

TTH200

Head-mount temperature transmitter

Temperature transmitter for HART protocol.
Suitable for all standard requirements.

Measurement made easy



Communication / output

- HART protocol
- 4 ... 20 mA

Input

- RTD, resistance thermometer
- Thermocouples
- Resistance-type remote sensor
- Voltages, mV voltages

Electrical isolation

- All input and output circuits

Input functionality

- Sensor error adjustment

Continuous sensor monitoring and self-monitoring

- Supply voltage monitoring
- Wire break and corrosion monitoring in accordance with NE 89

Functional safety

SIL 2 / SIL 3 in accordance with IEC 61508

Device safety in accordance with NE 53

Configuration

- FIM, DTM, EDD

Global approvals for explosion protection

- ATEX, IECEx, Zone 0
- FM, CSA
- GOST / EAC Ex
- Inmetro
- NEPSI

LCD display, optional

TTH200

Head-mount temperature transmitter

Specifications

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

- 28 years at 60 °C 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 ... 1000 ms

Measured value update

- 10/s, independent of sensor type and sensor circuit

Output filter

- Digital filter 1st order: 0 ... 100 s

Weight

- 50 g

Material

- Housing: polycarbonate
- Color: gray RAL9002
- Sealing compound: hard sealing compound

Installation conditions

- Mounting position: no restrictions
- Installation options:
 - Connection heads in accordance with DIN 43729 form B
 - Rail mounting (35 mm) in accordance with EN 60175 by means of latching base
 - Field mount housing

Electrical connection

- Terminals with captive screws, incl. soldering tags
- Lines up to maximum 1.5 mm² (AWG 16)
- Connection for handheld terminal

Dimensions

See chapter "Dimensions" on page 10.

Ambient conditions

Ambient temperature

- Standard: -40 ... 85 °C (-40 ... 185 °F)
- Restricted range during operation with LCD display: -20 ... 70 °C (-4 ... 158 °F)
- Restricted range during operation with explosion-proof design: see corresponding certificate

Transport / storage temperature

- -50 ... 85 °C (-58 ... 185 °F)

Climate class in accordance with DIN EN 60654-1

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

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

- 100 % relative humidity

Vibration resistance in accordance with IEC 60068-2-6

- 10 ... 2000 Hz at 5 g, during operation and transport

Shock resistance in accordance with IEC 68-2-27)

- $g_n = 30$, during operation and transport

IP rating

- Power supply circuit: IP 20
- Measurement current circuit: IP 00, or IP rating of installation housing

Electromagnetic compatibility

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

Interference immune in accordance with IEC 61326 and Namur NE 21.

Pt100: measuring range 0 ... 100 °C (32 ... 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 ¹⁾	6 kV	NO
– Sensor terminals ¹⁾	4 kV	NO
Radiated field		
80 MHz ... 2 GHz	10 V/m	< 0,5 %
Coupling		
150 kHz ... 80 MHz	10 V	< 0,5 %
Surge		
between the supply lines	0,5 kV	No malfunction
Line to ground	1 kV	No malfunction

1) Air discharge (at 1 mm (0.04 inch) distance)

SIL functional safety

Conforms with IEC 61508 as regards use in safety related applications, up to and including SIL 3 (redundant). While using the transmitter, the device fulfills the requirements in accordance with SIL 2. While using two redundant transmitters, the device fulfills the requirements in accordance with SIL 3.

Type AS LC display

Can only be ordered in conjunction with temperature transmitter.

CE marking

- The type AS LCD display fulfills all requirements for CE marking in accordance with all applicable guidelines.

Properties

Transmitter-controlled graphic (alphanumeric) LCD display without configuration function

- Character height, mode-dependent
- Sign, 4 digits, 2 decimal places
- Rotatable in 12 increments of 30°

Display options

- Process data for sensors
- Bargraph
- Output %

Display diagnostic information related to transmitter and sensor status

Specifications

Temperature range

- -20 ... 70 °C (-4 ... 158 °F)

Restricted display function (contrast, reaction time) in the temperature ranges:

- -40 ... -20 °C (-40 ... -4 °F)
or
- 70 ... 85 °C (158 ... 185 °F)

Humidity

- 0 ... 100 %, condensation permitted



A11163

Fig. 1: Type AS LCD display

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Head-mount temperature transmitter

Input - resistance thermometer / resistances

Resistance thermometer

- Pt100 according to IEC 60751, JIS C1604, MIL-T-24388
- Ni according to DIN 43760
- Cu according to recommendation OIML R 84

Resistance measurement

- 0 ... 500 Ω
- 0 ... 5000 Ω

Sensor connection type

- Two-, Three-, Four wire-circuits

Connection lead

- Maximum sensor line resistance:
of 50 Ω per line 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 μ A

Sensor short circuit < 5 Ω (for resistance thermometers)

Sensor wire break

- Measuring range: 0 ... 500 Ω > 0.6 ... 10 k Ω
- Measuring range: 0 ... 5 k Ω > 5.3 ... 10 k Ω

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 breakage
- 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 ... 125 mV
- -125 ... 1100 mV

Supply line

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

Sensor wire break monitoring in accordance with NE 89

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

Input resistance > 10 M Ω

Internal reference junction Pt1000, IEC 60751 Cl. B
(no additional jumpers necessary)

Sensor error signaling

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

Output

Transmission behavior

- Temperature linear
- Resistance linear
- Voltage linear

Output signal

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

Simulation mode 3.5 ... 23.6 mA

Induced current consumption < 3.5 mA

Maximum output current 23.6 mA

Configurable error current signal

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

Power supply

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

i NOTICE

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:
 $U_S = 11 \dots 42 \text{ V DC}$
- Ex applications:
 $U_S = 11 \dots 30 \text{ V DC}$

Max. permissible residual ripple for input terminal voltage

- During communication in accordance with HART FSK "Physical Layer" specification.

Undervoltage detection on the transmitter

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

Maximum load

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

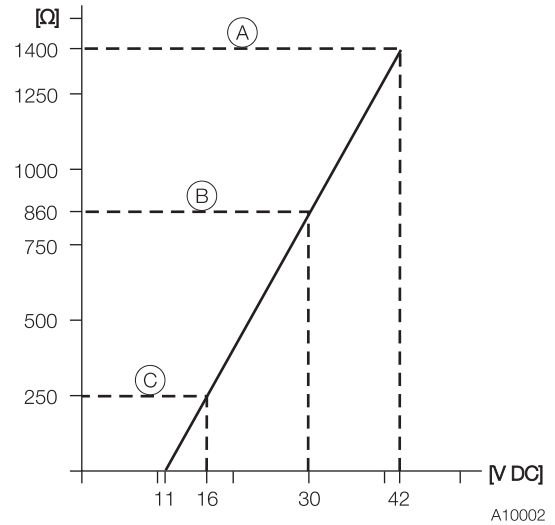


Fig. 2: Maximum load depending on input terminal voltage
Ⓐ TTH200 Ⓑ TTH200 In Ex ia hazardous area design Ⓒ HART communication resistance

Maximum power consumption

- $P = U_S \times 0.022 \text{ A}$
- e. g. $U_S = 24 \text{ V} \rightarrow P_{\text{max}} = 0.528 \text{ W}$

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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).

Sensor		Measuring range limits	Minimum span	Digital measuring accuracy (24-bit AD-converter)	DA measuring accuracy ¹⁾ (16-bit DA)
Resistance thermometer/resistor					
DIN IEC 60751	Pt10 (a=0.003850)	-200 ... 850 °C (-328 ... 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) ²⁾			± 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 ... 645 °C (-328 ... 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 ... 850 °C (-328 ... 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 ... 250 °C (-76 ... 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 %	± 0.05 %
	Ni1000 (a=0.006180)			± 0.05 %	± 0.05 %
OIML R 84	Cu10 (a=0.004270)	-50 ... 200 °C (-58 ... 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 ... 500 Ω	4 Ω	± 32 m Ω	± 0.05 %
		0 ... 5000 Ω	40 Ω	± 320 m Ω	± 0.05 %
Thermocouples ³⁾ / voltages					
IEC 60584	Type K (Ni10Cr-Ni5)	-270 ... 1372 °C (-454 ... 2502 °F)	50 °C (90 °F)	± 0.35 °C (± 0.63 °F)	± 0.05 %
	Type J (Fe-Cu45Ni)	-210 ... 1200 °C (-346 ... 2192 °F)			± 0.05 %
	Type N (Ni14CrSi-NiSi)	-270 ... 1300 °C (-454 ... 2372 °F)			± 0.05 %
	Type T (Cu-Cu45Ni)	-270 ... 400 °C (-454 ... 752 °F)			± 0.05 %
	Type E (Ni10Cr-Cu45Ni)	-270 ... 1000 °C (-454 ... 1832 °F)			± 0.05 %
	Type R (Pt13Rh-Pt)	-50 ... 1768 °C (-58 ... 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 ... 1820 °C (32 ... 3308 °F)		± 0.05 %	
DIN 43710	Type L (Fe-CuNi)	-200 ... 900 °C (-328 ... 1652 °F)	50 °C (90 °F)	± 0.35 °C (± 0.63 °F)	± 0.05 %
	Type U (Cu-CuNi)	-200 ... 600 °C (-328 ... 1112 °F)			± 0.05 %
ASTM E 988	Type C	-0 ... 2315 °C (32 ... 4200 °F)	100 °C (180 °F)	± 1.35 °C (± 2.43 °F)	± 0.05 %
	Type D				± 0.05 %
	Voltage measurement	-125 ... 125 mV	2 mV	± 12 μ V	± 0.05 %
		-125 ... 1100 mV	20 mV	± 120 μ V	± 0.05 %

Long-term drift: ± 0.05 °C (± 0.09 °F) or ± 0.05 %¹⁾ per year, the larger value applies.

1) Percentages refer to the configured measuring span

2) Standard model

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

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 effect: based on 23 °C (73.4 °F) for an ambient temperature range of -40 ... 85 °C (-40 ... 185 °F)

Sensor		Ambient temperature effect per 1 °C (1.8 °F) deviation from 23 °C (73.4 °F) for digital measured value	Ambient temperature effect ^{1) 2)} per 1 °C (1.8 °F) deviation from 23 °C (73.4 °F) for 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 ... 500 Ω	± 0.002 Ω	± 0.003 %
	0 ... 5000 Ω	± 0.02 Ω	± 0.003 %
Thermocouple, for all defined types		± [(0.001 % × (ME[mV] / MS[mV]) + (100 % × (0.009 °C / MS [°C])) ³⁾	± 0.003 %
Voltage measurement			
	-125 ... 125 mV	± 1.5 μV	± 0.003 %
	-125 ... 1100 mV	± 15 μV	± 0.003 %

1) Percentages refer to the configured measuring span of the analog output signal

2) Influence of the DA-converter

3) 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

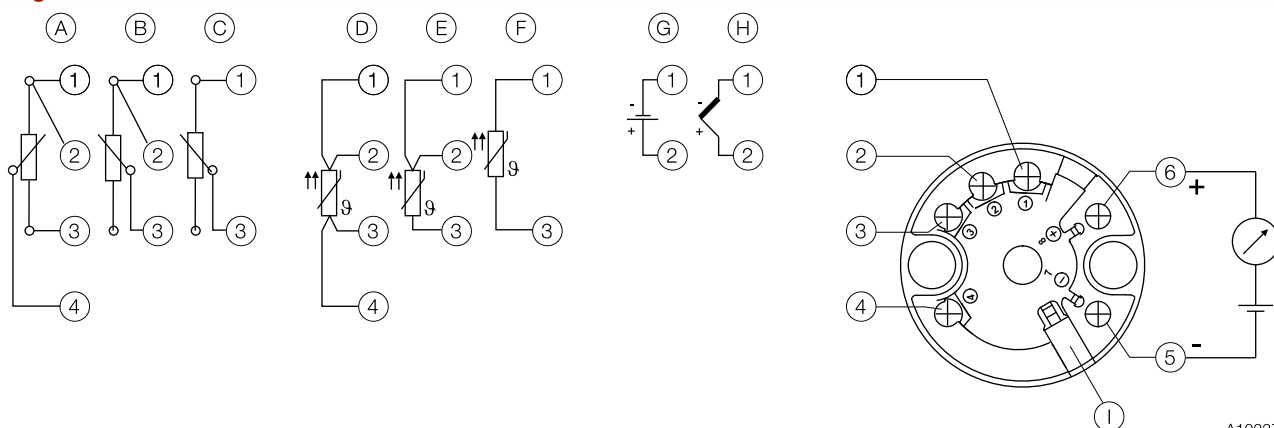
MS = voltage value of the thermocouple over the measuring span in accordance with the standard. MS = (ME - MA)

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Electrical connections

Pin assignment



A10237

Fig. 3
 (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) Interface for LCD display type AS
 (1) - (4) Sensor connection (from measuring inset) (5) - (6) 4 ... 20 mA HART

Communication

Configuration parameters

Measurement type

- Sensor type, connection type
- Error signaling
- Measuring range
- General information, e.g. TAG number
- Damping
- Output signal simulation
- Limit over/undershot "Order form configuration" on page 17

Write protection

- Software write protection

Diagnostic information in accordance with NE 107

- Sensor error signaling (wire break or short circuit)
- Device error
- Limit value overshoot/undershoot
- Measuring range overshoot/undershoot
- Simulation active

The device is listed with the FieldComm Group.

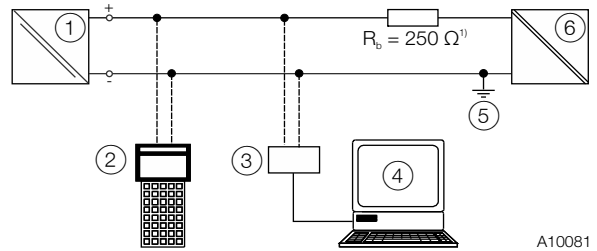


Fig. 4: Example for HART connection

- ① Transmitter ② Handheld terminal ③ HART modem ④ FDT / DTM technology ⑤ Grounding (optional) ⑥ Power supply unit (process interface)

1) If required

Manufacturer ID	0x1A
Device Type ID	0x0D
Profile	HART 5.1
Configuration	DTM EDD
Transmission signal	BELL Standard 202

Operating modes

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

Configuration options and tools

- Device management / asset management tools
- FDT / DTM technology – via TTX200-DTM driver
- EDD - via TTX200 EDD driver

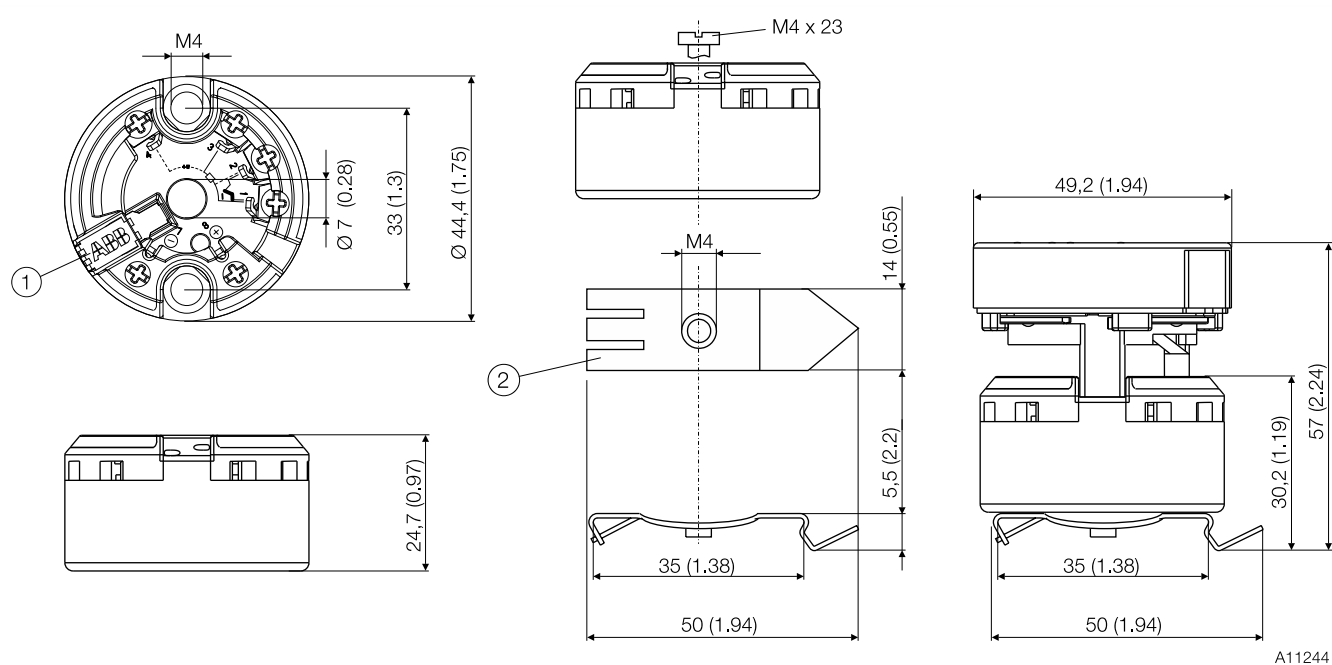
Diagnostic message

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

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Dimensions



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Fig. 5: Dimensions in mm / inch

① Interface for LCD display type AS (not suited for LCD display type A) ② Latching base for 35 mm (1.38 inch) Rail mounting in accordance with EN 60175

Use in potentially explosive atmospheres according to ATEX and IECEx

i NOTICE

- 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.

Ex-marking

Transmitter

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 TTH200-E1

Type Examination Test Certificate:	PTB 05 ATEX 2017 X
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II 1 G Ex ia IIC T6 Ga

II 2 (1) G Ex [ia] ib IIC T6 Gb (Ga)

II 2 G (1D) Ex [iaD] ib IIC T6 Gb (Da)

ATEX Non-sparking

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 TTH200-E2

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

IECEx intrinsic safety

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

Model TTH200-H1

IECEx certificate of conformity	IECEx PTB 09.0014X
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Ex ia IIC T6...T1 Ga

Ex [ia] ib IIC T6...T1 Gb (Ga)

Ex [ia IIC Da] ib IIC T6...T1 Gb

LCD indicators

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.

Type Examination Test Certificate:	PTB 05 ATEX 2079 X
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II 1G Ex ia IIC T6 Ga

ATEX Non-sparking

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

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

IECEx intrinsic safety

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

IECEx certificate of conformity	IECEx PTB 12.0028X
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Ex ia IIC T6

Temperature data

Transmitter

ATEX / IECEx intrinsic safety

Temperature class	Permissible ambient temperature range	
	Device category 1 use	Device category 2 / 3 use
T6	-40 ... 44 °C (-40 ... 111.2 °F)	-40 ... 56 °C (-40 ... 132.8 °F)
T5	-40 ... 56 °C (-40 ... 132.8 °F)	-40 ... 71 °C (-40 ... 159.8 °F)
T4-T1	-40 ... 60 °C (-40 ... 140.0 °F)	-40 ... 85 °C (-40 ... 185.0 °F)

ATEX Non-sparking

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

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LCD indicators

ATEX / IECEx intrinsic safety

Temperature class	Permissible ambient temperature range	
	Device category 1 use	Device category 2 / 3 use
T6	-40 ... 44 °C (-40 ... 111.2 °F)	-40 ... 56 °C (-40 ... 132.8 °F)
T5	-40 ... 56 °C (-40 ... 132.8 °F)	-40 ... 71 °C (-40 ... 159.8 °F)
T4-T1	-40 ... 60 °C (-40 ... 140 °F)	-40 ... 85 °C (-40 ... 185 °F)

Electrical data

Transmitter

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	$L_i = 160 \mu\text{H}^{1)}$
Internal capacitance	$C_i = 0.57 \text{ nF}^{2)}$

1) From HW rev. 1.12, previously $L_i = 0.5 \text{ mH}$.

2) 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	$I_o = 17.8 \text{ mA}^{1)}$	$I_o = 50 \text{ mA}$
Max. power	$P_o = 29 \text{ mW}^{2)}$	$P_o = 60 \text{ mW}$
Internal inductance	$L_i = 0 \text{ mH}$	$L_i = 0 \text{ mH}$
Internal capacitance	$C_i = 118 \text{ nF}^{3)}$	$C_i = 118 \text{ nF}^{3)}$
Maximum permissible external inductance	$L_o = 5 \text{ mH}$	$L_o = 5 \text{ mH}$
Maximum permissible external capacitance	$C_o = 1.55 \mu\text{F}$	$C_o = 1.05 \mu\text{F}$

1) From HW rev. 1.12, previously $I_o = 25 \text{ mA}$.

2) From HW rev. 1.12, previously $P_o = 38 \text{ mW}$.

3) From HW rev. 1.12, previously $C_i = 49 \text{ nF}$.

Intrinsic safety type of protection Ex ia IIC (part 3)

	LCD display interface
Max. voltage	$U_o = 6.2 \text{ V}$
Short-circuit current	$I_o = 65.2 \text{ mA}$
Max. power	$P_o = 101 \text{ mW}$
Internal inductance	$L_i = 0 \text{ mH}$
Internal capacitance	$C_i = 0 \text{ nF}$
Maximum permissible external inductance	$L_o = 5 \text{ mH}$
Maximum permissible external capacitance	$C_o = 1.4 \mu\text{F}$

LCD indicators

Intrinsic safety type of protection Ex ia IIC

Supply circuit

Max. voltage	$U_i = 9 \text{ V}$
Short-circuit current	$I_i = 65.2 \text{ mA}$
Max. power	$P_i = 101 \text{ mW}$
Internal inductance	$L_i = 0 \text{ mH}$
Internal capacitance	$C_i = 0 \text{ nF}$

Use in potentially explosive atmospheres in accordance with FM and CSA

i NOTICE

- 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 Transmitter

FM Intrinsically Safe

Model TTH200-L1

Control Drawing	TTH200-L1H (I.S.)
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Class I, Div. 1 + 2, Groups A, B, C, D

Class I, Zone 0, AEx ia IIC T6

FM Non-Incendive

Model TTH200-L2

Control Drawing	TTH200-L2H (N.I.)
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Class I, Div. 2, Groups A, B, C, D

CSA Intrinsically Safe

Model TTH200-R1

Control Drawing	TTH200-R1H (I.S.)
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Class I, Div. 1 + 2, Groups A, B, C, D

Class I, Zone 0, Ex ia Group IIC T6

CSA Non-Incendive

Model TTH200-R2

Control Drawing	TTH200-R2H (1) (N.I.) TTH200-R2H (2, no conduit) (N.I.)
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Class I, Div. 2, Groups A, B, C, D

LCD indicators

FM Intrinsically Safe

Control Drawing	SAP_214 748
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I.S. Class I Div 1 and Div 2, Group: A, B, C, D or

I.S. Class I Zone 0 AEx ia IIC T¹⁾

$U_i / V_{max} = 9 \text{ V}$, $I_i / I_{max} < 65.2 \text{ mA}$, $P_i = 101 \text{ mW}$, $C_i = 0.4 \text{ }\mu\text{F}$, $L_i = 0$

FM Non-Incendive

Control Drawing	SAP_214 751
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N.I. Class I Div 2, Group: A, B, C, D or Ex nL IIC T²⁾, Class I Zone 2

$U_i / V_{max} = 9 \text{ V}$, $I_i / I_{max} < 65.2 \text{ mA}$, $P_i = 101 \text{ mW}$, $C_i = 0.4 \text{ }\mu\text{F}$, $L_i = 0$

CSA Intrinsically Safe

Control Drawing	SAP_214 749
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I.S. Class I Div 1 and Div 2; Group: A, B, C, D or

I.S. Zone 0 Ex ia IIC T¹⁾

$U_i / V_{max} = 9 \text{ V}$, $I_i / I_{max} < 65.2 \text{ mA}$, $P_i = 101 \text{ mW}$, $C_i < 0.4 \text{ }\mu\text{F}$, $L_i = 0$

CSA Non-Incendive

Control Drawing	SAP_214 750
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N.I. Class I Div 2, Group: A, B, C, D oder Ex nL IIC T²⁾, Class I Zone 2

$U_i / V_{max} = 9 \text{ V}$, $I_i / I_{max} < 65.2 \text{ mA}$, $P_i = 101 \text{ mW}$, $C_i < 0.4 \text{ }\mu\text{F}$, $L_i = 0$

1) Temp. Ident: T6 T_{amb} 56 °C, T4 T_{amb} 85 °C

2) Temp. Ident: T6 T_{amb} 60 °C, T4 T_{amb} 85 °C

TTH200

Head-mount temperature transmitter

Ordering Information

Ordering information TTH200

Base model	TTH200	XX	X	X
TTH200 Head 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, Zone 1 (0): II 2 (1) G Ex [ia] ib IIC T6, Zone 1 (20): II 2 G (1D) Ex [iaD] ib IIC T6		E1		
ATEX Non-sparking type of protection: Zone 2: II 3 G Ex nA T6		E2		
IECEX Intrinsic Safety type of protection: Zone 0: Ex ia IIC T6, Zone 1 (0): Ex [ia] ib IIC T6, Zone 1 (20): Ex [iaD] ib IIC T6		H1		
FM Intrinsic Safety (IS): Class I, Div. 1+2, Groups A, B, C, D, Class I, Zone 0, AEx ia IIC T6		L1		
FM Non-incendive (NI): Class I, Div. 2, Groups A, B, C, D		L2		
CSA Intrinsic Safety (IS): Class I, Div. 1+2, Groups A, B, C, D		R1		
CSA Non-incendive (NI): Class I, Div. 2, Groups A, B, C, D		R2		
GOST Russia - metrological approval		G1		
GOST Russia - metrological approval and EAC-Ex, Ex i - Zone 0		G2		
GOST Kazakhstan - metrological approval		G3		
GOST Kazakhstan - metrological approval and EAC-Ex, Ex i - Zone 0		T2		
Inmetro Ex ia IIC T6...T4 Ga, Ex ib [ia Ga] IIC T6...T4 Gb Exib [ia IIC Da] IIC T6...T4 Gb		C1		
Communication Protocol				
HART, programmable, output signal 4 ... 20 mA			H	
Configuration				
Standard configuration				BS
Customer-specific configuration, except user curve			1)	BF

Additional ordering information TTH200

	XX	XX	XXX	XX	XX	XX	XX
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				
Field Housing							
Aluminium field housing 80 x 75 x 57 mm, IP 65, including 2 pieces M16 cable glands			2)	H1			
Polyester field housing 75 x 80 x 55 mm, IP 65, including 2 pieces M16 cable glands			2)	H2			
Polycarbonate field housing 80 x 82 x 55 mm, IP 65, including 2 pieces M16 cable glands			2)	H3			
Aluminium field housing 175 x 80 x 57 mm with separate terminal block, IP 65, including 1 piece M16 and 2 pieces M20 cable glands			2)	H5			
Aluminium field housing 175 x 80 x 57 mm without separate terminal block, IP 65, including 1 piece M16 and 2 pieces M20 cable glands			2)	H6			
Polyester field housing 190 x 75 x 55 mm with separate terminal block, IP 65, including 1 piece M16 and 2 pieces M20 cable glands			2)	H7			
Polyester field housing 190 x 75 x 55 mm without separate terminal block, IP 65, including 1 piece M16 and 2 pieces M20 cable glands			2)	H8			
Display Options							
LCD indicator type AS						D3	
Mounting Options							
Snap-on fixing set for 35 mm rail acc. EN 60175 (incl. fixing screws)							SF
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

1) E.g. set measuring range, TAG no.

2) Not available with Explosion Protection

TTH200

Head-mount temperature transmitter

Accessories	Order no.
TTH latching base set (packaging unit: 10 pcs.), for 35 mm rail in acc. with EN 60175 (incl. mounting screws)	3KXT091230L0001
TTH latching base set (packaging unit: 1 pcs.), for 35 mm rail in acc. with EN 60175 (incl. mounting screws)	3KXT091230L0002
TTH200 documentation on CD-ROM	3KXT231002R0800
TTH200 commissioning instructions, English	3KXT231002R4401
TTH200 commissioning instructions, German	3KXT231002R4403
TTH200 commissioning instructions, Western Europe / Scandinavia language package	3KXT231002R4493
TTH200 commissioning instructions, Eastern Europe language package	3KXT231002R4494

Trademarks

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Order form configuration

HART device design: Instructions for customer-specific configuration

Configuration		Selection
IEC 60751 JIS C1604 MIL-T-24388 DIN 43760 OIML R 84	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 <input type="checkbox"/> Pt10 <input type="checkbox"/> Pt50 <input type="checkbox"/> Pt100 <input type="checkbox"/> Pt10 <input type="checkbox"/> Pt50 <input type="checkbox"/> Pt100 <input type="checkbox"/> Pt200 <input type="checkbox"/> Pt1000 <input type="checkbox"/> Ni50 <input type="checkbox"/> Ni100 <input type="checkbox"/> Ni120 <input type="checkbox"/> Ni1000 <input type="checkbox"/> Cu10 <input type="checkbox"/> Cu100
	Resistance measurement	<input type="checkbox"/> 0 ... 500 Ω <input type="checkbox"/> 0 ... 5000
IEC 60584 DIN 43710 ASTM E-988	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 <input type="checkbox"/> Type L <input type="checkbox"/> Type U <input type="checkbox"/> Type C <input type="checkbox"/> Type D
	Voltage measurement	<input type="checkbox"/> -125 ... 125 mV <input type="checkbox"/> -125 ... 1100 mV
Sensor circuit (for resistance thermometer and resistance measurement only)		<input type="checkbox"/> Two-wire <input type="checkbox"/> Three-wire (standard) <input type="checkbox"/> Four-wire Two-wire circuit: Compensation of sensor-wire resistance max. 100 Ω <input type="checkbox"/> Sensor 1: ____ Ω
Reference junction (for thermocouples only)		<input type="checkbox"/> Internal (for standard thermocouple, except type B) <input type="checkbox"/> None (type B) <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 ... 20 mA (standard) <input type="checkbox"/> Falling 20 ... 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 ... 100 s)
TAG number		<input type="checkbox"/> _____ (maximum 8 characters)
Software write protection		<input type="checkbox"/> Off (standard) <input type="checkbox"/> On

Notes

Notes

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Sales



Service