



Technical Information

Cleanfit CPA472D

Retractable process assembly for pH and ORP sensors

Heavy duty version



Application

- Chemical industry
- Biodiesel plants
- Power plants
- Plant design
- Tanks, process vats or pipes

CPA472D is a robust, universal process assembly with a modular design. This heavy-duty retractable assembly can withstand harsh working environments and is available in the following materials:

- PVDF and conductive PVDF
- PVDF, Alloy C22 electrode holder
- PEEK
- Alloy C22
- Stainless steel 1.4571 (AISI 316 Ti)

Functions

- Move to measurement position with process pressures of up to 10 bar (145 psi)
- No pneumatic positioning in process if a sensor is not installed
- Gel electrodes or pressure-overlay KCl electrodes can be accommodated in the same assembly
- Electrode rinsing in service position
- Fully automated cleaning and calibration with Topcal CPC310

Your benefits

- Service-friendly design saves money
- Locking mechanism offers additional safety during sensor replacement
- Pressure-tight stainless steel housing enhances system safety
- Maximum chemical resistance properties ensure long operating times
- Immersion depth suitable for industrial use
- Easy sensor replacement allows Memosens laboratory calibration
- Flexible choice of material and practical modifications

Function and system design

Function

With the retractable assembly Cleanfit 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. 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, Alloy C22 and stainless steel 1.4571 (AISI 316 Ti). It has only three modules in contact with medium: Rinse chamber (C), electrode holder (E) and raised face (D). 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.

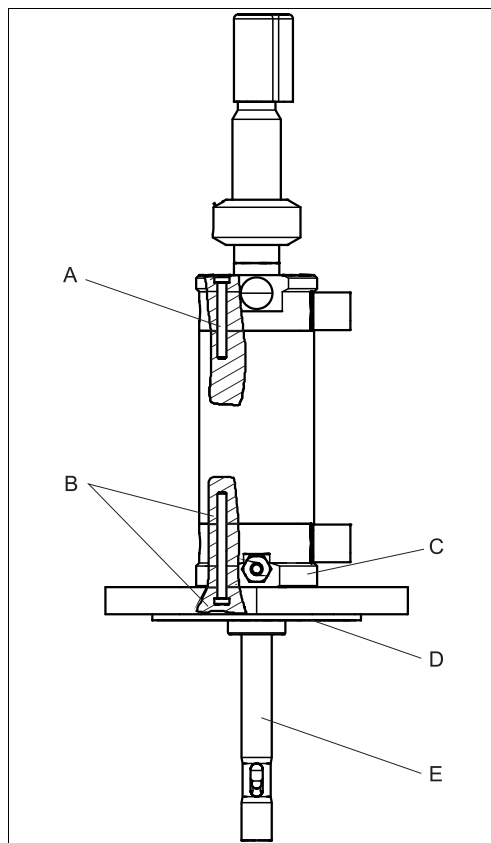
The novel electrode holder (4) supports an easy installation of the retractable pipe (7).

You have the choice of two immersion depths with gel and KCl electrodes:

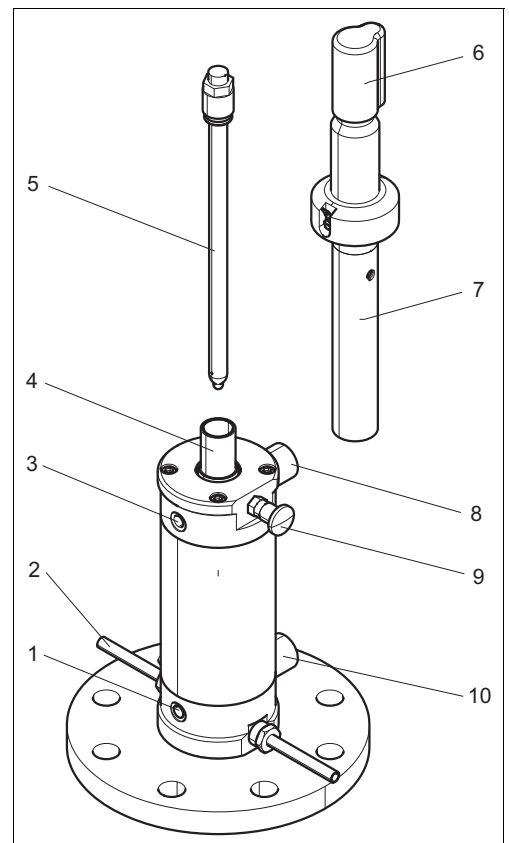
- the standard version (immersion depth up to 146 mm (5.75 "), applicable with 225 mm gel electrodes, 360 mm gel electrodes with adapter or 360 mm KCl electrodes) or
- the long version (immersion depth up to 280 mm (7.87 "), applicable with 360 mm gel electrodes).

The following process connections are available:

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



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- A Stainless steel housing, screwed
- B Rinse chamber armoring
- C Rinse chamber
- D Raising face
- E Electrode holder

- 1 Compressed air "Service"
- 2 Rinse connection

- 3 Compressed air "Measurement"
- 4 Electrode holder (head) with guidance for installation of the retractable pipe
- 5 Electrode
- 6 Splash protection cap
- 7 Retractable pipe
- 8 Limit switch "Service"
- 9 Stop lock bolt
- 10 Limit switch "Measurement"

Safety stop

The pneumatic retractable assembly CPA472D is fitted with an integrated safety stop mechanism (patented). This mechanism prevents the assembly from entering the process if the electrode is not installed but the compressed air supply is connected.

The safety stop mechanism is based on the air channels and works as follows:

The electrode is not installed and the command is given to "Move to measuring position":

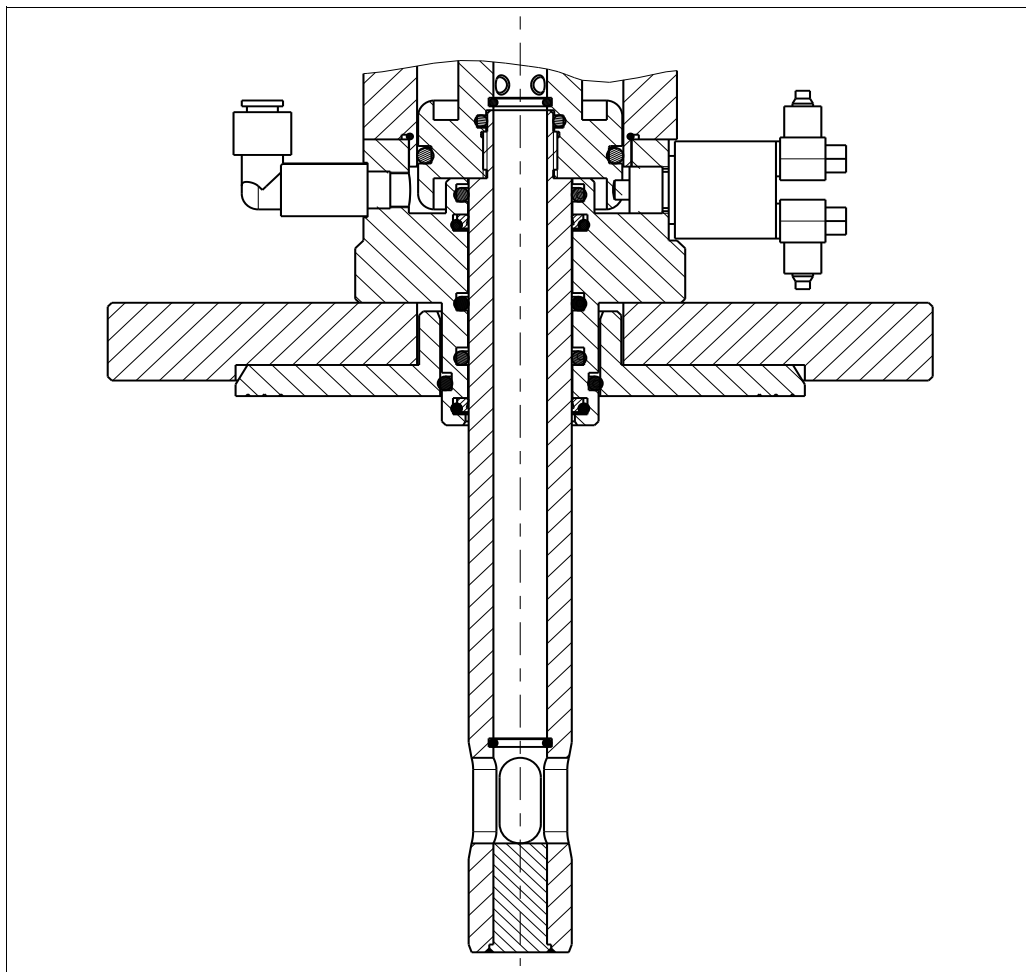
Pressure cannot build up since the compressed air enters the upper section of the electrode holder via the air channels and escapes via the retraction pipe. This is signalled by a loud noise.

The electrode is installed and the command is given to "Move to measuring position":

The electrode closes the air channels and seals off the chamber above the electrode thread. The upper part of the cylinder is filled with compressed air. Pressure builds and the electrode holder enters the process.

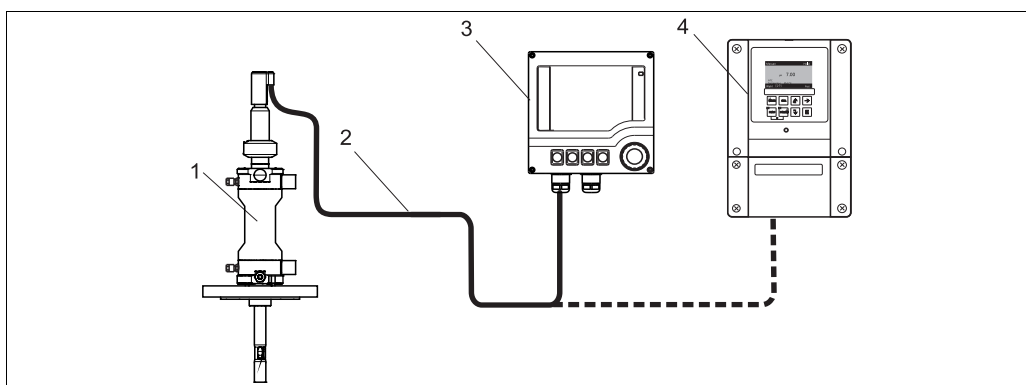
This means that an electrode must be installed in the assembly before the assembly can move to the measuring position.

Internal seal



Internal seal- position of the seals

Measuring system without control

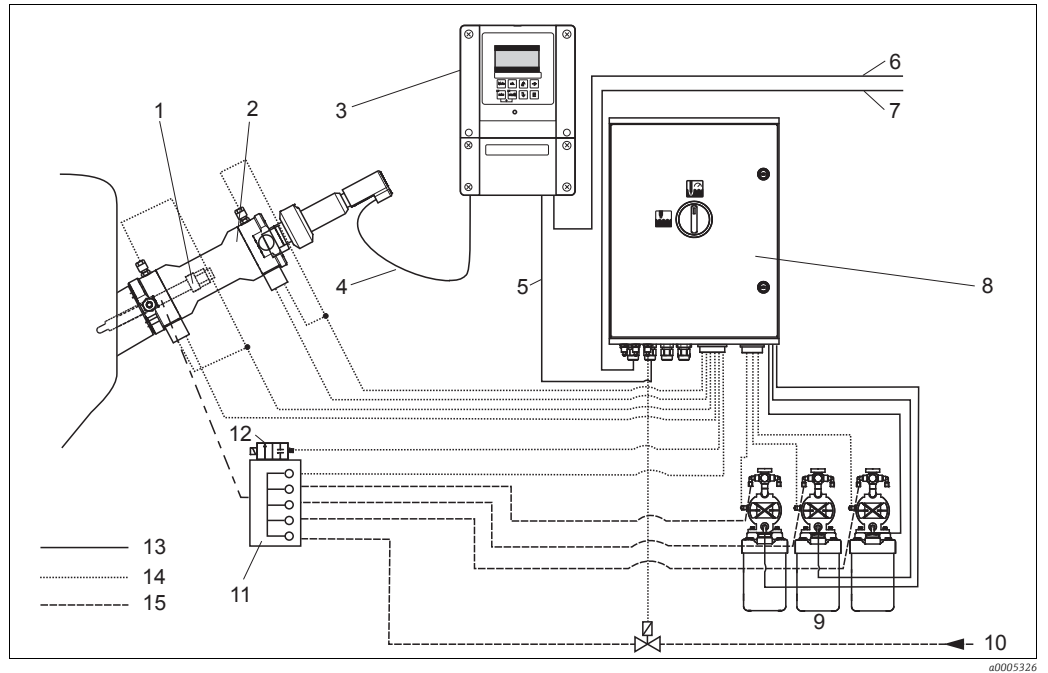


Measuring system without control (example)

- 1 Cleanfit assembly with pH/ORP sensor
2 Special measuring cable

- 3 Transmitter Liquiline M CM42 or
4 Transmitter Mycom S CPM153

Measuring system with pneumatical control



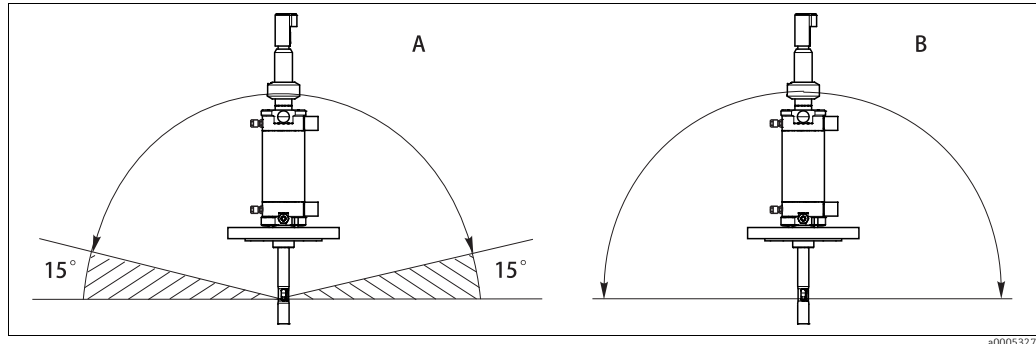
Measuring system with pneumatic control

- | | | | |
|---|------------------------------------|----|---|
| 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 and extension cables | 13 | Power/signal cable |
| 6 | Power supply Mycom | 14 | Air hoses |
| 7 | Power supply CPG310 | 15 | Medium |
| 8 | Control unit CPG310 | | |

Installation

Installation instructions

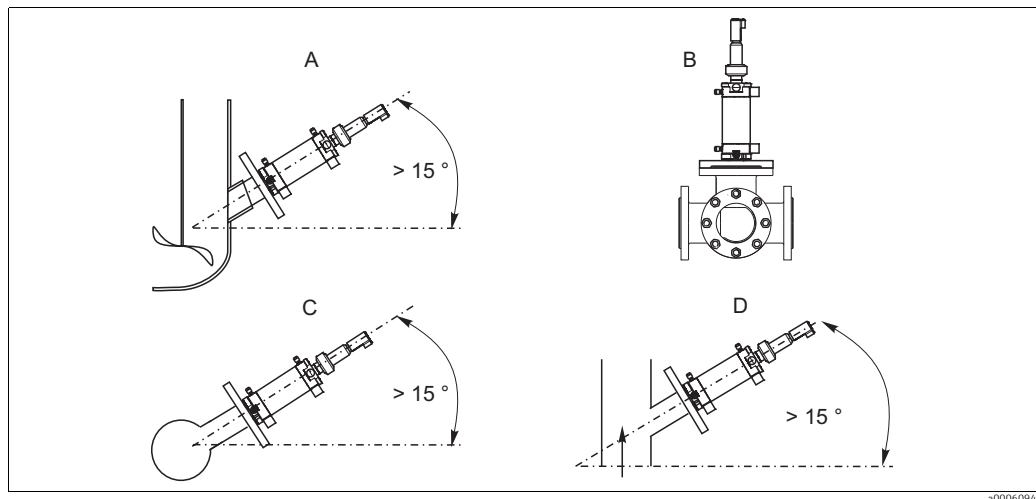
A	Glass electrode:	Installation angle of at least 15° from the horizontal
B	ISFET pH-sensor Tophit:	No restrictions, recommended 0 to 180°



Permitted orientations depending on the sensor used



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")



Installation examples with recommended installation angle (glass electrodes)

- A Tank
- B Flow assembly DN 50/80
- C Horizontal pipe minimum DN 80
- D Ascending pipe minimum DN 80

Pneumatic connection for automatic operation

Requirements:

- air pressure of 5 to 6 bar (72.5 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 ").

NOTICE

If the air pressure can increase to above 6 bar (87 psi) (including any short pressure surges) the assembly can get damaged.

- ▶ Install a pressure-reducing valve upstream.
- ▶ 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 µm) 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 an outlet valve at the outlet side of the rinse chamber (see "Accessories").

NOTICE

If the water pressure can increase to above 6 bar (87 psi) (including any short pressure surges) the assembly can get damaged.

- ▶ Install a pressure-reducing valve upstream

 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.

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

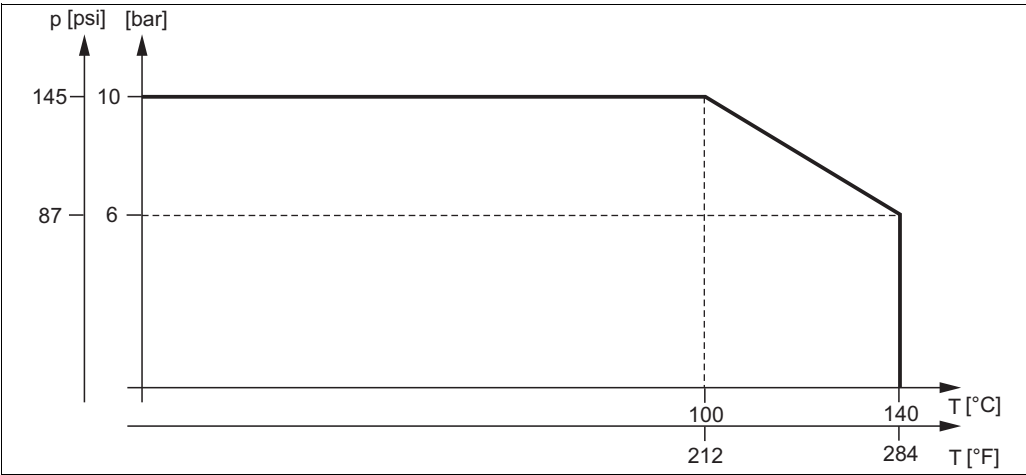
Process temperature range

0 to 140 °C (32 to 284 °F)

Process pressure range

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

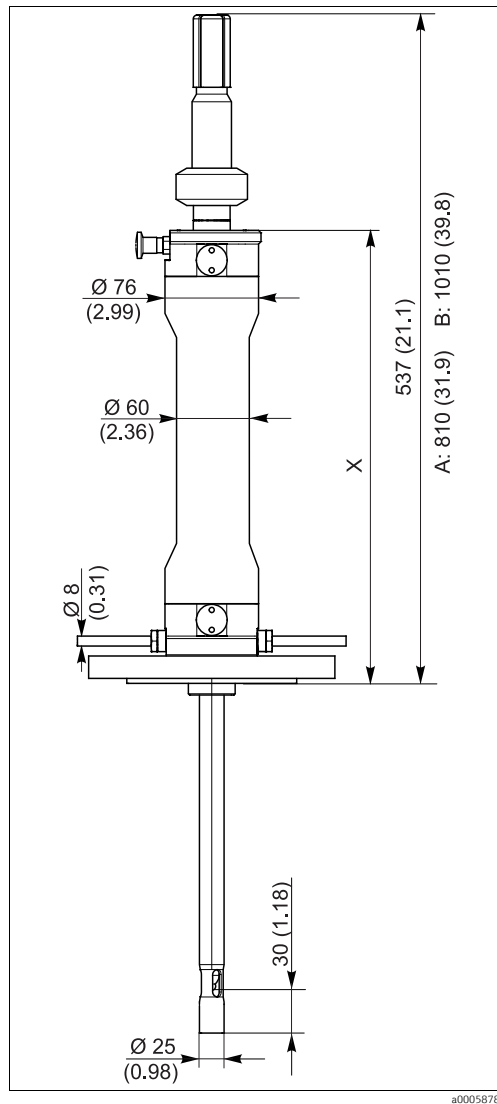
Pressure temperature diagram



Pressure temperature diagram

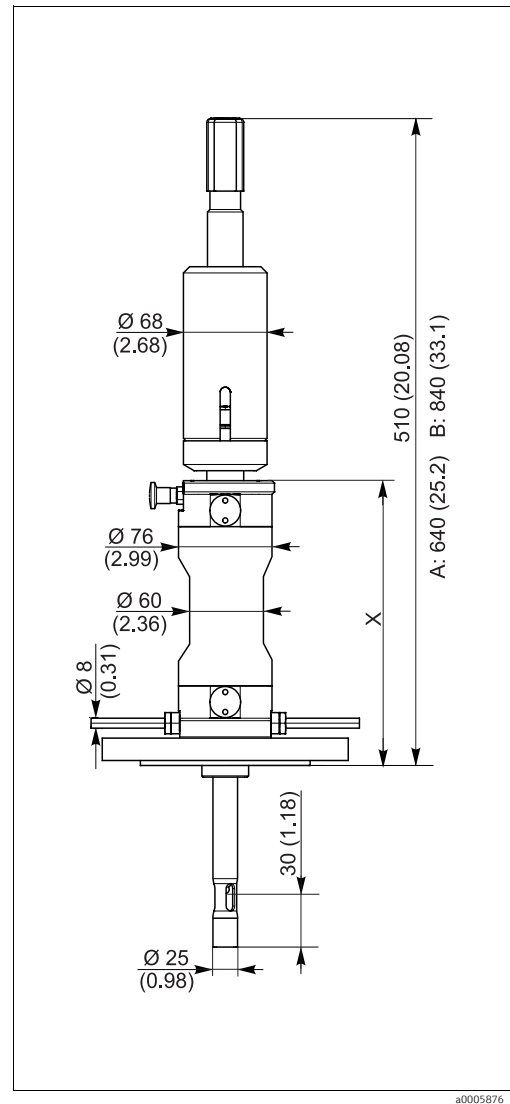
Mechanical construction

Dimensions



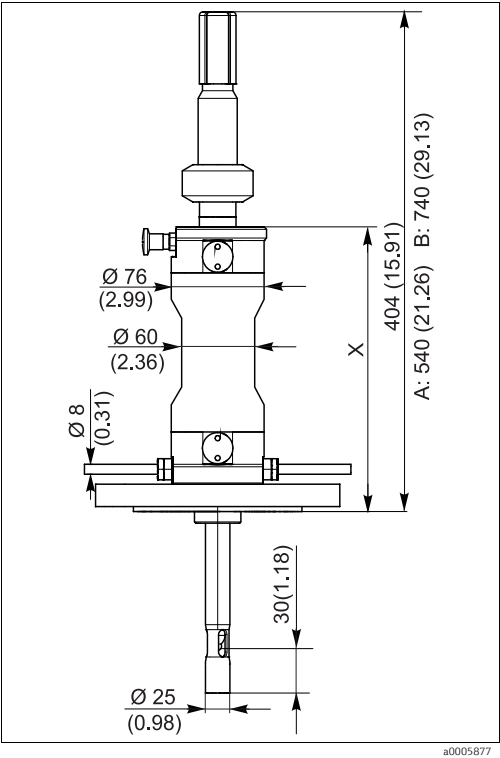
Assembly version: long, for gel sensors

A Length when extended
 B Required mounting clearance
 X 364/366 mm (14.3/14.4") depending on flange size



Assembly version: standard, for KCl sensors

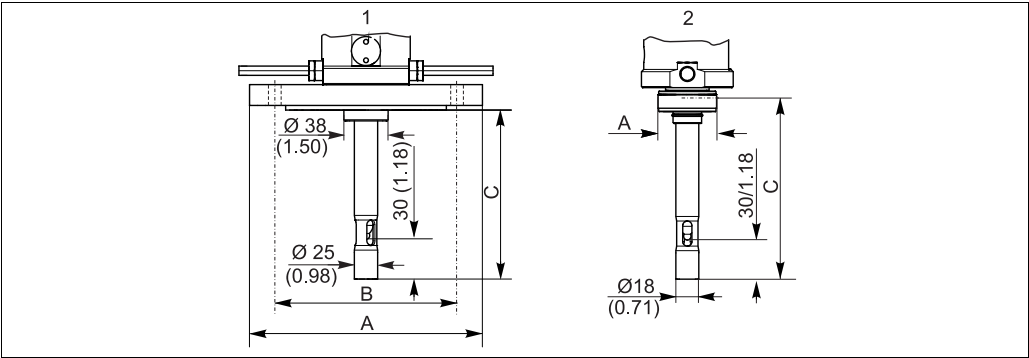
A Length when extended
 B Required mounting clearance
 X 229/231 mm (9.02/9.09") depending on flange size



Assembly version: standard, for gel sensors

A Length when extended
B Required mounting clearance
X 229/231 mm (9.02/9.09) depending on flange size

Process connections

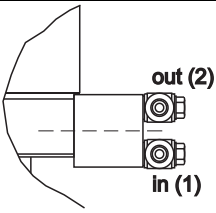
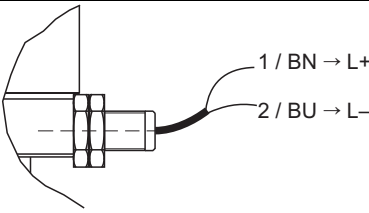


Process connections

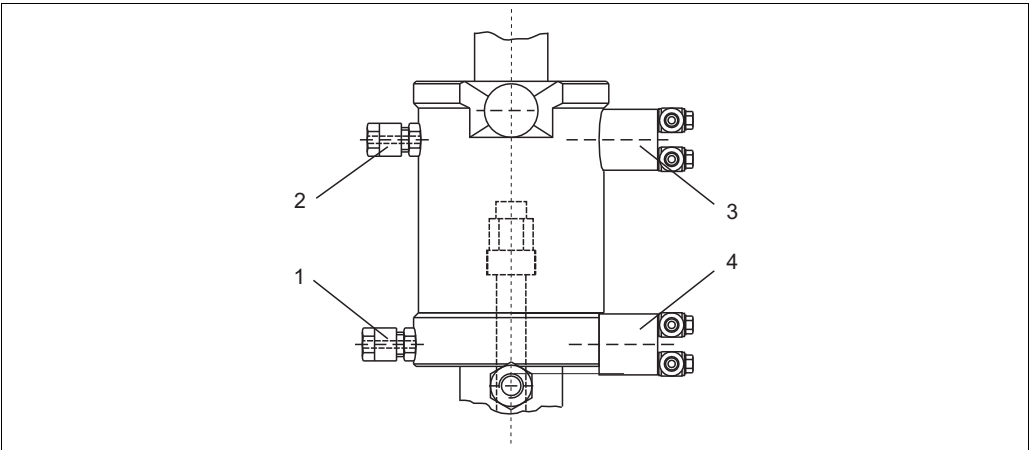
1 Flange DN 50 / DN 80 / ANSI 2" / JIS IS10K50A
2 Internal thread G1¼

Connection	A	B	C (standard)	C (long)
DN 50	165/6.50	125/4.92	145/5.71	280/11.0
DN 80	200/7.87	160/6.30	143/5.63	278/10.94
ANSI 2"	152.4/6.00	120.7/4.75	145/5.71	280/11.0
JIS IS10K50A	155/6.10	120/4.72	147/5.79	282/11.10
G 1¼	51/2.01	---	152/5.98	287/11.30
Dimensions in mm/inch				

 For 425 mm gel sensors a special version with extra large immersion depth of 378 mm (14.9") is available. Order no. 71220488 / C-PA100525-40

Sensors	Standard version	Gel sensors, ISFET	225 mm
		KCl sensors	360 mm
	Long version	Gel sensors, ISFET	360 mm
Weight	Depending on the material: 7.5 to 12.0 kg (16.54 to 26.46 lbs)		
Materials	In contact with medium:		
	Electrode holder	PEEK, PVDF, conductive PVDF, Alloy C22, stainless steel 1.4571 (AISI 316 Ti)	
	Rinse chamber and raised face	PEEK, PVDF, conductive PVDF, Alloy C22, stainless steel 1.4571 (AISI 316 Ti)	
	Seals	EPDM/FPM (Viton)/FFKM (Kalrez®)	
	Not in contact with medium:		
	Housing	Stainless steel 1.4404 (AISI 316 L)	
	Seals	FPM	
	Limit position switches (NAMUR-type)	Front surface PBT, cable PVC	
	Handle/protection cap	PVC	
Rinse connections	2 x G ¹ / ₄ (internal) or 2 x NPT ¹ / ₄ " (internal) or 2 x pipe 8 x 60 Swagelok as nozzle		
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)			
 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

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- | | | | |
|---|----------------------------------|---|----------------------------|
| 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 µm) and free from water and oil. There is no continuous pressure demand. The air lines must have a minimum nominal diameter of 4 mm.

NOTICE

If the air pressure can increase to above 6 bar (87 psi) (including any short pressure surges) the assembly can get damaged.

- ▶ Install a pressure-reducing valve upstream.
- ▶ We recommend you also use a pneumatic throttle for lower pressures. This results in a smoother assembly operation..

Certificates and approvals

Limit switches	The inductive limit switches meet the requirements of DIN EN 60 947-5-6 (NAMUR).
Inspection certificate	Inspection certificate 3.1 acc. to EN 10204 on demand.

Ordering information

Order code

Enter the following address in your browser to access the product page:
www.products.endress.com/cpa472d

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 without limit contact switches							
	B	Pneumatic without limit contact switches							
	C	Pneumatic with 2 pneumatic limit contact switches							
	D	Pneumatic with 2 electric Ex limit contact switches							
	E	Pneumatic with 1 electric Ex limit contact switch, position "Measuring"							
Assembly version, locking									
	3	Internal seal, service position							
	4	Internal seal, service position + measuring position							
Electrode type									
	A	For gel electrodes / ISFET sensors, 225 mm							
	B	For gel electrodes / ISFET sensors, 360 mm							
	C	For liquid KCl electrodes, 360 mm							
Immersion depth									
	1	max 146 mm (5.75")							
	2	max 280 mm (11.02")							
Assembly material (in contact with medium)									
	B	PEEK							
	C	PVDF							
	D	PVDF, conductive							
	E	PVDF, electrode holder Alloy C22							
	H	Stainless steel 1.4571; 316Ti							
	J	Alloy C22 incl. 3.1							
Seal material (in contact with medium)									
	1	EPDM							
	2	FPM Viton®							
	3	FFKM KALREZ®							
Process connection									
	D	DN 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	Thread G1¼ internal (only with materials H/J)							
	J	Flange JIS IS10K50A							
	Y	Special version acc. to customer specification							
Rinse 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:

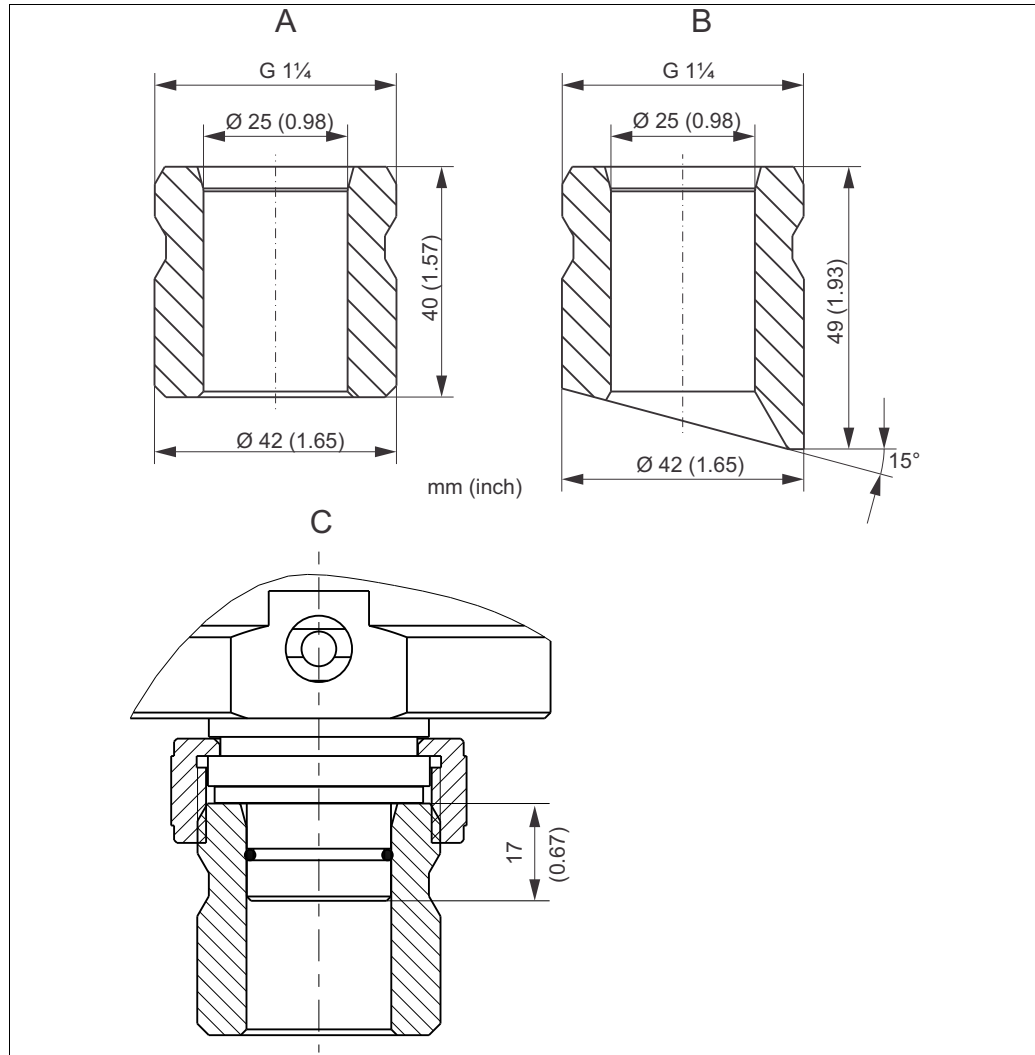
- Cleanfit CPA472D assembly (ordered version)
- Operating Instructions (English)

Accessories

Process adapter

Built-in adapter DN 25

- Stainless steel 1.4404
- "Straight" version - Order No.: 51500328
- "Inclined" version - Order No.: 51500327



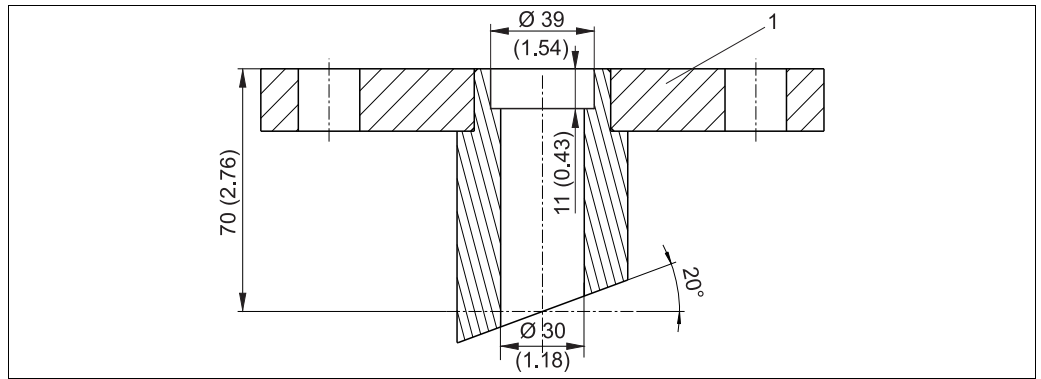
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Build-in adapter

- A *Build-in adapter, straight*
 B *Build-in adapter, inclined*
 C *Build-in adapter, CPA472D installed*

Welded fitting DN 50 (70 mm), inclined, material: 1.4571 (AISI 316 Ti);

- order no. 71098682



Welded fitting

1 Flange DN 50 / PN16

Dummy plug for G1¼ process connection,

- Stainless steel 1.4435 (AISI 316L), FKM (Viton®) seal, G1¼ internal thread; order no. 51502800

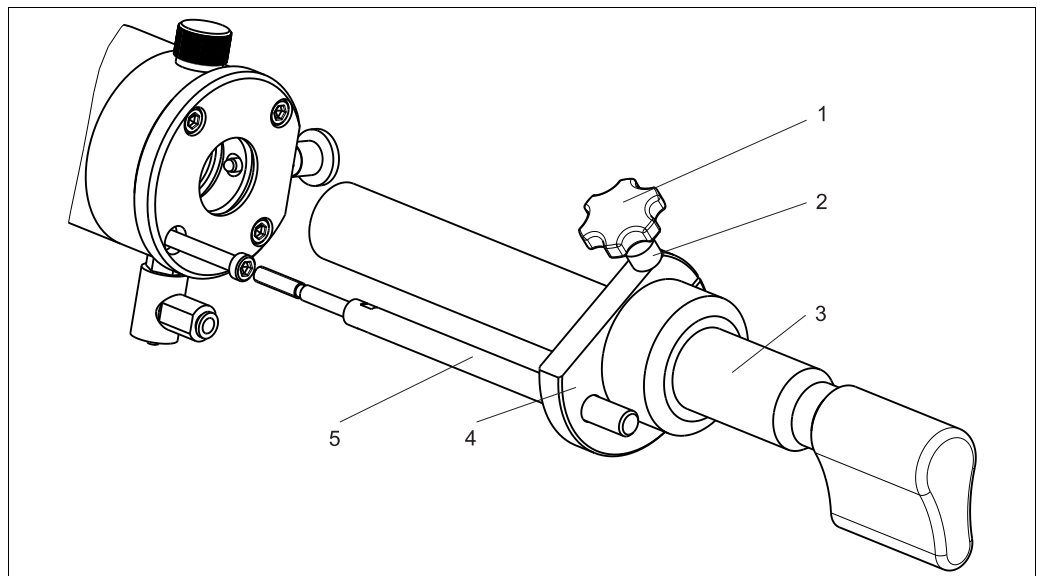
Dummy plug for G¾ rinse connection,

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

Anti-twist device

Anti-twist device

- Anti-twist device for CPA472D
- Screw (5): stainless steel 1.4404 (AISI 316 L)
- Plate (3): PA 6 G black
- Star-knob screw (1): thermoplast black and stainless steel 1.4305 (AISI 303)
- Sleeves (2 and 3): PVC black
- Order no. 71224451



Anti-twist device

- 1 Star-knob screw
- 2 Distance sleeve
- 3 Sleeve
- 4 Plate
- 5 Screw

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

Hose nozzle

- Hose nozzles for rinse connections G $\frac{1}{4}$, DN 12, PVDF, 2 pieces;
order no. 50090491

Rinse chamber valve

- Rinse chamber input valve, pneumatically ON - OFF, PVDF with bellows, connection G $\frac{1}{4}$, (on request)

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,

- G1/8 threaded connection
- order no. 50036864

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 TI00028C/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 TI00367C/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 TI00079C/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 TI00373C/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 TI00245C/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 TI00374C/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 TI00375C/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 TI00435C/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

Cable

CPK9 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 (TI00118C/07/EN)

CPK1 measuring cable

- For pH/ORP electrodes with GSA plug-in head
- Ordering acc. to product structure, see Technical Information (TI00118C/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 (TI00118C/07/EN)

CYK10 Memosens data cable

- For digital sensors with Memosens technology
pH, redox, oxygen (amperometric), chlorine, conductivity (conductive)
- Ordering acc. to product structure (-> online configurator, www.products.endress.com/cyk10)

Transmitter

Liquiline CM44x/CM44xR

- Multiple-channel transmitter for the connection of digital sensors with Memosens technology
- Field device or DIN rail device
- Power supply: 100 to 230 V AC, 24 V AC/DC
- Universally upgradeable
- SD card slot
- Ordering per product structure (--> Online configurator on product page)
- Technical Information TI00444C/07/EN (CM44x) or TI01112C/07/EN (CM44xR)

Liquiline 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 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 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 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 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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