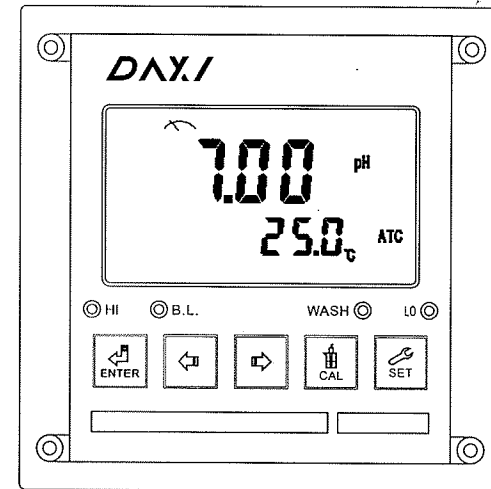


**DAXI**

Dongguan Daxin Electronic Technology Co.,Ltd



**INDUSTRIAL PH METER**

# User's Manual

Mode: PC-9903RS

## Remind

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- Please read this manual carefully before using this instrument.
- In order to make the measurement more accurate, the instrument must calibrate the sensor frequently. The shelf life of the glass sensor is half a year. One year after leaving the factory, its performance will be affected whether it is used or not, and it should be replaced in time.
- The pH sensor used for the first time or the pH sensor stopped for a long time must be soaked in 3mol / L potassium chloride solution for 24h before use.
- If the instrument works abnormally or is damaged during use, please contact the dealer and do not repair it by yourself.
- The instrument has only one sensor input. When pH mode is selected, pH sensor shall be installed, and ORP sensor shall be installed when ORP mode is selected.
- Please power on the instrument and preheat it for about 20 minutes before performing the calibration work.

## FEATURES

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PH meter is an intelligent upgraded product of industrial pH meter, which can continuously measure and control the pH value of sewage. This device is suitable for urban sewage treatment plant, chemical industry, printing and dyeing, papermaking, pharmacy, electroplating, environmental protection and other fields.

This product according to the environment and characteristics of the water industry, combined with the international power supply standards and considering the electrical design specifications of special environment, 220V AC (a) and safe low-voltage 24V AC and 24V DC (b) power supply options are added.

### Main features of this product:

- Factory default configuration English menu interface;
- It can carry out pH / ORP measurement, upper and lower limit control, current output, RS485 communication and 4-20mA output are optional;
- It can be set as automatic temperature compensation or manual compensation;
- PH high and low limit alarm two-way relay, and the hysteresis can be adjusted freely;
- Isolate the transmission port in instrument mode, and the maximum loop resistance is greater than 300 Ω;
- Sound alarm switch function, set on or off through interface options;

- The LCD backlight can select energy-saving mode and turn off automatically at fixed time;
- High performance CPU, good EMC performance;
- Password management function to prevent misoperation by non professionals.

### Main technical indicators:

1. Measure Range: pH(0 - 14 pH) ; ORP( -1900 - +1900 mV);
2. Accuracy: ±0.02pH; ±1mV;
3. Resolution: 0.01pH; 1mV;
4. Stability: ≤0.02 pH/24h; ≤3 MV / 24h;
5. PH standard solution: 4.01/7.00/10.00;
6. Display mode: 128 \* 64 dot matrix LCM;
7. Temperature compensation: 0-100 °C; Manual / automatic (ntc10k);
8. Signal output: 4-20mA isolation protection output, maximum loop resistance 300 Ω; Or RS485 modbus RTU communication.
9. Alarm output: one set of high and low limit alarm contacts (3A / 250 V AC), normally open contact relay;
10. Power supply: AC 220V ± 10% 50Hz;
11. Power consumption: ≤ 3W;
12. Environmental: temperature 0 ~ 60 °C; humidity ≤ 85% RH;
13. Outline dimension: 144mm × 144mm × 115mm (H × W × D);
14. Hole size(H x W): 138 x 138mm (H x W).

## ASSEMBLY AND INSTALLATION

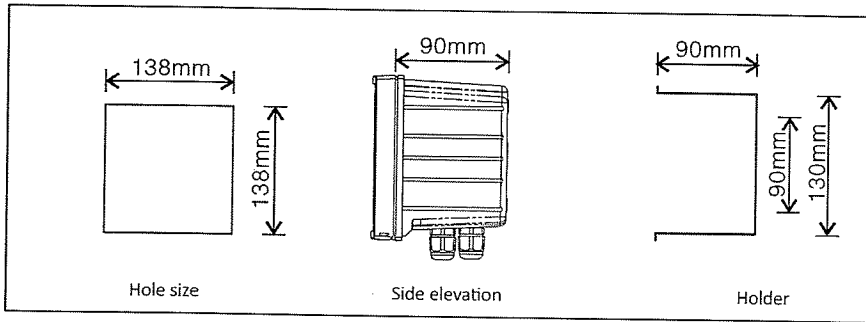
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### 1. Controller installation

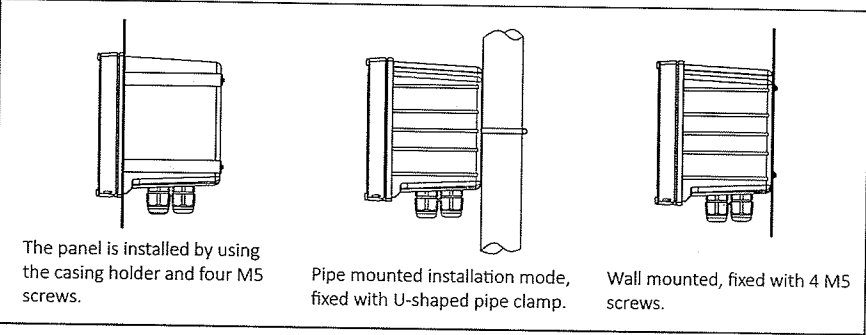
**Controller fixing:** The controller can be disk mounted, pipe mounted and wall mounted.

**Panel installation:** please leave a 138 \* 138mm square hole on the panel of the distribution box in advance, insert the fixing frame in the accessories from the rear, and fix the four M5 screws.

#### 1.1 Panel type installation reference drawing

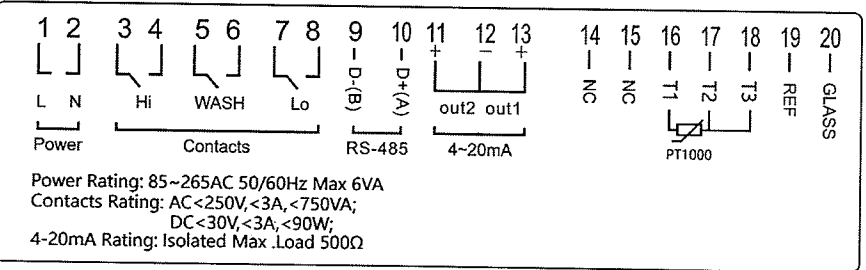


**1.2 Installation diagram of panel mounted, pipe mounted and wall mounted instruments**



**2. Backplane wiring Description:**

**2.1 Backplane wiring diagram:**



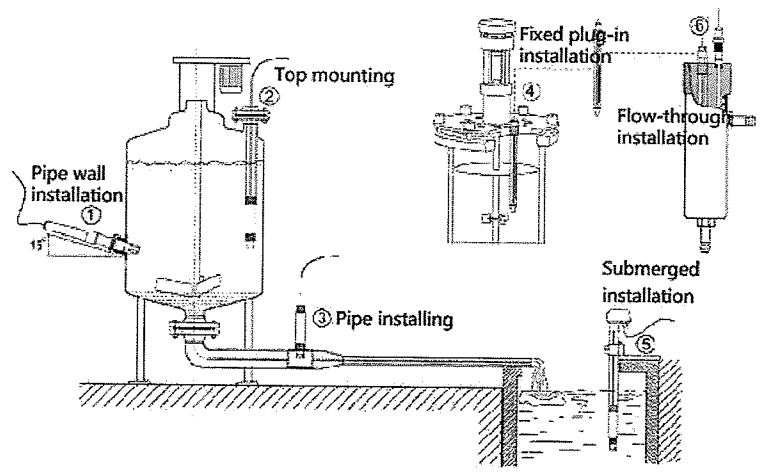
**2.2 Backplane contact Description:**

NO.	Contact	Wiring instructions
20	GLASS	Connected to the central axis of pH / ORP electrode signal line.
19	REF	Connect the network cable of pH / ORP electrode signal line.
18	T3	Connected to the other end of the temperature probe;
17	T2	In case of two-wire connection, this contact must be short circuited with REF (short circuit piece is contained in the attachment.)

		During the three wire connection method, the short-circuit piece must be removed, and this contact must be connected to the solution grounding.
16	T1	Connect one end of the temperature probe;
15	NC	Empty
14	NC	Empty
13	(1) 4-20mA +	The measured value corresponds to the "+" end of the current output contact;
12	4-20mA -	Measured value and temperature current output contact "-" end;
11	(2) 4-20mA +	Temperature corresponds to current output contact "+" end;
10	D+ (A) RS485	Connect to D + (A) of RS485 output (only applicable to PC-1001RS);
9	D- (B) RS485	Connect to D - (B) of RS485 output (only applicable to PC-1001RS);
7, 8	Lo	Low point control external relay contact;
5, 6	WASH	Relay contact of external cleaning device;
3, 4	Hi	High point control external relay contact;
1, 2	L N	Power terminal.

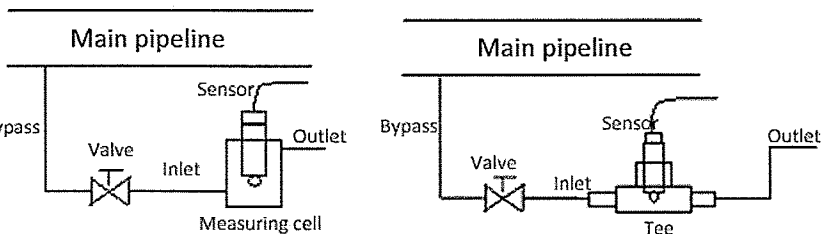
**SENSOR INSTALLATION**

**Installation method and attentions:**



**Several common installation methods**

In order to ensure that the sensor can correctly measure the pH value on the pipeline, avoid data error caused by bubbles in the measuring cell. Please install it strictly according to the following figure:



**Precautions for pipeline installation:**

Note: (1) The sensor shall be installed in the bypass of the main pipeline, and the valve shall be installed at the front end to control the flow rate. The flow shall be as small as possible. Generally, as long as there is a steady drop of aqueous solution at the outlet. The sensor shall be installed vertically and deep into the active water, and the water outlet shall be higher than the water inlet to ensure that the electrode is completely immersed in the solution.

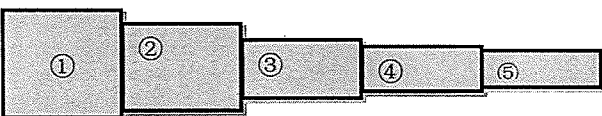
(2) The sensor shall be calibrated before installation.

(3) The measurement signal is a weak electrical signal, and its acquisition cable shall be routed independently. It is forbidden to connect with the power line and control line in the same group of cable connectors or terminal boards to avoid interference or breakdown of the measurement unit.

(4) If the cable needs to be lengthened, please contact the manufacturer or make an agreement before supply (generally no more than 10m).

**Precautions for extension and shortening of sensor signal line:**

Anatomical drawing of cable structure (without temperature compensation):



- ① Outer skin of electrode wire (BLACK)
- ② Electrode wire network wire (R E F)
- ③ Black conductive rubber (BLACK)
- ④ White protective tube (WHITE)
- ⑤ Centerline (INPUT)

Note: if the electrode signal line is too long on site and needs to be cut off, the No. 3 conductive rubber skin must be removed after cutting short. Otherwise, it is easy to cause a short circuit

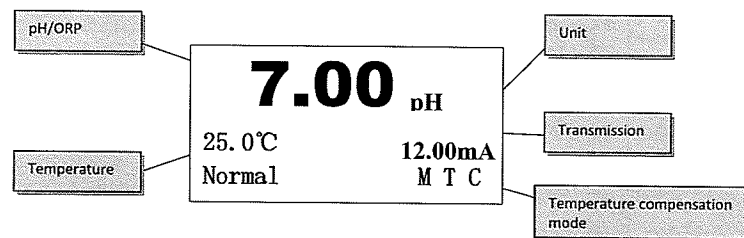
between the measuring line of electrode 5 and the reference line of electrode 2, which cannot be measured! If you need to extend, please contact the supplier!

**CORRECT SETTING**

**1. Front panel keys**

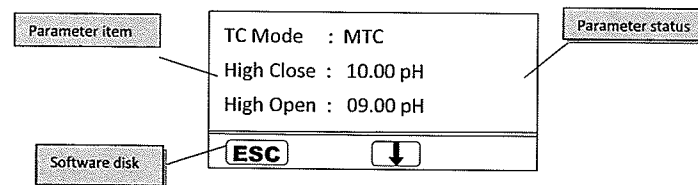
Button	Function	Function description
<b>ESC</b>	Return key	Check relevant parameter settings in measurement status; Return to the upper interface between the upper and lower interfaces related to "setting menu";
<b>→</b>	Right-shift	Cycle to select the digit of the parameter;
<b>↑</b>	Up-shift	Select relevant submenu; Change the size of the selected parameter digit value and parameter conversion;
<b>↓</b>	Down-shift	Select relevant submenu; Change the size of the selected parameter digit value and parameter conversion.
<b>OK</b>	Enter	Enter the main menu in the measurement state; Confirm to select the sub menu; Confirm options and parameters;

**Part 1: Main interface display**



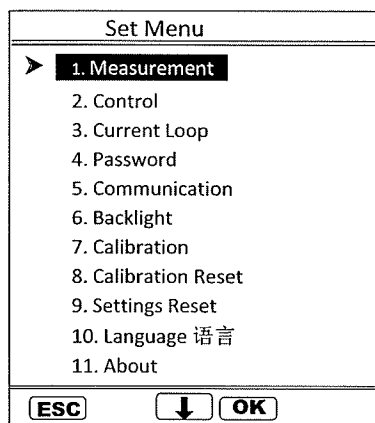
Note: the main interface can be switched to the browsing interface through "↓" and the setting parameters can be browsed without entering the menu setting interface.

**1. The browsing interface displays:**



Note: In the browsing interface, you can view the parameter status in turn through "↓" and switch back to the main interface through "ESC".

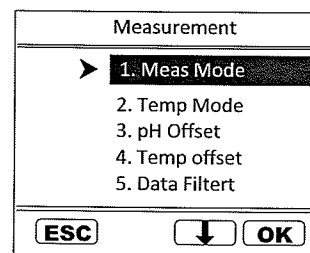
2. The main menu interface displays: enter the password and enter the main menu interface. The factory default password is "1000".



Note: In the main display interface, press the "ESC" key to enter the user login interface, enter the password and enter the "Set Menu" interface. The menu description of this interface is as follows:

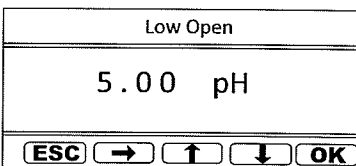
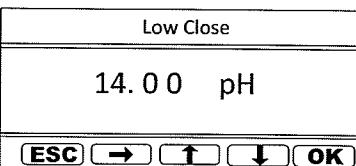
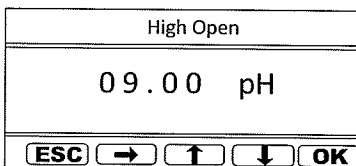
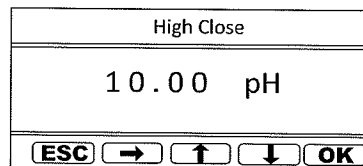
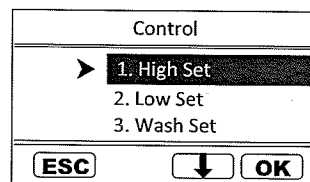
S/N	Menu name	Introduction of menu contents
1	Meas. Parameter	The sensor type "pH and ORP" can be converted; Setting of temperature compensation mode; If manually, enter the temperature value of the measured solution;
2	Ctrl. Parameter	Set the control of pH overrun or ORP overrun;
3	Current Loop	Set the initial range migration of pH and ORP transmission volume;
4	Password	Reset the login password;
5	Communication	Set communication baud rate and instrument address;
6	Backlight	Set the backlight to be normally on or delayed off;
7	Calibration	This menu is only available when the electrode type is pH;
8	Calibration Reset	Recalibrate the settings;
9	Setting Reset	Resetting device;
10	Language	Chinese/English
11	About	Logo/Model:PC-9903/Version:2.0

### Part 2: Measurement interface



Note: Press "↑" to enter the parameter setting of "electrode type" "OK" "temperature compensation", and press "OK" to enter.

### Part 3: Control interface

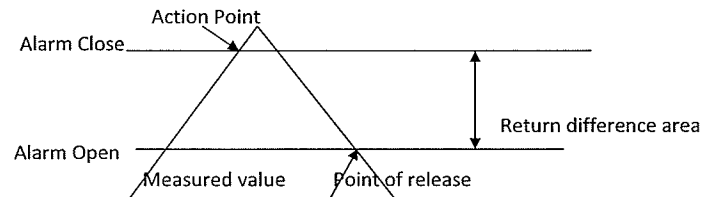


Relay Function	
▶	1. Close
	2. Control Wash
	3. Control Alarm
ESC	↑ ↓ OK

Note: you can choose to enter the "high relay" or "low relay" parameter interface through "down", press "OK" to enter, and then set the alarm value.

**Part 4 : Relay alarm**

The relay acts when it is greater than (or less than) the alarm pull-in value, and releases when it is lower than (or greater than) the opening limit. The relay action diagram is as follows:



When relay drives inductive load, please install intermediate relay to prevent contact from being broken down and ionized by inductive back EMF and burning contact.

**Part 5: Current Loop interface**

Current Loop	
▶	1. 4-20mA Channel 1
	2. 4-20mA Channel 2
ESC	↑ ↓ OK

Sign Source	
▶	1. pH Output
	2. Temp Output
ESC	↑ ↓ OK

pH output setting:

4 mA Value	
0.0 pH	
ESC	→ ↑ ↓ OK

20 mA Value	
14.00pH	
ESC	→ ↑ ↓ OK

Temp output setting:

4 mA Value	
+ 0.0 °C	
ESC	→ ↑ ↓ OK

20 mA Value	
+ 70.0 °C	
ESC	→ ↑ ↓ OK

Note: input parameters through "→" and "↑", and press "OK" to save.

**Part 6: Password change interface**

Old Password	
1000	
ESC	→ ↑ OK
New Password	
0000	
ESC	→ ↑ OK

Note: first input the old password. If the input is correct, you can enter the "New Password" interface. After the password is changed, press "OK" to save.

**Part 7: Communication**

Communication	
▶	1. Address
	2. Baud
ESC	↑ ↓ OK

Address
█ 1
ESC → ↑ OK

Baud
1 4800
2 9600
3 19200
4 38400
ESC → ↑ OK

Part 8: Backlight setting

Backlight
▶ 1 Normally On
2 Timing Off
ESC ↓ OK

Turn-Off Time
█ 0 min
ESC → ↑ OK

Note: first select "Normally On" or "All Time". If "Timing Off" is selected, enter "Turn-Off Time".

Part 9: Calibration

Calibration Mode
▶ 1 TECH
2 NIST
ESC ↑ ↓ OK

"TECH" calibration

Standard pH
▶ 1 4.00-7.00 pH
2 7.00-10.00 pH
ESC ↑ ↓ OK

7.00 pH
0.00 mV
ESC ↑ ↓ OK

7.00 pH
Waiting
ESC OK

4.00 pH
173.00 mV
ESC ↑ ↓ OK

4.00 pH
Waiting
ESC OK

pH 4.0
Succeed
ESC OK

"NIST" calibration

Standard pH
▶ 1 4.00-6.86 pH
2 6.86-9.18 pH
ESC ↑ ↓ OK

6.86 pH
20.21 mV
ESC ↑ ↓ OK

6.86 pH
Waiting
<b>ESC</b> <b>OK</b>

4.00 pH
173.00 mV
<b>ESC</b> ↑ ↓ <b>OK</b>

4.00 pH
Waiting
<b>ESC</b> <b>OK</b>

pH 4.0
Succeed
<b>ESC</b> <b>OK</b>

Calibration Reset
Calibration Reset?
<b>ESC</b> <b>OK</b>

Settings Reset
Settings Reset?
<b>ESC</b> <b>OK</b>

Part 12: Language Select

Language 语言
▶ 1 中文
2 English
<b>ESC</b> ↑ ↓ <b>OK</b>

Part 13: Factory Default

Menu Name	Set Range	Factory Default
Sensor type	PH sensor / PH-Sb(antimony) sensor/ ORP sensor	(Unchanged)
Temperature compensation	ATC / MTC	MTC
Manual temperature compensation value	-20.0 ~ 120.0 °C	25.0 °C
High Close	pH: 1.00 ~ 14.00 pH ORP: +10 ~ +1999 mV	pH: 10.00 pH ORP: +500 mV
High Open (Less than CLOSE value)	pH: 0.00 ~ (High Close Value) ORP: 0 ~ (High Close Value)	pH: 9.00 pH ORP: +400 mV
Low Close	pH: 0.00 ~ 13.00 pH ORP: -1999 ~ -10 mV	pH: 4.00 pH ORP: -500 mV
Low Open (Greater than CLOSE value)	pH: (Low Close Value) ~ 14.00 pH ORP: (Low Close Value) ~ 0 mV	pH: 5.00 pH ORP: -400 mV
4 mA value	pH: 0.00 ~ 13.00 pH ORP: -1999 ~ 0 mV	pH: 0.00 pH ORP: -1999 mV
20 mA value (Greater than 4mA value)	pH: (4 mA value) ~ 14.00 pH ORP: 0 ~ +1999 mV	pH: 14.00 pH ORP: +1999 mV
User password	0 ~ 9999	1000
Baudrate	4800/9600/19200/38400	9600
Localhost	1 ~ 127	1
Backlight Setting	All time / delay	All time
Delay Time	1 ~ 99 min	10 min



# MAINTENANCE

## Part 1 : pH part

### 1) Instrument maintenance:

- The input end (measuring sensor socket) of the instrument must be kept dry and clean to prevent the invasion of dust and water vapor.
- Avoid immersing the sensor in protein solution and acidic fluoride solution for a long time, and avoid contact with organic silicone oil.
- If the slope of the sensor decreases slightly after long-term use, soak the lower end of the electrode in 4% HF solution (hydrofluoric acid) for 3 ~ 5 seconds, then wash it with distilled water and soak it in 0.1mol/l hydrochloric acid to renew the electrode.
- In order to make the measurement more accurate, the sensor must be calibrated and cleaned with distilled water frequently.
- The instrument shall be placed in a dry environment or control box to avoid instrument leakage or measurement error caused by water droplet sputtering or moisture.

### 2) Calibration of instruments:

- Before calibration, please check whether the instrument wiring is correct, and power on and preheat for 20 minutes;
- Prepare three standard solutions of 4.00ph, 7.00ph and 10.00ph;
- Clean the sensor with distilled water and suck it dry with filter paper, then insert the sensor into the standard buffer solution of 7.00ph, gently stir it for several times, and wait until the value displayed by the instrument is stable.
- Enter the sensor calibration interface through the menu, the screen displays "7.00ph calibration", and the MV voltage output by the sensor is displayed in the middle. After MV is stable, press "OK" for calibration, and "succeeded" will be prompted after calibration.
- Repeat the above two steps to calibrate 4.00pH and 10.00pH respectively. After each standard solution is marked, the srnsor must be cleaned with distilled water and sucked dry with filter paper before it can be put into the next standard solution.
- After the above calibration, it will automatically enter the solution temperature calibration interface. If it is automatic temperature compensation, the solution temperature measured by the electrode will be displayed. If it is manual temperature compensation, you can enter the solution temperature by pressing the key, press "OK" to save the parameters and complete the calibration.

If you press "ESC" at this time, you will exit to the main interface, and the previously calibrated parameters will not be saved.

Standard value of pH standard buffer solution

Temp °C	0.05mol/kg (Potassium hydrogen phthalate)	0.025mol/kg (Mixed phosphate)	0.01mol/kg (Sodium tetraborate)
5	4.00	6.95	9.39
10	4.00	6.92	9.33
15	4.00	6.90	9.28
20	4.00	6.88	9.23
25	4.00	6.86	9.18
30	4.01	6.85	9.14
35	4.02	6.84	9.11
40	4.03	6.84	9.07
45	4.04	6.84	9.04
50	4.06	6.83	9.03
55	4.07	6.83	8.99
60	4.09	6.84	8.97

## Part 2 : ORP part

### 1) Preparation method of ORP standard solution:

- 86mV: slightly excessive quinone hydroquinone is added to the standard 7.00ph buffer;
- 256 mV: add slightly excessive quinone hydroquinone into the standard 4.00 pH buffer;
- The storage time of standard solution is 3 days.

### 2) ORP sensor detection:

- ORP sensor does not need to be calibrated with standard solution like pH sensor, but MV standard solution should be used to check ORP sensor. The most important purpose is to see whether the sensor is effective;
- Clean the sensor with clean water and dry it with a soft towel;
- Immerse the sensor into the MV standard solution and wait until the display is stable;
- Check whether the displayed value is close to MV standard solution. If the error is within  $\pm 35mV$ , the sensor can be used normally, otherwise the sensor must be replaced.

## 4-20mA CURRENT OUTPUT CALCULATION FORMULA

### Part 1 : pH current output calculation formula:

- When the machine leaves the factory, the output current is defined as:  
0 pH is the corresponding value of 4 mA; 14 pH is the 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 the output current value,  $4 \text{ mA} \leq I \leq 20 \text{ mA};$
- D is the pH value displayed by the instrument,  $0.00 \text{ pH} \leq D \leq 14.00 \text{ pH};$

### Part 2 : ORP current output calculation formula:

- The factory setting output current is defined as below:  
-2000mV is the corresponding value of 4 Ma+ 2000mv is the 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 the output current value,  $4 \text{ mA} \leq I \leq 20 \text{ mA};$
- D is the pH value displayed by the device,  $0.00 \text{ pH} \leq D \leq 14.00 \text{ pH};$

### Part 2 : ORP current output calculation formula:

- When the machine leaves the factory, the output current is defined as:  
-2000mV is the corresponding value of 4 mA; +2000mV is the 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 the output current value,  $4 \text{ mA} \leq I \leq 20 \text{ mA};$
- D is the ORP value displayed by the device,  $- 2000 \text{ mV} \leq D \leq + 2000 \text{ mV}.$

## TROUBLESHOOTING

### Q: Controller no display?

A: The power supply is not connected or the fuse is blown. Check the power supply line and fuse.

### Q: Display numbers, but jump up and down?

A: Sensor wire contaminated with moisture or ceramic. Check the sensor wire and clean the ceramic hole (0.1 m HCl).

### Q: Standard solution pH 4.01 and pH 7.00 can't be adjusted?

A: The outside of the sensor is polluted, the sensor wire is wet, the sensor is damaged or cracked, and the sensor ceramic is blocked. Clean the sensor (0.1 m HCl), check the sensor wire, replace the sensor, and clean the ceramic hole (0.1 m HCl).

### Q: Slow digital response?

A: The sensor film or ceramic hole is contaminated. Clean the sensor.

### Q: When the actual pH value has changed greatly, but the value displayed on control changed very little?

A: The ceramic hole of the sensor is blocked, the sensor is aging and the reaction is slow. Clean the sensor (0.1 m HCl) with regeneration solution.

### Q: The display value of the controller does not change?

A: The sensor is broken and the sensor cable is short circuited. Replace the sensor and check the cable.

### Q: The relay in the controller does not work or the pH value of the solution remains unchanged after dosing?

A: The relay is damaged, the controller is set incorrectly, and the liquid medicine is not enough. Contact the supplier to replace the relay, change the set value and supplement the liquid medicine.

## Packing List

Model: PC-9903RS

Name: Online pH meter

NO.	Name	Unit	quantity
1	Meter	pcs	1
2	Spare part	set	1
3	User manual	pcs	1