

Technical Information

Memosens CLL47E

Contacting conductivity sensor for laboratory measurements and random sampling in the field



Digital with Memosens 2.0 technology
4-electrode sensor with large measuring range

Application

For measurements where very diverse conductivities must be measured in one measuring system.

Your benefits

- 4-electrode sensor enables a large measuring range for a wide variety of samples
- Easy to clean thanks to smooth, mechanically polished surfaces, therefore suitable for sticky and viscous samples
- Integrated temperature sensor for automatic temperature compensation
- High measuring accuracy thanks to individually determined cell constant with manufacturer's certificate
- Stainless steel 1.4435 (AISI 316L) satisfies strictest requirements
- IP68 protection

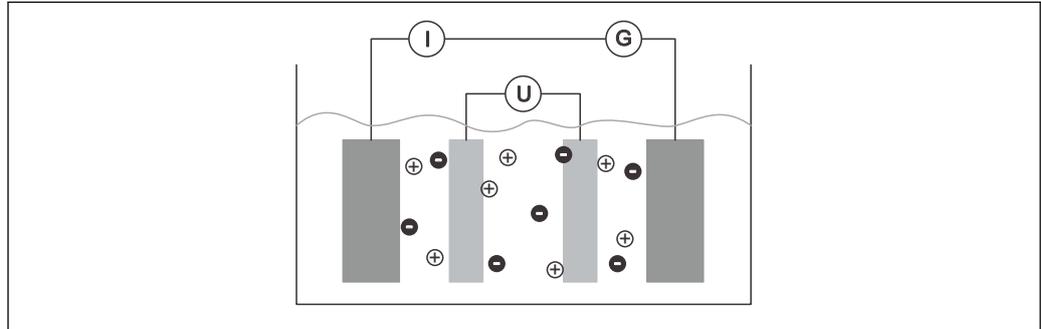
Other advantages of Memosens technology

- Maximum analysis safety with non-contact, inductive signal transmission
- Data security thanks to digital data transmission
- Very easy to use as sensor data saved in the sensor

Function and system design

Measuring principle

The measuring cell has four electrodes. An alternating current is applied via the outer electrode pair. At the same time, the voltage applied is measured at the two inner electrodes. The electrolytic conductivity between the electrodes can be reliably established based on the measured voltage and the current flow caused by the liquid's resistance. The advantage of this technology compared to traditional two-electrode sensors is that electrochemical effects at the live electrodes are suppressed by the two additional voltage measuring electrodes.



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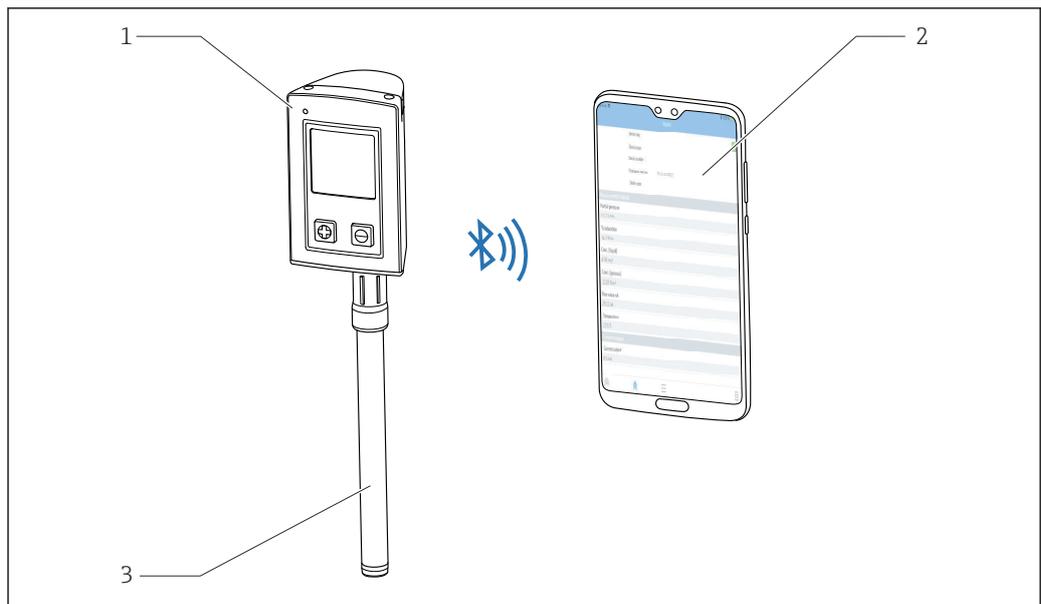
1 Conductivity measurement

I Current intensity measurement

U Voltage measurement

G Generator

Measuring system



A0047553

1 Transmitter CML18

2 Smartphone with Smartblue app (optional)

3 Memosens CLL47E

Communication and data processing

Communication with the handheld device

 Always connect digital laboratory sensors with Memosens technology to a handheld device with Memosens technology, e.g. CML18.

Digital laboratory sensors can store measuring system data in the sensor, including:

- Manufacturer data
 - Serial number
 - Order code
 - Date of manufacture
- Calibration data
 - Calibration date
 - Number of calibrations
 - Serial number of the handheld device used to perform the last calibration or adjustment
- Application data
 - Temperature application range
 - Conductivity application range
 - Date of initial commissioning

Input

Measured variables	<ul style="list-style-type: none"> ▪ Conductivity ▪ Temperature 				
Measuring ranges	<table> <tr> <td>Conductivity¹⁾</td> <td>5 µS/cm to 200 mS/cm</td> </tr> <tr> <td>Temperature</td> <td>0 to 100 °C (32 to 212 °F)</td> </tr> </table> <p>1) In relation to water at 25 °C (77 °F)</p>	Conductivity ¹⁾	5 µS/cm to 200 mS/cm	Temperature	0 to 100 °C (32 to 212 °F)
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Temperature	0 to 100 °C (32 to 212 °F)				
Cell constant	k = 0.57 cm ⁻¹				
Temperature compensation	Pt1000 (Class A according to IEC 60751)				

Performance characteristics

Uncertainty of measurement	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 %.								
Measured error	<table> <tr> <td>Conductivity</td> <td></td> </tr> <tr> <td>In the range 5 µS/cm to 1 mS/cm</td> <td>≤ 2 % of reading</td> </tr> <tr> <td>In the range 1 mS/cm to 200 mS/cm</td> <td>≤ 4 % of reading</td> </tr> <tr> <td>Temperature</td> <td>≤ 1.0 K, in measuring range 0 to 100 °C (32 to 212 °F)</td> </tr> </table>	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)
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Repeatability	<table> <tr> <td>Conductivity</td> <td>≤ 0.5 % of reading, in specified measuring range</td> </tr> <tr> <td>Temperature</td> <td>≤ 0.5 K</td> </tr> </table>	Conductivity	≤ 0.5 % of reading, in specified measuring range	Temperature	≤ 0.5 K				
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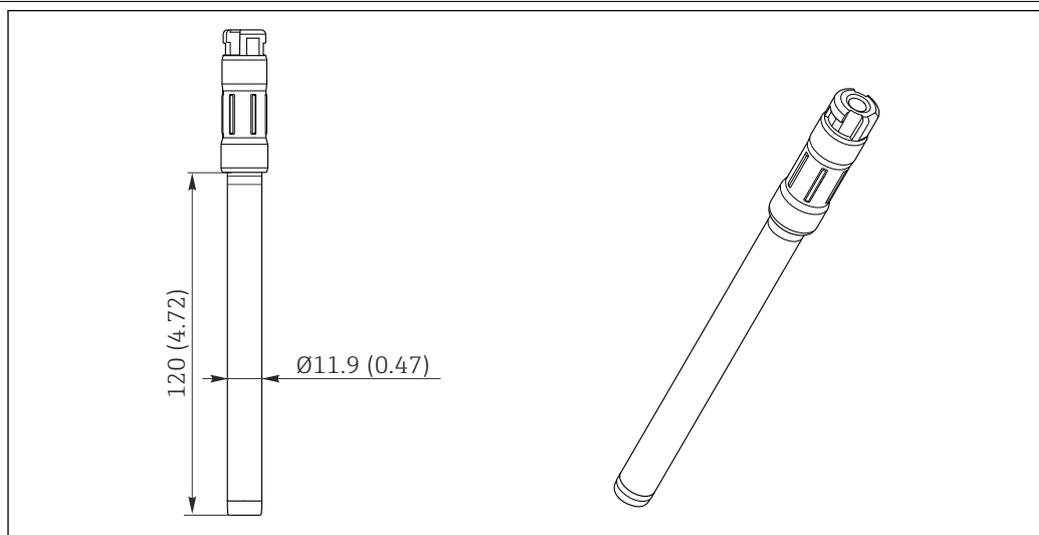
Environment

Ambient temperature	-20 to 60 °C (-4 to 140 °F)
Storage temperature	-25 to +80 °C (-13 to +176 °F)

Conditions for outdoor use	<p>If the sensor is used outdoors, the following conditions apply to maintain the confirmed specification:</p> <ul style="list-style-type: none"> ■ 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)
Humidity	5 to 95 %
Degree of protection	IP 68 / NEMA type 6P (1.9 m water column, 20 °C, 24 h)

Mechanical construction

Dimensions



2 Dimensions. Unit of measurement mm (in)

Weight	Max. 0.06 kg (0.13 lbs)
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Materials (in contact with medium)	Sensor element: Platinum and ceramic (zirconium oxide)
	Process connection: Stainless steel 1.4435 (AISI 316L)

Ordering information

Product page	www.endress.com/cll47e
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Product Configurator	1. Configure: Click this button on the product page.
	2. Select Extended selection . ↳ The Configurator opens in a separate window.
	3. Configure the device according to your requirements by selecting the desired option for each feature. ↳ In this way, you receive a valid and complete order code for the device.

4. **Apply:** Add the configured product to the shopping cart.

 For many products, you also have the option of downloading CAD or 2D drawings of the selected product version.

5. **Show details:** Open this tab for the product in the shopping cart.
 - ↳ The link to the CAD drawing is displayed. If selected, the 3D display format is displayed along with the option to download various formats.

Scope of delivery

The scope of delivery includes:

- Sensor in the version ordered
- Operating Instructions

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.

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

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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

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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

 Operating Instructions BA02002C

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

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www.addresses.endress.com
