



Level



Pressure



Flow



Temperature



Liquid  
Analysis



Registration



Systems  
Components



Services



Solutions

## Technical Information

# Orbisint CPS12/CPS12D/CPS13

ORP electrodes, analog and digital with Memosens technology and reference electrode

Each with dirt-repellent PTFE diaphragm for standard applications in process and environmental technology



### Application

- Long-term monitoring and limit monitoring of processes with stable process conditions
  - Paper industry
  - Plastics chemistry
  - Power plants (e.g. flue gas washers)
  - Incineration plants
  - Food industry
  - Breweries
- Water treatment
  - Drinking water
  - Cooling water
  - Well water



With ATEX, FM<sup>1</sup> and CSA<sup>1</sup> approval for application in hazardous areas

### Your benefits

- Robust electrode requiring low maintenance thanks to large PTFE ring diaphragm
- Application under pressures of up to 16 bar (232 psi)
- Long service life due to double junction system of metal lead and thus long electrode poison diffusion path
- Various measuring elements for application in oxidising and reducing media
- Three lengths: 120, 225 and 360 mm (4.72, 8.86, 14.17 inches)

### Further benefits offered by Memosens technology

- Maximum process safety through contactless inductive signal transmission
- Data safety through digital data transmission
- Easy handling due to storage of sensor-specific data
- Predictive maintenance possible thanks to registration of sensor load data

<sup>1</sup> approval for digital sensors pending

## Function and system design

### Measuring principle

#### Redox measurement

The redox potential is a unit of measurement for the state of equilibria between oxidising and reducing components of a medium. Redox potential is measured similarly to the pH value. A platinum or gold electrode is used instead of pH-sensitive membrane glass. Analog to the pH measurement, an integrated Ag/AgCl reference system is used as a reference electrode.

### General properties

#### ■ Low maintenance

The dirt-repellent, sterilisable PTFE ring diaphragm of the CPS12 prevents blocking and assures long-time stability and accuracy.

#### ■ Long service life

The double junction system of the metal lead offers better protection from electrode poisons and guarantees a considerably longer service life.

#### ■ Durability

Depending on the ordered version, the electrode is pressure proof up to 16 bar / 232 psi and can be applied at temperatures of up to 135 °C / 275 °F.

### Important properties CPS12D

#### Maximum process safety

The inductive and non-contacting measured value transmission of Memosens guarantees maximum process safety and offers the following benefits:

- All problems caused by moisture are eliminated.
  - The plug-in connection is free from corrosion.
  - Measured value distortion from moisture is not possible.
  - The plug-in system can even be connected under water.
- The transmitter is galvanically decoupled from the medium. The result: No more need to ask about "symmetrically high-impedance" or "unsymmetrical" or an impedance converter.
- EMC safety is guaranteed by screening measures for the digital measured value transmission.

#### Data safety through digital data transfer

The Memosens technology digitalizes the measured value in the sensor and transfers it to the transmitter via a contactless connection. The result:

- An automatic error message is generated if the sensor fails or the connection between sensor and transmitter is interrupted.
- The availability of the measuring point is dramatically increased by immediate error detection.
- The digital signals are suitable for application in hazardous areas; the integrated electronics are intrinsically safe.

#### Easy handling

Sensors with Memosens technology have integrated electronics that allow for saving calibration data and further information such as total hours of operation and operating hours at very high temperatures. When the sensor is mounted, the calibration data are automatically transferred to the transmitter and used to calculate the current redox potential. Storing the calibration data in the sensor allows for calibration and adjustment away from the measuring point. The result:

- The sensors can be calibrated under optimum external conditions in the measuring lab. Wind and weather do neither affect the calibration quality nor the operator.
- The measuring point availability is dramatically increased by the quick and easy replacement of precalibrated sensors.
- The transmitter does not need to be installed close to the measuring point but can be placed in the control room.
- Maintenance intervals can be defined based on all stored sensor load and calibration data and predictive maintenance is possible.
- The sensor history can be documented on external data carriers and evaluation programs at any time. Thus, the current application of the sensors can be made to depend on their previous history.

#### Communication with the transmitter

Always connect the digital sensor to a digital transmitter with Memosens technology. Data transmission to an analog transmitter is not possible.

**Data storage of CPS12D**

Digital sensors are able to store the following system data in the sensor.

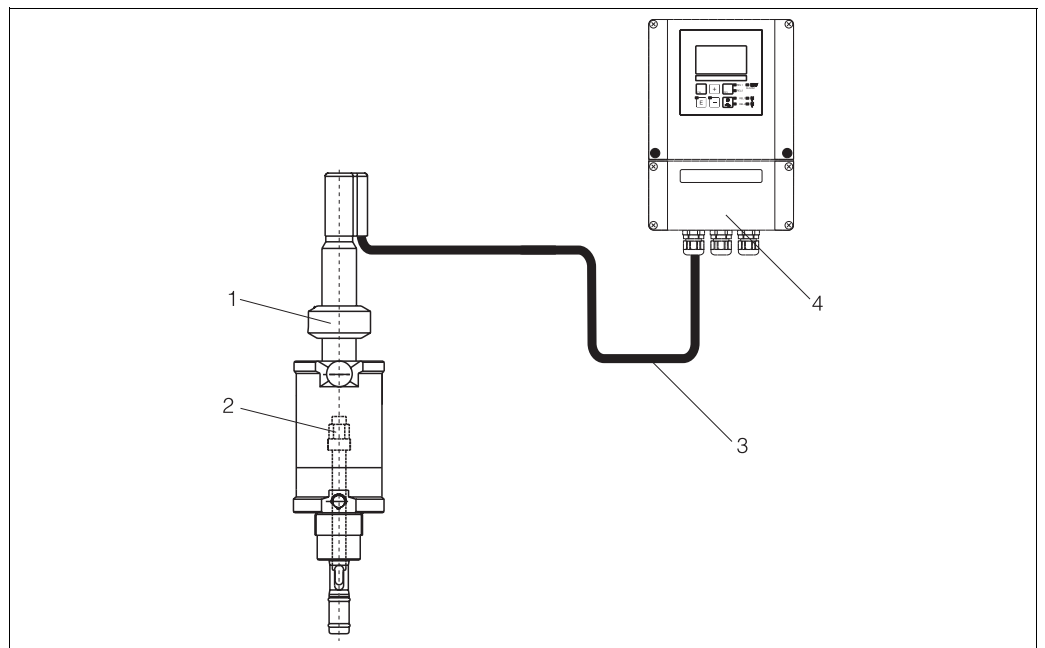
- Manufacturing data
  - Serial number
  - Order code
  - Date of manufacture
- Calibration data
  - Calibration date
  - Calibrated offset (operating mode "mV")
  - % slope (operating mode "%")
  - Number of calibrations
  - Serial number of the transmitter used for the last calibration
- Application data
  - Temperature application range
  - Redox application range
  - Date of first commissioning
  - Operating hours

These system data can be displayed with the Mycom S or the Liquiline M CM42 transmitter.

**Measuring system**

A complete measuring system comprises:

- CPS12 or CPS12D ORP electrode
- transmitter, e.g. Liquisys M CPM223/253 (with Memosens technology for CPS12D)
- special measuring cable, e.g. CPK9 or Memosens data cable CYK10 for CPS12D
- immersion, flow or retractable assembly, e.g. Cleanfit P CPA472



*Measuring system for measurement of redox potential*

- 1 Retractable Cleanfit P CPA472 assembly
- 2 CPS12 / CPS12D ORP electrode
- 3 CPK9 special measuring cable (for electrodes with TOP68 plug-in head) / CYK10 for digital sensors
- 4 Liquisys M CPM253 transmitter

## Input

**Measured variables** Redox potential

**Measuring range**

-1500 ... 1500 mV



Caution!  
Please note the process operating conditions.

## Installation

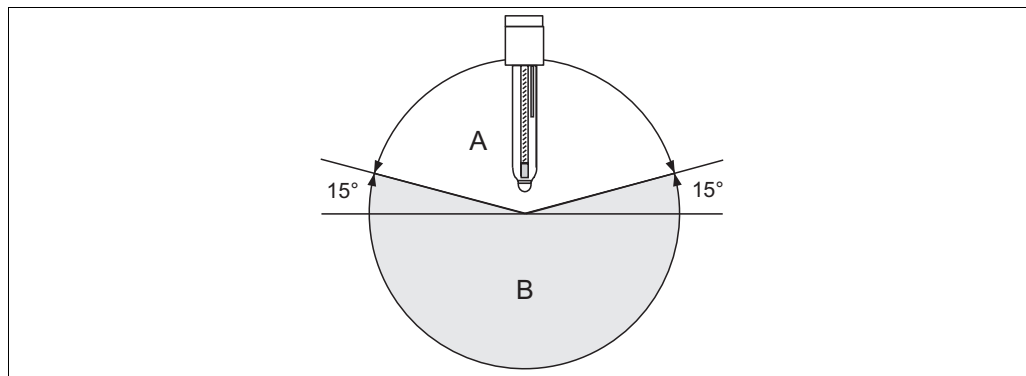
**Installation instructions**

Do not install the electrode upside down. The inclination angle must be at least 15° from the horizontal. A smaller inclination angle is not permitted as such an inclination results in air cushion forming. This might impair the contact of reference and metal lead.



Caution!

- Make sure that the assembly's threaded connection for the electrode is clean and well running before installing the electrode.
- Hand tighten the electrode (3 Nm)! (Given value only applies to installation in Endress+Hauser assemblies.)
- Make sure to follow the installation instructions in the operating instructions of the used assembly.



Electrode installation; inclination angle min. 15° from the horizontal

A Permitted inclination angle

B Non-permitted inclination angle

## Environment

**Ambient temperature**



Caution!  
*Danger of frost damage*  
Do not use the electrode at temperatures below -15 °C / 5 °F.

**Storage temperature**

0 ... 50 °C / 32 ... 122 °F

**Ingress protection**

IP 67: GSA plug-in head (with closed plug-in connection)  
IP 68: TOP 68 plug-in head (1 m / 3.28 ft water column, 50 °C / 122 °F, 168 h)  
IP 68: Memosens plug-in head (10 m / 32.8 ft water column, 25 °C / 77 °F, 45 days, 1 M KCl)

## Process

**Process temperature** -15 ... 135 °C / 5 ... 275 °F

**Process pressure** 0 ... 16 bar / 0 ... 232 psi

### Application

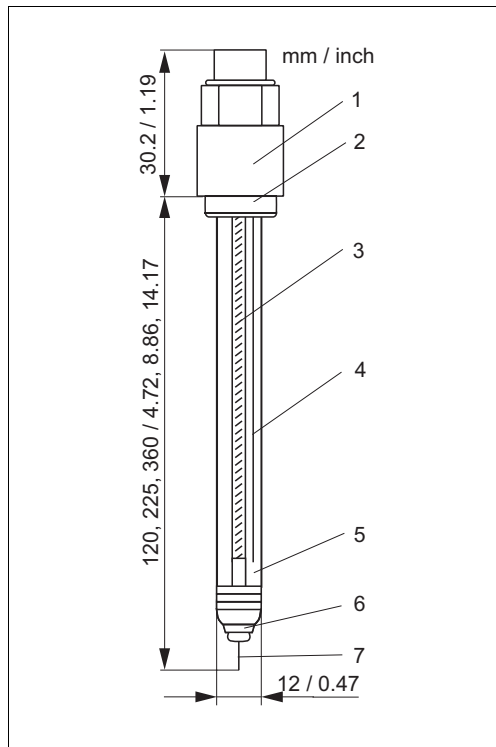
- CPS12,     ■ Gold electrode  
 CPS12D:   for oxidising media, e.g. cyanide oxidation, nitrite oxidation, ozone measurement, hydrogen superoxide measurement  
               ■ Platinum electrode  
               for reducing media, e.g. chromate reduction, chlorine dosing in swimming pools  
 CPS13:    Single reference electrode, used in combination with the single pH electrode CPS64



**Caution!**  
*Danger of damage to the electrode*  
 Never use the electrode in applications outside the given specifications!

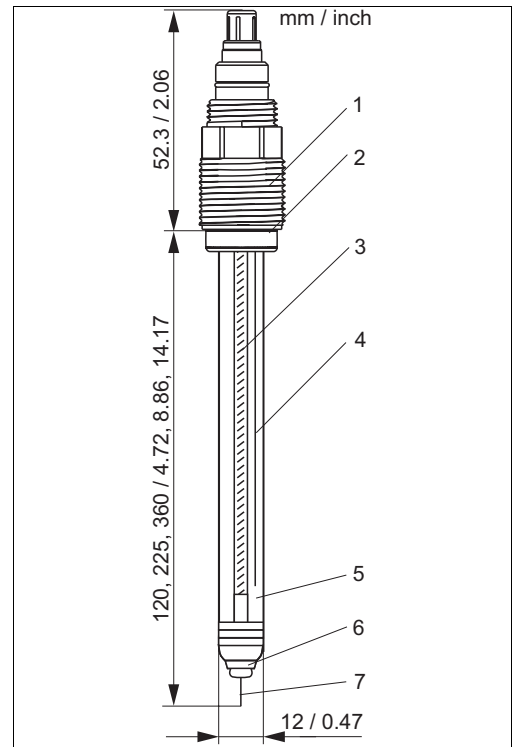
## Mechanical construction

### Design, dimensions CPS12



CPS12 with GSA plug-in head

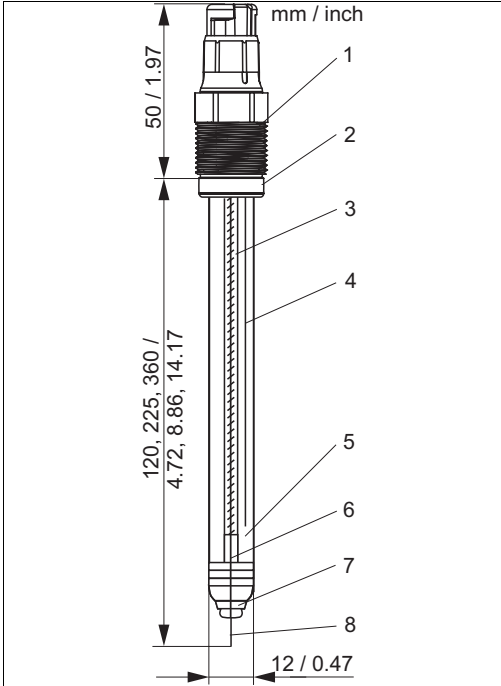
- 1 GSA plug-in head, PG 13.5
- 2 Viton O-ring with thrust collar
- 3 Inner metal lead
- 4 Ag/AgCl lead for the reference
- 5 "Advanced Gel" electrolyte
- 6 PTFE diaphragm
- 7 Gold pin or platinum ring



CPS12 with TOP68 plug-in head

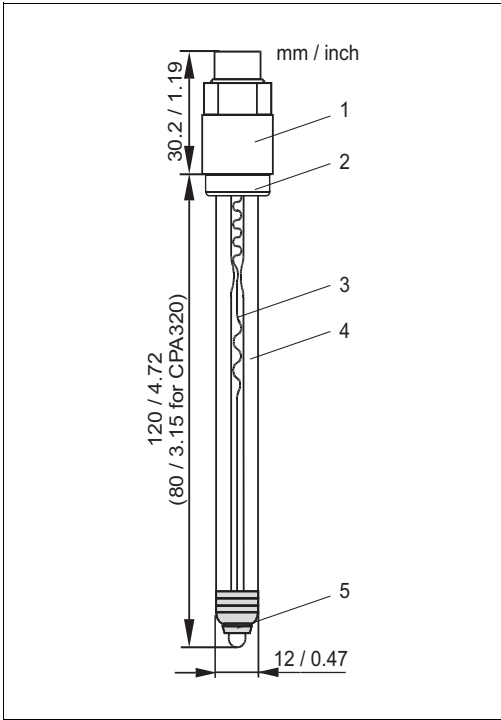
- 1 TOP68 plug-in head, Pg 13.5
- 2 Viton O-ring with thrust collar
- 3 Inner metal lead
- 4 Ag/AgCl lead for the reference
- 5 "Advanced Gel" electrolyte
- 6 PTFE diaphragm
- 7 Gold pin or platinum ring

Design, dimensions CPS12D

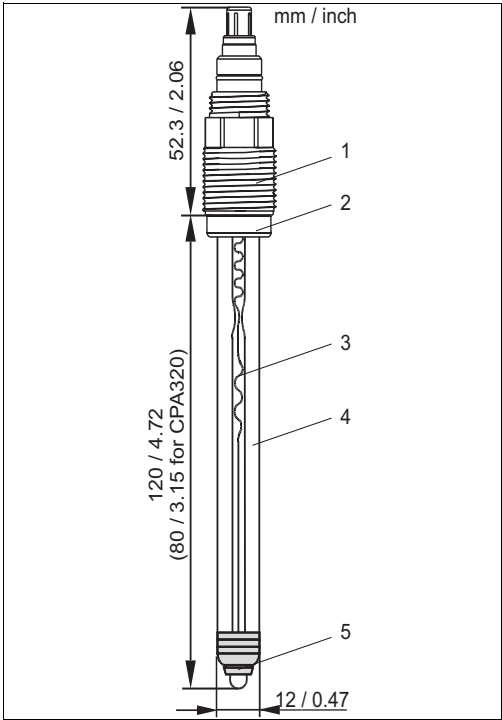


- CPS12D with Memosens plug-in head
- 1 Memosens plug-in head
  - 2 Viton O-ring with thrust collar
  - 3 Inner metal lead
  - 4 Ag/AgCl lead for the reference
  - 5 "Advanced Gel" electrolyte
  - 6 NTC 30K temperature sensor
  - 7 PTFE diaphragm
  - 8 Gold pin or platinum ring

Design, dimensions CPS13




- CPS13 with GSA plug-in head
- 1 GSA plug-in head, Pg 13.5
  - 2 Viton O-ring with thrust collar
  - 3 Ag/AgCl reference lead
  - 4 "Advanced Gel" electrolyte
  - 5 PTFE diaphragm



- CPS13 with TOP68 plug-in head
- 1 TOP68 plug-in head, Pg 13.5
  - 2 Viton O-ring with thrust collar
  - 3 Ag/AgCl reference lead
  - 4 "Advanced Gel" electrolyte
  - 5 PTFE diaphragm

<b>Weight</b>	0.1 kg / 0.2 lb.	
<b>Material</b>	Electrode shaft Redox measuring element Diaphragm	glass, suitable for processes platinum ring or gold pin ring-shaped Teflon® diaphragm, sterilisable
<b>Process connection</b>	Pg 13.5	
<b>Plug-in heads</b>	CPS12, CPS13: ESA: GSA: CPS12D:	ESA plug-in head Pg 13.5, TOP68, 16 bar / 232 psi, Ex GSA plug-in head Pg 13.5 Memosens plug-in head for digital, contactless data transmission, 16 bar / 232 psi, Ex or non-Ex
<b>Reference system</b>	Ag/AgCl lead with Advanced Gel 3 M KCl, AgCl free	

## Certificates and approvals

<b>Ex approval CPS12 (ESA) / CPS13 (ESA)</b>	<ul style="list-style-type: none"> <li>■ ATEX II 1G EEX ia IIC T3/T4/T6</li> <li>■ FM Class I Div. 2, in combination with the Liquiline M CM42 and Mycom S CPM153 transmitters</li> </ul>
<b>Ex approval CPS12D</b>	<ul style="list-style-type: none"> <li>■ ATEX II 1G EEX ia IIC T3/T4/T6</li> <li>■ FM<sup>a</sup> / CSA<sup>a</sup> Class I Div. 2, in combination with the Liquiline M CM42 and Mycom S CPM153 transmitters</li> </ul>
	Note! Ex versions of digital sensors with Memosens technology are indicated by an orange-red ring in the plug-in head.
<b>Biocompatibility</b>	Biocompatibility validated according to: <ul style="list-style-type: none"> <li>■ ISO 10993-5:1993</li> <li>■ USP, current revision</li> </ul>
<b>TÜV certificate TOP68 and Memosens plug-in head</b>	Pressure resistance 16 bar, min. triple overpressure safety
<b>Electromagnetic compatibility of CPS12D</b>	Interference emission and interference immunity complies with EN 61326: 1997 / A1: 1998

a) approval pending

## Ordering information

### Product structure CPS12

Electrode type	
0	Standard type
Measuring surface	
NA	Gold pin
PA	Platinum ring
Shaft length	
2	120 mm / 4.72"
4	225 mm / 8.86"
5	360 mm / 14.17"
Type of head	
ESA	Plug-in head Pg 13.5, TOP68, 16 bar, Ex
GSA	Plug-in head Pg 13.5
CPS12-	complete order code

### Product structure CPS12D

Version	
7	Basic version, max. 135 °C / 275 °F
Measuring surface	
NA	Gold pin
PA	Platinum ring
Shaft length	
2	120 mm / 4.72"
4	225 mm / 8.86"
5	360 mm / 14.17"
Approval	
1	Non-hazardous areas
G	ATEX II 1G EEx ia IIC T3/T4/T6
CPS12D-	complete order code

### Product structure CPS13

Electrode type	
0	Standard type
Electrolyte	
TA	Advanced Gel filling (120 mm / 4.72" only)
TD	Advanced Gel filling / double reference (80 mm / 3.15" only)
Shaft length	
1	80 mm / 3.15"
2	120 mm / 4.72"
Type of head	
ESA	Plug-in head Pg 13.5, TOP68, 16 bar / 232 psi, Ex
GSA	Plug-in head Pg 13.5
CPS13-	complete order code



## Accessories

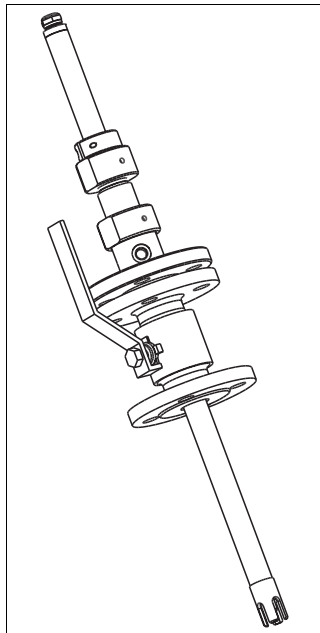


Note!

In the following sections, you find the accessories available at the time of issue of this documentation. For information on accessories that are not listed here, please contact your responsible service.

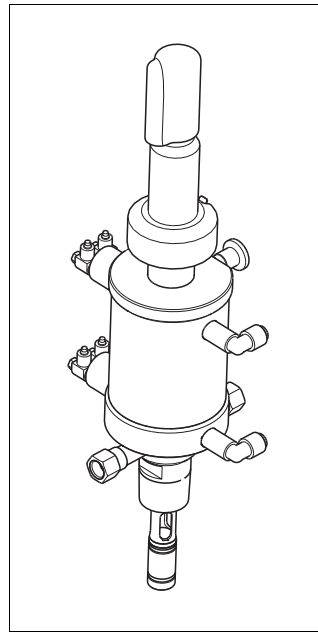
### Assemblies

- Cleanfit W CPA450  
Manually operated, retractable assembly for installation of 120 mm / 4.72" pH/ORP electrodes in tanks and pipes,  
Ordering acc. to product structure, see Technical Information (TI183C/07/en)
- Cleanfit P CPA471  
Compact retractable stainless steel assembly for installation in tanks and pipes, manual or pneumatic operation  
Ordering acc. to product structure, see Technical Information (TI217C/07/en)
- Cleanfit P CPA472  
Compact retractable plastic assembly for installation in tanks and pipes, manual or pneumatic operation,  
Ordering acc. to product structure, see Technical Information (TI223C/07/en)
- Cleanfit P CPA473  
Retractable stainless steel process assembly, with ball valve for a particularly safe and reliable separation of the medium from the environment,  
Ordering acc. to product structure, see Technical Information (TI344C/07/en)
- Cleanfit P CPA474  
Retractable plastic process assembly, with ball valve for a particularly safe and reliable separation of the medium from the environment,  
Ordering acc. to product structure, see Technical Information (TI345C/07/en)



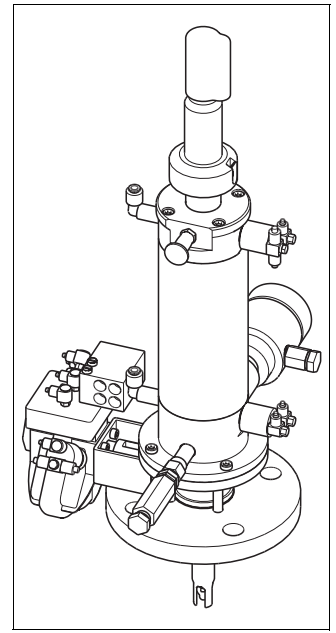
Cleanfit W CPA450

a0003135



Cleanfit P CPA471 or 472

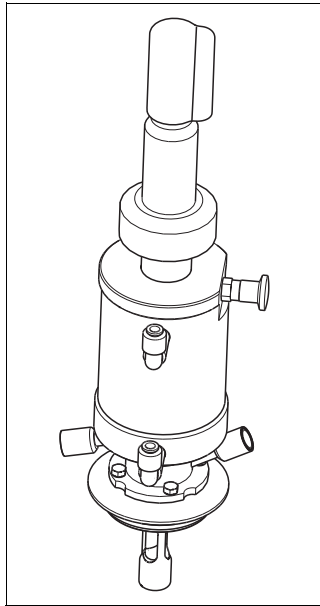
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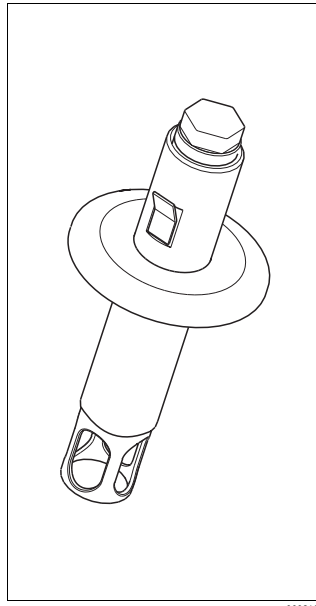
Cleanfit P CPA473 or 474

a0003138

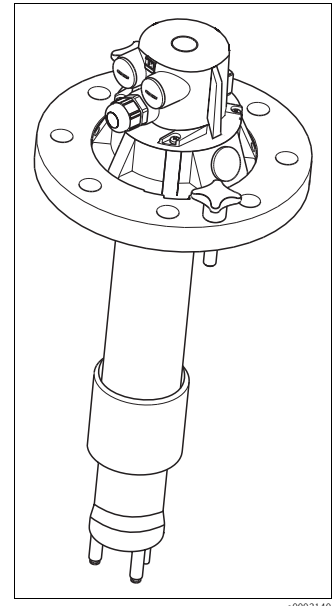
- **Cleanfit H CPA475**  
Retractable assembly for installation in tanks and pipes under sterile conditions,  
Ordering acc. to product structure, see Technical Information (TI240C/07/en)
- **Unifit H CPA442**  
Process assembly for the food industry, biotechnology and pharmaceutical industry, with EHEDG and 3A certificates,  
Ordering acc. to product structure, see Technical Information (TI306C/07/en)
- **Dipfit W CPA111**  
Plastic immersion and installation assembly for open and closed tanks,  
Ordering acc. to product structure, see Technical Information (TI112C/07/en)

*Cleanfit H CPA475*

a0003136

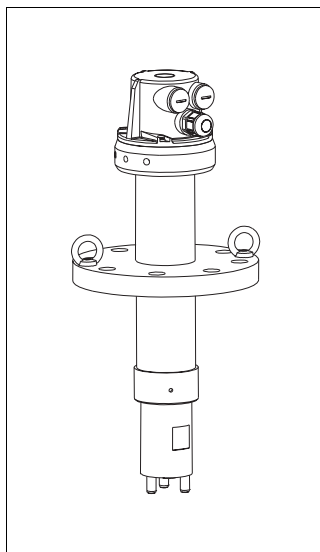
*Unifit H CPA442*

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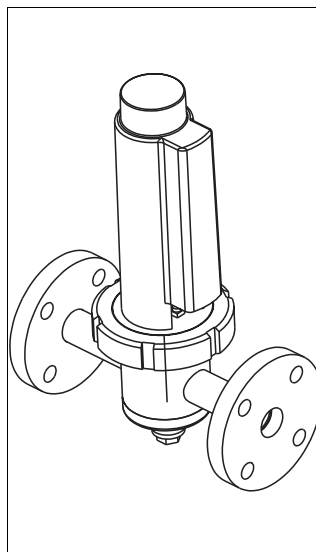
*Dipfit W CPA111*

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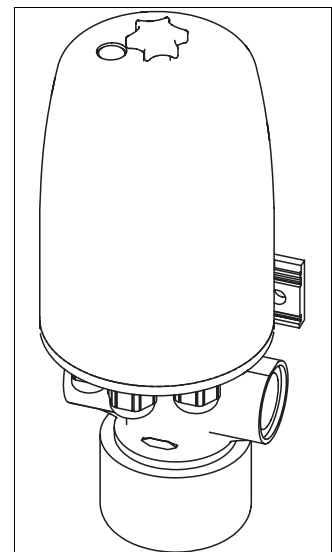
- **Dipfit P CPA140**  
Immersion assembly for pH/ORP electrodes for demanding processes,  
Ordering acc. to product structure, see Technical Information (TI178C/07/en)
- **Flowfit P CPA240**  
Flow assembly for pH/ORP electrodes, for demanding processes,  
Ordering acc. to product structure, see Technical Information (TI179C/07/en)
- **Flowfit W CPA250**  
Flow assembly for pH/ORP electrodes,  
Ordering acc. to product structure, see Technical Information (TI041C/07/en)

*Dipfit P CPA140*

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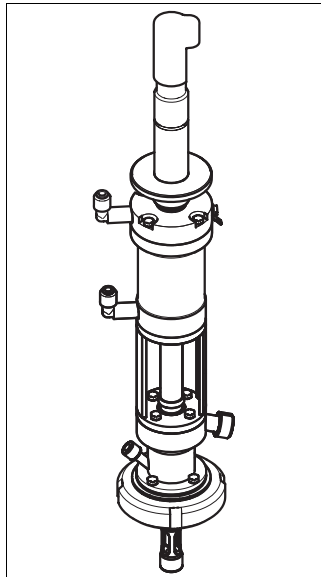
*Flowfit P CPA240*

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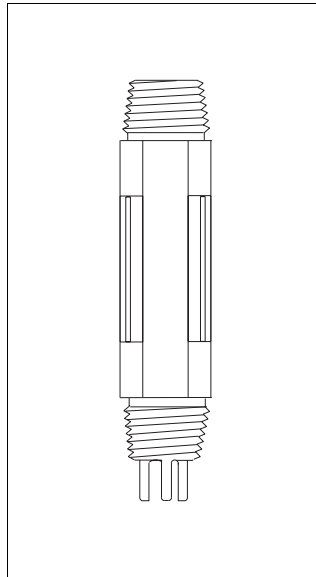
*Flowfit W CPA250*

a0003143

- Probit H CPA465  
Retractable assembly for installation in tanks and pipes under sterile conditions,  
Ordering acc. to product structure, see Technical Information (TI146C/07/en)
- Ecofit CPA640  
Process connection adapter and cable set for 120 mm pH/ORP electrodes,  
Ordering acc. to product structure, see Technical Information (TI264C/07/en)



Probit H CPA465



Ecofit CPA640

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**Buffer solutions**

Technical buffer solutions for ORP electrodes

- +220 mV, pH 7.0, 100 ml (0.026 US gal.); order no. CPY3-0
- +468 mV, pH 0.1, 100 ml (0.026 US gal.); order no. CPY3-1

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**Transmitters**

- Liquisys M CPM223/253  
Transmitter for pH and redox, field or panel-mounted housing,  
Hart® or PROFIBUS available  
Ordering acc. to product structure, see Technical Information (TI194C/07/en)
- Mycom S CPM153  
Transmitter for pH and redox, one or two channel version, Ex or Non-Ex,  
Hart® or PROFIBUS available  
Ordering acc. to product structure, see Technical Information (TI233C/07/en)
- Liquiline M CM42  
Modular two-wire transmitter for Ex and non-Ex areas  
Hart®, PROFIBUS or FOUNDATION Fieldbus available  
Ordering acc. to product structure, see Technical Information (TI381C/07/en)

## Measuring cables

- CPK9 special measuring cable  
For sensors with TOP68 plug-in head, for high-temperature and high-pressure applications, IP 68  
Ordering acc. to product structure, see Technical Information (TI118C/07/en)
- CPK1 special measuring cable  
For pH/redox electrodes with GSA plug-in head  
Ordering acc. to product structure, see Technical Information (TI118C/07/en)
- CYK10 Memosens data cable  
For digital sensors with Memosens technology  
Ordering according to product structure, see below

Certificates	
A	Standard, non Ex
G	ATEX II 1G EEx ia IIC T6/T4
Cable length	
03	Cable length: 3 m / 9.84 ft
05	Cable length: 5 m / 16.41 ft
10	Cable length: 10 m / 32.81 ft
15	Cable length: 15 m / 49.22 ft
20	Cable length: 20 m / 65.62 ft
25	Cable length: 25 m / 82.03 ft
88	... m length
89	... ft length
Ready-made	
1	Wire terminals
<b>CYK10-</b>	complete order code



Note!

Ex versions of CYK10 are indicated by an orange-red coupling end.

## International Head Quarters

Endress+Hauser  
GmbH+Co. KG  
Instruments International  
Colmarer Str. 6  
79576 Weil am Rhein  
Deutschland

Tel. +49 76 21 9 75 02  
Fax +49 76 21 9 75 34 5  
www.endress.com  
info@ii.endress.com

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