

USER MANUAL

pH / ORP Transmitter / Controller

pH / ORP-5500 Series



Introduction

Thanks for choosing pH / ORP – 5500 series pH / ORP Controller.

Correct sensor installation and parameter setting would show great performance and advantage of this instrument for your good usage. So please carefully read this manual before installation. This instrument is a precise electrochemical analysis meter, the installation and operation should be performed by technicians with relevant professional knowledge.

Please check the actual product with complete set after you receive the package, and contact us if any items are missing or damaged.

Warranty:

1. The meter's quality guarantee is one year from the date of purchasing. During this period, if the meter has quality problems, the supplier is responsible for maintenance work on free of charge basis.

2. If the damage of the meter is caused by the following reasons, it is out of Guarantee:
 - A. The meter is burned.
 - B. The meter is refitted or misused.
 - D. The relevant damage caused by improper power supply.
 - E. The cable damaged and rupture caused by improper installation and usage;
 - F. The incorrect measurement of the sensor caused by disconnecting or connecting wires personally;
 - G. Any other form of misuse/mishandling.



Please take care of the items which with this sign. !

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1. Conception

pH / ORP-5500 series is an online pH and ORP Controller , with plug-in PH-1110A sensor, which has good measurement accuracy, anti-interference, easy to install and operational features.



FEATURES :

- White backlight LCD screen, several operations, easy for operation
- Compatible with six kinds of buffer solutions suitable for international standards.
- Selectable temperature sensor which reduce the replacement cost ;
- Manual calibration is easy for on-site calibration.
- EMC enhancement type could run smoothly under various kinds of industry environment.
- (4~20) mA output supports instrument/transmitter modes and satisfies all 4~20mA receiving units.
- Double relay high/low and delay control function could fulfill pH or ORP interval control and adjustment.

1.1 Working Principle

A weak voltage change is generated when H^+ affects the inserted sensor, the changeable value will transmit to the instrument. After converting and calculating the generated pH/ORP signal, the instrument will show the values on the screen.

1.2 Application

This series of instruments are widely used for online pH/ORP monitoring in environment protection water treatment, pure water treatment, industrial process and so on.

1.3 Classification

Model	Power Supply	Frequency (Hz)	Current Mode	Sensor Selection
pH/ORP-5520	AC 220V	50 / 60	Instrument / Transmitter	pH-1110A

【NOTE】

1. Install the instrument in a dry environment and any water-drop or excess moisture will cause damage or measurement error ;
2. Pay attention on the power supply before wiring connection.

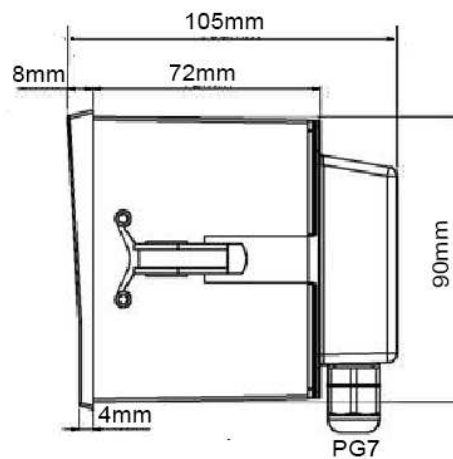
1.4 Technical index

Model		pH / ORP-5520 Series pH / ORP Online Transmitting Controller
Measurement Range	pH	0.00~14.00
	ORP	-2000mV~2000mV
	Temp.	(0.0~50.0) °C (temperature compensation component: NTC10K)
Resolution	pH	0.01 pH
	ORP	1mV
	Temp.	0.1 °C
Accuracy	pH	0.1 pH
	ORP	±5 mV (electronic unit)
	Temp.	±0.5 °C
Approximate input impedance		$3 \times 10^{11} \Omega$
Buffer Recognition		pH value: 10.00 ; 9.18 ; 7.00 ; 6.86 ; 4.01 ; 4.00
Temp. compensation range		(0~50) °C (with 25 °C as standard) Manual and automatic temperature compensation
(4~20)mA	Characteristics	Isolated, fully adjustable, reversible, instrument/transmitter for selection
	Loop resistance	500Ω (Max) , DC 24V
	Accuracy	±0.1mA
Control contact	Electrical Contacts	Double relay SPST-NO, return model
	Loop capacity	AC 220V/AC 110V 2A(Max) ; DC 24V 2A(Max)
Power consumption		< 3W
Working environment	Temperature	(0~50) °C
	Humidity	≤85%RH (non condensing)
Storage environment		Temp.(-20-60) °C ; ≤85%RH (non condensing)
Outline dimension		96mm×96mm×105mm (H×W×D)
Panel Cutout Dimension		91mm×91mm(H×W)
Installation		Panel mounted, fast installation

2. Installation



Front view



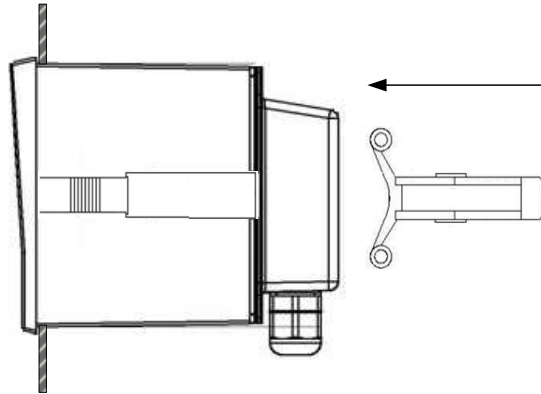
Side view

2.1 Installation of Instrument

pH/ORP-5500 series is a panel mounted type instrument, which can be installed easily.

Please follow the following steps:

1. Put the instrument into the Panel Cutout 91mm X 91mm (H x W)
2. Then push the quick clamp along with the trench and fasten the instrument.



3. Do not let the instrument drop on the floor when dismantling the meter. Withdraw the quick clamp and take the instrument out carefully

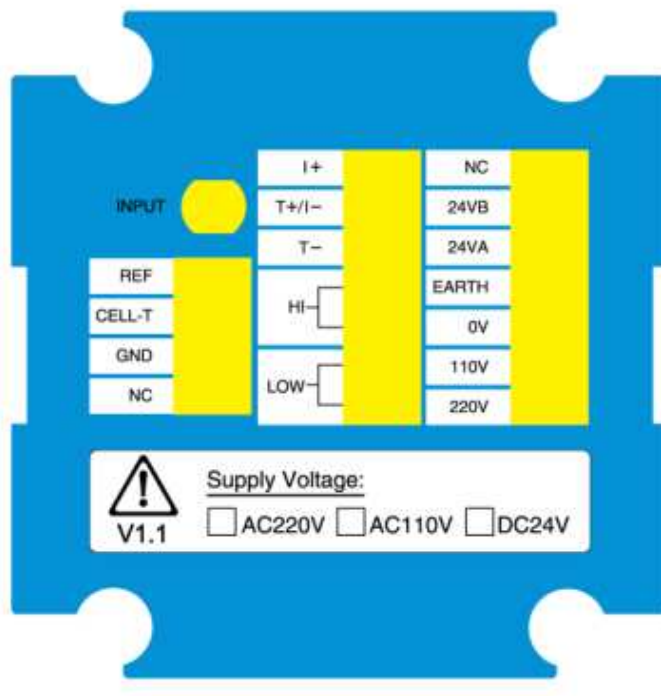



Do not place the LCD display screen directly under the sun for the UV could damage the screen.


2.2 Electrical Connection

The measurement cable cannot be mixed with high-tension and high frequency cables. To avoid any interference, the cables should be at a distance of 30cm from high tension cables and connected with the ground.

Connect the power line and signal line according to the below Diagrams: .



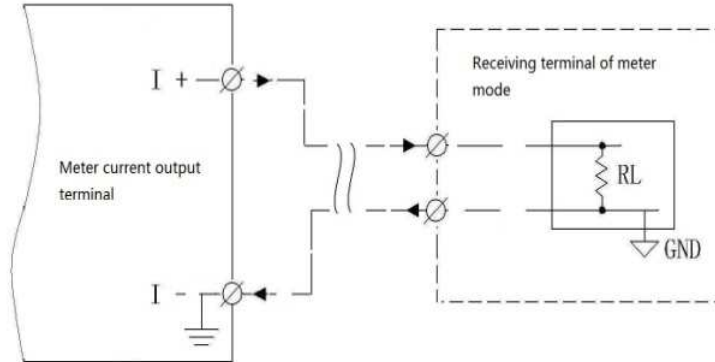
 The actual power supply must be the same with marked power supply !

 **Supply Voltage:**
 AC220V AC110V DC24V

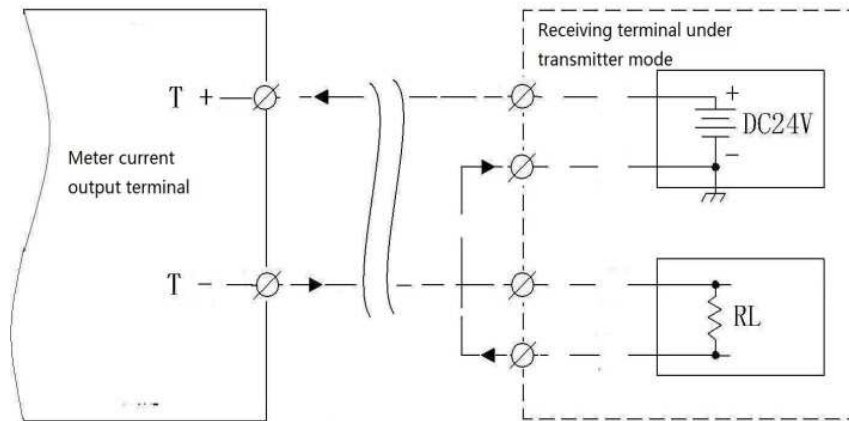
Wiring Connection:

INPUT	Connect pH/ORP measuring sensor (transparent line)
REF	Connect pH/ORP reference sensor (shielded line)
CELL-T	Connect the receiving terminal of the Temp. sensor(red)
GND	Connect grounding terminal of the temp. sensor (black)
I+/I-	Instrument mode (powered by instrument)
T+/T-	Transmitting model (external feed)
Hi	High limit alarm control terminal blocks
Low	Low limit alarm control terminal blocks
0V/220V	AC 220V input interface(pH/ORP-5520)
NC	Empty terminal
EARTH	Electromagnetic compatibility group protection terminal

2.3 Diagram of 4-20mA output

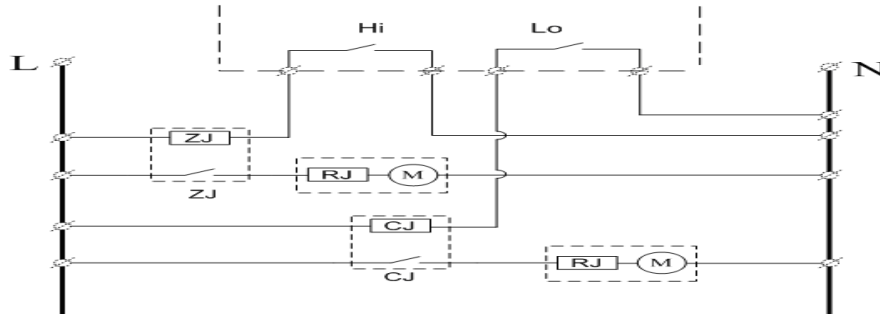


Instrument Mode



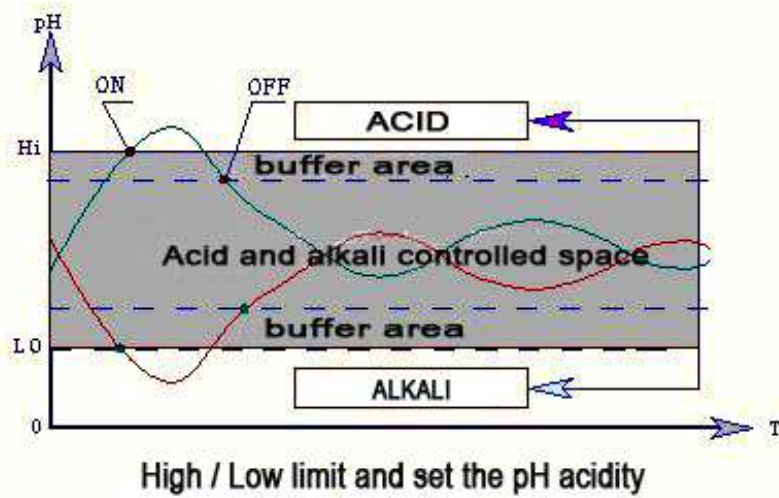
Transmitting Mode

2.4 Relay Control Connection

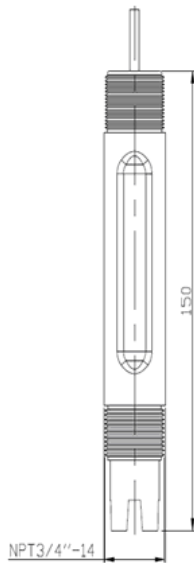


Relay ON/OFF contact component control wiring diagram

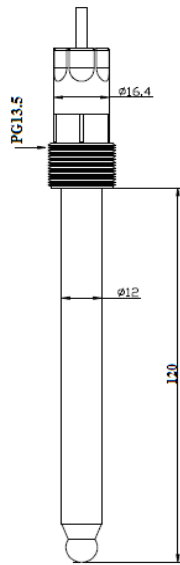
2.5 Control Mode



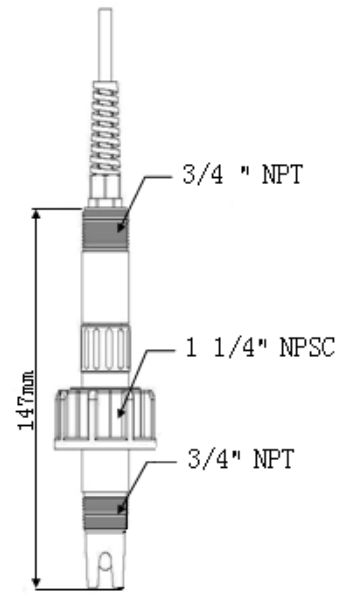
2.6 Outline dimension and installation of the sensor



pH/ORP one-piece sensor

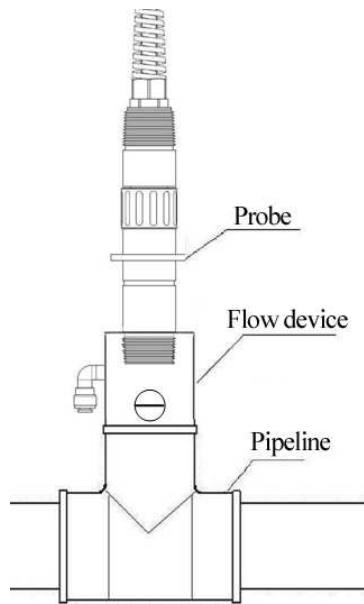


pH/ORP glass sensor

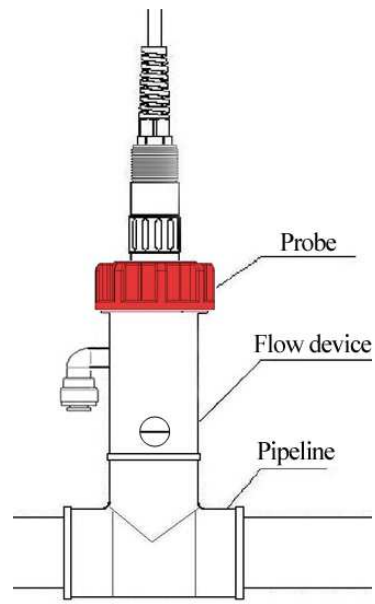


pH/ORP plug-in sensor

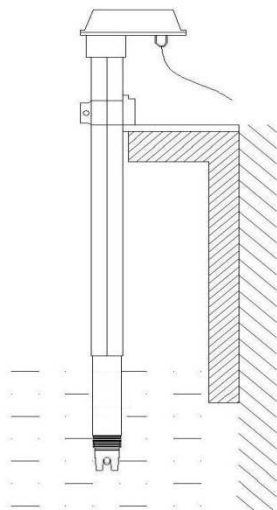
2.6.1 Installation Method of the Sensor



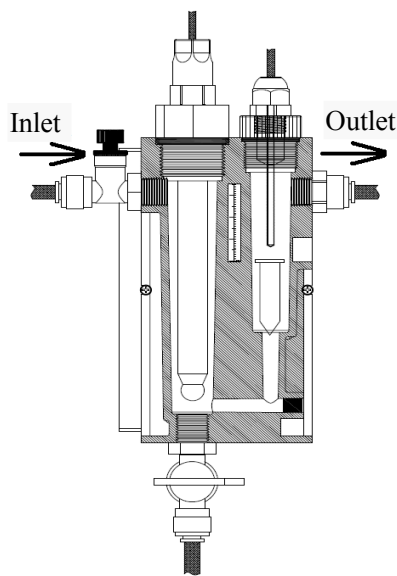
Flow Device P34A



Flow Device P34B



P16 Submersible Installation



pH sensor and temp. sensor by using P33



[Note] : Recommend using the flow device with needle valve (P34)

1. Needle valve flow device (model P34A/B) is recommended when pipeline doing installation.
2. Round sensitive glass type pH probe direct installation in the pipeline, will expose the probe to pressure change, water hammer or siphon effect. Using the flow device, the probe and atmosphere will be in equilibrium and ensure operational safety and stability in measurement.
3. When directly installed in the pipeline, pure water measurement value will be unstable because the water is a weak electrolyte.

2.6.2 Installation requirement



Middle 1 1/4 " NPSC straight pipe thread fitting Upright install or slant install no more than 30 °



Bottom 3/4 " NPT taper thread fitting; Upright install or slant install no more than 30 °



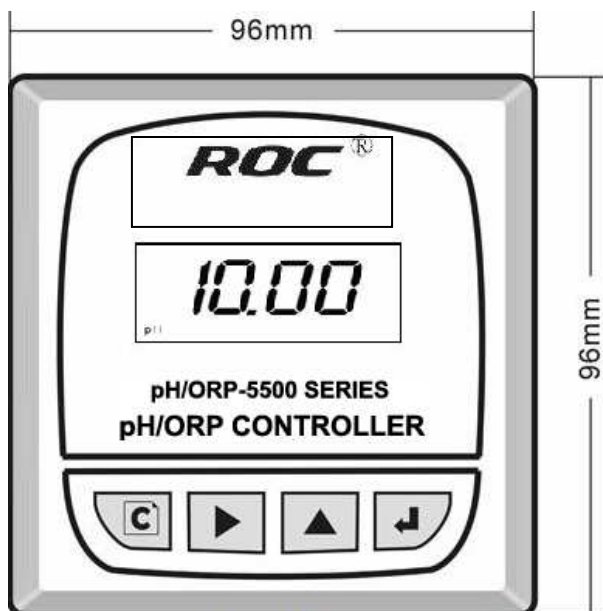
Horizontal installation does not work



Backward installation does not work

3. Settings



You could set the relative parameter after connecting the instrument and sensor. Please enter into the setting mode to check and set the relative parameters for your first use. These parameters are in different menus.



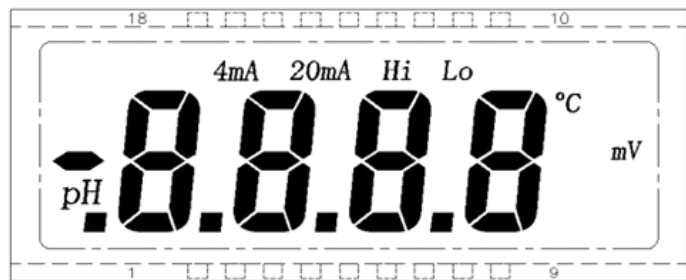
Main Menu

Please operate the meter with the keys. Under different modes, the function will be different.:

Sign	Name	Function
	ESC	<ol style="list-style-type: none"> 1. Check the temperature compensation value under pH measurement status. 2. Exit or skip the setting parameter.
	Select	<ol style="list-style-type: none"> 1. Select thousand, hundred, ten and unit circularly under parameter setting interface 2. Long press the key under pH measurement status, it will enter into pH mV calibration interface

	Add key	<ol style="list-style-type: none"> 1. Set the 0-9 figure under parameter setting status 2. long-press the key under pH measurement status, it will enter into the buffer calibration interface 3. Check mV value under pH measurement status.
	Enter key	<ol style="list-style-type: none"> 1. Enter into the main function menu 2. Save the parameter settings

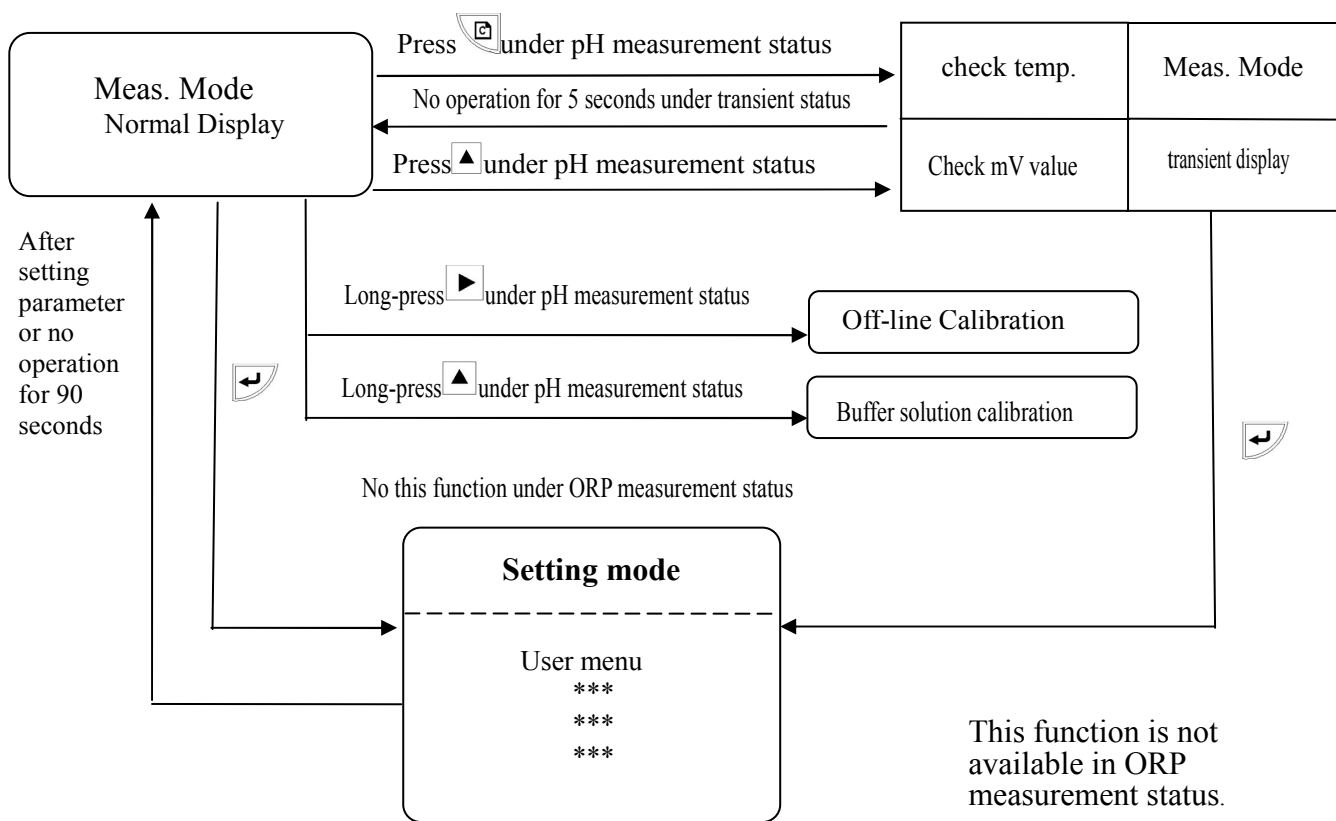
Three functions are shown on the main interface: the upper area is menu bar which guides the operation; the right area displays the measurement unit of the current time; the middle figures shows the measurement data or menu items.



pH / ORP-5500

- ◆ Measurement Mode: Normal Display、Transient Display
- ◆ Setting Mode: Parameter Setting

Switch the Mode as Following:





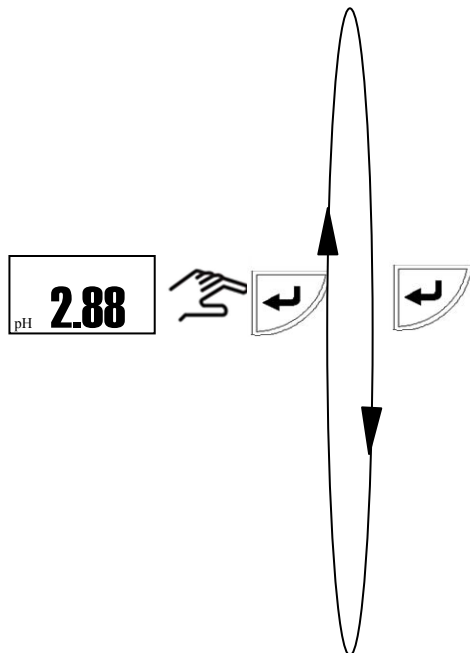
3.1 Measurement Mode

3.1.1 Normal display

The instrument will display the current pH/ORP value after powered on.

3.1.2 Transient display

Check the current temp value by pressing  under pH measurement status and check current mV value by pressing . The instrument will return to normal display without any operation in five seconds.





Function Selection	pH or ORP display	§ 3.2.1
4mA setting	“4 mA” blinks	§ 3.2.2
20mA setting	“20 mA” blinks	§ 3.2.3
High alarm setting	“Hi” blinks	§ 3.2.4
Low alarm setting	“Lo” blinks	§ 3.2.5
Hysteresis setting	“Hi” “Lo”	§ 3.2.6
Temp. Comp. setting	“H” or “A”	§ 3.2.7




3.2 Setting Mode

Some parameters have been set before dispatch. If the test environment changes (such as replacement of electrode, reset of alarm setting etc), please check the parameter which is in different menus. The specific content and operations as follows:




3.2.1 Function selection

Choose “pH” or “ORP” function selection by pressing  press  for saving the setting and enter into the next parameter setting.




3.2.2 4 mA setting

When the screen displays “4mA”, press  to select the position of input figures. Then press  to input the actual pH/ORP value, press  to save the settings and enter into the next menu setting.

3.2.3 20 mA setting

When the screen displays “20mA”,press  to select the position of input figures. Then press  to input the actual pH/ORP value, press  to save the settings and enter into the next menu setting.




3.2.4 High-limit alarm setting

The screen will displays “Hi” after entering the interface of high-limit alarm setting, press  to select the digital position and input the actual value by pressing , and save and enter into the next menu setting by pressing .

3.2.5 Low-limit alarm setting

Same operation as the high-limit alarm setting, and press  after setting.


3.2.6 Alarm Hysteresis setting

When “Hi” and “Lo” appear at the same time, set the pH/ORP hysteresis value by pressing“  ” and“  ”, and press  save and enter into the next menu.



The Min Value: Ph \geq 0.1; Orp \geq 10mv!

3.2.7 Temperature Setting

When “H” or “A” blinks, press “

This operation is not available for ORP measurement!





3.3 Sensor Calibration

3.3.1 System Calibration

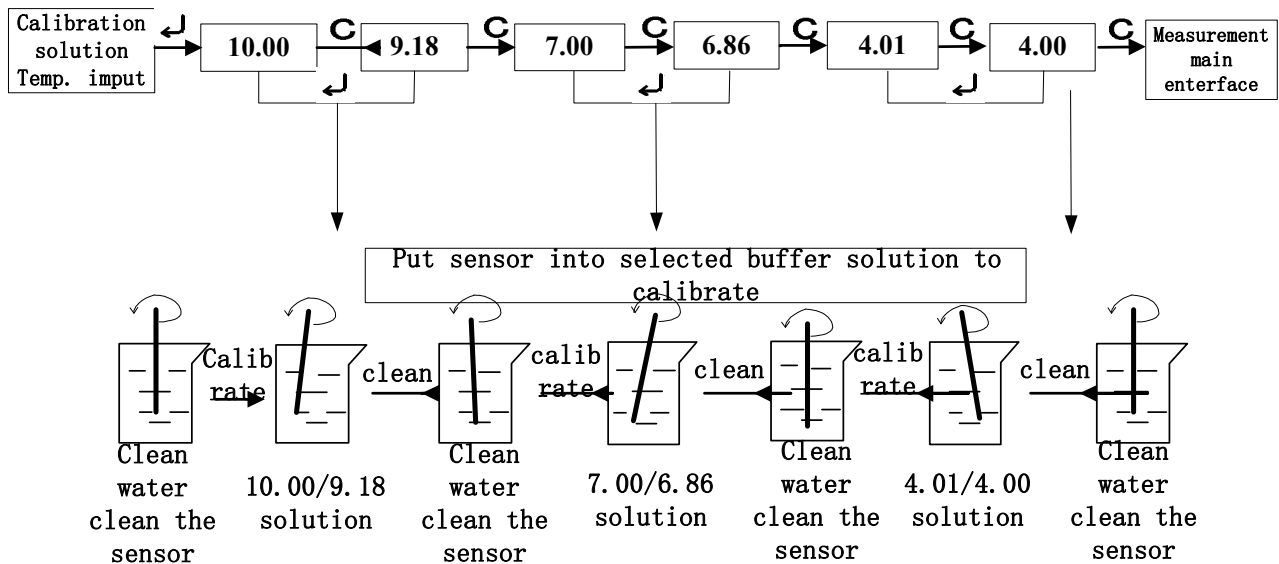
pH / ORP sensors are electrochemical Sensors and their sensitivity decreases with influence of time and medium. In order to get an accurate measurement, it is suggested to often calibrate sensor's slope. The recommended calibration period would be weekly, but sometimes could be more often.



1. Normal buffer solution ,10.00 \ 9.18 \ 7.00 \ 6.86 \ 4.00 \ 4.01
2. If the medium are acid or alkali, please choose two point slope calibration, use two kind buffer solution.;
3. Before the calibration, please read the instruction carefully , and prepare the standard buffer solution;
4. The meter will directly input calibration method, please refer the calibration steps.;
5. If the sensor is stored for a long time, please put the sensor in the water or KCL solution for 12 hours, and then calibrate it.

3.3.2 Buffer Solution Calibration

1. Choose the correct buffer solution to calibrate.;
2. Press the  for 3 seconds and enter into buffer solution calibration interface under pH measurement interface, input the current temperature , Press  save and enter into buffer solution calibration by pressing
3. When the “C10.0” and pH blinks, it means to enter into the buffer solution selection; press “  ” and enter into the next calibration menu.
4. Put the clean sensor into the buffer solution for 3-5 minutes.
5. Press“  ”to save the settings and enter into the next calibration, fetch the sensor out and clean, then put it into the suggestive buffer solution and finish the calibration in turn.
6. Check the buffer solution and recalibrated when “ ERRO ” comes out and then recalibrate.


Please follow the below detailed Calibration Process:




 means skip this operation; and “  ” means enter the operation.

3.3.3 Off-line Calibration

When field calibration is not good to carry on, the calibration to sensor's slope by using lab devices and buffer solution is recommended. Take notes of corresponding mV value of buffer solution in room temperature. Input of this record value to off-line calibration is called as manual input calibration.


Press “

```
graph TD; A[pH measurement] -- "Long-press 

The diagram illustrates the off-line calibration process. It starts with a 'pH measurement' screen. A long-press of the right arrow icon leads to the 'Off-line Calibration' screen. From there, the user is presented with six different pH buffer solutions: 10.00, 9.18, 7.00, 6.86, 4.01, and 4.00. For each solution, the user is prompted to 'Input mV value'. After entering the mV value, the user presses the enter icon to proceed to the next step.


```

Incorrect mV value input during calibration process, the screen will display “Err”.

Press “

22

4. Maintenance

4.1 Sensor Maintenance

1. To avoid long time dry storage, the sensor should be kept in the protection cap with KCl solution -3.0mol/L.;
2. Clean the sensor and calibrate the same on the indicator regularly.;
3. In case of suspended stuff attached, wash it with HCl or NaOH solution in 0.01mol/L and rinse with clean water;
4. If the above methods are invalid to reset slope, it means that the sensor should be replaced.
5. The platinum surface of ORP sensor should be shining. In case of smudginess, wash it with HCl or NaOH solution in 0.01mol/L and rinse with distilled water. If the surface of platinum is polluted and formed oxidation film, the platinum could be polished with sand paper and toothpaste, then clean it with distilled water
6. Place the sensor into 3.5 mol/L KCl solution for 6 hours before usage;
7. Buffer solution show different values at different temperatures, so please confirm the temperature of buffer solution at calibration.

4.2 Usage of sensors

1. pH/ORP sensors are consumables .Long time storage is not suggested
2. Sensitive glass film (glass bubble) is forbidden to use when the medium with hydrofluoric acid, fluorine and high-concentration sulfone.
3. pH/ORP sensors are not allowed to measure any organic solution which will damage or dissolve PC or ABS (such as carbon tetrachloride, trichloro ethylene or tetrahydrofuran etc....);
4. The chemical part of the sensor is glass, please protect carefully during transportation and storage.
5. Please clean the sensor at a regular intervals by using swab and neutral cleanser; do not use the acid and corrosive solution to clean the sensor
6. High-temp. pH glass sensor is recommended for biopharmacy and high-pressure autoclaved sterilization. The protection part is optional
7. pH signal is weak signal, the connecting cable should run separately. Do not mix the cable together.
8. Measurement cable is for special use, it's not allowed to cut or lengthened privately or replaced by other cables.
9. Install a filter before sensor when there is molecule in the medium to protect the pH glass bubble.

4.3 Instrument and probe fault common trouble shooting

Problem	Possible causes	Trouble shooting
No display when powered on	A. Bad connection of power supply B. Instrument fault	A. Check to see if there is 24V voltage between power terminals 24VA and 24VB. B. Check by professional technicians.
Unstable display	A. Improper wire connection of sensor B. Air bubbles in the pipeline C. Unstable water quality D. Badness connection	A. Refer to the instruction manuals B. Select the proper measurement point or change the pipeline C. Stabilizing the water quality D. Check the connector to be connected
Big deviation	A. Sensor fault B. The cable is damaged C. Incorrect installation D. Setting problem	A. Take out the sensor from the pipeline and Calibrate B. Replace the sensor which can not be calibrated C. find the correct measurement point and use the flow device D. Reset the parameter of the instrument
Difference at transmitting data	A. loop resistance is too large incorrect connection mode B. unusual power supply C. wrong transfer volume	A. Replace the cable to reduce the loop Resistance check the connection right or not B. Powered by the standard C. Reset the transferred volume

5. Package Contents

Transmitter	1pc (including quick clamp)
sensor	1pc (cable length 5 m)
Operation manual	1pc