Version:2020-02

PH/ORP Dual Input Controller

800 Series

Content

Unpacking instruction

Check for any damages on the content after unpacking.
Read the manual before installing and operating the instruments.
Confirm the wiring connections with the wiring diagram before switching on the power to avoid damages and injuries.

Safety precaution

1. The instrument must be operated by trained professional and technical personnel.
2. Avoid installing in a high humidity, high temperature, corrosive and in direct with sunlight environment.
3. Separate instrument signal cables from power lines and machine that produces high noise interference.

Instrument application

Widely used in industrial measuring of the temperature and PH/ORP, such as wastewater treatment, environmental monitoring, fermentation, pharmacy, food process agriculture production, pump control, etc.

Product content

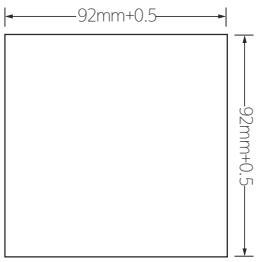
1 meter, 1 operational manual, 1 quality check form, and two sets of mounting kits

Specifications

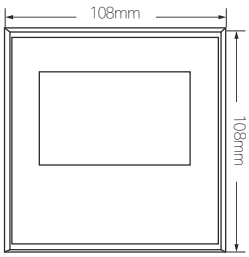
Functions	pH	ORP
Measuring range	-2.00pH to +16.00 pH	-2000mV to +2000mV
Resolution	0.01pH	1mV
Accuracy	±0.01pH	±1mV
Temp. compensation	Pt 1000/NTC10K	
Temp. range	-10.0 to +130.0℃	
Temp. compensation range	-10.0 to +130.0℃	
Temp. resolution	0.1℃	
Temp. accuracy	±0.2℃	
Ambient temperature range	0 to +70℃	
Storage temp.	-20 to +70℃	
Input impedance	$>10^{12}\Omega$	
Display	Back light,dot matrix	
pH1/ORP current output 1	Isolated, 4 to 20mA output , max. load 500Ω	
pH2/ORP current output 2	Isolated, 4 to 20mA output , max. load 500Ω	
Current output accuracy	±0.05 mA	
RS485	Mod bus RTU protocol	
Baud rate	9600/19200/38400	
Relay maximum contacts capacity	5A/250VAC, 5A/30VDC	
Relay delay	0-120 seconds	
Data logging capacity	500,000 data	
Language selection	English/ traditional Chinese/ simplified Chinese	
IP Rating	IP65	
Power supply	From 90 to 260VAC, power consumption<5 watts	
Installation	panel/wall/pipe installation	
Weight	0.55Kg	

Instrument installation

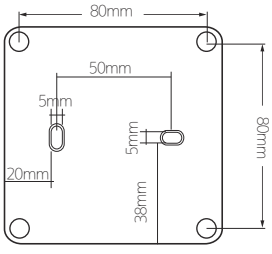
800 Series:The instrument can be panel, wall or pipe mounted installation.
To install 800 series on panel, make a 92x92 mm square cutout and insert the instrument then screw in the fixed HOLDER.



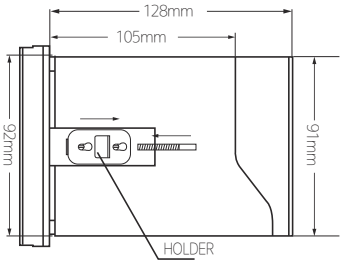
Cutout size - 800 series



Front view – 800 Series

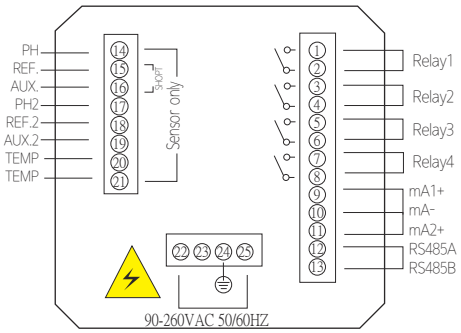


Back view – 800 series



Side view – 800 series

Connection label (800 series)



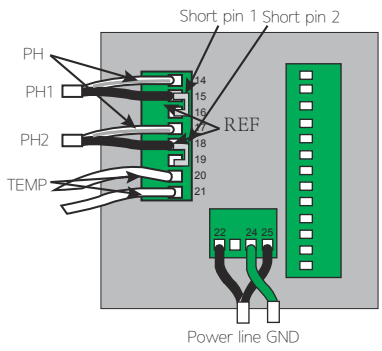
Notice

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

Rubber conductor not removed Rubber conductor removed

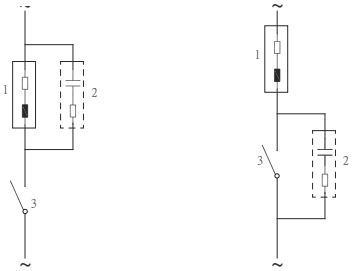
2. Different connection of 2-wire electrode (short pin 2 and 3) and 3-wire electrode (ground pin), Please see the connect label.

Electrode connection figure (800 series)

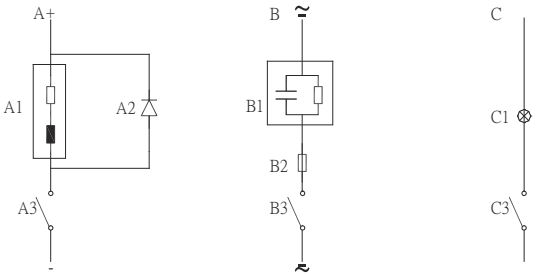


Relay contact protection

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.

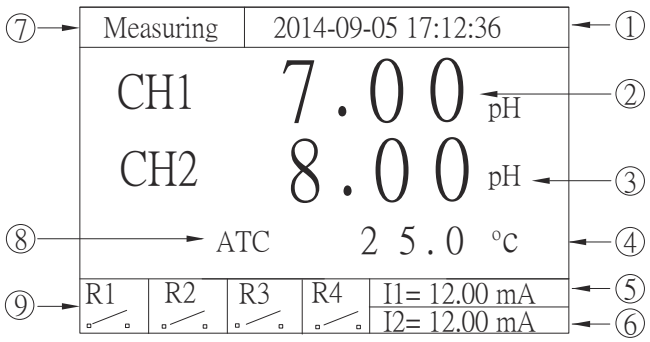


AC protection, use for inductive load
1. Load
2. RC eliminate spark, using in 220VAC, R=100 ohm1W,
3. Relay contact



DC protection: A1 - Inductive load || A2 - 1N4007 || A3 - Relay contact
AC/DC protection: B1 - Capacitive load || B2: 0.8 Ohm/1W（DC24V）||B3 - Relay contact
Resistive load: C1 - Lamp bulb ||C3 - Relay contact

Measurement display



1. Date and time
2. Main measurement display
3. Unit
4. Temperature and unit
5. Current output 1
6. Current output 2
7. Measurement status and error indicator (Does not show when meter is in keeping mode)
8. Temp. compensation: auto(ATC) or manual(MTC)
9. 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.
If the temperature readings are under or over the range, it will display -99.9/999.9.

Buttons

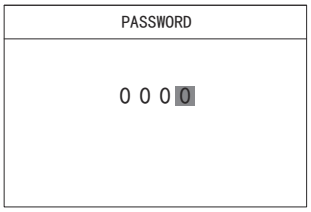
Key name	Meas. status	Setting status	Cal. status	Record status
MODE	Enter password	Exit	Exit	Exit
SHIFT	none	Move digit	Mode digit	Mode digit
UP	Enter record	Inc	Inc	Inc
DOWN	None	Dec	Dec	Dec
ENTER	ON/OFFback light	Enter	Enter	Enter

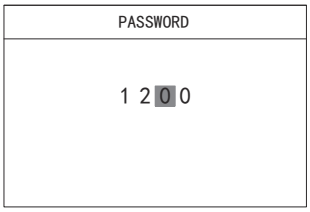
Keeping mode

1. Activates during startups, setting, calibration, record, and cleaning.
2. Relay will return to default status – All relays will not be energized (Inactive).
3. Current output:
a) Fixed current – Values set on output test
b) Last current – Hold the last output before entering Keeping mode.
4. Keeping mode will be deactivated 10 seconds after returning to measurement mode.

Setting

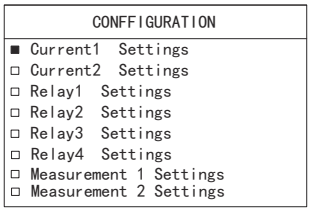
Press MODE key to enter the password menu and then press UP/DOWN/SHIFT key to input password 1200 then press ENTER will enter to setting mode or press MODE key to exit. Controller will return to measurement mode after 10 minutes of inactivity.



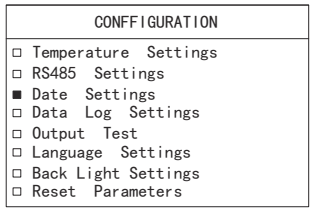


Main display

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



Page1



Page2

Note:
1. Error on measurement page indicates that input data is not in the correct range.
2. Press ENTER on setting pages to save any changed data.
3. Press MODE to return to the previous page.
4. Meter will return to measurement mode after 10 minutes of inactivity.

Current 1 settings (for channel 1)

```
CURRENT 1 SETTINGS
4.00 mA      = + 0 0 . 0 0 pH
20.00 mA     = + 1 4 . 0 0 pH
Offset       =   + 0 . 0 0 mA
Filter Time  =       0 0 0 SEC
HOLD Type    = ☐ Fixed
                 0 4 . 0 0 mA
               ☐ Last
```

OR

```
CURRENT 1 SETTINGS
4.00 mA      = + 1 4 . 0 0 pH
20.00 mA     = + 0 0 . 0 0 pH
Offset       =   + 0 . 0 0 mA
Filter Time  =       0 0 0 SEC
HOLD Type    = ☐ Fixed
                 0 4 . 0 0 mA
               ☐ Last
```

```
CURRENT 1 SETTINGS
4.00 mA      =   + 0 0 0 0 mV
20.00 mA     =   + 1 0 0 0 mV
Offset       =   + 0 . 0 0 mA
Filter Time  =       0 0 0 SEC
HOLD Type    = ☐ Fixed
                 0 4 . 0 0 mA
               ☐ Last
```

OR

```
CURRENT 1 SETTINGS
4.00 mA      =   + 1 0 0 0 mV
20.00 mA     =   + 0 0 0 0 mV
Offset       =   + 0 . 0 0 mA
Filter Time  =       0 0 0 SEC
HOLD Type    = ☐ Fixed
                 0 4 . 0 0 mA
               ☐ Last
```

1. Set the pH/OPR value to the corresponding 4.00mA and 20.00mA point.
2. The minimum range between 4.00mA and 20.00 mA at least is 1.00 pH/100 mV.
3. Set the offset current of pH/ORP, the range is±1.00mA.
4. The filter time range is 0-120 seconds. The low pass filter of software will be activated when the current from one point to another point if user sets the filter time.
5. Set the current 1 output mode(fixed / last) when instrument enters into keeping mode.

Current 2 settings (for channel 2)

```
CURRENT 2 SETTSINGS
4.00 mA      = + 0 0 . 0 0 pH
20.00 mA     = + 1 4 . 0 0 pH
Offset       =   + 0 . 0 0 mA
Filter Time  =       0 0 0 SEC
HOLD Type    = ☐ Fixed
                 0 4 . 0 0 mA
               ☐ Last
```

```
CURRENT 2 SETTSINGS
4.00 mA      =   + 0 0 0 0 mV
20.00 mA     =   + 1 0 0 0 mV
Offset       =   + 0 . 0 0 mA
Filter Time  =       0 0 0 SEC
HOLD Type    = ☐ Fixed
                 0 4 . 0 0 mA
               ☐ Last
```

The Settings are as same as "Current 1 Settings".

Relay 1 settings (for channel 1)

```
RELAY 1 SETTINGS
ON/OFF       = ■ ON
               ☐ OFF
Close S.P.   = + 1 0 . 0 0 pH
Open  S.P.   = + 0 4 . 0 0 pH
Delay Time   =       0 0 0 SEC
```

```
RELAY 1 SETTINGS
ON/OFF       = ■ ON
               ☐ OFF
Close S.P.   =   + 1 0 0 0 mV
Open  S.P.   =   + 0 4 0 0 mV
Delay Time   =       0 0 0 SEC
```

1. Press UP/DOWN key to ON/OFF (enable/disable) relay1.
2. Close set point: Target value to activate relay.
3. Open set point: Target value to deactivate relay.
4. Delay time: Relay will only be activated when this timer time out. Timer range from 0 to 120 seconds.

Ex: User targets to switch on the pump at 10.00pH and switch off at 04.00pH. Set close S.P. to 10.00pH and open S.P. to 04.00pH.

Relay 2 settings (for channel 1)

```
RELAY 2 SETTINGS
ON/OFF       = ■ ON
               ☐ OFF
Close S.P.   =+ 0 4 . 0 0 pH
Open  S.P.   =+ 1 0 . 0 0 pH
Delay Time   =       0 0 0 SEC
```

```
RELAY 2 SETTINGS
ON/OFF       = ■ ON
               ☐ OFF
Close S.P.   =   + 0 4 0 0 mV
Open  S.P.   =   + 1 0 0 0 mV
Delay Time   =       0 0 0 SEC
```

1. Press UP/DOWN key to ON/OFF (enable/disable) relay2.
2. Close set point: Target value to activate relay.
3. Open set point: Target value to deactivate relay.
4. Delay time: Relay will only be activated when this timer time out. Timer range from 0 to 120 seconds.

Ex: User targets to switch on the pump at 04.00 pH and switch off at 10.00 pH. Set close S.P. to 04.00 pH and open S.P. to 10.00 pH.

Relay 3 settings (for channel 2)

```
RELAY 3 SETTINGS
ON/OFF       = ■ ON
               ☐ OFF
Close S.P.   =   + 1 0.0 0 pH
Open  S.P.   =   + 0 4.0 0 pH
Delay Time   =       0 0 0 SEC
```

```
RELAY 3 SETTINGS
ON/OFF       = ■ ON
               ☐ OFF
Close S.P.   =   + 1 0 0 0 mV
Open  S.P.   =   + 0 4 0 0 mV
Delay Time   =       0 0 0 SEC
```

1. Press UP/DOWN key to ON/OFF (enable/disable) relay3.
2. Close set point: Target value to activate relay.
3. Open set point: Target value to deactivate relay.
4. Delay time: Relay will only be activated when this timer time out. Timer range from 0 to 120 seconds.

Ex: User targets to switch on the pump at 10.00pH and switch off at 04.00pH. Set close S.P. to 10.00pH and open S.P. to 04.00pH.

Relay 4 settings

```
RELAY 4 SETTINGS
ON/OFF       = ■ ON
               = ☐ OFF
Close S.P.   =   + 0 4.0 0 pH
Open  S.P.   =   + 1 0.0 0 pH
Delay Time   =       0 0 0 SEC
```

```
RELAY 4 SETTINGS
ON/OFF       = ■ ON
               = ☐ OFF
Close S.P.   =   + 0 4 0 0 mV
Open  S.P.   =   + 1 0 0 0 mV
Delay Time   =       0 0 0 SEC
```

1. Press UP/DOWN key to ON/OFF (enable/disable) relay4.
2. Close set point: Target value to activate relay.
3. Open set point: Target value to deactivate relay.
4. Delay time: Relay will only be activated when this timer time out. Timer range from 0 to 120 seconds.

Ex: User targets to switch on the pump at 04.00 pH and switch off at 10.00 pH. Set close S.P. to 04.00 pH and open S.P. to 10.00 pH.

Measurement 1 settings (for channel 1)

```
MEASUREMENT SETTINGS
Unit         = ■ pH
               ☐ ORP
Electrode    = ☐ Glass
               ☐ Antimony
Offset       =  + 0.0 0 pH
Filter       =      0 0
```

1. Unit: select the measuring unit.
2. Electrode: select the sensor type. (for pH only)
3. Offset: offset for the readings.
4. Filter: average the readings.

Measurement 2 settings (for channel 2)

```
MEASUREMENT SETTINGS
Unit         = ■ pH
               ☐ ORP
Offset       =  + 0.0 0 pH
```

1. Mode: select the measuring mode.
2. Offset: offset for the readings.

Temperature settings (Page 1)

TEMPERATURE SETTSINGS	
Automatic	= ■ Auto
	☐ Manual
Probe	= ☐ Pt 1000
	☐ NTC 10K
Offset	= + 0 . 0 ℃
Manual Meas.	= + 0 2 5 . 0 ℃
Manual Cal.	= 2 5 . 0 ℃

1. Automatic: select ATC or MTC
2. Probe: select probe type.
3. Offset: offset for the readings.
4. Manual measuring: the temperature is for measuring mode when it uses MTC.
5. Manual calibration: the temperature is for calibration mode when it uses MTC.

Temperature settings (Page 2)

TEMPERATURE SETTSINGS	
Display	= ■ YES
	☐ NO

6. Display: display the temperature on measuring mode or not.

RS485 settings

RS485 SETTSINGS	
ID Address	= 0 0 1
Baud Rate	= ☐ 9600
	= ☐ 19200
	= ☐ 34800

1. ID Address: 1-255
2. Baud Rate: Press UP/DOWN key to select correct baud rate.

Date settings

DATE SETTSINGS	
Year	= 2 0 1 5
Month	= 0 8
Day	= 1 5
Hour	= 1 3
Minute	= 3 6
Second	= 0 4

Press UP/DOWN key to set the date. Clock will continue to run for about 1 week after power down.

Data log settings

DATA LOG SETTSINGS	
OFF/ON	= ■ ON
	☐ OFF
Display Type	= ☐ Record
	= ☐ XY Chart
Reset Record	= ☐ Yes
	= ☐ No
Save Period	= 0 6 0 SEC

1. ON/OFF: Enable or disable data logging function.
2. Display type: select the display mode
3. Reset Record: Erase all recorded data.
4. Saving Period: Recording interval.

Notice: Reset record will take around 10 seconds.

Output test (Page 1)

OUTPUT TEST	
Current1	= 0 4 . 0 0 mA
Current2	= 0 4 . 0 0 mA
Relay1	= ☐ CLOSE
	☐ OPEN
Relay2	= ☐ CLOSE
	= ☐ OPEN
Relay3	= ☐ CLOSE
	= ☐ OPEN

1. Current 1 output: 4.00-20.00mA, press UP/DOWN to set.
2. Current 2 output: 4.00-20.00mA, press UP/DOWN to set.
3. Relay 1 output: press UP/DOWN to select.
4. Relay 2 output: press UP/DOWN to select.
5. Relay 3 output: press UP/DOWN to select.
6. Relay 4 output: press UP/DOWN to select.

Output test (Page 2)

OUTPUT TEST	
Relay4	= ☐ CLOSE
	= ☐ OPEN

Notice: This function for testing the output only.

Language settings

LANGUAGE SETTSINGS	
Language	= ■ English
	= ☐ 繁體中文
	= ☐ 简体中文

Language preference. Press UP/DOWN key to select the language.

Back light settings

BACK LIGHT SETTING	
Back Light	= ■ 60 Seconds
	= ☐ Manual

60 seconds : The back light will turn off when no key is be pressed in 60 seconds.
Manual: User needs to press the ENTER key to turn on/off the back light in measuring mode

Reset parameters

RESET PARAMETERS	
Reset Type	= ■ Current
	= ☐ Relay1
	= ☐ Relay2
	= ☐ Relay3
	= ☐ Relay4
	= ☐ All

Reset all parameters. Press UP/DOWN key to select the targeted preference to reset.

Notice: The reset will not affect the calibrated parameters.

Record query

Press UP key at the measurement mode to enter record query mode.

INPUT RECORD START NUMBER
0 1 0 3 0 0

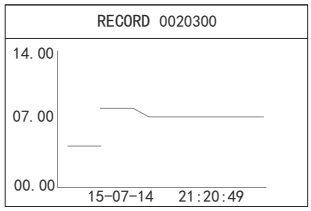
Press UP/DOWN and SHIFT key to input record number then press ENTER key to confirm record number or press MODE key to exit.

Display (pH) data in detail view

RECORD 0020300		
15-08-14 21:20:49	07.00 07.50	pH pH
15-08-14 21:20:59	07.00 07.50	pH pH
15-08-14 21:21:09	07.00 07.50	pH pH
15-08-14 21:21:19	07.00 07.50	pH pH
15-08-14 21:21:29	07.00 07.50	pH pH

The first for channel 1, the second for Channel 2

Display (pH) data in XY chart view



The XY chart for channel 1 only

Calibration

Press MODE key to enter the password menu. Then, press UP/DOWN/SHIFT key to input password 1100. Pressing ENTER will proceed to calibration mode or press MODE to exit. If no key is pressed for over 10 minute, then it will go back to measurement mode.

PASSWORD
0 0 0 0

PASSWORD
1 1 0 0

Main display (Page 1)

CALIBRATION
■ Channel 1 Calibration □ Channel 2 Calibration

Press UP/DOWN key to select the channel and then press ENTER key to go to next manu.

pH Main display (Page 2)

CALIBRATION
■ Automatic Calibration □ Manual Calibration □ Reset Parameters

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

1. Automatic calibration: follow the indication to select standard buffer.
2. Manual input calibration: manual input standard buffer.
3. Reset parameters: reset all of the calibrated parameters to default.

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.

Automatic calibration

Stand calibration

CALIBRATION	
■ 6.86 □ 7.00	7.00 pH 25.0 ℃
Select buffer and press ENTER	

1. Put the electrode to the first buffer.
2. Press UP/DOWN key to select the correct buffer and then press ENTER to start calibration.
3. User can press ENTER to go to next or wait for it auto lock.
4. Display the idea pH on the right side.
5. If the offset is over +/-1.5 pH or temperature is over 0.0-60.0℃ then it will display error message on the button of LCD.

Slope calibration

CALIBRATION	
□ 1.68 ■ 4.01 □ 9.18 □ 10.01 □ 12.45	4.00 pH 25.0 ℃
Select buffer and press ENTER	

1. Put the electrode to the second buffer.
2. Press UP/DOWN key to select the correct buffer and then press ENTER to start calibration.
3. User can press ENTER to go to next or wait for it auto lock.
4. Display the idea pH on the right side.
5. If the offset is over 30% or temperature is over 0.0-60.0℃ then it will display error message on the button of LCD.

Display efficiency

CALIBRATION	
04.01	4.00 pH 25.0 ℃
SLOPE = 57.8 mV/pH	
EFFICIENCY = 98.0 %	

If the efficiency is lower than 80%, that means the electrode is aged, user should Replace the new electrode.

Manual calibration

Stand calibration

CALIBRATION	
7.00	7.00 pH 25.0 ℃
Input buffer and press ENTER	

1. Put the electrode to the first 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. If the input is over 7.00+/-1.5pH then it will display ERROR on the top of LCD.
3. Display the idea pH on the right side.
4. If the idea pH is over 7.00+/-1.5 pH or temperature is over 0.0-60.0℃ then it will display error message on the button of LCD.

Slope calibration

CALIBRATION	
4.01	4.00 pH 25.0 ℃
Input buffer and press ENTER	

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. If the input is over 0.00 to 14.00pH then it will display " ERROR" on the top of LCD.
3. Display the idea pH on the right side.
4. 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.

Display efficiency

CALIBRATION	
04.01	4.00 pH 25.0 ℃
SLOPE = 57.8 mV/pH	
EFFICIENCY = 98.0 %	

If the efficiency is lower than 80%, that means the electrode is aged user should Replace the new electrode.
If the efficiency is lower than 50%, it will not accept this calibration

pH Reset parameters

RESET PARAMETERS
Reset

This will reset all the calibrated parameters to default.

ORP Main display

CALIBRATION
■ Manual Calibration □ Reset Parameters

Press UP/DOWN key to select the functions and then press ENTER key to confirm.
1. Manual input standard buffer.
2. Reset parameters: reset all of the calibrated parameters to default.

Manual calibration

CALIBRATION	
0 8 6 mV	0 8 8 mV
Input buffer and press ENTER	

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. Display the idea ORP on the right side.

ORP Reset parameters

RESET PARAMETERS
Reset

This will reset all the calibrated parameters to default.

Default settings

pH1 20.00mA corresponding	14.00	pH	range: -1.00 - 16.00
pH1 4.00mA corresponding	0.00	pH	range: -2.00 - 15.00 difference : 1.00
ORP1 20.00mA corresponding	1000	mV	range: -1900 - 2000
ORP1 4.00mA corresponding	0	mV	range: -2000 - 1900 difference : 100
pH2 20.00mA corresponding	14.00	pH	range: -1.00 - 16.00
pH2 4.00mA corresponding	0.00	pH	range: -2.00 - 15.00 difference : 1.00
ORP2 20.00mA corresponding	1000	mV	range: -1900 - 2000
ORP2 4.00mA corresponding	0	mV	range: -2000 - 1900 difference : 100

Current 1 output offset	0.00	mA	range: +/- 1.00
Current 2 output offset	0.00	mA	range: +/- 1.00
Current 1 filter	0	second	range: 0 - 120
Current 2 filter	0	second	range: 0 - 120
Current 1 fixed output	4.00	mA	range: 4.00 - 20.00
Current 2 fixed output	4.00	mA	range: 4.00 - 20.00
Current 1 HOLD type	last		range: fixed/last
Current 2 HOLD type	last		range: fixed/last
Relay 1 pH close S.P.	10.00	pH	range: -2.00 - 16.00
Relay 1 PH open S.P.	4.00	pH	range: -2.00 - 16.00 difference : 0.01
Relay 1 ORP close S.P.	1000	mV	range: -2000 - 2000
Relay 1 ORP open S.P.	400	mV	range: -2000 - 2000 difference : 1
Relay 1 delay time	0	second	range: 0-120
Relay 2 pH close S.P.	4.00	pH	range: -2.00 - 16.00
Relay 2 PH open S.P.	10.00	pH	range: -2.00 - 16.00 difference : 0.01
Relay 2 ORP close S.P.	400	mV	range: -2000- 2000
Relay 2 ORP open S.P.	1000	mV	range: -2000 - 2000 difference : 1
Relay 2 delay time	0	second	range: 0 – 120
Relay 3 pH close S.P.	10.00	pH	range: -2.00 - 16.00
Relay 3 PH open S.P.	4.00	pH	range: -2.00 - 16.00 difference : 0.01
Relay 3 ORP close S.P.	1000	mV	range: -2000 - 2000
Relay 3 ORP open S.P.	400	mV	range: -2000 - 2000 difference : 1
Relay 3 delay time	0	second	range: 0-120
Relay 4 pH close S.P.	4.00	pH	range: -2.00 - 16.00
Relay 4 PH open S.P.	10.00	pH	range: -2.00 - 16.00 difference : 0.01
Relay 4 ORP close S.P.	400	mV	range: -2000- 2000
Relay 4 ORP open S.P.	1000	mV	range: -2000 - 2000 difference : 1
Relay 4 delay time	0	second	range: 0 – 120

Record period	60	second	range: 5 - 120
ID address	1		range: 1 - 255
Baud rate	9600		range: 9600,19200,38400
PH1 offset	0.00	pH	range: +/- 1.00
PH2 offset	0.00	pH	range: +/- 1.00
ORP1 offset	0	mV	range: +/-100
ORP2 offset	0	mV	range: +/-100
Mode	pH		range: 0=PH, 1=ORP
Temp. Offset	0.0	℃	range: +/- 5.0
Manual Temp.for measurement	25.0	℃	range: -10.0 - 130.0
Manual Temp. for calibration	25.0	℃	range: 0.0 - 60.0
Language	English		range: English/traditional Chinese /simple Chinese
Filter	1		range: 0 - 10
Temp. compensation	MTC		range: ATC/MTC
Temp. probe	Pt1000		range: Pt1000, NTC10K
Record type	record		range: record/XY chart

Password

Press MODE key
1100: Calibration mode
1200: Setting mode
1300: USB mode
*If no key is be pressed within 10 minutes, it will return to measurement mode.

Error code

Error 01	Memory error
Error 02	Reading is over maximum
Error 03	Reading is under minimum
Error 04	Temperature is over maximum
Error 05	Temperature is under minimum
Error 06	Current 1 output is over 20.5 mA. The maximum is 22.00mA
Error 07	Current 1 output is under 3.8 mA. The minimum is 3.5mA
Error 08	Current 2 output is over 20.5 mA. The maximum is 22.00mA
Error 09	Current 2 output is under 3.8 mA. The minimum is 3.5mA
Error 10	Record error
Error 11	ADC damage
Error 99	Default parameters lost

RS485 command

The instrument come in standard with 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.

command 03: read the settings
command 04: read the readings

04:definition

address		
(00) 0x00	pH1/ORP1 reading	reading : pH X 0.01, ORP X 1
(01) 0x01	pH1/ORP1 current	reading : X 0.01
(02) 0x02	pH2/ORP2 reading	reading : pH X 0.01, ORP X 1
(03) 0x03	pH2/ORP2 current	reading : X 0.01
(04) 0x04	Temperature	reading : X 0.1
(05) 0x05	Error code	reading : X 1
(06) 0x06		
(07) 0x07		
(08) 0x08		
(09) 0x09	Model type	fix to 1

03:definition

Address		
(00) 0x00	pH1 20.00mA corresponding	reading:X 0.01
(01) 0x01	pH1 4.00mA corresponding	reading:X 0.01
(02) 0x02	ORP1 20.00mA corresponding	reading:X 1
(03) 0x03	ORP1 4.00mA corresponding	reading:X 1

(04) 0x04	pH2 20.00mA corresponding		reading:X 0.01
(05) 0x05	pH2 4.00mA corresponding		reading:X 0.01
(06) 0x06	ORP2 20.00mA corresponding		reading:X 1
(07) 0x07	ORP2 4.00mA corresponding		reading:X 1
(08) 0x08	Current 1 offset		reading:X0.01
(09) 0x09	Current 2 offset		reading:X0.01
(10) 0x0A	Current 1 filter		reading:X1
(11) 0x0B	Current 2 filter		reading:X1
(12) 0x0C	Current 1 fixed current		reading:X0.01
(13) 0x0D	Current 2 fixed current		reading:X0.01
(14) 0x0E	Current 1 HOLD type		reading:X1 0=fixed,1=last
(15) 0x0F	Current 2 HOLD type		reading:X1 0=fixed,1=last
(16) 0x10	Relay1 pH close S.P.		reading:X0.01
(17) 0x11	Relay1 pH open S.P.		reading:X0.01
(18) 0x12	Relay1 ORP close S.P.		reading:X1
(19) 0x13	Relay1 ORP open S.P.		reading:X1
(20) 0x14	Relay1 delay time		reading:X1
(21) 0x15	Relay2 pH close S.P.		reading:X0.01
(22) 0x16	Relay2 pH open S.P.		reading:X0.01
(23) 0x17	Relay2 ORP close S.P.		reading:X1
(24) 0x18	Relay2 ORP open S.P.		reading:X1
(25) 0x19	Relay2 delay time		reading:X1
(26) 0x1A	Relay3 pH close S.P.		reading:X0.01
(27) 0x1B	Relay3 pH open S.P.		reading:X0.01
(28) 0x1C	Relay3 ORP close S.P.		reading:X1
(29) 0x1D	Relay3 ORP open S.P.		reading:X1
(30) 0x1E	Relay3 delay time		reading:X1
(31) 0x1F	Relay4 pH close S.P.		reading:X0.01
(32) 0x20	Relay4 pH open S.P.		reading:X0.01
(33) 0x21	Relay4 ORP close S.P.		reading:X1
(34) 0x22	Relay4 ORP open S.P.		reading:X1
(35) 0x23	Relay4 delay time		reading:X1
(36) 0x24	Record saving time		reading:X1
(37) 0x25	Mode1		reading:X1 0=pH,1=ORP
(38) 0x26	Mode2		reading:X1 0=pH,1=ORP
(39) 0x27	pH1	offset	reading:X0.01
(40) 0x28	ORP1	offset	reading:X1
(41) 0x29	pH2	offset	reading:X0.01

(42) 0x2A	ORP2	offset	reading:X1
(43) 0x2B	Temp. offset		reading:X0.1
(44) 0x2C	Manual temp. for measurement		reading:X0.1
(45) 0x2D	Manual temp. for calibration		reading:X0.1
(46) 0x2E	Temp. compensation		reading:X1 0=Auto,1=manual
(47) 0x2F	Temp. probe		reading:X1 0=Pt1000,1=NTC10K
(48) 0x30	Language		reading:X1 0=English ,1=traditional Chinese,2=simple Chinese
(49) 0x31	Filter		reading:X1