AquaShock® DO Kit

850046K

SPER SCIENTIFIC

Environmental Measurement Instruments

AquaShock® DO Kit 850046K

Printed in the USA

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INTRODUCTION

The Sper Scientific AquaShock® DO Meter is the most waterproof, rugged and reliable DO meter on the market. It is fully waterproof, including probe connections. As with all AquaShock® meters, the DO Meter is completely shockproof, floats, and features a double injection molded case with an integral protective soft grip outer layer, high end antishock, LED backlight display, and is \powered by the latest environmentally friendly, long lasting, rechargeable Lithium Ion battery. The meter is highly accurate and stable, very intuitive and includes all of the functions required by most users. Sper Scientific guarantees you will not find any meters more rugged and reliable than AquaShock®.

FEATURES

- Floats
- Shockproof
- IP67 Waterproof
- Protective soft grip outer layer
- Rechargeable Lithium Ion battery
- Multi-line display LCD screen
- Reads DO (Dissolved Oxygen)
- Auto Ranging
- Selectable Automatic or Manual Temperature Compensation
- Celsius or Fahrenheit selectable
- 99 data points per scale for analysis
- Calibration point review
- Internal clock and calendar
- Maximum, minimum and average
- Hold function
- Low battery indicator
- Backlight

MATERIALS SUPPLIED

- Meter
- Waterproof Probe Input Covers
- Dissolved Oxygen/ATC Temperature Probe
- Electrolyte
- 1 Lithium 7.4 V Battery (1450 mAh)
- DC Power Adapter
- Instruction Manual
- Hard Carrying Case

OPTIONAL ACCESSORIES

- 840093 Field Tripod
- 850046P Replacement AquaShock® DO Probe 10’ Cable
- 850046P25 Replacement AquaShock® DO Probe 25’ Cable
- 850046P50 Replacement AquaShock® DO Probe 50’ Cable

LCD DISPLAY

	Name	Description
1	Ready	Displayed when measuring results are stable
2	Scale Unit	Current measurement scale unit
3	Measuring Results	Current measurement value
4	ATC/MTC	Automatic/Manual Temperature Compensation indicator
5	Temperature Scale	Current temperature measurement unit
6	Temperature Value	Current temperature measurement value
7	Battery Icon	Current battery power level

LCD DISPLAY

Probe Life Icon:

 More than 90% life remaining

 More than 85–90% life remaining

 More than 80-85% life remaining

 Less than 80% life remaining

Battery Power Icon:

 Battery voltage is more than 7.7V shows full.

 Battery voltage between 7.2V and 7.7V shows 2 cells.

 Battery voltage between 6.6V and 7.2V shows 1 cell.

 Battery voltage less than 6.6V shows 0 cells and flashes.

 Display showing battery charging from less than 6.6V to fully charged.

POWER SUPPLY

This meter is powered by one rechargeable Lithium 7.4V (1450 mAh) battery. The DC power adapter can be used to charge the battery even when the meter is turned off. This meter includes a charge protection function and will automatically stop charging when the battery is full. A complete re-charge takes approximately 8 hours.

KEYPAD

	Name	1st Function	2nd Function
1	Power/Backlight/ Low Battery	Power on/off	Backlight on/off
2	Setup	Setting parameters	Confirm setting
3	MI↑	Store data	↑
4	MR↓	Recall data	↓
5	Max/Min/Ave	Max/Min/Ave	
6	Range/Temp	Switch measuring scale	Set temperature value
7	Hold/Exit	Hold	Exit
8	CAL	Calibration	

SETUP MODE

The Setup Mode allows you to customize the following meter preferences and defaults:

- Temperature Scale
- Clock Setting
- Restore Factory Defaults
- MTC (Manual Temperature Compensation) Temperature Coefficient
- View Calibration Points
- View Probe Parameters
- Barometric Pressure Parameters
- RH Parameters
- Salinity Compensation
- Oxygen Content (mg/L (ppm)) Unit
- % Offset Setting

Press **POWER** to turn the meter on before performing any setup function.

Temperature Units

1. Press **SETUP** to enter the Setup Mode.
2. Press **SETUP** to enter the Set Temperature screen.
3. The unit °C or °F will flash on the LCD.
4. Press ↑ or ↓ to select the °C or °F temperature unit.
5. Press **SETUP** to save and return to Normal Mode.
6. Press **EXIT** to return to Normal Mode without saving the selection.

Note…
When the temperature reading is outside the range, the display will show “HHH” (high) or “LLL” (low).

Real Time Clock

1. Press **SETUP** to enter the Setup Mode.
2. Press ↑ or ↓ to select the Set Clock screen (see Fig. A).
3. Press **SETUP** to set the year (see Fig. B). The value will flash on the LCD.

4. Press ↑ to increase the value by 1.
   Hold down ↑ to continually increase the value.

   Press ↓ to decrease the value by 1.
   Hold down ↓ to continually decrease the value.

   Press **SETUP** to save and the meter automatically moves to the month setting (see Fig. C.).
5. Repeat step 4 to adjust the month, day, hour, and minute (see Fig. D, E & F).
6. Press **EXIT** to return to Normal Mode without saving.

Note...
This procedure adjusts the meter's internal clock which is a 24 hour format only. The internal clock will function when the meter is turned off if the battery is installed.

Fig. A

Fig. B

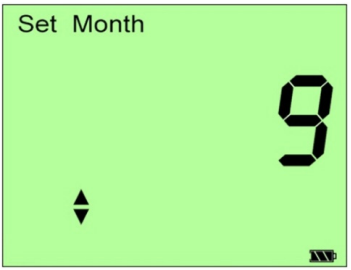

Fig. C

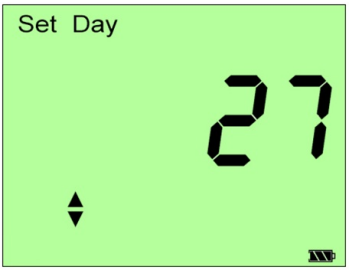

Fig. D

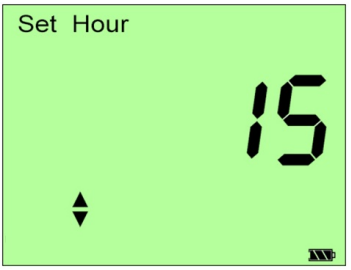

Fig. E

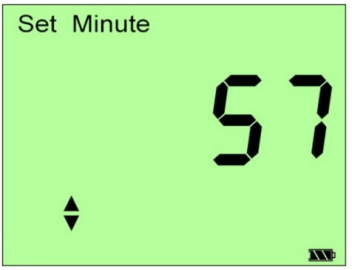

Fig. F

Restore Factory Settings

1. Press **SETUP** to enter the Setup Mode.
2. Press ↑ or ↓ to select the Restore Factory Settings screen (see Fig. A).
3. Press **SETUP** to confirm selection. “NO” will flash on the LCD. (see Fig. B).
4. Press ↑ or ↓ to select “YES” or “NO”. (see Fig. C).
5. When “YES” is displayed, press **SETUP** to confirm and all parameters will restore to factory settings (except the clock) and the meter returns to Normal Mode.
6. Press **EXIT** to return to Normal Mode without saving.

Fig. A

Fig. B

Fig. C

Factory Defaults

Parameter Name	Parameter Value
Date	2011-1-1 0:0
CAL Standard	
CAL Point	
Offset	
Temperature	77.0°F (25.0°C)
Temperature Unit	°F
Bar. Unit	mmHg
Bar. Value	760
% Offset Value	0.0ppt
mg/L (ppm)	0
% saturation	0
RH	100%
Memory	

Set MTC (Manual Temperature Compensation) Temperature Coefficient

Note...
Only perform this setting when ATC Temperature Probe is not available.

1. Press **RANGE** for 2 seconds to enter the Set Temperature Mode (see Fig. A).
   The temperature value will flash (see Fig. B).
2. Press ↑ to increase the Temperature Value.
   Hold down ↑ to continually increase the value.

   Press ↓ to reduce the Temperature Value.
   Hold down ↓ to continually reduce the value.

   If the temperature unit is °C, the range for adjustment is 0.0 to 50.0°C.

   If the temperature unit is °F, the range for adjustment is 32.0 to 122.0°F.
3. Press **SETUP** to confirm change and return to Normal Mode (see Fig. D).
   Press **EXIT** to return to Normal Mode without saving change (see Fig. C).

Fig. A

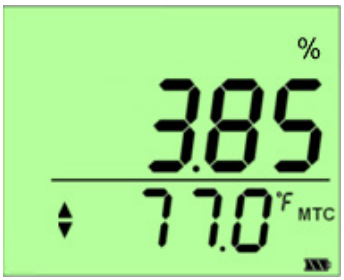

Fig. B

Fig. C

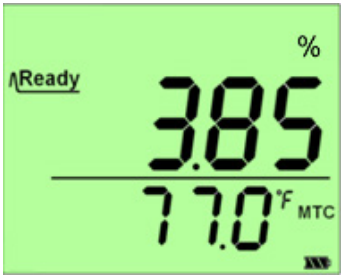

Fig. D

View the Probe Data

1. Press **SETUP** once to enter the Set up mode.
2. Press ↑ or ↓ to select the View Probe screen (see Fig. A).
3. Press **SETUP** once to enter the View Slope screen which shows the electrode slope (see Fig B).
4. Continue to press ↑ or ↓ to view % Offset Value, 100% Offset nA Value, 0% Offset nA Value screens (see Fig. C, Fig. D & Fig. E).
5. Press **SETUP** or **EXIT** to return to Normal Mode.

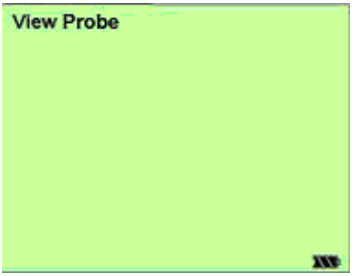

Fig. A

Fig. B

Fig. C

Fig. D

Fig. E

Set Barometric Pressure Parameters

1. Press **SETUP** to enter the Setup Mode.
2. Press ↑ or ↓ until the Bar. Pressure screen is seen (see Fig. A).
3. **SETUP** to enter the Select Bar. Unit screen (see Fig. B or Fig. C).
4. Press ↑ or ↓ to scroll through the available barometric measurement scales.
5. Press **SETUP** to save the displayed measurement scale and enter the Set Bar. Value screen (see Fig. D or Fig. E). The current Bar. Value number will flash.
6. Press ↑ to increase the Bar. Value.
   Hold down ↑ to continually increase the value.
7. Press ↓ to reduce the Bar. Value.
   Hold down ↓ to continually reduce the value.

   If the Bar. Value Measurement scale is mmHg the available range is 500 to 1499.

   If the Bar. Value measurement scale is kPa the available range is 66.6 to 199.9
8. Press **SETUP** to save the changes and return to Normal Mode.
9. Press **EXIT** to return to Normal Mode without saving changes.

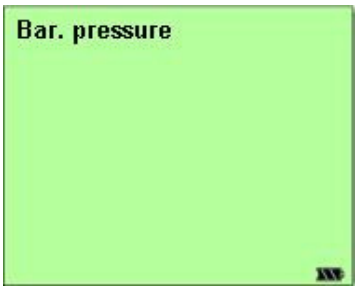

Fig. A

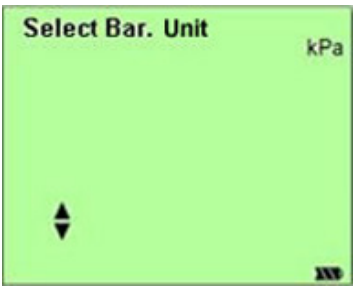

Fig. B

Fig. C

Fig. D

Fig. E

Set RH Parameters

1. Press **SETUP** to enter the Setup mode.
2. Press ↑ or ↓ to display the Set RH screen (see Fig. A)
3. Press **SETUP** to enter the Set RH screen (see Fig. B).
   The current set value will flash.
4. Press ↑ to increase the RH Value.
   Hold down ↑ to continually increase the value.
   Press ↓ to reduce the RH Value.
   Hold down ↓ to continually reduce the value.
   RH Value range may be set from 0 to 100%.
5. Press **SETUP** to save the change and return to Normal Mode.
6. Press **EXIT** to return to Normal Mode without saving change.

Fig. A

Fig. B

Set Salinity Compensation

1. Press **RANGE** to select mg/L (ppm) measurement scale.
2. Press **SETUP** to enter the Setup Mode.
3. Press ↑ or ↓ to display the Set Salinity screen (see Fig. A)
4. Press **SETUP** to enter the Set SAL. Value screen (see Fig. B).
5. Press ↑ to increase the SAL. Value.
   Hold down ↑ to continually increase the value.
   Press ↓ to reduce the SAL. Value.
   Hold down ↓ to continually reduce the value.
   Salinity compensation value range is 0.0 to 50.0 ppt.
6. Press **SETUP** to save the value and return to Normal Mode.
7. Press **EXIT** to return to Normal Mode without saving the change.

Fig. A

Fig. B

Set Oxygen Content (mg/L (ppm)) Unit of Measure

1. Press **RANGE** to select mg/L (ppm).
2. Press **SETUP** to enter the Setup Mode.
3. Press ↑ or ↓ to display the Select Unit screen (see Fig. A).
4. Press **SETUP** to enter the Select Unit screen (see Fig. B).
5. Press ↑ or ↓ to select either mg/L or ppm scale.
6. Press **SETUP** to save the change and return to Normal Mode.
7. Press **EXIT** to return to Normal Mode without saving the change.

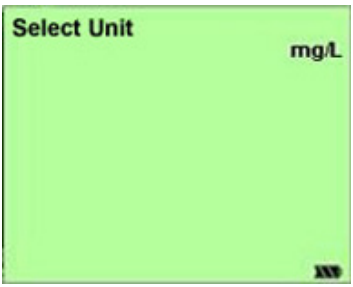

Fig. A

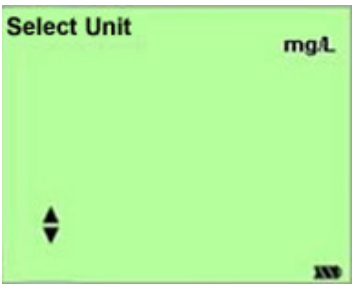

Fig. B

Set % Offset

1. Press **RANGE** to select % measuring scale.
2. Press **SETUP** to enter the Setup Mode.
3. Press ↑ or ↓ to display Set % Offset screen (see Fig. A).
4. Press **SETUP** to enter the Set % Offset mode.
   The current value will flash (see Fig. B).
5. Press ↑ to increase the % Offset Value.
   Hold down ↑ to continually increase the value.
   Press ↓ to reduce the % Offset Value.
   Hold down ↓ to continually reduce the value.
   The % Offset range is ±10.0. It cannot exceed 0.0 to199.9%.
6. Press **SETUP** to save the changes and return to Normal Mode.
   Press **EXIT** to return Normal Mode without saving changes.

Fig. A

Fig. B

PROBE SETUP

<u>IMPORTANT: THIS DO PROBE WILL NOT FUNCTION UNTIL ELECTROLYTE IS ADDED</u>

Before using the probe please follow the instructions, below.

1. Remove the protective cap from the DO probe by unscrewing it.
2. Fill the cap with the included electrolyte solution. The cap should be at least 75% full.
3. Securely screw the cap back onto the probe. Wipe any excess electrolyte from the outside of the probe.

NOTE...
It is better to have excess electrolyte in the probe's cap than not enough. Once the cap is secure, excess electrolyte can be wiped away with DI water to prevent crystallization.

4. Recalibrate the probe using a DO meter.

This procedure can also be used when replacing the membrane caps. Extra caps are included with this probe because they may need to be replaced occasionally.

CALIBRATION

Note...
While performing calibration, if the measurement value reads from 10% to 50% the display will show “Error” as in Fig. A. Check probe for damage. Repair or replace probe.

Press **EXIT** to return to Normal Mode.

All other keys except POWER ON/OFF and HOLD are inoperable while performing calibration.

Fig. A

100% Calibration

Note...
Only when the measurement value is above 50% can the meter be calibrated at 100%. All other keys except **POWER ON/OFF** and **HOLD** are inoperable while performing calibration.

1. Clean the probe thoroughly with deionized water.
2. Press **RANGE** to select the % saturation scale (see Fig. A).
3. Wrap the probe with a wet cloth being sure not to touch the probe's oxygen permeation membrane.
4. Press **CAL** for 2 seconds to enter the calibration mode (see Fig. B).
5. When calibration is complete the display will read "Finished" (see Fig. C).
6. Press **EXIT** to return to Normal Mode (see Fig. D).

Fig. A

Fig. B

Fig. C

Fig. D

0% Calibration

Note...
The measurement value must read below 10% to calibrate the meter at 0%. All other keys except POWER ON/OFF and HOLD are inoperable while performing calibration.

1. Clean the probe thoroughly with deionized water.
2. Press **RANGE** to select the % saturation scale (see Fig. A).
3. Place the probe into 0 Oxygen Solution.
   The solution should have a flow rate of at least 0.3m/s
4. Press **CAL** for 2 seconds to enter the calibration mode (see Fig. B)
5. Once the reading is steady the display will read "Finished" (see Fig. C).
6. Press **EXIT** to return to Normal Mode (see Fig. D).

Fig. A

Fig. B

Fig. C

Fig. D

Calibrate dissolved oxygen in mg/L (ppm) mode

Note...
mg/L (ppm) calibration can only be performed after 100% calibration has been completed.

1. Clean the probe thoroughly with deionized water.
2. Put the probe into a sample where the oxygen content is known. The solution should have a flow rate of at least 0.3m/s.
3. Press **RANGE** to select the mg/L(ppm) scale (see Fig. A).
4. Press **CAL** to enter calibration mode and begin calibration. The measurement value will flash (see Fig. B).
5. Press ↑ to increase the Measurement Value.
   Hold down ↑ to continually increase the value.
   Press ↓ to reduce the Measurement Value.
   Hold down ↓ to continually reduce the value.
   The Measurement Value range is 0.00 to 19.99mg/L.
6. Press **SETUP** to save the calibration value and exit to Normal Mode (see Fig. C).
7. Press **EXIT** to return to Normal Mode without saving.

Fig. A

Fig. B

Fig. C

View Calibration Points

1. Press **RANGE** chose the scale you want view.
2. Press **SETUP** to enter the Setup mode.
3. Press ↑ or ↓ to select the View Cal Data screen (see Fig. A).
4. Press **SETUP** to enter the mode. (The 100% scale will display as in Fig. B and Fig. C. The 0% scale will display as in Fig. E and Fig. F). The date and time is a cyclic display. If there are no calibration points set the display will show “- - - -” (see Fig. D).
5. Press ↑ once to view the previous Cal point. Repeat to view all previous Cal points. Press ↓ once to view the next Cal point. Repeat to view all additional Cal points.
6. Press **SETUP** or **EXIT** to return to Normal Mode.

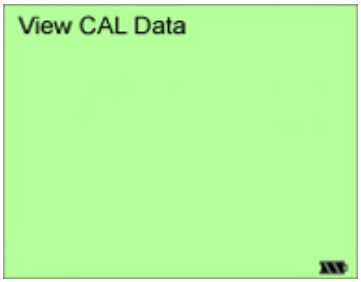

Fig. A

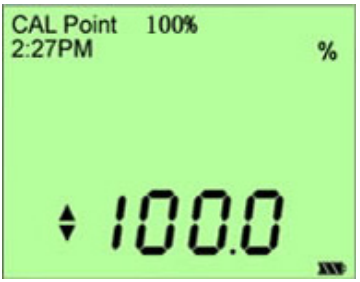

Fig. B

Fig. C

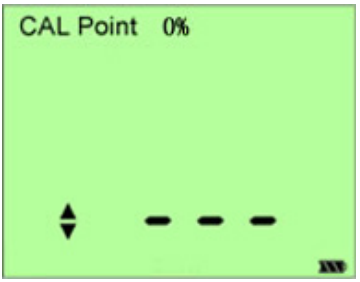

Fig. D

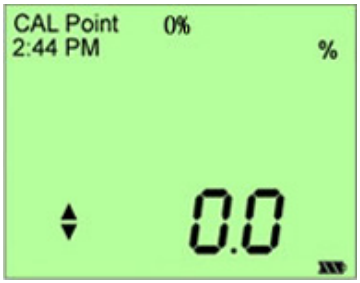

Fig. E

Fig. F

Auto Ranging

During measurement and calibration this meter will automatically switch to the correct range.

MEASUREMENT PROCEDURES

Note...
Before beginning measurements, connect the probe to the meter, turn the meter on and polarize the electrode for 15 minutes.

Turning the Meter On/Off

1. Press **POWER** to turn the meter on. The meter will default to the last used measurement and temperature scales.
2. Press and hold **POWER** for 2 seconds to turn the meter off.

Indicator Light Descriptions

Meter Status	Indicator Status
Power off	Light off
Power on	Green light on for 5 seconds, then light off
Low battery	Red light flashing every 5 seconds
Charging battery	Blue light on

Backlight

1. With the meter on press **POWER** again to turn the backlight on/off.

Scale Selection

1. Press **RANGE** to switch between the % of Saturation and Milligrams per Liter (mg/L) scales (see Fig. A and Fig. B).

Fig. A

Fig. B

Saving to Memory

1. Press **MI** to save the current measured value and view the data point number (see Fig. A).
2. Up to 99 Memories can be saved for both Conductivity and TDS. If the saved memory exceeds 99, the new data will be written over saved memories beginning with #1.

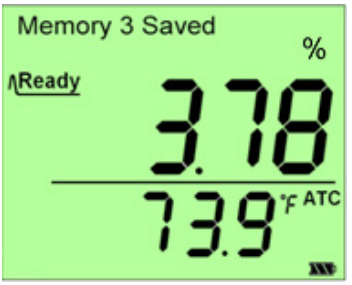

Fig. A

Recall Memory

1. Press **RANGE** to select the scale for recall.
2. Press **MR** to enter the Recall mode and view the last saved reading (see Fig. A and Fig. B). The date and time are on cyclical display. If there is no saved data "- - - -" is displayed (see Fig. C).
3. Press ↑ or ↓ to view the saved data points. Press ↑ to view the data points increasing by 1. Press ↓ to view the data points decreasing by 1.
4. Press **EXIT** to exit the Recall Mode and return to Normal Mode.

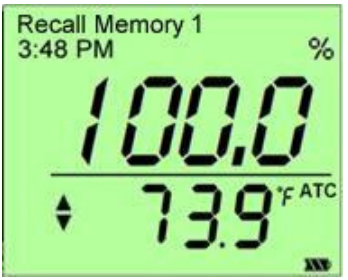

Fig. A

Fig. B

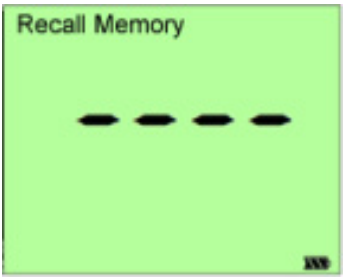

Fig. C

Clear Memory

1. Press **MI** and **MR** simultaneously for 2 seconds to clear all memory. The meter will return to Normal mode.

Hold

1. Press **HOLD** to hold the value (see Fig. A).
2. Press **HOLD** to release the hold value.

Note…
When in Hold Mode, all other functions will be disabled except turning the meter off, backlight function, saving and exiting Hold Mode.

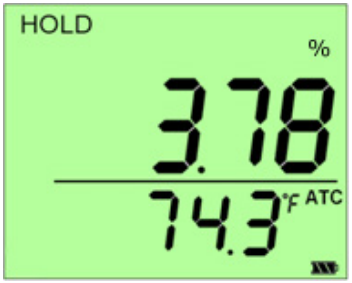

Fig. A

Maximum, Minimum and Average

1. Press **RANGE** to select the scale.
2. Press **MAX/MIN/AVE**, the maximum recorded value based on the saved measurements will appear on the LCD (see Fig. A and Fig. B.) The date and time are on cyclical display, If no measurements have been taken, "- - - -" is displayed (see Fig. C).
3. Press **MAX/MIN/AVE**, the minimum recorded value based on the saved measurements will appear on the LCD (see Fig. D and Fig. E). The date and time are on cyclical display. If no measurements have been taken, "- - - -" is displayed (see Fig. F).
4. Press **MAX/MIN/AVE**, the average recorded value based on the saved measurements will appear on the LCD (see Fig. G and Fig. H). The date and time are on cyclical display. If no measurements have been taken, "- - - -" is displayed.
5. Press **MAX/MIN/AVE** to return to the regular mode.

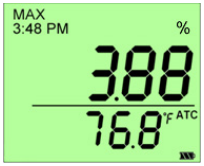

Fig. A

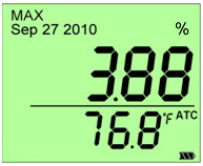

Fig. B

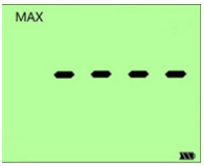

Fig. C

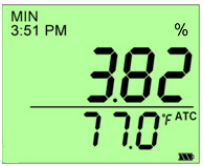

Fig. D

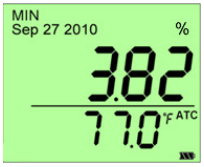

Fig. E

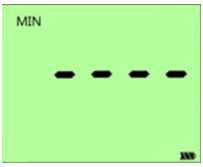

Fig. F

Fig. G

Fig. H

SPECIFICATIONS

Mode	mg/L(ppm)	% Saturation	Temperature
Range	0.00 to 19.99 mg/L (ppm)	0.0 to 199.9%	32 to 122°F (0 to 50°C)
Resolution	0.01mg/L (ppm)	0.1%	0.1°F/°C
Accuracy	±1.0% Full Scale	±1.0% Full Scale	±0.9°F/±0.5°C
Temperature Compensation	Automatic (ATC) or manual (MTC) from 32 to 122°F or 0 to 50°C		
SAL Correction	Range: 0.0 to 50.0 ppt		
	Resolution: 0.1 ppt		
	Method: Manual		
Barometric Pressure Correction	Range: 500 to 1499 mmHg / 66.6 to 199.9 kPa		
	Resolution: 1 mmHg / 0.1 kPa		
	Method: Manual		
Electrode	Polarographic Electrode		
Memory	99 data points per scale with time and date stamp		
Operating Temperature	32 to 122°F (0 to 50°C)		
Battery Specifications	Rechargeable Lithium battery 7.4V (1450mAh)		
Approximate Battery Life when Fully Charged			>200 hours

WARRANTY

Sper Scientific warrants this product against defects in materials and workmanship for a period of **five (5) years** from the date of purchase, and agrees to repair or replace any defective unit without charge. If your model has since been discontinued, an equivalent Sper Scientific product will be substituted if available. This warranty does not cover probes, batteries, battery leakage, or damage resulting from accident, tampering, misuse, or abuse of the product. Opening the meter to expose its electronics will break the waterproof seal and void the warranty. To obtain warranty service, ship the unit postage prepaid to:

SPER SCIENTIFIC LTD.

8281 E. Evans Rd., Suite #103

Scottsdale, AZ 85260

(480) 948-4448

The defective unit must be accompanied by a description of the problem and your return address. Register your product online at www.sperwarranty.com within 10 days of purchase.

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