

Analogue Temperature Transmitter

Configurable Ranges, Head Mounting

for Pt100 Resistance Thermometers for Thermocouples

Model T19



Applications

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



Special Features

- Designs for Pt100 or thermocouples
- Configurable measuring ranges (bridges)
- Output 4 ... 20 mA, 2 wire design
- Fault signal for sensor burnout and sensor short circuiting
- Large ambient temperature range
- Compact and reasonably priced

Description

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.

The case is designed as a head-mounted transmitter for direct installation into the temperature probe and can be mounted into any DIN connection head of form B with no problem.

Also available as rail mounting version:
model T19.30, see data sheet TE 19.02.

Specifications

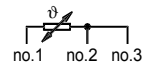
	Model T19			
Input	Pt 100	DIN IEC 751	2- or 3-lead	thermocouples DIN IEC 584
possible measuring ranges, configurable	measuring ranges small from -50 °C up to +200 °C	measuring ranges large from -50 °C up to +400 °C	measuring ranges for HVAC from -30 °C up to +120 °C	type T, J, K, S dependent upon type 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 (SP)	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			
linearisation	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 _{Tamb} or ⁴⁾ ± 0.2 K / 10 K _{Tamb}		± 0.1 % / 10 K _{Tamb} or ⁴⁾ ± 25 µV / 10 K _{Tamb}
	span	0.2 % / 10 K _{Tamb}		0.2 % / 10 K _{Tamb}
error effect of cold junction compensation	—		at T_{amb} -20 ... +60 °C ± 1.0 K at T_{amb} -40 ... +85 °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	
with sensor short circuit	down scale, < 3 mA ⁶⁾		—	
load R_A	$R_A \leq (U_B - 10V) / 0.02A$ 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 50 082-2 (March 95)			
Special features				
ambient and storage temperature	-40 ... +85 °C			
climate class	Cx (-40 ... +85 °C, 5 % up to 95 % relative humidity) DIN EN 60654-1			
maximum permissible humidity	95 % relative humidity, noncondensing DIN IEC 68-2-30 Var. 2			
vibration	10 ... 2000 Hz 5 g DIN IEC 68-2-6			
shock	DIN IEC 68-2-27 $g_N = 15$			
Case	head mounting design			
material	polyamide, glass fibre reinforced			
ingress protection case	IP 40 IEC 529 / EN 60 529			
terminal con.	IP 00 IEC 529 / EN 60 529			
cross section of terminal connectors	0.14 ... 1.5 mm ²			
weight	approx. 0.03 kg			
dimensions	see drawings			

Specifications in % refer 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 Pt100 in 3-lead connection, for Pt100 in 2-lead connection lead resistance counts fully towards error
- 2) with factory configured measuring range, value is valid at ambient temperature 23 °C ± 5K
- 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 Pt100 in 2-lead connection)

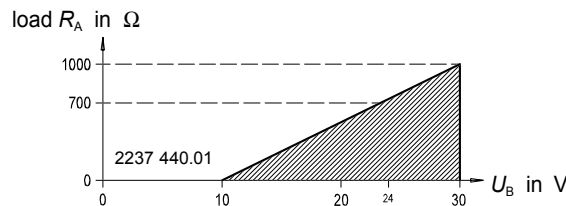
legend of lead number:



1375 890

Load diagram

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



Transmitter configuration

- ① Remove case bottom
- ② Set solder bridges for desired measuring range in accordance with the tables
- ③ Snapfit bottom to the case again
- ④ Adjust zero and span by means of potentiometer

Pt 100 meas. ranges small Model T19.10.1P0-1	
measuring range	bridge
- 50 ... + 50 °C	1 ● ● 2 5 0 ● 6 3 ● 0 4 7 0 ● 8
0 ... 50 °C	1 ● ● 2 5 0 ● 6 3 ● ● 4 7 0 ● 8
0 ... 100 °C	1 ● ● 2 5 0 ● 6 3 ● 0 4 7 0 ● 8
0 ... 120 °C	1 ● ● 2 5 0 ● 6 3 0 0 4 7 0 ● 8
0 ... 150 °C	1 ● 0 2 5 0 ● 6 3 0 0 4 7 ● ● 8
0 ... 200 °C	1 0 0 2 5 0 ● 6 3 0 0 4 7 ● ● 8

Pt 100 meas. ranges large Model T19.10.1P0-2	
measuring range	bridge
- 50 ... + 200 °C	1 ● ● 2 5 ● ● 6 3 ● 0 4 7 ● ● 8
0 ... 200 °C	1 ● ● 2 5 ● ● 6 3 ● ● 4 7 ● ● 8
0 ... 250 °C	1 ● ● 2 5 ● ● 6 3 ● 0 4 7 ● ● 8
0 ... 300 °C	1 ● ● 2 5 ● ● 6 3 0 0 4 7 ● ● 8
0 ... 350 °C	1 ● 0 2 5 ● ● 6 3 0 0 4 7 ● ● 8
0 ... 400 °C	1 0 0 2 5 ● ● 6 3 0 0 4 7 ● ● 8

Pt 100 meas. ranges for HVAC Model T19.10.1P0-3	
measuring range	bridge
- 30 ... + 30 °C	1 ● ● 2 5 ● ● 6 3 ● 0 4 7 ● ● 8
- 30 ... + 50 °C	1 ● ● 2 5 ● ● 6 3 0 0 4 7 ● ● 8
0 ... 60 °C	1 ● ● 2 5 ● ● 6 3 ● 0 4 7 ● ● 8
0 ... 80 °C	1 ● ● 2 5 ● ● 6 3 0 0 4 7 ● ● 8
0 ... 100 °C	1 ● 0 2 5 ● ● 6 3 0 0 4 7 ● ● 8
0 ... 120 °C	1 0 0 2 5 ● ● 6 3 0 0 4 7 ● ● 8

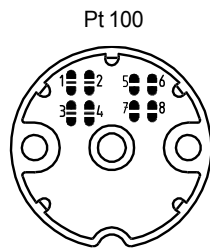
Thermocouple type T Model T19.10.3T0-4	
measuring range	bridge
- 100 ... + 200 °C	1 ● 0 0 3
- 100 ... + 300 °C	1 0 0 0 3
0 ... 400 °C	1 0 0 ● 3

Thermocouple type J Model T19.10.3J0-4	
measuring range	bridge
0 ... 350 °C	1 ● ● 0 3
0 ... 550 °C	1 ● 0 0 3
0 ... 700 °C	1 0 0 0 3

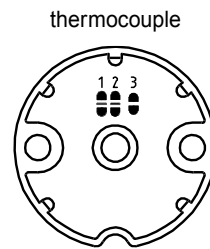
Thermocouple type K Model T19.10.3K0-4	
measuring range	bridge
0 ... 300 °C	1 ● ● 0 3
0 ... 600 °C	1 ● 0 0 3
0 ... 1200 °C	1 0 0 0 3

Thermocouple type S Model T19.10.3S0-4	
measuring range	bridge
0 ... 1500 °C	1 0 0 0 3

Bridge positions



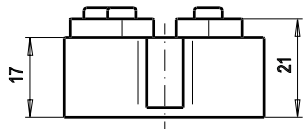
Pt 100



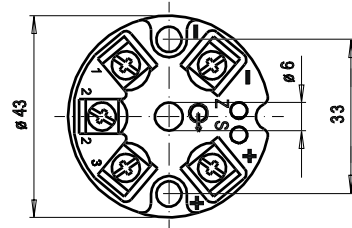
thermocouple

2225 328.01

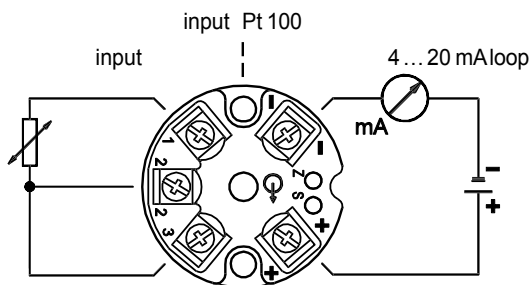
Dimensions in mm



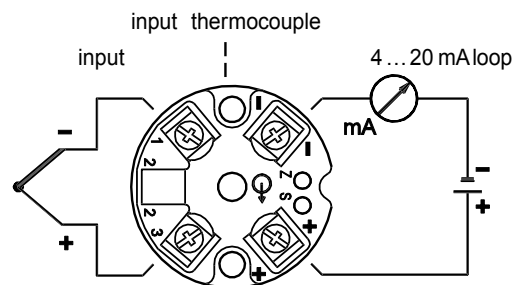
2226 120.02



Designation of terminal connectors



input Pt 100



input thermocouple

2225 352.01

Order code for temperature transmitter Model T19

Field No.	Code	Instrument design
Input		
1	<input type="text"/>	1P resistance thermometer Pt 100
	<input type="text"/>	3T thermocouple type T (Cu-CuNi)
	<input type="text"/>	3J thermocouple type J (Fe-CuNi)
	<input type="text"/>	3K thermocouple type K (NiCr-Ni)
	<input type="text"/>	3S thermocouple type S (PtRh-Pt)
	<input type="text"/>	?? other <i>please state as additional text</i>
Application		
2	<input type="text"/>	1 Pt100 measuring ranges small up to 200 °C (configurable through solder bridges)
	<input type="text"/>	2 Pt100 measuring ranges large up to 200 °C (configurable through solder bridges)
	<input type="text"/>	3 Pt100 measuring ranges for HVAC up to 120 °C (configurable through solder bridges)
	<input type="text"/>	4 thermocouple measuring ranges (configurable through solder bridges)
	<input type="text"/>	9 special measuring ranges (not reconfigurable)
Measuring range		
3	<input type="text"/>	NK not configured
	<input type="text"/>	configured (standard measuring range) <i>codes see below</i>
	<input type="text"/>	?? configured (special measuring range) <i>please state as additional text</i>
Additional order details		
4	<input type="text"/>	YES NO
	<input type="text"/>	T Z additional text <i>Please state in clearly understandable text !</i>

Order code for Model T19

	1		2	3	4
T19.10	-	<input type="text"/>	0	-	<input type="text"/> <input type="text"/> - <input type="text"/>

Additional text: _____

Mounting accessories <i>(please order separately)</i>	Order No.
mounting kit for mounting on a measuring insert	31 68281
mounting kit for mounting in the top of a connection head	31 87633
adapter for mounting on a DIN rail, plastic	35 93789
adapter for mounting on a DIN rail, metal	36 19851

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

Pt 100 meas. ranges small Model T19.10.1P0-1	
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 T19.10.1P0-2	
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 T19.10.1P0-3	
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	

Thermocouple type T Model T19.10.3T0-4	
Measuring range	Code
- 100 ... + 200 °C	KA
- 100 ... + 300 °C	KB
0 ... 400 °C	1Q

Thermocouple type J Model T19.10.3J0-4	
Measuring range	Code
0 ... 350 °C	1P
0 ... 550 °C	1T
0 ... 700 °C	1W

Thermocouple type K Model T19.10.3K0-4	
Measuring range	Code
0 ... 300 °C	1N
0 ... 600 °C	1U
0 ... 1200 °C	12

Thermocouple type S Model T19.10.3S0-4	
Measuring range	Code
0 ... 1500 °C	15

Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing. Modifications may take place and materials specified may be replaced by others without prior notice.