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Operating Instructions
Memosens CLL47E

Contacting conductivity sensor for laboratory measurements and random sampling in the field
Digital with Memosens 2.0 technology

Endress+Hauser
People for Process Automation

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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 or recommended
- Not permitted or not recommended
- Reference to device documentation
- Reference to page
- Reference to graphic
- Result of a step

1.3 Documentation

The following manuals, which complement these Operating Instructions, can be found on the product pages on the Internet:

Technical Information Memosens CLL47E, TI01666C

Operating Instructions Liquiline Mobile CML18, BA02002C

Operating Instructions Memobase Plus CYZ71D, BA00502C

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 Memosens CLL47E conductivity sensor is designed for the short-term measurement of low to high conductivity of liquids in laboratory or field environments.

The Memosens CLL47E conductivity sensor is **not** intended for:
- Continuous measurements and fixed installation in the process or in assemblies
- Use in very corrosive media that can corrode stainless steel, for example.

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

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

2.3 Workplace safety

As the user, you are responsible for complying with the following safety conditions:
- Installation guidelines
- Local standards and regulations

2.4 Operational safety

Before commissioning the entire measuring point:

1. Verify that all connections are correct.
2. Ensure that electrical cables and hose connections are undamaged.
3. Do not operate damaged products, and protect them against unintentional operation.
4. Label damaged products as defective.

During operation:

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

2.5 Product safety

The product is designed to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which it is safe to operate. The relevant regulations and international standards have been observed.

3 Incoming acceptance and product identification

3.1 Incoming acceptance

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

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

3.2 Product identification

3.2.1 Nameplate

The nameplate provides you with the following information on your device:
- Manufacturer identification
- Extended order code
- Serial number

► Compare the information on the nameplate with the order.

3.2.2 Product identification

Product page

www.endress.com/cll47e

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 address

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

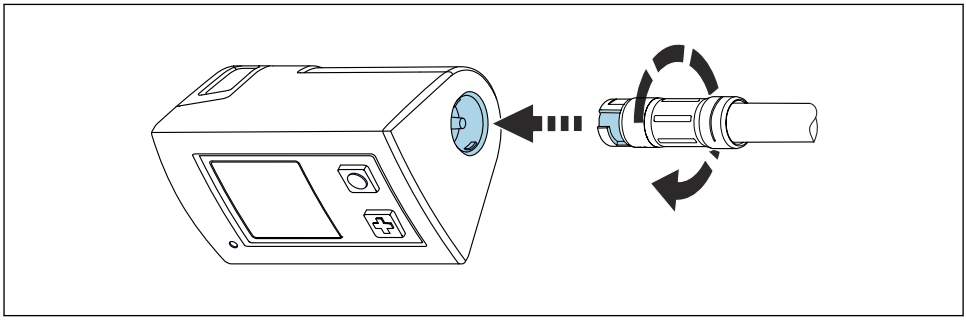
3.3 Scope of delivery

The scope of delivery includes:
- Sensor in the version ordered
- Operating Instructions

4 Electrical connection

4.1 Connecting the sensor

4.1.1 Connection to handheld device



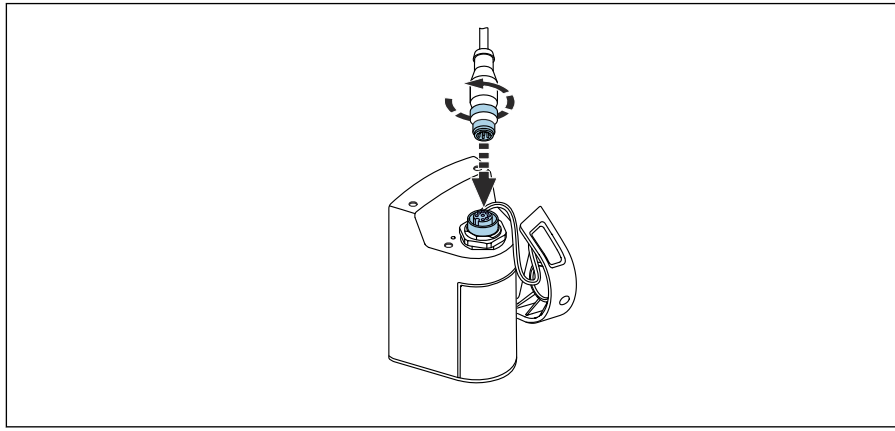
A0041682

1 Sensor connection

1. Insert the sensor into the Memosens connection.
2. Turn the plug-in head of the sensor until it locks into place.

4.1.2 Connection to handheld device via M12 cable

1.



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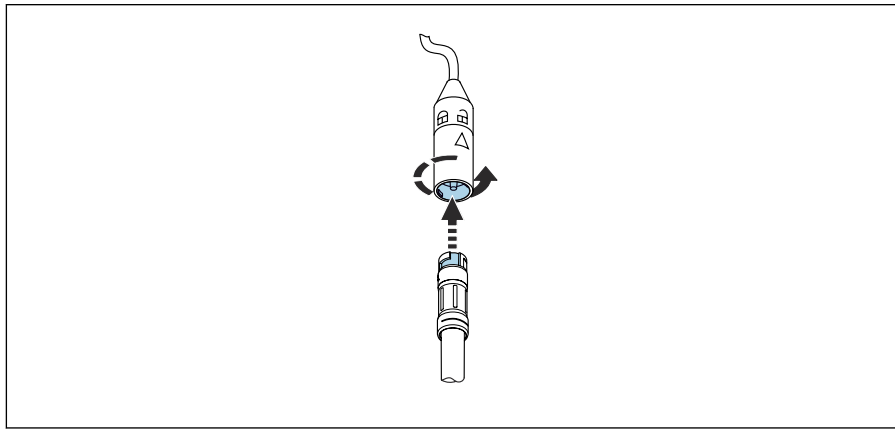
Connect the M12 cable to the handheld device.

2.



A0041680

Insert the sensor into the Memosens connection of the M12 cable and lock into place.

5 Commissioning

1. For accurate, precise conductivity measurement:
   Check the temperature compensation and damping settings on the transmitter.

2. For measurement, calibration and adjustment:
   Follow the Operating Instructions for the transmitter.

Operating Instructions Liquiline Mobile CML18, BA02002C

6 Maintenance

6.1 Cleaning the sensor

CAUTION

Corrosive chemicals

Risk of chemical burns to the eyes and skin and risk of damage to clothing and equipment!

- ▶ It is absolutely essential to protect the eyes and hands properly when working with acids, alkalis and organic solvents!
- ▶ Wear protective goggles and safety gloves.
- ▶ Clean away splashes on clothes and other objects to prevent any damage.
- ▶ Comply with instructions in the safety data sheets for the chemicals used.

WARNING

Thiocarbamide

Harmful if swallowed! Limited evidence of carcinogenicity! Possible risk of harm to the unborn child! Dangerous for the environment with long-term effects!

- ▶ Wear protective goggles, protective gloves and appropriate protective clothing.
- ▶ Avoid all contact with the eyes, mouth and skin.
- ▶ Avoid discharge into the environment.

Clean away fouling on the sensor as follows depending on the type of fouling:

1. Oily and greasy films:
   Clean with fat solvent, e.g. alcohol, or hot water and agents containing surfactants (alkaline) (e.g. dishwashing detergent).
2. Lime and metal hydroxide buildup and low solubility (lyophobic) organic buildup:
   Dissolve buildup with diluted hydrochloric acid (3 %) and then rinse thoroughly with plenty of clear water.
3. Sulfidic buildup (from flue gas desulfurization or wastewater treatment plants):
   Use a mixture of hydrochloric acid (3 %) and thiocarbamide (commercially available) and then rinse thoroughly with plenty of clear water.
4. Buildup containing proteins (e.g. food industry):
   Use a mixture of hydrochloric acid (0.5 %) and pepsin (commercially available) and then rinse thoroughly with plenty of clear water.
5. Readily soluble biological buildup:
   Rinse with pressurized water.

After cleaning, rinse the sensor thoroughly with water.

6.2 Sensor calibration

- Wall distance:
  When calibrating, ensure that there is a minimum distance of 15 mm to the base and walls of the calibration vessel.

7 Repair

7.1 General information

The repair and conversion concept provides for the following:
- The product has a modular design
- Only use original spare parts from the manufacturer
- Repairs are carried out by the manufacturer's Service Department or by trained users
- Observe applicable standards, national regulations and certificates

7.2 Return

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

To ensure the swift, safe and professional return of the device:

- Refer to the website www.endress.com/support/return-material for information on the procedure and conditions for returning devices.

7.3 Disposal

If required by the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), the product is marked with the depicted symbol in order to minimize the disposal of WEEE as unsorted municipal waste. Do not dispose of products bearing this marking as unsorted municipal waste. Instead, return them to Endress+Hauser for disposal under the applicable conditions.

8 Accessories

The following are the most important accessories available at the time this documentation was issued.

► For accessories not listed here, please contact your Service or Sales Center.

8.1 Device-specific accessories

Memosens laboratory cable CYK20
- For digital sensors with Memosens technology
- Product Configurator on the product page: www.endress.com/cyk20

Memosens data cable CYK10
- For the use of digital sensors with Memosens technology outdoors
- Terminated cable, length 3 m (9.84 ft), M12 plug
- Order code: CYK10-A032


Technical Information TI00118C

Conductivity calibration solutions CLY11
Precision solutions referenced to SRM (Standard Reference Material) by NIST for qualified calibration of conductivity measuring systems in accordance with ISO 9000
- CLY11-A, 74 µS/cm (reference temperature 25 °C (77 °F)), 500 ml (16.9 fl.oz)
  Order No. 50081902
- CLY11-B, 149.6 µS/cm (reference temperature 25 °C (77 °F)), 500 ml (16.9 fl.oz)
  Order No. 50081903
- CLY11-C, 1.406 mS/cm (reference temperature 25 °C (77 °F)), 500 ml (16.9 fl.oz)
  Order No. 50081904
- CLY11-D, 12.64 mS/cm (reference temperature 25 °C (77 °F)), 500 ml (16.9 fl.oz)
  Order No. 50081905
- CLY11-E, 107.00 mS/cm (reference temperature 25 °C (77 °F)), 500 ml (16.9 fl.oz)
  Order No. 50081906


Technical Information TI00162C

8.2 Communication-specific accessories

Liquiline Mobile CML18
- Multiparameter mobile device for laboratory and field
- Reliable transmitter with display and app connection
- Product Configurator on the product page: www.endress.com/CML18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Memobase Plus CYZ71D
- PC software to support laboratory calibration
- Visualization and documentation of sensor management
- Sensor calibrations stored in database
- Product Configurator on the product page: www.endress.com/cyz71d

Technical Information TI00502C

9 Technical data

9.1 Input

9.1.1 Measured variables

- Conductivity
- Temperature

9.1.2 Measuring ranges

Conductivity [1]	5 µS/cm to 200 mS/cm
Temperature	0 to 100 °C (32 to 212 °F)

1) In relation to water at 25 °C (77 °F)

9.1.3 Cell constant

$k = 0.57\ cm^{-1}$

9.1.4 Temperature compensation

Pt1000 (Class A according to IEC 60751)

9.2 Performance characteristics

9.2.1 Measuring uncertainty

Each individual sensor is factory-measured in a solution with approx. 50 µS/cm using a reference measuring system traceable to NIST or PTB. The exact cell constant is entered into the manufacturer certificate supplied. The uncertainty of measurement in determining the cell constant is 1.0 %.

9.2.2 Maximum measured error

Conductivity

In the range 5 µS/cm to 1 mS/cm	≤ 2 % of reading
In the range 1 mS/cm to 200 mS/cm	≤ 4 % of reading
Temperature	≤ 1.0 K, in measuring range 0 to 100 °C (32 to 212 °F)

9.2.3 Repeatability

Conductivity	≤ 0.5 % of reading, in specified measuring range
Temperature	≤ 0.5 K

9.3 Environment

9.3.1 Ambient temperature range

−20 to 60 °C (−4 to 140 °F)

9.3.2 Storage temperature

-25 to +80 °C (-13 to +176 °F)

9.3.3 Conditions for outdoor use

If the sensor is used outdoors, the following conditions apply to maintain the confirmed specification:
- Connection via CYK10-A052 cable, use of spacer (protection against loss)
- Maximum 30 minutes
- Maximum twice per week
- Maximum insertion depth 5 m (16.4 ft)
- Maximum medium temperature 50 °C (122 °F)

9.3.4 Humidity

5 to 95 %

9.3.5 Degree of protection

IP 68 / NEMA type 6P (1.9 m water column, 20 °C, 24 h)

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