

Instruction Manual

DO 300

Waterproof Hand-held Dissolved Oxygen / Temperature Meter



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Rev 3 02/04

Preface

This manual serves to explain the use of the Waterproof DO 300 hand-held meter. It functions in two ways, firstly as a step by step guide to help you to operate the meter. Secondly, it serves as a handy reference guide. It is written to cover as many anticipated applications of the Waterproof DO 300 meter as possible. If there are doubts in the use of the meter, please do not hesitate to contact the nearest Authorised Distributor.

Eutech Instruments/ Oakton Instruments cannot accept any responsibility for damage or malfunction to the meter caused by improper use of the instrument.

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1 INTRODUCTION

Thank you for selecting the DO 300 waterproof portable meter. This meter is a microprocessor-based instrument that is designed to be handy and capable of allowing one-hand operation. It is capable of measuring Dissolved Oxygen in mg/L or ppm, % Saturation of Oxygen and Temperature. It is completely WATERPROOF --- and it FLOATS!

This meter has many user-friendly features ---- all of which are completely accessible through the water-resistant membrane keypad. Your meter includes a dissolved oxygen / temperature probe with submersible cable (inclusive maintenance kit), instruction manual, and a warranty card. Please read this manual thoroughly before operating your meter.



Figure 1: Waterproof DO 300 Dissolved Oxygen Meter

2 DISPLAY AND KEYPAD FUNCTIONS

2.1 Display

The LCD has a primary and secondary display.

- The primary display shows the measured DO value either in mg/L, ppm or %, depending on units of measurement selected.
- The secondary display shows the measured temperature in °C.

The display also shows error messages, keypad functions and program functions. See Figure 2.

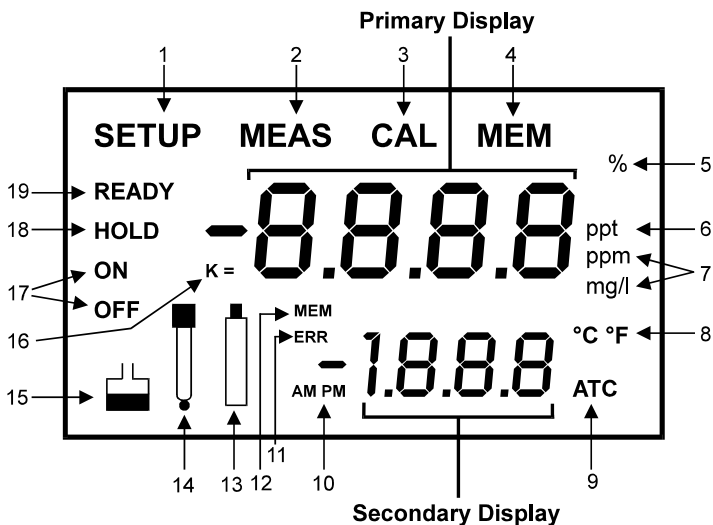



Figure 2: Full LCD Screen

- | | | |
|--|---|---------------------------------|
| 1. SETUP mode indicator | 8. Temperature indicator | 14. Probe indicator |
| 2. MEASurement mode indicator | 9. Automatic Temperature Compensation indicator | 15. Calibration indicator |
| 3. CALibration indicator | 10. Clock indicator | 16. DO probe cell factor |
| 4. MEMory recall mode indicator | 11. ERRor indicator | 17. Function ON / OFF indicator |
| 5. % saturation indicator | 12. MEMory location indicator | 18. HOLD indicator |
| 6. ppt indicator for input of Salinity value. | 13. Low battery indicator | 19. READY indicator |
| 7. Oxygen solubility indicator in mg/L or ppm. | | |

2.2 Keypad

The large membrane keypad makes the instrument easy to use. Each button, when pressed, has a corresponding graphic indicator on the LCD. See Figure 1. Some buttons have several functions depending on its mode of operation.

Key	Function
ON/OFF	Powers meter on and off. The meter powers on in the mode that you were last using. For example, if you shut the meter off in mg/L measurement mode, the meter will be in mg/L measurement mode when switched on. Note: The meter shuts off automatically after 20 minutes of the last key press.
HOLD	Freezes the measured reading. To activate, press HOLD while in measurement mode. To release, press HOLD again. <i>NOTE:</i> When auto endpoint feature is switched on, it automatically holds reading after 5 seconds of stability. The HOLD indicator appears on the display. Press HOLD to release auto endpoint feature.
MODE	<ol style="list-style-type: none"> 1. Selects the measurement parameter. Press MODE to toggle between DO % saturation; DO mg/L (or ppm) and date/time. 2. While in CAL mode under mg/L (or ppm) measurement status, this key will toggle between mg/L (or ppm) calibration and temperature calibration (refer to section 4.2)
CAL/MEAS	<p>Toggles between Calibration and Measurement mode.</p> <ol style="list-style-type: none"> 1. In DO % saturation measurement mode, press CAL/MEAS to enter DO % saturation calibration mode. 2. In DO mg/L (or ppm) measurement mode, press CAL/MEAS to enter DO mg/L (or ppm) calibration mode. 3. To abort calibration, press CAL/MEAS key again to go back to measurement mode. <p>While in advanced SETUP mode: Press CAL/MEAS to return to main group menu from sub group menus. Press CAL/MEAS again to return to measurement mode from main menu.</p>
ENTER	<ol style="list-style-type: none"> 1. Press to confirm your calibration values in calibration mode. 2. While in SETUP mode, pressing the ENTER key confirms the main group menu selection and takes you through each sub group menu.
MI/▲ & MR/▼	<p><u>In Measurement mode:</u> Press MI key to store the mg/L (ppm) or % Saturation values with its corresponding temperature and date/time values, into the memory. Press MR to retrieve data from memory in LIFO method.</p> <p><u>In Calibration & Set up mode:</u> In DO mg/L (or ppm) and temperature calibration mode, press ▲ or ▼ keys to increase or decrease the calibration values. In SETUP mode, press ▲ or ▼ keys to scroll through the SETUP main group menu and to set the parameters in the sub group menu.</p>
SETUP	Takes you into the SETUP mode. This mode lets you customise meter preference and defaults, view calibration and electrode data.
	LIGHT : Press to light up the backlit display.

3 PREPARATION

3.1 Inserting the Batteries

Four AAA batteries are included with your meter.

1. Use a Philips screwdriver to remove the two screws holding the battery cover. See Figure 3 below.
2. Remove battery cover to expose batteries.
3. Insert batteries. Follow the diagram inside the cover for correct polarity.
4. Replace the battery cover into its original position and secure into place using the two screws removed earlier.

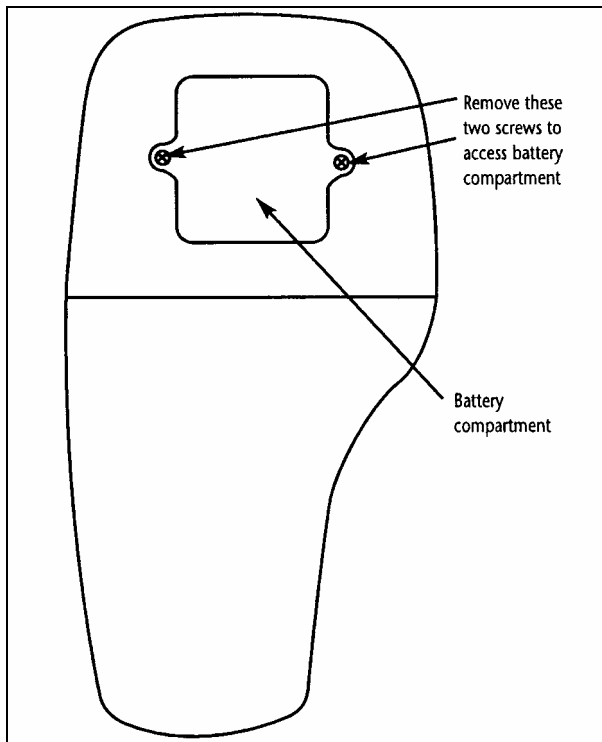


Figure 3: Back panel of meter showing meter compartment

3.2 Connecting the Probe

Your meter uses a dissolved oxygen/temperature probe. The probe cable has a notched 6-pin connector to attach the probe to the meter.

NOTE: Do not substitute other probes. For a replacement probe, see the “Accessories” section, page 47- 48.

NOTE: Keep connector dry and clean. Do not touch connector with soiled hands.

To connect the probe:

1. Line up the notch and 6 pins on the meter’s connector with the holes in the probe’s connector. Push down and turn the locking ring to lock into place. See Figure 4 below.
2. To remove probe, unscrew the metal locking ring by turning the ring counterclockwise and slide up the probe connector. While holding onto metal sleeve, pull probe away from the meter.

CAUTION: Do not pull on the probe cord or the probe wires might disconnect.

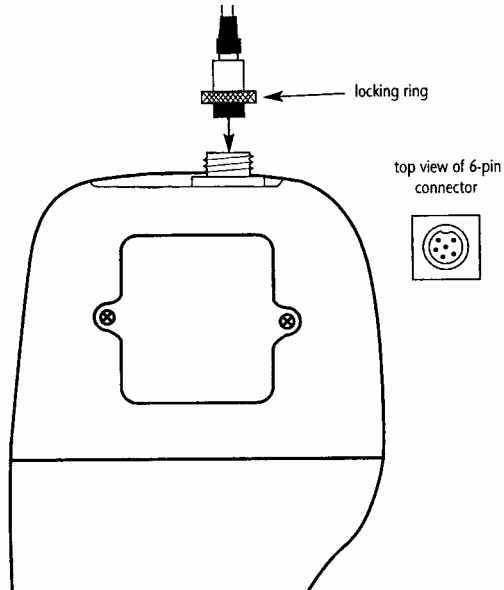


Figure 4: Connect DO Probe

4 CALIBRATION

4.1 Preparing the meter for calibration

The amount of oxygen dissolved in water will depend on its temperature, atmospheric pressure and its salinity. While the pressure and salinity values are manually entered into the instrument, the temperature is being measured by the probe. It is therefore very important that the temperature is calibrated if necessary prior to the DO calibration.

The measurements of % Saturation of DO will linearly affect the measurement for DO in mg/L. Hence calibration in % Saturation of DO should be carried out first.

Before calibrating your meter, make sure to rinse the probe well with DI (de-ionised) water or rinse solution.

NOTE: Do not let membrane surface of the probe touch any other surface. The probe guard (the piece with holes fitted over the end of the probe) protects the membrane; make sure this is always attached to the probe while it is in use.

You can calibrate for dissolved oxygen in either % saturation or mg/L (ppm). When you recalibrate your meter in % saturation mode, old calibrations in % saturation will be replaced while the % saturation offset adjustment will be erased. However, recalibration in the mg/L (ppm) concentration mode will only replace the old calibration in the mg/L (ppm) mode and do not affect the calibration in the % saturation mode.

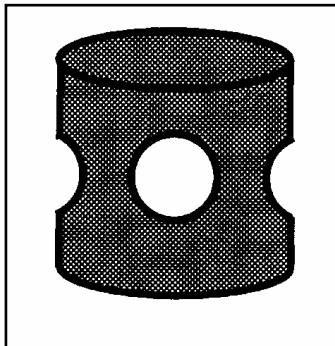


Figure 5: DO Probe guard

Before Calibration

Before starting calibration, make sure you are in the correct measurement mode. When you switch on the meter, the meter starts up in the mode last used (either in mg/L (ppm) or % Saturation measurement mode or clock). For example, if you switch the meter off while it is in the “mg/L” measurement mode, it will also be in the “mg/L” measurement mode when you switch the meter on.

4.2 Temperature Calibration

DO in mg/L is dependent on temperature, so it is first necessary to verify the temperature reading. Temperature calibration is accessible from the mg/L or ppm measurement mode.

The built-in temperature sensor in the probe is factory calibrated. Calibrate your sensor only if you suspect temperature errors may have occurred over a long period of time or if you have a replacement probe.

1. Dip the DO probe into a solution with known temperature. Allow sufficient time for the temperature to stabilise.

NOTE: Use an accurate temperature meter or bath to determine the solution's temperature.

2. Ensure that the meter is in measurement mode. Press MODE key if necessary to select mg/L mode.
3. Press CAL key to go into calibration mode of mg/L. The primary display shows the measured DO in mg/L and the secondary display shows the temperature.
4. Press MODE key to go into temperature offset adjustment mode. The primary and secondary displays will show the temperature values.
5. Press MI/▲ or MR/▼ key to set the correct temperature value.

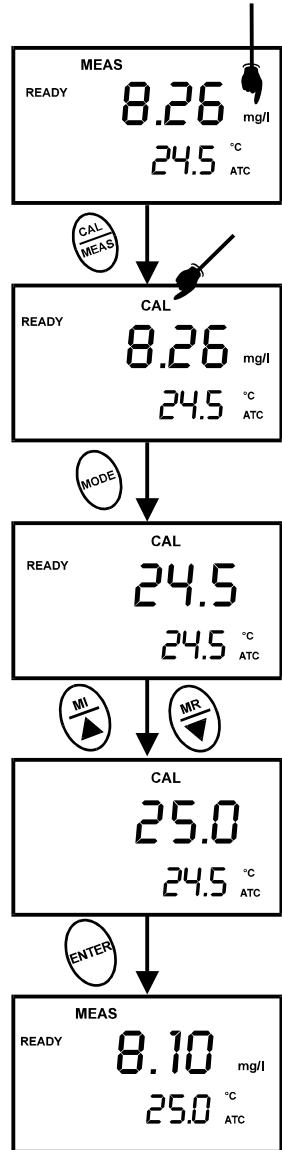
NOTE: Temperature calibration is restricted to $\pm 5^{\circ}\text{C}$ from the factory default value displayed during calibration (shown in the secondary display).

6. Press ENTER key to confirm the adjusted temperature.

NOTE: To exit from Temperature Calibration mode without confirming calibration, DO NOT press ENTER in Step 6. Press CAL/MEAS instead.

Since temperature readings affect the accuracy of the mg/L measurements, it is strongly recommended to carry out a mg/L calibration after a temperature calibration is done.

(The values shown above are for illustration purpose. Your meter may display different values depending on the settings & your environmental conditions)



4.3 Dissolved Oxygen Calibration in % Saturation

You can calibrate this meter quickly and easily in air. The exact calibration value depends on barometric pressure. The meter is set to a factory default of 760 mm Hg, which results in a calibration value of 100% saturation in air.

NOTE: If the barometric pressure setting has been changed from 760 mm Hg, the calibration value in air will automatically adjust to a value other than 100%. The adjusted value will be correct for the new barometric pressure setting.

See page 21 to change the pressure setting. See Pressure vs Altitude Table on page 50 for a table of adjusted % saturation values.

To calibrate 100% Saturation:

1. Press MODE key to select % Saturation mode.
2. Rinse the probe well with deionised rinse water. For best accuracy, wipe the end of the probe dry. Do not touch the membrane.
3. Hold the probe in the air with the sensor facing down and press CAL key to calibrate the meter. The LCD will show a “CAL” mode. The primary display will show the current value of measurement and the secondary display will show “100.0” to which the meter is going to be calibrated. Wait for the reading to stabilise.
4. Press ENTER key to confirm the calibration. The meter automatically calibrates to 100% air saturation and returns to the measurement mode.

NOTES:

Whenever an error occurs during calibration, the ERR indicator appears in the lower left hand corner of the display.

You can offset your % DO calibration. See section 8.4 - OFS: Offset for % Saturation Measurement on page 24 for directions.

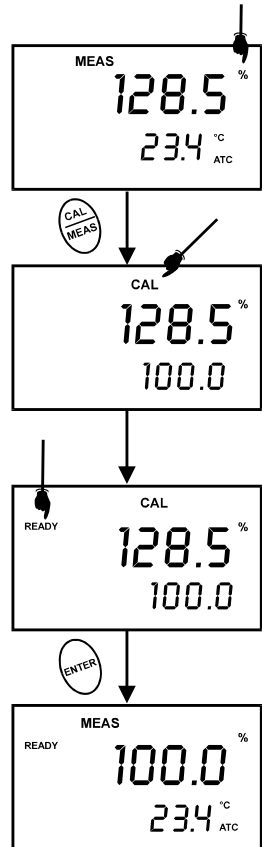


Figure 6: To calibrate for 100% saturation

To calibrate 0% Saturation:

1. Rinse the probe well with DI rinse water. For best accuracy, wipe the end of the probe dry. Do not touch the membrane.
2. Press the MODE key to select the % saturation mode.
3. Place the probe in zero oxygen solution. Stir the solution gently using the probe to homogenize the sample. Make sure that the sample is continuously flowing past the membrane sensor.
4. Press the CAL key. The CAL indicator will appear above the primary display. The primary display will show the factory default % saturation measurement and the secondary display will show 0.0.
5. Wait for the reading to stabilise. If the READY indicator feature is enabled, it will appear when the reading is stable. (See section 8.7.1 on page 29 for Ready indicator setup).
6. Press the ENTER key. The meter automatically calibrates to 0.0% saturation and returns to Measurement mode.

See figure on right.

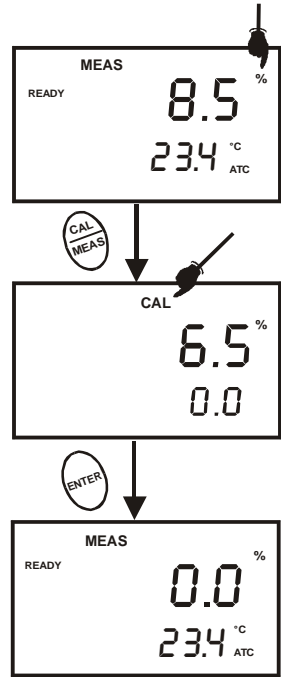


Figure 7: To calibrate for 0.0% saturation

NOTE

The factory default % saturation measurement in step 4 must read at 10% or under for the calibration to work correctly. Whenever an error occurs during calibration, the ERR indicator appears in the lower left hand corner of the display.

4.4 Dissolved Oxygen Calibration in mg/L (ppm) mode

Calibrating the meter to 100% in saturation mode will also calibrate the mg/L mode at the value in mg/L corresponding to 100% saturation. This should produce acceptable results in most applications.

This meter also lets you make a calibration adjustment in mg/L (ppm) mode without affecting your % saturation calibration.

To select between mg/L and ppm units, see page 30.

To calibrate in mg/L (ppm) mode:

1. Calibrate 100% saturation as per Section 4.3.
2. Rinse the probe well with DI rinse water or rinse solution. For best accuracy, wipe the end of the probe dry. Do not touch the membrane.
3. Press the MODE key to select the mg/L (ppm) mode.
4. Dip the probe into a sample of known oxygen concentration. Wait for the reading to stabilise. If the READY indicator feature is enabled, it will appear when the reading is stable.
5. Press the CAL key. The CAL indicator will appear above the primary display. The primary display will show the factory default mg/L (ppm) measurement and the secondary display shows the temperature.
6. Press the MI/▲ or MR/▼ keys to set the reading according to the sample value.
7. Press the ENTER key. The meter automatically calibrates to the value you entered and returns to Measurement mode.

Notes on mg/L (ppm) mode calibration

- During mg/L (ppm) measurement and calibration, the meter adjusts to the barometric pressure value and the salinity value that is programmed into the meter
- You can change the barometric pressure value and salinity value in the mg/L (ppm) SETUP mode (see section 8.3 on page 21 for directions).
- Whenever an error occurs during calibration, the ERR indicator appears in the lower left hand corner of the display.

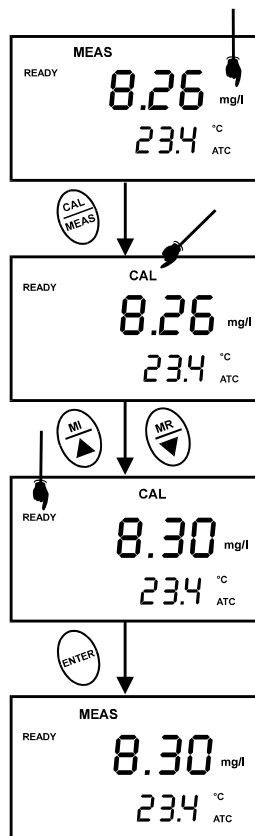


Figure 8: To calibrate in mg/L (ppm) mode
(The values shown above are for illustration purpose. Your meter may display different values depending on the settings & your environmental conditions)

5 MEASUREMENT

5.1 Taking DO readings


During measurement, the probe can be:

- Fully immersed in the solution
- Partially immersed in the solution

Do not allow the probe's membrane surface to touch anything! It is always advisable to insert the probe guard (refer to Figure 34 and 35 on pages 38 and 39)

IMPORTANT: Since the DO probe consumes oxygen from the sample, the sample must constantly flow past the membrane to achieve more accurate readings. You can use a stirrer to accomplish this.

To take measurements:

1. Rinse the probe well with DI rinse water or rinse solution.
2. Select the appropriate measurement mode. Press the MODE key to toggle between modes:
 - % Saturation
 - mg/L (or ppm)
 - date/time clock
3. Dip the probe into the sample. Stir the solution gently using the probe to homogenise the sample. Make sure that the sample is continuously flowing past the membrane sensor.
4. Note the reading on the display. If the READY indicator is switched on, it will appear when the reading is stable.
5. You can press the  (LIGHT) key to activate the backlit LCD. This helps you read measurements in dimly lit areas.

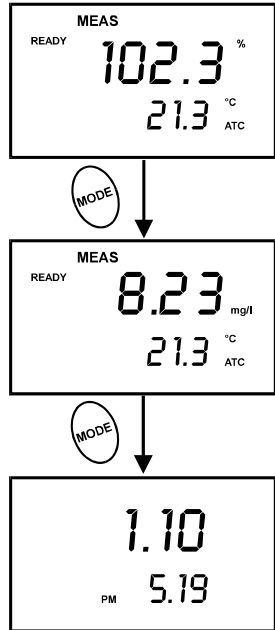


Figure 9: Change measurement mode

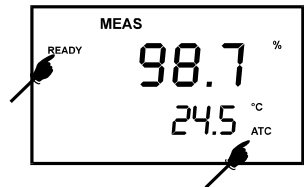


Figure 10: Taking measurement

NOTE: To select between mg/L and ppm units, see Section 8.7.2 on page 30.

The ATC indicator should appear in the lower right hand corner of the display. If it does not, this indicates an error.

Taking measurements with READY ON indicator selected on

If the READY indicator has been activated, the READY annunciator lights when the reading is stable.

To enable or disable the READY indicator – see Section 8.7.1 on page 29 for directions.

Taking measurements with READY HOLD indicator selected on

When a reading is stable for more than 5 seconds, the auto endpoint feature will automatically “HOLD” the reading. The “HOLD” indicator appears on the left side of the display. Press the HOLD key to release the reading.

To enable or disable the Auto endpoint feature– see Section 8.7.1 on page 29 for directions.

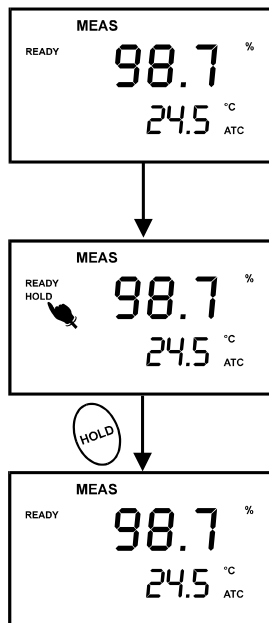


Figure 11 – Auto endpoint feature

(The values shown above are for illustration purpose. Your meter may display different values depending on the settings & your environmental conditions)

5.2 Taking Pressure/Salinity Compensated DO measurements

If necessary, you can adjust the pressure and salinity values of your measurements in the SETUP mode. The DO meter will automatically compensate for salinity and pressure based on the values entered in the SETUP functions. The meter is factory set at 760 mm Hg (101.3 kilo Pascals) pressure adjustment and a factor of 0.0 ppt salinity adjustment. See Section 15 on page 50 for a “Pressure vs Altitude” table.

Pressure Adjustment

1. Press the SETUP key to enter SETUP mode.
2. Press the MI/▲ key once. The upper display shows “dPr”.
3. Press the ENTER key until the upper display shows a number and the lower display shows “Hg” or “PA”.
4. Use the MI/▲ and MR/▼ keys to enter the barometric pressure. The upper display will show the value you have entered.
5. Press ENTER to confirm pressure value.
6. Press CAL/MEAS to return to Measurement mode, or continue with step 5 on page 23 to make a salinity adjustment [available from mg/L (ppm) SETUP mode only].
7. See Figure 18 on page 22.

Salinity Adjustment

NOTE: This mode appears in mg/L (or ppm) SETUP mode only.

1. Press the MODE key to select mg/L (ppm) mode.
2. Press the SETUP key to enter SETUP mode.
3. Press the MI/▲ key once. The upper display shows “dPr”.
4. Press the ENTER key until the upper display shows a number and the lower display shows “SAL”.
5. Use the MI/▲ or MR/▼ keys to enter the salinity of your solution in ppt. The upper display will show the value you have entered. Salinity correction values from 0.0 to 50.0 ppt can be entered.
6. Press ENTER key to confirm value.
7. Press CAL/MEAS to return to Measurement mode.
8. See Figure 19 on page 23.

6 HOLD FUNCTION

This feature lets you freeze the dissolved oxygen and temperature readings for a delayed observation. HOLD can be used any time when in MEAS mode.

To hold a measurement, press the HOLD key while in measurement mode. "HOLD" will appear on the display.

To release the held value, press HOLD again. Continue to take measurements.

NOTE: This meter shuts off automatically 20 minutes after the last key pressed. If the meter is shut off either automatically or manually, the HOLD value will be lost. For longer storage, use the memory functions.

NOTE: This meter has an auto endpoint feature. When this feature is switched on, the display will automatically "HOLD" a reading that has been stable for more than 5 seconds. The "HOLD" indicator appears. Press the HOLD key to release the reading. To switch on or off the auto endpoint feature, see Section 8.7.1 page 29.

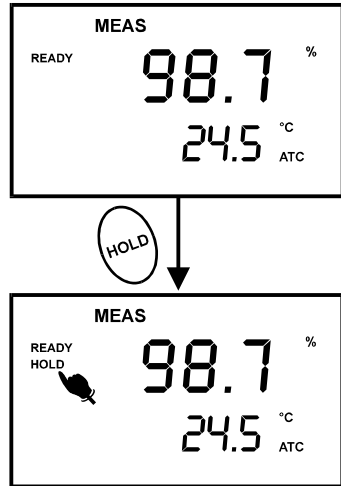


Figure 12: HOLD feature

(The values shown above are for illustration purpose. Your meter may display different values depending on the settings & your environmental conditions)

7 MEMORY FUNCTIONS

7.1 Memory Input

Your meter stores data in sets that include:

- Dissolved oxygen with corresponding temperature reading
- Time and date reading was taken

You can store up to 50 sets of data in any combination of %, mg/L or ppm readings.

To store a reading:

1. During any measurement function (MEAS), press the MI key to input any data into the memory.
2. MEM, "StO" and memory number will flash. The meter then returns to measurement mode.

NOTE: If the memory is full, the first value stored will be erased to create space for the new value.

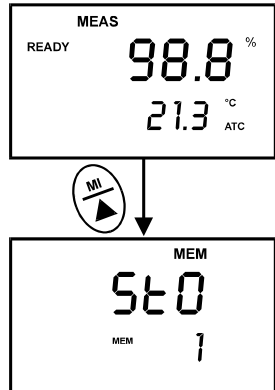


Figure 13: Memory Input, First Value

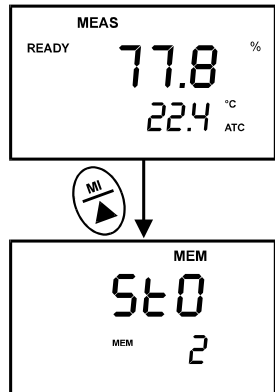


Figure 14: Memory Input, Second Value

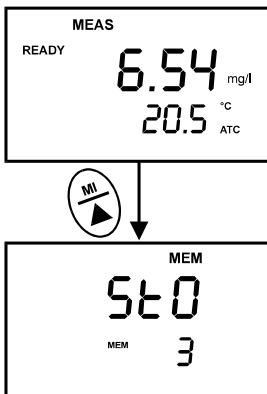


Figure 15: Memory Input, Third Value

7.2 Memory Recall

This function recalls the previous readings stored in the memory. You can only access MR from the MEASurement mode. Memory recall is in “Last In First Out” order.

To recall readings:

1. Press the MR/▼ key once to retrieve the last reading stored. The memory location screen “MEM”, “LOC” and the memory location number will be displayed.
2. Press the ENTER key to recall the reading stored under that memory location number.
3. Press the ENTER key again to view the date and time the reading was taken.
4. Press the ENTER key again to return to the “memory location” screen. The display automatically moves to the next memory location screen.
5. If necessary, use the MI/▲ or MR/▼ key to scroll through the memory location screen.
6. Repeat steps 2 to 5 to review additional stored data sets.
7. To exit Memory Recall, press the MEAS key to return to the Measurement mode.

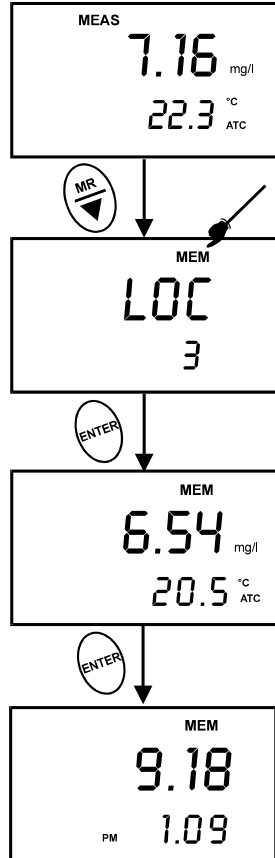


Figure 16: Memory Recall with Date and Time

NOTES

Readings stored in memory are retained even if the unit is turned off. To erase all readings stored in memory, use the “Clr” function in the SETUP mode. See Section 8.2 on page 20.

(The values shown above are for illustration purpose. Your meter may display different values depending on the settings & your environmental conditions)

8 ADVANCED SETUP FUNCTIONS

Your waterproof meter advanced SETUP mode lets you customize your meter parameters. It's menu features different main groups for various parameter preferences.

This meter will have two sets of SETUP mode; one set is when SETUP mode is entered from % saturation or Clock mode (% saturation SETUP mode) and the other set is when SETUP is entered from the mg/L (ppm) measurement mode (mg/L (ppm) SETUP mode). In each set, only main groups which are applicable to the measurement mode you are in when you enter SETUP mode will be featured.

The full selections of available main groups are:

1. **CLR:** Memory clear
2. **dPr:** Dissolved Oxygen parameters
3. **OFS:** % saturation offset adjustment -- *% saturation SETUP mode only*
4. **CAL:** Calibration data
5. **ELE:** Probe data
6. **COF:** Configuration
7. **LCd:** Brightness of Backlit display
8. **CLO:** Clock setting
9. **rSt:** Reset meter to factory default

IMPORTANT: *The main groups selection numbering will change accordingly with respect to the two sets of SETUP mode.*

See Section 17 on page 52 for more a detailed overview on the different parameters available in % saturation mode and mg/L (ppm) mode.

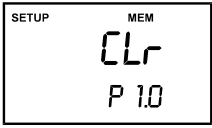
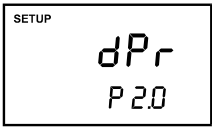
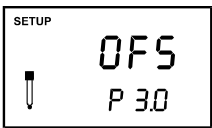
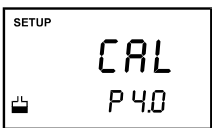
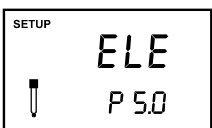
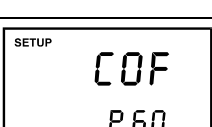
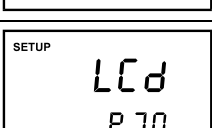
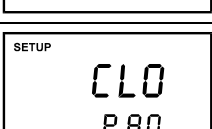
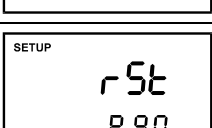
8.1 Advanced SETUP Mode Detailed Overview

Press the SETUP key to enter SETUP mode. Press MI/▲ or MR/▼ keys to scroll through main groups.

mg/L (ppm) Measurement Mode

<p>SETUP MEM CLR P 1.0</p>	<p><u>CLr: Memory Clear</u></p> <ul style="list-style-type: none"> Clear all stored readings <p><i>Instructions on page 20.</i></p>
<p>SETUP dPr P 2.0</p>	<p><u>dPr: Dissolved Oxygen parameters</u></p> <ul style="list-style-type: none"> Select Hg or Pa barometric pressure units Select barometric pressure Select salinity adjustment factor <p><i>Instructions on page 21.</i></p>
<p>SETUP CAL P 3.0</p>	<p><u>CAL: Viewing previous calibration data</u></p> <ul style="list-style-type: none"> View previous calibration data, including date/time <p><i>Instructions on page 25.</i></p>
<p>SETUP ELE P 4.0</p>	<p><u>ELE: Viewing probe data</u></p> <ul style="list-style-type: none"> View probe slope View mV value equivalent to 100% saturation View mV value equivalent to 0% saturation <p><i>Instructions on page 26.</i></p>
<p>SETUP COF P 5.0</p>	<p><u>COF: Unit configuration</u></p> <ul style="list-style-type: none"> Ready indicator ON or OFF / auto endpoint ON or OFF Select mg/L or ppm units Select °C or °F <p><i>Instructions on page 28.</i></p>
<p>SETUP LCd P 6.0</p>	<p><u>LCd: Backlit display</u></p> <ul style="list-style-type: none"> Adjust brightness of backlit LCD <p><i>Instructions on page 32.</i></p>
<p>SETUP CLO P 7.0</p>	<p><u>CLO: Clock setting</u></p> <ul style="list-style-type: none"> Setting year Setting date (month/day) Setting time (hour/minute/second) <p><i>Instructions on page 33.</i></p>
<p>SETUP rSt P 8.0</p>	<p><u>rSt: Reset to factory default</u></p> <ul style="list-style-type: none"> Reset to factory default settings <p><i>Instructions on page 35.</i></p>

% saturation Measurement Mode

	<p><u>CLr: Memory Clear</u></p> <ul style="list-style-type: none"> • Clear all stored readings <p><i>Instructions on page 20.</i></p>
	<p><u>dPr: Dissolved Oxygen parameters</u></p> <ul style="list-style-type: none"> • Select Hg or Pa barometric pressure units • Select barometric pressure <p><i>Instructions on page 21.</i></p>
	<p><u>OFS: % saturation offset adjustment</u></p> <ul style="list-style-type: none"> • Set % saturation offset adjustment <p><i>Instructions on page 24.</i></p>
	<p><u>CAL: Viewing previous calibration data</u></p> <ul style="list-style-type: none"> • View previous calibration data, including date/time <p><i>Instructions on page 25.</i></p>
	<p><u>ELE: Viewing probe data</u></p> <ul style="list-style-type: none"> • View probe slope • View mV value equivalent to 100% saturation • View mV value equivalent to 0% saturation • View offset value <p><i>Instructions on page 26.</i></p>
	<p><u>COF: Unit configuration</u></p> <ul style="list-style-type: none"> • Ready indicator ON or OFF / auto endpoint ON or OFF • Select °C or °F <p><i>Instructions on page 28.</i></p>
	<p><u>LCd: Backlit display</u></p> <ul style="list-style-type: none"> • Adjust brightness of backlit LCD <p><i>Instructions on page 32.</i></p>
	<p><u>CLO: Clock setting</u></p> <ul style="list-style-type: none"> • Setting year • Setting date (month/day) • Setting time (hour/minute/second) <p><i>Instructions on page 33.</i></p>
	<p><u>rSt: Reset to factory default</u></p> <ul style="list-style-type: none"> • Reset to factory default settings <p><i>Instructions on page 35.</i></p>

8.2 Clr: Memory Clear

Use this feature to clear all memory values when you need to store a new series of values. This will avoid confusing the old values with the new ones.

From measurement mode:

1. Press the SETUP key to enter SETUP mode.
2. Press MI/▲ or MR/▼ keys to scroll through main groups until you view parameter “CLr” in the upper display.
3. Press the ENTER key to enter parameter.
4. Press MI/▲ or MR/▼ keys to toggle between NO and YES.
 - NO retains current memory.
 - YES clears all memory
5. Press the ENTER key to confirm selection and return to the main group menu. Press the CAL/MEAS key to return to measurement mode.

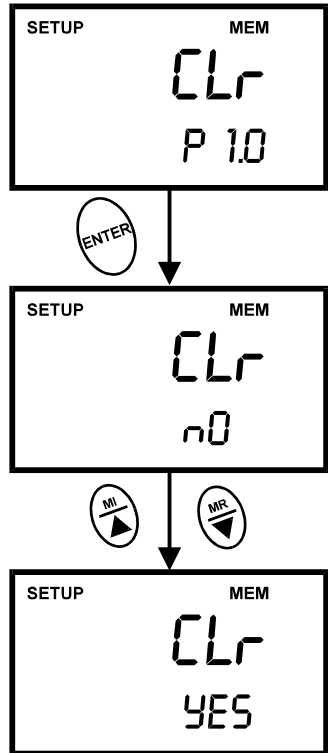


Figure 17 – Memory Clear

8.3 dPr: Dissolved Oxygen Parameters

This parameter lets you adjust the barometric pressure and salinity.

8.3.1 Pressure adjustment mode

Barometric pressure is vital to correct dissolved oxygen measurements. You need to enter the correct barometric pressure of the area where you are performing your DO measurement. This mode lets you perform two functions:

Select either mm Hg or Kilo Pascal barometric pressure units.

Adjust the barometric pressure. See page 50 for a “Pressure vs Altitude” table.

From measurement mode:

1. Press the SETUP key to enter SETUP mode.
2. Press MI/▲ or MR/▼ keys to scroll through main groups until you view parameter “dPr” in the upper display.
3. Press the ENTER key twice. The upper display shows either “Hg” (mm Hg) or ‘PA” (Kilo Pascal) and the lower display shows “bAr”. See Figure 18 on page 22.
4. Press MI/▲ or MR/▼ keys to toggle between mm Hg and Pascal units.
5. Press the ENTER key to confirm selection and move to the next screen. The upper display shows the barometric pressure and the lower display shows the selected unit.
6. Press MI/▲ or MR/▼ keys to adjust the barometric pressure. The pressure adjustment range is 500 to 1499 mm Hg (66.6 to 199.9 kPa).
7. Press the ENTER key to confirm selection and move to Step 5 on page 23 for salinity adjustment (appears only from mg/L (ppm) SETUP mode). If instead you want to return to measurement mode, press CAL/MEAS twice.

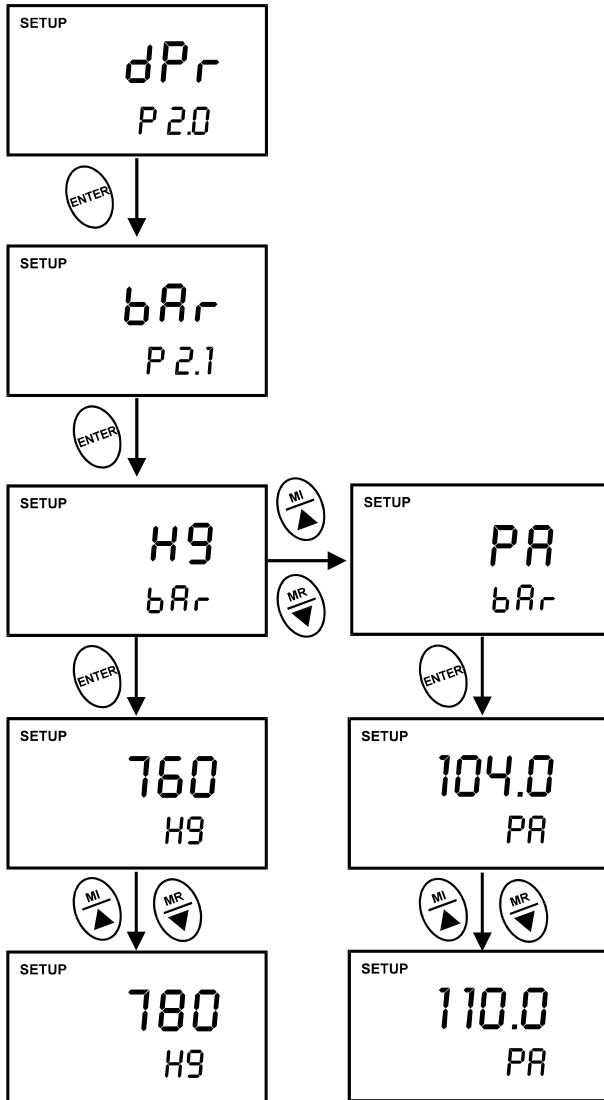


Figure 18: Change pressure units (mm Hg or kPa) & adjusting its values

8.3.2 Salinity Adjustment Mode

NOTE: This mode appears only from mg/L (ppm) SETUP mode .

Salinity correction mode lets you correct for the variations in oxygen solubility due to salt concentration in the sample.

From measurement mode:

1. Press the MODE key to select mg/L (ppm) mode.
2. Press the SETUP key to enter SETUP mode.
3. Press MI/▲ or MR/▼ keys to scroll through main groups until you view parameter “dPr” in the upper display.
4. Press the ENTER key five times. The upper display shows the salinity value and the lower shows **SAL**.
5. Press MI/▲ or MR/▼ keys to enter the correct salinity adjustment factor. The salinity adjustment factor range is 0.0 to 50.0 ppt.
6. Press the ENTER key to confirm selection and to move back to main group “dPr”. If you want to return to measurement mode, press CAL/MEAS.

(The values shown above are for illustration purpose only)

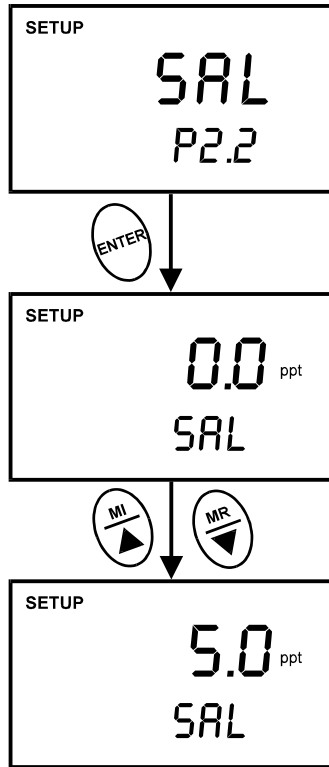


Figure 19: Input Salinity values for automatic correction

8.4 OFS: Offset for % Saturation Measurement

NOTE: This feature appears from % saturation SETUP mode only.

From measurement mode:

1. Press the MODE key to select % saturation mode.
2. Press the SETUP key to enter SETUP mode.
3. Press MI/▲ or MR/▼ keys to scroll through main groups until you view parameter “OFS” in the upper display.
4. Press the ENTER key. The upper display shows the current measurement in % saturation and the lower shows “OFS”.
5. Press MI/▲ or MR/▼ keys to offset the % saturation measurement.
6. Press the ENTER key to confirm selection and to move back to main group “OFS”. If you want to return to measurement mode, press CAL/MEAS.

(The values shown above are for illustration purpose. Your meter may display different values depending on the settings & your environmental conditions)

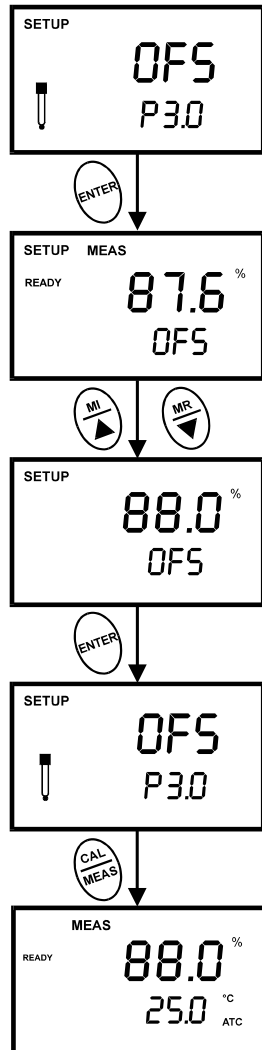


Figure 20: Offset for % saturation

8.5 CAL: Previous Calibration Information

This feature shows you the previous calibration data, along with date and time of calibration. This is a “view only” parameter.

In % saturation SETUP mode: Calibration information is shown in % saturation units.

In mg/L (ppm) SETUP mode: Calibration information is shown in mg/L (ppm) units.

From measurement mode:

1. Press the MODE key to select the calibration data you want to view: % or mg/L (ppm).
2. Press the SETUP key to enter SETUP mode.
3. Press MI/▲ or MR/▼ keys to scroll through main groups until you view parameter “CAL” in the upper display.
4. Press the ENTER key. The upper display shows the calibration data.
5. Press the ENTER key again. The display shows the date and time of the last calibration.
6. Press the ENTER key to move back to main group “CAL”. If you want to return to measurement mode, press CAL/MEAS.

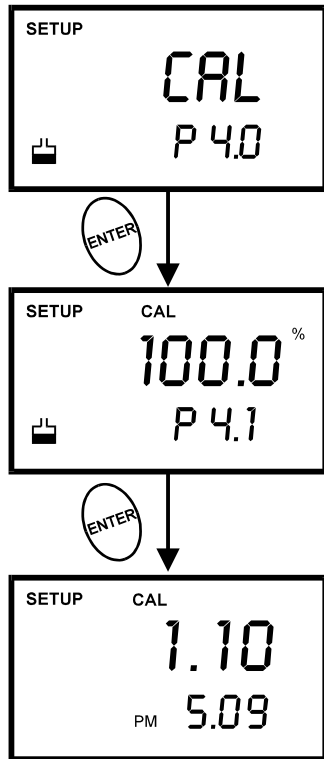


Figure 21: View calibration data

NOTE: If you did not calibrate this meter in a particular mode, the screen will show “---”. See Figure 22.

(The values shown above are for illustration purpose. Your meter may display different values depending on the settings & your environmental conditions)

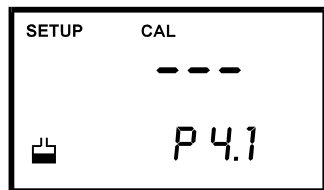


Figure 22: Meter is not calibrated

8.6 ELE: Electrode Properties

These “view only” parameters show you the electrode properties for diagnostic purposes:

- A. **Probe Slope:** Lets you view and give an indication of the probe's efficiency. The value displayed is the ratio of the theoretical value to the actual value produced by the probe. The higher the number, the lesser output from the probe. The ratio displays from 0.5 to 1.999.
- B. **% Saturation Offset:** (available in % saturation SETUP mode only): Lets you see the value of the % saturation offset entered in parameter “OFS” (see page 24 for instructions).
- C. **100% Saturation mV value:** Lets you view the sensor's mV output corresponding to 100% saturation.
- D. **0% Saturation mV Value:** Lets you view the sensor's millivolt output corresponding to 0% saturation.

From measurement mode:

1. Press the MODE key to select the measurement mode for the electrode properties you want to view: % or mg/L (ppm).
2. Press the SETUP key to enter SETUP mode.
3. Press MI/▲ or MR/▼ keys to scroll through main groups until you view parameter “ELE” in the upper display.
4. Press the ENTER key. The upper display shows the probe slope.
5. Press the ENTER key. The upper display shows the % saturation offset. See directions for setting this offset on page 24. NOTE: This % saturation slope and offset appears only in % saturation SETUP mode. If you are in mg/L (ppm) SETUP mode, the meter skips step 4 and 5 to show step 6 on page 27.

Checking electrode data from % saturation SETUP mode

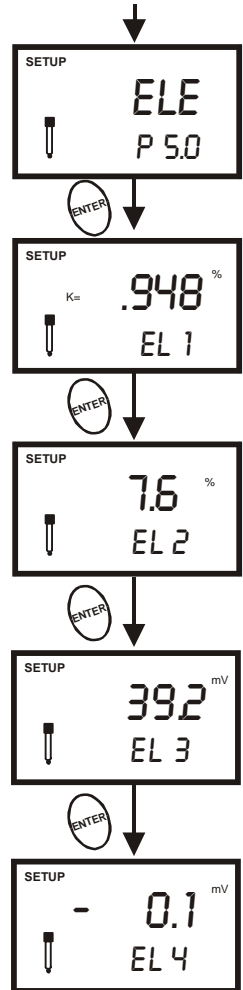


Figure 23: View electrode properties from % saturation SETUP mode

6. Press the ENTER key. The upper display shows the 100% saturation mV value.
7. Press the ENTER key. The upper display shows the 0% saturation mV value.
8. Press the ENTER key to move back to main group "ELE". If you want to return to measurement mode, press CAL/MEAS.

Checking electrode data from mg/L (ppm) SETUP mode

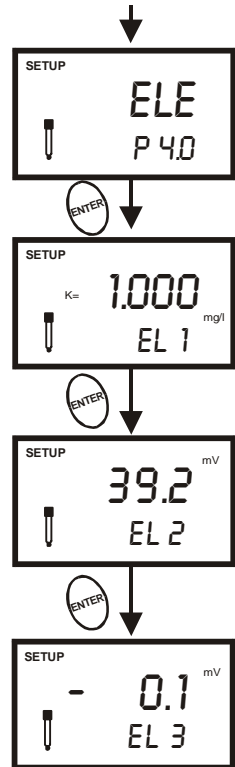


Figure 24: View electrode properties from mg/L (ppm) SETUP mode

(The values shown above are for illustration purpose. Your meter may display different values depending on the settings & your environmental conditions)

8.7 COF: Unit Configuration

Unit configuration mode lets you select the following parameters:

- A. READY indicator and auto endpoint function.
- B. mg/L or ppm units (*available from mg/L or ppm SETUP mode only*)
- C. Temperature in °C or °F.

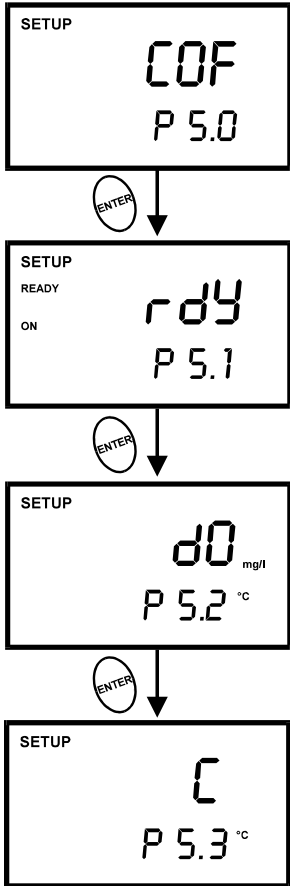


Figure 26: Unit configuration from mg/L (ppm) SETUP mode

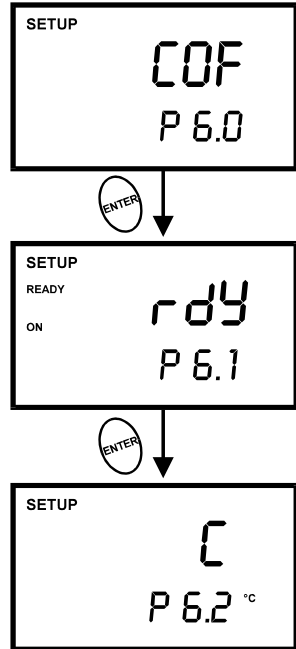


Figure 25: Unit configuration from % saturation SETUP mode

8.7.1 READY Indicator and Auto Endpoint Function

The first program lets you select:

- **“READY indicator ON”** to indicate when the reading is stable.
- **“READY indicator OFF”** for faster meter response.
- **Auto Endpoint Function ON**. Select auto endpoint ON to “HOLD” the reading when it is stable for more than 5 seconds. The display automatically freezes, and the HOLD indicator appears on the left side of the display. Press the HOLD key to release the display and access other functions.

From measurement mode

1. Press SETUP key to enter SETUP mode.
2. Press MI/▲ or MR/▼ keys to scroll through main groups until you view parameter COF in the upper display.
3. Press the ENTER key to select parameter “rdY” (Ready).
4. Press MI/▲ or MR/▼ keys to select the configuration you require.
 - ON switches the READY indicator on.
 - OFF switches the READY indicator off.
 - ON and HOLD together switches the auto endpoint feature on.
5. Press the ENTER key to confirm selection and to proceed to:
 - In % saturation SETUP mode: step 3 on Section 8.7.3.
 - In mg/L (ppm) SETUP mode: step 4 on Section 8.7.2.

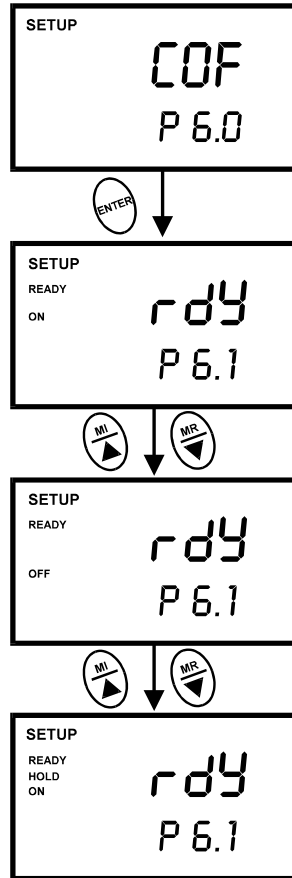


Figure 27: To configure for READY and Auto Endpoint functions

Or press the CAL/MEAS key twice to return to measurement mode.

NOTES: Meter default is set for Ready indicator ON, and auto endpoint function off.

8.7.2 Selecting mg/L or ppm units

NOTE: *This mode appears in mg/L (ppm) SETUP mode only.*

This mode lets you have the option to select either mg/L or ppm dissolved oxygen units.

From measurement mode

1. Press the MODE key to select mg/L (ppm) mode.
2. Press SETUP key to enter SETUP mode.
3. Press MI/▲ or MR/▼ keys to scroll through main groups until you view parameter “COF” in the upper display.
4. Press the ENTER key until “dO” appears in the upper display.
5. Press MI/▲ or MR/▼ keys to toggle between mg/L or ppm units.
6. Press the ENTER key to confirm selection and move to step 4 on next page. Press the CAL/MEAS key twice to return to measurement mode.

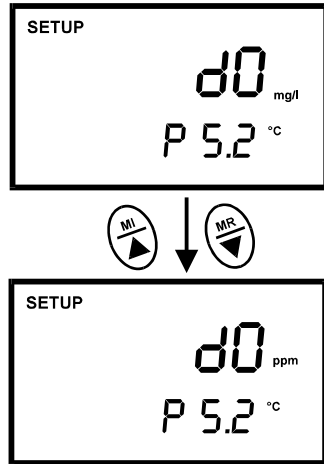


Figure 28: Change from mg/L to ppm unit

8.7.3 Selecting °C or °F Temperature Unit

This meter lets you select between °C and °F units for temperature readings.

From measurement mode

1. Press SETUP key to enter SETUP mode.
2. Press MI/▲ or MR/▼ keys to scroll through main groups until you view parameter “COF” in the upper display.
3. Press the ENTER key until “C” or “F” appears in the upper display.
4. Press MI/▲ or MR/▼ keys to toggle between °C and °F.
5. Press the ENTER key to confirm selection and to return to the main group menu. Press the CAL/MEAS key to return to measurement mode.

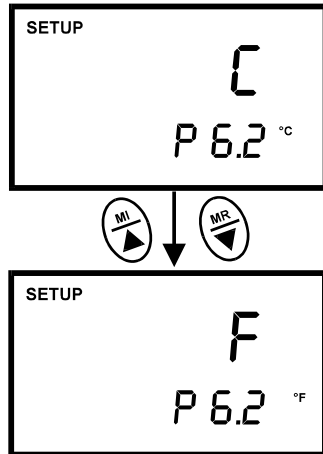


Figure 29: To change from units of measurement for temperature

8.8 LCd: Adjusting LCD Brightness

This mode allows you to make adjustment to the brightness of the backlit LCD. Selecting a dimmer back-lighting level helps conserve batteries.

From measurement mode

1. Press SETUP key to enter SETUP mode.
2. Press MI/▲ or MR/▼ keys to scroll through main groups until you view parameter “LCd” in the upper display.
3. Press the ENTER key. A number (0 – 8) appears in the upper display and “LCd” appears in the lower display.
4. Press MI/▲ or MR/▼ keys to select from level 0 (dimmiest light) to level 8 (brightest light).
5. Press the ENTER key to confirm selection and to return to the main group menu. Press the CAL/MEAS key to return to measurement mode.

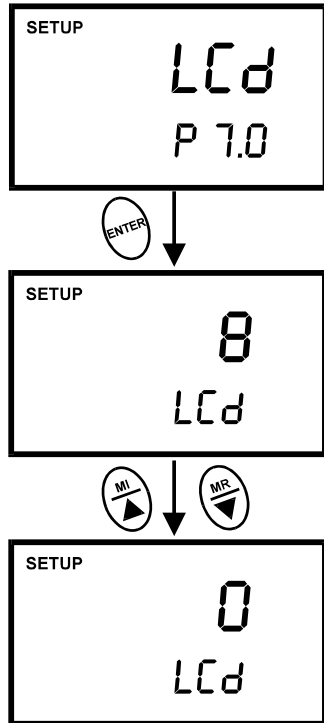


Figure 30: Adjusting LCD brightness

8.9 CLO: Setting the Real-Time Clock

Your meter features a real-time calendar and clock. This helps you meet GLP (Good Laboratory Practice) standards.

From measurement mode

1. Press SETUP key to enter SETUP mode.
2. Press MI/▲ or MR/▼ keys to scroll through main groups until you view parameter “CLO” in the upper display.
3. Press the ENTER key to enter parameter “CLO”. The meter lets you select the century: “19” or “20”. The century digits will flash.
4. Press MI/▲ or MR/▼ keys to toggle to the correct century.
5. Press the ENTER key to confirm the century and move to “year” selection. The “year” digits will flash.
6. Press MI/▲ or MR/▼ keys to toggle to the correct year.
7. Press the ENTER key to confirm the year and move to “month” selection. The “month” digits will flash.
8. Press MI/▲ or MR/▼ keys to toggle to the correct month.
9. Press the ENTER key to confirm the month and move to “date” selection. The “date” digits will flash.
10. Press MI/▲ or MR/▼ keys to toggle to the correct date.
11. Press the ENTER key to confirm the date and move to “hour” selection. The “hour” digits will flash.
12. Press MI/▲ or MR/▼ keys to toggle to the correct hour. Note the “AM” and “PM” indicator on the lower portion of the display.
13. Press the ENTER key to confirm the hour and move to “minute” selection. The “minute” digits will flash.

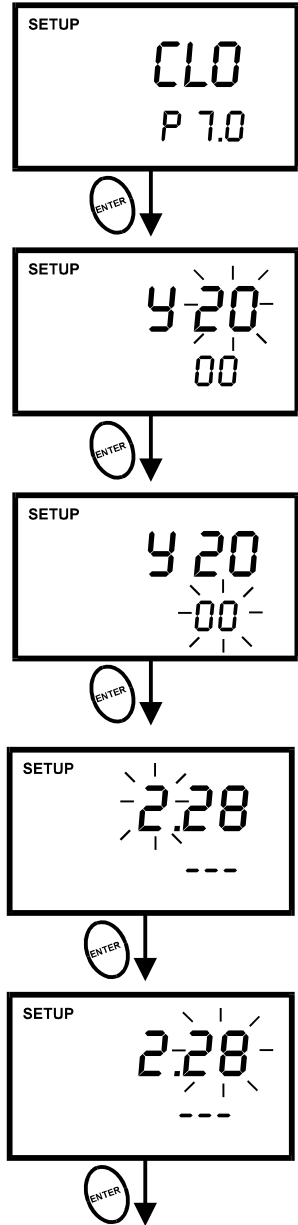


Figure 31: Setting Year and Date information

- 14. Press MI/▲ or MR/▼ keys to toggle to the correct minutes.
- 15. Press the ENTER key to confirm the minutes and move to “second” selection. The “second” digits will flash.
- 16. Press MI/▲ or MR/▼ keys to toggle to the correct seconds.
- 17. Press the ENTER key to confirm selection and to return to the main group menu. Press the CAL/meas key to return to measurement mode.

NOTES

Press the CAL/MEAS key at any point while setting the time to return to the main group menu.

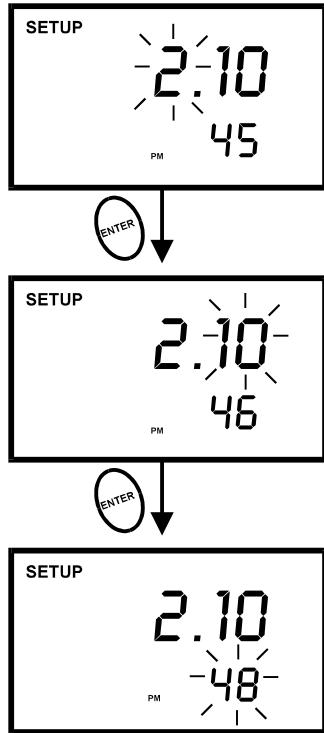


Figure 32: Setting Hours, Minutes & Seconds

8.10 rSt: Resetting to Factory Default Setting

This program lets you reset all parameters to factory default settings. This clears all calibration data, memory, and any other setup functions you might have changed. However, the clock settings will remain as you have set them.

There are also some other parameters that retain settings when reset is done. See Factory Default Setting on page 51 for a table of factory default condition.

From measurement mode

1. Press SETUP key to enter SETUP mode.
2. Press MI/▲ or MR/▼ keys to scroll through main groups until you view parameter “rSt” in the upper display.
3. Press the ENTER key.
4. Press MI/▲ or MR/▼ keys to toggle between NO and YES.
 - NO retains current set up parameters.
 - YES resets parameters to factory default condition. (Refer to Section 16 - Factory Default Setting)
5. Press the ENTER key to confirm selection and to return to measurement mode.

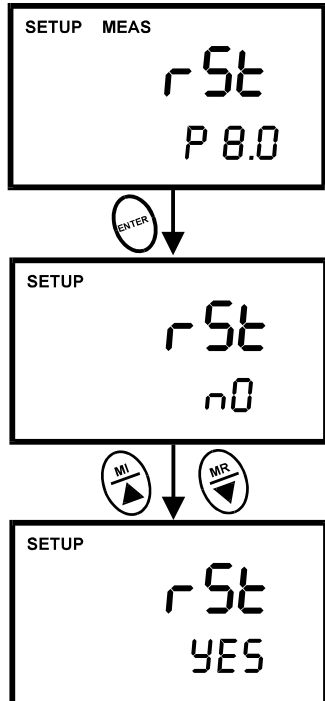


Figure 33: Reset to factory defaults

9 PROBE CARE AND MAINTENANCE

The probe is a galvanic measuring element which produces an output proportional to the oxygen present in the medium in which it is placed. The galvanic probe design lets you take measurements immediately – without the typical 15 minute wait of other dissolved oxygen probes.

The probe consists of two parts:

- An upper part consisting of an anode, a cathode, and cable.
- A lower part consisting of a membrane cap, membrane, and electrolyte solution.

See Figure 34.

Oxygen diffuses through the membrane onto the cathode, where it is consumed. This process produces an electrical current which flows through the cable to the meter. The electric current produced is proportional to the oxygen that passes through the membrane and the layer of electrolyte. This makes it possible to measure the partial pressure of oxygen in the sample at a given temperature.

Since the DO in the sample is consumed by the cathode it is essential that a new sample must flow past the membrane of the probe to prevent the occurrence of false readings. The probe uses very little oxygen for its measurement. This enables it to function correctly with liquid movement as low as 2.5 cm/sec.

The permeability of the membrane to oxygen varies greatly with temperature. Therefore compensation is needed for this variation. The DO probe comes with an in-built Temperature Compensation for the membrane variation.

9.1 Probe Care

Under typical operating conditions, the probe should last for several years. Proper care and maintenance will help you receive the maximum probe life and ensure more accurate readings.

Since any deposits on the membrane surface act as a barrier to oxygen diffusing through the membrane, the membrane must be cleaned at regular intervals to assure maximum reliability.

After using the probe, rinse the probe in clean water and wipe it with a soft cloth or paper to avoid any hardening of deposits. If growth develops on the probe, use a disinfecting chemical to clean.

NOTE

Although the membrane is strong and not easily damaged, wipe it gently while cleaning it. If the membrane is damaged or torn, the probe will no longer function.

There are no special probe storage requirements.

9.2 Membrane Housing Replacement

Replacement of the membrane cap housing/ membrane is required only when you cannot calibrate the probe, or if the membrane is damaged.

Typical membrane damages are punctures or wrinkles caused during measurements or cleaning.

Your new DO probe comes with a replacement membrane housing. To order more replacement membrane housing , see the “Accessories” section on page 47 - 48.

9.2.1 To replace the membrane cap (with pre-installed membrane)

Replacement is much easier with single membrane housing. Simply unscrew the old membrane cap housing, add solution to the new housing, and screw the new cap housing in place.

1. Fill the membrane cap housing with electrolyte solution and inspect the bottom for leaks. If the solution drops are leaking from the membrane, use a new cap housing.
2. If the assembly is leak-free, fill the membrane cap housing with electrolyte to the brim.
3. Tap the side of the housing gently to remove any air bubble that may be sticking to the membrane.
4. Screw the cap onto the probe. Excess electrolyte will drain out.
5. Replace probe guard.
6. Calibrate the probe (see section 4) after the % saturation readings have stabilised.

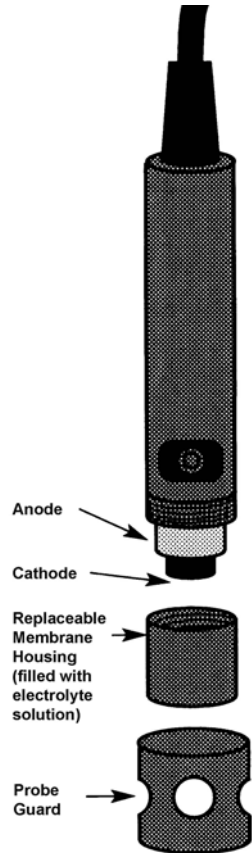


Figure 34: Positioning of O-ring & membrane

9.3 Membrane/O-ring Replacement (Optional Procedure)

It is recommended only experienced service personnel can perform this procedure.

This procedure is **OPTIONAL**, and should only be performed if you have new membrane and O-ring. You are also required to have a membrane installation tool. These items are available as optional accessories in the Accessories section.

1. Pull off the probe guard. See figure on right.
2. Unscrew the membrane cap from the probe.
3. Hold the probe under hot running water and brush away the white oxide on the cylindrical anode with a stiff plastic brush – do not use metal cleaning material.
4. If the cathode has any deposits, remove them with a light scouring powder. Do not polish the cathode.
5. Using the installation tool, unscrew and remove the membrane lock from the membrane cap. See Figure 36.
6. Remove the membrane and O-ring. Discard both.
7. Rinse the membrane cap and membrane lock in tap water.
8. Install a new O-ring inside the membrane cap.
9. Install a new membrane. Make sure the membrane covers the O-ring all around its circumference. See Figure 37.

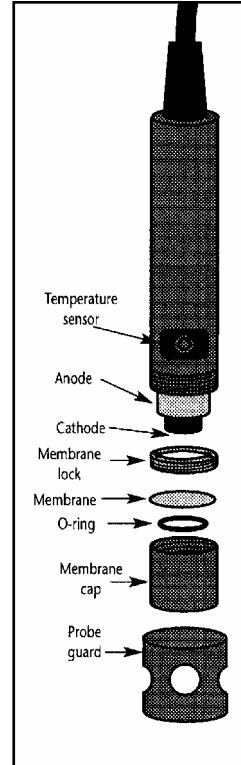


Figure 35: Positioning of O-ring & membrane

NOTE: Membrane replacements available from Oakton Instruments only.

10. Using the installation tool, screw the membrane lock back into the cap. Tighten the lock firmly over the membrane and O-ring, but do not over tighten.
11. Inspect the membrane for wrinkles. If wrinkles exist, remove the membrane and repeat steps 8 – 11.
12. Fill the membrane cap with water and inspect the bottom for leaks. If water drops are leaking from the membrane, re-seal the membrane on the O-ring (repeat steps 8 – 11, for membrane replacement only).
13. If the assembly is leak-free, empty the water and fill the membrane cap with electrolyte to the brim.
14. Tap the side of the housing gently to remove any air bubble that may be sticking to the membrane.
15. Screw the cap onto the probe. Excess electrolyte will drain out.
16. Replace probe guard.
17. Calibrate the probe (see section 4) after the % saturation readings have stabilised.

NOTE

Membranes can only be used once. When a membrane cap is screwed onto the probe, the membrane is stretched by the cathode. If the same O-ring and the membrane is used a second time it will not fit perfectly onto the cathode. This will result in erratic readings.

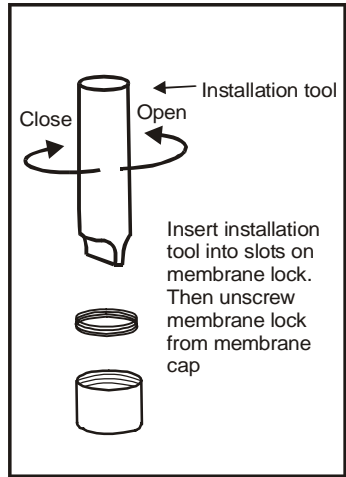


Figure 36: Use installation tool to take out (or put in) membrane

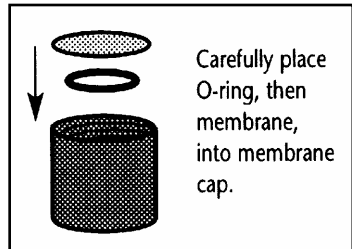


Figure 37: Parts of electrode showing O-ring, membrane & lock

9.4 Electrolyte Solution

The electrolyte solution in your probe's cap will periodically evaporate and need to be replaced. Your new DO probe comes with accessories of one 50-ml replacement electrolyte solution and a spare membrane cap. The replacement electrolyte comes premixed and ready to use. To order more electrolyte solution, see Accessories section.

9.5 DO Probe Troubleshooting Table

When experiencing difficulties with the equipment, keep in mind of the following:

1. Check for the obvious, such as physical condition of the probe, any signs of damage to the cable, power and signal connections etc.
2. Determine whether it is the probe, meter or the surrounding environment that is causing the problem.

The following troubleshooting table identifies most of the problems likely to occur:

Problem	Probable Causes	Solution
<p>1. Fluctuating readings when probe is shaken or bumped lightly or when membrane is touched.</p>	<p>Probe has lost electrolyte – a sloshing noise will be heard when the probe is shaken.</p> <p>Torn or damaged membrane.</p> <p>Wet connections in the wiring or within probe. See Problem 2.</p>	<p>Determine whether it is a physical or electronic problem with the probe.</p> <p>Unscrew the membrane cap, discard the electrolyte, membrane and O-ring.</p> <p>Dry the internals of the probe, especially the cathode with a soft cloth.</p> <p>Switch the meter ON and observe the display.</p> <p>If the display reads zero, the probe and cable circuitry are alright. Service probe and change membrane.</p> <p>If the display does not read zero, but some other value, then there is probably moisture somewhere. See Problem 2.</p>
<p>2. With membrane cap removed and probe internals thoroughly dry, the reading from the probe is not zero and/or is erratic.</p>	<p>Moisture has entered the system – either into the probe itself or at junctions or points in the cable. This moisture creates a secondary galvanic action in addition to that produced by the probe and results in non-zero or erratic readings.</p>	<p>Locate the source of moisture by process of elimination. If moisture has entered a junction box or a cable joint, thoroughly dry out the area and take measures to prevent reoccurrence.</p>

Problem	Probable Causes	Solution
<p>3. It is not possible to calibrate the probe in air – the display will not read high enough after fully adjusting the offset.</p>	<p>Probe has dried out – no electrolyte inside.</p> <p>Probe is overdue for servicing – excessive build-up of anode oxide.</p> <p>A deposit has built-up on the silver cathode, which is inhibiting the reduction of oxygen at its surface.</p>	<p>Service probe and change membrane. Use a stiff nylon brush to remove the oxide built-up from the anode. Do not use a wire brush. It is only necessary to remove the loose oxide layer. If it is suspected that the anode is badly corroded, replace with a new DO probe. Remember to tighten the nut under the anode before fitting a new anode.</p> <p>If it is suspected that a deposit is coating the silver cathode, clean the cathode with 400 grit wet/dry emery paper or with some scouring powder. The deposit is sometimes visible as a brownish stain on the surface of the cathode.</p>
<p>4. Display values are erratic when membrane is lightly touched. Membrane has bulged outwards.</p>	<p>The membrane has been damaged.</p> <p>The breather hole has become plugged. This prevents release of internal pressure due to expansion of electrolyte caused by the probe being warmed up in the sun, for example.</p>	<p>If the membrane has been damaged change it and service the probe.</p> <p>If the breather hole is blocked, clear hole with a pin or fine gauge wire. Change the membrane and service the probe.</p>

NOTE: The cathode must not be polished – the surface must remain dull (do not use a wire brush).

10 TROUBLE SHOOTING GUIDE

Problem	Cause	Solution
No display when turned on	<ul style="list-style-type: none"> a) Batteries not in place b) Batteries not in correct polarity (+ and – position). c) Weak batteries 	<ul style="list-style-type: none"> a) Check that batteries are in place and making good contact. b) Re-insert batteries with correct polarity. c) Replace batteries.
Unstable readings	<ul style="list-style-type: none"> a) Insufficient electrolyte in probe. b) Air bubbles trapped around the probe. c) Dirty probe. d) Probe not deep enough in sample. e) External noise pickup or induction caused by nearby electric motor. f) Broken probe. 	<ul style="list-style-type: none"> a) Fill probe with electrolyte & replace membrane. See page x. b) Tap probe to remove bubbles. c) Clean the probe and re-calibrate. d) Make sure sample entirely covers the probe sensors. e) Move or switch off interfering motor. f) Replace probe.
Slow response	<ul style="list-style-type: none"> a) Dirty / Oily probe. 	<ul style="list-style-type: none"> a) Clean probe. See Section 9 “Probe Care & Maintenance”.
Not responding to key press	<ul style="list-style-type: none"> a) HOLD mode in operation. b) Damaged key pad. c) Internal program error. 	<ul style="list-style-type: none"> a) Cancel HOLD mode. b) Return to dealer. c) Reset all internal programs by reinserting batteries.
“OR” or “UR” on upper display	<ul style="list-style-type: none"> a) Probe is shorted. b) Probe is in out-of-range (OR) or under range (UR) condition. d) Broken probe. 	<ul style="list-style-type: none"> a) Test probe. Make sure probe is fully connected to meter. b) Use different solution. d) Replace probe. See Accessories section.
Temperature reading erratic or lower display reads “OR”	<ul style="list-style-type: none"> a) Temperature of solution is out of range. 	<ul style="list-style-type: none"> a) Heat or cool solution.

11 ERROR MESSAGES

LCD Display	Indicates	Cause	Solution
Err annunciator	Unrecognised input from keypad	Wrong input in selected mode.	Release key. Select valid operations depending on mode.
CAL & Err annunciators on / Buffer and electrode indicators blink.	Calibration error.	Wrong value input at calibration. Dirty probe.	Check your input value, clean probe. See Calibration sections or Probe Maintenance section.
Battery indicator blinks	Low battery level.	Need new batteries or battery connection is bad.	Clean battery contacts. Replace batteries with fresh ones, noting polarity.

If an error message appears in the primary display (the upper row of larger digits), switching off the meter and switching it on again may eliminate the error message.

If error persists, or the meter shows incorrect values, return the meter. See Warranty and Return of Items sections.

For a complete diagram of the display, see page 2.

12 SPECIFICATIONS

Dissolved Oxygen Range Resolution Relative accuracy	0.00 – 19.99 mg/L or ppm 0.01 mg/L; 0.01 ppm ± 1.5% of Full Scale
% Saturation of Oxygen Range Resolution Relative accuracy	0.0 – 199.9 % 0.1 % ± 1.5% of Full Scale
Temperature Range Resolution Relative accuracy	0.0 – 50.0 °C (32.0 – 122.0 °F) 0.1 °C (0.1 °F) ± 0.3 °C (0.5 °F)
Salinity Correction Range Resolution Method	0.0 – 50.0 ppt 0.1 ppt Automatic correction after manual input
Barometric Pressure Correction (mm Hg) Range Resolution Method	500 to 1499 mm Hg or 66.6 to 199.9 kPa 1 mm Hg or 0.1 kPa Automatic correction after manual input
Temperature Compensation	Automatic from 0 to 50 °C (32.0 – 122.0 °F)
Operating Range	0 to 50 °C (32.0 – 122.0 °F)
Probe	Galvanic
Response Time	40 seconds to achieve 93% of the reading
No. of Calibration Points	Single point at 100% in saturated air or air-saturated water
Memory	50 sets with date & time
HOLD function	Yes
Auto-Off function	20 minutes after last key press
Averaging/Stability function	Selectable
Display	Customs Dual LCD
Back Lit Display	Yes
Inputs	6-pin military type
Power Requirements	four 1.5 V AAA-sized batteries (included)
Battery Life	> 100 hours continuous use
Dimensions	Meter: 19.1 cm (L) x 8.9 cm (W) x 4.5 cm (H) Case: 23.3 cm (L) x 21.6 cm (W) x 7.0 cm (H) Probe: 173 mm (L) x 32 mm (Diameter), with 3-m cable
Shipping weight	Meter: 0.92 kg Carrying case with meter:

13 ACCESSORIES

Replacement Meter and Meter accessories

Eutech Instruments

Item	Eutech Instruments Ordering Code.
Waterproof DO 300 Dissolved Oxygen meter (back-lit display) complete with submersible DO electrode (3m/ 10ft cable), electrode maintenance kit and carrying case with accessories	EC-DOWP300/01K
Waterproof DO 300 Dissolved Oxygen meter (back-lit display) complete with submersible DO electrode (25ft cable)	EC-DOWP300/02
Maintenance kit for DO electrode. Contains 5 membranes; 5 O-rings; a 50-ml bottle of electrolyte; 1 spare cap and 1 ring tool.	EC-DOHANDYKIT
Galvanic Dissolved Oxygen probe with ATC and 3-meter (10-ft) cable.	EC-DOHANDYNEW
Hard plastic carrying case comprises of 3 empty sample bottles (60ml) and 1 x empty rinse water bottle (480-ml)	EC-WPDRYKIT
Soft carrying pouch for meter	EC-POUCH-02
Membrane & O-ring (pack of 5)	01X241603
Assembled Membrane Cap Housing	15X241402
Membrane removal tool	15X241502
Electrode Guard Removal Tool	15X241504
DO Refilling Electrolyte (50ml)	01X211226

Oakton Instruments

Item	Oakton Instruments Ordering Code.
Waterproof DO 300 Dissolved Oxygen meter with submersible DO electrode (3m/ 10ft cable), electrode maintenance kit, and carrying case with accessories	35641-00
Waterproof DO 300 Dissolved Oxygen meter only.	35640-01
Replacement submersible Dissolved Oxygen probe with 3-meter (10-ft) cable.	35640-50
Submersible DO probe with 25-ft cable	35640-52
Submersible DO probe with 50-ft cable	35640-54
Submersible DO probe with 100-ft cable	35615-56
Hard carrying case for meter	35632-98
Replacement membrane assembly with membrane lock, O-ring and cap.	35640-72
Replacement HDPE membranes, pack of 5.	35640-74
Replacement HDPE membranes, pack of 25.	35640-75
Membrane installation tool	35640-79
DO kit includes hard carrying case, and 35640-80 membrane kit (meter not included).	35640-60
Replacement membrane housing kit comes with two membrane housings with pre-installed membrane and a bottle of premixed electrolyte.	35640-80

Calibration Solutions

Item	Oakton Instruments Ordering Code.
Zero oxygen solution, 500 mL	00653-00
Premixed electrolyte solution, 500 mL	35640-71
Electrolyte power (58.5 g)	35640-70

14 DISSOLVED OXYGEN & METER THEORY

Dissolved Oxygen (DO) refers to the volume of oxygen that is contained in water. There are two main sources of DO in water: from atmosphere and photosynthesis. Waves and tumbling water mix air into the water where oxygen readily dissolves until saturation occurs. Oxygen is also produced by aquatic plants and algae as a by-product of photosynthesis.

The amount of DO that can be held by water depends on 3 factors: water temperature, salinity, and atmospheric pressure.

1. Amount of DO increases with decreasing temperature (colder water holds more oxygen).
2. Amount of DO increases with decreasing salinity (freshwater holds more oxygen than saltwater does).
3. Amount of DO decreases with decreasing atmospheric pressure (amount of DO absorbed in water decreases as altitude increases).

The chart below shows the solubility of DO in mg/L in water at various temperatures.

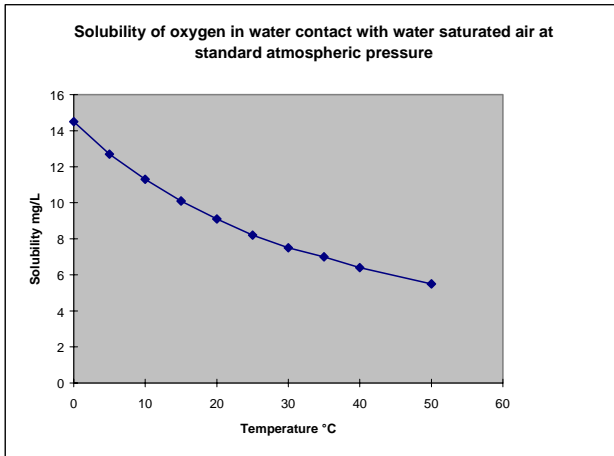


Figure 38: DO Solubility in Water vs Temperature °C

15 PRESSURE VS ALTITUDE TABLE

Barometric pressure affects DO readings; therefore this meter lets you enter the correct barometric pressure at your altitude. If you do not have equipment that lets you measure the exact barometric pressure at your altitude, you can estimate it using the chart below.

If you change the barometric pressure setting from its factory setting (760 mm Hg), the % saturation calibration value in air will automatically adjust to a value other than 100% (see “corrected % saturation value” column below). The adjusted value is correct for the new barometric pressure setting.

See page 21 for information on how to adjust the barometric pressure.

Pressure vs Altitude

ALTITUDE		PRESSURE (mm HG)	CORRECTED % SATURATION VALUE
feet	meters		
0 (sea level)	0 (sea level)	760	100
500	152.4	746	98.1
1000	304.8	732	96.3
1500	457.2	720	94.7
2000	609.6	707	93.0
2500	762.0	694	91.3
3000	914.4	681	89.6
3500	1066.8	668	87.8
4000	1219.2	656	86.2
4500	1371.6	644	84.6
5000	1524.0	632	83.0
5500	1676.4	621	81.6
6000	1828.8	609	80.0

(1 feet ~ 0.3048 meters)

16 FACTORY DEFAULT SETTINGS

Resetting the meter to factory default settings clears all DO calibration data and memory, and returns other setup functions to the default settings shown in the table below. However, the clock settings will remain as you have set them. See page 35 for directions on setting the meter to factory default settings.

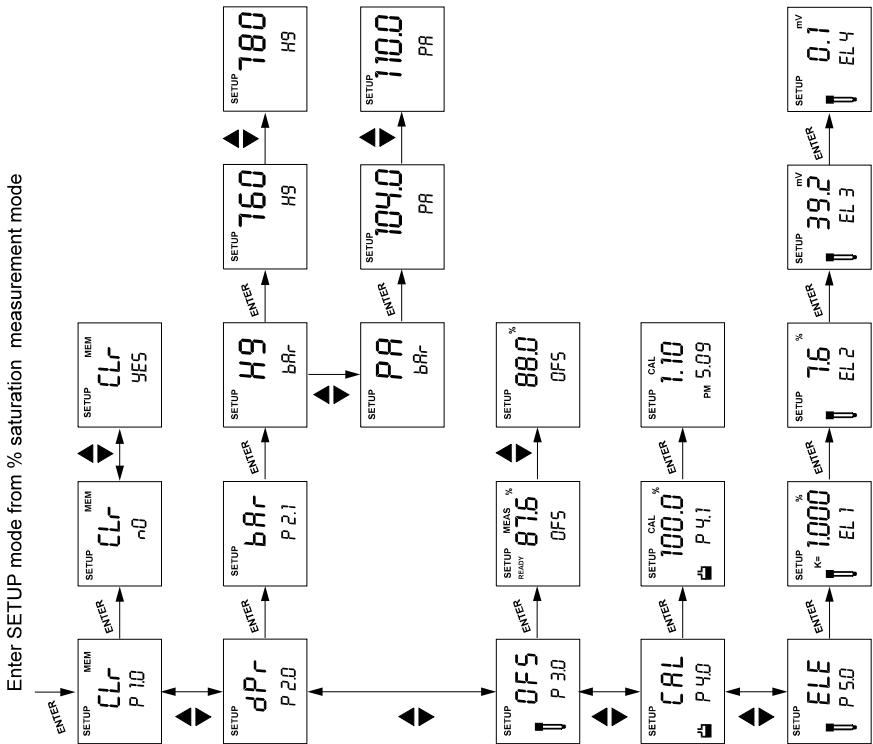
Program	Function	Options/settings	Default
CLr	Memory clear	Yes / no	No
dPr	Pressure inputs	Hg or Pa	Hg
	Barometric pressure	Adjust from 500 – 1499 mm Hg	760 mm Hg
	Salinity adjustment	Adjust from 0 – 50.00 ppt	0 ppt
OFS	Set % saturation offset	Up to $\pm 10\%$	No offset
CAL	View calibration data	----	----
ELE	View probe slope	----	1.000
	View % saturation offset	----	0% offset
	View mV = 100% saturation	----	37.0 mV
	View mV = 0% saturation	----	0.3 mV
COF	Ready indicator / auto endpoint	On / off	Ready ON only
	Select mg/L or ppm units	mg/L or ppm	mg/L
	Select temperature units	$^{\circ}\text{C}$ or $^{\circ}\text{F}$	Retains settings
LCd	Adjust back lit display	Levels 0 to 8 (brightest)	Retains settings
CLO	Setting clock	Year, date, time	Retains settings
rSt	Reset to factory default	Yes / no	no

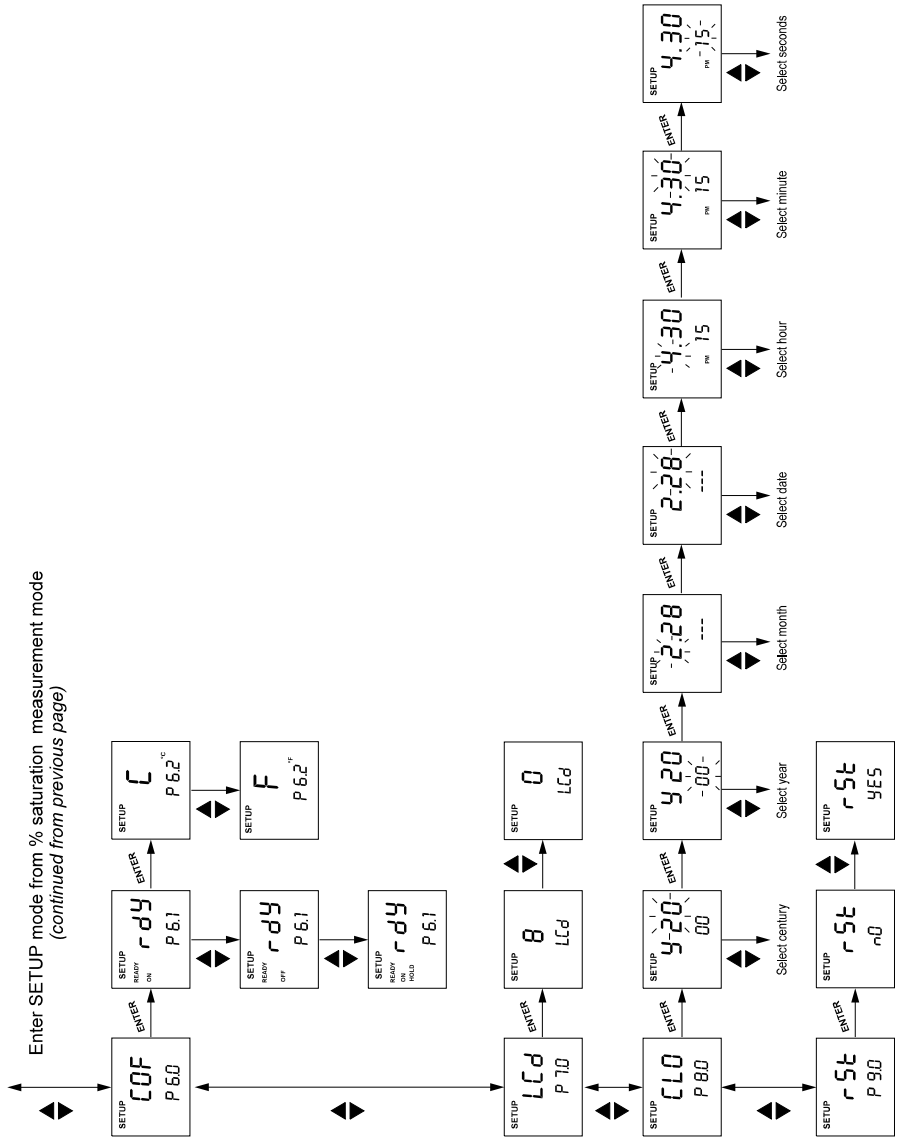
NOTES:

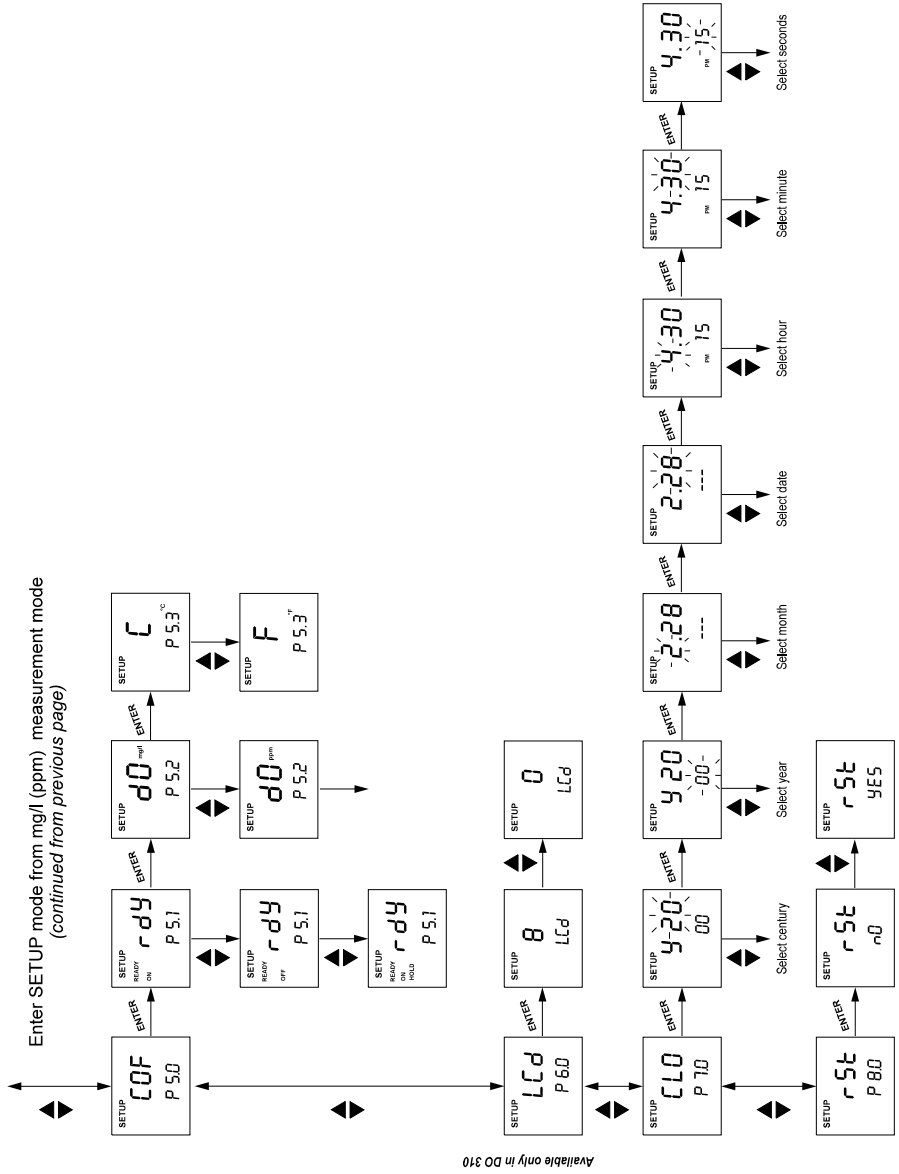
The P7.0 clock function retains the year and time that you set, even after reverting to factory default settings.

17 OVER-VIEW OF SETUP FUNCTIONS

(The values shown above are for illustration purpose. Your meter may display different values depending on the settings & your environmental conditions)







Available only in DO 310

18 WARRANTY

This meter is supplied with a **three** -year meter warranty and **six**-month pH/ DO probe warranty, against significant deviations in material and workmanship.

If repair or adjustment is necessary and has not been the result of abuse or misuse within the designated period, please return – freight pre-paid – and correction will be made without charge. Eutech Instruments/ Oakton Instruments will determine if the product problem is due to deviations or customer misuse.

Out of warranty products will be repaired on a charged basis.

Exclusions

The warranty on your instrument shall not apply to defects resulting from:

- Improper or inadequate maintenance by customer
- Unauthorised modification or misuse
- Operation outside of the environment specifications of the products

19 RETURN OF ITEMS

Authorisation must be obtained from our Customer Service Department or authorised distributor before returning items for any reason. A "Return Goods Authorisation" (RGA) form is available through our authorised distributor. Please include data regarding the reason the items are to be returned. For your protection, items must be carefully packed to prevent damage in shipment and insured against possible damage or loss. Eutech Instruments/ Oakton Instruments will not be responsible for damage resulting from careless or insufficient packing. A restocking charge will be made on all unauthorised returns.

NOTE: Eutech Instruments Pte Ltd/ Oakton Instruments reserves the right to make improvements in design, construction, and appearance of products without notice.

For more information on Eutech Instruments/ Oakton Instruments' products, contact your nearest distributor or visit our website listed below:

<p>Oakton Instruments P.O Box 5136, Vernon Hills, IL 60061, USA Tel: (1) 888-462-5266 Fax: (1) 847-247-2984 E-mail: info@4oakton.com Web-site: www.4oakton.com www.oaktoninstruments.com</p>	<p>Eutech Instruments Pte Ltd. Blk 55, Ayer Rajah Crescent, #04-16/24 Singapore 139949 Tel: (65) 6778 6876 Fax: (65) 6773 0836 E-mail: marketing@eutechinst.com Web-site: www.eutechinst.com</p>	<p>Distributed by:</p>
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