

Level Measurement

Continuous level measurement

Radar level transmitters / SITRANS LR460

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.

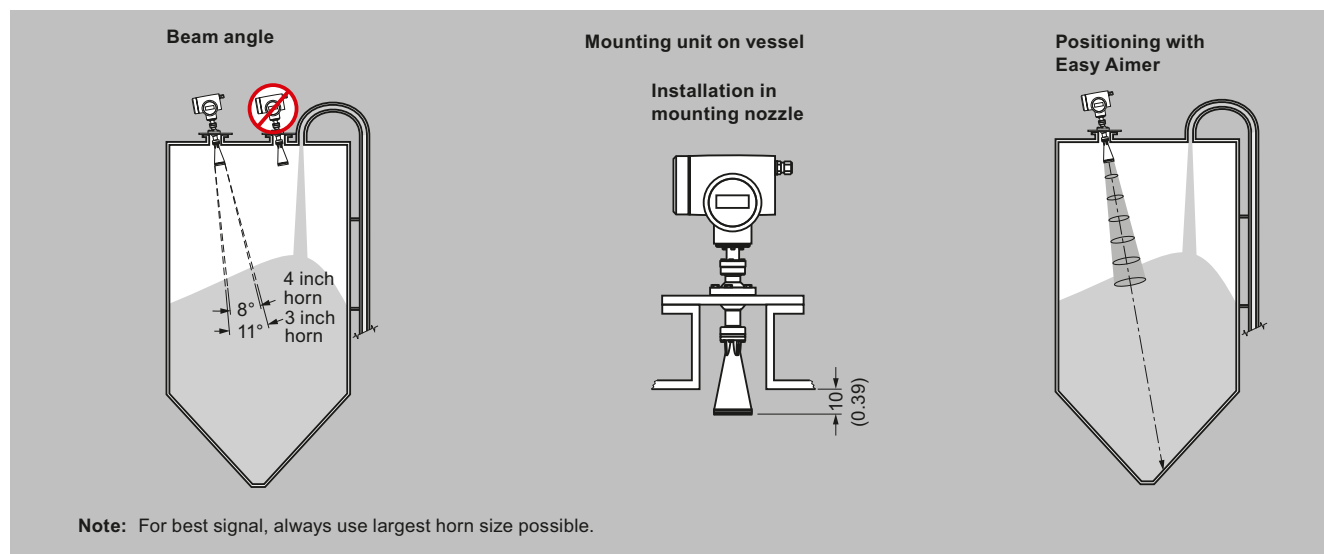
- Key Applications: long-range dusty applications, cement powder, fly-ash, coal, flour, grain, plastics

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Configuration



SITRANS LR460 installation, dimensions in mm (inch)

Selection and ordering data

Article No.									
SITRANS LR460 Radar level transmitter with horn Continuous, non-contact, 100 m (328 ft) range, for challenging solids applications.									
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.									
Process connection									
Universal, flat faced, 0.5 bar g (7.25 psi g) maximum with integral Easy Aimer ball									
3 inch (80 mm)									
4 inch (100 mm)									
6 inch (150 mm)									
Antenna									
3" horn antenna, fits 80 mm (3 inch) nozzles									
3" horn antenna, fits 80 mm (3 inch) nozzles with 100 mm extension									
3" horn antenna, fits 80 mm (3 inch) nozzles with 200 mm extension									
3" horn antenna, fits 80 mm (3 inch) nozzles with 500 mm extension ¹⁾									
3" horn antenna, fits 80 mm (3 inch) nozzles with 1 000 mm extension ¹⁾									
4" horn antenna, fits 100 mm (4 inch) nozzles									
4" horn antenna, fits 100 mm (4 inch) nozzles with 100 mm extension									
4" horn antenna, fits 100 mm (4 inch) nozzles with 200 mm extension									
4" horn antenna, fits 100 mm (4 inch) nozzles with 500 mm extension ¹⁾									
4" horn antenna, fits 100 mm (4 inch) nozzles with 1 000 mm extension ¹⁾									
Purge (self-cleaning) connection									
No purge connection									
Purge connection									
Output/Communication									
4 ... 20 mA, HART									
PROFIBUS PA									
Power supply/cable inlet									
100 ... 230 V AC									
• 2 x M20 x 1.5									
• 2 x ½" NPT									
24 V DC									
• 2 x M20 x 1.5									
• 2 x ½" NPT									
Approvals									
Ordinary Locations/General Purpose (Non-Ex), cCSA _{US} , FM, IC, FCC, CE, UKCA, RED, RCM									

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Selection and ordering data (continued)

SITRANS LR460 Radar level transmitter with horn Continuous, non-contact, 100 m (328 ft) range, for challenging solids applications.										Article No.
										7ML5426- 0 ● ● ● 0 - ● ● ● 0
CSA/FM Class II, Div. 1, Groups E, F, and G, Class III										B
ATEX II 1 D Ex ta IIIC T ₂₀₀ 85°C Da; UKEX II 1 D Ex ta IIIC T ₂₀₀ 85°C Da; IECEX SIR 06.0058X, IECEX Ex ta IIIC T ₂₀₀ 85°C Da; INMETRO DNV 12.0089 X, INMETRO Ex ta IIIC T ₂₀₀ 85°C Da; EAC Ex Ex ta IIIC T85°C Da X; CE, UKCA, RED										C

¹⁾ Available with Purge option 0 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
For applicable back up point level switch - see point level measurement section	

Accessories	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	
Handheld programmer, Infra-red, Intrinsically Safe, EEx ia	7ML5830-2AJ
Dust cap, PTFE, for 3 inch/80 mm horn	7ML1930-1BL
Dust cap, PTFE, for 4 inch/100 mm horn	7ML1930-1BM
HART modem with USB interface	7MF4997-1DB
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART ¹⁾	7ML1930-1AP
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA ¹⁾	7ML1930-1AQ
SITRANS RD100, loop powered display -see Chapter 7	7ML5741-.....
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	7ML5742-.....
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-.....
For applicable back up point level switch - see point level measurement section	

¹⁾ Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

SITRANS LR460 Specials	Article No.
Process connection part kits - non-pressure-rated	
SITRANS LR460, 100 mm extension for horn antenna, no purge ¹⁾	A5E01087872
SITRANS LR460, 200 mm extension for horn antenna, no purge ¹⁾	A5E01091262
SITRANS LR460, 100 mm extension for horn antenna with purge ¹⁾	A5E01261979
SITRANS LR460, 200 mm extension for horn antenna with purge ¹⁾	A5E01261981

Selection and ordering data (continued)

SITRANS LR460 Specials	Article No.
SITRANS LR460, horn 2", no purge, no emitter ¹⁾	A5E02083905
SITRANS LR460, horn 3", no purge, no emitter ¹⁾	A5E01623511
SITRANS LR460, horn 4", no purge, no emitter ¹⁾	A5E01623512
SITRANS LR460, horn 2", with purge, no emitter ¹⁾	A5E02083906
SITRANS LR460, horn 3", with purge, no emitter ¹⁾	A5E01623513
SITRANS LR460, horn 4", with purge, no emitter ¹⁾	A5E01623514
SITRANS LR460, 3" universal flat faced flange ¹⁾	A5E02303897
SITRANS LR460, 4" universal flat faced flange ¹⁾	A5E01259467
SITRANS LR460, 6" universal flat faced flange ¹⁾	A5E01261834
SITRANS LR460 O-Rings for Easy Aimer ¹⁾	A5E01261836
Kit, Emitter for LR460 ¹⁾	A5E02360694
Purge conversion kit - non-pressure-rated (no flange or extension included)	
SITRANS LR460 purge conversion, 2" horn ¹⁾	A5E02083914
SITRANS LR460 purge conversion, 3" horn ¹⁾	A5E02083915
SITRANS LR460 purge conversion, 4" horn ¹⁾	A5E02083916
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.automation.siemens.com/aspa_app.



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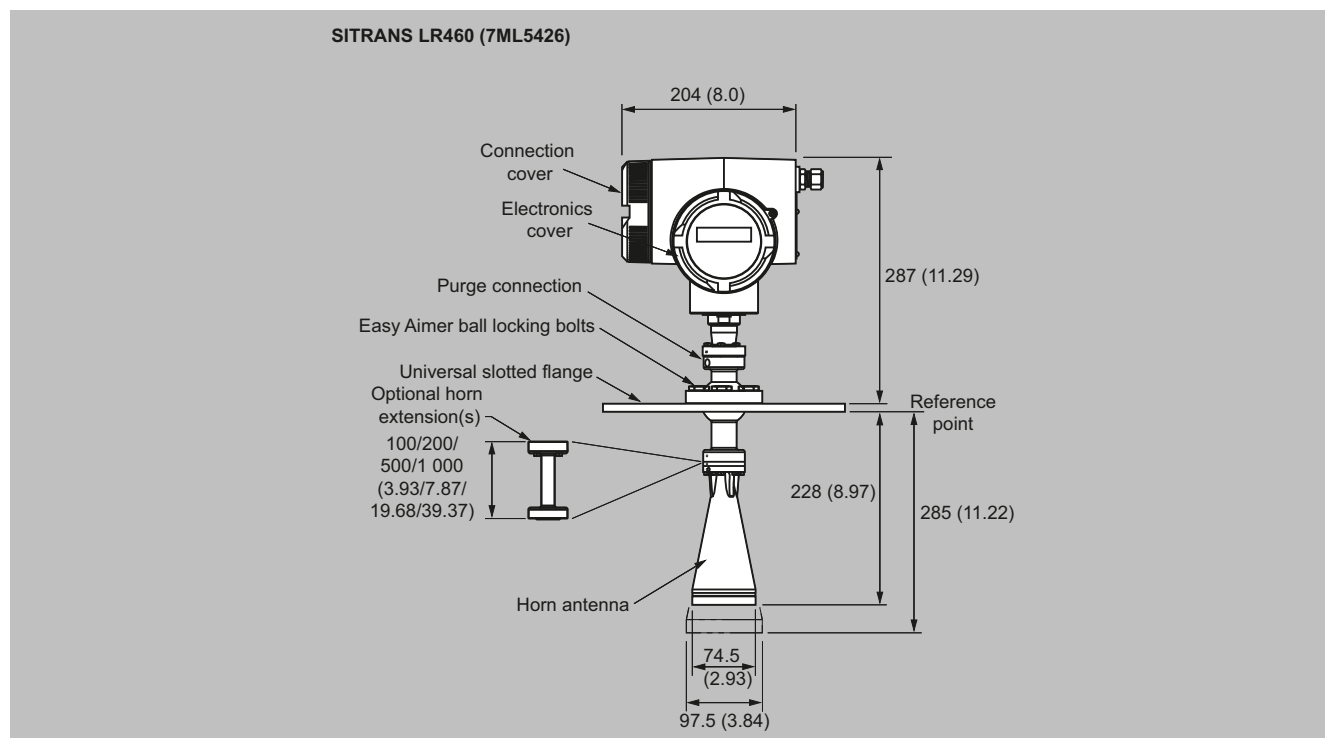
Technical specifications

SITRANS LR460	
Mode of operation	
Measuring principle	FMCW radar level measurement
Frequency	24.2 ... 25.2 GHz FMCW
Measuring range	0.35 ... 100 m (1.15 ... 328.08 ft)
Output	
Analog output (HART)	
• Signal range	Optically isolated
• 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
PROFIBUS PA protocol	Layer 1 and 2, Class A, Profile 3.01
Performance (Reference conditions according to IEC 60770-1)	
Non-linearity	Greater of 25 mm (1 inch) or 0.25 % of span (including hysteresis and non-repeatability), over the full ambient temperature range
Non-repeatability	≤ 10 mm (0.4 inch)
Rated operating conditions	
Amb. temperature for enclosure	-40 ... +65 °C (-40 ... +149 °F)
Storage temperature	-40 ... +65 °C (-40 ... +149 °F)
Location	Indoor/outdoor
Installation category	II
Pollution degree	4
Medium conditions	
Dielectric constant	$\epsilon_r > 1.4$
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
Programming	
Intrinsically Safe Siemens handheld programmer (ordered separately)	Infrared receiver
• Approvals for handheld programmer	IS model: ATEX II 1 GD Ex ia op is IIC T4 Ga, ATEX II 1 GD Ex ia op is IIIC T135°C Da; UKEX II 1 GD Ex ia op is IIC T4 Ga, UKEX II 1 GD Ex ia op is IIIC T135°C Da CSA/FM Class I, Div. 1, Groups A, B, C, D T6 at max. ambient temperature of 40°C (104°F)
Handheld communicator	HART Communicator 375
PC	SIMATIC PDM
Display (local)	Alphanumeric LCD for readout and entry
Power supply	
	100 ... 230 V AC ± 15 % (50/60 Hz), 6 W (12 VA) or 24 V DC +25/-20 %, 6 W (optional)
Certificates and approvals	
General	cCSA _{US} , CE, UKCA, FM, RCM
Radio	European Radio (RED), Industry Canada, FCC, RCM

Technical specifications (continued)

SITRANS LR460	
Hazardous Areas	ATEX II 1 D Ex ta IIIC T ₂₀₀ 85°C Da; UKEX II 1 D Ex ta IIIC T ₂₀₀ 85°C Da; IECEx Ex ta IIIC T ₂₀₀ 85°C Da; INMETRO Ex ta IIIC T ₂₀₀ 85°C Da; EAC Ex Ex ta IIIC T85°C Da X
Optional equipment	
Dust cap	PTFE
Air purge connection	1/8" NPT

Dimensional drawings



SITRANS LR460, dimensions in mm (inch)

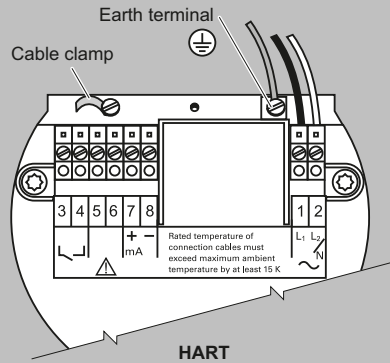
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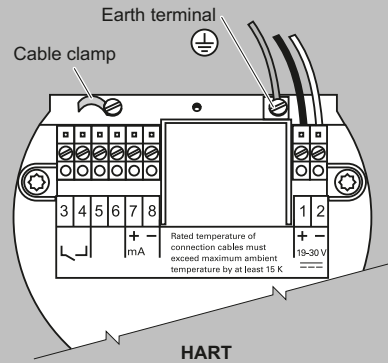
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Circuit diagrams

AC version



DC version

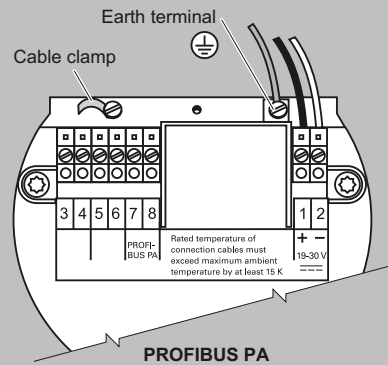
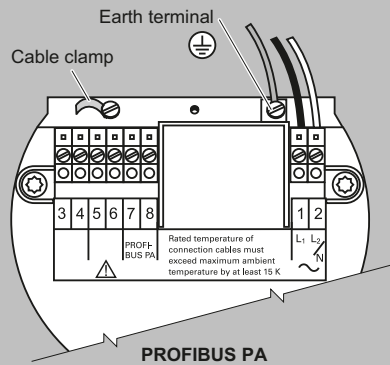


Hand programmer



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



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