



### Product highlights

- Programmable through integrated USB port
- Sensor calibration for either offset, slope or polynomial adjustment
- Accuracy better than 0.1°C for RTD elements
- Automatic cable compensation calibration (2-wire)
- Fast sampling time < 50 ms
- Isolation voltage 1.5 kVAC
- IECEx / ATEX pending

### Application examples

- Tanks and vessels
- Pipe systems
- Food & Beverage
- Water & Waste water

### Technical data

#### Housing

|              |  |
|--------------|--|
| Style        | <ul style="list-style-type: none"> <li>■ Compact transmitter, Ø44 mm</li> <li>■ DIN Form B compatible</li> </ul> |
| Overall size | <ul style="list-style-type: none"> <li>■ Refer to section "Dimensional drawings"</li> </ul>                      |
| Material     | <ul style="list-style-type: none"> <li>■ Polycarbonate</li> </ul>  |

#### Power supply

|                             |  |
|-----------------------------|--|
| Voltage supply range        | <ul style="list-style-type: none"> <li>■ 7 ...40 VDC, without DFON touch screen</li> <li>■ 13.5 ...40 VDC, with DFON touch screen</li> </ul> |
| Reverse polarity protection | <ul style="list-style-type: none"> <li>■ Yes</li> </ul>  |
| Power-up time               | <ul style="list-style-type: none"> <li>■ RTD, Ohm, mV &lt; 3 s</li> <li>■ T/C &lt; 5 s</li> </ul>  |

#### Input

|                                |   |
|--------------------------------|---|
| Accuracy                       | <ul style="list-style-type: none"> <li>■ Refer to section "Measuring range"</li> </ul>  |
| Min. measuring span            | <ul style="list-style-type: none"> <li>■ Refer to section "Measuring range"</li> </ul>  |
| Cable resistance               | <ul style="list-style-type: none"> <li>■ 2-wire: max. 30 Ω/Cable</li> <li>■ 3-/4-wire: max. 30 Ω/Cable (T &lt; 700 °C)</li> <li>■ 3-/4-wire: max. 15 Ω/Cable (T &gt; 700 °C)</li> </ul> |
| C/JC compensation              | <ul style="list-style-type: none"> <li>■ Internal: &lt; 0.5 °C</li> <li>■ External: &lt; 0.2 °C</li> </ul>  |
| Sample time                    | <ul style="list-style-type: none"> <li>■ &lt; 0.1 s</li> </ul>  |
| RTD measuring current          | <ul style="list-style-type: none"> <li>■ &lt; 0.16 mA</li> </ul>  |
| Error detection delay          | <ul style="list-style-type: none"> <li>■ &lt; 2 s</li> </ul>  |
| Temperature drift (by ambient) | <ul style="list-style-type: none"> <li>■ Refer to section "Measuring range"</li> </ul>  |
| Measuring unit                 | <ul style="list-style-type: none"> <li>■ °C, °F or K</li> </ul>   |
| Protection                     | <ul style="list-style-type: none"> <li>■ ± 35 VDC</li> </ul>  |
| Suppression                    | <ul style="list-style-type: none"> <li>■ 50 or 60 Hz</li> </ul>   |
| Resolution                     | <ul style="list-style-type: none"> <li>■ 17 bit</li> </ul>  |
| Repeatability                  | <ul style="list-style-type: none"> <li>■ Refer to section "Measuring range"</li> </ul>  |
| Offset adjustment              | <ul style="list-style-type: none"> <li>■ ± 500 °C</li> </ul>  |

#### Output

|                 |  |
|-----------------|--|
| Output signal   | <ul style="list-style-type: none"> <li>■ 4 ... 20 mA</li> <li>■ 20 ... 4 mA</li> </ul>       |
| Characteristics | <ul style="list-style-type: none"> <li>■ Linear or customised with max. 30 points</li> </ul> |

#### Output

|  |  |
|--|--|
| Accuracy                               | <ul style="list-style-type: none"> <li>■ &lt; ± 0.025 % of output span</li> </ul>                        |
| Shunt resistance                       | <ul style="list-style-type: none"> <li>■ <math>R_s \leq (V_s - 7 V) / 0.023 A [\Omega]</math></li> </ul> |
| Up/Down scaling limits                 | <ul style="list-style-type: none"> <li>■ 23 mA / 3.5 mA</li> </ul>                                       |
| Damping                                | <ul style="list-style-type: none"> <li>■ 0 ... 60 s</li> </ul>   |
| Response time T90                      | <ul style="list-style-type: none"> <li>■ 450 ms</li> </ul>   |
| Resolution                             | <ul style="list-style-type: none"> <li>■ 14 bit</li> </ul>   |
| Effect of variations in supply voltage | <ul style="list-style-type: none"> <li>■ &lt; 0.001 % / V</li> </ul>                                     |
| Temperature drift (by ambient)         | <ul style="list-style-type: none"> <li>■ &lt; ± 0.01 % / °C change</li> </ul>                            |
| Ripple immunity                        | <ul style="list-style-type: none"> <li>■ &lt; ± 1 % of output span</li> </ul>                            |

#### Ambient conditions

|                                 |  |
|---------------------------------|--|
| Operating temperature range     | <ul style="list-style-type: none"> <li>■ -40 ... 85 °C</li> </ul>            |
| Storage temperature range       | <ul style="list-style-type: none"> <li>■ -50 ... 85 °C</li> </ul>            |
| Humidity                        | <ul style="list-style-type: none"> <li>■ &lt; 98 % RH, condensing</li> </ul> |
| Degree of protection (EN 60529) | <ul style="list-style-type: none"> <li>■ IP55</li> </ul>                     |

#### Compliance and approvals

|     |   |
|-----|---|
| EMC | <ul style="list-style-type: none"> <li>■ EN 61326-1:2013 (Class A, Industrial)</li> <li>■ DNVGL-CG-0339:2015 (Class A)</li> <li>■ Namur NE21:2012 (1)</li> <li>■ EN 50121-3-2:2016</li> </ul> |
|-----|---|

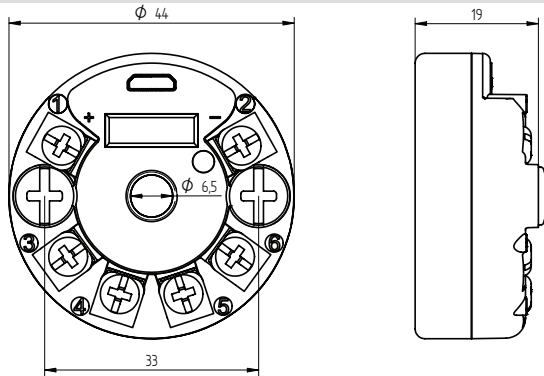
|                      |   |
|----------------------|---|
| Explosion protection | <ul style="list-style-type: none"> <li>■ ATEX (pending)</li> <li>■ IECEx (pending)</li> </ul> |
|----------------------|---|

#### Factory settings

|                        |   |
|------------------------|---|
| Type                   | <ul style="list-style-type: none"> <li>■ Pt100</li> </ul>         |
| Unit                   | <ul style="list-style-type: none"> <li>■ °C</li> </ul>            |
| Measuring span         | <ul style="list-style-type: none"> <li>■ 0.0 ... 100.0</li> </ul> |
| Connection             | <ul style="list-style-type: none"> <li>■ 2-wire</li> </ul>        |
| Cable resistance       | <ul style="list-style-type: none"> <li>■ 0 Ω</li> </ul>           |
| Damping                | <ul style="list-style-type: none"> <li>■ 0 s</li> </ul>           |
| Sensor break detection | <ul style="list-style-type: none"> <li>■ 23 mA</li> </ul>         |

(1) Voltage interruptions: 15 ms

## Dimensional drawings



## Description

The FlexTop 2212 is a 4...20 mA loop-powered, configurable universal transmitter with galvanic isolation between input and output. The input can be configured for RTD or T/C sensors, resistance, current or voltage signals.

Either 2-, 3- or 4-wire connection can be selected for the resistance input. The built-in temperature sensor or an external RTD element can be used to compensate for „cold junction“ (CJC) if thermo-couples are connected.

The configuration is done with the FlexProgram, and the connection can be established using an USB cable directly

mounted between the FlexTop and a PC.

The FlexTop 2212 is embedded in silicone which makes it resistant to humid environments. It is ready for direct display mounting through UnitCom cable. Furthermore it has a 6.5 mm center hole for fast sensor replacement and spring loaded mounting screws which ensures a safe fastening even in vibrating environments.

## Measuring range

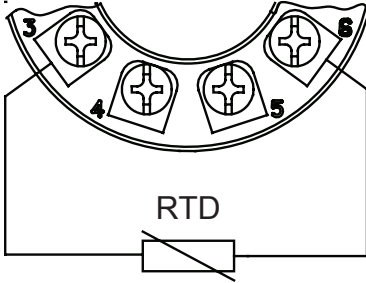
| Type            | Standard         | Measuring range        | Min. measuring span | Type            | Range           | Repeatability   | Input accuracy  | Input temperature drift (by ambient) |
|-----------------|------------------|------------------------|---------------------|-----------------|-----------------|-----------------|-----------------|--------------------------------------|
| Pt25 ... Pt1000 | DIN/EN/IEC 60751 | -200 ... 850 °C        | 10 °C               | Pt100-Pt200     | -200 ... 200 °C | ≤ ± 0.03 °C     | ≤ ± 0.05 °C     | ≤ ± 0.01 °C/°C change                |
|                 |                  |                        |                     |                 | 200 ... 850 °C  |                 | ≤ ± 0.06 °C     | ≤ ± 0.015 °C/°C change               |
|                 |                  |                        |                     | Pt500           | -200 ... 200 °C | ≤ ± 0.07 °C     | ≤ ± 0.14 °C     | ≤ ± 0.04 °C/°C change                |
|                 |                  |                        |                     |                 | 200 ... 850 °C  | ≤ ± 0.09 °C     | ≤ ± 0.18 °C     | ≤ ± 0.05 °C/°C change                |
|                 |                  |                        |                     | Pt1000          | -200 ... 200 °C | ≤ ± 0.04 °C     | ≤ ± 0.07 °C     | ≤ ± 0.02 °C/°C change                |
|                 |                  |                        |                     |                 | 200 ... 850 °C  |                 | ≤ ± 0.09 °C     | ≤ ± 0.025 °C/°C change               |
| Pt25 ... Pt1000 | a= 0.003902      | -150 ... 650 °C        | 10 °C               | Pt100-Pt200     | -150 ... 650 °C | ≤ ± 0.03 °C     | ≤ ± 0.05 °C     | ≤ ± 0.013 °C/°C change               |
|                 |                  |                        |                     |                 | Pt500           |                 | -150 ... 200 °C | ≤ ± 0.07 °C                          |
|                 |                  |                        |                     | Pt500           | 200 ... 650 °C  | ≤ ± 0.08 °C     | ≤ ± 0.16 °C     | ≤ ± 0.044 °C/°C change               |
|                 |                  |                        |                     |                 | Pt1000          | -150 ... 200 °C | ≤ ± 0.04 °C     | ≤ ± 0.07 °C                          |
|                 |                  |                        |                     | Pt1000          | 200 ... 650 °C  | ≤ ± 0.08 °C     |                 | ≤ ± 0.022 °C/°C change               |
|                 |                  |                        |                     | Pt25 ... Pt1000 | a= 0.003916     | -200 ... 720 °C | 10 °C           | Pt100-Pt200                          |
| 200 ... 720 °C  | ≤ ± 0.05 °C      | ≤ ± 0.013 °C/°C change |                     |                 |                 |                 |                 |                                      |
| Pt500           | -200 ... 200 °C  | ≤ ± 0.07 °C            | ≤ ± 0.14 °C         |                 |                 |                 |                 | ≤ ± 0.04 °C/°C change                |
|                 | 200 ... 720 °C   | ≤ ± 0.08 °C            | ≤ ± 0.16 °C         |                 |                 |                 |                 | ≤ ± 0.045 °C/°C change               |
| Pt1000          | -200 ... 200 °C  | ≤ ± 0.04 °C            | ≤ ± 0.07 °C         |                 |                 |                 |                 | ≤ ± 0.019 °C/°C change               |
|                 | 200 ... 720 °C   |                        | ≤ ± 0.08 °C         |                 |                 |                 |                 | ≤ ± 0.022 °C/°C change               |
| Pt25 ... Pt1000 | a= 0.003920      | -200 ... 660 °C        | 10 °C               | Pt100-Pt200     | -200 ... 200 °C | ≤ ± 0.03 °C     | ≤ ± 0.05 °C     | ≤ ± 0.01 °C/°C change                |
|                 |                  |                        |                     |                 | 200 ... 660 °C  |                 | ≤ ± 0.06 °C     | ≤ ± 0.013 °C/°C change               |
|                 |                  |                        |                     | Pt500           | -200 ... 200 °C | ≤ ± 0.07 °C     | ≤ ± 0.14 °C     | ≤ ± 0.04 °C/°C change                |
|                 |                  |                        |                     |                 | 200 ... 660 °C  | ≤ ± 0.08 °C     | ≤ ± 0.16 °C     | ≤ ± 0.045 °C/°C change               |
|                 |                  |                        |                     | Pt1000          | -200 ... 200 °C | ≤ ± 0.04 °C     | ≤ ± 0.07 °C     | ≤ ± 0.019 °C/°C change               |
|                 |                  |                        |                     |                 | 200 ... 660 °C  |                 | ≤ ± 0.08 °C     | ≤ ± 0.022 °C/°C change               |

**Measuring range**

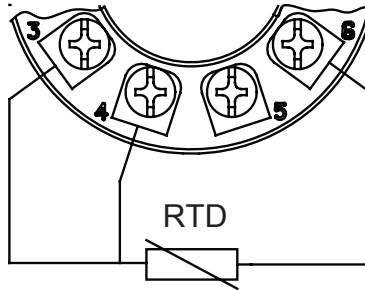
| Type              | Standard       | Measuring range  | Min. measuring span | Type                   | Range            | Repeatability | Input accuracy | Input temperature drift (by ambient) |
|-------------------|----------------|------------------|---------------------|------------------------|------------------|---------------|----------------|--------------------------------------|
| Ni25 ... Ni1000   | DIN 43760      | -60 ... 250 °C   | 10 °C               | Ni100-Ni200            | -60 ... 100 °C   | ≤ ± 0.03 °C   | ≤ ± 0.05 °C    | ≤ ± 0.01 °C/°C change                |
|                   |                |                  |                     |                        | 100 ... 250 °C   |               | ≤ ± 0.04 °C    | ≤ ± 0.006 °C/°C change               |
|                   |                |                  |                     |                        |                  |               |                |                                      |
|                   |                |                  |                     | Ni500                  | -60 ... 100 °C   | ≤ ± 0.06 °C   | ≤ ± 0.11 °C    | ≤ ± 0.03 °C/°C change                |
|                   |                |                  |                     |                        | 100 ... 250 °C   | ≤ ± 0.04 °C   | ≤ ± 0.08 °C    | ≤ ± 0.02 °C/°C change                |
|                   |                |                  |                     |                        |                  |               |                |                                      |
| Ni1000            | -60 ... 100 °C | ≤ ± 0.03 °C      | ≤ ± 0.06 °C         | ≤ ± 0.015 °C/°C change |                  |               |                |                                      |
|                   | 100 ... 250 °C | ≤ ± 0.02 °C      | ≤ ± 0.04 °C         | ≤ ± 0.01 °C/°C change  |                  |               |                |                                      |
|                   |                |                  |                     |                        |                  |               |                |                                      |
| Cu25 ... Cu1000   | 0.428 Ohm/°C   | -50 ... 200 °C   | 10 °C               | Cu50                   | -50 ... 200 °C   | ≤ ± 0.04 °C   | ≤ ± 0.08 °C    | ≤ ± 0.02 °C/°C change                |
|                   |                |                  |                     | Cu100-Cu200            | -50 ... 200 °C   | ≤ ± 0.02 °C   | ≤ ± 0.04 °C    | ≤ ± 0.01 °C/°C change                |
| B(PtRh30-Pt)      | IEC 584        | 100 ... 1820 °C  | 200 °C              |                        | 100 ... 500 °C   | ≤ ± 5 °C      | ≤ ± 10 °C      | ≤ ± 3.3 °C/°C change                 |
|                   |                |                  |                     |                        | 500 ... 1000 °C  | ≤ ± 1 °C      | ≤ ± 2.0 °C     | ≤ ± 0.6 °C/°C change                 |
|                   |                |                  |                     |                        | 1000 ... 1820 °C | ≤ ± 0.6 °C    | ≤ ± 1.1 °C     | ≤ ± 0.33 °C/°C change                |
| E(NiCr-CuNi)      | IEC 584        | -250 ... 1000 °C | 50 °C               |                        | -250 ... -40 °C  | ≤ ± 0.5 °C    | ≤ ± 1.03 °C    | ≤ ± 0.3 °C/°C change                 |
|                   |                |                  |                     |                        | -40 ... 150 °C   | ≤ ± 0.1 °C    | ≤ ± 0.19 °C    | ≤ ± 0.06 °C/°C change                |
|                   |                |                  |                     |                        | 150 ... 1000 °C  | ≤ ± 0.07 °C   | ≤ ± 0.14 °C    | ≤ ± 0.042 °C/°C change               |
| J(Fe-CuNi)        | IEC 584        | -210 ... 1200 °C | 50 °C               |                        | -210 ... -40 °C  | ≤ ± 0.25 °C   | ≤ ± 0.52 °C    | ≤ ± 0.16 °C/°C change                |
|                   |                |                  |                     |                        | -40 ... 150 °C   | ≤ ± 0.1 °C    | ≤ ± 0.21 °C    | ≤ ± 0.07 °C/°C change                |
|                   |                |                  |                     |                        | 150 ... 1200 °C  | ≤ ± 0.09 °C   | ≤ ± 0.18 °C    | ≤ ± 0.055 °C/°C change               |
| K(NiCr-Ni)        | IEC 584        | -250 ... 1370 °C | 100 °C              |                        | -250 ... -40 °C  | ≤ ± 1 °C      | ≤ ± 2.04 °C    | ≤ ± 0.6 °C/°C change                 |
|                   |                |                  |                     |                        | -40 ... 150 °C   | ≤ ± 0.15 °C   | ≤ ± 0.27 °C    | ≤ ± 0.08 °C/°C change                |
|                   |                |                  |                     |                        | 150 ... 1370 °C  | ≤ ± 0.13 °C   | ≤ ± 0.25 °C    | ≤ ± 0.075 °C/°C change               |
| L(Fe-CuNi)        | DIN 43710      | -200 ... 900 °C  | 50 °C               |                        | -200 ... 50 °C   | ≤ ± 0.17 °C   | ≤ ± 0.33 °C    | ≤ ± 0.1 °C/°C change                 |
|                   |                |                  |                     |                        | 50 ... 620 °C    | ≤ ± 0.1 °C    | ≤ ± 0.20 °C    | ≤ ± 0.06 °C/°C change                |
|                   |                |                  |                     |                        | 620 ... 900 °C   | ≤ ± 0.09 °C   | ≤ ± 0.17 °C    | ≤ ± 0.05 °C/°C change                |
| N(NiCrSi-NiSi)    | IEC 584        | -250 ... 1300 °C | 50 °C               |                        | -250 ... -40 °C  | ≤ ± 1.75 °C   | ≤ ± 3.45 °C    | ≤ ± 1.0 °C/°C change                 |
|                   |                |                  |                     |                        | -40 ... 500 °C   | ≤ ± 0.2 °C    | ≤ ± 0.40 °C    | ≤ ± 0.12 °C/°C change                |
|                   |                |                  |                     |                        | 500 ... 1300 °C  | ≤ ± 0.13 °C   | ≤ ± 0.26 °C    | ≤ ± 0.08 °C/°C change                |
| R(PtRh13-Pt)      | IEC 584        | -50 ... 1750 °C  | 100 °C              |                        | -50 ... 100 °C   | ≤ ± 1.35 °C   | ≤ ± 2.7 °C     | ≤ ± 0.8 °C/°C change                 |
|                   |                |                  |                     |                        | 100 ... 500 °C   | ≤ ± 0.7 °C    | ≤ ± 1.33 °C    | ≤ ± 0.4 °C/°C change                 |
|                   |                |                  |                     |                        | 500 ... 1750 °C  | ≤ ± 0.45 °C   | ≤ ± 0.9 °C     | ≤ ± 0.28 °C/°C change                |
| S(PtRh10-Pt)      | IEC 584        | -50 ... 1760 °C  | 100 °C              |                        | -50 ... 100 °C   | ≤ ± 1.3 °C    | ≤ ± 2.5 °C     | ≤ ± 0.75 °C/°C change                |
|                   |                |                  |                     |                        | 100 ... 500 °C   | ≤ ± 0.7 °C    | ≤ ± 1.37 °C    | ≤ ± 0.41 °C/°C change                |
|                   |                |                  |                     |                        | 500 ... 1760 °C  | ≤ ± 0.5 °C    | ≤ ± 1.01 °C    | ≤ ± 0.3 °C/°C change                 |
| T(Cu-CuNi)        | IEC 584        | -250 ... 400 °C  | 50 °C               |                        | -250 ... -40 °C  | ≤ ± 0.8 °C    | ≤ ± 1.6 °C     | ≤ ± 0.5 °C/°C change                 |
|                   |                |                  |                     |                        | -40 ... 100 °C   | ≤ ± 0.15 °C   | ≤ ± 0.29 °C    | ≤ ± 0.09 °C/°C change                |
|                   |                |                  |                     |                        | 100 ... 400 °C   | ≤ ± 0.1 °C    | ≤ ± 0.21 °C    | ≤ ± 0.065 °C/°C change               |
| U(Cu-CuNi)        | DIN 43710      | -200 ... 600 °C  | 50 °C               |                        | -200 ... 50 °C   | ≤ ± 0.25 °C   | ≤ ± 0.5 °C     | ≤ ± 0.15 °C/°C change                |
|                   |                |                  |                     |                        | 50 ... 300 °C    | ≤ ± 0.13 °C   | ≤ ± 0.25 °C    | ≤ ± 0.08 °C/°C change                |
|                   |                |                  |                     |                        | 300 ... 600 °C   | ≤ ± 0.09 °C   | ≤ ± 0.17 °C    | ≤ ± 0.05 °C/°C change                |
| W5-Re (Type C)    | ASTM 988       | 0 ... 2310 °C    | 100 °C              |                        | 0...1750 °C      | ≤ ± 0.4 °C    | ≤ ± 0.75 °C    | ≤ ± 0.22 °C/°C change                |
|                   |                |                  |                     |                        | 1750...2310 °C   | ≤ ± 0.55 °C   | ≤ ± 1.09 °C    | ≤ ± 0.22 °C/°C change                |
| W3-Re (Type D)    | ASTM 988       | 0 ... 2300 °C    | 100 °C              |                        | 0...400 °C       | ≤ ± 0.5 °C    | ≤ ± 1 °C       | ≤ ± 0.3 °C/°C change                 |
|                   |                |                  |                     |                        | 400...1200 °C    | ≤ ± 0.26 °C   | ≤ ± 0.52 °C    | ≤ ± 0.16 °C/°C change                |
|                   |                |                  |                     |                        | 1200...2300 °C   | ≤ ± 0.5 °C    | ≤ ± 1 °C       | ≤ ± 0.3 °C/°C change                 |
| Linear voltage    |                |                  | 5 mV                |                        | -140...140 mV    | ≤ ± 0.005 mV  | ≤ ± 10 µV      | ≤ ± 0.007 mV/°C change               |
| Linear voltage    |                |                  | 75 mV               |                        | -500...2000 mV   | ≤ ± 0.1 mV    | ≤ ± 125 µV     | ≤ ± 0.04 mV/°C change                |
| Linear resistance |                |                  | 5 Ω                 |                        | 0...390 Ω        | ≤ ± 0.007 Ω   | ≤ ± 15 mΩ      | ≤ ± 0.004 Ω/°C change                |
| Linear resistance |                |                  | 5 Ω                 |                        | 0...820 Ω        | ≤ ± 0.015 Ω   | ≤ ± 30 mΩ      | ≤ ± 0.007 Ω/°C change                |
| Linear resistance |                |                  | 50 Ω                |                        | 0...7000 Ω       | ≤ ± 0.15 Ω    | ≤ ± 250 mΩ     | ≤ ± 0.07 Ω/°C change                 |

Electrical connection

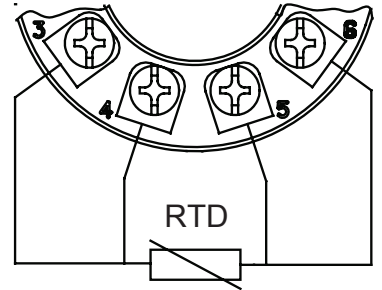
RTD



No cable compensation

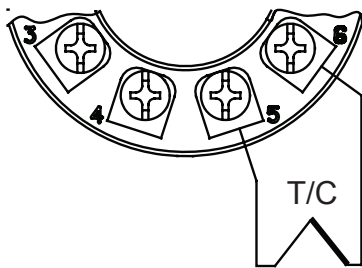


3-wire cable compensation

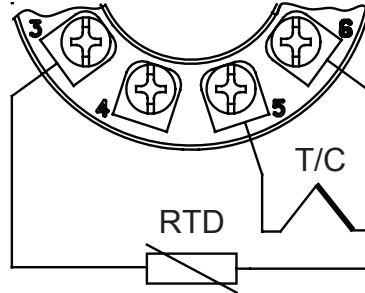


4-wire cable compensation

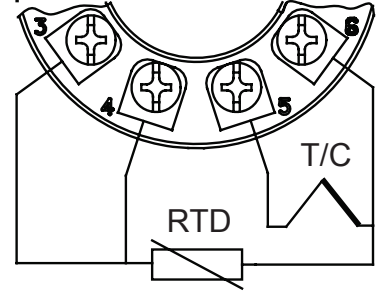
T/C



Internal CJC-compensation

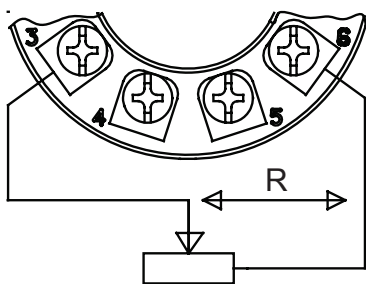


External CJC-compensation, no cable compensation

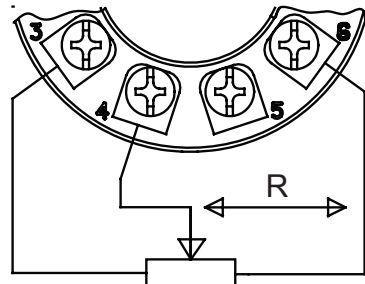


External CJC-compensation, 3-wire cable compensation

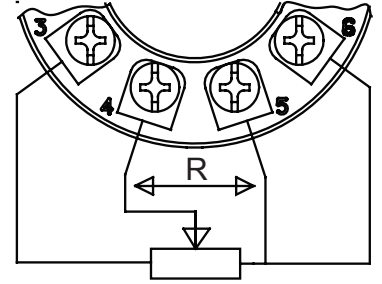
Potentiometer



No compensation



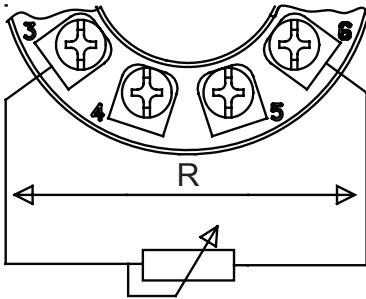
3-wire compensation for transfer resistance



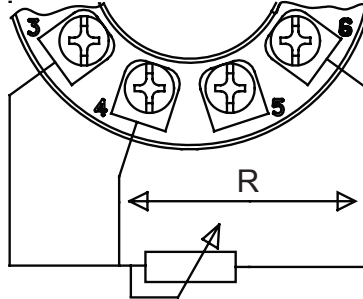
4-wire compensation for transfer resistance

## Electrical connection

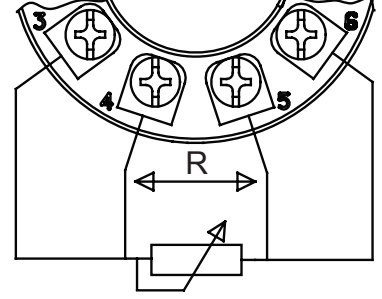
### Resistance



No compensation

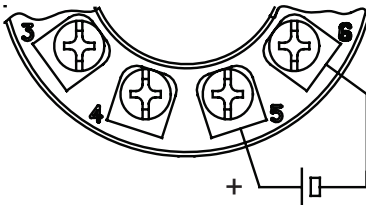


3-wire cable compensation

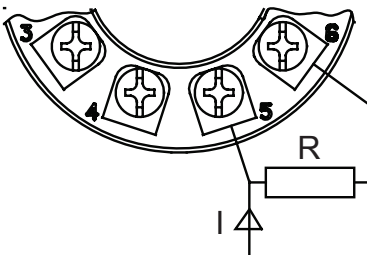


4-wire cable compensation

### Voltage measurement



### Current measurement



## Ordering information

### Ordering Key

|                                   |             |   |            |   |   |          |
|-----------------------------------|-------------|---|------------|---|---|----------|
|                                   | <b>2212</b> | - | <b>000</b> | x | · | <b>x</b> |
| <b>Product line</b>               |             |   |            |   |   |          |
| Universal temperature transmitter | 2212        |   |            |   |   |          |
| <b>Type</b>                       |             |   |            |   |   |          |
| Standard                          |             |   |            |   |   | 1        |
| <b>Configuration</b>              |             |   |            |   |   |          |
| Without                           |             |   |            |   |   | 0        |
| Configuration of range            |             |   |            |   |   | C        |