7-1200 or S7-200 stations • TeleControl Server Basic 32 V3.1 Connection management for 32 SIMATIC S7-1200 or S7-200 stations • TeleControl Server Basic 64 V3.1 Connection management for 64 SIMATIC S7-1200 or S7-200 stations • TeleControl Server Basic 256 V3.1 Connection management for 256 SIMATIC S7-1200 or S7-200 stations • TeleControl Server Basic 1000 V3.1 Connection management for 1 000 SIMATIC S7-1200 or S7-200 stations • TeleControl Server Basic 5000 V3.1 Connection management for 5 000 SIMATIC S7-1200 or S7-200 stations • TeleControl Server Basic UPGR V3.1 Upgrade package from version V2.x to V3 for all license sizes 	6NH9910-0AA31-0AA0 6NH9910-0AA31-0AF0 6NH9910-0AA31-0AB0 6NH9910-0AA31-0AC0 6NH9910-0AA31-0AD0 6NH9910-0AA31-0AE0 6NH9910-0AA31-0GA0	Sealing plugs M16 For IP68 enclosure, temperature range -40 to +100 °C, nickel-plated brass	6NH3112-3BA00-1XX5
		SIMATIC Memory Card 4 MB 12 MB 24 MB 256 MB 2 GB	6ES7954-8LC02-0AA0 6ES7954-8LE02-0AA0 6ES7954-8LF03-0AA0 6ES7954-8LL02-0AA0 6ES7954-8LP01-0AA0
		ANT896-4MA 2G/3G/4G antenna Omnidirectional antenna for GSM (2G), UMTS (3G) and LTE (4G) networks; omnidirectional characteristic; can be rotated radially with additional joint; with SMA connector for direct mounting on the device; antenna gain 2dBi; IP54	6GK5896-4MA00-0AA3
		ANT896-4ME 2G/3G/4G antenna Omnidirectional antenna for GSM (2G), UMTS (3G) and LTE (4G) networks; omnidirectional characteristic; with N-female connector for remote installation indoors and outdoors; antenna gain 3dBi; IP66	6GK5896-4ME00-0AA0
		ANT794-4MR antenna Omnidirectional antenna for GSM (2G), UMTS (3G) and LTE (4G) networks; omnidirectional, weather-proof for indoor and outdoor use; 5 m connecting cable with fixed connection to the antenna; SMA connector; including mounting bracket, screws, wall plugs	6NH9860-1AA00

Article No.	
SIMATIC NET Antenna Connection Cable N/SMA male/male Flexible antenna connecting cable for connection of antenna and SCALANCE M <ul style="list-style-type: none"> • 0.3 m • 1 m • 2 m • 5 m 	6XV1875-5LE30 6XV1875-5LH10 6XV1875-5LH20 6XV1875-5LH50
SIMATIC NET antenna N-Connect male/male flexible connection cable Flexible cable for connecting an RCoax cable or antenna to a SCALANCE W-700 access point with N-Connect connections; pre-assembled with two N-Connect male connections <ul style="list-style-type: none"> • 1 m • 2 m • 5 m • 10 m 	6XV1875-5AH10 6XV1875-5AH20 6XV1875-5AH50 6XV1875-5AN10
SIMATIC NET N-Connect/N-Connect female/female panel feedthrough Cabinet feedthrough for wall thicknesses up to 4.5 mm, two N-Connect female connections	6GK5798-2PP00-2AA6
LP798-1N lightning protector Lightning protector with N/N female/female connection, IP67 (-40 to +85 °C), frequency range: 0 ... 6 GHz	6GK5798-2LP00-2AA6
SITOP PSU100C single-phase, 12 V DC/2 A Stabilized power supply Input: 100 ... 230 V AC Output: 12 V DC/2 A	6EP1321-5BA00
SITOP PSU100C single-phase, 12 V DC/6.5 A Stabilized power supply Input: 100 ... 230 V AC Output: 12 V DC/6.5 A	6EP1322-5BA10
SITOP PSU100C single-phase, 24 V DC/1.3 A Stabilized power supply Input: 120 ... 230 V AC Output: 24 V DC/1.3 A	6EP1331-5BA10
SITOP PSU100C single-phase, 24 V DC/2.5 A Stabilized power supply Input: 100 ... 230 V AC Output: 24 V DC/2.5 A	6EP1332-5BA00
SITOP PSU100C single-phase, 24 V DC/3.7 A Stabilized power supply Input: 100 ... 230 V AC (110 ... 300 V AC) Output: 24 V DC/3.7 A Limited output power NEC class 2	6EP1332-5BA20

1) Please note country approvals under:
<http://www.siemens.com/mobilenetwork-approvals>

More information

Technical requirements/compatibility

Telecontrol Server Basic Version V3 SP1 for RTU3030C or V3.1 for RTU3010C is required for connection to a telecontrol control room.

Corresponding suitable industrial routers (e.g. SCALANCE M) for the connection to the control center via the Ethernet interface of the RTU3000C can be found under Remote Networks - IP-based modems and routers.

Supplementary Components

WirelessHART products

SITRANS AW200 - WirelessHART adapter

Overview



SITRANS AW200 WirelessHART adapter

The SITRANS AW200 WirelessHART adapter is a battery-powered communication component, which integrates HART and 4 to 20 mA field devices into a WirelessHART network. On the wireless communication side, the adapter supports the WirelessHART standard. HART and 4 to 20 mA field devices are connected on the field device side.

The SITRANS AW200 WirelessHART adapter

- Support the WirelessHART standard (HART V 7.1)
- Features a very high degree of security for wireless data transmission
- Integrates one 4 to 20 mA field device or up to four HART field devices (in multidrop mode) into a WirelessHART network
- Features intelligent energy management for the power supply of connected field devices
- Can be easily parameterized using SIMATIC PDM

Benefits

- High quality and service life
- Save on wiring costs for difficult installation conditions (e.g. moveable equipment parts) or for temporary installations
- Subsequent integration of an installed field device with HART interface into maintenance and diagnostic systems if the control system does not feature the required communication mechanisms.
- Proven HART devices can continue to be used for wireless communication, without any limitations.
- Field devices with a 4 to 20 mA interface (without HART) can also be connected.
- Intelligent energy management to achieve the best possible life time for the installed battery unit.
- Optimum addition to wired communication and expansion of solution options for system solutions in process automation.
- Burst mode and event notification parameterization for the adapter and connected field devices.

Application

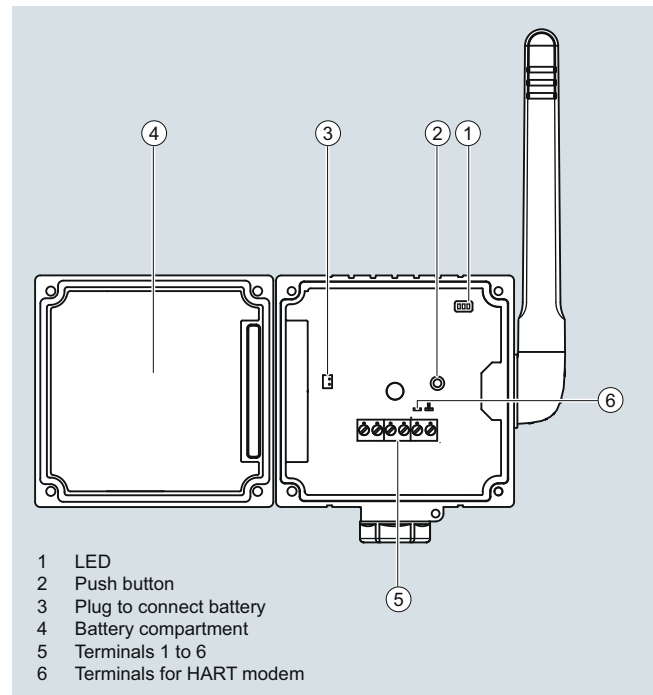
The WirelessHART adapter can be used in a number of different applications, e.g.

- Access to installed basis
Diagnostic information is obtained from existing wired HART devices through a permanent electrical connection of a WirelessHART adapter, and is sent to an asset management software near the system, e.g. SITRANS MDS.
- Status monitoring of the plant
Wireless devices are mounted at critical points in the plant, which are not usually connected to the control room due to difficult accessibility or extensive costs for wiring. Better data flow and diagnostics increase the system's reliability, transparency and safety.
- Process optimization
A temporary installation of a standard 4 to 20mA or HART device together with the WirelessHART adapter SITRANS AW200 allows flexible monitoring and plant optimization at lower costs and reduced effort.
- Process monitoring
Measured values from e.g. tanks or silos are transmitted to a superordinate system in regular time intervals, together with the device and battery status.

Design

The SITRANS AW200 WirelessHART adapter consists of

- A housing with mounted antenna
- Electronics
- A high-performance lithium battery unit



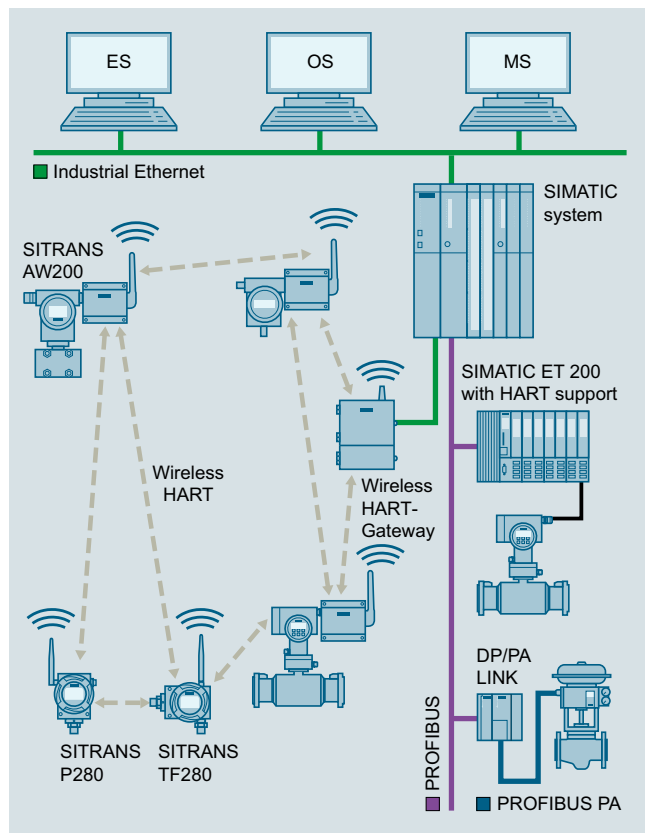
SITRANS AW200 WirelessHART adapter, assembly

The housing can be opened by loosening 4 screws. This allows to access the electronics and battery unit. The battery unit can be removed without the use of tools, since it is connected to the housing with clips.

The back of the housing features a connection part with a fixing nut onto which different replaceable connecting pieces can be screwed to mount the adapter directly on a field device.

The bottom of the housing contains an optional cable opening which can be used for a cable gland. In the case of an offset mounted adapter, it is possible to feed up to 2 cables.

Function



SITRANS AW200 WirelessHART adapter functional diagram

Measured values and diagnostic information of connected field devices with HART communication are transmitted via a wired connection to the WirelessHART adapter. The adapter transmits this information as wireless signals to a WirelessHART gateway. From here, the information is available to the network of the system.

Where a field device with a 4 to 20 mA output signal is connected to the adapter, only the measured value will be transmitted.

Following parameterization and integration into a WirelessHART network, each WirelessHART adapter is able to recognize its neighbors. It notes the strength of the wireless signal, synchronizes itself, receives network information and then establishes connections to the neighbors in the wireless network. A WirelessHART network organizes itself. Manual settings for organizational purposes are not required.

Two- and four-wire field devices can be connected to a WirelessHART adapter. In the case of a connected two-wire field device, power can be supplied by the adapter. Where multiple two-wire field devices are connected (multi drop operation), the adapter must be connected to an external power supply.

The WirelessHART adapter may also be connected in parallel to an already existing installation which consists of a power supply and a HART field device.

Interface	Connection	Function
1	—	Power supply for the field device
2	—	HART/4 ... 20 mA
3	—●—	External supply/Dimensions
4	—●—	High-resistance HART connection
5, 7	—●—	High-resistance HART connection
6, 8	—●—	Mass, high-resistance connection

Terminal block with 6 screw connection clamps

Parameterization

The SITRANS AW200 configured via HART. This can be done using a handheld communicator or even more conveniently with a HART modem and the SIMATIC PDM parameterization software.

Initial start-up of the adapter is usually carried out via SIMATIC PDM and HART modem or a handheld communicator. During initial start-up, the network ID and join key is set up in the adapter, among others. Using these parameters, the adapter is then integrated into an existing WirelessHART network.

Once it is integrated into the network, the adapter and connected HART devices can be conveniently operated via the WirelessHART network or with the onsite HART modem.

Siemens HART field devices for the adapter

HART and 4 to 20mA field devices can be connected to the SITRANS AW200 WirelessHART adapter. Depending on the electrical data of the field devices, they can receive their power supply from the WirelessHART adapter or will require an external power supply. Please find current information about connectivity to field devices from Siemens as FAQ under <http://www.siemens.com/automation/service&support>.

Note:

Siemens will only approve the Siemens HART field devices listed there for the adapter, and will only supply technical support for these devices.

Based on HART specifications, it is generally possible to connect devices that are not listed, however with the following limitations:

- All warranties and liabilities will be excluded.
- No technical support

Supplementary Components

WirelessHART products

SITRANS AW200 - WirelessHART adapter

Technical specifications

Input		Design	
Input	Point-to-Point connection to a HART field device or Point-to-Point connection to a 4 ... 20 mA field device or Up to four HART field devices with external power supply which are integrated using the multidrop method	Weight	0.5 kg without battery, 0.75 kg with battery
Communication	HART communication using multidrop method, 4 ... 20 mA power signal with Point-to-Point connection	Enclosure	
Protocol	HART V7 (compatible with previous HART versions)	• Material	• Polyester (PBT FR) • Aluminium
Transfer rate	1200 bits/s using HART multidrop method	• Cable entry	2x M20 x 1.5
Output		Degree of protection	IP65, IP66; NEMA 4
Communication	WirelessHART V7	Antenna	Omnidirectional dipolar aerial, vertical rotation
Transfer rate	Nominal 250 kBits/s	Mounting adapter	M20 x 1.5 on M20 x 1.5, M20 x 1.5 on G $\frac{1}{2}$, M20 x 1.5 on $\frac{1}{2}$ " - 14 NPT, M20 x 1.5 on $\frac{3}{4}$ " - 14 NPT
Transmission frequency band	2.4 GHz (ISM band)	Power supply	
Range (under reference conditions)	Outside areas up to 250 m, within buildings up to 50 m	Battery	Lithium thionylchlorid high-performance battery unit
RF signal strength	Can be configured: 0 dBm and 10 dBm	Supply voltage	5 ... 7.2 V DC
Output signals		Capacity	19 Ah at 20 °C
• WirelessHART adapter	Measured voltage and up to three other variables may be selected from the following: adapter temperature, battery voltage, energy consumed, expected battery life time	Service life	Up to 5 years, depending on update rate, connected field device and ambient conditions
• 4 ... 20 mA field device	Scaled or linearized process values	Voltage supply for one field device (independent of multidrop)	
• HART field device	Up to four process variables, can be configured via PDM or gateway	• No-load voltage	8 ... 23 V DC
Measuring accuracy (as per reference conditions IEC 61298-2)		• Current	4 ... 20 mA DC (as per NAMUR recommendation NE 43)
Max. measuring error (4 ... 20 mA circuit)	0.125 % re: measuring range	• Fault current	I ≤ 3.6 mA or I ≥ 21 mA
Effect of ambient temperature (4 ... 20 mA circuit)	5 µA/10 K	• Protection	Short-circuit proof, activated at voltages > 25 mA
Rated conditions		External voltage supply for one or more field devices (multidrop)	
Location	Outside/Inside	• Voltage	< 30 V DC
Ambient conditions		• Current	< 25 mA
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F) The capacity of the battery decreases rapidly if ambient temperature falls below -30 °C.	Certificates and approvals	
• Storage temperature	-40 ... +85 °C (-40 ... +185 °F) without batteries < 21 °C with batteries	Wireless communication approvals	ETSI (R&TTE) FCC Part 15.247 for wireless applications in the 2.4 GHz transmission frequency band EN 300328
• Relative humidity	Max 90 % at 25 °C (non-condensating)	ATEX approvals	ATEX II 2G Ex ia IIC T4/T3 Gb ATEX II 2G Ex ia IIC T4/T3 Gb, ATEX II 2D Ex tb [ia] IIIC IP6x T 70°C Db
• Resistance to vibration	20 ≤ f ≤ 2000 Hz: 0,01 g ² /Hz as per IEC 68-2-64	CSA approvals	Class I, DIV 1, GRP ABCD Class I, DIV 2, GRP ABCD Class I, Zone 1, Ex ia IIC, AEx ia IIC T4/T3C Class II, DIV 1, GRP EFG Class II, DIV 2, GRP FG Class III
• Shock resistance	15 g, 11 ms as per IEC 68-2-27	IECEx approvals	IECEx Ex ia IIC T4/T3 Gb IECEx Ex ia IIC T4/T3 Gb, IECEx Ex tb [ia] IIIC T 70°C Db
Electromagnetic compatibility	As per EN 61326, EN 301 489-1/17 and NAMUR NE 21		

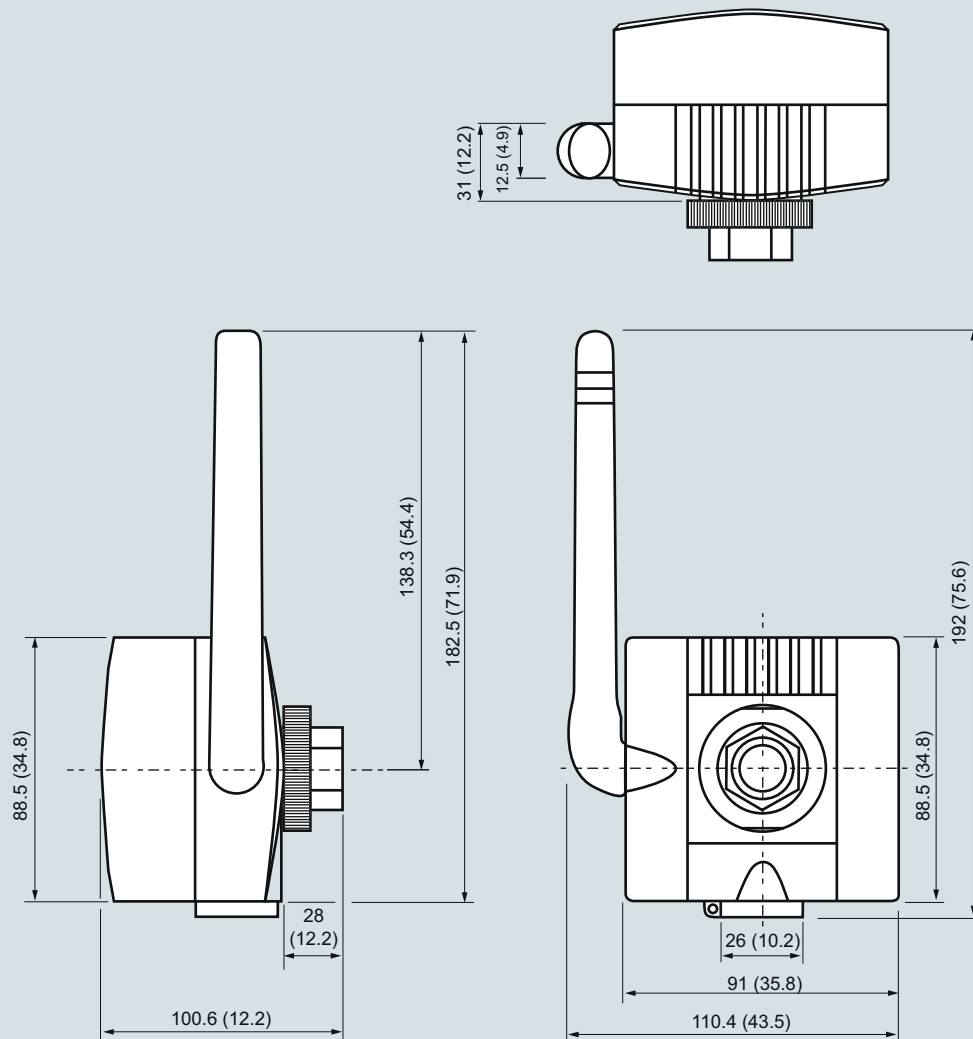
Selection and ordering data	Article No.
SITRANS AW200 adapter for WirelessHART communication Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7MP3112-0-0AA0
WirelessHART adapter AW200 with 4 ... 20 mA- or HART interface Without battery	1
Power supply Battery powered	A
Certificates and approvals Without explosion protection ATEX II 2G Ex ia IIC T4/T3 Gb ATEX II 2G Ex ia IIC T4/T3 Gb ATEX II 2D Ex tb [ia] IIIC IP6x T 70°C Db CSA General purpose Class I, DIV 1, DIV 2, GRP ABCD, Class I, Zone 1, Ex ia IIC, AEx ia IIC T4/T3C, Class II, DIV 1, GRP EFG, DIV 2, GRP FG, Class III IECEx Ex ia IIC T4/T3 Gb IECEx Ex ia IIC T4/T3 Gb IECEx Ex tb [ia] IIIC T 70°C Db	A B 0 C 1 D E F 0 G 1
Enclosure Polyester Aluminium	0 1
Accessories	
Lithium battery for SITRANS AW200	7MP3990-0AA00
Thread adapter for direct mounting of the adapter to a field device	
• M20 thread adapter	7MP3990-0BA00
• Thread adapter G½	7MP3990-0BB00
• Thread adapter ½" - 14 NPT	7MP3990-0BC00
• Thread adapter ¾" - 14 NPT	7MP3990-0BD00
Mounting bracket for attaching to wall/pipe, material: stainless steel SS304, including cable gland	7MP3990-0CA00

Supplementary Components

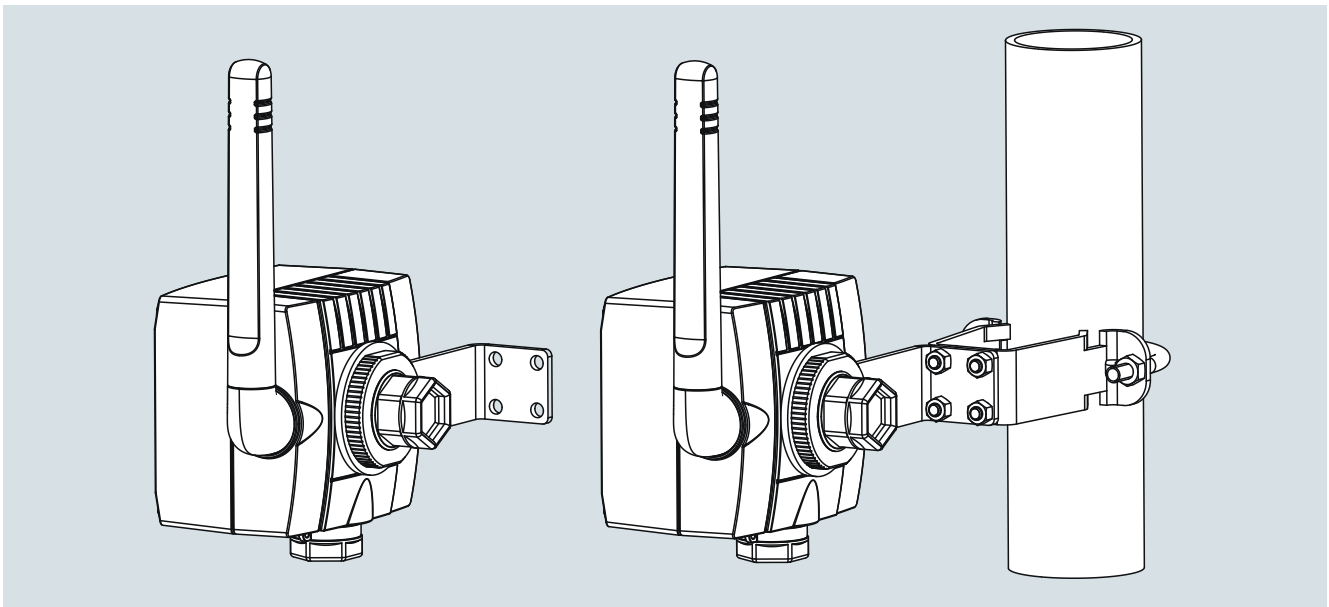
WirelessHART products

SITRANS AW200 - WirelessHART adapter

Dimensional drawings

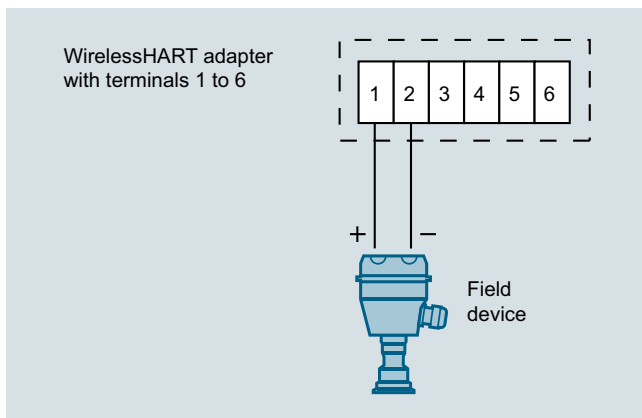


SITRANS AW200 WirelessHART adapter, dimensions in mm (inch)

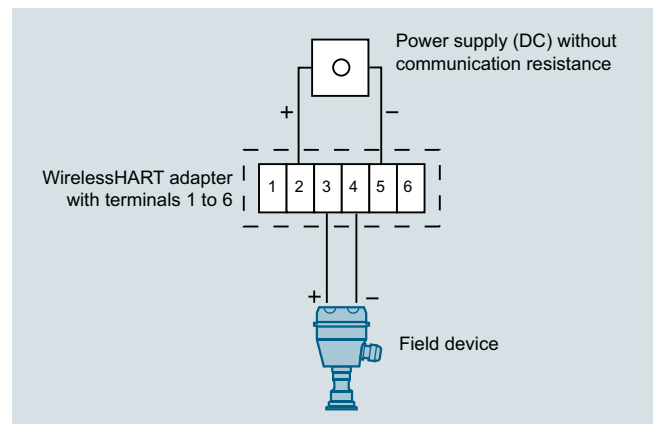


SITRANS AW200 with built-in mounting bracket for wall or pipe mounting

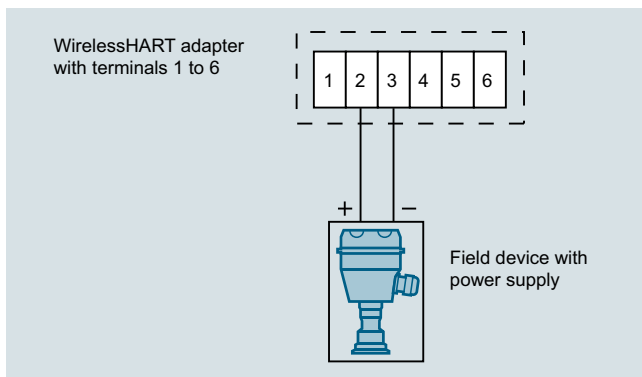
Schematics



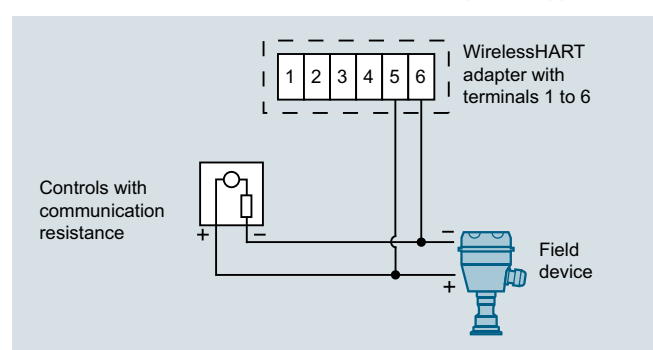
Connection of a two-wire field device, power supply provided by adapter



Connection of a two-wire field device with external power supply



Connection of a four-wire field device



Connection of adapter parallel to wired 4 to 20 mA communication

Supplementary Components

WirelessHART products

SITRANS AW210 - WirelessHART adapter

Overview



SITRANS AW210 WirelessHART adapter

The WirelessHART adapter SITRANS AW210 is a communication component which can integrate a wide range of field devices into a WirelessHART network. On the wireless communication side, the adapter supports the WirelessHART standard. HART and 4 to 20 mA field devices are connected on the field device side.

The WirelessHART adapter SITRANS AW210

- Supports the WirelessHART standard (HART V 7.1)
- Features an extremely high degree of security for wireless data transmission.
- Integrates a 4 to 20 mA field device into a WirelessHART network
- Integrates up to eight HART field devices (in multidrop mode) into a WirelessHART network
- Can be powered with the 4 to 20 mA loop or an external power supply
- Power management can be activated to minimize energy consumption
- Easy to configure with SIMATIC PDM, AMS, Handheld 475.

Benefits

- "Intrinsically safe" or "Explosion proof"
- High quality and service life
- Extremely rugged enclosure
- No additional cabling required with loop power supply
- Subsequent integration of an installed field device with HART interface into maintenance and diagnostic systems if the control system does not feature the required communication mechanisms
- Proven HART devices can continue to be used for wireless communication without any limitations
- Field devices with a 4 to 20 mA interface (without HART) can also be connected
- Ideal addition to wired communication and to the range of system solutions in process automation
- Burst mode and event notification configuration for the adapter and connected field devices

Application

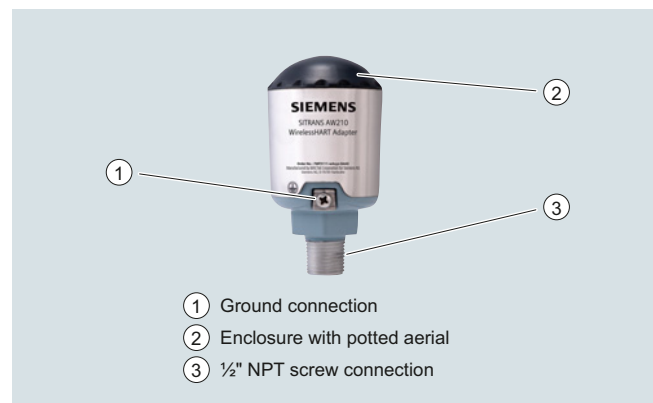
The WirelessHART adapter can be used in a number of different applications:

- Access to installed basis
Diagnostic information is obtained from existing wired HART devices thanks to the permanent electrical connection of a WirelessHART adapter and power from the 4 to 20 mA loop. This information is sent to central system-based asset management software such as SITRANS MDS.
- Status monitoring of the plant
Wireless devices are mounted at critical points in the plant which are not usually connected to the control room due to difficult access or high wiring costs. Better data flow and diagnostics increase plant reliability, transparency and safety.
- Process optimization
Temporary installation of a 4 to 20mA or standard HART device together with a SITRANS AW210 WirelessHART adapter allows easier, flexible monitoring and plant optimization at lower costs. SITRANS AW210 can also be usefully used where there is already an external power supply, or one is needed anyway.
- Process monitoring
Measured values, for example from tanks or silos, are transmitted to a higher-level system at regular intervals together with the device status. SITRANS AW210 is particularly easy to use with 4-wire devices, as they have an external power supply.

Design

SITRANS AW210 WirelessHART Adapter consists of:

- An enclosure with a fitted aerial
- Electronics

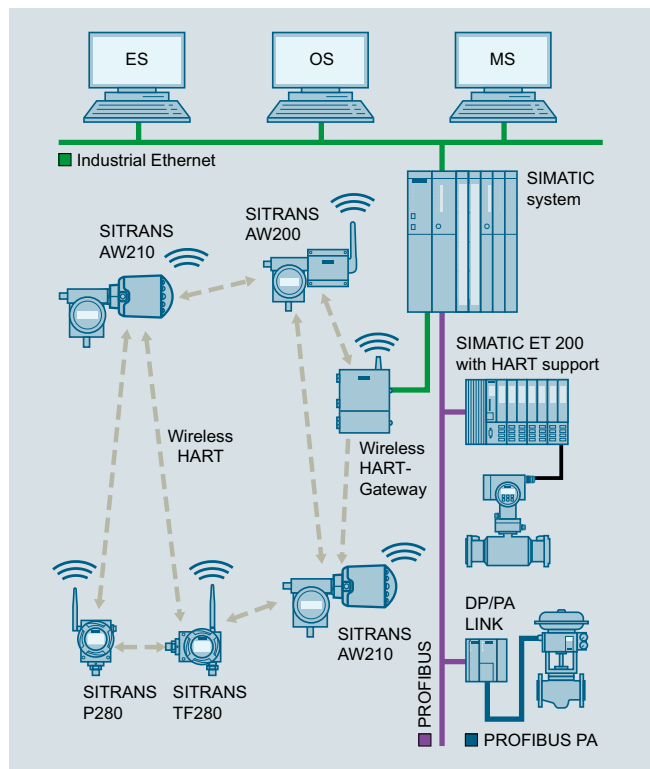


SITRANS AW210 Wireless-HART Adapter, assembly

The enclosure contains the potted electronics and the wireless module. The aerial is fitted at the top in the enclosure.

On the base of the enclosure is the connector with a 1/2" NPT female thread. Six cables run from this connector to connect the adapter.

Function



SITRANS AW210 WirelessHART Adapter, functional diagram

The measured values and diagnostic information from the connected field devices with HART communication are transmitted to the WirelessHART adapter over wired connections. The adapter transmits this information as wireless signals to a WirelessHART gateway. The measured values, all parameters and diagnostic information about the plant network can be accessed from this gateway.

If a field device with a 4 to 20 mA output signal is connected to the adapter, the current will be converted to a digital measured value and transmitted on the basis of a measuring range specified in SITRANS AW210.

Following configuration and integration into a WirelessHART network, each WirelessHART adapter is able to recognize its neighbors. It notes the strength of the wireless signal, synchronizes itself, receives network information and then establishes connections to its neighbors in the wireless network. A WirelessHART network organizes itself. Manual settings for organization are not required.

Two-wire and four-wire field devices can be connected to a WirelessHART adapter. Either up to 2 or up to 8 HART field devices can be connected to the adapter, depending on the selected product version. The adapter either has an external voltage supply or is loop-powered. The WirelessHART adapter can therefore also be connected in parallel to an existing installation consisting of a voltage supply and a HART field device.

Parameter assignment

SITRANS AW210 is configured via HART. Configuration can be carried out using handheld communicator 475 or, more conveniently, with a HART modem and the SIMATIC PDM configuration software.

Initial startup of the adapter is usually carried out via SIMATIC PDM and a HART modem or a handheld communicator. During initial startup, the network ID and join key are set in the adapter. These parameters are used to integrate the adapter into an existing WirelessHART network.

Following integration into the network, the adapter and HART devices connected can be conveniently operated via the WirelessHART network or locally, as detailed above.

Siemens HART field devices for the adapter

In principle, all HART devices certified by the HART Communication Foundation (HCF) can be operated with the SITRANS AW210 WirelessHART adapter. See <http://www.siemens.com/automation/service&support> for FAQ with the latest information on connectivity for Siemens field devices.

Note:

Siemens has only approved the Siemens HART field devices listed there for the adapter, and will only provide technical support for these devices.

Based on HART specifications, it is generally possible to connect devices that are not listed, however with the following restrictions:

- All warranties and liability will be excluded
- No technical support

Technical specifications

Input

Point-to-point connection to a HART field device or
Point-to-point connection to a 4 ... 20 mA field device or
Up to eight HART field devices with an external voltage supply integrated using multidrop

Communication

- HART communication with multidrop, as primary or secondary HART master (can be specified)
- 4 ... 20 mA current signal with a point-to-point connection scaling in user-defined measuring range in SITRANS AW210
 - Linear
 - User-defined scaling with up to 32 points

Protocol

HART V7 (compatible with previous HART versions)

Supplementary Components

WirelessHART products

SITRANS AW210 - WirelessHART adapter

Output		Certificates and approvals	
Communication	WirelessHART V7	Wireless communication approvals	<ul style="list-style-type: none"> • CE (R&TTE, EMC) • FCC Part 15.247 for wireless applications in the 2.4 GHz transmission frequency band • IC
Transmission frequency band	2.4 ... 2.4835 GHz (ISM band), 16-channel frequency hopping spread spectrum		
Range (under reference conditions)	Outside up to 235 m (771 ft)	Explosion protection	
RF signal strength	10 dBm	Intrinsic safe "i" gases and vapors	II 1G Ex ia IIC T*; IP68 T* = T5 for Ta = -40 ... +85 °C T* = T6 for Ta = -40 ... +75 °C
Output signals		Intrinsic safe dust	II 1 D Ex iaD 20 IP68 T95C; Ta = -40 ... +85 °C
• WirelessHART adapter	<ul style="list-style-type: none"> • HART Cmd 3 Measured current and up to 4 other dynamic variables (measured values, derived values) or device variables • HART Cmd 9 Up to 8 dynamic variables with status • HART Cmd 48 Additional status information 	Non-sparking (zone 2)	II 3 G Ex nA nC IIC T* Gc; IP68 T* = T5 for Ta = -40 ... +85 °C T* = T6 for Ta = -40 ... +75 °C
• 4 ... 20 mA field device	Scaled or linearized process values	Explosion protection to FM for US Intrinsic safe, Non-sparking	IS/I,II,III/1/ABCDEFGH/ T5 Ta = -40 ... +85 °C, T6 Ta = -40 ... +75 °C NI/I/2/ABCD/ T5 Ta = -40 ... +85 °C, T6 Ta = -40 ... +75 °C S/II,III/2/EFG/ T5 Ta = -40 ... +85 °C, T6 Ta = -40 ... +75 °C I/0/AEx ia/IIC/ T5 Ta = -40 ... +85 °C T6 Ta = -40 ... +75 °C; 20/AEx iaD/T95°C; Ta = -40 ... 85 °C I/2/AEx nA nC/IIC/ T5 Ta = -40 ... +85 °C, T6 Ta = -40 ... +75 °C; IP68
• HART field device	<ul style="list-style-type: none"> • HART Cmd 3 Measured current and up to 4 other dynamic variables (measured values, derived values) or device variables • HART Cmd 9 Up to 8 dynamic variables with status • HART Cmd 48 Additional status information 	Explosion protection to FM for CA Intrinsic safe, Non-sparking	IS/I,II,III/1/ABCDEFGH/ T5 Ta = -40 ... +85 °C T6 Ta = -40 ... +75 °C; NI/I/2/ABCD/ T5 Ta = -40 ... +85 °C T6 Ta = -40 ... +75 °C; S/II,III/2/EFG/ T5 Ta = -40 ... +85 °C T6 Ta = -40 ... +75 °C; I/0/Ex ia/IIC/ T5 Ta = -40 ... +85 °C T6 Ta = -40 ... +75 °C; I/2/Ex nA nC/IIC/ T5 Ta = -40 ... +85 °C T6 Ta = -40 ... +75 °C II/1/EFG Ta = -40 ... +85 °C; IP68
Update time for output signals	<p>You can set the update times separately for the adapter and the connected devices.</p> <p>The possible settings are:</p> <ul style="list-style-type: none"> • 1, 2, 4, 8, 16, 32 s • 1, 2, 5, 10, 30, 60 min (times also depend on the gateway) 		
Measuring accuracy			
Max. measuring error (4 ... 20 mA circuit)	1 % of measuring range, 40 ... 85 °C (104 ... 185 °F)		
Rated conditions			
Location	Outside/inside		
Ambient conditions			
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) In hazardous areas up to 75 °C (167 °F)		
• Storage temperature	-40 ... +85 °C (-40 ... +185 °F)		
Electromagnetic compatibility	To EN 301 489-17 and EN 300 328-1	Flameproof gases and vapors	II 2 G Ex d IIC T* Gb; IP68 T* = T5 for Ta = -40 ... +85 °C T* = T6 for Ta = -40 ... +75 °C
Design		Protection by enclosure dust	II 2 D Ex tb IIIC T95°C Ta = -40 ... +85 °C; IP68
Weight	0.46 kg (1.01 lb)	Explosion protection to FM for US Explosion proof, flameproof, gas, dust	XP/I/1/ABCD I/1 AEx d IIC T5, T6 Gb DIP/II,III/1/EFG 21/AEx tb IIIC T95°C T5 Ta = -40 ... +85 °C, T6 Ta = -40 ... +75 °C Type 6P, IP68
Enclosure		Explosion protection to FM for CA Explosion proof, flameproof, gas, dust	XP/I/1/ABCD I/1 Ex d IIC T5, T6 Gb DIP/II,III/1/EFG T5 Ta = -40 ... +85 °C, T6 Ta = -40 ... +75 °C
• Material			
- Enclosure	Aluminum alloy, RoHS-compliant polyurethane corrosion-resistant coating		
- Cap	Resin		
• Cable entry	½" NPT female thread		
Degree of protection	IP68		
Aerial	Potted in enclosure		
Auxiliary power			
Power supply	Loop power 1 ... DC 2.5 V, can be set by user in 0.5 V DC increments		
Loop-powered, operating current	DC 3.2 ... 25 mA operating current; overvoltage, surge and reverse polarity protection		

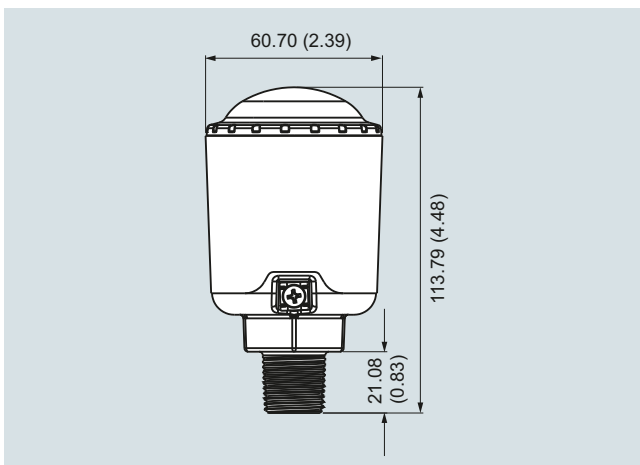
Supplementary Components

WirelessHART products

SITRANS AW210 - WirelessHART adapter

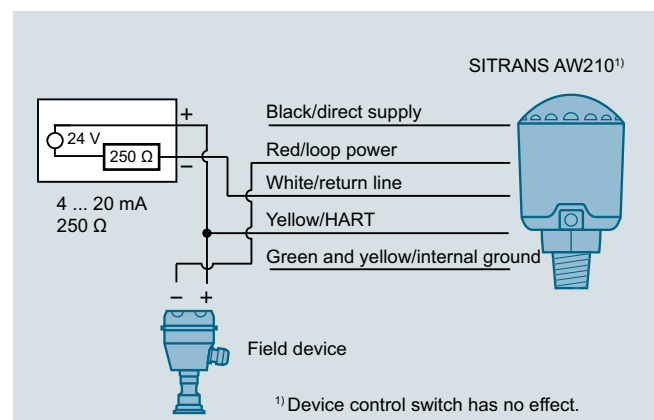
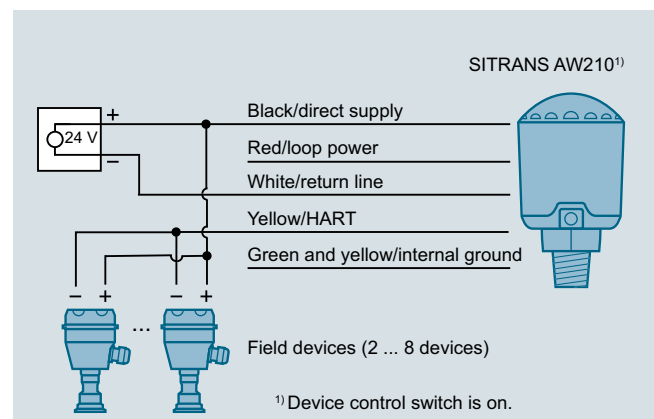
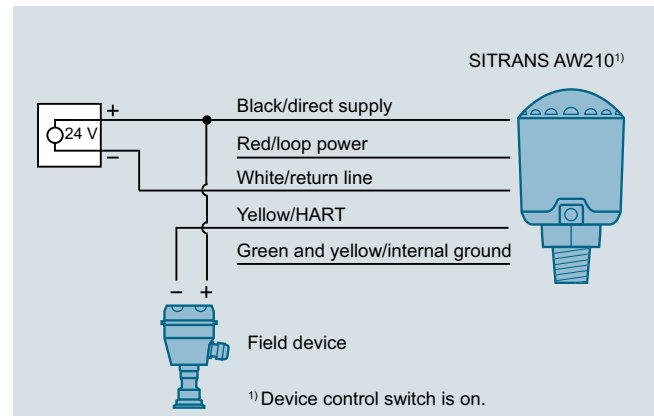
Selection and ordering data	Article No.
SITRANS AW210 Adapter for WirelessHART communication	7MP3111-0-0AA0
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
WirelessHART-Adapter AW210 with 4 ... 20 mA- or HART interface	
2 devices	1
8 devices	2
Auxiliary Power	A
Loop powered or 24 V DC (external)	
Certificates and approvals	B
Intrinsically safe gas, vapors and dust (ATEX) , Intrinsic Safe (FM)	
Explosion proof gas, vapour and dust (ATEX), Explosion proof (FM)	C
Enclosure	0
Aluminum	
Accessories	
Thread adapter M20 x 1.5 (male thread) on ½-14 NPT (female thread) IP65, not explosion proof	7MP1990-0BA00

Dimensional drawings



SITRANS AW210 WirelessHART adapter, dimensions in mm (inches)

Schematics



Supplementary Components

Network transitions

IE/PB LINK PN IO

Overview



PN	DP-M	DP-S	ASI-M		
●	●				

- Compact network transition between PROFINET and PROFIBUS
 - Connection to Industrial Ethernet via integrated 2-port real-time switch with 100 Mbps full duplex connection with autosensing for automatic switchover
 - In case of replacement part: Connection to PROFINET also with 10 Mbps half duplex
 - Connection to PROFIBUS with 9.6 Kbps to 12 Mbps
- PROFINET IO proxy; connection of PROFIBUS DP slaves to PROFINET IO controller in accordance with PROFINET standard:
From the viewpoint of the IO controller, all DP slaves are handled like I/O devices with Ethernet interface, i.e. the IE/PB LINK PN IO is their proxy
- Cross-network PG/OP communication by means of S7 routing
- Cross-network access to data of S7 stations for visualization by means of S7 OPC server and S7 routing; via the IE/PB LINK PN IO, access can be made from the Industrial Ethernet (e.g. for HMI applications with OPC client interface) to data of the S7 stations on the PROFIBUS by means of the S7 OPC server.
- High plant availability thanks to support of the Media Redundancy Protocol (MRP)
- Module replacement without the need for a programming device, using the C-PLUG swap media for backing up the configuration data
- Use in networks that support an exchange of devices without PG on the basis of the Link Layer Discovery Protocol (LLDP)
- ET200 SP design: use of the BusAdapter (BA) of the SIMATIC ET 200SP system for freely selecting the connection technology and physical characteristics for the PROFINET side

Benefits

PROFINET applications

- Protection of investment due to simple connection of PROFIBUS DP slaves to PROFINET IO controller
- Also enables use in plants with PROFIsafe applications
- Independence from individual vendors through support of the PROFINET standard for distributed field devices
- Easy engineering and extensive diagnostics options due to optimum TIA integration

Applications with vertical integration

- Worldwide access to data of the PROFIBUS stations via Industrial Ethernet and Internet for vertical integration
- Access to process data from all enterprise levels
- Loading of STEP 7 programs from a central location

Application

As an autonomous component, the IE/PB LINK PN IO provides a seamless transition between Industrial Ethernet and PROFIBUS.

Using the IE/PB LINK PN IO as a proxy, you can continue to use existing PROFIBUS nodes (even with PROFIsafe functionality V2.0 or higher) and integrate them into a PROFINET application.

The IE/PB LINK PN IO also offers cross-network PG/OP communication by means of S7 routing.

In addition, data record routing (PROFIBUS DP) is supported. This means it is possible, for example, to use SIMATIC PDM (on the PC) on Industrial Ethernet to parameterize and diagnose a PROFIBUS field device via the IE/PB LINK PN IO.

Design

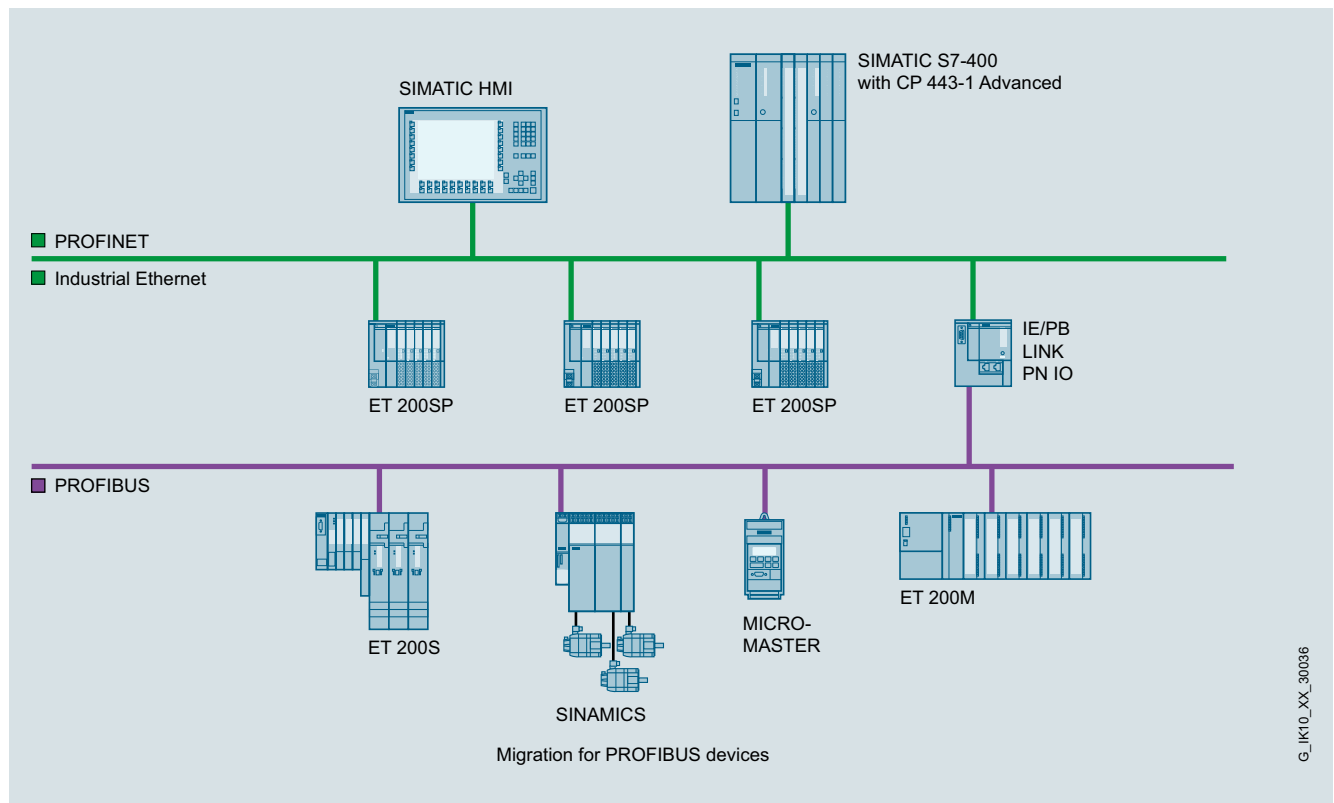
The IE/PB LINK PN IO has all the advantages of the SIMATIC ET200 SP design:

- Compact design; the front of the rugged plastic casing features:
 - Two RJ45 ports for connecting to Industrial Ethernet; the connection is made via the IE FC RJ45 Plug 90 with 90° cable outlet or via a standard patch cable
 - A 9-pin sub-D socket for connection to PROFIBUS
 - A 4-pin terminal strip for connecting the external redundant supply voltage of 24 V DC (two infeeds)
 - Diagnostics LEDs
- Optional connection possibility for Industrial Ethernet via BusAdapter (BA) of the SIMATIC ET 200SP system at the front
- Simple installation; the IE/PB LINK PN IO is mounted on a DIN rail
- Can be operated without a fan
- Fast device replacement in the event of a fault by using the optional C-PLUG swap medium (not included in scope of supply)

Function

PROFINET

- PROFINET IO proxy;
connection of PROFIBUS DP slaves to PROFINET IO controller
with real-time property, according to PROFINET standard



Example configuration: Seamless integration of PROFIBUS nodes into PROFINET via the IE/PB LINK PN IO as proxy

Supplementary Components

Network transitions

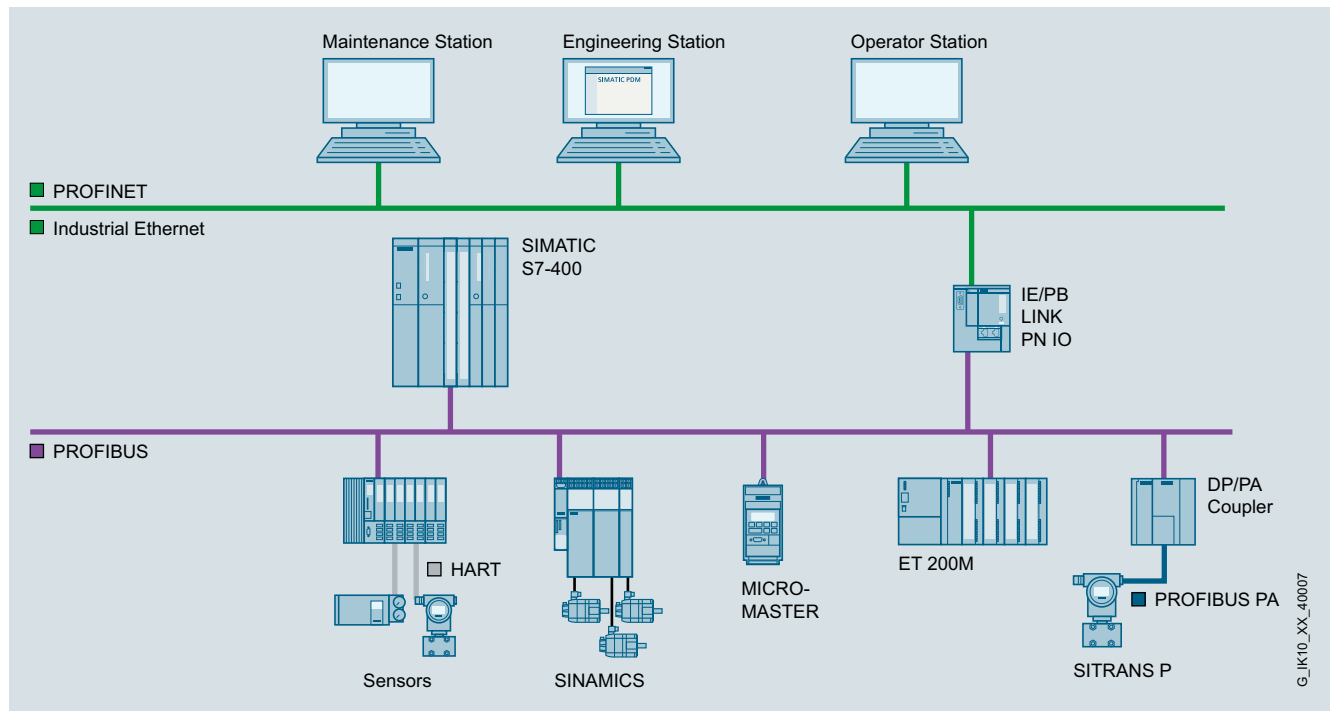
IE/PB LINK PN IO

Additional functionality for vertical integration

- S7 routing
 - Permits cross-network PG communication, i.e. all S7 stations on Industrial Ethernet or PROFIBUS can be programmed remotely using the programming device.
 - Access can be made to visualization data of S7 stations on the PROFIBUS from HMI stations on the Industrial Ethernet.
- Data record routing (PROFIBUS DP)
 - Using this option, the IE/PB LINK PN IO can be used as a router for data records that are forwarded to field devices (DP slaves). SIMATIC PDM (Process Device Manager) is a tool that creates data sets of this type for parameterizing and diagnosing field devices. The configuration of the IE/PB LINK PN IO is possible not only via the STEP 7 / TIA Portal but also via the PST (Primary Setup Tool).

The additional functions for vertical integration can also be used in an existing PROFIBUS application without PROFINET for connection to a higher-level Industrial Ethernet.

In this case, the IE/PB LINK PN IO is used as an additional DP-Master Class 2 on a PROFIBUS segment for linking to Industrial Ethernet and offers the above functions.



Example configuration: Use of the IE/PB LINK PN IO as a default gateway without TIA Portal / STEP 7

Media redundancy (MRP)

Within a PROFINET network with a ring topology, the IE/PB LINK PN IO supports the media redundancy protocol MRP as an MRP client

Diagnostics

Extensive diagnostic options are available via STEP 7 or SNMP, including:

- Diagnosis of the assigned PROFIBUS field devices; using the IE/PB LINK PN IO as a proxy, the connected DP slaves can be diagnosed in the same manner as PROFINET IO devices (even in the user program of the PROFINET IO controller)
- General diagnostics and statistics functions
- Connection diagnostics
- Diagnostic buffer
- Integration into network management systems through the support of SNMP V1 MIB-II

Configuration

STEP 7 V5.5 SP4 or higher or STEP 7 Professional (TIA Portal) V14 Update 1 with an HSP is required for configuring the full functional scope of the IE/PB LINK PN IO.

For the IE/PB LINK PN IO, STEP 7 automatically generates the necessary parameters, e.g. the addresses and all necessary routing information.

The configuration data for PROFINET IO created with STEP 7 is saved on the IO controller. Attention must however be paid to the memory capacity. The initialization data for the Industrial Ethernet interface is backed up on the C-PLUG (Configuration Plug) swap media. The IE/PB LINK PN IO can be swapped in the event of failure without a programming device because the relevant configuration data is saved on the IO controller or on the C-PLUG.

- SINEMA E (license-free TIA Portal for network components)
The IP and PROFIBUS parameters, as well as the network settings, can also be assigned with SINEMA E (V14 or higher), if the IE/PB LINK PN IO is only to be used as a network transition and not as a PROFINET IO device.
- Primary Setup Tool (PST)
The IP and PROFIBUS parameters, as well as the network settings, can also be assigned without STEP 7 / TIA Portal, but using PST (Version V4.2 HF1 or higher).

Technical specifications

Article number	6GK1411-5AB10
Product type designation	IE/PB LINK PN IO
Transmission rate	
Transfer rate	
• for Industrial Ethernet	10 ... 100 Mbit/s
• at the 1st interface acc. to PROFIBUS	9.6 kbit/s ... 12 Mbit/s
Interfaces	
Number of interfaces acc. to Industrial Ethernet	1
Number of electrical connections	
• at the 1st interface acc. to Industrial Ethernet	2
• at the 1st interface acc. to PROFIBUS	1
• for power supply	2
Type of electrical connection	
• at the 1st interface acc. to PROFIBUS	9-pin Sub-D socket (RS485)
• at the 1st interface acc. to Industrial Ethernet	RJ45 port
• for power supply	4-pole terminal block
Design of the removable storage C-PLUG	Yes
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage external	24 V
Supply voltage external at DC Rated value	24 V
Relative positive tolerance at DC at 24 V	20 %
Relative negative tolerance at DC at 24 V	15 %
Consumed current	
• from external supply voltage at DC at 24 V typical	0.2 A
• from external supply voltage at DC at 24 V maximum	0.3 A
Power loss [W]	4.8 W
Permitted ambient conditions	
Ambient temperature	
• for vertical installation during operation	0 ... 40 °C
• for horizontally arranged busbars during operation	0 ... 60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Width	100 mm
Height	117 mm
Depth	74 mm
Net weight	0.6 kg
Mounting type	
• 35 mm DIN rail mounting	Yes

Performance data PROFIBUS DP

Service as DP master	
• DPV1	Yes
Number of DP slaves on DP master usable	65
Amount of data	
• of the address area of the inputs as DP master total	2 048 byte
• of the address area of the outputs as DP master total	2 048 byte
• of the address area of the inputs per DP slave	244 byte
• of the address area of the outputs per DP slave	244 byte

Performance data S7 communication

Number of possible connections for S7 communication	
• maximum	32

Performance data multi-protocol mode

Number of active connections with multi-protocol mode	48
---	----

Performance data PROFINET communication as PN IO-Device

Product function PROFINET IO device	Yes
-------------------------------------	-----

Performance data telecontrol

Protocol is supported	
• TCP/IP	Yes
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	Yes
Configuration software	
• required	STEP 7 V5.5 SP4 or higher, STEP 7 Professional (TIA Portal), V14 Update 1 or higher, PST (Version V4.2 HF1 or higher)
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 - higher-level designation/location designation	Yes
• I&M3 - comment	Yes

Product functions switch

Product feature Switch	Yes
Product function	
• Configuration with STEP 7	Yes

Product functions Routing

Service as PROFIBUS dataset routing	Yes
Number of possible connections with dataset routing maximum	32

Product functions Redundancy

Product function	
• Ring redundancy	Yes
Protocol is supported Media Redundancy Protocol (MRP)	Yes

Product functions Time

Product function SICLOCK support	Yes
Product function pass on time synchronization	Yes
Protocol is supported	
• NTP	Yes

Supplementary Components

Network transitions

IE/PB LINK PN IO

Selection and ordering data

	Article No.		Article No.
IE/PB LINK PN IO	6GK1411-5AB10	S7-300 PS 307 load power supply	6ES7307-1BA01-0AA0
Network transition between Industrial Ethernet and PROFIBUS with PROFINET IO functionality, TCP/IP, S7 routing and data record routing, 10/100 Mbps Fast Ethernet, 9.6 to 12 Mbps PROFIBUS Including electronic manual on CD-ROM English, German, French, Spanish, Italian		24 V DC	
IE FC TP Standard Cable GP 2 x 2 (Type A)	6XV1840-2AH10	STEP 7 Version 5.6	
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compliant; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m		Target system: SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC Requirements: Windows Server 2016 Windows 7 SP1 Windows 10 Professional Windows 10 Enterprise Type of delivery: English, German, French, Spanish, Italian Including license key on USB flash drive, with electronic documentation	
IE FC RJ45 plug 180		For CP 343-1 Lean, CP 343-1, CP 343-1 Advanced, CP 343-1 ERPC, CP 443-1, CP 443-1 Advanced, CP 443-1 RNA	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface		• Floating license on DVD	6ES7810-4CC10-0YA5
• 1 pack = 1 unit	6GK1901-1BB10-2AA0	• Rental license for 50 hours	6ES7810-4CC10-0YA6
• 1 pack = 10 units	6GK1901-1BB10-2AB0	• Software Update Service on DVD (requires current software version)	6ES7810-4BC01-0YX2
• 1 pack = 50 units	6GK1901-1BB10-2AE0	• Upgrade floating license 3.x/4.x/5.x to V5.5; on DVD	6ES7810-4CC10-0YE5
IE FC stripping tool	6GK1901-1GA00	• Trial license STEP 7 V5.5; on DVD, 14 day trial	6ES7810-4CC10-0YA7
Pre-adjusted stripping tool for fast stripping of the Industrial Ethernet FC cables		STEP 7 Professional V14 SP1 Engineering Software	
CSM 377 Compact Switch Module	6GK7377-1AA00-0AA0	Target system: SIMATIC S7-300/-400, SIMATIC S7-1200/1500, SIMATIC C7, SIMATIC WinAC Requirement: Windows 7 Professional (32-bit) Windows 7 Enterprise (32-bit) Windows 7 Ultimate (32-bit) Microsoft Server 2003 R2 Std. SP2 (32-bit) Microsoft Server 2008 Std. SP2 (32-bit) Form of delivery: English, German, Chinese, Italian, French, Spanish	
Unmanaged switch for connection of a SIMATIC S7-300-CPU, ET 200M and up to three further nodes to Industrial Ethernet operating at 10/100 Mbps; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module including electronic manual on CD-ROM		For CP 1243-1, CP 1543-1, CM 1542-1, CP 343-1 Lean, CP 343-1, CP 343-1 Advanced, CP 343-1 ERPC, CP 443-1, CP 443-1 Advanced	
C-plug	6GK1900-0AB00	• STEP 7 Professional V14 SP1, floating license	6ES7822-1AA04-0YA5
Removable data storage medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot		• STEP 7 Professional V14 SP1, trial license	6ES7822-1AA04-0YA7
PROFIBUS FC Standard Cable GP	6XV1830-0EH10	• STEP 7 Professional, Software Update Service, 1 year; current software version required	6ES7822-1AA00-0YM5
Standard type with special design for fast mounting, 2-core, shielded,			
PROFIBUS FastConnect bus connection plug RS485 plug 180	6GK1500-0FC10		
With insulation displacement terminals, with 180° cable outlet, for industrial PC, SIMATIC HMI OP, OLM; max. transmission rate 12 Mbps			
PROFIBUS FastConnect Stripping Tool	6GK1905-6vAA00		
Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables			
S7-300 mounting rail	6ES7390-1AB60-0AA0		

Accessories

C-PLUG

BusAdapter

The BusAdapters offer a free selection of connection technology and physical characteristics for the PROFINET interface.

Alternatively, they can be used for the Industrial Ethernet interface on the device.

The following bus adapter versions are supported by the IE/PB LINK PN IO:

Versions with two PN copper interfaces (RJ45 or FastConnect (FC))

- BA 2xRJ45 with 2 RJ45 connections
- BA 2xFC with 2 FastConnect connections: enables maximum system availability, even when subjected to shocks and high electromagnetic loads. This is because the FastConnect cables are fully shielded and laid directly in the BusAdapter.

Versions with one or two PN fiber-optic cable (FOC) connections

- BA 2xSCRJ with 2 SCRJ FO connections with increased potential difference
- BA SCRJ / RJ45, each with one SCRJ FO and RJ45 connection (media converter)
- BA SCRJ / FC, each with one SCRJ FO and FastConnect connection (media converter)
- BA 2xLC with two glass fiber-optic connections (Lucent Connector) with increased potential difference
- BA SCRJ / RJ45, each with one glass fiber-optic and RJ45 connection (media converter)
- BA LC / FC with one glass fiber-optic and one FastConnect connection (media converter)

The version for connecting IP67 modules of the SIMATIC ET 200AL (BA-SEND, BA 1xFC) is not supported.

More information

<http://www.siemens.com/profinet>

Supplementary Components

Notes

Communication and Software



Communication

- 8/2 HART protocol
- 8/3 PROFIBUS
- 8/4 FOUNDATION Fieldbus

Software

- 8/5 SIMATIC PDM -
Process Device Manager
- 8/17 SITRANS DTM
- 8/18 SITRANS Library

Communication and Software

Communication

HART protocol

Overview

HART is a widely used communication standard for field devices. Specification of HART devices takes place through the HCF (HART Communication Foundation).

The HART standard expands the analog 4 to 20 mA signal for modulated, industry-proven, digital signal transmission.

Benefits

- Service-proven analog measured value transmission
- Simultaneous digital communication with bidirectional data transmission
- Possibility of transmitting several measured variables from one field device (e.g. diagnosis, maintenance and process data)
- Connection to higher-level systems such as PROFIBUS DP
- Easy installation and startup

Use in conjunction with SIMATIC PDM

- Cross-vendor operation of all HART devices by means of standardized parameter records
- HART field devices that are described by HART DD are integrated in SIMATIC PDM through the HCF catalog. HART DD (Device Description) is standardized in SIMATIC PDM, multi-vendor and very widely used. Other HART field devices are integrated in SIMATIC PDM through EDD (Electronic Device Description)
- Easy operation and startup of field devices, also in hard-to-reach locations
- Expanded diagnosis, evaluation and logging functions

Application

These devices can be connected in different ways:

- Using the distributed I/O system
 - SIMATIC ET 200M with the HART modules
 - SIMATIC ET 200iSP with the HART modules or with analog modules 4 to 20 mA and a HART handheld communicator
- Using a HART modem, with which a point-to-point connection is established between the PC or engineering station and the HART device
- Using HART multiplexers, which are contained in the HART server of the HCF

Integration

Siemens field devices for process automation which are listed in this catalog and can be controlled using HART:

Measuring instruments for pressure

SITRANS P300
SITRANS P310
SITRANS P320
SITRANS P DS III
SITRANS P410
SITRANS P420
SITRANS P500

Measuring instruments for temperature

SITRANS TF
SITRANS TH300
SITRANS TH320
SITRANS TH420
SITRANS TR320
SITRANS TR420
SITRANS TR300
SITRANS TW

Flowmeters

SITRANS F M MAG 5000
SITRANS F M MAG 6000 19" / IP67
SITRANS F M MAG 6000 I / I Ex
SITRANS F M Transmag 2
SITRANS F C MASS 6000 19" / IP67 / Ex d
SITRANS F C FCT030
SITRANS F S FST030
SITRANS FUS060
SITRANS FX300
SITRANS FX330

Measuring instruments for level

SITRANS Probe LR
SITRANS Probe LU
SITRANS LUT400
SITRANS LR200
SITRANS LR250
SITRANS LR260
SITRANS LR460
SITRANS LR560
SITRANS LG240 / LG 250 / LG 260 / LG 270

Positioners

SIPART PS2

Power supply units and isolation amplifiers

SITRANS I

Selection and Ordering data

Article No.

HART modem

With USB connection

7MF4997-1DB

Overview

Today, distributed automation solutions based on open field buses are state-of-the-art in large areas of the manufacturing industry and process engineering. It is only with field buses that the functional benefits of digital communication can be put to full use, e.g. better resolution of measured values, diagnosis options and remote parameterization.

PROFIBUS is today's most successful open field bus with a large installed base for a wide range of application. Standardization to IEC 61158 / EN 50170 provides you with future protection for your investment.

Benefits

- A uniform modular system from the sensor into the control level enables new plant concepts
- Problem-free exchangeability of field devices, including from different manufacturers, that comply with the standard profile
- Networking of transmitters, valves, actuators etc.
- Implementation of intrinsically safe applications through use of the field bus in hazardous areas
- Easy installation of 2-wire lines for joint energy supply and data transmission
- Reduced cabling costs through savings of material and installation time
- Reduced configuration costs through central, simple engineering of the field devices (PROFIBUS PA and HART with SIMATIC PDM, also cross-vendor)
- Fast and error-free installation
- Lower service costs thanks to simpler wiring and plant structure plus extensive diagnosis options
- Greatly reduced commissioning costs through simplified loop check
- Scaling/digitizing of the measured values in the field device already, hence no rescaling necessary in SIMATIC PCS 7

Application

PROFIBUS is suitable for fast communication with distributed I/Os (PROFIBUS DP) in production automation as well as for communication tasks in process automation (PROFIBUS PA). It is the first field bus system that meets the demands of both areas with identical communication services.

The transmission technique of the PROFIBUS PA is tailored to the needs of the process industry. Interoperability between field 10/11 devices from different manufacturers and remote parameterization of the field devices during operation are guaranteed by the standardized communication services.

Using SIMATIC PDM (Process Device Manager), a uniform and cross-vendor tool for configuring, parameterizing, commissioning and diagnosis of intelligent process devices on the PROFIBUS, it is possible to configure a wide variety of process devices from different manufacturers using one uniform graphical user interface.

PROFIBUS PA can just as readily be used in standard environments as well as hazardous areas. For use in hazardous areas, PROFIBUS PA and all connected devices have to be designed with type of explosion protection Ex [i].

The uniform protocol of PROFIBUS DP and PROFIBUS PA enables the two networks to be interlinked, thus combining time-based performance with intrinsically safe transmission.

Function

PROFIBUS PA expands PROFIBUS DP with near-process components for the direct connection of actuators and sensors.

For PROFIBUS PA the RS 485 transmission technique was replaced by a different technique optimized for intrinsically safe application. Both techniques are internationally standardized in IEC 61158.

PROFIBUS PA uses the same communication protocol as PROFIBUS DP; the communication services and telegrams are identical.

For PROFIBUS PA the data and energy supply for the field devices can be directed through a 2-wire line.

Integration

Siemens field devices for process automation which are listed in this catalog and can be controlled using PROFIBUS:

PROFIBUS PA

Measuring instruments for pressure

SITRANS P300
SITRANS P DS III
SITRANS P410

Measuring instruments for temperature

SITRANS TH400

Flowmeters

SITRANS F M MAG 6000 19" / IP67
SITRANS F M MAG 6000 I / I Ex
SITRANS F M Transmag 2
SITRANS F C MASS 6000 19" / IP67 / Ex d
SITRANS FUS060

Measuring instruments for level

Pointek CLS200 and CLS300
SITRANS Probe LU
SITRANS LR200
SITRANS LR250
SITRANS LR260
SITRANS LR460
SITRANS LR560

Electropneumatic positioners

SIPART PS2

Acoustic sensor for pump monitoring

SITRANS DA400

PROFIBUS DP

Measuring instruments for temperature

SITRANS TO500

Flowmeters

SITRANS F M MAG 6000 19" / IP67
SITRANS F M MAG 6000 I
SITRANS F C MASS 6000 19" / IP67
SIFLOW FC070 (via ET200M)

Measuring instruments for level

HydroRanger 200
MultiRanger 100/200

Acoustic sensor for pump monitoring

SITRANS DA400

Communication and Software

Communication

FOUNDATION Fieldbus

Overview

Today, distributed automation solutions based on open field buses are state-of-the-art in large areas of the process engineering industry. It is only with field buses that the functional benefits of digital communication can be put to full use, e.g. better resolution of measured values, diagnosis options and remote parameterization.

Like PROFIBUS PA, the FF bus (FOUNDATION Fieldbus) is an open field bus with a large installed base for a wide range of application. Standardization to IEC 61158 / EN 50170 provides you with future protection for your investment.

Benefits

- A uniform modular system from the sensor to the connection to the control level enables new plant concepts
- Networking of transmitters, valves, actuators etc.
- Implementation of intrinsically safe applications through use of the field bus in hazardous areas
- Easy installation of 2-wire cables for joint energy supply and data transfer
- Reduced cabling costs through savings of material and installation time.
- Reduced configuration costs through central, simple engineering of the field devices, also cross-vendor
- Fast and error-free installation
- Lower service costs thanks to simpler wiring and plant structure plus extensive diagnosis options
- Greatly reduced commissioning costs through simplified loop check
- Scaling/digitizing of the measured values in the field device already, hence no rescaling necessary in SIMATIC PCS 7

Application

The transfer technology of the FOUNDATION Fieldbus is tailored to the needs of the process industry. Interoperability between field devices from different manufacturers and remote parameterization of the field devices during operation are guaranteed by the standardized communication services.

FOUNDATION Fieldbus can just as readily be used in standard environments as in hazardous areas. For use in hazardous areas, FOUNDATION Fieldbus and all connected devices have to be designed with type of explosion protection Ex [i].

Function

FOUNDATION Fieldbus enables the direct connection of actuators and sensors.

FOUNDATION Fieldbus is based on a transfer optimized for intrinsically safe application. The transfer technology is internationally standardized in IEC 61158.

For FOUNDATION Fieldbus the data and energy supply for the field devices can be directed through a 2-wire cable.

FOUNDATION Fieldbus enables device-to-device communication ("control in the field").

Integration

Siemens field devices for process automation which are listed in this catalog and can be controlled using Foundation Fieldbus:

Measuring instruments for pressure

SITRANS P300

SITRANS P DS III

SITRANS P410

Measuring instruments for temperature

SITRANS TH400

Electropneumatic positioners

SIPART PS2

Flowmeters

SITRANS F M MAG 6000

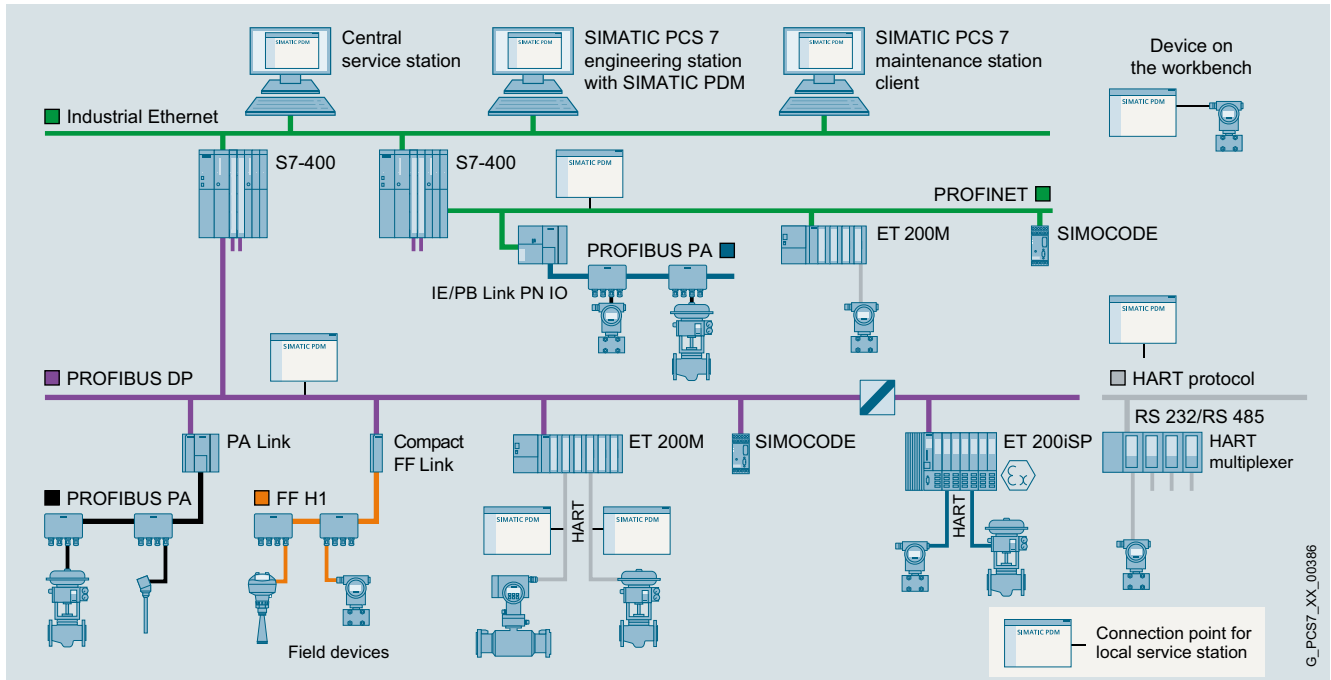
SITRANS F M MAG 6000 I / I Ex

SITRANS F C MASS 6000

Level meters

SITRANS LR250

SITRANS LR560

Overview

Configuration options with SIMATIC PDM

SIMATIC PDM (Process Device Manager) is a universal, vendor-independent tool for the configuration, parameter assignment, commissioning, diagnostics and servicing of intelligent field devices (sensors and actuators) and field components (remote I/Os, multiplexers, control-room devices, compact controllers), which in the following sections will be referred to simply as devices.

With *one* software product, SIMATIC PDM enables users to work with over 3 500 devices and device variants of Siemens and over 200 other manufacturers worldwide on a *single* homogeneous user interface.

The user interface satisfies the requirements of the VDI/VDE GMA 2187 and IEC 65/349/CD directives. Parameters and functions for all supported devices are displayed in a consistent and uniform fashion independent of their communications interface. Even complex devices with several hundred parameters can be represented clearly and processed quickly. Using SIMATIC PDM it is very easy to navigate in highly complex stations such as remote I/Os and even connected field devices.

From the viewpoint of device integration, SIMATIC PDM is the most powerful open process device manager on the global market. Devices not previously supported can be integrated in SIMATIC PDM by importing their device description packages (either EDD or FDI). This provides security for your investment and saves you investment costs, training expenses and follow-up costs.

SIMATIC PDM supports the operative system management in particular through:

- Uniform presentation and operation of devices
- Uniform representation of diagnostics information
- Indicators for preventive maintenance and servicing
- Detection of changes in the project and device
- Increasing the operational reliability
- Reducing the investment, operating and maintenance costs
- Quantity options for
 - Transfer of parameters between devices
 - Transfer of parameter sets to the devices
 - Export and import functions
 - Diagnostics update

Communication and Software

Software

Process Device Manager SIMATIC PDM

SIMATIC PDM can be used extremely flexibly and tailored to a specific task for field device service:

- Single-point station for point-to-point connection to field devices
- Local service and parameter assignment station with connection to fieldbus segments
- Central service and parameter assignment station with connection to plant bus
- Central HART service and parameter assignment station for HART multiplexers and WirelessHART field devices
- Integrated into the SIMATIC PDM stand-alone maintenance station
- Integrated into the SIMATIC PCS 7 process control system

Maintenance personnel can assign field device parameters at mobile and stationary workstations with SIMATIC PDM. Practically every workstation integrated in the production plant can be used for configuration. Service personnel are thus able to work directly at the location of the field device, while data is stored centrally in the engineering station or maintenance station. This leads to a significant shortening of maintenance and travel times. Additional device-independent system functions support higher-level maintenance stations for creating progress lists for work and servicing.

When a maintenance station is configured in the SIMATIC PCS 7 process control system, SIMATIC PDM is integrated into it and transmits parameter data, diagnostic information and processing information. You can switch directly to the SIMATIC PDM views from the diagnostics faceplates in the maintenance station to perform diagnostics and work on the device in more detail.

A SIMATIC PDM user administration system based on SIMATIC Logon is used to assign various roles with defined function privileges to users. These function privileges refer to SIMATIC PDM system functions, e.g. writing to the device.

For all devices integrated with device description packages, SIMATIC PDM provides a range of information for display and further processing on the maintenance station, for example:

- Device type information (electronic rating plate)
- Detailed diagnostics information (manufacturer information, information on error diagnostics and troubleshooting, further documentation)
- Results of internal condition monitoring functions
- Status information (for example local configuration changes), device test completed
- Information on changes (audit trail report)
- Parameter information

Design

Components	Product packages							
	SIMATIC PDM Stand alone				SIMATIC PDM system-integrated			
	Minimum configuration	Basic configuration	Service and parameter assignment station		in the configuration environment			
			local	central	SIMATIC S7	SIMATIC PCS 7		
	PDM Single Point	PDM Basic	PDM Service	PDM Stand alone Server	PDM S7	PDM PCS 7	PDM PCS 7 Server	PDM PCS 7 FF
SIMATIC PDM TAGs ¹⁾ in product package	1	4	4 + 50	4 + 100	4 + 100	4 + 100	4 + 100	4 + 100
SIMATIC PDM expansion options								
Count Relevant - 10 TAGs Licenses - 100 TAGs (accumulative) - 1 000 TAGs	<i>cannot be expanded</i>	o	o	o	o	o	o	o
SIMATIC PDM Basic		●	●	●	●	●	●	●
SIMATIC PDM Extended		o	o	●	●	●	●	●
SIMATIC PDM integration in STEP 7/PCS 7		o	o	o	●	●	●	●
SIMATIC PDM Routing ²⁾		o	o	o	o	●	●	●
SIMATIC PDM Server		o	o	●	o	o	●	o
SIMATIC PDM 1 Client ³⁾		o	o	● (2 x)	o	o	o	o
SIMATIC PDM Communication FOUNDATION Fieldbus		–	–	–	o	o	o	●
SIMATIC PDM HART server		o	o	o	o	–	–	–

SIMATIC PDM product structure

- Product component is part of the product package
- o Optional product component for the product package; order additive
- Product component is not relevant for the product package or not available

1) For TAG definition, see "Design" section under "SIMATIC PDM TAGs"

2) In combination with SIMATIC PDM Integration in STEP 7/PCS 7

3) In combination with SIMATIC PDM Server

Customer-oriented product structure

The customer-oriented product structure of SIMATIC PDM provides optimal support for the named main use cases and enables you to adapt the scope of functions and performance to your individual requirements. The product range is organized as follows:

SIMATIC PDM Stand alone product packages

- SIMATIC PDM Single Point, a minimum configuration for single device handling
- SIMATIC PDM Basic for local service and parameter assignment stations as well as basic configuration for individual product package with optional product components
- SIMATIC PDM Service for local service and parameter assignment stations
- SIMATIC PDM Stand alone Server for central service and parameter assignment stations, e.g. for various plant units

SIMATIC PDM system-integrated product packages

- SIMATIC PDM S7 for local SIMATIC S7 engineering and service stations
- Various configurations for central SIMATIC PCS 7 engineering and service stations:
 - SIMATIC PDM PCS 7
 - SIMATIC PDM PCS 7 Server (enables device parameter assignment and diagnostics on clients of the PCS 7 engineering station and PCS 7 Maintenance Station)
 - SIMATIC PDM PCS 7-FF (supports the FOUNDATION Fieldbus H1)

In some circumstances, the product packages can be expanded with optional product components.

Communication and Software

Software

Process Device Manager SIMATIC PDM

Product range	SIMATIC PDM V9.1							
	Single Point	Basic	Service	Stand alone Server	S7	PCS 7	PCS 7 Server	PCS 7-FF
TAGs contained	1	4	4 + 50	4 + 100	4 + 100	4 + 100	4 + 100	4 + 100
Project: Create offline	●	●	●	●	●	●	●	●
Project: Usable TAG extensions	–	●	●	●	●	●	●	●
Project: Process device network view	●	●	●	●	●	●	●	●
Project: Process device plant view	●	●	●	●	●	●	●	●
Project: Export/import devices	–	–	●	●	–	–	–	–
Project: Export/import parameters	–	o	●	●	●	●	●	●
Project: HW Config	–	o	o	o	●	●	●	●
Project: Utilization of SIMATIC PDM options	–	●	●	●	●	●	●	●
Project: Integration in STEP 7/PCS 7	–	o	o	o	●	●	●	●
Group operations	–	o	o	●	o	●	●	●
Setting device IDs	–	o	o	●	o	●	●	●
Communication: HART modem	●	●	●	●	●	–	–	–
Communication: HART interface	●	●	●	●	●	–	–	–
Communication: PROFIBUS DP/PA	●	●	●	●	●	●	●	●
Communication: HART over PROFIBUS DP	●	●	●	●	●	●	●	●
Communication: FF H1	–	–	–	–	o	o	o	●
Communication: Modbus	●	●	●	●	●	●	●	●
Communication: Ethernet	●	●	●	●	●	●	●	●
Communication: PROFINET	●	●	●	●	●	●	●	●
Communication: HART over PROFINET	●	●	●	●	●	●	●	●
Devices: Export/import parameters	–	o	o	●	●	●	●	●
Devices: Comparison of parameter values	–	o	o	●	●	●	●	●
Devices: Saving parameters	●	●	●	●	●	●	●	●
Devices: Change log (Audit Trail)	–	o	o	●	●	●	●	●
Devices: Calibration report	–	o	o	●	●	●	●	●
Devices: Print function	●	o	o	●	●	●	●	●
Devices: Document manager	–	o	o	●	●	●	●	●
Lifelist: Basic functionality	●	●	●	●	●	●	●	●
Lifelist: Expanded functionality (scan range, diagnostics, export, addressing)	–	o	o	●	●	●	●	●
Communication: Data record routing	–	o	o	o	o	●	●	●
Communication: HART multiplexer	–	o	o	o	o	–	–	–
Communication: Wireless HART	–	o	o	o	o	–	–	–
Function: HART SHC mode (increased communication speed)	●	●	●	●	●	●	●	●
Function: Device parameterization on PCS 7 maintenance station clients	–	o	o	o	o	o	●	o
Function: Device parameter assignment on SIMATIC PDM clients	–	o	o	● (2 x)	o	o	o	o

SIMATIC PDM overview of functions and features

- Product component is part of the product package
- o Optional product component for the product package; order additive
- Product component is not relevant for the product package or not available

SIMATIC PDM Stand alone product packages
SIMATIC PDM Single Point V9.1

This minimum configuration with handheld functionality is intended for handling exactly *one* field device via point-to-point coupling. It cannot be expanded with functions or with SIMATIC PDM TAG or SIMATIC PDM 1 Client licenses. Upgrading to a different product variant, e.g. SIMATIC PDM Basic, or a different product version is also not possible.

Supported communication types:

- PROFIBUS DP/PA
- HART communication (modem, RS 232 and via PROFIBUS/PROFINET)
- Modbus
- Ethernet
- PROFINET

The functionality is matched accordingly. The device functions are supported as defined in the device description, for example:

- Managing the device library and unlimited device selection
- Parameter assignment and diagnostics according to the device description
- Exporting and importing of parameter data
- Device identification
- Lifelist
- Printing the parameter list

SIMATIC PDM Basic V9.1

SIMATIC PDM Basic is for local service and parameter assignment stations on any computers (IPC/notebook) with local connection to bus segments or direct connection to the device.

Supported communication types:

- PROFIBUS DP/PA
- HART communication (modem, RS 232 and via PROFIBUS/PROFINET)
- Modbus
- Ethernet
- PROFINET

SIMATIC PDM Basic is equipped with all basic functions required for operation and parameter assignment of devices. That is, compared to SIMATIC PDM Single Point, it has the following additional functions:

- EDD-based diagnostics in the lifelist
- Memory function (only exporting and importing of parameter data)
- Report function
- Communication with HART field devices via remote I/Os

As a basic block for an individual configuration, SIMATIC PDM Basic can be expanded with all functional SIMATIC PDM options (PDM Routing only in combination with PDM Integration in STEP 7/PCS 7 required) as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs. Without TAG expansion, SIMATIC PDM Basic is suitable for projects with up to 4 TAGs. SIMATIC PDM 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option.

The SIMATIC PDM Extended option allows the activation of additional SIMATIC PDM system functions (for details, see SIMATIC PDM Extended V9.1 under "Optional product components").

SIMATIC PDM Service V9.1

With this product package for extended service, local service and parameter assignment stations can be realized on any type of computer (IPC/notebook) with a local connection to a bus segment or direct connection to field devices.

It comprises:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- 50 SIMATIC PDM TAGs

Like SIMATIC PDM Basic, SIMATIC PDM Service can be expanded with all functional SIMATIC PDM options (PDM Routing only in combination with PDM Integration in STEP 7/PCS 7 required) as well as with cumulative SIMATIC PDM TAGs (sets of 10, 100 or 1 000) (see "Optional product components"). SIMATIC PDM 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option. It is permitted to upgrade to another product version.

Note: For use of gateways and for PROFINET or Ethernet communication with field devices, SIMATIC PDM TAG licenses are charged for according to the objects configured in the process device plant view as follows:

- 10 SIMATIC PDM TAGs per S7 DSGW (data record gateway) with one PROFIBUS subnet
- 20 SIMATIC PDM TAGs per S7 DSGW with more than one PROFIBUS subnet
- 10 TAGs per IE/PB Link
- 1 TAG per field device (except in the case of special specifications)

SIMATIC PDM stand-alone server V9.1

With the SIMATIC PDM Stand alone Server product package, you can establish central service and parameter assignment stations that operate according to the client/server principle. Portals opened on licensed SIMATIC PDM clients (SIMATIC PDM sessions) enable handling of production plant field devices via the SIMATIC PDM server on the plant bus assigned via registration. The product package can be used multiple times within a plant, e.g. for various plant units. It comprises:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM Server
- 2 × SIMATIC PDM 1 Client
- 100 SIMATIC PDM TAGs

SIMATIC PDM Stand alone Server can be expanded with all functional SIMATIC PDM options (PDM Routing only in combination with PDM Integration in STEP 7/PCS 7 required) as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs and SIMATIC PDM 1-client licenses (see "Optional product components"). The portals opened on these clients (SIMATIC PDM sessions) must also be licensed with the SIMATIC PDM 1-client licenses (besides the SIMATIC PDM clients). For details about this, refer to "SIMATIC PDM 1 Client" under "Optional product components". For user management of the SIMATIC PDM clients, the SIMATIC Logon product is also required. It is possible to upgrade to another product version.

Note: For use of gateways and for PROFINET or Ethernet communication with field devices, SIMATIC PDM TAG licenses are charged according to the objects configured in the process device plant view (for details, see corresponding note under SIMATIC PDM Service V9.1).

Communication and Software

Software

Process Device Manager SIMATIC PDM

SIMATIC PDM system-integrated product packages

SIMATIC PDM S7 V9.1

The SIMATIC PDM S7 product package designed for use in a SIMATIC S7 configuration environment is intended for setup of a local SIMATIC S7 engineering and service station. It requires the installation of STEP 7 V5.5+SP4. It includes:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- 100 SIMATIC PDM TAGs

SIMATIC PDM S7 can be expanded with the functional options SIMATIC PDM Routing, SIMATIC PDM Communication FOUNDATION Fieldbus, SIMATIC PDM Server, and SIMATIC PDM HART Server as well as with cumulative SIMATIC PDM TAGs (sets of 10, 100 or 1 000) (see "Optional product components"). SIMATIC PDM 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option.

SIMATIC PDM PCS 7 V9.1

The SIMATIC PDM PCS 7 product package suitable for use in a SIMATIC PCS 7 configuration environment is intended for use in a central SIMATIC PCS 7 engineering and service station. It comprises:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- 100 SIMATIC PDM TAGs

SIMATIC PDM PCS 7 can be expanded with the functional options SIMATIC PDM Communication FOUNDATION Fieldbus and SIMATIC PDM Server as well as with cumulative SIMATIC PDM TAGs (sets of 10, 100 or 1 000) (see "Optional product components"). SIMATIC PDM 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option.

SIMATIC PDM PCS 7 Server V9.1

Instead of SIMATIC PDM PCS 7, the SIMATIC PDM PCS 7 Server product package expanded with the SIMATIC PDM Server option can also be used for a central SIMATIC PCS 7 engineering and service station. Field devices integrated using an Electronic Device Description (EDD) can then be assigned parameters on any client of the SIMATIC PCS 7 Maintenance Station as well as on local SIMATIC PDM clients. The following are components of SIMATIC PDM PCS 7 Server:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- SIMATIC PDM Server
- 100 SIMATIC PDM TAGs

SIMATIC PDM PCS 7 Server can be expanded with the functional option SIMATIC PDM Communication FOUNDATION Fieldbus as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs and SIMATIC PDM 1-Client licenses (see "Optional product components"). The portals opened on these clients (SIMATIC PDM sessions) must also be licensed with the SIMATIC PDM 1-client licenses (besides the SIMATIC PDM clients). For details about this, refer to "SIMATIC PDM 1 Client" under "Optional product components".

SIMATIC PDM PCS 7-FF V9.1

Instead of SIMATIC PDM PCS 7, the SIMATIC PDM PCS 7-FF product package expanded with the SIMATIC PDM Communication FOUNDATION Fieldbus option can also be used for a central SIMATIC PCS 7 engineering and service station. This additionally supports parameter assignment of field devices on FOUNDATION Fieldbus H1. Components of SIMATIC PDM PCS 7-FF are:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- SIMATIC PDM Communication FOUNDATION Fieldbus
- 100 SIMATIC PDM TAGs

SIMATIC PDM PCS 7-FF V9.1 can be expanded with the functional option SIMATIC PDM Server as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs (see "Optional product components"). SIMATIC PDM 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option.

Optional product components

SIMATIC PDM Extended V9.1 option

The SIMATIC PDM Extended option enables you to unlock other system functions for SIMATIC PDM Basic and SIMATIC PDM, for example:

- Change log
- Calibration report
- Extended information in the Lifelist
- Export and import functions
- Print functions
- Document manager
- Comparison function
- Group operations
- Setting device IDs

This functionality is already integrated in the following product packages: SIMATIC PDM Stand alone Server, SIMATIC PDM S7, SIMATIC PDM PCS 7, SIMATIC PDM PCS 7 Server and SIMATIC PDM PCS 7-FF.

SIMATIC PDM Integration option in STEP 7/PCS 7 V9.1

This option is used for the integration of SIMATIC PDM in a SIMATIC S7 or SIMATIC PCS 7 configuration environment. SIMATIC PDM can then be started directly from the hardware configurator (HW Config) in STEP 7/SIMATIC PCS 7.

This functionality is already integrated in the product packages of category "SIMATIC PDM system-integrated" (SIMATIC PDM S7, SIMATIC PDM PCS 7, SIMATIC PDM PCS 7 Server, and SIMATIC PDM PCS 7-FF).

SIMATIC PDM Routing V9.1 option

If SIMATIC PDM is used on an engineering station, the SIMATIC PDM Routing option enables handling of every device in the field that can be configured per EDD throughout the plant and across different bus systems and remote I/Os. SIMATIC PDM Routing can be used in combination with SIMATIC PDM Integration in STEP 7/SIMATIC PCS 7.

Routing is already integrated in SIMATIC PDM PCS 7, SIMATIC PDM PCS 7 Server, and SIMATIC PDM PCS 7-FF. SIMATIC PDM Routing can be additionally installed as an option on a local SIMATIC S7 engineering and service station with SIMATIC PDM S7.

SIMATIC PDM Server V9.1 option

The server functionality can be activated in a local or central service station with this option. It enables parameter assignment of selected field devices on any client of the SIMATIC PCS 7 Maintenance Station as well as on local SIMATIC PDM clients. This functionality is already integrated in the SIMATIC PDM Stand alone Server and SIMATIC PDM PCS 7 Server. The SIMATIC PDM clients as well as the portals opened on these clients (SIMATIC PDM sessions) must be licensed with SIMATIC PDM 1 client licenses. For details about this, refer to "SIMATIC PDM 1 Client" under "Optional product components".

SIMATIC PDM Communication FOUNDATION Fieldbus V9.1 option

In a SIMATIC S7/PCS 7 configuration environment, using this option SIMATIC PDM can communicate with field devices on the FOUNDATION Fieldbus H1 via the FF link.

This functionality is already integrated in the SIMATIC PDM PCS 7-FF product package.

SIMATIC PDM HART Server V9.1 option

This option permits the use of HART multiplexers from various vendors in SIMATIC PDM. Furthermore, wireless HART field devices can also be parameterized with SIMATIC PDM.

SIMATIC PDM TAGs (version-independent)

Depending on the project size, the SIMATIC PDM TAGs supplied with a product package (except SIMATIC PDM Single Point) can be cumulatively expanded with sets of 10, 100 or 1 000 SIMATIC PDM TAGs.

A SIMATIC PDM TAG corresponds to a SIMATIC PDM object that represents the individual field devices or field components within a project, e.g. measuring instruments, positioners, switching devices or remote I/Os. SIMATIC PDM TAGs are also relevant for diagnostics with the lifelist of SIMATIC PDM. In this case, TAGs are considered to be all recognized devices with diagnostics capability, whose detailed diagnostics is effected through the device description (EDD).

SIMATIC PDM 1 Client (version-independent)

SIMATIC PDM 1 Client is a cumulative single-client license for SIMATIC PDM configurations with SIMATIC PDM server, for example SIMATIC PDM stand-alone server or SIMATIC PDM PCS 7 server. The license is used to activate registered SIMATIC PDM clients and SIMATIC PDM sessions (opened portals) on these clients.

Each "SIMATIC PDM 1 Client" license activates one SIMATIC PDM client with one SIMATIC PDM session. A SIMATIC PDM session is defined as one opened portal together with the parameter views of the field devices opened from the portal. Each additional simultaneously opened SIMATIC PDM session on this client requires its own "SIMATIC PDM 1 Client" license. For larger projects, up to 30 registered SIMATIC PDM Clients are possible.

The "SIMATIC PDM 1 Client" license must be transferred to the computer with the SIMATIC PDM Server. The SIMATIC PDM Standalone Server product package comes with 2 "SIMATIC PDM 1 Client" licenses.

SIMATIC PDM Software Media Package V9.1

The current SIMATIC PDM installation software is offered without a license in the form of the SIMATIC PDM Software Media Package. Purchasing of corresponding software licenses is necessary to unlock the product-specific functionalities.

With SIMATIC PDM product packages, when supplied via physical delivery (not with optional product components), a SIMATIC PDM Software Media Package is supplied together with each ordering item. Further SIMATIC PDM Software Media Packages must be ordered separately as required.

The software of the SIMATIC PDM Media Package without a license can be used for demonstration purposes in demo mode. The SIMATIC PDM functionality is limited as follows in demo mode:

- Stand alone mode
- Storage functions disabled
- Export and import functions disabled
- Expanded functionality disabled
- Communication functions restricted

Information on ordering and delivery

SIMATIC PDM is among the products for which the installation software is provided in the form of a software media package. Software media packages and product-specific software licenses are separate packages, which are not merged into a single delivery unit for a physical delivery.

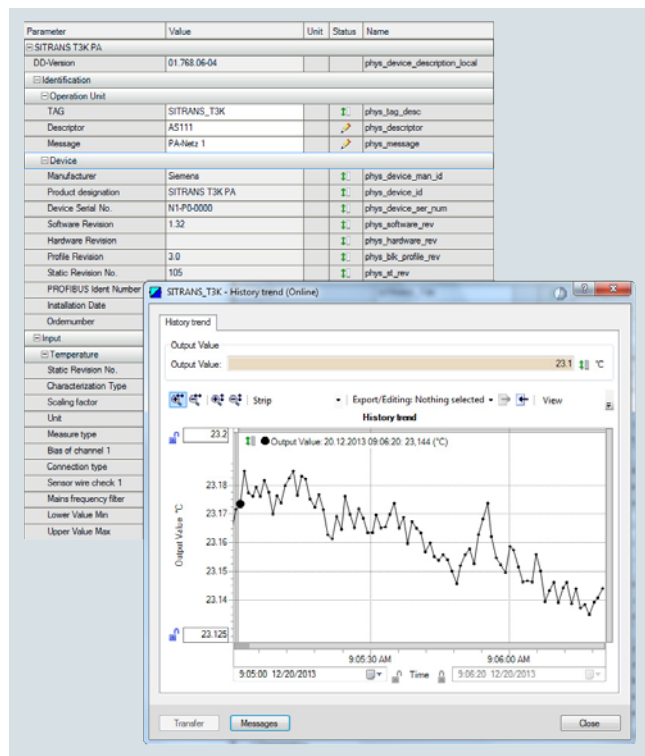
The number of delivered software media packages can be determined by the number of ordered items. You can find more information under "Delivery form package" in the "Software Media and Logistics", "PCS 7 Software Packages" section of the ST PCS 7 catalog.

Communication and Software

Software

Process Device Manager SIMATIC PDM

Function



SIMATIC PDM, parameter view and trend window

SIMATIC PDM core functions

- Creation of project-specific device libraries
- Adjustment and modification of device parameters
- Comparing (e.g. project and device data)
- Plausibility testing of data input
- Device identification and testing
- Device status indication (operating modes, interrupts, states)
- Simulation
- Diagnostics (standard, detailed)
- Export/import (parameter data, logs, documents)
- Management (e.g. networks and PCs)
- Commissioning functions, e.g. measuring circuit tests of device data
- Lifecycle management functions, e.g. for device replacement
- Global and device-specific modification logbook for user operations (audit trail)
- Device-specific calibration reports
- Graphic presentations of echo envelope curves, trend displays, valve diagnosis results etc.
- Presentation of incorporated manuals
- Document manager for integration of up to 10 multimedia files

Integration

Device integration

SIMATIC PDM supports all devices defined by the Electronic Device Description (EDD) and devices described by Field Device Integration Technology (FDI Technology V1.2). EDD is standardized to EN 50391 and IEC 61804. Internationally it is the most widely used standardized technology for device integration. At the same time, it is the guideline of the established organizations for

- PROFIBUS and PROFINET (PI – PROFIBUS & PROFINET International)
- HART (FCG: Field Communication Group)
- Foundation Fieldbus (FCG: Field Communication Group)

The devices are integrated directly in SIMATIC PDM through a company-specific EDD or through the libraries of the FCG. To achieve improved transparency, they can be managed in project-specific device libraries.

Field devices are described in the EDD or FDI device description packages in terms of functionality and construction using the Electronic Device Description Language (EDDL). Using this description, SIMATIC PDM automatically creates its user interfaces with the specific device data. By simply importing the manufacturer's device-specific device description packages, you can update existing devices and integrate further devices in SIMATIC PDM.

Technical support

If you wish to use devices which cannot be found in the SIMATIC PDM device description library, we would be pleased to help you integrate them.

Support Request

You can request support by service specialists at Technical Support by using a "Support Request" on the Internet:

www.siemens.com/automation/support-request

Contacts in the Region

The Technical Support responsible for your region can be found on the Internet at:

www.automation.siemens.com/partner

Technical specifications

SIMATIC PDM V9.1	
Hardware	<ul style="list-style-type: none"> • PG/PC/notebook with processor corresponding to operating system requirements
Operating system (alternatives)	<ul style="list-style-type: none"> • Windows 7 Professional/Ultimate/Enterprise SP1, 32-bit/64-bit • Windows 10 Enterprise 2015 LTSC 64-bit • Windows Server 2012 R2 Standard Edition, 64-bit
Integration in STEP 7/PCS 7	<ul style="list-style-type: none"> • SIMATIC PCS 7 V8.0+SP2/V8.1/V8.2 (without Communication FOUNDATION Fieldbus) • SIMATIC PCS 7 V9.0 • STEP 7 V5.5+SP4/V5.6
SIMATIC PDM Client	<ul style="list-style-type: none"> • Microsoft Internet Explorer 10 or 11 • Google Chrome

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Communication and Software

Software

Process Device Manager SIMATIC PDM

	Article No.		Article No.
SIMATIC PDM system-integrated product packages Configuration for local SIMATIC S7 engineering and service station SIMATIC PDM S7 V9.1 Product package for use in a SIMATIC S7 configuration environment, with - SIMATIC PDM Basic incl. 4 TAGs - SIMATIC PDM Extended - SIMATIC PDM Integration in STEP 7/PCS 7 - 100 TAGs 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user Without SIMATIC PCS 7 Software Media Package • Goods delivery License key on USB flash drive and certificate of license, bundled with 1 x SIMATIC PDM Software Media Package per order item • Online delivery License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) <u>Note: Email address required!</u>		SIMATIC PDM PCS 7-FF V9.1 Product package for use in a SIMATIC PCS 7 configuration environment, including FOUNDATION Fieldbus H1 communication 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information) Floating license for 1 user, with - SIMATIC PDM Basic incl. 4 TAGs - SIMATIC PDM Extended - SIMATIC PDM Integration in STEP 7/PCS 7 - SIMATIC PDM Routing - SIMATIC PDM Communication FOUNDATION Fieldbus - 100 TAGs Without SIMATIC PCS 7 Software Media Package • Goods delivery License key on USB flash drive and certificate of license, bundled with 1 x SIMATIC PDM Software Media Package per order item • Online delivery License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) <u>Note: Email address required!</u>	
	6ES7658-3KD68-0YA5		6ES7658-3MD68-0YA5
	6ES7658-3KD68-0YH5		6ES7658-3MD68-0YH5
Configuration for central SIMATIC PCS 7 engineering and service stations SIMATIC PDM PCS 7 V9.1 Product package for use in a SIMATIC PCS 7 configuration environment 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information) Floating license for 1 user, with - SIMATIC PDM Basic incl. 4 TAGs - SIMATIC PDM Extended - SIMATIC PDM Integration in STEP 7/PCS 7 - SIMATIC PDM Routing - 100 TAGs Without SIMATIC PCS 7 Software Media Package • Goods delivery License key on USB flash drive and certificate of license, bundled with 1 x SIMATIC PDM Software Media Package per order item • Online delivery License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) <u>Note: Email address required!</u>		SIMATIC PDM PCS 7 Server V9.1 Product package for use in a SIMATIC PCS 7 configuration environment, including server functionality 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information) Single license for 1 installation, with - SIMATIC PDM Basic incl. 4 TAGs - SIMATIC PDM Extended - SIMATIC PDM Integration in STEP 7/PCS 7 - SIMATIC PDM Routing - SIMATIC PDM Server - 100 TAGs Without SIMATIC PCS 7 Software Media Package • Goods delivery License key on USB flash drive and certificate of license, bundled with 1 x SIMATIC PDM Software Media Package per order item • Online delivery License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) <u>Note: Email address required!</u>	
	6ES7658-3LD68-0YA5		6ES7658-3TD68-0YA5
	6ES7658-3LD68-0YH5		6ES7658-3TD68-0YH5

Article No.		Article No.	
Optional product components for SIMATIC PDM			
SIMATIC PDM Extended V9.1 For enabling additional system functions 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user Without SIMATIC PCS 7/SIMATIC PDM Software Media Package <ul style="list-style-type: none"> • Goods delivery License key on USB flash drive and certificate of license • Online delivery (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license <u>Note:</u> Email address required! 	6ES7658-3NX68-2YB5	SIMATIC PDM Server V9.1 For activating the server functionality 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information), single license for 1 installation Without SIMATIC PCS 7/SIMATIC PDM Software Media Package <ul style="list-style-type: none"> • Goods delivery License key on USB flash drive, certificate of license • Online delivery License key download and online certificate of license <u>Note:</u> Email address required! 	6ES7658-3TX68-2YB5 6ES7658-3TX68-2YH5
	6ES7658-3NX68-2YH5		
SIMATIC PDM Integration in STEP 7/SIMATIC PCS 7 V9.1 For integration in a SIMATIC S7/SIMATIC PCS 7 configuration environment 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user Without SIMATIC PCS 7/SIMATIC PDM Software Media Package <ul style="list-style-type: none"> • Goods delivery License key on USB flash drive and certificate of license • Online delivery License key download and online certificate of license <u>Note:</u> Email address required! 	6ES7658-3BX68-2YB5	SIMATIC PDM Communication FOUNDATION Fieldbus V9.1 For communication with field devices on FOUNDATION Fieldbus H1 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user Without SIMATIC PCS 7/SIMATIC PDM Software Media Package <ul style="list-style-type: none"> • Goods delivery License key on USB flash drive and certificate of license • Online delivery License key download and online certificate of license <u>Note:</u> Email address required! 	6ES7658-3QX68-2YB5 6ES7658-3QX68-2YH5
	6ES7658-3BX68-2YH5		
SIMATIC PDM Routing V9.1 For plant-wide navigation to field devices 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user Without SIMATIC PCS 7/SIMATIC PDM Software Media Package <ul style="list-style-type: none"> • Goods delivery License key on USB flash drive and certificate of license • Online delivery License key download, online certificate of license <u>Note:</u> Email address required! 	6ES7658-3CX68-2YB5	SIMATIC PDM HART Server V9.1 For using HART multiplexers as well as for configuration of wireless HART field devices 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user Without SIMATIC PCS 7/SIMATIC PDM Software Media Package <ul style="list-style-type: none"> • Goods delivery License key on USB flash drive and certificate of license • Online delivery License key download and online certificate of license <u>Note:</u> Email address required! 	6ES7658-3EX68-2YB5 6ES7658-3EX68-2YH5
	6ES7658-3CX68-2YH5		

Communication and Software

Software

Process Device Manager SIMATIC PDM

	Article No.		Article No.
SIMATIC PDM 1 Client Cumulative client license for SIMATIC PDM configurations with SIMATIC PDM Server, software class A, single license for 1 installation <ul style="list-style-type: none"> • Goods delivery License key on USB flash drive and certificate of license • Online delivery License key download and online certificate of license <u>Note:</u> Email address required! 	6ES7658-3UA00-2YB5 6ES7658-3UA00-2YH5	SIMATIC PDM Software Media Package	
SIMATIC PDM TAGs TAG licenses for expanding the available TAG volume, cumulative, software class A, floating license for 1 user <ul style="list-style-type: none"> • Goods delivery License key on USB flash drive and certificate of license <ul style="list-style-type: none"> - 10 TAGs - 100 TAGs - 1 000 TAGs • Online delivery License key download and online certificate of license <u>Note:</u> Email address required! <ul style="list-style-type: none"> - 10 TAGs - 100 TAGs - 1 000 TAGs 	6ES7658-3XC00-2YB5 6ES7658-3XD00-2YB5 6ES7658-3XE00-2YB5 6ES7658-3XC00-2YH5 6ES7658-3XD00-2YH5 6ES7658-3XE00-2YH5	SIMATIC PDM Software Media Package V9.1 Installation software without license, 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSC 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information) Without SIMATIC PCS 7 Software Media Package <u>Note:</u> Can only be used in conjunction with a valid license or in demo mode! <ul style="list-style-type: none"> • Goods delivery SIMATIC PDM and device library software on DVD • Online delivery SIMATIC PDM and device library software download <u>Note:</u> Email address required! 	6ES7658-3GX68-0YT8 6ES7658-3GX68-0YG8

More information

Update/Upgrade

Existing installations based on SIMATIC PDM V6.x or V8.x/V9.0 (including SP in each case) can be upgraded straight to V9.1 with upgrade packages.

Projects with SIMATIC PDM V7.0 can only be upgraded to version 9.1 by first upgrading to version 8.0. Two upgrade packages are offered for SIMATIC PDM V8.x/V9.0:

- SIMATIC PDM Upgrade Package Basic¹⁾ (with/without SIMATIC PDM HART Server in each case) for configurations based on:
 - SIMATIC PDM Basic
 - SIMATIC PDM Service
 - SIMATIC PDM S7
 - SIMATIC PDM PCS 7
- SIMATIC PDM Upgrade Package Complete¹⁾ for configurations based on:
 - SIMATIC PDM PCS 7 Server
 - SIMATIC PDM PCS 7-FF

¹⁾ Optional product components for SIMATIC PDM such as PDM Extended, PDM Integration in STEP 7/PCS 7, PDM Routing, PDM Server and PDM Communication FOUNDATION Fieldbus are each included in a product package listed in the SIMATIC PDM Upgrade Package Basic or SIMATIC PDM Upgrade Package Complete and are implicitly authorized to be updated via the corresponding license. The SIMATIC PDM Upgrade Package Complete is required for use of the product components PDM Server or PDM Communication FOUNDATION Fieldbus.

For further information, see catalog ST PCS 7.

Overview

SITRANS DTM provides an easy way for Field Device Tool (FDT)/Device Type Manager (DTM) users to parameterize Siemens Instruments using international standards.

Benefits

- Same look and feel for all Siemens field instruments
- Support for Quick start wizards and other dialog boxes
- Quick overview using table and tree views
- Online and offline configuration
- Conformity to IEC profiles for HART and PROFFIBUS

Application

Electronic Device Description (EDD) is a proven way to describe the behavior and functionality of field instruments and other automation components.

For many years, EDD-based tools such as SIMATIC PDM from Siemens or handheld communicator have been used successfully in the process industry. Some years ago, an additional technology called FDT / DTM with the same approach was introduced to the market. To support the FDT DTM Technology for Siemens devices, the software SITRANS DTM has been developed which combines both EDD and FDT technologies.

SITRANS DTM uses EDDs as the device description and provides the DTM interface to allow the integration of our field instruments into FDT-frame applications.

The following field instruments are currently available in SITRANS DTM:

- SITRANS TH300 HART
- SITRANS TH400 PA
- SITRANS P300 HART
- SITRANS P500
- SITRANS P DSIII HART
- SITRANS F M MAG 6000 DP/PA
- SITRANS F C MASS 6000 PA/PA
- SITRANS FC430
- SITRANS PROBE LU 6 m, 12 m, HART
- SITRANS LR200 HART, PA
- SITRANS LR250 HART, PA
- SITRANS LR260 HART, PA
- SITRANS LR560 HART, PA
- SITRANS LUT400 HART
- SIPART PS2 HART, PA, FF

Technical specifications**SITRANS DTM****Version**

Current Version	3.1
• Compatible with PACTware versions	3.6, 4.0, 4.1
• Compatible with Windows	XP, 7
• Certified by FDT group	Yes

Free DTM software can be downloaded from:
<http://www.siemens.com/sitransdtm>

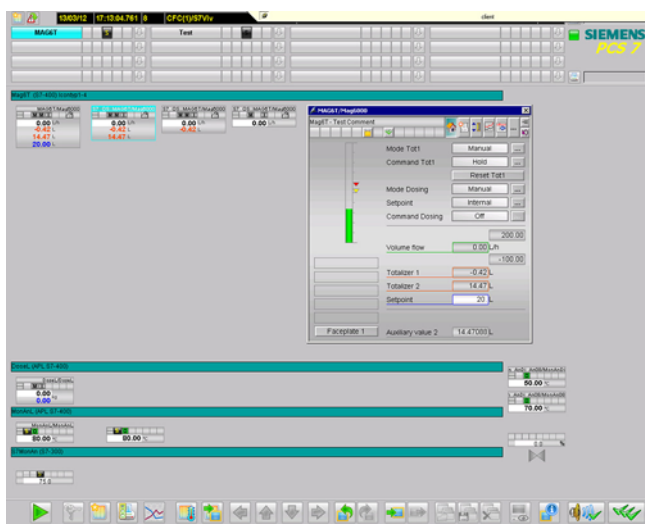
Click on Support in the collateral list on the right side of the web page, and choose Software downloads.

Communication and Software

Software

SITRANS Library

Overview



The SITRANS Library for SIMATIC PCS 7 V8.0 and higher extends standard functionality of the SIMATIC PCS 7 process control system concentrated in the SIMATIC PCS 7 Advanced Process Library (APL) with technological blocks and faceplates for device-specific functions of the SITRANS field devices.

Benefits

This allows you to easily operate all device functions, such as the dosing of the SITRANS FM MAG6000, in a single faceplate. In addition, it also supports operation and monitoring via Touch Panels as well as the integration in SIMATIC S7 applications. The SITRANS Library is based on the modern design of the Advanced Process Library (APL). Together with the APL, the SITRANS Library enables you to create harmonic solutions with a consistent look & feel and optimum use of the functions of the SITRANS field devices in many industries.

It helps accelerate the engineering process, reduces the time-to-market, and simplifies process control. In addition, operator functions (such as "Dosing") and process-related diagnostic information (such as empty pipe detection and flow direction) are provided.

Note:

SITRANS Library can be used in combination with SIMATIC PCS 7 version V8.0 and higher.

Application

The SITRANS Library can be used in combination with SIMATIC PCS 7 and SITRANS field devices.

You can find the current list of the SITRANS field devices and the supported SIMATIC PCS 7 versions at <http://support.automation.siemens.com/WW/view/en/85285872>

The SITRANS Library can be used for all core sectors of the process industry. These are:

- Chemical industry
- Pharmaceutical industry
- Water and wastewater
- Glass and solar
- Oil & gas
- Food and beverage industry
- Minerals and mining

Design

The product structure, however, is geared toward the operational environment in the SIMATIC PCS 7 process control system. Consequently, SITRANS Library is offered in the form of an engineering component:

- **SITRANS Library**
Engineering software with engineering license for one customer plant
- **SITRANS Library**
Runtime license for one automation system (SIMATIC PCS 7 automation systems of all designs and S7-300 controllers)

The SITRANS Library product component enables you to perform configuration work on a SIMATIC PCS 7 engineering station.

The SITRANS Library product component allows you to run blocks from a library on an automation system.

When using function blocks from SITRANS Library in SIMATIC PCS 7 automation systems, note that SIMATIC PCS 7 AS Runtime POs are also booked.

Function

SITRANS Library for SIMATIC PCS 7

Sublibrary for the functional expansion of the SIMATIC PCS 7 Advanced Process Library with:

- Function blocks and faceplates for the SITRANS F M MAG 6000 DP with dosing function for SIMATIC S7-400, SIMATIC S7-300 and panel interface blocks
- Function blocks and faceplates for SITRANS field devices for SIMATIC S7-400 and SIMATIC S7-300 with WinCC.

The function blocks are configured in CFC.

Control and monitoring from a panel is configured with the panel interface blocks for example for the SITRANS F M MAG 6000 DP. Taking operating rights and hierarchical operating concepts (multi-control room operation) into consideration, the technological function can then be operated from both an operator station and a Touch Panel.

Detailed information for which field devices which systems and system versions are supported and about free-of-charge download see under:

<http://support.automation.siemens.com/WW/view/en/85285872>

Selection and Ordering Data

Article No.

SITRANS Library

Block library for SIMATIC PCS 7 V8.0 and higher and SIMATIC S7 with function blocks and face plates as well as electronic documentation

Engineering software, software class A, two languages (English, German), runs under operation system
Windows XP Professional 32 Bit,
Windows 7 Ultimate 32/64 Bit,
Windows Server 2003 R2 Standard 32 Bit or
Windows Server 2008 R2 Standard 64 Bit,
single license for 1 installation

- Engineering license for one customer plant.
Delivery form: can be downloaded, with certificate of license

7MP2990-0AA00

Services for Process Instrumentation



9/2	Lifecycle Services for Process Instrumentation
9/2	Lifecycle Services
9/4	Field Services for Process Instrumentation
9/5	Calibration and Verification
9/6	Remote Services for Process Instrumentation
9/8	Inventory Baseline Services
9/9	Lifecycle Information Services
9/10	Managed Support Services
9/11	Technical Support Services
9/12	Asset Optimization Services
9/13	Extended Exchange Option
9/14	Extended Warranty for Process Instrumentation
9/16	Lifecycle Service Contracts

Services for Process Instrumentation

Lifecycle Services for Process Instrumentation

Overview

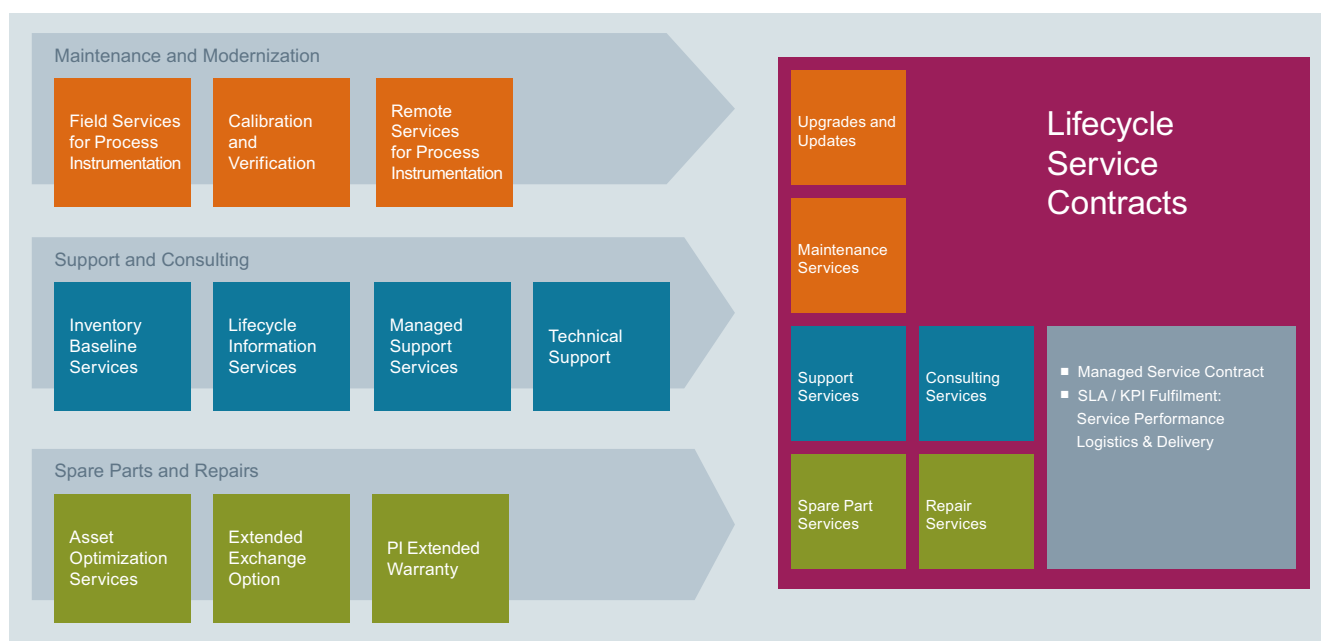
Introduction to Siemens Industry Services

As an industry partner, we offer you an unrivaled range of services and support based on our extensive technology and industry know-how. With our offer, you gain a high level of reliability and shape the digital future of your company. Our Industry Services cover the complete life cycle of your machines and plants and help you to increase their profitability and efficiency and to take advantage of the opportunities for digitalization while simultaneously reducing your total cost of ownership.

To learn more about Siemens Industry Services, see Appendix, page 10/7 and online at www.usa.siemens.com/services

Lifecycle Services for Process Instrumentation

Below is an overview of the specific Lifecycle Services for process instrumentation – a component of the Siemens Industry Services.



Lifecycle Services for process instrumentation – from individual services to a Lifecycle Service Contract

When it comes to making operating costs predictable and optimizing them continuously, protecting investments and thus ensuring plant availability, the key criterion for success is the serviceability of your instrumentation. That is the reason for our reactive, proactive and preventive Lifecycle Services for process instrumentation, which ensure the serviceability of instruments in modern plants at optimized costs throughout their life cycle. These individual services can be easily integrated on a product-specific basis into service programs or even into customized service contracts that are tailored to your specific requirements.

The standardized, yet flexible structure of our services for process instrumentation provides a future-proof basis for:

- Protection of your investment
- Assurance of plant availability
- Long-term predictability of maintenance costs
- Cost-optimized modernizations

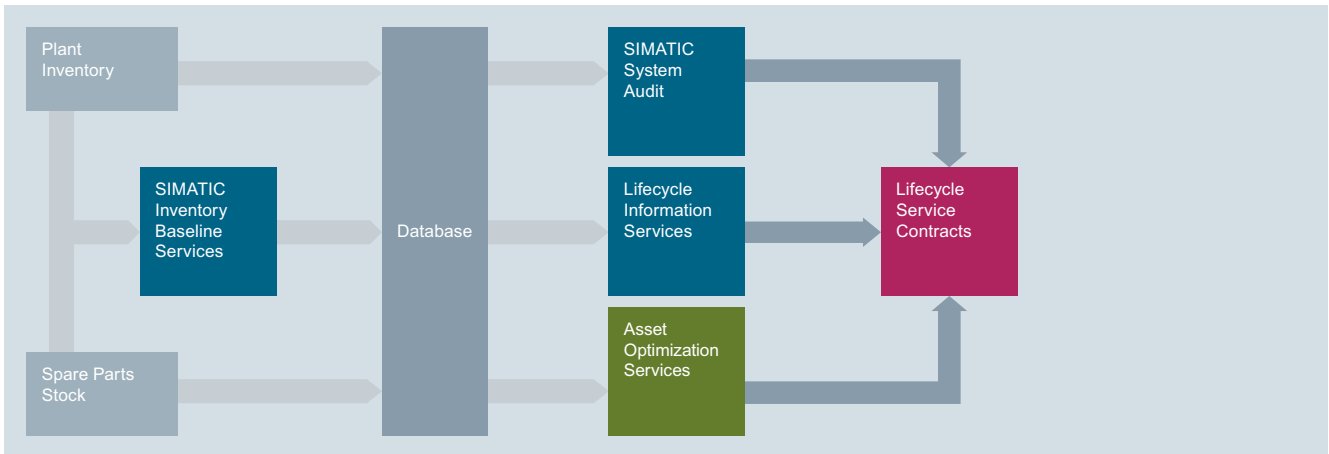
Applications

Service programs: Combination of selected portfolio elements

Service programs are selected packages of services for a product family or a service topic. The individual portfolio elements are coordinated to ensure seamless coverage throughout the entire life cycle and support optimum use of your products and systems. The individual services of a service program can also be used separately.

Based on the portfolio elements of our Lifecycle Services for process instrumentation, the following service programs are offered:

Installed Base Capture & Analytics Services

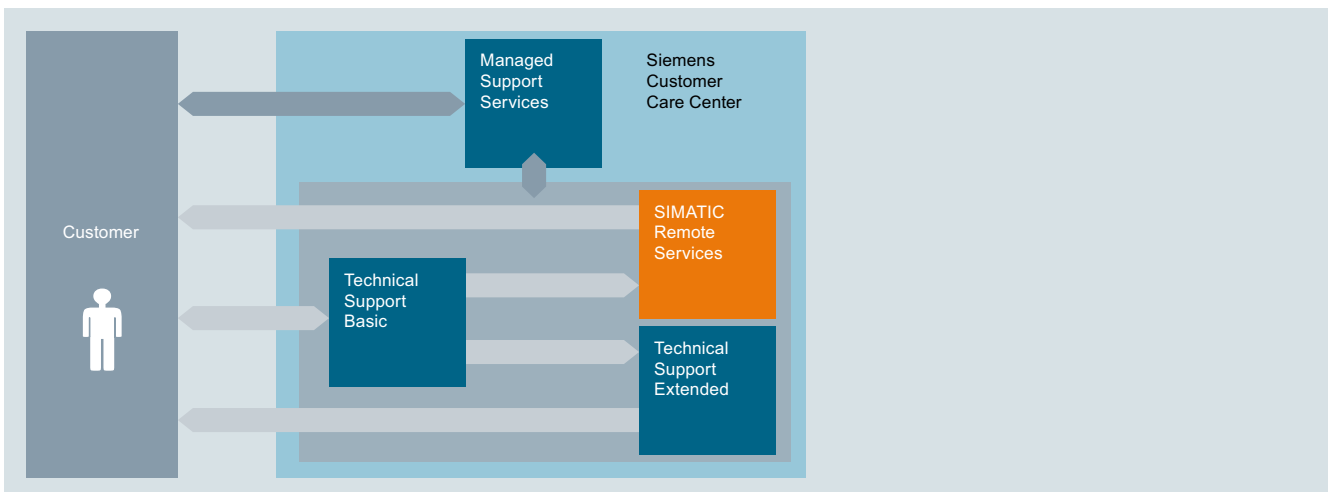


"Installed Base Capture & Analytics Services" service program

"Installed Base Capture & Analytics Services" are used to analyze and optimize the installed base. Ideally they include the following service elements:

- Inventory Baseline Services - inventory of installed field instruments
- Certified calibration and verification of field instruments
- Lifecycle Information Services - periodic life cycle status reports for all installed field instruments
- Asset Optimization Services - guaranteed spare part availability and optimized stock

Professional System Support



The "Professional System Support" service program combines the following portfolio elements:

- Managed Support Services
- Technical Support
- Remote Services for Process Instrumentation

More Information

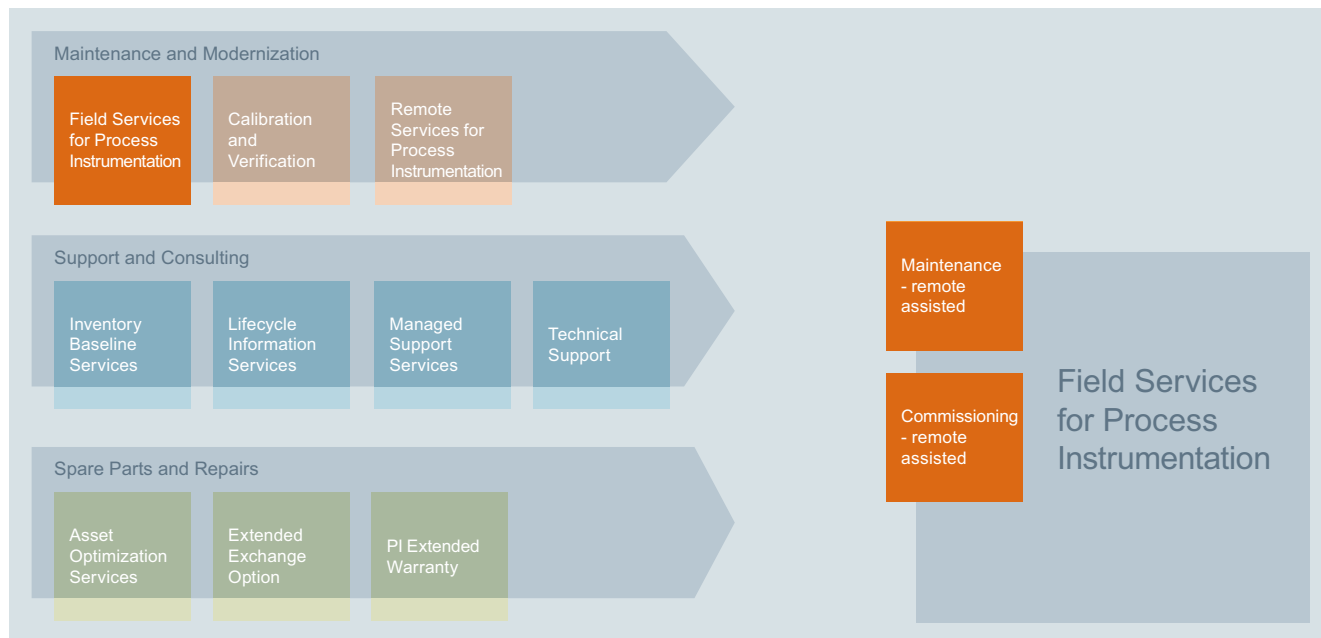
Additional information is available on the Internet at:
www.siemens.com/pils

Services for Process Instrumentation

Lifecycle Services for Process Instrumentation

Field Services for Process Instrumentation

Overview



Perfect plant integration through commissioning and maintenance are the key to optimal availability of field instruments and plants. However, the time spent and labor involved is often to the detriment of the core business. This can be avoided by using a qualified external service provider like Siemens - without compromising contractual security, achievability or coordination and adaptation to meet customer and process requirements.

Commissioning and maintenance - remote assisted

Experienced and qualified service personnel of Siemens Industry Services specialize in the commissioning and maintenance of field instruments and also have access to expertise from cross-industry applications and projects within a global service network. Customers receive optimal service from Siemens based on its extensive experience in the process industry environment and as a manufacturer of process instrumentation.

- Recording of process tag data
- Monitoring of operating conditions/instrument status
- Monitoring of installation
- Programming based on customer specifications
- Monitoring of instrument function
- Backup of data/parameters
- Creation of service documentation

In the event of a remote service request, on-site personnel are supported by a product specialist via the Siemens Remote Service Platform with Desktop Sharing.

Benefits

- Shorter response time and time-to-solution
- Direct contact between customer and manufacturer in close collaboration with the responsible on-site service
- Maximization of field instrument service life
- Reduction in downtime and associated costs through early detection of operational or environmental weak points and implementation of correspondingly schedulable counter-measures.

More Information

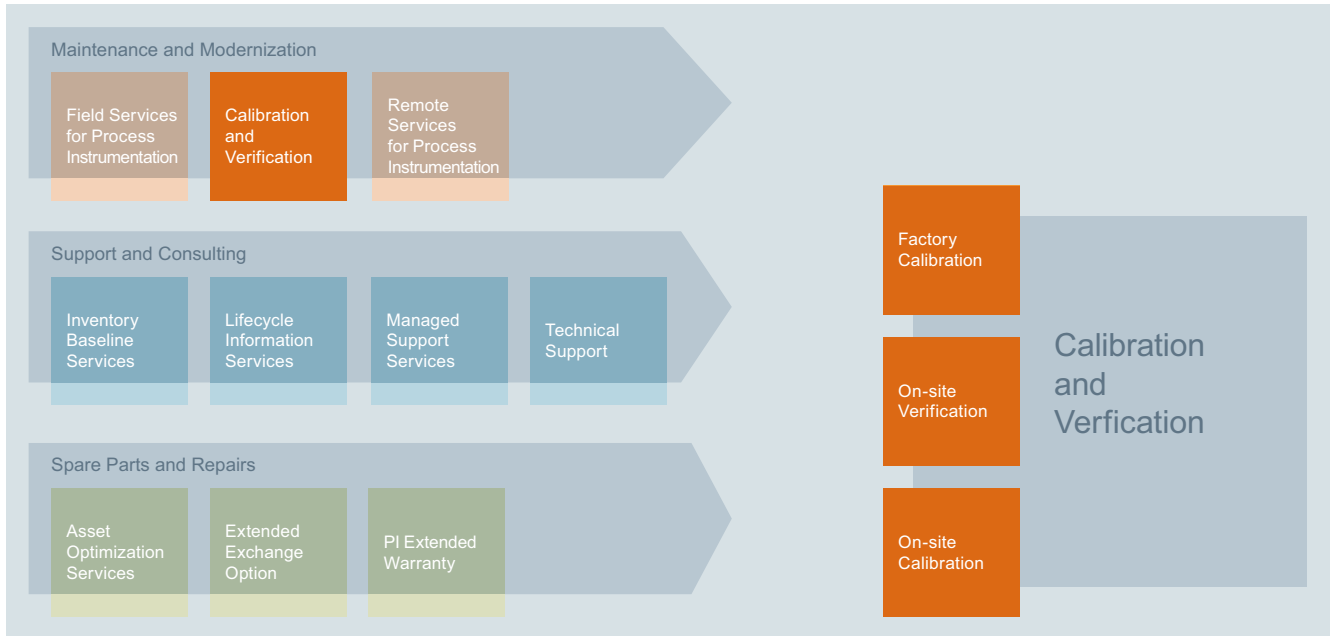
Additional information is available online at:
www.siemens.com/pils

Services for Process Instrumentation

Lifecycle Services for Process Instrumentation

Calibration and Verification

Overview



Our comprehensive Calibration and Verification Services assure maximum reliability and precision for your process measuring equipment.

- The **Factory Calibration** module provides factory and laboratory calibrations (according to ISO 9001, ISO/IEC 17025) for pressure, temperature and flow rate measuring equipment made by Siemens as well as other manufacturers.
- The **On-site Verification** module is an economical and time-saving alternative to sending field equipment back to the factory.
- With the **On-site Calibration** module, Siemens ensures sustainable and reliable quality assurance of your measurements.

	Pressure	Temperature	Flow Rate	Weighing Technology
Factory calibration ISO 9001	✓	✓	✓	
Accredited Laboratory Calibration ISO 17025	✓	✓	✓	
On-site Calibration ISO 9001	✓	✓		✓
On-site Verification ISO 9001			✓	

Benefits

Reasons for calibration of field instruments

- Periodic calibration for quality assurance according to ISO 9000
- Compliance with standards, guidelines or legal requirements
- Verification of custody transfer measurements
- Early detection of errors

Reasons for verification of flowmeters

- Alternative to expensive wet calibration
- Testing without uninstalling the process instrumentation
- Differentiation between product- and installation-related errors

More Information

Additional information is available on the Internet at:
www.siemens.com/piscv

Services for Process Instrumentation

Lifecycle Services for Process Instrumentation

Remote Services for Process Instrumentation

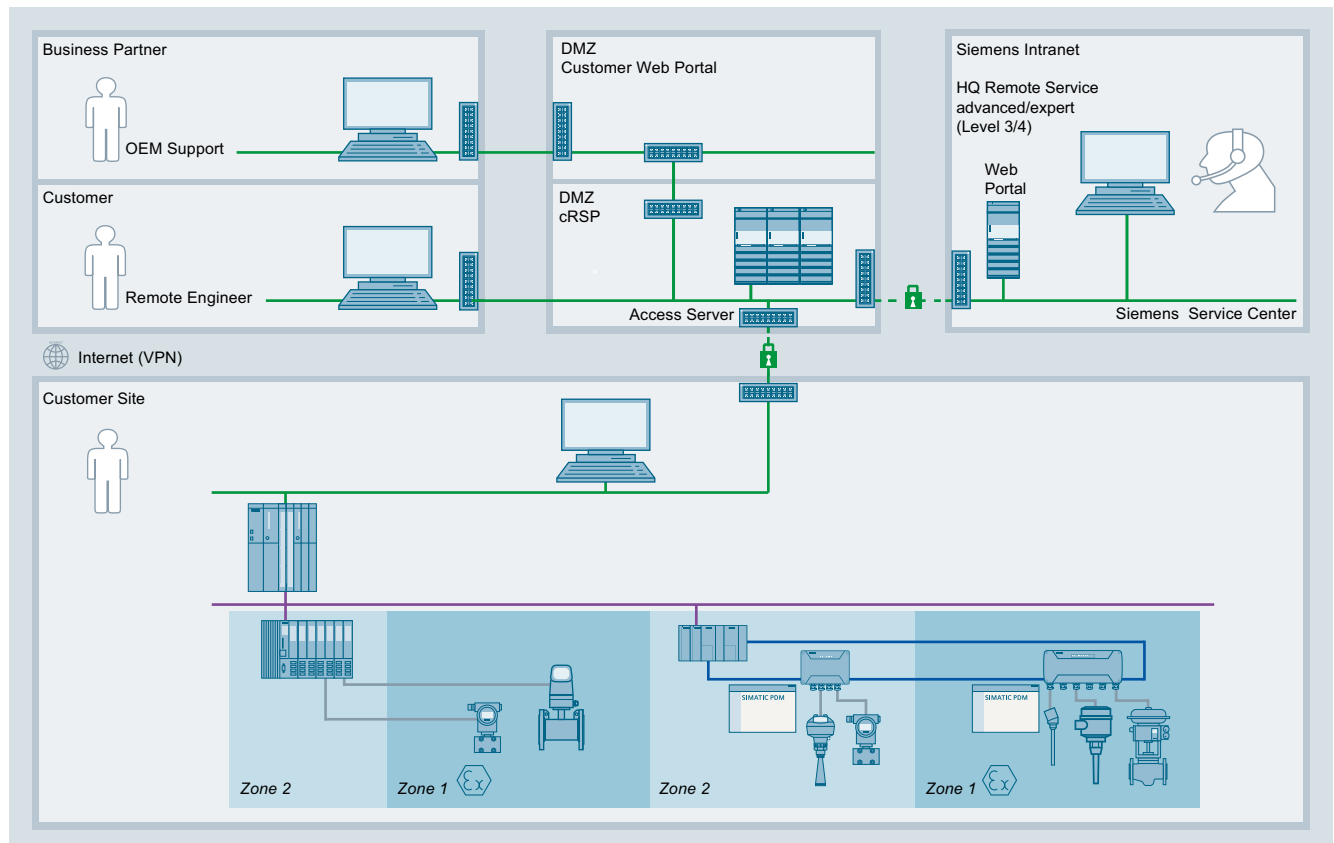
Overview



Remote Services for Process Instrumentation

Remote Services for Process Instrumentation ensure reactive support for all installed field devices. Reactive Remote Services provide a low-cost introduction to a modern efficient support service. Service availability based on the Siemens Remote Service (SRS) platform and remote access tools forms the basis for rapid troubleshooting or a comprehensive consultation regarding your machine or plant.

The "Remote Access Services" (so-called connectivity packages), which are required once per installation, enable communication between the customer system and Siemens IT infrastructure (cRSP = common Remote Service platform) and comprise different hardware and software components.



Siemens Remote Service platform

Services for Process Instrumentation

Lifecycle Services for Process Instrumentation

Remote Services for Process Instrumentation

Benefits

- Secure remote connection of your automation system to the SIMATIC TechSupport IT infrastructure
- Direct worldwide connection to the network of Siemens system experts
- Provision of remote IT infrastructure including support and maintenance
- Complete transparency due to central administration of all system accesses
- Compatible with generally valid Industrial Security concepts
- TÜV/CERT certification of Siemens cRSP infrastructure

More Information

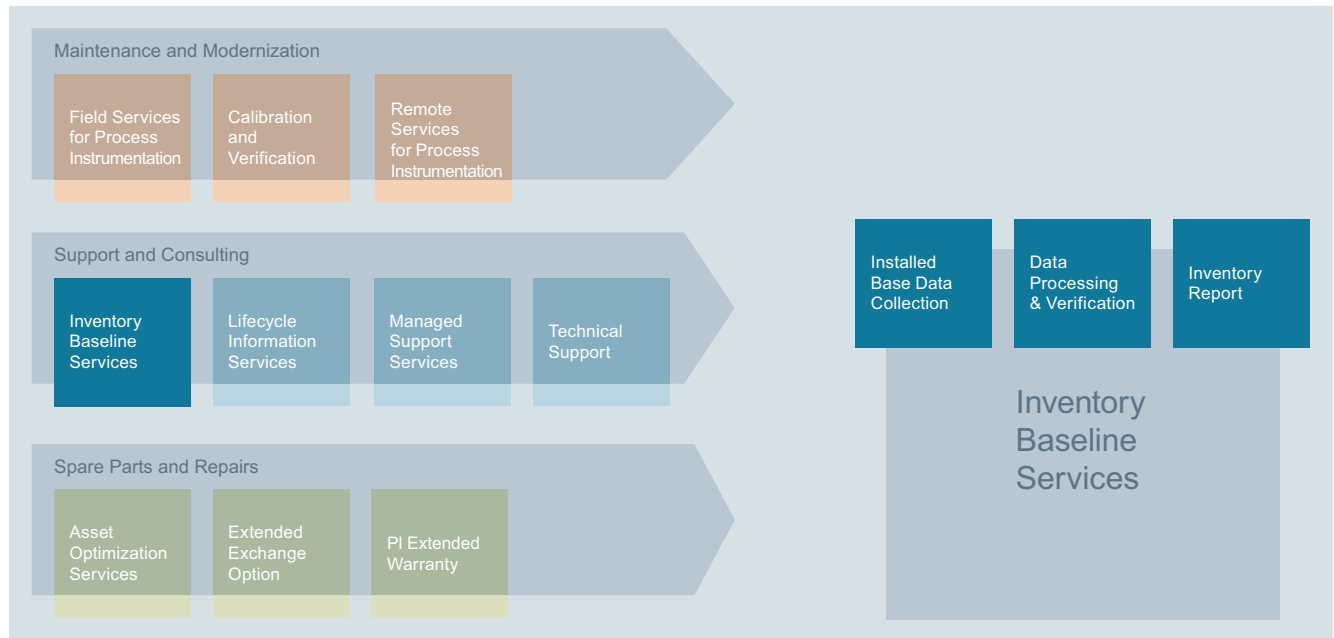
Additional information is available online at:
www.siemens.com/siremote

Services for Process Instrumentation

Lifecycle Services for Process Instrumentation

Inventory Baseline Services

Overview



It is essential to make the right decisions when planning modernizations or when budgeting for necessary maintenance measures. The basis for such decisions is an in-depth knowledge of the field instruments being used. This requires:

- Standardized and complete information collection on all installed process instrumentation components
- Information collection using the least possible time and money.
- Documentation of results in standardized reports

With its Inventory Baseline Services, Siemens offers modern data-driven services that use new methods and tools to help you plan maintenance of machines and plants even more efficiently.

Making an inventory gives you an overview of the currently installed plant equipment and the spare parts in stock. The inventory results serve as a decision-making aid when planning future measures for maintenance and modernization.

Inventory Baseline Services make the installed components of machines and plants transparent and create the database for other Lifecycle Services, such as Lifecycle Information Services or Asset Optimization Services.

Benefits

- Cost-efficient and standardized inventorying
- Valid decision-making aid for planned plant expansions, modernizations as well as for preparation for updates/upgrades
- Solid basis for planning and implementation of other Lifecycle Services

More Information

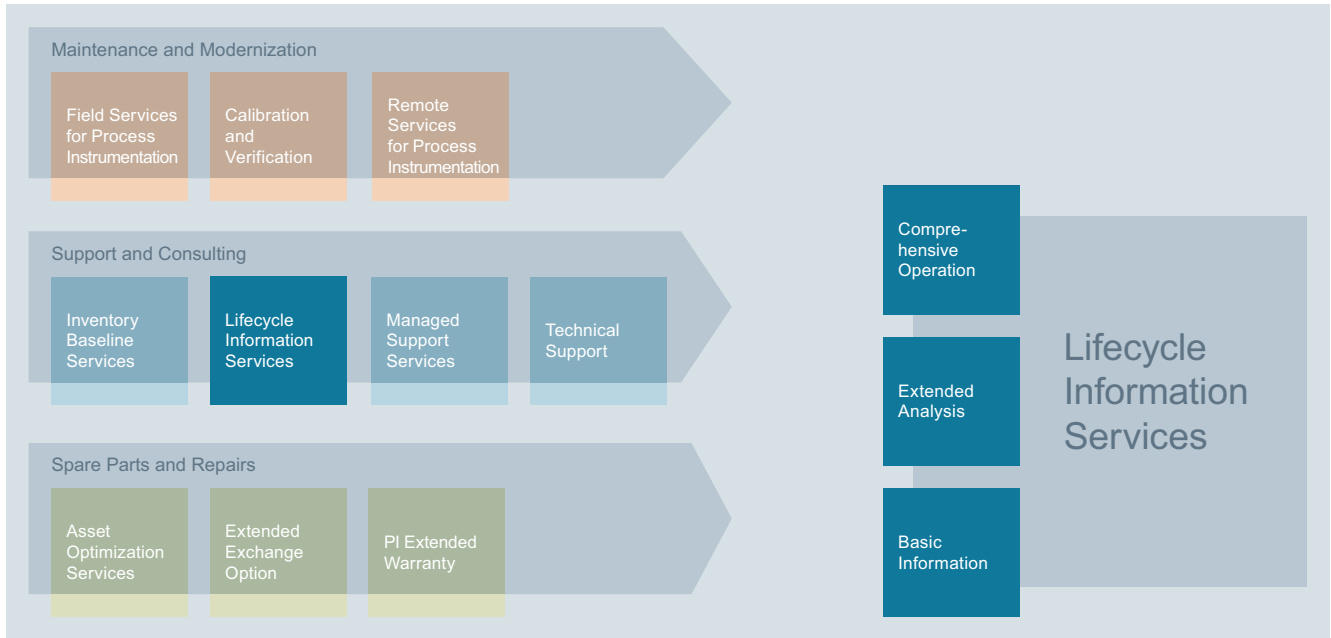
Additional information is available online at:
www.siemens.com/sibs

Services for Process Instrumentation

Lifecycle Services for Process Instrumentation

Lifecycle Information Services

Overview



For planning your maintenance strategy, Lifecycle Information Services periodically provide you with detailed information on the product life cycle of the utilized components.

The Lifecycle Information Services have a modular structure so that you need only request information that you actually require. Each of the following three methods returns a plant-specific report as result. You can decide for yourself how comprehensive you want this report to be.

- **Basic Information**
Product Lifecycle Status focusing on analysis of functional obsolescence
- **Extended Analysis**
"Basic Information" module and analysis of product-related statistical mean time between failures (MTBF)
- **Comprehensive Operation**
"Extended" module supplemented with plant-specific information on updates/upgrades and general recommendations

Benefits

- Proactive, periodic service information for reduction of obsolescence risks
- Assurance of plant availability through specific service recommendations
- Prevention of unscheduled downtimes or cost-intensive supply bottlenecks
- Evaluation of new technological innovations

More Information

Additional information is available online at:
www.siemens.com/lis

Services for Process Instrumentation

Lifecycle Services for Process Instrumentation

Managed Support Services

Overview



Managed Support Services offer competent and efficient support through a "Dedicated Support Manager" who, as the central contact person, ensures an efficient exchange of information between all parties involved.

The Dedicated Support Manager coordinates and prioritizes all activities, is familiar with the customer's plant, knows the maintenance processes and the installed base and, if necessary, uses remote access for diagnostic and troubleshooting purposes.

Benefits

- Quicker processing and resolution of complex support requests
- Simplification of requests by means of central coordination and an exclusive "incoming" channel
- Higher "first-time-fix-rate"
- Avoidance of expensive on-site service calls
- Greater transparency of the support measures performed through active support management

More Information

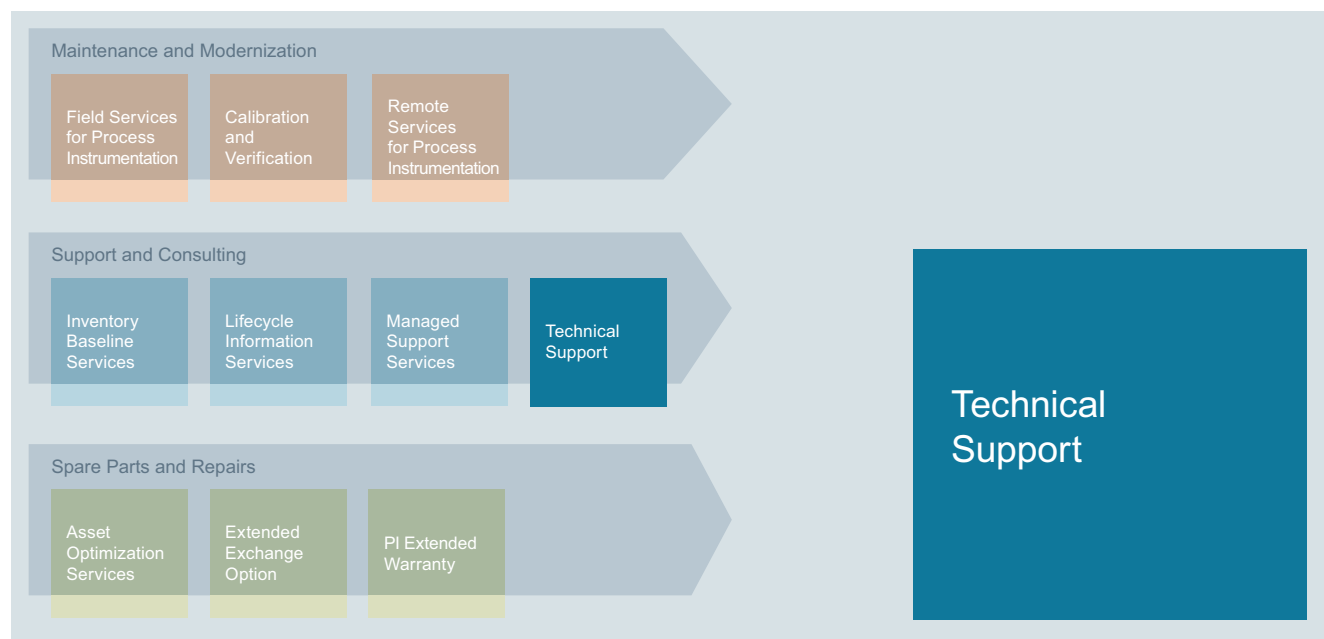
Additional information is available online at:
www.siemens.com/mss

Services for Process Instrumentation

Lifecycle Services for Process Instrumentation

Technical Support Services

Overview



The Technical Support of Siemens Industry provides you fast and competent support regarding all technical queries - ranging from basic support to customized support contracts. Even discontinued products and products that are no longer available are fully supported so that the value of your investment is preserved over the long term.

Ways to contact Technical Support

Online, using the Support Request form - A Support Request is the primary incoming channel for questions regarding Siemens Industry products. When you submit a Support Request, your request is assigned a unique ticket number that facilitates tracking. A Support Request gives you direct access to technical experts, recommended solutions for a wide range of issues (e.g. FAQs) and status tracking.

www.siemens.com/automation/support-request

By phone - You can get in touch with Technical Support experts at: 1-800-333-7421

Benefits

- Personal contacts for all questions regarding Siemens Industry products
- Available during regular business hours on work days
- Available free of charge online and by phone
- Fast commissioning and reduced energy expenditure
- Fast and competent support in critical situations

More Information

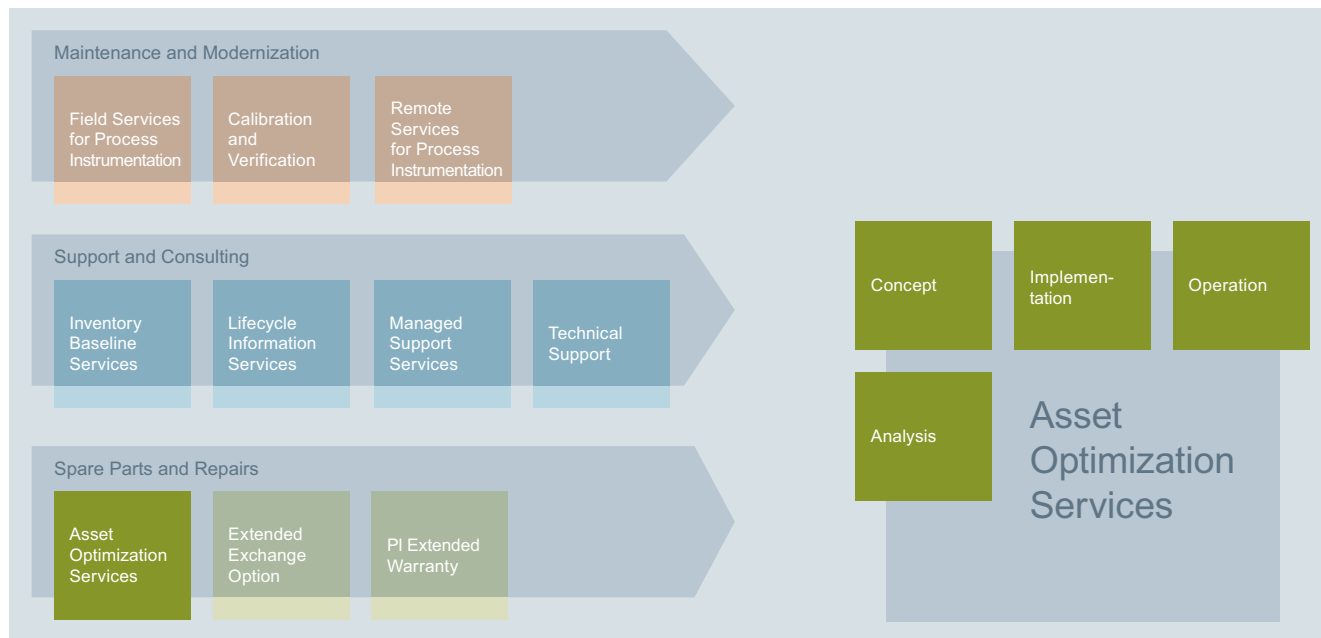
Additional information is available online at:
www.siemens.com/sios

Services for Process Instrumentation

Lifecycle Services for Process Instrumentation

Asset Optimization Services

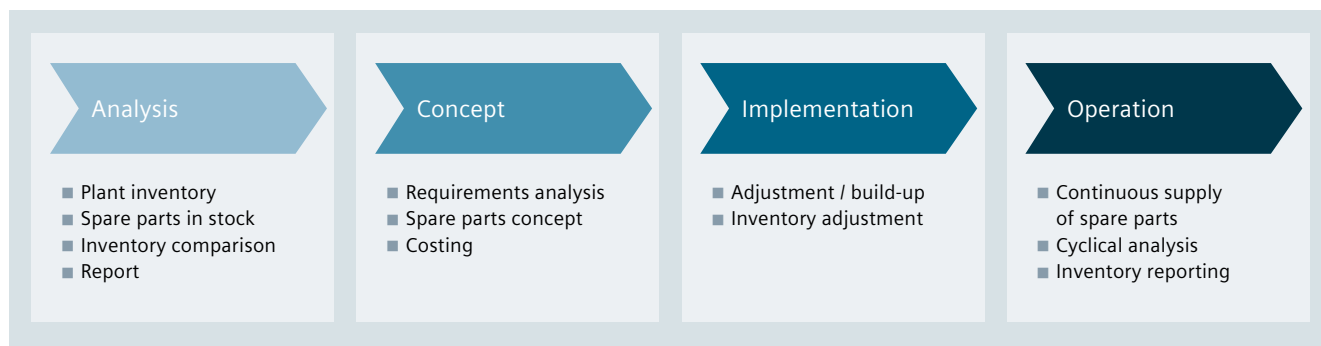
Overview



High plant availability with optimal spare parts supply - Asset Optimization Services provide a structured and systematic procedure for the holistic optimization of the supply of spare parts.

The four phases of Asset Optimization Services are coordinated with one other but can also be used independently:

- **Phase I: Analysis**
Determination of the current spare parts situation on site: availability, product life cycle, spare part delivery times
- **Phase II: Concept**
The concept phase consists of an analysis of the actual requirements and the development of a spare parts concept.
- **Phase III: Implementation**
Based on the results of the concept phase, the required warehouse structures, storage locations and spare parts are set up.
- **Phase IV: Operation**
The optimized and continuous supply of spare parts is an essential contribution to high plant availability. Depending on the specific contractual agreements, cyclic inventory analysis and a regular exchange of information also take place.



Benefits

- Creates transparency about the actual spare parts requirements
- Ensures spare parts availability over the entire life cycle of the machine or plant and therefore fulfills an important prerequisite for improved serviceability
- Shift to external inventory keeping and continuous supply with necessary spare parts

Ordering data

Ordering data	Article No.
Analysis	On request
Concept	On request
Implementation	On request
Operation	On request

More Information

Additional information is available online at www.siemens.com/aos

Services for Process Instrumentation

Lifecycle Services for Process Instrumentation

Extended Exchange Option

Overview



Extended Exchange Option offers extended replacement of defective products and systems that have failed under intended use, for example, due to material defects. An EEO can be ordered up to 12 months after product delivery. The running time of the EEO can be specified in 6-month increments ranging from 24 to 60 months from the time of product delivery. Within this pe-

riod, you receive free replacement of defective products that were included as part of the EEO agreement.

The EEO can be ordered for practically all currently marketed Siemens Industry products. Wear parts are excluded from the EEO.

Benefits

- More transparency about operating costs of a machine or plant
- Reduction of economic risk through better predictability
- EEO can be adapted to customer requirements by the product selection and flexible running time.

More Information

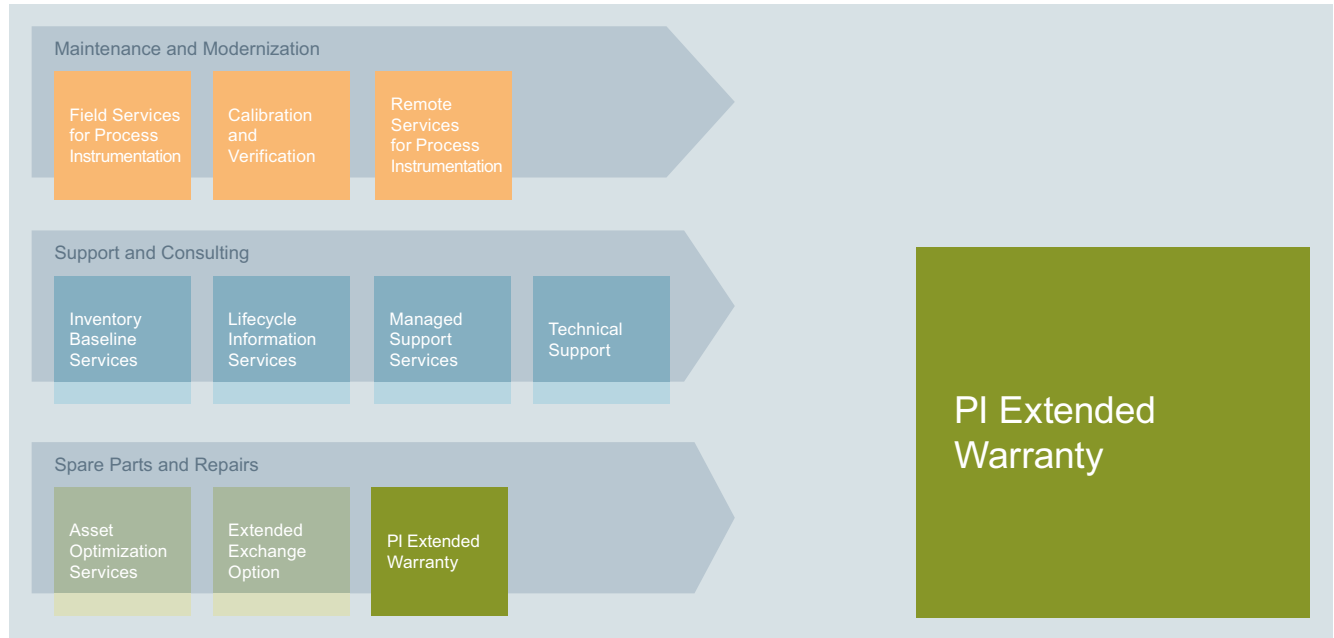
Additional information is available online at:
www.siemens.com/eeo

Services for Process Instrumentation

Lifecycle Services for Process Instrumentation

PI Extended Warranty

Overview

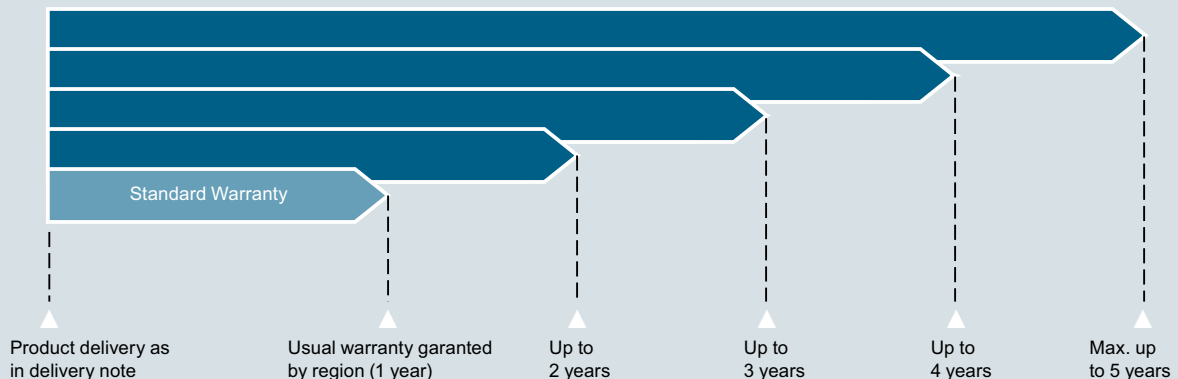


The Process Instrumentation (PI) Extended Warranty enables you to protect yourself against unforeseeable maintenance costs for your Siemens process instrumentation order. The Extended Warranty applies to repair and replacement of defective devices that have failed under intended use, for example, due to material defects. An Extended Warranty can be purchased for all Siemens process instrumentation devices together with the product order. A running period of 24, 36, 48 or 60 months can be selected and starts on product delivery. The selection of an

Extended Warranty applies to all process instrumentation devices in the respective order that have a serial number (for traceability). In case of a warranty claim, the defective device can be returned worldwide using the "Returned goods process" of the respective region.

The Extended Warranty can be ordered at any time from our local sales office. If you are interested or have further questions, feel free to contact the sales office.

PI - Extended Warranty



Services for Process Instrumentation

Lifecycle Services for Process Instrumentation

PI Extended Warranty

Benefits

- **Easy to order**
One-time payment together with the product order ensures protection of devices over an extended period.
- **Cost transparency**
During the running time of the Extended Warranty, no costs will be incurred for repairs, unless caused by the customer.
- **High flexibility**
The running time can be flexibly selected according to your requirements.
- **Global availability**
In the case of a warranty claim, the defective device can be returned to one of our worldwide offices.
- **Traceability**
If required, a certificate can be generated containing a list of covered devices including their running time. The running time for a device can additionally be traced by entering the serial number in the Siemens PIA Lifecycle Portal.

Ordering data

Extended Warranty

- For a total of 24 months
- For a total of 36 months
- For a total of 48 months
- For a total of 60 months

Article No.

GWK-PI-EXWARR-02**GWK-PI-EXWARR-03****GWK-PI-EXWARR-04****GWK-PI-EXWARR-05**

More Information

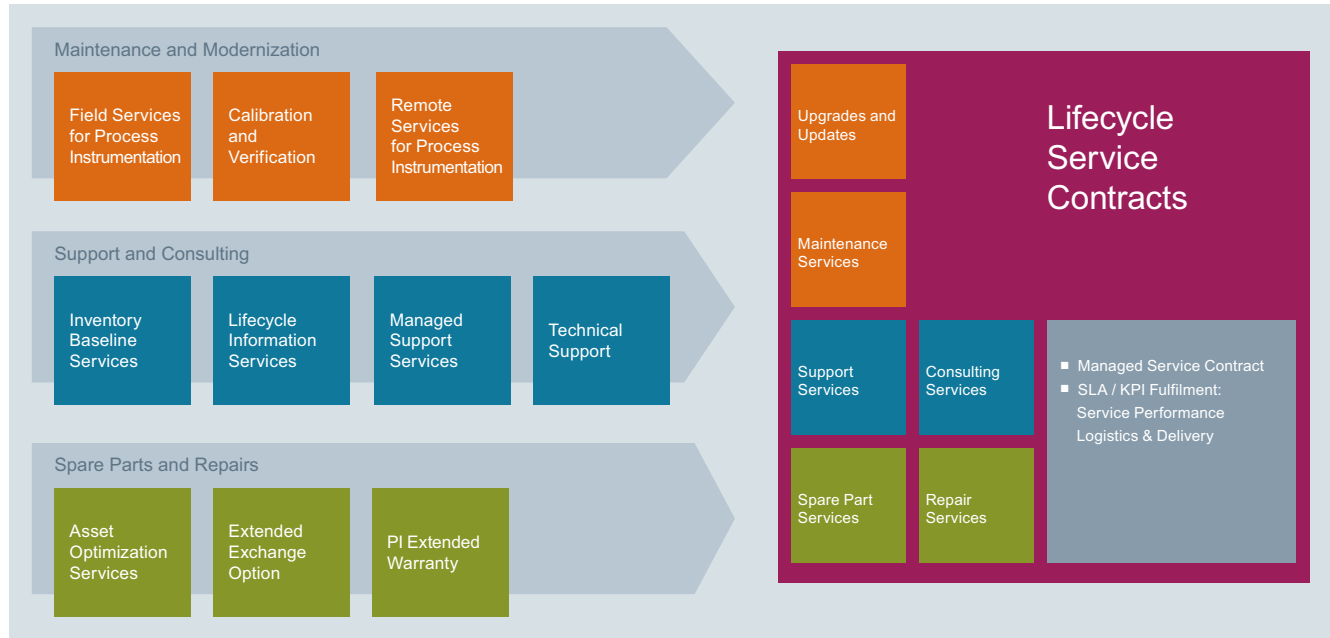
Additional information is available online at:
<http://www.usa.siemens.com/aplus>

Services for Process Instrumentation

Lifecycle Services for Process Instrumentation

Lifecycle Service Contracts

Overview



The service elements introduced in the preceding sections form the basis for customized Lifecycle Service Contracts for process instrumentation. In addition, specific contract parameters, so-called service KPIs, can be agreed upon individually. A prerequisite for entering into a Lifecycle Service Contract is an in-depth knowledge of the installed system base.

Long-term investment protection

Ongoing service of plants keeps the risk of obsolescence (failure) low; the optimized maintenance costs are largely constant and therefore predictable.

Benefits

Benefits of a long-term service contract

- Long-term investment protection
- Better predictability of maintenance costs
- Increased plant availability, for example, through promised arrival times for service, guaranteed spare parts supply and preventive maintenance measures
- Assurance of availability (minimization of failure risk) of utilized field instruments
- Protection of system know-how of the manufacturer
- Proactive contract management

Appendix



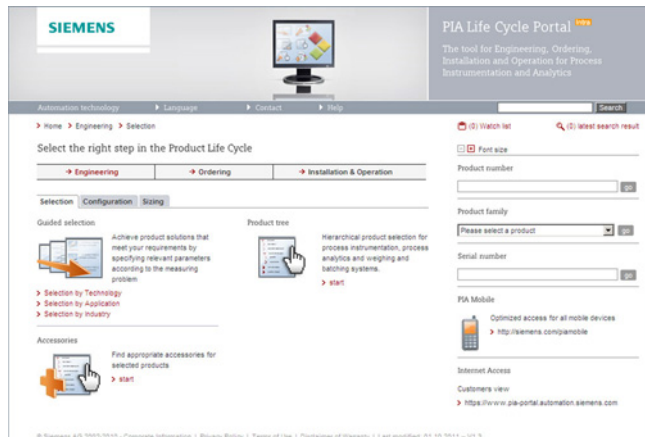
10/2	PIA Life Cycle Portal Engineering, Ordering, Installation and Operation Tool
10/3	Delivery Time Quick Ship Program, Stock Items delivery
10/5	Partner · Industry Mall and Interactive Catalog CA 01
10/6	Information and Download Center
10/8 10/10	Industry Services Industry Services – Portfolio overview Online Support
10/11 10/12	SITRAIN – Training for Industry Course offer for Process Instrumentation
10/13	Product documentation Supplied product documentation, QR Code, SIOS
10/14	Partner at Siemens Siemens Partner Program
10/15	Pressure Equipment Directive (2014/68/EU)
10/18	Functional safety
10/19	Software Licenses

Appendix

PIA Life Cycle Portal

Engineering, Ordering, Installation and Operation Tool

Overview



The PIA Life Cycle Portal provides the appropriate functionality in all stages of the Product Life Cycle for products of Process Instrumentation, Process Analytics and Weighing Technology.

The application guides you through Engineering & Selection, supports you at the Order and provides tools and information for Installation and Operation.

- **Phase 1:** Selection & Planning
- **Phase 2:** Ordering
- **Phase 3:** Installation & Operation
- **Additional features:** e. g. PIA Mobile

Phase 1: Selection & Planning



Selection

Achieve product solutions that meet your requirements by specifying relevant parameters according to the measuring point by using the *guided selection* or select the product directly in the *product and accessories tree*.



Configuration

Configure a selected product step by step and use the integrated configuration knowledge to avoid errors. Product configurations which cannot be ordered are blocked.



Sizing & calculation

Sizing & calculation tools for Gas Analyzers, Weighing and Batching Systems and Flow measurement instruments.

Phase 2: Ordering



Bulk upload

Verify several part numbers in one step by uploading a simple text file.



Watchlist & projects

Collect products in a *watch list* and save it as a *project* for later use.



Interface to the Industry Mall

Order the selected products with the ordering system for Siemens' automation and drive solutions.

Phase 3: Installation & Operation



Spare parts

Find appropriate *spare parts* for selected products or corresponding product families.



After sales support

Go to the *Service and Support Portal* to access manuals, certificates and further information concerning service & support.



Device information and history

Serial number specific product information for installed devices

Additional features



Personalize

Register in order to customize the application to your personal needs.



PIA Mobile

Use the product *selection, configuration and device information and history* with the version optimized for mobile devices.
www.siemens.com/piamobile



Product details

Find all relevant product information at a single glance: commercial and technical data, certificates, images and documents etc.

More information

PIA Life Cycle Portal
Ostliche Rheinbrückenstraße 50
76187 Karlsruhe, Germany
Tel.: +49 (721) 595 2114
E-Mail: support.pia-portal@siemens.com
www.siemens.com/pia-portal

Overview

Delivery times

Standard delivery times for our products are shown in the Selection and Ordering data.

Quick Ship and Stock Items delivery

If you need a product quickly, it is possible to choose between defined Stock Items delivery (► identifier) and the Quick Ship Program (◆ identifier) when ordering. Delivery times are then displayed at the end of the configuration overview

Note

In order to obtain special delivery times, only products with the same identifier may be combined (all Stock Item symbols or all Quick Ship Program symbols).

It is not possible to combine Stock Item/Quick Ship Program options.

All other information without identifiers is available with the current delivery times, which can be found in the "Basic Data" tab of the PIA Life Cycle Portal.

Contact

If you have questions about delivery time or the Quick Ship program, please contact your Siemens sales representative:
<https://www.reproom.industry.siemens.com/relocator.asp>

PI Advantage +

Advantage+ is a USA specific program designed to reduce costs and delivery times.

Advantage+ Shipping			
Benefit	Standard	Express 5%	Priority 10%
"From our dock to yours"	4-6 days	1-3 days	1-3 days
Taxes and duties	✓	✓	✓
Domestic packaging	✓	✓	✓
Priority processing	✓	✓	✓
Priority scheduling	✓	✓	✓
Priority handling	✓	✓	✓
Advantage+ Stock			
Selection of valve positioners and pressure, temperature, level and flow instrumentation			
Advantage+ Support			
Comprehensive support at no charge. Online via Support Request: http://support.industry.siemens.com Mobile via Siemens Industry Support App Telephone: 1-800-333-7421			

More information

You will find further information on the Internet at:

<https://www.industry.usa.siemens.com/automation/us/en/process-instrumentation-and-analytics/process-instrumentation/service-and-support/Pages/AdvantagePlus.aspx>

Appendix

Delivery Time

Quick Ship Program, Stock Items delivery

Example for Stock Items delivery in the PIA Life Cycle Portal

SIPART PS2 2 wire with Hart SA

Basic Data MLFB Configuration MLFB Overview Technical data Downloads / Documents Spare

Status: Your configuration is complete

Basic types Options [Order processing guidelines for con](#)

Configuration: [Reset](#) | [Print](#) | [Download](#) [Change Qu](#)

Description	Ex stock / QS
✓ Shipping clutch	
<input checked="" type="radio"/> 0 with fixable slipping clutch	
✓ Explosion protection	
N without explosion protection	
✓ Connection thread elec/pneum.	
G Connection thread el.: M20x1.5 / pneu.: G 1/4	
✓ Limit monitor	
0 without limit monitor	
✓ Option module	
1 with installed position feedback module (4 ... 20 mA)	
✓ Version	
0	
✓ Instruction manual	
A Brief instructions German / English / Chinese	
✓ Attached gauge block assembly	
0 without mounted pressure gauge block	

Product number (MLFB) 6DR5110 **0 N G 0 1 0 A A 0** [Basic L-price/Unit](#)
B-row L-price/unit L-price total

Copy & Paste 6DR5110-0NG01-0AA0

Information:
Ex stock, delivery time (working days): 1 (plus transport time)

Example for Quick Ship Program delivery in the PIA Life Cycle Portal

SITRANS F M MAG 5100 W

Basic Data MLFB Configuration MLFB Overview Technical data Downloads / Documents

Status: Your configuration is complete

Basic types Options [Order processing guidelines for con](#)

Configuration: [Reset](#) | [Print](#) | [Download](#) [Change Qu](#)

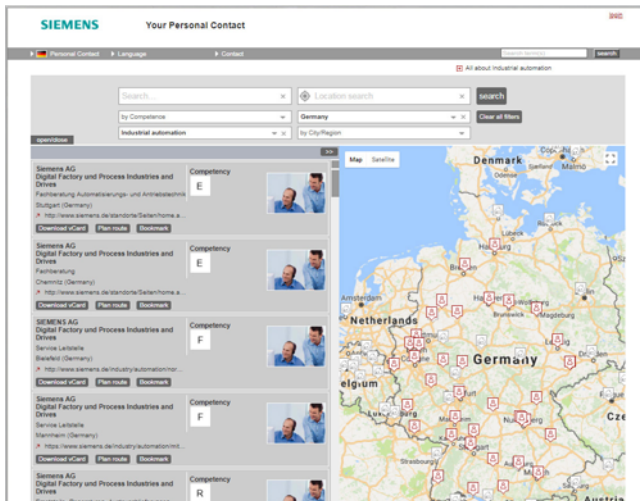
Description	Ex stock / QS
Additional feature for pricing: Total price for the marked (1) features	
✓ Label	
0	
✓ Diameter	
1V DN15, 1/2 Inch	
✓ Flange norm/Pressure rating	
F EN 1092-1, PN 40	
✓ Flange material	
1 Carbon steel flanges ASTM A 105, corrosion-resistant coating of category C4	
✓ Liner material	
2 Liner Material: EPDM	
✓ Electrode material	
2 Hastelloy C-276	
✓ Transmitter	
A Sensor for remote transmitter (order transmitter separately)	
✓ Communication	
A No bus communication	
✓ Cable glands/terminal box	
<input checked="" type="radio"/> 1 Metric Polyamid terminal box or 6000 l compact.	
<input type="radio"/> 2 1/2 inch NPT Polyamid Terminal box or 6000 l compact.	

Product number (MLFB) 7ME652 **0 1V F 1 2 2 A A 1** [Basic L-price/Unit](#)
B-row L-price/unit L-price total

Copy & Paste 7ME6520-1VF12-2AA1

Information:
 A shorter delivery time is possible, delivery time (working days): 5 (plus transport time)

Partner at Siemens



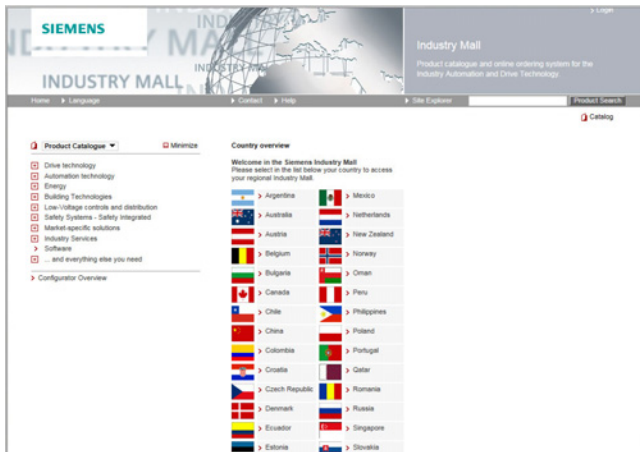
At your service locally, around the globe for consulting, sales, training, service, support, spare parts on the entire portfolio of Digital Factory and Process Industries and Drives.

Your partner can be found in our Personal Contacts Database at: www.siemens.com/automation-contact

You start by selecting

- the required competence,
 - products and branches,
 - a country and a city
- or by a
- location search or free text search.

Easy product selection and ordering in the Industry Mall and with the Interactive Catalog CA 01



Industry Mall

The Industry Mall is a Siemens Internet ordering platform. Here you have a clear and informative online access to a huge range of products.

Powerful search functions make it easy to select the required products. Configurators enable you to configure complex product and system components quickly and easily. CAx data types are also provided here.

Data transfer allows the whole procedure, from selection through ordering to tracking and tracing, to be carried out online. Availability checks, customer-specific discounts and bid creation are also possible.

www.siemens.com/industrymall



Interactive Catalog CA 01 - Products for Automation and Drives

The Interactive Catalog CA 01 combined with the Siemens Industry Mall unites the benefits of offline and online media in one application – the performance of an offline catalog with the availability of manifold and up-to-date information on the Internet.

Select products and assemble orders with the CA 01, determine the availability of the selected products and track & trace via the Industry Mall.

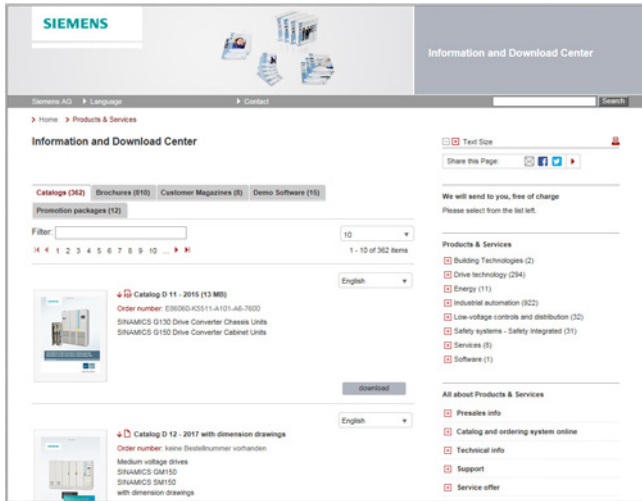
More information and download:

www.siemens.com/automation/ca01

Appendix

Information and Download Center

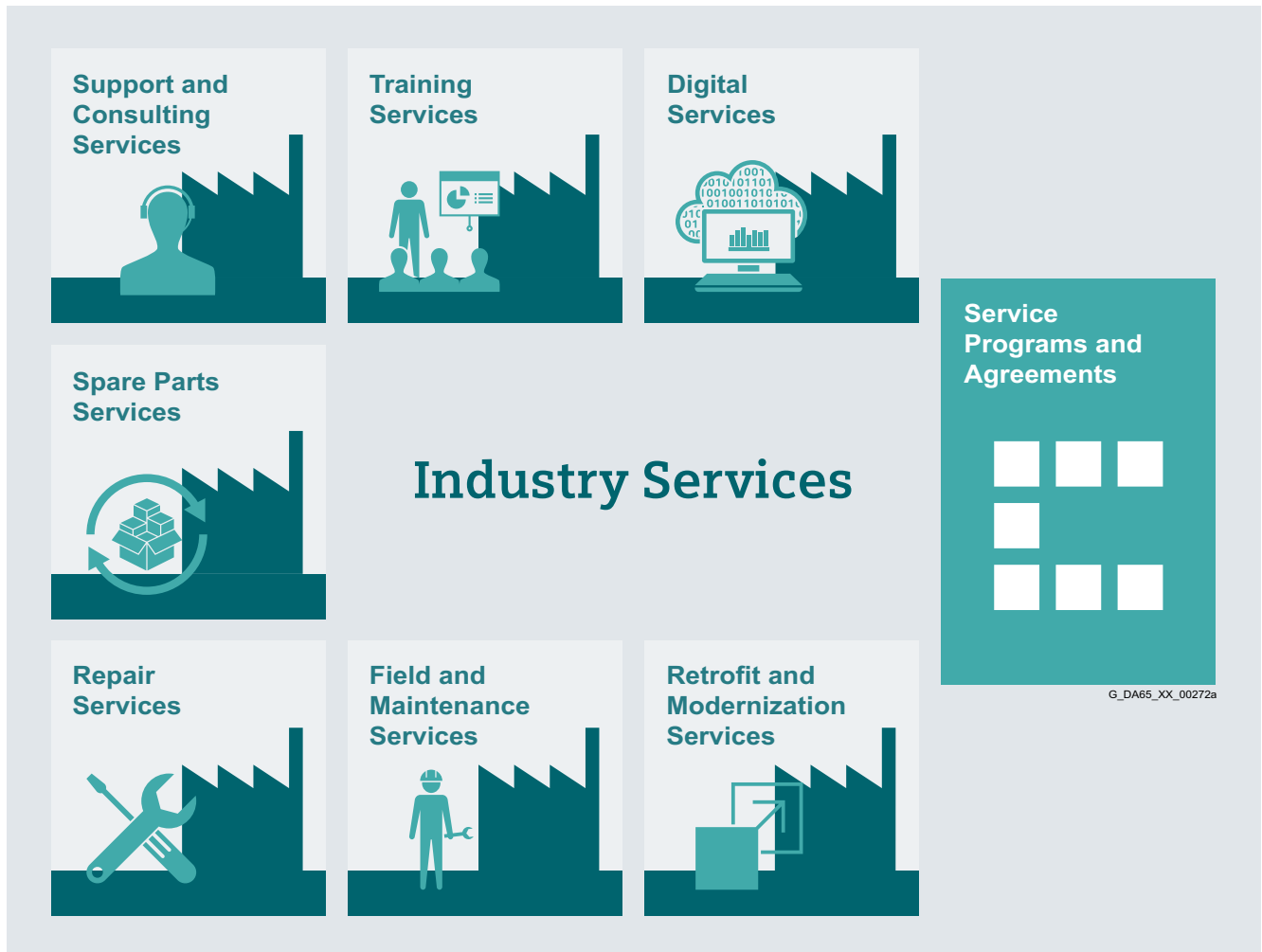
Downloading catalogs



In the Information and Download Center you can download catalogs and brochures in PDF format without having to register.

The filter dialog makes it possible to carry out targeted searches.

www.siemens.com/industry/infocenter

Overview

Keep your business running and shaping your digital future – with Industry Services

Optimizing the productivity of your equipment and operations can be a challenge, especially with constantly changing market conditions. Working with our service experts makes it easier. We understand your industry's unique processes and provide the services needed so that you can better achieve your business goals.

You can count on us to maximize your uptime and minimize your downtime, increasing your operations' productivity and reliability. When your operations have to be changed quickly to meet a new demand or business opportunity, our services give you the flexibility to adapt. Of course, we take care that your production is protected against cyber threats. We assist in keeping your operations as energy and resource efficient as possible and reducing your total cost of ownership. As a trendsetter, we ensure that you can capitalize on the opportunities of digitalization and by applying data analytics to enhance decision making: You can be sure that your plant reaches its full potential and retains this over the longer lifespan.

You can rely on our highly dedicated team of engineers, technicians and specialists to deliver the services you need – safely, professionally and in compliance with all regulations. We are there for you, where you need us, when you need us.

<https://www.siemens.com/global/en/home/products/services/industry.html>

Appendix

Industry Services

Industry Services – Portfolio overview

Overview

Digital Services



Digital Services make your industrial processes transparent to gain improvements in productivity, asset availability, and energy efficiency.

Production data is generated, filtered and translated with intelligent analytics to enhance decision-making.

This is done whilst taking data security into consideration and with continuous protection against cyber-attack threats.

<https://www.siemens.com/global/en/home/products/services/industry/digital-services.html>

Training Services



From the basics and advanced to specialist skills, SITRAIN courses provide expertise right from the manufacturer – and encompass the entire spectrum of Siemens products and systems for the industry.

Worldwide, SITRAIN courses are available wherever you need a training course in more than 170 locations in over 60 countries.

<https://support.industry.siemens.com/cs/ww/en/sc/2226>

Support and Consulting Services



Industry Online Support site for comprehensive information, application examples, FAQs and support requests.

Technical and Engineering Support for advice and answers for all inquiries about functionality, handling, and fault clearance. The Service Card as prepaid support for value added services such as Priority Call Back or Extended Support offers the clear advantage of quick and easy purchasing.

Information & Consulting Services, e.g. SIMATIC System Audit; clarity about the state and service capability of your automation system or Lifecycle Information Services; transparency on the lifecycle of the products in your plants.

<https://support.industry.siemens.com/cs/ww/en/sc/2235>

Spare Parts Services



Spare Parts Services are available worldwide for smooth and fast supply of spare parts – and thus optimal plant availability. Genuine spare parts are available for up to ten years. Logistic experts take care of procurement, transport, custom clearance, storage and order management. Reliable logistics processes ensure that components reach their destination as needed.

Since not all spare parts can be kept in stock at all times, Siemens offers a preventive measure for spare parts provisioning on the customer's premises with optimized **Spare Parts Packages** for individual products, custom-assembled drive components and entire integrated drive trains – including risk consulting.

Asset Optimization Services help you design a strategy for parts supply where your investment and carrying costs are reduced and the risk of obsolescence is avoided.

<https://support.industry.siemens.com/cs/ww/en/sc/2110>

Overview (continued)

Repair Services


Repair Services are offered on-site and in regional repair centers for fast restoration of faulty devices' functionality.

Also available are extended repair services, which include additional diagnostic and repair measures, as well as emergency services.

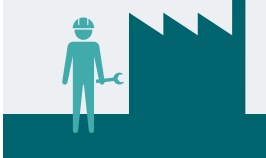
<https://support.industry.siemens.com/cs/ww/en/sc/2154>

Retrofit and Modernization Services


Provide a cost-effective solution for the expansion of entire plants, optimization of systems or upgrading existing products to the latest technology and software, e.g. migration services for automation systems.

Service experts support projects from planning through commissioning and, if desired over the entire extended lifespan, e.g. Retrofit for Integrated Drive Systems for an extended lifetime of your machines and plants.

<https://support.industry.siemens.com/cs/ww/en/sc/2286>

Field and Maintenance Services


Siemens specialists are available globally to provide expert field and maintenance services, including commissioning, functional testing, preventive maintenance and fault clearance.

All services can be included in customized service agreements with defined reaction times or fixed maintenance intervals.

<https://support.industry.siemens.com/cs/ww/en/sc/2265>

Service Programs and Agreements


A technical Service Program or Agreement enables you to easily bundle a wide range of services into a single annual or multi-year agreement.

You pick the services you need to match your unique requirements or fill gaps in your organization's maintenance capabilities.

Programs and agreements can be customized as KPI-based and/or performance-based contracts.

<https://support.industry.siemens.com/cs/ww/en/sc/2275>

Appendix

Industry Services

Online Support

Overview

Online Support – fast, intuitive, whenever you want, wherever you need



Web
support.industry.siemens.com

App
SIEMENS

Get it on Google Play | Get it on the App Store | Microsoft

Scan the QR code for information on our Online Support app.



	FAQ / Application examples Information about industrial products, programming and configuration as well as application examples
	Technical Information Videos, documentation, manuals, updates, product notes, compatibility tool, certificates, planning data such as dimensional drawings, product data, 3D models
	Forum Exchange information and experience with other users and experts

Online Support for Siemens Products for Industry

Siemens Industry and Online Support with some 1.7 million visitors per month is one of the most popular web services provided by Siemens. It is the central access point for comprehensive technical know-how about products, systems and services for automation and drives applications as well as for process industries.

In connection with the challenges and opportunities related to digitalization you can look forward to continued support with innovative offerings.



Your benefit from practical training directly from the manufacturer

SITRAIN – Training for Industry – provides you with comprehensive support in solving your tasks.

Training directly from the manufacturer enables you to make correct decisions with confidence.

Increased profits and lower costs:

- Shorter times for commissioning, maintenance and servicing
- Optimized production operations
- Reliable configuration and commissioning
- Shortened startup times, reduced downtimes, and faster troubleshooting
- Exclude expensive faulty planning right from the start.
- Flexible plant adaptation to market requirements
- Compliance with quality standards in production
- Increased employee satisfaction and motivation
- Shorter familiarization times following changes in technology and staff

Contact

Visit our site on the Internet at:
<http://www.sitrain.us/SII>

or let us advise you personally:

SITRAIN – Training for Industry
SITRAIN Customer Support USA

Tel: 1-800-333-7421 (Inside USA, Toll Free)

Email: sitrain.registration.industry@siemens.com

Your benefits with SITRAIN – Training for Industry

Certified top trainers

Our trainers are skilled specialists with practical experience. Course developers have close contact with product development, and pass on their knowledge to the trainers and then to you.

Practical application with practice

Practice, practice, practice! We have designed the trainings with an emphasis on practical exercises. They take up to half of the course time in our trainings. You can therefore implement your new knowledge in practice even faster.

300 courses in more than 60 countries

We offer a total of about 300 classroom-based courses. You can find us at more than 50 locations in Germany, and in 62 countries worldwide. You can find which course is offered at which location at:

www.siemens.com/sitrain

Skills development

Do you want to develop skills and fill in gaps in your knowledge? Our solution: We will provide a program tailored exactly to your personal requirements. After an individual requirements analysis, we will train you in our training centers near you or directly at your offices. You will practice on the most modern training equipment with special exercise units. The individual training courses are optimally matched to each other and help with the continuous development of knowledge and skills. After finishing a training module, the follow-up measures make success certain, as well as the refreshment and deepening of the knowledge gained.

Appendix

SITRAIN – Training for Industry

Course offer

Course Code*	Course Name	Project Managers	Programmers	Commissioning Engineers	Service Technicians	Operators/Users	Maintenance Personnel	Duration
PIA-PRFNGC2A	Clamp-On Ultrasonic Gas Flowmeters Advanced	✓		✓	✓	✓	✓	2 days
PIA-PRFLHC2A	Clamp-On Ultrasonic Hydrocarbon Flowmeters Advanced			✓	✓	✓	✓	2 days
PIA-PRFCOC2A	Clamp-On Ultrasonic Liquid and Thermal Energy Measurement			✓	✓	✓	✓	2 days
PIA-PRFCOC1A	Fundamentals of Clamp-on Flow			✓	✓	✓	✓	1 day
PIA-PRFFTC1A	Fundamentals of Flow Technologies			✓	✓	✓	✓	1 day
PIA-PRFFTC2A	Advanced Flow Technologies			✓	✓	✓	✓	2 days
PIA-PRFLTC1A	Fundamentals of Level Technologies			✓	✓	✓	✓	2 days
PIA-PRFLTC2A	Advanced Level Technology			✓	✓	✓	✓	2 days
PIA-PRPTVC1A	Fundamentals of Pressure, Temperature and Valve Positioners			✓	✓	✓	✓	1 day
PIA-PRPRTC2A	Pressure and Temperature Advanced			✓	✓	✓	✓	1 day
PIA-PRVALC2A	Valve Positioners Advanced	✓		✓	✓	✓	✓	1 day
PIA-PROGGC1A	Midstream Gas	✓		✓	✓	✓	✓	3 days
PIA-PROGLC1A	Midstream Liquid	✓		✓	✓	✓	✓	3 days
PIA-PROGUC1A	Oil and Gas Upstream	✓		✓	✓	✓	✓	3 days
PIA-PRWATC1A	Water Industry		✓	✓	✓	✓	✓	3 days
PI A-6	PROFIBUS PA Design & Troubleshooting	✓		✓	✓	✓		3 days
PI T-2	Weighing and Feeding			✓	✓	✓	✓	5 days
PI A-2	Advanced Radar			✓	✓	✓	✓	4.5 days
PI A-1	Advanced Ultrasonics			✓	✓	✓	✓	3 days
PI A-5	Advanced Weighing and Feeding			✓	✓	✓	✓	4 days

Course code specific to location visit our training website to find a location a time that will fit your needs.

Custom and tailor-made training

Additionally to our standard technical, industry and sales training we offer our customers the possibility of custom and tailor-made training out of our broad range of options.

We deliver training worldwide either in one of our training centers around the world or at a custom location on-site.

Be it a service training delivering the needed skills for commissioning, diagnosing, or repairing parts of our product portfolio, a general introduction into our portfolio including showcasing applications, use cases and serviced industries, or a deep dive into specific technologies with experts that know every nut, bolt and screw of our products and their applications - it is your wishes and needs we want to serve!

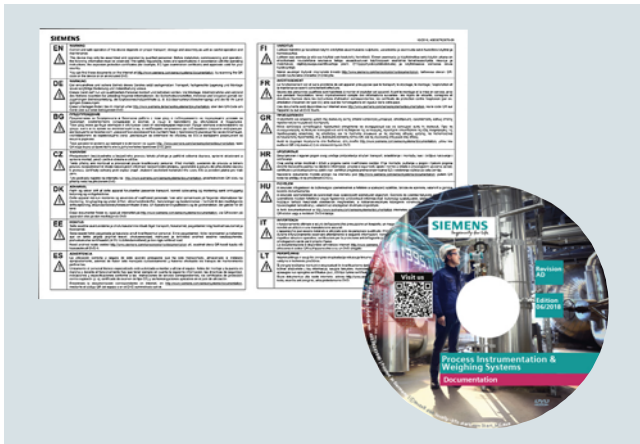
Feel free to contact us with your wishes!

More information

You will find further information on the Internet at:

<https://www.industry.usa.siemens.com/automation/us/en/process-instrumentation-and-analytics/process-instrumentation/training/Pages/Training.aspx>

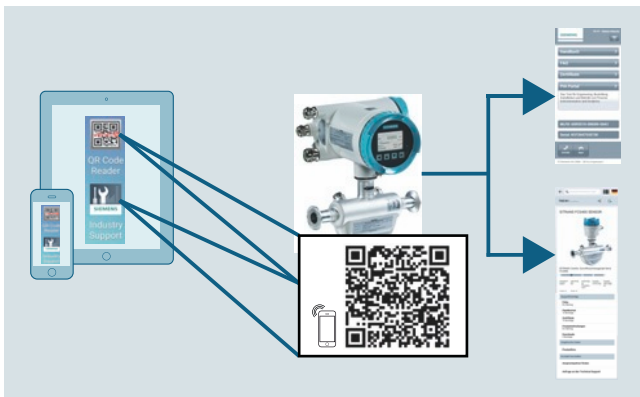
Supplied product documentation on DVD and safety instructions



Siemens products for process instrumentation will be delivered with a multi-language **Safety note** and a **Mini DVD "Process Instrumentation and Weighing Systems"**.

On the DVD, customers can find many important operating instructions and certificates of our Siemens portfolio for process instrumentation and weighing systems. As well, product or order-specific print material may be part of the delivery.

QR Code – Easy access to product information

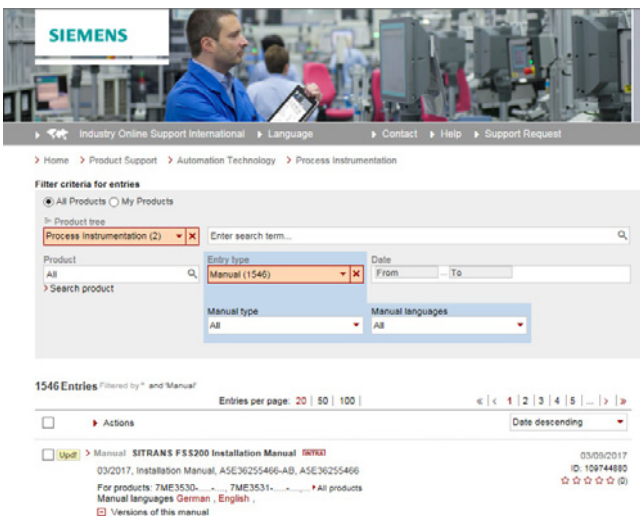


For easy identification, our devices are fitted with a QR code which can be read with the Siemens Industry Support App or any other QR code reader.

This not only enables simple access to article and serial numbers, it also provides you with a direct link to the product documentation, certificates, FAQs and videos.

You can find the Siemens Industry Support App or other QR code reader in your App Store for iOS, Android or Windows mobile.

Siemens Industry Online Support Portal (SIOS)



For the complete portfolio, customers can download product documentation for free using the following links to our Siemens Industry Online Support Portal (SIOS):

<http://www.siemens.com/processinstrumentation/documentation>

By entering the product names as **Search term** and selecting the field **Entry type**, you can find all operating instructions, certificates, product software (EDDs, calculation tools), product notes and other useful information.

Appendix

Partners at Siemens

Siemens Partner Program

Overview

Siemens Solution und Approved Partners



Highest competence in automation and drive technology as well as power distribution

Siemens works closely together with selected partner companies around the world in order to ensure that customer requirements for all aspects of automation and drives, as well as power distribution, are fulfilled as best as possible – wherever you are, and whatever the time.

We place great value on our customers acting in accordance with the same ideals which characterize Siemens as a whole: Competence, professionalism and quality. That is why continuous development through qualification and certification measures in line with global standards is a central aspect of our Partner Program. This means that with our partners, you benefit from the same high quality standards all over the world. The partner emblem is the symbol for tried and tested quality.

Solution Partners and Approved Partners

Our global network of partners includes both Solution Partners and Approved Partners. The latter can be further differentiated into "Value Added Reseller" and "Industry Services".

At present we are working with more than 1,500 Solution Partners worldwide. They are characterized by extensive application, system and sector knowledge, as well as proven project experience, and are able to implement future-proof tailored solutions of the highest quality, based on our product and system portfolio.

With their detailed technical knowledge, **Siemens Approved Partners – Value Added Resellers** offer a combination of products and services that range from specialist technologies and customized modifications to the provision of high-quality system and product packages. They also provide qualified technical support and assistance.

Approved Partners – Industry Services put their unique expertise entirely at the service of enhancing your productivity and can be instrumental in ensuring the availability of your plants.

Partner Finder



In the Siemens global Solution Partner program, customers are certain to find the optimum partner for their specific requirements - with no great effort. The Partner Finder is basically a comprehensive database that showcases the profiles of all our solution partners.

Easy selection:

Set filters in the search screen form according to the criteria that are relevant to you. You can also directly enter the name of an existing partner.

Skills at a glance:

Gain a quick insight into the specific competencies of any particular partner with the reference reports.

Direct contact option:

Use our electronic query form:

www.siemens.com/partnerfinder

Additional information on the Siemens Solution Partner Program is available online at:

www.siemens.com/partner-program

General

The pressure equipment directive **2014/68/EU** applies to the alignment of the statutory orders of the European member states for pressure equipment. Such equipment in the sense of the directive includes vessels, pipelines and accessories with a maximum permissible pressure of more than **0.5 bar** above atmospheric.

Classification according to hazard potential

The classification of the devices according to the pressure equipment directive takes place according to the hazard potential (medium/pressure/volume/nominal width) in the categories I to IV or article 4 paragraph 3.

The following criteria are decisive for assessing the hazard potential; they are also listed in diagrams 1 to 4 and 6 to 9:

• Fluid group	Group 1 or 2
• Aggregate state	Liquid, gaseous
• Type of pressurized equipment	
- Vessel	Product of pressure and volume (PS * V [barL])
- Pipeline	Nominal diameter, pressure or product of pressure and nominal diameter (PS * DN)

The fired or otherwise heated pressure equipment is listed separately in diagram 5.

Note:

Liquids according to Article 4 are those liquids whose steam pressure is **not** more than **0.5 bar** above standard atmospheric pressure (1013 mbar) at the maximum permissible temperature.

The **maximum permissible temperature** for the used liquids is the maximum process temperature which can occur, as defined by the user. This must be within the limits defined for the equipment.

Classification of the media (liquid/gas) into fluid groups*

"Fluids" are gases, liquids and vapors in pure phase as well as their mixtures; fluids can include a suspension of solid matter; fluids are classified into the following fluid groups according to article 13 of the pressure equipment directive 2014/68/EU.

Paragraph a

Group 1

Group 1 consisting of substances and mixtures, as defined in points 7 and 8 of article 2 of Regulation (EC) No. 1272/2008, that are classified as hazardous in accordance with the following physical or health hazard classes laid down in parts 2 and 3 of annex I to that Regulation:

- i) unstable explosive substances/mixtures or explosive substances/ mixtures of divisions 1.1, 1.2, 1.3, 1.4 and 1.5
- ii) flammable gases, categories 1 and 2
- iii) oxidizing gases, category 1
- iv) liquids, category 1 and 2
- v) flammable liquids, category 3 where the maximum permissible temperature is above the flash point
- vi) flammable solids, category 1 and 2
- vii) self-reactive substances and mixtures, type A to F
- viii) pyrophoric liquids, category 1
- ix) pyrophoric solids, category 1
- x) substances and mixtures which in contact with water emit flammable gases, category 1, 2 and 3

- xi) oxidizing liquids, category 1, 2 and 3
- xii) oxidizing solids, category 1, 2 and 3
- xiii) organic peroxides, types A to F
- xiv) acute oral toxicity, category 1 and 2
- xv) acute dermal toxicity, category 1 and 2
- xvi) acute inhalation toxicity, category 1, 2 and 3
- xvii) specific target organ toxicity - single exposure, category 1

Group 1 comprises also substances and mixtures in pressure equipment with a maximum allowable temperature TS which exceeds the flash point of the fluid.

Paragraph b

Group 2

All fluids that are not included in Group 1.

* from: "-DIRECTIVE 2014/68/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15 May 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment (recast)"

Conformity assessment

Pressure equipment of category I to IV must meet the safety requirements set out in annex II and carry a CE marking.

They must meet a conformity assessment procedure set out in annex III of the Directive.

Pressure equipment to article 4 paragraph 3 shall be designed and manufactured in accordance with the sound engineering practice of a Member State and must not have a CE marking (CE markings from other Directives are not affected).

Siemens has (as long as the device is not subject to article 4 paragraph 3) conducted a conformity assessment for its products, given a CE marking and provided a declaration of conformity.

Monitoring of the design, dimensioning, testing and production takes place according to module H (full quality assurance).

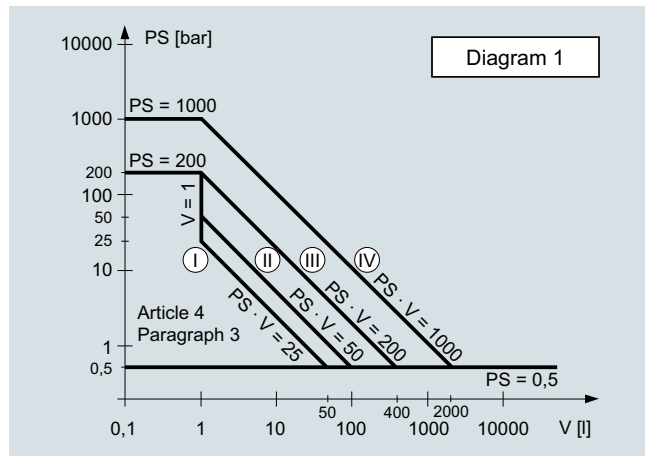
Notes:

- Equipment designed for media with a high danger potential (e.g. gases of fluid group 1) may also be used for media with a lower danger potential (e.g. gases of fluid group 2, or liquids of fluid groups 1 and 2).
- The pressure equipment directive according to Article 1 Paragraph 2 does not apply to equipment such as e.g. mobile offshore plants, ships, aircraft, water supply and waste water networks, nuclear plants, rockets and pipelines outside industrial plants.

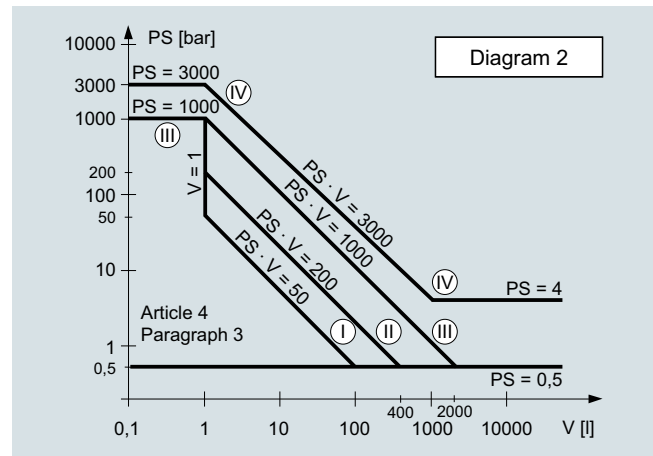
Appendix

Pressure Equipment Directive (2014/68/EU)

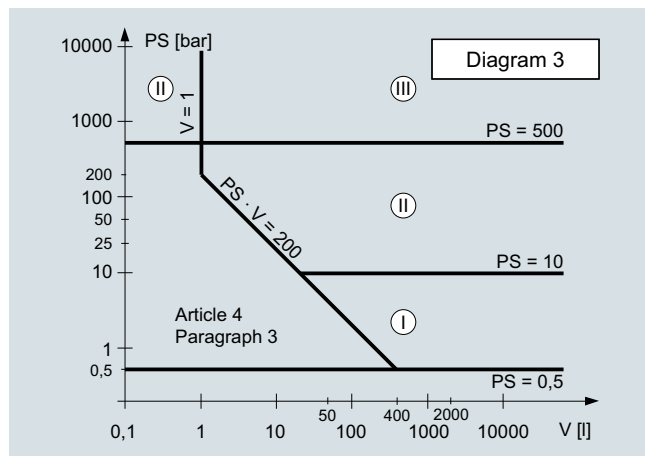
Diagrams



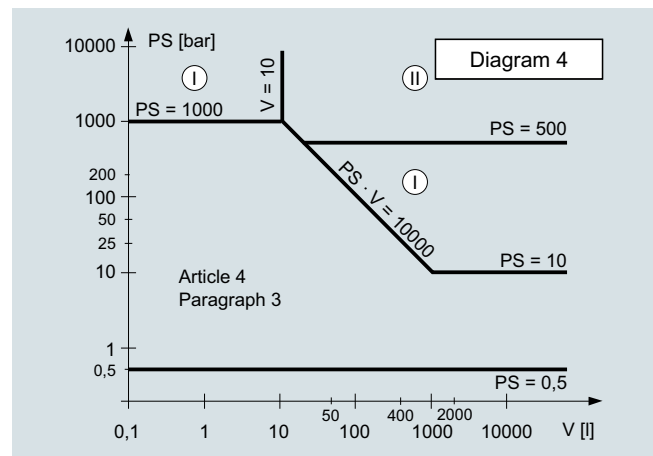
- Gases of fluid group 1
- Vessels in accordance with article 4 paragraph 1 letter a number i first dash
- Exception: unstable gases belonging to Categories I and II must be included in Category III.



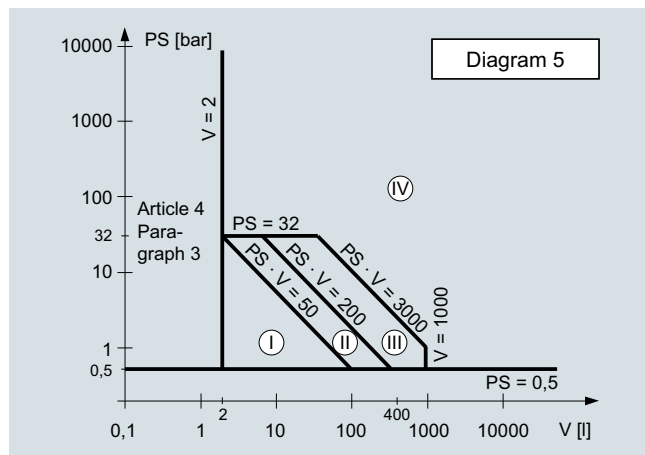
- Gases of fluid group 2
- Vessels in accordance with article 4 paragraph 1 letter a number i second dash
- Exception: fire extinguishers and bottles for breathing apparatus: at least Category III.



- Liquids of fluid group 1
- Vessels in accordance with article 4 paragraph 1 letter a number ii first dash



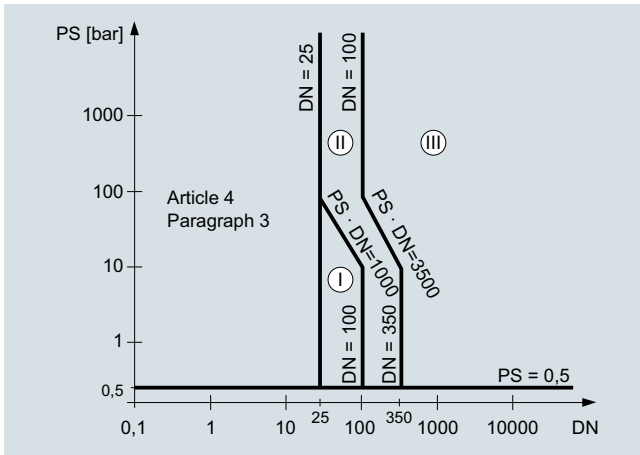
- Liquids of fluid group 2
- Vessels in accordance with article 4 paragraph 1 letter a number ii second dash
- Exception: modules for producing warm water



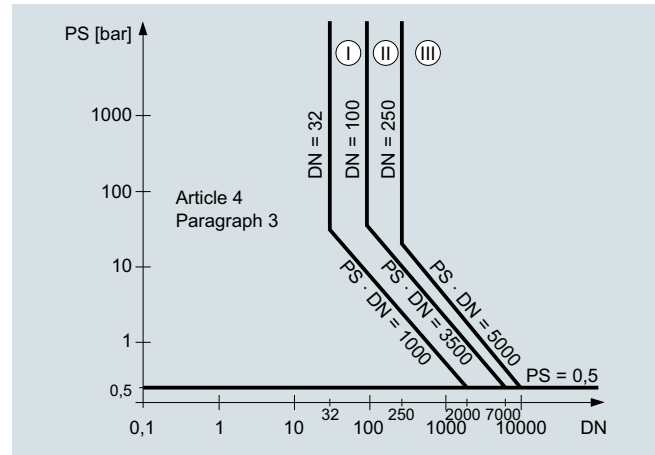
- Fuelled pressure equipment or equipment heated in another manner above 110 °C and liable to overheating.
- Pressure equipment in accordance with article 4 paragraph 1 letter b
- Exception: pressure cooker, test procedure at least according to Category III.

Appendix

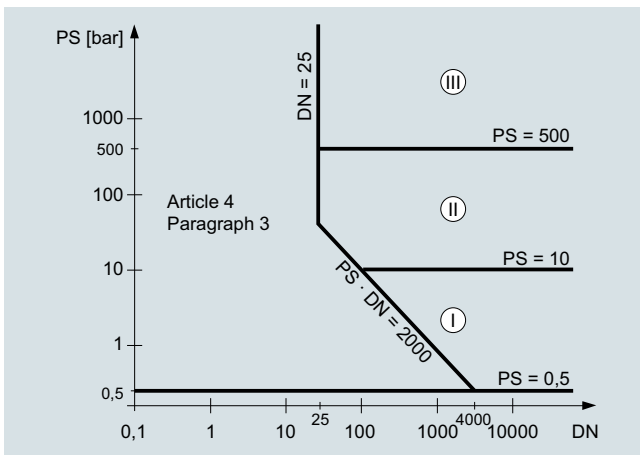
Pressure Equipment Directive (2014/68/EU)



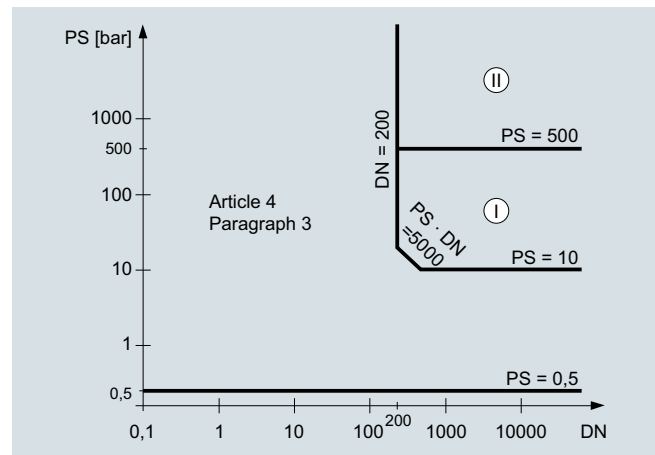
- Gases of fluid group 1
- Piping in accordance with article 4 paragraph 1 letter c number i first dash
- Exception: unstable gases belonging to Categories I and II must be included in Category III.



- Gases of fluid group 2
- Piping in accordance with article 4 paragraph 1 letter c number i second dash
- Exception: liquids at temperatures > 350 °C belonging to Category II must be included in Category III.



- Liquids of fluid group 1
- Piping in accordance with article 4 paragraph 1 letter c number ii first dash



- Liquids of fluid group 2
- Piping in accordance with article 4 paragraph 1 letter c number ii second dash

Appendix

Functional safety

Overview



Functional safety

Functional safety is a strong tradition at Siemens. Werner von Siemens realized as early as 1880 that safety in automated processes is not only a human obligation, it also makes economic sense. In the process industry, hazards for humans, plants and the environment must be minimized without affecting the production process. With Safety Integrated for Process Automation from Siemens, you benefit from a comprehensive product and service offering for safe, fault-tolerant applications.

What is the Safety Integrity Level (SIL)?

The Safety Integrity Level is a term from the field of functional safety. It helps you assess electrical/electronic/programmable electronic systems in terms of the reliability of their safety functions. The goal is to minimize the risk of malfunction of the system and thereby increase the protection of the employed personnel, the environment and property.

The international standard IEC 61508 describes the type of risk assessment as well as measures for designing appropriate safety functions ranging from sensors, logic processing and extending to actuators. The requirements for the process industry are further specified in IEC 61511-1.

Since the standards IEC 61508 and IEC 61511 for functional safety have been in effect, the demand for process instrumentation equipment conforming to SIL classification has continually increased. For this reason, the product portfolio is constantly expanded to include devices that meet the SIL standard.

You will find the current list of SIL devices from Siemens for process instrumentation available today at:

www.siemens.com/SIL

Additional information

Brochure: "Functional Safety in Process Instrumentation with SIL Rating"

http://w3app.siemens.com/mcims/infocenter/dokumentencenter/sc/pi/InfocenterLanguagePacks/Functional%20safety%20in%20process%20instrumentation%20with%20SIL%20rating/SIL-Broschuere_en.pdf

Website: "Functional Safety"

<http://www.industry.siemens.com/topics/global/en/safety-integrated>

Overview

Software types

Software requiring a license is categorized into types. The following software types have been defined:

- Engineering software
- Runtime software

Engineering software

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third parties free-of-charge.

Runtime software

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of delivery can be found in the readme file supplied with the relevant product(s).

License types

Siemens Industry Automation & Drive Technologies offers various types of software license:

- Floating license
- Single license
- Rental license
- Rental floating license
- Trial license
- Demo license
- Demo floating license

Floating license

The software may be installed for internal use on any number of devices by the licensee. Only the concurrent user is licensed. The concurrent user is the person using the program. Use begins when the software is started. A license is required for each concurrent user.

Single license

Unlike the floating license, a single license permits only one installation of the software per license.

The type of use licensed is specified in the ordering data and in the Certificate of License (CoL). Types of use include for example per instance, per axis, per channel, etc.

One single license is required for each type of use defined.

Rental license

A rental license supports the "sporadic use" of engineering software. Once the license key has been installed, the software can be used for a specific period of time (the operating hours do not have to be consecutive).

One license is required for each installation of the software.

Rental floating license

The rental floating license corresponds to the rental license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Trial license

A trial license supports "short-term use" of the software in a non-productive context, e.g. for testing and evaluation purposes. It can be transferred to another license.

Demo license

The demo license support the "sporadic use" of engineering software in a non-productive context, for example, use for testing and evaluation purposes. It can be transferred to another license. After the installation of the license key, the software can be operated for a specific period of time, whereby usage can be interrupted as often as required.

One license is required per installation of the software.

Demo floating license

The demo floating license corresponds to the demo license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Certificate of License (CoL)

The CoL is the licensee's proof that the use of the software has been licensed by Siemens. A CoL is required for every type of use and must be kept in a safe place.

Downgrading

The licensee is permitted to use the software or an earlier version/release of the software, provided that the licensee owns such a version/release and its use is technically feasible.

Delivery versions

Software is constantly being updated.

The following delivery versions

- PowerPack
- Upgrade

can be used to access updates.

Existing bug fixes are supplied with the ServicePack version.

PowerPack

PowerPacks can be used to upgrade to more powerful software. The licensee receives a new license agreement and CoL (Certificate of License) with the PowerPack. This CoL, together with the CoL for the original product, proves that the new software is licensed.

A separate PowerPack must be purchased for each original license of the software to be replaced.

Upgrade

An upgrade permits the use of a new version of the software on the condition that a license for a previous version of the product is already held.

The licensee receives a new license agreement and CoL with the upgrade. This CoL, together with the CoL for the previous product, proves that the new version is licensed.

A separate upgrade must be purchased for each original license of the software to be upgraded.

Appendix

Software licenses

Overview

ServicePack

ServicePacks are used to debug existing products. ServicePacks may be duplicated for use as prescribed according to the number of existing original licenses.

License key

Siemens Industry Automation & Drive Technologies supplies software products with and without license keys.

The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).

The complete installation of software products requiring license keys includes the program to be licensed (the software) and the license key (which represents the license).

Software Update Service (SUS)

As part of the SUS contract, all software updates for the respective product are made available to you free of charge for a period of one year from the invoice date. The contract will automatically be extended for one year if it is not canceled three months before it expires.

The possession of the current version of the respective software is a basic condition for entering into an SUS contract.

You can download explanations concerning license conditions from www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf

Further information can be obtained from our branch offices listed at www.siemens.com/automation-contact

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Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit <http://www.siemens.com/industrialsecurity>.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under <http://www.siemens.com/industrialsecurity>.



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