

OXYGEN SENSOR

COG-1
COG-1t

USER'S MANUAL

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5. STORAGE

1. For short storage, the sensor should be stored in distilled water.
 2. For long storage, the sensor should be stored in the box. If the storage is going to be very long it is advisable to unscrew all the parts of the sensor and dry them.
- Never store the sensor in NaSO₃ (sodium sulphide) solution, because it shortens the sensor life time, and getting this solution inside the sensor may cause its damage.

5.1. Preparation of the zero oxygen saturation solution

Pour a half volume of the cap of the container with NaSO₃ into 100 ml distilled water and stir accurately. The solution can be repeatedly used, being stored it in closed container; a small amount of NaSO₃ has to be added before reusing it.

6. TECHNICAL DATA

- The sensor's signal in 20 °C:
- in 100% O₂ saturated solution: 20 mV ±5 mV
 - in 0% O₂ saturated solution: <0.2 mV

Measurement accuracy:

- at calibration temp.: ±1%
±5 °C difference from calibration temp. ±3%
±10 °C difference from calibration temp. ±5%

Temperature measurement accuracy (only for the COG-1t sensor):
in range 0 ÷ 50 °C ±0.6 °C

Sensor's time constant T₉₀:

Minimal flow:

Working temperature:

- 20 s
5 l/h
0 ÷ 50 °C

1. PURPOSE

COG-1 oxygen sensor is designed to measure oxygen concentration in water and water solutions. COG-1t model is additionally equipped with Pt-1000B sensor (with Chinch plug), enabling measurement of the solution temperature.

2. BASIC INFORMATION ABOUT THE OXYGEN MEASUREMENT

Measurement of oxygen dissolved in water solutions is performed with use of the oxygen sensor. The basic element of the sensor is a Teflon semi-permeable membrane, which enables penetration of oxygen contained in the measured solution, into the electrolyte – inside of the sensor. The sensor generates a cell, which voltage depends on the oxygen content in the electrolyte.

The quality of the oxygen sensor has a major effect on the measurement accuracy. Complications arising during measurements are caused mainly (98%) by the sensor, not the device. In many cases problems result from negligence of basic maintaining activities of the sensor from the user's side. It is worth remembering that during measurement the sensor absorbs oxygen from the environment of the membrane. Thus the minimal flow-rate of the tested water is necessary, what will provide stable result. If that requirement is not complied the result will regularly decrease. During measurements in stagnant solutions the flow can be partly simulated by keeping the sensor in motion with a suitable speed. In laboratory conditions the flow can be forced with a magnetic stirrer. The best results can be achieved only in conditions recommended by the manufacturer of the sensor in the operation manual. Long-lasting storage of the sensor without performing any measurements (more than 2 months) requires removing the electrolyte. After this period the container must be filled with a fresh electrolyte and the sensor stored in distilled water for about 24 hours.

Accurate measurement result is determined by the condition of the membrane. The membrane must be free of any cracks (appearing of electrolyte-drops or white spots when dry). Before measurement the sensor should be activated by storing it in distilled water for about 15 minutes. Strongly polluted wastewater after some time causes clogging of the membrane, which is recognised by inability to calibrate the device at 100% oxygen content (the calibration range becomes too narrow). In both cases the membrane should be replaced according to the manufacturer's instructions. When replacing the membrane and replenishing the electrolyte it is important to pay attention if there are no air bubbles in the container beneath the membrane, because otherwise the readings will be burdened with error. In such case the container should be twisted off and the bubbles

removed by tapping it against the table, next the electrolyte should be refilled again and the sensor assembled.

Depending on thickness of the membrane, awaiting time for a stable result is about 1 - 1,5 min. Accuracy of the measurement is connected with the temperature of calibration and measurement. The greater the difference of these temperatures, the greater the measurement error. For measurements of concentration in the range 30 ÷ 80%, it is sufficient to make one-point calibration in 100% oxygen concentration. For measurements in solutions with low oxygen content (about a few %) calibration should be also made in 0% solution. Clean water contains about 60 ÷ 80% oxygen. Waste water and chemical solutions are in general less saturated with oxygen but liquids with forced aeration are much more saturated than clean water. When performing accurate measurements, the sensor's manufacturers recommend carrying out calibration just before the measurement since after some time the sensor's parameters are changing. Even the best oxygen sensors have so-called drift about $\pm 1\%/24$ h.

3. USAGE AND MAINTENANCE

Before the measurement the sensor should be activated. To activate, immerse the sensor in distilled water for about 5 minutes.

Lack of the result stabilisation informs that the membrane is contaminated. In this case it is necessary to clean or replace the membrane. The membrane may be cleaned by washing in distilled water, or by very gentle cleaning with cotton cloth with diluted alcohol. If the membrane is leaking the measured solution may get into the sensor and contaminate it, so it is very important to check the condition of the membrane, weather there are no cracks or leaks. In case of any irregularity both the membrane and the electrolyte should be replaced. Pic. 1 shows all the elements of the sensor.

To replace the membrane:

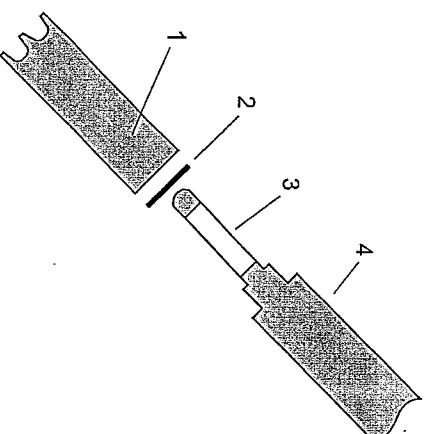
1. Unscrew the membrane cap (1) paying attention to o - ring (2) which should stay on the sensor corpus;
2. In case of contamination on the zinc electrode (3) remove it with emery (1500 or less). Next, the electrodes (3) should be degreased in alcohol, rinsed with distilled water and dried;
3. Pour in the new electrolyte into the membrane cup. It is important to pay attention weather there are no air bubbles in the electrolyte. In order to avoid air bubbles in the electrolyte, it is recommended to pour it on the wall of the cup;
4. Screw on the container (1) on the electrode corpus (4). This action should be done slowly, to enable the electrolyte excess to flow out. Pay attention to o - ring that should be put into right place (hole in the sensor corpus);
5. Wash the sensor in distilled water and dry it.

The sensor ensures stability of measurement 24 hours after electrolyte replacement.

4. EXPLOITATION NOTICES

While using, it is necessary to follow the conditions:

1. Never touch the central part of the membrane with fingers, because it is sensitive to contamination.
2. The frequency of the membrane and electrolyte replacing depends on the frequency and time of the measurements and on the measured solutions.
3. White deposit on the outer side of the membrane can be removed by rinsing it with 10% vinegar solution (edible vinegar). Next, rinse the cup with distilled water.



Pic. 1.

WARRANTY

The "ELMETRON" company provides 12 months of warranty for the COG-1

COG-1t * oxygen sensor no.*2100120*.....

In case of damage the manufacturer will repair the sensor within 14 days from the day of delivery.

The warranty does not cover the damage caused by usage not in conformity with the user's manual, mechanical damage and cracks of the membrane or internal cracks.

Note: Before sending the sensor to us please contact the firm by phone or e-mail.
In case of complaint the warranty with the date of sale should be added to the sensor.

We also provide after-warranty repair service.

Date of production..... **2020-07-29**

Date of sale.....

Date of expiry.....

* - delete as appropriate

Correct Disposal of This Product (Waste Electrical & Electronic Equipment)
(Applicable in countries with separate collection systems)
This marking on the product, accessories or literature indicates that the product and its electronic accessories should not be disposed of with other household waste at the end of their working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.
Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take these items for environmentally safe recycling.
Business users should contact their supplier and check the terms and conditions of the purchase contract. This product and its electronic accessories should not be mixed with other commercial wastes for disposal.

