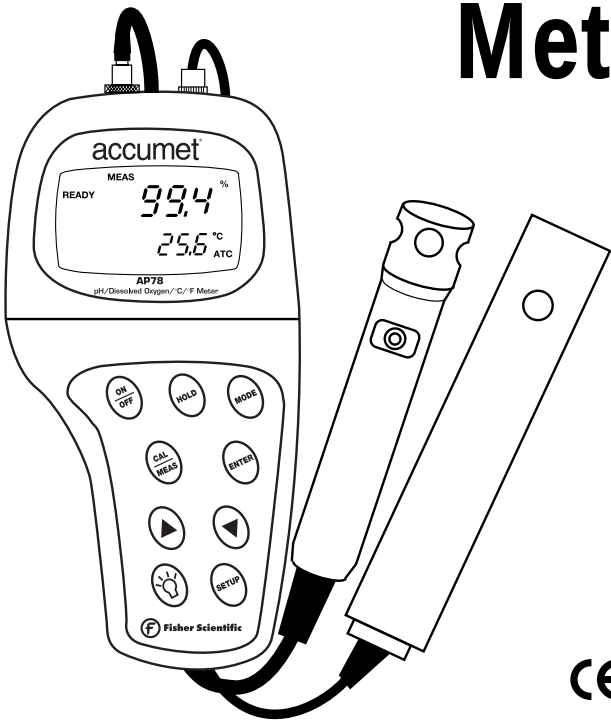
accumet®

OPERATING INSTRUCTIONS

accumet® 13636AP84A

Portable Waterproof pH/Dissolved Oxygen Meter



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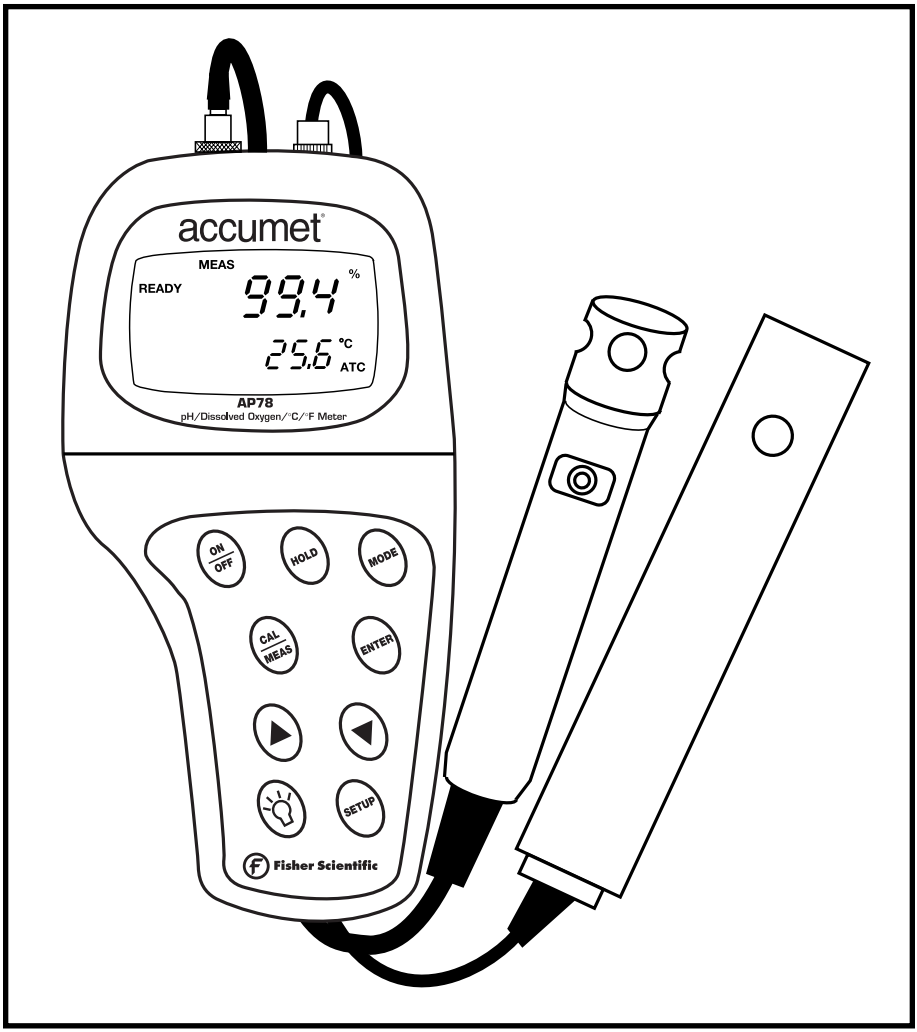
1. Introduction

Thank you for selecting an accumet AP84 meter. This portable meter is a microprocessor-based instrument that measures pH, dissolved oxygen and temperature. It's completely waterproof—and it floats! Your meter has many user-friendly features, all of which are accessible through the membrane keypad.

Your meter includes batteries. Please read this manual thoroughly before operating your meter.



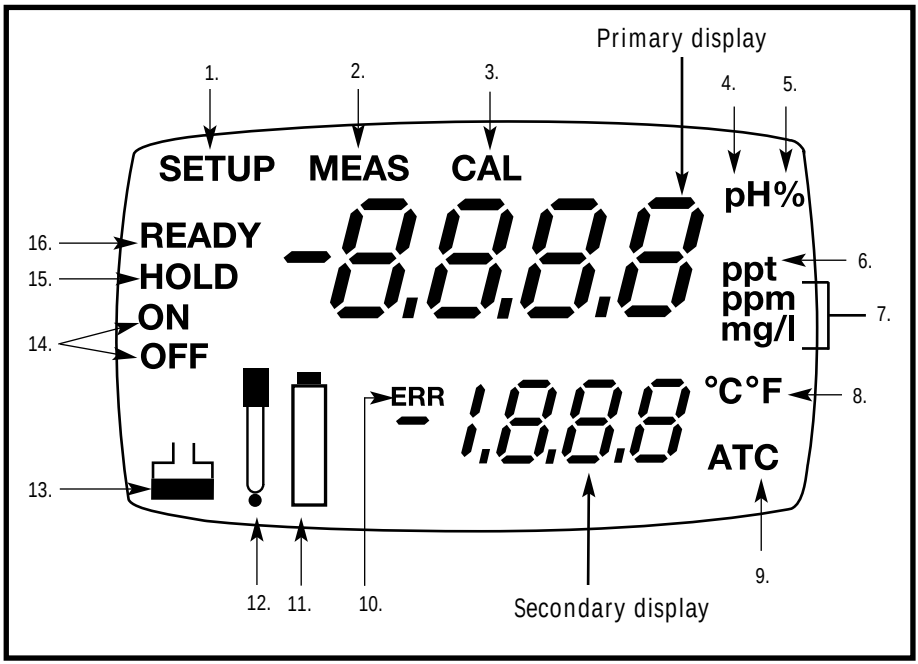
2. Display and Keypad Functions

2.1 Display

The LCD has a primary and secondary display.

- The primary display shows the measured pH or dissolved oxygen reading.
- The secondary display shows the temperature of the reading.

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



1. SETUP mode indicator
2. MEASurement mode indicator
3. CALibration mode indicator
4. pH indicator
5. % saturation indicator
6. Salinity input indicator
7. Oxygen solubility indicators
8. Temperature indicators
9. Automatic Temperature Compensation indicator
10. ERRor indicator
11. Low battery indicator
12. Probe indicator
13. Calibration data indicator
14. Function ON / OFF indicator
15. HOLD indicator
16. READY 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.

ON/OFF.....Powers and shuts off the meter.

HOLD .....Freezes the measured reading. To activate, press **HOLD** while in measurement mode. To release, press **HOLD** again.
NOTE: When auto endpoint feature is switched on, it automatically holds reading after 5 seconds of stability. The HOLD indicator appears on the display. Press HOLD to release.

MODE.....Selects the measurement parameter. Press MODE to toggle between pH; DO % saturation; DO mg/l (ppm). In pH and DO mg/l (ppm) calibration modes press MODE to access temperature calibration. NOTE: To switch between mg/l and ppm modes, see page 52.

CAL/MEAS.....Toggles user between Calibration and Measurement mode.
- If you were in pH mode, press **CAL/MEAS** to enter pH calibration mode.
- If you were in DO % saturation mode, press **CAL/MEAS** to enter DO % saturation calibration mode.
- If you were in DO mg/l (ppm) mode, press **CAL/MEAS** to enter DO mg/l (ppm) calibration mode.

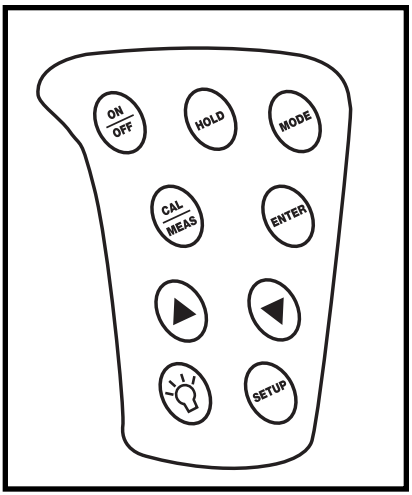
NOTE: Temperature calibration is available from both pH and DO mg/l (ppm) calibration modes; see page 19 for directions.
In advanced set-up mode: Press **CAL/MEAS** to return to main menu from sub menus. Press **CAL/MEAS** again to return to measurement mode from main menu.

ENTER .....Press to confirm values in Calibration mode and to confirm selections in **SETUP** mode.

▲ / ▼ .....Press in **SETUP** mode to scroll through subgroups. Also lets you increment/decrement the values in the mg/l and temperature calibration modes.

SETUP.....Press to enter **SETUP** mode. **SETUP** mode lets you customize meter preferences and defaults, and view calibration and probe data.

.....**LIGHT** Press to activate backlit display.

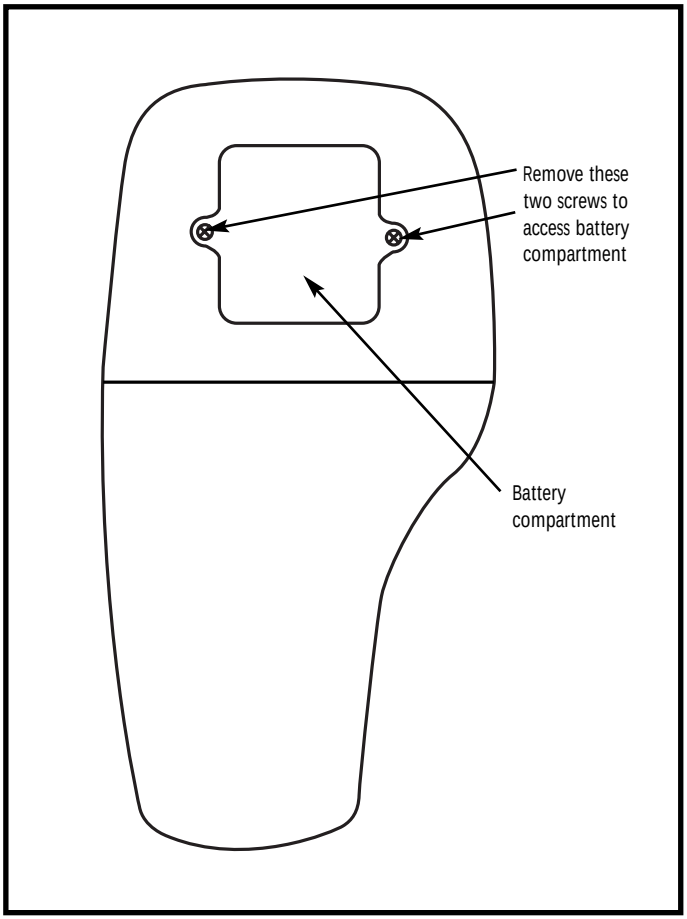


3. Preparation

3.1 Inserting the Batteries

Four AAA batteries are included with your meter.

1. Use a Phillips screwdriver to remove the two screws holding the battery cover. See figure below.
2. Lift off 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. Screw cover back into place.



3.2 Probe information

Your meter uses two probes:

- **pH electrode** with BNC connector
- **dissolved oxygen/temperature probe** with a notched 6-pin connector

The temperature sensing element built into the dissolved oxygen 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. If you do not have the DO probe connected you will need a separate temperature probe to provide temperature compensation for pH readings (not included; contact us for details). For the dissolved oxygen / temperature probe, you must use a dissolved oxygen / temperature probe with the notched 6-pin connector.

NOTE: Keep connectors dry and clean. Do not touch connectors 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.

See figure below.

2. To remove probe, push and rotate the connector counterclockwise. While holding onto the metal part of the connector, pull probe away from the meter.

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

To connect the dissolved oxygen probe:

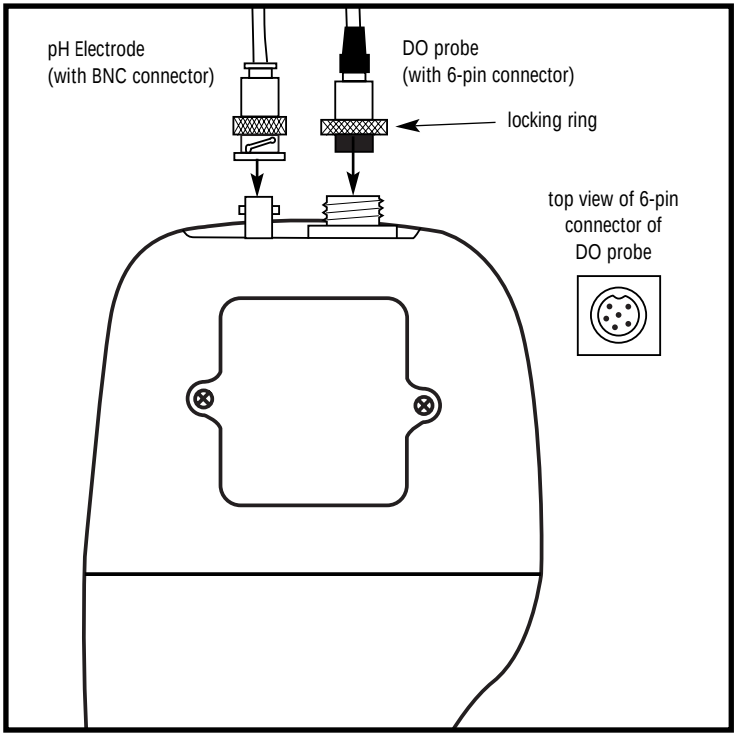
NOTE: Do not substitute other DO probes.

1. Line up the notch and 6 pins on the meter with the holes in the 6-pin connector. Push down and turn the locking ring clockwise to lock into place.

See figure below.

2. To remove probe, turn the locking ring counterclockwise on the probe connector. Pull probe away from the meter.

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



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 P1.0 in the SETUP section, page 32.
- **% saturation:** Program P3.0 in the SETUP section, page 41.
- **mg/l (ppm):** Program P2.0 in the SETUP section, page 49.

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 P4.0 in the SETUP section, page 38.
- **% saturation:** Program P7.0 in the SETUP section, page 46.
- **mg/l (ppm):** Program P6.0 in the SETUP section, page 55.

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 sections 4.2-4.3 on pages 11-13 for pH calibration
- See section 4.4-4.5 on page 14-16 for % saturation calibration
- See section 4.4 and 4.6 on page 14, 17-18 for mg/l (ppm) calibration
- See section 4.7 on pages 19 for Temperature Calibration

4.2 Preparing the Meter for pH Calibration

Before starting pH 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. For example, if you shut the meter off in "pH" units, the meter will read "pH" units when you switch the meter on.

Do not reuse pH calibration solutions after calibration. Contaminants in the solution can affect the calibration, and eventually the accuracy of the measurements. u

Be sure to remove the protective rubber cap from the pH electrode before calibration or measurement. If the electrode has been stored dry, wet the probe in tap water for 10 minutes before calibrating or taking readings to saturate the pH electrode surface and minimize drift.

Wash your probe in deionized water after use, and store in electrode storage solution. If storage solution is not available, use pH 4.0 or 7.0 buffer.

The pH / DO 300 meter is capable of up to 5-point pH calibration at pH 1.68, 4.01, 7.00, 10.01, and 12.45 to ensure accuracy across the entire pH range of the meter . The meter automatically recognizes and calibrates to these standard buffer values, which makes pH calibration faster and easier.

To calibrate at 5 points you must select a 5-pt calibration in SETUP mode program P3.2 on page 36. You can select 2, 3, 4 or 5 calibration points for pH calibration.

4.3 pH calibration

NOTE: We recommend that you perform at least a 2-point calibration using standard buffers that bracket (one above and one below) the expected sample range. You can perform a 1-point calibration, but make sure that the buffer value is close to the sample value you are measuring.

The temperature sensing element is in the DO probe. For temperature compensated readings and calibration, immerse the DO probe into the calibration buffer while calibrating pH.

pH Calibration

1. **If necessary, press the MODE key to select pH mode**. The pH indicator appears in the upper right hand corner of the display.

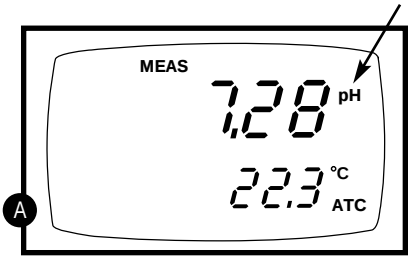
See figure A

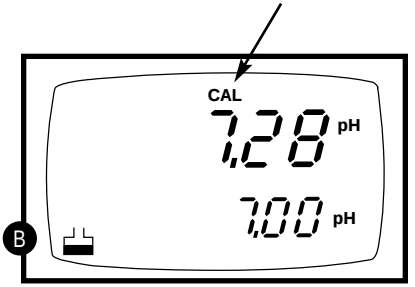
2. **Rinse the pH electrode and DO probe thoroughly with de-ionized water or a rinse solution.** Do not wipe the probe; this causes a build-up of electrostatic charge on the glass surface.
3. **Dip both probes into the calibration buffer.** The end of both probes must be completely immersed into the sample. Stir the probe gently to create a homogeneous sample.
4. **Press CAL/MEAS** to enter pH calibration mode. The CAL indicator lights. The primary display will show the measured reading while the smaller secondary display will indicate the pH standard buffer solution.

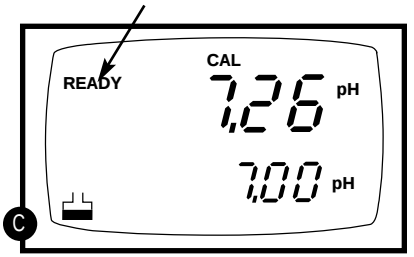
See figure B

5. **Wait for the measured pH value to stabilize.**

See figure C







If the READY indicator has been activated (set up program P3.1—see page 35), the READY annunciator lights when the reading is stable.

6. **Press ENTER to confirm calibration**. The meter is now calibrated to the current buffer.

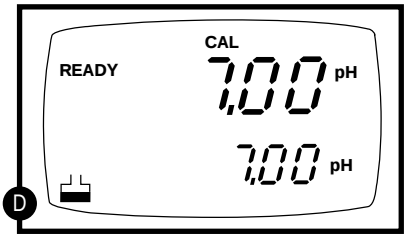
See figure D

- If you are performing multipoint calibration, go to step 7.
- If you are performing one-point calibration, go to step 9.

7. **Rinse the probe with de-ionized water or a rinse solution, and place it in the next pH buffer.**

8. Follow steps 5 to 8 for additional calibration points.

9. When calibration is complete, **press CAL/MEAS to return to pH measurement mode**.



Notes

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

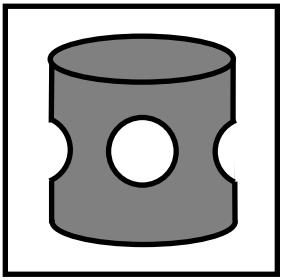
If the selected buffer value is not within ±1.0 pH from the measured pH value: the electrode and buffer icon blink and the ERR annunciator appears in the lower left corner of the display.

To limit the number of pH buffer values available during calibration, see section P3.2 on page 36.

4.4 Preparing the meter for DO calibration

Before calibrating your meter, make sure to rinse the DO probe well with de-ionized water or rinse solution.

NOTE: Do not let membrane surface of the DO probe touch any other surface. The DO 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.



DO Probe guard

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

Before Dissolved Oxygen calibration

Before starting DO 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, % saturation). For example, if you shut the meter off 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 midrange value between 10 and 100%. If you are calibrating to a midrange value, you need to set the 100% saturation value first.

4.5 Dissolved Oxygen calibration in percent saturation

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

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

- See page 39 to change the pressure setting.
- See Appendix 2 on page 64 for a chart of adjusted % saturation values.

To calibrate 100 % saturation:

1. **Rinse the probe well with deionized rinse water or rinse solution.** For best accuracy, wrap the end of the probe in a damp cloth. Do not touch the membrane.
2. **Press the MODE key** to select the % saturation mode.

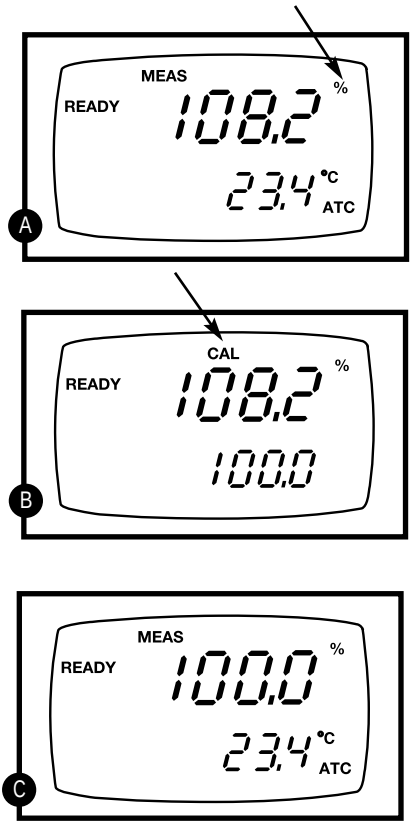
See figure A

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 NOTE above).

See figure B

4. **Hold the probe in the air (or in damp cloth).** Wait for the reading to stabilize. If the Ready indicator feature is enabled, it will appear when the reading is stable (see page 43 for Ready indicator setup).
5. **Press the ENTER key.** The meter automatically calibrates to 100.0% air saturation and returns to Measurement mode.

See figure C



Notes

The reading in the primary display in step 3 must read at 50% or above 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.

To calibrate 0 % saturation:

1. **Rinse the probe well with deionized rinse water or rinse solution.** Do not touch the membrane.
2. **Press the MODE key** to select the % saturation mode.

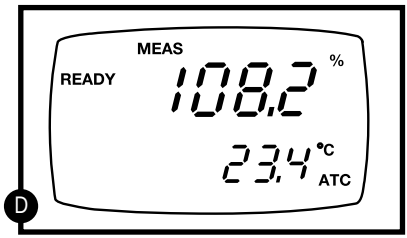
See figure D

2. **Place the probe in zero oxygen solution.** Stir the probe gently to homogenize the sample. Make sure that the sample is continuously flowing past the membrane sensor.
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 0.0.

See figure E

4. **Wait for the reading to stabilize.** If the Ready indicator feature is enabled, it will appear when the reading is stable (see page 43 for Ready indicator setup).
5. **Press the ENTER key.** The meter automatically calibrates to 0.0% saturation and returns to Measurement mode.

See figure F



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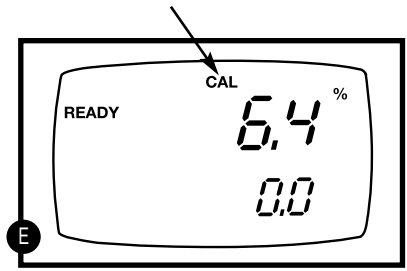

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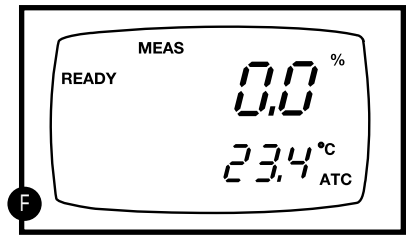


F

Notes

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 52.

To calibrate in mg/l (ppm) mode:

1. Calibrate 100% saturation per section 4.5 on page 15.
2. **Rinse the probe well with deionized rinse water or rinse solution.** 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 stabilize. If the Ready indicator feature is enabled, it will appear when the reading is stable (see page 43 for Ready indicator setup).

NOTE: The sample must continuously flow past the membrane for accurate readings. A stirrer can keep the solution agitated.

4. **Press the MODE key** to select the mg/l (ppm) mode.

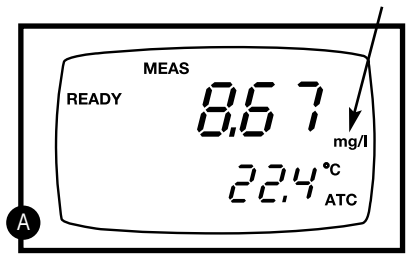
See figure A

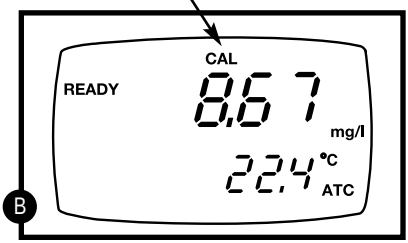
5. **Press the CAL key.** The CAL indicator will appear above the primary display. The primary display shows the current value of the measurement and the secondary display shows the temperature.

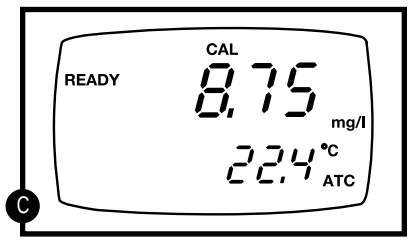
See figure B

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.

See figure C







Notes on mg/l (ppm) mode calibration

During mg/l (ppm) 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 pages 47-48 for directions).

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

4.7 Temperature Calibration

The built-in temperature sensor included in the DO probe is factory calibrated. Calibrate your sensor only if you suspect sensor drift that may have occurred over a long period of time or if you have a replacement DO probe. Make sure DO probe is attached before you perform the temperature 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.

See figure A

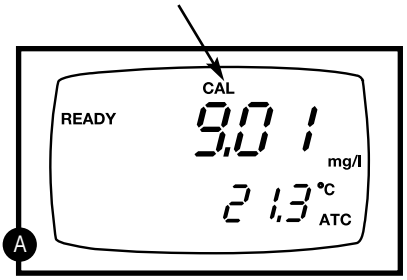
3. **While in pH or mg/l (ppm) calibration mode, press the MODE key to enter temperature calibration mode.** The primary display shows the last set temperature reading and the secondary display shows you the factory default temperature value.

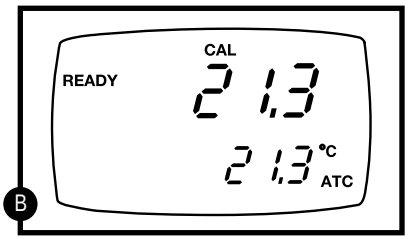
See figure B

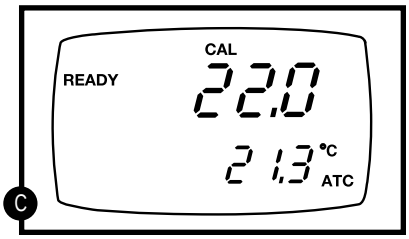
4. **Compare the primary display reading to a NIST-traceable thermometer or another thermometer known to be accurate.**
5. **Press the ▲ or ▼ keys** to adjust the primary display reading to agree with your temperature standard.

See figure C

6. **Press the ENTER key** to confirm temperature calibration and return to Measurement mode.







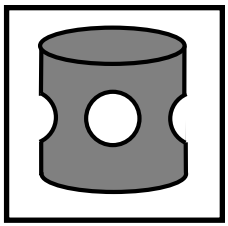
Notes

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

Temperature calibration is restricted to ±5°C from the factory default value displayed during calibration (shown in the secondary display).

5. Measurement

5.1 Taking DO readings



Probe guard

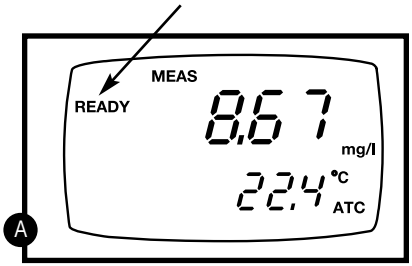
During measurement, the probe can be:
- fully immersed in the solution
- partially immersed in the solution

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 deionized 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 homogenize 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.



See figure A

**To select between mg/l and ppm units, see page 52.

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

CONTINUED ON NEXT PAGE

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 the SETUP program P5.1 for % saturation measurements (page 43) or program P4.1 (page 51) for mg/l (ppm) measurements.

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 the SETUP program P5.1 for % saturation measurements (page 43) or program P4.1 (page 51) for mg/l (ppm) measurements.

5.2 Taking pressure/salinity compensated DO measurements

If necessary, you can adjust the pressure and salinity values of your measurements in the SETUP mode. The DO meter will automatically compensate for salinity and pressure based on the values entered in the setup functions. The meter is factory set at 760 mm Hg (101.3 Pascals) pressure adjustment and a factor of 0.0 salinity adjustment. See Appendix 2 on page 64 for a "Pressure vs Altitude" table.

Pressure adjustment

NOTE: This adjustment appears in both the % saturation and mg/l (ppm) measurement modes.

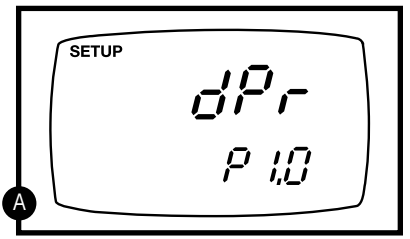
1. **Press the MODE key** to select % saturation or mg/l (ppm) mode. **Press the SETUP key** to enter Set Up mode.

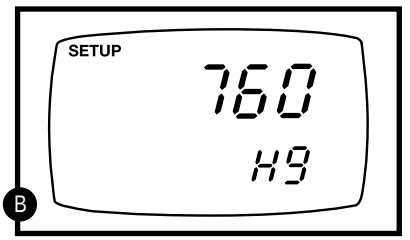
See figure A

2. **Press the ENTER key** until the upper display shows a number and the lower display shows "Hg" or "PA".
3. **Use the ▲ and ▼ keys** to enter the barometric pressure. The upper display will show the value you have entered.

See figure B

4. **Press ENTER** to confirm pressure value.
5. Press CAL/MEAS to return to measurement mode, or continue with step 4 on page 22 to make a salinity adjustment [available from mg/l (ppm) mode only].





Salinity adjustment

NOTE: ***this mode appears in mg/l (ppm) measurement mode only.***

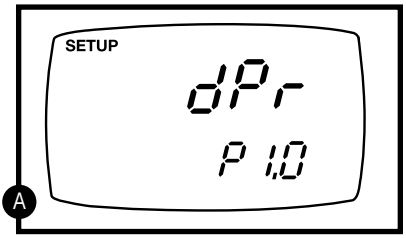
1. **Press the Mode key** to select mg/l (ppm) mode.
2. **Press the SETUP key** to enter Set Up mode.

See figure A

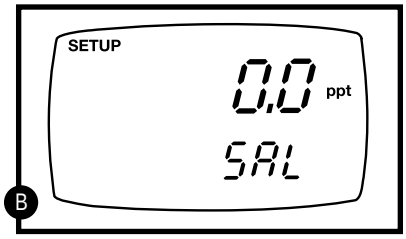
4. **Press the ENTER key** until the upper display shows a number and the lower display shows "SAL".
5. **Use the ▲ and ▼ keys** to enter the salinity of your solution in ppt. The upper display will show the value you have entered.

See figure B

6. **Press the ENTER key** to confirm value.
7. Press CAL/MEAS to return to Measurement mode.



A



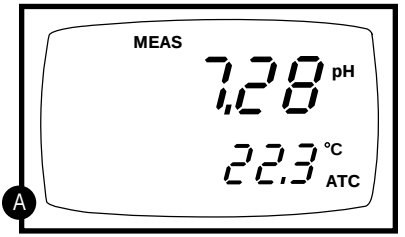
B

5.3 Taking pH Measurements

Be sure to remove the protective rubber cap on the electrode before measurement. To ensure Automatic Temperature Compensation (ATC) for pH measurements, the DO probe must be plugged in and must be immersed into the sample you wish to take pH readings.

To take readings:

1. **Rinse the pH electrode with deionized 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 or a 2M–4M KCl solution.
2. **Press ON to switch on meter. Press 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. If the ATC indicator does not appear, make sure DO probe is plugged into the meter.



See figure A

3. **Dip both the pH electrode and the DO probe into the sample.**

When dipping the pH electrode 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 homogenous sample.

4. **Allow time for the reading to stabilize.** Note the reading on the display.
5. **Press the MODE key** to toggle between modes:
   - **pH**
   - **% saturation.**
   - **mg/l (ppm)****

**To select between mg/l and ppm units, see page 52.

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

CONTINUED ON NEXT PAGE

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 Set up program P3.1—see page 35 for directions.

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 Set up program P3.1—see page 35 for directions.

5.4 Manual Temperature Compensation

IMPORTANT: For manual compensation, you must disconnect the DO or temperature probe (see page 9).

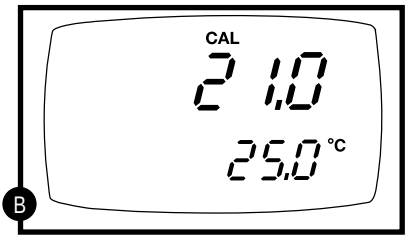
1. Switch the meter on. **Press the MODE key** to select pH mode.
2. **Press the CAL/MEAS key** to enter pH calibration mode. The CAL indicator will appear above the primary display.
3. While in pH calibration mode, **press the MODE key** to enter temperature calibration mode. The primary display shows the current temperature setting and the secondary display shows the default value 25°C.

See figure A

A

4. **Check the temperature of your sample** using an accurate thermometer.
5. **Press the ▲ or ▼ keys** to offset the temperature to the measured value from step 4.

See figure B



B

6. **Press ENTER** to confirm the selected temperature and to return to the pH measurement mode.

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

Notes

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

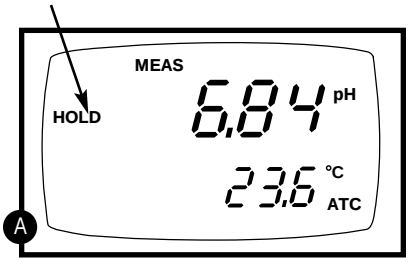
6. HOLD function

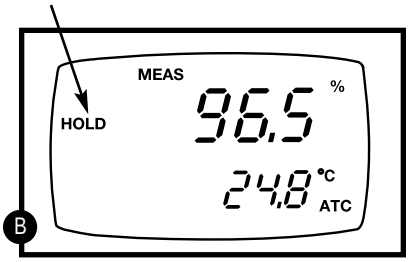
This feature lets you freeze the value of the pH, % saturation or mg/l (ppm) and temperature readings for a delayed observation. **HOLD** can be used any time when in **MEAS** mode.

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

See figures A *and* B

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





NOTE: This meter shuts off automatically after 20 minutes of nonuse. 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 the SETUP program P3.1 on page 35 for pH, P5.1 on page 43 for % saturation and P4.1 on page 51 for mg/l (ppm).

7. Backlit LCD

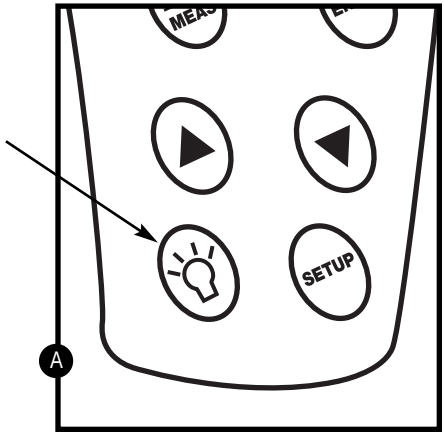
Using the backlit LCD

This feature lets you view readings in low light situations.

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

See figure A

To keep the LCD backlit, keep the key pressed. If the key is not pressed, the backlight automatically shuts off automatically after 20 seconds after pressing the key.



Adjusting 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 measurement mode:

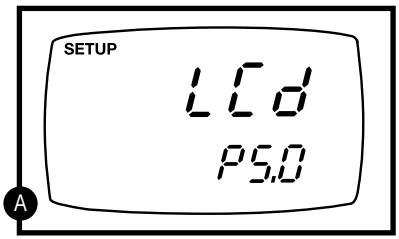
1. **Press the MODE key** to switch to % saturation or mg/l (ppm) mode.
2. **Press SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter "LCd" in the upper display.

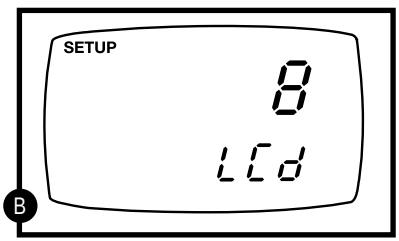
See figure A

4. **Press the ENTER key**. A number (0-8) appears in the upper display and "LCd" appears in the lower display.

See figure B

5. **Press the ▲ and ▼ keys** to select from level 0 (dimmest light) to level 8 (brightest light).
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.



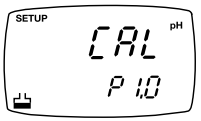


8. Advanced SETUP functions

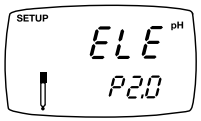
The advanced set up mode lets you customize your meter's preferences and defaults. Your meter features different sub groups that organize all SETUP parameters.

This meter displays different subgroups depending on which mode the meter is in:

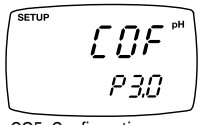
pH



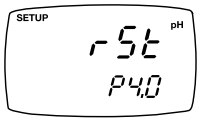
CAL: Calibration data



ELE: Probe data

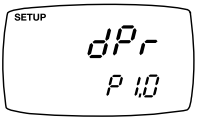


COF: Configuration

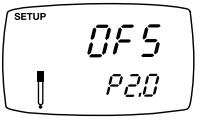


rSt: Reset meter to factory default

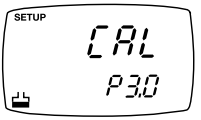
% Saturation



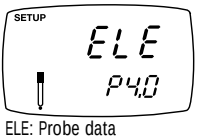
dPr: Dissolved oxygen parameters



% saturation offset adjustment

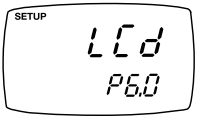


CAL: Calibration data

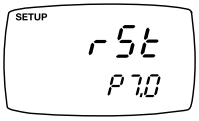


ELE: Probe data

COF: Configuration

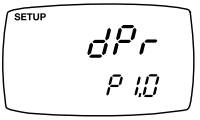


LCd: Backlit display

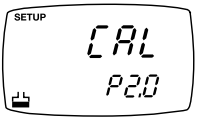


rSt: Reset meter to factory default

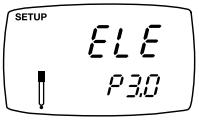
mg/l (ppm)



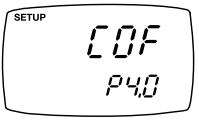
dPr: Dissolved oxygen parameters



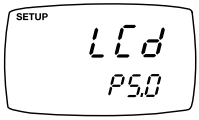
CAL: Calibration data



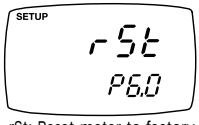
ELE: Probe data



COF: Configuration



LCd: Backlit display

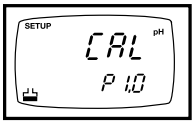


rSt: Reset meter to factory default

8.1 Advanced SETUP mode detailed overview

Press the SETUP key to enter SETUP mode. Press the ▲ and ▼ keys to scroll through sub groups.

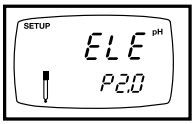
From the pH measurement mode



Instructions on page 32

CAL: Viewing previous calibration data

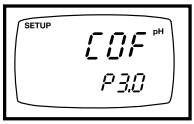
- View previous calibration data



Instructions on page 33-34

ELE: Viewing electrode data

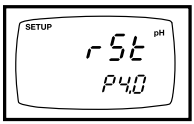
- View pH electrode offset
- View pH electrode slope



Instructions on page 35-37

COF: Unit configuration

- Ready indicator on or off / auto endpoint on or off
- number of calibration points: 2, 3, 4, or 5
- Select °F or °C

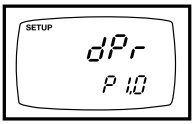


Instructions on page 38

rSt: Reset to factory default

- Reset to factory default settings

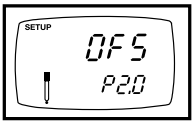
From the % saturation measurement mode



Instructions on page 39

dPr: Dissolved oxygen parameters

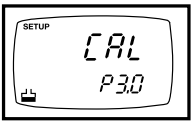
- Select Hg or Pa barometric pressure units
- Select barometric pressure



Instructions on page 40

OFS: % saturation offset adjustment

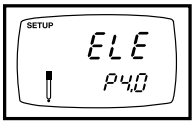
- Set % saturation offset adjustment



Instructions on page 41

CAL: Viewing previous calibration data

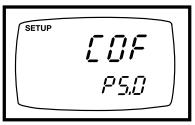
- View previous calibration data



Instructions on page 42

ELE: Viewing probe data

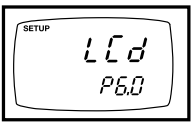
- View probe slope
- View % saturation offset
- View mV value equivalent to 100% saturation
- View mV value equivalent to 0% saturation



Instructions on page 43-44

COF: Unit configuration

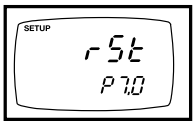
- Ready indicator on or off / auto endpoint on or off
- Select °F or °C



Instructions on page 45

LCd: Backlit display

- Adjust brightness of backlit LCD

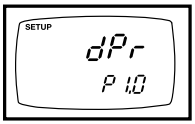


Instructions on page 46

rSt: Reset to factory default

- Reset to factory default settings

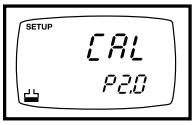
From the mg/l (ppm) measurement mode



Instructions on page 47-48

dPr: Dissolved oxygen parameters

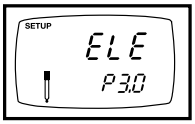
- Select Hg or Pa barometric pressure units
- Select barometric pressure
- Select salinity adjustment factor



Instructions on page 49

CAL: Viewing previous calibration data

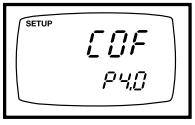
- View previous calibration data, including date/time



Instructions on page 50

ELE: Viewing probe data

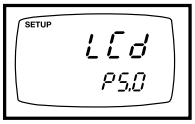
- View probe slope
- View mV value equivalent to 100% saturation
- View mV value equivalent to 0% saturation



Instructions on page 51-53

COF: Unit configuration

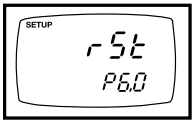
- Ready indicator on or off / auto endpoint on or off
- Select mg/l or ppm units
- Select °F or °C



Instructions on page 54

LCd: Backlit display

- Adjust brightness of backlit LCD



Instructions on page 55

rSt: Reset to factory default

- Reset to factory default settings

8.2 *pH mode*—P1.0: Viewing previous calibration data

Program P1.0 lets you recall previous calibration data, which helps you know when to recalibrate your meter. This is a "view only" mode.

From measurement mode:

1. **Press the MODE key** to select pH measurement mode.
2. **Press the SETUP key** to enter SETUP mode.

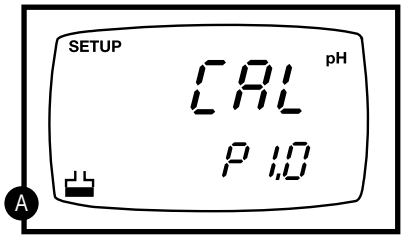
See figure A

3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P1.0.
4. **Press the ENTER key repeatedly** to view previous calibration data.

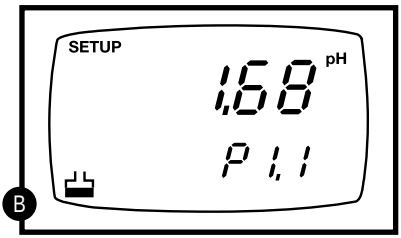
P1.1 = pH 1.68
P1.2 = pH 4.01
P1.3 = pH 7.00
P1.4 = pH 10.01
P1.5 = pH 12.45

See figure B

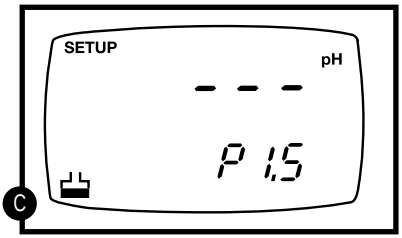
5. When you have scrolled through all calibration data, you will automatically return to the subgroup menu. Press the CAL/MEAS key to return to measurement mode.



A



B



C

NOTES:

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

See figure C

8.3 *pH mode*—P2.0: Viewing electrode data

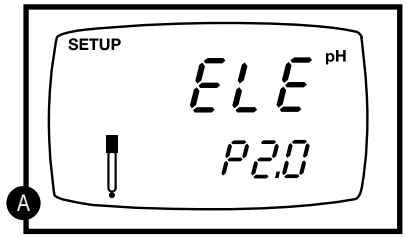
Program P2.0 has two "view only"options that lets you check the electrode parameters for diagnostic purposes.

P2.1: Electrode offset

From 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 ▲ and ▼ keys** to scroll through subgroups until you view parameter P2.0.

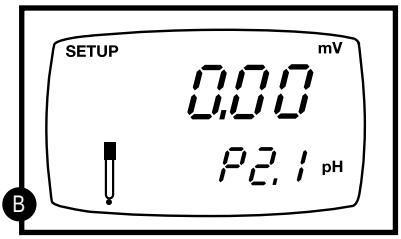
See figure A



A

4. **Press the ENTER key** to select parameter P2.1.
5. **The display shows the electrode offset value.**
   - the display shows the mV offset at pH 7.00. If you have not calibrated at any buffer, the primary display shows 0.00 mV.

See figure B



B

6. **Press the ENTER key** to to proceed to step 4 of P2.2. Or, press the CAL / MEAS key to return to measurement mode.

P2.2: Electrode slope

NOTE: this parameter is available in pH measurement mode only.

From measurement mode:

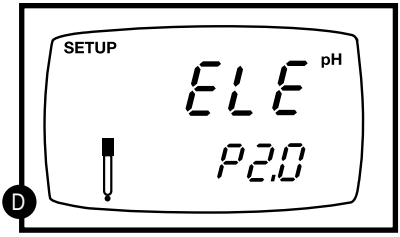
1. If necessary, **press the MODE key** to select pH measurement mode. **Press the SETUP key** to enter SETUP mode.
2. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P2.0.

See figure D

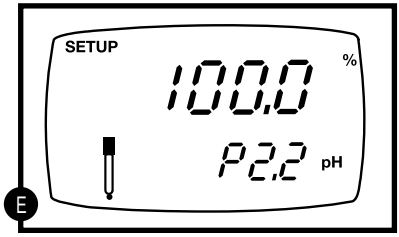
3. **Press the ENTER key** twice to select parameter P2.2.
4. The display shows electrode slope in percentage of the range you are currently measuring. Default setting is 100.0.

See figure E

5. **Press the ENTER key** to return to the subgroup menu. Press the CAL/MEAS key to return to measurement mode.



D



E

8.4 *pH mode*—P3.0: pH measurement configuration

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:

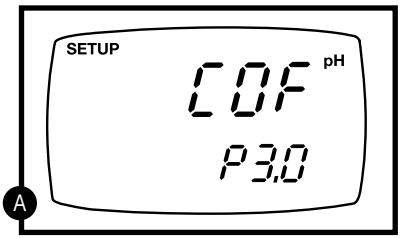
1. **Press the MODE key** to select pH measurement mode.
2. **Press SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P3.0.

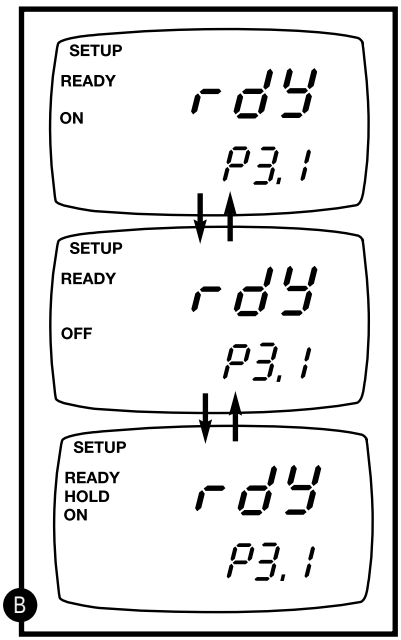
See figure A

4. **Press the ENTER key** to select parameter P3.1.

See figure B

5. **Press the ▲ and ▼ 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.





NOTES: 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 SETUP Program P5.1 on page 43 in % saturation mode or Program P4.1 on page 51 in mg/l (ppm) mode. Any changes you make to the Ready indicator/ auto endpoint function in pH mode will also change in % saturation and mg/l (ppm) modes.

P3.2: Selecting number of pH calibration points

Program P3.2 lets you select the number of pH calibration points the meter will use in 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:

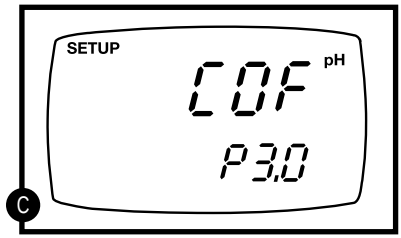
1. **Press the MODE key** to select pH measurement mode.
2. **Press SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P3.0.

See figure C

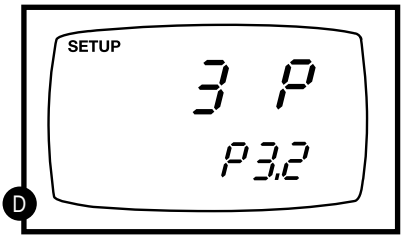
4. **Press the ENTER key** twice to select parameter P3.2.

See figure D

5. **Press the ▲ and ▼ 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 the CAL / MEAS key to return to measurement mode.



C



D

P3.3 Selecting °C or °F

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

From measurement mode:

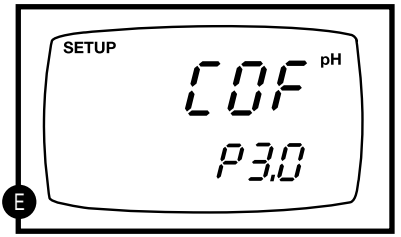
1. **Press the MODE key** to select pH measurement mode.
2. **Press SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P3.0.

See figure E

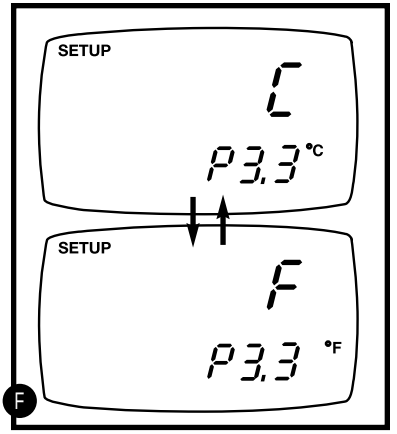
4. **Press the ENTER key** three times to select parameter P3.3.

See figure F

5. **Press the ▲ and ▼ 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.



E



F

NOTES:

You can also switch between °C and °F in SETUP Program P5.2 on page 44 in % saturation mode or Program P4.3 on page 53 in mg/l (ppm) mode. If you switch between °C and °F in pH mode, the meter will also switch in % saturation and mg/l (ppm) modes.

8.5 *pH mode*—P4.0: Resetting to factory default settings

This program lets you reset all pH parameters to factory default settings. This clears all calibration data 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 dissolved oxygen calibration data and parameters including the LCD contrast setting

From measurement mode:

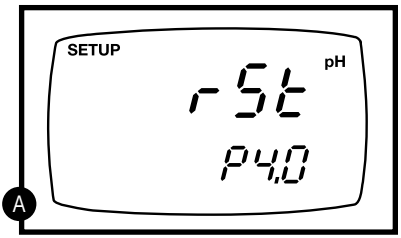
1. **Press the MODE key** to select pH measurement mode.
2. **Press SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P4.0 in the lower display.

See figure A

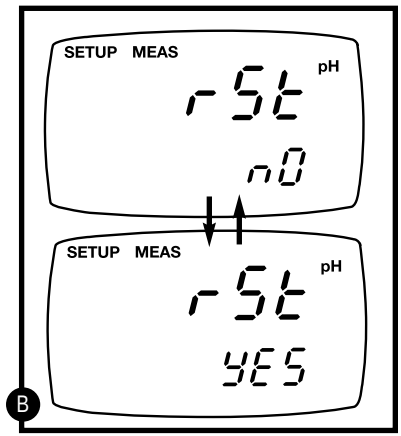
4. **Press the ENTER key**.

See figure B

5. **Press the ▲ and ▼ keys** to toggle between NO and YES.
   - NO retains current settings
   - YES resets to factory default settings
6. **Press the ENTER key** to confirm selection and to return to measurement mode.



A



B

Notes:

To reset all % saturation data, see page 46.

To reset all mg/l (ppm) data, see page 55.

See page 65 for a table of factory default settings.

8.6 *% saturation mode*—P1.0: Dissolved Oxygen Parameters

This sub group lets you adjust the barometric pressure

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 Appendix 2 on page 64 for a "Pressure vs Altitude" table.

From measurement mode:

1. **Press the MODE key** to select % saturation mode.
2. **Press the SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P1.0 in the lower display.

See figure A

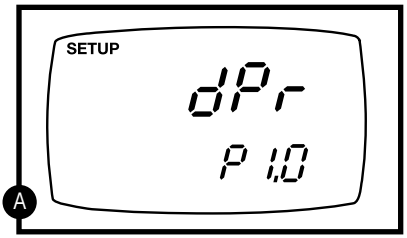
4. **Press the ENTER key twice.** The upper display shows either Hg or PA and the lower display shows bAr.
5. **Press the ▲ and ▼ keys** to toggle between mm Hg and Pascal units.

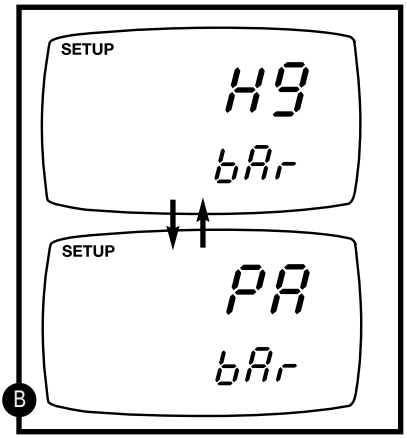
See figure B

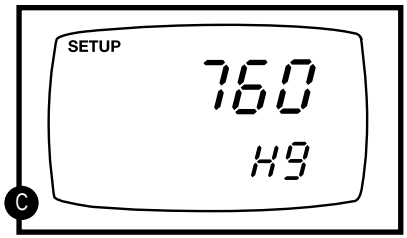
6. **Press the ENTER key** to confirm selection and move to the next screen. The upper display shows the barometric pressure and the lower display shows the units selected in step 5.

See figure C

7. **Press the ▲ and ▼ 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 3 on page 40. If instead you want to return to measurement mode, press CAL / MEAS twice.







8.7 *% saturation mode*—P2.0: Offset Adjustment

Use the offset adjustment to act as an offset at values between 0 and 100%. It is useful to match against end-user standards (i.e. a test kit value).

From measurement mode:

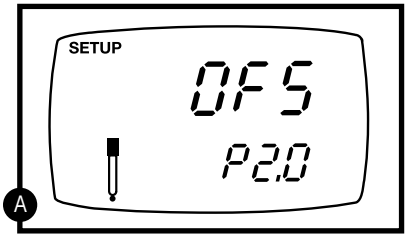
1. **Press the MODE key** to select % saturation mode.
2. **Press the SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P2.0 in the lower display.

See figure A

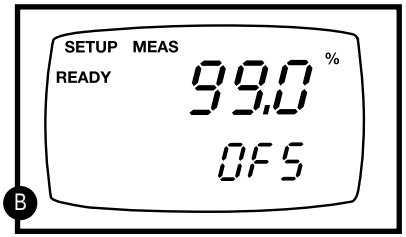
4. **Press the ENTER key.** The upper display shows the current measurement in % saturation and the lower shows OFS.

See figure B

5. **Press the ▲ and ▼ keys** to offset the % saturation measurement.
6. **Press the ENTER key** to confirm selection and to move back to subgroup P2.0. If you want to return to measurement mode, press CAL / MEAS.



A



B

8.8 *% saturation mode*—P3.0: Previous calibration information

This sub group shows you the previous calibration data, along with date and time of calibration. This is a "view only" parameter.

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

From measurement mode:

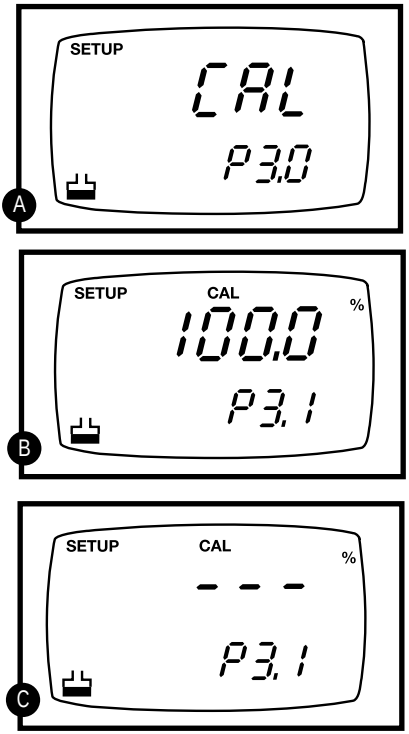
1. **Press the MODE key** to select % saturation mode.
2. **Press the SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P3.0 in the lower display.

See figure A

4. **Press the ENTER key.** The upper display shows the calibration data.

See figure B

6. **Press the ENTER key** to move back to subgroup P3.0. If you want to return to measurement mode, press CAL/MEAS.



NOTE: If you did not calibrate this meter in a particular mode, the screen will show "– – –".

See figure C

8.9 *% saturation mode*—P4.0: Electrode properties

These "view only" parameters show the electrode properties for diagnostic purposes:

probe slope: shows the calibration slope of the probe. This mode displays slope from 0.5 to 1.999 % of slope (1.0 = 100%).

% saturation offset: shows the value of the % saturation offset entered in parameter P2.0 (see page 40 for instructions).

100% saturation mV value: shows the sensor's mV output corresponding to 100% saturation.

0% saturation mV value: shows the sensor's millivolt output corresponding to 0% saturation.

From measurement mode:

1. **Press the MODE key** to select the % saturation measurement mode.
2. **Press the SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P4.0 in the lower display.

See figure A

4. **Press the ENTER key.** The upper display shows the probe slope.

See figure B

5. **Press the ENTER key.** The upper display shows the % saturation offset. See directions for setting this offset on page 40.

See figure C

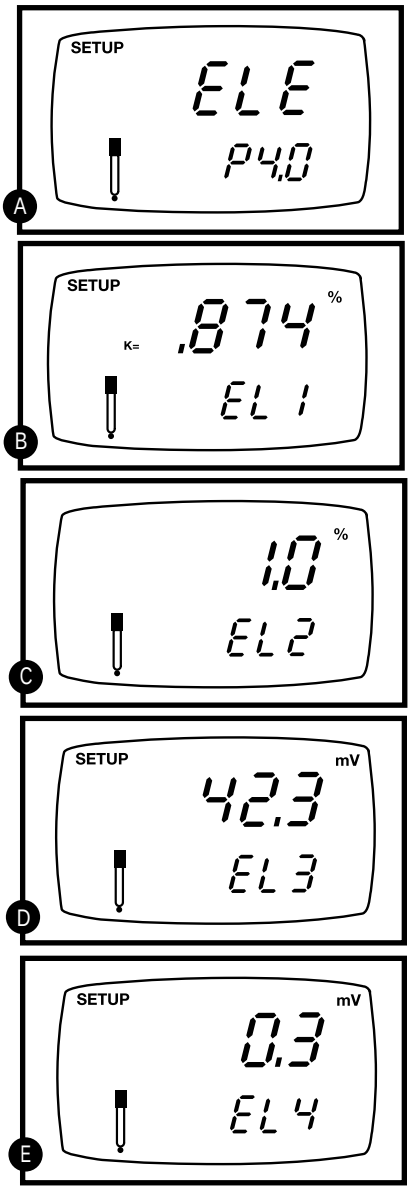
6. **Press the ENTER key.** The upper display shows the 100 % saturation mV value.

See figure D

7. **Press the ENTER key.** The upper display shows the 0 % saturation mV value.

See figure E

8. **Press the ENTER key** to move back to subgroup P4.0. If you want to return to measurement mode, press CAL/MEAS.



8.10 *% saturation mode*—P5.0: Unit configuration

Unit configuration mode lets you select the following parameters:

A. Ready indicator and auto endpoint function
B. Temperature in °C or °F

P5.1: 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:

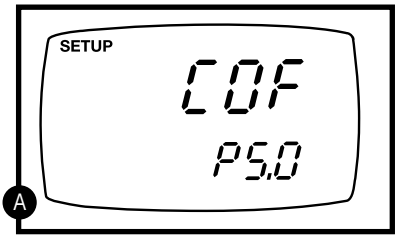
1. **Press the MODE key** to select the % saturation measurement mode.
2. **Press SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P5.0 in the lower display.

See figure A

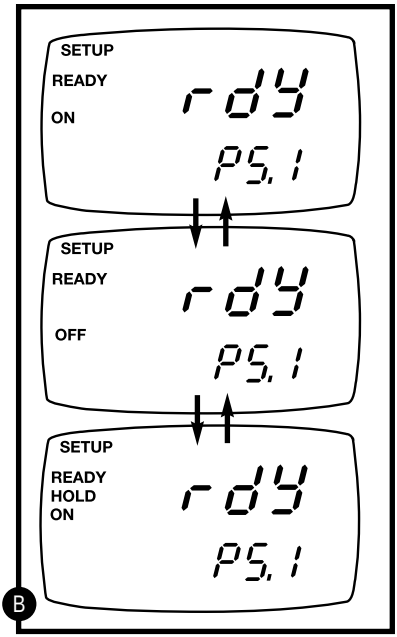
4. **Press the ENTER key** to select parameter P5.1 "rdY"(Ready).

See figure B

5. **Press the ▲ and ▼ 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.
6. **Press the ENTER key** to confirm selection and to move to step 3 on page 44 (P5.2). Or, press the CAL/MEAS key twice to return to measurement mode.



A



B

NOTES: 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 SETUP Program P3.1 on page 35 in pH mode or P4.1 on page 51 in mg/l (ppm) mode. Any changes you make to the Ready indicator/ auto endpoint function in % saturation mode will also change in pH and mg/l (ppm) modes.

P5.2: Selecting °C or °F temperature readout

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

From measurement mode:

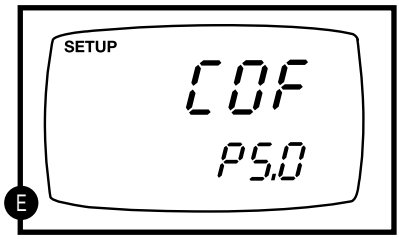
1. **Press the MODE key** to select the % saturation measurement mode.
2. **Press SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P5.0 in the lower display.

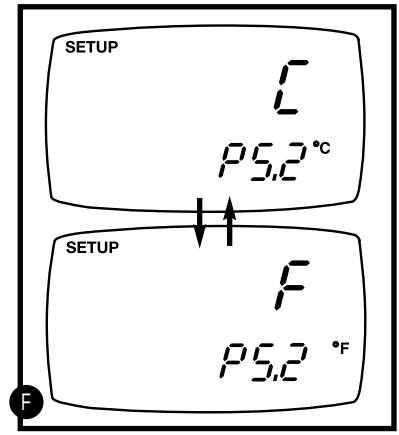
See figure E

4. **Press the ENTER key** until "C" or "F' appears in the upper display.

See figure F

5. **Press the ▲ and ▼ 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.





NOTES:

You can also switch between °C and °F in SETUP Program P3.3 on page 37 in pH mode or Program P4.3 on page 53 in mg / l (ppm) mode. If you switch between °C and °F in % saturation mode, the meter will also switch in pH and mg / l (ppm) modes.

8.11 *% saturation mode*—P6.0: Adjusting LCD brightness

This mode lets you adjust the brightness of the backlit LCD. Selecting a dimmer backlighting level helps conserve batteries.

From measurement mode:

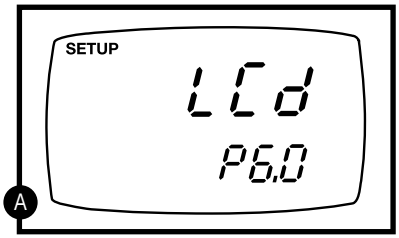
1. **Press the MODE key** to select the % saturation measurement mode.
2. **Press SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P6.0 in the lower display.

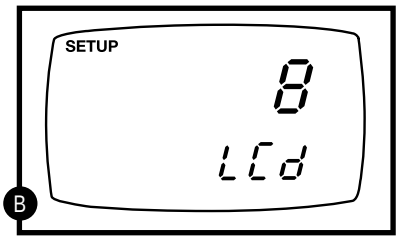
See figure A

4. **Press the ENTER key**. A number (0-8) appears in the upper display and "LCd" appears in the lower display.

See figure B

5. **Press the ▲ and ▼ keys** to select from level 0 (dimmest light) to level 8 (brightest light).
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.





8.12 *% saturation mode*—P7.0: Resetting to factory default settings

This program lets you reset all parameters to factory default settings. This clears all calibration data, memory, and any other setup functions you might have changed. The LCD contrast setting will be reset to 8 (the maximum setting). However, the following settings will remain as you have set them:

- temperature unit of measure (°C or °F)
- the temperature offset calibration value
- pH calibration data and set parameters

From measurement mode:

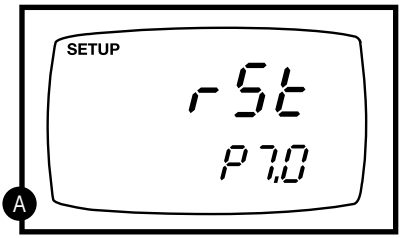
1. **Press the MODE key** to select the % saturation measurement mode.
2. **Press SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P7.0 in the lower display.

See figure A

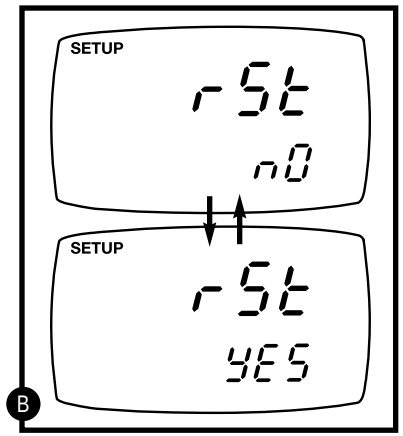
4. **Press the ENTER key**.

See figure B

5. **Press the ▲ and ▼ keys** to toggle between NO and YES.
   - NO retains current settings
   - YES resets to factory default settings
6. **Press the ENTER key** to confirm selection and to return to measurement mode.



A



B

Notes

To reset all pH data, see page 38.

To reset all mg/l (ppm) data, see page 55.

See page 65 for a table of factory default settings.

8.13 *mg/l (ppm) mode*—P1.0: Dissolved Oxygen Parameters

This sub group lets you adjust the barometric pressure and salinity.

P1.1 Pressure adjustment mode

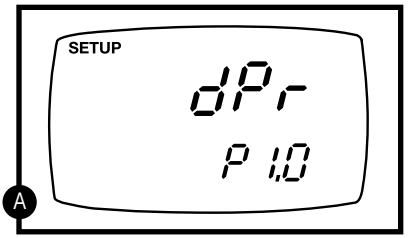
Barometric pressure is vital to correct dissolved oxygen measurements. You need to enter the correct barometric pressure of the area you are measuring. This mode lets you perform two functions:

- Select either mm Hg or Pascal barometric pressure units
- Adjust the barometric pressure. See Appendix 2 on page 64 for a "Pressure vs Altitude" table.

From measurement mode:

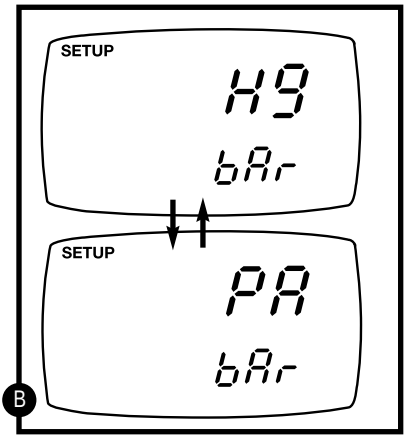
1. **Press the MODE key** to select mg/l (ppm) mode.
2. **Press the SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P1.0 in the lower display.

See figure A



4. **Press the ENTER key twice.** The upper display shows either Hg or PA and the lower display shows bAr.
5. **Press the ▲ and ▼ keys** to toggle between mm Hg and Pascal units.

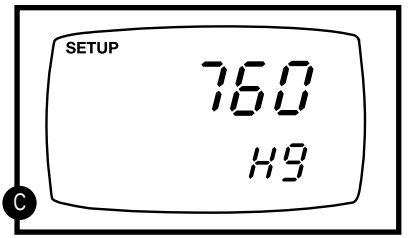
See figure B



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 5.

See figure C

7. **Press the ▲ and ▼ 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 P1.2 on page 48 (salinity adjustment). If instead you want to return to measurement mode, press CAL/MEAS twice.



NOTE: *Salinity adjustment appears in mg/l (ppm) measurement mode only.*

P1.2 Salinity adjustment mode

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

From measurement mode:

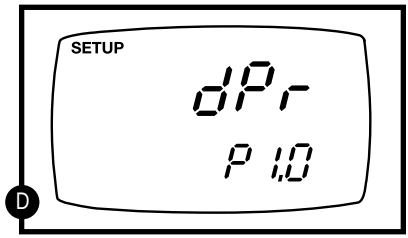
1. **Press the MODE key** to select mg/l (ppm) mode.
2. **Press the SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P1.0 in the lower display.

See figure D

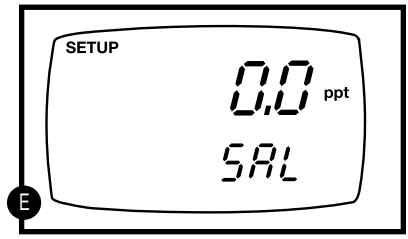
4. **Press the ENTER key five times.** The upper display shows the salinity value and the lower shows SAL.

See figure E

5. **Press the ▲ and ▼ 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 P1.0. If you want to return to measurement mode, press CAL/MEAS.



D



E

8.14 *mg/l (ppm) mode*—P2.0: Previous calibration information

This sub group shows you the previous calibration data, along with date and time of calibration. This is a "view only" parameter.

In mg/l (ppm) mode: calibration information is shown in mg/l (ppm) units.

From measurement mode:

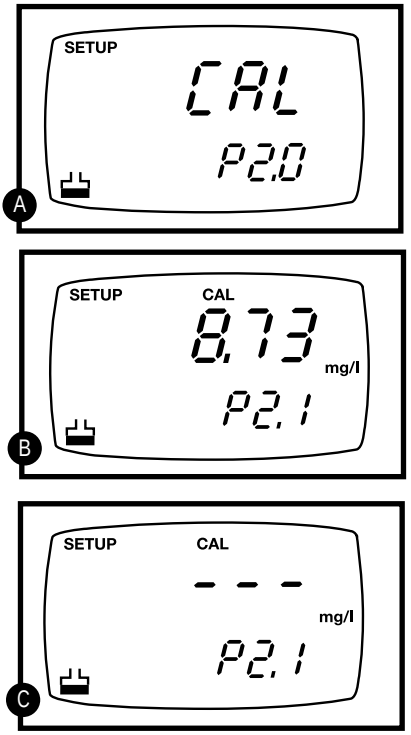
1. **Press the MODE key** to select mg/l (ppm) mode.
2. **Press the SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P2.0 in the lower display.

See figure A

4. **Press the ENTER key.** The upper display shows the calibration data.

See figure B

6. **Press the ENTER key** to move back to subgroup P2.0. If you want to return to measurement mode, press CAL/MEAS.



NOTE: If you did not calibrate this meter in a particular mode, the screen will show "– – –".

See figure C

8.15 *mg/l (ppm) mode*—P3.0: Electrode properties

These "view only" parameters show the electrode properties for diagnostic purposes:

probe slope: shows the calibration slope of the probe. This mode displays slope from 0.5 to 1.999 % of slope (1.0 = 100%).

100% saturation mV value: shows the sensor's mV output corresponding to 100% saturation.

0% saturation mV value: shows the sensor's millivolt output corresponding to 0% saturation.

From measurement mode:

1. **Press the MODE key** to select the mg/l (ppm) measurement mode.
2. **Press the SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P3.0 in the lower display.

See figure A

4. **Press the ENTER key.** The upper display shows the probe slope.

See figure B

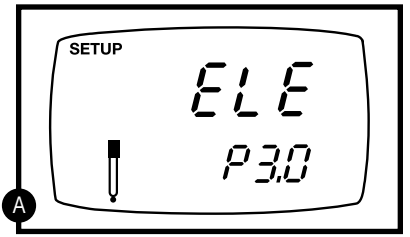
6. **Press the ENTER key.** The upper display shows the 100 % saturation mV value.

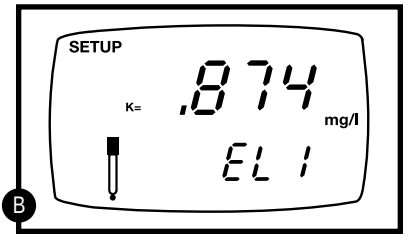
See figure C

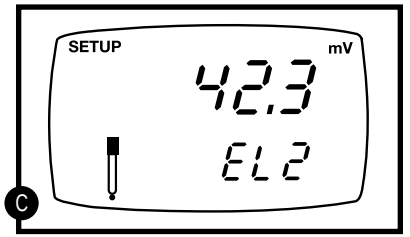
7. **Press the ENTER key.** The upper display shows the 0 % saturation mV value.

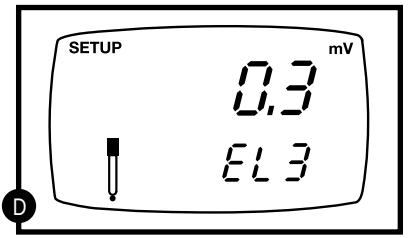
See figure D

8. **Press the ENTER key** to move back to subgroup P3.0. If you want to return to measurement mode, press CAL/MEAS.









8.16 *mg/l (ppm) mode*—P4.0: Unit configuration

Unit configuration mode lets you select the following parameters:

A. Ready indicator and auto endpoint function
B. mg/l or ppm units
C. Temperature in °C or °F

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:

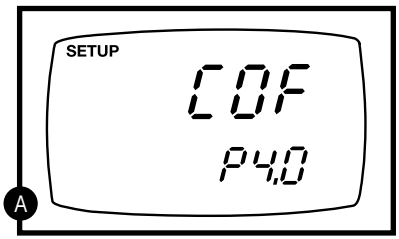
1. **Press the MODE key** to select the mg/l (ppm) measurement mode.
2. **Press SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P4.0 in the lower display.

See figure A

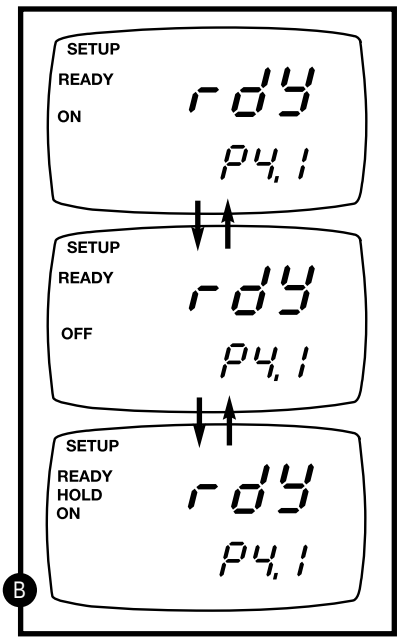
4. **Press the ENTER key** to select parameter P4.0 "rdy" (Ready).

See figure B

5. **Press the ▲ and ▼ 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.
6. **Press the ENTER key** to confirm selection and to proceed to P4.2 on page 52. Or, press the CAL/MEAS key twice to return to measurement mode.



A



B

Notes: 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 SETUP Program P3.1 on page 35 in pH mode or P5.1 on page 43 in % saturation mode. Any changes you make to the Ready indicator/ auto endpoint function in % saturation mode will also change in pH and % saturation modes.

P4.2: Selecting mg/l or ppm units

This mode lets you select between mg/l or ppm dissolved oxygen units.

From measurement mode:

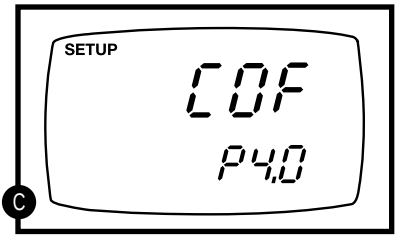
1. **Press the MODE key** to select mg/l (ppm) mode.
2. **Press SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P4.0 in the lower display.

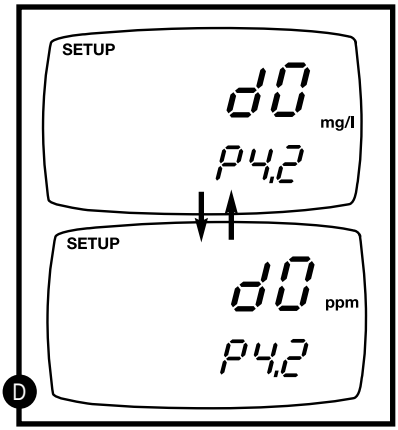
See figure C

4. **Press the ENTER key** until "dO" appears in the upper display, P4.2 in the lower display.

See figure D

5. **Press the ▲ and ▼ keys** to toggle between mg/l or ppm units.
6. **Press the ENTER key** to confirm selection and move to P4.3 on page 53. Press the CAL/MEAS key twice to return to measurement mode.





P4.3: Selecting °C or °F temperature readout

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

From measurement mode:

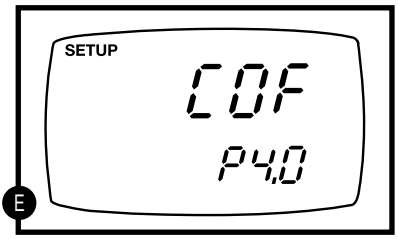
1. **Press the MODE key** to select mg/l (ppm) mode.
2. **Press SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P4.0 in the lower display.

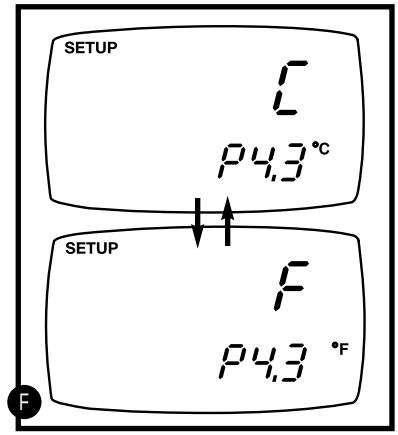
See figure E

4. **Press the ENTER key** until "C" or "F' appears in the upper display.

See figure F

5. **Press the ▲ and ▼ 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.





NOTES:

You can also switch between °C and °F in SETUP Program P3.3 on page 37 in pH mode or Program P5.2 on page 44 in mg/l (ppm) mode. If you switch between °C and °F in mg/l (ppm) mode, the meter will also switch in pH and % saturation modes.

8.17 *mg/l (ppm) mode*——P5.0: Adjusting LCD brightness

This mode lets you adjust the brightness of the backlit LCD. Selecting a dimmer backlighting level helps conserve batteries.

From measurement mode:

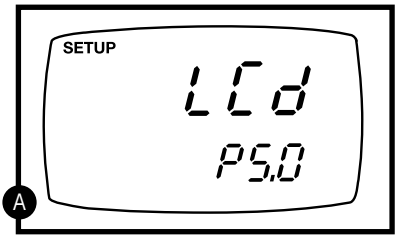
1. **Press the MODE key** to select mg/l (ppm) mode.
2. **Press SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P5.0 in the lower display.

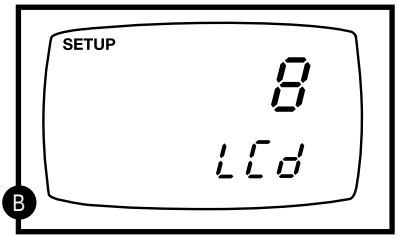
See figure A

4. **Press the ENTER key**. A number (0-8) appears in the upper display and "LCd" appears in the lower display.

See figure B

6. **Press the ▲ and ▼ keys** to select from level 0 (dimmest light) to level 8 (brightest light).
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.





8.18 *mg/l (ppm) mode*—P6.0: Resetting to factory default settings

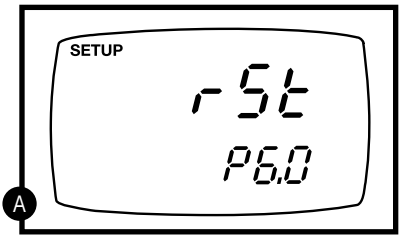
This program lets you reset all parameters to factory default settings. This clears all calibration data, memory, and any other setup functions you might have changed. The LCD contrast setting will be reset to 8 (the maximum setting). However, the following settings will remain as you have set them:

- temperature unit of measure (°C or °F)
- the temperature offset calibration value
- pH calibration data and set parameters

From measurement mode:

1. **Press the MODE key** to select mg/l (ppm) mode.
2. **Press SETUP key** to enter SETUP mode.
3. **Press the ▲ and ▼ keys** to scroll through subgroups until you view parameter P6.0 in the lower display.

See figure A

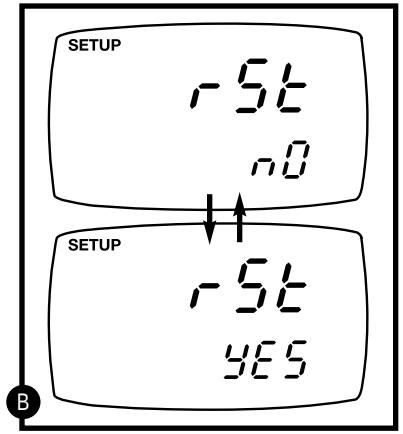


A

4. **Press the ENTER key**.

See figure B

5. **Press the ▲ and ▼ keys** to toggle between NO and YES.
   - NO retains current settings
   - YES resets to factory default settings
6. **Press the ENTER key** to confirm selection and to return to measurement mode.



B

NOTES:

To reset all pH data, see page 38.

To reset all % saturation data, see page 46.

See page 65 for a table of factory default settings.

9. Probe Care and Maintenance

9.1 pH Electrode Care

Since your pH electrode is susceptible to dirt and contamination, clean it every one to three months depending on the extent and condition of use.

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 rubber cap filled with electrode storage solution or pH 4 buffer with 1/100 part of saturated KCl. Other pH buffers are OK for storage, but NEVER use distilled water for storage.

After measuring

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

NOTE: If this does not restore electrode to normal response, see "Reactivating the pH electrode" section on page 57.

pH electrode cleaning

Salt deposits: dissolve the deposits by immersing the electrode in tap water for ten to fifteen minutes. Ten thoroughly rinse with distilled water.

Oil/grease film: wash electrode pH bulb gently in some detergent and water. Rinse electrode tip with distilled water or use a general purpose electrode cleaner (see page 65 for ordering information).

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, you probably need to replace the pH electrode. **Never touch or rub glass bulb. Contact builds up an electrostatic charge.**

9.2 DO Probe Care

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.

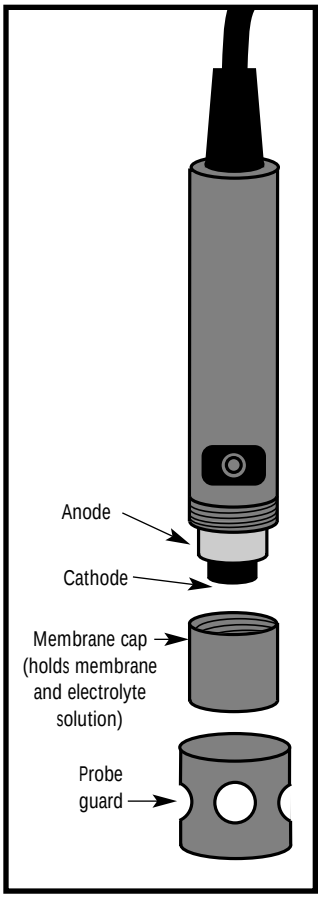
Under typical operating conditions, the probe should last for several years. Proper care and maintenance will help you receive the maximum probe life and ensure more accurate readings.

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

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

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

There are no special probe storage requirements.



9.3 DO Membrane Replacement

Replacement of the 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.

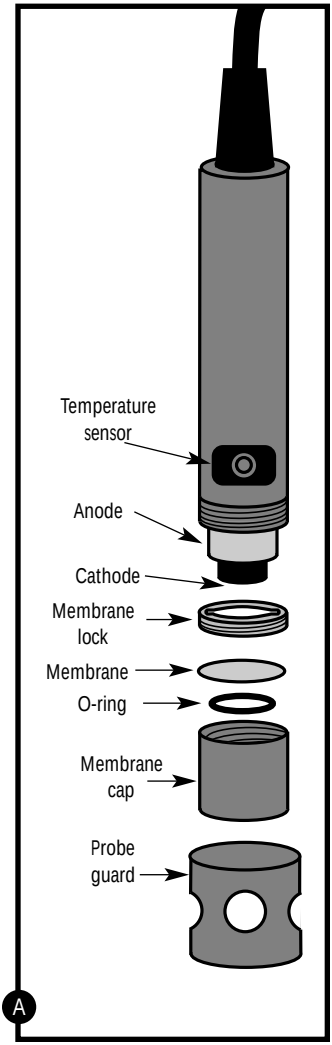
To order replacement probe components or a replacement probe, please contact us.

To replace the probe membrane:

1. Pull off the probe guard.
2. Unscrew the membrane cap from the probe.
3. Hold the probe under a water tap and brush away the white oxide on the cylindrical anode with a stiff plastic brush—do not use metal cleaning material.
4. It the cathode has any deposits, remove them with a light scouring powder. Do not polish the cathode.

NOTE: If you have purchased a replacement membrane module with preinstalled membrane, skip to step 12.

CONTINUED ON NEXT PAGE



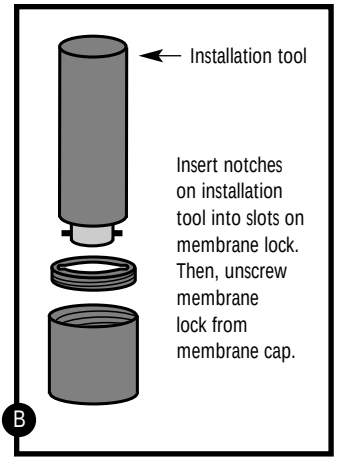
5. Using the installation tool, unscrew and remove the membrane lock from the membrane cap.

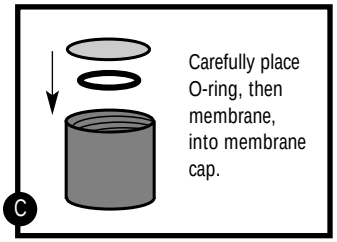
See figure B

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 C

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 overtighten.
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-seat the membrane on the O-ring (repeat steps 8-11).
13. If the assembly is leak-free, empty the water and fill the membrane cap with electrolyte to the brim.
14. Screw the cap onto the probe. Excess electrolyte will drain out.
15. Replace probe guard.
16. Calibrate the probe (see section 4.4-4.6 on pages 14-18) after the % saturation readings have stabilized.





10. Troubleshooting

Problem	Cause	Solution
Power on but no display	a) Batteries not in place.	a) Check that batteries are in place and making good contact.
	b) Batteries not in correct polarity (+ and –).	b) Reinsert batteries with correct polarity.
	c) Weak batteries.	c) Replace batteries.
Unstable readings	a) Insufficient electrolyte in DO probe.	a) Fill DO probe with reference electrolyte. See page 58-59.
	b) Air bubbles in probe.	b) Tap probe to remove bubbles.
	c) Dirty DO probe or pH electrode.	c) Clean the probe or electrode and recalibrate.
	d) Probe not deep enough in sample.	d) Make sure sample entirely covers the probe sensors.
	e) External noise pickup or induction caused by nearby electric motor.	e) Move or switch off interfering motor.
	f) Broken DO probe or pH electrode	f) Replace probe or electrode.
Slow response	a) Dirty membrane / Dirty electrode	a) Clean probe. See "Probe Care & Maintenance", page 56-59.
Not responding to key press	a) HOLD mode in operation.	a) Cancel HOLD mode.
	b) Damaged key pad.	b) Return to dealer.
	c) Internal program error.	c) Reset all internal programs by reinserting batteries.

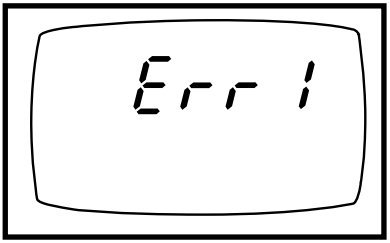
11. Error Messages

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

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

If error persists, or the meter shows incorrect values, return the meter.

For a complete diagram of the display, see page 5.



ERR 1 in primary display

12. Specifications

Mode	pH	mg/l (ppm)	% saturation	Temperature
Range	-2 to 16 pH	0.00 to 20.00 mg/l (ppm)	0.0 to 200.0%	0.0 to 50.0°C / 32.0 to 122.0°F
Resolution	0.01 pH	0.01 mg/l (ppm)	0.1%	0.1°C / 0.1°F
Accuracy	±0.01 pH	±1.5% full scale	±1.5% full scale	±0.3°C / ±0.5°F
Calibration	up to 5 points: pH 1.68; 4.01; 7.00; 10.01; 12.45	one or two points (100% and 0% saturation); plus separate mg/l (ppm) slope		offset up to ±5°C or ±10°F

Temperature compensation: automatic from 0 to 50°C

Salinity correction:
Range: 0.0 to 50.0 ppt
Resolution: 0.1 ppt
Method: Key in manually and automatic correction

Barometric pressure correction:
Range: 500 to 1499 mm Hg / 66.6 to 199.9 kPa
Resolution: 1 mm Hg / 0.1 kPa
Method: Key in manually and automatic correction

DO Probe type: galvanic probe

Display: dual LCD

Backlit display: select from eight levels of brightness

Operating temperature: 0 to 50°C

Power: four 1.5 V AAA batteries (included)

Battery life: > 100 hours continuous use
use of backlit display decreases battery life

Dimensions:
Meter: 7.5"L x 3.75"W x 2.25"H (19 x 9.5 x 5.7 cm)
Boxed: 9.2"L x 9.2"W x 2.75"H (23 x 23 x 7 cm)
DO Probe: 6.8"L x 1.3" dia (173 mm L x 32 mm dia) with 10-ft cable
pH Electrode: 6.0"L x 1.0" dia (152 mm L x 25 mm dia) with 10-ft cable

Weight:
Meter: 1.0 lb (0.5 kg)
Boxed: 2.0 lbs (0.9 kg)

13. Appendix 1: Meter Theory

Dissolved oxygen levels in natural and waste waters depend on the physical, chemical, and biochemical activities in the water body.

This meter uses a galvanic probe. It consists of a cell that contains electrolyte and that is enclosed by a selective membrane, and two metallic electrodes. The membrane is practically impermeable to water and ionic dissolved matter, but is permeable to oxygen and a few other gases.

The cathode consumes the oxygen passed through the membrane, and produces an electric current in the probe. This current is proportional to the partial pressure of oxygen in the sample.

Since the cathode consumes the oxygen in the sample, it is essential that the fluid must flow past the sensor to maintain accurate readings.

The solubility of oxygen in water varies with barometric pressure and temperature, and decreases as salinity increases. For the most accurate DO readings, you need to compensate for these factors. This meter automatically compensates for temperature readings. It also allows you to enter a salinity correction factor and the barometric pressure to correct for this variability.

14. Appendix 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 39 or 47 for information on how to adjust the barometric pressure.

Pressure vs Altitude

Altitude (ft)	Pressure (mm Hg)	Corrected % saturation value
0 (Sea level)	760	100
500	746	98.1
1000	732	96.3
1500	720	94.7
2000	707	93.0
2500	694	91.3
3000	681	89.6
3500	668	87.8
4000	656	86.2
4500	644	84.6
5000	632	83.0
5500	621	81.6
6000	609	80.0

15. Appendix 3: Factory Default Settings

Resetting the meter to factory default settings clears all calibration data and returns other setup functions to the default settings shown in the table below. However, the following settings will remain as you have set them:

- temperature unit of measure (°C or °F)
- The temperature offset calibration value
- the LCD contrast setting

See pages 38, 46 and 55 for directions on setting all modes of this meter to factory default settings.

Program	Function	Options/settings	Default
Clr	Memory clear	yes / no	no
dPr	Pressure units	Hg or Pa	Hg
	Barometric pressure	adjust from 500-1499 mm Hg	760 mm Hg
	Salinity adjustment	adjust from 0-50 ppt	0 ppt
OFS	Set % saturation offset	up to ±10%	no offset
CAL	View calibration data	—	– – –
ELE	View pH electrode offset	—	0.00 mV
	View pH electrode slope	—	100.0%
	View DO probe slope	—	1.000
	View % saturation offset	—	0 % offset
	View mV value of DO probe @ 100% saturation	—	37.0 mV
	View mV value of DO probe @ 0% saturation	—	0.3 mV
COF	Ready indicator / auto endpoint	on / off	Ready on only
	Select mg / l or ppm units	mg / l or ppm	mg / l
	Select temperature units	°C or °F	retains settings
LCd	Adjust backlit display	levels 0 to 8 (brightest)	8
rST	Reset to factory default	yes / no	no