



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services



Solutions

Technical information

iTEMP[®] TMT180

Temperature head transmitter

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



Application

- 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 PC with configuration kit and PC software

Your 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, presetable to NAMUR NE43
- EMC to IEC 61326, 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

Function and system design

Measurement principle	Electronic measurement and conversion of Pt100 input signals in industrial temperature measurement.
Measurement system	The iTEMP® 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 device is done using a configuration kit and the free of charge configuration software ReadWin® 2000.

Input

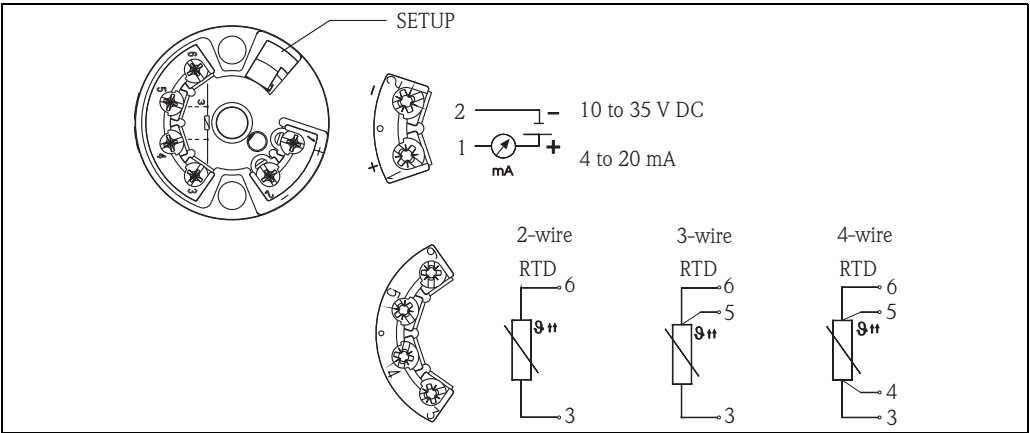
Measured variable	Temperature (temperature linear transmission behavior)		
Measurement range			
	Type	Measurement ranges	min. measurem. range
	Pt100 accord. to IEC 60751	-200 to +650 °C (-328 to +1202 °F)	10 K
		-50 to +250 °C (-58 to +482 °F)	10 K
-200 to +250 °C (-328 to +482 °F)		10 K	
<div>■ Connection type: 2-, 3- or 4-wire connection cable resistance compensation possible in the 2-wire system (0 to 20 Ω)</div> <div>■ Sensor cable resistance: max. 11 Ω per cable</div> <div>■ Sensor current: ≤ 0.6 mA</div>			

Output

Output signal	analog 4 to 20 mA, 20 to 4 mA
Transmission behaviour	temperature linear
Failure information	<ul style="list-style-type: none"> ■ 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 is ≥ 21.0 mA, an output signal ≥ 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 $I_a = 3.8 \text{ mA}$)

Power supply

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 operating conditions	Calibration temperature $+25 \text{ }^\circ\text{C}$ ($77 \text{ }^\circ\text{F}$) $\pm 5 \text{ K}$ ($\pm 9 \text{ K}$)
Maximum measured error	The accuracy data are typical values and correspond to a standard deviation of $\pm 3\sigma$ (normal distribution), i.e. 99.8% of all the measured values achieve the given values or better values. % is related to the adjusted measurement range (the value to be applied is the greater one).

	Type	Measurem. accuracy
Resistance thermometer (RTD)	Pt100 -200 to $+650 \text{ }^\circ\text{C}$ (-328 to $+1202 \text{ }^\circ\text{F}$)	0.2 K or 0.08%
	Pt100 ¹ -50 to $+250 \text{ }^\circ\text{C}$ (-58 to $+482 \text{ }^\circ\text{F}$)	0.1 K or 0.08%
	Pt100 ¹ -200 to $+250 \text{ }^\circ\text{C}$ (-328 to $+482 \text{ }^\circ\text{F}$)	0.2 K or 0.08%

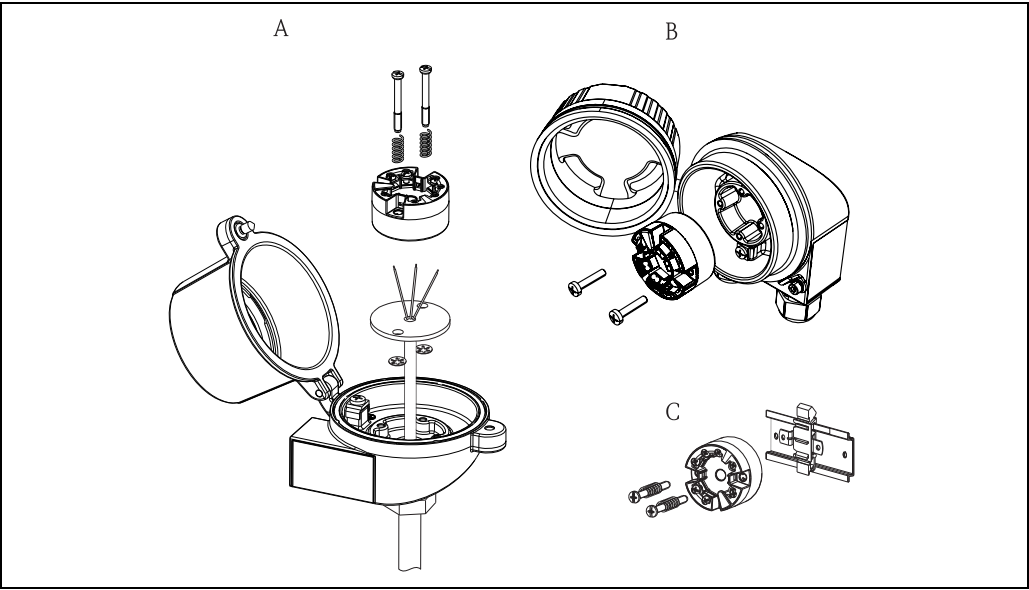
1. as option

Influence of power supply	$\leq \pm 0.01\%/V$ deviation from 24 V ¹
Influence of ambient temperature (temperature drift)	Resistance thermometer (Pt100): $T_d = \pm (15 \text{ ppm/K} * (\text{measuring range end value} - \text{measuring range start value}) + 50 \text{ ppm/K} * \text{preset meas. range}) * \Delta \vartheta$ $\Delta \vartheta =$ 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	$\leq 0.1 \text{ K/Year}^2$ or $\leq 0.05\%/Year$ ^{2 3}
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 conditions

Installation instructions

■ Mounting location:



A: Terminal head as per DIN EN 50446 form B, direct installation onto insert with cable entry (middle hole 7 mm / 0.28")

B: Separated from process in field housing

C: With DIN rail clip on top-hat rail as per IEC 60715 (TH35)

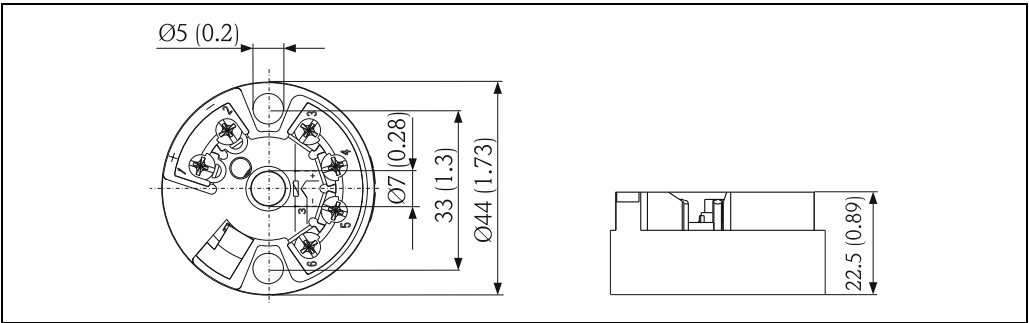
■ Orientation: No restriction

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
Humidity	■ Condensation as per IEC 60 068-2-33 permitted ■ Max. rel. humidity: 95% as per IEC 60068-2-30
Degree of protection	IP 00. In the installed state, it depends on the terminal head or field housing used.
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 613261 and NAMUR NE21

Mechanical construction

Design, dimensions



Dimensions of the head transmitter in mm (in)

Weight	approx. 40 g (1.41 oz)
Material	<ul style="list-style-type: none"> Housing: Polycarbonate (PC), complies with UL94 HB flammability standard (HB: horizontal burning test) Terminals: Nickel-plated brass and gold-plated contact Potting: WEVO PU 403 FP / FL, according to UL94 V0 flammability standard (V0: vertical burning test)
Terminals	Screw terminals, wires up to max. 1.75 mm ² (AWG 16) – secure screws or 1.5 mm ² (AWG 16) with wire end ferrules

Human interface

Operation via PC

Configuration via PC setup software ReadWin® 2000:

Menu	Configurable parameters
Standard settings	Connection mode (2-, 3- or 4-wire connection) Units (°C/°F) Measurement ranges
Expanded settings	Compensation resistance (0 to 20 Ω) on 2-wire connection Fault condition reaction Output (analog standard/inverse) Filter (0 to 60 s) Offset (-9.9 to +9.9 K) Measurement point identification/TAG
Service functions	Simulation (on/off)

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)
Other standards and guidelines	<ul style="list-style-type: none"> IEC 60529: Degrees of protection through housing (IP code) IEC 61010: Safety requirements for electrical measurement, control and laboratory instrumentation IEC 61326: Electromagnetic compatibility (EMC requirements) NAMUR: International user association of automation technology in process industries (www.namur.de)

Ordering information

Detailed ordering information is available from the following sources:

- In the **Product Configurator** on the Endress+Hauser website: www.endress.com → Select country → Instruments → Select device → Product page function: Configure this product
- From your Endress+Hauser Sales Center: www.endress.com/worldwide



Product Configurator - the tool for individual product configuration:

- Up-to-the-minute configuration data
- Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic creation of the order code and its breakdown in PDF or Excel output format
- Ability to order directly in the Endress+Hauser Online Shop

Accessories

- Head transmitter installation set: (4 screws, 6 springs, 10 circlips),
Order-Code: 51001112
- Adapter for DIN rail mounting, DIN rail clip according to IEC 60715
Order-Code: 51000856

Configuration kits for PC programmable transmitters

Operating software ReadWin[®] 2000 and PC-interface cable, 4-pin with USB-plug;

Order-Code: TXU10-AA

The operating software ReadWin[®] 2000 can be downloaded free of charge from the Internet from the following address:

www.endress.com/readwin

Documentation

Brief operating manual iTEMP[®] TMT180 (KA00118R/09/a3)

Instruments International

Endress+Hauser
Instruments International AG
Kaegenstrasse 2
4153 Reinach
Switzerland

Tel.+41 61 715 81 00
Fax+41 61 715 25 00
www.endress.com
info@ii.endress.com

Endress+Hauser 
People for Process Automation