TTD300

Dual compartment temperature transmitter

Safety instructions for use in harzadous areas in accordance with ATEX and IECEx

Measurement made easy

TTD300

Introduction

Safety Instruction for dual compartment temperature transmitter.

This document must be considered in conjunction with related operating instructions.

Additional Information

Additional documentation on TTD300 is available for download free of charge at www.abb.com/temperature.

Alternatively simply scan this code:

Search for or click on:

Data Sheet TTD300	DS/TTD300-EN
Operating Instruction TTD300	OI/TTD300-EN
Commissioning instruction TTD300	CI/TTD300-EN

3KXT221304R4801

SI/TTD300/ATEX/IECEX-EN Rev. A 11.2024

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1 Safety

1.1 General information and instructions

These instructions are an important part of the product and must be retained for future reference.

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

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

The content of these instructions is neither part of nor an amendment to any previous or existing agreement, promise or legal relationship.

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

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

The operating company must strictly observe the applicable national regulations relating to the installation, function testing, repair and maintenance of electrical products.

1.2 Warnings

The warnings in these instructions are structured as follows:

⚠ DANGER

The signal word '**DANGER**' indicates an imminent danger. Failure to observe this information will result in death or severe injury.

⚠ WARNING

The signal word '**WARNING**' indicates an imminent danger. Failure to observe this information may result in death or severe injury.

⚠ CAUTION

The signal word '**CAUTION**' indicates an imminent danger. Failure to observe this information may result in minor or moderate injury.

NOTICE

The signal word ***'NOTICE'*** indicates possible material damage.

Note

'**Note**' indicates useful or important information about the product.

1.3 Intended use

This device is intended for the following uses:

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

The device has been designed for use exclusively within the technical limit values indicated on the name plate and in the data sheets.

- The maximum ambient temperature must not be exceeded.
- The IP rating of the housing must be observed during operation.
- For use in potentially explosive atmospheres, follow the associated guidelines.
- When using as a SIL device in safety-relevant applications, the corresponding SIL-Safety Manual should be observed.

1.4 Improper use

The following are considered to be instances of especially improper use of the device:

- For use as a climbing aid, for example for mounting purposes.
- For use as a bracket for external loads, for example as a support for piping, etc.
- Material application, for example by painting over the housing, name plate or welding/soldering on parts.
- Material removal, for example by spot drilling the housing.

1.5 Warranty provisions

Using the device in a manner that does not fall within the scope of its intended use, disregarding this manual, 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.

1.6 Manufacturer's address

ABB AG
Measurement & Analytics
Schillerstr. 72
32425 Minden
Germany
Tel: +49 571 830-0
Fax: +49 571 830-1806

ABB Limited
Measurement & Analytics
Peenya Industrial Area
Bangalore-560058
India
Tel: 1800 420 0707 – Toll free
Tel: +91 80 67143000 – International
Email: contact.center@in.abb.com

1.7 Service address

Customer service center
Tel: +49 180 5 222 580
Email: automation.service@de.abb.com

To find your local ABB contact visit
www.abb.com/contacts

For more information visit:
www.abb.com/measurement

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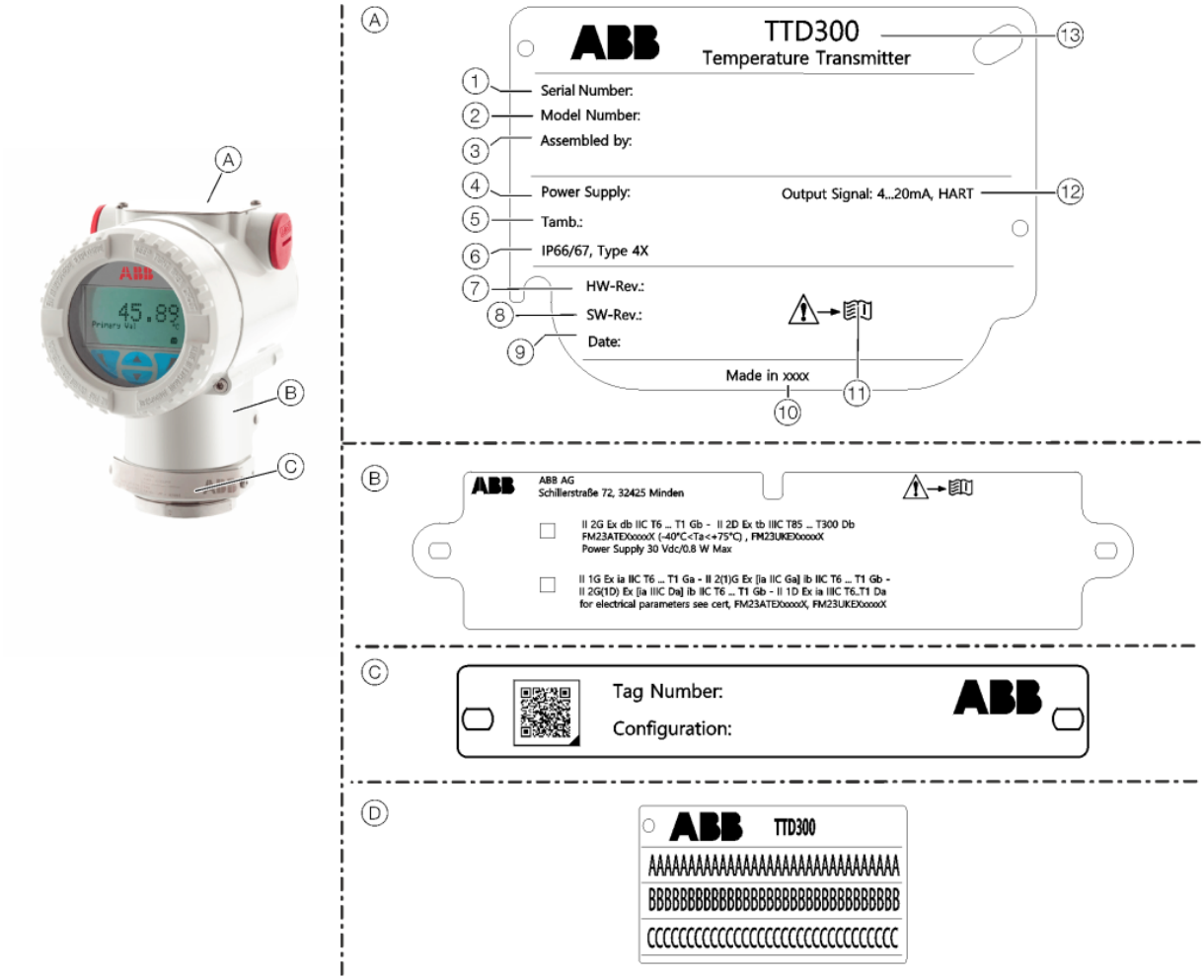
2 Product identification

2.1 Name plate



(A) Name plate
(B) Certification plate
(C) Tag plate (tag number)
(D) Optional wired-on stainless steel plate
(1) Serial number
(2) Model number
(3) Manufacturer adress
(4) Power supply
(5) Ambient temperature range, on additional plate for Ex versions
(6) IP rating of housing
(7) Hardware version
(8) Software revision
(9) Manufacturing year - week
(10) Country of manufacture
(11) 'Follow product documentation' symbol
(12) Output signal and communication protocol of the transmitter
(13) Type designation / model

Figure 1: Name and tag plates

The instrument is identified by the device identification plates shown in Figure 1.

The name plate Ⓐ, always made of stainless steel, AISI 316L (1.4404) provides information concerning the model code, maximum working temperature, power supply, serial number.

The certification plate Ⓑ contains the certification related parameters for use in hazardous areas. Please refer to the appropriate Safety Instruction for the corresponding information.

Note
Unmarked devices must NOT be commissioned.

The tag plate Ⓒ provides customer tag number and calibrated range.

Both certification and tag plates are supplied as self-adhesive labels as standard. Optional these plates are available in stainless steel, AISI 316L (1.4404).

Note

- The ambient temperature range specified on the name plate refers only to the transmitter itself and not to the measuring element used in the measuring inset.
- For all information related to explosion protection, please refer to the corresponding Safety Instructions.
- The device identification plates displayed are examples. The device identification plates affixed to the device can differ from this representation.

2.2 Additional identification plate

The device can be supplied with a wired-on stainless steel plate Ⓓ which is permanently laser printed with a custom text specified in phase of order.

The available space consists in 3 lines with 30 characters per line

2.3 Certification plate for devices with one or more types of protection

Devices with an explosion-protected design are marked with the following additional plates:

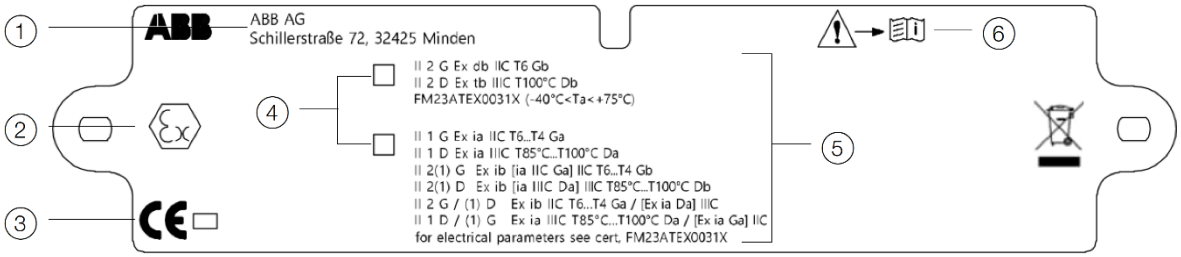


Figure 2: Certification plate for explosion-protected devices (example)

1. Certificate owner
2. Ex marking
3. CE mark (EU conformity) and notified body for quality assurance
4. Checkboxes for marking the type of protection used
5. Certification details with:
   - Protection class of the explosion-proof design (explosion protection marking)
   - Temperature class of the explosion-proof design
   - Approval number
6. 'Follow product documentation' symbol

⚠ WARNING

In the case of combined approvals, the user must

- decide on the type of protection during installation and
- read and observe the information in the relevant chapter.

NOTICE

Note for temperature transmitters with multiple types of protection

- Before the transmitter is installed, the selected type of protection must be indelibly marked on the explosion protection certification plate.
- The transmitter can then only be operated with this type of protection throughout its entire sevice life.
- If two protection types are indelibly marked on the explosion protection certification plate, the transmitter must not be used in areas categorized as hazardous.

3 Overview of explosion protection approvals

Type of protection "Intrinsic Safety (Ex ia / Ex ib)"

Approval	Model Code
ATEX	E1
IECEx	H1
FM (USA and Canada)	L1

Type of protection "Flameproof enclosures (Ex db)" & "Protection by enclosure (Ex tb)"

Approval	Model Code
ATEX	E3
IECEx	H5
FM (USA and Canada)	L3

Type of protection "Increased Safety (Ex ec)" & "Protection by enclosure (Ex tc)"

Approval	Model Code
ATEX	E5
IECEx	H2
FM (USA and Canada)	L2

Combined approval

Approval	Model Code
ATEX	E4 = E1 or E3
IECEX	H9 = H1 + H5
FM (USA and Canada)	L7 = L1 or L3

4 General information applicable for all types of protection

The installation, commissioning, maintenance and repair of devices in potentially explosive atmospheres must only be carried out by appropriately trained personnel. Works may be carried out only by persons, whose training has included instructions on different types of protection and installation techniques, concerned rules and regulations as well as general principles of zoning. The person must possess the appropriate competences for the type of work to be conducted.

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

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

All parts must be installed in accordance with the manufacturer's specifications, as well as relevant standards and regulations. For commissioning and operation, the respectively applicable regulations, especially for the protection of employees, should be complied with.When operating with combustible dusts, comply with IEC 60079-31.

The safety instructions for electrical apparatus in potentially explosive areas must be in accordance with Directive 2014/34/EU (ATEX) and IEC 60079-14 (Installation of electrical equipment in potentially explosive areas).

Comply with the applicable regulations for the protection of employees to ensure safe operation.

4.1 Specific Conditions of Use

- The service temperature inside the enclosure of the TTD300 and TTD300-N temperature transmitter represents the specified permissible ambient temperature. With the installation it shall be ensured that this service temperature cannot be exceeded.
- If the temperature is greater than
  - 70°C (158°F) on the cable entries resp.
  - 80°C (176°F) at the cable branching point

  cables with an appropriately specified temperature rating shall be used and an appropriately specified cable gland shall be installed.
- When the manufacturer of the equipment has not identified the type of protection on the label, the user shall, on installation, mark the label with the type of protection used. Once the type of protection has been marked it shall not be changed.

4.2 Ex marking

- Further information on the approval of devices for use in potentially explosive atmospheres can be found in the corresponding certificates (at www.abb.com/temperature).
- Depending on the design, a specific marking in accordance with ATEX or IECEx applies.
- A list of standards, including the output data to which the device conforms, can be found in the examination certificate or manufacturer’s declaration supplied with the device.
- Use in explosive hybrid mixtures, where an explosive gas atmosphere and a combustible dust atmosphere are, or can be, present at the same time, is currently not permitted in accordance with EN 60079-0 and EN 60079-31.
- Devices with several types of protection may only be operated in one of the possible types of protection.

4.3 Installation instructions

4.3.1 IP rating

The connection parts of the temperature transmitter must be installed so that at least the IP rating of the type of protection used can be achieved.

4.3.2 Cable entries

The operating instruction and approvals supplied with the cable glands, as well as any applicable requirements in accordance with EN 60079-14 must be taken into account accordingly.

Close unused cable entry in accordance with EN 60079-1.

4.3.3 Sensor instrumentation

As the user, it is your responsibility to ensure that the sensor instrumentation meets the requirements of applicable explosion protection standards

4.4 Commissioning

The commissioning and parameterization of the device may also be carried out in potentially explosive atmospheres using a handheld terminal that has been approved accordingly under consideration of an intrinsic safety installation check.

Alternatively, an Ex modem can be connected to the circuit outside the potentially explosive atmosphere.

4.5 Operating instructions

Protection against electrostatic discharges
The painted surface of the housing and the plastic parts inside the device can store electrostatic charges.

The temperature transmitter must be installed, operated and maintained in such a way as to avoid the occurrence of electrostatic charging.

⚠ WARNING

Risk of explosion!

- The device must not be used in areas in which process-related electrostatic charging of the housing may occur.
- The device must be installed, maintained and cleaned such that any dangerous electrostatic charge is avoided.

4.6 Maintenance

Check cable glands during each maintenance session. If the cable is slack, retighten the cap(s) of the cable glands.

If it is not possible to retighten them, the cable gland will need to be replaced.

4.7 Repair

⚠ DANGER

Explosion hazard

- Explosion hazard due to improper repair of the device. Faulty devices must not be repaired by the operator.
- The device may only be repaired by the ABB Service Department.

5 Specific information for "Intrinsic safety"

5.1 Ex marking of Transmitter

5.1.1 ATEX

Approved for use in Zone 0 & 1 and 20 & 21.

Model TTD300(-N)-E1	
Type Examination Test Certificate	FM23ATEX0031X
II 1 G Ex ia IIC T6...T4 Ga	
II 1 D Ex ia IIIC T85°C...T100°C Da	
II 2(1) G Ex ib [ia Ga] IIC T6...T4 Gb	
II 2(1) D Ex ib [ia Da] IIIC T85°C...T100°C Db	
II 2 G / (1) D Ex ib IIC T6…T4 Gb/ [Ex ia Da] IIIC	
II 1 D / (1) G Ex ia IIIC T85°C…T100°C Da / [Ex ia Ga] IIC	
-40°C ≤ Ta ≤ 85°C (-50°C for option "SE")	

5.1.2 IECEx

Approved for use in Zone 0 & 1 and 20 & 21

Model TTD300(-N)-H1	
IECEx certificate of conformity	IECEx FMG 23.0015X
Ex ia IIC T6...T4 Ga	
Ex ia IIIC T85°C...T100°C Da	
Ex ib [ia Ga] IIC T6...T4 Gb	
Ex ib [ia Da] IIIC T85°C...T100°C Db	
Ex ib IIC T6…T4 Gb / [Ex ia Da] IIIC Db	
Ex ia IIIC T85°C…T100°C Da / [Ex ia Ga] IIC	
-40°C ≤ Ta ≤ 85°C (-50°C for option "SE")	

5.2 Ex marking of LCD indicator

5.2.1 ATEX

Approved for use in Zone 0.

Type Examination Test Certificate PTB 05 ATEX 2079 X
II 1G Ex ia IIC T6…T1 Ga

5.2.2 IECEx

Approved for use in Zone 0.

IECEx certificate of conformity	IECEx PTB 12.0028X
Ex ia IIC T6…T1 Ga	

5.3 Specific Conditions of use

- For Intrinsic Safety the temperature code and ambient temperatures are as follows:
  - T* = Temperature Code T6 or T5 for a Maximum Ambient Temperature of 56°C
  - T* = Temperature Code T4 for a Maximum Ambient Temperature of 85°C
  - T* = Temperature Code T85°C for a Maximum Ambient Temperature of 70°C
  - T* = Temperature Code T100°C for a Maximum Ambient Temperature of 85°C
- The apparatus enclosure contains aluminum and is considered to constitute a potential risk of ignition by impact or friction. When installed as EPL Ga equipment care must be taken into account during installation and use to prevent impact or friction.
- With integral surge / transient protector (Option n = P1) the TTD300 and TTD300-N do not provide 500 V rms isolation between circuitry and earth. Care shall be taken to ensure that ignition-capable earth currents, resulting from dissimilar earth potentials, do not occur between the intrinsically safe apparatus and the associated apparatus.
- Inadmissible electrostatic charge of the plastic housing of the LCD indicator shall be prevented.

5.4 Temperature data

5.4.1 Transmitter

Use in Zone 0 & 1 and 20 & 21

Temperature class	**Permissible ambient temperature range**
T6, T5	−50 to 56 °C (−58 to 132.8 °F)
T4 to T1	−50 to 85 °C (−58 to 185.0 °F)
T85°C	−50 to 70 °C (−58 to 158 °F)
T100°C	−50 to 85 °C (−58 to 185.0 °F)

5.4.2 LCD indicator

Use in zone 0

LCD Indicator

Temperature class	Permissible ambient temperature range
T6	−50 to 44 °C (−58 to 111.2 °F)
T5	−50 to 56 °C (−58 to 132.8 °F)
T4…T1	−50 to 60 °C (−58 to 140 °F)

Use in zone 1

LCD Indicator

Temperature class	Permissible ambient temperature range
T6	−50 to 56 °C (−58 to 132.8 °F)
T5	−50 to 71 °C (−58 to 159.8 °F)
T4…T1	−50 to 85 °C (−58 to 185 °F)

5.5 Electrical data

Supply circuit	**TTD300**(-N)**-E1** **TTD300**(-N)**-H1**
Max. voltage	U_i = 30 V
Short-circuit current	I_i = 130 mA
Max. power	P_i = 0.8 W
Internal inductance	L_i = 160 µH
Internal capacitance	C_i = 3.5 nF

Measurement current circuit	Resistance thermometers, resistors (passive sensors)	Thermocouples, voltages (active sensors)
Max. voltage	U_o = 6.5 V	U_o = 1.2 V
Short-circuit current	I_o = 17.8 mA	I_o = 50 mA
Max. power	P_o = 29 mW	P_o = 60 mW
Internal inductance	L_i ≈ 0 mH (negligible)	L_i ≈ 0 mH (negligible)
Internal capacitance	C_i = 55 nF	C_i = 55 nF
Maximum permissible external inductance	L_o = 5 mH	L_o = 5 mH
Maximum permissible external capacitance	IIC: C_o = 1.65 µF IIB / IIIC: C_o = 8.85 µF	IIC: C_o = 1.15 µF IIB / IIIC: C_o =6.35 µF

5.6 Installation instructions

5.6.1 Grounding

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

5.7 Verification of intrinsically safe circuits

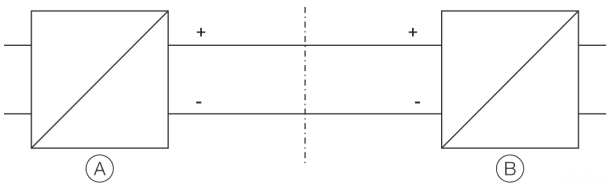
If transmitters are operated in an intrinsically safe circuit, proof that the interconnection is intrinsically safe must be provided in accordance with IEC/EN 60079-14 as well as IEC/EN 60079-25.

The supply isolators / DCS inputs must feature intrinsically safe input protection circuits in order to eliminate hazards (spark formation).

In order to provide proof of intrinsic safety, the electrical limit value must be used as the basis for the EU-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 / DCS input (related equipment)
U_i	≥	U_o
I_i	≥	I_o
P_i	≥	P_o
$L_i + L_c$ (cable)	≤	L_o
$C_i + C_c$ (cable)	≤	C_o



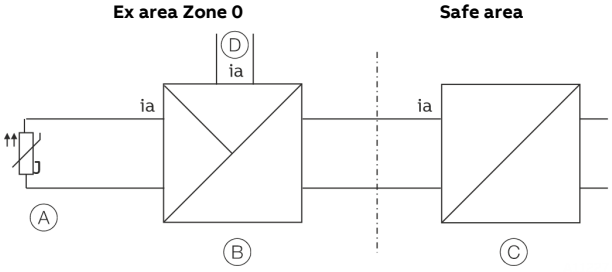
Ⓐ Transmitter
Ⓑ Supply isolator / DCS input with supply / segment coupler

Figure 3: Intrinsic safety proof

Note:
As the user, it is your responsibility to ensure that the sensor instrumentation meets the requirements of applicable explosion protection standards.

5.7.1 Use in explosive gas atmospheres

5.7.1.1 Transmitter in Zone 0, Sensor in Zone 0; Marking: II 1 G Ex ia IIC T6...T4 Ga, Ex ia IIC T6...T4 Ga



Ⓐ Sensor
Ⓑ TTD300(-N) transmitter
Ⓒ Supply isolator [Ex ia]
Ⓓ Interface for LCD indicator

Figure 4: Hookup in ATEX – Zone 0

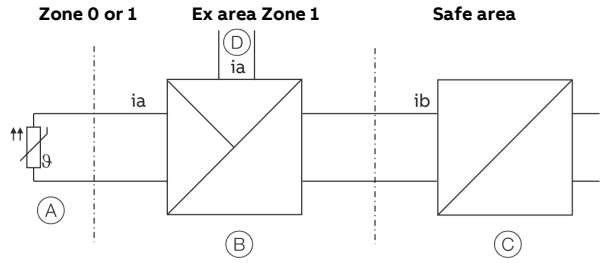
The input for the supply isolator must be designed with 'Ex ia' type of protection.

Note

When operating the transmitter in Zone 0 (EPL 'Ga'), the compatibility of the device materials with the surrounding atmosphere must be ensured.

Encapsulation material used for the transmitter: Polyurethane (PUR)

5.7.1.2 Transmitter in Zone 1, Sensor in Zone 0 or 1; Marking: II 2 (1) G Ex ib [ia Ga] IIC T6...T4 Gb, Ex ib [ia Ga] IIC T6...T4 Gb



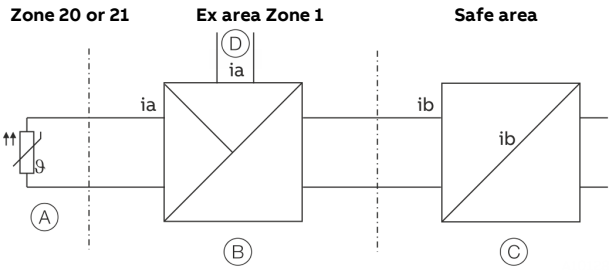
Ⓐ Sensor
Ⓑ TTD300(-N) transmitter
Ⓒ Supply isolator [Ex ia or ib]
Ⓓ Interface for LCD indicator

Figure 5: Hookup in ATEX - Zone 1 (0, 1)

Note

- The input for the supply isolator must be designed with 'Ex ib' type of protection. The sensor can be installed in Zone 1 or Zone 0.
- When using the sensor in Zone 0, the sensor circuit must be designed in the 'Ex ia' type of protection.

5.7.1.3 Transmitter in Zone 1, Sensor in Zone 20 or 21; Marking:II 2 G / (1) D Ex ib IIC T6...T4 Gb/ [Ex ia Da] IIIC, Ex ib IIC T6...T4 Ga / [Ex ia Da] IIIC



Ⓐ Sensor
Ⓑ TTD300(-N) transmitter
Ⓒ Supply isolator [Ex ib]
Ⓓ Interface for LCD indicator

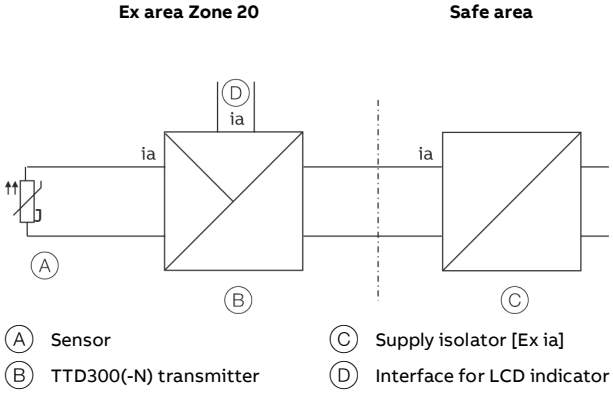
Figure 6: Hookup in ATEX - Zone 1 (20, 21)

Note

- The input for the supply isolator must be designed with 'Ex ib' type of protection. The sensor can be installed in Zone 20 or Zone 21.
- When using the sensor in Zone 20, the sensor circuit must be designed in the 'Ex ia' type of protection.

5.7.2 Use in explosive dust atmospheres

5.7.2.1 Transmitter in Zone 20, Sensor in Zone 20; Marking: II 1 D Ex ia IIIC T85°C...T100°C, Ex ia IIIC T85°C...T100°C

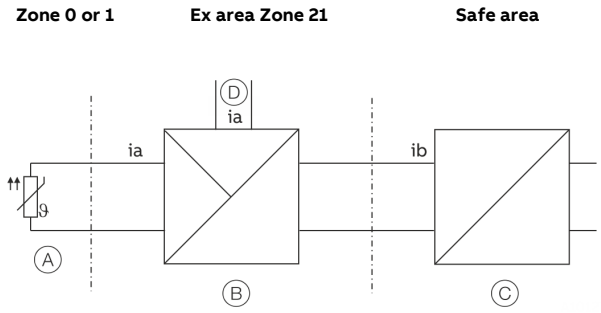


Ⓐ Sensor
Ⓑ TTD300(-N) transmitter
Ⓒ Supply isolator [Ex ia]
Ⓓ Interface for LCD indicator

Figure 7: Hookup in ATEX – Zone 20

The input for the supply isolator must be designed with 'Ex ia' type of protection.

5.7.2.2 Transmitter in Zone 21, Sensor in Zone 20 or 21; Marking: II 2 (1) D Ex ib [ia Da] IIIC T85°C...T100°C Db, Ex ib [ia Da] IIIC T85°C...T100°C Db



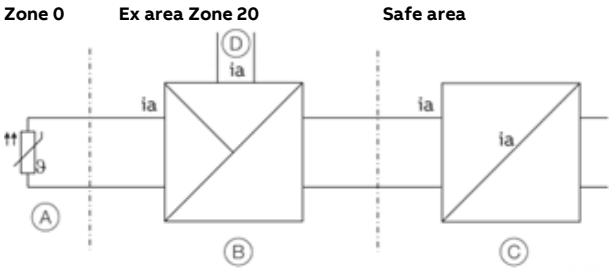
Ⓐ Sensor
Ⓑ TTD300(-N) transmitter
Ⓒ Supply isolator [Ex ib]
Ⓓ Interface for LCD indicator

Figure 8: Hookup in ATEX - Zone 21 (20,21)

The input for the supply isolator must be designed with 'Ex ib' type of protection. The sensor can be installed in Zone 21 or Zone 20.

- When using the sensor in Zone 20, the sensor circuit must be designed in the 'Ex ia' type of protection.

5.7.2.3 Transmitter in Zone 20, Sensor in Zone 0; Marking: II 1 D /(1 G) Ex ia IIIC T85°C...T100°C Da / [Ex ia Ga] IIC, Ex ia IIIC T85°C...T100°C Da / [Ex ia Ga] IIC



Ⓐ Sensor
Ⓑ TTD300(-N) transmitter
Ⓒ Supply isolator [Ex ib]
Ⓓ Interface for LCD indicator

Figure 9: Hookup in ATEX - Zone 20 (0)

The input for the supply isolator must be designed with 'Ex ia' type of protection. The sensor can be installed in Zone 20 or Zone 21.

6 Specific information for “Flameproof enclosures” and “Protection by enclosure”

6.1 Ex marking

6.1.1 ATEX

Model TTD300(-N)-E3	
Type Examination Test Certificate	FM23ATEX0031X
II 2 G Ex db IIC T6 Gb	
II 2 D Ex tb IIIC T100°C Db	
-40°C ≤ Ta ≤ 75°C (-50°C for option “SE”)	

6.1.2 IECEx

Model TTD300(-N)-H5	
IECEx Certificate of Conformity	IECEx FMG 23.0015X
Ex db IIC T6…T4 Gb	
Ex tb IIIC T100°C Db	
-40°C ≤ Ta ≤ 75°C (-50°C for option “SE”)	

6.2 Specific Conditions of Use

- Contact the manufacturer for specific flamepath joint details during repair of flameproof Ex db apparatus.

6.3 Temperature data

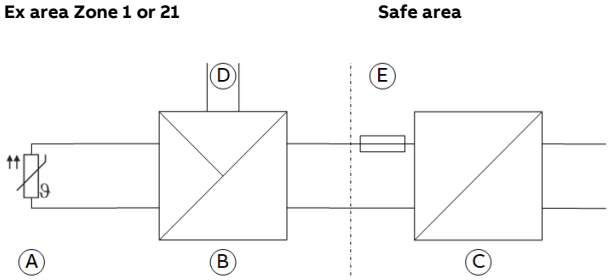
Temperature class	**Permissible ambient temperature range on the connection head**
T6	−50 to 75 °C (−58 to 167 °F)
T100°C	−50 to 75 °C (−58 to 167 °F)

6.4 Electrical data

Supply circuit	
Maximum voltage	U_S = 30 V
Maximum current	I_s = 32 mA, limited by the upstream fuse (rated fuse current 32 mA)

Measurement current circuit	
Maximum voltage	U_O = 6.5 V
Maximum current	I_O = 17.8 mA
Maximum power	P_O = 29 mW

6.5 Installation instructions



(A) Sensor
(B) TTD300(-N)
(C) Supply isolator with voltage limit
(D) Interface for LCD indicator
(E) Upstream fuse

Figure 10: Hookup in Zone 1, ‘flameproof (enclosure)’ type of protection

Note

- The power supply circuit of the transmitter must be energy-limited by an upstream fuse (according to IEC 60127 or UL248) having a rated fuse current of 32 mA.
- The fuse may be accommodated in the associated supply unit or shall be connected in series separately.
- The rated fuse voltage shall be equal to or higher than 30 V.
- The breaking capacity of the fuse link shall be equal to or higher than the maximum short-circuit current to be assumed at the place of installation (usually 1500 A).
- The specified operating voltage Us = 30 V represents the maximum permissible value of the supplying source according to EN IEC 60079-0:2017, clause 3.93 and shall not be exceeded.
- The ‘flameproof enclosure’ type of protection is only achieved by correctly installing a specially certified cable gland with the Ex d type of protection with the corresponding marking. Cable entries (PG glands) and sealing plugs of simple design must not be used.

- The transmitter must be connected using suitable cable and cable entries or pipeline systems that satisfy the requirements of EN 60079-1 and for which a separate examination certificate exists. If the transmitter is connected to pipeline systems, the relevant sealing device must be affixed directly to the housing.
- As far as the installation and mounting of components is concerned (explosion-proof cable entries, connection parts), only those components are approved which at the least technically comply with the current version of the type examination certificate and for which a separate examination certificate exists. At the same time, it is imperative that the operating conditions listed in the respective component certificates are complied with.
- The temperature transmitter must be integrated into the potential equalization of the system.
- The connection leads must be permanently installed and secured against tensile load.

6.6 Operating instructions

⚠ DANGER

Risk of explosion due to hot parts

Hot parts inside the device pose an explosion hazard.

- Never open the device immediately after switch-off.
- A waiting time of at least four minutes should be observed before opening the device.

⚠ DANGER

Explosion hazard when opening the device

Explosion hazard when opening the device with activated power supply.

- Before opening the device, switch off the power supply.

⚠ DANGER

Explosion hazard when damaging the flameproof thread

The cover thread is used as a flameproof joint for the 'Flameproof (enclosure) – Ex d' type of protection.

- During assembly / disassembly of the device, make sure that the cover thread does not get damaged.• Devices with damaged threads must no longer be used in potentially explosive atmospheres.

6.7 Repair

⚠ DANGER

Explosion hazard when damaging the flameproof thread

Repairs on flameproof joints are not permitted.

7 Specific information for “Increased safety” and “Protection by enclosure”

7.1 Ex marking

7.1.1 ATEX

Model TTD300(-N)-E5	
Type Examination Test Certificate	FM23ATEX0032X
II 3 G Ex ec IIC T6...T4 Gc	
II 3 D Ex tc IIIC T85°C...T100°C	
-40°C ≤ Ta ≤ 85°C (-50°C for option “SE”)	

7.1.2 IECEx

Model TTD300(-N)-H2	
Type Examination Test Certificate	IECEx FMG 23.0015X
Ex ec IIC T6 … T4 Gc	
Ex tc IIIC T85°C...T100°C Dc	
-40°C ≤ Ta ≤ 75°C (-50°C for option “SE”)	

7.2 Specific Conditions of Use

- For the operation as category-3 equipment Type of Protection Increased Safety "ec” or Protection by enclosure "tc" a fuse according to IEC 60127 having a rated fuse current of 32 mA shall be connected in series to the TTD300 and TTD300-N.
- The fuse may be accommodated in the associated supply unit or shall be connected in series separately.
- The rated fuse voltage shall be equal to or higher than 30 V.
- The breaking capacity of the fuse link shall be equal to or higher than the maximum short-circuit current to be assumed at the place of installation (usually 1500 A).

The specified operating voltage Us = 30 V represents the maximum permissible value of the supplying source according to EN IEC 60079-0:2017, clause 3.93. This voltage shall not be exceeded for the operation as category-3 equipment Type of Protection Increased Safety “ec” and Protection by enclosure "tc".

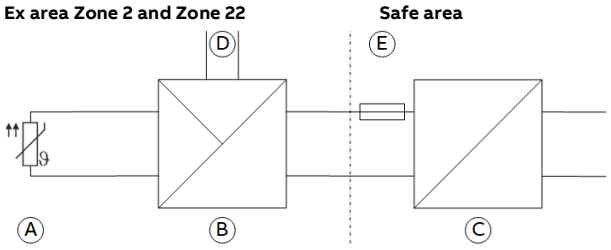
7.3 Temperature data

Temperature class	**Permissible ambient temperature range on the connection head**
T6 to T1	–50 to 85 °C (–58 to 185 °F)
T85°C …T100°C	–50 to 85 °C (–58 to 185 °F)

7.4 Electrical data

Supply circuit	
Maximum voltage	U_S = 30 V
Maximum current	I_s = 32 mA, limited by the upstream fuse (rated fuse current 32 mA)
Measurement current circuit	
Maximum voltage	U_O = 6.5 V
Maximum current	I_O = 17.8 mA
Maximum power	P_O = 29 mW

7.5 Installation instructions



(A) Sensor
(B) TTD300(-N) transmitter
(C) Supply isolator with voltage limit (30 V)
(D) Interface for LCD indicator
(E) Fuse

Figure 11: Hookup in ATEX - Zone 2

Note

- The power supply circuit of the transmitter must be energy-limited by an upstream fuse (according to IEC 60127 or UL248) having a rated fuse current of 32 mA.

- The transmitter must be connected using suitable cable and cable entries or pipeline systems that satisfy the requirements of EN 60079-1 and for which a separate examination certificate exists. If the transmitter is connected to pipeline systems, the relevant sealing device must be affixed directly to the housing.
- As far as the installation and mounting of components is concerned (explosion-proof cable entries, connection parts), only those components are approved which at the least technically comply with the current version of the type examination certificate and for which a separate examination certificate exists. At the same time, it is imperative that the operating conditions listed in the respective component certificates are complied with.
- The connection lead must be routed securely and in such a way as to ensure adequate protection against damage.

The connection leads must be permanently installed and secured against tensile load.

Notes

ABB Measurement & Analytics

For your local ABB contact, visit:
www.abb.com/contacts

For more product information, visit:
www.abb.com/temperature