

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



Picture similar



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

Input resistance > 20 MΩ , typ.

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

Input signal

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

Step response time, T90 < 450 ms

Temperature drift ± 0.01 %/K , max.

Load resistance $R_s \leq (V_{DC} - 7 V) / 0.023 A$

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 s

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"

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Technical data

Housing

Material Polycarbonate

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

Sensor type class RTD

Sensor type Pt100

Connection 2-wire

Unit °C

Output range 0 ... 100 °C

Damping 0 s

Output at sensor fault 23 mA

IECEX/ATEX II 1 G Ex ia IIC T6...T4 Ga

 Maximum values for barrier selection, U_i 30 V DC

 Maximum values for barrier selection, I_i 95 mA

 Maximum values for barrier selection, P_i 750 mW

 Internal capacitance, C_i 11 nF
 26 nF , with DFON touch screen (ATEX only)

 Internal inductance, L_i 24 µH
 34 µH , with DFON touch screen (ATEX only)

IECEX/ATEX II 1 G Ex ia IIC T6...T4 Ga

 Temperature class, T1 ... T4 - 40 < Tamb < 80 °C
 - 20 < Tamb < 60 °C, with DFON touch screen (ATEX only)

 Temperature class, T5 - 40 < Tamb < 71 °C
 - 20 < Tamb < 60 °C, with DFON touch screen (ATEX only)

Temperature class, T6 - 40 < Tamb < 56 °C

 Sensor circuit, U_o 10.5 V DC

 Sensor circuit, I_o 19 mA

 Sensor circuit, P_o 55 mW

 Sensor circuit, C_o 2 µF

 Sensor circuit, L_o 94 mH

IECEX/ATEX II 3 G Ex ec IIC T6...T5 Gc

 Voltage supply range, U_n 30 V DC

 Current rating, I_n 20 mA

Temperature class, T1 ... T5 - 40 < Tamb < 80 °C

Temperature class, T6 - 40 < Tamb < 31 °C

 Sensor circuit, U_o 2.3 V DC

 Sensor circuit, I_o 0.2 mA

Compliance and approvals

 EMC EN 61326-1
 EN 50121-3-2:2016

Namur NE21

 Explosion protection ATEX II 1 G Ex ia IIC T6...T4
 ATEX II 3 G Ex ec IIC T6...T5 Gc
 IECEX Ex ia IIC T6...T4
 IECEX Ex ec IIC T6...T5 Gc

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 |
| 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 | | ≤ ± 0.07°C | ≤ ± 0.14°C |
| | | | | | Pt500 | -150...200°C | ≤ ± 0.08°C | ≤ ± 0.16°C |
| 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 |
| 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 |
| 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 |
| Cu25...Cu1000 | 0.428 Ohm/°C | -50...200°C | 10°C | Ni1000 | 100...250°C | ≤ ± 0.03°C | ≤ ± 0.06°C | ≤ ± 0.02 °C/°C change |
| | | | | | -60...100°C | | ≤ ± 0.04°C | ≤ ± 0.015 °C/°C change |
| | | | | | Cu50 | 100...250°C | ≤ ± 0.02°C | ≤ ± 0.04°C |
| B(PtRh30-Pt) | IEC 584 | 100...1820°C | 200°C | Cu100-Cu200 | -50...200°C | ≤ ± 0.02°C | ≤ ± 0.04°C | ≤ ± 0.01 °C/°C change |
| | | | | | 100...500°C | | ≤ ± 5°C | ≤ ± 10°C |
| | | | | | 500...1000°C | ≤ ± 1°C | ≤ ± 2.0°C | ≤ ± 0.6 °C/°C change |
| E(NiCr-CuNi) | IEC 584 | -250...1000°C | 50°C | | 1000...1820°C | ≤ ± 0.6°C | ≤ ± 1.1°C | ≤ ± 0.33 °C/°C change |
| | | | | | -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 |
| J(Fe-CuNi) | IEC 584 | -210...1200°C | 50°C | | 150...1000°C | ≤ ± 0.07°C | ≤ ± 0.14°C | ≤ ± 0.042 °C/°C change |
| | | | | | -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 |
| K(NiCr-Ni) | IEC 584 | -250...1370°C | 100°C | | 150...1200°C | ≤ ± 0.09°C | ≤ ± 0.18°C | ≤ ± 0.055 °C/°C change |
| | | | | | -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 |
| L(Fe-CuNi) | DIN 43710 | -200...900°C | 50°C | | 150...1370°C | ≤ ± 0.13°C | ≤ ± 0.25°C | ≤ ± 0.075 °C/°C change |
| | | | | | -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 |
| N(NiCrSi-NiSi) | IEC 584 | -250...1300°C | 50°C | | 620...900°C | ≤ ± 0.09°C | ≤ ± 0.17°C | ≤ ± 0.05 °C/°C change |
| | | | | | -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 |
| R(PtRh13-Pt) | IEC 584 | -50...1750°C | 100°C | | 500...1300°C | ≤ ± 0.13°C | ≤ ± 0.26°C | ≤ ± 0.08 °C/°C change |
| | | | | | -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 |
| S(PtRh10-Pt) | IEC 584 | -50...1760°C | 100°C | | 500...1750°C | ≤ ± 0.45°C | ≤ ± 0.9°C | ≤ ± 0.28 °C/°C change |
| | | | | | -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 |
| T(Cu-CuNi) | IEC 584 | -250...400°C | 50°C | | 500...1760°C | ≤ ± 0.5°C | ≤ ± 1.01°C | ≤ ± 0.3 °C/°C change |
| | | | | | -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 |
| U(Cu-CuNi) | DIN 43710 | -200...600°C | 50°C | | 100...400°C | ≤ ± 0.1°C | ≤ ± 0.21°C | ≤ ± 0.065 °C/°C change |
| | | | | | -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 |
| W5-Re (Type C) | ASTM 988 | 0...2310°C | 100°C | | 300...600°C | ≤ ± 0.09°C | ≤ ± 0.17°C | ≤ ± 0.05 °C/°C change |
| | | | | | 0...1750°C | ≤ ± 0.4°C | ≤ ± 0.75°C | ≤ ± 0.22 °C/°C change |
| | | | | | 1750...2310°C | ≤ ± 0.55°C | ≤ ± 1.09°C | ≤ ± 0.3 °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 |

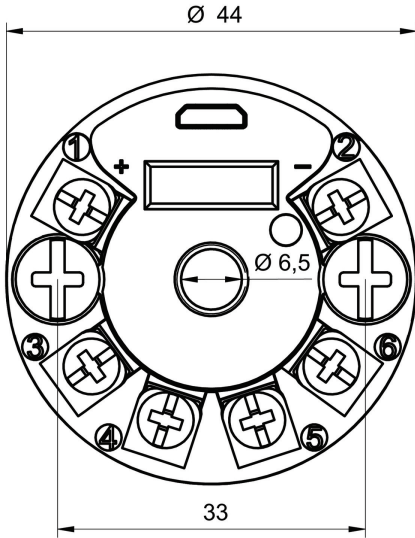
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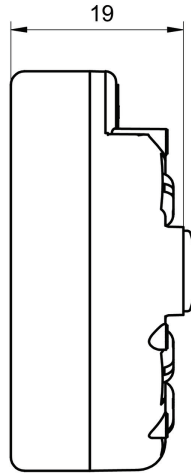
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Dimensional drawings (mm)

Housing



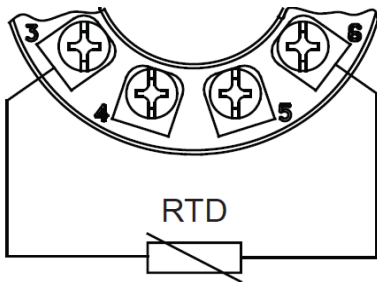
Front view



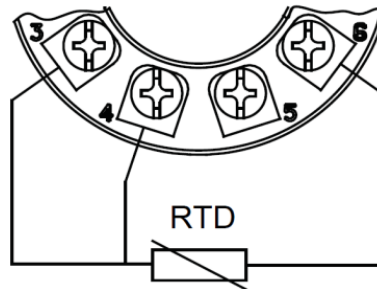
Side view

Electrical connection

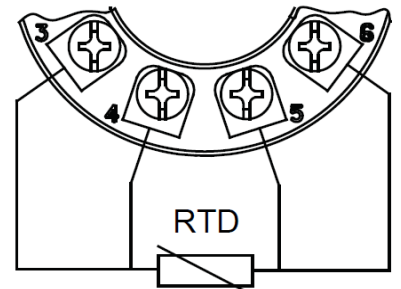
RTD



No cable compensation

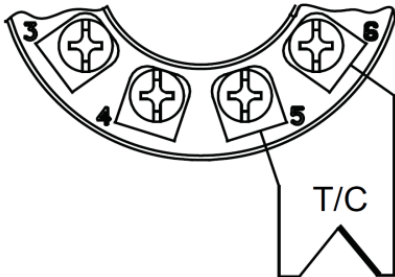


3-wire cable compensation

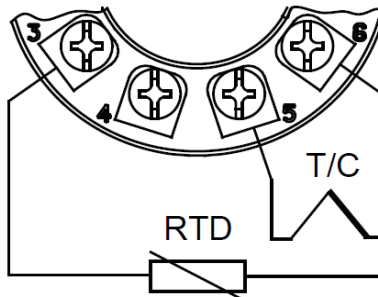


4-wire cable compensation

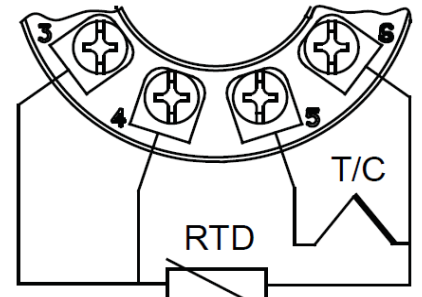
T/C



Internal CJC-compensation



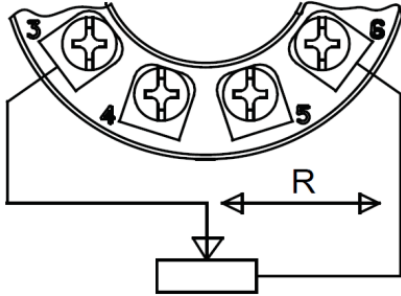
External CJC-compensation, no cable compensation



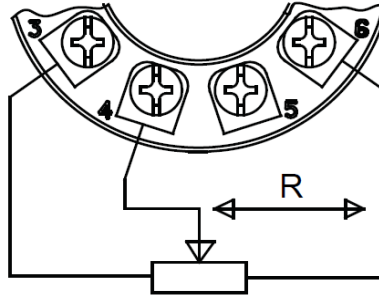
External CJC-compensation, 3-wire cable compensation

Electrical connection

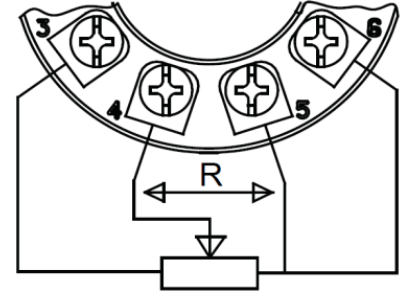
Potentiometer



No compensation

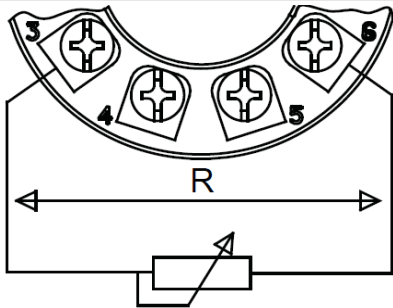


3-wire compensation for transfer resistance

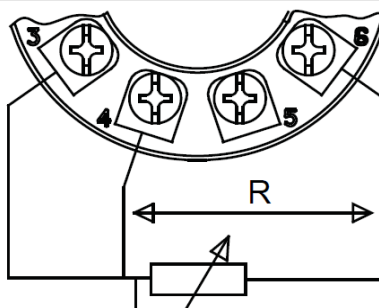


4-wire compensation for transfer resistance

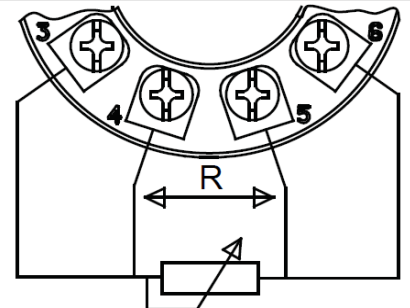
Resistance



No compensation

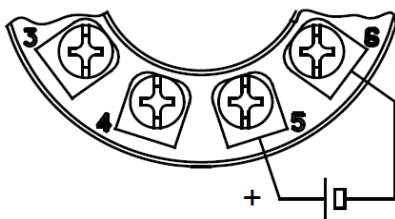


3-wire cable compensation

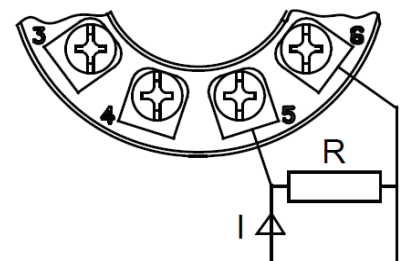


4-wire cable compensation

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 |