

pHG-2081S
Online pH Analyzer
User manual



Shanghai BOQU Instrument Co., Ltd.

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Introduction

pHG-2081S Industrial Online pH Analyzer is a brand-new online intelligent digital instrument independently developed and manufactured by BOQU Instrument. This pH analyzer communicates with the sensor through RS485 ModbusRTU, which has the characteristics of rapid communication and accurate data. Complete functions, stable performance, easy operation, low power consumption, safety and reliability are the outstanding advantages of this pH analyzer.

The pH analyzer works with digital pH sensor ,which can be widely used in industrial application such as thermal power generation, chemical industry, metallurgy, environmental protection, pharmaceutical, biochemical, food and tap water.

Technical Features

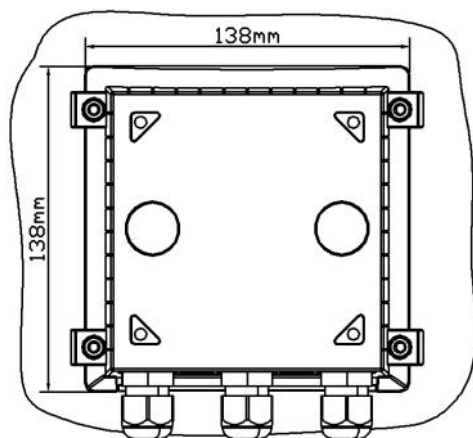
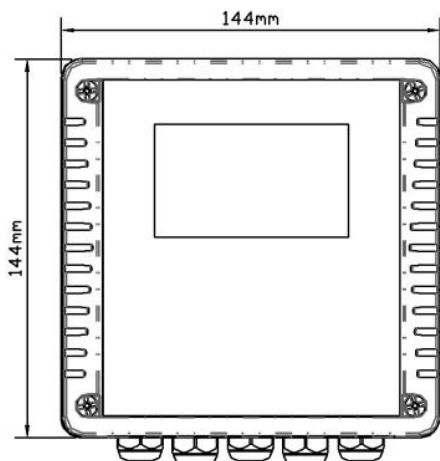
- 1) Extremely quickly and precision pH sensor.
- 2) It's suitable for harsh application and free-maintenance,save cost.
- 3) Provide two ways of 4-20mA output for pH and temperature.
- 4) Digital pH Sensor provide precision and online measurement.
- 5) With data recording function,user easy to check history data and history curve.

Technical Specification

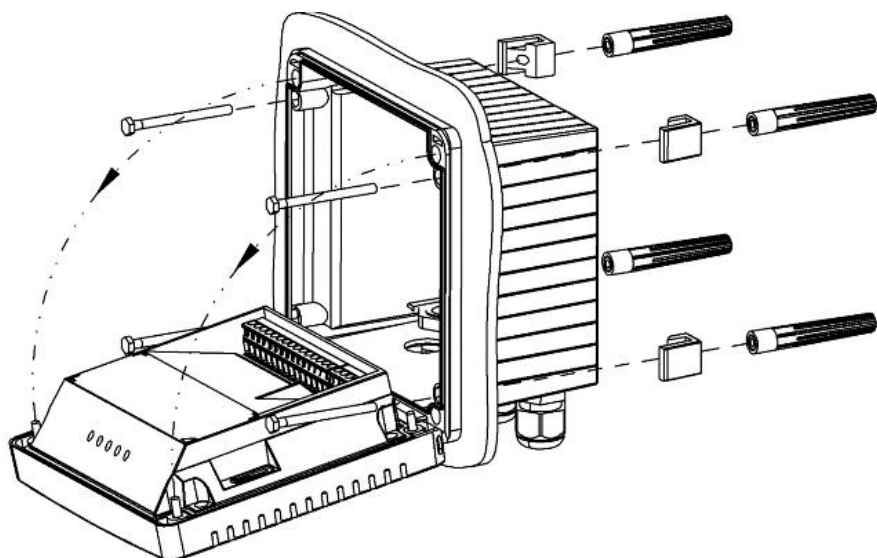
Specifications	Details
Name	Online pH Analyzer
Shell	ABS plastic
Power Supply	90V ~ 260V AC 50/60Hz
Power Consumption	4W
Output	Two 4-20mA output tunnels,RS485
Relay	5A/250V AC 5A/30V DC
Size	144mm×144mm×104mm
Weight	0.9kg
Protocol	Modbus RTU
Range	-2.00 pH ~16.00 pH -2000.0 mV ~2000.0 mV -30.0 °C ~130.0 °C
Accuracy	±1%FS ±0.5°C
Waterproof Level	IP65

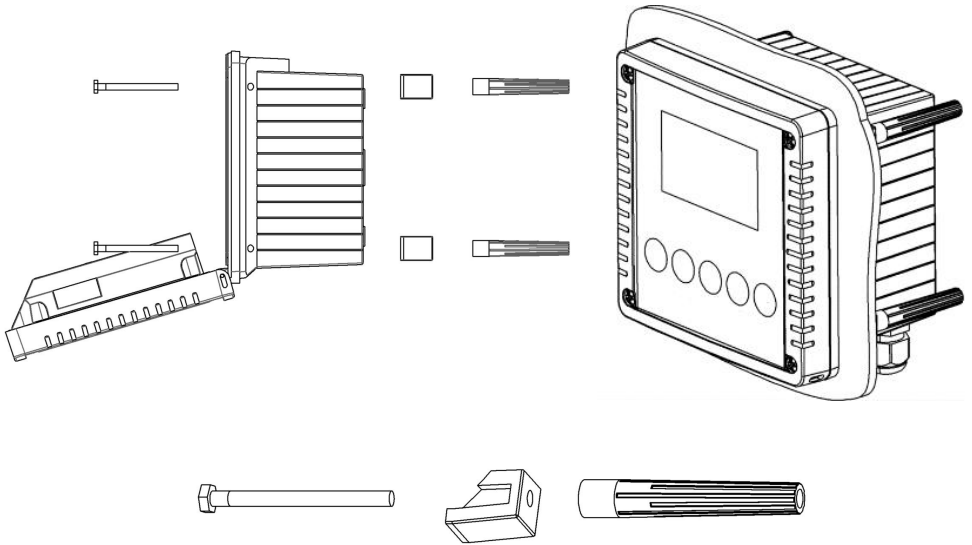
Installation and Wiring

SIZE

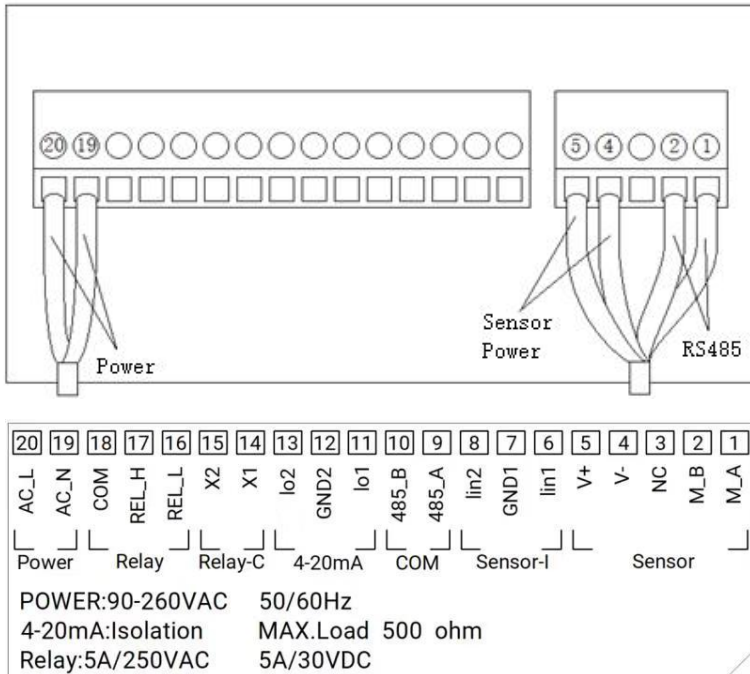


Installation





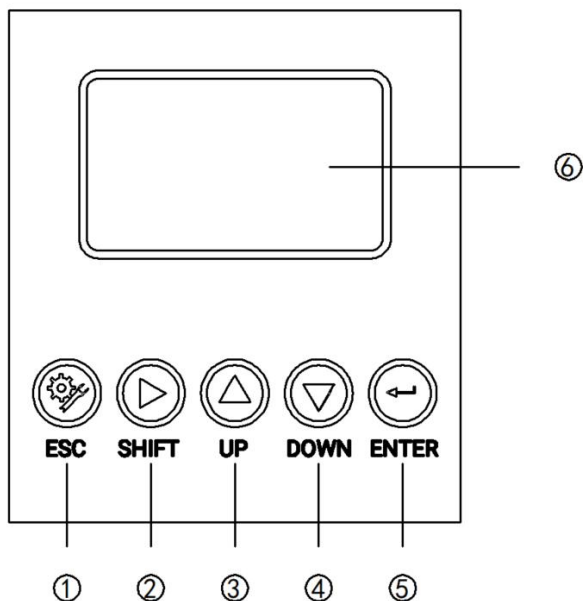
Wiring



Operation Interface

There are 2 modules in the main panel of the pH measuring instrument, LED LCD display module and button module.

Users can set and adjust the parameters of the instrument through the 5 buttons on the panel.



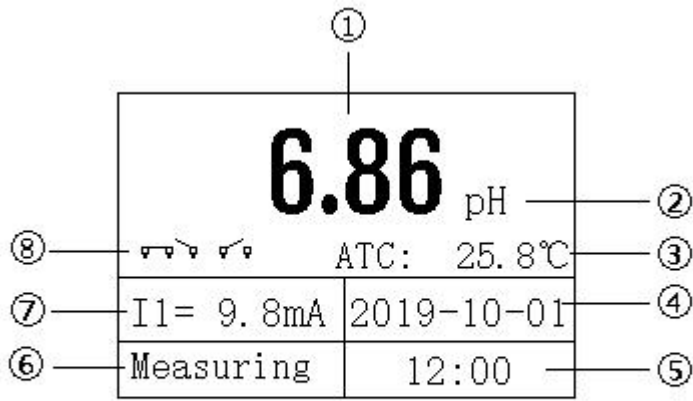
Picture 1 Operation Interface

- ① Set/Exit button
- ② Select/Shift button
- ③ Up button
- ④ Down button
- ⑤ Confirm button
- ⑥ LED screen

Measurement interface

Enter the main measurement interface after the start-up animation.

When the instrument is working normally, the LED display shows the following content.

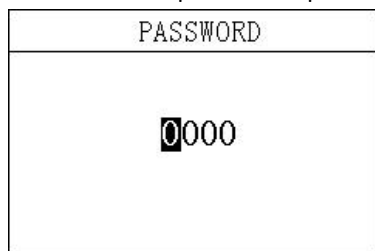


Picture 2 Main interface

- ① Measurement value
- ② Unit
- ③ Temperature
- ④ Real-time date
- ⑤ Real time
- ⑥ Measurement status
- ⑦ 4-20mA corresponding value of pH
- ⑧ Relay status

Setting

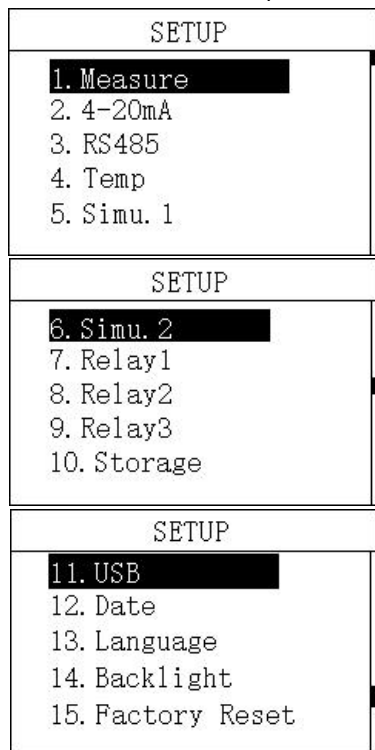
Press "Set/Exit Button" to enter the password input interface.



Picture 3 Password

Enter settings:

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



Picture 4 Setting Menu

3.1 Unit

In this menu, users can change the measurement method pH/ORP, and at the same time can adjust the offset to make the measurement accurate.

Measure	
Mode :	► pH
	ORP
Offset :	+0.00 pH

Picture 3.1 Unit

3.2 4-20mA

In this menu, users can change the corresponding value of 4-20mA and set the corresponding effective range.

4-20mA	
4mA :	00.00 pH
20mA :	14.00 pH
4mA :	+000 °C
20mA :	+100 °C

Picture 3.2 4-20mA

3.3 ModbusRTU communication

In this menu, users can change the communication address and rate.

Modbus RTU	
Address :	001
B. R. :	4800 bps
	►9600 bps
	19200 bps

Picture 3.3 ModbusRTU communication

3.4 Temperature

In this menu, users can set the temperature offset and manually set the temperature.

Temp
Offset : +0.0°C
MTC : +025.0°C

Picture 3.4 Temperature

3.5 Simulation

In this menu, users can simulate the 4-20mA current output. The current output can be verified by simulating the measurement of the IO1 (measured value) and IO2 (temperature) ports. The release relay is closed. The relay is simulated and verified.

Simulation1
Current1: 04.00mA
Current2: 04.00mA
Relay1: ON
▶ OFF

Picture 3.5.1 Simulation1

Simulation2
Relay2 : ON
▶ OFF
Relay3 : ON
▶ OFF

Picture 3.5.2 Simulation2

3.6 Relay1

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

Relay1	
Func. :	ON ▶ OFF
High :	10.00 pH
Hyst :	1.00 pH
Delay :	030 S

Picture 3.6 Relay1

3.7 Relay2

In this menu, users can switch the relay 2 function, set the parameter alarm lower limit value, alarm return difference value, and alarm delay time.

Relay2	
Func. :	ON ▶ OFF
Low :	03.00 pH
Hyst :	1.00 pH
Delay :	030 S

Picture 3.7 Relay2

3.8 Relay3

In this menu, users can set the relay 3 function, set the cleaning time and cleaning cycle.

Relay3	
Func. :	ON ▶ OFF
Period:	001.0h
Clean:	010s

Picture 3.8 Relay3

3.9 Storage

In this menu, users can set the storage function (default off), clear storage memory and recording interval.

Storage	
Switch :	ON ▶ OFF
Clear :	YES ▶ NO
Interval :	005 min

Picture 3.9 Storage

3.10 Date&Time

In this menu, users can change date and time according to different time zone.

Date	
Y-M-D :	2019-10-01
H:M:S :	12:00:00

Picture 3.10 Date&Time

3.11 Language

Users can choose English or Chinese according to need.

Language	
Language :	▶ 简体中文 English

Picture 3.11 Language

3.12 Backlight

In this menu, users can change the backlight mode of the LCD screen. The backlight can be always on or delayed off (the default is delayed off), the backlight brightness can be changed (brightness level 1-5, brightness increases), and the contrast can be changed.

Backlight	
Func. : ▶	ON
	Delay 30S
Bright :	3
Contrast :	2

Picture 3.12 Backlight

3.13 Factory data reset

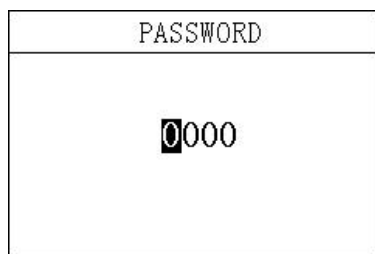
In this menu, users can restore the current output and relay to the factory parameters.

Factory Reset	
Restore : ▶	Current
	Relay1
	Relay2
	Relay3
	All

Picture 3.13 Factory data reset

Calibration

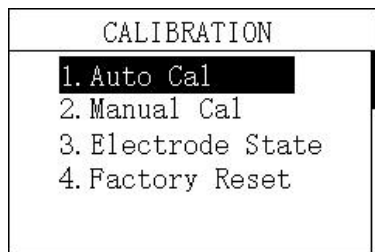
Press "ESC" to enter the password input interface.



Picture 5 Password

Enter calibration menu:

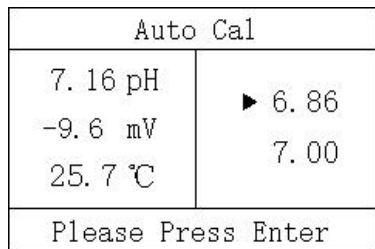
Enter the password "3900" to enter the calibration menu.



Picture 6 Calibration menu

4.1 Auto Calibration

In this menu, users can calibrate pH value by buffer group. When the value comes stable, press 'Enter' button.



Picture 4.1 Auto Calibration

4.2 Manual Calibration

In this menu, users can calibrate pH value by known density solution. Press 'Enter' button after value changed.

Manual Cal	
7.16 pH	07.00
-9.6 mV	
25.7 °C	
Please Press Enter	

Picture 4.2 Manual Calibration

4.3 Electrode State

In this menu, users can check offset and slope of electrode.

Electrode State
Offset : -2.6 mV
Slope : 98 %

Picture 4.3 Electrode State

4.4 Factory data reset

In this menu, users can restore the calibration parameters to the factory parameters.

Factory Reset
► YES
NO

Picture 4.4 Factory data reset

History Data Display

Press "ESC" to enter the password input interface.

PASSWORD
0000

Picture 7 Password

Enter History Data Display:

Enter the password "1300" to enter the History Data Display.

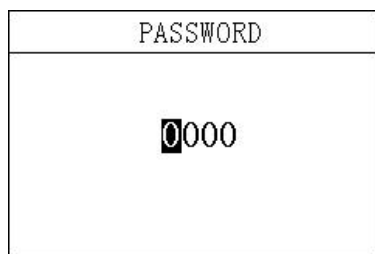
Press the up and down keys to switch the display. It can store up to 1000 records and overwrite automatically if reach maximum.

Record	1/1000
2020-01-09 12:48:28	
6.00 pH	
2020-01-09 12:43:28	
6.00 pH	
2020-01-09 12:38:28	
6.00 pH	
2020-01-09 12:33:28	
6.00 pH	

Picture 8 History

Waveform Display

Press "ESC" to enter the password input interface.

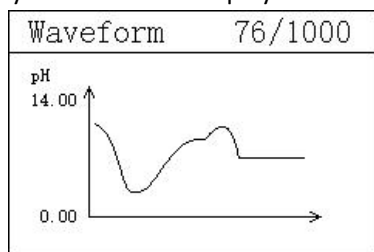


Picture 9 Password

Enter Waveform Display:

Enter the password "1400" to enter the Waveform Display.

Press the up and down keys to switch the display.



Picture 10 Waveform Display

Appendix

Communication protocol

Communication parameters:

Baudrate:4800, 9600, 19200(9600default)

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

Function code: 03

Device address: pH analyzer defaults to 1

Register definition:

Register address(Dec)	Definition	R/W	Remarks
0	Temp	R	$\times 0.1^{\circ}\text{C}$, sint16
1	pH	R	$\times 0.01\text{pH}$, sint16
2	mV	R	$\times 0.1\text{mV(pH)}$, $\times 1\text{mV(ORP)}$, sint16
6	Meter Type	R	pH is 1, ORP is 5
8	RTU Address	R/W	Modbus communication address, pH/ORP defaults 1.
9	Baudrate	R/W	4800, 9600, 19200, 9600 as default

Examples of communication formats:

Data reading instruction

Addr. + Func. + Register start address + Number of Registers read + CRC check code (Hex)

e.g. Tx:01 03 00 01 00 01 D5 CA

Address	Func.	Register start address	Number of Registers read	CRC check code
01	03	0001	0001	D5CA

Data return instruction:

Address + Func. + Data length + Data + CRC check code (Hex)

e.g. Rx:01 03 02 00 DF F9 DC

Address	Func.	Data length	pH value	CRC check code
01	03	02	00DF	F9DC

DF

HEX DF
DEC 223

The hexadecimal number DF is converted to decimal by a calculator (programmer mode) to obtain the value 223.

The actual value contains 2 decimal places, then the actual value is $223 \times 0.01 = 2.23$

Electrode parameter table of Online pH Analyzer

Electrode sort	pH	ORP
Type	BH-485-PH	BH-485-ORP
Measurement Range	0.00 pH ~14.00 pH	-2000.0 mV ~2000.0 mV
Temp Range	0.0 °C ~80.0 °C	0.0 °C ~85.0 °C
Accuracy	0.00 pH ~14.00 pH	-2000.0 mV ~2000.0 mV
Withstand pressure	0.06MPa	0.06MPa
Waterproof Level	IP68/NEMA6P	IP68/NEMA6P
Slope	≥95%	≥95%

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