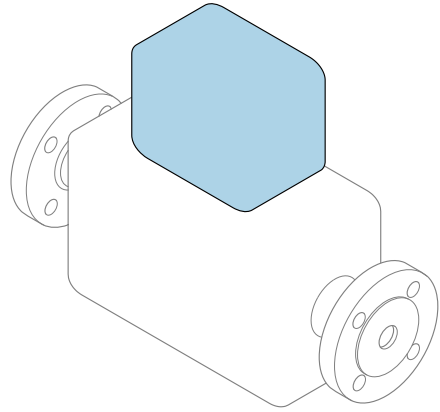
KA01476D/06/EN/01.21
71508894
2021-05-10

Brief Operating Instructions
Proline 500

Transmitter with ultrasonic time-of-flight sensor
Modbus RS485

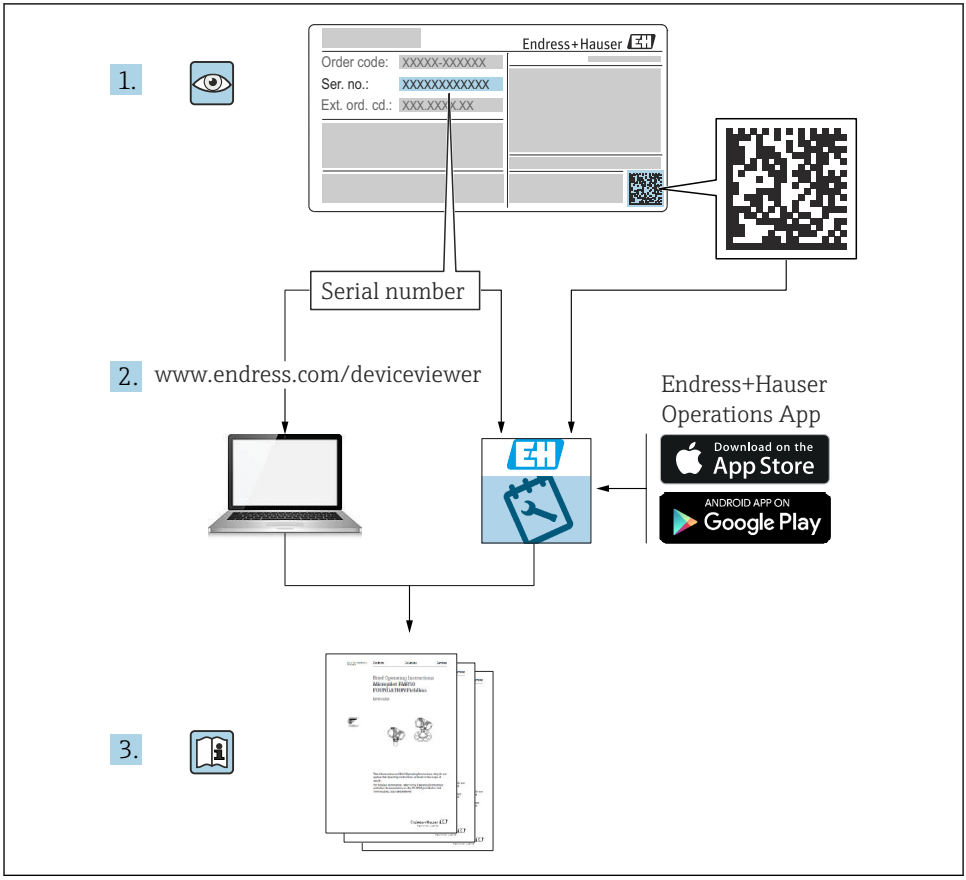


These instructions are Brief Operating Instructions; they are **not** a substitute for the Operating Instructions pertaining to the device.

Brief Operating Instructions part 2 of 2: Transmitter
Contain information about the transmitter.

Brief Operating Instructions part 1 of 2: Sensor → 3

Endress+Hauser
People for Process Automation


1.
Endress+Hauser
Order code: XXXXX-XXXXXX
Ser. no.: XXXXXXXXXXXX
Ext. ord. cd.: XXX.XXX-XXX
Serial number
2.
www.endress.com/deviceviewer
Endress+Hauser
Operations App
Download on the App Store
ANDROID APP ON Google Play
3.

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Brief Operating Instructions for flowmeter

The device consists of a transmitter and a sensor.

The process of commissioning these two components is described in two separate manuals that together form the Brief Operating Instructions for the flowmeter:
- Brief Operating Instructions Part 1: Sensor
- Brief Operating Instructions Part 2: Transmitter

Please refer to both parts of the Brief Operating Instructions when commissioning the device, as the contents of the manuals complement one another:

Brief Operating Instructions Part 1: Sensor
The Sensor Brief Operating Instructions are aimed at specialists with responsibility for installing the measuring device.
- Incoming acceptance and product identification
- Storage and transport
- Installation

Brief Operating Instructions Part 2: Transmitter
The Transmitter Brief Operating Instructions are aimed at specialists with responsibility for commissioning, configuring and parameterizing the measuring device (until the first measured value).
- Product description
- Installation
- Electrical connection
- Operation options
- System integration
- Commissioning
- Diagnostic information

Additional device documentation

These Brief Operating Instructions are **Brief Operating Instructions Part 2: Transmitter**.

The "Brief Operating Instructions Part 1: Sensor" are available via:
- Internet: www.endress.com/deviceviewer
- Smart phone/tablet: *Endress+Hauser Operations App*

Detailed information about the device can be found in the Operating Instructions and the other documentation:
- Internet: www.endress.com/deviceviewer
- Smart phone/tablet: *Endress+Hauser Operations App*

Table of contents

1 About this document

1.1 Symbols used

1.1.1 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.

1.1.2 Symbols for certain types of information

Symbol	Meaning	Symbol	Meaning
	**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 page
	Reference to graphic	1., 2., 3...	Series of steps
	Result of a step		Visual inspection

1.1.3 Electrical symbols

Symbol	Meaning	Symbol	Meaning
	Direct current		Alternating current
	Direct current and alternating current		**Ground connection** A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.

Symbol	Meaning
	Protective Earth (PE) A terminal which must be connected to ground prior to establishing any other connections. The ground terminals are situated inside and outside the device: ▪ Inner ground terminal: Connects the protectiv earth to the mains supply. ▪ Outer ground terminal: Connects the device to the plant grounding system.

1.1.4 Communication symbols

Symbol	Meaning	Symbol	Meaning
	Wireless Local Area Network (WLAN) Communication via a wireless, local network.		**Bluetooth** Wireless data transmission between devices over a short distance.
	Promag 800 **Cellular radio** Bidirectional data exchange via cellular network.		**LED** Light emitting diode is off.
	LED Light emitting diode is on.		**LED** Light emitting diode is flashing.

1.1.5 Tool symbols

Symbol	Meaning	Symbol	Meaning
	Torx screwdriver		Flat blade screwdriver
	Cross-head screwdriver		Allen key
	Open-ended wrench		

1.1.6 Symbols in graphics

Symbol	Meaning	Symbol	Meaning
1, 2, 3,...	Item numbers	1., 2., 3...	Series of steps
A, B, C, ...	Views	A-A, B-B, C-C, ...	Sections
	Hazardous area		Safe area (non-hazardous area)
	Flow direction		

2 Safety instructions

2.1 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.

2.2 Designated use

Application and media
The measuring device described in this manual is intended only for the flow measurement of liquids.

Depending on the version ordered, the measuring device can also measure potentially explosive, flammable, poisonous and oxidizing media.

Measuring devices for use in hazardous areas, in hygienic applications or where there is an increased risk due to process pressure, are labeled accordingly on the nameplate.

To ensure that the measuring device remains in proper condition for the operation time:
- Keep within the specified pressure and temperature range.
- Only use the measuring device in full compliance with the data on the nameplate and the general conditions listed in the Operating Instructions and supplementary documentation.
- Based on the nameplate, check whether the ordered device is permitted for the intended use in the hazardous area (e.g. explosion protection, pressure vessel safety).
- If the ambient temperature of the measuring device is outside the atmospheric temperature, it is absolutely essential to comply with the relevant basic conditions as specified in the device documentation.
- Protect the measuring device permanently against corrosion from environmental influences.

Incorrect use
Non-designated use can compromise safety. The manufacturer is not liable for damage caused by improper or non-designated use.

Residual risks

⚠ WARNING

The electronics and the medium may cause the surfaces to heat up or freeze. This presents a burn hazard!
- For elevated or low fluid temperatures, ensure protection against contact.

2.3 Workplace safety

For work on and with the device:
- ▶ Wear the required personal protective equipment according to federal/national regulations.

If mounting the sensors and tensioning bands:
- ▶ Due to the increased risk of cuts, gloves and goggles must be worn.

For welding work on the piping:
- ▶ Do not ground the welding unit via the measuring device.

If working on and with the device with wet hands:
- ▶ Due to the increased risk of electric shock, gloves must be worn.

2.4 Operational safety

Risk of injury.
- ▶ Operate the device in proper technical condition and fail-safe condition only.
- ▶ The operator is responsible for interference-free operation of the device.

2.5 Product safety

This measuring 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 EU directives listed in the device-specific EU Declaration of Conformity. Endress+Hauser confirms this by affixing the CE mark to the device.

2.6 IT security

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

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

2.7 Device-specific IT security

The device offers a range of specific functions to support protective measures on the operator's side. These functions can be configured by the user and guarantee greater in-operation safety if used correctly.

For detailed information on device-specific IT security, see the Operating Instructions for the device.

2.7.1 Access via service interface (CDI-RJ45)

The device can be connected to a network via the service interface (CDI-RJ45). Device-specific functions guarantee the secure operation of the device in a network.

The use of relevant industrial standards and guidelines that have been defined by national and international safety committees, such as IEC/ISA62443 or the IEEE, is recommended. This includes organizational security measures such as the assignment of access authorization as well as technical measures such as network segmentation.

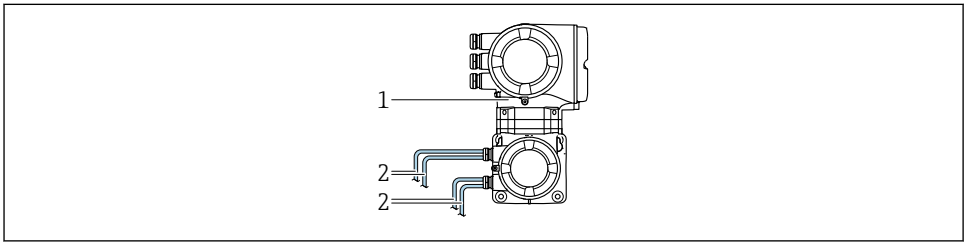
Transmitters with an Ex de approval may not be connected via the service interface (CDI-RJ45)!

Order code for "Approval transmitter + sensor", options (Ex de): BB, C2, GB, MB, NB

3 Product description

The measuring system consists of a transmitter and two or one sensor sets.

The transmitter and sensor are mounted in physically separate locations. They are interconnected via sensor cable(s).



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1 Transmitter with integrated ISEM
2 Sensor cable

For detailed information on the product description, see the Operating Instructions for the device

4 Installation

For detailed information about mounting the sensor, see the Sensor Brief Operating Instructions → 3

4.1 Mounting the transmitter housing

CAUTION

Ambient temperature too high!

Danger of electronics overheating and housing deformation.

- ▶ Do not exceed the permitted maximum ambient temperature .
- ▶ If operating outdoors: Avoid direct sunlight and exposure to weathering, particularly in warm climatic regions.

CAUTION

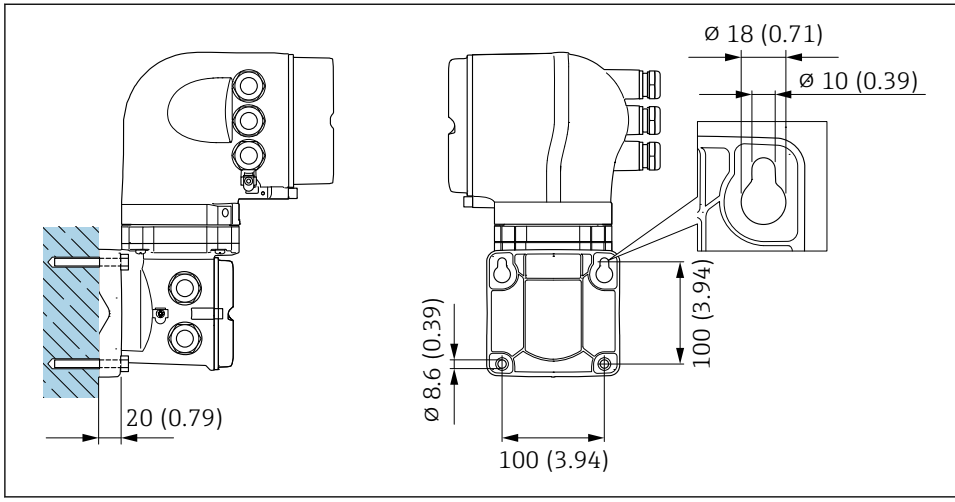
Excessive force can damage the housing!

- ▶ Avoid excessive mechanical stress.

The transmitter can be mounted in the following ways:

- Post mounting
- Wall mounting

4.1.1 Wall mounting



1 Engineering unit mm (in)

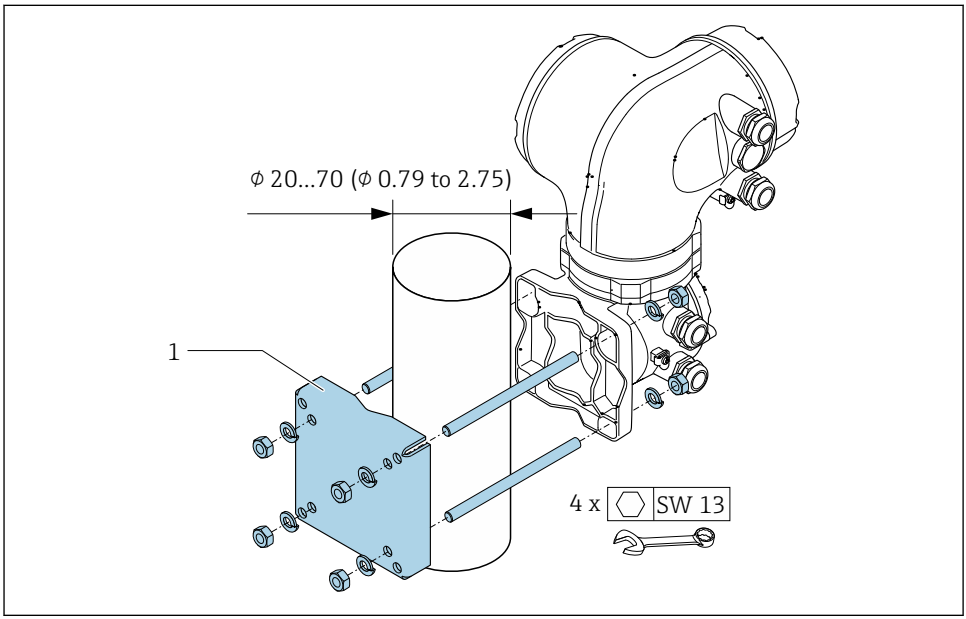
4.1.2 Post mounting

WARNING

Order code for "Transmitter housing", option L "Cast, stainless": cast transmitters are very heavy.

They are unstable if they are not mounted on a secure, fixed post.

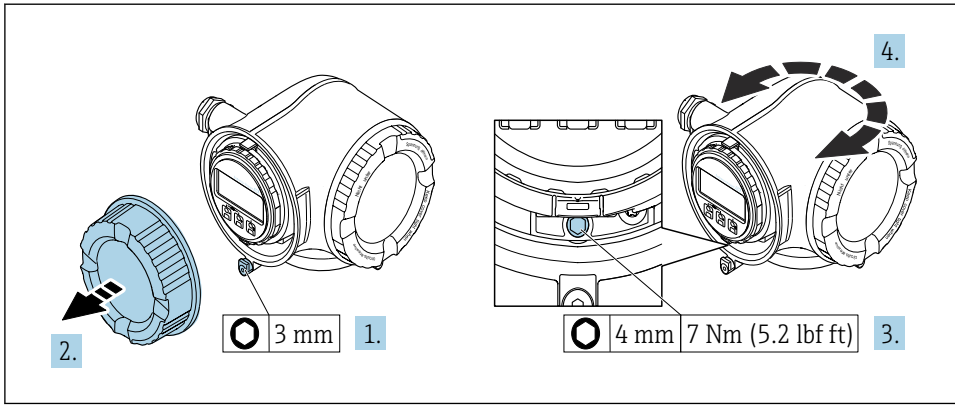
► Only mount the transmitter on a secure, fixed post on a stable surface.



2 Engineering unit mm (in)

4.2 Turning the transmitter housing

To provide easier access to the connection compartment or display module, the transmitter housing can be turned.



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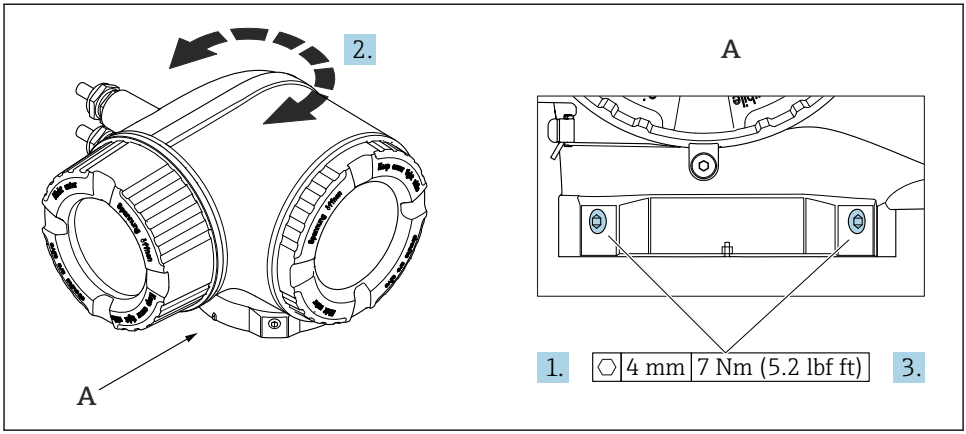
3 Non Ex housing

1. Depending on the device version: Loosen the securing clamp of the connection compartment cover.
2. Unscrew the connection compartment cover.
3. Release the fixing screw.
4. Turn the housing to the desired position.
5. Tighten the fixing screw.
6. Screw on the connection compartment cover.
7. Depending on the device version: Attach the securing clamp of the connection compartment cover.

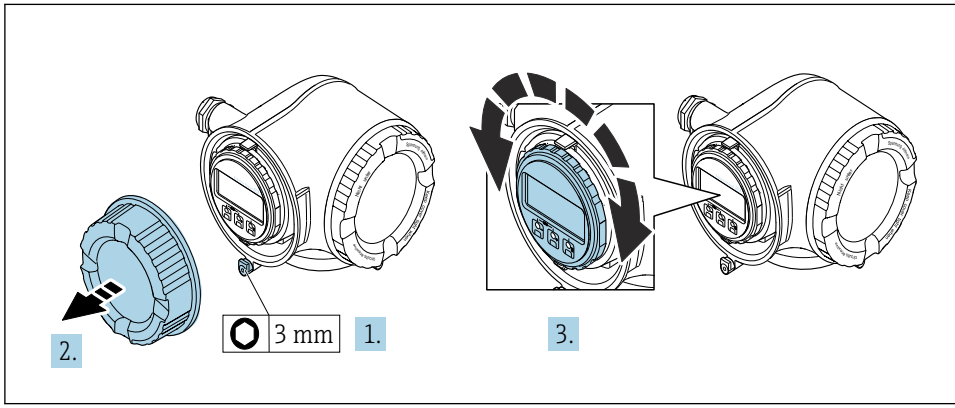


4 *Ex housing*

1. Loosen the securing screws.
2. Turn the housing to the desired position.
3. Tighten the securing screws.

4.3 Turning the display module

The display module can be turned to optimize display readability and operability.



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1. Depending on the device version: Loosen the securing clamp of the connection compartment cover.
2. Unscrew the connection compartment cover.
3. Turn the display module to the desired position: max. 8 × 45° in each direction.
4. Screw on the connection compartment cover.
5. Depending on the device version: Attach the securing clamp of the connection compartment cover.

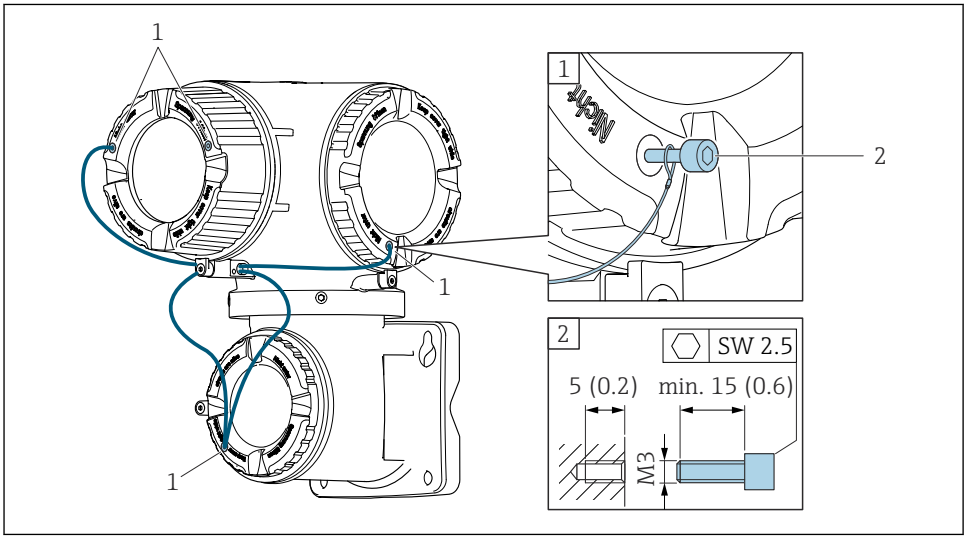
4.4 Cover locking

NOTICE

Order code for "Transmitter housing", option L "Cast, stainless": The covers of the transmitter housing are provided with a borehole to lock the cover.

The cover can be locked using screws and a chain or cable provided by the customer.

- ▶ It is recommended to use stainless steel cables or chains.
- ▶ If a protective coating is applied, it is recommended to use a heat shrink tube to protect the housing paint.



1 Cover borehole for the securing screw
2 Securing screw to lock the cover

4.5 Transmitter post-installation check

The post-installation check must always be performed after the following tasks:
- Mounting the transmitter housing:
  - Post mounting
  - Wall mounting
- Turning the transmitter housing
- Turning the display module

Is the device undamaged (visual inspection)?	❑
Turning the transmitter housing: ▪ Is the securing screw firmly tightened? ▪ Is the connection compartment cover screwed on tightly? ▪ Is the securing clamp firmly tightened?	❑
Turning the display module: ▪ Is the connection compartment cover screwed on tightly? ▪ Is the securing clamp firmly tightened?	❑
Post and wall mounting: Are the securing screws firmly tightened?	❑

5 Electrical connection

NOTICE

The measuring device does not have an internal circuit breaker.

- ▶ For this reason, assign the measuring device a switch or power-circuit breaker so that the power supply line can be easily disconnected from the mains.
- ▶ Although the measuring device is equipped with a fuse, additional overcurrent protection (maximum 10 A) should be integrated into the system installation.

5.1 Electrical safety

In accordance with applicable federal/national regulations.

5.2 Connection conditions

5.2.1 Required tools

- For cable entries: Use corresponding tools
- For securing clamp: Allen key 3 mm
- Wire stripper
- When using stranded cables: crimper for wire end ferrule
- For removing cables from terminal: Flat blade screwdriver ≤ 3 mm (0.12 in)

5.2.2 Requirements for connecting cable

The connecting cables provided by the customer must fulfill the following requirements.

Protective grounding cable for the outer ground terminal

Conductor cross-section ≤2.08 mm^2 (14 AWG)

Grounding impedance must be less than 2 Ω.

Permitted temperature range

- The installation guidelines that apply in the country of installation must be observed.
- The cables must be suitable for the minimum and maximum temperatures to be expected.

Power supply cable (incl. conductor for the inner ground terminal)

Standard installation cable is sufficient.

Cable diameter

- Cable glands supplied:
  M20 × 1.5 with cable Ø 6 to 12 mm (0.24 to 0.47 in)
- Spring-loaded terminals: Suitable for strands and strands with ferrules.
  Conductor cross-section 0.2 to 2.5 mm^2 (24 to 12 AWG).

Signal cable

Modbus RS485

The EIA/TIA-485 standard specifies two types of cable (A and B) for the bus line which can be used for every transmission rate. Cable type A is recommended.

For detailed information about the specification of the connecting cable, see the Operating Instructions for the device.

Current output 0/4 to 20 mA

Standard installation cable is sufficient.

Pulse/frequency/switch output

Standard installation cable is sufficient.

Double pulse output

Standard installation cable is sufficient.

Relay output

Standard installation cable is sufficient.

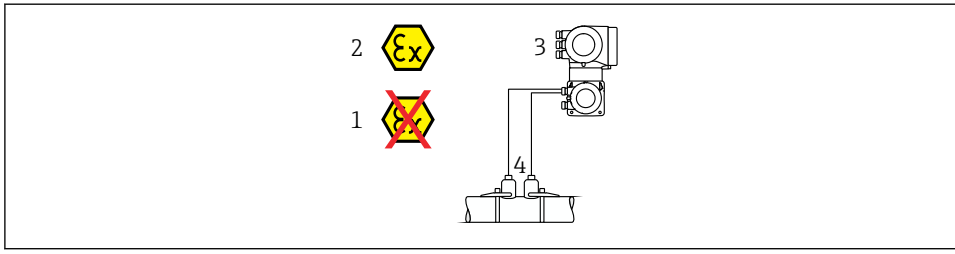
Current input 0/4 to 20 mA

Standard installation cable is sufficient.

Status input

Standard installation cable is sufficient.

5.2.3 Connecting cable between the transmitter and sensor



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1 *Non-hazardous area*
2 *Hazardous area: Zone 1; Class I, Division 1 or Zone 2; Class I, Division 2*
3 *Proline 500 transmitter*
4 *Prosonic Flow sensor set with sensor cable to transmitter 500 → 20*
Transmitter and sensor installed in the hazardous area: Zone 1; Class I, Division 1 oder Zone 2; Class I, Division 2

Sensor cable for sensor - Proline 500 transmitter

Standard cable	▪ TPE: -40 to +80 °C (-40 to +176 °F) ▪ TPE armored: -40 to +80 °C (-40 to +176 °F) ▪ TPE halogen-free: -40 to +80 °C (-40 to +176 °F) ▪ PTFE: -50 to +170 °C (-58 to +338 °F) ▪ PTFE armored: -50 to +170 °C (-58 to +338 °F)
Cable length (max.)	30 m (100 ft)
Cable lengths (available for order)	5 m (15 ft), 10 m (32 ft), 15 m (50 ft), 30 m (100 ft)
Operating temperature	Depends on the device version and how the cable is installed: Standard version: ▪ Cable - fixed installation [1]: minimum −40 °C (−40 °F) or −50 °C (−58 °F) ▪ Cable - movable: minimum −25 °C (−13 °F)

1) Compare details under the "Standard cable" row

5.2.4 Terminal assignment

Transmitter: supply voltage, input/outputs

The terminal assignment of the inputs and outputs depends on the individual order version of the device. The device-specific terminal assignment is documented on an adhesive label in the terminal cover.

Supply voltage		Input/output 1		Input/output 2		Input/output 3	
1 (+)	2 (–)	26 (B)	27 (A)	24 (+)	25 (–)	22 (+)	23 (–)
		Device-specific terminal assignment: adhesive label in terminal cover.					

Transmitter and sensor connection housing: connecting cable

The sensor and transmitter, which are mounted in separate locations, are interconnected by a connecting cable. The cable is connected via the sensor connection housing and the transmitter housing.

Terminal assignment and connection of the connecting cable .

5.2.5 Preparing the measuring device

Carry out the steps in the following order:

1. Mount the sensor and transmitter.
2. Connection housing, sensor: Connect connecting cable.
3. Transmitter: Connect connecting cable.
4. Transmitter: Connect signal cable and cable for supply voltage.

NOTICE

Insufficient sealing of the housing!

Operational reliability of the measuring device could be compromised.

► Use suitable cable glands corresponding to the degree of protection.

1. Remove dummy plug if present.
2. If the measuring device is supplied without cable glands:
   Provide suitable cable gland for corresponding connecting cable.
3. If the measuring device is supplied with cable glands:
   Observe requirements for connecting cables → 18.

5.3 Connecting the measuring device

NOTICE

Limitation of electrical safety due to incorrect connection!

- Have electrical connection work carried out by appropriately trained specialists only.
- Observe applicable federal/national installation codes and regulations.
- Comply with local workplace safety regulations.
- Always connect the protective ground cable ⏚ before connecting additional cables.
- For use in potentially explosive atmospheres, observe the information in the device-specific Ex documentation.

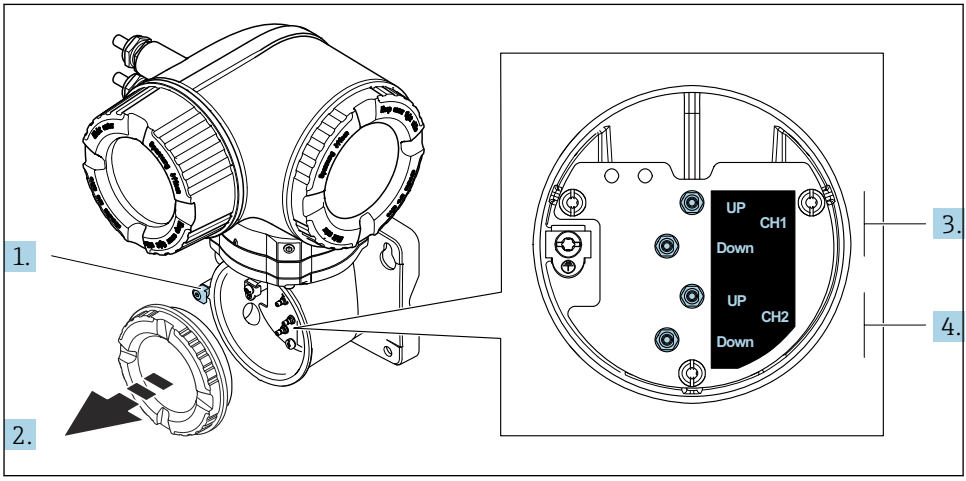
5.3.1 Attaching the connecting cable

WARNING

Risk of damaging the electronic components!

- Connect the sensor and transmitter to the same potential equalization.
- Only connect the sensor to a transmitter with the same serial number.
- Ground the connection housing of the sensor via the external screw terminal.

Terminal assignment of sensor cable



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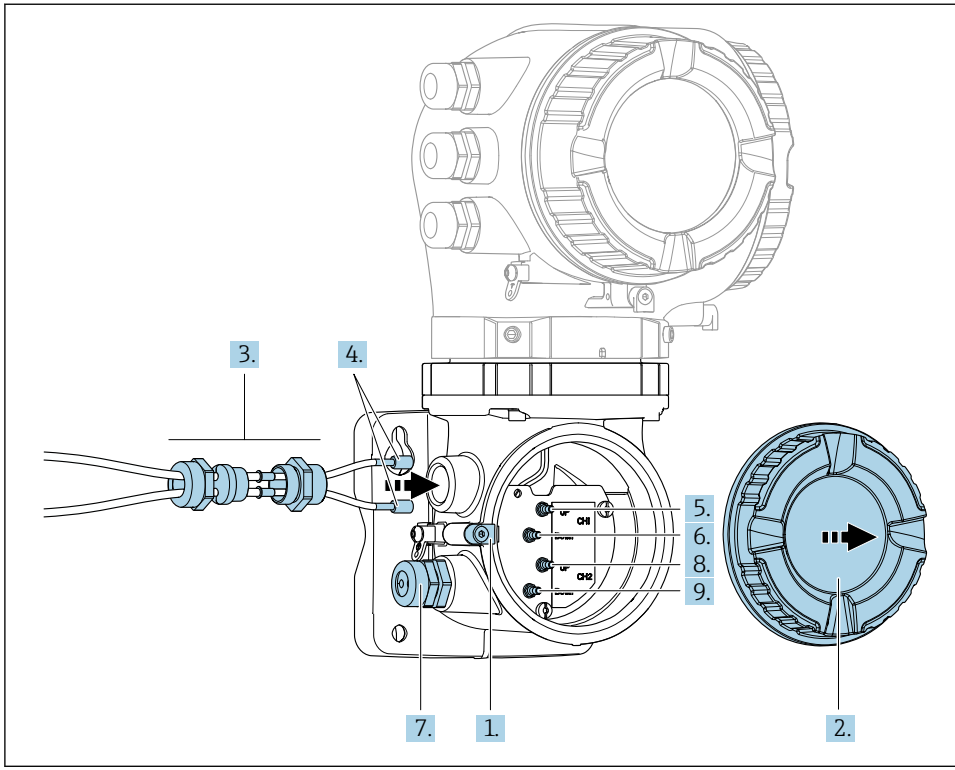
1 *Securing clamp*
2 *Connection compartment cover: sensor cable connection*
3 *Channel 1 upstream / downstream*
4 *Channel 2 upstream / downstream*

Connecting the sensor cable to the transmitter



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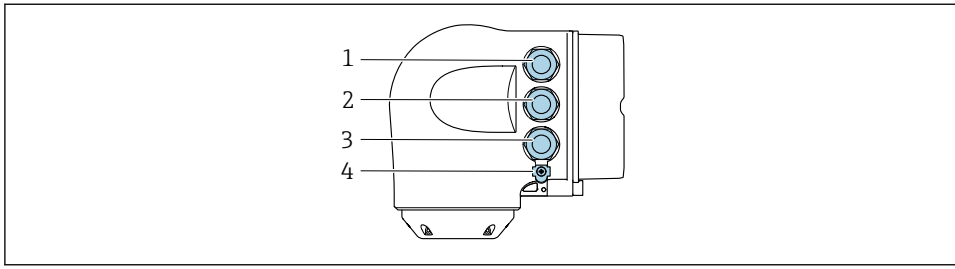
1. Loosen the securing clamp of the connection compartment cover.
2. Unscrew the connection compartment cover.
3. Route the two sensor cables of channel 1 through the slackened top union nut of the cable entry. To ensure tight sealing, mount a sealing insert on the sensor cables.
4. Mount the screw part of the cable entry in the top housing opening and then guide both sensor cables through the entry. Then fit the coupling nut with the sealing insert on the screw part and tighten. Ensure that the sensor cables are positioned in the cut-outs provided in the screw part.
5. Connect sensor cable to channel 1 upstream.
6. Connect sensor cable to channel 1 downstream.
7. For a two-path measurement: proceed as per steps 3+4
8. Connect sensor cable to channel 2 upstream.
9. Connect sensor cable to channel 2 downstream.
10. Tighten the cable gland(s).
    ↳ This concludes the process for connecting the sensor cable(s).

11. Screw on the connection compartment cover.
12. Tighten the securing clamp of the connection compartment cover.
13. After connecting the sensor cable(s):
    Connect the signal cable and the supply voltage cable → 25.

5.3.2 Connecting the signal cable and the supply voltage cable



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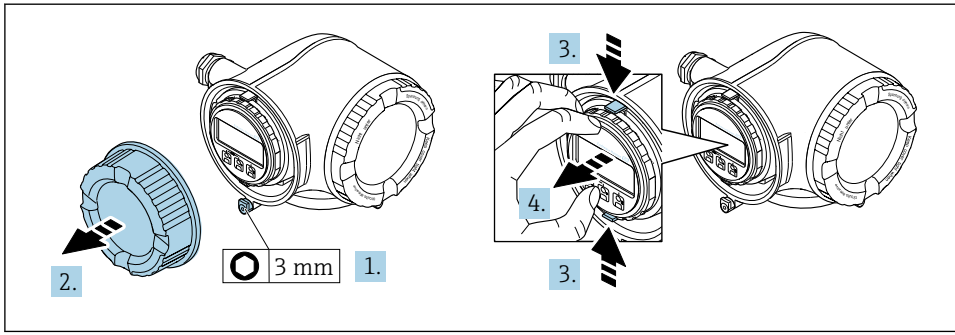
1 *Terminal connection for supply voltage*
2 *Terminal connection for signal transmission, input/output*
3 *Terminal connection for signal transmission, input/output or terminal connection for network connection via service interface (CDI-RJ45; non-Ex)*
4 *Protective earth (PE)*



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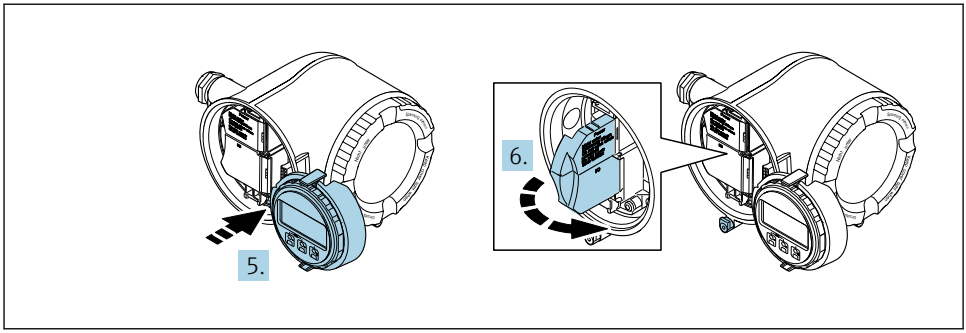
1. Loosen the securing clamp of the connection compartment cover.
2. Unscrew the connection compartment cover.
3. Squeeze the tabs of the display module holder together.
4. Remove the display module holder.



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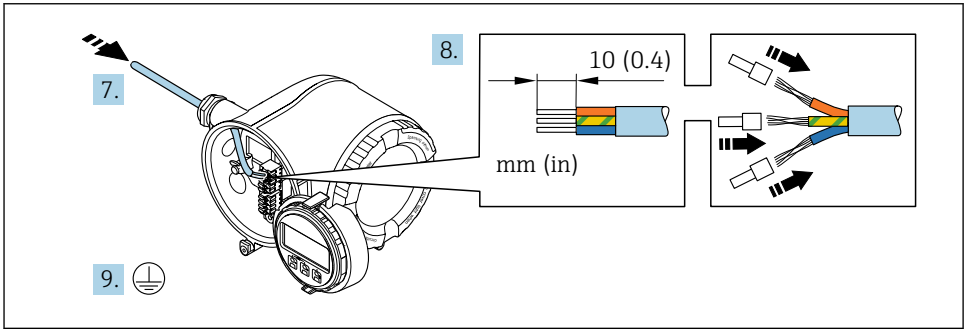
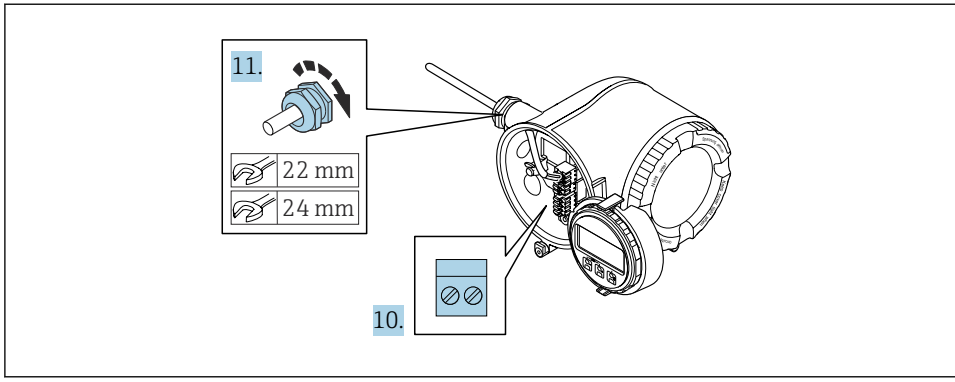
5. Attach the holder to the edge of the electronics compartment.
6. Open the terminal cover.



A0029815

7. Push the cable through the cable entry. To ensure tight sealing, do not remove the sealing ring from the cable entry.
8. Strip the cable and cable ends. In the case of stranded cables, also fit ferrules.
9. Connect the protective ground.



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10. Connect the cable in accordance with the terminal assignment .
    ↳ **Signal cable terminal assignment:** The device-specific terminal assignment is documented on an adhesive label in the terminal cover.
    Supply voltage terminal assignment: Adhesive label in the terminal cover or → 📄 21.
11. Firmly tighten the cable glands.
    ↳ This concludes the cable connection process.
12. Close the terminal cover.
13. Fit the display module holder in the electronics compartment.
14. Screw on the connection compartment cover.
15. Secure the securing clamp of the connection compartment cover.

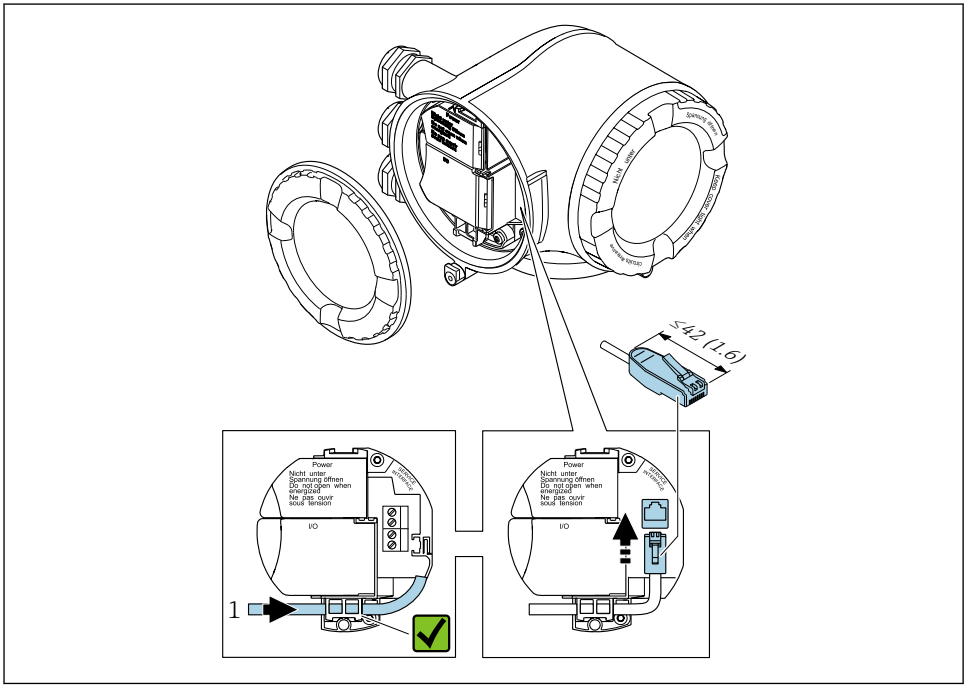
5.3.3 Integrating the transmitter into a network

This section only presents the basic options for integrating the device into a network.

Integrating via the service interface

The device is integrated via the connection to the service interface (CDI-RJ45).

Note the following when connecting:
- Recommended cable: CAT 5e, CAT 6 or CAT 7, with shielded connector (e.g. brand: YAMAICHI ; Part No Y-ConProfixPlug63 / Prod. ID: 82-006660)
- Maximum cable thickness: 6 mm
- Length of connector including bend protection: 42 mm
- Bending radius: 5 x cable thickness



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1 Service interface (CDI-RJ45)

An adapter for RJ45 (non-Ex) and the M12 connector is optionally available:
Order code for "Accessories", option **NB**: "Adapter RJ45 M12 (service interface)"

The adapter connects the service interface (CDI-RJ45; non-Ex) to an M12 connector mounted in the cable entry. Therefore the connection to the service interface can be established via an M12 connector without opening the device.

5.4 Ensuring potential equalization

5.4.1 Requirements

No special measures for potential equalization are required.

For devices intended for use in hazardous locations, please observe the guidelines in the Ex documentation (XA).

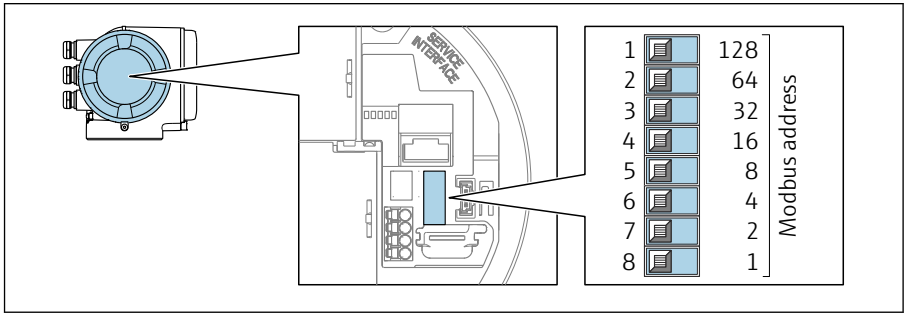
5.5 Hardware settings

5.5.1 Setting the device address

The device address must always be configured for a Modbus slave. The valid device addresses are in the range from 1 to 247. Each address may only be assigned once in a Modbus RS485 network. If an address is not configured correctly, the measuring device is not recognized by the Modbus master. All measuring devices are delivered from the factory with the device address 247 and with the "software addressing" address mode.

Hardware addressing

1.



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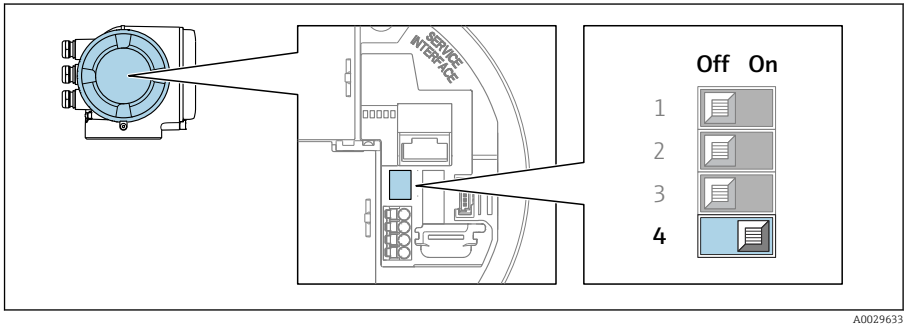
Set the desired device address using the DIP switches in the connection compartment.

2.



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To switch addressing from software addressing to hardware addressing: set the DIP switch to **On**.

↳ The change of device address takes effect after 10 seconds.

Software addressing

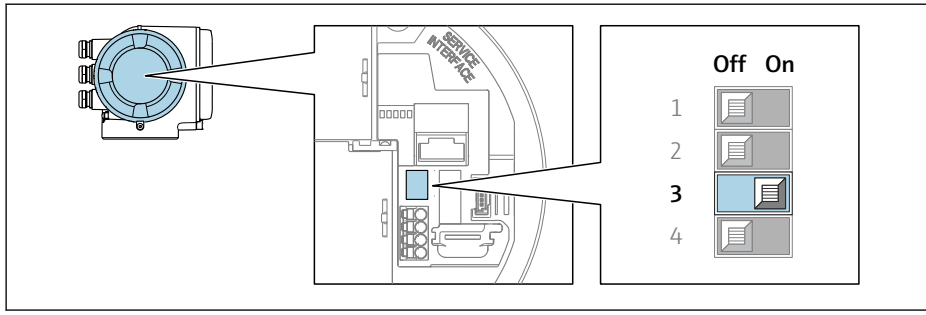
▶ To switch addressing from hardware addressing to software addressing: set the DIP switch to **Off**.

↳ The device address configured in the **Device address** parameter takes effect after 10 seconds.

5.5.2 Enabling the terminating resistor

To avoid incorrect communication transmission caused by impedance mismatch, terminate the Modbus RS485 cable correctly at the start and end of the bus segment.

▶



A0029632

Switch DIP switch No. 3 to **On**.

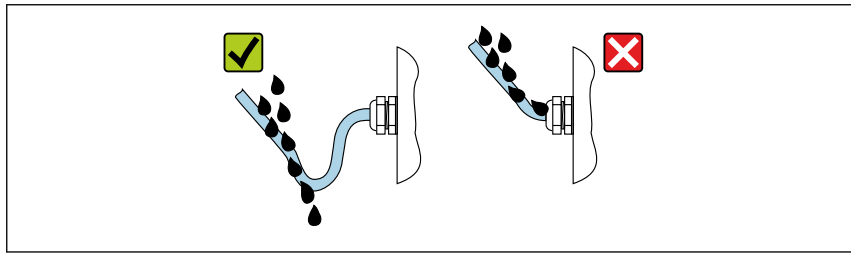
5.6 Ensuring the degree of protection

The measuring device fulfills all the requirements for degree of protection IP66/67, Type 4X enclosure.

To guarantee degree of protection IP66/67, Type 4X enclosure, carry out the following steps after the electrical connection:

1. Check that the housing seals are clean and fitted correctly.
2. Dry, clean or replace the seals if necessary.
3. Tighten all housing screws and screw covers.
4. Firmly tighten the cable glands.
5. To ensure that moisture does not enter the cable entry:
   Route the cable so that it loops down before the cable entry ("water trap").

   ↳



A0029278

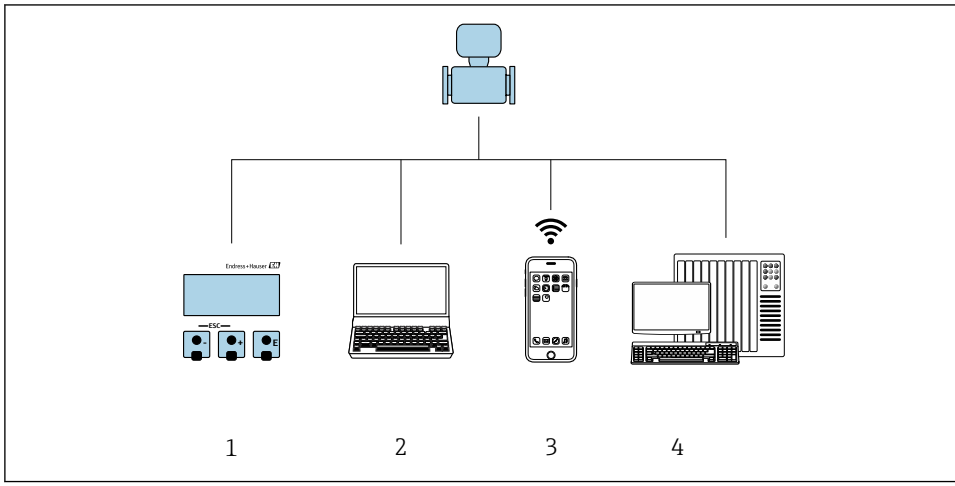
6. Insert dummy plugs (corresponding to the housing degree of protection) into unused cable entries.

5.7 Post-connection check

Are cables or the device undamaged (visual inspection)?	❑
Do the cables used meet the requirements ?	❑
Do the cables have adequate strain relief?	❑
Are all the cable glands installed, firmly tightened and leak-tight? Cable run with "water trap" → 🖹 31?	❑

6 Operation options

6.1 Overview of operation options

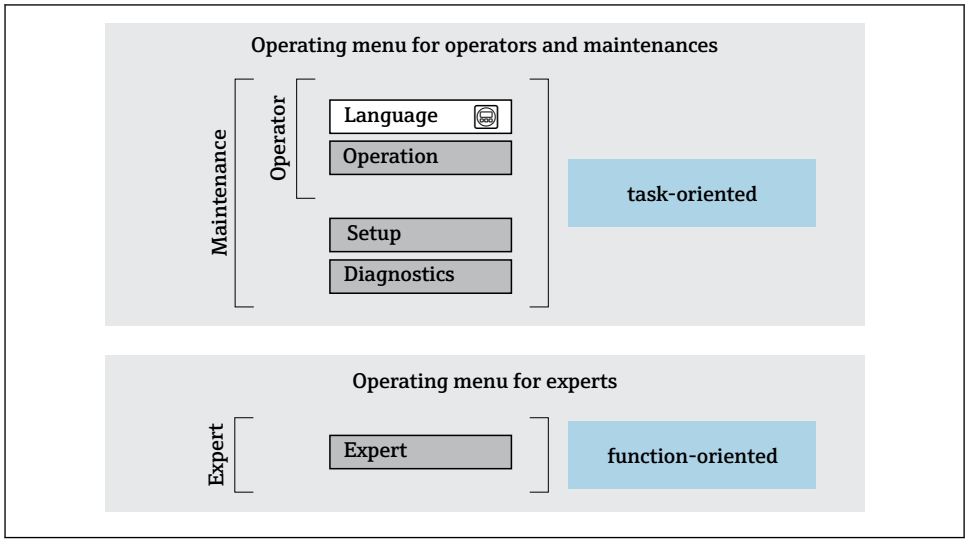


A0030213

1 *Local operation via display module*
2 *Computer with Web browser (e.g. Internet Explorer) or with operating tool (e.g. FieldCare, DeviceCare, AMS Device Manager, SIMATIC PDM)*
3 *Mobile handheld terminal with SmartBlue App*
4 *Control system (e.g. PLC)*

6.2 Structure and function of the operating menu

6.2.1 Structure of the operating menu



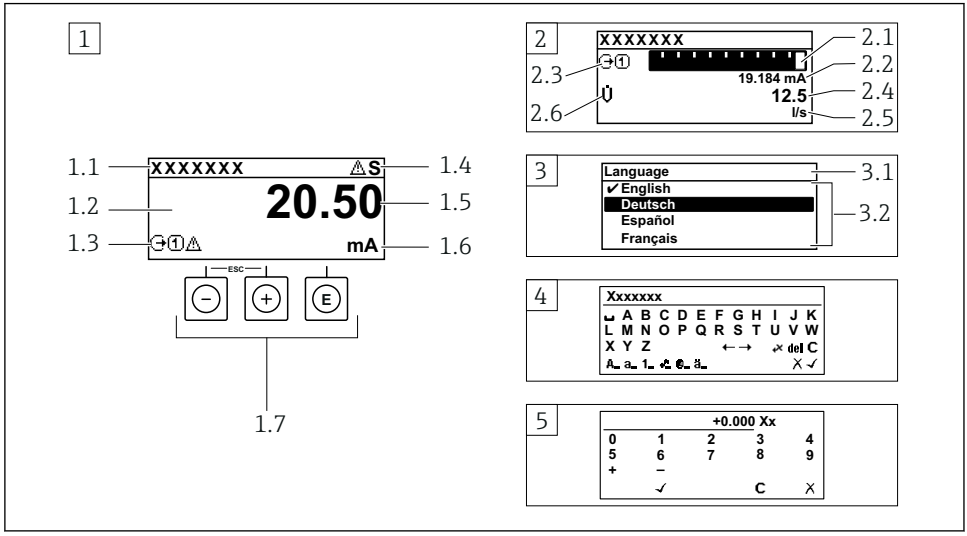
5 *Schematic structure of the operating menu*

6.2.2 Operating philosophy

The individual parts of the operating menu are assigned to certain user roles (operator, maintenance etc.). Each user role contains typical tasks within the device lifecycle.

For detailed information on the operating philosophy, see the Operating Instructions for the device.

6.3 Access to the operating menu via the local display



A0014013

1 Operational display with measured value shown as "1 value, max." (example)
1.1 Device tag
1.2 Display area for measured values (4-line)
1.3 Explanatory symbols for measured value: Measured value type, measuring channel number, symbol for diagnostic behavior
1.4 Status area
1.5 Measured value
1.6 Unit for the measured value
1.7 Operating elements
2 Operational display with measured value shown as "1 bar graph + 1 value" (example)
2.1 Bar graph display for measured value 1
2.2 Measured value 1 with unit
2.3 Explanatory symbols for measured value 1: measured value type, measuring channel number
2.4 Measured value 2
2.5 Unit for measured value 2
2.6 Explanatory symbols for measured value 2: measured value type, measuring channel number
3 Navigation view: picklist of a parameter
3.1 Navigation path and status area
3.2 Display area for navigation: ✔ designates the current parameter value
4 Editing view: text editor with input mask
5 Editing view: numeric editor with input mask

6.3.1 Operational display

Explanatory symbols for the measured value	Status area

▪ Depends on the device version, e.g.:
  ▪ U̇: Volume flow
  ▪ ṁ: Mass flow
  ▪ 🌡: Temperature
▪ Σ: Totalizer
▪ ⊖→: Output
▪ →⊖: Input
▪ ①…④: Measurement channel number [1]
▪ Diagnostic behavior [2]
  ▪ ⊗: Alarm
  ▪ ⚠: Warning
	The following symbols appear in the status area of the operational display at the top right:
	▪ Status signals
	  ▪ **F**: Failure
	  ▪ **C**: Function check
	  ▪ **S**: Out of specification
	  ▪ **M**: Maintenance required
	▪ Diagnostic behavior
	  ▪ ⊗: Alarm
	  ▪ ⚠: Warning
	▪ 🔒: Locking (locked via hardware))
	▪ ⇆: Communication via remote operation is active.

1) If there is more than one channel for the same measured variable type (totalizer, output etc.).
2) For a diagnostic event that concerns the displayed measured variable.

6.3.2 Navigation view

Status area	Display area

The following appears in the status area of the navigation view in the top right corner:
▪ In the submenu
  ▪ The direct access code for the parameter you are navigating to (e.g. 0022-1)
  ▪ If a diagnostic event is present, the diagnostic behavior and status signal
▪ In the wizard
If a diagnostic event is present, the diagnostic behavior and status signal
	▪ Icons for menus
	  ▪ Ⓘ: Operation
	  ▪ 🔧: Setup
	  ▪ 🔑: Diagnostics
	  ▪ 🔨: Expert
	▪ ▸: Submenus
	▪ 🪄: Wizards
	▪ ✎: Parameters within a wizard
	▪ 🔒: Parameter locked

6.3.3 Editing view

Text editor		Correction symbols under ✕C↔	
✓	Confirms selection.	C	Clears all entered characters.
X	Exits the input without applying the changes.	→	Moves the input position one position to the right.
C	Clears all entered characters.	←	Moves the input position one position to the left.
✕C↔	Switches to the selection of the correction tools.	⌫	Deletes one character immediately to the left of the input position.
Aa1@	Toggle ▪ Between upper-case and lower-case letters ▪ For entering numbers ▪ For entering special characters		

Numeric editor			
✓	Confirms selection.	←	Moves the input position one position to the left.
X	Exits the input without applying the changes.	·	Inserts decimal separator at the input position.
−	Inserts minus sign at the input position.	C	Clears all entered characters.

6.3.4 Operating elements

Keys and meaning

Enter key
 	
With an operational display
Pressing the key briefly opens the operating menu.
 	
In a menu, submenu
▪ Pressing the key briefly:
  ▪ Opens the selected menu, submenu or parameter.
  ▪ Starts the wizard.
  ▪ If help text is open:
  Closes the help text of the parameter.
▪ Pressing the key for 2 s in the case of a parameter:
  If present, opens the help text for the function of the parameter.
 	
With a wizard: Opens the editing view of the parameter.
 	
With a text and numeric editor
▪ Pressing the key briefly confirms your selection.
▪ Pressing the key for 2 s confirms the entry.

Minus key ▪ *In a menu, submenu:* Moves the selection bar upwards in a picklist. ▪ *With a wizard:* Confirms the parameter value and goes to the previous parameter. ▪ *With a text and numeric editor:* Moves the cursor position to the left.
Plus key ▪ *In a menu, submenu:* Moves the selection bar downwards in a picklist. ▪ *With a wizard:* Confirms the parameter value and goes to the next parameter. ▪ *With a text and numeric editor:* Moves the cursor position to the right.

Escape key combination (press keys simultaneously)
 	
In a menu, submenu
▪ Pressing the key briefly:
  ▪ Exits the current menu level and takes you to the next higher level.
  ▪ If help text is open, closes the help text of the parameter.
▪ Pressing the key for 2 s in the case of a parameter: Returns you to the operational display ("home position").
 	
With a wizard: Exits the wizard and takes you to the next higher level.
 	
With a text and numeric editor: Closes the editor view without applying any changes.

Keys and meaning
⊖ + Ⓔ **Minus/Enter key combination (press the keys simultaneously)** *With an operational display:* ▪ If keypad lock is active: Pressing the key for 3 s deactivates the keypad lock. ▪ If keypad lock is not active: Pressing the key for 3 s opens the context menu including the option for activating the keypad lock.

6.3.5 Further information

For further information on the following topics, see the Operating Instructions for the device
- Calling up help text
- User roles and related access authorization
- Disabling write protection via access code
- Enabling and disabling the keypad lock

6.4 Access to the operating menu via the operating tool

The operating menu can also be accessed via the FieldCare and DeviceCare operating tools. See the Operating Instructions for the device.

6.5 Access to the operating menu via the Web server

The operating menu can also be accessed via the Web server. See the Operating Instructions for the device.

7 System integration

For detailed information on system integration, see the Operating Instructions for the device.
- Overview of device description files:
  - Current version data for the device
  - Operating tools
- Compatibility with previous model
- Modbus RS485 information
  - Function codes
  - Response time
  - Modbus data map

8 Commissioning

8.1 Function check

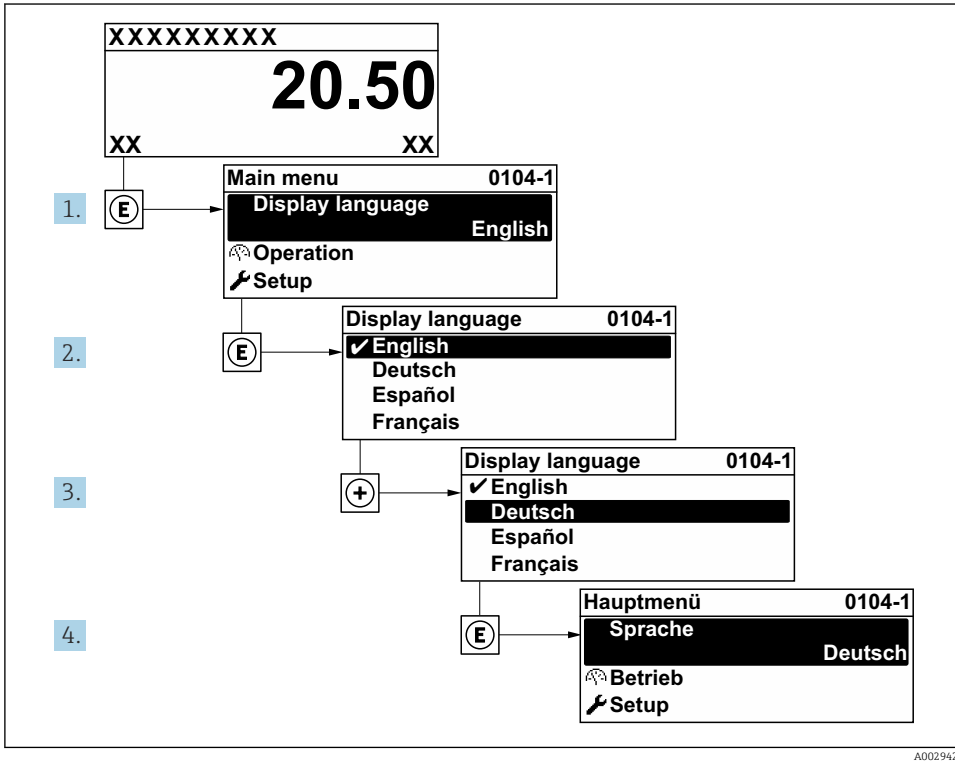
Before commissioning the measuring device:

▶ Make sure that the post-installation and post-connection checks have been performed.

- "Post-installation check" checklist → 17
- "Post-connection check" checklist → 32

8.2 Setting the operating language

Factory setting: English or ordered local language



6 *Taking the example of the local display*

8.3 Configuring the measuring device

The **Setup** menu with its submenus and various guided wizards is used for fast commissioning of the device. They contain all the parameters required for configuration, such as for measurement or communication.

Depending on the device version, not all submenus and parameters are available in every device. The selection can vary depending on the order code.

Example: Available submenus, wizards	Meaning
System units	Configure the units for all measured values
Communication	Configure the communication interface
Measuring point	Configuration of the measuring point
I/O configuration	User configurable I/O module
Current input	Configuration of the input/output type
Status input	
Current output 1 to n	
Pulse/frequency/switch output 1 to n	
Relay output	
Double pulse output	
Display	Configure the display format on the local display
Low flow cut off	Set the low flow cut off
Advanced setup	Additional parameters for configuration: ▪ Sensor adjustment ▪ Totalizer ▪ Display ▪ WLAN settings ▪ Data backup ▪ Administration

8.4 Protecting settings from unauthorized access

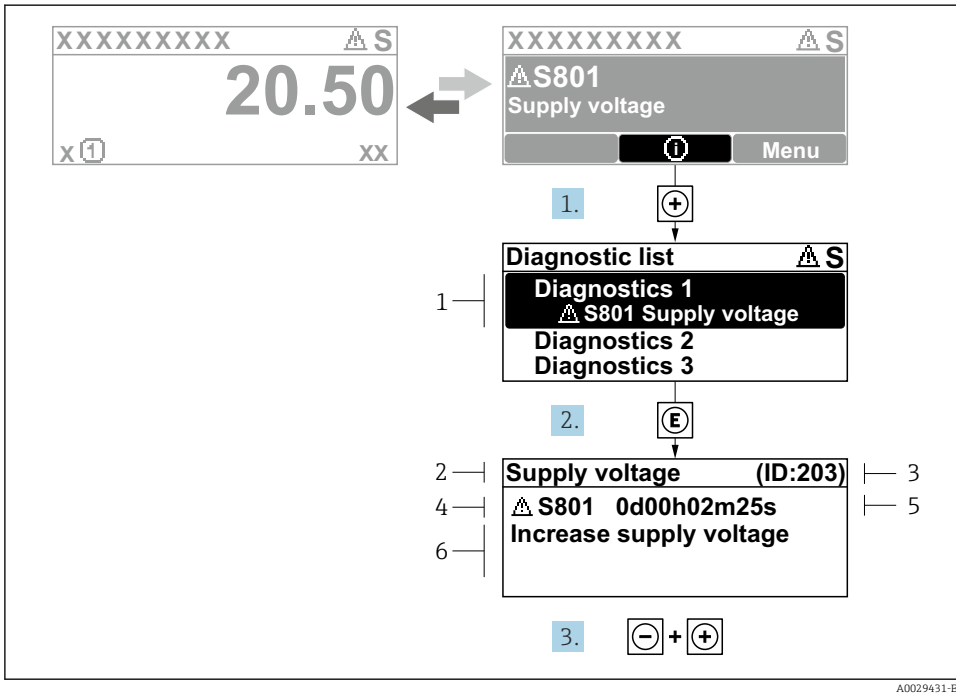
The following write protection options exist in order to protect the configuration of the measuring device from unintentional modification:
- Protect access to parameters via access code
- Protect access to local operation via key locking
- Protect access to measuring device via write protection switch

For detailed information on protecting the settings against unauthorized access, see the Operating Instructions for the device.

For detailed information on protecting the settings against unauthorized access in custody transfer applications, see the Special Documentation for the device.

9 Diagnostic information

Faults detected by the self-monitoring system of the measuring device are displayed as a diagnostic message in alternation with the operational display. The message about remedial measures can be called up from the diagnostic message, and contains important information on the fault.



7 *Message about remedial measures*

1 *Diagnostic information*
2 *Short text*
3 *Service ID*
4 *Diagnostic behavior with diagnostic code*
5 *Operation time of occurrence*
6 *Remedial measures*

1. The user is in the diagnostic message.
   Press ⊞ (ⓘ symbol).
   ↳ The **Diagnostic list** submenu opens.
2. Select the desired diagnostic event with ⊞ or ⊟ and press Ⓔ .
   ↳ The message about the remedial measures opens.
3. Press ⊟ + ⊞ simultaneously.
   ↳ The message about the remedial measures closes.

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