

Technical information

iTEMP[®] Pt TMT180

Pt100 head transmitter for an economical, high accuracy temperature monitoring. Settable using a PC, for installation in a DIN B sensor head



Application areas

- Economical and technical alternative to direct wiring to DCS or PLC
- PC programmable (PCP) Temperature head transmitter for converting a Pt100 input signal into an scalable 4 to 20 mA analog output signal

Features and benefits

- Operation, visualization and maintenance with PC, using ReadWin[®] 2000 operating freeware
- Very high accuracy up to 0.18 °F
- Breakdown information in event of sensor break or short-circuit, enables a quick maintenance intervention
- Online configuration during measurement using configuration kit for an easy setup
- Customer specific measurement range setting for high flexibility
- Long term stability: < 0.05%

and also:

- Electromagnetic compatibility to IEC 61326 for use in noisy environments
- Fully potted electronics allow humidity
- Captive screws for ease of connection
- Linearization curve match improves accuracy
- UL recognized component to UL 3111-1
- GL German Lloyd marine approval
- CSA General Purpose



Function and system design

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

Measuring 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. Set up of the TMT180 is done using the TMT180A or TXU10 configuration kit and PC (ReadWin® 2000 operating freeware).

Input

Measured variable Temperature

Measuring range

Type	Measurement ranges	min. span
Pt100 accord. to IEC 60751	-328 to 1202 °F (-200 to 650 °C) -58 to 482 °F (-50 to 250 °C)	18 °F (10 °C) 18 °F (10 °C)
<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

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

Breakdown information Breakdown information is created when the measuring information is invalid or not present anymore and gives a complete listing of all errors occurring in the measuring system.

		Signal (mA)
Under ranging	Standard	3.8
Over ranging	Standard	20.5
Sensor break; sensor short circuit low	To NAMUR NE43	≤ 3.6
Sensor break; sensor short circuit high	To NAMUR NE43	≥ 21.0

Source impedance max. $(V_{\text{power supply}} - 10 \text{ V}) / 0.022 \text{ A}$ (current output)
e.g. $(24 \text{ V} - 10 \text{ V}) / 0.022 \text{ A} = 636.4 \text{ } \Omega$

Transmission behavior temperature linear

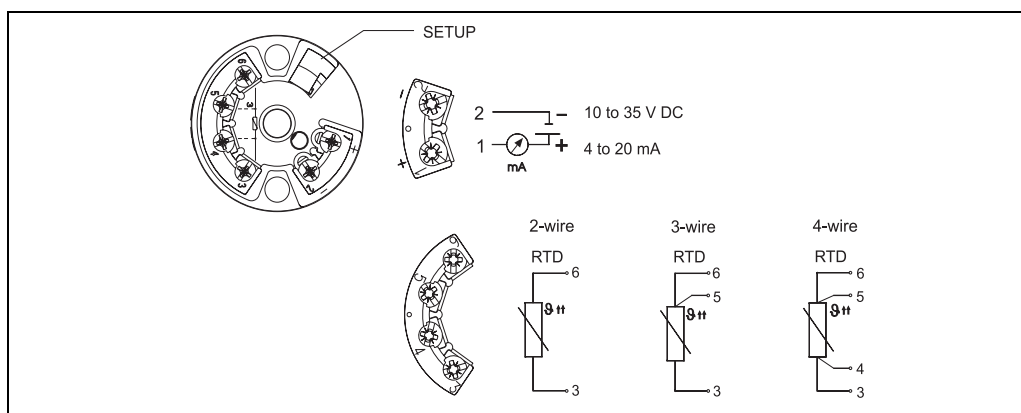
Input current required ≤ 3.5 mA

Current limit ≤ 23 mA

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

Power supply

Electrical connection



Head transmitter terminal connections

Supply voltage

$U_b = 10$ to 35 V DC, polarity protected

Residual ripple

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

Performance characteristics

Response time

1 s

Reference conditions

Calibration temperature $77\text{ °F} \pm 9\text{ °F}$ ($+25\text{ °C} \pm 5\text{ °C}$)

Maximum measured error

	Type	Measurem. accuracy ¹
Resistance thermometer (RTD)	Pt100 -328 to 1202 °F (-200 to 650 °C)	0.36 °F or 0.08%
	Pt100 ² -58 to 482 °F (-50 to 250 °C)	0.18 °F or 0.08%

1) % is related to the adjusted measurement range (the value to be applied is the greater)

2) as option

Influence of power supply

$\leq \pm 0.01\%/V$ deviation from 24 V
Percentages refer to the full scale value.

Influence of ambient temperature (temperature drift)

Resistance thermometer (Pt100):
 $T_d = \pm (8.3 \text{ ppm/°F} * (\text{range end value} + 328) + 27.8 \text{ ppm/°F} * \text{preset meas. range}) * \Delta \vartheta$
 $\Delta \vartheta$ = Deviation of the ambient temperature according to reference condition ($77\text{ °F} \pm 9\text{ °F}$)

Influence of load

$\pm 0.02\%/100\ \Omega$
Percentages refer to the full scale value.

Long-term stability

$\leq 0.18\text{ °F/Year}$ ($\leq 0.1\text{ °C/Year}$) or $\leq 0.05\%/Year$
Values under reference operating conditions. % refer to the set span. The highest value is valid.

Installation conditions

- Installation instructions
- Installation angle: No limit

■ Installation area: Connection head accord. to DIN 43 729 Form B; TAF10 field housing

Environment conditions

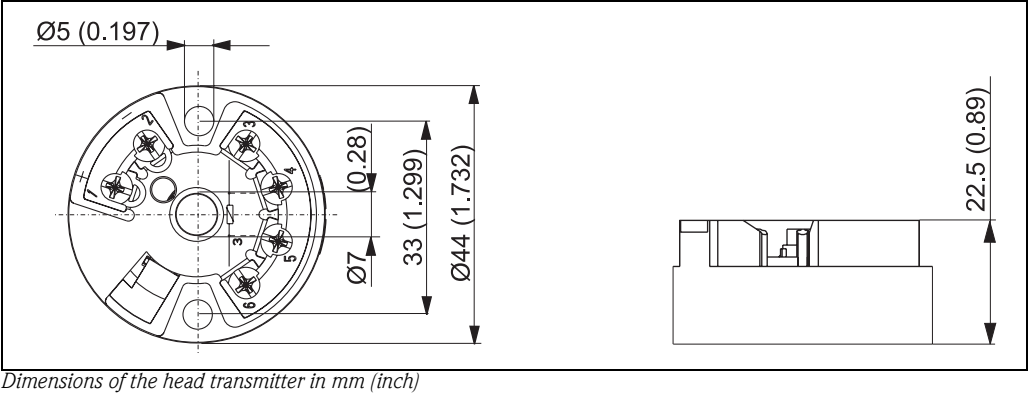
Ambient temperature limits	-40 to 185 °F (-40 to +85 °C)
Storage temperature	-40 to 212 °F (-40 to +100 °C)
Climate class	As per IEC 60 654-1, Class C
Condensation	allowed
Degree of protection	IP 00, NEMA 4 (IP 66) installed in TAF10 Field housing
Shock and vibration resistance	4g / 2 to 150 Hz according to IEC 60 068-2-6
Electromagnetic compatibility (EMC)	<div>CE Electromagnetic Compatibility Compliance</div> <div>The device meets all requirements listed under IEC 61326 Amendment 1, 1998.</div> <div>This recommendation is an uniform and practical way of determining whether the devices used in laboratory and process control are immune to interference with an objective to increase its functional safety.</div>

Discharge of static electricity	IEC 61000-4-2	6 kV cont., 8 kV air	
Electromagnetic fields	IEC 61000-4-3	80 to 2000 Hz	10 V/m
Burst (signal)	IEC 61000-4-4	1 kV / 2 kV (B) ¹	
Transient voltage	IEC 61000-4-5	1 kV unsym. / 0.5 kV sym.	
HF coupling	IEC 61000-4-6	0.15 to 80 MHz	10 V

1) self recovery

Mechanical construction

Design, dimensions



Weight	approx. 1.4 oz (40 g)
Material	Housing: PC Potting: PUR
Terminals	<ul style="list-style-type: none"> ■ Cable up to max. 16 AWG – secure screws ■ or 16 AWG with wire end ferrules

Human interface

Remote operation	<p>Configuration Configuration kit TMT180A-VM or TXU10, configurable on PC software program ReadWin® 2000. Starting from version R2.00.00 of the TMT180A the temperature head transmitter is configurable without voltage supply.</p> <p>Interface PC interface connection cable TTL-/RS 232 or USB with plug.</p> <p>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 mA/20 to 4 mA), offset, measurement point identification (8 characters), output simulation</p>
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Certificates and approvals

CE mark	This unit complies with the legal requirements laid out within the EU regulations.
GL	Ship building approval (Germanischer Lloyd)
UL	Recognized component to UL 3111-1
CSA GP	CSA General Purpose
Other standards and guidelines	<ul style="list-style-type: none"> ■ IEC 60529: Degrees of protection by housing (IP code) ■ IEC 61010: Safety requirements for electrical measurement, control and laboratory instrumentation ■ IEC 61326: Electromagnetic compatibility (EMC requirements) ■ NAMUR Standardization association for measurement and control in chemical and pharmaceutical industries. (www.namur.de) ■ NEMA Standardization association for the electrical industry

Accessories

- TMT180A-VM - 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-VM)
- TXU10 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)

Ordering information

How to order

Temperature 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		Version for non hazardous areas							
B		CSA General Purpose							
Programming									
1		PC-programmable							
2		Programming blocked							
Max. range accuracy									
1		-328 to 1202 °F (-200 to 650 °C), 0.08% of span or 0.36 °F							
2		-58 to 482 °F (-50 to 250 °C), 0.08% of span or 0.18 °F							
Configuration transmitter connection									
3		RTD 3-wire							
4		RTD 4-wire							
2		RTD 2-wire							
Configuration range									
KA		-40 to 140 °F (-40 to 60 °C)							
MB		0 to 200 °F (-18 to 93 °C)							
MC		0 to 300 °F (-18 to 149 °C)							
MD		0 to 500 °F (-18 to 260 °C)							
Model									
A		Standard model							
B		Works calibration certificate							
K		Standard model, North America region							
TMT180-		⇐ Order code (complete)							

Further Documentation

- Operating manual iTEMP® Pt TMT180 (BA163R/24/ae)
- Brief operating manual TAF10 Field housing (KA093R/09/a2)

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Mexico

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