



Level



Pressure



Flow



Temperature

Liquid
Analysis

Registration

Systems
Components

Services



Solutions

Technical Information

Cleanfit CPA471

Compact retractable assembly for installation of pH, ORP electrodes in tanks or pipelines



Application

- Chemical industry
- 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 10 bar (145 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 is stainless steel.

Your benefits

- Compact design
- Installation of 120-mm electrodes
- 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

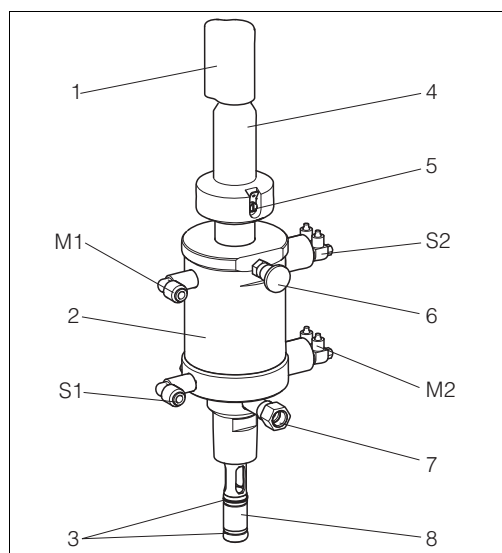
The retractable assembly Cleanfit P CPA471 is intended for reliable in-process measurement of pH value and ORP. This assembly has been designed as a compact retractable assembly for the chemical industry, for plant design and for industrial wastewater treatment. Without having to interrupt the process, 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 CPA471 assembly is available with stainless steel 1.4404 (AISI 316L) 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 95 mm) or
- the long assembly version (for use with 225 mm gel electrodes, immersion depth up to 201 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

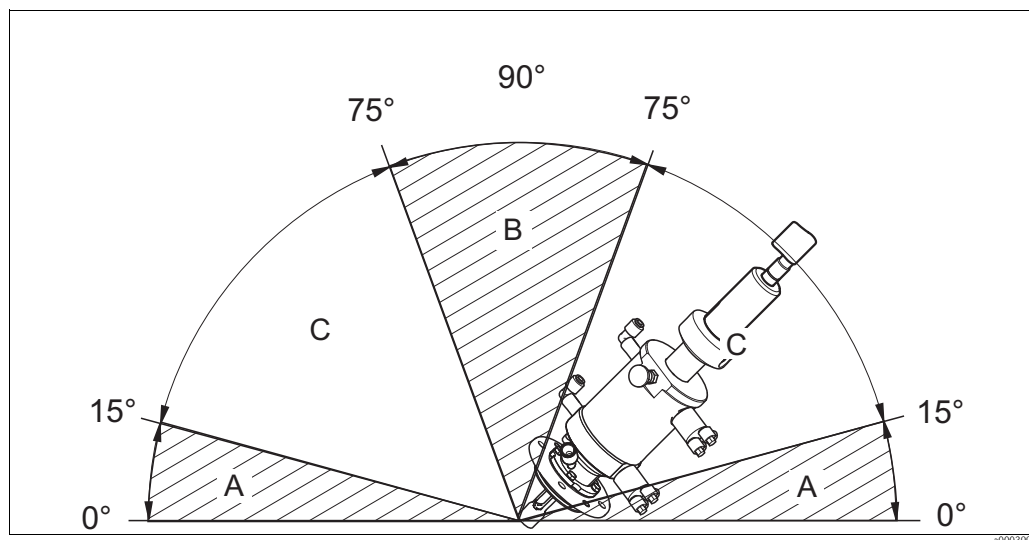
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Installation

Installation conditions

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

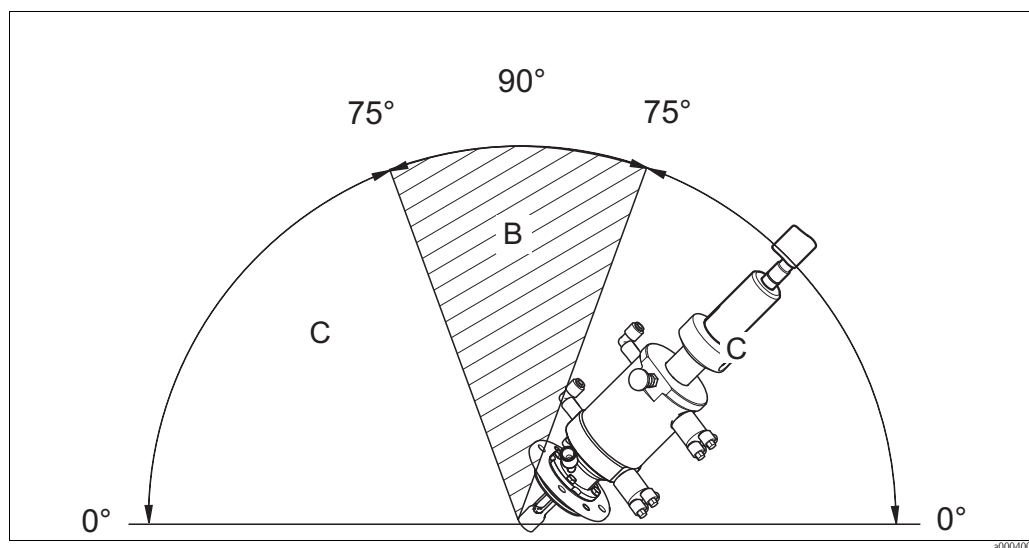
When using standard glass electrodes, only installation positions are permitted in which the middle axis of the assembly lies at an angle greater than 15° from the horizontal (see diagram). Otherwise, there will not be a reliable contact between the inner side of the pH membrane and the inner terminal leads via the electrolytes. Limited permissible angle of the installation position is above 75° 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° 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 6 bar (58 to 87 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 ")

Caution!
There must be a pressure-reducing valve upstream if the air pressure can increase to above 6 bar (87 psi) (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

Rinse water pressure: 2 to 6 bar (29 to 87 psi)
2 x G ¼ (inner)
2 x NPT ¼" (inner)

Note!
Prior to commissioning of the assembly the rinse water connections have to be connected to a cleaning system or secured by dummy plugs.

Environment

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).

Process

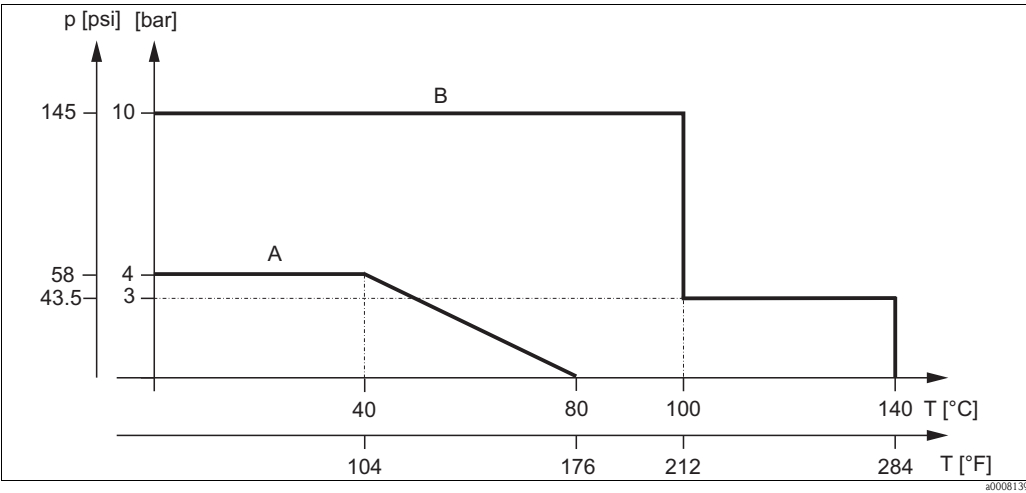
Process temperature

0 to 140 °C (32 to 284 °F)

Process pressure

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

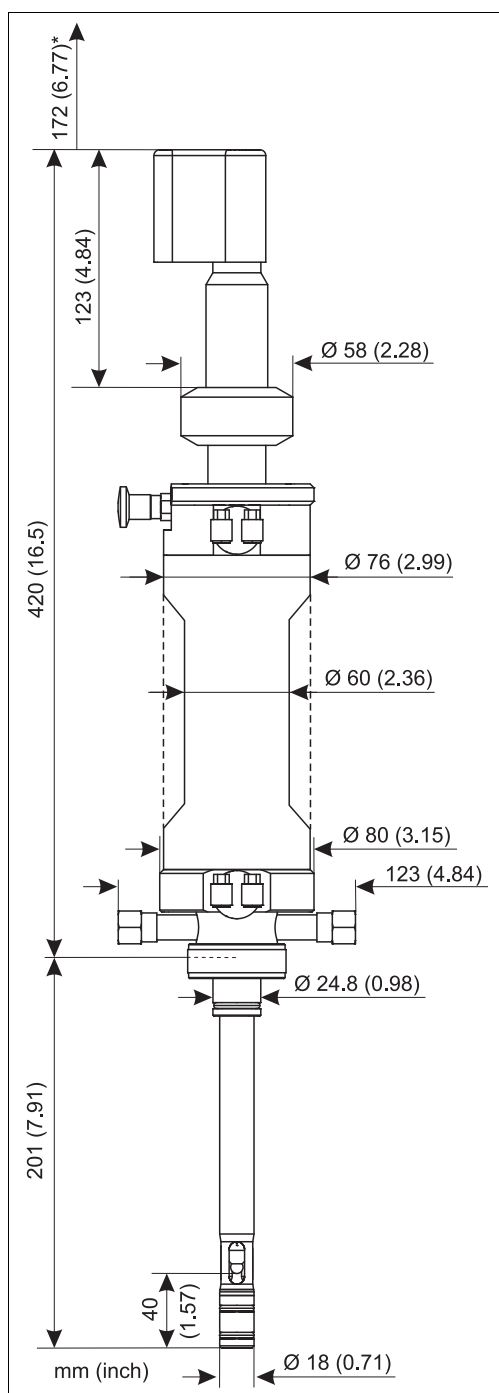
Pressure/temperature diagram



Pressure-temperature diagram
A PA housing (manual actuation only)
B Stainless steel housing 1.4404 (AISI 316L)

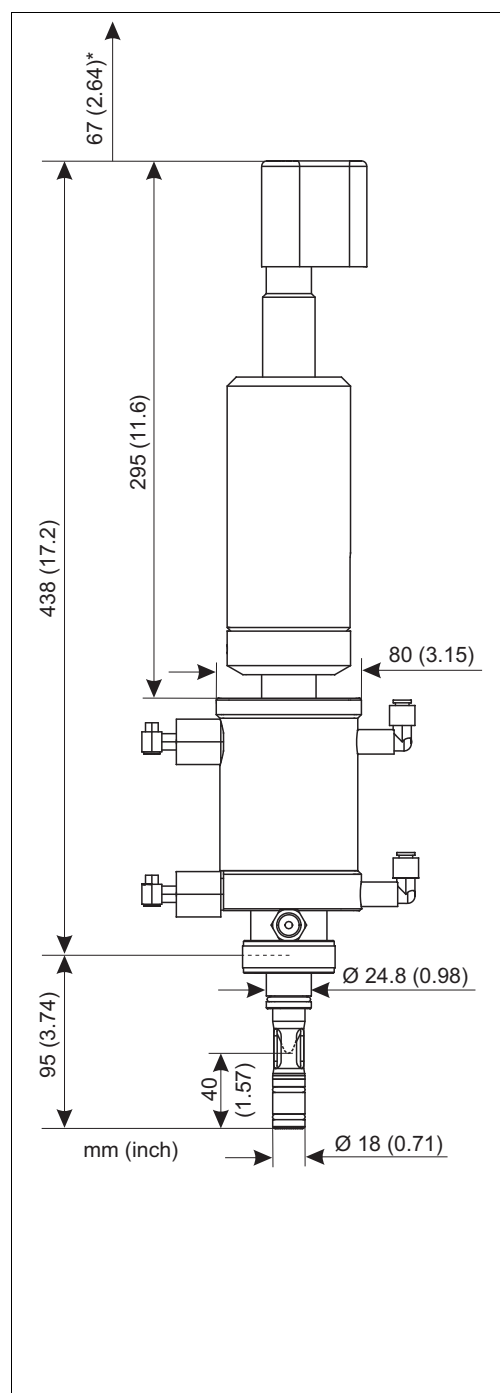
Mechanical construction

Dimensions



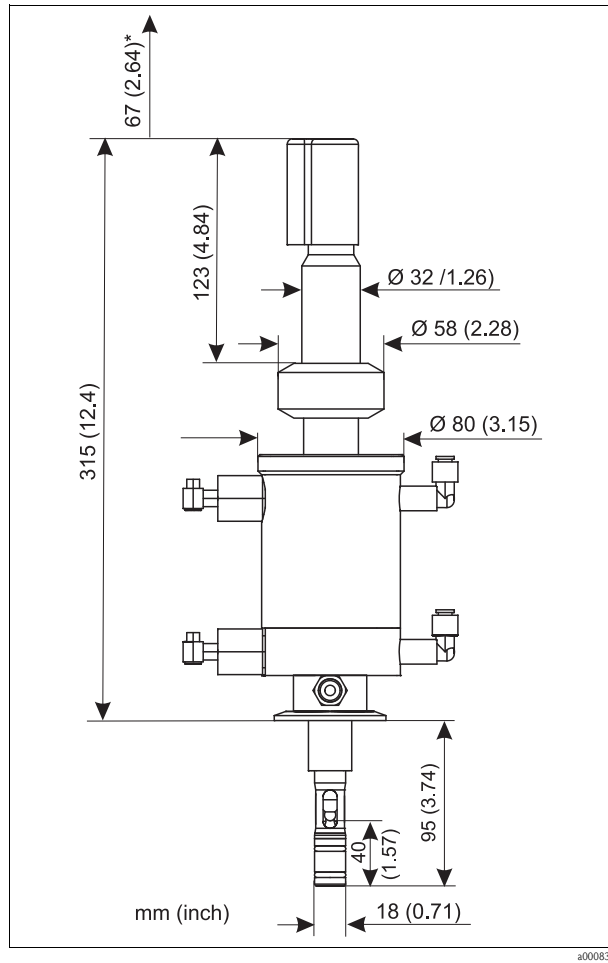
Long version for gel sensors

* Stroke



Short version for KCl sensors

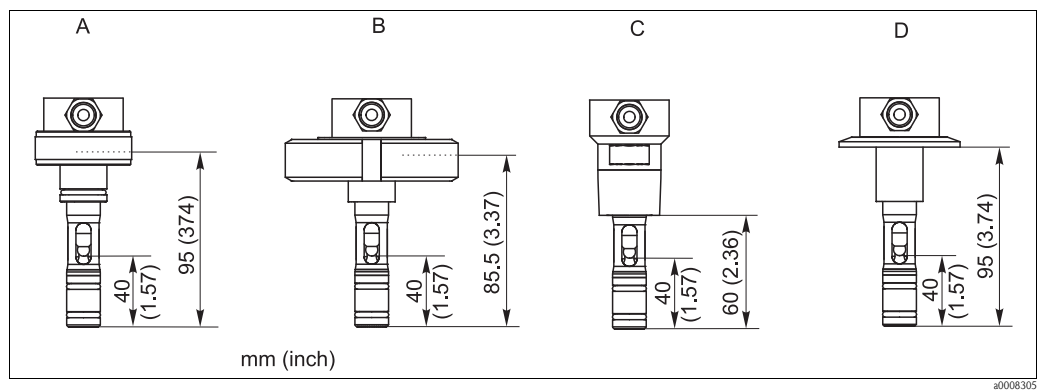
* Stroke



Short version for gel sensors

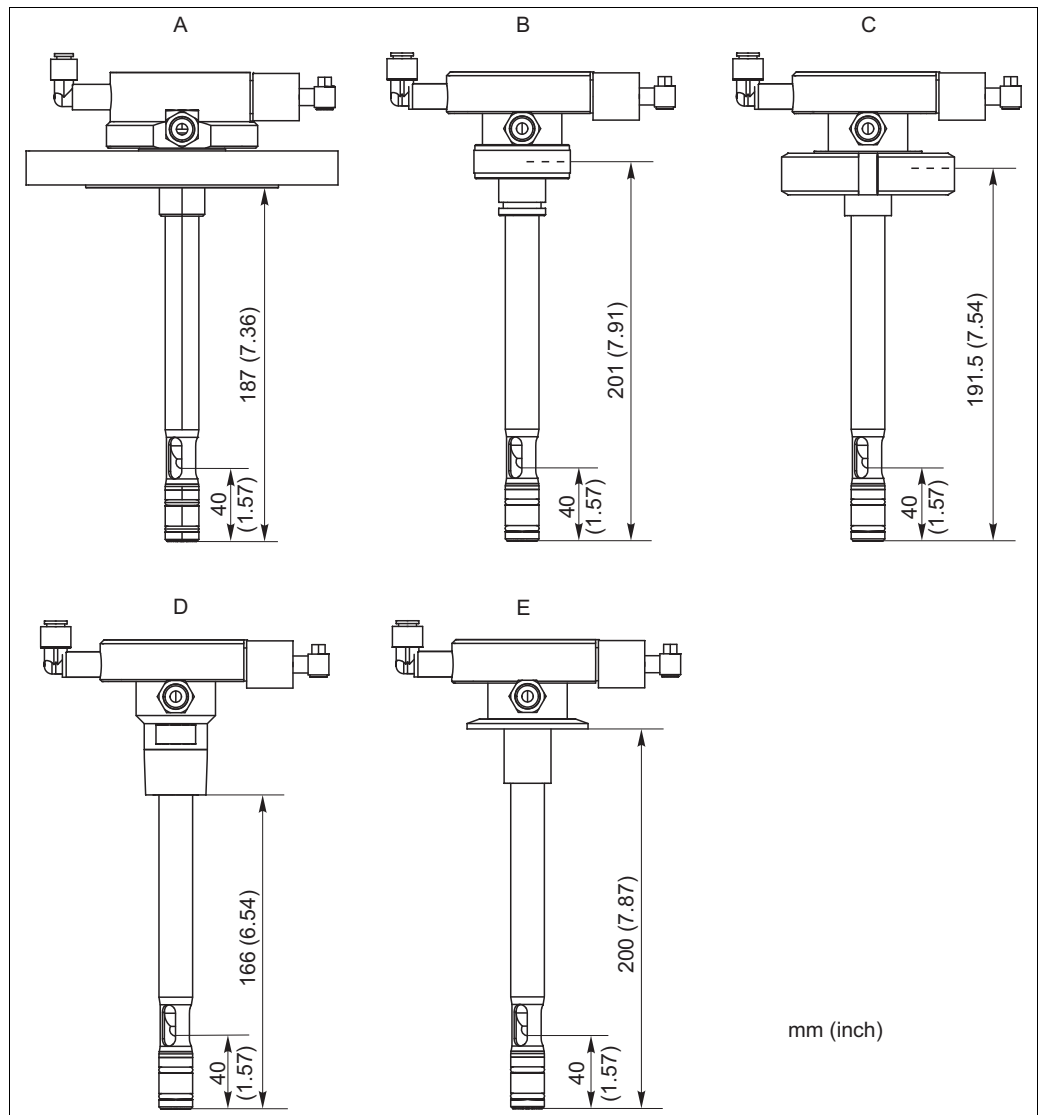
* *Stroke*

Process connections



Process connections (short version)

- | | |
|----------|--|
| <i>A</i> | <i>G1 1/4 internal thread with union nut</i> |
| <i>B</i> | <i>DN 50 dairy fitting</i> |
| <i>C</i> | <i>NPT 1" external thread</i> |
| <i>D</i> | <i>Triclamp 2"</i> |



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Process connections (long version)

- A DN 50 flange
- B G1 1/4 internal thread with union nut
- C DN 50 dairy fitting
- D NPT 1" external thread
- E Triclamp 2"

Sensors

Note!
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
	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

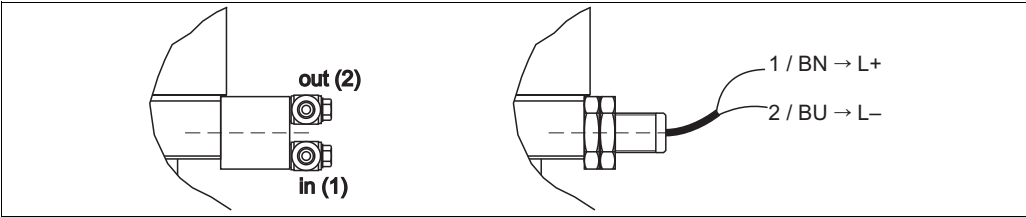
Weight 2.5 to 9 kg (5.5 to 19.8 lb), depending on cylinder material, on process connection and additional equipment, see product structure

Materials	In contact with medium	
	Seals	EPDM / FPM / Kalrez®
	Sensor holder	SS 1.4404 (AISI 316L)
	Rinse fittings	SS 1.4404 (AISI 316L)
	Not in contact with medium	
	Cylinder	PA / SS 1.4404 (AISI 316L)
	Electric 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 1 G 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)

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

Certificates The following certificates and approvals are available on request:

- Manufacturer's certificate
- Ex approval

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

Inspection certificate Depending on the version, an inspection certificate 3.1 acc. to EN10204 is supplied (—> product structure).

Ordering information

Order code

You can create a complete and valid order code on the Internet using the configurator tool.

Enter the following address in your browser to access the product page:
www.products.endress.com/cpa471

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

	Drive type and limit contact switches				
	A	Manual (cannot be converted to pneumatic)			
	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. 90 °C / 194 °F)			
	E	Pneumatic with 2 electric Ex limit contact switches (max. 90 °C / 194 °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 95 mm (depending on process connection) (possible electrode lengths: A = 120 mm, B = 225 mm)			
	2	Long version: up to 201 mm (depending on process connection) (possible electrode length: A = 225 mm)			
	9	Special version acc. to customer			
	Assembly material (in contact with medium)				
	A	1.4404 (AISI 316L) in contact with medium, with PA housing (manual operation only)			
	B	1.4404 (AISI 316L) in contact with medium, with stainless steel 1.4404 (AISI 316L) housing (max. 10 bar / 145 psi at 100 °C / 212 °F)			
	D	1.4404 (AISI 316L) in contact w. medium, with inspection certificate 3.1 acc. to EN10204, with 1.4404 (AISI 316L) housing			
	Seal material (in contact with medium)				
	1	EPDM (preferred for food applications)			
	2	FPM (Viton®, preferred for process applications)			
	3	FFKM (KALREZ®)			
	Process connection				
	A	G 1 ¼ internal thread (union nut)			
	B	NPT 1" external thread			
	C	Tri-Clamp 2"			
	D	Dairy fitting DN 50 (acc to. DIN 11 851)			
	G	DN 50 flange			
	H	2" ANSI flange			
	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			
CPA471-					complete order code

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).

Scope of delivery

The scope of delivery comprises:

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

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

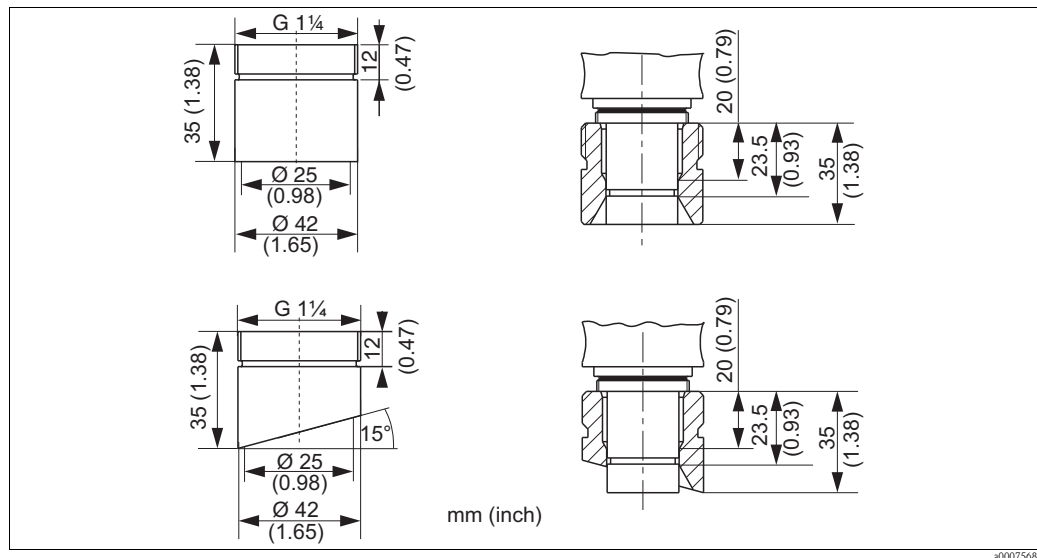
Welded fittings

Welded fitting G1¼, straight,

- SS 1.4435 (AISI 316L); order no. 51502798

Welded fitting G1¼, angular 15°,

- SS 1.4435 (AISI 316L); order no. 51502799



Welded fittings

Dummy plug

Dummy plug for G1¼ process connection,

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

Dummy plug for G¼ rinse connection,

- SS 1.4404 (AISI 316L); order no. 50092264

Hose nozzles

Hose nozzles for rinse connections G¼, DN 12

- SS 1.4404 (AISI 316L), 2 pieces
- Order no.: 51502808

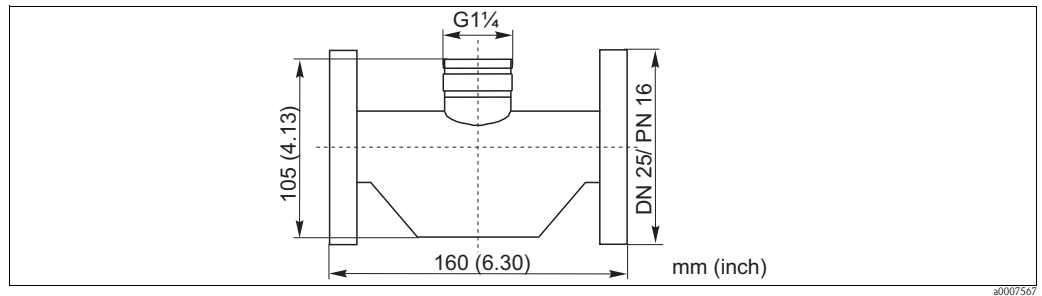
Hose nozzles for rinse connections G¼, DN 12

- PVDF, 2 pieces
- Order no.: 50090491

Flow vessel

DN 25 flow vessel,

- G1¼ external thread, SS 1.4404 (AISI 316L);
- order no. 51502801



Flow vessel

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 or 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 or 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 or 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 or 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 or 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 or 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 or 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 or 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 or 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 or 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 or www.products.endress.com/cps491d)
- Technical Information TI377C/07/EN

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