

# FlexTop 2221 Universal Transmitter

4...20 mA transmitter with HART® communication.

RTD, T/C, mV and R inputs

Isolation voltage 3.75 kV<sub>ac</sub>

Configuration via FlexProgrammer  
or HART® configurator

Accuracy < 0.1°C (Pt100)

Configurable linearisation,  
damping and status indication

Current-trim and sensor-trim

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

Ex approvals:

Ex ia IIC T5/T6, ATEX II 1G

FM Class I, Div 1, Groups A, B, C, D

FM Class II, Div 1, Groups E, F, G



## Description

FlexTop 2221 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 a remote Pt100 sensor can be used to compensate for "cold junction" (CJC) if thermocouples are connected.

The HART® communication feature on-line process calibration and adjustment, transmitter configuration and multiple process control in 2-wire networks.

The configuration can be established from a standard HART® configurator or the dedicated FlexProgrammer configuring tool connected to a PC.

FlexTop 2221 is embedded in silicone which makes it resistant to humid environments.

FlexTop 2221 has a 6 mm center hole for fast sensor replacement and spring loaded mounting screws which ensure a safe fastening even in vibrating environments.

## Technical Data

### Input

<b>Digital accuracy</b>	See „Measuring ranges“
<b>CJC-compensation</b>	Local < 0.5°C Remote < 0.2°C
<b>RTD measuring current</b>	0.2 mA, continuously
<b>Cable resistance</b>	
2-wire	Max. 30 Ohm/wire {1}
3-/4-wire	T > 600°C: Max. 10 Ohm/wire
3-/4-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>Signal span</b>	4...20 mA, 2-wire {1} 20...4 mA, 2-wire {1}
<b>Characteristic</b>	Linear or customised with max. 30 points {1}
<b>Accuracy</b>	< 0.1% of signal span
<b>Supply range</b>	8...35 V <sub>dc</sub>
<b>Ripple immunity</b>	3 V <sub>rms</sub>
<b>Load equation</b>	$R_L < (V_{cc} - 8)/23$ [kOhm]
<b>Up/Down scaling limits</b>	23 mA/3.5 mA {1}
<b>Damping</b>	0...15 sec. {1}
<b>Response time (t<sub>90</sub>)</b>	Pt100 1.0 sec. ; T/C 1.6 sec.
<b>Resolution</b>	12 bit

### HART® data

<b>Protocol</b>	HCF standard, Rev.5
<b>Features {1}</b>	Read serial number Read/Change user ID Read/Change configuration Read input signal value Read output signal value Input signal logging 2-point sensor-trim 2-point current-trim

### Environmental conditions

<b>Operating temperature</b>	-40...85°C
<b>Storage temperature</b>	-55...90°C
<b>Humidity</b>	< 98% RH, condensing
<b>Vibrations</b>	Lloyds Register, test 2

### EMC data

<b>Immunity</b>	EN 61326
<b>Emission</b>	EN 61326
<b>NAMUR</b>	NE 21

### Approval Ex ia IIC T5/T6, ATEX II 1G

<b>Supply range</b>	8...30 V <sub>dc</sub>
<b>Internal inductivity</b>	Li < 15 µH
<b>Internal capacity</b>	Ci < 5 nF
<b>Barrier data</b>	U < 30 V <sub>dc</sub> ; I < 0.1 A ; P < 0.75 W
<b>Temperature class</b>	T1...T5: -40 < T <sub>amb</sub> < 85°C T6: -40 < T <sub>amb</sub> < 50°C

### Approval FM (Application Manual 2221-8900)

<b>Intrinsically Safe</b>	Class I, Div 1, Groups A, B, C, D Class I, Zone 0, AEx ia IIC
<b>Non incandive</b>	Class I, Div 2, Groups A, B, C, D
<b>Dust proof</b>	Class II, Div 1, Groups E, F, G
<b>Fibres</b>	Class III, Div 1
<b>Temperature class</b>	T1...T5: -40 < T <sub>amb</sub> < 85°C T6: -40 < T <sub>amb</sub> < 50°C
<b>Input Entity Parameters</b>	Ui ≤ 30 V <sub>dc</sub> ; li ≤ 0.1 A ; Pi ≤ 0.75 W L <sub>i</sub> ≤ 15 µH ; C <sub>i</sub> ≤ 5 nF

### Mechanical data

<b>Dimensions</b>	ø44 x 26.3 mm
<b>Protection class</b>	Housing: IP 55 Terminals: IP 10

### Other data

<b>Isolation</b>	3.75 kV <sub>ac</sub>
<b>Temperature drift</b>	Typ. 0.003% per °C Max. 0.01% per °C
<b>Power-on time</b>	1.8...3.9 sec.

### Test conditions

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

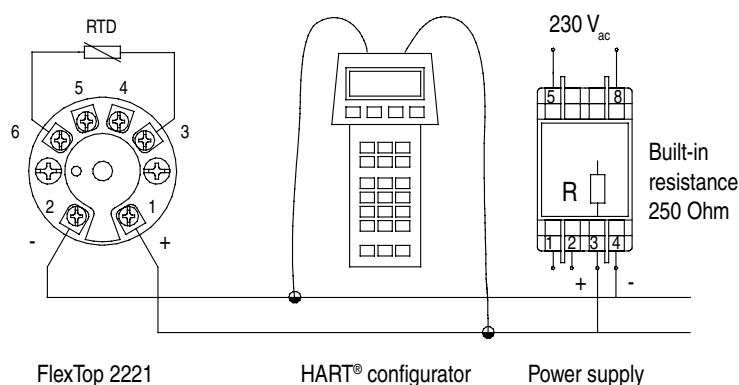
### Disposal of product and packing

According to national laws or by returning to Baumer

### Note

{1} Configurable

## Example of Application, Point-to-point



## Measuring Ranges

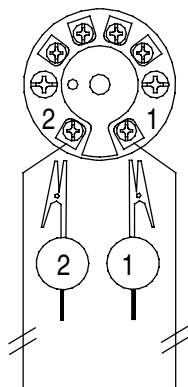
Type	Standard	Range	Min. span	Accuracy	Resolution
Pt25...Pt1000	DIN/EN/IEC 60751	-200...850°C {2}	10°C	0.1°C	0.1°C
Pt25...Pt1000	a = 0.003902	-200...850°C {2}	10°C	0.1°C	0.1°C
Pt25...Pt1000	a = 0.003916	-200...850°C {2}	10°C	0.1°C	0.1°C
Ni25...Ni1000	DIN 43760	-50...250°C {2}	10°C	0.1°C	0.1°C
Cu25...Cu1000	0.428 Ohm/°C	-50...200°C	10°C	0.1°C	0.1°C
B(PtRh30-Pt)	IEC 584	100...1820°C	50°C	2°C	0.1°C
E(NiCr-CuNi)	IEC 584	-270...900°C	50°C	1°C	0.1°C
J(Fe-CuNi)	IEC 584	-210...1200°C	50°C	1°C	0.1°C
K(NiCr-Ni)	IEC 584	-250...1370°C	50°C	1°C	0.1°C
L(Fe-CuNi)	DIN 43710	-200...900°C	50°C	1°C	0.1°C
N(NiCrSi-NiSi)	IEC 584	-200...1300°C	50°C	1°C	0.1°C
R(PtRh13-Pt)	IEC 584	-50...1750°C	100°C	2°C	0.1°C
S(PtRh10-Pt)	IEC 584	-50...1750°C	100°C	2°C	0.1°C
T(Cu-CuNi)	IEC 584	-250...400°C	40°C	1°C	0.1°C
U(Cu-CuNi)	DIN 43710	-200...600°C	50°C	1°C	0.1°C
W5-Re (Type C)	ASTM 988	0...2300°C	100°C	2°C	0.1°C
W3-Re (Type D)	ASTM 988	0...2300°C	100°C	2°C	0.1°C
Lin. voltage		-10...70 mV	2 mV	0.04 mV	0.1 mV
Lin. voltage		-0.1...1.1 V	20 mV	0.4 mV	1 mV
Lin. resistance		0...390 Ohm	5 Ohm	0.05 Ohm	0.01 Ohm
Lin. resistance		0...2200 Ohm	25 Ohm	0.25 Ohm	0.1 Ohm

{2} The max. temperature is lower for RTD-elements in the range 500...1000, i.e. Pt1000 max. 350°C.

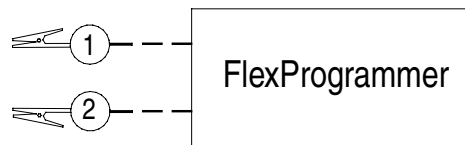
## Configuration

Note:

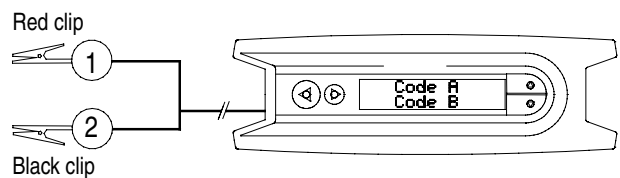
Disconnect loop supply before connecting the FlexProgrammer to FlexTop 2221.



### FlexProgrammer



### FlexProgrammer 9701

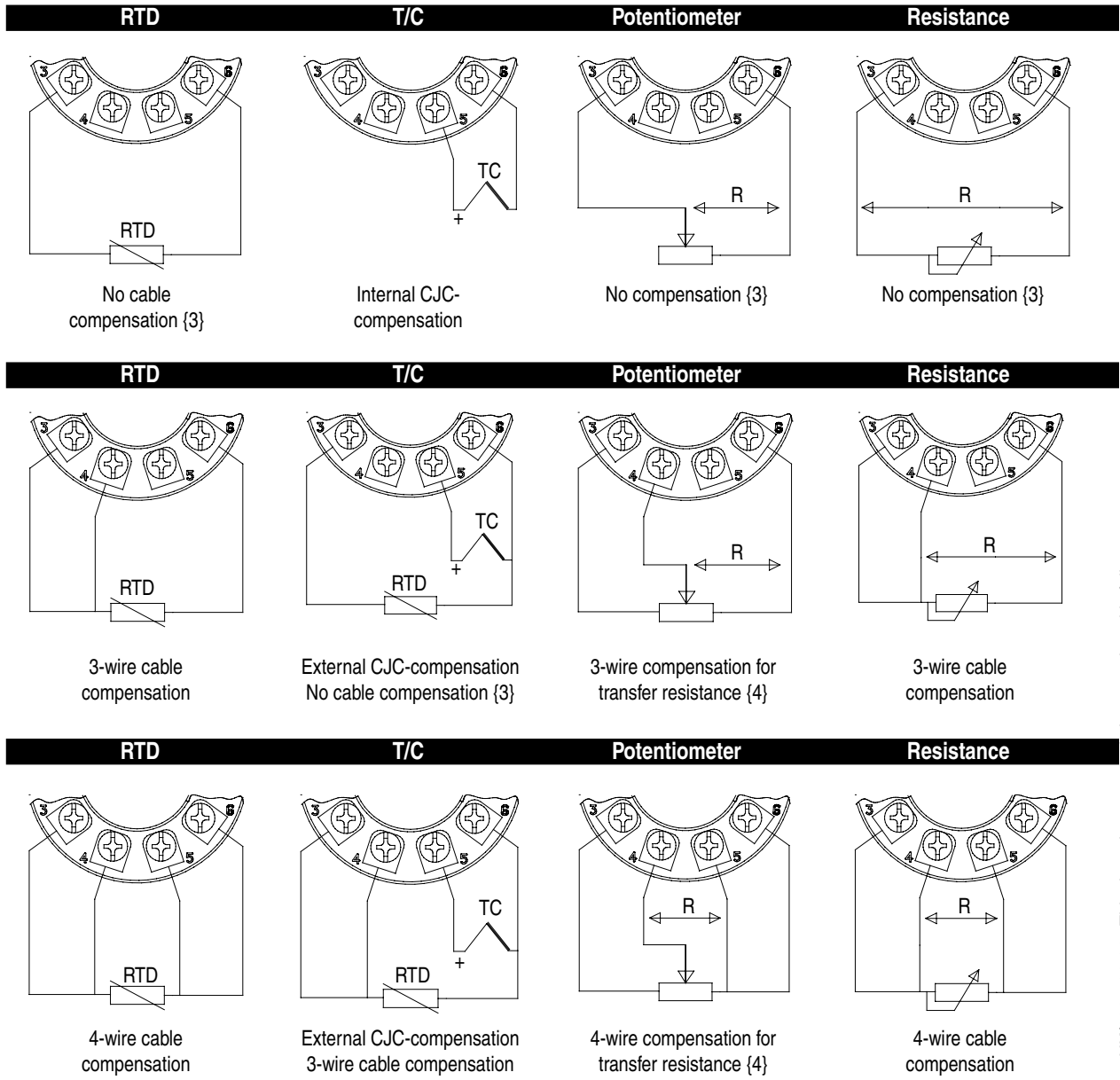


Note: Ambient temperature range 0...50°C

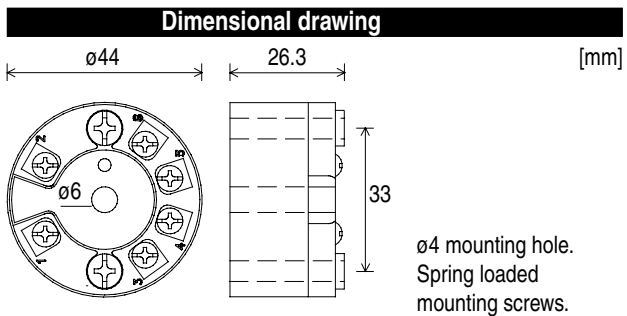
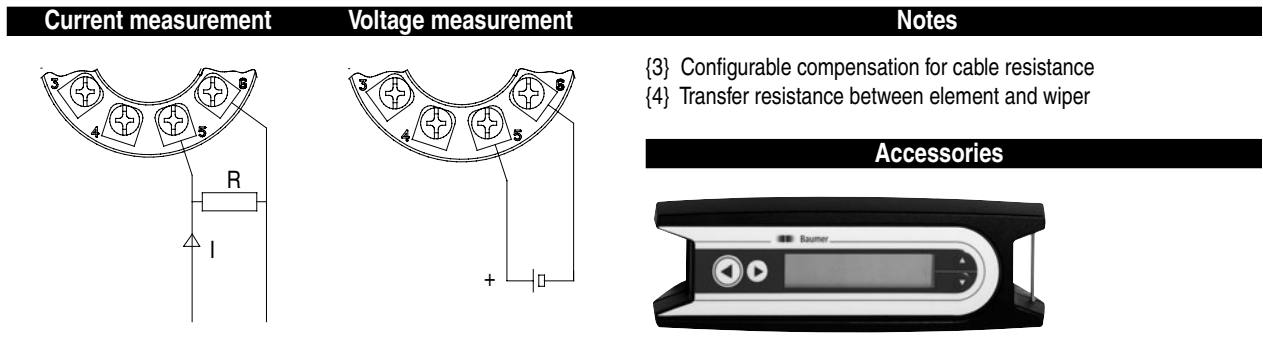
## Ordering Details - FlexTop 2221

Type	2221 000x (x)
Standard version, non-ex	5...8' digit   1
Ex ia IIC T5/T6, ATEX II 1G and FM approval	5...8' digit   2
Configuration	9' digit   C
Configuration according to customer specifications	

# Electrical Installation



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The FlexProgrammer 9701 is a dedicated tool to configure all Baumer configurable products.

- Type No. 9701-0001 complies:**
- FlexProgrammer interface unit
  - CD with the FlexProgram software and product drivers (DTM)
  - USB cable
  - Cable with 2 alligator clips

Design and specifications subject to change without notice