

Analogue Temperature Transmitter

Configurable ranges for Pt 100 Resistance Thermometers for Thermocouples (Typ T, J, K or S)



General features

The transmitters in the TET86, TET88 or TET85, TET87 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.

As an alternative there is also a case form for direct montage on hat rails.

Special features

- Input
 - for Pt 100
 - for thermocouples
- Configurable ranges
- Output 4 ... 20 mA, 2 wire design
- Fault signal for sensor burn
- Large range of ambient temperature
- Compact and at a low price

Applications

Plant construction

Power engineering

Heating, ventilation, air conditioning, refrigeration

Baureihe: TET85, TET86, TET87, TET88

Technical data

Model				
Head-Transmitter	TET 88			TET 86
Rail-Transmitter	TET 87			TET 85
Input	PT100 EN 60 751 2- or 3-leads			thermocouple DIN IEC 584
Possible measuring ranges	measuring ranges small	measuring ranges large	measuring ranges for HVAC	type T, J, K, S dependent on type of thermocouple, see page 3
configurable	from -50°C up to +200°C	from -50°C up to +400°C	from -30°C up to +120°C	from -100°C up to +1500°C
selection of measuring range	via solder bridges			
standard measuring ranges	see page 3			
special measuring ranges	on request (special measuring ranges can not be reconfigured)			
adjustment range				
zero potentiometer (Z)	approx. ± 10°C	approx. ± 25°C	approx. ± 30°C	approx. ± 40°C
span potentiometer (SP)	ca. 10 %			
sensor current	approx. 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 ... 20mA			2-wire design
linearization	proportional to temperature EN 60751			proportional to voltage
measuring deviation per DIN 770	± 0,5 % with factory configured measuring range, value is valid ambient temperature ± 23°C			
linearity error	± 0,15 %			---
amplification error	---			± 0,1 %
temperature-coefficient T_K zero span	± 0,1 % / 10 K _{TU} or ²⁾ ± 0,2 K / 10 K _{TU}			± 0,1 % / 10 K _{TU} or ²⁾ ± 25 μV / 10 K _{TU}
error effect of cold junction compensation	---			0,2 % / 10 K _{TU}
rising time t_{90}	< 1 ms			At T _U -20 ... +60°C ± 1,0 K
switch-on delay, electric	< 10 ms			At T _U -40 ... +85°C ± 2,0 K
signalling with sensor burnout	down scale, < 3 mA ³⁾			up scale, > 23,5 mA
with sensor short circuit.	down scale, < 3 mA ⁴⁾			---
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 ... 30V aus 4 ... 20 mA-loop			
input power supply protection	reserve polarity			
Electromagnetic compatibility (EMC)	CE - Conformity per DIN EN 61326-1			
Special features				
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 5g DIN IEC 68-2-6			
shock	DIN IEC 68-2-27 g _N = 15			
Case	head mounting design		rail mounting design	
material	polyamide glass fibre reinforced			
degree of case projection	IP 50 IEC 529 / EN 60529		IP 30 IEC 529 / EN 60529	
terminal con.	IP 00 IEC 529 / EN 60529		IP 10 IEC 529 / EN 60529	
cross section of terminal connectors	0,14 ... 1,5 mm ²		0,5 ... 1,5 mm ²	
weight	approx. 0,03 Kg		approx. 0,05 Kg	
dimensions	see drawings			

Specifications in % refers to the measuring span

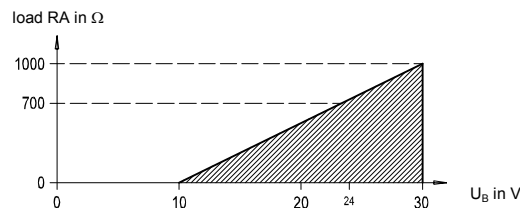
1) for Pt 100 in 3-lead connection
for Pt 100in 2-lead connection lead resistance counts fully towards error

- 2) whichever is greater
- 3) up scale, in case only lead no. 1 open
- 4) temperature value, in case of short between leads no. 2 and no. 3 (operation of Pt 100 in 2-lead connection)

R_A load
T_A ambient temperature
T_K temperature coefficient
U_B loop power supply voltage, see power supply

Load diagram

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



Configuration headtransmitter TET86 and TET88

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

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

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

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

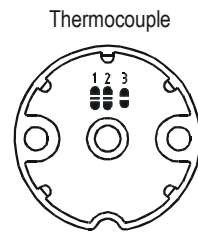
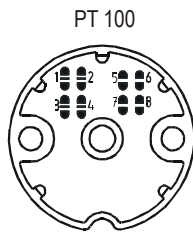
Thermocouple type T	
measuring range	bridge
-100 ... + 200 °C	1 0 0 3
-100 ... + 300 °C	1 0 0 3
0 ... 400 °C	1 0 0 3

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

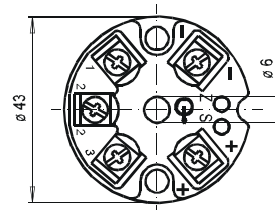
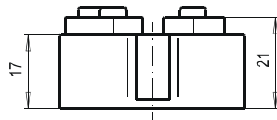
Thermocouple type K	
measuring range	bridge
0 ... 300 °C	1 0 0 3
0 ... 600 °C	1 0 0 3
0 ... 1200 °C	1 0 0 3

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

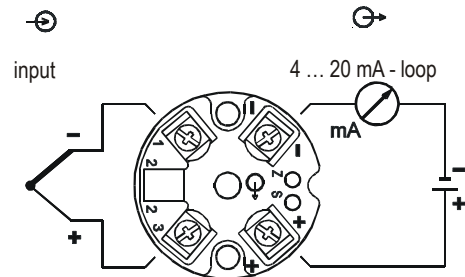
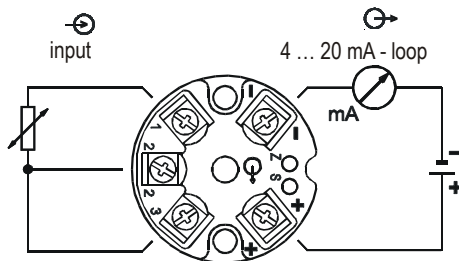
Bridge positions



Dimensions in mm



Designation of terminal connectors



Configuration railtransmitter TET87 TET85

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

PT 100-measuring range 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 range 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 range 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 ● ● ● ○ ● ○ ● ●
	1 2 3 4 5 6 7 8 ● ○ ○ ○ ○ ● ○ ○ ○
0 ... 120 °C	1 2 3 4 5 6 7 8 ○ ○ ○ ○ ○ ● ● ● ○

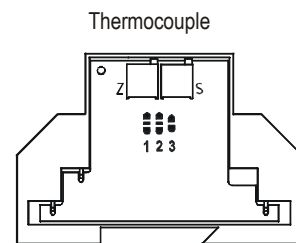
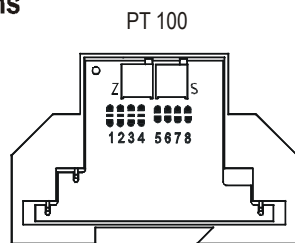
Thermocouple type T	
measuring range	bridge
-100 ... + 200 °C	1 ● ○ ○ 3
-100 ... + 300 °C	1 ○ ○ ○ 3
0 ... 400 °C	1 ○ ○ ● 3

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

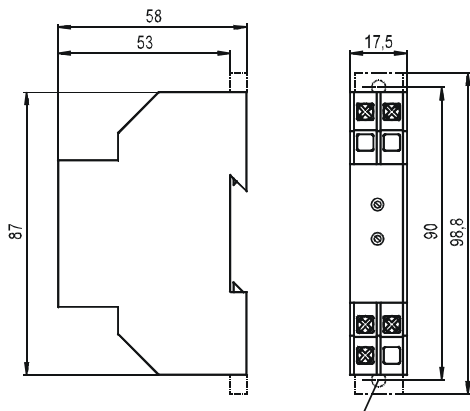
Thermocouple type K	
measuring range	bridge
0 ... 300 °C	1 ● ○ ○ 3
0 ... 600 °C	1 ● ○ ○ 3
0 ... 1200 °C	1 ○ ○ ○ 3

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

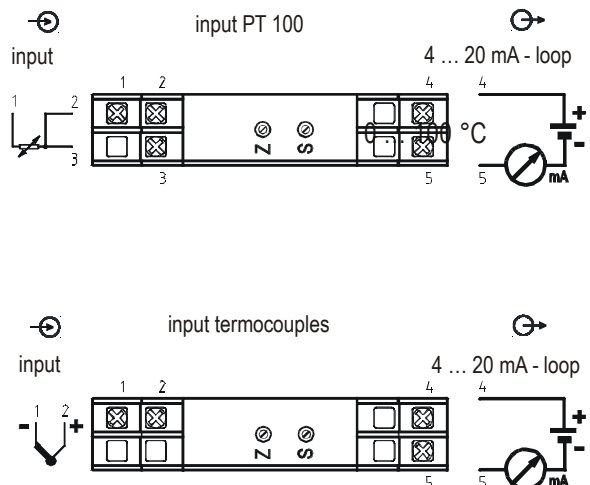
Bridges positions



Dimensions in mm



Designation of terminal connectors



Subject of technical changes