

OxiQuant B



Oxygen meter
Instructions for use

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1. Safety instructions

1.1. General safety instructions

These instructions for use are an integral part of the equipment. They should at all times be kept near the equipment.

In order to use the equipment intended, to handle it correctly and so use the equipment safely, exact compliance with the instructions for use is necessary.

The symbol  means: observe instructions for use. It indicates points which particularly need to be observed when using the equipment.

The quality assurance system used throughout EnviteC-Wismar GmbH corresponds to the standards DIN EN ISO 9001 and EN 46001.

There are no warranty claims for damages caused by the use of unsuitable foreign equipment and materials.

Defective equipment and empty batteries or storage batteries should not be placed in domestic waste and should be disposed of in accordance with the relevant national or local regulations.

The equipment is not authorised for use in explosive areas.

1.2. Safety instructions for oxygen sensor

- **Do not mechanically damage the sensor.** Do not use damaged products. Only use for the purposes for which it is intended.

Possible Hazards

Hazards for humans and the environment:

Lead/lead compounds: poisonous if swallowed, dust inhalation or skin resorption, protective measures in accordance with TRGS 505 (6/88).

Potassium hydroxide solution: hazardous materials regulations (GefStoffV) "corrosive". Skin or eye contact causes burns.

- Do not use liquid disinfectant
- Remove impurities with a damp disposable cloth.
- Sterilisation with ethylene oxide at maximum 50°C.
- Can be disinfected at 45°C in an aseptor.

Instructions for the disposal of the oxygen sensor

Product

- Recommendation: dispose of in accordance with regulations through incineration in a hazardous waste incineration plant. Local authority regulations must be complied with.
- Do not dispose of in household waste.
- EAK-key 160202 and 160606

Regulations

To be labelled "Corrosive", according to GefStoffV, for KOH solution component

2. Introduction

Area of application

The OxiQuant B-oxygen meter is used to determine oxygen concentrations in gas mixtures. It can be used to monitor gas supply equipment in industry and hospitals or to check breathing mixtures in diving systems (nitrox and trimix mixtures). Its compact dimensions, low weight, easy handling and calibration make the device particularly suitable for mobile application.

The OxiQuant B is not designed for personal protection or for monitoring medical breathing air in direct contact with patients. It must not be used for the preparation of gas mixtures, but only to monitor them.

OxiQuant B uses an ENVITEC oxygen sensor, type OOI101-1. This has a rapid response time, high reliability and stable performance.

3. Controls and symbols



LCD display

The display directly shows the oxygen concentration between 0-100% O₂

Calibration buttons

By holding down the buttons "21%" or "100%" (for approx. 3 sec.) the device is calibrated to air or 100% oxygen. -> see also Chapter 4 / Calibration

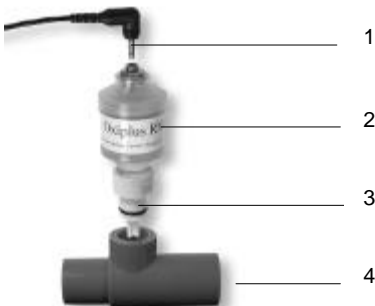
Keypad

ON/OFF button

Hold down the ON/OFF button for 2 seconds to switch the OxiQuant B on. To switch off, hold the button down for approx. 2 seconds.

If the battery indicator (**BAT**) appears continuously, the battery should be replaced, as it will not supply the necessary voltage for much longer. When the indicator flashes, the battery is empty. If, when the device is switched on, the battery indicator only flashes briefly before the device immediately switches itself off, the battery is entirely discharged and the device can no longer be used (-> **Replace battery!**).

4. Start-up



Connecting the oxygen sensor

Connect the sensor (2) to the jack plug on the device cable and fix with the connecting nut on the jack plug

Switch on the OxiQuant B and check whether a measurement value is displayed

After successful calibration, the device is ready to take measurements (-> see point 5/ Calibration and measurement accuracy)

To adapt it to a gas supply system, the sensor (1) is connected to the flow diverter (3) and inserted into the T-piece (4) (optionally available).

5. Calibration and measurement accuracy

5.1. Calibration using ambient air

1. Switch on the OxiQuant B
2. Hold the sensor away from the body.
3. By holding down the calibration button "21%" for approx. 3 seconds, the device is automatically calibrated to ambient air. The indicators "CAL" and "21" will appear alternately on the display for approx. 5 seconds.

The concentration of oxygen in ambient air is 20.95 %O₂. The calibration value is therefore set to 20.9% O₂. Ambient pressure, humidity and temperature can have an effect on the displayed value (see Chapter 6).

4. ? The device is ready to take measurements!

5.2. Calibration to 100% O₂

At high oxygen concentrations (50-100% O₂), it is recommended that the calibration be performed using a calibration gas consisting of 100% O₂. In this case, it must be ensured that the connection between the oxygen sensor and the inlet when supplying gas to the sensor is tight enough to prevent any possibility of ambient gases entering the mixture.

1. Connect the T-piece to the oxygen supply and insert the sensor with the flow diverter into the T-piece.
2. Adjust the oxygen flow to the recommended 2 l/min at the oxygen supply.
3. By holding down the calibration button "100%" for approx. 3 seconds, the device is automatically calibrated to pure oxygen. The indicators "CAL" and "100" will appear alternately on the display for approx. 5 seconds.
4. Remove the sensor from the supply and check, using clean ambient air, that a value of 21% O₂ is displayed after approx. 60 seconds.
Hold the sensor away from the body when doing this (away from breath!) and wave it around (unscrew the flow diverter if necessary).
5. ? The device is ready to take measurements!



The relevant calibration process should be checked and, if necessary, repeated before each new measurement!
If the calibration cannot be carried out correctly, see Chapter 5 / Errors during calibration and measurement, or contact your dealer.

5.3. Errors during calibration and measurement

- ? Measurement fluctuates by more than 1 Vol. % O₂
 - ? The sensor should be in thermal equilibrium with the environment
 - ? Note sensor response time (see socket label)
 - ? The sensor opening should be clean and dry
 - ? Gases mixed with ambient air during calibration
 - ? Internal electrical fault in device ? inform your dealer!
- ? ? The device does not display the expected measurement
 - ? Calculation of the gas mixture is faulty
 - ? Manometer is faulty
 - ? Device is not calibrated
 - ? Sensor not in thermal equilibrium with the environment
 - ? Sampled gas mixed with ambient gas
- ? Device shows "ERR" for approx. 6 seconds after being switched on
- ? Device must be returned to dealer to be checked!
- ? ? Display goes out soon after switching the device on or does not come on at all
 - ? Battery is discharged ? Replace battery!



The oxygen sensor wears out during its service life even when the device is switched off. The sensor must be replaced if it is not possible to achieve either 20.9% O₂ or 100% O₂ during calibration or if the measurement is not plausible after checking the possible causes of error described above.

5.4. Influencing factors

Influence of gas pressure and measured gas humidity

The oxygen sensor measures the partial pressure of oxygen in the gas being measured, but the device displays the concentration of oxygen and must therefore be calibrated.

The calibration process equates the partial pressure of oxygen in dry ambient air to a volume concentration of 20.9% O₂. Depending on the absolute humidity of the gas being measured, the proportion of oxygen (partial oxygen pressure) in the gas fluctuates slightly. The effect of humidity can be ignored as the difference between absolutely dry and saturated gas is less than 1% O₂ over the entire working temperature range.



Calibration should generally be implemented at the measurement pressure to compensate for the effect of pressure differences.

The measurement pressure conditions are that of the gas being measured or the current atmospheric pressure, which must take into account the height above sea level of the measuring location.

Ambient temperature

The influence of changes in the ambient temperature is compensated for by the measurement system.

However it should be kept in mind that the meter with the oxygen sensor should be adapted to the ambient temperature. Large short-term fluctuations in the gas temperature can considerably influence the accuracy of the display.

Water

Try to avoid getting the sensor or jack plug completely wet. Water on the gas-sensitive surface of the oxygen sensor affects the measured result. If the device does get wet, it can be dried on the outside with a cloth. It is recommended that the device is not switched on until the sensor is dry.

6. EnviteC oxygen sensor

6.1. Function principle

The function of the oxygen sensor can be simply described as follows:

1. The measured gas diffuses through a synthetic membrane and dissolves in the oxygen sensor electrolyte.
2. The electrolyte contains 2 electrodes which are connected together by an external resistor network.
3. The proportion of dissolved oxygen is reduced at the working electrode (cathode). Oxidation takes place in a complementary reaction at the second electrode (anode).
4. The resulting internal ion current drives an external electrical current proportional to the conversion of oxygen.
5. The diffusion of gas molecules is a temperature-dependent process. To compensate for this dependency, the current is converted into a temperature-compensated voltage by means of a thermistor resistance network.

6.2. Sensor service life

The OxiQuant B consists of a meter and an oxygen sensor. Because the batteries and the oxygen sensor wear out during use, the battery and/or the sensor should be replaced if the supply voltage or the measured signal display no longer functions. The battery and the sensor are designed so that an average service life of approx. 2 years is provided in normal use.

The following ageing influences must be noted:

The oxygen sensor ages independently of the length of time for which the device is switched on, dependent on temperature and the partial oxygen pressure on the sensor's gas-sensitive surface.

- ?? The minimum service life of the oxygen sensor is based on 1 oxygen percent x hours, i.e. 500,000 %O₂h. The sensor therefore wears out after 2 ½ years of use in ambient air or less if it is stored or used at higher partial oxygen pressures.
- ?? Temperature accelerates the rate of reaction of the oxygen sensor, and therefore has an effect on its ageing. The simplified relationship that applies here is that the higher the temperature, the shorter the expected service life.
- ?? Very dry ambient conditions also have a negative effect on the service life of the oxygen sensor, as they accelerate the evaporation of the electrolyte.



For these reasons, avoid storing the OxiQuant B unnecessarily at high ambient temperatures, in very dry environments or under increased partial oxygen pressures.

6.3. Changing the sensor

- ?? Undo the connecting nut on the sensor and remove the jack plug
- ?? Dispose of the sensor
- ?? Connect new sensor and check function



Sensor contains electrolyte and lead!

6.4. Packaging and storage

During storage, the sensor consumes the oxygen from the space inside the gas inlet opening. Ageing is therefore reduced if the sensor is stored in the original packaging. However, before it is ready to operate, the sensor requires some time after it has been removed from the packaging, depending on the storage period and temperature, before its measurement value becomes stable. This time can be up to 30 minutes. Meter calibration should therefore be carried out after the sensor has stabilised or should be repeated at that stage. A storage temperature between 5 and 15°C is recommended to reduce the necessary stabilisation time.

Storage:

- Temperature range -20°C to 50°C / store in original packaging.

Labelling:

Item description: oxygen sensor
Application: determination of oxygen concentrations
Type: OOIXXX, XXX – consecutive type number
Manufacturer/supplier details:
Manufacturer: ENVITEC-Wismar GmbH, Alter Holzhafen 18, D-23966
Wismar, Germany
Telephone / Fax: +49 3841 360 1 / +49 3841 360 222

7. Cleaning

Surface of device

Switch off the OxiQuant B.

Clean the device with a damp cloth only; on no account allow liquid to penetrate the device.

Most common detergents and disinfectants are suitable.

Caution



Damage to device - phenol-based disinfectants and peroxide compounds should not be used for surface disinfection.

Danger



Risk of electric shock, damage to device – if liquid penetrates the device it should not be put into operation again until it has been checked by the service department.

8. Accessories

Item	P/N
OxiQuant B	46-00-0023
O ₂ sensor OOI101-1	01-00-0073
Flow diverter	01-002171
T-piece	46-006005
Hose adaptor	46-000087



Defective equipment and empty batteries or storage batteries should not be placed in domestic waste and should be disposed of in accordance with the national or local regulations.

9. Specifications and characteristics

All specifications apply to standard conditions:
1013 hPa, 25°C dry ambient air

Measuring range:	0-100% oxygen
Display resolution:	0.1% oxygen
Accuracy:	< 1% vol.O ₂ , when calibrated at 100% vol.O ₂
Offset:	< 1% vol. O ₂ in 100% N ₂
Response time:	< 3.5 sec. to 90% of final value
Linearity error:	< 3% relative
Drift:	< 1% vol. O ₂ over 8 hours
Cross-sensitivity:	< 0.1% vol. O ₂ in reaction to: 15% CO ₂ equilibrium N ₂ 10% CO equilibrium N ₂
Effect of humidity:	0.03% relative per % RH
Effect of pressure:	Proportional to change in oxygen partial pressure
Sensitivity to impact:	< 1% relative after drop from 1 m
Operating temperature:	0°C – 50°C
Temperature compensation:	integrated NTC compensation
Operating humidity:	0 - 99% rel. humidity
Storage temperature:	-20°C – 50°C
Recommended storage:	5°C – 15°C
Battery type:	9V Block
Protection class:	IP 64
Guarantee:	24 months from date of manufacture on monitor (excluding battery) 15 months from date of manufacture for oxygen sensor

10. Declaration of Conformity

EC Declaration of Conformity

We declare under our sole responsibility that the product:

OxiQuant B

Complies with the requirements of the following guidelines:

- | | |
|------------------|--|
| DIN EN 61010 –1 | Safety regulations for electrical meters, control units and laboratory apparatus
Part 1: General requirements |
| DIN EN 55011 | Limit values and measurement procedures for radio interference from industrial, scientific and medical high frequency devices (ISM devices)

Class B/08.2003 |
| DIN EN 61000-6-2 | Electromagnetic compatibility (EMC) – Part 6-2:
Basic standards – Interference resistance – Industry sector
08.2002 |
| DIN EN 50104 | Electrical equipment for detecting and measuring oxygen
Requirements for operating performance and test methods
A1 |

CE label affixed:

Issuer: EnviteC – WISMAR GMBH
Alter Holzhafen 18
D-23966 Wismar
Germany

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Legally binding signature:

EnviteC-Wismar GmbH
Alter Holzhafen 18
23966 Wismar, Germany
Tel.: +49 3841 360 1
Fax: +49 3841 360 222
E-Mail: info@envitec.com
Web : <http://www.envitec.com>