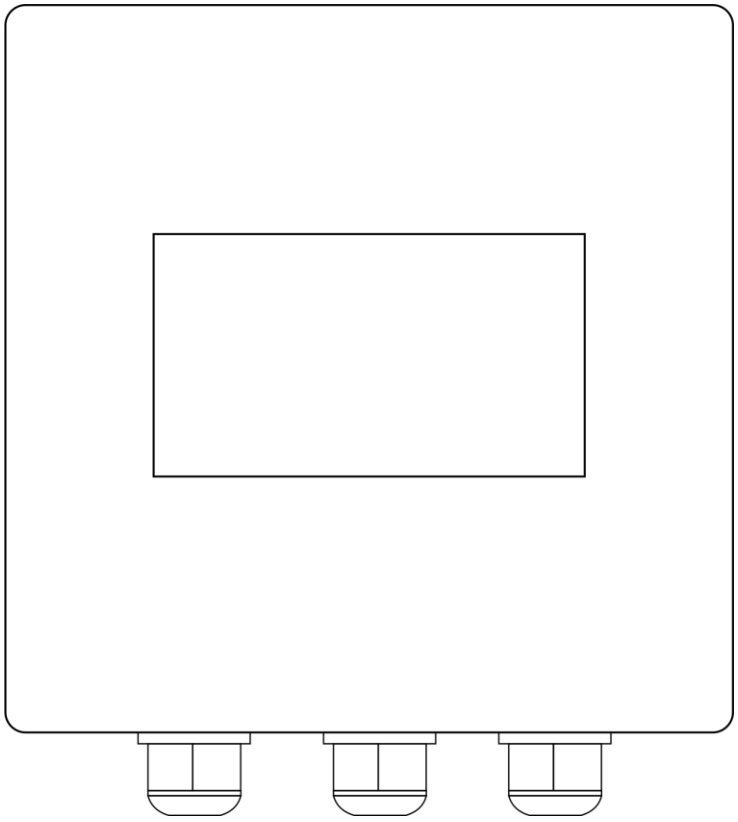
PH/ORP Controller



Content

Safe operation procedures

Read the following instructions before using the instrument.

1. After unpacking the instrument please check for damage due to shipping.
2. The instrument must be operated by trained professional and technical personnel.
3. Read the manual carefully to avoid incorrect wiring connection that can cause equipment damage and safe problem.
4. After wiring carefully check all are correct then can power on and make sure the others equipments are correct.
5. Please avoid installing in a high humidity, high temperature, corrosive and in a direct sunlight environment.
6. Please separate the power lines of instrument from other machines that produces high noise in the power lines.

Instrument use

Instruments are used in industrial measuring of the temperature and PH/ORP, such as wastewater treatment, environmental monitoring, fermentation, pharmacy, food process agriculture production, etc.
The instrument provides one current outputs. The maximum load is 500 Ohm.
The instrument provides 2 relays. It can pass though a maximum of 5 Amps at 250 VAC or 5 Amps at 30VDC.

Product content

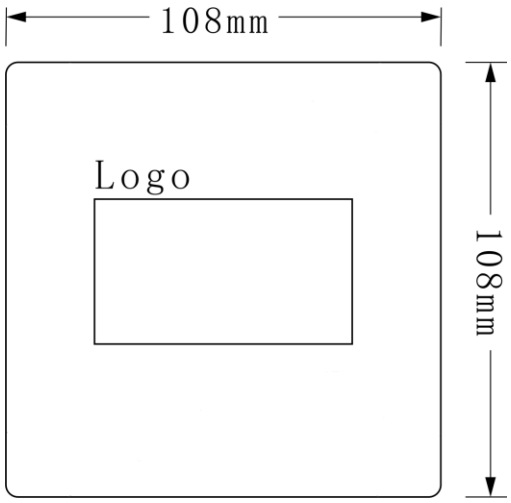
For 3000 series, the product package contains 1 instrument, the printed manual, 2 holders

Specifications

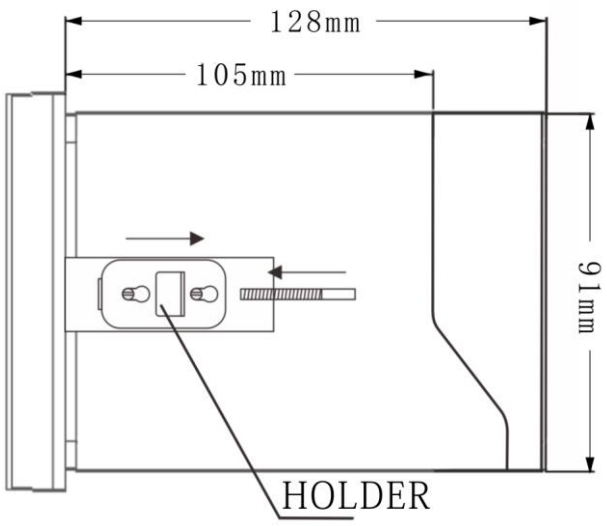
Functions	pH	ORP
Measuring range	-2.00 to +16.00 pH	-2000mVto +2000mV
Resolution	0.01pH	1mV
Accuracy	±0.01pH	±1mV
Temp. compensation	Pt 1000/NTC10K	
Temp. range	-10.0 to +130.0℃	
Temp. compensation range	-10.0 to +130.0℃	
Temp. resolution	0.1℃	
Temp. accuracy	±0.2℃	
Ambient temperature range	0 to +70℃	
Storage temp.	-20 to +70℃	
Input impedance	$>10^{12}\Omega$	
Display	Back light, dot matrix	
pH/ORP current output	Isolated, 4 to 20mA output , max. load 500Ω	
Current output accuracy	±0.05 mA	
RS485	Mod bus RTU protocol	
Baud rate	9600	
Maximum relay contacts capacity	5A/250VAC,5A/30VDC	
Language selection	English/traditional Chinese/simplified Chinese	
Waterproof grade	IP65	
Power supply	From 90 to 260 VAC, power consumption < 3 watts	
Installation	panel/wall/pipe installation	
Weight	0.55Kg	

Instrument installation

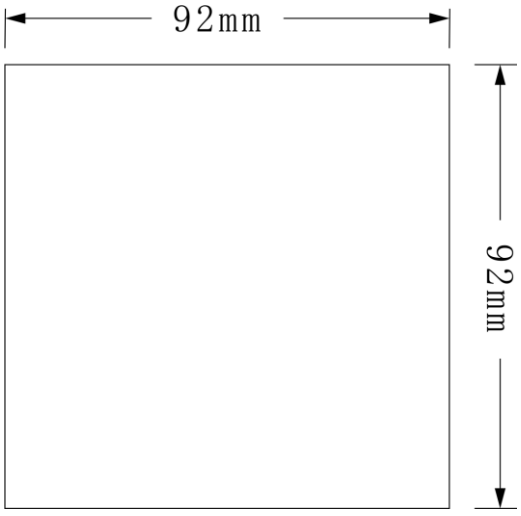
The instrument can be panel, wall or pipe mounted installation.
Panel Installation: Make a 92x92 mm square cutout and insert the instrument. Screw in the fixed block with the screws and fixed bar.



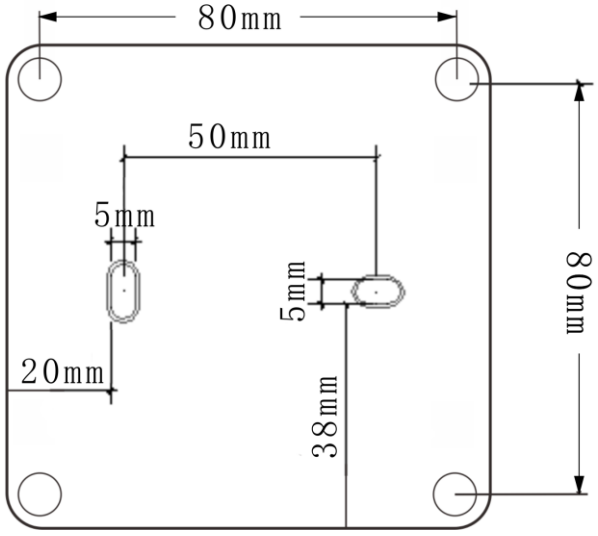
front size



3000 series dimension



Panel Installation： Make a 92x92 mm square cutout and insert the instrument then screw in the fixed HOLDER.



for wall/pipe mounting

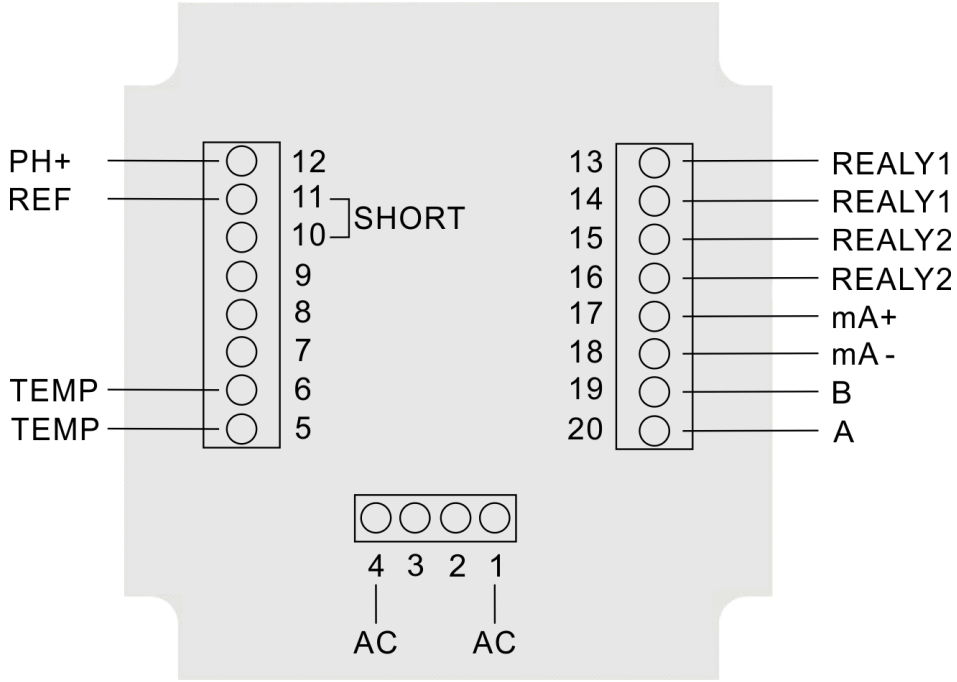
Connection label

Notice：

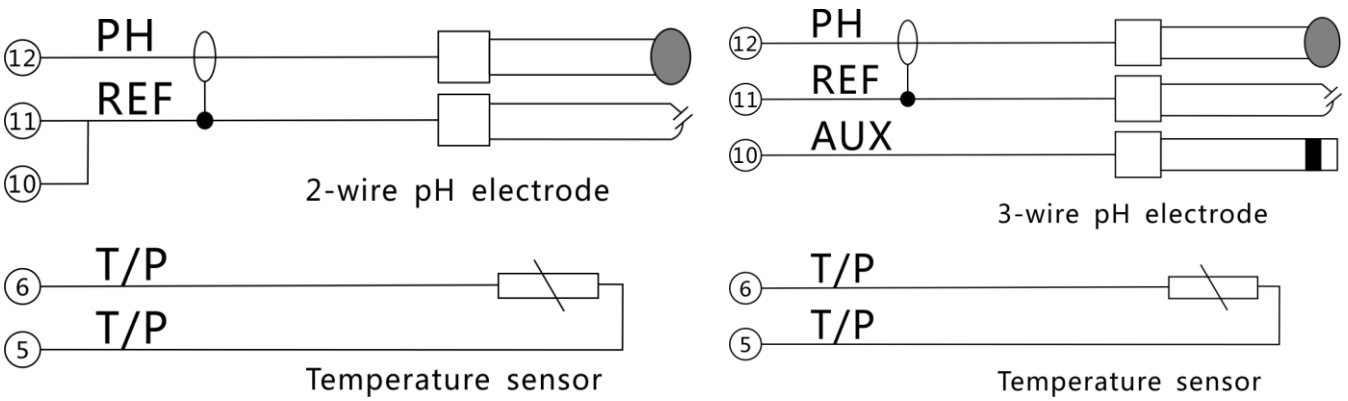
1. User must strip the pH wire to remove the black rubber conductor.

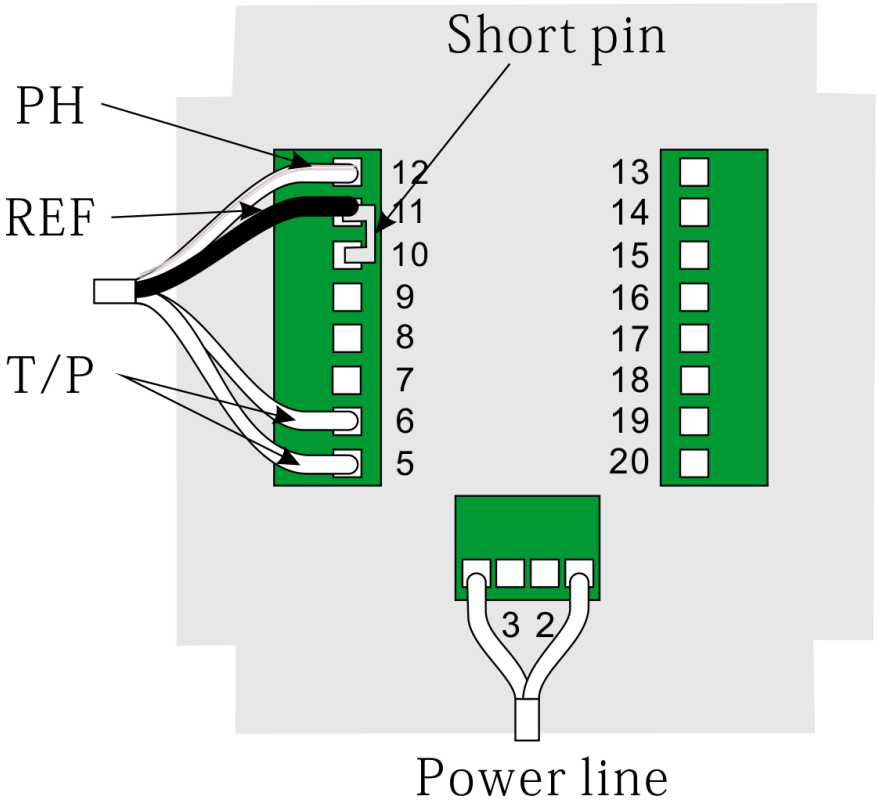
Rubber conductor not removed　　Rubber conductor removed

2. Different connection of 2-wire electrode (short pin 2 and 3) and 3-wire electrode (ground pin), Please see the connect label.



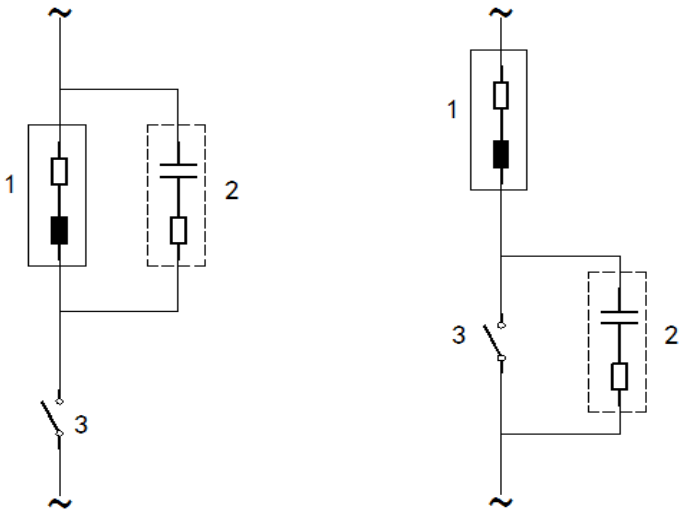
Electrode connection figure





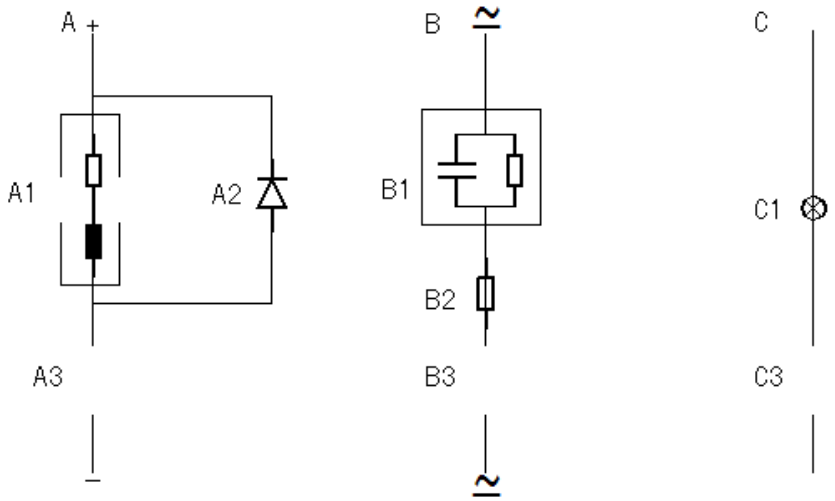
Relay contact protection

Electrical spark at the relay contact may affect the life of the relay, especially in an inductive and capacitive load. In order to inhibit the spark and arc, user should use an RC circuit to extend the life of the relay.



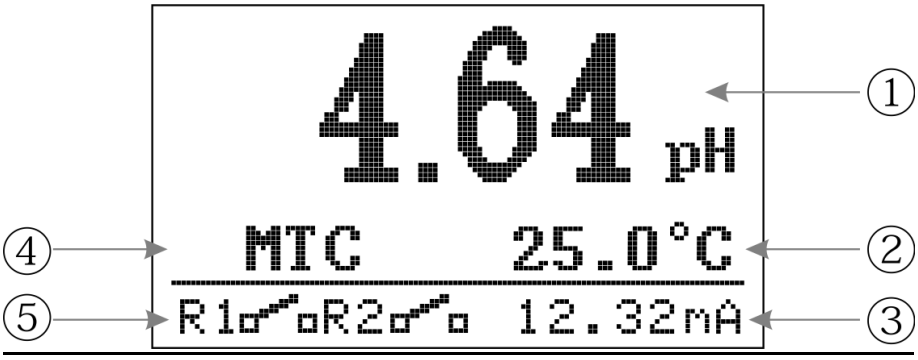
AC protection, use for inductive load

1. load
2. RC eliminate spark, using in 220VAC, R=100 ohm1W,
3. Relay contact



A. DC protection ,A1: inductive load A2: 1N4007, A3: relay contact
B. AC/DC protection ,B1: capacitive load ,B2: 0.8 Ohm/1W（DC24V）,B3: relay contact
C. Resistive load ,C1:lamp bulb ,C3:relay contact

Display



1. Main display
2. Temperature and unit
3. current output
4. Temp. compensation: auto(ATC) or manual(MTC)
5. Relay indicator

Note： If the pH readings are under or over the range, it will display -9.99/99.99.
If the ORP readings are under or over the range, it will display -9999/9999.

Key

Key name	Meas. status	Setting status	Cal. status
MODE	Enter password	Exit	Exit
SHIFT	none	Move digit	Move digit
UP	none	Inc	Inc
DOWN	none	Dec	Dec
ENTER	ON/OFF back light	Enter	Enter

Keeping mode

Keeping mode is a safe mode. It is for Calibration, Setting, Record and Clean. In this mode all the relays are open(inactive), current output follows the setting by user(last current or fixed current).

The instrument will enter keeping mode when user presses into Calibration, Setting, Record or the instrument works in clean mode.

It will in keeping mode around 10 seconds when it goes back to measurement mode form

the above mentioned 4 modes then left keeping mode.

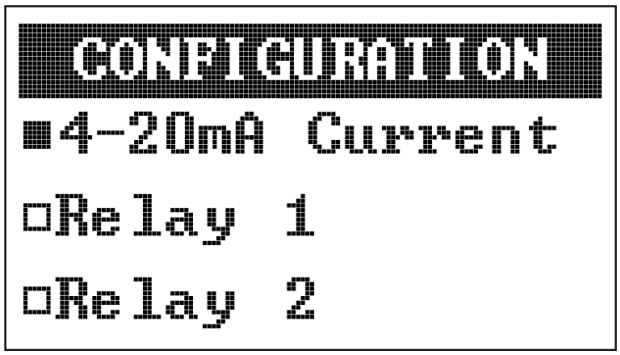
The instrument will go into the keeping mode when turn on the power, and will going to testing mode after 10 seconds.

Setting

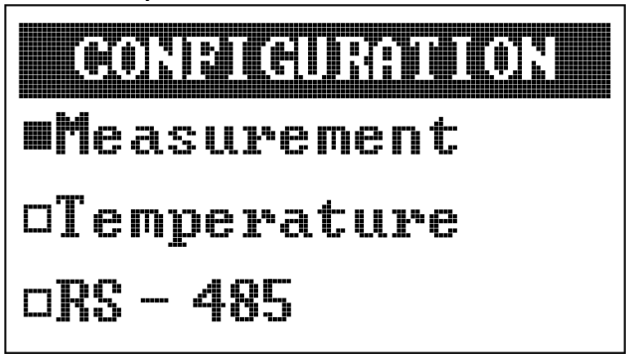
Press MODE key to enter the password menu and then press UP/DOWN/SHIFT key to input password 1200 then press ENTER will enter to setting mode or press MODE key to exit. If no key is be pressed and over 10 minutes then it will go back to measurement mode.

Main screen

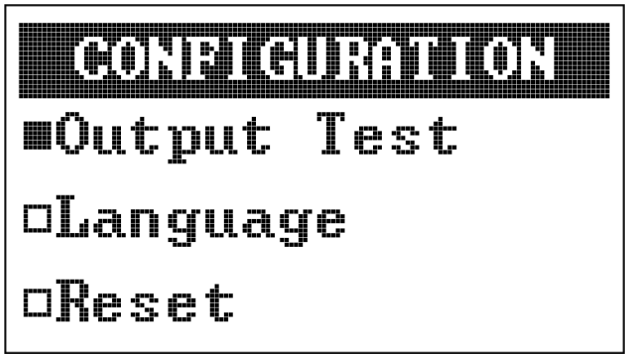
Press UP/DOWN key to choose functions, press ENTER key enter the function.



Page1



Page2

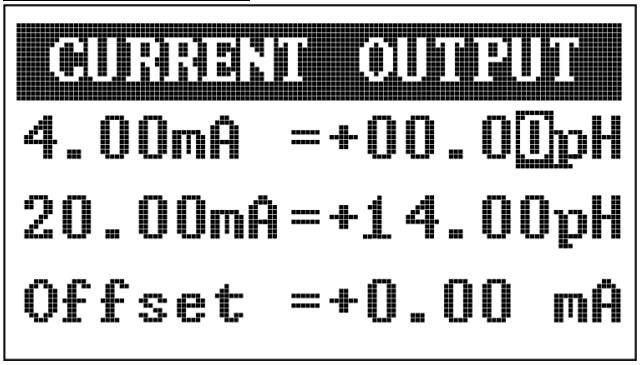


Page3

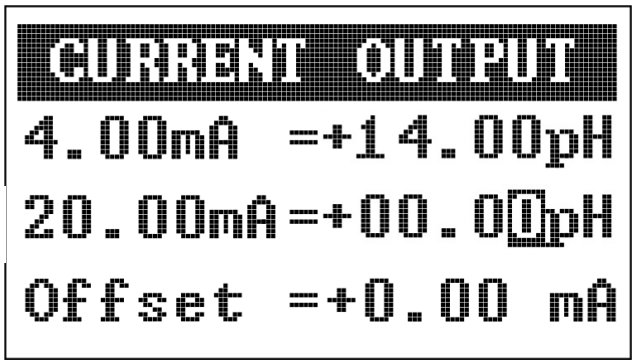
Notices:

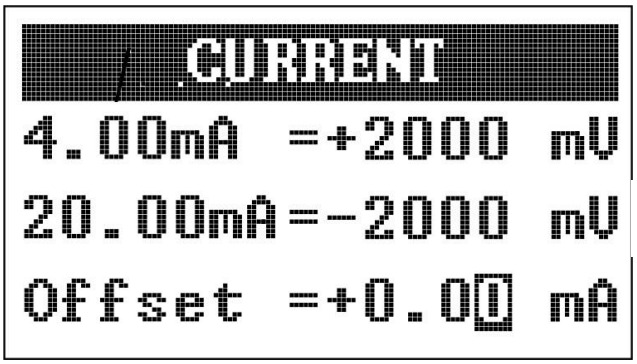
1. When the input data is not in correct range then it will display ERROR on the top of LCD.
2. After input data user needs to press ENTER to save the data.
3. Press MODE to exit.
4. No key is be pressed in 10 minutes then it will go back to measurement mode.

Current settings

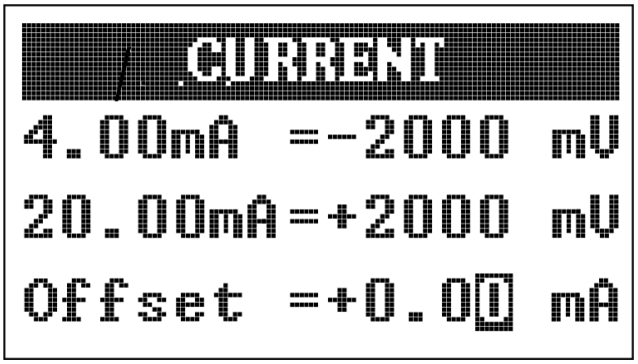


or



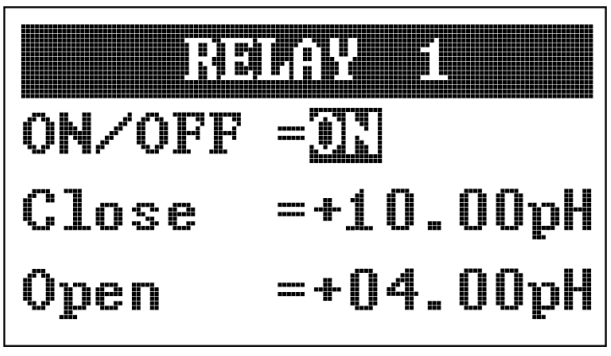


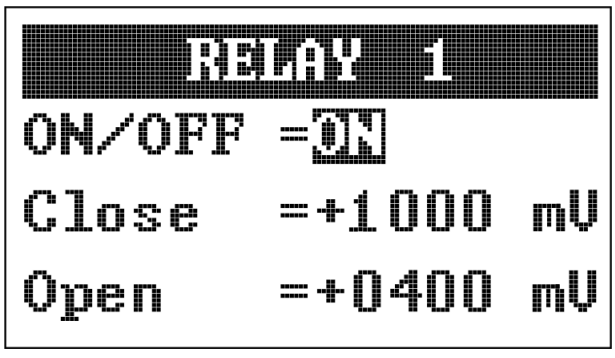
or



1. Set the corresponding 4.00mA to pH/ORP.
2. Set the corresponding 20.00mA to pH/ORP, the difference between 4.00mA and 20.00 mA at least for pH is 1.00, for ORP is 100 mV.
3. Can reverse PH value which correspond to 4.00mA~20.00mA（+00.00pH~14.00pH or +14.00pH~00.00pH)
4. Set the offset current of pH/ORP, the range is±1.00mA.

Relay 1 settings

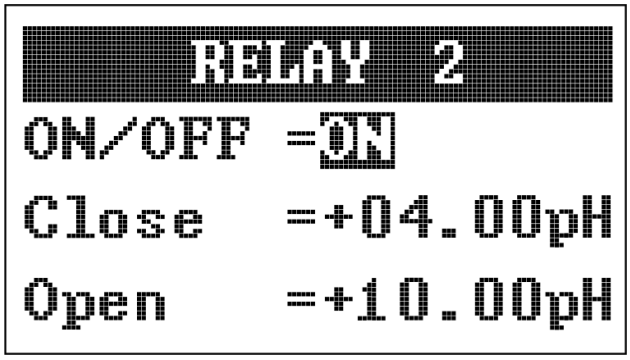


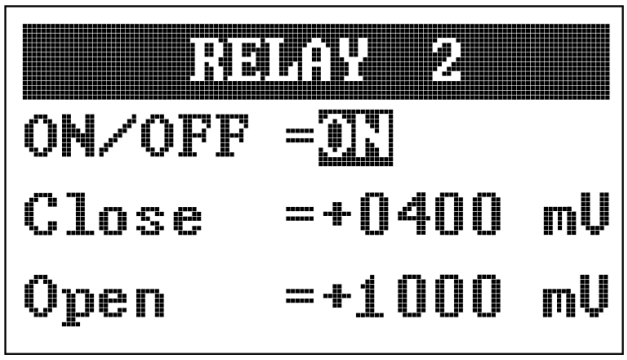


1. Press UP/DOWN key to ON/OFF (enable/disable) relay1.
2. Close set point: active point for pH/ORP.
3. Open set point: inactive point for pH/ORP.

Note：If user wants turn on the pump at pH10.00 and turn off it at pH4.00, then the close S.P. needs to set to pH10.00, Open S.P. sets to pH4.00.

Relay 2 settings

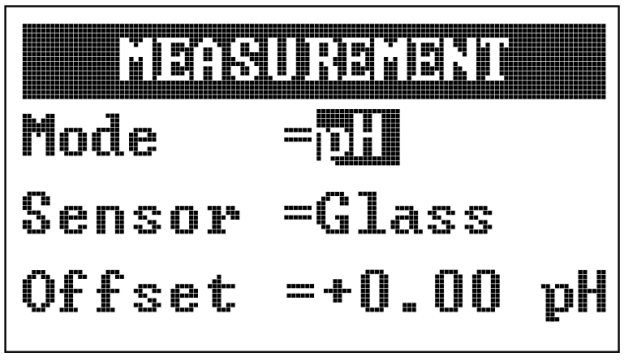


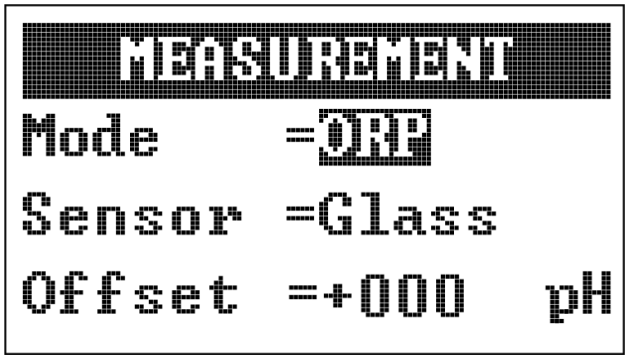


1. Press UP/DOWN key to ON/OFF (enable/disable) relay2.
2. Close set point: active point for pH/ORP.
3. Open set point: inactive point for pH/ORP.

Note：If user wants turn on the pump at pH4.00 and turn off it at pH10.00, then the close S.P. needs to set to pH4.00, Open S.P. sets to pH10.00.

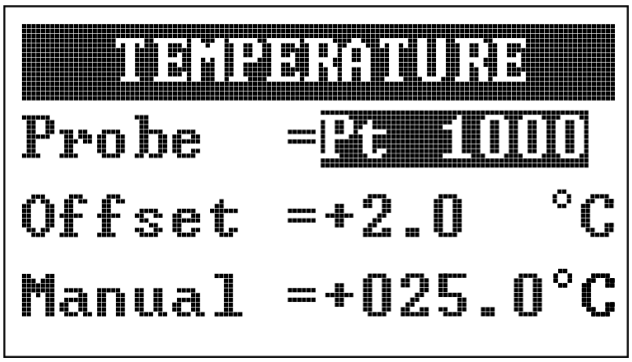
Measurement settings





1. Choose the mode for measuring, press UP/DOWN key to choose.
2. Electrode selection, press UP/DOWN key to choose.(for pH only)
3. Offset , range for pH is±1.00pH ,for ORP is±100mV.

Temperature settings

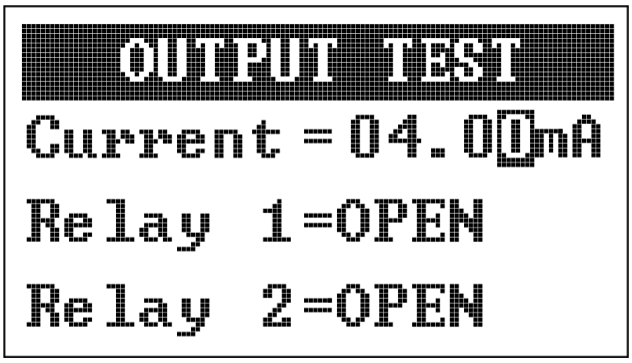


1. Temp. stick can chose NTC10K/Pt1000, press UP/DOWN key to choose.
2. Temperature offset ,the range is±5.00℃.
3. Temperature for measuring when user set the temperature to manual.
4. Temperature for measuring when user set the temperature to manual.
   （Manual can set range：-10℃ to +130℃）

RS485 settings

1. ID address:1-255.

Output test



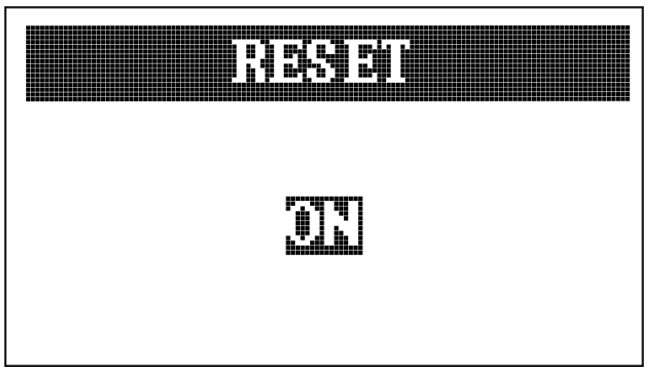
1. Current output: 4.00-20.00mA, press UP/DOWN to set.
2. Relay 1 output, press UP/DOWN to choose.
3. Relay 2 output, press UP/DOWN to choose.

Notice: This function for testing the output only.

Language settings

Press UP/DOWN key to choose the language.

Reset parameters



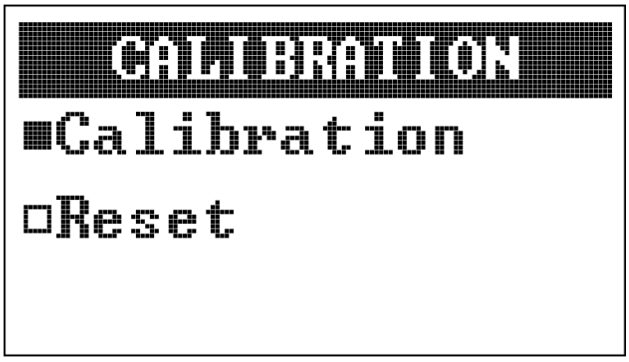
Press UP/DOWN key to choose the reset.

Notice： The reset will not affect the calibrated parameters.

pH Calibration

Press MODE key to enter the password menu and then press UP/DOWN/SHIFT key to input password 1100 then press ENTER will enter to calibration mode or press MODE key to exit. If no key is be pressed and over 10 minutes then it will go back to measurement mode.

Manu

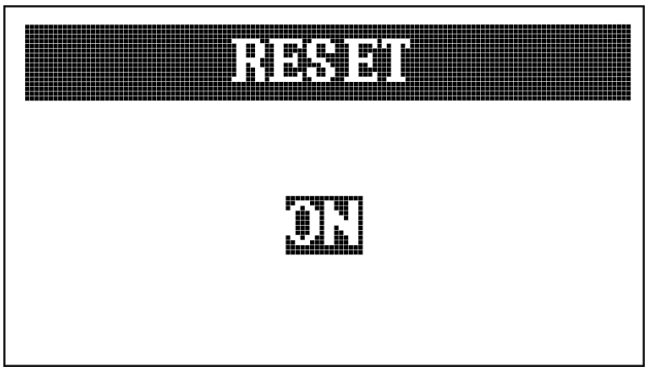


Please reset parameters before calibrate.
Press UP/DOWN key to select the functions and then press ENTER key to enter.

1. Reset: reset all of the calibrated parameters to default.
2. Calibration： pH calibration.

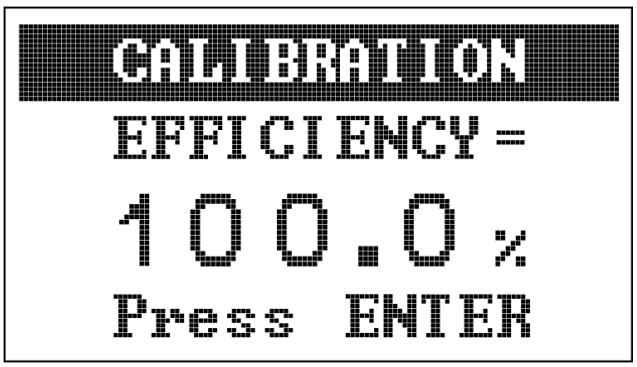
Notice：
If the electrode efficiency is lower than 80% or the waiting time is too long and can not locked, user should check the electrode if aged, user should Replace the new electrode.

Reset parameters



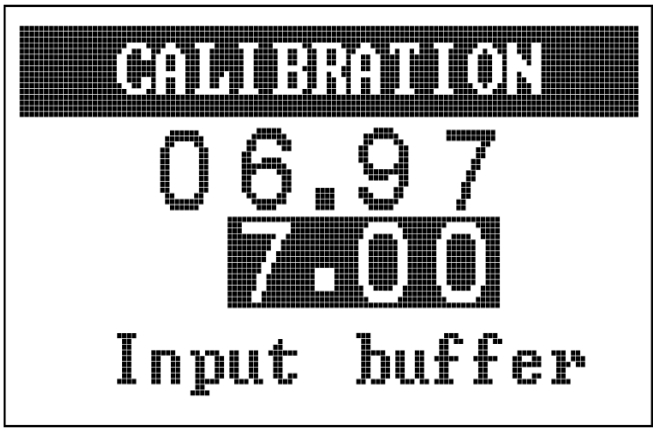
Press UP/DOWN key to select the functions and then press ENTER key to enter.

Notice：The rest parameters in here just back to original setting, it would not affect the calibrated parameters.

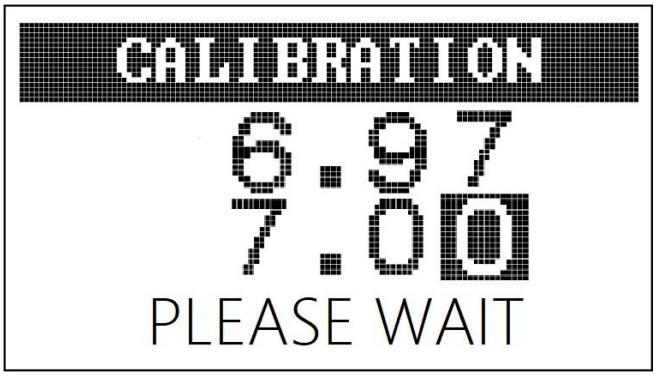


Display efficiency from last time, press ENTER key to start calibration.

Stand calibration



1. Put the electrode to the second buffer. (6.86pH /7.00pH)
2. Press UP/DOWN key input the standard buffer and then press ENTER key to start calibration. User can press ENTER to go to next or wait for it auto lock. If the input is over 0.00 to 14.00pH then it will display "ERROR" on the top of LCD.
3. If the input is over 0.00-14.00 pH, or temperature is over 0.0-60.0℃ then it will display error message on the button of LCD.

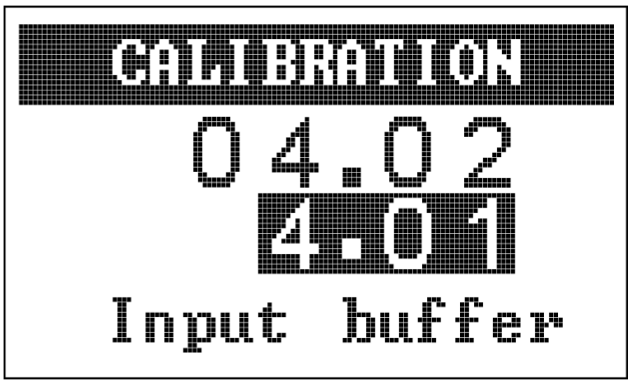


First line: real measuring value in buffer.

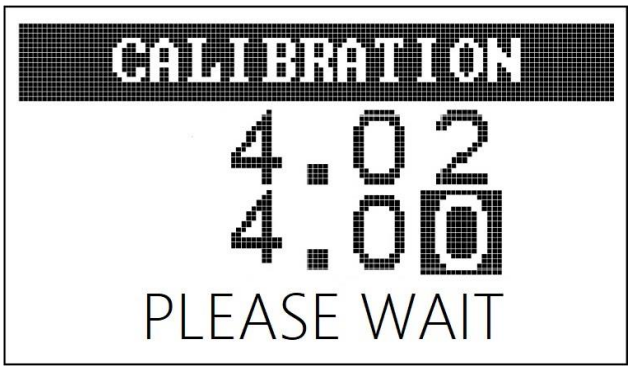
Second line: buffer's value.

Third line: User can press ENTER to go to next or wait for it auto lock.

Slope calibration



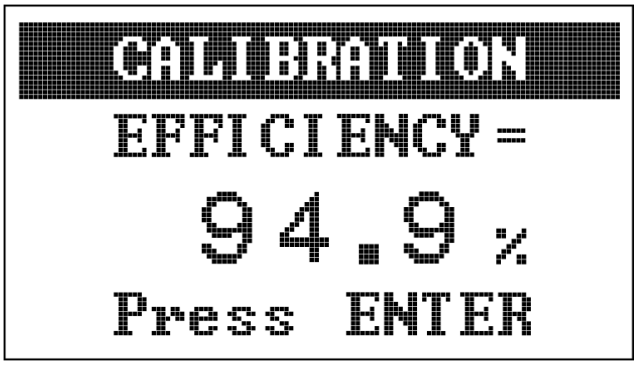
1. Put the electrode to the second buffer.
2. Press UP/DOWN key input the standard buffer and then press ENTER key to start calibration. User can press ENTER to go to next or wait for it auto lock.
3. If the input is over 0.00-14.00 pH, or temperature is over 0.0-60.0℃ then it will display error message on the button of LCD.



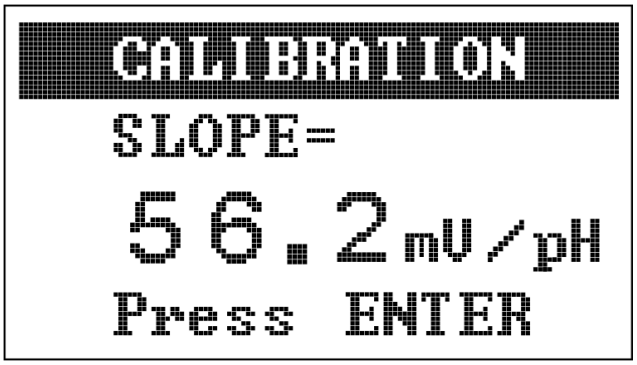
First line: real measuring value in buffer.

Second line: buffer's value.

Third line: User can press ENTER to go to next or wait for it auto lock.



Press ENTER key to enter the slope.

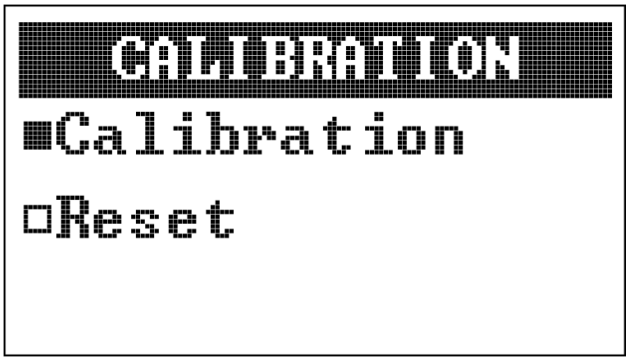


Press ENTER key to finish calibration.

ORP Calibration

Press MODE key to enter the password menu and then press UP/DOWN/SHIFT key to input password 1100 then press ENTER will enter to calibration mode or press MODE key to exit. If no key is be pressed and over 10 minutes then it will go back to measurement mode.

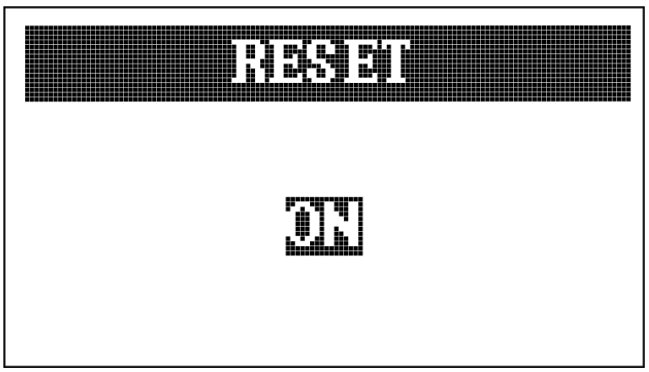
Manu



Press UP/DOWN key to select the function and then press ENTER key to enter function.

1. Reset: reset all of the calibrated parameters to default.
2. Calibration: ORP calibration.

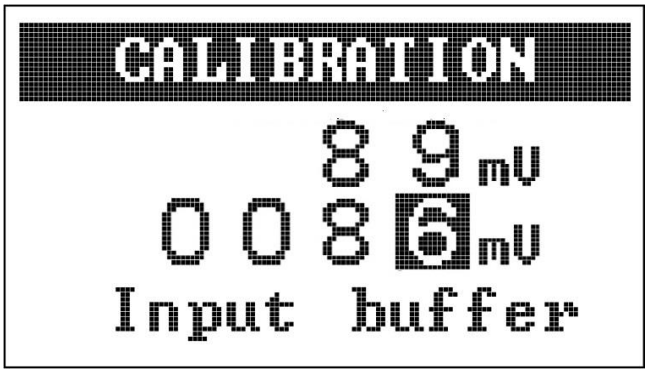
Reset parameters



Press UP/DOWN key to select the functions and then press ENTER key to enter.

Notice：The rest parameters in here just back to original setting, it would not affect the calibrated parameters.

Calibration



1. Put the electrode to the standard buffer.
2. Press UP/DOWN key input the standard buffer and then press ENTER key to start calibration. User can press ENTER to go to next or wait for it auto lock.
3. Wait the value is stable and press ENTER key to finish calibration.

Password

Press MODE key, and input password 1200/1100
1100：Calibration mode
1200：Setting mode
If no key is be pressed and over 10 minutes then it will go back to measurement mode.

Default

pH 20.00mA	corresponding	14.00	pH	range：-2.00 to 16.00
pH 4.00mA	corresponding	0.00	pH	range：-2.00 to 16.00 difference: 1.00pH
ORP 20.00mA	corresponding	2000	mV	range：-2000 to +2000
ORP 4.00mA	corresponding	-2000	mV	range：-2000 to +2000 difference :100mV

Current output offset	0.00	mA	range: +/- 1.00
Relay 1 pH close S.P.	10.00	pH	range: -2.00 to 16.00
Relay 1 PH open S.P.	4.00	pH	range: -2.00 to 16.00 difference : 0.01
Relay 1 ORP close S.P.	1000	mV	range: -2000 to +2000
Relay 1 ORP open S.P.	400	mV	range: -2000 to +2000 difference : 1 mV
Relay 2 pH close S.P.	4.00	pH	range: -2.00 to 16.00
Relay 2 PH open S.P.	10.00	pH	range: -2.00 to 16.00 difference : 0.01
Relay 2 ORP close S.P.	400	mV	range: -2000 to +2000
Relay 2 ORP open S.P.	1000	mV	range: -2000 to +2000 difference : 1 mV
ID address	1		range: 1 to 255
Baud rate	9600		
PH offset	0.00	pH	range: +/- 1.00
ORP offset	0	mV	range: +/-100
Mode	pH		range: PH/ORP
Temp. Offset	0.0	℃	range: +/- 5.0
Language	English		range: English/traditional Chinese /simple Chinese
Filter	1		range: 0 to 10
Temp. compensation	MTC		range: ATC/MTC
Temp. probe	Pt1000		range: Pt1000, NTC10K

RS485 command

The instrument use the standard Modbus-RTU protocol, all of the data are word type(2 bytes), the range is -32767～32767 ,16 system.

PC command:

	ID address	command	Start address	Data number	CRC16
length	1 byte	1byte	2 byte	2 byte	2 byte
Ex.	0x01	0x03	0x0001	0x0001	0xD5CA

Instrument response:

	ID address	command	Data number	data	CRC16
length	1 byte	1 byte	1byte	N byte	2 byte
Ex.	0x01	0x03	0x02	0x02 0xBC	0xB895

If response is 01,the command is wrong.
If response is 02,the address is not correct.
If response is 03,data number is not correct.

Baud rate：9600（regular）
Information：8
Parity：none
Stop bit：1
command 03: read the settings

03：definition

address			
(00)	0x00	pH/ORP reading	reading:pH X 0.01, ORP X 1
(01)	0x01	pH/ORP current	reading:X 0.01
(02)	0x02	Temperature	reading:X 0.1