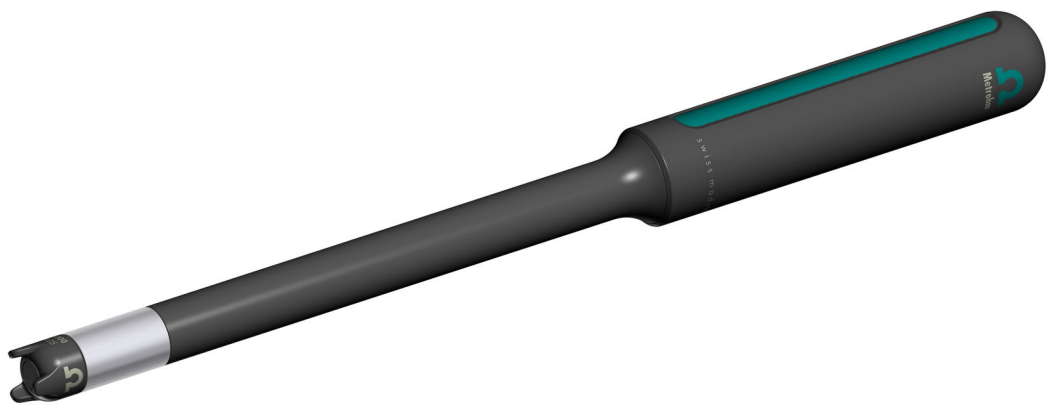


O₂ Lumitrode



6.1116.000

Sensor leaflet

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Disclaimer

Deficiencies arising from circumstances that are not the responsibility of Metrohm, such as improper storage or improper use, etc., are expressly excluded from the warranty. Unauthorized modifications to the product (e.g. conversions or attachments) exclude any liability on the part of the manufacturer for resulting damage and its consequences. Instructions and notes in the Metrohm product documentation must be strictly followed. Otherwise, Metrohm's liability is excluded.

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1 Overview

1.1 Product description

The O₂ Lumitrode is an optical sensor for measuring dissolved oxygen, i.e. the amount of dissolved oxygen molecules in an aqueous phase. The sensor works on the principle of luminescence quenching.

The O₂ Lumitrode can be connected to the following measuring instruments:

- 913 pH/DO Meter
- 914 pH/DO/Conductometer

1.2 Overview

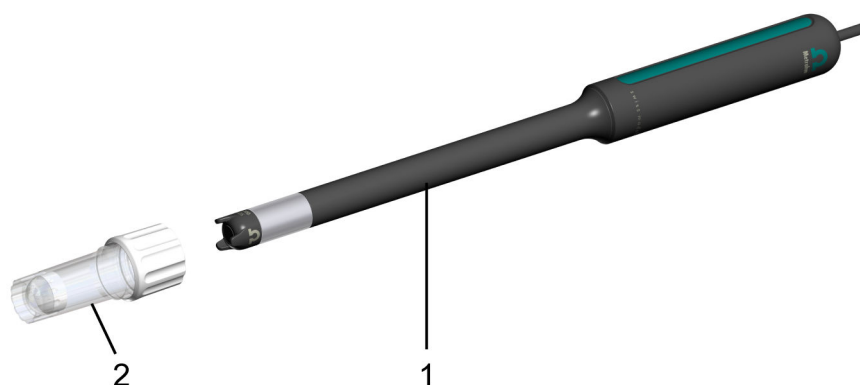


Figure 1 O₂ Lumitrode – Scope of delivery

1 O₂ Lumitrode

2 Calibration vessel



O₂ Lumitrode

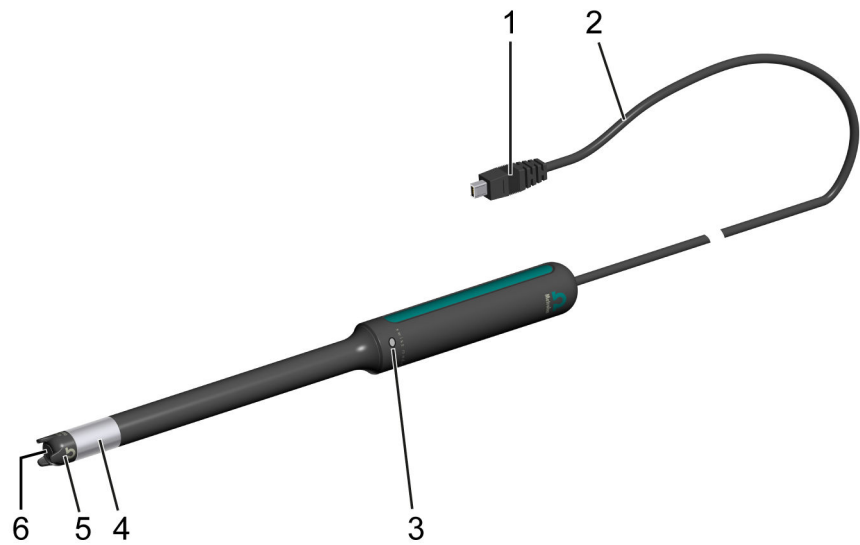


Figure 2 O₂ Lumitrode

1	Plug, mini-USB	2	Fixed cable, 1.2 m
3	Pressure compensation opening	4	Steel ring with temperature sensor
5	O ₂ cap, replaceable	6	Sensor membrane

Calibration vessel

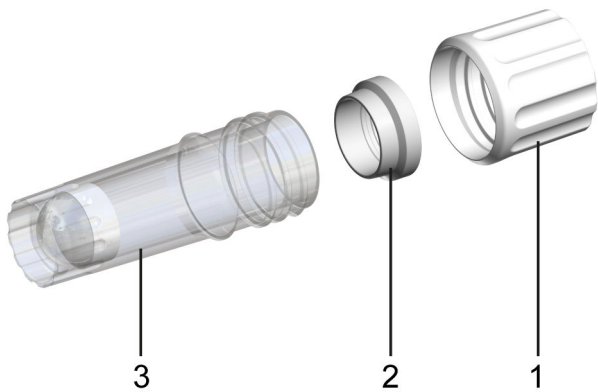


Figure 3 Calibration vessel

1	Screw cap	2	Clamping collar
3	Vessel with sponge		

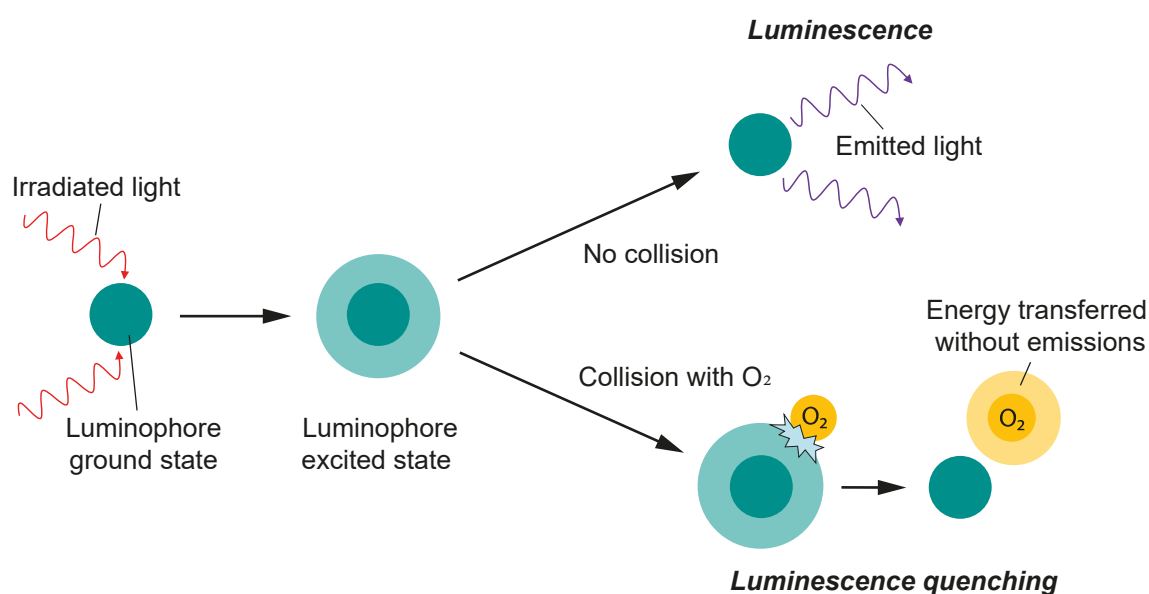
2 Functional description

The sensor works on the principle of luminescence quenching.

Luminescence

A luminophore is embedded in the sensor membrane in the O₂ Lumitrode. Irradiated light puts the luminophore into an excited state. When reverting to the ground state, the luminophore emits light in the NIR range.

The time period between excitation and reverting to the ground state (luminescence lifetime) causes a phase shift between irradiated and emitted light.



Luminescence quenching

If the aqueous phase contains dissolved oxygen, then oxygen molecules will collide with the luminophore. The collisions cause a transfer of energy from the luminophore to the oxygen molecules. The luminophore molecules thus revert to their ground state prematurely without radiation. The luminescence is quenched.

Influence on the phase shift

The luminescence lifetime of the luminophore molecules varies. The longer the luminescence lifetime, the greater the probability of a collision. Luminophore molecules with a long luminescence lifetime are therefore more frequently quenched. The average luminescence lifetime decreases. Accordingly, the phase shift between irradiated and emitted light is reduced.

[illegible]

3 Delivery and packaging

3.1 Delivery

Inspect the delivery immediately upon receipt:

- Check the delivery against the delivery note to ensure completeness.
- Check the product for damage.
- If the delivery is incomplete or damaged, contact your regional Metrohm representative.

3.2 Packaging

The product and accessories are supplied in protective special packaging. Keep this packaging to ensure safe transportation of the product. If a transport locking device is present, keep this as well for future reuse.

3.3 Unpacking the sensor

1 Unpacking and inspecting the sensor

Carefully remove the sensor and calibration vessel from the packaging.

2 Preparing the sensor

According to Chapter [\(see "Preparing the sensor", chapter 4, page 7\)](#).



Defective sensors must be sent back for warranty processing within 2 months (from the date of delivery).

3.4 Storing the sensor

Always store the sensor in the calibration vessel within the specified temperature range.

Improper handling

Damage to or reduced service life of the O₂ cap.

- Avoid major mechanical strain on the sensor membrane.
- Do not touch the sensor membrane with your fingers, the sponge of the calibration vessel, brushes or similar.

Storing the sensor

1 Mounting the calibration vessel on the sensor

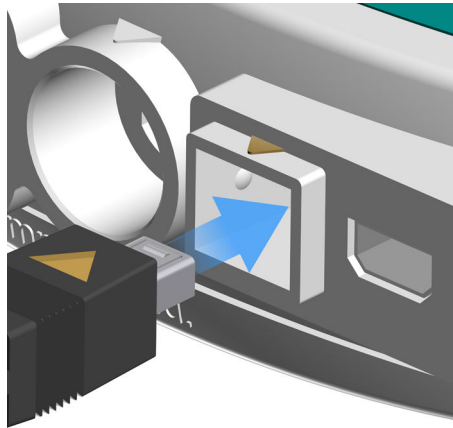
- Remove the screw cap from the calibration vessel.
- Place the screw cap of the calibration vessel on the sensor.
- Screw the calibration vessel onto the sensor. The sensor membrane must not touch the sponge.

- 2 Store the sensor within the specified temperature range. See [page 17](#).

4 Preparing the sensor

The sensor must be prepared before first use and after a long period of non-use.

1 Connecting the sensor



- Connect the plug of the sensor to the socket **i** of the measuring instrument. Observe the correct orientation (markings colored orange in the image).
- The measuring instrument detects the sensor after a few seconds. The sensor data is available in the sensor menu.

2 Calibrating the sensor

Carry out 2-point calibration with 0% and 100% air saturation. See [\(see "Calibrating the sensor", chapter 5.1, page 8\)](#).

Contaminated sensor

Impairment of the measuring behavior or falsification of the measuring results.

- The sensor surface and the sensor membrane must always be clean before measurement.

- Start calibration on the measuring instrument: press the **CAL** key.
- Follow the instructions of the instrument.
If necessary, set the **Temp. compens.** and **Air press. comp.**.

3 Calibration at 0% oxygen (with 6.2329.000 oxygen standard 0%)

- Remove the calibration vessel from the sensor.
- Tear open the sachet with oxygen standard 0% calibration solution.
- Immerse the sensor in the solution until it is over the metal ring.
- Swing the sensor briefly back and forth to remove adhering air bubbles.
- Start calibration on the measuring instrument: press the **CAL** key.
- Once the calibration has been completed, the instrument displays the results. If the measured values are within the defined limits, the instrument automatically adopts the calibration parameters. Otherwise the calibration is completed as a 1-point calibration. After a few seconds the main dialog appears.
- Rinse off the sensor with water.

The instrument is ready for measuring.

1-point calibration

Prerequisite:

- The sensor is connected to the measuring instrument.

- 1 Set the 1-point calibration **100%** on the 91x meter:
Menu ► Parameters DO ► Calibration param. ► Calibration points ► 100%

2 Calibration at 100% air saturation

- Detach the calibration vessel from the screw cap. Remove the calibration vessel and screw cap from the sensor.
- Remove the screw cap from the calibration vessel.
- Put some water on the sponge of the calibration vessel.
- Wait briefly so that the sponge can soak up the water.
- Pour off excess water.
- Place the screw cap of the calibration vessel on the sensor.
- Screw the calibration vessel onto the sensor. The sensor membrane must not touch the sponge.
- Wait at least 30 seconds to allow the air space to saturate with water vapor.
- Start calibration on the measuring instrument: press the **CAL** key.



- Follow the instructions of the instrument.
If necessary, set the **Temp. compens.** and **Air press. comp.**.
Once the calibration has been completed, the instrument displays the results and adopts them automatically.
After a few seconds the main dialog appears.




The instrument is ready for measuring.



6 Maintenance

6.1 Replacing the O₂ cap

The measuring instrument displays the signal intensity with a status traffic light:

	Green	The signal intensity is in the correct range.
	Orange	The signal intensity is in the range of the lower limit value. A replacement of the O ₂ cap will soon be necessary.
	Red	The signal intensity is below the lower limit value. Correct measuring can no longer be ensured. Replace the O ₂ cap. Replacement set: 6.5623.000

Replacing the O₂ cap

- 1 Unscrew existing O₂ cap.
- 2 Make sure that the sensor glass surface is clean and dry (see image). If necessary, rinse the sensor glass surface with deionized water and dry with a lint-free and non-scratching cloth.



- 3 If necessary, enter the serial number of the new O₂ cap on the 91x meter: **Menu ▶ Sensors ▶ Sensor list ▶ Serial no. cap**
- 4 Screw on new O₂ cap.

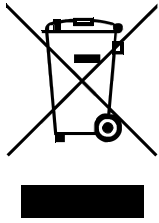
7 Troubleshooting

Measurement and calibration

Problem	Cause	Remedy
No measuring signal. Display: —.—	Wrong measuring channel switched on.	Switch on the corresponding measuring channel on the measuring instrument.
	The sensor is not connected.	Connect the sensor.
	The plug of the sensor is not properly plugged into the measuring instrument.	Check the connection to the measuring instrument. See (<i>see "Preparing the sensor", chapter 4, page 7</i>).
	O ₂ cap is missing.	Screw the O ₂ cap onto the sensor.
	Sensor membrane is leached out (photo-bleaching).	Replace the O ₂ cap.
	O ₂ cap is defective.	Replace the O ₂ cap.
	The sensor is defective.	Replace the sensor.
Signal intensity reduced – the sensor status display on the measuring instrument is in the yellow or red range.	The measuring input and/or the measuring channel is defective.	Send the measuring instrument to Metrohm Service for checks and, if necessary, repair.
	Sensor membrane is contaminated.	Clean the sensor membrane with water or tenside solution.
Measured value is clearly wrong.	Sensor membrane is leached out (photo-bleaching).	Replace the O ₂ cap.
	DO calibration is faulty.	<ul style="list-style-type: none"> Check/repeat calibration. Check the value for temperature compensation.

[illegible]

8 Disposal



This product is covered by European Directive, WEEE – Waste Electrical and Electronic Equipment.

The correct disposal of your old product will help to prevent negative effects on the environment and public health.

1 Disposing of the sensor

Put the sensor in electronic waste recycling.

More details about the disposal of your old product can be obtained from your local authorities, from waste disposal companies or from your local dealer.

