Model: UT-6801S-GW

(Product Name：Modbus Gateway)

User manual

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Conventions

This manual adopts the following conventions.

GUI Convention	Description
 Description	Supplement and explain the description of the operation content.
 Attention	Remind of things to pay attention to during the operation. Improper operation may cause data loss or device damage.

Foreword

Target readers

This manual is intended for installers and system administrators who are responsible for installing, configuring, or maintaining networks. This manual assumes that you understand the transmission and management protocols used by all networks.

This manual also assumes that you are familiar with the professional terminology, theoretical principles, practical skills, and specific professional knowledge related to networking devices, protocols, and interfaces. At the same time, you must have working experience with graphical user interfaces, Simple Network Management Protocol, and web browsers.

1. Product Overview

1.1 Product Introduction

UT-6801S-GW is a Modbus gateway. It is a Modbus protocol converter between asynchronous serial port RS232/422/485 and Ethernet. It is an independent intelligent device with CPU, embedded OS, and complete TCP/IP protocol stack. It can immediately connect RS232/422/485 serial port Modbus RTU devices to the network.

Product features: supporting dynamic IP (DHCP) and static IP, supporting Modbus RTU to Modbus TCP conversion function, and having storage-type Modbus gateway characteristics. Data can be transmitted via the Internet. Communication conversion between Modbus RTU Slave, Modbus RTU Master, Modbus TCP Master, and Modbus TCP Slave. Internally integrated with ARP, DHCP, TCP, IP, HTTP, ICMP, MODBUS, and other protocols. It can be used as long as you know how to use a computer.

1.2 Product Features

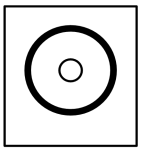
- Hardware features
- Has a Reset button to restore factory default settings.
- Has one 10/100M industrial-grade adaptive Ethernet port;
- The serial port provides 5 signals, including RXD, TXD, RTS, CTS, GND; with three serial port interfaces of RS232/485/422.
- The network port and power supply have independent indicator lights to conveniently indicate the working status;
- Wide power input range (12~57.6VDC), suitable for different on-site power supply methods.

- Software features
- Supports ARP, DHCP, TCP, IP, HTTP, ICMP, MODBUS, and other protocols.
- Supports a wide range of baud rates from 300-921600bps (standard baud rate), suitable for applications between different devices.
- Supports setting two operation modes on the serial port page: Modbus RTU Master and Modbus RTU Slave.
- Supports upgrading web firmware to facilitate special applications in different scenarios.
- Modbus proxy mode, storage type, faster response, and better stability.

2. Hardware Description

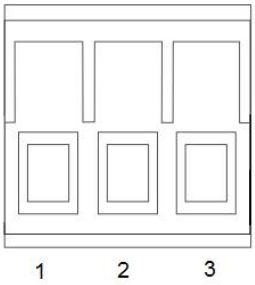
2.1 Power Interface Terminal Definition

The UT-6801S-GW front panel provides DC and 3PIN 5.08 power terminal for power connection, and the power input range is 12-57.6VDC. It is recommended to use a power adapter with a DC jack specification of inner diameter 2.5mm and outer diameter 5.5mm.



DC

Terminal block	Power Interface
1	Positive pole V+
2	Connect to ground (PGND)
3	Negative pole V-

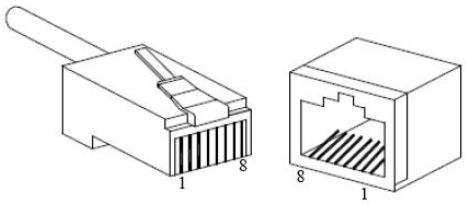


2.2 Ethernet RJ45 Interface Definition

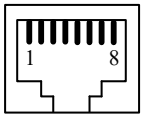
The UT-6801S-GW supports one Ethernet port and one RS-232/485/422 serial port.

10Base-T/100Base-TX Ethernet interface

The 10/100BaseT(X) Ethernet interface is located on the front panel of the device, with an RJ45 interface type. The pin distribution of the RJ45 port is defined as shown in the figure. Connection uses unshielded twisted pair (UTP) or shielded twisted pair (STP), and the connection distance does not exceed 100m. The 100Mbps connection uses a 5th category line with 100Ω, while the 10Mbps connection uses a 3rd, 4th, or 5th category line with 100Ω.



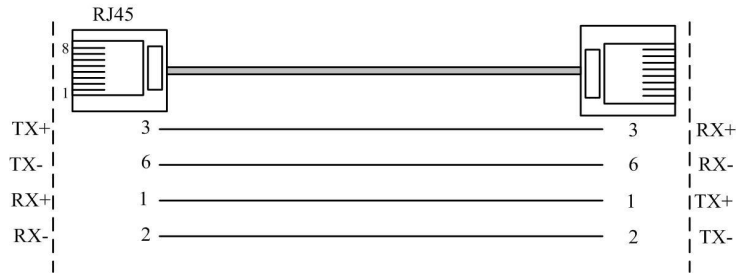
The RJ45 port supports automatic MDI/MDI-X operation, which can be connected to a PC or server using a straight-through cable and connected to other switches or hubs. In a straight-through cable (MDI), pins 1, 2, 3, and 6 correspond to the connection. For the MDI-X port of a switch or hub, a crossover cable is used: 1→3, 2→6, 3→1, 6→2. The pin definitions of the 10Base-T/100Base-TX in the MDI/MDI-X application are shown in the table below.



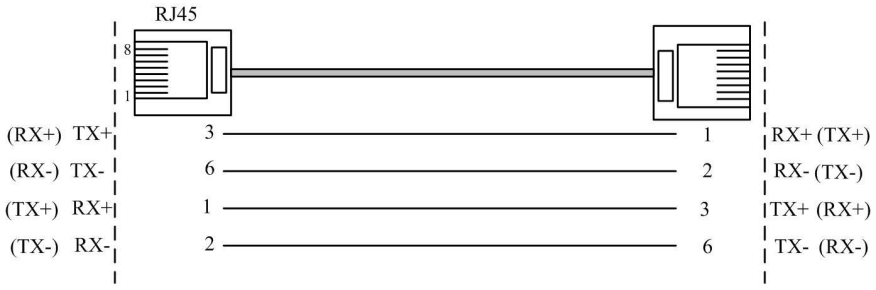
Pin No.	MDI singal	MDI-X singal
1	TX+	RX+
2	TX-	RX-
3	RX+	TX+
6	RX-	TX-
4、5、7、8	—	—

Note: "TX±" is for transmitting data + and -, "RX±" is for receiving data + and -, "-" means unused.

MDI (Medium Dependent Interface)：



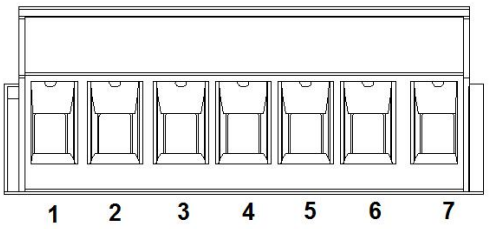
MDI-X (crossover cable):



MDI/MDI-X auto-adaptive function makes it easy for users to use the 10/100BaseT(X) Ethernet interface of UT-6801S-GW without considering the type of Ethernet cable. It can be directly connected to devices through a crossover or straight-through cable.

2.4 Serial Port Definition

The UT-6801S-GW provides a 7-pin industrial wiring terminal with a spacing of 5.08mm. Its pin definitions are shown in the table below:



Terminal block	RS-485	RS422	RS232
1	A(DATA+)	A（TxD+）	-
2	B(DATA-)	B（TxD-）	-
3	-	A（RxD+）	-
4	-	B（RxD-）	-
5	-	-	TX
6	-	-	RX
7	-	-	GND

2.5 Indicator Lights

The UT-6801S-GW provides LED indicator lights to monitor the working status and simplify troubleshooting. The detailed status of each indicator light is shown in the table below:

Name	Color	Function	Status
PWR	Red	Power indicator light	Steady on

LINK	Green	Network indicator light	Steady on
Serial Port Data Light	Green	Serial port data transmission and reception indicator light	Flashing when there is data, off when there is no data
RUN	Green	Operating status light	Alternating flash at 0.5s on and off

2.6 Device Installation

Before installation, confirm the device's operating environment, such as power supply voltage, installation space, and installation method. Please carefully check the following installation requirements:

Check if the necessary cables and connectors for installation are available.

Check if the cables are in place according to reasonable configuration requirements.

The product does not provide installation components. Users need to prepare components for the selected installation type: screws, nuts, and tools, etc., to ensure reliable installation.

Power supply requirements: 12-57.6VAC.

Environmental requirements: operating temperature is -40~85℃, operating humidity is 5%~95% (non-condensing).

Installation method: DIN rail installation (default), wall-mounted installation (optional).

2.7 Cable Laying

The cable laying must meet the following conditions:

Before laying the cable, verify that the specifications, models, and quantities of all cables meet the requirements.

Before laying the cable, check whether the cable is damaged, whether there is a factory record, and quality assurance certificates to prove its quality.

The required cable specifications, quantity, direction, and laying position all meet the construction requirements, and the laying length should be determined according to the actual position.

There should be no broken wires or intermediate joints in the laid cable.

The cables in the aisle should be straight, neat, evenly curved, smooth, and straight.

In the slot channel, the cable should be straight, not exceeding the slot channel, to avoid blocking other incoming and outgoing wire holes. The cable should be tied and fixed at the outlet of the slot channel or at the bend of the cable.

User cables and power cords are laid separately. When cables, power cords, and ground wires are laid in the same groove, they cannot overlap or mix. When the cable is too long, the cable's regular ground should be placed in the middle of the cable tray and should not be pressed on other cables.

Both ends of the cable should have corresponding markings, and the marking content should be concise and clear for maintenance.

3. Web Management

Before configuring the UT-6801S-GW Modbus gateway device, ensure that the necessary software has been installed on your computer and the network has been configured reasonably.

3.1 Network Settings

The default IP address of the UT-6801S-GW Modbus gateway device is 192.168.1.125, and the subnet mask is 255.255.255.0. When accessing the UT-6801S-GW Modbus gateway device through the web, the IP

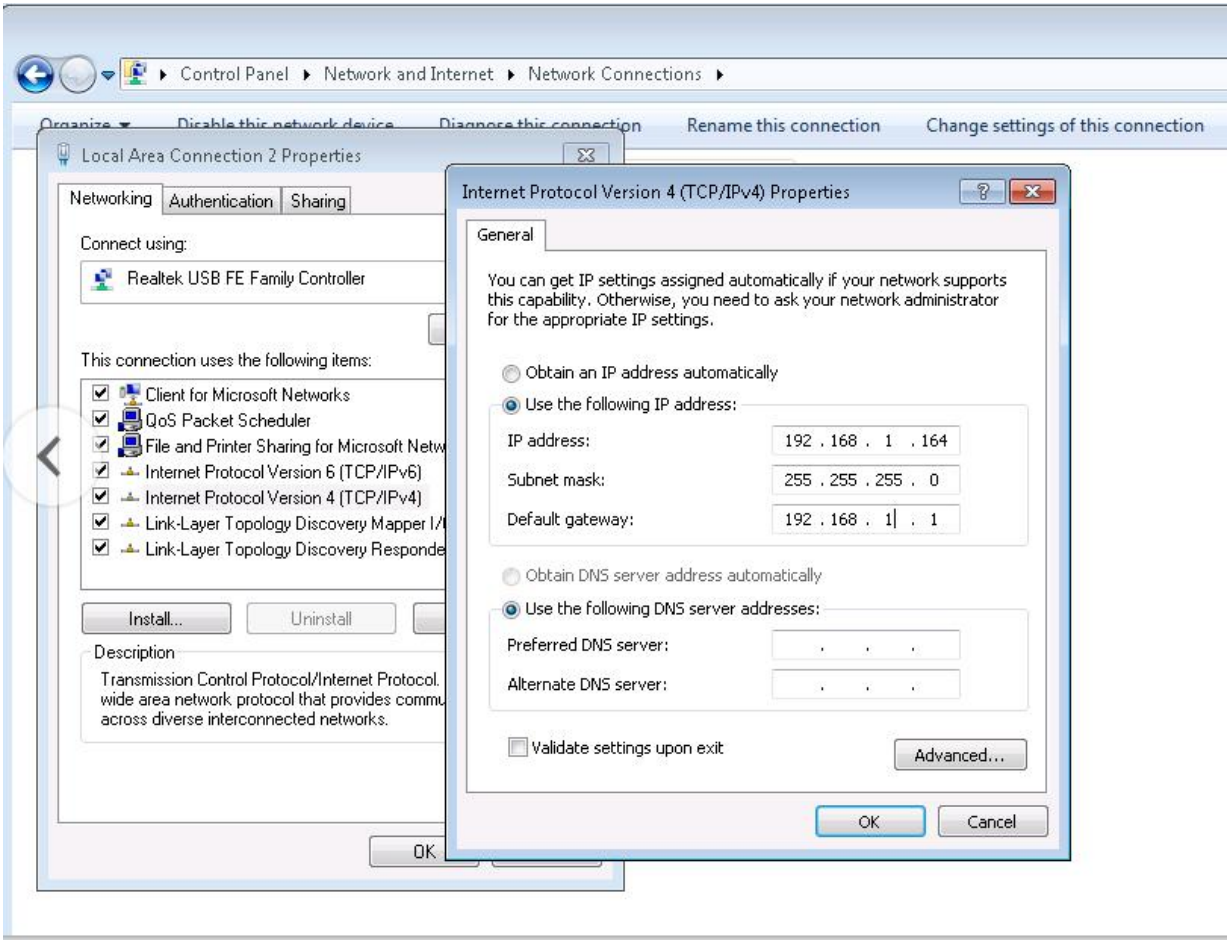
of the gateway device and the computer must be on the same local network. You can modify the computer's IP address or modify the IP address of the Modbus gateway device to ensure that their IPs are in the same local network. The specific steps can refer to the steps of Method 1 or Method 2.

Method 1: Modify the IP address of the computer.

Click Start->Control Panel->Network Connection->Local Connection->Properties->Internet Protocol (TCP/IP). Set the IP address of the PC to 192.168.1.X (X is any value from 2 to 253 except 254).

After clicking OK, the IP address is successfully modified.

The specific Windows system operation page is shown in Figure 3.1:



3.2 Function Menu

The main menu includes Serial Port Settings, Ethernet Settings, System Management, Modbus Settings, and User Settings. The content of each item will be introduced and configured in this chapter.

Menu Items	Page Functions
Serial Port Settings	Basic parameters setting for serial port
Ethernet Settings	Basic parameters setting for Ethernet
System Management	Supports factory reset and firmware upgrade functions

Modbus Settings	Basic parameters setting for Modbus
User Settings	Support password modification for users
Save Settings	Perform save operation

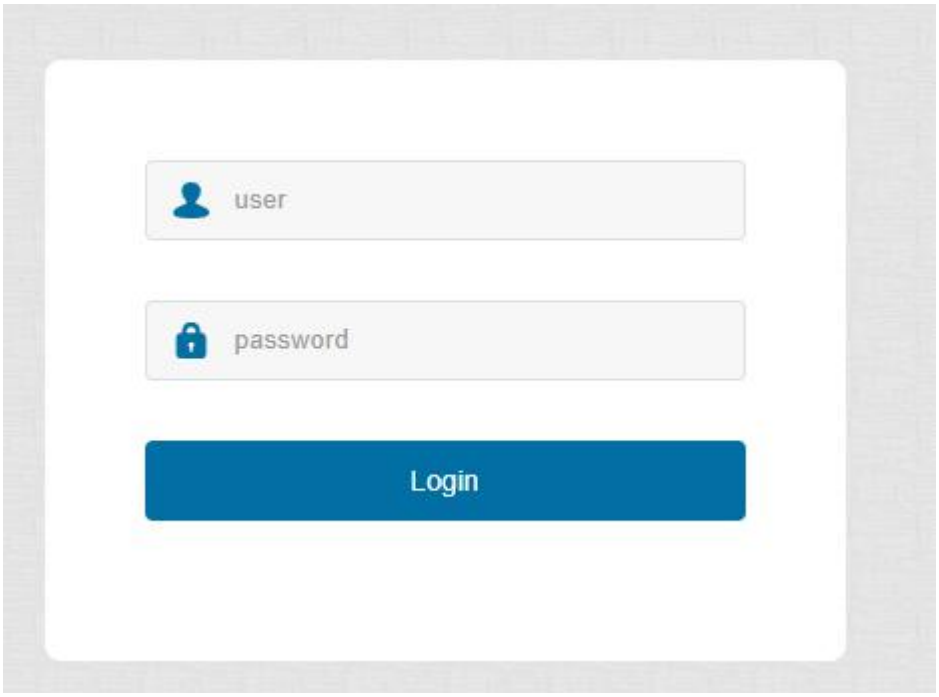
3.3 Login to Web Interface

Before accessing the Modbus gateway device through the IE browser, ensure that the PC and the device being accessed are on the same local network.

Operation method:

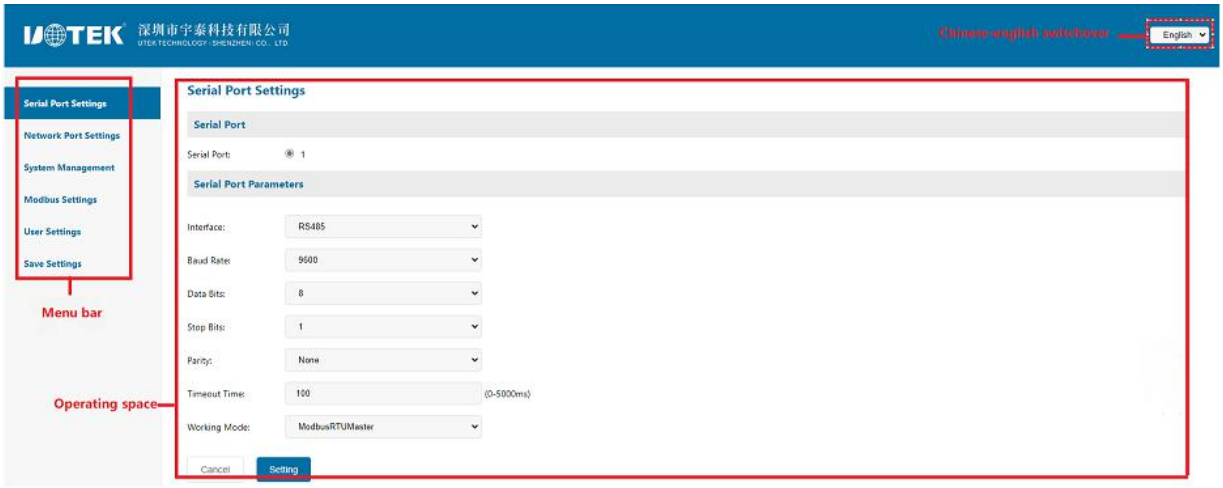
1. Right-click on IE, select Properties, and clear IE temporary files and history.

2. Open IE and enter the IP address of the UT-6801S-GW Modbus gateway device in the address bar. Press Enter to enter the username and password confirmation page as shown in Figure 3.1.

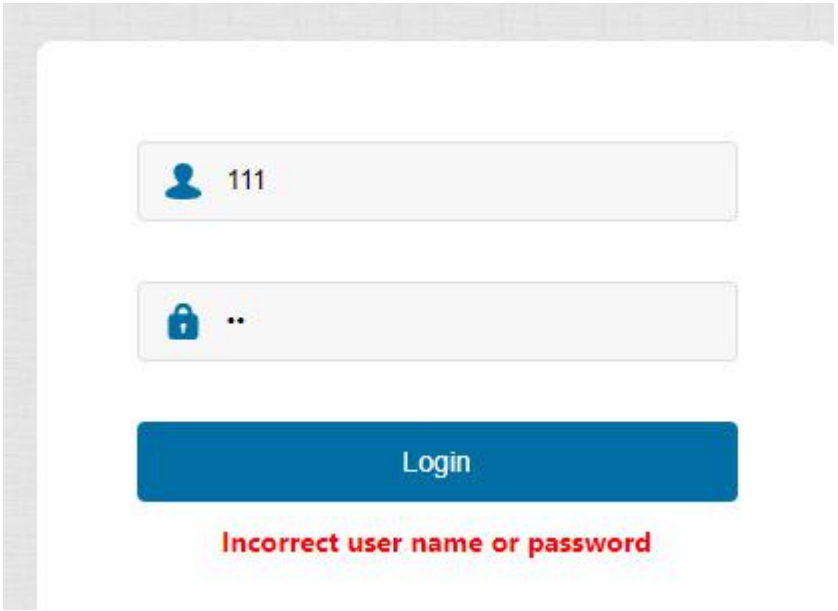


3. Enter the username and password, press Enter to enter the UT-6801S-GW Modbus gateway device interface as shown in Figure 3.2.

The web configuration page is divided into three parts: menu bar, operating area, and English/Chinese switch. Clicking on a menu item in the menu bar can enter the corresponding interface, and the configuration area displays device status information and can be configured.

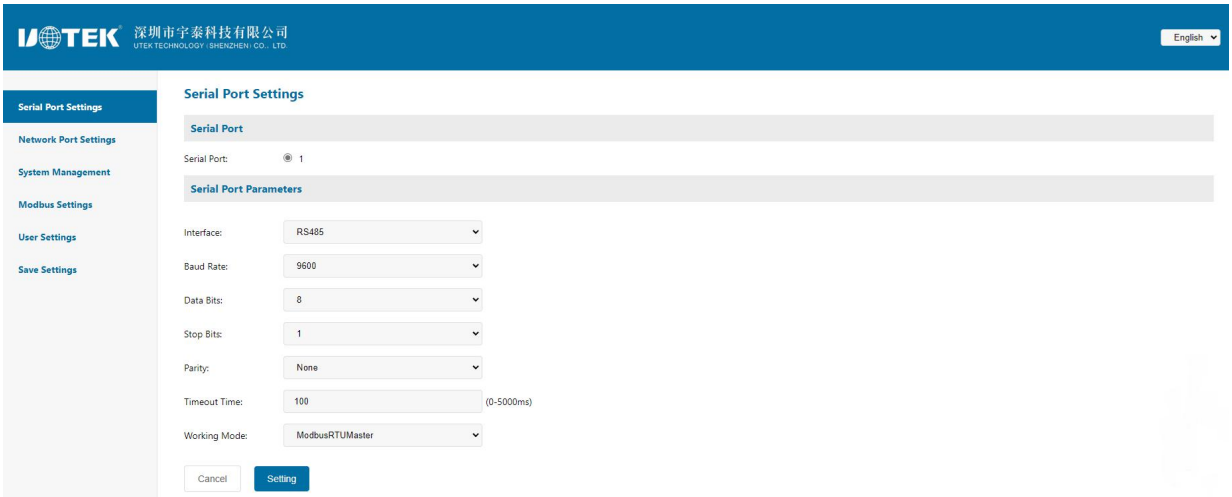


If the username or password is entered incorrectly, the interface will prompt "Incorrect user name or password" as shown in Figure 3.3, and it must be re-entered.



3.3.1 Serial Port Settings

Enter the UT-6801S-GW Modbus gateway device's web interface, the web interface is shown in Figure 3.4.

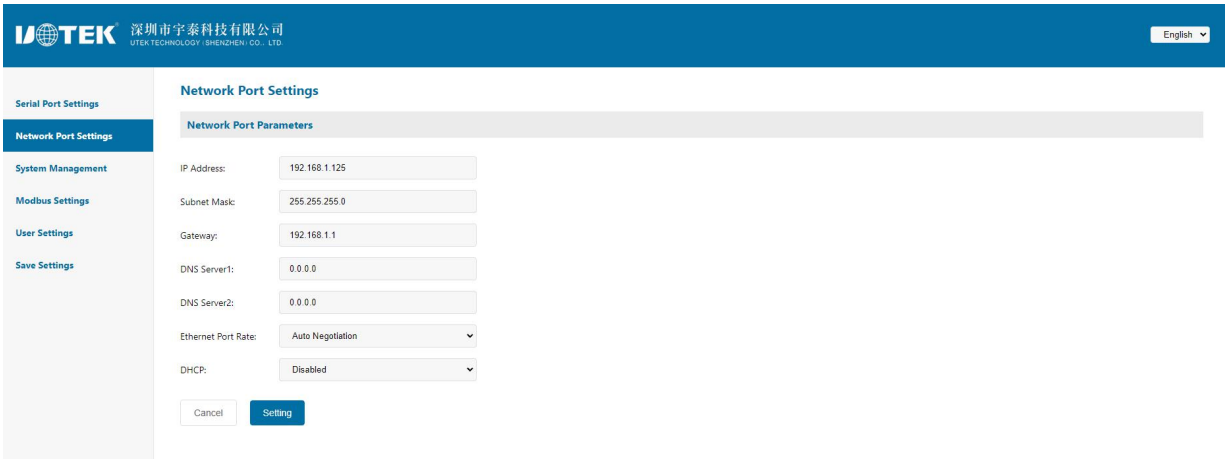


Select Serial Port	Default is single serial port
Interface Type	RS-485/422/232, default RS485

Baud Rate	300-921600 (standard baud rate), default 9600
Data Bits	5, 6, 7, 8; default 8
Stop Bits	1, 1.5, 2; default 1
Parity Bit	None, odd, even; default none
Timeout	Device reply timeout time, range 0-5000ms, if exceeded device will not reply and gateway reports error code; default 100
Operating Mode	ModbusRTU Master (default), ModbusRTU Slave

3.3.2 Ethernet Settings

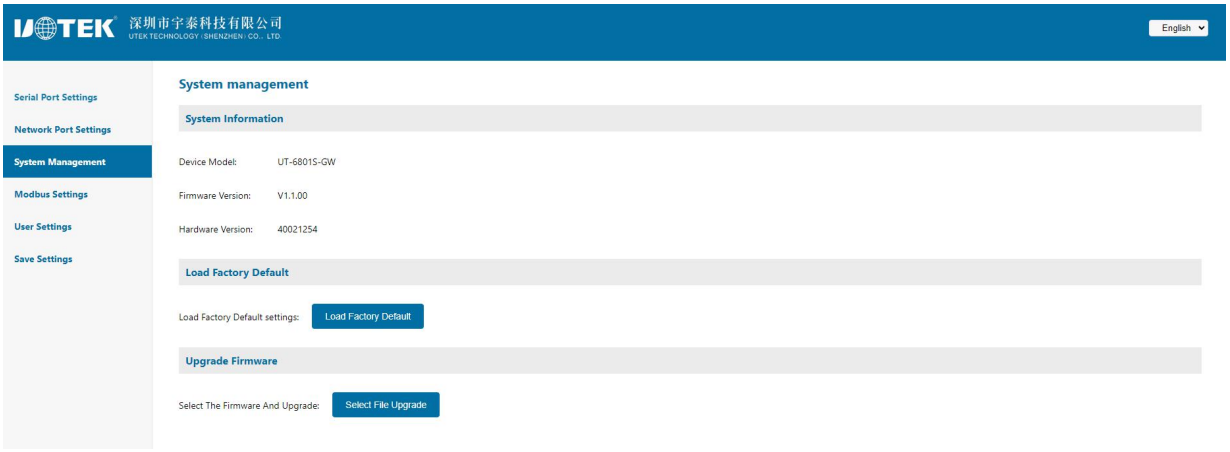
Enter the UT-6801S-GW Modbus gateway device's web interface, and the web interface is shown in Figure.



IP Address	A 32-bit address assigned to a device connected to the Internet. An IP address consists of two fields: a network number field (net-id) and a host number field (host-id). The IP address format is X.X.X.X, default display: 192.168.1.125.
Subnet Mask	The mask is a 32-bit number corresponding to an IP address, some of which are 1s and others are 0s. The mask can divide the IP address into two parts: the subnet address and the host address. The subnet address corresponds to the part in the IP address and mask where the bit is 1. The format of the mask is X.X.X.X, default display: 255.255.255.0.
Gateway	The default gateway in the host is usually referred to as the default route. The default route is the route selected by the router when the destination address in the IP packet cannot be found in other routes. All packets whose destinations are not in the router's routing table will use the default route. The format of the gateway is X.X.X.X, default display: 192.168.1.1.
DNS	DNS stands for Domain Name Server, which is used to resolve domain names that are easy for us to remember into IP addresses that the Internet can recognize. If our device needs to access a hostname, we need to use this server to resolve it to an IP address. The format of the DNS address is X.X.X.X, default display: 0.0.0.0.
Ethernet Rate	Set the interface rate to Auto Negotiation, 10M Half Duplex, 10M Full Duplex, 100M Half Duplex, 100M Full Duplex, Enable, disable. DHCP is also available.
DHCP	A 32-bit address assigned to a device connected to the Internet. An IP address consists of two fields: a network number field (net-id) and a host number field (host-id). The IP address format is X.X.X.X, default display: 192.168.1.125.

3.3.3 System Management

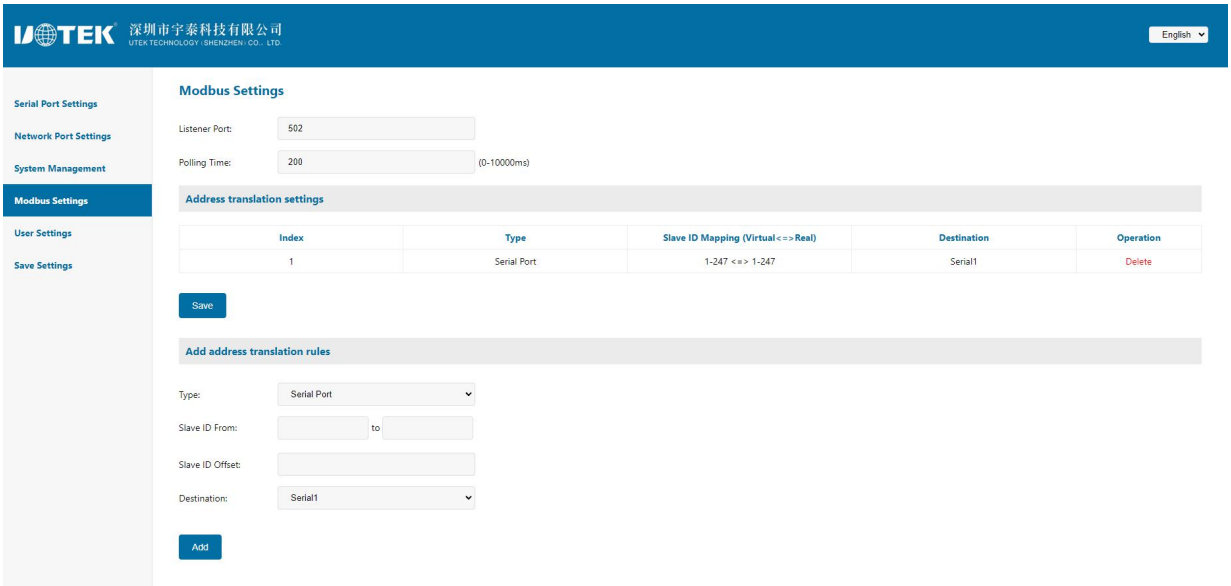
Enter the UT-6801S-GW Modbus gateway device's web interface, and the web interface is shown in Figure.



Device Model	Device Name Description
Firmware Version	Software Version Number
Hardware Version	Hardware Version Number
Factory Reset	Factory reset settings, parameter initialization, default IP: 192.168.1.125.
Firmware Upgrade	Upgrade firmware program, restart required after upgrade.

3.3.4 Modbus Settings

Enter the UT-6801S-GW Modbus gateway device's web interface, and the web interface is shown in Figure.



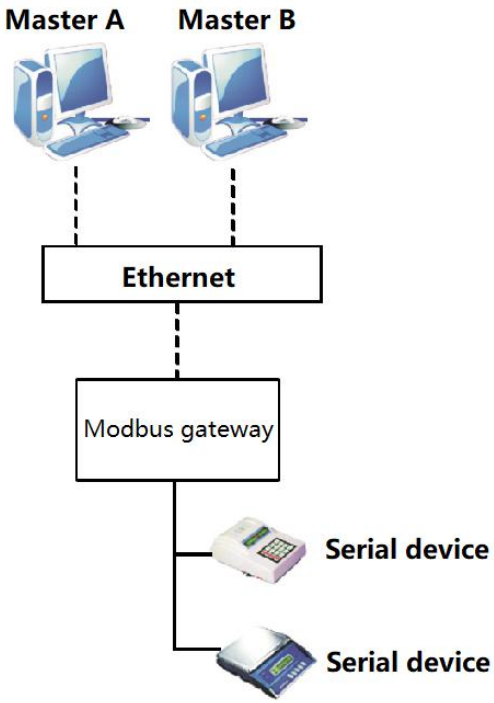
Listening Port	Default is 502, which is the device port connected to the TCP side, with a range of 1-65535.
Polling Interval	The polling interval time for each Modbus RTU instruction, with a setting range of 0-10000ms and a default of 200.
Address Conversion Settings	Query the address conversion table, with a maximum input of 15 address conversion entries.
Index	Maximum of 15 address entries.

Type	Two types are available: Serial Port (Master) and TCP Address (Slave). The two modes cannot be applied to the same serial port at the same time.
Slave Address Translation	Virtual <=> Real, the converted real address becomes the virtual address.
Add	After setting the parameters, click "Add" and save and restart the settings in the Save Settings section.
Slave address is	ID number setting, with a range of 1-247
Slave conversion address increment value	The increment value range is from -254 to 254 and can be negative, adding to the ID range of addresses.
Target	Serial1 or IP address + port, corresponding to the serial port or service IP + port of the address conversion entry.

3.3.4.1 Mode 1

The UT-6801S-GW supports multi-master and multi-slave, and can convert between Modbus TCP and Modbus RTU protocols. They can be accessed by up to 5 TCP master/client devices or connected to 5 TCP slave/server devices. The GW601S gateway can easily integrate Modbus TCP and RTU networks, providing a simpler and customizable network integration solution.

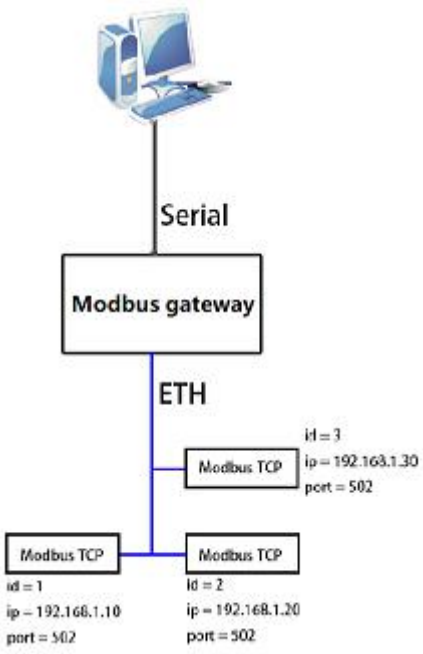
For Modbus deployments, the UT-6801S-GW gateway can effectively connect a large number of Modbus nodes to the same network. It can manage up to 16 serial port slave nodes (devices), with ID ranges from 1 to 247 (Modbus standard defines Modbus IDs from 1 to 247). Each RS-232/422/485 serial port can configure different operation commands and baud rates for each Modbus RTU, allowing two types of Modbus networks to be integrated into a Modbus TCP network through a Modbus gateway.



3.3.4.2 Mode 2

Serial port master server connects multiple Ethernet slave servers. If using a Modbus serial master device with only one serial interface and need to access Modbus TCP slave devices, you can configure the

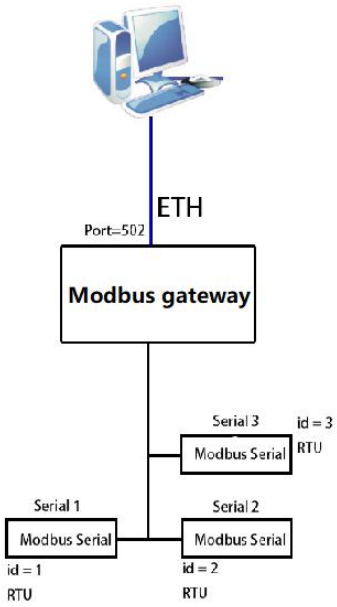
work type as Modbus slave in the gateway's web page, and then configure up to five Modbus TCP slave connection parameters on the page.



3.3.4.3 Mode 3

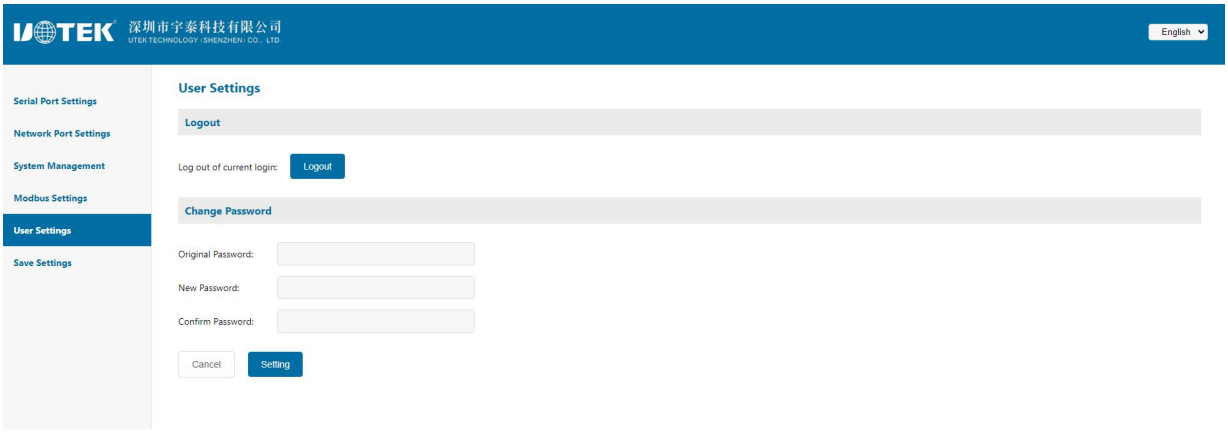
TCP master devices can establish connections with different Modbus slave devices. Each serial port of the gateway can be configured as a specific environment, and after configuring the ID mapping settings, the TCP master network communication protocol can access Modbus serial devices through the gateway.

Each serial port can manage up to 16 serial port slave nodes (devices), for example, managing up to 16 slave devices connected via RS-485, with ID ranges from 1 to 247 (Modbus standard defines Modbus IDs from 1 to 247).



3.3.5 User Settings

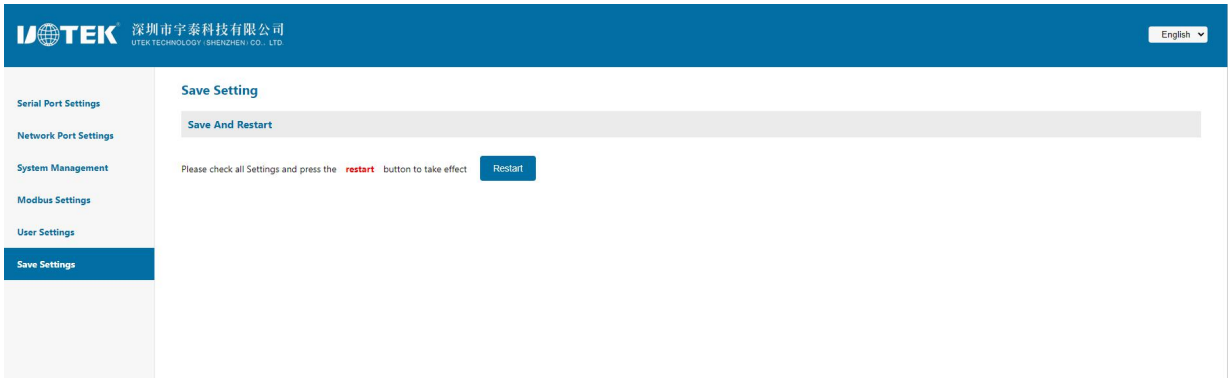
Enter the UT-6801S-GW Modbus gateway device's web interface, and the web interface is shown in Figure.



Logout	Exit the current interface and return to the login interface.
Current Password	Enter the current original password.
New Password	Change to a new login password.
Confirm Password	Enter the same password as the new password for confirmation.
Set	Click "Set" and restart to take effect.

3.3.6 Saving Settings

Enter the UT-6801S-GW Modbus gateway device's web interface, and the web interface is shown in Figure.

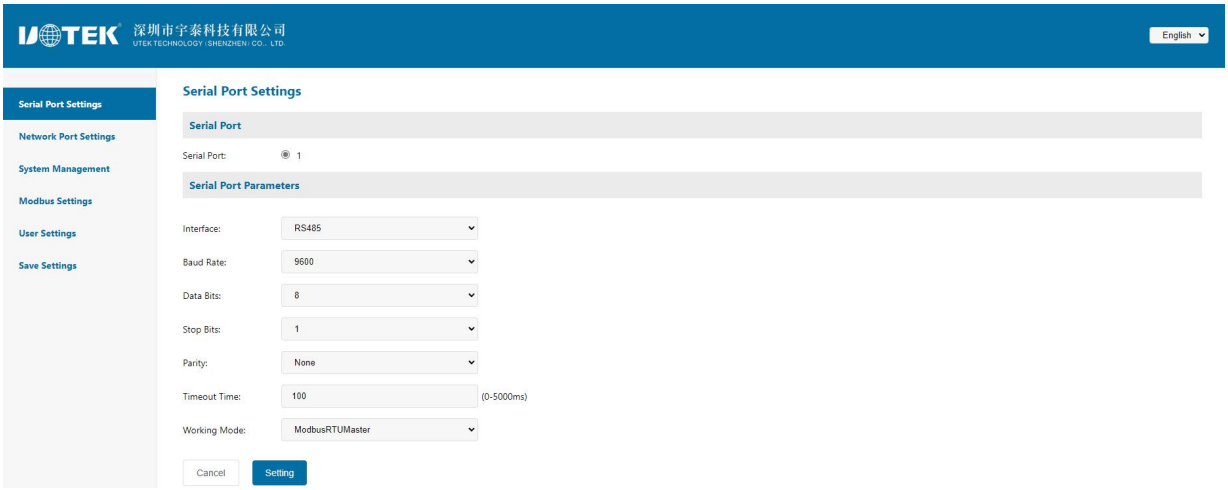


After making changes to the gateway settings, click on "Restart". There will be a prompt box that pops up, as shown in the figure below:

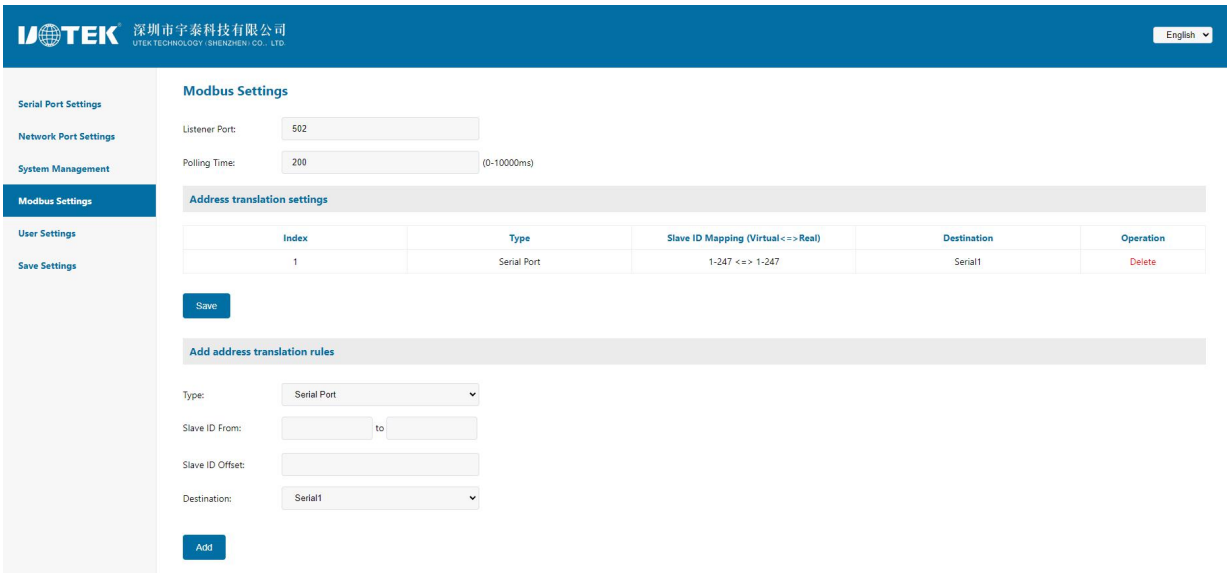
4. Example

a) Modbus RTU Master

1. This mode represents the serial port as the master station, and in the serial port configuration page, check whether the parameters correspond to the devices under the serial port.

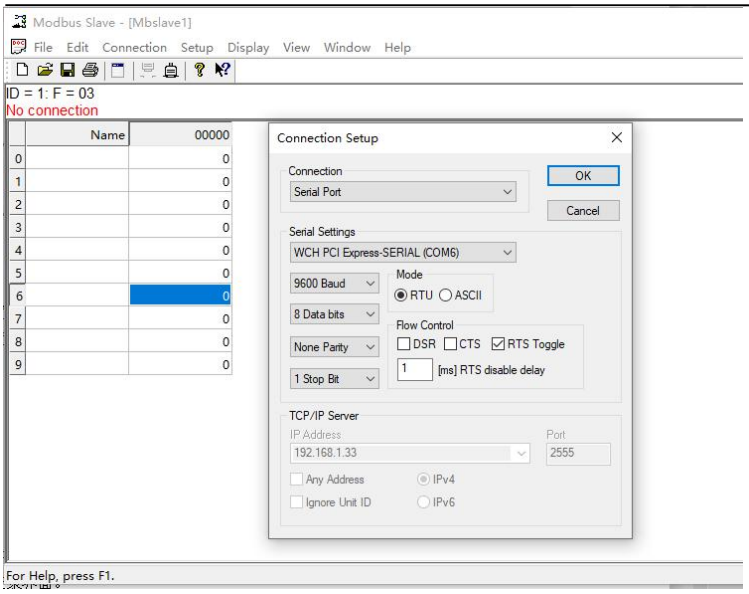


2. Open the Modbus settings page, configure the address conversion rules, and map the virtual address from the real address. The default factory configuration is as follows:



Open two debugging tools (Modbus Poll and Slave) respectively on the upper computer.

3. The Modbus slave tool configuration page is as follows, enter the COM number of the serial port device and the corresponding configured serial port parameters.

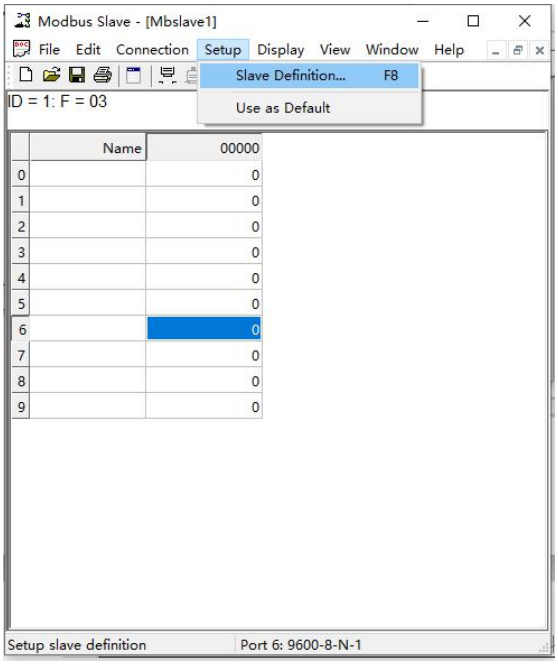


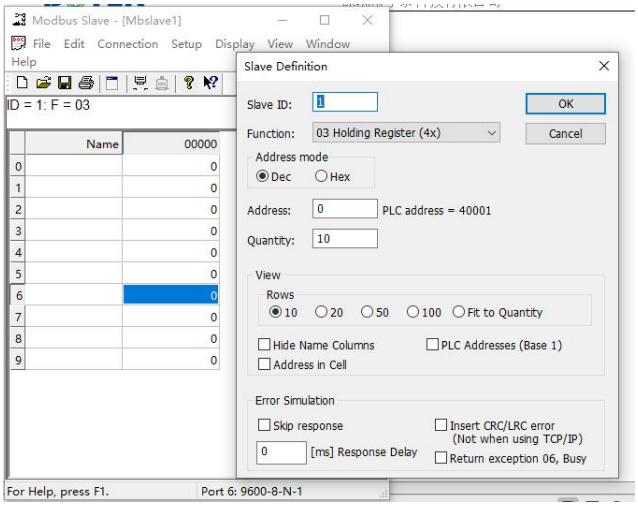
Continue to configure specific connection parameters. On this page, configure the slave ID to configure the master station address (real address), such as ID=1, which means the master station ID is 0x01. Several commonly used configuration items are as follows:

Function can be configured with the corresponding function code, which should correspond to the information configured by the slave station, such as displaying F=03, which is the 03 function code (holding register).

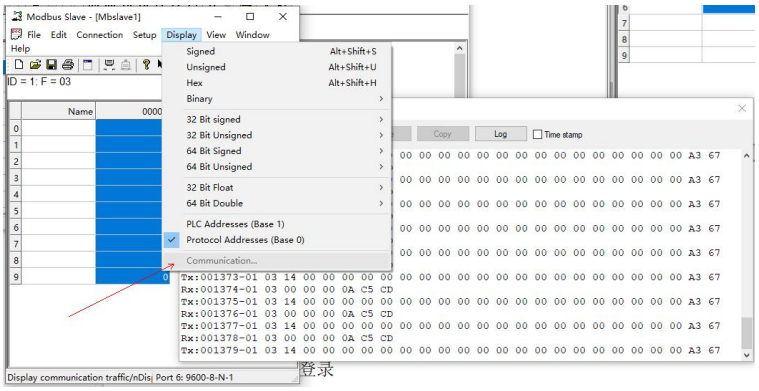
Address configures the starting register address.

Quantity configures the length of read/write registers, and the length setting needs to correspond to the slave station.

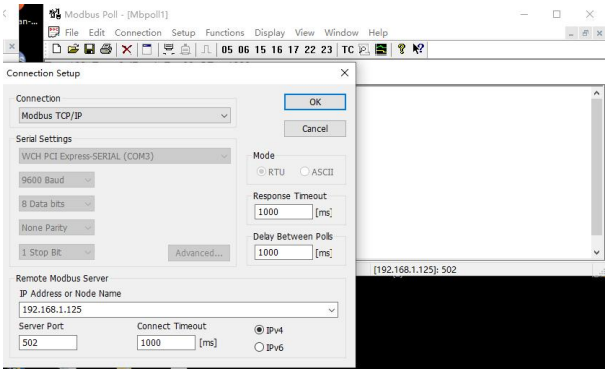




After the connection between the master and slave stations is established, you can monitor the message interaction on this page.



4. Open the Modbus poll tool, click Connection, and configure the gateway's IP and monitoring port on this page, set the connection timeout time, click OK, and the PC actively connects to the device network as a client.

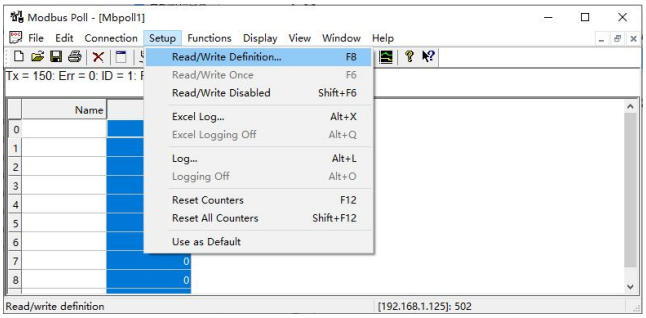


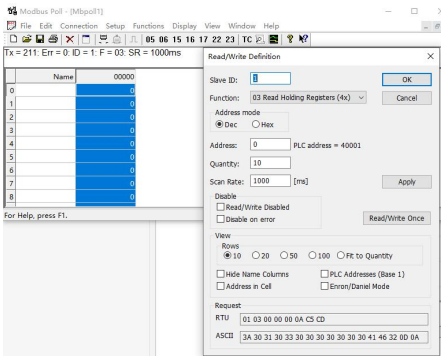
Continue to configure specific connection parameters. On this page, configure the slave ID to configure the slave station address (virtual address), such as ID=1, which means the slave station ID is 0x01. Several commonly used configuration items are as follows:

Function can be configured with the corresponding function code, which should correspond to the information configured by the slave station, such as displaying F=03, which is the 03 function code (holding register).

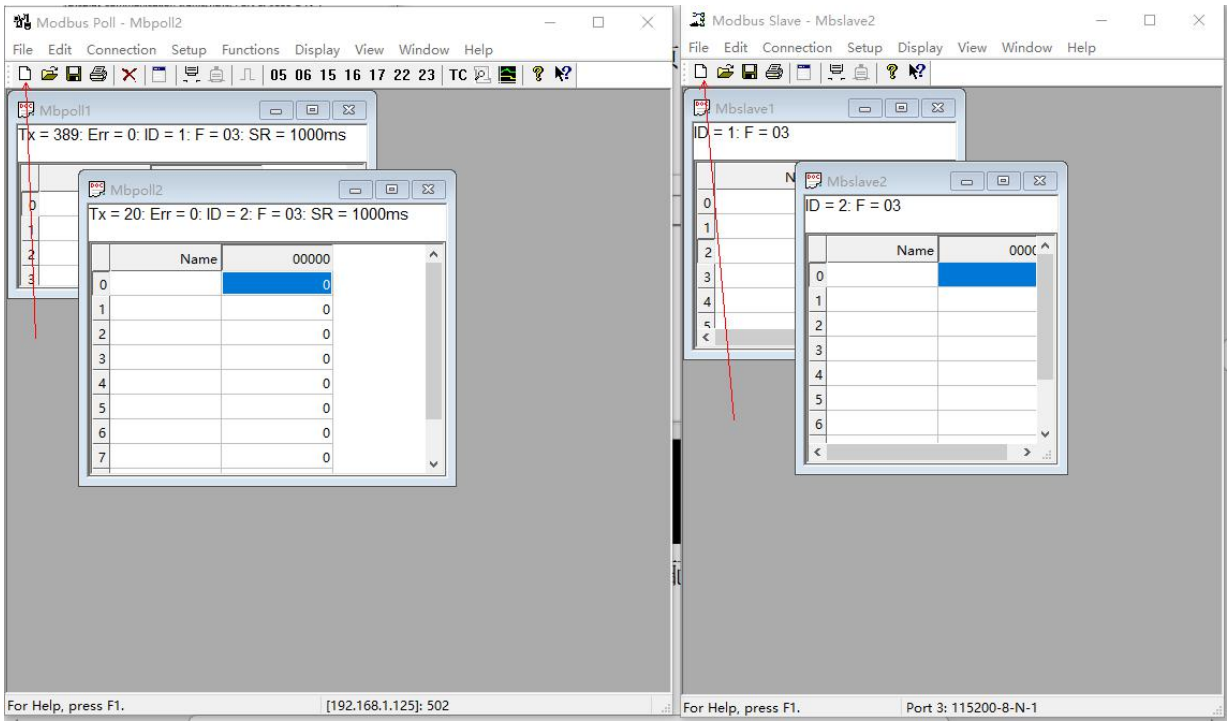
Address configures the starting register address.

Quantity configures the length of read/write registers, and the length setting needs to correspond to the master station.



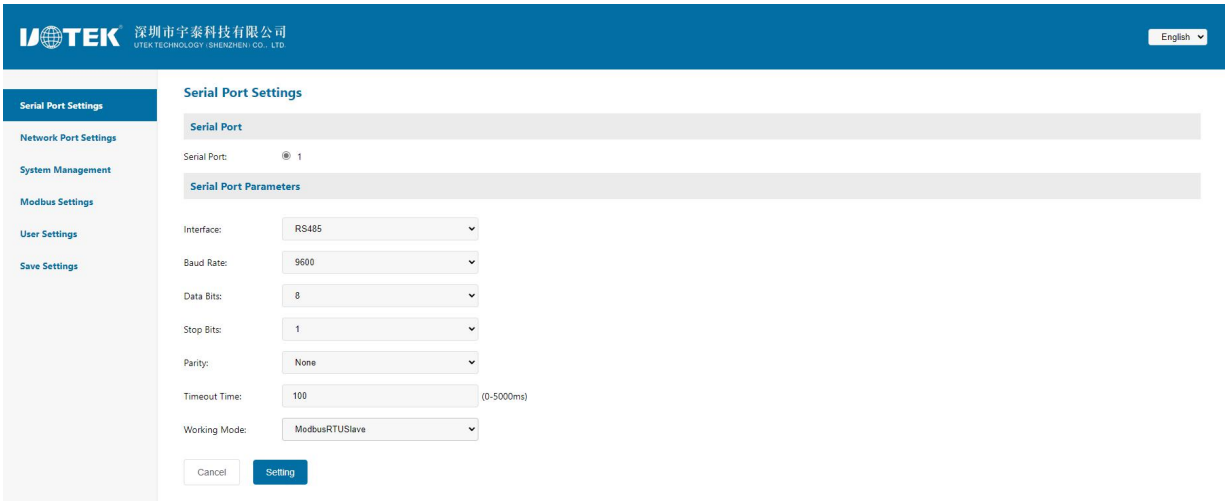


Multiple pairs of new entries can be created by clicking the New button on the left, and the corresponding ID numbers can be set separately, as shown in the figure below.



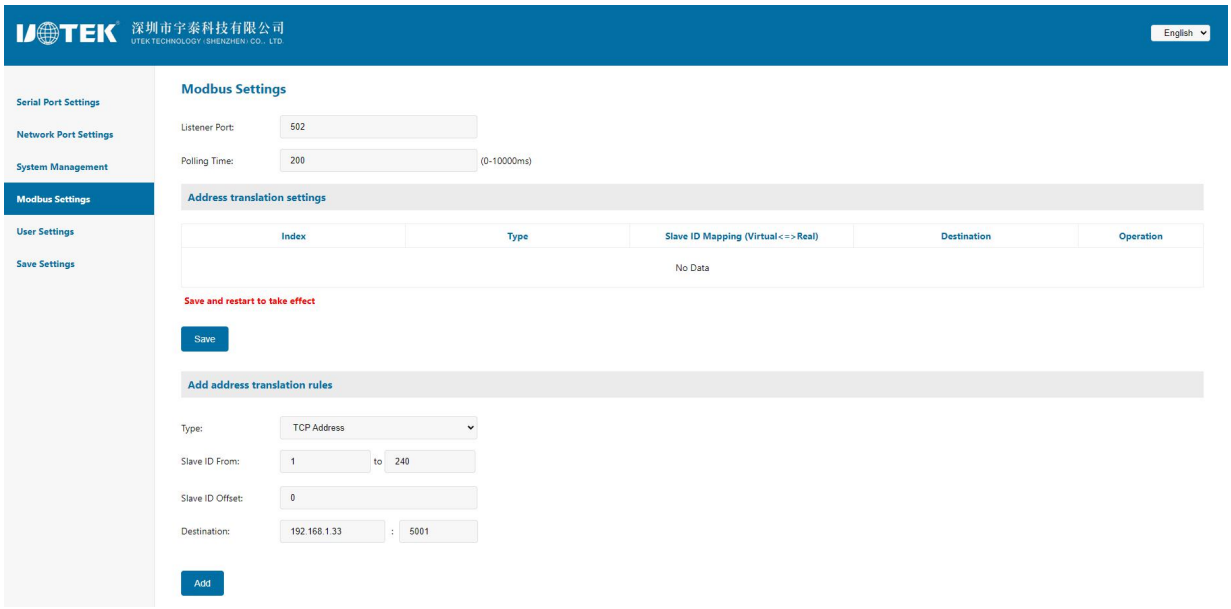
b) Modbus RTU Slave

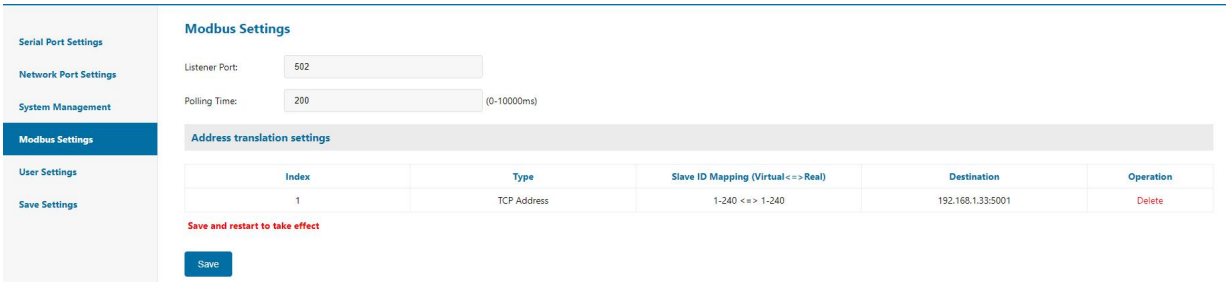
1. This mode represents the serial port as the slave station, and in the serial port configuration page, check whether the parameters correspond to the devices under the serial port.



Open the Modbus settings page, configure the address conversion rules, and map the virtual address from the real address. Only one working mode can be enabled for the same serial port.

On this page, set the type to TCP Address, set the address range and increment, and set the target to the IP and port of the PC.



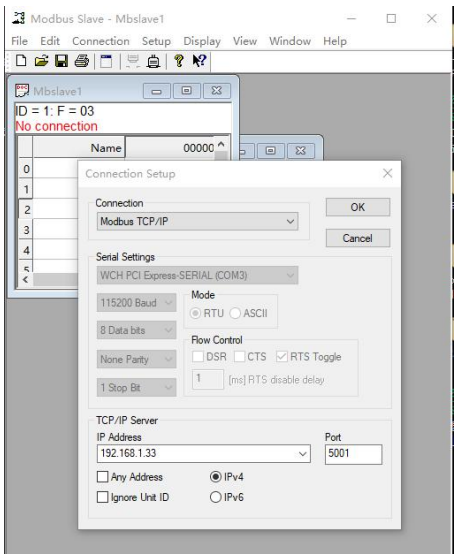


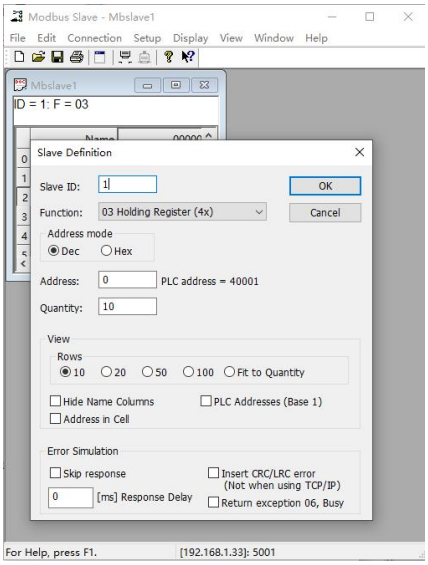
Up to 15 slave address translation entries can be set.

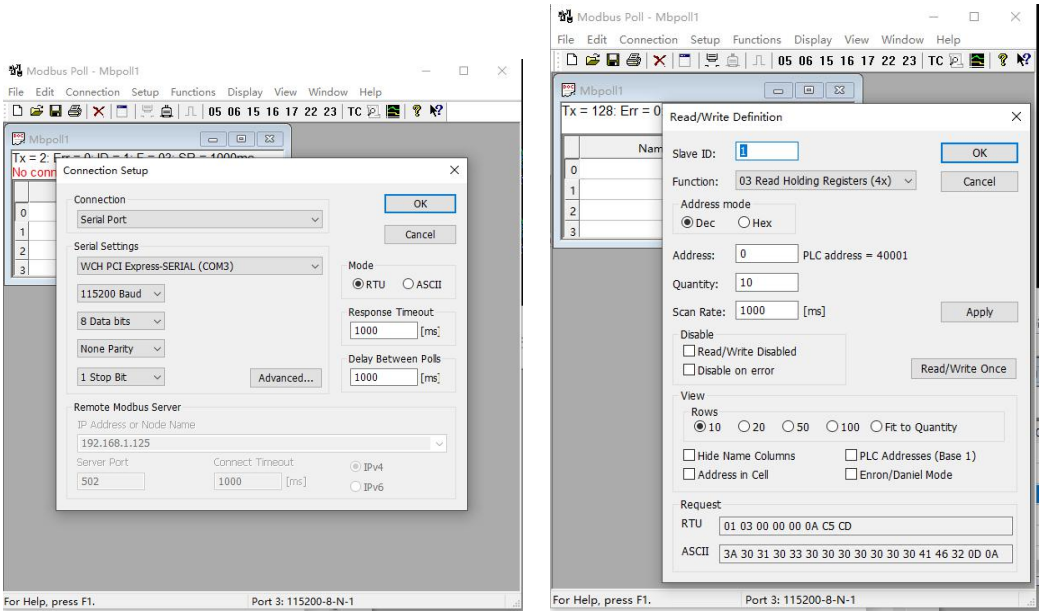
Modbus TCP can support up to 5 connections and can connect to different five TCP servers.

Open two debugging tools (Modbus Poll and Slave) respectively on the upper computer.

2. The Modbus slave tool configuration page is as follows, select Modbus TCP connection mode.







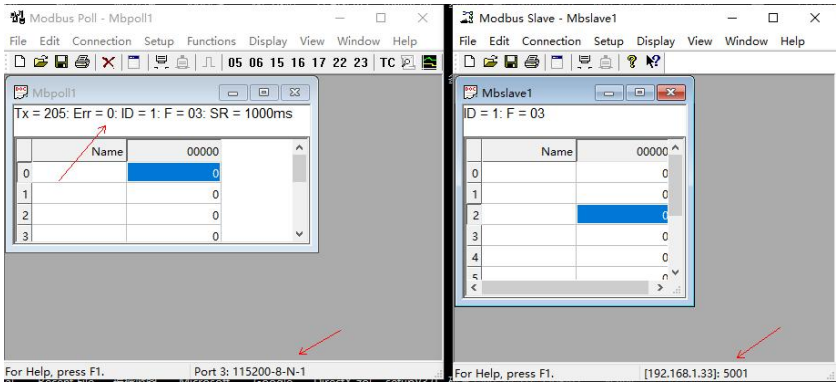
1) Enter the IP address of the PC and the port number in IP Address. The gateway acts as a client and actively connects to the port opened by the PC.

2) Configure the slave address and function code on the Setup->Slave Definition page, and check the starting address and length of bytes for read/write.

3) Open the Modbus poll tool, select Serial Port as the connection method, and check whether the COM number and serial port connection parameters correspond to the serial port parameters configured on the gateway configuration page.

4) Configure the slave address and function code on the Setup->Read/Write Definition page, and check the starting address and length of bytes for read/write.

5) After successful connection, it is shown as follows:



When the two tools are connected to the RTU side and the TCP side respectively, if Err is displayed as 0, it indicates that everything is normal. If Err increases, it indicates that the slave station has no response or other problems such as response timeout.

5. Troubleshooting Instructions

a) Unable to find the IP address of the gateway or access the web configuration page

1. First, check if the physical connection is normal, whether the network cable (distinguish between crossover and straight-through) and power are connected, observe the power indicator light, RUN light, and ACT (when connected to a 10M network, this light is off, only on for 100M).

2. Check if the host network card is available, whether it can communicate with other local hosts, whether the network segment corresponds to the device's IP, and whether there are conflicting devices with the same IP on the same LAN.

3. Turn off any tools and software that can block broadcast packets (do not enable the system's built-in firewall).

4. If you can ping the network but cannot access the web page, try switching to another browser. Google Chrome is recommended.

b) Master mode cannot communicate

1. Ensure that the serial port physical connection is normal, check the line sequence, and set the RTU side as the master station, with the conversion type set to Serial Port.

2. The target corresponds to the current serial port number, check whether it is virtual or genuine ID.

3. Check if the listening port is occupied. The default is 502. You can try changing the port number and then connect.

c) Slave mode cannot communicate

1. Ensure that the serial port physical connection is normal, check the line sequence, and set the RTU side as the slave station, with the conversion type set to TCP Address.

2. The target corresponds to the current serial port number, check whether it is virtual or genuine ID.

3. Check if the destination port is occupied.

d) Forgot the previously set password

1. Press and hold the "reset" button for 5 seconds and release it. The device enters the factory reset. After the device completes the factory reset, you can log in to the system using the default account and password: admin:admin. The factory IP address is 192.168.1.125.

e) Garbled data transmission

1. Check if the wiring is correct. Pay attention to the pairing problem of our 485 devices.

2. Check whether the line distance exceeds the standard distance and the quality of the line (you can also use an extended line receiver or an optical isolator).

3. Check if the set serial port parameters (baud rate, data bits, stop bits, parity bits, etc.) match the bottom device.

f) Error code 0B or timeout

1. When reporting error code 0B, check the wiring method, serial port parameters, and mapping relationship between virtual and genuine slave addresses.

2. If the timeout is intermittent, please set the polling time and timeout time within a reasonable range according to the situation. If it always times out, it indicates that the RTU-side device has not

responded or cannot connect to the device within the specified time. Check if the network connection is normal.

6. Maintenance and Service

From the date of product shipment, our company provides a five-year product warranty. According to our company's product specifications, if the product has any malfunctions or operational failures during the warranty period, our company will repair or replace the product free of charge. However, this commitment does not cover damages caused by improper use, accidents, natural disasters, incorrect operations, or incorrect installation.

To ensure that consumers benefit from our management-type series of serial port server products, you can get help and problem solutions through the following methods:

Internet service.

Technical support services

Product repair or replacement

6.1 Internet service

You can obtain more useful information and usage tips through our company's website. Website: http://www.szutek.com

6.2 Technical support services

Users of our company's products can call our technical support office. Our company has professional technical engineers to answer your questions and help you solve product or usage problems in a timely manner. Free service hotline: 400-1144-149

6.3 Product repair or replacement

Before repairing, replacing, or returning the product, you should first confirm it with our company's technical staff, and then contact our company's sales staff to get the problem solved. The above should be carried out according to our company's processing procedures, and negotiate with our company's technical staff and sales staff to complete the product repair, replacement or return.