Preliminary Preparations and Calibration of Dissolved Oxygen Sensor

1) Electrical Preparations

Connect a Power Supply to the Display. Use the same type as for the Analysers

Connect the D.O. Sensor to the Display

Remove the transparent Lid from the Display

2) Chemistry Preparations

Have a 1 litre beaker with ½ litre tap water in it ready. If you don't have a beaker any other vessel will do. Use normal water, distilled water is not necessary.

Half an hour before you do experiments prepare a water sample with zero or little oxygen in it:
Use a 500 mL beaker, put 250 mL distilled water in it and dissolve 2 teaspoons of Na_2SO_3 in it. Don't be anxious, the solution will not smell strong.

Have a spray bottle ready to rinse the sensor after you have immersed it in the Na_2SO_3 solution not to carry it over in the beaker with the normal water.

Have enough kitchen towels ready.

3) Preparing the Sensor

Remove the Protection Cap, Connect the sensor to the instrument and immerse the sensor in the tap water. Make sure that the sensor does not stand on its membrane.
If the vessel is wide enough the sensor will lean in an angle. If the vessel is narrow put something small on the bottom, so that the membrane is 1 cm above the bottom.

Let the sensor for ½ hour in the vessel and move it a little from time to time. Watch the display when you move the sensor.

Make notes of the Display Readings.

4) Air Calibration

Take the sensor out of the water, wipe the membrane dry with a kitchen towel and let the sensor lay in the air. Lean it against a book so it is in an angle of 40 to 60 degree.
Wait for 10 minutes and watch the display from time to time.

After this time try to adjust the display to 21.0. Put the Zero Knob in the middle position and adjust with the Gain Knob. If you can't adjust to 21.0 (because the sensor is not prepared long enough) adjust to another straight value (for example 18.0).

Make notes of the Display Readings.

5) Check the Reaction of the sensor in Water

Insert the sensor in the tap water. Move it slowly and watch the reading.
Let it still in the water for some minutes, check the display and move it again.

Make notes of the Display Readings.

6) Check the Reaction of the sensor in Water with zero or little D.O.

Insert the sensor in the Na_2SO_3 solution. Move it slowly and watch the reading.
Let it still in the solution for some minutes, check the display and move it again.

Make notes of the Display Readings.

7) Comments

The sensor consumes oxygen to generate the electric sensor signal, that means when there is no water flow the water near the membrane is depleted of oxygen.
This reduced oxygen concentration near the membrane is shown in a declining sensor signal.

Before starting test procedures immerse the sensor for 1/2 hour in normal tab water. Have the sensor connected to the instrument, which indicates the sensor signal.
Move the sensor from time to time to bring oxygen-rich water near the membrane.

When the sensor is moved, the sensor signal changes, because the movement of the electrolyte inside the sensor generates additional electric signals. Do not confuse this signal change with the signal change due to more oxygen-rich water near the membrane.

When doing the test move the sensor slowly in the water and watch the sensor signal to get a feeling for the effects of movements.

Calibration Procedures:
D.O. Sensors do usually not need a Zero-Calibration, because without oxygen the sensor generates no signal. Some electrochemical side effects may cause a small signal of less than 1% of the full-scale signal. This small signal error can be neglected for the usual measurements.

Therefore only a Full-scale Calibration will be performed.
The Calibration Standard for D.O. Sensors is Air. Air contains 21% of oxygen and we can define this in our test instrument to 21.0 ppm. Usually this is defined as the 100% value in air. A simple Air calibration is performed by exposing the sensor to the air for a time till the signal is stable. This time is usually less than 30 min.

The sensor signal is very stable and guarantees long re-calibration intervals.
When the sensor is newly installed it should be re-calibrated after one week, then again after one month. After this initial procedure the re-calibrating intervals can be some months, depending on the required accuracy.

8) Maintenance

Due to the large inner metal electrodes and the huge volume of electrolyte the sensor has very long service intervals. The sensor stays operational for many months up to one year.

Depending on the water conditions and location a more frequent cleaning of the membrane can be necessary Simply removing the sensor from the water and wipe the membrane with a soft clothe.

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