SZ4001

Handheld Multi-parameter Sensor

User Manual

SIBO.X INDUSTRIAL CO.,LTD.
Add: No. Building 1, No. 1, Jingshi Road, Cicheng Town Industrial Park, Jiangbei District, Ningbo City, Zhejiang, China
https://www.sbxsun.com
Email: info@sbxsun.com
Tel: +86-15958288207

Catalogue

Preface

Dear customer

Thank you for using our product . Reading the entire manual before use is highly recommended for operation and maintenance the instrument and out of unnecessary trouble.

Please observe the operating procedures and precautions in this manual.

To make sure the effective after-sales protection provided by the instrument, please do not use any operation or maintenance other than which mentioned in the manual.

Due to non-compliance with the precautions specified in this manual, any fault and loss caused shall not be covered by the warranty, and the manufacturer shall not bear any relevant responsibility. If you have any questions, please contact our after-sales service department or representative.

Carefully unpack the instrument and accessories from the shipping container, 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 our 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.

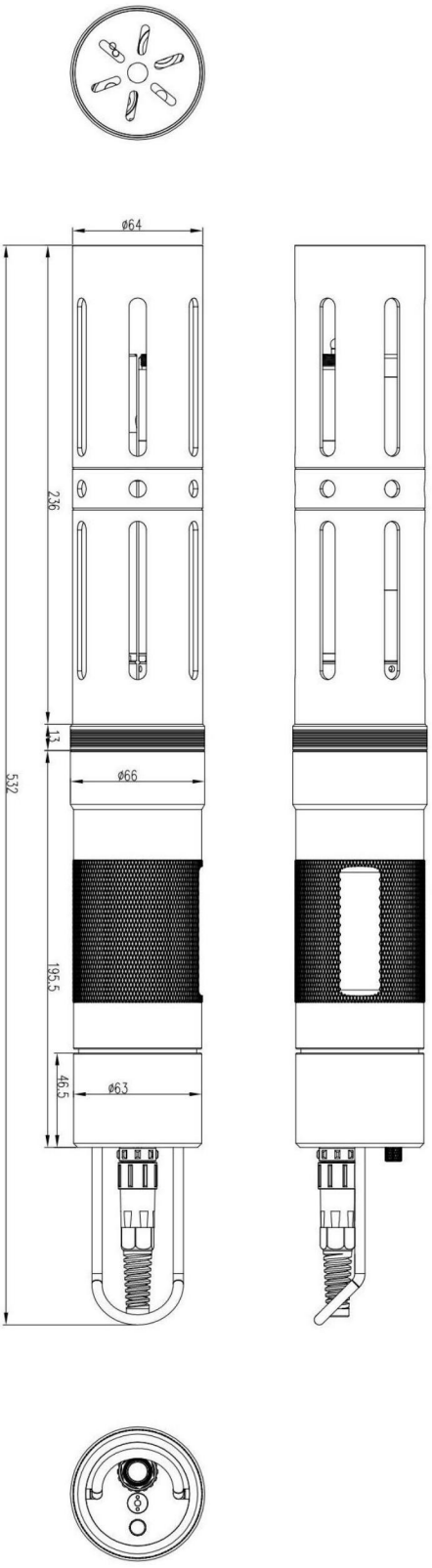
1 Overview

Handheld multi-Parameter sensor and handheld meter for the measurement of pH, ORP, optical dissolved oxygen, conductivity, turbidity, temperature, salinity and more.Handheld multi-parameter sensor allows for measurement of up to 5 parameters. They are automatically recognized by handheld meter when connected. A backlit display, brief interfaces, simple operation keyboard, convenient calibration procedures, rechargeable battery, large log memory and powerful PC data program (Meter Read) make the instrument user friendly.

The dissolved oxygen sensor adopts the internationally leading fluorescence lifetime technology, which is based on the quenching principle of specific substances to active fluorescence in physics. The remarkable advantage of this fluorescence method in measuring dissolved oxygen is that it does not consume oxygen in the measurement process, so there is no flow rate limit, no need to preheat electrolyte, no need for maintenance and frequent calibration. The response time of Yosemitech optical dissolved oxygen probe is as low as 30 seconds, making the measurement of dissolved oxygen more accurate, more stable, faster and more convenient.

1.1 Introduction

▲ Handheld multi-Parameter sensor



▲ Handheld multi-Parameter sensor size

1.2 Technical Specification

Handheld Multi-Parameter Sensor Specifications		
Dissolved oxygen Sensor	Range	0-20mg/L or 0-200% air Sat
	Accuracy	±1%
	Resolution	0.01mg/L
	Calibration	One-point or two-points calibration
Turbidity sensor	Range	0.1~1000 NTU
	Accuracy	±5% or ±0.3 NTU（Take the larger value）
	Resolution	0.1 NTU
	Calibration	Zore point ,one-point or two-points calibration
Conductivity(Salinity) sensor	CT Range	0.01~5 mS/cm or 0.01~100 mS/cm
	CT Accuracy	<1% or 0.01mS/cm（Take the larger value）
	SAL Range	0~2.5ppt or 0~80ppt
	SAL Accuracy	±0.05ppt or ±1ppt
	Calibration	One-point or two-points calibration
pH sensor	Range	pH:0 ~ 14
	Accuracy	±0.1
	Resolution	0.01
	Calibration	Three-points calibration
ORP sensor	Range	-999-999mV
	Accuracy	±20mV
	Resolution	1 mV
	Calibration	One-point calibration
BGA sensor	Range	0-200000 cells/mL
	Detection Limit	300 cells/mL
	Resolution	1 cells/mL
	Calibration	Two-points calibration
Chlorophyll sensor	Range	0-400μg/L or 0-100RF
	Resolution	0.1μg/L or 0.1%RFU

	Calibration	Zore point ,one-point or two-points calibration
	Range	0-400ug/ L or 0-100RF
OIW sensor	Range	0-50 ppm or 0-0.40FLU
	Detection Limit	$R^2 > 0.999$
	Resolution	0.01 ppm
	Calibration	Zore point ,one-point or two-points calibration
Temperature	Range	0~50℃
	Accuracy	±0.2℃
	Resolution	0.01℃
Other information	IP Rating	IP68
	Size	Φ64mm×532mm
	Sensor Interface	Supports RS-485, MODBUS protocol
	Power	DC 5~12V， current<50mA
Multifunctional handheld meter		
Size	220 x 96 x 44mm	
Weight	460g	
Power	Two 18650 rechargeable batteries	
Storage temperature	-40~85℃	
Display	54.38 x 54.38LCD back illuminated	
Data storage	Support	
Pressure compensation	Built-in， auto compensation in 50~115kPa	
IP rating	IP67	
Regular Shutoff	Support	

2 Installation

2.1 Configuration table

Item	Number	Note
Handheld meter	1	
Handheld Multi-Parameter Sensor	1	Including 4 sensors
18650 rechargeable battery	2	3.7V, used for handheld meter
D-type battery	2	Used for multi-parameter sensor
Port plug	4	
USB cable line	1	Micro USB
Wristband	1	
Screwdriver	1	To open the battery compartment
O-ring	1	Sensor cap sealing part
Sponge	2	To moisturize sensor cap
Protect Cap	1	To store the sensor cap

Note：Check the individual parts against the list of components. If anything is missing or damaged, notify after-sales service department immediately.

2.2 Installing the batteries

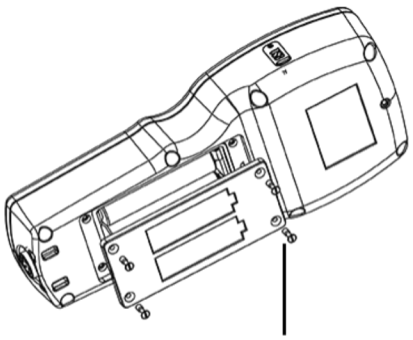
（1） Handheld meter battery installation

The instrument is designed to operate with two lithium batteries. Please follow the below steps.

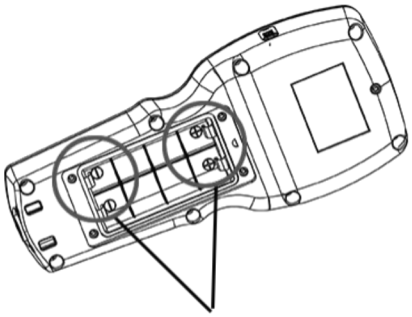
① Unscrew the screws on the battery compartment and open it. Note: The screw can't be taken off. That means the battery compartment cannot be opened until the screw can't be turned;

② Inspect battery compartment and install two batteries. Please pay attention to battery polarization marks inside the battery compartment, as shown in the figure below.

③ Close the battery compartment. Note that the sealing ring cannot fall off or be uneven. Make sure correct direction of compartment and tighten up the screws.



The screw can't be taken off.
That means the battery compartment
cannot be opened until the screw can't be turned



The positive and negative directions of the battery are the same, please install it correctly

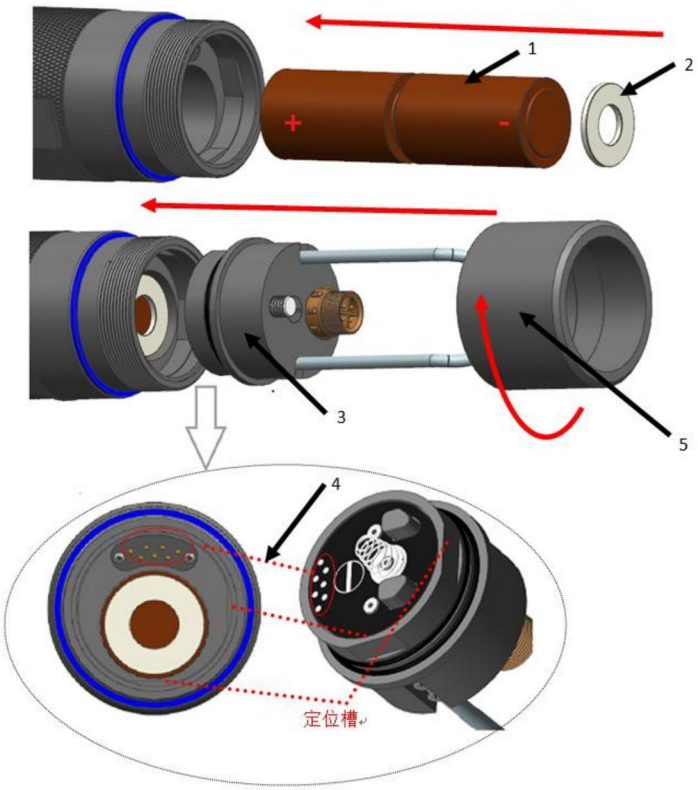
（2） Multi-Parameter sensor battery installation

The sensor is designed to operate with two D-type batteries. Please follow the below steps.

① Remove tail cover by unscrewing (counter-clockwise) with hand. Then pull out the tail plug.

② Correctly align and seat the two D-type batteries and gasket into the sensor. Please pay attention to battery polarization marks, as shown in the figure.

③ Align the tail plug and sensor connectors and locating slot, then insert the tail plug into the sensor. Tighten up the tail cover clockwise and the installation is completed.



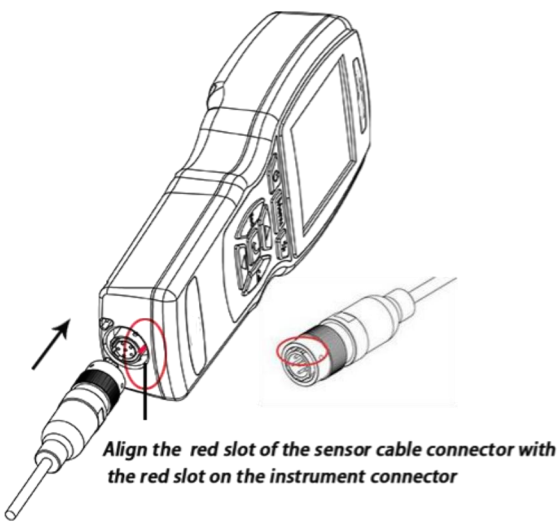
1 D-type battery	2 Battery gasket	3 Tail plug	4 Connectors	5 Tail cover

2.3 Installing

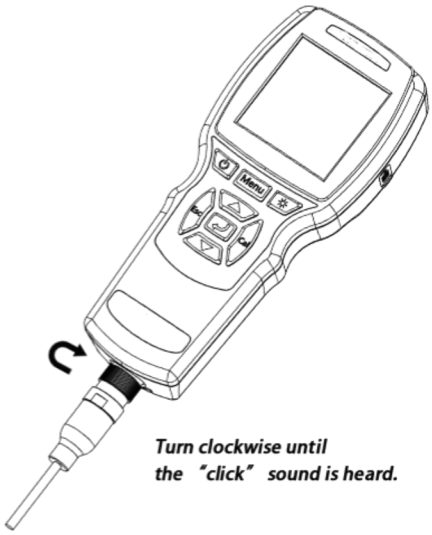
（1） Connect the cable assembly to handheld meter

Sensor cable has a red slot on the mini-BNC connector which must align with the connector at the base of the instrument. Then insert gently and turn clockwise until the “click” sound is heard. When remove the sensor, push the sensor cable connector in and turn out anticlockwise.

Install：

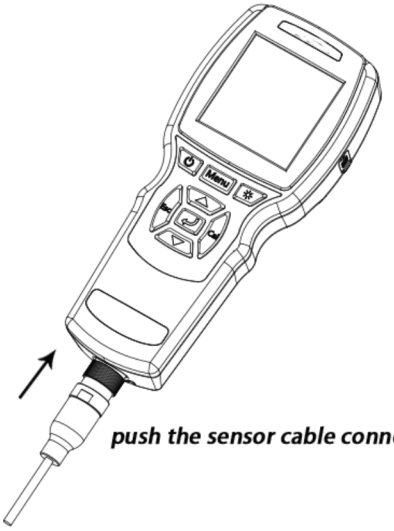


Align the red slot of the sensor cable connector with the red slot on the instrument connector



Turn clockwise until the “click” sound is heard.

Remove：



push the sensor cable connector

turn out anticlockwise

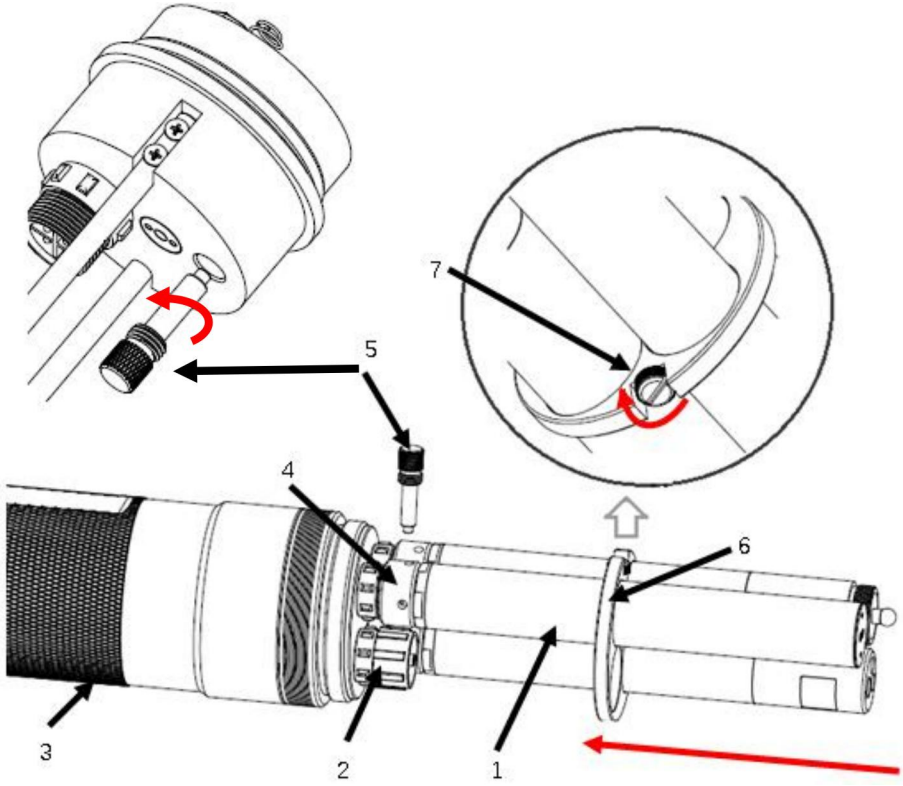
（2） Handheld multi-Parameter sensor installation

First rotate the sensor removal tool counterclockwise from the top of sensor, as shown in the figure below.

Carefully align the sensor and bulkhead connectors by inserting the sensor into the port then finger-tighten the retaining nut clockwise. If any resistance is felt, use the sensor removal tool to tighten the retaining nut clockwise until snug.

Insert the retaining ring and tighten the fixing screw clockwise.

Note: Do not over-tighten the fixing screw. Over-tightening can cause damage to the sensor or retaining ring not covered by the warranty.



1 Sensor	2 Port plug	3 Bulkhead	4 Sensor retaining nut
5 Sensor removal tool	6 Retaining ring	7 Fixing screw	

（3） Removal：

First remove the fixing screw anticlockwise and pull out the retaining ring. To remove a sensor, insert the sensor removal tool into the retaining nut, then rotate the retaining nut counter-clockwise to loosen. Pull the sensor straight out of the port and place it on a clean surface.

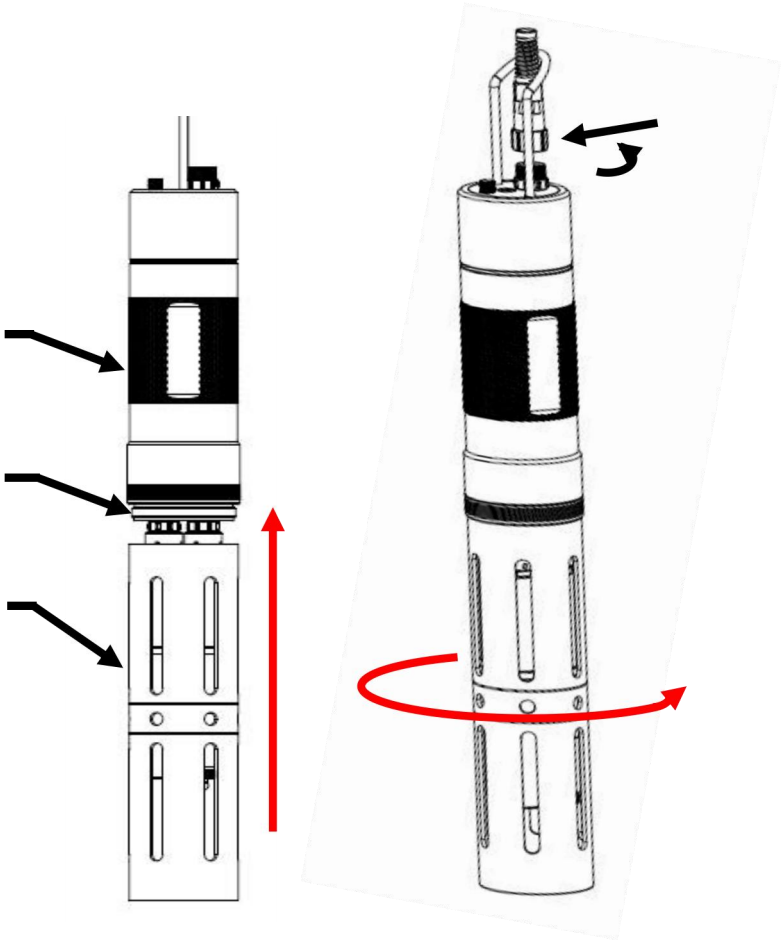
Note
Install a port plug if not reinstalling a sensor in the exposed port. Exposure to water can cause damage or corrosion to the connectors.

（4） Sensor guard installation and connect the cable to handheld multi-parameter sensor

① Carefully push the sensor guard toward the bulkhead until the sensor guard threads align with the bulkhead threads.

② Carefully finger-tighten the sensor guard clockwise.

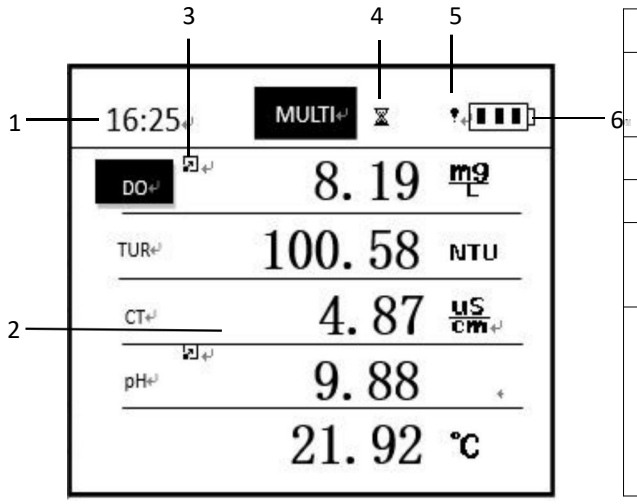
③ The sensor cable must insert gently and align with the connector at the top of the sensor. Then finger-tighten the connector clockwise.



1 Sensor Guard	2 Bulkhead threads	3 Bulkhead	4 Connector

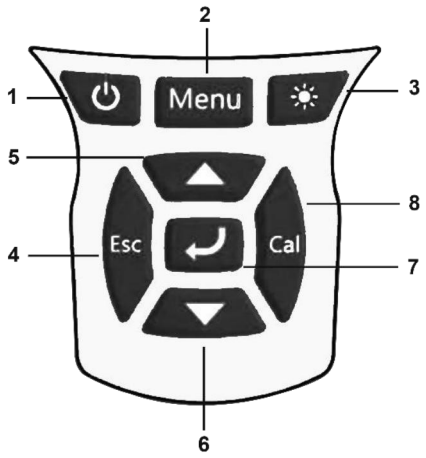
3 Operation

Press key to turn the handheld meter on. When there is no sensor connected, the measurement interface will display “No Signal!”. If handheld multi-Parameter sensor is connected, the display will show up to 5 parameters as shown in the figure below.



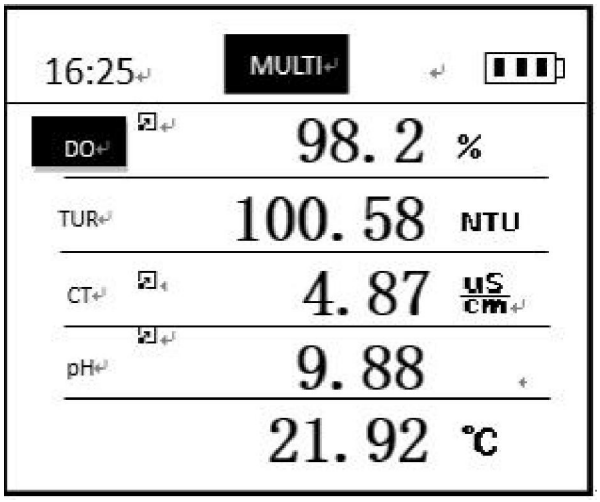
1	Time（min： sec）
2	Parameters: Including data of 4 sensors and temperature.
3	Press ” ↙” can switch unit of selected sensor
4	In logging data every 1 second
5	Battery warning: Indicting that will shut itself down soon.
6	Battery indicator. if appears, directly charge by using USB cable provided with or remove the rechargeable batteries to charge.。

Short press ： press and hold less than 2sec
Long press： press and hold more than 2sec



1		Short press	Turn the handheld meter on
		Long press	Turn the handheld meter off
2	Menu	Short press	Switch to Menu interface
3		Short press	Turn the backlight on and off
4	Esc	Short press	Exit settings ; Return to the previous interface
5		Short press	Scroll up the menu selection Increase figure
6		Short press	Scroll down the menu selection Decrease figure
7		Short press	Accept a menu selection Accept setting and values Switch unit
8	Cal	Short press	Switch to Calibration interface
		Long press	Switch to factory Calibration recovery interface
9	+	Short press	Store data once Note: Only in the measurement interface

3.1 Measurement interface



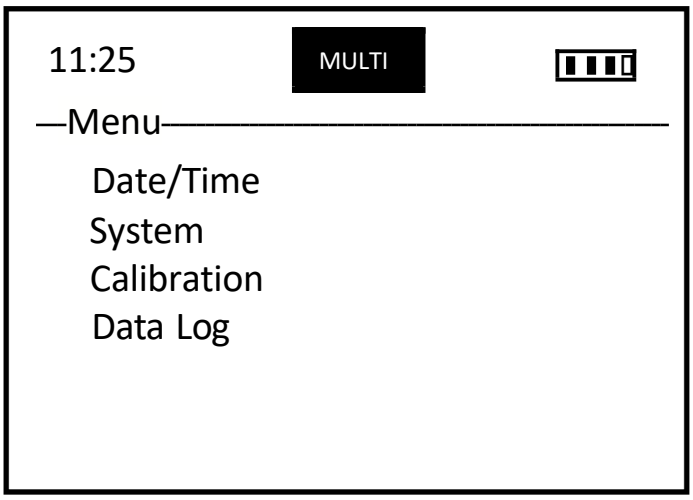
The **measurement interface** contains four sensor parameters: DO, Turbidity, Conductivity, pH.

To switch to each sensor, use the "▲▽" keys to highlight a selection. If there's a"⧉"beside the selection, press "↙" can switch its unit.

If the data is out of float, a "ovf" will flash.

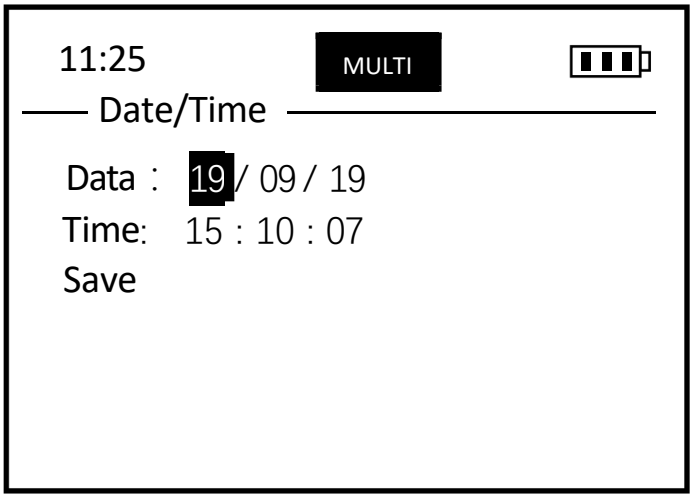
If"--"displayed, it means the probe is disconnected or does not exist.

3.2 Menu



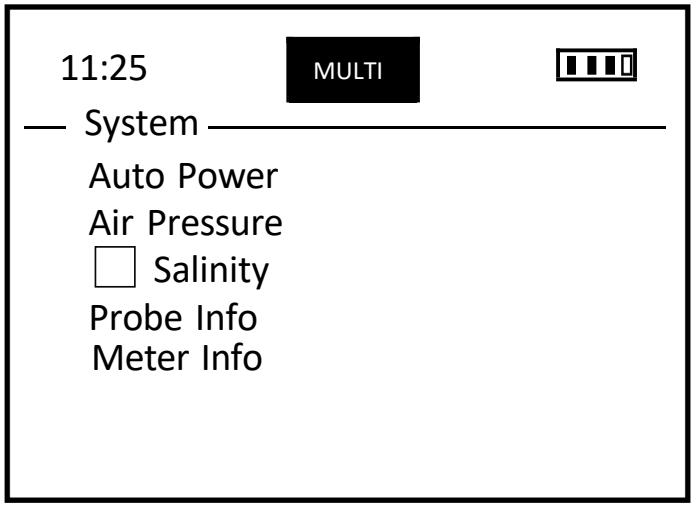
Press the **Menu** key to switch to menu interface. To select a menu item, use the "▲ ▼" key to highlight the selection and press the "↙" button. To exit a menu or menu item, press the ESC key.

3.3 Menu→Date/Time



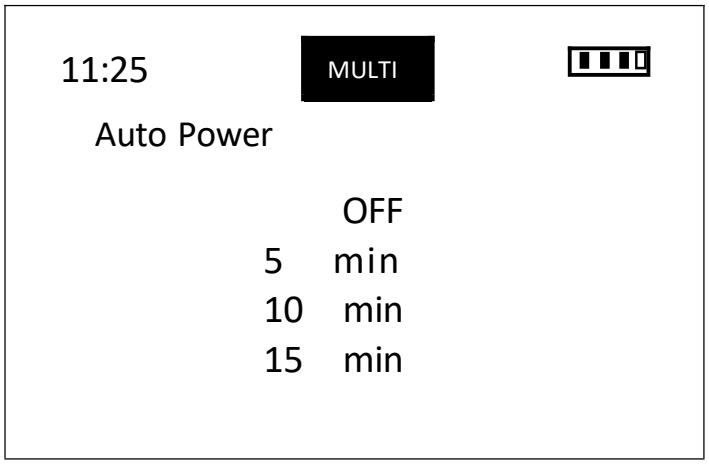
Date/Time menu is where you can setup date and time. Use the ▲or ▽ keys to scroll through the highlight data, and then press the "↙" key to move on to next data. Select Save and press the "↙" key to accept desired Data/Time. Then will shows "Save Success!".

3.4 Menu →System



System menu is where you can enquire and setup all parameters. These include Auto Power, Air Pressure, **Salinity optional (check the box to display salinity in the measurement interface, uncheck the box to display conductivity in the measurement interface)**, Probe Info, and Meter Info. To switch to a menu item, use the "▲ ▼" keys to select an option, and the "↙"key to accept.

3.4.1 Menu →System →Auto Power



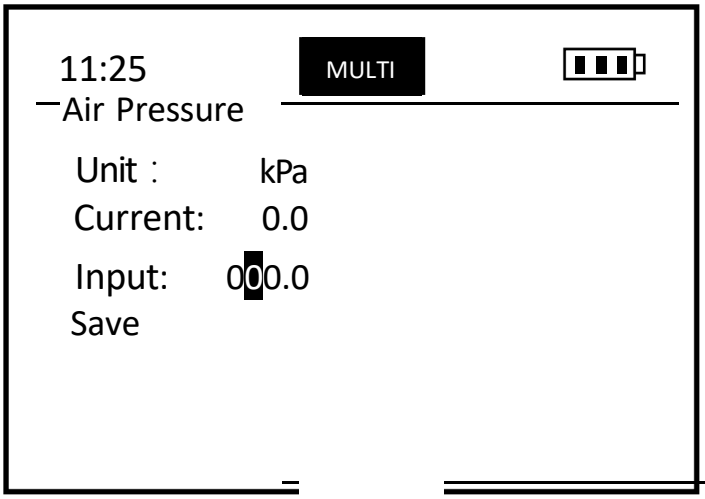
Auto Power, there are four mode:

OFF indicates the power supply is normally open,

When set to 5 min , 10 min, 15 min, the instrument will shut off after 5 minutes, 10 minutes, 15 minutes of no operation.

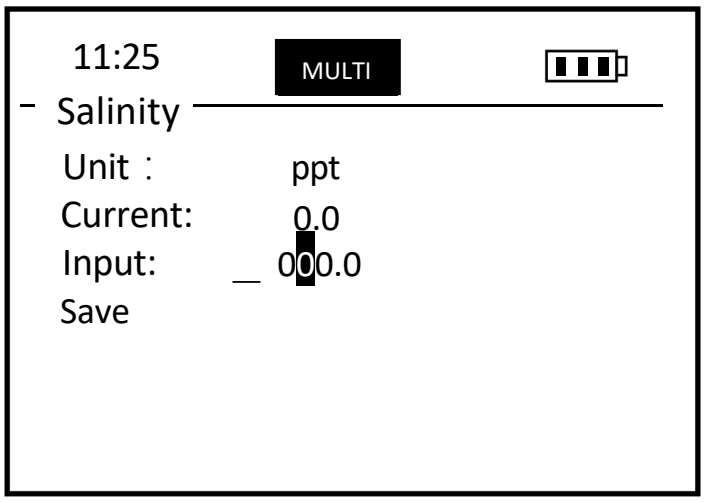
Use the "▲▽" keys to select the mode, and the "↙"key to accept. The instrument use 5 minutes by default.

3.4.2 Menu →System →Air Pressure



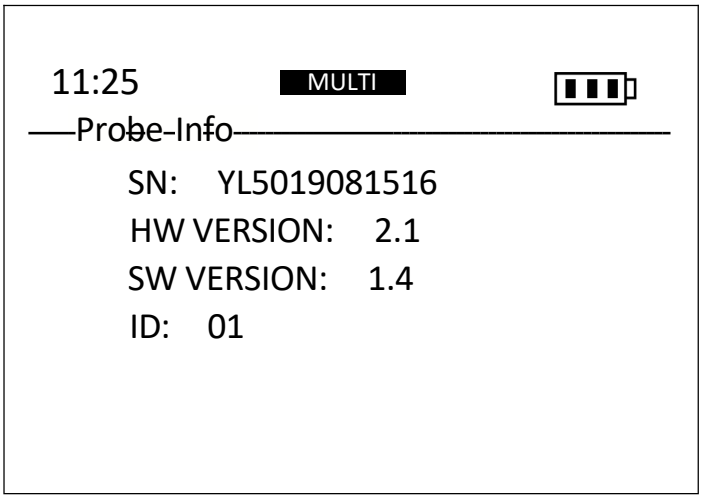
Air Pressure menu can do Air calibration in kPa as it will effect DO value. Current indicates measured air pressure. Standard indicates the desired pressure that to be calibrated. Make adjustments with the ▲ or ▼ arrow keys and the "↙" key to move on to next value. Select Save and press the "↙" key to accept.

3.4.3 Menu →System →Salinity



Salinity menu can setup salinity value. The DO value will increase as salinity decreases. The instrument can compensate for the deviation. Make adjustments with the ▲or ▽keys and then press the "↙" key to turn to next data. Select Save and press the "↙" key to accept desired salinity. The default value is 0 ppt. Generally, the fresh water is 0-0.5ppt, and the sea water is 35ppt.
If Salinity sensor exits, the setup will be failed.

3.4.4 Menu →System →Probe Info



Probe Info

This menu includes 4 sensors option. Select highlight sensor can check information of sensor including SN, HW version, SW version, Modbus ID.

Meter Info

This menu can check information of the instrument including SN, HW version, SW version.

3.5 Menu →Calibration

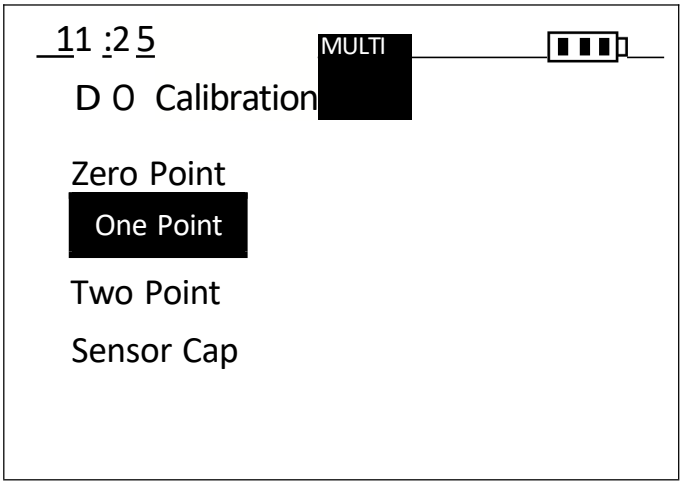
Under Menu->Calibration, chose a sensor and press the "↙" key to enter the calibration interface.

In the measurement interface, select a sensor and press the "Cal" key can also switch to the calibration interface.

Note
Please do not unplug the sensor during the entire calibration process.

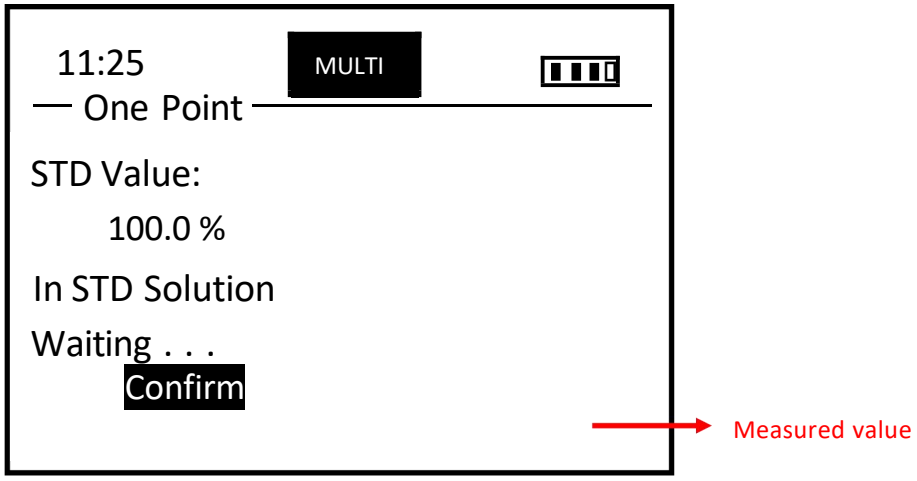
3.5.1 Menu →Calibration →DO

The instrument supports both single-point and two-points user calibration for DO sensor. There is no Zero calibration here. **Note: Before calibration, please move protect cap with damped sponge from the sensor cap of DO and make sure the sensor has connected to the instrument.**



（1）One-Point calibration

① **"STD Value":** The concentration values of standard solutions can be customized. **Normally 100%SAT DO is chosen for single-point calibration.** Make adjustments with the ▲or▼keys and then press the " ↙" key to turn to next data.



② **"In STD Solution"** : Press the " ↙" key under "Click Enter" to step to" In STD Solution". Put the DO sensor into the standard solution you choose. The measured value in % unit will display on the bottom of screen. Wait for few minutes to stabilize the data, as shown in the figure.

③**"Confirm"**: After the data is stabled, press the " ↙" key under "Confirm". And the instrument will calculate the slope. The prompt "success" or "fail" indicates calibration result. Press the " ↙" key under "Cali Done!" to exit the calibration.

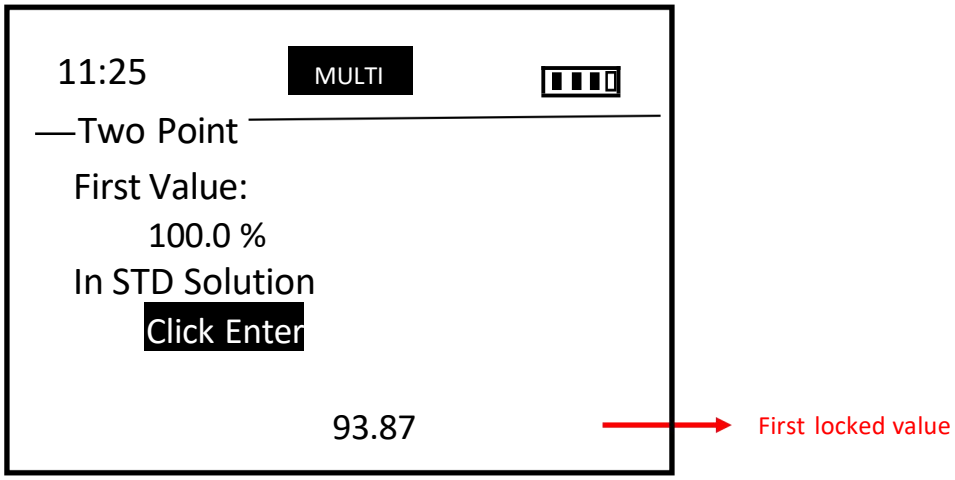
（2）Two-points calibration

① First performed 100% SAT calibration, the procedure is similar to single-point calibration. Then press the "↙" key under "Click Enter" to start second calibration, as shown in the figure.

② Follow the instructions: "STD Value"->" In STD Solution"->" Confirm". After enter the second

needed value, put the sensor into the standard solution. Press the "↙" key after the data is stabled. The prompt "success" or "fail" indicates calibration result.

We strongly recommend to use 100%SAT DO as first standard value and 0%SAT DO as second standard value.



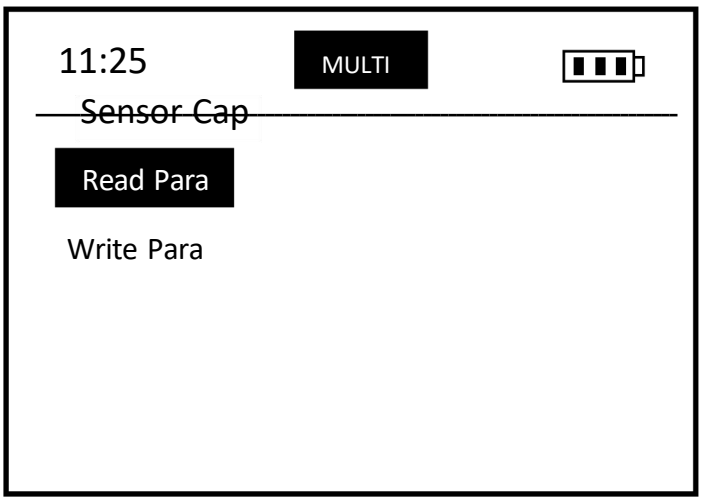
0% SAT DO calibration solution: take anhydrous sodium sulfite (Na2SO3) to a beaker, add 200ml of tap water or pure water, and stir until dissolved or even precipitates crystals.

100% SAT DO calibration solution: Aerate the water with an oxygen pump and continue 15 minutes. Then can get air saturated water solution.

* The air can be considered as saturated oxygen environment if the condition is not allowed.

（3）Sensor Cap

To update the sensor cap, you need to input correct coefficients specific to the sensor cap. There are K0 to K7 total 8 parameters.

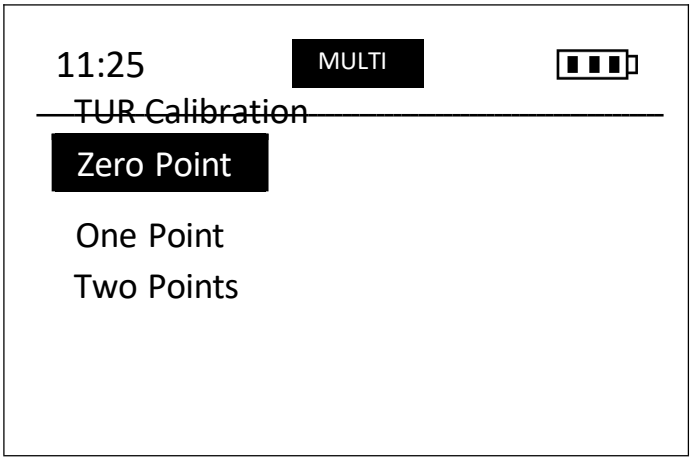


Select **Read Para** and press the "↙" key to switch to read sensor cap parameters interface. These consist of K0-K7 8 parameters.

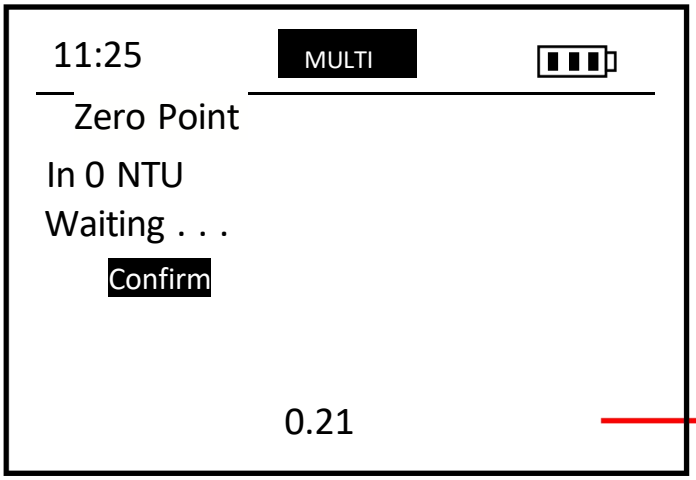
To change the value, highlight the **Write Para** option and press the "↙" key. Make adjustments with the ▲ or ▲ keys and then press the "↙" key to move on to next data. Select Save and press the "↙" key to accept all new coefficients.

3.5.2 Menu →Calibration →Turbidity

The instrument supports zero-point, single-point and two-points user calibration for Turbidity sensor.



（1）Zero-point Calibration



①“**In 0 NTU**”:First put turbidity sensor into 0 NTU standard solution (Normally used distilled water or DI water). The measured value in NTU unit will display on the bottom of screen. Wait for few minutes to stabilize the data.

②**“Confirm”**:After the data is stabled, press the “↙” key under “Confirm”. The prompt "success" or "fail" indicates calibration result. Press the “↙” key under "Cali Done!" to exit the calibration.

（2）One-Point calibration

Follow the instructions: “STD Value”->“In STD Solution”->“Confirm”. After enter needed value, put the sensor into standard calibration solution. The same as DO, see 3.5.1. **We strongly recommend not using 0NTU solution for single-point calibration.**

（3） Two-points calibration

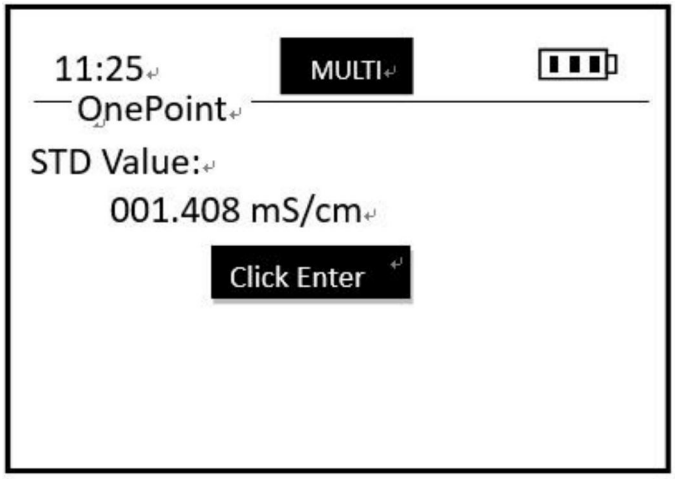
Follow the instructions: “STD Value”->“ In STD Solution ”->“ Confirm” to perform first calibration. Then press “ ↙” key under “Click Enter” to start second calibration. The same as DO, see 3.5.1.

3.5.3 Menu →Calibration →Conductivity

The instrument supports One-Point or Two-Point calibration for conductivity sensor.

1.4083mS/cm standard calibration solution is recommended for low range sensor;

12.852mS/cm standard calibration solution is recommended for high range sensor.



（1） One-Point calibration

Follow the instructions: “STD Value”->“ In STD Solution ”->“ Confirm”. Enter the needed calibration value as show in the figure. Press the “ ↙” key under “Click Enter” to step to“ In STD Solution”. Put the sensor into the standard solution you choose. The measured value in mS/cm unit will display on the bottom of screen. Wait for few minutes to stabilize the data, then press the “ ↙” key to finish calibration. The same as DO, see 3.5.1. **We strongly recommend not using 0mS/cm solution for single-point calibration.**

（2） Two-points calibration

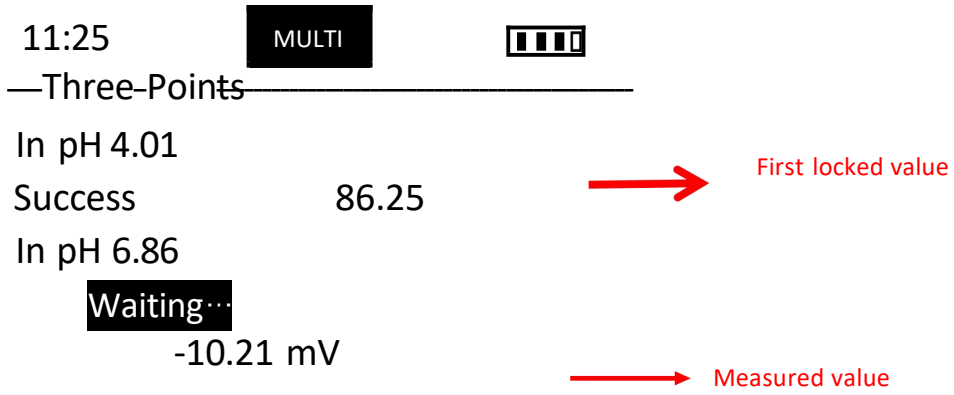
Follow the instructions: “STD Value”->“ In STD Solution ”->“ Confirm” to perform first calibration. Then press “ ↙” key under “Click Enter” to start second calibration. The same as DO, see 3.5.1.

3.5.4 Menu →Calibration →pH

Standard three point calibration at pH4.01, pH6.86, and pH9.18 is required for pH sensor.

Three-points calibration

Follow the screen instruction from pH4.01 calibration solution, to pH6.86, then pH9.18. Please make sure the reading is stable before accepting the data and move on to the next. The prompt "success" or "fail" indicates calibration result. Press the "↙" key under "Cali Done!" to exit the calibration.



3.5.5 Menu→Calibration→Chlorophyll

The instrument supports zero-point, one-point and two-points user calibration for chlorophyll sensor.

（1）Zero-point calibration

Follow the prompts: "In 0 ug/L" - >;"Confirm", place the probe into the chlorophyll standard liquid of 0ug/L, wait for the data to stabilize and press the key "↙" to complete calibration. The process is the same as the zero point calibration of 3.5.2.

（2）One-Point calibration

Follow the instructions: "STD Value"->"In STD Solution"->"Confirm". After enter needed value, put the sensor into standard calibration solution. The same as DO, see 3.5.1. **We strongly recommend not using 0ug/L solution for single-point calibration.** The measured value in μg/L unit will display on the bottom of screen.

（3）Two-points calibration

Follow the instructions: "STD Value"->"In STD Solution"->"Confirm" to perform first calibration. Then press "↙" key under "Click Enter" to start second calibration. The same as DO, see 3.5.1.

Note: The calibration unit of chlorophyll is μg/L. If the Rhodamine WT standard solution is

used for calibration, it is necessary to look up the table for conversion.

2mg/L Rhodamine WT solution-temperature-chlorophyll correspondence table

temperatur (℃)	30	28	26	24	22	20	18	16
chlorophyll (μg/L)	176.7	186.9	194.5	204.9	214.2	227.1	240.5	249.3

3.5.6 Menu→Calibration→BGA

The instrument supports two-points user calibration for BGA sensor.

Two-points calibration

Follow the instructions: "STD Value"->" In STD Solution"->" Confirm" to perform first calibration. Then press "↙" key under "Click Enter" to start second calibration. The same as DO, see 3.5.1. The measured value in cells/mL unit will display on the bottom of screen.

3.5.7 Menu→Calibration→OIW

The instrument supports zero-point, one-point and two-points user calibration for OIW sensor.

（1）Zero-point calibration

Follow the prompt: "In 0 ppm" - >;"Confirm", place the probe into the water oil standard liquid at 0 ppm, wait for the data to stabilize and press the key "↙" to complete calibration. The process is the same as the zero point calibration of 3.5.2.

（2）One-Point calibration

Follow the prompt: "STD Value" - >;"In STD Solution" - >;"Confirm", enter the calibration point, place the probe into the corresponding value of Oil in water standard liquid, wait for the data to stabilize and press the key "↙" to complete the calibration. The process is the same as that one-point calibration of 3.5.1. **One point calibration cannot be calibrated with a zero value.** The bottom of the screen will display the real-time measurement value, unit ppm.

（3）Two-points calibration

Click the prompt "STD Value" - >;"In STD Solution" - >;"Confirm", Enter the first calibration point to calibrate. When completed, press the key "↙" to Enter the second point for calibration. The process is the same as that two-points calibration of 3.5.1.

Note: this meter can identify two types of OIW probe, can automatically identify probe unit is ppb or ppm.

3.5.8 Menu→Calibration→ORP

The instrument supports one-point user calibration for ORP sensor.

One-Point calibration

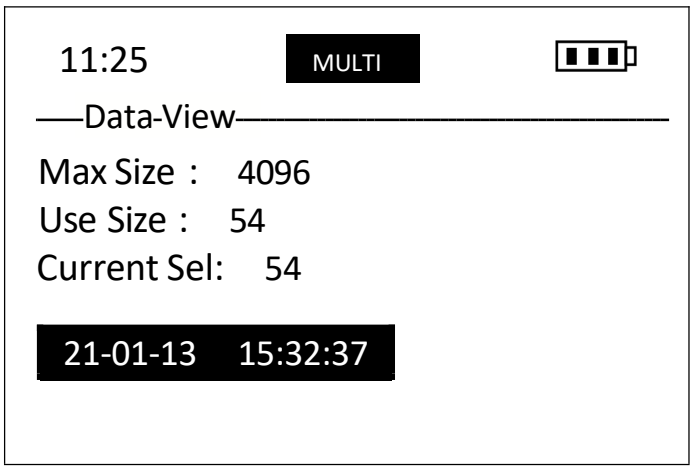
Follow the prompt: "STD Value" - >;" In STD Solution" - >;"Confirm", enter the calibration point, place the probe into the corresponding value of ORP standard solution, wait for the data to stabilize and press the key " ↙ " to complete the calibration. The process is the same as that of point 3.5.1. **One point calibration cannot be calibrated with a zero value.**The bottom of the screen will display the real-time measurement value, unit mv.

3.6 Menu→Data Log

3.6.1 Menu→Data Log→Data Store

The handheld meter has 4096 measurements that can be logged to memory and can be programmed to store measurements in two logging formats. When set to **Data Log/Data Store/Store 1 Times**, the user samples start to be logged a time. The user can also press the combination key ''**Enter+**▽'' on the measurement screen to save a single time. Press **Data Log/Data Store/Store** to automatically save data, " ⧗ " appears to start recording data, select **Data Log/Data Store/Store** again," ⧗ "disappears. The storage interval is set in minutes in the **Data Log/Data Store/time**.

3.6.2 Menu→Data Log→Data View



Max Size

Indicates the numbers of measurements to be logged.

Use Size

Indicates the numbers of measurements have been logged.

Current Sel

Indicates the selected sample item that contains the data to be recalled. As shown in below picture, currently, the sample item 54 is read.

The stored measurements are named after date and time the samples were taken. For example, 21-01-13 15:32:37 means the sample item 54 is stored at 15:32:37 on January 13, 2021. Use the ▲or ▽keys to scroll through the other **Current Sel** and press the "↙" key to view all the measurement parameters.

3.6.3 Menu →Data Log →Data Delete

*Select Yes to delete all data. Please choose carefully.

3.7 Cal/Reset Cal

Note
Remember in measurement interface where press the "Cal" key to switch to calibration interface.

In measurement, choose a sensor and press the "**Cal**" key to switch to the calibration interface. Please see chapter 3.5 in detail.

Press and hold the "**Cal**" key can switch to the selected sensor factory Calibration recovery interface where restore k = 1, b =0.

Connecting to a Computer

The handheld meter comes with special software called MeterRead, which is designed to provide you access to data memory.

Open the software on your computer and connect the supplied computer interface USB cable to the handheld meter and to a computer USB port. Then the COM PORT can identify the port. Select the download data path and click Load. The file format is. CSV.

Note
The software cannot recognize the port only when the instrument in shut off state.

4 Maintenance

4.1 Instrument maintenance

The 600-A instrument require very little maintenance to keep it performing well. If the instrument case needs cleaning, wipe it off with a soft cloth. Please keep the battery compartment dry during using.

4.2 Sensor maintenance

4.2.1 DO Sensor

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
Clean the sensor	Every 30 days
Sensor and DO sensor cap inspection	Every 30 days
DO sensor cap replacement	Every year
Sensor user calibration	Every 3~6 months
Moisturizing DO membrane surface	Every 30 days to Keep DO sensor storage cap wet

（1） Maintenance Schedule:

① **Clean the sensor case：** Use clean water to wash the sensor case. Then gently wipe off with a lens cleaning tissue that has been moistened. For some stubborn dirt, please use gentle home dish cleaner and a soft brush.

② **Clean the sensor cap surface：** Please move protect cap from the sensor cap, rinse any fouling with clean water. Please gently wipe off with a lens cleaning tissue that has been moistened if necessary. Then install the protect cap. Do not scratch the DO membrane with nails or sharp objects. That will cause DO membrane damage and the sensor will not work permanent!

③ **Clean the sensor cap internal surface：** If water vapor or dust intrudes into the sensor cap, the cleaning steps are as follows:

✓ 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
- ✓ Dry up with lens cleaning tissue

④ **Store DO Sensor Cap：** Keep DO sensor storage cap wet to moisturize DO membrane surface. Store the sensor cap inside protect cap with a piece of damped sponge. Please take off the protect cap and keep it properly during use. Note: if the sponge is dry and lack of water, deionized water or purified water can be added for wetting; if DO membrane is kept in a dry state for a long time, it will lead to inaccurate measurement and greatly shorten the life of DO membrane.

⑤ **Inspect sensor cable：** The cable should not be tightened in use; otherwise there is a risk of breaking the wire. The sensor will not work normally;

⑥ **The sensor case is inspected for damage due to corrosion or other reasons.**

（2） DO Sensor Cap replacement

① Please turn off the power and unplug the sensor from the instrument before perform sensor cap replacement;

② 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.

③ Inspect the O-ring on the probe carefully. If damaged, replace it. Do not use tools to remove or install o-rings.

④ Ensure the O-ring installed is clean.

⑤ Hold the sensor by one hand, and install the new sensor cap clockwise using the other hand. And dry the inside surface with clean tissue. DO NOT USE ANY TOOLS.

⑥ After replaced, set the new characteristic parameters that came with the product to the instrument. Please see chapter 3.5.1 in detail.

Note
Do not touch the DO membrane with hand. Do not apply any mechanical stress directly to the DO membrane (pressure, scratches, etc.)

4.2.2 Turbidity maintenance

Maintenance	Frequency Recommended
Sensor clean up	According to use environment
Sensor user calibration	Regular 1 or 2 point calibration

Maintenance Schedule:

① **Clean the sensor case**： The same as DO.

② **Outer surface:** wash with tap water, for some stubborn dirt, can use the traditional detergent and soft cloth to clean.

③ **Inspect sensor cable:** The same as DO.

④ **The sensor case is inspected for damage due to corrosion or other reasons.**

4.2.3 Conductivity（Salinity） maintenance

Maintenance	Frequency Recommended
Sensor clean up	Every 30 days
Sensor user calibration	Regular 1 or 2 point calibration

Maintenance Schedule:

① **Clean the sensor case：** The same as DO.

② **Inlet and outlet hole of sensor:** use a cotton swab or a soft cloth to wipe, for some stubborn dirt, can be added to the water in the washing liquid to wash.

③ **Inspect sensor cable:** The same as DO.

④ **The sensor case is inspected for damage due to corrosion or other reasons.**

4.2.4 pH maintenance

Maintenance	Frequency Recommended
Sensor user calibration	Calibration every 30 days
Electrode replacement	According to the warranty period and application environment

Maintenance Schedule:

① **Clean the sensor case：** The same as DO. Pay attention to the electrode ball bubble, avoid breaking!

② **Inspect sensor cable:** The same as DO.

③ Regular electrode maintenance requires that an electrode be stored in the recommended storage solution between measurements, and that the electrolyte solution be refilled as necessary. 3M KCl solution is recommended as the proper storage solution.

Important: Probe contains sensitive optical components and electronic components. Ensure that the probe stays away from potential mechanical impact. Any damage caused by misuse is not coved by warranty.

5 Common Errors and Trouble Shooting

Table 5-1 lists the symptoms, possible causes, and recommended solutions for common problems encountered with the handheld meter. If your symptom is not listed, or if none of the solutions solves your problem, please contact us.

Symptom	Possible Causes	Corrective Action
No data displayed on Instrument(if sensor are connected)	Connection Issue	Reconnect sensor to the instrument
	No batteries or batteries are low of handheld meter	Directly charge by using USB cable provided with or remove the rechargeable batteries to charge.
	Batteries are low of multi-parameter sensor	Replace batteries for the sensor
	Cable problem	Contact our company's Customer Service
Unstable values (Too high or too low)	Bubble or dirty attached to the sensor measured surface	Clean sensor measured surface or agitate the sensor to eliminate air bubbles
	Bad sensor cap or pH electrode or other consumables	Check and replace
	No regular calibration	Do calibration in time
A red signal shows on top of multi-parameter sensor	Batteries are low of multi-parameter sensor	Replace batteries for the sensor
A “ovf” flash in the measurement interface	Salinity sensor is exposed to the air	Insert salinity sensor into solution
	Other sensor, bad data	First reset user calibration. If not work, please contact our company's Customer Service

Table 5-1 Troubleshooting

6 Warranty Description

(1) The warranty period is 1 year（Except for consumables）.

(2) This quality assurance does not cover the following cases.

① Due to force majeure, natural disasters, social unrest, war (declared or undeclared), terrorism, the War or damage caused by any governmental compulsion.

②damage caused by misuse, negligence, accident or improper application and installation.

③ Freight charges for shipping the goods back to our company

④ Freight charges for expedited or express shipping of parts or products covered by the warranty.

⑤ Travel to perform warranty repairs locally.

(3) This warranty includes the entire contents of the warranty provided by our company with respect to its products.

①This warranty constitutes a final, complete and exclusive statement of the terms of the warranty, and no person or the agent is authorized to establish other warranties in the name of our company.

②The remedies of repair, replacement, or return of payment as described above are exceptional cases that do not violate this warranty, and the remedies of replacement or return of payment are for our products themselves. Based on strict liability or other legal theory, our company shall not be liable for any other damage caused by a defective product or by negligent operation, including any subsequent damage that is causally related to these conditions.