

Instruction Manual

PD 300

Waterproof Hand-held pH/Dissolved Oxygen/Temperature Meter



OAKTON®



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Rev.3 JUN 06

Preface

This manual serves to explain the use of the PD 300 hand-held meter.

The manual functions as a step by step guide to help the user operate the meter and as a handy reference guide.

This instruction manual is written to cover as many anticipated applications of the meter as possible. If there are doubts in the use of the PD 300 meter, 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 PD 300 waterproof portable meter. This meter is a microprocessor-based instrument that is designed to allow one-hand operation. It is capable of measuring pH, Dissolved Oxygen (mg/L or % 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 pH electrode (EC-DA93506-03B / 35805-23), dissolved oxygen electrode with integrated temperature sensor in a submersible cable (EC-DOHANDY / 35640-50), maintenance kit, and instruction manual. These items are available in a hard, plastic carrying case which makes it ideal for outdoor field measurement. Please read this manual thoroughly before operating your meter.



Figure 1: Waterproof PD 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 pH or DO value (either in mg/L, ppm or %, depending on units of measurement selected).
- The secondary display shows the measured temperature.

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

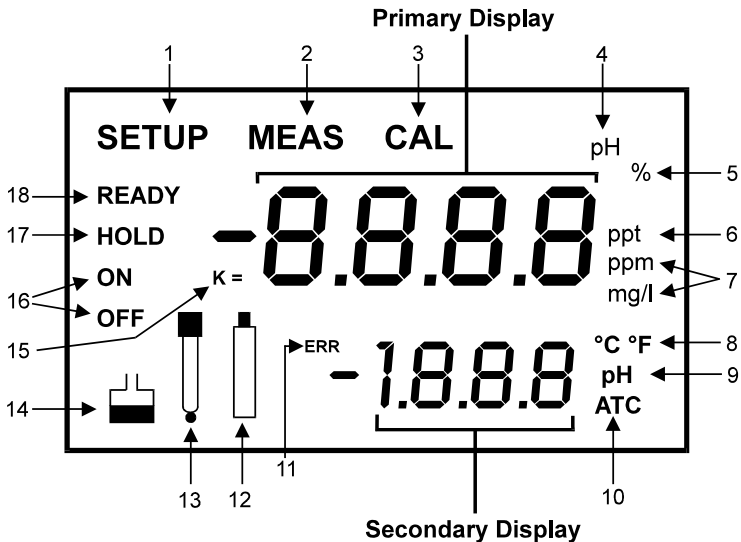



Figure 2: Full LCD Screen

- | | | |
|---|--|---------------------------------|
| 1. SETUP mode indicator | 7. Oxygen solubility indicator in mg/L or ppm. | 13. Probe indicator |
| 2. MEASurement mode indicator | 8. Temperature indicator | 14. Calibration indicator |
| 3. CALibration indicator | 9. pH buffer indicator | 15. Function ON / OFF indicator |
| 4. pH indicator | 10. Automatic Temperature Compensation indicator | 16. HOLD indicator |
| 5. % saturation indicator | 11. ERROR indicator | 17. READY indicator |
| 6. ppt indicator for input of Salinity value. | 12. Low battery indicator | |

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><u>NOTE:</u></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 again to release.
MODE	<ol style="list-style-type: none"> 1. Selects the measurement parameter. Press MODE to toggle between pH; DO % saturation; and DO mg/L. 2. While in CAL mode under pH or mg/L (parts per million – ppm) measurement status, this key will toggle between pH or mg/L (or ppm) calibration and temperature calibration (refer to Section 4.2 in page 8).
CAL/MEAS	<p>Toggles between Calibration and Measurement mode.</p> <ol style="list-style-type: none"> 1. In pH measurement mode, press CAL/MEAS to enter pH calibration mode. 2. In DO % saturation measurement mode, press CAL/MEAS to enter DO % saturation calibration mode. 3. In DO mg/L (or ppm) measurement mode, press CAL/MEAS to enter DO mg/L (or ppm) calibration mode. 4. 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 menu from sub menus. Press CAL/MEAS again to return 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, pressing the ENTER key confirms selections.
▲ / ▼	<p>In CALibration & SETUP mode:</p> <p>In DO mg/L (or ppm) and temperature calibration mode, press up or down keys to increase or decrease the values.</p> <p>In SETUP mode, press up or down keys to scroll through the setup subgroup programs. Within the SETUP sub-menu group, press up or down keys to change values.</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 activate 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.

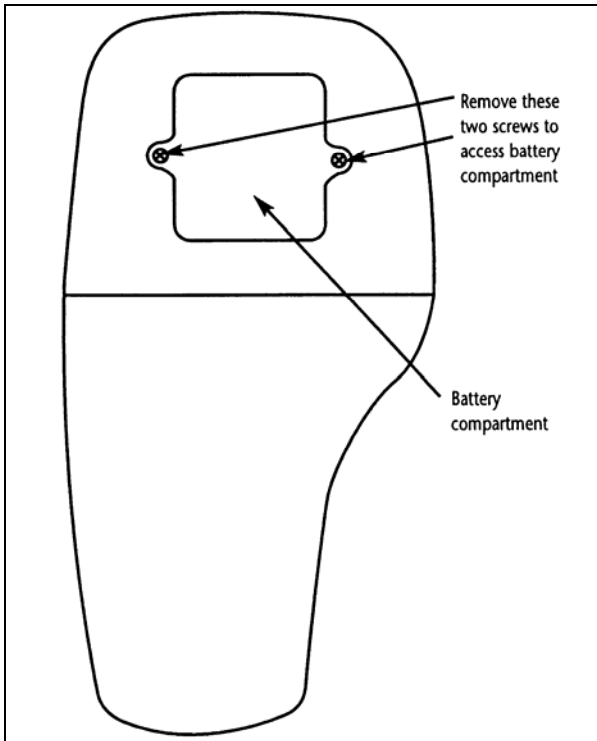


Figure 3: Back panel of meter showing meter compartment

3.2 Probe Information

Your meter includes two probes:

- pH electrode with BNC connector.
- DO/temperature probe with a notched 6-pin connector

The temperature sensing element built into the DO probe will also compensate for pH readings as long as both probes are in your solution at the same time.

You can use any standard pH electrode with a BNC connector with this meter. DO probes, “3-in-1” pH electrodes with a built-in temperature element, and temperature probes require a notched 6-pin connector (see Figure 4). For replacement probes, see the Accessories section.

If you want to use a “3-in-1” pH probe with a built-in temperature element, or if you want to use a separate temperature probe, you will need to disconnect the DO probe to allow for connection of the separate temperature sensor.

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

To connect the pH electrode:

1. Slide the BNC connector of the probe over the BNC connector socket on the meter. Make sure the slots of the connector are in line with the posts of the socket. Rotate and push the connector clockwise until it locks.
2. To remove electrode, push and rotate the connector counterclockwise. While holding onto the metal part of the connector, pull it away from the meter.

See Figure 4.

CAUTION: Do not pull on the probe cord or the probe wires may be damaged.

To connect the DO/ temperature probe:

1. Line up the notch and 6 pins on the probe connector with the holes in the connector located on the top of the meter. Push down and turn the metal locking ring clockwise to lock the probe connector into place. See Figure 4.
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.

NOTE

Do not substitute other DO probes. For a replacement DO probe, see the "Accessories" section. Follow the same directions to connect an optional separate temperature element.

CAUTION: Do not pull on the probe cord or the probe wires may be damaged.

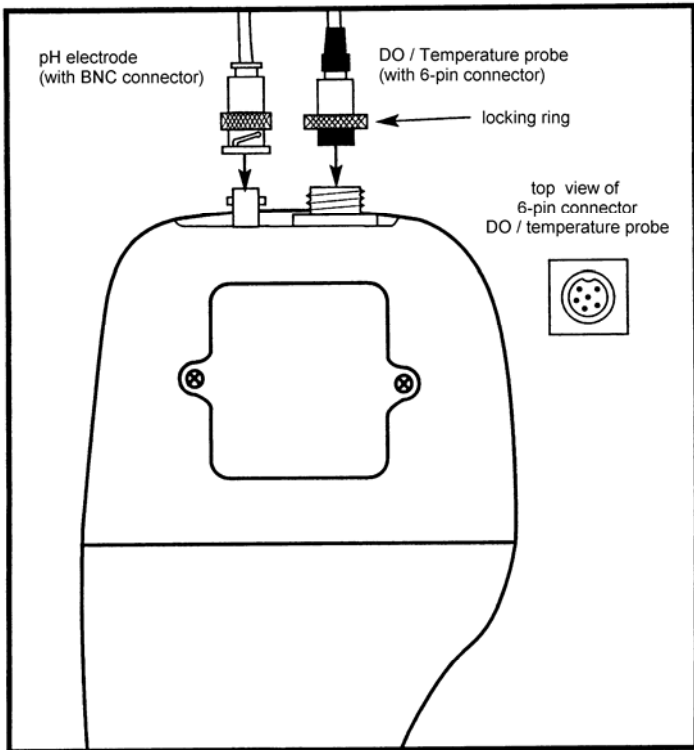


Figure 4: Connecting pH and DO/temperature probes

4 CALIBRATION

4.1 Important Information on Meter Calibration

When you recalibrate your meter, old calibration points are replaced on a “point by point” basis in pH and completely for % saturation and mg/L (ppm).

For example:

- **pH:** if you previously calibrated your meter at pH 4.01, 7.00 and 10.01, and you recalibrate at pH 7.00, the meter retains the old calibration data at pH 4.01 and pH 10.01.
- **% saturation and mg/L (ppm):** all new calibrations automatically override existing calibration data.

To view current calibration points:

- **pH:** Program 1.0 in the SETUP section, page 30.
- **% saturation:** Program 3.0 in the SETUP section: page 41.
- **mg/L (ppm):** Program 2.0 in the SETUP section, page 41.

To completely recalibrate your meter, or when you use replacement probes, it is best to clear old calibration data by resetting the meter.

To reset the meter to its factory defaults:

- **pH:** Program 4.0 in the SETUP section, page 36.
- **% saturation:** Program 7.0 in the SETUP section: page 49.
- **mg/L (ppm):** Program 6.0 in the SETUP section, page 49.

NOTE

Resetting the meter will set meter to factory defaults. pH, % saturation and mg/L (ppm) must be reset separately.

For directions on how to calibrate your meter:

See section 4.2 for Temperature Calibration

See sections 4.3 for pH calibration.

See section 4.5 for % saturation calibration

See sections 4.6 for mg/L (ppm) calibration

4.2 Temperature Calibration

The temperature sensor of the the DO probe is factory calibrated. Calibrate your sensor only if you suspect temperature errors that may have occurred over a long period of time or if you have a replacement probe. Make sure the DO probe is attached prior to performing the calibration.

1. Switch the meter on. Press MODE to select either pH or mg/L (ppm) measurement mode.
2. Press the CAL/MEAS key to enter pH or mg/L (ppm) calibration mode. The CAL indicator will appear above the primary display.
3. While in pH or mg/L (ppm) calibration mode, press the MODE key to enter temperature calibration mode. The primary display shows the temperature reading and the secondary display shows you the factory default temperature value.
4. **Compare the primary display reading to a NIST-traceable thermometer or another thermometer known to be accurate.**
5. Press the ▲ or ▼ keys to adjust the primary display reading to agree with your temperature standard.
6. Press the ENTER key to confirm temperature calibration and return to Measurement mode.

NOTE

- To exit from Temperature Calibration mode without confirming calibration, DO NOT press ENTER in Step 6. Press CAL/MEAS instead.
- If a separate temperature probe is used for pH measurement (EC-PHWPTMP-01W / 35618-05), then temperature calibration done for pH is separate and independent from mg/L measurement mode.
- Temperature calibration is restricted to ± 5°C from the factory default value displayed during calibration (shown in the secondary display).

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

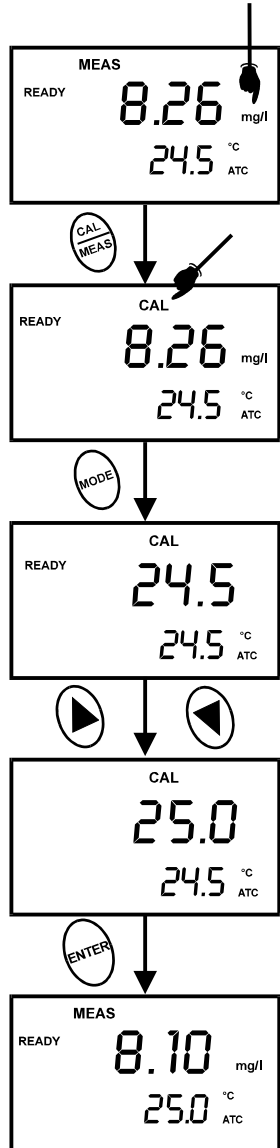


Figure 5: Temperature calibration

4.3 pH calibration

Before starting calibration, make sure you are in pH measurement mode.

NOTE

We recommend calibration with at least two calibration standards that bracket (one above and one below) the expected sample range. One point calibration is possible as long as the chosen buffer is close to the expected sample value.

When you re-calibrate your meter, old calibration points are replaced on a “point-by-point” basis. For example:

- if you previously calibrated your meter at pH 4.01, 7.00, and 10.01, and you re-calibrate at pH 7.00, the meter retains the old calibration data at pH 4.01 and pH 10.01.

Preparing for pH calibration

This meter is capable of up to 5-point pH calibration to ensure accuracy across the entire pH range of the meter. Select from the following buffer options:

- pH 1.68, 4.01, 7.00, 10.01 and 12.45.

The meter automatically recognises and calibrates to these standard buffer values, which makes pH calibration faster and easier.

Be sure to remove the protective electrode storage bottle or rubber cap of the electrode before calibration or measurement. If the electrode has been stored dry, hydrate the electrode in electrode storage solution or tap water for 10 minutes before calibrating or taking readings to saturate the pH electrode surface and minimise drift.

Rinse your electrode in deionised water after use, and store in electrode storage solution. If storage solution is not available, use fresh pH 4.01 or 7.00 buffer solution for short term storage.

Do not reuse buffer solutions after calibration. Contaminants in the solution can affect the calibration and eventually the accuracy of the measurements. See Accessories for information on pH buffer solutions.

To Calibrate pH:

1. If necessary, press the **MODE** key to select pH mode. The pH indicator appears in the upper right hand corner of the display.
2. Rinse the probe thoroughly with de-ionised water or a rinse solution. Do not wipe the probe; this causes a build-up of electrostatic charge on the glass surface.
3. Dip the probe into the calibration buffer. The end of the probe must be completely immersed into the sample. Stir the probe gently to create a homogeneous sample.

NOTE

The temperature element is in the DO electrode. For temperature compensated readings, dip the DO electrode into the calibration buffer as well.

4. Press **CAL/MEAS** to enter pH calibration mode. The CAL indicator will be shown. The primary display will show the measured reading while the smaller secondary display will indicate the pH standard buffer solution.
5. Wait for the measured pH value to stabilise. See Figure 5.
6. Press **ENTER** to confirm calibration. The meter is now calibrated to the current buffer. The lower display scrolls through the remaining buffer options.
 - For multi-point calibration, go to step 7.
 - For one-point calibration, go to step 9.

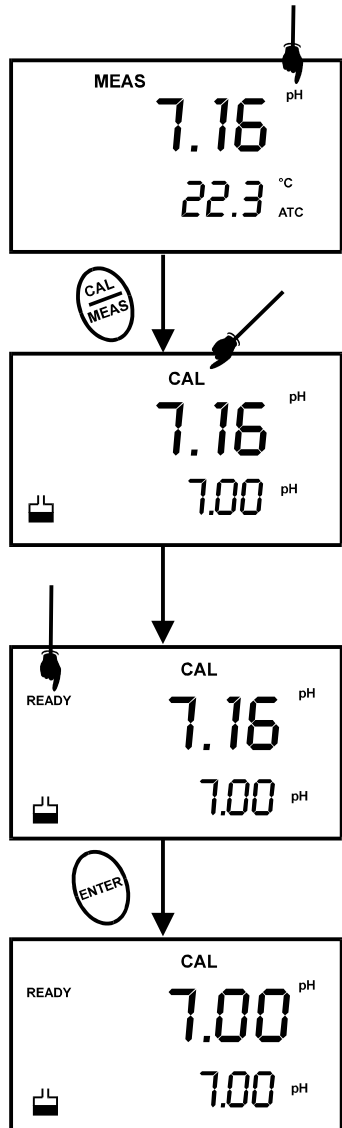


Figure 6: pH Calibration

7. Rinse the electrode with deionised water or in rinse solution, and place it in the next pH buffer.
8. Follow steps 5 to 8 for additional calibration points. See Figure 7.
9. When calibration is complete, press CAL/MEAS to return to pH measurement mode.

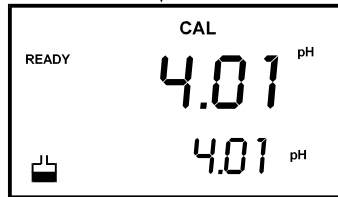
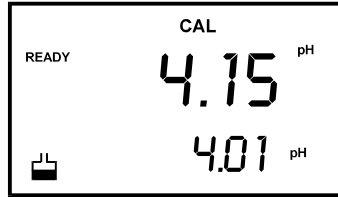


Figure 7: Next point calibration for pH 4.01

NOTE

To exit from pH calibration mode without confirming calibration, DO NOT press ENTER in step 6. Press CAL/MEAS instead.

If the selected buffer value is not within ± 1.0 pH from the measured pH value: the electrode and buffer icon blink and the ERR annunciator appears in the lower left corner of the display. See Figure 8.

To limit the number of pH buffer values available during calibration, see Setup Section 8.4 **P3.2: Selecting number of pH calibration points** on page 34.

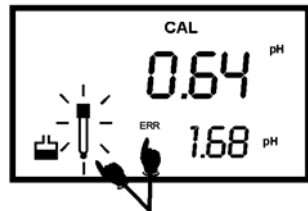


Figure 8: Err message and electrode icon will appear if incorrect buffer is used

4.4 Dissolved Oxygen Calibration

Before calibrating your meter, make sure to rinse the probe well with 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. See Figure 9.

You can calibrate for dissolved oxygen in either % saturation or mg/L (ppm). **All new calibrations automatically override existing DO calibration data.**

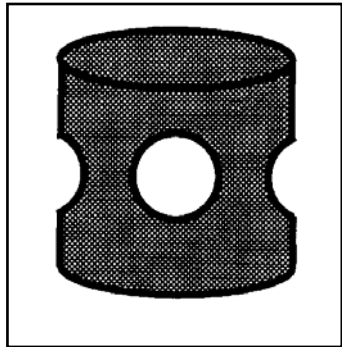


Figure 9: DO Probe guard

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 units last used (either pH, mg/L (ppm) or % air saturation). For example, if you shut off the meter in “mg/L” units, the meter will read “mg/L” units when you switch the meter on.

NOTE

Most users will calibrate to 100% saturation even when working in mg/L. When calibrating the meter in mg/L mode, you can make fine adjustments, typically to a mid-range value between 10 and 100%. If you are calibrating to a mid-range value, you need to set the 100% saturation value first.

4.5 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 Section 8.6.1 on page 37 to change the pressure setting. See Addendum 2 on page 67 for a table of adjusted % saturation values.

To calibrate 100% Saturation:

1. Rinse the probe well with deionised rinse water. Do not touch the membrane.
2. Press the MODE key to select the % saturation mode.
3. Press the CAL key. The CAL indicator will appear above the primary display. The primary display shows the current value of the measurement and the secondary display will show 100.0. See figure on right and NOTE above.
4. Hold the probe in the air. Wait for the reading to stabilise. If the READY indicator feature is enabled, it will appear when the reading is stable. (See page 45 for Ready indicator setup.)
5. Press the ENTER key. The meter automatically calibrates to 100.0% air saturation and returns to Measurement mode.

NOTE

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 page 40 for directions.

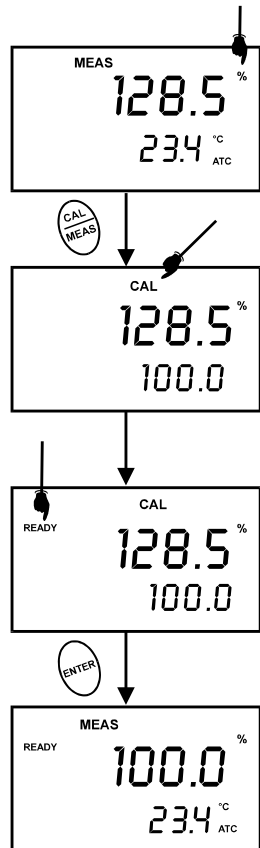


Figure 10: To calibrate for 100% saturation

To calibrate 0% Saturation:

1. Rinse the probe well with deionised rinse water. 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 probe gently to homogenise 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 shows the current value of the 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 page 45 for Ready indicator setup.)
6. Press the ENTER key. The meter automatically calibrates to 0.0% air saturation and returns to Measurement mode.

See figure on right.

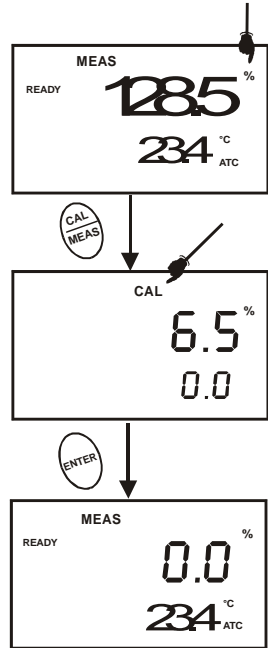


Figure 11: To calibrate for 0% saturation

NOTE

The reading in the primary display in step 3 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.

You can offset your % DO Calibration; see page 40 for directions.

4.6 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 46.

NOTES ON MG/L (PPM) MODE CALIBRATION

- During mg/L (ppm) measurement and calibration, the meter adjusts to the barometric pressure value that is programmed into the meter. It also adjusts to 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 8.6 -- P1.0 (dPr): Dissolved Oxygen Parameters) for directions).
- Whenever an error occurs during calibration, the ERR indicator appears in the lower left hand corner of the display.

To calibrate in mg/L (ppm) mode:

1. Calibrate 100% saturation as per Section 4.5.
2. Rinses the probe well with deionised rinse water. Wipe the outside of the probe carefully (do not touch the membrane).
3. 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.
4. Press the MODE key to select the mg/L (ppm) mode.
5. Press the CAL key. The CAL indicator will appear above the primary display. The primary display shows the current value of the measurement and the secondary display shows the temperature.
6. Press the ▲ and ▼ keys to adjust the reading.
7. Press the ENTER key. The meter automatically calibrates to the value you entered and returns to Measurement mode.

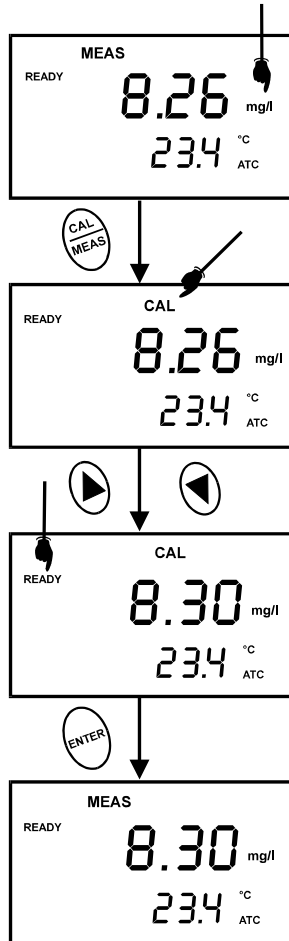


Figure 12: To calibrate in mg/L (ppm) mode
(The values shown above are for illustration purpose. Your meter may display different values depending on the settings & your environmental conditions)

5 MEASUREMENT

5.1 Taking pH Measurements

5.1.1 Automatic Temperature Compensation

Automatic Temperature Compensation only occurs when a compatible temperature sensing element is plugged into the meter.

If there is no temperature sensor plugged into the meter, the **default manual temperature setting is 25 °C**. You can manually set the temperature to match your working conditions using a separate thermometer.

For automatic temperature compensation (ATC) simply plug the temperature probe into the meter (see page 6 for directions). The ATC indicator will light up on the LCD. See figure on right.

NOTE

The temperature sensing element must be in the sample that you are calibrating or measuring.

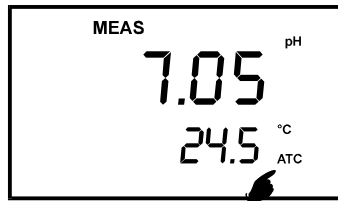


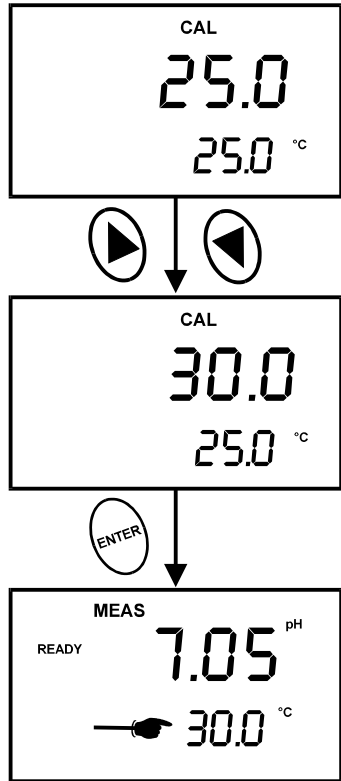
Figure 13: Automatic Temperature Compensation

5.1.2

Manual Temperature Compensation (pH only)

IMPORTANT: For manual compensation, you must disconnect the temperature probe (see page 10).

1. Switch the meter on. Press the **MODE** key to select pH mode.
2. Press the **CAL/MEAS** key to enter pH calibration mode. The CAL indicator will appear above the primary display.
3. While in pH calibration mode, press the **MODE** key to enter temperature calibration mode. The primary display shows the current temperature setting and the secondary display shows the default value 25 °C.
4. Check the temperature of your sample using an accurate thermometer.
5. Press the ▲ or ▼ keys to set the temperature to the measured value from step 4.
6. Press **ENTER** to confirm the selected temperature and to return to the pH measurement mode.



See Figure 14.

The meter will now compensate pH readings for the manually set temperature.

Figure 14: Manual temperature compensation

NOTE

To exit this program without confirming the manual temperature compensation value, DO NOT press **ENTER** in step 6. Press **CAL/MEAS** instead.

5.1.3

Taking Measurements (pH)

Be sure to remove the electrode storage bottle or protective rubber cap on the electrode before taking measurements. To ensure Automatic Temperature Compensation (ATC) for pH measurements, the DO or ATC probe must be plugged in and immersed into the sample.

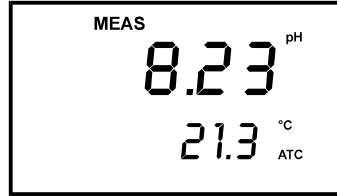


Figure 15: Measurement mode

To take readings:

1. Rinse the pH electrode with deionised or distilled water before use to remove any impurities adhering to the probe body. If the pH electrode has dehydrated, soak it for 30 minutes in electrode storage solution (sold separately).
2. Press **ON** to switch on meter.
3. Press the MODE key to select pH measurement mode. The MEAS annunciator appears on the top center of the LCD. The ATC indicator appears in the lower right-hand corner to indicate Automatic Temperature Compensation.

NOTE

For pH manual temperature compensation, you must disconnect the DO electrode from the 6-pin connector. The ATC indicator will disappear from the display. You also need to set a manual temperature compensation value. See Section 5.1.2 on page 18 to set Manual Temperature Compensation.

4. Dip the probe into the sample. Since the DO electrode contains the temperature sensor, make sure it is also immersed in your solution.

When dipping the probe into the sample, the sensor or the glass bulb of the electrode must be completely immersed into the sample. Stir the probe gently in the sample to create a homogeneous sample.

5. Allow time for the reading to stabilise. Note the reading on the display. If the Ready indicator is selected on, it will appear when the reading is stable. See below for more information.

Taking measurements with READY indicator selected on

If the READY indicator has been activated, the READY annunciator lights when the reading is stable*. *Switch the READY indicator on or off in SETUP Section 8.4 Program P3.1.*

** The READY indicator appears and the reading holds until the measured value exceeds the tolerance. Then, the READY annunciator turns off.*

Taking measurements with the auto endpoint feature 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. Switch the Auto endpoint feature on or off in SETUP Section 8.4 Program P 3.1.

5.2 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! The probe guard (the piece with holes fitted over the end of the probe) protects the membrane; you should leave this piece attached to the probe at all times.

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 deionised rinse water or rinse solution.
2. Select the appropriate measurement mode. Press the MODE key to toggle between modes:
 - % Saturation
 - mg/L (ppm) **
 - pH
3. Dip the probe into the sample. Stir the probe gently 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. Press the "LIGHT" key to activate the backlit LCD. This helps you read measurements in dimly lit areas.

** To select between mg/L and ppm units, see Section 8.10.2 on page 46.

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

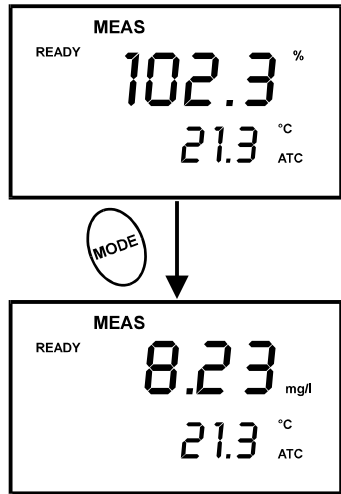


Figure 16: Change measurement mode from % saturation to mg/L

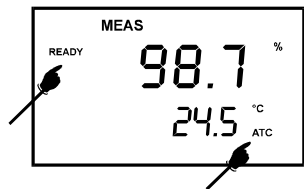


Figure 17: Taking measurement

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 switch the READY indicator on or off in the SETUP program – see Section 8.10.1 on page 45 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 switch the Auto endpoint feature on or off in the SETUP program – see Section 8.10.1 on page 45 for directions.

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

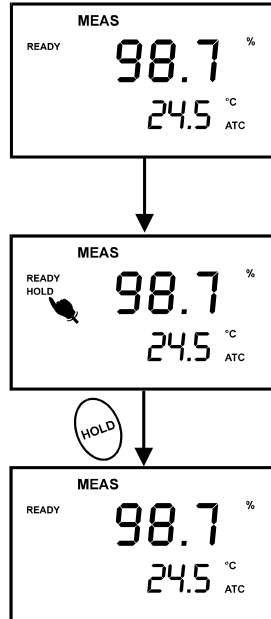


Figure 18 – Auto endpoint feature

5.3 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 Pascals) pressure adjustment and a factor of 0.0 ppt salinity adjustment. See Addendum 2 on page 67 for a "Pressure vs Altitude" table.

Pressure Adjustment

NOTE

This mode appears in both the % saturation and mg/L (ppm) measurement modes.

1. While in the measurement mode, press "Mode" key if necessary to enter DO measurement mode.
2. Press the SETUP key to enter SETUP mode.
3. The upper display shows "dPr".
4. Press the ENTER key until the upper display shows a number and the lower display shows "Hg" or "PA".
5. Use the ▲ or ▼ keys to enter the barometric pressure. The upper display will show the value you have entered.
6. Press ENTER to confirm pressure value.
7. Press CAL/MEAS to return to Measurement mode, or continue with step 4 on page 39 to make a salinity adjustment [available in mg/L (ppm) mode only].
8. See section 8.6.1 - "P1.1 Pressure adjustment mode" on page 37.

Salinity Adjustment

NOTE

This mode appears in ppm (mg/L) measurement mode only.

1. Press the MODE key to select mg/L (ppm) mode.
2. Press the SETUP key to enter SETUP mode.
3. 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 ▲ or ▼ keys to enter the salinity of your solution in parts per thousand. Note 1000 ppm = 1 ppt. The upper display will show the value you have entered.
6. Press ENTER key to confirm value.
7. Press CAL/MEAS to return to Measurement mode.
8. See section 8.6.2 - P1.2: Salinity Adjustment Mode on page 39.

6 HOLD FUNCTION

This feature lets you freeze the pH, 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

The meter shuts off automatically 20 minutes after the last key press. If the meter is shut off either automatically or manually, the HOLD value will be lost.

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 page 45.

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

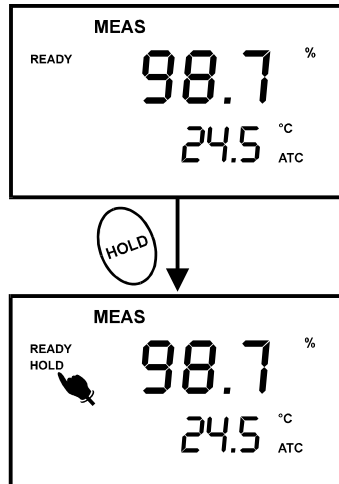


Figure 19: HOLD feature

7 BACKLIT LCD

7.1 Using the backlit LCD

This feature lets you view readings in low light situations.

- To activate the backlit LCD feature, press the  key to activate.

To conserve batteries, the backlight automatically shuts off after 20 seconds. To keep the LCD backlit, keep the backlight key pressed.

7.2 Adjusting the LCD brightness

This mode lets you adjust the brightness of the backlit LCD. Selecting a dimmer backlighting level helps conserve batteries. This adjustment is only available in the % saturation or mg/L (ppm) SETUP modes.

From the measurement mode:

- Press the MODE key to switch to % saturation or mg/L (ppm) mode.
- Press SETUP key to enter setup mode.
- Press the ▲ or ▼ keys to scroll through subgroups until you view parameters “LCd” in the upper display.
- Press the ENTER key. A number (0-8) appears in the upper display and “LCd” appears in the lower display.
- Press the ▲ or ▼ keys to select from level 0 (dimpest light) to level 8 (brightest light).
- Press the ENTER key to confirm selection and to return to the subgroup menu. Press the CAL/MEAS key to return to measurement mode.

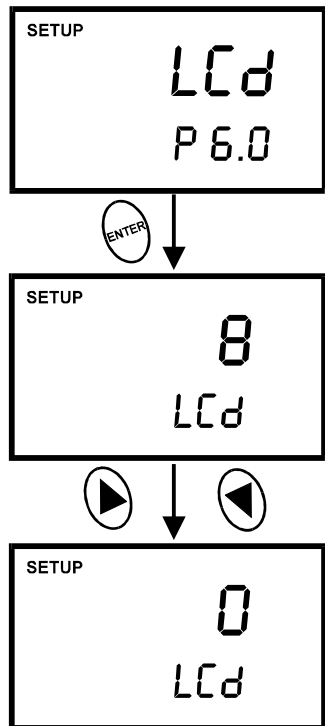


Figure 20: Adjusting LCD Brightness

8 ADVANCED SETUP FUNCTIONS

The advanced SETUP mode lets you customise your meter's preferences and defaults. Your waterproof meter features different sub groups that organise all set-up parameters.

Each measurement parameter (pH, % saturation, & mg/L) has its own sets of customisable setup functions. Some of which are unique and independent while others are common for the whole meter.

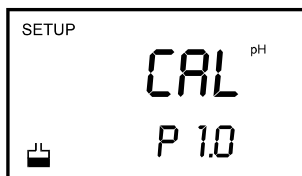
The full selection of available sub groups is shown in the following three pages.

8.1 Advanced SETUP Mode Detailed Overview

1. In either pH or DO measurement mode, press the **SETUP** key to enter Set up mode.
2. Press the **▲** or **▼** keys to scroll through sub groups.
3. Press **ENTER** key to enter a particular parameter.

See Addendum 3 on page 68 for a table of meter factory default settings.

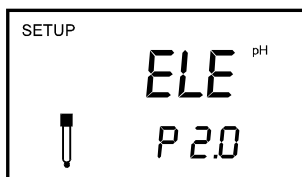
SETUP in pH Measurement Mode



P1.0: View previous calibration data

- P1.1 First calibration point (pH 1.68)
- P1.2 Second calibration point (pH 4.01)
- P1.3 Third calibration point (pH 7.00)
- P1.4 Fourth calibration point (pH 10.01)
- P1.5 Fifth calibration point (pH 12.45)

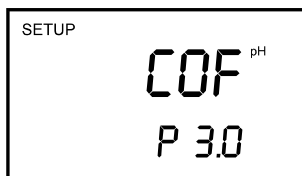
Instructions on page 30.



P2.0: View electrode data

- P2.1 pH electrode offset
- P2.2 pH electrode slope

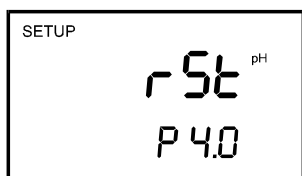
Instructions on page 31.



P3.0: Unit configuration

- P3.1 READY indicator and auto endpoint function – select on or off
- P3.2 Number of pH calibration points: 2, 3, 4 or 5
- P3.3 Select °C or °F

Instructions begin on page 32.

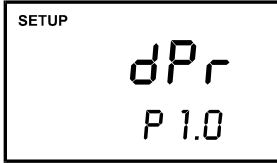


P4.0: Reset to factory defaults

- P4.0 Reset meter to factory defaults

Instructions on page 36.

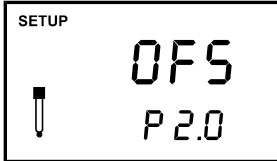
% Saturation Measurement Mode



dPr: Dissolved Oxygen parameters

- Select Hg or Pa barometric pressure units
- Select barometric pressure

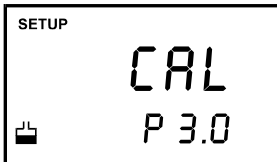
Instructions on page 37.



OFS: % saturation offset adjustment

- Set % saturation offset adjustment

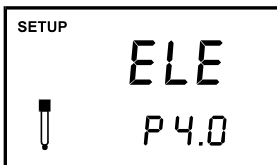
Instructions on page 40.



CAL: Viewing previous calibration data

- View previous calibration data

Instructions on page 41.



ELE: Viewing probe data

- View probe slope
- View % saturation offset value
- View mV value equivalent to 100% saturation
- View mV value equivalent to 0% saturation

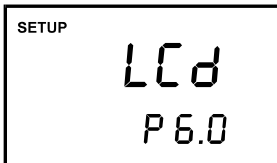
Instructions begin on page 42.



COF: Unit configuration

- Ready indicator ON or OFF / auto endpoint ON or OFF
- Select °C or °F

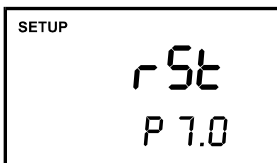
Instructions begin on page 44.



LCd: Backlit display

- Adjust brightness of backlit LCD

Instructions on page 48.

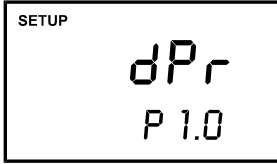


rSt: Reset to factory default

- Reset to factory default settings

Instructions on page 49.

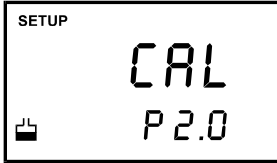
mg/L (ppm) Measurement Mode



dPr: Dissolved Oxygen parameters

- Select Hg or Pa barometric pressure units
- Select barometric pressure
- Select salinity adjustment factor

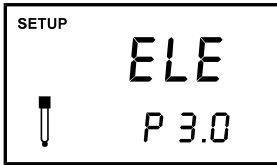
Instructions on page 37.



CAL: Viewing previous calibration data

- View previous calibration data

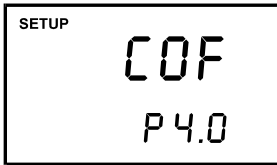
Instructions on page 41.



ELE: Viewing probe data

- View probe slope
- View mV value equivalent to 100% saturation
- View mV value equivalent to 0% saturation

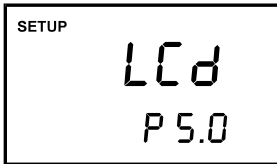
Instructions begin on page 42.



COF: Unit configuration

- Ready indicator ON or OFF / auto endpoint ON or OFF
- Select mg/L or ppm units
- Select °C or °F

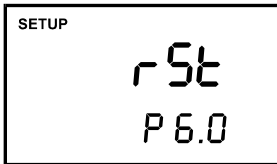
Instructions begin on page 44.



LCd: Backlit display

- Adjust brightness of backlit LCD

Instructions on page 48.



rSt: Reset to factory default

- Reset to factory default settings

Instructions on page 49.

8.2 P1.0: Viewing previous pH calibration data

This mode lets you recall previous pH calibration data, which helps you know when to re-calibrate your meter. This is a “view only” mode.

From measurement mode:

1. Press the **MODE** key to select pH measurement mode if necessary.
2. Press the **SETUP** key to enter Set up mode.
3. Press the **▲** or **▼** keys to scroll through subgroups until you view parameter P1.0.
4. Press the **ENTER** key repeatedly to view previous calibration data. See figure on right.
 - P1.1 = pH 1.68
 - P1.2 = pH 4.01
 - P1.3 = pH 7.00
 - P1.4 = pH 10.01
 - P1.5 = pH 12.45
5. When you have scrolled through all calibration data, you will automatically return to the subgroup menu. Press **CAL/MEAS** key to return to measurement mode.

NOTE

If there is no previous calibration data at a particular point, the primary display will show “----”.

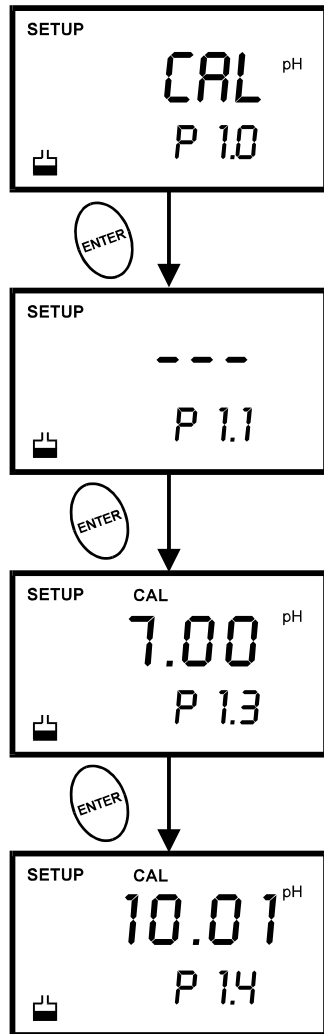


Figure 21 – P1.0: View calibration data for pH

8.3 P2.0: Viewing pH electrode data

Program 2 has two “view only” options that let you check the electrode parameters for diagnostic purposes. It lets you view:

- P2.1 = Electrode offset
- P2.2 = Electrode slope

From pH measurement mode

1. Press the **MODE** key to select pH measurement mode.
2. Press the **SETUP** key to enter Set Up mode.
3. Press the **▲** or **▼** keys to scroll through subgroups until you view parameter P2.0.
4. Press the **ENTER** key to select parameter 2.1.
5. The display shows the electrode offset value. It is the mV offset at pH 7.00. If you have not calibrated at any buffer, the primary display shows 0.00 mV.
6. Press the **ENTER** key to proceed to P2.2.
7. The display shows electrode slope in percentage. Slope displayed is the average slope based on the pH calibrations. Default setting is 100.0.
8. At any point, you can press the **CAL/MEAS** key to return to measurement mode.

See figure on right.

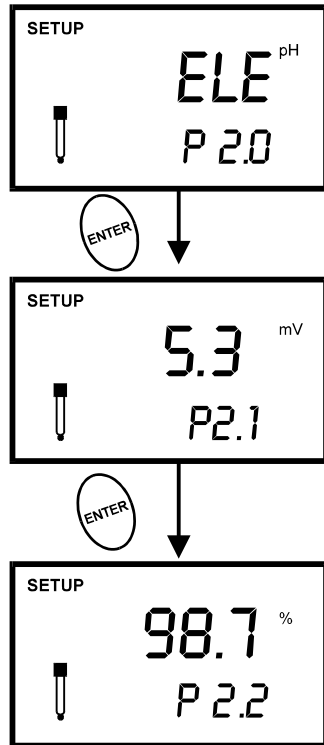


Figure 22: Viewing electrode's offset and slope status from pH measurement mode
(The values shown above are for illustration purpose. Your meter may display different values depending on the settings & your environmental conditions)

8.4 P3.0: pH Measurement configuration

This subgroup program allows to customise the meter to your specific needs. You can program the meter to:

1. Select READY indicator ON or OFF
2. Select the number of pH calibration points
3. Select between °C and °F units for temperature readings

Figure on the right shows the setup sequence for this program subgroup.

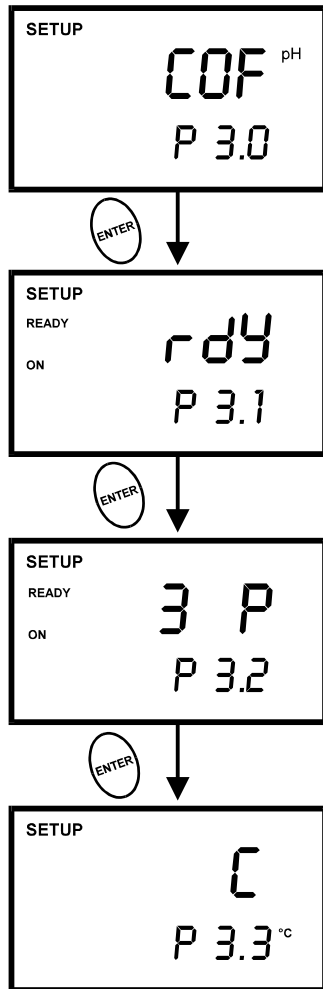


Figure 23 – P 3.0: Unit configuration program

P3.1: READY Indicator and auto endpoint function

This 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 the **MODE** key to select pH measurement mode.
2. Press **SETUP** key to enter Set Up mode.
3. Press the **▲** or **▼** keys to scroll through subgroups until you view parameter P3.0.
4. Press the **ENTER** key to select parameter 3.1.
5. Press the **▲** or **▼** keys to select the configuration you require.
 - OFF switches the READY indicator off.
 - ON switches the READY indicator on.
 - ON and HOLD together switches the auto endpoint feature on.
6. Press the **ENTER** key to confirm selection and to proceed to step 4 of P3.2. Press the **CAL/MEAS** key to return to measurement mode.

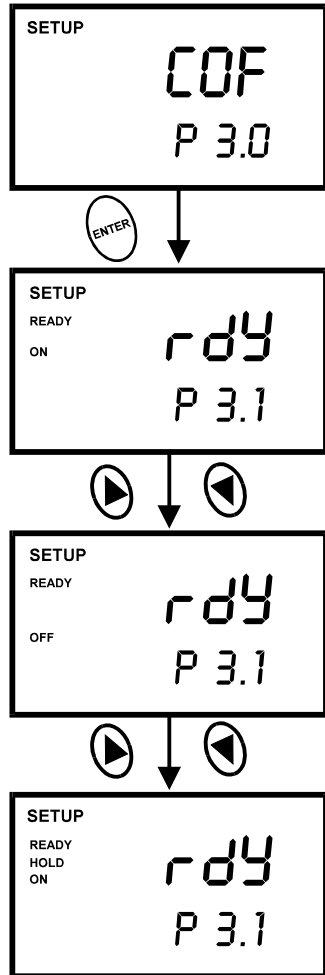


Figure 24 – P 3.1: Selecting READY function)

NOTE

Meter default is set for READY indicator on and auto endpoint function off.

You can also change the Ready indicator and auto endpoint function in the DO mode. Any changes you make to the Ready indicator/auto endpoint function in pH mode will also change in DO mode.

P3.2: Selecting number of pH calibration points

Program P3.2 lets you select the number of calibration points that appear in pH calibration mode: 2, 3, 4, or 5. The meter will automatically exit calibration mode after you have calibrated to your selected number of points.

From measurement mode.

1. Press the **MODE** key to select pH measurement mode.
2. Press **SETUP** key to enter Set Up mode.
3. Press the **▲** or **▼** keys to scroll through subgroups until you view parameter P3.0.
4. Press the **ENTER** key twice to select parameter 3.2.
5. Press the **▲** or **▼** keys to select 2, 3, 4, or 5 point pH calibration.
6. Press the **ENTER** key to confirm selection and to return to the subgroup menu. Press **CAL/MEAS** key to return to measurement mode.

See Figure on right.

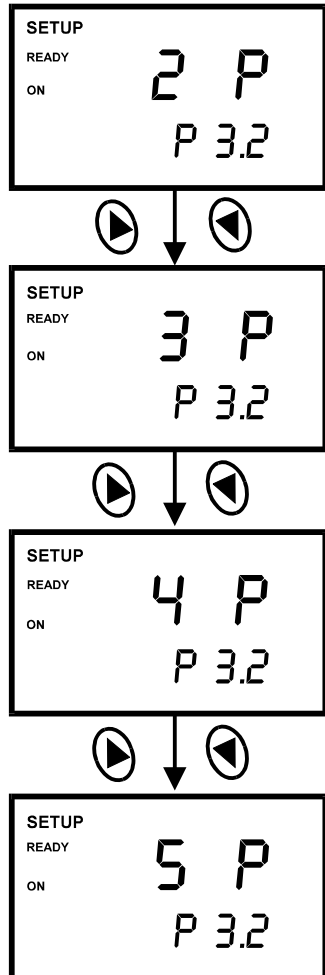


Figure 25 – P3.2: Select number of pH calibration points

P3.3 Selecting °C or °F

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

From measurement mode

1. Press the **MODE** key to select pH measurement mode.
2. Press **SETUP** key to enter Set Up mode.
3. Press the **▲** or **▼** keys to scroll through subgroups until you view parameter P3.0.
4. Press the **ENTER** key three times to select parameter 3.3.
5. Press the **▲** or **▼** keys to toggle between °C and °F.
6. Press the **ENTER** key to confirm selection and to return to the subgroup menu. Press the **CAL/MEAS** key to return to measurement mode.

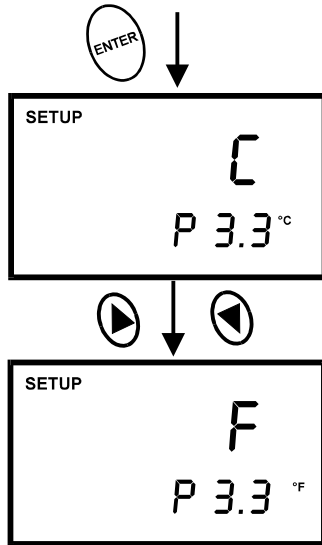


Figure 26 – P3.3: Select temperature units

See Figure on right.

NOTE

You can switch between °C and °F in Program P5.2 of % saturation mode (or P4.3 in mg/L mode). If you switch between °C and °F in pH mode, the meter will also switch in % saturation or mg/L mode.

8.5 P4.0: Resetting to factory default settings (pH)

This program lets you reset all pH parameters to factory default settings. This clears all calibration data and any other pH setup functions you might have changed.

The following settings will remain as you have set them:

- Temperature unit of measure (°C or °F)
- The temperature offset calibration value
- All DO calibration data and parameters

There are also some other parameters that retain settings when reset is done. See Addendum 3 on page 68 for a table of factory default settings.

From measurement mode

1. Press the **MODE** key to select pH measurement mode.
2. Press **SETUP** key to enter Set Up mode.
3. Press the **▲** or **▼** keys to scroll through subgroups until you view parameter P4.0 in the lower display.
4. Press the **ENTER** key to enter parameter P4.0.
5. Press the **▲** or **▼** keys to toggle between NO and YES. See figure on right.
 - NO retains current settings
 - YES resets to factory default settings.
6. Press the **ENTER** key to confirm selection and to return to the measurement mode. Otherwise press **CAL/MEAS** key to return to measurement mode without resetting to factory default.

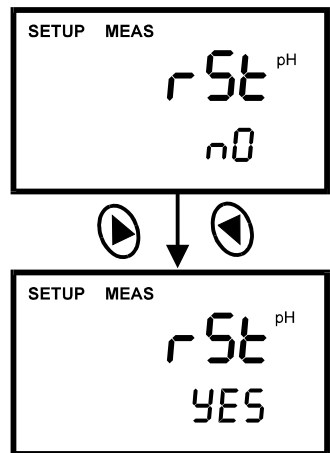


Figure 27 – P4.0: Reset to factory default values

NOTE

See page 68 for a table of factory default settings.

8.6 P1.0 (dPr): Dissolved Oxygen Parameters

This sub group is available in % saturation and mg/L (ppm) mode and lets you adjust the barometric pressure and salinity (% saturation mode only).

8.6.1 P1.1 Pressure adjustment mode

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

- Select either mm Hg or Pascal barometric pressure units.
- Adjust the barometric pressure. See Addendum 2 on page 67 for a "Pressure vs Altitude" table.

From measurement mode:

1. Press the **MODE** key to select DO measurement mode.
2. Press the **SETUP** key to enter SETUP mode.
3. Press the **▲** or **▼** keys to scroll through subgroups until you view parameter "dPr" in the upper display.
4. Press the **ENTER** key twice. The upper display shows either Hg or PA and the lower display shows bAr. See figure on next page.
5. Press the **▲** or **▼** keys to toggle between mm Hg and Pascal units.
6. 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 units selected in Step 3.
7. Press the **▲** or **▼** keys to adjust the barometric pressure. The pressure adjustment range is 500 to 1499 mm Hg (66.6 to 199.9 kPa).
8. Press the **ENTER** key to confirm selection and move to Step 4 on page 39 [*salinity adjustment appears in mg/L (ppm) measurement mode only*]. If instead you want to return to measurement mode, press **CAL/MEAS** twice.

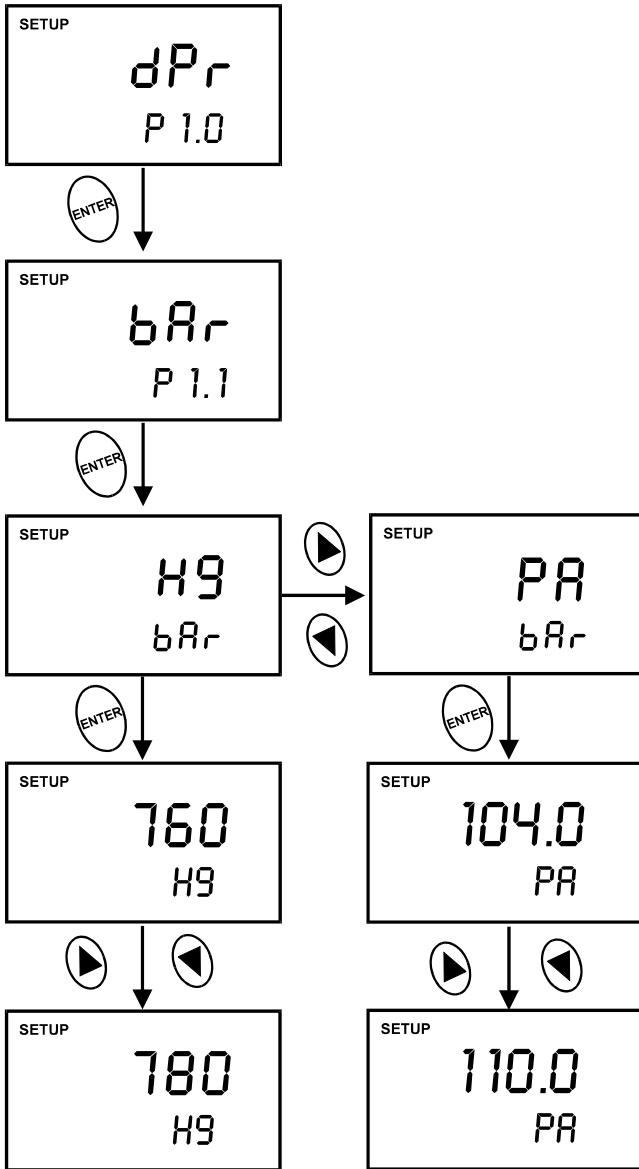


Figure 28: Change pressure units (mm Hg or kPa) & adjusting its values

8.6.2

P1.2: Salinity Adjustment Mode

NOTE

This mode appears in mg/L (ppm) measurement mode only.

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 ▲ or ▼ keys to scroll through subgroups 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 ▲ or ▼ 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 subgroup “dPr”. If you want to return to measurement mode, press CAL/MEAS.

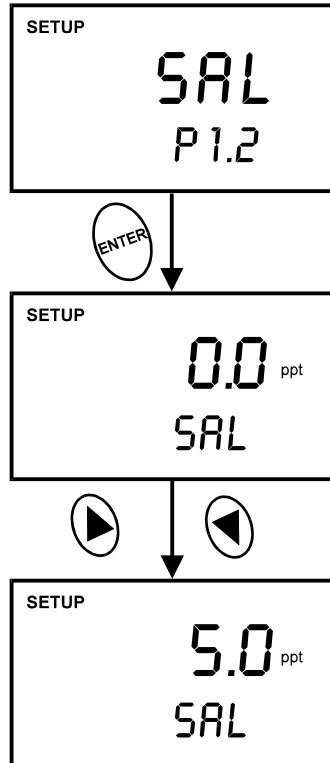


Figure 29: Input Salinity values for automatic correction
(The values shown above are for illustration purpose only)

8.7 P2.0 (OFS): Offset for % Saturation Measurement

NOTE

This sub group appears in % saturation measurement 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 ▲ or ▼ keys to scroll through subgroups 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 ▲ or ▼ keys to offset the % saturation measurement.
6. Press the ENTER key to confirm selection and to move back to subgroup “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)

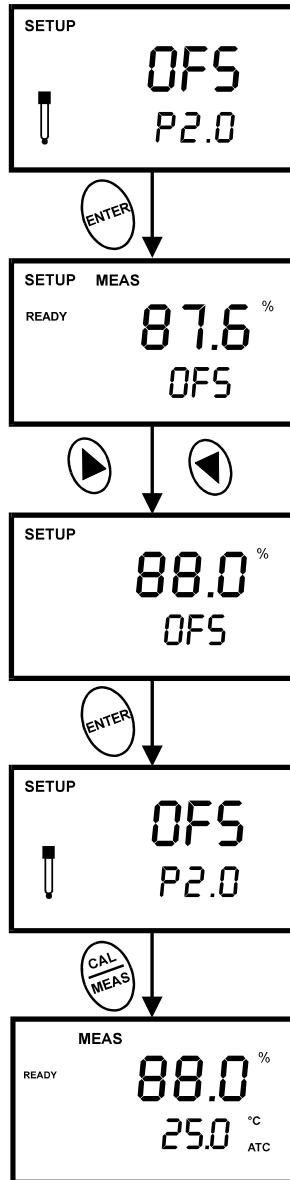


Figure 30: Offset for % saturation

8.8 P3.0 [P2.0] (CAL): Previous Calibration Information
*(*Program numbers in “[]” are for setup in mg/L (ppm) mode.*

This sub group shows you the previous calibration data. This is a “view only” parameter.

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

In mg/L (ppm) 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 ▲ or ▼ keys to scroll through subgroups 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 to move back to subgroup “CAL”. If you want to return to measurement mode, press CAL/MEAS.

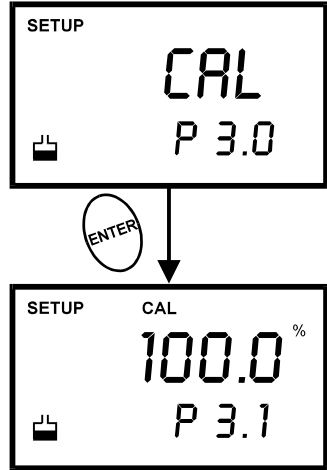


Figure 31: View calibration data

NOTE: If you did not calibrate this meter in a particular mode, the screen will show “---”. See Figure 30.

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

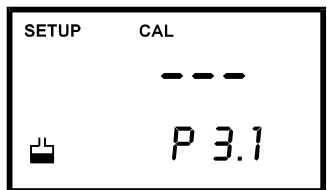


Figure 32: eter is not calibrated

8.9 P4.0 [P3.0] (ELE): Electrode Properties

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

- A. **P4.1 [P3.1] Probe Slope:** Provides 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% (1.0 = 100%).
- B. **P4.2 % Saturation Offset:** (available in % saturation mode only): Shows the value of the % saturation offset entered in parameter “OFS” (see page 40 for instructions).
- C. **P4.3 [P3.2] 100% Saturation mV value:** Lets you view the sensor's mV output corresponding to 100% saturation.
- D. **P4.4 [P3.3] 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 ▲ or ▼ keys to scroll through subgroups 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 40. NOTE: This appears only in % saturation measurement mode. If you are in mg/L (ppm) mode, the meter skips to step 6 on page 43.

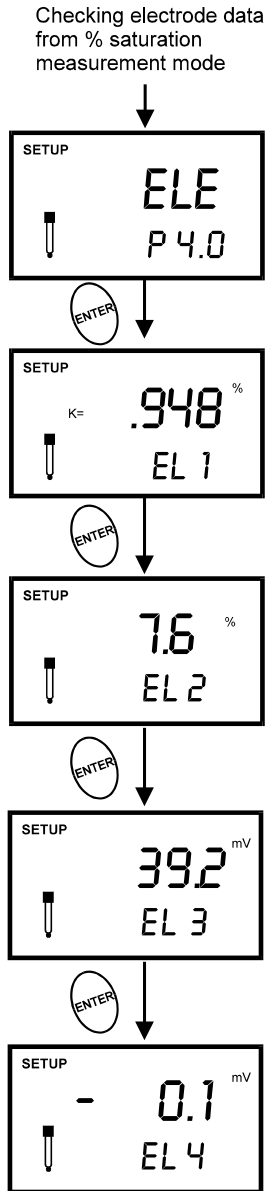


Figure 33: view electrode properties from % saturation

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 subgroup "ELE". 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)

Checking electrode data from mg/l (ppm) measurement mode

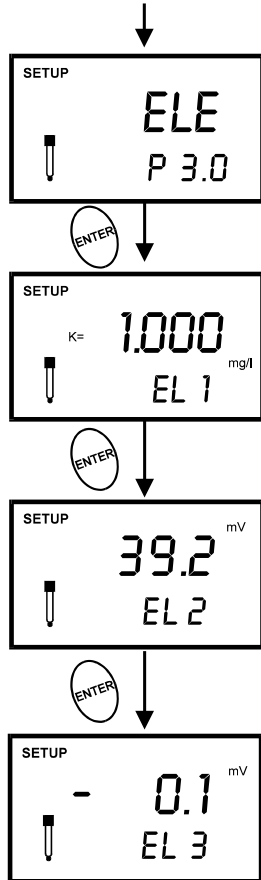


Figure 34: View electrode properties from mg/L (ppm) mode

8.10 P5.0 [P4.0] COF: Unit Configuration

Unit configuration mode lets you select the following parameters:

- A. P5.1 [P4.1] READY indicator and auto endpoint function.
- B. [P4.2] mg/L or ppm units (*available in mg/L or ppm mode only*)
- C. P5.2 [P4.3] Temperature in °C or °F.

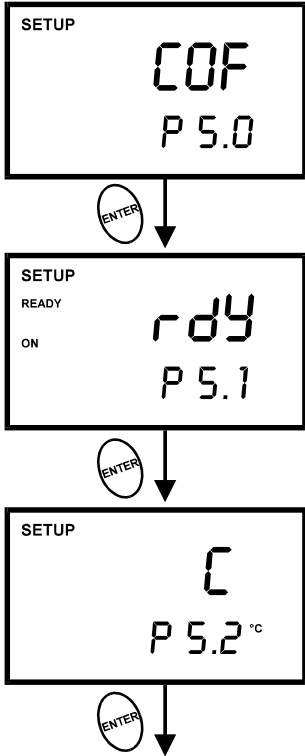


Figure 35: Unit configuration from % saturation measurement mode

8.10.1

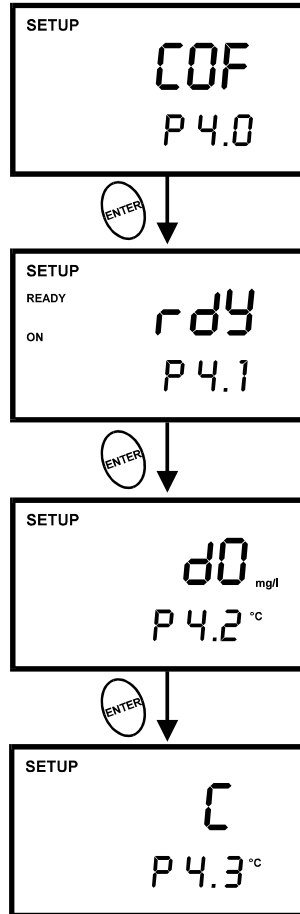


Figure 36: Unit configuration from mg/L measurement mode

P5.1 [P4.1] 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 ▲ or ▼ keys to scroll through subgroups until you view parameter COF in the upper display.
3. Press the ENTER key to select parameter “rdY” (Ready).
4. Press ▲ or ▼ 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 % mode: step 4 on page 47.
 - In mg/L (ppm) mode: step 5 on page 46.

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

Note: Meter default is set for Ready indicator ON, and auto endpoint function off. Any changes made to the Ready indicator/auto endpoint function will change in the pH mode as well.

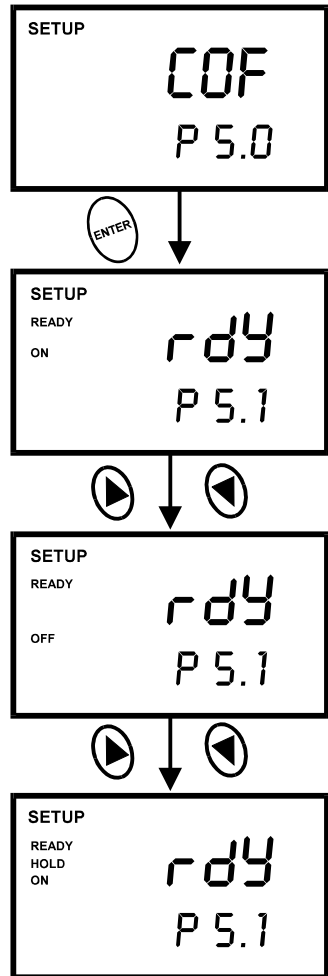


Figure 37: To configure for READY and Auto Endpoint functions

8.10.2 [P4.2] Selecting mg/L or ppm units

NOTE

This mode appears in mg/L (ppm) measurement mode only.

This mode lets you select between 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 ▲ or ▼ keys to scroll through subgroups until you view parameter “COF” in the upper display.
4. Press the ENTER key until “dO” appears in the upper display.
5. Press ▲ or ▼ keys to toggle between mg/L or ppm units.
6. Press the ENTER key to confirm selection. Press the CAL/MEAS key twice to return to measurement mode.

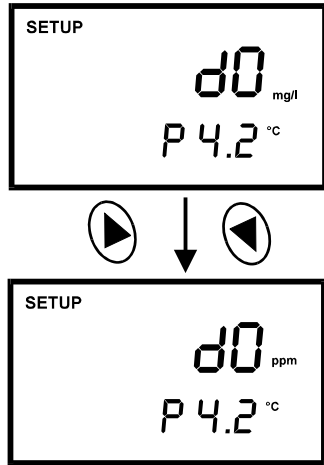


Figure 38: Change from mg/L to ppm unit

8.10.3 P5.2 [P4.3] 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 ▲ or ▼ keys to scroll through subgroups 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 ▲ or ▼ keys to toggle between °C and °F.
5. Press the ENTER key to confirm selection and to return to the subgroup menu. Press the CAL/MEAS key to return to measurement mode.

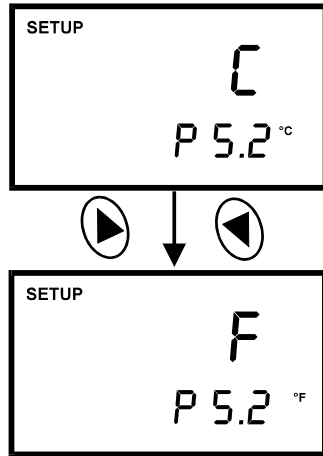


Figure 39: To change from units of measurement for temperature

Note: Any changes made to the temperature unit selection will change in the pH mode as well.

8.11 P6.0 [P5.0] LCd: Adjusting LCD Brightness

NOTE

This function is only available through DO measurement mode (% saturation or mg/L)

This mode lets you adjust 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 ▲ or ▼ keys to scroll through subgroups 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 ▲ or ▼ keys to select from level 0 (dimpest light) to level 8 (brightest light).
5. Press the ENTER key to confirm selection and to return to the subgroup menu. Press the CAL/MEAS key to return to measurement mode.

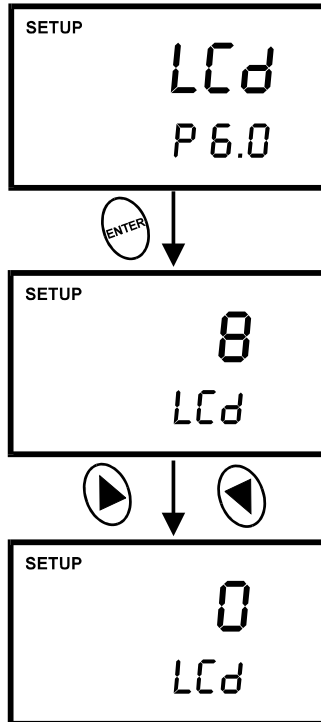


Figure 40: Adjusting LCD brightness

8.12 P7.0 [6.0] rSt: Resetting to Factory Default Setting (DO)

This program lets you reset all DO (% saturation and mg/L) parameters to factory default settings. This clears all calibration data and any other DO setup functions you might have changed.

The following settings will remain as you have set them:

- Temperature unit of measure (°C or °F)
- The temperature offset calibration value
- All DO calibration data and parameters

There are also some other parameters that retain settings when reset is done. See Addendum 3 on page 68 for a table of factory default settings.

From measurement mode

1. Press SETUP key to enter SETUP mode.
2. Press ▲ or ▼ keys to scroll through subgroups until you view parameter "rSt" in the upper display.
3. Press the ENTER key.
4. Press ▲ or ▼ keys to toggle between NO and YES.
 - NO retains current memory.
 - YES clears all memory
5. Press the ENTER key to confirm selection and to return to measurement mode.

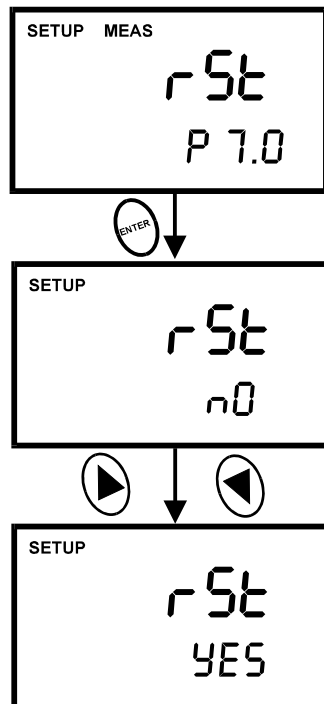


Figure 41: Reset to factory defaults

9 PROBE CARE AND MAINTENANCE

9.1 pH Electrode care

Your pH electrode should be kept clean and free from dirt and contamination. Probes that are not clean may provide slow or unusual readings. With proper care and normal usage, the pH electrode will need to be replaced every 6 to 18 months on average. **NOTE:** For specialty electrode care, consult the instruction manual included with your electrode.

pH electrode storage

For best results, always keep the pH bulb wet. Use the protective electrode storage bottle or rubber cap filled with electrode storage solution to store your electrode. Also, you can store in a pH 4 buffer with 1/100 part of saturated KCl. Other pH buffers are OK for short term storage, but NEVER use distilled water for storage.

After measuring

1. Rinse the pH electrode in de-ionised water.
2. Store the electrode as recommended above in "pH electrode storage," or as recommended by the electrode manufacturer.
3. Prior to next use, rinse the liquid junction with de-ionised water and shake dry – never wipe the electrode.

NOTE: If this does not restore electrode to normal response, see "Reactivating the pH electrode" section below.

pH electrode cleaning

- Salt deposits: Dissolve the deposits by immersing the electrode in warm tap water for ten to fifteen minutes. Thoroughly rinse with distilled water.
- Oil/Grease film: wash electrode pH bulb gently in detergent and water. Rinse electrode tip with distilled water or use a general purpose electrode cleaner (see Accessories).
- Clogged reference junction: Heat a diluted KCl solution to 60 to 80 °C. Place the sensing part of the electrode into the heated solution for about 10 minutes. Allow the electrode to cool in some unheated KCl solution.
- Protein deposits: Prepare a 1% pepsin solution in 0.1 M of HCl. Set the electrode in the solution for five to ten minutes. Rinse the electrode with distilled water.

Reactivating the pH electrode

If stored and cleaned properly, your pH electrode should be ready for immediate use. However, a dehydrated bulb may cause sluggish response. To rehydrate the bulb, immerse the electrode in a pH 4 buffer solution for 10 to 30 minutes. If this fails, the electrode requires activation. Never touch or rub glass bulb. Contact builds up an electro-static charge.

pH electrode activation (for glass body electrodes only)

WARNING: Only qualified persons proficient with the safe handling of dangerous chemicals should perform the procedure below. Provide proper containers, fume hoods, ventilation, and waste disposal. Safety goggles and protective clothing must be worn while performing this procedure. If possible, replace with another electrode instead of performing this re-activation procedure.

1. Dip or stir the pH electrode in alcohol for 5 minutes.
2. Leave the electrode in tap water for 15 minutes.
3. Dip and stir the electrode in concentrate acid (such as HCL or H₂SO₄) for five minutes.
4. Repeat Step 2.
5. Dip and stir in strong base (NaOH) for five minutes.
6. Leave for 15 minutes in tap water.
7. Now test with standard calibration buffer solutions to see if the electrode yields acceptable results. You may repeat step 3 through 6 up to three times for better response. If the response does not improve, then your electrode is no longer functioning. Replace with a new electrode – call your distributor for information.

9.2 Dissolved Oxygen Principle

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 42.

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.

9.3 Probe Care and Maintenance

Under typical operating conditions, the DO 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.

9.4 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. For more information see Trouble-Shooting Guide section on page 60.

Your new DO probe comes with a replacement membrane housing. To order more replacement membrane housing, , see the Accessories section on page 63.

9.4.1 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.

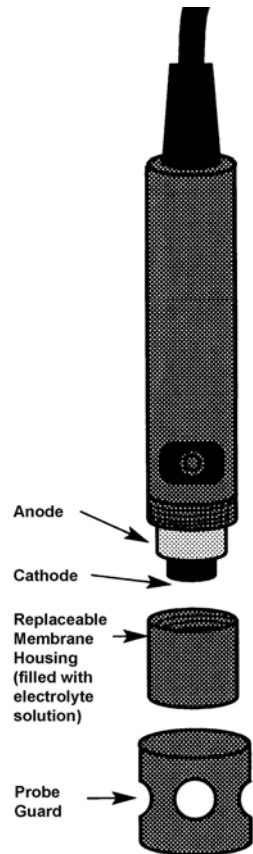


Figure 42: DO Probe, membrane cap housing & probe guard

9.5 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 44.
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 45.

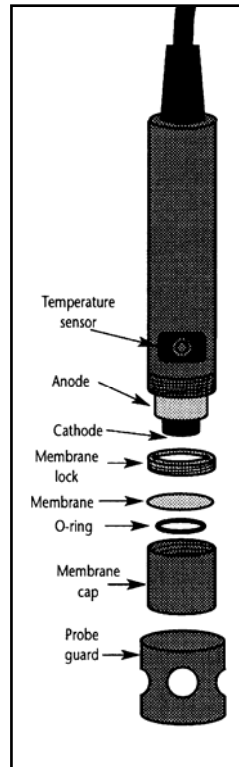


Figure 43: DO Probe & its various parts

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.

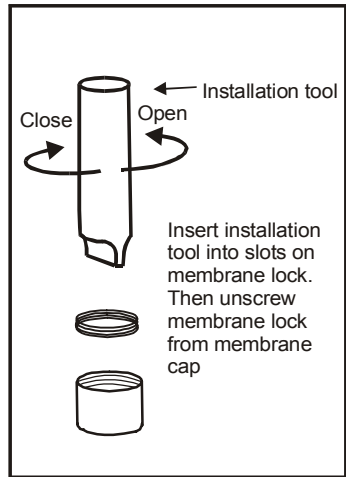


Figure 44: Use tool to take out (or put in) membrane

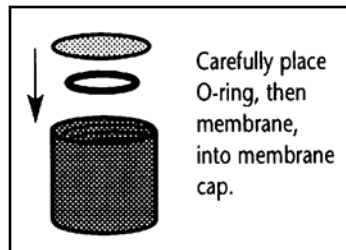


Figure 45 : Membrane cap housing with O-ring & membrane

9.6 Electrolyte Solution

The electrolyte solution in your probe's cap will deplete on usage and will need to be replaced periodically.

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.

9.7 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
Press 'ON' key but no display	<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.
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 by pressing Hold key. b) Return to dealer. c) Reset all internal programs by reinserting batteries.
Unstable readings	<ul style="list-style-type: none"> a) Insufficient electrolyte in probe. b) Air bubbles in 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 reference electrolyte. 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.
"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. c) Broken probe. 	<ul style="list-style-type: none"> a) Test probe. Make sure probe is fully connected to meter. b) Use different solution. c) 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.
Slow response	<ul style="list-style-type: none"> a) Dirty / Oily probe. 	<ul style="list-style-type: none"> a) Clean probe. See Probe Care & Maintenance section. b) Check membrane of DO probe. Replace if necessary

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 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

pH	Range Resolution Relative accuracy	-2.00 to 16.00 pH 0.01 pH ±0.01 pH
Dissolved Oxygen	Range Resolution Relative accuracy	0.00 – 20.00 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 – 200.0 % 0.1 % ± 1.5% of Full Scale
Temperature	Range Resolution °C Resolution °F Relative accuracy	-10.0 to 110.0 °C, (14.0 to 230°F) 0.1°C 0.1°F (14.0°F – 199.9°F) and 1°F(200°F to 230°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
DO Probe		Galvanic with integral Temperature Sensor
Response Time		40 seconds to achieve 93% of the reading
No. of DO Calibration Points		Single point at 100% in saturated air or air-saturated water
Temperature Compensation		Automatic or manual from 0 to 100 °C
pH Calibration		Up to 5 points (pH 1.68, 4.01, 7.00, 10.01 & 12.45)
pH Slope & Offset Display		Yes
Operating Temperature Range		0 to 50 °C
HOLD function		Yes
Auto-Off function		20 minutes after last key press
Averaging/Stability function		Selectable
Display		Customised Dual LCD
Back Lit Display		Yes
Inputs		BNC for pH, 6-pin military type for DO & Temperature
Power Requirements		four 1.5 V AAA-sized batteries (included)
Battery Life		> 100 hours continuous use
Dimensions		Meter: 19L x 9.5W x 5.7H cm (7.5"x3.75"x2.25") Case: 23.3L x 21.6W x 7.0H cm (9.17"x8.5"x2.8") Probe: 17.3L x 3.2 Dia cm (6.81"x1.26"dia) , with 3-m cable
Shipping weight		Meter: 0.92 kg (2.0 lbs) Carrying case with meter: 2.2 kg (4.85 lbs)

13 ACCESSORIES

Replacement Meters and accessories

Eutech Instruments

Item	Eutech Instruments Ordering Code
Waterproof CyberScan PD 300 portable pH/DO meter (with backlit) – with pH electrode (EC-DA93506-03B), DO probe with built-in temperature sensor (EC-DOHANDYNEW, 1 assembled membrane cap housing, 50-ml refilling electrolyte & hard plastic carrying case with pH calibration solutions (EC-PHWP-KIT).	EC-PDWP300/03K
Galvanic Dissolved Oxygen probe with built-in temperature sensor and 3-meter (10-ft) cable.	EC-DOHANDYNEW
Submersible Gel-filled pH combination electrode with 15-cm ABS guard, single annular ceramic junction and 3-meter cable length	EC-DA93506-03B
General Purpose Plastic-body Gel-Filled “3-in-1” pH/Temp. Combination Electrode, 12x110mm, BNC connector, 1m cable length.	EC-FE73528-01W
Temperature probe for CyberScan PD 300 meter	EC-PHWP-TEM01W
pH Carrying kit set – hard plastic carrying case comprises of 1 x pH 4.01, pH 7.00, pH 10.01 buffer solutions (60-ml), and 1 x empty rinse water bottle (480-ml)	EC-PHWP-KIT
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
PD 300 meter with DO/Temp probe (35640-50) and pH probe (35805-23)	35632-00
PD 300 meter only	35632-02
PD 300 meter with DO/Temp probe (35640-50) and pH probe (35805-23), electrode maintenance kit (35640-80), pH calibration solutions, and hard carrying case.	35632-60
Single-junction pH electrode, BNC, ABS body, 25-mm diameter, 10 ft (3 m) cable	35805-23
Double-junction pH electrode, BNC, ABS body, 25-mm diameter, 10 ft (3 m) cable	35805-24
Submersible DO/Temp electrode with 10 ft (3 m) cable	35640-50 (also includes 35640-80)
Submersible DO/Temp electrode with 25 ft cable	35640-52 (also includes 35640-80)
Submersible DO/Temp electrode with 50 ft cable	35640-54 (also includes 35640-80)
Submersible DO/Temp electrode with 100 ft cable	35640-56 (also includes 35640-80)
Membrane cap assembly (membrane, o-ring, membrane lock, bottom cap)	35640-72
Maintenance kit for DO electrode. Two membrane cap assemblies (35640-72) and a 30-mL bottle of electrolyte.	35640-80
Membrane installation tool. Required for 35640-74 & 35640-75	35640-79
Electrolyte solution, 500 mL	35640-71
Replacement membranes, pack of 5	35640-74
Replacement membranes, pack of 25	35640-75
Hard carrying case	35632-98
Temperature probe for pH or temperature only reading with PD 300 meter. Note: DO reading is not possible when this probe is used.	35618-05

Calibration Solutions

Item	Eutech Instruments Order Code	Oakton Instruments Order Code
pH 4.01 buffer solution, 480 ml bottle (1 pint)	EC-BU-4BT	00654-00
pH 7.00 buffer solution, 480 ml bottle (1 pint)	EC-BU-7BT	00654-04
pH 10.01 buffer solution, 480 ml bottle (1 pint)	EC-BU-10BT	00654-08
pH 4.01 buffer sachets, 20 ml x 20 pcs.	EC-BU-4BS	35653-01
pH 7.00 buffer sachets, 20 ml x 20 pcs.	EC-BU-7BS	35653-02
pH 10.01 buffer sachets, 20 ml x 20 pcs.	EC-BU-10BS	35653-03
pH De-ionised water rinse sachets, 20 ml x 20 pcs	EC-RIN-WT	35653-00
pH sachet assortment pack – 5 each of pH 4.01, pH 7.00, pH 10.01 and de-ionised water sachets per box.	EC-AST-PK	35653-04
Protein cleaning solution for pH electrode	EC-DPC-BT	00653-06
Storage solution for pH electrode	EC-RE-005	00653-04

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 ADDENDUM 1: 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.

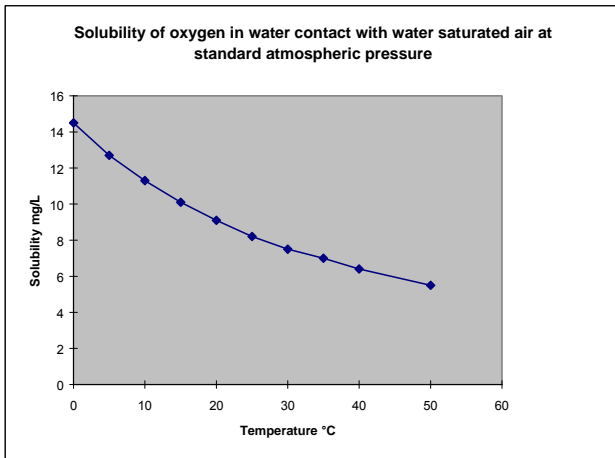


Figure 46: DO Solubility in Water vs Temperature °C

15 ADDENDUM 2: 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 37 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 ADDENDUM 3: METER FACTORY DEFAULT SETTINGS

Resetting the meter to factory default settings clears all calibration data and most other setup functions you might have changed. The following settings will remain as you have set them:

- Temperature unit of measure (°C or °F)
- The temperature offset calibration value.

NOTE

DO and pH data are cleared separately from each other.

- To clear pH data, see Sub group P4.0 on page 36.
- To clear DO data, see Sub group P7.0 on page 49.

Type	Parameter	P No.	Default	Remarks
<u>pH parameters</u>				
CAL	View pH calibration data	P1.1	--	Calibration data for 1st buffer, pH 1.68
		P1.2	--	Calibration data for 2nd buffer, pH 4.01
		P1.3	--	Calibration data for 3rd buffer, pH 7.00
		P1.4	--	Calibration data for 4th buffer, pH 10.01
		P1.5	--	Calibration data for 5th buffer, pH 12.45
ELE	View electrode offset	P2.1	0.00 mV	No offset adjustment
	View electrode slope	P2.2	100.0 %	No slope adjustment
COF	Ready indicator	P3.1	Ready On	Ready indicator on; auto endpoint off
	# pH calibration points	P3.2	3	Selects number of calibration points. Minimum 2 points.
	°C or °F	P3.3	No default	°C or °F remains as selected
rSt	pH factory default	P4.0	No	Retains your current settings
<u>DO parameter</u>				
dPr	Barometric pressure inputs.	P1.1	Hg 760 mm Hg	Hg or Pa. Adjustable from 500 – 1499 mm Hg
	Salinity adjustment	P1.2	0 ppt	Adjust from 0 – 50.00 ppt (% only)
OFS	Set % saturation offset	P2.0	--	Up to ±10% (% only)
CAL	View calibration data	P3.0 [P2.0]	--	--
ELE	View probe slope	P4.1 [P3.1]	1.000	--
	View % saturation offset	P4.2 [P3.2]	0% offset	--
	View mV = 100% saturation	P4.3 [P3.3]	37.0 mV	
	View mV = 0% saturation	P4.4 [P3.4]	0.3 mV	
COF	Ready indicator	P5.1 [4.1]	Ready On	Ready indicator on; auto endpoint off
	Select mg/L or ppm units	[P4.2]	mg/L	mg/L or ppm (mg/L mode only)
	°C or °F	P5.2 [P4.3]	Retains settings	°C or °F remains as selected
LCd	Adjust back lit display	P6.0 [P5.0]	8	Levels 0 to 8 (brightest)
rSt	Reset to factory default	P7.0 [P6.0]	No	Yes / no

* Program numbers with “[]” are accessed from mg/L (ppm) mode.

17 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

18 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) 888-462-5866 Fax: (1) 847-327-2984 E-mail: info@4oakton.com Web-site: www.4oakton.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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