

Brief Operating Instructions

Liquiline CM42B

Two-wire transmitter

Field device

Measurement with digital or analog sensors






Table of contents









1	About this document	3
1.1	Safety information	3
1.2	Symbols	3
1.3	Symbols on the device	3
1.4	Documentation	4
2	Basic safety instructions	5
2.1	Requirements for the personnel	5
2.2	Intended use	5
2.3	Workplace safety	5
2.4	Operational safety	6
2.5	Product safety	6
2.6	IT security	6
3	Product description	7
3.1	Product design	7
4	Incoming acceptance and product identification	11
4.1	Incoming acceptance	11
4.2	Product identification	11
4.3	Scope of delivery	12
5	Installation	13
5.1	Installation requirements	13
5.2	Installing the device	16
5.3	Post-installation check	22
6	Electrical connection	22
6.1	Connecting requirements	22
6.2	Connecting the device	24
6.3	Ensuring the degree of protection	55
6.4	Post-connection check	55
7	Operation options	55
7.1	Overview of operation options	55
7.2	Access to the operating menu via the local display	56
7.3	Access to the operating menu via the operating tool	62
8	System integration	65
8.1	Integrating the measuring instrument into the system	65
9	Commissioning	67
9.1	Preliminaries	67
9.2	Function check	67
9.3	Time and date	68
9.4	Configuring the operating language	68
9.5	Transferring device parameters to other devices	68
	Index	69

1 About this document


1.1 Safety information

Structure of information	Meaning
<p> DANGER</p> <p>Causes (/consequences) If necessary, Consequences of non-compliance (if applicable)</p> <ul style="list-style-type: none"> ▶ Corrective action 	<p>This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation will result in a fatal or serious injury.</p>
<p> WARNING</p> <p>Causes (/consequences) If necessary, Consequences of non-compliance (if applicable)</p> <ul style="list-style-type: none"> ▶ Corrective action 	<p>This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation can result in a fatal or serious injury.</p>
<p> CAUTION</p> <p>Causes (/consequences) If necessary, Consequences of non-compliance (if applicable)</p> <ul style="list-style-type: none"> ▶ Corrective action 	<p>This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or more serious injuries.</p>
<p>NOTICE</p> <p>Cause/situation If necessary, Consequences of non-compliance (if applicable)</p> <ul style="list-style-type: none"> ▶ Action/note 	<p>This symbol alerts you to situations which may result in damage to property.</p>

1.2 Symbols

	Additional information, tips
	Permitted
	Recommended
	Not permitted or not recommended
	Reference to device documentation
	Reference to page
	Reference to graphic
	Result of an individual step

1.3 Symbols on the device

	Reference to device documentation
	Do not dispose of products bearing this marking as unsorted municipal waste. Instead, return them to the manufacturer for disposal under the applicable conditions.

1.4 Documentation

In addition to these Brief Operating Instructions , the following manuals are available on the product pages on our website:

Operating Instructions, BA02380C

- Device description
- Commissioning
- Operation
- Device-specific diagnostics and troubleshooting
- Maintenance
- Repair and spare parts
- Accessories
- Technical data

2 Basic safety instructions

2.1 Requirements for the personnel

- Installation, commissioning, operation and maintenance of the measuring system may be carried out only by specially trained technical personnel.
- The technical personnel must be authorized by the plant operator to carry out the specified activities.
- The electrical connection may be performed only by an electrical technician.
- The technical personnel must have read and understood these Operating Instructions and must follow the instructions contained therein.
- Faults at the measuring point may only be rectified by authorized and specially trained personnel.



Repairs not described in the Operating Instructions provided must be carried out only directly at the manufacturer's site or by the service organization.

2.2 Intended use

2.2.1 Areas of application

The device is a two-wire transmitter for connecting digital sensors with Memosens technology or analog sensors (configurable). It features a 4 to 20 mA current output with optional HART communication and can be operated via an onsite display or optionally using a smartphone or other mobile devices via Bluetooth.

The device is designed for use in the following industries:

- Chemical industry
- Pharmaceutical industry
- Water and wastewater
- Food and beverage production
- Power stations
- Applications in hazardous areas
- Other industrial applications

2.2.2 Non-designated use

Any use other than that intended puts the safety of people and the measuring system at risk. Therefore, any other use is not permitted.

The manufacturer is not liable for harm caused by improper or unintended use.

2.3 Workplace safety

The operator is responsible for ensuring compliance with the following safety regulations:

- Installation guidelines
- Local standards and regulations
- Regulations for explosion protection

Electromagnetic compatibility

- The product has been tested for electromagnetic compatibility in accordance with the applicable international standards for industrial applications.
- The electromagnetic compatibility indicated applies only to a product that has been connected in accordance with these Operating Instructions.

2.4 Operational safety

Before commissioning the entire measuring point:

1. Verify that all connections are correct.
2. Ensure that electrical cables and hose connections are undamaged.

Procedure for damaged products:

1. Do not operate damaged products, and protect them against unintentional operation.
2. Label damaged products as defective.

During operation:

- ▶ If errors cannot be rectified, take products out of service and protect them against unintentional operation.

2.5 Product safety

The product is designed 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. The relevant regulations and international standards have been observed.

2.6 IT security

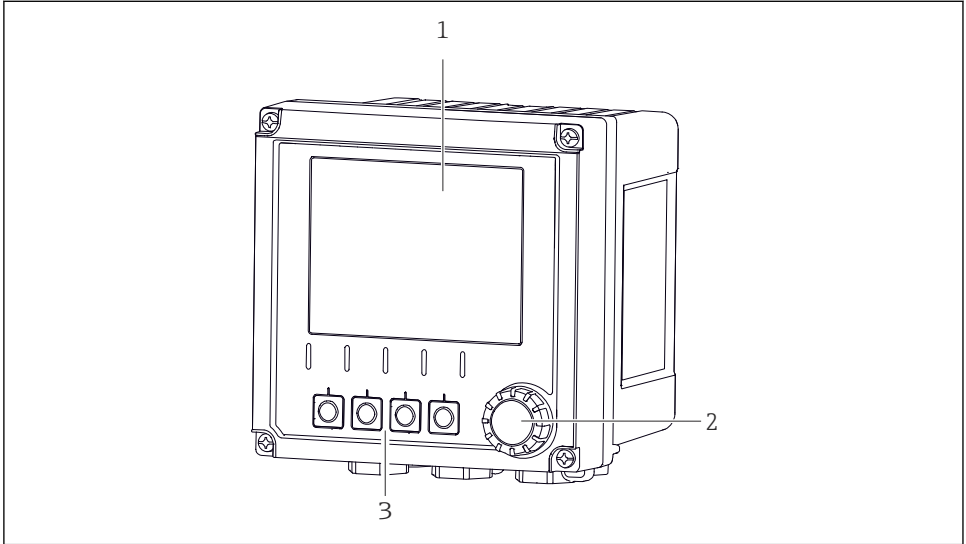
We only provide a warranty if the device is installed and used as described in the Operating Instructions and the Security Manual. The device is equipped with security mechanisms to protect it against any inadvertent changes to the device settings.

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. For more information, see the Security Manual.

3 Product description

3.1 Product design

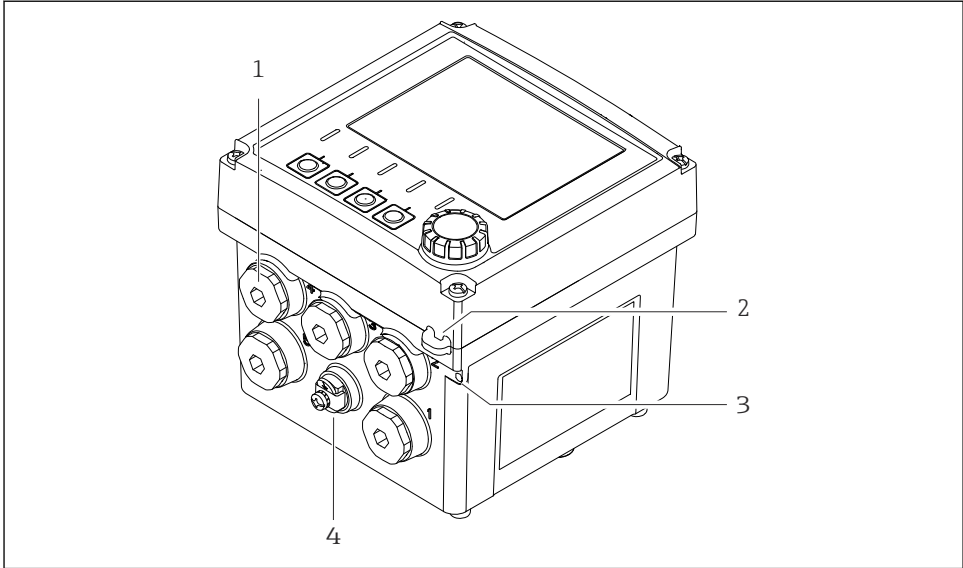
3.1.1 Housing closed



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1 Exterior view

- 1 Display
- 2 Navigator
- 3 Soft keys, assignment depends on menu



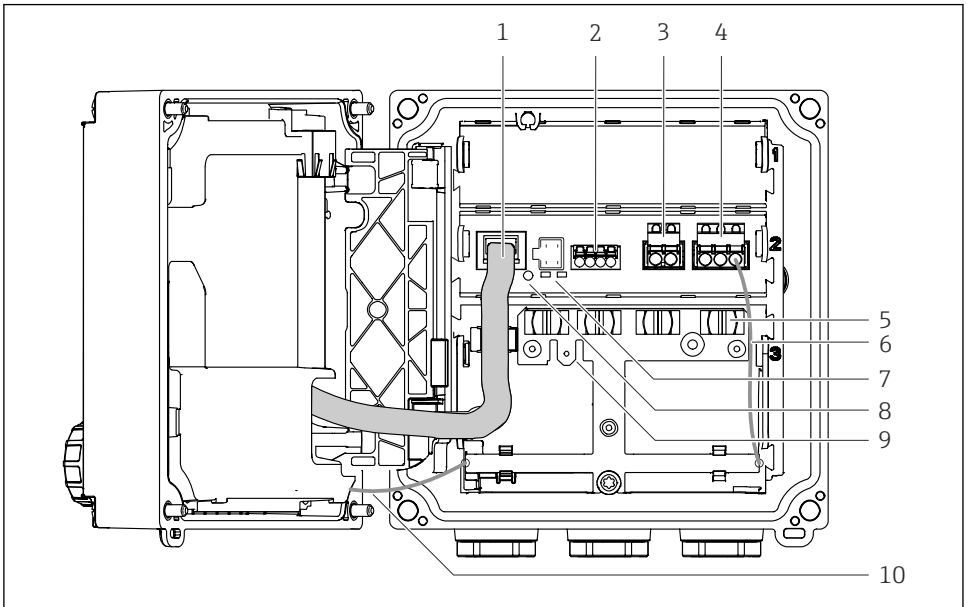
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 2 Exterior view

- 1 Connections for cable glands
- 2 Eyelet for security seal
- 3 Eyelet for Tagging (TAG)
- 4 Connection for potential equalization or functional ground

3.1.2 Housing open

Design of Memosens sensors



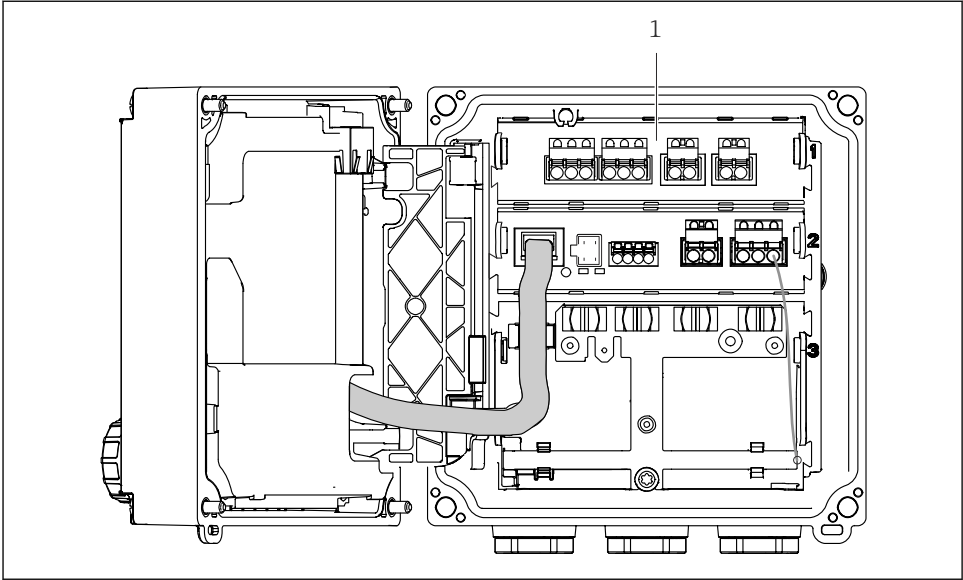
A0054757

- 1 *Display cable*
- 2 *Memosens input*
- 3 *Current output 1: 4 to 20 mA, passive/optional HART*
- 4 *Current output 2 (optional): 4 to 20 mA, passive*
- 5 *Cable mounting rail*
- 6 *Internal ground cable, wired at the factory*
- 7 *Status LEDs*
- 8 *Reset button*
- 9 *Internal grounding connection for blade receptacle 6.35 mm x 0.8 mm (0.25 in x 0.032 in), usage optional*
- 10 *Internal ground cable for display (only for devices with a stainless steel housing), wired at the factory*



The status LEDs are only active if the display is not connected.

Design of analog sensors (pH/ORP, inductive/conductive conductivity)



1 Connection area for analog sensors (different layout depending on the design)

Connection of the sensors is described in → 22.

3.1.3 Measuring parameters

Depending on the order, the transmitter is designed for digital Memosens sensors or for analog sensors. A transmitter for analog sensors can be reconfigured to Memosens. This requires an activation code and the analog input module must be removed.

A device for Memosens sensors cannot be retrofitted for analog sensors.

The following measuring parameters are possible with Memosens sensors:

- pH/ORP
- Conductivity, measured conductively
- Conductivity, measured inductively
- Dissolved oxygen, measured amperometrically
- Dissolved oxygen, measured optically

The measuring parameters and sensor type can be switched via the user interface.

The following measuring parameters are possible with analog sensors:

- pH/ORP
- Conductivity, measured conductively
- Conductivity, measured inductively

For a list of compatible sensors, see the Operating Instructions, "Accessories" section.

4 Incoming acceptance and product identification

4.1 Incoming acceptance

1. Verify that the packaging is undamaged.
 - ↳ Notify the supplier of any damage to the packaging.
Keep the damaged packaging until the issue has been resolved.
2. Verify that the contents are undamaged.
 - ↳ Notify the supplier of any damage to the delivery contents.
Keep the damaged goods until the issue has been resolved.
3. Check that the delivery is complete and nothing is missing.
 - ↳ Compare the shipping documents with your order.
4. Pack the product for storage and transportation in such a way that it is protected against impact and moisture.
 - ↳ The original packaging offers the best protection.
Make sure to comply with the permitted ambient conditions.

If you have any questions, please contact your supplier or your local Sales Center.

4.2 Product identification

4.2.1 Nameplate

The following information on the device can be found on the nameplate:

- Manufacturer identification
 - Product designation
 - Serial number
 - Ambient conditions
 - Input and output values
 - Safety information and warnings
 - Ex markings
 - Certification information
 - Warnings
- ▶ Compare the information on the nameplate with the order.

4.2.2 Identifying the product

Manufacturer address

Endress+Hauser Conducta GmbH+Co. KG
Dieselstraße 24
70839 Gerlingen
Germany

Product page

www.endress.com/CM42B

Interpreting the order code

The order code and serial number of your product can be found in the following locations:

- In the delivery papers
- On the internal label
- Serial number: on the nameplate
- Order code via the device menu: **Menu/System/Information/Device**

Obtaining information on the product

1. Scan the QR code on the product.
2. Open the URL in a web browser.
3. Click the product overview.
 - ↳ A new window opens. Here you will find information pertaining to your device, including the product documentation.

Obtaining information on the product (if there is no option for scanning the QR code)

1. Go to www.endress.com.
2. Page search (magnifying glass symbol): Enter valid serial number.
3. Search (magnifying glass).
 - ↳ The product structure is displayed in a popup window.
4. Click the product overview.
 - ↳ A new window opens. Here you will find information pertaining to your device, including the product documentation.

4.3 Scope of delivery

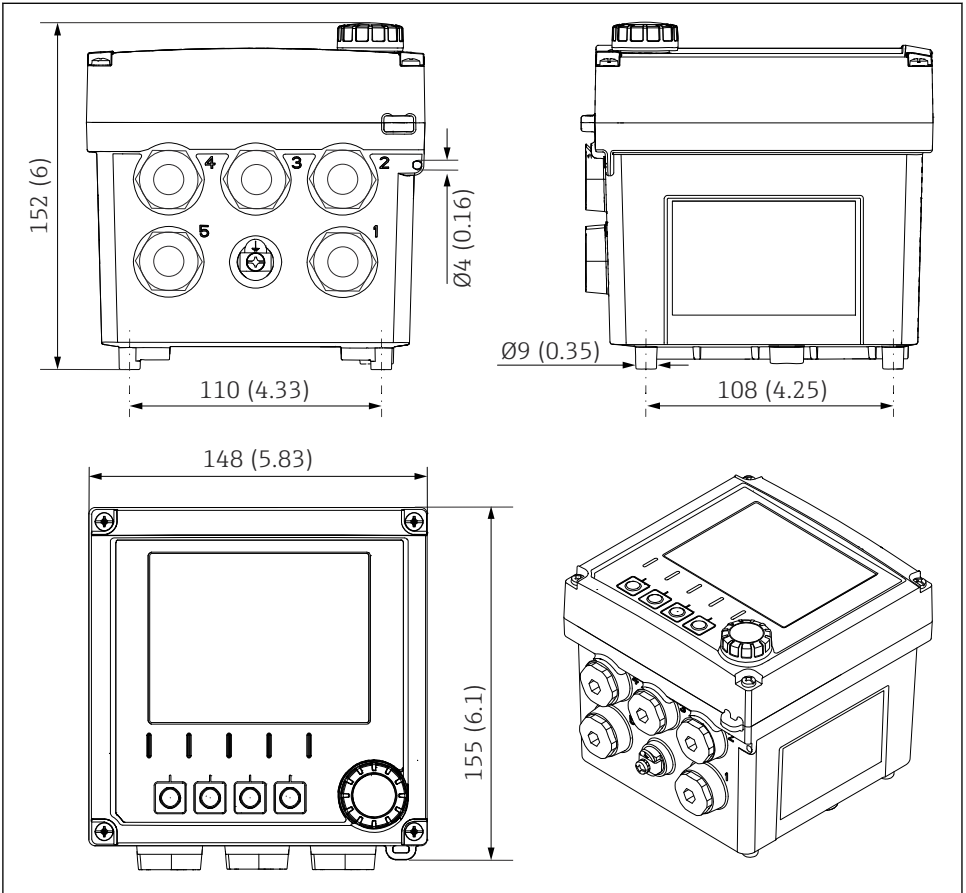
The scope of delivery includes:

- Liquiline CM42B
 - Cable glands depending on order
 - Field device mounting plate
 - Brief Operating Instructions
 - Safety instructions for hazardous area (for Ex versions)
- If you have any queries:
Please contact your supplier or local sales center.

5 Installation

5.1 Installation requirements

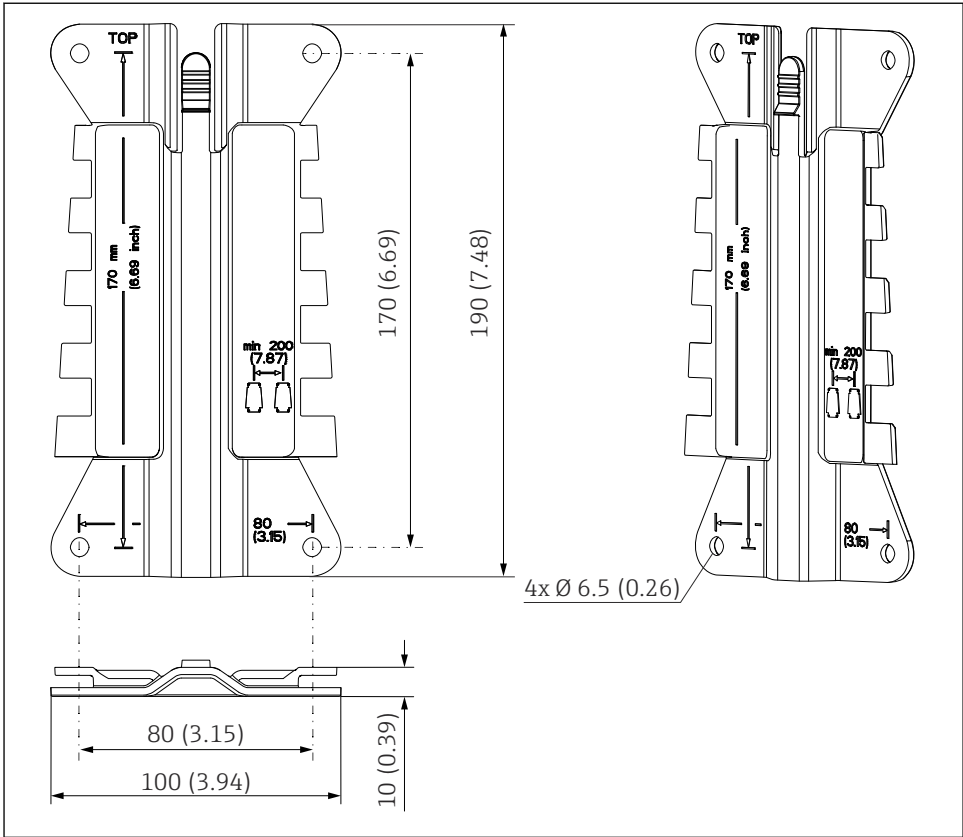
5.1.1 Dimensions



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3 Dimensions of field housing in mm (in)

5.1.2 Mounting plate (included in the delivery)



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4 Dimensions of mounting plate in mm (in)

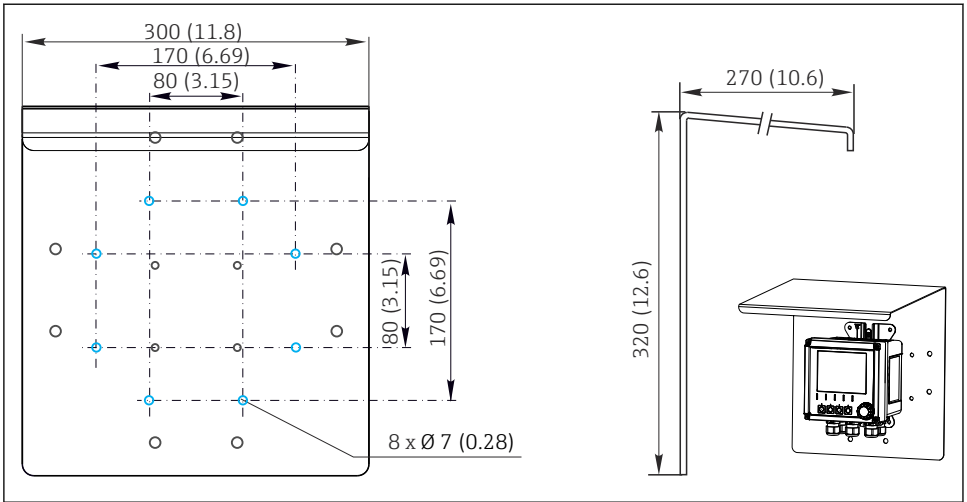
5.1.3 Weather protection cover CYY101 (optional)

NOTICE

Effect of climatic conditions (rain, snow, direct sunlight etc.)

Impaired operation to complete transmitter failure are possible!

- ▶ Always use weather protection cover CYY101 (available as an accessory) when installing the device outdoors.

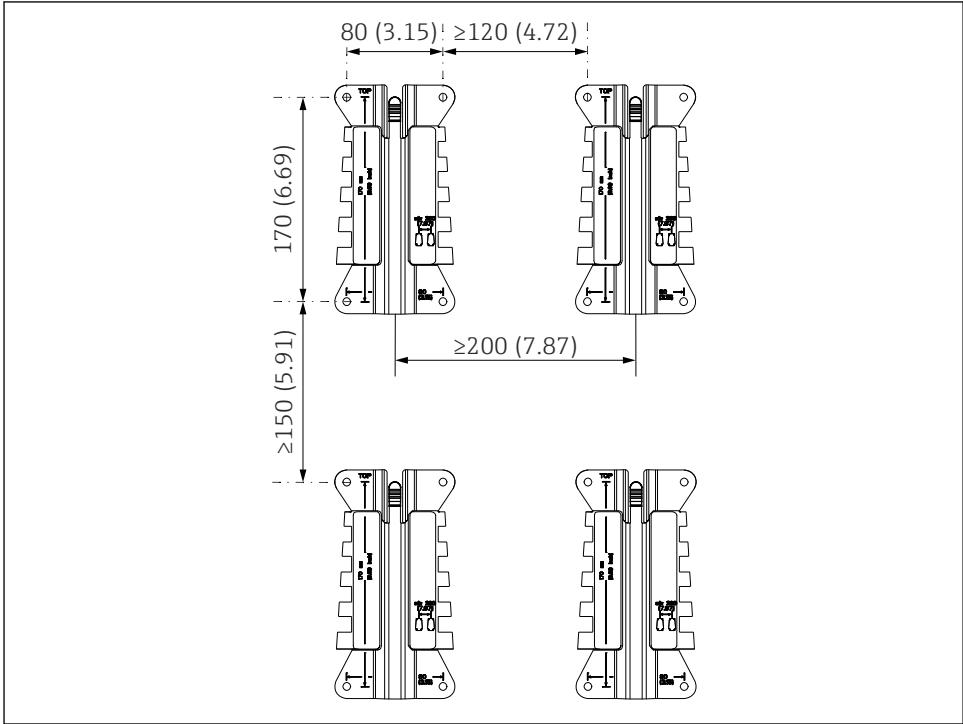


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5 Dimensions of weather protection cover CYY101 in mm (in)

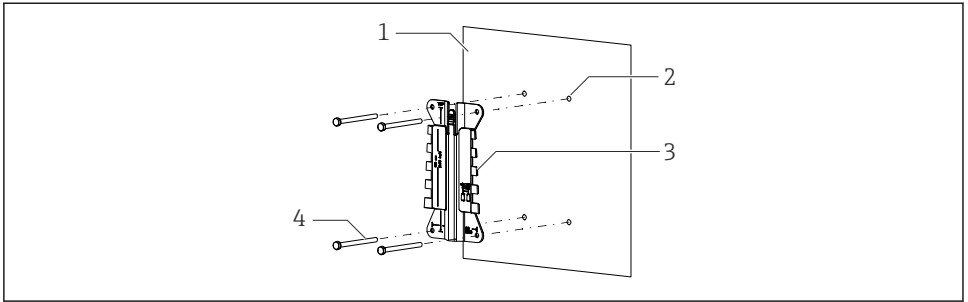
5.2 Installing the device

5.2.1 Wall mounting



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6 Mounting clearances in mm (in)



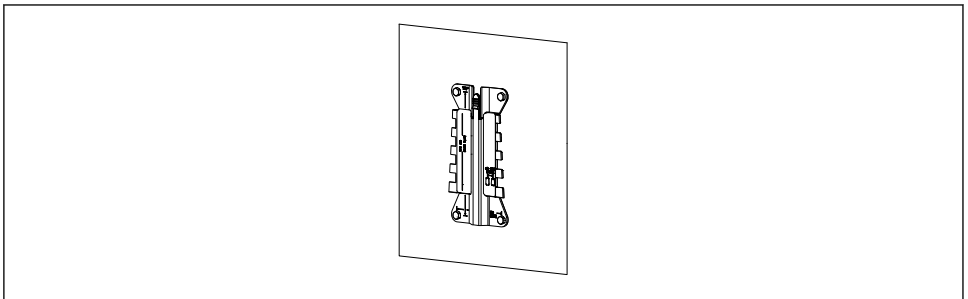
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7 Wall mounting

- 1 Wall
- 2 4 drill holes
- 3 Mounting plate
- 4 Screws (not included in the scope of delivery)

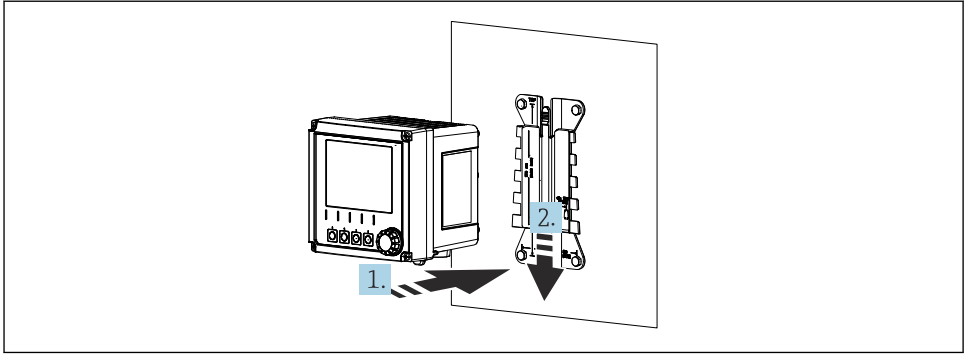
The size of the drill holes depends on the mounting material used. Mounting material must be provided by the customer.

Screw diameter: max. 6 mm (0.23 in)



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8 Mounting plate mounted on wall



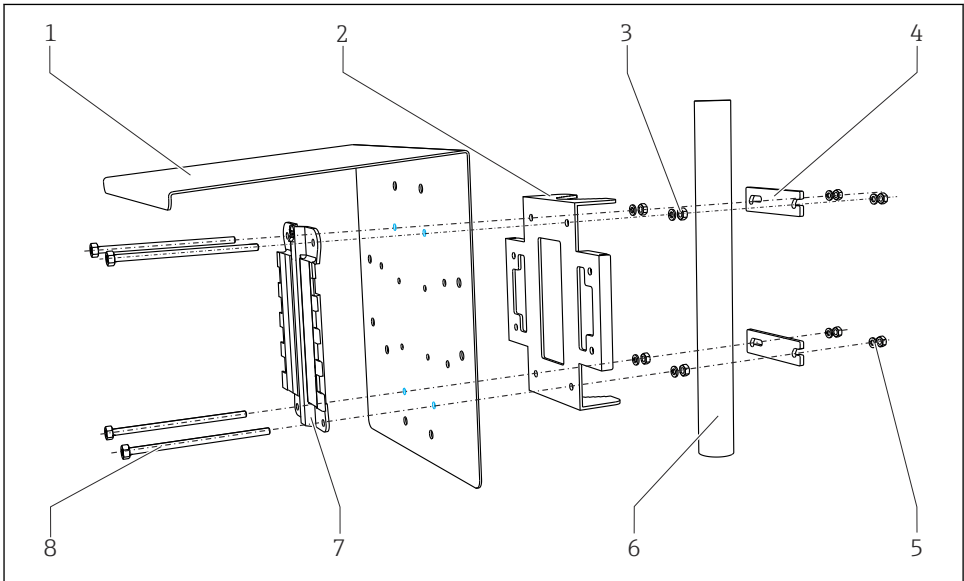
A0053944

9 Attach the device and click it into place

1. Place the device on the mounting plate.
2. Slide the device downwards in the guide on the mounting rail until it clicks into place.

5.2.2 Post mounting

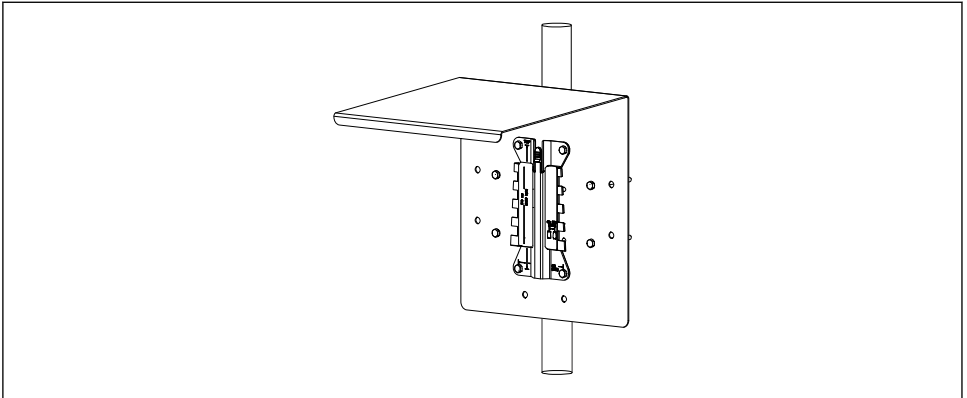
i You require the post mounting kit (optional) to mount the unit on a pipe, post or railing (square or circular, clamping range 20 to 61 mm (0.79 to 2.40")).



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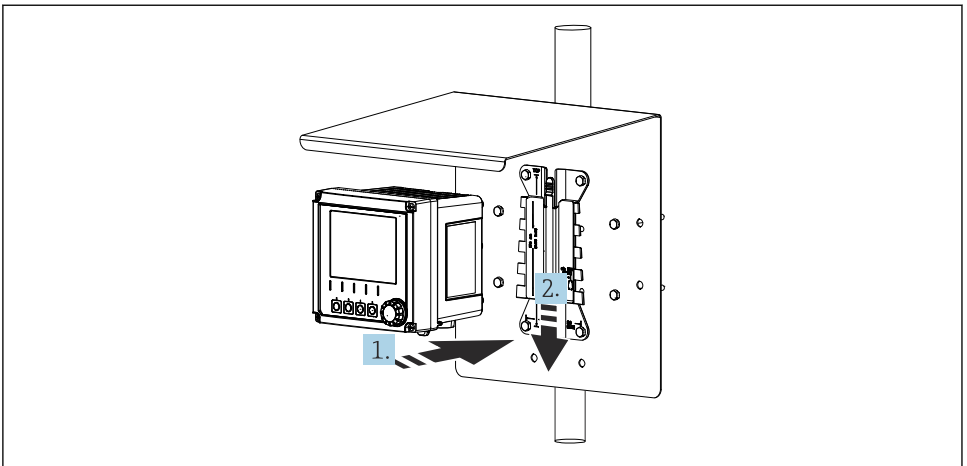
10 Post mounting

- | | | | |
|---|---|---|---|
| 1 | Weather protection cover (optional) | 5 | Spring washers and nuts (post mounting kit) |
| 2 | Post mounting plate (post mounting kit) | 6 | Pipe or post (circular/square) |
| 3 | Spring washers and nuts (post mounting kit) | 7 | Mounting plate |
| 4 | Pipe clamps (post mounting kit) | 8 | Screws (post mounting kit) |



A0053916

11 Post mounting



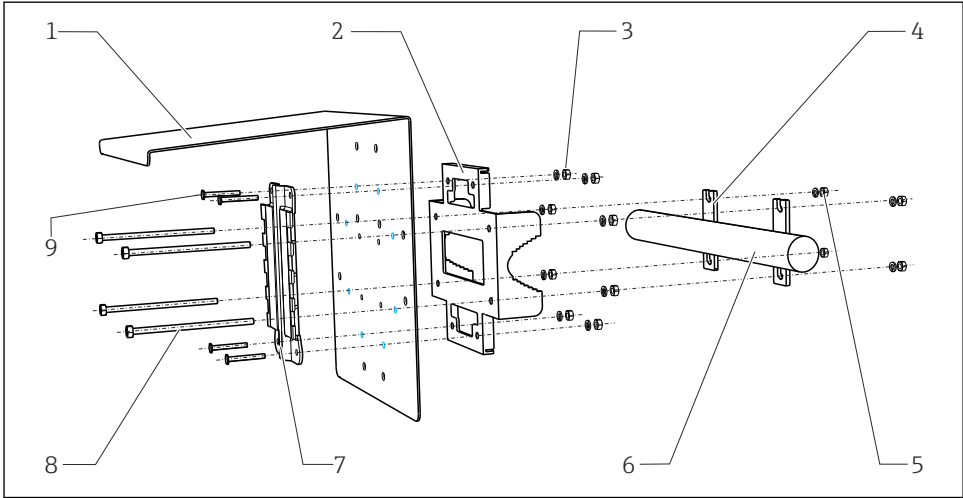
A0053917

12 Attach the device and click it into place

1. Place the device on the mounting plate.
2. Slide the device downwards in the guide on the mounting rail until it clicks into place.

5.2.3 Rail mounting

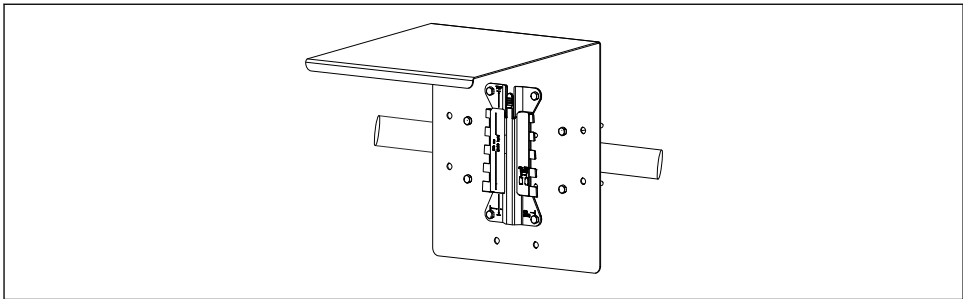
You require the post mounting kit (optional) to mount the unit on a pipe, post or railing (square or circular, clamping range 20 to 61 mm (0.79 to 2.40")).



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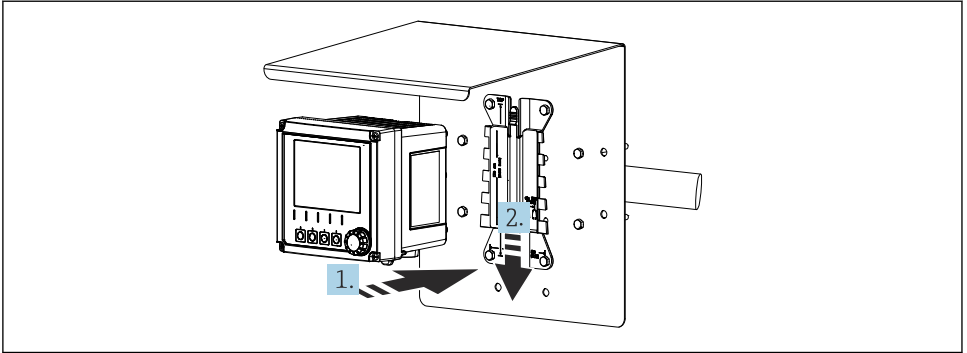
13 Rail mounting

- | | | | |
|---|---|---|-----------------------------------|
| 1 | Weather protection cover (optional) | 6 | Pipe or railing (circular/square) |
| 2 | Post mounting plate (post mounting kit) | 7 | Mounting plate |
| 3 | Spring washers and nuts (post mounting kit) | 8 | Threaded rods (post mounting kit) |
| 4 | Pipe clamps (post mounting kit) | 9 | Screws (post mounting kit) |
| 5 | Spring washers and nuts (post mounting kit) | | |



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14 Rail mounting



A0053919

15 Attach the device and click it into place

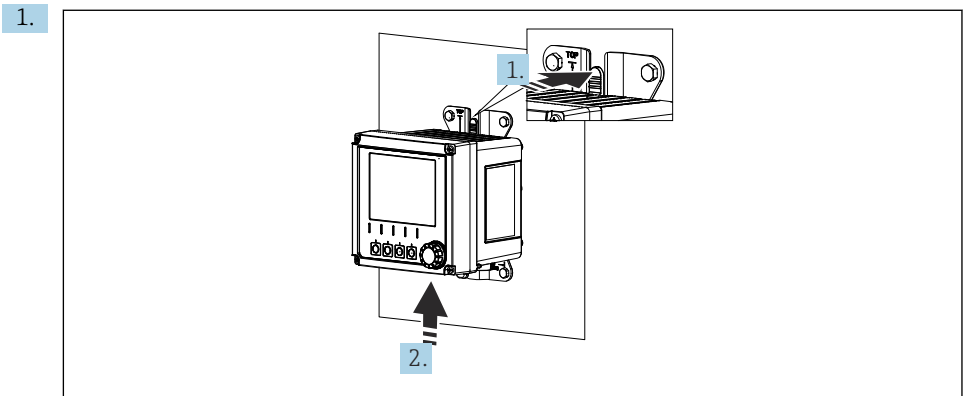
1. Place the device on the mounting plate.
2. Slide the device downwards in the guide on the mounting rail until it clicks into place.

5.2.4 Disassembly (for conversion, cleaning etc.)

CAUTION

Risk of injury and damage to the device if the device is dropped

- ▶ When pushing the housing out of the holder, secure the housing to prevent it from falling.



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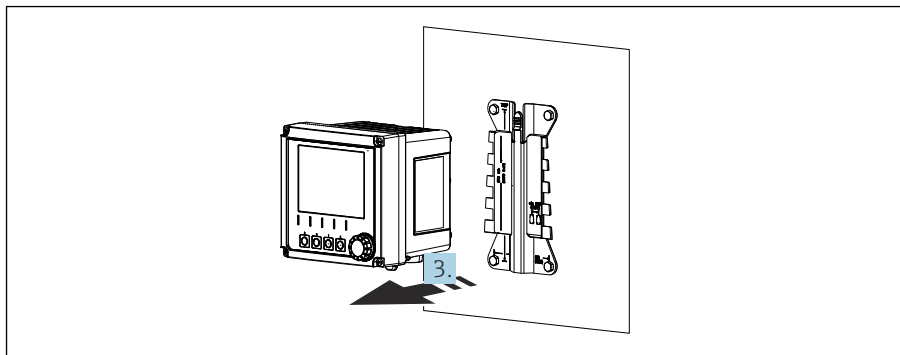
16 Disassembly

All cables have been removed.

Hold down the latch.

2. Push up the device to remove it from the holder.

3.



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17 Disassembly

Remove the device towards the front.

5.3 Post-installation check

1. Check the device for damage following mounting.
2. Check whether the device is protected against precipitation and direct sunlight (e.g. by the weather protection cover).
3. Verify that the specified installation clearances have been observed.
4. Ensure that the temperature limits are observed at the mounting location.

6 Electrical connection

6.1 Connecting requirements

6.1.1 Supply voltage

- ▶ Connect the device to a Safety Extra Low Voltage (SELV) or Protective Extra Low Voltage (PELV) system only.

6.1.2 Power units

- ▶ Use power units according to IEC 60558-2-16, IEC 62368-1 Class ES1 or IEC 61010-1.

6.1.3 Electrostatic discharge (ESD)

NOTICE

Electrostatic discharge (ESD)

Risk of damaging the electronic components

- ▶ Take personal protective measures to avoid ESD, such as discharging beforehand at PE or permanent grounding with a wrist strap, for example.

6.1.4 Unconnected cable cores

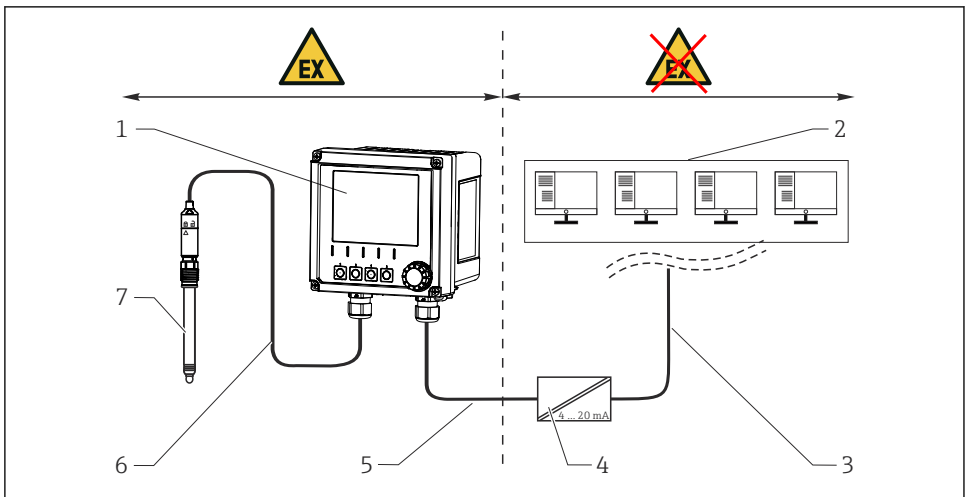
NOTICE

Unconnected cable cores can lead to malfunctions or damage to the device if they come into contact with connections, terminals and other conductive parts.

- Ensure that unconnected cable cores are sufficiently insulated from earth and from other cores by suitable terminations, e.g. by using heat-shrink tubing.

6.1.5 Installation in hazardous areas

Installation in hazardous area Ex ia Ga



A0056644

- 1 Hazardous area version of Liquiline CM42B
- 2 Control station
- 3 4 to 20 mA signal line/optional HART
- 4 Ex ia active barrier
- 5 Supply and signal circuit Ex ia, 4 to 20 mA (HART optional)
- 6 Intrinsically safe sensor circuit Ex ia
- 7 Hazardous area version of sensor

6.2 Connecting the device

6.2.1 Opening the housing

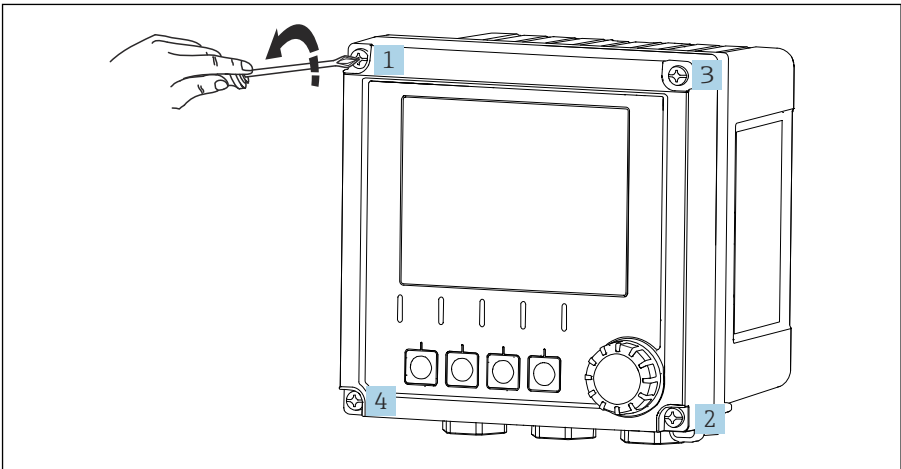
NOTICE

Use of cordless screwdrivers, screw drillers, pointed or sharp objects can damage the device

The use of a cordless screwdriver or screw driller can cause damage to the threads and impair the leak-tightness of the housing. If unsuitable tools are used, they can scratch the housing or damage the seal, and thus have a negative impact on the leak-tightness of the housing.

- ▶ Do not use a cordless screwdriver or screw driller to release and tighten the housing screws.
- ▶ Do not use any sharp or pointed objects, e.g. a knife, to open the housing.
- ▶ Use a suitable handheld screwdriver only.

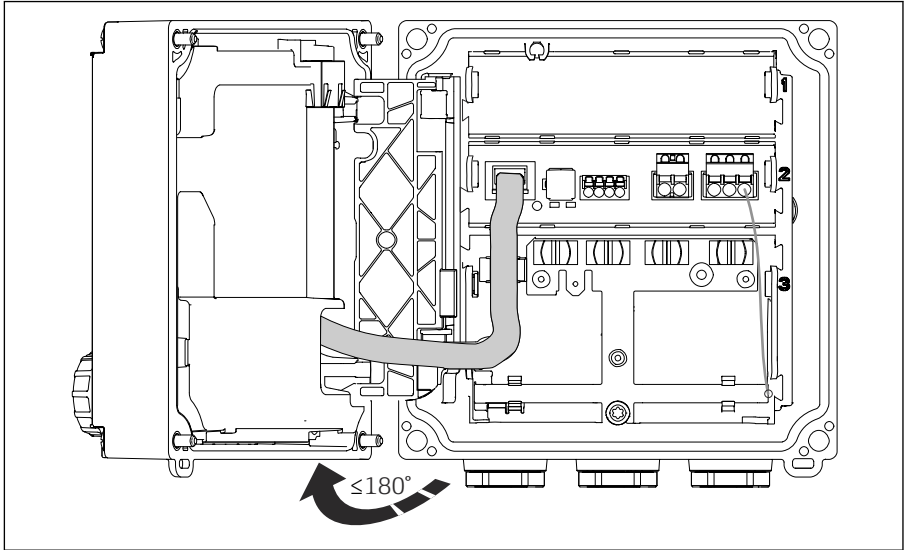
1.



A0054650

Slacken the housing screws crosswise.

2.



A0054B51

Open the cover by a maximum of 180° (depending on the orientation).

3. When closing the housing: Tighten the housing screws gradually and crosswise. Tightening torque 1 Nm

6.2.2 Connecting the cable shield

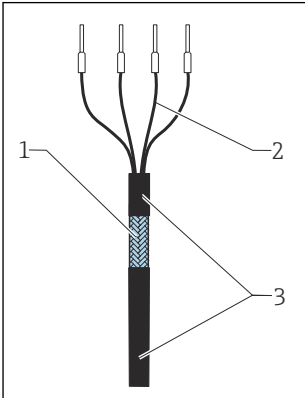
The descriptions of each of the connections specify which cables must be shielded.



Only use terminated original cables where possible.

Clamping range of grounding clamps: 4 to 11 mm (0.16 to 0.43 in)

Sample cable (does not necessarily correspond to the original cable supplied)

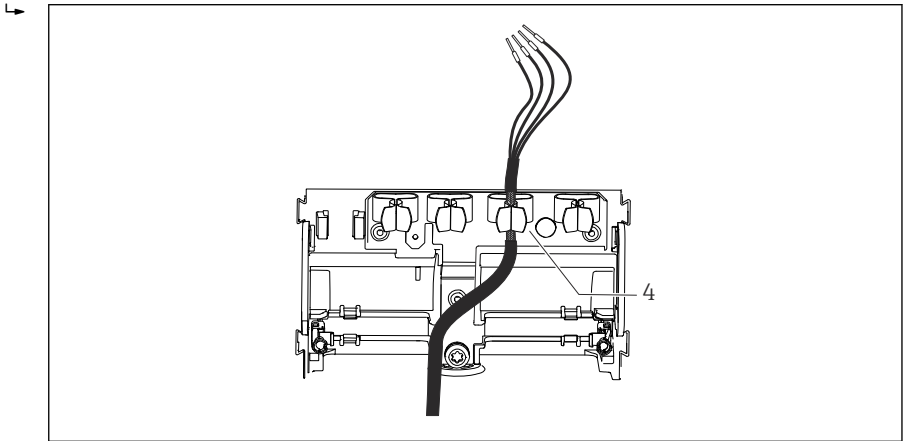


18 *Terminated cable*


- 1 *Outer shield (exposed)*
- 2 *Cable cores with ferrules*
- 3 *Cable sheath (insulation)*

1. Remove one sealing plug at the bottom of the housing.
2. Screw in a suitable cable gland.
3. Attach the gland to the cable end, making sure the gland is facing the right direction.
4. Pull the cable through the gland and into the housing.
5. Route the cable in such a way that the exposed cable shield fits into one of the grounding clamps and the cable cores can be easily routed as far as the terminal plugs.

6. Clamp the cable shield into the clamp.



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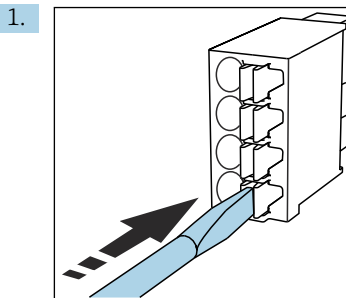
 19 Cable into grounding clamp

4 Grounding clamp

The cable shield is grounded by the grounding clamp. ¹⁾

7. Connect cable cores as per the wiring diagram.
8. Tighten the cable gland with the required torque.

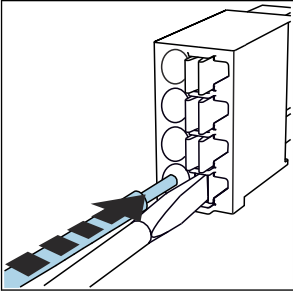
6.2.3 Cable terminals



Press the screwdriver against the clip (opens the terminal).

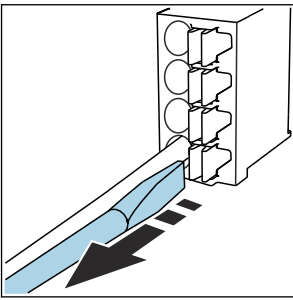
1) Refer to the instructions provided in the 'Ensuring the degree of protection' section.

2.



Insert the cable until the limit stop.

3.



Remove the screwdriver (closes the terminal).

4. After connecting, check all the cable cores to ensure they are secure.

6.2.4 Installing the cable glands

NOTICE

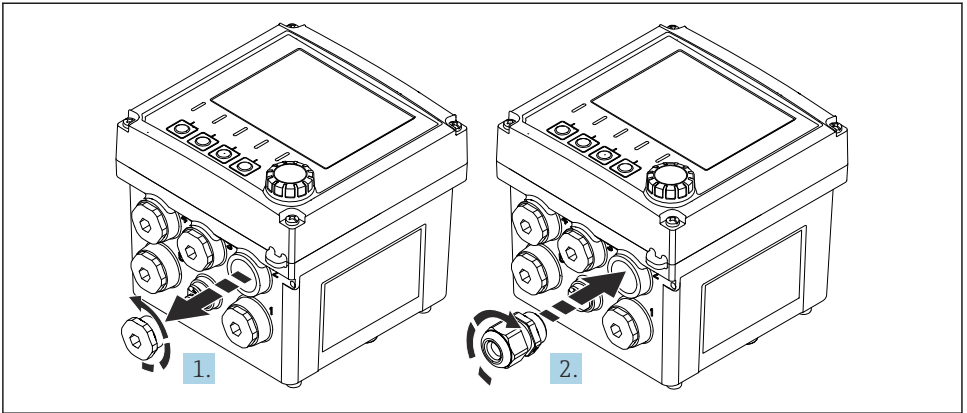
Unused cable glands installed

Housing not leak-tight

- ▶ Only fit cable glands at the positions where cables are fed through.
- ▶ Do not remove the sealing plugs at any of the other positions.

Cable glands with M20 thread

The cable glands are included in the scope of delivery in accordance with the order.

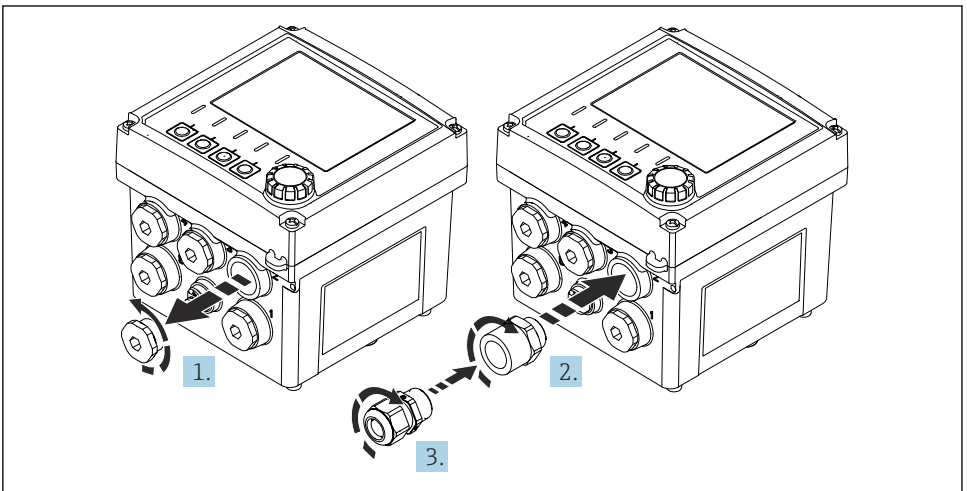


A0055833

1. Remove the sealing plug.
2. Screw in the cable gland. Tightening torque 2.5 to 3 Nm.

Cable glands with G1/2 thread or NPT1/2 thread

The cable glands and adapters are included in the delivery in accordance with the order.



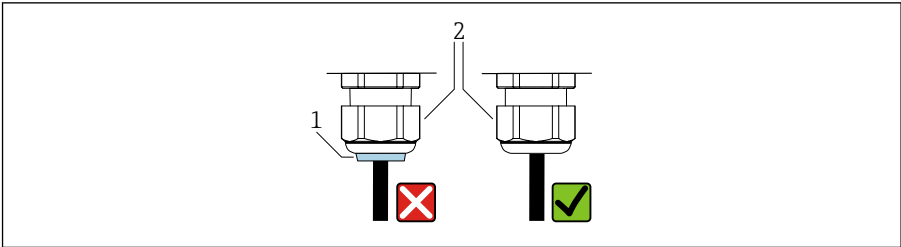
A0055834

1. Remove the sealing plug.
2. Screw in the adapter. Tightening torque 2.5 to 3 Nm.
3. Screw the cable gland into the adapter. Tightening torque 2.5 to 3 Nm.

Assignment of the cable glands

1. Feed the cables through the cable glands and connect. The illustration shows an example of how the cable glands are assigned.

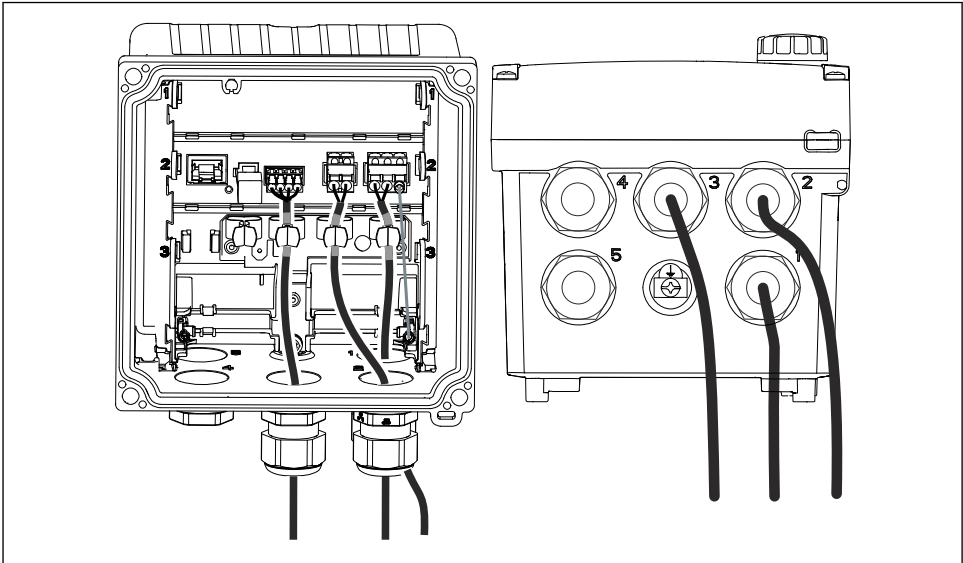
2.



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Tighten the cable gland again after the cable has been fed through. Make sure that the sealing insert (1) does not protrude from the pressure screw (2).

Feed through only one cable per cable gland.



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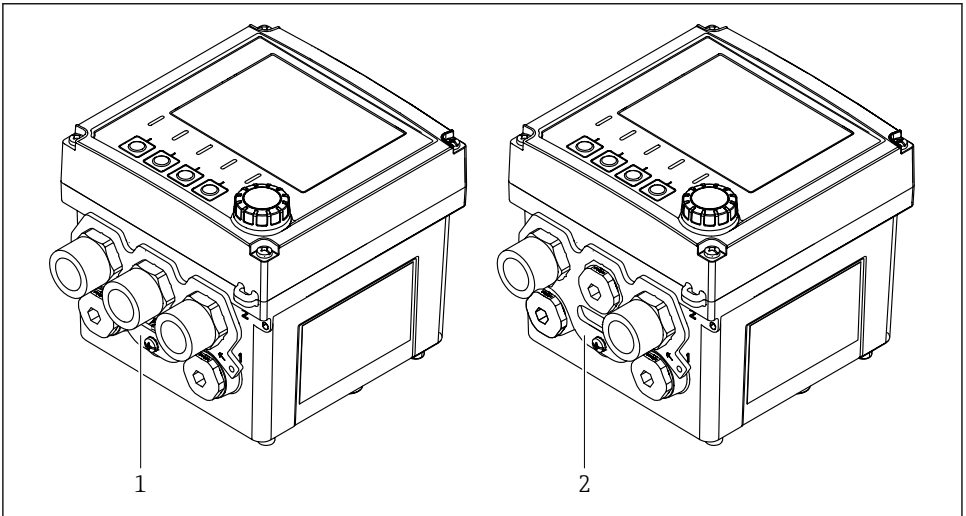
20 Example: Current outputs 1 and 2 through cable glands 1 and 2, Memosens cable through cable gland 3

6.2.5 Installing the adapters for conduit installation

The adapters are included in the scope of delivery in accordance with the order.

NOTICE**Leaks due to conduit adapter without connected pipe**

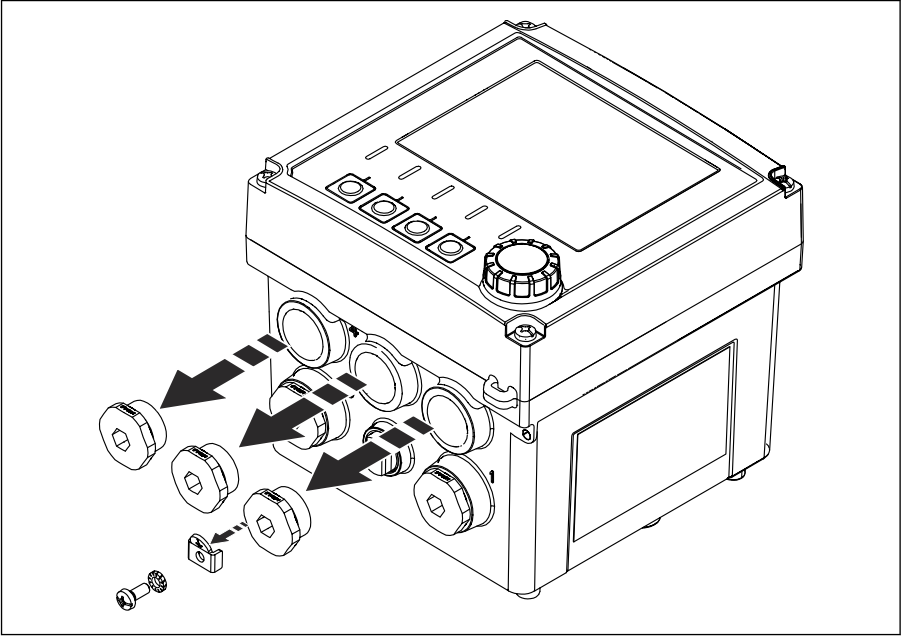
- ▶ With two pipes: Mount adapters at positions 2 and 4. Leave the sealing plugs at all the other positions.
- ▶ With three pipes: Mount adapters at positions 2, 3 and 4. Leave the sealing plugs at all the other positions.
- ▶ If a non-piped conduit adapter is mounted, seal it with a sealing plug (customer-supplied).



A0057685

- 1 Example: Three conduit adapters mounted at positions 2, 3 and 4
- 2 Example: Two conduit adapters mounted at positions 2 and 4

1.

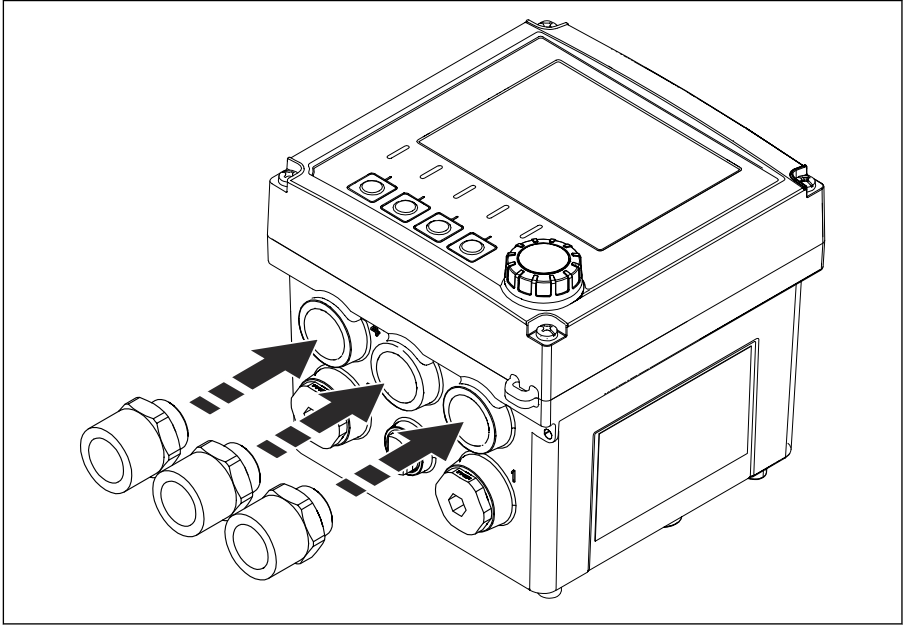


A0057686

Remove the sealing plug.

2. Remove the screw, securing disk and retaining plate from the potential equalization connection.

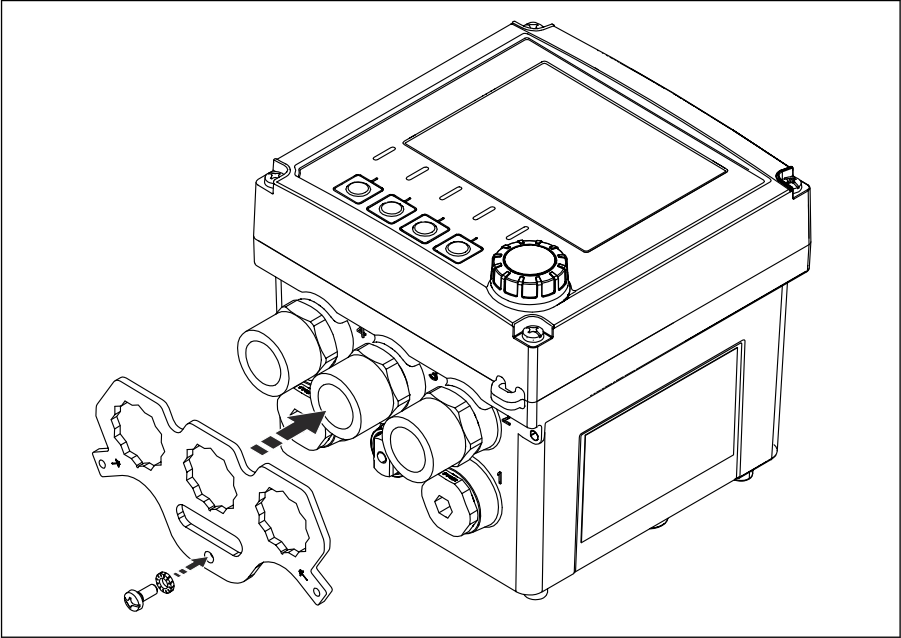
3.



A0057687

Screw in the conduit adapter. Tightening torque 2.5 to 3 Nm.

4.



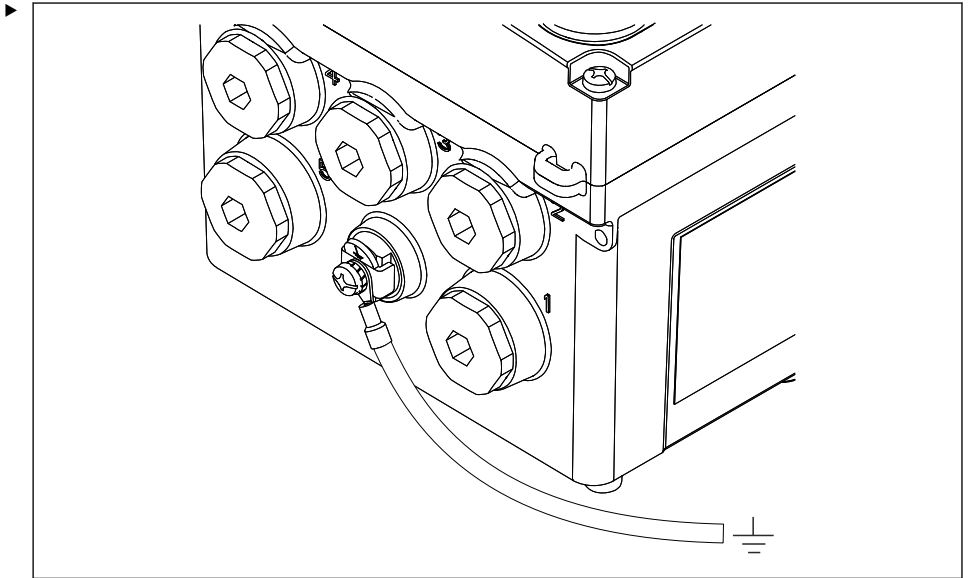
A0057690

Fit the conduit adapter support on the adapters or sealing plugs. Where necessary, align the adapters or sealing plugs by turning them.

5. Screw the conduit adapter bracket onto the equipotential bonding terminal using the screw and lock washer.
6. Bolt the piping with the adapters.

6.2.6 Connecting the potential equalization

Connecting the potential equalization – Installation without a conduit

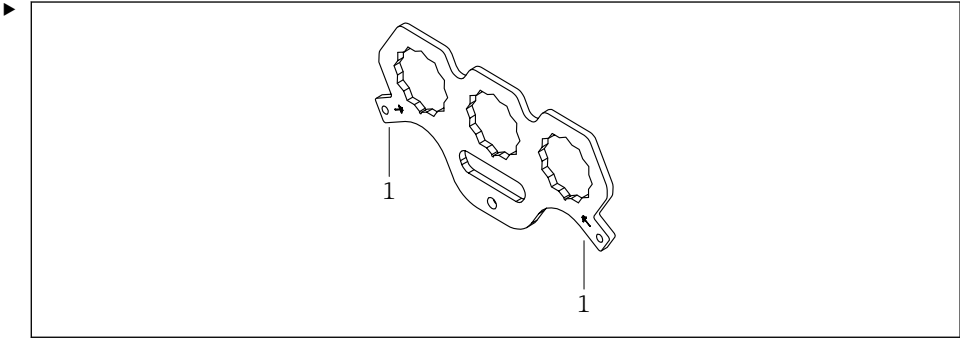


A0055870

▣ 21 *Potential equalization connection*

Attach the potential equalization connection of the housing to the earth or to the potential equalization system with a separate line. Cable cross-section max. 6 mm^2 (0.009 in^2). Where necessary, use a cable lug.

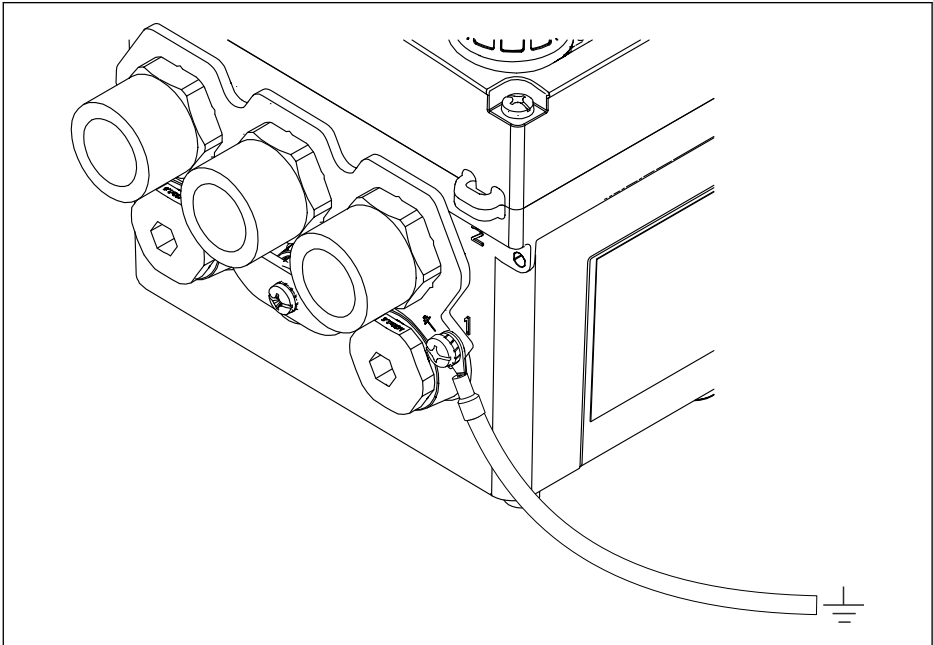
Connecting the potential equalization for conduit installation



A0057719

22 Conduit adapter support

1 Connections for potential equalization



A0057705

23 Potential equalization connection for conduit mounting

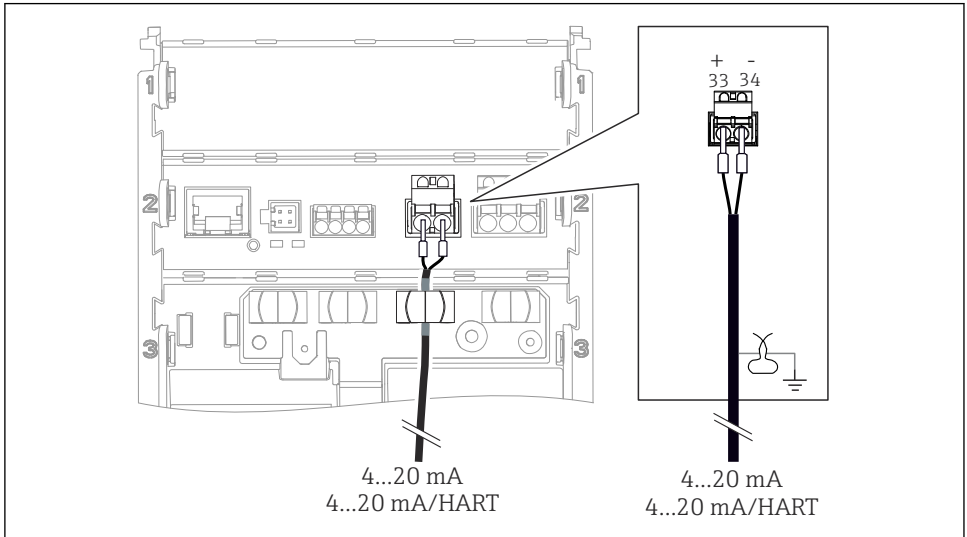
For conduit mounting, connect the ground cable to a potential equalization connection of the conduit adapter support. The conduit adapter support has two potential equalization connections.

6.2.7 Connecting the power supply and signal circuit

Shielded cables are required if HART (optional for current output 1) is used. If HART is not used, unshielded cables can also be used.

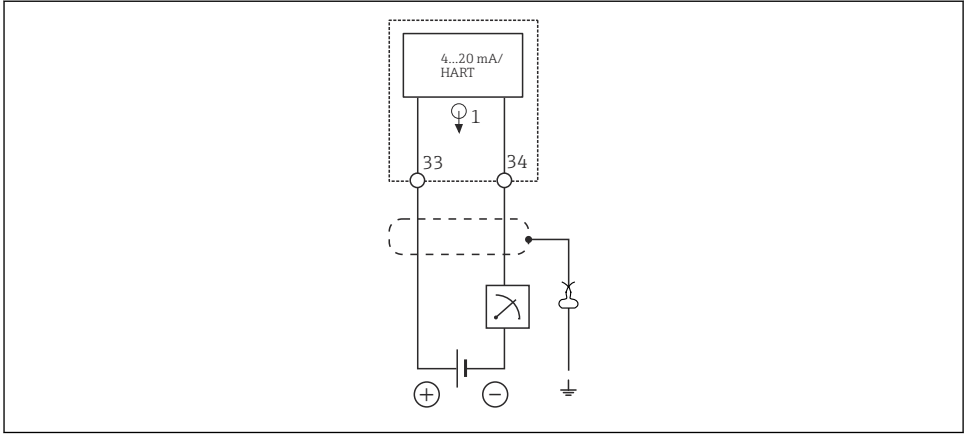
- ▶ Connect the current outputs with shielded two-wire cables as described in the following illustrations.

The type of shield connection depends on the anticipated interference influence. Grounding one side of the shield is sufficient to suppress electrical fields. To suppress interference due to an alternating magnetic field, the shield must be earthed on both sides.



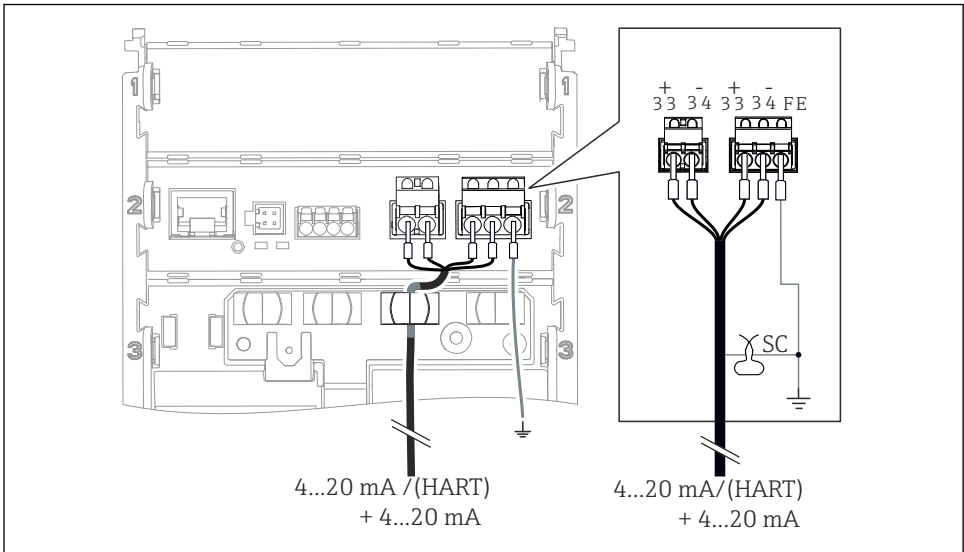
A0054900

24 Connection of 1 current output (example: device with HART)



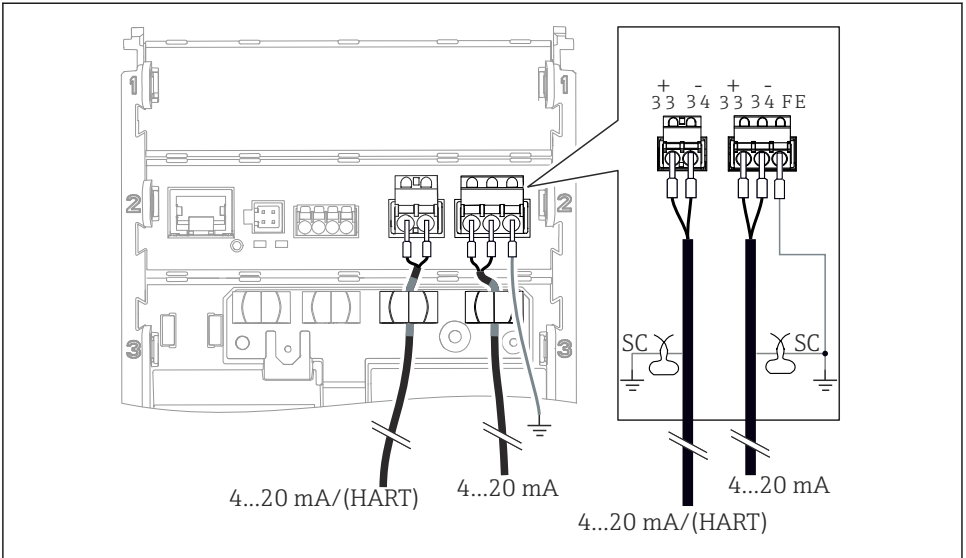
A0054914

25 Wiring diagram: 1 current output (current output with HART)



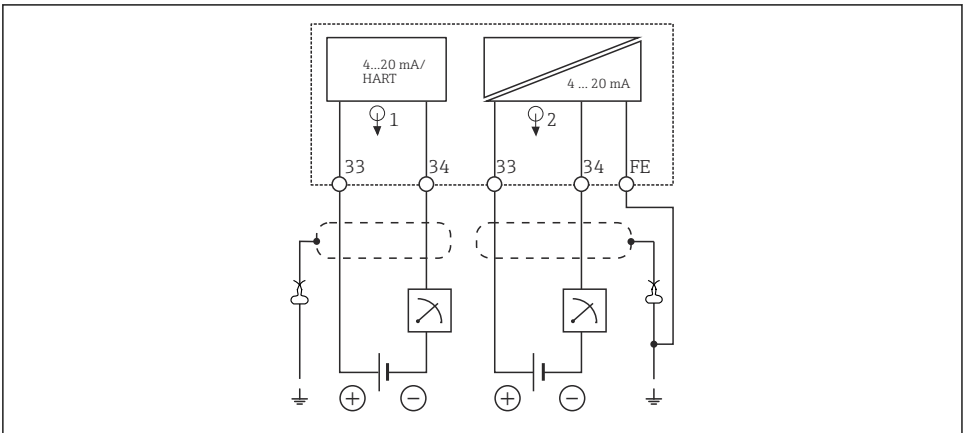
A0054901

26 Connection of 2 current outputs via 1 shielded cable (current output 1 with HART)



A0054902

27 Connection of 2 current outputs via 2 shielded cables (current output 1 with HART)




A0054915

28 Wiring diagram: 2 current outputs (current output 1 with HART)

6.2.8 Connecting the sensor

Abbreviations and color codes used

Explanation of abbreviations and labels used in the following illustrations:

Abbreviation	Meaning
pH	pH signal
Ref	Signal from reference electrode
PM	Potential Matching = Potential equalization (PAL)
Sensor	Sensor
⊘	Signal of temperature sensor
d.n.c.	do not connect!
 A0056947	Cable shield grounding clamp

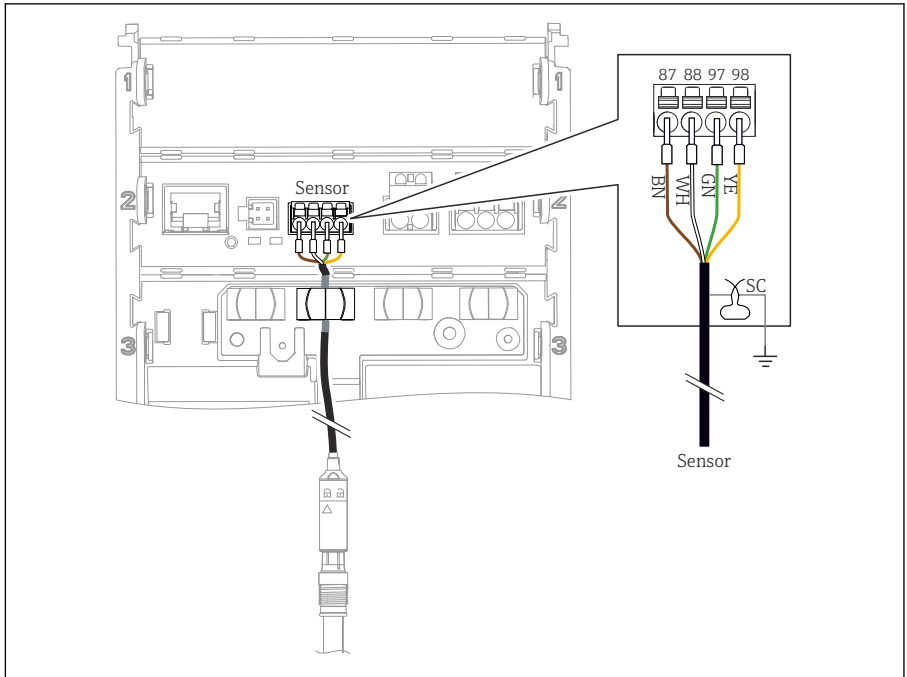
Explanation of color codes in the following illustrations:

Color code	Meaning
BK	Black
BN	Brown
BU	Blue
GN	Green
OG	Orange
RD	Red
YE	Yellow
VT	Violet
WH	White
TR	Transparent
SC	Braided shield/silver

Memosens sensors

Connecting sensors with Memosens plug-in head (via Memosens cable) and sensors with a fixed cable and Memosens protocol

1.



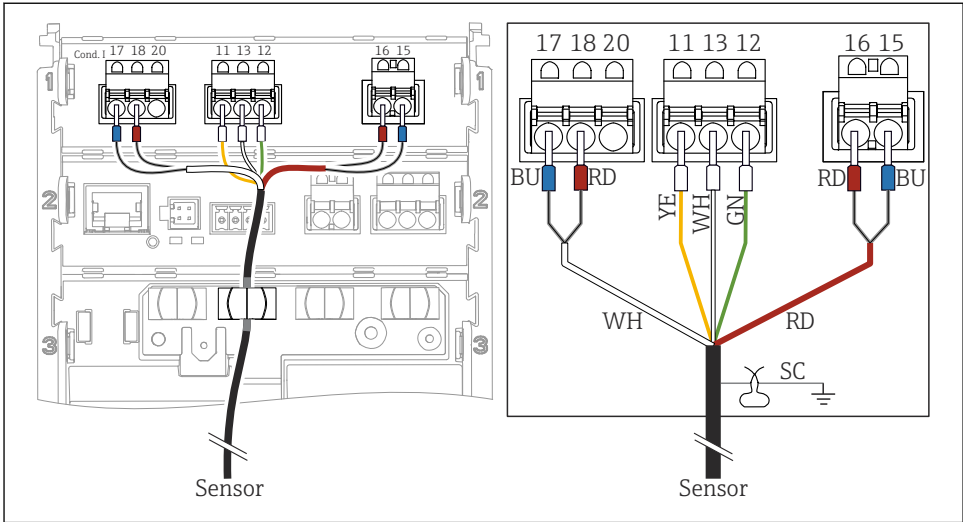
A0055579

29 Connecting Memosens sensors

Connect the sensor cable as shown in the illustration.

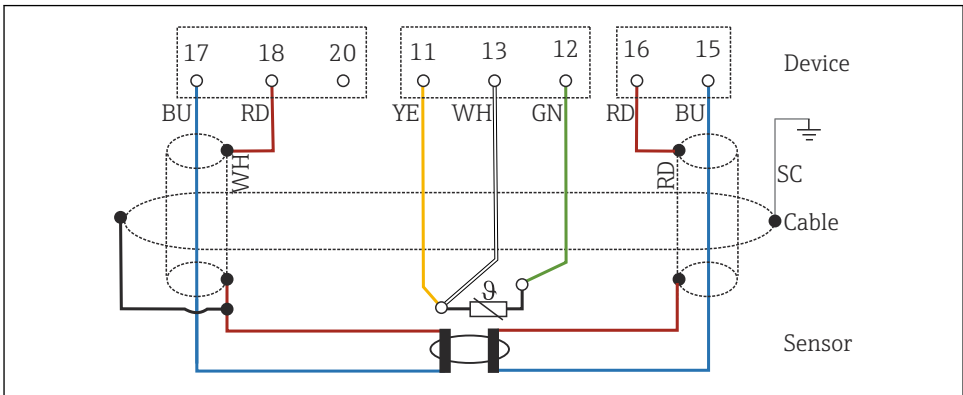
2. Ground the cable shield via the ground terminal.

Analog conductivity sensors (inductive)



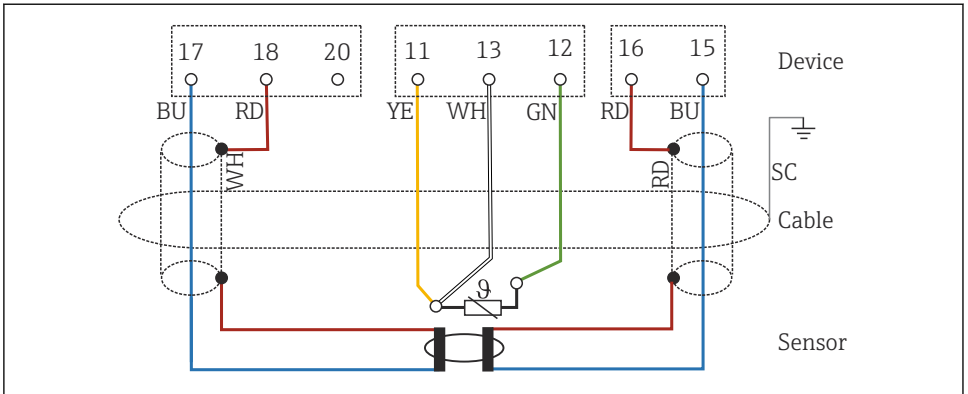
A0055787

30 Device view



A0055796

31 Wiring diagram CLS50



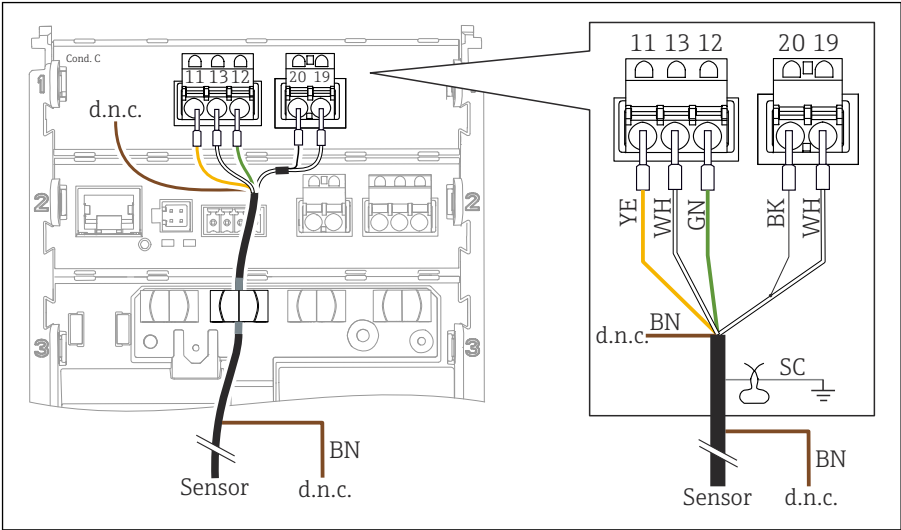
A0055799

32 Wiring diagram CLS54

1. Connect the sensor as shown in the illustration.
2. Ground the cable shield via the ground terminal.

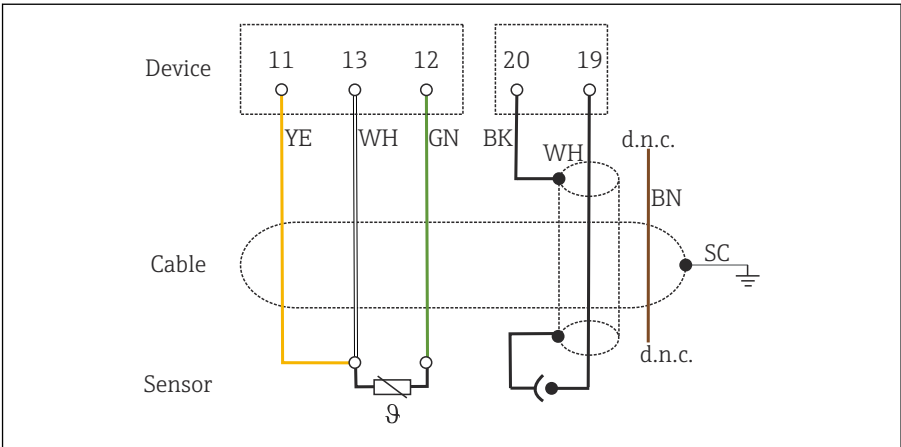
Analog conductivity sensors (conductive)

1.



A0061799

33 Device view



A0060654

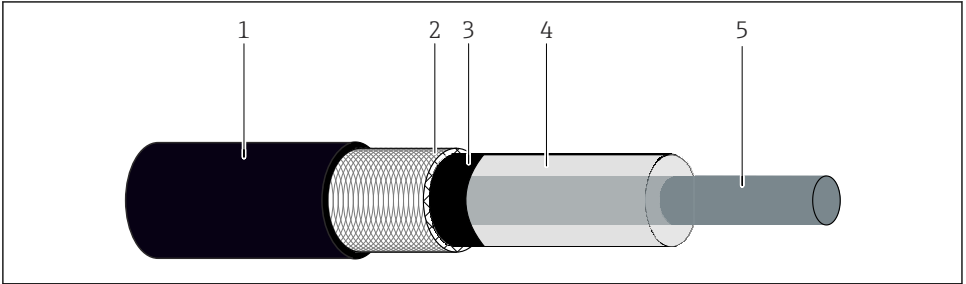
34 Wiring diagram

Connect the sensor as shown in the illustration.

2. Ground the cable shield via the ground terminal.

analog pH sensors

Note on connecting coaxial cables



A0056259

35 Coaxial cable structure

- 1 Protective sheath
- 2 Shield/outer conductor of the coaxial cable
- 3 Semi-conductive polymer layer
- 4 Inner insulation
- 5 Inner conductor

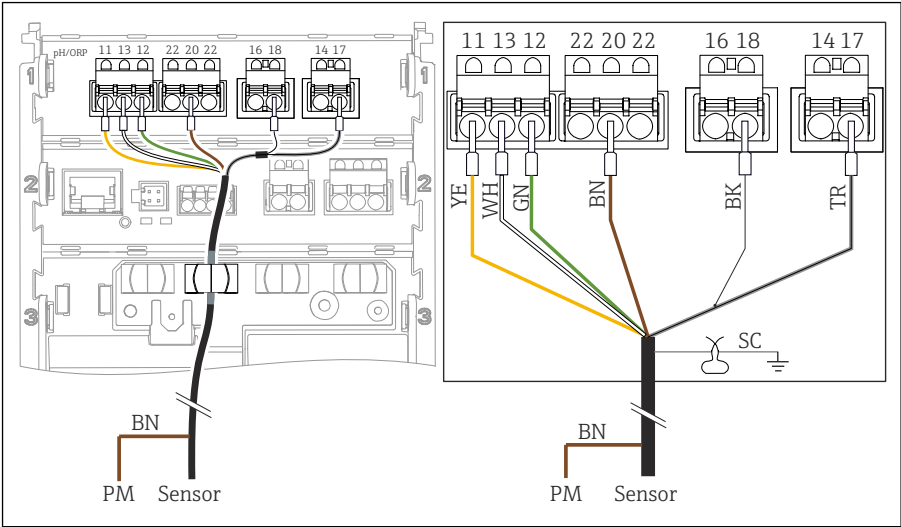
1. Completely remove the semi-conductive polymer layer (3) up to the end of the shield.
2. Ensure that the inner insulation (4) of the coaxial cable is not in contact with other components. Ensure there is an air gap around all components; otherwise, measurement errors may occur.

Unconnected cables

- ▶ Route unconnected cables (marked with d.n.c.) in such a way that they are not in contact with other connections.

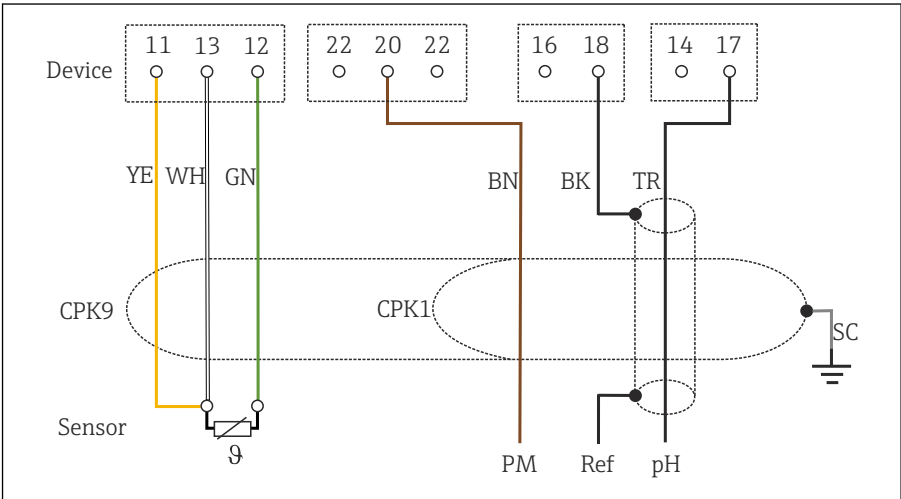
Connecting pH glass electrodes with PML (symmetrical)

1.



A0055755

36 Device view



A0060657

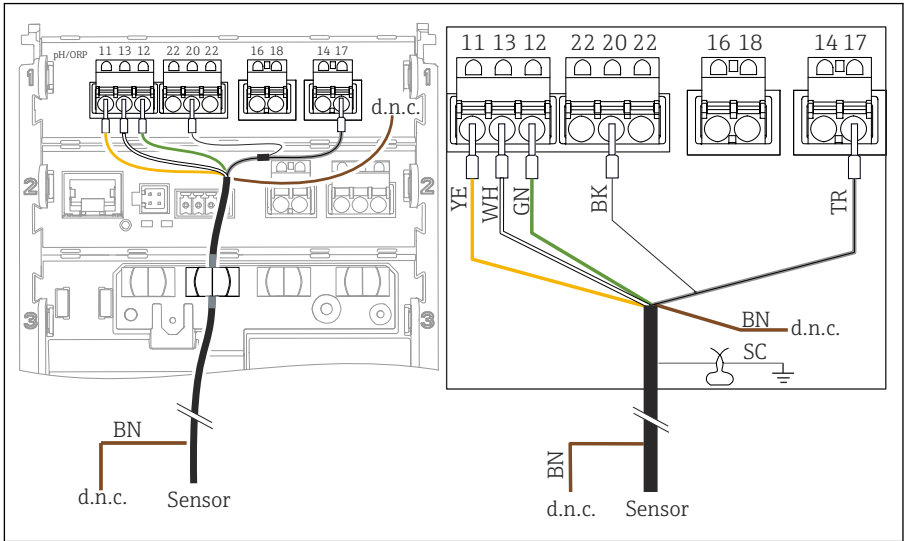
37 Wiring diagram

Connect the sensor as shown in the illustration.

2. Ground the cable shield via the shield clamp.

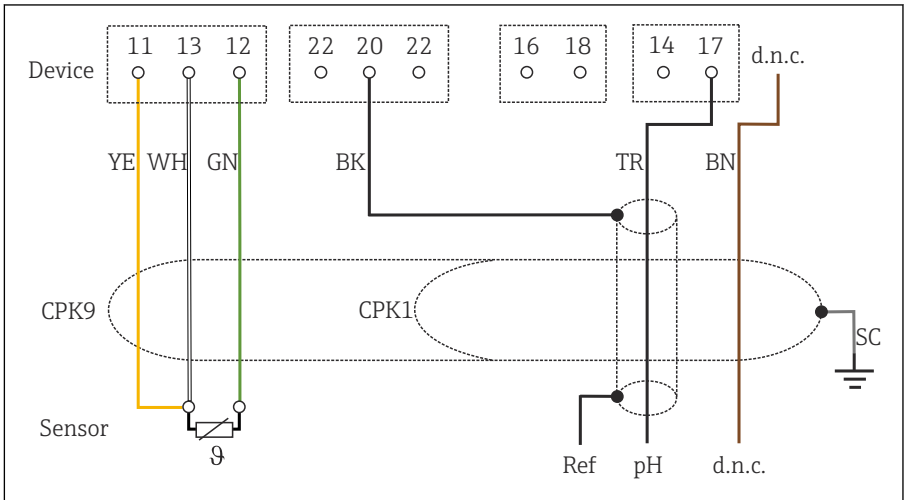
Connecting glass sensors without PML (asymmetrical)

1.



A0055760

38 Device view



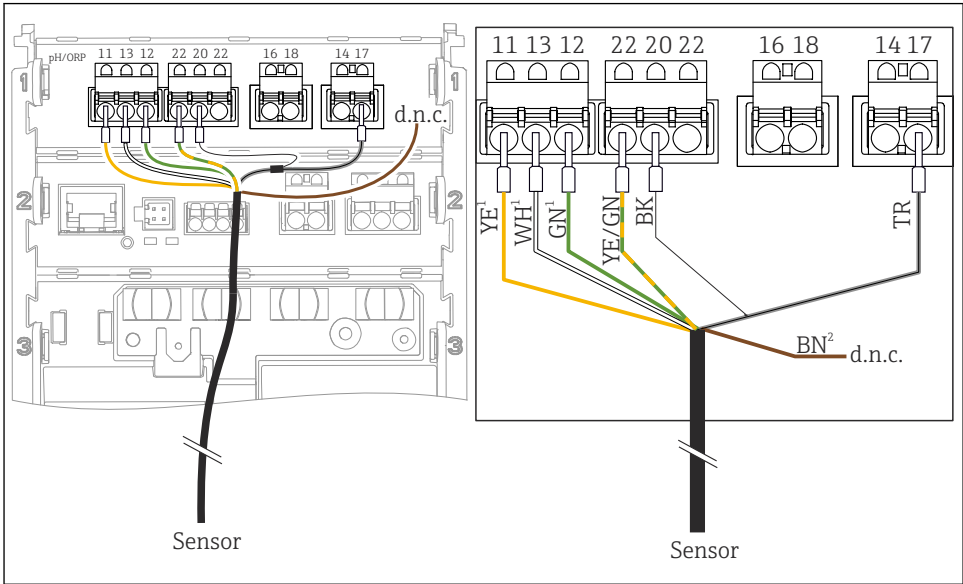
A0060685

39 Wiring diagram

Connect the sensor as shown in the illustration.

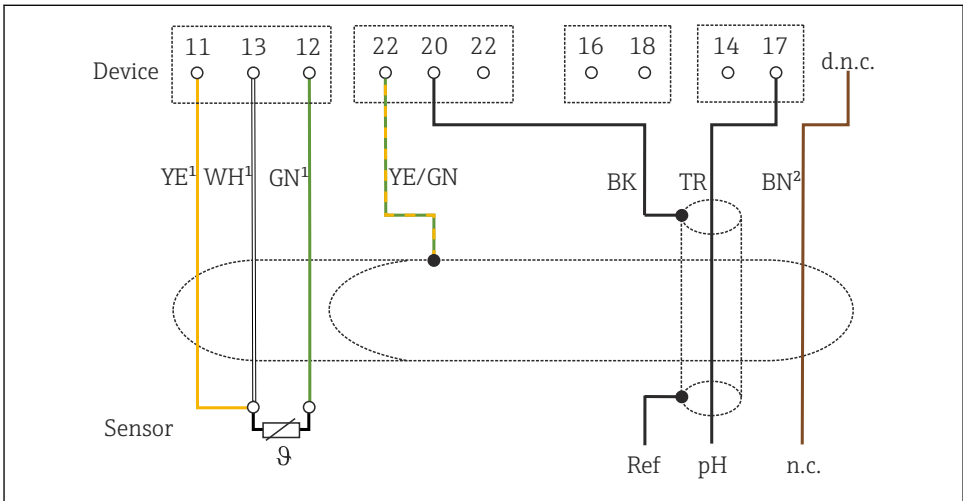
2. Ground the cable shield via the shield clamp.

Connecting ORP sensor CPF82 and pH sensor CPF81, without PML (asymmetrical) in each case with a fixed cable



A0061665

40 Device view



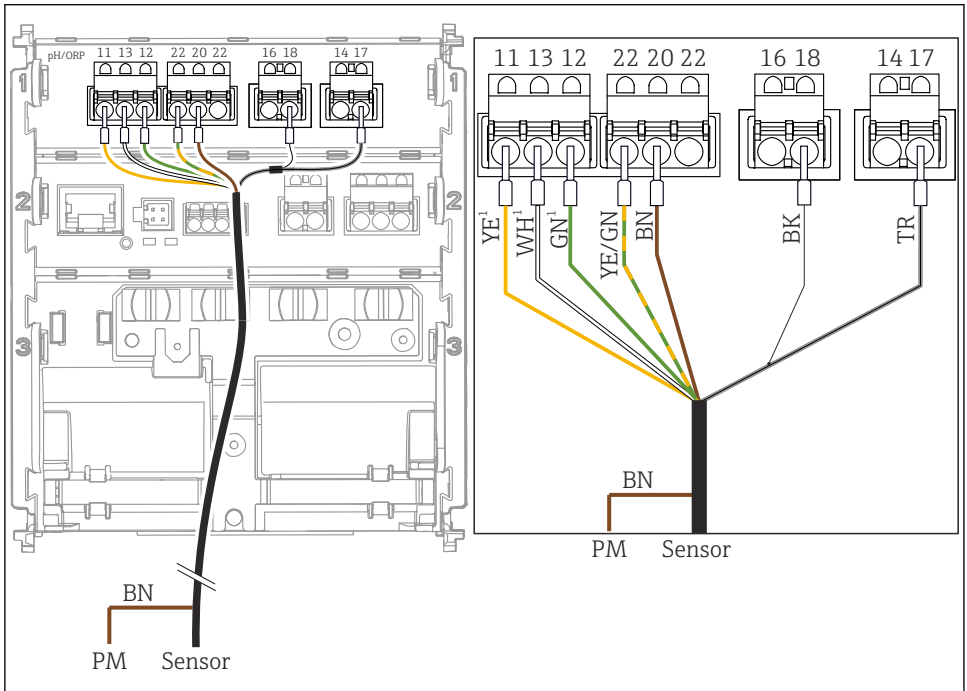
A0061667

41 Wiring diagram

- 1: Only available for version with temperature sensor
- 2: Not available depending on the version

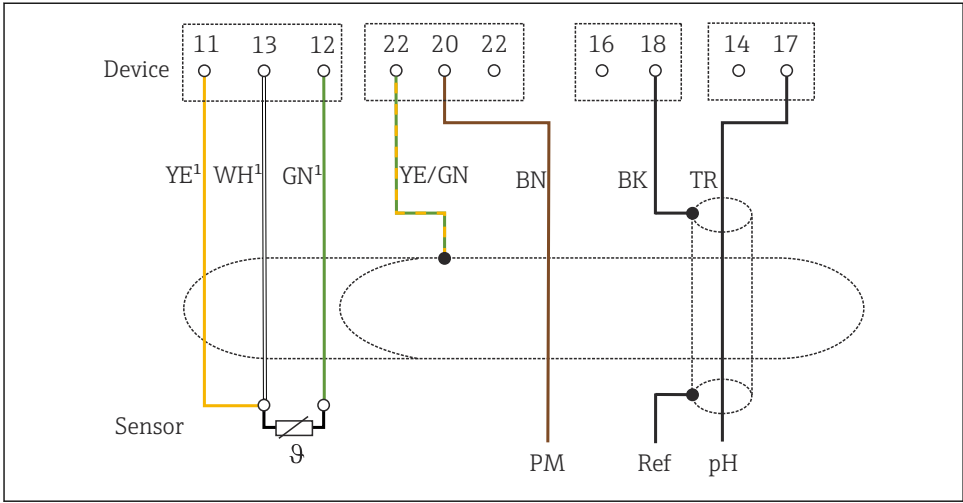
► Connect the sensor as shown in the illustration.

Connecting pH sensor CPF81 with PAL (asymmetrical) with a fixed cable



A0061671

42 Device view



A0061672

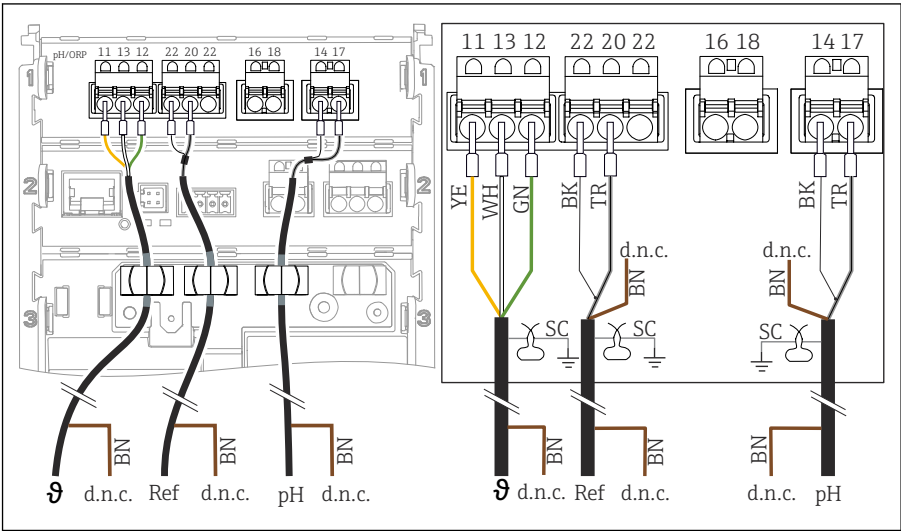
43 Wiring diagram

¹: Only available for version with temperature sensor

- Connect the sensor as shown in the illustration.

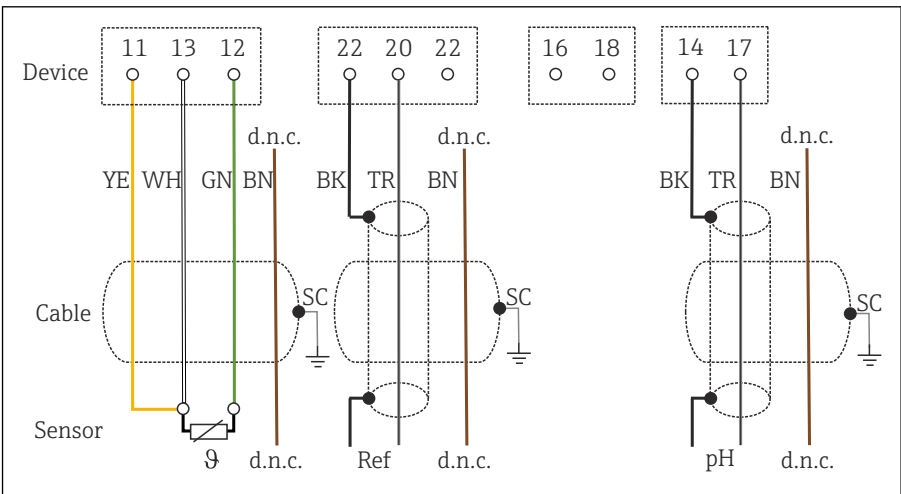
Connecting pH single electrodes without PML (asymmetrical) and separate reference electrode and separate temperature sensor

1.



A0055771

46 Device view



A0055776

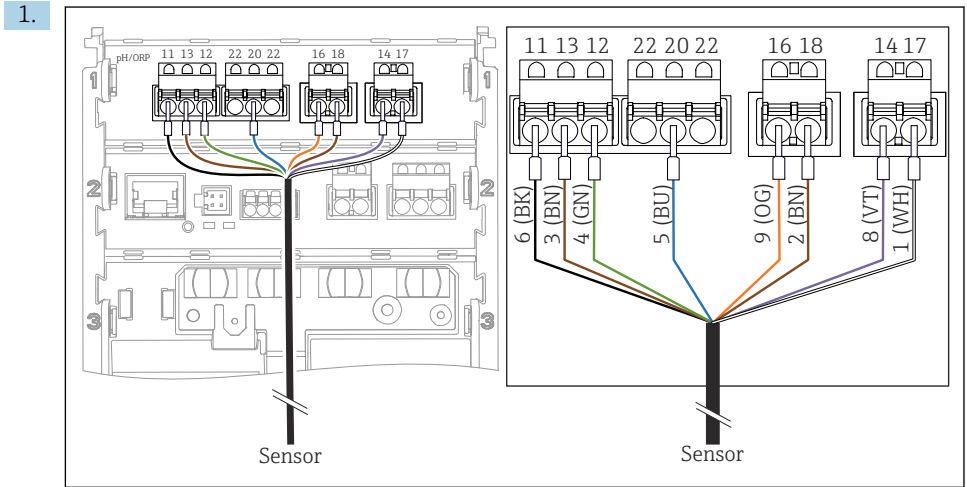
47 Wiring diagram

Connect the sensor as shown in the illustration.

2. Ground cable shields via shield clamps.

Connecting pH enamel electrodes

Pfaufler electrode, absolute (type O3/type O4) with PML (symmetrical) with LEMOSA cable

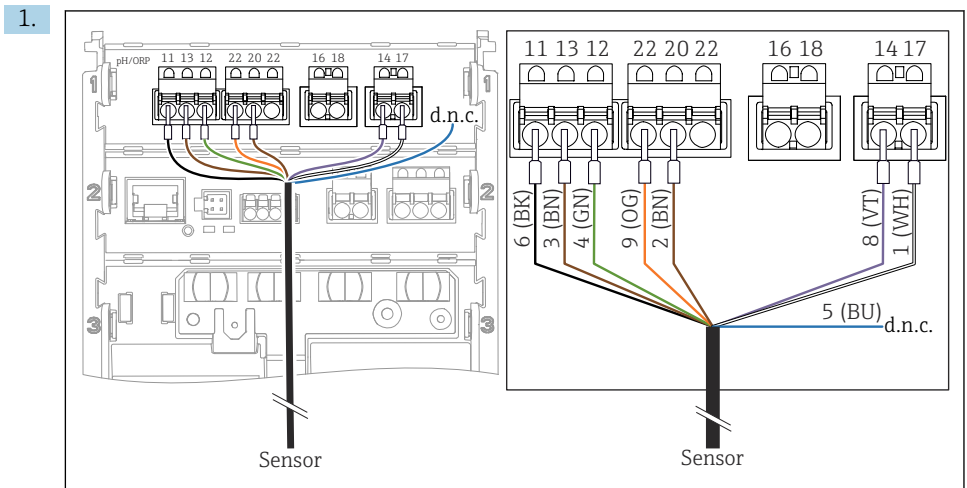


A0056295

Connect the sensor as shown in the illustration.

2. Only ground the cable shield on the sensor side.

Pfaufler electrode, absolute (type O3/type O4) without PML (asymmetrical) with LEMOSA cable



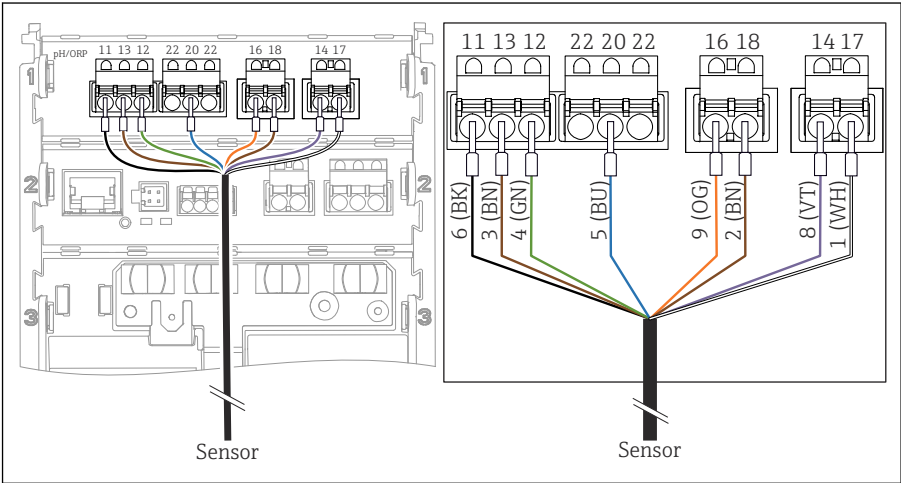
A0056296

Connect the sensor as shown in the illustration.

2. Only ground the cable shield on the sensor side.

Pfaunder electrode, relative (type 18/type 40) with PML (symmetrical) with LEMOSA cable

1.



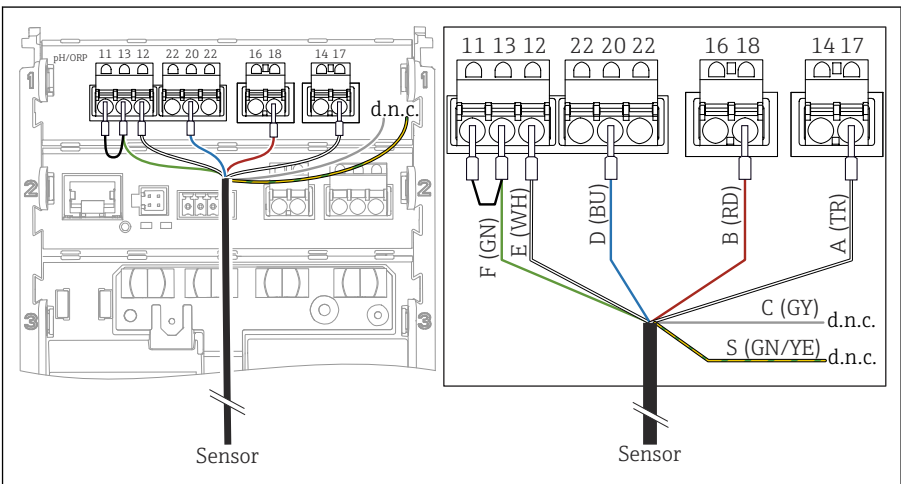
A0056295

Connect the sensor as shown in the illustration.

2. Only ground the cable shield on the sensor side.

pH-Reiner Pfaunder electrode with PML (symmetrical) with VARIOPIN cable

1.



A0057228

Connect the sensor as shown in the illustration.

2. Only ground the cable shield on the sensor side.

6.3 Ensuring the degree of protection

Only the mechanical and electrical connections which are described in these instructions, and which are necessary for the required designated application, may be established on the device delivered.

- ▶ Exercise care when carrying out the work.

Individual types of protection permitted for this product (impermeability (IP), electrical safety, EMC interference immunity, explosion protection) can no longer be guaranteed if, for example:

- Covers are left off
- Different power units from the ones permitted are used
- Cable glands are not tightened sufficiently
- Unsuitable cable diameters are used for the cable glands
- The housing cover is not properly secured (danger of moisture entering due to inadequate sealing)
- Cables/cable ends are loose or insufficiently tightened
- Cable shields not grounded using grounding clamp in accordance with the instructions
- Grounding is not ensured via the connection for potential equalization

6.4 Post-connection check

WARNING

Connection errors

The safety of people and of the measuring point is under threat. The manufacturer does not accept any responsibility for errors that result from failure to comply with the instructions in this manual.

- ▶ Put the device into operation only if you can answer **yes** to **all** the following questions.
- Are the device and cable undamaged (visual inspection)?
- Do the cables have adequate strain relief?
- Are the cables routed without loops and cross-overs?
- Does the supply voltage match the information on the nameplate?
- No reverse polarity?
- Correct terminal assignment?

7 Operation options

7.1 Overview of operation options

Operation and settings via:

- Operating elements on the device
- SmartBlue app (The full range of functions can be enabled by entering an activation code).
- Control station via HART (The full range of functions can be enabled by entering an activation code).

7.2 Access to the operating menu via the local display

7.2.1 User management

The local display menu offers user management functions with 2 user roles:

- Operator
- Maintenance

Both roles can be protected via a PIN as an option.

Set PINs

It is recommended to set PINs after initial commissioning.

1. Navigate to the path: **Menu/System/Security/Device PINs**
2. Set 4-digit PINs for the user roles. Only one PIN can be set for the **Operator** role if a PIN has already been set for the **Maintenance** role.

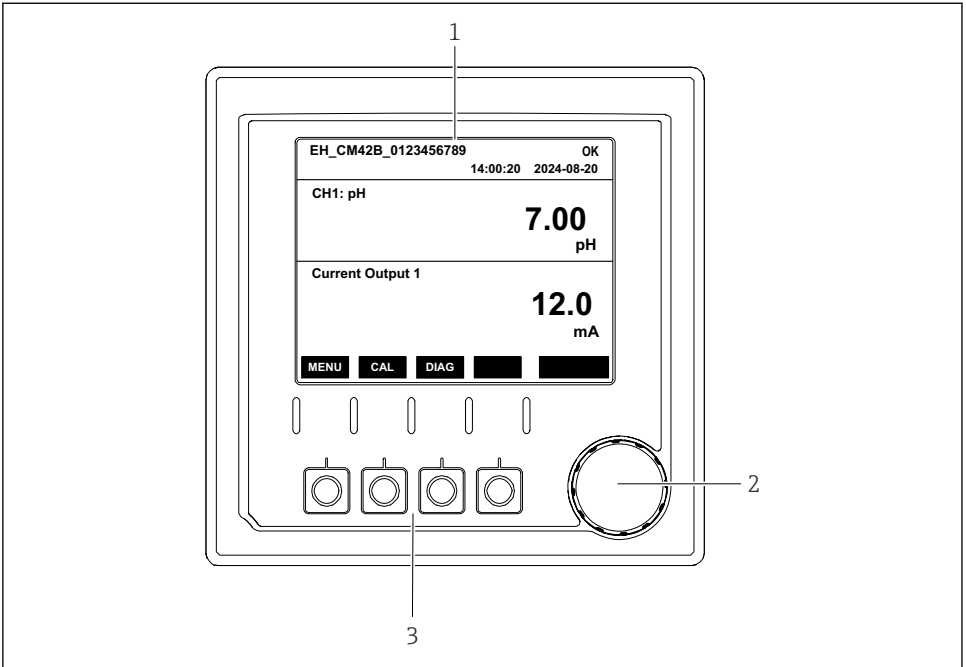
Overview of function access

PIN status	Device operation
No PINs set (as-delivered state)	Full access to the device menu is possible without login.
PIN set for Maintenance user role	<ul style="list-style-type: none"> ▪ The Operator user role functions can be accessed without login. ▪ Login with a PIN is required for the Maintenance user role functions. ▪ When the menu is called up, the Operator user role functions are displayed. ▪ Login with a PIN is required to access the Maintenance user role functions.
PIN set for Maintenance and Operator user roles	<ul style="list-style-type: none"> ▪ Measured values are displayed without logging in ▪ To access additional features, you must log in to a user role using the corresponding PIN. ▪ The login options for both user roles are displayed when you call up the menu.

Overview of user role access rights

User role	Access rights
Operator	<ul style="list-style-type: none"> ▪ Operating ▪ Calibration and adjustment functions ▪ Change and reset your PIN
Maintenance	<ul style="list-style-type: none"> ▪ Operating ▪ Calibration and adjustment functions ▪ Configuration and maintenance ▪ Change and reset your PIN and Operator user role PIN

7.2.2 Operating elements

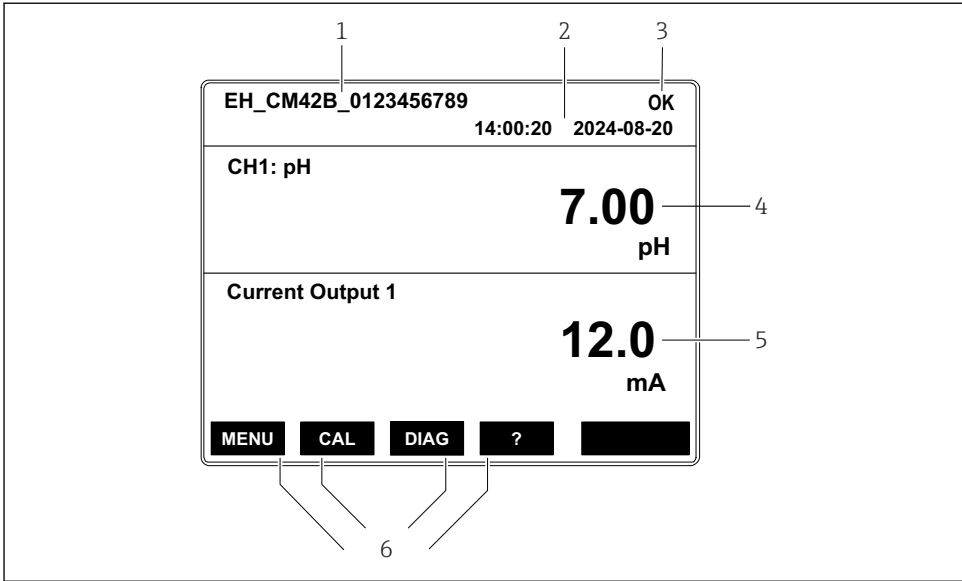


A0056333

48 Operating elements

- 1 Display
- 2 Navigator
- 3 Soft keys

7.2.3 Structure of the display



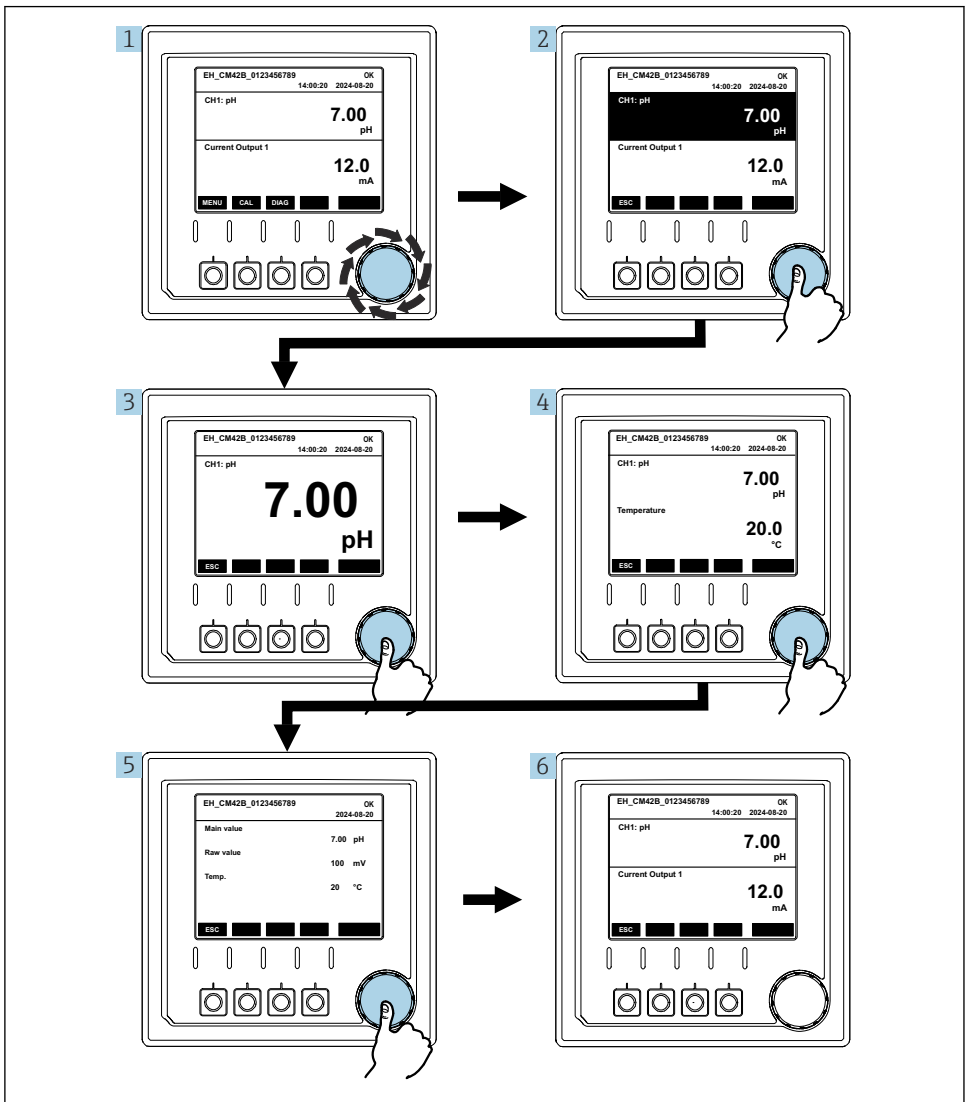
A0056328

49 Structure of the display: Start screen (device with one current output)

- 1 Device name or menu path
- 2 Date and time
- 3 Status symbols
- 4 Primary value display
- 5 Display of current output value (depending on the order, the device has 1 or 2 current outputs, the illustration shows a device with one current output)
- 6 Assignment of the soft keys

7.2.4 Navigating through the display

Measured values



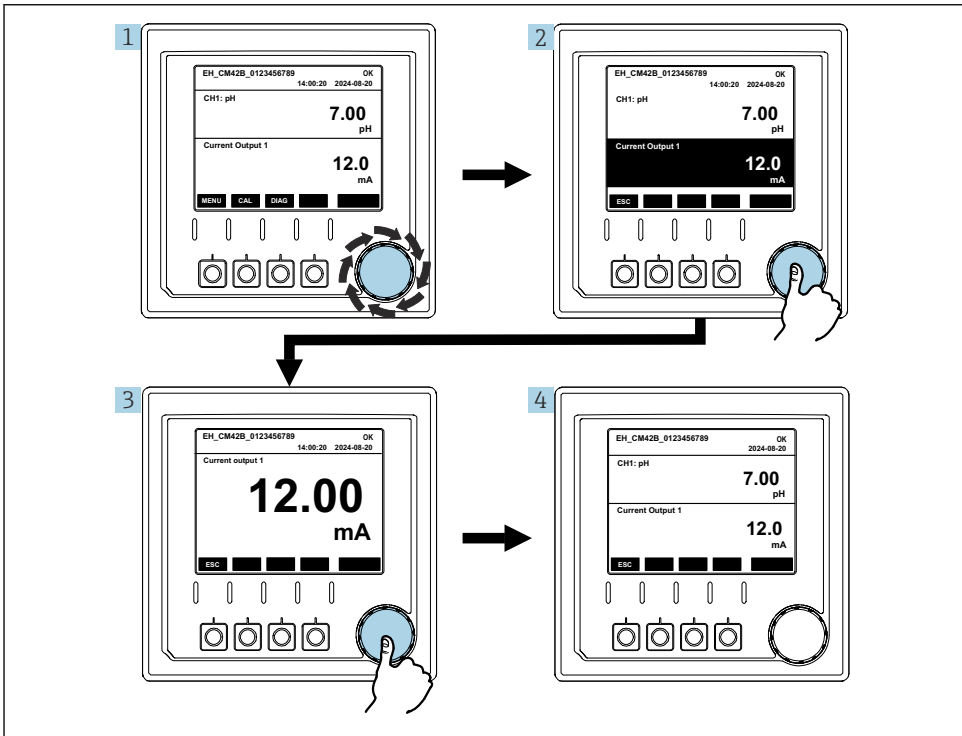
A0056209

50 Navigating through measured values

1. Press the navigator, or turn the navigator and continue turning.
 - ↳ Measured value is selected (inverted display).

2. Press the navigator.
 - ↳ The display shows the primary value.
3. Press the navigator.
 - ↳ The display shows the primary value and temperature.
4. Press the navigator.
 - ↳ The display shows the primary value, temperature and secondary measured values.
5. Press the navigator.
 - ↳ The display shows the primary value and current outputs.

Current output



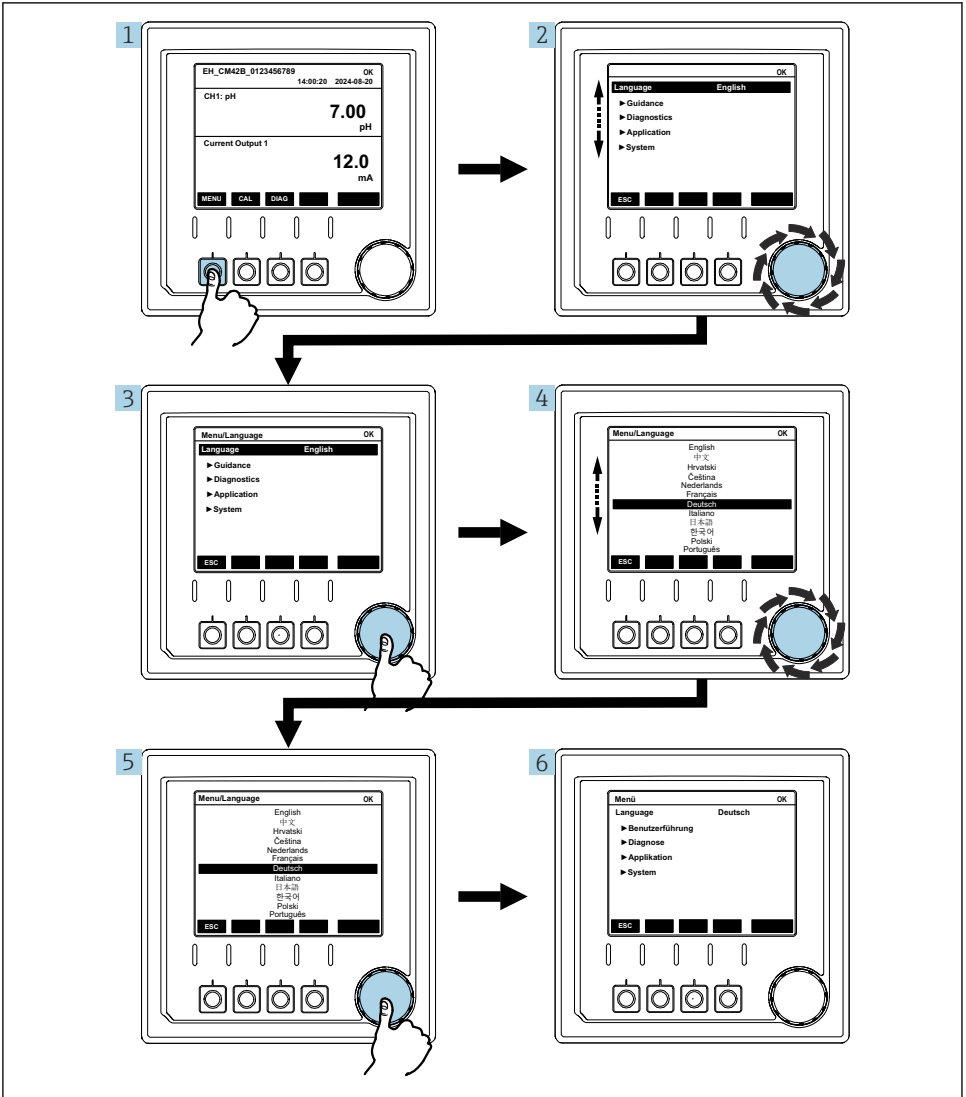
A0056210

51 Navigation, displaying a current output

1. Press the navigator, or turn the navigator and continue turning.
 - ↳ Current output is selected (black background).
2. Press the navigator.
 - ↳ The display shows the current output details.

3. Press the navigator.
 - ↳ The display shows the primary value and current outputs.

7.2.5 Operation concept menus



A0056305

The options available in the menu depend on the specific user authorization.

1. Press the soft key.
 - ↳ The menu is called up.
2. Turn the navigator.
 - ↳ The menu item is selected.
3. Press the navigator.
 - ↳ The function is called up.
4. Turn the navigator.
 - ↳ The value is selected (e.g. from a list).
5. Press the navigator.
 - ↳ The setting is adopted.

7.3 Access to the operating menu via the operating tool

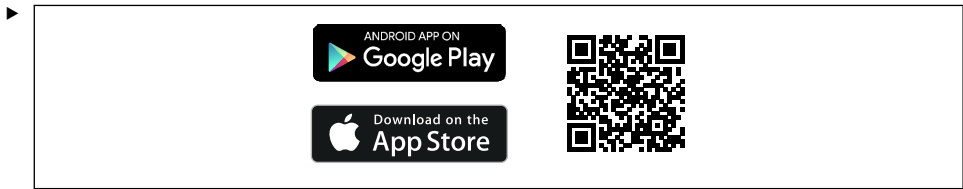
7.3.1 Access to the operating menu via the SmartBlue app

The SmartBlue app is available to download from the Google Play Store for Android devices and from the Apple App Store for iOS devices.

System requirements

- Mobile device with Bluetooth® 4.0 or higher
- Internet access

Download the SmartBlue app:



A0033202

Download the SmartBlue app via a QR code.

Connect the device to the SmartBlue app:

1. Bluetooth is enabled on the mobile device.
 Activate Bluetooth on the device: **Menu/System/Connectivity/Bluetooth**

2.



A0029747

Launch the SmartBlue app on the mobile device.

- ↳ The live list displays all of the devices that are within range.
The device in question is identified by the serial number: EH_CM42B_serial number

3. Tap the device to select it.

4. Log in with username and password.

Initial access data:

- Username: admin
- Default password: Serial number of the device



After logging in for the first time, the password can be changed and other user accounts activated.



You can drag additional information (e.g. main menu) onto the screen by swiping across the screen.



If the mainboard of the device is replaced, the default password of the admin account may change.

This is the case if a generic kit that was not ordered for the serial number of the device was used when replacing the mainboard.

In this case, the module serial number of the mainboard is the default password.

The serial number of the mainboard is saved in the device menu under: **Menu/System/Information/Modules/Mainboard**

7.3.2 Activating additional accounts in the SmartBlue app

The SmartBlue app is protected against unauthorized access by means of password-protected accounts. The authentication options of the mobile device can be used to log into the accounts.

The following accounts are available:

- Admin
- Operator
- Maintenance
- Auditor
- Recovery



The **Admin** and Recovery accounts are activated in the device as-delivered state.

Activating other user accounts

- ▶ Navigate to the path: **Menu/System/Security**

Overview of user account access rights

User account	Access rights
admin	<ul style="list-style-type: none"> ▪ Activate/deactivate user accounts ▪ Change your password and passwords of Operator, Maintenance and Auditor user accounts ▪ Security settings ▪ All other access rights for Operator, Maintenance and Auditor user accounts
Operator	<ul style="list-style-type: none"> ▪ Operating ▪ Calibration and adjustment functions ▪ Change your password
Maintenance	<ul style="list-style-type: none"> ▪ Operating ▪ Calibration and adjustment functions ▪ Configuration and maintenance ▪ Change your password
Auditor	<ul style="list-style-type: none"> ▪ Read access and export logbooks ▪ Change your password
Recovery	Reset admin password. In order to do this, please contact Endress+Hauser Service.

7.3.3 Changing passwords

Every user account can change their own password.

1. Log in with the relevant user account.
2. Navigate to the path: **Menu/System/Security**

7.3.4 Functions via the SmartBlue app

An activation code is required for full operation of the device via the SmartBlue app.

Without this activation code, the SmartBlue app offers the following functions:

- Firmware update
- **Security** menu
- Export of information for the service

7.3.5 Access to operating menu via HART and FDI

A connection can be established to Field Device Integration (FDI) via HART (optional). FDI provides access to the device's operating menu and is installed on a control station, for example. The access rights correspond to the **Maintenance** user group. The FDI packages are available in the download area of the product page.

www.endress.com/CM42B

8 System integration

8.1 Integrating the measuring instrument into the system

Interfaces for measured value transmission (depending on order):

- 4 to 20 mA current output (passive)
- Bluetooth® LE wireless technology
- HART

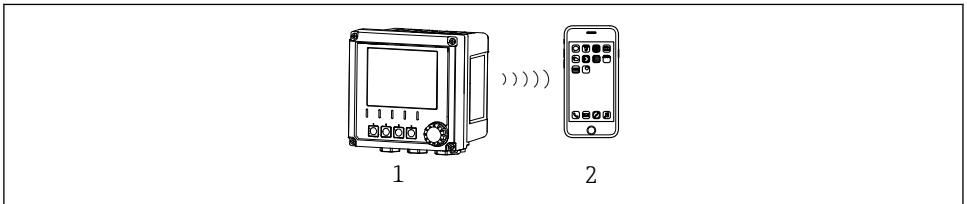
8.1.1 Current output

Depending on the order, the device has 1 or 2 current outputs.

- Signal range 4 to 20 mA (passive)
- The assignment of a process value to a current value is configurable within the signal range.
- Failure current can be configured from list.

8.1.2 Bluetooth® LE wireless technology

With the Bluetooth® LE wireless technology (energy-efficient wireless transmission) option that can be ordered, the device can be controlled via mobile devices.



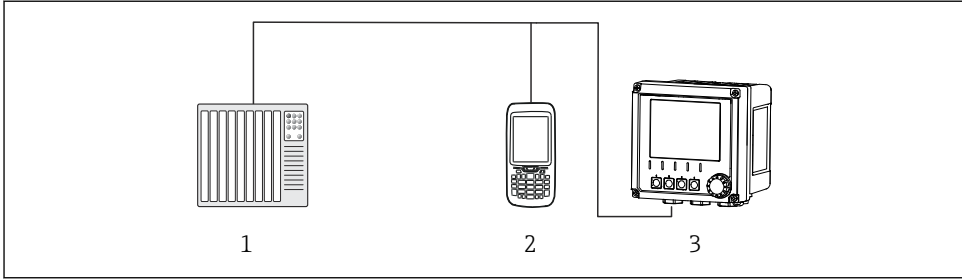
A0056361

52 Options for remote operation via Bluetooth® LE wireless technology

- 1 Transmitter with Bluetooth® LE wireless technology
- 2 Smartphone/tablet with SmartBlue app

8.1.3 HART

HART operation is possible via different hosts.



A0056628

53 *Wiring options for remote operation via HART protocol*

- 1 *PLC (programmable logic controller)*
- 2 *HART operating device (e.g. SFX350), optional*
- 3 *Transmitter*

The device can communicate via the HART protocol using current output 1 (depending on the order).

Follow the steps below to integrate the device into the system for this purpose:

1. Connect the HART modem or HART handheld terminal to current output 1 (communication load 250–500 Ohm).
2. Establish a connection via the HART device.
3. Operate the transmitter via the HART device. To do so, follow the HART device Operating Instructions.

9 Commissioning

9.1 Preliminaries

- ▶ Connect the device.
 - ↳ The device starts and displays the measured value.

Bluetooth® must be enabled on the mobile device for operation via the SmartBlue app.

9.2 Function check

Incorrect connection, incorrect supply voltage

Safety risks for staff and device malfunctions!

- ▶ Check that all connections have been established correctly in accordance with the wiring diagram.
- ▶ Ensure that the supply voltage matches the voltage indicated on the nameplate.

9.2.1 LED indicators

The displays use the status LEDs. The status LEDs are only active if no display is connected to the device.

LED behavior	Status
Green Continuous	Device is in normal operating mode.
Green Flashes quickly	Starting process for the device
Red Continuous	Category F diagnostic message is present. The complete message can be seen via HART or the SmartBlue app. For information on the status signals, see
Red Flashes slowly	Category M, C or S diagnostic message is present. The complete message can be seen via HART or the SmartBlue app. For information on the status signals, see
Alternating 2x red flashes and 2x green flashes	Squawk mode is enabled. See also
Alternating 1x red flash and 1x green flash	Error during the starting process. Contact service.

9.3 Time and date

- ▶ Configure the time and date under the following path: **Menu/System/Date and time**

If you are using the Smartblue app, the date and time can also be automatically adopted from the mobile device.

9.4 Configuring the operating language

- ▶ Configure the operating language under the following path: **Menu/Language**

9.5 Transferring device parameters to other devices

The parameters of one device can be transferred to other devices with the same measuring task using the SmartBlue app or via HART.

Prerequisite(s):

- For SmartBlue app: SmartBlue app operation fully enabled via activation code.
- For HART: HART is activated and FDI (field device integration) is installed on the remote station.

Account data, passwords and logbooks are not transferred.

Downloading the parameters from the device

1. Log in to the SmartBlue app on the device from which you want to transfer the parameters using the **“Admin”** or **“Maintenance”** user account. For HART, connect to the device via FDI.
2. Navigate to the path: **Menu/Guidance/Export/Import/Parameter save:**
3. Follow the instructions in the wizard.
 - ↳ The parameters are saved on the mobile device or the remote station.

Loading the parameters onto another device

1. Log in to the SmartBlue app on the device to which you want to transfer the parameters using the **“Admin”** or **“Maintenance”** account. For HART, connect to the device via FDI.
2. Navigate to the path: **Menu/Guidance/Export/Import/Parameter load:**
3. Follow the instructions in the wizard.
 - ↳ The parameters are loaded onto the device.



Diagnostic messages F100 and C413 are enabled during the import.

The measuring function is disabled during the import.

Enable device hold if necessary.

Index

C

Cable terminals	27
Check	
Installation and function	67
Commissioning	67
Configuring the date	68
Configuring the time	68
Connection	
Electrical	22

D

Dimensions	13
Disassembly	21
Documentation	4

E

Electrical connection	22
Ensuring the degree of protection	55
Establishing connection	68

F

Function check	67
--------------------------	----

H

HART	65
----------------	----

I

Identifying the product	11
Incoming acceptance	11
Installation	13
Installation check	67
Installation requirements	13
Intended use	5
IT security	6

L

LED indicators	67
--------------------------	----

M

Measuring parameters	10
--------------------------------	----

N

Nameplate	11
Non-designated use	5

O

Operating language	68
Operating menu	55
Operation	55
Operational safety	6

P

Post-connection check	55
Product description	7
Product design	7
Product safety	6

R

Requirements for the personnel	5
--	---

S

Safety	
Operation	6
Workplace safety	5
Safety information	3
Safety instructions	5
Scope of delivery	12
Symbols	3
System integration	65

T

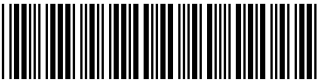
Technical personnel	5
-------------------------------	---

U

Use	
Intended	5
Non-designated	5

W

Workplace safety	5
----------------------------	---



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