Modbus RTU to Modbus TCP module, RS232/485 to Modbus TCP network module,WJ103

(Multi functional cost-effective serial server module, supporting edge computing)

Figure 1 WJ103 Module Appearance

Product features:

- Modbus RTU protocol is automatically converted to Mobus TCP protocol
- Support polling slave station data as Modbus RTU master station and MQTT reporting
- Support polling slave data as Modbus TCP master and MQTT reporting
- Support Modbus RTU or Mobus TCP data edge calculation function
- The phone can easily set WiFi password and configuration parameters
- RS232/485 baud rate can be set from 300 to 256000
- TCP Server and TCP Client can be selected as the working mode, UDP working mode, MODBUS protocol conversion mode;
- Support MQTT protocol, and data can be reported to the cloud
- Support virtual serial port working mode
- Can span gateways, switches and routers
- It can work on the LAN or the Internet (extranet)
- Work port, target IP address and port can be easily set

Typical applications:

- Serial port to industrial Ethernet
- Used for Internet of Things, real-time monitoring network and field equipment communication
- Intelligent building control, security engineering and other application systems
- Ethernet industrial automation control system
- Industrial field signal isolation and long line transmission
- Equipment operation monitoring and control
- Conversion and transmission of sensor signal
- Acquisition and conversion of industrial field data
- Internet of Things signal to RS232/485

Product Overview:

WJ103 is an industrial level protocol converter between RS232/485 and TCP/IP developed by Weijunrui Technology.The serial port server is used to transparently transmit TCP network data packets or UDP data packets with RS232 or RS485 interface data. The serial port server can easily connect the serial port device to Ethernet and Internet, and realize the network management of the serial port device.Compared with similar products, its remarkable feature is that it can stably send large quantities of data in full duplex without losing a byte.

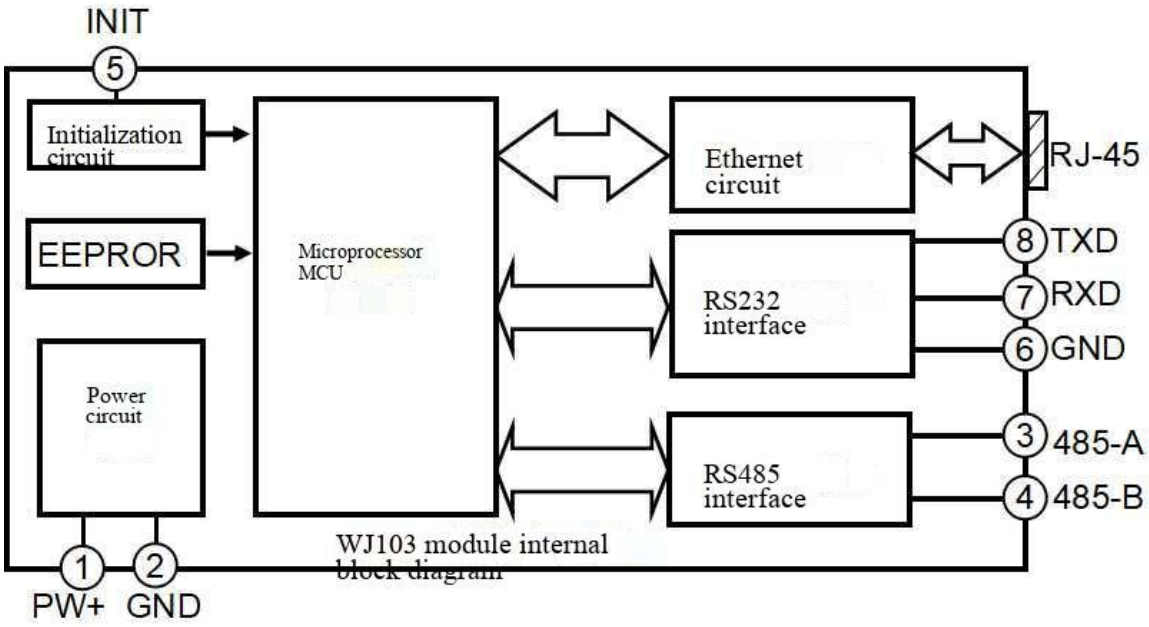


Figure 2 WJ103 Module Internal Block Diagram

WJ103 series products include power conditioning, analog switch switching, RS232 interface communication, RS485 interface communication and RJ-45 network interface communication.It is an embedded Ethernet serial port data conversion device, which is integrated with TCP/IP protocol stack. Users can easily complete the network functions of embedded devices by using it. It is equipped with a 32-bit processor, with a main frequency of up to 240MHz, fast speed, rapid response and high stability.Integrated RJ-45 interface, the highest baud rate of RS485 communication is up to 1Mbps, with TCP Server, TCP Client, UDP and MODBUS protocol conversion and other working modes, which can be set through mobile phone networking.

Product model:

WJ103 - 232/485 – RJ45

Communication interface 2
RJ45: RJ-45 network interface

Communication interface 1
232/485: Support RS232 interface
or RS485 interface, which can be selected through webpage

WJ103 general parameters:

(typical @+25 ℃, Vs is 24VDC)

Transmission distance: RS232 — 15m,

RS485 — 1000m,

200 meters of network cable (connected to the Internet through the switch, no distance limit)

CPU: 32 bit CPU;

LAN Ethernet: 10/100Mbps;

Web page: support the web page access module, and support the web page setting module parameters.

Communication: serial port to Ethernet transparent transmission

It can also be set as MODBUS RTU to MODBUS TCP communication protocol.

Protection: built-in TVS overvoltage protection;

Interface: RJ-45 network interface;RS232 interface or RS485 interface

Working power supply:+8~32VDC wide power supply range, internal anti reverse connection and overvoltage protection circuit

Power consumption: less than 3W

Operating temperature: -45~+80 ℃

Operating humidity: 10~90% (no condensation)

Storage temperature: -45~+80 ℃

Storage humidity: 10~95% (no condensation)

Overall dimensions: 106 mm x 59 mm x 37 mm

Pin definition and wiring:

Pin	Name	Description	Pin	Name	Description
one	INIT	Enter the AP configuration mode switch	**three**	RXD	232 Data reception RXD
			four	TXD	232 Data transmission TXD
			five	GND	232 Data GND
two	RJ-45	RJ-45 network port	**six**	485-B	485 data interface B
			seven	485-A	485 data interface A
			eight	GND	Negative terminal of power supply, signal common ground
			nine	PW+	Positive end of power supply

Note: The pins with the same name are connected internally

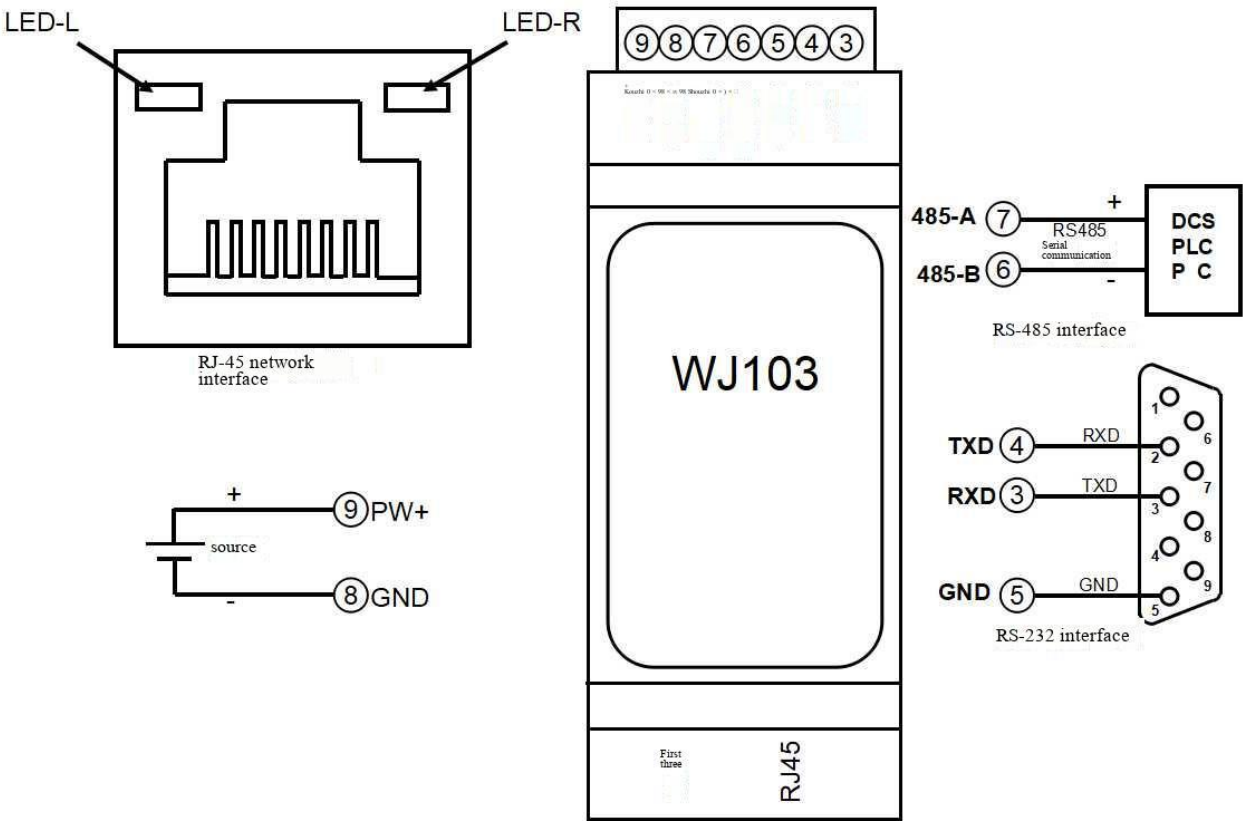
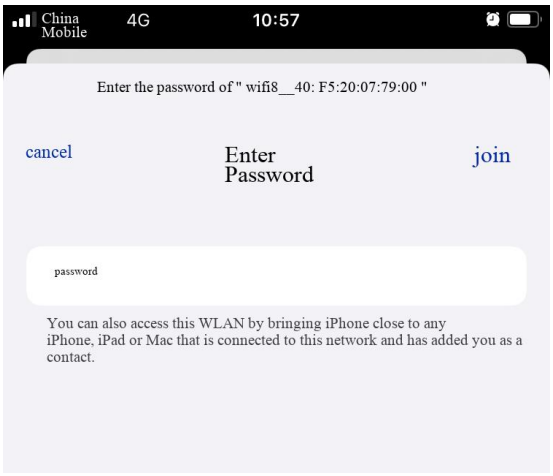


Figure 3 WJ103 Module Wiring Diagram

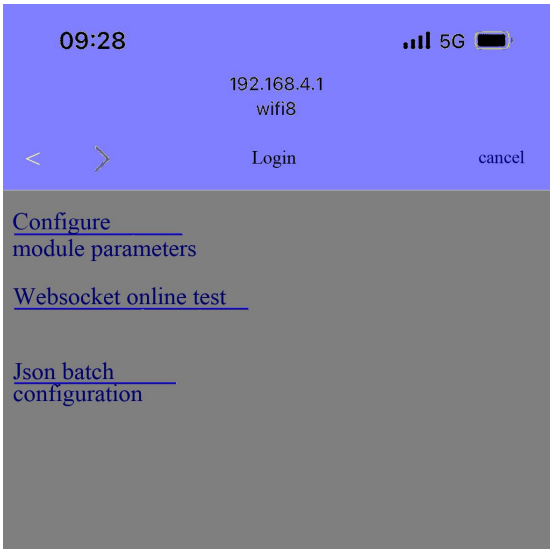
First, configure the WJ103 module through the mobile phone

1. Let the module enter AP mode

(1) Turn on the power, press and hold the module switch (INIT) for 3 seconds, and then release it.
(2) Open the mobile phone "WLAN" or "Settings → WLAN", find the WiFi name "wifi8" to connect.

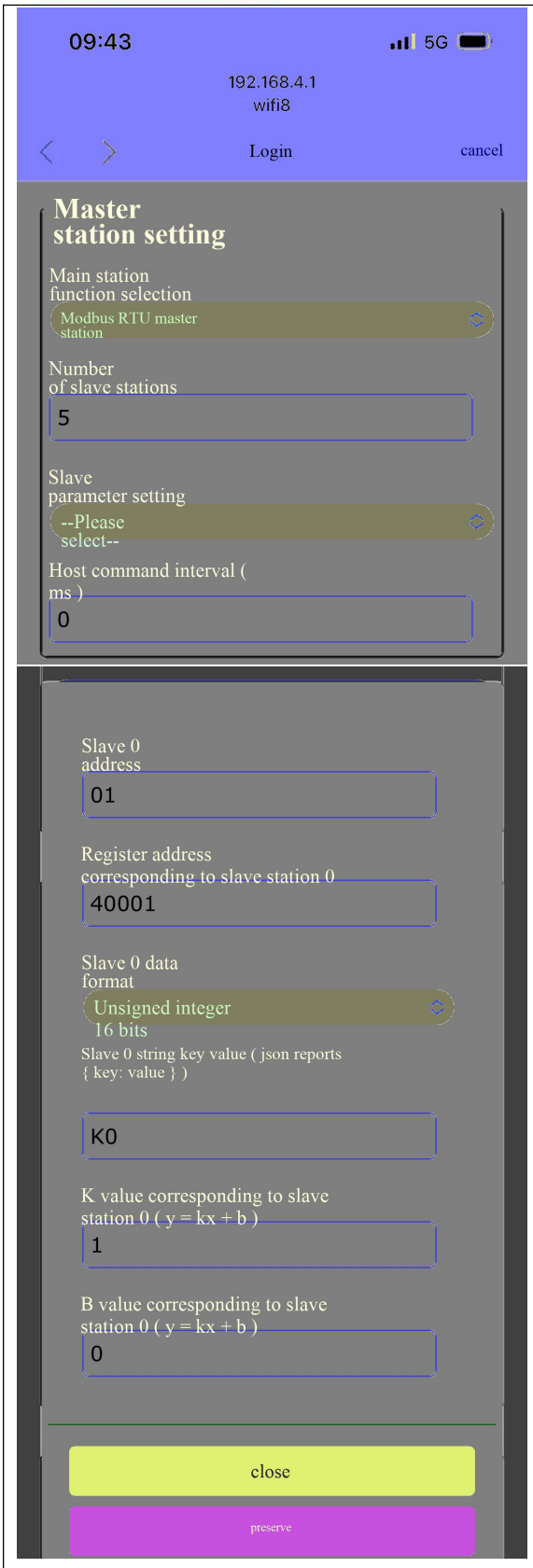


The factory password of this module is 12345678, and then "join".



2. Enter the module webpage.

After connecting the WiFi of the module, it will automatically jump to the module's built-in webpage after a few seconds, as shown in the left figure.If the mobile phone cannot automatically jump, you can also open the mobile browser and enter the website 192.168.4.1 to log in.
Click the configuration module parameter link to enter the configuration interface



3. Enter the setting interface

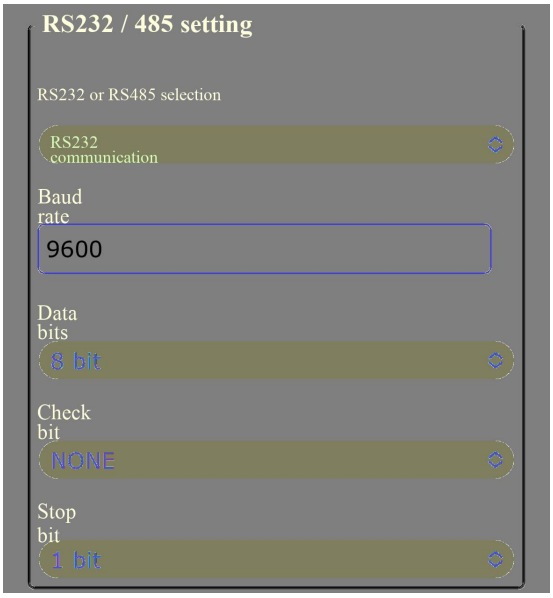
Please modify the following parameters according to actual needs:

（1） Main station function selection

Selectable: transparent transmission mode and Modbus RTU master station

（2） Slave parameter setting of Modbus RTU master mode

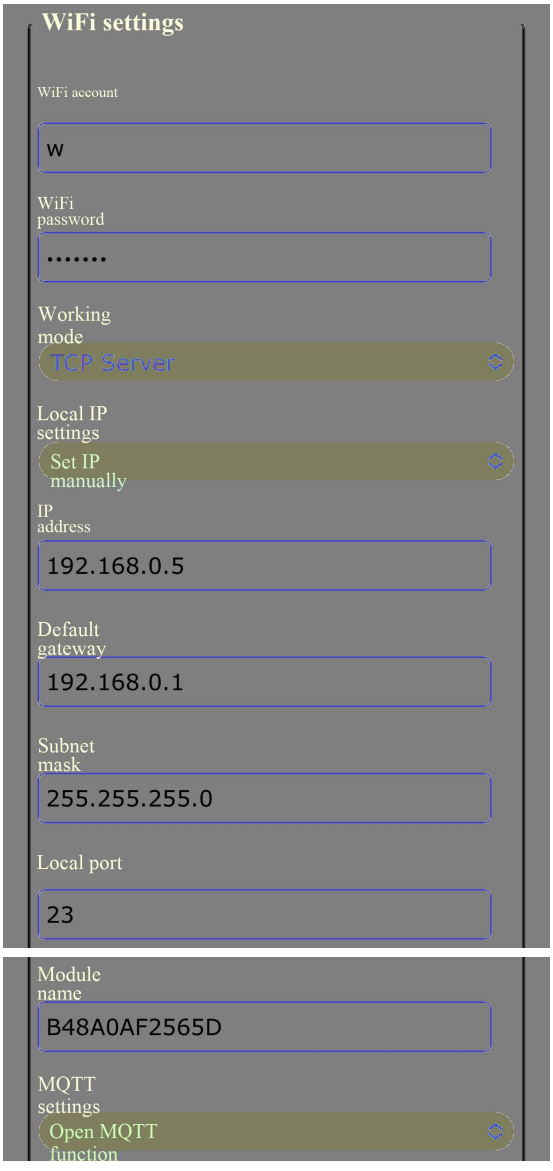
Slave parameter setting of Modbus RTU master mode



（3） RS232/485 setting

Communication port selection: RS232 or RS485

And set the baud rate, data bit, check bit, stop bit and other parameters of the serial port



（4） WiFi settings

1. WiFi account

Connect the WiFi covered here

2. WiFi password

Fill in the WiFi password. If it is already connected, do not enter it again.

1、 Working mode

Select the working mode and fill in according to the actual application.

0:TCP Server
1:TCP Client
2:UDP
3:MODBUS TCP
4:Websocket

2、 Local IP settings

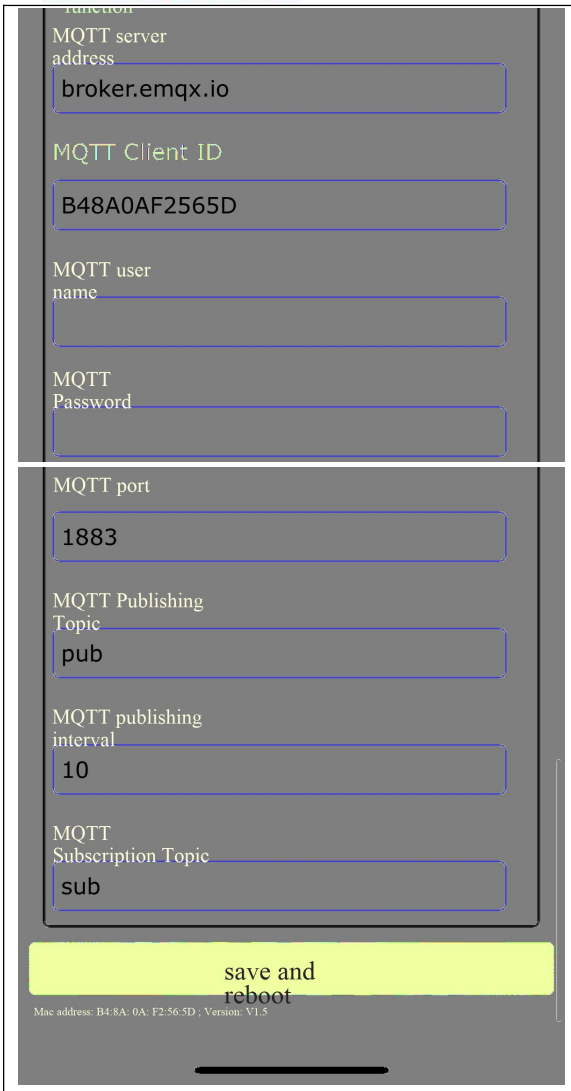
Select: Obtain IP automatically or set IP manually

5. IP address Remote server IP

Set the IP address of the module, which must be the network segment where the current WiFi is located, and not the same as the IP address of other devices in the LAN.

For example, if the IP address of the WiFi router is 192.168.0.1, you can set the IP address of the module to 192.168.0.5

The IP address of the remote server needs to be filled in when the working mode is TCP Client and UDP.The default value of other working modes is sufficient.



6. Default gateway

Gateway of the module, fill in the IP address of the current WiFi router.

For example, the IP address of the WiFi router is 192.168.0.1. Just fill in the IP address

4、 Subnet mask

The subnet mask of the module. If there is no cross network segment,

Fill in the default value of 255.255.255.0

8. Local port and remote port

Local port number and remote port number shall be filled according to the actual situation

9.Module name

Module name

10.MQTT settings

If MQTT communication is used, the MQTT function needs to be turned on.

11.MQTT server address

Fill in the URL of the MQTT server,

For example: broker.emqx.io

If the IP address of the local server is 192.168.0.100, you can write 192.168.0.100

12.MQTT Client ID， User name, password, port, publishing topic

Subscription topic and other parameters

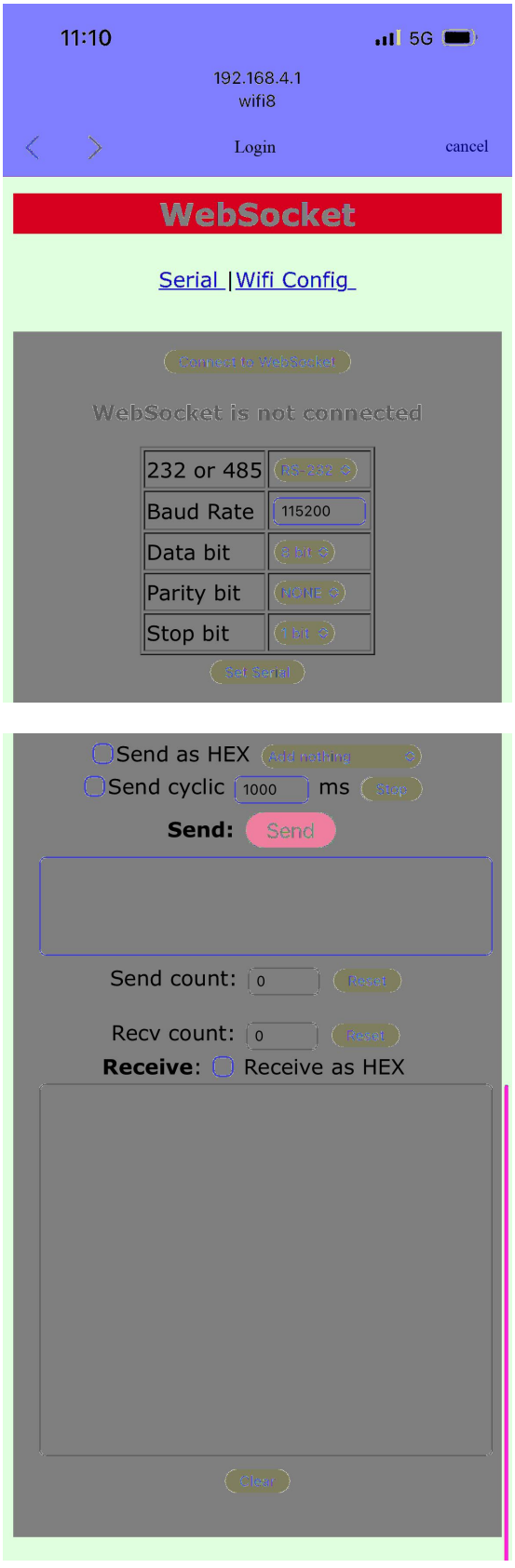
Please fill in according to the requirements of MQTT server.The QoS of MQTT is 0 and cannot be modified.

13.MQTT publishing interval

The time interval, in ms, when the module automatically publishes data to the MQTT server. Setting it to 0 means canceling the scheduled publishing function.

4. Save parameters

After setting the parameters, click the Save and Restart button, and the module will save the parameters and restart automatically.



5. Websocket online test

Click the Websocket online test link on the module's homepage to enter the data view interface.As shown in the left figure.

6. Batch setting parameters

Click the Json batch configuration link on the module homepage to enter the batch setting interface.As shown in the left figure.

The data must be in standard Json format. You can set all parameters or only some parameters.

If there are many products to set, you can save time by batch setting.

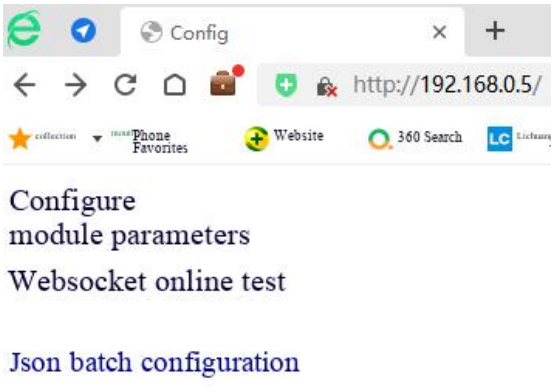
Click Save Json data after filling in.

Example 1: Only modify the WiFi account password to send:

```
{
  "WifiSsid": "w",
  "WifiPassword": "12345678",
  "setIP": 1,
  "ipAddress": "192.168.0.5",
  "gateway": "192.168.0.1",
  "netmask": "255.255.255.0",
}
```

Example 2: Only modifying MQTT parameters can send:

```
{
  "setMQTT": 1,
  "mqttHostUrl": "broker.emqx.io",
  "port": 1883,
  "clientId": "mqtt_test_001",
  "username": "",
  "passwd": "",
  "topic": "mqtt_topic_001",
  "pubTime": 2000,
  "pubonchange": 0
}
```



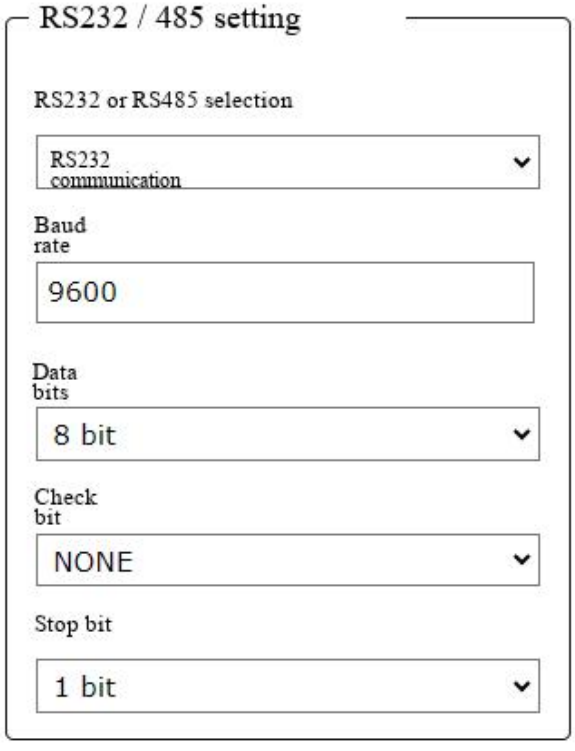
7. The module webpage can also be opened on the LAN

If the module has been connected to the local wifi, you can enter the module IP in the computer or mobile browser, such as 192.168.0.5, and open the module web page (provided that the computer IP or mobile IP is in the same network segment as the module, and the login web page should be based on the IP address of the current module) to enter the module internal web page.You can

	also configure the module or read the module data in the same way as the above table.

Routine 1: MODBUS RTU communication protocol to TCP Server communication protocol

1. How to set MODBUS RTU communication protocol to MODBUS TCP communication protocol?

	If you need to use MODBUS RTU communication protocol to transfer to MODBUS TCP communication protocol, you need to set the working mode, local port and baud rate. Working mode: ModbusTCP Local port: 502 Baud rate: set according to the communication baud rate of the field Modbus RTU Click Save after modification.Then restart the module.

Working mode

Modbus TCP

Local IP settings

Set IP manually

IP address

192.168.0.7

Default gateway

192.168.0.1

Subnet mask

255.255.255.0

Local port

502

2. The instance of MODBUS RTU communication protocol transferring to MODBUS TCP communication protocol.

Open **MODBUS** test software**:** ModScan32

Select Connection→Connect under the menu

In the pop-up window, set as follows:

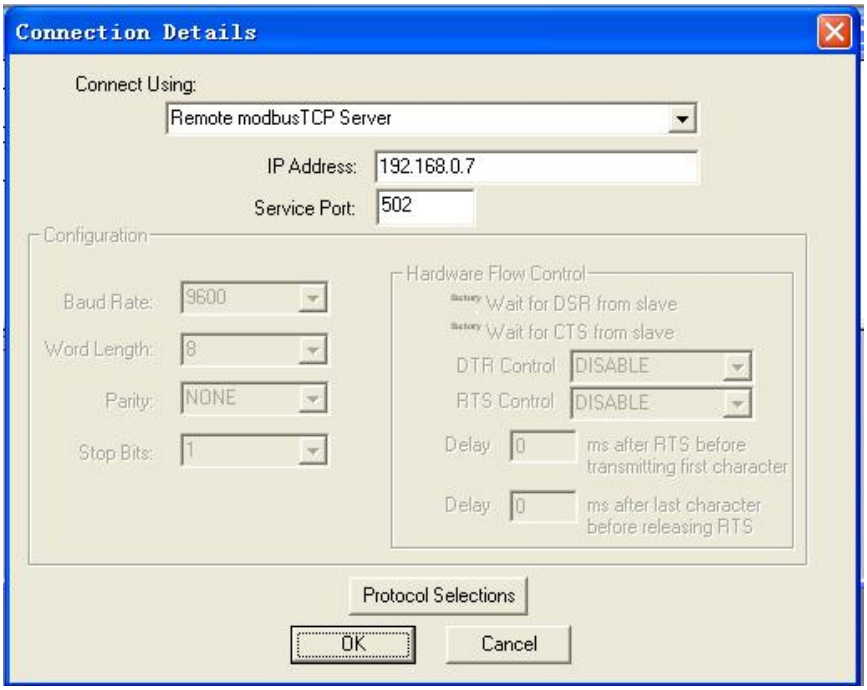


Figure 5 WJ103 Settings Using ModScan32 Software

After setting, the data uploaded from the existing device can be read.The figure is as follows:

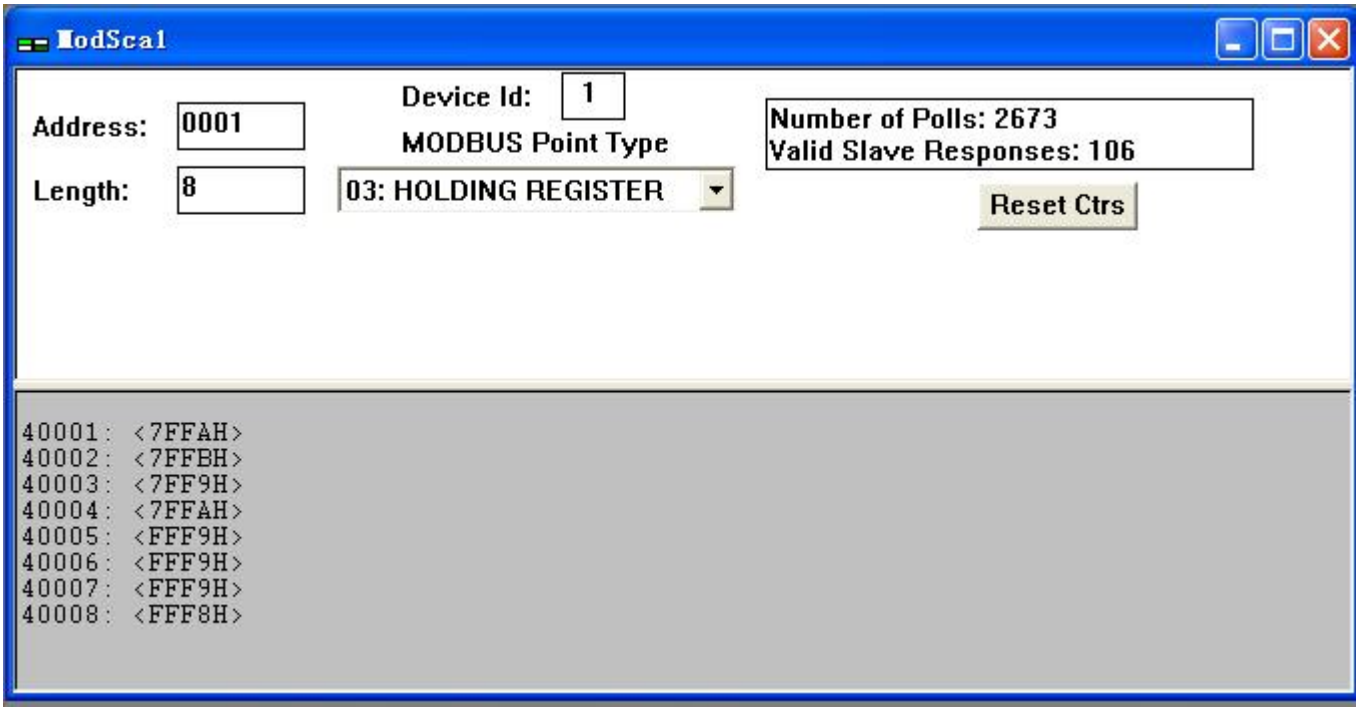
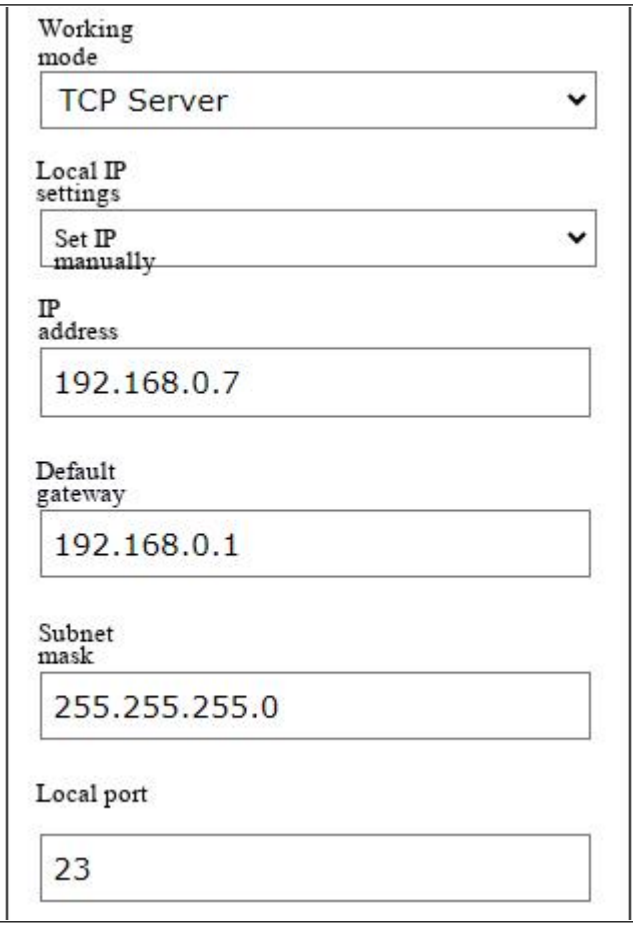


Figure 6 WJ103 Reads Existing Device Data Using ModScan32 Software

Routine 2: TCP Server working mode

1. How to set the TCP Server to serial communication protocol?



If you need to use the TCP Server working mode, you need to set the working mode, local port and baud rate:
Working mode: TCP Server
Local port: 23
Baud rate: set according to the on-site communication baud rate
Click Save after modification.Then restart the module.

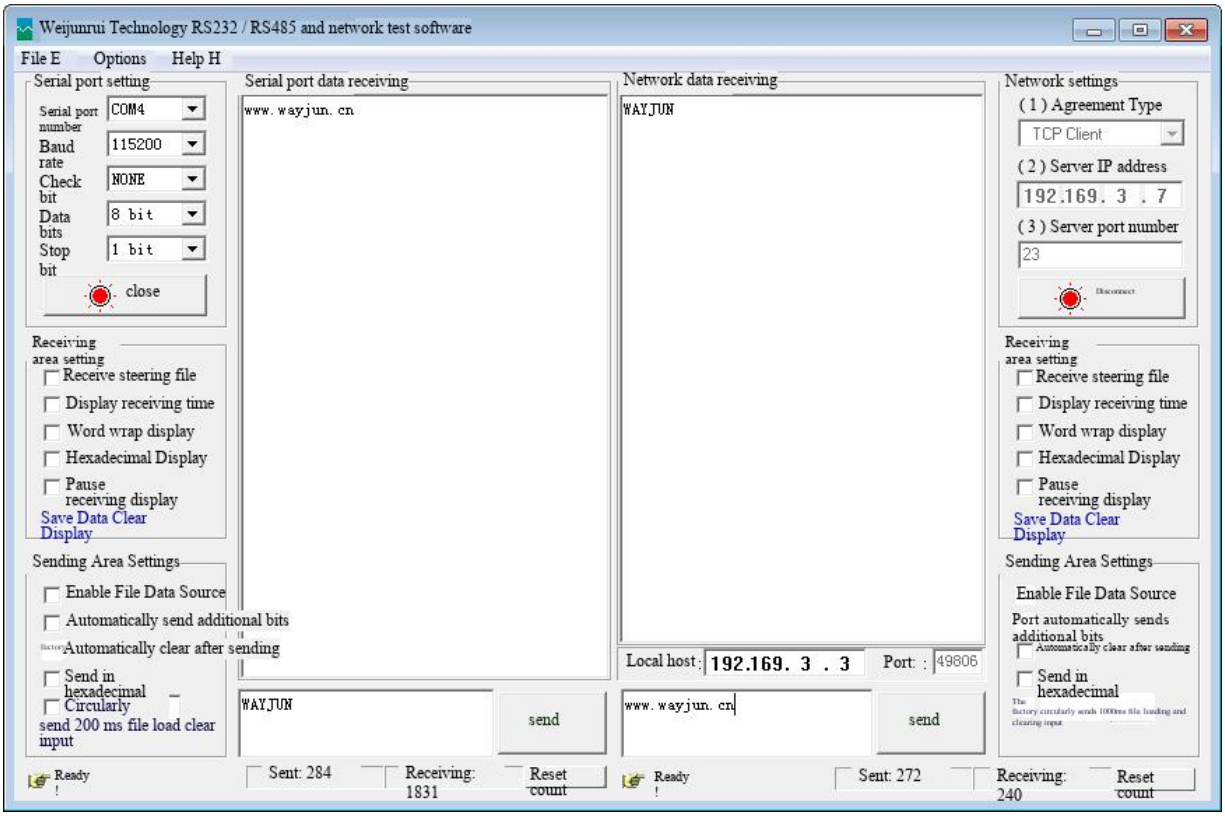
2. An instance of the communication protocol from TCP Server to serial port.

Open **the** network **test** software**:** Wayjun TCP and COM test

Serial port setting: set according to the COM port and communication baud rate of the field serial port.

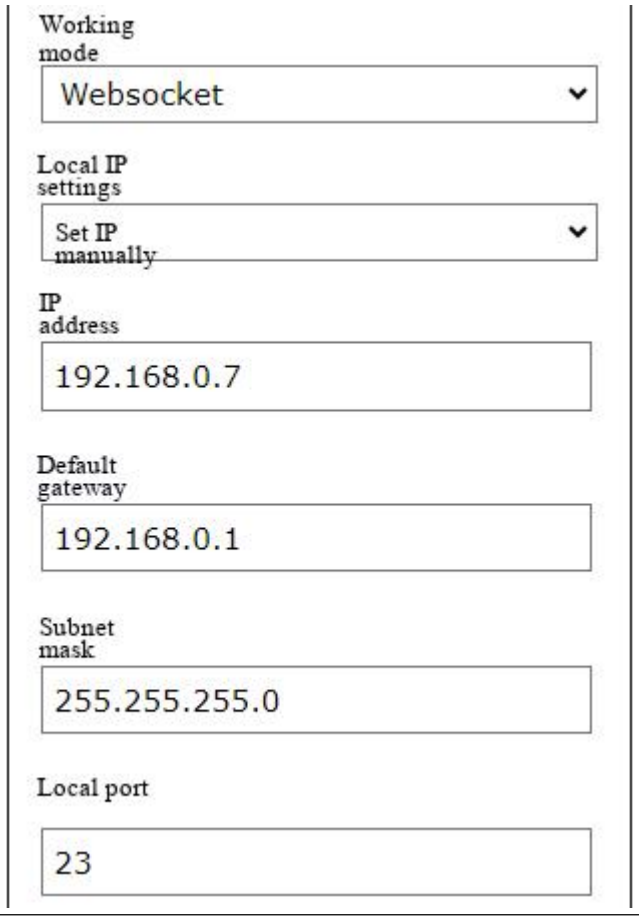
Network settings: Protocol type: TCP Client

IP address: 192.169.3.7 Port 23



Routine 3: Websocket working mode

1. How to set it as the communication protocol of Websocket to serial port?



If you need to use the Websocket working mode, you need to set the working mode and baud rate:

Working mode: Websocket

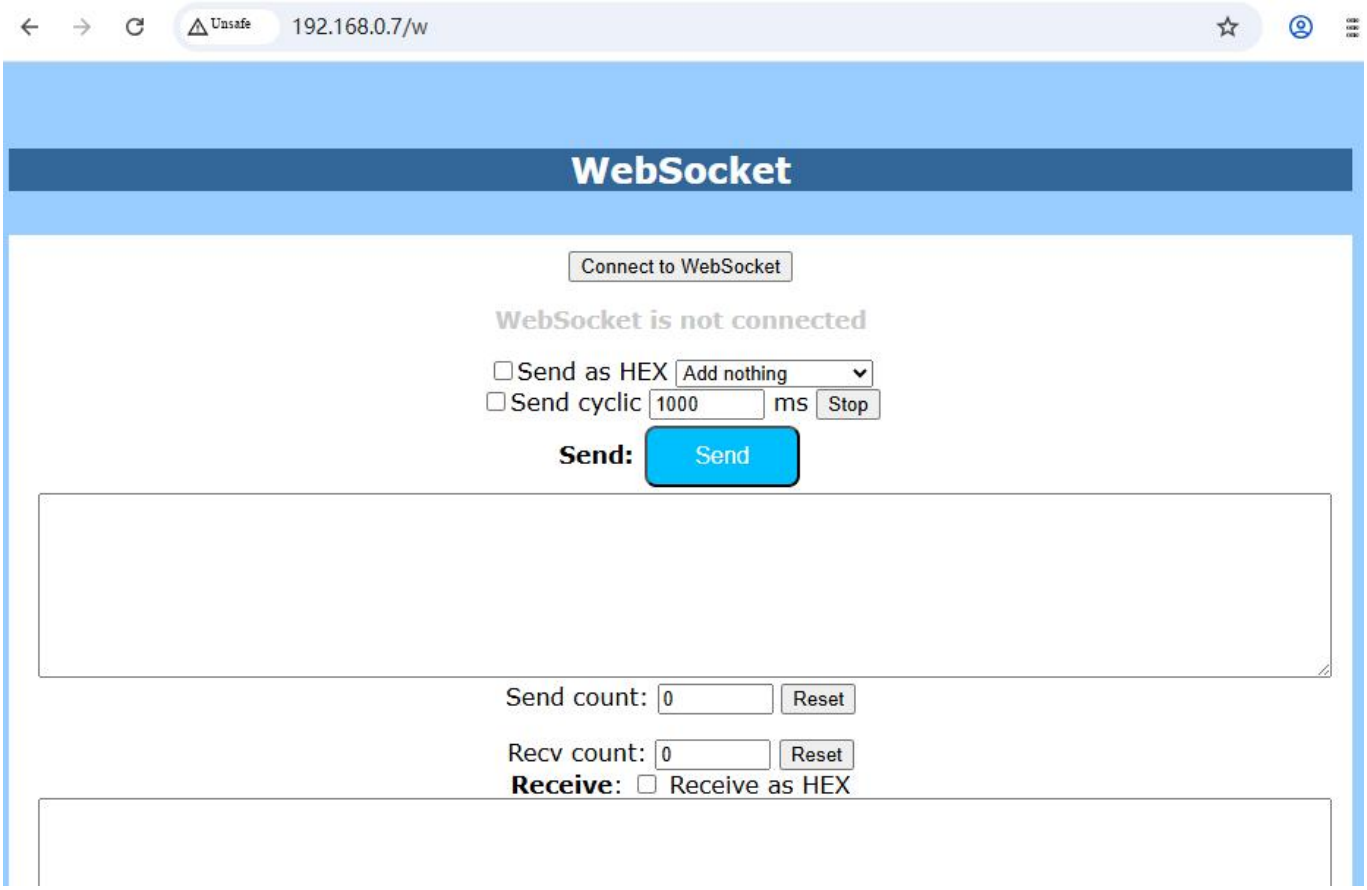
Baud rate: set according to the on-site communication baud rate

Click Save after modification.Then restart the module.

2. An instance of the communication protocol of the Websocket to serial port.

Open the browser and enter the IP address of the module. For example, the IP address of the module is 192.168.0.7,

Click "Websocket Online Test" to open the module's built-in web page.As shown in the figure below:

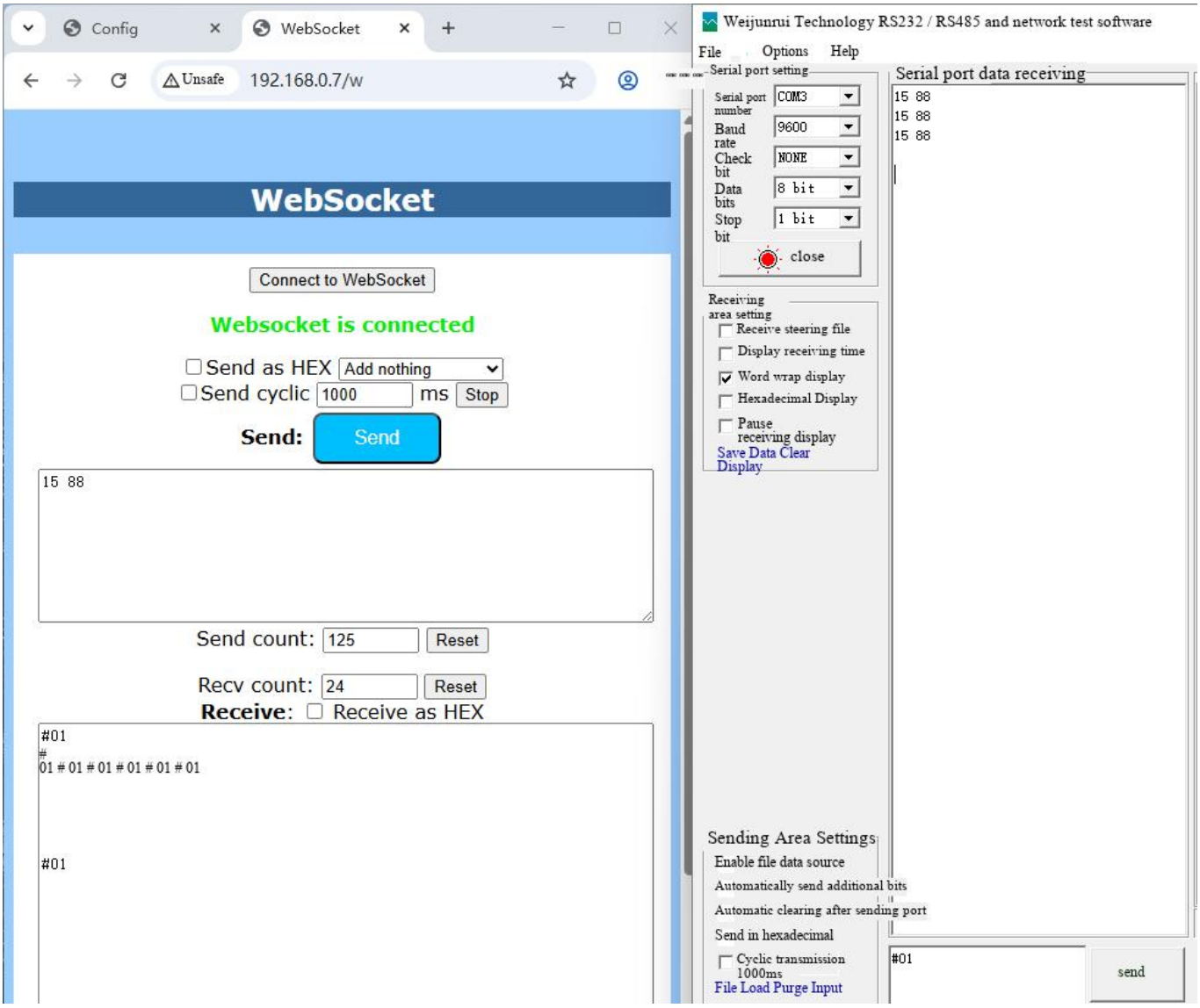


Click the button to connect to the Websocket

Open **the** network **test** software**:** Wayjun TCP and COM test

Serial port setting: set according to the COM port and communication baud rate of the field serial port.

Then send data to each other for testing.



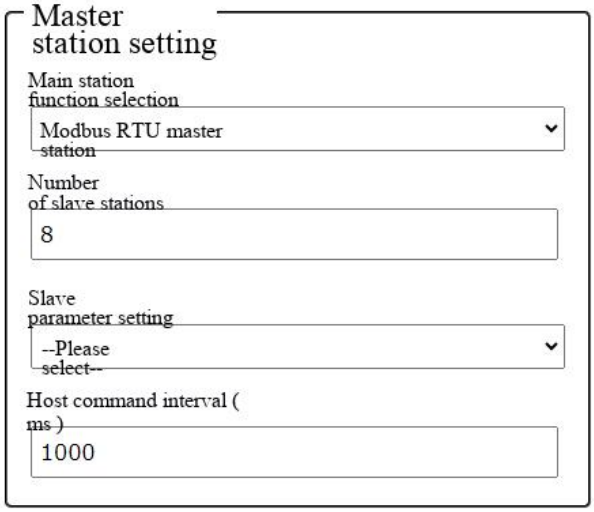
Routine 4: Example of Modbus RTU master station

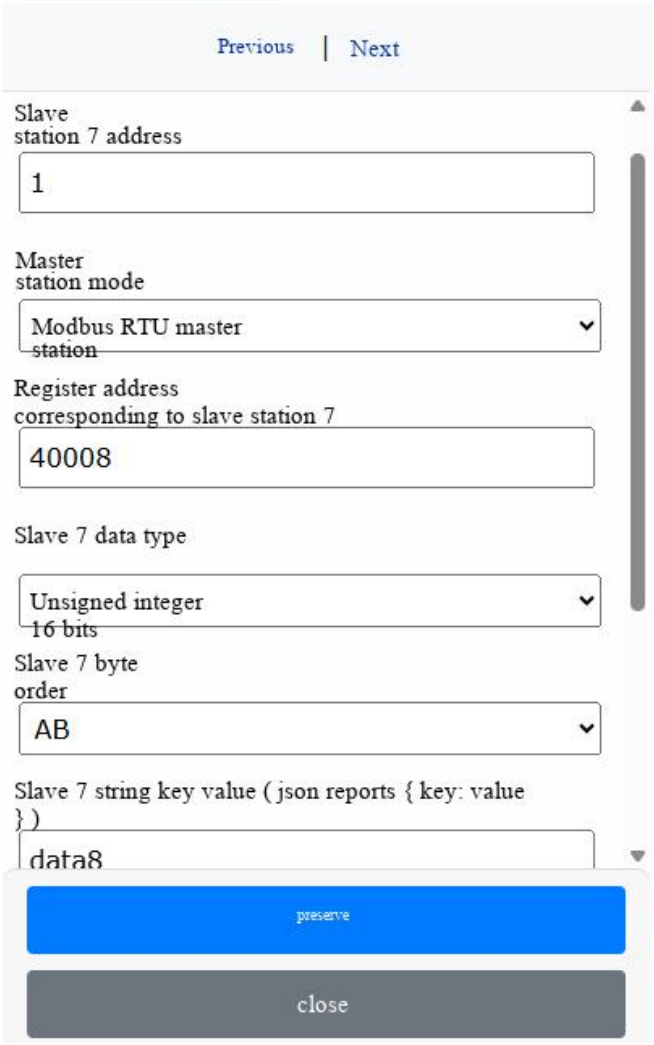
The following is a description of the 8-channel analog signal to RS-485 register. Connect it with WJ103 to realize the function of Modbus RTU master station.

Register description: (In general applications, reading the data with high 16 bits can meet the accuracy requirements)

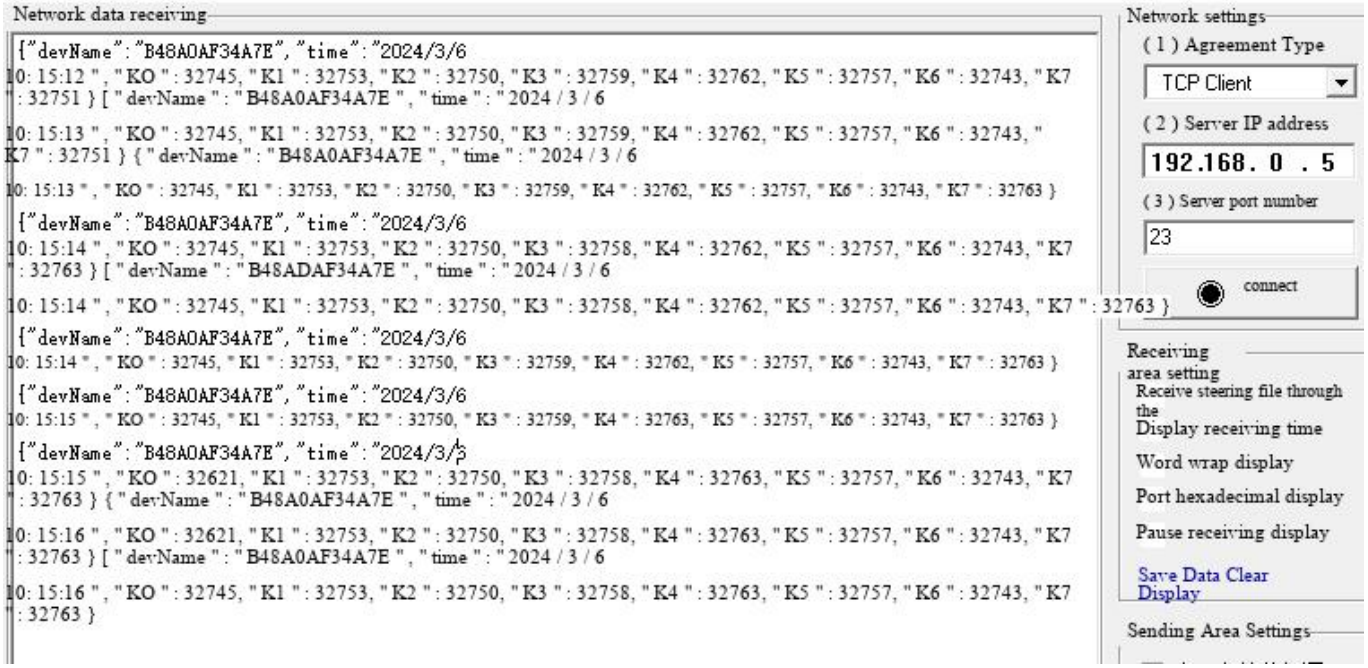
Address 4X (PLC)	Address (PC, DCS)	Data content	attribute	Data description
40001	0000	Analog quantity of channel 0	read-only	Integer, channel 0-7 data high 16 bits Complement mode with data of 2 0x0000-0x7FFF indicates positive number 0x8000-0xFFFF indicates negative number If no negative number can be used, the data read greater than 0x7FFF can be converted to 0.
40002	0001	Analog quantity of channel 1	read-only	
40003	0002	Analog quantity of channel 2	read-only	
40004	0003	Analog quantity of channel 3	read-only	
40005	0004	Analog quantity of channel 4	read-only	
40006	0005	Analog quantity of channel 5	read-only	
40007	0006	Analog quantity of channel 6	read-only	
40008	0007	Analog quantity of channel 7	read-only	

Set WJ103 as the Modbus RTU master station and configure 8 registers.





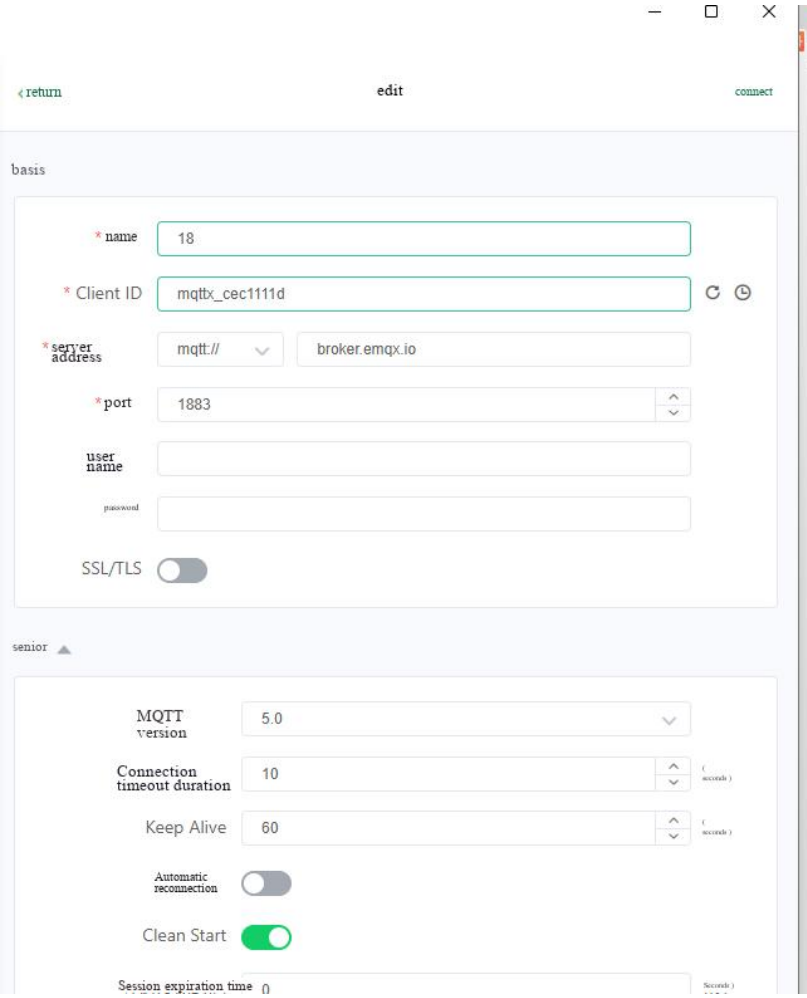
Data can be read on the network side.

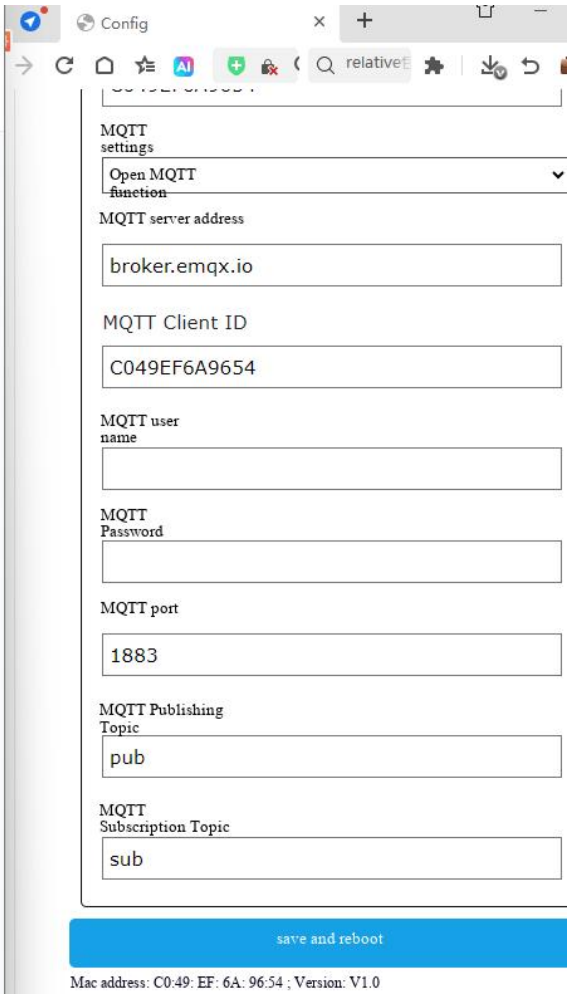


Routine 5: Use of MQTT

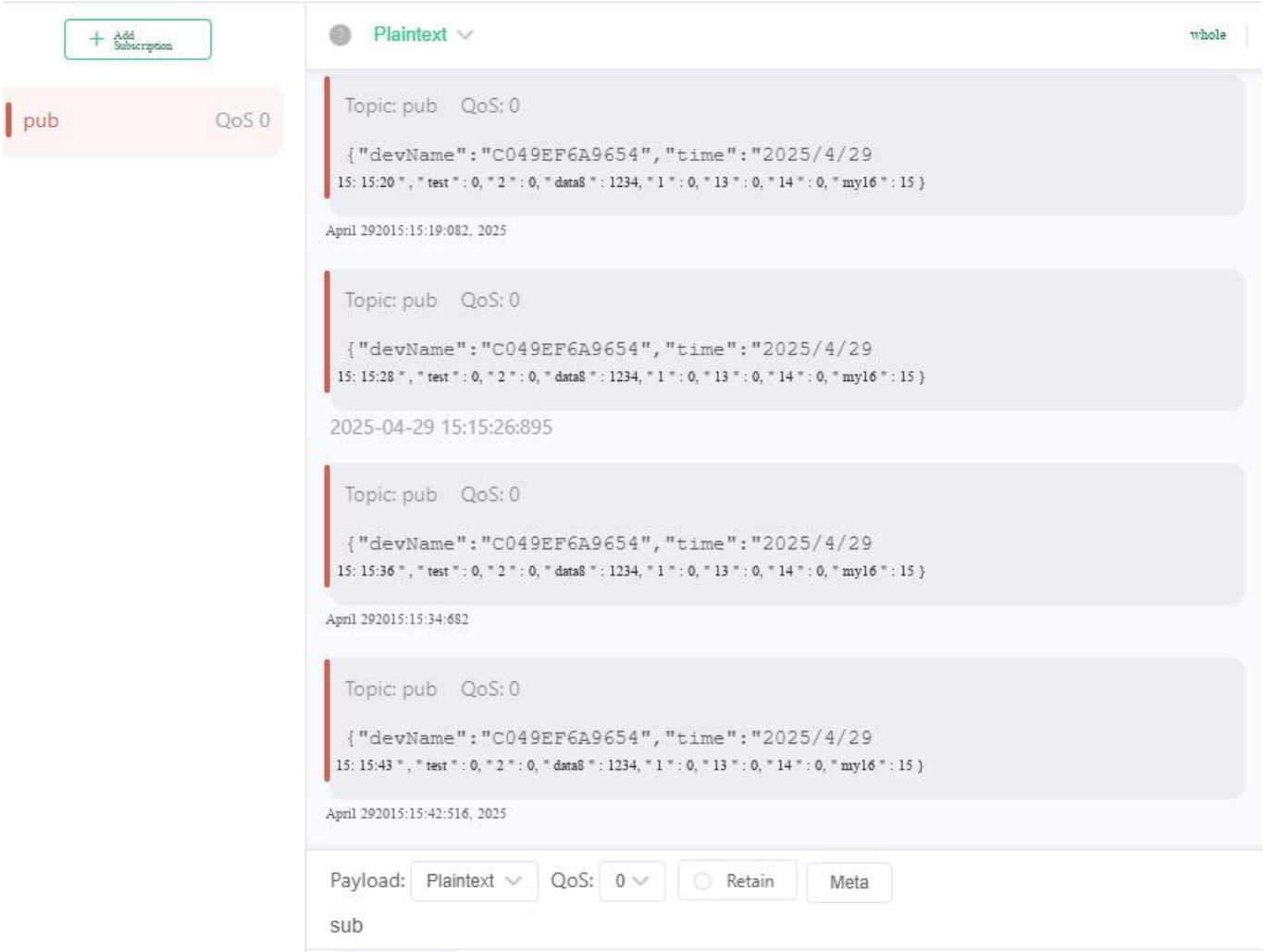
Open software MQTTX:

Set the connection configuration parameters of the MQTTX software and the configuration parameters of the module as follows:





Click the "Connect" button to see the data report:



FAQs of WJ103

1， How to judge the module status according to the light

The light 1S lights up twice: the module is waiting for the configured AP mode, and you can use the mobile phone to connect the module's wifi8 network to set parameters.

The light turns on once in 1S: the module is connecting to the wifi or network port. If it cannot be connected for a long time, please reset the parameters of the module.

The light is on once for 5S: the module has been connected to the wifi or network port and is working normally.

2. Cross network segment problem

If the IP address of the device and the communicating PC are not in the same network segment, are directly connected to the network cable, or are under the same sub router, then the two cannot communicate at all.

For example:

Equipment IP: 192.168.0.7

Subnet mask: 255.255.255.0

IP of PC: 192.168.1.100

Subnet mask: 255.255.255.0

Since the IP address of the device is 192.168.0.7, it is impossible to log in to the device web page on the PC and ping it. If you want to communicate between the two, you need to set the subnet mask of the device and the PC, as well as the subnet mask of the router, to 255.255.0.0, so that you can log in to the module webpage.

3. The device can ping but the web page cannot be opened

There may be several reasons:

1) The static IP set by the device conflicts with the existing device IP in the network

2) The HTTP server port is modified (80 by default)

3) Other reasons

Solution: Re set an unused IP address for the device; restore the factory settings or enter the correct port when opening the browser.

4. Disconnection and reconnection occur at regular intervals

Once in a while, disconnection and reconnection will occur

Cause: The serial server has an IP address conflict with other devices

5. The communication is abnormal, the network link is not available, or the search is not available

The firewall of the current computer needs to be closed (in Windows Firewall settings)

The three local ports cannot conflict, that is, they must be set to different values. The default value is 23, 26, 29

If there is an illegal MAC address, such as a full FF MAC address, the target IP address may not be connected, or the MAC address may be duplicate.

Illegal IP addresses, such as the network segment and router are not in the same network segment, may not be able to access the external network.

6. Hardware problem finding

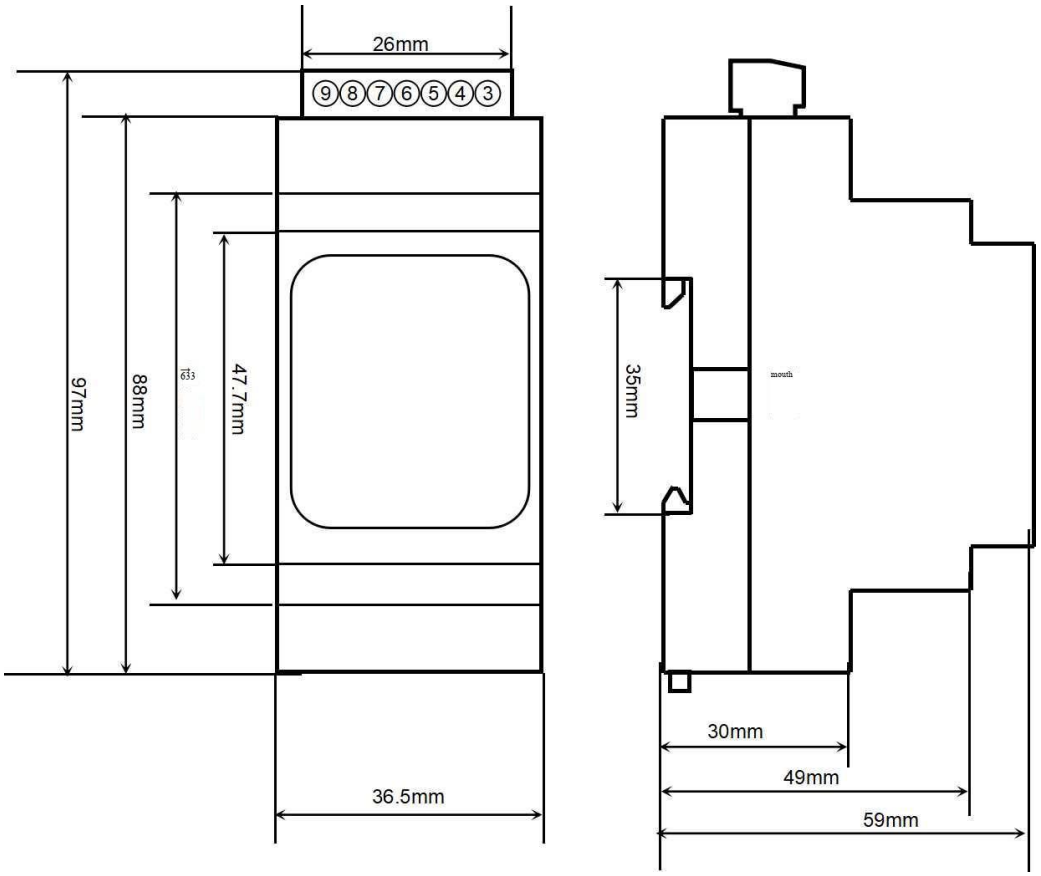
The power supply of the power adapter is poor, or the plug is in poor contact

The power light is not on, and the network port light is not on, which means there is no power supply or the hardware is broken

7. MODBUS TCP connection fails

The working mode should be set to modbus TCP, and the port number can only be 502, not other values.

Overall dimension: (unit: mm)



Can be installed on standard DIN35 guide rail

Warranty:

Within two years from the date of sale of this product, if the user complies with the storage, transportation and use requirements, but the product quality is lower than the technical indicators, the product can be returned to the factory for free maintenance.In case of damage due to violation of operating regulations and requirements, the device cost and maintenance cost shall be paid.

Copyright:

Trademark:

Other trademarks and copyrights mentioned in this manual belong to their respective owners.

Version No.: V1.0

Date: May 2025

This document was translated by AI, so there may be inappropriate descriptions. If you have any questions, please contact us via email: sales@wayjun.net