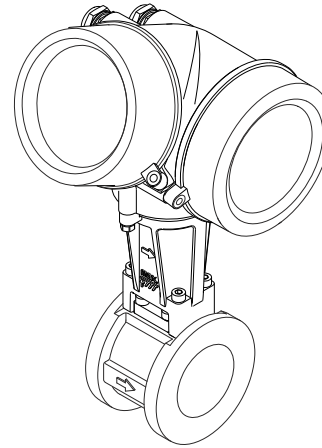
Brief Operating Instructions
Proline Prowirl D 200

Vortex flowmeter



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:
- On the CD-ROM supplied (not included in the delivery for all device versions).
- Available for all device versions via:
  - Internet: www.endress.com/deviceviewer
  - Smart phone/tablet: *Endress+Hauser Operations App*

Endress+Hauser
People for Process Automation

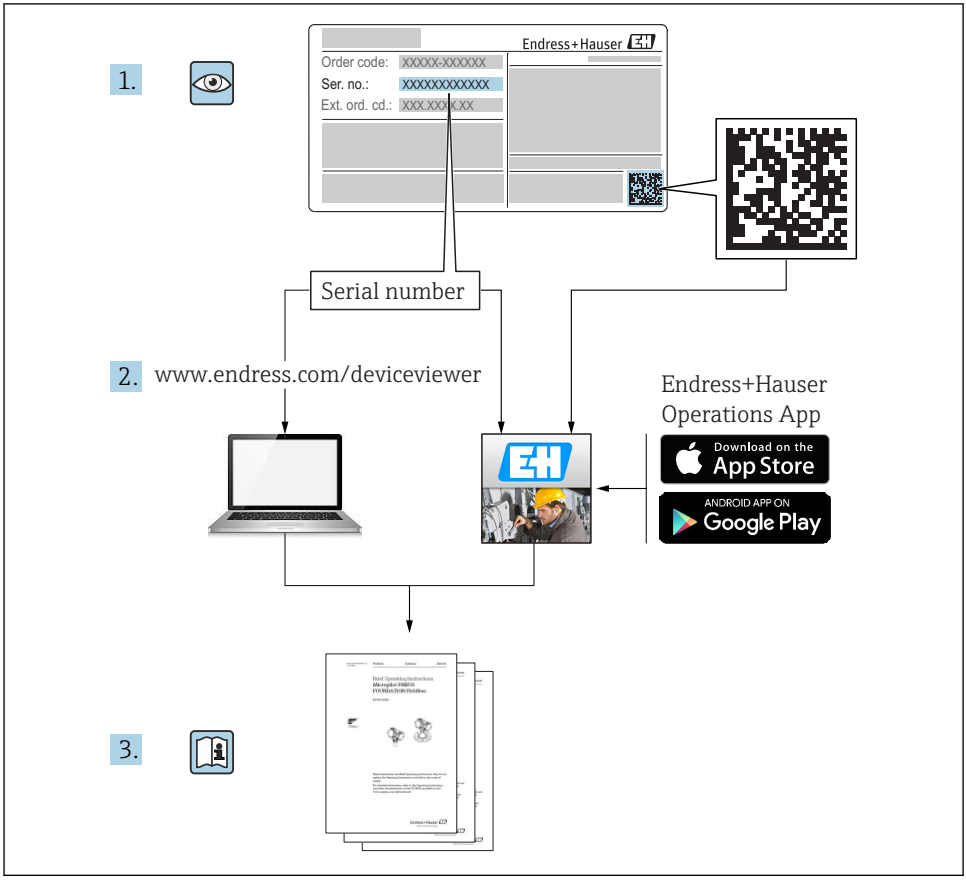

1.
Endress+Hauser
Order code: XXXXX-XXXXXX
Ser. no.: XXXXXXXXXXXX
Ext. ord. cd.: XXX.XXX-XXX
Serial number
2.
www.endress.com/deviceviewer
Endress+Hauser
Operations App
Download on the
App Store
ANDROID APP ON
Google Play
3.

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Table of contents

1 Document information

1.1 Symbols used

1.1.1 Safety symbols

Symbol	Meaning
DANGER	**DANGER!** This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.
WARNING	**WARNING!** This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.
CAUTION	**CAUTION!** This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.
NOTICE	**NOTE!** This symbol contains information on procedures and other facts which do not result in personal injury.

1.1.2 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.
	**Protective ground connection** A terminal which must be connected to ground prior to establishing any other connections.		**Equipotential connection** A connection that has to be connected to the plant grounding system: This may be a potential equalization line or a star grounding system depending on national or company codes of practice.

1.1.3 Tool symbols

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

1.1.4 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

1.1.5 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 Basic 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 beginning work, the specialist staff must have read and understood the instructions in the Operating Instructions and supplementary documentation as well as in the certificates (depending on the application)
- Following instructions and basic conditions

2.2 Designated use

Application and media

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 in applications 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:
- ▶ 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.
- ▶ Check the nameplate to verify if the device ordered can be put to its intended use in the approval-related area (e.g. explosion protection, pressure vessel safety).
- ▶ Use the measuring device only for media against which the process-wetted materials are adequately resistant.
- ▶ If the measuring device is not operated at atmospheric temperature, compliance with the relevant basic conditions specified in the associated device documentation is absolutely essential.
- ▶ 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.

⚠ WARNING

Danger of breakage of the sensor due to corrosive or abrasive fluids or from environmental conditions!
- ▶ Verify the compatibility of the process fluid with the sensor material.
- ▶ Ensure the resistance of all fluid-wetted materials in the process.
- ▶ Keep within the specified pressure and temperature range.

Verification for 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 as minute changes in the temperature, concentration or level of contamination in the process can alter the corrosion resistance properties.

Residual risks

Possible burn hazard due to fluid temperatures!
- ▶ For elevated fluid temperature, ensure protection against contact to prevent burns.

2.3 Workplace safety

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

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:
▶ It is recommended to wear gloves on account of the higher risk of electric shock.

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

2.6 IT security

We only provide a warranty 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 device settings.

IT security measures in line with operators' security standards and designed to provide additional protection for the device and device data transfer must be implemented by the operators themselves.

3 Product description

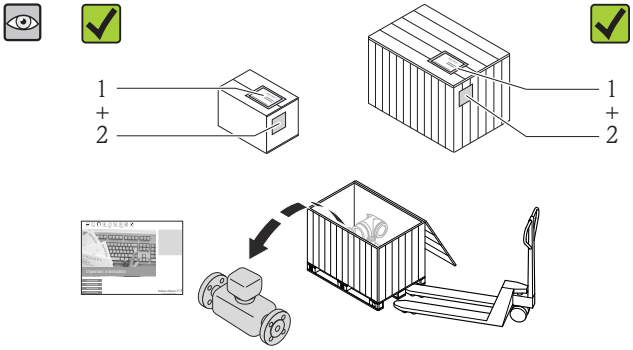
The device consists of a transmitter and a sensor.

Two device versions are available:
- Compact version - transmitter and sensor form a mechanical unit.
- Remote version - transmitter and sensor are mounted in separate locations.


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

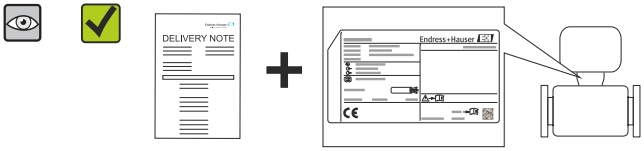
4 Incoming acceptance and product identification

4.1 Incoming acceptance

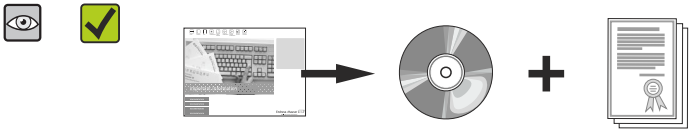


Are the order codes on the delivery note (1) and the product sticker (2) identical?

Are the goods undamaged?



Do the nameplate data match the ordering information on the delivery note?

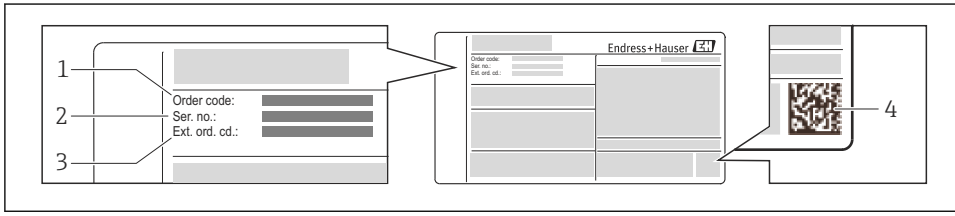


Is the CD-ROM with the Technical Documentation (depends on device version) and documents present?

- If one of the conditions is not satisfied, contact your Endress+Hauser Sales Center.
- Depending on the device version, the CD-ROM might not be part of the delivery! The Technical Documentation is available via the Internet or via the *Endress+Hauser Operations App*.

4.2 Product identification

The following options are available for identification of the measuring device:
- Nameplate specifications
- Order code with breakdown of the device features on the delivery note
- Enter serial numbers from nameplates in *W@M Device Viewer* (www.endress.com/deviceviewer): All information about the measuring device is displayed.
- Enter the serial number from the nameplates into the *Endress+Hauser Operations App* or scan the 2-D matrix code (QR code) on the nameplate with the *Endress+Hauser Operations App*: all the information for the measuring device is displayed.



1 *Example of a nameplate*

1 *Order code*
2 *Serial number (Ser. no.)*
3 *Extended order code (Ext. ord. cd.)*
4 *2-D matrix code (QR code)*

For detailed information on the breakdown of the specifications on the nameplate, see the Operating Instructions for the device .

5 Storage and transport

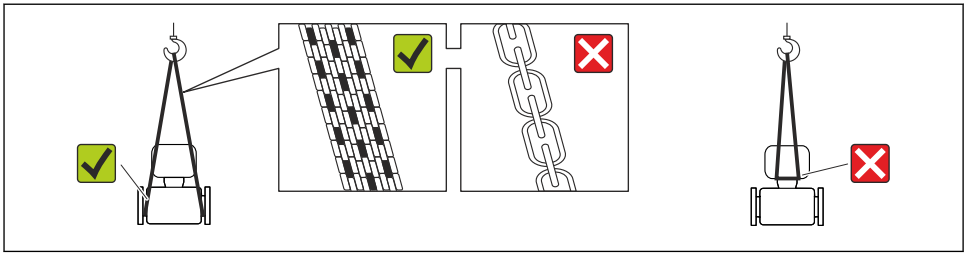
5.1 Storage conditions

Observe the following notes for storage:
- Store in original packaging.
- Do not remove protective covers or protective caps installed on process connections.
- Protect from direct sunlight.
- Store in a dry and dust-free place.
- Do not store outdoors.

Storage temperature:
– All components apart from the display modules: −50 to +80 °C (−58 to +176 °F)
– Display modules: −40 to +80 °C (−40 to +176 °F)

5.2 Transporting the product

Transport the measuring device to the measuring point in the original packaging.



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Do not remove protective covers or caps installed on process connections. They prevent mechanical damage to the sealing surfaces and contamination in the measuring tube.

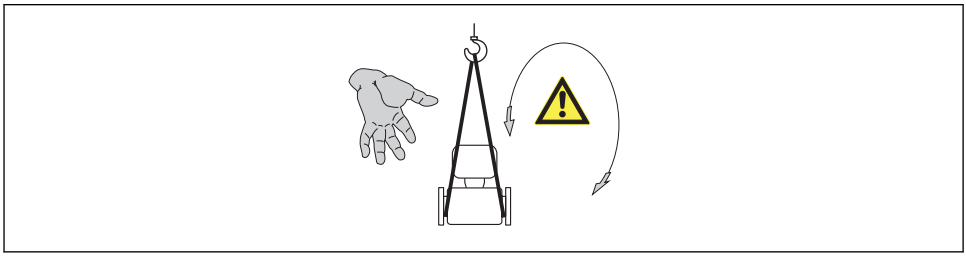
5.2.1 Measuring devices without lifting lugs

⚠ WARNING

Center of gravity of the measuring device is higher than the suspension points of the webbing slings.

Risk of injury if the measuring device slips.

- ▶ Secure the measuring device against slipping or turning.
- ▶ Observe the weight specified on the packaging (stick-on label).



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5.2.2 Measuring devices with lifting lugs

⚠ CAUTION

Special transportation instructions for devices with lifting lugs

- ▶ Only use the lifting lugs fitted on the device or flanges to transport the device.
- ▶ The device must always be secured at two lifting lugs at least.

5.2.3 Transporting with a fork lift

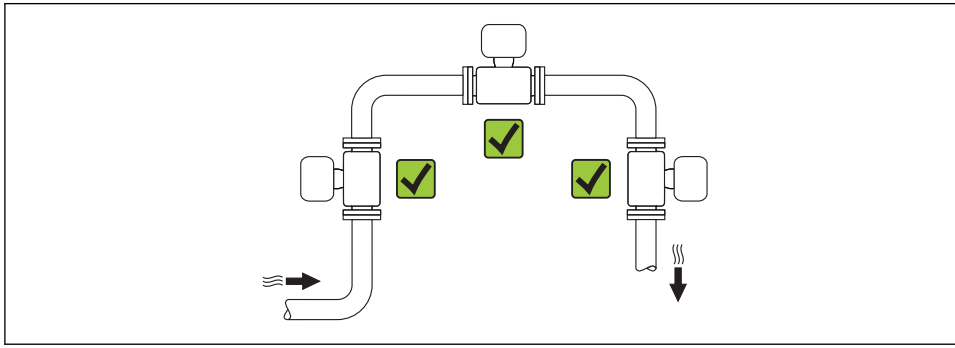
If transporting in wood crates, the floor structure enables the crates to be lifted lengthwise or at both sides using a forklift.

6 Installation

6.1 Installation conditions

6.1.1 Mounting position

Mounting location



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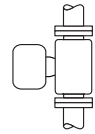
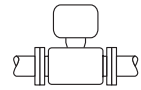
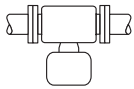
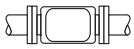
Orientation

The direction of the arrow on the sensor nameplate helps you to install the sensor according to the flow direction.

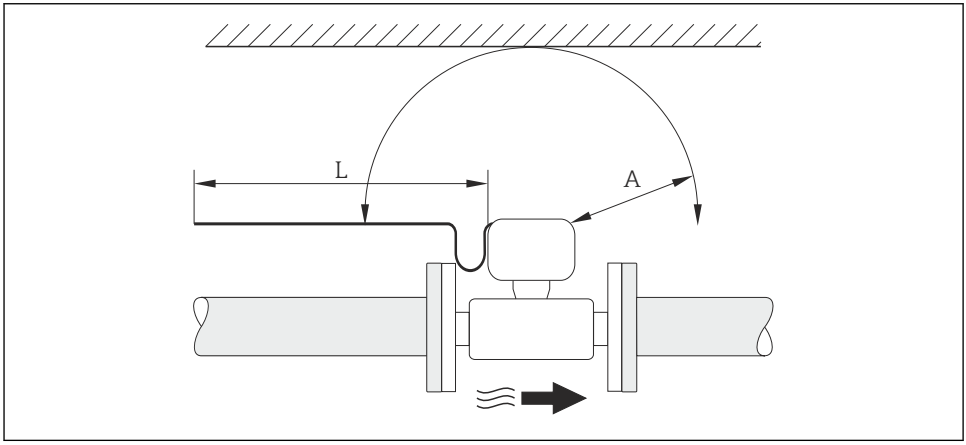
Vortex meters require a fully developed flow profile as a prerequisite for correct volume flow measurement. Therefore, please note the following:

Orientation			Compact version	Remote version
A	Vertical orientation	 A0015545	✓✓ 1)	✓✓
B	Horizontal orientation, transmitter head up	 A0015589	✓✓ 2) 3)	✓✓

Orientation			Compact version	Remote version
C	Horizontal orientation, transmitter head down	 A0015590	✔✔ 4) 5)	✔✔
D	Horizontal orientation, transmitter head at side	 A0015592	✔✔ 4)	✔✔

1) In the case of liquids, there should be upward flow in vertical pipes to avoid partial pipe filling (Fig. A). Disruption in flow measurement! In the case of vertical orientation and downward flowing liquid, the pipe always needs to be completely filled to ensure correct liquid flow measurement.
2) Danger of electronics overheating! If the fluid temperature is ≥ 200 °C (392 °F) orientation B is not permitted for the wafer version (Prowirl D) with nominal diameters DN 100 (4") and DN 150 (6").
3) In the case of hot media (e.g. steam or fluid temperature (TM) ≥ 200 °C (392 °F): orientation C or D
4) In the case of very cold media (e.g. liquid nitrogen): orientation B or D
5) For "wet steam detection/measurement" option: orientation C

Minimum spacing and cable length



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A Minimum spacing in all directions
L Required cable length

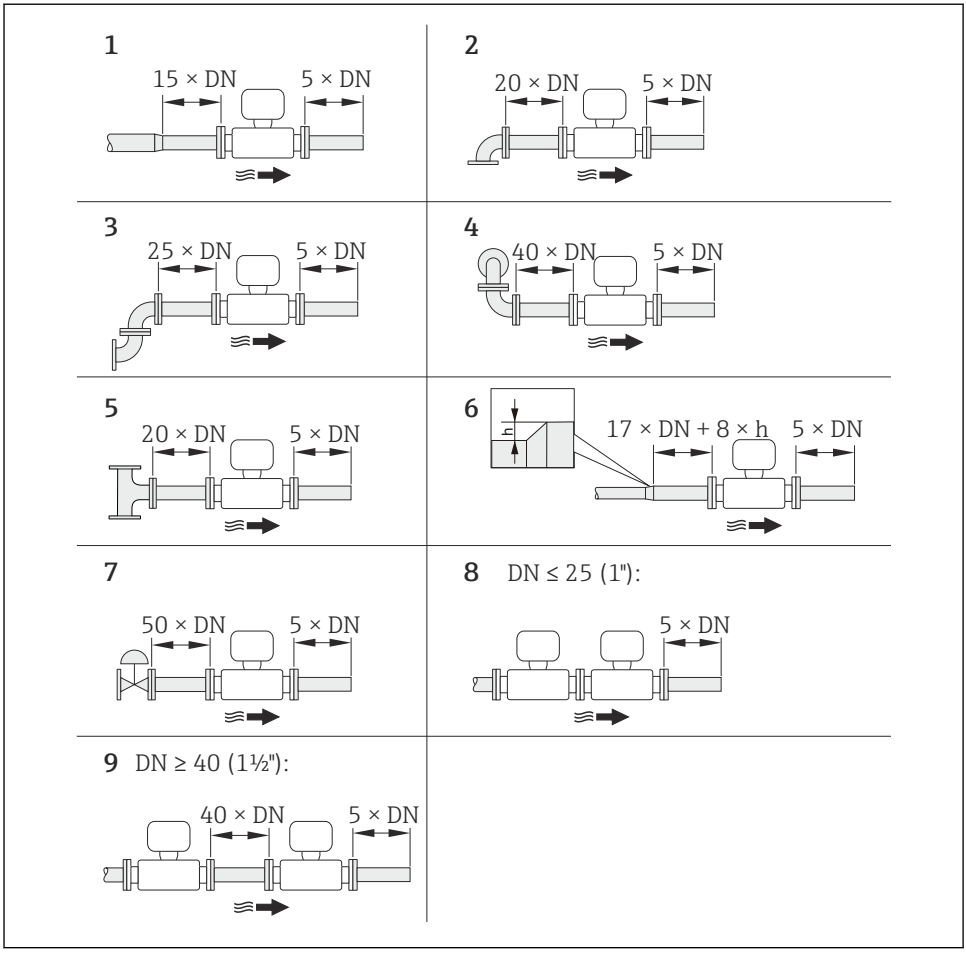
The following dimensions must be observed to guarantee problem-free access to the device for service purposes:
- A =100 mm (3.94 in)
- L = L + 150 mm (5.91 in)

Rotating the electronics housing and the display

The electronics housing can be rotated continuously by 360 °° on the housing support. The display unit can be rotated in 45 ° stages. This means you can read the display comfortably from all directions.

Inlet and outlet runs

To attain the specified level of accuracy of the measuring device, the inlet and outlet runs mentioned below must be maintained at the very minimum.



2 Minimum inlet and outlet runs with various flow obstructions

h Difference in expansion
1 Reduction by one nominal diameter size
2 Single elbow (90° elbow)
3 Double elbow (2 × 90° elbows, opposite)
4 Double elbow 3D (2 × 90° elbows, opposite, not on one plane)
5 T-piece
6 Expansion

7 Control valve
8 Two measuring devices in a row where DN ≤ 25 (1"): directly flange on flange
9 Two measuring devices in a row where DN ≥ 40 (1½"): for spacing, see graphic

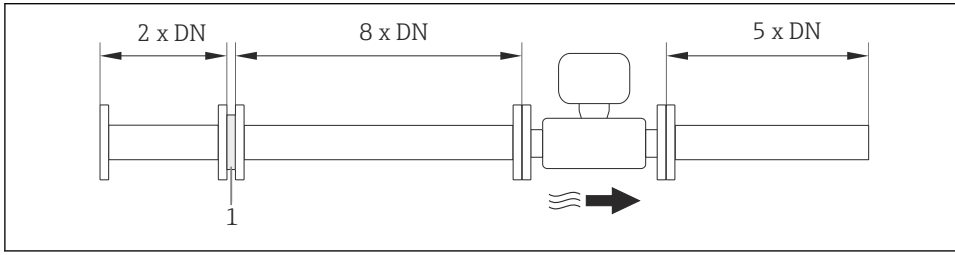
- If there are several flow disturbances present, the longest specified inlet run must be maintained.
- If the required inlet runs cannot be observed, it is possible to install a specially designed flow conditioner → 18.

For detailed information about inlet run correction and wet steam detection, see the Special Documentation for the device

For the dimensions and installation lengths of the device, see the "Technical Information" document, "Mechanical construction" section

Flow conditioner

If the required inlet runs cannot be observed, it is possible to install a specially designed flow conditioner which can be ordered from Endress+Hauser. The flow conditioner is fitted between two pipe flanges and centered by the mounting bolts. Generally this reduces the inlet run needed to 10 × DN with full accuracy.



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1 Flow conditioner

The pressure loss for flow conditioners is calculated as follows: Δp [mbar] = 0.0085 · ρ [kg/m³] · v² [m/s]

Example for steam	Example for H_2O condensate (80 °C)
p = 10 bar abs.	ρ = 965 kg/m³
t = 240 °C → ρ = 4.39 kg/m³	v = 2.5 m/s
v = 40 m/s	$\Delta p = 0.0085 \cdot 965 \cdot 2.5^2 = 51.3$ mbar
$\Delta p = 0.0085 \cdot 4.394.39 \cdot 40^2 = 59.7$ mbar	

ρ : density of the process medium

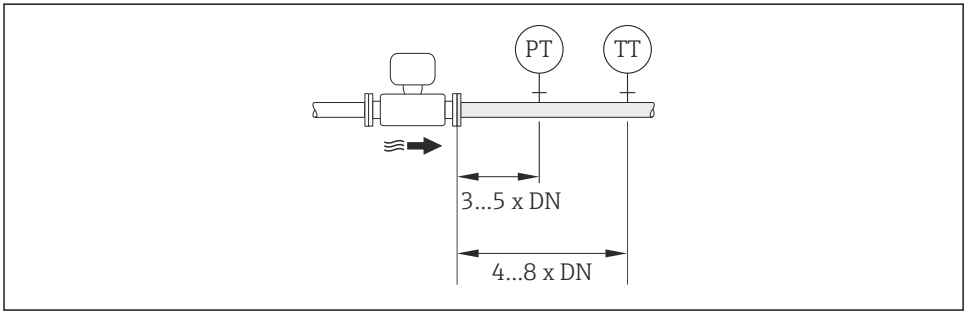
v: average flow velocity

abs. = absolute

For the dimensions of the flow conditioner, see the "Technical Information" document, "Mechanical construction" section

Outlet runs when installing external devices

If installing an external device, observe the specified distance.



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PT Pressure transmitter
TT Temperature transmitter

6.1.2 Requirements from environment and process

Ambient temperature range

Compact version

Measuring device	Non-Ex:	−40 to +80 °C (−40 to +176 °F) [1]
	Ex i:	−40 to +70 °C (−40 to +158 °F) [1]
	EEx d/XP version:	−40 to +60 °C (−40 to +140 °F) [1]
	ATEX II1/2G Ex d, Ex ia:	−40 to +60 °C (−40 to +140 °F) [1]
Local display		−20 to +70 °C (−4 to +158 °F) [1]

1) Additionally available as order code for "Test, certificate", option JN "Transmitter ambient temperature −50 °C (−58 °F)".

Remote version

Transmitter	Non-Ex:	−40 to +80 °C (−40 to +176 °F) [1]
	Ex i:	−40 to +80 °C (−40 to +176 °F) [1]
	Ex d:	−40 to +60 °C (−40 to +140 °F) [1]
	ATEX II1/2G Ex d, Ex ia:	−40 to +60 °C (−40 to +140 °F) [1]
Sensor	Non-Ex:	−40 to +85 °C (−40 to +185 °F) [1]

	Ex i:	−40 to +85 °C (−40 to +185 °F) [1]
	Ex d:	−40 to +85 °C (−40 to +185 °F) [1]
	ATEX II1/2G Ex d, Ex ia:	−40 to +85 °C (−40 to +185 °F) [1]
Local display		−20 to +70 °C (−4 to +158 °F) [1]

1) Additionally available as order code for "Test, certificate", option JN "Transmitter ambient temperature −50 °C (−58 °F)".

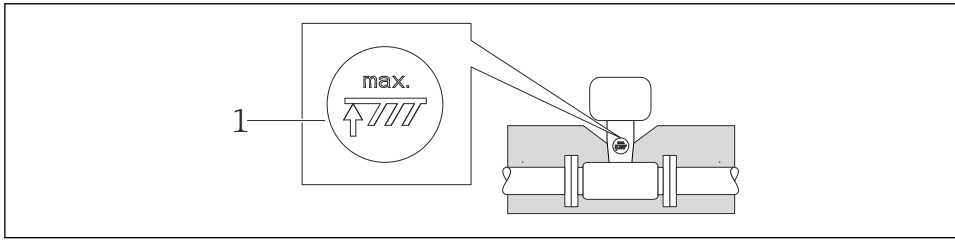
► If operating outdoors:
Avoid direct sunlight, particularly in warm climatic regions.

Thermal insulation

For optimum temperature measurement and mass calculation, heat transfer at the sensor must be avoided for some fluids. This can be ensured by installing thermal insulation. A wide range of materials can be used for the required insulation.

This applies for:
- Compact version
- Remote sensor version

The maximum insulation height permitted is illustrated in the diagram:



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1 Maximum insulation height

► When insulating, ensure that a sufficiently large area of the housing support remains exposed.

The uncovered part serves as a radiator and protects the electronics from overheating and excessive cooling.

NOTICE

Electronics overheating on account of thermal insulation!

- ▶ Observe the maximum permitted insulation height of the transmitter neck so that the transmitter head and/or the connection housing of the remote version is completely free.
- ▶ Observe information on the permissible temperature ranges .
- ▶ Note that a certain orientation might be required, depending on the fluid temperature → 11.

For detailed information about the fluid temperature, orientations and permitted temperature ranges, refer to the Operating Instructions for the device

Vibrations

The correct operation of the measuring system is not affected by plant vibrations up to 1 g, 10 to 500 Hz. Therefore no special measures are needed to secure the sensors.

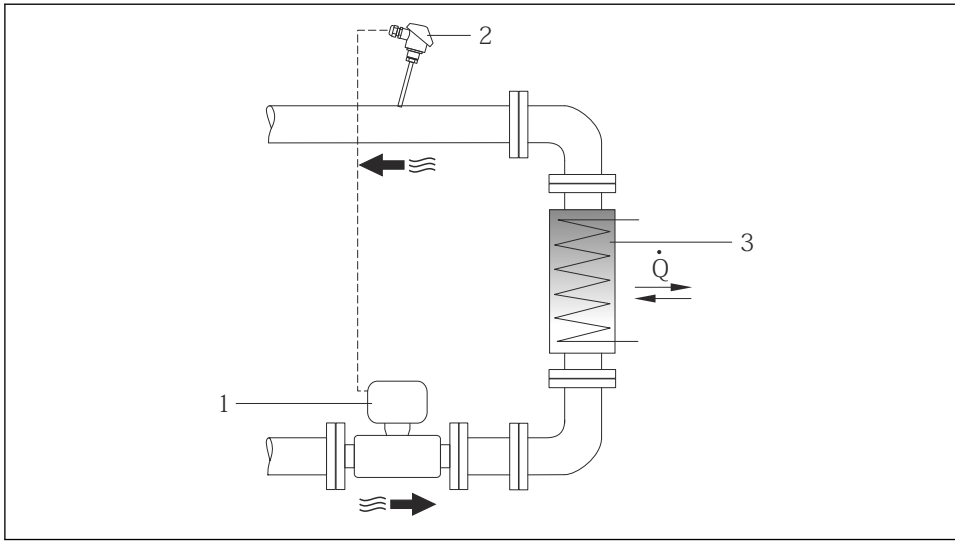
6.1.3 Special mounting instructions

Installation for delta heat measurements

Order code for *"Sensor version"*, option 3 *"Mass flow (integrated temperature measurement)"*

The second temperature measurement is taken using a separate temperature sensor. The measuring device reads in this value via a communication interface.

- In the case of saturated steam delta heat measurements, the Prowirl 200 must be installed on the steam side.
- In the case of water delta heat measurements, the Prowirl 200 can be installed on the cold or warm side.



3 *Layout for delta heat measurement of saturated steam and water*

1 Prowirl
2 Temperature sensor
3 Heat exchanger
Q Heat flow

Weather protection cover

Observe the following minimum head clearance: 222 mm (8.74 in)

6.2 Mounting the measuring device

6.2.1 Required tools

For transmitter

- For turning the transmitter housing: Open-ended wrench8 mm
- For opening the securing clamps: Allen key3 mm

For sensor

For flanges and other process connections: Corresponding mounting tools

6.2.2 Preparing the measuring device

1. Remove all remaining transport packaging.
2. Remove any protective covers or protective caps present from the sensor.
3. Remove stick-on label on the electronics compartment cover.

6.2.3 Mounting the sensor

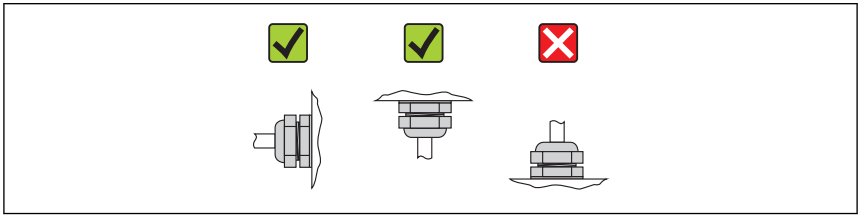
WARNING

Danger due to improper process sealing!

- ▶ Ensure that the inside diameters of the gaskets are greater than or equal to that of the process connections and piping.
- ▶ Ensure that the gaskets are clean and undamaged.
- ▶ Install the gaskets correctly.

1. Ensure that the direction of the arrow on the sensor matches the flow direction of the medium.
2. To ensure compliance with device specifications, install the measuring device between the pipe flanges in a way that it is centered in the measurement section.
3. Install the measuring device or turn the transmitter housing so that the cable entries do not point upwards.

↳



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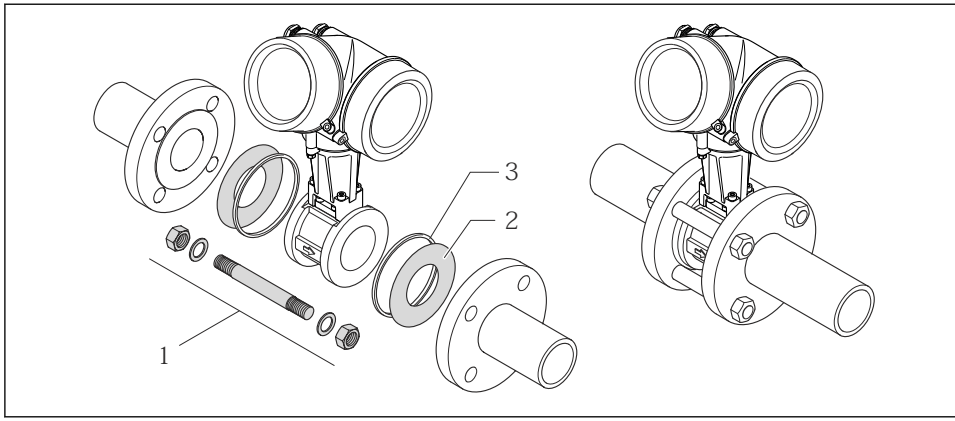
Mounting kit

Mounting kit for disc (wafer version)

The centering rings supplied are used to mount and center the wafer-style devices.

A mounting kit comprises:
- Tie rods
- Seals
- Nuts
- Washers



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4 Mounting kit for wafer version

1 Nut, washer, tie rod
2 Seal
3 Centering ring (is supplied with the measuring device)

A mounting kit can be ordered separately (see the "Accessories" section).

6.2.4 Mounting the transmitter of the remote version

CAUTION

Ambient temperature too high!

Danger of electronics overheating and housing deformation.

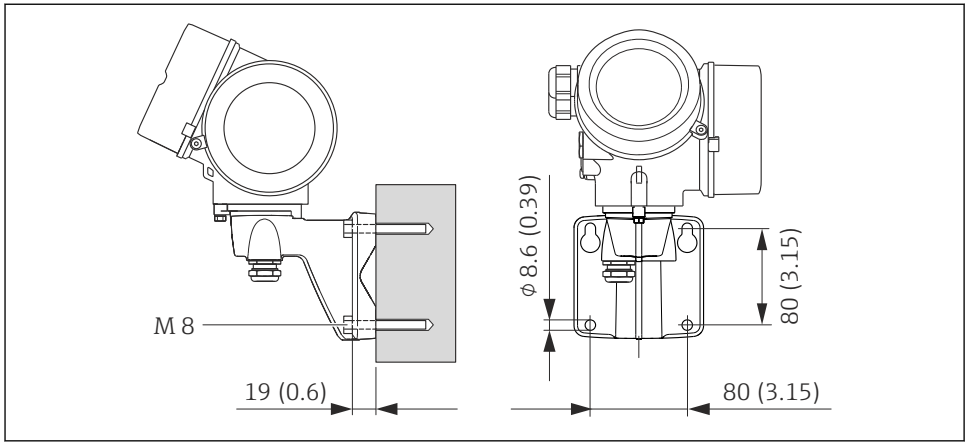
- Do not exceed the permitted maximum ambient temperature .
- If operating outdoors: Avoid direct sunlight and exposure to weathering, particularly in warm climatic regions.

CAUTION

Excessive force can damage the housing!

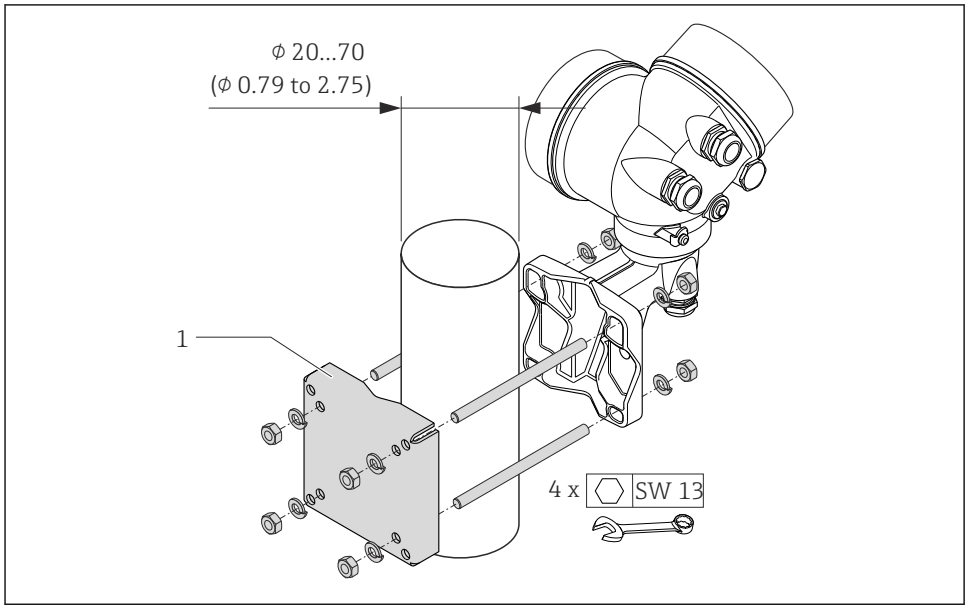
- Avoid excessive mechanical stress.

Wall mounting



5 Engineering unit mm (in)

Post mounting

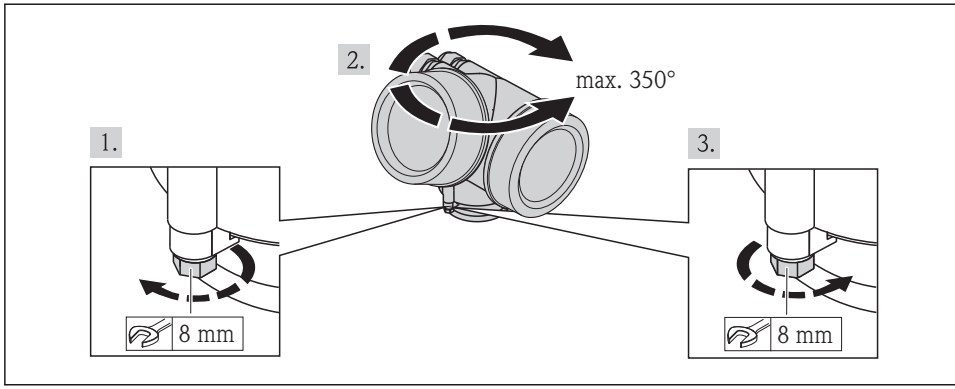


6 Engineering unit mm (in)

1 Post retainer kit for post mounting

6.2.5 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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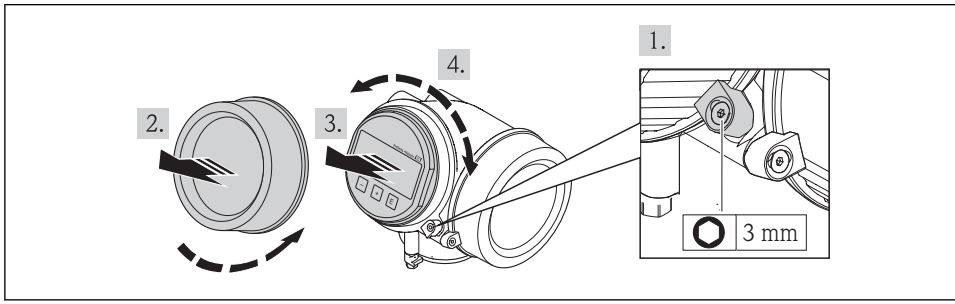
6.2.6 Turning the display module

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



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6.3 Post-installation check

Is the device undamaged (visual inspection)?	❑
Does the measuring device conform to the measuring point specifications? For example: ▪ Process temperature ▪ Process pressure (refer to the section on "Pressure-temperature ratings" in the "Technical Information" document) ▪ Ambient temperature ▪ Measuring range	❑

Has the correct orientation for the sensor been selected → 🖹 11? ▪ According to sensor type ▪ According to medium temperature ▪ According to medium properties (outgassing, with entrained solids)	❑
Does the arrow on the sensor nameplate match the direction of flow of the fluid through the piping → 🖹 11?	❑
Are the measuring point identification and labeling correct (visual inspection)?	❑
Is the device adequately protected from precipitation and direct sunlight?	❑
Are the securing screw and securing clamp tightened securely?	❑

7 Electrical connection

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.

7.1 Connection conditions

7.1.1 Required tools

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

7.1.2 Connecting cable requirements

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

Electrical safety

In accordance with applicable federal/national regulations.

Permitted temperature range

- −40 °C (−40 °F) to +80 °C (+176 °F)
- Minimum requirement: cable temperature range ≥ ambient temperature +20 K

Signal cable

Current output

- For 4-20 mA: standard installation cable is sufficient.
- For 4-20 mA HART: Shielded cable recommended. Observe grounding concept of the plant.

Pulse/frequency/switch output

Standard installation cable is sufficient.

Current input

Standard installation cable is sufficient.

FOUNDATION Fieldbus

Twisted, shielded two-wire cable.

For further information on planning and installing FOUNDATION Fieldbus networks see:

- Operating Instructions for "FOUNDATION Fieldbus Overview" (BA00013S)
- FOUNDATION Fieldbus Guideline
- IEC 61158-2 (MBP)

PROFIBUS PA

Twisted, shielded two-wire cable. Cable type A is recommended.

For further information on planning and installing PROFIBUS PA networks see:

- Operating Instructions "PROFIBUS DP/PA: Guidelines for planning and commissioning" (BA00034S)
- PNO Directive 2.092 "PROFIBUS PA User and Installation Guideline"
- IEC 61158-2 (MBP)

Connecting cable for remote version

Connecting cable (standard)

Standard cable	2 × 2 × 0.34 mm² (22 AWG) PVC cable with common shield (2 pairs, pair-stranded)
Flame resistance	According to DIN EN 60332-1-2
Oil-resistance	According to DIN EN 60811-2-1
Shielding	Galvanized copper-braid, opt. density approx. 85%
Cable length	5 m (16 ft), 10 m (32 ft), 20 m (65 ft), 30 m (98 ft)
Operating temperature	When mounted in a fixed position: −50 to +105 °C (−58 to +221 °F); when cable can move freely: −25 to +105 °C (−13 to +221 °F)

Connecting cable (reinforced)

Cable, reinforced	2 × 2 × 0.34 mm² (22 AWG) PVC cable with common shield (2 pairs, pair-stranded) and additional steel-wire braided sheath
Flame resistance	According to DIN EN 60332-1-2
Oil-resistance	According to DIN EN 60811-2-1
Shielding	Galvanized copper-braid, opt. density approx. 85%
Strain relief and reinforcement	Steel-wire braid, galvanized
Cable length	5 m (16 ft), 10 m (32 ft), 20 m (65 ft), 30 m (98 ft)
Operating temperature	When mounted in a fixed position: −50 to +105 °C (−58 to +221 °F); when cable can move freely: −25 to +105 °C (−13 to +221 °F)

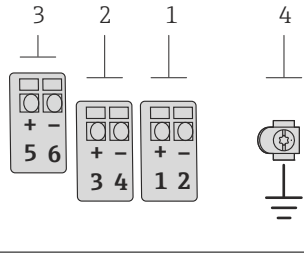
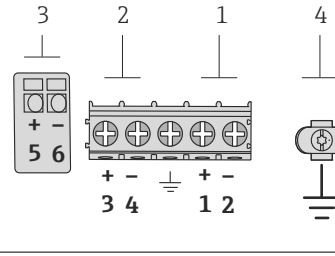
Cable diameter

- Cable glands supplied:
  M20 × 1.5 with cable ϕ 6 to 12 mm (0.24 to 0.47 in)
- Plug-in spring terminals for device version without integrated overvoltage protection: wire cross-sections 0.5 to 2.5 mm² (20 to 14 AWG)
- Screw terminals for device version with integrated overvoltage protection: wire cross-sections 0.2 to 2.5 mm² (24 to 14 AWG)

7.1.3 Terminal assignment

Transmitter

Connection versions

	
Maximum number of terminals *Terminals 1 to 6:* *Without integrated overvoltage protection*	*Maximum number of terminals for order code for "Accessory mounted", option NA "Overvoltage protection"* ▪ *Terminals 1 to 4:* *With integrated overvoltage protection* ▪ *Terminals 5 to 6:* *Without integrated overvoltage protection*

1 Output 1 (passive): supply voltage and signal transmission
2 Output 2 (passive): supply voltage and signal transmission
3 Input (passive): supply voltage and signal transmission
4 Ground terminal for cable shield

Order code for "Output"	Terminal numbers					
	Output 1		Output 2		Input	
	1 (+)	2 (-)	3 (+)	4 (-)	5 (+)	6 (-)
Option **A**	4-20 mA HART (passive)		-		-	
Option **B** [1]	4-20 mA HART (passive)		Pulse/frequency/switch output (passive)		-	
Option **C** [1]	4-20 mA HART (passive)		4-20 mA analog (passive)		-	
Option **D** [1] [2]	4-20 mA HART (passive)		Pulse/frequency/switch output (passive)		4-20 mA current input (passive)	
Option **E** [1] [3]	FOUNDATION Fieldbus		Pulse/frequency/switch output (passive)		-	
Option **G** [1] [4]	PROFIBUS PA		Pulse/frequency/switch output (passive)		-	

1) Output 1 must always be used; output 2 is optional.
2) The integrated overvoltage protection is not used with option D: Terminals 5 and 6 (current input) are not protected against overvoltage.
3) FOUNDATION Fieldbus with integrated reverse polarity protection.
4) PROFIBUS PA with integrated reverse polarity protection.

Remote version

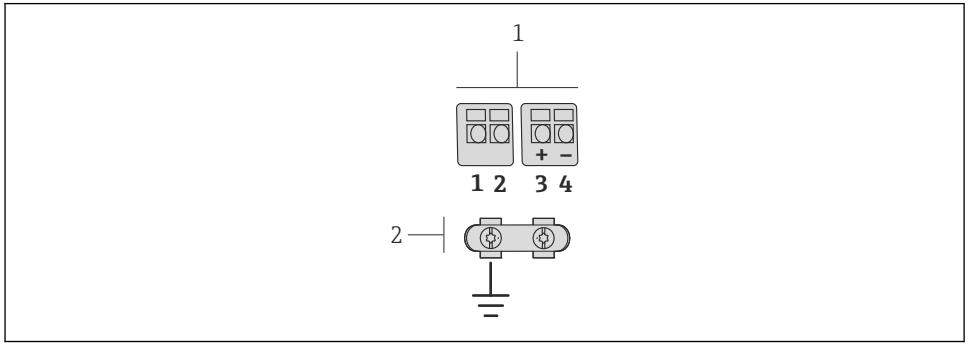
In the case of the remote version, the sensor and transmitter are mounted separately from one another and connected by a connecting cable. The sensor is connected via the connection housing while the transmitter is connected via the connection compartment of the wall holder unit.

The way the transmitter wall holder is connected depends on the measuring device approval and the version of the connecting cable used.

Connection is only possible via terminals:
- For approvals Ex n, Ex tb and cCSAus Div. 1
- If a reinforced connecting cable is used

The connection is via an M12 connector:
- For all other approvals
- If the standard connecting cable is used

Connection to the connection housing of the sensor is always via the terminals (tightening torque for terminals: 1.2 to 1.7 Nm).



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7 Terminals for connection compartment in the transmitter wall holder and the sensor connection housing

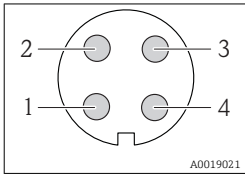
1 Terminals for connecting cable
2 Grounding via the cable strain relief

Terminal number	Assignment	Cable color Connecting cable
1	Supply voltage	Brown
2	Grounding	White
3	RS485 (+)	Yellow
4	RS485 (–)	Green

7.1.4 Pin assignment, device plug

PROFIBUS PA

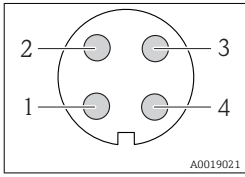
Device plug for signal transmission (device side)



Pin	Assignment		Coding	Plug/socket
1	+	PROFIBUS PA +	A	Plug
2		Grounding		
3	-	PROFIBUS PA –		
4		Not assigned		

FOUNDATION Fieldbus

Device plug for signal transmission (device side)



Pin	Assignment		Coding	Plug/socket
1	+	Signal +	A	Plug
2	-	Signal –		
3		Not assigned		
4		Grounding		

7.1.5 Shielding and grounding

PROFIBUS PA and FOUNDATION Fieldbus

Optimum electromagnetic compatibility (EMC) of the fieldbus system can only be guaranteed if the system components and, in particular, the lines are shielded and the shield forms as complete a cover as possible. A shield coverage of 90% is ideal.

- To ensure an optimum EMC protective effect, connect the shield as often as possible to the reference ground.
- For reasons of explosion protection, you should refrain from grounding however.

To comply with both requirements, the fieldbus system allows three different types of shielding:

- Shielding at both ends.
- Shielding at one end on the feed side with capacitance termination at the field device.
- Shielding at one end on the feed side.

Experience shows that the best results with regard to EMC are achieved in most cases in installations with one-sided shielding on the feed side (without capacitance termination at the field device). Appropriate measures with regard to input wiring must be taken to allow unrestricted operation when EMC interference is present. These measures have been taken into account for this device. Operation in the event of disturbance variables as per NAMUR NE21 is thus guaranteed.

Where applicable, national installation regulations and guidelines must be observed during the installation!

Where there are large differences in potential between the individual grounding points, only one point of the shielding is connected directly with the reference ground. In systems without

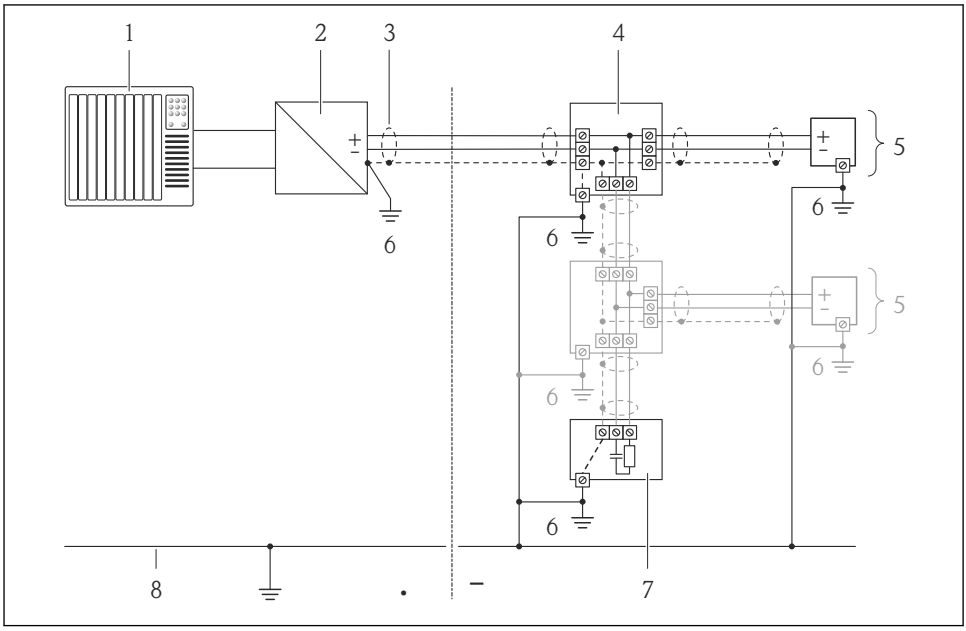
potential equalization, therefore, cable shielding of fieldbus systems should only be grounded on one side, for example at the fieldbus supply unit or at safety barriers.

NOTICE

In systems without potential matching, the multiple grounding of the cable shield causes mains frequency equalizing currents!

Damage to the bus cable shield.

- Only ground the bus cable shield to either the local ground or the protective ground at one end. Insulate the shield that is not connected.



1 *Controller (e.g. PLC)*
2 *Segment coupler PROFIBUS DP/PA or Power Conditioner (FOUNDATION Fieldbus)*
3 *Cable shield*
4 *T-box*
5 *Measuring device*
6 *Local grounding*
7 *Bus terminator*
8 *Potential matching line*

7.1.6 Requirements for the supply unit

Supply voltage

Transmitter

Increase in minimum terminal voltage

Local operation	Increase in minimum terminal voltage
Order code for *"Display; Operation"*, option **C**: Local operation SD02	+ DC 1 V
Order code for *"Display; Operation"*, option **E**: Local operation SD03 with lighting (backlighting **not used**)	+ DC 1 V
Order code for *"Display; Operation"*, option **E**: Local operation SD03 with lighting (backlighting **used**)	+ DC 3 V

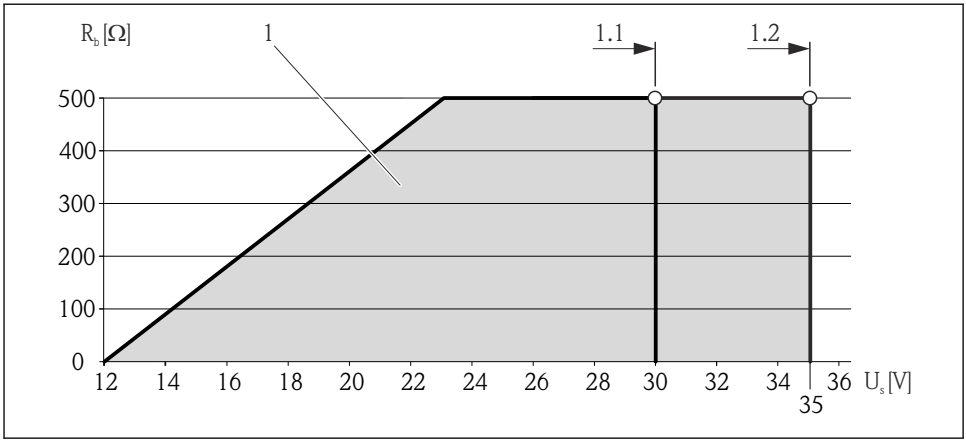
Load

Load for current output: 0 to 500 Ω, depending on the external supply voltage of the power supply unit

Calculation of the maximum load

Depending on the supply voltage of the power supply unit (U_S), the maximum load (R_B) including line resistance must be observed to ensure adequate terminal voltage at the device. In doing so, observe the minimum terminal voltage

- $R_B \leq (U_S - U_{term.\ min})$: 0.022 A
- $R_B \leq 500\ \Omega$



8 *Load for a compact version without local operation*

1 Operating range
1.1 For order code for "Output", option A "4-20 mA HART"/option B "4-20 mA HART, pulse/frequency/switch output" with Ex i and option C "4-20 mA HART + 4-20 mA analog"
1.2 For order code for "Output", option A "4-20 mA HART"/option B "4-20 mA HART, pulse/frequency/switch output" with non-Ex and Ex d

Sample calculation

Supply voltage of the supply unit:
– U_S = 19 V
– $U_{term.\ min}$ = 12 V (measuring device) + 1 V (local operation without lighting) = 13 V

Maximum load: $R_B \leq$ (19 V - 13 V): 0.022 A = 273 Ω

The minimum terminal voltage ($U_{term.\ min}$) increases if local operation is used (Verweisziel existiert nicht, aber @y.link.required='true').

7.1.7 Preparing the measuring device

1. Remove dummy plug if present.
2. 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.

   If measuring device is delivered without cable glands:
   Provide suitable cable gland for corresponding connecting cable .
3. If measuring device is delivered with cable glands:
   Observe cable specification .

7.2 Connecting the measuring device

NOTICE

Limitation of electrical safety due to incorrect connection!

- For use in potentially explosive atmospheres, observe the information in the device-specific Ex documentation.

7.2.1 Connecting the remote version

WARNING

Risk of damaging the electronic components!

- Ground the remote version and in doing so connect the sensor and transmitter to the same potential equalization.
- Only connect the sensor to a transmitter with the same serial number.

The following procedure (in the action sequence given) is recommended for the remote version:

1. Mount the transmitter and sensor.
2. Connect the connecting cable.
3. Connect the transmitter.

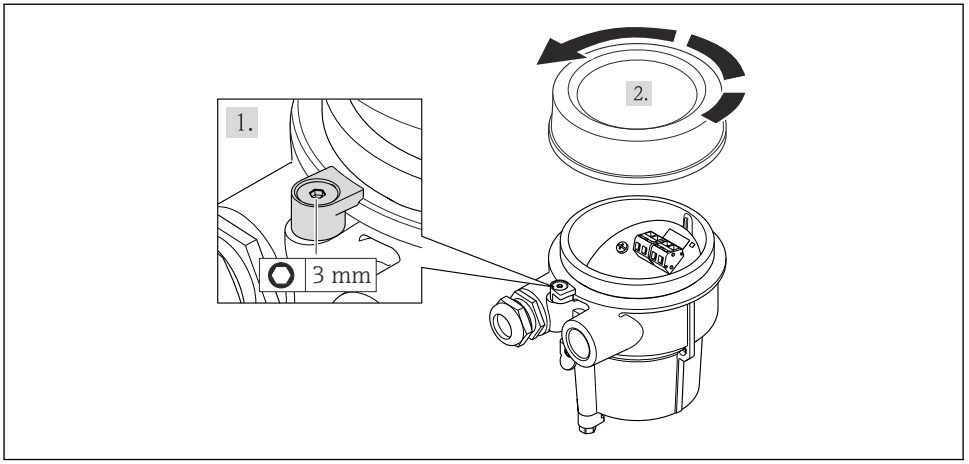
The way the transmitter wall holder is connected depends on the measuring device approval and the version of the connecting cable used.

Connection is only possible via terminals:
- For approvals Ex n, Ex tb and cCSAus Div. 1
- If a reinforced connecting cable is used

The connection is via an M12 connector:
- For all other approvals
- If the standard connecting cable is used

Connection to the connection housing of the sensor is always via the terminals (tightening torque for terminals: 1.2 to 1.7 Nm).

Connecting the sensor connection housing



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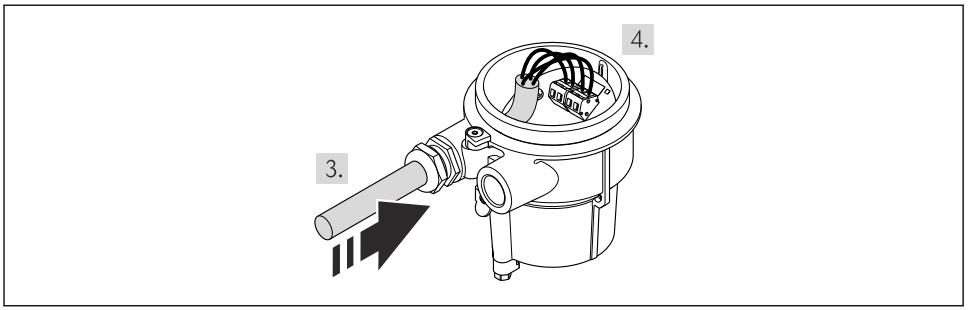

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1. NOTICE

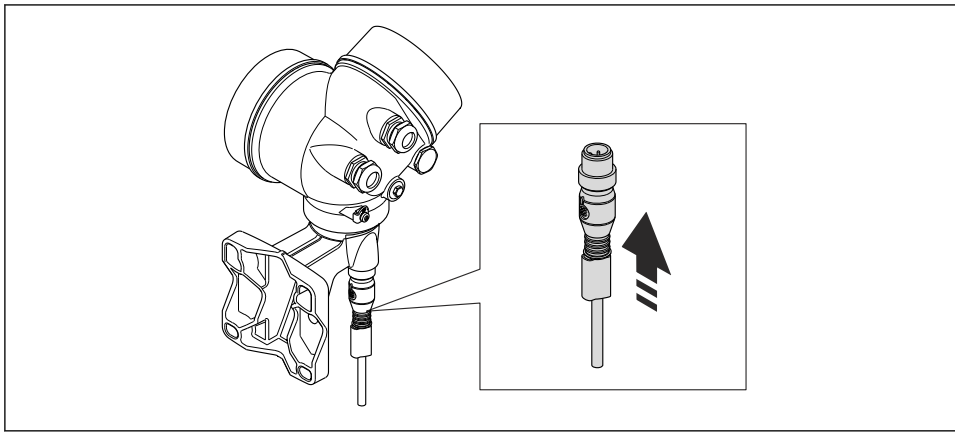
Terminals tightened with an incorrect tightening torque.
Incorrect connection or damaged terminal.
▶ Tighten the terminals with a tightening torque in the 1.2 to 1.7 Nm range.

Wire the connecting cable:
↳ Terminal 1 = brown cable
Terminal 2 = white cable
Terminal 3 = yellow cable
Terminal 4 = green cable

2. Connect the cable shield via the cable strain relief.

Connection to the wall holder of the transmitter

Connecting the transmitter via plug



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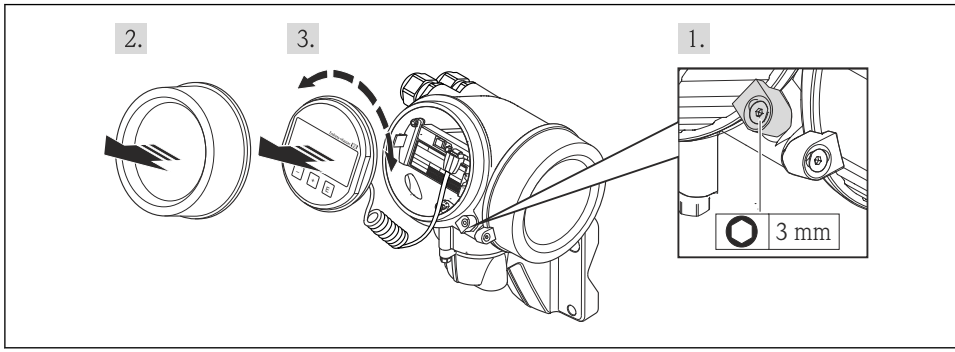
Connecting the transmitter via terminals



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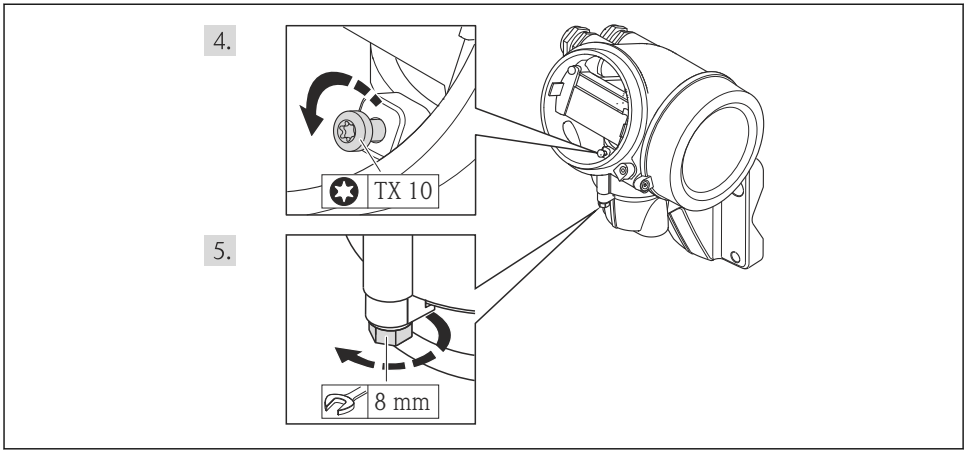

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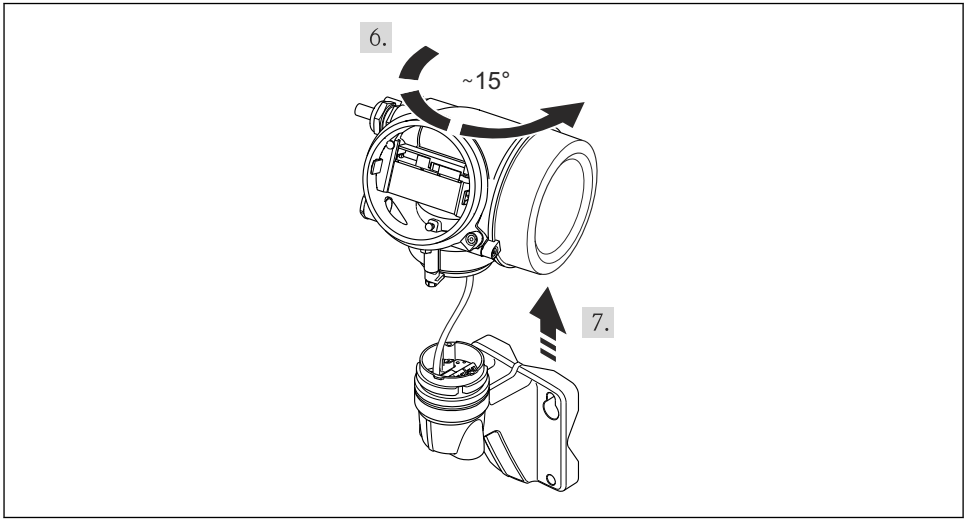
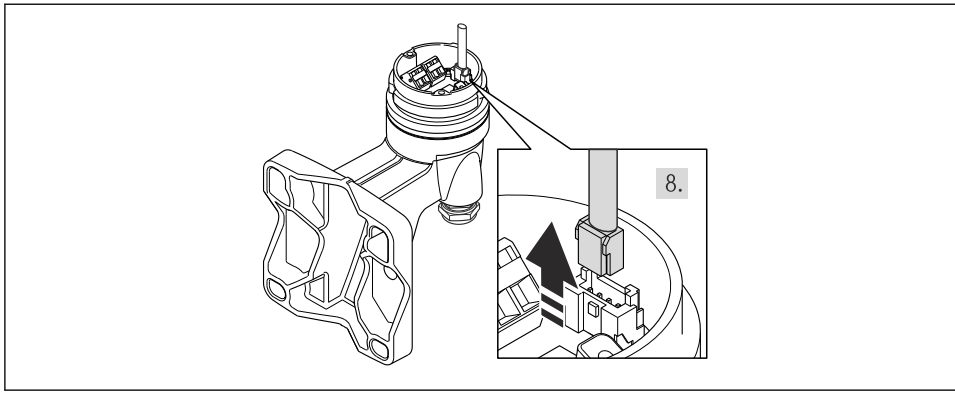


A0020406



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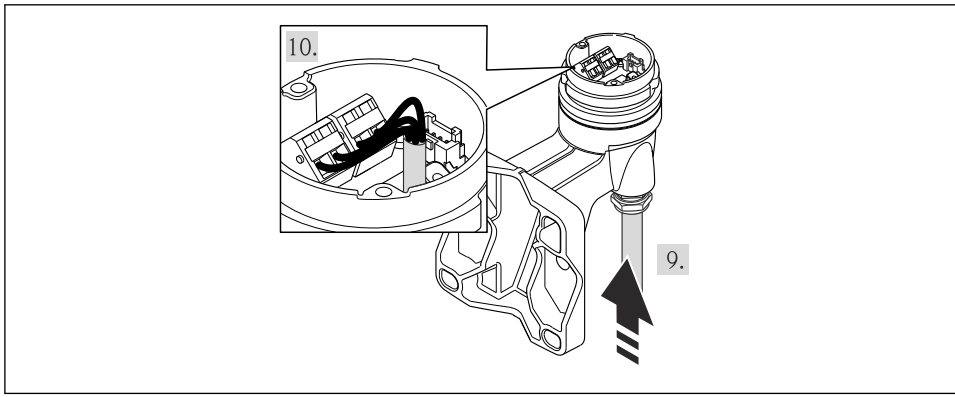

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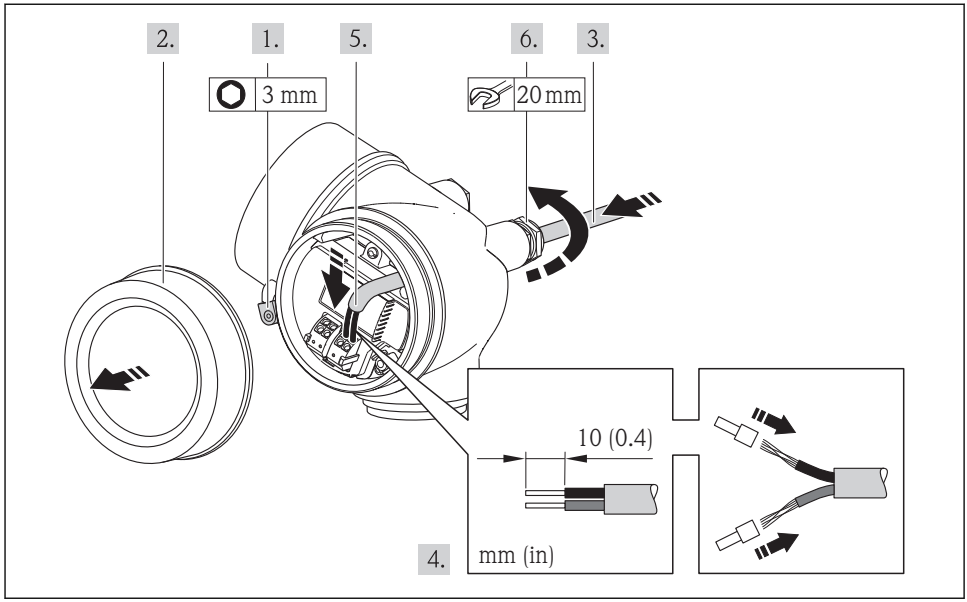
1. Wire the connecting cable:
   ↳ Terminal 1 = brown cable
   Terminal 2 = white cable
   Terminal 3 = yellow cable
   Terminal 4 = green cable
2. Connect the cable shield via the cable strain relief.

7.2.2 Connecting the transmitter

The connection of the transmitter depends on the following order codes:

Connection version: terminals or device plug

Connection via terminals



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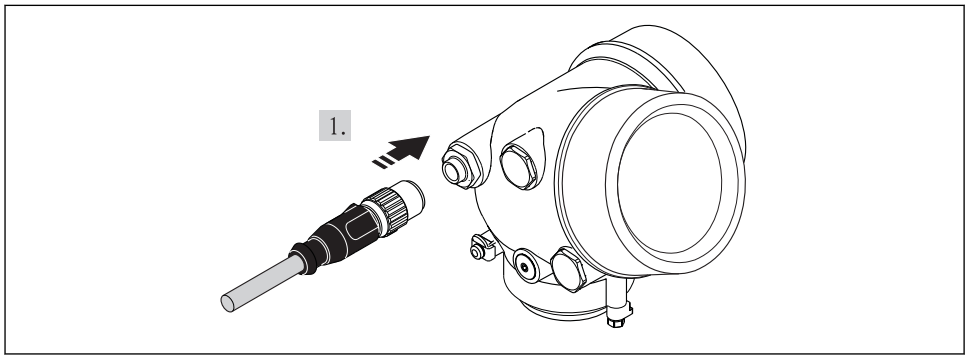
▶ Connect the cable in accordance with the terminal assignment . For HART communication: when connecting the cable shielding to the ground terminal, observe the grounding concept of the facility.

Connection via device plug



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▶ Plug in the device plug and tighten firmly.

7.2.3 Ensuring potential equalization

Requirements

Please consider the following to ensure correct measurement:
- Same electrical potential for the fluid and sensor
- Remote version: same electrical potential for the sensor and transmitter
- Company-internal grounding concepts
- Pipe material and grounding

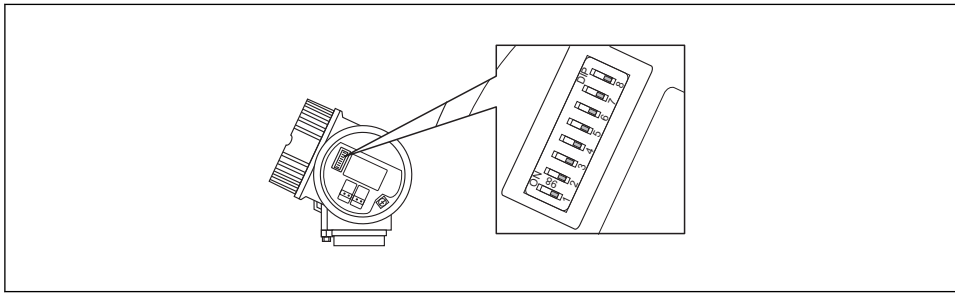
For devices intended for use in hazardous locations, please observe the guidelines in the Ex documentation (XA).

7.3 Hardware settings

7.3.1 Setting the device address

PROFIBUS PA

The address must always be configured for a PROFIBUS DP/PA device. The valid address range is between 1 and 126. In a PROFIBUS DP/PA network, each address can only be assigned once. If an address is not configured correctly, the device is not recognized by the master. All measuring devices are delivered from the factory with the device address 126 and with the software addressing method.



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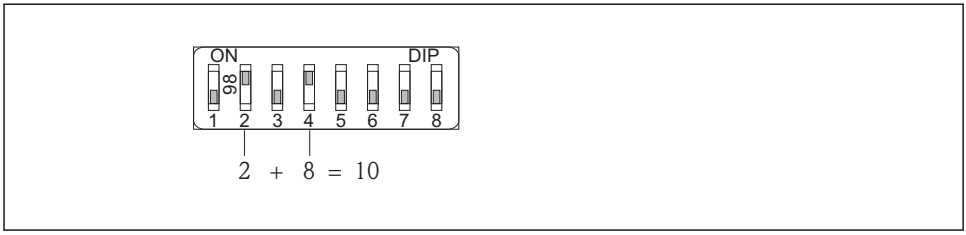
9 Address switch in the connection compartment

Hardware addressing

1. Set switch 8 to the "OFF" position.
2. Using switches 1 to 7, set the address as indicated in the table below.

The change of address takes effect after 10 seconds. The device is restarted.

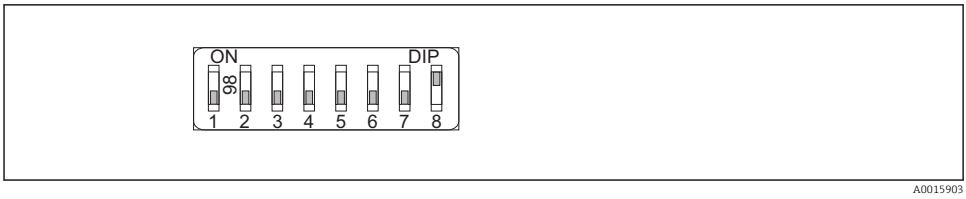
Switch	1	2	3	4	5	6	7
Value in "ON" position	1	2	4	8	16	32	64
Value in "OFF" position	0	0	0	0	0	0	0



10 *Example of hardware addressing; switch 8 is set to the "OFF" position; switches 1 to 7 define the address.*

Software addressing

1. Set switch 8 to "ON".
   ↳ The device restarts automatically and reports the current address (factory setting: 126).
2. Configure the address via the operating menu: **Setup** menu→**Communication** submenu→**Device address** parameter



11 *Example of software addressing; switch 8 is set to the "ON" position; the address is defined in the operating menu ("Setup" menu→"Communication" submenu→"Device address" parameter).*

7.4 Ensuring the degree of protection

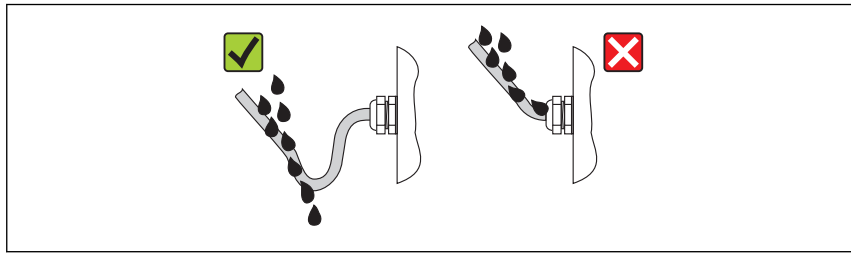
The measuring device fulfills all the requirements for the IP66/67 degree of protection, Type 4X enclosure.

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

1. Check that the housing seals are clean and fitted correctly. Dry, clean or replace the seals if necessary.
2. Tighten all housing screws and screw covers.
3. Firmly tighten the cable glands.

4. To ensure that moisture does not enter the cable entry, route the cable so that it loops down before the cable entry ("water trap").

↳



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5. Insert dummy plugs into unused cable entries.

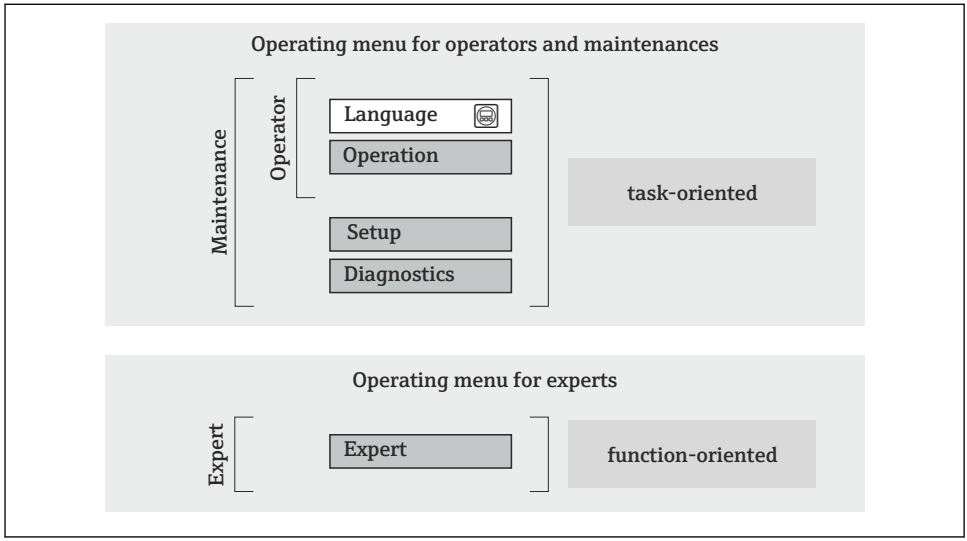
7.5 Post-connection check

Are cables or the device undamaged (visual inspection)?	❑
Do the cables comply with 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" → 🖹 40 ?	❑
Depending on the device version: are all the device plugs firmly tightened ?	❑
Does the supply voltage match the specifications on the transmitter nameplate ?	❑
Is the terminal assignment correct ?	❑
Is the terminal assignment or the pin assignment of the device plug correct?	❑
If supply voltage is present, do values appear on the display module?	❑
Are all housing covers installed and firmly tightened?	❑
Is the securing clamp tightened correctly?	❑

8 Operation options

8.1 Structure and function of the operating menu

8.1.1 Structure of the operating menu



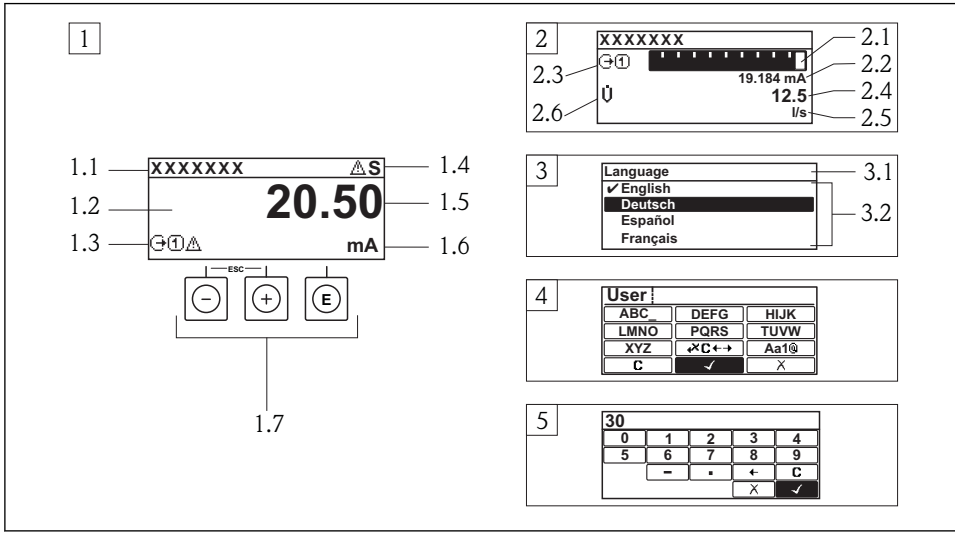
12 Schematic structure of the operating menu

8.1.2 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.

8.2 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

8.2.1 Operational display

Status area

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 (the device is locked via the hardware)
- ⇆: Communication (communication via remote operation is active)

Display area

- Measured variables (depending on the device version), e.g.:
  - U̇: Volume flow
  - ṁ: Mass flow
  - ρ: Density
  - **G**: Conductivity
  - 🌡: Temperature
- Σ: Totalizer (the measurement channel number indicates which totalizer is displayed)
- ⊖→: Output (the measurement channel number indicates which output is displayed)
- →⊖: Input
- ① … ④: Measurement channel number (if more than one channel is present for the same measured variable type)
- Diagnostic behavior (for a diagnostic event that concerns the displayed measured variable)
  - ⊗: Alarm
  - ⚠: Warning

8.2.2 Navigation view

Status area

The following appears in the status area of the navigation view in the top right corner:
- Of 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

Display area

- Icons for menus
  - : Operation
  - : Setup
  - : Diagnostics
  - : Expert
- : Submenus
- : Wizards
- : Parameters within a wizard
- : Parameter locked

8.2.3 Editing view

Input mask

Operating symbols in the numeric editor

Key	Meaning	Key	Meaning
	Confirms selection.		Moves the input position one position to the left.
	Exits the input without applying the changes.		Inserts decimal separator at the input position.
	Inserts minus sign at the input position.		Clears all entered characters.

Operating symbols in the text editor

Key	Meaning	Key	Meaning
	Confirms selection.		Switches to the selection of the correction tools.
	Exits the input without applying the changes.		Clears all entered characters.
	Toggle ▪ Between upper-case and lower-case letters ▪ For entering numbers ▪ For entering special characters		

Correction symbols under

Key	Meaning	Key	Meaning
	Clears all entered characters.		Moves the input position one position to the left.
	Moves the input position one position to the right.		Deletes one character immediately to the left of the input position.

8.2.4 Operating elements

Keys and meaning
Minus key ▪ *In a menu, submenu:* Moves the selection bar upwards in a choose list. ▪ *With a wizard:* Confirms the parameter value and goes to the previous parameter. ▪ *With a text and numeric editor:* Moves the selection bar to the left (backwards) in an input screen.
Plus key ▪ *In a menu, submenu:* Moves the selection bar downwards in a choose list. ▪ *With a wizard:* Confirms the parameter value and goes to the next parameter. ▪ *With a text and numeric editor:* Moves the selection bar to the right (forwards) in an input screen.
Enter key *For operational display* ▪ Pressing the key briefly opens the operating menu. ▪ Pressing the key for 2 s opens the context 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 for 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: – Opens the selected group. – Carries out the selected action. ▪ Pressing the key for 2 s confirms the edited parameter value.
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 for the 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 text or numeric editor without applying changes.
Minus/Enter key combination (press the keys simultaneously) Reduces the contrast (brighter setting).
Plus/Enter key combination (press and hold down the keys simultaneously) Increases the contrast (darker setting).
Minus/Plus/Enter key combination (press the keys simultaneously) *For operational display:* Enables or disables the keypad lock (only SD02 display module).

8.2.5 Further information

For further information on the following topics, see the Operating Instructions for the device

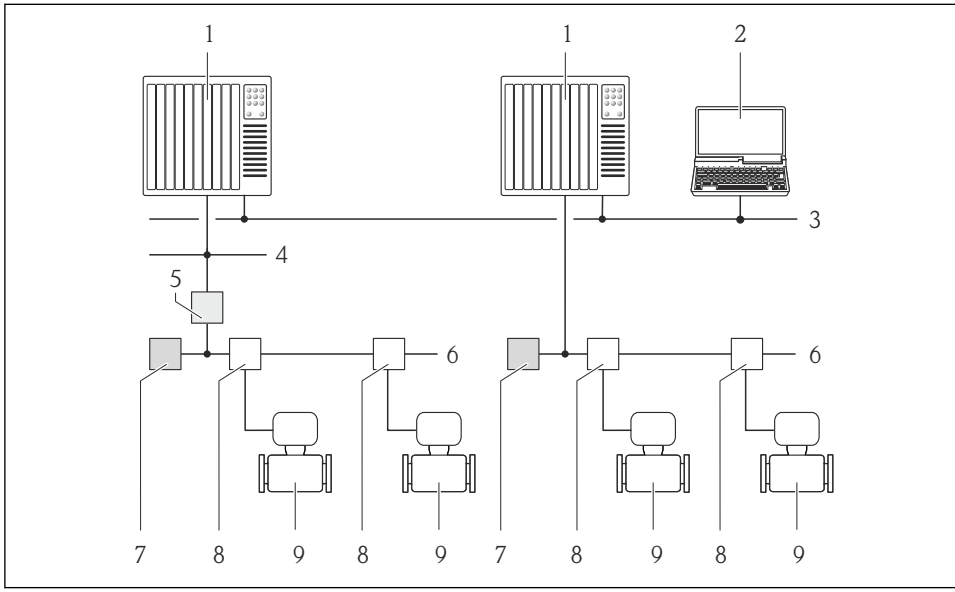
- Calling up help text
- User roles and related access authorization
- Disabling write protection via access code
- Enabling and disabling the keypad lock

8.3 Access to the operating menu via the operating tool

8.3.1 Connecting the operating tool

Via FOUNDATION Fieldbus network

This communication interface is available in device versions with FOUNDATION Fieldbus.

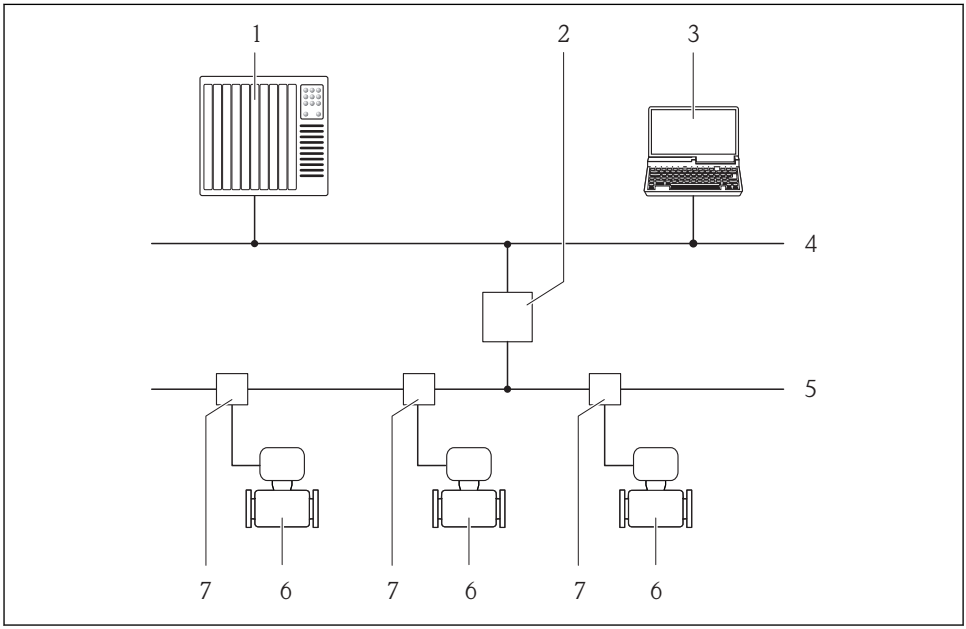


13 Options for remote operation via FOUNDATION Fieldbus network

1 Automation system
2 Computer with FOUNDATION Fieldbus network card
3 Industry network
4 High Speed Ethernet FF-HSE network
5 Segment coupler FF-HSE/FF-H1
6 FOUNDATION Fieldbus FF-H1 network
7 Power supply FF-H1 network
8 T-box
9 Measuring device

Via PROFIBUS PA network

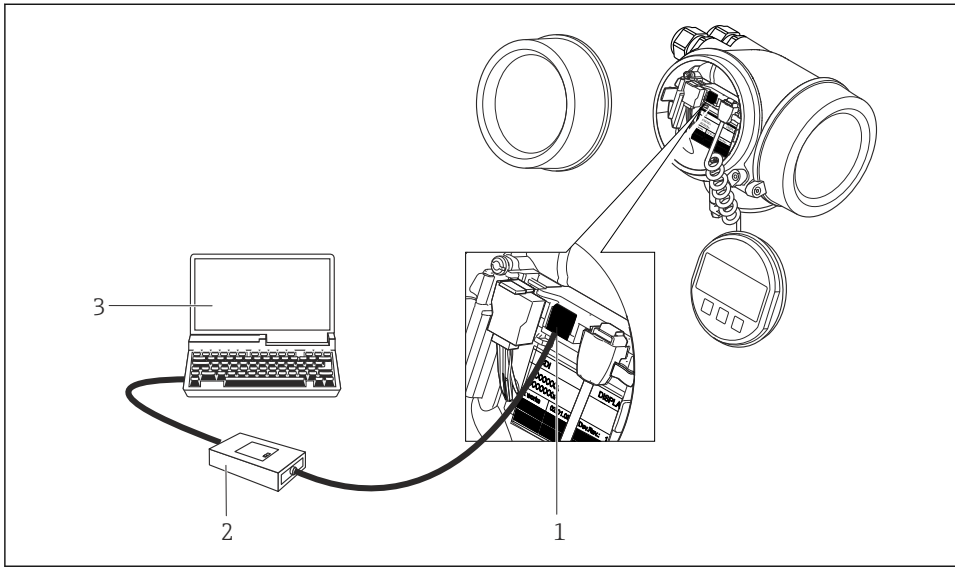
This communication interface is available in device versions with PROFIBUS PA.



14 *Options for remote operation via PROFIBUS PA network*

1 Automation system
2 Segment coupler PROFIBUS DP/PA
3 Computer with PROFIBUS network card
4 PROFIBUS DP network
5 PROFIBUS PA network
6 Measuring device
7 T-box

Via service interface (CDI)



1 Service interface (CDI = Endress+Hauser Common Data Interface) of the measuring device
2 Commubox FXA291
3 Computer with "FieldCare" operating tool with COM DTM "CDI Communication FXA291"

8.3.2 FieldCare

Function scope

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

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

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

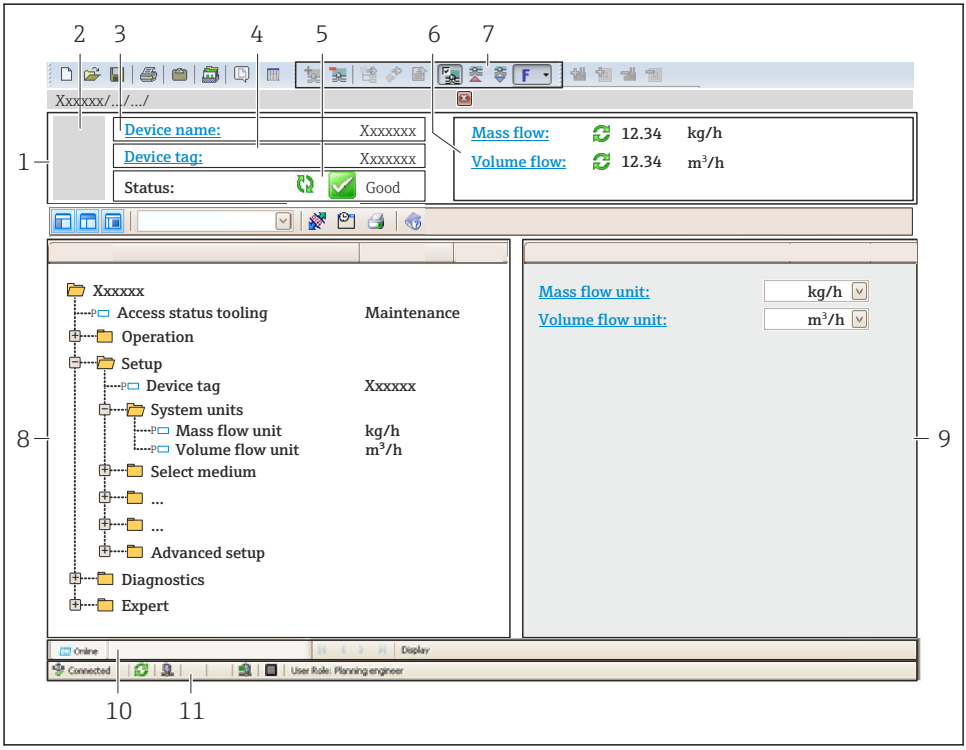
Source for device description files

- www.endress.com → Downloads
- CD–ROM (contact Endress+Hauser)
- DVD (contact Endress+Hauser)

Establishing a connection

For additional information, see Operating Instructions BA00027S and BA00059S

User interface



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1 *Header*
2 *Picture of device*
3 *Device name*
4 *Tag name*
5 *Status area with status signal*
6 *Display area for current measured values*
7 *Edit toolbar with additional functions such as save/restore, event list and create documentation*
8 *Navigation area with operating menu structure*
9 *Working area*
10 *Range of action*
11 *Status area*

9 System integration

For detailed information on system integration, see the Operating Instructions for the device.

10 Commissioning

10.1 Function check

Before commissioning the measuring device:

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

- "Post-installation check" checklist → 23
- "Post-connection check" checklist → 41

10.2 Switching on the measuring device

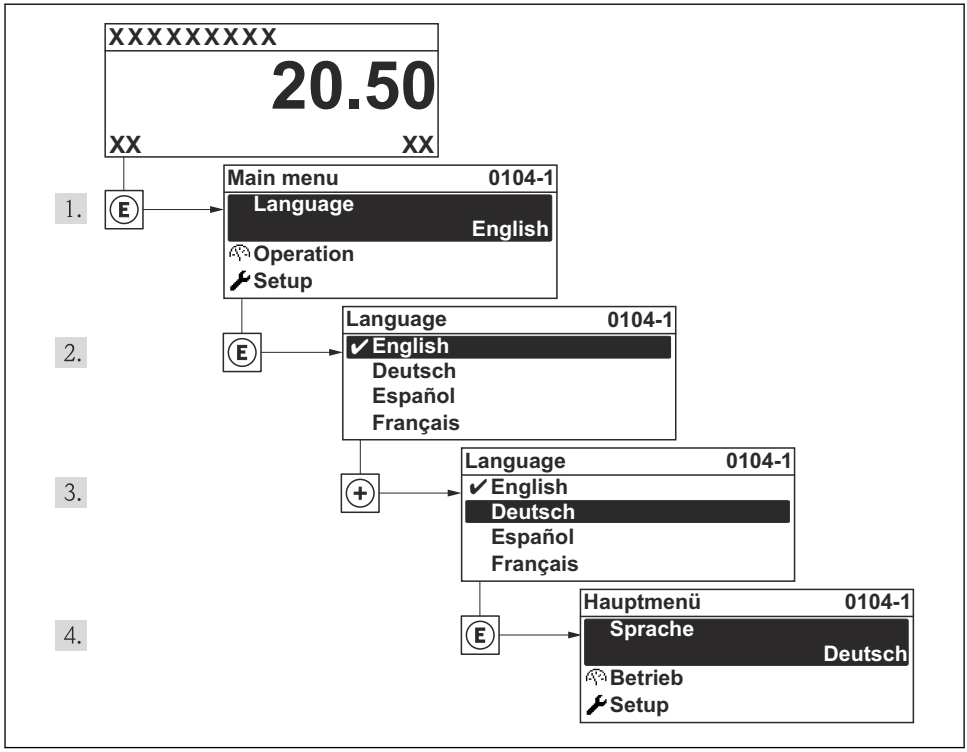
▶ After a successful function check, switch on the measuring device.

↳ After a successful startup, the local display switches automatically from the startup display to the operational display.

If nothing appears on the local display or a diagnostic message is displayed, refer to the Operating Instructions for the device

10.3 Setting the operating language

Factory setting: English or ordered local language



15 *Taking the example of the local display*

10.4 Configuring the measuring device

The **Setup** menu with its **System units** submenu and various guided wizards enable fast commissioning of the measuring device.

The desired units can be selected in the **System units** submenu. The wizards systematically guide the user through all the parameters required for configuration, such as parameters for measurement or outputs.

The wizards available in the particular device can vary on account of the device version (e.g. communication method).

Wizard	Meaning
Current input	Configure the current input
Current output 1 to n	Set current output 1-2
Pulse/frequency/switch output	Configure the selected output type
Analog inputs	Configure the analog inputs

Wizard	Meaning
Display	Configure the measured value display
Output conditioning	Define the output conditioning
Low flow cut off	Set the low flow cut off

10.5 Defining the tag name

To enable fast identification of the measuring point within the system, you can enter a unique designation using the **Device tag** parameter and thus change the factory setting.

Navigation

"Setup" menu → Device tag

Parameter overview with brief description

Parameter	Description	User entry	Factory setting
Device tag	Enter the name for the measuring point.	Max. 32 characters such as letters, numbers or special characters (e.g. @, %, /).	Prowirl

10.6 Protecting settings from unauthorized access

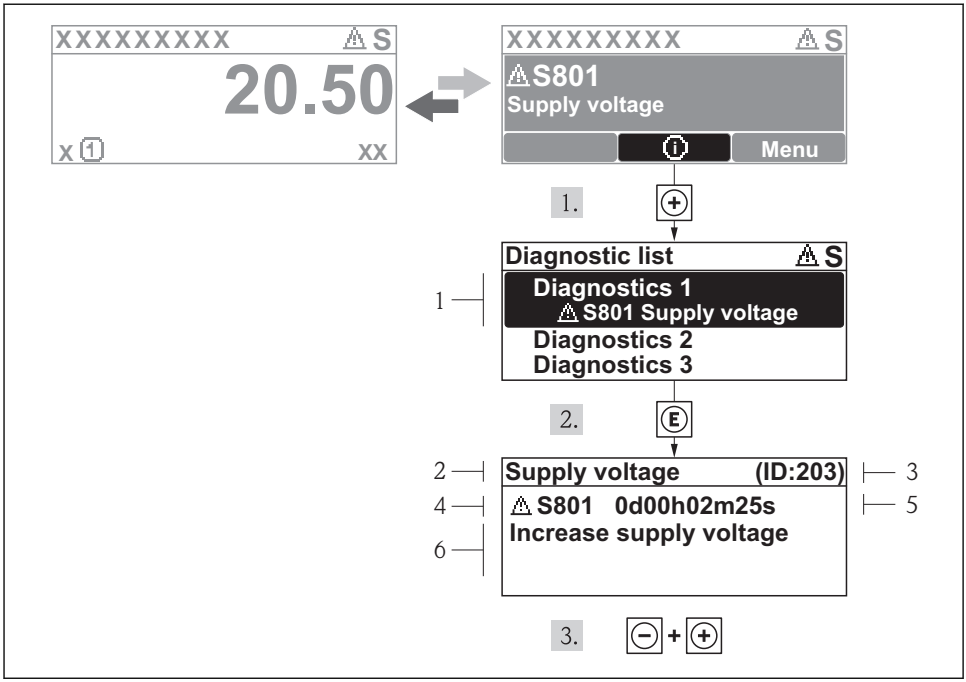
The following options exist for protecting the configuration of the measuring device from unintentional modification after commissioning:

- Write protection via access code
- Write protection via write protection switch
- Write protection via keypad lock
- FOUNDATION Fieldbus: write protection via block operation

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

11 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 on remedial measures can be called up from the diagnostic message, and contains important information on the fault.



16 *Message for 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*

The user is in the diagnostic message.

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

11.1 General troubleshooting

For local display

Problem	Possible causes	Remedy
Local display dark and no output signals	Supply voltage does not match the value indicated on the nameplate.	Apply the correct supply voltage .
Local display dark and no output signals	The polarity of the supply voltage is wrong.	Correct the polarity.
Local display dark and no output signals	No contact between connecting cables and terminals.	Check the connection of the cables and correct if necessary.
Local display dark and no output signals	Terminals are not plugged into the I/O electronics module correctly.	Check terminals.
Local display dark and no output signals	I/O electronics module is defective.	Order spare part .
Local display is dark, but signal output is within the valid range	Display is set too bright or too dark.	▪ Set the display brighter by simultaneously pressing ⊞ + Ⓔ. ▪ Set the display darker by simultaneously pressing ⊟ + Ⓔ.
Local display is dark, but signal output is within the valid range	The cable of the display module is not plugged in correctly.	Insert the plug correctly into the main electronics module and display module.
Local display is dark, but signal output is within the valid range	Display module is defective.	Order spare part .
Backlighting of local display is red	Diagnostic event with "Alarm" diagnostic behavior has occurred.	Take remedial measures
Text on local display appears in a foreign language and cannot be understood.	Incorrect operating language is configured.	1. Press ⊟ + ⊞ for 2 s ("home position"). 2. Press Ⓔ. 3. Set the desired language in the **Language** parameter.
Message on local display: "Communication Error" "Check Electronics"	Communication between the display module and the electronics is interrupted.	▪ Check the cable and the connector between the main electronics module and display module. ▪ Order spare part .

For output signals

Problem	Possible causes	Remedy
Signal output outside the valid range	Main electronics module is defective.	Order spare part .
Signal output outside the valid current range (< 3.6 mA or > 22 mA)	I/O electronics module is defective.	Order spare part .

Problem	Possible causes	Remedy
Device shows correct value on local display, but signal output is incorrect, though in the valid range.	Configuration error	Check and correct the parameter configuration.
Device measures incorrectly.	Configuration error or device is operated outside the application.	1. Check and correct parameter configuration. 2. Observe limit values specified in the "Technical Data".

For access

Problem	Possible causes	Remedy
No write access to parameters	Hardware write protection enabled	Set the write protection switch on the main electronics module to the OFF position .
No write access to parameters	Current user role has limited access authorization	1. Check user role . 2. Enter correct customer-specific access code .
No connection via HART protocol	Communication resistor missing or incorrectly installed.	Install the communication resistor (250 Ω) correctly. Observe the maximum load → 31.
No connection via HART protocol	Commubox ▪ Connected incorrectly ▪ Configured incorrectly ▪ Drivers not installed correctly ▪ USB interface on computer configured incorrectly	Observe the documentation for the Commubox. FXA195 HART: Document "Technical Information" TI00404F
No connection via service interface	Incorrect configuration of USB interface on PC or driver not installed correctly.	Observe the documentation for the Commubox. FXA291: Document "Technical Information" TI00405C

12 Maintenance

12.1 Maintenance tasks

No special maintenance work is required.

12.1.1 Exterior cleaning

When cleaning the exterior of measuring devices, always use cleaning agents that do not attack the surface of the housing or the seals.

12.1.2 Interior cleaning

NOTICE

The use of unsuitable equipment or cleaning liquids can damage the transducer.

- ▶ Do not use pigs to clean the pipe.

12.1.3 Replacing seals

Replacing sensor seals

NOTICE

Under normal circumstances, wetted seals must not be replaced.

Replacement is necessary only in special circumstances, for example if aggressive or corrosive fluids are incompatible with the seal material.

- ▶ The time span between the individual replacement procedures depends on the fluid properties.
- ▶ Only Endress+Hauser sensor seals may be used: replacement seals

Replacing housing seals

The housing seals must be clean and undamaged when inserted into their grooves. Dry, clean or replace the seals if necessary.

NOTICE

When the measuring device is used in a dusty atmosphere:

- ▶ only use the associated Endress+Hauser housing seals.

12.2 Measuring and test equipment

Endress+Hauser offers a wide variety of measuring and test equipment, such as W@M or device tests.

Your Endress+Hauser Sales Center can provide detailed information on the services.

For a list of some of the measuring and test equipment, refer to the "Accessories" chapter of the "Technical Information" document for the device.

12.3 Endress+Hauser services

Endress+Hauser offers a wide variety of services for maintenance such as recalibration, maintenance service or device tests.

Your Endress+Hauser Sales Center can provide detailed information on the services.

www.addresses.endress.com

Endress+Hauser

People for Process Automation