

TT2780

Temperature head transmitter

For resistance thermometers Pt100, settable using a PC,
for installation in a sensor head Form B, BUZ, BUZ-H



Application area

- PC programmable (PCP) Temperature head transmitter for converting a Pt100 input signal into an scalable 4 to 20 mA analog output signal
- Input: Resistance thermometer Pt100
- Online configuration using a PC with configuration kit

Features and benefits

- Universal PC programmable for Pt100 input signal
- 2 wire technology, 4 to 20 mA analog output
- High accuracy in total ambient temperature range
- Fault signal on sensor break or short circuit, presettable to NAMUR NE43
- EMC to IEC 61326-1, CE
- Online configuration during measurement using SETUP connector
- Customer specific measurement range setting



Operation and system construction

Measurement principle Electronic measurement and conversion of Pt100 input signals in industrial temperature measurement.

Measurement system The TT2780 temperature head transmitter is a two wire transmitter with an analog output. It has measurement input for resistance thermometer Pt100 in 2-, 3- or 4-wire connection. Setting up of the TT2780 is done using the configuration kit.

Input values

Measurement value Temperature

Measurement range

Type	Measurement ranges	min. measur. range
Pt100 accord. to IEC 60751	-200 to 650 °C (-328 to 1202 °F) -50 to 250 °C (-58 to 482 °F)	10 K 10 K
<ul style="list-style-type: none"> ■ Connection type: 2-, 3- or 4-wire connection cable resistance compensation possible in the 2-wire system (0 to 20 Ω) ■ Sensor cable resistance: max. 11 Ω per cable ■ Sensor current: ≤ 0.6 mA 		

Output values

Output signal analog 4 to 20 mA, 20 to 4 mA

Transmission behaviour temperature linear

Signal on alarm

- Measurement range undercut:
Linear drop to 3.8 mA
- Exceeding measurement range:
Linear rise to 20.5 mA
- Sensor breakage; Sensor short circuit:
≤ 3.6 mA or ≥ 21.0 mA (if setting ≥ 21.0 mA output ≥ 21.5 mA is guaranteed)

Load max. $(V_{\text{power supply}} - 10 \text{ V}) / 0.022 \text{ A}$ (Current output)

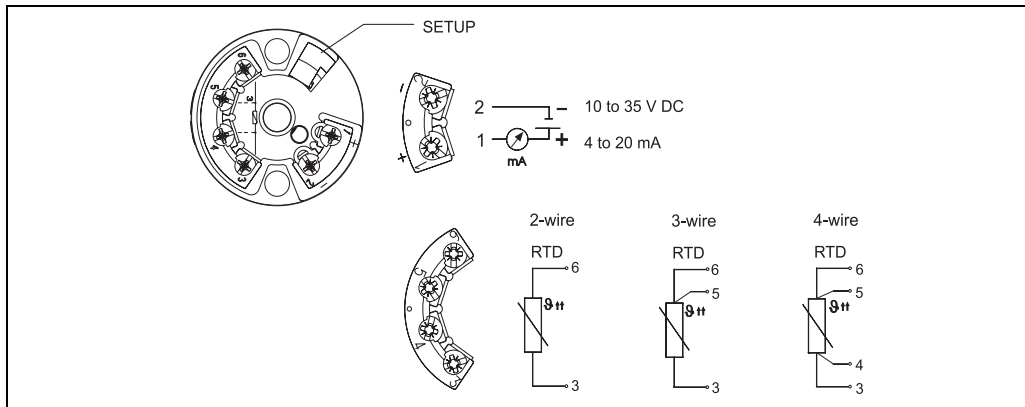
Input current required ≤ 3.5 mA

Current limit ≤ 23 mA

Switch on delay 4 s (during power up $I_a = 3.8 \text{ mA}$)

Auxiliary energy

Electrical connection



Head transmitter terminal connections

Supply voltage $U_b = 10 \text{ to } 35 \text{ V DC}$, polarity protected

Residual ripple Allowable ripple $U_{ss} \leq 3 \text{ V}$ at $U_b \geq 13 \text{ V}$, $f_{max.} = 1 \text{ kHz}$

Performance characteristics

Response time 1 s

Reference conditions Calibration temperature $+25 \text{ }^\circ\text{C}$ ($77 \text{ }^\circ\text{F}$) $\pm 5 \text{ K}$ ($\pm 9 \text{ K}$)

Maximum measured error

	Type	Measur. accuracy ^a
Resistance thermometer (RTD)	Pt100 -200 to 650 °C (-328 to 1202 °F)	0.2 K or 0.08%
	Pt100 ^b -50 to 250 °C (-58 to 482 °F)	0.1 K or 0.08%

a. % is related to the adjusted measurement range (the value to be applied is the greater one)

b. as option

Influence of power supply $\leq \pm 0.01\%/V$ deviation from 24 V^1

Influence of ambient temperature (temperature drift) Resistance thermometer (Pt100):
 $T_d = \pm (15 \text{ ppm/K} * (\text{range end value} + 200) + 50 \text{ ppm/K} * \text{preset meas. range}) * \Delta \vartheta$
 $\Delta \vartheta =$ Deviation of the ambient temperature according to reference condition ($+25 \text{ }^\circ\text{C}$ ($77 \text{ }^\circ\text{F}$) $\pm 5 \text{ K}$ ($\pm 9 \text{ K}$)).

Long term stability $\leq 0.1\text{K}/\text{Year}^2$ or $\leq 0.05\%/ \text{Year}^3$ ²

Influence of load $\leq \pm 0.02\%/100 \Omega^1$

1. All data is related to a measurement end value.
2. according to reference conditions
3. % is related to the adjusted measurement range (the value to be applied is the greater one).

Installation

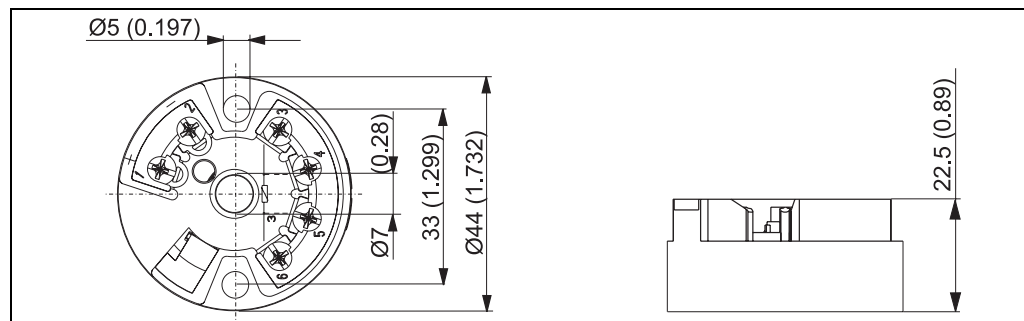
Installation conditions	<ul style="list-style-type: none"> ■ Installation angle: No limit ■ Installation area: Connection head accord. to DIN 43 729 Form B; TAF10 field housing
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Environment

Ambient temperature range	-40 to +85 °C (-40 to 185 °F)
Storage temperature range	-40 to +100 °C (-40 to 212 °F)
Climate class	according to IEC 60 654-1, Class C
Condensation	allowable
Ingress protection	IP 00, IP 54 (installed in sensor head)
Shock and vibration resistance	4g / 2 to 150 Hz according to IEC 60 068-2-6
Electromagnetic compatibility (EMC)	Interference immunity and interference emission according to IEC 61 326-1

Mechanical construction

Design, dimensions



Dimensions of the head transmitter in mm (inch)

Weight	approx. 40 g (1.41 oz)
Material	Housing: PC Potting: PUR
Terminals	<ul style="list-style-type: none"> ■ Cable up to max. 1.75 mm² (AWG 16) - secure screws ■ or 1.5 mm² (AWG 16) with wire end ferrules

Human interface

Remote operation	<p>Configuration</p> <p>Configuration kit, configurable on PC software programme</p> <p>Starting from version R2.00.00 of the TT2780A the temperature head transmitter is configurable without voltage supply.</p>
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Ordering information

How to order

Head transmitter TT2780	
PC programmable temperature transmitter, configurable measurement range for Pt100, analog output 4 to 20 mA, 2-wire technology, fail-ure mode to NAMUR NE43, for mounting in Form B head to DIN 43729	
Certification	
A	Non-hazardous areas
Programming	
1	PC-programmable
Max. range, accuracy	
1	-200 to 650 °C (-328 to 1202 °F), 0.08% of span or 0.2 K
2	- 50 to 250 °C (-58 to 482 °F), 0.08% of span or 0.1 K
Configuration transmitter connection	
3	RTD 3-wire
4	RTD 4-wire
2	RTD 2-wire
Configuration range	
AA	0 to 50 °C (32 to 122 °F)
AB	0 to 100 °C (32 to 212 °F)
AC	0 to 150 °C (32 to 302 °F)
AD	0 to 250 °C (32 to 482 °F)
AE	0 to 200 °C (32 to 392 °F)
KA	-40 to 140 °F
MB	0 to 200 °F
MC	0 to 300 °F
MD	0 to 500 °F
XX	Customised range (min. span 10 K)
Model	
A	Standard model
TT2780-	← Order-Code