Analogue Temperature Transmitter
Model T19.10, Configurable Ranges, Head Mounting
Model T19.30, Configurable Ranges, Rail Mounting

Applications

- Plant construction
- Power engineering
- Heating, ventilation, air-conditioning, refrigeration

Special Features

- Designs for Pt100 or thermocouples
- Configurable measuring ranges (soldered jumpers)
- Fault signal for sensor burnout and sensor short-circuit
- Large ambient temperature range
- Compact and inexpensive

Description

The analogue transmitters in the T19 series are provided with configurable ranges and are intended for use with both resistance thermometers and insulated thermocouples. Simply by setting the solder jumpers, one of the several available measuring ranges can be selected. Therefore, these transmitters are especially suitable for applications where frequently changing requirements have to be taken into account.

The temperature transmitter converts either temperature-dependent changes in resistance, in the case of resistance thermometers, or temperature-dependent changes in voltage, in the case of insulated thermocouples, into a 4 ... 20 mA loop signal. This guarantees the simple and reliable transmission of the measured temperature values.

Accuracy, sensor monitoring and the permissible ambient conditions are matched to the requirements of industrial applications.

For direct mounting into the temperature probe, the instrument case is configured as a head-mounted transmitter and can be easily mounted into any DIN Form B connection head.

The rail mounting case fits to any standard rail per DIN EN 50 022 - 35.
### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>T19.10</th>
<th>T19.30</th>
</tr>
</thead>
<tbody>
<tr>
<td>1P01</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1P02</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1P03</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3J04</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3K04</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3S04</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3T04</td>
<td>1</td>
<td>1</td>
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</tbody>
</table>

#### Input
- 1 x Pt100 per IEC 60 584 (α = 0.00385) * Thermocouple per IEC 584 **
- 2 or 3 wire
- 1 x Type J (Fe-CuNi)
- 1 x Type K (NiCr-Ni)
- 1 x Type S (PtRh-Pt)
- 1 x Type T (Cu-CuNi)

* Not configured (not factory configured / the measuring range can be configured via solder jumpers, within the limits specified below)

#### Standard

- °C
- -50 ... +50
- -50 ... +200
- -30 ... +30
- 0 ... 350
- 0 ... 300
- 0 ... 1500
- -100 ... +200
- 0 ... 300
- 0 ... 60
- 0 ... 1200
- 0 ... 400
- 0 ... 350
- 0 ... 200
- 0 ... 120
- 0 ... 250
- 0 ... 300
- 0 ... 350
- 0 ... 400

#### Special measuring ranges

- °C
- -50 ... +50
- -50 ... +200
- -30 ... +30
- 0 ... 350
- 0 ... 300
- 0 ... 1500
- -100 ... +200
- 0 ... 300
- 0 ... 60
- 0 ... 1200
- 0 ... 400
- 0 ... 350
- 0 ... 200
- 0 ... 120
- 0 ... 250
- 0 ... 300
- 0 ... 350
- 0 ... 400

#### Adjustment range

**Zero point**

<table>
<thead>
<tr>
<th>°C</th>
<th>-50</th>
<th>-50</th>
<th>-30</th>
<th>-30</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>-100</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>350</td>
<td>300</td>
<td>60</td>
<td>60</td>
<td>700</td>
<td>700</td>
<td>1200</td>
<td>400</td>
</tr>
</tbody>
</table>

**Span**

<table>
<thead>
<tr>
<th>%</th>
<th>±10</th>
<th>±25</th>
<th>±30</th>
<th>±40</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>±10</td>
<td>±10</td>
<td>±10</td>
<td></td>
</tr>
</tbody>
</table>

**Sensor measuring current**

- approx. 0.8 mA
- -

**Max. output resistance**

- 30 Ω per wire, 3-wire symmetric
- 250 Ω per wire
- yes

**Cold junction compensation**

- Permanent (analogue system)
- Permanent (analogue system)

#### Analogue output

- Linearisation
- proportional to temperature per IEC 60 751/ DIN 43 760
- proportional to voltage

#### Output limits

- Sensor burnout mA
- down scale, < 3 2)
- up scale, > 23.5
- Sensor short circuit mA
- down scale, < 3 3)
- Rise time t90 s
- < 0.01
- < 0.02
- Switch-on time (time to first measured value) s
- < 0.1
- Measuring range
- Soft
- Yes

#### Power supply Ua

- DC 10 … 30 V from 4 … 20 mA-loop
- DC 10 … 30 V from 4 … 20 mA-loop
- Load Ra
- Ra ≤ (Ua - 10 V) / 0.02 A with Ra in Ω and Ua in V
- Rb ≤ (Ua - 10 V) / 0.02 A with Ra in Ω and Ua in V

#### Measuring deviation per DIN EN 60 770, at 23 °C ± 5 K

<table>
<thead>
<tr>
<th>%</th>
<th>±0.5</th>
<th>±0.5</th>
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<tbody>
<tr>
<td></td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>±0.025</td>
<td>±0.025</td>
</tr>
<tr>
<td></td>
<td>±0.1</td>
<td>±0.1</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Error effect of cold junction compensation

- ± 0.1 K
- ± 0.2 K
- ± 0.1 K
- ± 0.2 K

#### Temperature coefficient Tk

- ± 0.1 %/10 K or ± 0.2 K/10 K 7)
- ± 0.1 %/10 K or ± 0.25 µV/10 K 7)

#### Galvanic isolation between the sensor and output side (4 … 20 mA)

- No
- No

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*Pt1000 and special measuring ranges on request.
**Further thermocouple types and special measuring ranges on request.
1) Further units e.g. °F and K are possible.
2) Up scale, in the event only lead no. 1 open-circuit.
3) Temperature value, in the event of a short between leads no. 2 and no. 3 (operation of Pt100 in 2-wire configuration).
4) Input power supply protected from reverse polarity.
5) With factory configured measuring range.
6) ± 0.15 % with measuring range: 0 … 50 °C, 0 … 300 °C, 0 … 350 °C
7) Whichever is greater.
8) A non-isolated thermocouple can cause a ground loop if the T19 does not have an ungrounded connection, which can, in turn, lead to the T19 malfunctioning.

### Load diagram

The permissible load is dependent upon the loop power supply voltage.

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**Legend for lead numbers:**

1. N1
2. N2
3. N3

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**Note:**

- The load diagram is not included in the text. It can be found in the original document or as a separate figure.
**Case**

<table>
<thead>
<tr>
<th>Model</th>
<th>Material</th>
<th>Weight</th>
<th>Ingress protection</th>
<th>Terminal connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>T19.10</td>
<td>plastic, PA, glass-fibre reinforced</td>
<td>approx. 0.03 kg</td>
<td>IP00 (IP40)</td>
<td>(captive screws) 0.14 ... 1.5 mm²</td>
</tr>
<tr>
<td>T19.30</td>
<td>polyamide, glass-fibre reinforced</td>
<td>0.05 kg</td>
<td>IP10 (IP40)</td>
<td>0.5 ... 1.5 mm²</td>
</tr>
</tbody>
</table>

**Ambient conditions**

<table>
<thead>
<tr>
<th>Model</th>
<th>Climate class per DIN IEC 60 068-2-30</th>
<th>Ambient / storage temperature</th>
<th>Vibration per DIN IEC 60 068-2-6</th>
<th>Shock per DIN IEC 60 068-2-27</th>
</tr>
</thead>
<tbody>
<tr>
<td>T19.10</td>
<td>Cx (-40 ... +85 °C, 5 % to 95 % relative humidity)</td>
<td>-40 ... +85 °C</td>
<td>10 ... 2000 Hz; 5g</td>
<td>10 g</td>
</tr>
<tr>
<td>T19.30</td>
<td>Bx (-20 ... +70 °C, 5 % to 95 % relative humidity)</td>
<td>-20 ... +70 °C</td>
<td>10 ... 2000 Hz; 5g</td>
<td>10 g</td>
</tr>
</tbody>
</table>

**Transmitter Model T19.10, head mounting version**

Dimensions in mm

**Transmitter Model T19.30, rail mounting version**

**Designation of terminal connectors**

**Input Pt100 / Model T19.10.1P0x**

- Resistance thermometer / resistance sensor
- 3-wire 2-wire input 4 ... 20 mA loop

**Input thermocouple / Model T19.10.3x04**

- input 4 ... 20 mA loop

**Input Pt100 / Model T19.30.1P0x**

- input 4 ... 20 mA loop

**Input thermocouple / Model T19.30.3x04**

- input 4 ... 20 mA loop

**Accessories for Model T19.10 temperature transmitter, head mounting version (please order separately)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapter, plastic/stainless steel, dimensions: 60 x 20 x 41.6 mm</td>
<td>3593789</td>
</tr>
<tr>
<td>Suitable for TS 35 per DIN EN 60 715 (DIN EN 50 022 or TS 32 per DIN EN 50 036)</td>
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</tr>
<tr>
<td>Adapter, tuned steel, dimensions: 49 x 8 x 14 mm</td>
<td>3619851</td>
</tr>
<tr>
<td>Suitable for TS 35 per DIN EN 60 715 (DIN EN 50 022)</td>
<td></td>
</tr>
<tr>
<td>Fieldcase, plastic (ABS), ingress protection IP 65, dimensions: 82 x 80 x 55 mm (W x L x H)</td>
<td>3301732</td>
</tr>
<tr>
<td>For head mounting of transmitter, permissible ambient temperature range: -40 °C ... +80 °C, with two M16 x 1.5 cable glands</td>
<td></td>
</tr>
</tbody>
</table>

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### Ordering Information

<table>
<thead>
<tr>
<th>Field No.</th>
<th>Code</th>
<th>Features</th>
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<tbody>
<tr>
<td>1</td>
<td>T19.10</td>
<td>T19.10, head mounting</td>
</tr>
<tr>
<td>1</td>
<td>T19.30</td>
<td>T19.30, rail mounting</td>
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</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>3J</td>
<td>Type J (Fe-CuNi)</td>
</tr>
<tr>
<td>3T</td>
<td>Type T (Cu-CuNi)</td>
</tr>
<tr>
<td>3S</td>
<td>Type S (PtRh-Pt)</td>
</tr>
<tr>
<td>3K</td>
<td>Type K (NiCr-Ni)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Code Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES NO</td>
</tr>
<tr>
<td>T Z additional text Please state as clearly understandable text!</td>
</tr>
</tbody>
</table>

**Example:** T19.10-3K0-41N-Z
T19.10 head mounting version
Thermocouple type K (NiCr-Ni)
Measuring range type K: 0 ... 300 °C without additional text

Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing. Modifications may take place and materials specified may be replaced by others without prior notice.