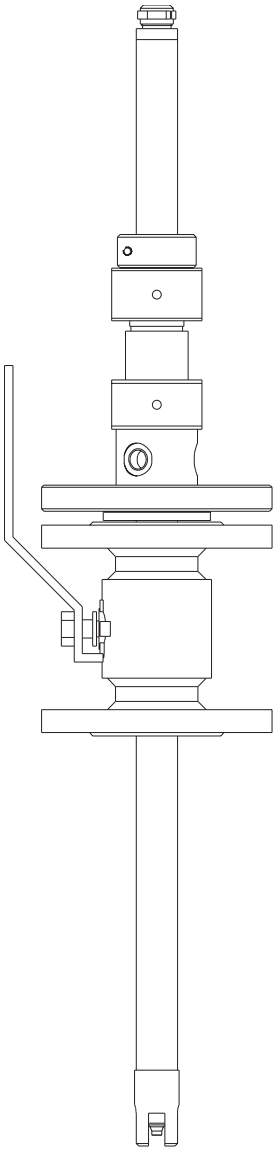
BA 183e00/10.02
Nr. 51512412

OPA 450
Retractable Assembly for pH/Redox Measurement

Operating Instructions



PA450E00.CHP

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1 General information

1.1 Symbols used

Warning:

This symbol alerts to hazards. Failure to observe these warnings may result in injury or damage to equipment.

Note:

This symbol indicates important items of information. Ignoring this information may result in malfunction.

1.2 Storage and transport

The packaging material used to store or transport the assembly must provide shock protection. Optimal protection is provided by the original packaging materials.

The ambient conditions also have to meet the requirements (see Technical data).

1.3 Unpacking

Verify that the packaging and contents are undamaged! Inform the post office or freight carrier of any damage. Damaged merchandise must be retained until the matter has been settled.

Check that the delivery is complete and agrees with the shipping documents and your order (refer to nameplate for type and variant).

The delivery comprises:

- Assembly OPA 450 with inner pipe
- PMC mounting set
- Additional inner pipe for electrode (inner pipe length depends on electrode type and immersion depth of assembly)
- Operating instructions BA 183e00.

Keep the original packaging materials for future storage or shipping of the assembly.

If you have any questions, consult your supplier or the sales agency in your area.

1.4 Packaging and disposal

Package the assembly properly for reuse at a later point in time. Optimal protection is provided by the original packaging materials.

Observe local regulations for disposal.

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1.5 Product structure

You can identify the assembly variant by the order code on the nameplate.

OPA 450	
Order code: Serial no.:	OPA450-1F110
Spec.: PN=4bar	T=-15...130°C

Fig. 1.1 Nameplate of OPA 450

Retractable assembly OPA 450

Immersion depth
1 250 mm (10 inch)
2 700 mm (28 inch)

Process connection
A G 1½ F (without adapter)
B Adapter SS 316S with G 1¼ M
C Adapter SS 316S with 1¼" NPT M
D Adapter with DN32, PN16 flange
E Adapter with ANSI 1¼" flange, 150 lbs
F Ball valve SS 316C with G1¼ F
G Ball valve SS 316S with G1¼ F
H Ball valve SS 316C with 1¼" NPT F
I Ball valve SS 316C with DN32, PN16 flange
K Ball valve SS 316C with ANSI 1¼" flange

Sealing material
1 Sealing material: EPDM
2 Sealing material: Viton

Equipment
10 Basic version
20 Assembly desiliconised, Pg 13.5
30 Certificate 3.1.B acc. to EN 10204
(not for process connections F, H, I, K)

OPA 450- □□□□ **complete order code**

2 Safety

2.1 Intended use

The manually operated retractable assembly OPA 450 is intended for installation of pH/ redox sensors in tanks and pipelines.

Thanks to its special design, this assembly can be used in pressurised systems (see Technical data).

It is the operator's responsibility to assure that the following safety regulations are observed:

- Regulations for explosion protection
- Regulations for installation
- Operating conditions for the device and its materials
- Local standards and regulations

2.2 General safety notes

The OPA 450 assembly has been designed for safe operation according to the state of the art in engineering and according to current regulations and European standards (see Technical data).

However, if used improperly or for purposes other than the intended purpose, it may be dangerous, e.g. due to incorrect installation or incorrect operating conditions.

Warning:

- Operating this assembly in any way other than as described in these instructions may compromise the safety and function of the measuring system.
- The notes and warnings in these operating instructions are to be strictly adhered to!

2.3 Installation, start-up, operation

Warning:

- This device may only be installed, connected electrically, commissioned, operated and serviced by properly trained personnel authorised by the system operator.
- The personnel must be familiar with these operating instructions and must adhere to the instructions contained therein.
- When this assembly is used in an explosive atmosphere, adherence to the applicable regulations is mandatory.
- Check that all connections have been properly made before powering up the system!
- Damaged assemblies that may be dangerous must not be operated and should be clearly identified as being defective.
- Any troubleshooting of the measuring system is to be performed exclusively by authorized, trained personnel.
- If faults cannot be remedied, the assembly must be removed from service and secured to prevent accidental start-up.
- Repair work which is not described in these operating instructions must be carried out directly by the manufacturer or by the Service Organization.
- Exchange of seals may only be performed by properly trained personnel. If the assembly will be sent back to the producer for seals exchange, additionally a pressure safety test is performed.

2.4 Safety features

Safety devices

The assembly is protected against external influences and damage by means of the following design measures:

- media-resistant material
- stopcock

2.5 Notes for installation in pressurised systems

Warning:

- The maximum operating pressure of the assembly must not be exceeded.
- The pressure in the system is to be released before assembly installation or removal.
- Couplings, cocks and lines are to be checked for leakage and damage at regular intervals.

3 Installation

3.1 Measuring system

The complete measuring system consists of:

- Retractable assembly OPA 450
- 1 gel-filled pH combination electrode, length 120 mm, with or without integrated temperatur sensor, e.g. OPS 11
- pH/redox transmitter, e.g. OPM 152, OPM 431, OPM 223 / 253
- Measuring cable OPK 1 or OPK 9 (terminated)

Optional:

- Junction box VBA for measuring cable extension
- Measuring cable OYK 71 (not terminated) for extension
- Cleaning device with injector OYR 10

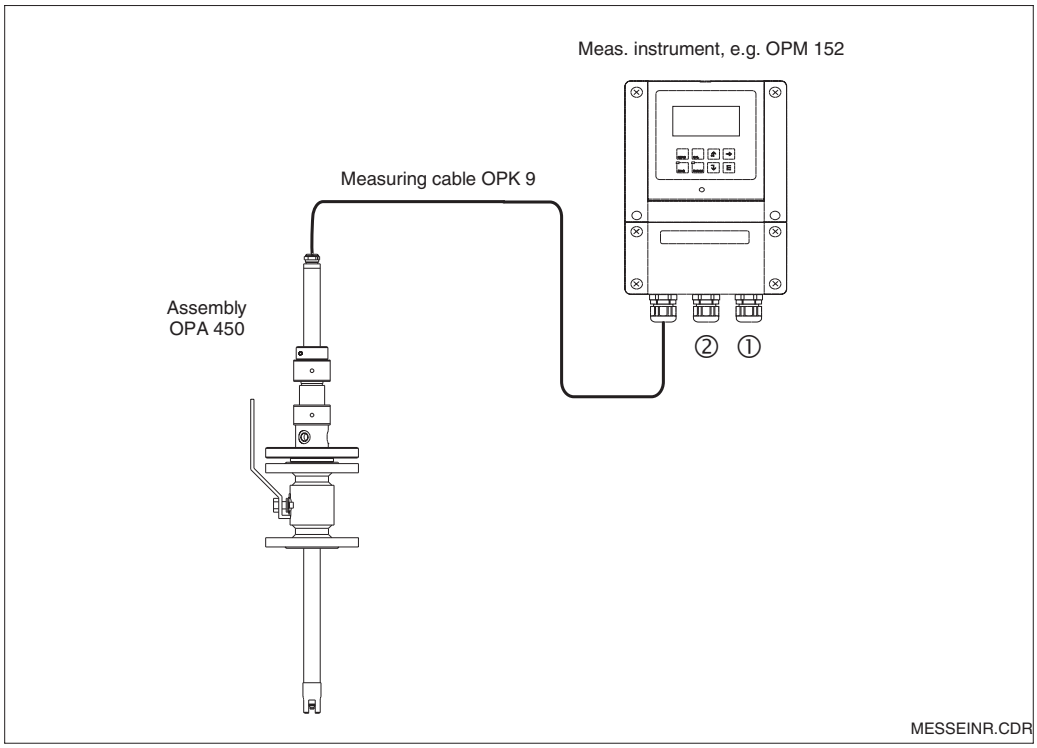

Fig. 3.1 Complete measuring system

① Power supply (e.g. 230 V AC / 50 Hz)

② Output (e.g. 0 or 4 ... 20 mA)

3.2 Dimensions and process connections

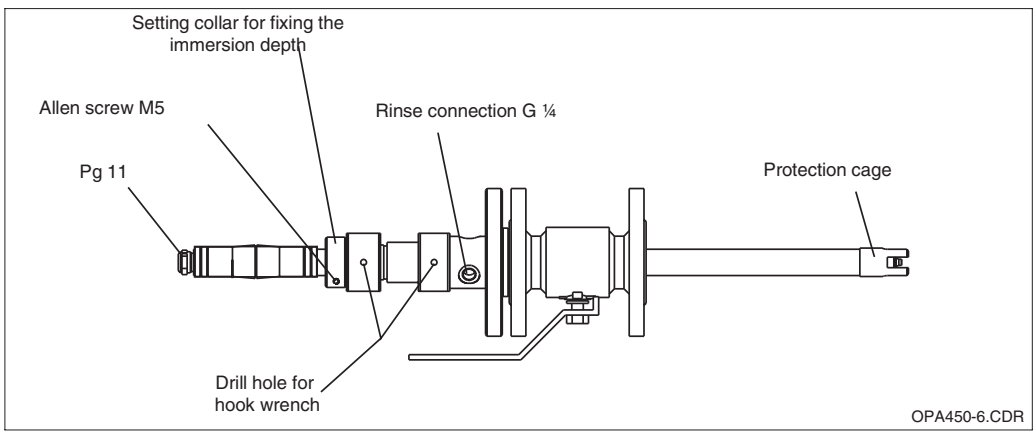

Fig. 3.2 Mechanical construction of assembly OPA 450

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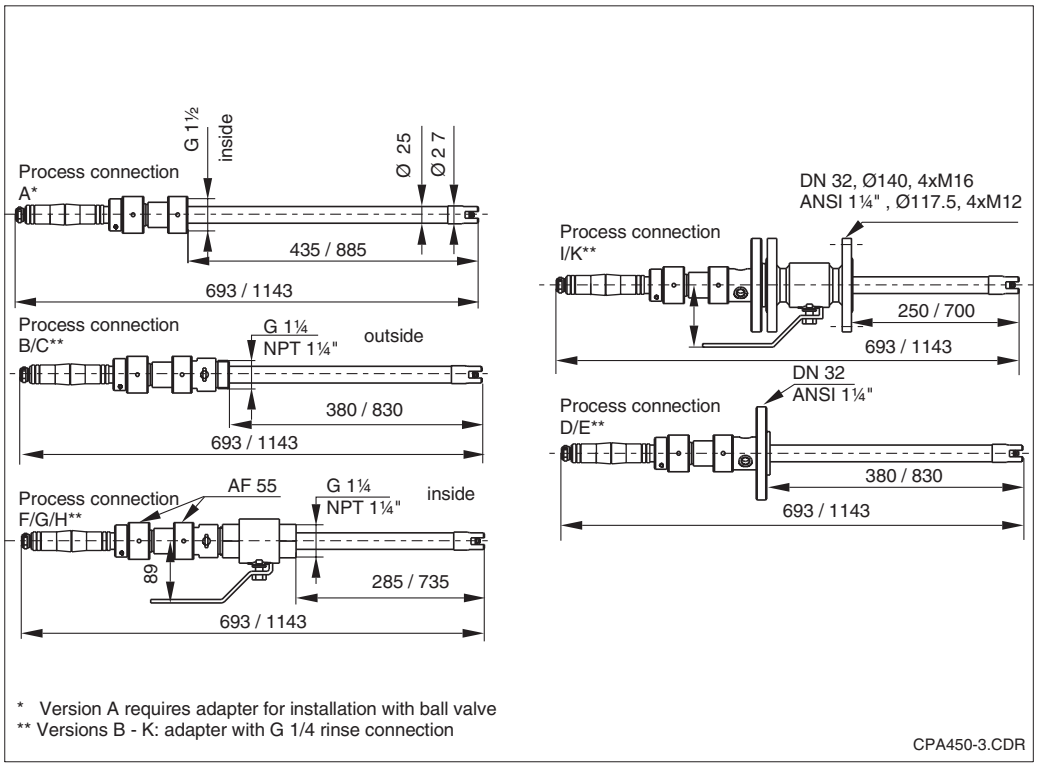


Fig. 3.3 Dimensions of the various length and connection variants (moved-in state, i.e. sensor in process)

3.3 Sectional view

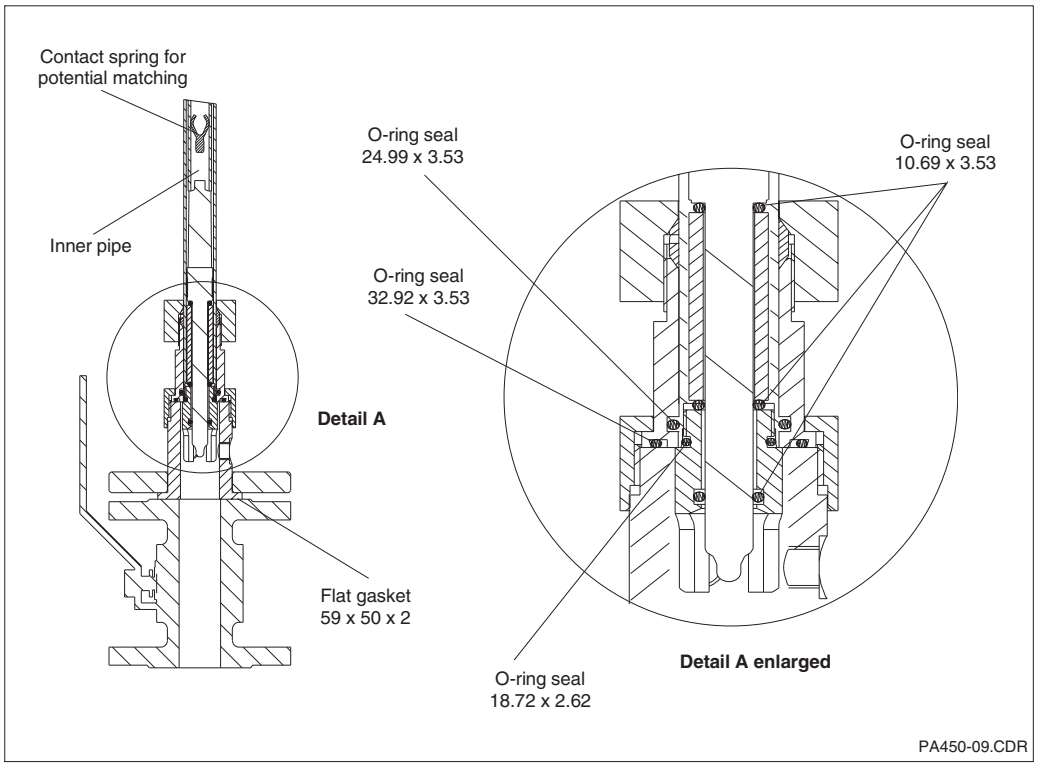


Fig. 3.4 Sectional view of assembly OPA 450 showing seals

Variant: adapter with flange ball valve and 4-pole electrode (with Pt 100)

3.4 Assembly installation

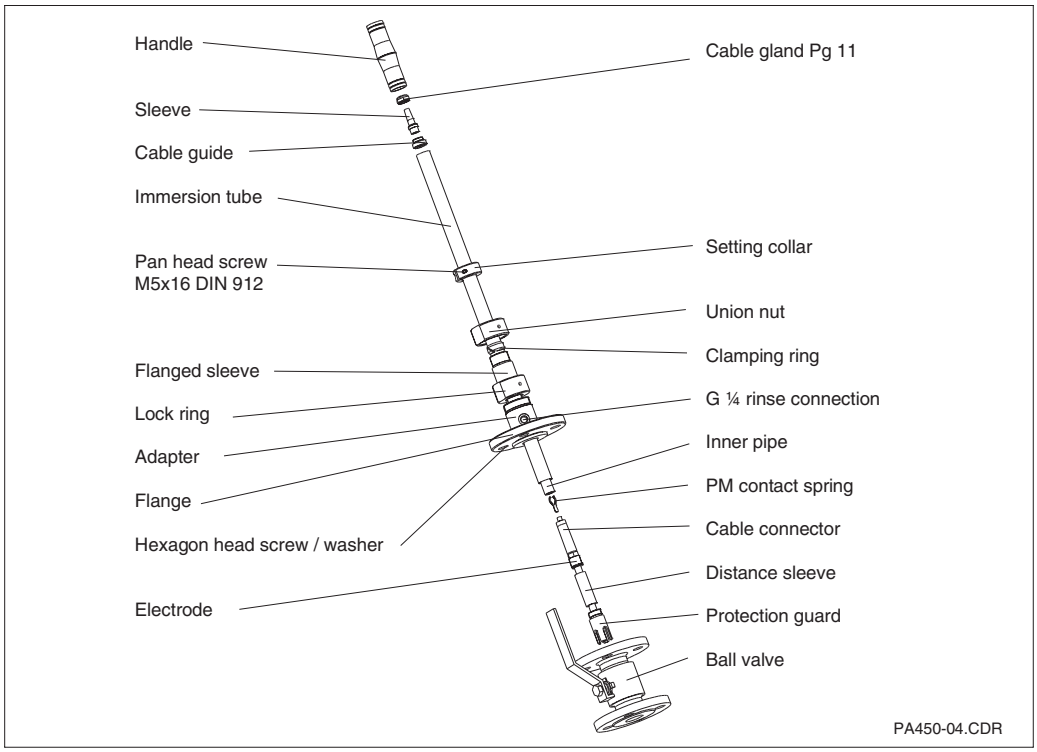


Fig. 3.5 Overview of assembly parts

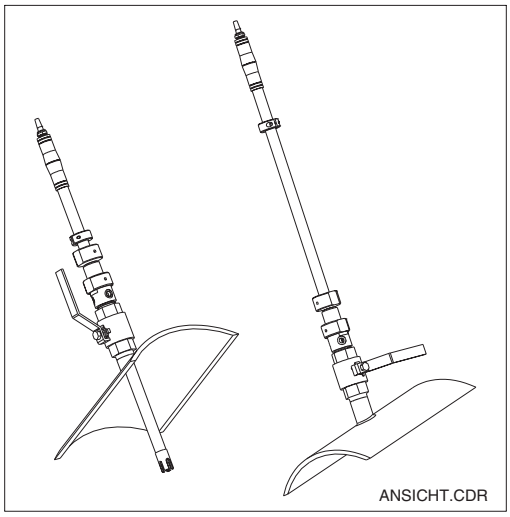
The OPA 450 assembly should preferably be installed upright. See the next page for mounting instructions.

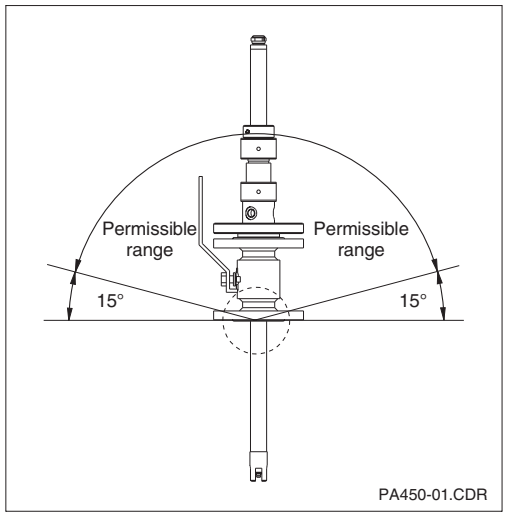
The immersion assembly is to be installed in the tank or pipeline at such a depth that the electrode is sufficiently immersed in the medium at all times.

The figure below shows the assembly in the moved-in state (operation) and in the retracted state (for electrode change, calibration, rinsing).

Warning:

- Depressurise the system before assembly installation or removal.
- The medium pressure in the tank must not exceed the maximum permissible assembly and electrode pressures.
- The assembly must not be installed horizontally. The minimum installation angle from the horizontal is 15°.





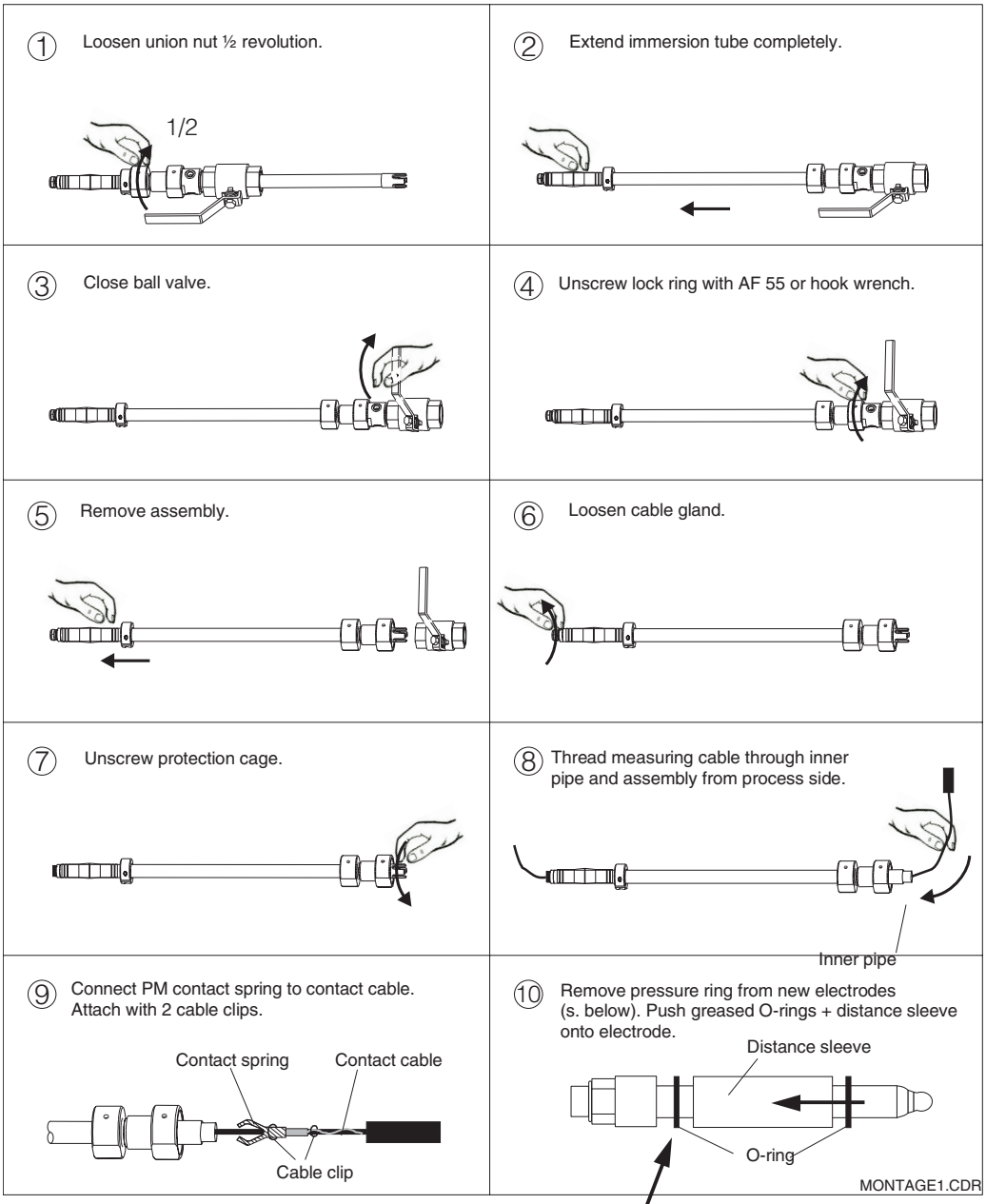
Left
Assembly OPA 450 in moved-in state (ball valve open)

Assembly OPA 450 in moved-out state (ball valve closed)

Right
Permissible installation angle of OPA 450 assembly

Fig. 3.6

Instructions for assembly, electrode and measuring cable installation



Note:

- Required mounting clearance: min. 700 / 1150 mm.
- Use proper inner pipe for electrode. The inner pipe facilitates cable threading through the cable guide. With every assembly two inner pipes are in scope of delivery.

Assembly immersion depth	Inner pipe length	
	2-pole electrode	4-pole electrode
250 mm	524 mm	462 mm
700 mm	974 mm	912 mm

Warning:

- Make sure that the O-ring seals are properly seated.
- Be sure to remove the pressure ring before screwing in the electrode.

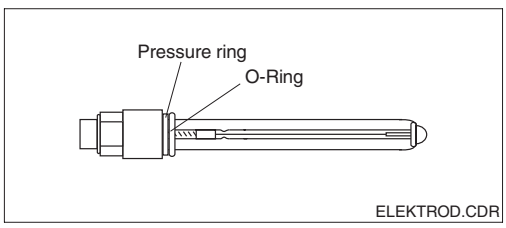
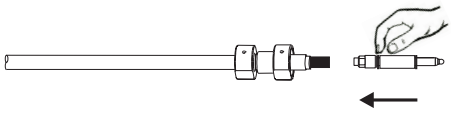


Fig. 3.7 Pressure / O-ring electrode

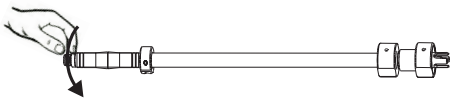
Mounting instructions (continued)

⑪ Plug electrode head onto cable connector and hand-tighten. Push electrode head into inner pipe all the way to stop.



⑫ Plug protection cage onto electrode and hand-tighten.

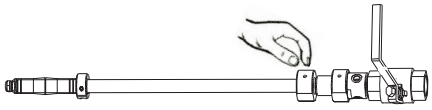
⑬ Tighten cable gland. Tighten completely with AF 20.



⑭ Insert tube assembly in ball valve.

⑮ Screw on lock ring.
Tighten with AF 55 or hook wrench.

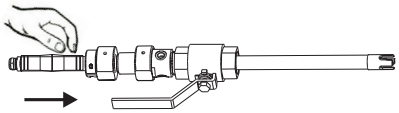
⑯ Make sure that union nut is only loosened 1/2 revolution.



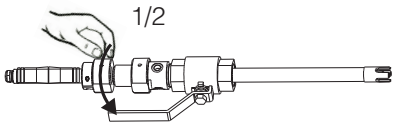
⑰ Adjust setting collar to desired immersion depth and lock in position.

⑱ Open ball valve.

⑲ Push in immersion tube all the way against setting collar.



⑳ Tighten union nut.



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Warning:

- Before you open the ball valve make sure that the union nut is only loosened slightly (1/2 revolution).
- For electrodes changing perform steps 1 to 7 and 10 to 20. Be sure to always loosen the cable gland before unscrewing the sensor protection cage.

4 Maintenance

Electrode soiling may impair measurement to such an extent that the electrode ceases to function at all, e.g. due to:

- coatings on the pH-sensitive part of the glass electrode → these cause poor response and low sensitivity or slope;
- soiling or blocking of diaphragm → this causes poor response and unstable measurement.

In order to guarantee reliable measurement, the electrodes must be cleaned regularly. The frequency and intensity of cleaning will depend on the type of medium to be measured.

4.1 Cleaning the electrode

Electrode cleaning is required:

- before every calibration;
- as necessary at regular intervals during operation.

Cleaning may be performed manually by removing the electrode or with the aid of an injector using the integrated rinse chamber.

Note:

- Do not use any abrasive cleaning materials for the electrodes. These may cause irreparable damage to the measuring surfaces.
- Rinse the rinse chamber thoroughly with water (possibly distilled or deionised) after cleaning. Cleaning agent residue may impair measurement.
- Calibrate the measuring system always after cleaning.

Note:

Clean Redox electrodes only mechanically! Chemical cleaning cause measured errors because a potential is implicated. This does not abate before a few hours.

Manual cleaning

All parts in contact with the medium, such as the electrode, electrode holder and immersion tube, require regular cleaning.

- Remove slight soiling using a suitable cleaning agent.
- Use a soft brush and suitable cleaning agent to remove more adhering dirt.
- Stubborn dirt is to be dissolved by soaking in cleaning fluid.

Selection of cleaning agents

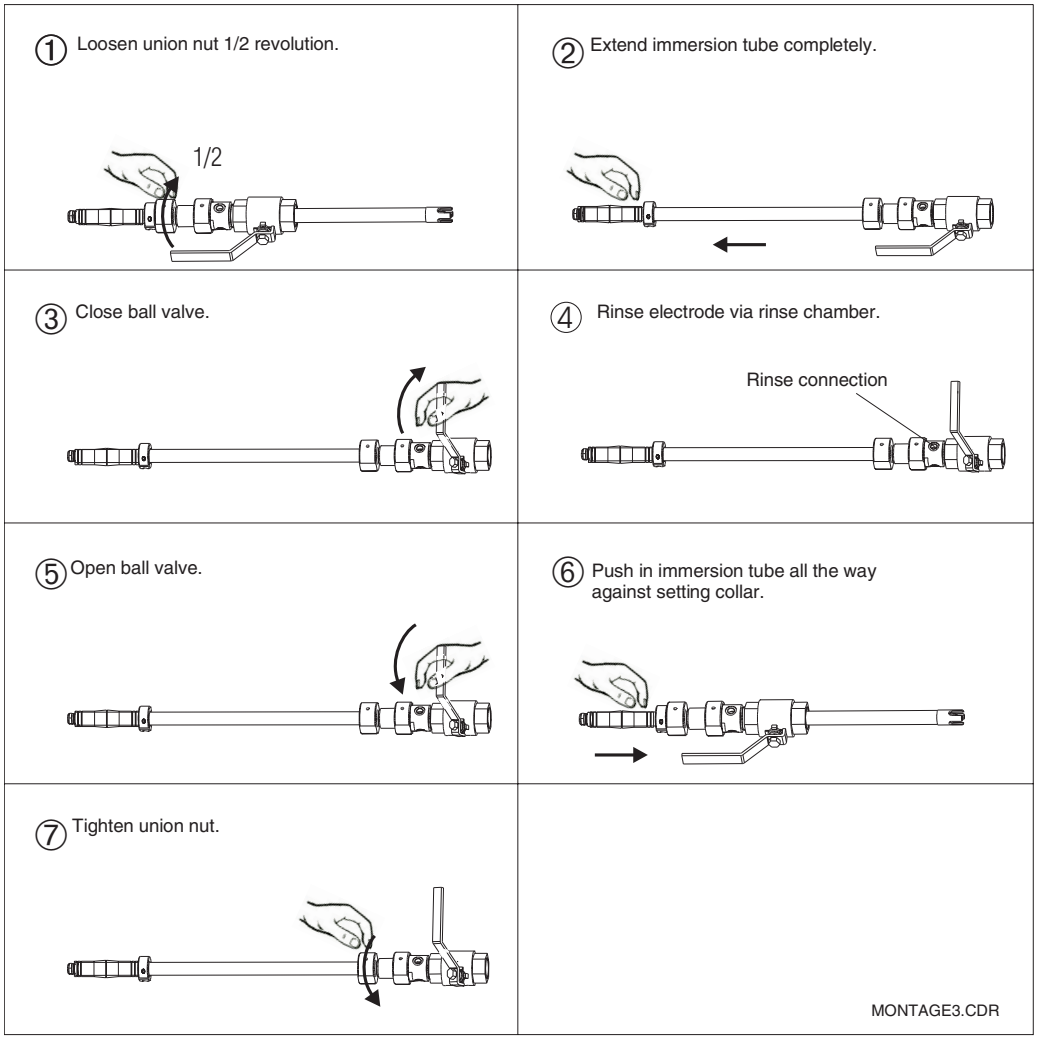
The selection of cleaning agents will depend on the type of soiling. The types of soiling and the appropriate cleaning agents are listed in the following table:

Type of soiling	**Cleaning agent**
Fat, oil	Detergents or water-soluble organic solvents (e.g. alcohol)
Limestone deposits, metal hydroxide coatings, heavy biol. deposits	manual: 3% HCl via rinse chamber: HCl 10% diluted to 3% in the injector
Sulphide deposits	Mixture of 3% HCl and thio-urea (usual commercial)
Protein deposits	Mixture of 0.1 molar HCl and pepsin (usual commercial)
Fibres, suspended materials	Pressurized water, possibly with wetting agents
Light biological deposits	Pressurized water

Cleaning via the rinse chamber

The integrated rinse chamber permits cleaning via a hose connection set and injector OYR 10 (see Accessories).

Instructions for electrode cleaning

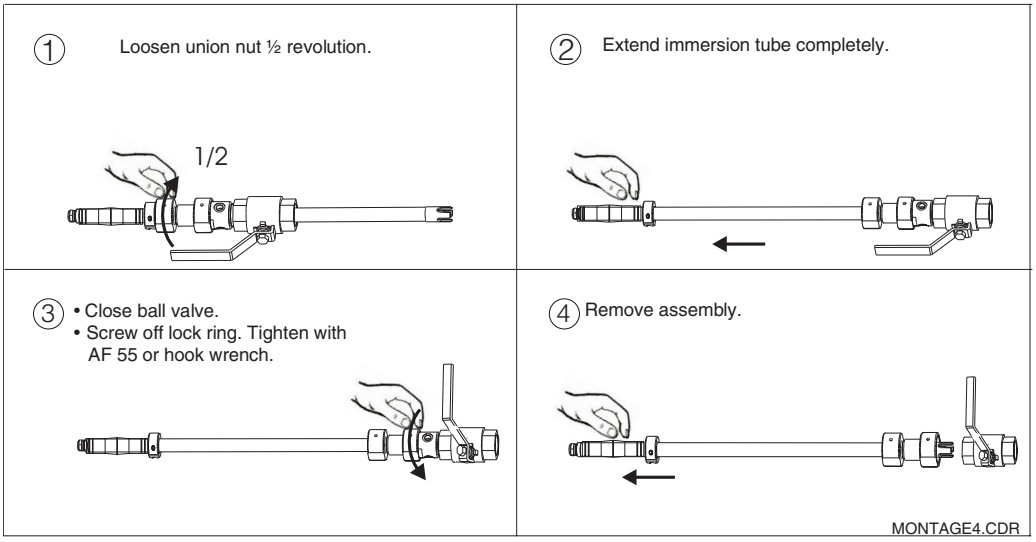


4.2 Calibration

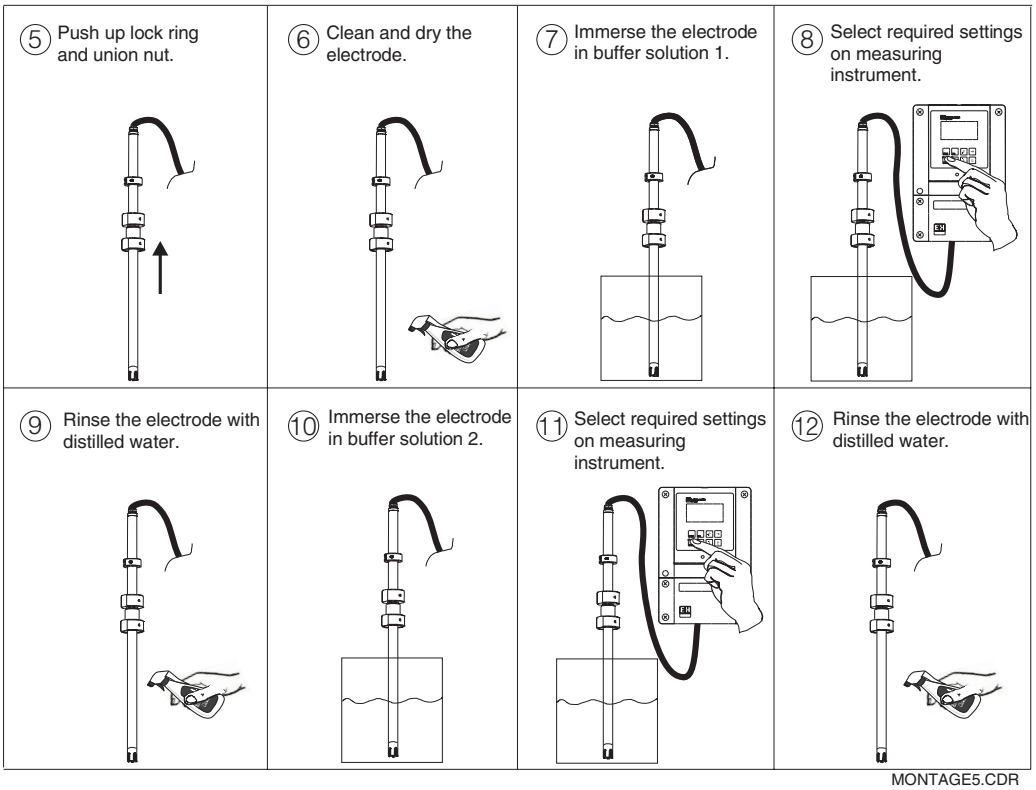
Careful and regular calibration is essential for reliable and accurate measurement. The calibration cycles depend on the area of application and the desired accuracy.

The calibration cycles must be individually determined for each application. More frequent calibration is recommended at the beginning, e.g. once a week, to study the operating behaviour.

Instructions for electrode calibration



Refer to the operating instructions of the measuring transmitter in question for the calibration procedure to be used.



Mount electrode and assembly in reversed dircetion as at unmounting.

4.3 Maintenance and replacement of wearing parts

The retractable assembly OPA 450 requires only little maintenance. However, the following maintenance work is required to guarantee safe operation:

- Replace damaged assembly parts.
- Keep O-rings and sealing surfaces free of dirt.
- Grease dry O-rings (particularly the O-rings on the protection cage).
- Inspect O-rings for damage regularly and replace at appropriate intervals.
- Replace adhering coatings from time to time.

5 Accessories and spare parts

The following accessories may be ordered separately:

- Hose connection set (2 pcs.)
  12 mm hose connector for rinse connection on OPA 450
  Order no. 50090491

- Welding neck SS 316 Ti G 1¼ straight
  for process connections F and G
  Order no. 51502284

- Gel-filled pH combination electrode with or without integrated temperature sensor, e.g. OPS 11:
  – Order no. OPS11-2AA2 TSA (with temperature sensor)

  – Order no. OPS 11-1AA2 GSA (without temperature sensor)

- Gel-fillled Redox combination electrode with gold or platinum electrode, e.g. OPS 12:
  – Order no. OPS12-0NA2 GSA (with gold electrode)

  – Order no. OPS12-0PA2 GSA (with platinum electrode)

- Measuring cables for electrodes
  – e.g. OPK 1 (for electrodes without temperature sensor)
  Order no.OPK1-05/0/A (5 m)

  – e.g. OPK 9 (for electrodes with temperature sensor and waterproof TOP 68 connector)
  Order no. OPK9-NAA1A (5 m)

- Junction box VBA
  for extension of measuring cable between assembly and measuring instrument
  Order no. 50005276

- Cable OYK 71 for measuring cable extension
  Order no. 50085333

- Hook wrench DIN 1810 design B
  D 58 - 62 mm
  Order no. 50090687

- Calibration solution OPY 2
  for pH electrode calibration
  Order no. according to pH value

- Calibration solution OPY 3
  for redox electrode calibration
  e.g. 220 mV, pH 7:
  Order no. OPY3-0

The following spare parts can be ordered:

- PMC mounting set
  Order no. 51501551

- Protection cage
  with EPDM O-rings
  Order no. 51501533

- Protection cage
  with Viton O-rings
  Order no. 51501534

- O-ring sets:

Sealing material	**Order no.**
EPDM	50090489
Viton	50090490

6 Technical data

General specifications	Designation	OPA 450
Installation	Immersion depth	250 mm, 700 mm
	No. of electrode positions in sensor holder	1 mounting position for combination gel electrode
	Electrode length	120 mm
	Electrode plug-in head	Pg 11
Process connection	A	G 1½ internal thread
	B	G 1¼ external thread
	C	1¼" NPT external thread
	F, G	G 1¼ internal thread
	H	1¼" NPT internal thread
	D, I	DN 32, PN 16 flange
	E, K	1¼" ANSI flange
	Flush connection	G ¼
Weight	Without ball valve	2 kg
	With threaded ball valve	5 kg
	With flange ball valve	10 kg
Materials in contact with the medium	Immersion tube	stainless steel 316S
	Rinse adapter plugs	PVDF
	O-rings	EPDM / Viton
	Ball valve	stainless steel 316S or 316C
	Ball valve sealings	PTFE
Materials not in contact with the medium	Inner tube, lock ring	stainless steel 304S
	Screws	stainless steel 316S
	Union nut	PA66GF
	Clamping ring	PEEK
	Distance sleeve	PVDF
	Handle	PVC
	Cable gland	Brass
Operating data	Operating pressure	max. 4 bar
	Max. pressure limits	20 bar at 20 °C, 5 bar at 130 °C
	Temperature range	-15 to +130 °C

Subject to modifications

Note:

The operating limits of the entire system are determined by the operating limits of the components used (assembly, sensor, cable, accessories, etc.).

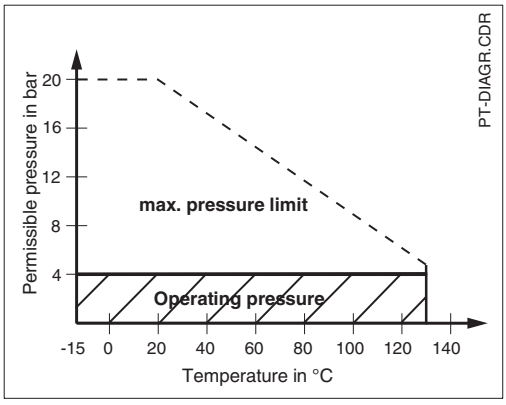


Fig. 6.1 Pressure -temperature diagram

7 Index

Declaration of contamination

Dear customer,
Because of legal determinations and for the safety of our employes and operating equipment we need this "Declaration of contamination" with your signature before your order can be handled. Please put the completely filled in declaration to the instrument and to the shipping documents in any case. Add also safety sheets and/or specific handling instructions if necessary.

type of instrument / sensor: _____ serial number: _____

medium / concentration: _____ temperature: _____ pressure: _____

cleaned with: _____ conductivity: _____ viscosity: _____

Warning hints for medium used:

☐ radioactive ☐ explosive ☐ caustic ☐ poisonous ☐ harmful of health ☐ biological hazardous ☐ inflammable ☐ safe

Please mark the appropriate warning hints.

Reason for return:

_____

_____

Company data:

company: _____
_____
_____
address: _____
_____
_____

contact person: _____
_____
department: _____
phone number: _____
Fax/E-Mail: _____
your order no.: _____

I hereby certify that the returned equipment has been cleaned and decontaminated acc. to good industrial practices and is in compliance with all regulations. This equipment poses no health or safety risks due to contamination.

_____ _____

(Date) (company stamp and legally binding signature)

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