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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

TI00088R/09/en
71190228

Endress+Hauser
People for Process Automation

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) -50 to +250 °C (-58 to +482 °F) -200 to +250 °C (-328 to +482 °F)	10 K 10 K 10 K

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

Input current required

≤ 3.5 mA

Current limit

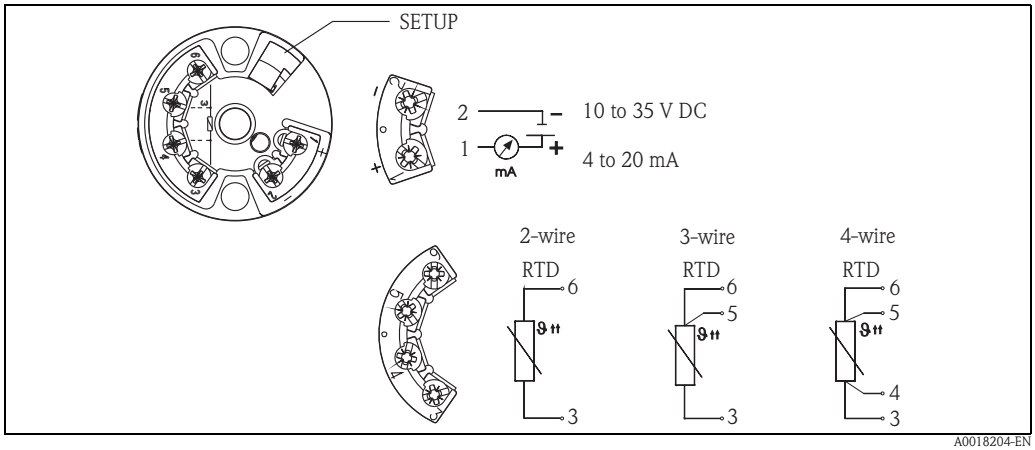
≤ 23 mA

Switch on delay

4 s (during power up I_a = 3.8 mA)

Power supply

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 ± 3σ (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) Pt100[1] -50 to +250 °C (-58 to +482 °F) Pt100[1] -200 to +250 °C (-328 to +482 °F)	0.2 K or 0.08% 0.1 K or 0.08% 0.2 K or 0.08%

1. as option

Influence of power supply

≤ ± 0.01%/V deviation from 24 V[1]

Influence of ambient temperature (temperature drift)

Resistance thermometer (Pt100):
T_d = ± (15 ppm/K * (measuring range end value - measuring range start value) + 50 ppm/K * preset meas. range) * Δ ϑ

Δ ϑ = Deviation of the ambient temperature according to reference condition (+25 °C (77 °F) ± 5 K (± 9 K)).

Long term stability

≤ 0.1K/Year[2] or ≤ 0.05%/Year[2 3]

Influence of load

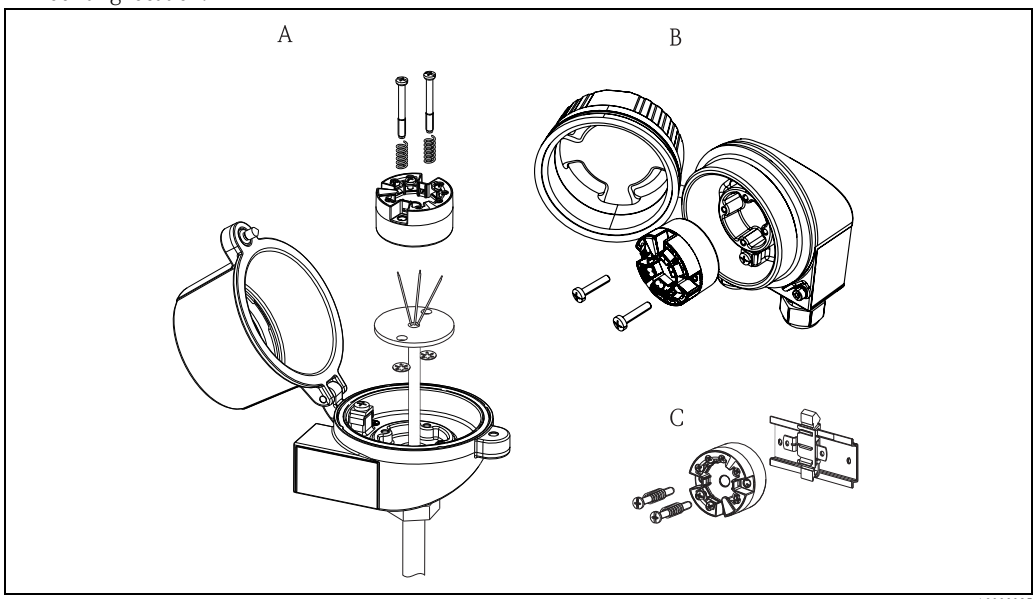
≤ ±0.02%/100 Ω[1]

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:



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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)

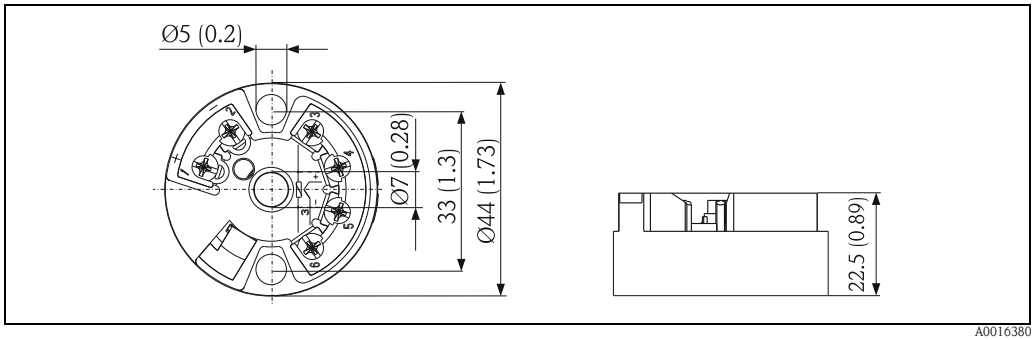
- Orientation: No restriction

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

- 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

- 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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