

# Analogue Temperature Transmitter

## Configurable Ranges, Head Mounting

### for Pt 100 Resistance Thermometers for Thermocouples Model T19

## Electronic Temperature Measurement

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### 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 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.

# Specification

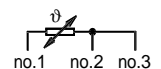
	Model T19			
Input	Pt 100	DIN IEC 751	2- or 3-lead	thermocouples DIN IEC 584
possible measuring ranges, configurable	measuring ranges small from - 50 °C up to +200 °C	measuring ranges large from - 50 °C up to +400 °C	measuring ranges for HVAC from - 30 °C up to + 120 °C	type T, J, K, S dependent upon 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 <sup>1)</sup>			± 0.2 K / 10 Ω
permissible load resistance	30 Ω each lead, 3-lead symmetric			500 Ω total resistance
<b>Analogue output</b>	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 % <sup>2)</sup>			
linearity error	± 0.1 % <sup>3)</sup>			—
amplification error	—			± 0.1 %
temperature coefficient $T_C$	zero	± 0.1 % / 10 K <sub>Tamb</sub> or <sup>4)</sup> ± 0.2 K / 10 K <sub>Tamb</sub>		± 0.1 % / 10 K <sub>Tamb</sub> or <sup>4)</sup> ± 25 µV / 10 K <sub>Tamb</sub>
coefficient	span	0.2 % / 10 K <sub>Tamb</sub>		0.2 % / 10 K <sub>Tamb</sub>
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 <sup>5)</sup>		up scale, > 23.5 mA	
with sensor short circuit	down scale, < 3 mA <sup>6)</sup>		—	
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			
<b>Power supply <math>U_B</math></b>	DC 10 ... 30 V by 4 ... 20 mA-loop			
input power supply protection	reverse polarity			
<b>Electromagnetic compatibility (EMC)</b>	CE - Conformity per EN 50082-2 (March 95)			
<b>Special features</b>				
ambient and storage temperature	-40 ... +85 °C			
climate application class	GPF DIN 40040			
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 $g_N = 15$			
guarantee	5 years for performance			
<b>Case</b>	head mounting design			
material	polyamide, glass fibre reinforced			
degree of protection case	IP 50 IEC 529 / EN 60 529			
terminal con.	IP 00 IEC 529 / EN 60 529			
cross section of terminal connectors	0.14 ... 1.5 mm <sup>2</sup>			
weight	approx. 0.03 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)

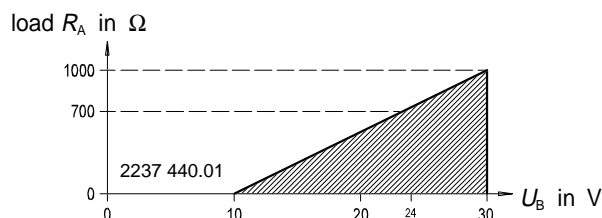
legend of lead number:



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

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

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

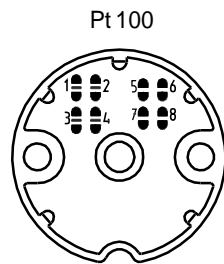
Thermocouple type T	
measuring range	bridge
- 100 ... + 200 °C	1 ● 0 0 3
- 100 ... + 300 °C	1 0 0 0 3
0 ... 400 °C	1 0 0 ● 3

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

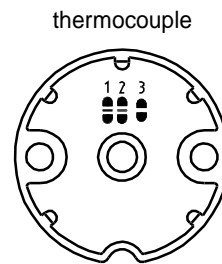
Thermocouple type K	
measuring range	bridge
0 ... 300 °C	1 ● ● 0 3
0 ... 600 °C	1 ● 0 0 3
0 ... 1200 °C	1 0 0 0 3

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

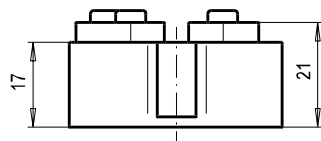
### Bridge positions



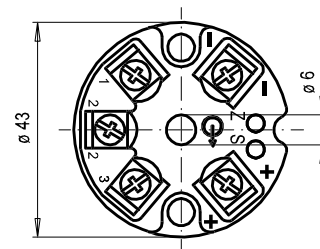
2225 328.01



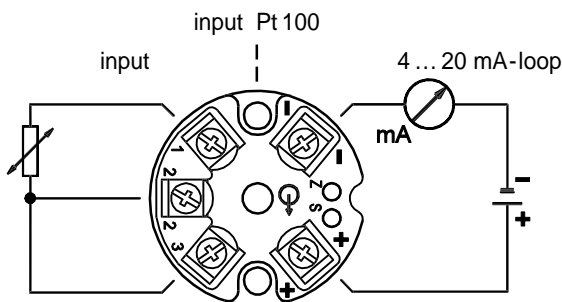
### Dimensions in mm



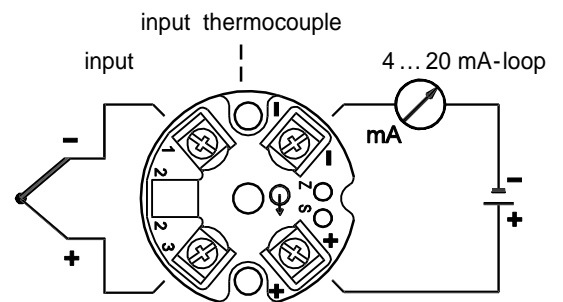
2226 120.01



### Designation of terminal connectors



2225 352.01



# Order code for temperature transmitter Model T19

Field No.	Code	Instrument design
<b>Input</b>		
1	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)
	??	other
<b>Application</b>		
2	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)
	9	special measuring ranges (not reconfigurable)
<b>Measuring range</b>		
3	NK	not configured
		configured (standard measuring range) <i>codes see below</i>
	??	configured (special measuring range) <i>please state as additional text</i>
<b>Additional order details</b>		
4	YES	NO
	T	Z

## Order code for Model T19

T19.10	-	1		0	-	2		3		-	4	
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Additional text: \_\_\_\_\_

Mounting accessory <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	1F

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 are correct at the time of printing.  
Modifications may take place and materials specified may be replaced by others without prior notice.



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