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Baumer
Passion for Sensors

Temperature measurement/FlexTop

2222

In-head transmitter for CombiTemp- or OEM applications

2222-000#.#

Overview

- 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
- ATEX and IECEx certified



Technical data

Ambient conditions	
Operating temperature range	-40 … 85 °C
Storage temperature range	-50 … 85 °C
Degree of protection (EN 60529)	IP 55
Humidity	< 98 % RH , condensing
Insulation voltage	1.5 kV AC
Input signal	
Range	Refer to section "Operating conditions"
Connection variants	2-wire 3-wire 4-wire
Measuring unit	°C °F K
Min. measuring span	10 °C
Resolution	17 bit
RTD measuring current	0.16 mA , continuous
Sample time	≤ 0.1 s
Accuracy	Refer to section "Operating conditions"
CJC-compensation	< 0.5 °C , internal < 0.2 °C , external
Cable resistance	< 30 Ω/wire , 2-wire < 30 Ω/wire , 3/4-wire (T < 700°C) < 15 Ω/wire , 3/4-wire (T > 700°C)
Repeatability	Refer to section "Operating conditions"
Offset adjustment	± 500 °C , max.
Suppression	50 Hz 60 Hz
Protection	± 35 V DC
Error detection delay	< 2.0 s

Output signal	
Characteristic	Linear or customised with max. 30 points
Output signal	4 … 20 mA , 2-wire 20 … 4 mA , 2-wire
Accuracy	< 0.025 % FSR
Response time, T90	< 450 ms
Temperature drift	± 0.01 %/K , max.
Load resistance	Rs ≤ (V DC - 7 V)/0.023 A
Resolution	14 bit
Up/Down scaling limits	23 mA / 3.5 mA
Ripple immunity	< 1 %, FSR (1 Vrms, 50Hz...1kHz)
Effect of variations in supply voltage	0.001 %/V
Damping	0 … 60
HART® interface	
Properties	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 For more information please see ‚HART Field Device Specification‘
Protocol	HCF standard, Rev.7 including „Temperature Device Family“ commands
Housing	
Style	Compact transmitter, Ø44 mm DIN form B compatible
Overall size	Refer to section "Dimensional drawings"
Material	Polycarbonate

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Technical data

Power supply	
Voltage supply range	7 … 40 V DC , without DFON touch screen 13.5 … 40 V DC , with DFON touch screen
Power-up time	< 3 s , RTD, Ohm, mV < 5 s , T/C
Reverse polarity protection	Yes
Factory settings	
Output range	0 … 100 °C
Sensor type class	RTD
Sensor type	Pt100
Connection	2-wire
Unit	°C
Damping	0 s
Output at sensor fault	23 mA
IECEx/ATEX II 1G Ex ia IIC T6...T4 Ga	
Maximum values for barrier selection, Ui	30 V DC
Maximum values for barrier selection, Ii	95 mA
Maximum values for barrier selection, Pi	750 mW
Internal capacitance, Ci	11 nF 26 nF , with DFON touch screen (ATEX only)
Internal inductance, Li	24 µH 34 µH , with DFON touch screen (ATEX only)
Temperature class, T1 ... T6	- 40 < Tamb < 56 °C
Temperature class, T1 ... T5	- 40 < Tamb < 71 °C - 20 < Tamb < 60 °C, with DFON touch screen (ATEX only)
Temperature class, T1 ... T4	- 40 < Tamb < 80 °C - 20 < Tamb < 60 °C, with DFON touch screen (ATEX only)

IECEx/ATEX II 1G Ex ia IIC T6...T4 Ga	
Sensor circuit, Uo	10.5 V DC
Sensor circuit, Io	19 mA
Sensor circuit, Po	55 mW
Sensor circuit, Co	2 µF
Sensor circuit, Lo	94 mH
IECEx/ATEX II 3G Ex nA IIC T6...T5 Gc	
Voltage supply range, Un	30 V DC , max.
Current rating, In	20 mA
Temperature class, T1 ... T6	- 40 < Tamb < 31 °C
Temperature class, T1 ... T5	- 40 < Tamb < 80 °C
Sensor circuit, Uo	2.3 V DC
Sensor circuit, Io	0.2 mA
IECEx/ATEX II 3G Ex ec IIC T6...T5 Gc	
Voltage supply range, Un	30 V DC , max.
Current rating, In	20 mA
Temperature class, T1 ... T6	- 40 < Tamb < 31 °C
Temperature class, T1 ... T5	- 40 < Tamb < 80 °C
Sensor circuit, Uo	2.3 V DC
Sensor circuit, Io	0.2 mA
Compliance and approvals	
EMC	EN 61326-1:2013 DNV GL - Class A EN 50121-3-2:2016
Namur	NE21
Explosion protection	ATEX II 1G Ex ia IIC T6...T4 Ga ATEX II 3G Ex nA IIC T6...T5 Gc ATEX II 3G Ex ec IIC T6...T5 Gc IECEx Ex ia IIC T6...T4 Ga IECEx Ex nA IIC T6...T5 Gc IECEx Ex ec IIC T6...T5 Gc

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Operating conditions

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	≤ ± 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
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	≤ ± 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
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	
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

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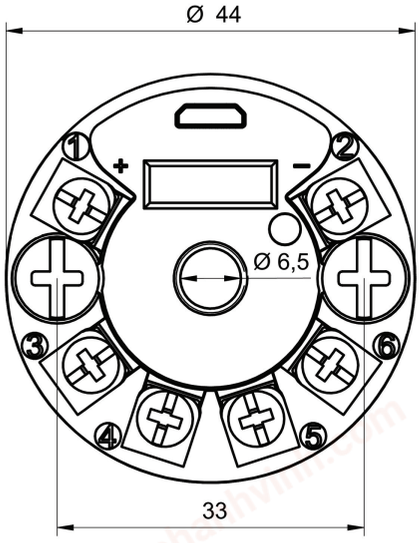
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In-head transmitter for CombiTemp- or OEM applications

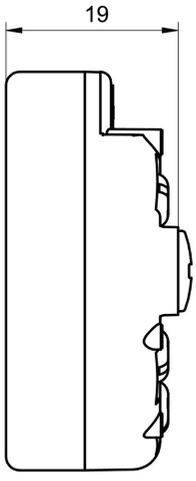
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Dimensional drawings (mm)

Housing



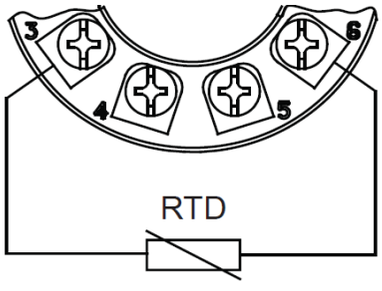
Front view, standard version



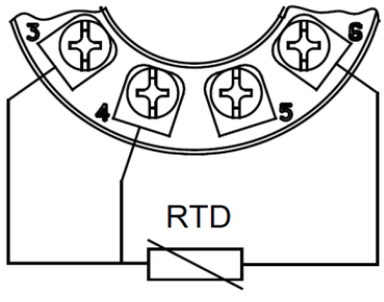
Side view

Electrical connection

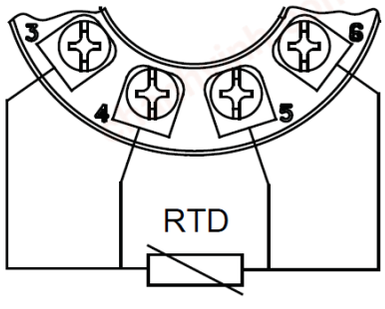
RTD



No cable compensation

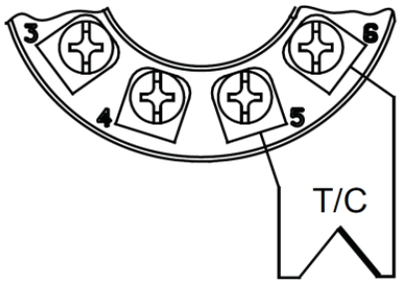


3-wire cable compensation

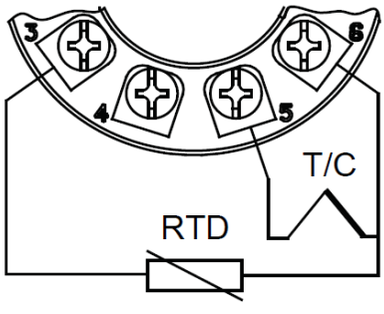


4-wire cable compensation

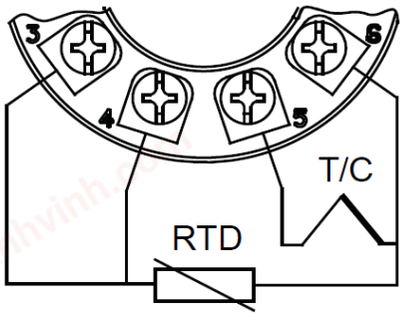
T/C



Internal CJC-compensation



External CJC-compensation, no cable compensation



External CJC-compensation, 3-wire cable compensation

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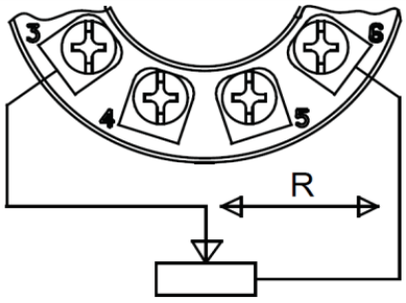
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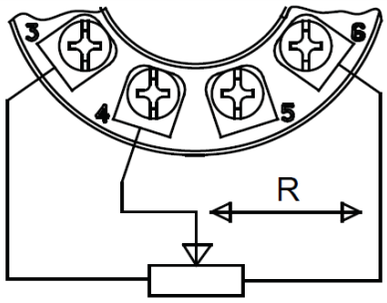
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Electrical connection

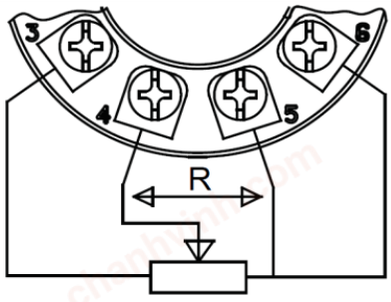
Potentiometer



No compensation

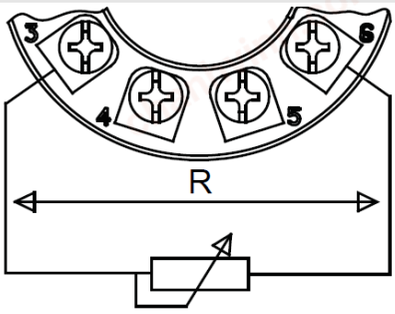


3-wire compensation for transfer resistance

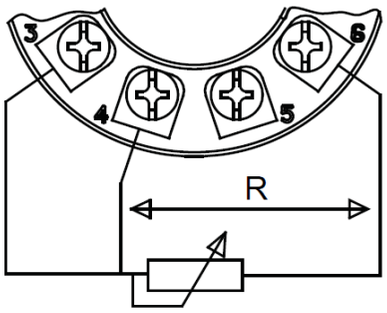


4-wire compensation for transfer resistance

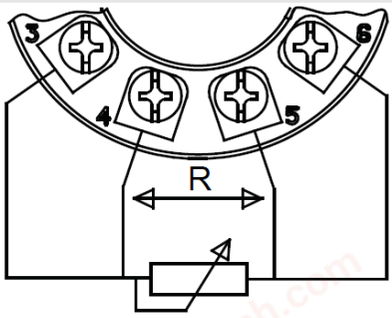
Resistance



No compensation

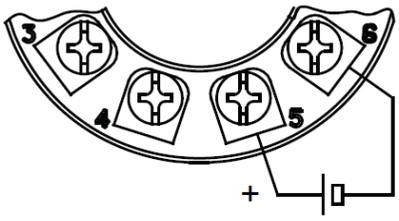


3-wire cable compensation

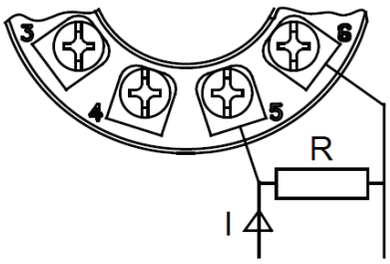


4-wire cable compensation

Voltage measurement



Current measurement



Ordering information

Ordering key - Configuration possibilities see website

	22	22 -	####	. #
Product	22			
Type				
Universal input / 4-20 mA + HART out / USB		22		
Safety				
Standard			0001	
IECEx / ATEX ia			0002	
IECEx / ATEX nA			0003	
IECEx / ATEX ec			0004	
Configuration				
None				0
Programmed acc. to customer specification				C

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