

Brief Operating Instructions

Liquisys M CLM223

Transmitter for conductivity



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1 About this document

1.1 Warnings

Structure of information	Meaning
 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.
 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.
 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.
 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 used

	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.

2 Basic safety instructions

2.1 Requirements concerning 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

The Liquisys M transmitter is used to determine the conductivity and the resistivity of liquid media.

The transmitter is particularly suited for use in the following areas:

- Ultrapure water
- Water treatment
- Cooling water desalination
- Condensate treatment
- Municipal wastewater treatment plants
- Chemical industry
- Food industry
- Pharmaceutical industry

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

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

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

On receipt of the delivery:

1. Check the packaging for damage.
 - ↳ Report all damage immediately to the manufacturer.
Do not install damaged components.
2. Check the scope of delivery using the delivery note.
3. Compare the data on the nameplate with the order specifications on the delivery note.

4. Check the technical documentation and all other necessary documents, e.g. certificates, to ensure they are complete.



If one of the conditions is not satisfied, contact the manufacturer.

3.2 Scope of delivery

- 1 CLM223 transmitter
- 1 set of plug-in screw terminals
- 2 tensioning screws
- 1 set of Brief Operating Instructions
- For versions with HART communication:
 - 1 set of Operating Instructions: Field communication with HART
- For versions with PROFIBUS interface:
 - 1 set of Operating Instructions: Field communication with PROFIBUS PA/DP

3.3 Product identification

3.3.1 Manufacturer address

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

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 will find information pertaining to your device, including the product documentation.

3.3.2 Product page

www.endress.com/CLM223

3.3.3 Nameplate

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

- Manufacturer identification
- Order code
- Extended order code
- Serial number
- Ambient and process conditions
- Input and output values
- Safety information and warnings

► Compare the information on the nameplate with the order.

3.3.4 Product identification

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

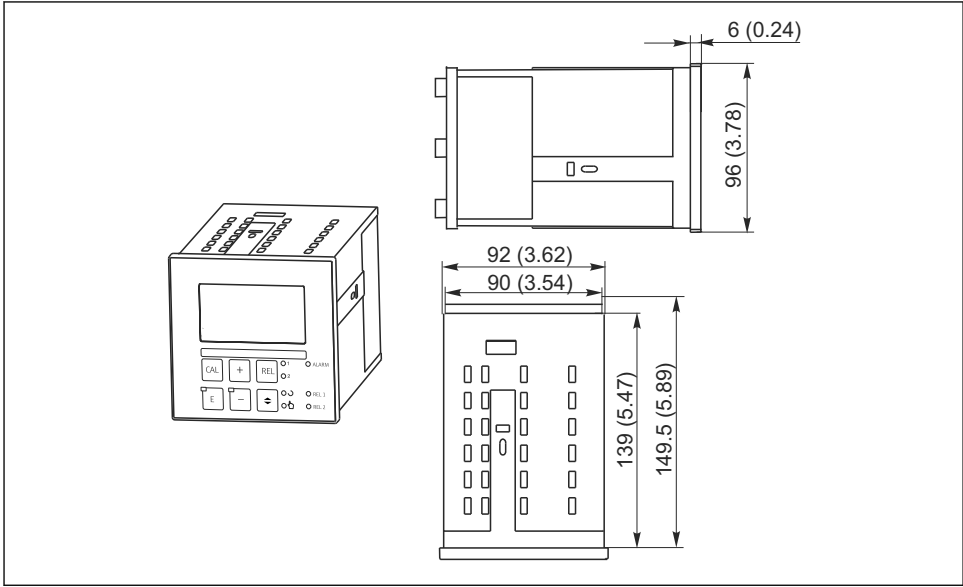
- On the nameplate
- In the delivery papers

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 will find information pertaining to your device, including the product documentation.

4 Installation

4.1 Installation requirements



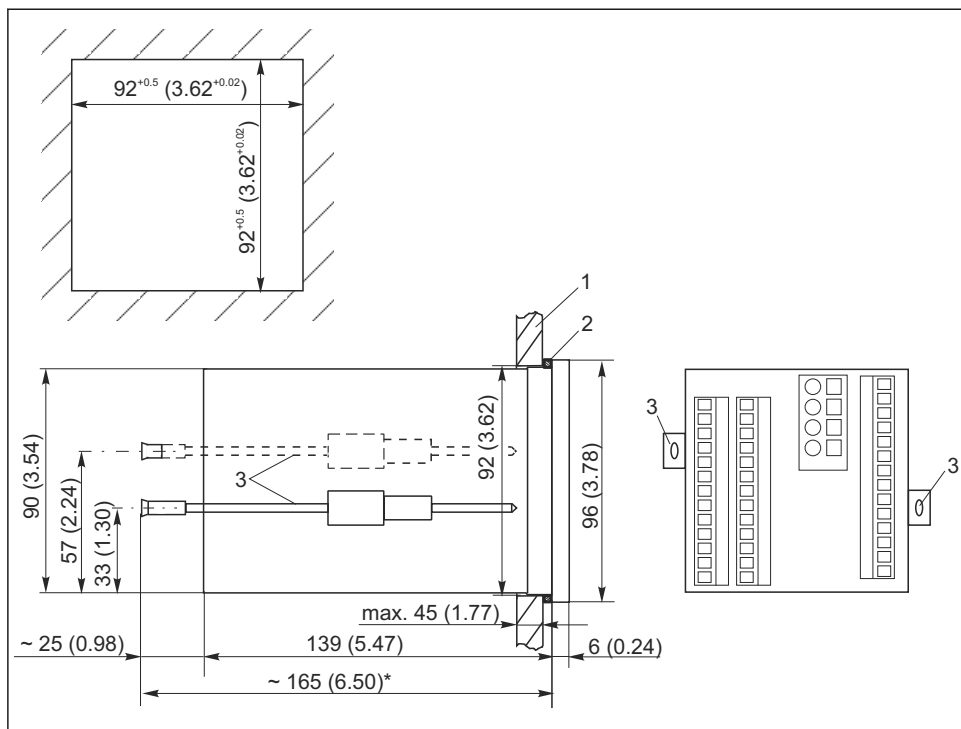
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1 Panel-mounted device, dimensions in mm (in)

4.2 Installing the device

The panel-mounted device is secured with the tensioning screws supplied → 2

The necessary installation depth is approx. 165 mm (6.50").



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2 Dimensions in mm (inch)

1 Mounting plate

2 Seal

3 Tensioning screws

* Necessary installation depth

4.3 Post-installation check

- After installation, check the transmitter for damage.
- Check whether the transmitter is protected against precipitation and direct sunlight

5 Electrical connection

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.

5.1 Connecting the device

WARNING

Risk of electric shock!

- ▶ 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 power supply.

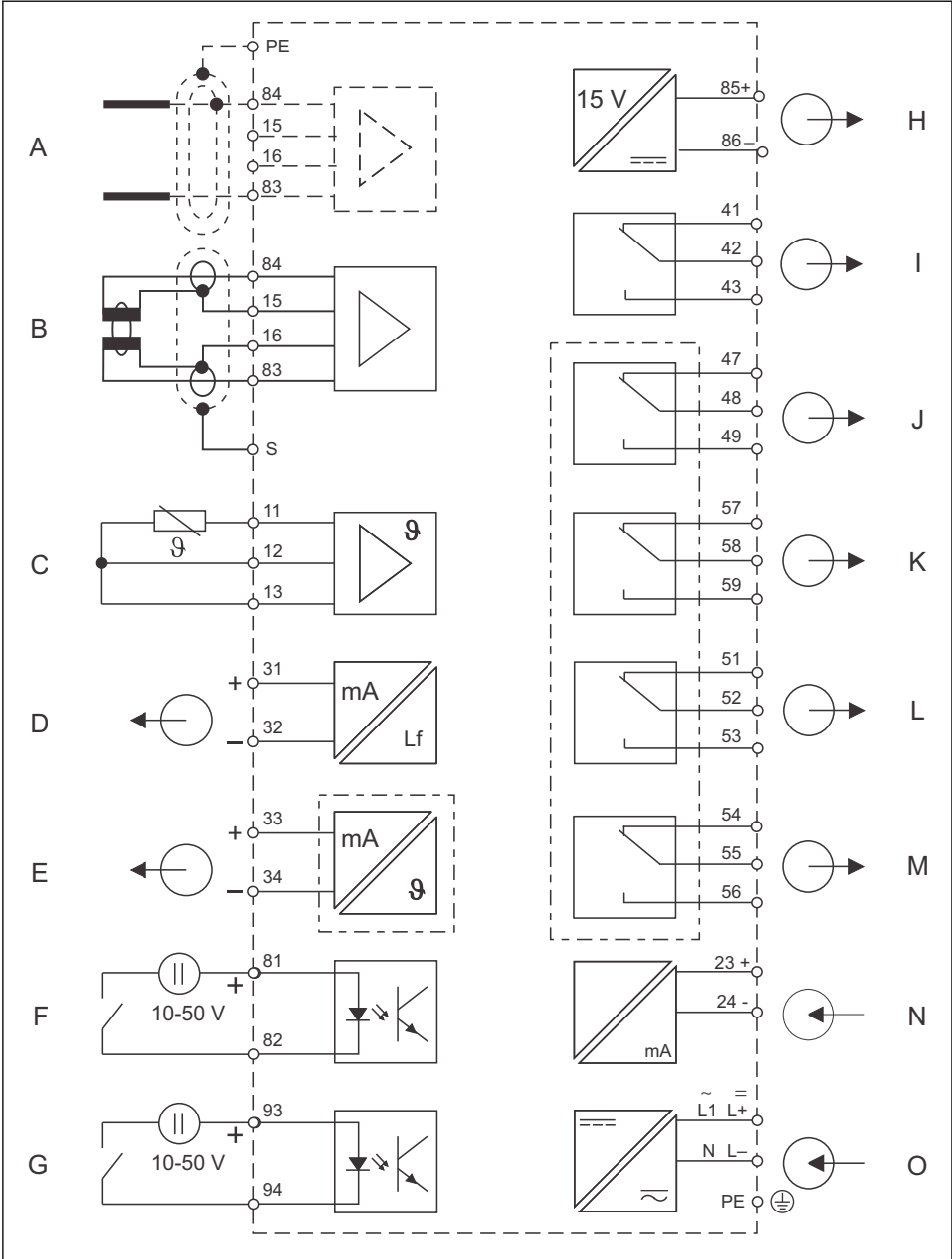
NOTICE

The device does not have a power switch

- ▶ A protected circuit breaker must be provided in the vicinity of the device at the place of installation.
- ▶ The circuit breaker must be a switch or power switch, and you must label it as the circuit breaker for the device.

5.1.1 Wiring diagram

The wiring diagram shows the connections of a device equipped with all the options. The connection of the sensors to the various measuring cables is explained in more detail in the "Measuring cables and sensor connection" section.



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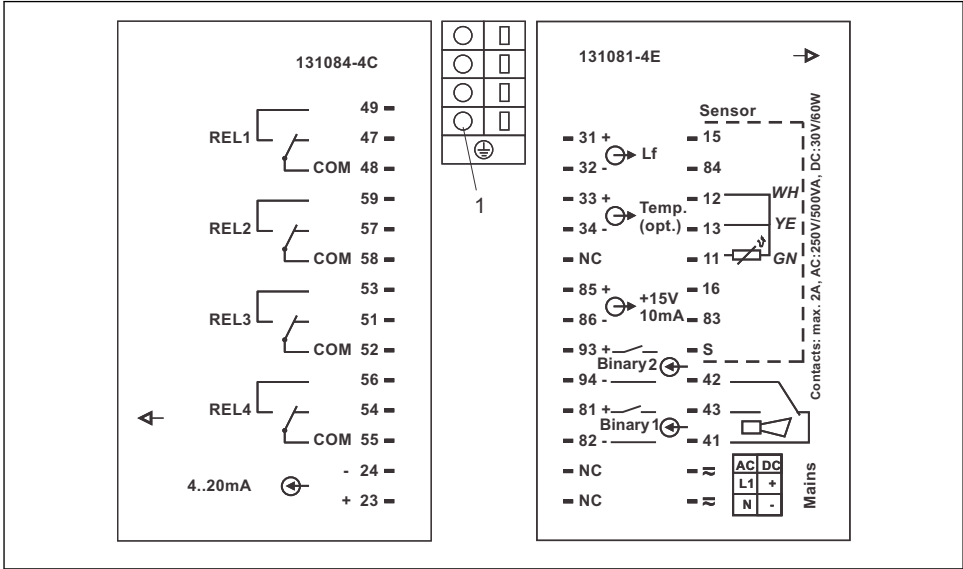
3 Electrical connection of the transmitter

A	Sensor (conductive)	I	Alarm (current-free contact position)
B	Sensor (inductive)	J	Relay 1 (current-free contact position)
C	Temperature sensor	K	Relay 2 (current-free contact position)
D	Signal output 1, conductivity	L	Relay 3 (current-free contact position)
E	Signal output 2, user-definable variable	M	Relay 4 (current-free contact position)
F	Binary input 1 (hold)	N	Current input 4 to 20 mA
G	Binary input 2 (Chemoclean)	O	Power connection
H	Auxiliary voltage output		

Observe the following:

- The device is approved for protection class II and is generally operated without a protective ground connection.
- To guarantee measuring stability and functional safety, connect the outer shield of the sensor cable:
 - Inductive sensors: terminal "S"
 - Conductive sensors: PE distributor railThe PE distributor rail is located on the cover frame. Ground the PE distributor rail or the ground terminal directly on site wherever possible.
- Circuits "E" and "H" are not galvanically isolated from each other.

Connecting the device



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4 Connection sticker

1 Ground terminal

► Connect the measuring cables according to the terminal assignment.

5.1.2 Measuring cables and sensor connection

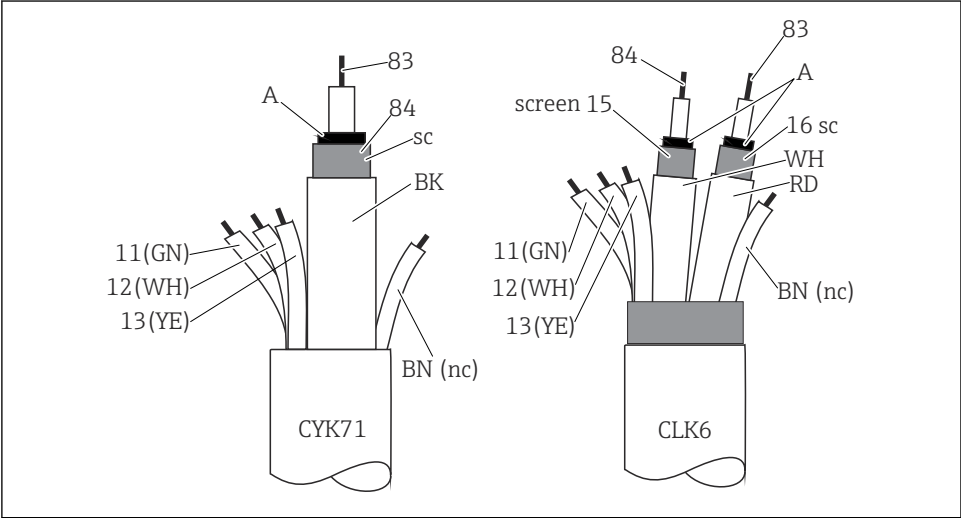
Special shielded measuring cables are required to connect conductivity sensors to the transmitter.

The following multi-core, pre-terminated cable types are possible:

Sensor type	Cable	Extension
Two-electrode sensor with or without temperature sensor Pt 100	CYK71 CPK9* (for CLS16)	VBM box + CYK71 cable
Inductive sensor CLS50, CLS52	Fixed cable on sensor	VBM box + CLK6 cable

* High-temperature version without PML

Maximum cable length	
Conductive measurement of conductivity	Max 100 m (328 ft) with CYK71
Resistance measurement	Max 15 m (49.2 ft) with CYK71
Inductive measurement of conductivity	Max. 55 m (180 ft) with CLK5 (incl. sensor cable)



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5 Structure and termination of the measuring cables

- A Semiconductor layer
- sc Shielding

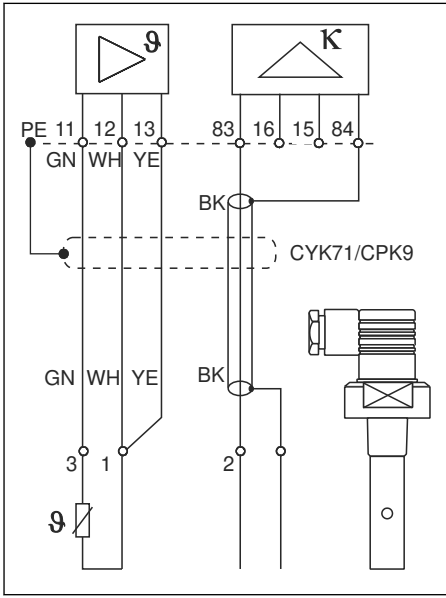
For further information on the cables and junction boxes, refer to the "Accessories" section.

Connecting the measuring cable

1. Open the housing cover to access the terminal block in the connection compartment.
2. Break the perforation for a cable gland out of the housing, install a cable gland and guide the cable through this gland.
3. Connect the cable according to the terminal assignment (see connection compartment sticker).
4. Tighten the cable gland.

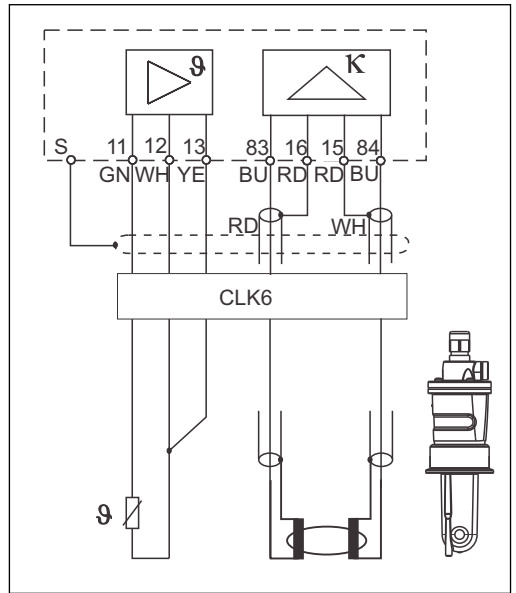
Connecting the measuring cable

- Connect the measuring cable to the terminals at the rear of the device according to the terminal assignment (see connection sticker)



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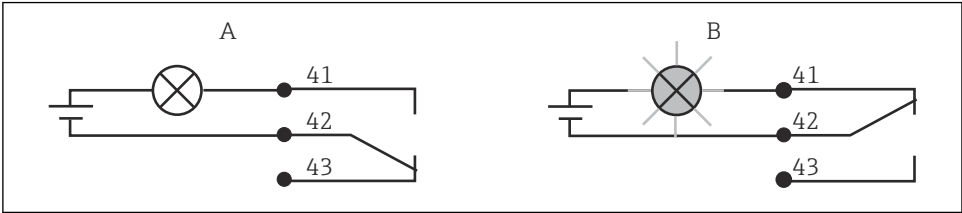
 6 Connection of conductive sensors



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 7 Connection of inductive sensors

5.2 Alarm contact



8 Recommended fail-safe switching for the alarm contact

- A Normal operating status
- B Alarm condition

Normal operating status

Device in operation and no error message present (alarm LED off):

- Relay energized
- Contact 42/43 closed

Alarm condition

Error message present (alarm LED red) or device defective or de-energized (alarm LED off):

- Relay de-energized
- Contact 41/42 closed

5.3 Post-connection check

Once the electrical connection is set up, carry out the following checks:

Device condition and specifications	Notes
Are the devices and cables free from damage on the outside?	Visual inspection

Electrical connection	Notes
Are the mounted cables strain relieved?	
Are the connected cables provided with strain relief?	
Is the cable run correct, without loops and cross-overs?	
Are the power cable and signal cables connected correctly and in accordance with the wiring diagram?	
Are all the screw terminals tightened?	
Are all the cable entries fitted, tightened and leak-proof?	
Are the PE distributor blocks grounded (if present)?	Grounding is carried out at the point of installation.

6 Operation options

6.1 Overview of operation options

Options for controlling the transmitter:

- On site via the key field
- Via the HART interface (optional, with corresponding order version) with:
 - HART handheld terminal
 - PC with HART modem and the Fieldcare software package
- Via PROFIBUS PA/DP (optional, with corresponding order version) by PC with a corresponding interface and the Fieldcare software package or via a programmable logic controller (PLC).

 For operation via HART or PROFIBUS PA/DP, observe the relevant sections in the additional Operating Instructions:

- PROFIBUS PA/DP, field communication for Liquisys M CXM223/253, BA00209C/07/DE
- HART, field communication for Liquisys M CXM223/253, BA00208C/07/DE

The following section only explains operation via the keys.

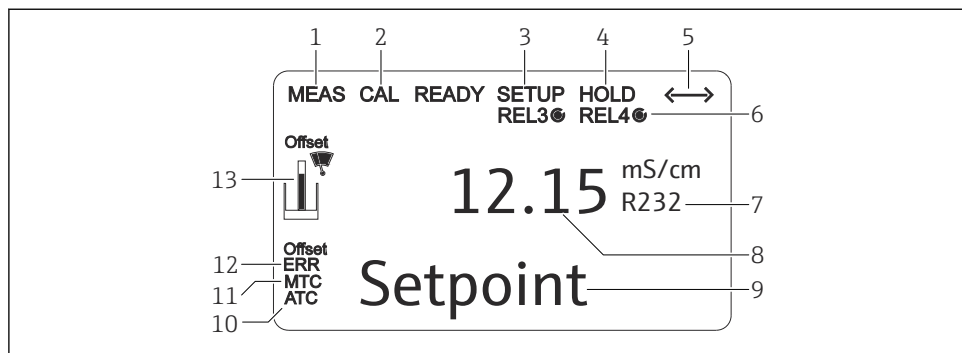
6.2 Display and operating elements

6.2.1 Structure and function of the operating menu

LED indicators

  A0027220	Indicates the current operating mode, "Auto" (green LED) or "Manual" (yellow LED)
  A0027222	Indicates the activated relay in the "Manual" mode (red LED) The status of relays 3 and 4 is indicated on the LC display.
  A0027221	Indicates the working status of relay 1 and 2 LED green: measured value within the permitted limit, relay inactive LED red: measured value outside the permitted limit, relay active
 A0027218	Alarm display, e.g. in event of continuous limit value overshoot, temperature sensor failure or system error (see error list)

LC display



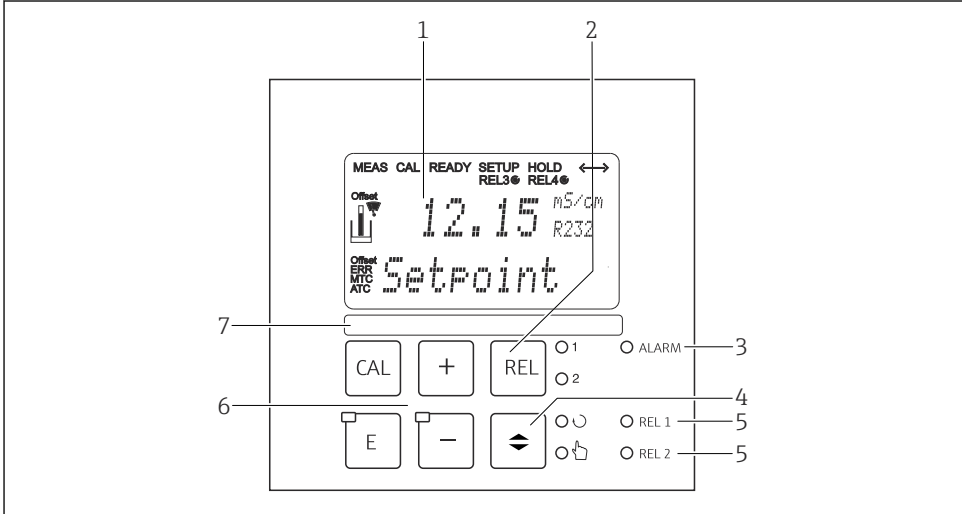
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9 Transmitter LC display

- 1 Indicator for measuring mode (normal operation)
- 2 Indicator for calibration mode
- 3 Indicator for setup mode (configuration)
- 4 Indicator for "Hold" mode (current outputs remain at last current state)
- 5 Indicator for receipt of a message on devices with communication
- 6 Indicator of working status of relays 3/4: ○ inactive, ● active
- 7 Indicator for function code
- 8 In measuring mode: measured variable - in setup mode: configured variable
- 9 In measuring mode: secondary measured value - in setup/calibr. mode: e.g. Setting value
- 10 Indicator for autom. Temperature compensation
- 11 Indicator for man. Temperature compensation
- 12 "Error": error display
- 13 Sensor symbol (see the "Calibration" section)

Operating elements

The display shows the current measured value and the temperature simultaneously. This provides you with the most important process data at a glance. Help text in the configuration menu helps users configure the device parameters.



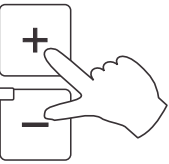
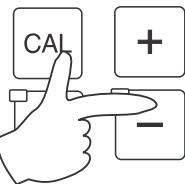
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10 Operating elements

- 1 LC display for displaying the measured values and configuration data
- 2 Key to switch relays in manual mode and to display the active contact
- 3 LED for alarm function
- 4 Changeover switch for automatic/manual mode
- 5 LEDs for limit contactor relay (switch status)
- 6 Main operating keys for calibration and device configuration
- 7 Field for user-defined information

Functions of keys

 A0027235	CAL key When you press the CAL key, the device first prompts you for the calibration access code: ■ Code 22 for calibration ■ Code 0 or any other code for reading the last calibration data Use the CAL key to accept the calibration data or to switch from field to field within the calibration menu.
 A0027236	ENTER key When you press the ENTER key, the device first prompts you for the setup mode access code: ■ Code 22 for setup and configuration ■ Code 0 or any other code for reading all the configuration data. The ENTER key has several functions: ■ Calls up the Setup menu from the measuring mode ■ Saves (confirms) data entered in the setup mode ■ Moves on within function groups
 ○ 1 ○ 2 A0027241	REL key In the manual mode, you can use the REL key to switch between the relay and the manual start of cleaning. In the automatic mode, use the REL key to read out the switch-on points (for limit contactor) or set points (for PID controller) assigned to the relay in question. Press the PLUS key to jump to the settings of the next relay. Use the REL key to get back to the display mode (automatic return after 30 s).
 ○ ○ ○ ○ A0027234	AUTO key Use the AUTO key to switch between automatic mode and manual mode.

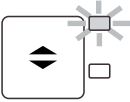
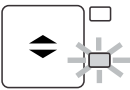
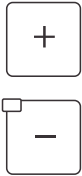
 A0027240	PLUS key and MINUS key In the Setup mode, the PLUS and MINUS keys have the following functions: ■ Selection of function groups. Press the MINUS key to select the function groups in the order given in the "System configuration" section. ■ Configuration of parameters and numerical values ■ Operation of the relays in manual mode In the measuring mode, the device displays the following functions in sequence by repeatedly pressing the PLUS button: ■ Temperature displayed in °F ■ Temperature is hidden ■ Current input signal in % ■ Current input signal in mA ■ Uncompensated conductivity value is displayed ■ Return to basic settings In the measuring mode, the device displays the following sequence of information by repeatedly pressing the MINUS key: ■ The current faults are displayed consecutively (max. 10). ■ Once all the faults have been displayed, the standard measurement display appears. In the function group F, an alarm can be defined separately for each error code.
 A0027237	Escape function If you press the PLUS and MINUS key simultaneously, you return to the main menu, or are taken to the end of calibration if calibrating. If you press the PLUS and MINUS key again, you return to the measuring mode.
 A0027238	Locking the keyboard Press the PLUS and ENTER key simultaneously for at least 3 s to lock the keyboard against any unauthorized data entry. All the settings can continue to be read. The code prompt displays the code 9999.
 A0027239	Unlocking the keyboard Press the CAL and MINUS key simultaneously for at least 3 s to unlock the keyboard. The code prompt displays the code 0.

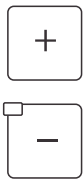
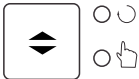
6.3 Access to operating menu via onsite display

6.3.1 Automatic/manual mode

The transmitter normally operates in automatic mode. Here, the relays are triggered by the transmitter. In the manual mode, you can trigger the relays manually using the REL key or start the cleaning function.

Switching operating modes:

 A0027242	1. The transmitter is in automatic mode. The top LED (green) next to the AUTO key is lit.
 A0027243	2. Press the AUTOMATIC key.
 A0027240	3. To enable the manual mode, enter code 22 via the PLUS and MINUS keys and press ENTER to confirm. The lower LED (manual mode) is lit.
 A0027241	4. Select relay or function. Use the REL key to switch between the relays. The relay selected and the switch status (ON/OFF) is displayed on the second line of the display. In the manual mode, the measured value is displayed continuously (e.g. for measured value monitoring for dosing functions).

 A0027240	5.	Switch relays. The relay is switched on with PLUS and switched off with MINUS. The relay remains in this switched state until it is switched again.
 A0027234	6.	Press the AUTOMATIC key to return to the measuring mode, i.e. to the automatic mode. All the relays are triggered again by the transmitter.

-  The operating mode remains in effect even after a power failure. The relays assume the quiescent state, however.
- The manual mode has priority over all other automatic functions.
- Hardware locking is not possible in the manual mode.
- The manual settings are kept until they are actively reset.
- Error code E102 is signaled during manual operation.

6.3.2 **Operation concept**

Operating modes

Calibration mode

1. Press the **CAL** key.
2. Enter the code 22 with the +/- keys.
3. Press the **CAL** key again.

Setup mode

1. Press the **E** key.
2. Enter the code 22 with the +/- keys.
3. Press **E** again.

-  If no key is pressed in the setup mode for approx. 15 min, the device automatically returns to the measuring mode. Any active hold (hold during setup) is canceled.

Access codes

All device access codes are fixed and cannot be altered. When the device requests the access code, it distinguishes between different codes.

- **CAL key + code 22:** access to Calibration and Offset menu
- **ENTER key + code 22:** access to the menus for the parameters which make configuration and user-specific settings possible
- **PLUS + ENTER keys** simultaneously (min. 3 s): lock the keyboard
- **CAL + MINUS keys** simultaneously (min. 3 s): unlock the keyboard
- **CAL or ENTER key + any code:** access to read mode, i.e. all the settings can be read but not modified.

The device continues measuring in the read mode. It does not shift to the "Hold" status. The current output and the controllers remain active.

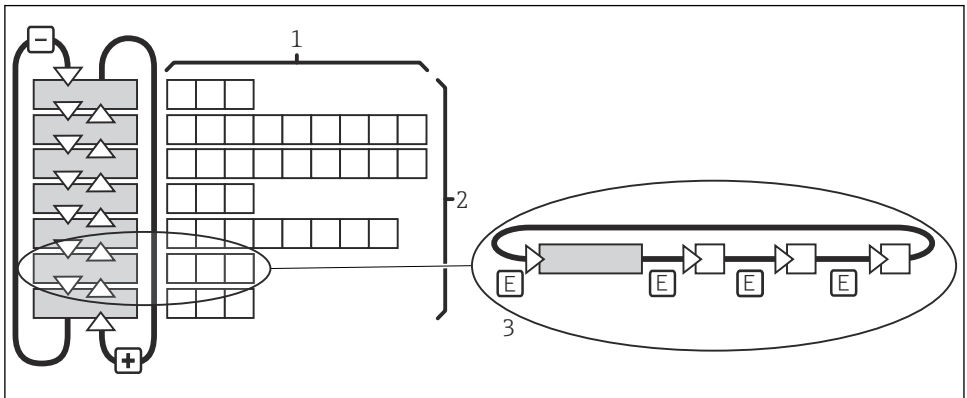
Menu structure

The configuration and calibration functions are arranged in function groups.

- In the setup mode, select a function group with the PLUS and MINUS keys.
- In the function group itself, switch from function to function with the ENTER key.
- Within the function, select the desired option once again with the PLUS and MINUS keys or edit the settings with these keys. Then confirm with the ENTER key and continue.
- Press the PLUS and MINUS keys simultaneously (Escape function) to exit programming (return to the main menu).
- Press the PLUS and MINUS keys simultaneously again to switch to the measuring mode.



If a modified setting is not confirmed by pressing ENTER, the old setting is retained.



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11 Menu structure

- 1 Functions (selection of parameters, entry of numbers)
- 2 Function groups, scroll backwards and forwards with the PLUS and MINUS keys
- 3 Switch from function to function with the ENTER key

7 Commissioning

7.1 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.

7.2 Switching on the device

Familiarize yourself with the operation of the transmitter before switching it on for the first time. In particular, please read the "Basic safety instructions" and "Operation options" sections. After power-up, the device performs a self-test and then switches to the measuring mode.

Now calibrate the sensor in accordance with the instructions in the "Calibration" section.

 During initial commissioning, the sensor must be calibrated so that the measuring system can return precise measurement data.

Then perform the first configuration in accordance with the instructions in the "Quick setup" section. The values set by the user are kept even in the event of a power failure.

The following function groups are available in the transmitter (the groups that are only available in the Plus Package are marked accordingly in the functional description):

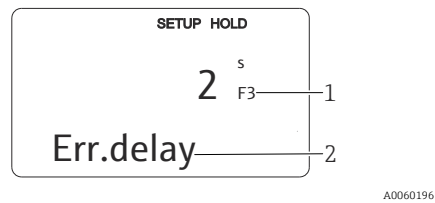
Setup mode

- SETUP 1 (A)
- SETUP 2 (B)
- CURRENT INPUT (Z)
- CURRENT OUTPUT (O)
- ALARM (F)
- CHECK (P)
- RELAY (R)
- TEMPERATURE COMPENSATION (T)
- CONCENTRATION MEASUREMENT (K)
- SERVICE (S)
- E+H SERVICE (E)
- INTERFACE (I)

Calibration mode

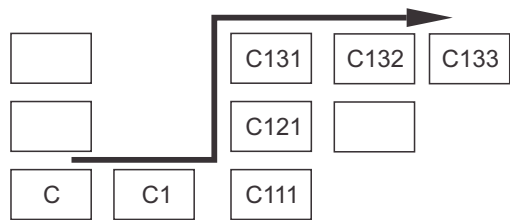
CALIBRATION (C)

 For a detailed explanation of the function groups available in the transmitter, see the "Device configuration" section.



- 1 Function indicator: The code shown indicates the function position in the function group.
- 2 Additional information

12 Information for the user on the display



To make it easier to select and find function groups and functions, a code for the corresponding field is displayed for each function

The structure of this code is shown in → 13. The function groups are indicated as letters in the first column (see the names of the function groups). The functions of the individual groups are displayed incrementally by row and by column.

13 Function code

7.3 Quick start guide

After power-up, some settings are necessary to configure the most important functions of the transmitter which are required for correct measurement. The following section gives an example of this.

User input		Range of adjustment (factory settings in bold)
1.	Press the ENTER key.	
2.	Enter the code 22 to open access to the menus. Press the ENTER key.	
3.	Press the MINUS key until the "Service" function group is displayed.	
4.	Press the ENTER key to make the required settings.	
5.	S1 In S1, select the language, e.g. "ENG" for English. Confirm the entry by pressing the ENTER key.	ENG = English GER = German FRA = French ITA = Italian NEL = Dutch ESP = Spanish
6.	Press the PLUS and MINUS keys simultaneously to exit the "Service" function group.	
7.	Press the MINUS key until the "Setup 1" function group is displayed.	
8.	Press the ENTER key to configure the settings for "Setup 1".	

User input		Range of adjustment (factory settings in bold)
9.	A1 In A1, select the desired mode of operation, e.g. "cond" = conductive. Confirm the entry by pressing the ENTER key.	cond = conductive ind = inductive MOhm = resistance Conc = concentration
10.	A2 In A2, press the ENTER key to accept the factory setting. (Only if A1 = conc, otherwise continue with Step 12)	% ppm mg/l TDS = total dissolved solids None
11.	A3 In A3, press ENTER to accept the standard setting.	XX.xx X.xxx XXX.x XXXX
12.	A4 In A4, press ENTER to accept the standard setting.	auto , $\mu\text{S}/\text{cm}$, mS/cm , S/cm , $\mu\text{S}/\text{m}$, mS/m , S/m
13.	A5 In A5, enter the exact cell constant of the sensor. The cell constant is provided on the sensor quality certificate.	cond: 1.000 cm^{-1} ind: 1.98 cm^{-1} MOhm: 0.01 cm^{-1} 0.0025 to 99.99 cm^{-1}
14.	A6 Enter the cable resistance (only applies to conductive sensors) in A6.	Cable resistance: 0 Ω 0 to 99.99 Ω
15.	A7 Enter the measured value damping in A7. Measured value damping causes the measured value to be averaged over the specified number of individual measured values (if A7 = 1, no damping takes place). Confirm the entry by pressing the ENTER key. The display returns to the initial display of the "Setup 1" function group.	1 1 to 60
16.	Press the MINUS key until the "Setup 2" function group is displayed. Press the ENTER key to configure the settings for "Setup 2".	
17.	B1 In B1, select the temperature sensor. Confirm the entry by pressing the ENTER key.	Pt100 Pt1k = Pt 1000 NTC30 Fixed
18.	B2 In B2, select the appropriate type of temperature compensation for the process, e.g. "lin" = linear. Confirm the entry by pressing the ENTER key. For detailed information, see the "Setup 2" section.	None Lin = linear NaCl = table salt (IEC 746) Pure = ultrapure water NaCl PureH = ultrapure water HCl Tab = Table
19.	B3 In B3, enter the temperature coefficient α . Confirm the entry by pressing the ENTER key.	2.1 %/K 0.0 to 20.0 %/K

User input		Range of adjustment (factory settings in bold)
20.	B5 The current temperature is displayed in B5. If necessary, adjust the temperature sensor to an external measurement. Confirm the entry by pressing the ENTER key.	Actual value displayed and entered -35.0 to 250.0 °C
21.	The difference between the measured and entered temperature is displayed. Press the ENTER key. The display returns to the initial display of the "Setup 2" function group.	0.0 °C -5.0 to 5.0 °C
22.	Press the MINUS key to go to the "Current output" function group. Press the ENTER key to configure the settings for the current outputs.	
23.	O1 In O1, select the current output, e.g. "Out 1" = output 1. Confirm the entry by pressing the ENTER key.	Out 1 Out 2
24.	O3 In O3, select the linear characteristic. Confirm the entry by pressing the ENTER key.	Lin = linear (1) Lin = linear (1) Tab = Table
25.	O311 In O311, , select the current range for the current output, e.g. 4 to 20 mA. Confirm the entry by pressing the ENTER key.	4 to 20mA 0 to 20 mA
26.	O312 In O312, specify the conductivity at which the minimum current value is applied at the transmitter output, e.g. 0 µS/cm. Confirm the entry by pressing the ENTER key.	Cond/ind: 0.00 µS/cm MOhm: 0.00 kΩ·cm Conc: 0.00 % Temp: 0.00 °C
27.	O313 In O313, specify the conductivity at which the maximum current value is applied at the transmitter output, e.g. 2000 mS/cm. Confirm the entry by pressing the ENTER key. The display returns to the initial display of the "Current output" function group.	Cond/ind: 2000 mS/cm MOhm: 500 kΩ·cm Conc: 99.99 % Temp: 150 °C
28.	Press PLUS and MINUS simultaneously to switch to the measuring mode.	



Perform an air set before installing the inductive conductivity sensor. See the "Calibration" section for more information.



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