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INSTRUCTION SHEET
DISSOLVED OXYGEN PROBE

Introduction

This instruction sheet provides information on the Hach Dissolved Oxygen Probe for use with the *sens**ion***™*6* Dissolved Oxygen Meter.

The Dissolved Oxygen Probe is a Clark-type amperometric sensor used to measure dissolved oxygen in aqueous solutions. It consists of an anode/cathode electrode system and potassium chloride-based electrolyte, separated from the sample by a replaceable oxygen-permeable Teflon membrane. A built-in thermistor provides automatic temperature compensation when using the *sens**ion**6* Dissolved Oxygen Meter.

Specifications

	Dissolved Oxygen Probe 1-meter cable	**Dissolved Oxygen Probe 3-meter cable**	**Dissolved Oxygen Probe 15-meter cable**
Warranty	1 year	1 year	1 year
Concentration Range	0 - 20 mg/L or 0 - 200% saturation	0 - 20 mg/L or 0 - 200% saturation	0 - 20 mg/L or 0 - 200% saturation
Accuracy	± 1.0% Full Scale	± 1.0% Full Scale	± 1.0% Full Scale
Temperature Range	0 - 50 °C	0 - 50 °C	0 - 50 °C
Response Time	99% of full value in 1 minute	99% of full value in 1 minute	99% of full value in 1 minute
Minimum Sample Flow	20 cm/sec	20 cm/sec	20 cm/sec
Drift	< 1%/day	< 1%/day	< 1%/day
Length	150 mm	150 mm	150 mm
Diameter	12 mm	12 mm	12 mm
Connector	5-pin circular	5-pin circular	5-pin circular
Weight Accessory	Optional	Optional	Included

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Assembly Instructions

1. Hold the membrane module cap in a vertical position.

2. Fill the module cap about $^{2}/_{3}$ of the way full with Dissolved Oxygen Electrolyte Filling Solution, Hach Cat. No. 27591-26.

3. Hold the DO probe in a vertical position with the tip down and gently screw the module cap onto the tip. Electrolyte should leak out of the threads.

Note: *If electrolyte does not leak out of the threads, air may remain inside the module cap. To ensure accurate results, repeat this procedure using more filling solution.*

Attach the DO probe cable connector to the input connector at the top of the meter. Refer to the *sens**ion6** Dissolved Oxygen Meter Instruction Manual* for additional information.

Using the Weight Assembly

The Weight Assembly is included with the probe equipped with the 15 m cable. Install the weight assembly as follows:

1. Remove the cap from the body of the weight.

2. Insert the probe into the body.

3. Slide the cap over the cable and thread the cap onto the body.

The weight will help to ensure that the probe travels straight down after being placed in the water and also protects the membrane from damage.

Zeroing the Probe

Chemically zeroing the probe is only necessary when measuring dissolved oxygen at a level less than 1 ppm (or 10% saturation). When measuring in this range, zero the probe prior to calibration. It is only necessary to zero a probe once.

Refer to the *sens**ion6** Dissolved Oxygen Meter Instruction Manual* for specific instructions.

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General Probe Operation

Follow the procedures presented in this section to obtain maximum performance and accuracy from your DO probe:

- Use the DO probe only for aqueous applications.
- Take extra care when handling and storing the oxygen membrane module cap.
- Do not allow the DO probe's sensing area (cap reservoir) to dry out.
- Perform the calibration procedure at the beginning of each day for maximum performance. Recalibrate the DO probe every two hours for maximum accuracy.

The DO probe can be left out of solution for up to 24 hours without damage. If the DO probe is not being used for more than 24 hours, prevent electrolyte evaporation by storing it in the storage/calibration chamber. Refer to the meter instruction manual for more information on probe storage.

Probe Polarization

Note: *Prior to operation, connect the probe to the meter. Allow the probe to stabilize for 30-50 minutes before attempting a calibration.*

Hach dissolved oxygen probes are continuously polarized when they are connected to the instrument. A steady reading will not be seen for 30–50 minutes when the probe is new or when it has been unplugged for more than an hour. Interrupted connections of less than one hour will require 5–25 minutes before stabilizing. Refer to the *sens**ion6** Dissolved Oxygen Meter Instruction Manual* for additional information.

Probe Calibration

Detailed instructions for calibrating the Dissolved Oxygen Probe using a Water-saturated Air or Winkler Titration method are presented in the *sens**ion 6** Dissolved Oxygen Meter Instruction Manual.* Perform a calibration procedure at the beginning of each day for best performance. Obtain maximum accuracy by recalibrating the probe every two hours.

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Dissolved Oxygen Measurement

After the probe is properly stabilized, chemically zeroed (for measurements below 1 mg/L), and calibrated, take measurements as follows:

1. Add the weight assembly to the probe if required (3 m or 15 m cable versions only).
2. Insert the probe into the sample to the desired depth. Agitate the probe in the sample to dislodge air bubbles from the sensing area of the probe tip.
3. Stir the sample vigorously using the probe or a stir stand and stir bar. When sampling bodies of water, create motion around the probe tip by pulling on the cable to move the probe up and down approximately 3-6 inches.
4. When the reading on the meter stabilizes, record the value or store in meter memory.

Storage

To store the probe between measurements, insert the probe tip into the provided Calibration/Storage Chamber containing deionized water.

To prepare the probe for long-term storage complete the following:

1. Disconnect the probe from the meter.
2. Remove the membrane cap assembly.
3. Rinse the anode, cathode, and membrane cap assembly with deionized water.
4. Shake the deionized water out of the membrane cap.
5. Use a clean lab wipe to blot the moisture from the electrode anode and cathode.
6. Thread the membrane cap assembly loosely onto the body of the probe.

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Maintenance

Membrane cap replacement and refilling are required at scheduled intervals or if the probe does not function properly, e.g. in the case of a damaged membrane or contaminated DO probe. If the membrane is not damaged, the recommended time interval for replacing the Electrolyte Filling Solution is 1-2 months.

Note: *Hach supplies a DO probe service kit that includes one 50-mL bottle of Dissolved Oxygen Electrolyte Filling Solution, two Membrane Module Caps and a Polishing cloth.*

Prior to replacing a membrane cap, rub the anode (the outer, metallic stem of the probe that is visible when the membrane cap is removed) with the polishing cloth supplied with the probe. The polishing cloth will remove deposits that may decrease the performance of the probe. Polish the anode whenever the membrane cap is replaced or between membrane cap replacements if the performance of the probe seems to have degraded over time.

BOD Measurement

Adapt the Model 51970 Dissolved Oxygen Probe for BOD measurements using the BOD Accessary Kit (Cat. No. 51971-00). The kit includes a funnel and spacer that fit the Model 51970 DO Probe and a standard 300 mL BOD bottle. The funnel has a stir bar incorporated into the end which, when used with a stir stand, creates the proper stirring motion required for BOD measurement. The spacer positions the DO probe properly in the funnel. The funnel allows for sample displacement with insertion of the DO probe and limits exposure to atmospheric oxygen. Consult the *sens**ion6** Dissolved Oxygen Meter Instruction Manual* for more information.

Barometric Pressure Correction

The values presented in *Table 1* are based on the assumption that the barometric pressure at sea level is 760 mm Hg. Use *Table 1* to determine the barometric pressure at specific elevations or obtain the current barometric pressure from a local weather service. See the *sens**ion6** Dissolved Oxygen Meter Instruction Manual* for specific calibration instructions when using *Table 1*.

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Table 1 Elevation Barometric Pressure

Elevation in feet	Elevation in meters	Barometric pressure in mm Hg	Elevation in feet	Elevation in meters	Barometric pressure in mm Hg
0	0	760	6000	1829	613
500	152	746	6500	1981	601
1000	305	733	7000	2134	590
1500	457	720	7500	2286	579
2000	610	708	8000	2438	568
2500	762	695	8500	2591	559
3000	914	683	9000	2743	548
3500	1067	671	9500	2896	538
4000	1219	659	10000	3048	527
4500	1372	647	10500	3200	517
5000	1524	635	11000	3353	506
5500	1676	624			

Replacement Parts and Accessories

BOD Accessory Kit (includes funnel and spacer for DO probe 51970) 51971-00
Bottle, BOD w/stopper, 300-mL 621-00
Calibration and Storage Chamber 51974-00
DO Probe Service Kit (includes DO Electrolyte Filling Solution, two Membrane Module Caps, and Polishing cloth) 51968-00
Electrode Holder w/Electromagnetic Stirrer, 115 V 45300-01
Electrode Holder w/Electromagnetic Stirrer, 230 V (without plug) 45300-02
Filling Solution, 50 mL 27591-26
Replacement Membranes, 2/pkg 51973-00
Weight Assembly for the DO Probe 51969-00

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