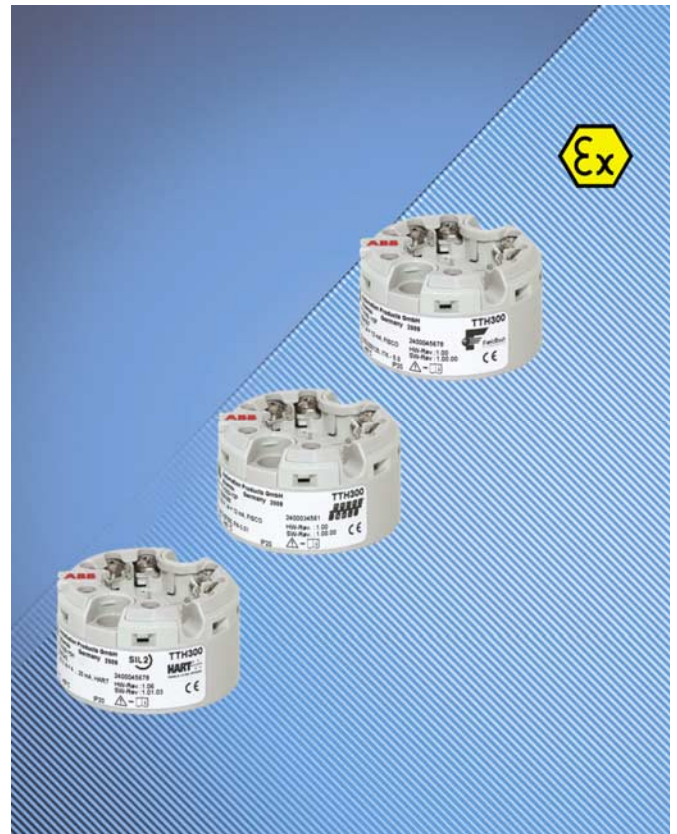


**EN**  
English

**Commissioning Instructions**  
Head mounted Temperature Transmitter  
TTH300





# Head mounted Temperature Transmitter TTH300

## Commissioning Instruction - EN

CI/TTH300-EN

02.2010

Rev. B

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## 1 Safety

### 1.1 General information and notes for the reader

Read these instructions carefully prior to installing and commissioning the device.

These instructions are an important part of the product and must be kept for later use.

These instructions are intended as an overview and do not contain detailed information on all designs for this product or every possible aspect of installation, operation and maintenance.

For additional information or in case specific problems occur that are not discussed in these instructions, contact the manufacturer.

The content of these instructions is neither part of any previous or existing agreement, promise or legal relationship nor is it intended to change the same.

This product is built based on state-of-the-art technology and is operationally safe. It has been tested and left the factory in a safe, maintenance-free state. The information in the manual must be observed and followed in order to maintain this state throughout the period of operation.

Modifications and repairs to the product may only be performed if expressly permitted by these instructions.

Only by observing all of the safety information and all safety/warning symbols in these instructions can optimum protection of both personnel and the environment, as well as safe and fault-free operation of the device, be ensured.

Information and symbols directly on the product must be observed. They may not be removed and must be fully legible at all times.

### 1.2 Intended use

To measure the temperature of fluid, pulpy or pasty substances and gases or resistance/voltage values.

The device is designed for use exclusively within the stated values on the name plate and in the technical specifications (see the "Specifications" chapter in the operating instructions or on the data sheet).

- The maximum operating temperature must not be exceeded.
- The permitted operating temperature must not be exceeded.
- The housing protection type must be observed.

### **1.3 Target groups and qualifications**

Installation, commissioning, and maintenance of the product may only be performed by trained specialist personnel who have been authorized by the plant operator to do so. The specialist personnel must have read and understood the manual and comply with its instructions.

Prior to using corrosive and abrasive materials for measurement purposes, the operator must check the level of resistance of all parts coming into contact with the materials to be measured. ABB Automation Products GmbH will gladly support you in selecting the materials, but cannot accept any liability in doing so.

The operators must strictly observe the applicable national regulations with regards to installation, function tests, repairs, and maintenance of electrical products.

### **1.4 Warranty provisions**

Using the device in a manner that does not fall within the scope of its intended use, disregarding this instruction, using underqualified personnel, or making unauthorized alterations releases the manufacturer from liability for any resulting damage. This renders the manufacturer's warranty null and void.

1.5 Plates and symbols

1.5.1 Safety-/ warning symbols, note symbols



**DANGER – <Serious damage to health / risk to life>**

This symbol in conjunction with the signal word "Danger" indicates an imminent danger. Failure to observe this safety information will result in death or severe injury.



**DANGER – <Serious damage to health / risk to life>**

This symbol in conjunction with the signal word "Danger" indicates an imminent electrical hazard. Failure to observe this safety information will result in death or severe injury.



**WARNING – <Bodily injury>**

This symbol in conjunction with the signal word "Warning" indicates a possibly dangerous situation. Failure to observe this safety information may result in death or severe injury.



**WARNING – <Bodily injury>**

This symbol in conjunction with the signal word "Warning" indicates a potential electrical hazard. Failure to observe this safety information may result in death or severe injury.



**CAUTION – <Minor injury>**

This symbol in conjunction with the signal word "Caution" indicates a possibly dangerous situation. Failure to observe this safety information may result in minor or moderate injury. This may also be used for property damage warnings.



**ATTENTION – <Property damage>!**

The symbol indicates a potentially damaging situation.

Failure to observe this safety information may result in damage to or destruction of the product and/or other system components.



**IMPORTANT (NOTICE)**

This symbol indicates operator tips, particularly useful information, or important information about the product or its further uses. It does not indicate a dangerous or damaging situation.

**1.5.2 TTH300-XXH - HART name plate**

The name plate is located on the transmitter housing.

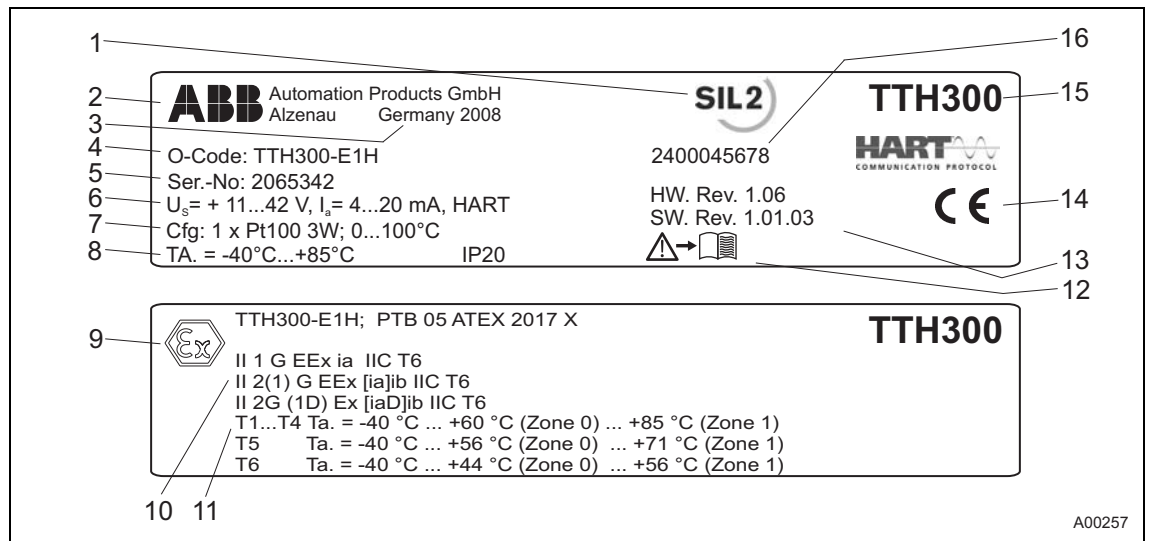


Fig. 1: Example for ATEX explosion protection

- |  |  |
|--|--|
| 1 Safety Integrity Level (optional)                      | 9 Ex mark (optional)                                     |
| 2 Manufacturer of transmitter                            | 10 Protection class of hazardous area design (optional)  |
| 3 Country and year of manufacture                        | 11 Temperature class of hazardous area design (optional) |
| 4 Order number   | 12 Refer to product documentation                        |
| 5 Serial number  | 13 Software revision number / Hardware revision number   |
| 6 Supply voltage range, typical current range, protocol  | 14 CE mark (EC conformity)                               |
| 7 Customer configuration                                 | 15 Model name  |
| 8 Ambient temperature range / Housing ingress protection | 16 Order number  |

**i**

**Important**

The temperature range on the name plate (7) refers only to the permissible ambient temperature range for the transmitter and not to the measuring element used in the measuring inset.

### 1.5.3 TTH300-XXP - PROFIBUS PA name plate

The name plate is located on the transmitter housing.

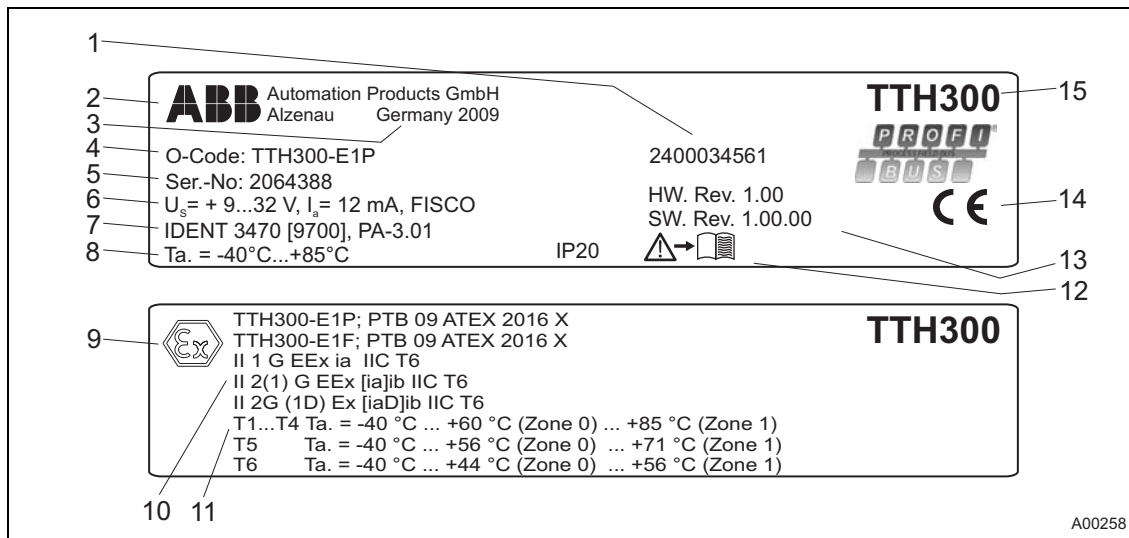


Fig. 2: Example for ATEX explosion protection

- |  |  |
|--|--|
| 1 Order number   | 9 Ex mark (optional)                                     |
| 2 Manufacturer of transmitter  | 10 Protection class of hazardous area design (optional)  |
| 3 Country and year of manufacture  | 11 Temperature class of hazardous area design (optional) |
| 4 Order number   | 12 Refer to product documentation                        |
| 5 Serial number  | 13 Software revision number / Hardware revision number   |
| 6 Supply voltage range, typical current range, concept for intrinsically safe fieldbuses | 14 CE mark (EC conformity)                               |
| 7 PROFIBUS ID number, protocol   | 15 Model name  |
| 8 Ambient temperature range / Housing ingress protection                                 |  |

**1.5.4 TTH300-XXF - FOUNDATION Fieldbus name plate**

The name plate is located on the transmitter housing.

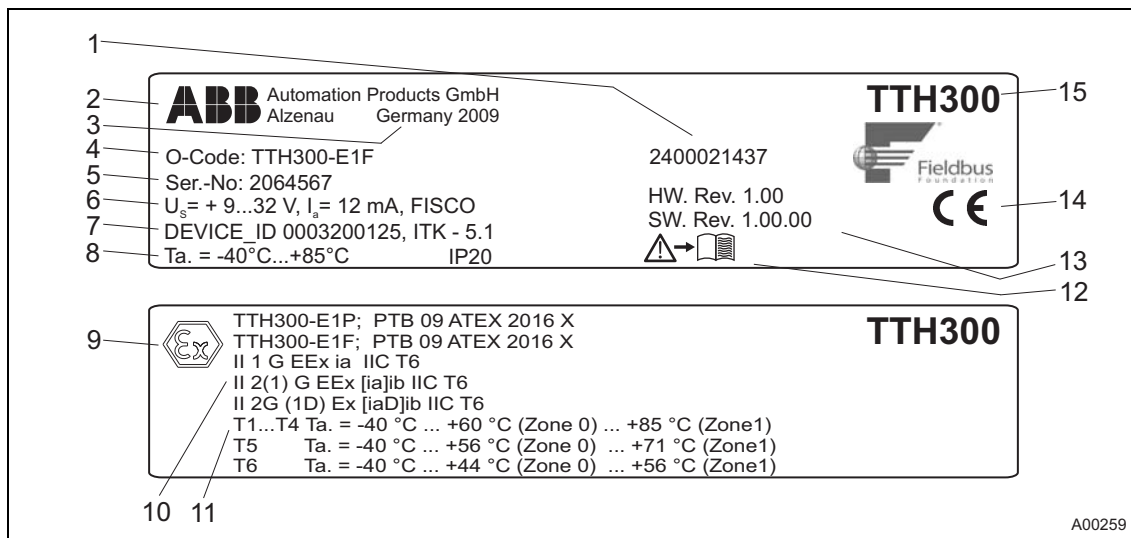


Fig. 3: Example for ATEX explosion protection

- |   |  |    |   |
|---|--|----|---|
| 1 | Order number   | 9  | Ex mark (optional)                                    |
| 2 | Manufacturer of transmitter  | 10 | Protection class of hazardous area design (optional)  |
| 3 | Country and year of manufacture  | 11 | Temperature class of hazardous area design (optional) |
| 4 | Order number   | 12 | Refer to product documentation                        |
| 5 | Serial number  | 13 | Software revision number / Hardware revision number   |
| 6 | Supply voltage range, typical current range, concept for intrinsically safe fieldbuses | 14 | CE mark (EC conformity)                               |
| 7 | FOUNDATION Fieldbus device ID number   | 15 | Model name  |
| 8 | Ambient temperature range / Housing ingress protection                                 |    |   |

**1.6 Transport safety information**

Observe the following information:

- Do not expose the device to moisture during transport. Pack the device accordingly.
- Pack the device so that it is protected from vibration during transport, e.g. through air-cushioned packaging.

**1.7 Safety information for electrical installation**

The electrical connections may only be performed by authorized specialist personnel according to the electrical plans.

Comply with electrical connection information in the instruction. Otherwise, the electrical protection class can be affected.

The secure separation of contact-dangerous electrical circuits is only ensured when the connected devices fulfil the requirements of the DIN EN 61140 (VDE 0140 Part 1) (basic requirements for secure separation).

For secure separation, run the supply lines separated from contact-dangerous electrical circuits or additionally insulate them.

**1.8 Safety information for commissioning**

The transmitter is immediately ready for operation after mounting and installation of the connections. The parameters are set at the factory.

The connected lines must be checked for firm seating. Only firmly seated lines ensure full functionality.

**1.9 Operating safety information**

Before switching on, ensure that the specified environmental conditions in the “Technical Specifications” chapter and in the data sheet are complied with and that the power supply voltage corresponds with the voltage of the transmitter.

When there is a chance that safe operation is no longer possible, put the device out of operation and secure against unintended operation.

## 2 Use in potentially explosive atmospheres

Special regulations must be observed in potentially explosive atmospheres for the power supply, signal inputs/outputs, and ground connection. The information relating specifically to explosion protection that appears within the individual sections must be observed.



### **Notice - Potential damage to parts!**

All parts must be installed in accordance with the manufacturer's specifications, as well as relevant standards and regulations.

Commissioning and operation must comply with EN 60079-14 (Electrical apparatus for explosive gas atmospheres).

### 2.1 Approvals

Codes relating to the approvals for use in potentially explosive atmospheres can be found in the section titled "Ex relevant specifications" in this manual.

### 2.2 Housing ingress protection

The connection parts of the temperature transmitter and LC display types A and AS must be installed so that housing ingress protection of at least IP 20 as per IEC 60529:1989 is achieved.

### 2.3 Electrostatic charging

When using the transmitter in a potentially explosive atmosphere, please ensure that impermissible electrostatic charging of the temperature transmitter and the LC display is prevented (observe the warnings on the device).

### 2.4 Grounding

If, for functional reasons, the intrinsically safe circuit needs to be grounded by means of a connection to the equipotential bonding, it may only be grounded at one point.

### 2.5 Interconnection

If transmitters are operated in an intrinsically safe circuit, proof that the interconnection is intrinsically safe must be provided in accordance with DIN VDE 0165/Part 1 (EN 60079-25/2004 and IEC 60079-25/2003). An interconnection certificate must always be provided for intrinsically safe circuits.

### 2.6 Configuration

The transmitter can be configured in the potentially explosive atmosphere in compliance with the interconnection certificate, both directly in the potentially explosive atmosphere using approved handheld terminals and by coupling an Ex modem into the circuit outside the potentially explosive atmosphere.

### 2.7 Ex relevant specifications

See Chapter 5, "Ex relevant specifications" page 24.

## Mounting

### 3 Mounting

#### 3.1 Installation options

There are three options for installing the transmitter:

- Installation in the cover of the connection head (without springs)
- Direct installation on the measuring inset (with springs)
- Installation on a top-hat rail

##### 3.1.1 Installation in the cover of the connection head

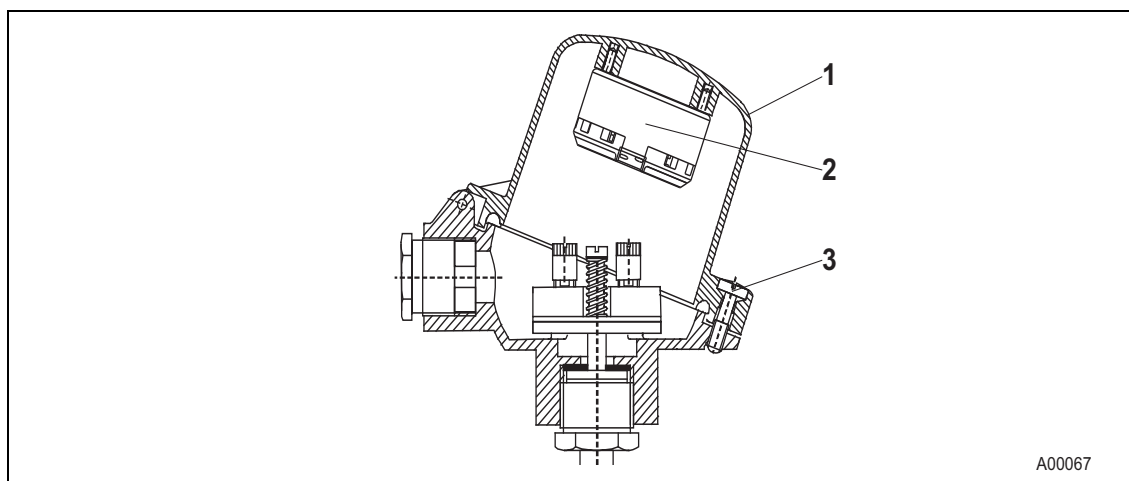


Fig. 4

1. Release the screw plug (3) for the cover of the connection head.
2. Open the cover (1).
3. Secure the transmitter (2) at the proper position on the cover, using the captive screws found in the transmitter.

### 3.1.2 Installation on the measuring inset

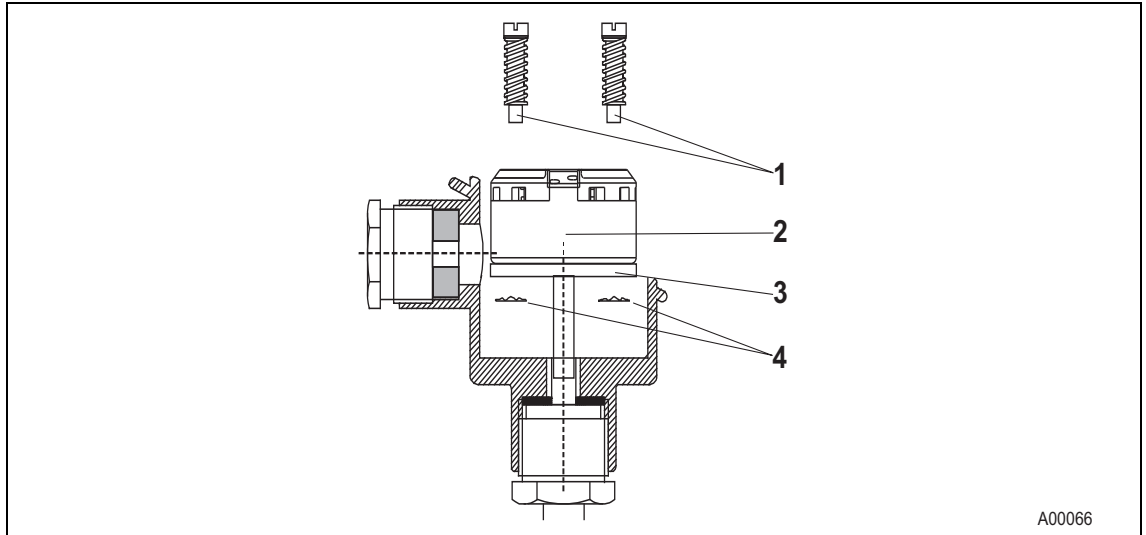


Fig. 5

**i**

#### Important

Before mounting the transmitter on the measuring inset, remove the ceramic block on the measuring inset and the captive screws in the transmitter.

To install the transmitter on the measuring inset, cambered toothed discs and the corresponding mounting screws are required; these must be ordered as separate accessories:

Measuring inset installation set (2 mounting screws, 2 springs, 2 toothed discs)

Order number: 237013

1. Remove the ceramic block from the measuring inset (3).
2. Remove the screws from the transmitter (2). Remove the sleeves from the screw holes and then remove the screws.
3. Insert new mounting screws (1) from above in the installation holes of the transmitter.
4. Place the cambered toothed discs (4) with curve facing upward on the downward protruding screw thread.
5. Connect the power supply cable to the transmitter according to connection diagram.
6. Place the transmitter in the housing on the measuring inset and secure it.

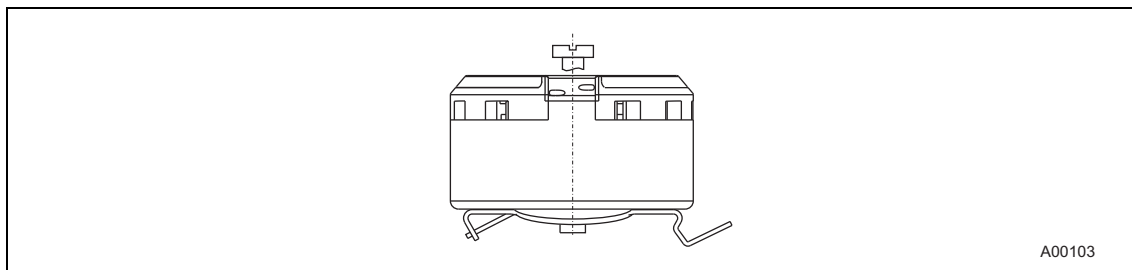
**i**

#### Important

The toothed discs between measuring inset and transmitter are straightened when the screws are tightened. This enables them to grip the mounting screws.

### 3.1.3 Installation on a top hat rail

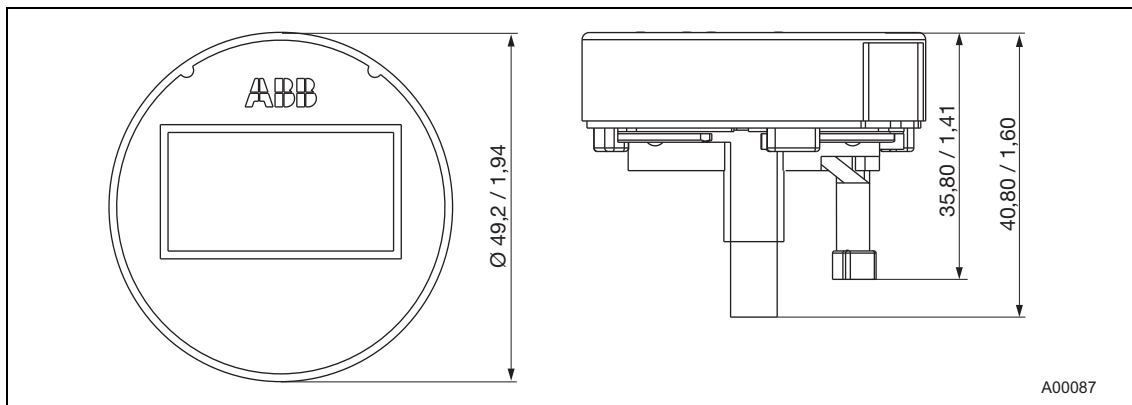
When mounted on a top hat rail, the transmitter can be placed at a distance from the sensor in a housing that is suitable for the ambient conditions.



A00103

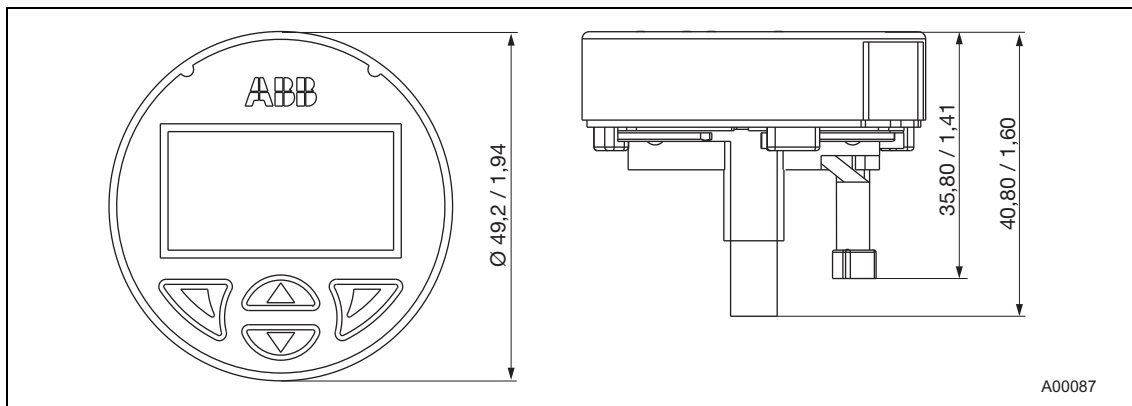
Fig. 6

### 3.2 Installing / Removing the optional LCD display



A00087

Fig. 7: Type AS LC display



A00087

Fig. 8: Type A LC display

Thanks to the LC display interface, the TTH300 can be operated using the LC display.

The display must be removed to enable connection of the sensor line or supply line:

- Carefully remove the LC display from the transmitter inset. The LC display is held firmly in place, meaning that you may have to use the tip of a screwdriver to pry it loose. Take care to avoid any mechanical damage.

No tools are required to insert the LC display.

1. Carefully insert the guide pins for the LC display in the guide holes of the transmitter inset. Make sure the black connection socket fits into the terminal on the transmitter inset.
2. Then press the LC display in as far as it will go. Make sure that the guide pins and connection socket are fully inserted.

The position of the LC display can be adjusted to suit the installation position of the transmitter, to ensure that the display is as clearly legible as possible.

There are twelve positions at increments of 30°.

1. Carefully turn the LC display to the left to release it from its holder.
2. Carefully turn the LC display into the required position.
3. Insert the LC display into its holder again and turn it to the right into the required position until it snaps into place.



**Caution - Potential damage to parts**

Make sure the flat ribbon cable does not get twisted or torn when rotating the LC display.

## 4 Electrical connections



**Warning - Dangerous electrical current**

The relevant guidelines must be observed during electrical installation. Connections must only be established in a dead-voltage state.

The transmitter has no switch-off elements. Therefore, overvoltage protection devices, lightning protection, or voltage disconnection options must be provided at the plant.

The power supply and signal are routed in the same line and must be implemented as a SELV or PELV circuit in accordance with the standard (standard version). For the Ex version, the guidelines stipulated by the Ex standard must be adhered to.

A check must be carried out as to whether the existing power supply corresponds to the specifications both on the name plate and in the technical specifications in the "Technical specifications" section or the data sheet.



**Important**

The signal cable wires must be provided with wire end sleeves.

The slotted screws of the connection terminals are tightened with a size 1 screwdriver (3.5 or 4 mm).

## Electrical connections

### 4.1 Conductor material

- Power supply cable: flexible standard conductor material
- Maximum wire cross-section: 1.5 mm<sup>2</sup> (16 AWG)



#### Notice - Potential damage to parts

Using rigid conductor material may cause line breaks.

### 4.2 Electrical connections configuration

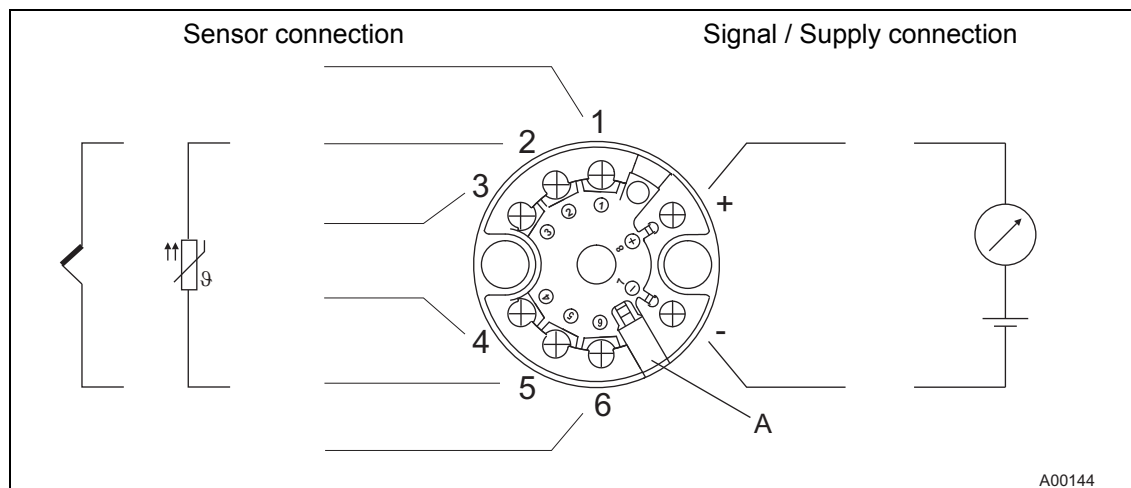


Fig. 9

A LC display interface

#### 4.2.1 Sensor connection

Depending on the sensor model, a variety of conductor materials can be used for sensor connections. The integrated internal reference point makes it possible to directly connect thermal compensating lines.

**Resistance thermometers (RTD) / resistors (potentiometers)**

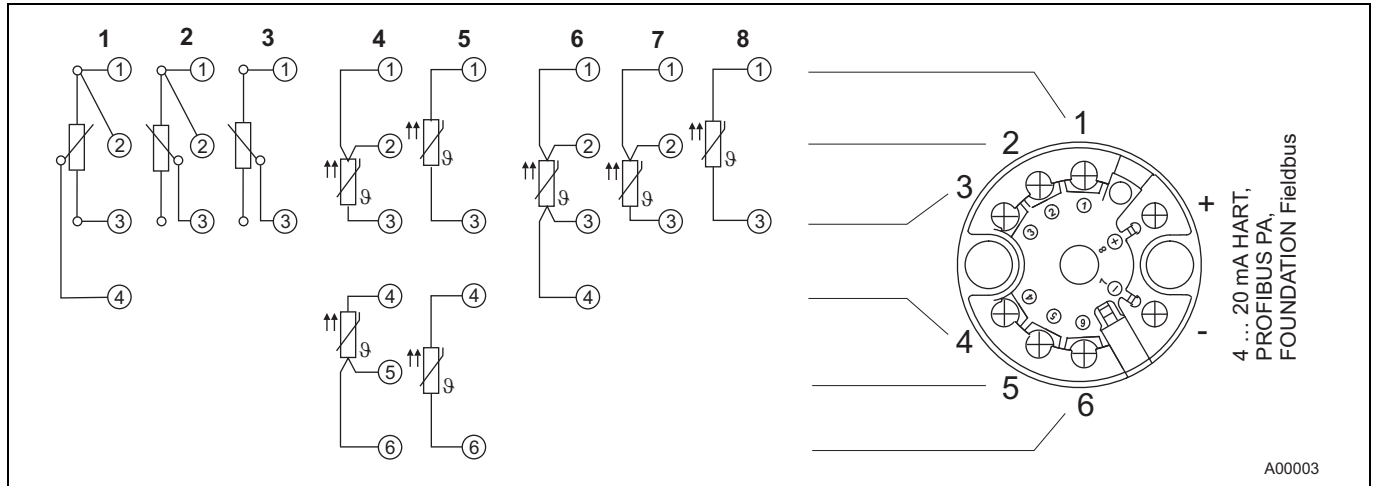


Fig. 10

- |                                     |   |                           |
|-------------------------------------|---|---------------------------|
| 1 Potentiometer, four-wire circuit  | 4 2 x RTD, three-wire circuit <sup>1)</sup> | 6 RTD, four-wire circuit  |
| 2 Potentiometer, three-wire circuit | 5 2 x RTD, two-wire circuit <sup>1)</sup>   | 7 RTD, three-wire circuit |
| 3 Potentiometer, two-wire circuit   |   | 8 RTD, two-wire circuit   |

1) Sensor backup/redundancy, sensor drift monitoring, mean measurement or differential measurement

**Thermocouple / voltage and resistance thermometer (RTD) / thermocouple combinations**

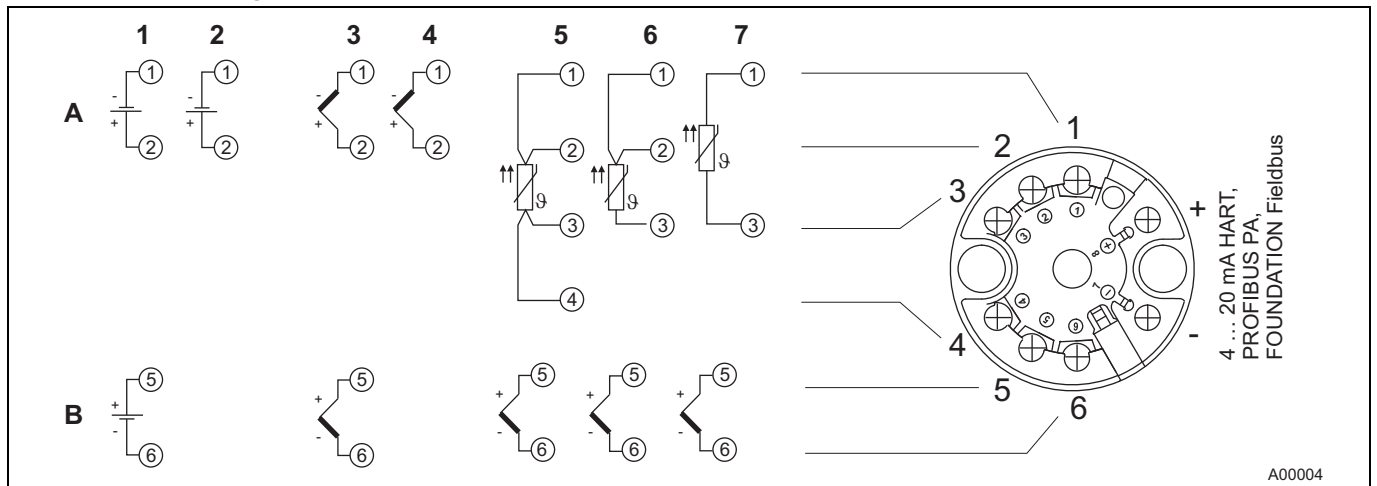


Fig. 11

- |   |                                  |  |
|---|----------------------------------|--|
| A Sensor 1                              | 2 1 x voltage measurement        | 5 1 x RTD, four-wire circuit and 1 x thermocouple <sup>1)</sup>  |
| B Sensor 2                              | 3 2 x thermocouple <sup>1)</sup> | 6 1 x RTD, three-wire circuit and 1 x thermocouple <sup>1)</sup> |
| 1 2 x voltage measurement <sup>1)</sup> | 4 1 x thermocouple               | 7 1 x RTD, two-wire circuit and 1 x thermocouple <sup>1)</sup>   |

1) Sensor backup/redundancy, sensor drift monitoring, mean measurement or differential temperature measurement

4.2.2 Standard application with 4 ... 20 mA functionality

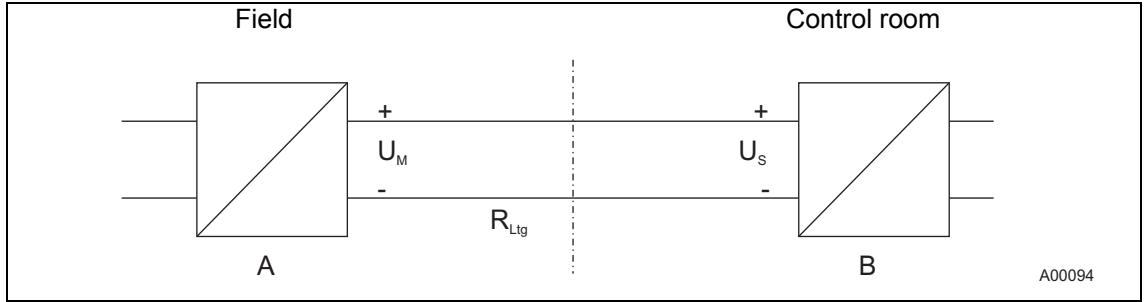


Fig. 12

A Transmitter

B Supply isolator / PCS input with supply

When connecting these components, observe the following condition:

$$U_{Mmin} \leq U_{Smin} + 0.022 A \times R_{Ltg}$$

Where

- $U_{Mmin}$ : Minimum operating voltage of transmitter
- $U_{Smin}$ : Minimum supply voltage of supply isolator / PCS input
- $R_{Ltg}$ : Line resistance between transmitter and supply isolator

4.2.3 Standard application with HART functionality

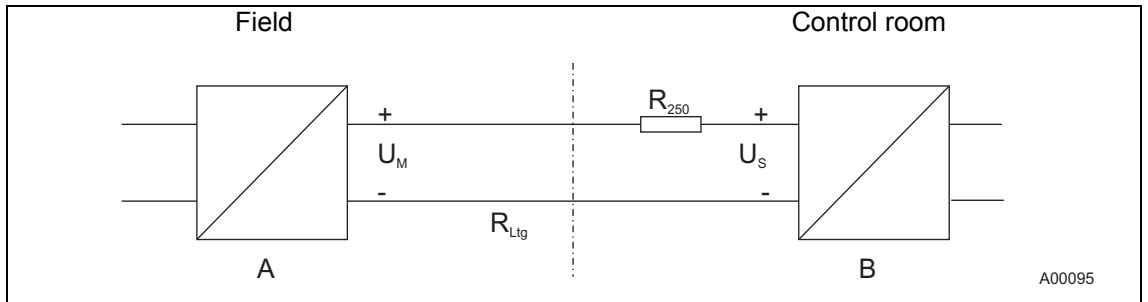


Fig. 13

A Transmitter

B Supply isolator / PCS input with supply

Adding resistance  $R_{250}$  increases the minimum supply voltage:

$$U_{Mmin} \leq U_{Smin} + 0,022 A \times (R_{Ltg} + R_{250})$$

Where

- $U_{Mmin}$ : Minimum operating voltage of transmitter
- $U_{Smin}$ : Minimum supply voltage of supply isolator / PCS input
- $R_{Ltg}$ : Line resistance between transmitter and supply isolator
- $R_{250}$ : Resistance for HART functionality

For HART functionality, use supply isolators or PCS input cards with a HART mark. If this is not possible, the interconnection must have a resistance of  $\geq 250 \Omega$  ( $< 1,100 \Omega$ ).

The signal line can be connected with or without grounding. When establishing a ground connection (minus side), make sure that only terminal side is connected to the equipotential bonding.

**4.2.4 Standard application with PROFIBUS PA and FOUNDATION Fieldbus H1 functionality**

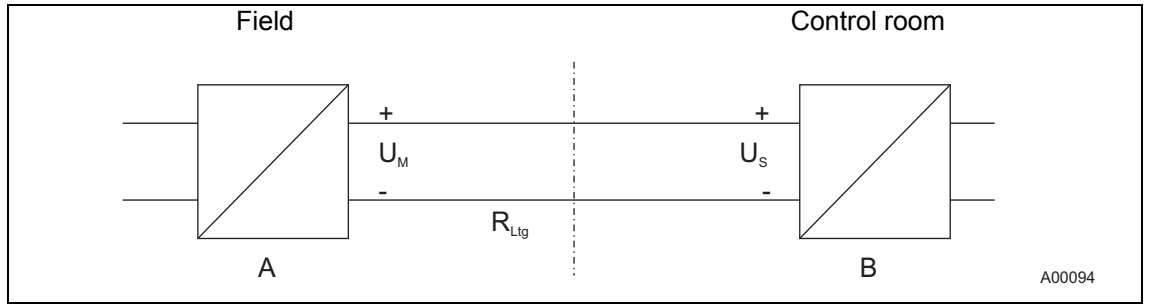


Fig. 14

A Transmitter

B Segment coupler

When connecting these components, observe the following condition:

$$U_{Mmin} \leq U_{Smin} + 0.012 A \times R_{Ltg}$$

Where

- $U_{Mmin}$ : Minimum operating voltage of transmitter
- $U_{Smin}$ : Minimum supply voltage of supply isolator / PCS input
- $R_{Ltg}$ : Line resistance between transmitter and supply isolator

4.3 Electrical interconnection in explosion hazardous areas

Depending on the safety requirements, special interconnections are required for use in potentially explosive atmospheres.



**Important**

Refer to Chapter "Ex relevant specifications".

**Intrinsic safety**

The supply isolators / PCS inputs must feature intrinsically safe input protection circuits in order to eliminate hazards (spark formation). The interconnection must be inspected. In order to provide proof of intrinsic safety, the electrical limit values must be used as the basis for the EC-type examination certificates for the equipment (devices); this includes the capacitance and inductance values of the cables. Proof of intrinsic safety is said to have been provided if the following conditions are fulfilled when a comparison is carried out in relation to the limit values of the equipment:

Transmitter (intrinsically safe equipment)		Supply isolator / PCS input (related equipment)
$U_i$	$\geq$	$U_o$
$I_i$	$\geq$	$I_o$
$P_i$	$\geq$	$P_o$
$L_i + L_c$ (cable)	$\leq$	$L_o$
$C_i + C_c$ (cable)	$\leq$	$C_o$

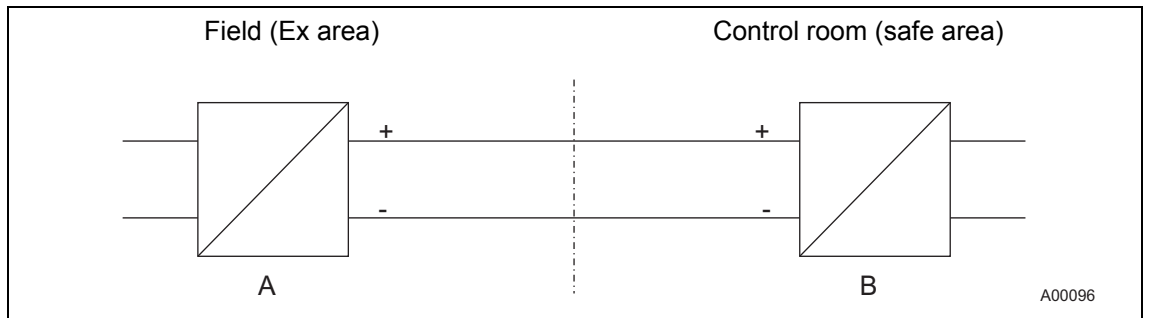


Fig. 15

A Transmitter

B Supply isolator / PCS input with supply / Segment coupler

**4.3.1 Installation in a potentially explosive atmosphere**

Transmitters can be installed in all kinds of industrial sectors. Potentially explosive systems are divided into zones, meaning that a wide range of different instruments are also required. Depending on the region in question, different certificates are required for these.

**i**

**Important**

Ex relevant specifications must be taken from the EC-type examination certificates and other relevant certificates that apply in each case.

With transmitters for PROFIBUS PA and FOUNDATION Fieldbus H1 applications, FISCO / FNICO interconnection methods can be used.

**4.3.2 ATEX - Zone 0**

**Transmitter design: II 1 G Ex ia IIC T6**

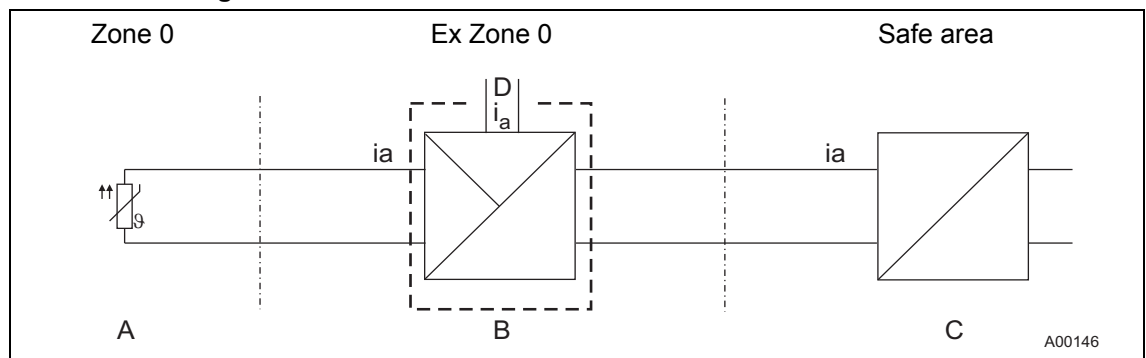


Fig. 16

- A Sensor
- B Transmitter in housing with IP 20 ingress protection
- C Supply isolator [Ex ia]
- D Interface for LC display

For instruments in Zone 0, the transmitter must be installed in a suitable housing with IP 20 ingress protection. The input for the supply isolator must have an [Ex ia] design.

When using the transmitter in Zone 0, you must ensure that impermissible electrostatic charging of the temperature transmitter is prevented (observe the warnings on the device).

The user must ensure that the sensor instrumentation meets the requirements of applicable explosion protection standards.

4.3.3 ATEX - Zone 1 (0)

Transmitter design: II 2 (1) G Ex [ia] ib IIC T6

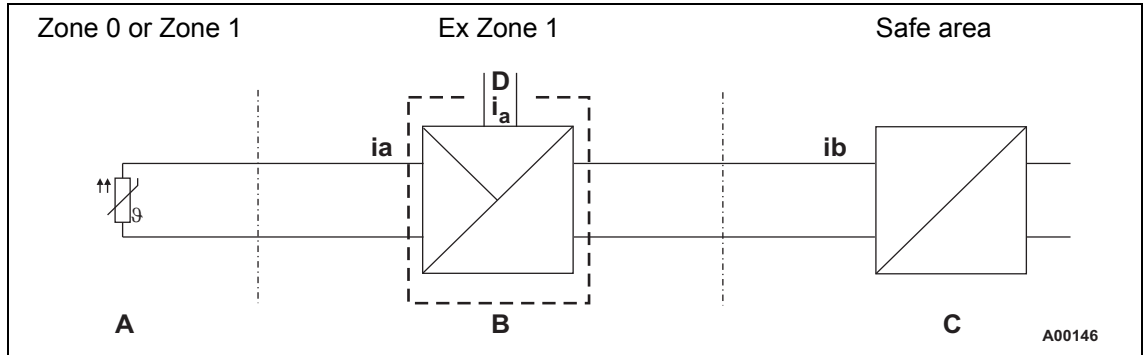


Fig. 17

- A Sensor
- B Transmitter in housing with IP 20 ingress protection
- C Supply isolator [Ex ib]
- D Interface for LC display

For instruments in Zone 1, the transmitter must be installed in a suitable housing with IP 20 ingress protection. The input for the supply isolator must have an [Ex ib] design.

The user must ensure that the sensor instrumentation meets the requirements of applicable explosion protection standards. It can be installed in Zone 1 or Zone 0.

**4.3.4 ATEX - Zone 1 (20)**

**Transmitter design: II 2 G (1D) Ex [iaD] ib IIC T6**

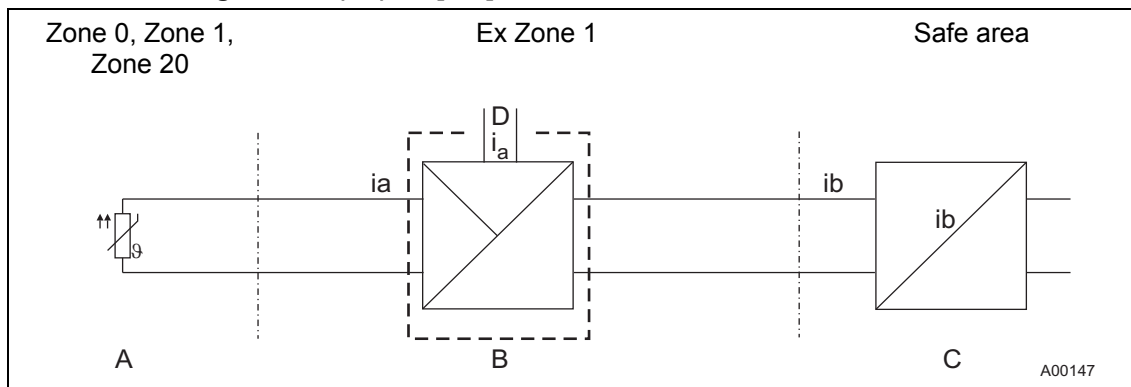


Fig. 18

- A Sensor
- B Transmitter in housing with IP 20 ingress protection
- C Supply isolator [Ex ib]
- D Interface for LC display

For instruments in Zone 1, the transmitter must be installed in a suitable housing with IP 20 ingress protection. The input for the supply isolator must have an [Ex ib] design.

The user must ensure that the sensor instrumentation meets the requirements of applicable explosion protection standards. It can be installed in Zone 0, Zone 1, or Zone 20.

**4.3.5 ATEX - Zone 2**

**Transmitter design: II 3 G Ex nA II T6**

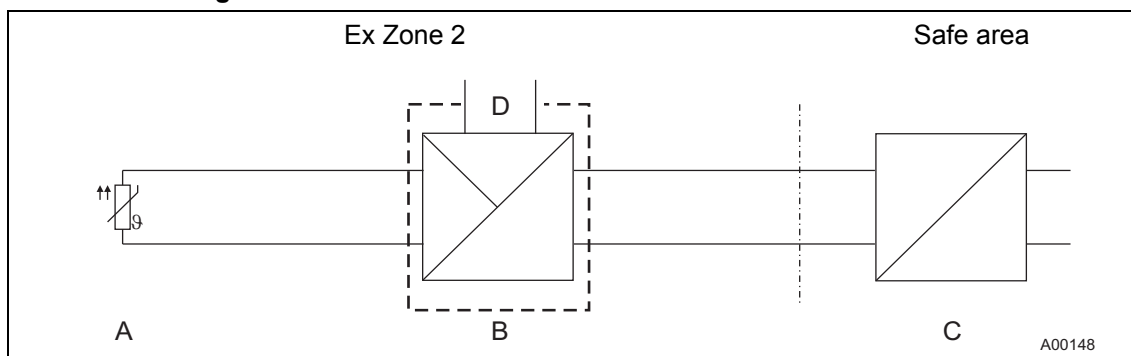


Fig. 19

- A Sensor
- B Transmitter in housing with IP 54 ingress protection
- C Supply isolator
- D Interface for LC display

For instruments in Zone 2, the transmitter must be installed in a suitable housing with ingress protection of at least IP 54.

In the event of a disturbance, it must be ensured that the supply voltage cannot exceed the normal voltage by more than 40 %.

## Ex relevant specifications

### 5 Ex relevant specifications

#### 5.1 TTH300-E1X, intrinsic safety ATEX

##### Explosion protection

The TTH300 complies with the requirements of the ATEX Directive 94/9/EC

Approved for use in Zone 0, 1, and 2

##### Designation

II 1G Ex ia IIC T6 (Zone 0)

II 2(1)G Ex [ia] ib IIC T6 (Zone 1 [0])

II 2G(1D) Ex [iaD] ib IIC T6 (Zone 1 [20])

TTH300-E1H:

EC type-examination test certificate PTB 05 ATEX 2017 X

TTH300-E1P/E1F:

EC type-examination test certificate PTB 09 ATEX 2016 X

#### 5.2 TTH300-H1X, intrinsic safety IECEx

##### Designation

Ex ia IIC T6

Ex [ia] ib IIC T6

Ex [iaD] ib IIC T6

TTH300-H1H:

IECEx certificate of conformity IECEx PTB 09.0014X

TTH300- H1P/H1F:

IECEx certificate of conformity

#### 5.3 Safety specifications for Intrinsic Safety ATEX / IECEx

##### Temperature table

Temperature class	Permissible ambient temperature range	
	Device category 1 use	Device category 2 use
T6	-50 ... 44 °C (-58 ... 111.2 °F)	-50 ... 56 °C (-58 ... 132.8 °F)
T5	-50 ... 56 °C (-58 ... 132.8 °F)	-50 ... 71 °C (-58 ... 159.8 °F)
T4, T3, T2, T1	-50 ... 60 °C (-58 ... 140.0 °F)	-50 ... 85 °C (-58 ... 185.0 °F)

##### Type of protection intrinsic safety Ex ia IIC (Part 1)

	TTH300-E1H TTH300-H1H Supply circuit	TTH300-E1P/-H1P TTH300-E1F/-H1F Supply circuit 1)	
		FISCO	ENTITY
Max. voltage	$U_i = 30 \text{ V}$	$U_i \leq 17.5 \text{ V}$	$U_i \leq 24.0 \text{ V}$
Short circuit current	$I_i = 130 \text{ mA}$	$I_i \leq 183 \text{ mA}^2)$	$I_i \leq 250 \text{ mA}$
Max. power	$P_i = 0.8 \text{ W}$	$P_i \leq 2.56 \text{ W}^2)$	$P_i \leq 1.2 \text{ W}$
Internal inductance	$L_i = 0.5 \text{ mH}$	$L_i \leq 10 \mu\text{H}$	$L_i \leq 10 \mu\text{H}$
Internal capacitance	$C_i = 5 \text{ nF}$	$C_i \leq 5 \text{ nF}$	$C_i \leq 5 \text{ nF}$

1) FISCO in accordance with 60079-27

2) II B FISCO:  $I_i \leq 380 \text{ mA}$ ,  $P_i \leq 5.32 \text{ W}$

##### Type of protection intrinsic safety Ex ia IIC (Part 2)

	Measurement current circuit: resistance thermometers, resistors	Measurement current circuit: thermocouples, voltages
Max. voltage	$U_o = 6.5 \text{ V}$	$U_o = 1.2 \text{ V}$
Short circuit current	$I_o = 25 \text{ mA}$	$I_o = 50 \text{ mA}$
Max. power	$P_o = 38 \text{ mW}$	$P_o = 60 \text{ mW}$
Internal inductance	$L_i = 0 \text{ mH}$	$L_i = 0 \text{ mH}$
Internal capacitance	$C_i = 49 \text{ nF}$	$C_i = 49 \text{ nF}$
Maximum permissible external inductance	$L_o = 5 \text{ mH}$	$L_o = 5 \text{ mH}$
Maximum permissible external capacitance	$C_o = 1.55 \mu\text{F}$	$C_o = 1.05 \mu\text{F}$

##### Type of protection intrinsic safety Ex ia IIC (Part 3)

	LCD 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	$C_o = 1.4 \mu\text{F}$

#### 5.4 TTH300-E2X, non-sparking ATEX

##### Explosion protection

The TTH300 complies with the requirements of  
ATEX Directive 94/9/EC  
Approved for use in Zone 2

##### Designation

II 3 G Ex nA II T6

ABB manufacturer's declaration in accordance with ATEX Directive

##### Temperature table

Temperature class	Device category 3 use
T6	-50 ... 56 °C (-58 ... 132.8 °F)
T5	-50 ... 71 °C (-58 ... 159.8 °F)
T4	-50 ... 85 °C (-58 ... 185.0 °F)

#### 5.5 TTH300-L1X, intrinsically safe FM

Class I, Div. 1 + 2, Groups A, B, C, D  
Class I, Zone 0, AEx ia IIC T6  
TTH300-L1H: control drawing: SAP\_214829  
TTH300-L1P: control drawing: TTH300-L1P (IS)  
TTH300-L1F: control drawing: TTH300-L1F (IS)

#### 5.6 TTH300-L2X, non-incendive FM

Class I, Div. 2, Groups A, B, C, D  
TTH300-L2H:  
Control drawing: 214830 (non-incendive)  
Control drawing: 214831 (non-incendive)  
TTH300-L2P:  
Control drawing: TTH300-L2P (NI\_PS), TTH300-L2P (NI\_AA)  
TTH300-L2F:  
Control drawing: TTH300-L2F (NI\_PS), TTH300-L2F (NI\_AA)

#### 5.7 TTH300-R1X, intrinsically safe CSA

Class I, Div. 1 + 2, Groups A, B, C, D  
Class I, Zone 0, Ex ia Group IIC T6  
TTH300-R1H: control drawing: 214826  
TTH300-R1P: control drawing: TTH300-R1P (IS)  
TTH300-R1F: control drawing: TTH300-R2F (IS)

#### 5.8 TTH300-R2X, non-incendive CSA

Class I, Div. 2, Groups A, B, C, D  
TTH300-R2H:  
Control drawing: SAP\_214824 (non-incendive)  
Control drawing: SAP\_214896 (non-incendive)  
TTH300-R2P:  
Control drawing: TTH300-R2P (NI\_PS), TTH300-R2P (NI\_AA)  
TTH300-R2F:  
Control drawing: TTH300-R2F (NI\_PS), TTH300-R2F (NI\_AA)

## Type A and type AS LCD indicator

### 6 Type A and type AS LCD indicator

#### 6.1 Ex relevant specifications

##### 6.1.1 Intrinsic Safety ATEX

###### Explosion protection

Approved for use in Zone 0.

###### Designation

II 1G Ex ia IIC T6

EC type-examination certificate PTB 05 ATEX 2079 X

##### 6.1.2 Intrinsic Safety IECEx

###### Explosion protection

Approved for use in Zone 0.

###### Designation

Ex ia IIC T6

For further information, see certificate

##### 6.1.3 Safety specifications for Intrinsic Safety ATEX / IECEx

###### Temperature table

Temperature class	Permissible ambient temperature range	
	Device category 1 use	Device category 2 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	-40 ... 60 °C (-40 ... 140 °F)	-40 ... 85 °C (-40 ... 185 °F)

###### Protection type intrinsic safety Ex ia IIC

	Supply circuit
Max. voltage	$U_i = 9 \text{ V}$
Short circuit current	$I_i = 65.2 \text{ mA}$
Max. power	$P_i = 101 \text{ W}$
Internal inductance	$L_i = 0 \text{ mH}$
Internal capacitance	$C_i = 0.4 \text{ nF}$

##### 6.1.4 Intrinsically Safe FM

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\*

Temp. Ident: T6  $T_{amb} 56 \text{ °C}$ , T4  $T_{amb} 85 \text{ °C}$

$U_i / V_{max} = 9 \text{ V}$ ,  $I_i / I_{max} < 65.2 \text{ mA}$ ,  $P_i = 101 \text{ mW}$

$C_i = 0.4 \text{ }\mu\text{F}$ ;  $L_i = 0$

Control Drawing: SAP\_214 748

##### 6.1.5 Non-Incendive FM

N.I. Class I Div 2, Group: A, B, C, D or

Ex nL IIC T\*, Class I Zone 2

Temp. Ident: T6  $T_{amb} 60 \text{ °C}$ , T4  $T_{amb} 85 \text{ °C}$

$U_i / V_{max} = 9 \text{ V}$ ,  $I_i / I_{max} < 65.2 \text{ mA}$ ,  $P_i = 101 \text{ mW}$

$C_i = 0.4 \text{ }\mu\text{F}$ ;  $L_i = 0$

Control Drawing: SAP\_214 751

##### 6.1.6 Intrinsically Safe CSA

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

I.S. Zone 0 Ex ia IIC T\*

\*Temp. Ident T6  $T_{amb} 56 \text{ °C}$ , T4  $T_{amb} 85 \text{ °C}$

$U_i / V_{max} = 9 \text{ V}$ ,  $I_i / I_{max} < 65.2 \text{ mA}$ ;  $P_i = 101 \text{ mW}$

$C_i < 0.4 \text{ }\mu\text{F}$ ,  $L_i = 0$

Control Drawing: SAP\_214 749

##### 6.1.7 Non-Incendive CSA

N.I. Class I Div 2, Group: A, B, C, D or

Ex nL IIC T\*, Class I Zone 2

\*Temp. Ident T6,  $T_{amb} 60 \text{ °C}$ , T4  $T_{amb} 85 \text{ °C}$

$U_i / V_{max} = 9 \text{ V}$ ,  $I_i / I_{max} < 65.2 \text{ mA}$ ,  $P_i = 101 \text{ mW}$

$C_i < 0.4 \text{ }\mu\text{F}$ ,  $L_i = 0$






Control Drawing: SAP\_214 750

**7 Appendix**

**7.1 Additional documents**

- Data sheet (DS/TTH300)
- Operating instructions (OI/TTH300)
- SIL safety instructions (SM/TTX3X0/SIL)
- HART interface description (COM/TTX300/HART)
- PROFIBUS PA interface description (COM/TTX300/PB)
- FOUNDATION Fieldbus interface description (COM/TTX300/FF)

**7.2 Approvals and certifications**

CE mark		<p>The version of the meter in your possession meets the requirements of the following European directives:</p> <ul style="list-style-type: none"> <li>- EMC directive 2004/108/EC</li> <li>- ATEX directive 94/9/EC</li> </ul>
Explosion Protection	   	<p>Identification for intended use in potentially explosive atmospheres according to:</p> <ul style="list-style-type: none"> <li>- ATEX directive (marking in addition to CE marking)</li> <li>- IEC standards</li> <li>- FM Approvals (US)</li> <li>- CSA International (Canada)</li> </ul>



**Important**

All documentation, declarations of conformity, and certificates are available in ABB's download area.

[www.abb.com/temperature](http://www.abb.com/temperature)



## EG-Konformitätserklärung EC-Certificate of Compliance

ABB Automation Products GmbH  
Borsigstr. 2  
D-63755 Alzenau  
Germany

Erklärt, dass die Produkte der  
Geräteart:  
*Declare that the products of device type:*

Temperatur Messumformer  
Temperature Transmitter

Modell- / Typebezeichnung:  
*Model- / type name:*

TTH300

Produktnummer:  
*Product number:*

TTH300-.H (HART)  
TTH300-.P (Profibus PA)  
TTH300-.F (Fieldbus Foundation)

Konform zu EG-Richtlinien:  
*Conform to EC-directives:*

94/9/EG (ATEX)  
2004/108/EG (EMV/EMC)

EG-Baumusterprüfbescheinigung:  
*EC-Type examination certificate:*

PTB 05 ATEX 2017 X  
PTB 09 ATEX 2016 X

Relevante Normen:  
*Related Standards:*

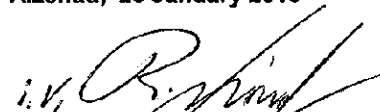
EN 61326-1:2006  
EN 60079-0:2006  
EN 60079-11:2007  
EN 60079-26:2006

Qualitätssicherung Produktion  
Anerkennung:  
*Production Quality notification:*

PTB 99 ATEX -Q004-...

entspricht.  
*complies.*

Alzenau, 29 January 2010

  
i.V. Reiner Laurinat  
Leiter Qualitätsmanagement  
Quality Manager

  
i.A. Harald Müller  
Leiter Hardwareentwicklung  
R&D Manager Hardware

ABB Automation Products GmbH



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