

ABB MEASUREMENT & ANALYTICS | DATA SHEET

TTR200

Rail-mount temperature transmitter



Measurement made easy

Temperature transmitter for the HART protocol

Suitable for all standard requirements

Input circuit and communication

- Universal sensor input for resistance thermometers (RTD) and thermocouples
- Communication via a 4 to 20 mA signal and the HART protocol

Safety

- Global approvals for explosion protection up to Zone 0
- Functional safety SIL 2 / SIL 3 in accordance with IEC 61508
- Device versioning in accordance with NE 53
- Two function LEDs
- Continuous monitoring of supply voltage
- Wire break / corrosion monitoring in accordance with NE 89

Environmental conditions

- Ambient temperature -40 to 85 °C (-40 to 185 °F)

Use

- Configuration in accordance with FDT / DTM, EDD or FDI Standard (Field Information Manager, FIM)

Specification

General information

CE Marking

The device fulfills all requirements for CE marking in accordance with all applicable guidelines.

Electrical isolation

3.5 kV DC (approx. 2.5 kV AC), 60 s, input to output

MTBF time

190 years at 40 °C (104 °F) mean ambient temperature

Input filter

50 / 60 Hz

Switch-on delay

< 10 s ($I_a \leq 3.6$ mA during switch-on cycle)

Warm-up time

5 minutes

Rise time t_{90}

400 to 1000 ms

Measured value update

10/s, independent of sensor type and sensor circuit

Output filter

Digital filter 1st order: 0 to 100 s

Weight

180 g

Housing material

- Housing: polycarbonate
- Color: gray RAL9002

Encapsulation resin for the device

Polyurethane (PUR), WEVO PU-417

Installation conditions

- Mounting position: no restrictions
- Possible installations: Rail mounting (35 mm) in accordance with EN 60175

Electrical connection

- Terminals with captive screws, plug-in with screw connections
- Lines up to a maximum of 2.5 mm² (AWG 14)

Dimensions

Refer to **Dimensions** on page 11.

Ambient conditions

Ambient temperature

- Standard: -40 to 85 °C (-40 to 185 °F)
- Restricted range during operation with explosion-proof design:
see corresponding certificate

Transport / storage temperature

-40 to 85 °C (-40 to 185 °F)

Climate class in accordance with DIN EN 60654-1

Cx -40 to 85 °C (-40 to 185 °F) at 5 to 95 % relative air humidity

Max. permissible humidity in accordance with IEC 60068-2-30

100 % relative air humidity

Vibration resistance in accordance with IEC 60068-2-6

10 to 2000 Hz at 5 g, during operation and transport

Shock resistance in accordance with IEC 68-2-27

gn = 30, during operation and transport

IP rating

IP 20 or IP rating of the installation housing

... Specification

Electromagnetic compatibility

Emitted interference in accordance with IEC EN 61326 and Namur NE 21.

Interference-resistant in accordance with IEC 61326 and Namur NE 21.

Pt100: measuring range 0 to 100 °C (32 to 212 °F), span 100 K

| Type of test | Testing accuracy | Effect |
|-------------------------------|------------------|----------------|
| Burst to signal- / data lines | 2 kV | < 0.5 % |
| Static discharge | | |
| • Contact plate (indirect) | 8 kV | No |
| • Supply terminals* | 6 kV | No |
| • Sensor terminals* | 4 kV | No |
| Radiated field | | |
| 80 MHz to 2 GHz | 10 V/m | < 0.5 % |
| Coupling | | |
| 150 kHz to 80 MHz | 10 V | < 0.5 % |
| Surge | | |
| between the supply lines | 0.5 kV | No malfunction |
| Line to ground | 1 kV | |

* Air discharge (at 1 mm (0.04 in) distance)

SIL functional safety

With conformity according to IEC 61508 for the use in safety relevant applications up to and including SIL 3 (redundant).

- In the use of one transmitter the device fulfills the requirements according to SIL 2.
- In the use of redundant handled transmitters the requirements can be fulfilled according to SIL 3.

Instructions on this can be found in the SIL-Safety Manual.

Input - resistance thermometer / resistances

Resistance thermometer

- Pt100 in accordance with IEC 60751, JIS C1604, MIL-T-24388
- Ni in accordance with DIN 43760
- Cu in accordance with recommendation OIML R 84

Resistance measurement

- 0 to 500 Ω
- 0 to 5000 Ω

Sensor connection type

Two-, three-, four-wire circuit

Connection lead

- Maximum sensor line resistance per line 50 Ω in accordance with NE 89
- Three-wire circuit: Symmetrical sensor line resistances
- Two-wire circuit: Compensation up to 100 Ω total lead resistance

Measurement current

< 300 μA

Sensor short circuit

< 5 Ω (for resistance thermometer)

Sensor wire break

- Measuring range: 0 to 500 Ω > 0.6 to 10 kΩ
- Measuring range: 0 to 5 Ω > 5.3 to 10 kΩ

Corrosion detection in accordance with NE 89

- Three-wire resistance measurement > 50 Ω
- Four-wire resistance measurement > 50 Ω

Sensor error signaling

- Resistance thermometer: Sensor short circuit and sensor wire break
- Linear resistance measurement: Sensor wire break

Input - thermocouples / voltages

Types

- B, E, J, K, N, R, S, T in accordance with IEC 60584
- U, L in accordance with DIN 43710
- C, D in accordance with ASTM E-988

Voltages

- -125 to 125 mV
- -125 to 1100 mV

Connection lead

- Maximum sensor line resistance:
per line 1.5 k Ω , total 3 k Ω

Sensor wire break monitoring in accordance with NE 89

- Pulsed with 1 μ A outside measurement interval
- Thermocouple measurement 5.3 to 10 k Ω
- Voltage measurement 5.3 to 10 k Ω

Input resistance

> 10 M Ω

Internal reference junction Pt1000, IEC 60751 Cl. B

(no additional jumpers necessary)

Sensor error signaling

- Thermocouple:
Sensor wire break
- Linear voltage measurement:
Sensor wire break

HART® output

Transmission characteristics

- Temperature linear
- Resistance linear
- Voltage linear

Output signal

- Configurable 4 to 20 mA (standard)
- Configurable 20 to 4 mA
(Dynamic range: 3.8 to 20.5 mA in accordance with NE 43)

Simulation mode

3.5 to 23.6 mA

Induced current consumption

< 3.5 mA

Maximum output current

23.6 mA

Configurable error current signal

- Overrange 22 mA (20.0 to 23.6 mA)
- Underrange 3.6 mA (3.5 to 4.0 mA)

Power supply

Two-wire technology, polarity safe; power supply lines = signal lines

Note

Following calculations apply for standard applications. This should be taken into consideration when working with a higher maximum current.

Input terminal voltage

Non-Ex application:

$$U_S = 11 \text{ to } 42 \text{ V DC}$$

Ex applications:

$$U_S = 11 \text{ to } 30 \text{ V DC}$$

Maximum permissible residual ripple for input terminal voltage

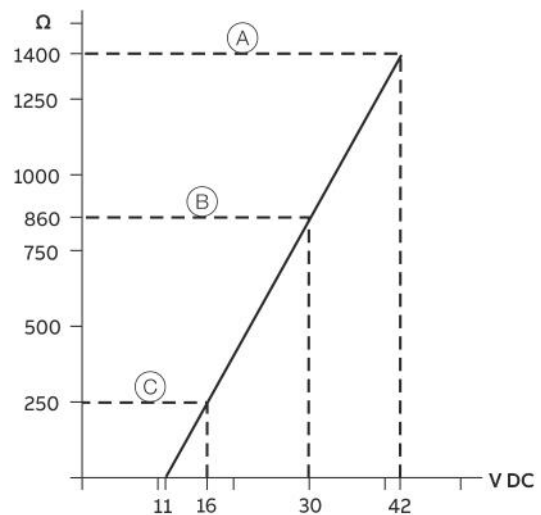
During communication, this is in accordance with the HART® FSK 'Physical Layer' specification.

Undervoltage detection on the transmitter

If the terminal voltage on the transmitter down-scales a value of 10 V, this may lead to an output current of $I_a \leq 3.6 \text{ mA}$.

Maximum load

$$R_B = (U_S - 11 \text{ V}) / 0.022 \text{ A}$$



- (A) TTR200
- (B) TTR200 in Ex-applications
- (C) HART® communication resistance (R_B)

Figure 1: Maximum load depending on input terminal voltage

Maximum power

- $P = U_S \times 0.022 \text{ A}$
- Example: $U_S = 24 \text{ V} \rightarrow P_{\text{max}} = 0.528 \text{ W}$

... Specification

Measuring accuracy

Includes linearity error, repeatability / hysteresis at 23 °C (73.4 °F) ±5 K and 20 V supply voltage.

Information on measuring accuracy corresponds to 3 σ (Gaussian distribution).

Long-term drift: ±0.05 °C (±0.09 °F) or ±0.05 %* per year, the larger value applies.

| Sensor | Measuring range limit | Minimum span | Measuring accuracy | | |
|--|------------------------|----------------------------------|--------------------------------|---|------------|
| | | | Input (24-bit AD-converter) | Analog output* (16-bit DA-converter) | |
| Resistance thermometer / resistor | | | | | |
| DIN IEC 60751 | Pt10 (a=0.003850) | -200 to 850 °C (-328 to 1562 °F) | 10 °C (18 °F) | ±0.80 °C (±1.44 °F) | ±0.05 % |
| | Pt50 (a=0.003850) | | | ±0.16 °C (±0.29 °F) | ±0.05 % |
| | Pt100 (a=0.003850)** | | | ±0.08 °C (±0.14 °F) | ±0.05 % |
| | Pt200 (a=0.003850) | | | ±0.24 °C (±0.43 °F) | ±0.05 % |
| | Pt500 (a=0.003850) | | | ±0.16 °C (±0.29 °F) | ±0.05 % |
| | Pt1000 (a=0.003850) | | | ±0.08 °C (±0.14 °F) | ±0.05 % |
| JIS C1604 | Pt10 (a=0.003916) | -200 to 645 °C (-328 to 1193 °F) | 10 °C (18 °F) | ±0.80 °C (±1.44 °F) | ±0.05 % |
| | Pt50 (a=0.003916) | | | ±0.16 °C (±0.29 °F) | ±0.05 % |
| | Pt100 (a=0.003916) | | | ±0.08 °C (±0.14 °F) | ±0.05 % |
| MIL-T-24388 | Pt10 (a=0.003920) | -200 to 850 °C (-328 to 1562 °F) | 10 °C (18 °F) | ±0.80 °C (±1.44 °F) | ±0.05 % |
| | Pt50 (a=0.003920) | | | ±0.16 °C (±0.29 °F) | ±0.05 % |
| | Pt100 (a=0.003920) | | | ±0.08 °C (±0.14 °F) | ±0.05 % |
| | Pt200 (a=0.003920) | | | ±0.24 °C (±0.43 °F) | ±0.05 % |
| | Pt1000 (a=0.003920) | | | ±0.08 °C (±0.14 °F) | ±0.05 % |
| DIN 43760 | Ni50 (a=0.006180) | -60 to 250 °C (-76 to 482 °F) | 10 °C (18 °F) | ±0.16 °C (±0.29 °F) | ±0.05 % |
| | Ni100 (a=0.006180) | | | ±0.08 °C (±0.14 °F) | ±0.05 % |
| | Ni120 (a=0.006180) | | | | ±0.05 % |
| | Ni1000 (a=0.006180) | | | | ±0.05 % |
| OIML R 84 | Cu10 (a=0.004270) | -50 to 200 °C (-58 to 392 °F) | 10 °C (18 °F) | ±0.80 °C (±1.44 °F) | ±0.05 % |
| | Cu100 (a=0.004270) | | | ±0.08 °C (±0.14 °F) | ±0.05 % |
| | Resistance measurement | | | 0 to 500 Ω | 4 Ω |
| | | 0 to 5000 Ω | 40 Ω | ±320 m Ω | ±0.05 % |

* Percentages refer to the configured measuring span

** Standard Version

| Sensor | Measuring range limit | Minimum span | Measuring accuracy | | |
|-----------------------------------|------------------------|-----------------------------------|--------------------------------|---|---------|
| | | | Input (24-bit AD-converter) | Analog output* (16-bit DA-converter) | |
| Thermocouples** / voltages | | | | | |
| IEC 60584 | Type K (Ni10Cr-Ni5) | -270 to 1372 °C (-454 to 2502 °F) | 50 °C (90 °F) | ±0.35 °C (±0.63 °F) | ±0.05 % |
| | Type J (Fe-Cu45Ni) | -210 to 1200 °C (-346 to 2192 °F) | | | ±0.05 % |
| | Type N (Ni14CrSi-NiSi) | -270 to 1300 °C (-454 to 2372 °F) | | | ±0.05 % |
| | Type T (Cu-Cu45Ni) | -270 to 400 °C (-454 to 752 °F) | | | ±0.05 % |
| | Type E (Ni10Cr-Cu45Ni) | -270 to 1000 °C (-454 to 1832 °F) | ±0.05 % | | |
| | Type R (Pt13Rh-Pt) | -50 to 1768 °C (-58 to 3215 °F) | 100 °C (180 °F) | ±0.95 °C (±1.71 °F) | ±0.05 % |
| | Type S (Pt10Rh-Pt) | | | | ±0.05 % |
| | Type B (Pt30Rh-Pt6Rh) | -0 to 1820 °C (32 to 3308 °F) | | | ±0.05 % |
| DIN 43710 | Type L (Fe-CuNi) | -200 to 900 °C (-328 to 1652 °F) | 50 °C (90 °F) | ±0.35 °C (±0.63 °F) | ±0.05 % |
| | Type U (Cu-CuNi) | -200 to 600 °C (-328 to 1112 °F) | | | ±0.05 % |
| ASTM E 988 | Type C | -0 to 2315 °C (32 to 4200 °F) | 100 °C (180 °F) | ±1.35 °C (±2.43 °F) | ±0.05 % |
| | Type D | | | | ±0.05 % |
| | Voltage measurement | -125 to 125 mV | 2 mV | ± 12 µV | ±0.05 % |
| | | -125 to 1100 mV | 20 mV | ± 120 µV | ±0.05 % |

* Percentages refer to the configured measuring span

** For digital measuring accuracy, the internal reference junction error must be added: Pt1000, DIN IEC 60751 Cl. B

... Specification

Operating influence

The percentages refer to the configured measuring span.

Input terminal voltage effect / load effect:

Within the specified limit values for the voltage / load, the total influence is less than 0.001 % per volt.

Common-mode interference

No influence up to 100 V_{eff} (50 Hz) or 50 VDC

Ambient temperature influence:

Based on 23 °C (73.4 °F) for ambient temperature range -40 to 85 °C (-40 to 185 °F)

| Sensor | Ambient temperature effect per 1 °C (1.8 °F) deviation from 23 °C (73.4 °F) | | |
|---|---|---|----------|
| | Input (24 bit AD-converter) | Analog output* (16 bit DA-converter) | |
| Resistance thermometer for two-, three- and four-wire circuits | | | |
| IEC, JIS, MIL | Pt10 | ±0,04 °C (±0.072 °F) | ±0.003 % |
| | Pt50 | ±0.008 °C (±0.014 °F) | ±0.003 % |
| | Pt100 | ±0.004 °C (±0.007 °F) | ±0.003 % |
| IEC, MIL | Pt200 | ±0.02 °C (±0.036 °F) | ±0.003 % |
| | Pt500 | ±0.008 °C (±0.014 °F) | ±0.003 % |
| | Pt1000 | ±0.004 °C (±0.007 °F) | ±0.003 % |
| DIN 43760 | Ni50 | ±0.008 °C (±0.014 °F) | ±0.003 % |
| | Ni100 | ±0.004 °C (±0.007 °F) | ±0.003 % |
| | Ni120 | ±0.003 °C (±0.005 °F) | ±0.003 % |
| | Ni1000 | ±0.004 °C (±0.007 °F) | ±0.003 % |
| OIML R 84 | Cu10 | ±0,04 °C (±0.072 °F) | ±0.003 % |
| | Cu100 | ±0.004 °C (±0.007 °F) | ±0.003 % |
| Resistance measurement | | | |
| | 0 to 500 Ω | ±0.002 Ω | ±0.003 % |
| | 0 to 5000 Ω | ±0.02 Ω | ±0.003 % |
| Thermocouple, for all defined types | | | ±0.003 % |
| | ±[(0.001 % x (ME[mV] / MS[mv]) + (100 % x (0.009 °C / MS [°C]))]** | | ±0.003 % |
| Voltage measurement | | | |
| | -125 to 125 mV | ±15 μV | ±0.003 % |
| | -125 to 1100 mV | ±15 μV | ±0.003 % |

* Percentages refer to the configured measuring span of the analog output signal

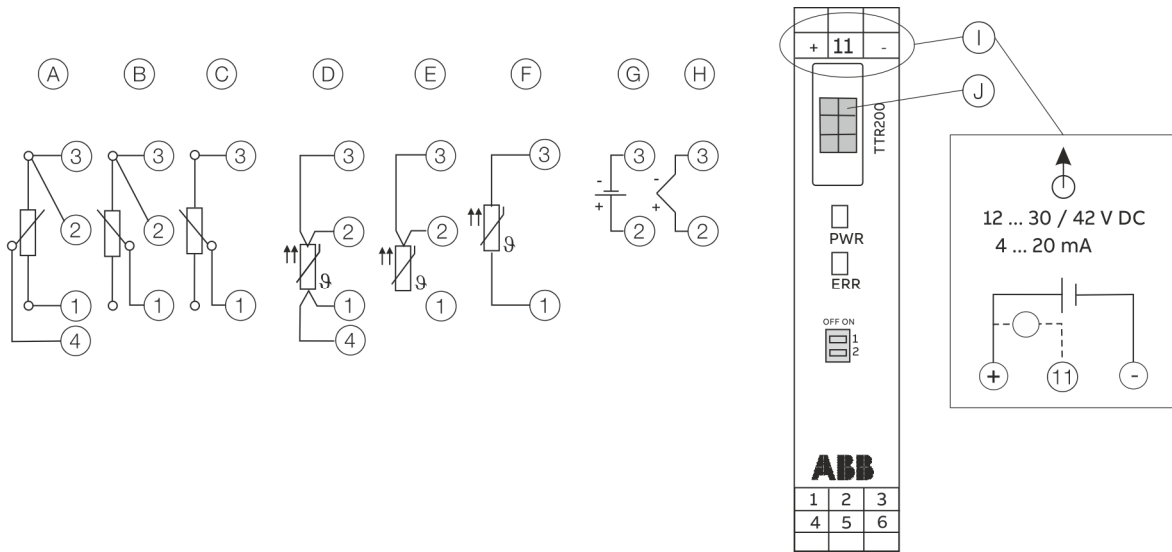
** ME = voltage value of the thermocouple at the upper range value in accordance with the standard

MA = voltage value of the thermocouple at the lower range value in accordance with the standard

MS = voltage value of the thermocouple over the measuring span in accordance with the standard. MS = (ME - MA)

Electrical connections

Pin assignment



- (A) Potentiometer, four-wire circuit
- (B) Potentiometer, three-wire circuit
- (C) Potentiometer, two-wire circuit
- (D) RTD, four-wire circuit
- (E) RTD, three-wire circuit
- (F) RTD, two-wire circuit

- (G) Voltage measurement
- (H) Thermocouple
- (I) Terminal 11: measurement of 4 to 20 mA output current without opening / interrupting the current loop
- (J) No function
- (1) to (4) Sensor connection (of measuring inset)

Figure 2: TTR200 connections

Control and display elements

- **PWR** / green LED: supply voltage display
- **ERR** / red LED: sensor, sensor lead and unit fault signaling
- **DIP switch 1**: on -> Hardware write protection enabled
- **DIP switch 2**: without function

Communication

Configuration parameters

Measurement type

- Sensor type, connection type
- Error signaling
- Measuring range
- General information, e.g. TAG number
- Damping
- Output signal simulation

For details, see **Order form configuration** on page 17.

Write protection

Software write protection

Diagnostic information in accordance with NE 107

- Sensor error signalling (wire break or short-circuit)
- Device error
- Limit value up- / down-scaled
- Upper range up- / down-scaled
- Simulation active

HART® Communication

The device is listed with the FieldComm Group.

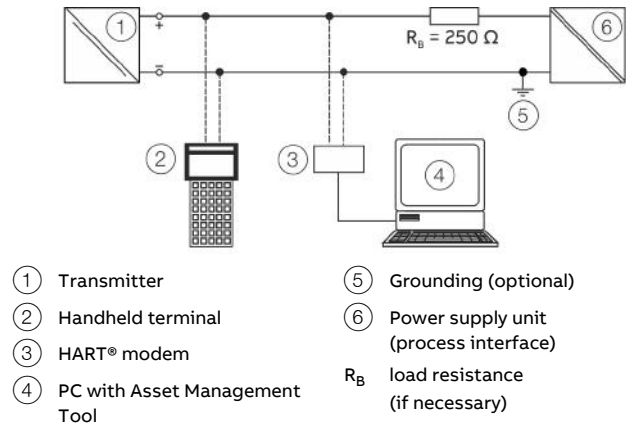


Figure 3: Example for HART connection

| | |
|---------------------|---------------------|
| Manufacturer ID | 0x1A |
| Device Type ID | 0x0D |
| Profile | HART® 5.1 |
| Configuration | DTM, EDD, FDI (FIM) |
| Transmission signal | BELL Standard 202 |

Operating modes

- Point-to-point communication mode – standard (general address 0)
- Multidrop mode (addressing 1 to 15)
- Burst Mode

Diagnosis notice

- Overrange / underrange in accordance with NE 43
- HART® diagnosis

Configuration options / tools

- Device management / Asset management tools
- FDT technology – via TTX200-DTM driver (Asset Vision Basic / DAT200)
- EDD – via TTX200 EDD driver (Handheld terminal, Field Information Manager / FIM)
- FDI technology – via TTX200 Package (Field Information Manager / FIM)

Dimensions

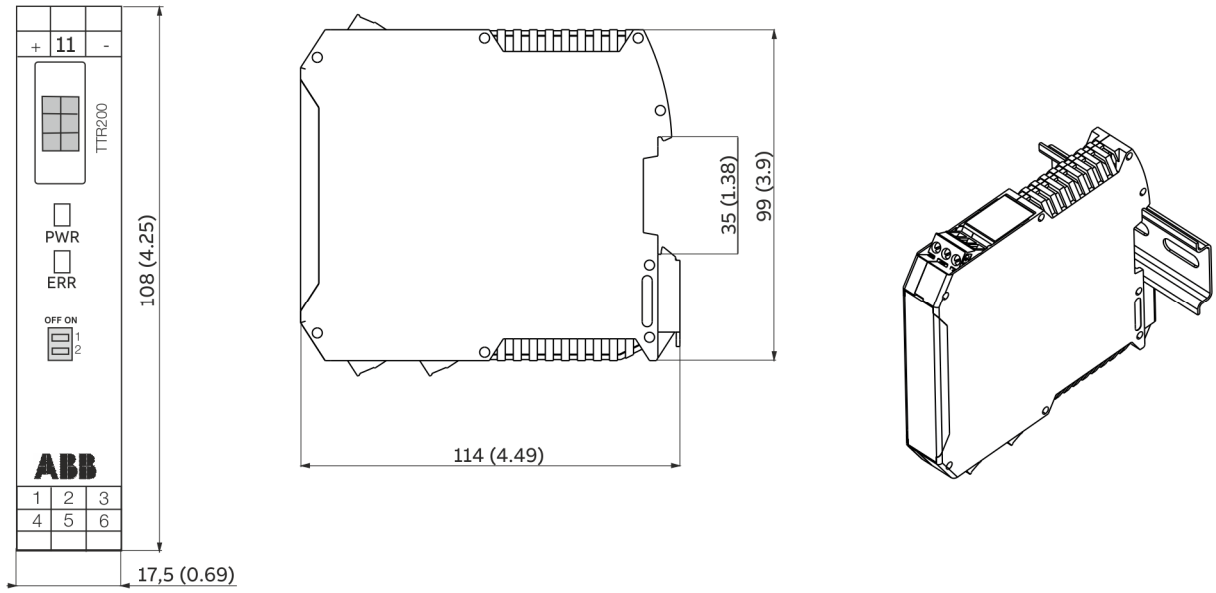


Figure 4: Dimensions in mm (in)

Use in potentially explosive atmospheres in accordance with ATEX and IECEx

Ex marking

Note

- Further information on the approval of devices for use in potentially explosive atmospheres can be found in the explosion protection test certificates (at www.abb.com/temperature).
- Depending on the design, a specific marking in accordance with ATEX or IECEx applies.

ATEX intrinsic safety

The device fulfills the requirements of Directive 2014/34/EU in case of corresponding purchase orders and is approved for use in Zone 0, 1 and 2.

Model TTR200-E1

| | |
|--|--------------------|
| Type Examination Test Certificate | PTB 05 ATEX 2017 X |
| II 1 G Ex ia IIC T6 Ga | |
| II 2 (1) G Ex [ia IIC Ga] ib IIC T6 Gb | |
| II 2 G (1D) Ex [ia IIIC Da] ib IIC T6 Gb | |

Non-sparking ATEX

The device fulfills the requirements of Directive 2014/34/EU in case of corresponding purchase orders and is approved for use in Zone 2.

Model TTR200-E2

| |
|---------------------------|
| Declaration of conformity |
| II 3 G Ex nA IIC T1-T6 Gc |

IECEx intrinsic safety

Approved for use in Zone 0, 1, and 2.

Model TTR200-H1

| | |
|-----------------------------------|--------------------|
| IECEx certificate of conformity | IECEx PTB 09.0014X |
| Ex ia IIC T6...T1 Ga | |
| Ex [ia IIC Ga] ib IIC T6...T1 Gb | |
| Ex [ia IIIC Da] ib IIC T6...T1 Gb | |

Temperature data

ATEX / IECEx intrinsic safety

| Temperature class | Permissible ambient temperature range | |
|-------------------|---------------------------------------|-----------------------------------|
| | Device category 1 use | Device category 2 / 3 use |
| T6 | -40 to 44 °C (-40 to 111.2 °F) | -40 to 56 °C (-40 to 132.8 °F) |
| T4-T1 | -40 to 60 °C (-40 to 140.0 °F) | -40 to 85 °C (-40 to 185.0 °F) |

ATEX Non-sparking

| Temperature class | Device category 3 use |
|-------------------|--------------------------------|
| T6 | -40 to 56 °C (-40 to 132.8 °F) |
| T5 | -40 to 71 °C (-40 to 159.8 °F) |
| T4 | -40 to 85 °C (-40 to 185.0 °F) |

Electrical data

Intrinsic safety type of protection Ex ia IIC (Part 1)

| | Supply circuit |
|-----------------------|------------------------------|
| Max. voltage | $U_i = 30 \text{ V}$ |
| Short-circuit current | $I_i = 130 \text{ mA}$ |
| Max. power | $P_i = 0.8 \text{ W}$ |
| Internal inductance | $L_i = 160 \mu\text{H}^*$ |
| Internal capacitance | $C_i = 0.57 \text{ nF}^{**}$ |

* From HW-Rev. 1.12, previously $L_i = 0.5 \text{ mH}$.

** From HW-Rev. 1.07, previously $C_i = 5 \text{ nF}$.

Intrinsic safety type of protection Ex ia IIC (Part 2)

Thermocouples, voltages

| | Measurement circuit: resistance thermometer, resistances | Measurement circuit: thermocouples, voltages |
|---|---|--|
| Max. voltage | $U_o = 6.5 \text{ V}$ | $U_o = 1.2 \text{ V}$ |
| Short-circuit current | $I_o = 17.8 \text{ mA}^*$ | $I_o = 50 \text{ mA}$ |
| Max. power | $P_o = 29 \text{ mW}^{**}$ | $P_o = 60 \text{ mW}$ |
| Internal inductance | $L_i = 0 \text{ mH}$ | $L_i = 0 \text{ mH}$ |
| Internal capacitance | $C_i = 118 \text{ nF}^{***}$ | $C_i = 118 \text{ nF}^{***}$ |
| Maximum permissible external inductance | $L_o = 5 \text{ mH}$ | $L_o = 5 \text{ mH}$ |
| Maximum permissible external capacitance | $C_o = 1.55 \mu\text{F}$ | $C_o = 1.05 \mu\text{F}$ |

* From HW-Rev. 1.12, previously $I_o = 25 \text{ mA}$.

** From HW-Rev. 1.12, previously $P_o = 38 \text{ mW}$.

*** From HW-Rev. 1.12, previously $C_i = 49 \text{ nF}$.

Use in potentially explosive atmospheres in accordance with FM and CSA

Note

- Further information on the approval of devices for use in potentially explosive atmospheres can be found in the explosion protection test certificates (at www.abb.com/temperature).
- Depending on the design, a specific marking in accordance with FM or CSA applies.

Ex marking

FM Intrinsically Safe

Model TTR200-L6

| | |
|-----------------|-------------------|
| Control Drawing | TTR200-L6H (I.S.) |
|-----------------|-------------------|

Class I, Div. 1 + 2, Groups A, B, C, D

Class I, Zone 0, AEx ia IIC T6

FM Non-Incendive

Model TTR200-L6

| | |
|-----------------|-------------------|
| Control Drawing | TTR200-L6H (N.I.) |
|-----------------|-------------------|

Class I, Div. 2, Groups A, B, C, D

CSA Intrinsically Safe

Model TTR200-R6

| | |
|-----------------|-------------------|
| Control Drawing | TTR200-R6H (I.S.) |
|-----------------|-------------------|

Class I, Div. 1 + 2, Groups A, B, C, D

Class I, Zone 0, Ex ia Group IIC T6

CSA Non-Incendive

Model TTR200-R6

| | |
|-----------------|-------------------|
| Control Drawing | TTR200-R6H (N.I.) |
|-----------------|-------------------|

Class I, Div. 2, Groups A, B, C, D

Ordering Information

TTR200

| Base model | TTR200 | XX | X | XX |
|---|--------|----|---|-----|
| TTR200 Rail Mounted Temperature Transmitter, HART, Pt100 (RTD), thermocouples, electrical isolation | | | | |
| Explosion Protection | | | | |
| Without explosion protection | | Y0 | | |
| ATEX Intrinsic Safety type of protection: Zone 0: II 1 G Ex ia IIC T6 Ga, Zone 1 (0): II 2 (1) G Ex [ia IIC Ga] ib IIC T6 Gb, Zone 1 (20): II 2 G (1D) Ex [ia IIIC Da] ib IIC T6 Gb | | E1 | | |
| ATEX Non-sparking type of protection: Zone 2: II 3 G Ex nA IIC T1-T6 Gc | | E2 | | |
| IECEx Intrinsic Safety type of protection: Zone 0: Ex ia IIC T6 Ga, Zone 1 (0): Ex [ia IIC Ga] ib IIC T6 Gb, Zone 1 (20): Ex [ia IIIC Da] ib IIC T6 Gb | | H1 | | |
| FM Intrinsic Safety (IS): Class I, Div. 1+2, Groups A, B, C, D / Class I, Zone 0, AEx ia IIC T6, Non-incendive (NI): Class I, Div. 2, Groups A, B, C, D | | L6 | | |
| CSA Intrinsic Safety (IS): Class I, Div. 1+2, Groups A, B, C, D / Class I, Zone 0, Ex ia Group IIC T6, Non-incendive (NI): Class I, Div. 2, Groups A, B, C, D | | R6 | | |
| GOST Russia - metrological approval | | G1 | | |
| GOST Russia - metrological approval and EAC-Ex, Ex i - Zone 0 | | P2 | | |
| GOST Kazakhstan - metrological approval | | G3 | | |
| GOST Kazakhstan - metrological approval and EAC-Ex, Ex i - Zone 0 | | T2 | | |
| GOST Belarus - metrological approval | | M5 | | |
| GOST Belarus - metrological approval and EAC-Ex, Ex i - Zone 0 | | U2 | | |
| Inmetro Ex ia IIC T6...T4 Ga, Ex ib [ia Ga] IIC T6...T4 Gb Ex ib [ia IIIC Da] IIC T6...T4 Gb | | C1 | | |
| Communication Protocol | | | | |
| HART | | | H | |
| Configuration | | | | |
| Standard configuration | | | | BS |
| Customer-specific configuration, except user curve | | | | BF* |
| * E. g. set measuring range, TAG no. | | | | |

... Ordering Information

Additional ordering information TTR200

| | XX | XX | XXX | XX | XX |
|---|----|----|-----|----|----|
| Declarations and Certificates | | | | | |
| SIL2 - Declaration of Conformity | CS | | | | |
| Declaration of compliance according EN 10204-2.1, with the order | C4 | | | | |
| Inspection certificate according EN 10204-3.1, visual, dimensional and functional test | C6 | | | | |
| Calibration Certificates | | | | | |
| With 5-point factory certificate | | EM | | | |
| Inspection certificate according EN 10204-3.1, 5-point calibration | | EP | | | |
| Handling of Certificates | | | | | |
| Send via e-mail | | | GHE | | |
| Send via mail | | | GHP | | |
| Send via mail express | | | GHD | | |
| Send with instrument | | | GHA | | |
| Only archived | | | GHS | | |
| Customer-specific Versions | | | | | |
| (Please specify) | | | | | Z9 |
| Documentation Language | | | | | |
| German | | | | | M1 |
| English | | | | | M5 |
| Language package Western Europe / Scandinavia (Languages: DA, ES, FR, IT, NL, PT, FI, SV) | | | | | MW |
| Language package Eastern Europe (Languages: EL, CS, ET, LV, LT, HU, HR, PL, SK, SL, RO, BG) | | | | | ME |

* E. g. set measuring range, TAG no.

Order form configuration

HART device design: Instructions for customer-specific configuration

| Configuration | | Selection | |
|--|------------------------|--|---|
| IEC 60751 | Resistance thermometer | <input type="checkbox"/> Pt10 | <input type="checkbox"/> Pt50 |
| | | <input type="checkbox"/> Pt100 (Standard) | <input type="checkbox"/> Pt200 |
| | | <input type="checkbox"/> Pt500 | <input type="checkbox"/> Pt1000 |
| JIS C1604 | | <input type="checkbox"/> Pt10 | <input type="checkbox"/> Pt50 |
| | | <input type="checkbox"/> Pt100 | |
| MIL-T-24388 | | <input type="checkbox"/> Pt10 | <input type="checkbox"/> Pt50 |
| | | <input type="checkbox"/> Pt100 | <input type="checkbox"/> Pt200 |
| | | <input type="checkbox"/> Pt1000 | |
| DIN 43760 | | <input type="checkbox"/> Ni50 | <input type="checkbox"/> Ni100 |
| | | <input type="checkbox"/> Ni120 | <input type="checkbox"/> Ni1000 |
| OIML R 84 | | <input type="checkbox"/> Cu10 | <input type="checkbox"/> Cu100 |
| | Resistance measurement | <input type="checkbox"/> 0 to 500 Ω | <input type="checkbox"/> 0 to 5000 Ω |
| IEC 60584 | Thermocouple | <input type="checkbox"/> Type K | <input type="checkbox"/> Type J |
| | | <input type="checkbox"/> Type N | <input type="checkbox"/> Type R |
| | | <input type="checkbox"/> Type S | <input type="checkbox"/> Type T |
| | | <input type="checkbox"/> Type E | <input type="checkbox"/> Type B |
| DIN 43710 | | <input type="checkbox"/> Type L | <input type="checkbox"/> Type U |
| ASTM E-988 | | <input type="checkbox"/> Type C | <input type="checkbox"/> Type D |
| | Voltage measurement | <input type="checkbox"/> -125 to 125 mV | <input type="checkbox"/> -125 to 1100 mV |
| Sensor circuit | | <input type="checkbox"/> Two-wire | <input type="checkbox"/> Three-wire (standard) |
| | | <input type="checkbox"/> Four-wire | |
| (for resistance thermometer and resistance measurement only) | | Two-wire circuit: Compensation of sensor-wire resistance max. 100 Ω | |
| | | <input type="checkbox"/> Sensor 1: _____ Ω | |
| Reference junction | | <input type="checkbox"/> Internal (for standard thermocouple, except type B) | <input type="checkbox"/> None (type B) |
| (for thermocouples only) | | <input type="checkbox"/> External / temperature: _____ $^{\circ}\text{C}$ | |
| Measuring range | | <input type="checkbox"/> Lower range value : _____ (standard: 0) | |
| | | <input type="checkbox"/> Upper range value : _____ (standard: 100) | |
| Unit | | <input type="checkbox"/> Celsius (default) | <input type="checkbox"/> Fahrenheit |
| | | <input type="checkbox"/> Rankine | <input type="checkbox"/> Kelvin |
| Characteristic behavior | | <input type="checkbox"/> rising 4 to 20 mA (standard) | <input type="checkbox"/> falling 20 to 4 mA |
| Output behavior for error | | <input type="checkbox"/> Overrange / 22 mA (standard) | <input type="checkbox"/> Underrange / 3.6 mA |
| Output damping (T_{63}) | | <input type="checkbox"/> Off (standard) | <input type="checkbox"/> _____ seconds (1 to 100 s) |
| TAG number | | <input type="checkbox"/> _____ (maximum 8 characters) | |
| Software write protection | | <input type="checkbox"/> Off (standard) | <input type="checkbox"/> On |



Trademarks

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