



Level



Pressure



Flow



Temperature



Liquid  
Analysis



Registration



Systems  
Components



Services

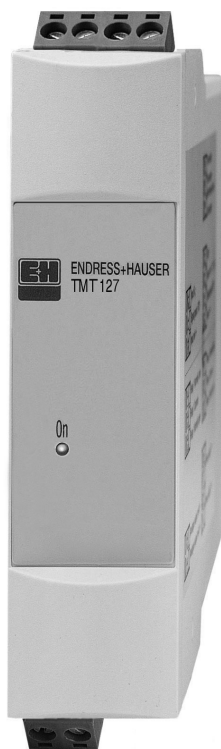


Solutions

Technical information

## iTEMP<sup>®</sup> Pt100 TMT127

Pt100 Temperature Transmitter for DIN rail mounting



### Application

- Temperature transmitter with fixed measuring range for converting a Pt100 input signal into an analogue, scalable 4 to 20 mA output signal

### Features and benefits

- Fixed measuring range for Pt100
- Two-wire technology, 4 to 20 mA analogue output
- High accuracy in complete ambient temperature range
- Failure information when sensor breaks or short-circuits as per NAMUR NE 43
- EMC as per NAMUR NE 21, CE
- Ex approval
  - ATEX EEx ia, nA
  - CSA IS, NI
  - CSA GP
  - FM IS, NI
- GL Germanische Lloyd / marine approval
- UL recognized component
- Galvanic isolation



## Function and system design

**Measuring principle** Electronic acquisition and conversion of input signals in industrial temperature measurement.

**Measuring system** The iTEMP® Pt100 TMT127 DIN rail temperature transmitter is a 2-wire transmitter with analogue output, measuring input for Pt100 in 2, 3, or 4-wire connection.

## Input values

**Measured variable** Temperature

**Measuring range** Depending on the application, different measuring ranges can be ordered (see 'Product structure').

**Input type**

| Input                        | Designation   | Measuring range limits           | Min. span |
|------------------------------|---|----------------------------------|-----------|
| Resistance thermometer (RTD) | Pt100<br>as per IEC 60751   | -200 to 850 °C (-328 to 1562 °F) | 10 K      |
|                              | <ul style="list-style-type: none"> <li>■ Type of connection: 2, 3 or 4-wire connection</li> <li>■ Cable resistance: sensor cable resistance of max. 40 Ω per cable</li> <li>■ Sensor current: ≤ 0.6 mA</li> </ul> |                                  |           |

## Output values

**Output signal** Analogue 4 to 20 mA

**Signal on alarm**

- Undershooting measuring range:  
linear decrease to 3.8 mA
- Exceeding measuring range:  
linear increase to 20.5 mA
- Sensor break; Sensor short-circuit:  
≥ 21.0 mA (failure signal is guaranteed > 21.5 mA)

**Load** Max.  $(V_{\text{Power supply}} - 12V) / 0.022 \text{ A}$  (current output)

**Linearisation/transmission behaviour** Temperature linear

**Galvanic isolation** U = 2 kV AC (input/output)

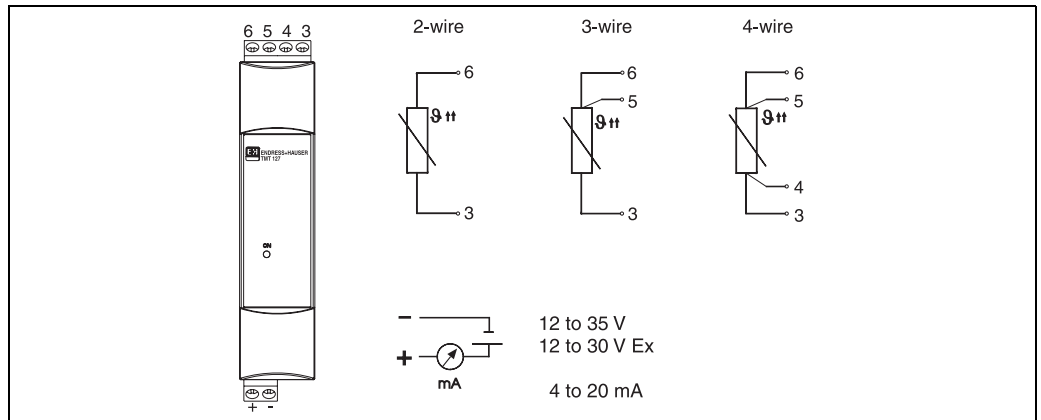
**Induced current requirement** ≤ 3.5 mA

**Current limitation** ≤ 23 mA

**Switch-on delay** 4 s (during switch-on procedure  $I_a = 3.8 \text{ mA}$ )

## Power supply

### Electrical connection



Temperature transmitter terminal assignment

### Supply voltage

$U_b = 12$  to 35 V, reverse polarity protection

### Residual ripple

Permitted residual ripple  $U_{ss} \leq 3$  V at  $U_b \geq 15$  V,  $f_{max.} = 1$  kHz

## Accuracy

### Response time

1 s

### Reference operating conditions

Calibration temperature:  $+25$  °C (77 °F)  $\pm 5$  K (9 °F)

### Measuring error

|                            | Designation | Accuracy <sup>1)</sup>   |
|----------------------------|-------------|--------------------------|
| Resistance thermometer RTD | Pt100       | 0.2 K (0.36 °F) or 0.08% |

1) % refer to the set span. The highest value is valid.

### Influence of supply voltage

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

### Influence of ambient temperature (temperature drift)

- Pt100 resistance thermometer:  
 $T_d = \pm(15 \text{ ppm/K} * (\text{full scale value} + 200) + 50 \text{ ppm/K} * \text{of set measuring range}) * \Delta \vartheta$   
 $\Delta \vartheta$  = deviation of ambient temperature from the reference operating condition.

### Influence of load

- $\pm 0.02\%/100 \Omega$   
Values refer to the full scale value

### Long term stability

- $\leq 0.1$  K/year or  $\leq 0.05\%/year$   
Values under reference operating conditions. % refer to the set span. The highest value is valid.

## Installation conditions

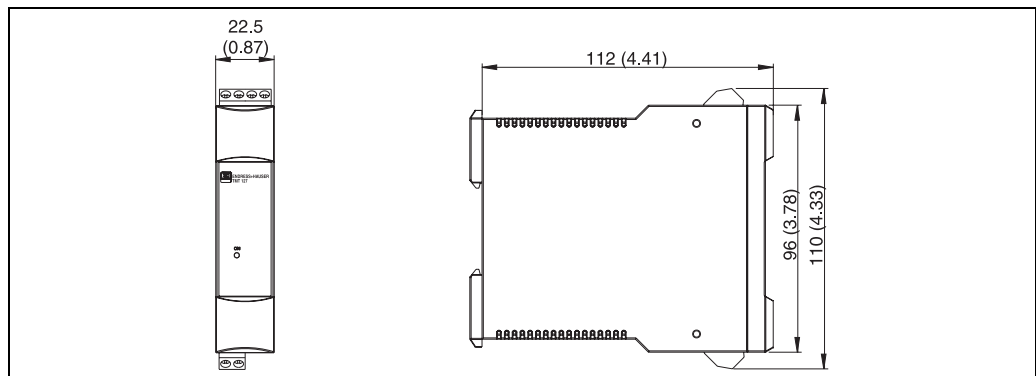
|                                  |   |
|----------------------------------|---|
| <b>Installation instructions</b> | <b>Installation location</b><br>No restrictions |
|----------------------------------|---|

## Environmental conditions

|  |  |
|--|--|
| <b>Ambient temperature limits</b>          | -40 to +85 °C (-40 to 185 °F) for Ex-area, see Ex-certificate                            |
| <b>Storage temperature</b>                 | -40 to +100 °C (-40 to 212 °F)   |
| <b>Climate class</b>                       | as per IEC 60654-1, class C  |
| <b>Ingress protection</b>                  | IP 20  |
| <b>Shock resistance</b>                    | 4g / 2 to 150 Hz as per IEC 60068-2-6  |
| <b>Vibration resistance</b>                | see "Shock resistance"   |
| <b>Electromagnetic compatibility (EMC)</b> | Shock resistance and interference emission as per EN 61326-1 (IEC 61326) and NAMUR NE 21 |
| <b>Condensation</b>                        | permitted  |

## Mechanical construction

### Design, dimensions



Values in mm (inch)

|                  |  |
|------------------|--|
| <b>Weight</b>    | approx. 90 g (3.18 oz)   |
| <b>Materials</b> | Housing: PC/ABS, UL 94V0   |
| <b>Terminals</b> | Pluggable screw terminal, max. 2.5 mm <sup>2</sup> (0.0039 in <sup>2</sup> ) solid, or strand with wire end sleeve |

## Display and operating system

|                           |  |
|---------------------------|--|
| <b>Display elements</b>   | Illuminated yellow LED (2 mm, 0.08 in) signals device operation. |
| <b>Operating elements</b> | There are no operating elements available on the device.         |

## Certificates and approvals

|                                       |   |
|---------------------------------------|---|
| <b>CE-Mark</b>                        | The device meets the legal requirements of the EC directives. Endress+Hauser confirms that the device has been successfully tested by applying the CE mark.   |
| <b>Hazardous area approvals</b>       | For further details on the available Ex versions (ATEX, CSA, FM, etc.), please contact your nearest E+H sales organisation. All relevant data for hazardous areas can be found in separate Ex documentation. If required, please request copies from us or your E+H sales organisation.   |
| <b>GL</b>                             | Ship building approval (Germanischer Lloyd)   |
| <b>Other standards and guidelines</b> | <ul style="list-style-type: none"> <li>■ IEC 60529:<br/>Degree of protection provided by housing (IP-Code)</li> <li>■ IEC 61010:<br/>Safety requirements for electrical measurement, control and laboratory use.</li> <li>■ IEC 61326:<br/>Electromagnetic compatibility (EMC requirements)</li> <li>■ NAMUR<br/>Standards working group for measurement and control technology in the chemical industry.<br/>(www.namur.de)</li> </ul> |
| <b>UL</b>                             | Recognized component to UL 3111-1   |

## Ordering information

|                          |   |   |
|--------------------------|---|---|
| <b>Product structure</b> | <b>TMT127</b>   | <b>iTEMP Pt100 TMT127</b>   |
|                          |   | for temperature measurement with Pt100; Analog output 4 to 20 mA, 2-wire techn.; Galv. isol., fail. mode to NAMUR NE 43; 22.5 mm wide, for 35 mm top hat DIN rail according to IEC 60715; UL recognized, ship building approval GL  |
|                          |   | <b>Approval</b>   |
|                          |   | <b>A</b> Non hazardous areas<br><b>B</b> ATEX II2(1)G EEx ia IIC T4/T5/T6<br><b>C</b> FM IS, NI, Class I, Div. 1+2, Group ABCD<br><b>D</b> CSA IS, NI, Class I, Div. 1+2, Group ABCD<br><b>E</b> ATEX II3G EEx nA IIC T4/T5/T6<br><b>I</b> FM+CSA IS, NI, Class I, Div. 1+2, Group ABCD<br><b>J</b> CSA General Purpose                     |
|                          |   | <b>Terminal Type</b>  |
|                          | <b>2</b> RTD 2-wire<br><b>3</b> RTD 3-wire<br><b>4</b> RTD 4-wire |   |
|                          | <b>Temperature sensor</b>   | <b>1</b> Pt100 (-200 to 850 °C, -328 to 1562 °F, min. span 10 K)  |
|                          | <b>Measuring Range</b>  | <b>BA</b> -50 to 100 °C (-58 to 212 °F)<br><b>CA</b> -40 to 60 °C (-40 to 140 °F)<br><b>DA</b> -30 to 60 °C (-22 to 140 °F)<br><b>DB</b> -30 to 150 °C (-22 to 302 °F)<br><b>DC</b> -30 to 70 °C (-22 to 158 °F)<br><b>DE</b> -10 to 200 °C (14 to 392 °F)<br><b>EA</b> -20 to 20 °C (-4 to 68 °F)<br><b>EB</b> -20 to 60 °C (-4 to 140 °F) |

| Measuring Range   |   |
|-------------------|---|
| EC                | -20 to 70 °C ( -4 to 158 °F)                  |
| ED                | -20 to 80 °C ( -4 to 176 °F)                  |
| EN                | -10 to 40 °C (14 to 104 °F)                   |
| FC                | 0 to 50 °C (32 to 122 °F)                     |
| FE                | 0 to 100 °C (32 to 212 °F)                    |
| FG                | 0 to 150 °C (32 to 302 °F)                    |
| FH                | 0 to 200 °C (32 to 392 °F)                    |
| FI                | 0 to 250 °C (32 to 482 °F)                    |
| FJ                | 0 to 300 °C (32 to 575 °F)                    |
| FK                | 0 to 400 °C (32 to 752 °F)                    |
| FL                | 0 to 500 °C (32 to 932 °F)                    |
| FN                | 0 to 600 °C (32 to 1112 °F)                   |
| FO                | 0 to 160 °C (32 to 320 °F)                    |
| LA                | -40 to 140 °F                                 |
| LB                | -40 to 200 °F                                 |
| MA                | -20 to 400 °F                                 |
| NA                | 0 to 100 °F                                   |
| NB                | 0 to 200 °F                                   |
| NC                | 0 to 300 °F                                   |
| ND                | 0 to 500 °F                                   |
| NE                | 0 to 750 °F                                   |
| NF                | 0 to 900 °F                                   |
| NH                | 0 to 1200 °F                                  |
| OA                | 40 to 90 °C (104 to 194 °F)                   |
| Additional Option |   |
| A                 | Basic version                                 |
| B                 | Works calibration certificate (6 test points) |
| K                 | Standard model, North American region         |
| TMT127            | 1 ⇒ Order code (complete)                     |

## Accessories

No accessories are required for this device.

## Documentation

- Brochure 'Temperature measurement' (FA006T/09/en)
- Short operating manual "iTEMP® RTD/TC DIN rail TMT 127/128" (KA140R/09/a3)
- ATEX Safety instructions II2(1)G (XA013R/09/a3) and II3G (XA018R/09/a3)

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