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Find the *Lazar DO-166-MT* at our website: ***Click HERE***

LAZAR RESEARCH LABORATORIES, INC.

INSTRUCTIONS FOR
DO-166-MT

The micro dissolved oxygen probe has a special probe extension which narrows down to less than 0.125 inches (.32 cm). It can be used for measurements of dissolved oxygen in tissue, petri dishes, and other biological applications. The instructions for the use of this probe are identical to the DO-166 probe except that stirring need not be used where space is limited and stirring is impractical.

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ELECTRODE CALIBRATION
For pH meters having full 1400 mV to 19999 mV scale

1. Take DC power adapter which comes with DO probe kit and plug into wall outlet (110/220 Volts AC). Insert plug from DC power adapter into receptacle on DO probe black amplifier box marked ON--OFF. Plugging the DC power adapter into the DO probe turns the DO probe on. To turn the DO probe off remove the DC power adapter from the DO probe. For portable applications use the DC battery pack (an accessory which can be ordered) and plug it into the receptacle on DO probe black amplifier box marked ON--OFF.

Locate output cable on black amplifier box and plug connector at end of output cable into input receptacle of pH meter. Switch pH meter to read millivolts. Thoroughly rinse membrane tip of DO electrode with distilled water and dry with paper wiper (Kimwipes etc).

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LAZAR RESEARCH LABORATORIES, INC.

INSTRUCTION MANUAL

OPERATING INSTRUCTIONS FOR DO-166

DISSOLVED OXYGEN SYSTEM

INTRODUCTION: The DO-166 Dissolved Oxygen Probe can be used to measure dissolved oxygen in lakes, rivers, and other water sources. The probe can also be used to measure biological oxygen demand (BOD) in the laboratory. Anions, cations, and most other dissolved oxygen gases do not interfere with DO measurements. The concentration range of the electrode is 0 to 20 ppm dissolved oxygen. The electrode is designed to be used with any pH meter having a millivolts scale.

ELECTRODE ASSEMBLY:

1) Rinse electrode opening with distilled water making sure all water is removed after rinse.

2) Hold electrode with tip facing up and cable facing down, using laboratory clamp, and fill electrode mouth with filling solution (completely fills bottom portion of electrode body). Put a few additional drops of solution on silver electrode tip. (See Figure 1 of electrode diagram).

3) Remove one membrane from membrane bag and place on top of electrode tip (See Fig. 1). Force o-ring supplied with kit over membrane and onto black body of electrode, being careful to obtain a tight seal between the silver electrode and the membranes. Once the o-ring is in position, membrane can be further pulled underneath o-ring to give smooth tight seal of membrane against silver electrode. Remove electrode from clamp and face electrode tip with membrane down. Loosen membrane slightly by moving o-ring toward silver tip, and carefully retighten, making sure not too much force is used. If membrane is too tight, or loose, on silver electrtode, it will not work properly. Membrane should lie smoothly against silver electrode but should not be so tight that solution from body cannot reach silver electrode.

ELECTRODE CALIBRATION: For pH meters having full 1400 mv or 1999 mv Scale

1) Connect electrode to pH meter and switch meter to read millivolts. Turn power switch on DO probe to ON . Thoroughly rinse electrode with distilled water and wipe dry with paper wiper (Kimwipes, etc.).

2) The pH meter may initially be reading off scale. This is not a malfunction, but occurs when the probe is initially turned on. After waiting 10 minutes, adjust CAL potentiometer, using small screwdriver so that pH meter reads values given in Table I, which are corrected for temperature and pressure.

NOTE: If electrode is still reading off scale after 10 minutes, turn CAL potentiometer in counter clockwise direction until reading comes on scale. If electrode is still reading off scale after CAL adjustment, check contact between membrane and silver electrode, making sure that film of solution is present between the silver electrode and the membrane.

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TABLE I. Electrode Calibration vs. Temperature & Pressure

TEMP oC	Pressure Millimeters Hg							
	775	760	750	725	700	675	650	625
0	1490	1460	1440	1390	1350	1290	1250	1200
5	1310	1280	1260	1220	1180	1140	1090	1050
10	1160	1130	1120	1080	1040	1010	970	930
15	1040	1020	1000	970	930	900	870	830
20	930	920	910	870	840	810	780	750
25	850	840	830	800	770	740	710	680
30	780	770	760	730	700	680	650	620
35	720	710	700	670	650	620	600	570
40	670	650	640	620	600	570	550	530
45	620	600	590	570	550	530	510	480
50	570	560	550	530	510	490	470	440

For example, If the temperature is 25oC and the pressure is 760 mm Hg set CAL potentiometer so that pH meter reads 840 millivolts. If the temperature is 35oC and the pressure is 775 mm Hg set CAL potentiometer so that pH meter reads 720 millivolts. For intermediate values to those listed in the table above interpolate between values given in table. The electrode is now set up to read Do directly each 100 mv corresponding to 1 ppm dissolved oxygen.

ELECTRODE CALIBRATION:- For pH meters having zero center scale and ± 700 mv scale.

1) For meters having a ± 700 mv scale, only the positive half of the scale is used. Follow exact same procedure as in calibrating full scale 1400 mv or 1999 mv meters, but divide millivolt values in the table above by 2. For example, If the temperature is 25oC and the pressure is 760 mm Hg set CAL potentiometer so that pH meter reads 840/2=420 millivolts. If temperature is 35oC and pressure is 775 mm Hg set CAL potentiometer so that pH meter reads 720/2=360 millivolts. Each 50 millivolt reading on pH meter will correspond to 1 ppm dissolved oxygen.

NOTE: If electrode reads off scale after initial calibration period turn CAL potentiometer in counter-clockwise direction until reading comes on scale.

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ELECTRODE ZEROING: Electrode has been zeroed at facrory and shold be rezeroed periodically for most accurate readings.

1) Prepare zero oxygen solutuion by adding 16 grams of sodium bisulfite NaHS03 to 1 liter of distilled water. Keep solution in closed container when not in use. Prepare new solution about once a month.

2) Place some zero oxygen solution into tall narrow beaker (e.g. graduated cylinder) and immerse electrode into solution so that electrode is covered up to the cable end.

3) Connect electrode plug to input terminals of pH meter and switch pH meter to read millivolts. Turn power switch on DO to ON.

4) The pH meter may initially be reading off scale. This is not a malfunction, but occurs when the probe is initially turned on. After wating 10 minutes, read millivolts on pH meter and adjust ZERO potentiometer oon DO-166 probe with small screwdriver until pH meter reads zero millivolts.

5) Redo standardization as described in previous sections.

DISSOLVED OXYGEN MEASUREMENT

1) After calibration procedure has been completed, immerse electrode into water source. Stir solution being measured by using a magnetic stirrer for laboratory BOD measurements and stirring motor or paddle for field measurements. Stirring rate should be fast enough so that convection is clearly visible in liquid sample.

2) Allow millivolts reading to stabilize for about 2 minutes, and read millivlots on pH meter. To find dissolved oxygen concentration, proceed as follows:

a) pH meter having 1400 or 1999 millivolts full scale-
divide millivolts reading by 100 to get dissolved oxygen reading. For example, if millivolts reading is 654 millivolts, then dissolved oxygen value is 6.54 parts per million (ppm).

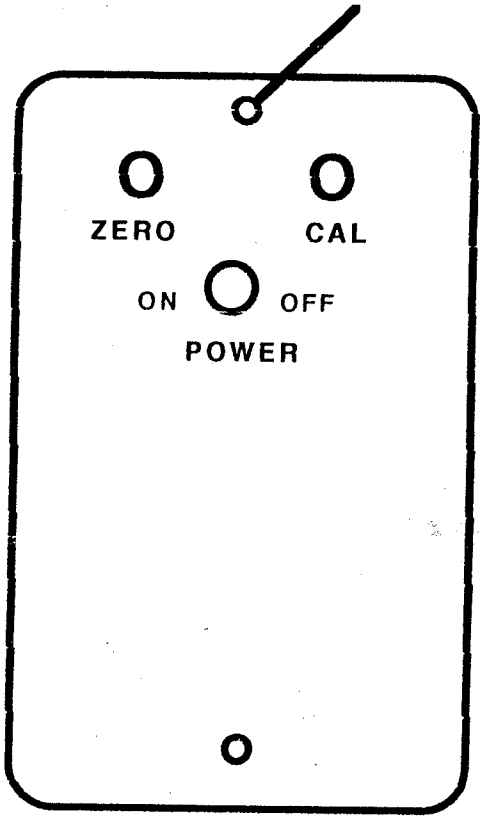
b)pH meter having zero center scale-
divide millivolts reading by 50 to obtain dissolved oxygen reading. For example, if millivolts reading is 420 millivolts, then dissolved oxygen value is 8.4 ppm.

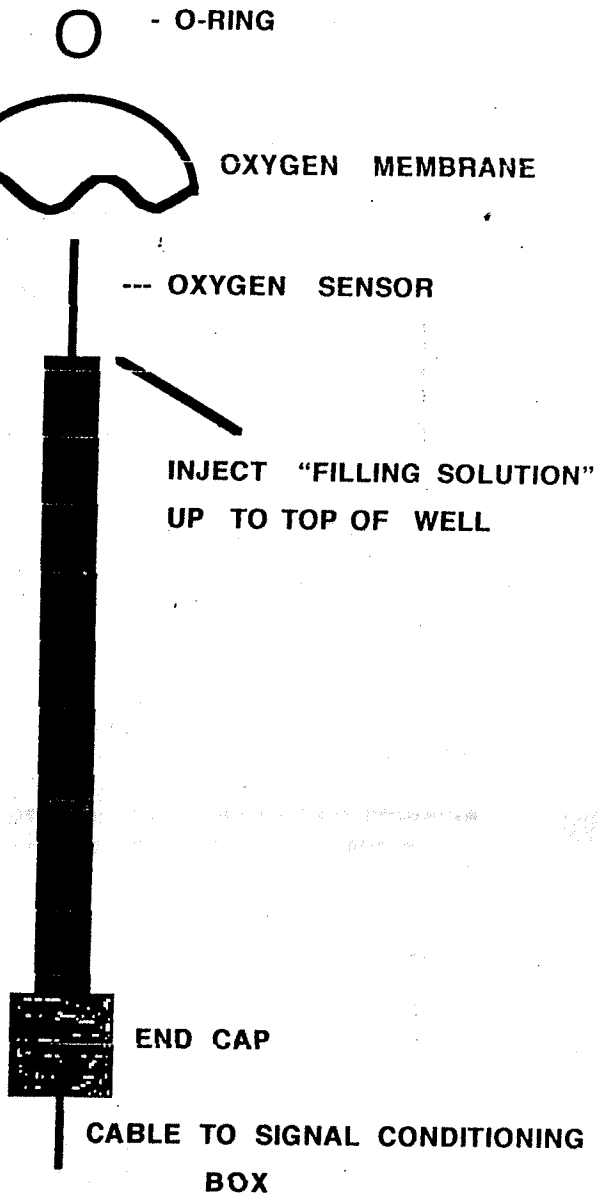
ELECTRODE STORAGE: When the DO eelctrode is not in use, the membrane should be removed and filling solution poured out. The electrode should then be thoroughly rinsed with distilled water. Dry electrode and membrane and place membrane back on electrode (using o-ring) with no liquid inside DO electrode. Place electrode into dry storage area with power switch in the OFF position.

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DO-166MT OXYGEN PROBE

Figure No. 1





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ELECTRODE TROUBLESHOOTING

Malfunction- Low millivolt reading when calibrating electrode, even though CAL potentiometer is open all the way.

Possible causes and remedies

a) Low battery voltage-check batteries with voltmeter. Voltage shold be 7.5 volts or higher.

b) Oxide layer on silver electrode - rub silver electrode surface lightly once or twice over emery paper provided with DO kit.

Malfunction- unable to zero electrode

Possible causes and remedies

a) Low battery voltage - check batteries with voltmeter. Voltage shoild be 7.5 volts or higher.

b) Old zero solution - prepare fresh zero solution by adding 16 grams sodium bisulfite to 1 liter distilled water.

Malfunction- reading too high or reading off scale.

Possible causes and remedies

a) Lead spiral electrode too close to top of electrode body - take small screwdriver and push lead alloy electrode spiral down into chamber of DO probe as far as it will go (do not exert excess force.).

b) Bad connection between pH meter and DO probe - check and clean contacts of both pH meter and DO probe. Contacts chould be cleaned with acetone.

Malfunction - DO reading too low compared to true DO value.

Possible causes and remedies

a) Insufficient stirring - increase stirring rate so that convection currents are clearly visible in solution being measured.

ROUTINE MAINTENENCE

1. Resurfacing silver electrode - Silver electrode should be resurfaced by rubbing lightly once or twice against emery paper provided with DO kit. This procedure should be done when electrode has not been used for more than two weeks, or every four weeks, when electrode is in use.

2. Battery replacement - Batteries shold be replaced when they read below 7.5 volts.

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3. Resurfacing lead alloy electrode- A deposit builds up on the lead alloy electrode which should be carefully removed once every three to four months. Using a screw driver, carefully pull out the lead wire and carefully rub with emery paper provided in DO kit. Carefully recoil the lead alloy wire and push it back into the DO chamber as far as it will go.

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