

Safety Instructions

Digital transmitter TMD1

Tank gauge

Explosion-proof construction: Ex d IIB T4

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Digital transmitter TMD1

Tank gauge

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About this document

This document contains precautions regarding the explosion protection of digital transmitter TMD1 with certification numbers TC20243 and TC20249. To ensure safety, read and understand the contents of this document before using this product.

This document is an integral part of the following Operating Instructions:

BA00427G

Supplementary documentation

Explosion protection brochure: CP00021Z/11

The Explosion-protection brochure is available:

- In the download area of the Endress+Hauser website:
www.endress.com -> Downloads -> Media Type: Documentation ->
Documentation Type: Brochures and catalogs -> Text Search: CP00021Z
- On the CD for devices with CD-based documentation

Manufacturer's certificates

Certificates

Certificate no.

- TC20243
- TC20249

Manufacturer address

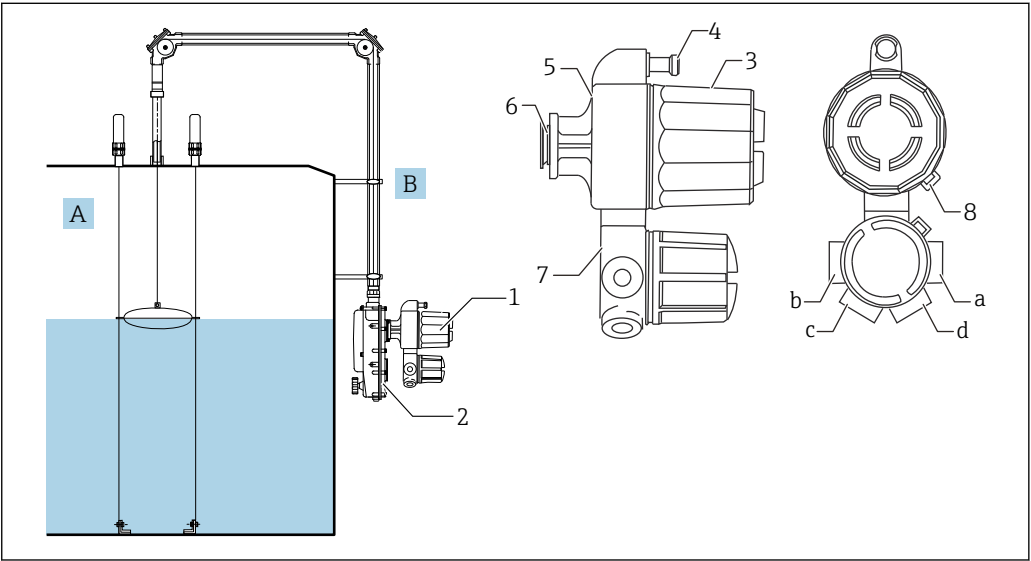
Endress+Hauser Yamanashi Co., Ltd.

406-0846

862-1 Mitsukunugi, Sakaigawa-cho, Fuefuki-shi, Yamanashi

Installation

Use TMD1 by configuring it as shown in the diagram below. When installing TMD1 in heating tanks, ensure that the ambient temperature of TMD1 does not exceed 60 °C (140 °F) by placing thermal isolation material on the tank walls.



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1 TMD1 installation

- A Zone 0
- B Zone 1
- 1 Digital transmitter TMD1
- 2 Float level gauge LT11
- 3 Cover: AC4C, 1 pc.
- 4 Hand-held terminal connector: 1 pc.
- 5 Main body: AC4C, 1 pc.
- 6 Coupling: ADC6, 1 pc.
- 7 Terminal box: ADC12, 1 pc.
- 8 Locking device: ADC6, 2 pcs.

Position	Thread type	Thread of adapter (reducer)
a	G1	G3/4
		G1/2
b	G1	G3/4
		G1/2
c	G1	G3/4
		G1/2
d	G1	G3/4
		G1/2

Safety instructions

Product requirements

- **Power supply**
Before turning on the power, ensure that the power supply and frequency of TMD1 are within specifications. Use the proper voltage required for operation of the product.
- **Power supply cable**
Always use a power supply cable recommended by Endress+Hauser. The power supply cable must be grounded. See Operating Instructions (BA00427G) for recommended cables.
- **Protective grounding**
For external grounding wires, use conducting wires with a cross-sectional area of at least 4 mm² (4 sq). For crimp terminals, use conducting wires of at least 4 sq and round crimp terminals that are compatible with M5 screws.
Do not remove ground connection or ground wires when the power is on.
- **External connection**
This product may be connected to external devices listed in the Operating Instructions (BA00427G). For information on the features of these external devices, see the operating instructions of the respective devices. When connecting to external devices, ensure secure protective grounding of TMD1 before connecting the main unit to the power supply.

Precautions for float level gauge installation and cable connection

- For instructions on how to install the product on a float level gauge, see the Operating Instructions (BA00427G).
- Only trained personnel authorized by the installation supervisor may handle the installation, electrical equipment, start-up, operation, and maintenance of TMD1 and the connected external devices.
- Such personnel must read and understand this document prior to executing the instructions.
- The installer must make sure that the measuring system is correctly wired according to the wiring diagrams. The measuring system must be grounded.
- Observe all laws, notices, and regulations applicable and valid for installation, testing, and operation.

Cable connection



The terminal layout and internal wiring will vary depending on the specifications. When connecting TMD1 to an external device, be sure to check the terminal layout according to the delivery specifications before wiring.



Heat-resistant temperature of the cable

A heat-resistant temperature of 65 °C (150.8 °F) or lower may compromise the explosion-proof performance.

- ▶ Select cables with a heat-resistant temperature of at least 65 °C (150.8 °F) for all cables. See Operating Instructions (BA00427G) for types of cables. For information on handling cable glands, see "External cable entry."

Precautions for using hand-held terminals

- Open the optical connector connection unit cover on the main unit of TMD1 only when connecting to a hand-held terminal. Once use of the hand-held terminal is complete, be sure to close the optical connector connection unit cover.
- During normal operation, the optical connector connection unit cover must be closed.

Instructions for safe use

- TMD1 is Ex d equipment and therefore can be installed in Zone 1 and Zone 2 hazardous areas. It is not designed for installation in Zone 0 hazardous areas.
- Do not modify or alter the product.
- Never open the cover in a hazardous area when voltage is applied to the TMD1 terminal block.
- Always ensure that an explosive atmosphere is absent before opening the cover.

- For information on handling cable glands, see "External cable entry."
- Observe the "USERS' GUIDELINES for Installations for Explosive Atmospheres in General Industry," "Recommended Practices for Explosion-Protected Electrical Installations in General Industries," and other laws, notices, and regulations regarding the use of explosion-proof devices when performing installation, wiring, pipework, maintenance, inspection, and repair on TMD1.
- Contact your Endress+Hauser sales office or distributor when performing maintenance or repair based on the "USERS' GUIDELINES for Installations for Explosive Atmospheres in General Industry" or "Recommended Practices for Explosion-Protected Electrical Installations in General Industries" regarding the use of explosion-proof equipment.

CAUTION

Erroneous handling

Handling this product in a manner that deviates from this document may cause accidents and/or malfunction.

- Always follow the instructions in this document.

Maintenance

Perform periodic maintenance and inspection by referring to the Recommended Practices for Explosion-Protected Electrical Installations in General Industries (Gas and Vapor Explosion Protection) and USERS' GUIDELINES for Installations for Explosive Atmospheres in General Industry (Gas Explosion Protection). Contact your Endress+Hauser sales office or distributor if parts replacement is required as a result of maintenance and inspection.

External cable entry

Cable gland mounting

When reinstalling a cable gland that has been removed for maintenance, inspection, or repair, tighten the cable gland with a torque of 4 N·m. Once tightened, secure it with a set screw for the cable gland.

-  When an adapter (reducer) is used to connect a terminal box and a cable gland, hold the adapter (reducer) in place with a wrench to prevent it from rotating while the cable gland is being removed and mounted. Do not remove the adapter (reducer) or the set pin unless it is malfunctioning.

Cable gland packing

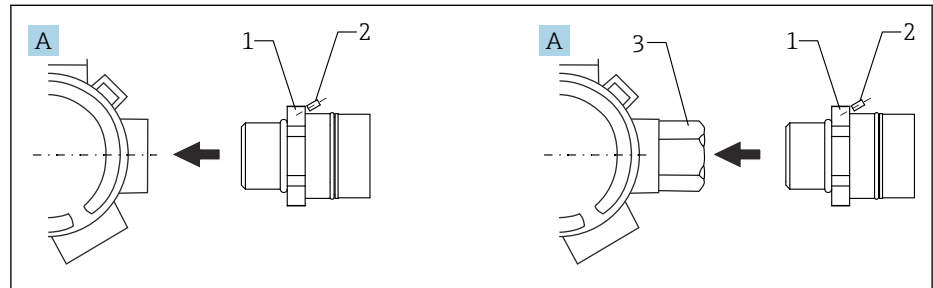
Use cable gland packing that fits the cable's external diameter.

Cable gland mounting procedure

The following table shows the names of components for the mounting procedure.

No.	Description
A	Terminal box
1	Cable gland main unit
2	Set screw
3	Adapter (reducer)
4	Washer
5	Packing
6	Packing gland
7	Clamp
8	Cross-recessed head screw
9	Union nut / B coupling
10	Set screw
11	Cable

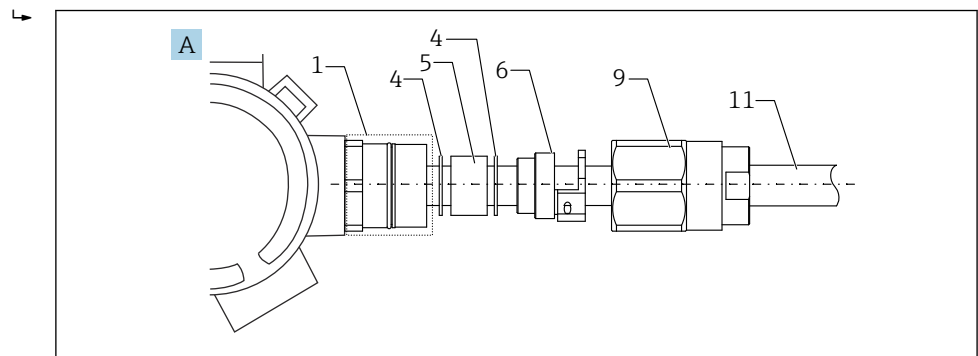
1. Tighten the cable gland main unit [1] on the terminal box side with a hexagonal wrench (nominal dimension: 1.5 mm (0.06 in)).
↳ Tightening torque: 4 N·m



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2 Cable gland mounting 1

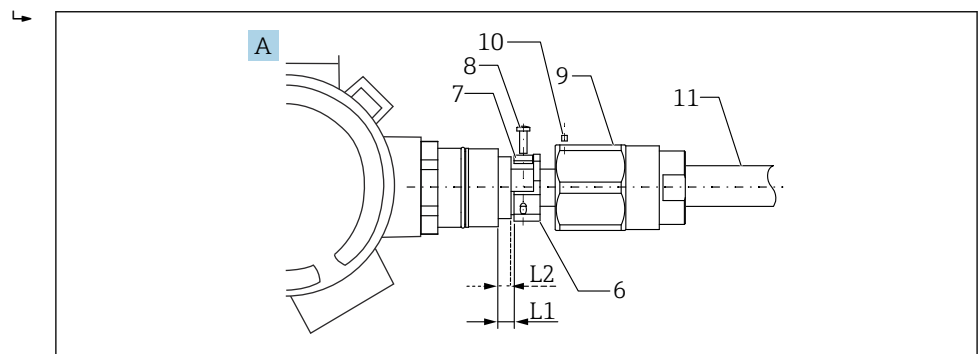
2. Guide the cable through the cable gland main unit [1], washer [4], packing [5], packing gland [6], and union nut / B coupling [9].



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3 Cable gland mounting 2

3. Screw in the packing gland [6] with a wrench until it reaches the compressed length (see the following table).



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4 Cable gland mounting 3

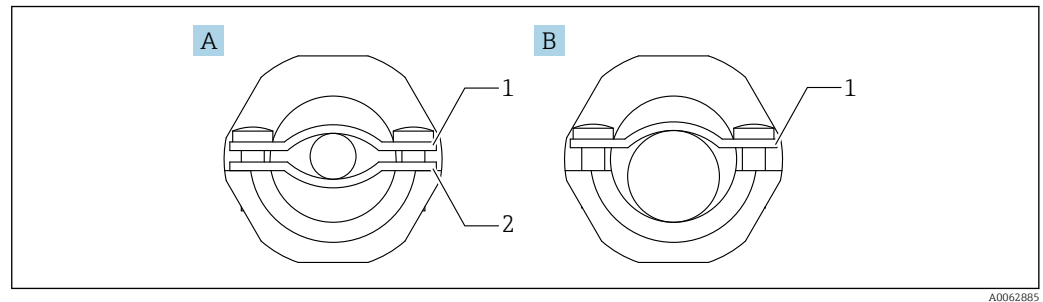
- i** To tighten until the compressed length of the packing in the following table is reached, measure L1 when packing gland [6] is screwed in until it stops, then determine the tightening position using the following equation.

$$L2 = L1 - \{(\text{Non-compressed length of packing: 21 mm (0.83 in)}) - (\text{Post-compression length of packing})\}$$

4. Secure the cable with a clamp [7] and a cross-recessed screw [8]. The tightening torque of the cross-recessed screw at this time is shown in the table below.

Cable gland model	Tightening torque (N·m)
EXPC-16B	0.4
EXPC-22B	
EXPC-28B	0.5

i Note that different clamps will be required for cables with an external diameter of $\phi 6$ mm (0.24 in) to $\phi 8$ mm (0.31 in) and cables with an external diameter of at least $\phi 8$ mm (0.31 in).



5 Cable external diameter

A Clamps for an external diameter of $\phi 6$ (0.24) to 8 mm (0.31 in) (packing internal diameter $\phi 8$ mm (0.31 in))

B Clamps for an external diameter of at least $\phi 8$ mm (0.31 in) (packing internal diameter at least $\phi 10$ mm (0.39 in))

1 Clamp (top)

2 Clamp (bottom)

5. Screw in the union nut / B coupling [9] and tighten it with a hexagonal wrench (nominal dimension: 1.5 mm (0.06 in)).

Compressed packing length (cable gland model: EXPC-28B (G1))

Packing internal diameter	Cable external diameter	Compressed packing length
$\phi 18$ mm (0.71 in)	$\phi 16.0$ mm (0.63 in)	16.6 mm (0.65 in)
	$\phi 16.5$ mm (0.65 in)	17.1 mm (0.67 in)
	$\phi 17.0$ mm (0.67 in)	17.5 mm (0.69 in)
	$\phi 17.5$ mm (0.69 in)	18.0 mm (0.7 in)
	$\phi 18.0$ mm (0.7 in)	18.6 mm (0.73 in)
$\phi 20$ mm (0.79 in)	$\phi 18.0$ mm (0.7 in)	16.1 mm (0.63 in)
	$\phi 18.5$ mm (0.73 in)	16.6 mm (0.65 in)
	$\phi 19.0$ mm (0.75 in)	17.1 mm (0.67 in)
	$\phi 19.5$ mm (0.77 in)	17.7 mm (0.7 in)
	$\phi 20.0$ mm (0.79 in)	18.4 mm (0.73 in)

Compressed packing length (cable gland model: EXPC-22B (G3/4))

Packing internal diameter	Cable external diameter	Compressed packing length
$\phi 14$ mm (0.55 in)	$\phi 12.0$ mm (0.47 in)	16.2 mm (0.64 in)
	$\phi 12.5$ mm (0.49 in)	16.7 mm (0.66 in)
	$\phi 13.0$ mm (0.51 in)	17.2 mm (0.68 in)
	$\phi 13.5$ mm (0.53 in)	17.7 mm (0.7 in)
	$\phi 14.0$ mm (0.55 in)	18.1 mm (0.71 in)
$\phi 16$ mm (0.63 in)	$\phi 14.0$ mm (0.55 in)	15.4 mm (0.6 in)

Packing internal diameter	Cable external diameter	Compressed packing length
	φ14.5 mm (0.57 in)	16.0 mm (0.63 in)
	φ15.0 mm (0.59 in)	16.6 mm (0.65 in)
	φ15.5 mm (0.61 in)	17.4 mm (0.69 in)
	φ16.0 mm (0.63 in)	18.1 mm (0.71 in)

Compressed packing length (cable gland model: EXPC-16B (G1/2))

Packing internal diameter	Cable external diameter	Compressed packing length
φ8 mm (0.31 in)	φ6.0 mm (0.24 in)	17.1 mm (0.67 in)
	φ6.5 mm (0.26 in)	17.3 mm (0.68 in)
	φ7.0 mm (0.28 in)	17.6 mm (0.69 in)
	φ7.5 mm (0.3 in)	18.0 mm (0.7 in)
	φ8.0 mm (0.31 in)	18.4 mm (0.73 in)
φ10 mm (0.39 in)	φ8.0 mm (0.31 in)	16.4 mm (0.65 in)
	φ8.5 mm (0.33 in)	16.8 mm (0.66 in)
	φ9.0 mm (0.35 in)	17.2 mm (0.68 in)
	φ9.5 mm (0.37 in)	17.7 mm (0.7 in)
	φ10.0 mm (0.39 in)	18.3 mm (0.72 in)
φ12 mm (0.47 in)	φ10.0 mm (0.39 in)	15.6 mm (0.61 in)
	φ10.5 mm (0.41 in)	16.0 mm (0.63 in)
	φ11.0 mm (0.43 in)	16.0 mm (0.63 in)
	φ11.5 mm (0.45 in)	17.3 mm (0.68 in)
	φ12.0 mm (0.47 in)	18.1 mm (0.71 in)

Unused external cable entry

Close off any unused external cable entry by mounting a plug directly onto the terminal box. If the plug needs to be replaced, contact your Endress+Hauser sales office or distributor.

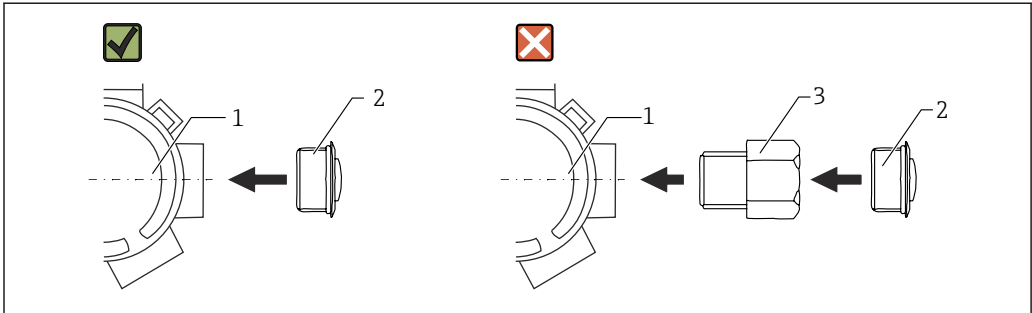
Warning



Combined use of an adapter (reducer) and a plug

Combined use of an adapter (reducer) and a plug is not permitted by the explosion-proof specifications.

- Do not use an adapter (reducer) and a plug together.



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6 Plug and adapter (reducer)

- 1 Terminal box
- 2 Plug
- 3 Adapter (reducer)

Optical connector

- Do not open the optical connector cover unless a hand-held terminal is connected.
- Contact your Endress+Hauser sales office or distributor for repair and replacement if optical connectors are damaged.
- Never remove the optical connector and the securing pin.

Tightening bolt

The tightening bolt that joins the electrical housing to the terminal box is a stainless steel bolt of strength class A2-50. Contact your Endress+Hauser sales office or distributor if replacement is required as a result of maintenance and inspection.

Repair

If repair is necessary, contact your Endress+Hauser sales office or distributor. For details, see Operating Instructions (BA00427G).

Notes on cleaning

If the surface of the container is dirty, wipe it with a cloth moistened with water or a mild detergent. Do not use organic solvents such as thinners, alcohol, or benzene to clean the product. This may damage the surface coating. Additionally, do not use synthetic fibers, such as polyester, nylon, or acrylic, as they may generate static electricity.

Troubleshooting

See Operating Instructions (BA00427G).

Malfunction diagnosis

See Operating Instructions (BA00427G).

Spare parts

See Operating Instructions (BA00427G).



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