

## Product highlights

- Universal transmitter with HART® communication
- Programmable through integrated USB port or HART® modem
- 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
- Galvanic isolated
- IECEx / ATEX pending

## Application examples

- Tanks & 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</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>
CJC 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 (VDC - 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; ± 0.002 % / °C change</li> </ul>
Ripple immunity	<ul style="list-style-type: none"> <li>■ &lt; ± 1% of output span</li> </ul>

### HART® information

Protocol	<ul style="list-style-type: none"> <li>■ HCF standard, Rev.7 (including „Temperature Device Family“ commands)</li> </ul>
Features	<ul style="list-style-type: none"> <li>■ Read serial number</li> <li>■ Read/Change user ID</li> <li>■ Read/Change configuration</li> <li>■ Read input signal value</li> <li>■ Read output signal value</li> <li>■ Input signal logging</li> <li>■ 2-point sensor-trim</li> </ul> <p>For more information please see ‚Field Device Specification - FlexTop 2222‘</p>

### 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>

## Technical data

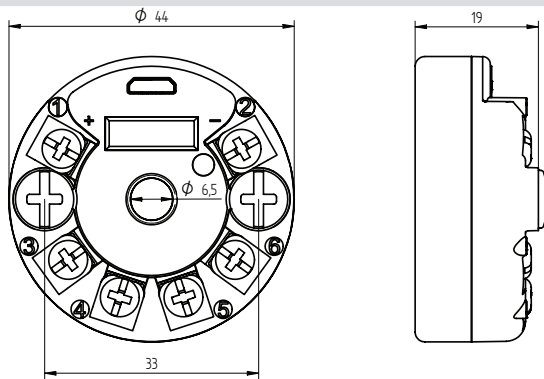
### Compliance and approvals

EMC	<ul style="list-style-type: none"> <li>■ EN 61326-1:2013</li> <li>■ DNV GL - Class A</li> </ul>
Namur	<ul style="list-style-type: none"> <li>■ NE21 (pending)</li> </ul>
Railway	<ul style="list-style-type: none"> <li>■ EN 50121 (pending)</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>

## Dimensional drawings



## Description

The FlexTop 2222 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 thermocouples are connected.

The HART® communication feature online process calibration and adjustment, transmitter configuration and multiple process control in 2-

wire networks.

The configuration is done with a standard HART® modem. Alternatively the configuration is done with the FlexProgram where the connection is established using an USB cable directly mounted between the FlexTop and a PC.

The FlexTop 2222 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
					200 ... 650 °C		≤ ± 0.08 °C	≤ ± 0.04 °C/°C change
				Pt500	-150 ... 200 °C	≤ ± 0.07 °C	≤ ± 0.14 °C	≤ ± 0.04 °C/°C change
					200 ... 650 °C	≤ ± 0.08 °C	≤ ± 0.16 °C	≤ ± 0.044 °C/°C change
				Pt1000	-150 ... 200 °C	≤ ± 0.04 °C	≤ ± 0.07 °C	≤ ± 0.019 °C/°C change
					200 ... 650 °C		≤ ± 0.08 °C	≤ ± 0.022 °C/°C change

**Measuring range**

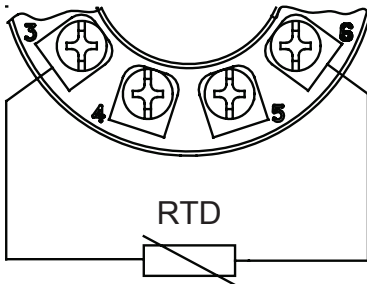
Type	Standard	Measuring range	Min. measuring span	Type	Range	Repeatability	Input accuracy	Input temperature drift (by ambient)
Pt25 ... Pt1000	a=0.003916	-200 ... 720 °C	10 °C	Pt100-Pt200	-200 ... 200 °C	≤ ± 0.03 °C	≤ ± 0.04 °C	≤ ± 0.01 °C/°C change
					200 ... 720 °C		≤ ± 0.05 °C	≤ ± 0.013 °C/°C change
				Pt500	-200 ... 200 °C	≤ ± 0.07 °C	≤ ± 0.14 °C	≤ ± 0.04 °C/°C change
					200 ... 720 °C		≤ ± 0.08 °C	≤ ± 0.16 °C
				Pt1000	-200 ... 200 °C	≤ ± 0.04 °C	≤ ± 0.07 °C	≤ ± 0.019 °C/°C change
					200 ... 720 °C		≤ ± 0.08 °C	≤ ± 0.22 °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
				Pt1000	-200 ... 200 °C	≤ ± 0.04 °C	≤ ± 0.07 °C	≤ ± 0.019 °C/°C change
					200 ... 660 °C		≤ ± 0.08 °C	≤ ± 0.22 °C/°C change
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
				Ni1000	-60 ... 100 °C	≤ ± 0.03 °C	≤ ± 0.06 °C	≤ ± 0.015 °C/°C change
					100 ... 250 °C		≤ ± 0.02 °C	≤ ± 0.04 °C
Cu25 ... Cu1000	0.428 Ohm/°C	-50 ... 200 °C	10 °C	Cu50	-50 ... 100 °C	≤ ± 0.04 °C	≤ ± 0.08 °C	≤ ± 0.02 °C/°C change
				Cu100-Cu200	-50 ... 100 °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	≤ ± 0.42 °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	≤ ± 0.8 °C/°C change
					150 ... 1370 °C	≤ ± 0.13 °C	≤ ± 0.25 °C	≤ ± 0.75 °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

## Measuring range

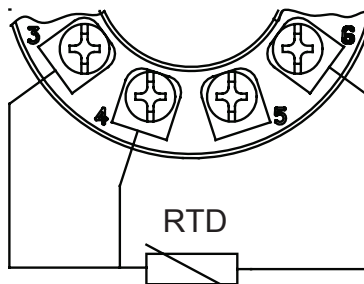
Type	Standard	Measuring range	Min. measuring span	Type	Range	Repeatability	Input accuracy	Input temperature drift (by ambient)
W5-Re (Type C)	ASTM 988	0 ... 2310 °C	100 °C		0...1750 °C	≤ ± 0.4 °C	≤ ± 0.75 °C	≤ ± 0.22 °C/°C change
					1750...2310 °C	≤ ± 0.55 °C	≤ ± 1.09 °C	
W3-Re (Type D)	ASTM 988	0 ... 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

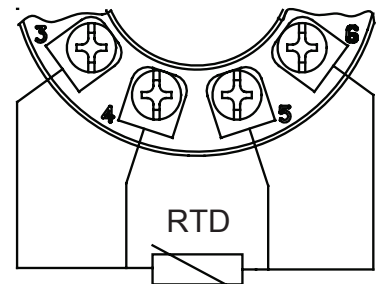
### RTD



No cable compensation

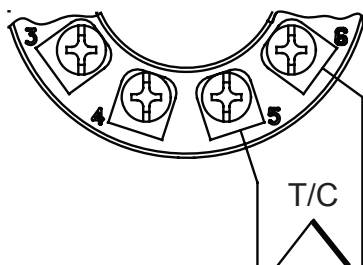


3-wire cable compensation

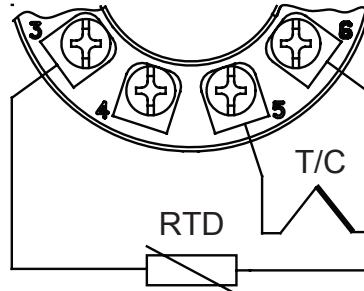


4-wire cable compensation

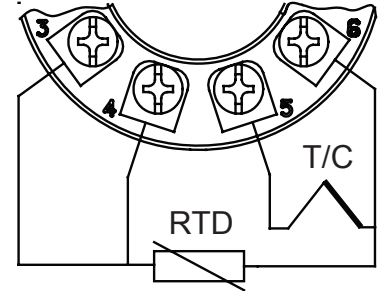
### T/C



Internal CJC-compensation



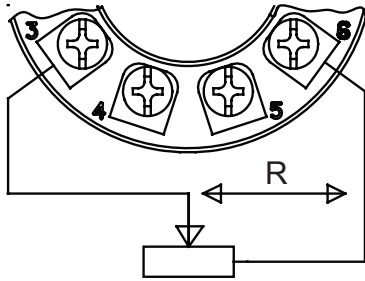
External CJC-compensation, no cable compensation



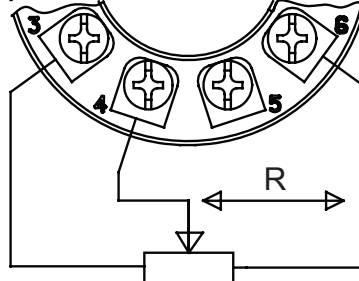
External CJC-compensation, 3-wire cable compensation

## Electrical connection

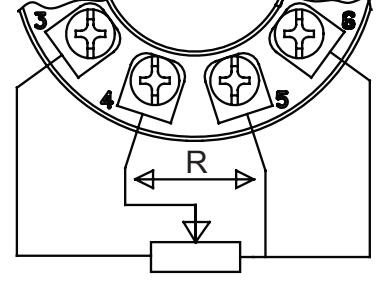
### Potentiometer



No compensation

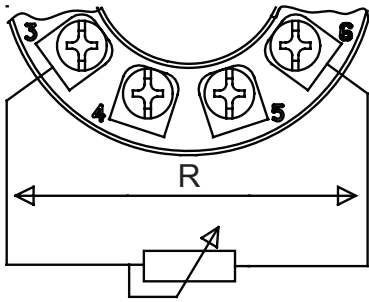


3-wire compensation for transfer resistance

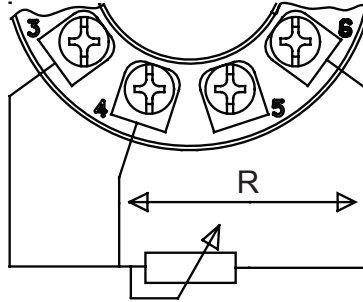


4-wire compensation for transfer resistance

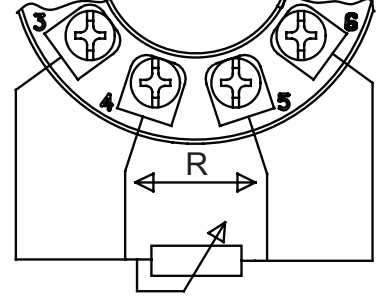
### Resistance



No compensation

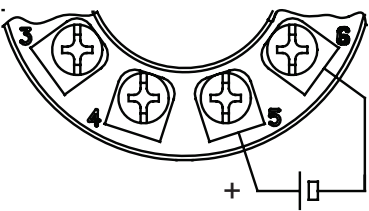


3-wire cable compensation

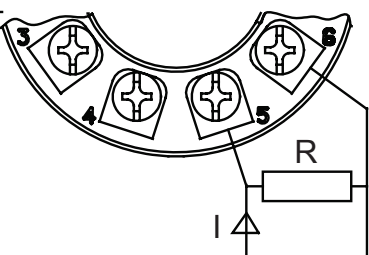


4-wire cable compensation

### Voltage measurement



### Current measurement



## Ordering information

### Ordering Key

	<b>2222</b>	-	<b>000</b>	x	·	<b>x</b>
<b>Product line</b>	Universal transmitter with HART® communication					
	2222					
<b>Type</b>	Standard					
					1	
<b>Configuration</b>	Without					
						0
	Configuration of range					
						C