

Operating Manual

GWO 3600

**Oxygen electrode
for GMH 3611, GMH 3651, (GMH 3610, GMH 3630)
respectively OXY 3610 MP**

Specification:

Measuring range:

Partial oxygen pressure: 0 ... 1200 hPa O₂

Temperature: -5,0 ... 50,0 °C

Electrode: active diaphragm type, with integrated NTC resistor

Response time: 95% in 10 sec., depending on temperature

Operation life: 3 years or more, depending on proper maintenance

Operating pressure: max. 3 bar.

Mounting diameter: Ø 12,0 ±0,2 mm (also suitable for ½" glanding)

Length: approx. 220 mm (incl. anti-buckling glanding)

Mounting length: approx. 110 mm

Weight approx. 180 g

Materials: Membrane: PTFE
Shaft and membrane head: PVC
Membrane head sealing: NBR

Connection:

GWO 3600 approx. 4 m long cable with Mini-DIN-plug.
(optionally other cable lengths possible)

GWO 3600 - MU approx. 4 m long cable with 5-pin diode plug.
(optionally other cable lengths possible)

Operating temperature: 0 to +40 °C

Storage temperature: 0 to +60 °C

Standards and directives: The sensors comply with the following Council Directives on the approximation of the laws of the Member States:

2011/65/EU RoHS

Applied harmonised standards:

EN IEC 63000 : 2018

Note: The sensors contain lead, but according to Annex IV [1b] / for sensors with "lead anodes in electrochemical oxygen sensors" this is exempted from the restriction.



Safety requirements:

This device has been designed and tested in accordance with the safety regulations for electronic devices. However, its trouble-free operation and reliability cannot be guaranteed unless the standard safety measures and special safety advises given in this manual will be adhered to when using the device.

1. Trouble-free operation and reliability of the device can only be guaranteed if the device is not subjected to any other climatic conditions than those stated under "Specification".
2. If the device is transported from a cold to a warm environment condensation may result in a failure of the device. In such a case make sure the device temperature has adjusted to the ambient temperature before trying a new start-up.
3. If device is to be connected to other devices (e.g. via serial interface) the circuitry has to be designed most carefully. Internal connection in third party devices (e.g. connection GND and earth) may result in not-permissible voltages impairing or destroying the device or another device connected.
4. If there is a risk whatsoever involved in running it, the unit has to be switched off immediately and to be marked accordingly to avoid re-starting.

Operator safety may be at risk if:

- there is visible damage to the device.
- the device is not working as specified.
- the device has been stored under unsuitable conditions for a longer time.

In case of doubt, please return device to manufacturer for repair or maintenance.

5. **Caution, acid!** The electrode contains **KOH**. KOH can cause severe chemical burns! If leaking, avoid contact!



If there was contact:

- to skin: Flush contacted area with large amounts of water for several minutes.
- to clothing: remove contaminated clothing.
- to eyes: Flush with large amounts of water for several minutes, obtain medical treatment.

After swallowing:

- give large volumes of water. DO NOT induce vomiting!
- Obtain medical treatment.

Disposal instructions

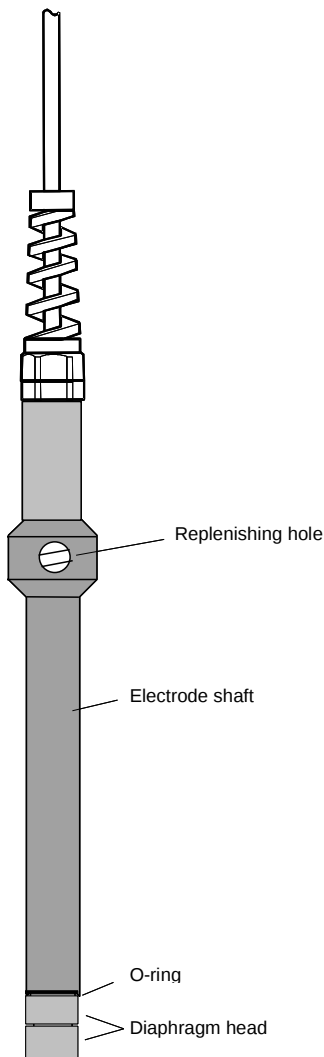


The electrode contains lead and corrosive electrolytic liquid and must not be disposed of in the residual waste bin. Do not dispose of together with batteries, risk of explosion! Return it to us, freight prepaid. We will then arrange for the proper and environmentally-friendly disposal.



Private end users in Germany have the possibility of dropping off the product at the municipal collection centre.

The oxygen electrode:



The oxygen electrode is an active electrode consisting of a silver cathode and a lead anode using potassium hydroxide (KOH) as an electrolyte. In case of oxygen being present it will be reduced at the silver cathode and the electrode produces electric current. In case of no oxygen being present not current will be produced. Both the silver cathode and the lead anode will be used up during oxygen measuring. The electrode ages. We, therefore, recommend regular maintenance of the electrode at monthly intervals (p.r.t. 'Electrode maintenance').

Electrode design:

The electrode housing is made of PVC. With the exception of the electrode shaft all parts need to be maintained regularly and be replaced if necessary.

o **Protective flask:** The protective flask is used to moisten the diaphragm. The service life of the electrode will be prolonged. The protective flask contains water.

Attention! Use water only; never use calcium chloride (KCl); this is only required for storage of pH-electrode.

o **Diaphragm head:** the diaphragm head is covered with a teflon diaphragm. It will be filled with KOH electrolyte and screwed onto the electrode shaft (no air bubbles). Damages in the diaphragm, large air bubbles or air bubble rings in the diaphragm head will result in erroneous measurements. This may also be the reason for errors in the calibration. The diaphragm head is a spare part and can be ordered individually.

o **Filling hole:** If the electrode is used at high temperatures or if it has been stored without its protective flask for a longer period of time, some electrolyte will be lost due to pervaporation. If necessary unscrew diaphragm head, remove locking screws and top up electrolyte using a syringe. Replace and tighten locking screws. Normally some electrolyte can be observed penetrating at the silver cathode.

When is electrode maintenance required:

- Unless it is used the electrode is to be stored in the protective flask filled with water or directly in a vessel filled with dechlorinated water.
- Residues of bacteria, fungi or algae must be removed prior to measuring using a soft paper towel.
- If a calibration can no longer be carried out or if the membrane is damaged the electrode needs maintenance.
- In the course of the time air bubbles may accumulated underneath the membrane. As long as they are small and do not affect the silver cathode the measurements will not be influenced. If, however, there is a large ring of air bubbles underneath the membrane covering the silver cathode, the electrode needs maintenance.

! Attention during maintenance is required as the electrolyte is highly corrosive !

Use disposable gloves during maintenance, if available, or rinse hands thoroughly with water.

Electrode maintenance:

1. Prepare liquid absorbing paper towel.
2. Remove membrane head and wipe off electrolyte solution with paper cloth.
Do not touch electrolyte. If your skin has come into contact with electrolyte, rinse thoroughly with clear water.
3. Clean silver cathode using sand paper (grain size 240). Do not shine silver cathode as its surface needs to be rough so that the electrolyte can be dispersed evenly. Remove any dust from grinding.
4. If necessary take out replenishing screw and top up with electrolyte till it is spilling out (e.g. using a disposable syringe). Put back replenishing screw. (normally not necessary)
5. Put new membrane head on the paper towel and fill up with electrolyte making sure there are no air bubbles.
6. Put electrode into head vertically from above till the thread catches. Then take up head with paper towel and screw onto electrode from underneath. Electrolyte will be displaced from the membrane head, flowing over.
7. Mop up excess electrolyte using paper towel.
8. Turn electrode around and check for air bubbles. If there are no air bubbles or only tiny ones the maintenance has been completed. If there are large air bubbles the process has to be repeated.

If O-ring has been damaged, it has to be replaced.

Please note: Prior to its being calibrated again the electrode needs to be lying on a table for at least 3 hours.

If electrode can no longer be calibrated although it has been properly maintained, the electrode needs to be returned to manufacturer for check up and may have to be replaced.

How to Operate:

- a.) **Store the oxygen electrode always in water**, either in the protective flask, or directly in a vessel filled with dechlorinated water. For storage in the protective flask first push the cap on the electrode second the o-ring and thereafter put the electrode in the flask and screw the cap down the flask.
If the diaphragm has dried up the electrode must be soaked in water for approx. 2 h prior to measuring start-up. Then a calibration can be carried out without any problems.
- b.) The electrodes GWO 3610 may only be used with the appropriate suitable devices (GMH 3611, GMH 3651 or GMH 3610, GMH 3630).
The electrodes GWO 3610 - MU are intended for use with the OXY 3610 MP.
Unsuitable devices may lead to the destruction of the measuring device and the oxygen electrode.
- c.) Treat device and sensor carefully. Use only in accordance with above specification. (do not throw, hit against etc.).
Protect plug and socket from soiling.
- d.) When connecting the electrode the connector may not lock to the jack correctly. In such a case hold the connector not at the case but at the buckling protection of the cable during the plug in.
Don't connect electrode canted! If plug is entered correctly, it will slide in smoothly.
To disconnect sensor do not pull at the cable but at the plug
- e.) For measuring remove the protective flask of the electrode
- f.) **Please note:** the electrode measurement is sensitive against shocks!
By stirring of the electrode in the measured liquid be careful that the electrode does not hit the container. A vibration of the electrode has a effect to the measured value.