KA01729C/07/EN/01.24-00
71701396
2024-10-01

Brief Operating Instructions
Liquiline Mobile CML18

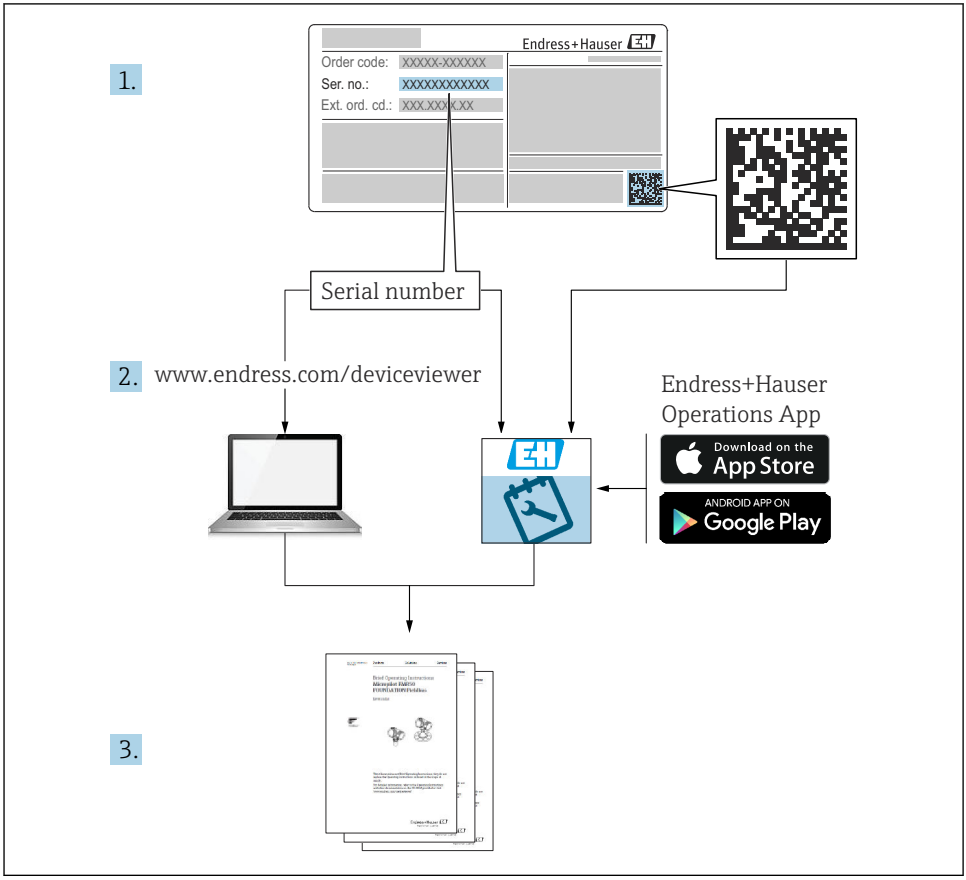
Multiparameter mobile device

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

1.1 Warnings

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

1.2 Symbols

- Additional information, tips
- Permitted
- Recommended
- Not permitted or not recommended
- Reference to device documentation
- Reference to page
- Reference to graphic
- Result of an individual step

1.3 Symbols on the device

- Reference to device documentation
- Do not dispose of products bearing this marking as unsorted municipal waste. Instead, return them to the manufacturer for disposal under the applicable conditions.

1.4 Documentation

The following instructions complement these Brief Operating Instructions and are available on the product pages on the Internet:
Operating Instructions, BA02002C
- Device description
- Commissioning
- Operation
- Diagnostics and troubleshooting
- Maintenance
- Firmware update
- Accessories
- Technical data

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.

The battery may only be changed directly at the manufacturer's premises or by the service organization.

2.2 Intended use

Liquiline Mobile CML18 is a multiparameter mobile device for connecting digital sensors with Memosens technology and optional operation by smartphone or other mobile devices via Bluetooth.

The device is designed for reliable operation in the field or laboratory and is particularly suitable for the following industries:

- Life sciences
- Chemical industry
- Water and wastewater
- Food and beverages
- Power stations
- Other industrial applications of liquid analysis

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

As the user, you are responsible for complying with the following safety conditions:

- Installation guidelines
- Local standards and regulations
- Regulations for explosion protection

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,
  take products out of service and protect them against unintentional operation.

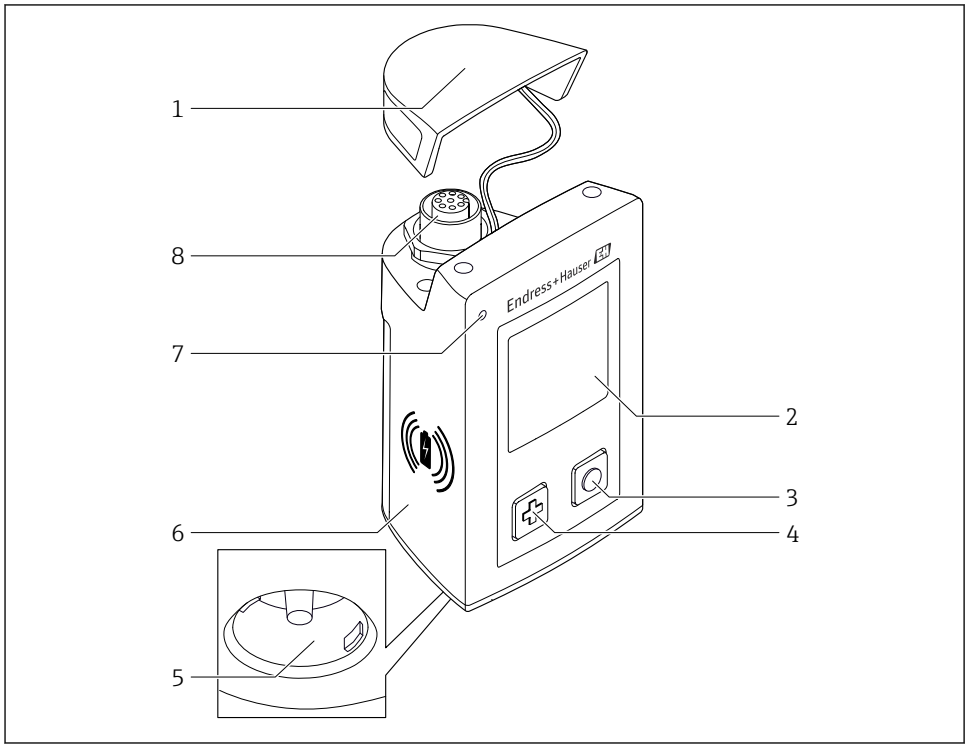
2.5 Product safety

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.

3 Product description

3.1 Product design



1 CML18

1 *Protective cap*
2 *Display screen with automatic screen rotation*
3 *"Select" button*
4 *"Next" button*
5 *Memosens connection*
6 *Area for wireless charging*
7 *Status LED*
8 *M12 connection*

3.1.1 Measuring parameters

The mobile device is designed for digital Memosens sensors with an inductive plug-in head and fixed cable sensors with the Memosens protocol and no external power supply:
- pH
- ORP
- Combined pH/ORP sensors
- Conductive conductivity
- Inductive conductivity
- Dissolved oxygen (optical/amperometric)

In addition to measuring the main parameters, Memosens sensors can be used to measure temperature.

The measuring range is adapted to the individual sensor type.

4 Incoming acceptance and product identification

4.1 Incoming acceptance

1. Verify that the packaging is undamaged.
   ↳ Notify the supplier of any damage to the packaging.
   Keep the damaged packaging until the issue has been resolved.
2. Verify that the contents are undamaged.
   ↳ Notify the supplier of any damage to the delivery contents.
   Keep the damaged goods until the issue has been resolved.
3. Check that the delivery is complete and nothing is missing.
   ↳ Compare the shipping documents with your order.
4. Pack the product for storage and transportation in such a way that it is protected against impact and moisture.
   ↳ The original packaging offers the best protection.
   Make sure to comply with the permitted ambient conditions.

If you have any questions, please contact your supplier or your local Sales Center.

4.2 Product identification

4.2.1 Nameplate

The nameplate contains the following information:
- Manufacturer identification
- Device designation
- Order code
- Serial number
- Protection class
- Ambient and process conditions
- Input and output values

► Compare the information on the nameplate with the order.

4.2.2 Identifying the product

Product page

www.endress.com/CML18

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.

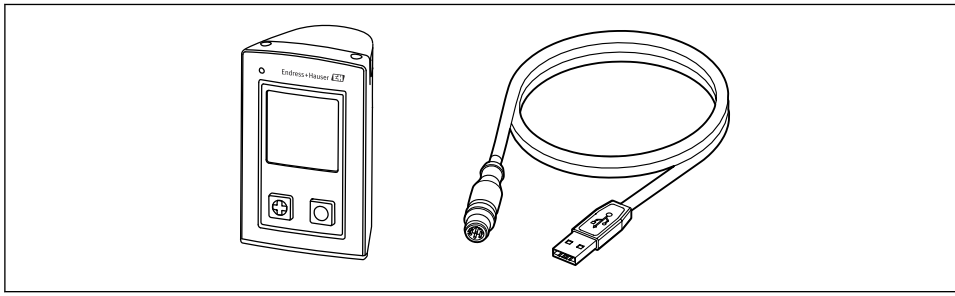
2. Page search (magnifying glass symbol): Enter valid serial number.
3. Search (magnifying glass).
   ↳ The product structure is displayed in a popup window.
4. Click the product overview.
   ↳ A new window opens. Here you fill information pertaining to your device, including the product documentation.

Manufacturer's address

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

4.3 Scope of delivery

The scope of delivery comprises:
- 1 Liquiline Mobile CML18
- 1 M12-USB data and charging cable
- 1 Brief Operating Instructions in German
- 1 Brief Operating Instructions in English



A0057982

Inductive charger and power unit are available separately.

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

4.4 Storage and transport

The device contains a lithium ion battery. For this reason, the device may only be exposed to the operating and storage temperatures indicated.

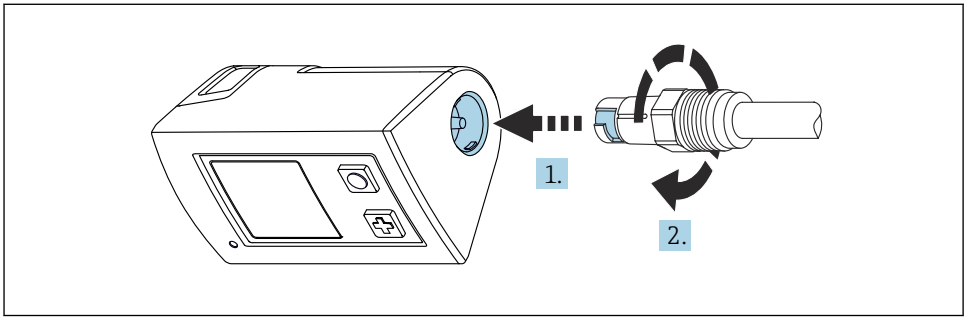
The device may not be exposed to mechanical shocks of any kind.

The device may not be operated under water.

5 Electrical connection

5.1 Connecting the sensor

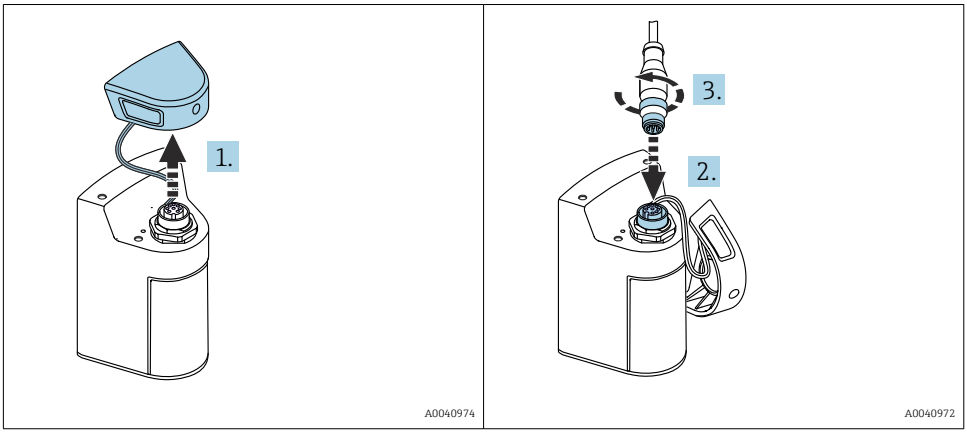
5.1.1 Connecting the Memosens sensor directly



2 Sensor connection

1. Insert the sensor into the Memosens connection.
2. Click the Memosens connection into place.

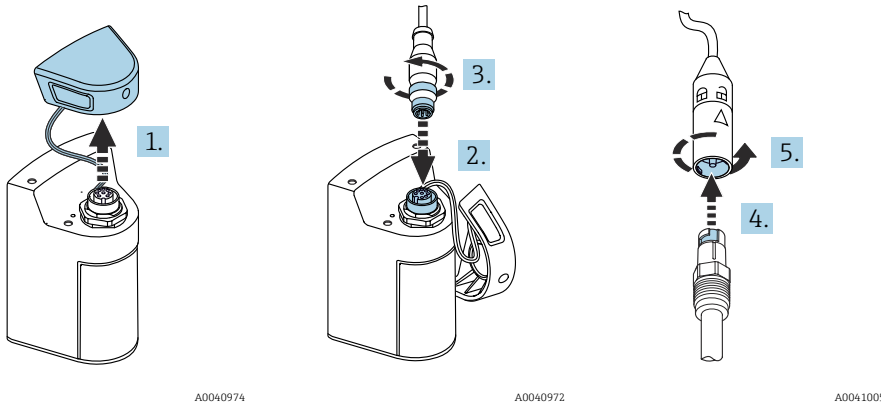
5.1.2 Connecting the Memosens sensor with M12 fixed cable connection



1. Remove the protection cap.
2. Insert the M12 fixed cable.
3. Screw on the M12 fixed cable.

5.1.3 Connecting the sensor via the Memosens M12 cable

The M12 cable has two different connectors:
- M12 connector for connecting to the device
- Memosens connection to connect the Memosens sensor



3 Cable connection

1. Remove the protective cap.
2. Insert the M12 connector.
3. Screw on the M12 connector.
4. Insert the sensor into the Memosens connection.
5. Click the Memosens connection into place.

5.2 Ensuring the degree of protection

Only the mechanical and electrical connections which are described in these instructions, and which are necessary for the required intended use, may be established on the device delivered.

► Exercise care when carrying out the work.

Otherwise, the individual types of protection (Ingress Protection (IP), electrical safety, EMC interference immunity) agreed for this product can no longer be guaranteed due, for example, to covers being left off or cable (ends) that are loose or insufficiently secured.

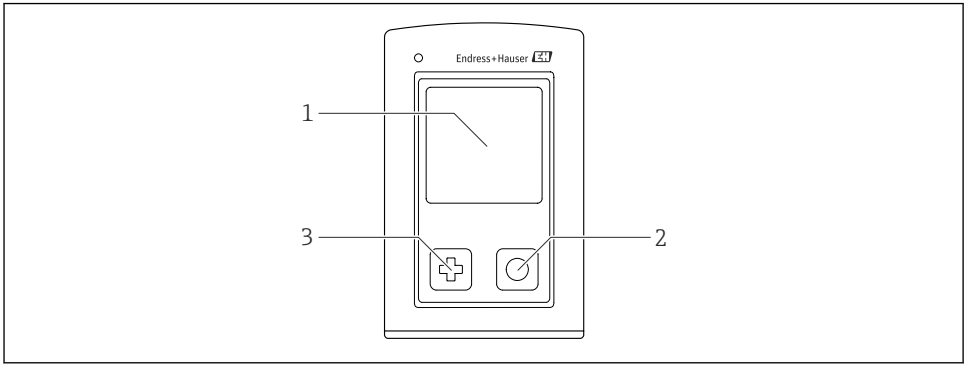
6 Operation options

6.1 Overview of operation options

6.1.1 Operation options

There are three options for operating and configuring the device:
- Internal operating menu with keys
- Memobase Pro app via Bluetooth® LE wireless technology → 19
- SmartBlue app via Bluetooth® LE wireless technology → 28

6.1.2 Display and operating elements



A0040996

4 *Overview of display and operating elements*

1 Display
2 "Select" button
3 "Next" button

Button functions

Button	Device switched off	On measuring screen	In the menu
⊞	Switch on	Scroll through measuring screens	Scroll down
⊙	Switch on	Save current measured values (Grab Sample)	Confirm/select
⊞ (long hold)	-	Open the menu	Change to the measuring screen
⊞ + ⊙ (Press and hold for more than 7 seconds until the green LED lights up and the device restarts.)	Forced hardware reset	Forced hardware reset	Forced hardware reset

6.2 Structure and function of the operating menu

6.2.1 Menu structure

Power-off	
Power-off ⏭	

Application			
Data logger ▷	Data logger ⏭		
	Log interval ⏭		
	Cond. unit ⏭		
	Res. unit ⏭		
	Erase data ▷	Erase grab values ▷	Abort ⏭
			Erase ⏭
		Erase continuous logs ▷	Abort ⏭
			Erase ⏭
Data logger plot ⏭			
Units ⏭			

Diagnostics		
Sensor info ⏭		
Calibration info ⏭		
Diagnostics list ⏭		
Data logger entries ⏭		
Display test ⏭		
Device info ▷	Manufacturer ⏭	
	Software version ⏭	
	Serial number ⏭	
	Name ⏭	
	Extended order code ⏭	

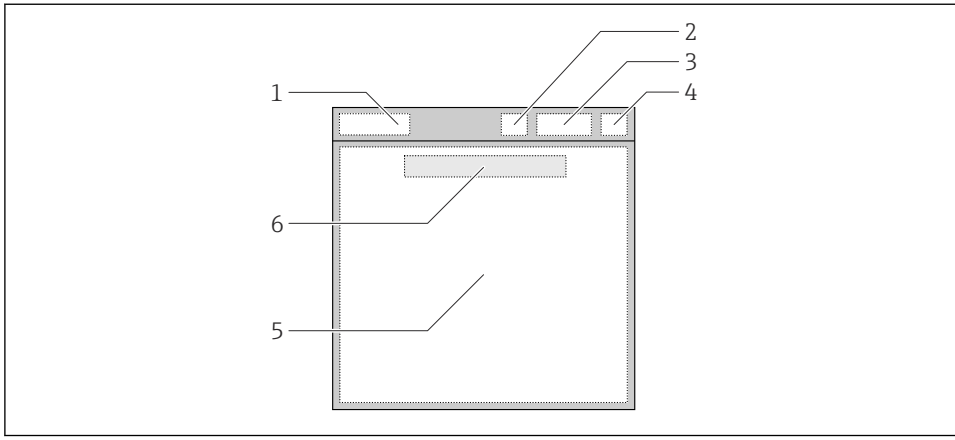
System/Language	
Display language ⏭	
Bluetooth ⏭	
Display brightness ⏭	

System/Language			
Signal sounds	▶|		
M12 CSV	▶|		
Power management	▷	Power save w. charger	▶|
		Power save w/o charger	▶|
		Power-off w. charger	▶|
		Power-off w/o charger	▶|
Regulatory information	▶|		

Support links	
Support links	▶|

Guidance	
1 point calib. (ORP/Redox)	▶|
2 point calibration (pH and ISFET)	▶|
Cell constant (Inductive/conductive conductivity)	▶|
Installation factor (Conductive conductivity)	▶|
Air 100% rh (Oxygen)	▶|
Air variable (Oxygen)	▶|
1 point calib. (Oxygen)	▶|

6.2.2 Display



5 Schematic representation of the display structure

1 Menu path/title of measuring screen
2 Bluetooth status
3 Battery level, charging information
4 NAMUR indicator
5 Measuring screen
6 Date and time (displayed in main menu and if no sensor is connected)

Status according to NAMUR NE107 categories:

NAMUR indicator	Status
OK	The device and sensor are working reliably.
F	Failure of device or sensor. F status signal as per NAMUR NE107
M	Device or sensor requires maintenance. M status signal as per NAMUR NE107
C	Device or sensor undergoing function check. C status signal as per NAMUR NE107
S	Device or sensor being operated out of specification. S status as per NAMUR NE107

6.2.3 Measuring screens

The display can show 3 measuring screens that the user can switch between:

Measuring screen (1 of 3)	Measuring screen (2 of 3)	Measuring screen (3 of 3)
Primary value	Primary and secondary measured value	All measured values of the sensor input

6.3 Operation via Memobase Pro app

6.3.1 Operation options

- Connection of two CML18 devices simultaneously with color coding for differentiation
- Save measured values via the app and via CML18
- Create samples by scanning a QR code or manual data entry
- Assign measured values of a sample
- Clearly identify samples with unique ID, photo, GPS coordinates and comment function
- Export measured values to a CSV file
- Calibrate sensors using guided wizard, traceable storage of calibration data
- Enter data from buffer solutions and reference buffer solutions. E+H buffer solutions and reference buffer solutions can be imported by scanning a QR code.

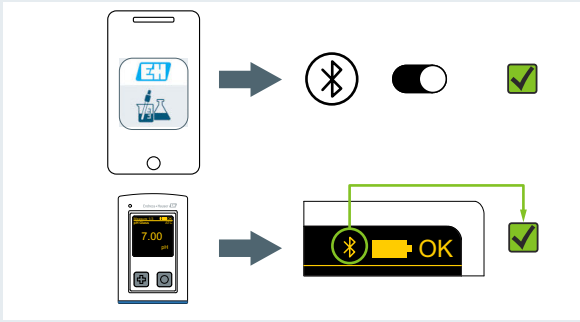
The Memobase Pro app is available in the relevant app stores for iOS devices and Android devices.

6.3.2 Installing the Memobase Pro app and registering users

1. Scan the QR code and install the Memobase Pro app on the mobile device.
2. Start the app after installation.
   ↳ The guided user registration starts automatically.

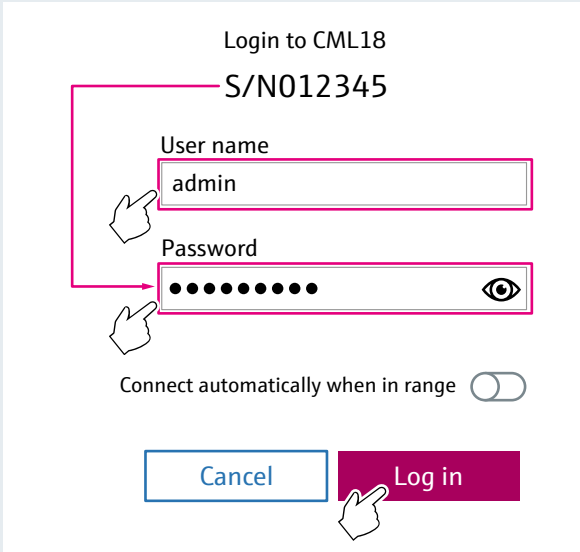
6.3.3 Connecting the device to the Memobase Pro app

1



2

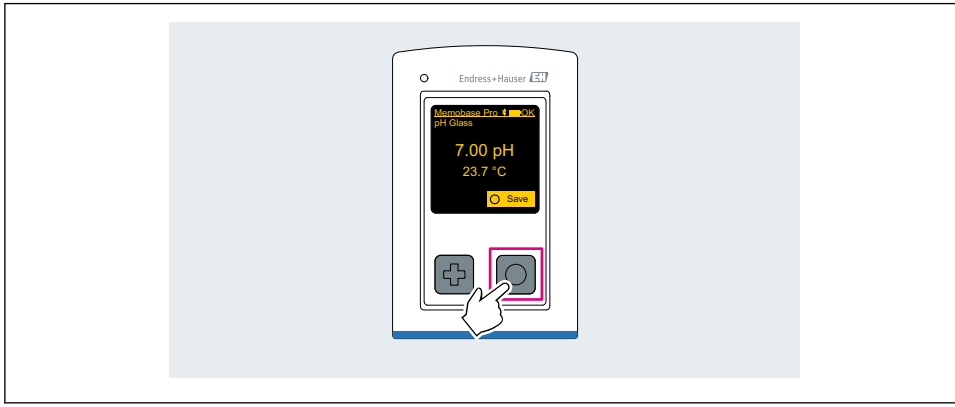
Default user name: admin
Default password: Serial number of CML18



A0055343

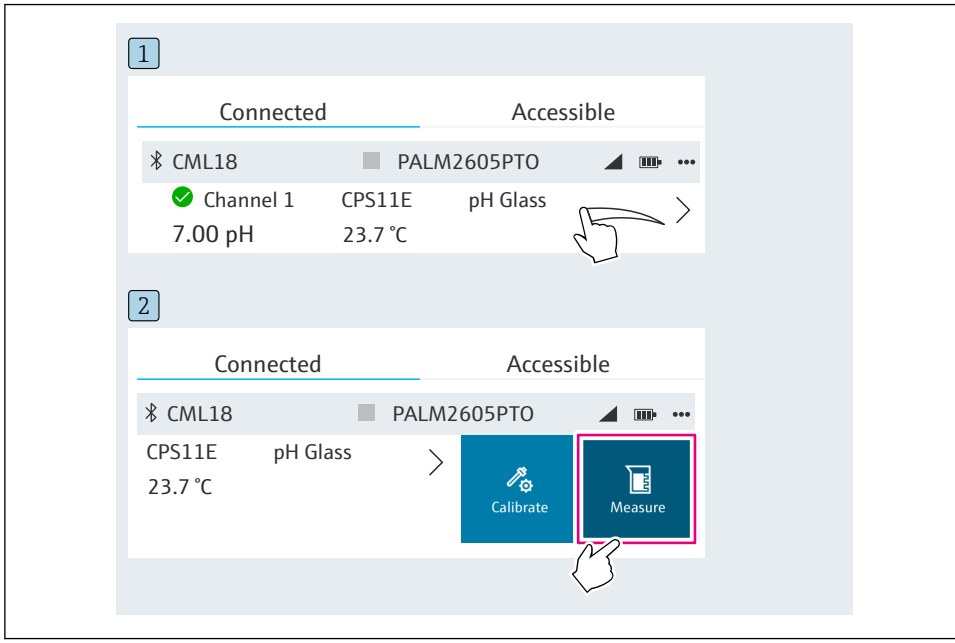
6.3.4 Saving the measured value

via the device



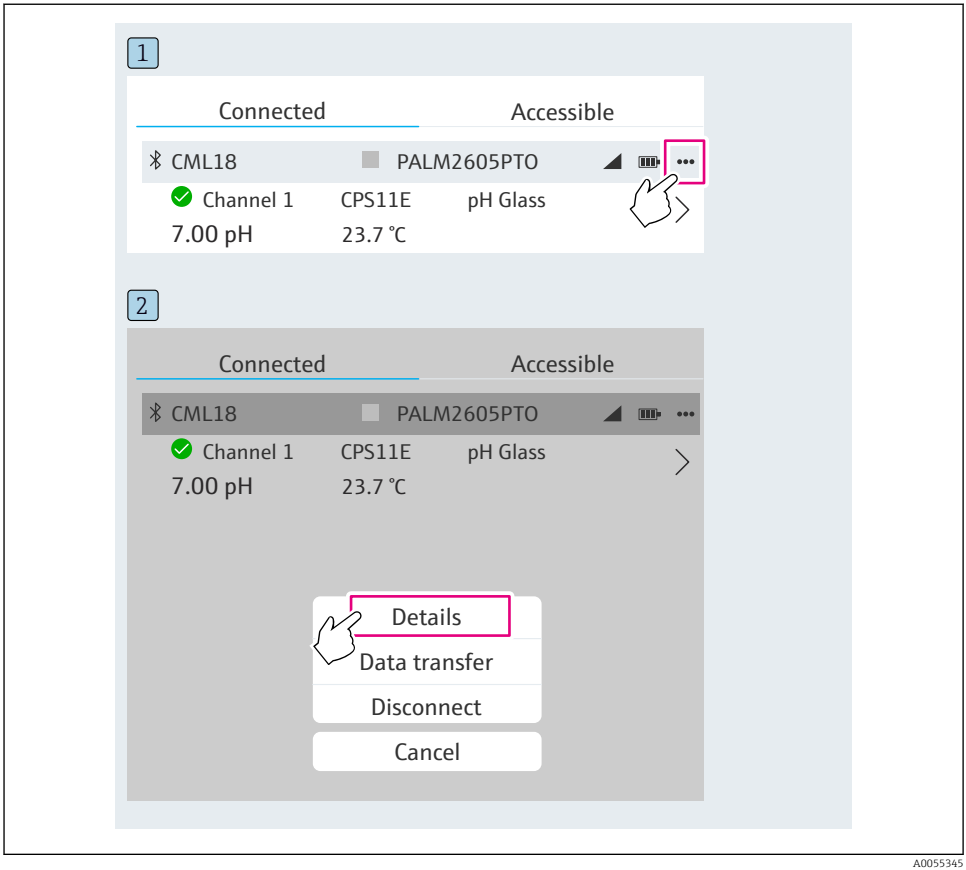
A0055328

via the Memobase Pro app



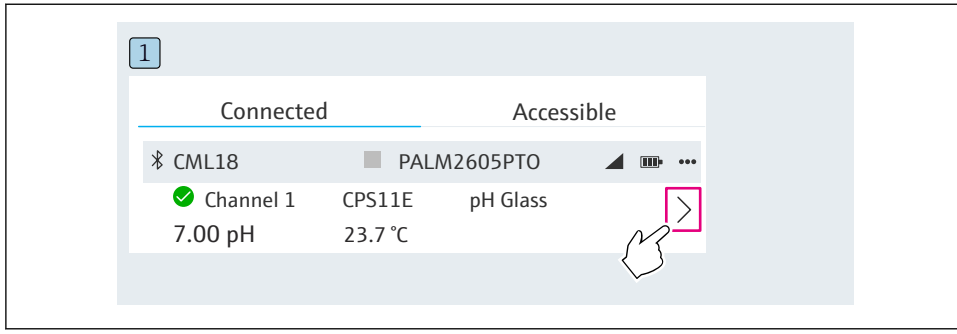
A0055329

6.3.5 Configuring the device



Functions:
- Display device details
- Enter a name for the device
- Define channel ID: Name and color of the channel
- Connect automatically
- Device management
  - Firmware update
  - Change password
  - Change recovery code
  - Change date and time

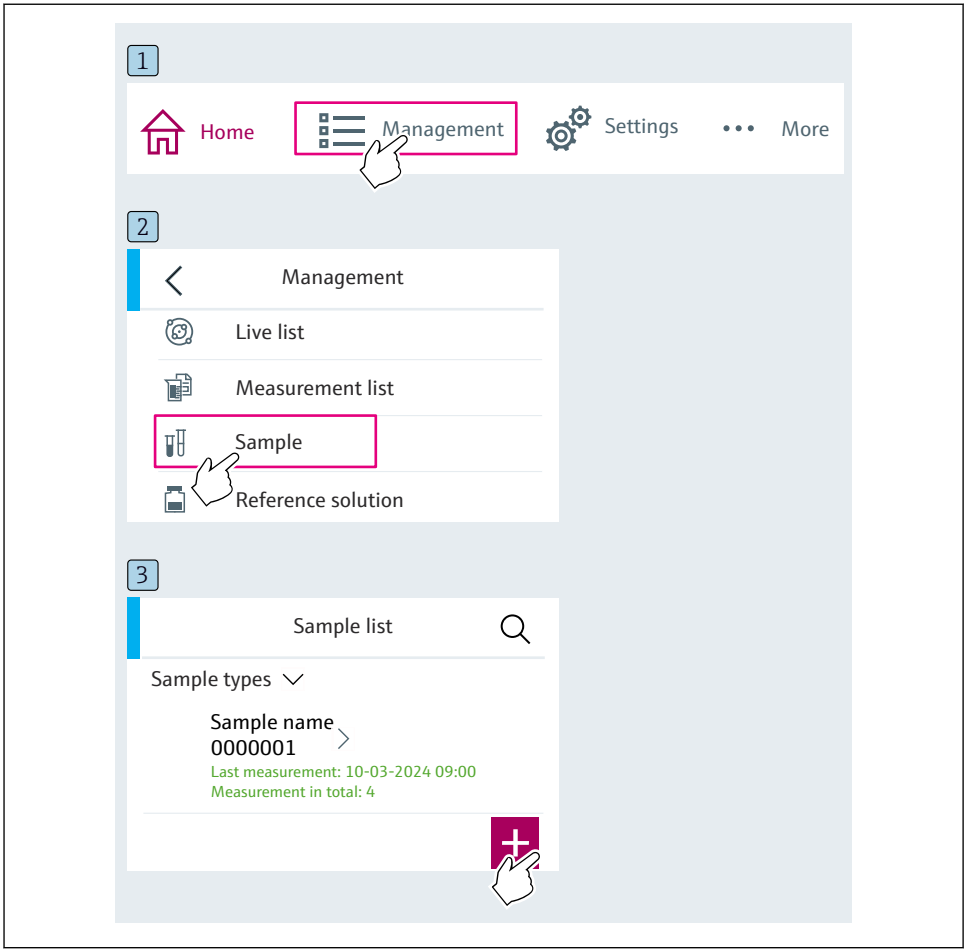
6.3.6 Displaying sensor details



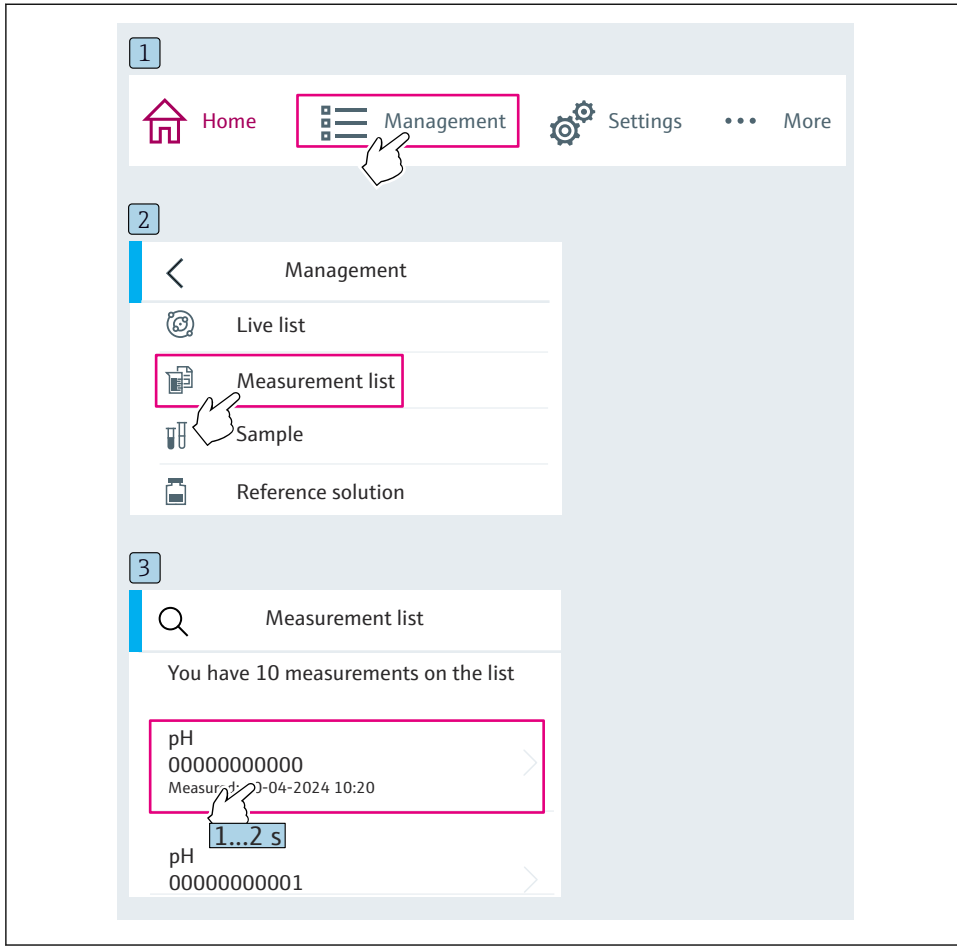
A0055344

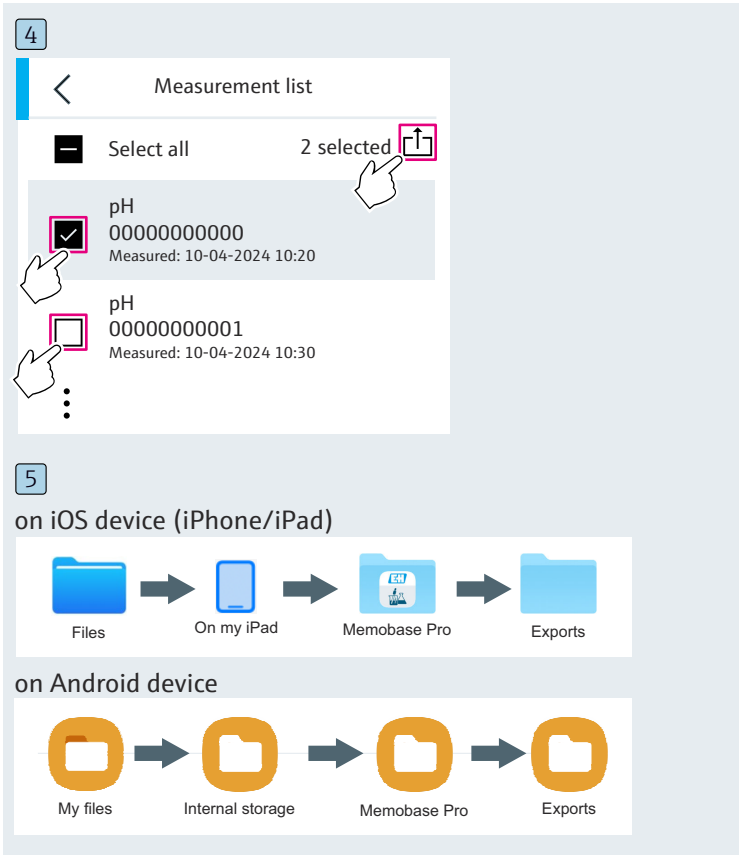
Functions:
- Detailed display and graphic representation of all the measured values of the sensor
- Save the measured value
- Calibrate the sensor
- Display the operating information and calibration information of the sensor location
- Perform calibration settings and measurement settings for the sensor

6.3.7 Creating a sample



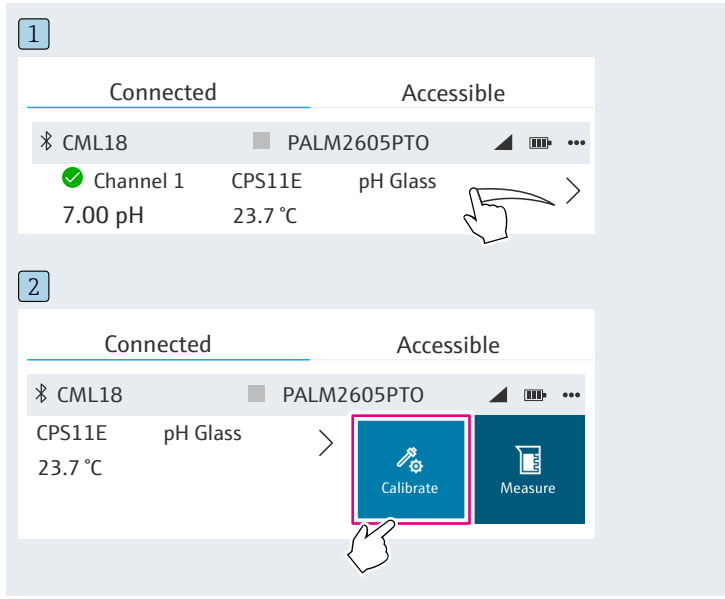
6.3.8 Exporting measured values




4
Measurement list
Select all
2 selected
pH
00000000000
Measured: 10-04-2024 10:20
pH
00000000001
Measured: 10-04-2024 10:30
5
on iOS device (iPhone/iPad)
Files
On my iPad
Memobase Pro
Exports
on Android device
My files
Internal storage
Memobase Pro
Exports

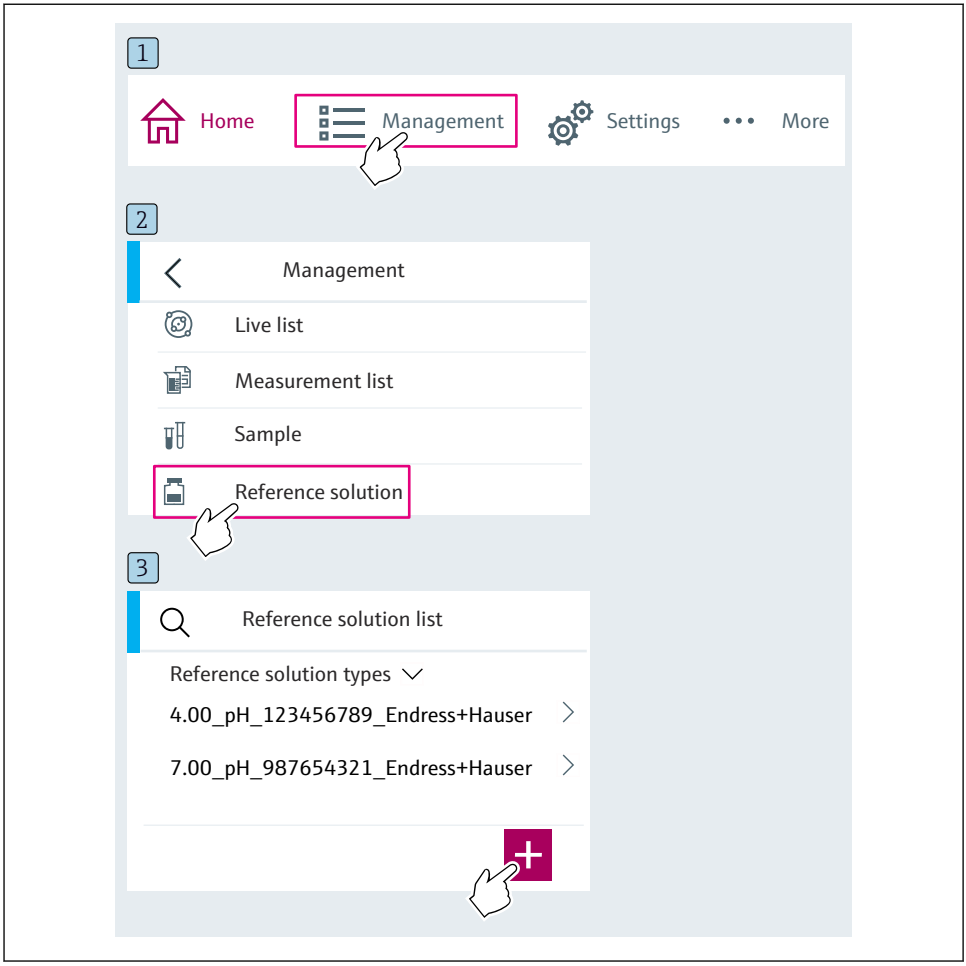
A0055342

6.3.9 Calibrating the sensor



A0055332

6.3.10 Adding a reference buffer solution



6.4 Operation via the SmartBlue app

The SmartBlue App is available for download from the Google Play Store for Android devices and from the Apple App Store for iOS devices.

Download the SmartBlue App.

▶ Use the QR codes to download the app.

A0033202

6 *Download links*

System requirements

- iOS devices: iPhone 4S or higher from iOS9.0; iPad2 or higher from iOS9.0; iPod Touch 5th generation or higher from iOS9.0
- Devices with Android: from Android 4.4 KitKat and Bluetooth® 4.0
- Internet access

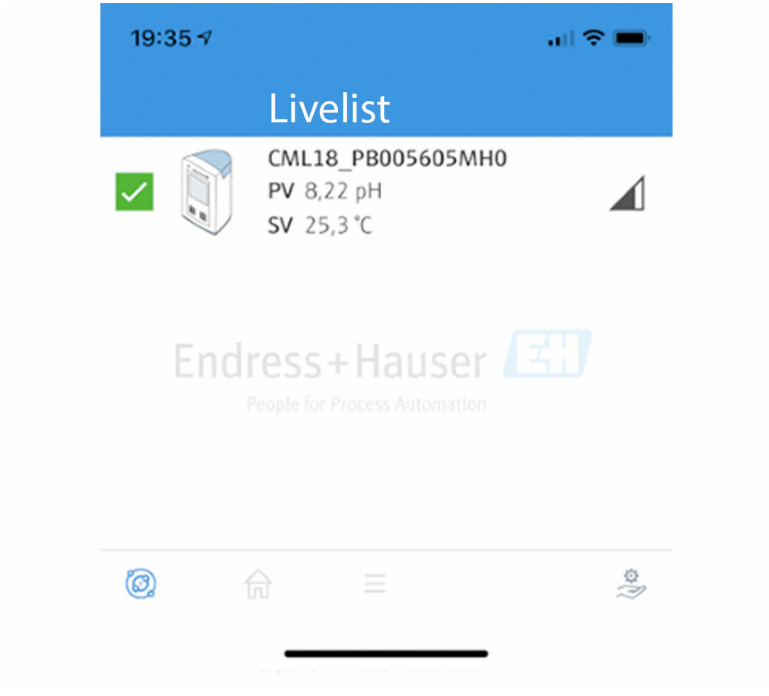
▶ Open the SmartBlue App.

A0029747

7 *SmartBlue App icon*

Bluetooth must be enabled on both devices.

Enable Bluetooth → 📄 37



8 SmartBlue App Livelist

The Livelist displays all of the devices that are within range.

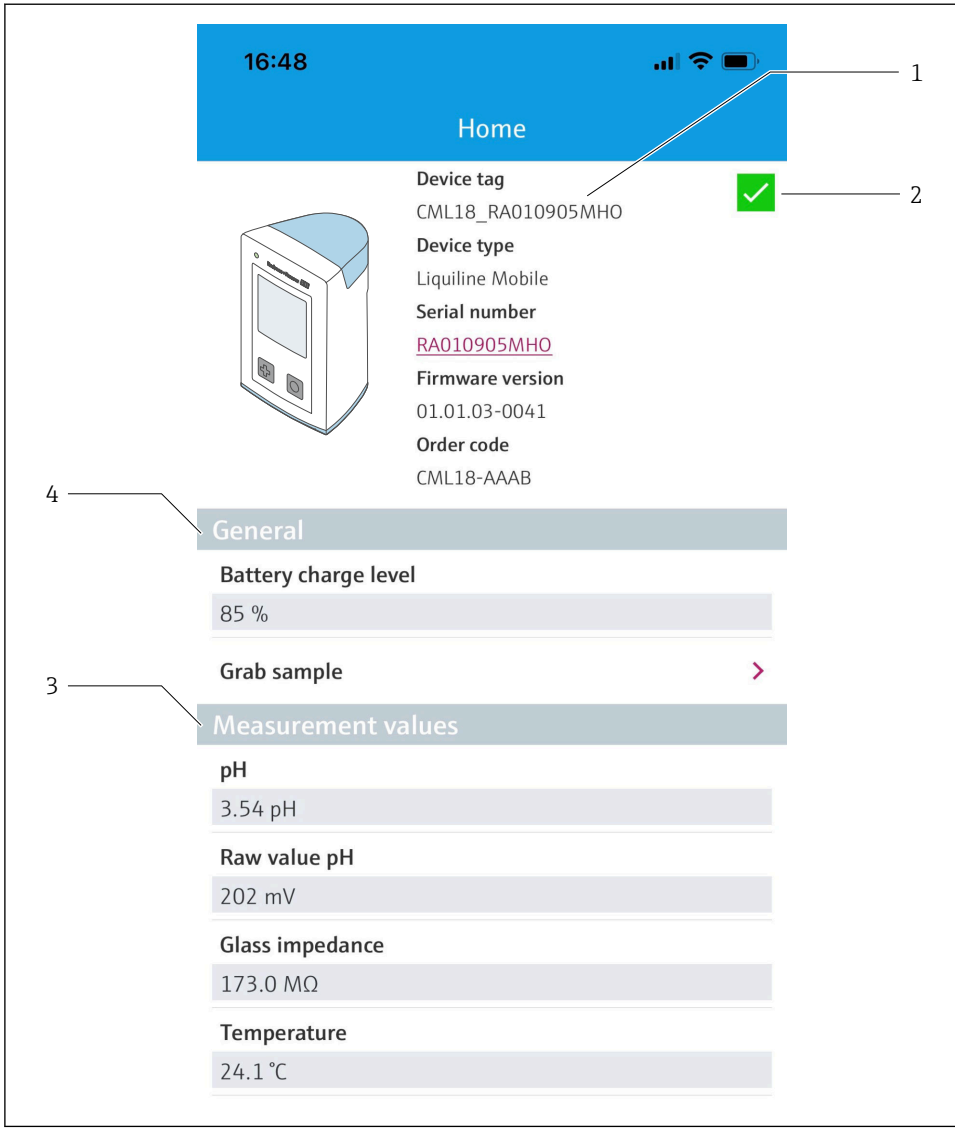
▶ Tap the device to select it.

▶ Log in with user name and password.

- User name: **admin**
- Initial password: **Serial number of the device**

Change the user name and password after logging in for the first time.

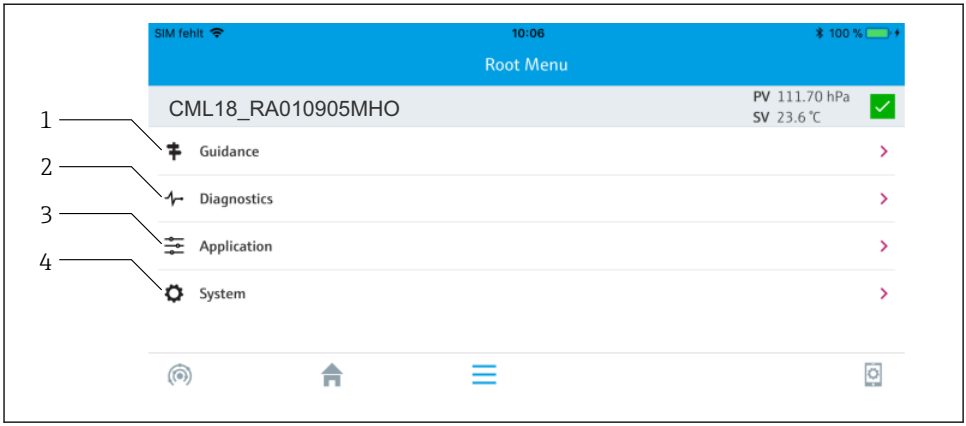
In the Home view, the current measured values are displayed along with the device information (tag, serial number, firmware version, order code).



9 *Home view of SmartBlue app with current measured values*

1 *CML18 system and device information*
2 *Current NAMUR status and shortcut to diagnostic list*
3 *Overview of measured values of connected sensor*
4 *Battery charge level and sampling option*

Operation is via 4 main menus:



A0048103

10 Main menus of the SmartBlue app

1 *Guidance*
2 *Diagnostics*
3 *Application*
4 *System*

Menu	Function
Guidance	Contains functions that involve a sequence of activities in itself (= "Wizard", guided operation). E.g. Calibration or data logger export.
Diagnostics	Contains information on operation, diagnostics and troubleshooting, as well as configuration of the diagnostic behavior.
Application	Sensor data for specific optimization and for detailed process adjustment. Adapts the measuring point to the application.
System	These menus contain parameters for configuring the overall system, e.g. Time and date options.

7 Commissioning

7.1 Preparatory steps

7.1.1 Charging the device

Charge the device fully before initial commissioning.

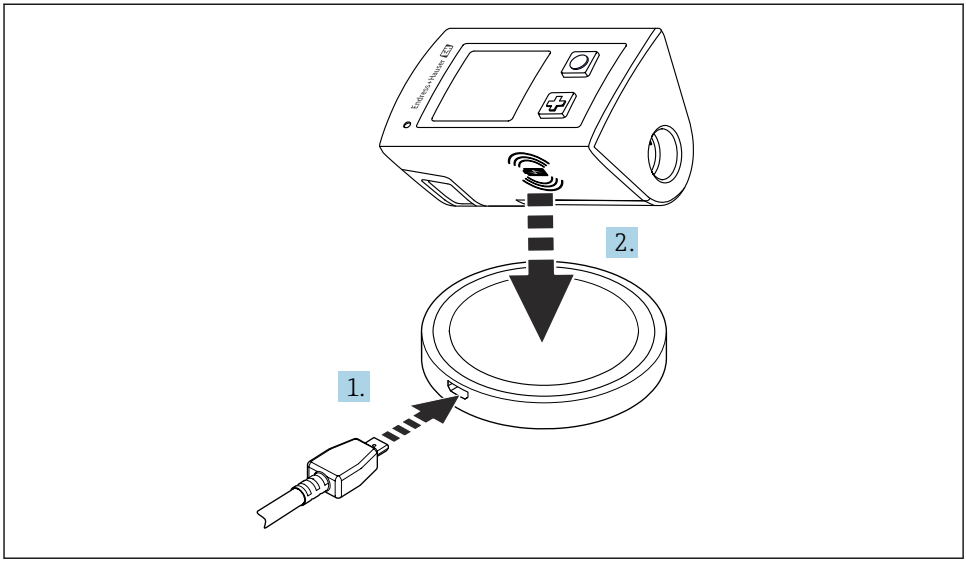
There are two possible ways to charge the device:
- Inductively (wirelessly) via Qi-certified charger
- Via cable with M12 USB data + charging cable

The following applies to both options:
- When device is switched on:
  - When charging starts, a flash symbol appears on the display and a confirmation tone sounds.
  - If charging stops before the battery is fully charged, another confirmation tone sounds.
  - An acoustic signal sounds when charging is complete.
- When device is switched off:
  - The green LED flashes during charging.
  - When charging is complete, an acoustic signal sounds and the LED is continuously lit green for 10 minutes.
  - The device then switches off.

Inductive charging via Qi charger

Only use Qi-certified chargers (Qi version 1.2)!

Further information: www.wirelesspowerconsortium.com



11 Inductive charging

1. Connect the charger to the power source.
2. Place the device with the charging side on the charger.

Charging begins.

The battery charge level is shown on the display when the device is switched on.

If the device is switched off, the battery charge level is indicated via the LED.

An acoustic signal indicates that charging is complete.

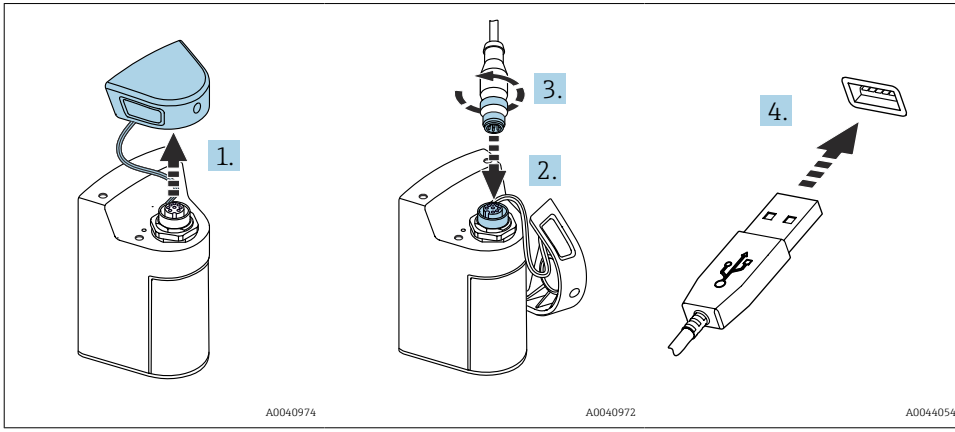
During inductive charging, measurement via the integrated Memosens connection on the device is not possible.

A message to this effect is shown on the display.

Measurement via M12 cable is still possible.

Charging via M12 USB data + charging cable

The M12 USB data + charging cable has two different connectors:
- M12 connector for connecting to the device
- USB connector for connecting to a computer or USB charger



1. Remove the protective cap.
2. Attach the M12 connector of the cable to the device connection.
3. Screw on the M12 connector of the cable.
4. Connect the USB connector to a USB charger or USB port on a computer.

7.2 Function check

⚠ WARNING

Connection errors

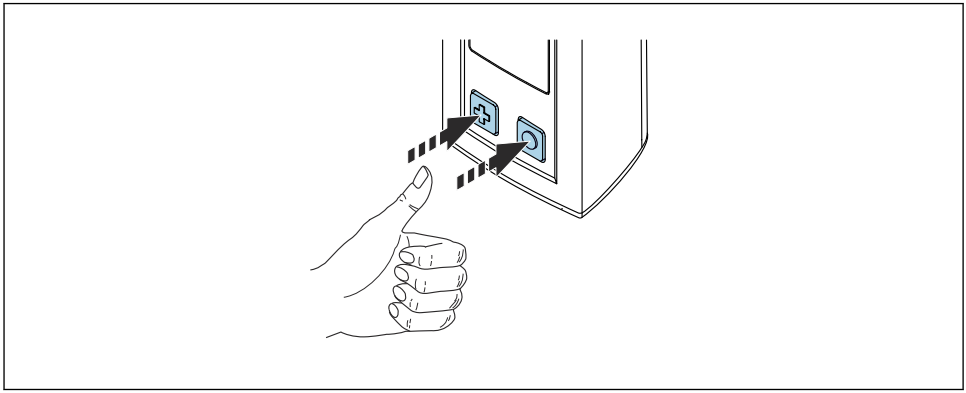
The safety of people and of the measuring point is at risk!

▶ 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?
▶ Are the mounted cables strain relieved?
▶ Are the cables routed without loops and cross-overs?

7.3 Switching on the measuring instrument



A0040976

12 Switching on the device

- Press ⊕ or ⊙.
  - The device starts up.

A connected sensor is recognized automatically.

The time required before a measured value is displayed depends on the sensor type and measuring principle and can vary.

7.3.1 Switching OFF the measuring instrument

1. Navigate to: **Main menu/Power-off**
2. Press ⊙ to switch off the device.

7.4 Setting the display language

When the device is started for the first time, the user is prompted to select the display language. After this, proceed as described below to change the display language.

1. Navigate to: **Main menu/System/Language/Display language**
2. Press ⊙ to select the display language.

The following display languages are available:
- English
- German
- Croatian
- Spanish
- Italian
- French
- Japanese
- Korean
- Dutch

- Polish
- Portuguese
- Russian
- Chinese
- Czech
- Norwegian

7.5 Configuring the measuring instrument

7.5.1 Configuring the Bluetooth connection

1. Navigate to: **Main menu/System/Language/Bluetooth**
2. Press ⊙ to scroll through the predefined values.

Description of setting	Configuration options
Switch Bluetooth connection on/off	▪ Enabled ▪ Disabled

If the Bluetooth connection is disabled, operation via the SmartBlue App is not possible.

7.5.2 Setting the date and time

Time and date can be set manually or adopted from the mobile device.

Preparatory steps

1. Enable Bluetooth. → 37
2. Pair the device with a mobile device via the SmartBlue app. → 28

1. Select the device in the SmartBlue app.
2. Navigate to path: **Main menu/System**
3. Adopt date and time from the mobile device or set manually.

7.6 Advanced settings

7.6.1 Displaying device information

1. Navigate to: **Main menu/Diagnostics/Device info**
2. Press ⊙ to scroll through the **Device info**.

The following information about the device is shown on the display:
- Manufacturer identification
- Software version
- Serial number
- Name
- Extended order code

7.6.2 Adjusting the energy settings

A maximum battery life of 48 h can be achieved via the energy settings.

For measurements with oxygen sensors, the device remains permanently switched on, regardless of the energy settings selected.

1. Navigate to: **Main menu/System/Language/Power management**
2. Press ⊙ to scroll through the predefined values.

The following energy settings are available:
- **Power save w. charger** (power save with charger)
- **Power save w/o charger** (power save without charger)
- **Power-off w. charger** (switch off with charger)
- **Power-off w/o charger** (switch off without charger)

The power save mode is activated after the set time if there is no user interaction.

In the power save mode, the display is switched off and the device remains on standby.

There are 2 power save settings:

Power save w. charger *(power save with charger)*

Description of setting	Configuration options
Set the time until the power save mode is activated if the device is connected to the mains.	▪ 1 min ▪ 5 min ▪ **15 min** ▪ 30 min ▪ 1 h ▪ 2 h ▪ Never

Power save w/o charger *(power save without charger)*

Description of setting	Configuration options
Set the time until the power save mode is activated if the device is running on the battery.	▪ 1 min ▪ **5 min** ▪ 15 min ▪ 30 min ▪ 1 h

The device is automatically switched off after the selected time.

The device is not switched off automatically if the Bluetooth connection is enabled.

There are 2 power-off settings:

Power-off w. charger *(switch off with charger)*

Description of functions	Configuration options
Set the time until the device switches off automatically if it is connected to the mains.	▪ 1 min ▪ 5 min ▪ **15 min** ▪ 30 min ▪ 1 h ▪ 2 h ▪ Never

Power-off w/o charger *(switch off without charger)*

Description of functions	Configuration options
Set the time until the device switches off automatically if it is running on the battery.	▪ 1 min ▪ 5 min ▪ **15 min** ▪ 30 min ▪ 1 h ▪ 2 h ▪ Never

7.6.3 System sounds

1. Navigate to: **Main menu/System/Language/Signal sounds**
2. Press ⊙ to scroll through the predefined values.
   ↳ Other settings are possible via the SmartBlue App.

Description of setting	Configuration options
Switch signal sounds on/off	▪ Enabled ▪ Disabled

Additional changes to the signal sounds can be made via the SmartBlue App.

7.6.4 Configuring M12 CSV

Measured values can be output to other devices via the device's M12 connection. The M12 USB data + charging cable is used for this purpose. The transmitted data can, for example, be further processed in real-time in an external computer program.

A data rate of 9600 bit/s in 8N1 configuration must be used as the connection parameter at the receiving system.

1. Navigate to: **Main menu/System/Language/M12 CSV**
2. Press ⊙ to scroll through the predefined values.

Description of setting	Configuration options
Switch on/off M12 CSV	▪ On ▪ Off

When the M12 CSV option is enabled, no sensor can be operated via cable. Operation via the Memosens connection on the device is still possible.

A message to this effect is shown on the display.

7.6.5 Adjusting the display brightness

1. Navigate to: **Main menu/System/Language/Display brightness**
2. Press ⊙ to adjust the display brightness.

Description of setting	Configuration options
Set the display brightness	▪ Low ▪ Medium ▪ High ▪ Maximum

7.6.6 Hardware reset in an emergency

This type of restart should only be performed in an emergency if the device does not respond to any other input.

▶ Press and hold ⊙ and ⊕ simultaneously for at least 7 seconds until the LED flashes green.
↳ The device restarts.

7.6.7 Displaying regulatory information and approvals

1. Navigate to: **Main menu/System/Language/Regulatory information**
2. Press ⊙ to display regulatory information and approvals.

7.6.8 Data logger

Defining the log interval

The log interval can only be changed if the data logger is deactivated.

1. Navigate to: **Main menu/Application/Data logger/Log interval**
2. Press ⊙ to scroll through the predefined values.

Description of setting	Configuration options
Set the time until the next measured value is saved automatically.	▪ 1 s ▪ 2 s ▪ 10 s ▪ 20 s ▪ 30 s ▪ 1 min ▪ 5 min ▪ 30 min ▪ 1 h

If the device is woken up to record a log value, any existing switch-on / settling times of the connected sensor are not taken into account.

For measurements with oxygen sensors, the device remains permanently switched on with the data logger enabled, regardless of the energy settings selected.

Adjusting the energy settings:→ 38

Enabling/disabling the data logger

The data logger must be deactivated in the following cases:
- if changes are made to the measurement settings
- if the measured values are exported
- Sensor replacement

1. Navigate to: **Main menu/Application/Data logger/Data logger**
2. Press ⊙ to scroll through the predefined values.

Description of setting	Configuration options
Enable/disable automatic data logger	▪ On ▪ Off

3. Exit the menu.
4. Once activated, the data logger automatically starts recording the measured values.
   ↳ If the data logger is activated, the display flashes alternately between the "**Logging...**" message and the current menu path/measuring screen title.
5. Press ⊡ to change the active measuring window.

Configuring the data logger for ultrapure water

Prior to activating the data logger, the measured value units can be adjusted for conductivity measurement with the data logger in ultrapure water. An adjustment is necessary to eliminate rounding errors in the smallest measured values.

The units for conductivity and resistance can be permanently configured.

1. Navigate to: **Main menu/Application/Data logger/Cond. unit**
2. Press ⊙ to scroll through the predefined values.

1. Navigate to: **Main menu/Application/Data logger/Res. unit**
2. Press ⊙ to scroll through the predefined values.

7.6.9 Switching units

Only the units used by the sensor are displayed.

1. Navigate to: **Main menu/Application/Units**
2. Press ⊙ to scroll through the predefined values.

www.addresses.endress.com

Endress+Hauser

People for Process Automation