



User Manual

Online pH/ORP Controller

pH/ORP-1800



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User Instruction

- Please read the manual carefully before use the instrument.
- To make measure more accurate, the electrode should be calibrated periodically, if match glass electrode, its guarantee is half year, one year after out of factory, no matter it is used or not, its performance will be effected and should be replace.
- The first time use the pH electrode or it is stay for long time not used, before use it should be dip in 3mol/L muriate solution for 24hours.
- During use process, if found the instrument work not properly or broken, please contact with the supplier, please do not repair it by yourself.
- This instrument only has one electrode input terminal, if need to measure pH, please install pH electrode; if need to measure ORP, please install ORP electrode.
- Before calibration, please connect power on the instrument and wait 20 minutes for preparation.

I Introduction

Industrial PH Meter is the intelligent upgrade product of industrial pH testing instrument. It could measure and control pH value of waste water continuously, the pH meter is applicable for municipal waste water treatment, chemistry, printing and dyeing, paper, medicine, plating and environmental production etc.

In accordance with the environment and characteristics of water industry, as well as the international power supply standard, considering the electricity design in special environment, the pH meter could be supplied with power 220V AC, and safe low voltage 24V AC,24V DC for selection.



Main Characteristics:

- ✧ Chinese and English language display
- ✧ Measure pH/ORP, high/low limit control, current output, digital communication
- ✧ It could be set automatic or manual temperature compensation
- ✧ pH high limit alarm, low limit alarm, double relay, alarm delay could be adjust
- ✧ Instrument mode isolated transmitting port, max circle resistance bigger than 300Ω
- ✧ Sound alarm function could be set;
- ✧ Back light of LCD could select power saving mode, timing automatic off
- ✧ High performance CPU, good electromagnetic compatibility
- ✧ Password management avoid non-professional person operation

II Main Technical Index

Measure range: pH(0 – 14 pH) ; ORP(-1900 - +1900 mV)

Accuracy: ± 0.02 pH; ± 1 mV

Resolution: 0.01pH; 1mV

Stability: ≤ 0.02 pH/24hr ; ≤ 3 mV/24hr

pH standard solution: 4.01/6.86/9.18

Display: 128 * 64 dot matrix LCD

Temperature compensation: 0–100 °C Manual/ Auto (NTC10K)

Signal output: Isolated 4-20mA signal output ;

max circle resistance 300Ω

Alarm output: high and low limit alarm contact each group



(5A/250 V AC) ,normal open contact relay

Power supply: AC 220V $\pm$ 10% 50Hz, DC 24V(optional)

Power consumption: $\leq$ 3W

Working environment: (1) temperature 0 $\sim$ 60 $^{\circ}$ C

(2) humidity $\leq$ 85%RH

Outline dimension: 96 $\times$ 96 $\times$ 110mm(height $\times$ width $\times$ depth)

Hole size: 92 $\times$ 92mm(height $\times$ width)

III Fixed Support Installation

Insert the controller from the front panel, install the fix clamp (up and down), tighten with the screws.

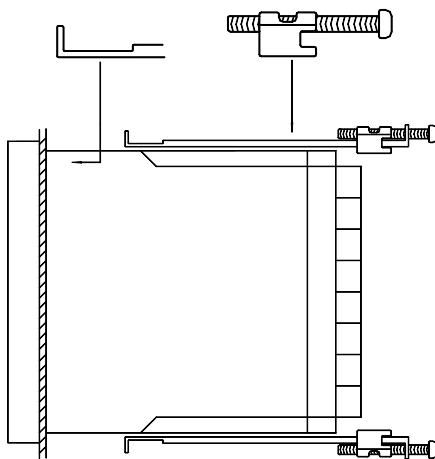


Chart 1 Fixed support installation



IV Wire Connection

1	TEMP	●INPUT	LO	9
2	TEMP			10
3	REF		HI	11
4	NC			12
5	A		NC	13
6	B		NC	14
7	+		N	15
8	-		L	16

Chart 2 Rear terminals

V Connection Instruction

- ◆ Electrode measure terminal (**transparent wire**) screw on the copper post **beside INPUT**

1. TEMP1: Temperature compensation port **Red wire**
2. TEMP2: Temperature compensation port **Yellow wire**
3. REF: Reference electrode(black) port **Black wire**
4. NC: Undefined
5. A: 485 communication port
6. B: 485 communication port
7. mA+: 4~20mA output +
8. mA-: 4~20mA output -
9. LO:low limit alarm normal open contact 1



10. LO: low limit alarm normal open contact 2
11. HI: high limit alarm normal open contact 1
12. HI: high limit alarm normal open contact 2
13. NC: undefined 14. NC: undefined
15. N: 220V power connection 16. L: 220V power connection

VI Electrode Installation

1、Installation method and Attention-matter

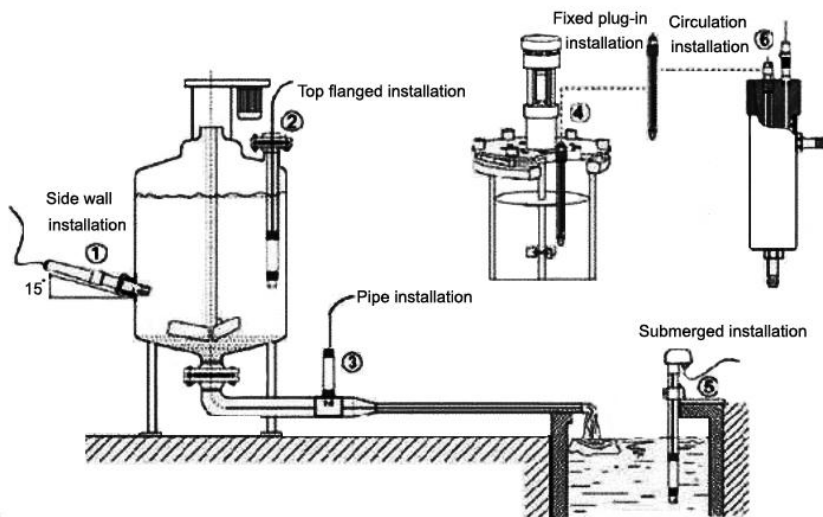


Chart 3 (Several common method of installation)

In order to make sure the probe measure the real value on the pipe, bubbles should be avoided ,otherwise the value will be not accurate, please install according to the following chart:



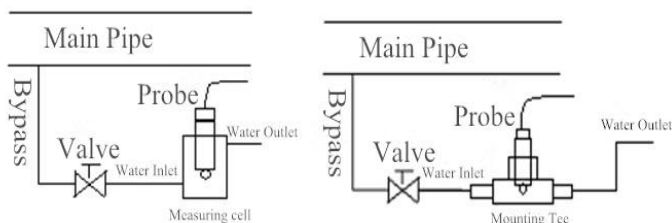


Chart 4 (attention matters of pipe installation)

Note:

- (1) The probe bypass pipe of the main pipe, valve should be installed in front of it to control the water flow speed, flow should be Relatively slow, generally there are steady water flow out of the outlet port is ok. The probe should be installed vertically and should be insert into the active water flow, outlet port should be higher than inlet port which could make sure the probe was in the water solution absolutely.
- (2) The probe should be calibrated before installation.
- (3) The measure signal is weak electric signal, its cable should be contributed separately, it is not allowed to contributed together in same cable or terminal with other power line, control line etc, which is to avoid interrupt or broke the measure unit.
- (4) If the measure cable should be length, please contact with the supplier or indicated before place order (generally not longer than 10m)

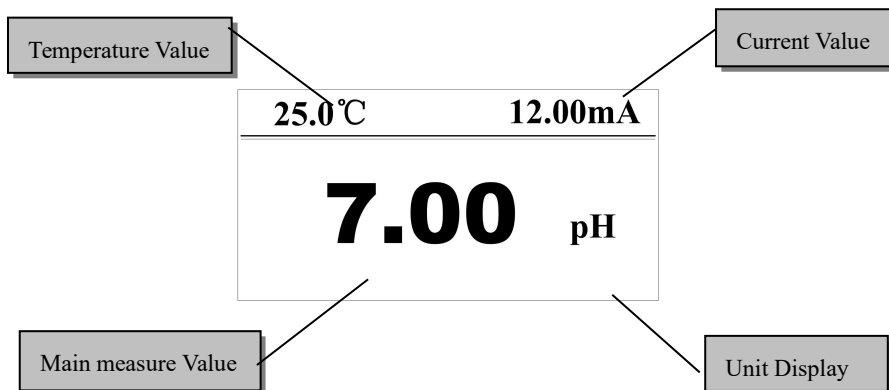
VII Correct setting

1. Soft key function



Soft key	Key function	Function description
ESC	Return key	Check parameters setting under measure state; return to the upper interface
→	Right shift key	Select the parameters digit circularly
↑	Up shift key	Select sub-menu circularly; change the digit value and parameter transfer
OK	Confirm key	Under measure state to enter password input interface, and then enter menu setting; confirm selected sub-menu; confirm/save selection and value
CAL In menu	Cancel key	To exit the current parameters setting interface or modify state

2、Main Interface Display



Note: Under main interface through press “ **ESC** ” to shift to **browsing interface**, no need to enter 'menu setting' interface ,it could **browse setting value**.



3、Browsing Interface Display

Sensor : PH / ORP sensor High on: 14.00 PH High off: 13.50 PH ESC ↓	Temp. : 25.0 °C Low on: 3.00 PH Low off: 3.50 PH ESC ↓
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Note: Browsing interface through press “  ” could check parameter state in turn, through press “  ” return to main interface.

4、Main Menu Interface Display

Menu Setting

➤

1. Measure Parameter

2. Control Parameter

3. Trans Parameter

4. Password Change

5. Communication setting

6. Backlight Setting

7. Alarm Sound

8. Factory reset

9. Language

10. Sensor calibration

ESC

↓

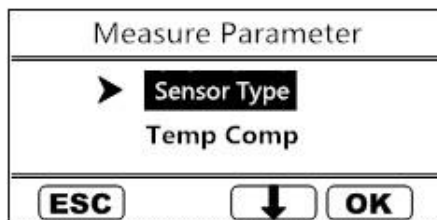
OK

Under main interface, press “  ” key to enter user login interface, after input password to enter “ setting menu ” interface, this interface menu instruction as follow:



NO.	Menu Name	Menu content instruction
1	Measure parameter	Set sensor type(pH/ORP)transfer, temperature compensation mode setting; for example manual: to input the test media temperature value manually
2	Control parameter	Set control of pH and ORP over limit
3	Transmission parameter	Set pH and ORP transmission capacity start range transferring
4	Password change	Reset logon password
5	Communication setting	Set communication baud rate and meter address
6	Backlight setting	Set backlight normal ON or delay off
7	Alarm sound	Set alarm on and off
9	Factory parameter	Recovery the instrument parameters to factory setting
8	Language	English /Chinese
10	Sensor calibration	This menu only open when select pH sensor

5、Measure Parameter Interface:



Note: press “” to select to enter “sensor type” or “temperature compensation” parameter setting, press “” to enter.

6、Control parameter interface

Control Parameter	
➤	Alarm High
	Alarm Low
	Delay Alarm
	 

Note: press“” can select and enter “high alarm setting” or“ low alarm setting” parameter interface, press “” to enter and set alarm value.

High on
14.00 PH
   

High OFF
13.50 PH
   

7、Transmission Parameter Interface

4mA corresponding value
00.00 pH
   

20mA corresponding value
14.00 pH
   

Note: press“”and“”input parameter, press“”to save.



8、Password Change Interface:

Old Password	New Password
0 0 0 0	0 0 0 0
ESC → ↑ OK	ESC → ↑ OK

Note: Input **old password** (1000) firstly, if it was input correctly then it will enter interface of input new password, after change password press “**OK**” to save.

9、Communication Setting:

Communication Setting	Communication Setting
Baud rate: 9600 bps	Address: 001
CAL ↑ OK	ESC → ↑ OK

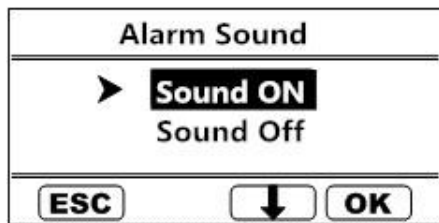
10、Backlight setting interface:

Backlight Setting	Delay Time
➤ Delay Off Normal ON	6 0 S
ESC ↓ OK	ESC → ↑ OK

Note: first to select backlight “delay off” or normal “ON”, if select delay off, then it need to input “delay time”.



11、 Alarm Sound Interface:



Note: select alarm sound “ on ” or “ off ”, then press **OK** ” to save.

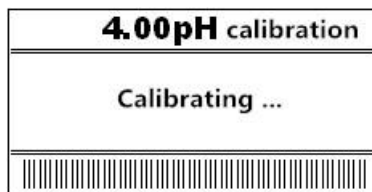
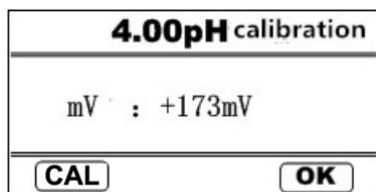
12、 Factory default parameter

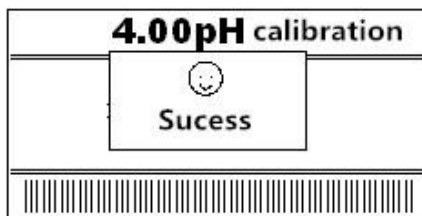
Menu name	Setting range	Factory parameter
Sensor type	PH sensor/ORP sensor/antimony sensor	PH sensor
Temp. comp	Auto/manual	manual
Manual temp.comp value	0 ~ 100 ℃	25 ℃
High alarm ON	pH:1.00 ~14.00 pH	pH: 14.00 pH
	ORP: + 10 ~ + 1999 mV	ORP: + 1900 mV
HI alarm off	pH: 0.00 ~ 13.99 pH	pH: 13.50 pH
	ORP: 0 ~ + 1998 mV	ORP: + 1800 mV
Low alarm ON	pH: 0.00 ~ 13.00 pH	pH: 3.00 pH
	ORP: - 1999 ~ - 10 mV	ORP: - 1800 mV



Low alarm OFF	pH: 0.01 ~ 14.00 pH	pH: 3.50 pH
	ORP : - 1998 ~ 0 mV	ORP: - 1900 mV
4mA corresponding value	pH: 0.00 ~ 13.00 pH	pH: 0.00 pH
	ORP : - 1999 ~ 0 mV	ORP: - 1999 mV
20mA corresponding value (bigger than 4mA value)	pH: 0.01 ~ 14.00 pH	pH: 14.00 pH
	ORP: 0 ~ +1999 mV	ORP: +1999 mV
User password	0 ~ 9999	1000
Baud rate	2400、4800、9600	9600
Meter address	2 ~ 99	001
Backlight setting	Normal ON/Delay	Delay
Delay time	5 ~ 99 S	60 S
Alarm sound	ON / OFF	ON

13、PH Sensor Calibration Interface:





Note: this part operation refer to “instrument calibration” part.

14、Relay Alarm

Relay active when measure value bigger (or smaller) than Alarm ON;
Release when measure value lower (or higher) than Alarm OFF,

VIII Maintenance

1. PH part

1) Maintenance of instrument

- The input terminal of instrument (insert port of electrode) should be keep dry and clean, avoid dust and moisture invade.
- It is not allowed to put the electrode in protein solution and acidic fluoride for long time, avoid touch with silicone oil.
- After long time use, if we found the slope is lower, it could be put the electrode into 4% HF solution(hydro fluoride acid) 3-5 seconds, and then clean with distilled water, then dip in 0.1mol/L hydrochloric acid, that will renew the electrode.



- To measure more accurate, the electrode should be calibrated periodically and wash with distilled water.
- The instrument should be installed at a dry place or in a electric cabinet, to avoid water drop spatter or wet which will cause leakage of electricity or measure errors.

2) Calibration of instrument:

- Before calibrate, check if the wire connection of instrument is correct or not, power on and wait 20mins.
- Prepare three kind of standard solution:4.00pH 6.86pH 9.18pH
- Clean the electrode with distilled water and dry with filter paper, put the electrode into standard buffer solution 4.01PH, mix it slowly till the display value is steady.
- Through the menu to enter electrode calibration interface, the screen display '4.00PH calibration', in the middle it display electrode output mV voltage value, till the mV is steady and press ' confirm key' to operate calibration, when calibration finished successfully it will indicate sucess.
- Repeat the upper two steps, calibrate the 6.86 and 9.18PH . After finish each step calibrate, electrode should be cleaned by distilled water and dry with filter paper, then it can be put into the next solution to calibrate.
- After finish these calibration, it will enter temperature calibration interface, if it is automatic temperature compensation, it display the test media temperature value; if it is manual temperature



- compensation, we could input the temperature (of tested solution) manually, and press 'confirm key' to save parameters and finish calibration, if press 'return key' at this time, it come back to main interface, the calibrated parameters we did just now can not be saved.

2. ORP part

1) Preparation method of ORP standard solution

- 86mV : put a slight excess quinhydrone into standard 7.00pH buffer solution
- 256 mV : put a slight excess quinhydrone into standard 4.00pH buffer solution
- The save time of standard solution is 3 days

2) ORP electrode checking:

- Not like pH electrode need be calibrated by standard solution, the ORP electrode need to use standard solution to check, the most important is to check if the electrode is workable or not.
- Clean the electrode with clear water and dry it with soft towel.
- Put the ORP electrode into the mV standard solution which is prepared. wait till the reading is steady.
- Watch the display value is close to mV standard solution or not, if the errors is within range $\pm 35\text{mV}$, the electrode could be used otherwise it need to be replaced.



IX 4-20mA current output formula

1. PH Current output formula:

- Factory setting define output current value is :0 pH is corresponding value of 4 mA; 14 pH is corresponding value of 20 mA.
- $I = (D - 4 \text{ mA corresponding value}) \times (16 / (20 \text{ mA corresponding value} - 4 \text{ mA corresponding value})) + 4.00$
- $I = (D - 0) \times (16 / 14) + 4.00$
- Note: I is output current value $4 \text{ mA} \leq I \leq 20 \text{ mA}$
- D is pH value displayed by the instrument $0.00 \text{ pH} \leq D \leq 14.00 \text{ pH}$

2. Formula of ORP current output:

- Factory setting define the output current is :-2000mV is corresponding value of 4 mA; +2000mV is corresponding value of 20 mA.
- $I = (D - 4 \text{ mA corresponding value}) \times (16 / (20 \text{ mA corresponding value} - 4 \text{ mA corresponding value})) + 4.00$
- $I = (D - (-2000)) \times (16 / (+2000 - (-2000))) + 4.00$
- $I = (D + 2000) \times (16 / 4000) + 4.00$
- Note: I is output current value $4 \text{ mA} \leq I \leq 20 \text{ mA}$
- D is ORP value displayed by the instrument $-2000 \text{ mV} \leq D \leq +2000 \text{ mV}$

X Fault Judgments and Trouble Clearing:

(1) No display of the controller?

Answer: the power is not well connected or blown fuse. Check the



power supply line and fuse.

(2)Value can be displayed but not stable ?

Answer: electrode cable is wet or ceramic of electrode is polluted.
Check electrode cable, clean ceramic core(0.1mHCL).

(3)Solution PH4.01 and PH6.86 can not be adjusted ?

Answer: Outside of electrode is polluted, electrode cable is wet, electrode is broken or there is cracks, ceramic core of electrode is blocked. Clear electrode (0.1mHCL), check the electrode cable, replace electrode, clean ceramic core (0.1mHCL).

(4)Numbers response slow ?

Answer: thin film of electrode or ceramic core is polluted. Clean the whole electrode.

(5)The actual pH value change a lot but the instrument display pH value change very small?

Answer: ceramic core of electrode is blocked, electrode fall off/perish, slow response. Clean electrode (0.1mHCL), use recovery solution.

(6)Display value of instrument not change ?

Answer: electrode broken, electrode cable short circuit. replace electrode, check electrode cable.

(7)Relay not active or pH value not change after dosing chemicals ?

Answer: Relay broken; wrong setting of the instrument and chemical solution is not enough. Contact supplier to replace relay, change settings, add chemical solution.



XI Complete Instrument

A PH/ORP controller -1

A PH/ORP sensor -1

An Operation manual -1

A fixing clamp-1

Three packet PH calibration powder