

Brief Operating Instructions

Micropilot FMR20B

Free-space radar
HART



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

Detailed information about the device can be found in the Operating Instructions and the other documentation:

Available for all device versions via:

- Internet: www.endress.com/deviceviewer
- Smart phone/tablet: *Endress+Hauser Operations App*

1 Associated documentation



2 About this document

2.1 Document function

The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.

2.2 Symbols

2.2.1 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 potentially dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

CAUTION

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

NOTICE

This symbol alerts you to a potentially harmful situation. Failure to avoid this situation can result in damage to the product or something in its vicinity.

2.2.2 Communication-specific symbols

Bluetooth®:

Wireless data transmission between devices over a short distance via radio technology.

2.2.3 Symbols for certain types of information

Permitted:

Procedures, processes or actions that are permitted.

Forbidden:

Procedures, processes or actions that are forbidden.

Additional information: 

Reference to documentation: 

Reference to page: 

Series of steps: 1., 2., 3.

Result of an individual step: 

2.2.4 Symbols in graphics

Item numbers: 1, 2, 3 ...

Series of steps: 1., 2., 3.

Views: A, B, C, ...

2.3 Documentation

 For an overview of the scope of the associated Technical Documentation, refer to the following:

- *Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from the nameplate
- *Endress+Hauser Operations app*: Enter serial number from nameplate or scan matrix code on nameplate.

3 Basic safety instructions

3.1 Requirements for the 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.
- ▶ Are authorized by the plant owner/operator.
- ▶ Are familiar with federal/national regulations.
- ▶ Before starting work, read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).
- ▶ Follow instructions and comply with basic conditions.

3.2 Intended use

Application and media

Device for continuous, non-contact level measurement of liquids, pastes, sludges and solids. 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 is completely harmless 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 instrument 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 device remains in proper condition for the operation time:

- ▶ Use the 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 can reach a temperature close to the medium temperature.

Danger of burns from contact with surfaces!

- ▶ In the event of elevated fluid temperatures, ensure protection against contact to prevent burns.

3.3 Workplace safety

For work on and with the device:

- ▶ Wear the required personal protective equipment as per national regulations.
- ▶ Switch off the supply voltage before connecting the device.

3.4 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 ensuring that the device is in good working order.

Modifications to the device

Unauthorized modifications to the device are not permitted and can lead to unforeseeable dangers:

- ▶ If modifications are nevertheless required, consult with the manufacturer.

Repair

To ensure continued operational safety and reliability:

- ▶ Only use original accessories.

Hazardous area

To eliminate the risk of danger to persons or the facility when the device is used in the hazardous 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 hazardous area.
- ▶ Comply with the instructions in the separate supplementary documentation, which is an integral part of this manual.

3.5 Product safety

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

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

3.6 IT security

The manufacturer warranty is valid only if the product is installed and used as described in the Operating Instructions. The product is equipped with security mechanisms to protect it against any inadvertent changes to the settings.

IT security measures, which provide additional protection for the product and associated data transfer, must be implemented by the operators themselves in line with their security standards.

3.7 Device-specific IT security

The device offers specific functions to support protective measures by the operator. These functions can be configured by the user and guarantee greater in-operation safety if used correctly. The user role can be changed with an access code (applies to operation via Bluetooth®).

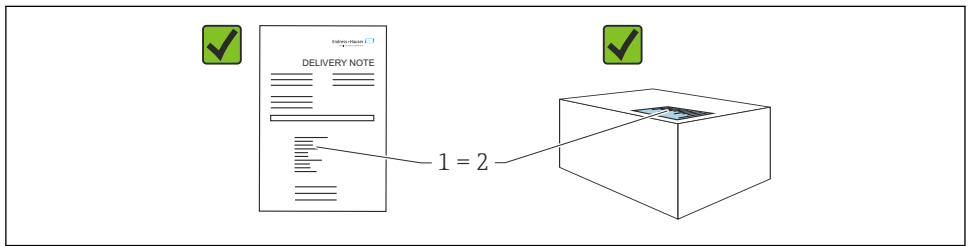
3.7.1 Access via Bluetooth® wireless technology

Secure signal transmission via Bluetooth® wireless technology uses an encryption method tested by the Fraunhofer Institute.

- Without the SmartBlue app, the device is not visible via Bluetooth® wireless technology.
- Only one point-to-point connection is established between the device and a smartphone or tablet.
- The Bluetooth® wireless technology interface can be disabled via SmartBlue or an operating tool via digital communication.

4 Incoming acceptance and product identification

4.1 Incoming acceptance



A0016870

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.

4.2 Product identification

The following options are available for identification of the device:

- Nameplate specifications
- Order code with breakdown of the device features on the delivery note
- Enter the serial numbers from the nameplates in *Device Viewer* (www.endress.com/deviceviewer): all the information about the device is displayed.

4.2.1 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)

Compare the data on the nameplate with your order.

4.2.2 Manufacturer address

Endress+Hauser SE+Co. KG
Hauptstraße 1
79689 Maulburg, Germany
Place of manufacture: See nameplate.

4.3 Storage and transport

4.3.1 Storage conditions

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

Storage temperature

-40 to +80 °C (-40 to +176 °F)

4.3.2 Transporting the product to the measuring point



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.

5 Installation

5.1 Installation requirements

5.1.1 Installation instructions



Note the following when installing:

The sealing element used must have a continuous operating temperature corresponding to the maximum process temperature.

- Devices are suitable for use in wet environments in accordance with IEC 61010-1
- Protect the housing against impact

5.1.2 Ambient temperature range

-40 to +80 °C (-40 to +176 °F)

If operating outdoors in strong sunlight:

- Mount the device in the shade.
- Avoid direct sunlight, particularly in warmer climatic regions.
- Use a weather protective cover.

5.1.3 Operating height

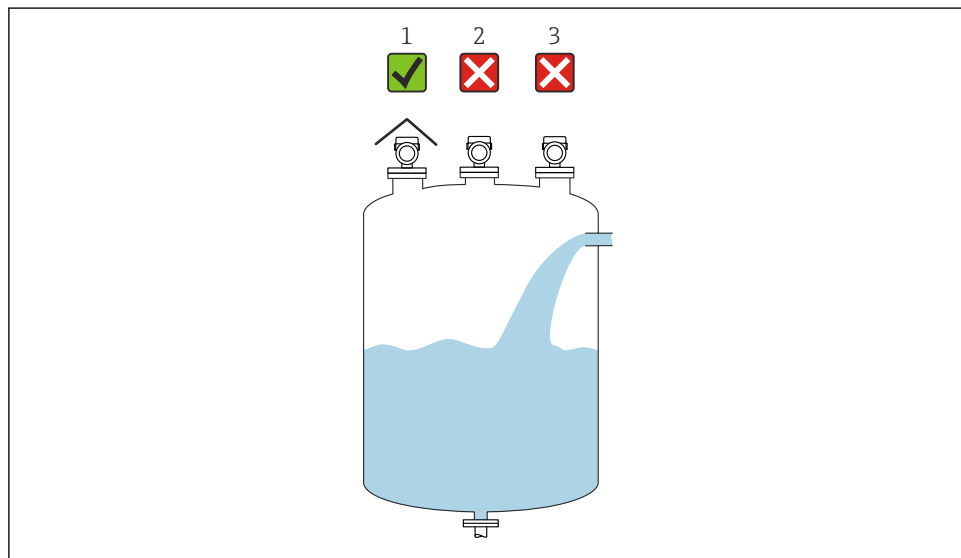
Up to 5 000 m (16 404 ft) above sea level

5.1.4 Degree of protection

Testing according to IEC 60529 and NEMA 250:

- IP66, NEMA Type 4X
- IP68, NEMA Type 6P (24 h at 1.83 m (6.00 ft) under water)

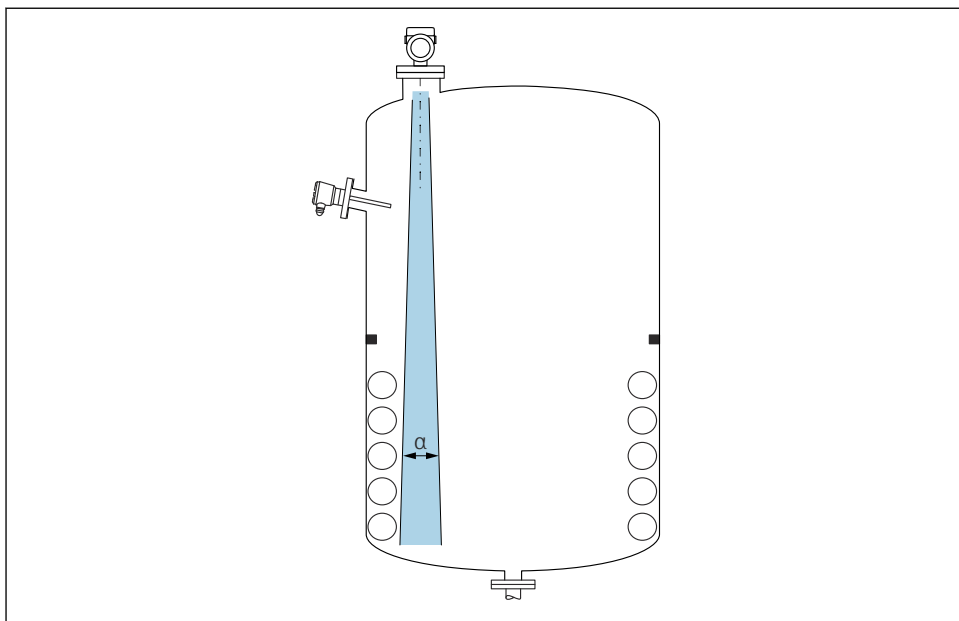
5.1.5 Mounting location



A0055811

- 1 Use of a weather protection cover; protection from direct sunlight or rain
- 2 Installation not centered: Interferences can lead to incorrect signal analysis
- 3 Do not install above the filling curtain

5.1.6 Internal vessel fittings



A0031777

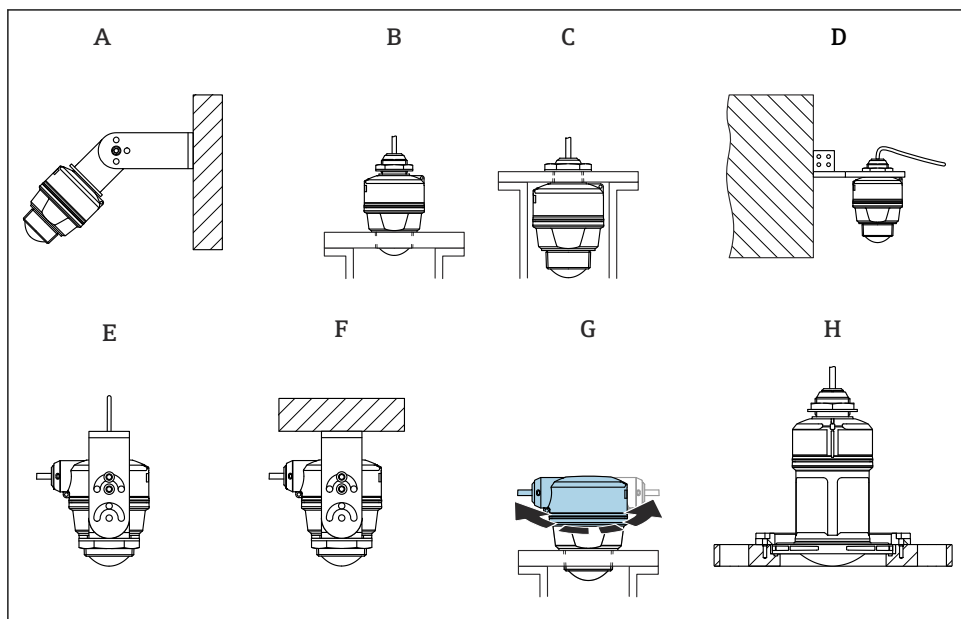
Avoid internal fittings (level switches, temperature sensors, struts, vacuum rings, heating coils, baffles etc.) inside the signal beam. Pay attention to the beam angle α .

5.1.7 Aligning the antenna axes

See Operating Instructions.

5.2 Installing the device

5.2.1 Installation types



A0055150

1 Wall or ceiling mount

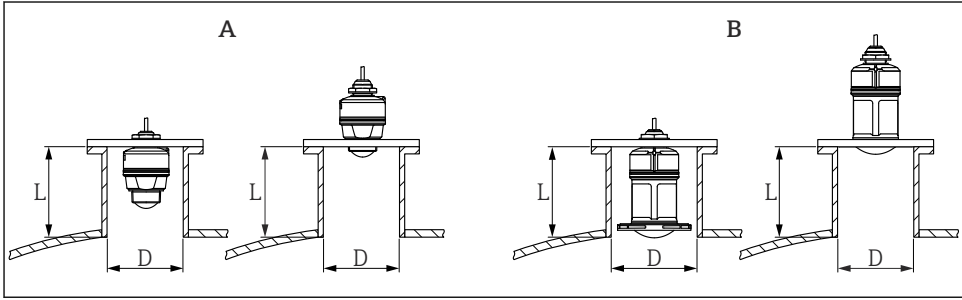
- A Wall mounting adjustable
- B Tightened at antenna end process connection
- C Tightened at cable entry from above process connection
- D Wall mounting with cable entry from above process connection
- E Rope mounting with cable entry at the side
- F Ceiling mounting with cable entry at the side
- G Cable entry at the side, top housing section can be rotated
- H Mounting with UNI slip-on flange

Please note the following:

- The sensor cables are not designed as supporting cables. Do not use them for suspension purposes.
- For rope mounting, the rope must be provided by the customer.
- Always operate the device in a vertical position in free-space applications.
- For devices with side cable outlet and 80 mm antenna, installation is only possible with a UNI slip-on flange.

5.2.2 Installation instructions

To ensure optimum measurement, the antenna must protrude from the nozzle. The interior of the nozzle must be smooth and must not contain any edges or welded joints. If possible, round the nozzle edge.



A0055399

2 Nozzle installation

A 40 mm (1.5 in) antenna

B 80 mm (3 in) antenna

The maximum nozzle length L depends on the nozzle diameter D .

Please note the limits for the diameter and length of the nozzle.

40 mm (1.5 in) antenna, installation outside nozzle

- D : min. 40 mm (1.5 in)
- L : max. $(D - 30 \text{ mm (1.2 in)}) \times 7.5$

40 mm (1.5 in) antenna, installation inside nozzle

- D : min. 80 mm (3 in)
- L : max. $100 \text{ mm (3.94 in)} + (D - 30 \text{ mm (1.2 in)}) \times 7.5$

80 mm (3 in) antenna, installation inside nozzle

- D : min. 120 mm (4.72 in)
- L : max. $140 \text{ mm (5.51 in)} + (D - 50 \text{ mm (2 in)}) \times 12$

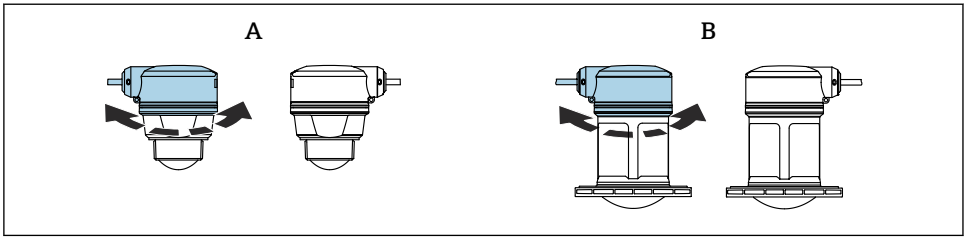
80 mm (3 in) antenna, installation outside nozzle

- D : min. 80 mm (3 in)
- L : max. $(D - 50 \text{ mm (2 in)}) \times 12$

5.2.3 Turning the housing

The housing can be rotated freely with the cable entry at the side.

Easy installation due to optimum alignment of housing.



A0056103

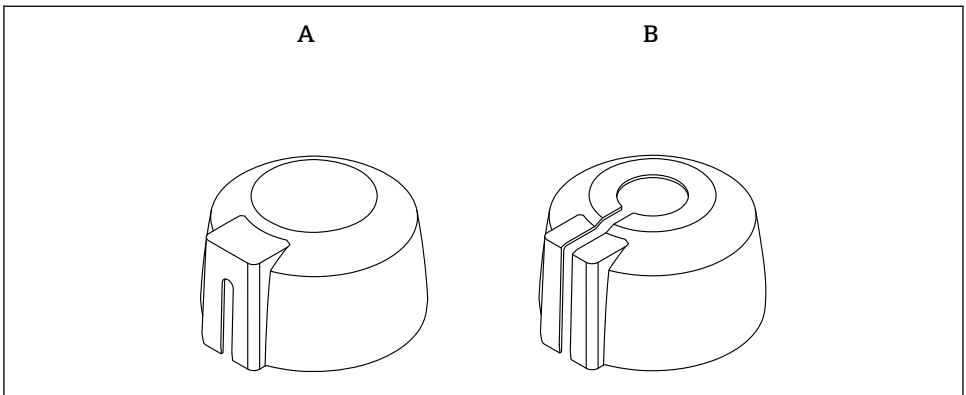
A 40 mm (1.5 in) antenna

B 80 mm (3 in) antenna

5.2.4 Weather protection cover

A weather protective cover is recommended for outdoor use.

The weather protective cover can be ordered as an accessory or together with the device via the product structure "Accessory enclosed".



A0055201

 3 Weather protective cover

A Side cable entry

B Cable entry from above

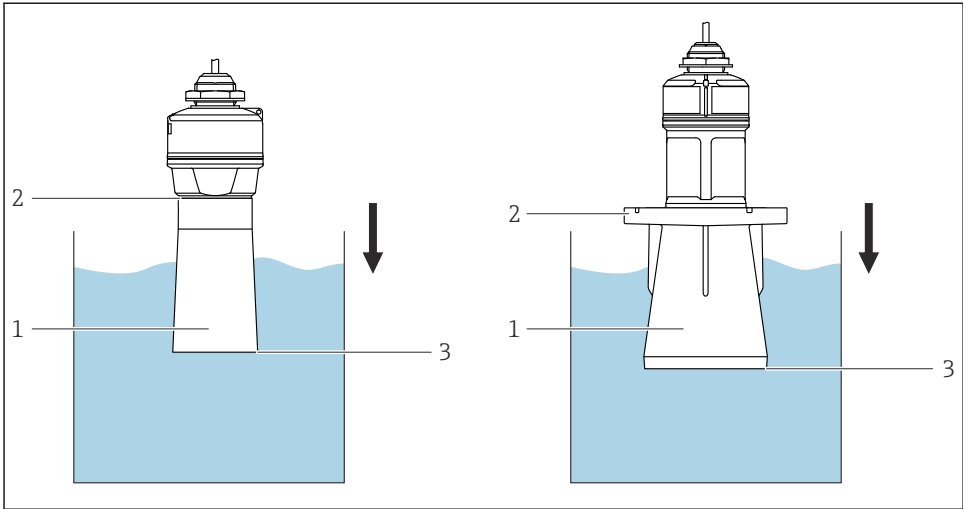


The sensor is not completely covered by the weather protective cover.

5.2.5 Flooding protection tube

The flooding protection tube ensures the sensor measures the maximum level even if it is completely flooded.

The flooding protection tube can be ordered as an accessory or together with the device via the product structure "Accessory enclosed".



A0055202

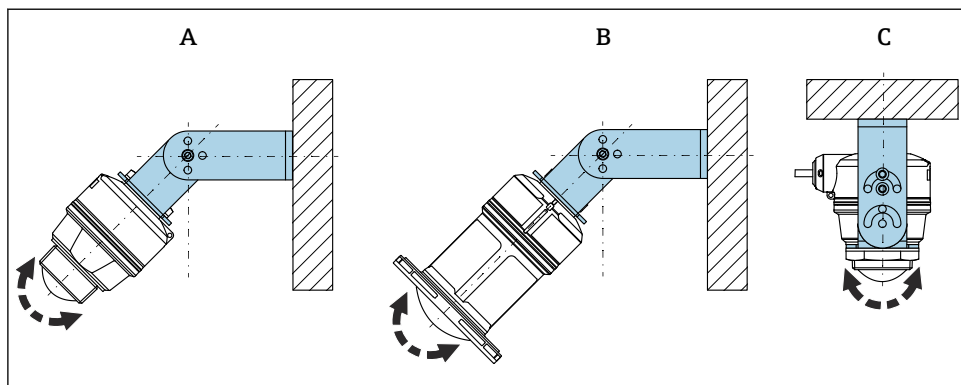
4 *Function of flooding protection tube*

- 1 *Air pocket*
- 2 *O-ring (EPDM) seal*
- 3 *Max. level*

The tube is screwed directly onto the sensor and seals off the system by means of an O-ring making it air-tight. In case of flooding, the air cushion formed within the sleeve guarantees precise detection of the maximum fill level, located directly at the sleeve's end.

5.2.6 Installation with mounting bracket, adjustable

The mounting bracket can be ordered as an accessory or together with the device via the product structure "Accessory enclosed".



A0055113

■ 5 Installation with mounting bracket, adjustable

- A Mounting bracket adjustable for 40 mm (1.5 in) antenna, wall mounting
 B Mounting bracket adjustable for 80 mm (3 in) antenna, wall mounting
 C Mounting bracket adjustable for 40 mm (1.5 in) antenna, ceiling mounting

- Wall or ceiling mounting is possible
- Align the antenna vertically to the product surface using the mounting bracket

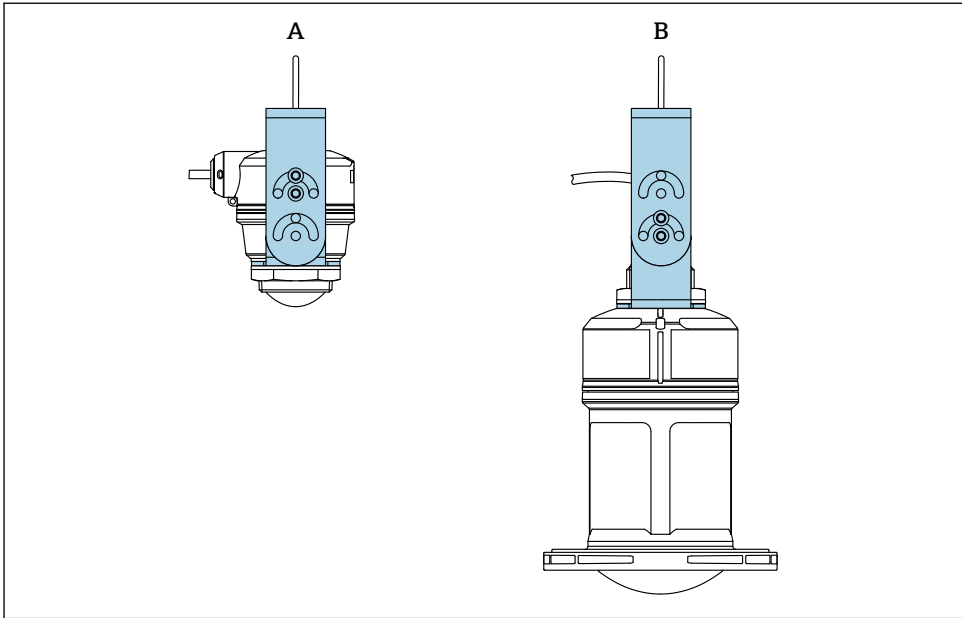
NOTICE

There is no conductive connection between the mounting bracket and transmitter housing.

Electrostatic charging possible.

- Integrate the mounting bracket in the local potential equalization system.

Rope mounting



A0055397

6 Installation with rope mounting

A Mounting bracket adjustable for 40 mm (1.5 in) antenna, rope mounting

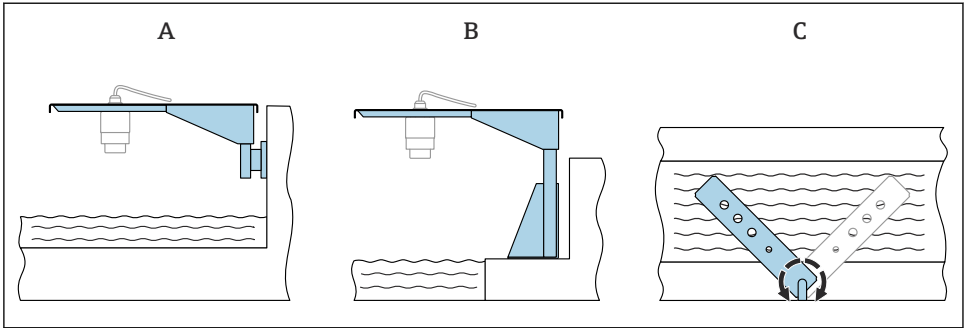
B Mounting bracket adjustable for 80 mm (3 in) antenna, rope mounting

Align the antenna perpendicular to the product surface.

 In the case of rope mounting, the cable must not be used to suspend the device.
Use separate rope.

5.2.7 Cantilever installation, with pivot

The cantilever, wall bracket and mounting frame can be ordered as accessories.



A0028412

7 Cantilever installation, with pivot

A Cantilever with wall bracket (side view)

B Cantilever with mounting frame (side view)

C Cantilever can be turned, e.g. in order to position the device over the center of the flume (top view)

NOTICE

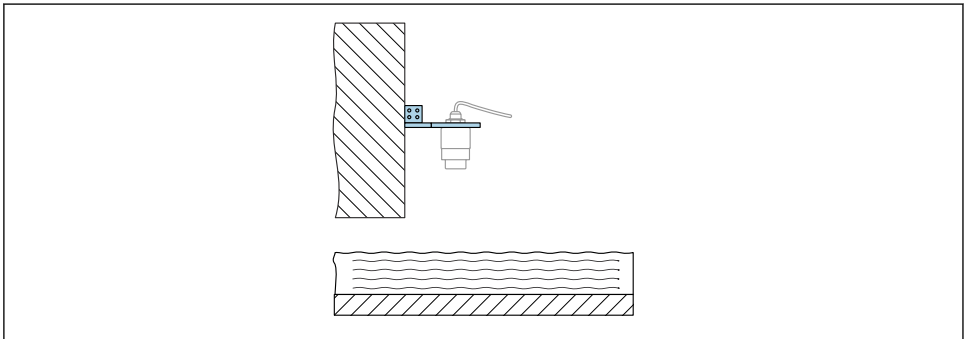
There is no conductive connection between the mounting bracket and transmitter housing.

Electrostatic charging possible.

- Integrate the mounting bracket in the local potential equalization system.

5.2.8 Mounting with a pivotable mounting bracket

The pivotable mounting bracket can be ordered as an accessory or together with the device via the product structure "Accessory enclosed".



A0055398

8 Pivotable and adjustable cantilever with wall bracket (e.g. to align the device with the center of a flume)

NOTICE

There is no conductive connection between the mounting bracket and transmitter housing.

Electrostatic charging possible.

- Integrate the mounting bracket in the local potential equalization system.

5.3 Post-mounting check

- ☐ Are the device and cable undamaged (visual check)?
- ☐ Are the measuring point identification and labeling correct (visual inspection)?
- ☐ Is the device protected from precipitation and direct sunlight?
- ☐ Is the device properly secured?
- ☐ Does the device comply with the measuring point specifications?

For example:

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

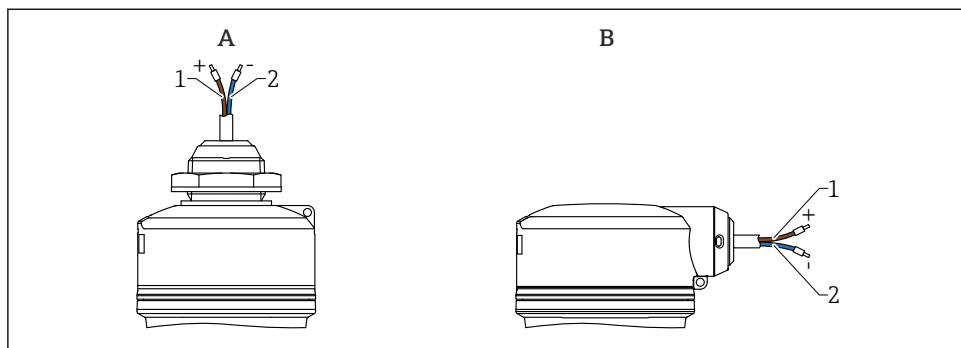
6 Electrical connection

6.1 Connecting the device

6.1.1 Potential equalization

No special measures for potential equalization are required.

6.1.2 Cable assignment



A0055191

9 Cable assignment

A Cable entry from above

B Side cable entry

1 Plus, brown wire

2 Minus, blue wire

6.1.3 Supply voltage

12 to 30 V DC on a DC power unit

i The power unit must be safety-approved (e.g. PELV, SELV, Class 2) and must comply with the relevant protocol specifications.

Protective circuits against reverse polarity, HF influences and overvoltage peaks are installed.

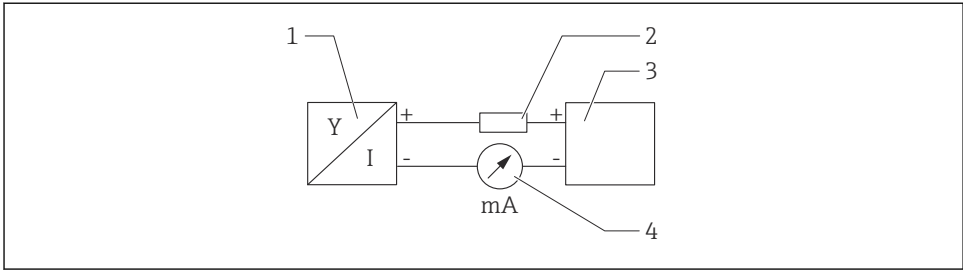
6.1.4 Power consumption

- Non-hazardous area: To meet device safety specifications according to the IEC/EN 61010 standard, the installation must ensure that the maximum current is limited to 500 mA.
- Hazardous area: The maximum current is restricted to $I_i = 100$ mA by the transmitter power supply unit when the device is used in an intrinsically safe circuit (Ex ia).

6.1.5 Connecting the device

Function diagram of 4 to 20 mA HART

Connection of the device with HART communication, power source and 4 to 20 mA indicator



A0028908

10 Function diagram of HART connection

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

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

The voltage drop to be taken into account is:

Max. 6 V for 250 Ω communication resistor

Function diagram of HART device, connection with RIA15, display only without operation, without communication resistor

i The RIA15 remote display can be ordered together with the device.

b Alternatively available as an accessory, for details see Technical Information TI01043K and Operating Instructions BA01170K

Terminal assignment RIA15

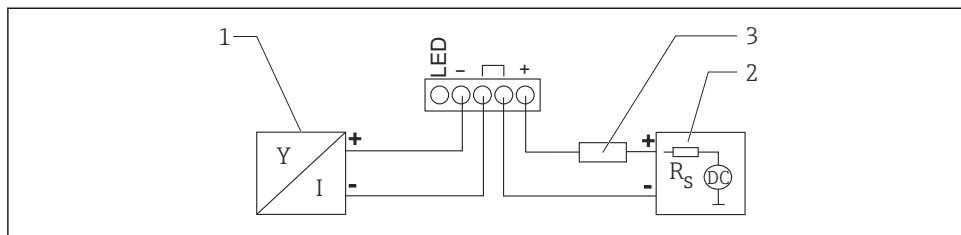
- +
Positive connection, current measurement
- -
Negative connection, current measurement (without backlighting)
- LED
Negative connection, current measurement (with backlighting)
- $\equiv$
Functional grounding: Terminal in housing

i The RIA15 process indicator is loop-powered and does not require any external power supply.

The voltage drop to be taken into account is:

- ≤ 1 V in the standard version with 4 to 20 mA communication
- ≤ 1.9 V with HART communication
- and an additional 2.9 V if display light is used

Connection of the HART device and RIA15 without backlighting

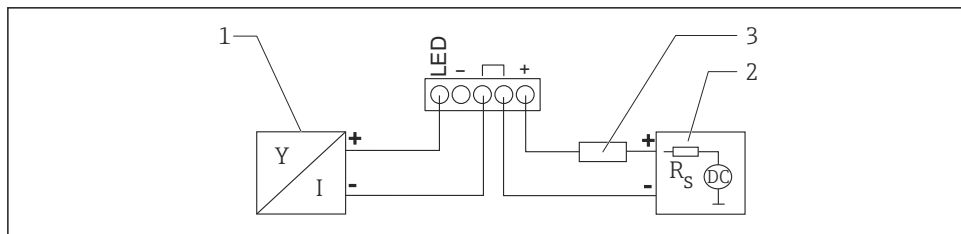


A0019567

11 Function diagram of HART device with RIA15 process indicator without light

- 1 Device with HART communication
- 2 Current supply
- 3 HART resistor

Connection of the HART device and RIA15 with backlighting



A0019568

12 Function diagram of HART device with RIA15 process indicator with light

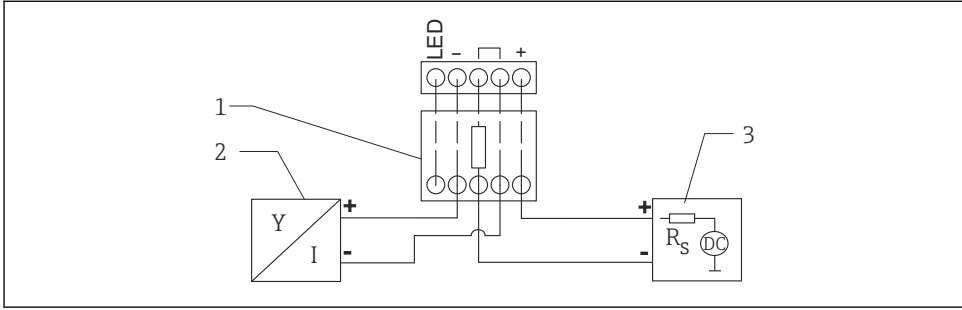
- 1 Device with HART communication
- 2 Current supply
- 3 HART resistor

Function diagram of HART device, RIA15 display with operation, with communication resistor

i The voltage drop to be taken into account is:
Max. 7 V

b Alternatively available as an accessory, for details see Technical Information TI01043K and Operating Instructions BA01170K

Connection of the HART communication resistor module, RIA15 without backlighting

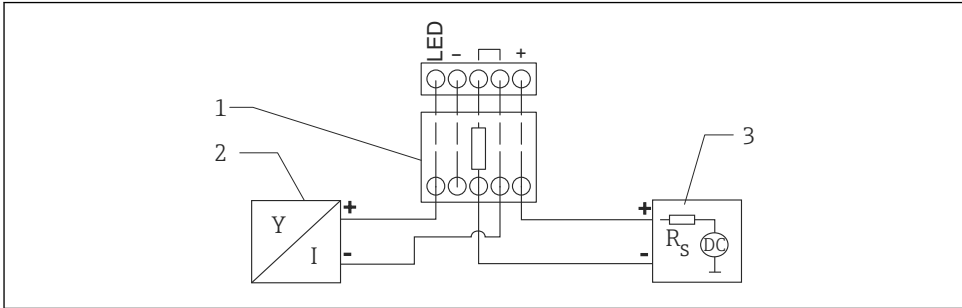


A0020839

13 Function diagram of HART device, RIA15 without light, HART communication resistor module

- 1 HART communication resistor module
- 2 Device with HART communication
- 3 Current supply

Connection of the HART communication resistor module, RIA15 with backlighting



A0020840

14 Function diagram of HART device, RIA15 with light, HART communication resistor module

- 1 HART communication resistor module
- 2 Device with HART communication
- 3 Current supply

6.1.6 Cable specification

Unshielded cable, wire cross-section 0.5 mm²

- Resistant to UV and weather conditions as per ISO 4892-2
- Flame resistance according to IEC 60332-1-2

As per IEC 60079-11 section 9.4.4, the cable is designed for a tensile strength of 30 N (6.74 lbf) (over a period of 1 h).

The device is available in cable lengths of 5 m (16 ft), 10 m (32 ft), 15 m (49 ft), 20 m (65 ft), 30 m (98 ft) and 50 m (164 ft).

User-defined lengths up to total length of 300 m (980 ft) are possible in increments of one meter (order option "1") or one foot (order "2").

For devices with marine approval:

- Only available with a length of 10 m (32 ft) and "user-defined"
- Halogen-free as per IEC 60754-1
- No development of corrosive fire gases in accordance with IEC 60754-2
- Low flue gas density in accordance with IEC 61034-2

6.1.7 Overvoltage protection

The device satisfies the IEC/DIN EN 61326-1 product standard (Table 2 Industrial environment). Depending on the type of connection (DC power supply, input line, output line), different test levels are used to prevent transient overvoltages (IEC/DIN EN 61000-4-5 Surge) in accordance with IEC/DIN EN 61326-1: Test level for DC power supply lines and IO lines: 1 000 V wire to ground.

Devices for the "protection by enclosure" explosion protection are equipped with an integrated overvoltage protection system.

Overvoltage category

In accordance with IEC/DIN EN 61010-1, the device is intended for use in networks with overvoltage protection category II.

6.2 Ensuring the degree of protection

Testing according to IEC 60529 and NEMA 250:

- IP66, NEMA Type 4X
- IP68, NEMA Type 6P (24 h at 1.83 m (6.00 ft) under water)

6.3 Post-connection check

- ☐ Are the device and cable undamaged (visual check)?
- ☐ Does the cable used comply with the requirements?
- ☐ Is the mounted cable strain-relieved?
- ☐ Is the screw connection properly mounted?
- ☐ Does the supply voltage match the specifications on the nameplate?
- ☐ No reverse polarity, terminal assignment correct?
- ☐ If supply voltage is present: Is the device ready for operation and is the green operating status LED lit?

7 Operation options

See Operating Instructions.

8 Commissioning

8.1 Preliminaries

⚠ WARNING

Settings on the current output can result in a safety-related condition (e.g., product overflow)!

- ▶ Check current output settings.
- ▶ The setting of the current output depends on the setting in the **Assign PV** parameter.

8.2 Post-installation and function check

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

 Post-mounting check

 Post-connection check

8.3 Overview of commissioning options

- Commissioning with the SmartBlue app
- Commissioning via FieldCare/DeviceCare/Field Xpert
- Commissioning via additional operating tools (AMS, PDM, etc.)
- Operation and settings via RIA15

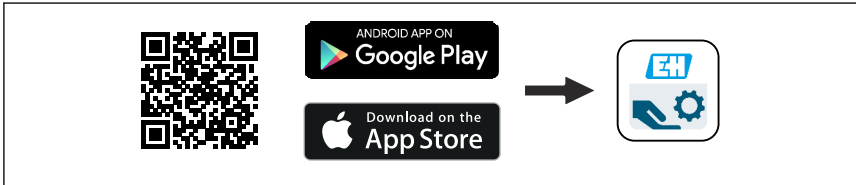
8.4 Commissioning via SmartBlue app

8.4.1 Device requirements

Commissioning via SmartBlue is only possible if the device has Bluetooth capability (Bluetooth module installed at the factory prior to delivery or retrofitted).

8.4.2 SmartBlue App

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



A0039186

 15 Download link

2. Start SmartBlue.
3. Select device from livelist displayed.
4. Enter the login data:
 - ↳ User name: admin
 - Password: serial number of the device

5. Tap the icons for more information.

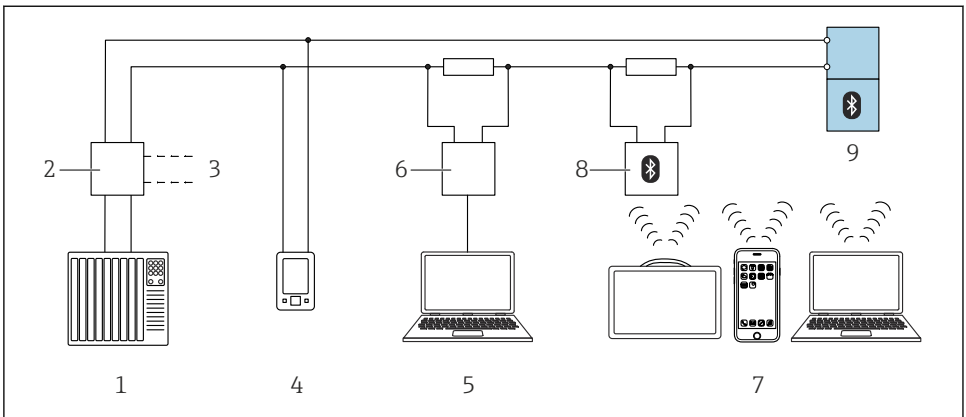


After logging in for the first time, change the password!

8.5 Commissioning via FieldCare/DeviceCare

1. Download the DTM: <http://www.endress.com/download> -> Device Driver -> Device Type Manager (DTM)
2. Update the catalog.
3. Click the **Guidance** menu and start the **Commissioning** wizard.

8.5.1 Connecting via FieldCare, DeviceCare and FieldXpert



A0044334

16 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 TrexTM device communicator
- 4 AMS TrexTM device communicator
- 5 Computer with operating tool (e.g. DeviceCare/FieldCare, AMS Device View, SIMATIC PDM)
- 6 Commubox FXA195 (USB)
- 7 Field Xpert SMT70/SMT77, smartphone or computer with operating tool (e.g. DeviceCare)
- 8 Bluetooth modem with connecting cable (e.g. VIATOR)
- 9 Transmitter

8.6 Commissioning via additional operating tools (AMS, PDM, etc.)

Download the device-specific drivers: <https://www.endress.com/en/downloads>

For more details, see the help for the relevant operating tool.

8.7 Notes on the "Commissioning" wizard

The **Commissioning** wizard allows you to carry out easy, user-guided commissioning.

1. Once you have started the **Commissioning** wizard, enter the appropriate value in each parameter or select the appropriate option. These values are written directly to the device.
2. Click "Next" to go to the next page.
3. Once all the pages have been completed, click "End" to close the **Commissioning** wizard.



If the **Commissioning** wizard is cancelled before all necessary parameters have been configured, the device may be in an undefined state. In such situations, it is advisable to reset the device to the factory default settings.

8.8 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
- Default HART address: 0

8.9 Configuring the device

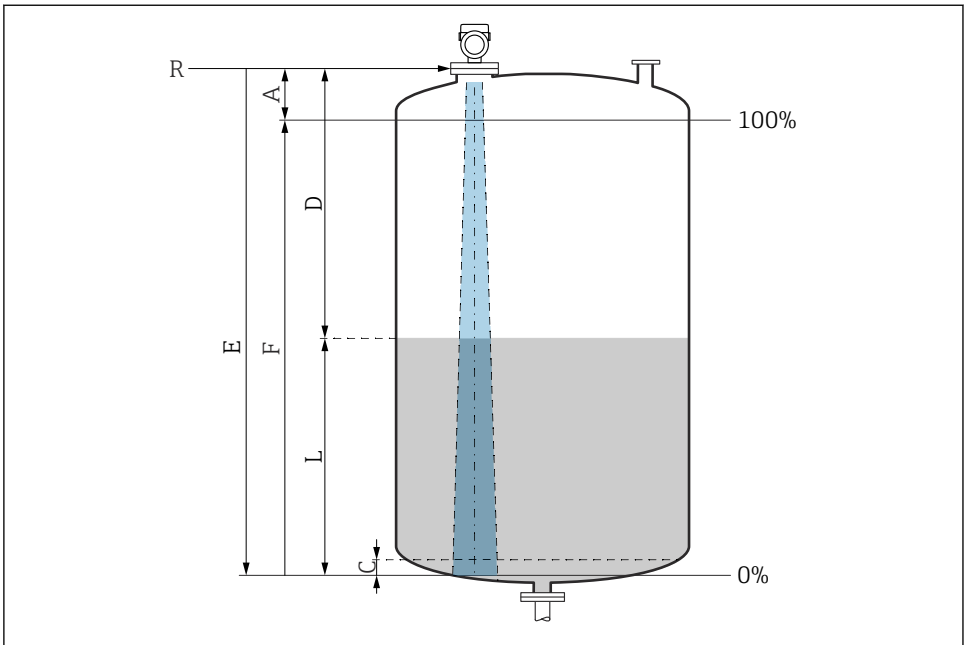


Commissioning via the Commissioning wizard is recommended.

See  "Commissioning with SmartBlue" section

See  "Commissioning via FieldCare/DeviceCare" section

8.9.1 Level measurement in liquids



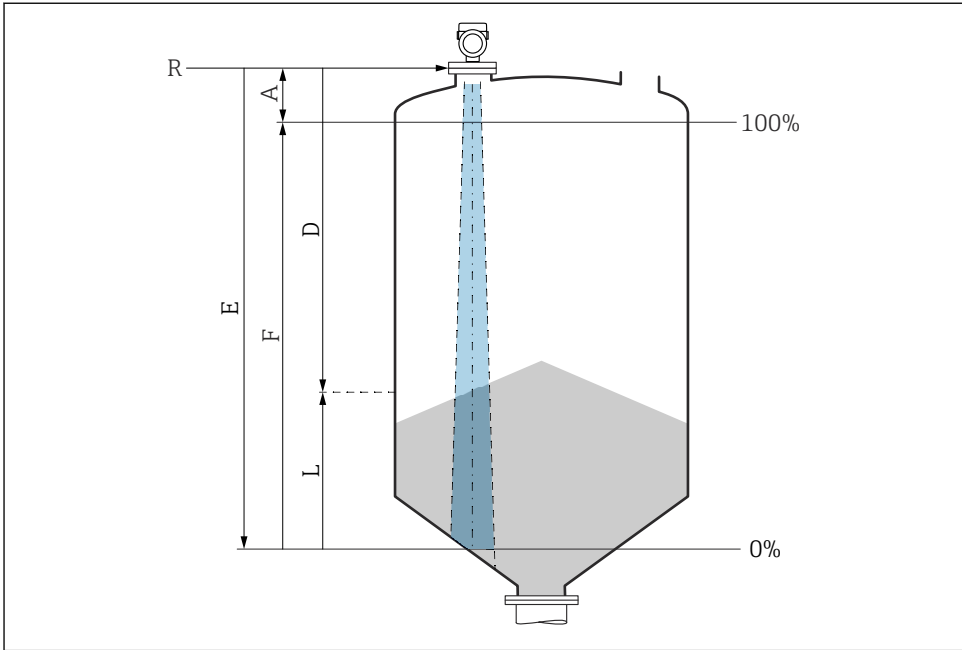
A0016933

17 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 for these applications (see figure).

8.9.2 Level measurement in bulk solids



A0016994

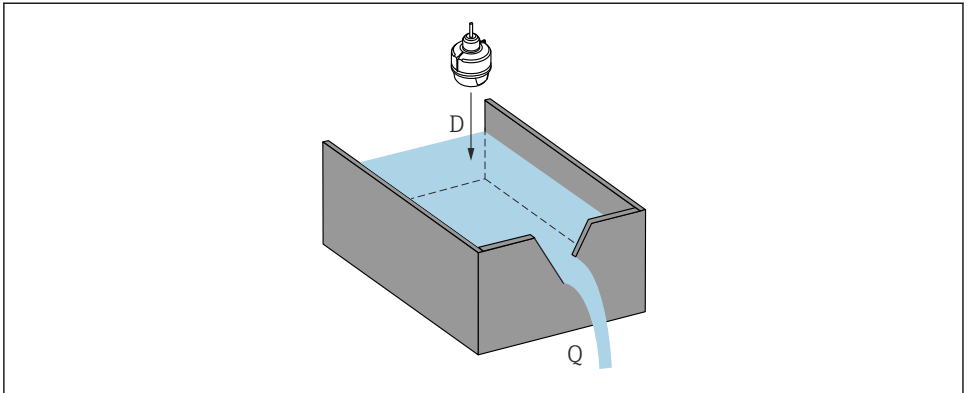
18 Configuration parameters for level measurement in bulk solids

- R Reference point of measurement
- A Length of antenna + 10 mm (0.4 in)
- D Distance
- L Level
- E "Empty calibration" parameter (= 0 %)
- F "Full calibration" parameter (= 100 %)

8.9.3 Configuring flow measurement via operating software

Installation conditions for flow measurement

- A channel or a weir is required for flow measurement
- Position the sensor in the center of the channel or weir
- Align the sensor so that it is perpendicular to the surface of the water
- Use a weather protection cover to protect the device from sunshine and rain



A0055823

19 Configuration parameters for the flow measurement of liquids

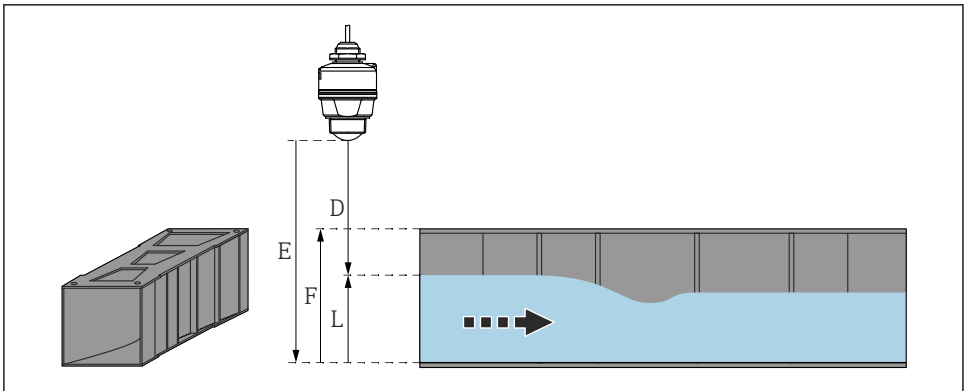
D Distance

Q Flow rate at measuring weirs or channels (calculated from the level using linearization)

Flow measurement configuration



The value pairs must be entered in ascending order when configuring a linearization table.



A0055824

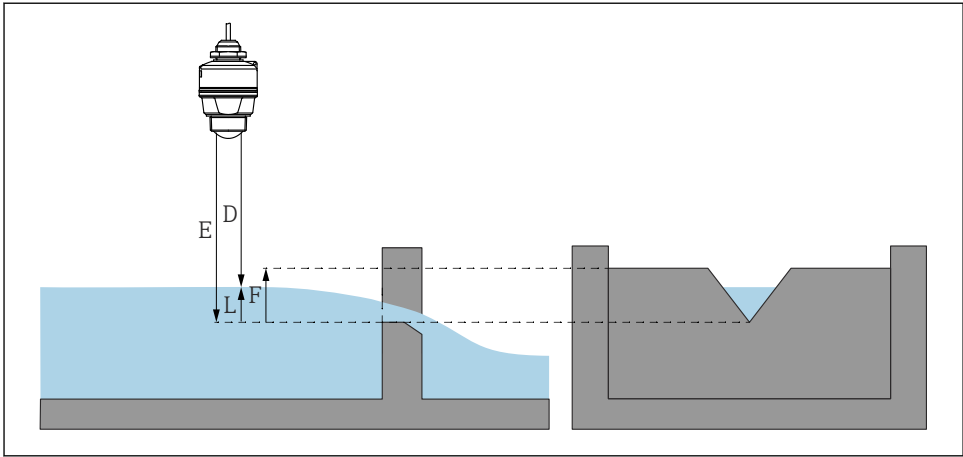
20 Example: Khafagi-Venturi flume

E "Empty calibration" parameter (= zero point)

F "Full calibration" parameter (= maximum level)

D Distance

L Level



A0055825

21 Example: V-notch weir

- E* "Empty calibration" parameter (= zero point)
F "Full calibration" parameter (= maximum level)
D Distance
L Level

i If flow measurement has been commissioned using the standard formula, subsequent corrections to the empty and full calibration can lead to incorrect measured values. Commissioning must be repeated in this case.

8.10 Configuring the "Frequency mode" parameter

The **Frequency mode** parameter is used to define country or region-specific settings for the radar signals.

i The **Frequency mode** parameter must be configured at the start of commissioning in the operating menu using the appropriate operating tool.

Application → Sensor → Advanced settings → Frequency mode

Operating frequency 80 GHz:

- **Mode 2** option: Europe, USA, Australia, New Zealand, Canada, Brazil, Japan, South Korea, Taiwan, Thailand, Mexico
- **Mode 3** option: Russia, Kazakhstan
- **Mode 4** option: Not used
- **Mode 5** option: India, Malaysia, South Africa, Indonesia

i The metrological properties of the device may vary, depending on the mode set. The specified metrological properties refer to the device as supplied to the customer (**Mode 2** option).

8.11 "Simulation" submenu

Process variables and diagnostic events can be simulated with the **Simulation** submenu.

Navigation: Diagnostics → Simulation

During simulation of the switch output or current output, the device issues a warning message for the duration of the simulation.

8.12 Protecting settings from unauthorized access

8.12.1 Software locking or unlocking

Locking via password in FieldCare/DeviceCare/SmartBlue app

Access to parameter configuration of the device can be locked by assigning a password. When the device is delivered from the factory, the user role is set to **Maintenance** option. The device parameters can be fully configured with the **Maintenance** option user role. Afterwards, access to the configuration can be locked by assigning a password. The **Maintenance** option switches to the **Operator** option as a result of this locking. The configuration can be accessed by entering the password.

The password is defined under:

System menu **User management** submenu

The user role is changed from the **Maintenance** option to **Operator** option under:

System → User management

Deactivating the lock via FieldCare/DeviceCare/SmartBlue App

After entering the password, you can enable parameter configuration of the device as an **Operator** option with the password. The user role then changes to **Maintenance** option.

If necessary, the password can be deleted in User management: System → User management



71726354

www.addresses.endress.com
