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Technical Information
iTEMP TMT180

Temperature head transmitter for resistance thermometers Pt100

Application

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

Your benefits

- Two-wire technology, analog output 4 to 20 mA
- High level of accuracy over the entire operating temperature range
- Fault signal in the event of sensor break or sensor short circuit, presettable to NAMUR NE43
- EMC according to NAMUR NE21
- Customer-specific measuring range setting

Endress+Hauser
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Function and system design

Measuring principle

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

Measuring system

The iTEMP TMT180 temperature head transmitter is a two-wire transmitter with an analog output and measurement input for Pt100 in 2-, 3-, or 4-wire connection. The device is set up using a configuration kit and the ReadWin 2000 operating software which is free-of-charge.

Input

Measured variable

Temperature (temperature-linear transmission behavior)

Measuring range

Description	Measuring range limits	Min. span
Pt100 as per IEC 60751	−200 to +650 °C (−328 to +1 202 °F)	10 K
	−50 to 250 °C (−58 to +482 °F)	10 K
▪ Connection type: 2-, 3- or 4-wire connection With 2-wire circuit, compensation of wire resistance possible (0 to 20 Ω) ▪ Cable resistance: 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 behavior

Temperature linear

Signal on alarm

- Sensor breakage; sensor short circuit:
  ≤ 3.6 mA or ≥ 21.0 mA (if setting is ≥ 21.0 mA an output current ≥ 21.5 mA is guaranteed)
- Underranging:
  Linear drop to 3.8 mA
- Overranging:
  Linear rise to 20.5 mA

Load

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

Input current required

≤ 3.5 mA

Current limit

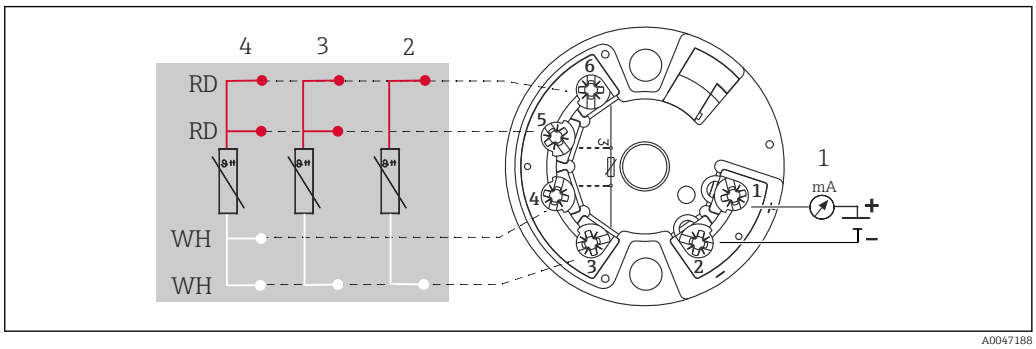
≤ 23 mA

Switch-on delay

4 s (during power up I_a = 3.8 mA)

Power supply

Terminal assignment



1 Transmitter mounted in the terminal head

1 Power supply for head transmitter and analog output 4 to 20 mA or fieldbus connection
2 RTD, 2-wire
3 RTD, 3-wire
4 RTD, 4-wire

Supply voltage

U_b = 10 to 35 V_{DC}, reverse polarity protection

Residual ripple

Permitted residual 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 °F)

Maximum measured error

The data relating to the measured error are typical values and correspond to a standard deviation of ± 3σ (normal distribution), i.e. 99.8% of all measured values achieve the specified values or better values. Percentage values refer to the set span. The larger value is valid.

	Designation	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 −50 to +250 °C (−58 to +482 °F)	0.2 K or 0.08%

1) Optional

Influence of the supply voltage

≤ ±0.01%/V deviation from 24 V [1]

Long-term drift

≤ 0.1 K/Year [2] or ≤ 0.05%/Year [2] [3]

Influence of ambient temperature

Resistance thermometer (Pt100):

$T_d = \pm$ (15 ppm/K * (full scale value - measuring range start) + 50 ppm/K * preset measuring range) * Δθ

1) All data is related to a full scale value
2) Under reference operating conditions
3) % is related to the set span. The larger value is valid.

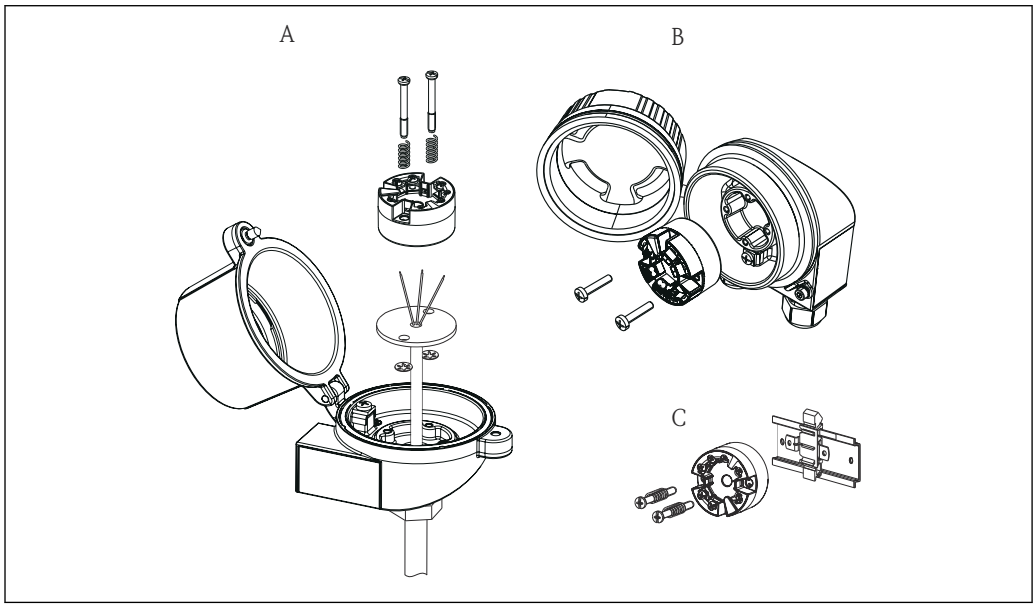
Δθ = Deviation of the ambient temperature from the reference operating condition (+25 °C (+77 °F) ± 5 K (9 °F)).

Influence of load

≤ ±0.02%/100 Ω [2)]

Installation

Mounting location



A Terminal head in accordance with DIN EN 50446 form B, direct installation onto insert with cable entry (middle hole 7 mm (0.28 in))
B Separate from process in field housing
C With clip on DIN rail as per IEC 60715 (TH35)

Orientation

No restrictions

Environment

Ambient temperature range

−40 to +85 °C (−40 to +185 °F)

Storage temperature

−40 to +100 °C (−40 to +212 °F)

Humidity

- Condensation permitted as per IEC 60068-2-33
- Max. rel. humidity: 95% as per IEC 60068-2-30

Climate class

As per IEC 60 654-1, Class C

Degree of protection

IP 00. Depends on the terminal head or field housing when installed.

Shock and vibration resistance

4 g / 2 to 150 Hz as per IEC 60 068-2-6

Electromagnetic compatibility (EMC)

CE conformity

EMC to all relevant requirements of the IEC/EN 61326-series and NAMUR Recommendation EMC (NE21). For details, refer to the Declaration of Conformity.

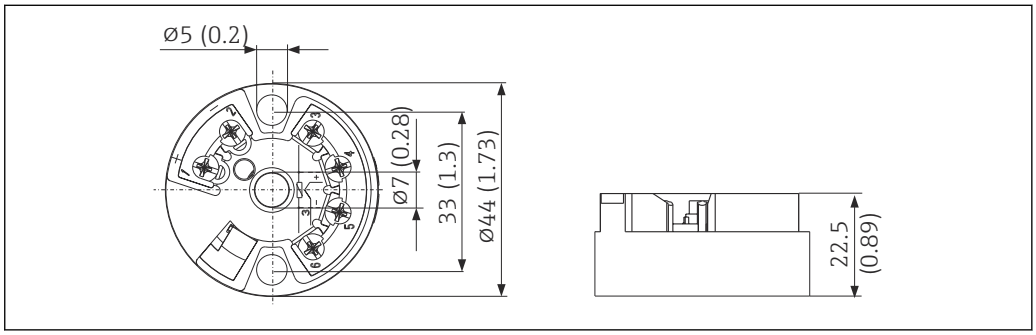
Maximum fluctuations during EMC-tests: <1% of measuring span.

Interference immunity to IEC/EN 61326-series, requirements for industrial areas.

Interference emission to IEC/EN 61326-series, electrical equipment Class B

Mechanical construction

Design, dimensions



2 *Dimensions of the head transmitter in mm (in)*

Weight

Approx. 40 g (1.41 oz)

Materials

- Housing: Polycarbonate (PC), complies with UL94 HB flammability standard (HB: Horizontal Burning Test). Terminals: nickel-plated brass and gold-plated or tin-plated contacts.
- Potting: WEVO PU 403 FP/FL, approved in accordance with UL94 V0 flammability standard (V0: Vertical Burning Test)

Terminals

Screw terminals, wires up to max. 1.75 mm^2 (15 AWG) (secure screws) or 1.5 mm^2 (16 AWG) with wire end ferrules

Operability

Remote operation

Configuration using PC operating program ReadWin 2000

Menu	Configurable parameters
Standard settings	▪ Connection type (2-, 3- or 4-wire connection) ▪ Measuring unit (°C/°F) ▪ Measuring range limits
Advanced settings	▪ Compensation resistance (0 to 20 Ω) on 2-wire connection ▪ Failsafe mode ▪ Output (analog standard/inverse) ▪ Filter (0 to 60 s) ▪ Offset (–9.9 to +9.9 K) ▪ Measuring point identification/TAG
Service functions	Simulation (on/off)

Certificates and approvals

Current certificates for the product are available on the product page at www.endress.com.

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Downloads**.
4. Select **Technical Documentation**.

5. Select **ZE (Certificates)** as the filter

A list of all the certificates appears.

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2. Open the product page.
3. Select **Downloads**.
4. Select **Approvals**.

A list of all the approvals appears.

Ordering information

Detailed ordering information is available for your nearest sales organization www.addresses.endress.com or in the Product Configurator under www.endress.com :

1. Click Corporate
2. Select the country
3. Click Products
4. Select the product using the filters and search field
5. Open the product page

The Configuration button to the right of the product image opens the Product Configurator.

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

Device-specific accessories

- Mounting kit for head transmitter (4 screws, 6 springs, 10 fuses)
  Order code: 51001112
- Adapter for top-hat rail mounting, DIN rail clip according to IEC 60715
  Order code.: 71528231
- Field housing TAF10 for Endress+Hauser head transmitter, aluminum, IP 66
  Order code: TAF10

Communication-specific accessories

- FXA291 Commubox: PC interface cable, USB, with 4-pin plug;
  Order code: 51516983
- TXU10-AA: ReadWin 2000 setup program and PC interface cable, USB, with 4-pin plug;
  Order code: TXU10-...

ReadWin 2000 can also be downloaded directly from the Internet for free at the following address: www.endress.com/readwin

Service-specific accessories

Accessories	Description
Applicator	Software for selecting and sizing Endress+Hauser measuring devices: ▪ Calculation of all the necessary data for identifying the optimum measuring device: e.g. pressure loss, accuracy or process connections. ▪ Graphic illustration of the calculation results Administration, documentation and access to all project-related data and parameters over the entire life cycle of a project. Applicator is available: ▪ Via the Internet: https://portal.endress.com/webapp/applicator ▪ On CD-ROM for local PC installation.
Configurator	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 The Configurator is available on the Endress+Hauser website: www.endress.com -> Click "Corporate" -> Select country -> Click "Products" -> Select the product using the filters and search field -> Open product page -> The "Configure" button to the right of the product image opens the Product Configurator.
W@M	Life cycle management for your plant W@M supports with a wide range of software applications over the entire process: from planning and procurement, to the installation, commissioning and operation of the measuring devices. All the relevant device information, such as the device status, spare parts and device-specific documentation, is available for every device over the entire life cycle. The application already contains the data of your Endress+Hauser device. Endress +Hauser also takes care of maintaining and updating the data records. W@M is available: ▪ Via the Internet: www.endress.com/lifecyclemanagement ▪ On CD-ROM for local PC installation.

Supplementary documentation

Brief Operating Instructions iTEMP TMT180 (KA00118R)

www.addresses.endress.com

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