



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
- Cost-effective online measurement for simple applications
- Can be automated with a pneumatic or electric control system

## Function and system design

### Function

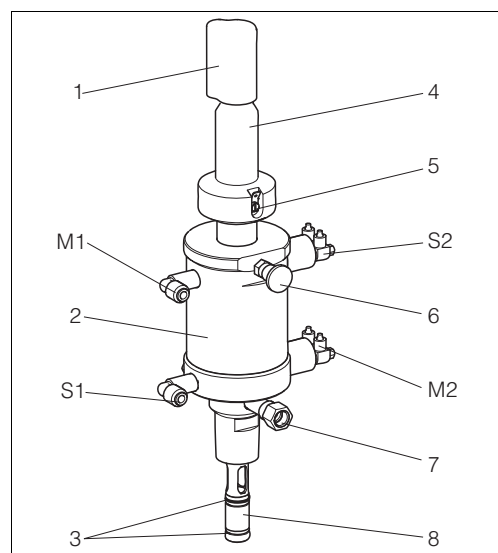
The retractable assembly Cleanfit P CPA472 is intended for reliable measurement of pH value and ORP in pipes and vats. This assembly has been designed as a compact retractable assembly for water treatment, for plant design and for industrial wastewater treatment. Without having to interrupt the process,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



*M = Measuring  
S = Service*

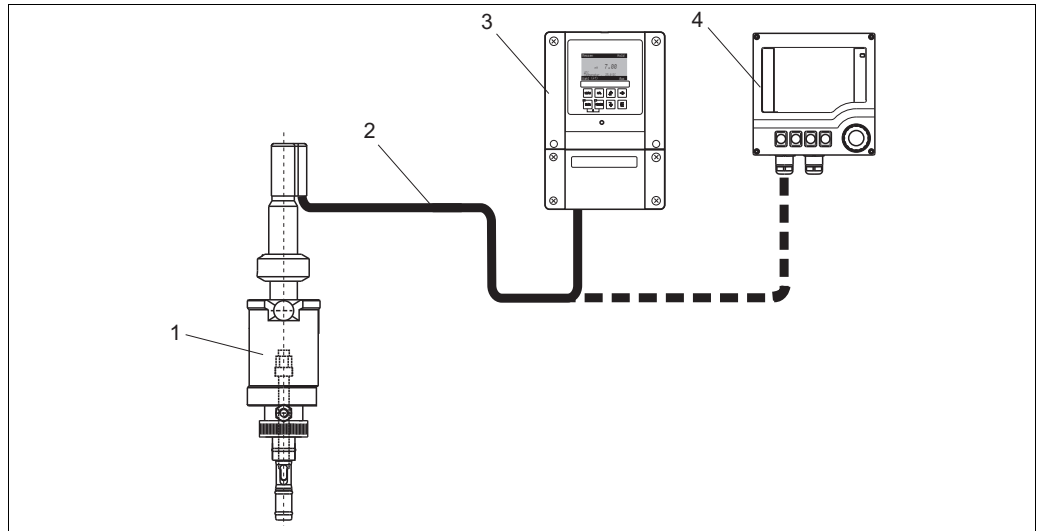
*M1 Pneumatics "Assembly measuring"  
M2 Limit position switch "Assembly measuring"  
S1 Pneumatics "Assembly Service"  
S2 Limit position switch "Assembly Service"*

*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)*

Operating elements

a0004479

**Measuring system without control**

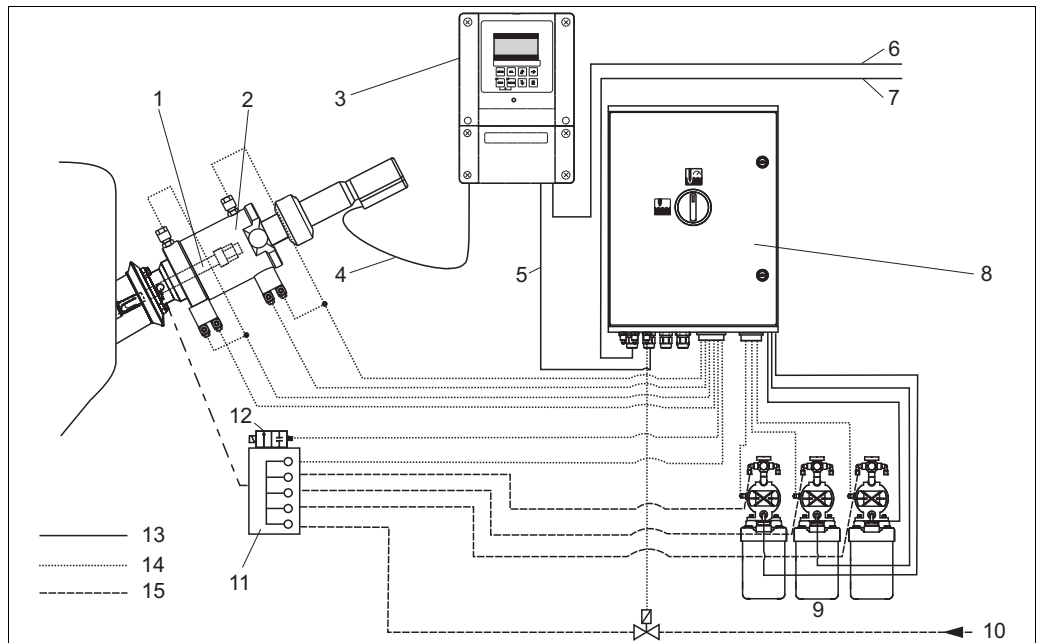


Measuring system without control (example)

a0007572

- |   |  |   |                               |
|---|--|---|-------------------------------|
| 1 | Assembly Cleanfit                      | 3 | Transmitter Mycom S CPM153 or |
| 2 | Special pH measuring cable, e.g. CYK10 | 4 | Transmitter Liquiline M CM42  |

**Measuring system with pneumatic control**



Measuring system with pneumatic control

a0006077

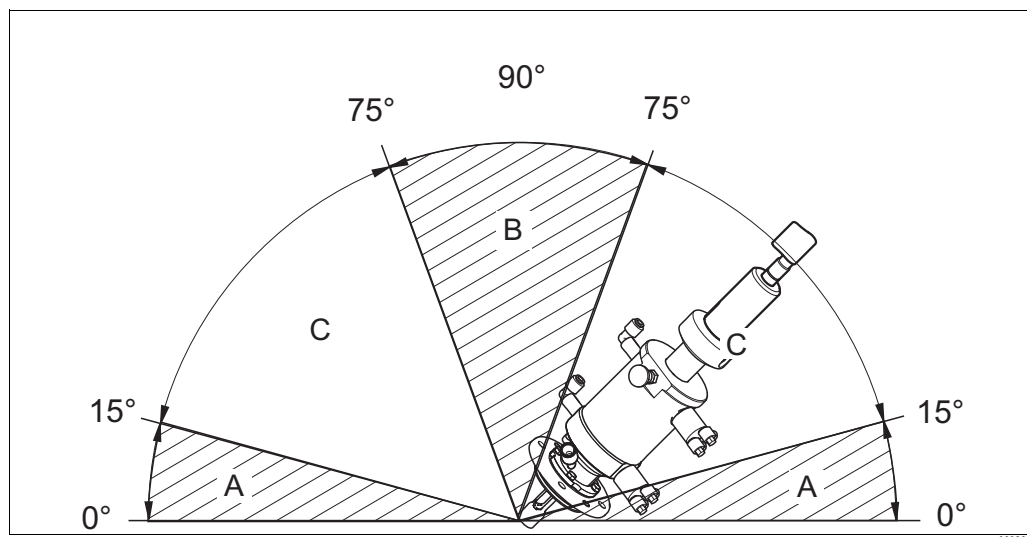
- |   |                                    |    |   |
|---|------------------------------------|----|---|
| 1 | pH/ORP sensor                      | 9  | Canisters for cleaning and buffer solutions           |
| 2 | Assembly Cleanfit                  | 10 | Superheated steam/water/cleaning solutions (optional) |
| 3 | Transmitter Mycom CPM153           | 11 | Rinse block   |
| 4 | Special measuring cable            | 12 | Rinse water valve                                     |
| 5 | Communication / power supply cable | 13 | Power/signal cables                                   |
| 6 | Power supply Mycom                 | 14 | Air hoses   |
| 7 | Power supply CPG310                | 15 | Media   |
| 8 | Control unit CPG310                |    |   |

## Installation

### Installation conditions

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

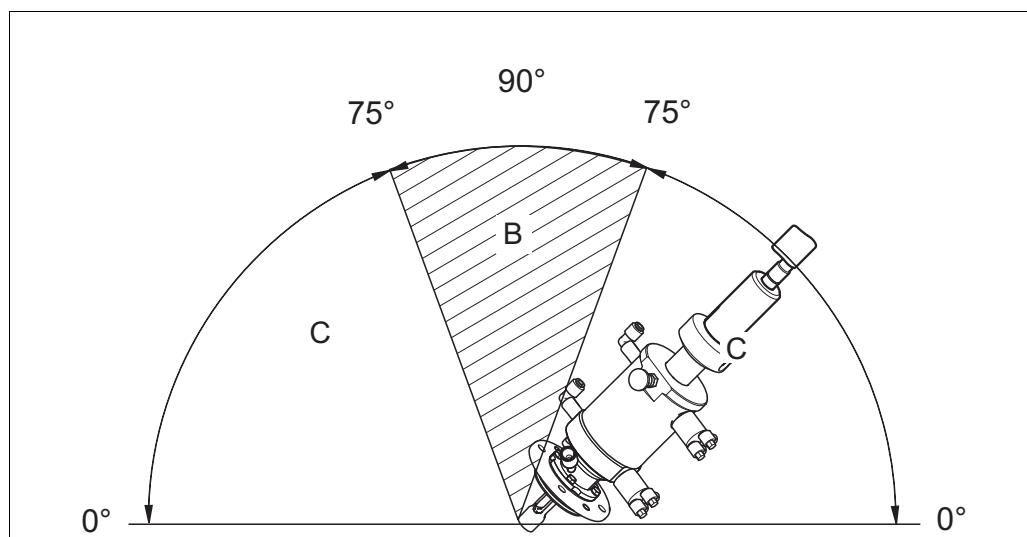
When using standard glass electrodes, only installation positions are permitted in which the middle axis of the assembly lies at an angle greater than  $15^\circ$  from the horizontal (see diagram). Otherwise, there will not be a reliable contact between the inner side of the pH membrane and the inner terminal leads via the electrolytes. Limited permissible 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.

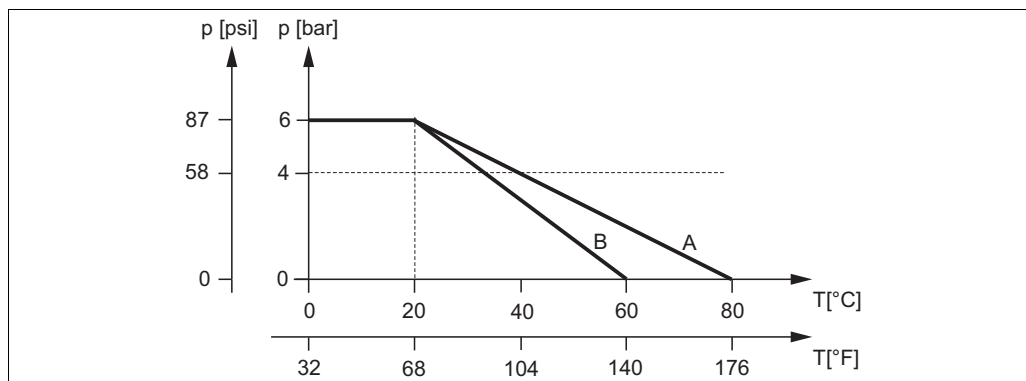
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## Process

**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

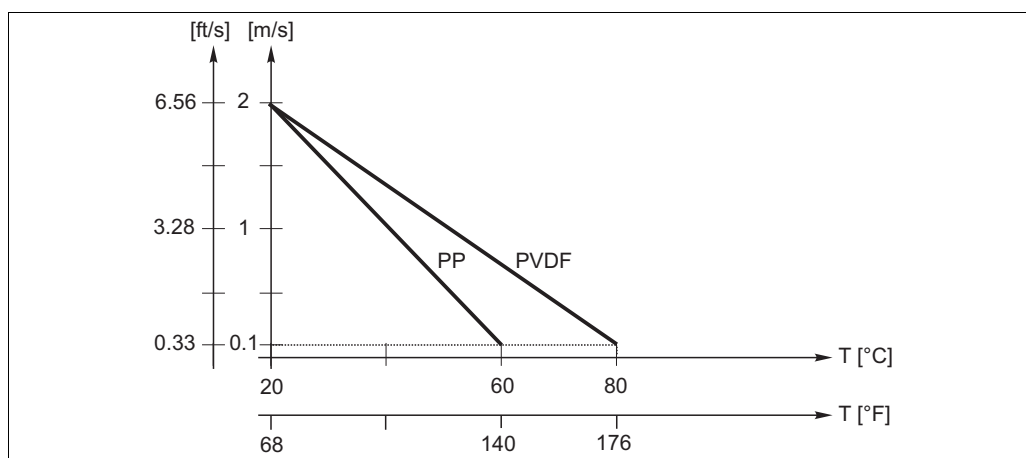


Pressure temperature diagram

A PVDF  
B PP

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)

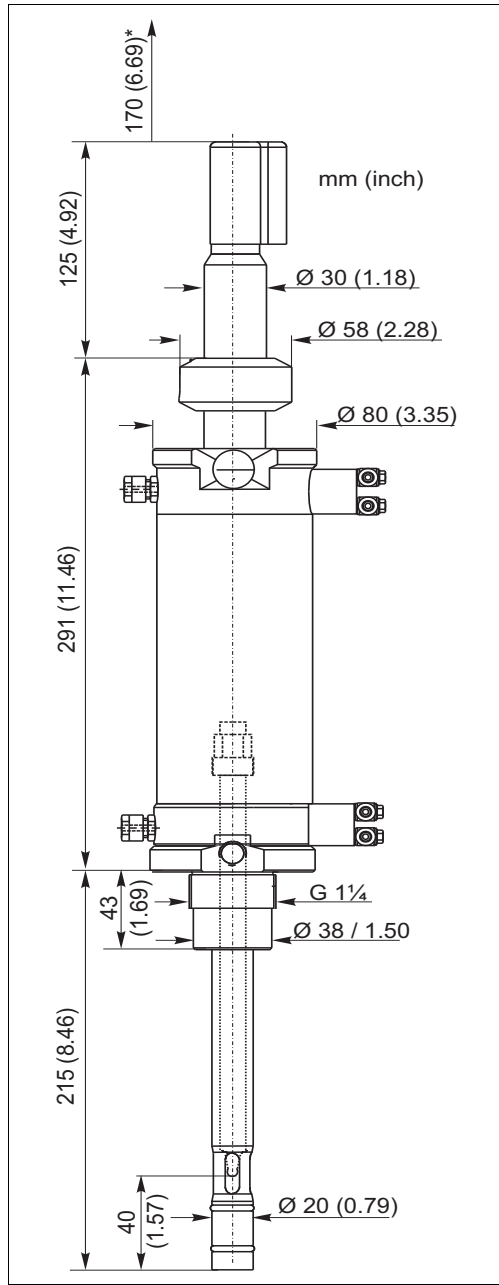
### NOTICE

#### Measuring error due to high medium velocity

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

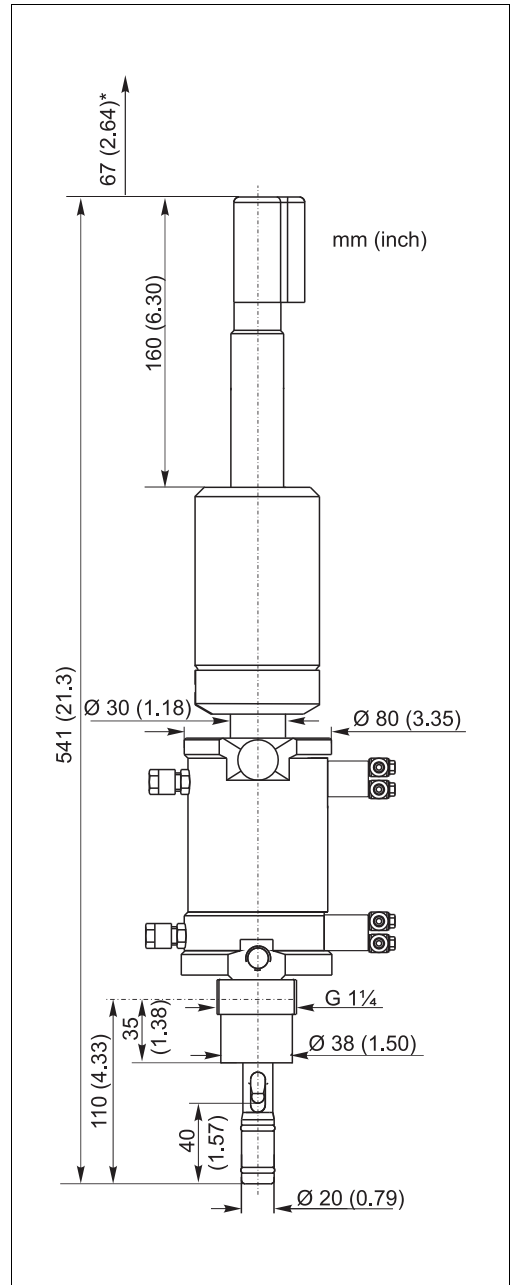
## Mechanical construction

### Dimensions



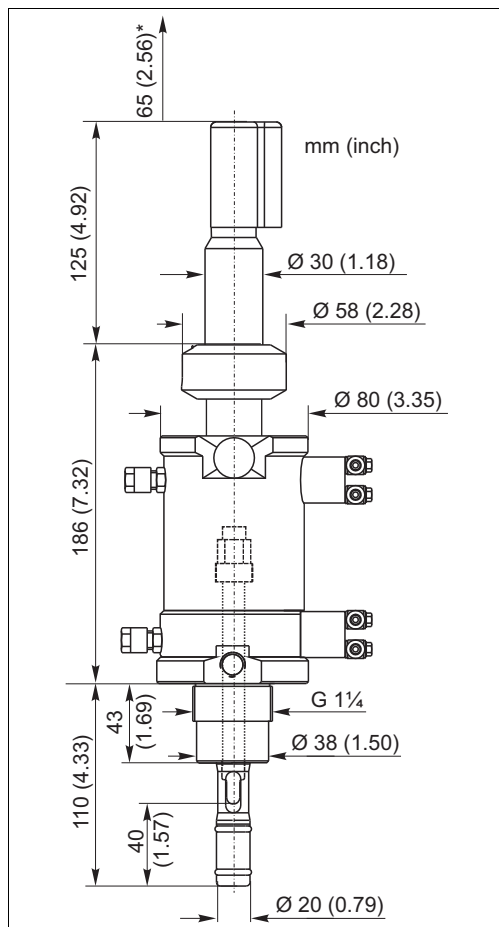
Long version for gel sensors

\* Stroke



Short version for KCl sensors

\* Stroke



Short version for gel sensors

\* Stroke

Process connections

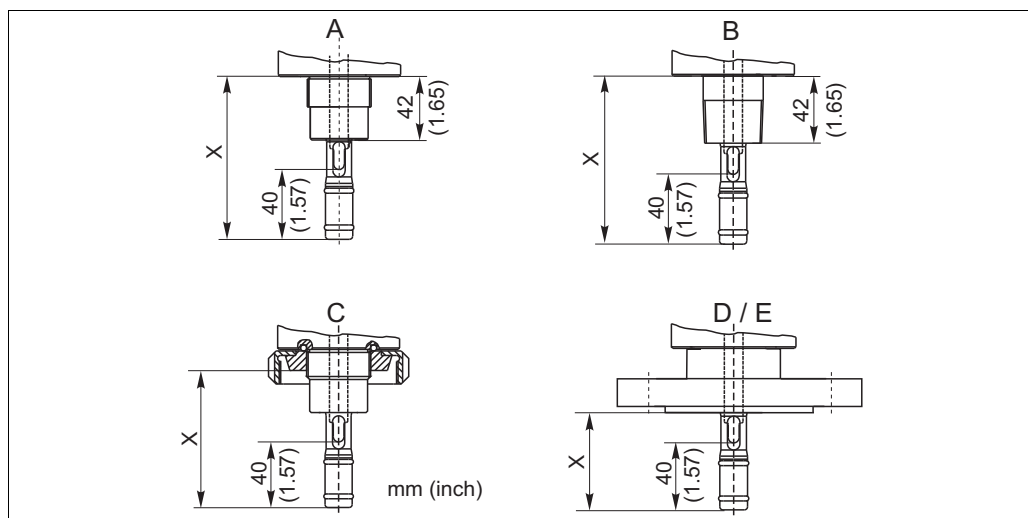


Fig. 1: Process connections short version / long version

Process connection	X short version	X long version
A G1½, 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	75 mm (2.95")	182 mm (7.17")
E Flange ANSI 2"	75 mm (2.95")	182 mm (7.17")



**Sensors**

- i** The short version with flange DN 50 is suitable for compact block flanges only. Flanges with nozzle require the long version.  
Use liquid KCl electrodes with the short version only!

Short version	pH glass electrodes, gel, 120 mm
	pH glass electrodes, KCl, 225 mm
Long version	pH ISFET sensors, gel, 120 mm
	pH ISFET sensors, KCl, 225 mm
	pH glass electrodes, gel, 225 mm
	pH ISFET sensors, gel, 225 mm

**Weight**

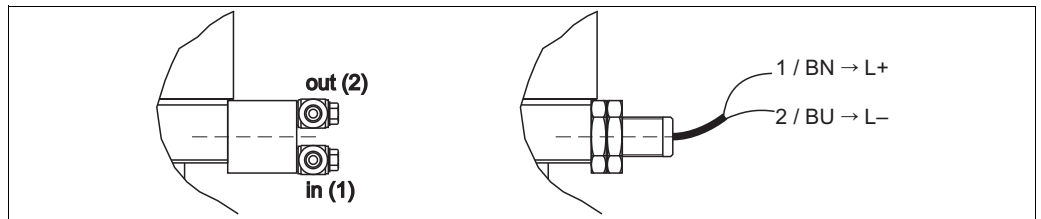
1.5 to 3 kg (3.3 to 6.6 lb), depending on assembly version and additional equipment, see product structure

**Materials**

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

**Limit position switches**

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



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

- i** 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****Limit switches**

The inductive limit switches meet the requirements of DIN EN 60 947-5-6 (NAMUR).

## Ordering information

### Order code


Enter the following address in your browser to access the product page:  
[www.products.endress.com/cpa472](http://www.products.endress.com/cpa472)

1. You can choose from the following options on the product page located on the right:

Product page function
:: Add to product list
:: Price & order information
:: Compare this product
:: Configure this product

2. Click "Configure this product".
3. The configurator opens in a separate window. You can now configure your device and receive the complete order code that applies for the device.
4. Afterwards, export the order code as a PDF or Excel file. To do so, click the appropriate button at the top of the page.

### Product structure

 The following product structure represents the status of printing. You can create a complete and valid order code on the Internet using the configurator tool.

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)

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**Special materials**

Materials like Alloy C4, titanium, stainless steel 14571 (AISI 316 Ti), PEEK and conductive PVDF are available materials for the CPA472D assembly (see TI00403C/07/EN).

## Accessories

**i** 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 local service or sales representation.

### 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;

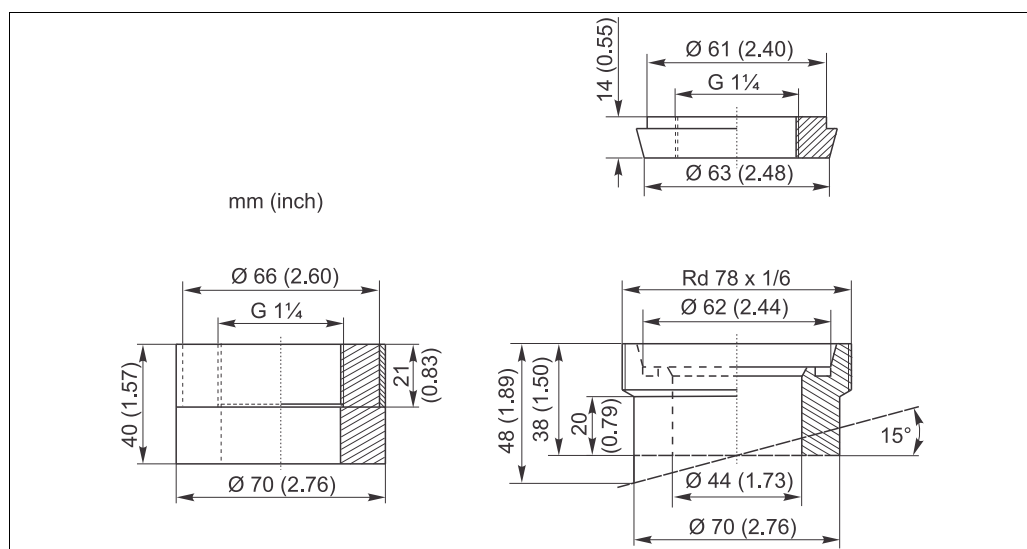
- order no.: 51502810

Dairy pipe welded fitting, PP, with FPM seal;

- order no.: 51502811

Dairy pipe welded fitting, PVDF, with FPM seal;

- order no.: 51502812



Welded fitting

### Dummy plug

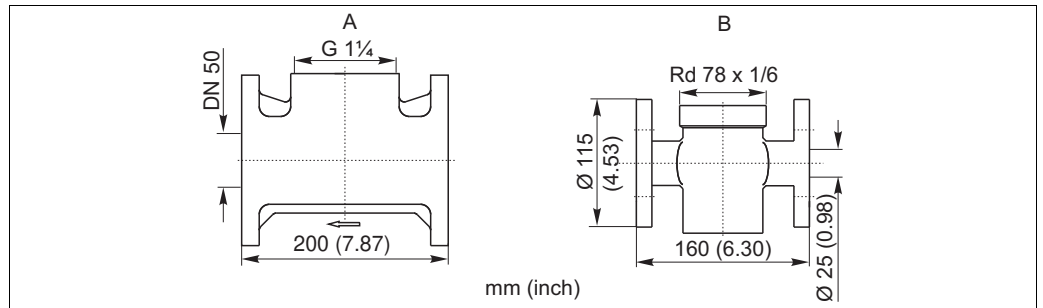
Dummy plug for G1¼ process connection,

- 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, process connection: dairy fitting



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 sensor for process applications
- Optional SIL version for connection to SIL approved transmitters
- With dirt-repellent PTFE diaphragm
- Ordering per product structure (→ Online configurator, [www.products.endress.com/cps11](http://www.products.endress.com/cps11) or [www.products.endress.com/cps11d](http://www.products.endress.com/cps11d))
- Technical Information TI028C/07/EN

## Orbisint CPS12/CPS12D

- ORP electrode for process applications
- With dirt-repellent PTFE diaphragm
- Ordering per product structure (→ Online configurator, [www.products.endress.com/cps12](http://www.products.endress.com/cps12) or [www.products.endress.com/cps12d](http://www.products.endress.com/cps12d))
- Technical Information TI367C/07/EN

## Ceraliquid CPS41/CPS41D

- pH sensor
- With ceramics diaphragm and liquid KCl electrolyte
- Ordering per product structure (→ Online configurator, [www.products.endress.com/cps41](http://www.products.endress.com/cps41) or [www.products.endress.com/cps41d](http://www.products.endress.com/cps41d))
- Technical Information TI079C/07/EN

## Ceraliquid CPS42/CPS42D

- ORP electrode
- With ceramics diaphragm and liquid KCl electrolyte
- Ordering per product structure (→ Online configurator, [www.products.endress.com/cps42](http://www.products.endress.com/cps42) or [www.products.endress.com/cps42d](http://www.products.endress.com/cps42d))
- Technical Information TI373C/07/EN

## Ceragel CPS71/CPS71D

- pH sensor
- With double chamber reference system and integrated bridge electrolyte
- Ordering per product structure (→ Online configurator, [www.products.endress.com/cps71](http://www.products.endress.com/cps71) or [www.products.endress.com/cps71d](http://www.products.endress.com/cps71d))
- Technical Information TI245C/07/EN

## Ceragel CPS72/CPS72D

- ORP electrode
- With double chamber reference system and integrated bridge electrolyte
- Ordering per product structure (→ Online configurator, [www.products.endress.com/cps72](http://www.products.endress.com/cps72) or [www.products.endress.com/cps72d](http://www.products.endress.com/cps72d))
- Technical Information TI374C/07/EN

## Orbipore CPS91/CPS91D

- pH sensor
- With open aperture for media with high dirt load
- Ordering per product structure (→ Online configurator, [www.products.endress.com/cps91](http://www.products.endress.com/cps91) or [www.products.endress.com/cps91d](http://www.products.endress.com/cps91d))
- Technical Information TI375C/07/EN

## Orbipore CPS92/CPS92D

- ORP sensor
- With open aperture for media with high dirt load
- Ordering per product structure (→ Online configurator, [www.products.endress.com/cps92](http://www.products.endress.com/cps92) or [www.products.endress.com/cps92d](http://www.products.endress.com/cps92d))
- Technical Information TI435C/07/EN

### **ISFET sensors**

Tophit CPS471/CPS471D

- Sterilizable and autoclavable ISFET sensor for food and pharmaceuticals, process technology, water treatment and biotechnology;
- Ordering per product structure (→ Online configurator, [www.products.endress.com/cps471](http://www.products.endress.com/cps471) or [www.products.endress.com/cps471d](http://www.products.endress.com/cps471d))
- Technical Information TI283C/07/EN

Tophit CPS441/CPS441D

- Sterilizable ISFET sensor for media with low conductivity, with liquid KCl electrolyte;
- Ordering per product structure (→ Online configurator, [www.products.endress.com/cps441](http://www.products.endress.com/cps441) or [www.products.endress.com/cps441d](http://www.products.endress.com/cps441d))
- Technical Information TI352C/07/EN

Tophit CPS491/CPS491D

- ISFET sensor with open aperture for media with high dirt load;
- Ordering per product structure (→ Online configurator, [www.products.endress.com/cps491](http://www.products.endress.com/cps491) or [www.products.endress.com/cps491d](http://www.products.endress.com/cps491d))
- Technical Information TI377C/07/EN

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