Transmitter for temperature, head mounting for Pt 100, 2 wire technology universal, SITRANS TH200, Type Series PA220.

Features

- Digital programmable transmitter
- Suitable for installation in connecting heads in accordance with DIN, form B
- Input for
  - Resistance thermometer (2-, 3- or 4-wire technology)
  - Thermocouples
  - Resistance-based sensors and DC voltage sources
- Output signal: 4...20 mA invertible, 2-wire technology
- Power supply: 8...35 V DC
  8...30 V DC (Ex)
- Electrically isolated
- Test sockets for multimeters for monitoring purposes and plausibility checks without interruption of the current loop.
- Diagnostics LED:
  - Sensor and power supply have been correctly connected (LED displays a green light)
  - Sensor breakage or short-circuit (LED flashes red)
  - Internal device fault (steady red light)
- Sensor monitoring, open circuit and short-circuit
- Self-monitoring

Application area

· all process industry fields

Applications

The digital transmitter converts different signal sources to a load-independent current signal commonly found in process control systems. The output is the standard sensor line signal, a load-independent, 4 to 20 mA, DC signal. The transmitter has extensive configuration options.

Options

- Explosion protection for gases and dust
- Parameterization via PC Software
- Classification per SIL 2
- Expanded diagnostic functions, such as slave pointer, operating hours counter
- Special characteristic

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Construction

Dimensions	See "Dimensional drawings"
Material	Molded plastic
Degree of protection	to IEC 60529 • Enclosure IP40 • Terminals IP00
Weight	50 g (0.11 lb)

Input

Resistance thermometer

Measured variable	Temperature
Sensor type	
• to IEC 60751	Pt25 … Pt1000
• To JIS C 1604; a = 0.00392 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 ≤ 100 Ω (loop resistance)
• Three-wire system	No balancing required
• Four-wire system	No balancing required
Sensor current	≤ 0.45 mA
Response time	≤ 250 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

Input (continued)

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 ≤ 100 Ω (loop resistance)
• Three-wire system	No balancing required
• Four-wire system	No balancing required
Sensor current	≤ 0.45 mA
Response time	≤ 250 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 Ω ... 25 Ω (see Table "Digital measuring errors")
Characteristic curve	Resistance-linear or special characteristic

Thermocouples

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	≤ 250 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 60571 (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

mV sensor

Measured	variable DC voltage
Sensor type	DC voltage source (DC voltage source possible over an externally connected resistor)

Input (continued)

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
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 with Ex)
Max. load	(Uaux – 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)	3.6 ... 23 mA, infinitely adjustable
(conforming to NE43)	(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 kVeff)

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

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 NE21

Certificates and Approvals

Explosion protection ATEX Siemens SITRANS TH 200

EC type test certificate	PTB 05 ATEX 2040X
• "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
• "Operating equipment that is nonignitable and has limited energy" type of protection	II 3 G Ex nL IIC T6/T4 II 3 G Ex nA IIC T6/T4

Software Requirements (SIPROM T)

PC operating system	Windows ME, 2000 and XP Windows 7 WIndows 8

Digital measuring errors

Resistance thermometer

Input	Measuring range °C / °F	Min. measured span °C	°F	Digital accurancy °C	°F
to DIN EN 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. measured span Ω	Digital accurancy Ω
Resistance	0 ... 390	5	0,05
Resistance	0 ... 2200	25	0,25

Thermocouples

Input	Measuring range °C / F	Min. measured span °C	°F	Digital accurancy °C	°F
Type B	0 ... 182 (32 ... 3308)	100	(180)	2[1)]	(3.60)
Type C (W5)	0 ... 2300 (32 ... 4172)	100	(180)	2	(3.60)
Type D (W3)	0 ... 2300 (32 ... 4172)	100	(180)	1[2)]	(1.80)
Type E	-200 ... +1000 (-328 ... +1832)	50	(90)	1	(1.80)
Type J	-210 ... +1200 (-346 ... +2192)	50	(90)	1	(1.80)
Type K	-230 ... +1370 (-382 ... +2498)	50	(90)	1	(1.80)

Digital measuring errors

Input	Measuring range	Min. measured span		Digital accurancy	
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)
Type T	-200 ... +400 (-328 ... +752)	40	(72)	1	(1.80)
Type U	-200 ... +600 (-328 ... +1112)	50	(90)	2	(3.60)

[1)] The digital accuracy in the range 0 to 300 °C (32 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 mV	Min. measured span mV	Digital accurancy µV
mV sensor	-10 ... +70	2	40
mV sensor	-100 ... +1100	20	400

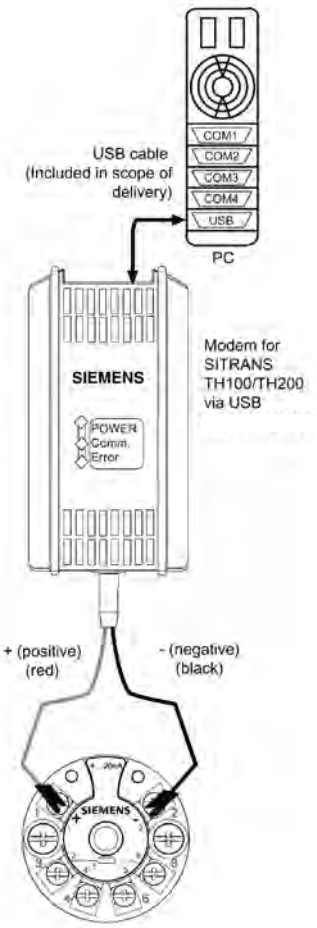
The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value.

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).

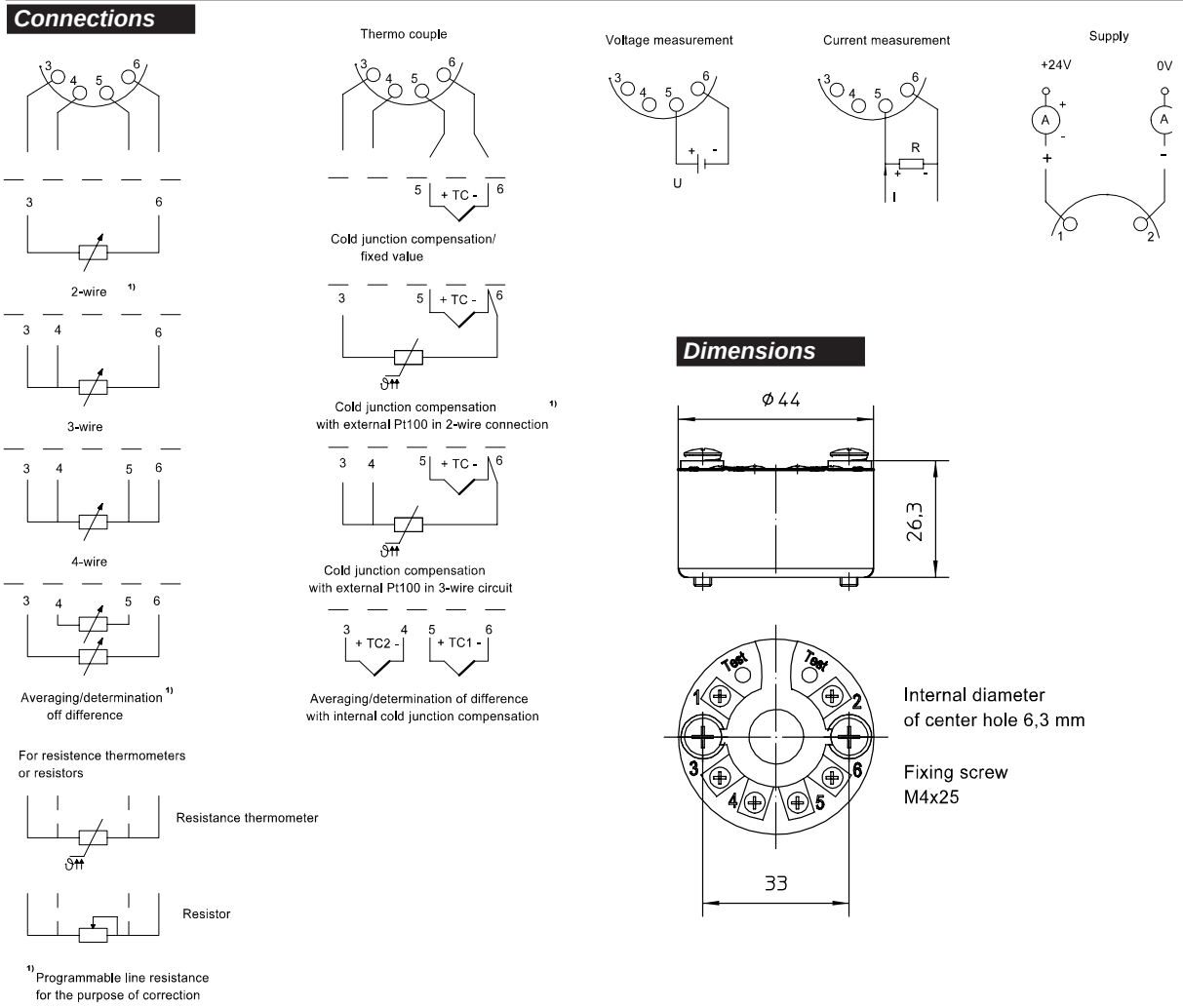
The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of cold junction errors in the case of thermocouple measurements).

Parameterization

parameter assignment SITRANS TH200 via USB-Modem



Connections



Dimensions

Order Details

- please give additional specifications for models not listed -

Transmitter for temperature, head mounting for Pt 100, SITRANS TH200			**PA220 .**		
design	· standard		**0**		
	· Ex-protection, type of ex-protection as follows		**1**		
standard range	· input	· Pt 100 in 3-wire technology		**F11**	
	· temperature range	· 0...100 °C			
	· error current (following sensor breakage)	· 22,8 mA			
	· sensor offset	· 0 °C			
	· damping	· 0,0 s			
custom-made configuration	· input	as per customers` specification		**F12**	
	· measuring range				
	· error current (following sensor breakage)				
	· sensor offset				
	· damping				
output signal	· 4...20 mA, 2-wire technology				**H1**
additional features (to be indicated in case of need, only)					
type of ex-protection (Siemens SITRANS TH200)	· Ex II 1G Ex ia IIC T6/T4				**S81**
	· Ex II 2(1)G Ex ia/ib IIC T6/T4				
	· Ex II 3(1)G Ex ia/ic IIC T6/T4				
	· Ex II 1D Ex iaD 20 T115 °C				
	· Ex II 3G Ex nL IIC T6/T4				
	· Ex II 3G Ex nA IIC T6/T4				
functional safety per IEC 61508, classifcation per SIL 2					**W2606**
order code (example):			**PA2200**	**F11**	**H1**

accessories

Programming set consisting of Software SIPROM T and modem with USB-port (PA2100 compatible to SITRANS TH200)	**MC1250**

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