TI01397C/07/EN/03.22-00
71601190
2022-11-14

Technical Information
Liquiline Compact CM82

Configurable multi-parameter transmitter for Memosens sensors



Space-saving transmitter for monitoring and controlling processes in industry and the environmental sector

Application

The CM82 transmitter can be used in all sectors and by plant manufacturers in these sectors and supports sensors with the blue Memosens plug-in head:

- pH sensors
- ORP sensors
- pH/ORP combined sensors
- Contacting conductivity sensors
- Oxygen sensors

Direct connection to PLC via:
- 4 to 20 mA
- HART
- Bluetooth® LE interface for commissioning and maintenance

Your benefits

- Space-saving installation and storage:
  - The two-wire device fits into an assembly and does not require a separate power supply.
  - Minimum inventory
- Maximum safety:
  Tried and trusted Memosens technology
- Easy operation
  - Use your existing tablet and smartphone for operation and commissioning.
  - Standardized operating concept across all devices from the Liquiline platform
- Fast and reliable
  A reliable Bluetooth® LE connection allows you to check measuring points that are dangerous or difficult to access from a safe distance.
- Suitable for all locations
  Regardless of whether your measuring point is exposed to dust, steam, rain, snow, heat or cold, the CM82 is always exactly the transmitter you need!

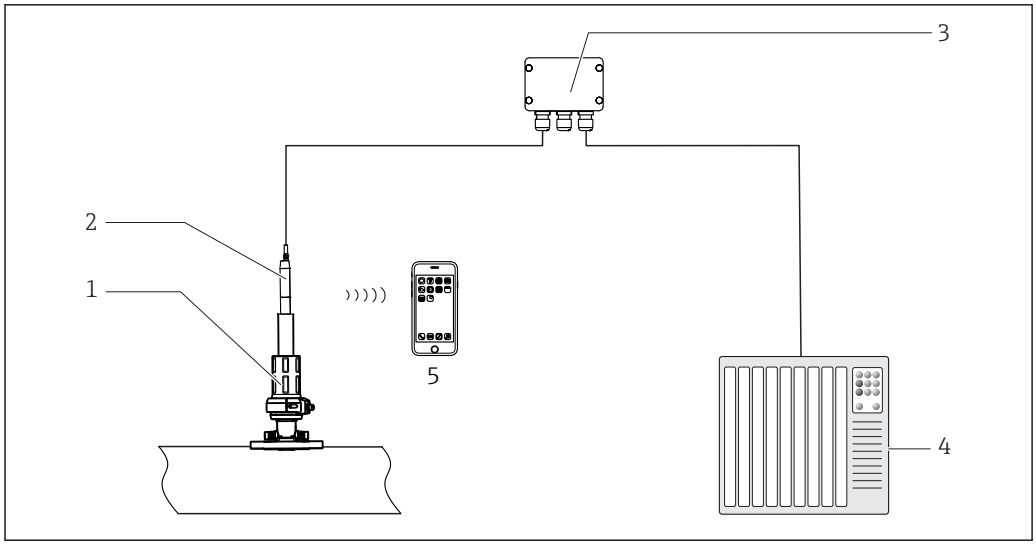
Endress+Hauser
People for Process Automation

Function and system design

Measuring system

The overview shows examples of measuring systems. Other sensors and assemblies can be ordered for conditions specific to your application (www.endress.com/products).

A complete measuring system comprises the following components:
- Liquiline compact transmitter
- Sensors with Memosens technology
- Assemblies to suit the sensors used



1 Example of a measuring system

1 Measuring point with assembly and Memosens sensor
2 Liquiline Compact CM82
3 Junction box, optionally available
4 PLC (programmable logic controller)
5 Bluetooth LE optional for mobile terminals, e.g. tablets

Sensor connection

Sensors with Memosens protocol

Sensor types	Sensors
Digital sensors with inductive Memosens plug-in head	▪ pH sensors ▪ ORP sensors ▪ pH/ORP combined sensors ▪ Oxygen sensors ▪ Conductivity sensors

Application example



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2 *Application example in a fermenter, using a tablet for operation*

Communication and data processing

Communication protocols:
- 4 to 20 mA
- Fieldbus HART
- Bluetooth® LE wireless technology (optional)

The device drivers available make it possible to perform a basic setup and display measured values and diagnostics information via the fieldbus. Full device configuration is possible via the fieldbus and Bluetooth.

Dependability

Reliability

Memosens

Memosens makes your measuring point safer and more reliable:
- Non-contact, digital signal transmission enables optimum galvanic isolation
- No contact corrosion
- Completely watertight
- Sensor can be calibrated in a lab, thus increasing the availability of the measuring point in the process
- Predictive maintenance thanks to recording of sensor data, e.g.:
  - Total hours of operation
  - Hours of operation with very high or very low measured values
  - Hours of operation at high temperatures
  - Number of steam sterilizations
  - Sensor condition



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3 *Plug & Play with Memosens technology*

The status of the transmitter and the connected sensor is indicated by a red/green LED.



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4 *LED display*

USP and EP

- "Water for Injection" (WFI) as per USP <645> and EP
- "Highly Purified Water" (HPW) as per EP
- "Purified Water" (PW) as per EP

The uncompensated conductivity value and the temperature are measured for the USP/EP limit functions. The measured values are compared against the tables defined in the standards. An alarm is triggered if the limit value is exceeded. Furthermore, it is also possible to configure an early warning alarm that signals undesired operating states before they occur.

Security

Safe signal transmission via Bluetooth® LE

Signal transmission via Bluetooth® wireless technology uses a cryptographic technique tested by the Fraunhofer Institute.

Security levels for Endress and Hauser Bluetooth infrastructure: [1]:
- Protocol: **High**
- Algorithms: **High**

Measured against:
- the security objectives, e.g. confidentiality, integrity, availability, etc.
- the risk analysis, e.g. key distribution, authentication, password recovery, etc.
- the attack model, e.g. motivation for attack, time required, expertise in electronics, etc.
- the weak-point analysis

For comparison: The general Bluetooth standard is classified as "Low".

Protection against unauthorized access:
- Password-protected
- Without the SmartBlue app, the device is not visible via Bluetooth® wireless technology.
- Only one point-to-point connection is established between a sensor and a smartphone or tablet.
- The Bluetooth® wireless technology interface can be disabled via SmartBlue.
- Bluetooth® is optional. The device can be ordered with this functionality enabled.
  If ordered with Bluetooth® disabled, Bluetooth® can be enabled at a later stage by means of an activation code (accessory kit) linked to the serial number.
- A disabled Bluetooth® interface can be re-enabled only via HART.

Measured value compensation

pH:
Temperature

Oxygen:
- Temperature
- Air pressure

1) Multi-level scale for security assessments in accordance with Fraunhofer AISEC cryptographic technique: "Very low", "Low", "High", "Very high"

Conductivity:
Temperature
Various methods are available to compensate for the temperature dependency:
- Linear
- NaCl (IEC 746-3)
- Water ISO7888 (20°C)
- Water ISO7888 (25°C)
- Ultrapure water (NaCl)
- Ultrapure water (HCl)

IT security

Our warranty is valid only if the product is installed and used as described in the Operating Instructions. The product is equipped with security mechanisms to protect it against any inadvertent changes to the settings.

IT security measures, which provide additional protection for the product and associated data transfer, must be implemented by the operators themselves in line with their security standards.

Input

Measured variable

The transmitter is designed for digital Memosens sensors with an inductive plug-in head:
- pH
- ORP
- pH/ORP combined sensors
- Conductive conductivity
- Dissolved oxygen

Measuring range

→ Documentation of the connected sensor

Type of input

Digital sensor inputs for Memosens-sensors

Output

Output signal

4 … 20 mA/HART, galvanically isolated from the sensor circuits

Linearization

Linear

Transmission behavior

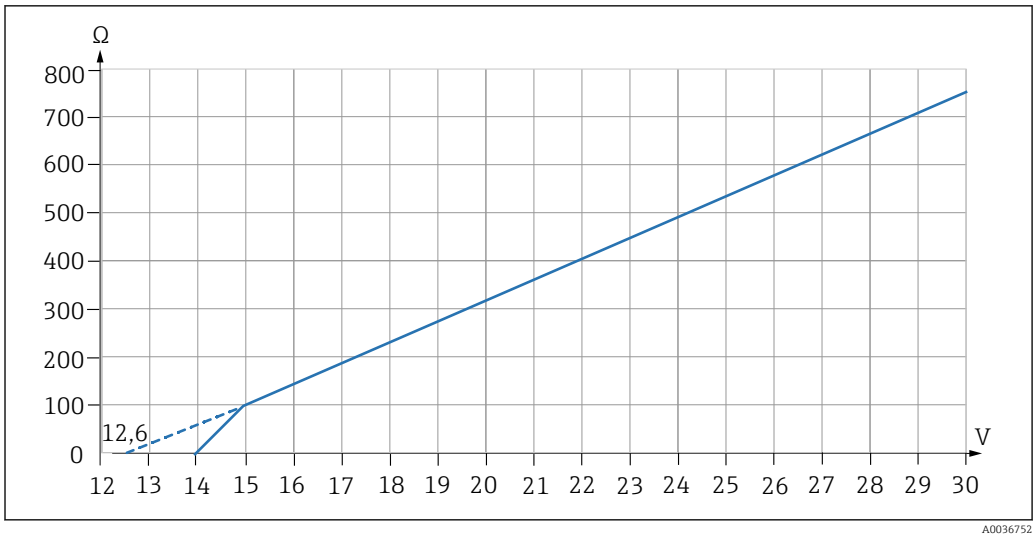
Linear

Power supply

Supply voltage

12.6 to 30 VDC (when failure current setting > 20 mA)

14 to 30 VDC (when failure current setting < 4 mA)



5 *Supply voltage and load*

The lower voltage value in each case applies only to a load resistance of 0 Ohm.

NOTICE

The device does not have a power switch

▶ 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.

Cable specification

Cable length:
- Max. 3 m (10 ft)
- Max. 7 m (23 ft)
- Max. 15 m (49 ft)

Overvoltage protection

IEC 61 000-4-4 and IEC 61 000-4-5 with +/- 1 kV

Performance characteristics

Resolution

Current output

< 5 µA

Repeatability

→ Documentation of the connected sensor

Response time

Current output

t_{90} = max. 500 ms for an increase from 0 to 20 mA

Tolerance

Current output

Typical measuring tolerances:
< ±20 µA (if current value = 4 mA)
< ±50 µA (for current values 4 to 20 mA)
at 25 °C (77 °F) each

additional tolerance depending on the temperature:
< 1.5 µA/K

Environment

Ambient temperature range

–20 to 85 °C (–4 to 185 °F)

The maximum ambient temperature depends on the process temperature and the transmitter's installation position.

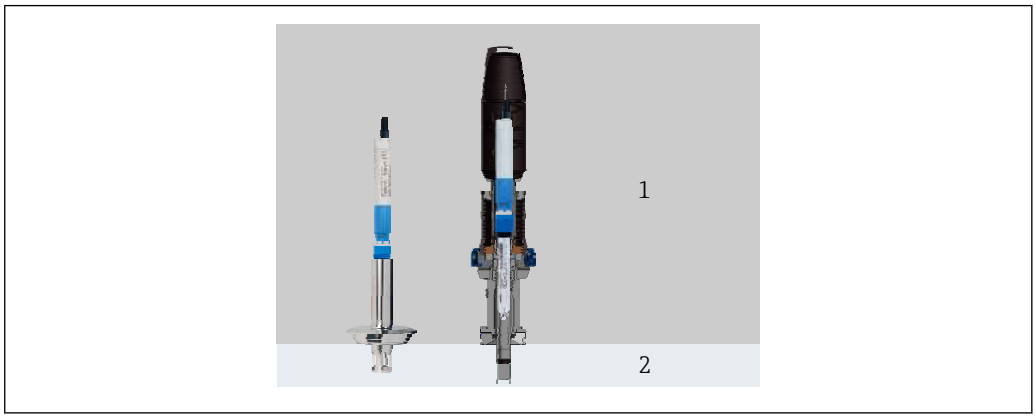
► Make sure that the ambient temperature at the transmitter does not exceed 85 °C (185 °F).

Example for ambient conditions in Endress+Hauser assemblies:
- for open installation (without protective cover, i.e. free convection at the transmitter), e.g. CPA442, CPA842
- for enclosed installation (with protective cover), e.g. CPA871, CPA875, CPA842

$T_{ambient}$ = max. 60 °C (140 °F)

$T_{process}$ = max. 100 °C (212 °F), in continuous operation

$T_{process}$ = max. 140 °C (284 °F), < 2h (for sterilization)



6 Installation position of transmitter with or without protective cover

1 Ambient temperature $T_{ambient}$
2 Process temperature $T_{process}$

Storage temperature

-40 to +85 °C (-40 to 185 °F)

Relative humidity

5 to 95 %

Degree of protection

IP 67

IP 68

NEMA Type 6

Electromagnetic compatibility (EMC)

- EN 61326-1
- EN 61326-2-3
- EN 301489-1
- EN 301489-17
- NAMUR NE 21

Electrical safety

EN 61010-1

Operating height

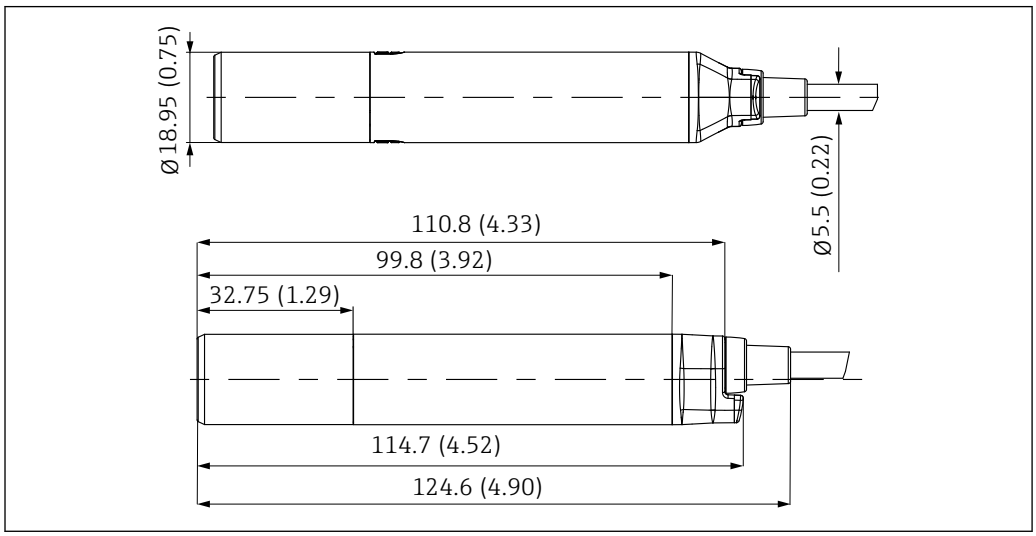
< 2000 m (< 6562 ft) above MSL

Pollution degree

Complete device:	Pollution level 4
Internal:	Pollution level 2

Mechanical construction

Dimensions



7 Dimensions in mm (inch)

Materials

Components	Material
Housing, cover	Peek 151
Strain relief	EPDM (peroxide crosslinked)
Axial ring	Peek 450 G
Optical waveguide	PC transparent

Impact loads

The product is designed for mechanical impact loads of 1 J (IK06) as per the requirements of EN 61010-1.

Weight

without cable	Approx. 42 g (1.5 oz)
3 m (9 f) cable	Approx. 190 g (7 oz)
7 m (23 f) cable	Approx. 380 g (13 oz)
15 m (49 f) cable	Approx. 760 g (27 oz)
For every 1 m (3 f) of cable	Approx. 48 g (2 oz)

Operability

Operating concept

- Bluetooth® LE wireless technology
- HART

Operation via SmartBlue (app)

SmartBlue is available as a download for Android terminals from the Google Play Store and for iOS devices in the App Store.

If you scan the QR code, you will be brought directly to the app:



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8 Download links



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9 SmartBlue app



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10 Livelist

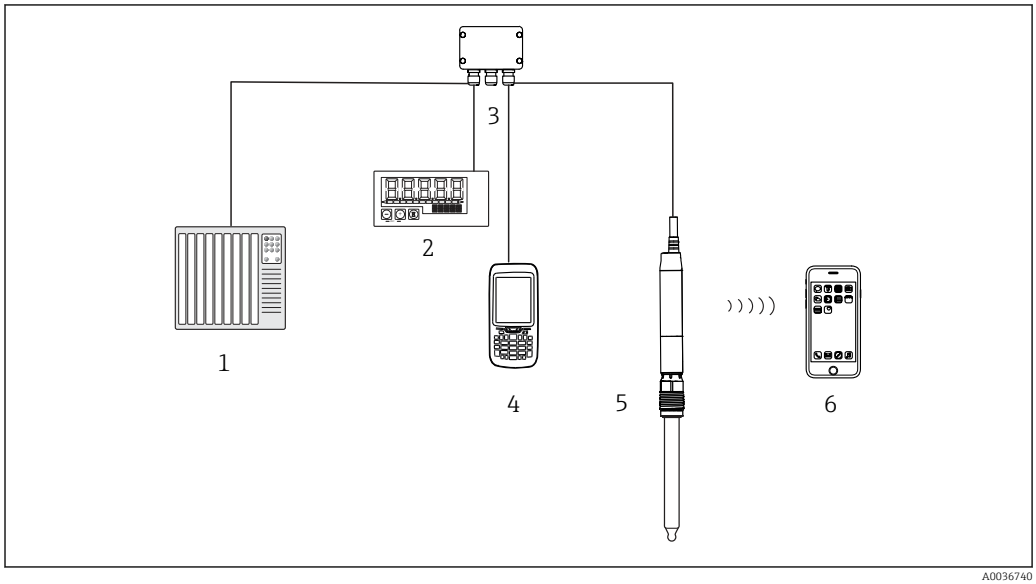
The Livelist displays all of the devices that are within range.

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
- Android devices: from Android 4.4 KitKat and Bluetooth® 4.0

Remote operation

HART



11 *Wiring options for remote operation via HART protocol*

1 *PLC (programmable logic control)*
2 *RIA15 loop-powered process indicator, optional*
3 *Junction box*
4 *HART operating device (e.g. Fieldcare), optional*
5 *Transmitter with optional Bluetooth® LE wireless technology*
6 *Optional: Smartphone / tablet with SmartBlue (app)*

Certificates and approvals

Current certificates and approvals that are available for the product can be selected via the Product Configurator at www.endress.com:

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Configuration**.

Radio standards

- EN 300 328 (Europe)
- 47 CFR 15.247 (United States)
- RSS-247 Issue 1 (Canada)
- RSS-GEN Issue 4 (Canada)
- 202-LSF040 (Japan)
- CMIIT ID: 2017DJ6495 (China)
- R-CRM-E1H-CM82A (South Korea)
- Anatel 00182-18-11036 (Brazil)
- IFETEL: RCPENCM18-0926-A1 (Mexico)
- SDoC procedure (Thailand)
- IMDA Standards DA108204 (Singapore)
- CNC ID: C-23309 (Argentina)

Ordering information

Product page

www.endress.com/CM82

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:
- CM82
- Brief Operating Instructions

Accessories

Device-specific accessories

Sensors

pH glass electrodes

Memosens CPS11E
- pH sensor for standard applications in process and environmental engineering
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps11e

Technical Information TI01493C

Memosens CPS31E
- pH sensor for standard applications in drinking water and swimming pool water
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps31e

Technical Information TI01574C

Memosens CPS41E
- pH sensor for process technology
- With ceramic junction and KCl liquid electrolyte
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps41e

Technical Information TI01495C

Memosens CPS71E
- pH sensor for chemical process applications
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps71e

Technical Information TI01496C

Memosens CPS171D
- pH electrode for bio-fermenters with digital Memosens technology
- Product Configurator on the product page: www.endress.com/cps171d

Technical Information TI01254C

Memosens CPS91E
- pH sensor for heavily polluted media
- With open aperture
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps91e

Technical Information TI01497C

Memosens CPF81E
- pH sensor for mining operations, industrial water and wastewater treatment
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cpf81e

Technical Information TI01594C

Enamel pH electrodes

Ceramax CPS341D
- pH electrode with pH-sensitive enamel
- Meets highest demands of measuring accuracy, pressure, temperature, sterility and durability
- Product Configurator on the product page: www.endress.com/cps341d

Technical Information TI00468C

ORP sensors

Memosens CPS12E
- ORP sensor for standard applications in process and environmental engineering
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps12e

Technical Information TI01494C

Memosens CPS42E
- ORP sensor for process technology
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps42e

Technical Information TI01575C

Ceragel CPS72D
- ORP electrode with reference system including ion trap
- Product Configurator on the product page: www.endress.com/cps72d

Technical Information TI00374C

Memosens CPF82E
- ORP sensor for mining operations, industrial water and wastewater treatment
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cpf82e

Technical Information TI01595C

Orbipore CPS92D
- ORP electrode with open aperture for media with high dirt load
- Product Configurator on the product page: www.endress.com/cps92d

Technical Information TI00435C

pH-ISFET sensors

Tophit CPS441D
- Sterilizable ISFET sensor for low-conductivity media
- Liquid KCl electrolyte
- Product Configurator on the product page: www.endress.com/cps441d

Technical Information TI00352C

Tophit CPS471D
- Sterilizable and autoclavable ISFET sensor for food and pharmaceutics, process engineering
- Water treatment and biotechnology
- Product Configurator on the product page: www.endress.com/cps471d

Technical Information TI00283C

Tophit CPS491D
- ISFET sensor with open aperture for media with high dirt load
- Product Configurator on the product page: www.endress.com/cps491d

Technical Information TI00377C

pH/ORP combined sensors

Memosens CPS16E
- pH/ORP sensor for standard applications in process technology and environmental engineering
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps16e

Technical Information TI01600C

Memosens CPS76E
- pH/ORP sensor for process technology
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps76e

Technical Information TI01601C

Memosens CPS96E
- pH/ORP sensor for heavily polluted media and suspended solids
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps96e

Technical Information TI01602C

Conductivity sensors with conductive measurement of conductivity

Memosens CLS15E
- Digital conductivity sensor for measurements in pure and ultrapure water
- Conductive measurement
- With Memosens 2.0
- Product Configurator on the product page: www.endress.com/cls15e

Technical Information TI01526C

Memosens CLS16E
- Digital conductivity sensor for measurements in pure and ultrapure water
- Conductive measurement
- With Memosens 2.0
- Product Configurator on the product page: www.endress.com/cls16e

Technical Information TI01527C

Memosens CLS21E
- Digital conductivity sensor for media with medium or high conductivity
- Conductive measurement
- With Memosens 2.0
- Product Configurator on the product page: www.endress.com/cls21e

Technical Information TI01528C

Memosens CLS82E
- Hygienic conductivity sensor
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cls82e

Technical Information TI01529C

Oxygen sensors

Memosens COS22E
- Hygienic amperometric oxygen sensor with maximum measurement stability over multiple sterilization cycles
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cos22e

Technical Information TI01619C

Memosens COS51E
- Amperometric oxygen sensor for water, wastewater and utilities
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cos51e

Technical Information TI01620C

Memosens COS81E
- Hygienic optical oxygen sensor with maximum measurement stability over multiple sterilization cycles
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cos81e

Technical Information TI01558C

Software

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

DeviceCare SFE100
Configuration tool for HART, PROFIBUS and FOUNDATION Fieldbus field devices
DeviceCare is available for download at www.software-products.endress.com. You need to register in the Endress+Hauser software portal to download the application.

Technical Information TI01134S

Other accessories

Activation codes

You must quote the serial number of the device when ordering the activation code.

Activation code: Bluetooth
Order No. 71401176

Cable junction with Velcro strip

Cable junction with Velcro strip
- 4 pieces, for sensor cable
- Order No. 71092051

Communication-specific accessories

Commubox FXA195
Intrinsically safe HART communication with FieldCare via the USB port

Technical Information TI00404F

Wireless HART adapter SWA70
- Wireless device connection
- Easily integrated, offers data protection and transmission safety, can be operated in parallel with other wireless networks, minimum cabling complexity

Technical Information TI00061S

System components

RIA15

- Process display unit, Digital display unit for integration into 4-20 mA circuits
- Panel mounting
- With optional HART communication

Technical Information TI01043K



www.addresses.endress.com

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