TE 19.02

Analogue Temperature Transmitter

Configurable Ranges, Rail Mounting

for Pt 100 Resistance Thermometers for Thermocouples Model T19.30

Electronic Temperature Measurement

Applications

- Plant construction
- Power engineering
- Heating, ventilation, air conditioning, refrigeration

Features

- Input
  for Pt 100
  for thermocouples
- Configurable ranges
- Output 4 ... 20 mA, 2 wire design
- Fault signal for sensor burnout and sensor short circuiting
- Large ambient temperature range
- Compact and reasonably priced
- 5 years guarantee

General features

The transmitters in the T19 series are provided with configurable ranges. One of several available measuring ranges can be selected simply by setting solder bridges. Therefore, these transmitters are especially suitable for applications where frequently changing requirements have to be taken into account.

These temperature transmitters serve to convert temperature-dependent changes in resistance in the case of resistance thermometers or temperature-dependent changes in voltage in the case of thermocouples into a 4 ... 20 mA-loop signal. This method guarantees an easy and reliable transmission of the temperature values measured.

Accuracy, sensor monitoring and the permissible ambient conditions are matched to the requirements of industrial applications. A guarantee of 5 years on the function of these transmitters gives evidence of the high reliability of these instruments.
The rail mounting case fits to any standard rail per DIN EN 50 022-35 .

Specification

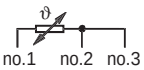
	Model T19.30			
Input	**Pt 100 DIN IEC 751 2- or 3-lead**			**thermocouples DIN IEC 584**
possible measuring ranges, configurable	measuring ranges small from - 50 °C up to +200 °C	measuring ranges large from - 50 °C up to +400 °C	measuring ranges for HVAC from - 30 °C up to + 120 °C	type T, J, K, S dependent upon type of thermocouple, see last page from - 100 °C up to + 1500 °C
selection of measuring range	via solder bridges			
standard measuring ranges	see last page			
special measuring ranges	on request (special measuring ranges cannot be reconfigured)			
adjustment range				
zero potentiometer (Z)	approx. ± 10 °C	approx. ± 25 °C	approx. ± 30 °C	approx. ± 40 °C
span potentiometer (S)	approx. 10 %			
sensor current	approx. 0.8 mA			—
cold junction compensation	—			yes
input connection leads				
effect	± 0.2 K / 10 Ω [1]			± 0.2 K / 10 Ω
permissible load resistance	30 Ω each lead, 3-lead symmetric			500 Ω total resistance
Analogue output	4 … 20 mA 2 wire design			
linearization	proportional to temperature per DIN IEC 751			proportional to voltage
measuring deviation per DIN IEC 770	± 0.5 % [2]			
linearity error	± 0.1 % [3]			—
amplification error	—			± 0.1 %
temperature coefficient T_C zero	± 0.1 % / 10 $K_{T_{amb}}$ or [4] ± 0.2 K / 10 $K_{T_{amb}}$			± 0.1 % / 10 $K_{T_{amb}}$ or [4] ± 25 µV / 10 $K_{T_{amb}}$
coefficient span	0.2 % / 10 $K_{T_{amb}}$			0.2 % / 10 $K_{T_{amb}}$
error effect of cold junction compensation	—			at T_{amb} -20 … +60 °C ± 1.0 K at T_{amb} -20 … +70 °C ± 2.0 K
rising time t_{90}	< 1 ms			
switch-on delay, electric	< 10 ms			
signalling with sensor burnout	down scale, < 3 mA [5]			up scale, > 23.5 mA
signalling with sensor short circuit	down scale, < 3 mA [6]			—
load R_A	$R_A \leq (U_B - 10\,V) / 0.02\,A$ with R_A in Ω and U_B in V			
load effect	± 0.05 % / 100 Ω			
power supply effect	± 0.025 % / V			
Power supply U_B	DC 10 … 30 V by 4 … 20 mA-loop			
input power supply protection	reverse polarity			
Electromagnetic compatibility (EMC)	CE - Conformity per EN 50082-2 (March 95)			
Special features				
ambient and storage temperature	-20 … +70 °C			
climate class	Bx (-20 … +70 °C, 5 % up to 95 % retative humidity) DIN EN 60654-1			
vibration	10 … 2000 Hz 5 g DIN IEC 68-2-6			
shock	DIN IEC 68-2-27 g_N = 15			
guarantee	5 years for performance			
Case	rail mounting case for standard rail per DIN EN 50 022-35 or wall mounting			
material	polyamide, glass fibre reinforced			
degree of protection case	IP 30 IEC 529 / EN 60 529			
degree of protection terminal con.	IP 10 IEC 529 / EN 60 529			
cross section of terminal connectors	0.5 … 1.5 mm²			
weight	approx. 0.05 kg			
dimensions	see drawings			

Specifications in % refers to the measuring span

R_A load
T_{amb} ambient temperature
T_C temperature coefficient
U_B loop power supply voltage, see power supply

1) for Pt 100 in 3-lead connection, for Pt 100 in 2-lead connection lead resistance counts fully towards error
2) with factory configured measuring range, value is valid at ambient temperature 23 °C ± 5 K
3) ± 0.15 % with measuring range 0 ... 50 °C, 0 ... 300 °C, 0 ... 350 °C
4) whichever is greater
5) up scale, in case only lead no. 1 open
6) temperature value, in case of short between leads no. 2 and no. 3 (operation of Pt 100 in 2-lead connection)

legend of lead number:



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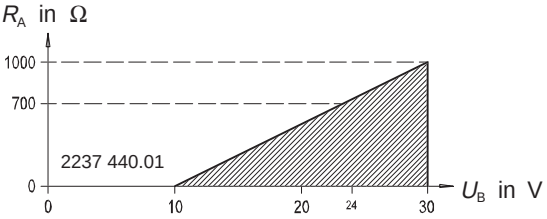
Load diagram

The permissible load is dependent upon the loop power supply voltage.



Transmitter configuration

① Remove case lid

② Set solder bridges for desired measuring range in accordance with the tables

③ Snapfit lid to the case again

④ Adjust zero and span by means of potentiometer

Pt 100 measuring ranges small	
measuring range	bridge
- 50 ... + 50 °C	1 2 3 4 5 6 7 8 ● ● ● ○ ○ ● ○ ○
0 ... 50 °C	1 2 3 4 5 6 7 8 ● ● ● ● ○ ○ ○ ●
0 ... 100 °C	1 2 3 4 5 6 7 8 ● ● ● ○ ○ ○ ○ ○
0 ... 120 °C	1 2 3 4 5 6 7 8 ● ● ○ ○ ○ ○ ○ ○
0 ... 150 °C	1 2 3 4 5 6 7 8 ● ○ ○ ○ ○ ○ ● ●
0 ... 200 °C	1 2 3 4 5 6 7 8 ○ ○ ○ ○ ○ ○ ● ○

Pt 100 measuring ranges large	
measuring range	bridge
- 50 ... + 200 °C	1 2 3 4 5 6 7 8 ● ● ● ○ ● ● ● ●
0 ... 200 °C	1 2 3 4 5 6 7 8 ● ● ● ● ● ○ ○ ●
0 ... 250 °C	1 2 3 4 5 6 7 8 ● ● ● ○ ● ○ ● ●
0 ... 300 °C	1 2 3 4 5 6 7 8 ● ● ○ ○ ● ○ ○ ○
0 ... 350 °C	1 2 3 4 5 6 7 8 ● ○ ○ ○ ● ○ ○ ○
0 ... 400 °C	1 2 3 4 5 6 7 8 ○ ○ ○ ○ ● ○ ● ○

Pt 100 measuring ranges for HVAC	
measuring range	bridge
- 30 ... + 30 °C	1 2 3 4 5 6 7 8 ● ● ● ○ ● ● ● ●
- 30 ... + 50 °C	1 2 3 4 5 6 7 8 ● ● ○ ○ ● ● ● ●
0 ... 60 °C	1 2 3 4 5 6 7 8 ● ● ● ○ ● ○ ● ●
0 ... 80 °C	1 2 3 4 5 6 7 8 ● ● ○ ○ ● ○ ● ●
0 ... 100 °C	1 2 3 4 5 6 7 8 ● ○ ○ ○ ● ○ ○ ○
0 ... 120 °C	1 2 3 4 5 6 7 8 ○ ○ ○ ○ ● ○ ● ○

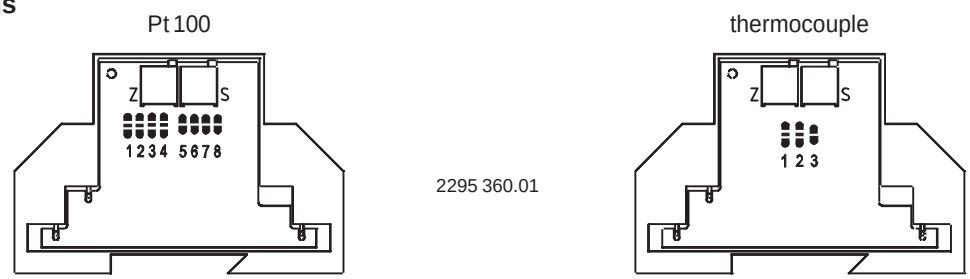
Thermocouple type T	
measuring range	bridge
- 100 ... + 200 °C	1 ● ○ ○ 3
- 100 ... + 300 °C	1 ○ ○ ○ 3
0 ... 400 °C	1 ○ ○ ● 3

Thermocouple type J	
measuring range	bridge
0 ... 350 °C	1 ● ● ○ 3
0 ... 550 °C	1 ● ○ ○ 3
0 ... 700 °C	1 ○ ○ ○ 3

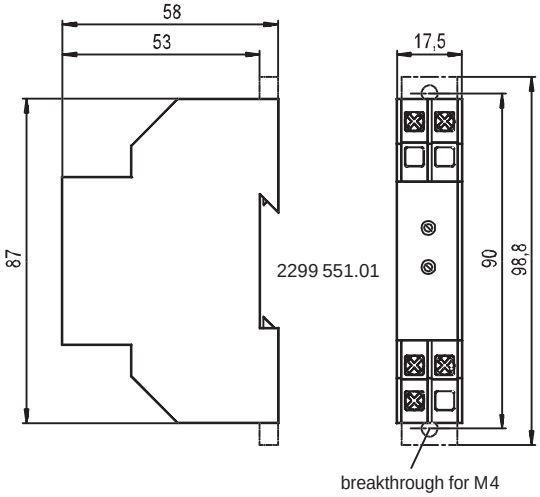
Thermocouple type K	
measuring range	bridge
0 ... 300 °C	1 ● ● ○ 3
0 ... 600 °C	1 ● ○ ○ 3
0 ... 1200 °C	1 ○ ○ ○ 3

Thermocouple type S	
measuring range	bridge
0 ... 1500 °C	1 ○ ○ ○ 3

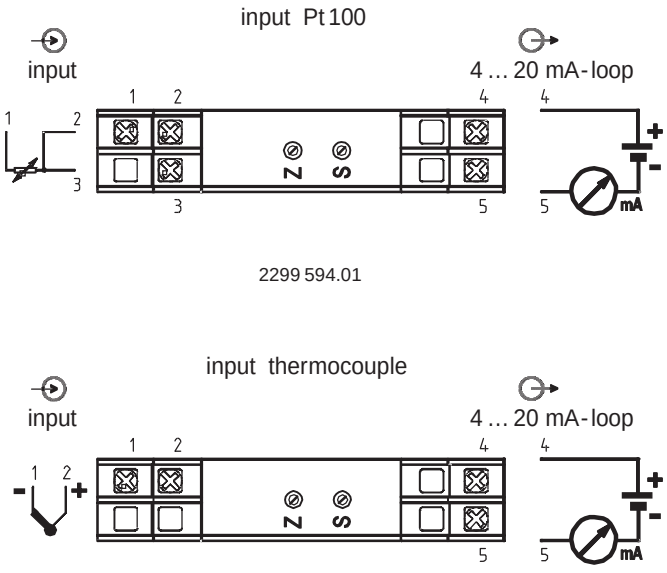
Bridge positions



Dimensions in mm



Designation of terminal connectors



Order code for temperature transmitter Model T19.30

Field No.		Code	Features	
			Input	
		1P	resistance thermometer Pt 100	
		3T	thermocouple type T (Cu-CuNi)	
		3J	thermocouple type J (Fe-CuNi)	
		3K	thermocouple type K (NiCr-Ni)	
		3S	thermocouple type S (PtRh-Pt)	
1		**??**	other	
			Application	
		1	Pt 100 measuring ranges small up to 200 °C (configurable through solder bridges)	
		2	Pt 100 measuring ranges large up to 200 °C (configurable through solder bridges)	
		3	Pt 100 measuring ranges for HVAC up to 120 °C (configurable through solder bridges)	
		4	thermocouple measuring ranges (configurable through solder bridges)	
2		**9**	special measuring ranges (not reconfigurable)	
			Measuring range	
		NK	not configurated	
			configurated (standard measuring range)	*codes see below*
3		**??**	configurated (special measuring range)	*please state as additional text*

		Additional order details		
		YES	**NO**	
4		**T**	**Z**	additional text *Please state in clearly understandable text !*

Order code for Model T19.30

	1		2	3		4
T19.30	–		**0**	–		–	

Additional text: _____

Codes of the configurable standard measuring ranges, special measuring ranges and other thermocouples on request

Pt 100 meas. ranges small Model T19.30.1P0-1	
Measuring range	**Code**
- 50 ... + 50 °C	**EA**
0 ... 50 °C	**1A**
0 ... 100 °C	**1E**
0 ... 120 °C	**1F**
0 ... 150 °C	**1H**
0 ... 200 °C	**1L**

Pt 100 meas. ranges large Model T19.30.1P0-2	
Measuring range	**Code**
- 50 ... + 200 °C	**EL**
0 ... 200 °C	**1L**
0 ... 250 °C	**1M**
0 ... 300 °C	**1N**
0 ... 350 °C	**1P**
0 ... 400 °C	**1Q**

Pt 100 meas. ranges for HVAC Model T19.30.1P0-3	
Measuring range	**Code**
- 30 ... + 30 °C	**CA**
- 30 ... + 50 °C	**CB**
0 ... 60 °C	**1C**
0 ... 80 °C	**1D**
0 ... 100 °C	**1E**
0 ... 120 °C	**1F**

Thermocouple type T Model T19.30.3T0-4	
Measuring range	**Code**
- 100 ... + 200 °C	**KA**
- 100 ... + 300 °C	**KB**
0 ... 400 °C	**1Q**

Thermocouple type J Model T19.30.3J0-4	
Measuring range	**Code**
0 ... 350 °C	**1P**
0 ... 550 °C	**1T**
0 ... 700 °C	**1W**

Thermocouple type K Model T19.30.3K0-4	
Measuring range	**Code**
0 ... 300 °C	**1N**
0 ... 600 °C	**1U**
0 ... 1200 °C	**12**

Thermocouple type S Model T19.30.3S0-4	
Measuring range	**Code**
0 ... 1500 °C	**15**

W 1393 GB 30 11.2000 CM 9026215 Printed in Germany

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