



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services



Solutions

Technical information

iTEMP[®] Pt TMT180

Temperature head transmitter

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



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 TMT180A or TXU10 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
- GL (Germanischer Lloyd) marine approval
- Recognized component to UL 3111-1
- CSA General Purpose



Operation and system construction

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

Measurement system The iTEMP[®] Pt TMT180 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 TMT180 is done using the TMT180A or TXU10-AA configuration kit.

Input values

Measurement value Temperature

Measurement range

Type	Measurement ranges	min. measurem. 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)

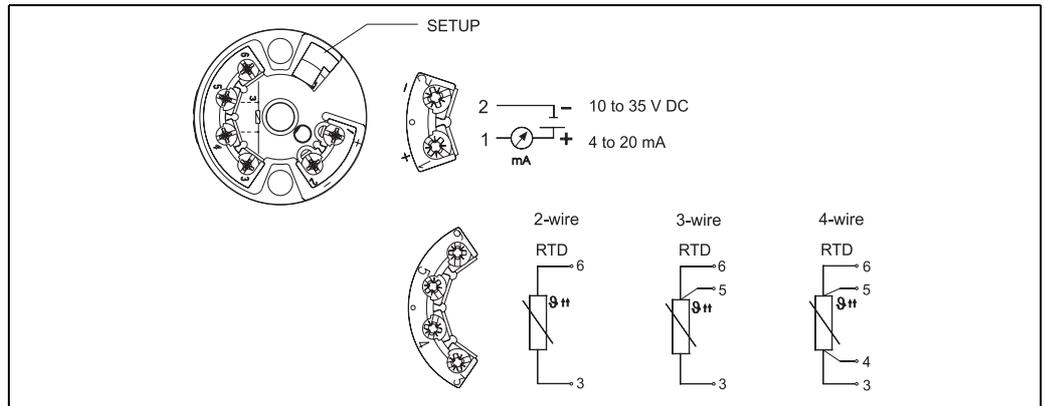
Input current required ≤ 3.5 mA

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 $U_b \geq 13 \text{ V}$, $f_{\text{max.}} = 1 \text{ kHz}$

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 $^\circ\text{C}$ (-328 to 1202 $^\circ\text{F}$)	0.2 K or 0.08%
	Pt100 ^b -50 to 250 $^\circ\text{C}$ (-58 to 482 $^\circ\text{F}$)	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

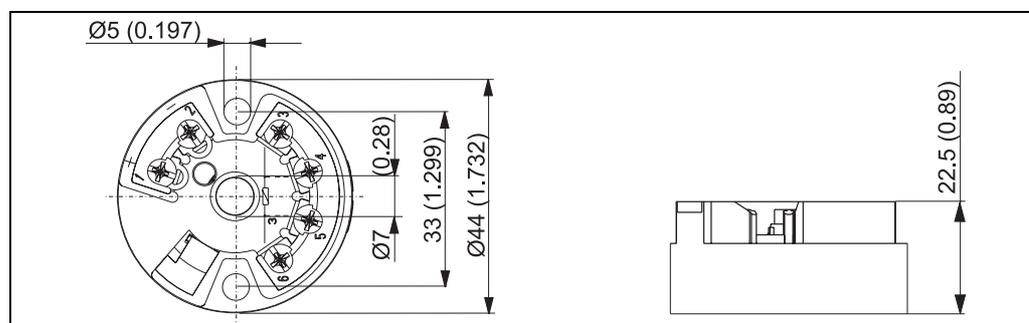
Installation conditions	<ul style="list-style-type: none"> ■ Installation angle: No limit ■ Installation area: Connection head accord. to DIN 43 729 Form B; TAF10 field housing
--------------------------------	--

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 TMT180A or TXU10-AA, configurable on PC software programme ReadWin® 2000. Starting from version R2.00.00 of the TMT180A the temperature head transmitter is configurable without voltage supply.</p>
-------------------------	---

Interface

PC interface connection cable TTL-/RS 232 or USB with plug.

Configurable parameters

Sensor type and connection type Pt100, engineering units (°C/°F), measurement range, cable resistance compensation on 2 wire connection, fault conditioning, output signal (4 to 20/20 to 4 mA), offset, measurement point identification (8 characters), output simulation

Certificates and approvals

CE mark	The measurement system fulfills the requirements demanded by the EU regulations. Endress+Hauser acknowledges successful unit testing by adding the CE mark.
UL	Recognized component to UL3111-1
CSA	CSA GP (General Purpose)
GL	Marine approval (Germanischer Lloyd)

Ordering information**How to order****Head transmitter iTEMP® Pt TMT180**

PC programmable temperature transmitter, configurable measurement range for Pt100, analog output 4 to 20 mA, 2-wire technology, failure mode to NAMUR NE43, for mounting in Form B head to DIN 43729

Certification	
A	Non-hazardous areas
B	CSA General Purpose
Programming	
1	PC-programmable
2	Programming blocked
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
B	Works calibration certificate, 6-point
K	Standard model, North American region
TMT180-	← Order-Code

Accessories

- TMT180A - Configuration kit iTEMP[®] PCP:
Setup program (ReadWin[®] 2000) and PC serial interface connection cable (TTL/RS 232C) for configuration of the TMT180 (Order-No.: TMT180A)
- TXU10-AA Configuration kit iTEMP[®] PCP:
Setup program (ReadWin[®] 2000) and PC serial interface connection cable (USB) with adapter 4 pin plug for configuration of the TMT180 (Order-No.: TXU10-AA)

Further Documentation

- Brief operating manual iTEMP[®] Pt TMT180 (KA118R/09/a3)

Subject to modification

International Head Quarter

Endress+Hauser
GmbH+Co. KG
Instruments International
Colmarer Str. 6
79576 Weil am Rhein
Germany

Tel. +49 76 21 9 75 02
Fax +49 76 21 9 75 34 5
www.endress.com
info@ii.endress.com

Endress+Hauser 
People for Process Automation