

Technical Information

Ceragel CPS72 and CPS72D

ORP electrodes, analog and digital with Memosens technology

For process technology, hygienic and sterile applications with poison-resistant reference with ion trap



Application

- Hygienic and sterile applications (sterilizable, autoclavable)
 - Fermenters
 - Biotechnology
 - Pharmaceutical industry
 - Food industry
- Process technology and monitoring of processes with:
 - Rapidly changing ORP measured values
 - High proportion of electrode poisons such as H₂S

With ATEX, FM and CSA approval for use in hazardous areas

Your benefits

- Certified biocompatibility, no cytotoxicity
- Acrylamide-free bridging electrolyte
- Integrated temperature sensor in the case of Memosens
- Poison-resistant reference with ion trap, resulting in a very long service life
- Bridging electrolyte free of silver ions
- Suitable for CIP/SIP cleaning and autoclavable, depending on version up to 140 °C (284 °F)

Function and system design

Measuring principle

ORP measurement

The oxidation-reduction potential is an indicator of the equilibrium between oxidizing and reducing substances in the medium. The oxidation-reduction potential is measured with a gold or platinum electrode instead of the pH-sensitive glass membrane. As in the case of pH measurement, an integrated Ag/AgCl reference system is used as the reference electrode.

General characteristics

■ Short response times

The ceramic junction allows sufficiently fast diffusion of the medium, thereby enabling short response times.

■ Long service life

Use of an ion trap as standard ensures that the reference is protected against poisoning, results in a significantly longer service life and guarantees immunity to temperature and pressure fluctuations. The ion trap also effectively prevents the diffusion of silver ions into the bridging electrolyte.

Communication and data processing CPS72D

Measuring system data which digital sensors can save in the sensor include:

- Manufacturer data
 - Serial number
 - Order code
 - Date of manufacture
- Calibration data
 - Date of calibration
 - Calibrated offset ("mV" measuring mode)
 - % slope ("% measuring mode)
 - Number of calibrations
 - Serial number of the transmitter used to perform the last calibration
- Operating data
 - Temperature application range
 - ORP area of application
 - Date of initial commissioning
 - Operating hours

You can display the data listed above using the Liquiline CM44x or Liquiline M CM42 transmitter.

CPS72D dependability

Maximum process safety

With its inductive transmission of the measured value via a non-contact plug-in connection, Memosens guarantees maximum process safety and offers the following advantages:

- All problems caused by moisture are eliminated:
 - The plug-in connection is free from corrosion
 - Moisture cannot corrupt the measured value
 - Plug-in system can even be connected under water
- The transmitter is galvanically decoupled from the medium.

This means there is no need to choose between "symmetrical high-impedance" or "unsymmetrical" solutions and impedance converters when it comes to pH/ORP measurement.
- EMC safety is guaranteed by screening measures in the digital measured value transmission.
- Can easily be used in hazardous areas thanks to intrinsically safe electronics.

Memosens technology digitizes the measured values in the sensor and transmits them to the transmitter via a non-contact connection in a way that is free from any potential interference. The result:

- Automatic error message generation if the sensor fails or the connection between sensor and transmitter is interrupted
- Immediate error detection increases measuring point availability

Ease of use

Sensors with Memosens technology have integrated electronics that save calibration data and other information, such as total hours of operation and operating hours at very high temperatures etc. When the sensor is mounted, the sensor data are automatically sent to the transmitter and used to calculate the current ORP potential.

Saving the calibration data makes it possible to calibrate and adjust the sensor irrespective of the measuring point. The result:

- Convenient calibration in the measuring lab under optimum external conditions improves the quality of the calibration.
- Measuring point availability is dramatically increased by the quick and easy replacement of precalibrated sensors.
- Installing the transmitter in the measuring container with integrated measuring devices reduces the amount of fastening material and cabling work required.
- The availability of the sensor data makes it possible to accurately determine the maintenance intervals of the measuring point and enables predictive maintenance.
- The sensor history can be documented with external storage media and evaluation programs. The sensor's field of application can be determined based on its previous history.

Communication with the transmitter

Always connect digital sensors with Memosens technology to a transmitter with Memosens technology. It is not possible to transfer data to a transmitter for analog sensors.

Measuring system

A complete measuring system comprises:

- ORP electrode CPS72 or CPS72D
- Transmitter, e.g. Liquiline CM42 or Liquiline CM44x (for CPS72D with Memosens technology)
- Special measuring cable. e.g. CPK9 or Memosens data cable CYK10 for CPS72D
- Immersion, flow or retractable assembly, e.g. Cleanfit H CPA475

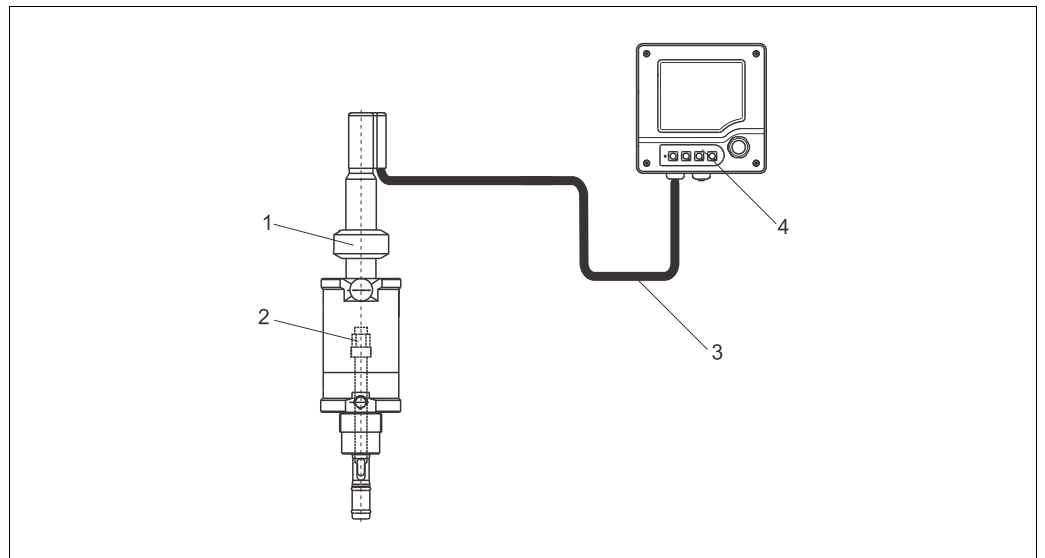


Fig. 1: Measuring system for ORP measurement

- 1 Process assembly Cleanfit H CPA475
- 2 ORP electrode CPS72 / CPS72D
- 3 Special measuring cable CPK9 (for electrodes with TOP68 plug-in head) / CYK10 for digital sensors
- 4 Liquiline CM42 transmitter

Input

Measured variables	ORP	
Measuring range	ORP	-1500 to 1500 mV
	Temperature:	-15 to 140 °C (5 to 284 °F) 0 to 135 °C (32 to 275 °F) for sensors with Ex approval and analog sensors

 Pay attention to the application conditions in the process.

Installation

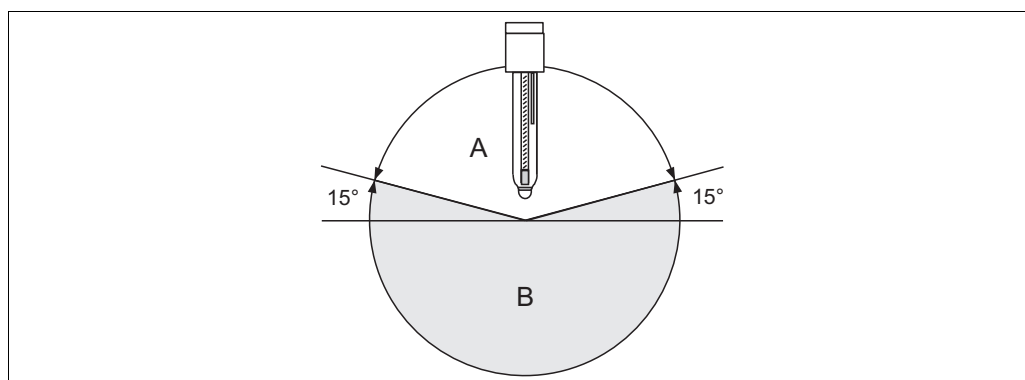
Installation instructions

Do not install the electrodes upside down. The inclination angle must be at least 15° from the horizontal. A smaller installation angle is not permitted as it could cause an air bubble to form, preventing contact between the reference and the reference lead.

NOTICE

Before screwing in, make sure the threaded connection of the assembly is clean and runs smoothly.

- ▶ Screw in the electrode finger-tight (3 Nm)! (Information valid only when installing in Endress+Hauser assemblies.)
- ▶ Also pay attention to the installation instructions provided in the Operating Instructions of the assembly used.



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Electrode installation; installation angle at least 15° from the horizontal

A Permitted orientation
B Forbidden orientation

Environment

Ambient temperature range

NOTICE

Risk of damage due to frost

- ▶ The sensor must not be used at temperatures below -15 °C (5 °F).

Storage temperature

0 to 50 °C (32 to 120 °F)

Degree of protection

IP 67: GSA plug-in head (with closed connector system)
 IP 68: ESA plug-in head (1 m (3.3 ft) water column, 50 °C (120 °F), 168 h)
 IP 68: Memosens plug-in head (10 m (33 ft) water column, 25 °C (77 °F), 45 days, 1 M KCl)

Process

Process temperature range

-15 to 140 °C (5 to 284 °F)
 -15 to 135 °C (5 to 275 °F) for sensors with Ex approval and analog sensors

Process pressure (absolute)

0.8 to 11 bar (12 to 160 psi)

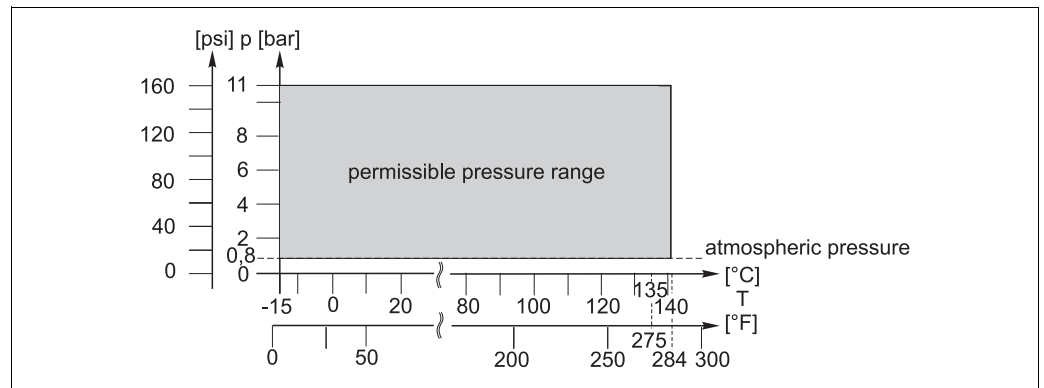
⚠ CAUTION

Sensor is exposed to pressure when used for longer periods under increased process pressure

Risk of injury due to glass breakage

- ▶ Do not apply too much heat to sensors of this type if they are being used under reduced process pressure or under atmospheric pressure.
- ▶ Wear protective goggles and suitable gloves when handling this type of sensor.

Pressure-temperature ratings



Pressure-temperature ratings

Application

Hygienic and sterile applications, but also applications such as chromate reduction and chlorine metering in swimming pools

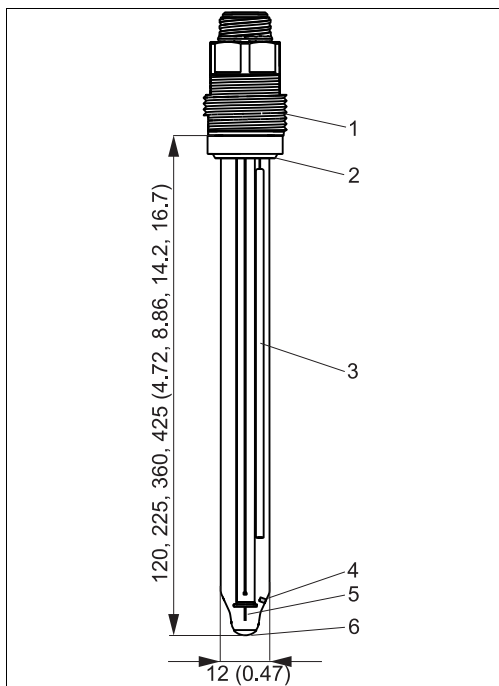
NOTICE

Risk of damage to electrode

- ▶ Never use the electrode outside of the listed specifications!

Mechanical construction

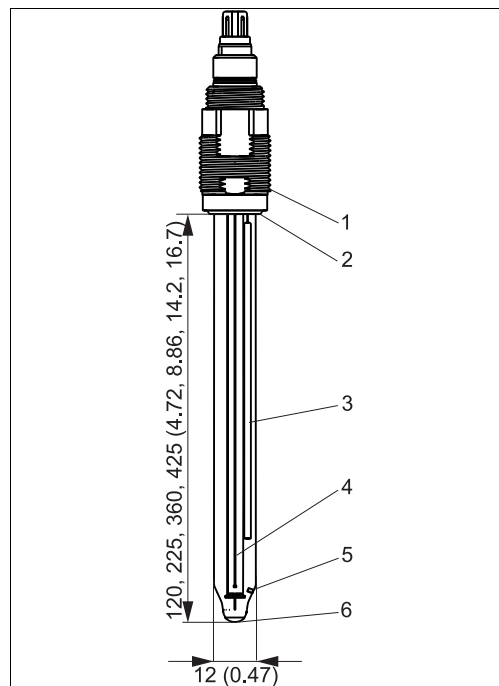
Design, dimensions CPS72



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CPS72 with GSA plug-in head, dimensions in mm (inch)

- 1 GSA electrode plug-in head, Pg 13.5
- 2 Viton O-ring with thrust collar
- 3 External reference lead with ion trap
- 4 Diaphragm
- 5 Ag wire
- 6 Platinum element

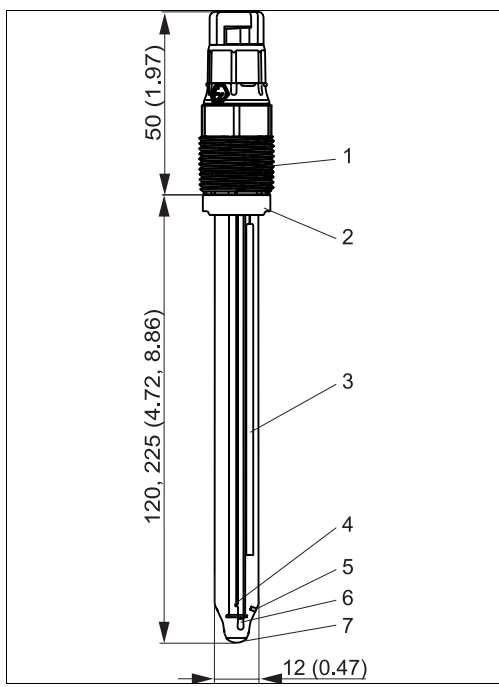


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CPS72 with ESA plug-in head, dimensions in mm (inch)

- 1 ESA electrode plug-in head, Pg 13.5
- 2 Viton O-ring with thrust collar
- 3 External reference lead with ion trap
- 4 Diaphragm
- 5 Ag wire
- 6 Platinum element

Design, dimensions CPS72D



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CPS72D with Memosens plug-in head, dimensions in mm (inch)

- 1 Memosens plug-in head
- 2 Viton O-ring with thrust collar
- 3 External reference lead with ion trap
- 4 Temperature sensor
- 5 Diaphragm
- 6 Ag wire
- 7 Platinum element

Weight	0.1 kg (0.22 lbs)	
Materials	Electrode shaft Metal lead Junction ORP-sensitive element Gel	Glass to suit process Ag/AgCl Ceramic, sterilizable and autoclavable Platinum Bridging electrolyte acrylamide-free, no cytotoxicity In contact with medium polyacrylamide-free
Process connection	Pg 13.5	
Temperature sensor	CPS72D:	NTC 30K
Plug-in heads	CPS72: ESA: GSA: CPS72D:	Threaded plug-in head Pg 13.5, TOP68, 16 bar (232 psi), Ex Threaded plug-in head Pg 13.5, non-Ex Memosens plug-in head for digital, non-contact data transmission, 16 bar (232 psi), Ex or non-Ex
Reference system	Ag/AgCl reference lead with gel, acrylamide-free bridging electrolyte, non-cytotoxic, AgCl-free, ion trap	

Certificates and approvals

Ex approval CPS72 (ESA) and CPS72D	ATEX/NEPSI <ul style="list-style-type: none"> ▪ II 1G Ex ia IIC T3/T4/T6 Ga FM/CSA <ul style="list-style-type: none"> ▪ IS/NI CL. I. Div 1, Group A-D IECEX <ul style="list-style-type: none"> ▪ Ex ia IIC T3/T4/T6 Ga
Biocompatibility	Biocompatibility certified in accordance with: <ul style="list-style-type: none"> ▪ ISO 10993:1993 ▪ USP <87>, agar diffusion test and decoloration test
TÜV certificate ESA and Memosens plug-in head	Pressure resistance 16 bar (232 psi), process overpressure minimum three times the safety pressure
Electromagnetic compatibility CPS72D	Interference emission and interference immunity as per EN 61326: 2006

Ordering information

Product page

You can create a valid and complete order code on the Internet with the Configurator tool.

Enter the following addresses in the browser to access the relevant product page:

www.endress.com/cps72


www.endress.com/cps72d

Product structure

The navigation area is located on the right of the product page.

1. Under "Device support" click "Configure your selected product".
 - ↳ The Configurator opens in a separate window.
2. Configure the device as per your requirements by selecting all the options.
 - ↳ This results in a valid and complete order code.
3. Export the order code as a PDF or Excel file. To do so, click the appropriate button at the top of the screen.

Accessories

-  The most important accessories available at the time this document went to print are listed below. Contact your service department or sales center for accessories that are not listed here.

Assemblies

Cleanfit W CPA450

- Manual retractable assembly for pH/ORP electrodes for installation of 120 mm electrodes in tanks and pipes
- Order according to product structure (-> online Configurator, www.endress.com/cpa450)
- Technical Information TI183C/07/EN

Cleanfit P CPA471

- Compact stainless steel retractable assembly for installation in tanks and pipes, for manual or pneumatically remote -controlled operation
- Order according to product structure (-> online Configurator, www.endress.com/cpa471)
- Technical Information TI217C/07/EN

Cleanfit P CPA472

- Compact plastic retractable assembly for installation in tanks and pipes, for manual or pneumatically remote-controlled operation
- Order according to product structure (-> online Configurator, www.endress.com/cpa472)
- Technical Information TI223C/07/EN

Cleanfit P CPA472D

- Robust retractable assembly for pH, ORP and other industrial sensors, for manual or pneumatically remote-controlled operation, heavy-duty version made from very durable materials
- Order according to product structure (-> online Configurator, www.endress.com/cpa472d)
- Technical Information TI403C/07/EN

Cleanfit P CPA473

- Stainless steel process retractable assembly with ball valve shutoff for particularly reliable separation of the medium from the environment
- Order according to product structure (-> online Configurator, www.endress.com/cpa473)
- Technical Information TI344C/07/EN

Cleanfit P CPA474

- Plastic process retractable assembly with ball valve shutoff for particularly reliable separation of the medium from the environment
- Order according to product structure (-> online Configurator, www.endress.com/cpa474)
- Technical Information TI345C/07/EN

Cleanfit H CPA475

- Retractable assembly for pH/ORP measurement in tanks and pipes under sterile measuring conditions
- Order according to product structure (-> online Configurator, www.endress.com/cpa475)
- Technical Information TI240C/07/EN

Unifit H CPA442

- Process assembly for food, biotechnology and chemicals; for 120 mm electrodes
- Order according to product structure (-> online Configurator, www.endress.com/cpa442)
- Technical Information TI306C/07/EN

Dipfit W CPA111

- Immersion and installation assembly made of plastic for open and closed containers
- Order according to product structure (-> online Configurator, www.endress.com/cpa111)
- Technical Information TI112C/07/EN

Dipfit P CPA140

- pH/ORP immersion assembly with flange connection for very demanding processes
- Order according to product structure (-> online Configurator, www.endress.com/cpa140)
- Technical Information TI178C/07/EN

Flowfit P CPA240

- pH/ORP flow assembly for very demanding processes
- Order according to product structure (-> online Configurator, www.endress.com/cpa240)
- Technical Information TI179C/07/EN

Flowfit W CPA250

- Flow assembly for pH/ORP measurement
- Order according to product structure (-> online Configurator, www.endress.com/cpa250)
- Technical Information TI041C/07/EN

Ecofit CPA640

- Set comprising adapter for 120 mm pH sensors and sensor cable with TOP68 coupling
- Order according to product structure (-> online Configurator, www.endress.com/cpa640)
- Technical Information TI264C/07/EN

Buffer solutions

Technical ORP buffer solutions

- +220 mV, pH 7, 100 ml (3.4 fl.oz.); Order No. CPY3-0
- +468 mV, pH 0.1, 100 ml (3.4 fl.oz.); Order No. CPY3-1

Measuring cable

Measuring cable


- For sensors with ESA plug-in head, for high-temperature and high-pressure applications, IP 68
- Order according to product structure
- Technical Information TI00501C/07/EN

Special measuring cable CPK1

- For pH/ORP electrodes with GSA plug-in head
- Order according to product structure
- Technical Information TI00501C/07/EN

Memosens data cable CYK10

- For digital sensors with Memosens technology
- Order according to product structure (-> online Configurator, www.endress.com/cyk10)
- Technical Information TI00118C/07/EN

 Versions of the CYK10 that are suitable for use in hazardous areas are marked by an orange/red coupling end element.

www.addresses.endress.com
