

Operating Instructions

Liquiline CM42B

Two-wire transmitter

Device for DIN rail mounting

Measurement with digital Memosens sensors






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1 About this document



1.1 Safety information

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

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 (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

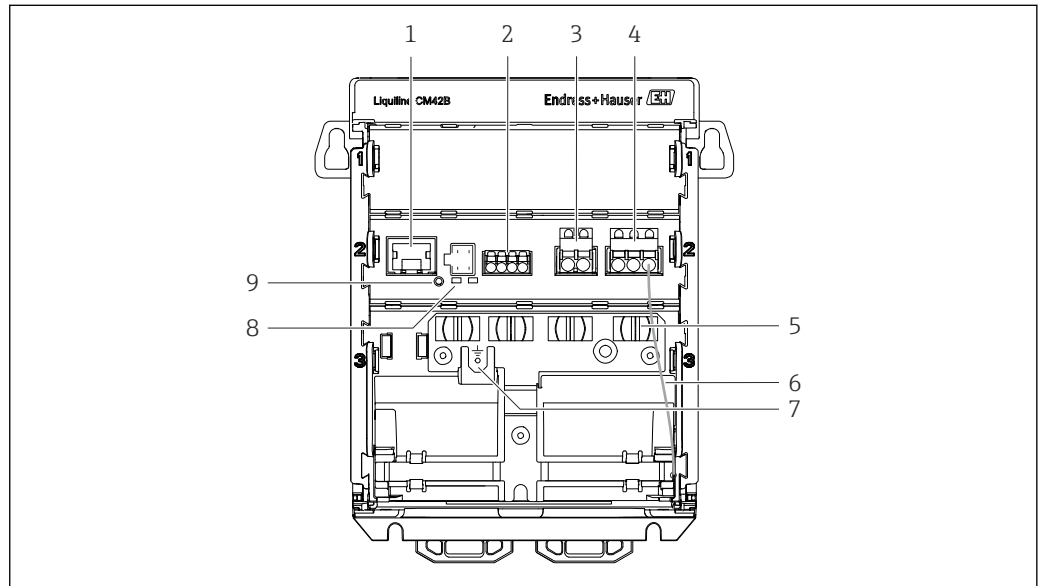
We only provide a warranty if the device is installed and used as described in the Operating Instructions and the Security Manual. The device is equipped with security mechanisms to protect it against any inadvertent changes to the device settings.

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 Device

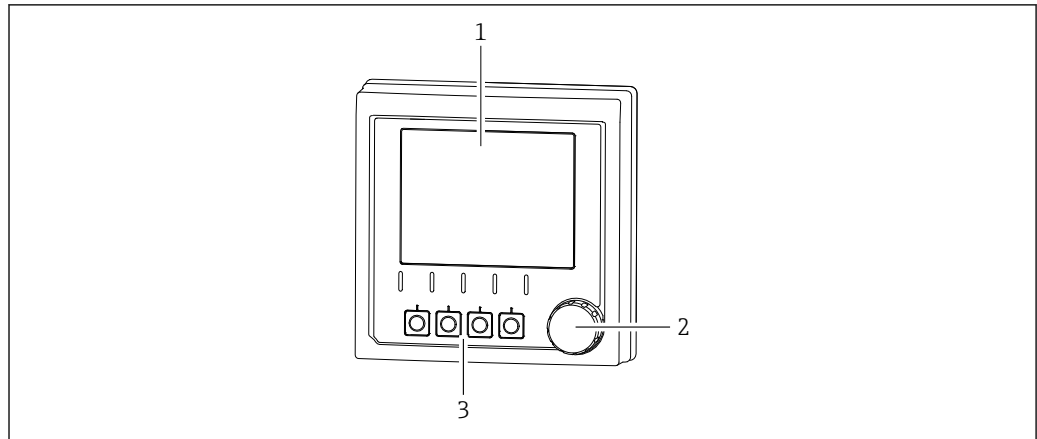


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- 1 RJ50 socket for display cable
- 2 Memosens input
- 3 Current output 1: 4 to 20 mA/optional HART, passive
- 4 Current output 2 (optional): 4 to 20 mA, passive
- 5 Cable mounting rail
- 6 Internal ground cable (wired at the factory)
- 7 Connection 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:

- 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

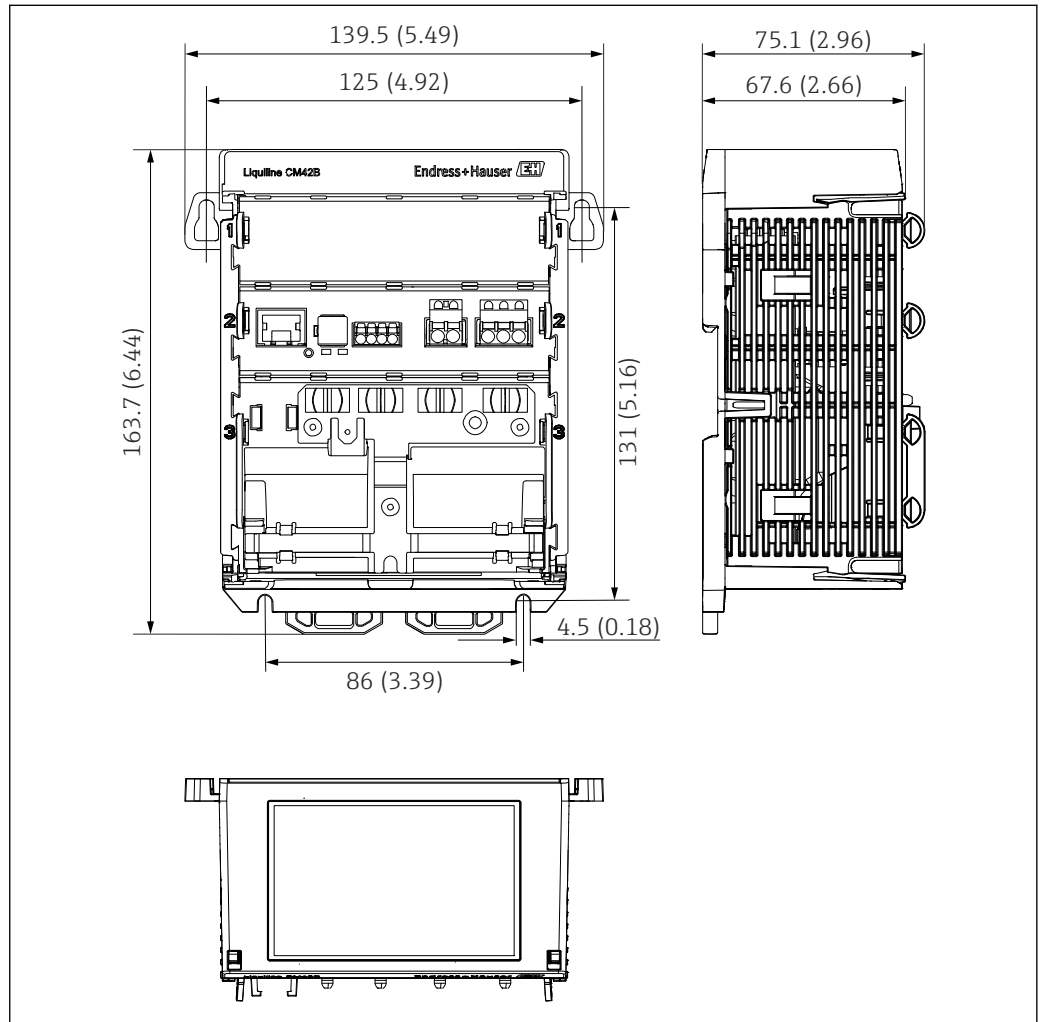
The scope of delivery includes:

- Liquiline CM42B
 - 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

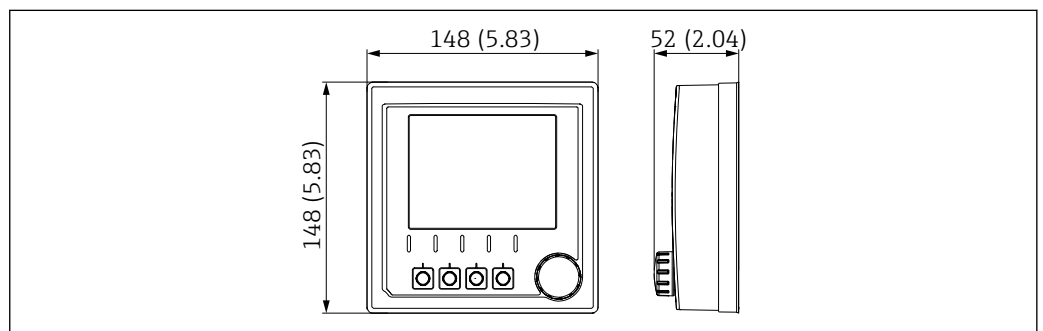
5.1 Installation requirements

5.1.1 Dimensions



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2 Dimensions of device in mm (inches)



A0055931

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 Installing the device

5.2.1 Mounting on DIN rail as per IEC 60715

NOTICE

Condensation on the device

Potential device failure

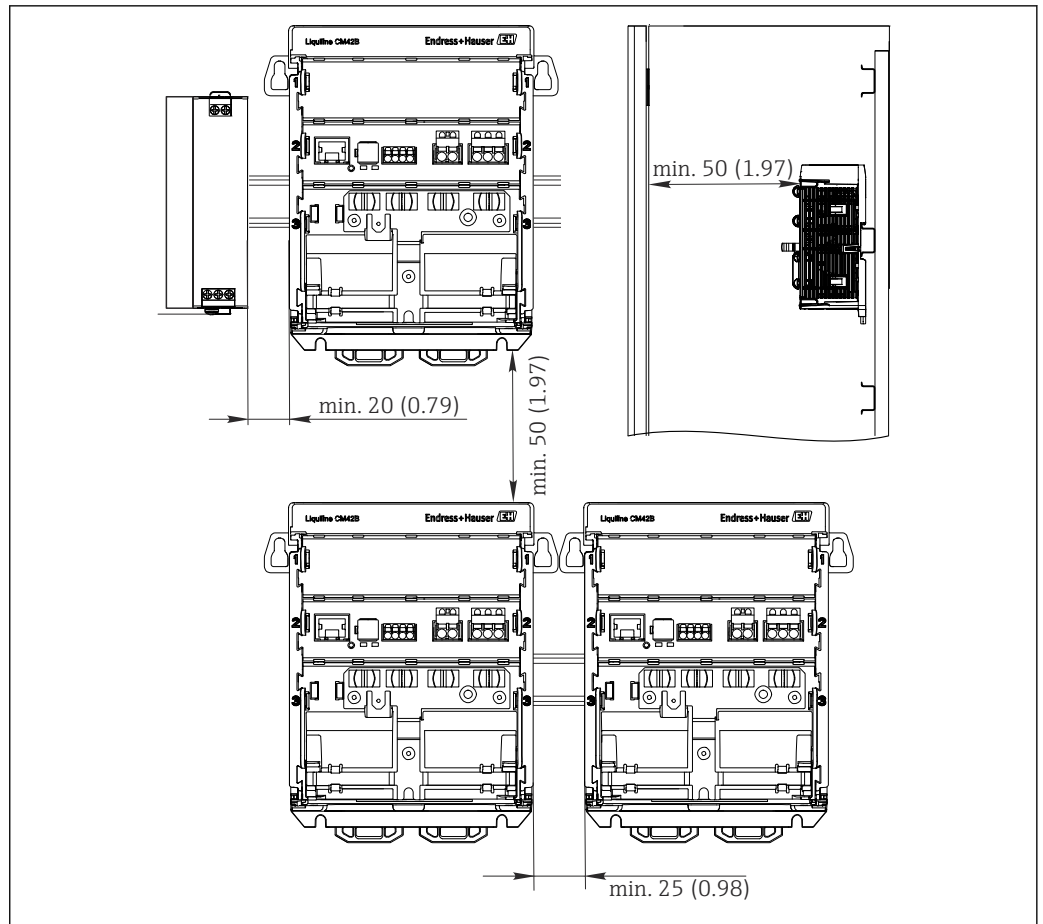
- ▶ The device complies with the IP20 degree of protection. It is designed only for environments with non-condensing moisture.
- ▶ Comply with the specified ambient conditions, e.g. by installing the device in an appropriate protective enclosure.

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.



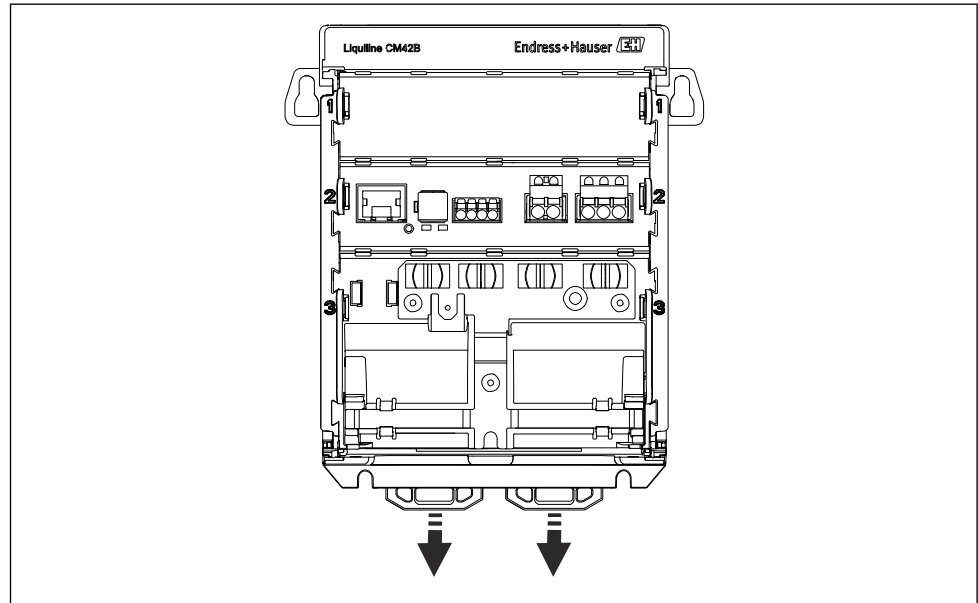
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4 Minimum clearance in mm (in)

Minimum clearances required:

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

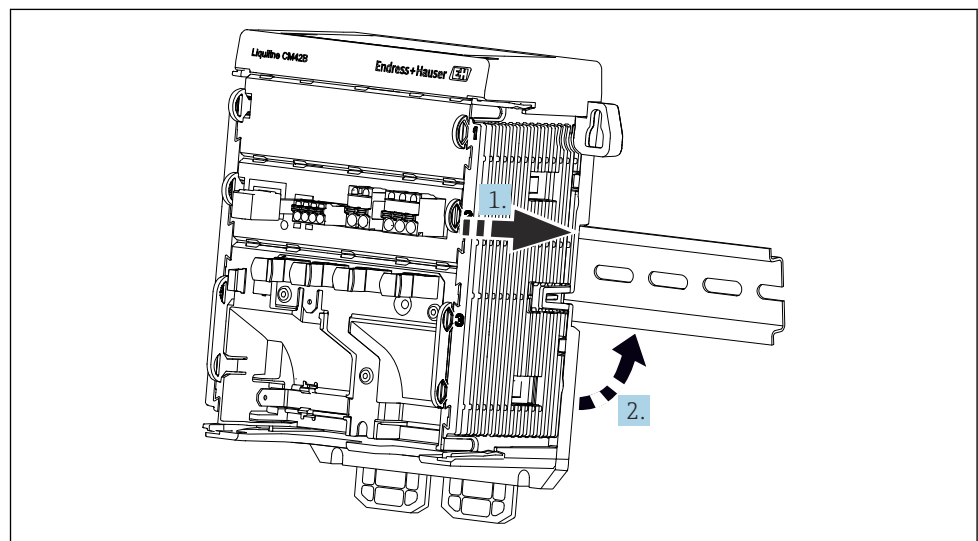
1.



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

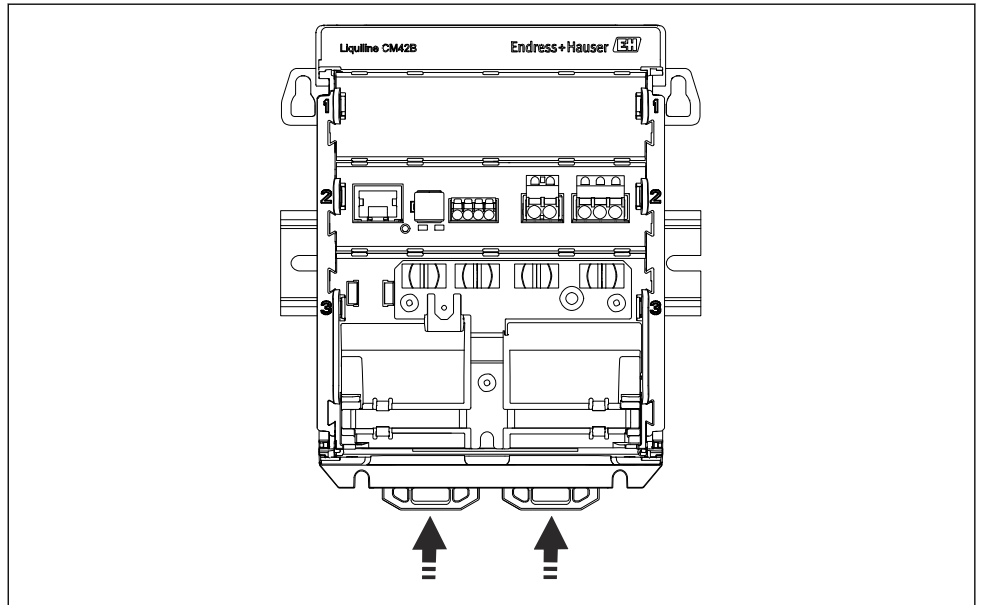
2.



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

3.

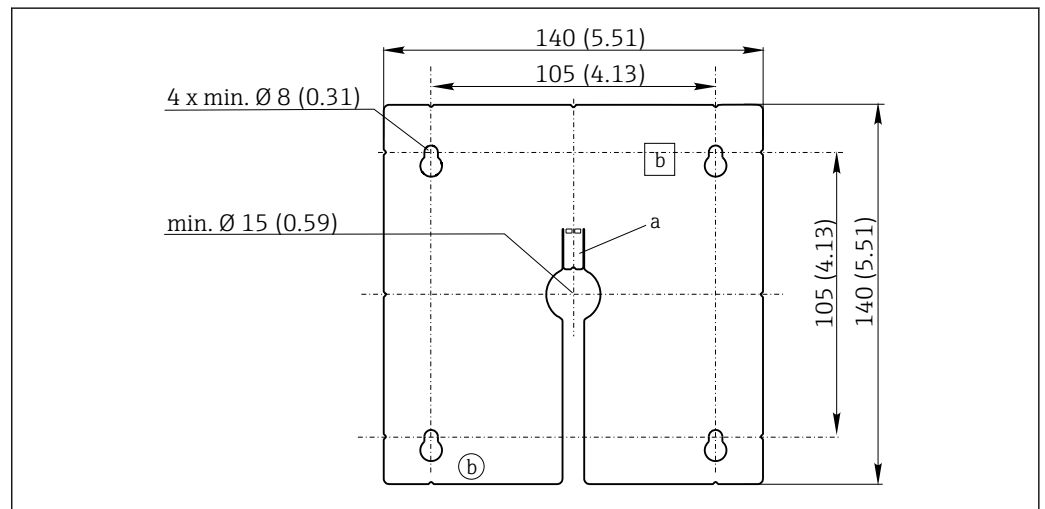


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Slide the securing clips upwards until they click, thereby securing the device to the DIN rail.

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.



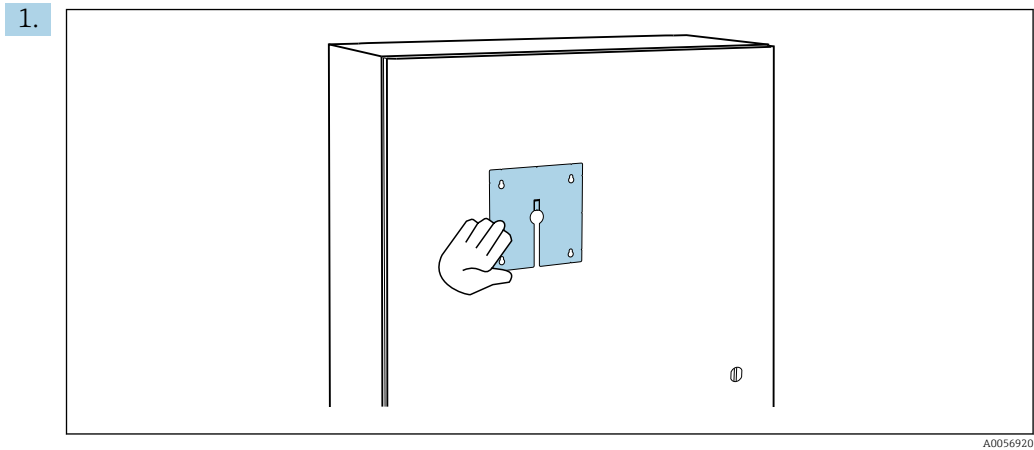
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5 Mounting plate of external display, dimensions in mm (in)

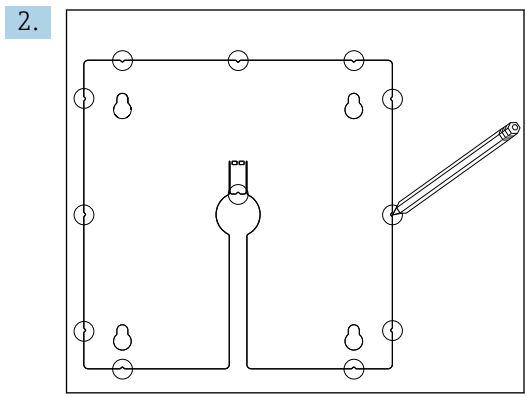
a Retaining tab

b Production-related recesses, no function for the user

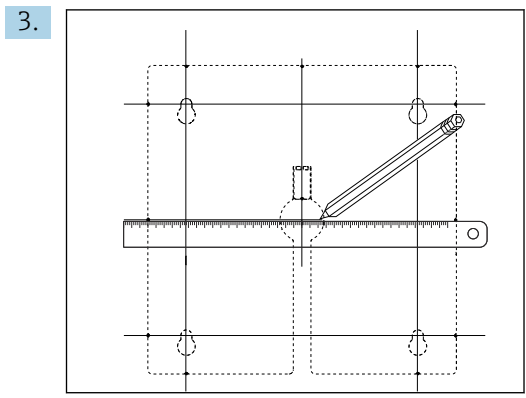
Mounting the external display on the control cabinet door



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.

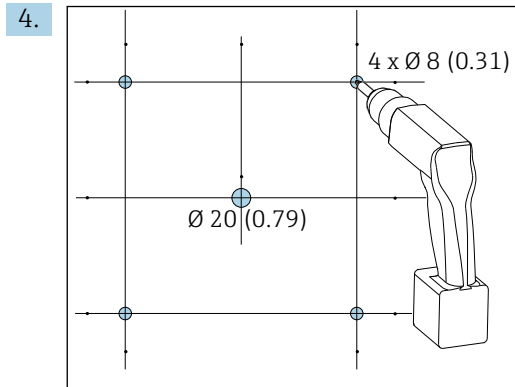


Make all the markings.



Draw lines to interconnect all the marks.

↳ The points of intersection of the lines mark the position of the 5 necessary boreholes.



6 Diameter of boreholes in mm (in)

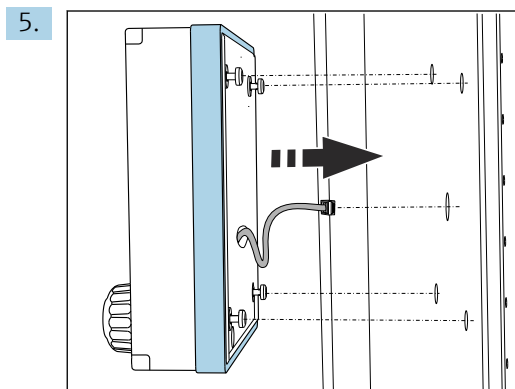
Drill the holes. → 5, 15

CAUTION

Sharp-edged, non-deburred boreholes

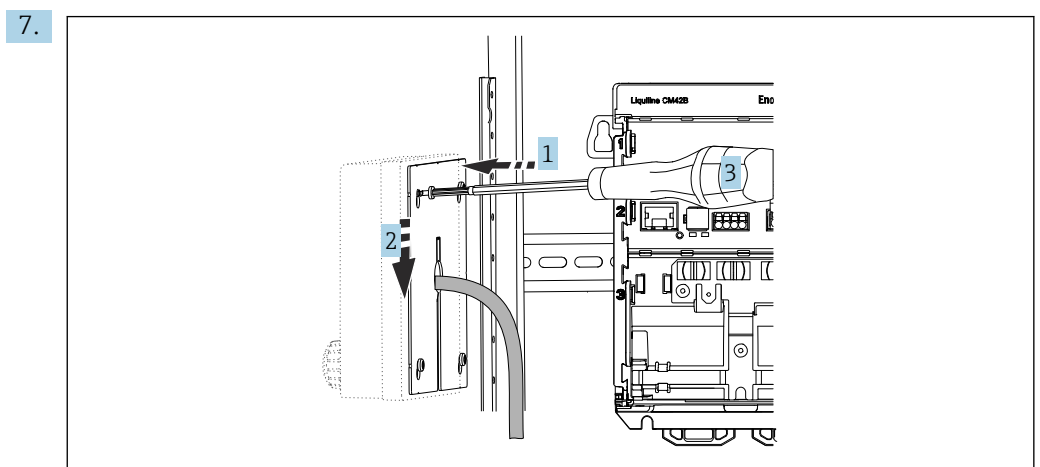
Risk of injury, display cable may get damaged!

- ▶ Trim and deburr all boreholes. In particular, make sure that the middle borehole for the display cable is properly deburred.



Pull the display cable through the central borehole.

6. Insert the external display with the screws unscrewed (but still in place) through the 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.



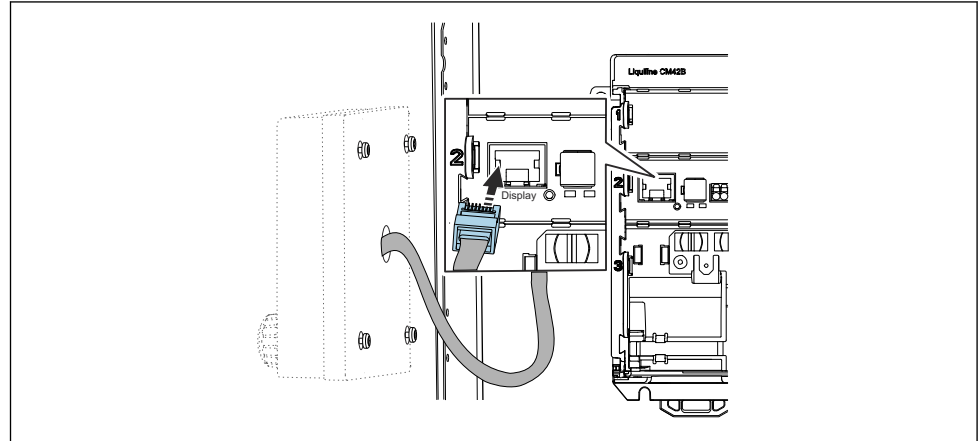
A0056921

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.

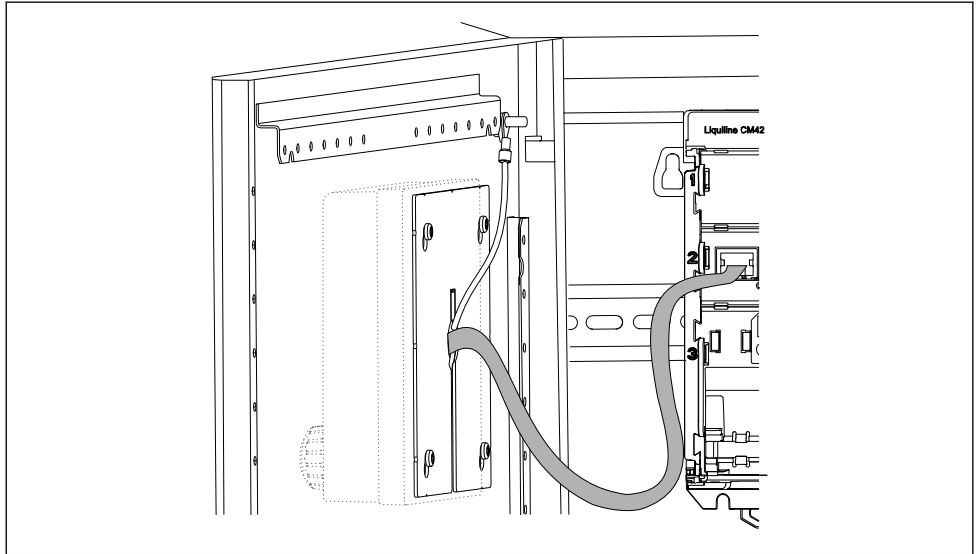
- Lay cables in such a way that they do not get squashed e.g. when closing the cabinet door.



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

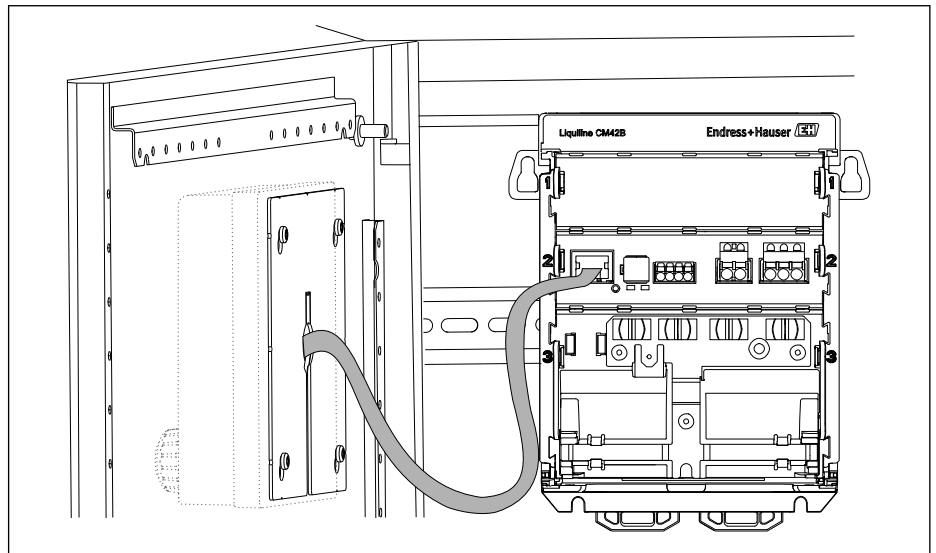
9.



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Stainless steel display only: Connect the display's ground cable to the nearest grounding point.

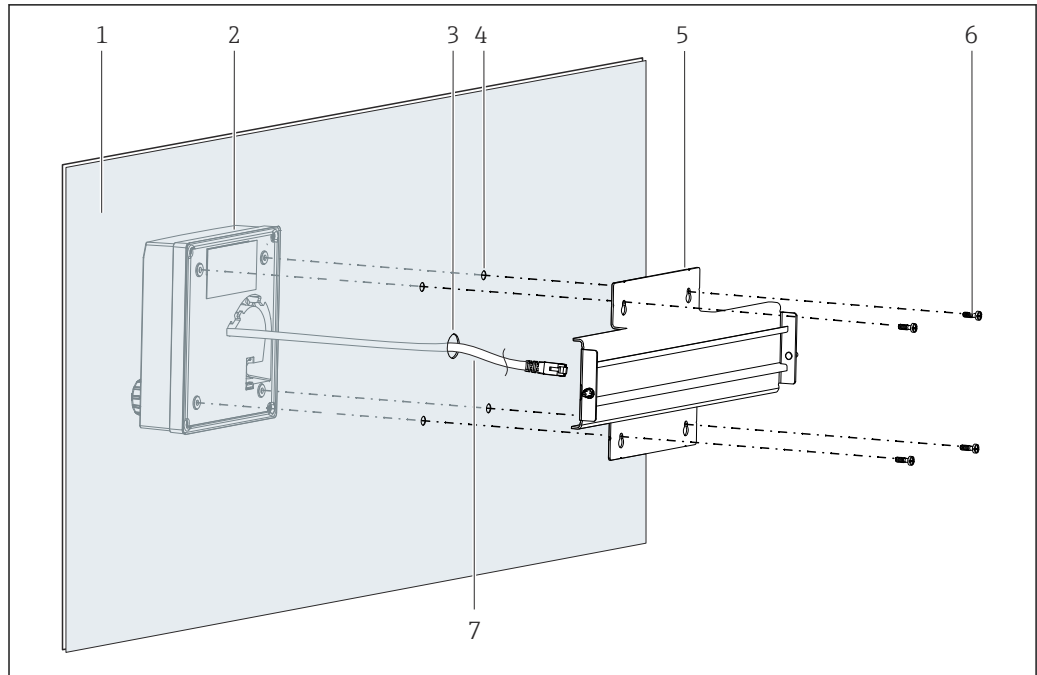
↳ The external display is now mounted and ready to use.



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7 External display mounted (plastic display without ground cable in illustration)

5.2.3 Mounting on panel (incl. external display)



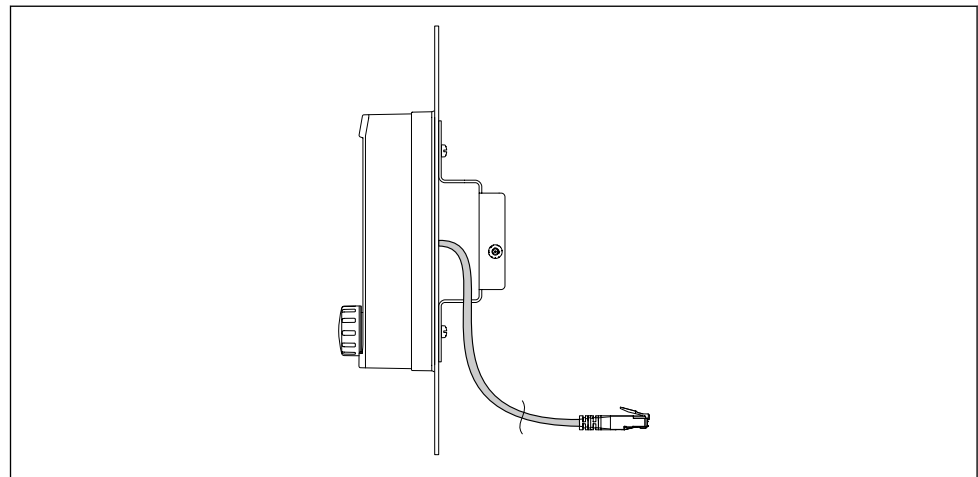
A0054860

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.

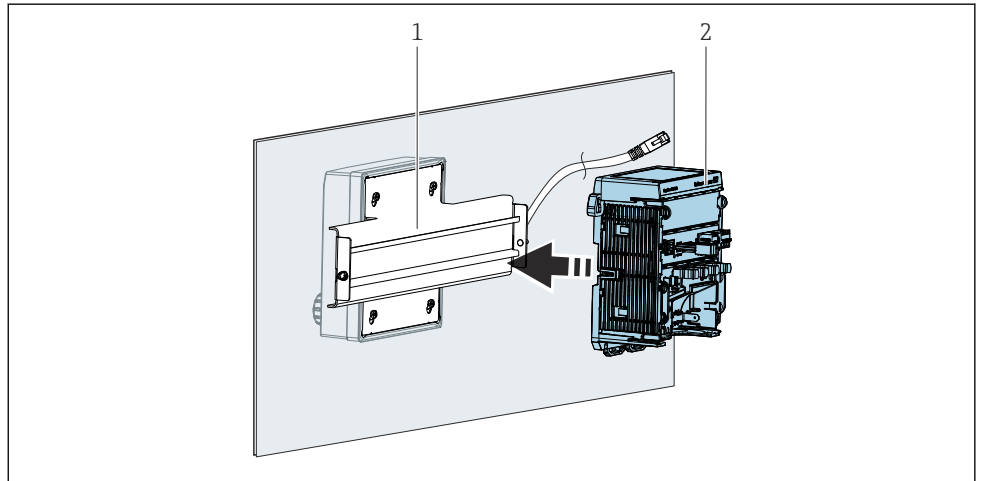


A0056254

9 *Layout of the display cable*

Route the display cable as shown in the illustration.

3.



- 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.

6.2 Connecting the device

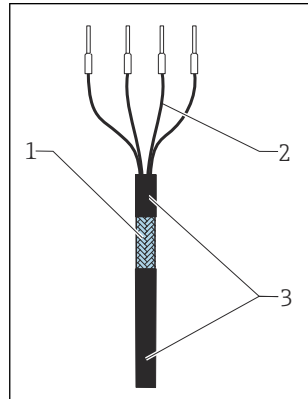
6.2.1 Connecting the cable shield

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)

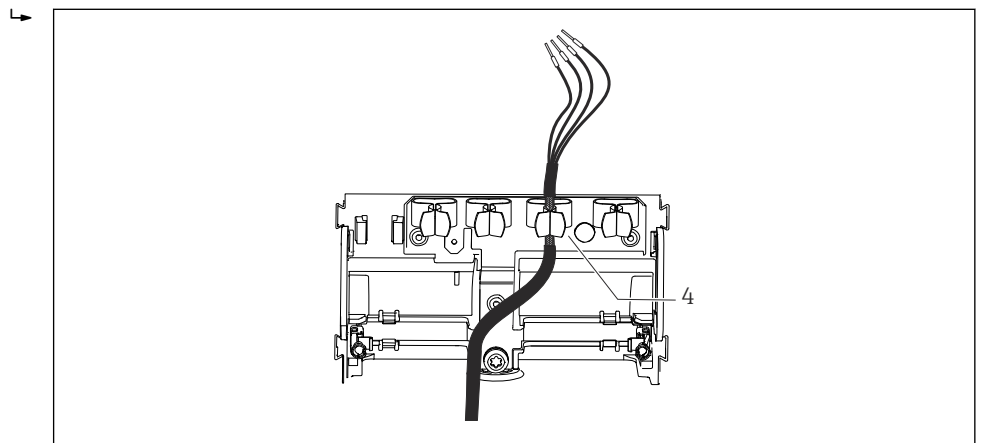
Sample cable (does not necessarily correspond to the original cable supplied)



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. Clamp the cable shield into the clamp.



11 Cable into grounding clamp

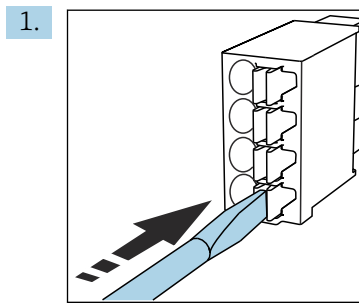
- 4 Grounding clamp

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

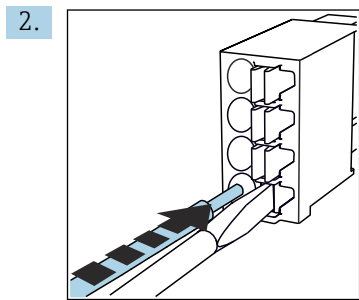
3. Connect cable cores as per the wiring diagram.

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

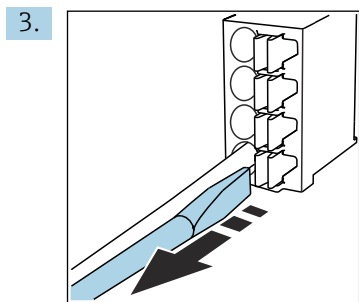
6.2.2 Cable terminals



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



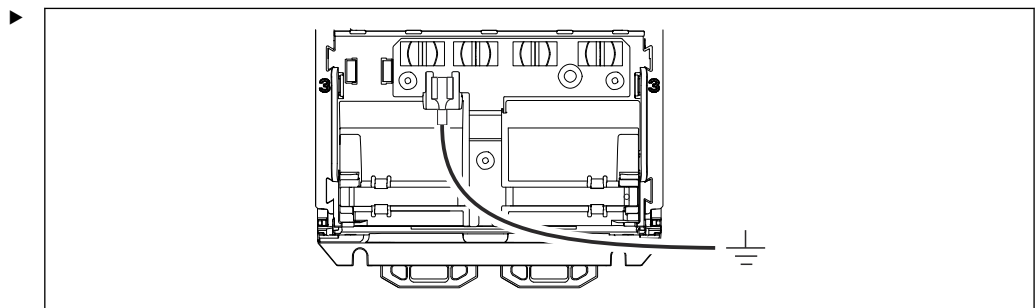
Insert the cable until the limit stop.



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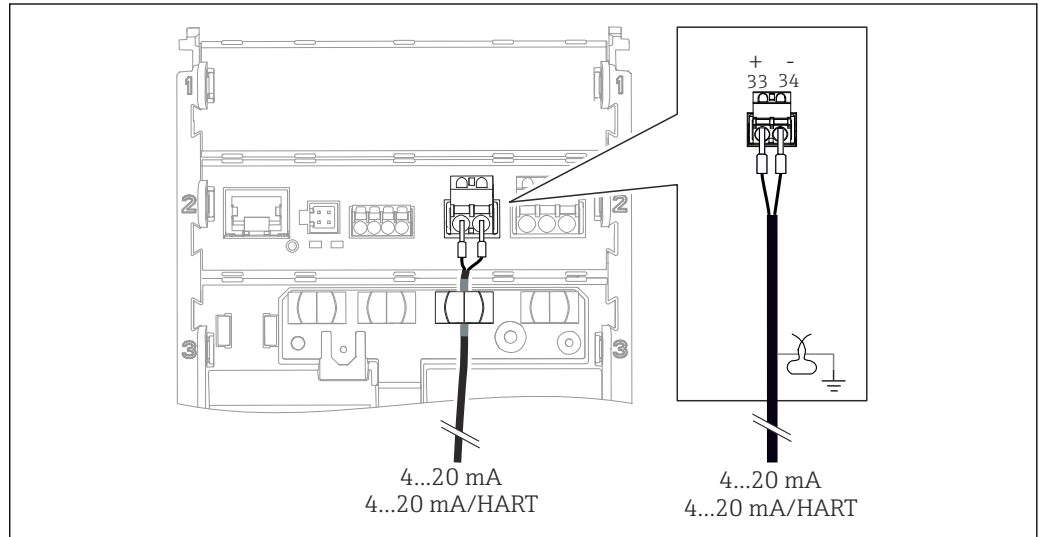
Attach the potential equalization connection to the earth or potential equalization system with a separate line. Use the preassembled 6.35 mm cable lug. Cable cross-section 1.03 to 2.62 mm² (0.002 to 0.004 in²)

6.2.4 Connecting the power supply and signal circuit

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

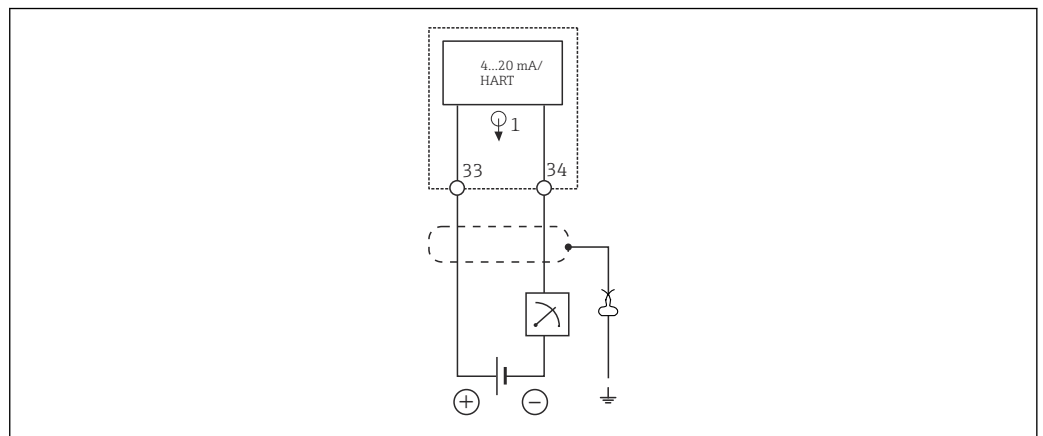
- ▶ Connect the current outputs with shielded two-wire cables as described in the following illustrations.

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.



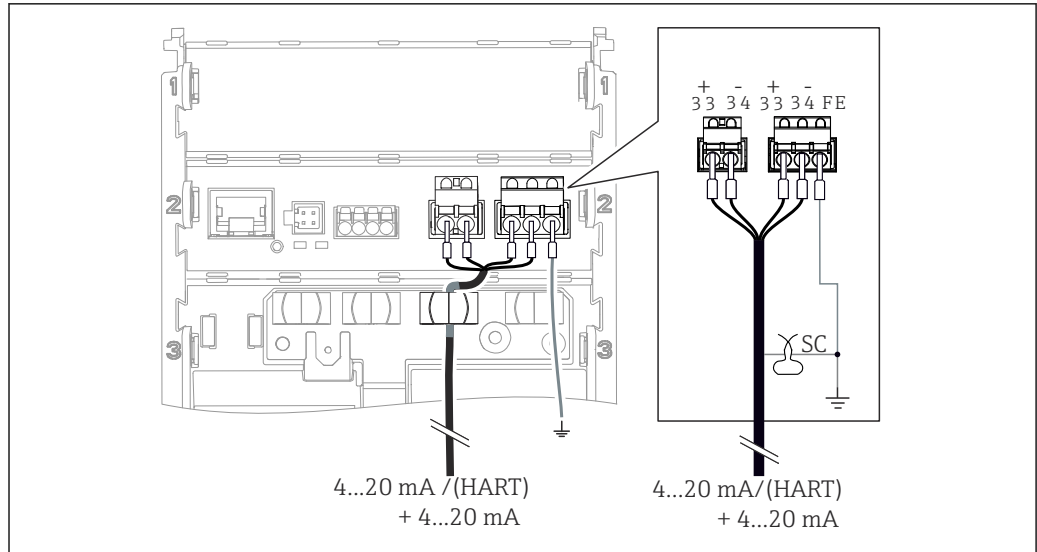
A0054900

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



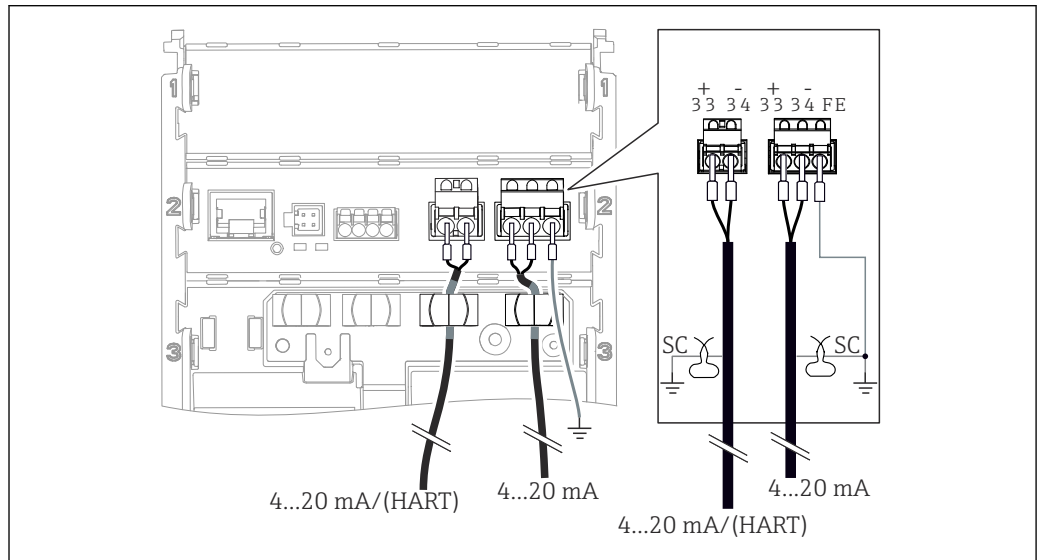
A0054914

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



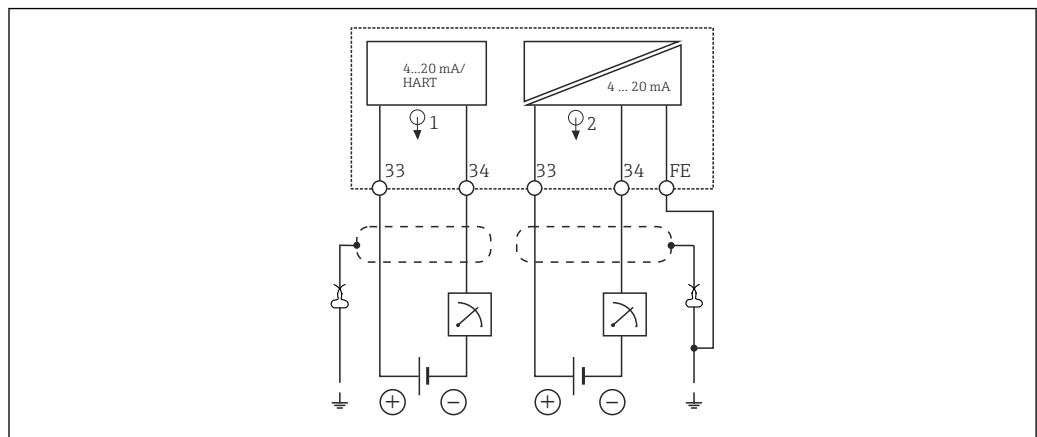
A0054901

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



A0054902

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



A0054915

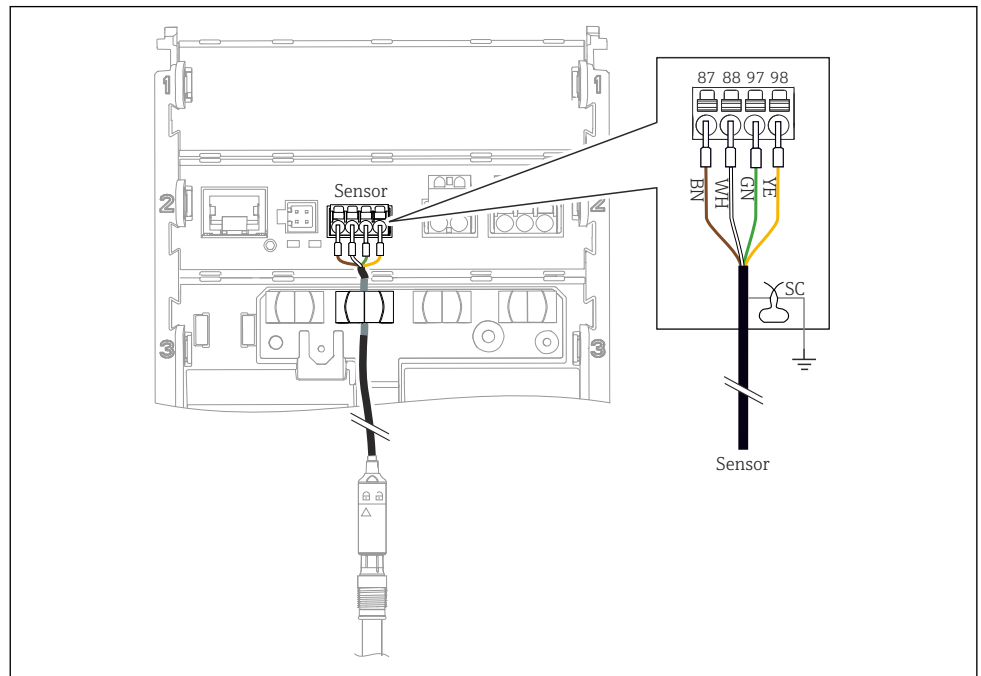
16 Wiring diagram: 2 current outputs (current output 1 with HART)

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

1.



17 Connecting Memosens sensors

Connect the sensor cable as shown in the illustration.

2. Ground the cable shield via the ground terminal.

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 (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.

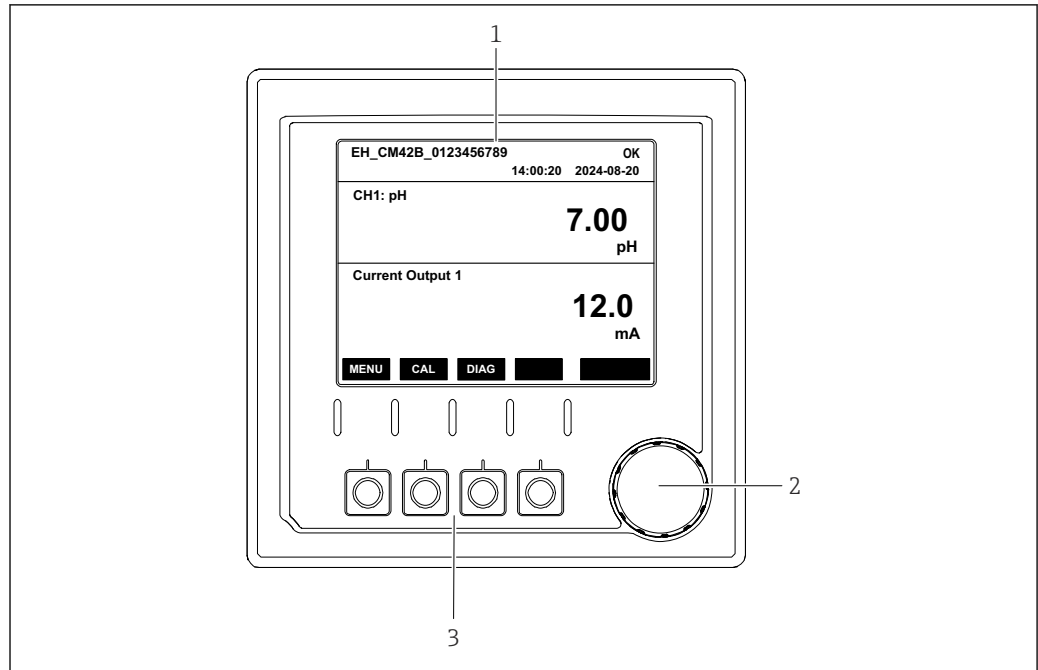
Overview of function access

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 of the external display (optional)

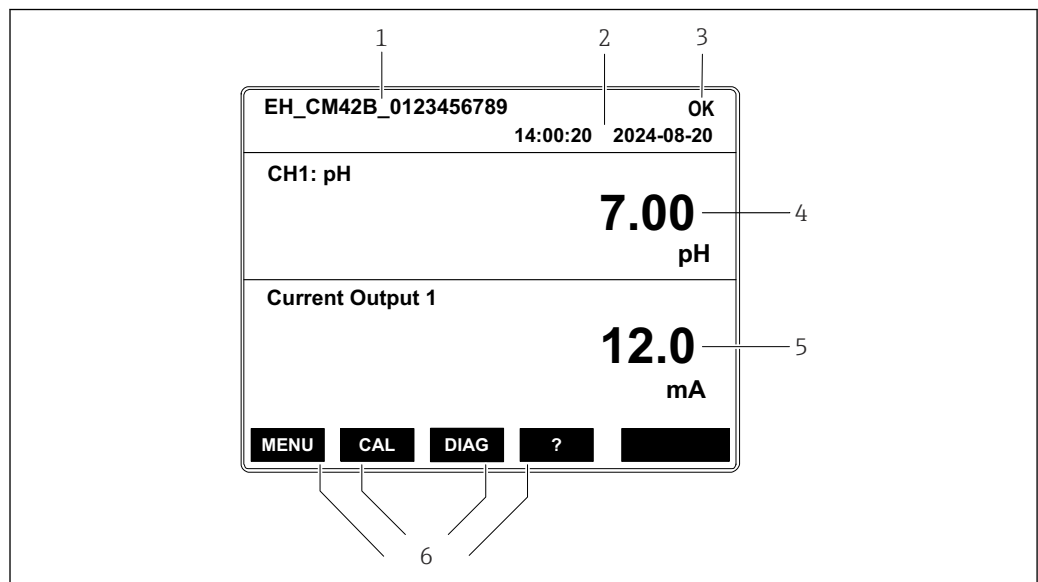


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18 Operating elements

- 1 Display
- 2 Navigator
- 3 Soft keys

7.2.3 Structure of the display



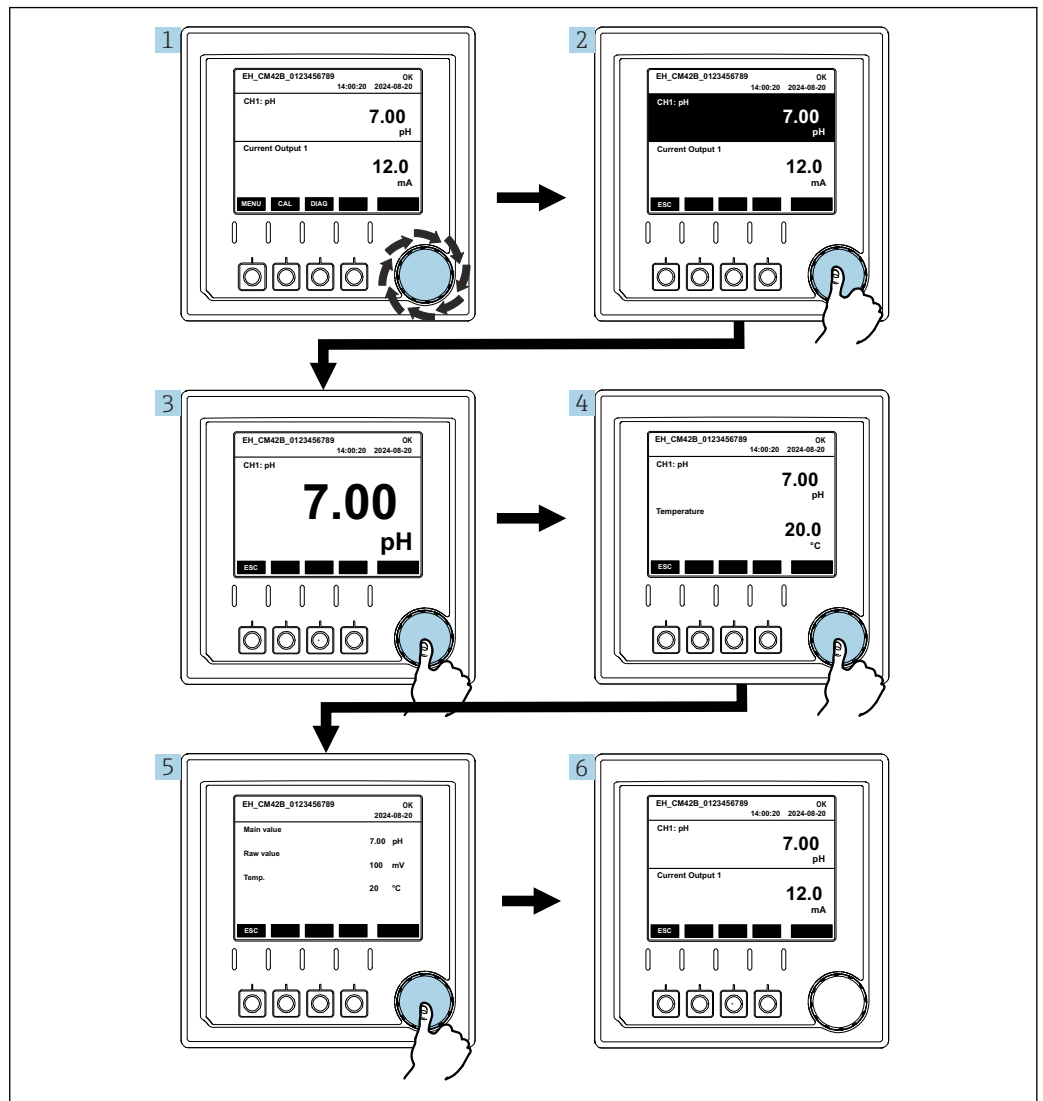
A0056328

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

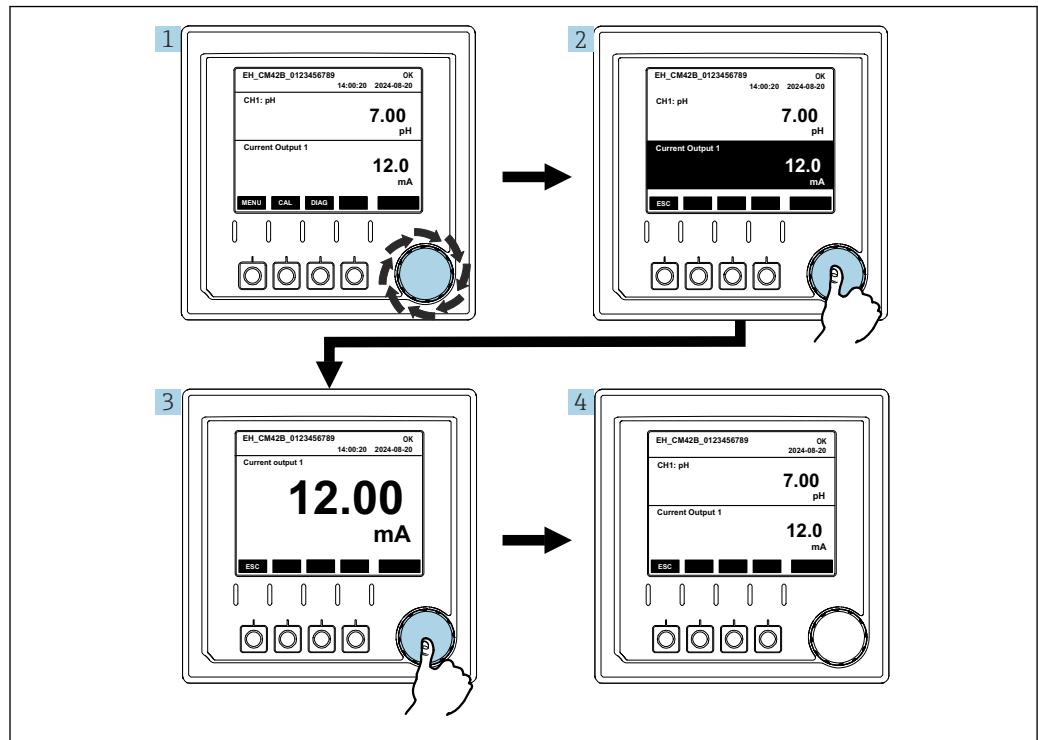


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20 Navigating through measured values

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

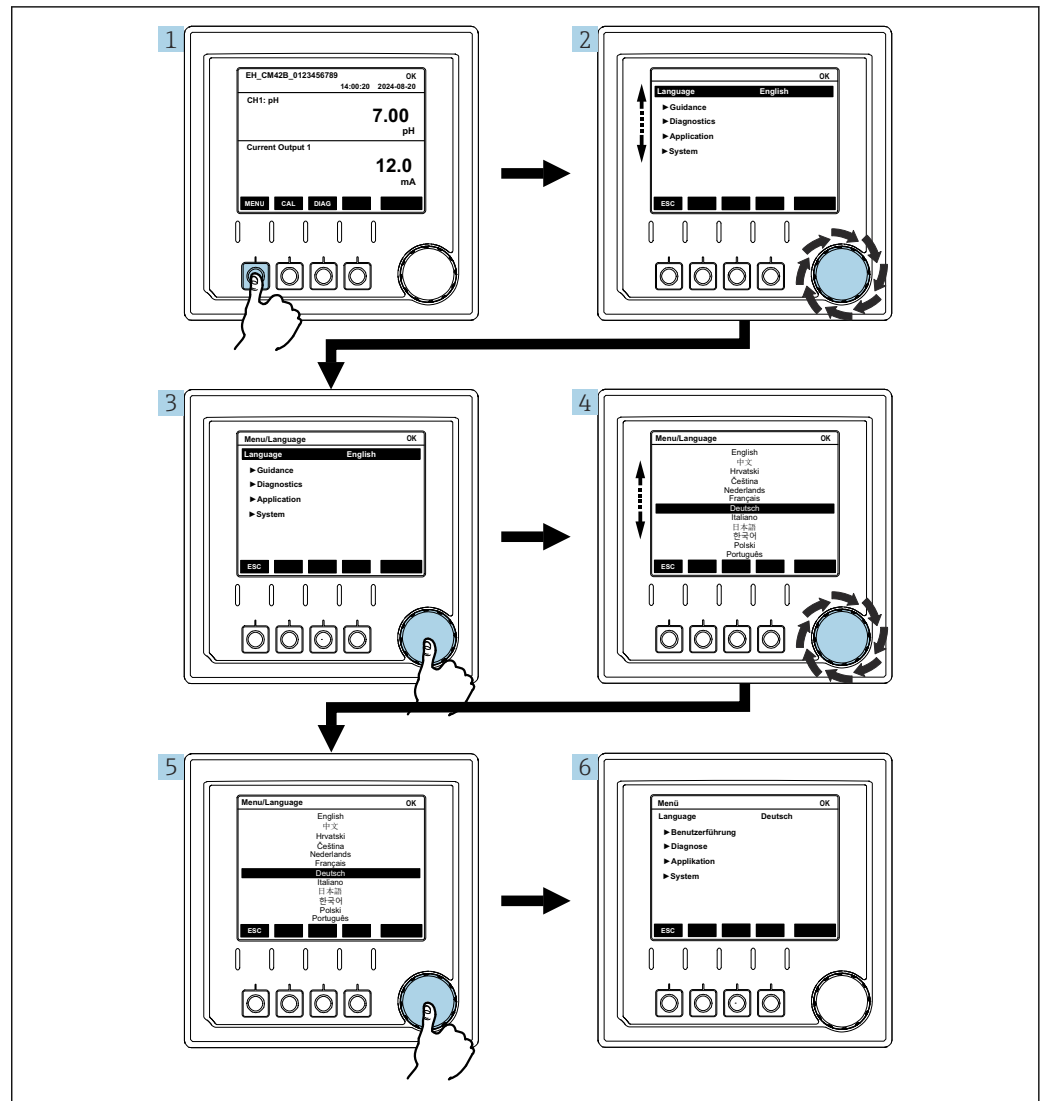


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21 Navigation, displaying a current output

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



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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

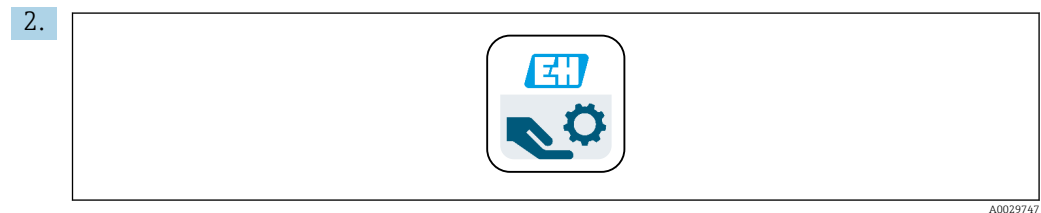
Download the SmartBlue app:



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**



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

- i** After logging in for the first time, the password can be changed and other user accounts activated.
- i** You can drag additional information (e.g. main menu) onto the screen by swiping across the screen.
- 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.


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 the 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

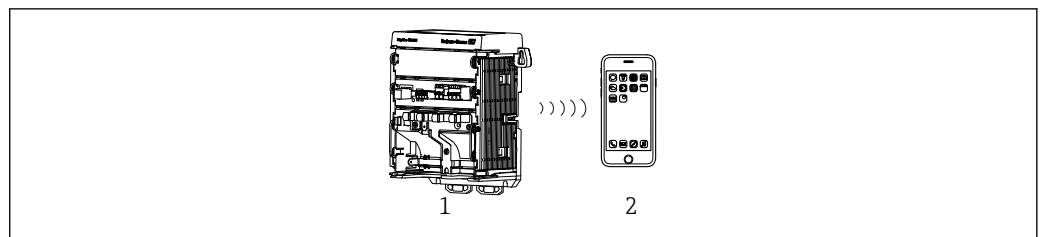
8.1.1 Current output

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.

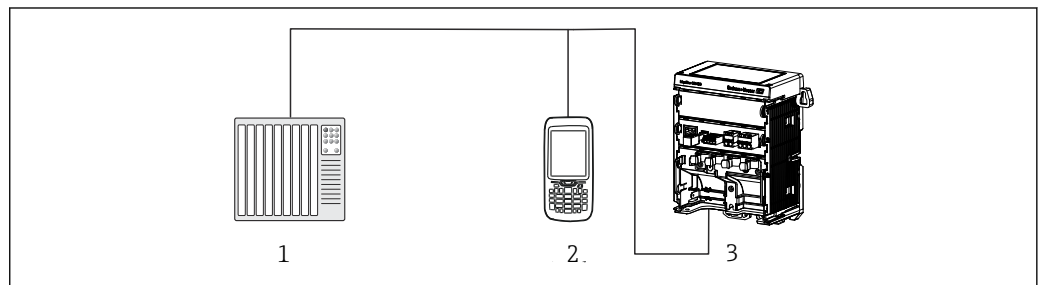


22 Options for remote operation via Bluetooth® LE wireless technology

- 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 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 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 SmartBlue app. For information on the status signals, see →  53
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 →  53
Alternating 2x red flashes and 2x green flashes	Squawk mode is enabled. See also →  52
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.

10 Operation

10.1 Reading off measured values

Reading measured values via the display (optional): →  29


Reading measured values via the SmartBlue app (Bluetooth operation fully enabled via activation code): →  34

Reading measured values via the HART connection (HART is enabled by entering activation code): →  37

10.2 Adapting the device to process conditions

10.2.1 Calibrating the sensor

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

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

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 measured value is smoothed) for the primary value and temperature.

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

10.2.3 Calibration settings

Adjustment 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 (configurable for the pH, ORP, and dissolved oxygen measuring parameters only)

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**

Slope monitoring (only for pH sensors and amperometric oxygen sensors)

The slope characterizes the sensor condition.

In pH sensors, the greater the deviation from the ideal value (59 mV/pH), the poorer the sensor condition.

In amperometric oxygen sensors, decreasing values indicate electrolyte consumption.

It is possible to control when the sensor or electrolyte should be replaced by specifying warning limits which cause the system to trigger diagnostic messages.

Configuration options:

- Enter warning limits for slope monitoring
 - Enter warning limits for the delta slope
 - Configure diagnostic behavior if a warning limit is reached
- ▶ Navigate to the path: **Menu/Application/Sensor/Calibration settings/Slope monitoring:**

Zero point monitoring (only for pH sensors and amperometric oxygen sensors)

In pH sensors, the zero point characterizes the condition of the sensor reference. The greater the deviation from the ideal value (pH 7.00), the poorer the condition. This can be caused by KCl dissolving away or reference contamination, for example.

In amperometric oxygen sensors, the zero point corresponds to the sensor signal that is measured in a medium in the absence of oxygen. Zero point calibration is possible in oxygen-free water or high-purity nitrogen. This improves measurement accuracy in the trace range.

Configuration options:

- Enter the upper and lower warning limit for zero point monitoring
 - Enter the warning limit for the delta zero point
 - Configure diagnostic behavior if a warning limit is reached
- ▶ Navigate to the path: **Menu/Application/Sensor/Calibration settings/Zero monitoring:**

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 time monitoring (Memosens sensors only)

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:

- Activate/deactivate operating time monitoring
- Enter the limit value for total operating time
- Configure diagnostic behavior if an operating time upper limit is exceeded
- ▶ Navigate to the path: **Menu/Application/Sensor/Operating time monitoring**


10.2.5 Tag control (Memosens sensors only)

Tag control specifies which sensors the device allows.

If tag control is enabled, the device only allows sensors with the same channel tag/tag group or identical and brand-new sensors.

Configuration options:

- Enable/disable tag control for specific channel tag or tag group.
- Enter the channel tag
- Enter the name for the tag group
- ▶ Navigate to the path: **Menu/Application/Sensor:**

 German umlauts are replaced with question marks in the channel tag.

10.2.6 Cleaning in place (CIP) (Memosens sensors only)**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 (Memosens sensors only)**Information displayed:**

Number of sterilization cycles performed by the sensor

Configuration options:

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

10.2.8 Specifying the primary value

Different primary values can be displayed depending on the sensor.

- ▶ Navigate to the path: **Menu/Application/Operating mode / units.**

10.2.9 Specifying units and decimal places

- ▶ Navigate to the path: **Menu/Application/Operating mode / units.**

The units and decimal places can be automatically defined by the device for conductivity sensors (with a large measuring range). The device automatically selects the unit and the number of decimal places that are optimal for the display.

- ▶ Select the value **auto** for **Unit** or **Format** in **Menu/Application/Operating mode / units/Main measurement value settings**.

10.2.10 Add activation code

Activation codes are required to enable optional features.

Adding an activation code

1. Navigate to the path: **Menu/System/Software configuration/Add activation code**.
2. Enter the activation code and confirm.
 - ↳ Depending on the activation code, you are prompted to restart the device.
3. Restart the device under **Menu/System/Device management/Restart device** when this prompt appears.

10.2.11 Displaying active activation codes

- ▶ Navigate to the path: **Menu/System/Software configuration/Active activation codes**

10.2.12 Changing measuring parameters

Changing measuring parameters on Memosens devices

The measuring parameter can be changed via the user interface in Memosens devices. The following measuring parameters are possible:

- pH, ORP, pH/ORP
- Conductivity (conductive or inductive measurement)
- Dissolved oxygen (measured optically or amperometrically)


1. Navigate to the path: **Menu/Guidance/Measurement parameter change**:
2. Follow the instructions in the wizard.
3. Connect the appropriate Memosens sensor.

Changing measuring parameters in analog devices

In analog devices, the extension module must be swapped to slot 1 to change the measuring parameter. Retrofit kits with extension modules are available for the following measuring parameters:

- Conductivity (inductive measurement)
- Conductivity (conductive measurement)
- pH, ORP, pH/ORP

1. De-energize the device.
2. Install the extension module using the installation instructions provided.

 It is also possible to convert the device from analog to Memosens using a retrofit kit.

10.2.13 Entering a measuring point name

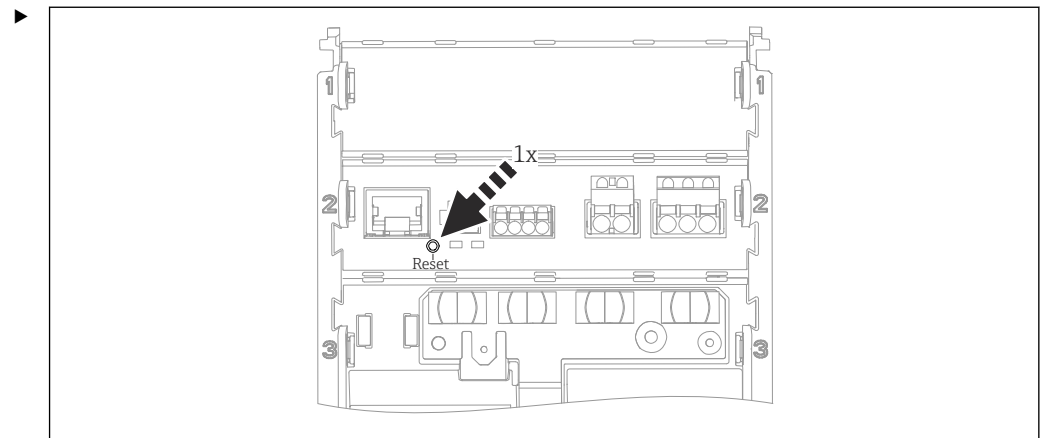
Enter a name for the device or the measuring point. The measuring point name is shown on the display and is the device name in the SmartBlue app and other remote access options.

- ▶ Navigate to the path: **Menu/System/Device management/Device tag**.


10.2.14 Restarting the device

- ▶ Navigate to the path: **Menu/System/Device management/Restart device**

or



Press the reset button once briefly.

-  The reset button can be deactivated. It is activated/deactivated in the **Security** menu.

10.2.15 Resetting the device to the default settings

User-specific parameters/data are reset:

- Units
- Settings for the current outputs
- Fieldbus settings (except identification data and address)

The following parameters/data are retained:

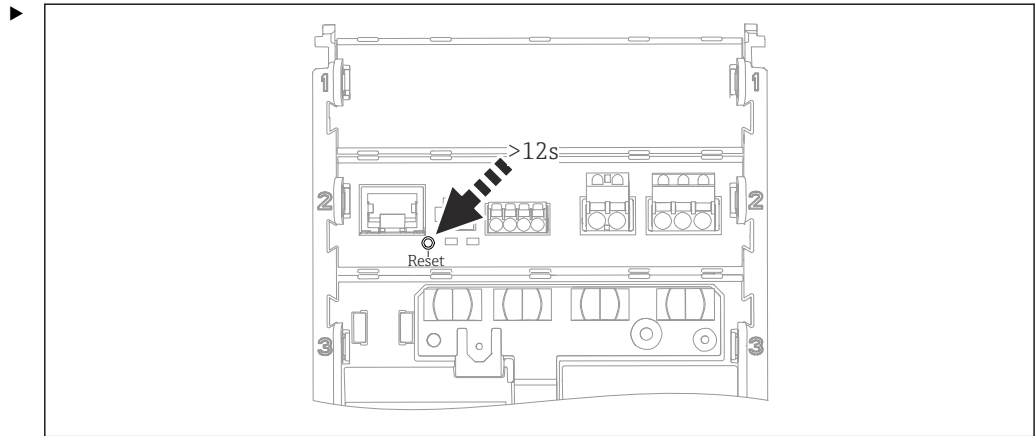
- Access data for user accounts
- Activation codes
- Measuring point tags
- Non-editable diagnostic data such as operating hours counter, logbooks

- ▶ Navigate to the path: **Menu/System/Device management/Reset device to std. deliv. sett.**

10.2.16 Resetting the device for decommissioning or resale

The device is reset to the factory settings and all parameters and data are deleted.

The hardware history and firmware history are retained.



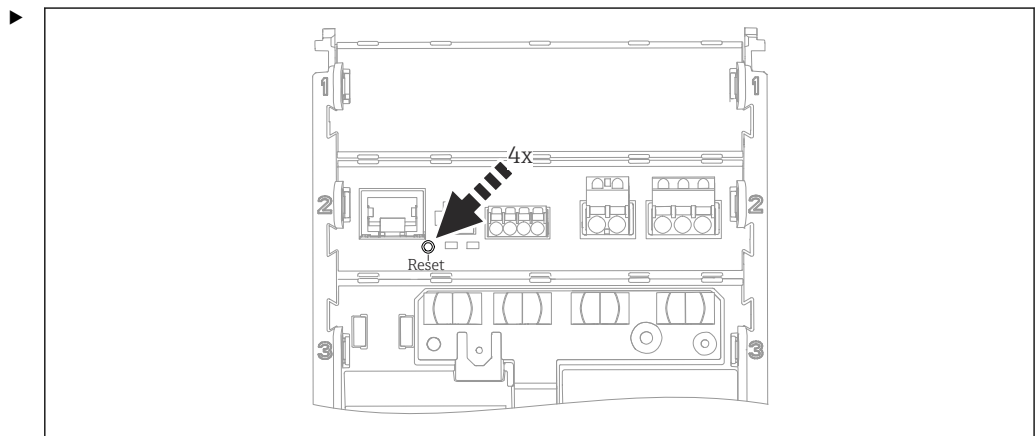
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Press and hold the reset button for a min. of 12 seconds.

i The reset button can be deactivated. It is activated/deactivated in the **Security** menu.

10.2.17 Resetting user access

The user access PINs are reset to the factory settings.



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Press the reset button briefly 4 times.

i The reset button can be deactivated. It is activated/deactivated in the **Security** menu.

10.2.18 Temperature compensation in pH sensors


The measured value is compensated for via temperature compensation in the event of fluctuating temperatures. Temperature compensation can be entered automatically via the temperature probe of the sensor, or manually via the entered medium temperature.

Configuration options:

Select the type of temperature compensation

- **Automatic (ATC):** Temperature compensation is carried out based on the medium temperature that the temperature probe of the sensor measures.
- **Manual (MTC):** Temperature compensation is carried out based on a medium temperature entered.

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

 This temperature compensation only refers to compensation during measuring mode, not during calibration. Temperature compensation for the calibration is carried out in the **Menu/Application/Sensor/Calibration settings/Temperature comp. during calibr.** menu.

10.2.19 Medium compensation in pH sensors

Medium compensation is used to determine the pH value of a sample at different temperatures in the laboratory. Medium compensation is possible via two points or via several points in a table.

Configuration options:

Select the type of medium compensation

- Off
- Two-point
- Table

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

10.2.20 Temperature compensation for conductivity sensors

The temperature coefficient depends both on the chemical composition of the medium and the temperature itself.

Configuration options:

Select the type of temperature compensation

- **Automatic (ATC):** Temperature compensation is carried out based on the medium temperature that the temperature probe of the sensor measures.
- **Manual (MTC):** Temperature compensation is carried out based on a medium temperature entered.

Select the temperature compensation method

- Off
- Linear
- NaCl (IEC 746-3)
- Water ISO7888 (20°C)
- Water ISO7888 (25°C)
- UPW NaCl
- UPW HCl
- User table

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

Temperature coefficient α

Temperature coefficient α = change in the conductivity per degree of temperature change:

$$\kappa(T) = \kappa(T_0)(1 + \alpha(T - T_0))$$

$\kappa(T)$... conductivity at process temperature T

$\kappa(T_0)$... conductivity at reference temperature T_0

Linear temperature compensation

The change between two temperature points is taken to be constant, i.e., $\alpha = \text{const.}$

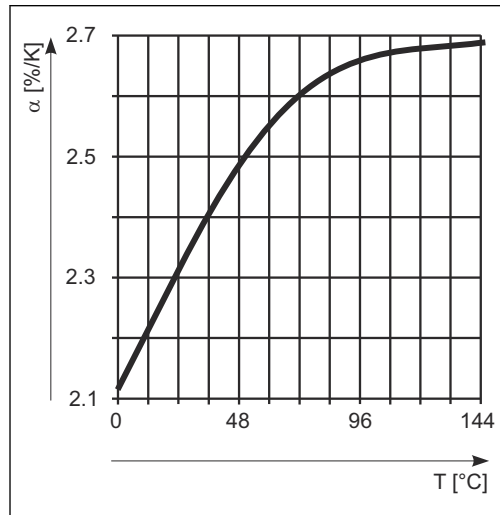
Reference temperature and alpha coefficient (only for linear temperature compensation)

The alpha coefficients and alpha reference temperatures of your process medium must be known. Typical alpha coefficients at a reference temperature of 25 °C are:

- Salts (e.g. NaCl): approx. 2.1 %/K
- Bases (e.g. NaOH): approx. 1.7 %/K
- Acids (e.g. HNO₃): approx. 1.3 %/K

NaCl compensation

In the case of NaCl compensation (as per IEC 60746), a fixed non-linear curve specifying the relationship between the temperature coefficient and temperature is saved in the device. This curve applies to low concentrations of up to approx. 5 % NaCl.



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Compensation for natural water in accordance with ISO 7888

A non-linear function in accordance with ISO 7888 is saved in the device for temperature compensation in natural water.

Ultrapure water compensation (for conductive sensors)

Algorithms for pure and ultrapure water are stored in the device. These algorithms take the dissociation of the water and its temperature dependency into account. They are used up to conductivity levels of approx. 10 µS/cm.

- UPW HCl
Optimized for measuring the acid conductivity downstream of a cation exchanger. Also suitable for ammonia (NH₃) and caustic soda (NaOH).
- UPW NaCl
Optimized for pH-neutral contamination.

User table

You can save a function that takes the properties of your specific process into account. To do so, determine the value pairs made up of the temperature T and conductivity κ with:

- κ(T₀) for the reference temperature T₀
- κ(T) for the temperatures that occur in the process
- Use the following formula to calculate the α values for the temperatures that are relevant in your process:

$$\alpha = \frac{100\% \cdot \kappa(T) - \kappa(T_0)}{\kappa(T_0) \cdot (T - T_0)} ; T \neq T_0$$

i Values must be constantly increasing or decreasing.

10.2.21 Temperature compensation, medium pressure compensation and salinity compensation for oxygen sensors

Configuration options:

Select the type of temperature compensation

- **Automatic (ATC):** Temperature compensation is carried out based on the medium temperature that the temperature probe of the sensor measures.
- **Manual (MTC):** Temperature compensation is carried out based on a medium temperature entered.

Select the type of process pressure compensation and enter the compensation value

- **Process pressure:** The process pressure is known and higher than atmospheric pressure.
- **Air pressure:** The ambient air pressure is known.
- **Altitude:** The altitude of the measuring station above sea level is known.

Enter salt content for salt content compensation

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

10.2.22 Glass monitoring (for pH/ORP glass sensors only)

Glass monitoring monitors the high resistance of the sensor glass. An alarm occurs if a minimum impedance value is undershot or a maximum impedance value is exceeded.

Glass breakage or a worn glass membrane is the main reason for a drop in high impedance values.

The reasons for increasing impedance values include:

- Dry sensor
- Buildup on the glass membrane

Information displayed

- Current glass impedance
- Diagnostic codes if limit values are exceeded/undershot

Configuration options:

- Activating/deactivating warning limits and alarm limits (upper and lower limit values can be activated and deactivated separately)
- Enter limit values for warning limits and alarm limits
- Configure diagnostic behavior for warning limits and alarm limits
- ▶ Navigate to the path: **Menu/Application/Sensor/Glass monitoring**

10.2.23 Enter offset (pH sensors only)

The offset compensates for a difference between a laboratory measurement and an online measurement which is caused by interference ions.

- ▶ Navigate to the path: **Menu/Application/Sensor/Extended settings/Offset pH**

10.2.24 Specifying the temperature offset (ORP sensors only)

The offset compensates for a difference between a laboratory measurement and an online measurement which is caused by interference ions.

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

10.2.25 Configuring ORP value monitoring (ORP sensors only)

Configuration options:

- Activate/deactivate ORP value monitoring
- Define the upper and lower warning limit
- Configure diagnostic behavior if warning limit is exceeded or undershot
- ▶ Navigate to the path: **Menu/Application/Sensor/ORP value monitoring**

10.2.26 Monitoring of pharmaceutical water (only for conductivity sensors with 2 electrodes)

The pharmaceutical water monitoring system issues a diagnostic message if a conductivity value defined by the USP (United States Pharmacopeia 645) standards or EP (European Pharmacopoeia 169) standards is exceeded.

In addition, a warning limit in % can be defined for this value.

Configuration options:

- Activate and deactivate pharmaceutical water monitoring according to USP (United States Pharmacopeia 645) or EP (Pharmacopeia of Eurpoaea 169) standards.
- Enter a limit value for the warning limit
- ▶ Navigate to the path: **Menu/Application/Sensor/Pharma water monitoring**

10.2.27 Cable compensation (only for analog pH/ORP sensors)

The length of the sensor cable influences the measured value. This is compensated for by means of cable compensation.

Configuration options:

- Activate/deactivate cable compensation
- Enter the cable length
- ▶ Navigate to the path: **Menu/Application/Sensor/Analog sensor configuration/Cable compensation**

10.2.28 Operating time monitoring, cap (oxygen sensors only)

Configuration options:

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

10.2.29 Electrolyte consumption monitoring (only for oxygen sensors with amperometric measurement)

Configuration options:

- Activate/deactivate electrolyte consumption monitoring
- Specify the warning limit
- Define the diagnostic behavior
- ▶ Navigate to the path: **Menu/Application/Sensor**

10.2.30 Select the measured value filter (for oxygen sensors with optical measurement only)

Configuration options:

Activate/deactivate the measured value filter

- ▶ Navigate to the path: **Menu/Application/Sensor/LED and filter settings**

The following measured value filters are available:

- **Off:** Signals are not filtered.
- **Low:** Signal filtering is weak.
- **Medium:** Signal filtering is normal.
- **High:** Signal filtering is strong.

- **Very high:** Signal filtering is very strong. Widely fluctuating raw signals are greatly attenuated by the sensor.
- **Advanced low:** Optimized filter for use of the sensor in fermenter applications
- **Advanced high:** High-performance filter for use with the sensor in fermentation applications where oxygen control is hindered by the accumulation of small air bubbles on the sensor due to the consistency of the medium

10.2.31 LED settings (only for oxygen sensors with optical measurement)

Configuration options:

- Activate/deactivate the LED temperature mode. If the LED temperature mode is activated, the LED is switched off as of a defined medium temperature. This increases the service life of the LEDs. The temperature is entered if the LED temperature mode is activated. This mode is recommended for processes with high cleaning temperatures.
 - Select the LED measuring interval. The LED measuring interval influences the response time on the one hand and the operating life of the sensor cap on the other. Shorter intervals improve the response time but reduce the operating life of the sensor cap. Set according to process requirements.
- ▶ Navigate to the path: **Menu/Application/Sensor/LED and filter settings**

10.3 Settings of the current output

Configuration options:

- Failure current
 - Select from list
 - The current outputs provide the selected current if an error occurs.
 - Process variable
 - Measured value provided by the current output
 - Output mode
 - **Linear:** The current output provides a signal that is linear to the measured value.
 - **Table:** An output signal is defined in a table for the individual measured values of the measuring range.
 - **Lower range value:** Process value for which 4 mA is output
 - **Upper range value:** Process value for which 20 mA is output
 - Hold behavior
 - Freeze current
 - Fixed current
 - Ignore
- ▶ Navigate to the path: **Menu/Application/Current output**

10.4 HART settings


Configuration options:

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

10.5 Activate, deactivate and configure hold

Configuration options:

- Enable/disable device hold
 - Define the hold delay. The hold delay determines how long the device remains in the hold state after hold is deactivated before it switches back to measuring mode.
 - Enable/disable automatic calibration hold
- ▶ Navigate to the path: **Menu/Application/Hold:**

 The hold response for the current outputs is configured under:
Menu/Application/Current output/Current output 1/Hold settings
Menu/Application/Current output/Current output 2/Hold settings

10.6 Enable/disable squawk

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

Squawk mode can be enabled via the SmartBlue app.


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:

Squawk mode can be enabled/disabled via the SmartBlue app (connection via Bluetooth LE) or FDI (connection via HART).

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

 Squawk mode is enabled briefly when the connection is established with the SmartBlue app.

11 Diagnostics 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.

Detailed information on the current diagnostic messages is available under **Menu/Diagnostics/Diagnostic list**.

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

- Event number
- Status signal (letter in front of the event number)
 - **F** = (Failure) a malfunction has been detected
The measured value is no longer reliable. The cause of the malfunction is to be found in the measuring point. Set any controller connected 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, there is a risk of increased wear, a shorter operating life or reduced measurement accuracy. 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.
- Event text

 Only forward the event number to the Endress+Hauser service department. Since the assignment to a status signal can be changed on a case-by-case basis, this information is not used by the service department.

11.2 Diagnostic information via LEDs

See LED displays in the "Commissioning" section. →  39

11.3 Diagnostic information on local 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 SmartBlue app

If the SmartBlue app is fully operational (access code required), diagnostic events, status signal and additional information are displayed in the SmartBlue app.

11.5 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.

11.6 Adapting the diagnostic information

Configuration options:

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

11.7 Overview of diagnostic information

No.	Factory setting	Message	Tests or remedial action
2	F - Alarm, bad	Sensor unknown	Sensor unknown ► Replace sensor
4	F - Alarm, bad	Sensor defective	Sensor defective ► Replace sensor
5	F - Alarm, bad	Invalid sensor data	Invalid sensor data <ol style="list-style-type: none"> 1. Check the software compatibility of sensor and transmitter. Update the transmitter and sensor, if applicable. 2. Perform factory default sensor and power cycle sensor afterwards 3. Update the date of the transmitter 4. Replace sensor
12	F - Alarm, bad	Writing data failed	Writing data to sensor failed <ol style="list-style-type: none"> 1. Repeat writing 2. Replace sensor
13	F - Alarm, bad	Sensor type wrong	Sensor type wrong <ul style="list-style-type: none"> ▪ The sensor does not fit the device configuration ▪ The device configuration may be changed to a new sensor type <ol style="list-style-type: none"> 1. Change to a sensor of configured type 2. Change device configuration to connected sensor
18	F - Alarm, bad	Sensor not ready	Sensor communication blocked Possible reasons: <ul style="list-style-type: none"> ▪ Connected sensor failed sensor check ▪ Internal software error ► Replace sensor
22	F - Alarm, bad	Temperature sensor	Temperature sensor defective ► Replace sensor
61	F - Alarm, bad	Sensor electronics	Sensor electronics defective <ol style="list-style-type: none"> 1. Check sensor connections 2. Replace sensor electronics
100	F - Alarm, bad	Sensor communication	Sensor no communication Possible reasons: <ul style="list-style-type: none"> ▪ Sensor disconnected ▪ Faulty sensor connection ▪ Short-circuit in sensor cable ▪ Short-circuit in next channel ▪ Faulty sensor FW update <ol style="list-style-type: none"> 1. Check sensor cable connection 2. Check for short-circuit of the cables 3. Replace sensor 4. Update the sensor FW again

No.	Factory setting	Message	Tests or remedial action
101	F - Alarm, bad	Sensor incompatible	The sensor firmware and the device firmware are incompatible. <ol style="list-style-type: none"> 1. Replace sensor 2. Update device firmware
104	M - Warning, good	Calibration validity	Validity of last calibration expired. Date of last calibration of the sensor is too long ago. Measurement is still possible. Possible reasons: Long storage of sensor <ol style="list-style-type: none"> 1. Calibrate sensor 2. Check the configuration of the calibration validity
105	M - Warning, good	Calibration validity	Validity of last calibration expires soon. Date of last calibration of the sensor is long ago. Measurement is still possible. Possible reasons: Long storage of sensor <ol style="list-style-type: none"> 1. Calibrate sensor 2. Check the configuration of the calibration validity
106	F - Alarm, bad	Sensor TAG	Sensor TAG control The connected sensor has an invalid TAG or TAG group <ol style="list-style-type: none"> 1. Change sensor 2. Use new sensor of same type 3. Deactivate the TAG control
107	C - Warning, good	Calibration active	Sensor calibration is active, please wait.
108	M - Warning, good	SIP, CIP sensor	The configured max. number of sterilizations / cleanings is reached. Measurement is still possible. <ul style="list-style-type: none"> ► Replace sensor
109	M - Warning, good	SIP, CIP sensor cap	The configured max. number of sensor cap sterilizations / cleanings is reached. Measurement is still possible. <ul style="list-style-type: none"> ► Replace sensor cap
111	M - Warning, good	Operating time cap	Sensor cap operating time warning Measurement is still possible. The configured limit of the sensor cap operating time is reached. <ol style="list-style-type: none"> 1. Replace sensor cap 2. Adjust limit
113	F - Alarm, bad	Incompatible filter	Filter setting in sensor is incompatible <ol style="list-style-type: none"> 1. Switch to valid measurement filter in the sensor setup 2. Update device firmware 3. Contact service
118	F - Alarm, bad	Sensor glass break	Sensor glass breakage alarm Glass membrane impedance too low <ol style="list-style-type: none"> 1. Check glass electrode for cracks 2. Check the temperature of the medium 3. Replace sensor
120	F - Alarm, bad	Sensor reference	Sensor reference alarm Reference impedance too low <ol style="list-style-type: none"> 1. Check glass electrode for cracks 2. Check the temperature of the medium 3. Replace sensor

No.	Factory setting	Message	Tests or remedial action
122	F - Alarm, bad	Sensor glass	Sensor glass limit lower value exceeded Glass membrane impedance too low <ol style="list-style-type: none"> 1. Check the pH sensor, clean as needed 2. Check the configured glass limit value, correct as needed 3. Replace sensor
123	M - Warning, good	Sensor glass	Sensor glass limit lower value reached Glass membrane impedance low Measurement is still possible until alarm message <ol style="list-style-type: none"> 1. Check the pH sensor, clean as needed 2. Check the configured glass limit value, correct as needed 3. Replace sensor
124	F - Alarm, bad	Sensor glass	Sensor glass limit upper value exceeded Glass membrane impedance too high <ol style="list-style-type: none"> 1. Check the pH sensor, replace as needed 2. Check the glass limit value, correct as needed 3. Replace sensor
125	M - Warning, good	Sensor glass	Sensor glass limit upper value reached Glass membrane impedance high Measurement is still possible until alarm message <ol style="list-style-type: none"> 1. Check the pH sensor, clean as needed 2. Check the configured glass limit value, correct as needed 3. Replace sensor
128	F - Alarm, bad	Sensor leakage	Sensor leakage current alarm Sensor defective due to abrasion or damage <ul style="list-style-type: none"> ▶ Replace sensor
129	M - Warning, good	Sensor leakage current	Sensor leakage current warning Sensor defective due to abrasion or damage Measurement is still possible until alarm message <ul style="list-style-type: none"> ▶ Replace sensor
130	F - Alarm, bad	Sensor supply	Sensor check Sensor power supply bad <ol style="list-style-type: none"> 1. Check cable connections 2. Replace sensor
131	M - Warning, good	Sensor calibration	Sensor relaxation time underrange Measurement is still possible Possible reasons: <ul style="list-style-type: none"> ■ High oxygen content ■ Wrong calibration data <ol style="list-style-type: none"> 1. Repeat the calibration 2. Replace sensor cap
132	M - Warning, good	Sensor calibration	Sensor relaxation time overrange Measurement is still possible Possible reasons: <ul style="list-style-type: none"> ■ Low oxygen content ■ Wrong calibration data <ol style="list-style-type: none"> 1. Repeat the calibration 2. Replace sensor cap
133	F - Alarm, bad	Sensor signal	Sensor low signal decay <ul style="list-style-type: none"> ▶ Replace sensor cap
134	M - Warning, good	Sensor signal	Sensor low signal amplitude Measurement is still possible <ul style="list-style-type: none"> ▶ Replace sensor cap

No.	Factory setting	Message	Tests or remedial action
142	N - Disabled, good	Sensor signal	Sensor check No conductivity indication Possible reasons: <ul style="list-style-type: none"> ■ Sensor in air ■ Sensor defective <ol style="list-style-type: none"> 1. 2. Replace sensor
144	N - Disabled, good	Conductivity range	Conductivity out of meas. range Possible reasons: Sensor with wrong cell constant <ul style="list-style-type: none"> ► Use sensor with appr. cell constant
146	N - Disabled, good	Sensor temperature	Sensor temperature out of spec. range <ol style="list-style-type: none"> 1. Check temperature 2. Check measurement 3. Change sensor type
151	M - Warning, good	Sensor buildup	Sensor check High pollution degree <ol style="list-style-type: none"> 1. Clean sensor 2. Replace sensor
152	N - Disabled, good	Sensor data invalid	Sensor data No calibration data available <ul style="list-style-type: none"> ► Carry out air-set calibration
154	N - Disabled, good	Sensor data invalid	Sensor data No calibration data of sensor, factory settings are used. <ol style="list-style-type: none"> 1. Check calibration information of sensor 2. Calibrate cell constant
158	F - Alarm, bad	Sensor check	Measurement value invalid <ol style="list-style-type: none"> 1. Check sensor power supply 2. Restart device
160	M - Warning, good	Sensor data invalid	No calibration data available Possible reasons: Customer calibration data erased <ol style="list-style-type: none"> 1. Calibrate sensor 2. Choose other data set 3. Use factory calibration data set
164	N - Disabled, good	Sensor data invalid	Sensor data No calibration data of temperature sensor, factory settings are used. <ol style="list-style-type: none"> 1. Check calibration information of sensor 2. Calibrate temperature sensor
199	M - Warning, good	Operating time	Operating time warning Measurement is still possible. The configured limit of operating time is reached. <ol style="list-style-type: none"> 1. Replace sensor 2. Adjust limit
201	F - Alarm, bad	Electronics faulty	<ol style="list-style-type: none"> 1. Restart device 2. Replace electronics
202	F - Alarm, bad	Selftest active	Selftest active, please wait

No.	Factory setting	Message	Tests or remedial action
243	F - Alarm, bad	Firmware failure	Firmware failure - internal <ol style="list-style-type: none"> 1. Update firmware 2. Replace backplane board 3. Contact service and report the indicated number
262	F - Alarm, bad	Module connection	Electronics module no communication <ol style="list-style-type: none"> 1. Check module connection 2. Replace electronics module 3. Check internal cable to module
263	F - Alarm, bad	Incomp. detected	Incompatibility detected The device configuration does not match the parameterization. <ol style="list-style-type: none"> 1. Check device settings 2. Check electronic module type 3. Update firmware
284	F - Alarm, bad	Firmware update	Firmware update active, please wait.
302	M - Warning, good	Battery low	Battery of real-time clock low In case of power outage time and date will be lost. <ul style="list-style-type: none"> ► Replace battery
384	F - Alarm, bad	Unspecific failure	Unspecific failure <ol style="list-style-type: none"> 1. Update software 2. Check external fieldbus configuration 3. Check connected sensors 4. Contact service and report the indicated number
412	C - Warning, good	Download active	Download active, please wait.
413	C - Warning, good	Upload active	Upload active, please wait. Measurement is still not possible. User interface is locked.
436	M - Warning, good	Date/time incorrect	Check date and time settings
445	C - Warning, good	Housing open	Transmitter housing open <ul style="list-style-type: none"> ► Close housing and tighten the screws.
460	S - Warning, uncertain	Output below limit	Current output below limit Measurement value out of spec. range Possible reasons: <ul style="list-style-type: none"> ▪ Sensor / sample line in air ▪ Air cushion in assembly ▪ Wrong sensor inflow ▪ Sensor / sample line dirty <ol style="list-style-type: none"> 1. Check application 2. Check the current output parameterization 3. Clean sensor / sample line
461	S - Warning, good	Output above limit	Current output above limit Measurement value out of spec. range Possible reasons: <ul style="list-style-type: none"> ▪ Sensor / sample line in air ▪ Air cushion in assembly ▪ Wrong sensor inflow ▪ Sensor / sample line dirty <ol style="list-style-type: none"> 1. Check application 2. Check configuration of current output 3. Clean sensor / sample line

No.	Factory setting	Message	Tests or remedial action
488	C - Warning, good	Simulation active	Simulation active, please wait. Simulation can be stopped in the device settings, or by restarting the device
505	M - Warning, good	Sensor calibration	Max. zero point (pH/Disinfection (Di)/DO) / offset (ORP) warning Measurement is still possible until alarm message. Possible reasons: <ul style="list-style-type: none"> ■ Sensor aged or defective ■ pH/ORP: diaphragm blocked ■ pH/ORP: buffer solution expired or contaminated ■ Di/DO: electrolyte consumed ■ Di/DO: sensor pin damaged <ol style="list-style-type: none"> 1. Check sensor, replace as necessary 2. Check buffer or electrolyte, replace as necessary 3. Repeat the calibration
507	M - Warning, good	Sensor calibration	Min. zero point (pH/Disinfection (Di)/DO) / offset (ORP) warning Measurement is still possible until alarm message. Possible reasons: <ul style="list-style-type: none"> ■ Sensor aged or defective ■ pH/ORP: diaphragm blocked ■ pH/ORP: buffer solution expired or contaminated ■ Di/DO: electrolyte consumed ■ Di/DO: sensor pin damaged <ol style="list-style-type: none"> 1. Check sensor, replace as necessary 2. Check buffer or electrolyte, replace as necessary 3. Repeat the calibration
509	M - Warning, good	Sensor calibration	Min. slope warning Measurement is still possible until alarm message. Possible reasons, depending on sensor type: <ul style="list-style-type: none"> ■ Sensor aged or defective ■ Diaphragm blocked ■ Buffer solution expired or contaminated ■ Electrolyte consumed ■ Sensor pin damaged <ol style="list-style-type: none"> 1. Check sensor, replace as necessary 2. Check buffer or electrolyte, replace as necessary 3. Repeat the calibration
511	M - Warning, good	Sensor calibration	Max. slope warning Measurement is still possible until alarm message. Possible reasons, depending on sensor type: <ul style="list-style-type: none"> ■ Sensor aged or defective ■ Diaphragm blocked ■ Buffer solution expired or contaminated ■ Electrolyte consumed ■ Sensor pin damaged <ol style="list-style-type: none"> 1. Check sensor, replace as necessary 2. Check buffer or electrolyte, replace as necessary 3. Repeat the calibration

No.	Factory setting	Message	Tests or remedial action
515	M - Warning, good	Sensor calibration	<p>Max. operation point warning Measurement is still possible until alarm message.</p> <p>Possible reasons:</p> <ul style="list-style-type: none"> ■ Sensor aged or defective ■ Diaphragm blocked ■ Buffer solution expired or contaminated <ol style="list-style-type: none"> 1. Check sensor, replace as necessary 2. Check buffer, replace as necessary 3. Repeat the calibration
517	M - Warning, good	Sensor calibration	<p>Min. operation point warning Measurement is still possible until alarm message.</p> <p>Possible reasons:</p> <ul style="list-style-type: none"> ■ Sensor aged or defective ■ Diaphragm blocked ■ Buffer solution expired or contaminated <ol style="list-style-type: none"> 1. Check sensor, replace as necessary 2. Check buffer, replace as necessary 3. Repeat the calibration
518	M - Warning, good	Sensor calibration	<p>Delta slope warning Measurement is still possible. The calibration shows a large change of sensor slope.</p> <ol style="list-style-type: none"> 1. Check sensor, replace as necessary 2. Check buffer or electrolyte, replace as necessary 3. Repeat the calibration
520	M - Warning, good	Sensor calibration	<p>Delta zero point warning Measurement is still possible. The calibration shows a large change of sensor zero point.</p> <ol style="list-style-type: none"> 1. Check sensor, replace as necessary 2. Check buffer or electrolyte, replace as necessary 3. Repeat the calibration
522	M - Warning, good	Sensor calibration	<p>Delta working point warning Measurement is still possible The calibration shows a large change of sensor working point</p> <ol style="list-style-type: none"> 1. Check sensor, replace as necessary 2. Check buffer, replace as necessary 3. Repeat the calibration
534	M - Warning, good	Electrolyte warning	<p>Electrolyte consumption warning The configured limit of electrolyte consumption is reached. Measurement is still possible.</p> <ol style="list-style-type: none"> 1. Replace electrolyte and if applicable membrane cap. Reset counters. 2. Replace sensor
535	M - Warning, good	Sensor check	<p>The configured max. number of sensor cap calibrations reached Measurement is still possible.</p> <ul style="list-style-type: none"> ► Replace sensor cap
550	S - Warning, good	Process temperature	<p>Concentration measurement: Process temperature below concentration table</p> <p>Possible reasons: Process value out of specification</p> <p>If custom table: Concentration table not complete</p> <ul style="list-style-type: none"> ► Expand concentration table

No.	Factory setting	Message	Tests or remedial action
551	S - Warning, good	Process temperature	Concentration measurement: Process temperature above concentration table Possible reasons: Process value out of specification If custom table: Concentration table not complete ▶ Expand concentration table
552	S - Warning, good	Conductivity low	Concentration measurement: Process conductivity below concentration table Possible reasons: Process value out of specification If custom table: Concentration table not complete ▶ Expand concentration table
553	S - Warning, good	Conductivity high	Concentration measurement: Process conductivity above concentration table Possible reasons: Process value out of specification If custom table: Concentration table not complete ▶ Expand concentration table
554	S - Warning, good	Concentration low	Concentration measurement: Process concentration below concentration table Possible reasons: Process value out of specification If custom table: Concentration table not complete ▶ Expand concentration table
555	S - Warning, good	Concentration high	Concentration measurement: Process concentration above concentration table Possible reasons: Process value out of specification If custom table: Concentration table not complete ▶ Expand concentration table
556	S - Warning, good	Temperature low	Conductivity measurement: Process temperature below compensation table Possible reasons: ■ Process value out of specification ■ Concentration table not complete ▶ Expand concentration table
557	S - Warning, good	Temperature high	Conductivity measurement: Process temperature above compensation table Possible reasons: ■ Process value out of specification ■ Concentration table not complete ▶ Expand concentration table
558	S - Warning, good	Conductivity low	Conductivity measurement: Process conductivity below compensation table Possible reasons: ■ Process value out of specification ■ Concentration table not complete ▶ Expand concentration table

No.	Factory setting	Message	Tests or remedial action
559	S - Warning, good	Conductivity high	Conductivity measurement: Process conductivity above compensation table Possible reasons: <ul style="list-style-type: none"> ■ Process value out of specification ■ Concentration table not complete <ul style="list-style-type: none"> ▶ Expand concentration table
560	S - Warning, good	Conduc. compensation	Conductivity measurement: Conductivity compensation below compensation table Possible reasons: <ul style="list-style-type: none"> ■ Process value out of specification ■ Concentration table not complete <ul style="list-style-type: none"> ▶ Expand concentration table
561	S - Warning, good	Conduc. compensation	Conductivity measurement: Conductivity compensation above compensation table Possible reasons: <ul style="list-style-type: none"> ■ Process value out of specification ■ Concentration table not complete <ul style="list-style-type: none"> ▶ Expand concentration table
703	F - Alarm, bad	Temp. sensor wiring	Temperature sensor wiring wrong <ul style="list-style-type: none"> ▶ Correct wiring of temperature sensor
724	F - Alarm, bad	Sensor reference	Sensor reference limit upper value exceeded Reference membrane impedance too high <ol style="list-style-type: none"> 1. Check the sensor, replace as needed 2. Check the reference limit value, correct as needed 3. Replace sensor
725	M - Warning, good	Sensor reference	Sensor reference limit upper value reached Reference membrane impedance high Measurement is still possible until alarm message <ol style="list-style-type: none"> 1. Check the sensor, replace as needed 2. Check the reference limit value, correct as needed 3. Replace sensor
734	M - Warning, good	Calibration quality	Min. calibration quality warning Measurement is still possible. The calibration quality shows a large change since last calibration. <ol style="list-style-type: none"> 1. Repeat the calibration 2. Check sensor, replace as necessary
740	F - Alarm, bad	Sensor defective	Sensor defective Internal sensor connection broken <ol style="list-style-type: none"> 1. Replace sensor 2. Contact service
801	F - Alarm, bad	Supply voltage	Supply voltage too low. <ul style="list-style-type: none"> ▶ Increase supply voltage.
816	C - Warning, good	Hold active	Hold active, please wait. Operation mode with modified measurement output Output and status of all channels on hold
832	N - Disabled, good	Temp. range exceeded	Out of temperature range <ol style="list-style-type: none"> 1. Check application 2. Check sensor
841	N - Disabled, good	Operating range	Process value out of operating range <ol style="list-style-type: none"> 1. Check application 2. Check sensor

No.	Factory setting	Message	Tests or remedial action
892	F - Alarm, bad	Internal failure	Internal failure with device restart
914	M - Warning, good	USP / EP Alarm	USP / EP Alarm Conductivity limit for USP or EP exceeded ▶ Check process
915	M - Warning, good	USP / EP warning	USP / EP warning Conductivity value close to the limit for USP or EP ▶ Check process
942	N - Disabled, good	Process value	Process value high Possible reasons: <ul style="list-style-type: none"> ▪ Sensor in air ▪ Air cushion in assembly ▪ Wrong sensor installation ▪ Sensor defective <ol style="list-style-type: none"> 1. No process value increase 2. Check measurement 3. Change sensor type
943	N - Disabled, good	Process value	Process value low Possible reasons: <ul style="list-style-type: none"> ▪ Sensor in air ▪ Air cushion in assembly ▪ Wrong sensor installation ▪ Sensor defective <ol style="list-style-type: none"> 1. No process value increase 2. Check measurement 3. Change sensor type
984	S - Warning, good	Process temperature	Process temperature out of specified range <ol style="list-style-type: none"> 1. Check process temperature 2. Check measurement
987	M - Warning, good	Calibration required	Due to a sensor maintenance a calibration is required.

11.8 Diagnostic list

Displays:

List of active diagnostic messages

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

11.9 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**

An activation code is required for the simulation of current output 2. In addition, the current output has to be enabled in the following menu path:

Menu/Application/Current output/Current output 2

11.10 Firmware history

Date	Version	Changes to firmware	Documentation
02/2025	01.00.00	Release	BA02380C/07/EN/01.25
05/2026	01.01.00	Full operation via Bluetooth	BA02380C/07/EN/02.26

11.10.1 Firmware update

Firmware updates are installed via a mobile device and the SmartBlue app.


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

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

Preliminaries

1. Download the firmware update package (.zip) and save it to the mobile device. The current firmware update package can be found in the Download area on the product page at www.endress.com/CM42B.
2. Unpack the zip archive. A separate app is required for this depending on the operating system of the mobile device.
3. Open the unpacked file (ends with*.sfu) using the SmartBlue app. To do this, tap the file at the storage location. If the mobile device offers multiple apps to open, select the SmartBlue app.

Installing the firmware update


 The device does not display any measured values during installation of the firmware update.

NOTICE

The firmware update can take up to one hour to install depending on the device configuration and the mobile device.

Malfunction due to incomplete firmware installation

- ▶ Ensure the mobile device has sufficient battery charge. Connect to the power supply if necessary.
- ▶ Do not disconnect the Bluetooth connection when installing.

1. Connect the device with the SmartBlue app (see →  34) and log in with the "admin" account or another account with the required authorization.
 - ↳ Navigate to the path: **Menu/System/Device management/Firmware update:**
2. Follow the instructions.
 - ↳ The firmware update is installed.
The device restarts following the installation.

11.11 Exporting service data

Service information (device data, logbooks) can be exported to a zip archive via the SmartBlue app. Logbooks are* .xlsx files. Device data are* .csv files.

Exporting service data

1. Launch the SmartBlue app and log in with the "admin" account.
 - ↳ Navigate to the path: **Menu/Guidance/Export/Import/Service data export:**
2. Follow the instructions in the wizard.
 - ↳ The service data are saved to the mobile device.

12 Maintenance

The maintenance of the measuring point comprises:

- Sensor 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 tasks

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.

12.1.2 Replacing the sensor on Memosens devices

1. Navigate to the path: **Menu/Guidance/Sensor change**:
2. Follow the instructions in the wizard.

12.1.3 Replacing the sensor on analog devices

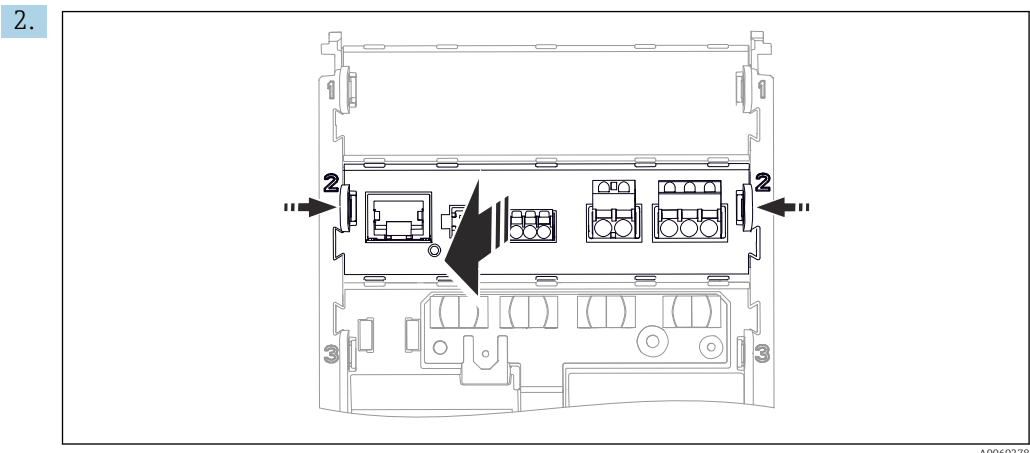
1. De-energize the device. To do this, disconnect all the current input and current output cables.
2. Replace the sensor. For sensor connection, see →  27
3. Reconnect the device.
4. Perform commissioning. To do so, run the wizard under **Menu/Guidance/Analog sensor commissioning**.

12.1.4 Replacing the battery

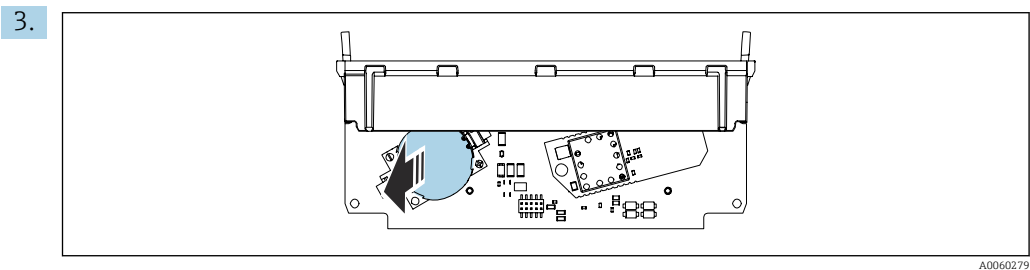
Only use battery types approved by the manufacturer.

The approved battery types are specified on the internal label of the base module.

1. Disconnect all the cables that are connected to slot 2 of the base module.
↳ to de-energize the device.



Remove the base module from slot 2. To do this, press the locking clips on the sides together.



Remove the battery at the bottom of the base module.

4. Insert the new battery.
5. Plug the base module back in.
6. Reconnect the device.

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

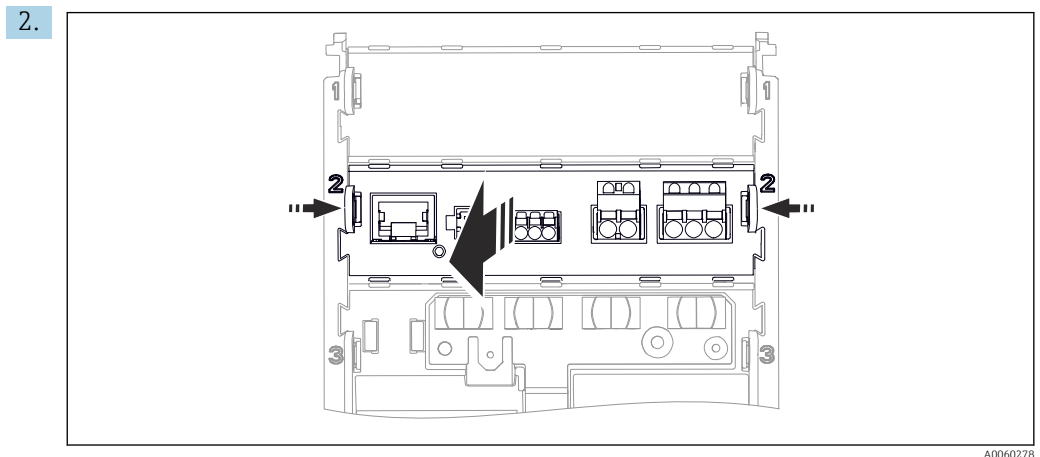
The product must be returned if repairs or a factory calibration are required, or if the wrong product was ordered or delivered. As an ISO-certified company and also due to legal regulations, Endress+Hauser is obliged to follow certain procedures when handling any returned products that have been in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

www.endress.com/support/return-material

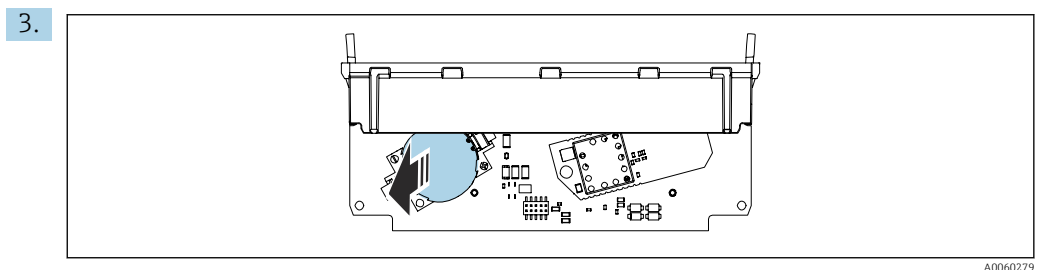
13.3 Disposal

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




- ▶ Observe the local regulations.
1. Disconnect all the cables that are connected to slot 2 of the base module.
 ↳ to de-energize the device.



Remove the base module from slot 2. To do this, press the locking clips on the sides together.



Remove the battery at the bottom of the base module.

-  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.
-  **▪** Follow the instructions in the Security Manual to ensure safe disposal in accordance with cybersecurity guidelines.
- If necessary, reset the device for decommissioning or for resale to delete all data before disconnecting it from the power supply. See →  45

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

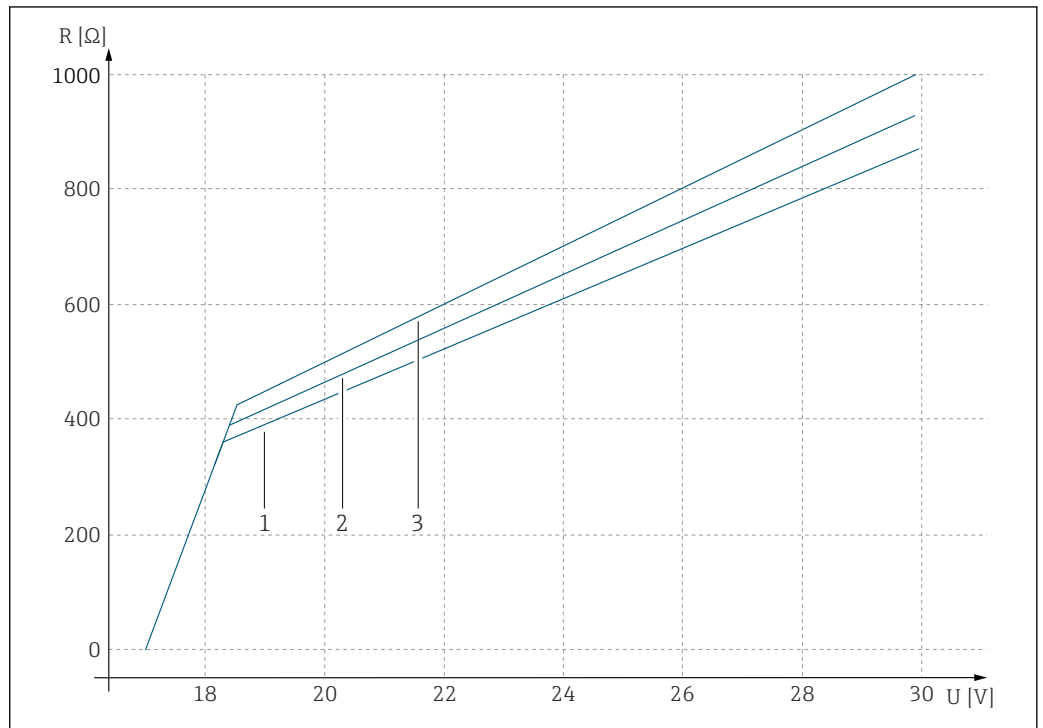
Signal on alarm as per NAMUR NE 43

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.



- 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

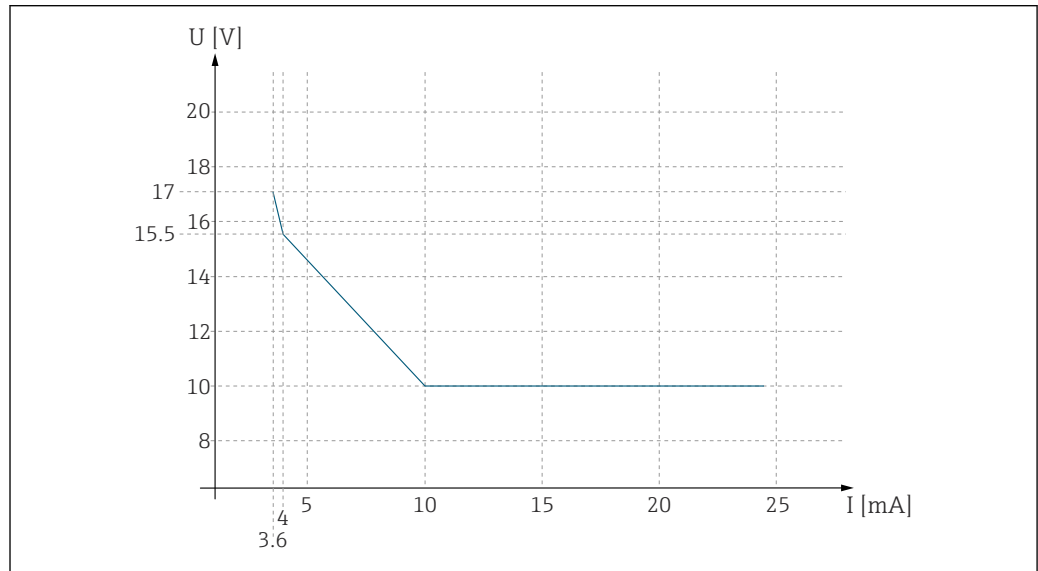
Manufacturer ID	0x0011
Device type	0x11A4 (pH), 0x11A5 (conductivity), 0x11A6 (oxygen)
Device revision	1
Manufacturer name	Endress+Hauser
Model name	Depends on the measuring principle
HART version	7.9
Device description files (DD/DTM)	www.endress.com/hart https://www.fieldcommgroup.org/registered-products 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)

Connection cable for external display (optional)

RJ50

Length (cable supplied): 3 m (10 ft)

Max. permitted length: 3 m (10 ft)

15.5 Performance characteristics

Response time of current output

t₉₀ = 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)
Operating height	<3000 m (6500 ft)
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)					

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