Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions

Technical Information

Cleanfit H CPA475

Retractable assembly for pH, ORP measurement under sterile conditions

74-

Application

- Food industry
- Beverage industry
- Pharmaceutical industry
- Drinking water

The retractable assembly is used wherever very exacting sanitary and hygienic demands are placed on the measuring equipment.

Your benefits

- All parts in contact with the medium are made of stainless steel 1.4435 (AISI 316L), the seals consist of EPDM or Viton according to FDA recommendations
- With certificate 3A 74-
- Several adapter versions are available:
  - Dairy fitting
  - Varivent
  - APV
  - Flange DN 50 / ANSI 2"
  - Clamp 2"
  - Mounting adapter DN 25

TI240C/07/en/07.07
51505599

Endress+Hauser

People for Process Automation

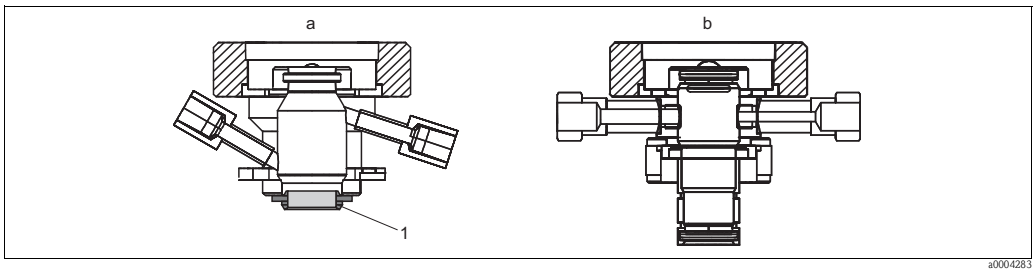
Function and system design

Function

With the retractable assembly Cleanfit H CPA475 you can realize reliable pH and ORP measurements. The assembly has been designed as a sterilizable retractable assembly for foodstuffs, biotechnology and pharmaceutical applications and other processes with maximum demands on sanitation and hygiene. 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

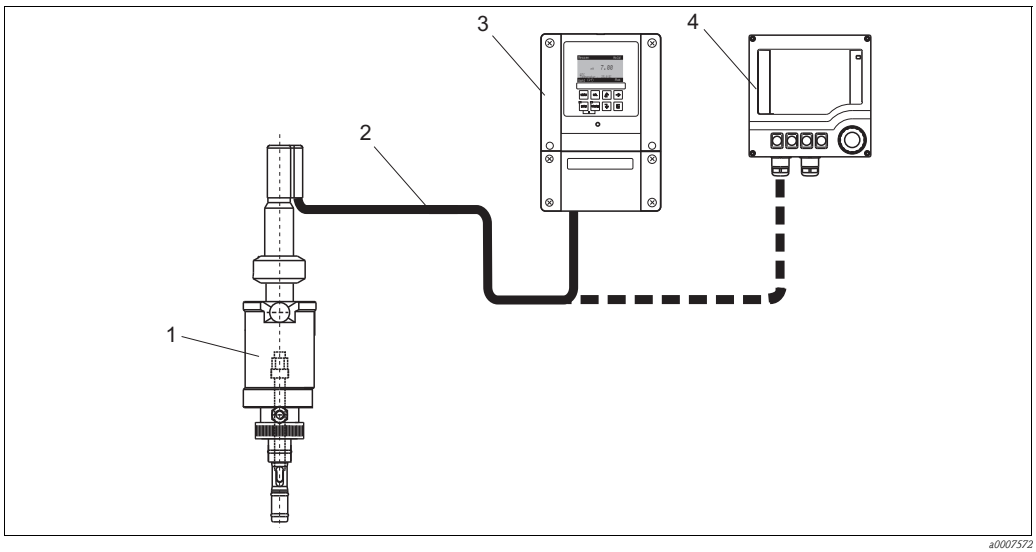
Those parts of the Cleanfit H CPA475 assembly which are in contact with the medium are executed in stainless steel 1.4435 (AISI 316L). The seals are made of EPDM or Viton® according to FDA recommendations. All common process connections are available (see Process connections section).



Rinse chamber versions (depending on the process connection)

a Rinse chamber with welded rinse connectors, for Triclamp, dairy pipe, Varivent, APV, flanges
b Rinse chamber with screwed rinse connectors, for G1¼ inner
1 Formed seal

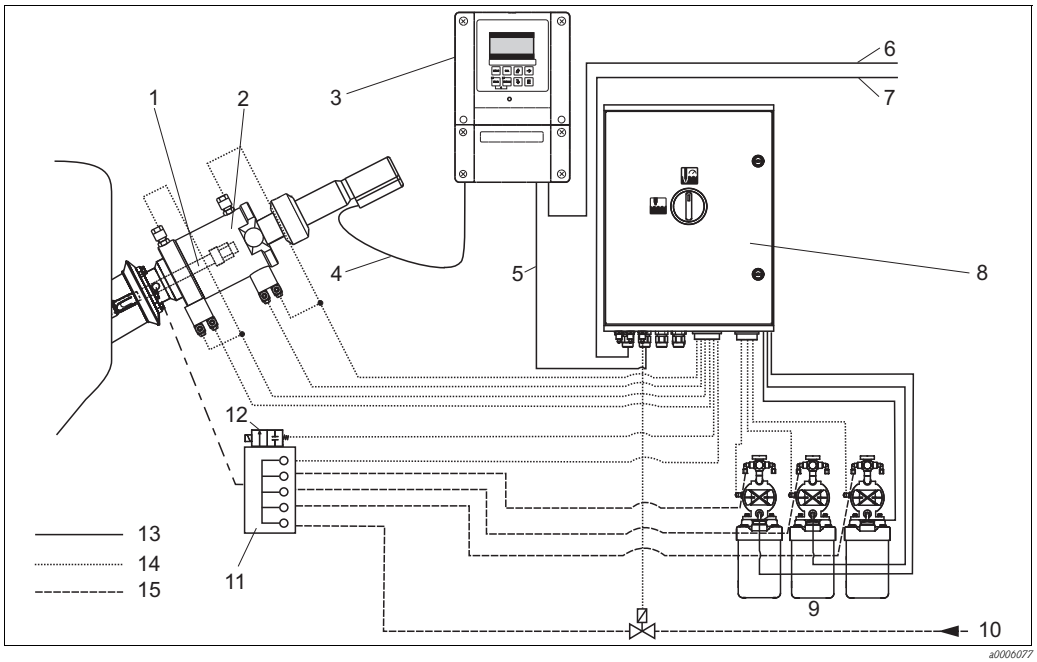
Measuring system without control



Measuring system without control (example)

1 Assembly Cleanfit H CPA475
2 Special pH measuring cable, e.g. CPK9, CPK12
3 Transmitter Mycom S CPM153 or
4 Transmitter Liquiline M CM42

Measuring system with pneumatic control



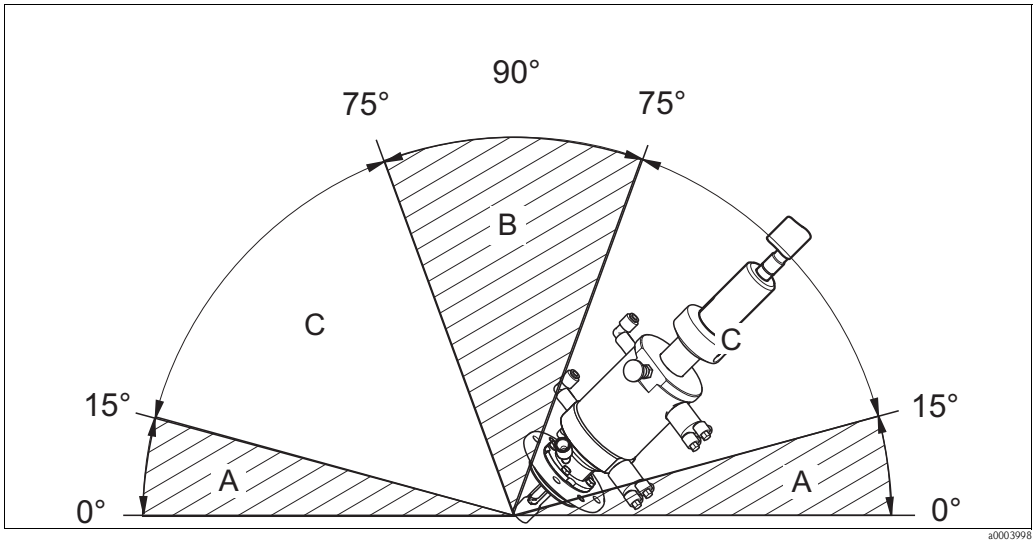
Measuring system with pneumatic control

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

Installation

Installation conditions

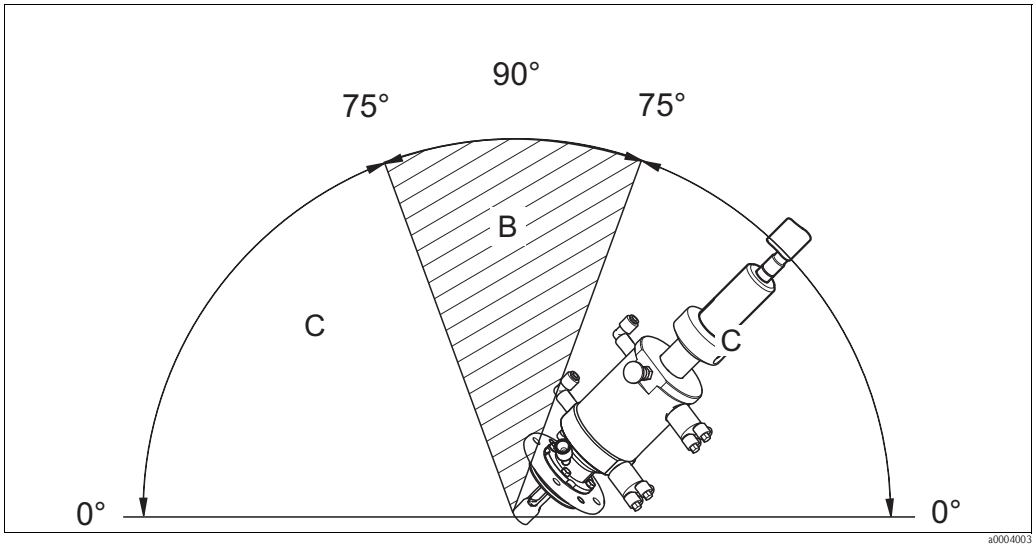
The assembly is designed for installation on tanks and pipes. Suitable nozzles must be available for this. When using standard glass electrodes, only installation positions are permitted in which the middle axis of the assembly lies at an angle between 15° and 75° from the horizontal (see diagram). Otherwise, 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° 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 5 bar (72.5 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)

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

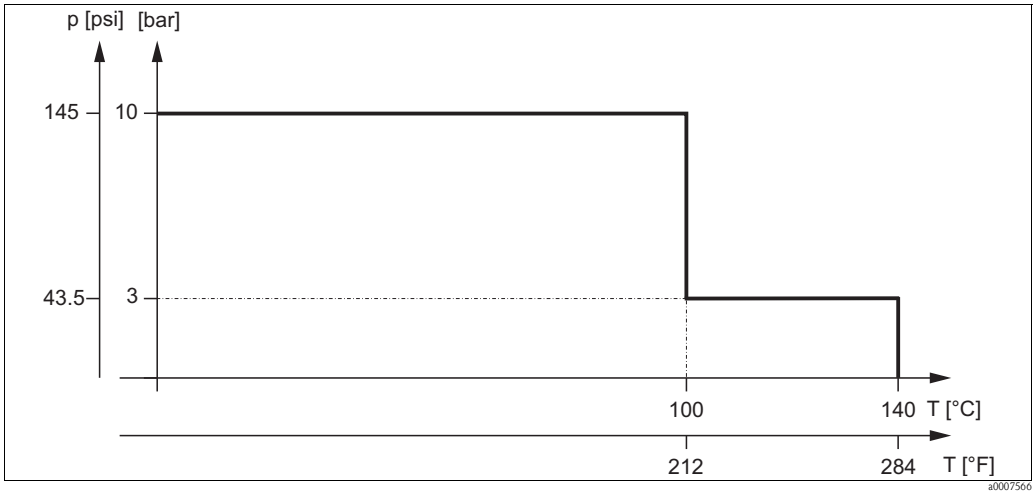
Process temperature

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

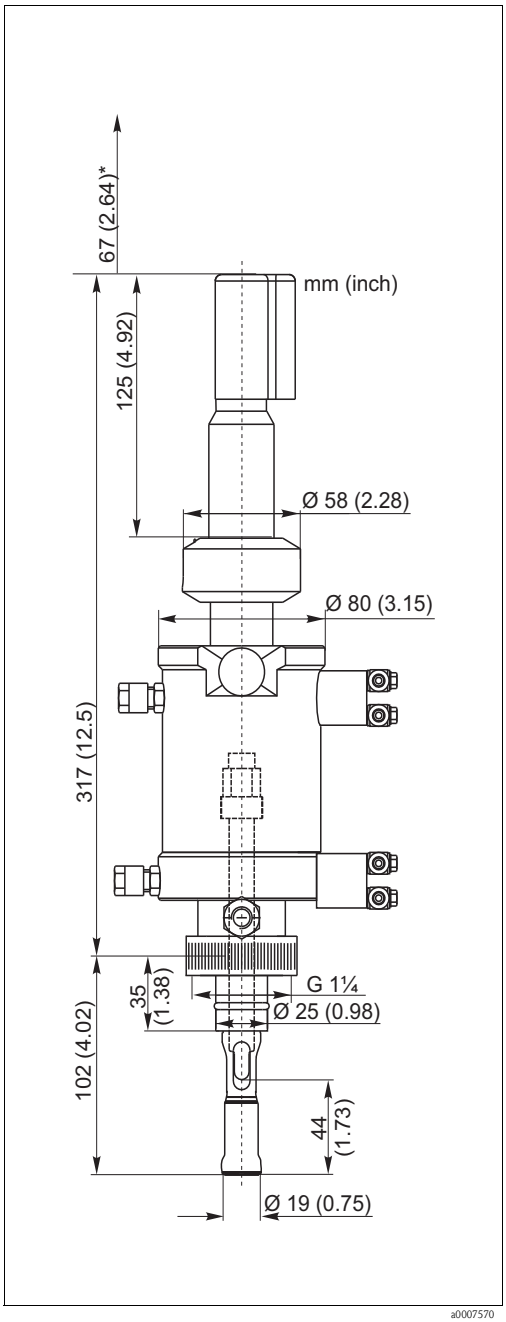
Pressure/temperature diagram



Pressure temperature diagram

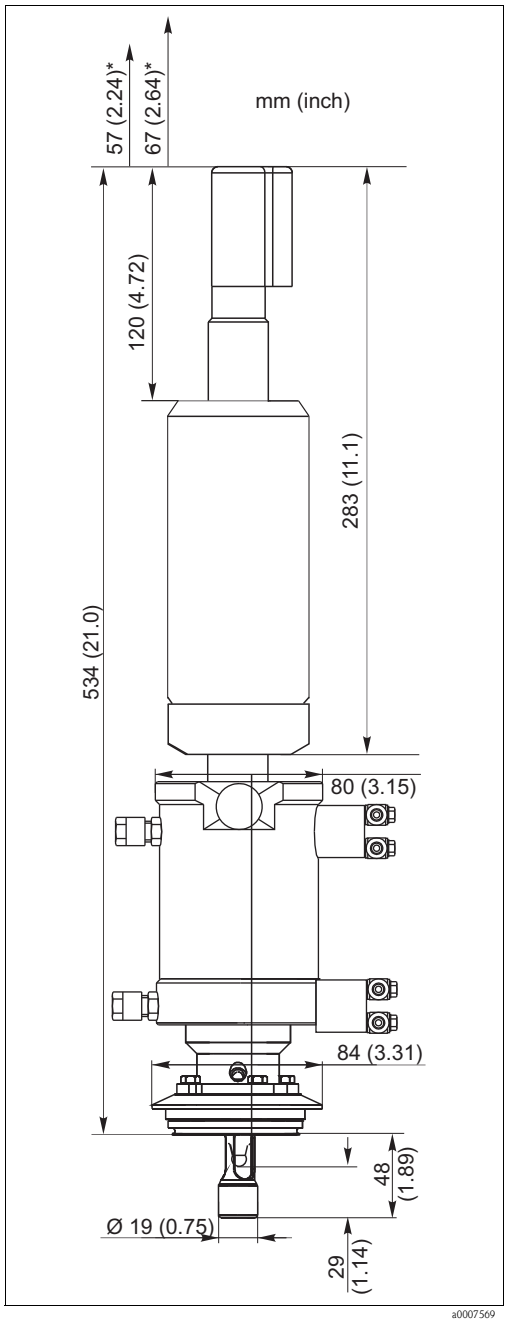
Mechanical construction

Dimensions



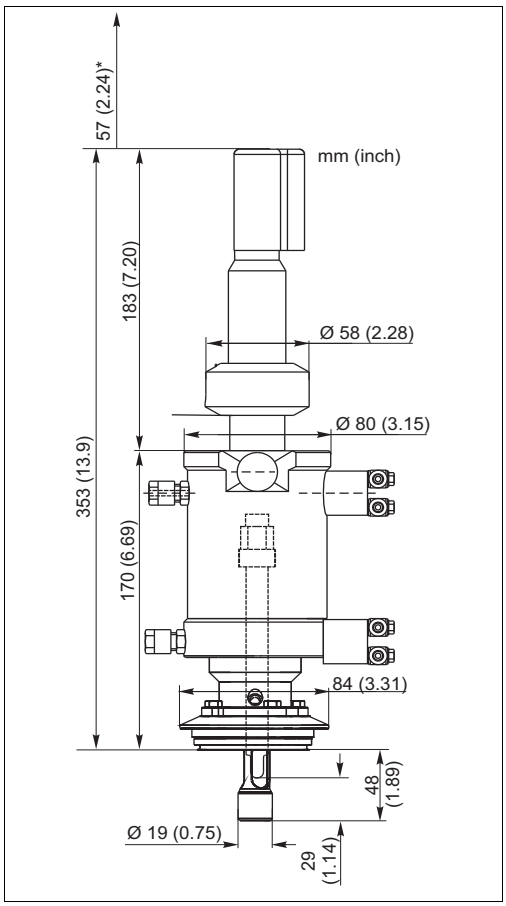
Standard version with G1¼ thread nut

* *stroke*



Liquid KCl electrolyte version

* *stroke (depending on version)*



Version with Varivent

** stroke*

Process connections

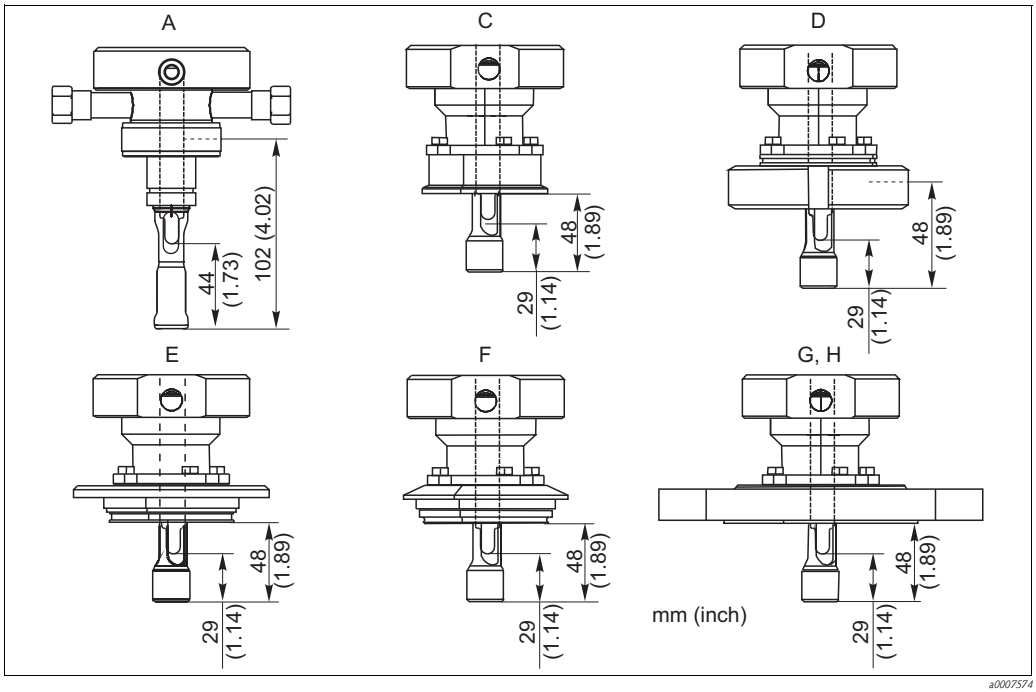


Fig. 1: Process connections

A G1 ¼ internal thread with thread nut
C Triclamp 2"
D DN 50 dairy fitting (DIN 11851)
E APV DN 50 to 100
F Varivent DN 50 to 125
G/H DN 50 flange (DIN 1092-1) resp. ANSI 2" flange

Sensors

pH glass electrodes, gel 120 mm
pH glass electrodes, KCl 225 mm
pH ISFET sensors, gel, 120 mm
pH ISFET sensors, KCl, 225 mm
Oxygen sensors, 120 mm

Weight

approx. 4 kg (8.8 lb), depending on cylinder material, on process connection and additional equipment, see product structure

Materials

in contact with medium	
Seals	EPDM / FPM (Viton®, FDA certified)
Sensor holder	SS 1.4435 (AISI 316L)
Rinse chamber	SS 1.4435 (AISI 316L)
Rinse fittings	SS 1.4435 (AISI 316L)
not in contact with medium	
Cylinder	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: 2 m (6.56ft);
housing material: stainless steel; thread M 12 x 1;
nominal voltage: 8 V
⟨Ex⟩II 1G EEx ia IIC T6; switching distance: 2mm, flush

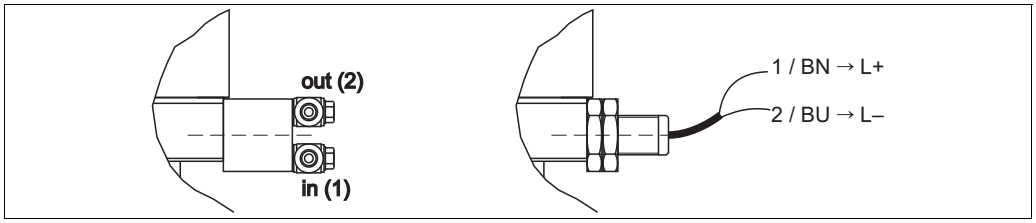


Fig. 2: Limit position switches, left: pneumatic (1 = compressed air inlet, 2 = compressed air outlet) right: electric (NAMUR)

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

3A

The following versions meet the requirements of the rule 3A 74-:
- CPA475-XXXXXXCX (process connection: triclamp)
- CPA475-XXXXXXDX (process connection: dairy fitting)
- CPA475-XXXXXXEX (process connection: varivent)
- CPA475-XXXXXXFX (process connection: APV)

Sterilizability

TNO report V3641:
"The retractable assembly for pH measurement Cleanfit H CPA475 – including the seals – is classified as in-line steam sterilizable by a 30 minute saturated steam treatment at a temperature of 120 °C." [1)]

1) acc. to the test method of the European Hygienic Design Group (EHEDG)

Ordering information

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 120 mm gel electrodes / ISFET sensors with Pg 13.5						
		B	For 225 mm liquid KCl electrodes / ISFET sensors with Pg 13.5 and hose connection head						
			Immersion depth / maximum stroke						
			1	Immersion depth / stroke: 101/65 mm resp. 48/23 mm (depending on process connection)					
			9	Special version acc. to customer					
				Assembly material (in contact with medium)					
				B	1.4435 (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	1.4435 (AISI 316L) in contact w. medium, with test certificate 3.1 acc. to EN10204, with 1.4404 (AISI 316L) housing				
					Seal material (in contact with medium)				
					1	EPDM (preferred for food application)			
					2	FPM (Viton®, preferred for process application)			
						Process connection			
						A	G 1¼ internal thread (union)		
						C	Tri-Clamp 2"		
						D	Dairy fitting DN 50 (acc to. DIN 11 851) ***only permissible with SKS Siersma adapter; compatible with standard 3A 74-		
						E	Varivent N, 68 mm, for pipe lines DN 50 to 125 and tank connection; compatible with standard 3A 74-		
						F	APV DN 50 to 100; compatible with standard 3A 74-		
						G	DN 50 flange (acc. to EN 1092-1)		
						H	2" ANSI flange		
							Optional equipment		
							3	With rinse fitting 2 x G ¼ internal thread	
							4	With rinse fitting 2 x NPT ¼" internal thread	
CPA475-									complete order code

Scope of delivery

The scope of delivery comprises:
- Cleanfit assembly (ordered version)
- Operating Instructions (English)

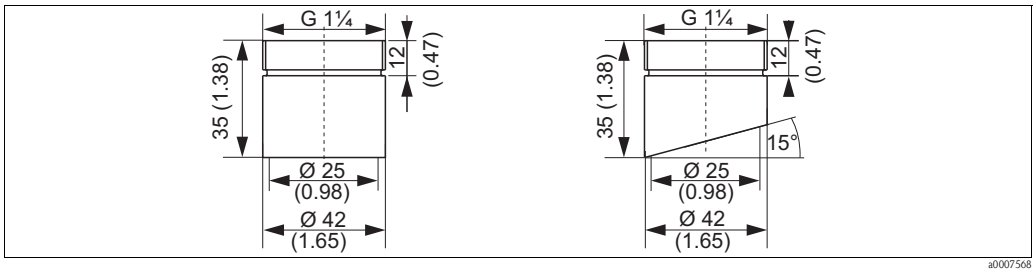
Accessories

Water filter and pressure reducer

- Filter set CPC310
  Water filter (dirt trap) 100 µm, complete, incl. angle bracket;
  order no. 71031661
- Pressure reducer kit
  complete, incl. manometer and angle bracket;
  order no. 51505755

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 fitting

Dummy plug

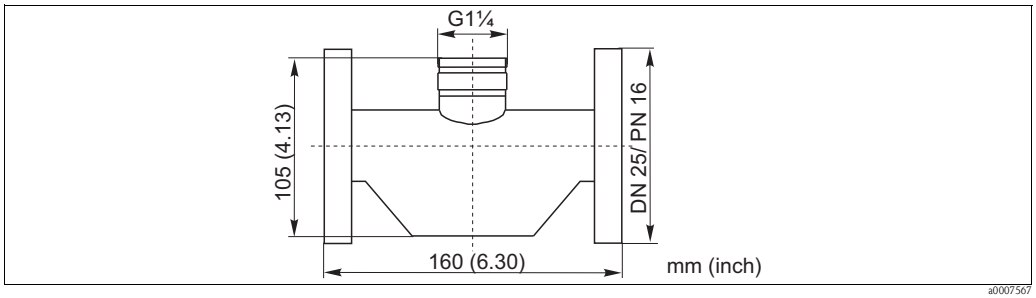
- Dummy plug for G1¼ process connection,
  SS 1.4435 (AISI 316L), FPM (Viton®) seal, G1¼ internal thread; order no. 51502800

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

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

Pneumatic throttle

- Pneumatic throttle for the reduction of the assembly moving speed,
  order no. 51511990

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 (TI028C/07/en)
- Orbisint CPS12/CPS12D
  ORP electrode for process applications, with PTFE diaphragm, Memosens technology as option;
  Ordering acc. to product structure, see Technical Information (TI367C/07/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 (TI079C/07/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 (TI373C/07/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 (TI245C/07/en)
- 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/07/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 (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

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

Instruments International

Endress+Hauser
Instruments International AG
Kaegenstrasse 2
4153 Reinach
Switzerland

Tel.+41 61 715 81 00
Fax+41 61 715 25 00
www.endress.com
info@ii.endress.com

Endress+Hauser

People for Process Automation

TI240C/07/en/07.07
51505599
Printed in Germany / FM+SGML 6.0 / DT