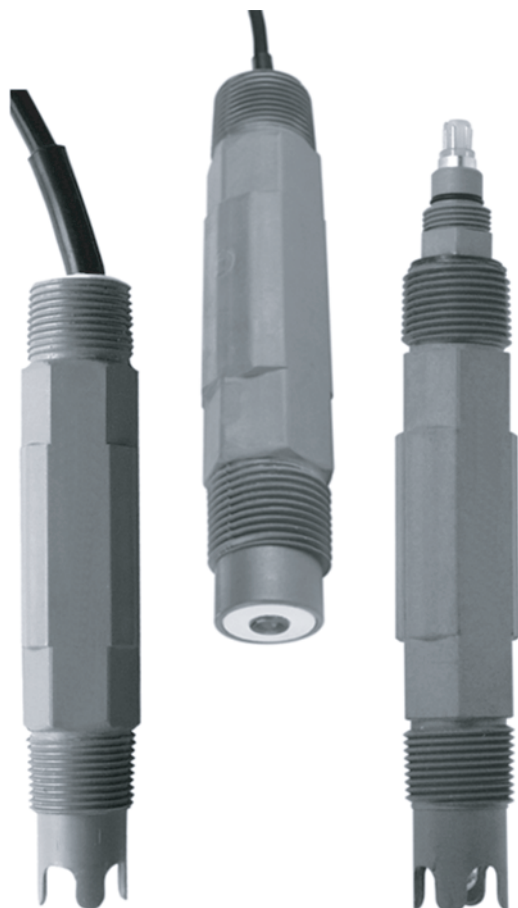


Electrodes for pH/Redox Measurement

OPF 81/82

pH/Redox compact electrodes for installation or immersion in industrial and waste water



Areas of application

- Waste water treatment, industrial and communal
- Process technology
- Food industry
- Water conditioning
- Condensate cleaning

Benefits at a glance

- Suitable for installation and immersion
- Suitable for measurement within pH range 0 ... 14 and temperature range 0 ... 110 °C
- Two fixed cable lengths available (5 m, 10 m)
- pH combination electrode with or without integrated temperature sensor
- With patented KNO_3 electrolyte bridge for better protection against electrode poisons like S^{2-} or CN^- ions
- Protection guard against damage
- Flat membrane suitable for high flow rates and fibrous applications
- Selectable integrated pre-amplifier for noise-free measured value transmission
- Screw-in thread NPT $\frac{3}{4}$ "
- Ingress protection IP 67

Input

Measured values

pH value
Temperature

Measuring range

Electrode version LH

pH: 0 ... 14 pH
Temperature: 0 ... 110 °C / 32 ... 230 °F

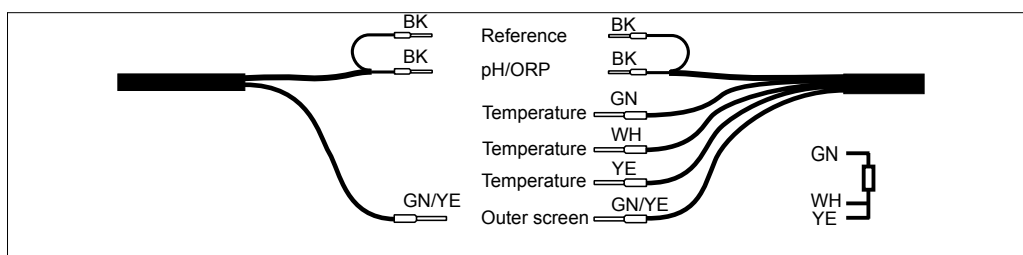
Electrode version NN

pH: 0 ... 14 pH (12 ... 14 pH reduced accuracy)
Temperature: 0 ... 80 °C / 32 ... 176 °F

Caution!

Please note the process operating conditions.

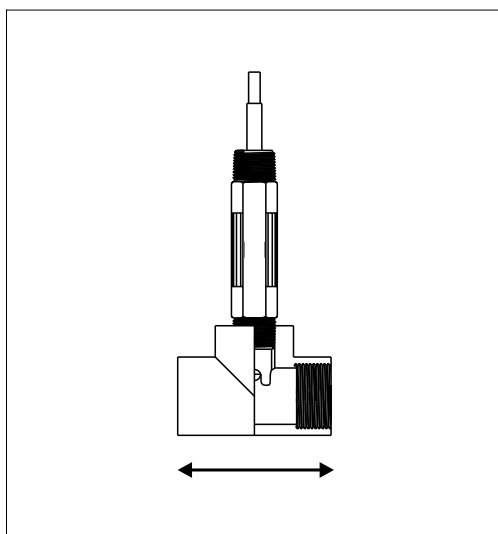
Cable specification



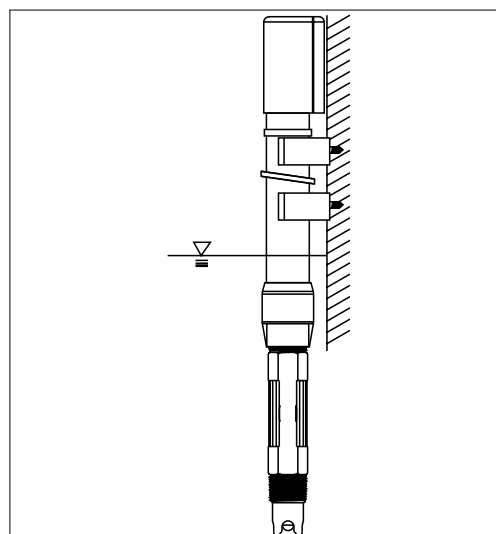
Installation

Installation instructions

The electrode is suitable for flow and immersion installation.



Flow installation



Immersion installation

Note!

Make sure to follow the installation instructions in the operating instructions of the used assembly.

Environment

Ambient temperature

Caution!

Danger of frost damage

Do not use the electrodes at temperatures below 0 °C / 32 °F.

Storage temperature

0 ... 50 °C / 32 ... 122 °F

Ingress protection

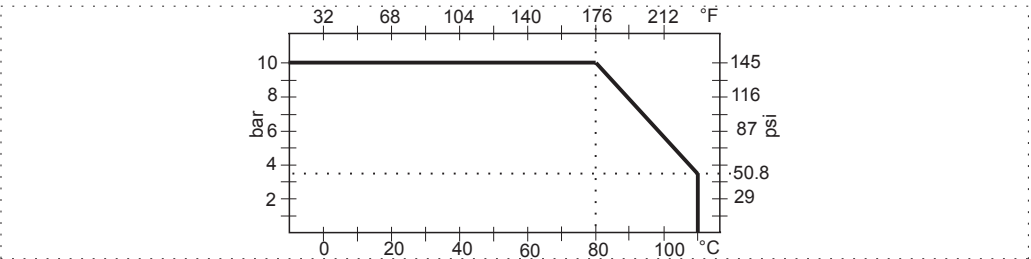
Fixed cable version: IP 67

Process

Process temperature 0 ... 80 °C / 32 ... 176 °F (0 ... 110 °C / 32 ... 230 °F)

Process pressure 0 ... 10 bar (at 80°C) / 0 ... 145 psi (at 176 °F)

Pressure temperature load curve

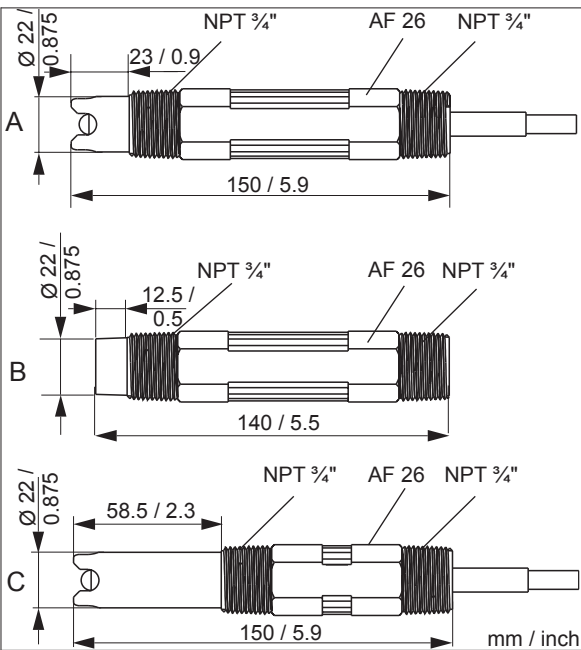


Glass impedance 150 MΩ at 25 °C / 77 °F

Minimum conductivity min. 50 µS/cm

Mechanical construction

Design, dimensions



- A xx1 version with short shaft and protection guard
- B xx2 version with short shaft and flat membrane,
- C xx3 version with long shaft and protection guard for installation in large pipe diameters

Material

Housing, electrode shaft PPS
pH electrode (in contact with medium) lead-free membrane glass, suitable for process applications
ORP electrode (in contact with medium) platinum pin
Double chamber reference system KNO₃ and KCl/AgCl

Process connection NPT 3/4" thread

Integrated preamplifier (if ordered)

Design cast in sensor body
Power supply via integrated round cells
Reference potential reference electrode

Note!
With preamplifier versions, the SCS function of the transmitter is not available and should be turned off.

Temperature and pH ranges

When selecting pH electrodes, the one of the medium to be measured must be considered as well as the pH range. The temperature / pH range table is a guide for selecting the appropriate version.

Finally select shaft length, membrane shape, connecting cable length and integrated temperature sensor according to the order code.

Applications of the electrode variants dependent on temperature and pH value

Application	Version	Temperature range in °C												pH range																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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Accessories

☐ Immersion assembly OYA 611

Technical data

Mechanical data

Total length	140 mm / 150 mm
Shaft length with protection guard	23 mm / 12.5 mm
Shaft diameter	22 mm
Ingress protection of housing	IP 67

Process connection

Threaded connection	NPT 1/4"
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Materials

Housing	PPS
Shaft (wetted materials)	PPS
pH electrode (wetted materials)	lead-free glass, suitable for process applications
Redox electrode (wetted materials)	platinum ring

Measuring range

pH range	0 ... 11 / 0 ... 14
Temperature range	0 ... 80 °C / 0 ... 110 °C
Pressure range	10 bar

Measuring system

Reference system	double junction (two-chamber system) KNO ₃ and KCl / AgCl
Minimum conductivity	> 50 µS / cm
Zero potential	pH 7.0 ± pH 0.2
Glass impedance	150 MΩ at 25 °C

Integrated pre-amplifier

Design	potted in sensor body
Power supply	via integrated round cells
Reference potential	reference electrode

Subject to modifications.

Care and maintenance

Prior to servicing, the sensor must be removed from the process. To avoid spillage it is advised to drain or stop the flow in the appropriate process line or vessel where the sensor is mounted.

1. Remove the sensor from the process by turning counterclockwise until fully released.
2. Spray with water and/or detergent, using a soft brush to dislodge any particulate matter.
3. Visually inspect the sensor for sign of damage.
4. Calibrate the sensor.
5. Replace the PTFE tape and remount into the process, taking care to avoid torsion on the cable by first rotating it counterclockwise prior to tightening the process connection.

Caution!

The use on non-polar solvents such as tri-chloroethylene, toluene or hexane is not recommended as these will break up the gel-layer on the glass bulb. The sensor will then need to remain soaked in water for at least 12 h before functioning normally again.

If the electrode loses pH sensitivity, follow the etching procedure below.

Warning!

This procedure uses hazardous chemicals and should only be performed by a qualified person, familiar with fluoride compounds.

1. Prepare a 10% solution of ammonium bifluoride.
2. Immerse the glass bulb in this solution for 10 to 20 s only. Rinse with tap water.
3. Immerse in 5 to 6 molar HCl for 5 min to remove any excess bifluoride and rinse again with tap water.
4. Soak in pH 4.0 buffer for at least 1 h before use.

Slow response or non-reproducible measurements are signs that the sensor has become coated or clogged.

The pH glass is susceptible to coating by many substances. The speed of response, normally 95% of the reading in less than 10 s, is dramatically degraded when the pH glass is coated.

How to restore the speed of response

1. Clean the bulb with a high quality detergent methyl alcohol or other suitable solvent using a "Q-tip".
2. Rinse well with distilled water and retest.
3. If the sensor now responds, but erratically, soak the sensor in 0.1 molar HCl for 5 min.
4. Remove and rinse with water and place in 0.1 molar NaOH for 5 min.
5. Remove, rinse again and then place the sensor in pH 4.0 buffer for 10 min before use.

Product structure

Electrodes OPF 81						
<div><div><div>Application</div><div>NNpH 0 ... 11, T = 0 ... 80 °C</div><div>NHpH 0 ... 11, T = 0 ... 110 °C</div><div>LNpH 0 ... 14, T = 0 ... 80 °C</div><div>LHpH 0 ... 14, T = 0 ... 110 °C</div></div><div><div>Version</div><div>123 mm, with protection guard</div><div>212.5 mm, flat membrane</div></div><div><div>Process connection</div><div>1NPT 3/8"</div></div><div><div>Equipment</div><div>AWithout Pt 100, without pre-amplifier</div><div>BWithout Pt 100, with pre-amplifier</div><div>CWith Pt 100, without pre-amplifier</div><div>DWith Pt 100, with pre-amplifier</div></div><div><div>Connecting cable</div><div>25 m fixed cable</div><div>310 m fixed cable</div></div></div>						
OPF 81-						complete order code

Electrodes OPF 82						
<div><div><div>Application</div><div>PARedox measurement</div></div><div><div>Version</div><div>123 mm, with protection guard</div></div><div><div>Process connection</div><div>1NPT 3/8"</div></div><div><div>Equipment</div><div>AWithout pre-amplifier</div><div>BWith pre-amplifier</div></div><div><div>Connecting cable</div><div>25 m fixed cable</div><div>310 m fixed cable</div></div></div>						
OPF 82-						complete order code