



Level



Pressure



Flow



Temperature



Liquid  
Analysis



Registration



Systems  
Components



Services



Solutions

## Technical Information

# Cleanfit P CPA472

Compact retractable plastic assembly for installation of 120 mm electrodes in tanks or pipelines



### Application

- Water treatment
- Wastewater treatment
- Plant design
- Tanks and process vats
- Pipelines or pipes

This compact retractable assembly permits replacement of the electrode while the tank is full or under process conditions with pressures of up to 6 bar (87 psi). In connection with the complete system Topcal S CPC310 you can automatically clean and calibrate the electrodes.

The material in contact with the medium and the housing are plastic.

### Your benefits

- Compact design
- Electrode can be cleaned and calibrated without interrupting the process; electrode life is extended
- Reliable separation from process by stop bolt and O-ring seals
- Simple removal and installation of electrode during ongoing process
- Can be automated with a pneumatic or electric control system

## Function and system design

### Function

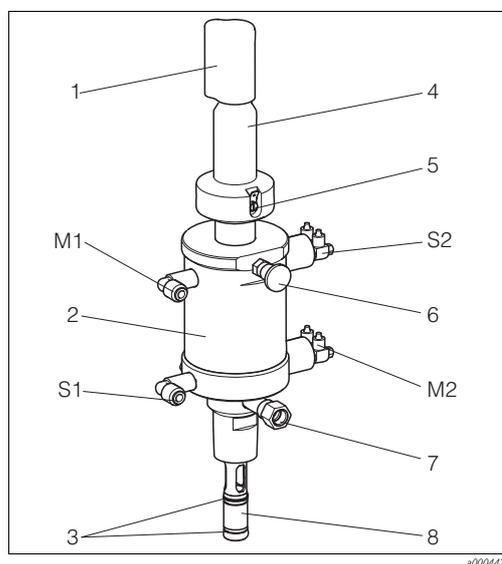
The retractable assembly Cleanfit P CPA472 is intended for reliable measurement of pH value and ORP in pipes and vats. This assembly has been designed as a compact retractable assembly for water treatment, for plant design and for industrial wastewater treatment. Without having to interrupt the process, the electrode can be

- separated from the process and moved into the rinse chamber manually or pneumatically
- rinsed with water or cleaning solution
- kept moist during interruptions in operation
- removed
- sterilized or
- calibrated.

The Cleanfit P CPA472 assembly is available with polypropylene (PP) or polyvinylidene fluoride (PVDF) as the material in contact with the medium. Depending on the application, you can choose

- the short assembly version (for use with 120 mm gel electrodes or 225 mm liquid KCl electrodes, immersion depth up to 108 mm) or
- the long assembly version (for use with 225 mm gel electrodes, immersion depth up to 215 mm).

The most commonly used process connections are available (see section Process connections).



Operating elements

*M = Measuring*

*S = Service*

*M1 Pneumatics "Assembly measuring"*

*M2 Limit position switch "Assembly measuring"*

*S1 Pneumatics "Assembly Service"*

*S2 Limit position switch "Assembly Service"*

*1 Splash protection cap*

*2 Assembly housing (cylinder)*

*3 Seals in contact with medium*

*4 Retractable pipe*

*5 Potential matching*

*6 Stop bolt*

*7 Rinse fitting (optional)*

*8 Sensor holder (= sensor guide)*

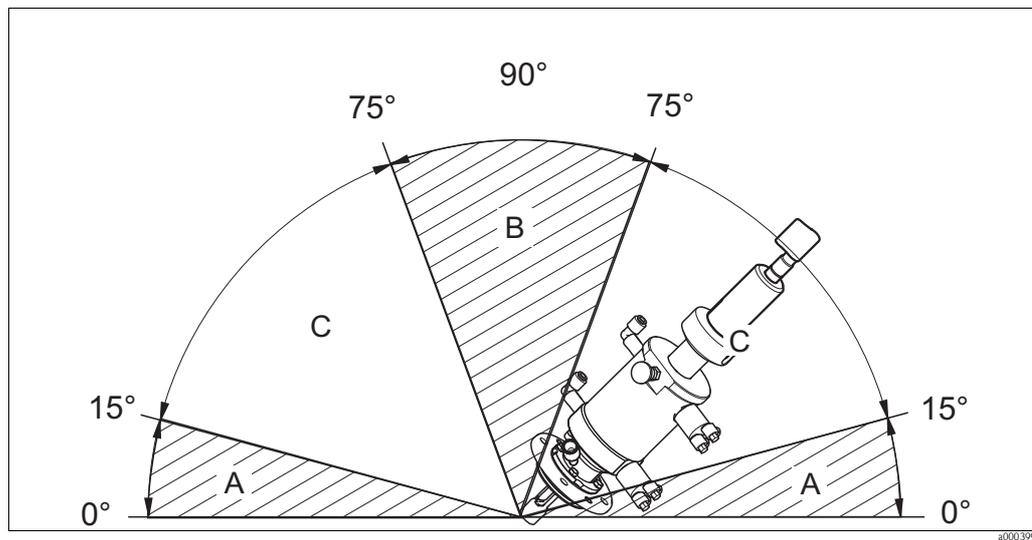


## Installation

### Installation conditions

The assembly is designed for installation on tanks and pipes. **Special** welded fittings are necessary for the installation (see chapter "Accessories").

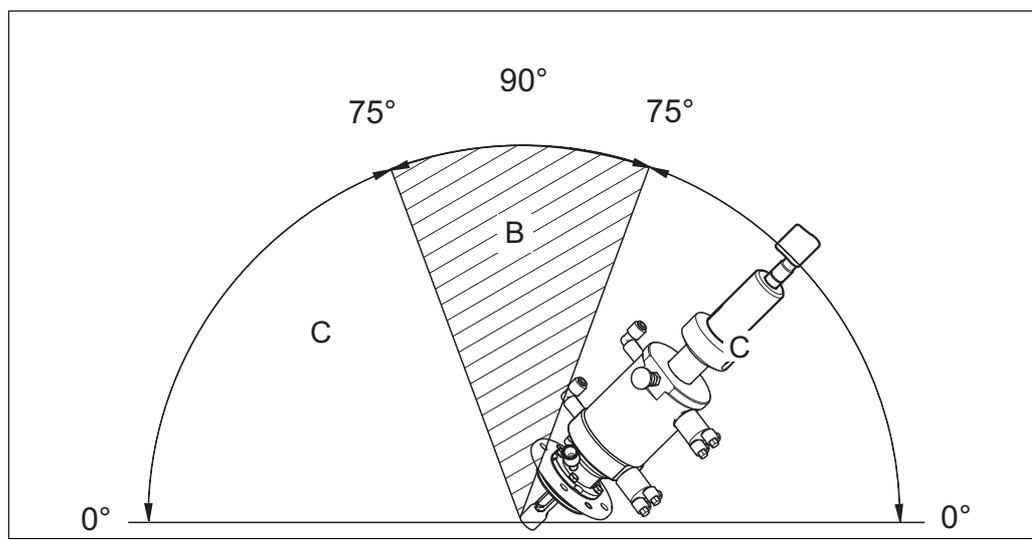
When using standard glass electrodes, only installation positions are permitted in which the middle axis of the assembly lies at an angle between  $15^\circ$  and  $75^\circ$  from the horizontal (see diagram). Otherwise, there will not be a reliable contact between the inner side of the pH membrane and the inner terminal leads via the electrolytes. If the angle of the installation position is above  $75^\circ$  from the horizontal, air bubbles can accumulate in the chamber.



Installation angle

- A Inadmissible installation angle
- B Limited permissible angle (air bubbles can build up in the chamber)
- C Recommended installation angle

When using an ISFET Tophit sensor, there are, in principle, no restrictions for the installation position. An installation angle of 0 to  $75^\circ$  is, however, recommended. An overhead installation is possible.



Installation angle for assemblies with ISFET sensors

- B Limited permissible angle (air bubbles can build up in the chamber)
- C Recommended installation angle

**Pneumatic connections for automatic assembly actuation**

Requirements:

- air pressure of 4 to 5 bar (58 to 72.5 psi)
- air must be filtered (40 µm) and be free of water and oil
- no continuous air consumption
- minimum nominal diameter of the air lines: 4 mm (0.16 ")

Connection thread: 2 x G 1/8



Caution!

There must be a pressure-reducing valve upstream if the air pressure can increase to above 5 bar (72.5 psi) (including any short pressure surges).

To ensure a smooth assembly operation the assembly is equipped with a pneumatic throttle.

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**Rinse water connection**

Rinse water pressure: 2 to 6 bar (29 to 87 psi)

2 x G ¼ (inner)

2 x NPT ¼" (inner)

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## Environment

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**Ambient temperature**

Ambient temperature not below 0 °C (32 °F).

The maximum permissible temperature for electric limit position switches (NAMUR type) is 90 °C (194 °F).

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**Hazardous areas**

The assembly Cleanfit P CPA472 is a plastic assembly (housing and materials in contact with medium are not metallic). The assembly is **not** suitable for the intrinsically safe operation in hazardous areas according to ATEX regulations. For applications in these areas we recommend the assembly Cleanfit P CPA472D with the housing made of stainless steel 1.4404 (AISI 316L), see TI403C/07/en.

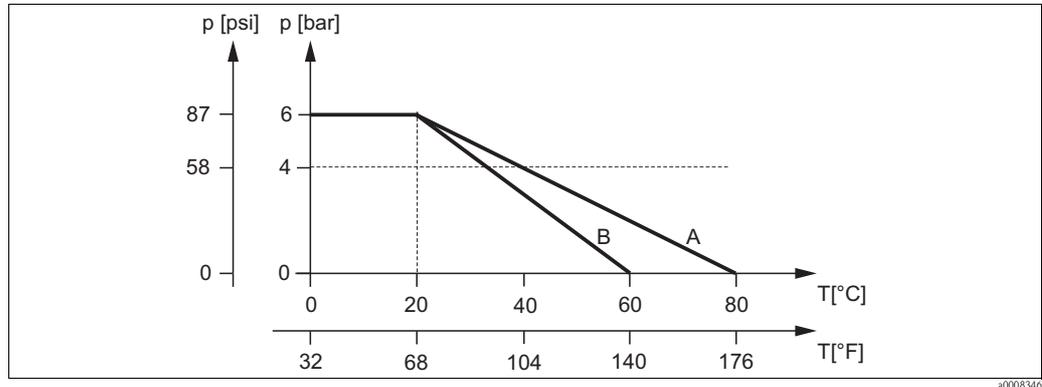
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## Process

**Process temperature** 0 to 80 °C (32 to 176 °F) in PVDF  
0 to 60 °C (32 to 140 °F) in PP

**Process pressure** 0 to max. 4 bar (0 to max. 58 psi) overpressure for manual operation  
0 to 6 bar (0 to 87 psi) overpressure at 20 °C (68 °F) for pneumatic operation

### Pressure/temperature diagram



Pressure temperature diagram

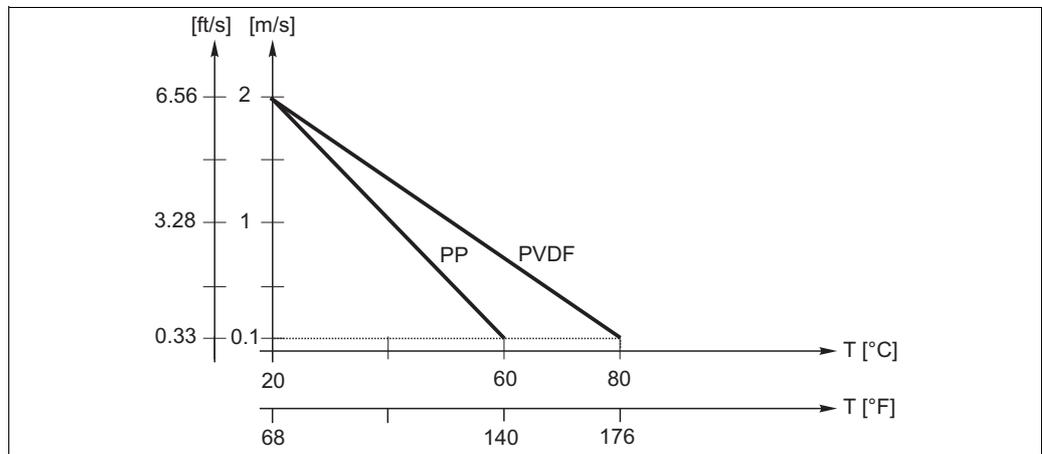
A PVDF  
B PP



Note!

For high temperature applications and pressures up to 10 bar (145 psi) the "heavy duty assembly" CPA472D is recommended (see TI403C/07/en).

### Medium velocity



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

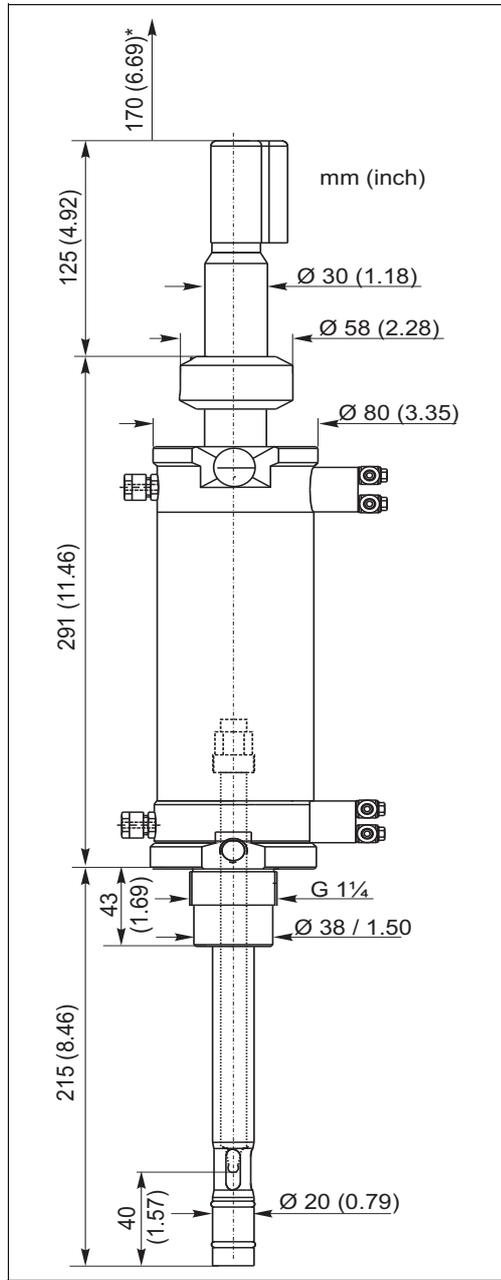


Note!

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

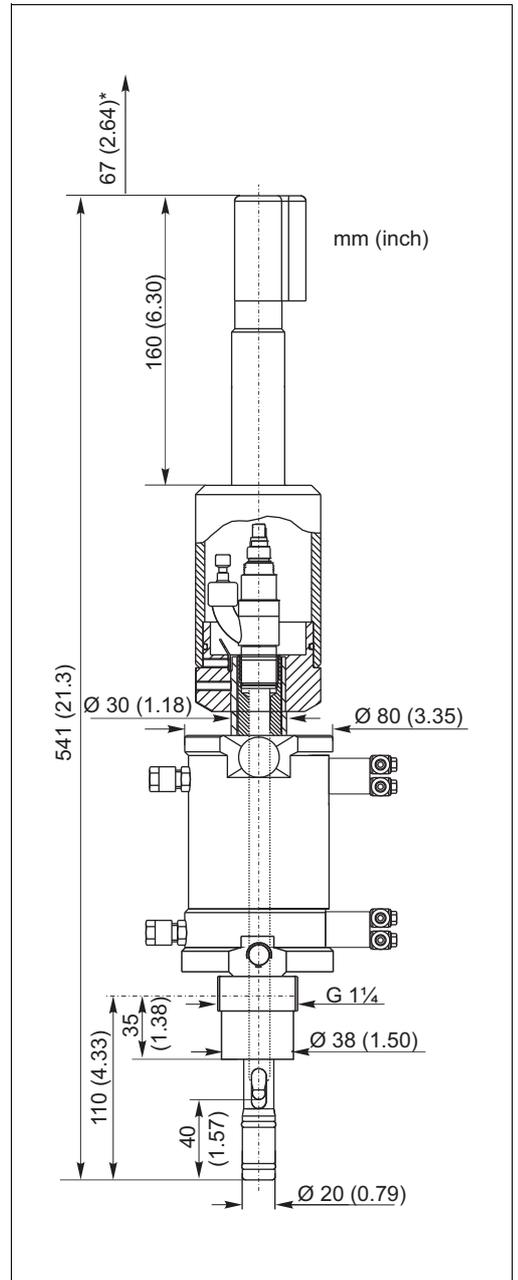
## Mechanical construction

### Dimensions



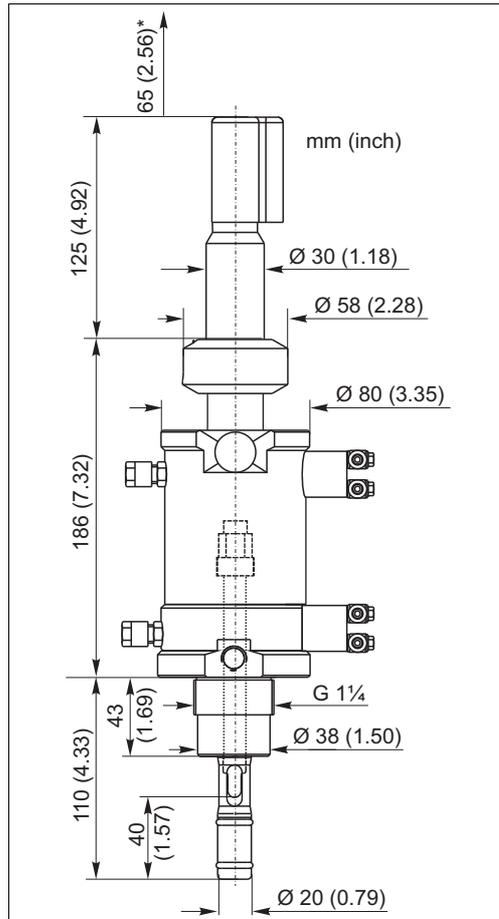
Long version for gel sensors

\* Stroke



Short version for KCl sensors

\* Stroke



Short version for gel sensors

\* Stroke

Process connections

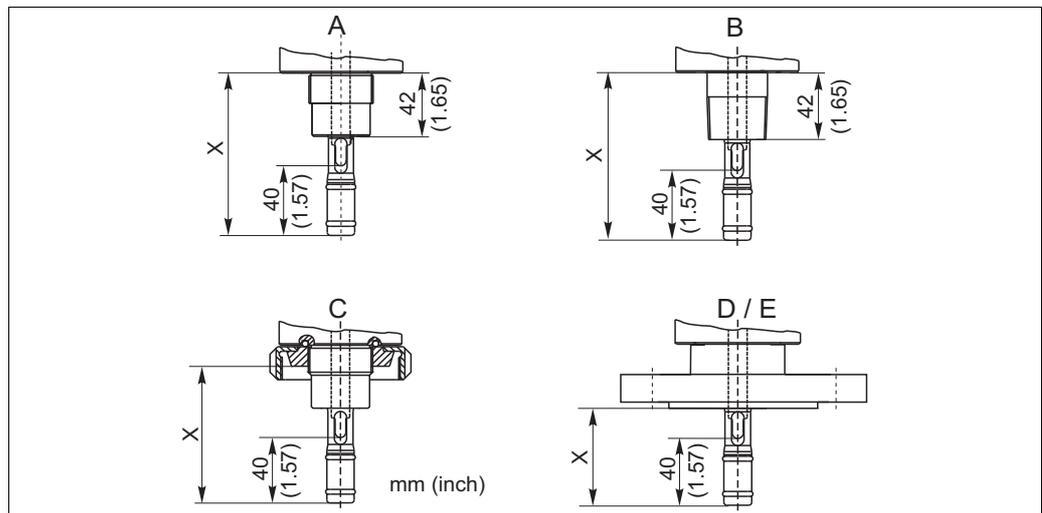


Fig. 1: Process connections short version / long version

Process connection	X short version	X long version	
A	G1 1/4, external	108 mm (4.25")	215 mm (8.46")
B	NPT 1" external	108 mm (4.25")	215 mm (8.46")
C	Dairy fitting DN 50	94 mm (3.70")	201 mm (7.91")
D	Flange DN 50	66 mm (2.60")	173 mm (6.81")
E	Flange ANSI 2"	66 mm (2.60")	173 mm (6.81")

<b>Sensors</b>	Short version	pH glass electrodes, gel 120 mm pH glass electrodes, KCl 225 mm pH ISFET sensors, gel, 120 mm pH ISFET sensors, KCl, 225 mm
	Long version	pH glass electrodes, gel, 225 mm pH ISFET sensors, gel, 225 mm
<b>Weight</b>	1.5 to 3 kg (3.3 to 6.6 lb), depending on assembly version and additional equipment, see product structure	
<b>Materials</b>	in contact with medium	
	Seals	FPM / Kalrez®
	Sensor holder	PP, PVDF
	not in contact with medium	
Cylinder	PA	
El. limit position switch	fore-part PBT, cable PVC	

<b>Limit position switches</b>	Pneumatic:	3/2 way valve; thread M 12 x 1; connection for hoses with OD = 6 mm (0.24")
	Electric:	inductive (NAMUR type); cable length: 10 m (32.8 ft); housing material: stainless steel; thread M 12 x 1; nominal voltage: 8 V ⓈII 1G EEx ia IIC T6; switching distance: 2 mm, flush

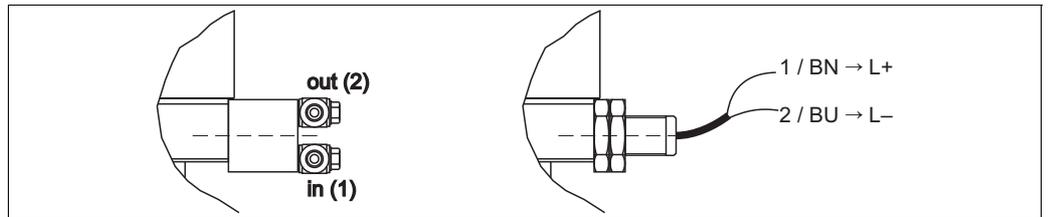


Fig. 2: Limit position switches, left: pneumatic (1 = compressed air inlet, 2 = compressed air outlet) right: electric (NAMUR)



**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).

## Certificates and approvals

<b>Limit switches</b>	The inductive limit switches meet the requirements of DIN EN 60 947-5-6 (NAMUR).
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## Ordering information

### Product structure

Drive type and limit contact switches										
A	Manual									
B	Pneumatic without limit contact switches (suitable for retrofitting)									
C	Pneumatic with 2 pneumatic limit contact switches									
D	Pneumatic with 2 electric limit contact switches (max. 80 °C / 176 °F)									
E	Pneumatic with 2 electric Ex limit contact switches (max. 80 °C / 176 °F)									
Assembly version										
1	Standard version									
Electrode holder										
A	For gel electrodes / ISFET sensors with Pg 13.5									
B	For liquid KCl electrodes / ISFET sensors with Pg 13.5 hose connection head									
Immersion depth										
1	Short version: up to 108 mm (depending on process connection) (possible electrode lengths: A = 120 mm, B = 225 mm)									
2	Long version: up to 212 mm (depending on process connection) (possible electrode length: A = 225 mm)									
9	Special version acc. to customer									
Assembly material (in contact with medium)										
A	In contact with medium: PP									
C	In contact with medium: PVDF									
Seal material (in contact with medium)										
2	FPM (Viton®, preferred for process applications)									
3	KALREZ®									
Process connection										
A	G 1¼ external thread									
B	NPT 1" external thread									
C	Dairy fitting DN 50 (acc to. DIN 11 851)									
D	DN 50 flange, PP (acc. to EN 1092)									
E	2" ANSI flange, PP									
Optional equipment										
1	Without rinse connection (retrofitting not possible)									
3	With rinse fitting 2 x G ¼ internal thread									
4	With rinse fitting 2 x NPT ¼" internal thread									
CPA472-										complete order code

### Scope of delivery

The scope of delivery comprises:

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

### Special materials

Materials like Hastelloy C4, titanium, stainless steel 14571 (AISI 316 Ti), PEEK and conductive PVDF are available materials for the CPA472D assembly (see TI403C/07/en).

## Accessories

### Pressure reducer

Pressure reducer kit

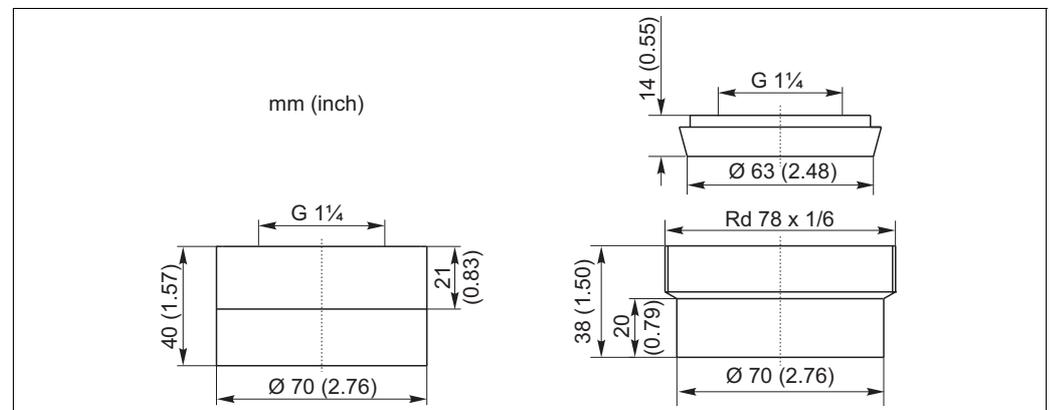
- complete, incl. manometer and angle bracket;
- order no. 51505755

Pneumatic throttle for the reduction of the assembly moving speed,

- G1/8 threaded connection
- order no. 50036864

### Welded fittings

- G1¼ welded fitting, PP; order no.: 51502809
- G1¼ welded fitting, PVDF; order no.: 51502810
- Dairy pipe welded fitting, PP, with FPM seal; order no.: 51502811
- Dairy pipe welded fitting, PVDF, with FPM seal; order no.: 51502812



Welded fitting

a0008340

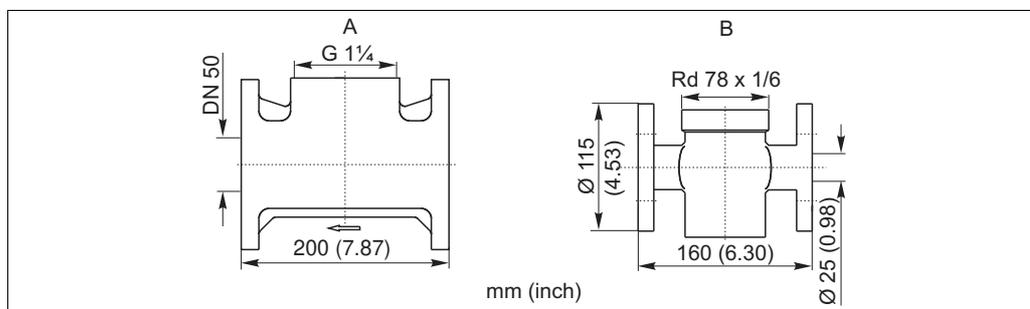
### Dummy plug

Dummy plug for G1¼ process connection,

- SS 1.4435 (AISI 316L), FPM (Viton®) seal, G1¼ internal thread; order no. 51502800

**Flow vessel**

- DN 50 flow vessel,  
G 1¼ internal thread, PP;  
order no.: 51502815
- DN 25 flow vessel,  
Rd 78 external thread, PVDF;  
order no.: 51502816



Flow vessels

- A Flow vessel DN 50, PP  
B Flow vessel DN 25, PVDF



Note!  
More flow vessels, e.g. with/without view glass, PFA lined, DN 24, DN 50, DN 80 etc., are available on request.

**Protection cover**

- On request at TSP

**Limit switches**

- 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

**Sensors****Glass electrodes**

Orbisint CPS11/CPS11D

- pH electrode for process applications, with PTFE diaphragm;
- Ordering acc. to product structure, see Technical Information (TI028C/07/en)

Orbisint CPS12/CPS12D

- ORP electrode for process applications, with PTFE diaphragm;
- Ordering acc. to product structure, see Technical Information (TI367C/07/en)

Ceraliquid CPS41/CPS41D

- pH electrode with ceramics diaphragm and liquid KCl electrolyte;
- Ordering acc. to product structure, see Technical Information (TI079C/07/en)

Ceraliquid CPS42/CPS42D

- ORP electrode with ceramics diaphragm and liquid KCl electrolyte;
- Ordering acc. to product structure, see Technical Information (TI373C/07/en)

Ceragel CPS71/CPS71D

- pH electrode with double chamber reference system and integrated bridge electrolyte;
- Ordering acc. to product structure, see Technical Information (TI245C/07/en)

Ceragel CPS72/CPS72D

- ORP electrode with double chamber reference system and integrated bridge electrolyte;
- Ordering acc. to product structure, see Technical Information (TI374C/07/en)

Orbipore CPS91/CPS91D

- pH electrode with open aperture for media with high dirt load;
- Ordering acc. to product structure, see Technical Information (TI375C/07/en)

**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/07/en)
- Tophit CPS441/CPS441D  
Sterilizable ISFET sensor for media with low conductivity, with liquid KCl electrolyte;  
Ordering acc. to product structure, see Technical Information (TI352C/07/en)
- Tophit CPS491/CPS491D  
ISFET sensor with open aperture for media with high dirt load;  
Ordering acc. to product structure, see Technical Information (TI377C/07/en)

**Calibration solutions****pH****High-quality buffer solutions of Endress+Hauser**

The secondary buffer solutions have been referenced to primary reference material of the PTB (German Federal Physico-technical Institute) and to standard reference material of NIST (National Institute of Standards and Technology) according to DIN 19266 by a DKD (German Calibration Service) accredited laboratory.

pH value	
A	pH 2.00 (accuracy ± 0.02 pH)
C	pH 4.00 (accuracy ± 0.02 pH)
E	pH 7.00 (accuracy ± 0.02 pH)
G	pH 9.00 (accuracy ± 0.02 pH)
I	pH 9.20 (accuracy ± 0.02 pH)
K	pH 10.00 (accuracy ± 0.05 pH)
M	pH 12.00 (accuracy ± 0.05 pH)

Quantity	
01	20 x 18 ml (0.68 fl.oz) only buffer solutions pH 4.00 and 7.00
02	250 ml (8.45 fl.oz)
10	1000 ml (0.26 US gal)
50	5000 ml (1.32 US gal) canister for Topcal S

Certificates	
A	Buffer analysis certificate

Version	
1	Standard

CPY20-				complete order code
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**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

**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/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 sensors with Memosens technology
  - Ordering according to product structure, see Technical Information (TI376C/07/en)

**Transmitters**

## 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/07/en)

## 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/07/en)

## 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/07/en)

**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/en

## 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/07/en



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