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 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
- Contacting conductivity sensors
- Oxygen sensors

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).

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

Sensor connection

Sensors with Memosens protocol

<table>
<thead>
<tr>
<th>Sensor types</th>
<th>Sensors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital sensors with inductive Memosens plug-in head</td>
<td>pH sensors, ORP sensors, Oxygen sensors, Conductivity sensors</td>
</tr>
</tbody>
</table>

Communication and data processing

Communication protocols:
4 to 20 mA

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.
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

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

Security

Measured value compensation

pH:
Temperature

Oxygen:
- Temperature
- Air pressure

Conductivity:
Temperature
Compensation of temperature dependency is linear.
Input

**Measured variable**

The transmitter is designed for digital Memosens sensors with an inductive plug-in head:

- pH
- ORP
- 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 range**

→ Documentation of the connected sensor

**Type of input**

Digital sensor inputs for Memosens-sensors

Output

**Output signal**

4 ... 20 mA, 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)
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.

<table>
<thead>
<tr>
<th>Cable specification</th>
<th>Cable length:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Max. 3 m (10 ft)</td>
</tr>
<tr>
<td></td>
<td>Max. 7 m (23 ft)</td>
</tr>
<tr>
<td></td>
<td>Max. 15 m (49 ft)</td>
</tr>
</tbody>
</table>

**Overvoltage protection**

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

**Performance characteristics**

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Current output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt; 5 µA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Repeatability</th>
<th>Current output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>→ Documentation of the connected sensor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Response time</th>
<th>Current output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$t_{90} = \text{max. 500 ms for an increase from 0 to 20 mA}$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tolerance</th>
<th>Current output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Typical measuring tolerances:</td>
</tr>
<tr>
<td></td>
<td>$&lt; \pm 20 \mu A$ (if current value = 4 mA)</td>
</tr>
<tr>
<td></td>
<td>$&lt; \pm 50 \mu A$ (for current values 4 to 20 mA)</td>
</tr>
<tr>
<td></td>
<td>at 25 °C (77 °F) each</td>
</tr>
<tr>
<td></td>
<td>additional tolerance depending on the temperature:</td>
</tr>
<tr>
<td></td>
<td>$&lt; 1.5 \mu A/K$</td>
</tr>
</tbody>
</table>

**Environment**

**Ambient temperature range**

$-20$ to $85 \degree C$ ($-4$ to $185 \degree F$)

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 $85 \degree C$ ($185 \degree F$).

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

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

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

$T_{\text{process}} = \text{max. 140 \degree C (284 \degree F), < 2h (for sterilization)}$
Installation position of transmitter with or without protective cover

1. Ambient temperature $T_{\text{ambient}}$
2. Process temperature $T_{\text{process}}$

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage temperature</td>
<td>-40 to +85 °C (-40 to 185 °F)</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>5 to 95 %</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 67</td>
</tr>
<tr>
<td></td>
<td>IP 68</td>
</tr>
<tr>
<td></td>
<td>NEMA Type 6</td>
</tr>
<tr>
<td>Electromagnetic compatibility (EMC)</td>
<td>• EN 61326-1</td>
</tr>
<tr>
<td></td>
<td>• EN 61326-2-3</td>
</tr>
<tr>
<td></td>
<td>• NAMUR NE 21</td>
</tr>
<tr>
<td>Electrical safety</td>
<td>EN 61010-1</td>
</tr>
<tr>
<td>Operating height</td>
<td>&lt; 2000 m (&lt; 6562 ft) above MSL</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>Complete device: Pollution level 4</td>
</tr>
<tr>
<td></td>
<td>Internal: Pollution level 2</td>
</tr>
</tbody>
</table>
Mechanical construction

Dimensions

<table>
<thead>
<tr>
<th>Dimensions in mm (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø18.95 (0.75)</td>
</tr>
<tr>
<td>110.8 (4.33)</td>
</tr>
<tr>
<td>99.8 (3.92)</td>
</tr>
<tr>
<td>32.75 (1.29)</td>
</tr>
<tr>
<td>114.7 (4.52)</td>
</tr>
<tr>
<td>124.6 (4.90)</td>
</tr>
</tbody>
</table>

Materials

<table>
<thead>
<tr>
<th>Components</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing, cover</td>
<td>Peek 151</td>
</tr>
<tr>
<td>Strain relief</td>
<td>EPDM (peroxide crosslinked)</td>
</tr>
<tr>
<td>Axial ring</td>
<td>Peek 450 G</td>
</tr>
<tr>
<td>Optical waveguide</td>
<td>PC transparent</td>
</tr>
</tbody>
</table>

Impact loads

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

Weight

<table>
<thead>
<tr>
<th>Weight</th>
<th>Approx.</th>
</tr>
</thead>
<tbody>
<tr>
<td>without cable</td>
<td>42 g (1.5 oz)</td>
</tr>
<tr>
<td>3 m (9 ft) cable</td>
<td>190 g (7 oz)</td>
</tr>
<tr>
<td>7 m (23 ft) cable</td>
<td>380 g (13 oz)</td>
</tr>
<tr>
<td>15 m (49 ft) cable</td>
<td>760 g (27 oz)</td>
</tr>
<tr>
<td>For every 1 m (3 ft) of cable</td>
<td>48 g (2 oz)</td>
</tr>
</tbody>
</table>

Operability

Operating concept

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 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.
Ordering information

Product page
www.endress.com/CM72

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:
- CM72
- 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
Liquiline Compact CM72

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](http://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](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

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](http://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](http://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](http://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](http://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](http://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

Cable junction with Velcro strip

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