

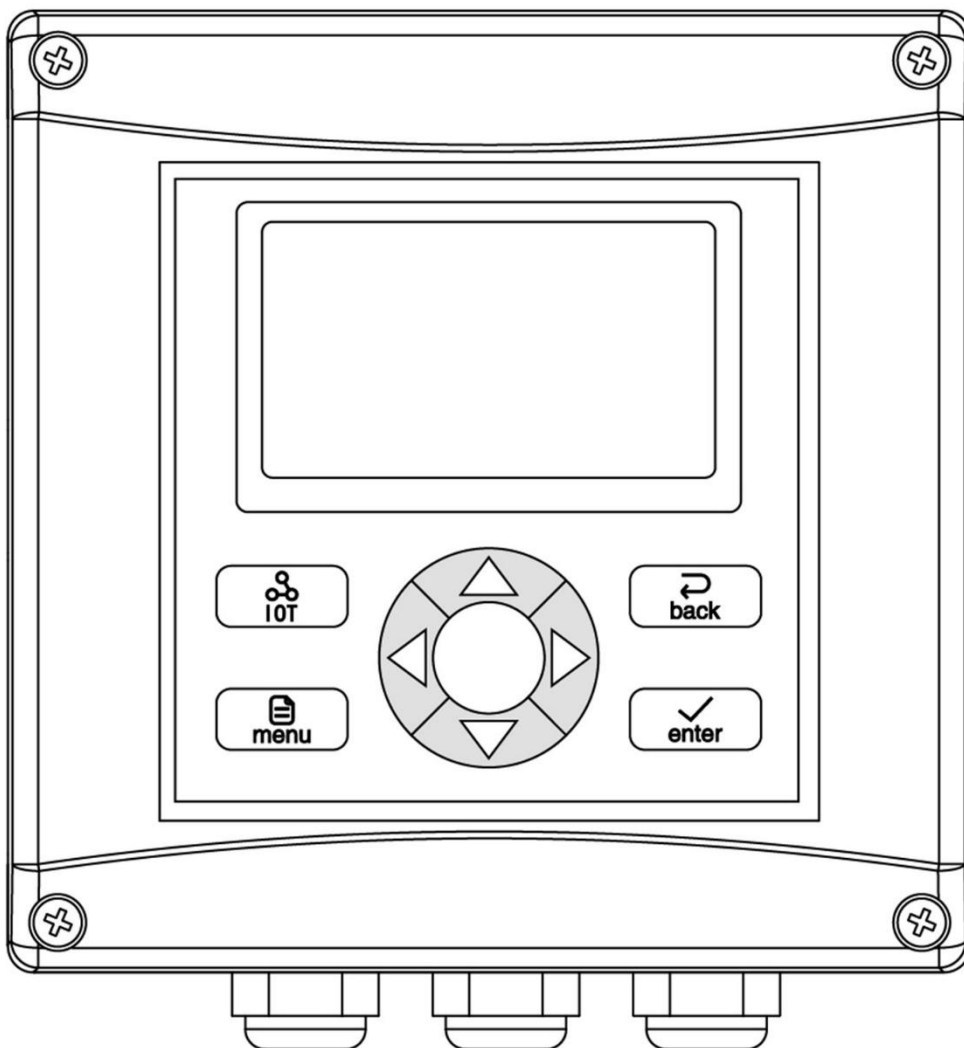


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Daruifuno

# Digital Multi-parameter controller

## User Manual



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Model: MCC200

Version 1.0



## Important Safety Information

Please read and observe the following:

Please read this entire manual before unpacking, installation and operation, with particular attention to all danger warnings and precautions. Failure to do so may result in damage to the instrument or personal injury to the operator due to misuse. Do not install or use the instrument by any means other than those specified in this manual.

- After opening the analyzer case, the user may touch the instrument supply voltage. Please make sure to disconnect the power, before you open the analyzer cases. Analyzer housing assembly only low voltage, the operation is safe.
- The analyzer must be installed in accordance with relevant local codes and the professional and technical personnel, to comply with the analyzer's technical specifications and input ratings. If you are not sure which of the main power lines is the zero line, use a double-blade switch to disconnect the analyzer.
- As soon as a problem occurs with the analyzer, disconnect the analyzer from power to prevent any unintentional operation that could result in damage to the instrument. For example, it may be in an unsafe state when the following situations occur:
  - (1) The analyzer appears visibly damaged;
  - (2) Analyzer fails to operate properly or provide the intended measurements;
  - (3) Analyzer has been stored for a long period of time at temperatures over 70°C environment.
- Wiring or repair should be done by professionals, and only the power-off analyzer should be operated.

## Power Wiring Note

1. Please install voltage stabilization and surge protection equipment that meets the instrument parameters at the power supply terminal to ensure that the power supply provided by the instrument is stable and reliable and meets the standards, otherwise the instrument will be irreversibly damaged due to poor power supply.
2. Damage caused by incorrect power supply is not covered by our quality guarantee.
3. Detailed parameters see the technical parameters.

## Useful signs

In addition to installation and operation information, the manual also includes warning signs related to user safety, caution signs related to possible instrument failure, and note signs related to important and useful operating instructions.

### Warning:

The warning sign is shown above, which warns the user might get hurt

### Caution:

The caution sign is shown above, it reminds the user that the instrument may malfunction or be damaged



The note sign is shown on the left, warns the user of important information about operation.

## **Guarantee**

Our company warrants the instrument for one year (12 months) from the date of delivery. Consumables and consumable parts in the equipment are not covered by the warranty. The terms of this warranty shall not apply if damage to the instrument occurs beyond the warranty period, or in the opinion of the company, the breakage or destruction of the instrument is due to improper use, lack of maintenance, improper installation, improper modification, abnormal environmental conditions, etc. The Company's obligation under this warranty is limited to providing replacement or repair of this product, as the case may be. The product must be thoroughly cleaned to remove any contaminated chemicals before it is accepted for replacement or repair. Our obligations shall not exceed the price of the product itself. In no event shall the company be liable for damage caused by incidental or consequential damages, whether to persons or objects. The Company shall not be liable for any other loss, damage or expense of any kind, including economic loss resulting from the installation, use or improper use of the product.

- For details, please refer to the product's quality promise with the product, and keep this manual and the quality promise properly.

# Contents

## Part 1 Introduction

### Chapter 1 Overview

1.1 Technical Parameters .....	1
--------------------------------	---

## Part 2 Installation

Chapter 2 Unpacking .....	2
---------------------------	---

### Chapter 3 Mechanical Installation

3.1 Installation Location .....	2
3.2 Dimension .....	3
3.3 Panel Mounting .....	3
3.3.1 Wall Mounting .....	4

### Chapter 4 Electrical

4.1 Power Connection .....	6
4.2 Wiring Terminals Definition .....	7

## Part 3 Operation

### Chapter 5 User Interface

5.1 Panel keys .....	8
----------------------	---

### Chapter 6 System Default

### Chapter 7 Menu Description

7.1 Probe Set .....	11
7.1.1 Scan probe .....	11
7.1.2 Probe options .....	11
7.1.3 Remove probe .....	11
7.2 Alarm set .....	11
7.2.1 Wash relay .....	11
7.2.2 Alarm relay .....	12
7.3 Current set .....	12
7.4 Communication set .....	12
7.4.1 N e t address .....	12
7.4.2 Baud rate .....	12
7.4.3 Verify bit .....	12
7.4.4 Stop bit .....	12
7.4.5 Format .....	12

7.5 System Set .....	12
7.5.1 Data/Time set .....	12
7.5.2 Backlight .....	12
7.5.3 Contrast set .....	12
7.5.4 Software .....	12
7.5.5 Password .....	12
7.6 History logs .....	13
7.6.1 Memory inform .....	13
7.6.2 Set interval .....	13
7 . . . 6 . . . 3 . . . P . . . o . . . i . . . n . . . t	
Query .....	13
7 . . . 6 . . . 4 . . . W . . . a . . . r . . . n	
Log .....	13
7.7 Servings .....	13
7.7.1 Measure mode .....	13

**Appendix**

A . . . M . . . o . . . d . . . b . . . u . . . s . . . r . . . e . . . g . . . i . . . s . . . t . . . e . . . r	
information .....	14
..	

# Part 1 Introduction

## Chapter 1

### Overview

This product is a 4-channel digital universal controller, which realizes measurement by connecting various types of digital sensors for detecting physical, chemical and biological properties.

#### 1.1 Technical Parameters

Relay Control	Channels Quantity	1
	Control Type	Wash relay
	Contact Type	SPST
	Contact Capacity	3A 250VAC
Communication Interface	RS485 MODBUS-RTU	
Memory Backup	All user settings are retained in EEPROM indefinitely	
Historical Data	7800 storage points, the recording interval can be set	
Operating Environment	0~+60℃, 0~95% relative humidity, no condensation	
Storage Environment	-20~+70℃, 0~95% relative humidity, no condensation	
Power Requirements	100~240VAC or 18~36VDC, 24W MAX	
Installation Method	Panel / Wall / Pipe	
Instrument Size	144*144*120 (unit mm)	
Protection Class	IP66	
Controller Weight	About 1600g	

## Part 2 Installation

### Chapter 2

#### Unpacking

After unpacking, it is recommended that the shipped cardboard boxes and packing materials be saved for instrument storage or reshipment. Inspect equipment and packing materials for signs of damage during shipment. If there are signs of damage, immediately notify the person delivering the shipment.

### Chapter 3

#### Mechanical Installation

#### 3.1 Installation Location

The installation location of the meter is:

Unaffected by weather (rain, snow, ice, dust, etc.)

- Clean, dry and with little or no vibration
- Keep away from corrosive liquids
- Within ambient temperature limits (32~140°F or 0~60°C)

#### Caution:

Analyzer directly exposed to the sun, its operating temperature may exceed its specified limit temperature, and will reduce the visibility of the display.



**Note: Please read this operation manual thoroughly before installation to avoid damage to the instrument due to wrong wiring.**

- Please choose a well-ventilated location to install the instrument to avoid direct sunlight.
- The electrode signal transmission must use specific cables or cables provided by our company, and cannot be replaced by random wires.
- When using AC 220V power supply, avoid using three-phase power supply to avoid power spike interference (if power spike interference occurs, the power supply of the controller can be separated from the power supply of the control device, so that the controller uses a separate power supply, or the coil ends of all electromagnetic switches and power control devices are connected to spike absorbers to eliminate spikes, such as dosing machines, mixers, etc.).
- It is generally recommended that the controller be accessible to the electrode during installation.
- Avoid corrosive liquids, or need to protect and isolate the environment.



### 3.2 Dimension

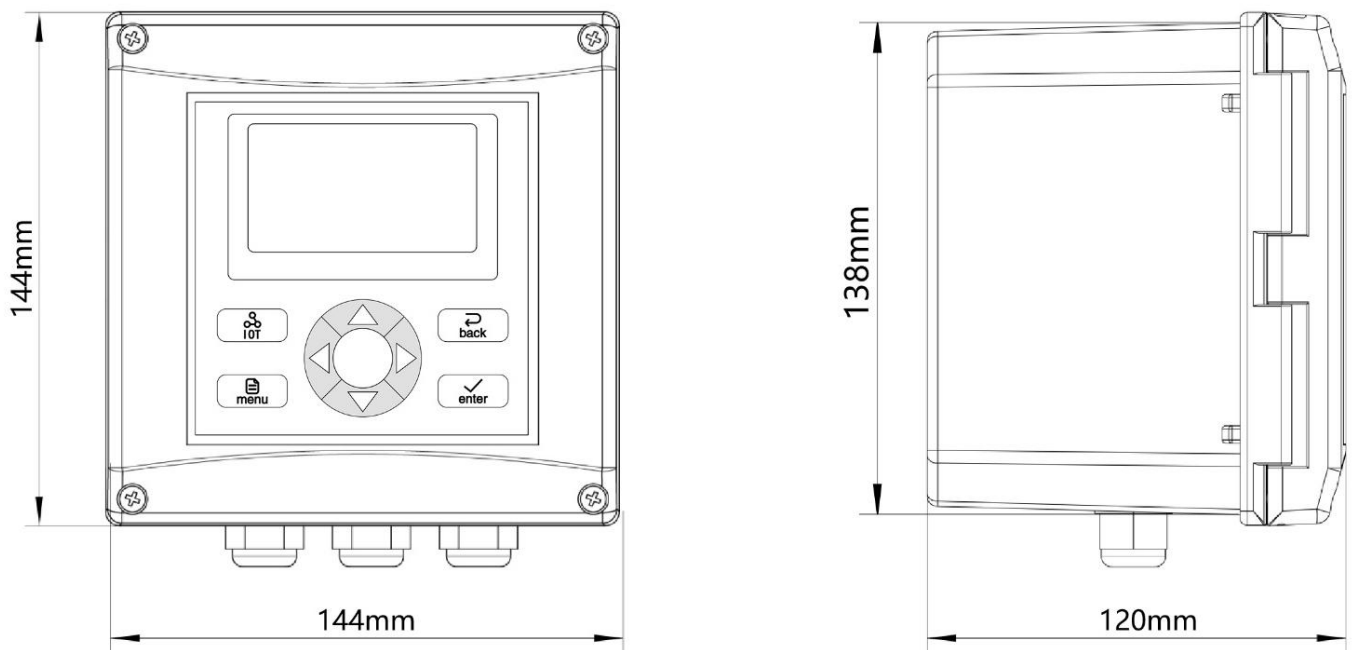


Figure 3-1 Schematic diagram of the appearance and dimensions

### 3.3 Panel mounting

When the instrument is installed in a panel cabinet, use two fixing brackets to fix the instrument. The installation diagram is as follows:

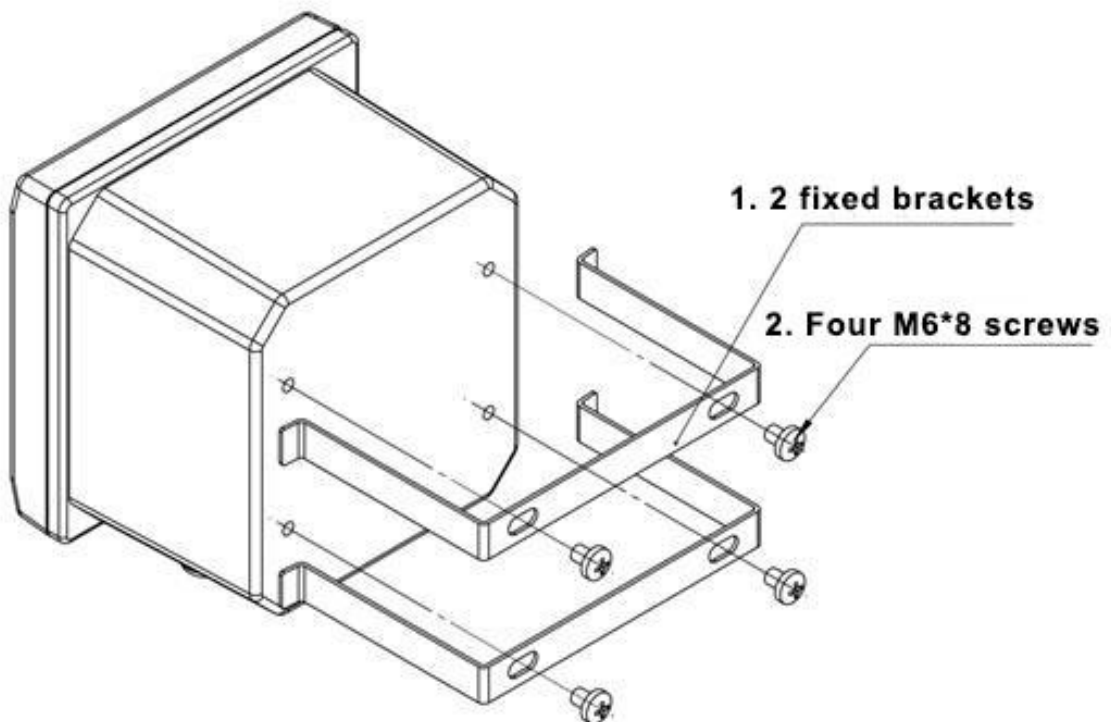


Figure 3-2 Panel mounting

### 3.4 Wall Mounting

Connect the gray back panel to the instrument, and then install it on the box or the side wall of the wall. The installation dimensions and schematic diagram are as follows:

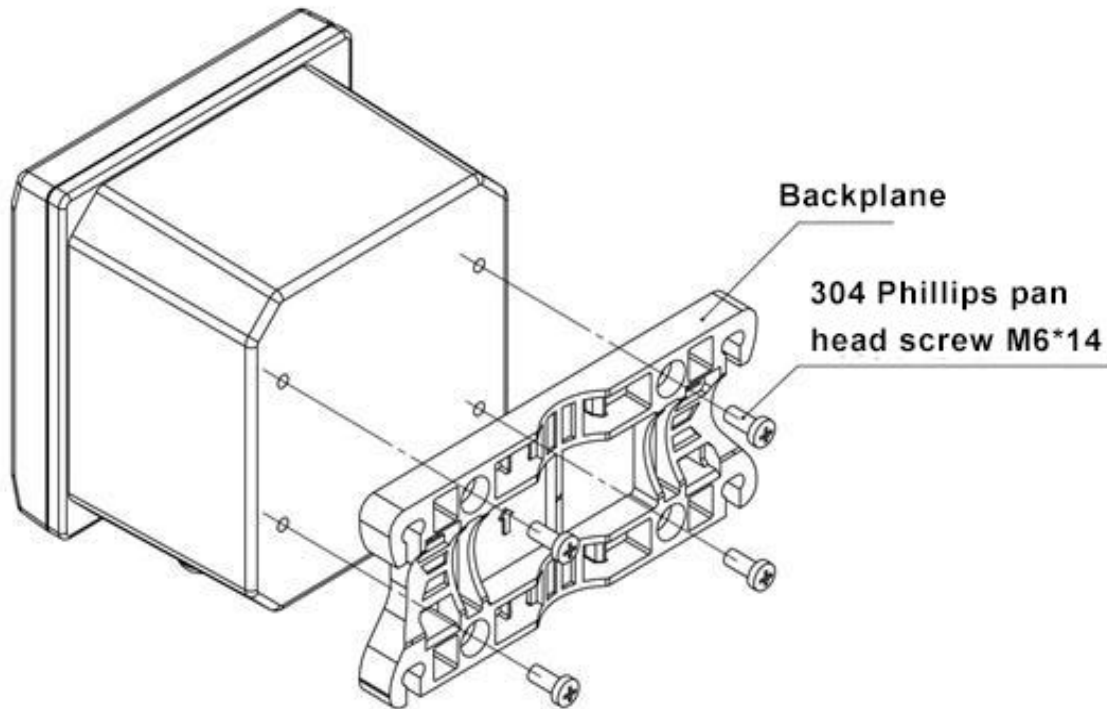


Figure 3-3 Schematic diagram of wall-mounted installation

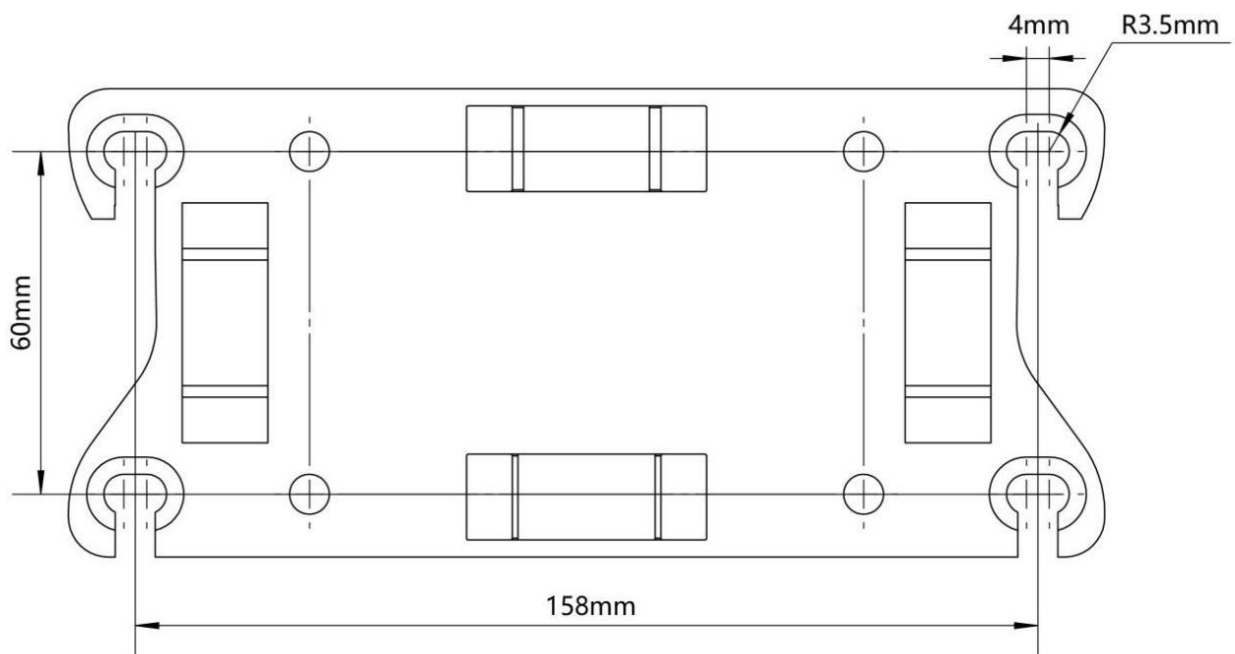


Figure 3-4 Wall-mounted installation hole size diagram

### 3.5 Pipe mounting

Connect the gray backplane to the instrument, and then fix the backplane to the horizontal pipe or vertical pipe with a clamp. The installation diagram is as follows:

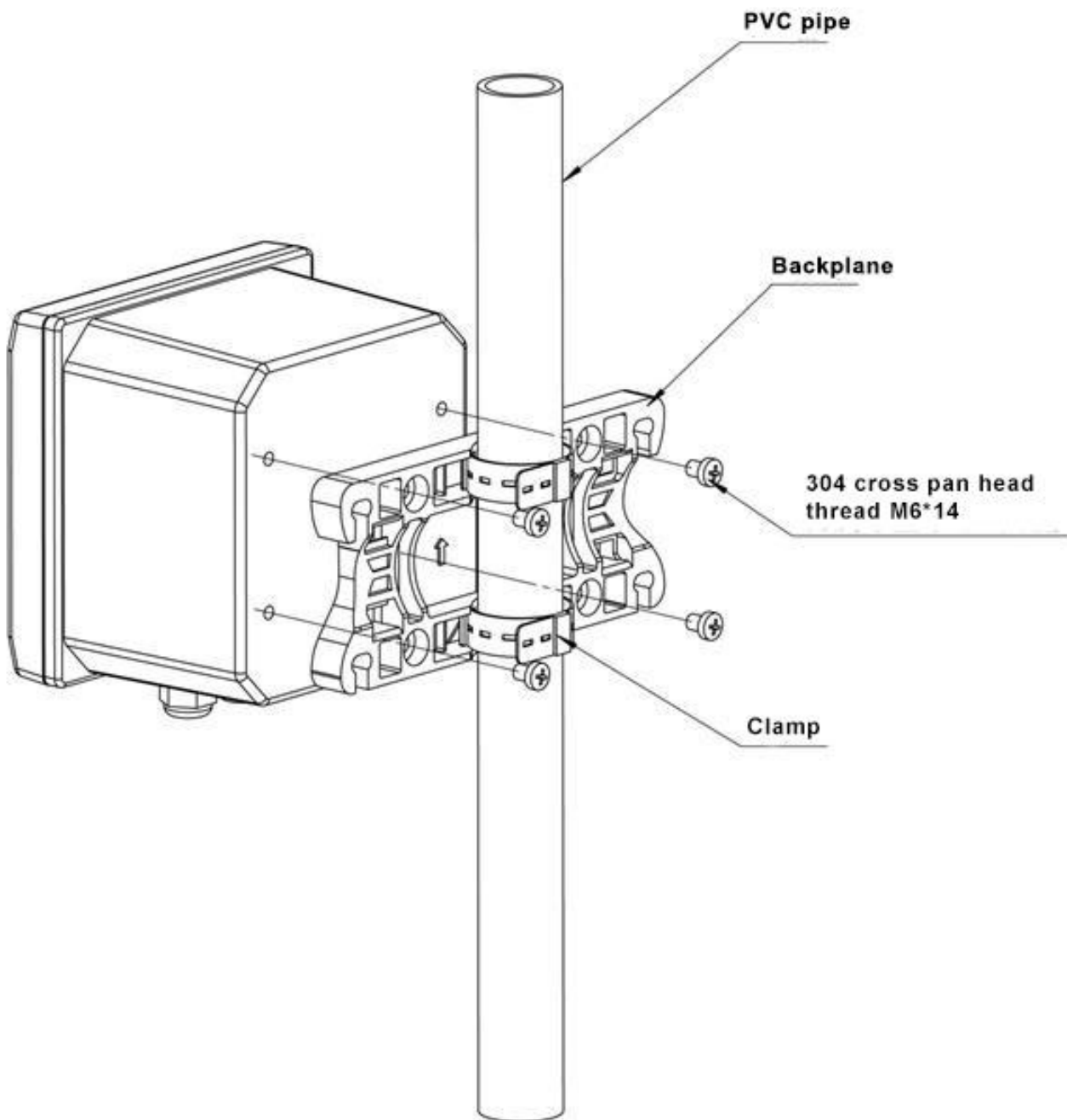


Figure 3-5 Schematic diagram of pipeline installation

Electrical Installation

### 4.1 Power Connection

Two types of power supply: AC power supply 100 ~ 240VAC and DC power supply 18 ~ 36VDC.

After unscrewing the screws at the back of the meter and taking off the cover, you can see two rows of terminals.

Figure 4-1 indicates the location and name of the access terminals for both power



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

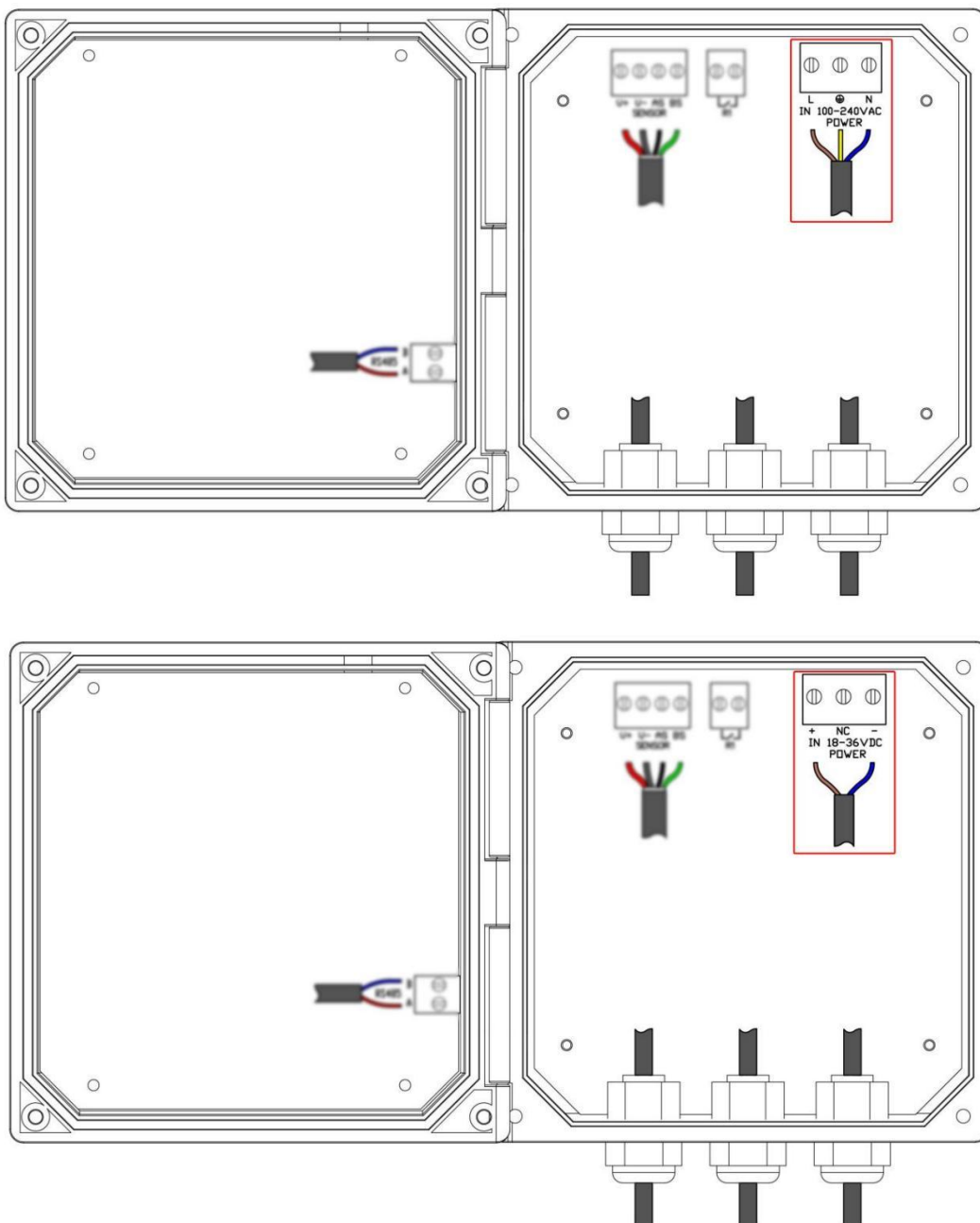


Figure 4-1 Two types of power terminals

Two kinds of power terminals are defined in Table 4-1:

POWER AC IN 100-240V	L	AC power fire wire input	POWER DC IN 18-36V	+	DC power positive
	⊕	AC power ground wire		NC	Floating terminal
	N	AC power zero line input		-	DC power negative

## 4.2 Wiring Terminals Definition

The terminal locations and names are shown in Figure 4-2:

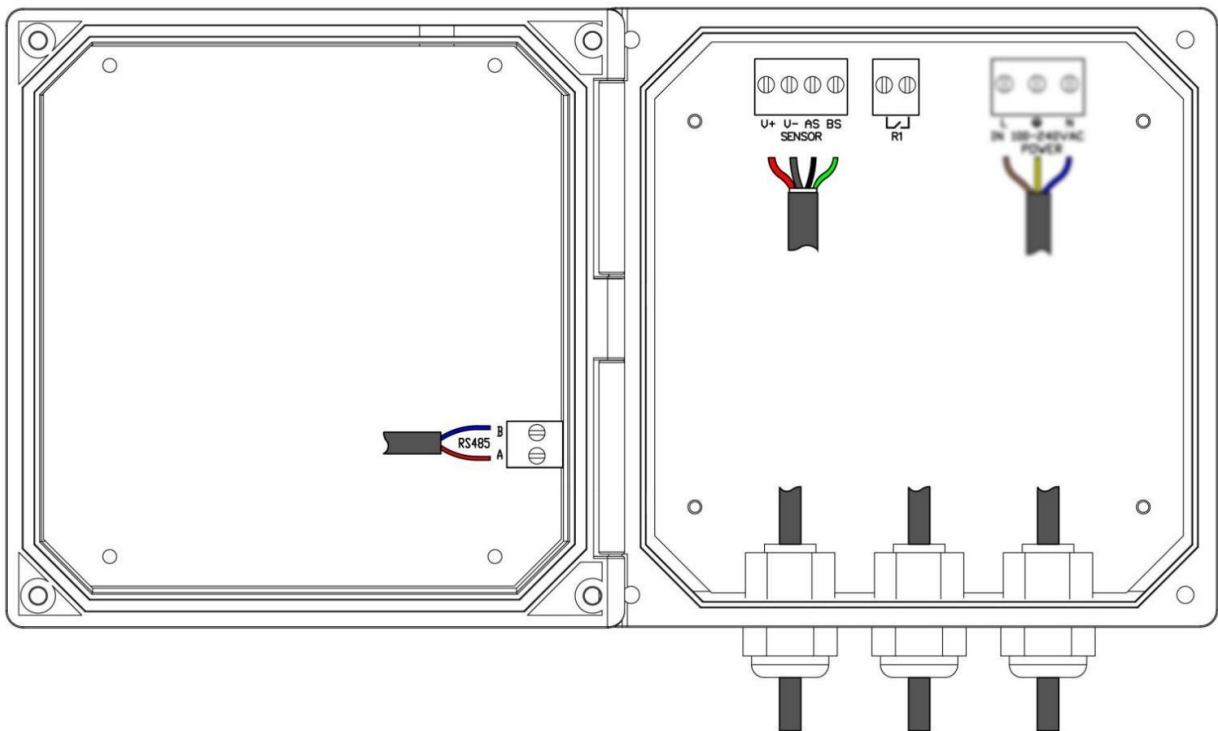


Figure 4-2 terminal blocks

The following table is the terminal definition:

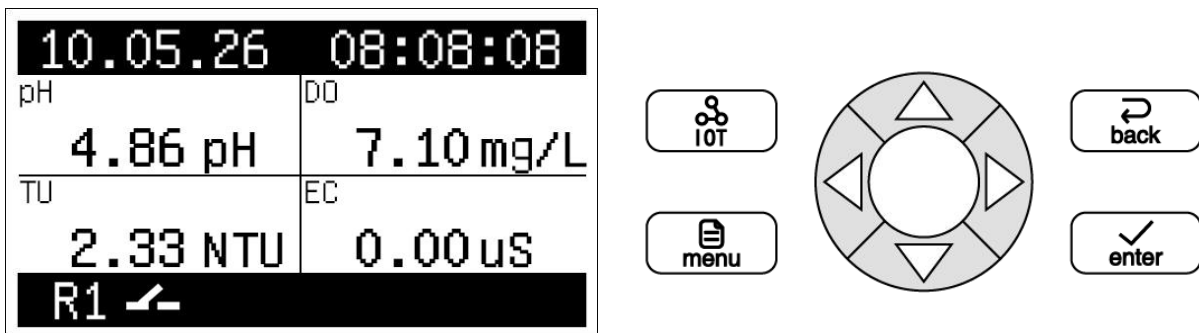
RS485	A	RS485 signal D+(A) end	V+	Electrode power + terminal
	B	RS485 signal D-(B) end	V-	Electrode power-terminal
R1		Relay one contact	AS	Electrode communication terminal A
		Relay one contact	BS	Electrode communication terminal B

# Part 3 Operation

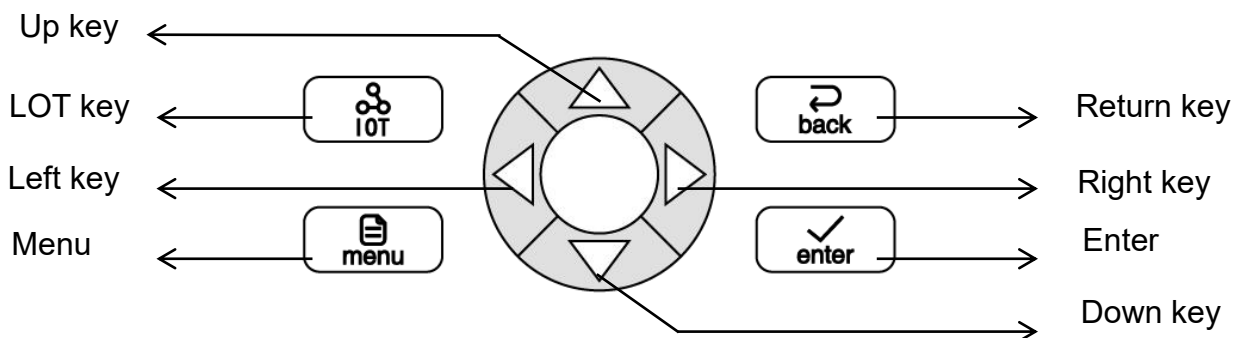
## Chapter 5

### User Interface

The instrument panel consists of a display screen and eight buttons, namely IOT (Internet of Things) button, menu (menu) button, back (return) button, enter (confirm) button, four up, down, left and right Arrow keys.



### 5.1 Panel keys



**Up key:** In the menu option interface, move the cursor up;  
In the parameter set interface, increase the data by 1 (change in the order of 0, 1, 2,... 9, 0).

**Down key:** In the menu option interface, move the cursor down;  
In the parameter set interface, reduce the data by 1 (changes in the order of 9, 8, 7... 0, 9);  
In the measurement interface, switch to display the relay status.

**Left key:** In the parameter set interface, move the cursor to the left.  
In the menu interface, return to the previous menu.

**Right key:** In the parameter set interface, move the cursor to the right.  
In the measurement interface, switch and display different measurement objects, and switch between single-parameter and multi-parameter interfaces.

**LOT key:** In the measurement interface, short press this key to turn on or off the LOT function, and long press to enter the LOT setting menu.



Note: The LOT key can only be used in instruments with hardware version C0 or above.

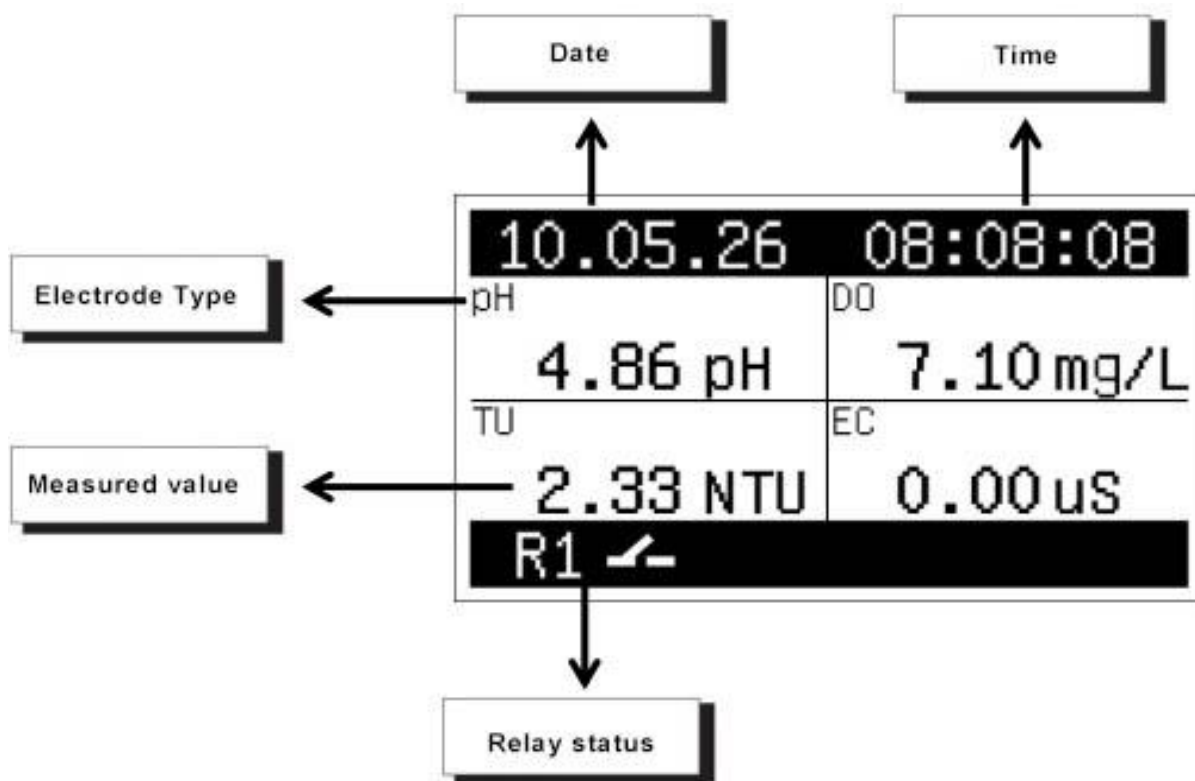
**Menu button:** In the measurement interface, enter the menu interface. In the menu option interface, directly return to the measurement state. In the parameter set interface, return to the previous menu.

**Enter button:** In the menu option interface, select the selected item. In the parameter set interface, confirm and return to the previous menu.

**Return button:** Press this key to return to the previous menu. For example, in the parameter setting interface, press this key to abandon the modification and return to the previous menu.

## 5.2 Display

After the instrument completes the scanning probe step, the instrument is powered on again, and the corresponding scanning probes measurement interface will be displayed, such as the following:



**Date and time:** Display the current date and time information.

**Electrode type:** Display the currently connected electrode measurement object type.


**Measured value:** Display the current measurement value, and the unit changes according to the measurement object.

**Relay Status:** Display the current switching status of the relay.

**System Default Settings**

<b>Setting Type</b>	<b>Setting Options</b>	<b>Initial Value</b>
<b>Wash Relay</b>	Clean interval	5min
	Duration of clean	60sec
	Wash state	Hold
<b>Comm. Set</b>	Net address	001
	Baud Rate	9600bps
	Verify Bit	None
	Stop Bit	1 bit
	Format	CDAB
	Protocol	ModBus
<b>System Set</b>	Backlight	Scanty Power 01min
	Contrast Set	25
	Password	000000
<b>History Logs</b>	Set Interval	5min
<b>Servings</b>	Measure mode	Probe measure



In the measurement interface, long press the  button to enter the menu. The following is a detailed introduction to the menu content.

## 7.1 Probe Set

### 7.1.1 Scan probe

The initial state of the meter is no measurement value display. After connecting the probes, you need to scan the probes first, and then the corresponding measurement value can be displayed.

### 7.1.2 Probe options

The meter is connected to different probes, and the options are set according to the probe type.

For details, please refer to the "Digital Universal Controller Electrode Setting Instructions".

### 7.1.3 Remove probe

The removed electrode will no longer be displayed in the measurement interface.

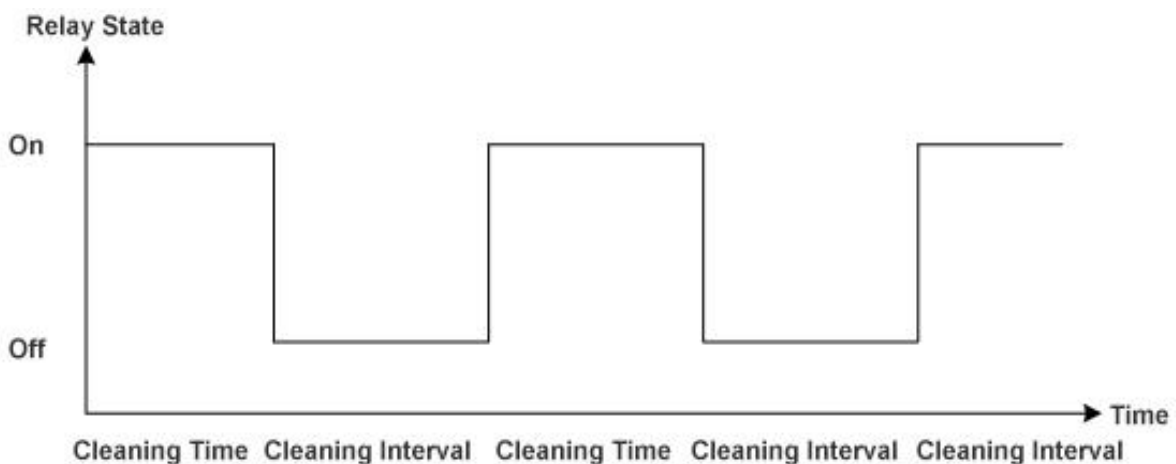
## 7.2 Alarm set

The instrument provides a relay output contact, and the user can set the function and parameters of the relay.

### 7.2.1 Wash relay

The relay is used for wash control, and the cleaning time and cleaning interval can be set to be closed periodically.

The relationship between the relay state and the cleaning time and interval is shown in the following figure:



#### Wash state:

Select "hold", when cleaning, the displayed value remains the same as before the relay action.

Select "constant", the measured value is the real-time value of continuous measurement.

## **7.2.2 Alarm relay**

The relay is used for alarm control and can only be used after installing an external expansion module.

## **7.3 Current set**

To set the current signal output, it can only be used after installing an external expansion module.

## **7.4 Comm.set**

The instrument provides a digital communication interface, and this menu can set the parameters of the communication interface.

### **7.4.1 Net address**

Set the slave address used by the instrument in the communication network.

### **7.4.2 Baud rate**

Select the baud rate used by the communication interface.

### **7.4.3 Verify bit**

Select the verification method, the default is "none".

### **7.4.4 Stop bit**

Select the number of stop bits, the default is "1bit".

### **7.4.5 Format**

Set the floating point format in communication data, the default is "CDAB".

### **7.4.6 Protocol**

Select the communication protocol, the default is "ModBus".

## **7.5 System set**

### **7.5.1 Data/Time set**

Set the system time "Year/Month/Day" and "Hour/Minute/Second".

### **7.5.2 Backlight**

Set the LCD backlight working mode. If it is set to "scanty power" mode, the backlight will automatically go out without any key operation within the set time.

### **7.5.3 Contrast set**

Set the contrast of the LCD display, the left key decreases the contrast, the right key increases the contrast.

### **7.5.4 Software**

View program version information.

### **7.5.5 Password**

Used to set the verification password when entering the menu in measurement mode. The password is set to "000000" when leaving the factory. At this time, the menu can be directly entered without a password in the measurement mode. If the user sets another password, the user will be prompted to enter the password when entering, and the menu can be entered only after the password is verified.

## 7.6 History logs


### 7.6.1 Memory inform

View meter history storage information.

### 7.6.2 Set interval

Set the interval time for the instrument to record the measurement data, the setting range is 0~999min. When the recording interval is set to 0, it means that the recording function is turned off.

### 7.6.3 Ponit query

After entering the menu, you can enter the query date, and press the  key to display the historical data closest to the query point.

### 7.6.4 Warn log

Record electrode warn logs.

## 7.7 Servings

### 7.7.1 Measure mode

The displayed measurement value can be set as "probe measure" or "sim measure".  
Probe measure: The screen displays the measurement value as the value measured by the electrode.  
Sim measure: The measurement value displayed on the screen is the input value set by the user.

### 7.7.2 Output module

After the instrument is connected to the expansion module, the module can be added by scanning.

### 7.7.3 Restore defaults

**The instrument calibration parameters and all setting parameters can be restored to the factory default state.**

# Appendix

## A Modbus register information

### 1. About Modbus RTU overview:

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

Data communication is initiated by the host, and the first byte of the transmitted message is the target slave address. When the first byte is received by all the slaves on the network, each slave will decode it to determine whether the message is sent to itself.

The transmission of the RTU message frame must start with a pause interval of at least 3.5 characters. After the last character is transmitted, a pause of at least 3.5 characters marks the end of the message frame. A new message can start after this pause. In the transmission process, the entire message frame must be transmitted in a continuous stream. If there is a pause interval of more than 1.5 characters before the completion of the message frame transmission, the receiving device will refresh the incomplete message and assume that the next byte is the beginning of a new message. Similarly, if a new message starts after the previous frame in less than 3.5 characters, the receiving device will consider it a continuation of the previous frame, and this will cause an error because of the final CRC. The value cannot be correct.

The meter uses the function code 0x04 to complete the output of the measurement results and the output of two current values. The meter uses the function code 0x04 to

### 2. Function code details (function code 0x04):

This function enables the master (host computer) to obtain the real-time measurement value of the slave (instrument). The value is specified as a single-precision floating-point type (that is, occupying two consecutive register addresses), and the corresponding parameters are marked with different register addresses;


The host can send a command frame to read a single or all data results. The data frame format is as follows (the data is all in Hex format):

Host send:

1	2	3	4	5	6	7	8
Slave address	Function code	Register start Address high 8 bit	Register start address low 8 bit	Register number high 8 bit	Register number low 8 bit	CRC low 8 bit	CRC high 8 bit
Addr	04	xx	xx	xx	xx	CRC	CRC

Slave response:

1	2	3	4	5	5+n	5+n+1	5+n+2	5+n+3
Device Address	Function code	Length	Data 1 high 8 bit	Data 1 low 8 bit	Data n high 8 bit	Data n low 8 bit	CRC low 8 bit	CRC high 8 bit
Addr	04	Len	xx	xx	xx	xx	CRC	CRC

-  Note :
1. Addr is the slave address, with an optional range of 0 x 01 to 0 x FE.
  2. Len is the number of bytes of returned data.

**For example:**

**Send frame:** [01 04 00 00 00 02 71 CB], the meaning is as follows:

[01]: Instrument address

[04]: Function code

[00 00]: The starting register address is 0x0000

[00 02]: Read 2 registers starting from the starting address (that is, read 1 single-precision floating-point data result)

[71 CB]: CRC check data

**Return frame:** [01 04 04 CC CD 41 48 65 4D], the meaning is as follows:

[01]: Instrument address

[04]: Function code

[04]: Number of bytes returned (here 4)

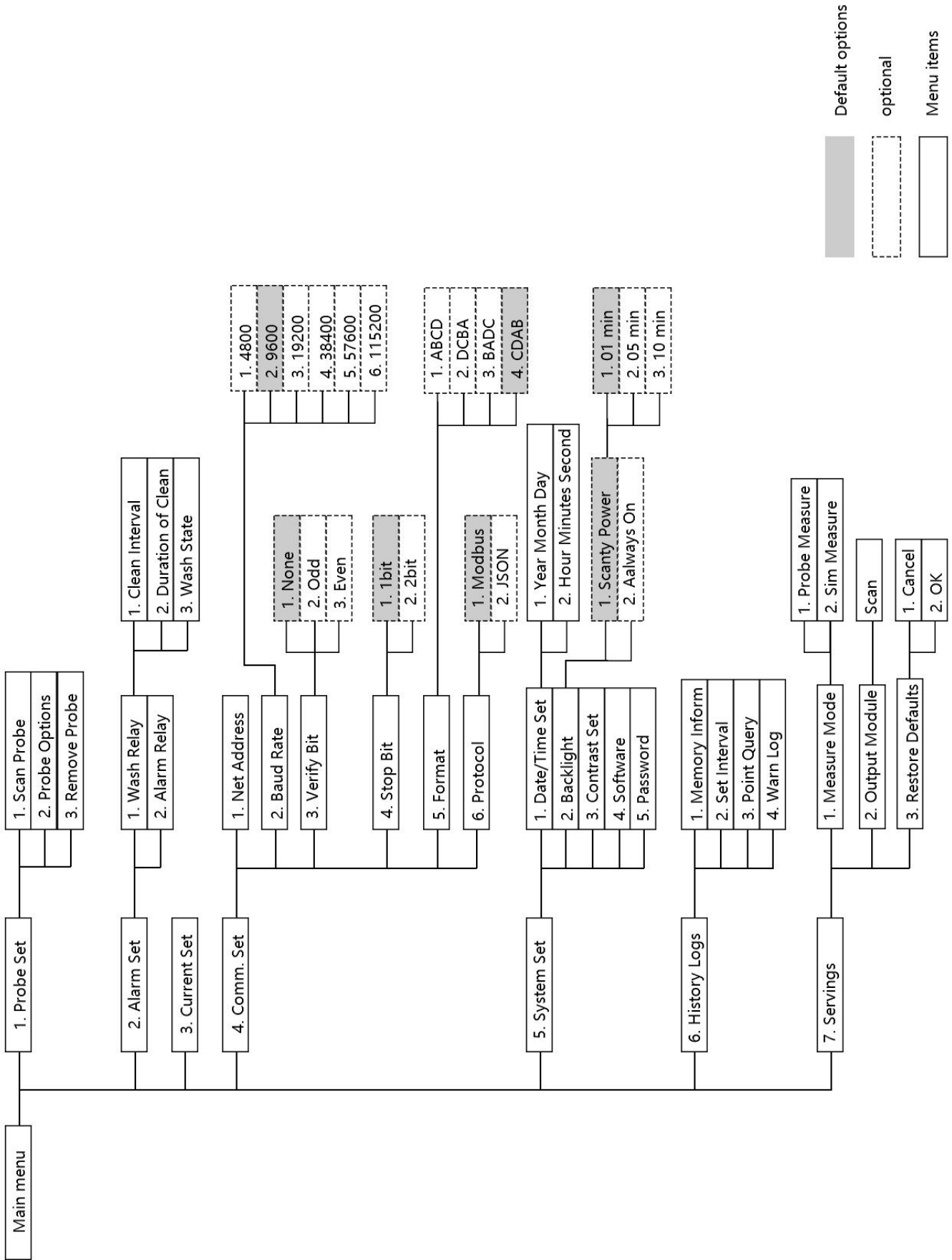
[CC CD 41 48]: 0x4148CCCD (that is, the floating-point value is 12.55, and the specific value means to find the corresponding address) (Note: Combine two 16-bit integer registers to form a single-precision floating-point number, pay attention to the order of the data)

[65 4D]: CRC check data

### 3. Corresponding parameter table of communication

According to the measurement object, the meter is connected to different electrodes. Please refer to the "Digital Universal Controller Electrode Setting Instructions" for the corresponding parameter table of the communication address.

# Menu structure diagram







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