

pH/ORP-5500 Series
pH/ORP Transmitting Controller

Instruction Manual

Notes before Operation

1. Notice before operation:

- (1) Carefully read the relevant parts of this manual before installation and operation to prevent wrong operation, measurement error and damage of instrument.
- (2) Improper installation and unsuitable flow speed will cause big measurement error, so please read the installation passage in detail.
- (3) This instrument is precise electrochemical measurement, and its installation and operation should be performed by technicians with relevant professional knowledge.
- (4) If for some special conditions, please consult our Technical Department for further details.

2. Maintenance items:

- (1) The indicators' quality guarantee is one year from the date of purchasing. During this period, if the meter has quality problems, manufacturer is responsible for maintenance work for free or changes it.
- (2) pH and ORP probes are consumer goods which without quality guarantee. Because, the lifespan is based on the medium and working conditions.
- (3) Manufacturer offers the maintenance service for whole life of the sold meters.
- (4) If the damage of the meter is caused by the following reasons, it is out of the maintenance service:
 - A、 The meter is burned or foundered caused by improper usage and maintenance.
 - B、 The meter is refitted or misused without permit.
 - C、 The meter is destroyed under the condition out of company's regulation.
 - D、 The relevant damage caused by choosing the wrong type.
 - E、 The cable damage and rupture caused by improper installation and usage.
 - F、 The incorrect measurement of the probe caused by disconnecting or connecting wires personally.
 - G、 The measurement inaccurate caused by privately cutting the probe cable.
 - H、 The inner broken wire caused by indiscreetly disassembling.
 - I、 The consumptive materials are not within the scope the warranty.

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I CONCEPTION

pH/ORP-5500 series pH/ORP Transmitting Controller is a popular type,high Cost performance instrument, mating pH/ORP probe,the entire instrument have high measurement accuracy, anti-interference,easy installation,simple operate features.

1. 1 Main Features

1. LCD screen with prompt code, make every step operating get the presentation and guide;
2. Programming pH&ORP function can be switched,suit any type of pH&ORP probe;
3. Support six types of buffer calibration which can free combination, greatly broaden the application scope;
4. Innovative manual input calibration method provide the biggest convinence for site calibration
5. Selectable manual/automatic temperature compensation measurement type,providing the largest flexibility.
6. Independent external automatic temperature compensation probe provide high measurement accuracy.
7. Isolated/transferable /Reverse /instrument/Transmitter mode current output, compatible all the transmitting receive modes.
8. Double relay's high/low limit and delay control satisfied pH or ORP region control and dosing ;
9. Mating split style,double combination probe easy change, one time wiring, permanent using (see the pH/ORP1220Aseries instruction) ;
10. Industrial standard terminals, EMC electromagnetic compatibility measurement, platform design and development, series grouping ;
11. Satisfy world electric power supply standard, DC/AC power input nonpolarity connection, site operation will not worry about wrong connect;
12. SMT Automatically Surface Mount Technology,AOI Automated Optical Inspection,ICT, FCT Full Computer Test,quality control means make, reliable quality ;
13. Every instrument make aging test, surface processing treatment, Full equipped electrical productive technology, high quality level ;
14. Calibrate the probe one before leave factory ;

1. 2 Application

This instrument is used for pH/ORP online monitor in environmental protection of water treatment, purified water treatment, industry process, aquaculture and etc

1. 3 Note:

1. The instrument should place in dry environment or control box to avoid the sputtering or condensation water causing leakage or measurement error
2. This series instrument is platform develop result, various power supply can select, pls pay attention to the voltage class when install the wiring ;
3. long time ultraviolet rays shining will burn the screen, result the gray scale reduce, so avoid installing direct sunlight place.

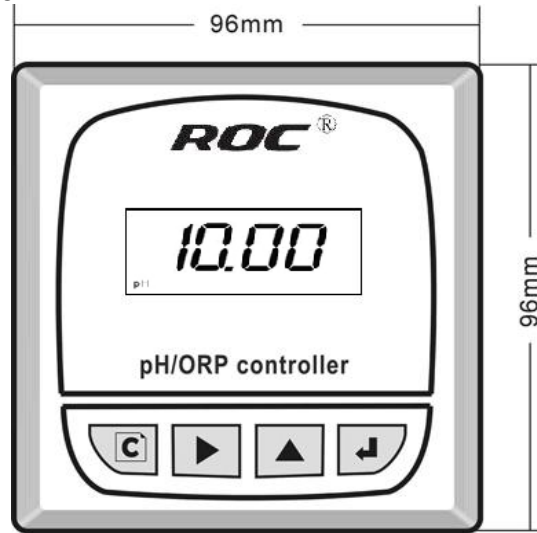
1.4 Technical features

Model		5500	5510	5520
Power supply		DC24V	AC110	AC220V
Supply frequency		-----	50/60	50/60
Measurement range	pH	0.00~ 14.00		
	ORP	-1000mV~ +1000mV		
	Temp.	0.0 ~99.9℃		
Resolution	pH	0.01		
	ORP	1mV		
	Temp	0.1℃		
Indication error	pH	≤±0.05		
	ORP	≤±5 mV		
	Temp	≤ ±0.5℃		
Input impedance cause value error	pH	±0.03		
Approx equivalent input impedance		5×10 ¹² Ω		
PH buffer solution		10.0; 9.18; 7.00; 6.86; 4.00; 4.01		
Temp. compensation error	pH	≤±0.05		
Entire instrument error	pH	≤±0.1		
Entire instrument repeatability error	pH	0.05		
	ORP	±2mV		
Compensation range	Temp.	0 ~ 50℃		
Working environment	Temp.	0 ~ 50℃		
	Humidity	≤85% RH		
Cable length		≤20m (standard 10m)		
Control output		double relay (single contact ON/OFF), hysteresis can be set		
Contact capacity		3A(max), AC220V/AC110V	3A(max), DC24V	
Power consumption		<2.5W		
(4~20)mA current loop	Channels	One channel		
	Technical features	Isolated, transferable, adjustable, instrument/transmitter mode		
	Loop	≤500Ω (max), DC24V		
	Accuracy	±0.1mA		
Protection grade level		IP65 (with rear cover)		

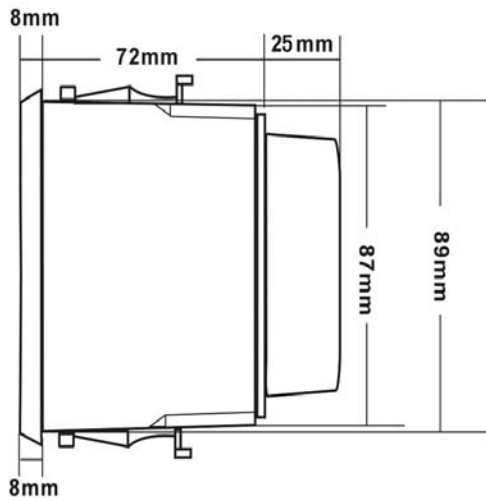
Installation	Panel mounted, fast installation clamp
Dimension	96 mm × 96mm × 103 mm (H × W × D)
hole dimension	91mm × 91mm

II. INSTRUMENT DIMENSION AND TERMINAL DEFINITION

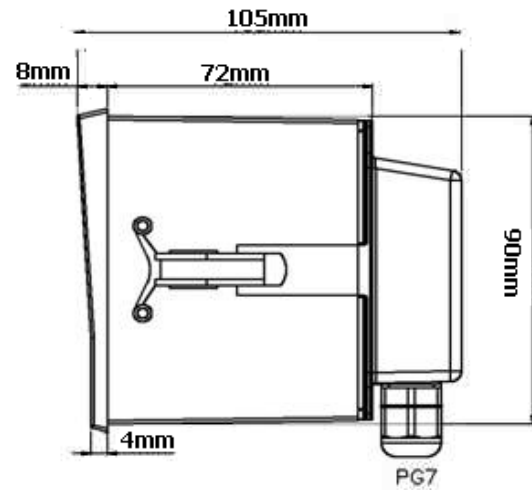
2. 1. Instrument dimension



Shell front view

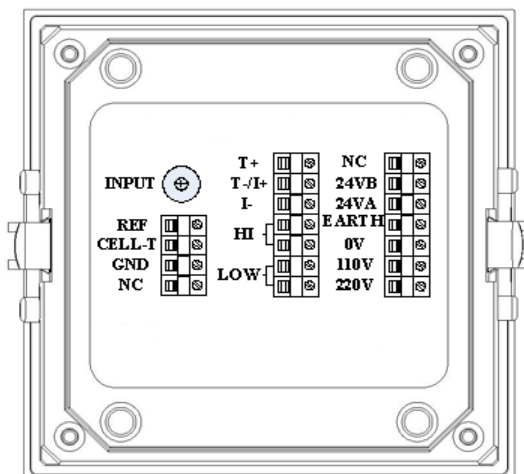


Shell top view



Shell side view

2.2. Instrument rear terminals definition

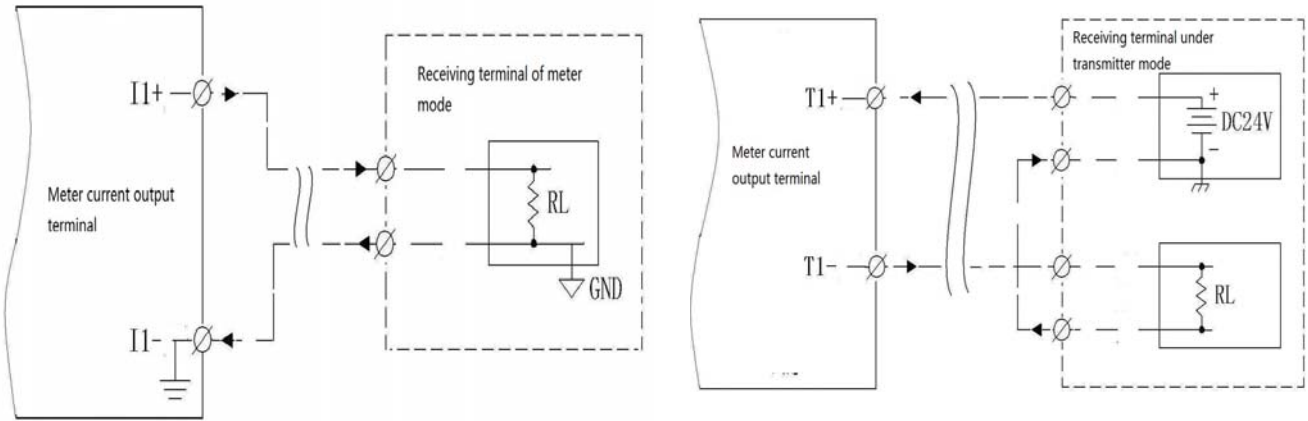


Wire instruction:

0V/220V	AC 220V input terminal (pH/ORP-5520)
0V/110V	AC 110V input terminal (pH/ORP-5510)
24VA/B	DC 24V input terminal (pH/ORP-5500) (Internal automatic recognition of polarity)
EARTH	Electromagnetic compatibility earth protection terminal
Hi	High limit alarm control terminal blocks
Low	Low limit alarm control terminal blocks
T+	(T+, T-) external feed under transmitting mode
T-/I+	public terminal under Transmitter /Instrument Mode
I-	(I+, I-) mA output terminal under Instrument mode
INPUT	Connect pH/ORP measurement electrode (Clear line)
REF	Connect pH/ORP reference electrode (shielding)
CELL-T	Connect temp. probe collect terminal (red line)
GND	Connect temp. probe earth terminal (black line)
NC	Empty terminal

III. EQUIPMENT LAYOUT REFERENCE DIAGRAM

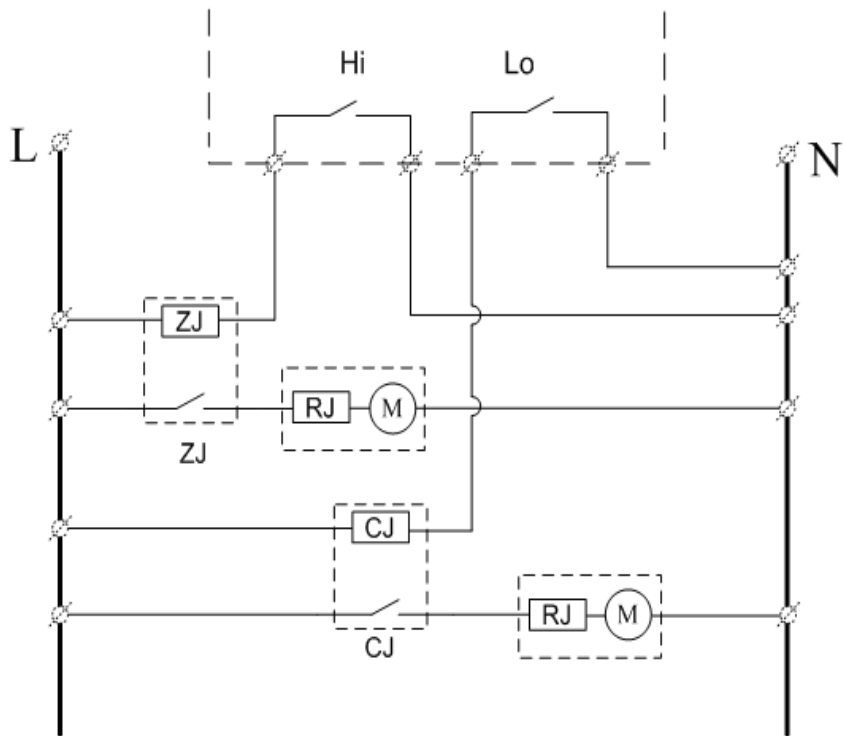
3.1 Milliampere transmitting connection layout



Instrument mode current loop wiring

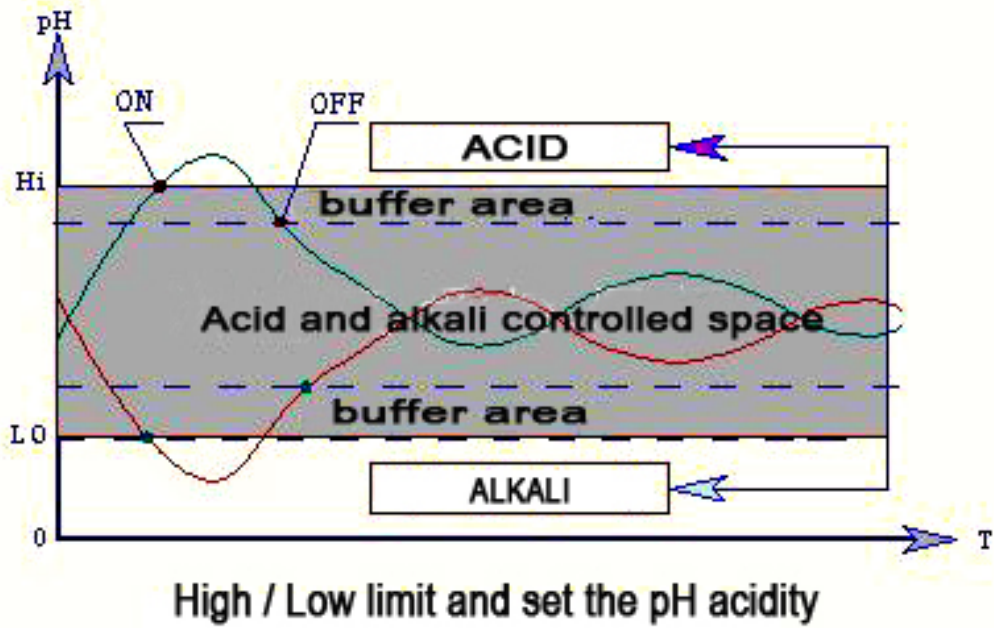
Transmitter mode current loop wiring

3.2 Electrical connection layout



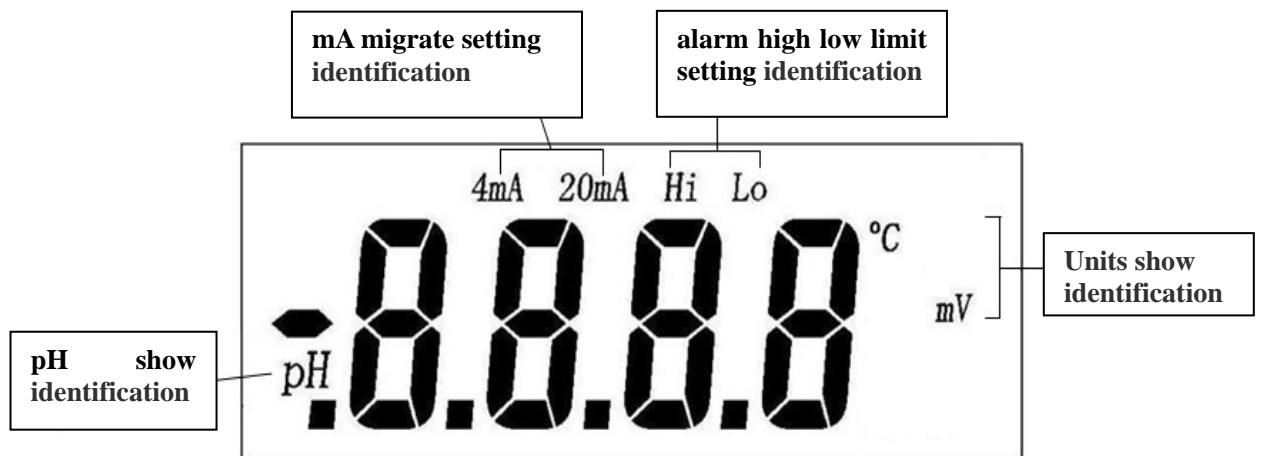
Relay ON/OFF contact component control wiring diagram

3.3 Control Mode



IV. OPERATE SETTING

4. 1 Panel and main interface display



4.2 Key board function

Keyboard	Name	Function
C	Return	<ol style="list-style-type: none"> 1. pH automatic temperature compensation measurement mode ; 2. Ph measurement status to check temperature compensation value 3. Return or skip the revised item
▶	Select	<ol style="list-style-type: none"> 4. Parameter setting status circulate of thousand hundred ten one bit symbol 5. pH measurement mode long time press this key, enter into pH manual mV calibration interface
▲	Add	<ol style="list-style-type: none"> 6. Processing 0~9 setting under parameters setting status. 7. Long time press this key under pH measurement mode, enter into standard buffer solution calibration interface 8. Check mV value under pH measurement status
↵	Enter	<ol style="list-style-type: none"> 9. enter into function setting menu ; 10. confirm the modification item and save

4.3 Setting interface

Under main measurement interface, press“ **↵** ”key enter into parameter setting

order	Name	Function
1	Function selection	“pH” or “ORP” flashing, select “Add” key, processing pH、ORP function selection, press “enter” to save, enter into next parameter setting。
2	4mA corresponding pH setting	4mA flashing, operate “select” & “Add” key set 4mA corresponding pH value ; press“ enter” key save, enter into next parameter setting (the same below)
3	20mA corresponding pH setting	20mA flashing, set 20mA corresponding pH value ; confirm and save, enter into next parameter setting
4	High limit alarm pH setting	Hi flashing, setting high limit alarm pH value ; confirm and save, enter into next parameter setting
5	Low limit alarm pH setting	Lo flashing, setting low limit alarm pH value ; confirm and save, enter into next parameter setting
6	Alarm return back lash pH setting	Hi & Lo flashing, setting hysteresis pH value ; confirm and save, enter into next parameter setting (note : min value of hysteresis setting 0.1pH or 10mV)
7	Temperature setting	pH & °C flashing, operate “Add” key, processing manual temp. compensation (H25.0) and automatic compensation(A25.0) selection, confirm and save, return to measuring status. NOTE : This item setting is factory default setting, no need to change
Note : ORP function setting the same as 1.2.3.4.5.6		

4. 4 Probe calibration

4. 4. 1 Calibration

pH probe is a kind of electrochemical probe , the sensitivity will reduce after long time usage and medium. So, the probe needs calibration regularly. The calibration cycle basis on the medium impact.

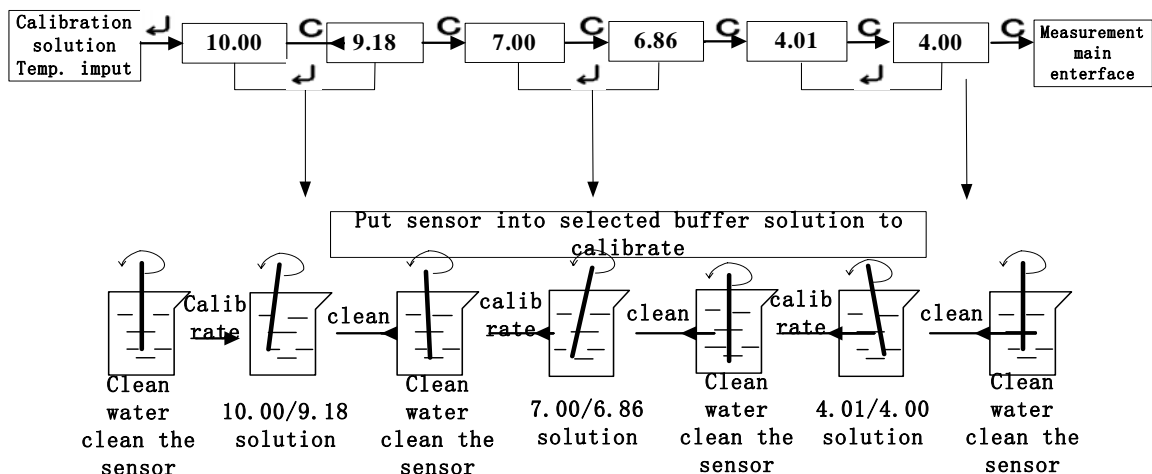
1. Normal buffer solution ,10.00\9.18\7.00\6.86\4.00\4.01 can be selected
2. If the measurement medium is acid or alkali, please choose two point slope calibration.
3. If crossing acid or alkali, please choose three kinds of buffer solution to processing three point calibration.
4. Read the buffer solution configuration before calibrate, correct prepare the buffer solution is the key point to calibrate.
5. The meter with directly input calibration method, please reference the calibration steps
6. If the probe with long time storage, please put it in the water or KCl solution for 12 hours, and then calibrate it.

4. 4. 2 Buffer solution calibration

Select the buffer solution according to the measurement range, correct preparation buffer according to the instruction ;

1. Under pH main measurement interface,press“▲”3 seconds enter into buffer solution calibration interface, input current buffer solution tempreture, press“enter”key save, enter into buffer solution calibration interface;
2. “10.00”& [pH] flashing, indicate enter into buffer solution calibrate selection ;press enter key start calibration(“10.00”flashing),press return key skip it ; enter into next calibration menu ;
3. Put the cleaned probe into selected buffer solution and wait, calibrate item flashing ;
4. After finished calibration, stop flashing, press enter key save, select next item to calibrate, take out the probe to wash meantime, and put into the buffer solution that the instrument suggested, complete the selected item calibration in order ;
5. calibrate error“E-,-”flashing, check the buffer solution configuration correct or not and recalibrate ;

Calibrate operating process as below:



【Note】 “ C ” means skip the setting “ ↵ ” means save the setting

4. 4. 3 Offline calibration

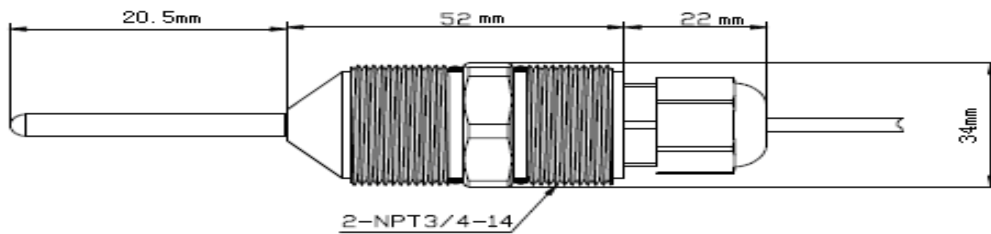
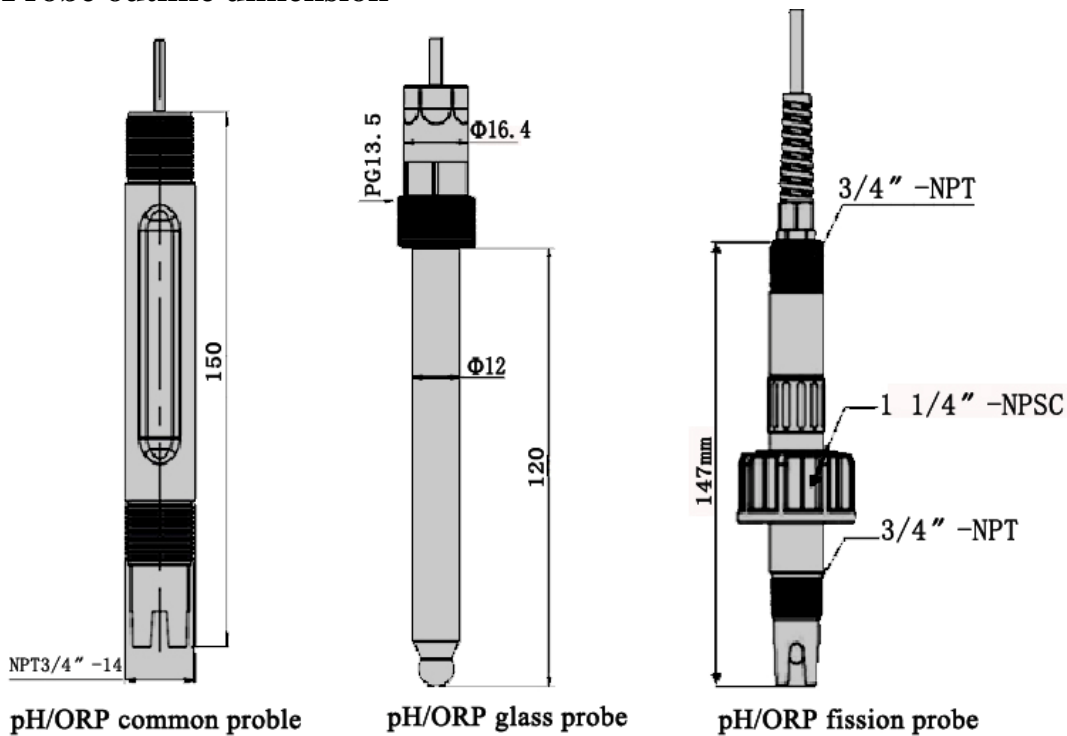
If it's not convenient for on site calibration, please use the Lab device to calibrate the probe o. Firstly, record mV value which relative to the current room temperature, and then input the value into Offline item. That is manual input calibration.

Under pH measurement main interface press“select” 3s enter into manul calibrate interface, input the relative mA value of buffer solution with mating probe, press” ↵ ”save, return main interface.

NOTE: input wrong LCD screen display“E-1-1” under any calibrating spot mV value; Press “enter” key to continue calibration, or press “return” key cancel the calibration and enter into next calibrate spot.

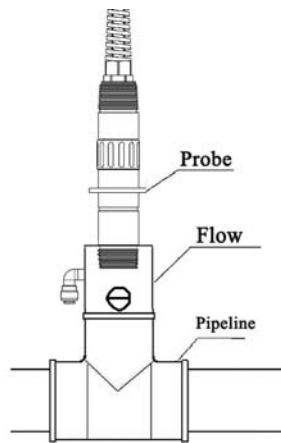
V INSTRUMENT MATING PROBE INSTALLATION GUIDE

5.1 Probe outline dimension

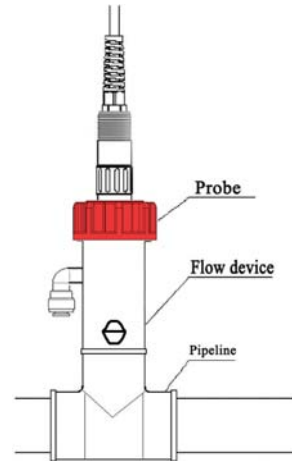


Temp.probe

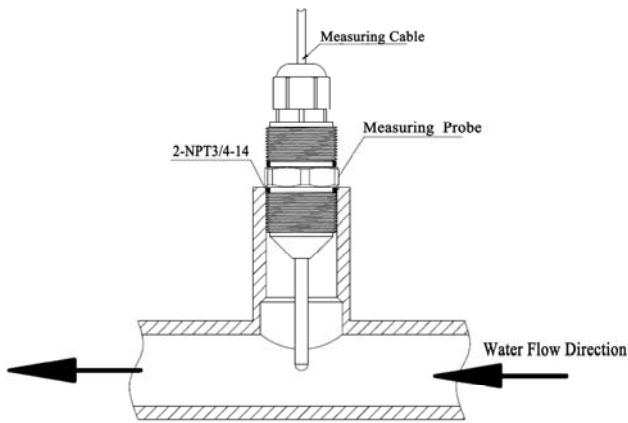
5.2 Probe installation



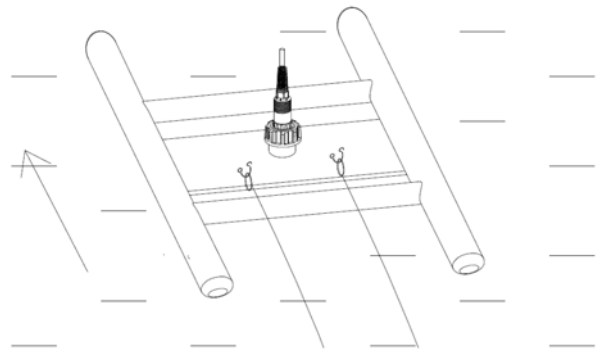
pH/ORP Flow device (P34A) installation



pH/ORP Flow device (P34B) installation



Temp probe pipeline installation



pH/ORP Floating bed style installation



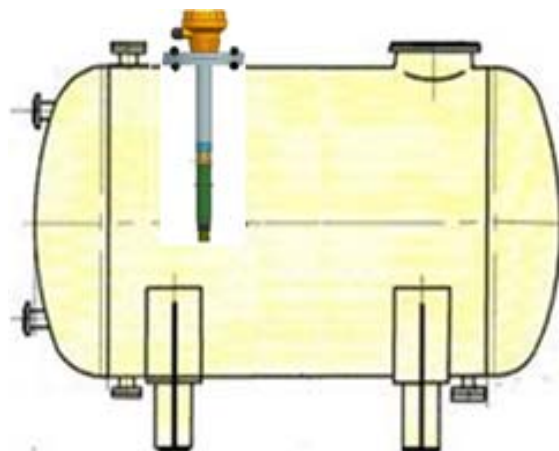
pH/ORP Scaffolding installation(P16)



pH/ORP reaction pool installation



Flange installation



Horizontal installation

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

1. Recommend using with needle control valve flow device when install pipeline (model P34A/B), which can change probe under pressure-bearing, continue condition ;
2. Round sensitive glass steep pH probe direct install in the pipeline, it will threaten the probe when the pipeline pressure change, water hammer or siphon effect, after using flow device, the probe and atmosphere will communicate, operational states safe and measure stability
3. When direct install pipeline, pure water measurement value will unstability because the water is weak electrolyte, sensitive glass film (glass bubble) and salt bridge present discontinuity open circuit, result the measure value unstability
4. When direct install the pipeline to measure pure water, high concentration KCL of pH probe and pure water form huge concentration difference, trough liquid abutment spread into the water largely. Cause the probe lose effectiveness fastly, pollute the pure water meantime., make the conductivity under probe downstream of pH probe rise hugely.

5.3 Probe installation request



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 °



Level installation cannot work



Fall to install cannot work

VI、 MAINTAINING

6. 1 Probe maintaining

1. pH probe may not dry storage, soak in with 3.0mol/L KCL solution box ;
2. Suggesting according to the measurement media condition clean the probe timely, calibrate the probe after mating the meter..
3. If probe is slicked by suspended matter, can use 0.01mol/L HCl or NaOH solution to clean, then use clear water washing up.
4. If the instrument still can not finish the calibration after above method, means the probe can not use, should change new one ;
5. ORP probe platinum ring surface is bright normally, surface suspended matter will influence the measurement, may use 0.01mol/L HCl or NaOH solution cleaning, then use clear water washing up.
6. Strong oxidation or reduction causing rough surface will effect probe's response potential, may use toothpaste lighting the platinum surface, then use clear water washing up.
7. washing cleaned probe suggested immerse into 3.0mol/L KCL solution hydration 6 hours then use it;
8. When calibrate pH probe and instrument, the buffer solution must processing under 25°C.

6.2 Probe using attention

1. pH/ORP probe is consumption type probe, it will ineffective after long time storage, so suggested to buy to use, do not storage;
2. Prohibit sensitive glass-film (glass boll steep) working in hydrofluoric acid, fluorinion and high concentration sulfion environment.
3. Prohibit using standard configuration pH/ORP probe measure the organic solution which can soluable PC and ABS (such as CCL4、CHCLCCL2、C4H8O) , or it will damage the probe shell;
4. Using cotton swab and neutral warm cleanser clean the ball sleep and surface of bounds on liquid, do not use acid or causticity such strong solution or abrasive material.
5. Biopharmaceutical、 high pressure sterilization recommend using high temp. glass pH probe and matting forcing sheath.
6. pH signal belong to weak current signal, the cable should independent, prohibit wiring with strong current.

7. The probe cable is low noise private cable, untried person can not cut or lengthen privately ;
8. When measuring Contain tiny particles of fluid pH value, install filter before the probe, prevent the particle impact the glass ball steep.

VII、INSTRUMENT AND PROBE FAULT COMMON TROUBLE SHOOTING

Phenomenon	Possible factor	Judgment analysis and treatment
Electricity meter no display	A. Power impassability B Instrument fault	A. check instrument power terminal power B. invite professional person service
Display instability	A. probe installation error B. flow rate too fast C. water quality unsteady D. connector bad contact	A. rectify and reform the probe installation B. slow down the flow rate installing the flow device C. using steady water exclude the instrument reason D. check connector and contact good
Measurement data large deviation	A. Probe fault B. Cable damage C. Installation dead area D. Instrument Setting error	A. put the probe away from the pipeline, using buffer solution to calibrate B. change the probe which can not calibrate C. analysis and improve measure point or using flow device D. resetting the instrument parameter
Transmitting and display nunconsistent	A. Recelive cell unreappear B. Large Loop resistance C. Connect mode error D. Feed voltage unusual E. Secondary traffics error	A. Using single calibrating instrument inspect the instrument 4~20mA ; B. Change signal loop cable length, reduce loop resistance ; C. Checking the instrument and transmitting mode connecting correct or not ; D. According to feed standard given transmitting power supply E. Resetting migration correspondence solution

VIII UNIT

pH/ORP Transmitting controller	1set (including one quick installation clamp)
pH/ORP probe	1 pc (selectable, cable length 10m)
Flow device	1set (selectable, refer to purchase instruction)
Instrument operating manual	1 book
Probe operating instruction manual	1 book
Certification of inspection	1 pc

IX、PURCHASE INSTRUCTION

Name of flow device	Matting probe	Apply to
P33 intergrated flow device	Glass probe	Automatic observe control equipment cabinet or experiment system
P34A flow device	General probe/fission probe	Pipeline installation
P34B flow device	1220A fission probe	Pipeline installation
P16 top protect case immersed install assembly	General probe/fission probe	Open channel or impounding reservoir
P17 top flange immersed install assembly	General probe/fission probe	Stiring reaction kettle and material tank
Fold immersed install assembly	General probe/fission probe	Dirt waste water pool, aeration basin
Floating bed component	General probe/fission probe	Open channel , stream,aquiculture
Pressure sheath components	High temp. sterilization glass probe	Biological pharmaceutical, food fermentation
Noble metal protective screening	General probe/fission probe	Contains hard particle metallurgy and flotation system

*Without the influence on the operation, any small change or improvement on the products by the manufacturer will not be notified separately. Please make the object as the standard.