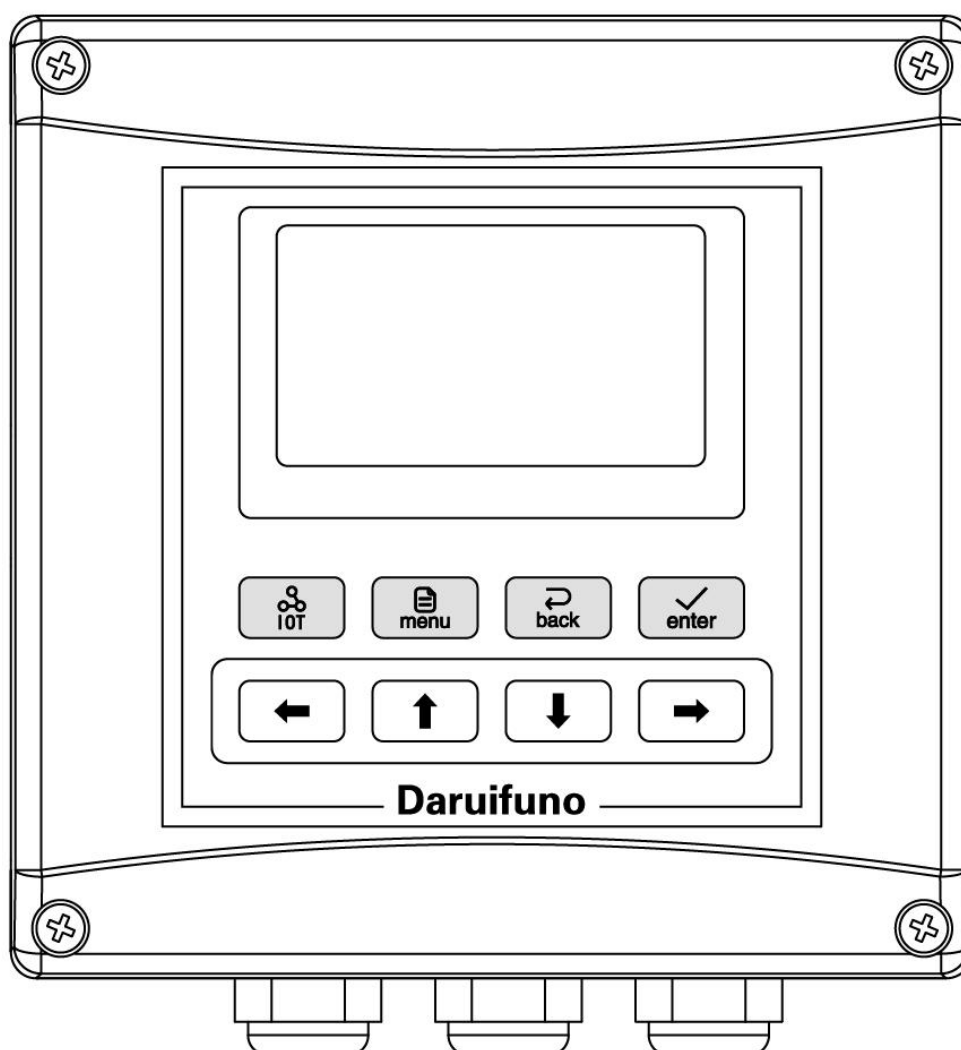




Digital PH/ORP Controller

User Manual



Model: DUC2-PR

Version 02.52

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Chapter 1 Overview

This product is a digital pH/ORP controller, connected to a digital pH or ORP sensor for measurement. The controller supports two current outputs, one digital communication output and two control relays with configurable functions.

1.1 Technical Parameters

Detection Channel	Single channel digital pH/ORP sensor
Measurement Parameters	PH/ORP(redox potential), temperature
Relay Control	2 SPST relays, Contact rating 3A
	Control Type: pH control/ ORP control/ Temp. control / Wash control
Current Output	Two active 4~20mA or 0~20mA, Max. Load: 1000Ω
	Corresponding Channel: PH / ORP / Temp.
Comm. Interface	A RS485, support MODBUS-RTU protocol and JSON text format
Display Screen	3.2 inch graphic LCD display
Electronic Clock	Year-Month-Day, Hour-Minute-Second
History Recording	10,000 historical data can be recorded, support historical data download ⁽¹⁾
	100 calibration logs, 100 alarm logs
Operating Environment	0~+60℃, relative humidity 0~95%, no condensation
Storage Environment	-20~+70℃, relative humidity 0~55%, no condensation
Power Supply	100~240VAC or 18~36VDC, 7W Max
Installation Method	Panel / wall / pipe mounting
Instrument Dimension	144*144*120 (unit: mm)
Protection Grade	IP66
Instrument Weight	About 800g

Note: (1) The download needs to be realized through the RS485 interface external data downloader.

Chapter 2 Mechanical Installation

2.1 Dimension

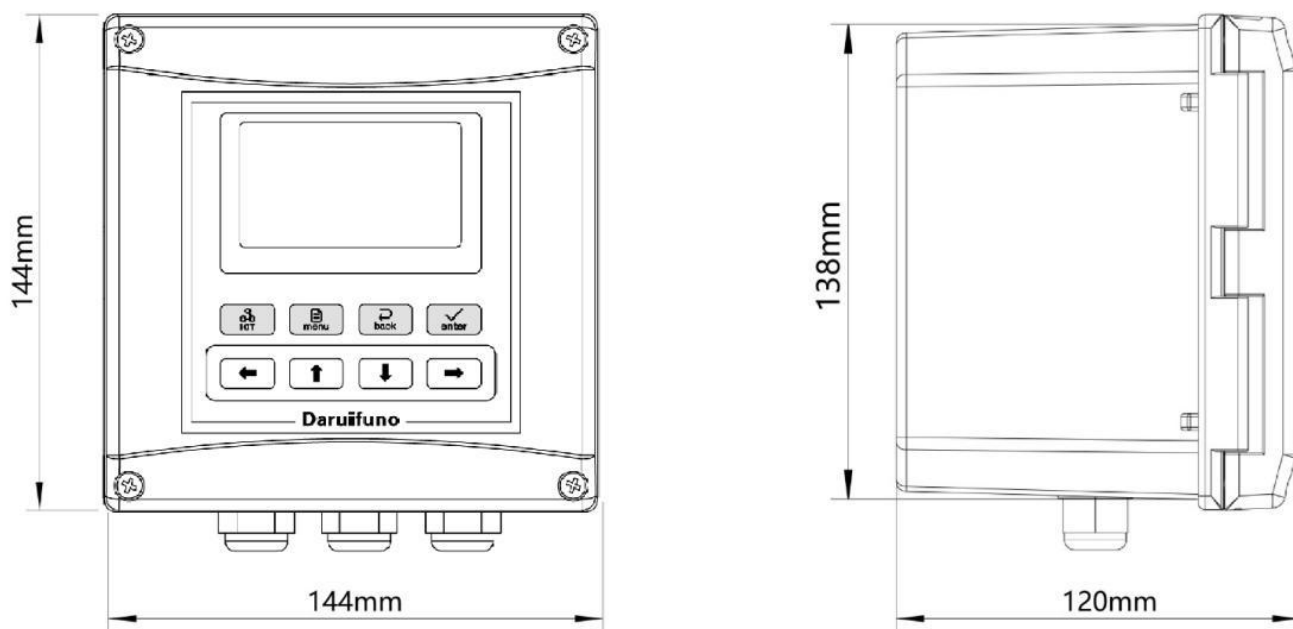


Figure 2-1 Instrument dimension

2.2 Installation

● Panel installation

When selecting a rack mount for the meter, use 2 mounting brackets to secure the meter, and the installation diagram is shown below:

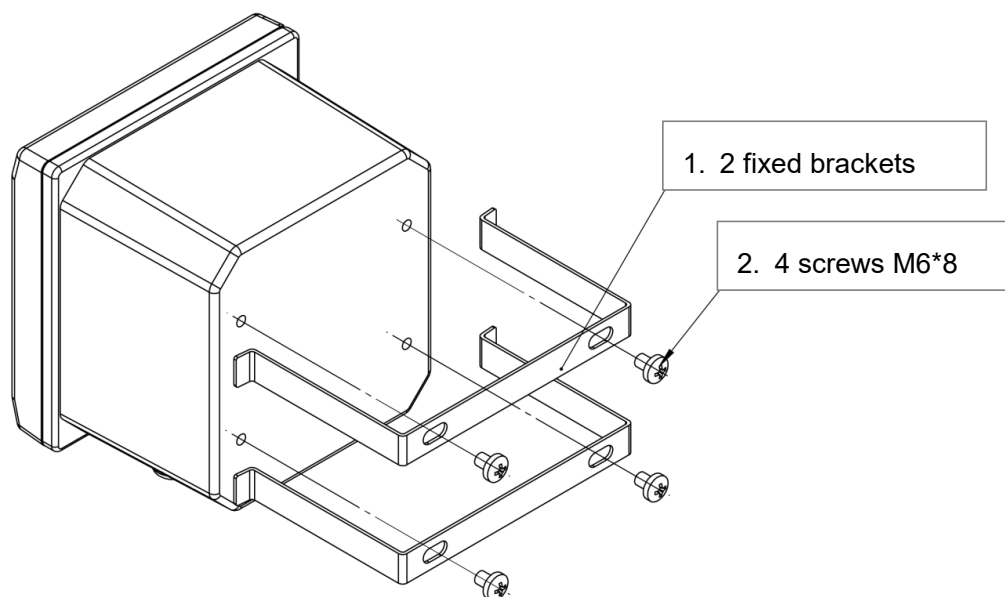


Figure 2-2 Panel mounting

- Wall installation

Connect the gray backplate to the meter, and then install it on the box or wall sidewall, the installation dimensions and schematic diagram are as follows:

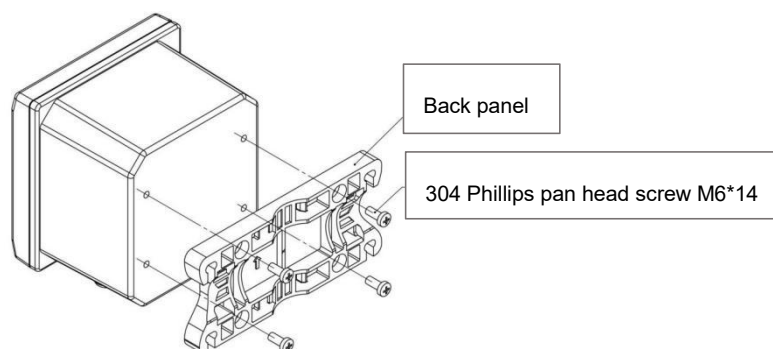


Figure 2-3 Wall mounting

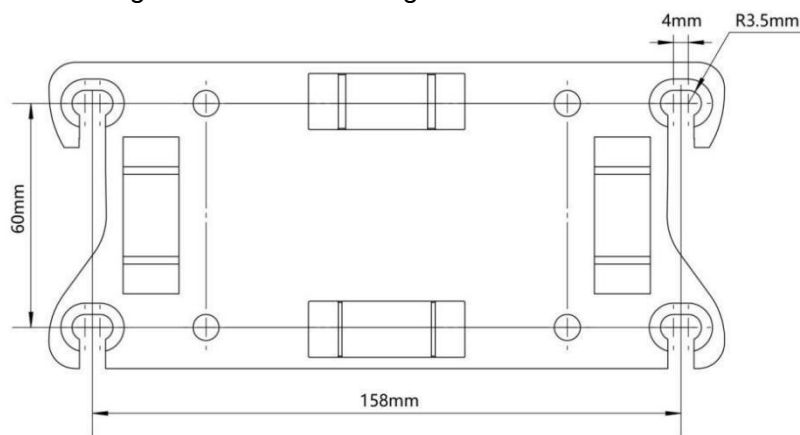


Figure 2-4 Wall mounting hole size dimensional drawing

- Pipe installation

Connect the gray backplate to the meter, and then fix the backplate to the horizontal or vertical pipe with a clamp, the installation diagram is shown below:

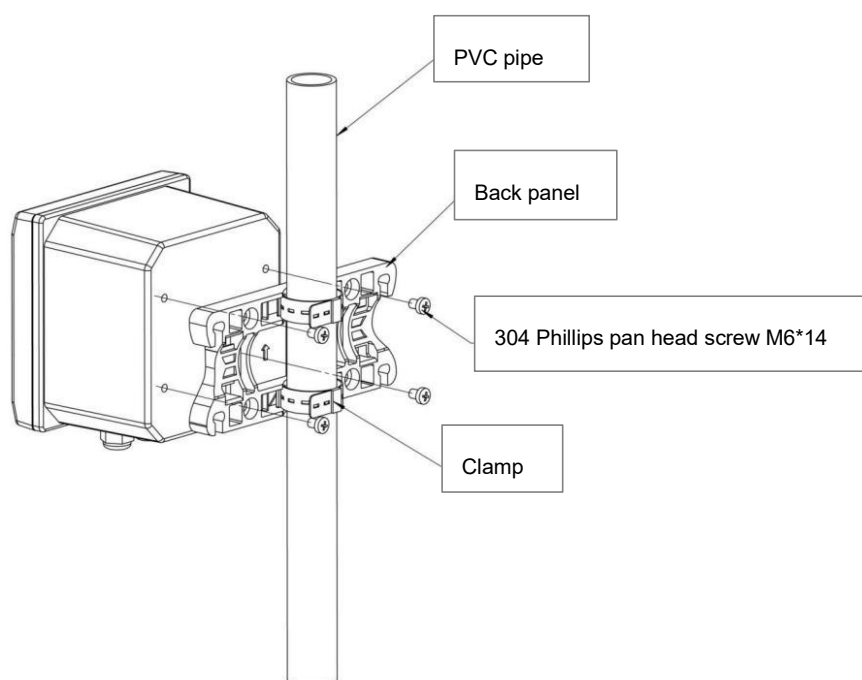


Figure 2-5 Pipe installation

Chapter 3 Electrical Installation

3.1 Power Connection

After unscrewing the screws on the back of the meter, remove the cover and see the terminal blocks. According to the power supply type of the instrument, access 100~240VAC or 18~36VDC.

Note: Before connecting AC power, be sure to cut off the power supply !

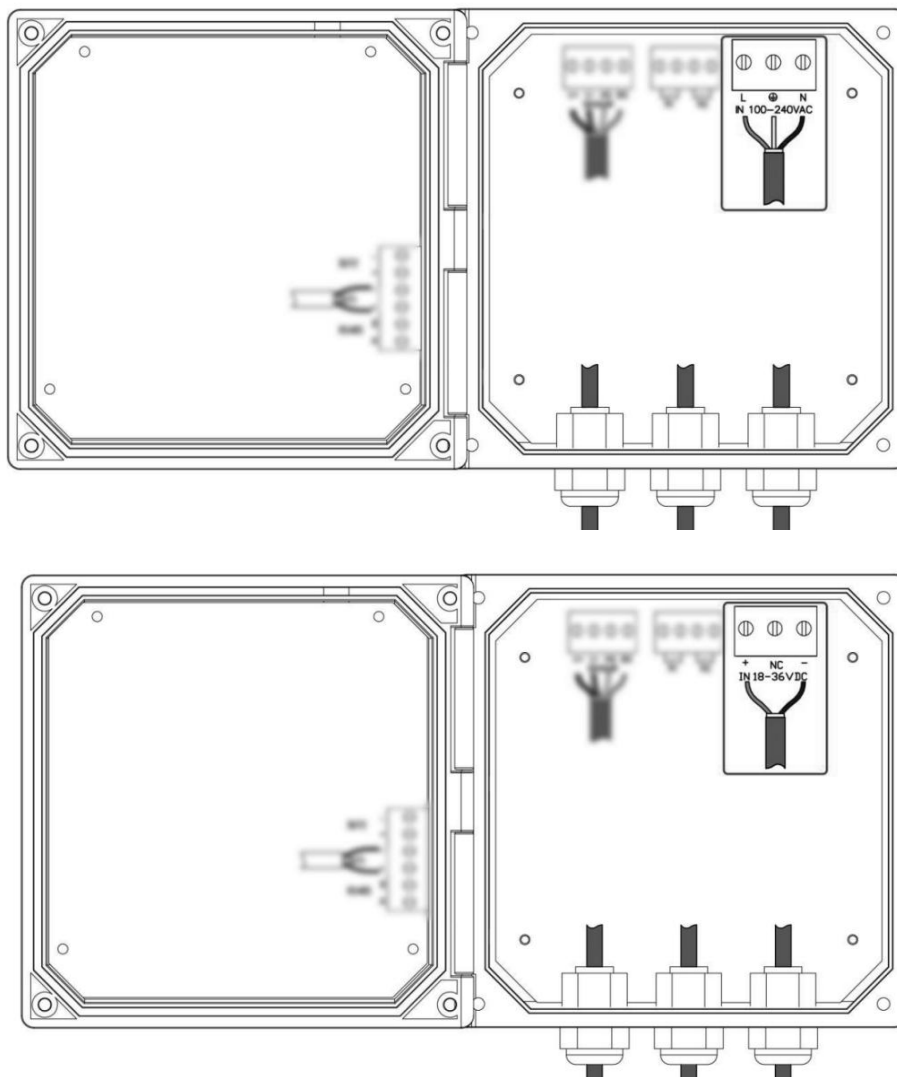


Figure 3-1 Two types of power terminals

Two kinds of power terminals are defined in the Table:

POWER	L	AC power LIVE wire	POWER	+	DC power positive
AC IN	⊕	AC power ground wire	DC IN	NC	Floating terminal
100-240V	N	AC power NEUTRAL wire	18-36V	-	DC power negative

3.2 Terminal Definition

The electrode cable is connected to the V+ V- AS BS terminals, and the rest are connected according to actual needs.

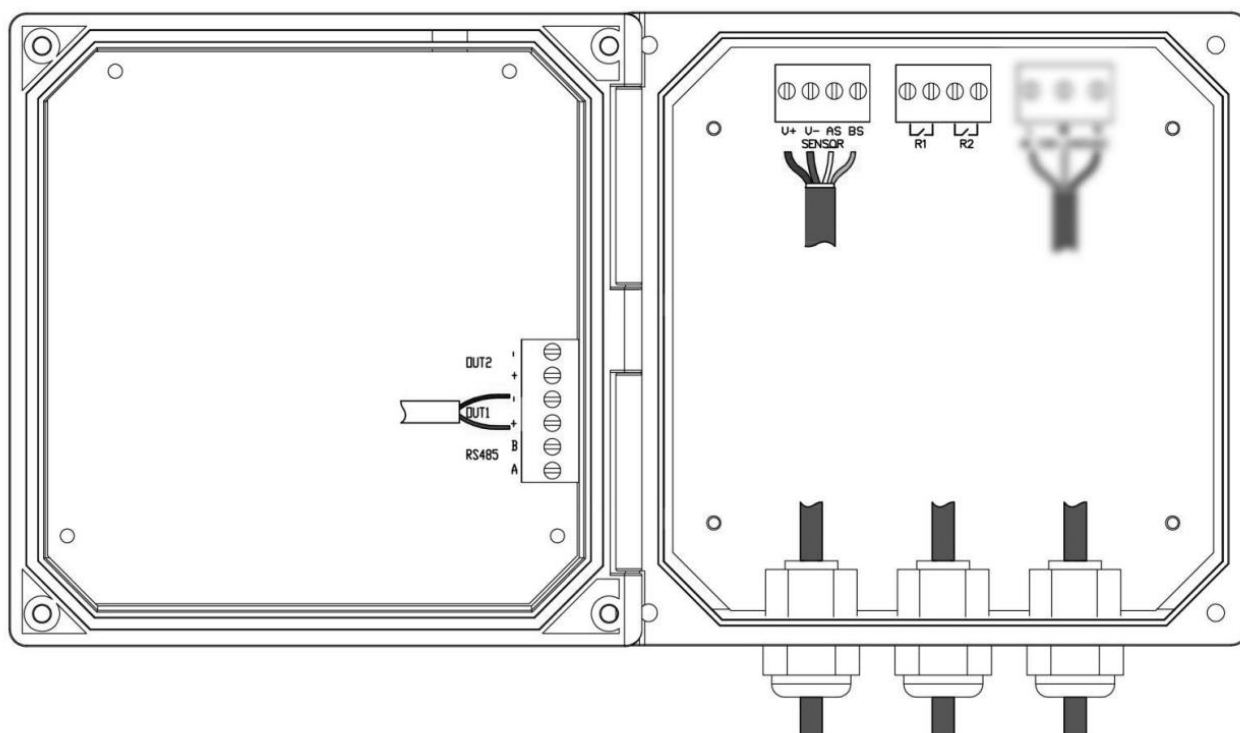


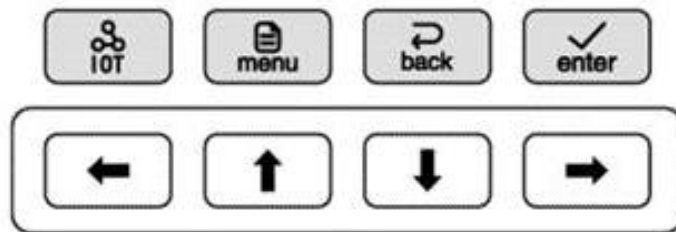
Figure 3-2 terminal blocks

The terminal locations and names are shown in the table below:

OUT2	+	Current 2 Output positive	V-	Sensor power - terminal
	-	Current 2 Output negative	AS	Sensor communication A terminal
OUT1	+	Current 1 Output positive	BS	Sensor communication B terminal
	-	Current 1 Output negative	R1	Relay 1 contact
RS485	A	RS485 signal D+(A) terminal	R2	Relay 1 contact
	B	RS485 signal D-(B) terminal		Relay 2 contact
V+		Sensor power + terminal	Relay 2 contact	

Chapter 4 User Interface

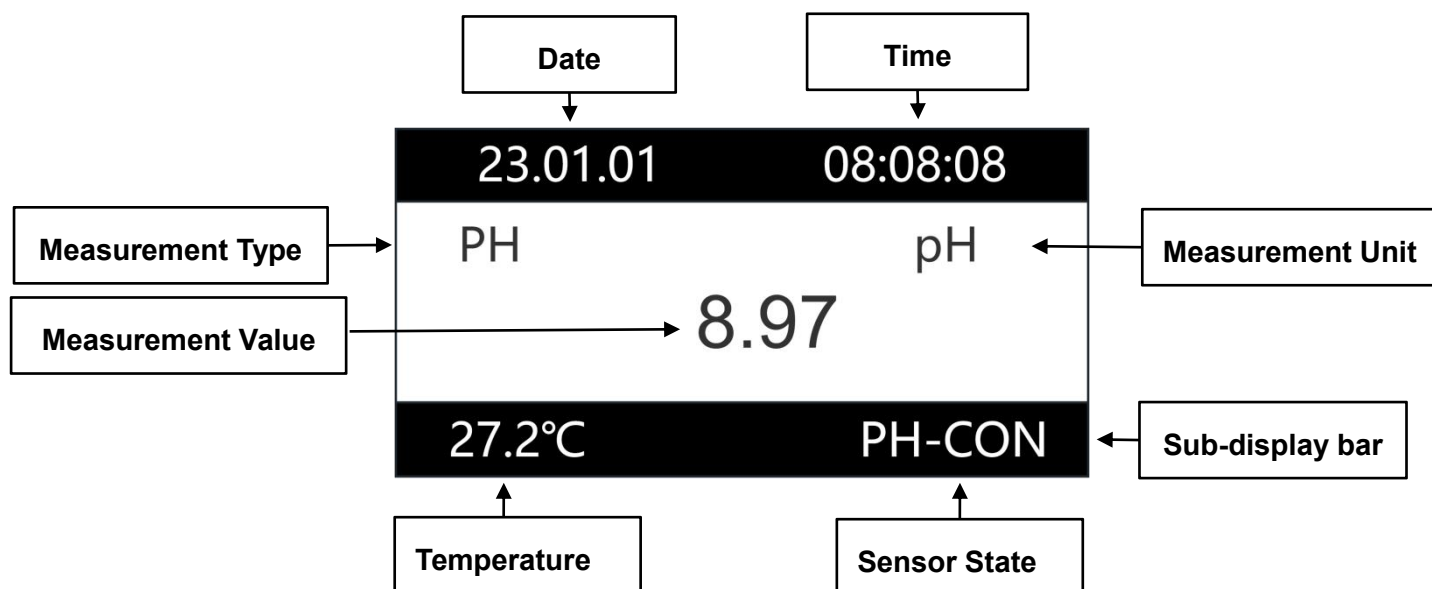
4.1 Panel Button



- **Up key:** In the menu option interface, to move the cursor up;
In the parameter setting interface to increase the data by 1 (change in the order of 0, 1, 2.... 9, 0);
- **Down key:** In the menu option interface to move the cursor down;
In the parameter setting interface to reduce the data by 1 (change in the order of 9, 8, 7... 0, 9);
In the measurement interface, can switch secondary displays.
- **Left key:** In the parameter setting interface, to move the cursor left;
In the menu interface, to return to the previous menu;
- **Right key:** In the parameter setting interface, to move the cursor right;
- **Internet of Things key:** has no function
- **Menu key:** In the measurement interface, long press to enter the menu interface; In the menu option interface to directly return to the measurement state; In the parameter setting interface to return to the previous menu.
- **Back key:** Return to the previous menu, such as in the parameter setting interface, abandon the modification and return to the previous menu.
- **Enter key:** In the menu option interface, press this key to select the option; in the parameter setting interface, press this key to confirm and return to the previous menu.

4.2 Display Screen

The meter normally displays the measurement interface after power-on. The specific information is as follows:



- **Date and Time:** Display the current date and time
- **Measurement Value/Type/Unit:** Display the current measurement type, value and unit.
When the pH sensor is connected, under the measurement interface, press the left/right key to switch between displaying "pH value" and "mV/pH value".
- **Sub-display Bar:** Press ↓ key under the measurement interface to switch the sub-display bar information: "Temperature value&Sensor state", "Two relay status", "Two current values".
- **Temperature Value:** Display the current temperature measurement.
- **Sensor State:** When the pH sensor is normally connected, it will display "PH-CON", and when it is not connected, it will display "PH-NC".
"ORP-CON" is displayed when the ORP sensor is connected normally, and "ORP-NC" is displayed when it is not connected.

Chapter 5 Menu Description

In the measurement interface, long press the  button to enter the menu. This chapter describes the main features.

5.1 Probe Setting

● Sensor communication

After the meter is connected to the sensor, if the measured value is not displayed, you need to enter the menu and select [Auto. Scan], or manually enter the current address of the sensor in [Sensor Address].

When the connected sensor type is changed, it is necessary to re-enter the menu and select [Auto. Scan] to change the measurement value type.

● Sensor calibration

■ pH calibration

1) Preparation before calibration

- Standard solutions with pH values of 4.01, 6.86, and 9.18 ⁽¹⁾
- Deionized cleaning solution and absorbent paper

2) Zero calibration

- (1) Clean the electrode with a deionized cleaning solution, dry it with absorbent paper, and put it into a standard solution with a pH value of 6.86;
- (2) After the measured value is stable, select "Point 2 calibration", enter the calibration value, and press the **Enter** button to start calibration;

3) Slope 1 calibration

- (1) Clean the electrode with a deionized cleaning solution, dry it with absorbent paper, and put it into a standard solution with a pH value of 4.01;
- (2) After the measured value is stable, select "Point 1 calibration", enter the calibration value, and press the button **Enter** to start calibration;

4) Slope 2 calibration

- (1) Clean the electrode with a deionized cleaning solution, dry it with absorbent paper, and put it into a standard solution with a pH value of 9.18;
- (2) After the measured value is stable, select "Point 3 calibration", enter the calibration value, and press the button **Enter** to start calibration.

■ ORP Calibration

1) Preparation before calibration

- Standard solutions with ORP of 86mV and 256mV⁽¹⁾
- Deionized cleaning solution and absorbent paper

2) Zero calibration

- (1) Clean the electrode with a deionized cleaning solution, dry it with absorbent paper, and put it into a standard solution with an ORP of 86mV;
- (2) After the measured value is stable, select "Calibration 86mV", enter the calibration value, and press the button **Enter** to start calibration;

3) Slope Calibration

- (1) Clean the electrode with a deionized cleaning solution, dry it with absorbent paper, and put it into a standard solution with an ORP of 256mV;
- (2) After the measured value is stable, select "Calibration 256mV", enter the calibration value, and press the button **Enter** to start calibration.

Note: (1) If there is a standard solution with other values, after selecting the calibration value, modify the value to the actual value before calibrating.

5.2 Alarm Setting

● Control function

When " Sensor Control " is selected in the menu, the relay is a control output relay.

When " On Value " > " Off Value " are set in the menu, the relay is a high alarm control.

When " On Value " < " Off Value " are set in the menu, the relay is low alarm control.

● Wash relay

When [Wash Relay] is selected in the menu, the relay is in the wash output state, and the relay will on and off in the set cycle for wash control.

When [Hold] is selected for " Wash State ", when cleaning, the measurement display value remains unchanged before the relay is operated.

When [Constant] is selected for " Wash State ", the measurement value is the real-time value of continuous measurement.

5.3 Current Setting

Use a current signal to output the measured value.

Set the measured value for the current in [Channel Select].

The measured values corresponding to the current output " 20mA " and " 0mA/4mA " are set in " Max. Value " and " Min. value ", respectively.

5.4 Comm. Setting

Use RS485 interface to output the measured value.

When [ModBus] is selected for [Comm. Protocol], Modbus standard comm. is used. Refer to the appendix for the description of relevant registers.

When [Json] is selected for [Comm. Protocol], the instrument will send the measured value every one minute in text format.

Appendix

ModBus Register Introduction

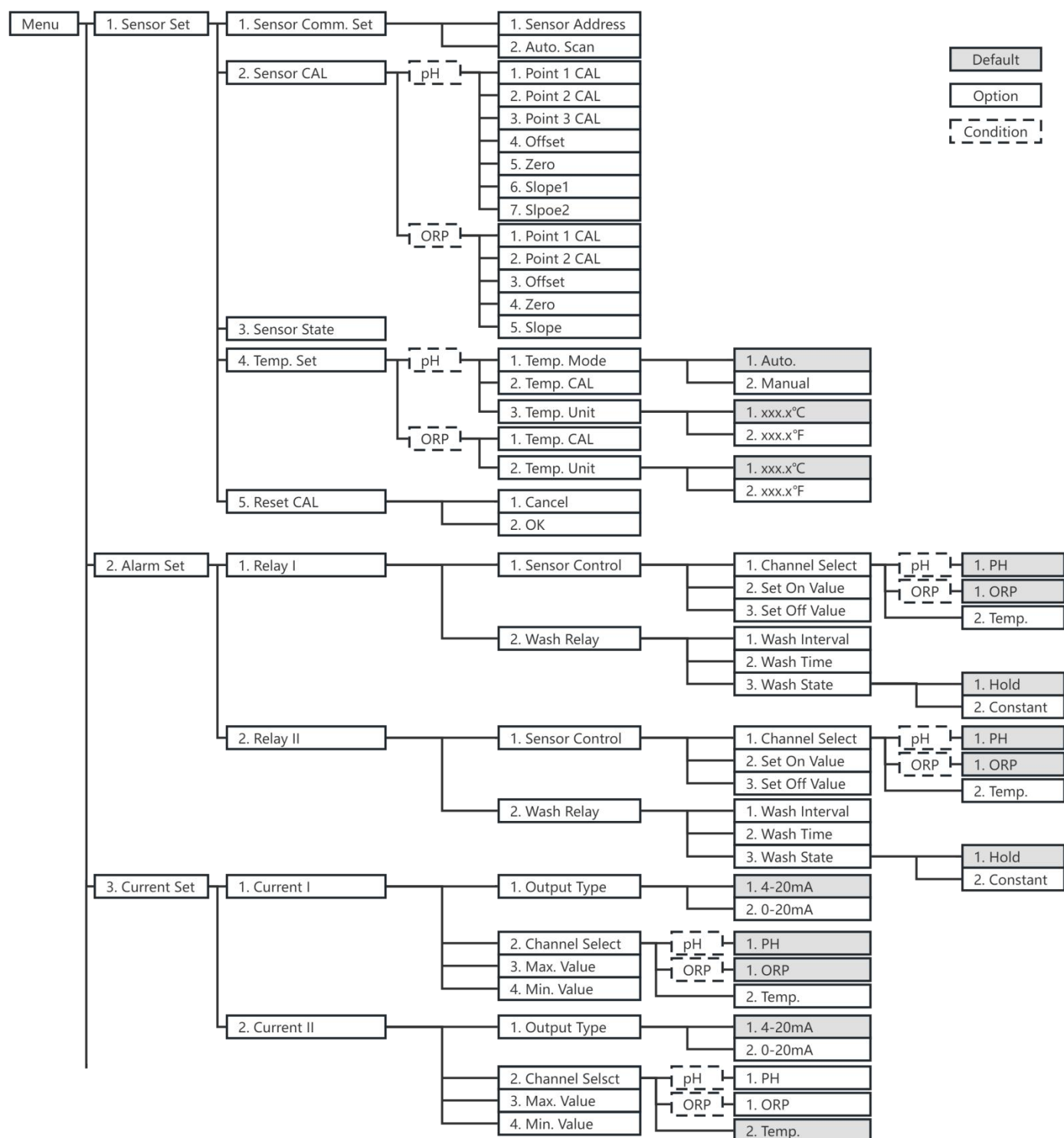
The instrument acts as a slave on the network and supports the Modbus RTU communication protocol.

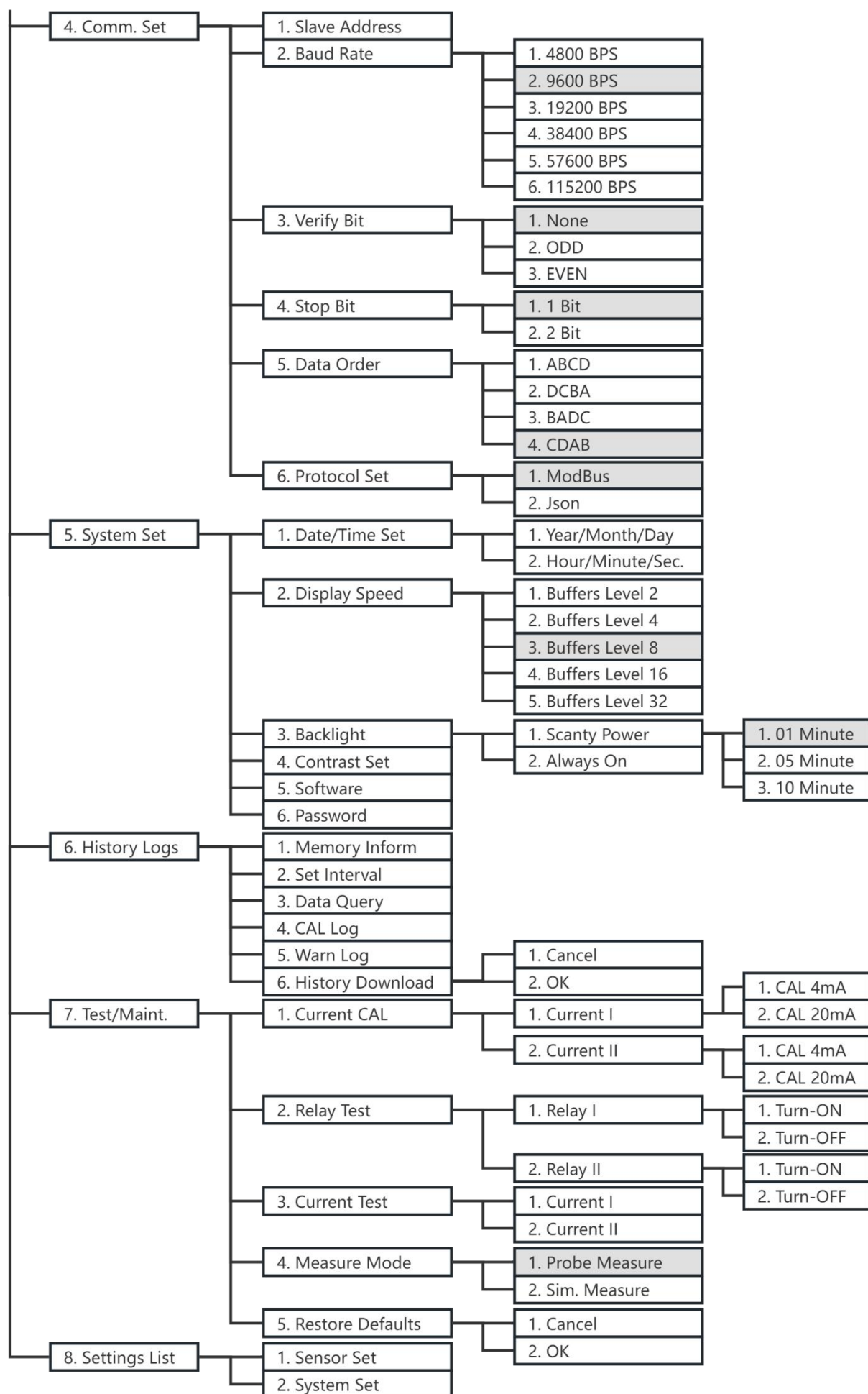
The main unit can use function code 04 to read the measurement results.

The parameters corresponding to the register address are defined as follows:

Register Start Address	Function Code	Parameters	Number of Registers	Data Format
0	04	pH value or ORP value (pH or mV)	2	32 bit floating point default CDAB(3412)
2	04	Temp. Value(°C)	2	32 bit floating point default CDAB(3412)

Menu Structure Diagram







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