



# **BH-485-CHL**

## **Chlorophyll Sensor**

### **operating manual**



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## Chapter 1 Product Information

The principle of Chlorophyll Sensor is using the characteristics of chlorophyll A who has absorption peaks and emission peaks in the spectrum. The absorption peaks emit monochromatic light into the water, Chlorophyll A in the water absorbs the energy of monochromatic light, releasing monochromatic light of emission peak of another wavelength. The light intensity emitted by cyanobacteria is proportional to the content of chlorophyll A in water. The sensor is simple to install and easy to use. It is widely used for chlorophyll monitoring in water stations, surface water and other fields. The technical specifications of sensors are shown in Table 1.

specification	Details
<b>Measurement range</b>	0-500 ug/L
<b>Measurement Accuracy</b>	$\pm 5\%$ of the signal level corresponding value of 1ppb Rhodamine WT Dye
<b>Repeatability</b>	$\pm 3\%$
<b>Resolution</b>	0.01 ug/L
<b>Pressure range</b>	$\leq 0.4\text{Mpa}$
<b>Calibration</b>	Deviation value calibration, slope Calibration
<b>Requirements</b>	Suggest a multipoint monitoring for the distribution of Blue-Green Algae in water is very uneven. Water turbidity is below 50NTU.
<b>Main material</b>	Body : SUS316L ( normal version ), Titanium alloy ( The sea version ); Cover: POM; Cable: PUR
<b>Storage temperature</b>	-15 to 50°C
<b>Measuring temperature</b>	0 - 45°C (Non-freezing)
<b>Weight</b>	0.8KG;

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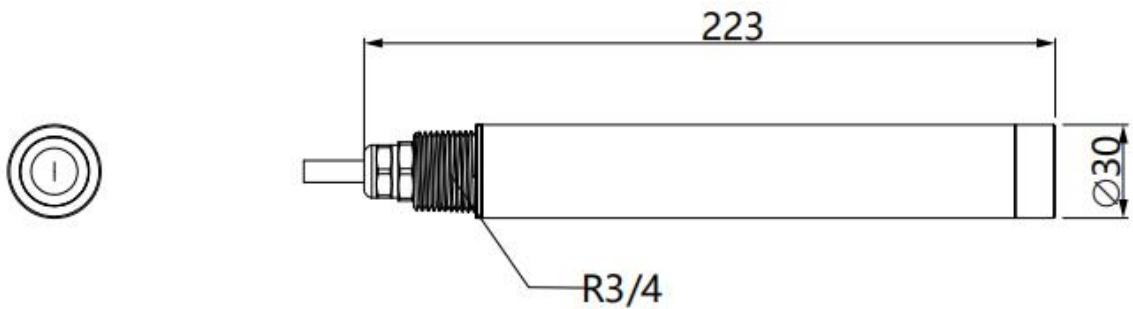
<b>Protective rate</b>	IP68/NEMA6P;
<b>Cable length</b>	Standard: 10m, the maximum may be extended to 100m
<b>External Dimension:</b>	
	

Table 1 Technical Specification of Chlorophyll sensor

**Note:** Product specifications are subject to change without notice.

## Chapter 2 Installation

### 2.1 Installation of Sensors

#### 2.1.1 Quick Dismantling pool side fixed installation

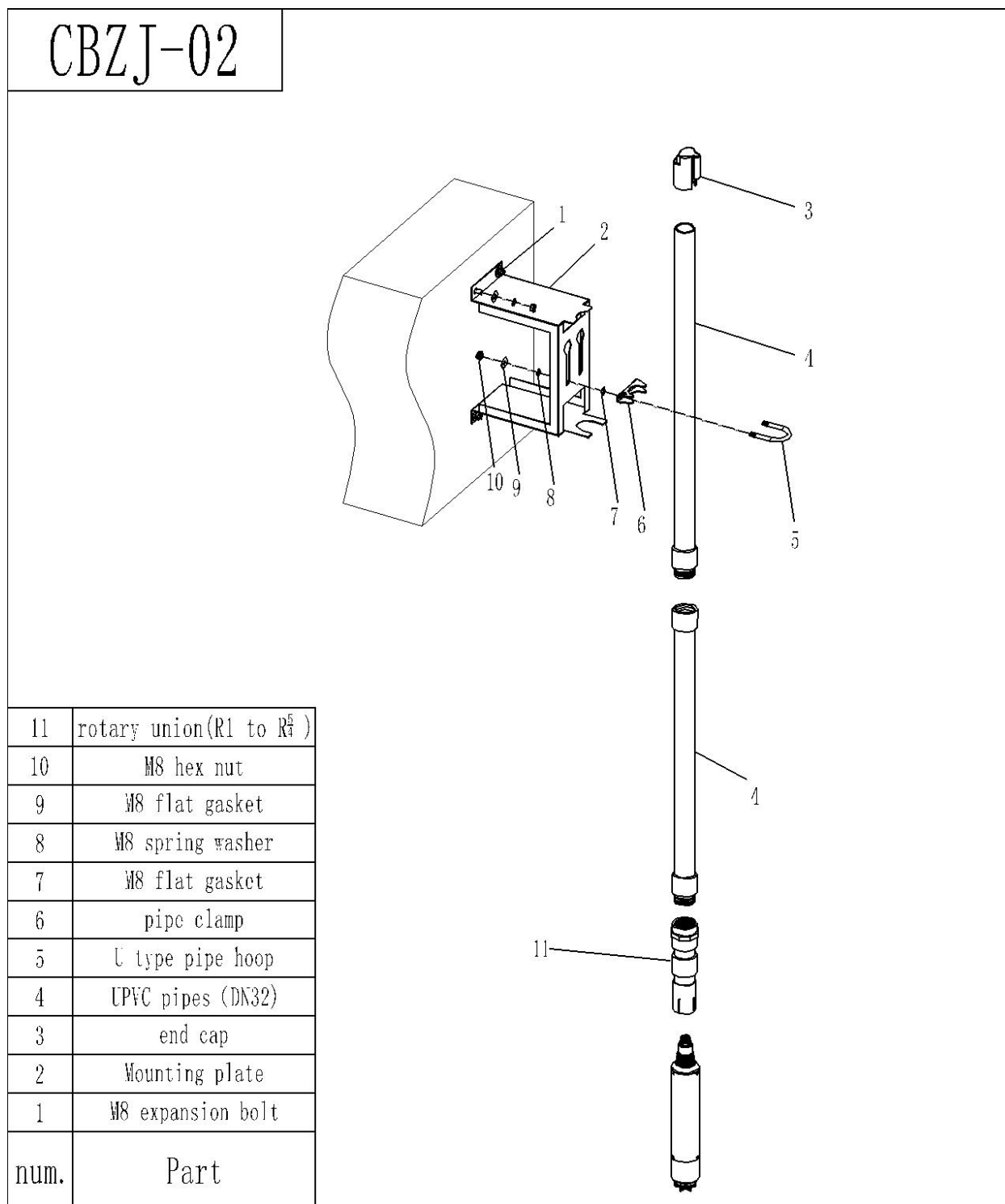


Figure 1 Quick Dismantling pool side installation sketch map

## 2.1.2 Classic pool side fixed installation

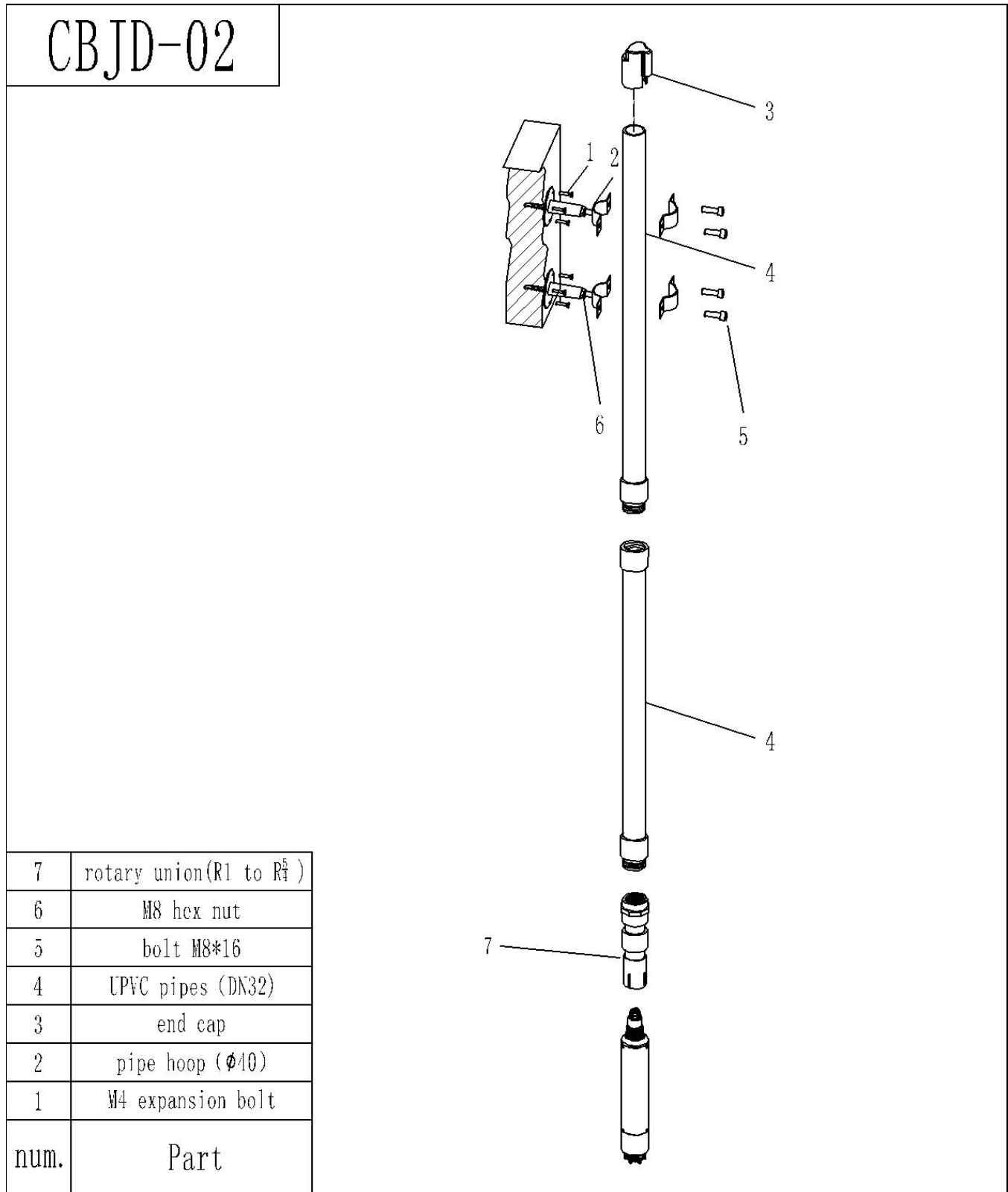


Figure 2 Classic pool side fixed installation sketch map

### 2.1.3 Railing fixed installation

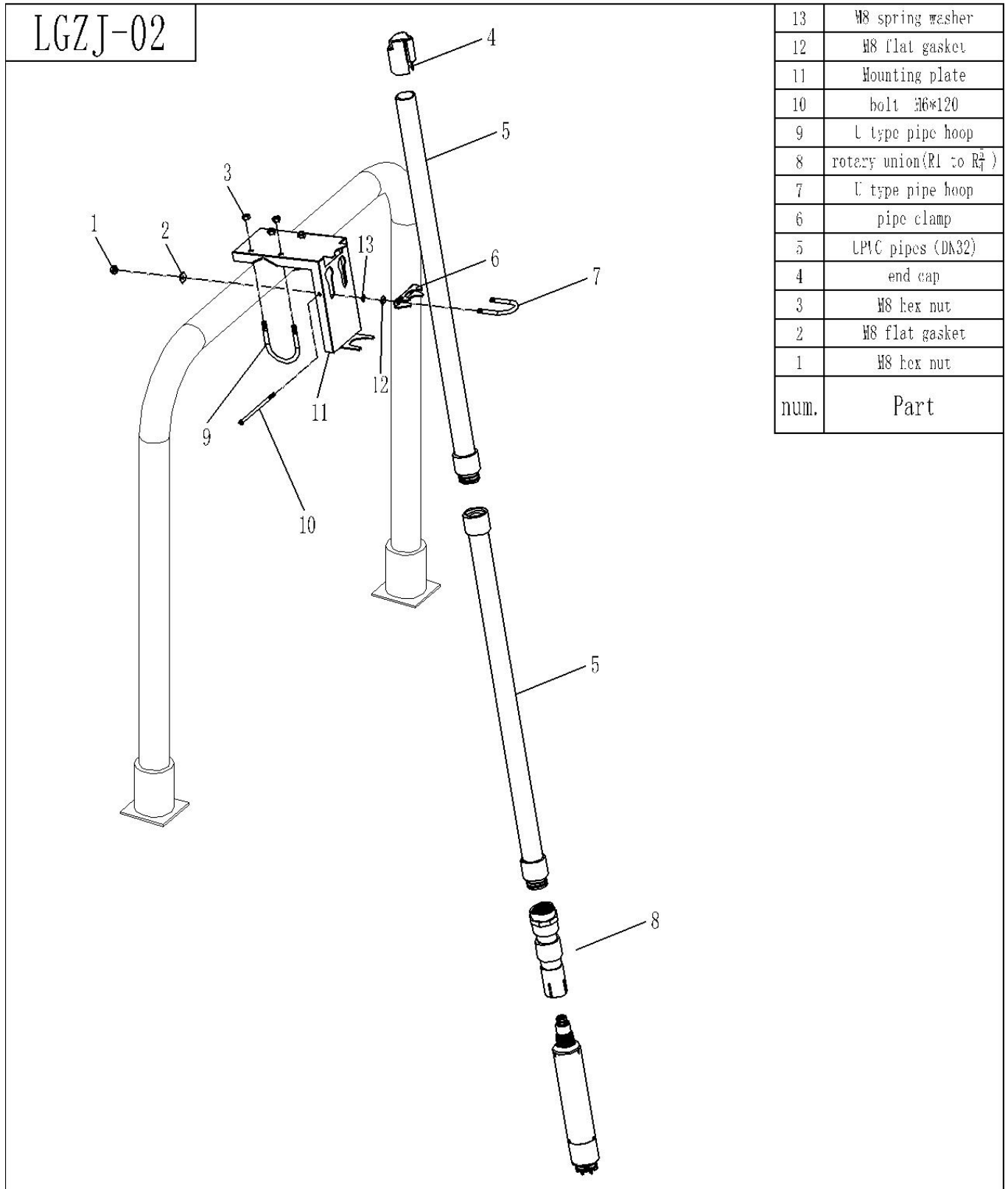


Figure 3 Railing fixed installation sketch map

## 2.2 Connection of Sensor

As shown in Figure 4, connect chlorophyll sensor with the transmitter.

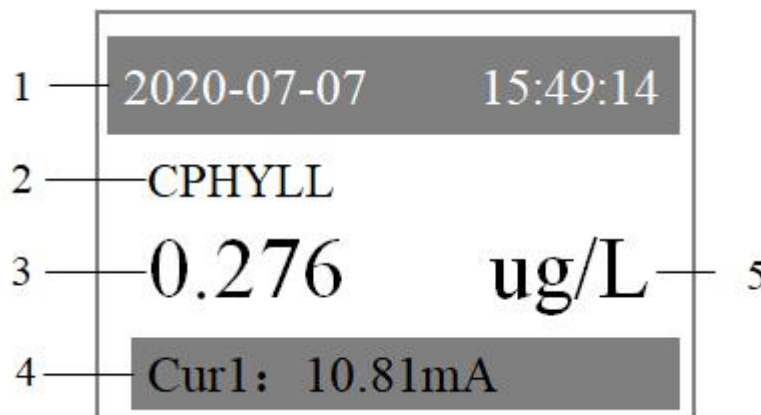


Figure 4 The Diagram of Sensor connection

## Chapter 3 Interface and Operation

### 3.1 The Main Screen

When a sensor is connected to the Transmitter, the screen shows measured data of the sensor, warnings, errors and so on. The main screen is shown as below.



1- time display	2- name of the sensor
3- the measured data of sensor	4- the unit of measured data
5-humidity value/ fault display/current loop output/relay/ (main screen switch, right and left)	



## **3.2Probe Set**

The sensor can be configured with options such as Sensor Information (Info.)、Factor、Deviation、Sample Calibration (Cal.)、Zero Calibration (Cal.) .

<b>Options</b>	<b>Descriptions</b>
Sensor Information (Info.)	check the S/N, the software
Factor	Current calibration factor display, default is 1
Deviation	The deviation value defaults to 0.00
Sample Calibration (Cal.)	The value of a water sample or standard sample
Zero Calibration (Cal.)	The value measured by distilled water

## **3.3 Calibration**

The chlorophyll sensor has been calibrated before leaving the factory. If you need to calibrate yourself, you can follow the steps below:

Chlorophyll calibration requires the use of laboratory tests for chlorophyll values in water samples.

### **3.3.1Zero Calibration(Cal.)**

1. Connect the sensor to the transmitter.
2. Set the relevant parameters, cleaning and wiping the sensor,。
3. place the sensor in the distilled water.
4. Press "Menu" to enter the main menu.
5. Press “Up/Down” to move the cursor to “CPHYLL CH1/2” option and press “Enter”.
6. Press “Up/Down” to move the cursor to “Zero Calibration(Cal.)” option and press “Enter”, wait for the successful indication of calibration, Zero Calibration(Cal.) is completed.

### **3.3.2 Sample Calibration (Cal.)**

Sample Calibration ( Cal. ) is basically the same as the Zero Calibration(Cal.),. For Sample Calibration ( Cal. ) we need a standard water sample with known chlorophyll concentration.

There are usually two standards available for "Standard calibration(Cal.)":

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A: Extraction by water or seawater standard detection methods to get the value for the water sample with known chlorophyll content precipitated;

B: 0.3mg/L Rhodamine B stain solution

### Calibration steps are as follows::

1. Dry the probe with a dust-free cloth, put the probe into a water sample or a 0.3mg/L Rhodamine B stain solution. The probe must enter the solution at least 2cm below, and ensure no bubbles on the mirror surface of the probe.

2. Press “Up/Down” to move the cursor to the “Sample Calibration (Cal.) ” option, and press the “Enter”.

3. 3. Enter the chlorophyll value of the laboratory test water sample. If you use 0.3mg/L Rhodamine B stain solution, you need to find the chlorophyll value according to the corresponding temperature, as shown in Table 2 below, and then enter the correct chlorophyll value. Press the “Enter” key. Wait for the calibration to complete and confirm the return.

**Table 2 Algae chlorophyll of 0.3mg/L Rhodamine B as a function of temperature**

Temperature(°C)	Chlorophyll (µg/L)	Temperature (°C)	Chlorophyll (µg/L)
30	43.51	18	65.06
28	47.23	16	67.82
26	51.23	14	70.5
24	56.11	12	73.1
22	59.74	10	75.8
20	63.46	8	77.3

Note: As shown in the table, 0.3mg/L rhodamine B at 24°C corresponds to 56.11µg/L chlorophyll

### 3.3.3 Solution preparation

1. Accurately weigh 0.300g of rhodamine B solid and quantitatively transfer to a 1000mL tank, dissolve the solid with pure water (distilled water or deionized water), and then use deionized water or distilled water to dilute the solution in the tank to the scale and shake well for usage. The concentration of this rhodamine B solution is 300 mg/L.

2. Accurately measure 1.0mL of the above prepared solution into a 1000mL tank, and then dilute the

solution to the mark with pure water. Mix the solution evenly, and the concentration of the prepared solution is 0.3mg/L rhodamine B solution.

3. The concentrated standard solution must be stored in a dark glass bottle and stored in the refrigerator to prevent decomposition. The diluted standard solution prepared according to the above steps must be used within 24 hours after preparation.

## Chapter 4 Maintenance

In order to obtain the best measurement results, it is very necessary to maintain the sensor regularly. Maintenance mainly includes cleaning, inspecting damage of the sensor, and periodic calibration. You can also view the sensor's status during maintenance and inspection.

### 4.1 Sensor Cleaning

Both the two lenses on the sensor need to be cleaned and maintained regularly to ensure the accuracy of the measurement on the basis of actual use. Wash with clean water, then wipe with a cleanser and rag to remove stubborn stains.

### 4.2 Inspection on the Damage of Sensor

Check the appearance of the sensor to see whether there is damage, if it's damaged, please contact to the after-sales service center in time for replacement to prevent malfunction of sensor caused by water due to the damage.

## Chapter 5 Errors and Warning

If an error or warning occurs, the reading on the measurement screen will flash and "Fault" will be displayed at the bottom. The following are common mistakes and warnings:

### 1) Measured Value Outrange

When the measured value exceeds the range, the screen will appear flashing "++ • ++" words, in its next line will display "Fault" word.

### 2) ERR3 Alarm

When the ERR3 alarm occurs, it indicates the current loop is out of range, at this time, the reading on the screen will flash continuously and "ERR3" will be displayed below the reading. In case of such warning, please contact technical support or after-sales service department.

### 3) Loss of Sensor

When the probe is not connected to the transmitter, the screen will display "LOSE"; when the connection between the probe and the transmitter is bad, an alarm about the loss of sensor appears, the screen will continue to flash, and the word "fault" will be displayed in its next line. The above situation can be resolved in accordance with the following steps.

① Disconnect the transmitter power and reconnect the sensor to ensure that the connection is correct.

② Connect the power supply, observe the measurement interface, if the connection is successful, there will be measurement data appears; if the connection fails, the measurement interface will appear "not connected".

## Chapter 6 Problems and Solutions

Common Problems and Solutions:

Malfunction	Solutions
LOSE	Check if the cable is plugged tightened and reconnect the cable; restart the transmitter.
Over-range alarm	Check if the lens is attached with dirt, if with, remove the dirt; if not, restart the transmitter and check again. If it still appears, please contact the technical support department.

**Note:** In case of other unsolvable problems, please contact our after-sales service or technical support department.