SZ600-A
Multifunctional handheld meter
User Manual

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Preface

Dear customer：

Thank you for our company's instrument purchase. 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 company's 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

Multifunctional handheld meter provides keyboard and backlight with comprehensive functions, simple operation and brief interface. The instrument is a portable device that can automatically recognize our company's digital sensors including optical DO, 4-electronic conductivity(salinity), turbidity, chlorophyll, BGA, OIW and TSS ,and can measure, display, log. The microprocessor based meter can transmit USB signals and perform sensor calibration easily on a single platform.

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 our company 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



1.2 Technical Specification

Instrument	
Size	220x96x44mm
Weight	460g （ Includes batteries)
Power	Two 18650 rechargeable batteries
Temperature	- 5℃~50℃
Display	54.38x54.38, LCD back illuminated
Data Storage	Support
Pressure Compensation	Built-in, auto compensation in 50-115kPa
Salinity Compensation	Automatic compensation (compensation range 0-80ppt)
IP Rating	IP67
Sensor Interface	Supports RS-485, MODBUS protocol
Cable Length	5m standard, Custom length available
Warranty Time	One year

Probe Specifications					
DO	Interface	RS-485, MODBUS	TUR	Interface	RS-485, MODBUS
	Principle	Fluorimetry		Principle	90° diffuse light
	Range	0-20mg/Lor0-200%		Range	0.1-1000NTU
	Accuracy	±1%		Accurac	±5%
	Size	Φ26mm*175mm		Size	Φ22mm*175.5mm
CT (SAL)	Interface	RS-485, MODBUS	OIW	Interface	RS-485, MODBUS
	Principle	Four-electrode		Principle	Fluorimetry
	CT Range	0-200mS/cm (0-2mS/cm、2-20mS/cm、20-200mS/cm)		Range	0-150ppm
	SAL Range	0-175ppt		Linearity	R^2>0.999
	TDS Range	0-128000mg/L		Size	Φ22mm*175.5mm
pH	Interface	RS-485, MODBUS	ORP	Interface	RS-485, MODBUS
	Principle	Glass electrode method		Principle	Platinum electrode method
	Range	0-14 pH		Range	-1999-1999mV
	Accuracy	±0.02 pH		Accurac	±20mV

	Size	Φ28mm*194mm(without cap)		Size	Φ28mm*194mm
CHL	Interface	RS-485, MODBUS	BGA	Interface	RS-485, MODBUS
	Principle	Fluorimetry		Principle	Fluorimetry
	Range	0-500μg/L		Range	0-300000cells/mL
	Accuracy	±5%		Linearity	R^2>0.999
	Size	Φ22mm*175.5mm		Size	Φ22mm*175.5mm
COD	Interface	RS-485, MODBUS	NH4-N	Interface	RS-485, MODBUS
	Principle	Ultraviolet absorption		Principle	Ionization electrode method
	Range	0-500mg/L or 0-1500mg/L		Range	0-100mg/L or 0-1000mg/L
	Accuracy	±5%		Accurac	±10%
	Size	Φ50mm*179mm		Size	Φ36mm*265mm（With cap）
TSS	Interface	RS-485, MODBUS	CDOM	Interface	RS-485, MODBUS
	Principle	Transmitted-light method		Principle	Fluorimetry
	Range	0-4000mg/L or 0-15000mg/L		Range	0-400ppb
	Accuracy	±5%		Linearity	R^2>0.999
	Size	Φ36mm*198.2mm		Size	Φ45mm*190.8mm
TRANS	Interface	RS-485, MODBUS	COLOR	Interface	RS-485, MODBUS
	Principle	Transmitted-light method		Principle	Absorption principle
	Range	0-500cm		Range	0-500Hazen
	Accuracy	±5%		Linearity	R^2>0.999
	Size	Φ50mm*211.5mm		Size	Φ46mm*189.5mm

Explanation of nouns

DO	Dissolved Oxygen Sensor	**TUR**	Turbidity Sensor
CT(SAL)	Conductivity (Salinity) Sensor	**OIW**	Oil in Water Sensor
pH	pH Sensor	**ORP**	ORP Sensor
CHL	Chlorophyll Sensor	**BGA**	Blue Green Algae Sensor
COD	COD Sensor	**NH4-N**	NH4-N Ammonium Sensor
TSS	Suspension Sensor	**CDOM**	Colored Dissolved Organic Matter
TRANS	Transparency Sensor	**COLOR**	Color Sensor

2 Installation

2.1 Configuration table

Item	Number	Note
Instrument	1	
18650 rechargeable battery	2	3.7V
USB cable line	1	Type-C
Wristband	1	
Screwdriver	1	To open the battery compartment

Optional items	Description
Dissolved oxygen sensor	Dissolved oxygen sensor *1、cable*1、O-ring*1、Protect Cap（with Sponge）*1
Turbidity sensor	Turbidity sensor*1、cable*1
Conductivity(Salinity)sensor	Conductivity(Salinity) sensor*1、cable*1
pH sensor	pH sensor*1、cable*1
ORP sensor	ORP sensor*1、cable*1
Chlorophyll sensor	Chlorophyll sensor*1、cable*1
BGA sensor	BGA sensor*1、cable*1
TSS sensor	TSS sensor*1、cable*1
OIW sensor	OIW sensor*1、cable*1
OIW sensor	OIW sensor*1、cable*1
COD sensor	COD sensor*1、cable*1、Cleaning brush set*1
BOD sensor	BOD sensor*1、cable*1、Cleaning brush set*1
NH4-N sensor	NH4-N sensor*1、cable*1
CDOM sensor	CDOM sensor*1、cable*1
Transparency sensor	Transparency Sensor*1、cable*1
Color sensor	Color Sensor*1、cable*1

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

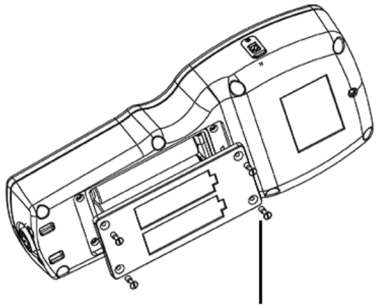
2.2 Installing the batteries

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

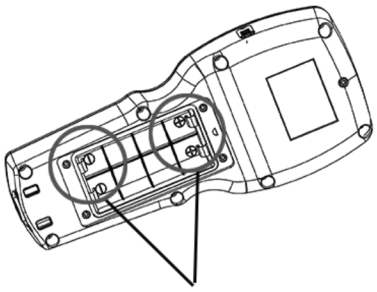
（1） Unscrew the screws on the battery compartment and open it. Note: The screw can't be taken off. That means the battery compartment cannot be opened until the screw can't be turned;

（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

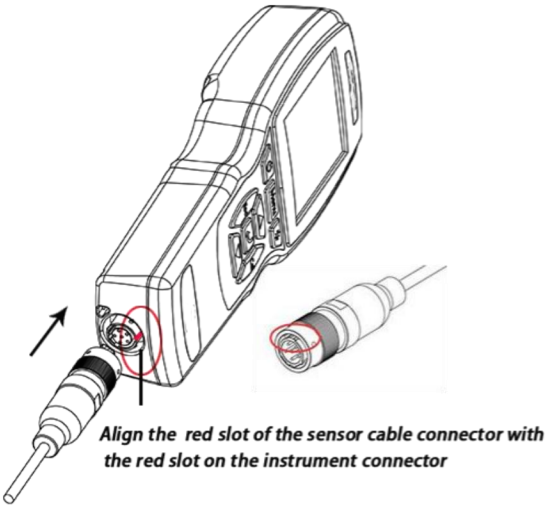


The positive and negative directions of the battery are the same, please install it correctly

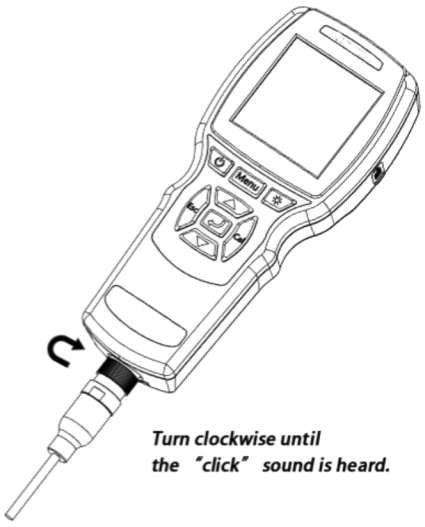
2.3 Installing the sensor

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：

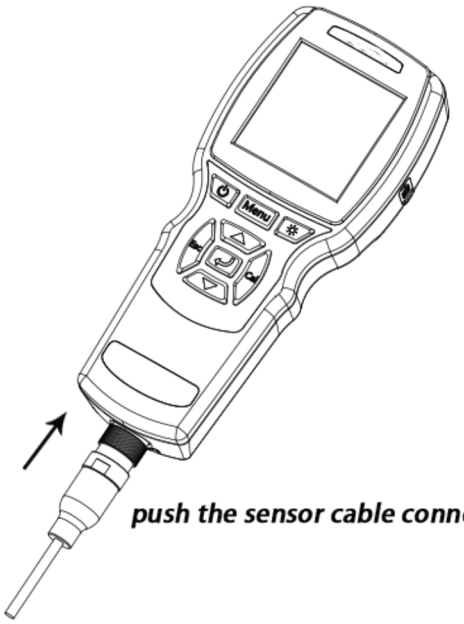


Align the red slot of the sensor cable connector with the red slot on the instrument connector



Turn clockwise until the "click" sound is heard.

Remove：



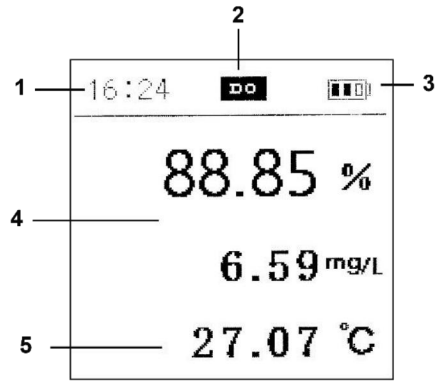
push the sensor cable connector



turn out anticlockwise

3 Operation

Press Boot button to turn handheld meter on. When there is no sensor, the measurement interface will display “No Signal!”. If the dissolved oxygen Sensor is connected, the display will show DO values as shown in the figure below.

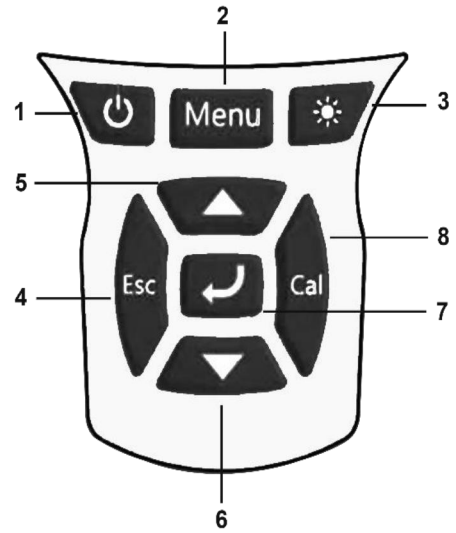


1	Time （min： sec）
2	Sensor Type (DO/CT/TUR/CHL/pH(ORP)/BGA/COD/OIW/NH4N/TSS /MULTI)
3	Battery indicator. If appears, charge the meter using USB cable provided with directly or rechargeable batteries removed from meter.
4	Sensor data
5	Temperature

Keypad Fouction

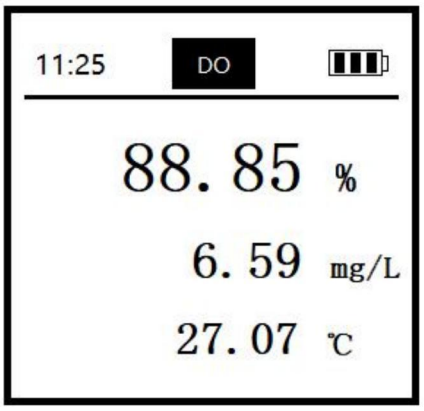
Short press： press and hold less than 2sec

Long press： press and hold more than 2sec

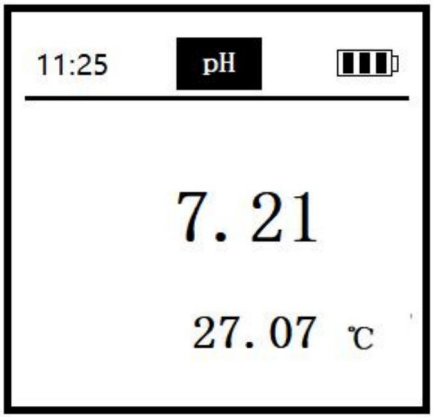


1		Short press	Turn handheld meter on
		Long press	Turn handheld meter off
2	Menu	Short press	Enter the menu screen
3		Short press	Turn the backlight on and off
4	Esc	Short press	Exit settings； Return to previous interface
5		Short press	Scroll up menu selection Increase figure
6		Short press	Scroll down menu selection Decrease figure
7		Short press	Accept a menu selection Accept setting and values
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

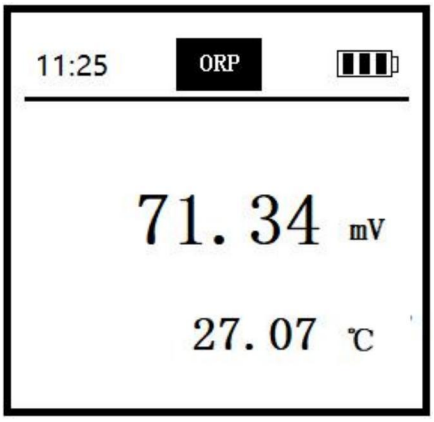
3.1 The main interface



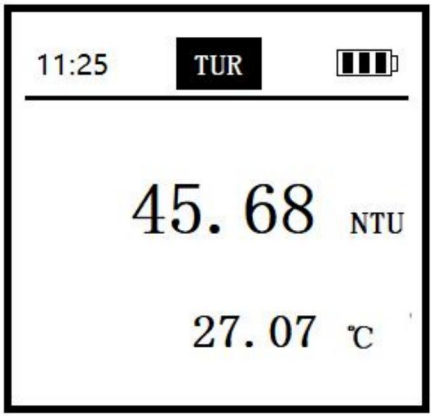
Dissolved oxygen interface: including dissolved oxygen percentage, dissolved oxygen mg/L and temperature ℃.



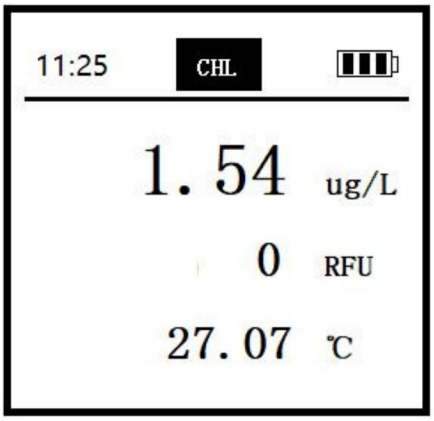
PH interface: including pH and temperature ℃.



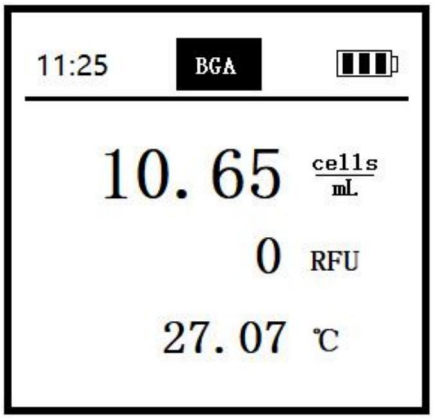
ORP interface: including ORP mV and temperature ℃.



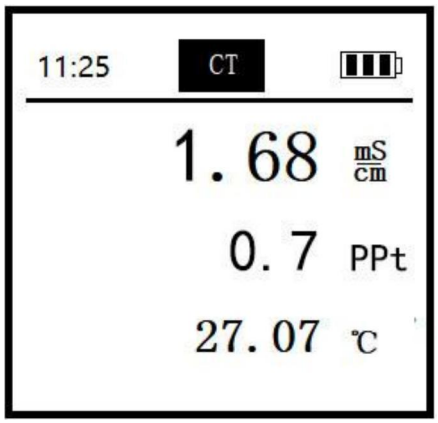
Turbidity interface: including turbidity NTU and temperature ℃.



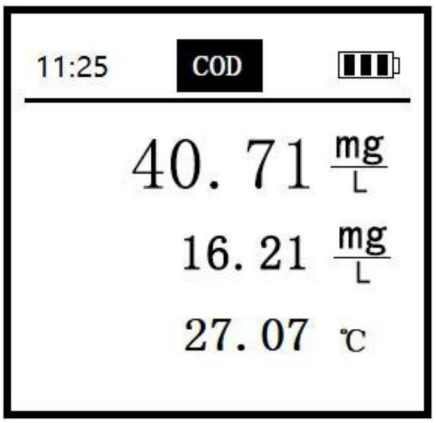
Chlorophyll interface: Includes chlorophyll ug/L, RFU(relative fluorescence unit) and temperature ℃.



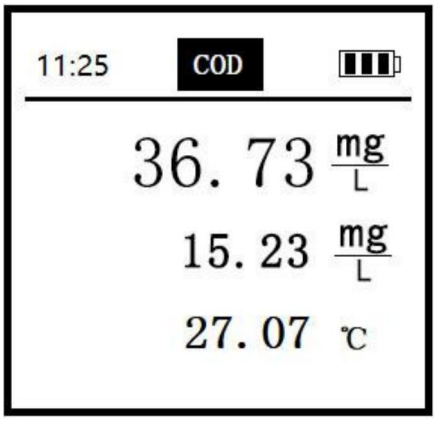
BGA interface: including BGA cells/mL, RFU(relative fluorescence unit) and temperature ℃.



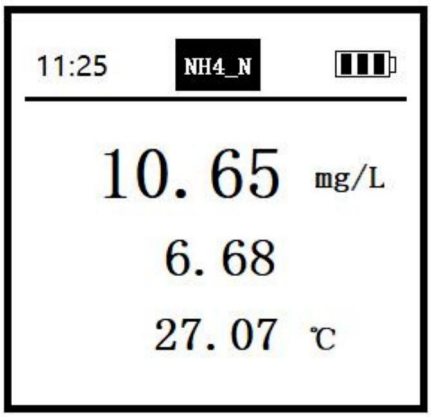
CT interface: including conductivity mS/cm、Salinity PPT(check the salinity of the system interface) and temperature ℃.



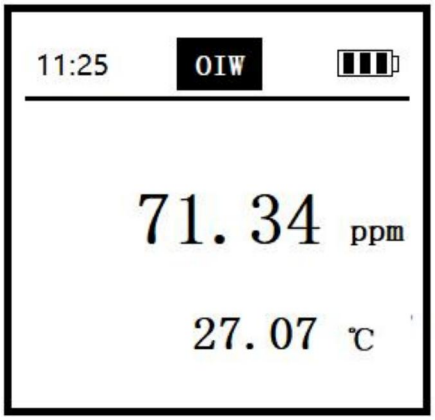
COD interface: including COD mg/L 、TOC mg/L and temperature ℃.



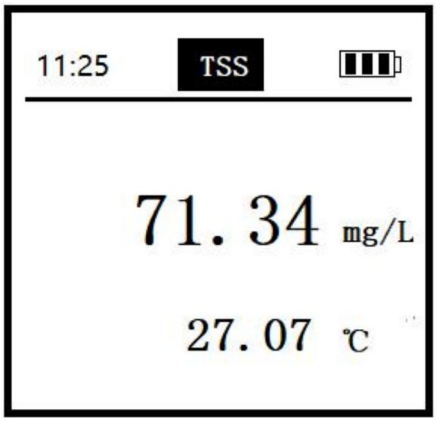
COD interface: including COD mg/L、BOD mg/L and temperature ℃.



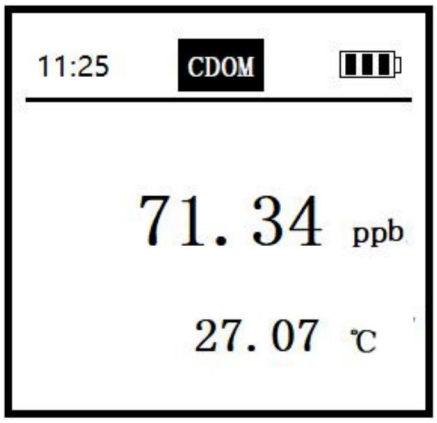
NH4-N interface: including ammonia nitrogen mg/L, pH and temperature ℃.



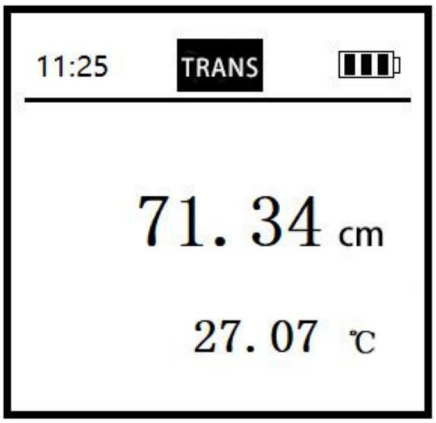
Water oil interface: including water oil PPM and temperature ℃.The oil unit in the water will indicate PPM or PPB depending on the actual probe type.



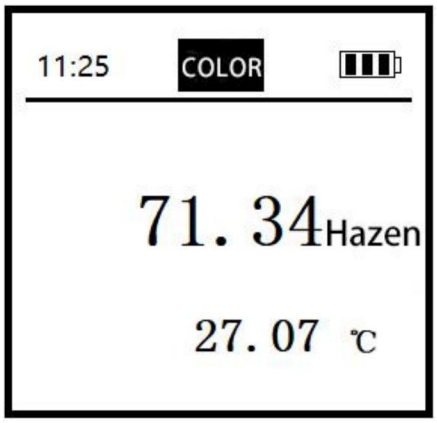
TSS interface: including TSS mg/L and temperature ℃.



CDOM interface: including CDOM ppb and temperature ℃.

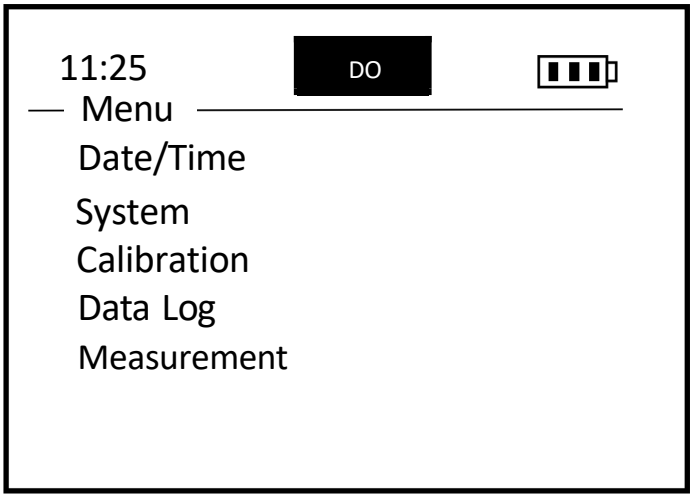


TRANS interface: including TRANS cm and temperature ℃.



Color interface: including COLOR Hazen and temperature ℃.

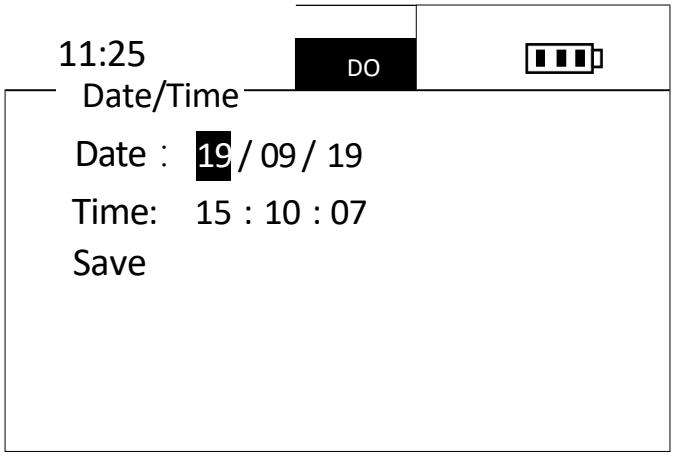
3.2 Menu



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



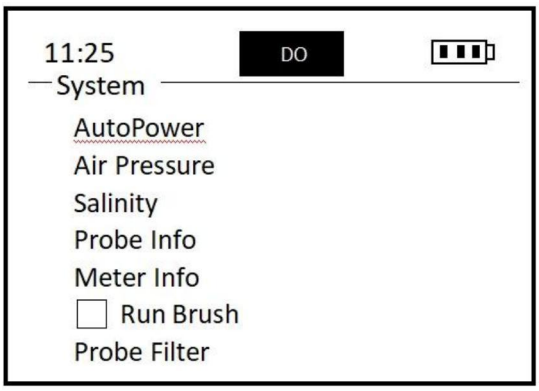
Date/Time

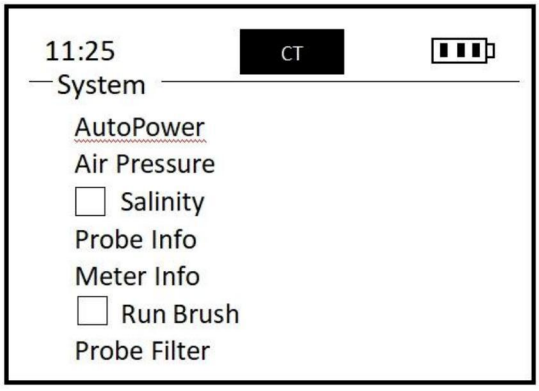
Date/Time menu is where you can setup date and time. Use the ▲or ▽keys to scroll through the highlight data, and then press the "↙" key to move on to next data. Select **Save** and press the "↙" key to accept desired Data/Time. Then will shows "Save Success!".

3.4 Menu→System

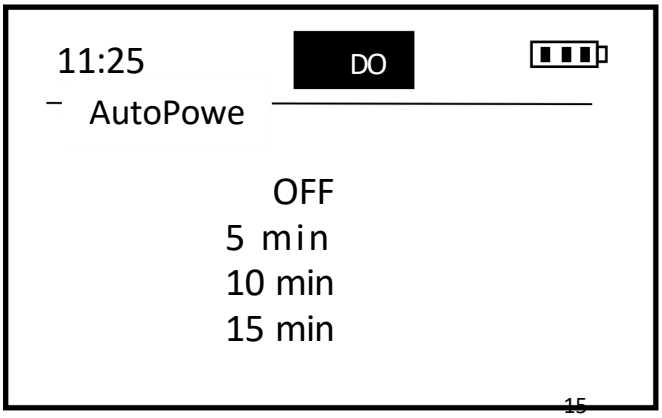
System

System menu is where you can enquire and setup all parameters. These include Auto Power, Air Pressure, Salinity, Probe Info, and Meter Info. To switch to a menu item, use the "▲▽" keys to select an option, and the "↙"key to accept. (**Note:** the salinity of the system interface of the conductivity probe is optional, if it is checked, the measurement interface displays salinity, and if it is unchecked, the measurement interface displays tds)





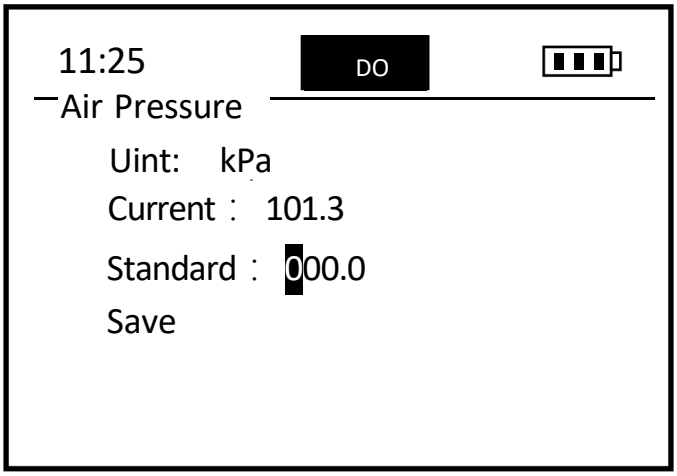
3.4.1 Menu→System→AutoPower



AutoPower

In 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.

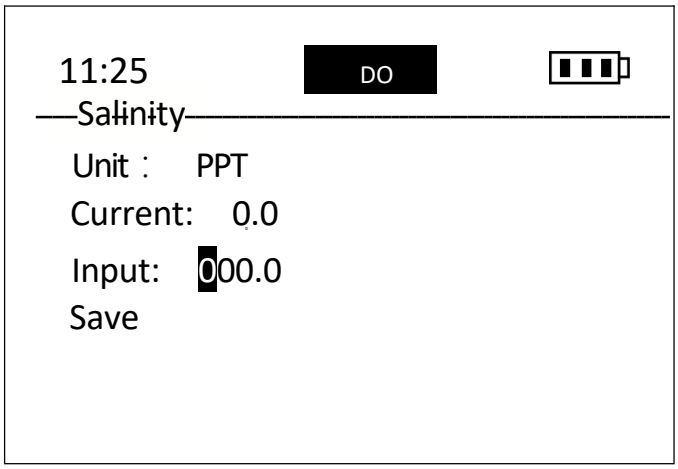
3.4.2 Menu →System →Air Pressure



Air Pressure

This 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

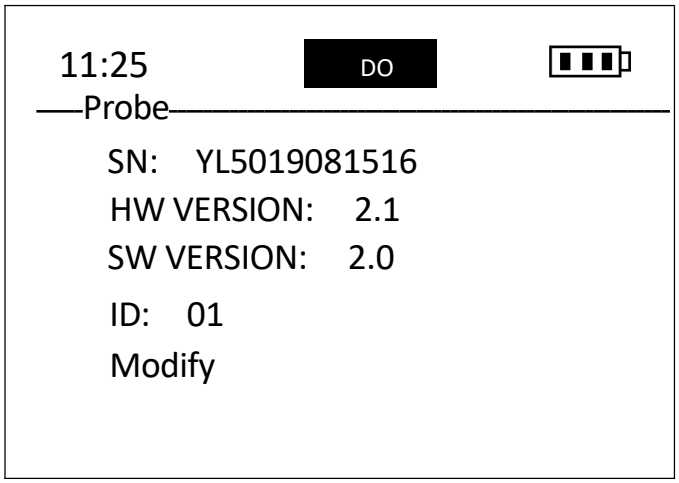


Salinity

This menu can setup salinity value. The amount of DO increases as salinity level decreases.

The instrument can compensate for the deviation of DO value caused by salinity. 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.

3.4.4 Menu →System →Probe Info



Probe Info

This menu can check information of sensor including SN, HW version, SW version, Modbus ID. Modbus ID can change with the ▲or ▽keys. Select **Modify** and press the "↙" key to accept new ID address.

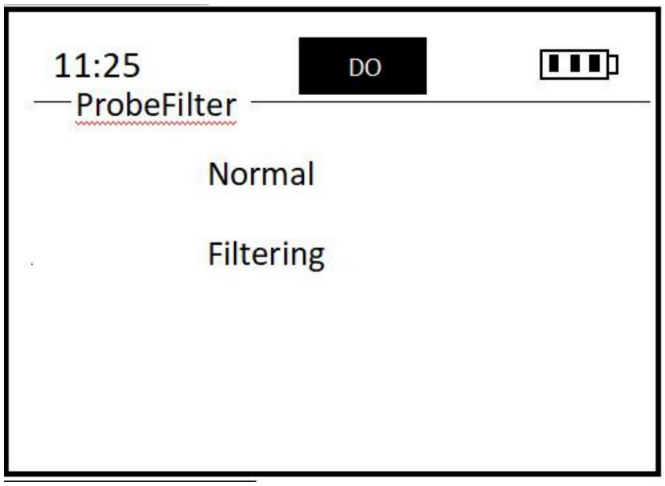
3.4.5 Menu →System →Meter Info

Menu can check information of the instrument including SN, HW version, SW version, grayscale.

3.4.6 Menu →System →Run Brush

Suitable for probes with brushes, open the brush once and clean the probe.

3.4.7 Menu →System →Probe Filter



Probe Filter

The dissolved oxygen probe selects the filter mode to increase the filtering process of the data.It can make the data of the probe smoother and suitable for some special environment.For example, in a wastewater treatment plant, the sensitivity of the relative data is reduced appropriately. The normal mode has no filtering process.

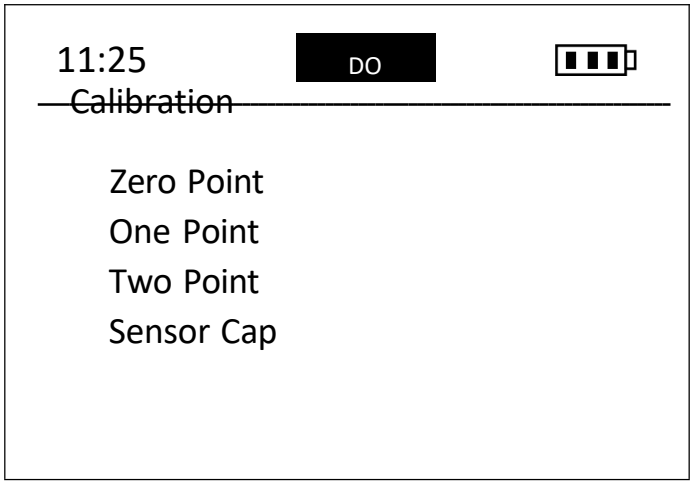
Currently the meter only supports dissolved oxygen probes.

3.5 Menu →Calibration

3.5.1 Menu →Calibration →DO

The instrument supports DO both one-point and two-points user calibration.

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.

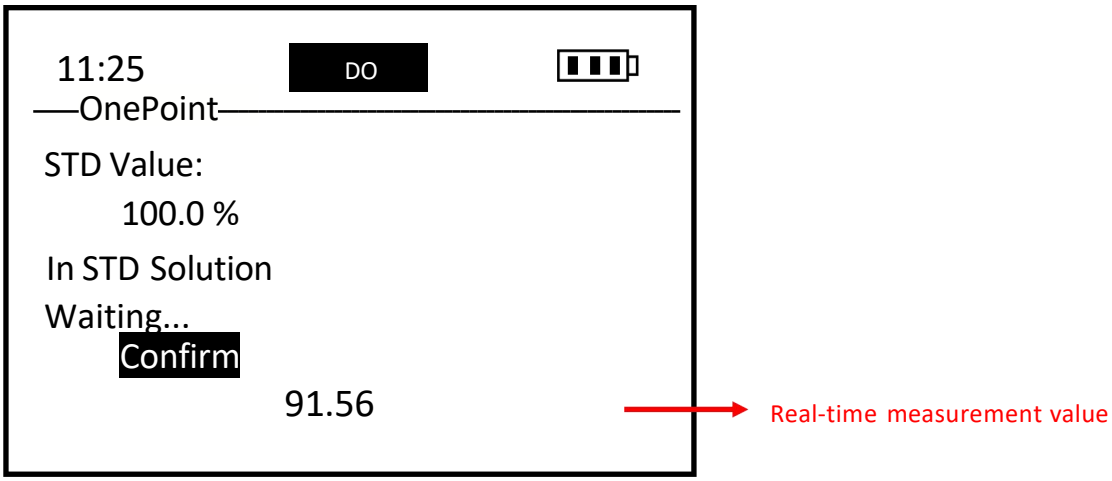


（1） One-point calibration

"STD Value" : input the target Value to be calibrated, one point calibration, it is recommended

to set the target Value of dissolved oxygen to be 100% SAT.

Press the ▲ key and the ▽ key to adjust the value, press the key " ↙" to automatically skip to the next value.



"In STD Solution": Select "Click Enter" and press the key "↙" In STD Solution "to the next step, which means that when the dissolved oxygen electrode is placed in the corresponding input dissolved oxygen environment, the real-time measurement value, in %, will be displayed at the bottom of the screen, waiting for the data to stabilize, as shown in the figure above.

"Confirm": When stable press the key "↙" under Confirm, the meter calculates the slope, and if it indicates "Success", the calibration is successful, if it fails, it indicates "Fail". After a successful "Cali Done! Press the key "↙"to exit the calibration .

（2）Two-points calibration

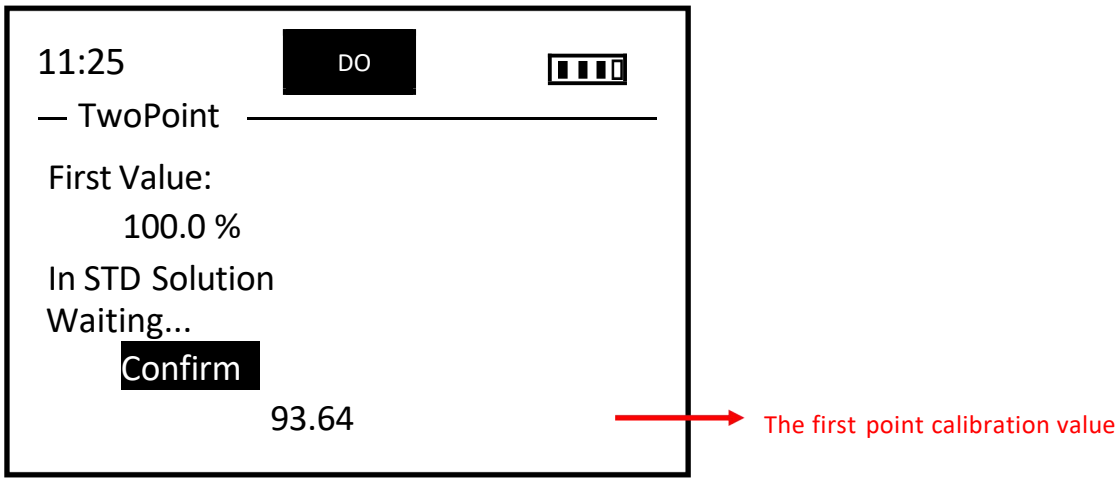
Enter the first calibration point for calibration, the process is the same as above. When completed, press "Click Enter" to press the key " ↙" for the second point calibration.

As shown in the figure below.

Still follow the tip: "STD Value" - >;" In STD Solution" - >;"Confirm", enter a second target value to be calibrated. Place the electrode in the standard liquid with the corresponding value, wait for the data to stabilize and press the key " ↙" to calculate the zero point and slope of the meter.

If the calibration is successful, it will indicate "Success", if it fails, it will indicate "Fail".

For the two-points calibration of dissolved oxygen, it is recommended to choose 100%SAT for the first point and 0%SAT for the second point.



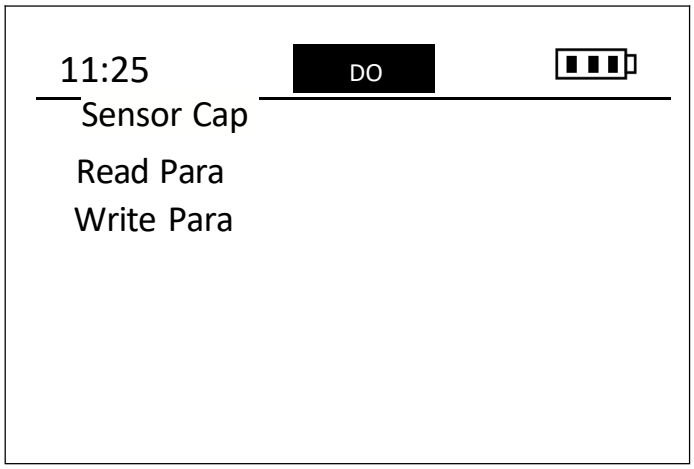
0%SAT DO calibration solution: take anhydrous sodium sulfite (Na2SO3) to a beaker, add 200ml of tap water or pure water, and stir until dissolved or even precipitates crystals.

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

When replacing the new cap, it is necessary to correctly input the characteristic parameters of the electrode cap, otherwise the measured data of the electrode will be inaccurate. There are 8 sets of parameters, K0-K7.

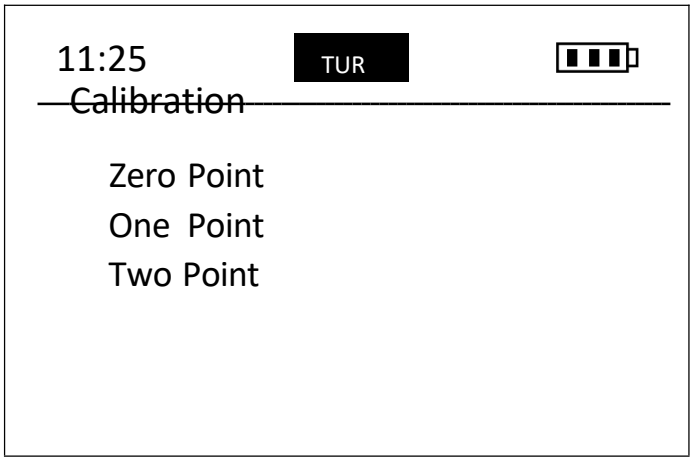


Select **Read Para** and press the key "↙" to enter the interface to Read the parameters of the fluorescent cap. At this point, 8 groups of data K0-K7 will appear.

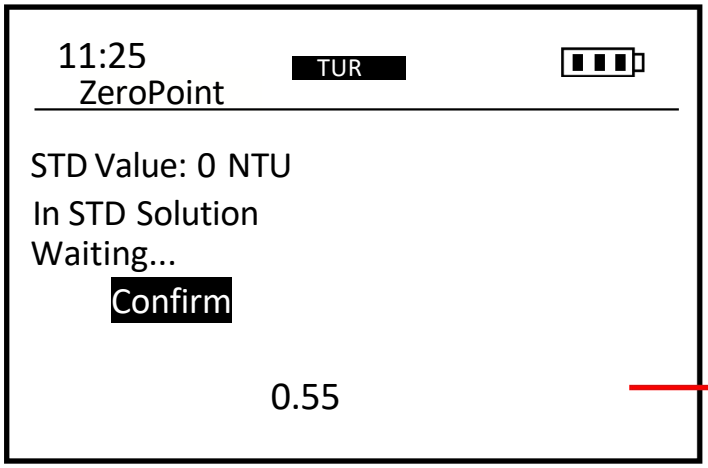
Select **Write Para** and press the key "↙" to enter the interface to Write the parameters of the fluorescent cap. At this point 8 groups of data K0-K7 will appear.Adjust each bit value by the ▲ key and the ▲ key, press the "↙" to automatically skip to the next value. When all the update is completed, select Save to press the "↙" button.

3.5.2 Menu →Calibration →Turbidity

Turbidity sensor support zero-point 、 one-point calibration and two-points calibration.



（1） Zero-point calibration



"**In 0 NTU**":Put the turbidity sensor into a standard solution of 0NTU (distilled water/deionized water can be substituted) as instructed. The real-time measurement value in unit NTU will be displayed at the bottom of the screen, and wait for the data to become stable.

"**Confirm**" :Press the "Confirm" button to complete the calibration. When "Confirm" is pressed to finish the calibration key, "Success" is pressed for calibration Success, if failure "Fail", when successful, "Cali Done!" is pressed. Press the key to exit the calibration key.

（2） One-point calibration

Follow the prompts: "STD Value" - >"In STD Solution" - >"Confirm", enter the calibration point, place the probe into the turbidity standard liquid with the corresponding concentration value, 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.**

（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 of 3.5.1 two-points calibration.

3.5.3 Menu→Calibration→Conductivity

Conductivity sensor support one-point and two-points calibration.

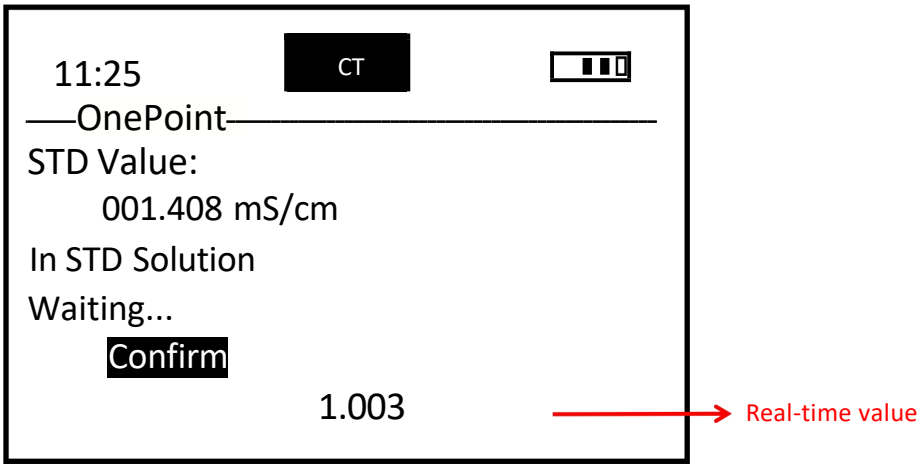
If it is a low range sensor, it is recommended to use a conductivity standard solution of 1.4083mS/cm for calibration. If it is a high range sensor, it is recommended to use a conductivity standard solution of 12.852mS/cm for calibration.

（1） One-point calibration

Follow the prompts: "STD Value" - >;"In STD Solution" - >;"Confirm", enter the calibration point as shown in the picture below.

Press "↙" under "Click Enter" to the next step "In Std Solution", place the probe into the standard liquid corresponding to the value, wait for the data to stabilize and press the key "↙" to complete calibration. The process is the same as that of point 3.5.1.

One point calibration cannot be calibrated with a zero value. Real-time measurements in mS/cm will be displayed at the bottom of the screen.



（2） 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 of 3.5.1.

3.5.4 Menu →Calibration →pH

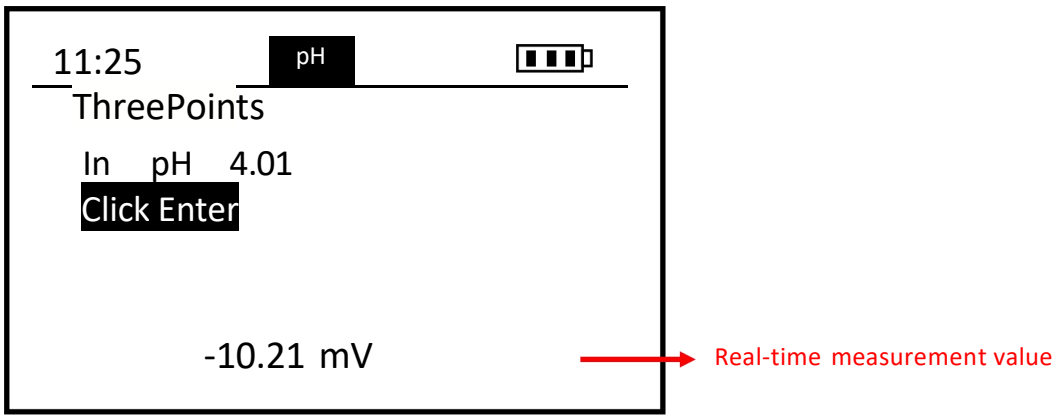
The pH sensor supports three-point calibration.

The standard liquid of the three calibration points should be fixed at 4.01, 6.86 and 9.18.

Three-points calibration

After selecting the three point calibration, press "Click Enter" to press the first calibration point to press the key 4.01 for the three-point calibration. After Waiting for data to stabilize, press "Waiting...". Then press "↙" to enter the second calibration point, press the probe into the second calibration mark liquid 6.86 and wait for stability, as shown in the figure below.

Stable, in "Waiting..." Then press the "↙" to enter the third calibration point, press the probe to the third standard liquid 9.18. When the data is stable, press the "↙" to complete calibration. If the calibration is successful, it will show SUCCESS; otherwise, it will show Fail!



3.5.5 Menu →Calibration →Chlorophyll

Chlorophyll sensor support one-point and two-points calibration.

（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 prompt: "STD Value" - >;"In STD Solution" - >;"Confirm", enter the calibration point, place the probe into the corresponding chlorophyll 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 ug/L.

（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 of 3.5.1.

Note:The chlorophyll calibration unit is μg/L. If Rhodamine WT solution is used for calibration, it is necessary to check 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

BGA sensor support two-points calibration.

Two-points calibration

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

Real-time measurements in cells/mL are displayed at the bottom of the screen.

3.5.7 Menu →Calibration →TSS

TSS sensor support one-point and two-points calibration.

（1）One-point calibration

Follow the prompt: "STD Value" - >;" In STD Solution" - >;"Confirm", enter the calibration point, place the probe into the corresponding value of Sludge concentration standard liquid, 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 mg/L.

（2）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 of 3.5.1.

3.5.8 Menu→Calibration→OIW

OIW sensor support zero-point、one-point calibration and two-points calibration.

（1）Zore-point calibration

Follow the prompt: "In 0 ppb/ppm" - >;"Confirm", place the probe into the water oil standard liquid at 0 ppb/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 ppb/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 of 3.5.1.

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

3.5.9 Menu→Calibration→COD

COD sensor support zero-point、one-point calibration and two-points calibration.

（1）Zore-point calibration

Follow the prompt: "In 0 mg/L" - >;"Confirm", place the probe into 0 mg/L COD standard solution, 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 COD 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 mg/L.

（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 of 3.5.1.

3.5.10 Menu →Calibration →NH4-N

NH4-N supports one point, two point calibration of NH4+ and three point calibration of pH.

（1） One-point calibration

Follow the prompt: "STD Value" - >;" In STD Solution" - >;"Confirm", enter the calibration point, place the probe into the corresponding value of NH4+ standard solution (mg/L), 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 of LG(NH4+) in mg/L.

（2） 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 of 3.5.1.

Note: The standard solution at two calibration points should have 10 times the gradient (e.g., 10mg/L, 100mg/L).

（3） PH calibration

Same as the 3.5.4 pH calibration.

3.5.11 Menu →Calibration →CDOM

CDOM sensor support one-point and two-point calibration.

（1） One-point calibration

Follow the prompt: "STD Value" - >;" In STD Solution" - >;"Confirm", enter the calibration point, place the probe into the corresponding value of CDOM 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 ppb.

（2） 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 of 3.5.1.

3.5.12 Menu→Calibration→ORP

ORP sensor support one-point calibration.

One-point calibration

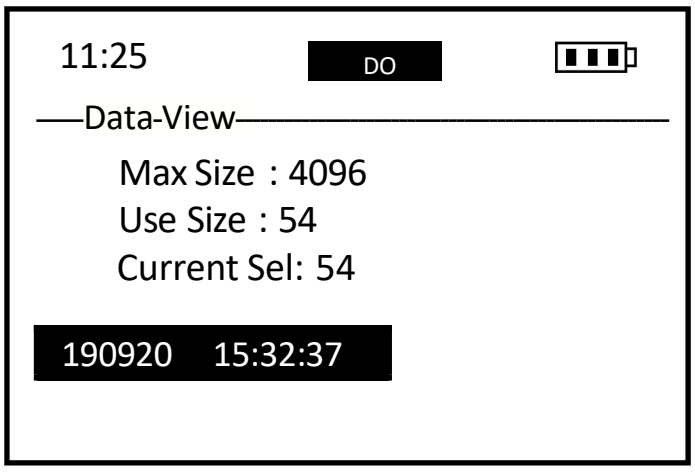
Follow the prompt: "STD Value" - >;" In STD Solution" - >;"Confirm", enter the calibration point, place the probe into the corresponding value of ORP standard solution, wait for the data to stabilize and press the key " ↙" to complete the calibration. The process is the same as that of point 3.5.1. **One 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.

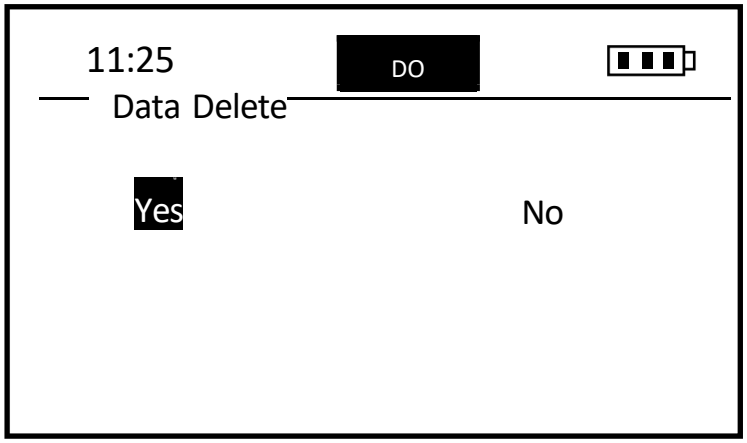
Current Sel

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 data result is named after the storage time. 190920 15:32:37 means that the data in Article 54 was saved at 15:32:37 on September 20, 2019.Select the other data time by the ▲ key and the ▲ key, press the key "↙" to view the specific data result at the time point.

3.6.3 Menu→Data Log→Data Delete

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



3.7 Cal

Note
Remember in measurement interface where press the **“Cal”** key to switch to calibration interface.

Short press "Cal" to enter the calibration interface, as detailed in Section 3.5 above.

Long press "Cal" to enter the calibration and recovery interface. Select Yes to restore the user's calibration parameters to k=1 and 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. The software is stored in the USB shipped with the goods.

Follow the instructions to install 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.



3.8 Menu→Measurement

push to read means that the data will automatically lock when it is stable， To measure again, press "↙".

Continuous means that the data is always updated and will not be locked.Currently the meter only supports dissolved oxygen probes.

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 Task	Frequency Recommended
Sensor cleaning	Cleaning before and after using
Sensor and DO sensor cap inspection	Every 30 days
DO sensor cap replacement	Every year
Sensor calibration	Every 3 months or before using (high precision requirement)
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;

For dirt containing fat and oil, wash it in warm water with household detergent;

Rinse the inner surface of the fluorescent cap with deionized water;

Gently dry all surfaces with a clean flannelless cloth and place in a dry place to allow water to completely evaporate.

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 **Removal of old fluorescent caps:** 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 3.4.4 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 sensor

Maintenance Task	Frequency Recommended
Sensor cleaning	Cleaning before and after using
Sensor calibration	Every 1 month or before using (high precision requirement)

Maintenance method:

① **Clean the outer surface of the sensor:** the same as the dissolved oxygen electrode;

② **Measuring the outer surface of the window:** clean the outer surface of the sensor with tap water. For some stubborn dirt, you can use traditional detergent and soft cloth to clean it. Do not scrape the sapphire window with sharp tools!

③ **Check the cable of the sensor:** same as the dissolved oxygen electrode;

④ **Check whether the sensor shell is damaged due to corrosion or other reasons.**

4.2.3 Conductivity（Salinity） sensor

Maintenance Task	Frequency Recommended
Sensor cleaning	Cleaning before and after using
Sensor calibration	Every 1 month or before using (high precision requirement)

Maintenance method:

① **Clean the outer surface of the sensor:** the same as the dissolved oxygen electrode;

② **Sensor inlet and outlet water hole:** use the equipped special long hair brush to clean the hole. If silt or foreign matter is blocked, please gently use the special long hair brush to clean for many times and flush the plug. Do not force through the hole to avoid damage to the electrode.

③ **Check the cable of the sensor:** same as the dissolved oxygen electrode;

④ **Check whether the sensor shell is damaged due to corrosion or other reasons.**

4.2.4 pH/ORP sensor

Maintenance Task	Frequency Recommended
Sensor calibration	3-point calibration is recommended every 30 days
Replace the pH/ORP electrode	According to its warranty period and application environment

Maintenance method:

① **Clean the outer surface of the sensor:** the same as the dissolved oxygen electrode; Pay special attention to the electrode bulb to avoid breaking!

② **Check the cable of the sensor:** same as the dissolved oxygen electrode;

③ **Sensor preservation:** when the sensor is not in use, the black plastic cap should be buckled to check whether the sponge inside is wet. If it is not wet enough, please add 3mol/L of potassium chloride solution and put the electrode into the solution with potassium chloride for preservation.

4.2.5 chlorophyll sensor

Maintenance Task	Frequency Recommended
Sensor cleaning	Cleaning before and after using
Sensor calibration	Every 1 month or before using (high precision requirement)

Maintenance method:

① **Clean the outer surface of the sensor:** the same as the dissolved oxygen electrode;

② **Measuring the outer surface of the window:**clean the outer surface of the sensor with tap water. For some stubborn dirt, you can use traditional detergent and soft cloth to clean it. **Do not scrape the sapphire window with sharp tools!**

③ **Check the cable of the sensor:** same as the dissolved oxygen electrode;

④ **Check whether the sensor shell is damaged due to corrosion or other reasons.**

4.2.6 BGA sensor

Maintenance Task	Frequency Recommended
Sensor cleaning	Cleaning before and after using
Sensor calibration	Every 1 month or before using (high precision requirement)

Maintenance method:

① **Clean the outer surface of the sensor:** the same as turbidity sensor;

② **Check the cable of the sensor:** same as the dissolved oxygen electrode.

4.2.7 OIW sensor

Maintenance Task	Frequency Recommended
Sensor cleaning	Cleaning before and after using
Sensor calibration	Every 1 month or before using (high precision requirement)

Maintenance method:

① **Clean the outer surface of the sensor:** the same as turbidity sensor;

② **Measuring the outer surface of the window:** clean the outer surface of the sensor with tap water. For some stubborn dirt, you can use traditional detergent and soft cloth to clean it. Do not scrape the window with sharp tools!

③ **Check the cable of the sensor:** same as the dissolved oxygen electrode;

④ **Check whether the sensor shell is damaged due to corrosion or other reasons.**

4.2.8 COD sensor

Maintenance Task	Frequency Recommended
Sensor cleaning	Cleaning before and after using
Sensor calibration	Every 1 month
Maintenance and check clean brush	Replace every 3 months

Maintenance method:

① **Clean the outer surface of the sensor:** the same as the dissolved oxygen electrode;

② **Measuring the outer surface of the window:** clean the outer surface of the sensor with tap water. For some stubborn dirt, you can use traditional detergent and soft cloth to clean it. Avoid using alcohol and other organic solvents. Do not scrape the sapphire window with sharp tools!

③ **Check the cable of the sensor:** same as the dissolved oxygen electrode;

④ **Check whether the brush skin of the sensor is damaged,** excessive wear and less than the light window and other abnormalities.

⑤ **If it has been used for 18 months continuously, it shall be returned to the factory for replacement of dynamic sealing device.**

4.2.9 TSS sensor

Maintenance Task	Frequency Recommended
Sensor cleaning	Cleaning before and after using
Sensor calibration	Every 1 month or before using (high precision requirement)

Maintenance method:

① **Clean the outer surface of the sensor:** the same as the dissolved oxygen electrode;

② **Measuring the outer surface of the window:** clean the outer surface of the sensor with tap water. For some stubborn dirt, you can use traditional detergent and soft cloth to clean it. Avoid using alcohol and other organic solvents. Do not scrape the sapphire window with sharp tools!

③ **Check the cable of the sensor:** same as the dissolved oxygen electrode;

④ **Check whether the brush skin of the sensor is damaged,** excessive wear and less than the light window and other abnormalities.

⑤ **If it has been used for 18 months continuously, it shall be returned to the factory for replacement of dynamic sealing device.**

4.2.10 CDOM sensor

Maintenance Task	Frequency Recommended
Sensor cleaning	Cleaning before and after using
Sensor calibration	Every 1 month or before using (high precision requirement)

Maintenance method:

① **Clean the outer surface of the sensor:** the same as the dissolved oxygen electrode;

② **Measuring the outer surface of the window:** clean the outer surface of the sensor with tap water. For some stubborn dirt, you can use traditional detergent and soft cloth to clean it. Avoid using alcohol and other organic solvents. Do not scrape the sapphire window with sharp tools!

③ **Check the cable of the sensor:** same as the dissolved oxygen electrode;

④ **Check whether the brush skin of the sensor is damaged**, excessive wear and less than the light window and other abnormalities.

4.2.11 NH4-N sensor

Application	Frequency Recommended
Surface water	Every 2~4 weeks
Aquaculture	Every 2~4 weeks
Sewage treatment	Every 2~3 weeks
Industrial wastewater (non-chemical)	Every 2~3 weeks
Chemical industry wastewater	According to the actual situation

（1）Maintenance method

① **Clean the outer surface of the sensor:** the same as the dissolved oxygen electrode;

② **Check the cable of the sensor:** same as the dissolved oxygen electrode;

③ **electrode cleaning and precautions**

· The surface of the electrode cylinder can be washed with a soft brush, but do not touch the ammonium ion sensitive membrane;

· pH, reference electrode membrane head, after washing by tap water, can be used dust-free cloth or soft brush gently scrub;

· Ammonium ion electrode sensitive film, can not be any scraping and scrubbing! Only tap water (deionized water preferably) can be used for washing;

· After the sensor is cleaned, if it is not calibrated, it can be directly installed back to continue to use; If you want to calibrate, you need to use deionized water to clean and dry the probe, the sensor shell and electrode cylinder can be dried with a dust-free cloth, do not wipe the electrode membrane head, it is recommended to dry or gently wipe with absorbent paper!

· During calibration, the electrode process of deionization and cleaning shall be repeated once for each step of calibration of standard liquid to avoid contamination of standard liquid.

（2）Sensor preservation

When the sensor is not in use, the sensor should be clean and properly stored, especially pay

attention to the preservation of the electrode, which PH and reference electrodes should use the corresponding protection solution provided by our company; Ammonium ions should be dry and stored in a protective case.

Note: the film head is dirty and dry, and the electrode is dry for a long time, which will lead to the electrode failure, and it is not within the scope of the warranty!

（3） Replacement of consumable parts and wearing parts

· Ammonium ion, reference and pH electrode are all consumable parts, please replace them in time according to the actual situation;

· It is recommended to replace the cleaning brush every 3 months (if the environment is bad, it is recommended to reduce the replacement cycle);

· The cleaning brush seal ring is guaranteed for one year. It is recommended to send it back to our company for replacement every year.

5 Frequently Asked Questions

Table 5-1 lists possible problems with sensors and solutions. If your problem is not listed or the solution does not handle your problem, please contact us.

Failure phenomenon	Possible causes	Solution
No data displayed on Meter(if sensors are connected)	Controller and cable connection error	Reconnect meters and cables
	handheld meter no batteries or batteries are low	Charge the meter using USB cable provided with directly or rechargeable batteries removed from meter.
	Cable problem	Contact our company's Customer Service
The measured value is too high or too low.Or the value continues to be unstable.	Whether the measuring end face of the sensor adheres to bubbles or dirt adheres	Check and Clear
	Fluorescent caps, pH electrodes and other consumables are abnormal	Check and replace
	The sensor is not calibrated on schedule	calibration
A flashing "OVF" symbol appears	Salinity sensor appears "OVF" in air	Place the salinity sensor into the liquid

Table 5-1 List of frequently asked questions

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.

① This 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.

② The 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.