pHG-2091Pro

Online pH / ORP Meter

User manual

Shanghai BOQU Instrument Co., Ltd.

Content

Product description

The PHG-2091Pro online pH ORP meter is a brand new online intelligent analog meter independently developed and manufactured by BOQU Instrument. It has a built-in A/D conversion module and is compatible with a variety of analog signal electrodes. Complete functions, stable performance, easy operation, low power consumption, safety and reliability are the outstanding advantages of this instrument. This instrument is equipped with RS485 transmission interface, which can be connected to the upper computer through Modbus RTU protocol to realize monitoring and recording.
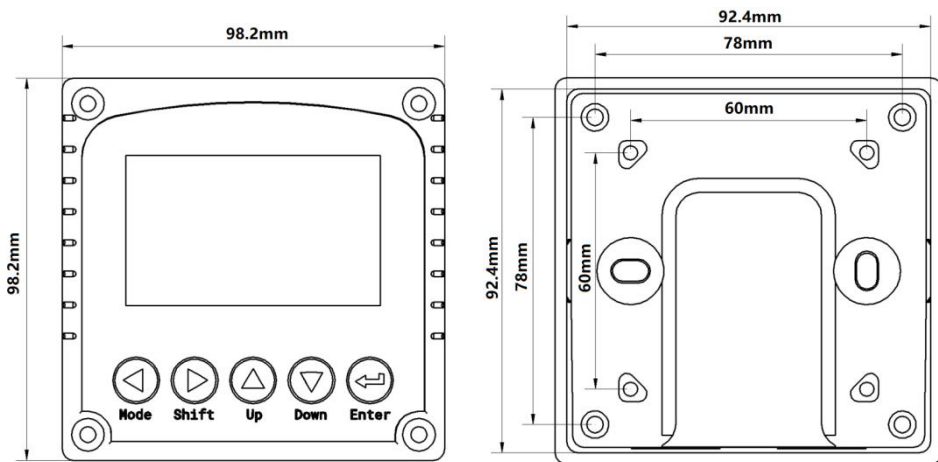
This online pH and ORP meter uses a matching analog signal pH electrode and ORP electrode (see appendix 2 for details), which can be widely used in solutions, wastewater pH or ORP values and temperatures in industrial occasions such as thermal power generation, chemical industry, metallurgy, environmental protection, pharmaceuticals, biochemical, food, and tap water. Continuous monitoring.

Product Specification Sheet

Specification	details
Name	Online pH/ORP meter
Measuring range	-2 ~16 pH -2000 ~2000 mV -30 ~130 ℃
Measurement accuracy	±1%FS ±0.5℃
Shell material	ABS plastic
Power Supply	90 – 260V AC 50/60Hz
Power consumption	4W
Output method	Two 4-20mA outputs, RS485
Relay	5A/250V AC 5A/30V DC
Communication	RS485 Modbus RTU
Waterproof level	IP65
Size	98.2×98.2×128.3mm
Hole szie	92*92mm

Installation and wiring

Instrument size chart

Embedded installation diagram
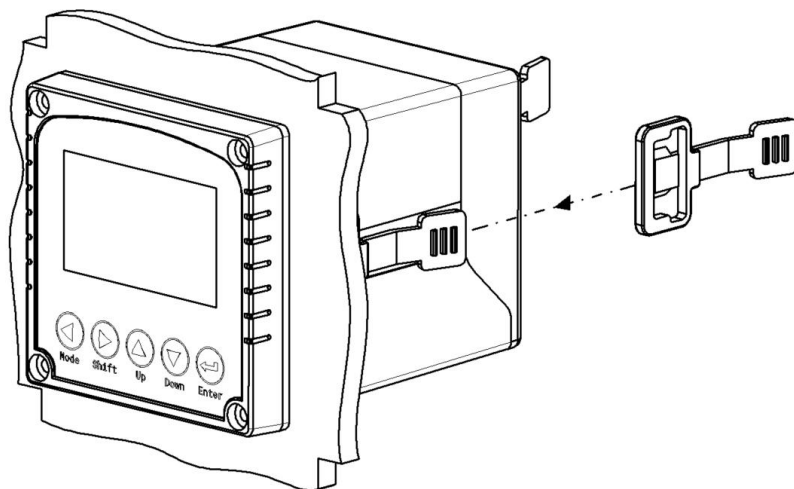
Pipeline installation diagram

Wiring diagram

01 AC_L	GND 11	
	CL2+ 12	
02 AC_N	GND 13	
	CL1+ 14	
03 GND	RS485_A 15	
04 NC	RS485_B 16	
	NC 17	
05 S1_COM	TEMP2 18	
06 S1_C	TEMP1 19	
07 S1_O		
	REF 20	
08 S2_COM	NC 21	
09 S2_C	NC 22	
	NC 23	
10 S2_O	pH 24	

POWER:90-260VAC 50/60Hz
4-20mA:Isolation MAX.Load 500Ω
Relay:5A/250VAC 5A/30VDC
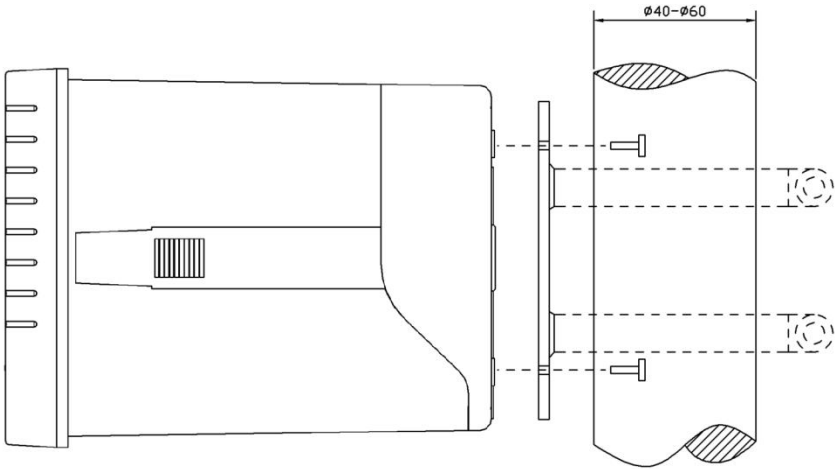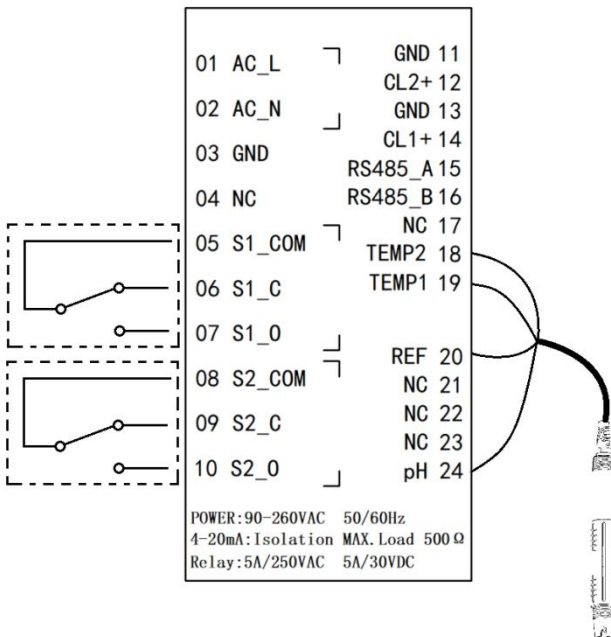
1. Operation panel

The main panel of the pH ORP controller has 2 modules, the LED LCD display module and the button module.

The user can set and adjust the parameters of the instrument through the 5 keys on the panel.

Figure 1 Measuring instrument operation panel
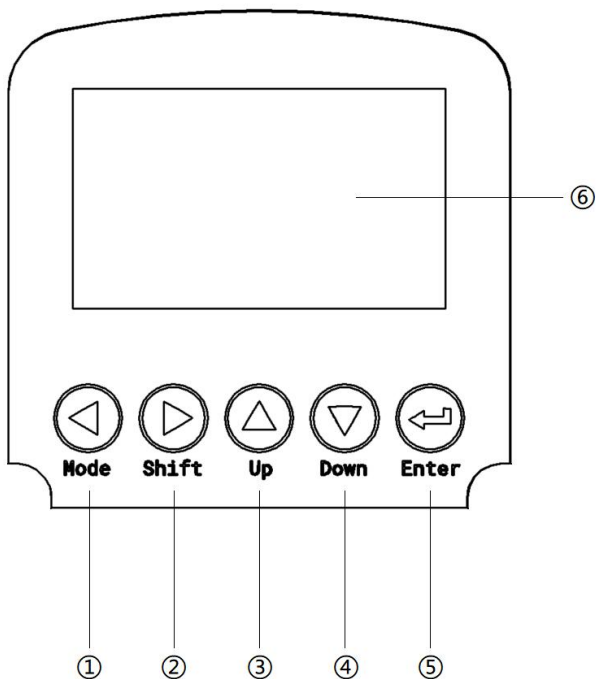
①   Set/Exit button

②   Select/change button

③   Up selection button

④   Down selection button

⑤   Confirm button

⑥   Instrument display

1. Measurement interface

After the start-up animation ends, enter the main measurement interface.

When the pH ORP meter is working normally, the LED display shows the following

contents.
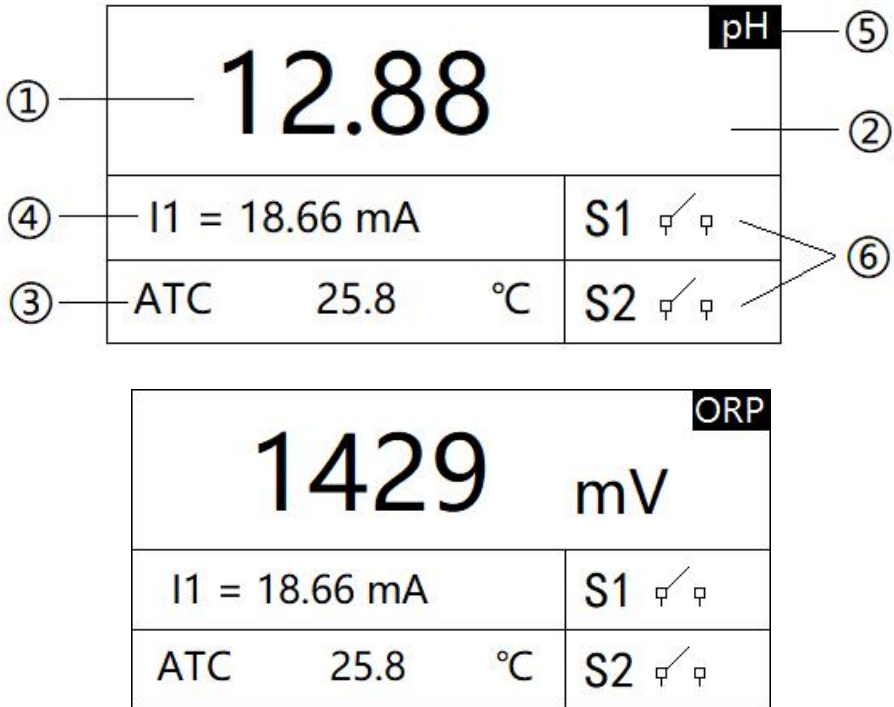

Figure 2 The main interface of measurement display

①   Measurement reading

②   Measurement unit

③   Measure temperature

④   pH/ORP The corresponding value of 4-20mA

⑤   Measurement mode

⑥   Over/low limit alarm prompt

Three, settings

Press the "Set/Exit button" to enter the password input interface.

PASSWORD

0000

Figure 3 Enter the password

Enter settings:

Enter the password "3700" to enter the setup menu.

SETUP

1.Measure

2.4-20mA

SETUP

3.RS485

4.Temp

SETUP

5.Relay1 Func.

6.Relay1

SETUP

7.Relay2

8.Language

Factory Reset

▶ Yes

No

Figure 4 Setting menu

3.1 Measurement settings

Under this menu, the user can change the measurement method pH / ORP.

Measure

▶ pH

ORP

Figure 3.1 Measurement settings

3.2 4-20mA setting

In this menu, the user can change the corresponding value of 4-20mA and set the corresponding effective range.
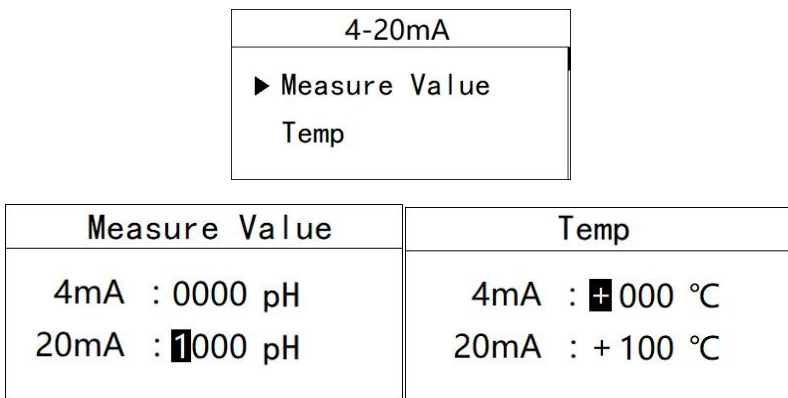
```
           4-20mA
  ▶ Measure Value
    Temp
```

```
   Measure Value              Temp
  4mA  : 0000 pH       4mA  : +000 ℃
  20mA : 1000 pH       20mA : +100 ℃
```

Figure 3.2 4-20mA setting

3.3 Communication settings

In this menu, the user can change the communication address and communication speed.

```
           RS485
    ▶ Address
      B. R.
```

```
    Address             ▶ 4800 bps
      001                 9600 bps
                          19200 bps
```
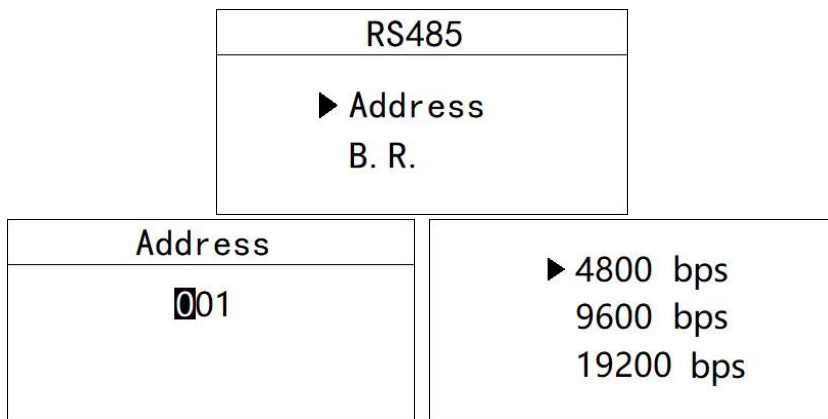
Figure 3.3 Communication settings

3.4 Temperature setting

In this menu, the user can change the temperature compensation type and set the temperature manually.
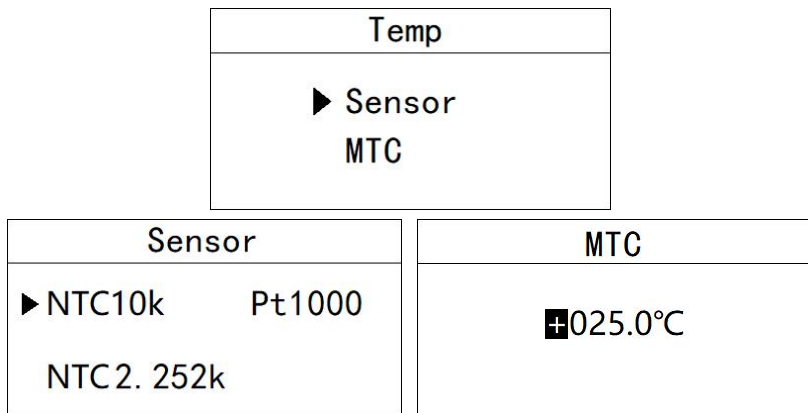
```
           Temp
        ▶ Sensor
          MTC
```

```
      Sensor                    MTC
 ▶ NTC10k    Pt1000        ■025.0℃
   NTC2.252k
```

Figure 3.4 Temperature setting

3.5 Relay 1 setting

In this menu, the user can switch the relay 1 function, set the parameter alarm upper limit, alarm return difference, and alarm delay time.

```
          Relay1
       ▶ Function
         Parameter
```

```
     Function            High : ■0.00 pH
       OFF               Hys  : 1.00  pH
     ▶ ON                Time : 030    s
```

Figure 3.6 Relay 1 setting

3.6 Relay 2 setting

In this menu, the user can switch the relay 2 function, set the parameter alarm lower limit, alarm return difference, and alarm delay time.
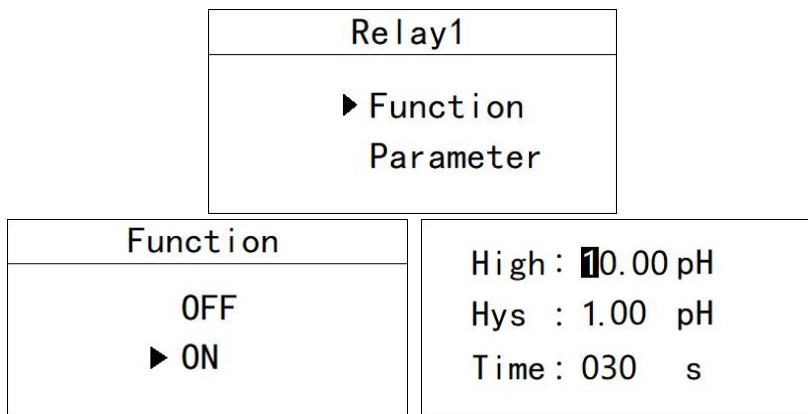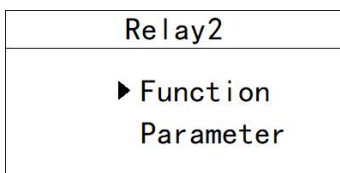
```
          Relay2
       ▶ Function
         Parameter
```

```
        Function             Low  : ▮0.00 pH
          OFF                Hys  : 1.00  pH
        ▶ ON                 Time : 030   s
```

Figure 3.7 Relay 2 setting

3.7 Language setting

In this menu, users can change the language of the system interface. Simplified Chinese and English are built-in.

```
           Language
          ▶ 简体中文
            English
```

Figure 3.11 Language setting

3.8 Backlight setting

In this menu, the user can change the backlight mode of the LCD screen, choose whether the backlight is always on or delay off (the default is delayed off), change the backlight brightness (brightness level 1-5, brightness increase), and change the contrast.

```
           Backlight
          ▶ Mode
            Parameter
```

```
         Mode                Parameter
       ▶ ON                Bright   : ▮3▮
         Delay 30s         Contrast : 2
```

Figure 3.12 Backlight setting

3.9 Restore factory settings

In this menu, users can restore all current output and relay parameters to factory parameters.
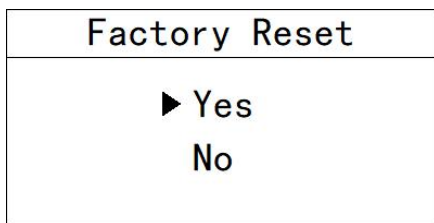
Figure 3.13 Restore factory settings

Four, calibration

Press the "Set/Exit button" to enter the password input interface.
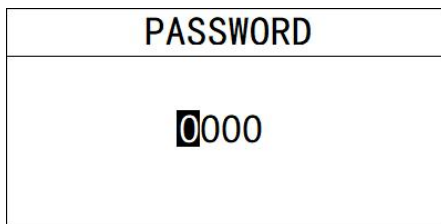

Figure 5 Enter the password

Enter calibration:

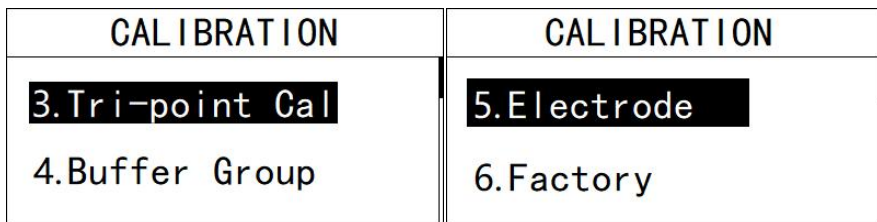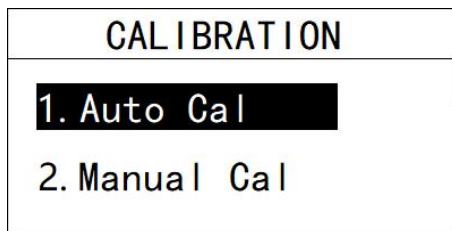**Enter the password "3900" to enter the calibration menu.**

Figure 6 Calibration menu

4.1 Automatic calibration

In this menu, users can use standard solutions to calibrate the instrument at two

10

points.

Auto Cal 1	Auto Cal 2
6.91 pH 23 mV 25.3 ℃ ▶ 6.86	4.08 pH 182 mV 25.3 ℃ ▶ 4.00 9.18

Figure 4.1 Automatic calibration

4.2 Manual input calibration

In this menu, users can calibrate the pH of the known solution by themselves.

Manual Cal
6.99 pH 46 mV 25.3 ℃   0̲7.00

Figure 4.2 Manual calibration

4.3 Three-point calibration

Put the electrodes into the standard solution of the specified concentration in order, and press the confirm key after the data is stable.

Tri-point Cal   1
9.12 pH -172 mV 25.3 ℃   ▶ 9.18

Tri-point Cal 2	Tri-point Cal 3
6.91 pH 23 mV 25.3 ℃ ▶ 6.86	4.08 pH 182 mV 25.3 ℃ ▶4.00

Figure 4.3 Three-point calibration

4.4 Buffer group

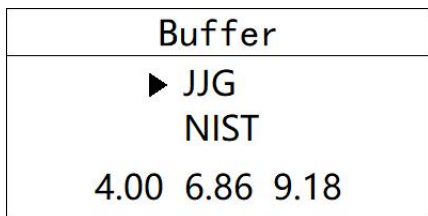**It is possible to modify the buffer standard set used in electrode calibration.**

```
┌─────────────────────────────┐
│          Buffer             │
│       ▶ JJG                  │
│         NIST                 │
│     4.00  6.86  9.18         │
└─────────────────────────────┘
```

Figure 4.4 Buffer group

4.5 Electrode status

You can view the current zero potential millivolt value and slope of the electrode.

```
┌─────────────────────────────┐
│        Electrode            │
│   Offset :   6.7 mV          │
│   Slope :   99%              │
└─────────────────────────────┘
```
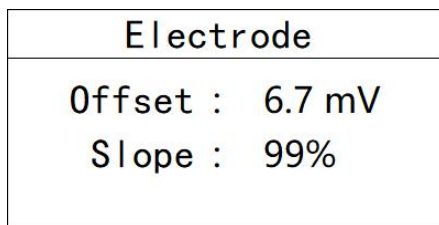
Figure 4.5 Electrode status

4.5 Restore factory settings,

The calibration parameters can be initialized to factory parameters.

```
┌─────────────────────────────┐
│      Factory Reset          │
│       ▶ Yes                  │
│         No                   │
└─────────────────────────────┘
```
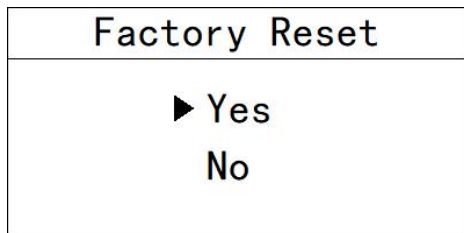
Figure 4.5 Restore factory settings

Appendix

1. Communication protocol

Communication parameters:

Baud rate: 4800, 9600, 19200 (default is 9600)

Serial data format: 8N1 (8 data bits, no parity, 1 stop bit)

Function code: 03

Device address: pH/ORP controller defaults to 1

Register definition:

Register address	Register definition	R/W	illustrate
0,1	Temp	R	℃,Float CDAB
2,3	pH	R	Float CDAB
4,5	mV	R	mV,Float CDAB
7	Temperature mode	R/W	1:ATC 2:MTC
12	RTU Address	R/W	Modbus mailing address,pH/ORP Default is 1
11	Baud rate	R/W	4800,9600,19200,The default is 9600

Detailed example of communication format:

Data read instruction:

Address + function code + register start address + register read number + CRC check code (hexadecimal)

For example Tx: 02 03 00 02 00 02 65 F8

address	function code	Register start address	Number of read registers	CRC Check code
02	03	0002	0002	65F8

Data return instruction:

Address + function code + data length + data + CRC check code (hexadecimal)

For example, Rx: 02 03 04 40 0E B8 52 4E CD

address	function	Data length	Measured value	CRC Check code

	code			
02	03	04	400EB852	4ECD

Convert the hexadecimal number 400EB852 (note the data format) to decimal by a floating-point number converter, and get the value 2.23

2. Electrode parameter table for industrial online pH controller

Electrode type	pH/ORP				ORP
Model	pH8012	pH8012F	pH8010	pH8010F	ORP8083
Range	0.00~14.00pH -2000~2000mV				-2000~2000mV
Temp	0.0~80.0℃				
Accuracy	2%,±0.5℃		2%		2%
Pressure	0.06MPa				
IP	IP68/NEMA6P				
Theoretical slope	≥95%				

SHANGHAI BOQU INSTRUMENT COMPANY
TEL:86-021-2092-2782
WA:86-15000087545
WEB: www.boquinstrument.com
Email: michael@shboqu.com
ADRESS: No. 118 Xiuyan Road,Pudong New Area,Shanghai,Zip
Code:201315,China

30200134