

# Brief Operating Instructions

## Micropilot FMR60B

### PROFIBUS PA

Free space radar

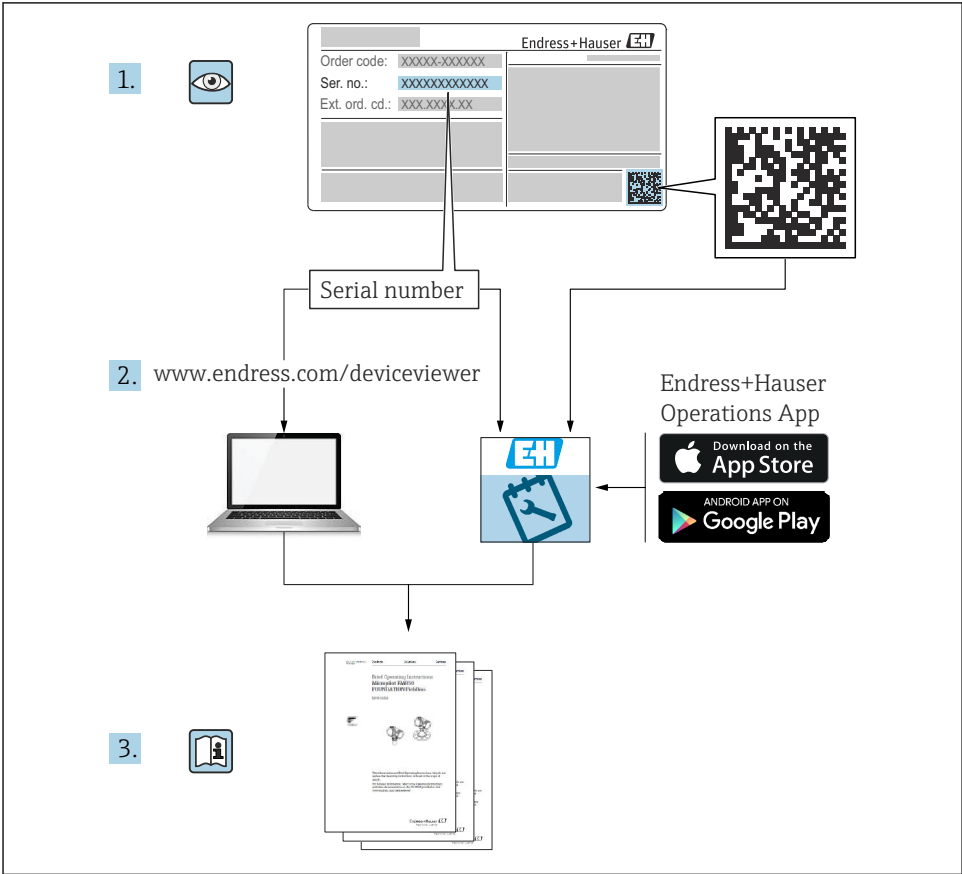


These Brief Operating Instructions are not a substitute for the Operating Instructions pertaining to the device.

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

Available for all device versions via:

- Internet: [www.endress.com/deviceviewer](http://www.endress.com/deviceviewer)
- Smartphone/tablet: Endress+Hauser Operations app



A0023555

# Table of contents

<b>1</b>	<b>Symbols</b>	<b>4</b>
1.1	Safety symbols	4
1.2	Symbols for certain types of information and graphics	4
<b>2</b>	<b>Requirements for personnel</b>	<b>5</b>
<b>3</b>	<b>Intended use</b>	<b>5</b>
<b>4</b>	<b>Workplace safety</b>	<b>6</b>
<b>5</b>	<b>Operational safety</b>	<b>6</b>
<b>6</b>	<b>Product safety</b>	<b>6</b>
<b>7</b>	<b>Incoming acceptance</b>	<b>7</b>
<b>8</b>	<b>Product identification</b>	<b>7</b>
8.1	Nameplate	7
8.2	Manufacturer address	8
<b>9</b>	<b>Storage and transport</b>	<b>8</b>
9.1	Storage conditions	8
9.2	Transporting the product to the measuring point	8
<b>10</b>	<b>Mounting</b>	<b>8</b>
10.1	General instructions	8
10.2	Mounting requirements	9
10.3	Mounting the measuring device	11
10.4	Post-mounting check	15
<b>11</b>	<b>Electrical connection</b>	<b>16</b>
11.1	Connecting requirements	16
11.2	Connecting the device	18
11.3	Ensuring the degree of protection	24
11.4	Post-connection check	24
<b>12</b>	<b>Operation</b>	<b>25</b>
12.1	Reading off the device locking status	25
12.2	Reading off measured values	25
12.3	Adapting the device to process conditions	25
12.4	Heartbeat Technology (optional)	25
<b>13</b>	<b>Commissioning</b>	<b>26</b>
13.1	Preliminaries	26
13.2	Function check	26
13.3	Connecting via FieldCare and DeviceCare	26
13.4	Setting the operating language	27
13.5	Configuring the device	28
13.6	Recording the Echo curve	29
13.7	"Simulation" submenu	29

# 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 in liquids, pastes and sludges. Due to its operating frequency of approx. 80 GHz, a maximum radiated peak power of <1.5 mW and an average output power of <70 µW, unrestricted use outside of closed, metallic vessels is also permitted (for example over basins or open channels). 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 only for the following measurements:

- ▶ Measured process variables: level, distance, signal strength
- ▶ Calculated process variables: volume or mass in vessels of any shape; flow rate through measuring weirs or channels (calculated based on the level using the linearization functionality)

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

- ▶ Use the measuring device only for media to which the process-wetted materials are sufficiently 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):

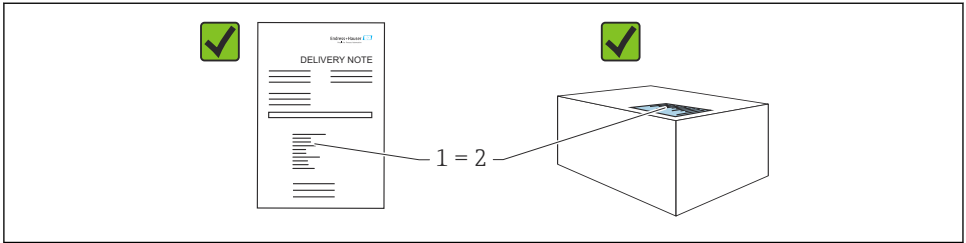
- ▶ Check the nameplate to verify if the device ordered can be put to its intended use in the approval-related area.
- ▶ Observe the specifications in the separate supplementary documentation that is an integral part of this manual.

## 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 identification of the device:

- Nameplate specifications
- Extended order code with breakdown of the device features on the delivery note
- ▶ *Device Viewer*([www.endress.com/deviceviewer](http://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 Mounting

## 10.1 General instructions

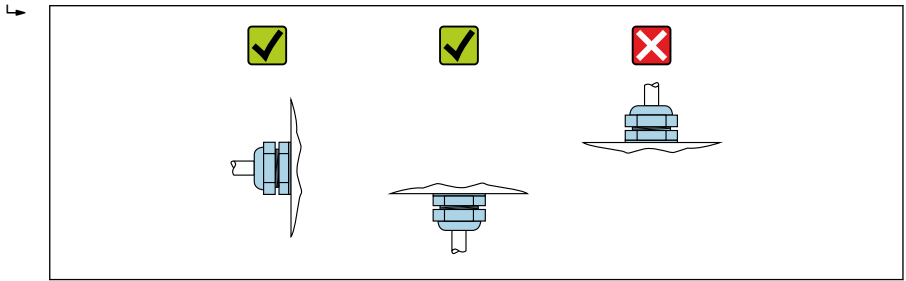
### WARNING

**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.

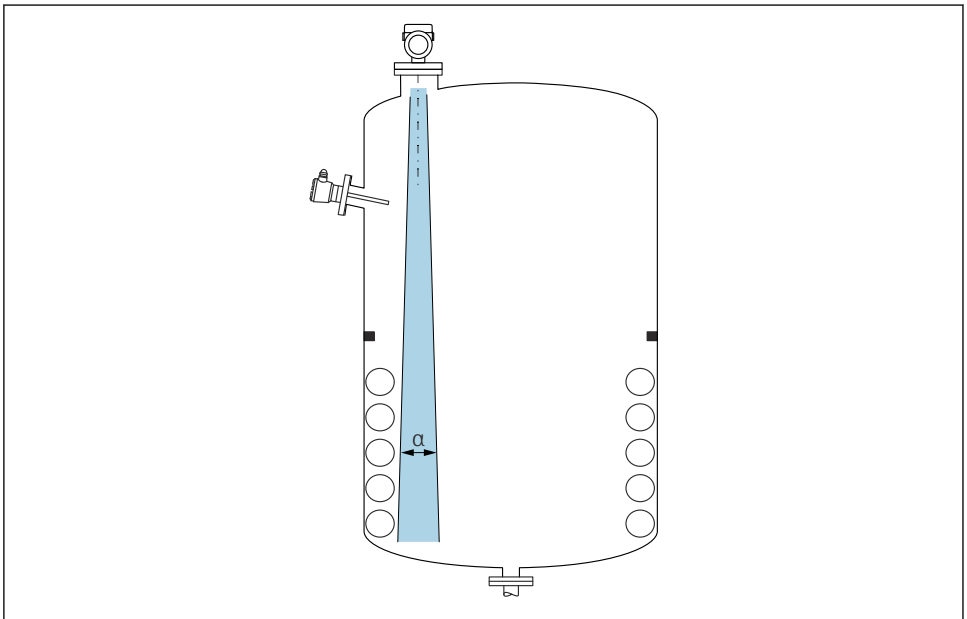


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2. Always firmly tighten the housing cover and the cable entries.
3. Counter-tighten the cable entries.
4. A drip loop must be provided when laying the cables.

## 10.2 Mounting requirements

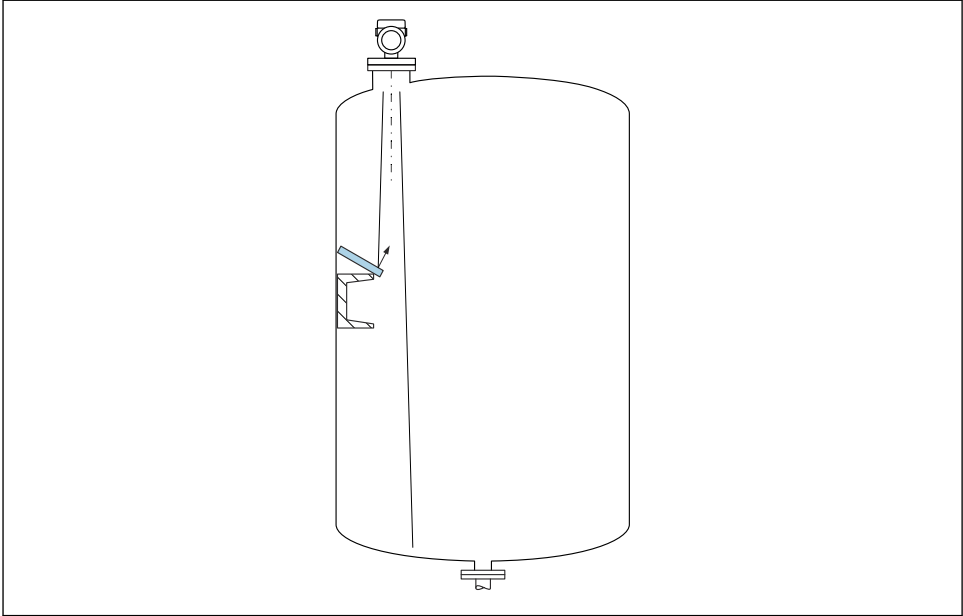
### 10.2.1 Internal vessel fittings



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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  $\alpha$ .

## 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 Encapsulated antenna, PVDF 40 mm (1.5 in)

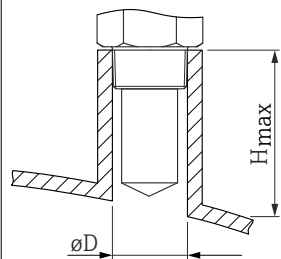
**Information concerning threaded connections**


- When screwing in, turn by the hex bolt only.
- Tool: open-ended wrench 50 mm
- Maximum permissible torque: 30 Nm (22 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  $D$*

	$\phi D$	$H_{max}$
	50 to 80 mm (2 to 3.2 in)	600 mm (24 in)
	80 to 100 mm (3.2 to 4 in)	1 000 mm (24 in)
	100 to 150 mm (4 to 6 in)	1 250 mm (50 in)
	$\geq 150$ mm (6 in)	1 850 mm (74 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 Drip-off antenna PTFE 50 mm (2 in)

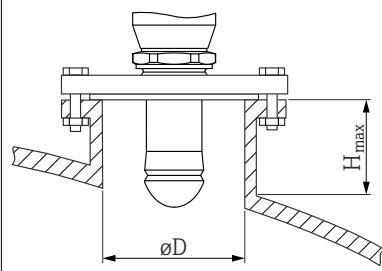
**Information concerning threaded connections**

- 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  $D$

	$\phi D$	$H_{max}$
	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)
	$\geq 150$ mm (6 in)	2 200 mm (88 in)

**i** 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 Integrated antenna, PEEK 20 mm (0.75 in)

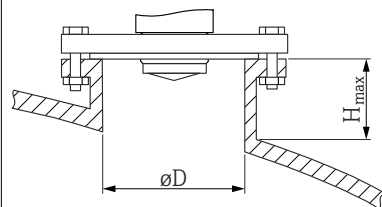
Information concerning threaded connections

- When screwing in, turn by the hex bolt only.
- Tool: open-ended wrench 36 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  $D$

	$\phi D$	$H_{max}$
	40 to 50 mm (1.6 to 2 in)	200 mm (8 in)
	50 to 80 mm (2 to 3.2 in)	300 mm (12 in)
	80 to 100 mm (3.2 to 4 in)	450 mm (18 in)

	ØD	H <sub>max</sub>
	100 to 150 mm (4 to 6 in)	550 mm (22 in)
	≥ 150 mm (6 in)	850 mm (34 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 Integrated antenna, PEEK 40 mm (1.5 in)

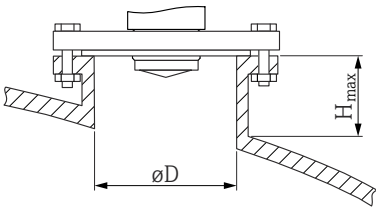
Information concerning threaded connections


- 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 <sub>max</sub>
	40 to 50 mm (1.6 to 2 in)	400 mm (16 in)
	50 to 80 mm (2 to 3.2 in)	550 mm (22 in)
	80 to 100 mm (3.2 to 4 in)	850 mm (34 in)
	100 to 150 mm (4 to 6 in)	1 050 mm (42 in)
	≥150 mm (6 in)	1 600 mm (64 in)

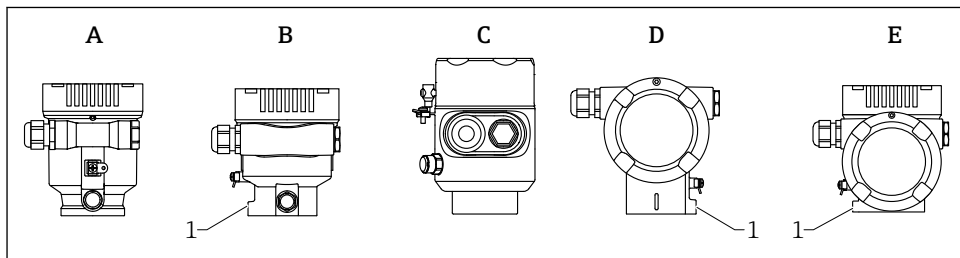
-  In the case of longer nozzles, reduced measuring performance must be expected.  
Please note the following:
  - The end of the nozzle must be smooth and free from burrs.
  - The edge of the nozzle should be rounded.
  - Mapping must be performed.
  - Please contact the manufacturer's support department for applications with nozzles that are higher than indicated in the table.

10.3.5 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)



A0046660

- A Plastic single compartment housing (no locking screw)  
 B Aluminum single compartment housing  
 C Single compartment housing, 316L, hygiene (no locking screw)  
 D Dual compartment housing  
 E 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).

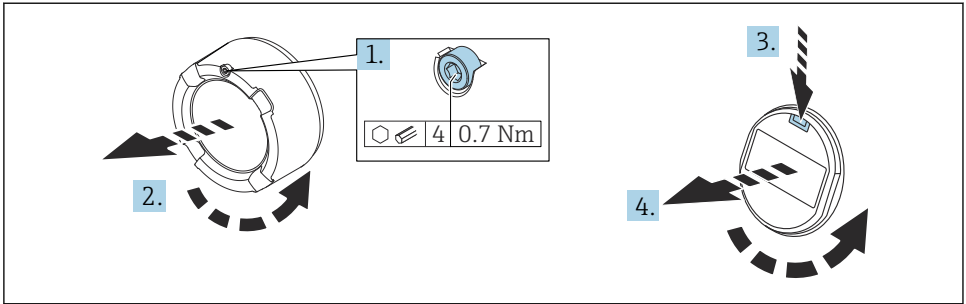
#### 10.3.6 Turning the display module

#### **⚠ WARNING**

#### Supply voltage switched on!

Risk of electric shock and/or explosion!

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



A0038224

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)  $\pm 0.2$  Nm (0.15 lbf ft).

### 10.3.7 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 threads of the electronics and connection compartment can be coated with an anti-friction coating.

The following applies for all housing materials:

**✗ Do not lubricate the housing threads.**

### 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

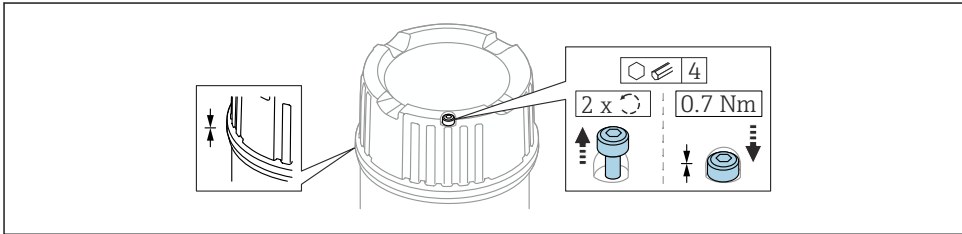
#### 11.1.1 Cover with securing screw

The cover is locked by a securing screw in devices for use in hazardous areas with certain explosion protection.


#### NOTICE

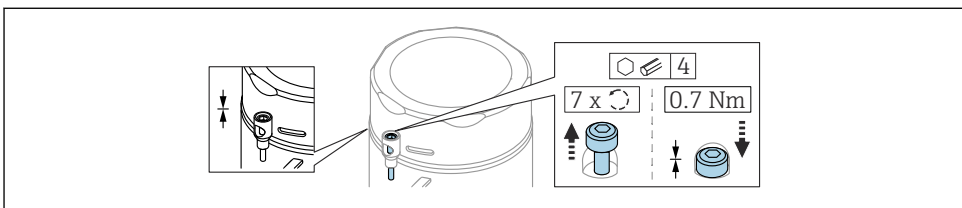
**If the securing screw is not positioned correctly, the cover cannot provide secure sealing.**

- ▶ 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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 1 Cover with securing screw



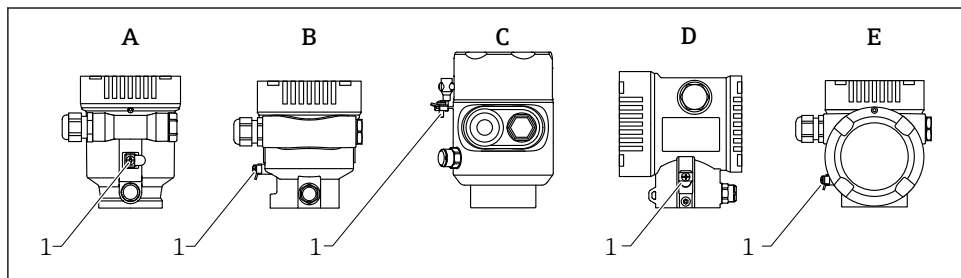
A0050983

 2 Cover with securing screw; hygienic housing (only for dust explosion protection)



### 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.



A0046583

- A Single compartment housing, plastic
- B Single compartment housing, aluminum
- C Single compartment housing, 316L hygiene (Ex device)
- D Dual compartment housing
- E Dual compartment housing, L-form
- 1 Ground terminal for connecting the potential matching line

#### **⚠ WARNING**

#### **Explosion Hazard!**

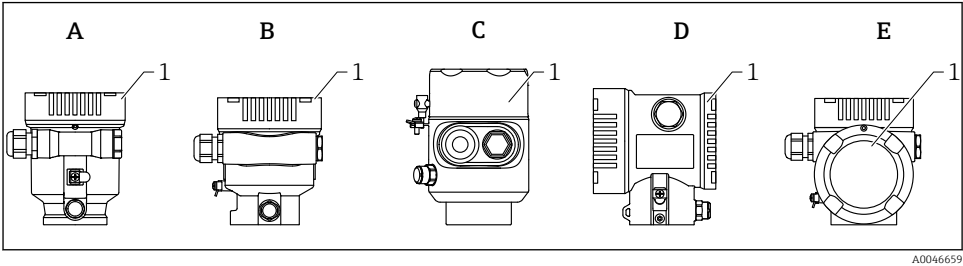
- Please refer to the separate documentation on applications in hazardous areas for the safety instructions.



For optimum electromagnetic compatibility:

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

## 11.2 Connecting the device



- A Plastic single compartment housing
- B Aluminum single compartment housing
- C Single compartment housing, 316L hygiene
- D Dual compartment housing
- E Dual compartment housing, L-form
- 1 Connection compartment cover

**i** Devices with a single compartment housing, 316L hygiene, and conduit gland must be connected as end-of-line devices. Only one conduit entry must be used.

**i** **Housing thread**  
The threads of the electronics and connection compartment can be coated with an anti-friction coating.  
The following applies for all housing materials:  
**⊗ Do not lubricate the housing threads.**

### 11.2.1 Supply voltage

The supply voltage depends on the selected type of device approval

Non-hazardous, Ex d, Ex e	9 to 32 V <sub>DC</sub>
Ex i	9 to 30 V <sub>DC</sub>
Nominal current	14 mA
Failure current FDE (Fault Disconnection Electronic)	0 mA

- i**
- Use only suitable and certified Profibus PA components (e.g. DP/PA segment coupler) for the power supply
  - FISCO/FNICO-compliant according to IEC 60079-27
  - The supply is not polarity-dependent

### Device display and Bluetooth

The display background lighting and Bluetooth function (order option) is guaranteed across the entire supply voltage range. The Bluetooth function can be restricted at high ambient temperatures.

### 11.2.2 Cable specification

#### Rated cross-section

- Supply voltage  
0.5 to 2.5 mm<sup>2</sup> (20 to 13 AWG)
- Protective earth or grounding of the cable shield  
> 1 mm<sup>2</sup> (17 AWG)
- External ground terminal  
0.5 to 4 mm<sup>2</sup> (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)



Use a twisted, shielded twin-core cable, preferably cable type A.

For further information on the cable specification:

-  Operating Instructions BA00034S "PROFIBUS DP/PA: Guidelines for planning and commissioning"
-  PROFIBUS Assembling Guideline 8.022
-  IEC 61158-2 (MBP).

### 11.2.3 Overvoltage protection

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

#### Devices without optional overvoltage protection

The equipment 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<sub>DC</sub>
- Tested according to IEC / DIN EN 60079-14 sub chapter 12.3 (IEC / DIN EN 60060-1 chapter 7)
- Nominal discharge current: 10 kA

#### NOTICE

#### Device could be destroyed

- ▶ Always ground device with integrated overvoltage protection.

## Overvoltage category

Overvoltage category II

### 11.2.4 Wiring

#### **WARNING**

#### **Supply voltage might be connected!**

Risk of electric shock and/or explosion!

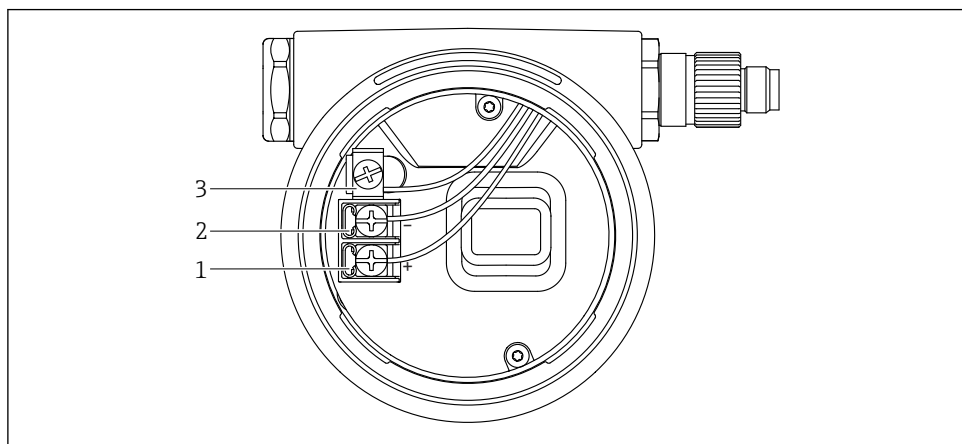
- ▶ If the device is used in hazardous areas, make sure to comply with national standards and the specifications in the Safety Instructions (XAs). The specified cable gland must be used.
- ▶ The supply voltage must match the specifications on the nameplate.
- ▶ Switch off the supply voltage before connecting 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.
- ▶ FISCO/FNICO compliant according to IEC 60079-27.
- ▶ The supply does not depend on the polarity.
- ▶ 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 cable.
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)  $\pm 0.2$  Nm (0.15 lbf ft).

## 11.2.5 Terminal assignment

### Single compartment housing

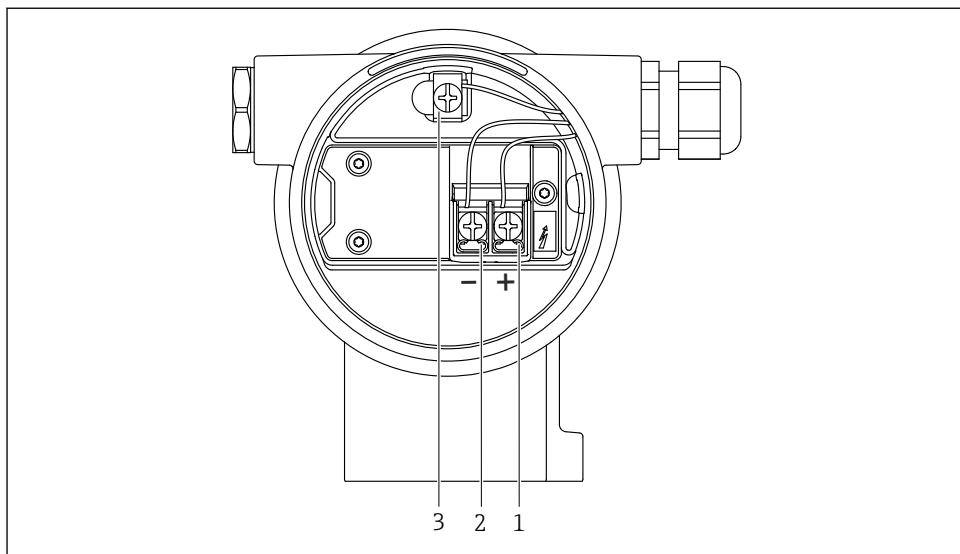


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 3 *Connection terminals and ground terminal in the connection compartment*

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

## Dual compartment housing

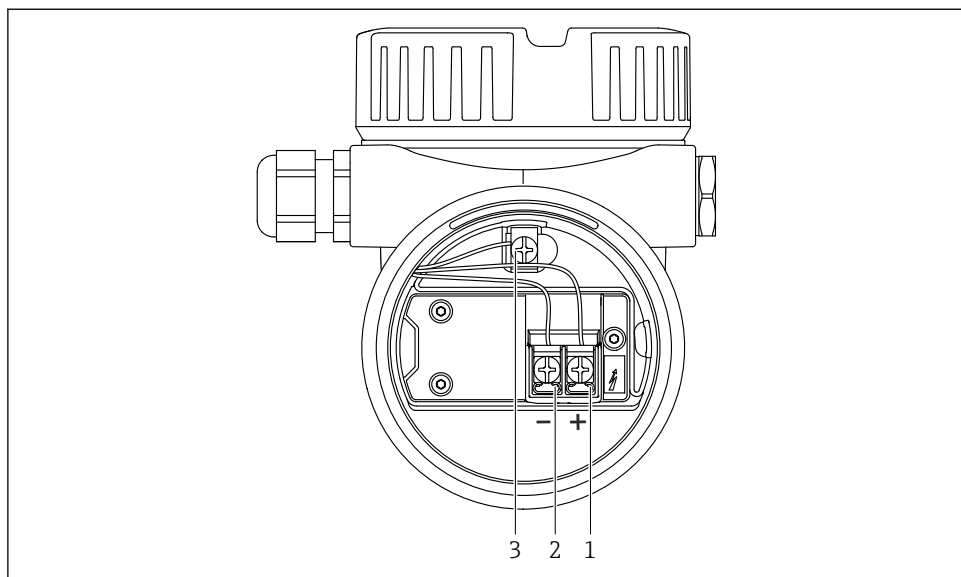


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4 Connection terminals and ground terminal in the connection compartment

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

## Dual compartment housing, L-form

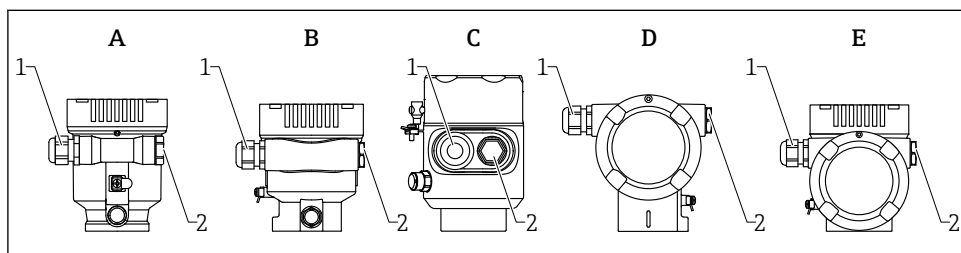


A0045842

 5 Connection terminals and ground terminal in the connection compartment

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


### 11.2.6 Cable entries



A0045842


- A Single compartment housing, plastic
- B Single compartment housing, aluminum
- C Single compartment housing, 316L hygiene
- D Dual compartment housing
- E 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.

### 11.2.7 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

- M20 coupling, plastic, IP66/68 NEMA TYPE 4X/6P
  - M20 coupling, nickel-plated brass, IP66/68 NEMA TYPE 4X/6P
  - M20 coupling, 316L, IP66/68 NEMA TYPE 4X/6P
  - M20 thread, IP66/68 NEMA Type 4X/6P
  - G1/2 thread, 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
- NPT 1/2 thread, IP66/68 NEMA Type 4X/6P
  - Dummy plug transport protection: IP22, NEMA TYPE 2
  - 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

#### **M12 plug: Loss of IP protection class due to incorrect installation!**

- ▶ 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

### 12.1 Reading off the device locking status

Displaying active write protection in the **Locking status** parameter

- Local display :  
The  symbol appears on the main page
- Operating tool (FieldCare/DeviceCare) :  
Navigation: System → Device management → Locking status

### 12.2 Reading off measured values

All the measured values can be read off using the **Measured values** submenu.

Navigation: **Application** menu → **Measured values** submenu

### 12.3 Adapting the device to process conditions

The following menus are available for this purpose:

- Basic settings in the **Guidance** menu
- Advanced settings in:
  - **Diagnostics** menu
  - **Application** menu
  - **System** menu

### 12.4 Heartbeat Technology (optional)

#### 12.4.1 Heartbeat Verification

##### "Heartbeat Verification" wizard

This wizard is used to start an automatic verification of the device functionality. The results can be documented as a verification report.

- The wizard can be used via the operating tools and the display  
The wizard can be started on the display but only shows the **Passed** option or **Failed** option result.
- The wizard guides the user through the entire process for creating the verification report

#### 12.4.2 Heartbeat Verification/Monitoring




The **Heartbeat** submenu is only available if operating via FieldCare, DeviceCare or the SmartBlue app. It contains the wizards that are available with the application packages Heartbeat Verification and Heartbeat Monitoring.



Documentation on the Heartbeat Technology: Endress+Hauser website:  
[www.endress.com](http://www.endress.com) → Downloads.

## 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.

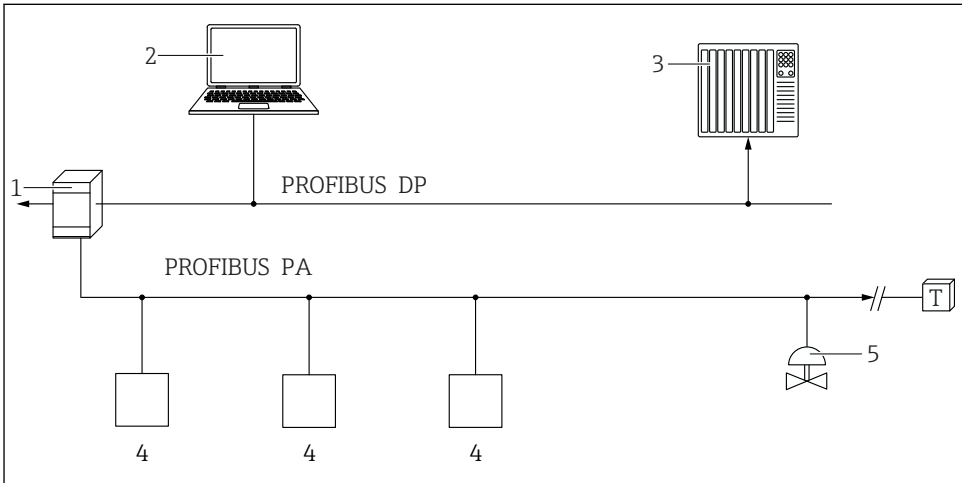
### 13.2 Function check

Before commissioning the measuring point, check whether the post-installation and post-connection checks have been performed.

-   →  Post-installation check
-   →  Post-connection check

### 13.3 Connecting via FieldCare and DeviceCare

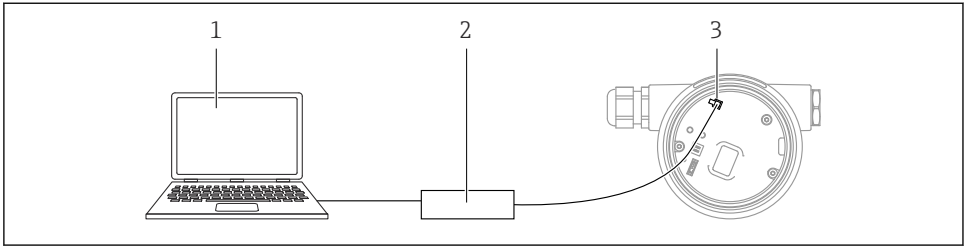
#### 13.3.1 Via PROFIBUS PA protocol



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- 1 Segment coupler
- 2 Computer with PROFlush and operating tool (e.g. DeviceCare/FieldCare )
- 3 PLC (programmable logic controller)
- 4 Transmitter
- 5 Additional functions (valves etc.)

### 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 Setting the operating language

### 13.4.1 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

### 13.4.2 Operating tool

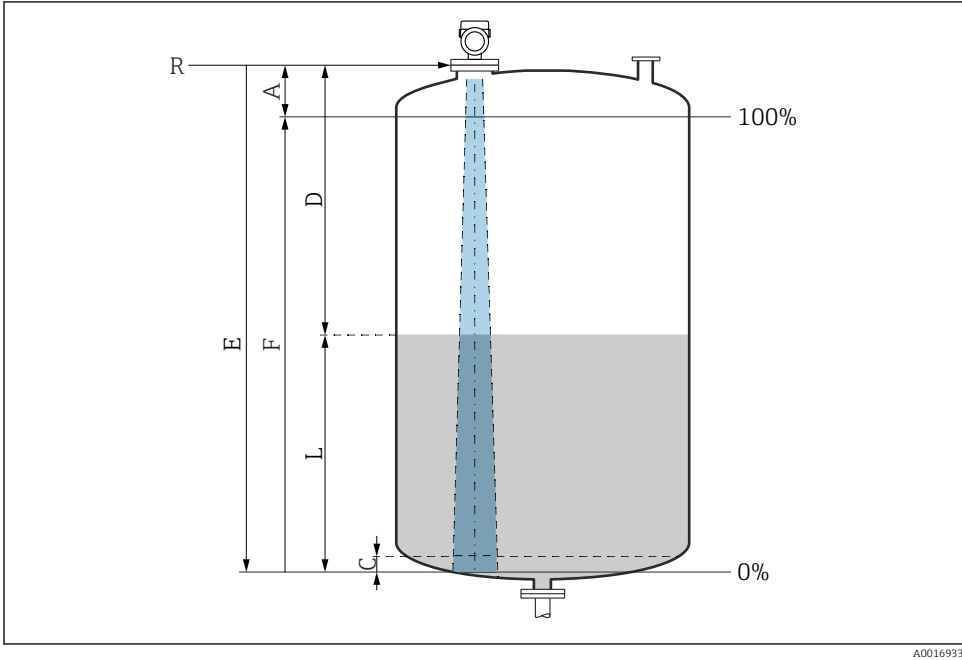
Set display language

System → Display → Language

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

## 13.5 Configuring the device


### 13.5.1 Level measurement in liquids



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#### 6 Configuration parameters for level measurement in liquids

- R Reference point of measurement
- A Length of antenna + 10 mm (0.4 in)
- C 50 to 80 mm (1.97 to 3.15 in); medium  $\epsilon_r < 2$
- D Distance
- L Level
- E "Empty calibration" parameter (= 0 %)
- F "Full calibration" parameter (= 100 %)

In the case of media with a low dielectric constant,  $\epsilon_r < 2$ , the tank floor may be visible through the medium at very low levels (lower than level C). Reduced accuracy must be expected in this range. If this is not acceptable, the zero point should be positioned at a distance C above the tank floor in these applications →  Configuration parameters for level measurement in liquids.

### 13.5.2 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 have made will be saved. For this reason, the device may then be in an undefined state!

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

## 13.6 Recording the Echo curve

### Record the current Echo curve as a reference echo curve for subsequent diagnostic purposes

After the measurement has been configured, it is recommended to record the current Echo curve as a reference echo curve.

The **Save reference curve** parameter in the **Echo curve** submenu is used to record the Echo curve.

Diagnostics → Echo curve → Save reference curve

- Under the **Save reference curve** parameter, activate the **Customer reference curve** option

## 13.7 "Simulation" submenu

Simulation of a process variable, a pulse output or a diagnostic event.

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