

Measuring Dissolved Oxygen *OOS 41*

Membrane-covered amperometric sensor



Applications

Continuous measurement of the concentration of dissolved oxygen in water plays a vital role in many sectors of water engineering:

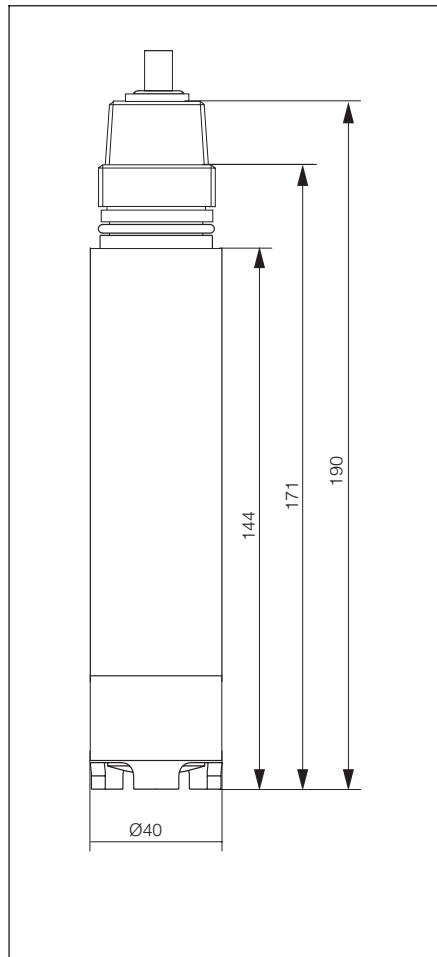
- Sewage treatment plants:
O₂ measurement and regulation in activated sludge basins to achieve high efficiency in the biological cleaning process
- Water monitoring:
Measuring O₂ in rivers, lakes and in the sea as an indicator for water quality
- Water treatment:
O₂ measurement, e.g. in drinking water to check the condition (O₂ enrichment / corrosion prevention etc.)
- Fish farming:
O₂ measurement and regulation to maintain optimum survival and growth conditions

Features and benefits

- Membrane-covered sensor, therefore high O₂ selectivity
- Minimum maintenance requirements
- Minimum calibration effort through simple air calibration.
No zero calibration required
- Very high measuring reliability
- High long-term stability
- Due to disconnectable cable connection on sensor side (TOP 68 plug-in connector) easy to maintain.
- Sensor and process monitoring in conjunction with transmitter allows optimum protection from incorrect measurements.

Dimensions and functional principle

Dimensions OOS 41



Oxygen occurs in the medium in the form of physically dissolved gas and is conveyed to the membrane by the required flow. Due to the materials used and the production process, this means that only dissolved gases permeate through the membrane, and not the substances which occur in the liquid phase. Similarly, dissolved salts and ionic substances are retained. This is why the conductivity of the medium has no impact on the measuring signal when the sensor membrane is covered, as opposed to the open measuring principle.

The oxygen molecules diffused through the membrane are reduced to hydroxide ions (OH^-) on the gold cathode. On the anode, silver is oxidised to silver ions (Ag^+ , formation of a silver bromide layer). A current flows due to the associated electrode release at the gold cathode and acceptance at the anode. Under constant conditions, this flow is proportional to the external oxygen concentration of the medium.

The current flow is converted in the measuring device and displayed on the LCD as the content of dissolved oxygen in mg/l, the oxygen saturation index in % SAT or the partial oxygen pressure in hPa.

Sensor monitoring

In conjunction with the associated transmitter, a special sensor check system (SCS) can automatically detect a number of error states on the sensor and generate an alarm immediately:

- Cable breakage or cable short-circuit
- Error measurement in the form of implausibly high or low measured values
- Sensor passivation, i.e. no or very slow change in the measuring signal despite an external change in the oxygen content in the medium.

Special technical features

- Alarm messages in conjunction with the transmitter
- No zero calibration required
- Precise automatic high speed calibration together with the transmitter
- Range lower limit typically 0.05 mg/l O_2 at 20 °C
- Extremely stable »elephant skin« membrane

- On version with TOP 68 connector: sensor locally disconnectable from measuring cable
- Minimum flow velocity only 0.005 m/s
- Easy to maintain: both the membrane cap and the electrolyte are preterminated
- Max. permissible overpressure 10 bar
- Long life through the use of highquality materials.

Measuring system

The functional measuring system comprises:

- Oxygen sensor OOS 41 with transmitter OOM 223-DX/DS
- Immersion assembly OYA 611, poss. extended by a universal suspension assembly holder OYH 101-A, or flow assembly OOA 250 or retractable assembly OOA 461

- Associated installation accessories.

We recommend the following under extreme operating conditions:

- Automatic spray cleaning system.

Technical data

General data

Product designation	OOS 41
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Mechanical data

Measuring principle	membrane-covered amperometric sensor
Materials	Sensor body: POM; membrane cap: POM
Membrane thickness	approx. 50 µm
Threaded connection	G 1 and NPT 3/4"
Electrical connection	Fixed cable or TOP 68 plug-in connector: Double-screen coaxial cable with 2 pilot wires, terminal connection on transmitter
Cable lengths	7 m, 15 m, special version on request
Max. total cable extension	50 m
Weight without packaging (for cable length)	0.7 kg (7 m) or 1.1 kg (15 m)

Measuring ranges

Lower range limit	typically 0.05 mg/l
Upper range limit	20 mg/l
Temperature measurement	with integrated NTC temperature sensor, 0 ... 50 °C

Operating data

Response time	90% of full scale value displayed after 3 mins at 20 °C 99% of full scale value displayed after 9 mins at 20 °C
Polarisation time	< 60 min
Min. flow velocity	typ. 0.5 cm/s for 95% measured value display
Sensor monitoring	in conjunction with transmitter: Cable breakage or short circuit, incorrect measurement and sensor passivation
Drift	under continuous polarisation: < 1%/month
Zero current	zero-current-free

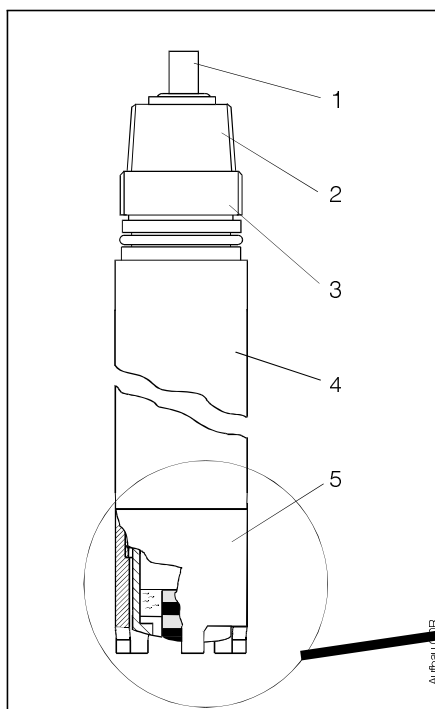
Process conditions

Max. permissible overpressure	10 bar
Degree of protection	IP 68
Nominal operating temperature	-5 ... 50 °C
Storage temperature	filled: -5 ... 50 °C, unfilled: -20 ... 60 °C

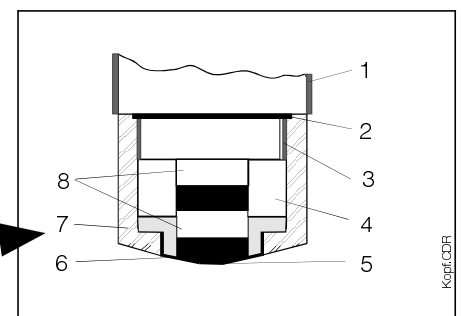
Subject to modification.

Design

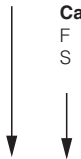
- OOS 41:
- 1 Sensor cable
 - 2 Thread NPT 3/4"
 - 3 Thread G 1
 - 4 Sensor body
 - 5 Protection guard



- Sensor head
- 1 Thread for protection guard
 - 2 Sealing ring
 - 3 Thread for membrane cap
 - 4 Electrolyte
 - 5 Gold cathode
 - 6 Membrane
 - 7 Membrane cap
 - 8 Anode



Product overview

Oxygen sensor OOS 41	
Cable length	
2	Cable length 7 m
4	Cable length 15 m
8	Without cable (only on TOP 68 version)
Cable connection	
F	Fixed cable connection
S	Cable connection with TOP 68 connector
	
OOS 41-	Complete order code

Accessories

- OOY 31-WP**
2 preterminated spare replacement cartridges with pretensioned membrane for OOS 41
- OOY 3-F**
Fill electrolyte for OOS 41, 10 plastic ampoules, transparent
- Zero solution**
Powder to produce oxygen-free solution for test purposes
- OOY 31-OR**
Sealing ring, 3 pcs
- OYK 71**
Special cable for extension between sensor and transmitter

Supplementary documentation

- Transmitter OOM 223-DX/DS
Technical Information No. 51505694
- Immersion assembly OYA 611
Technical Information
- Suspension assembly holder OYH 101
Technical Information