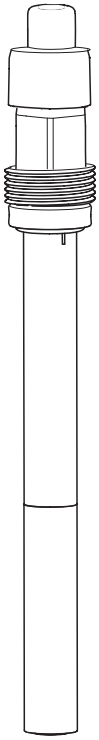
Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

Operating Instructions

Oxymax H COS21

Dissolved oxygen sensor



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1 Safety instructions

1.1 Designated use

The sensor is suitable for continuous measurement of dissolved oxygen in water.

Major applications:

- Process control in enzyme production
- Control of culture growth
- Biotechnological production
- Food industry
- General process applications

Any other use than the one described here compromises the safety of persons and the entire measuring system and is, therefore, not permitted.
The manufacturer is not liable for damage caused by improper or non-designated use.

1.2 Installation, commissioning and operation

Please note the following items:

- Installation, commissioning, operation and maintenance of the measuring system must only be carried out by trained technical personnel.
  The technical personnel must be authorized for the specified activities by the system operator.
- Electrical connection must only be carried out by a certified electrician.
- Technical personnel must have read and understood these Operating Instructions and must adhere to them.
- Before commissioning the entire measuring point, check all the connections for correctness. Ensure that electrical cables and hose connections are not damaged.
- Do not operate damaged products and secure them against unintentional commissioning. Mark the damaged product as being defective.
- Measuring point faults may only be rectified by authorized and specially trained personnel.
- If faults can not be rectified, the products must be taken out of service and secured against unintentional commissioning.
- Repairs not described in these Operating Instructions may only be carried out at the manufacturer's or by the service organisation.

1.3 Operational safety

The sensor has been designed and tested according to the state of the art and left the factory in perfect functioning order.
Relevant regulations and European standards have been met.

As the user, you are responsible for complying with the following safety conditions:

- Installation instructions
- Local prevailing standards and regulations.

1.4 Return

If the sensor has to be repaired, please return it *cleaned* to the sales centre responsible.
Please use the original packaging, if possible.

Please enclose the completed "Declaration of Hazardous Material and De-Contamination" (copy the second last page of these Operating Instructions) with the packaging and the transportation documents.
No repair without completed declaration!

1.5 Notes on safety icons and symbols

Warning!
This symbol alerts you to hazards. They can cause serious damage to the instrument or to persons if ignored.

Caution!
This symbol alerts you to possible faults which could arise from incorrect operation. They could cause damage to the instrument if ignored.

Note!
This symbol indicates important items of information.

2 Installation

2.1 Incoming acceptance, transport, storage

- Make sure the packaging is undamaged!
  Inform the supplier about damage to the packaging. Keep the damaged packaging until the matter has been settled.
- Make sure the contents are undamaged!
  Inform the supplier about damage to the delivery contents. Keep the damaged products until the matter has been settled.
- Check that the scope of delivery is complete and agrees with your order and the shipping documents.
- The packaging material used to store or to transport the product must provide shock protection and humidity protection. The original packaging offers the best protection. Also, keep to the approved ambient conditions (see "Technical data").
- If you have any questions, please contact your supplier or your sales center responsible.

2.2 Installation conditions

2.2.1 Angle of installation

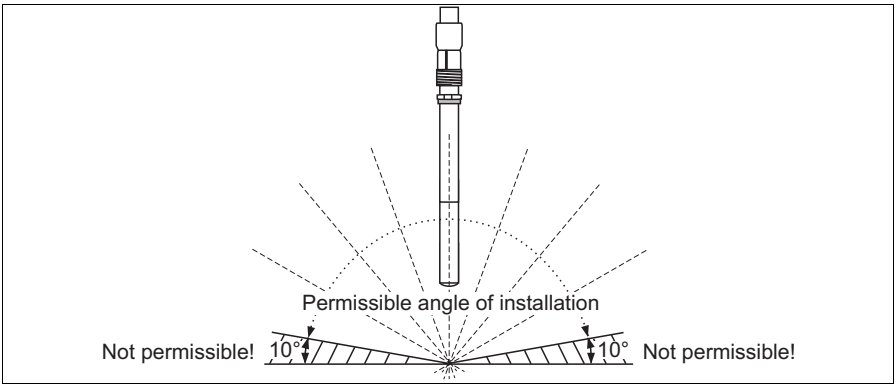

Fig. 1: Permitted installation angle

The sensor must be installed with an angle of inclination of at least 10 ° to the horizontal in an assembly, support or a suitable process connection. Other angles are not permissible. Do **not** install the sensor overhead.

Note!
Make sure you comply with the instructions for installing sensors. You will find them in the Operating Instructions for the assembly used.

2.2.2 Mounting location

- Select the installation location so that there is easy access for later calibration.
- Make sure that upright posts and assemblies are secured safely and vibration-free.
- For immersed operation in an activated sludge basin, select an installation location which produces a typical oxygen concentration.

2.3 Installation instructions

2.3.1 Measuring system

A complete measuring system comprises:
- Oxygen sensor COS21
- Transmitter, e.g. Liquisys M COM223/253 F
- Special measuring cable COK21
- Assembly, e.g. retractable assembly CPA475

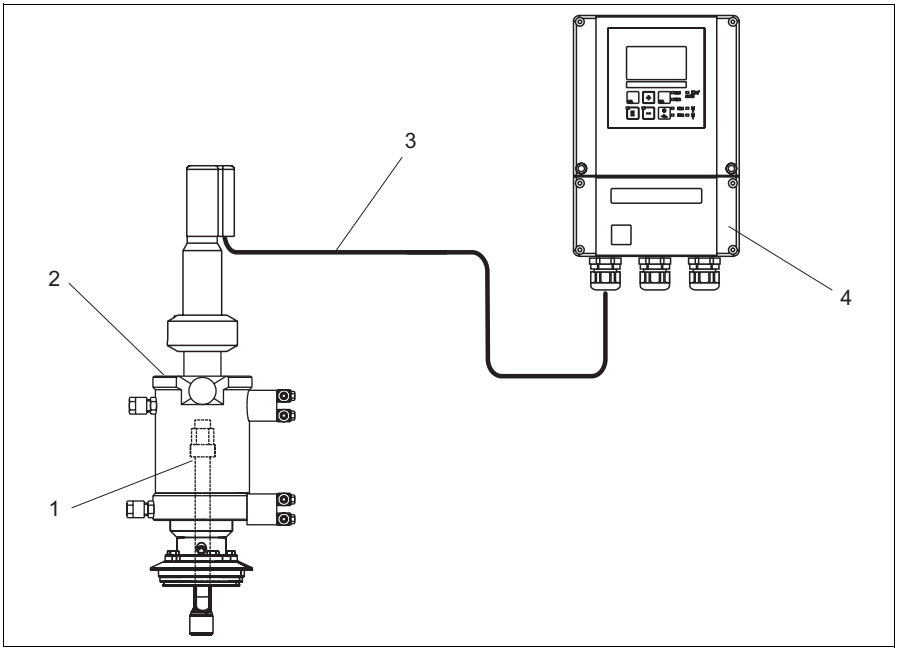

Fig. 2: Measuring system (example)

1 Oxygen sensor COS21
2 Retractable assembly CPA475
3 Special measuring cable COK21
4 Transmitter Liquisys M COM253 F

2.3.2 Installing a measuring point

For a complete installation of a measuring point, proceed as follows:

1. Install a retractable or a flow assembly (if used) into the process.
2. Connect the water supply to the rinse connections (if you use an assembly with cleaning function).
3. Install and connect the oxygen sensor.

Caution!
- **Do not install the sensor suspended from the cable.**
- Screw the sensor into the assembly so that the cable is not twisted.
- Avoid exerting excessive tensile force on the cable (e.g. from jerky pulling).
- Select the installation location so that there is easy access for later calibration.

⚠ Warning!
When using metallic assemblies and installation equipment, comply with national grounding regulations.

2.4 Post-installation check

- Sensor and cable undamaged?
- Cap undamaged?
- Compliance with permissible sensor installation position?
- Is the sensor installed in an assembly and is not suspended from the cable?
- Avoid moisture by rain by fitting the protective cap to the immersion assembly?

3 Wiring

⚠ Warning!
- The electrical connection must only be carried out by a certified electrician.
- Technical personnel must have read and understood the instructions in this manual and must adhere to them.
- Ensure that there is no voltage at the power cable before beginning the connection work.

3.1 Connection to Liquisys M COM223/253 F

The electrical connection between the sensor and the transmitter uses the multi-core special measuring cable COK21.

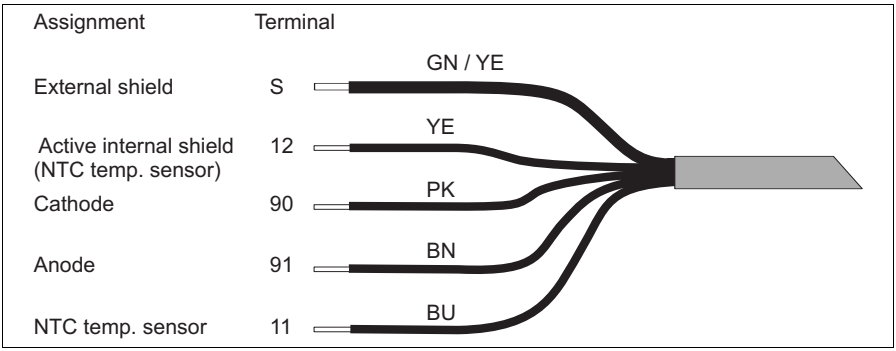

Fig. 3: Special measuring cable COK21

3.2 Post-connection check

Instrument status and specifications	Remarks
Are the sensor, assembly, junction box or cable damaged?	Visual inspection
Electrical connection	**Remarks**
Are the installed cables strain-relieved and not twisted ?	
Is the cable type route completely isolated ?	Power cable/weak current cable
Are the power supply and signal cable correctly connected to the transmitter ?	Use the connection diagram of the transmitter.
Are all the screws terminals properly tightened ?	Tighten
Are all the cable entries installed, tightened and sealed ?	For cable entries lateral: cable loops downwards for water to be able to drip off.
Are all the cable entries installed downwards or lateral ?	

4 Commissioning

4.1 Function check

Before first commissioning, check if:
- the sensor is correctly installed
- the electrical connection is correct.

If using an assembly with automatic cleaning, check the correct water connection at the assembly rinse connection.

⚠ Warning!
Danger of medium leaking off
Before applying compressed air to an assembly with cleaning facility, make sure the connections are correctly fitted. Otherwise, the assembly may not be insert into the process.

4.2 Polarization

The sensor was tested in the factory for perfect functionality and is supplied ready for operation.

To prepare for calibration, proceed as follows:

1. Remove the sensor protective cap.
2. Place the externally dry sensor in atmospheric air. The air should be saturated with water vapour. Therefore, install the sensor as close to the water surface as possible. When calibrating the sensor membrane, make sure the membrane remains dry. Therefore, avoid any direct contact with the water surface.
3. Connect the sensor to the transmitter and switch on the transmitter.

4. Switch-on the transmitter.
   If you connect the sensor to the transmitter, polarization is automatically performed after switching on the transmitter.
5. Wait for the polarization time to end.

Caution!
- When you remove the sensor from the medium, protect the sensor from strong sunlight.
- Make sure you comply with the instructions for commissioning and calibration in the Operating Instructions of the transmitter.

4.3 Calibration

Calibrate the sensor (air calibration) immediately after the polarization time has elapsed.

The calibration intervals depend heavily on:
- The application and
- The installation position of the sensor.

The following methods help you determine how long the calibration intervals should be:

1. Check the sensor one month after its being put into operation by taking it out of the fluid, drying it and then measuring the oxygen saturation index at air after 10 minutes. Decide using the results:
   a. If the measured value is not at 102 ± 2 %SAT, you have to calibrate the sensor.
   b. Otherwise, double the length of time to the next inspection.
2. Proceed as per Point 1 after two, four and/or eight months. In this way, you can determine the optimum calibration interval for your sensor.

Note!
Be sure to calibrate the sensor at least once a year.

5 Maintenance

Maintenance work must carried out at regular intervals. To ensure that it is carried out, we recommend you enter the maintenance dates into an operations logbook or in an operations calendar in advance.
The maintenance cycle primarily depends on the system, the installation conditions and the medium in which measurement is taking place.

The following activities must be carried out:
- Cleaning the sensor
  (In particular when the membrane is soiled)
- Check the measuring function:
  1. Remove the sensor from the medium.

2. Clean and dry the membrane.
3. After about 10 minutes, measure the oxygen saturation index in air (without recalibration).
4. The measured value should be near to 102% SAT.

- If necessary, replace a defective membrane or one which cannot be cleaned any more.
- Recalibration.
  (if desired or required)

5.1 Cleaning the sensor

To ensure reliable measurement, the sensor must be cleaned at regular intervals. The frequency and intensity of the cleaning operation depend on the measuring medium.

Clean the sensor:
- before every calibration
- at regular intervals during operation as necessary
- before returning it for repairs.

Depending on the type of soiling, proceed as follows:

Type of soiling	Cleaning
Salt deposits	Immerse the sensor in drinking water or in 1-5% hydrochloric acid for a few minutes. Afterwards, rinse it with copious amounts of water.
Dirt particles on the sensor body **(not cap!)**	Clean the sensor body mechanically with water and a suitable brush.
Dirt particles on the membrane cap or the membrane	Clean with water and a soft sponge.

Caution!
After cleaning, rinse the sensor with copious amounts of clean water.

5.2 Regenerating the sensor

5.2.1 Replacing the sealing ring

Replacing the sealing ring is only necessary when it is visibly damaged. For replacement, use only original sealing rings.

5.2.2 Replacing the electrolyte

Warning!
Risk of acid burns!
The electrolyte is very caustic. You must follow the appropriate occupational safety regulations. Always wear protective gloves and goggles with handling electrolytes.

To replace the electrolyte, proceed as follows:

1. Remove the membrane cap.
2. Replace the electrolyte and, if necessary, the membrane cap.
3. Place the membrane cap back on the sensor and screw the cap closed to the stop.

5.2.3 Replacing the membrane cap

Removing the old membrane cap

1. Remove the sensor from the medium.
2. Clean the outside of the sensor.
3. Unscrew the membrane cap.
4. If necessary, clean the cathode or replace the sealing ring if it is damaged.
5. Rinse the electrode holder with drinking water.

Installing the new membrane cap

1. Make sure that there are no dirt particles on the sealing surface.
2. Using the pipette supplied, fill approx. 1.5 ml (0.05 fl.oz.) of electrolyte into the membrane cap.
3. Hold the sensor body **straight** and carefully screw the membrane cap onto it **until the stop.**

Note!
After replacing the membrane cap, polarize and recalibrate the sensor. Then insert the sensor into the medium and check that no alarm is displayed on the transmitter.

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Declaration of Hazardous Material and De-Contamination

RA No. ☐☐☐☐☐☐☐ Please reference the Return Authorization Number (RA#), obtained from Endress+Hauser,

Because of legal regulations and for the safety of our employees and operating equipment, we need the "Declaration of Hazardous Material and De-Contamination", with your signature, before your order can be handled. Please make absolutely sure to attach it to the outside of the packaging.

Type of instrument / sensor _____ **Serial number** _____

☐ **Used as SIL device in a Safety Instrumented System**

Process data

Temperature _____ [°F] _____ [°C] Pressure _____ [psi] _____ [Pa]

Conductivity _____ [µS/cm] Viscosity _____ [cp] _____ [mm^2/s]

Medium and warnings

	Medium /concentration	Identification CAS No.	 flammable	 toxic	 corrosive	 harmful/ irritant	 other *	 harmless
Process medium								
Medium for process cleaning								
Returned part cleaned with								

* explosive; oxidising; dangerous for the environment; biological risk; radioactive

Please tick should one of the above be applicable, include safety data sheet and, if necessary, special handling instructions.

Description of failure _____

_____

_____

Company data

Company _____ Phone number of contact person _____

Address _____ Fax / E-Mail _____

_____

_____ Your order No. _____

"We hereby certify that this declaration is filled out truthfully and completely to the best of our

_____ _____ _____

(place, date) Name, dept. (please print) Signature

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