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Brief Operating Instructions
Liquisys M CPM223

Transmitter for pH and ORP
Measurement with analog sensors

Endress+Hauser
People for Process Automation

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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 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 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

The Liquisys M transmitter is used to determine the pH value or the ORP.

The transmitter is particularly suited for use in the following areas:
- Chemical industry
- Pharmaceutical industry
- Food industry
- Drinking water treatment
- Condensate treatment
- Municipal wastewater treatment plants
- Water treatment
- Electroplating

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 transmitter CPM223
- 1 set of plug-in screw terminals
- 2 tensioning screws
- 1 BNC connector (solder-free measuring cable connection)
- 1 set of 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/CPM223

3.3.3 Nameplate

The nameplate provides you with the following information on your device:
- 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 Identifying the product

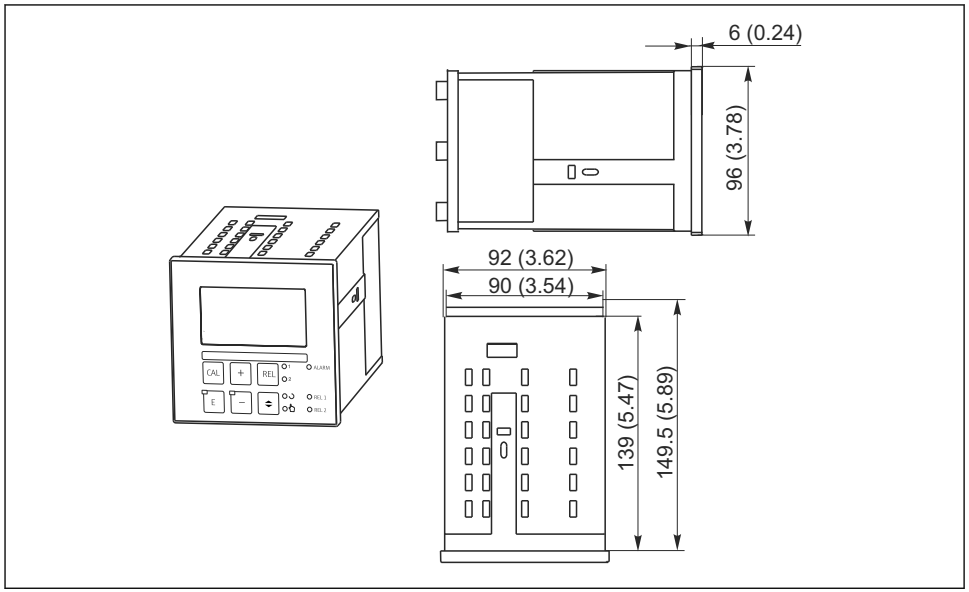
The order code and serial number of your product can be found in the following locations:
- On the nameplate
- In the delivery papers

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.

4 Installation

4.1 Installation requirements

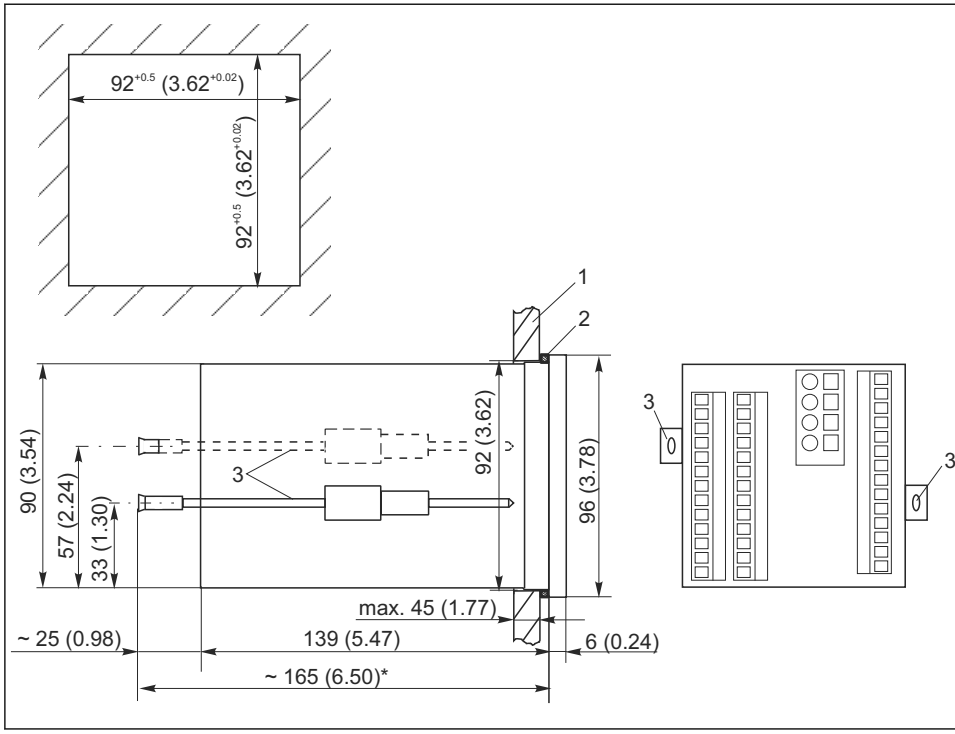


1 Panel-mounted device, dimensions in mm (in)

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").



2 Dimensions in mm (inch)

1 Mounting plate
2 Seal
3 Tensioning screws
* *Necessary installation depth*

4.3 Post-mounting 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

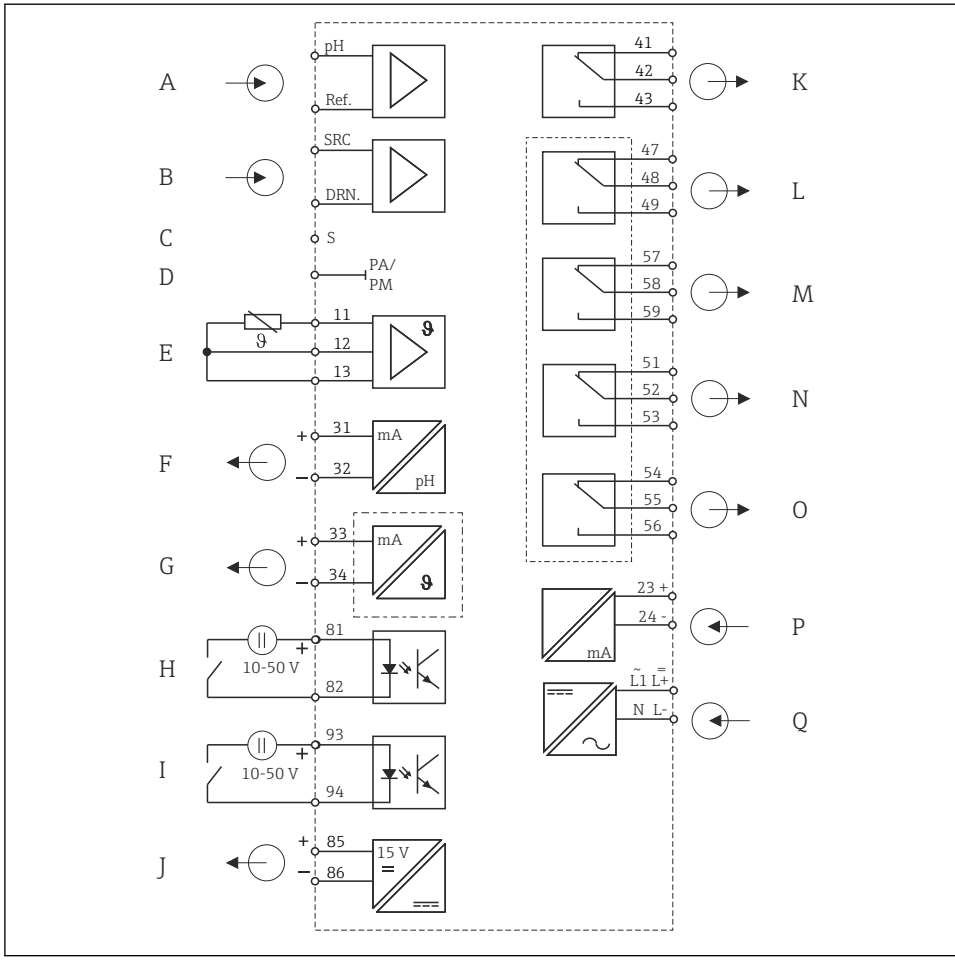
The device does not have a power switch

- 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.

5.2 Electrical connection without Memosens functionality

5.2.1 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.



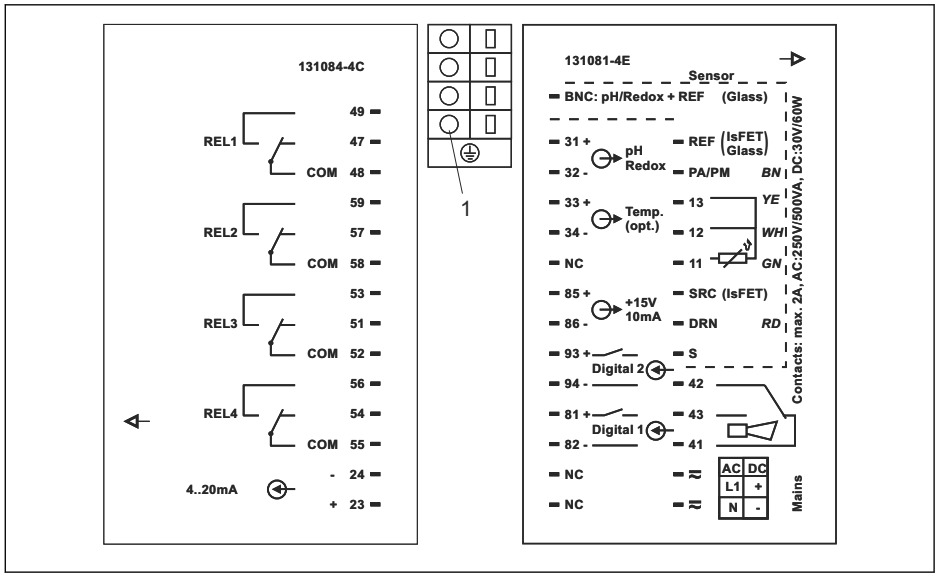
3 Electrical connection of the transmitter without Memosens functionality

A Standard sensor
B ISFET sensor
C Outer shield connection with glass electrodes
D Potential equalization
E Temperature sensor
F Signal output 1 pH/ORP
G Signal output 2 temperature, pH/ORP or controller
H Binary input 1 (hold)
I Binary input 2 (Chemoclean)
J Auxiliary voltage output
K Alarm (current-free contact position)
L Relay 1 (current-free contact position)
M Relay 2 (current-free contact position)
N Relay 3 (current-free contact position)
O Relay 4 (current-free contact position)
P Current input 4 to 20 mA
Q Power supply

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, you must ground the outer shield of the sensor cable:
  - Glass electrodes (PR/PS device version): terminal "S"
  - ISFET sensors (IS device version): PE distributor rail
    This is on the cover frame in the case of panel-mounted devices, and in the connection compartment in the case of field devices.
- Ground the PE distributor rail or the ground terminal.

Connecting the device

▶



4 *Panel-mounted device connection sticker*

1 Ground terminal for IS device version

Connect the cables to the terminals at the rear of the device according to the terminal assignment.

NOTICE

Non-observance could cause incorrect measurement
- ▶ Protect the cable ends and terminals from moisture.
- ▶ Do not connect terminals marked NC.
- ▶ Do not connect terminals that are not marked.

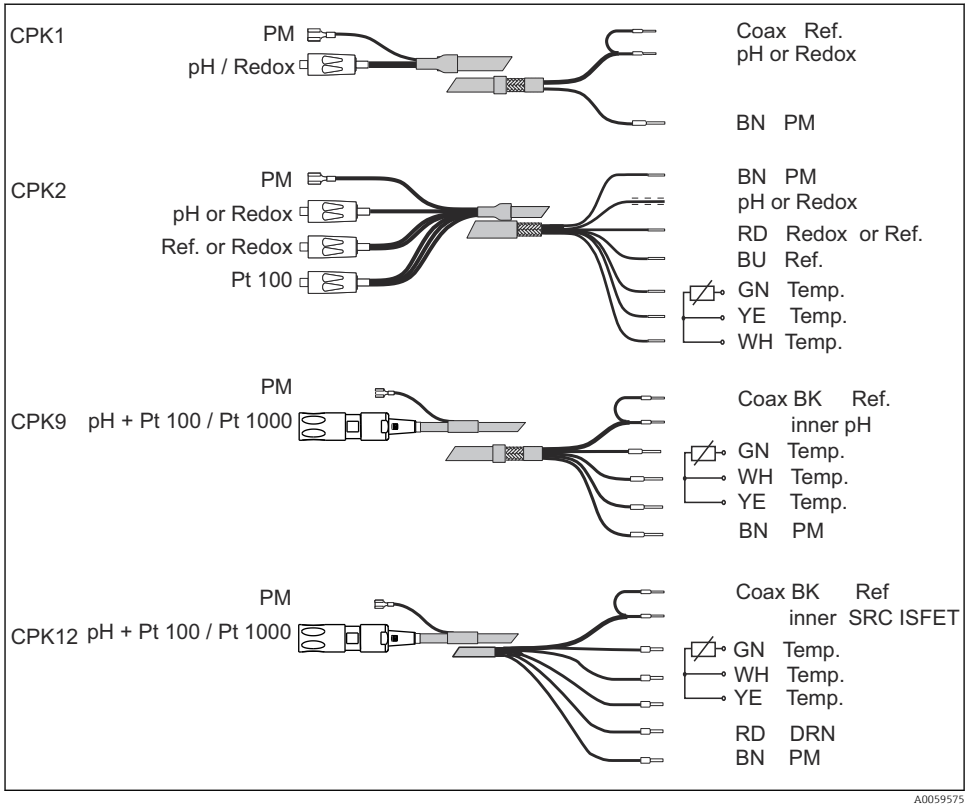
Label the sensor terminal block with the sticker provided.

5.2.2 Measuring cables and sensor connection

Special shielded measuring cables are required to connect pH and ORP electrodes to the transmitter.

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

Sensor type	Cable	Extension
Electrode without temperature sensor	CPK1	VBA / VBM box + CYK71 cable
Electrode with Pt 100 temperature sensor and TOP 68 plug-in head	CPK9	VBA / VBM box + CYK71 cable
ISFET sensor with Pt 100/Pt 1000 temperature sensor and TOP 68 plug-in head	CPK12	VBA / VBM box + CYK12 cable
pH single electrode with separate reference electrode and separate temperature sensor	CPK2	VBA / VBM box + PMK cable



5 Structure and termination of the measuring cables

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

Panel-mounted device measuring cable connection

To connect a pH electrode to the panel-mounted device, connect the cable to the terminals at the rear of the device according to the terminal assignment.

If glass electrodes are used with the panel-mounted device, terminate the measuring cable with a BNC connector. A solder-free BNC connector is supplied with the device. Proceed as follows:

Connecting the measuring cable

1. Connect the cable to the terminals at the rear of the device according to the terminal assignment.
2. If glass electrodes are used with the panel-mounted device, terminate the measuring cable with a BNC connector. A solder-free BNC connector is supplied with the device. Proceed as follows:

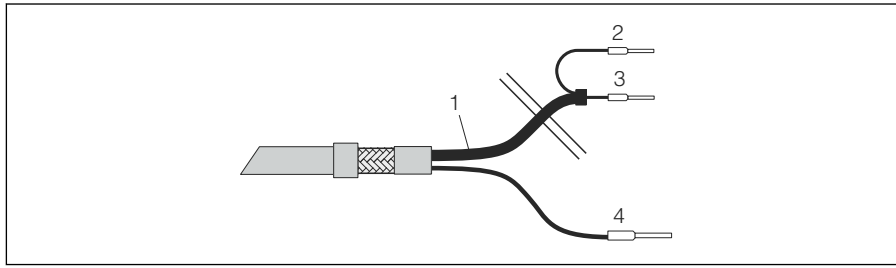
NOTICE

Moisture can cause incorrect measurements

► Protect the connector, cable ends and terminals from moisture.

Terminate the cable with the BNC connector

1.

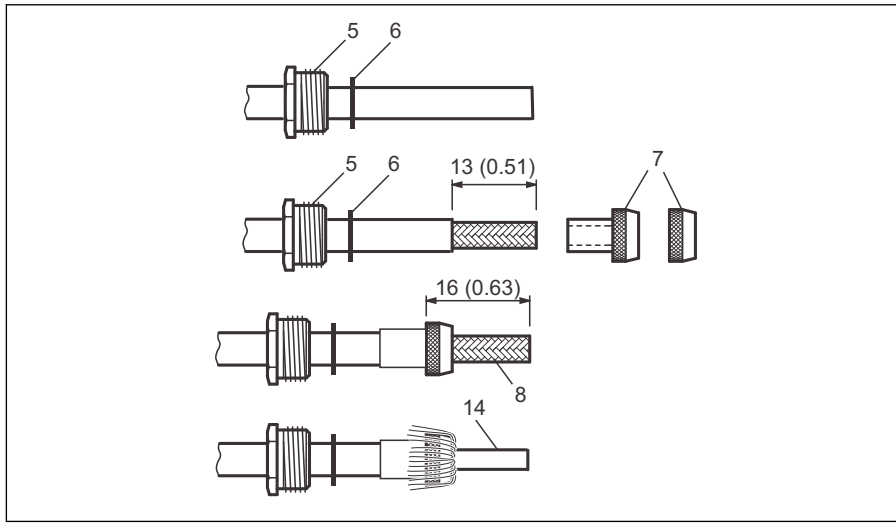


6 *Cable CPK1: device connection*

1 Coax cable
2 Inner shield BK (ref)
3 Inner coax (pH / mV)
4 Strand BN (PA)

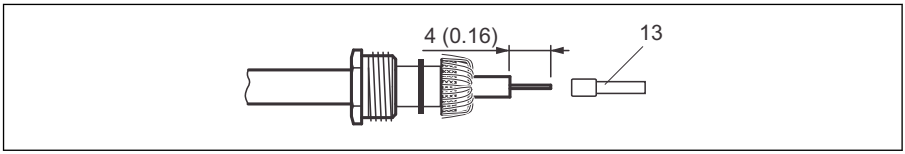
Cut off the end ferrules 2 and 3 of the coaxial cable.

2.



7 *Terminating the pH connecting cable for mounting the BNC elbow plug. Dimensions in mm (inch)*

Slide the cable gland 5 and washer 6 over the coaxial cable.

3. Remove the insulation (13 mm (0.51")) and screw the clamping ring 7 on the insulation. Parts 5 to 7 are supplied with the BNC connector for cable diameters 3.2 mm and 5 mm.
4. Fold the braided shield 8 of the shield over the clamping ring and cut off the excess material.
5. There is a semiconductor layer 14 (conductive membrane) between the inner insulation and the braided shield 8. Strip this semiconductor layer as far as the braided shield.
6. 

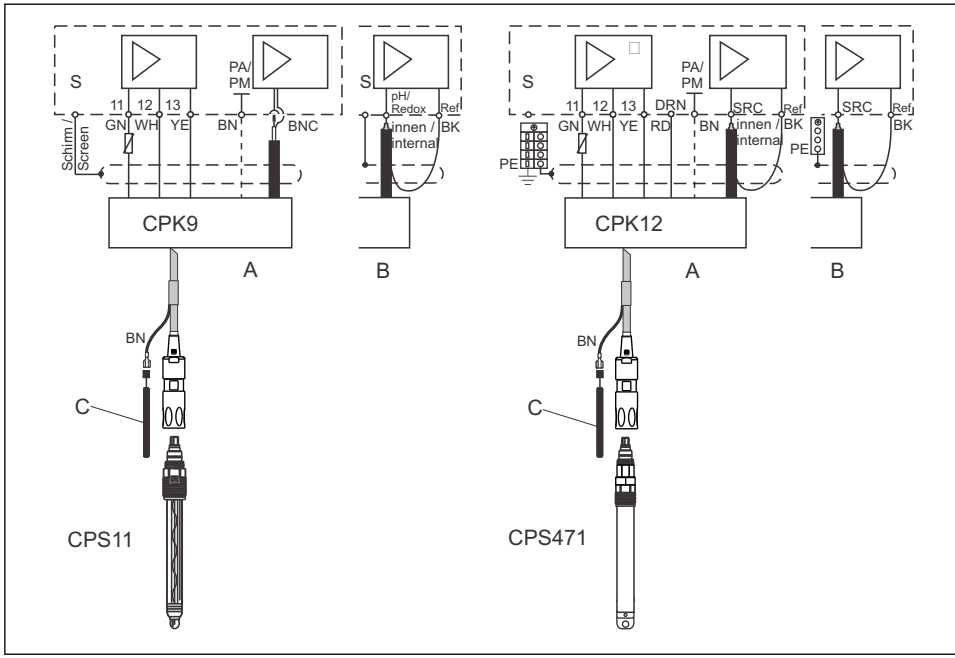
8 Terminating the pH connecting cable for mounting the BNC elbow plug. Dimensions in mm (inch)

Remove the inner insulation (4 mm (0.16")), fit the end ferrule 13 on the stripped inner conductor and secure the end ferrule with a crimping pliers.

7. Slide the BNC connector housing 9 over the cable. The inner conductor must be located on the clamping surface 10 of the connector.
8. Tighten the cable gland 5.
9. Insert the clamping piece 11 and screw in the connector cover 12. This creates a reliable connection between the inner conductor and the connector pin.

Connection examples

The following diagrams show the connection of various pH and ORP sensors.



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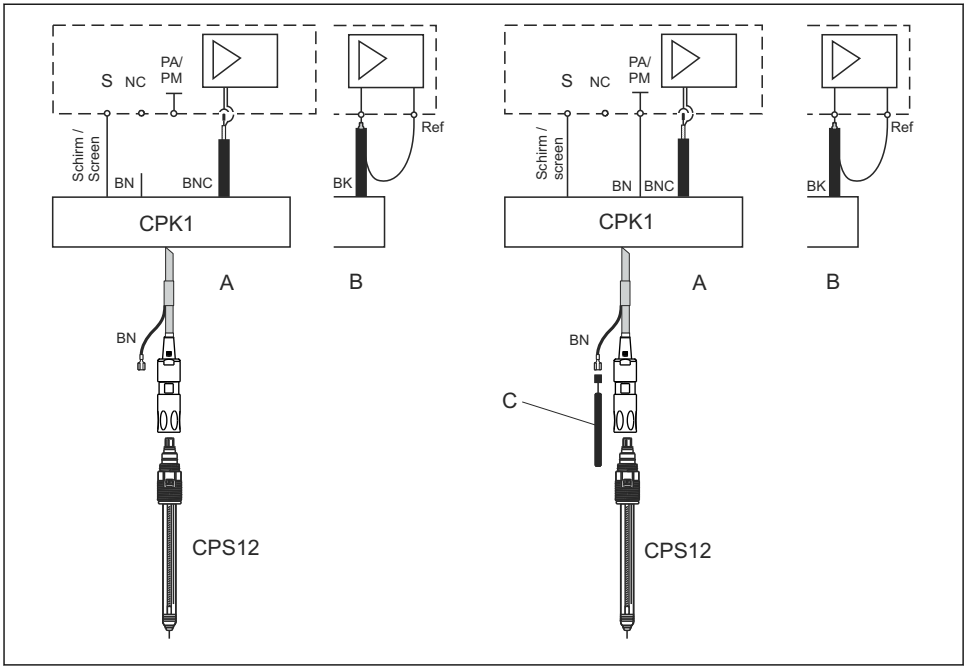
9 *Connecting glass electrode CPS11 with CPK9 (left) and ISFET sensor CPS471 with CPK12 (right) to Liquisys M*

A Panel-mounted device
B Field device
C Potential matching PM for symmetrical connection



10 *Asymmetrical (without PML) and symmetrical (with PML) connection of ORP electrodes*

A Panel-mounted device
B Field device
C Potential matching (PM) in the medium for symmetrical connection

The pH and ORP sensors can be connected both symmetrically and asymmetrically. Generally, the following applies:
- No potential matching connection present: asymmetrical connection
- Potential matching connection present: symmetrical connection

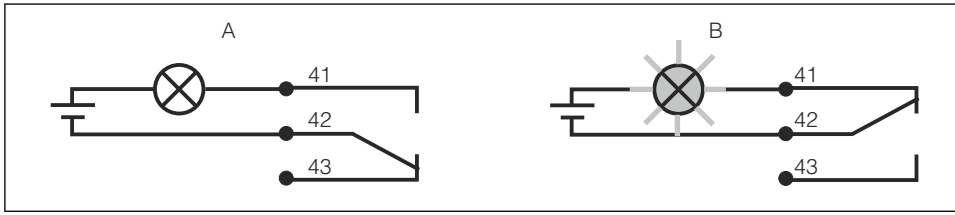
The decision can also depend on the operating conditions.

Observe the following:
- Liquisys M is pre-programmed for symmetrical measurement with potential matching. For asymmetrical measurement, change the configuration in the A2 field.
- If the "asymmetrical" software setting is selected for a symmetrical connection, the operating life of the reference electrode is reduced.

In the case of a symmetrical connection, the potential matching pin must be connected and must always be immersed in the medium.

Advantages of symmetrical vs. asymmetrical:
- Symmetrical measurement:
  - No leak current since the reference and the pH/ORP electrode is connected with high impedance
  - Reliable measurement under difficult process conditions (strong flowing and high-impedance media, partially soiled junction)
- Asymmetrical measurement:
  Possible to use assemblies without potential matching

5.3 Alarm contact



11 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

5.4 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?	

Electrical connection	Notes
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

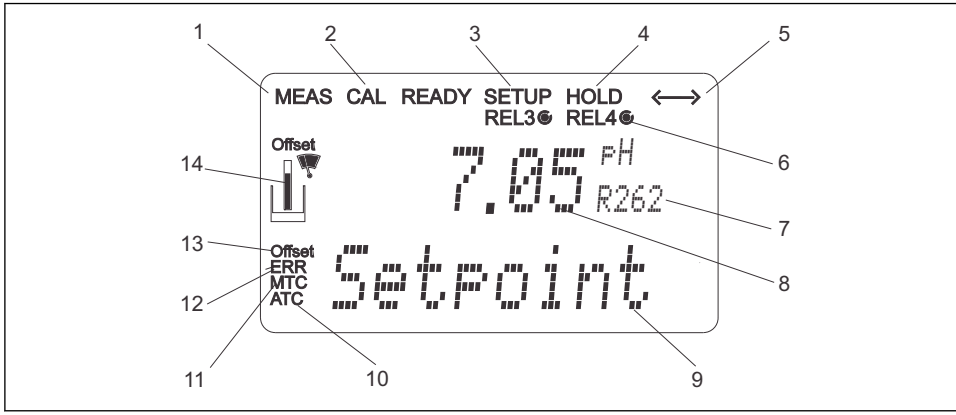
6.2.1 Structure and function of the operating menu

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.

○ REL 1 ○ REL 2 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
○ ALARM A0027218	Alarm display, e.g. in event of continuous limit value overshoot, temperature sensor failure or system error (see error list)

LC display

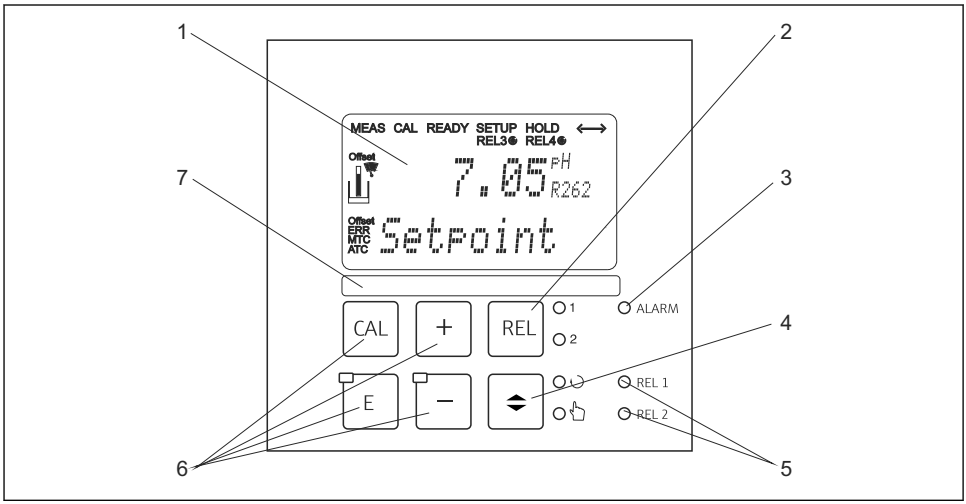


12 Transmitter LC display

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 Function code indicator
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 Temperature offset
14 Sensor symbol (see the "Calibration" section)

Operating elements

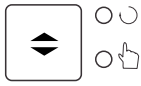
The display shows the current measured value and the temperature simultaneously. This provides you with the most important process data at a glance. Help text in the configuration menu helps users configure the device parameters.

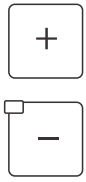


13 Operating elements

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
 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.



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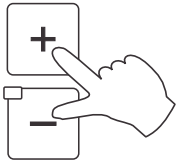
PLUS key and MINUS key

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
- Measured value display in mV
- Current input signal in %
- Current input signal in mA
- 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.



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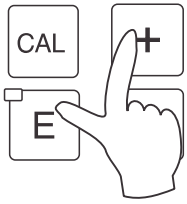
Escape function
If you press the PLUS and MINUS key simultaneously, you return to the main menu, or are taken to the end of calibration if calibrating. If you press the PLUS and MINUS key again, you return to the measuring mode.



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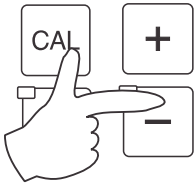
Locking the keyboard
Press the PLUS and ENTER key simultaneously for at least 3 s to lock the keyboard against any unauthorized data entry. All the settings can continue to be read.
The code prompt displays the code 9999.



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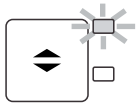
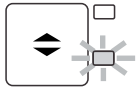
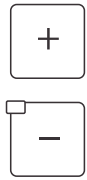
Unlocking the keyboard
Press the CAL and MINUS key simultaneously for at least 3 s to unlock the keyboard.
The code prompt displays the code 0.

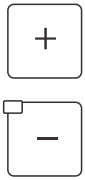
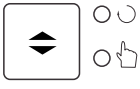
6.3 Access to operating menu via local display

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.

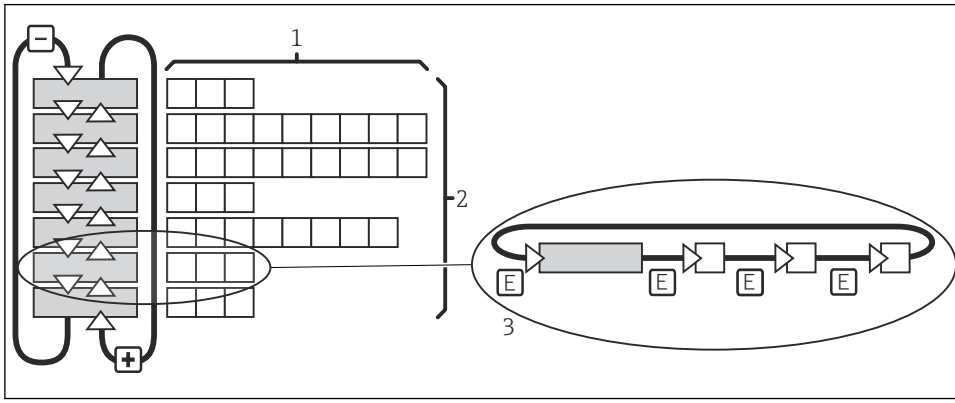
- **CAL key + code 22**: access to Calibration and Offset menu
- **ENTER key + code 22**: access to the menus for the parameters which make configuration and user-specific settings possible
- **PLUS + ENTER keys** simultaneously (min. 3 s): lock the keyboard
- **CAL + MINUS keys** simultaneously (min. 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.



14 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 Specificities of commissioning ISFET sensors

Switch-on behavior

A closed-control loop is created when the measuring system is switched on. The measured value adjusts to the real value during this time (approx. 5 to 8 minutes). This settling behavior occurs every time the liquid film between the pH-sensitive semiconductor and the reference lead is interrupted (e.g. caused by dry storage or intensive cleaning with compressed air). The settling time depends on the length of the interruption.

Sensitivity to light

Like all semiconductor components, the ISFET chip is sensitive to light (measured value variations). However, this only affects the measured value if the sensor is directly exposed to sunlight. For this reason, avoid direct sunlight when calibrating. Normal ambient light does not have any effect on the measurement.

7.2 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.

7.3 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 (does not apply for digital sensors).

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.

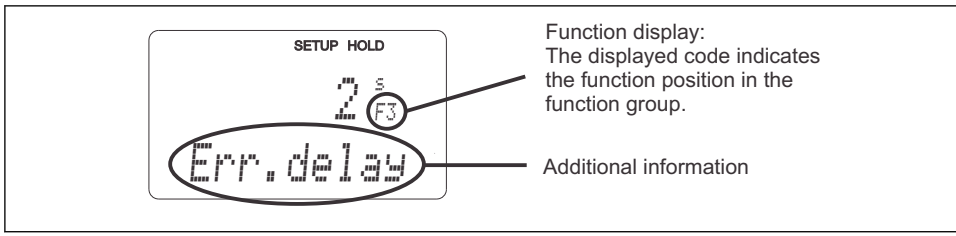
The following function groups are available in the transmitter (the groups that are only available in the Plus Package are marked accordingly in the functional description):

Setup mode
- SETUP 1 (A)
- SETUP 2 (B)
- CURRENT INPUT (Z)
- CURRENT OUTPUT (O)
- ALARM (F)
- CHECK (P)
- RELAY (R)

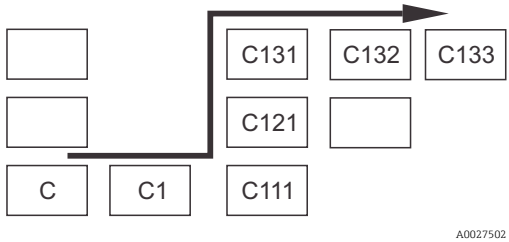
- SERVICE (S)
- E+H SERVICE (E)
- INTERFACE (I)

Calibration and offset mode
- CALIBRATION (C)
- NUMERIC (N)
- OFFSET (V)

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



15 *Information for the user on the display*



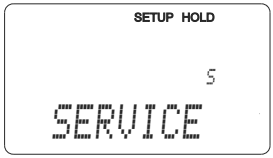
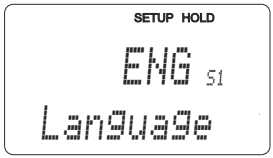
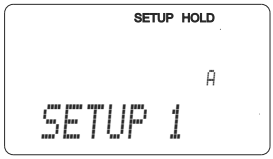
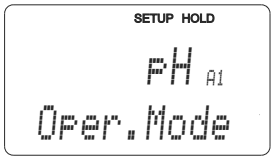
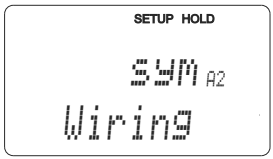
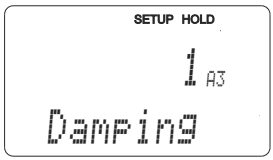
To make it easier to select and find function groups and functions, a code for the corresponding field is displayed for each function → 15
The structure of this code is shown in → 16. The function groups are indicated as letters in the first column (see the names of the function groups). The functions of the individual groups are displayed incrementally by row and by column.

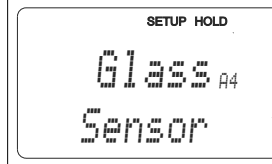
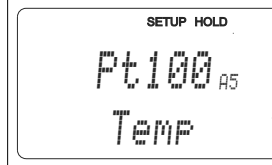
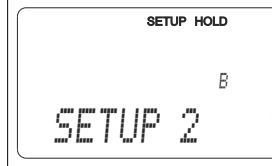
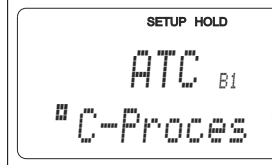
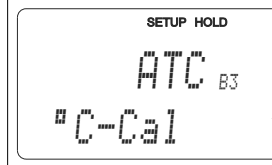
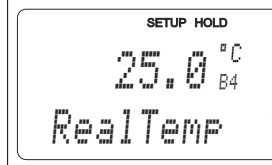
16 *Function code*

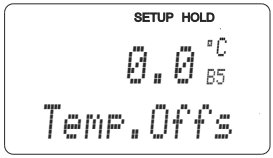
7.4 Quick Setup

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 entry		Range of adjustment (factory settings in bold)	Display
1.	Press the ENTER key.		
2.	Enter the code 22 to open access to the menus. Press the ENTER key.		

User entry		Range of adjustment (factory settings in bold)	Display
3.	Press the MINUS key until the "Service" function group is displayed.		 A0008408-EN
4.	Press the ENTER key to make the required settings.		
5.	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	 A0008409-EN
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.		 A0007824-EN
8.	Press the ENTER key to configure the settings for "Setup 1".		
9.	In A1, select the desired mode of operation, e.g. "pH". Confirm the entry by pressing the ENTER key.	**pH** ORP (= redox) mV ORP (= redox) %	 A0007825-EN
10.	Select the connection type for the sensor in A2. Also refer to the "Sensor connection" section for this. Confirm the entry by pressing the ENTER key.	**sym = symmetrical** asym = asymmetrical	 A0007826-EN
11.	Enter the damping factor in A3. Measured value damping averages the individual measured values and serves to stabilize the display and the signal output. Enter "1" if no measured value damping is required. Confirm the entry by pressing the ENTER key.	**1** 1 to 60	 A0007827-EN

User entry		Range of adjustment (factory settings in bold)	Display
12.	In A4, specify the type of sensor used, e.g. "Glass" for glass electrode. Confirm the entry by pressing the ENTER key.	**Glass** ISFET	 A0007828-EN
13.	In A5, select the temperature sensor that the electrode being used has, e.g. "Pt 100" for a glass electrode. Confirm the entry by pressing the ENTER key. The display returns to the initial display of the "Setup 1" function group.	**Pt 100** Pt 1K NTC 30K None	 A0007829-EN
14.	Press the MINUS key until the "Setup 2" function group is displayed. Press the ENTER key to configure the settings for "Setup 2".		 A0009009-EN
15.	In B1, select the type of temperature compensation for the process, e.g. ATC for automatic temperature compensation. Confirm the entry by pressing the ENTER key. If ATC is selected, the menu automatically skips to field B3.	**ATC** MTC	 A0007831-EN
16.	In B3, select the type of temperature compensation for the calibration, e.g. ATC for automatic temperature compensation. Confirm the entry by pressing the ENTER key.	**ATC** MTC	 A0007833-EN
17.	The current temperature is displayed in B4. If necessary, adjust the temperature sensor to an external measurement. Confirm the entry by pressing the ENTER key.	Actual value displayed and entered -50.0 to 150.0 °C	 A0007834-EN

User entry		Range of adjustment (factory settings in bold)	Display
18.	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	 A0007835-EN
19.	Press PLUS and MINUS simultaneously to switch to the measuring mode.		

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