

# Technical Information

## Liquiline Compact CM72

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!

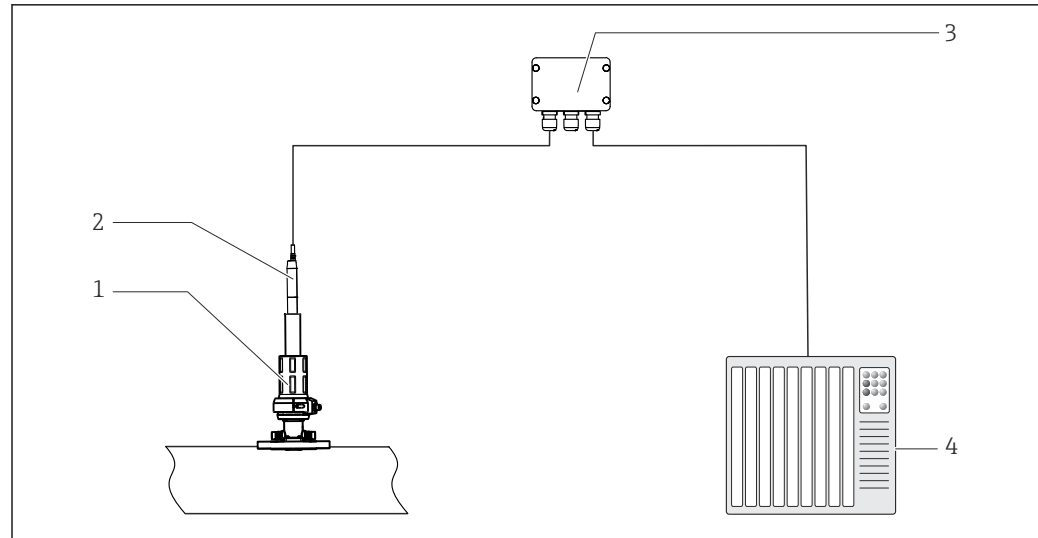
## Function and system design

### 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](http://www.endress.com/products)).

A complete measuring system comprises:

- Liquiline compact transmitter
- Sensors with Memosens technology
- Assemblies to suit the sensors used



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1 Example of a measuring system

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

## Communication and data processing

**Types of communication:**

4 to 20 mA

**i** 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

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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2 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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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.

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**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°C)
- Water ISO7888 (25°C)

## Input

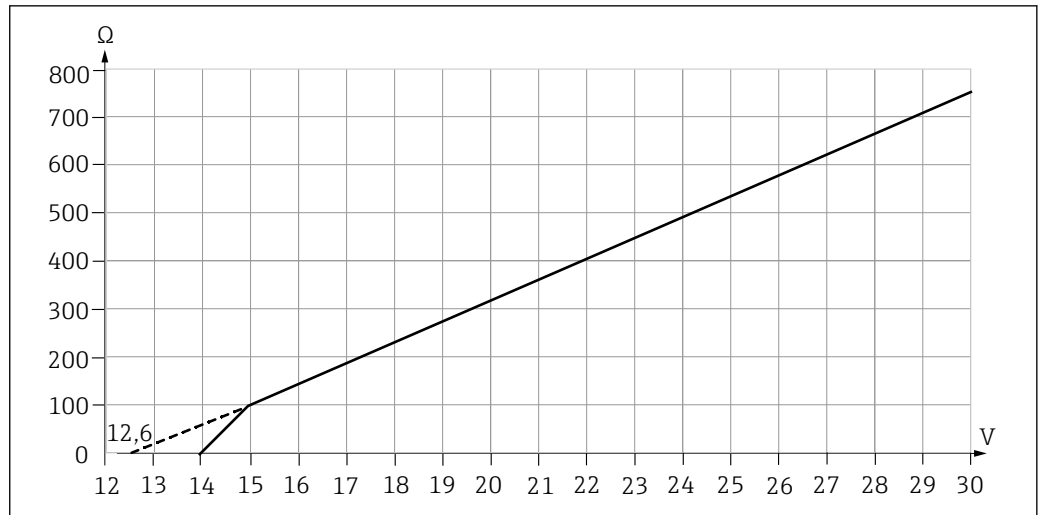
<b>Measured variables</b>	<p>The transmitter is designed for digital Memosens sensors with inductive plug-in head:</p> <ul style="list-style-type: none"> <li>■ pH, ORP, pH/ORP combined sensors</li> <li>■ Conductive conductivity</li> <li>■ Dissolved oxygen</li> </ul> <p>Depending on the order version, the measuring range is configured to suit the sensor type:</p> <ul style="list-style-type: none"> <li>■ pH sensor: 0 to 14 pH</li> <li>■ ORP: -1500 mV to +1500 mV</li> <li>■ Conductivity: 0 to 20 <math>\mu\text{S}/\text{cm}</math></li> <li>■ Conductivity: 0 to 500 <math>\mu\text{S}/\text{cm}</math></li> <li>■ Conductivity: 0 to 20 <math>\text{mS}/\text{cm}</math></li> <li>■ Conductivity: 0 to 500 <math>\text{mS}/\text{cm}</math></li> <li>■ Oxygen: 0 to 200 <math>\mu\text{g}/\text{l}</math></li> <li>■ Oxygen: 0 to 20 <math>\text{mg}/\text{l}</math></li> </ul>
<b>Measuring ranges</b>	→ Documentation of the connected sensor
<b>Types of input</b>	Digital sensor inputs for Memosens-sensors
<b>Cable specification</b>	<p><b>Cable length:</b></p> <ul style="list-style-type: none"> <li>■ Max. 3 m (10 ft)</li> <li>■ Max. 7 m (23 ft)</li> <li>■ Max. 15 m (49 ft)</li> </ul>

## Output

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

## Power supply

<b>Supply voltage</b>	<p>12.6 to 30 VDC (with setting error current &gt; 20 mA)</p> <p>14 to 30 VDC (with setting error current &lt; 4 mA)</p>
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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	<ul style="list-style-type: none"> <li>■ pH sensors</li> <li>■ ORP sensors</li> <li>■ pH/ORP combination sensors</li> <li>■ Oxygen sensors</li> <li>■ Conductivity sensors</li> </ul>

## 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:**  
 <  $\pm 20 \mu A$  (if current value = 4 mA)  
 <  $\pm 50 \mu A$  (for current values 4 to 20 mA)  
 at 25 °C (77 ° F) each  
**additional tolerance depending on the temperature:**  
 <  $1.5 \mu A/K$

**Resolution of current output** < 5  $\mu A$

**Repeatability** → Documentation of the connected sensor

## Environment

**Ambient temperature** -20 to 85 °C (-4 to 185 °F)

**i** The maximum ambient temperature depends on the process temperature and the installation position of the transmitter.

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

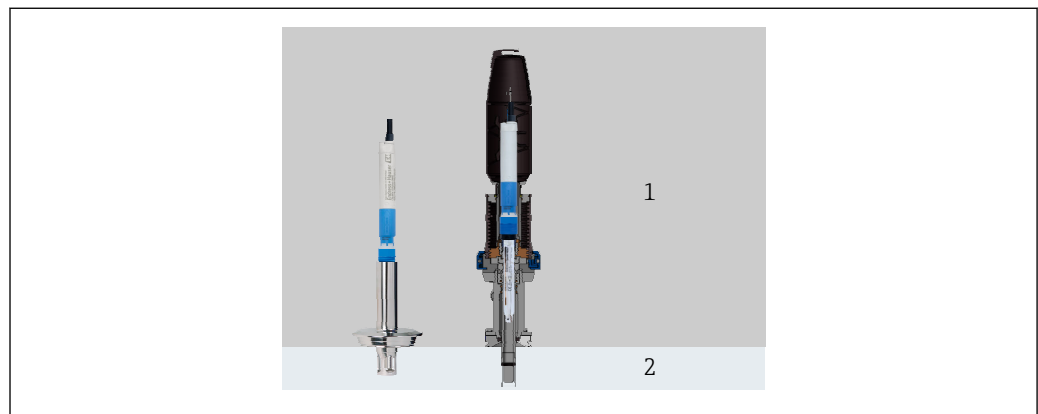
Example of ambient conditions in Endress+Hauser assemblies:

- 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

$T_{\text{ambient}} = \text{max. } 60 \text{ } ^\circ\text{C} (140 \text{ } ^\circ\text{F})$

$T_{\text{process}} = \text{max. } 100 \text{ } ^\circ\text{C} (212 \text{ } ^\circ\text{F})$ , in continuous operation

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



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**5** Installation position of transmitter with or without protective sleeve

1 Ambient temperature

2 Process temperature

**Storage temperature** -40 to +85 °C (-40 to 185 °F)

**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

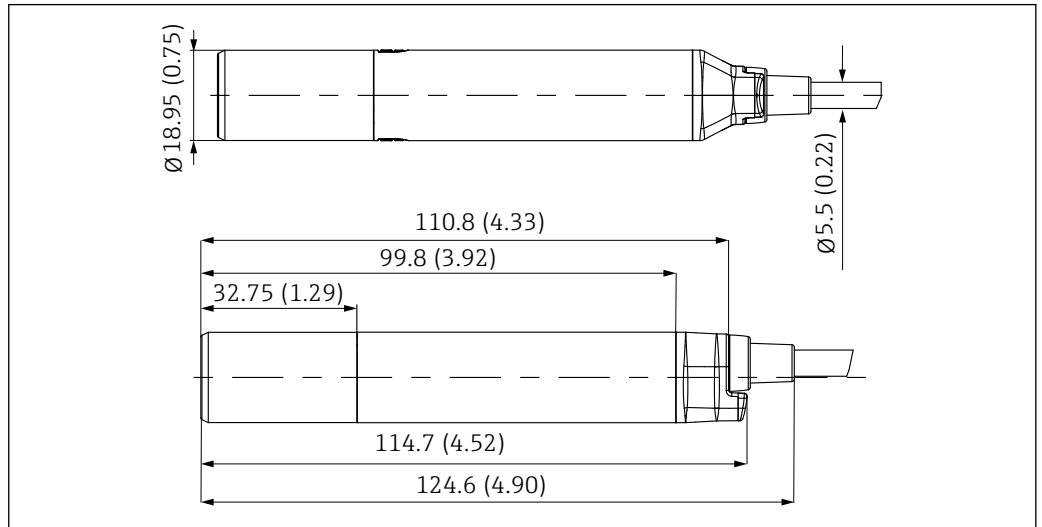
**Max. altitude above MSL** < 2000 m (< 6562 ft) above MSL

**Pollution degree**

Complete device:	Pollution level 4
Internal:	Pollution level 2

## Mechanical construction

### Dimensions



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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

**i** 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

Current certificates and approvals for the product are available via the Product Configurator at [www.endress.com](http://www.endress.com).

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

The **Configuration** button opens the Product Configurator.


## Ordering information

### Product page

[www.endress.com/CM72](http://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 sensor for process technology
- With dirt-repellent PTFE diaphragm
- Product Configurator on the product page: [www.endress.com/cps11d](http://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](http://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](http://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](http://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](http://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](http://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](http://www.endress.com/cpf81d)



Technical Information TI00191C

#### **Orbisint CPS11D**

- pH sensor for process technology
- With dirt-repellent PTFE diaphragm
- Product Configurator on the product page: [www.endress.com/cps11d](http://www.endress.com/cps11d)



Technical Information TI00028C

#### **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](http://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](http://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](http://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](http://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](http://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](http://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](http://www.endress.com/cps441d)



Technical Information TI00352C

**Tophit CPS471D**

- Sterilizable and autoclavable ISFET sensor for food and pharmaceuticals, process engineering
- Water treatment and biotechnology
- Product Configurator on the product page: [www.endress.com/cps471d](http://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](http://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](http://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](http://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](http://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 hazardous area applications
- Product Configurator on the product page: [www.endress.com/CLS15d](http://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](http://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](http://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](http://www.endress.com/cls82d)



Technical Information TI01188C

### Oxygen sensors

#### Oxymax COS22D

- Sterilizable sensor for dissolved oxygen
- With Memosens technology
- Product Configurator on the product page: [www.endress.com/cos22d](http://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](http://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](http://www.endress.com/cos81d)



Technical Information TI01201C

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### 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](http://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](http://www.software-products.endress.com). You need to register in the Endress+Hauser software portal to download the application.



Technical Information TI01134S

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### 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



[www.addresses.endress.com](http://www.addresses.endress.com)

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