

Head-mount temperature transmitter



Measurement made easy

Temperature transmitter for 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
- Continuous monitoring of supply voltage
- Wire break / corrosion monitoring in accordance with NE 89

Use

- Configuration in accordance with the FDT / DTM, EDD or FDI standard (FIM)
- Turnable LCD indicator for optimal readability (option)

Specification

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

- 50 g

Material

- Housing: polycarbonate
- Color: gray RAL9002
- Encapsulation resin: polyurethane (PUR), WEVO PU-417

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 stainless steel screws, including soldering tags
- Lines up to a maximum of 1.5 mm² (AWG 16)
- Connection for handheld terminal

Dimensions

Refer to **Dimensions** on page 12.

Ambient conditions

Ambient temperature

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

Transport- / Storage temperature

-50 to 85 °C (-58 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

- Power supply circuit: IP 20
- Measurement current circuit: IP 00 or IP-rating of 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.

Type AS LC display

Can only be ordered in conjunction with temperature transmitter.

CE marking

The type AS LCD indicator 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
- Turnable in 12 increments of 30° each

Display options

- Process value sensor
- Bargraph
- Output %

Display diagnostic information related to transmitter and sensor status

Specification

Temperature range

- -20 to 70 °C (-4 to 158 °F)

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

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

Humidity

- 0 to 100 %, condensation permitted



Figure 1: Type AS LCD indicator

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 μ A

Sensor short circuit

< 5 Ω (for resistance thermometer)

Sensor wire break

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

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)

... Specification

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

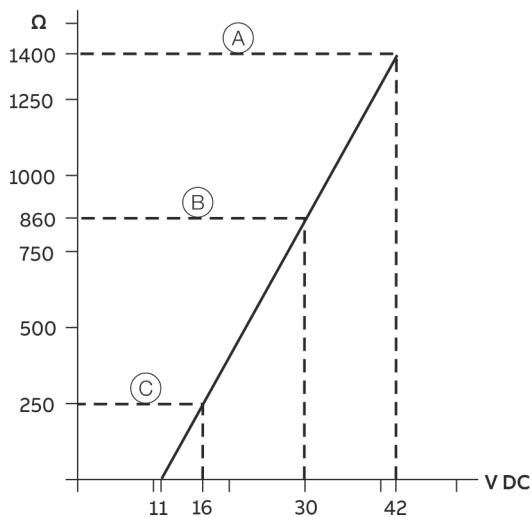
During communication, this is in accordance with the HART® FSK 'Physical Layer' specification.

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) TTH200

(B) TTH200 in Ex-applications

(C) HART® communication resistance (R_B)

Figure 2: Maximum load depending on input terminal voltage

Maximum power

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

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	±32 mΩ	±0.05 %
		0 to 5000 Ω	40 Ω	±320 mΩ	±0.05 %

* Percentages refer to the configured measuring span

** Standard Version

... Specification

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

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

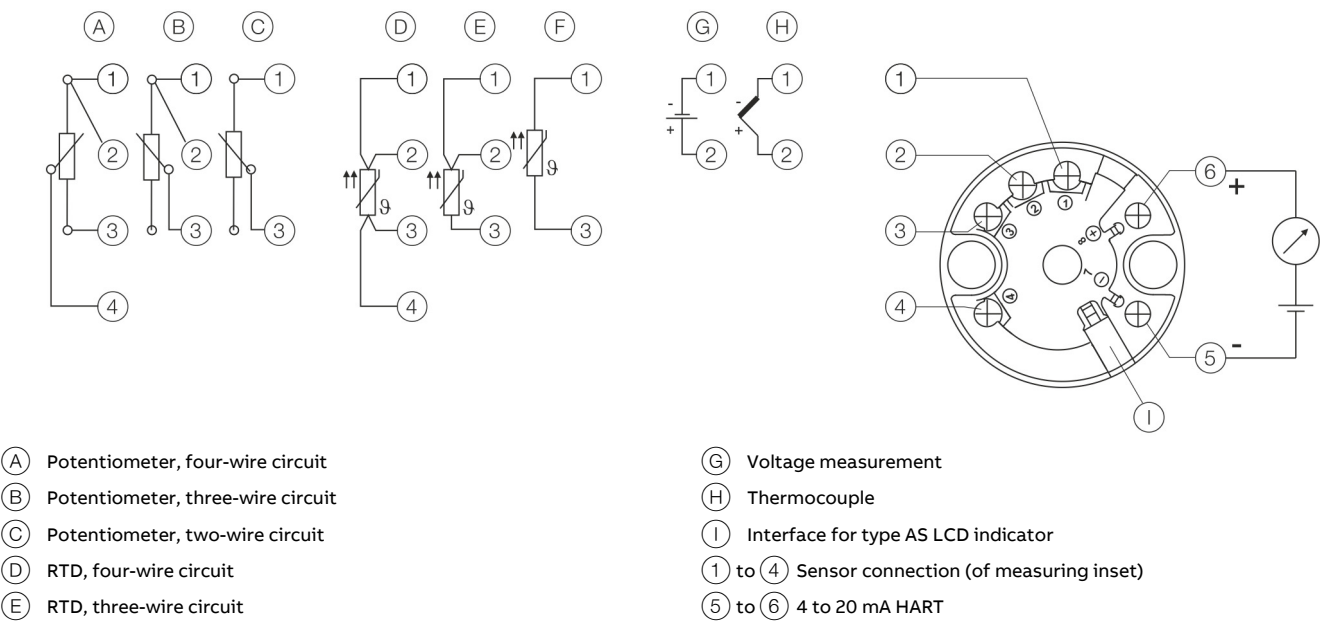


Figure 3: TTH200 connections

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 18.

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.

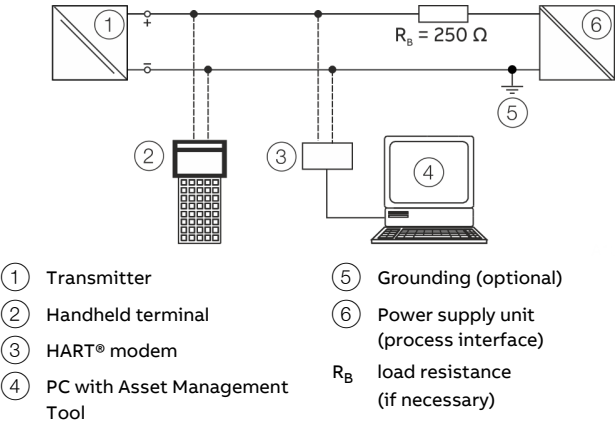


Figure 4: Example for HART connection

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

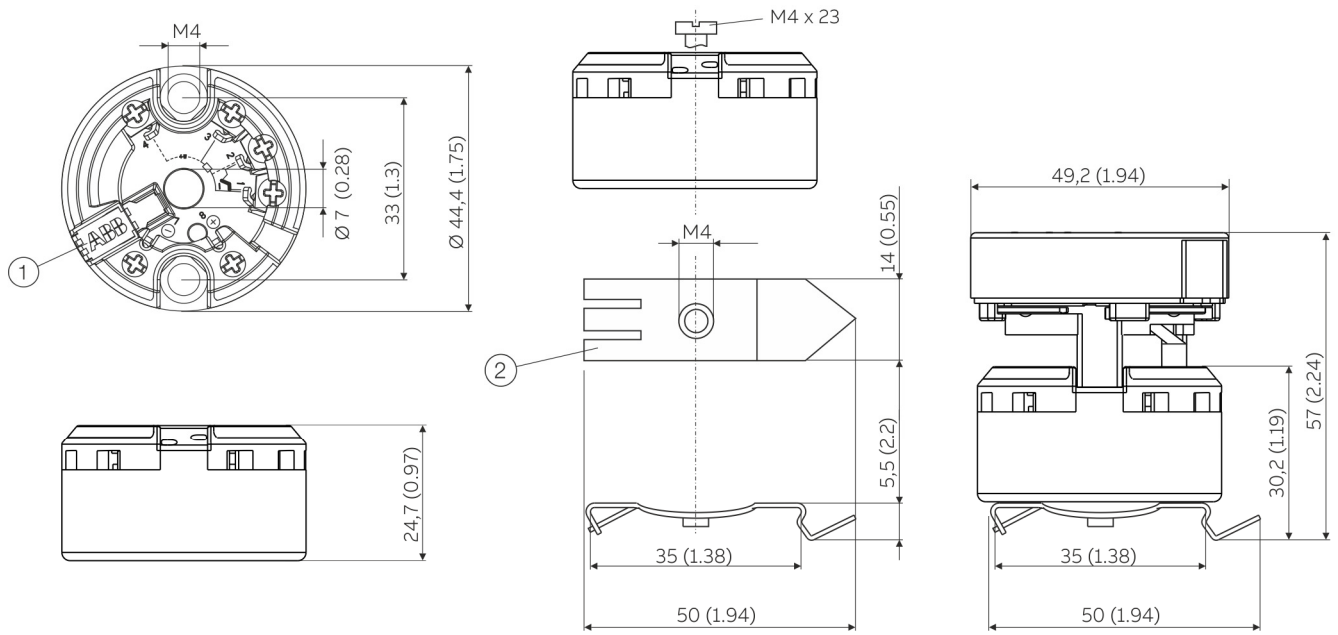
Configuration options / Tools

- 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)

Diagnosis notice

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

Dimensions



① Interface for Type AS LCD indicator (not suited for type A LCD indicator)

② Latching base for 35 mm (1.38 in) rail mount in accordance with EN 60175

Figure 5: Dimensions in mm (in)

Use in potentially explosive atmospheres in accordance with ATEX and IECEx

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.

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
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 TTH200-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 TTH200-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	

LCD indicator

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
II 1G Ex ia IIC T6 Ga	

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.

Declaration of conformity

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
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 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)

... Use in potentially explosive atmospheres in accordance with ATEX and IECEx

LCD indicator

ATEX / IECEx intrinsic safety, ATEX non-sparking

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)
T5	-40 to 56 °C (-40 to 132.8 °F)	-40 to 71 °C (-40 to 159.8 °F)
T4-T1	-40 to 60 °C (-40 to 140 °F)	-40 to 85 °C (-40 to 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	$L_i = 160 \mu\text{H}^*$
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 $C_i = 49 \text{ nF}$.

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

	LCD indicator 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 indicator

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

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

Transmitter

FM Intrinsically Safe

Model TTH200-L1

Control Drawing TTH200-L1H (I.S.)

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.)

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

CSA Intrinsically Safe

Model TTH200-R1

Control Drawing TTH200-R1H (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 TTH200-R2

Control Drawing TTH200-R2H (1) (N.I.)

TTH200-R2H (2, no conduit) (N.I.)

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

LCD indicator

FM Intrinsically Safe

Control Drawing

SAP_214 748

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

I.S. Class I Zone 0 AEx ia IIC T*

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

FM Non-Incendive

Control Drawing

SAP_214 751

N.I. Class I Div 2, Group: A, B, C, D oder Ex nL IIC T**, Class I Zone 2

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

CSA Intrinsically Safe

Control Drawing

SAP_214 749

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

I.S. Zone 0 Ex ia IIC T*

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

CSA Non-Incendive

Control Drawing

SAP_214 750

N.I. Class I Div 2, Group: A, B, C, D oder Ex nL IIC T**, Class I Zone 2

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

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

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

Ordering Information

TTH200

Base model	TTH200	XX	X	XX
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 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		L1		
FM Non-incendive (NI): Class I, Div. 2, Groups A, B, C, D or Class I Zone 2 Group IIC T6		L2		
CSA Intrinsic Safety (IS): Class I, Div. 1+2, Groups A, B, C, D, Class I, Zone 0, Ex ia IIC		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		P2		
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 Ex ib [ia IIIC Da] IIC T6...T4 Gb		C1		
Communication Protocol				
HART, programmable, output signal 4 to 20 mA			H	
Configuration				
Standard configuration				BS
Customer-specific configuration, except user curve				BF*

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

Additional ordering information TTH200

	XX	XX	XXX	XX	XX	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				
Field Housing							
Aluminium field housing 80 x 75 x 57 mm, IP 65, including 2 pieces M16 cable glands				H1**			
Polyester field housing 75 x 80 x 55 mm, IP 65, including 2 pieces M16 cable glands				H2**			
Polycarbonate field housing 80 x 82 x 55 mm, IP 65, including 2 pieces M16 cable glands				H3**			
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				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				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				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

** Not available with Explosion Protection

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

Order form configuration

HART device design: Instructions for customer-specific configuration

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

Trademarks

HART is a registered trademark of FieldComm Group, Austin, Texas, USA

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