

Operating Instructions

Liquiline CM42B

Two-wire transmitter

Device for DIN rail mounting

Measurement with digital Memosens sensors






Table of contents









1	About this document	4	9.4	Time and date	40
1.1	Warnings	4	9.5	Configuring the operating language	40
1.2	Symbols	4	10	Operation	41
1.3	Symbols on the device	4	10.1	Reading the measured values	41
1.4	Documentation	4	10.2	Adapting the measuring instrument to the process conditions	41
2	Basic safety instructions	5	10.3	Settings of the current output	43
2.1	Requirements for personnel	5	10.4	Bluetooth	43
2.2	Designated use	5	10.5	HART settings	43
2.3	Safety at the workplace	5	10.6	Hold settings	43
2.4	Operational safety	6	10.7	Squawk	43
2.5	Product security	6	11	Diagnosis and troubleshooting	44
2.6	IT security	6	11.1	General troubleshooting	44
3	Product description	7	11.2	Diagnostic information via LEDs	44
3.1	Product design	7	11.3	Diagnostic information on the onsite display (optional)	44
4	Incoming acceptance and product identification	9	11.4	Diagnostic information via communication interface	44
4.1	Incoming acceptance	9	11.5	Adapting the diagnostic information	45
4.2	Product identification	9	11.6	Diagnostic list	45
4.3	Scope of delivery	10	11.7	Event logbook	45
5	Mounting	11	11.8	Simulation	45
5.1	Mounting requirements	11	11.9	Firmware history	45
5.2	Mounting the device	12	12	Maintenance	46
5.3	Post-mounting check	21	12.1	Maintenance work	46
6	Electrical connection	22	13	Repair	47
6.1	Connecting requirements	22	13.1	General information	47
6.2	Connecting the device	23	13.2	Return	47
6.3	Ensuring the degree of protection	27	13.3	Disposal	47
6.4	Post-connection check	28	14	Accessories	49
7	Operation options	29	15	Technical data	50
7.1	Overview of operation options	29	15.1	Input	50
7.2	Access to operating menu via onsite display ..	29	15.2	Output	50
7.3	Access to the operating menu via the operating tool	34	15.3	Protocol-specific data	51
8	System integration	36	15.4	Power supply	52
8.1	Integrating the measuring instrument into the system	36	15.5	Performance characteristics	52
9	Commissioning	38	15.6	Environment	53
9.1	Preliminaries	38	15.7	Mechanical construction	53
9.2	Post-installation and function check	38	Index	54	
9.3	Establishing a connection via the SmartBlue (app) app	38			

1 About this document



1.1 Warnings

Structure of information	Meaning
 DANGER Causes (/consequences) If necessary, Consequences of non-compliance (if applicable) ▶ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation will result in a fatal or serious injury.
 WARNING Causes (/consequences) If necessary, Consequences of non-compliance (if applicable) ▶ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation can result in a fatal or serious injury.
 CAUTION Causes (/consequences) If necessary, Consequences of non-compliance (if applicable) ▶ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or more serious injuries.
NOTICE Cause/situation If necessary, Consequences of non-compliance (if applicable) ▶ Action/note	This symbol alerts you to situations which may result in damage to property.

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 Operating Instructions , the following manuals are available on the product pages on our website:

- Brief Operating Instructions, KA01731C
- Security Manual, SD03215C

2 Basic safety instructions

2.1 Requirements for 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 Designated use

2.2.1 Areas of application

The device is a two-wire transmitter for connecting digital sensors with Memosens technology (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 Safety at the workplace

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 security

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

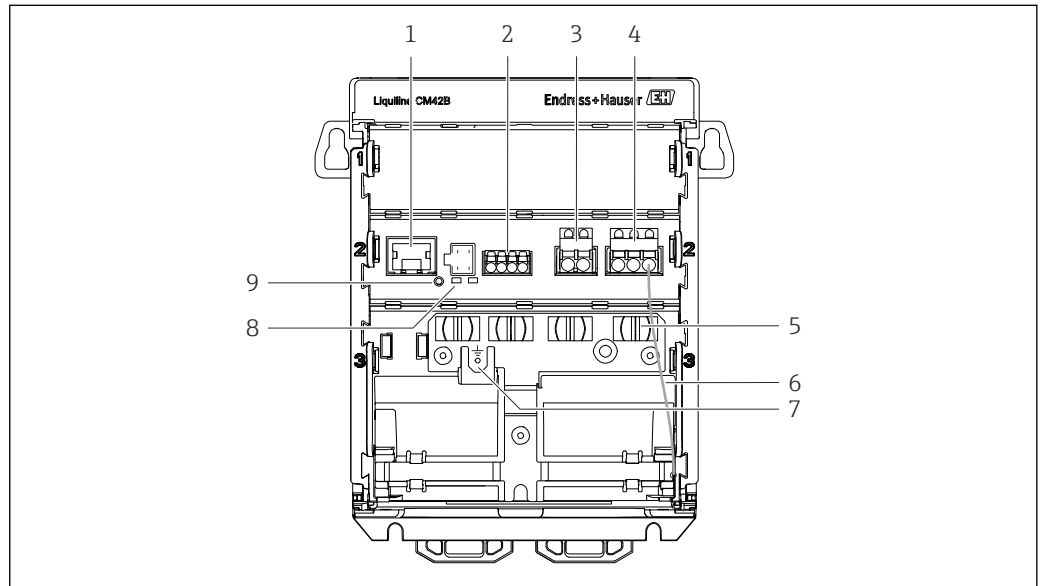
We only provide a warranty if the device is installed and used as described in the Operating Instructions and the Security Manual. The device is equipped with security mechanisms to protect it against any inadvertent changes to the device settings.

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 further information, see the Security Manual.

3 Product description


3.1 Product design

3.1.1 Device

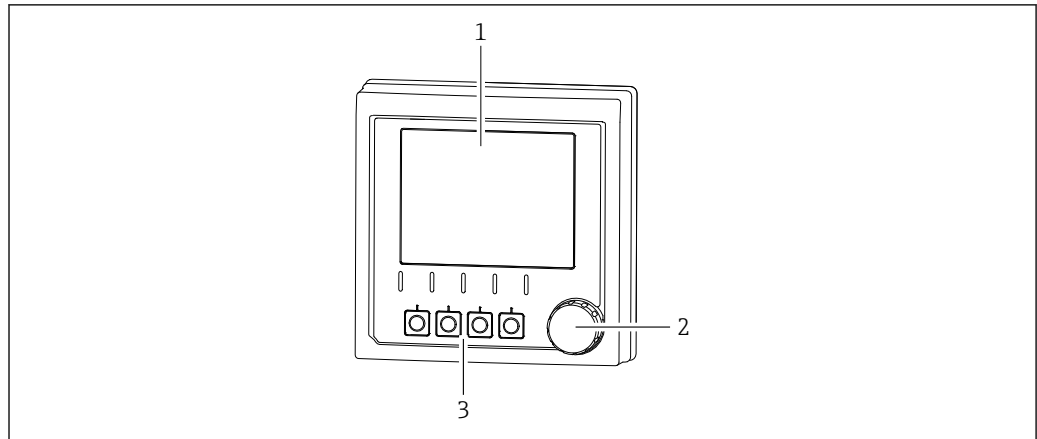


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- 1 RJ50 socket for display cable
- 2 Memosens input
- 3 Current output 1: 4 to 20 mA/optional HART, passive
- 4 Current output 2 (optional): 4 to 20 mA, passive
- 5 Cable mounting rail
- 6 Internal ground cable (wired at the factory)
- 7 Connection for potential equalization or functional earth, connection established via cable lug 6.35 mm
- 8 Status LEDs
- 9 Reset button

 The status LEDs are only active if no external display is connected.

3.1.2 External display (optional)



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- 1 External display (optional)
- 1 Display
- 2 Navigator
- 3 Soft keys, assignment depends on menu

3.1.3 Measuring parameters

The transmitter is designed for digital Memosens sensors.

The following measuring parameters are:

- 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.

For a list of compatible sensors, see the "Accessories" section (link).

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:

- On the nameplate
- In the delivery papers
- On the internal label

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 fill 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 fill information pertaining to your device, including the product documentation.



4.3 Scope of delivery

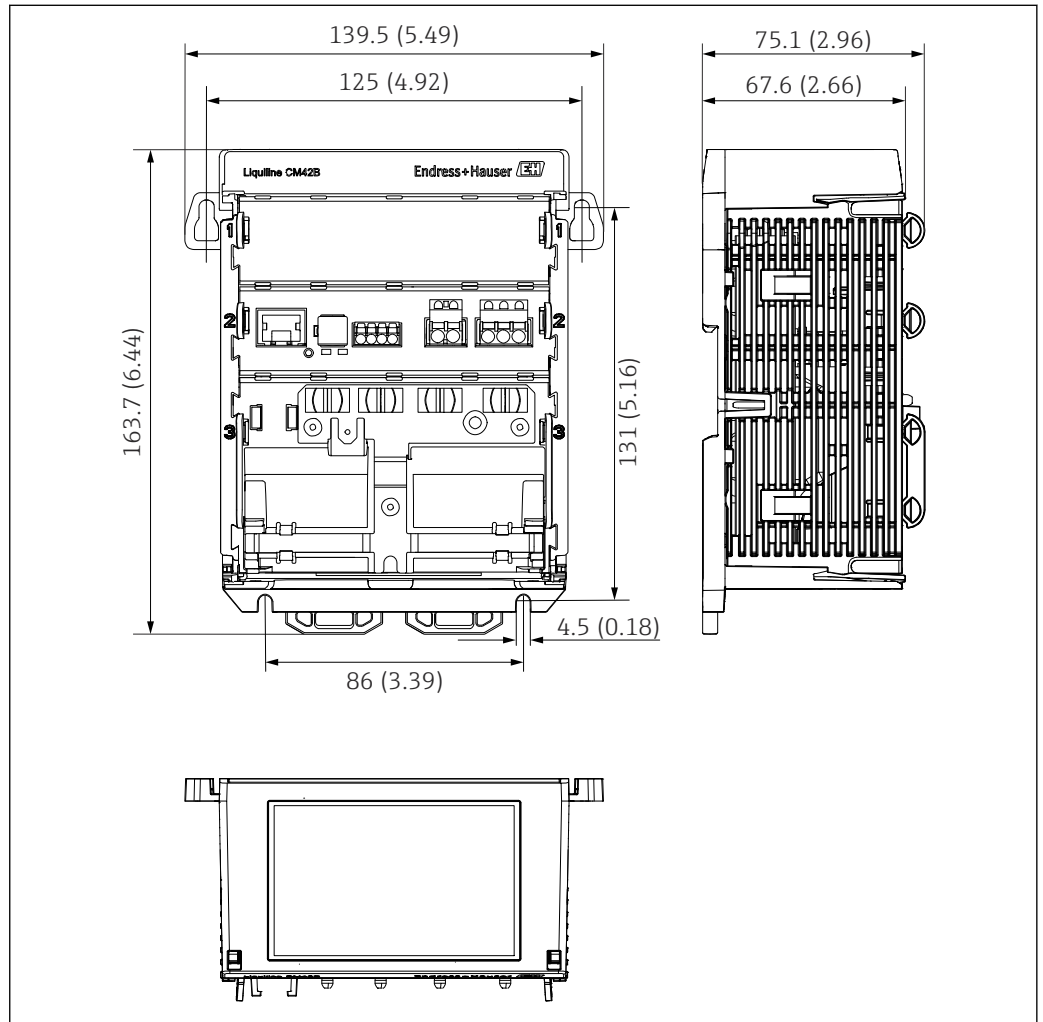
The scope of delivery includes:

- Liquiline CM42B
 - 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 Mounting

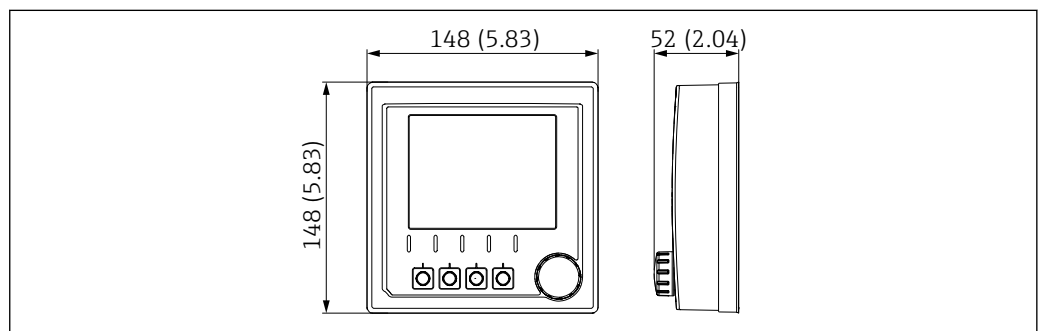
5.1 Mounting requirements

5.1.1 Dimensions



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2 Dimensions of device in mm (inches)



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3 Dimensions of external display in mm (inches)

5.1.2 Pollution degree

The device is designed for operation in a pollution degree 2 environment.

- ▶ Install the device in an appropriate housing.

5.2 Mounting the device

5.2.1 Mounting on DIN rail as per IEC 60715

NOTICE

Condensation on the device

Potential device failure

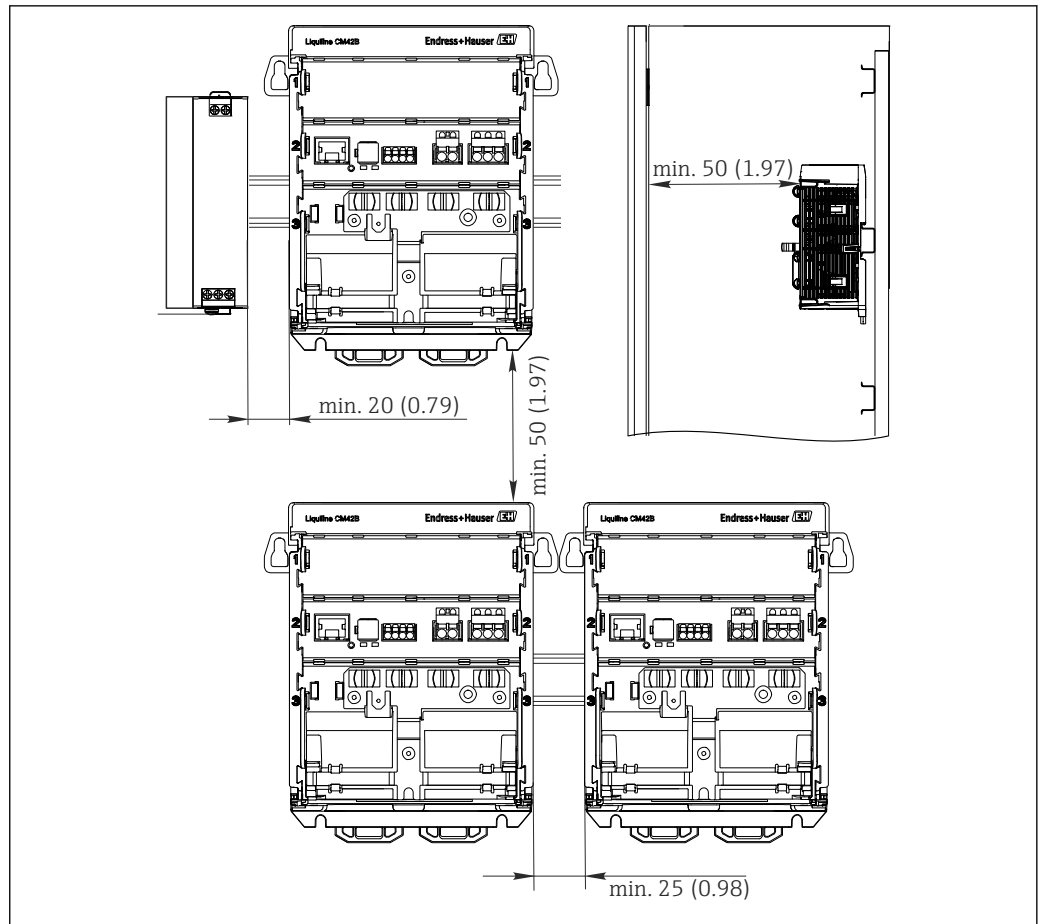
- ▶ The device complies with the IP20 degree of protection. It is designed only for environments with non-condensing moisture.
- ▶ Comply with the specified ambient conditions, e.g. by installing the device in an appropriate protective enclosure.

NOTICE

Incorrect mounting location in the control cabinet, spacing regulations not observed

Possible malfunctions as a result of heat buildup and interference from neighboring devices!

- ▶ Do not position the device directly above sources of heat.
- ▶ The components are designed for convection-based cooling. Avoid heat buildup. Ensure openings are not covered, e.g. by cables.
- ▶ Observe the specified distances to other devices.
- ▶ Physically separate the device from frequency converters and high-voltage devices.

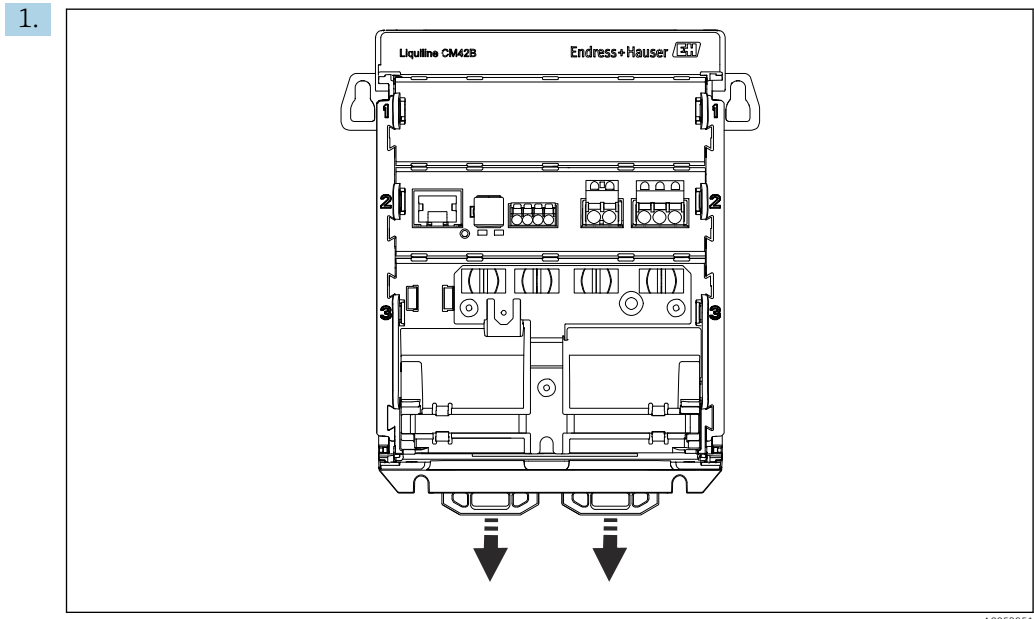


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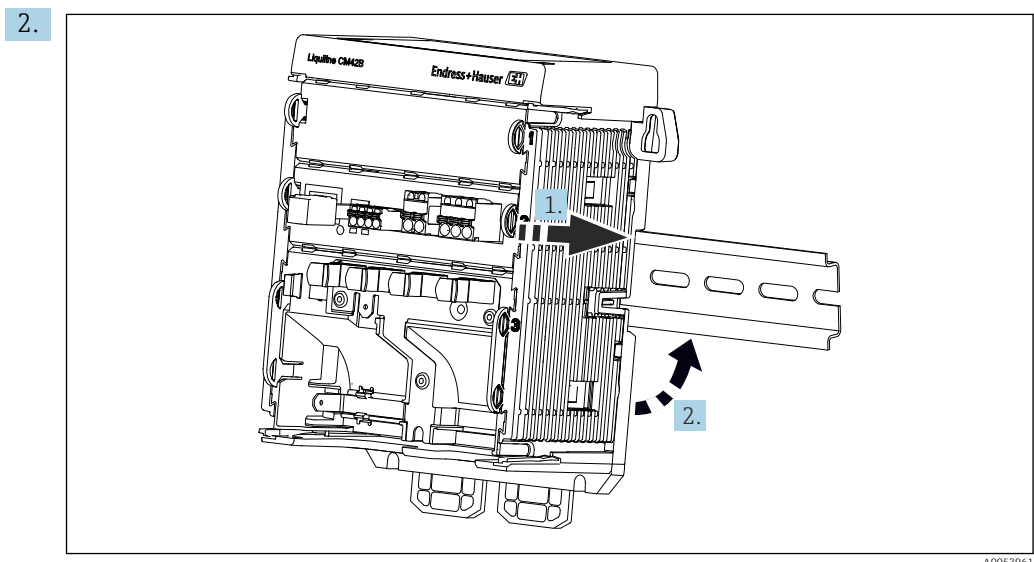
4 Minimum clearance in mm (in)

Minimum clearances required:

- Distance at the side, to other devices and control cabinet wall:
At least 20 mm (0.79 inches)
- Distance above and below the device and depth distance (to control cabinet door or other devices installed there):
At least 50 mm (1.97 inches)

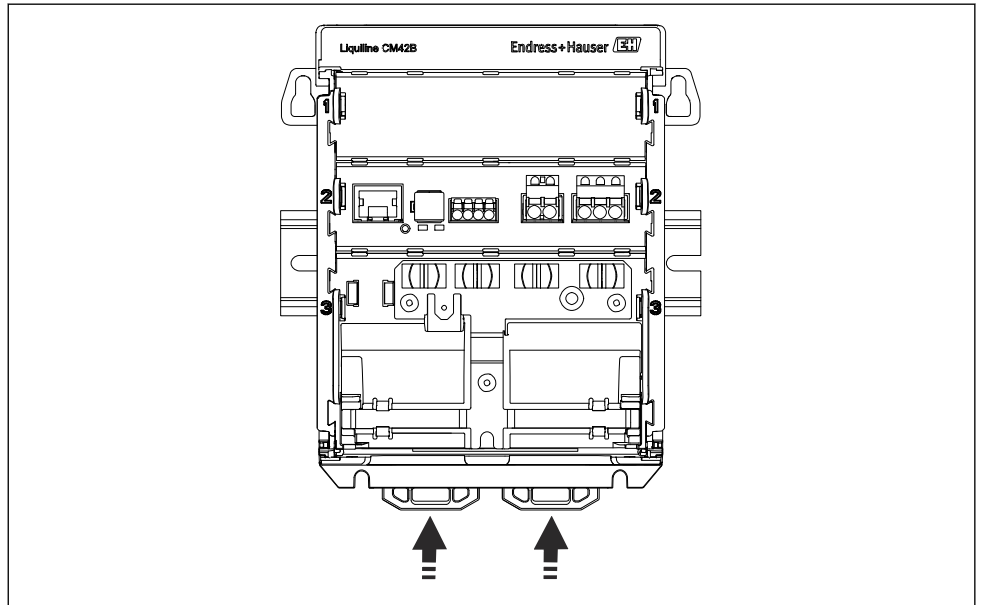


When delivered, the securing clips are locked to secure the DIN rail.
Unlock the securing clips by pulling them downwards.



Attach the device from the top to the DIN rail (1) and secure it by pressing down (2).

3.

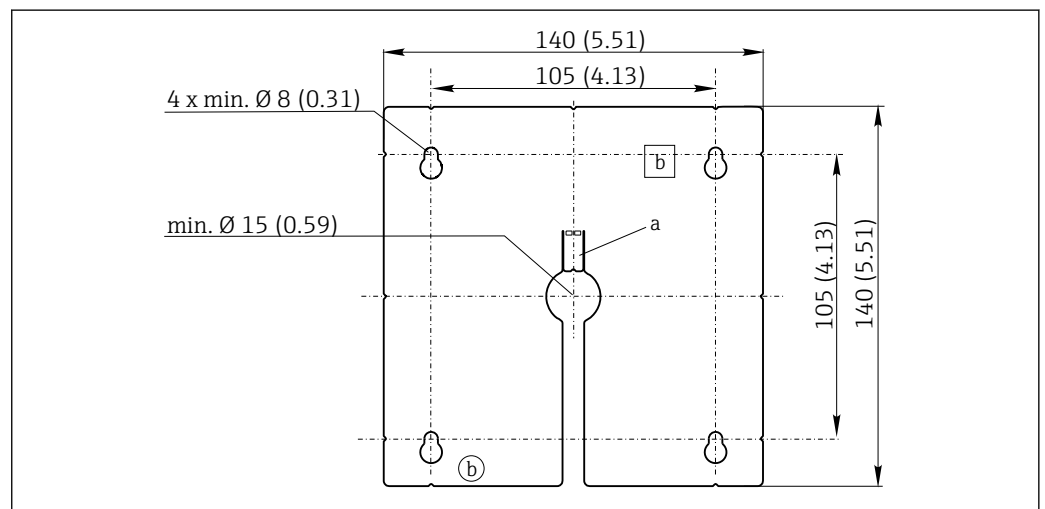


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Slide the securing clips upwards until they click, thereby securing the device to the DIN rail.

5.2.2 Mounting the external display (optional)

i The mounting plate also serves as the drilling template. The side markings are used to mark the drill holes.



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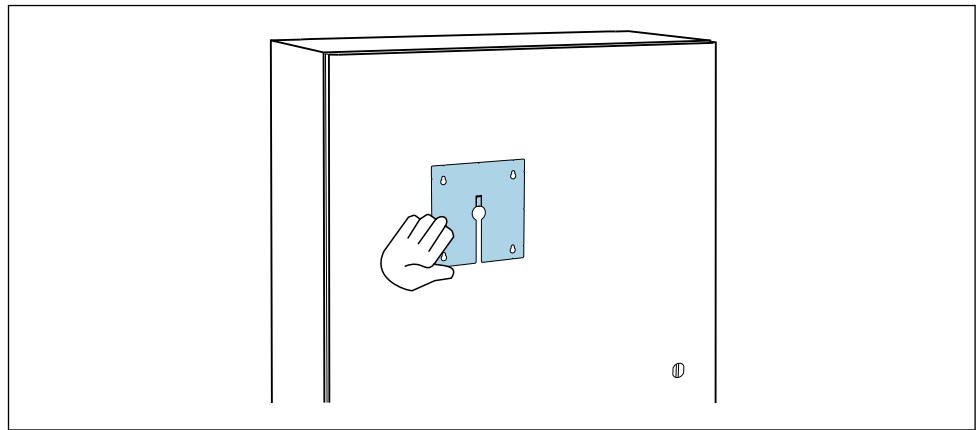
5 Mounting plate of external display, dimensions in mm (in)

a Retaining tab

b Production-related recesses, no function for the user

Mounting the external display on the door of the control cabinet

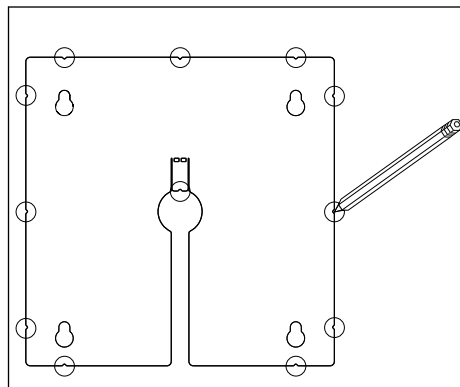
1.



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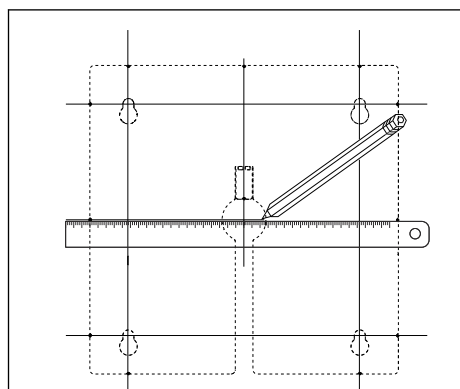
Hold the mounting plate from the outside against the door of the control cabinet. Select the position at which the external display is to be mounted.

2.



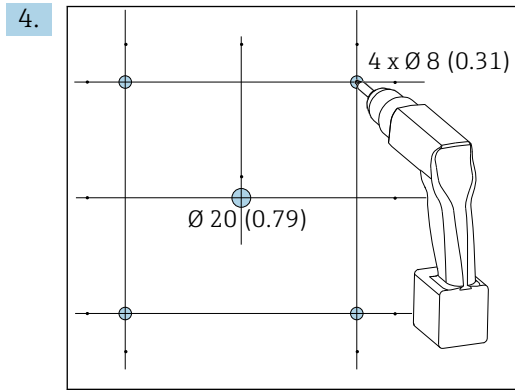
Make all the markings.

3.



Draw lines to interconnect all the markings.

↳ The points of intersection of the lines mark the position of the five necessary drill holes.



6 Diameter of drill holes in mm (in)

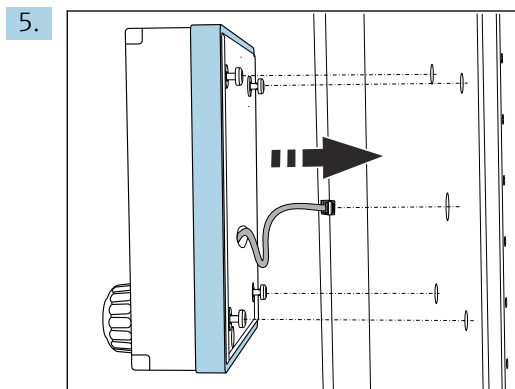
Drill the holes. → 5, 15

CAUTION

Sharp-edged, non-deburred drill holes

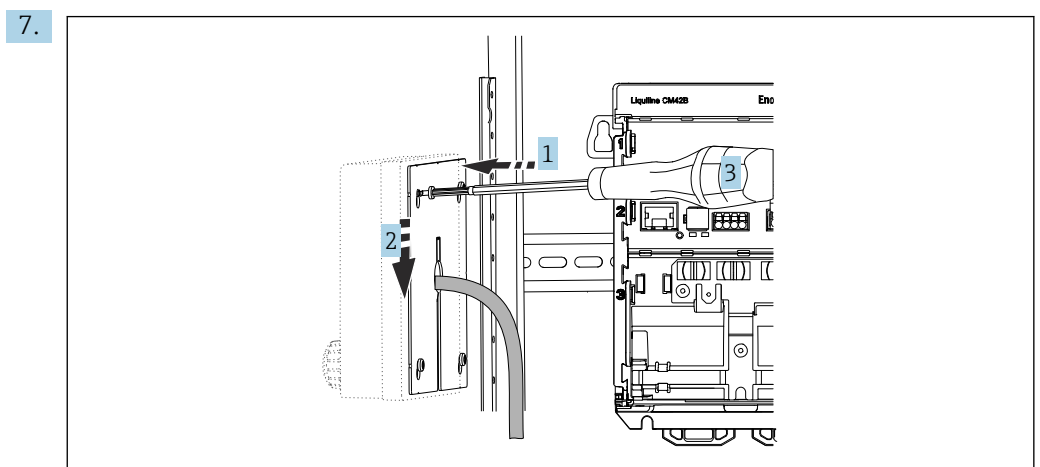
Risk of injury, display cable may get damaged!

- Trim and deburr all drill holes. In particular, make sure that the middle drill hole for the display cable is properly deburred.



Pull the display cable through the central drill hole.

6. Insert the external display with the Torx screws unscrewed (but still in place) through the drill holes from the outside. Ensure that the rubber frame (seal, highlighted blue) does not become damaged and is properly positioned on the surface of the door.



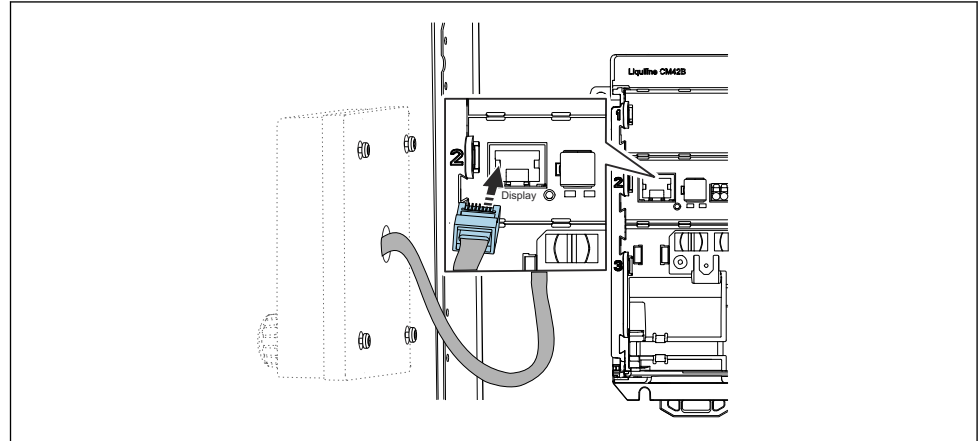
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Place the mounting plate on the inside over the screws (1), slide it down (2) and tighten the screws (3).

8. NOTICE**Incorrect installation**

Damage and malfunctions possible.

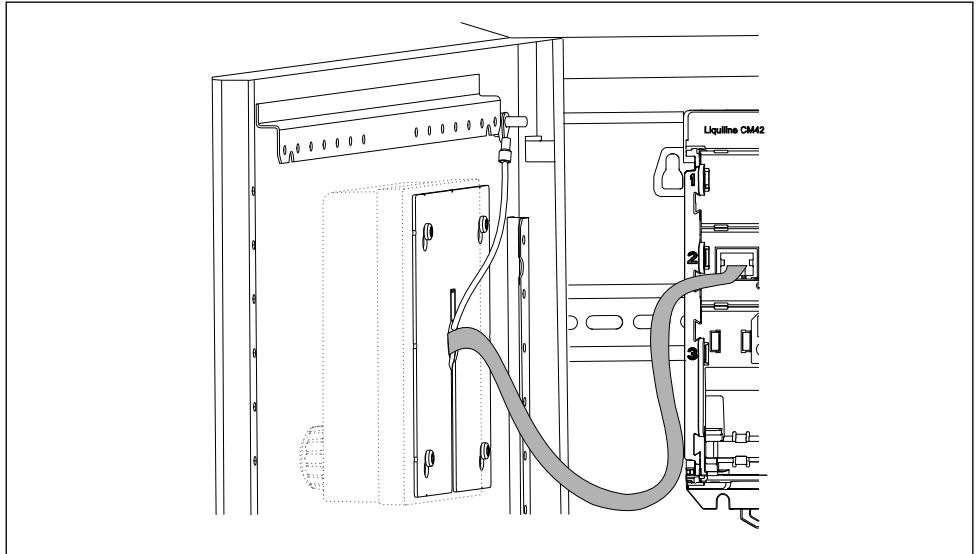
- Lay cables in such a way that they do not get squashed, e.g. when closing the cabinet door.



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Connect the display cable to the RJ50 socket of the transmitter. The RJ50 socket is labeled **Display**.

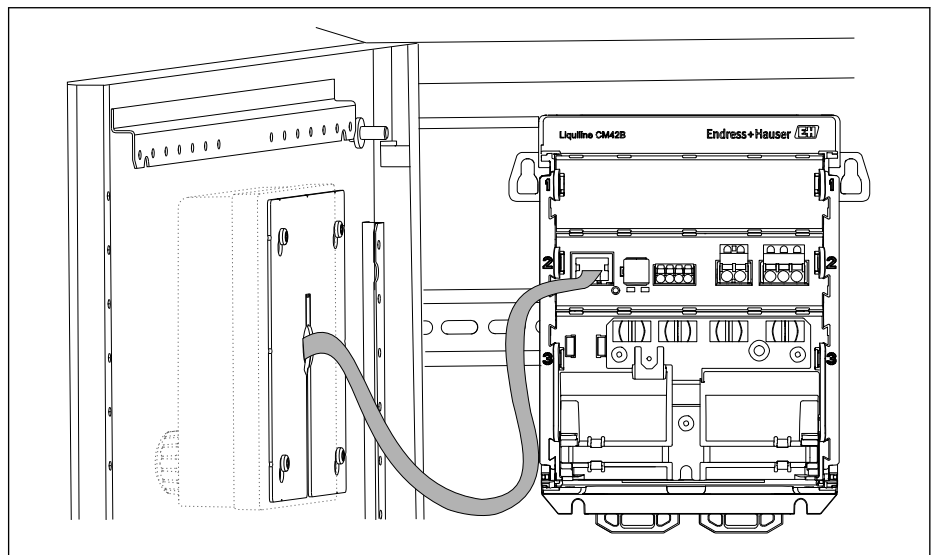
9.



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Only for stainless steel display: Connect the ground cable of the display to the nearest grounding point.

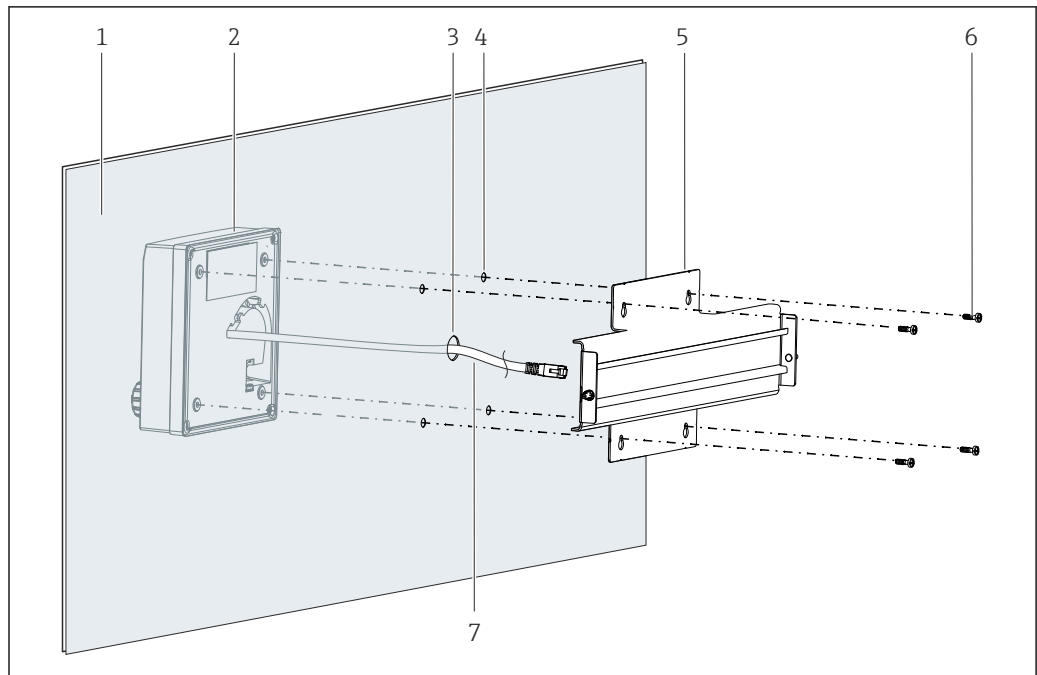
↳ The external display is now mounted and ready to use.



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7 Mounted external display (illustration of plastic display without ground cable)

5.2.3 Mounting on panel (incl. external display)



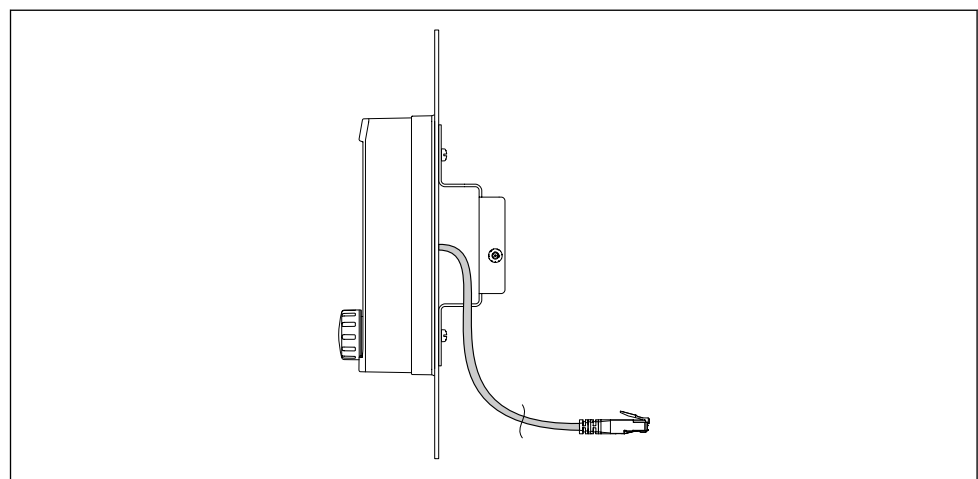
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8 Mounting the external display and DIN rail

- 1 Panel/mounting surface
- 2 External display
- 3 Drill hole for display cable
- 4 Drill holes for screws
- 5 Mounting plate with DIN rail
- 6 Screws
- 7 Display cable

1. Mount the external display on the panel as described in → 16. To do so, mount the DIN rail (5) on the back of the panel.

2.

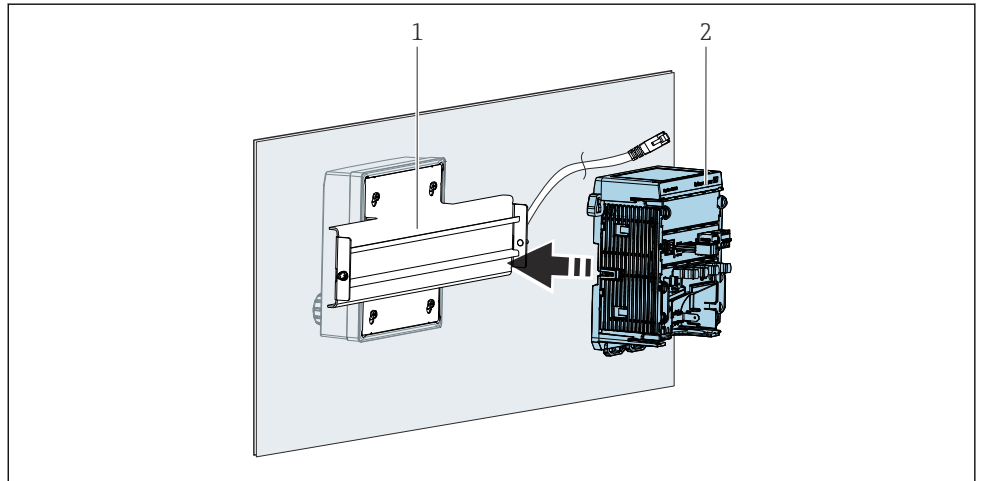


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9 Layout of the display cable

Route the display cable as shown in the illustration.

3.



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- 1 *DIN rail*
- 2 *Transmitter*

Secure the transmitter (2) to the DIN rail (1) as described in →  12.

5.3 Post-mounting check

1. Following mounting, check all devices (transmitter, external display) for damage.
2. Verify that all securing clips have been fully snapped into place and that the device is securely positioned on the DIN rail.
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

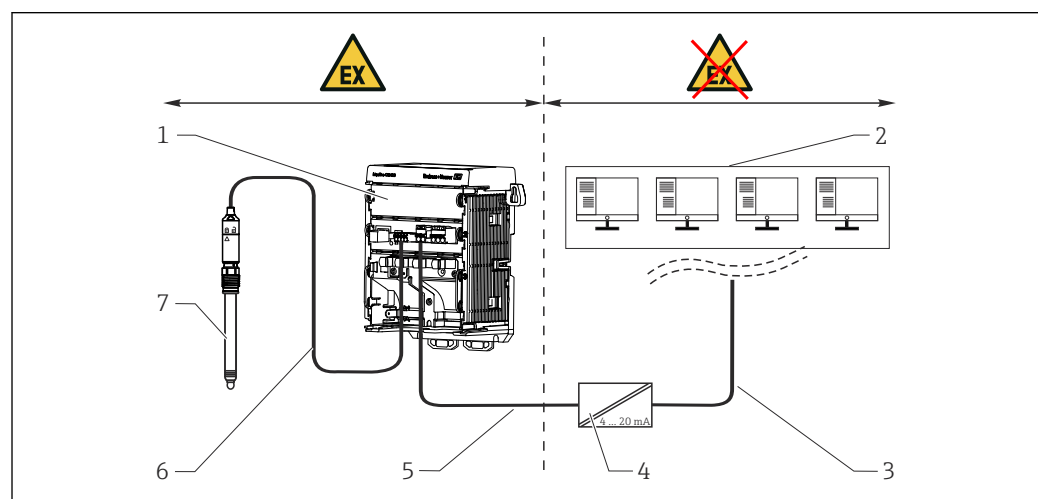
NOTICE

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



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- 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)
- 6 Intrinsically safe sensor circuit Ex ia
- 7 Hazardous area version of sensor

6.2 Connecting the device

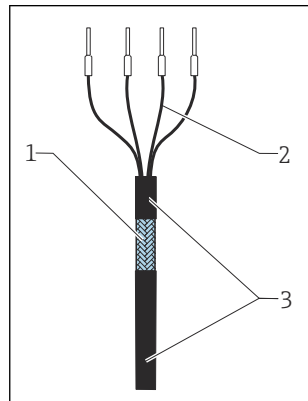
6.2.1 Connecting the cable shield

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

i Only use terminated original cables where possible.

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

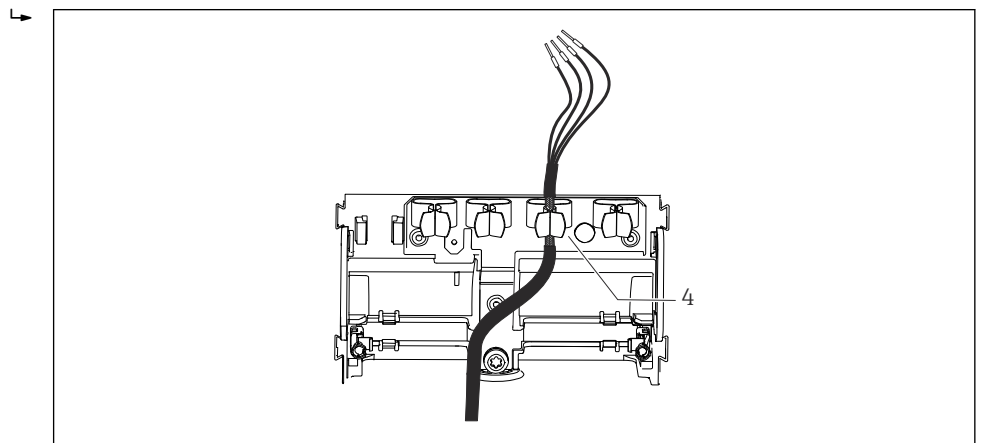
Cable sample (does not necessarily correspond to the original cable supplied)



10 Terminated cable

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

1. 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.
2. Connect the cable to the grounding clamp.
3. Clamp the cable into place.



11 Cable into grounding clamp

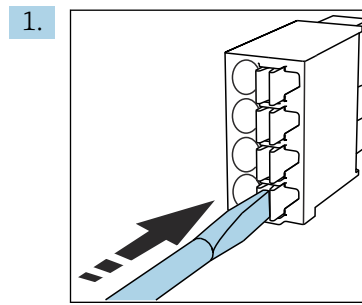
- 4 Grounding clamp

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

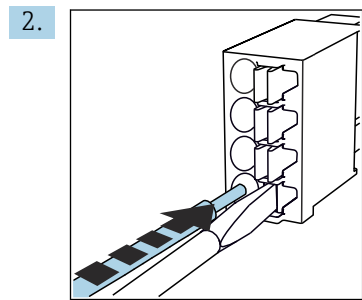
4. Connect cable cores as per the wiring diagram.

1) Refer to the instructions provided in the "Ensuring the degree of protection" section. → 27

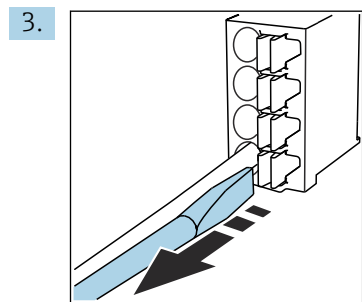
6.2.2 Cable terminals



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



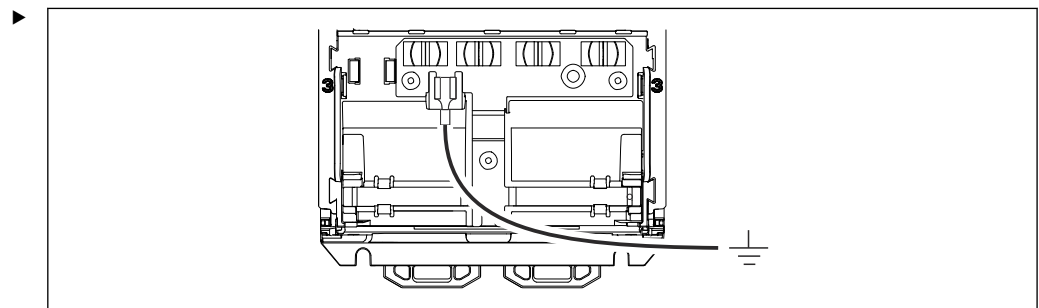
Insert the cable until the limit stop.



Remove the screwdriver (closes the terminal).

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

6.2.3 Connecting the potential equalization



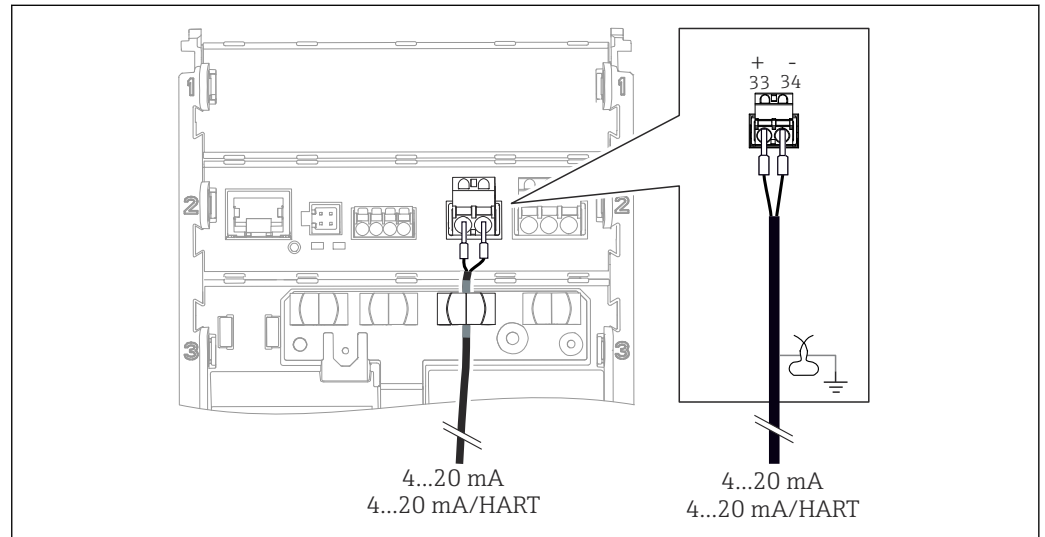
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Attach the potential equalization connection to the earth or potential equalization system with a separate line. Use the preassembled 6.35 mm cable lug. Cable cross-section 1.03 to 2.62 mm² (0.002 to 0.004 in²)

6.2.4 Connecting the power supply and signal circuit

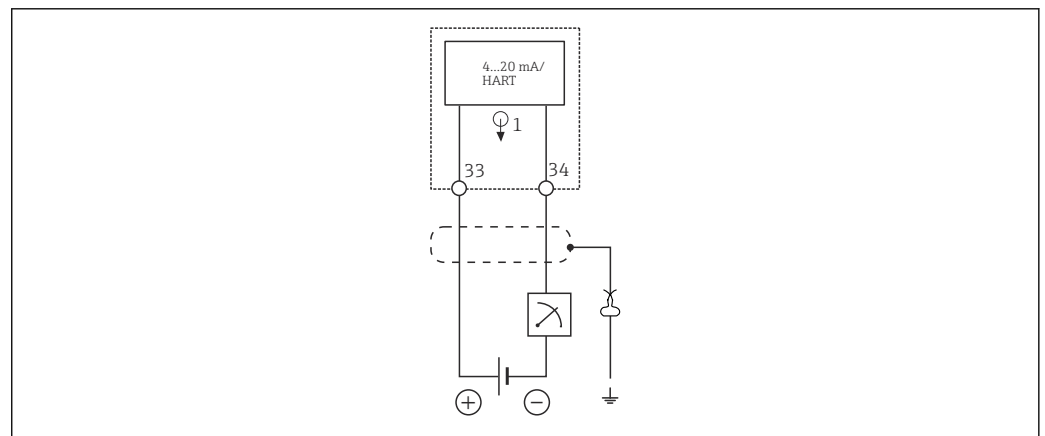
- ▶ Connect the current outputs with shielded two-wire cables as described in the following illustrations.

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.



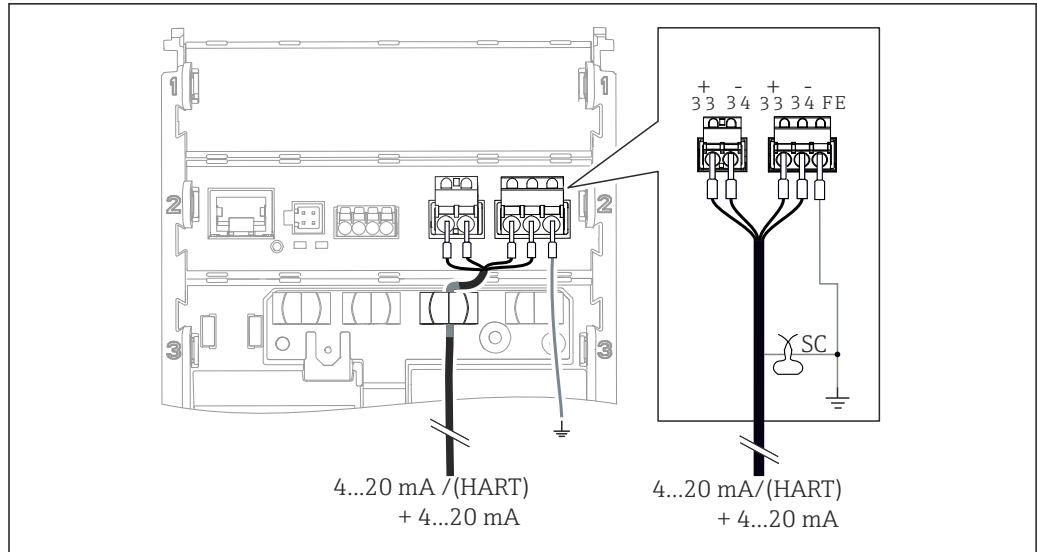
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12 Connection of 1 current output



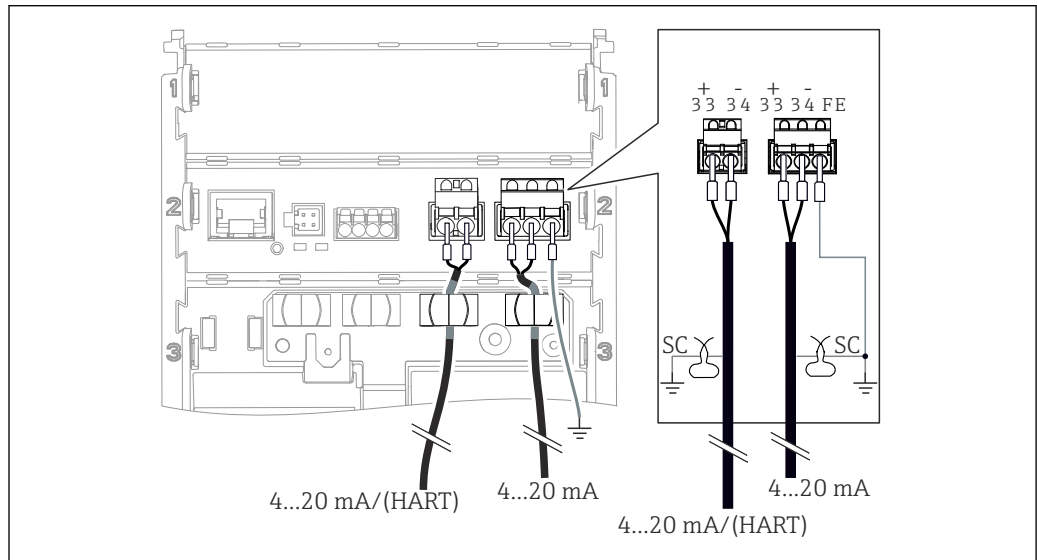
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13 Wiring diagram: 1 current output



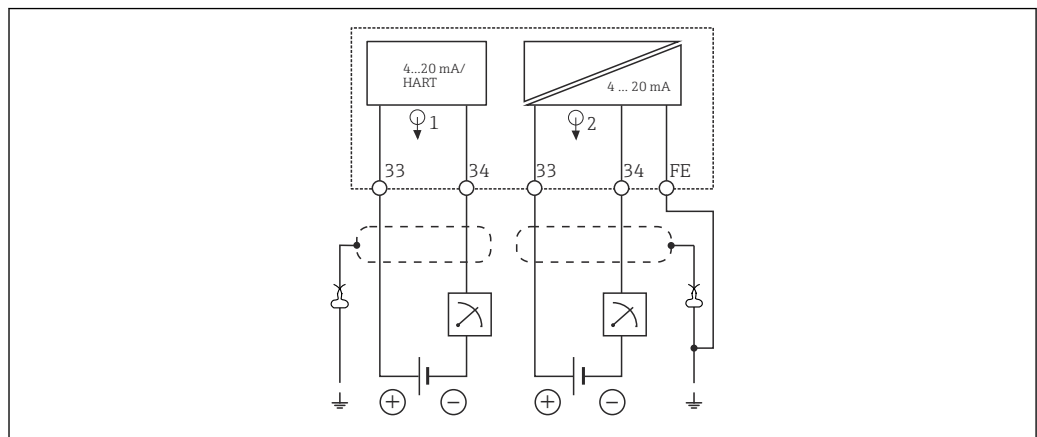
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14 Connection of 2 current outputs via 1 cable



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15 Connection of 2 current outputs via 2 cables



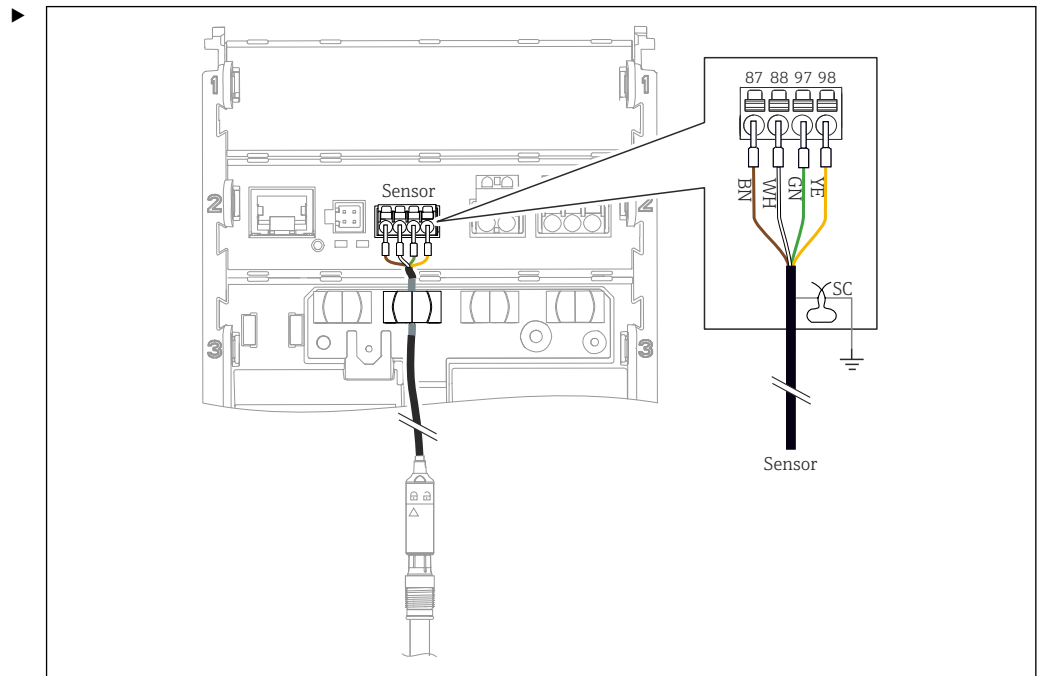
A0054915

16 Wiring diagram: 2 current outputs

6.2.5 Connecting the sensor

Memosens sensors

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



17 Connecting Memosens sensors

Connect the sensor cable as shown in the illustration.

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
- The display 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 (does not support the full range of functions)
- Control station (via HART)

7.2 Access to operating menu via onsite display

7.2.1 User management

The onsite display menu offers user management functions. There are two roles in user management.

- Operator
- Maintenance

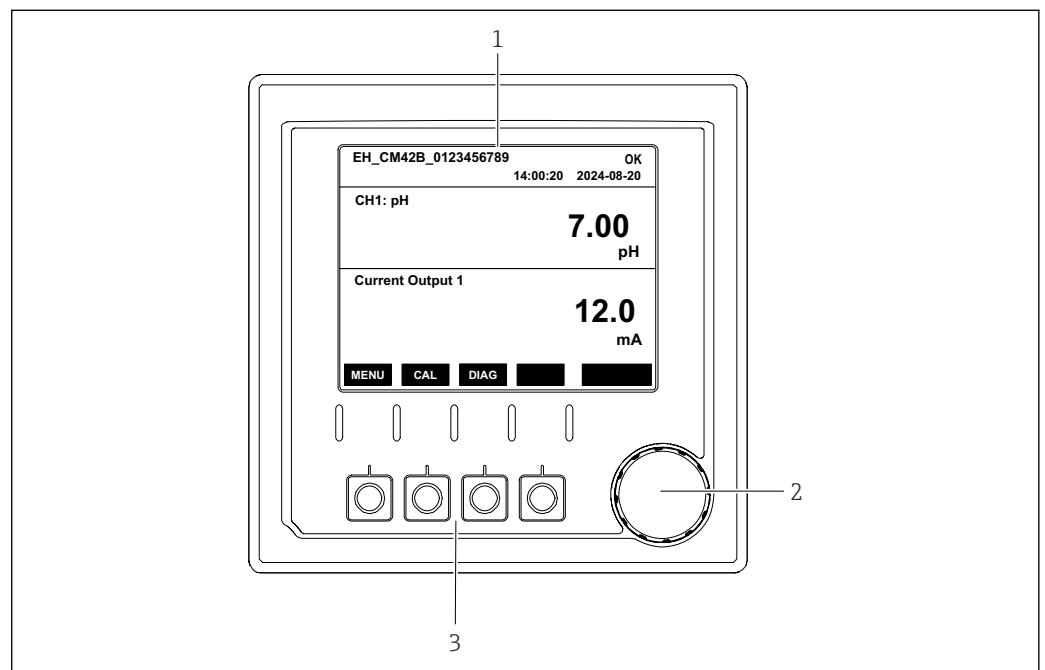
Both roles can be protected via a PIN as an option. Only one PIN can be set for the Operator role if a PIN is also set for the Maintenance role.

The Maintenance role has the authorization to change both PINs.

It is recommended to set the PINs after initial commissioning.

If PINs are set, the two roles first appear when the menu is called up. To access other menu items, login is required with a role.

7.2.2 Operating elements of the external display (optional)

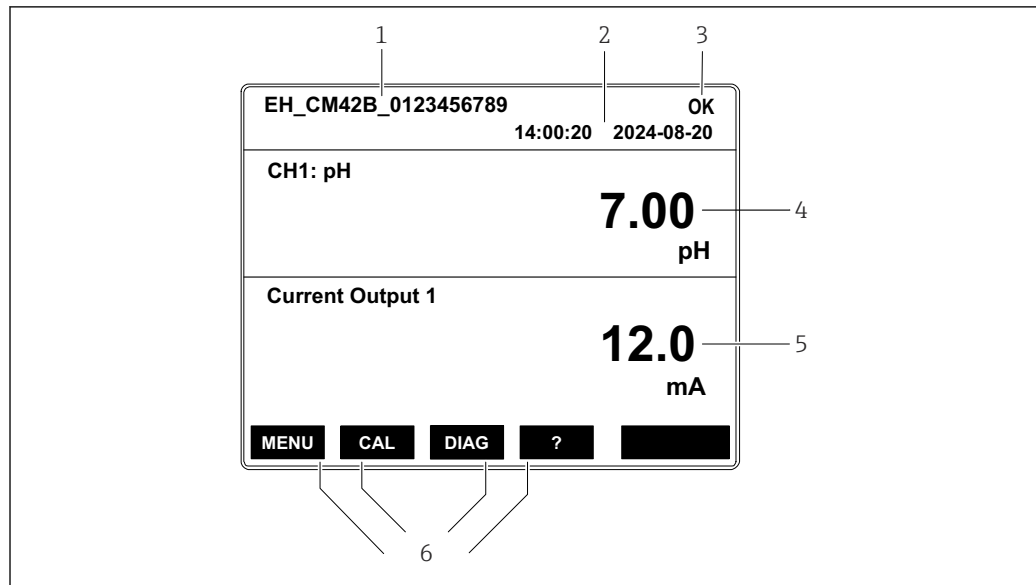


18 Operating elements

- 1 Display
- 2 Navigator
- 3 Soft keys

A0056333

7.2.3 Structure of the display



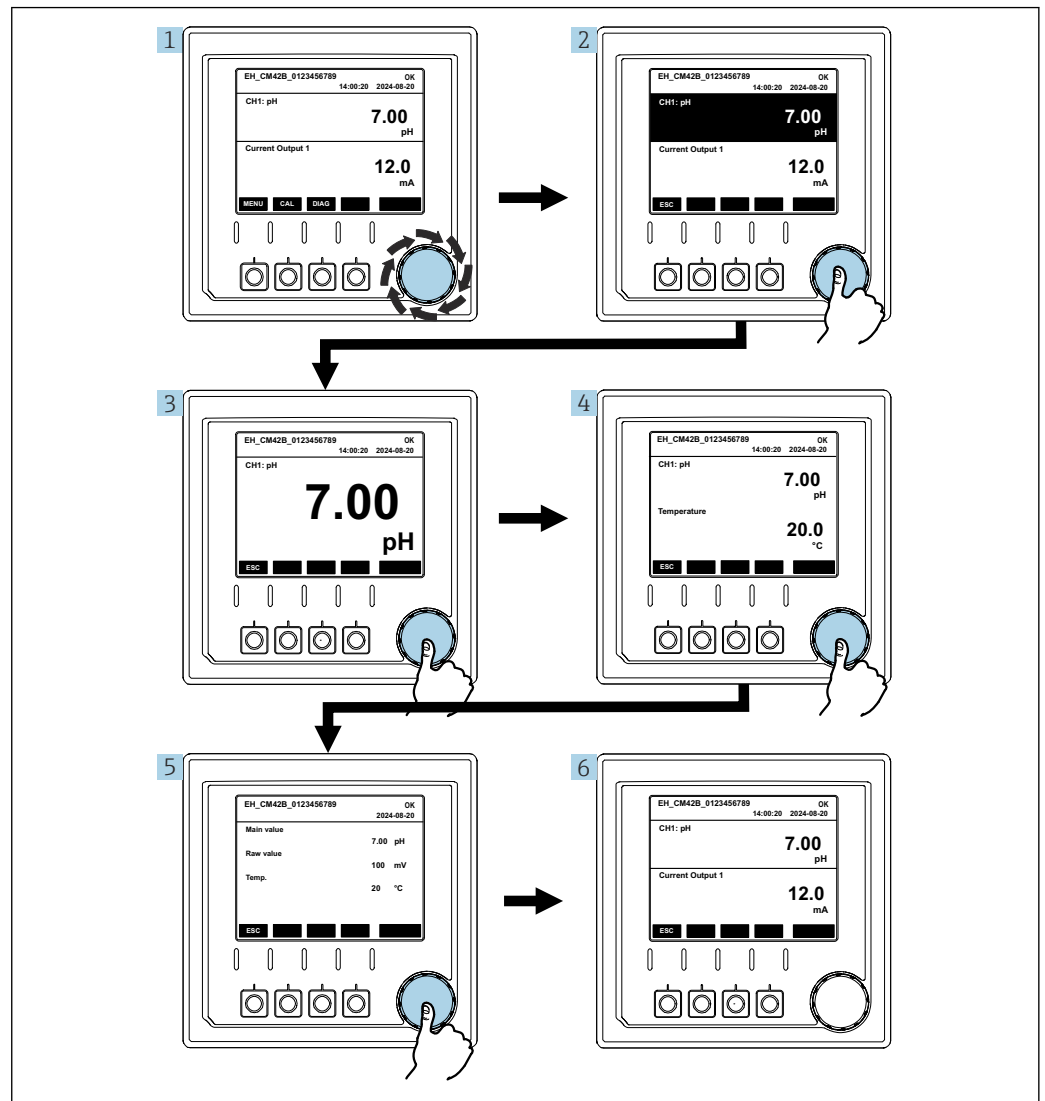
A0056328

19 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

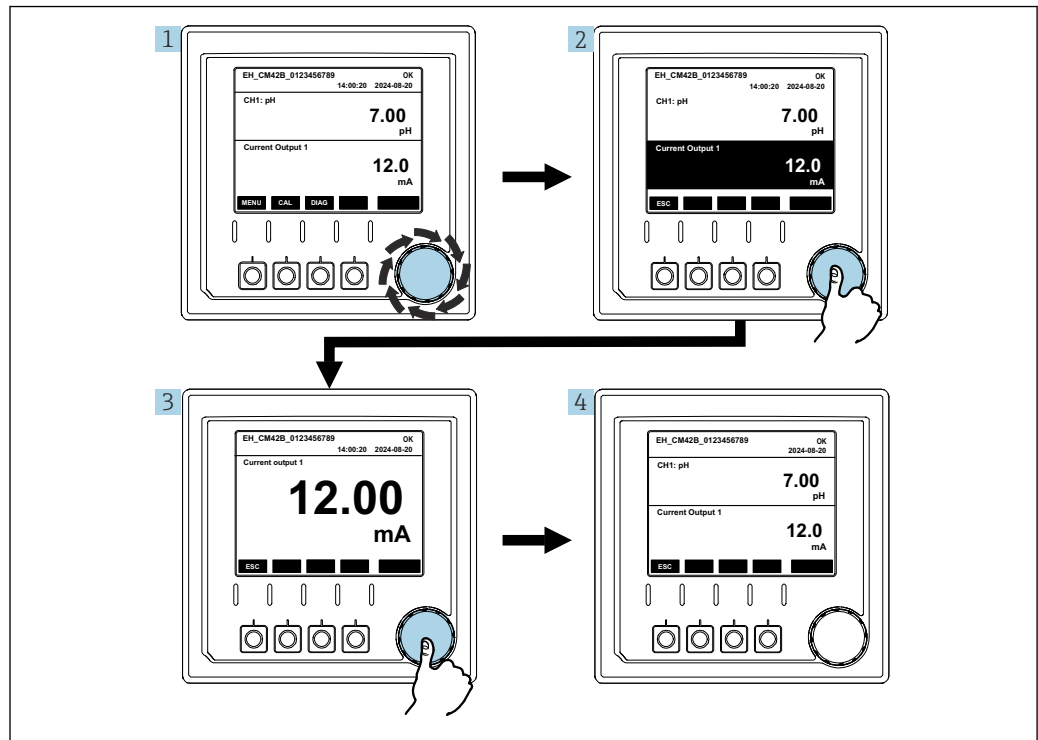


20 Navigating through measured values

A0056209

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

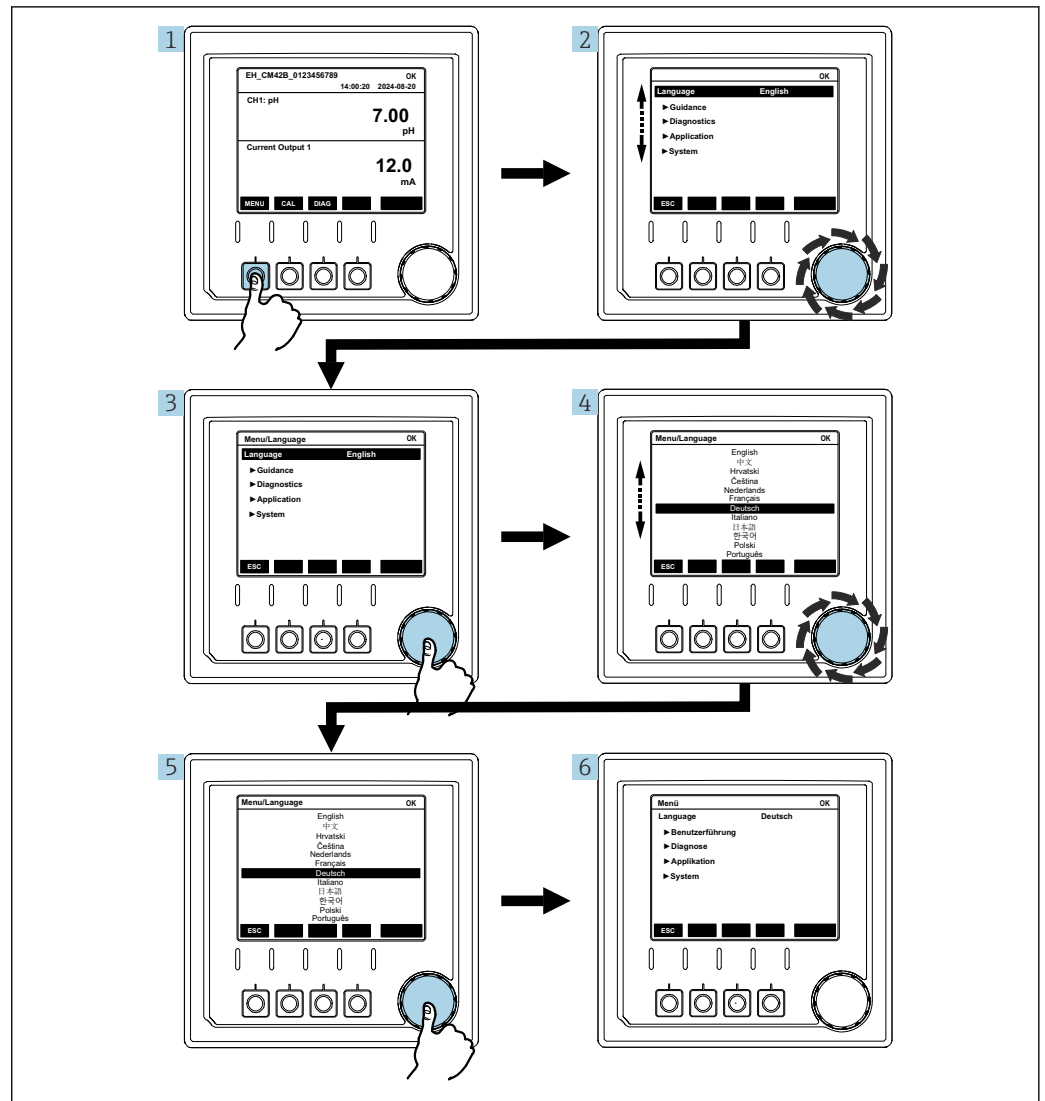


A0056210

21 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 for 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**



A0029747

Launch the SmartBlue app on the mobile device.

↳ The live list displays all of the devices that are within range.

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

i 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.

7.3.2 SmartBlue app accounts

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:

- operator
- maintenance
- admin

7.3.3 Functions via the SmartBlue app

The SmartBlue app supports the following functions:

- Firmware update
- User management
- Export of information for the service

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)
- HART

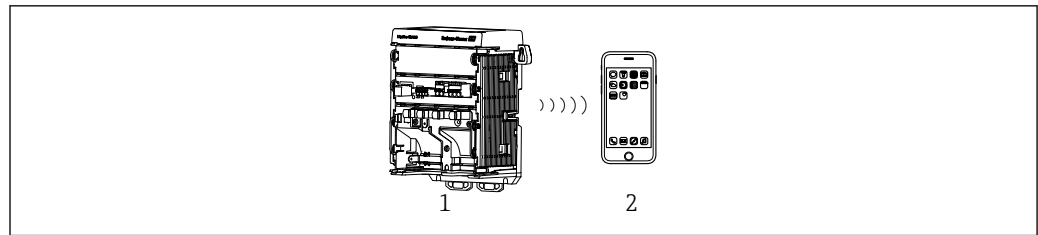
8.1.1 Current output


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.

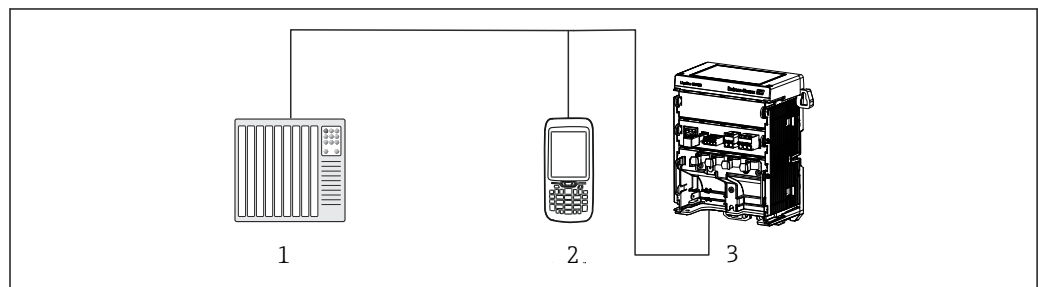



 22 Options for remote operation via Bluetooth® LE wireless technology

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

8.1.3 HART

HART operation is possible via different hosts.



 23 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 Post-installation and 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 displays

The displays use the status LEDs. The status LEDs are only active if no external 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 service display. For information on the diagnostic categories, see →  44
Red Flashes slowly	Category M, C or S diagnostic message is present. The complete message can be seen via HART or the service display. For information on the diagnostic categories, see →  44
Alternating 2x red flashes and 2x green flashes	Squawk mode is enabled. See also →  43
Alternating 1x red flash and 1x green flash	Error during the starting process. Contact the Service Team.

9.3 Establishing a connection via the SmartBlue (app) app

1. The SmartBlue App is installed on the mobile device and Bluetooth is enabled.
Start the SmartBlue app.
 - ↳ The SmartBlue App shows all available devices in the live list.
2. Select device from the live list.
3. Log in with username and password.

Initial access data:

- Username: admin
- Password: serial number of the device



It is advisable to change the username and password after logging in for the first time.



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

9.4 Time and date

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


When using the SmartBlue app, the date and time can also be automatically transferred from the mobile device.

9.5 Configuring the operating language

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

10 Operation

10.1 Reading the measured values

See →  29

10.2 Adapting the measuring instrument to the process conditions

10.2.1 Calibrating the sensor

Different calibration methods are available depending on the measuring parameter and connected sensor.

1. Navigate to the path: **Menu/Guidance/Calibration** or press the **CAL** softkey.
2. Select the desired calibration method.
3. Follow the instructions in the wizard.

10.2.2 Damping

Damping causes smoothing of the measured value with the entered time constant.

Configuration options:

Enter the time constant (the time over which the mean value is generated) for all measured values of the sensor.

- ▶ Navigate to the path: **Menu/Application/Sensor/Damping**

10.2.3 Calibration settings

Calibration monitoring

Displays

- Number of sensor calibrations
- Operating hours of the sensor since last calibration

Configuration options:

- Enable calibration monitoring when operating/enable during the connection process/disable
- Define the warning limit and the alarm limit for the time after the last calibration.
- ▶ Navigate to the path: **Menu/Application/Sensor/Calibration settings/Adjustment monitoring**

Stability criteria (only pH, ORP or dissolved oxygen measuring parameters)

The stability criteria are permitted measured value fluctuations which must not be exceeded in a certain timeframe during calibration. If the permitted fluctuation is exceeded, calibration cannot be started. It is then possible to regenerate the measured value.

Configuration options:

Depending on the measuring parameter

- ▶ Navigate to the path: **Menu/Application/Sensor/Calibration settings/Stability criteria**

Calibration methods

Different calibration methods are available depending on the measuring parameter and the sensor used.

Configuration options:

Select the calibration methods that are displayed under **Menu/Guidance/Calibration**

- ▶ Navigate to the path: **Menu/Application/Sensor/Calibration settings/Calibration methods**

Further calibration settings

Further calibration settings are available depending on the measuring parameter and connected sensor.

10.2.4 Operating hours monitoring

The total operating time of the sensor and its use under extreme conditions are recorded. If the operating time exceeds the defined threshold values, the device issues a corresponding diagnostic message.

Configuration options:

- Enable/disable operating hours monitoring
- Enter limit value for total operating hours
- Select diagnostic behavior if an operating hours upper limit is exceeded
- ▶ Navigate to the path: **Menu/Application/Sensor/Operating hours monitoring**



For oxygen sensors, operating hours monitoring is also available for the cap.

Path: **Menu/Application/Sensor/Operating hours monitoring cap**

10.2.5 Tag control

Tag control specifies which sensors the device allows.

When tag control is enabled, the device only allows sensors with the same measuring point name/measuring point group or identical and brand-new sensors.

Configuration options:

- Enable/disable tag control for individual measuring point name or measuring point group
- Enter the name of the measuring point
- Enter the name of the measuring point group
- ▶ Navigate to the path: **Menu/Application/Sensor/Tag control**

10.2.6 Cleaning in place (CIP)

Displays:

Number of CIP cycles performed by the sensor

Configuration options:

- Enable/disable CIP detection
- Configure parameters for CIP detection
- Enable/disable CIP monitoring (CIP cycle counter)
- Configure warning limit and diagnostic behavior for CIP monitoring.
- ▶ Navigate to the path: **Menu/Application/Sensor/Cleaning in place (CIP)**

10.2.7 Sterilization

Displays:

Number of sterilization cycles performed by the sensor

Configuration options:

- Configure parameters for sterilization detection
- Enable/disable sterilization monitoring (sterilization cycle counter)
- Configure warning limit and diagnostic behavior for sterilization monitoring.
- ▶ Navigate to the path: **Menu/Application/Sensor/Sterilization**

10.3 Settings of the current output

Configuration options:

- Failure current
- Process variable/measured value
- Linear output mode/table
- Start and end of measuring range
- Hold behavior of the current output
- ▶ Navigate to the path: **Menu/Application/Current output**

10.4 Bluetooth

Displays:

Bluetooth device name

Configuration options:

Enable/disable Bluetooth

- ▶ Navigate to the path: **Menu/System/Connectivity/Bluetooth**

10.5 HART settings

Configuration options:

- Enable/disable HART communication
- Configure the HART interface
- ▶ Navigate to the path: **Menu/Application/HART output**

10.6 Hold settings

Configuration options:

- Enable/disable device hold
- Specify hold delay
- Enable/disable automatic calibration hold
- ▶ Navigate to the path: **Menu/Application/Hold settings**

10.7 Squawk

Squawk mode makes the device easier to find in larger installations.

In devices with a connected external display, squawk mode being enabled causes the display screen to flash (alternates between normal display and inverted display).

In devices without a connected external display, squawk mode is shown via the status LEDs (alternates between 2x green flashes and 2x red flashes).

Configuration options:

Enable/disable squawk mode

- ▶ Navigate to the path: **Menu/System/Device Management**

11 Diagnosis and troubleshooting

11.1 General troubleshooting


The transmitter continuously monitors its functions itself.

If a diagnostic message occurs, the display alternates between the diagnostic message and the measured value in the measuring mode for devices with an external display. In devices without an external display, pending diagnostic messages are displayed by LED signals.

In the **DIAG/Diagnostics list** menu, you can find more detailed information on the current diagnostic messages displayed.

In accordance with NAMUR specification NE 107, the diagnostic messages are characterized by:

- Message number
- Error category (letter in front of the message number)
 - **F** = (Failure) a malfunction has been detected
The measured value of the affected channel is no longer reliable. The cause of the malfunction is to be found in the measuring point. Any controller connected should be set to manual mode.
 - **C** = (Function check), (no error)
Maintenance work is being performed on the device. Wait until the work has been completed.
 - **S** = (Out of specification), the measuring point is being operated outside its specification
Operation is still possible. However, you run the risk of increased wear, a shorter operating life or lower accuracy levels. The cause of the problem is to be found outside the measuring point.
 - **M** = Maintenance required. Action must be taken as soon as possible
The device still measures correctly. Immediate measures are not necessary. However, proper maintenance efforts would prevent a possible malfunction in the future.
- Message text

 If you contact the Service Department, please cite the message number only. Since you can individually change the assignment of an error to an error category, the Service Department cannot use this information.

11.2 Diagnostic information via LEDs

See LED displays in the "Commissioning" section. →  38

11.3 Diagnostic information on the onsite display (optional)

Current diagnostic events appear on the display. In the measuring mode, the display shows the diagnostic message with what is currently the highest priority. If a menu is currently open, you have to navigate to the diagnostic list.

11.4 Diagnostic information via communication interface

Diagnostic events, status signals and more information are transmitted according to the definitions and technical capability of the respective fieldbus systems.

11.5 Adapting the diagnostic information

Configuration options:

- Specify the error category for the diagnostic messages as per NAMUR NE 107 (F, M, C, S).
- Specify the diagnostic behavior for the diagnostic messages.
- ▶ Navigate to the path: **Menu/Diagnostics/Diagnostics settings**

11.6 Diagnostic list

Displays:

List of active diagnostic messages

- ▶ Navigate to the path: **Menu/Diagnostics/Diagnostic List**

11.7 Event logbook

Diagnostic events, calibration events, firmware changes, hardware changes, configuration changes, system events, etc. are saved in the event logbook.

- ▶ Navigate to the path: **Menu/Diagnostics/Event logbook**

11.8 Simulation


Certain parameters can be simulated for test purposes:

- Current value of the current outputs
- Primary value
- Temperature
- ▶ Navigate to the path: **Menu/Diagnostics/Simulation**

11.9 Firmware history

Date	Version	Changes to firmware	Documentation
02/2025	01.00.00	Release	BA02425C/07/EN/01.24

11.9.1 Firmware update

 Information about firmware updates can be found in the sales office or on the www.endress.com/CM42B product page.

The current firmware version and device type can be found under: **System/Information/Device**

12 Maintenance

The maintenance of the measuring point comprises:

- Calibration
- Cleaning the transmitter, assembly and sensor
- Checking cables and connections.

WARNING

Process pressure and temperature, contamination

Risk of serious or fatal injury

- ▶ If the sensor has to be removed during maintenance work, avoid dangers posed by pressure, temperature and contamination.

NOTICE

Electrostatic discharge (ESD)

Risk of damaging the electronic components

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

12.1 Maintenance work

12.1.1 Cleaning the external display (when installed)

- ▶ Clean the front of the housing using commercially available cleaning agents only.

The front is resistant to:

- Ethanol (for a short time)
- Diluted acids (max. 2% HCl)
- Diluted bases (max. 3% NaOH)
- Soap-based household cleaning agents

Cleaning agents not permitted

Damage to the housing surface or housing seal possible!

- ▶ Never use concentrated mineral acids or alkaline solutions for cleaning.
- ▶ Never use organic cleaners such as acetone, benzyl alcohol, methanol, methylene chloride, xylene or concentrated glycerol cleaner.
- ▶ Never use high-pressure steam for cleaning.

13 Repair

13.1 General information

- ▶ Only use spare parts from Endress+Hauser to guarantee the safe and stable functioning of the device.

Detailed information on the spare parts is available at:

www.endress.com/device-viewer

13.2 Return

The product must be returned if repairs or a factory calibration are required, or if the wrong product was ordered or delivered. As an ISO-certified company and also due to legal regulations, Endress+Hauser is obliged to follow certain procedures when handling any returned products that have been in contact with medium.

www.endress.com/support/return-material

The product must be returned if repairs or a factory calibration are required, or if the wrong product was ordered or delivered.

To ensure safe, professional and swift product returns, please contact your local Sales Center for information on the procedure to be followed and general conditions.

13.3 Disposal

The device contains electronic components. The product must be disposed of as electronic waste.

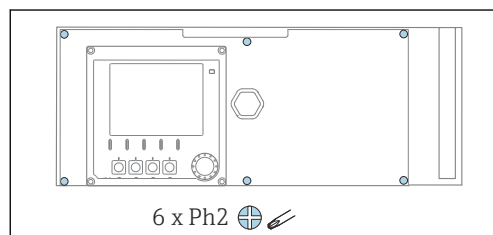
- ▶ Observe the local regulations.

Battery disposal

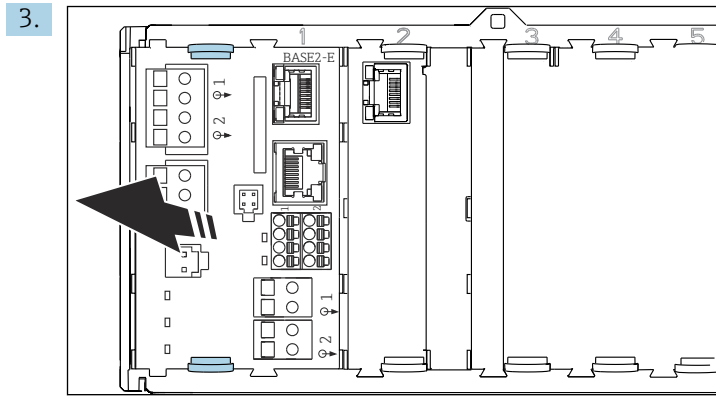
A lithium button cell is located on the backplane of the controller. This must be removed as electronic waste prior to disposal of the device.

1. Disconnect the device from the power supply.

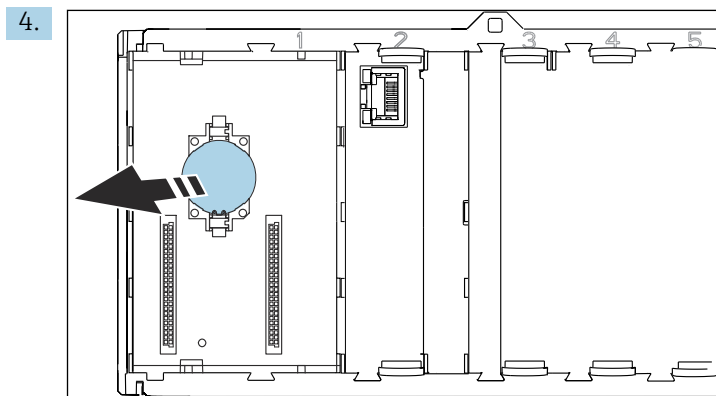
- 2.



Release the six screws on the electronics compartment cover using a Phillips screwdriver and fold out the cover towards the front.



Press together the securing clips of the base module and pull them out of the base module.



Release the lithium button cell from the backplane and dispose of it according to local battery regulations.



If required by the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), the product is marked with the depicted symbol in order to minimize the disposal of WEEE as unsorted municipal waste. Do not dispose of products bearing this marking as unsorted municipal waste. Instead, return them to the manufacturer for disposal under the applicable conditions.

14 Accessories

The latest list of accessories, all compatible sensors and activation codes is provided on the product page: www.endress.com/CM42B

15 Technical data

15.1 Input

Measured variable

- pH
- ORP
- pH/ORP
- Conductivity
- Dissolved oxygen

Measuring range

→ Documentation of the connected sensor

Type of input

Digital sensor input for Memosens sensors

Memosens input

Cable specifications

- Memosens data cable or fixed sensor cable, in each case with ferrules
- Cable length max. 100 m (330 ft)

15.2 Output

Output signal

Passive current output

Current output 1

- 4 to 20 mA, optionally with HART support
- Galvanic isolations
 - Against current output 2
 - Depends on the device version against the analog sensor input

Current output 2 (optional)

- 4 to 20 mA
- Galvanic isolations
 - Against current output 1
 - Depends on the device version against the analog sensor input or against the Memosens input

HART	
Signal encoding	FSK ± 0.5 mA above current signal
Data transmission	1200 baud
Galvanic isolation	See current output 1
Load (communication resistor)	250 Ω

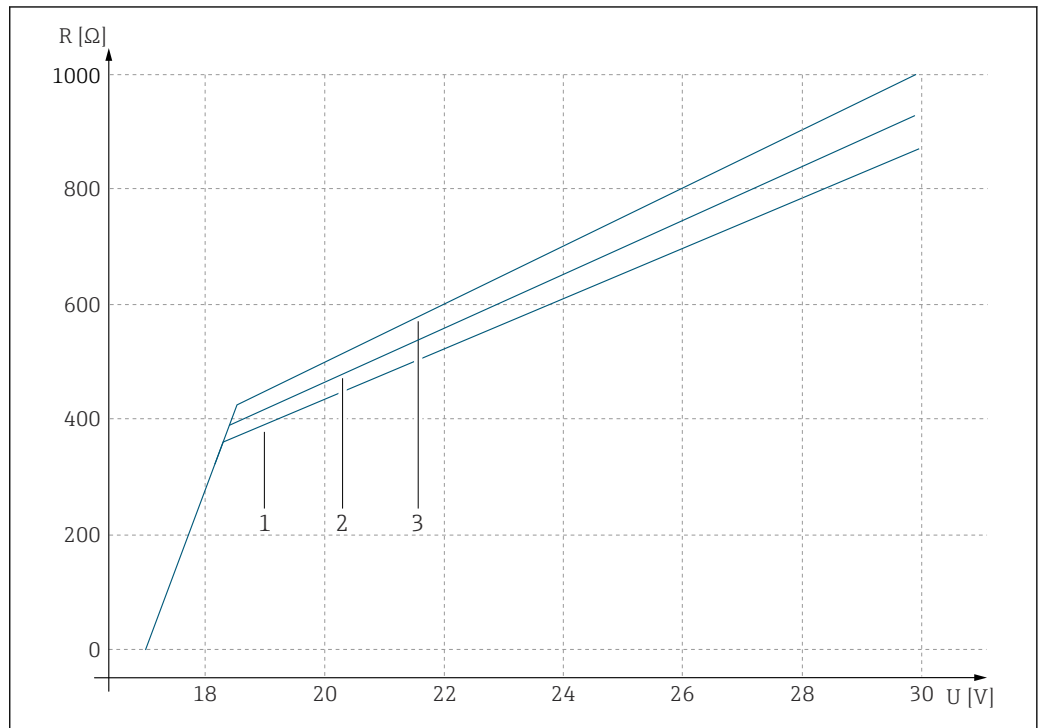
Signal on alarm as per NAMUR NE 43

The following values can be selected:

- < **3.6 mA**
- 21.5 mA
- 22.0 mA
- 22.5 mA
- 23.0 mA

Load

For load, see characteristic curve.



A0055514

U Supply voltage [V]

R Load [Ω]

1 Max. load with configured failure current 23 mA

2 Max. load with configured failure current 21.5 mA

3 Max. load with configured failure current < 3.6 mA

Output span

3.6 to 23 mA

15.3 Protocol-specific data

HART

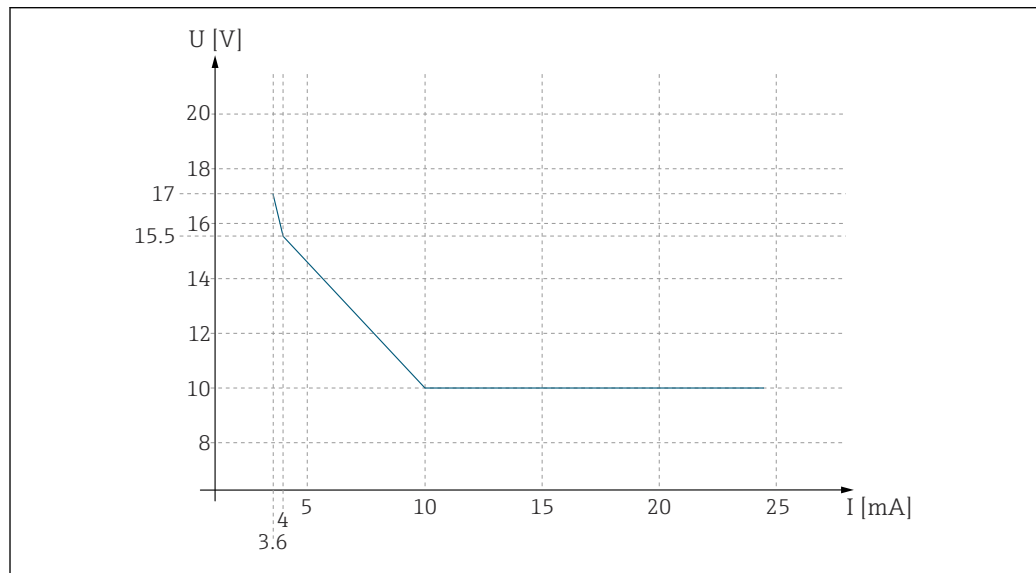
Manufacturer ID	0x0011
Device type	0x11A4 (pH), 0x11A5 (conductivity), 0x11A6 (oxygen)
Device revision	1
Manufacturer name	Endress+Hauser
Model name	Depends on the measuring principle
HART version	7.9
Device description files (DD/DTM)	www.endress.com/hart https://www.fieldcommgroup.org/registered-products Device Integration Manager DIM
Device variables	PV, SV, TV and QV can be selected from all device variables. All measured values are each available as a device variable.
Supported features	FDI packages

15.4 Power supply

Supply voltage

i The power supply must comply with the relevant safety requirements and be separated from the mains voltage by double or reinforced insulation. (ELV)

- For supply voltage, see characteristic curve
- Max. supply voltage: 30 V DC



24 Min. supply voltage at the transmitter depending on the output current

U Supply voltage [V DC]
I Output current [mA]

Cable specification

Cable cross-section

Terminal connector is suitable for strands and ferrules.

Cable cross-section: 0.25 mm² (≈23 AWG) to 2.5 mm² (≈12 AWG)

15.5 Performance characteristics

Response time of current output

t_{90} = max. 500 ms for an increase from 4 to 20 mA

Memosens measurement error

Thanks to digital data transmission, the measured value supplied by the sensor is passed on exactly at the sensor input. The accuracy depends solely on the connected sensor and the quality of its adjustment.

Tolerance, current outputs


Tolerance at ambient temperature 20 °C (77 °F):

- At output current 20 mA: ±50 µA
- At output current 4 mA: ±20 µA

15.6 Environment

Ambient temperature	<p>Non-Ex version -30 to 70 °C (-20 to 160 °F)</p> <p>For Ex versions, please refer to the relevant safety instructions (XA) on the online product pages.</p>
Storage temperature	-40 to +80 °C (-40 to 176 °F)
Relative humidity	10 to 95 %, non-condensing
Degree of protection	<p>Device IP20</p> <p>External display (optional) IP66 front-panel, when installed correctly including seal for door/wall</p> <p>External display (optional) IP 20</p>
Electromagnetic compatibility	<p>According to IEC 61326-1</p> <ul style="list-style-type: none"> ▪ Interference immunity: Table 2 (industrial environments) ▪ Interference emission: Class B (residential environments)

15.7 Mechanical construction

Dimensions	See →  11				
Weight	0.43 kg (0.95 lbs)				
Materials	<table border="1"> <tr> <td>Housing</td> <td>PC-FR (polycarbonate, flame-retarding)</td> </tr> <tr> <td>External display (optional)</td> <td>PC-FR (polycarbonate, flame-retarding)</td> </tr> </table>	Housing	PC-FR (polycarbonate, flame-retarding)	External display (optional)	PC-FR (polycarbonate, flame-retarding)
Housing	PC-FR (polycarbonate, flame-retarding)				
External display (optional)	PC-FR (polycarbonate, flame-retarding)				

Index

A

Accessories	
Communication-specific	49
Device-specific	49
System components	49
Activation codes	49
Adjustment monitoring	41
Ambient temperature	53

B

Bluetooth	43
-----------	----

C

Cable cross-section	52
Cable terminals	24
Calibration	41, 46
Calibration methods	42
Check	
Post-installation and function	38
CIP	42
Cleaning	46
Cleaning in place	42
Commissioning	38
Configuring the date	40
Configuring the time	40
Connection	38
Electrical	22
Supply voltage	52
Current output	43

D

Damping	41
Degree of protection	53
Designated use	5
Diagnosis	44
Diagnostic list	45
Diagnostic messages	45
Adapting	45
Communication interface	44
LEDs	44
Onsite display	44
Disposal	47
Documentation	4

E

Electrical connection	22
Electromagnetic compatibility	53
Ensuring the degree of protection	27
Event logbook	45

F

Firmware	45
Firmware update	45
Function check	38

H

HART	36, 43, 51
------	------------

Hold	43
------	----

I

Identifying the product	9
Incoming acceptance	9
Input	
Measured variables	50
IT security	6

L

LED displays	38
--------------	----

M

Maintenance	46
Maintenance work	46
Materials	53
Measured variables	50
Measuring parameters	8
Measuring ranges	50
Mounting	11
Mounting requirements	11

N

Nameplate	9
Non-designated use	5

O

Operating hours monitoring	42
Operating language	40
Operating menu	29
Operation	29, 41
Operational safety	6
Output	
Output signal	50
Output span	51

P

Paths	
Application	
Current output	43
HART output	43
Hold settings	43
Application/Sensor	
Calibration settings/Adjustment monitoring	41
Calibration settings/Calibration methods	42
Calibration settings/Stability criteria	41
Cleaning in place (CIP)	42
Damping	41
Operating hours monitoring	42
Sterilization	42
Tag control	42
Diagnostics	
Diagnostic List	45
Diagnostics settings	45
Event logbook	45
Simulation	45

Guidance	
Calibration	41
System	
Connectivity/Bluetooth	43
Post-connection check	28
Post-installation check	38
Power supply	52
Supply voltage	52
Product description	7
Product design	7
Product security	6
Protocol-specific data	
HART	51
R	
Relative humidity	53
Repair	47
Requirements for personnel	5
Return	47
S	
Safety	
Operation	6
Workplace safety	5
Safety instructions	5
Scope of delivery	10
Sensors	49
Simulation	45
Software	49
Squawk	43
Stability criteria	41
Sterilization	42
Storage temperature	53
Supply voltage	52
Symbols	4
System integration	36
T	
Tag control	42
Technical data	50
Environment	53
Input	50
Mechanical construction	53
Output	50
Protocol-specific data	51
Technical personnel	5
Troubleshooting	44
Diagnostic information	44
General troubleshooting	44
Types of input	50
U	
Use	
Designated	5
Non-designated	5
W	
Warnings	4
Weight	53
Workplace safety	5



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