



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 1.4571, Hastelloy and titanium. It can be used with temperatures up to 140 °C (284 °F) at 6 bar (87 psi). The robust retractable assembly permits replacement of the electrode while the tank is full or under process conditions with pressures of up to 6 bar. In combination with the complete system Topcal S CPC310 you can automatically clean and calibrate the sensors.

Solutions

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 140 °C (284 °F) at 6 bar (87 psi) or up to 100 °C (212 °F) at 10 bar (145 psi)
- 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 10 bar (145 psi). 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 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 140 °C (284 °F) and pressures up to 6 bar (87 psi). 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 148 mm (5.83 "), 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 280 mm (7.87 "), applicable with 360 mm gel electrodes).

The following process connections are available:

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







Measuring system without control (example)

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

Measuring system with pneumatical control



Measuring system with pneumatic control

- pH/redox sensor 1
- 2 3
- Assembly Cleanfit P CPA472D Transmitter Mycom S CPM153
- 4 Special measuring cable
- 5 Communication and extension cables
- 6 Control unit CPG310

- Canisters for cleaning and buffer solutions
- Superheated steam/water/cleaning solutions (optional) 8
- 9 Rinse block

7

- 10 Power/signal cable
- Air hoses 11
- 12 Medium

Installation instructions А Glass electrode: Installation angle of at least 15° from the horizontal ISFET pH-sensor Tophit: No restrictions, recommended 0 to 180° В В A 15° 15 Permitted orientations depending on the sensor used Note! The assembly is designed for installation in pipes with nominal diameters of DN 80 or larger. To install it in pipes with the nominal diameter DN 50, please use the flow assembly with integrated sight glass (see "Accessories") Pneumatic connection for **Requirements:** automatic operation air pressure of 5 to 6 bar (72.5 to 87 psi) • air must be filtered (40 μ m) 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** The rinse chamber allows you to clean the electrode with water or cleaning solution with a pressure of 2 to max. 6 bar (30 to max. 87 psi). When using water you have to install a check valve and a filter (100 μ m) 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



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

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

Environment

rinse chamber (see "Accessories").

Installation

Cleanfit P CPA472D



Pressure temperature diagram





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.

Mechanical construction

Dimensions





Assembly version: long, for gel sensors

A B Length when extended

Required mounting clearance

Assembly version: standard, for KCl sensors

Length when extended Required mounting clearance A B



Assembly version: standard, for gel sensors

- A B
- Length when extended Required mounting clearance





Process connections

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

2

Connection	А	В	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 sense	ors, ISFET	225 mm				
	Longwareion	KCl sens	OTS	360 mm				
	Long version	Gel sells	JIS, ISFE I	300 11111				
Weight	Depending on the material: 7.5 to 12.0 kg (16.54 to 26.46 lbs)							
Materials	In contact with medium:							
	Electrode holde	er	PEEK, PVDF, conductive P steel 1.4571	VDF, Hastelloy C4, titanium, stainless				
	Rinse chamber	and raised face	PEEK, PVDF, conductive P steel 1.4571	VDF, Hastelloy C4, titanium, stainless				
	Seals		FPM (Viton)/FFKM (Kalrez	Z [®])				
	Not in contact with medium:							
	Housing		Stainless steel 1.4404					
	Seals		FPM					
	Limit position s	witch (NAMUR-type)	Front surface PBT, cable PV	VC				
Rinse connections	2 x G ¹ / ₄ (internal) or							
	$2 \times \text{NPT} \frac{1}{4}$ (internal) or							
	2 x pipe 8 x 60 Swagelok as nozzle							
Limit position switches	Pneumatic	3/2 way valve						
	Electric:	inductive (NAMI	UR type)					
		out (2)		1 / BN → L+				
	<i>Fig. 1:</i> 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 5 to 6 bar (72.5 to 87 psi). The air must be filtered (40 μ m) and free from water and oil. There is no continuous pressure demand. The air lines must have a minimum nominal diameter of 4 mm.



Note!

If pressure increases to above 6 bar (87 psi) 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

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Product structure]	Drive	type	and lin	mit c	ontact s	switches	
	1	A Manual without limit contact switches						
	1	B Pn	euma	tic witho	ut lim	nit contact	t switches	
		C Pn	euma	tic with 2	2 pnei	umatic lin	nit contact switches	
]	D Pn	euma	tic with 2	2 elect	tric Ex lin	nit contact switches	
]]]	E Pn	euma	tic with 1	1 elec	tric Ex lin	nit contact switch	
		A	ssem	bly ver	sion			
		1	Ser	vice posit	tion			
		2	Ser	vice posit	tion +	measurir	ng position	
			Ele	ectrode	type	e		
			A For gel electrodes / ISFET sensors, 225 mm					
			В	For gel	electr	odes, 360) mm	
			С	For liqu	iid KC	21 electrod	les, 360 mm	
				Imme	rsior	n depth		
				1 ma	ax 148	8 mm (5.8	33")	
				2 ma	ax 280	0 mm (11	.02")	
				As	ssem	bly mat	terial (in contact with medium)	
				В	In c	contact w	ith medium: PEEK	
				С	In c	contact w	ith medium: PVDF	
				D	In c	contact w	ith medium: PVDF, conductive	
				E	In c	contact w	ith medium: PVDF, electrode holder Hastelloy C4	
				F	In c	contact w	ith medium: Hastelloy C4	
				G	In c	contact w	ith medium: Titanium	
				Н	In c	contact w	ith medium: Stainless steel 1.4571; 316Ti	
					Sea	al mater	rial (in contact with medium)	
					2	FPM Vit	ton®	
					3	FFKM K	CALREZ®	
						Proces	ss connection	
						D DN	1 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 Th	read G1¼" internal (only with materials F/G/H)	
						Y Spe	ecial version acc. to customer specification	
						Riı	nse 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)

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 G¹/₄, DN 12, PVDF, 2 pieces; order no. 50090491
Rinse chamber valve	 Rinse chamber input valve, pneumatically ON - OFF, PVDF with bellows, connection G¹/₄, (on request)
Flow assembly with and without sight glass	 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

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Accessories



Installation seal	 Profile seal DN 50, PTFE, order no. 51515675 DN 80, PTFE, order no. 51515677 	
Holder	 Holder for retraction pipe, material: PP order no. 51518530 	
Protection cover	 On request at TSP 	
Limit position 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 	
Pneumatic throttle	 Pneumatic throttle for the reduction of the assembly moving speed, order no. 51511990 	

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Sensors	Glass electrodes						
	 Orbisint CPS11/CPS11D pH electrode for process applications, with PTFE diaphragm, Memosens technology as option; Ordering acc. to product structure, see Technical Information (TI028/C07/en) Orbisint CPS12/CPS12D ORP electrode for process applications, with PTFE diaphragm, Memosens technology as option; Ordering acc. to product structure, see Technical Information (TI367/C07/en) Ceraliquid CPS41/CPS41D pH electrode with ceramics diaphragm and liquid KCl electrolyte, Memosens technology as option; Ordering acc. to product structure, see Technical Information (TI079/C07/en) Ceraliquid CPS42/CPS42D ORP electrode with ceramics diaphragm and liquid KCl electrolyte, Memosens technology as option; Ordering acc. to product structure, see Technical Information (TI079/C07/en) Ceraliquid CPS42/CPS42D ORP electrode with ceramics diaphragm and liquid KCl electrolyte, Memosens technology as option; Ordering acc. to product structure, see Technical Information (TI079/C07/en) 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 (TI245/C07/en) Ceragel CPS72/CPS72D ORD electrode with double chamber reference system and integrated bridge electrolyte, Memosens 						
	 ORP electrode with double chamber reference system and integrated bridge electrolyte, Memosens technology as option; Ordering acc. to product structure, see Technical Information (TI374/C07/en) 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/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 (TI283/C07/en) Tophit CPS441/CPS441D Sterilizable ISFET sensor for media with low conductivity, with liquid KCl electrolyte; Ordering acc. to product structure, see Technical Information (TI352/C07/en) Tophit CPS491/CPS491D ISFET sensor with open aperture for media with high dirt load; Ordering acc. to product structure, see Technical Information (TI377/C07/en) 						
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 huffer solutions for OPP electrodes						

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/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/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/07/en

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People for Process Automation