

OPA 250

Flow Assembly for pH / Redox Measurement

Operating Instructions

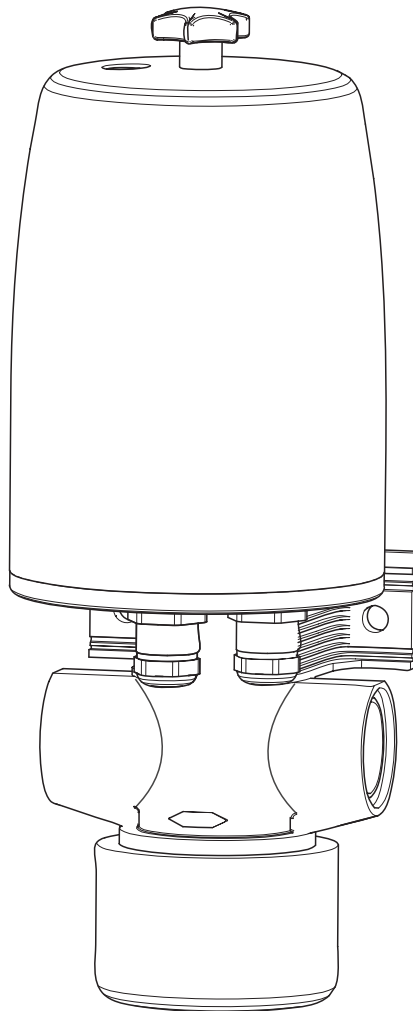


Table of contents

1 Safety	2	3 Installation	5
1.1 Safety symbols	2	3.1 Installation at a glance	5
1.2 Intended application	2	3.2 Mounting	6
1.3 Installation, start-up, operation	2	3.2.1 Mounting type	6
1.4 Operational security	3	3.2.2 Mounting of measuring cables	7
1.5 Sending back	3	3.2.3 Mounting of electrodes	8
2 Identification	4	4 Maintenance	9
2.1 Product designation	4	4.1 Cleaning	9
2.2 Scope of supply	4	4.2 Calibration	10
		5 Accessories	11
		6 Technical data	14

1 Safety

1.1 Safety symbols



Warning!

This symbol alerts to hazards. Disregard may cause serious injuries to persons or damage to equipment.



Caution!

This symbol alerts to possible malfunction due to operator error. Disregard may cause damage to equipment.



Note!

This symbol indicates important items of information.

1.2 Intended application

Thanks to its special design, the 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 installation
- Operating conditions for the device and its materials
- Local standards and regulations.

1.3 Installation, start-up, operation



Warning!

- The measuring system 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.
- 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 authorised, trained personnel.
- If faults cannot be remedied, the assembly must be removed from service and secured to prevent accidental start-up.
- Repairs not described in these operating instructions may only be performed at the manufacturer's works.

1.4 Operational security

The 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"). It has left the manufacturer's works in perfect condition. 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!

- Operation in any way other than as described in these instructions may compromise the safety and function of the measuring system and is therefore impermissible.
- The notes and warnings in these operating instructions must be strictly adhered to.

Notes for installation in pressurised systems



Warning!

- The maximum operating pressure of the assembly must not be exceeded.
- The system must be depressurised before installation or removal of the assembly.
- Couplings and lines must be checked for leakage and damage at regular intervals.

1.5 Sending back

In case of repair, please send the **cleaned** assembly back to the salesman. Use the original packaging material.

2 Identification

2.1 Product designation

Nameplate

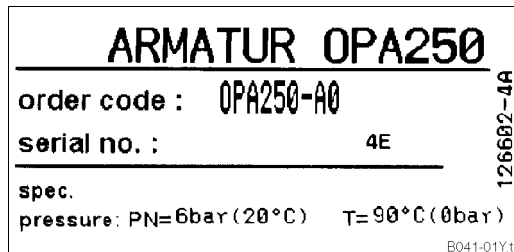


Fig. 2.1: Nameplate of OPA 250-A00

Product structure

Design	
A	With 3 electrode mounting places
Material / connection	
00	PP, potential matching pin of SS 316Ti / thread G 1
01	PP, potential matching pin of Titanium / thread G 1
10	SS 316Ti/ thread G 1
11	SS 316Ti / flange DN 25
OPA 250-	complete order code

2.2 Scope of supply



Caution!

- Verify that the packaging is undamaged! Inform the post office or freight carrier of any damage. Keep the original packaging material until the matter has been settled.
- Verify that the contents are undamaged! Inform the post office or freight carrier of any damage and consult your supplier. Keep damaged merchandise 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 version).

The delivery includes:

- Assembly OPA 250
- Operating instructions BA 041e00.

If you have any questions, consult your supplier.

3 Installation

3.1 Installation at a glance

Measuring system

The complete measuring system comprises

- the flow assembly OPA 250 with up to 3 sensors (e.g. pH, redox, temperature)
 - the pH / redox measuring transmitter, e.g. OPM 223 or OPM 253
 - the pH / redox measuring cables, e.g. OPK 1, OPK 7 or OPK 9
- and optionally
- a junction box
 - extension cables.

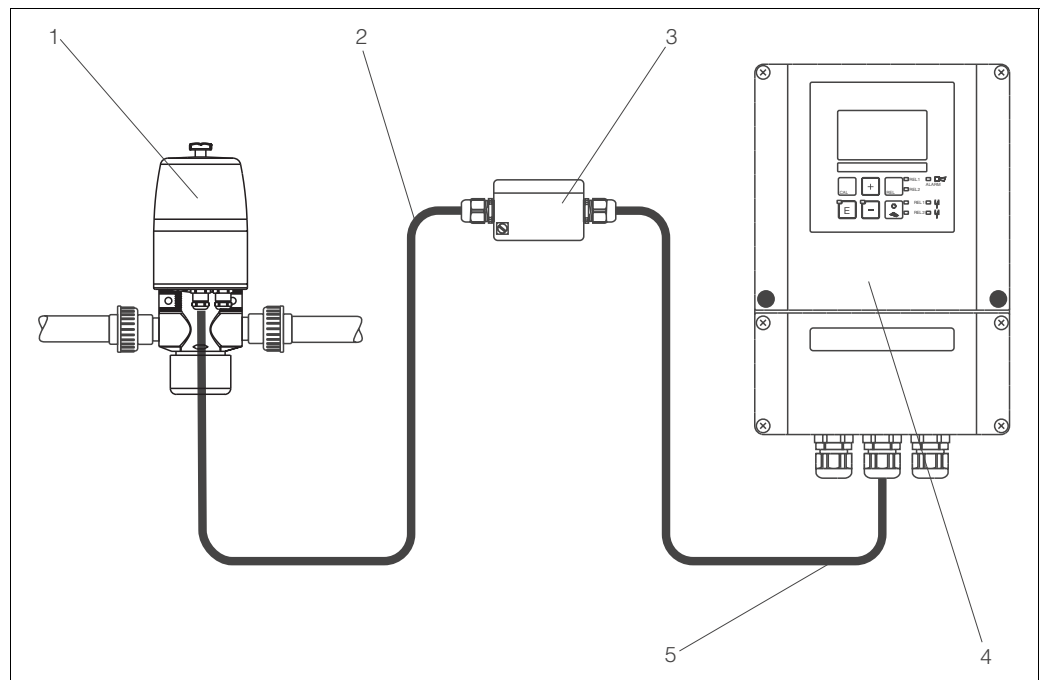


Fig. 3.1: Complete measuring system with OPA 250-A0

- 1 OPA 250
- 2 Measuring cable
- 3 Junction box
- 4 Transmitter
- 5 Extension cable

3.2 Mounting

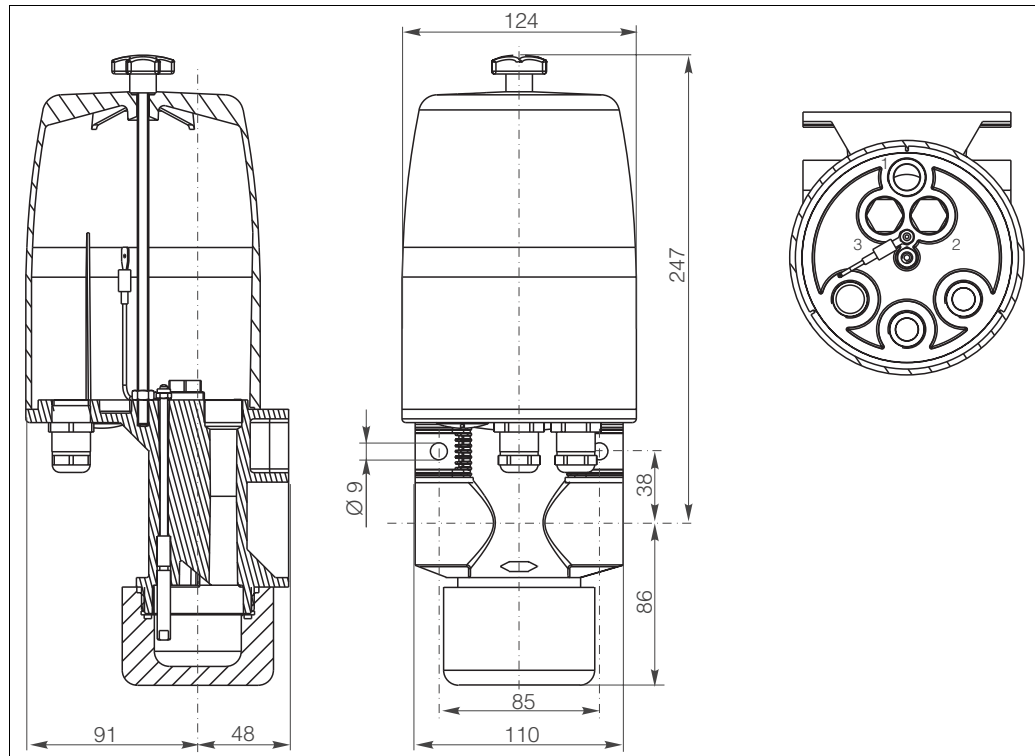


Fig. 3.2: OPA 250-A00 with three electrode mounting places, material PP, with connection thread G 1
 1,2,3 Three electrode mounting places
 4 Pg cable glands M20x1.5
 5 Mounting plate (drawn without cover and seal)

3.2.1 Mounting type

The flow assembly should be installed in horizontal pipes at locations where the pipe cannot run dry. Installation in the by-pass is preferable to installation in the process pipe as the by-pass pipe can be blocked off without process interruption. This permits maintenance of the electrodes without interrupting the process. The medium pressure in the pipe must not exceed the maximum permissible pressure of the flow assembly or electrodes.

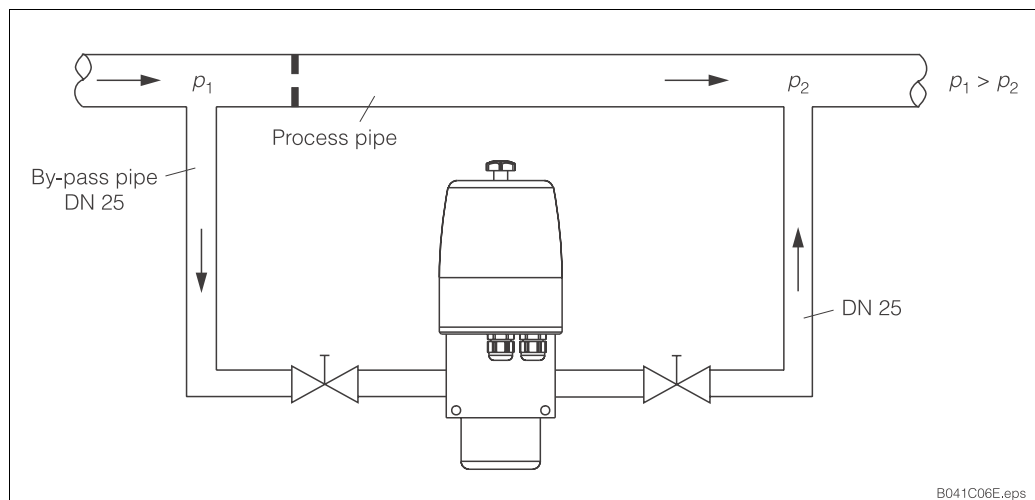


Fig. 3.3: Pipe by-pass
 The pressure build-up required to produce flow through the sampling by-pass is produced by a plate orifice in the process pipe.

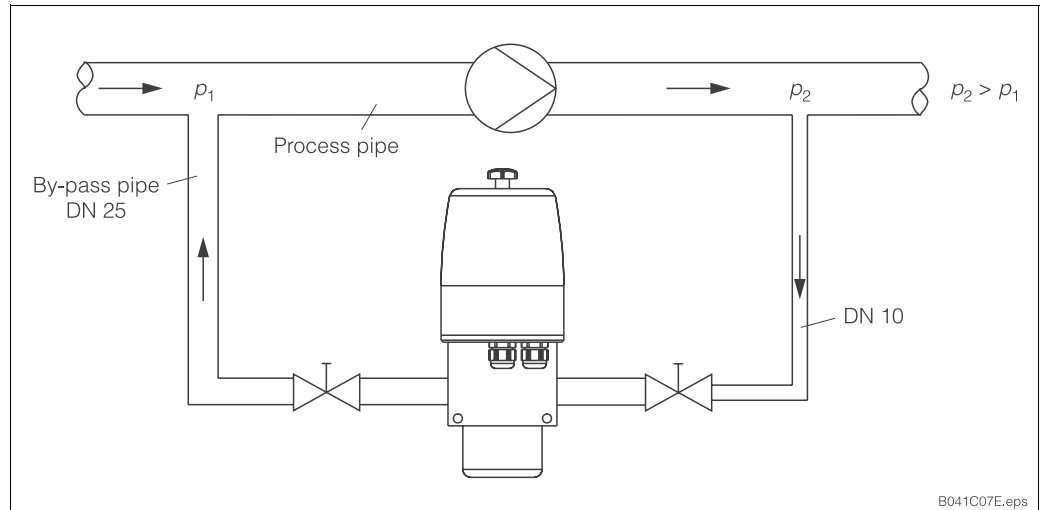


Fig. 3.4: Pump by-pass

The pressure build-up required to produce flow through the sampling by-pass is produced by a booster pump in the process pipe.

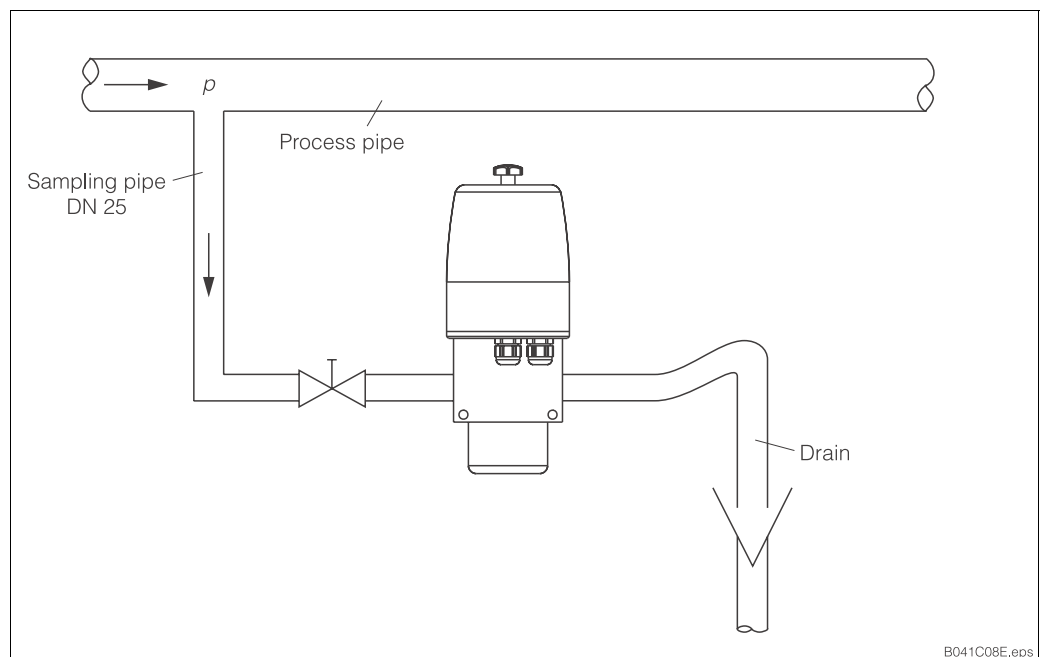


Fig. 3.5: Sampling pipe

Stub pipe branching off from the process pipe without raising pressure.

3.2.2 Mounting of measuring cables

Electrode cables of types OPK 1, OPK 7 and OPK 9 are fitted with electrode plugs on one side, the other side of the cable is free.

1. When the protective cover is open, lead the electrode cables through the Pg threads into the interior and put them on the electrode plug-in heads.
2. If cable glands are not used, then seal them off with dummy plugs.
3. Lay the electrode cables in the assembly in such a way that the electrodes can be removed without opening the Pg threads. A free cable length of approx. 30 mm has proved adequate.
4. Tighten the Pg threads.

3.2.3 Mounting of electrodes



First mounting of electrodes

Note!

- When fitting the electrodes, ensure that the O-rings are correctly positioned and that the sealing surfaces are clean.
 - Mounting of two electrodes with liquid KCl and pipe connection is not possible.
1. Unscrew the star nut on the protective cover. Remove the protective cover. The electrode mounting places are now freely accessible.
 2. The assembly allows mounting of three electrodes. Mounting places not in use must remain sealed off with dummy plugs. To use locked mounting places, unscrew the sealing plugs (complete with O-rings) from the electrode holder.
 3. Remove the electrodes from the packaging, check them for damage, wet the glass shaft and then screw them into the Pg threads.
 4. Hand-tighten the electrodes and then tighten them by a quarter turn with a socket wrench (16 AF).
 5. Connect the electrodes as shown in the operating instructions of your measuring instrument.

Replacement of electrodes

1. Unscrew the protection cover.
2. Loosen the electrode plug.
3. Depressurise the system and drain it by removal of the measuring cap.
4. Screw out the old sensor.
5. Mount the new sensor as described above.

Electrical connection

For connection diagrams and connection examples, refer to the operating instructions of the respective devices.

4 Maintenance

4.1 Cleaning

Soiling of the electrode may impair measurement up to malfunction:

- Coatings on the pH-sensitive part of the glass electrode cause poor response time and low sensitivity or slope.
- Soiling or blocking of the diaphragm causes poor response and unstable measurement.

Therefore all parts in contact with the medium (electrodes, lower parts of the holder block, measuring cap etc.) must be cleaned at regular intervals. The frequency and intensity of cleaning depend on the medium to be measured.



Caution!

- Do not use abrasive cleaning agents. These may cause irreparable damage to the glass membrane of the electrode.
- After cleaning, the complete system must be thoroughly rinsed with water (tap water, no distilled or deionised water). Cleaning agent residue not removed may impair measurement.
- Always recalibrate the measuring system after cleaning.

Manual cleaning

The procedure depends on the degree of soiling.

- Remove light soiling and coatings by rinsing with a suitable cleaning agent.
- To remove adherent dirt, use a soft brush and suitable cleaning agent. Soak in cleaning solution beforehand if required.

Selection of cleaning agents

The selection of cleaning agents depends on the type of soiling. The types of soiling most frequently encountered and the corresponding cleaning agents are listed in the following table.

Soiling, coating	Cleaning agent
Grease and oil	(Alkaline) agents containing surfactants or water-soluble organic solvents (e.g. alcohol)
Limestone deposits, metal hydroxide coatings, heavy biological coatings	Hydrochloric acid (3%)
Sulphide deposits	Mixture of hydrochloric acid (3%) and thiourea (commercial)
Protein coatings	Mixture of hydrochloric acid (0.1-molar) and pepsin (commercial)
Fibres, suspended substances	Pressure water, containing wetting agents if required
Light biological coatings	Pressure water



Note!

Redox electrodes may only be cleaned mechanically. Chemical cleaning forces a potential to the electrode. This potential takes several hours to decay and causes a measured error.

4.2 Calibration

Careful and regular calibration is indispensable for reliable and accurate measurement. The calibration cycles depend on the area of application and the desired accuracy. They must be determined individually for each case. More frequent calibration is recommended at the beginning, e.g. once a week, to study the behaviour of the application.



Warning!

- Ensure that the pipeline is unpressurised and free of flow.
- The measuring cap contains measuring fluid. Wear protective gloves when handling products injurious to health.

Calibration steps

1. Turn off the flow and depressurise the system.
2. Unscrew and discharge the measuring cap.
3. Clean the electrodes.
4. Check the electrodes for mechanical damage.
5. Clean and dry the measuring cap.
6. Fill the measuring cap with buffer solution.
7. Screw on the measuring cap.
8. Perform calibration according to the operating instructions of the measuring instrument.
9. Commission the pipe system again.

5 Accessories

□ Electrolyte reservoir OPY 7

It is used to supply depressurised or pressurised electrodes filled with liquid electrolyte. If a reference electrode is installed, the reservoir can be used as an electrolyte bridge device.

The delivery includes:

- Distance tube
- Pg 9 gland with connection hose
- Pressure hose and hose couplings with check valve (version for pressurised applications)
- Wall mounting support (optional).

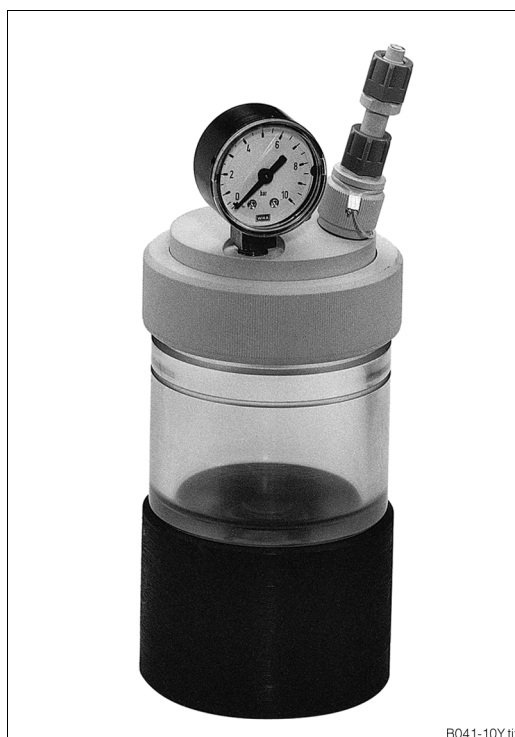


Fig. 5.1: Pressure electrolyte reservoir OPY 7 for wall mounting

□ NP

2 nipples for OPA 250-A, adapter to PP pipes without thread. External diameter 32 mm.
Order no. 50003450

□ NV

2 nipples for OPA 250-A, adapter to PVC pipes.
– External diameter 32 mm.
Order no. 50003454
– External diameter 25 mm.
Order no. 50003456

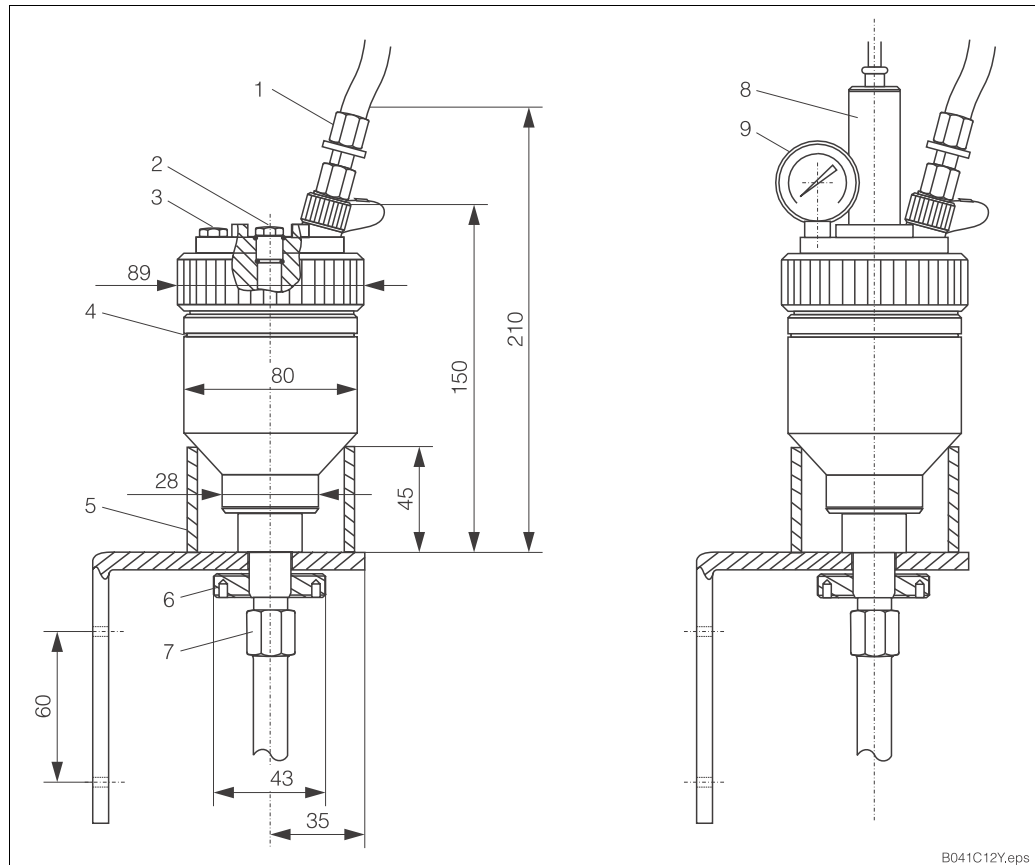


Fig. 5.2: Electrolyte reservoir OPY 7 with wall mounting support (left) or with wall mounting support, reference electrode and manometer (right)

- 1 Compressed-air supply with check valve (OPY 7-B only)
- 2 Dummy plug for reference electrode
- 3 Dummy plug for manometer (OPY 7-B only)
- 4 Filling mark
- 5 Distance tube
- 6 Fastening nut M 20 for electrolyte reservoir
- 7 Coupling nut 14 AF
- 8 Reference electrode
- 9 Manometer

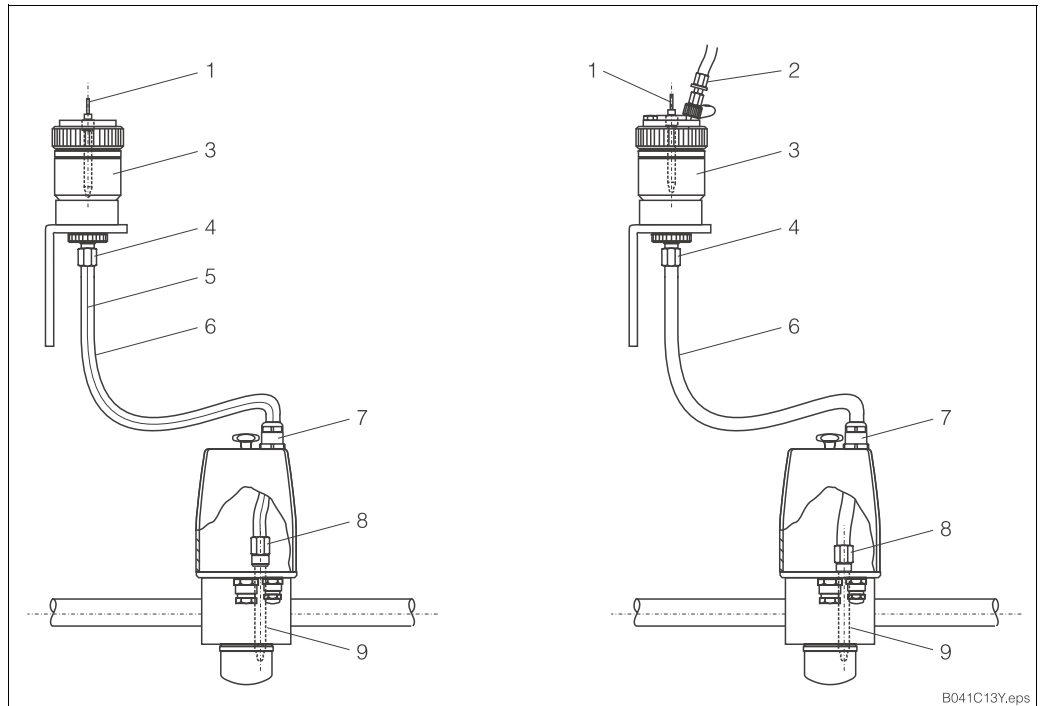


Fig. 5.3: OPA 250 with electrolyte reservoir OPY 7 as an electrolyte bridge for unpressurised (left) and pressurised applications (right)

- 1 Reference electrode
- 2 Compressed-air supply with check valve
- 3 OPY 7-A0 (left) or OPY 7-B0 (right)
- 4 Coupling nut for hose connection of the electrolyte reservoir
- 5 Special wick
- 6 Silicon hose (left) or PE pressure hose (right)
- 7 Pg 9 gland
- 8 Coupling nut for hose connection of the diaphragm tube
- 9 Diaphragm tube

6 Technical data

Connection to medium	
<i>PP version</i>	screw socket G 1 DN 20
<i>Stainless steel versions</i>	flange DN 25
Materials in contact with medium	
<i>OPA 250-A0</i>	PP
<i>OPA 250-A1x</i>	stainless steel SS 316Ti
<i>O-rings</i>	EPDM
<i>Potential matching pin</i>	stainless steel SS 316Ti
Operating pressure and temperature	
<i>PP version</i>	6 bar at 20 °C, unpressurised 90 °C
<i>Stainless steel versions</i>	6 bar at 115 °C
Mechanical data	
<i>Cable entry</i>	Pg 16, Pg 13.5, dummy plug for Pg 9
<i>Electrode mounting places</i>	max. 3
<i>Measuring chamber cap for calibration and cleaning</i>	unscrewable

Subject to modifications.

Index

A

Accessories 11–13

C

Calibration 10

Cleaning 9

E

Electrical connection 8

Electrolyte reservoir OPY 7 11–13

F

First mounting of electrodes 8

I

Identification 4

Installation 2–8

Installation at a glance 5

Intended application 2

J

Junction box 5

M

Maintenance 9–10

Measuring system 5

Measuring transmitter 5

Montage 5

Mounting 6

Mounting of electrodes 8

Mounting of measuring cables 7

Mounting type 6

N

Nameplate 4

O

Operation 2

Operational security 3

OPY 7 11–13

P

Pipe by-pass 6

Product structure 4

Pump by-pass 7

Q

Questions 4

R

Replacement of electrodes 8

S

Safety 2–3

Safety symbols 2

Sampling pipe 7

Scope of supply 4

Sending back 3

Start-up 2

T

Technical data 14



51502342