

Multiparameter Meter Manual (v1.5)



CONTENTS

| | |
|---|-----------|
| 1 INTRODUCTION..... | 3 |
| 2 SPECIFICATIONS..... | 4 |
| 2.1 Sensor Specifications..... | 6 |
| 2.2 Instrument Specifications..... | 5 |
| 3 INSTALLATION | 6 |
| 4 SETUP,MEASUREMENT, AND CALIBRATION..... | 7 |
| 4.1 Main Manual..... | 8 |
| 4.2 Instrument Setup | 8 |
| 4.3 Sensor Setup and Calibration | 25 |
| 4.4 Factory Default Reset | 22 |
| 4.5 Data Storage..... | 22 |
| 5 CARE AND MAINTENANCE..... | 24 |
| 6 COMMON ERRORS AND TROUBLE SHOOTING | 28 |
| 7 WARRANTIES | 29 |

1. INTRODUCTION

Thank you for choosing Yosemite Technologies' multiparameter water quality instrument. The instrument is a portable device that can monitor three different water quality parameters simultaneously, including temperature, pH(ORP), and any one of Yosemite's digital sensors of dissolved oxygen, conductivity, turbidity, or chlorophyll sensors. The microprocessor based meter can automatically detect Yosemite's digital sensors and can measure, display, log, transfer, and perform sensor calibration easily on a single platform.

The instrument is designed for outdoor applications and it is an ideal solution for field measurement of water qualities in lakes, rivers and oceans.

For more information about Yosemite Technologies Ltd. and its water quality monitoring products, please visit us at www.yosemitech.com for more details.

Reading the entire manual before use is highly recommended for an overall understanding of the instrument's features.

2. SPECIFICATIONS

Sensor Specifications

| Optical Dissolved Oxygen Sensor | | |
|---------------------------------|---------------------------|--------------------------------------|
| 1 | Sensor Type | immersible |
| 2 | Dimensions | Φ 16×180mm |
| 3 | Weight in Air | 51g |
| 4 | Cable length | 5m default, 10m,15m and 30m optional |
| 5 | Min cable bending radius | 15 mm |
| 6 | Communication protocol | RS-485, MODBUS |
| 7 | Range | 0-20mg/L or 0-200% air Sat. |
| 8 | Accuracy | 0- 200%: ±1% |
| 9 | Response time | 10 sec |
| 10 | Drift | <1% /Year |
| 11 | Temperature accuracy | ±0.2 °C |
| 12 | Working temperature range | 0~ 50°C |
| 13 | Storage temperature | -40 ~ 85°C |
| 14 | Calibration method | One-point or two-point calibration |
| 15 | Sensor cap lifetime | One year in normal use |
| pH | | |
| 1 | Range | 0 ~14 |
| 2 | Resolution | 0.01 |
| 3 | Accuracy | ± 0.05 |
| Temperature | | |
| 1 | Range | 0 ~100°C |
| 2 | Resolution | 0.1°C |
| 3 | Accuracy | ± 0.2°C |
| 4-electrode conductivity | | |
| 1 | Range | 1uS/cm~200mS/cm |
| 2 | Accuracy | 1% |
| 3 | Temperature range | 0~50°C |
| Turbidity | | |
| 1 | Range | 0.1~1000NTU |
| 2 | Accuracy | <5% or 0.3NTU |

| | | |
|-------------|-------------------|--------------|
| 3 | Temperature range | 0~50°C |
| Chlorophyll | | |
| 1 | Range | 0~400ug/L |
| 2 | Accuracy | <5% or 2ug/L |
| 3 | Temperature | 0~50°C |

Instrument Specifications

| | | |
|----|-----------------------|---|
| 1 | General Description | Microprocessor based multi-parameter instrument |
| 2 | Dimensions | 166 x 84 x 32mm |
| 3 | Weight | 190g(exclude batteries) |
| 4 | Power | 4 AAA Alkaline batteries |
| 5 | Working temperature | -5~50°C |
| 6 | Storage temperature | -40~85°C |
| 7 | Display | 128 x 64 LCD back illuminated |
| 8 | Sensor supported | ODO/Turbidity/Conductivity/pH/Temp/Chlorophyll |
| 9 | Data storage | Internal memory |
| 10 | User calibration | One-point or two-point |
| 11 | Pressure compensation | Built-in, auto compensation in 50~115kPa |
| 12 | IP rating | IP54 |

3. INSTALLATION

3.1 Initial Inspection

Carefully unpack the instrument and accessories, and inspect for possible damage during shipping. Check received parts with items on the packing list, if any parts or materials are damaged or missing, please contact Yosemite Technologies customer service or the authorized distributor immediately. Save all packing materials until you are sure that the instrument functions properly. Any damaged or defective items must be returned in their original packaging materials.

3.2 Battery Installation

Inspect battery compartment and install four AAA alkaline batteries before using the instrument. Please pay attention to battery polarization marks inside the battery compartment.

3.3 Sensor Installation

There are three ports on top of the instrument. The right side port is a digital port dedicated for a digital sensor (ODO, turbidity, conductivity, or chlorophyll), Middle port with a BNC connector is dedicated for pH sensor, and the port on the left is for temperature sensor only.

- With the meter power off (IMPORTANT, HOT PLUG MAY CAUSE SENSOR OR INSTRUMENT DAMAGE), locate and install sensors to appropriate ports.
- Turn the meter on by pressing on power Switch and hold for 2 seconds. The meter will automatically recognize connected sensor(s) and display readings on main display window.

4. SETUP, MEASUREMENT, AND CALIBRATION



| Number | Name | Descriptions |
|--------|---------------------|--|
| 1 | Temperature port | Port only for temperature sensor |
| 2 | pH port | Only for analog pH sensor |
| 3 | Digital sensor port | Any one of Yosemite's digital sensors including ODO, Turbidity, conductivity, or chlorophyll |
| 4 | Display | Display window |
| 5 | UP key | UP key to select manual above |
| 6 | Right Key | RIGHT Key to select manual on the right |
| 7 | DOWN Key | DOWN Key to select manual down |
| 8 | Power Switch | Power on/off (Hold the button for two seconds) |
| 9 | Backlight Switch | Turn ON/OFF of the display backlight |
| 10 | ESC | In EDIT Panel, back up to up level manual, in other case, back up to main manual |
| 11 | ENTER | Confirm selection |
| 12 | LEFT Key | In EDIT Panel, select left manual, in other case of no-edit panel, backup to up level manual |

Note: In EDIT Panel, use ESC to cancel current edit

4.1 Main Manual

Hold POWER switch on for 2 seconds, the instrument will be turned on and the display will briefly show Yosemite's Logo then enter into main display window as shown below.

| SYS | PROBE | CAL | FILE |
|--------|-----------------------------------|---|-----------|
| 98.1 % | 7.59 $\frac{\text{mg}}{\text{L}}$ | 27.7 °C | 100.1 kPa |
| | | 7.00 pH | |
| 3/31 | 14:28:42 |  | |

Figure 4-1

The meter shows dissolved oxygen concentration (assume a dissolved oxygen sensor is connected) in percent saturation (%) and concentration in mg/L. pH value, temperature in °C, barometric pressure in kPa, and date/time in the format of MM/DD and HH/MM/SS are also shown in the window. At top the display window, four functional manual of SYS, PROBE, CAL, and FILE have been displayed. These four function manuals are used for data storage, memory data management, sensor calibrations, and others as described below in details. On the lower right corner, a battery indicator has also been shown of battery usage status.

4.2 Instrument Setup

4.2.1 Instrument setup - SYS

Highlight SYS tab and press ENTER to enter SYS manual. In SYS setup manual, you can perform functions of Store Data setup, Date/Time setup, retrieve instrument information, and perform Auto Shut-off setup.

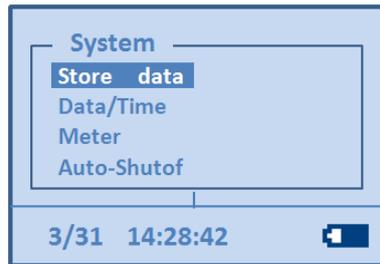


Figure 4-2

4.2.2 Data storage setup

Select "Store data" key, then press "ENTER" key, it will display "Store over !". It will automatically return to main display panel after one second. Measured data will then be saved in internal memory. The maximum number of data sets can be saved in the memory is 170. After reaching maximum data sets saved, it will erase the first data set and replace with the most recent one.

4.2.3 Date/Time setup

In System manual, select "Date/Time", and press ENTER. You can setup date and time by pressing LEFT or RIGHT key to select the position, and using UP or DOWN keys to increase or decrease the numbers as shown in Figure 4-3

Date format: YY/MM/DD

Time format: HH/MM/SS



Figure 4-3

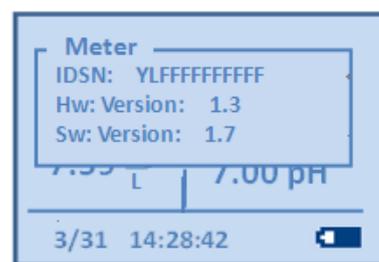


Figure 4-4

4.2.4 Instrument Information

By selecting "Meter" then push ENTER key, you can check instrument information such as HW version, SW version as shown in Figure 4-4. Please note that all the information in this panel is read only.

4.2.5 Auto-Shutoff

As shown in Figure 4-5, select "Auto-Shutoff", you can set the period of the instrument auto-shutoff time (you can choose 5 min, 10 min, 15 min or Never, when you choose Never, the instrument then needs manual shutoff), as shown in Figure 4-5. Default value of Auto-Shutoff period is 10 min.

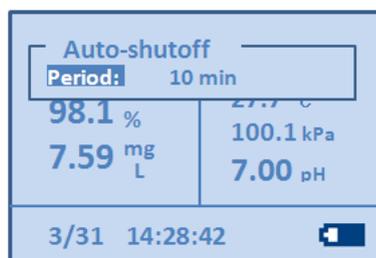


Figure 4-5



Figure 4-6

Note: if battery is running low, the instrument will set off alarm. Sensor will then be disconnected from the instrument and instrument will shut off automatically in 15 seconds

4.3 Sensor setup, measurement and calibration

The instrument is designed to measure multi or single parameter simultaneously. Each sensor requires unique sensor property setup. Sensor setup, measurement, and calibration will be addressed in details.

4.3.1 Dissolved Oxygen sensor

a) Probe information

Under PROBE, select Pro DO then press ENTER, you will be in Pro DO setup panel. You can find sensor hardware and software versions, and sensor cap calibration coefficients, as shown in Figure 4-6. This is also a place to update sensor cap coefficients when a new sensor cap is replaced.

Note: DO NOT change any parameters in “Sensor Cap” unless a sensor cap is replaced .

b) Measurement

Dissolved oxygen sensor can be used independently without any other sensors, or can be integrated with pH and temperature probes. When DO probe is used without external temperature probe, the displayed temperature reading is from DO sensor's internal temperature sensor, which is used for DO concentration temperature compensation.

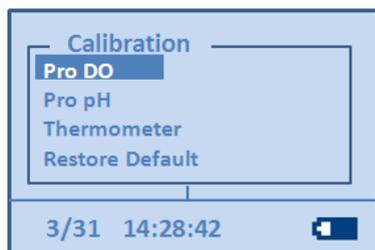


Figure 4-7

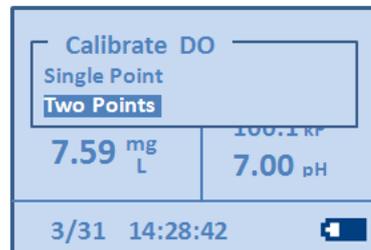


Figure 4-8

During the measurement, make sure that the stainless steel section of the probe is totally submerged into the liquid under test, and wait till the data is stabilized.

c) Stop measurement

To turn the instrument off, hold Power switch (Key 8) for 1 second and then release the switch, you will hear a beep which confirms that the instrument has been turned off. After the measurement, clean up the sensor head in clean water and keep it properly based on Yosemite Technologies' instruction.

d) Calibration

DO sensor supports both single-point and two-point user calibration. Select "Pro DO" under CAL Tab, you can select either 'Single-Point' or "Two-Point", as shown in Figure 4-7 and 4-8. For example if two-point calibration is selected, you need to wait a moment until sensor is ready to reset (Figure 4-9 and 4-10). Select Next and follow screen instruction to complete calibration procedures in zero and 100% DO concentration environments respectively (Figure 4-11 and 4-12). Please note that you need to wait until readings are stabilized before you select Next button to accept the calibration reading.

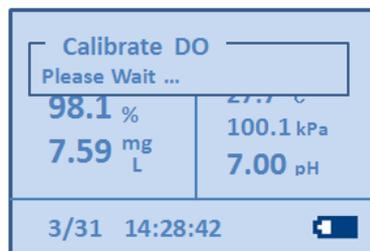


Figure 4-9

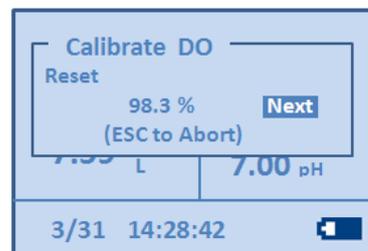


Figure 4-10

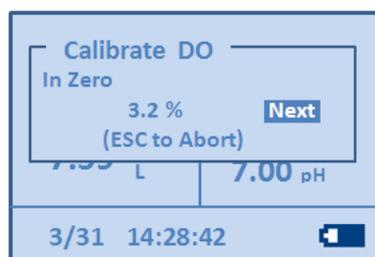


Figure 4-11

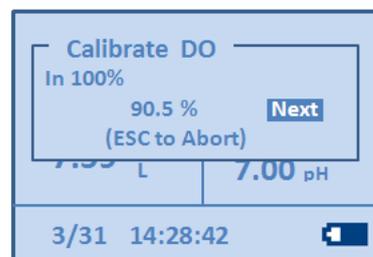


Figure 4-12

e) Salinity

The amount of dissolved oxygen increases as salinity level decreases. The instrument performs automatic compensation of salinity level based on manual input of sample salinity under test. Select "PROBE" as shown in Figure 4-13, and scroll down to "Salinity", in "Salinity" manual, you can setup salinity value of your sample under test.



Figure 4-13

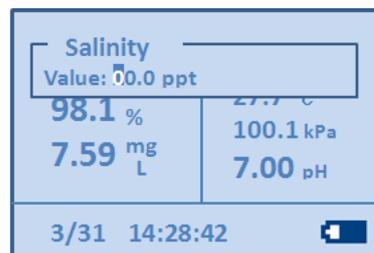


Figure 4-14

f) Dissolved Oxygen Unit Selection

In "Display" manual, you can setup DO display unit. The default display units are % and mg/L as shown in Figure 4-15.

g) Pressure Unit Selection

Pressure display unit selection: in "Display" manual, select "Barometer", you can select pressure unit of your choice as shown in Figure 4-16.

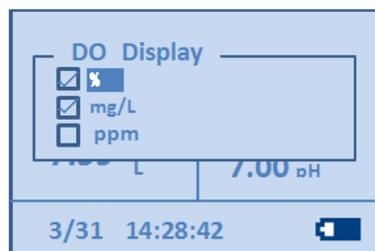


Figure: 4-15



Figure: 4-16

4.3.2 pH and Temperature sensor

Note: pH sensor will not work without temperature sensor installed

a) Setting

pH and temperature sensor setup: under "Display" manual, select "Pro pH", or select "Temperature" to change the display unit as shown in Figures 4-17 and 4-18. There are two options for pH unit, pH unit or mV. For temperature unit, you can either select °C or K.

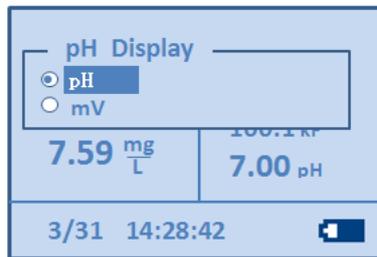


Figure 4-17

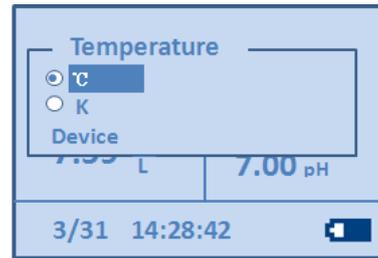


Figure 4-18

Note: when there is no temperature sensor installed, you can still be able to select temperature unit, but the temperature value displayed will be a random number.

There are two temperature sources available, external connected thermometer in the left port of the instrument and Pro DO internal built-in temperature sensor. The temperature to be displayed can be selected from either thermometer installed or Pro DO as shown in Figure 4-19 from Device tab in Figure 4.20.

If Pro DO temperature source is selected, pH real time temperature compensation is disabled, and a single default temperature of 25°C is used in pH temperature compensation. To make pH real time temperature compensation, "Thermometer" has to be selected and temperature sensor has to be installed in appropriate port of the instrument.

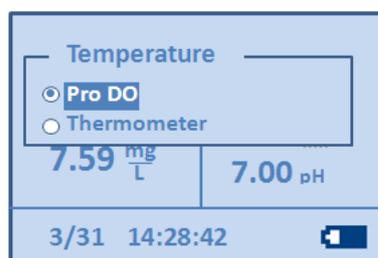


Figure 4-19

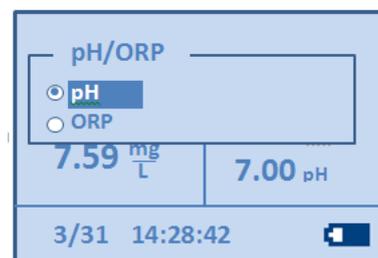


Figure 4-20

b) Measurement

Carefully inspect pH sensor head before performing measurement. If there is a bubble trapped inside pH glass sensing head, remove the bubble first, otherwise, the accuracy will be affected.

c) Calibration

pH sensor calibration

Under CALIBRATION Tab, select "Pro pH" then press "ENTER" to enter into pH calibration mode. pH sensor supports three point calibration at pH standards of pH=4.00, pH=6.86, and pH=9.18. Follow the screen instructions to finish calibration, as shown in Figure 4-21.

Temperature sensor calibration

You can also implement signal point temperature sensor calibration as shown in Figure 4-22. Adjust temperature value and confirm to complete temperature calibration.

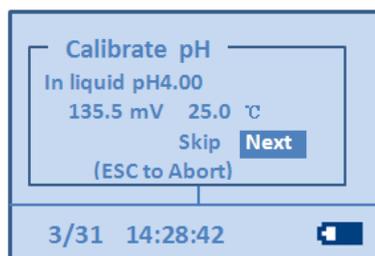


Figure 4-21

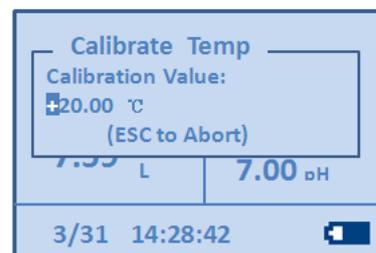


Figure 4-22

4.3.3 ORP

By selecting "pH/ORP" in Figure 2.16, you can change pH to ORP. ORP(mV) reading will be displayed.

Calibration

Under CALIBRATION tab, select "Pro ORP", then press ENTER to enter into ORP calibration mode (only one-point calibration supported). Like pH, if

"Thermometer" has not been selected, the default temperature will be a single

value of 25°C. Follow the screen instruction to finish the calibration process as shown in Figure 4-23.

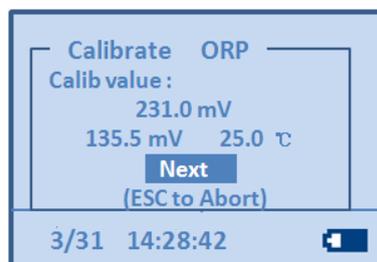


Figure 4-23

Note: All Yosemitech's digital sensor will be automatically recognized by the instrument. Digital sensors are optical dissolved oxygen, conductivity, turbidity, and chlorophyll sensors.

4.3.4 Turbidity sensor

When a turbidity sensor is installed, in main manual, turbidity reading (NTU), pH, and current pressure (kPa) will be displayed. By selecting PROBE, then ENTER, and select Pro Turbidity, Turbidity sensor information will be displayed.



Figure 4-24

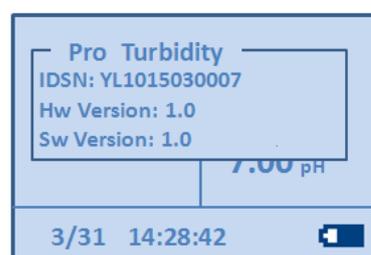


Figure 4-25

Calibration

Under calibration panel, select "Pro Turbidity" to enter into turbidity sensor calibration routine as shown in Figure 4-26. There are three calibration options

available, Zero point, Single-point and Two-Point. For example of Two-point calibration, select "Two-points" in Calibration Turb tab, press "Reset", a new screen will show up the next step to perform. Follow the screen instruction to finish the calibration. Please wait until stable reading is reached before you accept the calibration value. At anytime, you can abort current calibration process using ESC button.

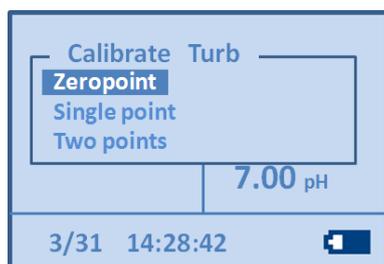


Figure 4-26

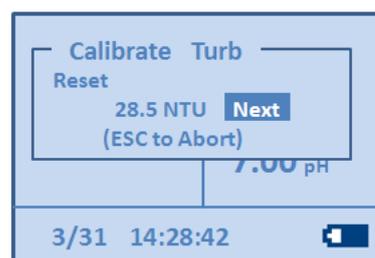


Figure 4-27

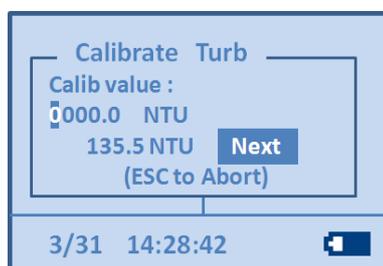


Figure 4-28

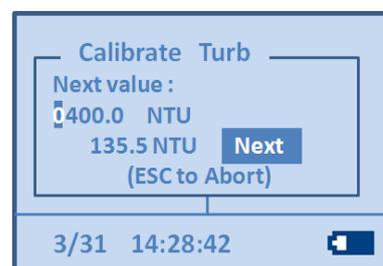


Figure 4-29

4.3.5 Conductivity sensor

When a conductivity sensor is installed, a conductivity sensor reading will be displayed in $\mu\text{S}/\text{cm}$ as well as pH, and current pressure (kPa) (Figure 4-30).

Calculated total dissolved solid (TDS) is also displayed in the window as mg/L. By selecting PROBE, then ENTER, and select Pro Conduct, Conductivity sensor information will be displayed as shown in Figure 4-31.

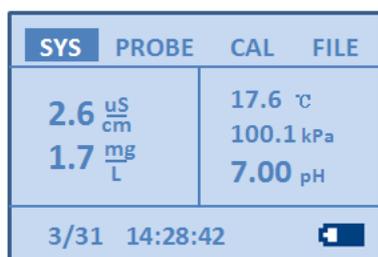


Figure 4-30

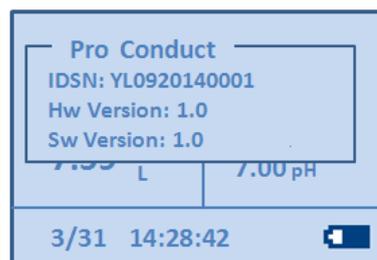


Figure 4-31

Calibration

Under calibration panel, select "Pro Conduct" to enter into conductivity sensor calibration routine as shown from Figure 4-32 to 4-35. There are 4 standard conductivity solutions available to support Single-point or Two-point calibration (111.3 mS/cm, 12.88 mS/cm, 1.413 mS/cm, and 84 μ S/cm). Follow the screen instructions from standard calibration solution of 111.31 mS/cm, 12.88 mS/cm, 1.413 mS/cm, to 84 μ S/cm. You can skip current solution to next standard calibration standard solution by selecting "SKIP".

Note: if all four standard solution calibrations are performed, only 1.413 mS/cm and 84 μ S/cm solutions are selected by default to perform a two-point calibration.

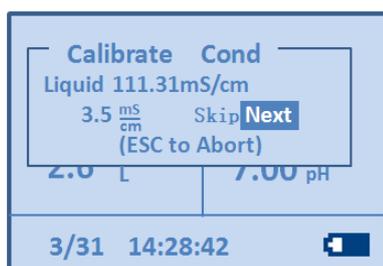


Figure 4-32

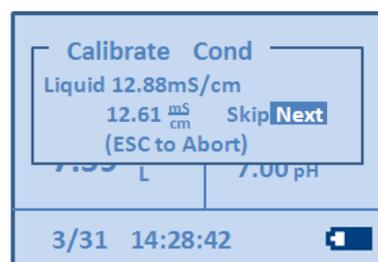


Figure 4-33

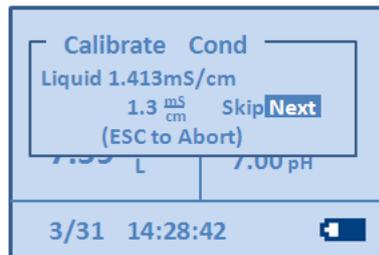


Figure 4-34

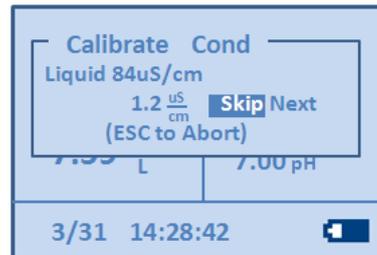


Figure 4-35

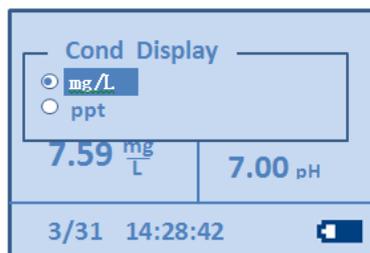


Figure 4-36

Conductivity Unit

Under "PROBE", select "Display", then "Pro Conduct", two calculated units can be displayed either mg/L for TDS (Total Dissolved Solid) or ppt (parts per thousands) for salinity.

4.3.6 Chlorophyll Sensor

When a chlorophyll sensor is installed, a chlorophyll reading will be displayed in $\mu\text{g/L}$ as well as pH, and current pressure (kPa) under main display window (Figure 4-37). Select "Pro Chlorophyll" under "PROBE", sensor information will be displayed as shown in Figure 4-38.

| SYS | PROBE | CAL | FILE |
|------|--------------------------------|-----------|------|
| 28.5 | $\frac{\mu\text{g}}{\text{L}}$ | 27.7 °C | |
| | | 100.1 kPa | |
| | | 7.00 pH | |
| 3/31 | 14:28:42 | | |

Figure 4-37

| Pro Chlorophyll | |
|-------------------|----------|
| IDSN:YL4816071401 | |
| Hw Version: 1.0 | |
| Sw Version: 1.0 | |
| | 7.00 pH |
| 3/31 | 14:28:42 |

Figure 4-38

Calibration

Under calibration panel, select "Pro Chlorophyll" to enter into chlorophyll sensor calibration routine. Chlorophyll A sample solution of known concentration or Rhodamine B solution can be chosen from for Chlorophyll sensor calibration.

a) Calibration using Chlorophyll A solution

Chlorophyll sensor can be calibrated using known chlorophyll concentration solution. Chlorophyll concentration can be determined by standard extraction process. You can input user defined chlorophyll concentration value during calibration process.

b) Calibration using Rhodamine B solution

Rhodamine B dye is widely used to calibrate the chlorophyll sensor. Rhodamine B calibration is a very cost effectively way for sensor calibration. It provides stable fluorescence signal for sensor calibrations.

Rhodamine B can be purchased from chemical suppliers, such as Sigma Aldrich Chemical Company. We recommend to stay with recommended supplier of Sigma Aldrich (R95-3) since different supplier may have different dye purity which could cause big difference in calibration.

Weight 0.05 g of Rhodamine B solid and dissolved into 500ml DI water to make 100ppm stock solution. Draw 5 ml from that stock solution and transfer it to 1000 ml DI water to make 0.5 mg/L standard solution. Please note that concentrated Rhodamine B stock solution is stable. Store it in dark for future use.

Rhodamine B fluorescence intensity decreases with temperature increases. To compensate for this temperature dependency, a temperature correction table has been provided for temperature correction. At temperature of 20°C, using 0.5 ppm Rhodamine solution, equivalent 82 µg/L Chlorophyll concentration should be entered. If you calibrate at temperature of 26°C using 0.5 ppm Rhodamine solution, 75.6 µg/L should be entered. Please see the attached table for detail.

| Temp, °C | µg/L Chl to Enter |
|----------|-------------------|
| 30 | 72.6 |
| 28 | 74.1 |
| 26 | 75.6 |
| 24 | 77.0 |
| 22 | 79.4 |
| 20 | 82.0 |
| 18 | 86.4 |
| 16 | 90.8 |
| 14 | 93.2 |
| 12 | 95.1 |
| 10 | 98.0 |
| 8 | 100.0 |

Chlorophyll concentration equivalent to 0.5 ppm rhodamine B at different temperature

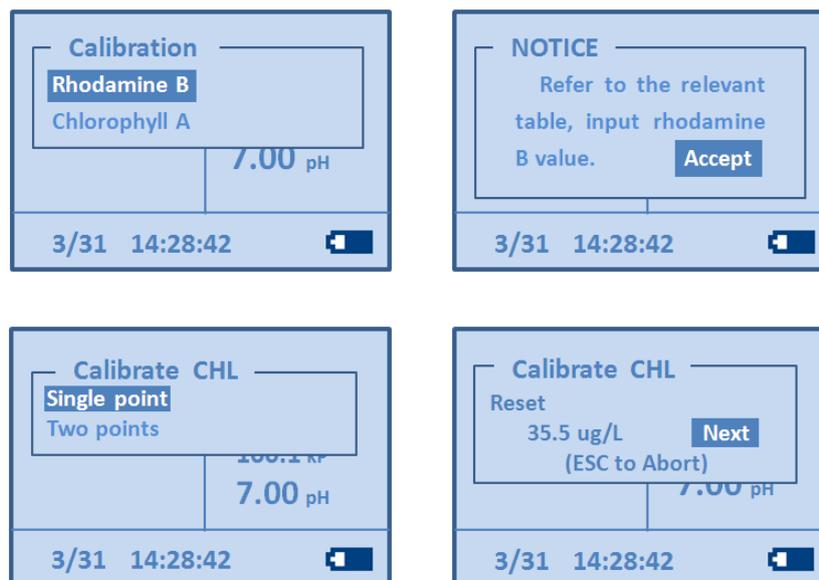


Figure 4-39

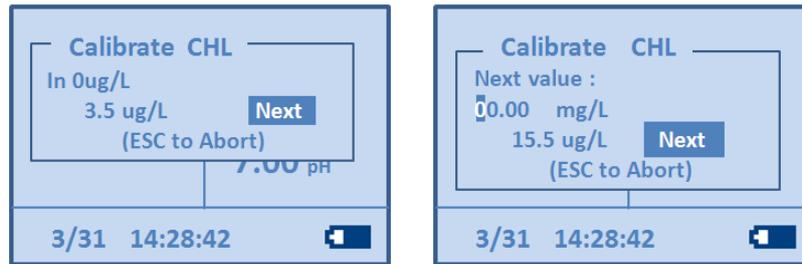


Figure 4-40

For two-points calibration, another point of DI water shall be chosen for zero chlorophyll concentration (0 $\mu\text{g/L}$) as shown in Figure 4-39 and 4-40.

4.4 Factory Default Restoration

User can restore factory default setup. Under "Calibration" Tab, select "Restore Default" then select the probe that you need to restore, as shown in Figure 4-41, then press "ENTER", all user calibration data of the sensor will be replaced with factory default settings.

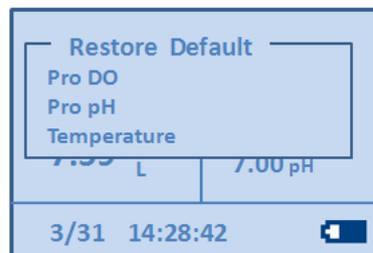


Figure 4-41

4.5 View Data in Memory

Under main manual, select 'File', you will be able to review saved data sets in memory, as shown in Figure 4-42. By selecting "View Data", each data set is listed with time stamp and can be displayed individually as shown in Figure 4-43.

Maximum data set can be recorded is 170 and total data set recorded will be displayed. You can view each time stamped data set individually as shown in Figure

4-43. By selecting "Delete Data", all recorded data will be deleted.

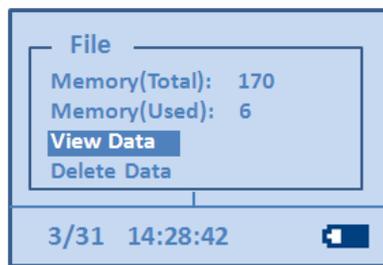


Figure 4-42

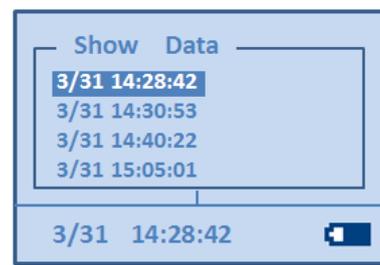


Figure 4-43

5. CARE AND MAINTENANCE

5.1 Maintenance

- Inspect all sensor connectors for corrosion and replace sensors if necessary.
- Inspect sensor o-rings or other damage and replace if necessary
- After prolonged storage, calibration of the sensor is required.
- After use, rinse the sensor body with clean water and dry it. Return DO and pH sensors to their storage caps. **Keep DO sensor storage cap wet to moisturize DO membrane surface(IMPORTANT).**
- **DO NOT DRYOUT DO SENSOR CAP**
- NEVER USE DISTILLED OR DEIONIZED WATER TO STORE pH SENSORS
- Inspect the sensor for scratches or cracks, if any are present , replacement of the sensor cap may be needed.

5.2 Maintenance Schedule

Optical dissolved oxygen sensor is a maintenance free sensor, however to ensure its accuracy specifications, we strongly recommend to perform routine maintenance based on following schedule.

| Maintenance | Frequency Recommended |
|--------------------------------------|-----------------------|
| Sensor clean up | Every 30 days |
| Sensor and DO sensing cap inspection | Every 30 days |
| DO sensing cap replacement | Every year |
| Sensor user calibration | Before measurement |

5.3 DO maintenance

DO sensor cap should be kept clean. To clean the sensor cap, gently wipe off any fouling with a lens cleaning tissue that has been moistened with clean water. Do not use organic solvents to clean the sensor cap. Using an organic solvent to clean the sensor cap may cause permanent damage to the cap.

If the sensor cap internal surface has contaminations. Carefully remove the sensor cap, use clean water to wash the sensor cap internal surface. You can use gentle home dish cleaner if necessary, then followed with clean water wash and dry up with lens cleaning tissue.

5.4 DO Sensor Cap storage

Store the sensor cap inside protect cap with a piece of damped sponge.

5.5 DO Sensor Cap replacement

The sensor cap should be replaced about once per year based on maintenance schedule recommended above. It should also be replaced if it is damaged. An instruction sheet will be shipped with the replacement sensor cap, which includes calibration coefficients specific to the sensor cap.

The replacement sensor cap is shipped in a humidified container and the package should not be opened until immediately before sensor cap replacement. Once the sensor cap has been installed on the sensor, it is important to keep the sensor in a 100% humid environment.

Note: turn off the power before perform sensor cap replacement

1. Hold the sensor by one hand, and remove the sensor cap from the sensor by rotating the sensor cap counterclockwise using the other hand.
DO NOT USE ANY TOOLS.

2. Inspect the O-ring on the probe carefully. If damaged, replace it. Do not use tools to remove or install o-rings.
3. Ensure the O-ring installed is clean.
4. Install the Sensor Cap clockwise from hydrated container and dry the inside surface with clean tissues.
5. After installing the new sensor cap, keep the sensor in humidified environment.
6. Highlight "Sensor Cap", enter into the manual as shown in below, at this time, the display shows the old Sensor Cap coefficients. Select "Update", then update 10 groups of data (K0 to K9). After confirm the update, the display shows "Success and check", and new Sensor Cap coefficients are displayed. See figure 5-1 and 5-2 below.

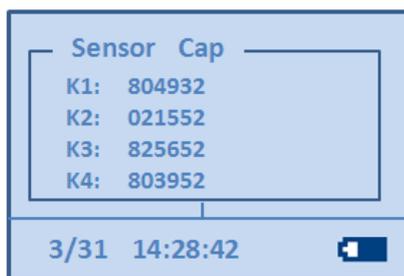


Figure 5-1

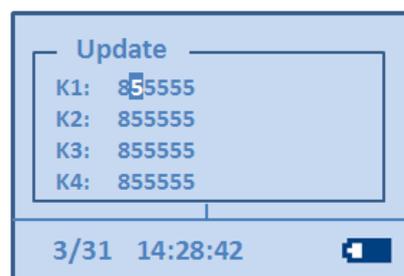


Figure 5-2

5.6 Temperature sensor routine maintenance

Inspect temperature sensor tip carefully. If there is fouling or debris attached, use soft brush gently clean the sensor tip.

5.7 pH sensor maintenance

pH sensor glass tip is very fragile. Even though there is a protection guard, please be careful not to hit with hard materials. If the glass sensing tip is broken or cracked, replace it.

5.8 Instrument maintenance

Keep instrument surface clean, using soft cloth to clean instrument display window.

Keep battery compartment dry and clean.

CAUTION: KEEP DO MEMBRANE CAP CLEAN AND IN WET STORAGE CAP, AVOID ANY MECHANICAL STRESS TO MEMBRANE CAP, AVOID ANY SCRATCHES TO MEMBRANE SURFACE.

6. COMMON ERRORS AND TROUBLE SHOOTING

| ERRORS | POSSIBLE CAUSES | SOLUTIONS |
|---|-----------------------------------|--|
| No data displayed on Meter (if sensors are connected) | Connection Issue | Reconnect sensor to the meter |
| | No batteries or batteries are low | Replace Batteries |
| | Cable problem | Contact Yosemite Technologies Customer Service |
| | Bad DO sensor cap or loose cap | Reinstall sensor cap or replace |
| Unstable DO value | Dirty sensor cap | Clean sensor cap |
| | Bad sensor cap | Replace sensor cap |
| | Sensor cap expired | |
| Bad temperature data | Connection problem | Reconnect Meter and Temperature sensor |
| | Dirty sensor or fouling | Clean sensor |
| Random pH reading | Bad connection | Reconnect Meter and pH sensor |
| | Dirty sensor | Clean sensor |

7. WARRANTIES

Yosemite Technologies' multiparameter meter and sensors are warranted for one (1) year from date of purchase against any material and manufacturing workmanship. Within the warranty period, Yosemite Technologies will repair or replace, free of charge, any product that Yosemite Technologies determines to be covered by warranty.

Limitation of Warranty

This Warranty does not apply to any Yosemite Technologies product damage or failure caused by:

1. Failure to install, operate or use properly according to Yosemite Technologies' product instructions;
2. Abuse or misuse of the product;
3. Failure to maintain the product in accordance with Yosemite Technologies' maintain instructions, or standard industry procedure;
4. Modification of the product in any way not expressly authorized by Yosemite Technologies.