

Brief Operating Instructions

Micropilot FMR67B

Free space radar
HART

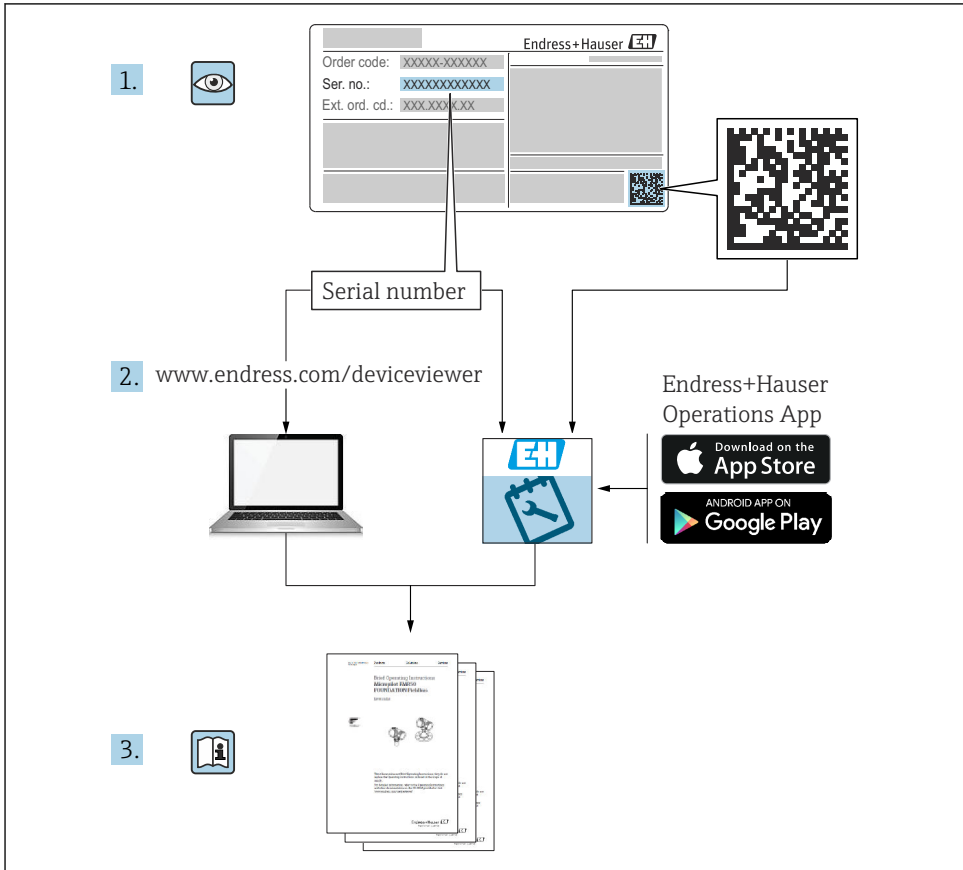


These Brief Operating Instructions are not a substitute for the Operating Instructions pertaining to the device.

Detailed information is provided in the Operating Instructions and other documentation.

Available for all device versions via:

- Internet: www.endress.com/deviceviewer
- Smartphone/tablet: Endress+Hauser Operations app



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1 Symbols

1.1 Safety symbols

DANGER

This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

WARNING

This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

CAUTION

This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.

NOTICE

This symbol contains information on procedures and other facts which do not result in personal injury.

1.2 Symbols for certain types of information and graphics

Permitted

Procedures, processes or actions that are permitted

Preferred

Procedures, processes or actions that are preferred

Forbidden

Procedures, processes or actions that are forbidden

Tip

Indicates additional information



Reference to documentation



Reference to graphic



Notice or individual step to be observed

1, 2, 3

Series of steps



Result of a step

1, 2, 3, ...

Item numbers

A, B, C, ...

Views

→ **Safety instructions**

Observe the safety instructions contained in the associated Operating Instructions

2 Requirements for personnel

The personnel must fulfill the following requirements for its tasks:

- ▶ Trained, qualified specialists must have a relevant qualification for this specific function and task.
- ▶ Personnel must be authorized by the plant owner/operator.
- ▶ Personnel must be familiar with federal/national regulations.
- ▶ Before starting work: personnel must read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).
- ▶ Personnel must follow instructions and comply with general policies.

3 Intended use

Application and media

The measuring device described in these Operating Instructions is intended for continuous, non-contact level measurement primarily in bulk solids. Because of its operating frequency of approx. 80 GHz, a maximum radiated peak power of 6.3 mW and an average output power of 63 μ W, unrestricted use outside of closed, metallic vessels is also permitted (for example over heaps). Operation does not pose any danger whatsoever to humans and animals.

If the limit values specified in the "Technical data" and the conditions listed in the instructions and additional documentation are observed, the measuring device may be used for the following measurements only:

- ▶ Measured process variables: level, distance, signal strength
- ▶ Calculable process variables: volume or mass in any shape of vessel

To ensure that the measuring device remains in proper condition for the operation time:

- ▶ Use the measuring device only for media against which the process-wetted materials are adequately resistant.
- ▶ Observe the limit values in the "Technical data".

Incorrect use

The manufacturer is not liable for damage caused by improper or non-intended use.

Avoid mechanical damage:

- ▶ Do not touch or clean device surfaces with pointed or hard objects.

Clarification of borderline cases:

- ▶ For special fluids and fluids for cleaning, Endress+Hauser is glad to provide assistance in verifying the corrosion resistance of fluid-wetted materials, but does not accept any warranty or liability.

Residual risks

Due to heat transfer from the process as well as power loss in the electronics, the temperature of the electronics housing and the assemblies it contains (e.g. display module, main electronics module and I/O electronics module) may rise to 80 °C (176 °F). When in operation, the sensor may reach a temperature close to the medium temperature.

Danger of burns from contact with surfaces!

- ▶ For elevated fluid temperatures, ensure protection against contact to prevent burns.

4 Workplace safety

When working on and with the device:

- ▶ Wear the required personal protective equipment according to federal/national regulations.
- ▶ Switch off the supply voltage before connecting the device.

5 Operational safety

Risk of injury!

- ▶ Operate the device only if it is in proper technical condition, free from errors and faults.
- ▶ The operator is responsible for interference-free operation of the device.

Hazardous area

To eliminate the risk of danger to persons or the facility when the device is used in the approval-related area (e.g. explosion protection, pressure equipment safety):

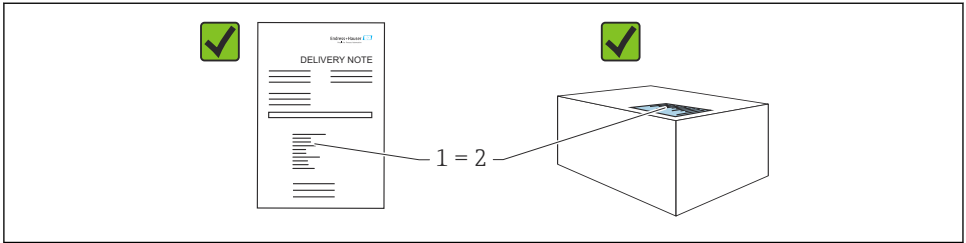
- ▶ Check the nameplate to verify if the device ordered can be put to its intended use in the approval-related area.
- ▶ Observe the specifications in the separate supplementary documentation that is an integral part of this manual.

6 Product safety

This device is designed in accordance with good engineering practice to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which it is safe to operate.

It meets general safety standards and legal requirements. It also complies with the EC directives listed in the device-specific EC Declaration of Conformity. Endress+Hauser confirms this by affixing the CE mark to the device.

7 Incoming acceptance



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Check the following during incoming acceptance:

- Is the order code on the delivery note (1) identical to the order code on the product sticker (2)?
- Are the goods undamaged?
- Do the data on the nameplate correspond to the order specifications and the delivery note?
- Is the documentation provided?
- If required (see nameplate): are the Safety Instructions (XA) provided?



If one of these conditions is not met, please contact the manufacturer's sales office.

8 Product identification

The following options are available for the identification of the measuring device:

- Nameplate specifications
- Extended order code with breakdown of the device features on the delivery note
- ▶ *Device Viewer*(www.endress.com/deviceviewer); manually enter the serial number from the nameplate.
 - ↳ All the information about the measuring device is displayed.
- ▶ *Endress+Hauser Operations app*; manually enter the serial number indicated on the nameplate or scan the 2D matrix code on the nameplate.
 - ↳ All the information about the measuring device is displayed.

8.1 Nameplate

The information that is required by law and is relevant to the device is shown on the nameplate, e.g.:

- Manufacturer identification
- Order number, extended order code, serial number
- Technical data, degree of protection

- Firmware version, hardware version
- Approval-related information, reference to Safety Instructions (XA)
- DataMatrix code (information about the device)

8.2 Manufacturer address

Endress+Hauser SE+Co. KG

Hauptstraße 1

79689 Maulburg, Germany

Place of manufacture: See nameplate.

9 Storage and transport

9.1 Storage conditions

- Use the original packaging
- Store the device in clean and dry conditions and protect from damage caused by shocks

9.1.1 Storage temperature range

See Technical Information.

9.2 Transporting the product to the measuring point

WARNING

Incorrect transport!

The housing or sensor can be damaged or pull off. Risk of injury!

- ▶ Transport the device to the measuring point in its original packaging or by the process connection.
- ▶ Always secure lifting equipment (slings, eyes, etc.) at the process connection and never lift the device by the electronic housing or sensor. Pay attention to the center of gravity of the device so that it does not tilt or slip unintentionally.

10 Installation

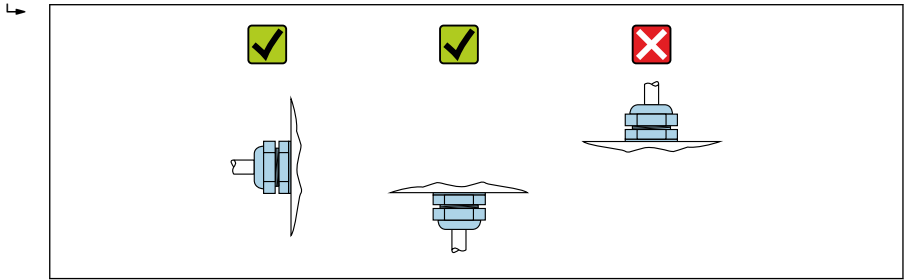
10.1 General instructions

WARNING

Loss of protection rating if the device is opened in a wet environment.

- ▶ Only open the device in a dry environment!

1. Install the device or turn the housing so that the cable entries do not point upwards.

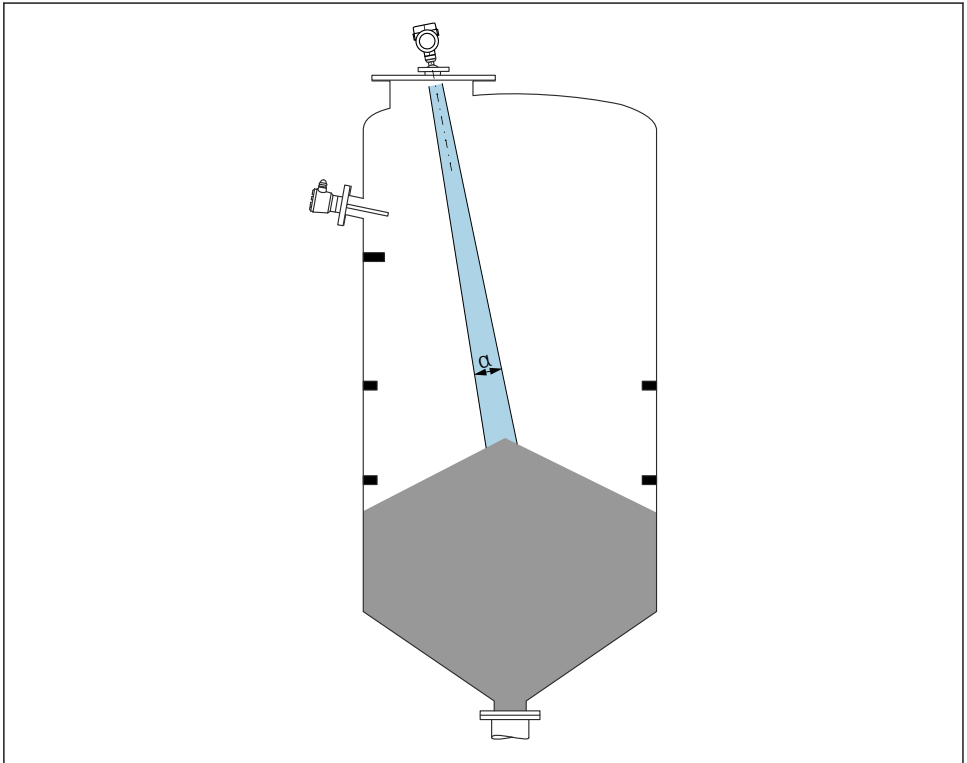


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2. Always firmly tighten the housing cover and the cable entries.
3. Counter-tighten the cable entries.
4. A drip loop must be provided when laying the cables.

10.2 Mounting requirements

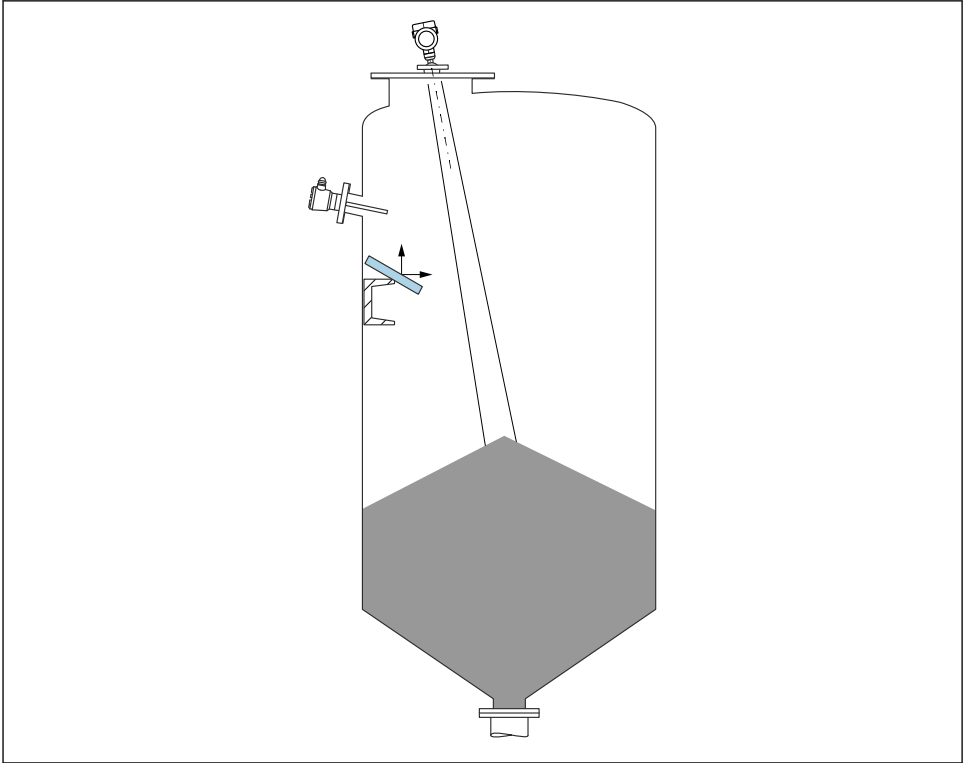
10.2.1 Internal vessel fittings



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Avoid internal fittings (point level switches, temperature sensors, struts, vacuum rings, heating coils, baffles etc.) inside the signal beam. Pay attention to the beam angle α .

10.2.2 Avoiding interference echoes



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Metal deflector plates, installed at an angle to scatter the radar signals, help prevent interference echoes.

10.2.3 Vertical alignment of antenna axis

Align the antenna so that it is perpendicular to the product surface.



The maximum reach of the antenna can be reduced, or additional interference signals can occur, if the antenna is not installed perpendicular to the product.

10.2.4 Radial alignment of the antenna

Based on the directional characteristic, radial alignment of the antenna is not necessary.

10.2.5 Optimization options

Mapping

Measurement can be optimized by electronically suppressing interference echoes. See the **Confirm distance** parameter.

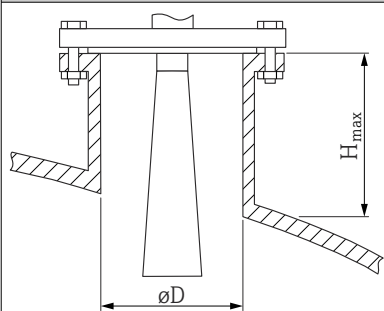
10.3 Mounting the measuring device


10.3.1 Horn antenna 65 mm (2.56 in)

Information about the mounting nozzle

The maximum nozzle length H_{max} depends on the nozzle diameter D .

Maximum nozzle length H_{max} as a function of the nozzle diameter D

	ϕD	H_{max}
	80 to 100 mm (3.2 to 4 in)	1 700 mm (67 in)
	100 to 150 mm (4 to 6 in)	2 100 mm (83 in)
	≥ 150 mm (6 in)	3 200 mm (126 in)

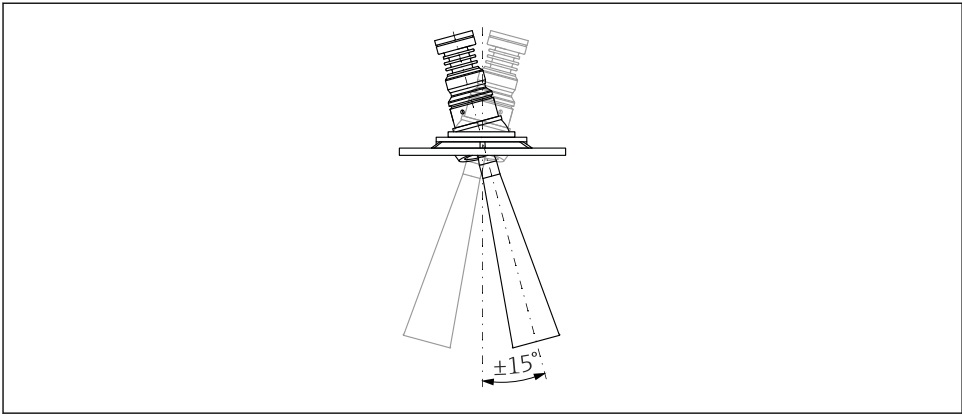
 In the case of longer nozzles, reduced measuring performance must be expected.

Please note the following:


- The end of the nozzle must be smooth and free from burrs.
- The edge of the nozzle should be rounded.
- Mapping must be performed.
- Please contact the manufacturer's support department for applications with nozzles that are higher than indicated in the table.

10.3.2 Horn antenna 65 mm (2.56 in) with alignment unit

UNI flanges with an integrated alignment unit are available for the horn antenna 65 mm (2.56 in). An angle of inclination of up to 15 ° in all directions can be set for the antenna axis using the alignment unit. The alignment unit is used to optimally align the measuring signal to the bulk solids.



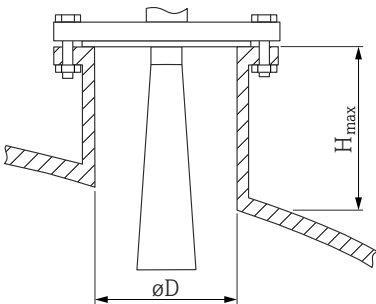
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 1 *Horn antenna with alignment unit*

Information about the mounting nozzle

The maximum nozzle length H_{max} depends on the nozzle diameter D .

The maximum nozzle length H_{max} depends on the nozzle diameter D

	ϕD	H_{max}
	80 to 100 mm (3.2 to 4 in)	1 700 mm (67 in)
	100 to 150 mm (4 to 6 in)	2 100 mm (83 in)
	≥ 150 mm (6 in)	3 200 mm (126 in)

 In the case of longer nozzles, reduced measuring performance must be expected.

Please note the following:

- The end of the nozzle must be smooth and free from burrs.
- The edge of the nozzle should be rounded.
- Mapping must be performed.
- Please contact the manufacturer's support department for applications with nozzles that are higher than indicated in the table.

10.3.3 Drip-off antenna PTFE 50 mm (2 in)

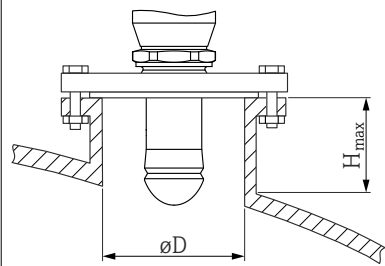
Information concerning threaded connections


- When screwing in, turn by the hex bolt only.
- Tool: open-ended wrench 55 mm
- Maximum permissible torque: 50 Nm (36 lbf ft)

Information about the mounting nozzle

The maximum nozzle length H_{max} depends on the nozzle diameter D .

Maximum nozzle length H_{max} as a function of the nozzle diameter D

	ØD	H _{max}
	50 to 80 mm (2 to 3.2 in)	750 mm (30 in)
	80 to 100 mm (3.2 to 4 in)	1 150 mm (46 in)
	100 to 150 mm (4 to 6 in)	1 450 mm (58 in)
	≥150 mm (6 in)	2 200 mm (88 in)

 In the case of longer nozzles, reduced measuring performance must be expected.

Please note the following:

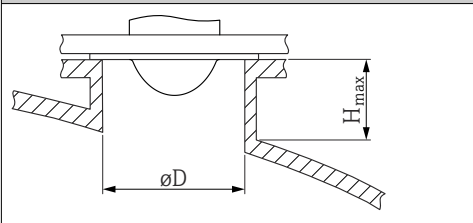
- The end of the nozzle must be smooth and free from burrs.
- The edge of the nozzle should be rounded.
- Mapping must be performed.
- Please contact the manufacturer's support department for applications with nozzles that are higher than indicated in the table.


10.3.4 Antenna, flush mount 80 mm (3 in)

Information about the mounting nozzle

The maximum nozzle length H_{max} depends on the nozzle diameter D .

Antenna nozzle mounting, flush mount 80 mm (3 in)

	$\varnothing D$	H_{max}
	80 to 100 mm (3.2 to 4 in)	1 750 mm (70 in)
	100 to 150 mm (4 to 6 in)	2 200 mm (88 in)
	≥ 150 mm (6 in)	3 300 mm (132 in)

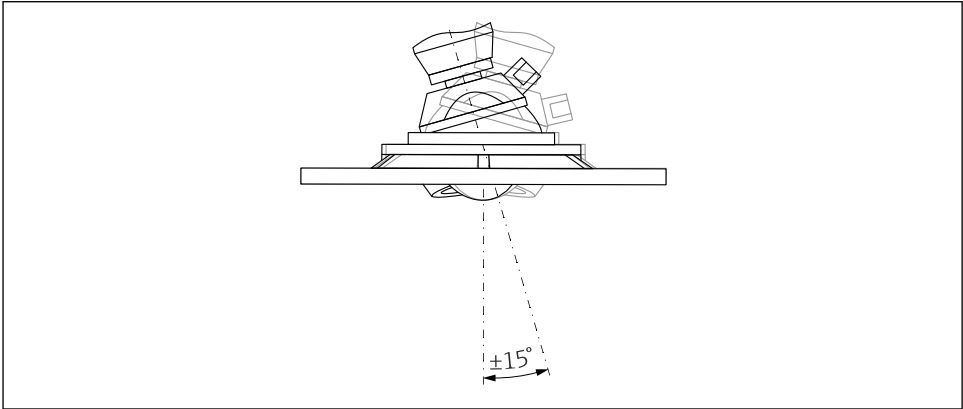
 In the case of longer nozzles, reduced measuring performance must be expected.

Please note the following:


- The end of the nozzle must be smooth and free from burrs.
- The edge of the nozzle should be rounded.
- Mapping must be performed.
- Please contact the manufacturer's support department for applications with nozzles that are higher than indicated in the table.

10.3.5 Antenna flush mount 80 mm (3 in) with alignment unit

UNI flanges with an integrated alignment unit are available for the antenna flush mount 80 mm (3 in). An inclination of the antenna axis of up to 15° in all directions can be set with the help of the alignment unit. The alignment unit is used to optimally align the measuring signal to the bulk solids.



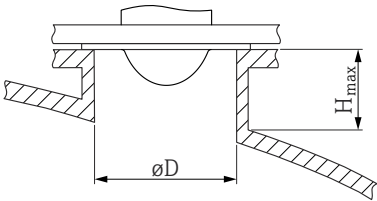
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 2 Antenna flush mount with alignment unit

Information about the mounting nozzle

The maximum nozzle length H_{max} depends on the nozzle diameter D .

The maximum length of the nozzle H_{\max} depends on the nozzle diameter D

	ΦD	H_{\max}
	min. 80 to 100 mm (3 to 4 in)	1 450 mm (57 in)
	100 to 150 mm (4 to 6 in)	1 800 mm (71 in)
	≥ 150 mm (6 in)	2 700 mm (106 in)



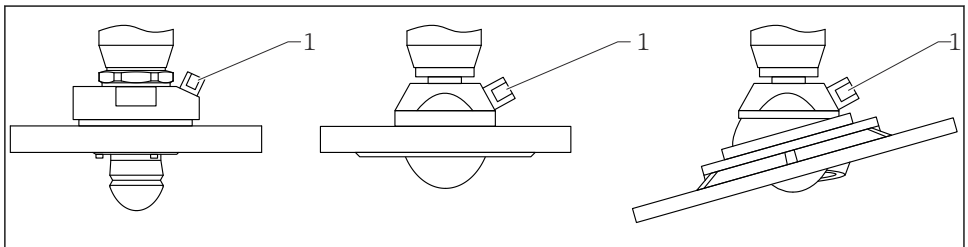
In the case of longer nozzles, reduced measuring performance must be expected.

Please note the following:

- The end of the nozzle must be smooth and free from burrs.
- The edge of the nozzle should be rounded.
- Mapping must be performed.
- Please contact the manufacturer's support department for applications with nozzles that are higher than indicated in the table.

10.3.6 Purge air connection

In applications with strong dust emissions, the integrated purge air connection can prevent the antenna from becoming clogged. Pulse operation is recommended.



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3 Antenna with purge air adapter

1 Purge air connection NPT 1/4" or G 1/4"

Purge air pressure range

- **Pulse operation :**
Max. 6 bar (87 psi)
- **Continuous operation:**
200 to 500 mbar (3 to 7.25 psi)

Purge air connection

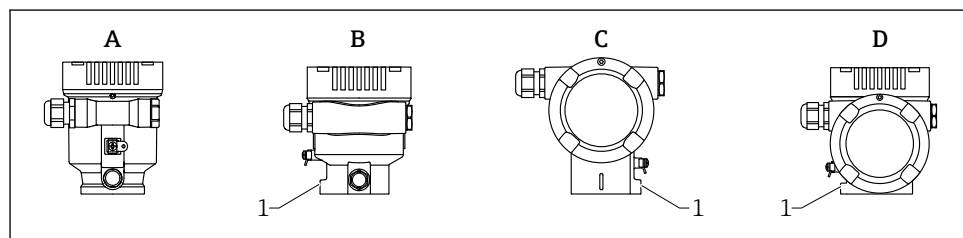
- Tool:
 - Open-ended wrench 13 mm (G 1/4")
 - Open-ended wrench 14 mm (NPT)
 - Open-ended wrench 17 mm (NPT "adapter")
 - Min. torque: 6 Nm (4.4 lbf ft)
 - Max. torque: 7 Nm
- i**
- Always use dry purge air
 - In general, purging should only be performed to the extent necessary as excess purging can cause mechanical damage (abrasion)

10.3.7 Turning the housing

The housing can be rotated up to 380° by loosening the locking screw.

Your benefits

- Easy installation due to optimum alignment of housing
- Easily accessible device operation
- Optimum readability of the local display (optional)



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- A Plastic single compartment housing (no locking screw)
 B Aluminum single compartment housing
 C Dual compartment housing
 D Dual compartment housing, L-form
 1 Locking screw

NOTICE

The housing cannot be unscrewed fully.

- Loosen the external locking screw by a maximum of 1.5 turns. If the screw is unscrewed too much or completely (beyond the screw anchor point), small parts (counter disk) can become loose and fall out.
- Tighten the securing screw (hexagon socket 4 mm (0.16 in)) with maximum 3.5 Nm (2.58 lbf ft) \pm 0.3 Nm (0.22 lbf ft).

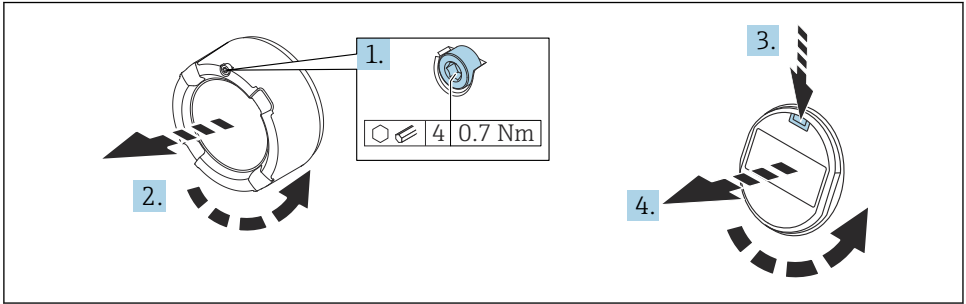
10.3.8 Turning the display module

⚠ WARNING

Supply voltage switched on!

Risk of electric shock and/or explosion!

- Switch off the supply voltage before opening the measuring device.



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1. If fitted: release the screw of the cover lock for the electronics compartment cover using the Allen key.
2. Unscrew the electronics compartment cover from the transmitter housing and check the cover seal.
3. Press the release mechanism and remove the display module.
4. Turn the display module to the desired position: maximum $4 \times 90^\circ$ in each direction. Fit the display module on the electronics compartment in the desired position until it clicks into place. Screw the electronics compartment cover back onto the transmitter housing. If fitted: tighten the screw of the cover lock using the Allen key 0.7 Nm (0.52 lbf ft) ± 0.2 Nm (0.15 lbf ft).

10.3.9 Closing the housing covers

NOTICE

Thread and housing damaged from dirt!

- Remove dirt (e.g. sand) on the cover and housing thread.
- If you encounter resistance when closing the cover, check the thread for dirt and clean it.



Housing thread

The thread of the electronics and connection compartment is coated with lubricant varnish.

- ⊗ Avoid additional lubrication.

10.4 Post-mounting check

- ☐ Is the device free from damage (visual inspection)?
- ☐ Are the measuring point identification and labeling correct (visual inspection)?

- ☐ Is the measuring device protected against precipitation and sunlight?
- ☐ Are the securing screws and cover lock tightened securely?
- ☐ Does the measuring device comply with the measuring point specifications?

For example:

- ☐ Process temperature
- ☐ Process pressure
- ☐ Ambient temperature
- ☐ Measuring range

11 Electrical connection

11.1 Connecting requirements

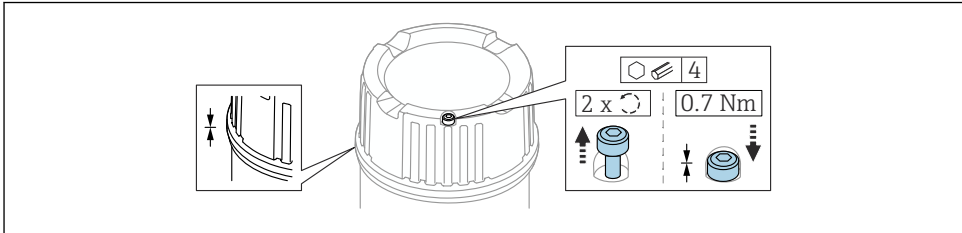
11.1.1 Cover with securing screw

In the case of devices for use in the hazardous area with a certain type of protection, the cover is sealed by a securing screw.


NOTICE

If the securing screw is not positioned correctly, the cover cannot provide secure sealing.

- ▶ Open the cover: slacken the screw of the cover lock with a maximum of 2 turns so that the screw does not fall out. Fit the cover and check the cover seal.
- ▶ Close the cover: screw the cover securely onto the housing, making sure that the securing screw is positioned correctly. There should not be any gap between the cover and housing.

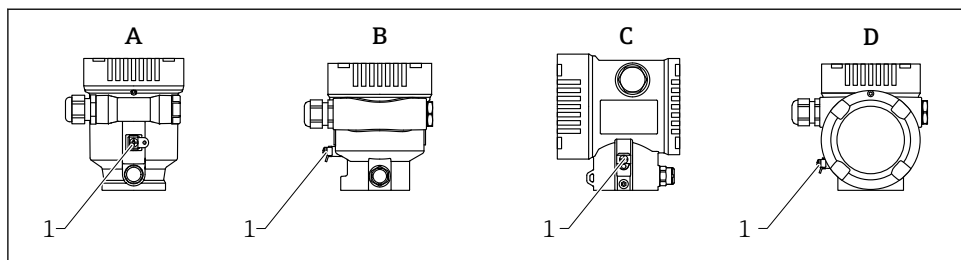


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 4 Cover with securing screw

11.1.2 Potential equalization

The protective ground on the device must not be connected. If necessary, the potential matching line can be connected to the outer ground terminal of the transmitter before the device is connected.



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- A Single compartment housing, plastic
 B Single compartment housing, aluminum
 C Dual compartment housing
 D Dual compartment housing, L-form
 1 Ground terminal for connecting the potential matching line

WARNING

Explosion Hazard!

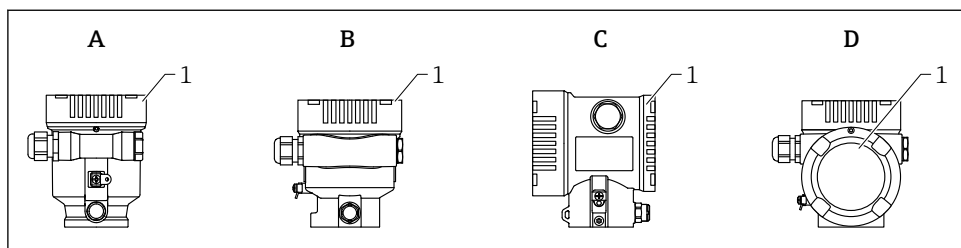
- ▶ Please refer to the separate documentation on applications in hazardous areas for the safety instructions.



For optimum electromagnetic compatibility:

- Keep the potential matching line as short as possible
- Observe a cross-section of at least 2.5 mm^2 (14 AWG)

11.2 Connecting the device



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- A Plastic single compartment housing
 B Aluminum single compartment housing
 C Dual compartment housing
 D Dual compartment housing, L-form
 1 Connection compartment cover



Housing thread


The thread of the electronics and connection compartment is coated with lubricant varnish.

-  Avoid additional lubrication.

11.2.1 Supply voltage

The supply voltage depends on the selected type of device approval

Non-hazardous, Ex d, Ex e	10.5 to 35 V _{DC}
Ex i	10.5 to 30 V _{DC}
Nominal current	4 to 20 mA

 The power unit must be tested to ensure it meets safety requirements (e.g., PELV, SELV, Class 2) and complies with the relevant protocol specifications.

A suitable circuit breaker must be provided for the device in accordance with IEC/EN61010-1

11.2.2 Cable specification

Rated cross-section

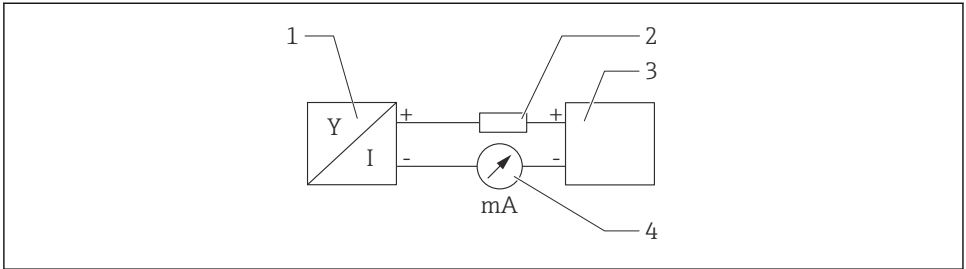
- Supply voltage
0.5 to 2.5 mm² (20 to 13 AWG)
- Protective earth or grounding of the cable shield
> 1 mm² (17 AWG)
- External ground terminal
0.5 to 4 mm² (20 to 12 AWG)

Cable outer diameter


The cable outer diameter depends on the cable gland used

- Coupling, plastic:
Ø5 to 10 mm (0.2 to 0.38 in)
- Coupling, nickel-plated brass:
Ø7 to 10.5 mm (0.28 to 0.41 in)
- Coupling, stainless steel:
Ø7 to 12 mm (0.28 to 0.47 in)

11.2.3 4 to 20 mA HART



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 5 Block diagram of HART connection

- 1 Device with HART communication
- 2 HART communication resistor
- 3 Power supply
- 4 Multimeter or ammeter



The HART communication resistor of 250 Ω in the signal line is always necessary in the case of a low-impedance power supply.

Take the voltage drop into consideration:

Maximum 6 V for a 250 Ω communication resistor

11.2.4 Overvoltage protection

The overvoltage protection can optionally be ordered as a "Mounted accessory" via the product structure

Devices without optional overvoltage protection

Equipment from Endress+Hauser fulfills the requirements of the product standard IEC / DIN EN 61326-1 (Table 2 Industrial Environment).

Depending on the type of port (DC power supply, input/output port) different testing levels according to IEC / DIN EN 61326-1 against transient overvoltages (Surge) are applied (IEC / DIN EN 61000-4-5 Surge):

Test level on DC power ports and input/output ports is 1 000 V line to earth

Devices with optional overvoltage protection

- Spark-over voltage: min. 400 V_{DC}
- Tested according to IEC / DIN EN 60079-14 sub chapter 12.3 (IEC / DIN EN 60060-1 chapter 7)
- Nominal discharge current: 10 kA

Overvoltage category

Overvoltage category II

11.2.5 Wiring

WARNING

Supply voltage might be connected!

Risk of electric shock and/or explosion!

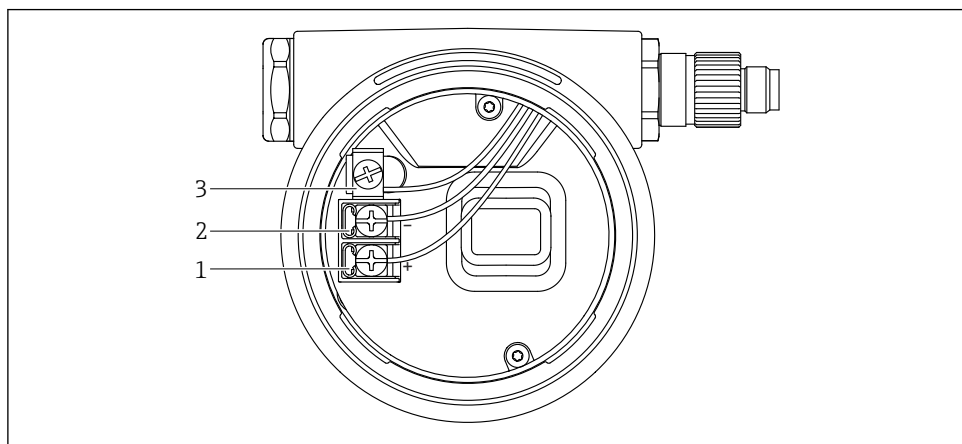
- ▶ If the device is used in hazardous areas, make sure to comply with national standards and the specifications in the Safety Instructions (XAs). The specified cable gland must be used.
- ▶ The supply voltage must match the specifications on the nameplate.
- ▶ Switch off the supply voltage before connecting the device.
- ▶ If necessary, the potential matching line can be connected to the outer ground terminal of the device before the power supply lines are connected.
- ▶ A suitable circuit breaker should be provided for the device in accordance with IEC/EN 61010.
- ▶ The cables must be adequately insulated, with due consideration given to the supply voltage and the overvoltage category.
- ▶ The connecting cables must offer adequate temperature stability, with due consideration given to the ambient temperature.
- ▶ Only operate the measuring device with the covers closed.

Connect the device in the following order:


1. Release the cover lock (if provided).
2. Unscrew the cover.
3. Guide the cables into the cable glands or cable entries.
4. Connect the cables.
5. Tighten the cable glands or cable entries so that they are leak-tight. Counter-tighten the housing entry.
6. Screw the cover securely back onto the connection compartment.
7. If provided: tighten the screw of the cover lock using the Allen key 0.7 Nm (0.52 lbf ft) ± 0.2 Nm (0.15 lbf ft).

11.2.6 Terminal assignment

Single compartment housing

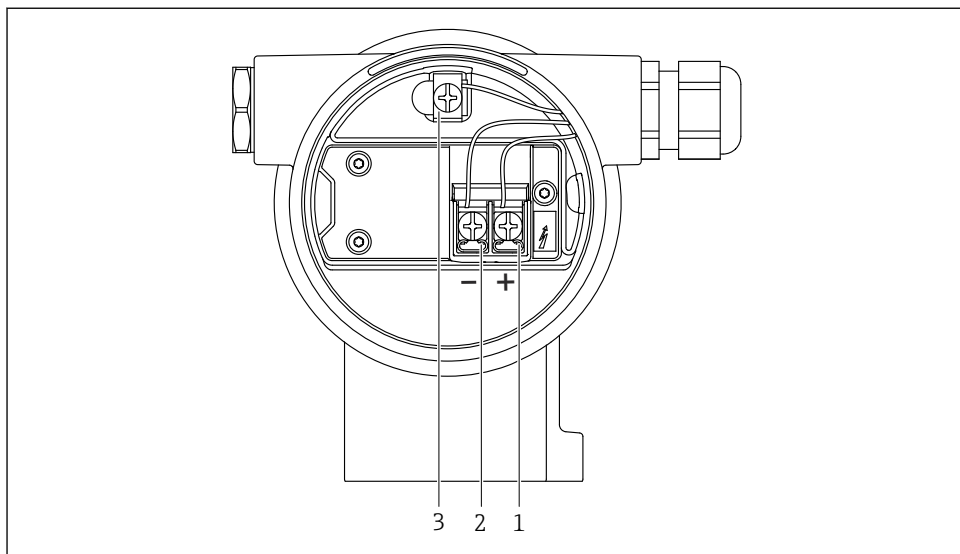


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 6 Connection terminals and ground terminal in the connection compartment

- 1 Positive terminal
- 2 Negative terminal
- 3 Internal ground terminal

Dual compartment housing

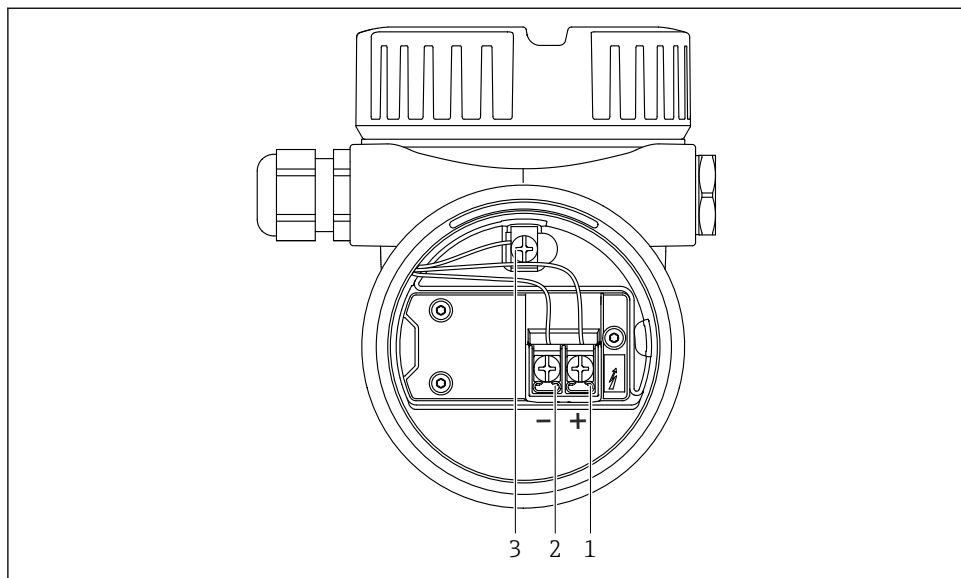


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 7 Connection terminals and ground terminal in the connection compartment

- 1 Positive terminal
- 2 Negative terminal
- 3 Internal ground terminal

Dual compartment housing, L-form

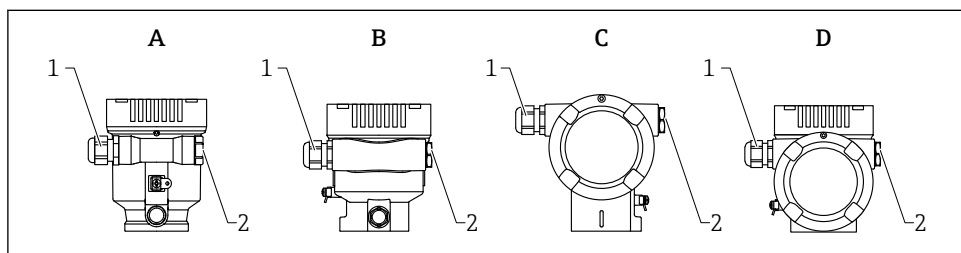


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 **8** Connection terminals and ground terminal in the connection compartment

- 1 Positive terminal
- 2 Negative terminal
- 3 Internal ground terminal


11.2.7 Cable entries



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- A Single compartment housing, plastic
- B Single compartment housing, aluminum
- C Dual compartment housing
- D Dual compartment housing, L-form
- 1 Cable entry
- 2 Dummy plug

The type of cable entry depends on the device version ordered.

 Always route connecting cables downwards so that moisture cannot penetrate the connection compartment.

If necessary, create a drip loop or use a weather protection cover.

11.2.8 Available device plug connectors

 In the case of devices with a plug, it is not necessary to open the housing for connection purposes.

Use the enclosed seals to prevent the penetration of moisture into the device.

11.3 Ensuring the degree of protection

11.3.1 Cable entries

- Gland M20, plastic, IP66/68 NEMA TYPE 4X/6P
- Gland M20, nickel-plated brass, IP66/68 NEMA TYPE 4X/6P
- Gland M20, 316L, IP66/68 NEMA TYPE 4X/6P
- Thread M20, IP66/68 NEMA TYPE 4X/6P
- Thread G1/2, IP66/68 NEMA TYPE 4X/6P

If the G1/2 thread is selected, the device is delivered with an M20 thread as standard and a G1/2 adapter is included with the delivery, along with the corresponding documentation
- Thread NPT1/2, IP66/68 TYPE 4X/6P
- Dummy plug transport protection: IP22, TYPE 2
- HAN7D plug, 90 degrees, IP65 NEMA Type 4X
- M12 plug
 - When housing is closed and connecting cable is plugged in: IP66/67, NEMA Type 4X
 - When housing is open or connecting cable is not plugged in: IP20, NEMA Type 1

NOTICE

Plug M12 and plug HAN7D: incorrect mounting can invalidate the IP protection class!

- ▶ The degree of protection only applies if the connecting cable used is plugged in and screwed tight.
- ▶ The degree of protection only applies if the connecting cable used is specified according to IP67, NEMA Type 4X.
- ▶ The IP protection classes are only maintained if the dummy cap is used or the cable is connected.

11.4 Post-connection check

- ☐ Are the device or cables undamaged (visual inspection)?
- ☐ Do the cables used comply with the requirements?
- ☐ Do the mounted cables have strain relief?
- ☐ Cable glands mounted, securely tightened and leak-tight?
- ☐ Does the supply voltage correspond to the specifications on the nameplate?
- ☐ No reverse polarity, terminal assignment correct?

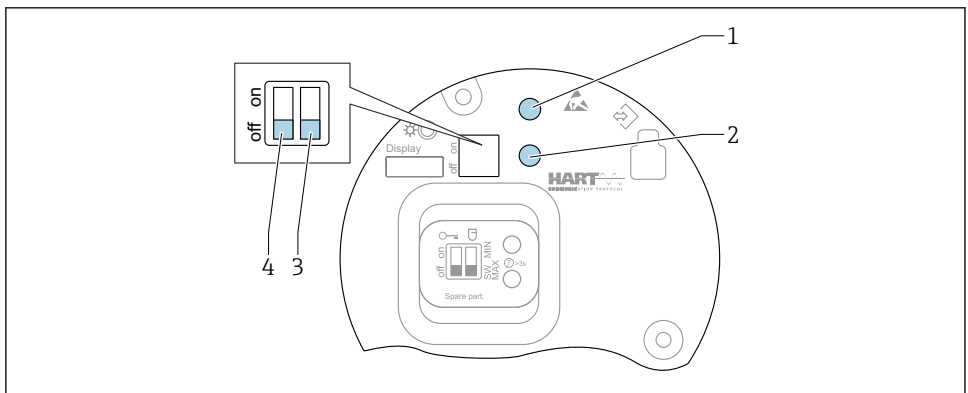
- ☐ Cover screwed down correctly?
- ☐ Cover lock tightened correctly?

12 Operation options

12.1 Overview of operating options

- Operation via operating keys and DIP switches on the electronic insert
- Operation via optical operating keys on the device display (optional)
- Operation via Bluetooth® wireless technology (with optional device display with Bluetooth) with Smartblue app or FieldXpert, DeviceCare
- Operation via operating tool (Endress+Hauser FieldCare/DeviceCare, handheld terminal, AMS, PDM, ...)


12.2 Operating keys and DIP switches on the HART electronic insert



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9 Operating keys and DIP switches on the HART electronic insert

- 1 Operating key for reset password (for Bluetooth login and Maintenance user role)
- 1+2 Operating keys for device reset (as-delivered state)
- 2 Operating key II (only for factory reset)
- 3 DIP switch for alarm current
- 4 DIP switch for locking and unlocking the device

 The setting of the DIP switches on the electronic insert has priority over the settings made via other operation methods (e.g. FieldCare/DeviceCare).

12.3 Structure and function of the operating menu

The differences between the structure of the operating menus of the local display and the Endress+Hauser FieldCare or DeviceCare operating tools can be summarized as follows:

The local display is suitable for configuring simple applications.

The operating tools (FieldCare, DeviceCare, SmartBlue, AMS, PDM, ...) can be used to configure the parameters of wide-ranging applications.

Wizards help the user to commission the various applications. The user is guided through the individual configuration steps.

12.3.1 User roles and related access authorization

The two user roles **Operator** and **Maintenance** (as-delivered state) have different write access to the parameters if a device-specific access code has been defined. This access code protects the device configuration from unauthorized access.

If an incorrect access code is entered, the user obtains the access rights of the **Operator** role.

12.4 Access to the operating menu via the local display

12.4.1 Device display (optional)

Possible to operate the optical operating keys through the cover. No need to open the device.

Functions:

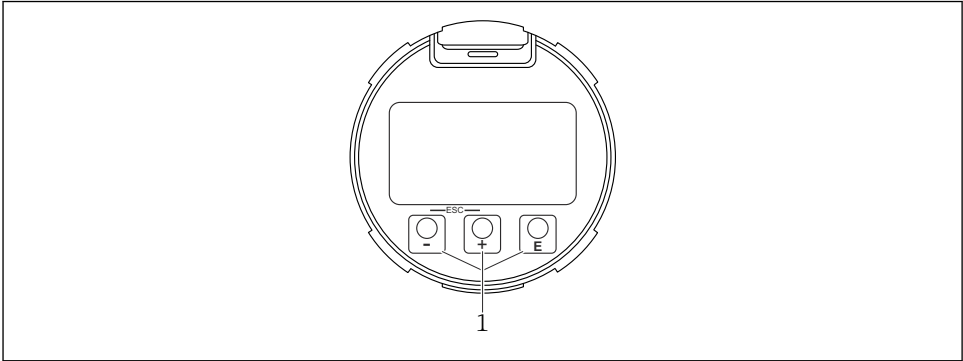
- Display of measured values and fault and notice messages
- Background lighting, which switches from green to red in the event of an error
- The device display can be removed for easier operation




Backlighting is switched on or off depending on the supply voltage and the current consumption.









The device display is also optionally available with Bluetooth® wireless technology.



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 10 Graphic display with optical operating keys (1)


- Key 
 - Navigate downwards in the picklist
 - Edit the numerical values or characters within a function
- Key 
 - Navigate upwards in the picklist
 - Edit the numerical values or characters within a function
- Key 
 - Change from main display to main menu
 - Confirm entry
 - Jump to the next item
 - Select a menu item and activate the edit mode
 - Unlock/lock the display operation
 - Press and hold the  key to display a short description of the selected parameter (if available)
-  key and  key (ESC function)
 - Exit edit mode for a parameter without saving the changed value
 - Menu at a selection level: pressing the keys simultaneously takes the user back up a level in the menu
 - Press and hold the keys simultaneously to return to the upper level

12.4.2 Operation via Bluetooth® wireless technology (optional)

Requirement

- Device with device display including Bluetooth
- Smartphone or tablet with Endress+Hauser SmartBlue app or PC with DeviceCare from version 1.07.05 or FieldXpert SMT70

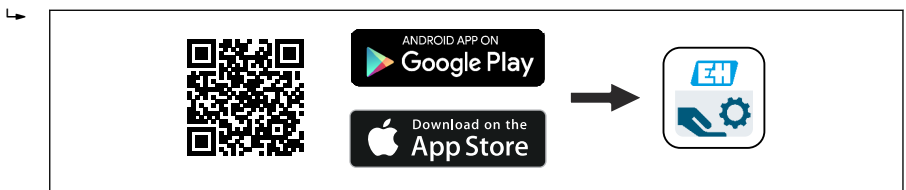
The range of the connection is up to 25 m (82 ft). The range can vary depending on environmental conditions such as attachments, walls or ceilings.

 The operating keys on the display are locked as soon as the device is connected via Bluetooth.

A flashing Bluetooth symbol indicates that a Bluetooth connection is available.

SmartBlue app

1. Scan the QR code or enter "SmartBlue" in the search field of the App Store or Google Play.



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2. Start the SmartBlue app.
3. Select device from livelist displayed.

4. Login:
 - ↳ Enter the user name: admin
Password: serial number of the device.
5. Change the password after logging in for the first time!

Prerequisites

System requirements

The SmartBlue app is available to download for smartphones or tablets.

- Devices with iOS: iPhone 5S or higher as of iOS11; iPad 5th generation or higher as of iOS11; iPod Touch 6th generation or higher as of iOS11
- Devices with Android: from Android 6.0 and *Bluetooth*® 4.0

Initial password

The serial number of the device serves as the initial password when the connection is established for the first time.



Please note the following

If the Bluetooth display is removed from one device and installed in another device:

- All the log-in data are only saved in the Bluetooth display and not in the device
- The password changed by the user is also saved in the Bluetooth display

12.5 Access to the operating menu via the operating tool

Access via the operating tool is possible:

- Via HART communication, e.g. Commubox FXA195
- Via Endress+Hauser Commubox FXA291
With the Commubox FXA291, a CDI connection can be established with the device interface and a Windows PC/notebook with a USB port

12.6 DeviceCare

12.6.1 Function scope

Tool for connecting and configuring Endress+Hauser field devices.

The fastest way to configure Endress+Hauser field devices is with the dedicated "DeviceCare" tool. Together with the device type managers (DTMs), DeviceCare presents a convenient, comprehensive solution.



For details, see Innovation Brochure IN01047S

12.7 FieldCare

12.7.1 Function scope

FDT-based plant asset management tool from Endress+Hauser. FieldCare can configure all smart field devices in a system and helps you manage them. By using the status information, FieldCare is also a simple but effective way of checking their status and condition.

Access is via:

- CDI service interface
- HART communication

Typical functions:

- Parameterization of transmitters
- Loading and saving of device data (upload/download)
- Documentation of the measuring point
- Visualization of the measured value memory (line recorder) and event logbook



For additional information about FieldCare, see Operating Instructions BA00027S and BA00059S

13 Commissioning



All configuration tools provide a commissioning assistant that supports the user when setting the most important configuration parameters (**Guidance** menu **Commissioning** wizard).

13.1 Preliminaries

The measuring range and the unit in which the measured value is transmitted correspond to the data on the nameplate.



WARNING

The settings of the current output are relevant for safety!

This can result in product overflow.

- ▶ The setting for the current output depends on the setting in the **Assign PV** parameter.
- ▶ After changing the setting of the current output, check the setting of the span (Lower range value output and Upper range value output) and change it if necessary!

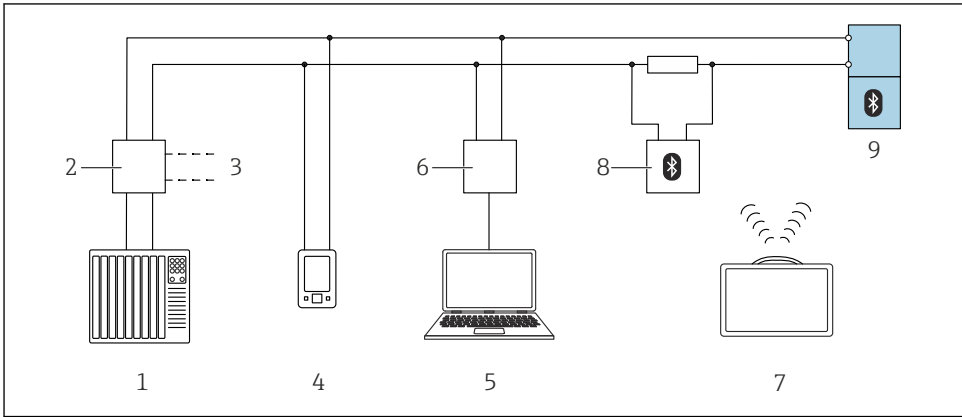
13.2 Function check

Before commissioning the measuring point, check whether the post-mounting and post-connection checks (checklist) have been performed:

-  "Post-mounting check" section
-  "Post-connection check" section

13.3 Establishing a connection via FieldCare and DeviceCare

13.3.1 Via HART protocol

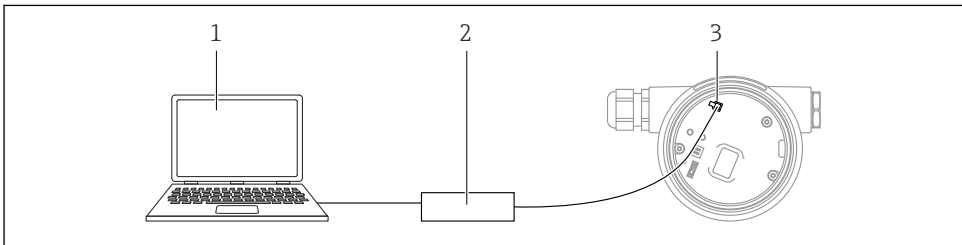


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11 Options for remote operation via HART protocol

- 1 PLC (programmable logic controller)
- 2 Transmitter power supply unit, e.g., RN42
- 3 Connection for Commubox FXA195 and AMS Trex™ device communicator
- 4 AMS Trex™ device communicator
- 5 Computer with operating tool (e.g., DeviceCare/FieldCare, AMS Device View, SIMATIC PDM)
- 6 Commubox FXA195 (USB)
- 7 Field Xpert SMT70
- 8 Bluetooth modem with connecting cable (e.g., VIATOR)
- 9 Transmitter

13.3.2 Via service interface (CDI)



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- 1 Computer with FieldCare/DeviceCare operating tool
- 2 Commubox FXA291
- 3 Service interface (CDI) of the measuring device (= Endress+Hauser Common Data Interface)

13.4 Configuring the device address via software

See "HART address" parameter

Enter the address to exchange data via the HART protocol.

- Guidance → Commissioning → HART address
- Application → HART output → Configuration → HART address

13.5 Setting the operating language

13.5.1 Local display

Setting the operating language



To set the operating language, the display first needs to be unlocked:

1. Press the key for at least 2 s.
 - ↳ A dialog box appears.
2. Unlock the display operation.
3. Select the **Language** parameter in the main menu.
4. Press the key.
5. Select the desired language with the or key.
6. Press the key.



Display operation locks automatically (except in the **Safety mode** wizard):

- after 1 min on the main page if no key has been pressed
- after 10 min within the operating menu if no key has been pressed

13.5.2 Operating tool

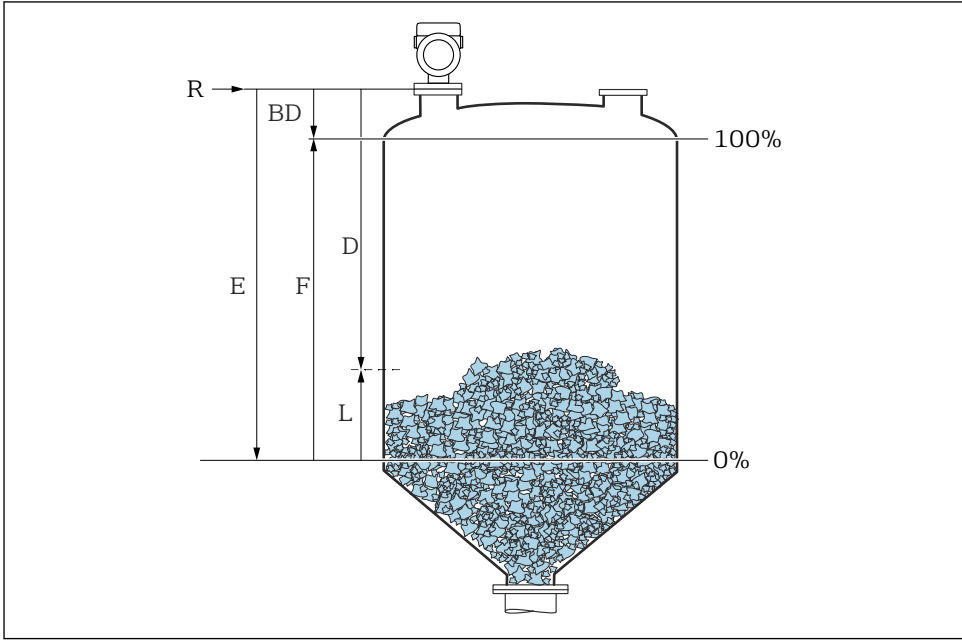
Set display language

System → Display → Language

Selection in the **Language** parameter; Visibility depends on order options or device settings

13.6 Device configuration

13.6.1 Level measurement in bulk solids



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 12 Configuration parameters for level measurement in bulk solids

R Reference point of measurement

D Distance

L Level

E "Empty calibration" parameter (= 0%)

F "Full calibration" parameter (= 100%)

13.6.2 Commissioning with the Commissioning wizard

In FieldCare, DeviceCare, SmartBlue and on the display, the **Commissioning** wizard is available to guide the user through the initial commissioning steps.

Complete this wizard to commission the device.

For each parameter, enter the appropriate value or select the appropriate option.

NOTE

If you exit the wizard before completing all required parameters, the changes you made will be saved. For this reason, the device may be in an undefined state!

In this case, a reset to the default settings is recommended.



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www.addresses.endress.com
