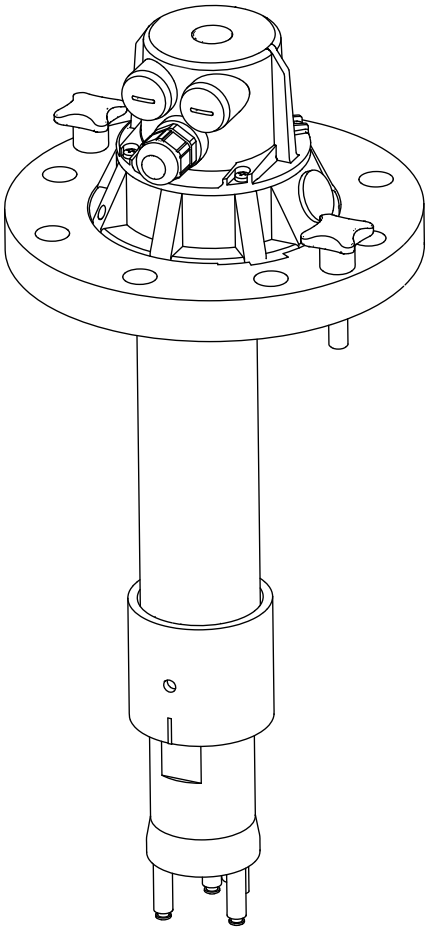
Operating Instructions
Dipfit CPA111

Immersion and installation assembly for pH/ORP measurement



Endress+Hauser
People for Process Automation

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1 Document information

1.1 Safety information

Structure of information	Meaning
DANGER **Causes (/consequences)** Consequences of non-compliance (if applicable) ▶ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation **will** result in a fatal or serious injury.
WARNING **Causes (/consequences)** Consequences of non-compliance (if applicable) ▶ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation **can** result in a fatal or serious injury.
CAUTION **Causes (/consequences)** Consequences of non-compliance (if applicable) ▶ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or more serious injuries.
NOTICE **Cause/situation** Consequences of non-compliance (if applicable) ▶ Action/note	This symbol alerts you to situations which may result in damage to property.

1.2 Symbols

Symbol	Meaning
	Additional information, tips
	Permitted or recommended
	Not permitted or not recommended
	Reference to device documentation
	Reference to page
	Reference to graphic
	Result of a step

2 Basic safety instructions

2.1 Requirements for personnel

- Installation, commissioning, operation and maintenance of the measuring system may be carried out only by specially trained technical personnel.
- The technical personnel must be authorized by the plant operator to carry out the specified activities.
- The electrical connection may be performed only by an electrical technician.
- The technical personnel must have read and understood these Operating Instructions and must follow the instructions contained therein.
- Measuring point faults may be repaired only by authorized and specially trained personnel.

Repairs not described in the Operating Instructions provided may only be carried out directly by the manufacturer or by the service organization.

2.2 Designated use

The assembly is suitable for universal use in water and wastewater applications. Thanks to its design, it can be used in pressurized systems (→ 25).

Use of the device for any purpose other than that described, poses a threat to the safety of people and of the entire measuring system and is therefore not permitted.

The manufacturer is not liable for damage caused by improper or non-designated use.

2.3 Occupational safety

As the user, you are responsible for complying with the following safety conditions:
- Installation guidelines
- Local standards and regulations

2.4 Operational safety

1. Before commissioning the entire measuring point, verify that all connections are correct. Ensure that electrical cables and hose connections are undamaged.
2. Do not operate damaged products, and safeguard them to ensure that they are not operated inadvertently. Label the damaged product as defective.
3. If faults cannot be rectified:
   Take the products out of operation and safeguard them to ensure that they are not operated inadvertently.

2.5 Product safety

The product is designed to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which it is safe to operate. The relevant regulations and European standards have been observed.

3 Incoming acceptance and product identification

3.1 Incoming acceptance

1. Verify that the packaging is undamaged.
   ↳ Notify your supplier of any damage to the packaging.
   Keep the damaged packaging until the matter has been settled.
2. Verify that the contents are undamaged.
   ↳ Notify your supplier of any damage to the delivery contents.
   Keep the damaged products until the matter has been settled.
3. Check the delivery for completeness.
   ↳ Check it against the delivery papers and your order.
4. Pack the product for storage and transportation in such a way that it is protected against impact and moisture.
   ↳ The original packaging offers the best protection.
   The permitted ambient conditions must be observed (see "Technical data").

If you have any questions, please contact your supplier or your local sales center.

3.2 Product identification

3.2.1 Nameplate

The nameplate provides you with the following information on your device:
- Manufacturer identification
- Order code
- Extended order code
- Serial number
- Ambient and process conditions
- Safety information and warnings

Compare the data on the nameplate with your order.

3.2.2 Product identification

Product page

www.endress.com/cpa111

Interpreting the order code

The order code and serial number of your product can be found in the following locations:
- On the nameplate
- In the delivery papers

Obtaining information on the product

1. Go to the product page for your product on the Internet.
2. In the navigation area on the right-hand side, select "Check your device features" under "Device support".
   ↳ An additional window opens.
3. Enter the order code from the nameplate into the search field.
   ↳ You will receive information on each feature (selected option) of the order code.

3.3 Scope of delivery

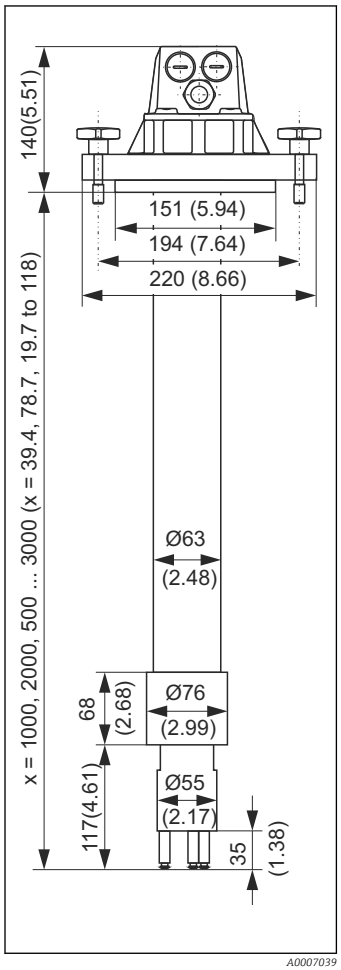
The delivery comprises:
- Assembly in the version ordered
- Operating Instructions

If you have any questions, please contact your supplier or your local sales center.

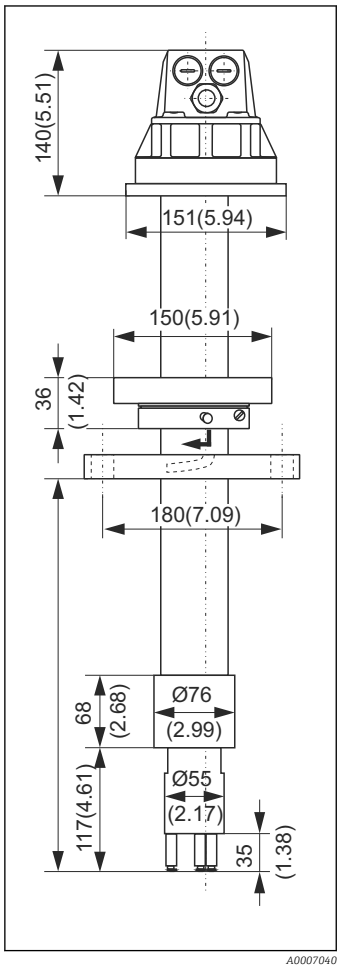
4 Installation

4.1 Installation conditions

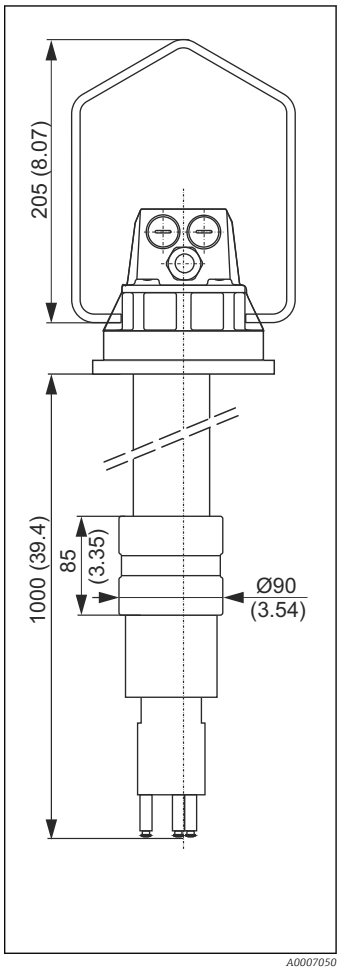
4.1.1 Dimensions



1 CPA111-A or -C

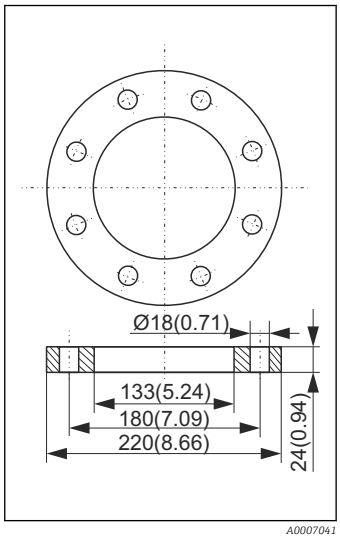


2 CPA111-B



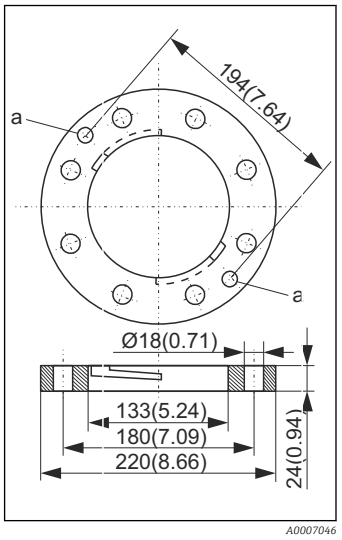
3 CPA111-D

All dimensions in mm (inch)



4 *Pressurized flange DN 100 for CPA111-C*

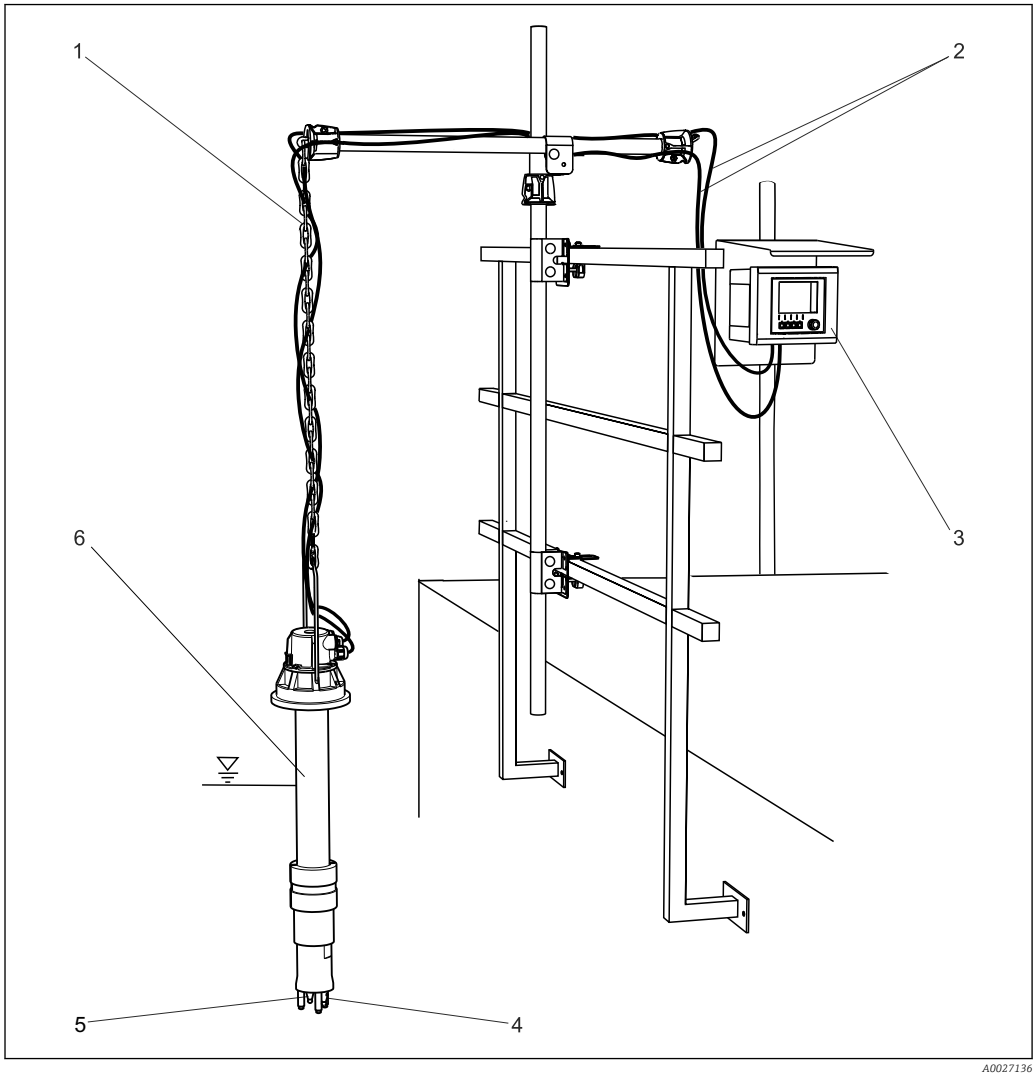
All dimensions in mm (inch)



5 *Flange DN 100 for CPA111-A/B*

a = bore holes for cross formed screws

4.1.2 Measuring system

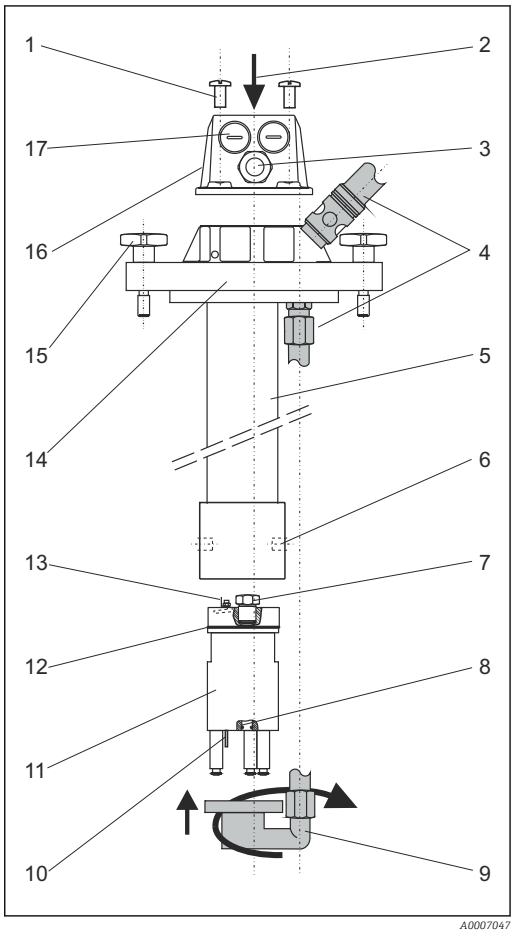


6 *Example of a measuring system*

1	*Assembly holder CYH112 (with chain)*	*4*	*Sensor CPS11D (pH)*
2	*Sensorkabel CYK10*	*5*	*Sensor CPS12D (ORP)*
3	*Transmitter CM442 with weather protection cover*	*6*	*Assembly CPA111-D (with suspension bracket)*

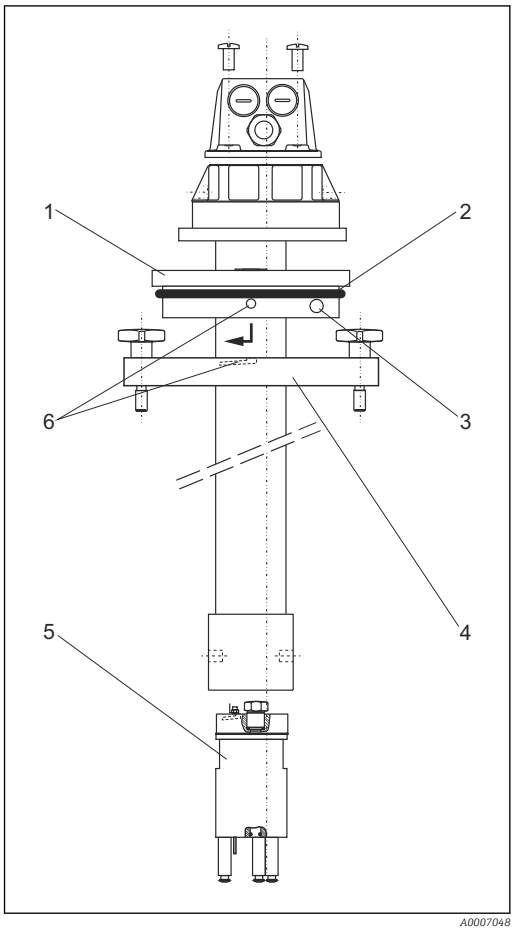
4.2 Installing the assembly

4.2.1 Versions with a flange



7 *Version A and C with flange DN 100*

1 *Phillips screw (x 4)*
2 *Perforation for electrolyte vessel CPY7*
3 *Gland Pg 13.5*
4 *Quick connect coupling for Chemoclean cleaning*
5 *Assembly pipe*
6 *Bore hole for wetting cup*
7 *Dummy plug*
8 *O-ring for electrode installation*
9 *Chemoclean CPR30 accessory*
10 *Potential matching pin*
11 *Electrode holder (3 mounting slots)*
12 *O-ring*
13 *AMP connector for PML connection*
14 *Flange DN 100, A: standard C: pressurized flange*
15 *Cross formed screws M10 (not for pressurized version)*
16 *Assembly head*
17 *Dummy plug Pg 16*



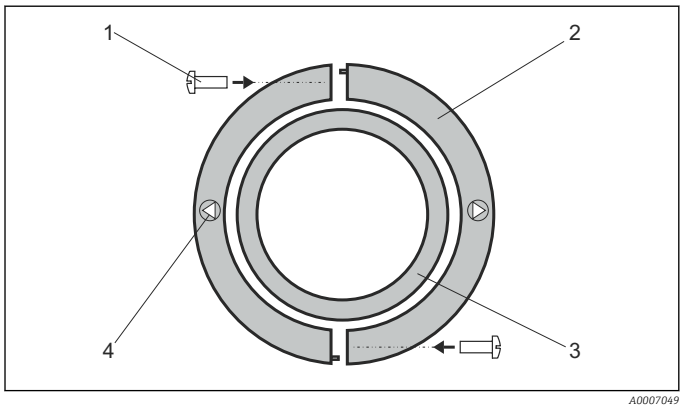
8 *Version B with adjustable flange DN 100*

1 *Adjustable flange adapter (2 half-shells)*
2 *O-ring for tolerance compensation*
3 *Tensioning screws (x 2)*
4 *Flange DN 100*
5 *Sensor holder*
6 *Bayonet lock*

Installing the assembly with flange DN 100 (version A and C)

▶ Use the drawing as a guide (→ 7).

Installing the assembly with adjustable flange DN 100 (version B)



1 Phillips screws
2 Half-shells
3 Assembly pipe
4 "Final position" marker

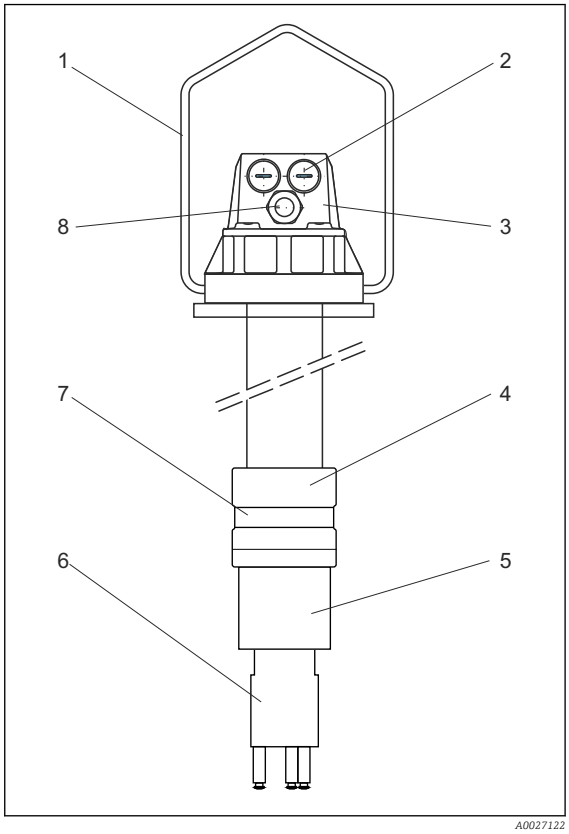
9 Adjustable flange adapter

1. Mount the flange DN 100 on the frame.
2. Fit the half-shells (→ 9, item 2) of the adapter in the desired position on the pipe.
3. Tighten the half-shells with the two Phillips screws (item 1).
4. Insert the O-ring into the O-ring groove (adjustable flange adapter on outside).
5. Insert the assembly into the ready-mounted flange DN 100.
6. Holding the assembly by the assembly head, screw the assembly clockwise into the bayonet lock as far as the "final position" marker (item 4).

Removing the assembly

1. Leave the mounted flange DN 100 on the frame.
2. Holding the assembly by the assembly head, screw the assembly counter-clockwise out of the bayonet lock and remove the assembly from the medium.

4.2.2 Version with suspension bracket



1 Suspension bracket
2 Dummy plug Pg 16
3 Assembly head
4 Weight (half-shells)
5 Sleeve
6 Sensor holder
7 Cable clamp for fixing the half-shells
8 Gland Pg 13.5

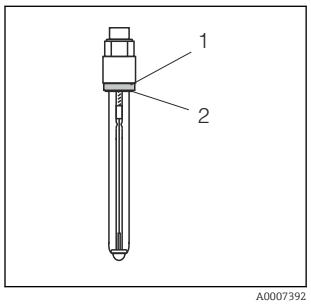
Installing the assembly in the measuring point

1. You can install the assembly on the basin.
   To do so, suspend the assembly from the chain retainer CYH112.
   ↳ The mounting chain enables a flexible immersion depth.
2. The weight (item 4) is required to stabilize the assembly.
   Push the weight down as far as the sleeve (item 5).
3. Then fix the cable clamp (item 8).

4.3 Installing the sensor

Preparing the sensor

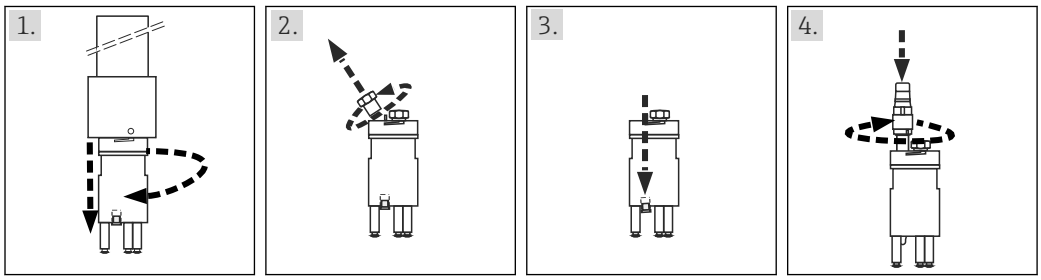
You can only install sensors that meet the following requirements:
- Threaded plug-in head Pg 13.5
- 120 mm shaft length
- 12 mm shaft diameter



10

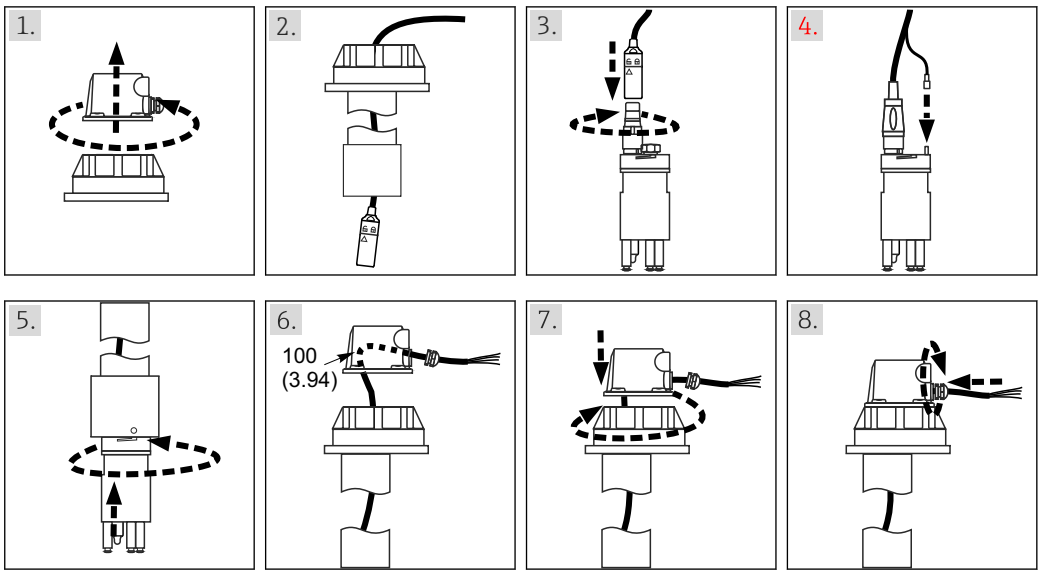
1. Remove the protection cap from the sensor.
2. Check that the O-ring (→ 10, item 2) and the thrust collar (item 1) are provided on the sensor shaft.
3. Wet the sensor shaft with water.
   ↳ This makes it easier to screw in the sensor.

Installing the sensor in the sensor holder



1. Unscrew the sensor holder from the bayonet lock.
2. Unscrew the upper dummy plug from the sensor holder.
3. Push the lower dummy plug out of the sensor holder.
4. Screw the sensor into the sensor holder finger-tight (3 Nm).

Mounting the sensor cable

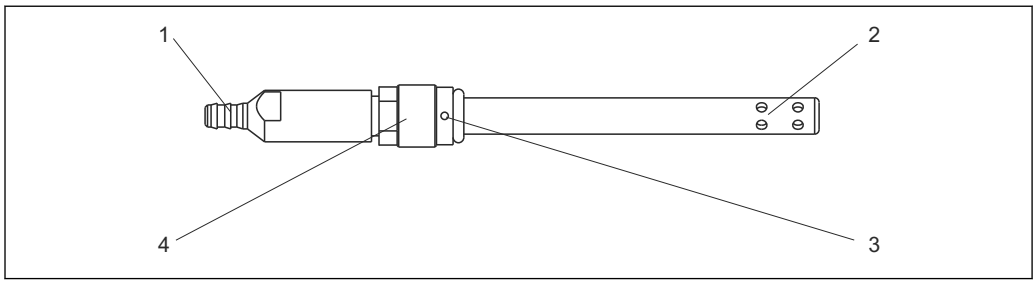


1. Unscrew the cover from the assembly head.
2. Push the connector side of the measuring cable through the assembly pipe.
3. Screw the connector of the measuring cable onto the sensor head.
4. Only for analog sensors with PML:
   Attach the connector of the potential matching cable to the AMP connector.
5. Screw the electrode holder into the bayonet lock.
6. Push the other end of the measuring cable through the Pg 13.5 cable gland. Leave approx. 10 cm of measuring cable in the assembly pipe (is required to remove the sensor).
7. Screw the cover onto the assembly head.
8. Tighten the Pg gland.

Refer to the sensor Operating Instructions for information on how to connect the sensor to the transmitter.

4.4 Installing the spray cleaning system CPR31

Preparing the spray cleaning system

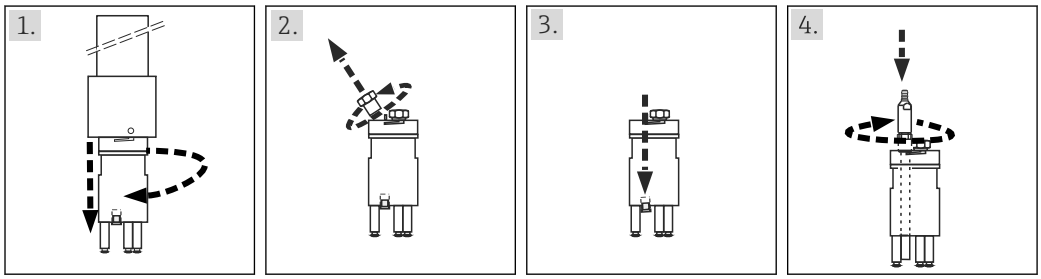


11 Spray cleaning system CPR31

1 Hose connection
2 Spray head
3 Positioning pin
4 Hex banjo screw

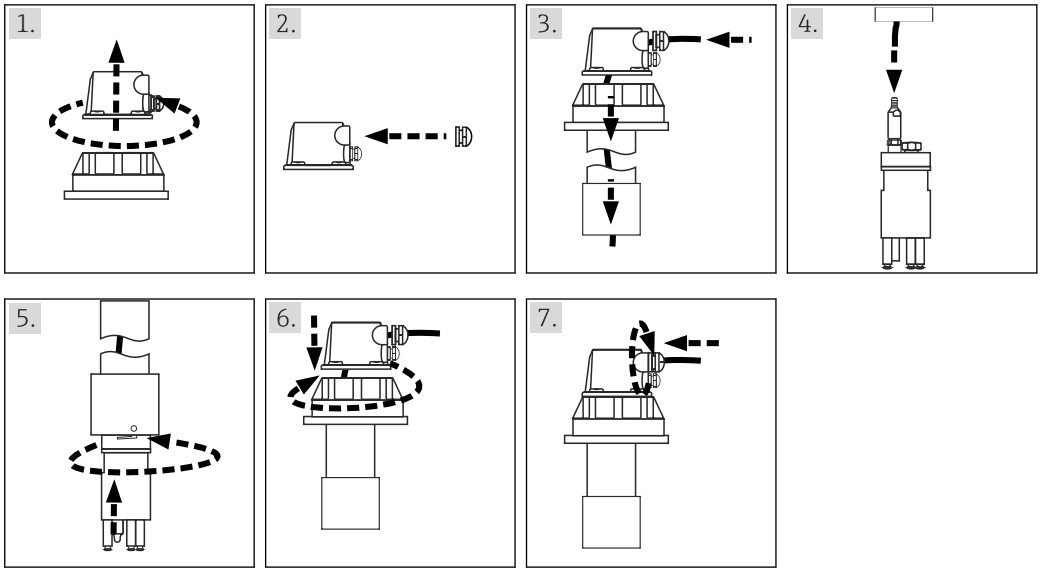
▶ The assembly does not have a positioning groove.
Remove the position pin (item 3) using a pliers.

Installing the spray cleaning system in the sensor holder



1. Unscrew the sensor holder from the bayonet lock.
2. Unscrew the upper dummy plug from the sensor holder.
3. Push the lower dummy plug out of the sensor holder.
4. Screw the spray cleaning system into the sensor holder finger-tight (3 Nm).
   ↳ Arrange it so that the openings of the spray head point towards the sensors.

Connecting the water hose



1. Unscrew the cover from the assembly head.
2. Replace a dummy plug Pg 16 with a cable gland Pg 16.
3. Push the hose through the Pg 16 gland from below and through the assembly pipe.
4. Fit the hose onto the hose connection of the spray cleaning system.
   ↳ Secure the hose with a hose clip.
5. Screw the electrode holder into the bayonet lock.
6. Screw the cover onto the assembly head.
7. Tighten the Pg 16 gland.

4.5 Post-installation check

1. After mounting, check all the connections to ensure they are secure and leak-tight.
2. Make sure that the hose of the (optional) spray cleaning system cannot be removed unless force is applied. This pipe is in open contact with the medium and must be secured accordingly.
3. Check the hoses for damage.

5 Maintenance

⚠ WARNING

Risk of injury if medium escapes

- ▶ Before every maintenance task make sure that the process pipe or container is empty and rinsed.

Take all the necessary precautions in time to ensure the operational safety and reliability of the entire measuring system.

NOTICE

Effects on process and process control

- ▶ When carrying out any work on the system, take into account possible repercussions for process control or the process itself.
- ▶ For your own safety, only use genuine accessories. With genuine parts, the function, accuracy and reliability are also ensured after maintenance work.

5.1 Servicing the assembly

The assembly must be serviced at regular intervals. The frequency and type of servicing depend on the medium.

1. Remove buildup on the assembly from time to time.
2. Keep O-rings and sealing surfaces clean.
3. Replace damaged O-rings.
   ↳ Versehen Sie trockene O-Ringe mit einem dünnen Fettfilm (z.B. Syntheso Glep).
4. Replace damaged parts of the assembly.

Most common types of fouling and suitable cleaning agents

Fouling	Suitable cleaning agent
Greases and oils	Agents containing surfactants (alkaline agents) or water-soluble organic solvents (halogen-free, e.g. ethanol) [1)]
Limescale deposits, metal hydroxide buildup, lyophobic biological buildup	Approx. 3% hydrochloric acid
Sulfide deposits	Mixture of 3% hydrochloric acid and thiocarbamide (commercially available)
Protein buildup	Mixture of 3% hydrochloric acid and pepsin (commercially available)
Fibers, suspended substances	Pressurized water, possibly surface-active agents
Light biological buildup	Pressurized water

1) Do not use agents containing surfactants (alkaline agents) for the Tophit ISFET sensor! Verwenden Sie statt dessen handelsübliche saure Reiniger für die Lebensmittelindustrie (z.B. P3-horolith CIP, P3-horolith FL, P3-oxonia active).

⚠ WARNING

Solvents containing halogens and acetone

Gesundheitsgefährdung durch Einatmen, können Krebs verursachen (z.B. Chloroform) und Kunststoffteile der Armatur oder Sensors zerstören (Aceton).

- ▶ Never use acetone or any solvents containing halogens.

5.2 Cleaning the sensor

- Clean the ORP electrodes mechanically only and always use water. Never clean with chemical cleaning agents. Such cleaning agents cause a potential to build up at the electrode which takes a few hours to dissipate. The potential causes errors in the measurement.
- Do not use abrasive cleaners. These can cause irreparable damage to the sensor.
- Where necessary, perform a new calibration following the cleaning process.

You must clean the sensor:
- Before every calibration
- Regularly during operation
- Before returning it for repairs

You can remove the sensor and clean it manually. Alternatively you can use the Chemoclean automatic spray cleaning system for cyclic sensor cleaning. The complete cleaning system includes:
- Spray head CPR30
- Cleaning injector CYR10
- Cleaning control, e.g. internally via transmitter Liquisys CPM223/253 with a Plus Package.

6 Repairs

6.1 Return

The product must be returned if repairs or a factory calibration are required, or if the wrong product was ordered or delivered. As an ISO-certified company and also due to legal regulations, Endress+Hauser is obliged to follow certain procedures when handling any returned products that have been in contact with medium.

To ensure swift, safe and professional device returns, please read the return procedures and conditions at www.endress.com/support/return-material.

6.2 Disposal

The device contains electronic components and must therefore be disposed of in accordance with regulations on the disposal of electronic waste.

Observe the local regulations.

7 Accessories

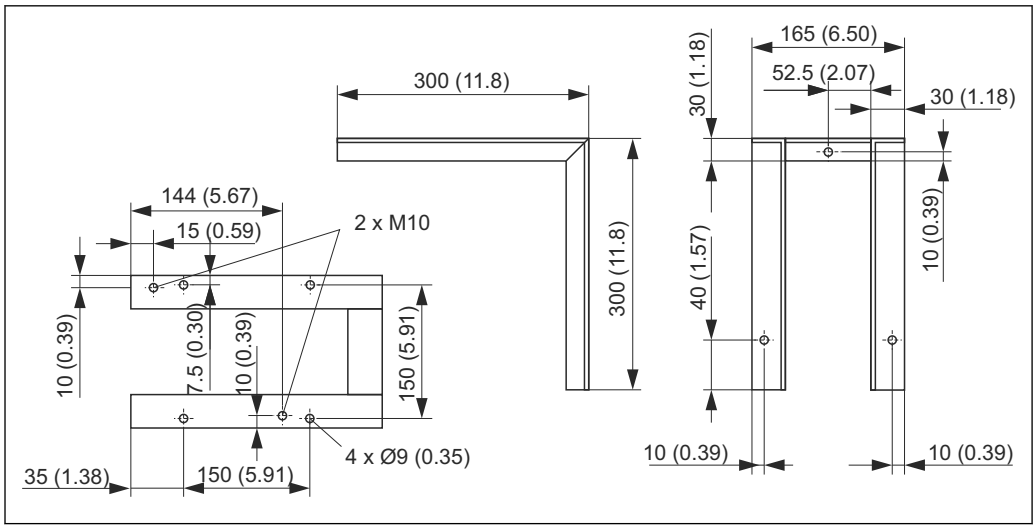
The following are the most important accessories available at the time this documentation was issued. For accessories not listed here, please contact your service or sales office.

7.1 Installation accessories

Flexdip CYH112
- Modular holder system for sensors and assemblies in open basins, channels and tanks
- For Flexdip CYA112 water and wastewater assemblies
- Can be affixed anywhere: on the ground, on the capstone, on the wall or directly onto railings.
- Stainless steel version
- Product Configurator on the product page: www.endress.com/cyh112

Technical Information TI00430C

Mounting frame
For CPA111, CPA510, CPA530 and CLA111
- Material: stainless steel 1.4301 (AISI 304)
- Order number: 50066561



12 *Mounting frame in mm (inch)*

Adjustable flange adapter DN 100
- For CPA111 and CLA111 for variable immersion depths
- Order number: 50070514

Flange DN 100, unpressurized
- For CPA111 and CLA111 suitable for adjustable flange adapter
- Order number: 50066632

7.2 Seals

O-ring set for CPA111
- Material: EPDM
- Order number: 50091993

7.3 Sensors

7.3.1 Glass electrodes

Orbisint CPS11D/ CPS11
- pH electrode for process technology
- Optional SIL version for connecting to SIL transmitter
- With dirt-repellent PTFE diaphragm
- Product Configurator on the product page: www.endress.com/cps11d or www.endress.com/cps11

Technical Information TI00028C

Ceraliquid CPS41D/ CPS41
- pH electrode with ceramic junction and KCl liquid electrolyte
- Product Configurator on the product page: www.endress.com/cps41d or www.endress.com/cps41

Technical Information TI00079C

Ceragel CPS71D/ CPS71
- pH electrode with double-chamber reference system and integrated bridge electrolyte
- Product Configurator on the product page: www.endress.com/cps71d or www.endress.com/cps71

Technical Information TI00245C

Orbipore CPS91D/ CPS91
- pH electrode with open aperture for media with high dirt load
- Product Configurator on the product page: www.endress.com/cps91d or www.endress.com/cps91

Technical Information TI00375C

Orbisint CPS12D/ CPS12
- ORP sensor for process technology
- Product Configurator on the product page: www.endress.com/cps12d or www.endress.com/cps12

Technical Information TI00367C

Ceraliquid CPS42D/ CPS42
- ORP electrode with ceramic junction and KCl liquid electrolyte
- Product Configurator on the product page: www.endress.com/cps42d or www.endress.com/cps42

Technical Information TI00373C

Ceragel CPS72D/ CPS72
- ORP electrode with double-chamber reference system and integrated bridge electrolyte
- Product Configurator on the product page: www.endress.com/cps72d or www.endress.com/cps72

Technical Information TI00374C

Orbipore CPS92D/ CPS92
- ORP electrode with open aperture for media with high dirt load
- Product Configurator on the product page: www.endress.com/cps92d or www.endress.com/cps92

Technical Information TI00435C

7.3.2 ISFET sensors

Tophit CPS441D/ CPS441
- Sterilizable ISFET sensor for low-conductivity media
- Liquid KCl electrolyte
- Product Configurator on the product page: www.endress.com/cps441d or www.endress.com/cps441

Technical Information TI00352C

Tophit CPS471D/ CPS471
- Sterilizable and autoclavable ISFET sensor for food and pharmaceutics, process engineering
- Water treatment and biotechnology
- Product Configurator on the product page: www.endress.com/cps471d or www.endress.com/cps471

Technical Information TI00283C

Tophit CPS491D/ CPS491
- ISFET sensor with open aperture for media with high dirt load
- Product Configurator on the product page: www.endress.com/cps491d or www.endress.com/cps491

Technical Information TI00377C

7.3.3 Combined sensors

Memosens CPS16D
- Combined pH/ORP sensor for process technology
- With dirt-repellent PTFE diaphragm
- With Memosens technology
- Product Configurator on the product page: www.endress.com/cps16D

Technical Information TI00503C

Memosens CPS76D
- Combined pH/ORP sensor for process technology
- Hygienic and sterile applications
- With Memosens technology
- Product Configurator on the product page: www.endress.com/cps76d

Technical Information TI00506C

Memosens CPS96D
- Combined pH/ORP sensor for chemical processes
- With poison-resistant reference with ion trap
- With Memosens technology
- Product Configurator on the product page: www.endress.com/cps96d

Technical Information TI00507C

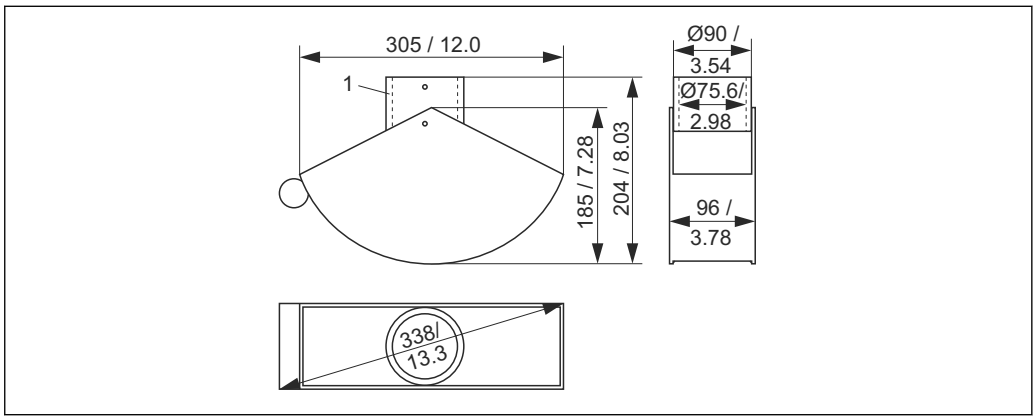
7.4 Extension cable

Memosens data cable CYK11
- Extension cable for digital sensors with Memosens protocol
- Product Configurator on the product page: www.endress.com/cyk11

Technical Information TI00118C

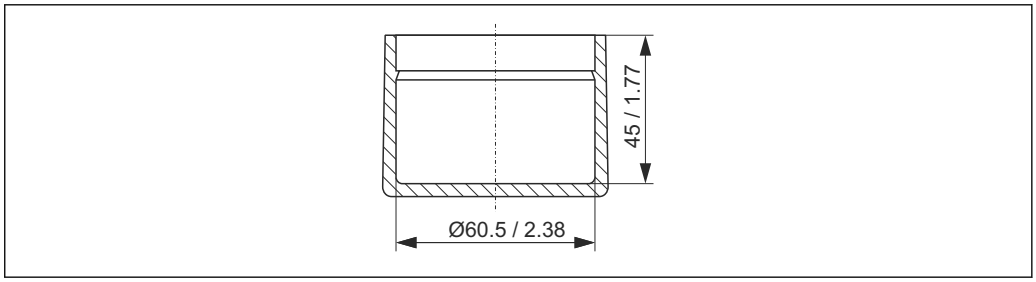
7.5 Calibration accessories

Wetting cup for CPA111
- Prevents the sensors from drying out if water level is too low
- For use in open vessels, tanks and channels
- Material: PP
- Order number: 50066569



13 *Dimensions in mm (inch)*

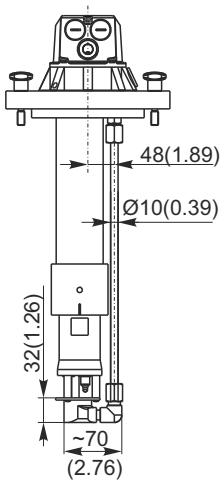
Calibration cap for CPA111
- For the calibration of pH/ORP electrodes
- Temporary fastening capability to spacer bolts of the electrode holder
- Material: PP
- Order number: 50066570



14 *Dimensions in mm (inch)*

7.6 Chemoclean

Chemoclean CPR30



Automatic spray cleaning system for cleaning the sensors Order according to product structure	
Materials in contact with the medium	
Spray head	PP-GF20
O-rings	EPDM / VITON
Operating data	
Process pressure	Max. 4 bar (58 psi) absolute, at 20 °C (68 °F)
Process temperature	Max. 80 °C (176 °F) at ambient pressure
Cleaner pressure	4 to 6 bar (58 to 87 psi) absolute, at 20 °C (68 °F)

CPR31

Materials in contact with the medium	
Spray head, check valve	PVDF
O-rings	EPDM / VITON
Hose	EPDM, reinforced
Operating data	
Process pressure	Max. 8 bar (116 psi) absolute, at 50 °C (122 °F)
Process temperature	Max. 120 °C (248 °F) at ambient pressure
Process pressure when cleaning	Max. 3 bar (43 psi) absolute
Cleaner pressure	3 to 6 bar (43 to 87 psi) absolute, at 20 °C (68 °F)
Cleaner temperature	Max. 30 °C (86 °F)

8 Technical data

8.1 Environment

Ambient temperature range	-10 to +80 °C (+10 to +180 °F)

8.2 Process

Process temperature	-10 to +80 °C (+10 to +180 °F)	
Process pressure	CPA111-A/B/D	Unpressurized
	CPA111-C	Max. 5 bar (72 psi) abs. at 20 °C (68 °F), unpressurized up to 80 °C (176 °F)

8.3 Mechanical construction

Dimensions	→ 🖹 8	
Weight	Approx. 4.0 kg (8.8 lbs)	
Materials	Sensor holder	PP-GF 20
	Immersion tube	PP
	O-ring	VITON
	Only version CPA111-D:	
	Half-shells	Cast iron, PVC-coated
	Cable clamp	Stainless steel 1.4401 (AISI 316)
Cable entries	1 x Pg 13.5 and 2 x Pg 16	
Sensors suitable for use	12 mm glass electrodes, ISFET sensors and combined sensors	
Immersion depth	Standard	1000 mm (39.4 inch), 2000 mm (78.8 inch)
	Other length	500 to 3000 mm (19.7 to 118 inch)
Process connections	CPA111-A	Flange DN 100, additionally with captive cross formed screws
	CPA111-B	Adjustable flange DN 100
	CPA111-C	Pressurized flange DN 100
	CPA111-D	Stainless steel suspension bracket (1.4571 (AISI 316 Ti))

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