

Temperature transmitters

Compact and head transmitters / SITRANS TH200 (4 to 20 mA, universal)

Overview



Ultra flexible - with the universal SITRANS TH200 transmitter

- 2-wire device 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 mounting type
- Galvanic isolation
- 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 note 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. Its compact size means that it can be installed in connection heads of type B or larger. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometer (2, 3, 4-wire connection)
- 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.

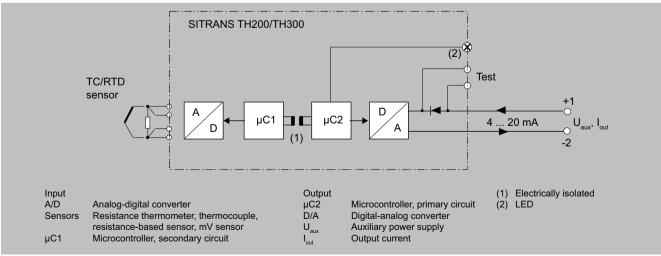
Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices meet the directive 2014/34/EU (ATEX) as well as the FM and CSA requirements.

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 (FEPROM)

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 break, 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 transmitters

Compact and head transmitters / SITRANS TH200 (4 to 20 mA, universal)

Selection and ordering data

	Article No.
SITRANS TH200 head transmitter For installation in connection head type B, 2-wire system 4 20 mA, programmable, with galvanic isolation	
Without explosion protection	7NG3211-1NN00
With explosion protection	
According to ATEX	7NG3211-1AN00
• According to FM (_C FM _{US})	7NG3211-1BN00

Options Add "-Z" to article number, specify order code and, if applicable, plain text	Order code
Test report (5 measuring points)	C11
Functional safety SIL2	C20
Functional safety SIL2/3	C23
Customer-specific programming	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: to °C, °F	Y01 ¹⁾
Measuring point number (TAG) max. 8 characters	Y17 ²⁾
Measuring point description, max. 16 characters	Y23 ²⁾
Measuring point message, max. 32 characters	Y24 ²⁾
Pt100 (IEC) 2-wire, $R_L = 0 \Omega$	U02 ³⁾
Pt100 (IEC) 3-wire	U03 ³⁾
Pt100 (IEC) 4-wire	U04 ³⁾
Type B thermocouple	U20 ³⁾⁴⁾
Type C thermocouple (W5)	U21 ³⁾⁴⁾
Type D thermocouple (W3)	U22 ³⁾⁴⁾
Type E thermocouple	U23 ³⁾⁴⁾
Type J thermocouple	U24 ³⁾⁴⁾
Type K thermocouple	U25 ³⁾⁴⁾
Type L thermocouple	U26 ³⁾⁴⁾
Type N thermocouple	U27 ³⁾⁴⁾
Type R thermocouple	U28 ³⁾⁴⁾
Type S thermocouple	U29 ³⁾⁴⁾
Type T thermocouple	U30 ³⁾⁴⁾
Type U thermocouple	U31 ³⁾⁴⁾
For TC: Cold junction compensation: external (Pt100, 3-wire)	U41
For TC: Cold junction compensation: external with fixed value: Specify in plain text	Y50
Enter special deviating customer-specific setting in plain text	Y09 ⁵⁾
Fault current 3.6 mA (instead of 22.8 mA)	U36 ²⁾
Cable extension Transmitter with installed cable extension 200 mm (7.87 inches), for Pt100 in 4-wire con- nection	W01

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.

Selection and ordering data (continued)

Accessories

	Article No.
Other accessories for assembly, connection and transmitter configuration, see page 2/198.	
Modem	
Modem with USB interface and SIPROM T software	7NG3092-8KN
Mounting rail adapter for head transmitter (Quantity delivered: 5 units)	7NG3092-8KA
Connecting cable 4-wire, 200 mm (7.87 inches), for sensor connections when using head transmitters in the high spring flap (set with 5 units)	7NG3092-8KC

For supply units, see Catalog FI01 section "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); 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current: 22.8 mA • Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

⁵ For customer-specific programming for mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Temperature transmitters

Compact and head transmitters / SITRANS TH200 (4 to 20 mA, universal)

Technical specifications

SITRANS TH200 (4 20 mA, universal)				
Input				
Resistance thermometer				
Measured variable	Temperature			
Sensor type				
According to IEC 60751	Pt25 Pt1000			
• According to JIS C 1604; a = 0.00392 K ⁻¹	Pt25 Pt1000			
According to IEC 60751	Ni25 Ni1000			
Special type	Via special characteristic curve (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 connection			
Averaging	2 identical resistance thermometers in 2-wire connection for generation of average temperature			
Differentiation	2 identical resistance thermometers (RTD) in 2-wire connection (RTD 1 – RTD 2 or RTD 2 – RTD 1)			
Connection				
2-wire connection	Wire resistance can be configured $\leq 100 \Omega$ (loop resistance)			
3-wire connection	No trim necessary			
4-wire connection	No trim necessary			
Sensor current	≤ 0.45 mA			
Response time	≤ 250 ms for 1 sensor with break monitoring			
Break monitoring	Always active (cannot be switched off)			
Short-circuit monitoring Measuring range	Can be switched on/off (default value: ON) Assignable (see "Digital measuring error" table)			
Min. measuring span	10 °C (18 °F)			
Characteristic curve	Temperature-linear or special characteristic curve			
<u>Resistance-based sensor</u>				
Measured variable	Ohmic resistance			
Sensor type	Resistance-based, potentiometers			
Units	Ω			
Connection				
Standard connection .	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire connection			
Averaging	2 resistance-based sensors in 2-wire connection for averaging			
Differentiation	2 resistance thermometers in 2-wire connection (R1 – R2 or R2 – R1)			
Connection • 2-wire connection	Wire resistance can be configured ≤100 Ω			
3-wire connection	(loop resistance) No trim necessary			
	•			
4-wire connection	No trim necessary			
Sensor current	≤ 0.45 mA			
Response time	≤ 250 ms for 1 sensor with break monitoring			
Break monitoring Short-circuit monitoring	Always active (cannot be switched off) Can be switched on/off (default value: OFF)			
Measuring range	Assignable max. 0 2200 Ω (see "Digital measuring error" table)			
Min. measuring span	5 Ω 25 Ω (see "Digital measuring error" table)			
Characteristic curve	Resistance-linear or special characteristic curve			
<u>Thermocouples</u>				

Temperature transmitters

Compact and head transmitters / SITRANS TH200 (4 to 20 mA, universal)

Technical specifications (continued)

Break monitoring Cold junction compensation Internal With integrated Pt100 resistance thermometer External With external Pt100 IEC 60751 (2-wire or 3-wire connection) External fixed Reference junction temperature can be set as fixed value Measuring range Assignable (see "Digital measuring error" table) Min. measuring span Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve mV sensor Measured variable DC voltage DC voltage DC voltage source (DC voltage source possible over externally connected resistance) Units with integrated off With integrated Pt100 resistance Hit integrated Pt100 resistance	SITRANS TH200 (4 20 mA, uni	
 Type B Pt30Rh-Pt6Rh acc. to IEC 584 Type C W5%-Re acc. to ASTM 988 Type D W3%-Re acc. to ASTM 988 Type E NiCr-CuNi acc. to IEC 584 Type J Fe-CuNi acc. to IEC 584 Type K NiCr-Ni acc. to IEC 584 Type L Fe-CuNi acc. to IEC 584 Type N NiCrSi-NiSi acc. to IEC 584 Type R Pt3Rh-Pt acc. to IEC 584 Type T Cu-CuNi acc. to IEC 584 Type T Cu-CuNi acc. to IEC 584 Type U Cu-CuNi acc. to IEC 584 Type U Units "C or "F Connection Standard connection 1 thermocouple (TC) Averaging 2 thermocouples (TC) TC1) Experation of the switched off Old junction compensation Internal External With integrated Pt100 resistance thermometer External External fixed Reference junction temperature can be set as fixed value Measuring range Assignable (see "Digital measuring error" table) Min. measuring span Min. 40 100 "C (72 180 °F) (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve mV Sensor type DC voltage DC voltage Sons for 1 sensor with break monitoring Can be switched off Can be switched o		Temperature
• Type C • Type D • Type D • Type E • Type E • Type J • Type J • Type K • Type L • Type N • Type N • Type S • Type C • Type S • Type S • Type C • Type S • Type C • Type S • Type C • Type C • Type C • Type C • Type S • Type S • Type C • Type S • Type S • Type C • Cu-CuNi acc. to IEC 584 • Type C • Cu-CuNi acc. to IEC 584 • Type C • Cu-CuNi acc. to IEC 584 • Type U • Cu-CuNi acc. to IEC 584 • Type U • Cu-CuNi acc. to IEC 584 • Type U • Cu-CuNi acc. to IEC 584 • Type U • Cu-CuNi acc. to IEC 584 • Type U • Cu-CuNi acc. to IEC 584 • Type T • Cu-CuNi acc. to IEC 584 • Type T • Cu-CuNi acc. to IEC 584 • Type T • Cu-CuNi acc. to IEC 584 • Type T • Cu-CuNi acc. to IEC 584 • Type T • Cu-CuNi acc. to IEC 584 • Type T • Cu-CuNi acc. to IEC 584 • Type T • Cu-CuNi acc. to IEC 584 • Type S • P113Rh-Pt acc. to IEC 584 • Type T • Cu-CuNi acc. to IEC 584 • Type S • P113Rh-Pt acc. to IEC 584 • Type S • Type S • P113Rh-Pt acc. to IEC 584 • Type S • P113Rh-Pt acc. to IEC 584 • Type S • Type S • Type S • P113Rh-Pt acc. to IEC 584 • Type S • Type S • Type S • P113Rh-Pt acc. to IEC 584 • Type S		
• Type D • Type E • Type E • Type J • Type J • Type K • Type L • Type L • Fe-CuNi acc. to IEC 584 • Type L • Type N • Type N • Type R • Type S • Type C • Type S • Type S • Type T • Type S • Type U Units • Cor °F Connection • Standard connection • With integrated Pt100 resistance thermometer • External • External • External • External • External With external Pt100 IEC 60751 (2-wire or 3-wire connection) • External fixed • Reference junction temperature can be set as fixed value Measuring range • Assignable (see "Digital measuring error" table) Min. measuring span Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Min. measuring span Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve mV sensor Measured variable Sensor type D C voltage DC voltage Sensor type D C voltage Sensor type D C voltage DC voltage Sensor type D C voltage D C voltage Sensor type D C voltage Sensor type D C voltage Sensor type D C voltage D C voltage Sensor type D C voltage Sen		
 Type E NiCr-CuNi acc. to IEC 584 Type J Fe-CuNi acc. to IEC 584 Type K NiCr-Ni acc. to IEC 584 Type L Fe-CuNi acc. to IEC 584 Type N NiCri-Ni acc. to IEC 584 Type R Ptype R Pt13Rh-Pt acc. to IEC 584 Type S Pt10Rh-Pt acc. to IEC 584 Type U Cu-CuNi acc. to IEC 584 Type U Units "Cor "F Connection Standard connection 1 thermocouple (TC) Averaging 2 thermocouples (TC) Tet person for 1 sensor with break monitoring Can be switched off Cold junction compensation Internal External External External Pt100 IEC 60751 (2-wire or 3-wire connection) External Fixed Reference junction temperature can be set as fixed value Measuring range Assignable (see "Digital measuring error" table) Min. measuring span Min. 40 100 "C (72 180 °F) (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve mV Sesponse time Break monitoring Can be switched off —10 +70 mV —100 +70 mV —1	Type C	W5%-Re acc. to ASTM 988
 Type J Fe-CuNi acc. to IEC 584 Type L Fe-CuNi acc. to IEC 584 Type N NiCrSi-NiSi acc. to IEC 584 Type R Pt19R Pt2 cc. to IEC 584 Type S Pt10Rh-Pt acc. to IEC 584 Type T Cu-CuNi acc. to IEC 584 Type U Cu-CuNi acc. to IEC 584 Type U Cu-CuNi acc. to IEC 584 Type U Cu-CuNi acc. to DIN 43710 Winits Cor "F Connection Standard connection 1 thermocouple (TC) Averaging 2 thermocouples (TC) TC1) Response time ≤ 250 ms for 1 sensor with break monitoring Can be switched off Cold junction compensation Internal With integrated Pt100 resistance thermometer External External fixed Reference junction temperature can be set as fixed value Resuming range Assignable (see "Digital measuring error" table) Min. measuring span Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve MV sensor Measured variable DC voltage Sensor type DC voltage Sensor type DC voltage Sensor type DC voltage Sensor with break monitoring Can be switched off -10 +70 mV -100 +70 mV -100 +710 mV -100 +1100 mV Min. measuring span -10 +73.5 V DC -10 +710 mV -100 +1100 mV Auxiliary power 1 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nand Ib;	Type D	W3%-Re acc. to ASTM 988
 Type K NiCr-Ni acc. to IEC 584 Type L Fe-CuNi acc. to DIN 43710 NiCrSi-NiSi acc. to IEC 584 Type R Pt13Rh-Pt acc. to IEC 584 Type T Cu-CuNi acc. to IEC 584 Type U Units Cor °F Connection Standard connection Standard connection 1 thermocouple (TC) Averaging 2 thermocouples (TC) Differentiation 2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1) Response time S 250 ms for 1 sensor with break monitoring Cold junction compensation Internal With integrated Pt100 resistance thermometer External With external Pt100 IEC 60751 (2-wire or 3-wire connection) External fixed Reference junction temperature can be set as fixed value Measuring range Assignable (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve Wo voltage source (DC voltage source possible over externally connected resistance) MV Response time S 250 ms for 1 sensor with break monitoring Can be switched off 10 +70 mV -10 +70 mV -10 +710 mV -10 +70 mV -10 +73 mV -10 23 mV, continuously adjustable (default range: 3.80 mA 20.5 mA) Corror signal (e.g. in case of sensor	Type E	NiCr-CuNi acc. to IEC 584
• Type L • Type N • Type N • Type N • Type R • Type R • Type S • Type S • Type T • Cu-CuNi acc. to IEC 584 • Type U Units • Connection • Standard connection • Standard connection • Averaging • Differentiation • Internal • External • External • External fixed • Research grange Measuring range Min. measuring span Mesured variable Sensor type DC voltage Sensor type DC voltage DC voltage DC voltage Sensor type DC voltage DC voltage Sensor type DC voltage DC voltage source (DC voltage source possible over externally connected resistance) Units MR ≥ 250 ms for 1 sensor with break monitoring Can be switched off Characteristic curve mV sensor Measured variable Sensor type DC voltage DC voltage DC voltage DC voltage Sensor type DC voltage DC voltage DC voltage DC voltage source (DC voltage source possible over externally connected resistance) Units MC ≥ 250 ms for 1 sensor with break monitoring Characteristic curve mV sensor Measured variable DC voltage DC voltage DC voltage DC voltage source (DC voltage source possible over externally connected resistance) Units MC ≥ 250 ms for 1 sensor with break monitoring Can be switched off • -10 +70 mV • -1100 +1100 mV Min. measuring span Qm vor 20 mV Overload capability of the input 1.5 +3.5 V DC □ 1 MQ Voltage-linear or special characteristic curve Voltage-linear or special charact	• Type J	Fe-CuNi acc. to IEC 584
• Type N • Type R • Type R • Type S • Type S • Pt13Rh-Pt acc. to IEC 584 • Type T Cu-CuNi acc. to IEC 584 • Type U Units Connection • Standard connection • Standard connection • Standard connection • Averaging • Differentiation Response time Break monitoring Cold junction compensation • Internal • External fixed Measuring range Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Min. measuring span Messonse time DC voltage DC voltage DC voltage DC voltage DC voltage DC voltage source (DC voltage source possible over externally connected resistance) mV sensor Units MC Can be switched off DC voltage DC voltage DC voltage DC voltage DC voltage source (DC voltage source possible over externally connected resistance) mV sensor Units MC S S Om S for 1 sensor with break monitoring can be switched off DC voltage DC voltage DC voltage DC voltage DC voltage DC voltage source (DC voltage source possible over externally connected resistance) mV sensor Wesuring range 4 20 mA, 2-wire 11 35 V DC J MQ Voltage Inear or special characteristic curve Voltput signal Auxiliary power 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex naInLic) Max. load Overrange (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable	Type K	NiCr-Ni acc. to IEC 584
• Type N • Type R • Type R • Type S • Pt13Rh-Pt acc. to IEC 584 • Type T Cu-CuNi acc. to IEC 584 • Type U Units Connection • Standard connection • Standard connection • Averaging • Differentiation Response time Break monitoring • External • External • External fixed Measuring range Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Min. measuring span Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) DC voltage Sensor type DC voltage DC voltage DC voltage DC voltage DC voltage source (DC voltage source possible over externally connected resistance) Units mV Response time DC voltage DC voltage DC voltage DC voltage DC voltage source (DC voltage source possible over externally connected resistance) Units mV Response time ≤ 250 ms for 1 sensor with break monitoring can be set as fixed value Assignable (see "Digital measuring error" table) Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Characteristic curve mV sensor Measured variable DC voltage DC voltage DC voltage DC voltage DC voltage source (DC voltage source possible over externally connected resistance) Units mV Response time ≤ 250 ms for 1 sensor with break monitoring Reak monitoring Measuring range • -10+70 mV • -100+1100 mV • 110+1100 mV Voltage-linear or special characteristic curve Output Output signal Auxiliary power 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex naInLiC) Max. load Overrange 3.6 23 mA, continuously adjustable Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable	Type L	Fe-CuNi acc. to DIN 43710
 Type R Pt13Rh-Pt acc. to IEC 584 Type S Pt10Rh-Pt acc. to IEC 584 Type U Cu-CuNi acc. to IEC 584 Type U Units Cor °F Connection Standard connection 1 thermocouple (TC) Averaging 2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1) Response time ≥ 250 ms for 1 sensor with break monitoring Con 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 Reference junction temperature can be set as fixed value Measuring range Assignable (see "Digital measuring error" table) Min. measuring span Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve mV sensor Measured variable DC voltage DC voltage DC voltage source (DC voltage source possible over externally connected resistance) teristance Londous externally connected resistance there is to switched off 10 +70 mV 10 +70 mV 10 +1100 mV Min. measuring span 2 mV or 20 mV 11 +35 VD C to 10 mV 11 +35 VD C to 30 V with Ex ia and ib; to 32 V with Ex ia and ib; to 32 V with Ex nA/InLic) Max. load Output 1135 VD C (to 30 V with Ex ia and ib; to 32 V with Ex nA/InLic) Max. load Overrange 3.623 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.623 mA, continuously adjustable 		NiCrSi-NiSi acc. to IEC 584
Type S Type T Cu-CuNi acc. to IEC 584 Type U Cu-CuNi acc. to IEC 584 Type U Cu-CuNi acc. to IEC 584 Type U Cu-CuNi acc. to DIN 43710 Units Cor °F Connection Standard connection I thermocouple (TC) Averaging I thermocouples (TC) TC1) Response time Seak monitoring Coal 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 Reference junction temperature can be set as fixed value Measuring range Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve MV sensor Measured variable DC voltage Sensor type DC voltage source (DC voltage source possible over externally connected resistance) Units Response time Break monitoring Measuring range PC voltage source (DC voltage source possible over externally connected resistance) Units MV Response time Break monitoring Can be switched off PC voltage source (DC voltage source possible over externally connected resistance) Units MV Response time PC voltage source (DC voltage source possible over externally connected resistance) Units MV Response time PC voltage source (DC voltage source possible over externally connected resistance) Units MV Response time PC voltage source (DC voltage source possible over externally connected resistance) Units MV Response time PC voltage source (DC voltage source possible over externally connected resistance) Units MV Response time PC voltage source (DC voltage source possible over externally connected resistance) Units MV Response time PC voltage source (DC voltage source possible over externally connected resistance) Units MV Response time PC voltage source (DC voltage source possible over externally connected resistance) Units MV Response time PC voltage source (DC voltage source possible voltage source possible voltage source voltage source voltage source voltage source voltage source voltage sou		
• Type T • Type U Units Cu-CuNi acc. to DIN 43710 Units Cor °F Connection • Standard connection • Standard connection • Differentiation Presentiation Internation • Internation compensation • Internation • Internation • Externation • Externatio		
Type U Units CurCuNi acc. to DIN 43710 Units Connection Standard connection 1 thermocouple (TC) Averaging 2 thermocouples (TC) Differentiation 2 thermocouples (TC) (TC1 − TC2 or TC2 − TC1) Response time Break monitoring Coan be switched off Cold junction compensation Internal Internal External External External External Min. measuring range Min. measuring span Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Characteristic curve Measured variable Sensor type DC voltage Sensor type DC voltage Sensor type DC voltage DC voltage Sensor type DC voltage Sensor in sensor with break monitoring Can be switched off DC voltage Sensor type DC voltage Sensor in sensor with break monitoring Can be switched off ■ -10 +70 mV − -100 +1100 mV Aunum -20 mV Overload capability of the input 1.5 +3.5 ∨ DC Input resistance Duput Output Output signal Auxiliary power Auxiliary power 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable Error signal (e.g. in case of sensor breakage) 2 thermocouples (TC) 2 thermocouples (TC) 2 thermocouples (TC) 1 thermocouples (TC) 2 thermocouples (TC) 1 thermocouples (TC) 2 thermocouples (TC) 1 thermocouples (TC) 2 thermocouples (TC) 1 thermocouples (TC) 1 thermocouples (TC) 2 thermocouples (TC) 2 thermocouples (TC) 1 thermocouples (TC) 2 thermocouples (TC) 2 thermocouples (TC) 2 thermocouples (TC) 2 thermocouples (TC) 3 thermocouples (E-60751 (2-wire or TC2 or TC1 1 thermocouples (E-60751 (2-wire or 3-wire or 3-wire breakage) (Healt range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3 thermocouples (E-60751 (2-wire or TC2 or TC2 TC1) 1 thermocouples (TC) 1 thermocouples (TC) 1 thermocouples (TC) 2 thermocouples (TC) 1 thermoco		
Units Connection • Standard connection • Standard connection • Averaging 2 thermocouples (TC) • Averaging 2 thermocouples (TC) • Differentiation 2 thermocouples (TC) (TC1 − TC2 or TC2 − TC1) Response time 8 ≥ 250 ms for 1 sensor with break monitoring Coan be switched off Cold junction compensation • Internal • External • External • External • External • External With integrated Pt100 resistance thermometer • External With external Pt100 IEC 60751 (2-wire or 3-wire connection) • External fixed Reference junction temperature can be set as fixed value Measuring range Assignable (see "Digital measuring error" table) Min. measuring span Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve mV sensor Measured variable DC voltage Sensor type DC voltage source (DC voltage source possible over externally connected resistance) Units mV Response time Break monitoring Gan be switched off • 10 +70 mV • 100 +1100 mV 2 mV or 20 mV Overload capability of the input 1.5 +3.5 ∨ DC Linput resistance ≥ 1 MΩ Overload capability of the input 1.1 35 ∨ DC (to 30 ∨ with Ex ia and ib; to 32 ∨ with Ex nAfnLific) Max. load Overrange 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable		
Standard connection Standard connection Averaging Differentiation 2 thermocouples (TC) 2 thermocouples (TC) 2 thermocouples (TC) Differentiation 2 thermocouples (TC) (TC1 − TC2 or TC2 − TC1) Response time ≤ 250 ms for 1 sensor with break monitoring Can be switched off Cold junction compensation Internal With integrated Pt100 resistance thermometer External External With external Pt100 IEC 60751 (2-wire or 3-wire connection) External fixed Reference junction temperature can be set as fixed value Measuring range Assignable (see "Digital measuring error" table) Min. measuring span Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve mV sensor Measured variable DC voltage Sensor type DC voltage DC voltage source (DC voltage source possible over externally connected resistance) Units mV Response time Sensor type Source (DC voltage source (DC voltage source possible over externally connected resistance) Units mV Response time ≤ 250 ms for 1 sensor with break monitoring Can be switched off 1-10 +70 mV 1-15 +3.5 V DC Unput resistance DA mV Overload capability of the input 1-15 +3.5 V DC Unput signal Auxiliary power Unity is put in the input 1-15 +3.5 V DC Unity is put in the input 1-15 +3.5 V DC Unity is put in the input 1-15 +3.5 V DC Unity is put in the input 1-15 +3.5 V DC Unity is put in the input 1-15 +3.5 V DC Unity is put in the input 1-15 +3.5 V DC Unity is put in the input 1-15 +3.5 V DC Unity is put in the input 1-15 +3.5 V DC Unity is put in the input 1-15 +3.5 V DC Unity is put in the input 1-15 +3.5 V DC Unity is put in the input 1-15 +3.5 V DC Unity is put in the input 1-15 +3.5 V DC Unity is put in the input 1-15 +3.5 V DC Unity is put in the input 1-15 +3.5 V DC Unity is put in the input 1-15 +3.	Type U	Cu-CuNi acc. to DIN 43710
 Standard connection Averaging 2 thermocouples (TC) Differentiation 2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1) Response time ≥ 250 ms for 1 sensor with break 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 Reference junction temperature can be set as fixed value Measuring range Assignable (see "Digital measuring error" table) Min. Measuring span Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve mV sensor DC voltage Sensor type DC voltage DC voltage Sensor type DC voltage DC voltage source (DC voltage source possible over externally connected resistance) mV Response time ≤ 250 ms for 1 sensor with break monitoring Can be switched off -10 +70 mV -10 +70 mV -10 +70 mV -10 +70 mV -10 +1100 mV Min. measuring span 2 mV or 20 mV Overload capability of the input -1.5 +3.5 V DC Input resistance ≥ 1 MΩ Overload capability of the input -1.5 +3.5 V DC Input resistance ≥ 1 MΩ Overload capability of the input -1.35 V DC (to 30 V with Ex la and ib; to 32 V with Ex nA/nLic) Max. Ioad Overrange 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) 		°C or °F
 Averaging Differentiation 2 thermocouples (TC) Differentiation 2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1) Response time ≤ 250 ms for 1 sensor with break 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 Reference junction temperature can be set as fixed value Measuring range Assignable (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve mV sensor Measured variable DC voltage DC voltage Sensor type DC voltage source (DC voltage source possible over externally connected resistance) mV Response time ≤ 250 ms for 1 sensor with break monitoring Gan be switched off 4 can be switched off 4 can be switched off 4 can be switched off 5 can be switched off 6 can be switched off 7 can be switched off 7 can be switched off 8 can be switched off 9 can be switched off 1 can be switched off 2 mV or 20 mV 10 can be switched off 1 can be switched off 1 can be switched off 1 can be switched off 2 can be switched off 2 can be switched off 2 mV or 20 mV		
 Differentiation 2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1) Response time ≤ 250 ms for 1 sensor with break 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 Reference junction temperature can be set as fixed value Measuring range Assignable (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve mV sensor Measured variable DC voltage Sensor type DC voltage source (DC voltage source possible over externally connected resistance) mV Response time ≤ 250 ms for 1 sensor with break monitoring Can be switched off -10 +70 mV -100 +1100 mV Min. measuring span Qur vo 20 mV -100 +1100 mV Input resistance ≥ 1 MΩ Characteristic curve Output Output Output signal Auxiliary power 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nA/nL/ic) Max. load Output 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable 	Standard connection	1 thermocouple (TC)
TC1) Response time S ≥ 250 ms for 1 sensor with break monitoring Cold junction compensation Internal With integrated Pt100 resistance thermometer External With external Pt100 IEC 60751 (2-wire or 3-wire connection) External fixed Reference junction temperature can be set as fixed value Measuring range Assignable (see "Digital measuring error" table) Min. measuring span Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve mV sensor Measured variable DC voltage DC voltage Sensor type DC voltage source (DC voltage source possible over externally connected resistance) mV Response time S ≥ 250 ms for 1 sensor with break monitoring Break monitoring Measuring range 1 - 10 +70 mV - 100 +1100 mV 2 mV or 20 mV Overload capability of the input 1 - 1.5 +3.5 V DC ≥ 1 MQ Overload capability of the input Output Output Output Output Output Output Output signal Auxiliary power 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nA/nL/ic) Max. load Overrange 16 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Srror signal (e.g. in case of sensor breakage) A16 23 mA, continuously adjustable	Averaging	2 thermocouples (TC)
Break monitoring Can be switched off Cold junction compensation With integrated Pt100 resistance thermometer • External With external Pt100 IEC 60751 (2-wire or 3-wire connection) • External fixed Reference junction temperature can be set as fixed value Measuring range Assignable (see "Digital measuring error" table) Min. measuring span Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve mV sensor DC voltage Measured variable DC voltage source (DC voltage source possible over externally connected resistance) Units mV Response time ≤ 250 ms for 1 sensor with break monitoring Break monitoring Can be switched off Measuring range • -10 +70 mV • -10 +70 mV • -100 +1100 mV Vorload capability of the input -1.5 +3.5 V DC Input resistance ≥ 1 MΩ Characteristic curve Voltage-linear or special characteristic curve Output Voltage-linear or special characteristic curve Output 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nAInLic) Max. load (U _a	Differentiation	
Cold junction compensation Internal Internal Internal With integrated Pt100 resistance thermometer With external Pt100 IEC 60751 (2-wire or 3-wire connection) Reference junction temperature can be set as fixed value Measuring range Assignable (see "Digital measuring error" table) Min. measuring span Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve Measured variable DC voltage DC voltage Sensor type DC voltage source (DC voltage source possible over externally connected resistance) Units mV Response time Break monitoring Measuring range □ -10 +70 mV □ -100 +1100 mV 2 mV or 20 mV □ -100 +1100 mV 2 mV or 20 mV □ -15 +3.5 ∨ DC ≥ 1 MΩ Overload capability of the input Input resistance Characteristic curve Voltage-linear or special characteristic curve Output Output Output Output signal Auxiliary power 11 35 ∨ DC (to 30 ∨ with Ex ia and ib; to 32 ∨ with Ex naInULic) (Uaux − 11 ∨)/0.023 A 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA)	Response time	≤ 250 ms for 1 sensor with break monitoring
 Internal External External With integrated Pt100 IEC 60751 (2-wire or 3-wire connection) External fixed Reference junction temperature can be set as fixed value Measuring range Assignable (see "Digital measuring error" table) Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve More that the proof of the input in the proof of the inpu		Can be switched off
thermometer With external Pt100 IEC 60751 (2-wire or 3-wire connection) External fixed Reference junction temperature can be set as fixed value Measuring range Assignable (see "Digital measuring error" table) Min. measuring span Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve Measured variable DC voltage DC voltage DC voltage source (DC voltage source possible over externally connected resistance) Units MV Response time Break monitoring Measuring range 1 -10 +70 mV -100 +1100 mV Min. measuring 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 curve Output Output Output Output signal 4 20 mA, 2-wire 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex Nahrlufic) Max. load Overrange (Ju _{aux} − 11 V)/Io.023 A 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable	· ·	With the control Bidge and the control
3-wire connection) Reference junction temperature can be set as fixed value Measuring range Assignable (see "Digital measuring error" table) Min. measuring span Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve MV sensor Measured variable Sensor type DC voltage DC voltage source (DC voltage source possible over externally connected resistance) Units mV Response time Senson type ≤ 250 ms for 1 sensor with break monitoring Can be switched off Measuring range • -10 +70 mV • -100 +1100 mV Min. measuring span 2 mV or 20 mV -1.5 +3.5 V DC Input resistance ≥ 1 MΩ Voltage-linear or special characteristic curve Output Output Output Output signal 4 20 mA, 2-wire 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nA/nL/Lic) Max. load Overrange 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable		thermometer
as fixed value Assignable (see "Digital measuring error" table) Min. measuring span Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve DC voltage Sensor type DC voltage source (DC voltage source possible over externally connected resistance) Units mV Response time Break monitoring Can be switched off Measuring range • -10 +70 mV • -100 +1100 mV Min. measuring span 2 mV or 20 mV Overload capability of the input -1.5 +3.5 V DC Input resistance Voltage-linear or special characteristic curve Output Output signal 4 20 mA, 2-wire 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nAinUlic) Max. load Overrange 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable	• External	
table) Min. 40 100 °C (72 180 °F) (see "Digital measuring error" table) Characteristic curve Temperature-linear or special characteristic curve Measured variable DC voltage DC voltage DC voltage source (DC voltage source possible over externally connected resistance) Units MV Response time Break monitoring Can be switched off Measuring range • -10 +70 mV • -100 +1100 mV Min. measuring 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 curve Output Output Output signal 4 20 mA, 2-wire 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex naIntLifc) Max. load Overrange 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable	External fixed	
measuring error" table) Characteristic curve Temperature-linear or special characteristic curve Measured variable Sensor type DC voltage DC voltage source (DC voltage source possible over externally connected resistance) Units mV Response time Sensor type Can be switched off Measuring range • -10 +70 mV • -100 +1100 mV Min. measuring span 2 mV or 20 mV Overload capability of the input -1.5 +3.5 V DC Input resistance ≥ 1 MΩ Voltage-linear or special characteristic curve Output Output Output signal Auxiliary power 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nA/nL/Lic) Max. load Overrange 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable	Measuring range	
curve Measured variable Sensor type DC voltage DC voltage source (DC voltage source possible over externally connected resistance) Units MV Response time Sensor type Gan be switched off Measuring range • -10 +70 mV • -100 +1100 mV Min. measuring 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 curve Output Output signal 4 20 mA, 2-wire 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nAinLifc) Max. load Overrange 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable	Min. measuring span	
Measured variable DC voltage Sensor type DC voltage source (DC voltage source possible over externally connected resistance) Units mV Response time ≤ 250 ms for 1 sensor with break monitoring Break monitoring Can be switched off Measuring range • -10 +70 mV • -100 +1100 mV Min. measuring 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 curve Output 4 20 mA, 2-wire Auxiliary power 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nA/nL/ic) Max. load (U _{aux} = 11 V)/0.023 A Overrange 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable		
Sensor type DC voltage source (DC voltage source possible over externally connected resistance) Units mV Response time ≤ 250 ms for 1 sensor with break monitoring Break monitoring Can be switched off Measuring range • -10 +70 mV • -100 +1100 mV Min. measuring 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 curve Output 4 20 mA, 2-wire Auxiliary power 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex na/nL/lic) Max. load (U _{aux} − 11 V)/0.023 A Overrange 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable	mv sensor	
possible over externally connected resistance) Units Response time Break monitoring Measuring range • -10 +70 mV • -100 +1100 mV Min. measuring 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 curve Output Output signal 4 20 mA, 2-wire 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex na/ntL/ic) Max. load Overrange 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable	Measured variable	DC voltage
Response time Seak monitoring Gan be switched off Measuring range • -10 +70 mV • -100 +1100 mV Min. measuring span 2 mV or 20 mV -1.5 +3.5 V DC Input resistance ≥ 1 MΩ Characteristic curve Voltage-linear or special characteristic curve Output Output signal 4 20 mA, 2-wire 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nAinLife) Max. load Overrange 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable	Sensor type	possible over externally connected
Break monitoring Can be switched off • -10 +70 mV • -100 +1100 mV Min. measuring span 2 mV or 20 mV -1.5 +3.5 V DC Input resistance ≥ 1 MΩ Characteristic curve Voltage-linear or special characteristic curve Output Output signal 4 20 mA, 2-wire 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nAinLifc) Max. load (U _{aux} − 11 V)/0.023 A 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable	Units	mV
Measuring range • -10 +70 mV • -100 +1100 mV Min. measuring 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 curve Output Output Output signal 4 20 mA, 2-wire 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nAinLifc) Max. load (Va _{aux} − 11 V)/0.023 A 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable	· ·	≤ 250 ms for 1 sensor with break monitoring
• -100 +1100 mV Min. measuring 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 curve Output Output signal 4 20 mA, 2-wire Auxiliary power 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nAinLifc) Max. load (U _{aux} − 11 V)/I0.023 A Overrange 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable	· · · · · · · · · · · · · · · · · · ·	
Min. measuring 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 curve Output 4 20 mA, 2-wire Auxiliary power 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nAnlulic) Max. load (U _{aux} − 11 V)/0.023 A Overrange 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable	Measuring range	
Overload capability of the input -1.5 +3.5 V DC Input resistance ≥ 1 MΩ Voltage-linear or special characteristic curve Output Output signal Auxiliary power 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex na/nt/Lic) Max. load Overrange 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable		• -100 +1100 mV
Input resistance ≥ 1 MΩ Characteristic curve Voltage-linear or special characteristic curve Output 4 20 mA, 2-wire Auxiliary power 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nAinLifc) Max. load (U _{aux} − 11 V)/0.023 A Overrange 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable	* '	
Characteristic curve Output Output signal Auxiliary power Max. load Overrange Querrange Characteristic curve Voltage-linear or special characteristic curve 4 20 mA, 2-wire 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nAinLife) (U _{aux} – 11 V)/0.023 A 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable		
Output Output signal Auxiliary power 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nAinLlic) Max. load Overrange 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable	·	
Output signal Auxiliary power 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nA/nL/lic) Max. load Overrange 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable		voltage-linear or special characteristic curve
Auxiliary power 11 35 V DC (to 30 V with Ex ia and ib; to 32 V with Ex nA/nL/ic) Max. load (U _{aux} – 11 V)/0.023 A Overrange 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable		4 20 mA 2-wire
Max. load $(U_{aux} - 11 \text{ V})/0.023 \text{ A}$ Overrange $3.6 \dots 23 \text{ mA}$, continuously adjustable (default range: $3.80 \text{ mA} \dots 20.5 \text{ mA}$) Error signal (e.g. in case of sensor breakage) $3.6 \dots 23 \text{ mA}$, continuously adjustable		11 35 V DC (to 30 V with Ex ia and ib;
Overrange 3.6 23 mA, continuously adjustable (default range: 3.80 mA 20.5 mA) Error signal (e.g. in case of sensor breakage) 3.6 23 mA, continuously adjustable	Max. load	
		3.6 23 mA, continuously adjustable

Temperature transmitters

Compact and head transmitters / SITRANS TH200 (4 to 20 mA, universal)

Technical specifications (continued)

SITRANS TH200 (4 20 mA, uni		
Sample cycle	0.25 s nominal	
Damping	Software filter 1st order 0 30 s (parameterizable)	
Protection	Against reverse polarity	
Galvanic isolation	Input against output 2.12 kV DC (1.5 kV $_{\rm rms}$ AC)	
Measuring accuracy		
Digital measuring error	See "Digital measuring error" table	
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 measuring span	
Error due to internal reference junction	< 0.5 °C (0.9 °F)	
Effect of ambient temperature		
Analog measuring error	0.02% of measuring span/10 °C (18 °F)	
Digital measuring error		
- 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 meas. span/V	
Effect of load impedance	< 0.002% of meas. span/100 Ω	
Long-term drift		
In the first month	• < 0.02% of measuring span	
After one year	• < 0.2% of measuring span	
After 5 years	• < 0.3% of measuring span	
Operating conditions		
Ambient conditions		
Ambient temperature	-40 +85 °C (-40 +185 °F)	
Storage temperature	-40 +85 °C (-40 +185 °F)	
Relative humidity	< 98%, with condensation	
Electromagnetic compatibility	According to EN 61326 and NE21	
Structural design		
Material	Molded plastic	
Weight Dimensions	50 g (0.11 lb) See "Dimensional drawings"	
Cross-section of cables	Max. 2.5 mm ²² (AWG 13)	
Degree of protection according to IEC 60529	2.3 (3 / 3)	
• Enclosure	IP40	
Terminals	IPOO	
Certificates and approvals		
ATEX explosion protection		
	PTB 05 ATEX 2040X	
EC type-examination certificate		
EC type-examination certificate • "Intrinsic safety" type of protection	• II 1 G Ex ia IIC T6T4 Ga	
	• II 1 G Ex ia IIC T6T4 Ga • II 2 (1) G Ex [ia Ga] ib IIC T6T4 Gb	
	• II 2 (1) G Ex [ia Ga] ib IIC T6T4 Gb • II 3 (1) G Ex [ia Ga] ic IIC T6T4 Gc	
	II 2 (1) G Ex [ia Ga] ib IIC T6T4 Gb II 3 (1) G Ex [ia Ga] ic IIC T6T4 Gc II 3 G Ex ic IIC T6T4 Gc	
	• II 2 (1) G Ex [ia Ga] ib IIC T6T4 Gb • II 3 (1) G Ex [ia Ga] ic IIC T6T4 Gc	
	II 2 (1) G Ex [ia Ga] ib IIC T6T4 Gb II 3 (1) G Ex [ia Ga] ic IIC T6T4 Gc II 3 G Ex ic IIC T6T4 Gc	



Siemens Solution Partner - Automation

Argentina

Tel: (+54 11) 5352 2500 Email: info@dastecsrl.com.ar Web: www.dastecsrl.com.ar

Temperature transmitters

Compact and head transmitters / SITRANS TH200 (4 to 20 mA, universal)

Technical specifications (continued)

SITRANS TH200 (4 20 mA, universal)				
FM approval	FM 3024169			
Degrees of protection	• IS / Cl I, II, III / Div 1 / GP ABCDEFG T6, T5, T4			
	• Cl I / ZN 0 / AEx ia IIC T6, T5, T4			
	• NI / Cl I / Div 2 / GP ABCDFG T6, T5, T4			
	• NI / Cl I / ZN 2 / IIC T6, T5, T4			
Explosion protection to FM for Canada (${}_{c}FM_{U-s}$)				
FM approval	FM 3024169C			
Degrees of protection	• IS / Cl I, II, III / Div 1/ GP ABCDEFG T6, T5, T4			
	• NI / CI I / DIV 2 / GP ABCD T6, T5, T4			
	NIFW / Cl I, II, III / DIV 2 / GP ABCDFG T6, T5, T4			
	• DIP / Cl II, III / Div 2 / GP FG T6, T5, T4			
	• Cl I / ZN 0 / Ex ia IIC T6, T5, T4			
	• Cl I / ZN 2 / Ex nA nL IIC T6, T5, T4			
Other certificates	NEPSI			
Software requirements for SIPROM T				
PC operating system	Windows ME, 2000, XP, Win 7, 8 and 10; in connection with RS 232 modem, also Windows 95, 98 and 98 SE			

Factory setting:

• Pt100 (IEC 751) in the 3-wire connection

• Measuring range: 0 ... 100 °C (32 ... 212 °F)

Fault current: 22.8 mASensor offset: 0 °C (0 °F)

• Damping 0.0 s

Digital measuring error

Resistance thermometer

Input	Measuring range	Minimum measurin	n snan	Digital accuracy	
	°C (°F)	°C	(°F)	°C	(°F)
According 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)
According 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 transmitters

Compact and head transmitters / SITRANS TH200 (4 to 20 mA, universal)

Technical specifications (continued)

Resistance-based sensor

Input	Measuring range Ω	Minimum measuring span Ω	Digital accuracy Ω
Resistance	0 390	5	0.05
Resistance	0 2200	25	0.25

Thermocouples

Input	Measuring range	Minimum measuring span		Digital accuracy	
	°C (°F)	°C		°C	(°F)
Type B	100 1820 (212 3308)	100	(180)	2 ¹⁾	(3.60)1)
Type C (W5)	0 2300 (32 4172)	100	(180)	2	(3.60)
Type D (W3)	0 2300 (32 4172)	100	(180)	12)	(1.80)2)
Type E	-200 +1000 (-328 +1832)	50	(90)	1	(1.80)
Type J	-200 +1200 (-328 +2192)	50	(90)	1	(1.80)
Туре К	-200 +1370 (-328 +2498)	50	(90)	1	(1.80)
Type L	-200 +900 (-328 +1652)	50	(90)	1	(1.80)
Type N	-200 +1300 (-328 +2372)	50	(90)	1	(1.80)
Type R	-50 +1760 (-58 +3200)	100	(180)	2	(3.60)
Type S	-50 +1760 (-58 +3200)	100	(180)	2	(3.60)
Туре Т	-200 +400 (-328 +752)	40	(72)	1	(1.80)
Type U	-200 +600 (-328 +1112)	50	(90)	2	(3.60)

mV sensor

Input	Measuring range	Minimum measuring 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 measuring 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 reference junction errors in the case of thermocouple measurements).

 $^{^{1)}}$ 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).

Temperature transmitters

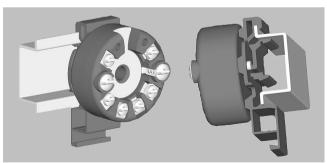
Compact and head transmitters / SITRANS TH200 (4 to 20 mA, universal)

Dimensional drawings

Ø 44 (1.73) 33 (1.30) (1)- (1) (2) (2) (3) (4) 26.3 (1.04) M4 x 30 Auxiliary power supply $\rm U_{aux}$, output current $\rm I_{Out}$ Pt100 sensor (for connections, see sensor 1(+) and 2 (-) 3, 4, 5 and 6 connection assignment) Test (+), Test (-) Measurement of the output current with a multimeter (1) Test terminal (2) (3) (4) Mounting screw M4x30 LED for operation indication Internal diameter of center hole 6.3 (0.25)

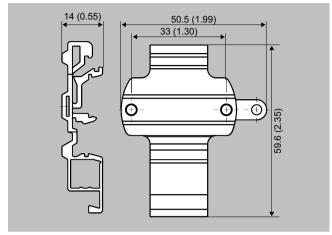
SITRANS TH200, dimensions and pin assignment, dimensions in mm (inch) $\,$

Mounting on DIN rail



SITRANS TH200, mounting of transmitter on DIN rail

Dimensional drawings (continued)

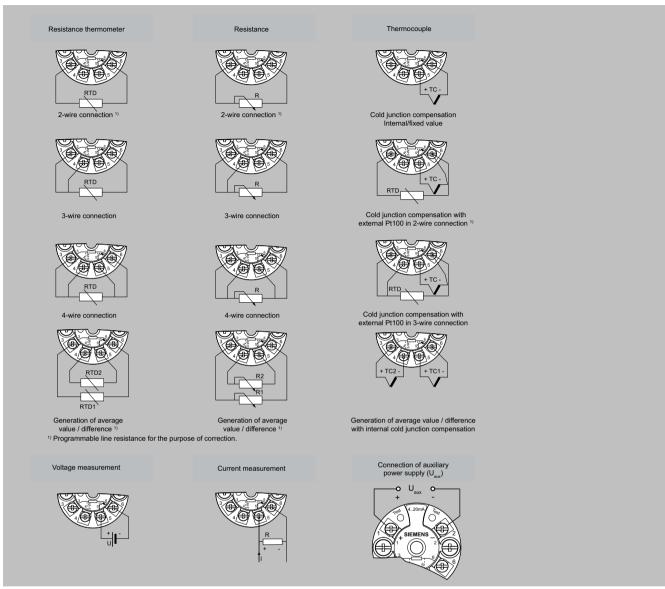


Mounting rail adapter, dimensions in mm (inch)

Temperature transmitters

Compact and head transmitters / SITRANS TH200 (4 to 20 mA, universal)

Circuit diagrams



SITRANS TH200, sensor connection assignment



Siemens Solution Partner - Automation

Argentina

Tel: (+54 11) 5352 2500 Email: info@dastecsrl.com.ar Web: www.dastecsrl.com.ar