KA01160C/07/EN/11.23-00
71625993
2023-08-24

Brief Operating Instructions **Liquiline CM442R/CM444R/CM448R**

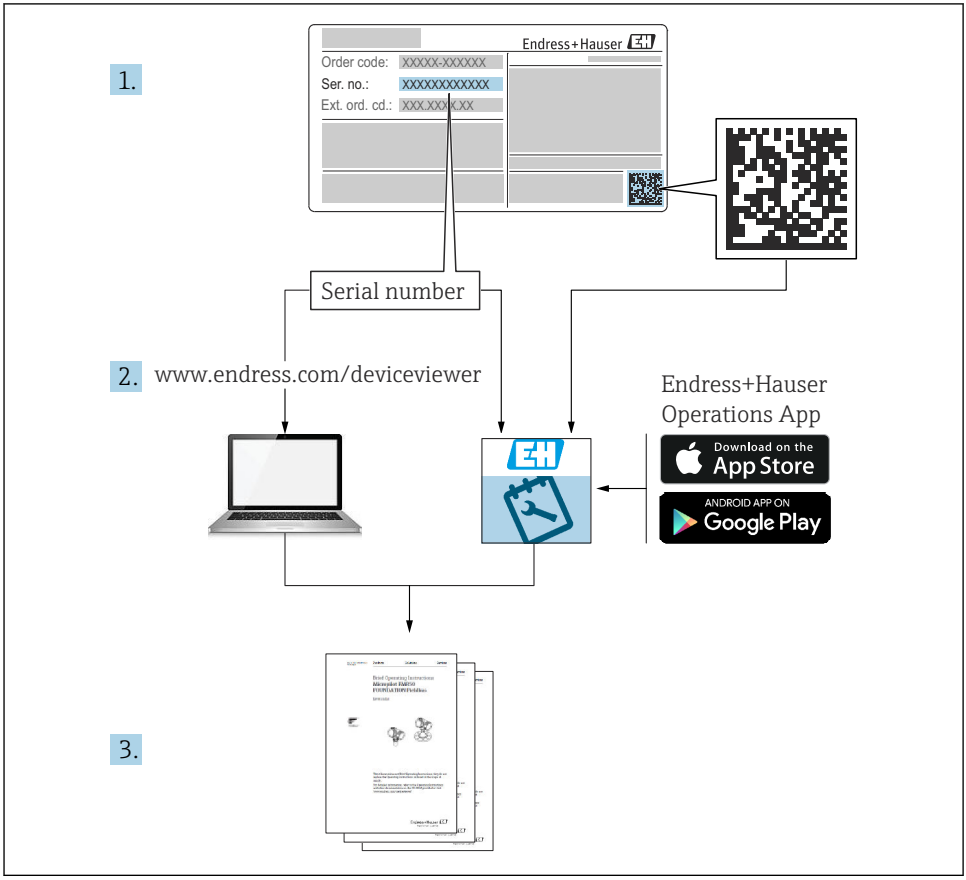
Universal four-wire multichannel controller for cabinet installation

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

Detailed information on the device can be found in the Operating Instructions and in the other documentation available at:

- www.endress.com/device-viewer
- Smart phone/tablet: Endress+Hauser Operations App

Endress+Hauser
People for Process Automation


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

A0040778

Table of contents

1 About this document ... 4
1.1 Warnings ... 4
1.2 Symbols ... 4
1.3 Symbols on the device ... 5
1.4 Documentation ... 5

2 Basic safety instructions ... 6
2.1 Requirements of the personnel ... 6
2.2 Intended use ... 6
2.3 Workplace safety ... 7
2.4 Operational safety ... 7
2.5 Product safety ... 8

3 Incoming acceptance and product identification ... 9
3.1 Incoming acceptance ... 9
3.2 Product identification ... 9
3.3 Scope of delivery ... 10

4 Mounting ... 11
4.1 Mounting requirements ... 11
4.2 Mounting the measuring device ... 14
4.3 Post-mounting check ... 19

5 Electrical connection ... 20
5.1 Connecting the measuring device ... 20
5.2 Connecting the sensors ... 23
5.3 Connecting additional inputs, outputs or relays ... 28
5.4 Connecting PROFIBUS or Modbus 485 ... 30
5.5 Hardware settings ... 34
5.6 Ensuring the degree of protection ... 35
5.7 Post-connection check ... 36

6 Operation options ... 37
6.1 Overview ... 37
6.2 Access to operating menu via local display ... 38

7 Commissioning ... 39
7.1 Function check ... 39
7.2 Power-up ... 39
7.3 Basic setup ... 40

1 About this document

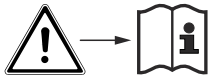
1.1 Warnings

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

1.2 Symbols

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

1.3 Symbols on the device

Symbol	Meaning
	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

The following manuals complement these Brief Operating Instructions and are available on the product pages on the Internet:

- Operating Instructions for Liquiline CM44xR, BA01225C
  - Device description
  - Commissioning
  - Operation
  - Software description (excluding sensor menus; these are described in a separate manual - see below)
  - Device-specific diagnostics and troubleshooting
  - Maintenance
  - Repair and spare parts
  - Accessories
  - Technical data
- Operating Instructions for Memosens, BA01245C
  - Software description for Memosens inputs
  - Calibration of Memosens sensors
  - Sensor-specific diagnostics and troubleshooting
- Operating Instructions for HART communication, BA00486C
  - Onsite settings and installation instructions for HART
  - Description of HART driver
- Guidelines for communication via fieldbus and web server
  - HART, SD01187C
  - PROFIBUS, SD01188C
  - Modbus, SD01189C
  - Web server, SD01190C
  - EtherNet/IP, SD01293C
  - PROFINET, SD02490C

2 Basic safety instructions

2.1 Requirements of 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 Non-hazardous environment

Liquiline CM44xR is a multichannel controller for connecting digital sensors with Memosens technology in non-hazardous environments.

The device is designed for use in the following applications:
- Food and beverages
- Life science
- Water and wastewater
- Chemical industry
- Power stations
- Other industrial applications

2.2.2 Hazardous environment

- ▶ Pay attention to the information in the relevant documents relating to safety instructions (XA).

2.2.3 Non-intended use and improper use

NOTICE

Objects stored on top of the housing

May cause short-circuits or fire or result in the failure of individual cabinet components or complete failure of the measuring point!

- ▶ Never place any objects, such as tools, cables, paper, food, liquid containers or similar, on top of the housing.
- ▶ Always observe the operator's regulations, in particular with regard to fire safety (smoking) and foodstuffs (beverages).

Use of the device for any purpose other than that described, poses a threat to the safety of people and of the entire measuring system and is therefore not permitted.

The manufacturer is not liable for damage caused by improper or non-designated use.

2.2.4 Installation environment

The device and the associated power units can be operated with 24 V AC, 24 V DC or 100 to 230 V AC and comply with IP20.
The components were designed for pollution degree 2 and for environments with non-condensing moisture. They must therefore be installed in an appropriate enclosure for protection. The ambient conditions specified in the instructions must be observed here.

2.3 Workplace safety

As the user, you are responsible for complying with the following safety conditions:
- 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.
3. Do not operate damaged products, and protect them against unintentional operation.
4. Label damaged products as defective.

During operation:

- ▶ If faults cannot be rectified:
  products must be taken out of service and protected against unintentional operation.

⚠ CAUTION

Programs not switched off during maintenance activities.
Risk of injury due to medium or cleaning agent!
- ▶ Quit any programs that are active.
- ▶ Switch to the service mode.
- ▶ If testing the cleaning function while cleaning is in progress, wear protective clothing, goggles and gloves or take other suitable measures to protect yourself.

2.5 Product safety

2.5.1 State-of-the-art

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.

2.5.2 IT security

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

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

3 Incoming acceptance and product identification

3.1 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.

3.2 Product identification

3.2.1 Nameplate

Nameplates can be found:
- on the packaging (adhesive label, portrait format)
- on the back of the external display (not visible when installed)

The nameplate provides you with the following information on your device:
- Manufacturer identification
- Order code
- Extended order code
- Serial number
- Firmware version
- Ambient conditions
- Input and output values
- Activation codes
- Safety information and warnings
- Degree of protection

▶ Compare the information on the nameplate with the order.

3.2.2 Identifying the product

Product page

www.endress.com/cm442r

www.endress.com/cm444r

www.endress.com/cm448r

Interpreting the order code

The order code and serial number of your product can be found in the following locations:
- On the nameplate
- In the delivery papers

Obtaining information on the product

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

3.2.3 Manufacturer address

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

3.3 Scope of delivery

The scope of delivery comprises:
- 1 multichannel controller in the version ordered
- 1 mounting plate
- 1 external display (if selected as an option) [1)]
- 1 DIN rail power unit incl. cable (CM444R and CM448R only)
- 1 printed copy of the Operating Instructions for the DIN rail power unit
- 1 printed copy of the Brief Operating Instructions in the language ordered
- Separation element (pre-installed on hazardous area version type 2DS Ex-i)
- Safety instructions for the hazardous area (for hazardous area version type 2DS Ex-i)
- Terminal strip

▶ If you have any queries:
Please contact your supplier or local sales center.

1) The external display can be selected as an option in the order structure or ordered as an accessory at a later stage.

4 Mounting

4.1 Mounting requirements

4.1.1 Mounting on DIN rail as per IEC 60715

⚠ CAUTION

The power unit can get very hot under full load

Burn hazard!

- ▶ Avoid touching the power unit during operation.
- ▶ The minimum distances to other devices must be observed.
- ▶ After switching off the power unit, allow it to cool down before carrying out any work on it.

⚠ CAUTION

Condensation on the device

Risk to user safety!

- ▶ 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

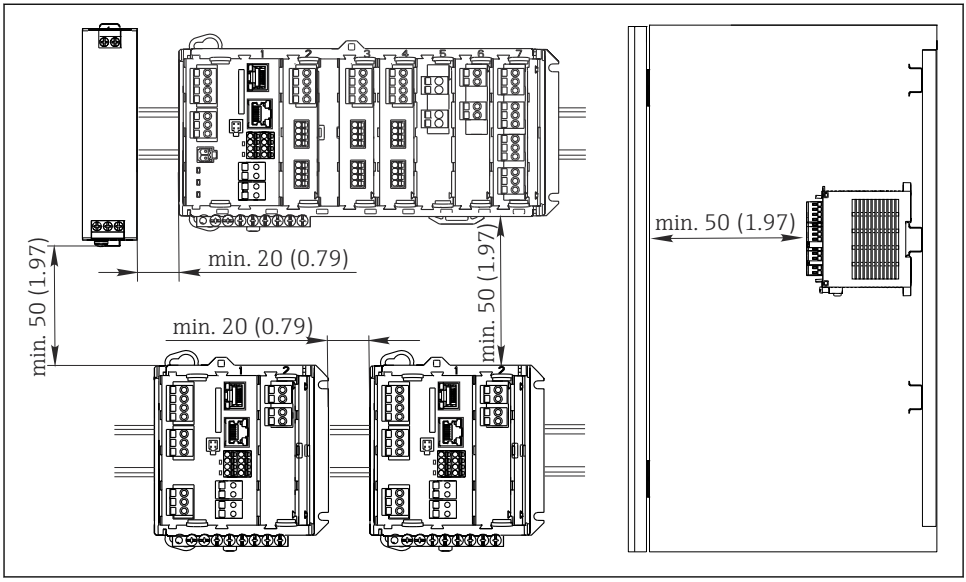
Incorrect mounting location in the cabinet, spacing regulations not observed

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

- ▶ Do not position the device directly above sources of heat. The temperature specification must be observed.
- ▶ 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.
- ▶ Recommended installation direction: horizontal. The specified ambient conditions, and particularly the ambient temperatures, only apply for horizontal installation.
- ▶ Vertical orientation is also possible. However, this requires additional fixing clips at the place of installation to hold the device in position on the DIN rail.
- ▶ Recommended installation of power unit for CM444R and CM448R: to the left of the device

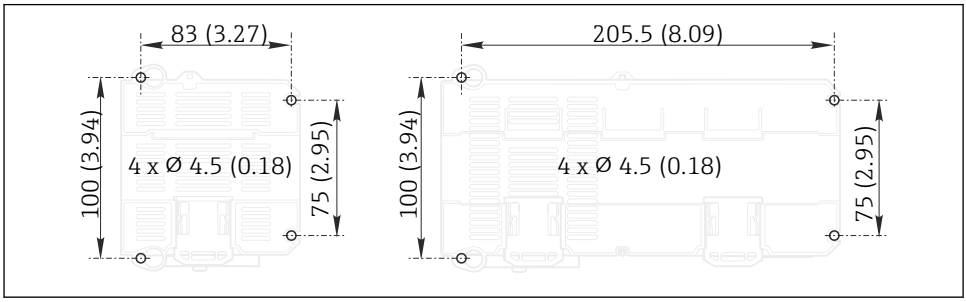
The following minimum clearance specifications must be observed:

- Distances at the side in relation to other devices incl. power units and to the wall of the cabinet:
  at least 20 mm (0.79 inch)
- Distance above and below the device and depth distance (to control cabinet door or other devices installed there):
  at least 50 mm (1.97 inch)



1 Minimum clearance in mm (in)

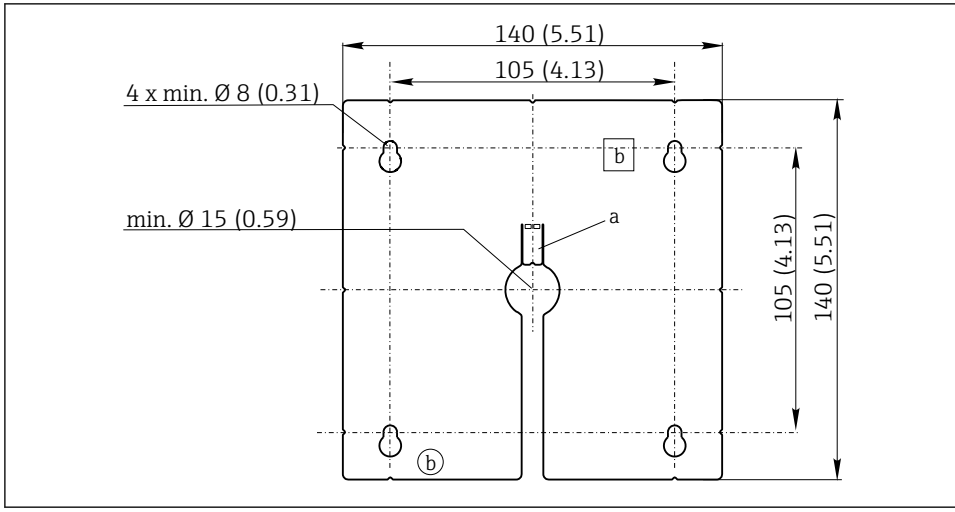
4.1.2 Wall mounting



2 Drilling pattern for wall mounting in mm (in)

4.1.3 Mounting the external display

The mounting plate also serves as the drilling template. The marks on the side help you mark the position of the drill holes.



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

a Retaining tab
b Production-related recesses, no function for the user

4.1.4 Cable length for optional display

Length of display cable provided:
3 m (10 ft)

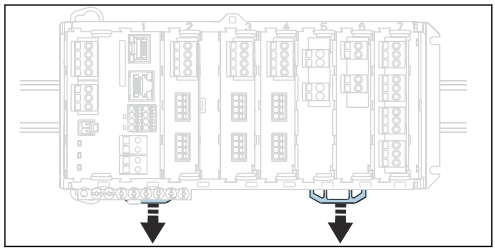
Maximum permitted length of a display cable:
5 m (16.5 ft)

4.2 Mounting the measuring device

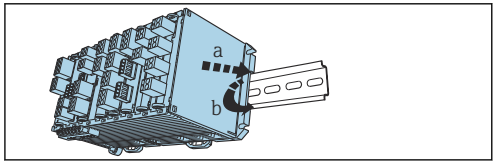
4.2.1 DIN rail mounting

The mounting procedure is the same for all Liquiline devices. The example shows a CM448R.

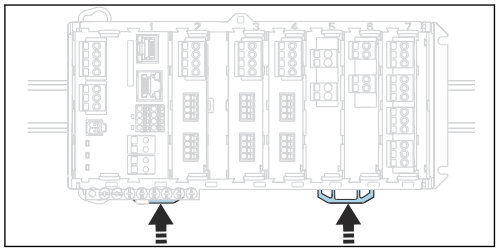
1. In the order configuration, the securing clips are "tightened" to secure the DIN rail.
   Release the securing clips by pulling them downwards.



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



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



4. **CM444R and CM448R only**
   Mount the external power unit in the same way.

4.2.2 Wall mounting

Mounting material (screws, dowels) are not included in the scope of delivery and must be provided by the customer.

CM444R and CM448R: The external power unit can be mounted on a DIN rail only.

Use the back of the housing to mark the mounting holes. (→ 2, 12)

1. Drill the corresponding holes and insert wall plugs if necessary.
2. Screw the housing onto the wall.

4.2.3 Mounting the optional external display

CAUTION

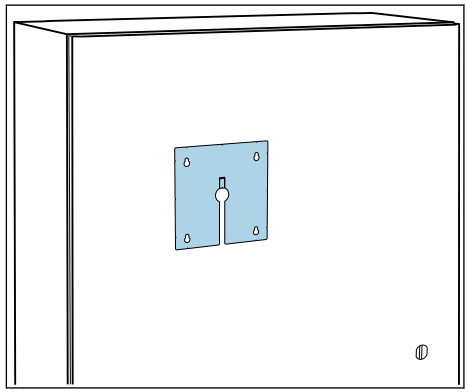
Sharp-edged, non-deburred boreholes

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.

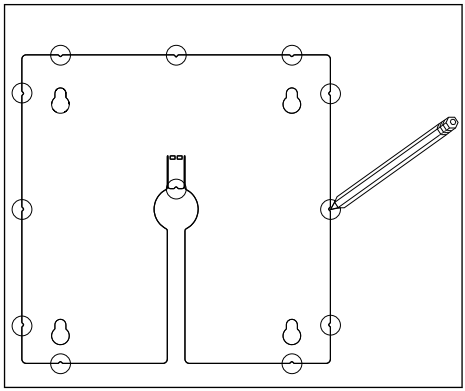
Mounting the display on the door of the cabinet

1.



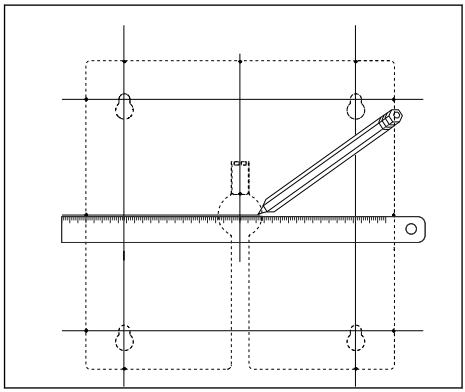
Hold the mounting plate from the outside against the door of the control cabinet. Select the position at which the display is to be mounted.

2.



Make all the markings.

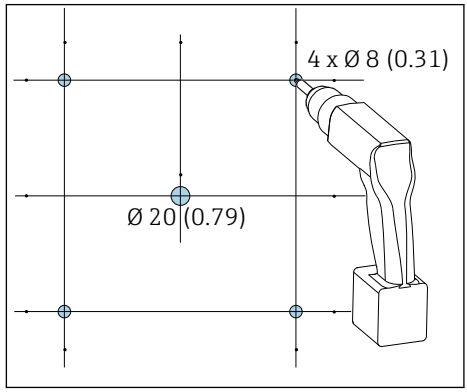
3.



Draw lines to interconnect all the marks.

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

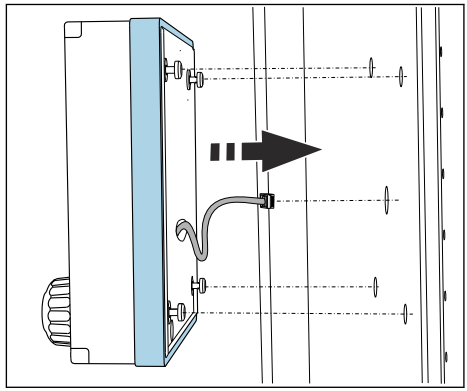
4.



4 *Diameter of boreholes in mm (in)*

Drill the holes. → 3, 13

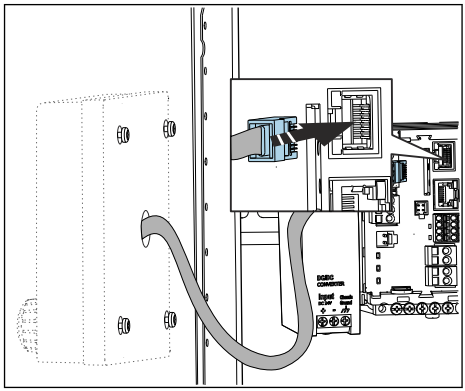
5.



Pull the display cable through the central borehole.

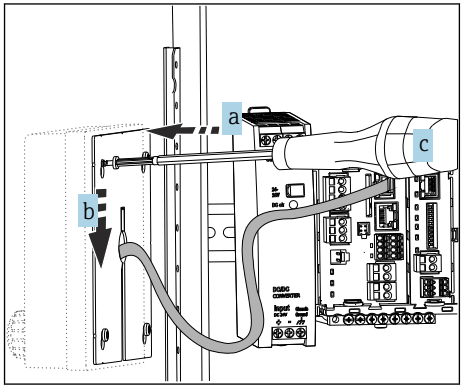
6. With the Torx screws unscrewed until the last half turn (but still inserted), fit the display from the outside via the 4 outer boreholes. Ensure that the rubber frame (seal, highlighted blue) does not become damaged and is properly positioned on the surface of the door.

7.



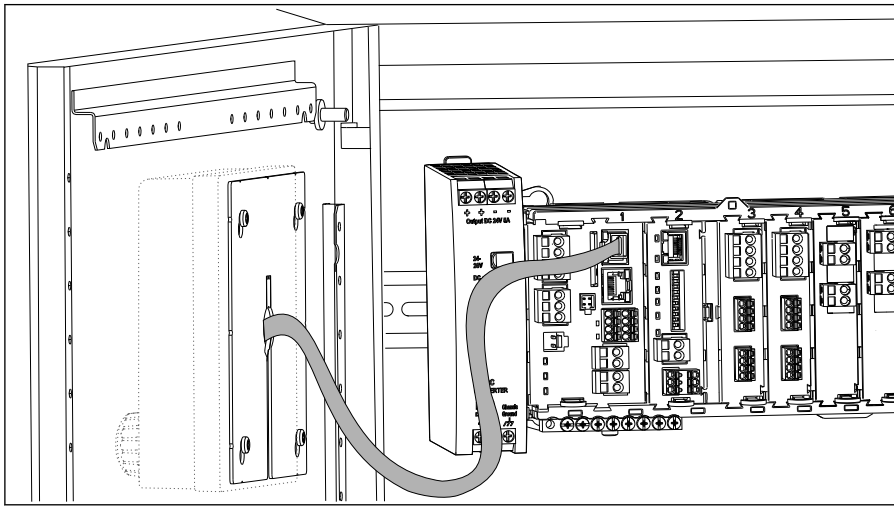
Connect the display cable to the RJ-45 socket of the base module. The RJ-45 socket is labeled **Display**.

8.



Place the mounting plate on the inside over the screws (a), slide it down (b) and tighten the screws (c).

↳ The display is now mounted and ready to use.



5 *Mounted display*

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.
- ▶ Only connect the display cable to the RJ45 socket with the **Display** labeling on the base module.

4.3 Post-mounting check

1. After mounting, check all devices (controller, power unit, display) for damage.
2. Verify that the specified installation clearances have been observed.
3. Verify that all securing clips have been snapped into place and that the components are securely positioned on the DIN rail.
4. Ensure that the temperature limits are observed at the mounting location.

5 Electrical connection

5.1 Connecting the measuring device

WARNING

Device is live!

Incorrect connection may result in injury or death!

- The electrical connection may be performed only by an electrical technician.
- The electrical technician must have read and understood these Operating Instructions and must follow the instructions contained therein.
- **Prior** to commencing connection work, ensure that no voltage is present on any cable.

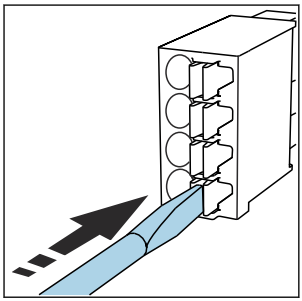
NOTICE

The device does not have a power switch!

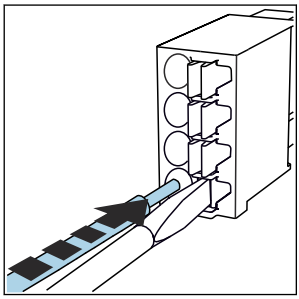
- Provide a protected circuit breaker in the vicinity of the device at the place of installation.
- The circuit breaker must be a switch or power switch, and must be labeled as the circuit breaker for the device.
- At the supply point, the power supply must be isolated from dangerous live cables by double or reinforced insulation in the case of devices with a 24 V supply voltage.

5.1.1 Cable terminals

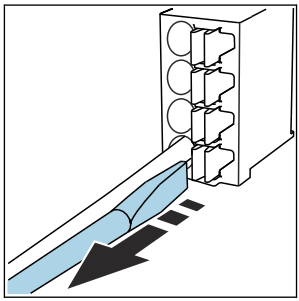
Plug-in terminals for Memosens and PROFIBUS/RS485 connections



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



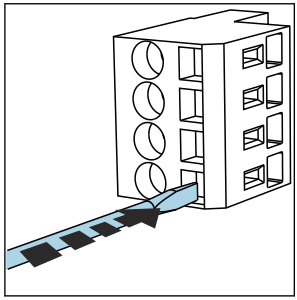
- Insert the cable until the limit stop.



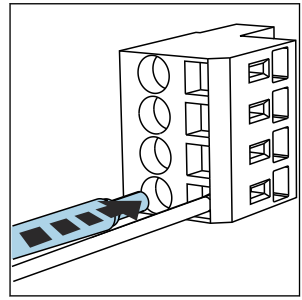
- Remove the screwdriver (closes the terminal).

After connection, make sure that every cable end is securely in place. Terminated cable ends, in particular, tend to come loose easily if they have not been correctly inserted as far as the limit stop.

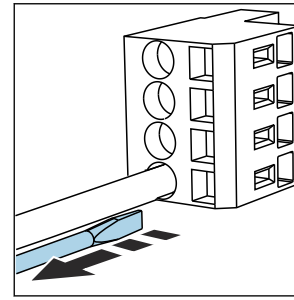
All other plug-in terminals



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

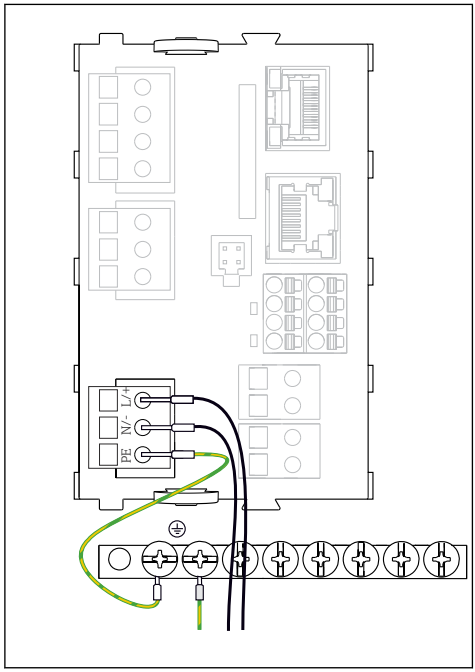


▶ Insert the cable until the limit stop.

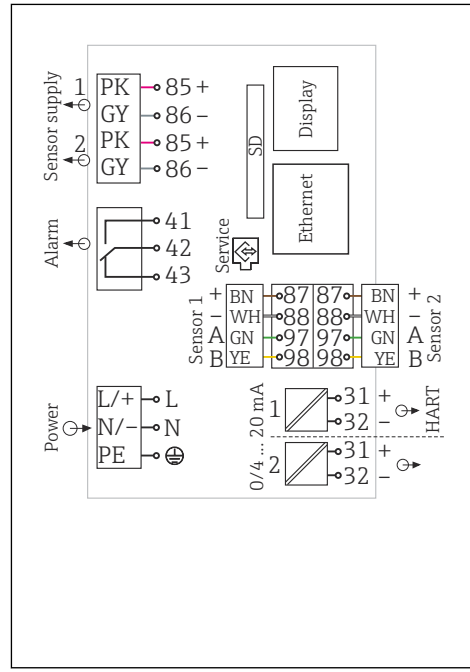


▶ Remove the screwdriver (closes the terminal).

5.1.2 Connecting the supply voltage for the CM442R



6 *Connecting the power supply using the example of the BASE2-H or -L*



7 *Complete wiring diagram using the example of the BASE2-H or -L*

H Power unit 100 to 230 VAC
L Power unit 24 VAC or 24 VDC

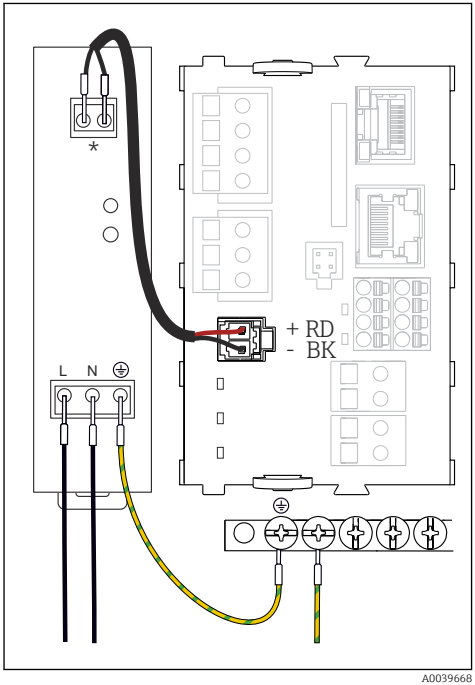
NOTICE

Incorrect connection and cable run not separate

Interference on signal or display cable, incorrect measured values or failure of display may occur!

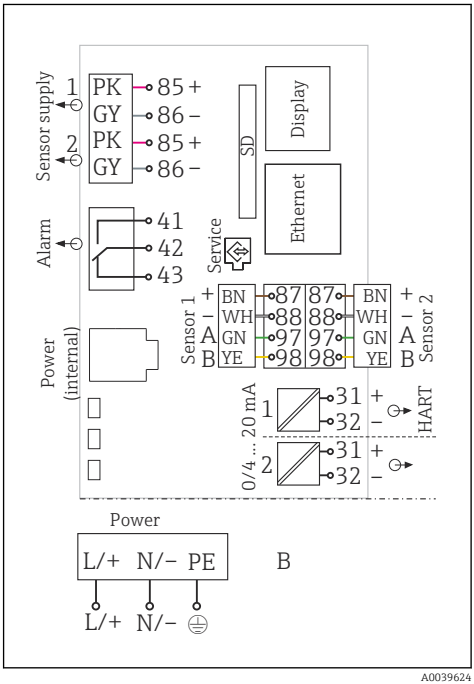
- ▶ Do **not** connect the cable shield of the display cable to PE (terminal strip of device)!
- ▶ Run the signal/display cable in the control cabinet separately from live (current-carrying) cables.

5.1.3 Connecting the supply voltage for CM444R and CM448R



8 *Connecting the power supply using the example of the BASE2-E*

* *Assignment depends on power supply unit; make sure it is correctly connected.*



9 *Complete wiring diagram using the example of the BASE2-E and external power supply unit (B)*

The two device versions may only be operated with the power unit supplied and the power unit cable. Also pay attention to the information in the operating instructions supplied for the power unit.

NOTICE

Incorrect connection and cable run not separate

Interference on signal or display cable, incorrect measured values or failure of display may occur!

- ▶ Do **not** connect the cable shield of the display cable to PE (terminal strip of device)!
- ▶ Run the signal/display cable in the control cabinet separately from live (current-carrying) cables.

5.2 Connecting the sensors

5.2.1 Sensor types with Memosens protocol for non-hazardous area

Sensors with Memosens protocol

Sensor types	Sensor cable	Sensors
Digital sensors **without** additional internal power supply	With plug-in connection and inductive signal transmission	▪ pH sensors ▪ ORP sensors ▪ Combined sensors ▪ Oxygen sensors (amperometric and optical) ▪ Conductivity sensors with conductive measurement of conductivity ▪ Chlorine sensors (disinfection)
	Fixed cable	Conductivity sensors with inductive measurement of conductivity
Digital sensors with additional internal power supply	Fixed cable	▪ Turbidity sensors ▪ Sensors for interface measurement ▪ Sensors for measuring the spectral absorption coefficient (SAC) ▪ Nitrate sensors ▪ Optical oxygen sensors ▪ Ion-sensitive sensors

The following rule applies if connecting CUS71D sensors:

- CM442R
  - Only one CUS71D is possible; an additional sensor is not permitted.
  - The second sensor input may also not be used for another type of sensor.
- CM444R
  No restrictions. All the sensor inputs can be used as required.
- CM448R
  - If a CUS71D is connected, the number of sensor inputs that can be used is limited to a maximum of 4.
  - Of these, all 4 inputs can be used for CUS71D sensors.
  - Every combination of CUS71D and other sensors is possible, provided that the total number of connected sensors does not exceed 4.

5.2.2 Sensor types with Memosens protocol for hazardous area

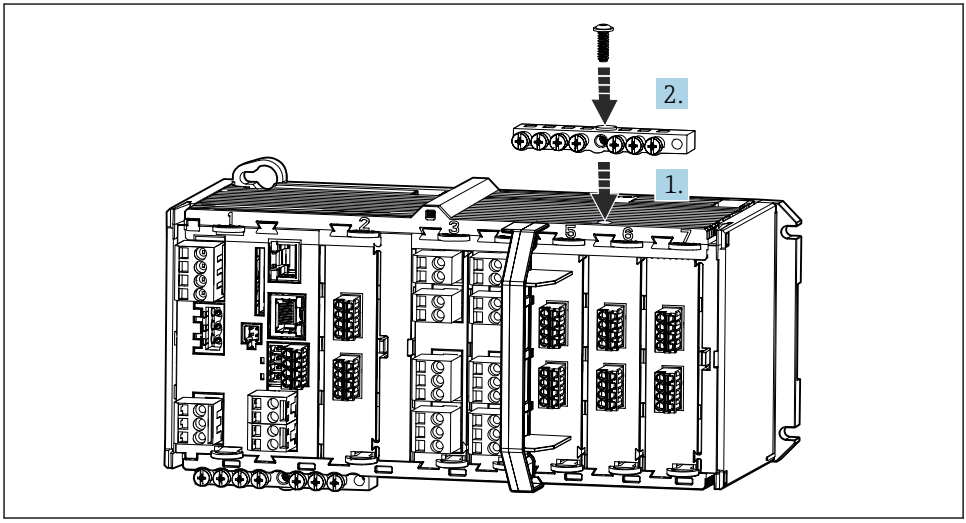
Sensors with Memosens protocol

Sensor types	Sensor cable	Sensors
Digital sensors **without** additional internal power supply	With plug-in connection and inductive signal transmission	▪ pH sensors ▪ ORP sensors ▪ Combined sensors ▪ Oxygen sensors (amperometric and optical) ▪ Conductivity sensors with conductive measurement of conductivity ▪ Chlorine sensors (disinfection)
	Fixed cable	Conductivity sensors with inductive measurement of conductivity

Intrinsically safe sensors for use in explosive atmospheres may only be connected to the sensor communication module type 2DS Ex-i. Only the sensors covered by the certificates may be connected (see XA).

The sensor connections for non-Ex sensors on the base module are disabled.

5.2.3 Mounting the terminal strip for sensor communication module 2DS Ex-i

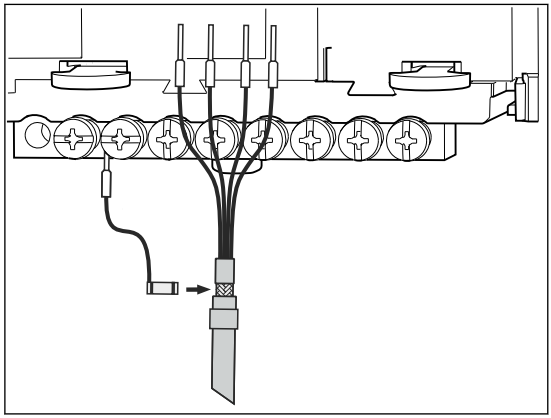


A0045451

1. Fit the cable duct with the central bore over the thread of the sensor communication module 2DS Ex-i.
2. Tighten the cable duct.
3. Establish the grounding of the cable duct (e.g. via the cable duct of the base module). Use the green/yellow cable supplied for this purpose.

5.2.4 Connecting the functional ground

You must always connect the terminal strip with PE from the central node in the cabinet. Use the conductor with cable clamp that is included with the Memosens cable to connect the functional earth to the terminal strip of the device.



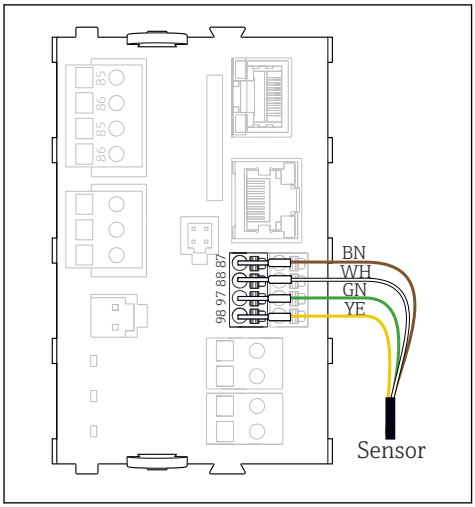
10 Functional earth connection

You must only ever connect one functional earth to each screw in the terminal strip. Otherwise, shielding is not guaranteed.

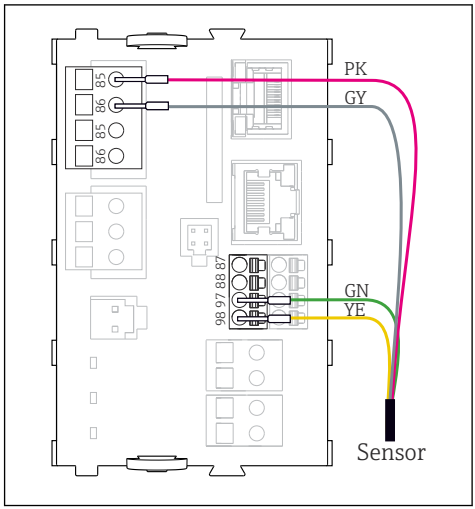
5.2.5 Connecting sensors for non-hazardous area

Connection

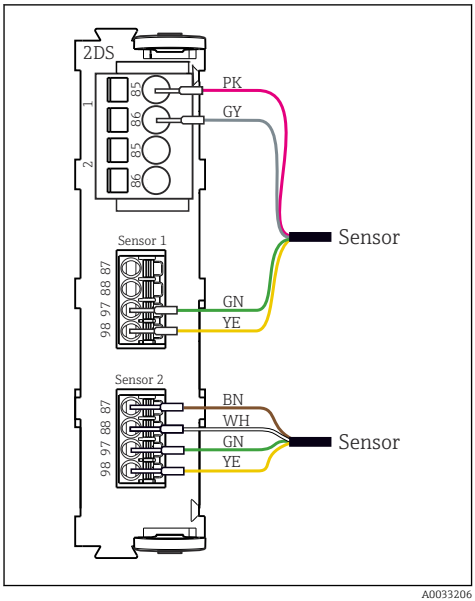
Direct connection of the sensor cable to the terminal connector of the , basic module-L, -H or -E (→ 11 ff.)



11 *sensors without additional supply voltage*



12 *sensors with additional supply voltage*



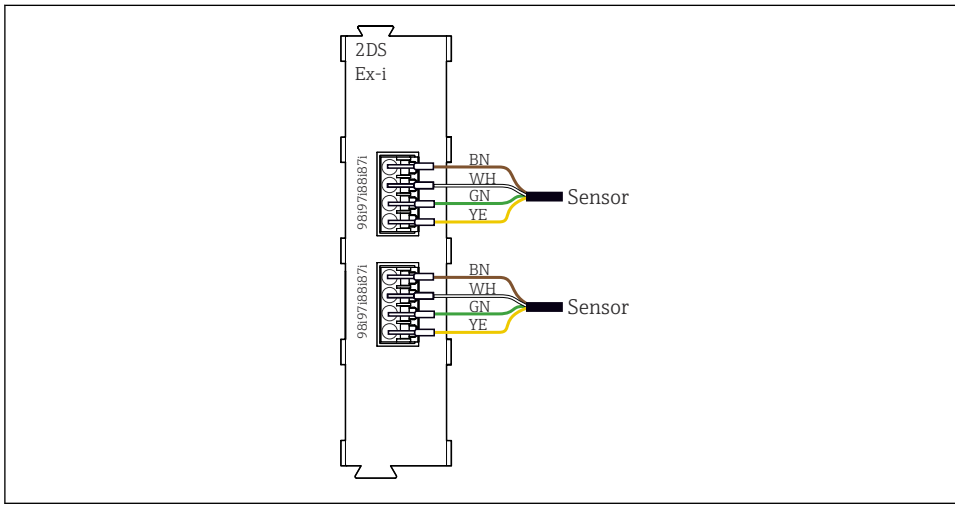
13 *Sensors with and without additional supply voltage at sensor module 2DS*

In the case of a single-cannel device:
The left-hand Memosens input on basic module must be used!

5.2.6 Connecting sensors for hazardous area

Sensor cable connected directly

- Connect the sensor cable to the terminal connector of the sensor communication module 2DS Ex-i.



14 *Sensors without additional supply voltage at sensor communication module type 2DS Ex-i*

Intrinsically safe sensors for use in explosive atmospheres may only be connected to the sensor communication module type 2DS Ex-i. Only the sensors covered by the certificates may be connected (see XA).

5.3 Connecting additional inputs, outputs or relays

⚠ WARNING

Module not covered

No shock protection. Danger of electric shock!

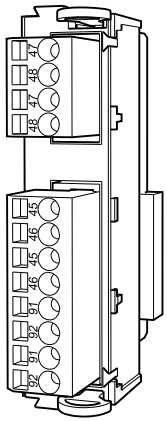
- ▶ Change or extend the hardware for the **non-hazardous area**: always fill the slots from left to right. Do not leave any gaps.
- ▶ If all of the slots are not occupied in the case of devices for the **non-hazardous area**: always insert a dummy cover or end cover in the slot to the right of the last module. This ensures that the unit is shock-protected.
- ▶ Always ensure shock protection is guaranteed particularly in the case of relay modules (2R, 4R, AOR).
- ▶ Hardware for the **hazardous area** may not be modified. Only the Manufacturer's Service Team may convert a certified device to another certified device version. This includes all modules of the transmitter with an integrated 2DS Ex-i module, as well as changes that concern non-intrinsically safe modules.

The terminal strip is used to connect the cable shields.

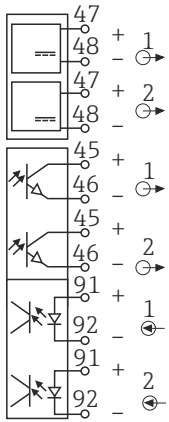
- ▶ If additional shields are required, connect them with PE centrally in the control cabinet via terminal blocks supplied by the customer.

5.3.1 Digital inputs and outputs

DIO module



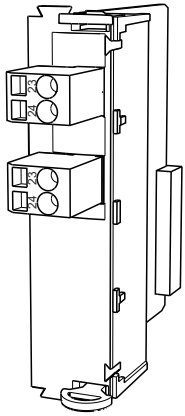
15 *Module*



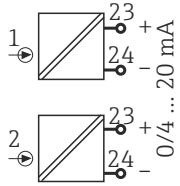
16 *Wiring diagram*

5.3.2 Current inputs

2AI module



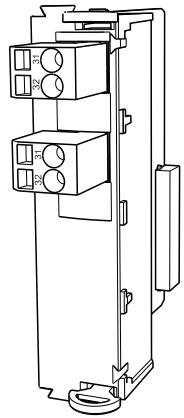
17 Module



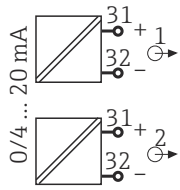
18 Wiring diagram

5.3.3 Current outputs

2AO

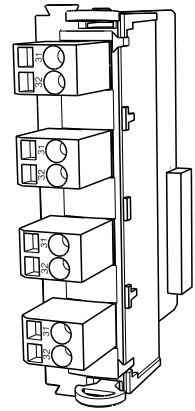


19 Module

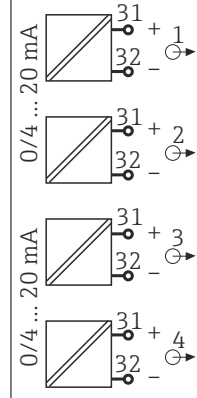


20 Wiring diagram

4AO

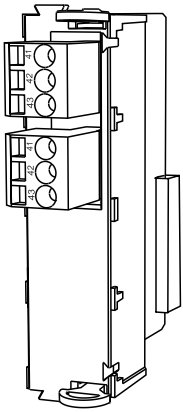
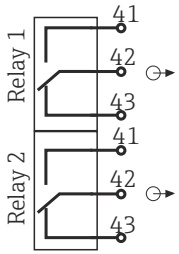
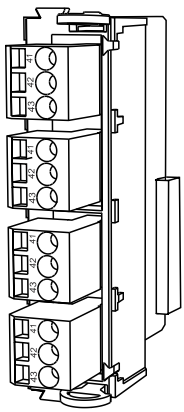
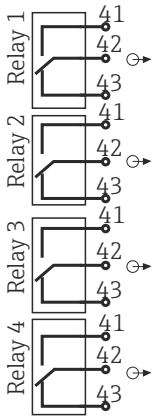


21 Module



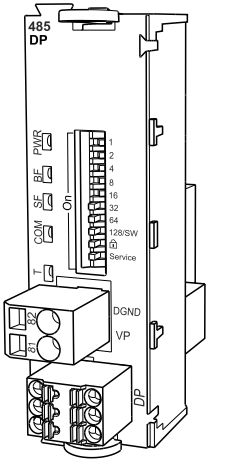
22 Wiring diagram

5.3.4 Relay

2R module		4R module	
			
23 *Module*	24 *Wiring diagram*	25 *Module*	26 *Wiring diagram*

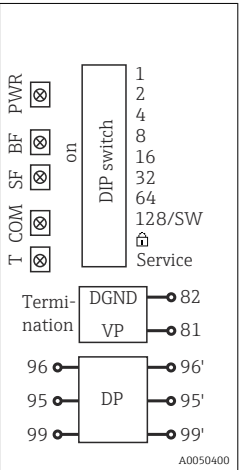
5.4 Connecting PROFIBUS or Modbus 485

5.4.1 Module 485DP



A0050399

27 *Module*



A0050400

28 *Wiring diagram*

Terminal	PROFIBUS DP
95	A
96	B
99	Not connected
82	DGND
81	VP

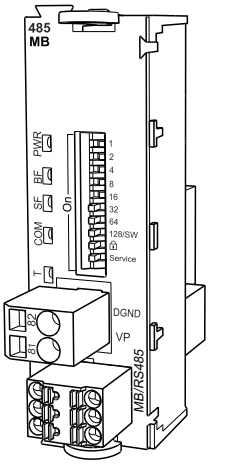
LEDs on front of module

LED	Designation	Color	Description
PWR	Power	GN	Supply voltage is applied and module is initialized.
BF	Bus failure	RD	Bus failure
SF	System failure	RD	Device error
COM	Communication	YE	PROFIBUS message sent or received.
T	Bus termination	YE	▪ Off = No termination ▪ On = Termination is used

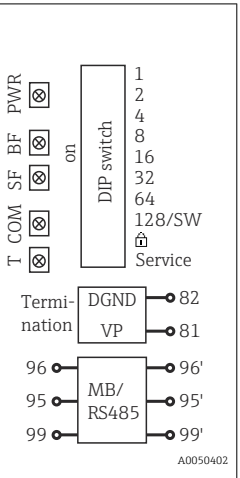
DIP switches on front of module

DIP	Factory setting	Assignment
1-128	ON	Bus address (→ "Commissioning/communication")
🔓	OFF	Write protection: "ON" = configuration not possible via the bus, only via local operation
Service	OFF	The switch has no function

5.4.2 Module 485MB



29 *Module*



30 *Wiring diagram*

Terminal	Modbus RS485
95	B
96	A
99	C
82	DGND
81	VP

LEDs on front of module

LED	Designation	Color	Description
PWR	Power	GN	Supply voltage is applied and module is initialized.
BF	Bus failure	RD	Bus failure
SF	System failure	RD	Device error
COM	Communication	YE	Modbus message sent or received.
T	Bus termination	YE	▪ Off = No termination ▪ On = Termination is used

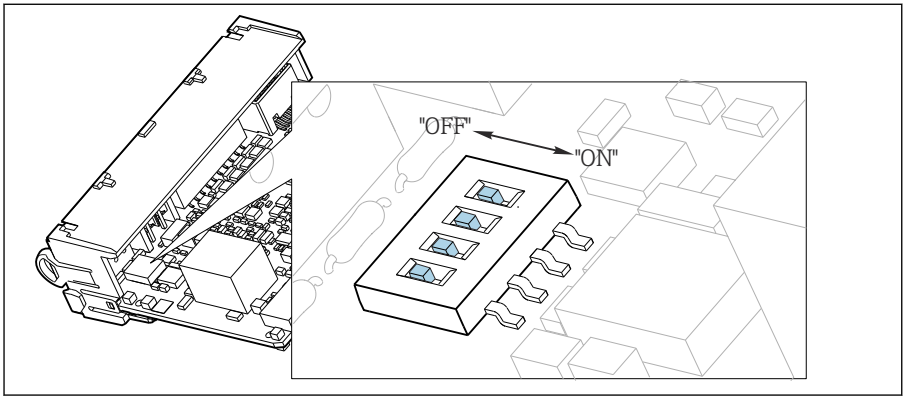
DIP switches on front of module

DIP	Factory setting	Assignment
1-128	ON	Bus address (→ "Commissioning/communication")
🔓	OFF	Write protection: "ON" = configuration not possible via the bus, only via local operation
Service	OFF	The switch has no function

5.4.3 Bus termination

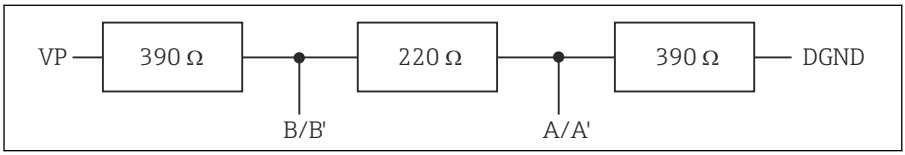
There are 2 ways to terminate the bus:

1. Internal termination (via DIP switch on module board)



31 DIP switch for internal termination

- Using a suitable tool such as a tweezer, move all four DIP switches to the "ON" position.
  - The internal termination is used.



32 Structure of internal termination

2. External termination

Leave the DIP switches on the module board in the "OFF" position (factory setting).

- Connect the external termination to terminals 81 and 82 on the front of module 485DP or 485MB for 5-V power supply.
  - The external termination is used.

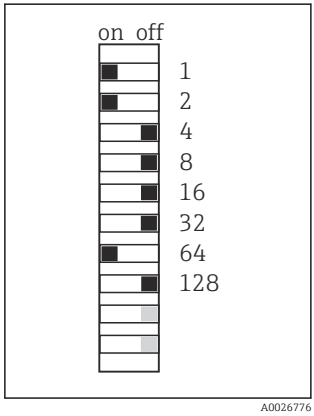
5.5 Hardware settings

Setting the bus address

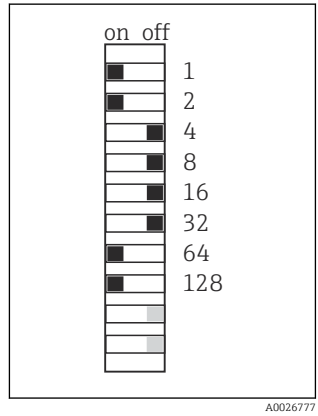
1. Open the housing.

2. Set the desired bus address via the DIP switches of module 485DP or 485MB.

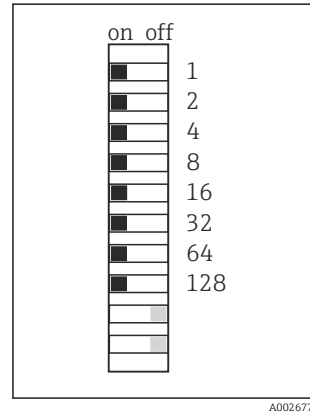
For PROFIBUS DP, valid bus addresses are anything between 1 and 126, and anything between 1 and 247 for Modbus. If you configure an invalid address, software addressing is automatically enabled via the local configuration or via the fieldbus.



33 *Valid PROFIBUS address 67*



34 *Valid Modbus address 195*



35 *Invalid address 255* [1]

[1] Order configuration, software addressing is active, software address configured at the factory: PROFIBUS 126, Modbus 247

For detailed information on "Setting the address via software", see the Operating Instructions → BA01225C

5.6 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 use, may be carried out 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, Ex protection) can no longer be guaranteed if, for example :

- Covers are left off
- Different power units to the ones supplied are used
- Cable glands are not sufficiently tightened (must be tightened with 2 Nm (1.5 lbf ft) for the permitted level of IP protection)
- Unsuitable cable diameters are used for the cable glands
- Modules are not fully secured
- The display is not fully secured (risk of moisture entering due to inadequate sealing)
- Loose or insufficiently tightened cables/cable ends
- Conductive cable strands are left in the device

5.7 Post-connection check

⚠ WARNING

Connection errors

The safety of people and of the measuring point is at risk! 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.

Device condition and specifications

- Are the device and all the cables free from damage on the outside?

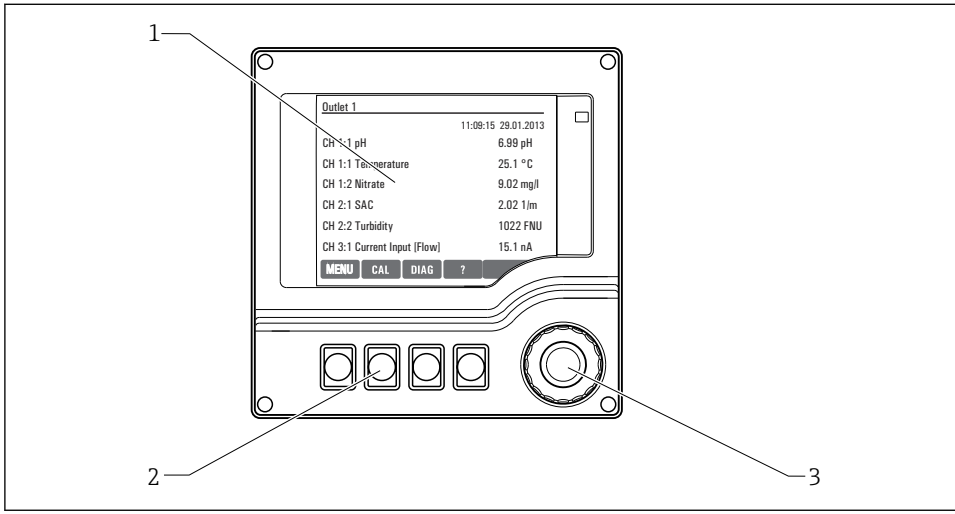
Electrical connection

- Are the mounted cables strain relieved?
- Are the cables routed without loops and cross-overs?
- Are the signal cables correctly connected as per the wiring diagram?
- Are all plug-in terminals securely engaged?
- Are all the connection wires securely positioned in the cable terminals?

6 Operation options

6.1 Overview

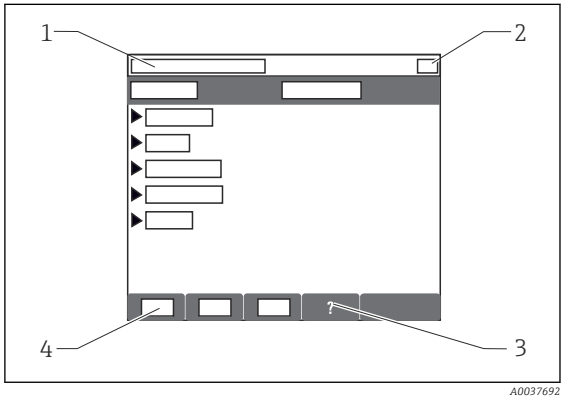
6.1.1 Display and operating elements (only with optional display)



36 *Overview of operation*

1 *Display (with red display background in alarm condition)*
2 *Soft keys (function depends on menu)*
3 *Navigator (jog/shuttle and press/hold function)*

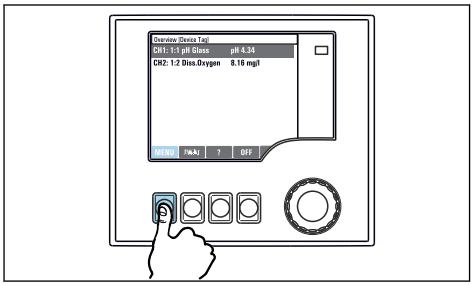
6.1.2 Display



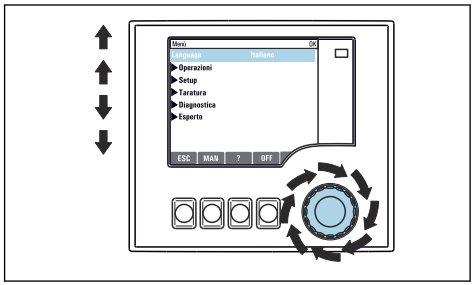
1 *Menu path and/or device designation*
2 *Status display*
3 *Help if available*
4 *Assignment of the soft keys*

6.2 Access to operating menu via local display

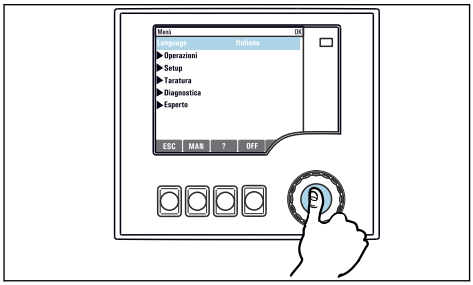
6.2.1 Operating concept (with optional display)



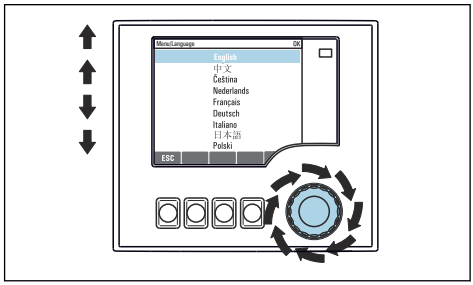
▶ Pressing the soft key: selecting the menu directly



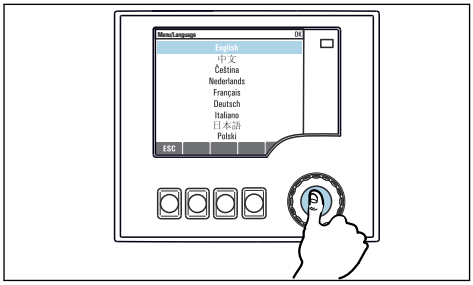
▶ Turning the navigator: moving the cursor in the menu



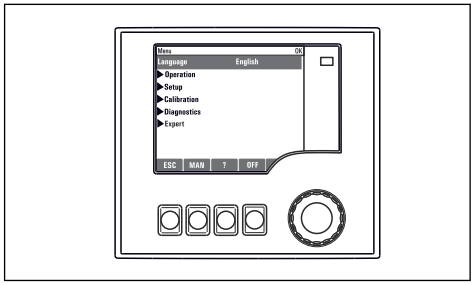
▶ Pressing the navigator: launching a function



▶ Turning the navigator: selecting a value (e.g. from a list)



▶ Pressing the navigator: accepting the new value



↳ New setting is accepted

6.2.2 Locking or unlocking operating keys

Locking operating keys

1. Press the navigator for longer than 2 s.
   ↳ A context menu for locking the operating keys is displayed.
   You have the choice of locking the keys with or without password protection. "With password" means that you can only unlock the keys again by entering the correct password. Set this password here: **Menu/Setup/General settings/Extended setup/Data management/Change key lock password**.
2. Select whether to lock keys with or without a password.
   ↳ The keys are locked. No more entries can be made. In the soft key bar, you will see the symbol.

The password is 0000 when the device is delivered from the factory. **Make sure to note down any changes to the password,** as otherwise you will not be able to unlock the keypad yourself.

Unlocking operating keys

1. Press the navigator for longer than 2 s.
   ↳ A context menu for unlocking the operating keys is displayed.
2. **Key unlock** .
   ↳ The keys are unlocked immediately if you did not choose to lock with a password. Otherwise you are asked to enter your password.
3. Only if keypad is password-protected: enter the right password.
   ↳ The keys are unlocked. It is possible to access the entire onsite operation again. The symbol is no longer visible on the display.

7 Commissioning

7.1 Function check

WARNING

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.

7.2 Power-up

During the device startup phase, the relays and current outputs have an undefined status for a few seconds prior to initialization. Watch out for possible effects on any actuators which may be connected.

7.2.1 Setting the operating language

Configuring the language

1. Switch on the supply voltage.
   ↳ Wait for the initialization to finish.
2. Press the soft key: **MENU**.
3. Set your language in the top menu item.
   ↳ The device can now be operated in your chosen language.

7.3 Basic setup

Making basic settings

1. Switch to the **Setup**/**Basic setup** menu.
   ↳ Make the following settings.
2. **Device tag**: Give your device any name of your choice (max. 32 characters).
3. **Set date**: Correct the set date if necessary.
4. **Set time**: Correct the set time if necessary.
   ↳ For quick commissioning, you can ignore the additional settings for outputs, relays etc. You can make these settings later in the specific menus.
5. To return to the measuring mode: press the soft key for **ESC** for at least one second.
   ↳ Your controller now works with your basic settings. The sensors connected use the factory settings of the sensor type in question and the individual calibration settings that were last saved.

If you wish to configure your most important input and output parameters in the **Basic setup** :

- Configure the current outputs, relays, limit switches, controllers, device diagnostics and cleaning cycles with the submenus which follow the time setting.

www.addresses.endress.com

Endress+Hauser

People for Process Automation