Technical Information
TI 284C/07/en
51506689

Measuring Dissolved Oxygen
OxyMax W COS 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:
  O_2 measurement and regulation in activated sludge basins to achieve high efficiency in the biological cleaning process
- Water monitoring:
  Measuring O_2 in rivers, lakes and in the sea as an indicator for water quality
- Water treatment:
  O_2 measurement, e.g. in drinking water to check the condition (O_2 enrichment / corrosion prevention etc.)
- Fish farming:
  O_2 measurement and regulation to maintain optimum survival and growth conditions

Features and benefits

- Membrane-covered sensor, therefore high O_2 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.

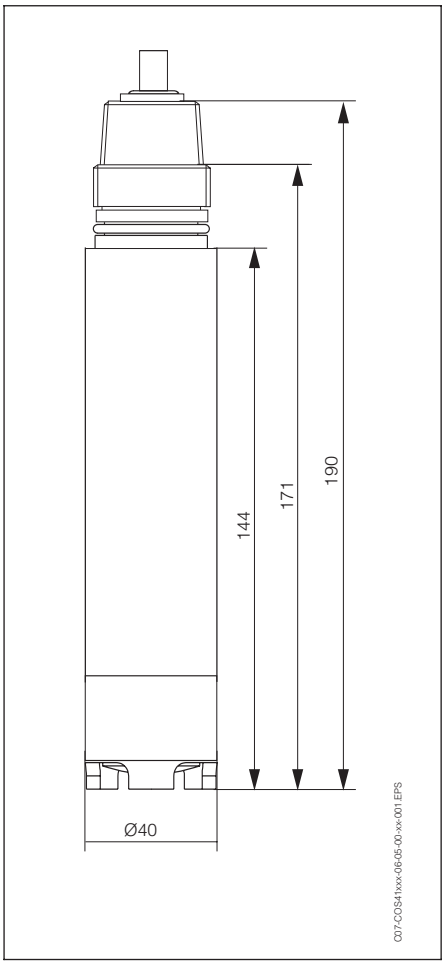
Quality made by
Endress+Hauser

ISO 9001

Endress+Hauser

The Power of Know How

Dimensions and functional principle



Dimensions COS 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 OxyMax W COS 41 with transmitter Liquisys M COM 223 / 253-DX/DS
- Immersion assembly DipFit W CYA 611, poss. extended by a universal suspension assembly holder CYH 101-A, *or* flow assembly COA 250 *or* retractable assembly ProbFit W COA 461
- Associated installation accessories.

We recommend the following under extreme operating conditions:

- Automatic spray cleaning system Chemoclean.

Technical data

General data

Manufacturer	Endress+Hauser
Product designation	OxyMax W COS 41

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 ¾"
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

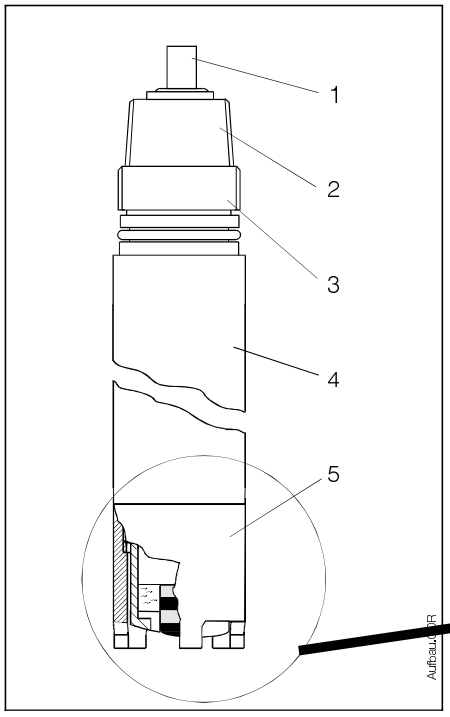
Response time	90% of full scale value displayed after 3 mins at 20 °C 99% of full scale value displayed after 9 mins at 20 °C
Polarisation time	< 60 min
Min. flow velocity	typ. 0.5 cm/s for 95% measured value display
Sensor monitoring	in conjunction with transmitter: Cable breakage or short circuit, 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

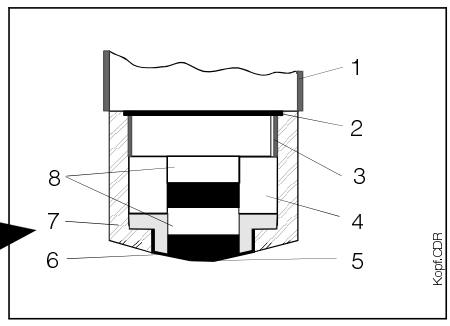
Subject to modification.

Design



COS 41:
1 Sensor cable
2 Thread NPT ¾"
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 COS 41

Cable length

2 Cable length 7 m
4 Cable length 15 m
8 Without cable (only on TOP 68 version)
9 Special version to customer requirements

Cable connection

F Fixed cable connection
S Cable connection with TOP 68 connector

COS 41-			Complete order code

Accessories

- ❏ **COY 31-WP**
  2 preterminated spare replacement cartridges with pretensioned membrane for COS 41
  Order No.: 51506976
- ❏ **COY 3-F**
  Fill electrolyte for COS 41,
  10 plastic ampoules, transparent
  Order No.: 50053349
- ❏ **Zero solution**
  Powder to produce oxygen-free solution for test purposes
  Order No.: 50001041
- ❏ **COY 31-OR**
  Sealing ring, 3 pcs
  Order No.: 51506985
- ❏ **CYK 71**
  Special cable for extension between sensor and transmitter
  Order No.: 50085333
- ❏ **Accessory set COY 31-Z**
  each 1x COY 3-F, COY 31-WP, COY 31-OR and COY 31-PF
  Order No.: 51506784

Supplementary documentation

- ❏ Transmitter
  Liquisys M COM 223 / 253-DX/DS
  Technical Information No. 51500281
- ❏ Immersion assembly DipFit W CYA 611
  Technical Information No. 50085985
- ❏ Suspension assembly holder CYH 101
  Technical Information No. 50061228
- ❏ Immersion assembly
  DipFit W COA 110
  Technical Information No. 50057221
- ❏ Flow assembly FlowFit W COA 250
  Technical Information No. 50068520
- ❏ Retractable assembly
  Probfit W COA 461
  Technical Information No. 50082361
- ❏ Automatic cleaning system
  Chemoclean CYR 10 / CYR 20
  Technical Information No. 50014223

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