



<b>Product Name</b>	GAOTek Agricultural ph Meter
<b>Product SKU</b>	GAOTek-PHM-140
<b>Product URL</b>	<a href="https://gaotek.com/product/gaotek-turbidity-measurement-ph-meter/">https://gaotek.com/product/gaotek-turbidity-measurement-ph-meter/</a>

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## Attention

- Choose the suitable electrode and installation method according to the environment.
- Please follow the operating procedures and precautions of this manual when using.
- If you find that the instrument is working abnormally or damaged during use, please contact the dealer, do not repair it yourself.
- Before performing the calibration work, please connect the instrument to the electrode and warm it up for 30 minutes.
- Due to product updates, this manual is subject to change without notice.

## 1 Product Configuration

Please confirm the meter you purchased, the package is complete, if there is any damage to the package or any shortage of accessories, please contact the dealer as soon as possible. The configuration is as follows.



### 1.1 Standard Configuration

- ✧ MLSS controller ×1
- ✧ MLSS sensor ×1
- ✧ Locking bars ×2
- ✧ User manual ×1



## 1.2 Optional Accessories

- ✧ Mounting bracket
- ✧ Connector of 485 communication interface and 485 transfer into 232 or 485 transfer into USB

## 2. Product Introduction

The water contains mud, silt, fine organic matter and other microorganisms and colloids that can make the water appear turbid. This product is to detect the sludge concentration in the water body by using the degree of obstruction of the suspended matter in the water to the light passing through. The infrared light wave sent by the transmitter on the sensor is received by the detector at a certain angle after being absorbed, reflected and scattered by the measured object during transmission. The internal calculation unit of the sensor uses a specific algorithm to calculate the sludge concentration of the measured solution through the light intensity received by the detector. It is widely used in the monitoring of sludge concentration in solutions of chemical industry, electroplating, papermaking, environmental protection water treatment engineering, pharmacy, food, etc. Especially suitable for use in the field and on-site.

### 2.1 Main Features

- ✧ Large screen dot matrix LCD display, support English menu.
- ✧ Good reproducibility, not affected by sample water flow rate and pressure.
- ✧ Using a stable invisible near-monochromatic infrared light source, avoiding the interference of chromaticity in the liquid and external visible light on the sensor measurement; and built-in luminosity compensation to improve measurement accuracy.
- ✧ Using the latest detection technology to avoid the interference of external light, strong anti-interference ability.
- ✧ Using quartz glass lens with extremely high light transmittance on the optical path, the transmission and reception of infrared light waves are more stable.



- ✧ Communication function (optional): With RS-485 communication interface (partially compatible with MODBUS protocol), the value corresponding to 4-20 mA current output can be set arbitrarily.
- ✧ Photoelectric isolation 4-20mA current output.
- ✧ Relay lag value can be set freely, avoiding frequent action of switch relay, and with function of setting the replay on and off.
- ✧ Using multi-point correction method.
- ✧ With automatic wiper cleaning function to reduce maintenance costs. The automatic cleaning interval can be set freely (only sensor supports that).
- ✧ Watchdog function: to ensure that the meter will not crash.
- ✧ Power off protection >10 years.

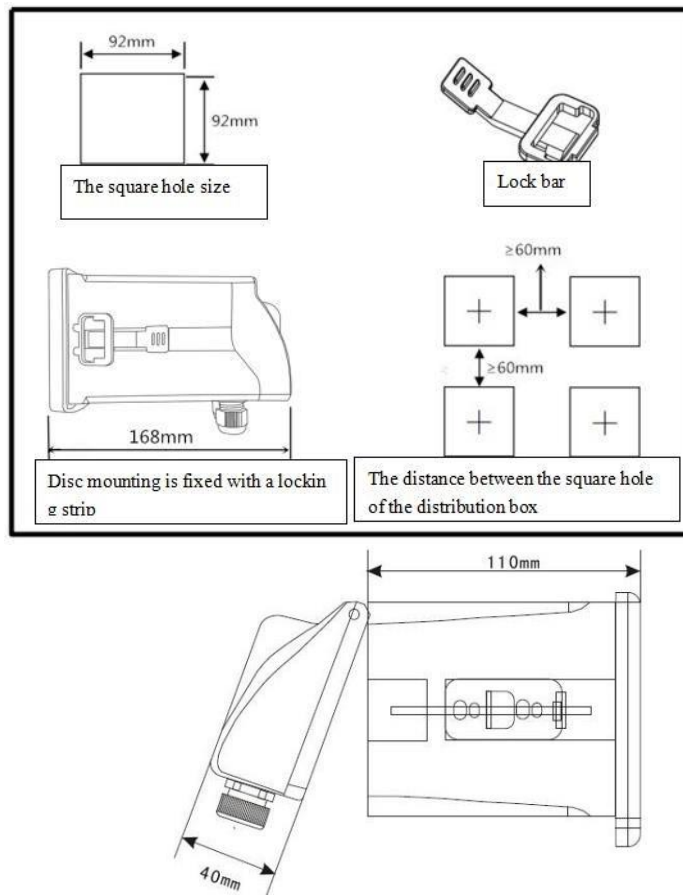
### 3. Technical Indicators

- ✧ Measuring Range: 0-50g/L, measurement range is customizable (controller range is adaptive according to the sensor range)
- ✧ Resolution:  $\frac{0.01}{0.01}$ 0.01% (Adaptive according to sensor resolution)
- ✧ Accuracy:  $\pm 2.5\%$ FS
- ✧ Repeatability:  $\pm 1.0\%$
- ✧ Control interface: two relays of ON/OFF control function; High point and low point alarm signal photoelectric isolation output.
- ✧ Signal isolation output: 4-20mA signal output with photoelectric coupler isolation protection)
- ✧ Relay: the relay hysteresis can be set arbitrarily; the relay load is 3A 220VAC/24VDC
- ✧ Working conditions: Ambient temperature is 0~60°C, relative humidity  $\leq 90\%$ .
- ✧ Output load:  $< 750\Omega$  (4-20mA)
- ✧ Working voltage: AC 220V10%、50/60Hz
- ✧ Size: 100×106×168mm(controller)
- ✧ Hole-cutting Size: 92×92mm
- ✧ Protection level: IP65(controller), IP68(sensor)

## 4. Instrument Installation

### 4.1 Installation of Main Unit

The instrument should be installed in a clean, dry, well-ventilated and vibration-free position, with no corrosive gas around.

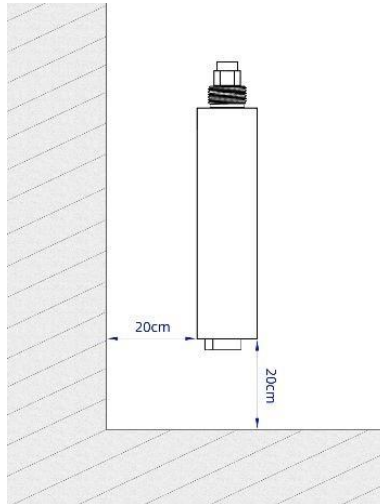


### 4.2 Installation of Sensor

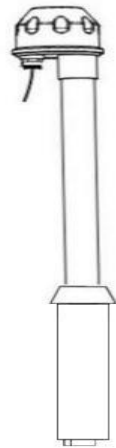
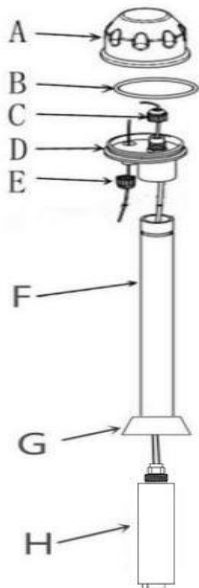
- The sensor is required to be installed indoors or out of the sun, because the strong infrared rays in the sun will seriously affect the sensor's measurement results.
- In the case of submerged installation, since the infrared rays emitted by the sensor will be reflected on the wall and bottom of the pool, which will affect the measurement result, the sensor is required to be installed at least 20cm away from the wall and the ground, as shown in the figure below.



### Submerged Type



### Installation method of submerged type sensor



A--The top lid of Junction box

B--O-rings

C--Fastener of wire of sensor

D--Bottom lid of Junction box

E--Electrode wire fastener

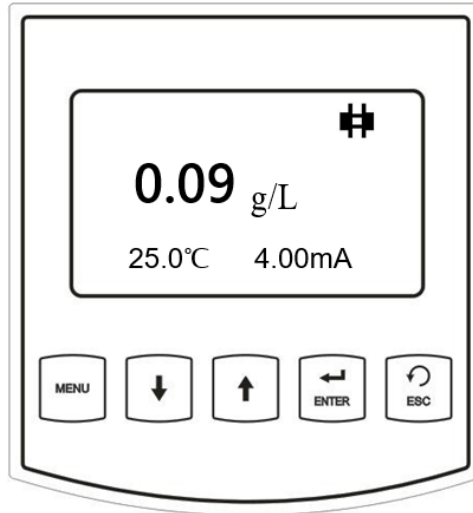
F--Guard tube of wire of sensor

G--Sensor thread connection

H--Sensor

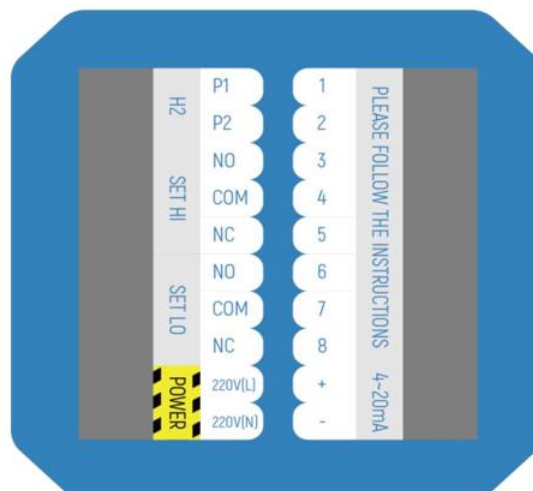
## 5. Instrument Panel and Wiring Instructions

The buttons of front side



1. Menu/selection
2. DOWN: numerical reduction
3. UP: numerical increase
4. ENTER: Confirmation
5. ESC: return key

Wiring instructions of the rear panel







P1: 12V+ (12V sensor power +) red wire	1. empty
P2: 0V (0V sensor power) brown wire	2.empty
HI NO: High point relay normally open port	3.RS485 A of sensor yellow wire
HI COM: High point relay common port	4..RS485 B of sensor green wire
HI NC: High point relay normally closed port	5.empty
LO NO: Low point relay normally open port	6. empty
LO COM: Low point relay common port	7. RS485 A
LO NC: Low point relay normally closed port	8. RS485 B
Power: 220V (L)	9. 4~20mA+
Power: 220V (N)	10. 4~20mA-

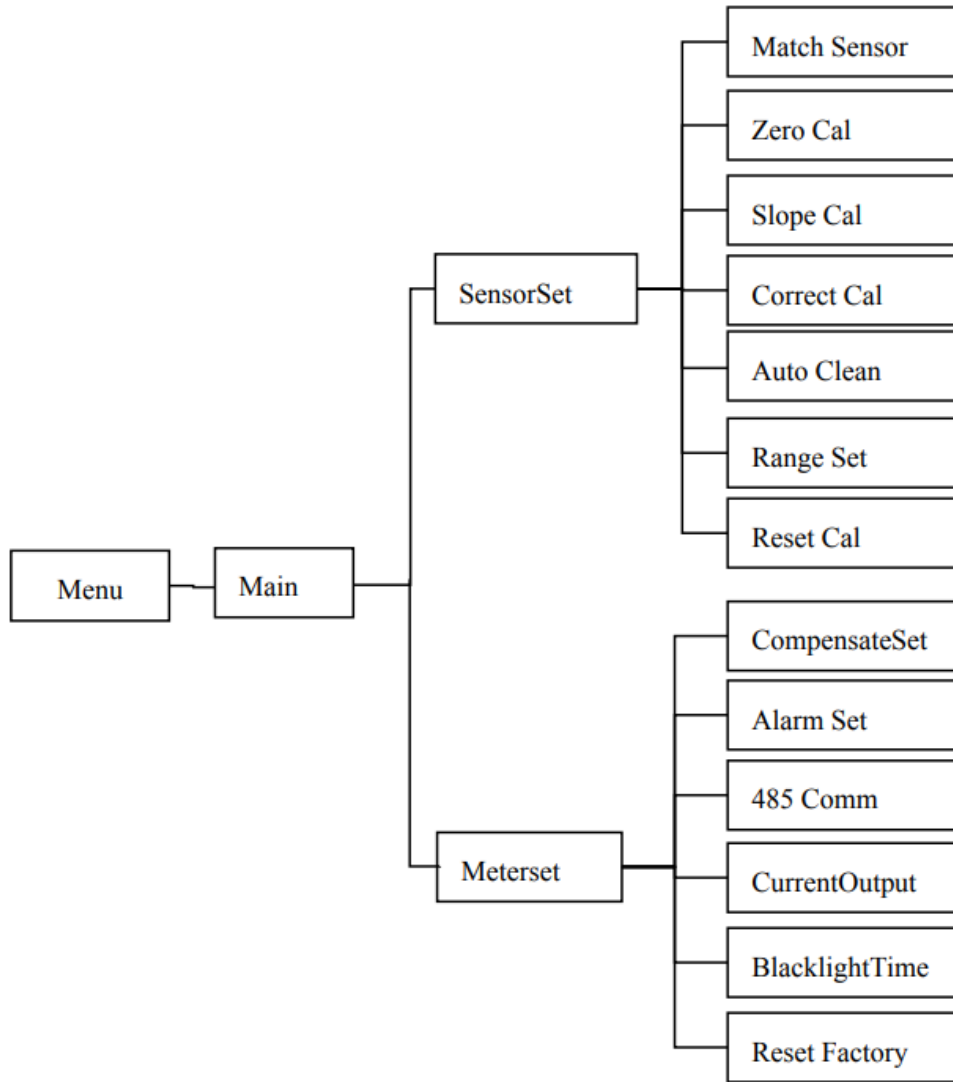
Note: If you want RS-232 function, please select the appropriate RS-485 to RS-232 device. The RS-485 interface part of this instrument is compatible with MODBUS protocol. Please consult the manufacturer or dealer for details.

1. Make sure the wiring is correct before turning on the power. Incorrect wiring may cause damage to the meter.
2. The power cannot be bypassed from high-power equipment, and the power line and signal line should be separated when wiring.



## 6. Instrument Function Setting



### 6.1 Menu Structure





## 6.2 Main Interface and Main Menu

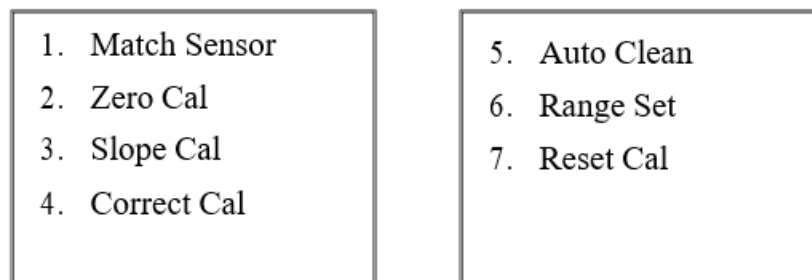


The Sludge concentration (MLSS) value in the main interface is the main display, and the temperature and current values are sub-displays. Right above is the current MLSS measurement value, and 4.00mA is the current output value. The icon  in the upper right corner indicates that the sensor has communicated. If an icon  is displayed in the upper right corner, it means that the sensor is not communicating. At this time, the measured value is generally 0, and functions other than matching the sensor under the sensor setting menu cannot be used.

## 6.3. Sensor settings

### 6.3.1 Matching sensor

In the main menu, press the up and down keys to select the Sensor Set, and press the ENTER key to enter the sensor setting menu, as shown below, the left picture is the first page, and the right picture is the second page. Press the up and down keys to select various settings, the first item in this section.



Press ENTER to enter the match sensor menu. Press the MENU selection key to pop up the cursor, move the cursor, press the up and down keys to modify, select "Yes" to execute the action, select "No" to cancel. Press the ENTER key to store the data, and press the ESC key to return to the previous menu



Match Sensor  
Start: No

Match Sensor  
Start: Yes

The instrument communicates with the sensor through RS485, the sensorslave ID should be 1, and the baud rate should be 9600. If the sensor is not with this configuration, the meter cannot read sensor data and set the sensor. At this time, the sensor can be modified to slave ID 1, and the baud rate is 9600 by matching the sensor function.

### 6.3.2 MLSS Calibration

The MLSS sensor has been professionally calibrated before leaving the factory, and it does not need to be calibrated during normal use. When the measured value is deviated, please give priority to cleaning and maintenance. If you really need to calibrate, please ensure the accuracy of the standard solution used for calibration.

#### Zero Calibration

Zero calibration of MLSS: put the electrode in water (such as distilled water, purified water, etc.), Press ENTER key, then press the MENU key to pop up the cursor, press the up and down keys to modify, the default value is the last calibration value. Press the up and down keys to change to the known concentration value, and then press the ENTER key after it is stable to save the data. Press the ESC key to return to the previous menu.

Zero Cal  
MS: 0g/L  
VAL: 001 g/L

Zero Cal  
MS: 0g/L  
VAL: 001 g/L

#### Slope Calibration

Slope calibration of MLSS: Enter into the MLSS slope calibration menu. Before calibration, place the MLSS electrode in a MLSS standard solution with a known concentration, and generally choose a standard solution with a measure range value. press the ENTER key to



enter, and then press the MENU selection key to pop up the cursor. The default value is the last calibration value. Press the up and down keys to change to a known concentration value, such as 10g/L. After the MLSS value is stable press the ENTER key to save the data. Press the ESC key to return to the previous menu.

Slope Cal
MS: 12g/L
VAL: 10g/L

Slope Cal
MS: 12g/L
VAL: 10g/L

### MLSS correction calibration

When zero calibration and slope calibration are performed, when the intermediate value of the meter is not accurate, correction calibration can be performed. Correction calibration can be calibrated to 3 points, but it is not necessary to calibrate all 3 points. Generally, the low range does not need correction calibration. Before calibration, put the MLSS electrode in the MLSS standard solution of known concentration. Enter the MLSS correction calibration menu, press the ENTER key to enter the menu, and then press the MENU selection key to pop up the cursor. The default correction point is 1, and the fixed value defaults to the last calibration value. Press the up and down keys to change to the correction point and the known concentration value, such as the correction point 5g/L. After the MLSS value is stable, press the ENTER key to save the data. Press the ESC key to return to the previous menu.

Correct Cal Point: 1
MS: 0g/L

Correct Cal Point: 1
MS: 0g/L

### 6.3.3 Automatic cleaning function Settings

This function is to set the automatic cleaning interval of the sensor. Select the cleaning setting in the sensor setting menu and press the ENTER key to enter the cleaning setting interface. Press the MENU selection key to pop up the cursor and move the cursor. The default value is 1440 minutes(1 day). You can press the up and down keys to modify the cleaning interval,



such as 60, and press the ENTER key to save the data. After the setting is successful, the sensor will perform a cleaning operation and recalculate the time.

Press the ESC key to return to the previous menu.

Clean Set
Minute: 01440

Clean Set
Minute: 01440

### 6.3.4 Range setting

This function is to set the sensor range, and modify the unit displayed by the meter. Select the range setting in the sensor setting menu and press the ENTER key to enter the range setting interface. Press the MENU selection key to pop up the cursor, move the cursor, and press the up and down keys to modify the range value or unit. Press the ENTER key to save the data, or press the ESC key to return to the previous menu

Range Set
VAL: 50
UNIT: g/L

Range Set
VAL: 50
UNIT: g/L

### 6.3.5 Reset Cal

This function can restore the calibration status of the sensor to the factory settings. Select Restore sensor in the sensor setting menu and press the ENTER key to enter the restore sensor interface. Press the MENU selection key to pop up the cursor, move the cursor, and press the up and down keys to select and confirm

Reset Sensor
NO

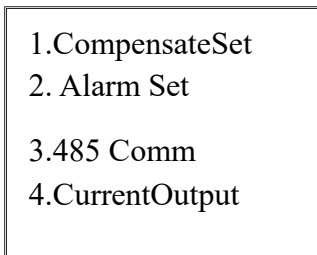
Reset Sensor
YES



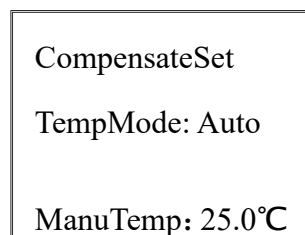
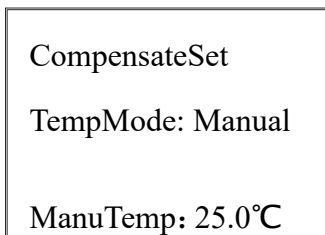
## 6.4. Meter setting

### 6.4.1 Compensation settings

In the main menu, press the up and down keys to select the Compensate Set, and press the ENTER key to enter the meter setting menu, as shown below, the left picture is the first page, and the right picture is the second page. Press the up and down keys to select various settings, select the first item in this section.



Press the ENTER key to enter the compensate Set menu. Press the MENU selection key to pop up and move the cursor and press the up and down keys to modify. The temperature is divided into manual or automatic mode. When automatic is selected, the manual value is invalid, and vice versa. When equipped with a thermistor, the real value is measured automatically. If not, manual input can be selected (for occasions where the temperature value does not change much). Press the ENTER key to save the data, and press the ESC key to return to the previous menu



### 6.4.2 Alarm Setting

Select the alarm setting in the parameter setting menu and press ENTER. Press the MENU to pop up the cursor and move the cursor. You can press the UP and DOWN keys to modify it



High:	01000
Lag H:	00000
Low:	00000
Lag L:	00000

High:	01000
Lag H:	00000
Low:	00000
Lag L:	00000

High limit H: High limit setting of warmer; Lag “H”: Delayed alarm of high limit; low limit L: Low limit setting of warmer; Lag “L”: Delayed alarm of low limit. (Note: Delayed figure was set between high limit low limit.)

In order to avoid the relay from fluctuation or controlling the MLSS value of the solution, the instrument sets this function. The specific operation is as follows: Press the up and down keys adjust to delayed figure

High limit relay: It will be activated when the actual measured value is higher than the high limit alarm setting value HIGH value, and the actual measured value will fall again below (High limit H value - Delayed figure H value).

Low limit relay: It will be operated when the actual measured value is lower than the low limit alarm setting value LOW value, and the actual measured value will rise again when it rises above (low limit L value + Delayed figure L value). Useful to extend the life of the relay or AC contactor. Therefore, the user must set the high, low and hysteresis according to the actual situation.

### 6.4.3: 485 Communication (Optional)

485Comm Set
ADD: 01
BAUD: 9600

485Comm Set
ADD: 01
BAUD: 9600

Select the 485-communication setting in the parameter setting menu and press ENTER. Press MENU to pop up the cursor, you can press the UP and DOWN keys to adjust. Communication address (hexadecimal), press ENTER to save the data, press ESC return to the previous menu.





(Note: Please consult the manufacturer or distributor for specific protocol specifications)

### 6.4.4 Current Output Setting

The factory value of the 4-20mA output corresponds to default measurement range of meter, but the user can arbitrarily set the corresponding value according to his own requirements to meet the industrial control needs. Press ENTER to pop up the cursor, move the cursor. You can press the up and down keys to modify. Press ENTER to save the data, press ESC to return to the previous menu. Press the ESC return to previous menu.

Note: Output current (mA)

Forward control:  $I=16 \times (C-A)/(B-A) + 4$      $4mA \leq I \leq 20mA$

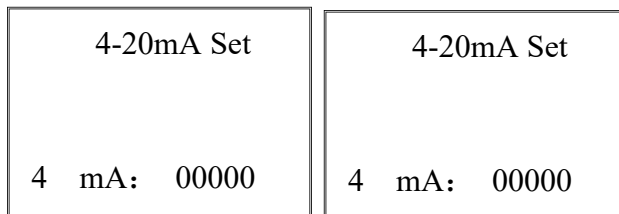
Reverse control:  $I=16 \times (A-C)/(A-B) + 4$      $4mA \geq I \geq 20mA$

I is the output current value

C is the current measured PH value of the meter,  $0.00 \leq C \leq 14.00$ .

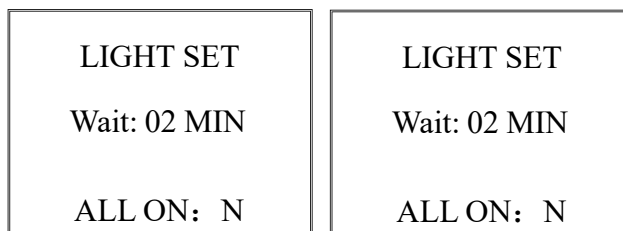
A is the value corresponding to 4 mA in the setting

B is the value corresponding to 20mA in the setting



### 6.4.5 Backlight Setting

Select backlight setting in the parameter settings menu and press ENTER. Press MENU to pop up the cursor, move the cursor. You can press the up and down keys to modify. Press ENTER to save the data, press ESC to return to the previous menu. Press the ESC return to previous menu. Backlight control allows the meter to save power, protect the display and extend life.





### 6.4.6 Restore Factory Setting

This function restores the settings of the controller, and will not restore the calibration, range, and automatic cleaning interval of the sensor. The restored parameters are calibration default value, unit, compensation setting, alarm setting, 485 communication setting, current output setting, backlight time. In the parameter setting menu, select Restore Factory Values, and press the ENTER key to enter the Restore Factory Values menu. Press the MENU selection key to pop up the cursor, and you can press the up and down keys to modify. Press the ENTER key to store the data and press the ESC key to return to the previous menu.

SET	SET
ResetValue: NO	ResetValue: NO
Language:EN	Language:EN

## 7.Daily Maintenance Points

- The instrument has been calibrated before leaving the factory and can be used directly by the user.
- The failure rate of the instrument is generally low.

### Maintenance:

1. When using the instrument for the first time, please test it after 24 hours.
2. After the instrument has been used for a period of time, if the automatic cleaning interval is too long, the optical path lens of the sensor will be stained, which will cause a big measurement error. At this time, depending on the situation, set a shorter interval time, or reset the interval time to perform immediate cleaning and re-timing.
3. If the attached dirt cannot be cleaned by the automatic cleaning wiper,it can be cleaned as follows after the instrument and sensor are powered off  
Submerged type sensor:  
Use tweezers with an alcohol cotton ball to clean the deposits on the optical path lens until it is clean.
4. Do not disassemble the instrument to avoid affecting or damaging the performance of the instrument.



## Troubleshooting Steps

Phenomenon	Reasons	Resolutions
The indicator light is off	The power is not connected, and the power plug is not in good contact with the outlet.	Plug in the power cord and check the plug and socket
Value fluctuation	There are bubbles in the water tank, or the water level is too low	Turn down the water flow at the water inlet to allow sufficient exhaust time. And make sure there is water flowing out of the overflow.
Large error of Measurement	Zero is not calibrated, or the calibration potentiometer has been moved by mistake	Re-calibration

## Quantity Assurance

The company provides after-sales guarantee for the machine within one year of the sales date but does not incur any damage caused by improper use. If you need it to be repaired or adjusted, please send it back. (Note: the electrode and standard liquid are consumable products, which are not within the guaranteed scope. The company will guarantee the quality of the electrode as before delivery.)



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