SITRANS TH100 two-wire system (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.

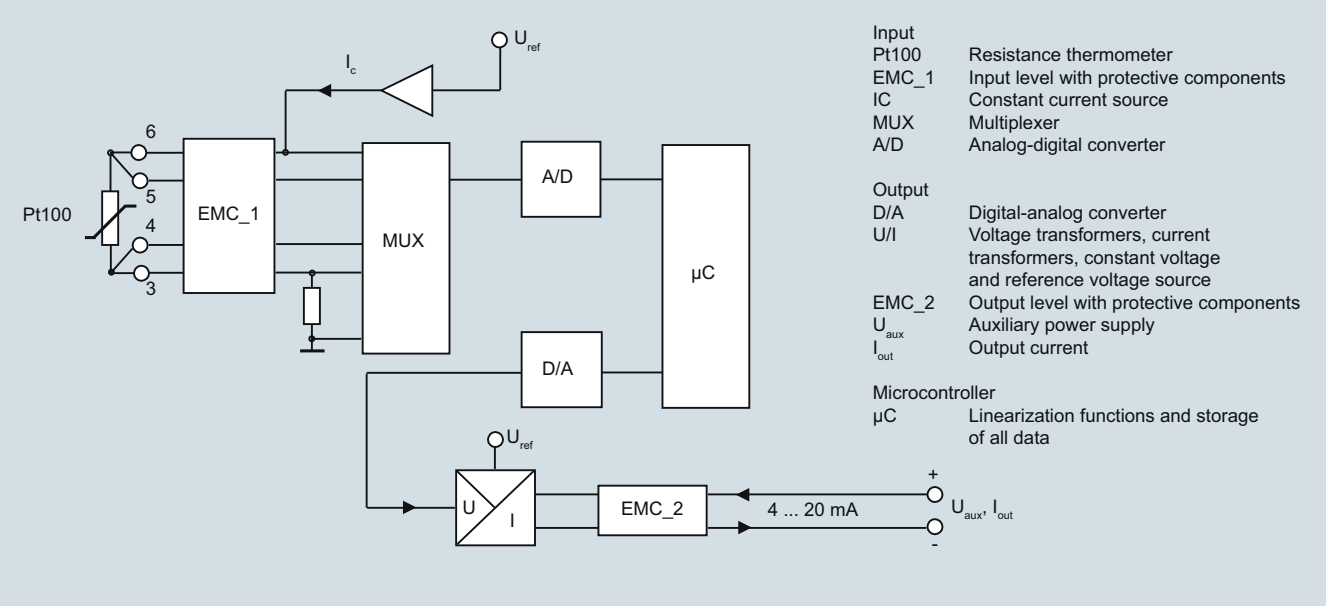
Function

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

Technical specifications

Input	
Resistance thermometer	
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	
• Span <250 °C (450 °F)	< 0.25 °C (0.45 °F)
• Span >250 °C (450 °F)	< 0.1 % of span
Repeatability	< 0.1 °C (0.18 °F)
Measuring current	approx. 0.4 mA
Measuring cycle	< 0.7 s
Measuring range	-200 ... +850 °C -328 ... +1562 °F)
Measuring span	25 ... 1050 °C (77 ... 1922 °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 ia and ib; 32 V for Ex nL/ic; 35 V for Ex nA)
Max. load	$(U_{aux}$ - 8.5 V)/0.023 A
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	• < 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

Construction	
Weight	50 g
Dimensions	See dimensional drawing
Material	Molded plastic
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	PTB 05 ATEX 2049X
• "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
• "Non-sparking" type of protection	II 3 G Ex nA IIC T6/T4 Gc II 3 G Ex nA[ic] IIC T6/T4 Gc
• "Intrinsic dust safety" type of protection	II 1 D Ex ia IIIC T115 °C Da
Explosion protection FM for USA	
• FM approval	FM 3024169
• Degree 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 FM for Canada ($_cFM_{US}$)	
• FM approval	FM 3024169C
• Degree of protection	IS / Cl I, II, III / Div 1/ GP ABCDEFG T6, T5, T4 NI / Cl 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	EAC Ex(GOST), NEPSI
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

SITRANS TH100 two-wire system (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 ► ⬟	**7NG3211-0NN00**
• With explosion protection "Intrinsic safety" type of protection and for zone 2	
- to ATEX ► ⬟	**7NG3211-0AN00**
- to FM ($_cFM_{US}$) ► ⬟	**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	**Y01**[1]
Measuring point no. (TAG), max. 8 characters	**Y17**[2]
Measuring point descriptor, max. 16 characters	**Y23**[2]
Pt100 (IEC) 2-wire, R_L = 0 Ω	**U02**[3]
Pt100 (IEC) 3-wire	**U03**[3]
Pt100 (IEC) 4-wire	**U04**[3]
Special differing customer-specific programming, specify in plain text	**Y09**[4]
Fail-safe value 3.6 mA (instead of 22,8 mA)	**U36**[2]
Accessories	Article No.
Modem for SITRANS TH100, TH200, TR200 and TF with TH200 incl. SIPROM T parameterization software ► With USB connection	**7NG3092-8KU**
MiniDVD for temperature measuring instruments ► With documentation in German, English, French, Spanish, Italian, Portuguese and SIPROM T parameterization software	**A5E00364512**
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**

► Available ex stock.

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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".

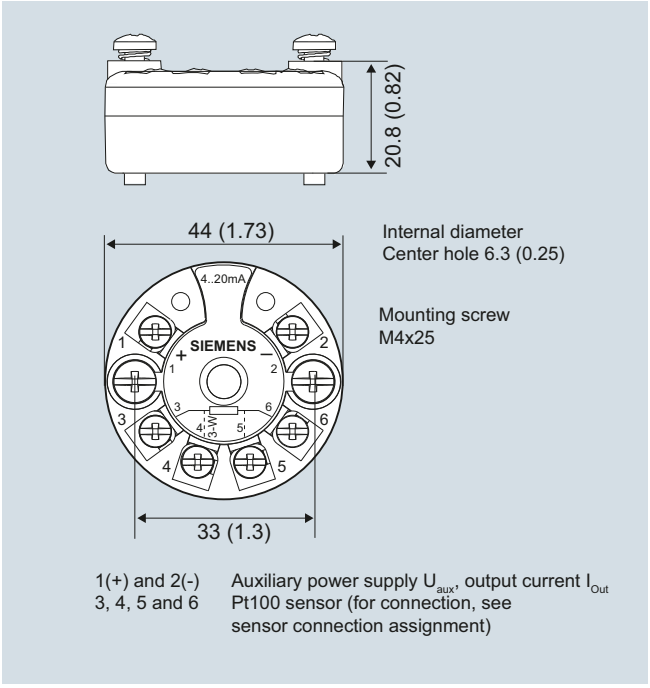
Ordering example

7NG3211-0NN00-Z Y01+Y23+U03
Y01: -10 ... +100 °C
Y23: TICA1234HEAT

Factory setting:

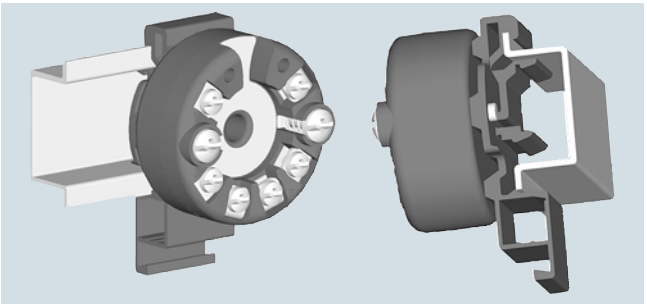
- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 … 100 °C (32 … 212 °C)
- Error signal in the event of sensor breakage: 22.8 mA
- Sensor offset: 0 C (0 °F)
- Damping 0.0 s

Dimensional drawings

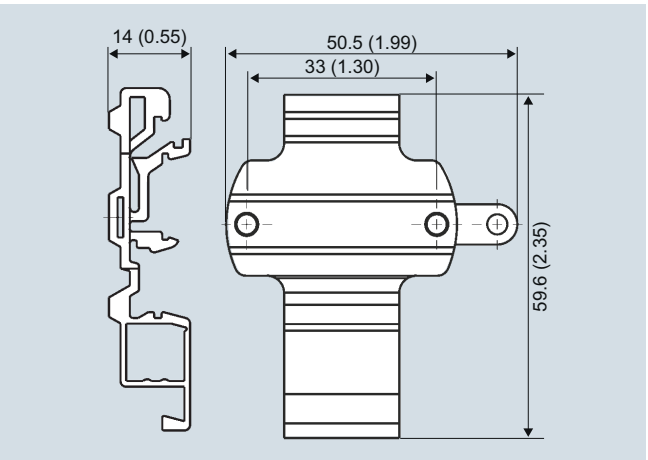


SITRANS TH100, dimensions in mm (inch)

Mounting on DIN rail

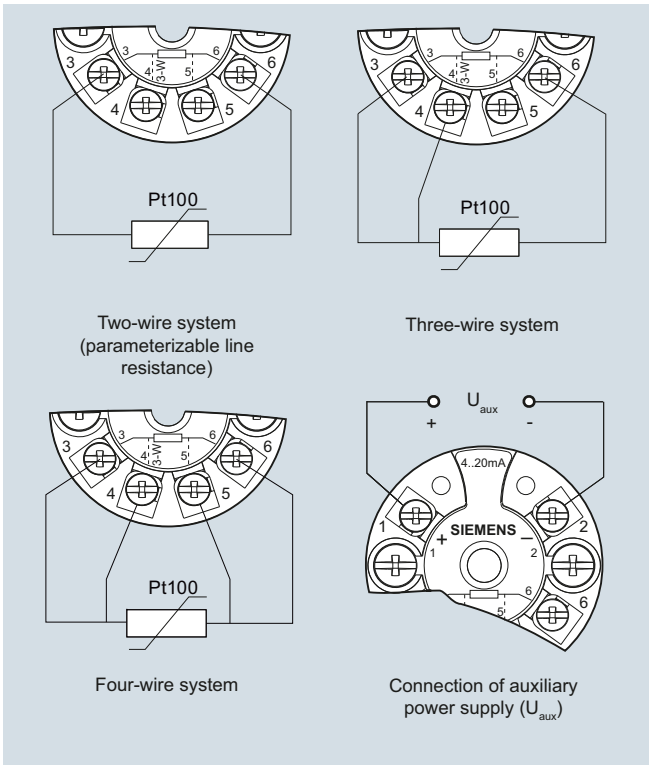


SITRANS TH100, mounting of transmitter on DIN rail



DIN rail adaptor, dimensions in mm (inch)

Schematics



SITRANS TH100, sensor connection assignment