



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, presettable 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. measur. range
Pt100 accord. to IEC 60751	-200 to +650 °C (-328 to +1202 °F) -50 to +250 °C (-58 to +482 °F) -200 to +250 °C (-328 to +482 °F)	10 K 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

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

Transmission behaviour temperature linear

Failure information

- 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)

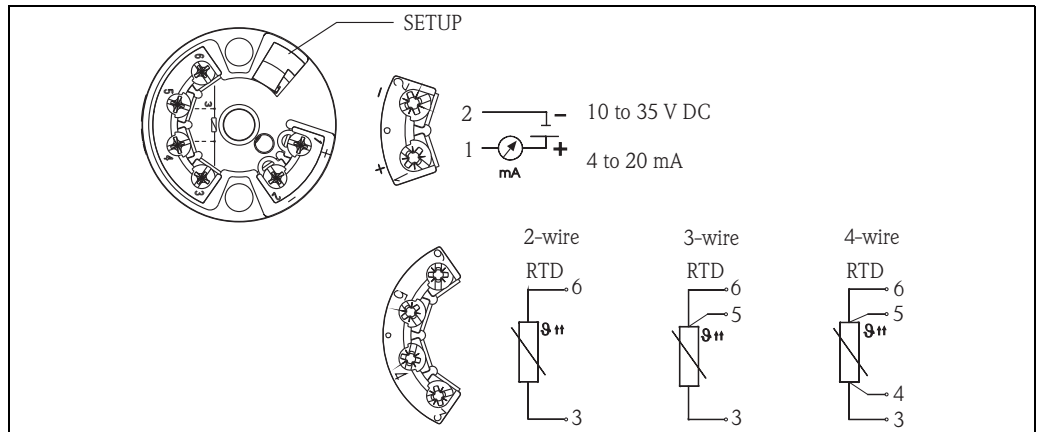
Input current required ≤ 3.5 mA

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

$U_b = 10$ 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 operating conditions

Calibration temperature $+25$ °C (77 °F) ± 5 K (± 9 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 °C (-328 to +1202 °F)	0.2 K or 0.08%
	Pt100 ¹ -50 to +250 °C (-58 to +482 °F)	0.1 K or 0.08%
	Pt100 ¹ -200 to +250 °C (-328 to +482 °F)	0.2 K or 0.08%

1. as option

Influence of power supply

$\leq \pm 0.01\%/V$ deviation from 24 V¹

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 ($+25$ °C (77 °F) ± 5 K (± 9 K)).

Long term stability

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

Influence of load

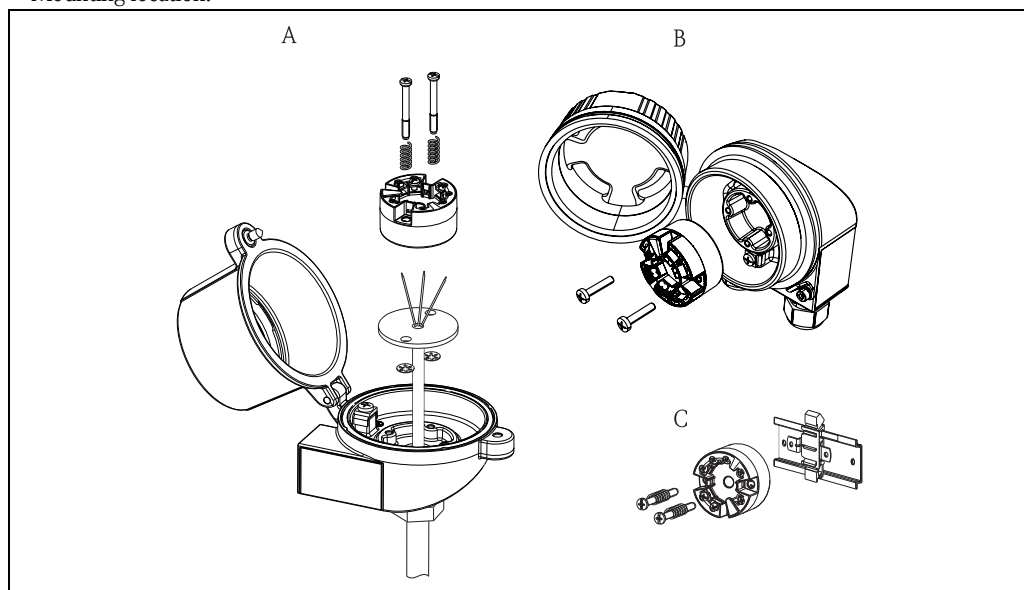
$\leq \pm 0.02\%/100 \Omega^1$

- All data is related to a measurement end value.
- according to reference conditions
- % 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

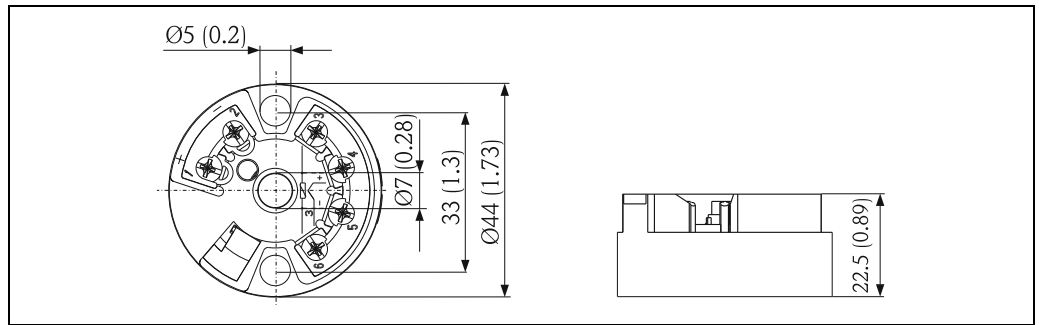
Degree of protection IP 00. In the installed state, it depends on the terminal head or field housing used.

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)

A0016380

Weight

approx. 40 g (1.41 oz)

Material

- 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 mm² (AWG 16) – secure screws or 1.5 mm² (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

- 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)

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