



Level



Pressure



Flow



Temperature

Liquid
Analysis

Registration

Systems
Components

Services



Solutions

Technical Information

Cleanfit P CPA472D

Retractable process assembly for pH, ORP and other industry sensors
Heavy-duty version



Application

- Chemical industry
- Power plants
- Plant design
- Tanks and process vats
- Pipelines or pipes

This ideal process assembly is available with the following materials in contact with medium: PVDF, conductive PVDF, PEEK, stainless steel (316Ti), Hastelloy and titanium. It can be used with temperatures up to 284°F (140°C) at 87 psi (6 bar). The robust retractable assembly permits replacement of the electrode while the tank is full or under process conditions with pressures of up to 87 psi (6 bar). In combination with the complete system Topcal S CPC310 you can automatically clean and calibrate the sensors.

Your benefits

- Service-friendly design
- Outstanding pressure resistance for plastic assemblies
- Outstanding temperature resistance
- Outstanding resistance to chemicals
- Immersion depth suitable for industrial use
- Application at temperatures up to 284°F (140°C) at 87 psi (6 bar) or up to 212°F (100°C) at 145 psi (10 bar)
- Many materials available

Function and system design

Function

With the retractable assembly Cleanfit P CPA472D you can realize reliable pH and ORP measurements. The retractable assembly is designed as a chemically resistant assembly for the chemical industry, process engineering and plant construction. Without interrupting the process you can perform the following manual or pneumatic operations for the electrode:

- separate from the process and move into the rinse chamber
- rinse with water or cleaning solution
- keep wet during operation pauses
- dismount
- sterilize, or
- calibrate

The modular assembly is especially designed for applications with aggressive chemicals, high temperatures and pressures up to 145 psi (10 bar). Therefore the assembly housing (A) is made of stainless steel. The parts in contact with medium like the rinse chamber (PVDF) are installed between the structural housing parts (B) with machine screws. This ensures the dimensional stability.

The assembly Cleanfit CPA472D is available in PEEK, PVDF, conductive PVDF, Hastelloy C4, titanium and 316Ti stainless steel (1.4571). It has only three modules in contact with medium: Rinse chamber (D), electrode holder (F) and raised face (E). Thanks to the modular design you can combine materials as required for your application. The assembly can be used for temperatures up to 284°F (140°C) and pressures up to 87 psi (6 bar). Please see the pressure and temperature diagram.

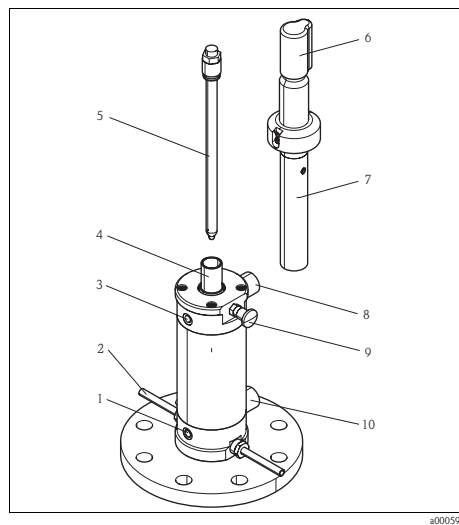
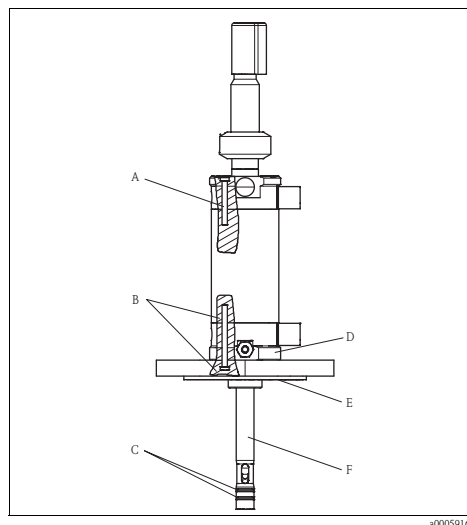
The novel electrode holder (4) supports an easy installation of the retractable pipe (7).

You have the choice of two immersion depths with gel and KCl electrodes:

- the standard version (immersion depth up to 5.83 " (148 mm), applicable with 225 mm gel electrodes, 360 mm gel electrodes with adapter or 360 mm KCl electrodes) or
- the long version (immersion depth up to 7.87 " / 280 mm, applicable with 360 mm gel electrodes).

The following process connections are available:

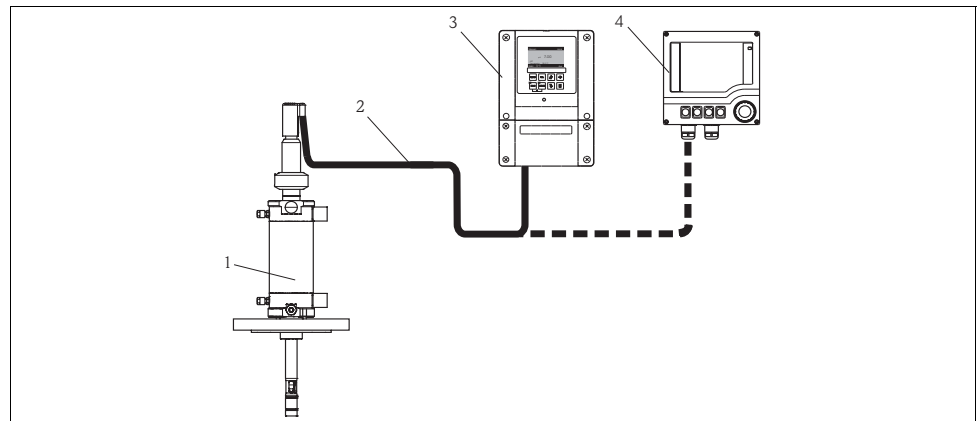
- ANSI 2" flange / DN 50 / DN 80 for tanks
- DN 50 / DN 80 for pipes with sight glass assembly
- G 1¼ with union nut for metal versions



- | | |
|---|----------------------------------|
| A | Stainless steel housing, screwed |
| B | Rinse chamber armoring |
| C | Seals, in contact with medium |
| D | Rinse chamber |
| E | Raised face |
| F | Electrode holder |
| 1 | Compressed air "Service" |
| 2 | Rinse connection |

- | | |
|----|--|
| 3 | Compressed air "Measurement" |
| 4 | Electrode holder (head) with guidance for installation of the retractable pipe |
| 5 | Electrode |
| 6 | Splash protection cap |
| 7 | Retractable pipe |
| 8 | Limit switch "Service" |
| 9 | Stop lock bolt |
| 10 | Limit switch "Measurement" |

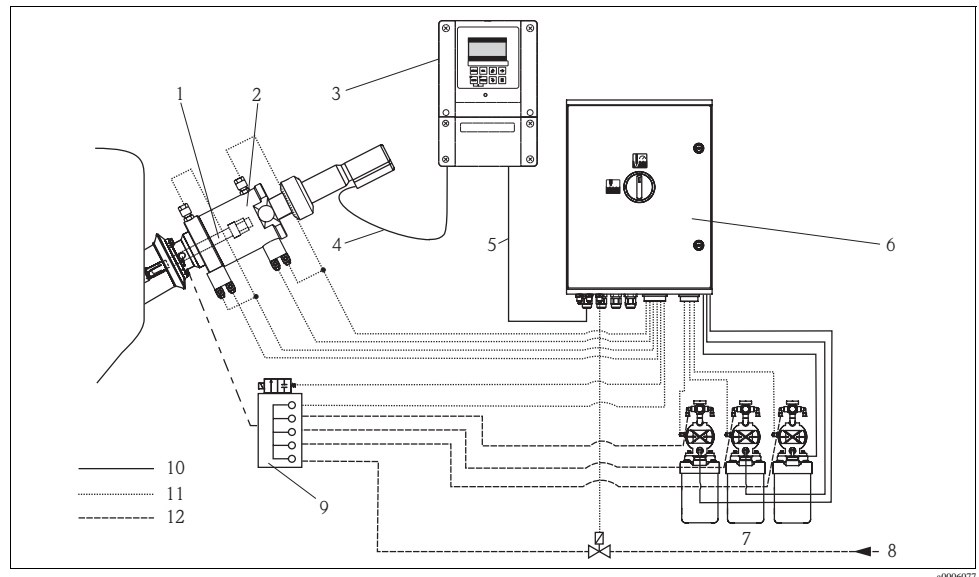
Measuring system without control



Measuring system without control (example)

- | | | | |
|---|--|---|-------------------------------|
| 1 | Assembly Cleanfit CPA472D | 3 | Transmitter Mycom S CPM153 or |
| 2 | special pH measuring cable, e.g. CPK9, CPK12 | 4 | Transmitter Liquiline M CM42 |

Measuring system with pneumatical control



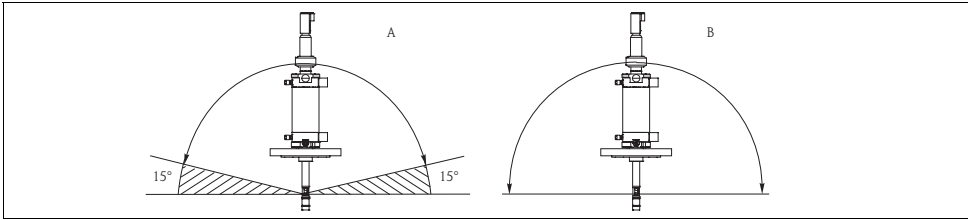
Measuring system with pneumatical control

- | | | | |
|---|------------------------------------|----|---|
| 1 | pH/redox sensor | 7 | Canisters for cleaning and buffer solutions |
| 2 | Assembly Cleanfit P CPA472D | 8 | Superheated steam/water/cleaning solutions (optional) |
| 3 | Transmitter Mycom S CPM153 | 9 | Rinse block |
| 4 | Special measuring cable | 10 | Power/signal cable |
| 5 | Communication and extension cables | 11 | Air hoses |
| 6 | Control unit CPG310 | 12 | Medium |

Installation

Installation instructions

A	Glass electrode:	Installation angle of at least 15° from the horizontal
B	ISFET pH-sensor Tophit:	No restrictions, recommended 0 to 180°



Permitted orientations depending on the sensor used



Note!
The assembly is designed for installation in pipes with nominal diameters of 4" (DN 80) or larger. To install it in pipes with the nominal diameter 2" (DN 50), please use the flow assembly with integrated sight glass (see "Accessories")

Pneumatic connection for automatic operation

- Requirements:
- air pressure of 72.5 to 87 psi (5 to 6 bar)
 - air must be filtered (40 µm) and be free of water and oil
 - no continuous air consumption
 - minimum nominal diameter of the air lines: 0.16 " (4 mm).



Caution!
There must be a pressure-reducing valve upstream if the air pressure can increase to above 87 psi (6 bar), including any short pressure surges.
We recommend you also use a pneumatic throttle for lower pressures. This results in a smoother assembly operation. Endress+Hauser offers such a throttle as an accessory (see chapter "Accessories").

Rinse water connection

The rinse chamber allows you to clean the electrode with water or cleaning solution with a pressure of 30 to max. 87 psi (2 to max. 6 bar). When using water, you have to install a check valve and a filter (100 µm) at the inlet side. When you operate the assembly with pneumatic actuation and use a cleaning solution you have to install the chemically resistant ON/OFF valve (see "Accessories"). Install a ball valve at the outlet side of the rinse chamber (see "Accessories").



Caution!
There must be a pressure-reducing valve upstream if the water pressure can increase to above 87 psi (6 bar), including any short pressure surges.



Note!
Connect the rinse connections to the in-house facilities via ball valves. If you do not use the rinse function, please leave the dummy plug installed.

Environment

Ambient temperature

Ambient temperature not below 32°F (0°C).
The maximum permissible temperature for electric limit position switches (NAMUR type) is 194°F (90°C).

Protection cover

We recommend to use the protection cover for installations in corrosive, moist or dusty atmosphere. The protection cover is available as an accessory.

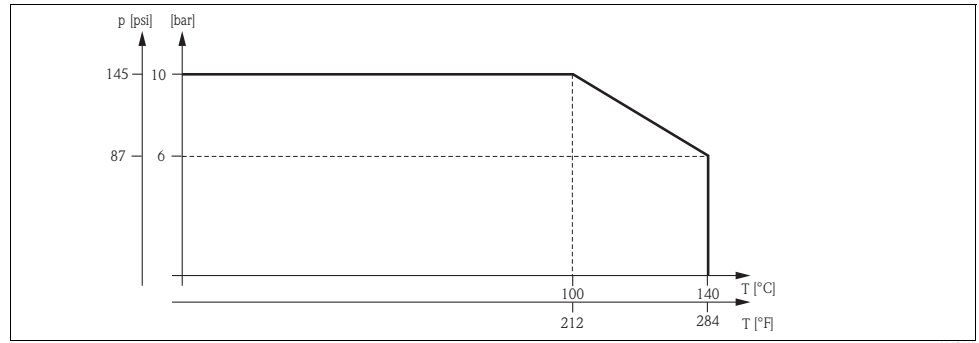
Process

Process temperature range

32 to 284°F (0 to 140°C)

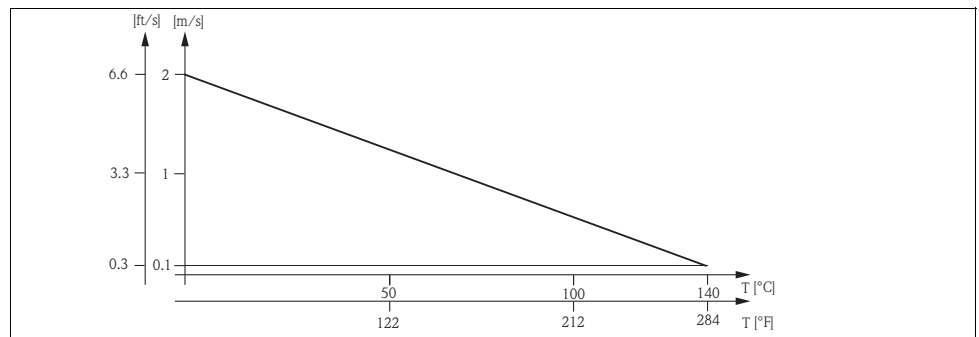
Process pressure range

0 to max. 58 psi (0 to max. 4 bar) overpressure for manual actuation
0 to 145 psi (0 to 10 bar) overpressure for pneumatic actuation

Pressure temperature diagram

Pressure temperature diagram

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Flow velocity

Permissible medium velocity in m/s (ft/s) depending on the medium temperature in °F (°C)

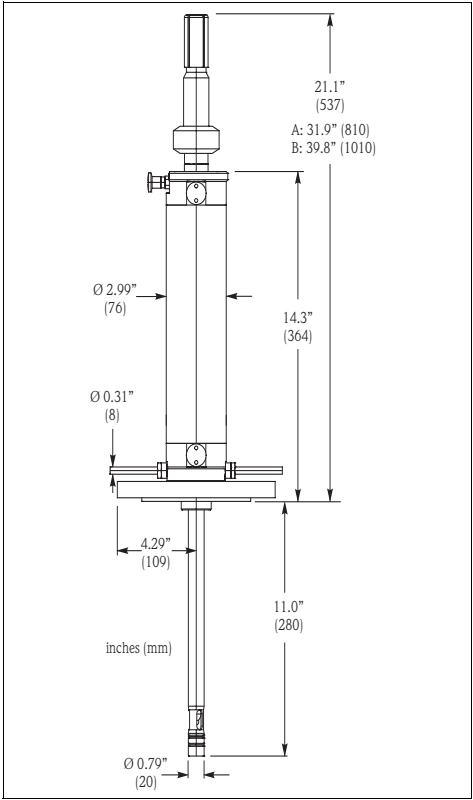
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**Note!**

To prevent measurable electric potential at the electrode, the medium velocity should not exceed 6.6 ft/s (2 m/s).

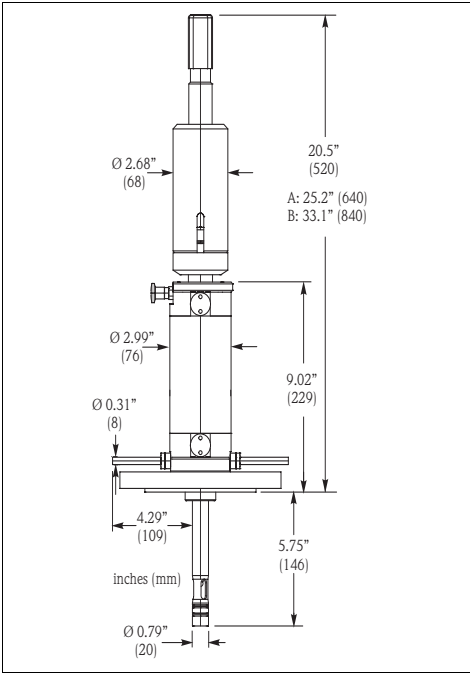
Mechanical construction

Dimensions



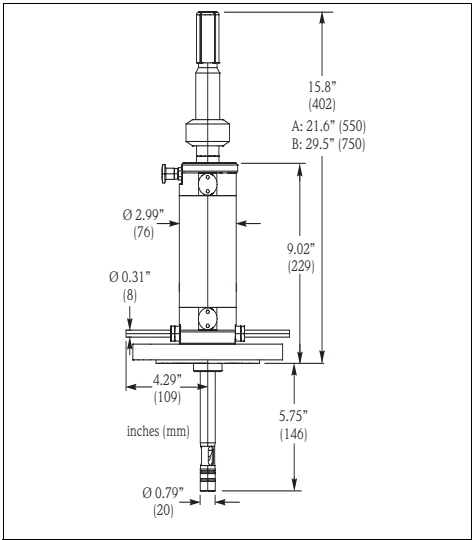
Assembly version: long, for gel sensors

- A Length when extended
- B Required mounting clearance



Assembly version: standard, for KCl sensors

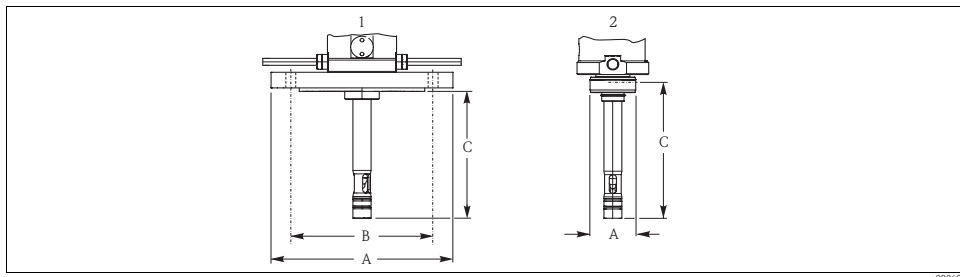
- A Length when extended
- B Required mounting clearance



Assembly version: standard, for gel sensors

- A Length when extended
- B Required mounting clearance

Process connections



Process connections

- 1 Flange DN 50 / DN 80 / ANSI 2"
2 Internal thread G1¼

Connection	A	B	C (standard)	C (long)
DN 50	165/6.50	125/4.92	146/5.75	280/11.0
DN 80	200/7.87	160/6.30	146/5.75	280/11.0
ANSI 2"	152.4/6.00	120.7/4.75	146/5.75	280/11.0
G 1¼	51/2.01	—	156/6.14	290/11.4
Dimensions in mm/inch				

Sensors

Standard version	Gel sensors, ISFET KCl sensors	225 mm (9.8") 360 mm (14.2")
Long version	Gel sensors, ISFET	360 mm (14.2")

Weight

Depending on the material: 16.54 to 26.46 lbs (7.5 to 12.0 kg)

Materials

In contact with medium:	
Electrode holder	PEEK, PVDF, conductive PVDF, Hastelloy C4, titanium, stainless steel 316Ti (1.4571)
Rinse chamber and raised face	PEEK, PVDF, conductive PVDF, Hastelloy C4, titanium, stainless steel 316Ti (1.4571)
Seals	FPM (Viton)/FFKM (Kalrez®)
Not in contact with medium:	
Housing	Stainless steel 316L (1.4404)
Seals	FPM
Limit position switch (NAMUR-type)	Front surface PBT, cable PVC

Rinse connections

2 x G¼ (internal) or
2 x NPT ¼" (internal) or
2 x pipe 8 x 60 Swagelok as nozzle

Limit position switches

Pneumatic: 3/2 way valve
Electric: inductive (NAMUR type)

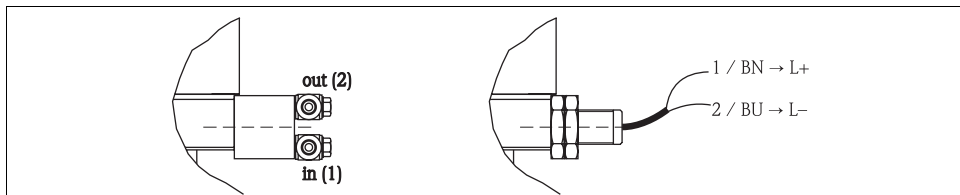


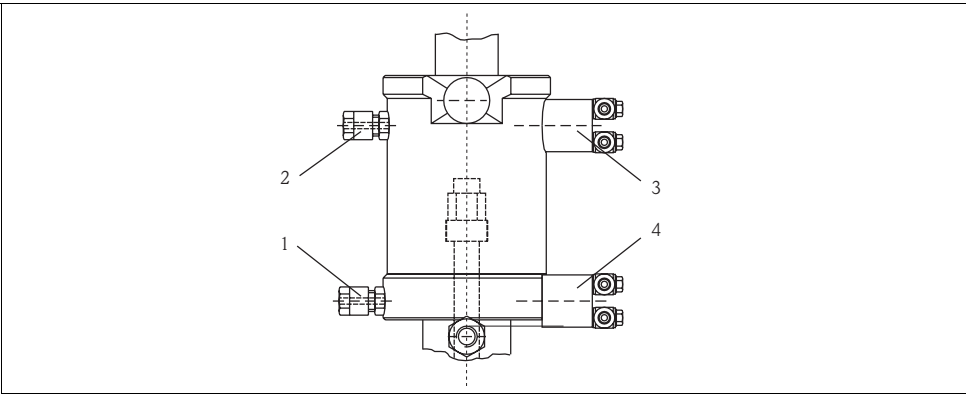
Fig. 1: Limit position switches, left: pneumatic (1 = compressed air inlet, 2 = compressed air outlet)
right: electric (NAMUR)



Note!

The position of the input resp. the output may be different from the figure. Please, refer to the marks at the limit position switch: "1" is the input (in), "2" is the output (out).

Pneumatic connections (depending on version)



Pneumatic connections for automatic assembly actuation

- | | | | |
|---|----------------------------------|---|----------------------------|
| 1 | Compressed air for "service" | 3 | Limit switch "service" |
| 2 | Compressed air for "measurement" | 4 | Limit switch "measurement" |

The assembly Cleanfit CPA472D is operated with an air pressure of 72.5 to 87 psi (5 to 6 bar). The air must be filtered (40 µm) and free from water and oil. There is no continuous pressure demand. The air lines must have a minimum nominal diameter of 0.16" (4 mm).



Note!
If pressure increases to above 87 psi (6 bar) are likely (including short peak pressures), a pressure reducer must be installed. A pressure reducer is recommended for lower pressures as well for a softer starting of the assembly.

Certificates and approvals

Limit position switches	The inductive limit position switches meet the requirements of the DIN EN 60 947-5-6 (NAMUR).
Inspection certificate	Inspection certificate 3.1B acc. to EN 10204 on demand.

Ordering information

Product structure

Drive type and limit contact switches									
A	Manual without limit contact switches								
B	Pneumatic without limit contact switches								
C	Pneumatic with 2 pneumatic limit contact switches								
D	Pneumatic with 2 electric Ex limit contact switches								
E	Pneumatic with 1 electric Ex limit contact switch								
Assembly version									
1	Service position								
2	Service position + measuring position								
Electrode type									
A	For gel electrodes / ISFET sensors, 225 mm								
B	For gel electrodes, 360 mm								
C	For liquid KCl electrodes, 360 mm								
Immersion depth									
1	max 148 mm (5.83")								
2	max 280 mm (11.02")								
Assembly material (in contact with medium)									
B	In contact with medium: PEEK								
C	In contact with medium: PVDF								
D	In contact with medium: PVDF, conductive								
E	In contact with medium: PVDF, electrode holder Hastelloy C4								
F	In contact with medium: Hastelloy C4								
G	In contact with medium: Titanium								
H	In contact with medium: Stainless steel 1.4571; 316Ti								
Seal material (in contact with medium)									
2	FPM Viton®								
3	FFKM KALREZ®								
Process connection									
D	DN 50 flange (acc. to EN 1092), stainless steel								
E	DN 80 flange (acc. to EN 1092), stainless steel								
F	2" ANSI flange, stainless steel								
G	Thread G1 ¼" internal (only with materials F/G/H)								
Y	Special version acc. to customer specification								
Rinse connection									
1	Without rinse connection								
3	With rinse fitting 2 x G ¼" internal thread								
4	With rinse fitting 2 x NPT ¼" internal thread								
5	With rinse fitting 2 x pipe 8x60 mm Swagelok								
CPA472D-									complete order code

Scope of delivery

The scope of delivery comprises:

- Cleanfit CPA472D assembly (ordered version)
- Operating Instructions (English)

Accessories

Water filter and pressure reducer

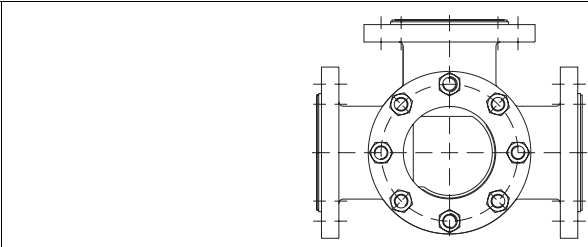
- Filter set CPC300
Water filter (dirt trap) 100 µm, complete, incl. angle bracket;
order no. 51511336
- Pressure reducer kit
complete, incl. manometer and angle bracket;
order no. 51505755

Rinse adapter

- Rinse connection adapter CPR40 for connecting 2 or 4 different media.
Order acc. to product structure, see Technical Information (TI342C/07/en).

Hose nozzle

- Hose nozzles for rinse connections G¼, DN 12, PVDF, 2 pieces;
order no. 50090491

Rinse chamber valve	<ul style="list-style-type: none"> ■ Rinse chamber input valve, pneumatically ON - OFF, PVDF with bellows, connection G$\frac{1}{4}$, (on request)
Flow assembly with and without sight glass	<ul style="list-style-type: none"> ■ Flow assembly with sight glass, PFA lined, conductive (see Fig.) DN 50, length 230 mm (9.06 "), only for CPA472D-xxx1xxDx, order no. 51515653 DN 80, length 310 mm (12.20 "), order no. 71024439 ■ Flow assembly (without sight glass), PFA lined, conductive DN 50, length 230 mm (9.06 "), only for CPA472D-xxx1xxYx with C-PA060418-50 for stroke reduction and flange adaption, order no. 71024441 DN 80, length 310 mm (12.20 "), order no. 71024442
	
Flow assembly with integrated sight glass #0005368	
Installation seal	<ul style="list-style-type: none"> ■ Profile seal DN 50, PTFE, order no. 51515675 DN 80, PTFE, order no. 51515677
Holder	<ul style="list-style-type: none"> ■ Holder for retraction pipe, material: PP order no. 51518530
Protection cover	<ul style="list-style-type: none"> ■ On request at TSP
Limit position switches	<ul style="list-style-type: none"> ■ Set of pneumatic limit position switches (2 pieces); order no. 51502874 ■ Set of electric limit position switches, Ex and Non-Ex (2 pieces); order no. 51502873
Pneumatic throttle	<ul style="list-style-type: none"> ■ Pneumatic throttle for the reduction of the assembly moving speed, order no. 51511990
Sensors	<p>Glass electrodes</p> <ul style="list-style-type: none"> ■ Orbisint CPS11/CPS11D pH electrode for process applications, with PTFE diaphragm, Memosens technology as option; Ordering acc. to product structure, see Technical Information (TI028C/24/ae) ■ Orbisint CPS12/CPS12D ORP electrode for process applications, with PTFE diaphragm, Memosens technology as option; Ordering acc. to product structure, see Technical Information (TI367C/24/ae) ■ Ceraliquid CPS41/CPS41D pH electrode with ceramics diaphragm and liquid KCl electrolyte, Memosens technology as option; Ordering acc. to product structure, see Technical Information (TI079C/24/ae) ■ Ceraliquid CPS42/CPS42D ORP electrode with ceramics diaphragm and liquid KCl electrolyte, Memosens technology as option; Ordering acc. to product structure, see Technical Information (TI079C/24/ae) ■ Ceragel CPS71/CPS71D pH electrode with double chamber reference system and integrated bridge electrolyte, Memosens technology as option; Ordering acc. to product structure, see Technical Information (TI245C/24/ae) ■ Ceragel CPS72/CPS72D ORP electrode with double chamber reference system and integrated bridge electrolyte, Memosens technology as option; Ordering acc. to product structure, see Technical Information (TI374C/24/ae)

- Orbipore CPS91/CPS91D
pH electrode with open aperture for media with high dirt load, Memosens technology as option;
Ordering acc. to product structure, see Technical Information (TI375C/24/ae)

ISFET sensors

- Tophit CPS471/CPS471D
Sterilizable and autoclavable ISFET sensor for food and pharmaceuticals, process technology, water treatment and biotechnology;
Ordering acc. to product structure, see Technical Information (TI283C/24/ae)
- Tophit CPS441/CPS441D
Sterilizable ISFET sensor for media with low conductivity, with liquid KCl electrolyte;
Ordering acc. to product structure, see Technical Information (TI352C/24/ae)
- Tophit CPS491/CPS491D
ISFET sensor with open aperture for media with high dirt load;
Ordering acc. to product structure, see Technical Information (TI377C/24/ae)

Calibration solutions**pH**

Technical buffer solutions, accuracy 0.02 pH, acc. to NIST/DIN

- pH 4.0 red, 100 ml (3.4 fl.oz.), order no. CPY2-0
- pH 4.0 red, 1000 ml (34 fl.oz.), order no. CPY2-1
- pH 7.0 green, 100 ml (3.4 fl.oz.), order no. CPY2-2
- pH 7.0 green, 1000 ml (34 fl.oz.), order no. CPY2-3

Technical buffer solutions for single use, accuracy 0.02 pH, acc. to NIST/DIN

- pH 4.0 20 x 20 ml (0.68 fl.oz.), order no. CPY2-D
- pH 7.0 20 x 20 ml (0.68 fl.oz.), order no. CPY2-E

ORP

Technical buffer solutions for ORP electrodes

- +220 mV, pH 7.0, 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

Cable

- 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/ORP electrodes with GSA plug-in head
Ordering acc. to product structure, see Technical Information (TI118C/07/en)
- CPK12 special measuring cable
For pH/ORP glass electrodes and ISFET sensors with TOP68 plug-in head
Ordering acc. to product structure, see Technical Information (TI118C/07/en)
- CYK10 Memosens data cable
For digital pH sensors with Memosens technology (CPSxxD)
Ordering according to product structure, see Technical Information (TI376C/07/en)

Transmitter

- Liquiline M CM42
Modular two-wire transmitter, stainless steel or plastic, field or panel instrument, various Ex approvals (ATEX, FM, CSA, Nepsi, TIIS), HART, PROFIBUS or FOUNDATION Fieldbus available
Ordering acc. to product structure, see Technical Information (TI381C/24/ae)
- Liquisys M CPM223/253
Transmitter for pH and ORP, field or panel-mounted housing, HART or PROFIBUS available
Ordering acc. to product structure, see Technical Information (TI194C/24/ae)
- Mycom S CPM153
Transmitter for pH and ORP, one or two channel version, Ex or Non-Ex, HART or PROFIBUS available
Ordering acc. to product structure, see Technical Information (TI233C/24/ae)

Measuring, cleaning and calibration systems

- Topcal S CPC310
- Fully automatic measuring, cleaning and calibration system; Ex or Non-Ex
- in-situ cleaning and calibration, automatic sensor monitoring
- Ordering acc. to product structure, Technical Information TI404C/07/de

- Topclean S CPC30
- Fully automatic measuring and cleaning system; Ex or Non-Ex
 - in-situ cleaning, automatic sensor monitoring
 - Ordering acc. to product structure, see Technical Information TI235C/24/ae)

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