Technical Information
Liquiline Compact CM72

Permanently preconfigured single-parameter transmitter for Memosens sensors

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

Application

The CM72 can be used in all sectors and by plant manufacturers in these sectors and supports all sensors with the blue Memosens plug-in head:

- pH, ORP and pH-ORP combined electrodes
- Conductive conductivity
- Oxygen

Direct connection to PLC via:
4 to 20 mA

Your benefits

- Space-saving installation:
  - The two-wire device fits into an assembly and does not require a separate power supply.
  - Minimum inventory
- Fast commissioning and maintenance:
  - Thanks to its permanent configuration, the CM72 does not need to be commissioned and can start measurement immediately.
  - All of the benefits of Memosens technology: lab-calibrated sensors, hot plug & play
  - The status of the transmitter and the connected sensor is indicated by a red/green LED.
- Suitable for all locations
  Regardless of whether your measuring point is exposed to dust, steam, rain, snow, heat or cold, the CM72 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:
- Liquiline compact transmitter
- Sensors with Memosens technology
- Assemblies to suit the sensors used
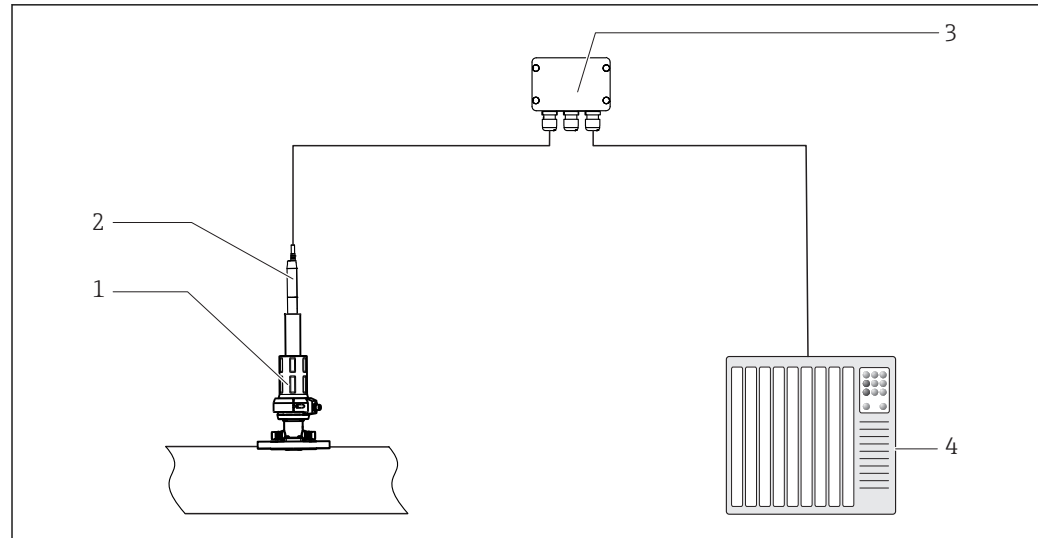
⊡ *1   Example of a measuring system*

1   Measuring point with assembly and Memosens sensor
2   Liquiline Compact CM72
2   Junction box (optional)
3   PLC (programmable logic control)

Communication and data processing

Types of communication:
4 to 20 mA

ℹ️ For configuration with the measured value and the current output turndown, select the option in the order structure when ordering. This cannot be changed at a later stage.

Dependability

Reliability

Memosens MEMO SENS

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

A0035116

⊞ 2   Plug & Play with Memosens technology

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

A0036843

⊞ 3   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.

| Safety | **Measured value compensation** |

pH:
Temperature

Oxygen:
- Temperature
- Air pressure

Conductivity:
Temperature
Various methods are available to compensate for the temperature dependency:
– Linear
– NaCl (IEC 746-3)
– Water ISO7888 (20℃)
– Water ISO7888 (25℃)

# Input

Measured values	The transmitter is designed for digital Memosens sensors with inductive plug-in head: • pH, ORP. pH/ORP combined sensors • Conductive Conductivity • Dissolved oxygen Depending on the order version, the measuring range is configured to suit the sensor type: • pH sensor: 0 to 14 pH • ORP: -1500 mV to +1500 mV • Conductivity: 0 to 20 µS/cm • Conductivity: 0 to 500 µS/cm • Conductivity: 0 to 20 mS/cm • Conductivity: 0 to 500 mS/cm • Oxygen: 0 to 200 µg/l • Oxygen: 0 to 20 mg/l
Measuring ranges	→ Documentation of the connected sensor
Types of input	Digital sensor inputs for Memosens-sensors
Cable specification	**Cable length:** • Max. 3 m (10 ft) • Max. 7 m (23 ft) • Max. 15 m (49 ft)

Output

Output signal	4 ... 20 mA, galvanically isolated from the sensor circuits
Linearization/transmission behavior	Linear

Power supply

Supply voltage	12.6 to 30 VDC (with setting error current > 20 mA) 14 to 30 VDC (with setting error current < 4 mA)
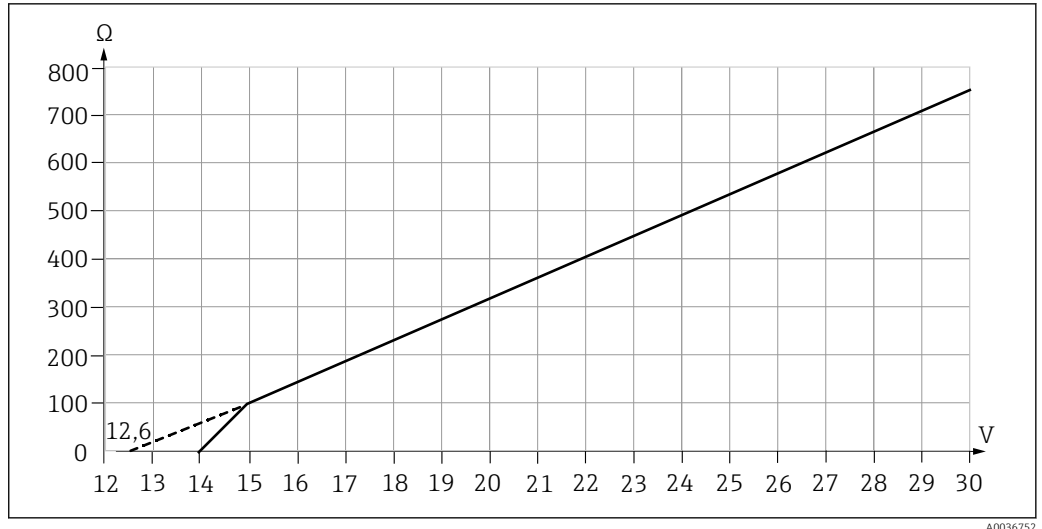
⊠ 4   *Supply voltage and load*

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.

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

Sensor connection	*Sensors with Memosens protocol*

Sensor types	Sensors
Digital Sensors with inductive memosens plug head	• pH sensors • ORP sensors • pH/ORP combination sensors • Oxygen sensors • Conductivity sensors

Performance characteristics

Response time of current output	t_{90} = max. 500 ms for an increase from 0 to 20 mA

Tolerance of 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

Resolution of current output	< 5 µA

Repeatability	→ Documentation of the connected sensor

Environment

Ambient temperature range	-20 to +85 ℃ (0 to 185 ℉)

ℹ️ The maximum ambient temperature depends on the process temperature and the installation situation of the transmitter.

Make sure that the ambient temperature at the transmitter does not exceed +85 ℃ (185 ℉).
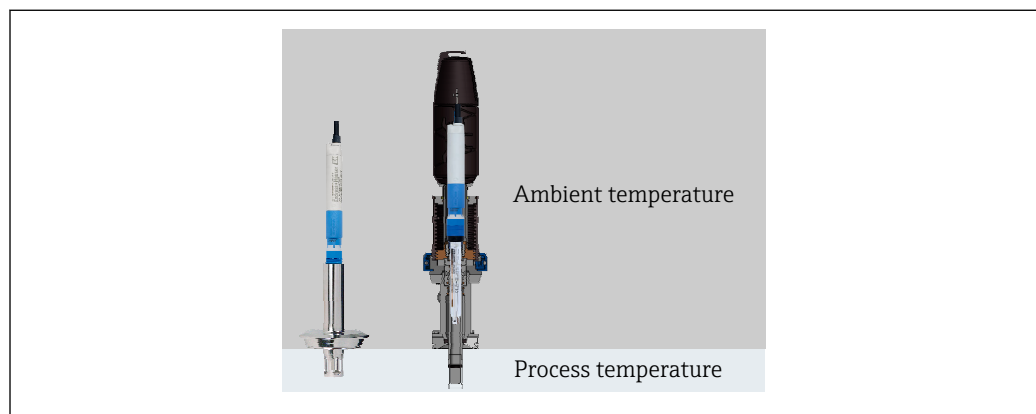
Example of environmental conditions in Endress+Hauser fittings:
- with open installation (without protective cover, i.e. free convection at the transmitter), e.g. CPA442, CPA842
- for enclosed installation (with protective cover), e.g. CPA871, CPA875, CPA842

$T_{ambient}$ = max. 60 ℃ (140 ℉)

$T_{prozess}$ = max. 100 ℃ (212 ℉), in continuous operation

$T_{prozess}$ = max. 140 ℃ (284 ℉), < 2h (for sterilization)

A0036933-EN

🖼 *5   Mounting situation of the transmitter with or without protective cover*

Storage temperature	-40 to +85 ℃ (-40 to 185 ℉)

Humidity	5 to 95 %

Degree of protection	IP 67
	IP 68
	NEMA Type 6

Electromagnetic compatibility	• EN 61326-1 • EN 61326-2-3 • NAMUR NE 21

Electrical safety	EN 61010-1

Max. altitude above MSL	< 2000 m (< 6562 ft) above MSL

Degree of contamination	Complete device:	Pollution level 4
	Internal:	Pollution level 2

Mechanical construction

Dimensions

⌀ 18.95 (0.75)

⌀ 5.5 (0.22)

110.8 (4.33)

99.8 (3.92)

32.75 (1.29)

114.7 (4.52)

124.6 (4.90)
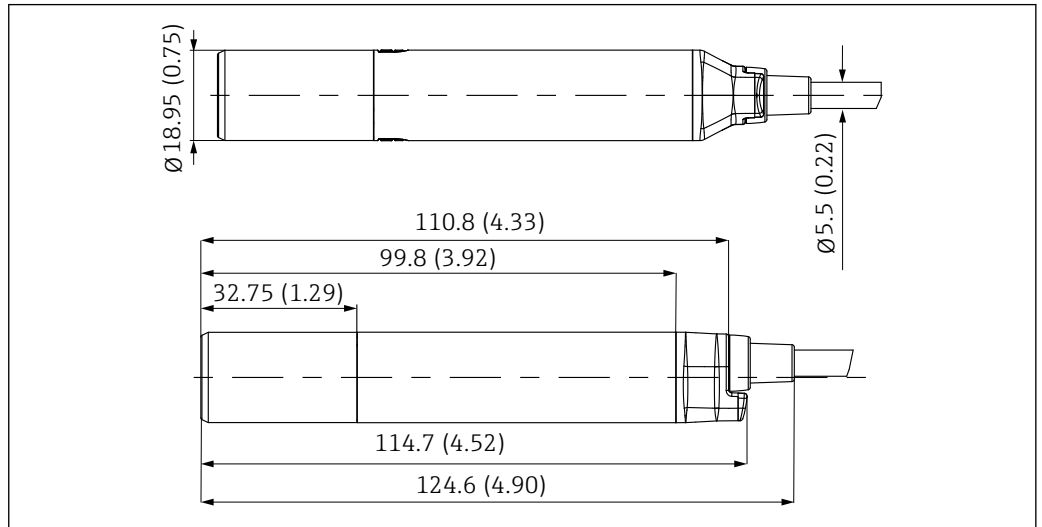
A0033272

🖸 *6   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 EN61010-1.

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

ℹ️ For configuration with the measured value and the current output turndown, select the option in the order structure when ordering. This cannot be changed at a later stage.

Certificates and approvals

C€ mark

The product meets the requirements of the harmonized European standards. As such, it complies with the legal specifications of the EU directives. The manufacturer confirms successful testing of the product by affixing to it the C€ mark.

Ordering information

Product page	www.endress.com/CM72

Product Configurator	On the product page there is a **Configure** button to the right of the product image.

1. Click this button.
   ↳ The Configurator opens in a separate window.
2. Select all the options to configure the device in line with your requirements.
   ↳ In this way, you receive a valid and complete order code for the device.
3. Export the order code as a PDF or Excel file. To do so, click the appropriate button on the right above the selection window.

For many products you also have the option of downloading CAD or 2D drawings of the selected product version. Click the **CAD** tab for this and select the desired file type using picklists.

Scope of delivery	The scope of delivery includes:

- CM72
- Brief Operating Instructions

Accessories

Sensors

Glass electrodes

Orbisint CPS11D
- pH electrode for process technology
- Optional SIL version for connecting to SIL transmitter
- With dirt-repellent PTFE diaphragm
- Product Configurator on the product page: www.endress.com/cps11d

Technical Information TI00028C

Memosens CPS31D
- pH electrode with gel-filled reference system with ceramic diaphragm
- Product Configurator on the product page: www.endress.com/cps31d

Technical Information TI00030C

Ceraliquid CPS41D
- pH electrode with ceramic junction and KCl liquid electrolyte
- Product Configurator on the product page: www.endress.com/cps41d

Technical Information TI00079C

Ceragel CPS71D
- pH electrode with reference system including ion trap
- Product Configurator on the product page: www.endress.com/cps71d

Technical Information TI00245C

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

Technical Information TI01254C

Orbipore CPS91D
- pH electrode with open aperture for media with high dirt load
- Product Configurator on the product page: www.endress.com/cps91d

Technical Information TI00375C

Orbipac CPF81D
- Compact pH sensor for installation or immersion operation
- In industrial water and wastewater
- Product Configurator on the product page: www.endress.com/cpf81d

Technical Information TI00191C

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

Orbisint CPS12D
- ORP sensor for process technology
- Product Configurator on the product page: www.endress.com/cps12d

Technical Information TI00367C

Ceraliquid CPS42D
- ORP electrode with ceramic junction and KCl liquid electrolyte
- Product Configurator on the product page: www.endress.com/cps42d

Technical Information TI00373C

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

Technical Information TI00374C

Orbipac CPF82D
- Compact ORP sensor for installation or immersion operation in process water and wastewater
- Product Configurator on the product page: www.endress.com/cpf82d

Technical Information TI00191C

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 and ORP combined sensors

Memosens CPS16D
- Combined pH/ORP sensor for process technology
- With dirt-repellent PTFE diaphragm
- With Memosens technology
- Product Configurator on the product page: www.endress.com/cps16D

📖 Technical Information TI00503C

Memosens CPS76D
- Combined pH/ORP sensor for process technology
- Hygienic and sterile applications
- With Memosens technology
- Product Configurator on the product page: www.endress.com/cps76d

📖 Technical Information TI00506C

Memosens CPS96D
- Combined pH/ORP sensor for chemical processes
- With poison-resistant reference with ion trap
- With Memosens technology
- Product Configurator on the product page: www.endress.com/cps96d

📖 Technical Information TI00507C

Conductivity sensors with conductive measurement of conductivity

Condumax CLS15D
- Conductive conductivity sensor
- For pure water, ultrapure water and Ex applications
- Product Configurator on the product page: www.endress.com/CLS15d

📖 Technical Information TI00109C

Condumax CLS16D
- Hygienic, conductive conductivity sensor
- For pure water, ultrapure water and Ex applications
- With EHEDG and 3A approval
- Product Configurator on the product page: www.endress.com/CLS16d

📖 Technical Information TI00227C

Condumax CLS21D
- Two-electrode sensor in plug-in head version version
- Product Configurator on the product page: www.endress.com/CLS21d

📖 Technical Information TI00085C

Memosens CLS82D
- Four-electrode sensor
- With Memosens technology
- Product Configurator on the product page: www.endress.com/cls82d

📖 Technical Information TI01188C

Oxygen sensors

Oxymax COS22D
- Sterilizable sensor for dissolved oxygen
- With Memosens technology or as an analog sensor
- Product Configurator on the product page: www.endress.com/cos22d

📖 Technical Information TI00446C

Oxymax COS51D
- Amperometric sensor for dissolved oxygen
- With Memosens technology
- Product Configurator on the product page: www.endress.com/cos51d

📖 Technical Information TI00413C

Memosens COS81D
- Sterilizable, optical sensor for dissolved oxygen
- With Memosens technology
- Product Configurator on the product page: www.endress.com/cos81d

📖 Technical Information TI01201C

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

Other accessories

Cable junction with Velcro strip

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

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

Endress+Hauser

People for Process Automation

www.addresses.endress.com