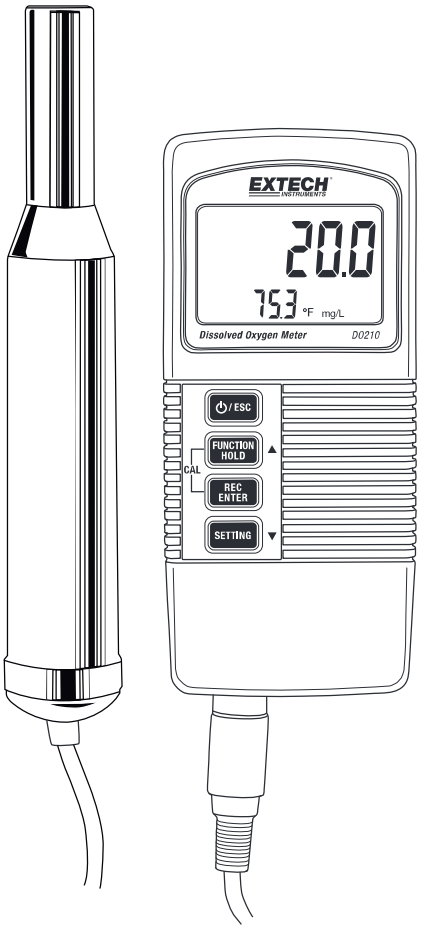
EXTECH INSTRUMENTS

User Guide

Dissolved Oxygen Meter

Model DO210

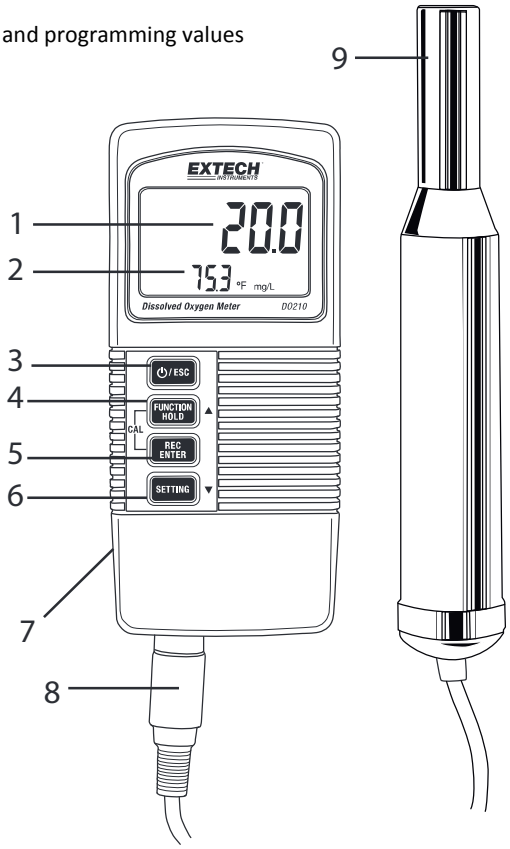


Introduction

Thank you for choosing the Extech Dissolved Oxygen / Temperature Meter which simultaneously displays Dissolved Oxygen and Temperature or Oxygen in air and Temperature. Units of measure are mg/l for Dissolved Oxygen, % for Oxygen in air, and ^{o}C/^{o}F for temperature. Oxygen is measured with a remote sensor that also contains a thermistor for measuring air temperature. Advanced features include altitude and % salt compensation, data hold, auto shut off, and Min/Max recording.

Meter Description

1. Main display digits for measurements and programming values
2. Temperature reading
3. Power/Escape button
4. Function/Hold/Up arrow button
5. Record/Enter button
6. Setting/Down arrow button
7. Battery Compartment (on back)
8. Probe connecting cable
9. Probe

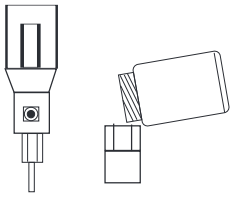


Getting Started

Note: The dissolved oxygen probe assembly may be shipped from the factory dry. If the probe does not contain electrolyte solution, refer to the Electrolyte Replacement section below for information on adding the electrolyte solution prior to initial use.

Filling the Electrolyte Container Prior to Initial Use

1. Unscrew and remove the electrolyte container from the tip of the probe.
2. Fill the electrolyte container with new electrolyte.
3. Screw the electrolyte container back onto the electrode holder and probe handle. Excess Electrolyte may be forced out through the threads. Wipe clean.
4. Lightly tap the probe to remove air bubbles.



Calibration

For first time use or after long periods of non-use, calibrate the instrument using the procedure below. The procedure should be performed in an open, well-ventilated area.

1. Connect the oxygen probe plug to the probe input socket.
2. Switch ON the meter by pressing the Power/ESC button.
3. The lower display should indicate the %O2 unit symbol and a temperature value.
4. The upper display will begin fluctuating. Wait approximately 3 minutes for the upper display to stabilize.
5. Press the HOLD button and the display will show the HOLD icon.
6. Press the REC button. The display will show "CAL" flashing and the meter display will begin counting down from 30 to zero; the meter will then display the END icon.
7. The upper display will show a value approximately 20.9 or 20.8 (typical concentration of oxygen in air).

Dissolved Oxygen (DO) Measurements

Measurement Preparation

Before taking measurements, perform the calibration described above if necessary.

Taking Measurements

1. Press and hold the Function button for at least 2 seconds to change from %O2 to mg/L or from mg/L to %O2. For DO measurements select mg/L (milligrams per liter).
2. Immerse the probe in the solution under test. For optimum automatic temperature compensation, immerse the probe to a depth of at least 4" (10 cm).
3. Wait until the display stabilizes.
4. The velocity of the liquid coming into contact with the probe must be at least 0.6 to 1 ft/min (0.2 to 0.3 m/s). If the solution is standing, stir the solution with the probe or use an agitator.
5. Rinse the probe with clean water after each use and cover the probe head with the probe head protective cover.

Oxygen in Air (%O2) Measurements

Measurement Preparation

Before taking measurements, perform the calibration described earlier if necessary.

Taking Measurements

1. Press and hold the Function button for at least 2 seconds to change from mg/L to %O2 if necessary. For oxygen in air measurements be sure to select %O2.
2. Hold the probe in the area under test and wait until the display stabilizes.

Temperature Measurements

The lower display will indicate the temperature of a measured solution or the temperature of the air (depending on what type of measurement the user is performing). To change the temperature unit of measure ^{o}C/^{o}F follow the procedure below or refer to the Settings mode section:

- Press and hold the Setting button for 5 seconds (until a beep is heard) to access the Setting mode
- Press the Setting button momentarily two more times
- Use the UP arrow button to select ^{o}C or ^{o}F temperature units
- Press ENTER to save the setting and press ESC to return to the normal mode of operation

Data Hold

Press the Hold key to freeze the displayed value. The LCD will display **HOLD** along with the held reading. Press the Hold key again to release the data hold function.

MIN/MAX Data Recording

When selected, the Data Recording function records the Min/Max readings. To start a data recording session:

1. Press the REC button once. The REC indicator will appear on the display. Press the REC button again and REC MAX will display on the screen along with the maximum value.
2. Press the REC button again and the display will show REC MIN and the minimum value will be displayed.
3. To release the held MAX or MIN reading, press the HOLD button while either the REC MAX or REC MIN icons are visible; now only the REC icon will be visible. The meter is now continuing to monitor the highest (MAX) and lowest (MIN) readings but is displaying real time measurements. To view the MAX and MIN values again use the REC button as described earlier.
4. To exit the Record mode, press and hold the REC button for at least 2 seconds. The display will return to the normal operating mode.

Settings Mode

Before accessing the Settings mode ensure that the meter is not in the HOLD or MIN/MAX Recording modes. To use the Settings mode:

1. Press and hold the SETTING button for at least 5 seconds (until a beep is heard)
2. Use the SETTING button to scroll through the Settings options The options are:

   HIGH Altitude compensation adjustment

   SALt % Salt adjustment

   °C/°F Temperature unit selection

   OFF Auto power off management

3. Refer to the following sections for detailed instructions on programming the Setting mode parameters

Altitude Compensation Adjustment (HIGH)

If the measurement environment is not at sea level the altitude (HIGH) value must be adjusted as described below:

1. Press and hold the Settings button for 5 seconds (until a beep is heard); the meter will then display the word **HIGH** on the lower left and the altitude compensation value in the upper LCD area in larger digits
2. Press ENTER and the **HIGH** symbol will flash
3. Use the ▲ and ▼ buttons to set the desired altitude compensation in meters
4. After selecting the desired value press ENTER to save and to step to the Salt compensation parameter (or press ESC to return to the normal operating mode)
5. Note that the altitude compensation can be adjusted from 0 to 3900 meters; when the meter is powered OFF the value will revert to 0 meters (sea level)

% Salt Adjustment

1. Continuing from the previous section in the Settings mode: When the LCD shows **SALt** at the lower left, press the ENTER button
2. The **SALt** symbol will flash and the display will show the salt compensation value on the upper, large LCD digits
3. Use the ▲ and ▼ buttons to adjust the display to the desired % **SALt** value
4. Press ENTER to save the data and to step to the next parameter (or press ESC to return to the normal mode of operation)
5. The % salt value can be adjusted from 0 to 39% salt (%weight). When the meter is powered OFF the salt value will revert to 0% salt.

Temperature Units Selection

Continuing from the previous section in the Settings mode:

When **°C** or **°F** is displayed, press the ▲ button to select the desired units. Press ENTER to save the selection and to step to the next parameter (or press ESC to return to the normal mode of operation).

Auto Power OFF Enable/Disable

Continuing from the previous section in the Settings mode:

When **OFF YES** or **OFF NO** is displayed, use the ▲ button to select YES or NO.
YES: Auto power OFF enabled (meter will automatically switch off after 10 minutes of inactivity; NO: Auto power OFF disabled.
Press ENTER to save the selection and to return to the normal operating mode.

Battery Replacement

The 9V battery that powers the instrument requires replacing when the battery icon flashes on the display. To replace the battery follow the steps below:

1. Disconnect the probe from the instrument.
2. Open the rear battery compartment using a screwdriver to remove the two Phillips head screws that secure the compartment.
3. Carefully remove the old battery from the compartment lid chamber and gently unsnap the battery's terminals from the wired (red/black) connectors.
4. Install a new 9V battery by snapping the battery terminals onto the wired connectors (observing correct polarity) and inserting the battery into the compartment lid chamber.
5. Install the compartment lid chamber into the meter housing and secure with the two screws.

Never dispose of used batteries or rechargeable batteries in household waste. As consumers, users are legally required to take used batteries to appropriate collection sites, the retail store where the batteries were purchased, or wherever batteries are sold.

Disposal: Do not dispose of this instrument in household waste. The user is obligated to take end-of-life devices to a designated collection point for the disposal of electrical and electronic equipment.

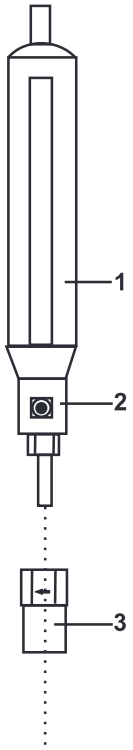
Probe Head Replacement

The probe head (on the tip of the probe) holds a thin Teflon® membrane and an electrolyte container. Calibration errors or reading errors could indicate loss of electrolyte or a dirty/damaged membrane. The membrane is very delicate and can easily be damaged if it comes in contact with solid objects. Replacement probe heads are available from an Extech distributor.

Replacement procedure

1. Unscrew the probe head and empty the old electrolyte from the container.
2. Fill the new probe head/electrolyte container with electrolyte.
3. Screw the probe head onto the probe handle. Excess electrolyte may be forced out through the threads. Wipe clean.
4. Lightly tap the probe to remove any air bubbles.

1. Probe handle
2. Temperature sensor
3. Probe Head



Specifications

General Specifications

Circuit	Custom one-chip LSI microprocessor circuit
Display	Dual function LCD
Measurements	Dissolved Oxygen %O_2 or mg/l (milligrams per liter); Oxygen in air: %; Temperature: °C/°F
Data hold	Data hold key freezes displayed reading
Sensor Structure	Remote Polarographic Dissolved Oxygen Sensor Temperature sensor: Precision thermistor
Data recording	Min/Max memory and recall
Auto power off	Meter turns off after 10 minutes (can be disabled)
Sample rate	1.0 Second (approx.)
Operating conditions	Temperature: 0 to 50 °C (32 to 122 °F); Humidity: < 80% RH
Battery power	9V alkaline battery
Power Consumption	Approx. 6.2 mA DC
Weight	446g (0.98 lbs.) including batteries & probe
Dimensions	Main instrument: 135 x 60 x 33mm (5.3 x 2.4 x1.3") Probe: 190 x 28mm (7.5" x 1.1") length/diameter

Electrical Specifications

Measurement	Range	Resolution	Accuracy
Dissolved Oxygen	0.0 - 20.0 mg/L	0.1mg/L	± 0.4 mg/L
Oxygen in air	0 - 100% O_2	0.1 % O_2	± 0.7% O_2
Temperature (probe only)	32 to 122 °F 0 to 50 °C	0.1°F/C	±1.5 °F ± 0.8 °C
Compensation adjustments	Temperature (automatic)	0 to 50°C (32 to 122 °F)	
	Salt	0 to 39%	
	Altitude	0 to 3900 meters	

www.extech.com