

# FlexTop 2231 Temperature Transmitter

**Transmitter with Profibus® PA, version 3.0 communication.**

**Inputs: RTD dual, RTD, T/C, mV and R**

**Isolation voltage 2 kV<sub>ac</sub>**

**Configuration via Simatic® PDM® software**

**Accuracy < 0.1°C (Pt100)**

**Configurable damping**

**Sensor-trim**

**Local, remote or fixed compensation for "cold junction" (CJC)**

**Demko EEx ia IIC T4/T5, ATEX II 1G**



## Description

FlexTop 2231 is a Profibus® PA 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.

2-, 3- or 4-wire as well as dual Pt100 connection can be selected for the resistance input. Selecting the latter it can be configured for a differential, average or average with redundancy output signal.

The built-in temperature sensor or a remote Pt100 sensor can be used to compensate for "cold junction" (CJC) if thermocouples are connected.

FlexTop 2231 is embedded in silicone which makes it resistant to humidity.

FlexTop 2231 has a compact design in a ø44 mm enclosure for installation in a DIN-B housing, Bourdon-Haenni ø80 mm stainless steel housing or similar. It has a 6 mm center hole for fast sensor replacement and spring loaded mounting screws which ensure a safe fastening even in vibrating environments.

FlexTop 2231 is designed according to the Profibus® PA profile ver. 3.0 and is fully configurable via Simatic® PDM® software.

The Profibus® PA communication features on-line process monitoring, transmitter configuration and multiple process control in 2-wire networks especially suited for Ex applications.

**BOURDON  
HAENNI**

made to measure



## Technical Data

### Input

<b>Digital accuracy</b>	See „Measuring ranges“ (IEC 770 6.1)
<b>CJC-compensation</b>	Local < 0.5°C Remote < 0.2°C
<b>RTD measuring current</b>	0.2 mA, continuously
<b>Sample time</b>	RTD, R, mV: max. 0.5 sec. T/C: max. 0.8 sec.
<b>Response time (t<sub>99</sub>)</b>	Max. 2 x sample time
<b>Cable resistance (3-/4-wire)</b>	T > 600°C: Max. 10 Ohm/wire T < 600°C: Max. 30 Ohm/wire
<b>Protection</b>	+/- 35 V <sub>dc</sub>
<b>Suppression</b>	50 and 60 Hz
<b>Resolution</b>	16 bit
<b>Repeatability</b>	< 0.05°C

### Output

<b>Current (basic)</b>	13 mA ±1 mA
<b>Signal</b>	IEC 1158-2
<b>Supply range</b>	9...32 V <sub>dc</sub> (non Ex)
<b>Damping</b>	0...30 sec.

### Profibus® data

<b>Profile</b>	Profibus PA, ver. 3.0 DPV1
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### Environmental conditions

<b>Operating temperature</b>	-40...85°C
<b>Humidity</b>	< 98% RH, condensing
<b>Vibrations</b>	Lloyds Reg. (IEC 60068-2-6)

### EMC data

<b>Immunity</b>	EN 61326 Burst: 2 kV
<b>Emission</b>	EN 61326
<b>NAMUR</b>	NE21

### Approval (Demko) EEx ia IIC T4/T5, ATEX II 1G

<b>Internal inductivity</b>	L <sub>i</sub> ≤ 10 µH
<b>Internal capacity</b>	C <sub>i</sub> ≤ 2 nF
<b>Coupler/link</b>	FISCO standard; U ≤ 17.5 V <sub>dc</sub> ; I ≤ 215 mA; P ≤ 2 W
<b>Zener barrier</b>	U ≤ 20 V <sub>dc</sub> ; I ≤ 0.1 A; P ≤ 0.75 W
<b>Temperature class</b>	T1...T4: -40 < T <sub>amb</sub> < 85°C T1...T5: -40 < T <sub>amb</sub> < 60°C

### Mechanical data

<b>Dimensions</b>	ø44 x 26.3 mm
<b>Protection class</b>	Housing: IP 55 Terminals: IP 00

### Other data

<b>Isolation voltage</b>	2 kV <sub>ac</sub>
<b>Temperature drift</b>	Pt100, 3-wire Max. 0.002% per °C T/C - type K, 0...600°C Max. 0.02% per °C
<b>Power-on time</b>	1.8...3.9 sec.
<b>Sensor break detection</b>	2...10 sec.

### Test conditions

<b>Configuration</b>	Pt100; 3-wire; 0...100°C
<b>Amb. temperature</b>	23°C +/- 2°C

### Disposal of product and packing

According to national laws or by returning to Bourdon-Haenni

## Ordering Details - FlexTop 2231

	2231 000x (x)
<b>Type</b>	
Not configured, standard safety	1
Not configured, Demko EEx ia IIC T4/T5, ATEX II 1G	2
<b>Configuration</b>	
Configuration according to customer specifications	C
GSD and EDD files on diskette. Also available from our home page. Calibration certificate.	9000 0008 0922 5212

## Configuration

Unless specified the FlexTop 2231 will be delivered with the following standard configuration:

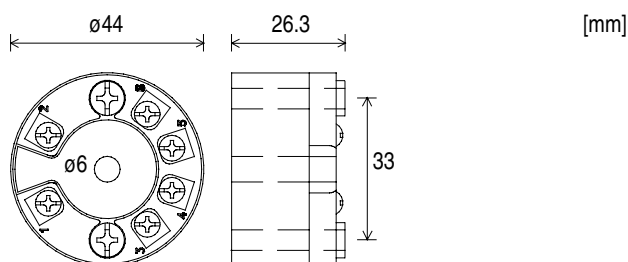
Address 126  
Pt100 sensor, single mode  
3-wire connection  
Alarm limits: -200...850°C  
Warning limits: -200...850°C

## Measuring Ranges

Type	Standard	Range	Accuracy	Note
Pt25...Pt500	DIN/EN/IEC 60751	-200...850°C	0.1°C	
Pt25...Pt500	JIS C 1604	-200...850°C	0.1°C	
Pt501...Pt1000	DIN/EN/IEC 60751	-200...350°C	0.1°C	
Pt501...Pt1000	JIS C 1604	-200...350°C	0.1°C	
Ni25...Ni1000	DIN/EN/IEC 60751	-50...250°C	0.1°C	
Cu25...Cu1000	0.428 Ohm/°C	-50...200°C	0.1°C	
B(PtRh30-Pt)	DIN/EN/IEC 584-1	500...1820°C	2°C	{2}
E(NiCr-CuNi)	DIN/EN/IEC 584-1	-270...900°C	1°C	{2}
J(Fe-CuNi)	DIN/EN/IEC 584-1	-210...1200°C	1°C	{2}
K(NiCr-Ni)	DIN/EN/IEC 584-1	-270...1370°C	1°C	{2}
L(Fe-CuNi)	DIN 43710	-200...900°C	1°C	{2}
N(NiCrSi-NiSi)	BS4937	-200...1300°C	1°C	{2}
R(PtRh13-Pt)	DIN/EN/IEC 584-1	-50...1750°C	2°C	{2}
S(PtRh10-Pt)	DIN/EN/IEC 584-1	-50...1750°C	2°C	{2}
T(Cu-CuNi)	DIN/EN/IEC 584-1	-250...400°C	1°C	{2}
U(Cu-CuNi)	DIN 43710	-200...600°C	1°C	{2}
W3-Re (D)	ASTM 988	0...2300°C	2°C	{2}
W5-Re (C)	ASTM 988	0...2300°C	2°C	{2}
Lin. voltage		-10...70 mV	0.04 mV	
Lin. voltage		-0.1...1.1 V	0.4 mV	
Lin. resistance		0...390 Ohm	0.05 Ohm	
Lin. resistance		0...2200 Ohm	0.25 Ohm	

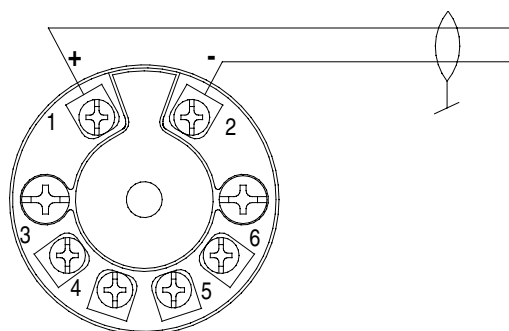
Note {2} For internal CJC 0.5°C must be added to the accuracy.

## Dimensional Drawing



ø4 mounting holes.  
Spring loaded mounting screws.

## Connection to Profibus PA

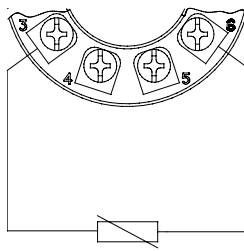


Profibus® PA cable  
2-wire twisted pair with shield

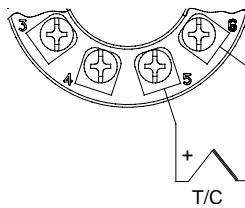
**Warning:** In order to minimize electrical disturbances we recommend to connect the cable shield to the metal housing.

# Electrical Installation

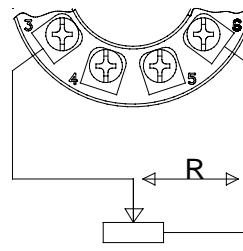
## RTD      T/C      Potentiometer      Resistance



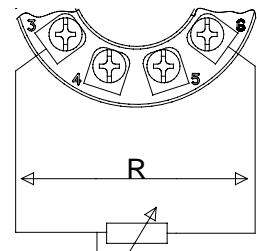
No cable compensation {3}



Internal CJC-compensation

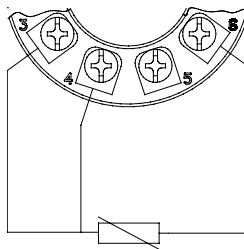


No compensation {3}

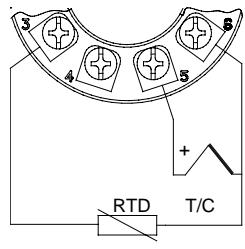


No compensation {3}

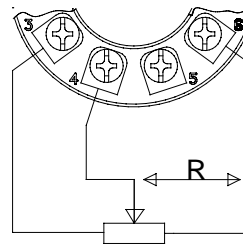
## RTD      T/C      Potentiometer      Resistance



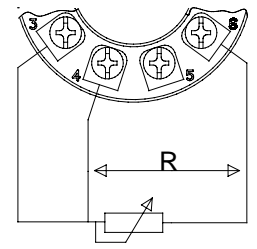
3-wire cable compensation



External CJC-compensation  
No cable compensation {3}

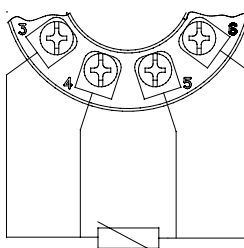


3-wire compensation for transfer resistance {4}

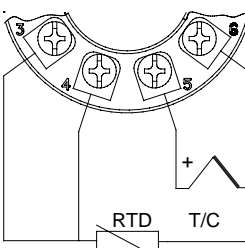


3-wire cable compensation

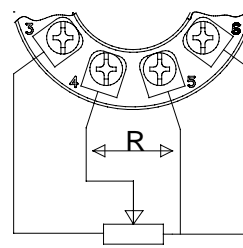
## RTD      T/C      Potentiometer      Resistance



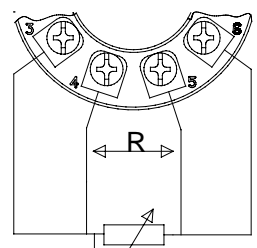
4-wire cable compensation



External CJC-compensation  
3-wire cable compensation

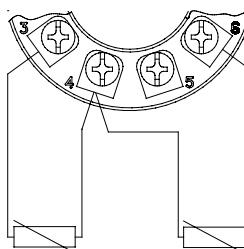


4-wire compensation for transfer resistance {4}

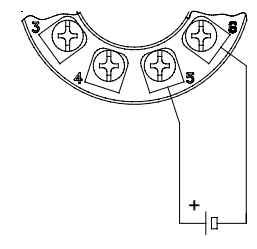
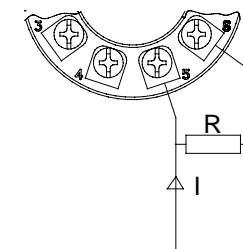


4-wire cable compensation

## Dual Pt100      Current measurement      Voltage measurement



The dual Pt100 sensor can be configured for:  
Differential  
Average  
Average with redundancy



## Notes

- {3} Configurable compensation for cable resistance
- {4} Transfer resistance between element and wiper

GB/2002-02-01 This data sheet may only be reproduced in full.