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SAN TELEQUIP
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Modbus Gateway Series

User Manual

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Preface

Modbus Gateway user manual describes the following contents:

- Network management method
- Overview of related principles of network management

Note
The screenshot reference model for this manual is 4 RS-232/485/422 + 2 100M copper ports. In addition to the supported serial type (RS-232, RS-422, RS-485), the number of network ports and the number of serial ports, the interface functions and interface operations of other types of products are the same.

Audience

This manual applies to the following engineers:

- Network administrators
- Technical support engineers

Text Format Convention

Format	Description
" "	Words with “” represent the interface words. Fox example “Port number”.
>	Multi-level paths are separated by ">". Such as opening the local connection path description: Open "Control Panel> Network Connection> Local Area Connection".
Light Blue Font	It represents the words clicked to achieve hyperlink. The font color is as follows: ‘Light Blue’.
About this chapter	The section ‘about this chapter’ provide links to various sections of this chapter, as well as links to the Principles Operations Section of this chapter.

Symbols

Format	Description
Notice	Remind the announcements in the operation, improper operation may result in data loss or equipment damage.
Warning	Pay attention to the notes on the mark, improper operation may cause personal injury.
Note	Conduct a necessary supplements and explanations for the description of operation content.
Key	Configuration, operation, or tips for device usage.
Tips	Pay attention to the operation or information to ensure success device configuration or normal working.

Port Convention

The port number in this manual is only an example, and does not represent the actual port with this number on the device. In actual use, the port number existing on the device shall prevail.

Revision Record

Version No.	Date	Revision note
01	2021-01-04	Software Function updates, and webpage style changes.
02	2021-01-28	Add Static Routing Configuration
03	2021-02-05	Manual Maitenace
04	2021-04-12	Optimize Protocol Setting function

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Content

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The First Part: Operation

1 Log in the Web Interface

About this chapter

Content	Link
This Chapter	1.1 WEB Browsing System Requirements 1.2 Setting IP Address of PC 1.3 Log in the Web Configuration Interface

1.1 WEB Browsing System Requirements

Using the Modbus Gateway device, the system should meet the following conditions.

Hardware and Software	System requirements
CPU	Above Pentium 586
Memory	Above 128MB
Resolution	Above 1024x768
Color	256 color or above
Browser	Internet Explorer 6.0 or above
Operating system	Windows XP/7/8/10

1.2 Setting IP Address of PC

The default management of the Modbus Gateway device is as follows:

IP Settings	Default Values
IP address (LINK1)	192.168.1.254
Subnet mask	255.255.255.0

Note
The network configuration of parts of double IP device supports single IP and double IP modes.

- In the single IP mode, the default IP address of Ethernet port LINK1/LINK2 is 192.168.1.254.
- In the Dual IP mode, the default IP address of Ethernet port LINK1 is 192.168.1.254, the default IP address of Ethernet port LINK2 is 192.168.8.254.

When configuring a Modbus Gateway through the Web:

- Before making remote configuration, make sure that the route between the computer and the Gataway is reachable.
- Before making a local configuration, make sure that the IP address of the computer and the Modbus Gateway are on the same subnet.

Note
When the Modbus gateway is first configured, if it is configured locally, make sure the current computer network segment is 1.

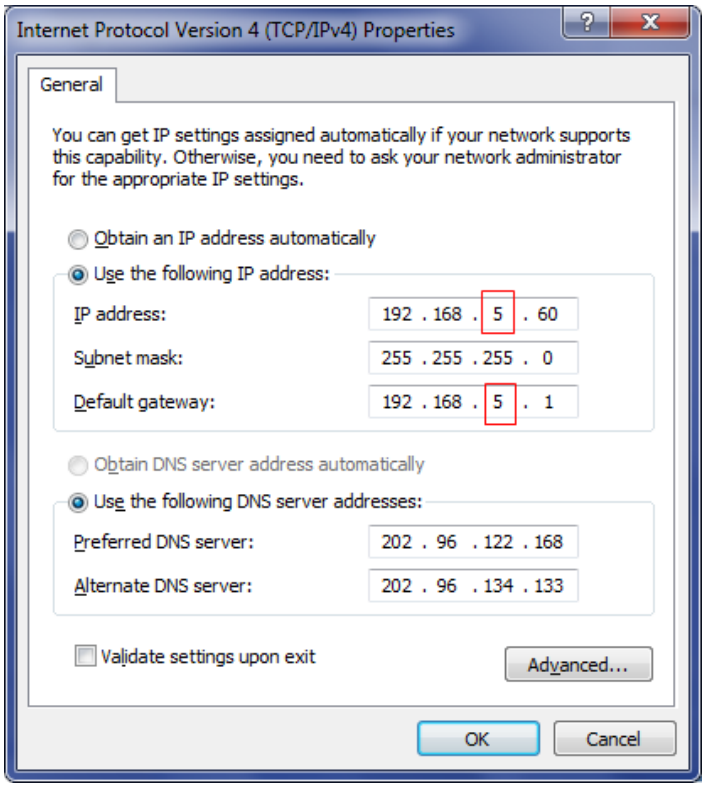
Eg: Assume that the IP address of the current PC is 192.168.5.60, change the network segment "5" of the IP address to "1".

Operation steps

The steps are as follows:

Step 1 Open "Control Panel> Network Connection> Local Area Connection> Properties> Internet Protocol Version 4 (TCP / IPv4)> Properties".

Step 2 Change the selected "5" in red frame of the picture below to "1".



Step 3 Click “OK”, IP address is modified successfully.

Step 4 End.

1.3 Log in the Web Configuration Interface

Operation steps

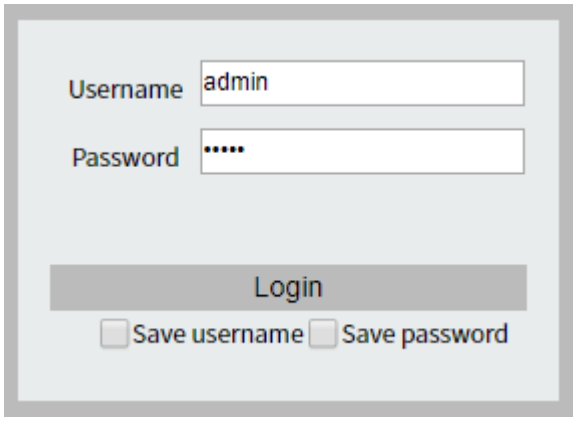
Log in to the WEB configuration interface as follows:

Step 1 Run the computer browser.

Step 2 Enter the address of the switch "http://192.168.1.254" in the address bar of the browser.

Step 3 Click the “Enter” key.

Step 4 Pop-up dialog box as shown below, enter the user name and password in the login window.



Note:

- The default username and password for the Modbus gateway are "admin", which is strictly case-sensitive when typing.
- Default user account has the administrator privileges.

Step 5 Click "Login".

Step 6 End.

After successful login, you can configure the relevant parameters and information of the WEB interface as needed.

Note
After logging in to the device, you can modify the IP address of the Modbus gateway for ease of use.

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2 System Information

About this chapter

Content	Link
This Chapter	2.1Product Information 2.2Network information

2.1 Product Information

Function Description

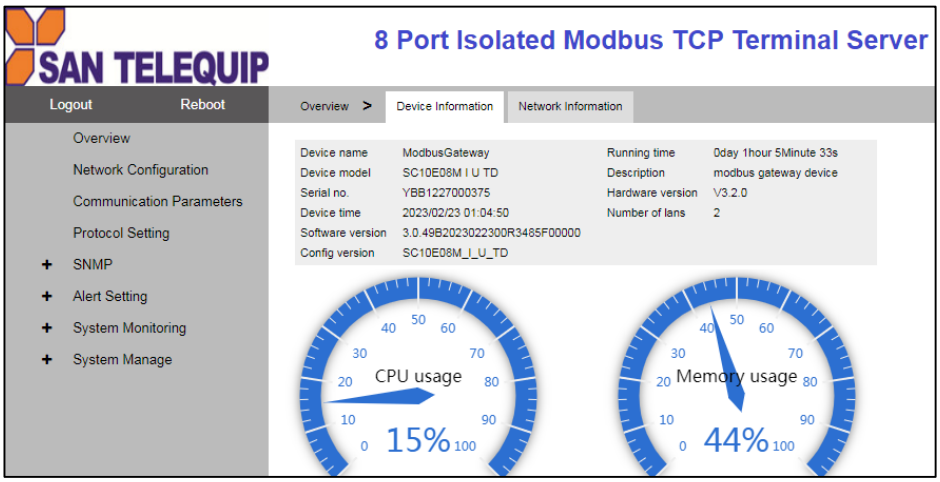
In “Device information” interface, user can check Device name,Device model, Serial No, Firmware Ver, Device time, Description, Number of LAN, CPU Utilization, Memory Utilization and so on.

Operation Path

Open in order: “System Maintenance > Device information”.

Interface Description

The product information interface is as follows:



The main elements configuration description of device information interface:

Interface Element	Description
Device name	Network identity or device type of the device.
Device model.	Equipment model or name of the device.
Serial No.	Serial number of the device
Software Version	Software version information of the device.
Device time	The current device time display, synchronizes the local PC or NTP server time.
Running time	Running time of the current device.
Description	Port information of the device.
Hardware Version	Current hardware version information, pay attention to the

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Interface Element	Description
	hardware version limits in software version.
Number of lans	The network port number of the device.
CPU usage	CPU usage of the current device.
Memory usage	Memory usage of the current device.

2.2 Network information

Function Description

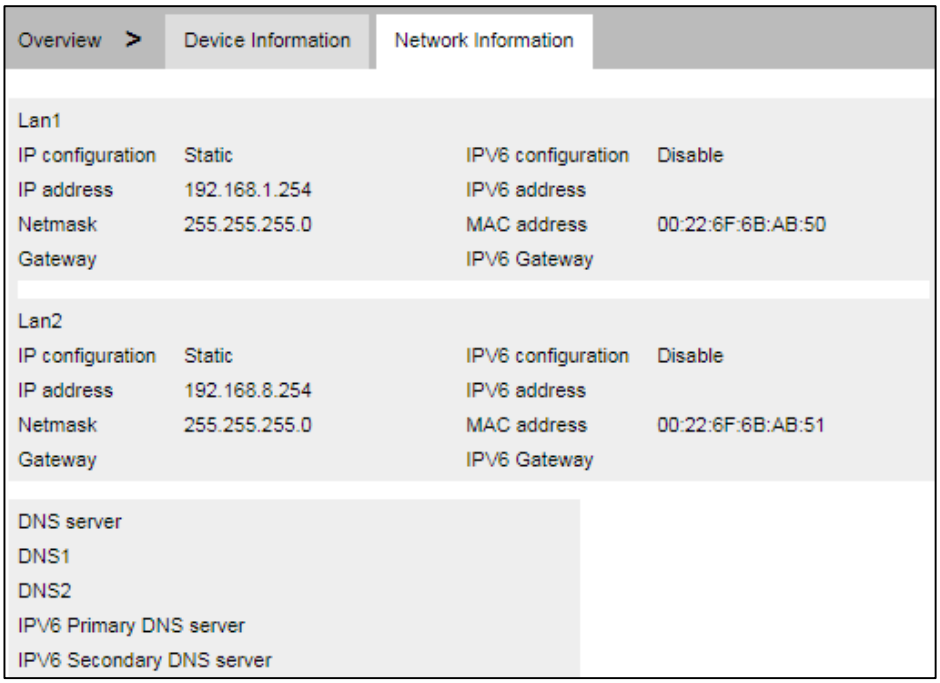
On the page of "Network information", user can check device network address information and DNS server information.

Operation Path

Open in order: “System Information” > Network Information”.

Interface Description

Network information interface as follows:



The main elements configuration description of network information interface.

Interface Element	Description
LAN1	**LAN1 information bar**
IP configuration	Shows how the LAN 1 of the device gets the IP address.
Netmask	Display device subnet mask.
MAC address	Display device LAN 1 MAC address.
IP address	Display LAN1 IP address.
Gateway	Display LAN1 gateway address.
LAN2	**LAN2 information bar**

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Interface Element	Description
IP configuration	Shows how the LAN 2 of the device gets the IP address.
Netmask	Display device LAN2 subnet mask.
MAC address	Display device LAN 2 MAC address.
IP address	Display LAN2 IP address.
Gateway	Display LAN2 IP address.
DNS server	**DNS server information bar**
DNS1	Display device main DNS server address.
DNS2	Display device backup DNS server address.

Note
The dual-port device or dual-IP mode displays the "Lan1" and "Lan2" columns. The single-port device or single-IP mode displays only the "Lan1" column.

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3 Network Configuration

Function Description

On the “Network Settings” page, user can set the IP address and DNS address of this device. The IP address of the device supports DHCP/BOOTP protocol dynamic acquisition or manual static configuration.

Note

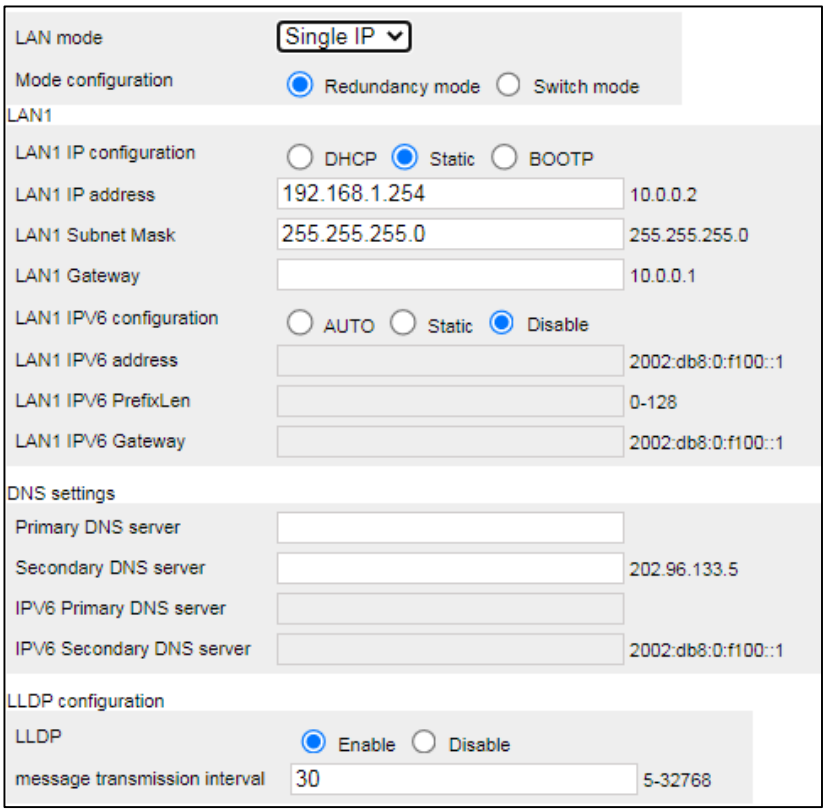
- Parts of dual-IP device provide two Ethernet ports, which can work in single IP mode (redundant mode / switching mode) or dual IP mode to meet the requirements of various network environments.
- The configuration of single-IP device is the same with that of dual-IP device, except the network address of single-IP device doesn’t support “Network Mode” and “Mode Setting”.

Operation Path

Open: “Network Configuration”.

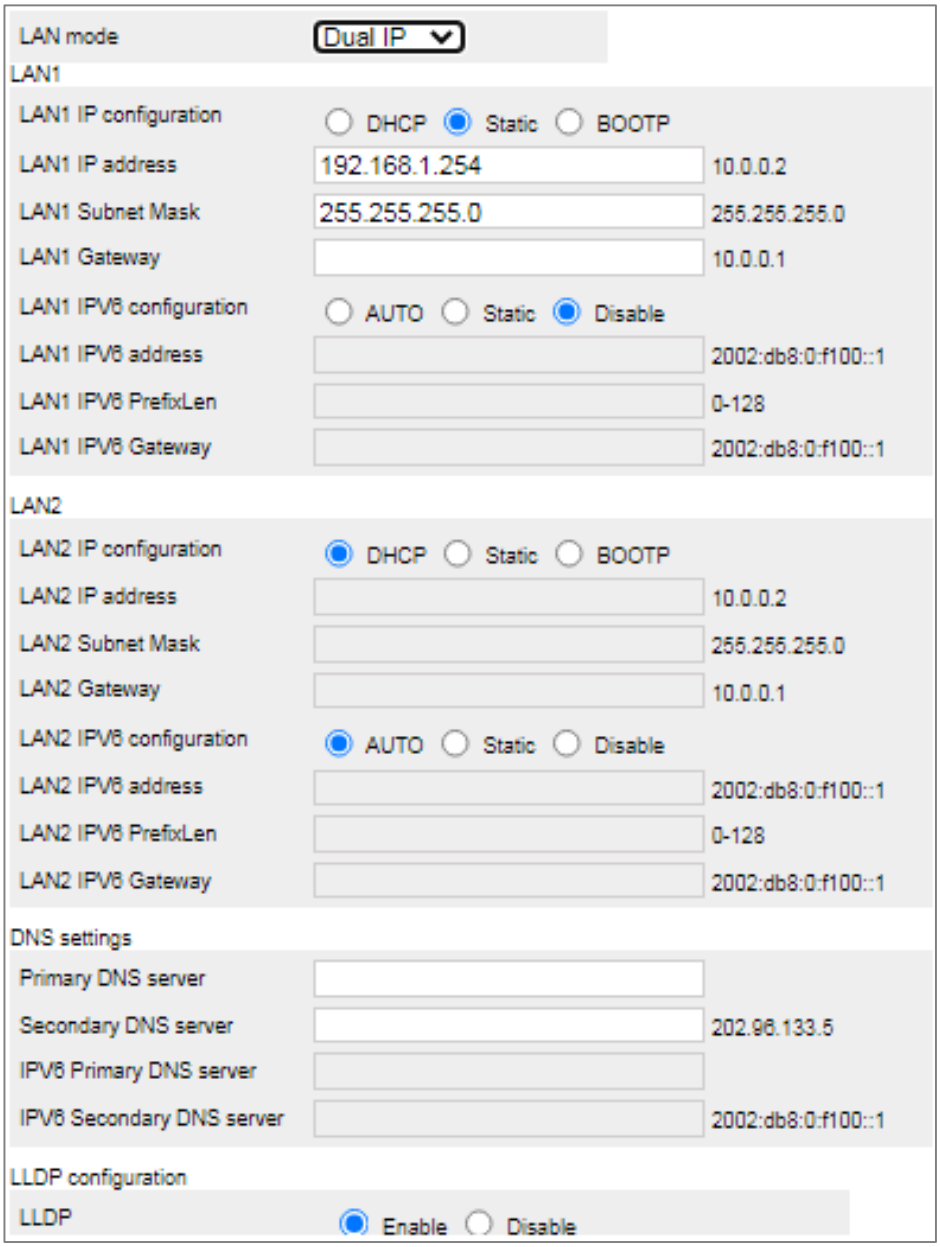
Interface Description 1: Single IP

Single IP interface is as below:



Interface Description 2: Dual IP

Dual IP interface is as below:



The main elements configuration description of network setting interface:

Interface Element	Description
LAN Mode	The network mode drop-down list of the device can be selected as follows: • Single IP: the device ports LINK1 and LINK2 are in the same network LAN1; • Dual IP: the device has dual IP and dual MAC addresses, with port LINK1 in network LAN1 and port LINK2 in network LAN2.
Mode Configuration	In the single IP mode, the operation mode of the equipment network port can be checked as follows: • Redundancy mode: Ports LINK1 and LINK2 are

Interface Element	Description
	redundant ports, which support link backup. One port is in active state and one port is in backup state; • Switch mode: ports LINK1 and LINK2 are normal Ethernet ports.
LAN1	**LAN1 Configuration Bar**
LAN1 IP Configuration	Configuration of network address of device LAN 1: • Obtain an IP address automatically(DHCP): Obtain an IP address, subnet mask, and gateway address automatically from DHCP server. • Manual setting: manually configure the IP address, subnet mask, and gateway address. • BOOTP: Automatically obtain IP address, subnet mask and default gateway address from BOOTP(Bootstrap Protocol) server.
LAN1 IP Address	Manually set the IP address of the device LAN1, which is 192.168.1.254 by default.
LAN1 Subnet Mask.	Manually set the subnet mask of the device LAN 1, which is 255.255.255.0 by default.
LAN1 Gateway	Manually set the gateway address of the device LAN 1.
LAN 2	**LAN2 configuration bar**
LAN2 IP Configuration	Configuration of network address of device LAN 2: • Obtain an IP address automatically(DHCP): Obtain an IP address, subnet mask, and gateway address automatically from DHCP server. • Manual setting: manually configure the IP address, subnet mask, and gateway address. • BOOTP: Automatically obtain IP address, subnet mask and default gateway address from BOOTP(Bootstrap Protocol) server.
LAN2 IP Address	Manually set the IP address of the device LAN 2, which is 192.168.1.254 by default.
LAN2 Subnet Mask.	Manually set the subnet mask of the device LAN 2, which is 255.255.255.0 by default.
LAN2 Gateway	Manually set the gateway address of the device LAN 2.
DNS Settings	**DNS Settings Bar**
Primary DNS Server	DNS Sever IP address, for example: 202.96.133.4.
Secondary	DNS Sever backup IP address, for example: 202.96.133.5.

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Interface Element	Description
DNS Server	

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4 COM Settings

Function Description

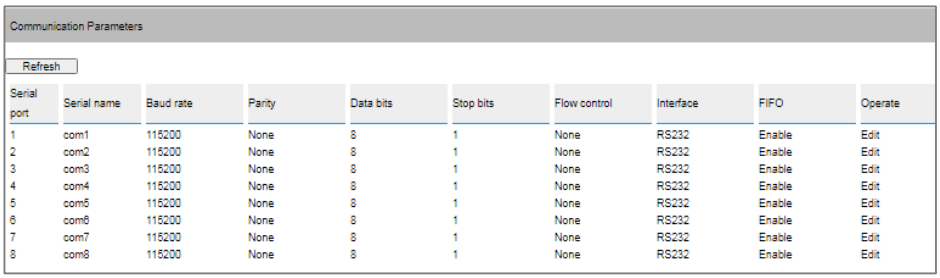
On the "COM Settings" page, you can view and configure the baud rate, parity bit, data bit, stop bit, flow control, interface type, FIFO function, RTS/DTR control and other parameters of each serial port of the device.

Operation Path

Open: “COM Settings”.

Interface Description

COM setting interface as follows:



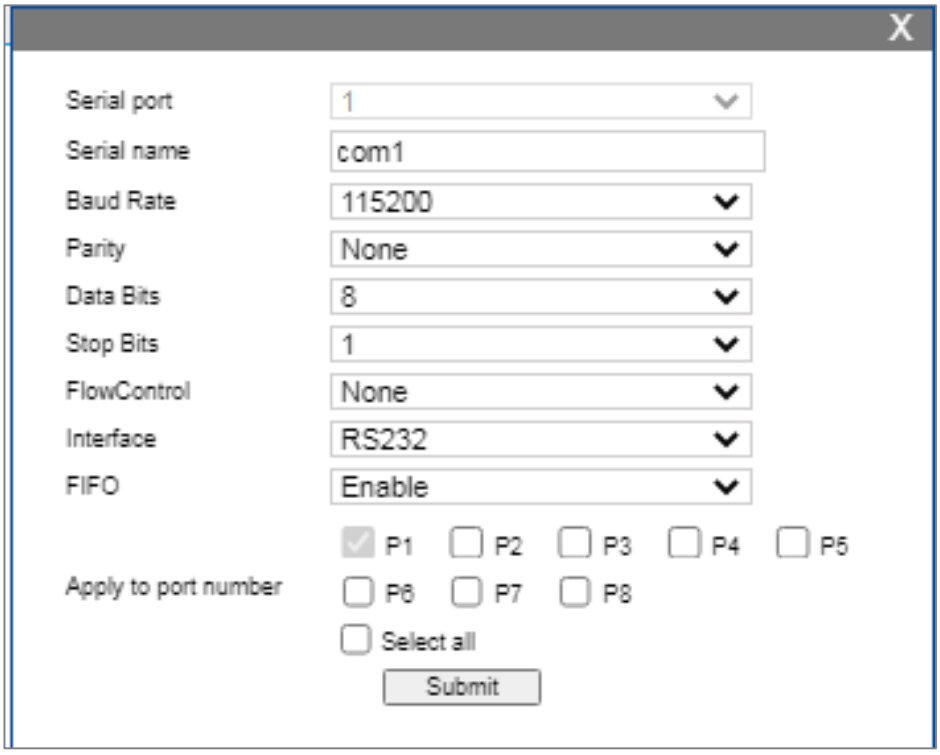
The main elements configuration description of serial port setup interface:

Interface Element	Description
Port	Display the serial port number of the device.
Serial name	Displays the name of the device.
Baud rate	Displays the baud rate of the device’s serial port.
Parity	Displays the parity bits of the device's serial Port.
Data Bits	Displays the data bits of the device’s serial port.
Stop Bits	Displays the stop bits of the device’s serial port.
Flow Control	Displays whether the flow control function of the device’s serial port is enabled.
Interface mode	Displays the interface mode of the device’s serial port.
FIFO	Display whether the FIFO function of the device’s serial port is enabled.
Operate	Click Edit to modify the parameters of the device’s serial port.

Click Edit in the serial port entry to modify the current serial port parameters.

Interface Description: Edit

Edit interface is as follows:



Configuration description of main elements of the Edit interface:

Interface Element	Description
Port number	Display the serial port number of the device.
Serial name	The text box of serial port name, which supports 1-32 letters or numbers input, and can customize the name of the current serial port.
Baud Rate	Choose baud rate of corresponding serial port. Unit: bps. Options: 110/300/600/1200/2400/4800/9600/19200/38400/57600/115200
Parity	Select parity bits of corresponding serial number. Options: • None • Odd • Even • Mark • Space
Data Bits	Select data bits of corresponding serial number. Options: • 7 bits • 8 bits Note: Data Bit supports 8 bits when the serial Port Mode is RTU; Data Bit supports 7 bits or 8 bits optional when the serial Port Mode is ASCII.

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Interface Element	Description
Stop Bits	Select stop bits of corresponding serial number. Options: • 1 bits • 2 bits
Flow Control	Flow control is used in two data transmission speed of different devices in the control of data flow technology to ensure that two devices communicate with each other to avoid data loss. Click the "flow control" drop-down list box, select the flow control parameters, the options are: • None • RTS/CTS • DTR/DSR • XON/XOFF
Interface	Determined by both hardware and software, options are as follows: • RS232 • RS485 • RS422
FIFO	Enable or disable the FIFO function, if the serial device does not support data transceiver cache FIFO, FIFO function can be disabled to avoid data transmission errors.
Apply to the above setting to	Check the serial port check box to apply the current settings to the specified serial port.

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5 Protocol Setting

About this chapter

Content	Link
This Chapter	5.1 Mode **Error! Reference source not found.** Slave ID Map 5.3 Priority Control 5.4 Advanced Settings **Error! Reference source not found. Error! Reference source not found.**Intelligent Commands

5.1 Mode

Function Description

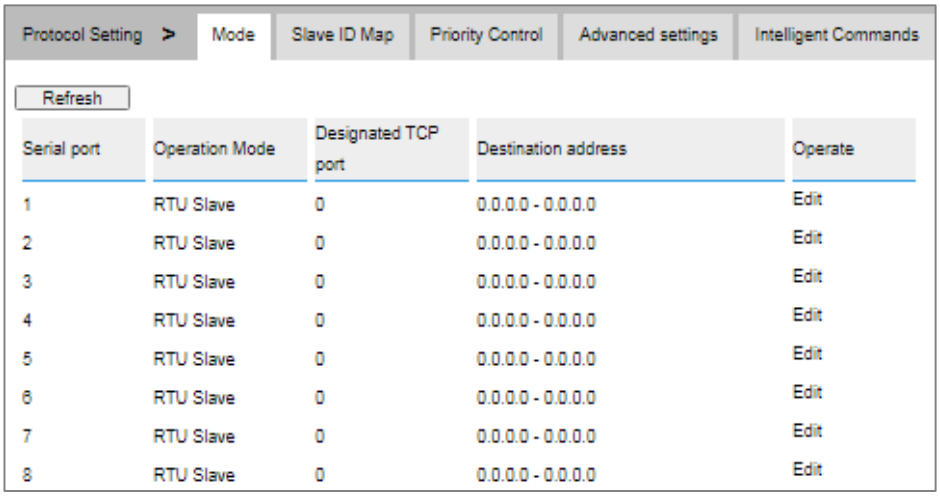
In the “Mode Settings” page, users can configure the operation Mode of Modbus RTU/ASCII device connecting to the serial port, and IP address of Modbus TCP device connecting to the LAN, to achieve data conversion between Modbus RTU/ASCII and Modbus TCP.

Operation Path

Open in order: "Protocol Setting > Mode".

Interface Description

Operation Mode interface as follows:



The main elements configuration description of mode settings interface:

Interface Element	Description
Port numbers	Display the serial port number of the device.
Operation Mode	The operation mode of current serial port are as follows: • RTU Master • RTU Slave

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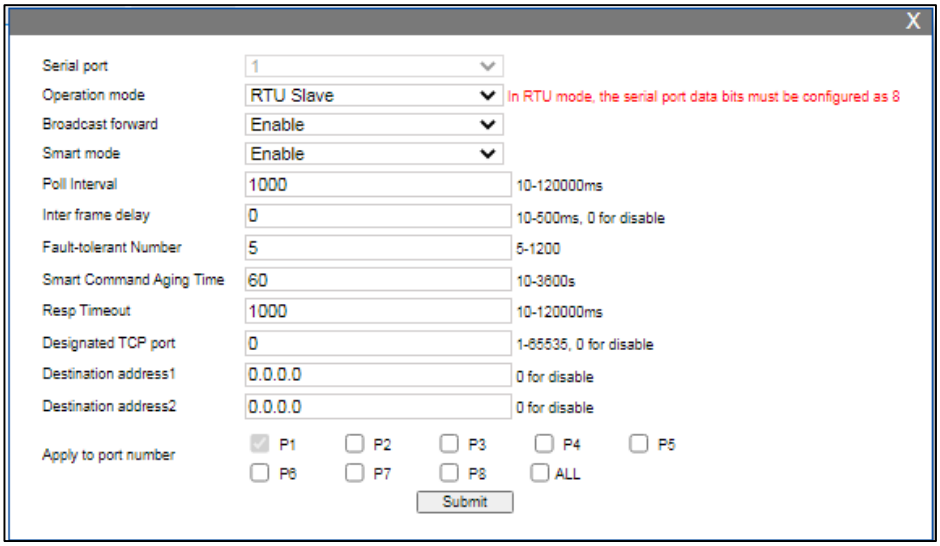
Interface Element	Description
	• ASCII Master • ASCII Slave
Designated TCP Port	Display the specific TCP port number, packets from specific TCP port will be routed to the serial port.
Destination address	Display the specific IP address, packets from specific IP address will be routed to the serial port.
Operate	Click Edit to modify the parameters of the current serial port mode.

Click Edit in the serial port entry to modify the parameters of the current serial port mode.

Interface Description: Edit

Edit interface is as follows:



Configuration description of main elements of the Edit interface:

Interface Element	Description
Port numbers	Display port number of current serial port.
Operation Mode	The network mode drop-down list, select the device role connecting to the serial port ,options as follows: • RTU Master: the serial port connects to the Modbus RTU master device. • RTU Slave: the serial port connects to the Modbus RTU slave device. • ASCII Master: the serial port connects to the Modbus ASCII master device. • ASCII Slave: the serial port connects to the Modbus ASCII slave device. Note:

Interface Element	Description
	• In slave mode, the device supports connecting up to 256 Modbus TCP Master devices at the same time. • In master mode, the device supports connecting up to 128 Modbus TCP slave devices at the same time.
Smart Mode	The drop-down list of smart mode can control the smart mode status, options as follows: • Disable • Enable When the smart mode is enabled, the device will study and memorize the received Modbus commands, then sent the commands to corresponded slave device, and save responses data for the master device to read.
Poll Interval	In intelligent mode, the device learns the interval time of Modbus command transmission actively, value range is 10--120000, the unit is millisecond.
Fault-tolerant number	The maximum number of consecutive errors received by the master station that are tolerated and not reported during smart command polling.
Smart Command Aging Time	In intelligent mode, the device learns the aging period of Modbus command actively, value range is 10--3600, the unit is second.
Resp timeout	The data response timeout time of Modbus slave device, value range is 10-120000, in millisecond. The device will not wait for the reply and continue to perform next option if it doesn't receive responses in specific time.
Inter frame delay	The delay time of the device transmits received data frames from slave device to the upstream device. The configuration doesn't take effect when the value is 0.
Destination TCP Port	In RTU/ASCII slave mode, Modbus demand designating destination TCP port number will be forwarded to current serial port by device route. Port value range is 1--65535.The configuration doesn't take effect when the value is 0.
Destination IP address 1	In RTU/ASCII slave mode, Modbus demand designating destination IP Address 1 will be forwarded to current serial port by device route. The configuration doesn't take effect when the value is 0.0.0.0
Destination IP address 2	In RTU/ASCII slave mode, Modbus demand designating destination IP Address 2 will be forwarded to current serial port by

Interface Element	Description
	device route. The configuration doesn't take effect when the value is 0.0.0.0
Apply the above setting to	Check the serial port check box to apply the current settings to the specified serial port.

5.2 Slave ID Map

Function Description

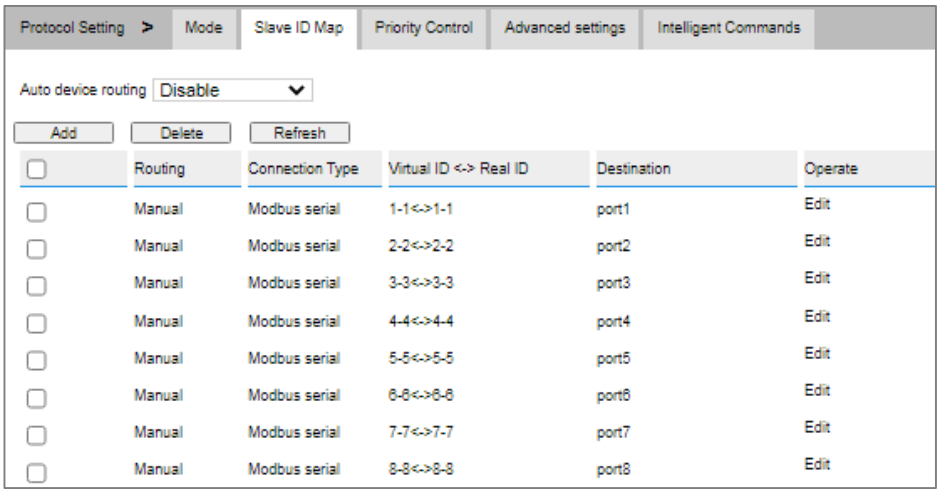
On the "Slave ID Map" page, you can configure master and Slave ID Map information. Slave ID Map supports two configuration modes include automatic route and manual configuration. In automatic route mode, device will check connection style automatically, and build route forwarding list to reduce manual configuration. In manual configuration mode, device supports mapping between visual ID and real ID, therefore slave device can still work normally without changing original ID.

Operation Path

Open "Protocol Setting > Slave ID Map" in sequence.

Interface Description

Slave ID Map interface screenshot



Main element configuration instructions in Slave ID Map interface:

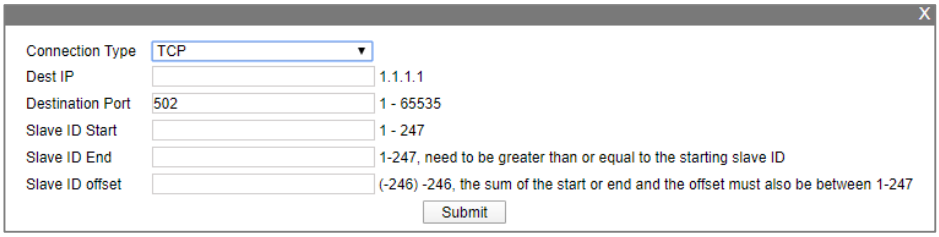
Interface Element	Description
Auto device routing	Automatic Route drop-down list, options as follows: • Disable • Enable Enable automatic route, device will probe automatically and create route list. Notice: Switch from manual route mode to automatic route mode, you can save or delete the current route list; Switch from automatic

Interface Element	Description
	route mode to manual route mode, the current list will be deleted.
Routing	Display the connection type of slave device, support two types include automatic and manual.
Connection type	Display the connection type of slave device, support two types include Modbus TCP and Modbus Serial.
Visual ID <-> Real ID	Display real ID of slave device, and visual ID correspond to master device.
Destination	Display destination address Modbus requests.
Operate	Click “Edit” button to modify the parameter information of current item.

Click “Add” to add Slave ID Map item manually.

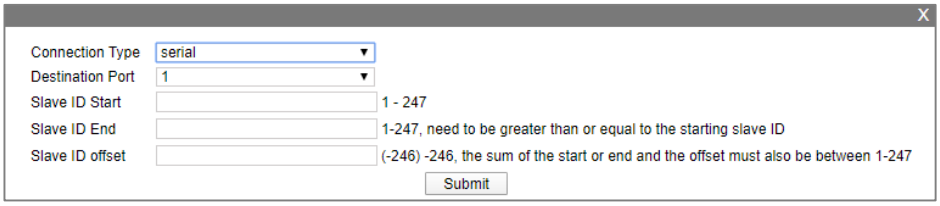
Interface Description: Add - TCP

The Add - TCP interface as follows:



Interface Description: Add - Serial

The Add - Serial interface as follows:



The main elements configuration description of Add interface:

Interface Element	Description
Connection type	Slave device connection types drop-down list, and the options are as follows: • TCP:Modbus TCP; • Serial:Modbus RTU/ASCII.
Dest IP	Destination IP address that Modbus requests when slave device connection type is TCP.
Destination port	Destination port number that Modbus requests when slave device

Interface Element	Description
	connection type is TCP, value range is 1--65535; Destination port number that Modbus requests when slave device connection type is Serial, that is serial port number connected to slave device.
Slave ID Start	The initial address of slave ID, value range is 1--247.
Slave ID End	The end address of slave ID, value range is 1--247, end address should be equal to or greater than initial ID.
Slave ID offset	The offset between real ID and visual ID, and the value range is -246-246. Note: Real ID = Visual ID + offset, visual ID range is 1--247.

5.3 Priority Control

Function Description

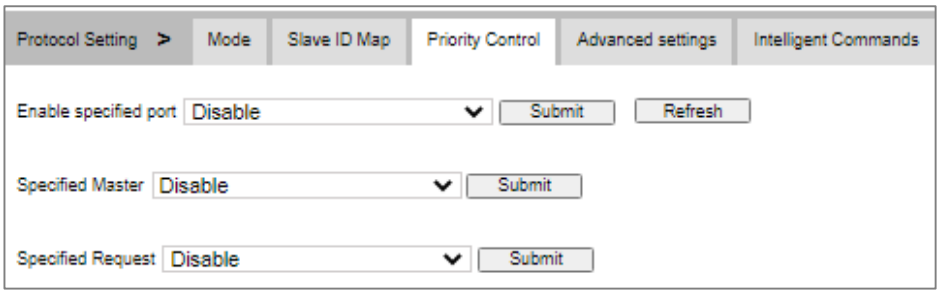
In “Priority Control” page, you can specify data priority that master device request, and data transmission will according to specified TCP port, master address or data priority.

Operation Path

Open in order: "Protocol Setting > Priority Control".

Interface Description

Priority control interface as follows:



The main elements configuration description of priority control interface:

Interface Element	Description
Enable specified port	Designated port enable drop-down list, can control port priority status, options are as follows: • Disable • Enable
Specified Port	Designated TCP port number when designated port priority is enabled, the value range is 1024-65535.
Specified Master	Designated master station drop-down list, can control data priority status of master station, options are as follows: • Disable

Interface Element	Description
	• Enable Click “ Add” button to add IP address and serial port connection of master station.
Type	Display the connection type of master device.
Definition	Display the IP address and serial port connection of master device.
Operate	Click the "Edit" button to modify the designated IP address information.
Specified Request	Designated request drop-down list, can control priority status of designated request, options are as follows: • Disable • Enable Click “Add” to add designated slave ID, function code, command and other data request when designated request is enabled.
Slave_id	Display slave ID of designated request.
Function Code	Display function code of designated request.
Data	Display data of designated request.
Operation	Click Edit to modify the parameters of designated request.

5.4 Advanced Settings

Function Description

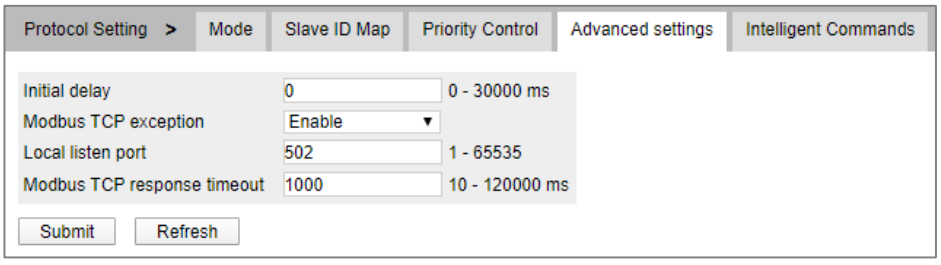
In “Advanced Settings” page, you can configure device parameters such as listening port, initial delay, response timeout and so on. See more details in 13 Modbus Settings.

Operation Path

Open in order: "Protocol Setting > Advanced Settings".

Interface Description

The advanced settings interface as follows:



The main elements configuration description of advanced settings interface:

Interface Element	Description
Initial Delay	The delay time of the first Modbus request send by device when it's started, value range is 0-30000, in millisecond.

Interface Element	Description
Modbus TCP exception	TCP Abnormal drop-down list, options as follows: • Enable After TCP anomaly is enabled, device will report anomaly automatically when it is transmitting request demand and find slave device timeout or data losing. • Disable
Local Listen port	Modbus TCP listen port of device, value range is 1-65535, port number is 502 by default.
Modbus TCP response Timeout	The response timeout time of Modbus RTU/ASCII slave device, value range is 10-120000, in millisecond.

5.5 Intelligent Commands

Function Description

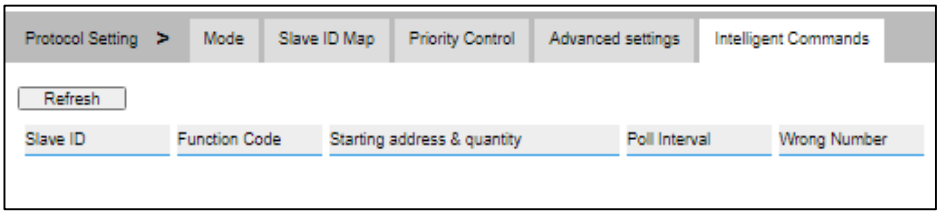
In “Intelligent Commands” page, you can check Modbus demand learned by device automatically.

Operation Path

Open in order: "Protocol Setting > Intelligent Commands".

Interface Description

Intelligent Commands interface is as below:



Configuration description of main elements of the smart command interface:

Interface Element	Description
Slave ID	Display slave ID information in the command.
Function Code	Display function code in the command.
Address/Quantity	Display start address and numbers in the command.
Poll Interval	Display poll interval in the command.
Number of consecutive errors	The number of consecutive errors in smart command polling; When polling is successful, the data is cleared to zero.

6 SNMP

SNMP (Simple Network Management Protocol)is a network management standard protocol widely used in TCP/IP networks. SNMP provides a way to manage devices by running network management software on a central computer (or network management workstation).

SNMP System consists of NMS (Network Management System), Agent Process, Management Object and MIB (Management Information Base) four parts. Agent: Agent is an agent process in the managed device, which is used to maintain the information data of the managed device and respond to the request from the NMS, and report the administration data to the NMS that sending the request.

6.1 SNMP Agent Settings

Function Description

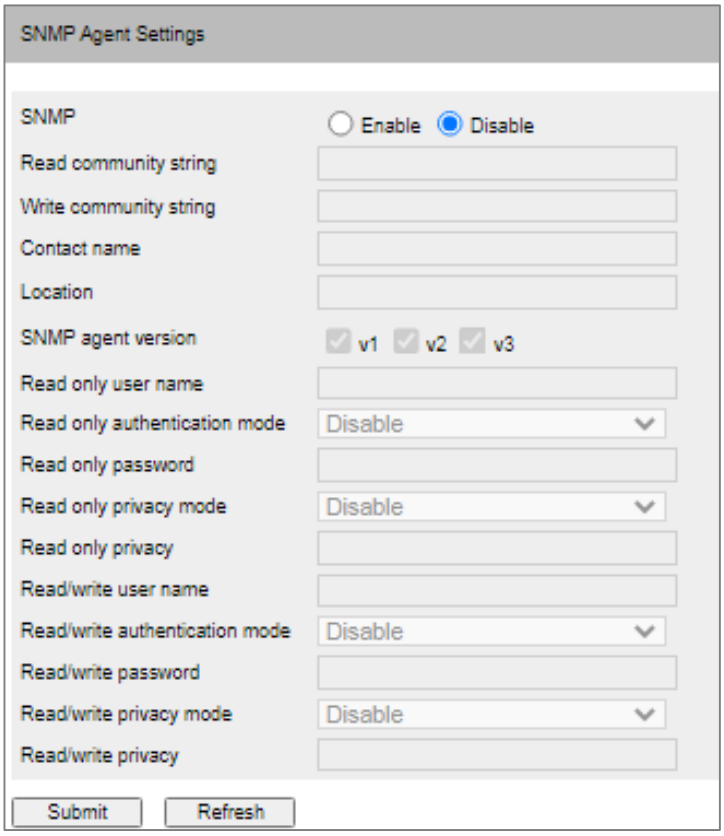
In the "SNMP Agent Settings" page, the SNMP function can be enabled and disabled, and other related parameters such as SNMP community name, version and user information can be configured.

Operation Path

Open in order: "SNMP > SNMP Agent Settings".

Interface Description

SNMP agent settings interface as follows:



Main elements configuration description of SNMP agent settings interface:

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Interface Element	Description
SNMP	The radio box of enable/disable SNMP function, the options are as follows: • Enable • Disable
Read community string	The text box of readable community name, supporting 0-32-bit character string input. The readable community name is used for authentication of Get operation between Agent and NMS.
Write community string	The text box of writable community name, supporting 0-32-bit character string input. The writable community name is used to complete Set operation authentication between Agent and NMS.
Contact name	The text box of SNMP contact information, which supports 0-32-bit character string input.
Location	The text box of position information, which supports 0-32-bit character string input.
SNMP agent version	The check box of the SNMP agent version, which supports optional v1, v2 and v3 versions. Compared with v1/v2, version v3 mainly adds authentication and encryption.
Read only user name	The text box of read-only user name, supporting 0-32-bit character string input.
Read only user Authentication Mode	The drop-down list of read-only user authentication mode, the options are as follows: • Disable • MD5: message digest algorithm 5; • SHA: Secure Hash Standard.
Read-only password	The text box of read-only user authentication key, supporting 0-32-bit character string input.
Read-only privacy Mode	The drop-down list of read-only user data encryption mode, the options are as follows: • Disable • DES_CBC: The system encrypts the data by using the cipher group link code of the data encryption standard.
Read-only privacy	Read-only user data encryption key text box, supporting 0-32 bit character string input.
Read/Write user name	The text box of read/write user name, supporting 0-32 bit character string input.

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Interface Element	Description
Read/Write-user Authentication Mode	The drop-down list of read/write user authentication mode, the options are as follows: • Disable • MD5 (message digest algorithm 5); • SHA: Secure Hash Standard.
Read/Write-user Password	The text box of read/write user authentication key, supporting 0-32-bit character string input.
Read/Write-user privacy Mode	The drop-down list of read/write user data encryption mode, the options are as follows: • Disable • DES_CBC: The system encrypts the data by using the cipher group link code of the data encryption standard.
Read/Write-user privacy	The text box of read/write user data encryption key, supporting 0-32-bit character string input.

7 Alarm Settings

About this chapter

Content	Link
This Chapter	7.1 Mail Alarm Configuration 7.2 SNMP Trap Alarm Configuration 7.3 System Alert Settings

7.1 Mail Alarm Configuration

Function Description

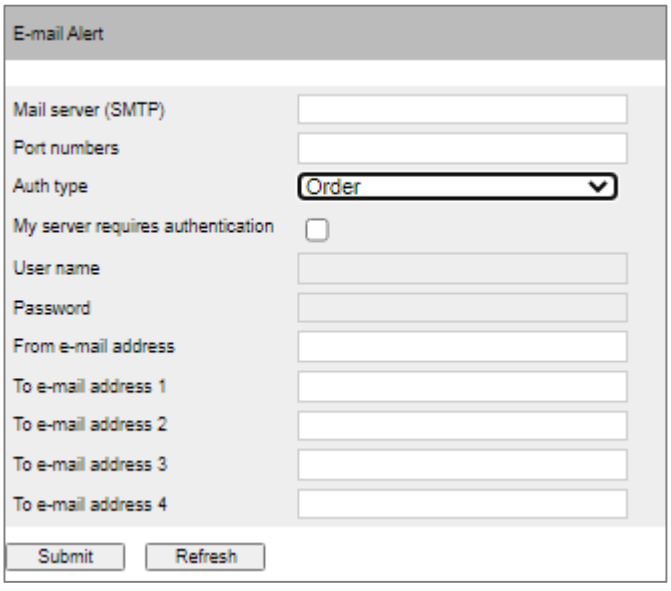
On the "mail Alarm configuration" page, user can configure the sender, recipient, mailbox server and other parameters. The system can inform the change information of power connection, warm start, cold start, LAN port connection, serial DCD and DSR signals of the device by mail.

Operation Path

Open in order: "Alarm Configuration > Mail Alarm Settings".

Interface Description

Mail Alarm Settings configuration interface is as follows:



Main element configuration instructions in Disable Mode interface

Interface Element	Description
Mail server(SMTP)	Mailbox server address using SMTP simple mail transfer protocol provided by mailbox service provider, and mailbox server address used by sender when sending mail.
Port numbers	Port number of mailbox server.

Interface Element	Description
Auth type	The drop-down list of authentication method, the options are as follows: • Plaintext; • SSL: encryption protocol of Secure Sockets Layer; • TLS: encryption protocol of Transport Layer Security.
My server requires authentication	The check box of mailbox server authentication. Check the configuration according to the authentication requirements of mailbox server.
Username	The user name of the sender's mailbox server.
Password	Login password or authorization code of sender's mailbox server.
From E-mail address	The email address from which the sender sends a warning message.
To e-mail address 1	The input text box of Address 1 which is used to fill in the email address of receiving alarm mails.
To e-mail address 2	The input text box of Address 2 which is used to fill in the email address of receiving alarm mails.
To e-mail address 3	The input text box of Address 3 which is used to fill in the email address of receiving alarm mails.
To e-mail address 4	The input text box of Address 4, which is used to fill in the email address of receiving alarm mails.

7.2 SNMP Trap Alarm Configuration

Function Description

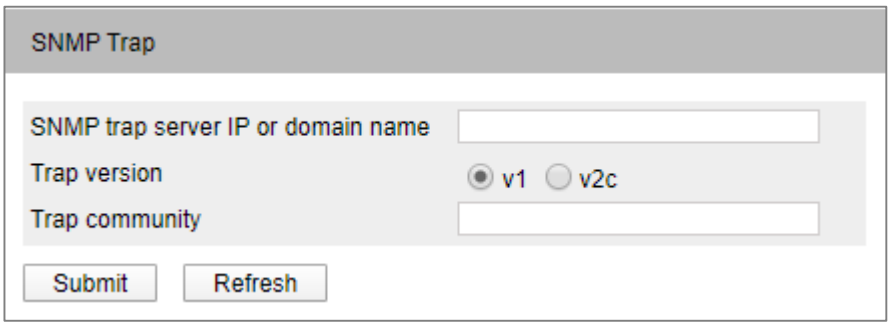
In the SNMP Trap Alarm page, you can configure the IP address or domain name of the server that receives SNMP Trap information.

Operation Path

Open in order: "Advanced Config > SNMP Trap Alarm Configuration".

Interface Description

The SNMP Trap Alarm Configuration interface as follows:



The main elements configuration description of SNMP Trap alarm interface:

Interface Element	Description
SNMP trap server IP or domain name	The text box of IP address or domain name of SNMP Trap server. The server is used to receive SNMP Trap information sent by devices.
Trap version	The radio box of SNMP Trap version, which supports optional v1 and v2c versions.
Trap community	The text box of SNMP Trap community name, which specifies SNMP community name.

7.3 System Alert Settings

Function Description

In the "System Alert Settings" page, the alarm type of system events can be configured.

Operation Path

Open in order: "Alarm Configuration >System Alarm Settings".

Interface Description

System Alert Settings interface is as follows:

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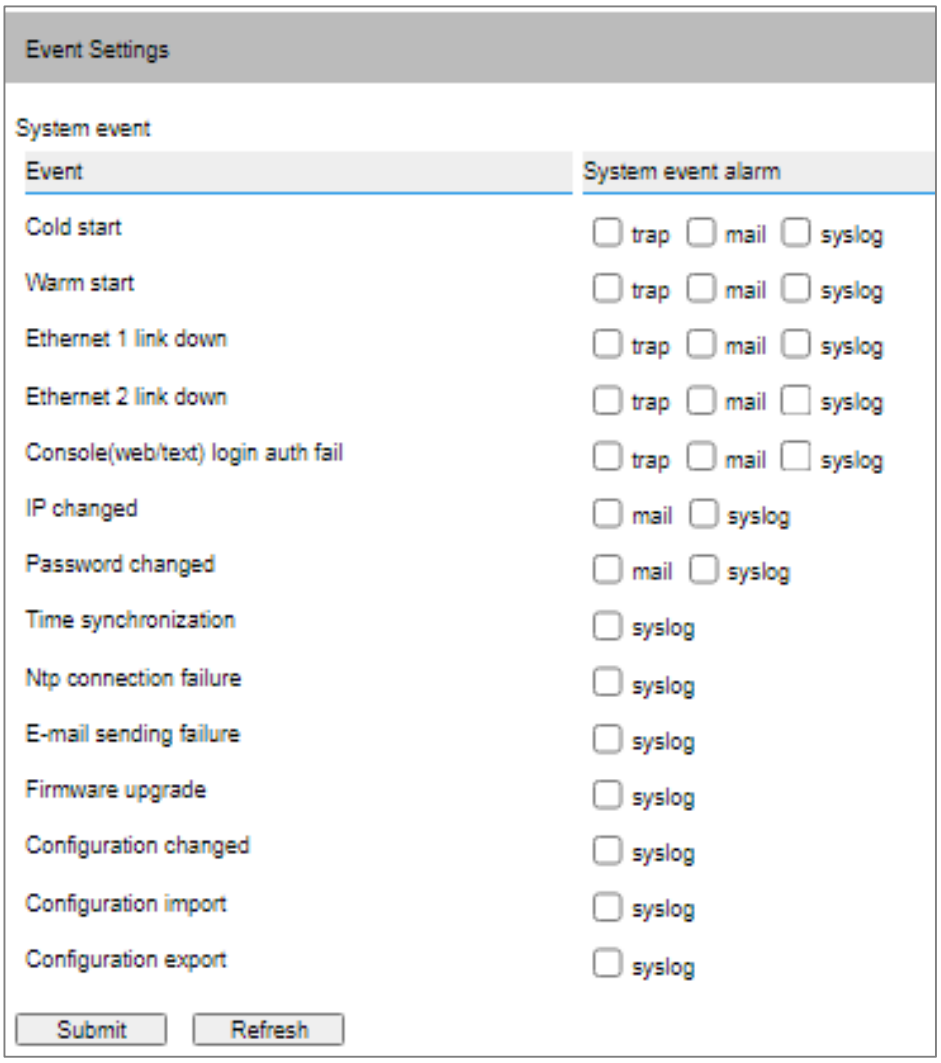


Main elements configuration description of system alarm interface:

Interface Element	Description
System event alert	**System event alert configuration bar**
Event	System event alert types, shown as follows: • Cold start: device will send alarm after it is powered off and restarted. • Warm start: In the case of uninterrupted power supply, the device will send alarm after restarting the device via the Web or CLI configuration. • Ethernet 1 link down: device will send alarm when lan1 loses connection. • Ethernet 2 link down: device will send alarm when lan2 loses connection. • Consle (web/text) login auth fail: Login Failed: device will send alarm when web login password authentication fails.

Interface Element	Description
	• IP changed: device will send alarm when “Network Configuration” is modified. • Password changed: device will send alarm when “User Configuration” is modified. • Time synchronization: device will send alarm when “Time Setting” is modified. • NTP Connection Failure: device will send alarm when NTP sever connection fails. • E-mail Sending Faileure: device will send alarm when mail sending fails due to network or other problems. • Firmware Upgrade: device will send alarm when the firmware is upgraded. • Configuration changed: device will send alarm when part of webpage configuration is modified. • Configuration Import: device will send alarm when configuration file is imported. • Configuration Export: device will send alarm when configuration file is exported.
System event alarm	System alert mode check box, the options are as follows: • Trap: after checked, device will send SNMP Trap message for alarm according to “SNMP Trap Alarm Configuration” information when the corresponding system event sends an alarm. • Mail: after checked, device will send mail for alarm according to “Mail Alarm Configuration” information when the corresponding system event sends an alarm. • Sys log: after checked, device will record alarm message in “System Log” information when the corresponding system event sends an alarm; device will send log message for alarm to remote syslog if it is enabled.

8 System Status

About this chapter

Content	Link
This Chapter	8.1 Routing Table 8.2 System Log

8.1 Routing Table

Function Description

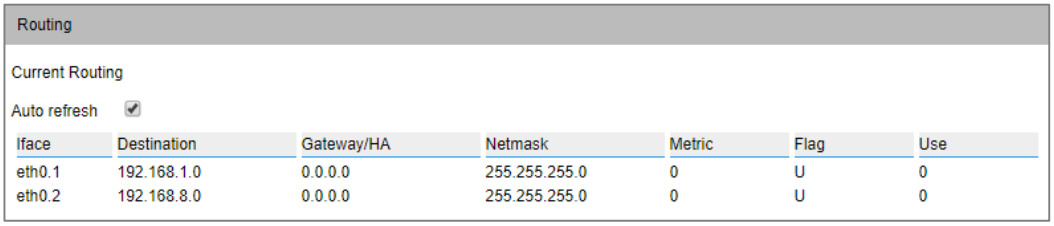
In “Routing” page, you can see the current route information.

Operation Path

Open in order: “System Status > Routing".

Interface Description

Routing interface Screenshot:



The main elements configuration description of routing interface:

Interface Element	Description
Iface	Display the interface name of physical network.
Destination	Display the IP address of destination host or the network address of destination routing.
Gateway/HA	Display gateway IP address orthe IP address of next hop router .
Netmask	Display the subnet mask of destination network.
Metric	Display the router hops from source terminal to destination terminal.
Flag	Display routing status, valid status is: • U:UP • D:DOWN • G: Route to gateway • H: Route to host computer • T: Routing settings • R: RIP is dynamic

Interface Element	Description
Use	The quantity of data packet which is sent correctly via the router.

8.2 System Log

Function Description

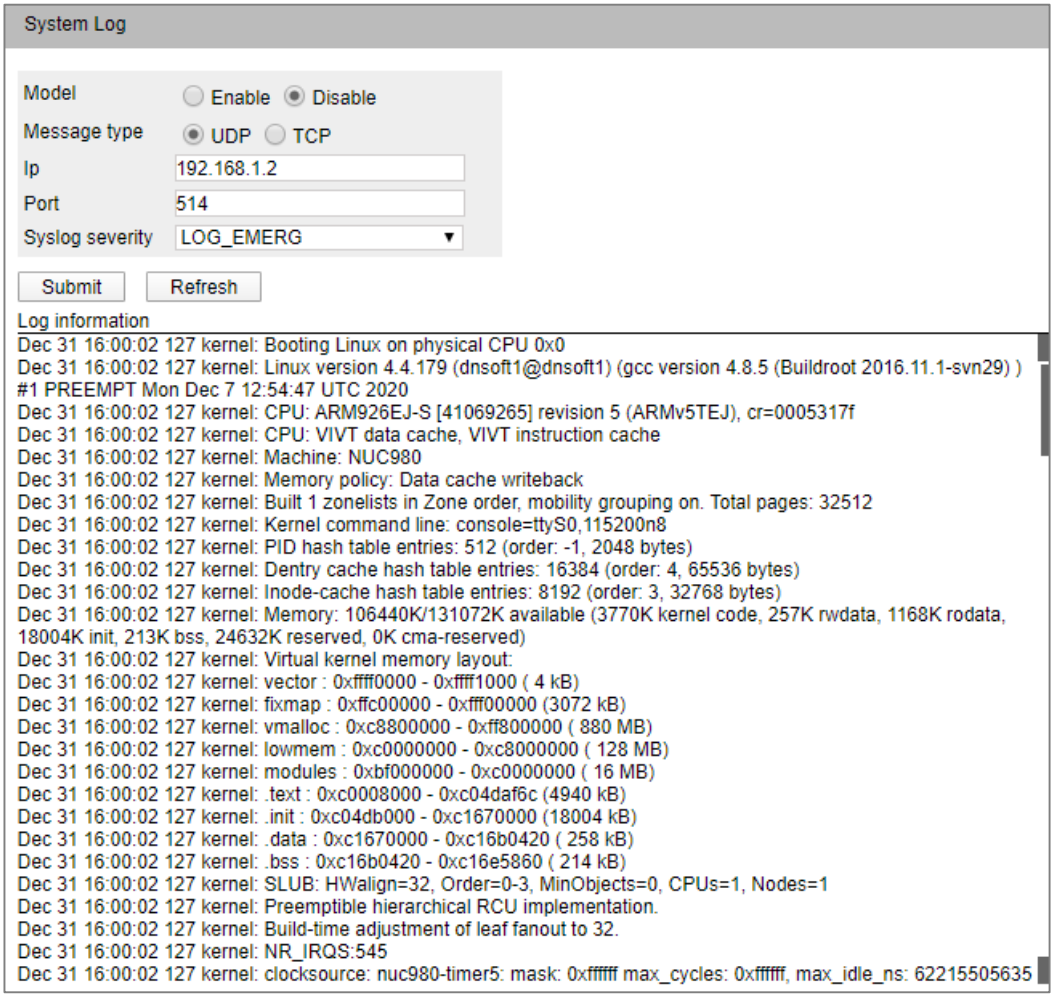
On the "System log" page, you can view the log information of the device and upload the log information to the syslog server. During the operation of the device, the system will record all kinds of situations in operation, thus forming log information. The log information is mainly used to check the running status of device, analyze the status of network and locate the causes of problems, and provide basis for system diagnosis and maintenance. The generated log information can be saved on the device, and the log information can be output to the log server by using syslog protocol.

Operation Path

Open in order: “System Management > System Log”.

Interface Description

System log interface as follows:



The main elements configuration description of system log interface:

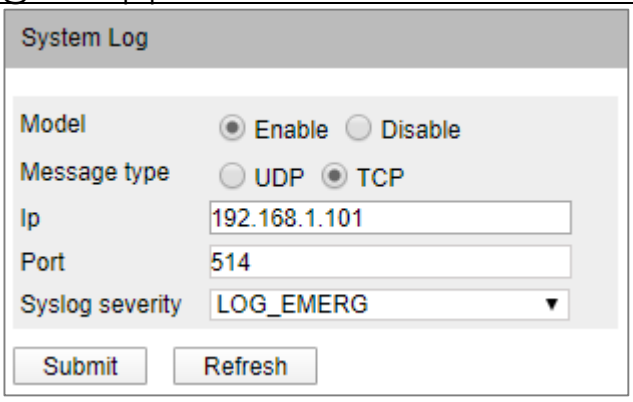
Interface Element	Description
Mode	System log server configuration type, which can be checked as follows: • Enable: when enabled, the system log will be saved to the remote system log server. • Disable: Disable the syslog server function.
Message Type	System log information transmission protocol, which can be selected as follows: • TCP: system log information is sent to the log server by TCP protocol. TCP (transmission control protocol), connection-oriented and reliable transmission-layer communication protocol; • UDP: the system log information is sent to the log server by UDP protocol. UDP (user datagram protocol), connectionless-oriented transmission-layer communication protocol.
IP	IP address of the syslog server.
Port	The port number of syslog server, and the default port of syslog protocol is 514.
Log Level	The level of system log can be selected as follows: • LOG_EMERG: extremely urgent error; • LOG_ALERT: an error that needs to be corrected immediately; • LOG_CRIT: a more serious error; • LOG_ERR: An error occurred; • LOG_WARNING: warning, there may be some error; • LOG_NOTICE: information to be noticed; • LOG_INFO: general prompt information; • LOG_DEBUG: debug information.

Configuration Instance

"Visual Sys log Server" is a free open source software for receiving and viewing syslog messages. At present, the host with "Visual Sys log Server" installed is used as the system log server, and the IP address of the host is 192.168.1.101. The device transmits log information to the host server through TCP protocol. The configuration steps are as follows:

Step 1 Log in to the device WEB interface.

Step 2 On the "System log" page, configure relevant parameters, as shown in the following figure:



1 Check “Enable” in the “Model” checkbox;

2 Check “TCP“ protocol in “Message Type” checkbox;

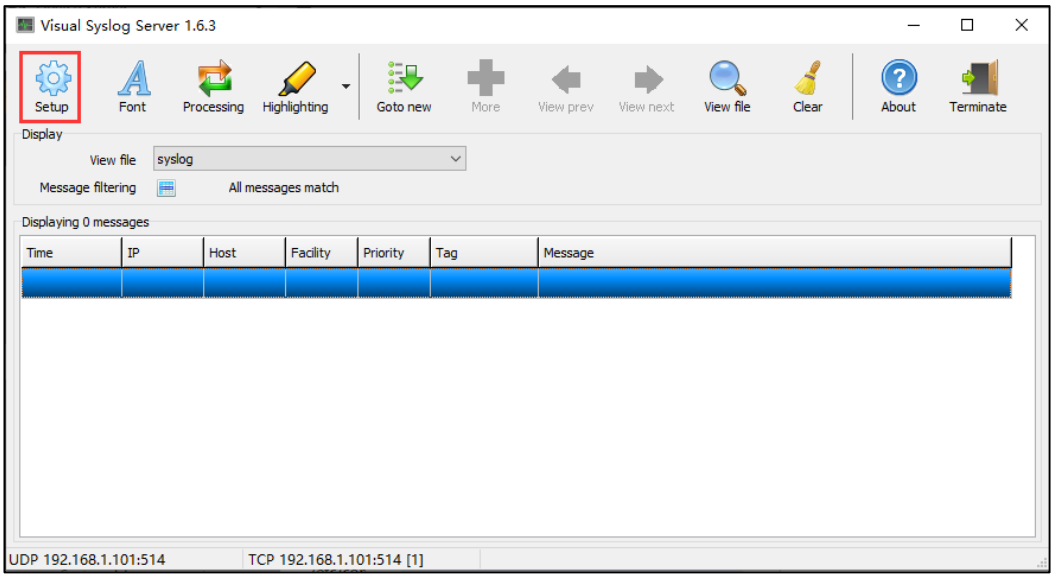
3 In the IP text box, enter the IP address "192.168.1.101" of the server.

4 In the "Port" text box, enter the port number of the server, and the default port of syslog protocol is 514;

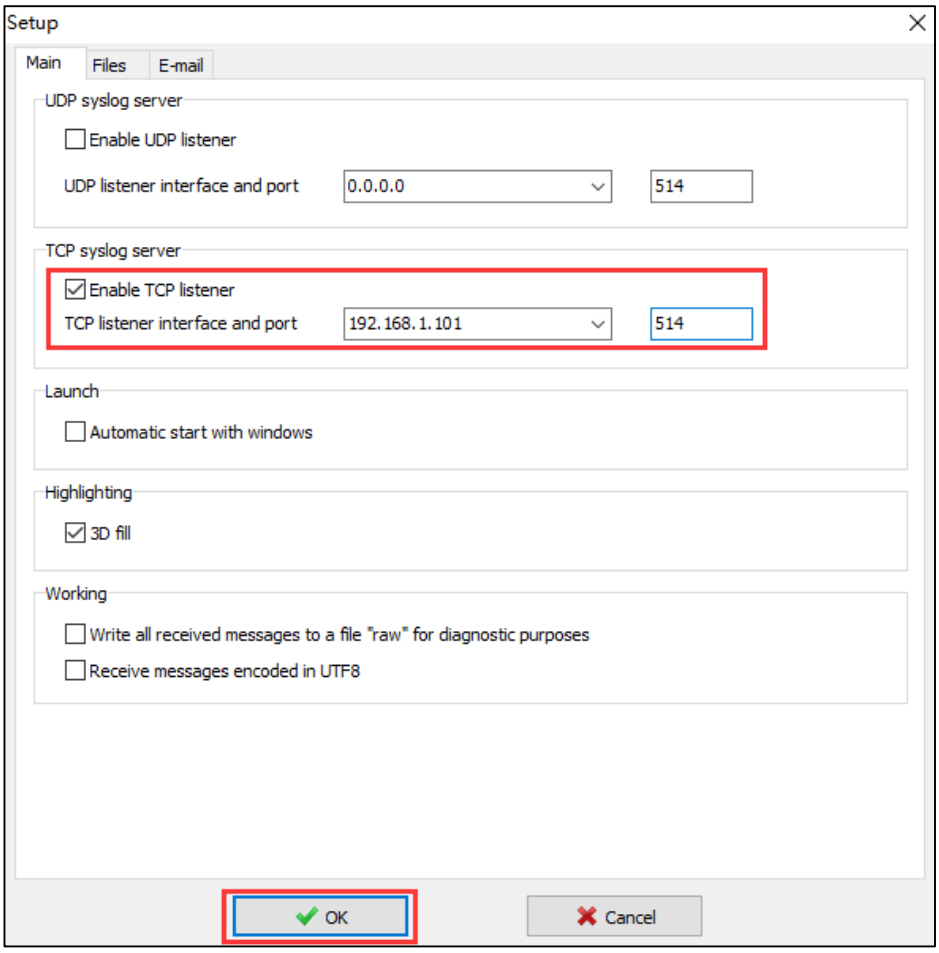
5 In the “SysLog severity” drop-down list, select “LOG_EMERG”;

6 Click “Submit” button.

Step 3 Run "Visual Syslog Server" on the host to complete the configuration of relevant parameters, as shown below.



1 Click the "Setup" button, as shown in the above figure;



2 On the "Setup" page, in the Main configuration area, check "Enable TCP Listener", as shown in the above figure;

3 Select the IP address "192.168.1.101" and port number "514" of the server from the "TCP listener interface and port" drop-down list;

4 Click “OK” button.

Step 4 Check the log information in the "Visual Syslog Server" configuration interface, as shown in the following figure.

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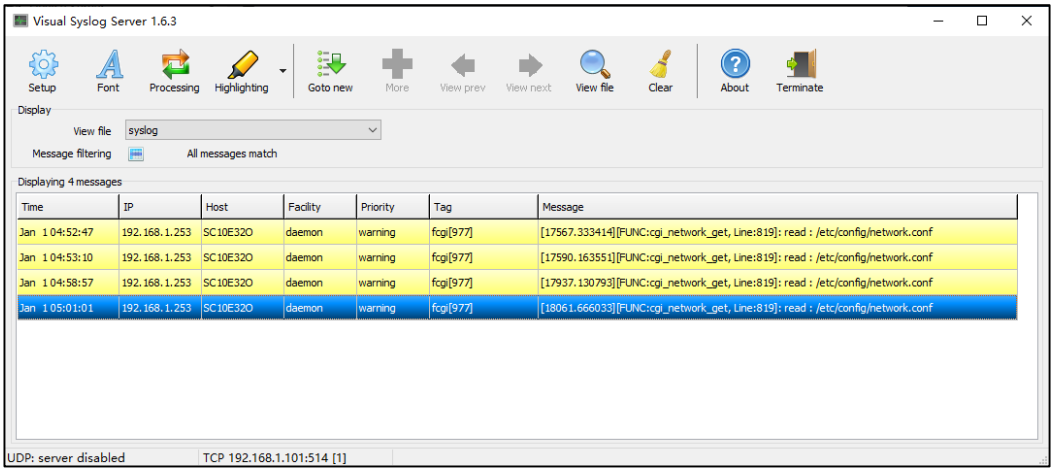

Step 5 End.

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9 System Management

About this chapter

Content	Link
This Chapter	9.1 Device Information 9.2 Time Setting 9.3 Remote 9.4 User 9.5 IP Address Filtering 9.6 Mac Address Filtering **Error! Reference source not found.** Route Table 9.8 ARP 9.9 Diagnostic 9.10 System Management

9.1 Device Information

Function Description

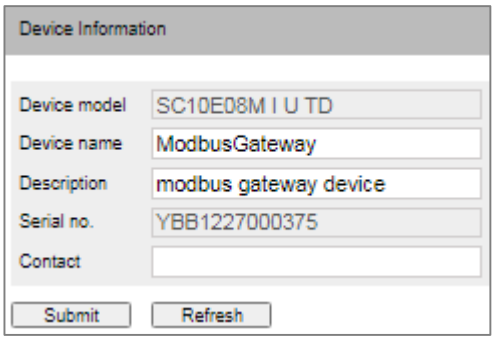
In the “Device Information Configuration” page, you can configure the device name, device description, and maintenance contact information.

Operation Path

Open in order: "System Management > Device Information ".

Interface Description

The screenshot of device information interface:



The main elements configuration description of device information interface:

Interface Element	Description
Device model	Device model information, the input box is grayed and cannot be entered by default.
Device name	Enter the device name in the “Name” text box. To identify each device in the network, give the device a different name.
Description	Enter the device description in the “Description” text box.
Serial no.	Device serial information, the input box is grayed and cannot be

Interface Element	Description
	entered by default.
Contact	Enter the contact information of the equipment maintenance personnel in the "Contact information" text box.

9.2 Time Setting

The full name of NTP protocol is Network Time Protocol. Its destination is to transmit uniform and standard time in international Internet. Specific implementation scheme is appointing several clock source websites in the network to provide user with timing service, and these websites should be able to mutually compare to improve the accuracy. It can provide millisecond time correction, and is confirmed by the encrypted way to prevent malicious protocol attacks.

Function Description

On the "Time Settings" page, user can configure the device time and NTP server information.

Operation Path

Open in order: "System manage > Time setting".

Interface Description

Time setting interface as follows:

The main elements configuration description of time settings interface:

Interface Element	Description
Time zone	Time standard of different global regions.
local Time	The device's own time. Click the "Change" button to manually modify the device time or synchronize it to the current computer time.
Time Server	IP address or domain name of NTP server. The device will automatically synchronize NTP server time.

9.3 Remote Administration

HTTPS (full name: Hypertext Transfer Protocol over Secure Socket Layer) is an HTTP channel targeted for security, which in short is a Secure version of HTTP. HTTPS provides data encryption services to prevent the attacker to intercept the transmitted message

between the Web browser and web server, obtain some sensitive information, such as credit card numbers, passwords, etc.

The full English name of SSH is Secure Shell. SSH is the security protocol based on the application layer and transport layer. Telnet is transmitted in plaintext, while SSH is transmitted in ciphertext, which is more secure. SSH is a currently reliable protocol that provides security protocol for remote login sessions and other web services. Using SSH protocol can effectively prevent information leakage in the process of remote management, and can also prevent DNS and IP spoofing. In addition, the transmitted data is compressed so that the transmission speed can be increased.

Function Description

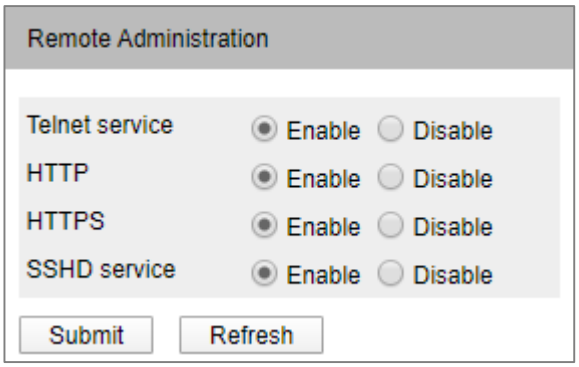
On the "Remote Administration" page, access methods such as TELNET, HTTP, HTTPS and SSHD can be restricted.

Operation Path

Open in order: "System Management > Remote Administration".

Interface Description

The remote administration interface is as follows:



The main elements configuration description of remote administration interface:

Interface Element	Description
TELNET Service	TELNET service function status, the options are as follows: • Enable; • Disable. Note: When enabled, the TELNET client can access the CLI interface of the device.
HTTP	Device HTTP protocol function status, options are as follows: • Enable; • Disable. Note: When enabled, when using HTTP to access the WEB interface, the format is HTTP://192.168.1.254, and the address is the IP address of the corresponding device.
HTTPS	Device HTTPS protocol function status, options are as follows: • Enable;

Interface Element	Description
	• Disable. Note: When enabled, when using HTTPS to access the WEB interface, the format is HTTPS://192.168.1.254, and the address is the IP address of the corresponding device.
SSHD service	SSH service function status, the options are as follows: • Enable; • Disable. Note: When enabled, the SSH client can access the CLI interface of the device.

9.4 User Management

Function Description

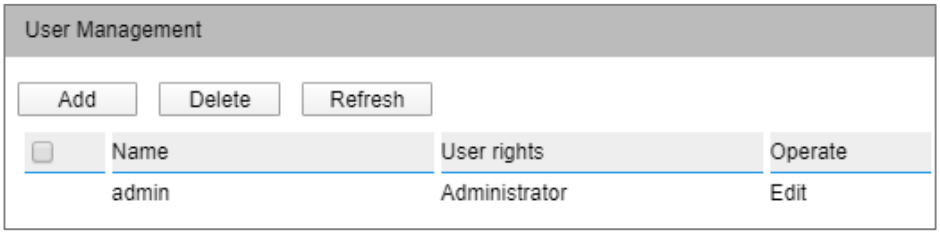
In the "user configuration" page, users can add and delete users freely. Users need to access the device by login with user name and password. The initial user name and password are both: admin.

Operation Path

Open in order: "System Management > User Management".

Interface Description

The interface of user management is as follows:



The main elements configuration description of user configuration interface:

Interface Element	Description
Name	Identification of the visitor. Note: User names and passwords can support up to 32 characters.
User rights	The user's access rights are shown as follows: • Administrator: has administrator authority and can configure parameters of device; • General user: has viewing authority, and can view device configuration parameters and network diagnosis operations.
Operate	Click Edit to modify the password and user rights of the current user.

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9.5 IP Address Filtering

Function Description

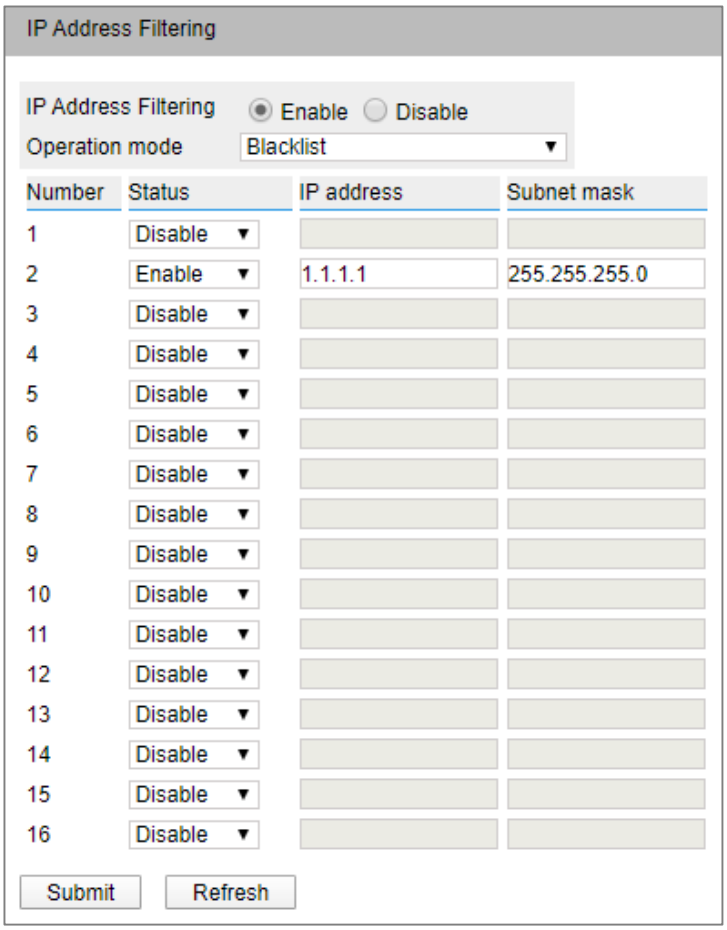
Users can limit the ongoing access or connected host IP address and subnet mask via setting access rules on the "IP Address Filtering" page.

Operation Path

Open in order: “System Management> IP Address Filtering”.

Interface Description

IP Address Filter interface as follows:



Main elements configuration instructions in IP Address Filtering interface:

Interface Element	Description
IP address Filtering	Enable or disable IP filtering rules. • Enable • Disable
Operation Mode	Set filtering rules for IP addresses. • White list: the IP address set in the filtering rule is allowed to access the device. • Blacklist: IP addresses set in filtering rules are prohibited from accessing devices.

Interface Element	Description
	Notice: • When the white list is enabled, IP addresses outside the white list will not be able to access the device. • If the IP address in the white list cannot access the device, please clean the browser cache and access it again. • When the blacklist is enabled, the IP addresses covered by the blacklist will not be able to access the device.
Number	Displays the IP address filtering rule number.
Status	Enable or disable Filtering rules. • Enable • Disable
IP Address	Set the IP address in dotted decimal format in the filter rule, such as "192.168.1.61".
Subnet mask	Set the subnet mask in dotted decimal format in the filter rule, such as "255.255.255.0".

9.6 Mac Address Filtering

Function Description

On the "MAC Address Filtering" page, user can restrict the host MAC address to access or connect by setting access rules.

Operation Path

Open in order: “System Management > MAC Address Filtering”.

Interface Description

MAC filter interface shown as follows:

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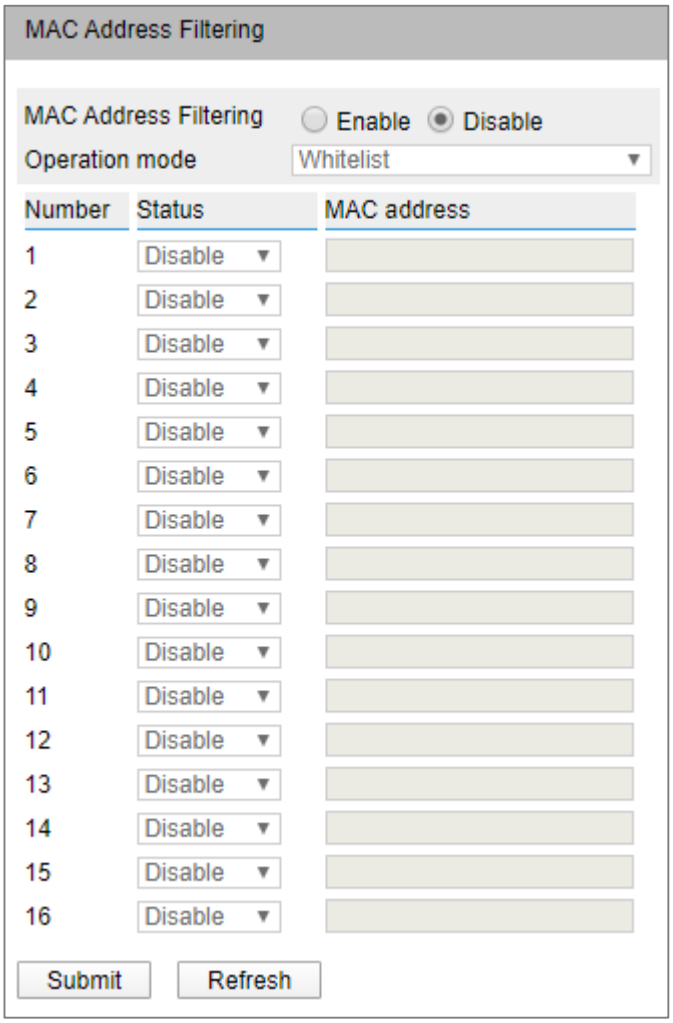


The main elements configuration description of MAC Filter interface:

Interface Element	Description
Mac Address Filtering	Enables or disables MAC address filtering rules. • Enable • Disable
Operation Mode	Set filtering rules for MAC addresses. • White list: the MAC address set in the filtering rule is allowed to access the device. • Blacklist: MAC addresses set in filtering rules are prohibited from accessing devices. Notice: • When the white list is enabled, MAC addresses outside the white list will not be able to access the device. • When the blacklist is enabled, the MAC addresses covered by the blacklist will not be able to access the device.
Number	Display the MAC address filtering rule number.
Status	Enable or disable Filtering rules.

Interface Element	Description
	• Enable • Disable
MAC address	Set a six-byte hexadecimal MAC address within the filtering rules, such as "00-22-6F-03-BD-52".

9.7 Route Table

Function Description

In “Route Table“ page, you can configure how to connect device with external network. In the dual IP mode, the data egress interface can be specified via static routing configuration when device is communicating across network segment. Device supports up to 32 routing entries, every entry must provide gateway, destination address, subnet mask, egress interface and other information.

Operation Path

Open in order: "System Management > Route Table".

Interface Description

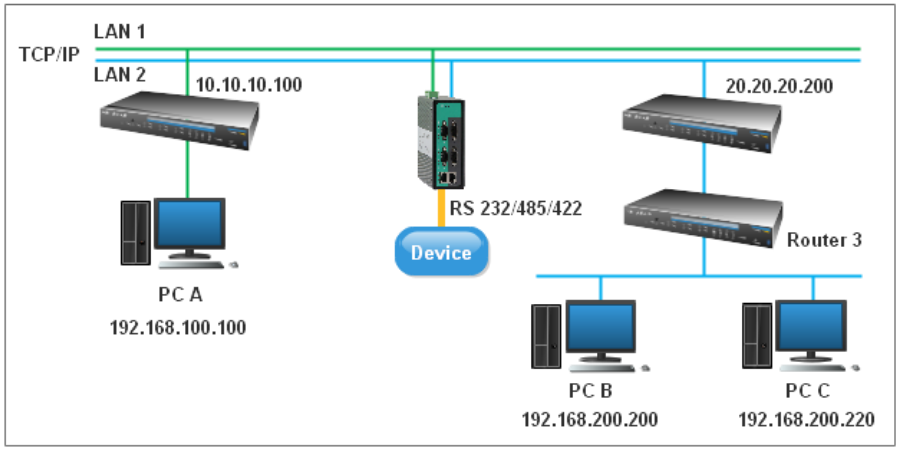
The Route Table interface as follows:

The main elements configuration description of static routing configuration interface:

Interface Element	Description
No.	The entry number of static routing table.
Gateway	Gateway IP address or IP address of next hop router.
Destination	The IP address of destination host or the network address of destination routing.
Netmask	Subnet mask of destination network.
Metric	The number of routers from source terminal to destination terminal is hop. Device will prioritize the routing forward of data packets if more than one router is available to reach a given destination.
Iface	Network data egress, options are as follows: • lan1 • lan2

Configuration Instance

Configure Modbus gateway static routing to communicate with PC A, PC B and PC C. Suppose Modbus gateway LAN1 connects to router1, and communicates with PC A; Modbus gateway LNA2 connects to router2, and communicates with PC B/PC C via router3, as the picture below.



Note:

The device picture mentioned in above figure is only an example, and the actual appearance of the device is subject to the device obtained.

Modbus gateway communicates with PC A, the network parameter is as follows:

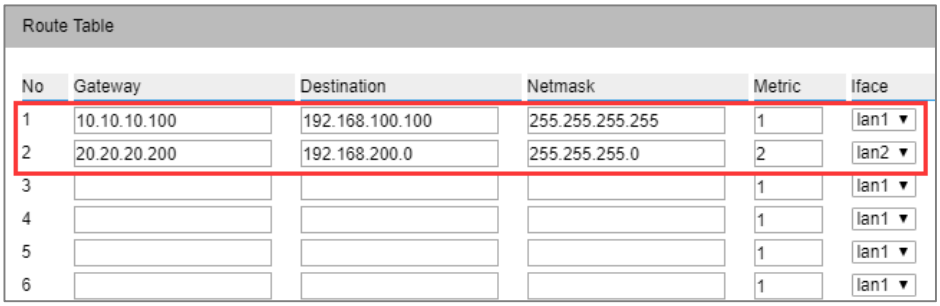
- The IP address (LAN 1) of the Modbus gateway network Port 1: 10.10.10.10
- Router1 IP address (LAN 1) : 10.10.10.100
- PC A IP address: 192.168.100.100

Modbus gateway communicates with PC B and PC C, the network parameter is as follows:

- Configure the IP address (LAN 2) of the Modbus gateway network Port 2: 20.20.20.20

- Router2 IP address (LAN 2) : 20.20.20.200
- PC B IP address 192.168.200.200
- PC C IP address 192.168.200.200

When Modbus gateway communicates with PC A and crosses one router, the hop is 1, add routing as entry1 in the figure below. When Modbus gateway communicates PC B or PC C, crosses two routers, the hop is 2, add routing as entry2 in the figure below.



9.8 ARP Setting

Function Description

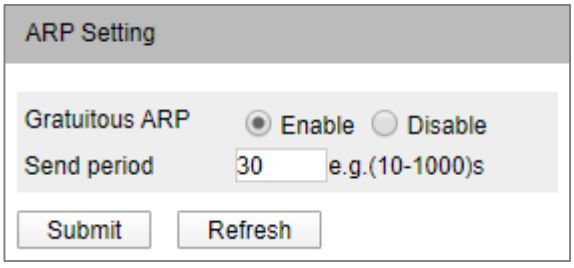
In “ARP Setting” page, you can enable free ARP function and set parameter of sending period. Free ARP function can avoid the failure of communication due to device MAC address being aged by switch or router.

Operation Path

Open in order: “System Management > ARP Setting”.

Interface Description

ARP Setting interface is as below:



Main elements configuration descriptions of free ARP interface:

Interface Element	Description
Gratuitous Setting	Free ARP function status, options as follows: • Enable • Disable
Send period	The interval time of sending Gratuitous ARP network packet, 10 in default, for example:10-1000s.

9.9 Diagnostic

9.9.1 Ping

Function Description

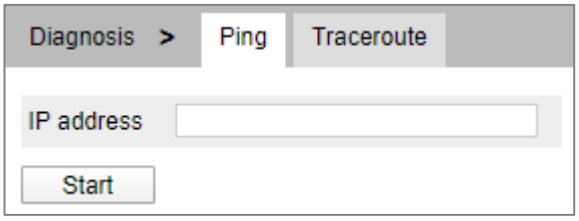
On the "Ping" page, users can use the Ping command to check whether the network is clear or the network connection speed. Ping demand utilizes the uniqueness of network machine IP address to send a data packet to the target IP address, and then ask the other side to return a similarly sized packet to determine whether two network machines are connected and communicated, and confirm the time delay.

Operation Path

Open in order: “System Management > Diagnosis > Ping".

Interface Description

The interface of Ping is as follows:



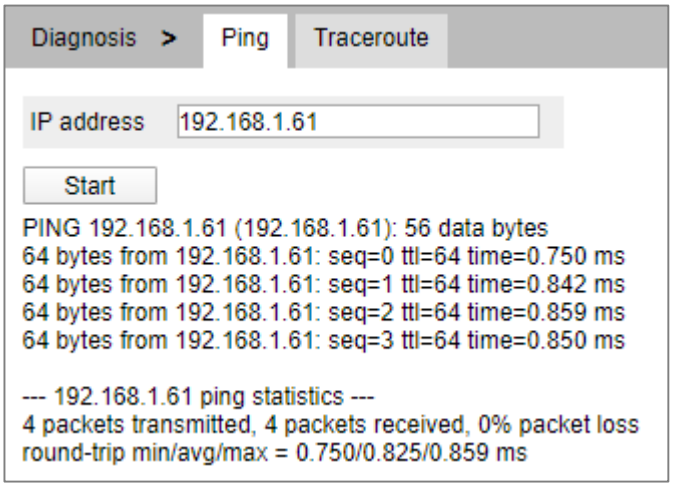
The main elements configuration description of Ping configuration interface:

Interface Element	Description
IP Address	The IP address of the detected device, that is, the destination address. The device can check the network intercommunity to other devices via the ping command.

Ping Configuration:

Step 1 Fill in the IP address that needs ping in the IP address text box;

Step 2 Click the "Start” button to check the ping results;



Step 3 End.

9.9.2 Traceroute

Function Description

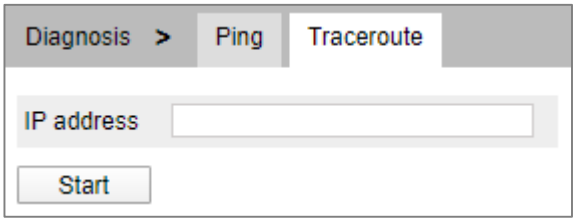
On the "Traceroute" page, users can test the network conditions between the device and the target host. Traceroute sends the small data packet to destination device until it returns and measures the time it needs. Each Traceroute will measure a route for three times. Output result includes each test time (ms), device name (if exists) and the IP address.

Operation Path

Open in order: “System Management > Diagnose > Traceroute".

Interface Description

TRACEROUTE interface as follows:



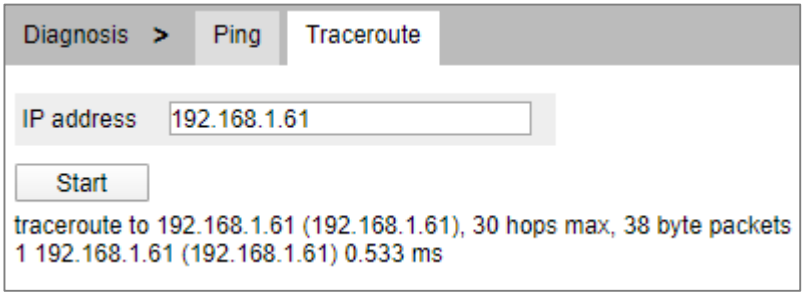
The main elements configuration description of Traceroute interfaces:

Interface Element	Description
IP Address	IP address of the destination device, fill in the IP address of the opposite device that needs to be detected.

TRACEROUTE Configuration:

Step 1 Fill in the destination IP address in the "IP address" text box;

Step 2 Click the "Start" to see the results, as the picture below.



Note:

The above figure shows the time from the device to IP address 192.168.1.200, which takes 0.239ms after one hop.

Step 3 End.

9.10 System Management

9.10.1 Configuration File

Function Description

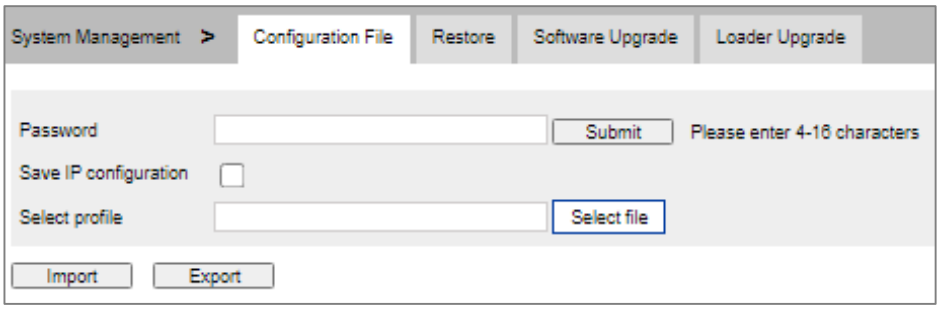
On the " Configuration File" page, user can download and upload configuration file.

Operation Path

Open in order: “System Management > Configuration File”.

Interface Description

Configuration file interface is as follows:



The main elements configuration description of configure file management interface:

Interface Element	Description
Save IP configuration	When checked, the device can keep the current IP address after importing the configuration file.
Select profile	Select the path to uploadconfiguration file locally , click "Select File" to select required configuration file. Note: Uploaded configuration files need to be exported by devices of the same model.
Export	Download the configuration file of the current device in the format of. tar. Note: The downloaded configuration file will be saved in the format of ".tar", which is encrypted, so please do not decompress or modify it.
Import	Upload configuration file.

Note

- After finishing update, the device will automatically open a new page to "System Information", and the uploaded configuration file will be valid after the device is reset.
- After uploading the configuration file, if the static IP in the configuration file and the computer IP are not in the same network segment, the webpage cannot be opened.
- While uploading configuration file, if dynamic IP is used in the configuration file and there is no DHCP server in the network segment, relative IP portion won't be

updated.

- Do not click on or configure other WEB pages of the device or restart the device when uploading configuration files or upgrading software. Otherwise, the configuration file upload or software update will fail, or the device system will crash.

9.10.2 Restore

Function Description

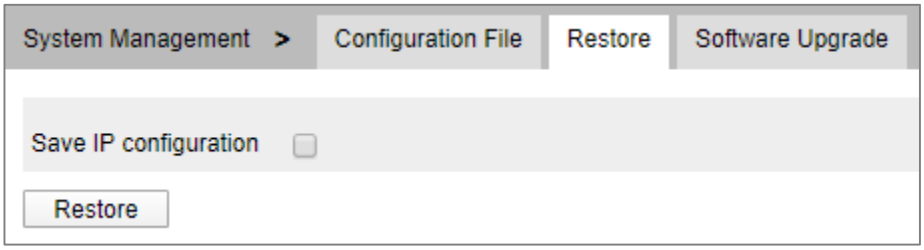
On the "Restore" page, user can restore the device to default setting.

Operation Path

Open in order: "System management > Restore".

Interface Description

Restore interface is as follows:



The main elements configuration description of Restore Factory settings interface:

Interface Element	Description
Save IP configuration	When checked, the device can keep the current IP address after restoring the factory settings.
Restore	Click this button and the device will lose all existing configurations and reverts to factory settings.

Note
Restoring factory value settings will cause all configurations to be in the factory state, where the IP address is the static IP address "192.168.1.254", and the user name and password default to "admin".

9.10.3 Software Upgrade

Function Description

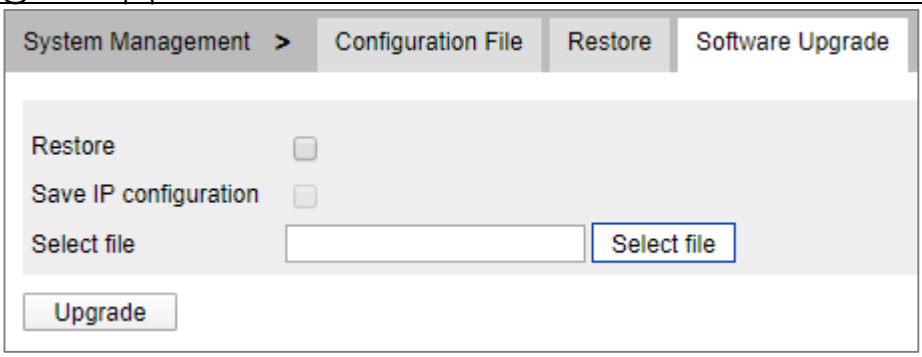
On the Software Upgrade page, you can update and upgrade the device program.

Operation Path

Open in order: "System management > Software Upgrade".

Interface Description

The software update interface as follows:



The main elements configuration description of software update interface:

Interface Element	Description
Restore	When checked, the device will be restored to the factory settings after upgrading. After unchecking, the configuration parameters will be kept after the device software is upgraded.
Save IP configuration	After the software upgrade is checked to restore the factory configuration, the IP configuration can be checked to keep the current IP address and other parameters will be restored to the factory configuration.
Select file	Select the path of the local upgrade file, and click “Select file” to select the required configuration file.
Upgrade	Click “upgrade” button to start the program upgrade.

Note

- Do not click on or configure other WEB pages of the device or restart the device or power off the device when upgrading software. Otherwise, the software update will fail, or the device system will crash.
- Maintain a reliable wired connection when upgrading.
- When the online upgrade is complete, the device will restart automatically.

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10 Operation Mode Configuration Instance

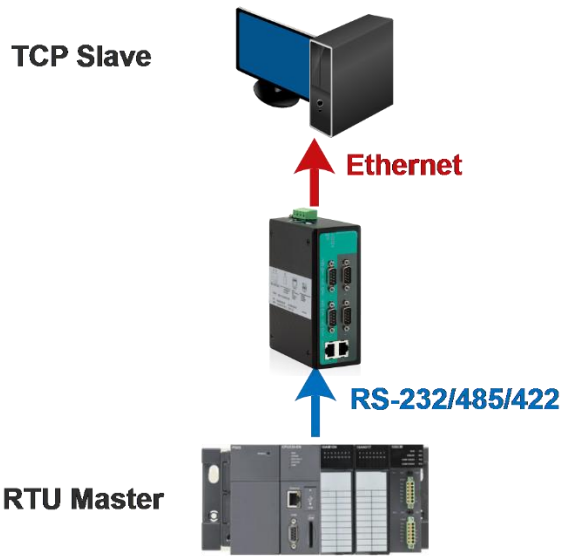
About this chapter

Content	Link
This Chapter	10.1 RTU Master Mode 10.2 RTU Slave Mode 10.3 ASCII Master Mode 10.4 ASCII Slave Mode 10.5 Intelligent Commands and Automatic Route 10.6 Demand priority and TCP port / IP address route

10.1 RTU Master Mode

Background introduction

When the user needs to implement the Modbus RTU master device to communicate with the Modbus TCP slave device, use the Modbus gateway device and set the device's operating mode to RTU Master.



Note:

The device picture mentioned in above figure is only an example , and the actual appearance of the device is subject to the device obtained.

In RTU Master Mode, the RTU master device accesses the TCP slave device through the gateway.

① RTU master device sends request to gateway;
② Gateway forwards request to TCP slave device;
③ TCP slave device returns a response;
④ The gateway sends back the response.

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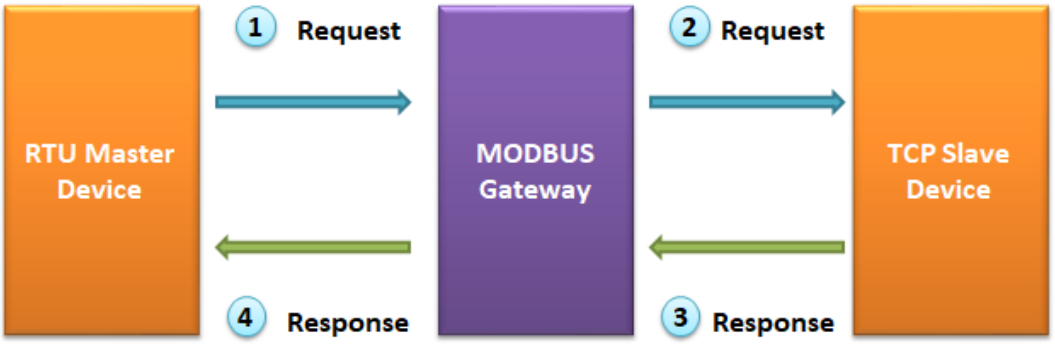


The parameters of the RTU master are as follows:

- Communication port: COM1
- Baud rate: 115200
- Parity bit: None
- Data bit: 8
- Stop bit: 1

Gateway parameter information as follow:

- IP address: 192.168.1.254

The parameters of the TCP slave are as follows:

- IP address: 192.168.1.61
- Slave ID: 1
- TCP port number: 501

Configuration Steps

Note
The screenshot reference model for this manual is 4 RS-232/485/422 + 2 100M copper ports. In addition to the supported serial type (RS-232, RS-422, RS-485), the number of network ports and the number of serial ports, the interface functions and interface operations of other types of products are the same.

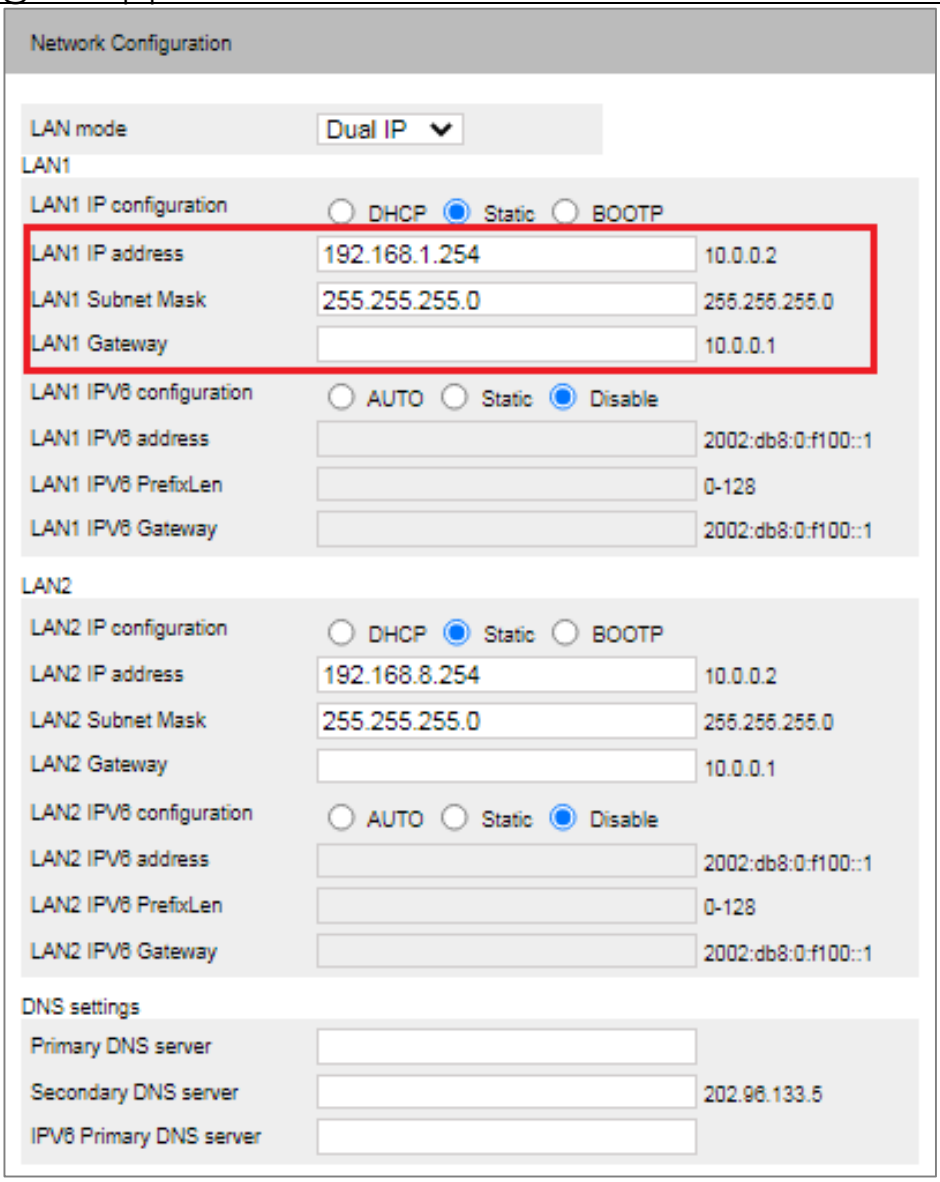
Step 1 Connect the COM serial port of the computer and the COM1 serial port of the Modbus gateway using a cable or a converter.

Step 2 Connect the network port of the computer and the network port1 of the Modbus gateway using a Ethernet cable.

Step 3 Configure the IP address of the Modbus gateway.

1 Login in the Web configuration interface, choose "Network Setting".

2 In the "LAN1" area, enter the "IP address", "Subnet Mask" and "Gateway address" corresponding to the Modbus gateway.

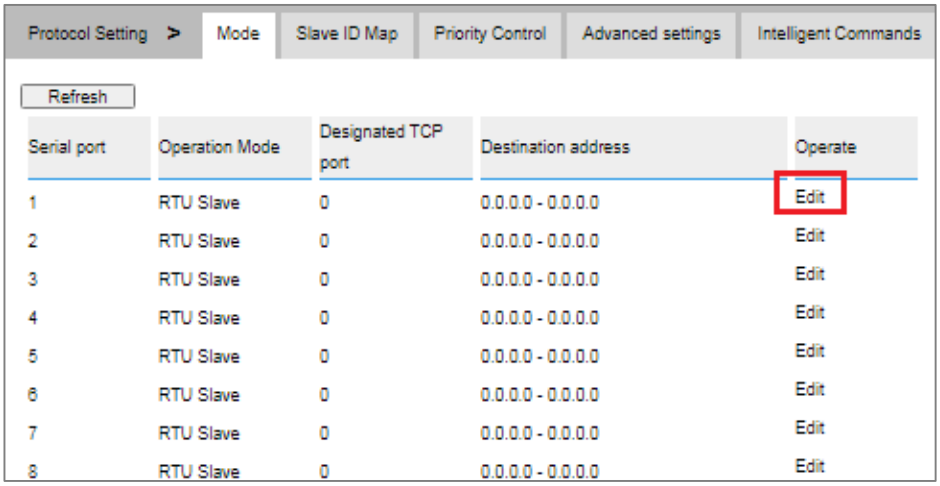


3 Other parameters remain the default, click "Submit".

Step 4 Configure the operation mode and slave ID of the Modbus gateway.

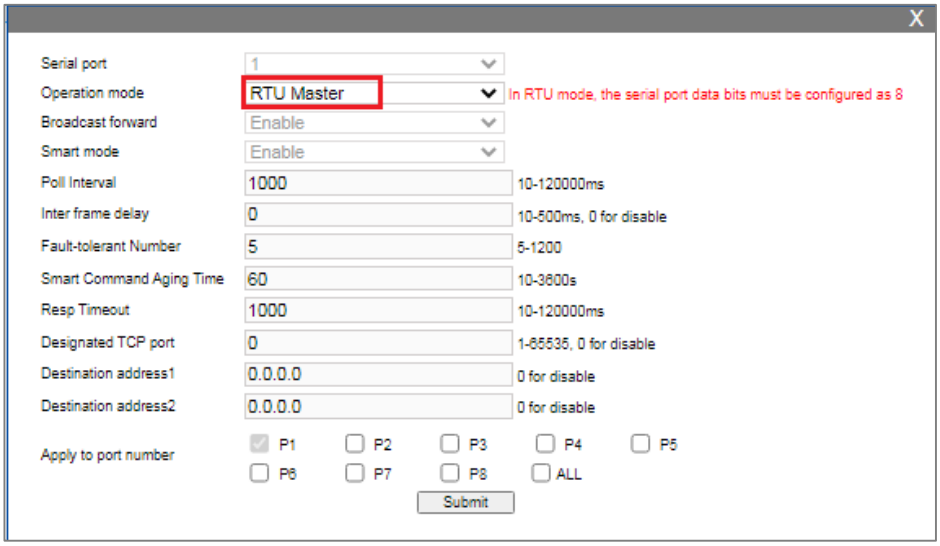
1 Log in to the Web configuration interface and select "Protocol Setting > Mode".

2 In the Port1 entry, click Edit under operation, as shown in the following figure.



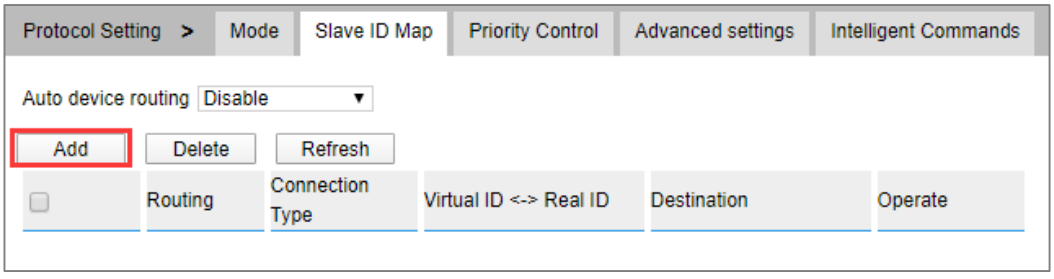
3 In the edit window of serial port1, configure mode as “RTU Master”, as the picture below.

- Click the “Operation Mode” drop-down list and select “RTU Master”.
- Click “Submit” button.



4 Select “Protocol Setting > Slave ID Map”, and enter “Slave ID Map” page.

5 In “Slave ID Map” page, click "add" button, as the picture below.



6 In “Add” window, fill in slave station information, as the picture below.

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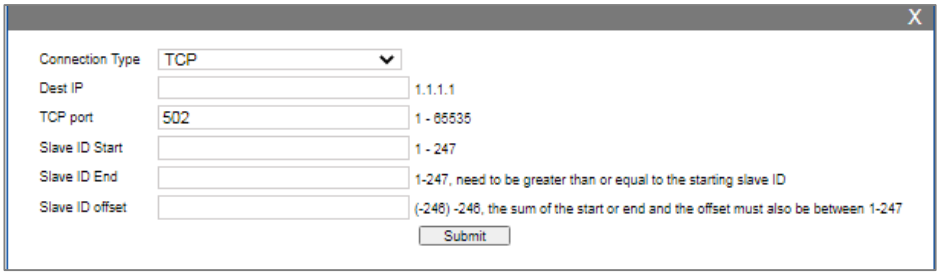
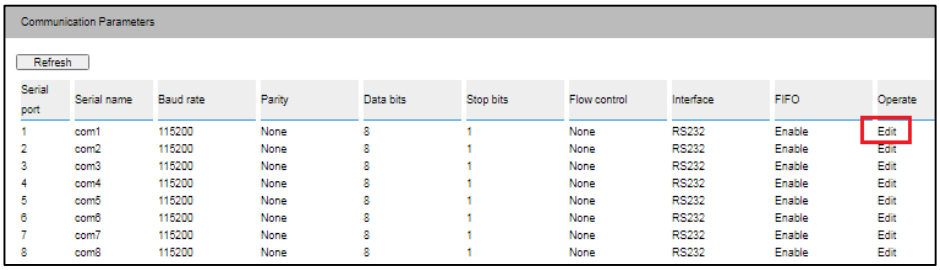


- Click "Connection type" drop-down list, select "TCP" connection.
- Enter the host PC's IP address "192.168.1.61" in the "Dest IP" text box.
- Enter the port number "501" of the host in the "Dest Port" text box.
- Enter slave ID start number "1" in the "Slave ID Start" text box.
- Enter "1" in the "Slave ID END" text box.
- Enter "0" in the "Slave ID Offset" text box.
- Click "Submit" button.

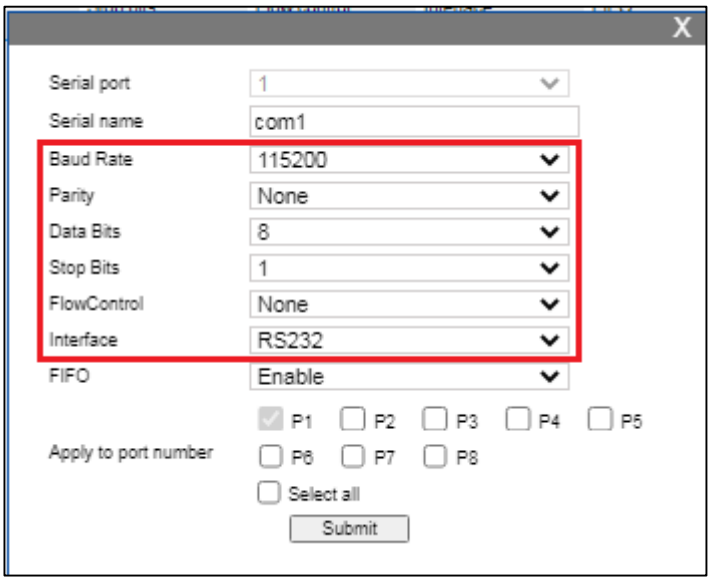
Step 5 Configure the serial port parameter information.

1 Log in to the Web configuration interface and select "Serial Settings".

2 In the Port1 entry, click Edit under operation, as shown in the following figure.



3 Set the "BaudRate", "Parity","Stop Bits","Data Bits" and "Interface" in the "COM Parameter" option box.

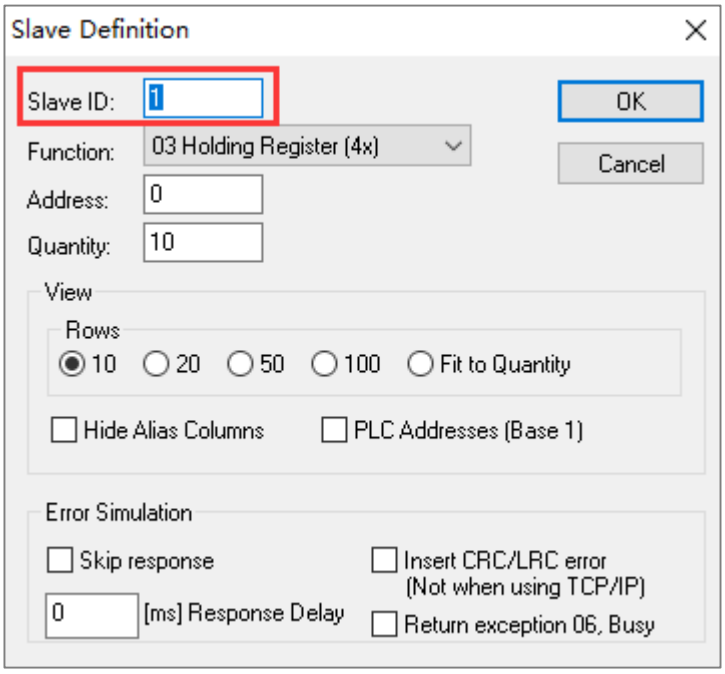


4 Other parameters remain the default, click "Submit".

Step 6 Run "Modbus Poll" and “Modbus Slave” software to configure master and slave information.

1 Open “Modbus Slave” software, click "Setup > Slave Definition".

2 Enter "1" in the "Slave ID" text box.



3 Other parameters remain the default, click "OK".

4 Click " Connection > Connection Setup ".

5 Click the "Connection" drop-down list box and select "Modbus TCP/IP".

6 Enter the TCP slave IP address "192.168.1.61" in the "IP Address" text box of the "TCP/IP Server" area.

7 Enter the TCP slave port number "501" in the "Port" text box of the "TCP/IP Server" area.

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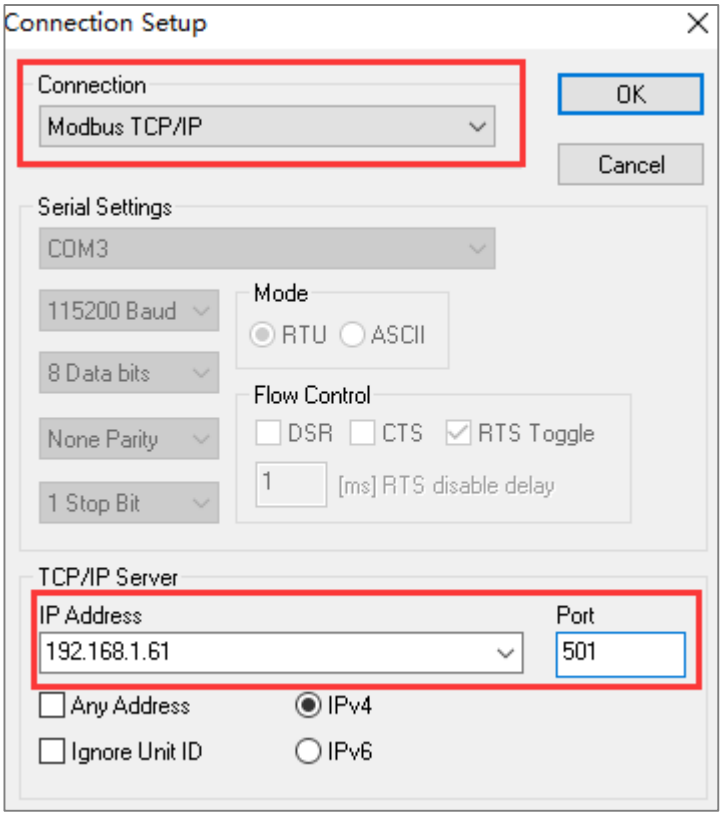
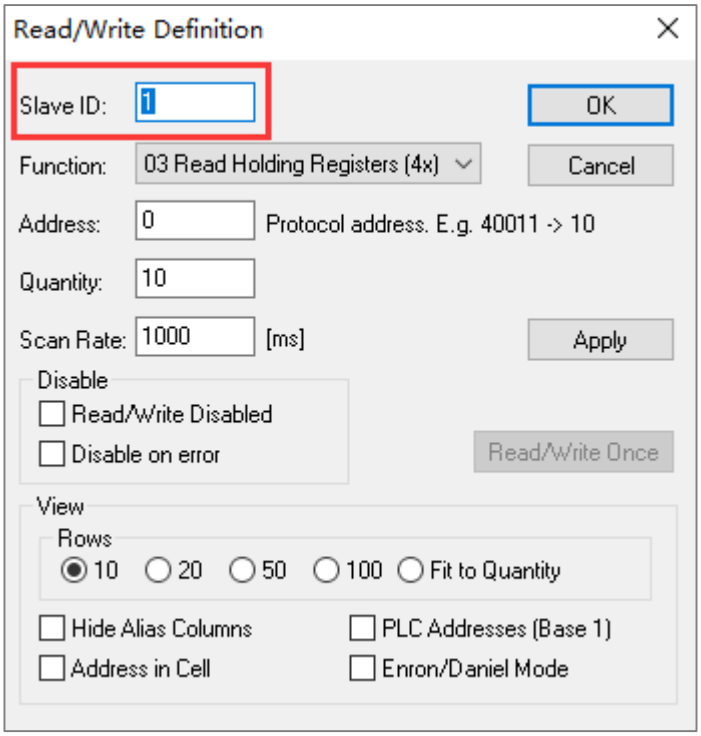


8 Other parameters remain the default, click "OK".

9 Run the “Modbus Poll” software, click "Setup > Read / Write Definition".

10 Enter "1" in the "Slave ID" text box.

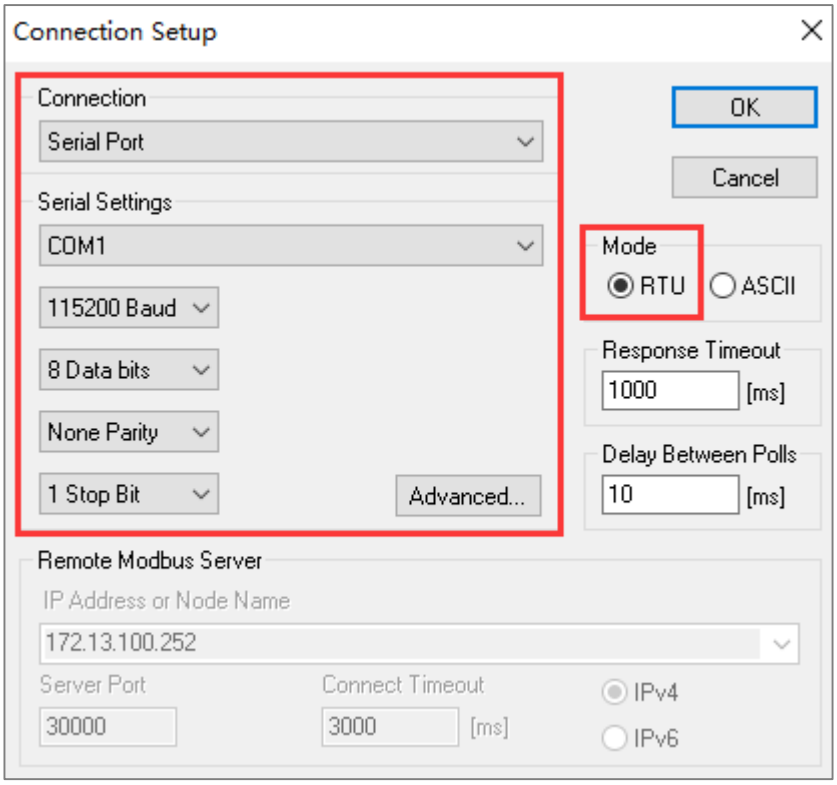


11 Other parameters remain the default, click "OK".

12 Click " Connection > Connection Setup ".

13 Click the "Connection" drop-down list box and select "serial port".

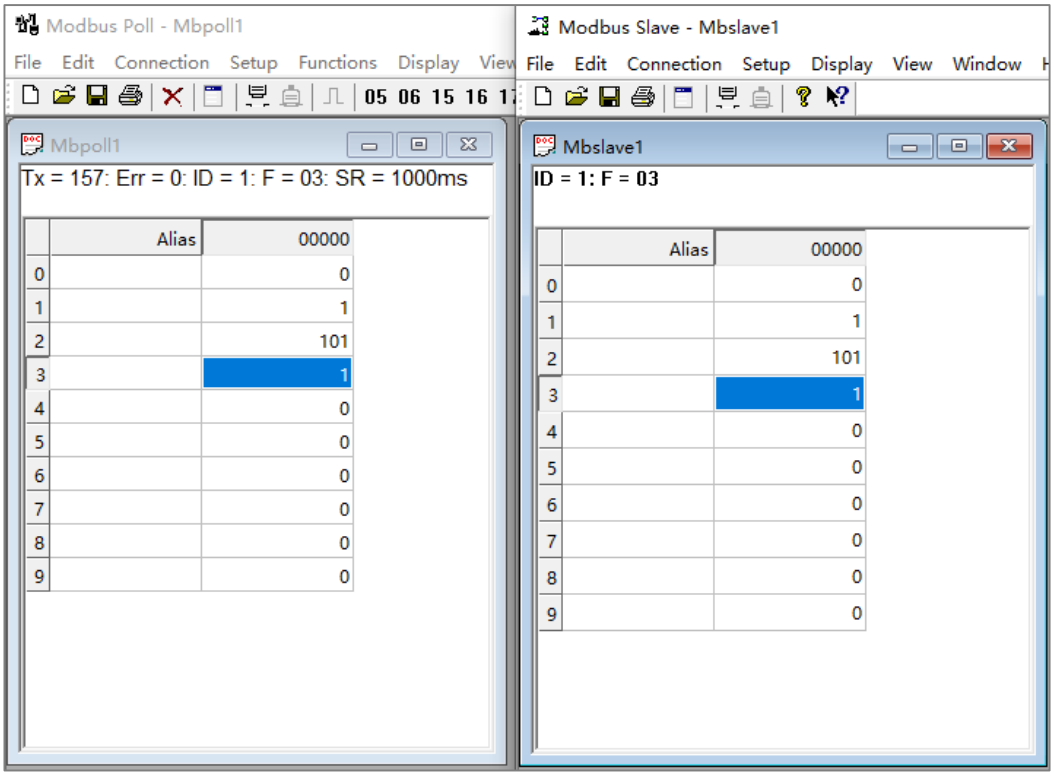
14 In the "Serial Settings" option box, configure serial port information such as serial number, baud rate, data bit, parity bit and stop bit.



15 Select the "RTU" mode in the "Mode" option.

16 Other parameters remain the default, click "OK".

Step 7 Check the normal communication between the RTU master and the TCP slave.

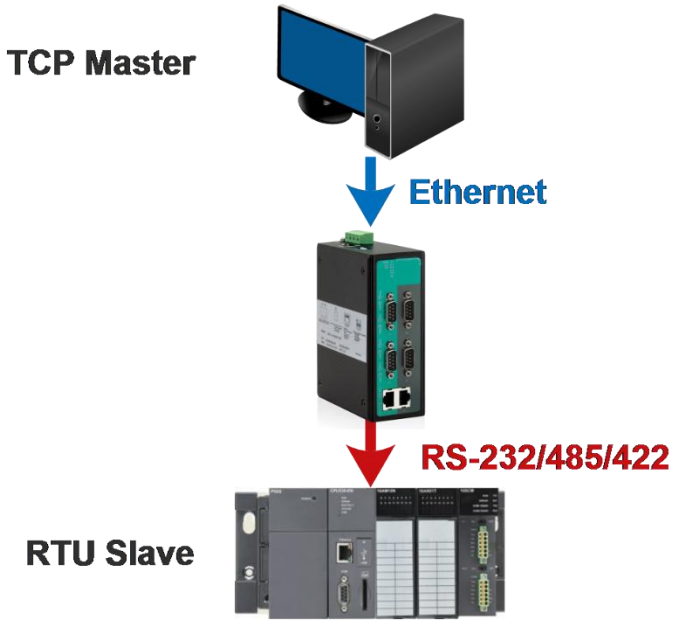


Step 8 End.

10.2 RTU Slave Mode

Background introduction

When the user needs to implement the Modbus TCP master device to communicate with the Modbus RTU slave device, use the Modbus gateway device and set the device's operating mode to RTU Slave.



Note:

The device picture mentioned in above figure is only an example, and the actual appearance of the device is subject to the device obtained.

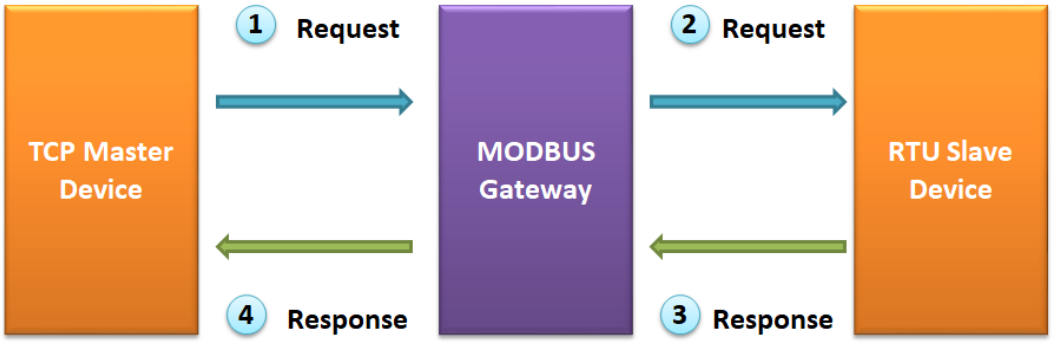
In RTU Slave Mode, the TCP master device accesses the RTU slave device through the gateway.

① TCP master device sends request to gateway;

② Gateway forwards request to RTU slave device;

③ RTU slave device returns a response;

④ The gateway sends back the response.



The parameters of the TCP master are as follows:

- IP address: 192.168.1.61

The parameter information of Modbus gateway is as follows:

- IP address: 192.168.1.254
- TCP port number: 502

The parameters of the RTU slave are as follows:

- Slave ID: 2
- Communication port: COM 2
- Baud rate: 115200
- Parity bit: None
- Data bit: 8
- Stop bit: 1

Configuration Steps

Note

The screenshot reference model for this manual is 4 RS-232/485/422 + 2 100M copper ports. In addition to the supported serial type (RS-232, RS-422, RS-485), the number of network ports and the number of serial ports, the interface functions and interface operations of other types of products are the same.

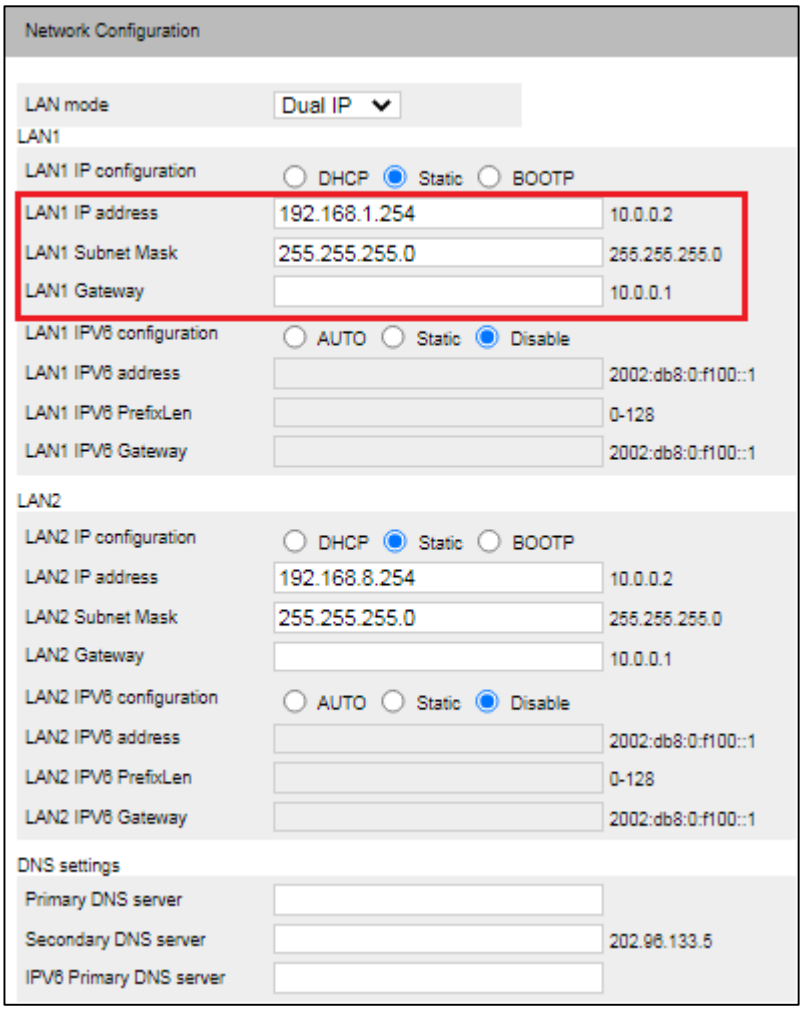
Step 1 Connect the COM serial port of the computer and the COM2 serial port of the Modbus gateway using a cable or a converter.

Step 2 Connect the network port of the computer and the network port1 of the Modbus gateway using a Ethernet cable.

Step 3 Configure the IP address of the Modbus gateway.

1 Login in the Web configuration interface, choose "Network Setting".

2 In the "LAN1" area, enter the "IP address", "Subnet Mask" and "Gateway address" corresponding to the Modbus gateway.



3 Other parameters remain the default, click "Submit".

Step 4 Configure the operation mode of the Modbus gateway.

1 Log in to the Web configuration interface and select "Protocol Setting > Mode".

2 In the Port2 entry, click “Edit” under operation, as shown in the following figure.

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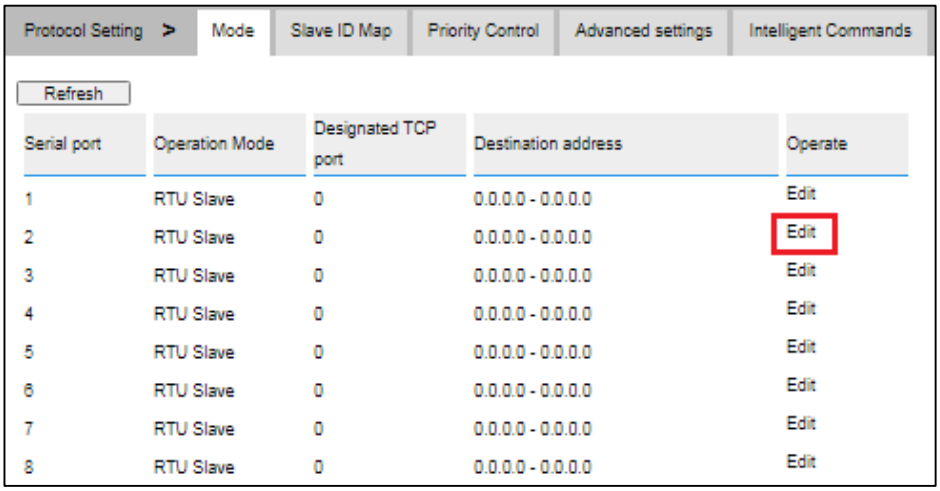
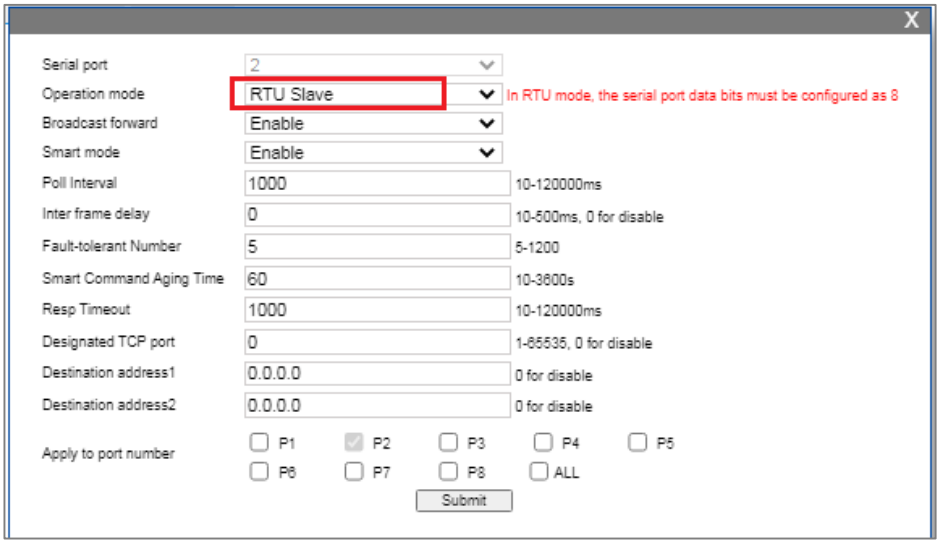


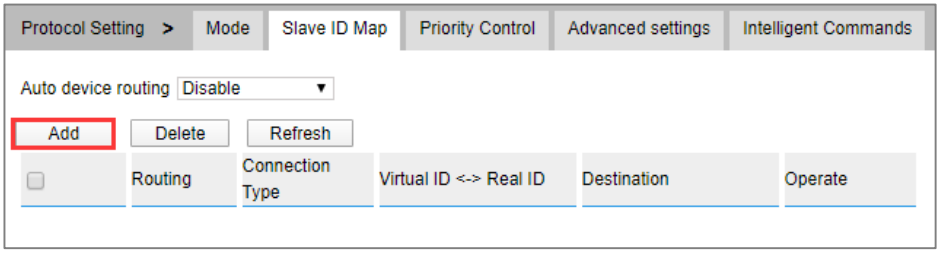
3 In the edit window of serial port2, configure mode as “RTU Slave”, as the picture below.

- Click the "Operation Mode" drop-down list and select "RTU Slave".
- Other parameters remain the default, click "Submit".



4 Select “Protocol Setting > Slave ID Map”, and enter “Slave ID Map” page

5 In “Slave ID Map” page, click "add" button, as the picture below.



Note:
Device will detect RTU/ASCII slave mapping information automatically without having to add it manually when “Automatic Route” is enabled.

6 In “Add” window, fill in slave station information, as the picture below.

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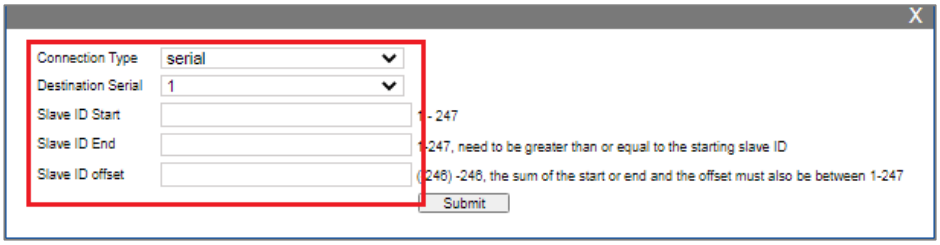
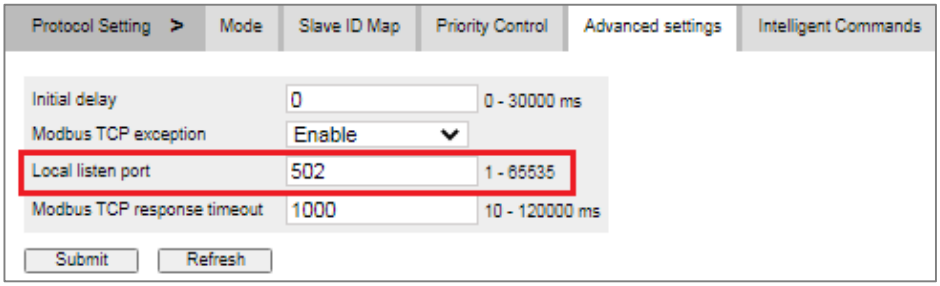


- Click "Connection type" drop-down list, select "serial1" connection.
- Click "Destination Port" drop-down list, choose serial port "2".
- Enter slave ID start number "2" in the "Slave ID Start" text box.
- Enter "2" in the "Slave ID END" text box.
- Enter "0" in the "Slave ID Offset" text box.
- Click "Apply" button.

7 Select "Protocol Setting > Advanced Settings", enter "Advanced Settings" page.

8 Enter TCP port number "502" in the "listening port" text box.

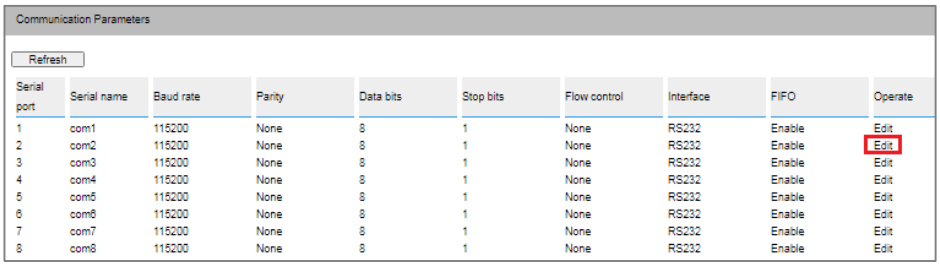


9 Other parameters remain the default, click "Submit".

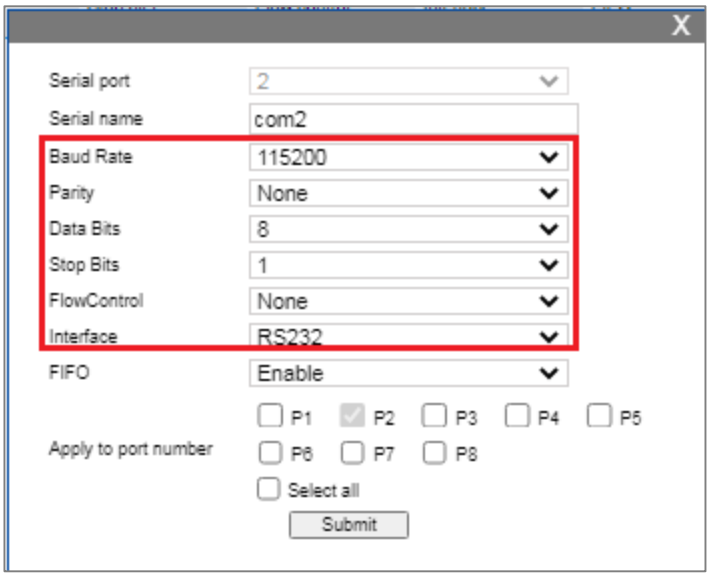
Step 5 Configure the serial port parameter information.

1 Log in to the Web configuration interface and select "Serial Settings".

2 In the Port2 entry, click "Edit" under operation, as shown in the following figure.



3 Set the "BaudRate", "Parity","Stop Bits","Data Bits" and "Interface" in the "COM Parameter" option box.

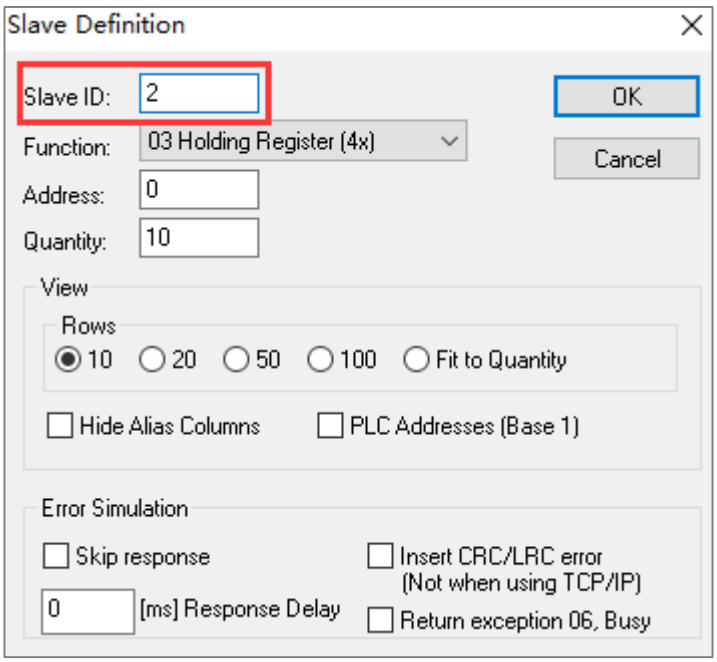


4 Other parameters remain the default, click "Submit".

Step 6 Run "Modbus Poll" and “Modbus Slave” software to configure master and slave information.

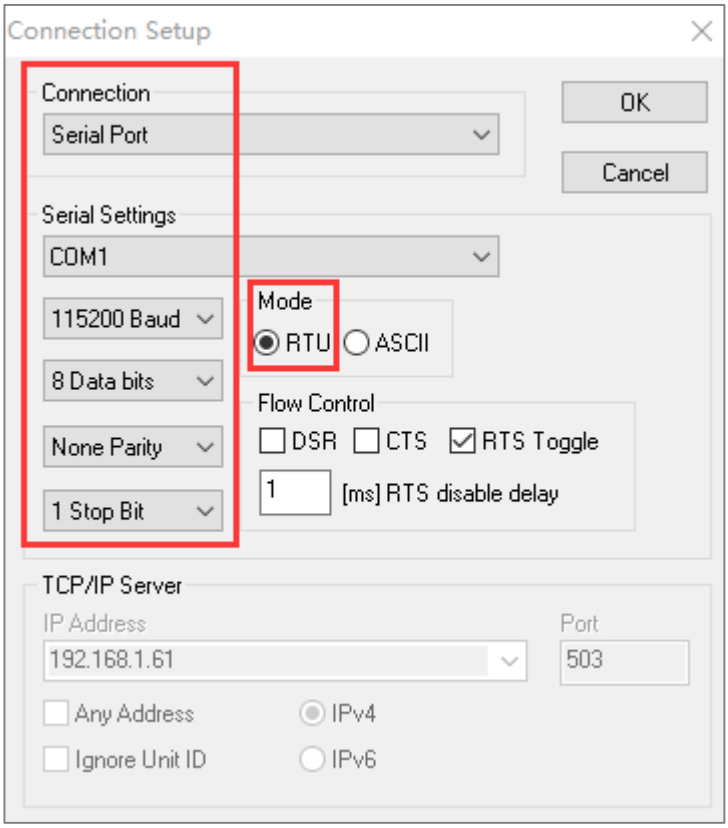
1 Open “Modbus Slave” software, click "Setup > Slave Definition".

2 Enter "2" in the "Slave ID" text box.



3 Other parameters remain the default, click "OK".

4 Click " Connection > Connection Setup ".



5 Click the "Connection" drop-down list box and select "serial port".

6 In the "Serial Settings" option box, configure serial port information such as serial number, baud rate, data bit, parity bit and stop bit.

7 Select the "RTU" mode in the "Mode" option.

8 Other parameters remain the default, click "OK".

9 Run the “Modbus Poll” software, click "Setup > Read / Write Definition".

10 Enter "2" in the "Slave ID" text box.

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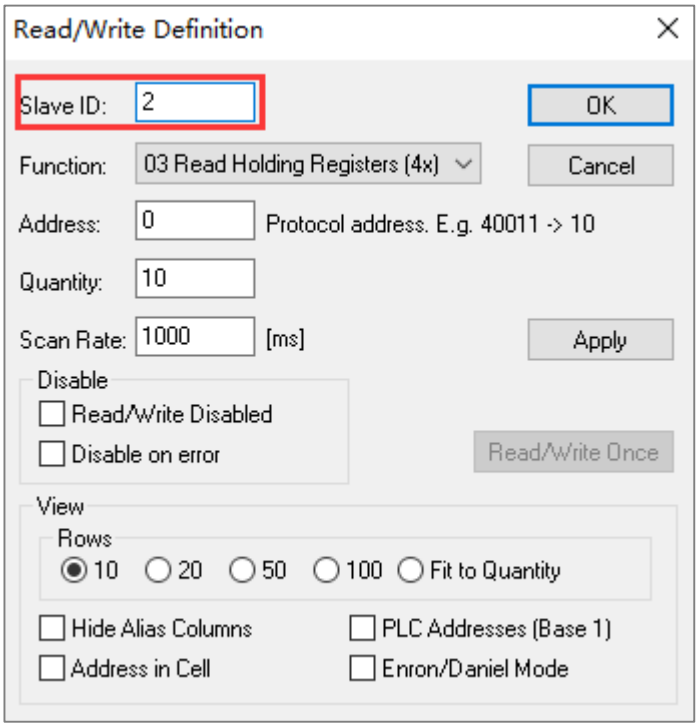

11 Other parameters remain the default, click "OK".

12 Click " Connection > Connection Setup ".

13 Click the "Connection" drop-down list box and select "Modbus TCP / IP".

14 Enter IP address "192.168.1.254" in the "IP Address" text box of the "Remote Modbus Server" area.

15 Enter port number "502" in the “Server Port" text box of the "Remote Modbus Server" area.

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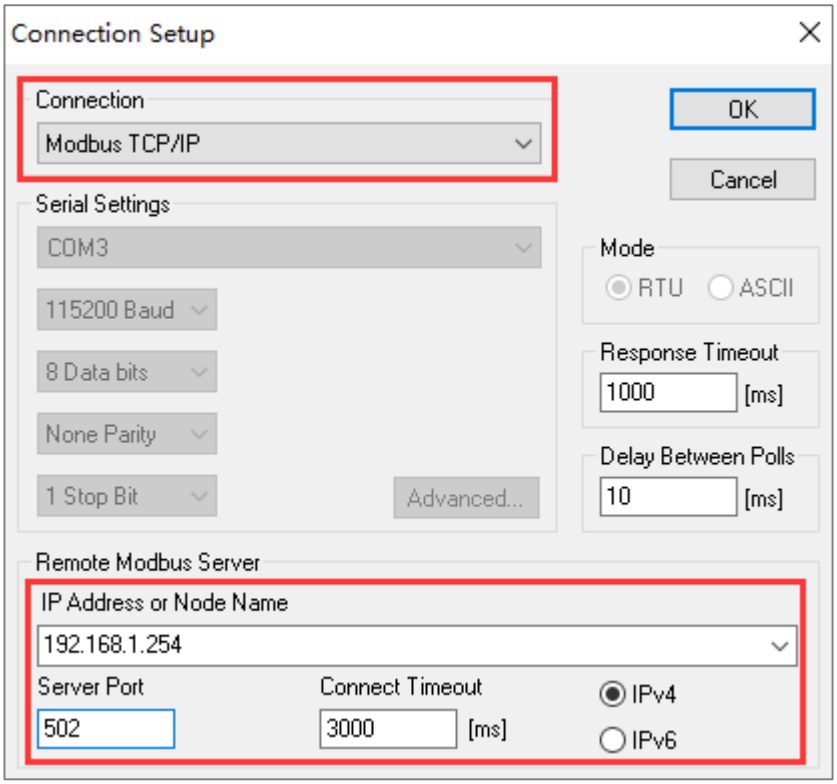
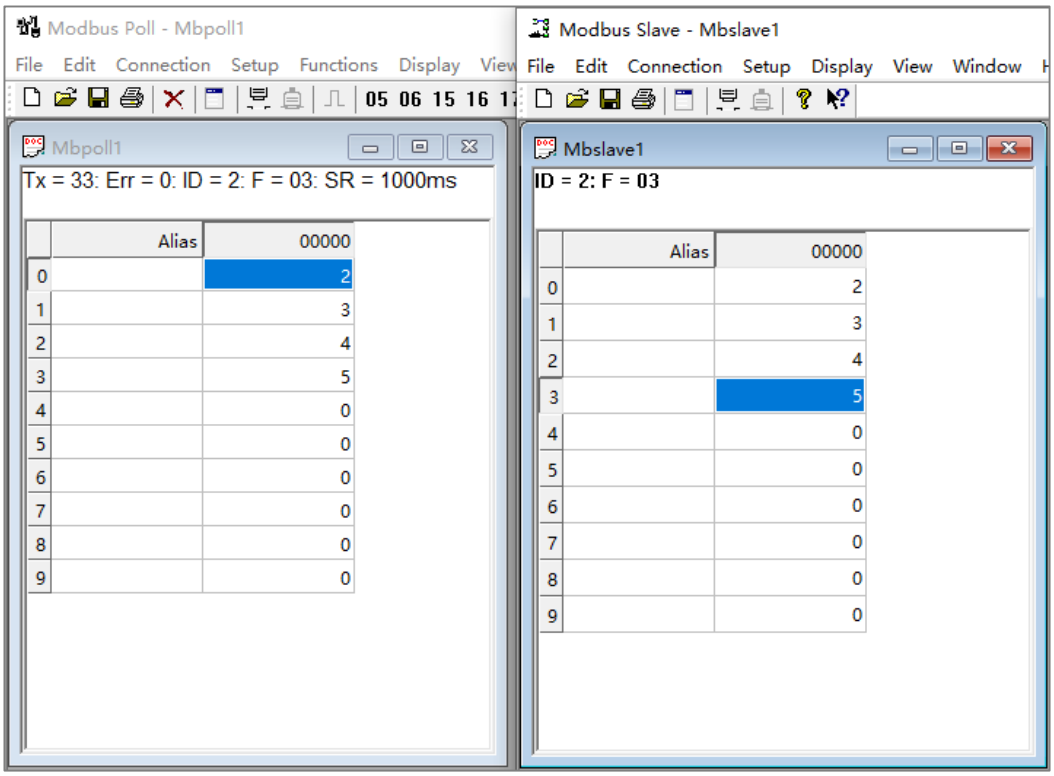


16 Other parameters remain the default, click "OK".

Step 7 Check the normal communication between the TCP master and the RTU slave.



Step 8 End.

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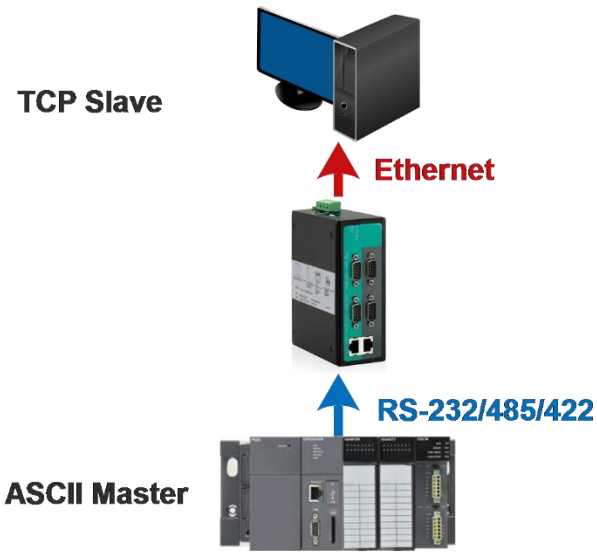
10.3 ASCII Master Mode

Background introduction

When the user needs to implement the Modbus ASCII master device to communicate with the Modbus TCP slave device, use the Modbus gateway device and set the device's operating mode to ASCII Master.

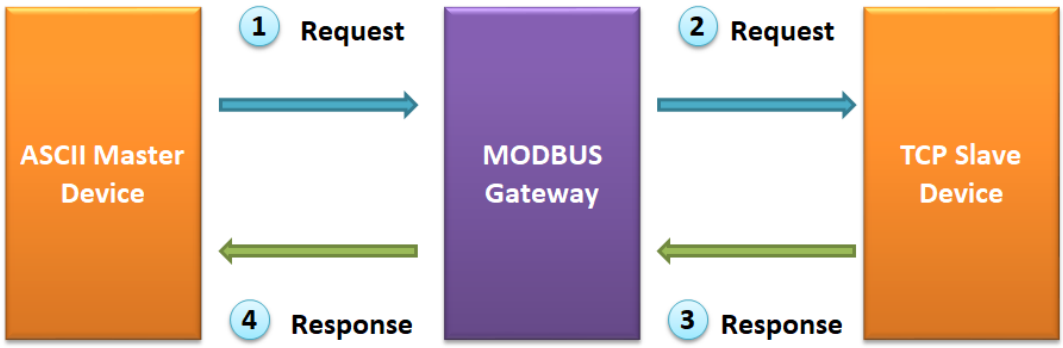


Note:

The device picture mentioned in above figure is only an example, and the actual appearance of the device is subject to the device obtained.

In ASCII Master Mode, the ASCII master device accesses the TCP slave device through the gateway.

① ASCII master device sends request to gateway;
② Gateway forwards request to TCP slave device;
③ TCP slave device returns a response;
④ The gateway sends back the response.



The parameters of the ASCII master are as follows:

- Communication port: COM3
- Baud rate: 115200
- Parity bit: None
- Data bit: 8
- Stop bit: 1

Gateway parameter information as follow:

- IP address: 192.168.1.254

The parameters of the TCP slave are as follows:

- IP address: 192.168.1.61
- Slave ID: 3
- TCP port number: 503

Configuration Steps

Note
The screenshot reference model for this manual is 4 RS-232/485/422 + 2 100M copper ports. In addition to the supported serial type (RS-232, RS-422, RS-485), the number of network ports and the number of serial ports, the interface functions and interface operations of other types of products are the same.

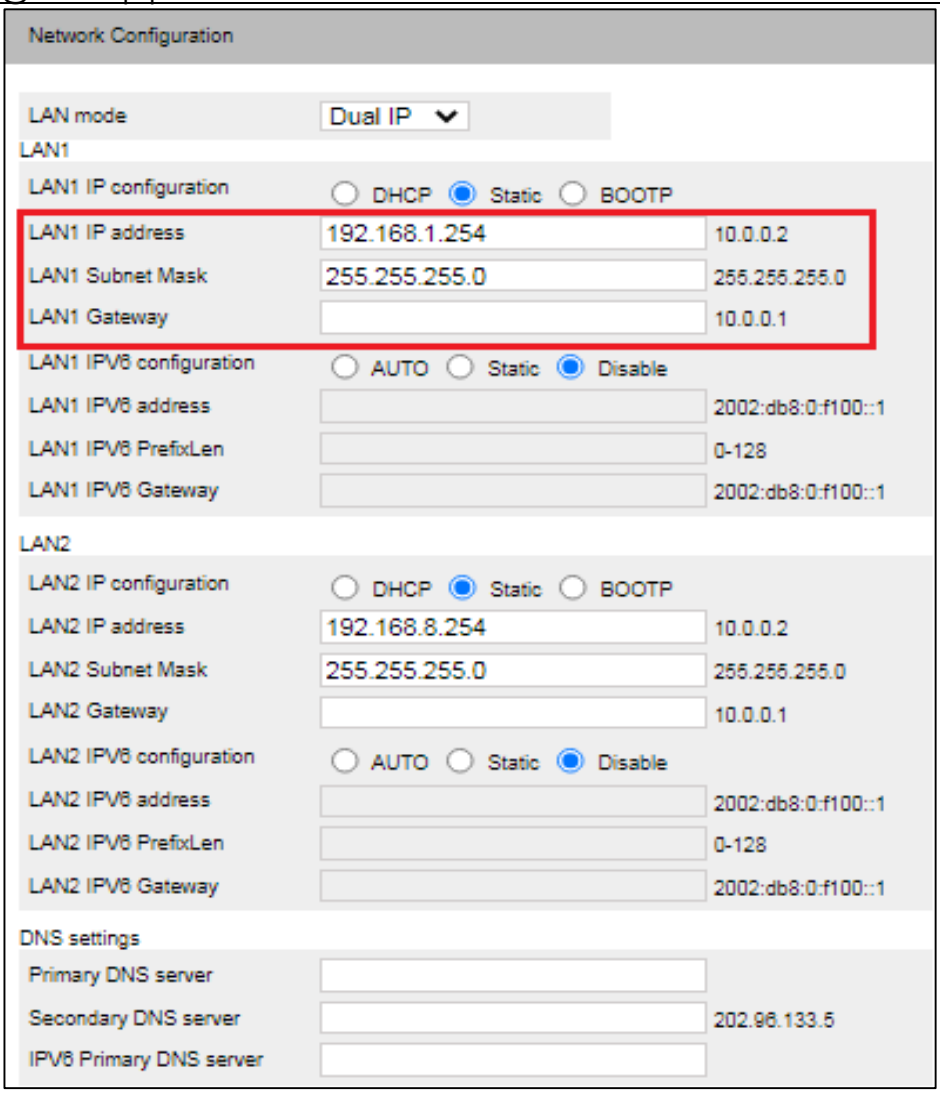
Step 1 Connect the COM serial port of the computer and the COM3 serial port of the Modbus gateway using a cable or a converter.

Step 2 Connect the network port of the computer and the network port1 of the Modbus gateway using a Ethernet cable.

Step 3 Configure the IP address of the Modbus gateway.

1 Login in the Web configuration interface, choose "Network Setting".

2 In the "LAN1 address" option box, enter the "IP address", "Subnet Mask" and "Gateway address" corresponding to the Modbus gateway.

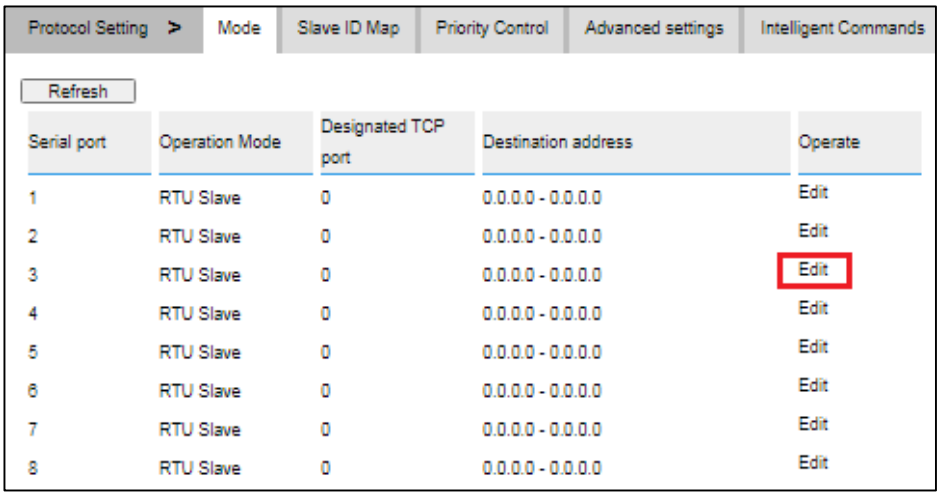


3 Other parameters remain the default, click "Submit".

Step 4 Configure the operation mode and slave ID of the Modbus gateway.

1 Log in to the Web configuration interface and select "Protocol Setting > Mode".

2 In serial port3 entry, click “Edit” under operation, as shown in the following figure.



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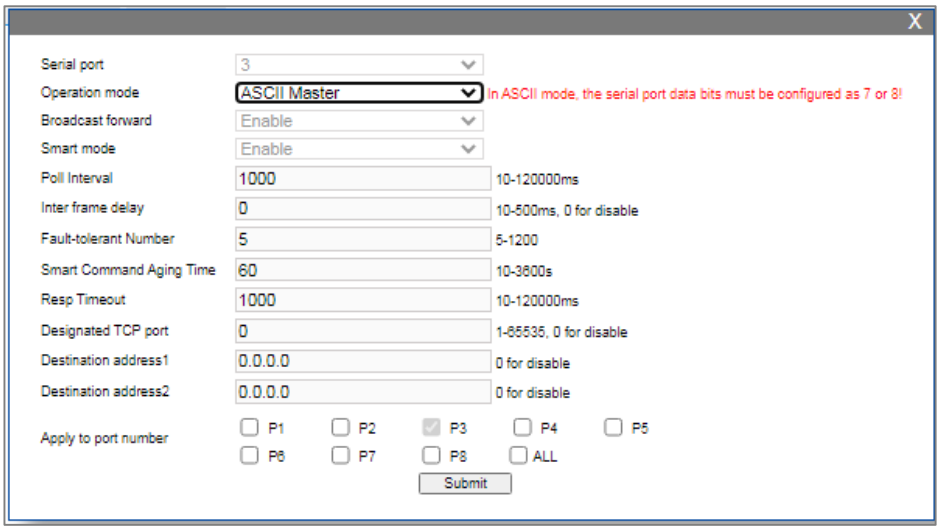
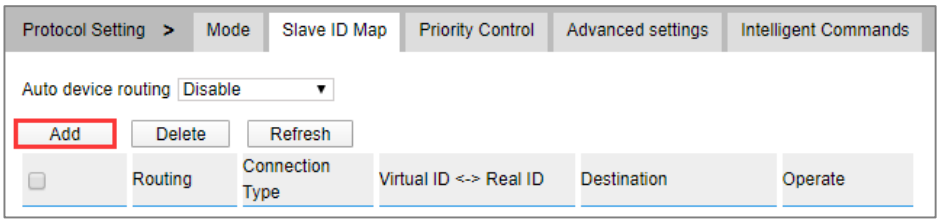
3 In the edit window of serial port3, configure mode as “ASCII Master”, as the picture below.

- Click the “Operation Mode” drop-down list and select “ASCII Master”.
- Click “Apply” button.

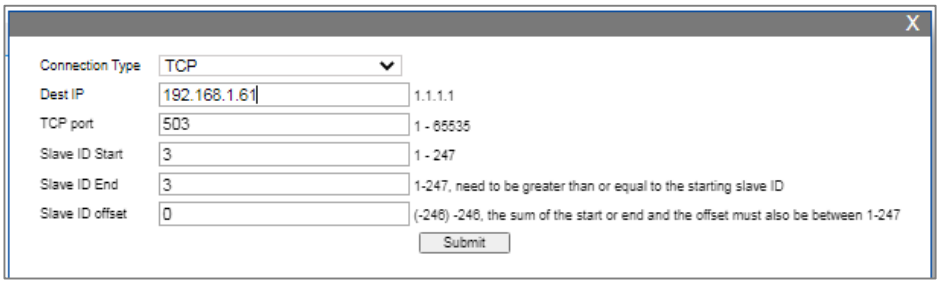


4 Select “Protocol Setting > Slave ID Map”, and enter “Slave ID Map” page

5 In “Slave ID Map” page, click "add" button, as the picture below.



6 In “Add” window, fill in slave station information, as the picture below.



- Click "Connection type" drop-down list, select "TCP” connection.
- Enter the host PC's IP address "192.168.1.61" in the “Dest IP” text box.
- Enter the port number "503" of the host in the "Dest Port" text box.
- Enter slave ID start number "3" in the "Slave ID Start" text box.
- Enter "3" in the "Slave ID END" text box.
- Enter "0" in the "Slave ID Offset" text box.
- Click “Apply” button.

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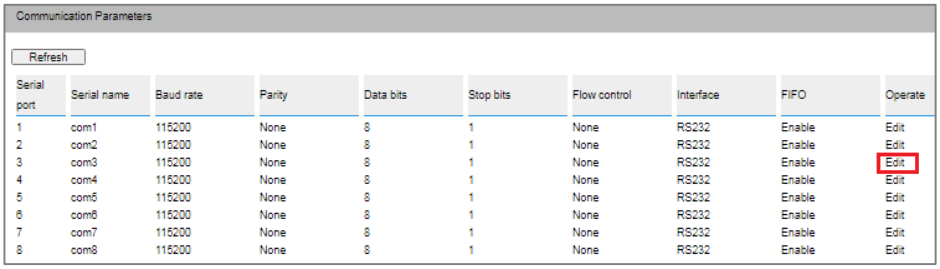
Step 5 Configure the serial port parameter information.

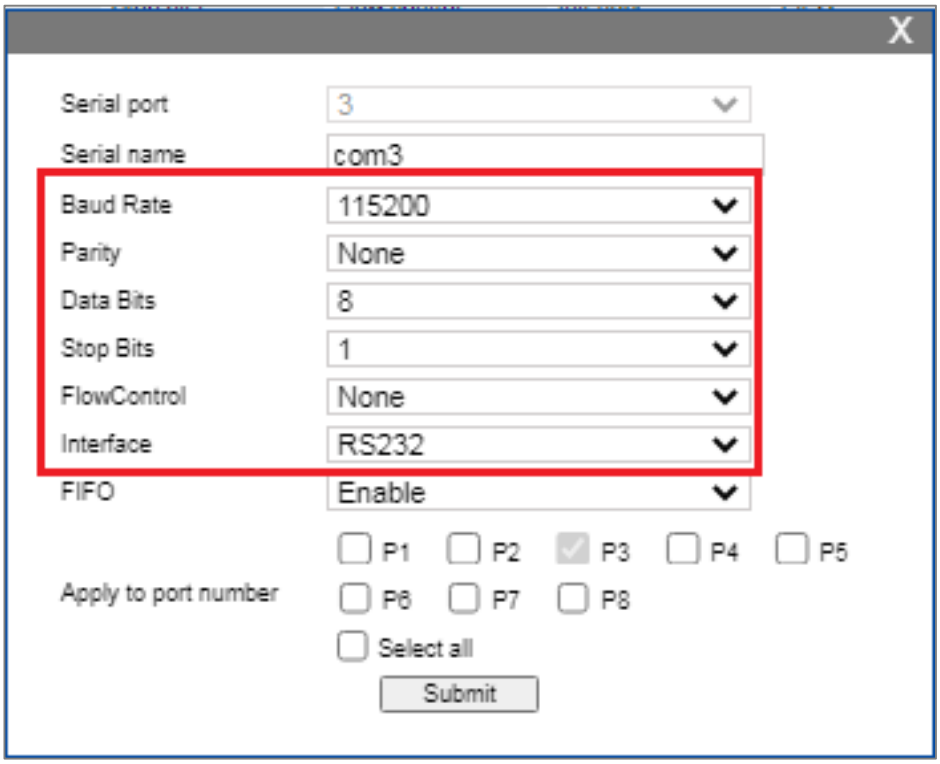
1 Log in to the Web configuration interface and select "Serial Settings".

2 In serial port3 entry, click “Edit” under operation, as shown in the following figure.



Serial port	Serial name	Baud rate	Parity	Data bits	Stop bits	Flow control	Interface	FIFO	Operate
1	com1	115200	None	8	1	None	RS232	Enable	Edit
2	com2	115200	None	8	1	None	RS232	Enable	Edit
3	com3	115200	None	8	1	None	RS232	Enable	Edit
4	com4	115200	None	8	1	None	RS232	Enable	Edit
5	com5	115200	None	8	1	None	RS232	Enable	Edit
6	com6	115200	None	8	1	None	RS232	Enable	Edit
7	com7	115200	None	8	1	None	RS232	Enable	Edit
8	com8	115200	None	8	1	None	RS232	Enable	Edit

3 Set the “BaudRate”,“Parity”,“Stop Bits”,“Data Bits” and “Interface” in the “COM Parameter” option box.



4 Other parameters remain the default, click "Submit".

Step 6 Run "Modbus Poll" and “Modbus Slave” software to configure master and slave information.

1 Open “Modbus Slave” software, click "Setup > Slave Definition".

2 Enter "3" in the "Slave ID" text box.

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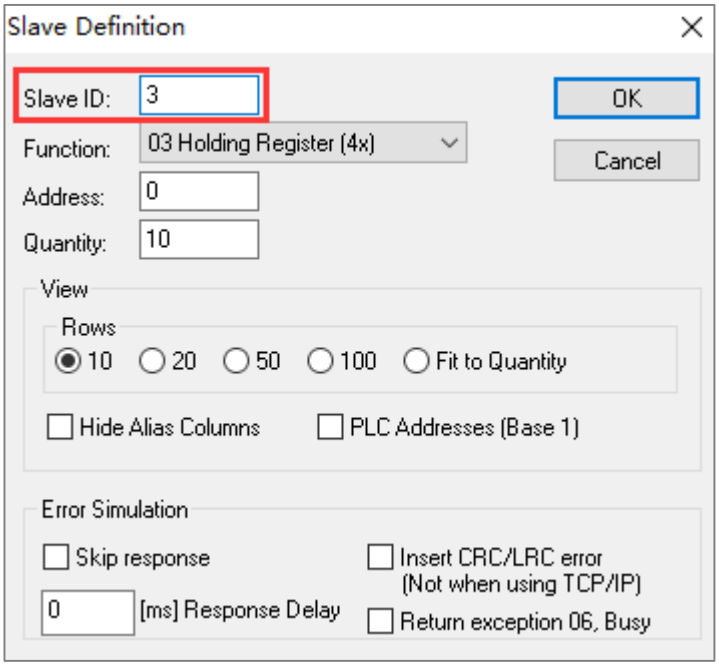

3 Other parameters remain the default, click "OK".

4 Click " Connection > Connection Setup ".

5 Click the "Connection" drop-down list box and select "Modbus TCP / IP".

6 Enter the TCP slave IP address "192.168.1.61" in the "IP Address" text box of the "TCP / IP Server" area.

7 Enter the TCP slave port number "503" in the "Port" text box of the "TCP / IP Server" area.

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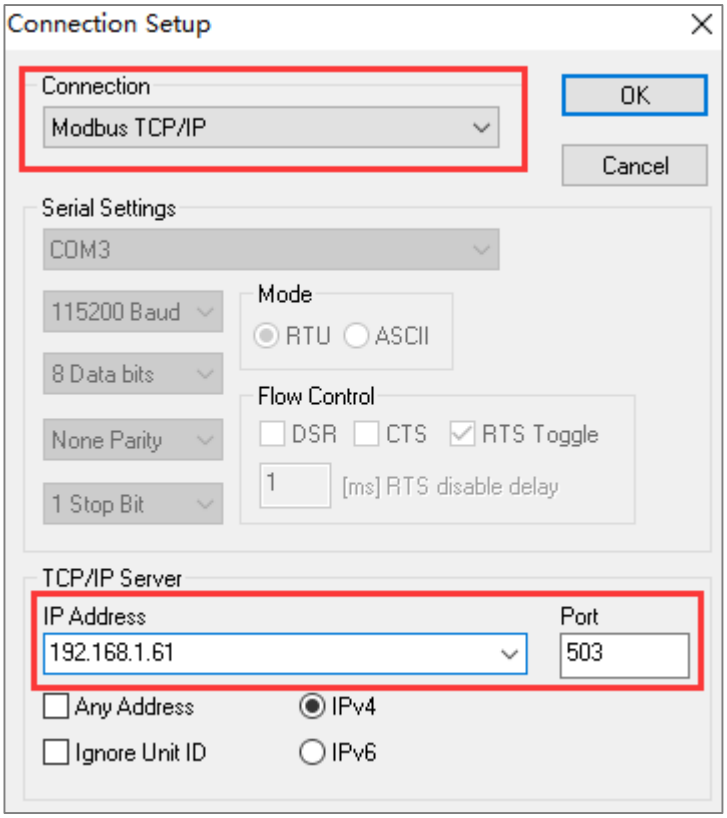
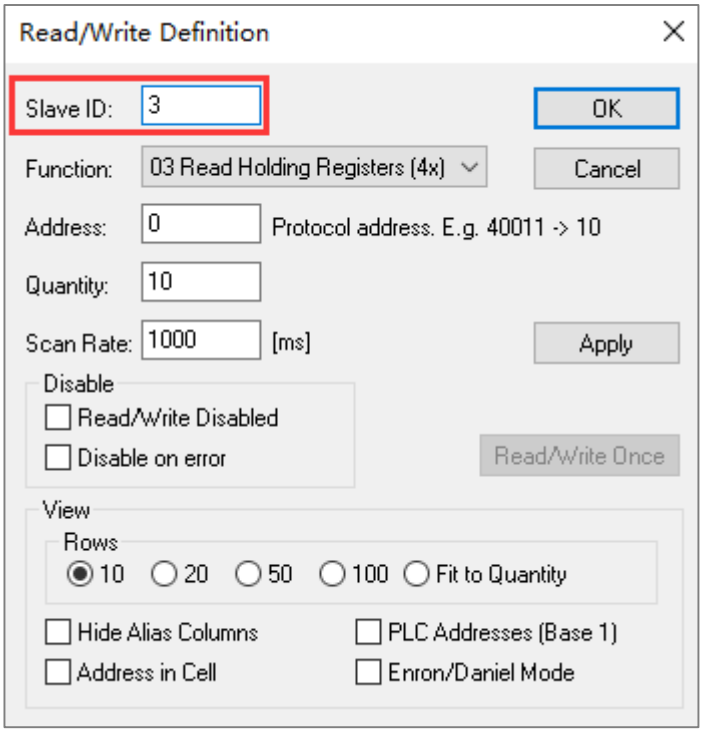


8 Other parameters remain the default, click "OK".

9 Run the “Modbus Poll” software, click "Setup > Read / Write Definition".

10 Enter "3" in the "Slave ID" text box.

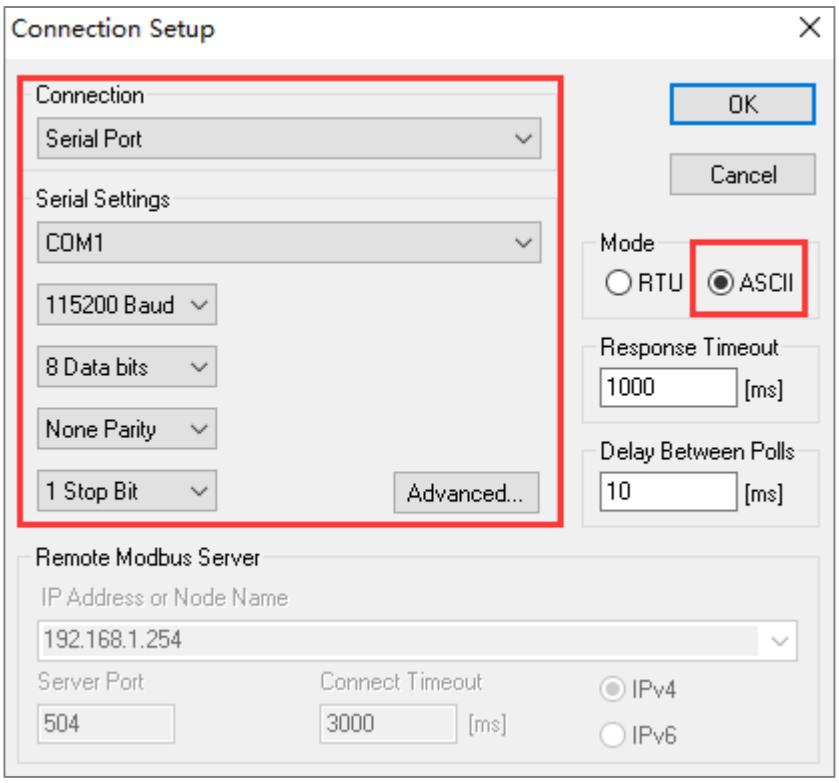


11 Other parameters remain the default, click "OK".

12 Click " Connection > Connection Setup ".

13 Click the "Connection" drop-down list box and select "serial port".

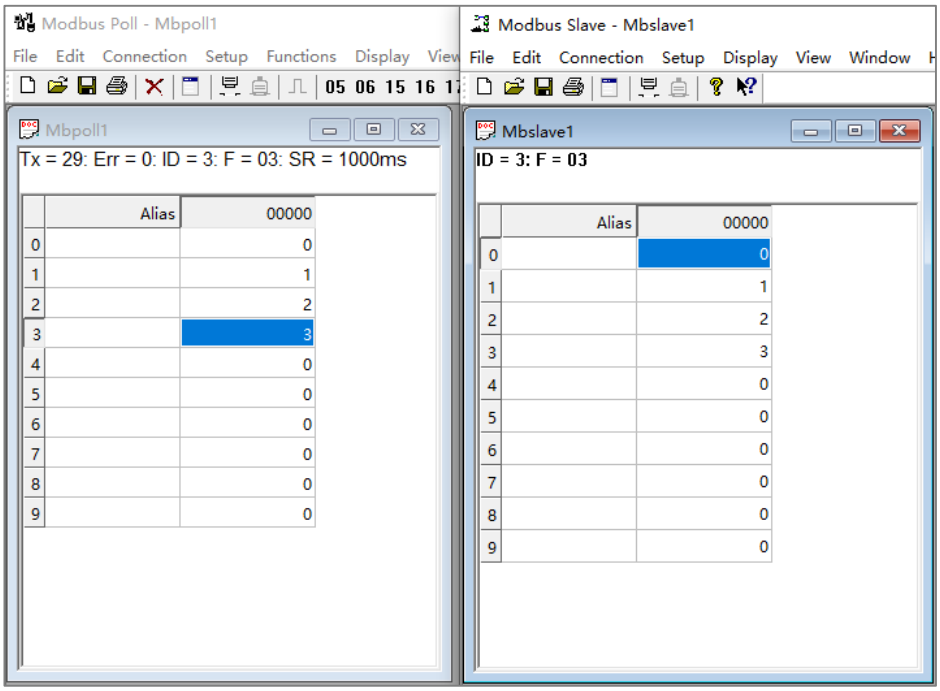
14 In the "Serial Settings" option box, configure serial port information such as serial number, baud rate, data bit, parity bit and stop bit.



15 Select the "ASCII" mode in the "Mode" option.

16 Other parameters remain the default, click "OK".

Step 7 Check the normal communication between the ASCII master and the TCP slave.

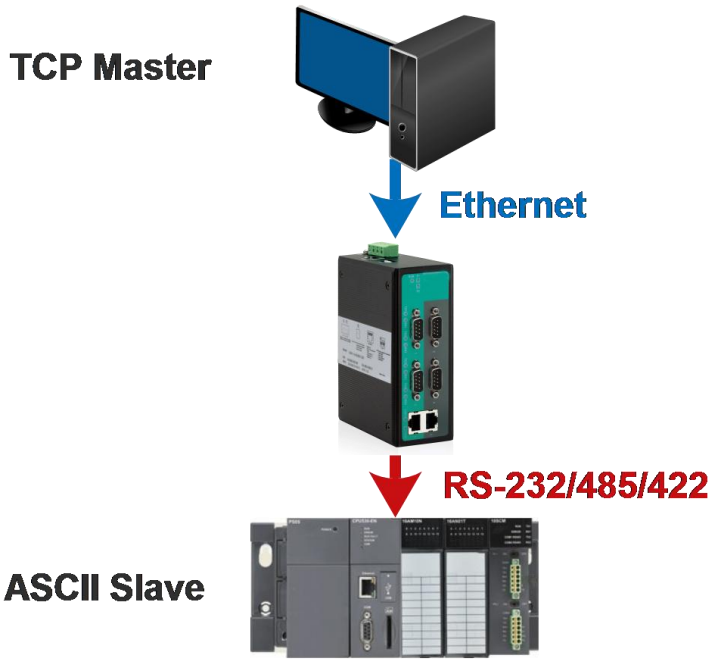


Step 8 End.

10.4 ASCII Slave Mode

Background introduction

When the user needs to implement the Modbus TCP master device to communicate with the Modbus ASCII slave device, use the Modbus gateway device and set the device's operating mode to ASCII Slave.



Note:

The device picture mentioned in above figure is only an example , and the actual appearance of the device is subject to the device obtained.

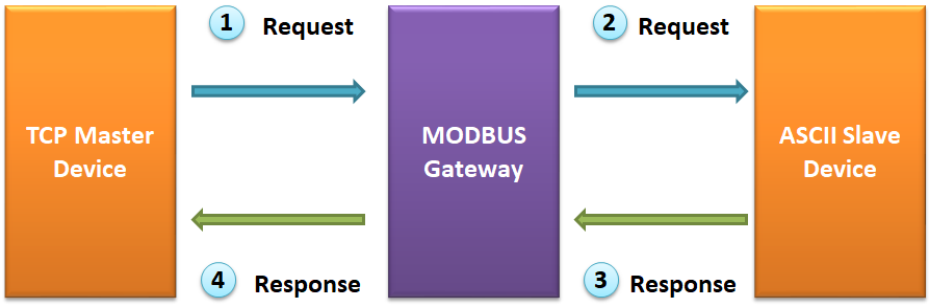
In ASCII Slave Mode, the TCP master device accesses the ASCII slave device through the gateway.

① TCP master device sends request to gateway;

② Gateway forwards request to ASCII slave device;

③ ASCII slave device returns a response;

④ The gateway sends back the response.



The parameters of the TCP master are as follows:

- IP address: 192.168.1.61

The parameter information of Modbus gateway is as follows:

- IP address: 192.168.1.254
- TCP port number: 504

The parameters of the ASCII slave are as follows:

- Slave ID: 4
- Communication port: COM 4
- Baud rate: 115200
- Parity bit: None
- Data bit: 8
- Stop bit: 1

Configuration Steps

Note

The screenshot reference model for this manual is 4 RS-232/485/422 + 2 100M copper ports. In addition to the supported serial type (RS-232, RS-422, RS-485), the number of network ports and the number of serial ports, the interface functions and interface operations of other types of products are the same.

Step 1 Connect the COM serial port of the computer and the COM4 serial port of the Modbus gateway using a cable or a converter.

Step 2 Connect the network port of the computer and the network port1 of the Modbus gateway using a Ethernet cable.

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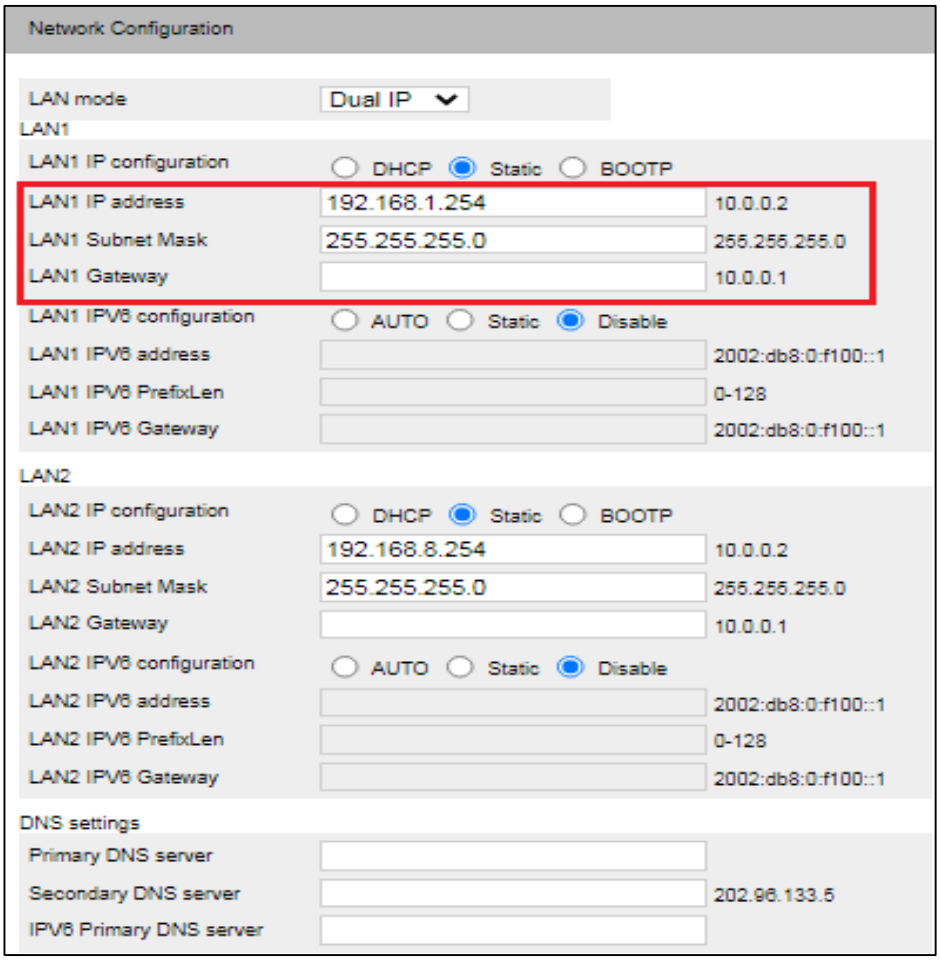
Step 3 Configure the IP address of the Modbus gateway.

1 Login in the Web configuration interface, choose "Network Setting".

2 In the "LAN1 address" option box, enter the "IP address", "Subnet Mask" and "Gateway address" corresponding to the Modbus gateway.



3 Other parameters remain the default, click "Submit".

Step 4 Configure the operation mode of the Modbus gateway.

1 Log in to the Web configuration interface and select "Protocol Setting > Mode".

2 In the Port4 entry, click “Edit” under operation, as shown in the following figure.

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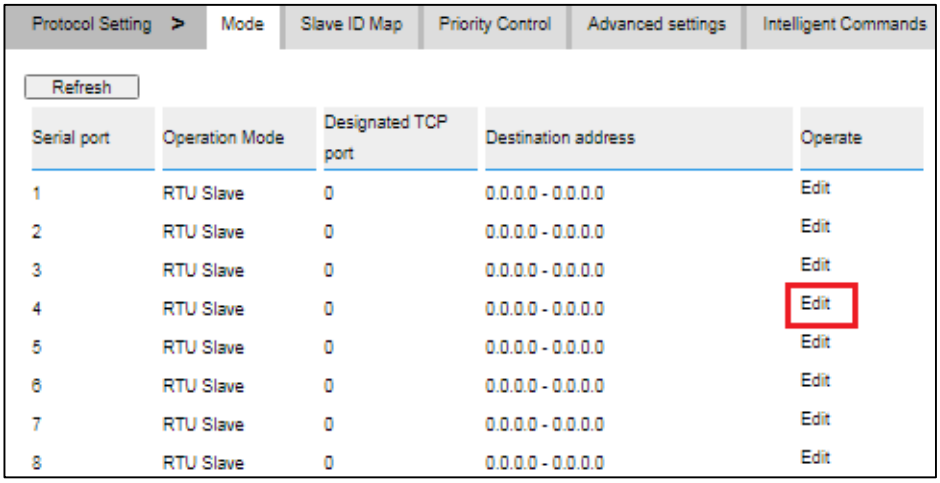
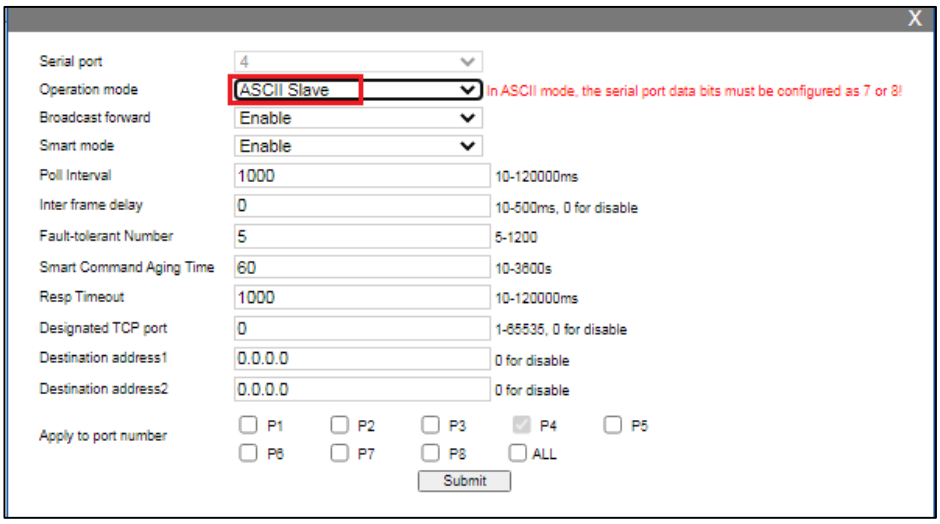


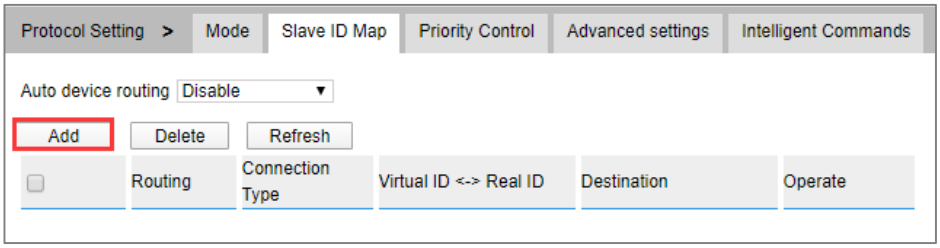
3 In the edit window of serial port4, configure mode as “ASCII Slave”, as the picture below.

- Click the "Operation Mode" drop-down list and select "ASCII Slave".
- Other parameters remain the default, click "Submit".



4 Select “Protocol Setting > Slave ID Map”, and enter “Slave ID Map” page

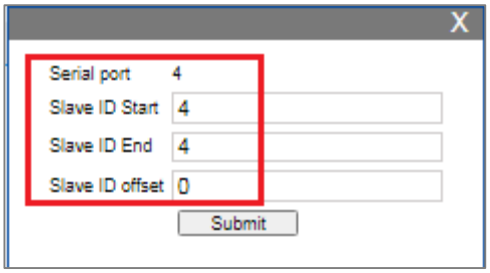
5 In “Slave ID Map” page, click "add" button, as the picture below.



Note:

Device will detect RTU/ASCII slave mapping information automatically without having to add it manually when “Automatic Route” is enabled.

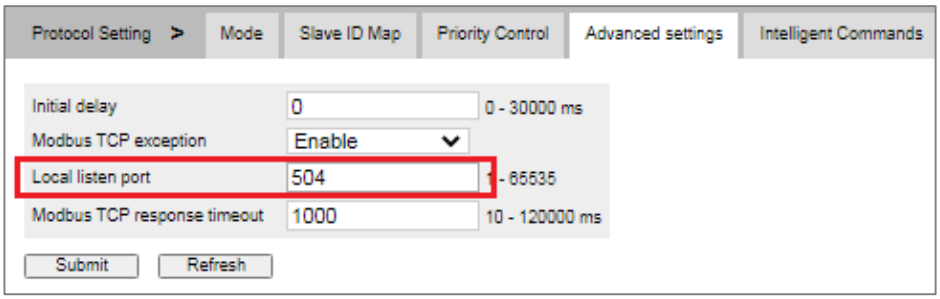
6 In “Add” window, fill in slave station information, as the picture below.



- Click "Connection type" drop-down list, select "serial1” connection.
- Click “Destination Port" drop-down list, choose serial port "4".
- Enter slave ID start number "4" in the "Slave ID Start" text box.
- Enter "4" in the "Slave ID END" text box.
- Enter "0" in the "Slave ID Offset" text box.
- Click “Apply” button.

7 Select “Protocol Setting > Advanced Settings”, enter “Advanced Settings” page.

8 Enter TCP port number "504" in the “listening port” text box.

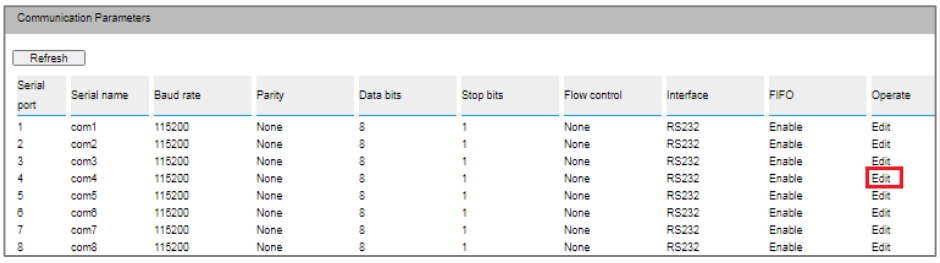


9 Other parameters remain the default, click "Submit".

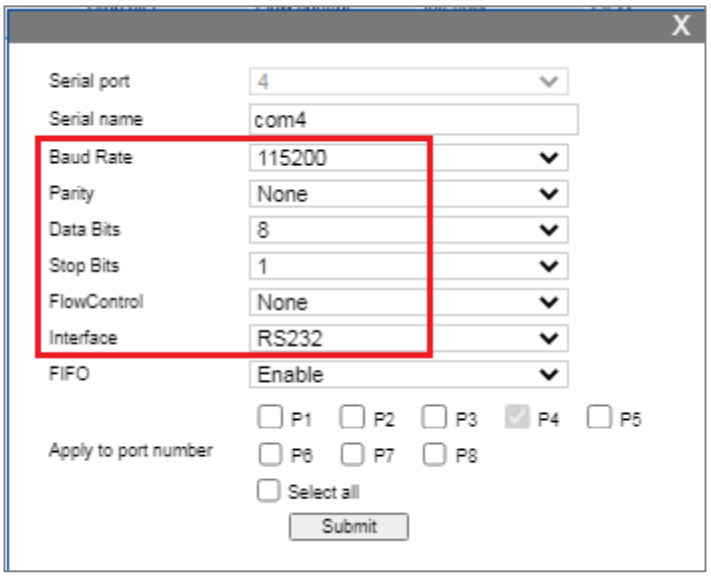
Step 5 Configure the serial port parameter information.

1 Log in to the Web configuration interface and select "Serial Settings".

2 In the Port4 entry, click “Edit” under operation, as shown in the following figure.



3 Set the “BaudRate”,“Parity”,“Stop Bits”,“Data Bits” and “Interface” in the “COM Parameter” option box.

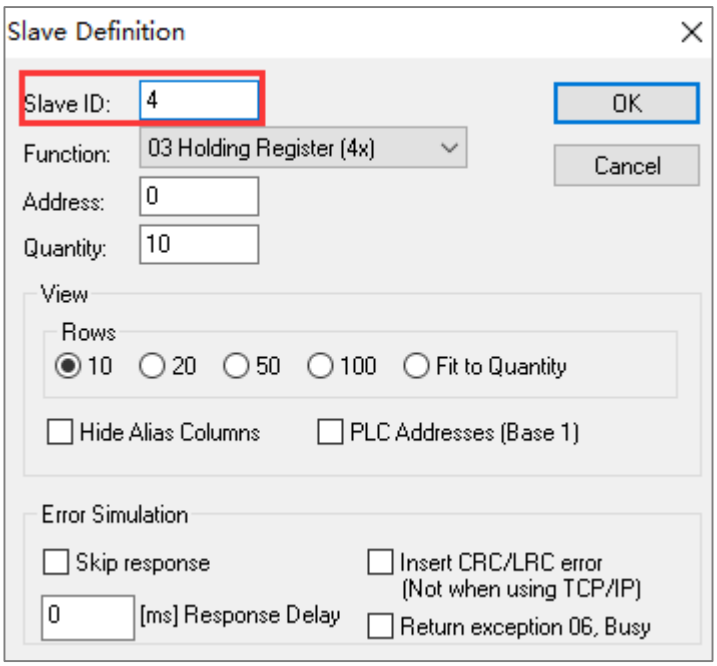


4 Other parameters remain the default, click "Submit".

Step 6 Run "Modbus Poll" and “Modbus Slave” software to configure master and slave information.

1 Open “Modbus Slave” software, click "Setup > Slave Definition".

2 Enter "4" in the "Slave ID" text box.



3 Other parameters remain the default, click "OK".

4 Click " Connection > Connection Setup ".

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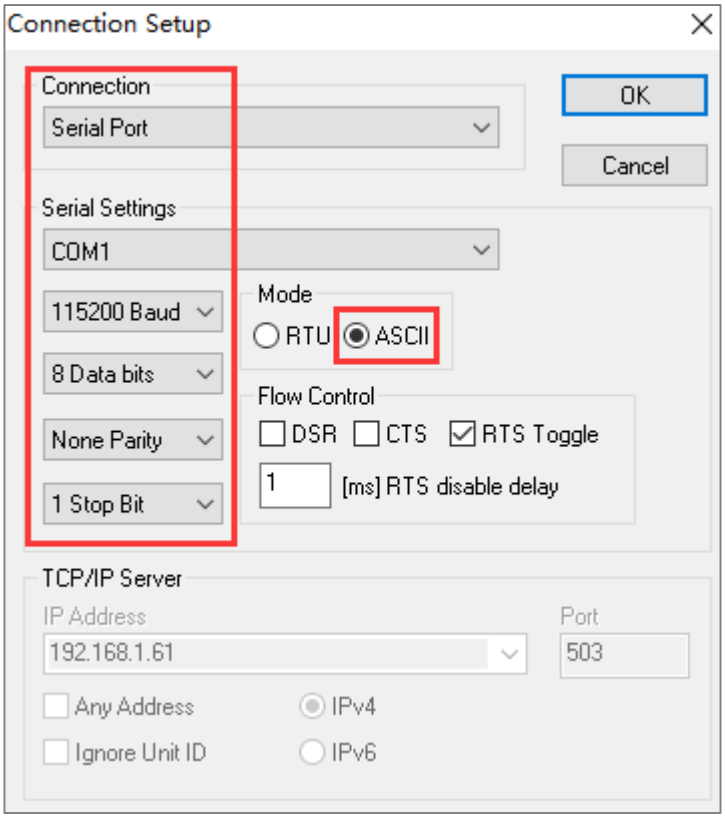

5 Click the "Connection" drop-down list box and select "serial port".

6 In the "Serial Settings" option box, configure serial port information such as serial number, baud rate, data bit, parity bit and stop bit.

7 Select the "RTU" mode in the "Mode" option.

8 Other parameters remain the default, click "OK".

9 Run the “Modbus Poll” software, click "Setup > Read / Write Definition".

10 Enter "4" in the "Slave ID" text box.

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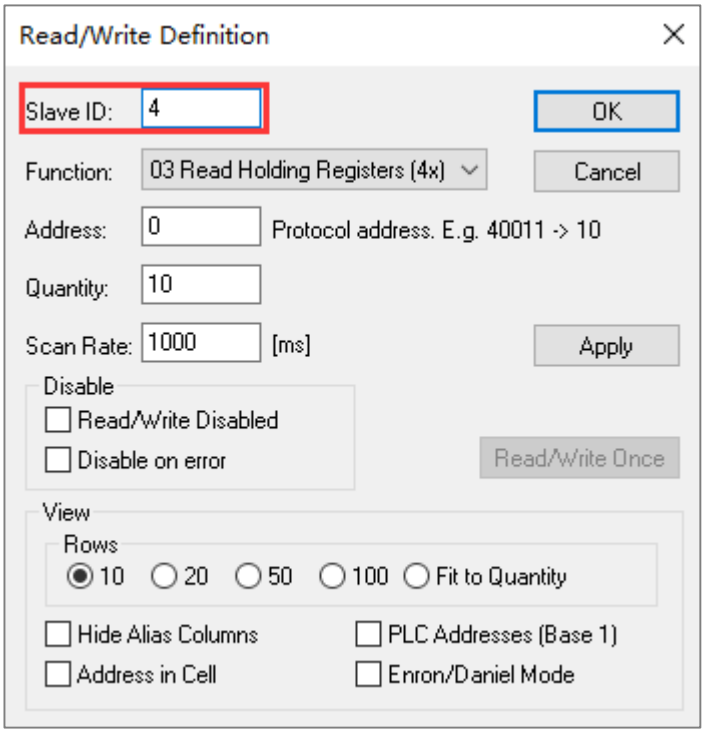

11 Other parameters remain the default, click "OK".

12 Click " Connection > Connection Setup ".

13 Click the "Connection" drop-down list box and select "Modbus TCP / IP".

14 Enter IP address "192.168.1.254" in the "IP Address" text box of the "Remote Modbus Server" area.

15 Enter port number "504" in the “Server Port" text box of the "Remote Modbus Server" area.

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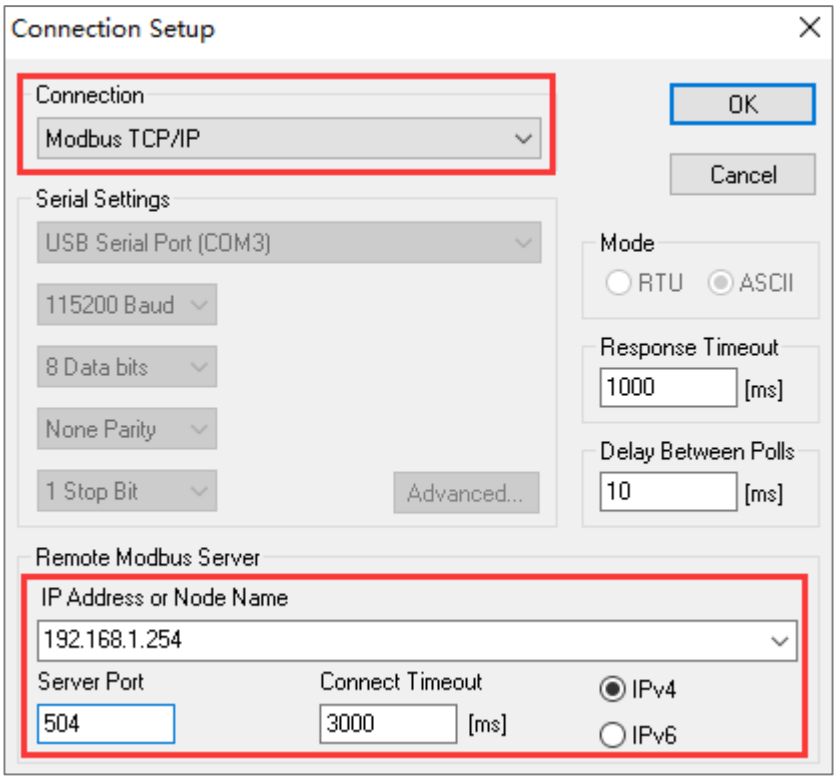
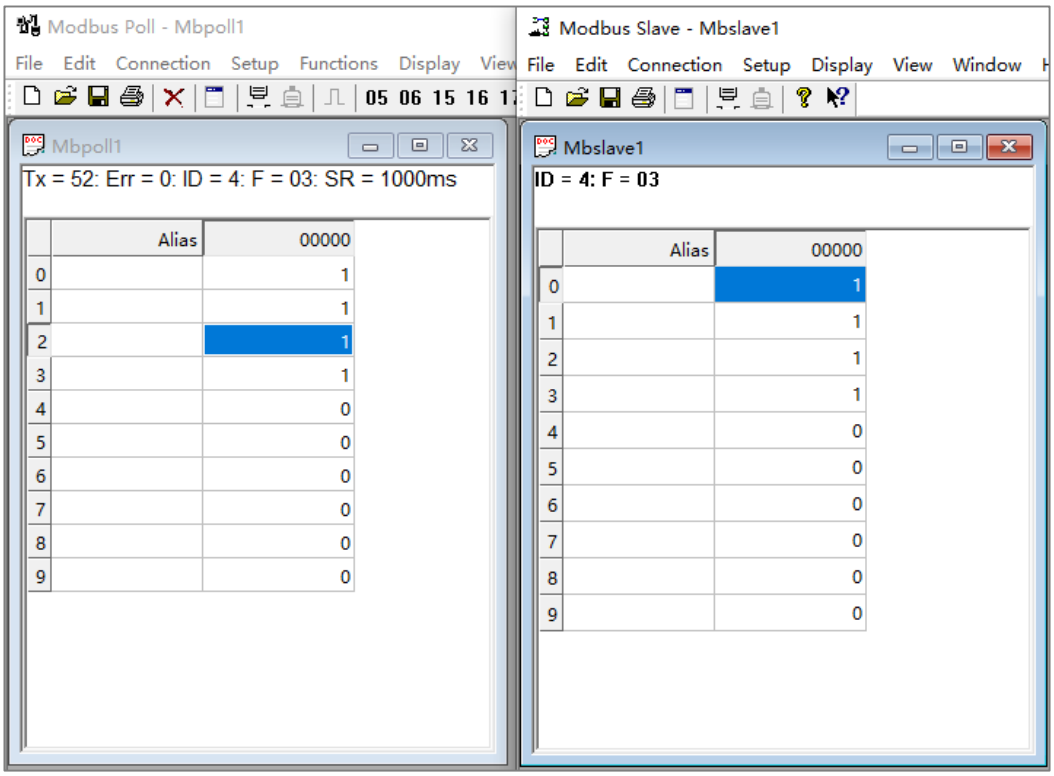


16 Other parameters remain the default, click "OK".

Step 7 Check the normal communication between the TCP master and the RTU slave.



Step 8 End.

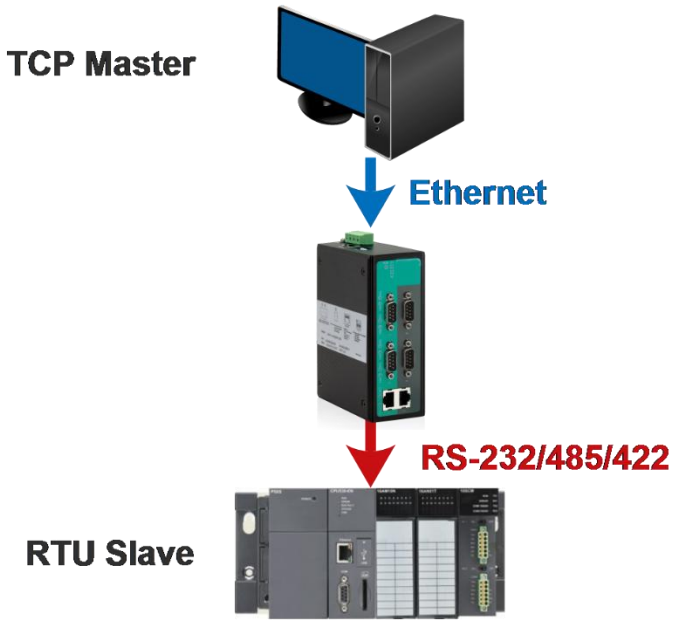
10.5 Intelligent Commands and Automatic Route

Device will learn and memorize this kind of command automatically when it receives Modbus query command from Modbus TCP Master on the condition of smart mode is enabled in Modbus RTU/ASCII Slave mode. Device will send memorized commands to slave station according to poll interval, and save slave response data in memory, waiting for master device to read. The demands that device learns are smart commands. Device will delete the smart command if it doesn't learn or receive the command again in designated aging period of smart command.

Device will detect and create slave ID table automatically when it receives Modbus query command from Modbus TCP Master on the condition of smart mode is enabled in Modbus RTU/ASCII Slave mode.

Background introduction

When the user needs to implement the Modbus TCP master device to communicate with the Modbus RTU slave device, use the Modbus gateway device and set the device's operating mode to RTU Slave. Enable smart command to learn when master device need read slave device data regularly.



Note:

The device picture mentioned in above figure is only an example and the actual appearance of the device is subject to the device obtained.

The parameters of the TCP master are as follows:

- IP address: 192.1681.61 poll interval: 10s

The parameter information of Modbus gateway is as follows:

- IP address: 192.168.1.254
- TCP port number: 502

- Smart Command poll interval: 2000ms

The parameters of the RTU slave are as follows (parameters in default):

- Slave ID: 1
- Baud rate: 115200
- Parity bit: None
- Data bit: 8
- Stop bit: 1

Configuration Steps

Note
The screenshot reference model for this manual is 4 RS-232/485/422 + 2 100M copper ports. In addition to the supported serial type (RS-232, RS-422, RS-485), the number of network ports and the number of serial ports, the interface functions and interface operations of other types of products are the same.

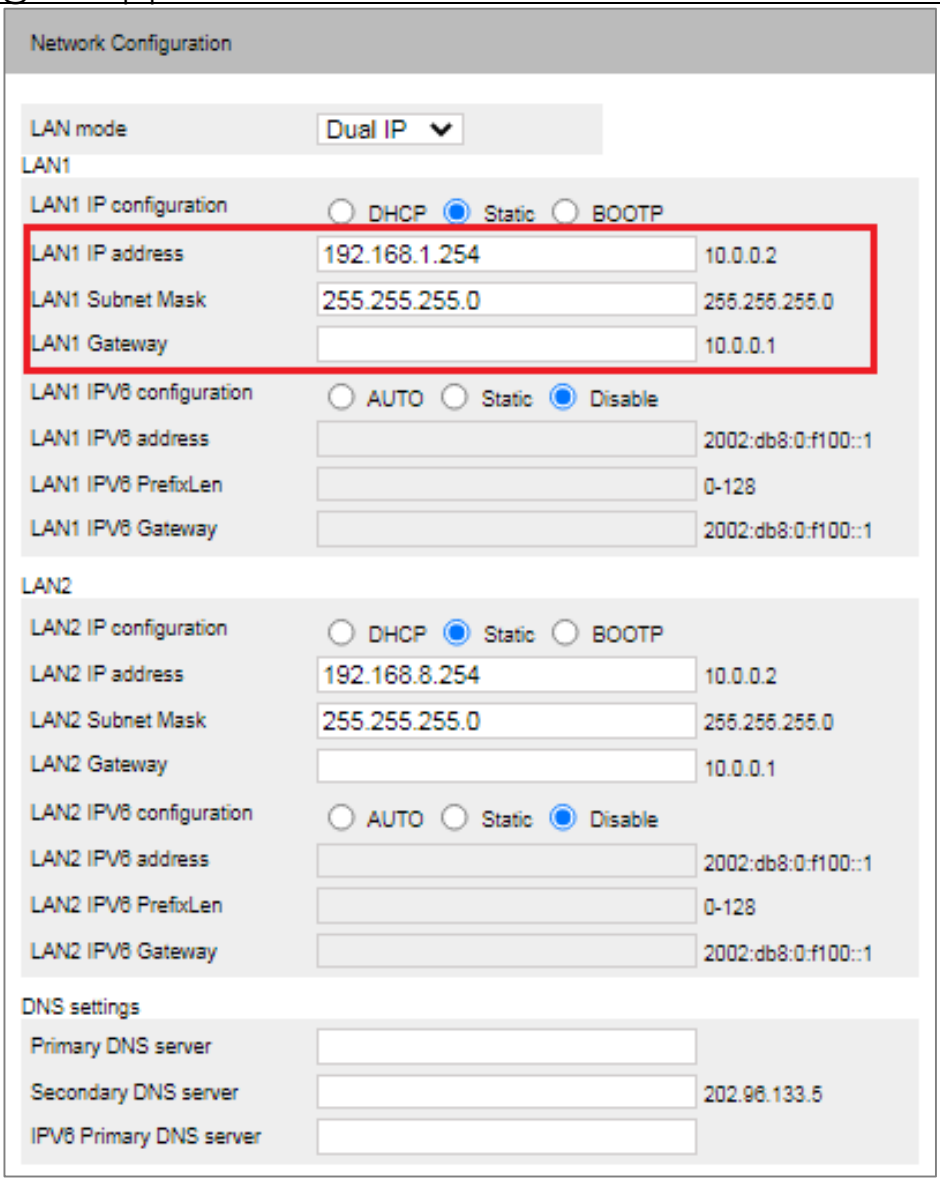
Step 1 Connect the COM serial port of the computer and the COM1 serial port of the Modbus gateway using a cable or a converter.

Step 2 Connect the network port of the computer and the network port1 of the Modbus gateway using a Ethernet cable.

Step 3 Configure the IP address of the Modbus gateway.

1 Login in the Web configuration interface, choose "Network Setting".

2 In the "LAN1 address" option box, enter the "IP address", "Subnet Mask" and "Gateway address" corresponding to the Modbus gateway.



3 Other parameters remain the default, click "Submit".

Step 4 Configure the operation Mode and smart command parameters of the Modbus gateway.

1 Log in to the Web configuration interface and select "Protocol Setting > Mode".

2 In the Port1 entry, click Edit under operation, as shown in the following figure.

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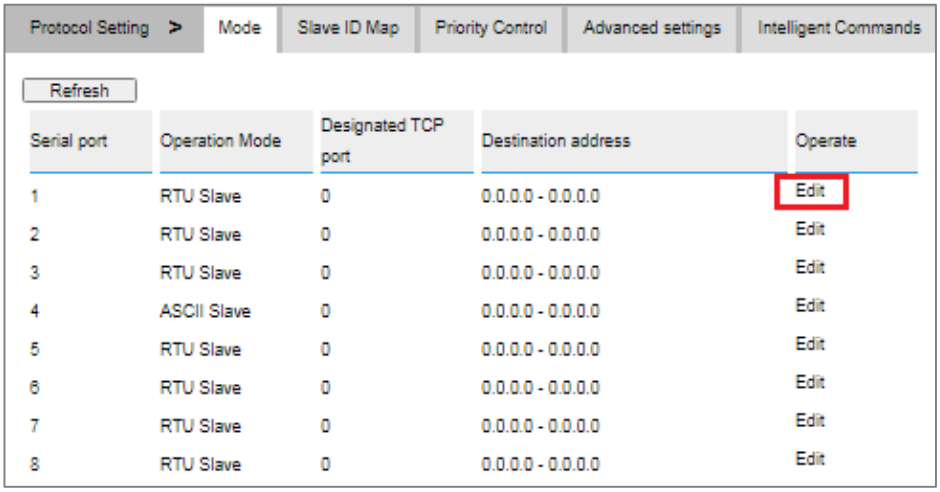
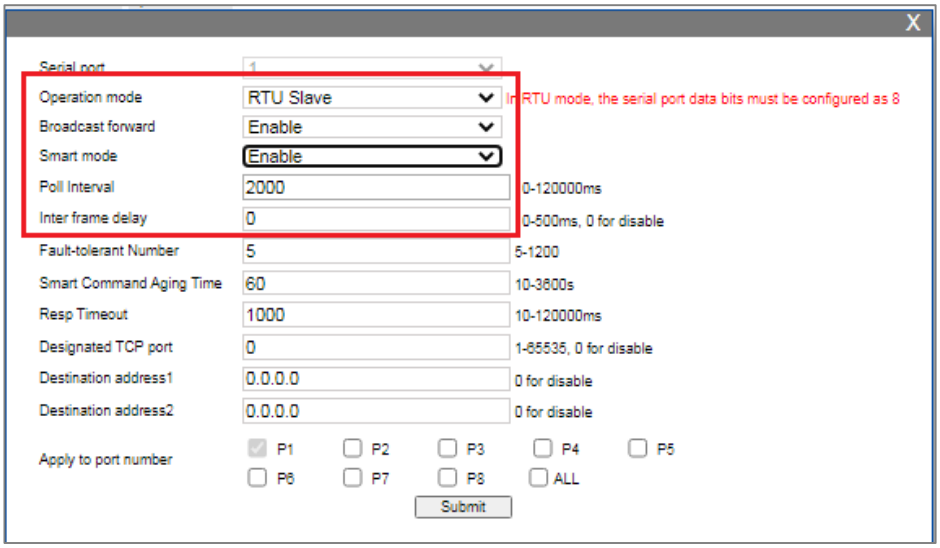


3 In the edit window of serial port1, configure operation Mode as “RTU Slave” and enable smart mode, as the picture below.

- Click the "Operation Mode" drop-down list and select "RTU Slave".
- Click “Smart Mode“ drop-down list and select “Enable”.
- Enter "2000” milliseconds in "Poll Interval” text box .
- Enter “10” seconds in “Smart Command Aging Time” text box.
- Other parameters remain the default, click "Submit".



4 Select “Protocol Setting > Slave ID Map”, and enter “Slave ID Map” page

5 Select "Enable" on the drop-down list of "Automatic Route" of the "Slave ID Map" page, as the picture below.

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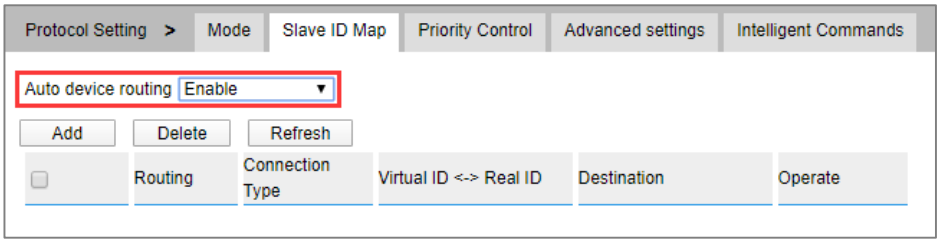
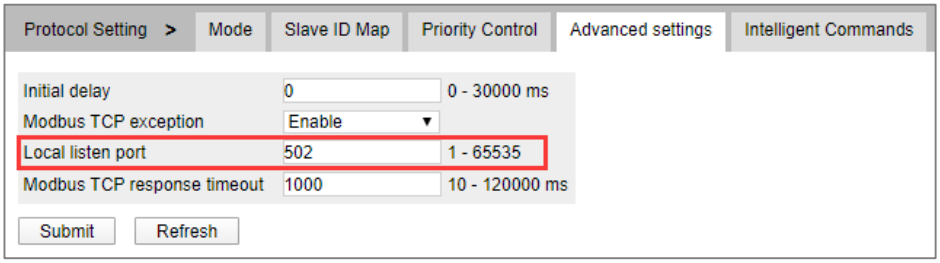


6 Select “Protocol Setting > Advanced Settings”, enter “Advanced Settings” page.

7 Enter TCP port number "502" in the “listening port” text box.

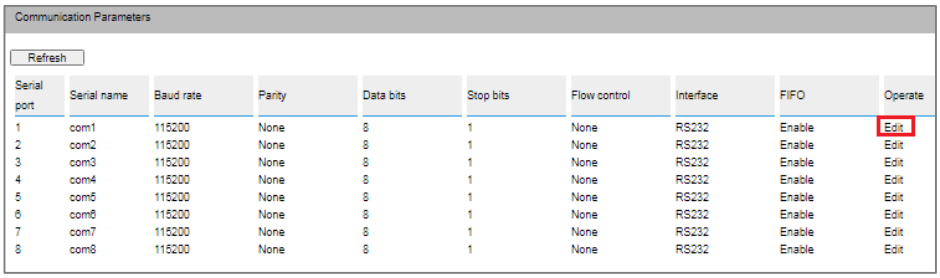


8 Other parameters remain the default, click "Submit".

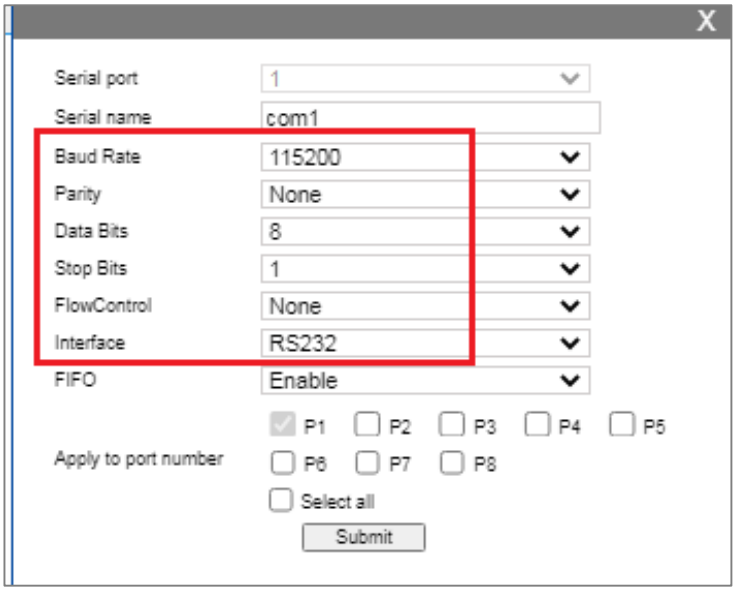
Step 5 Configure serial port1 parameters of the Modbus gateway.

1 Log in to the Web configuration interface and select "Serial Settings".

2 In the Port1 entry, click Edit under operation, as shown in the following figure.



3 Set the “BaudRate”,“Parity”,“Stop Bits”,“Data Bits” and “Interface” in the “COM Parameter” option box.

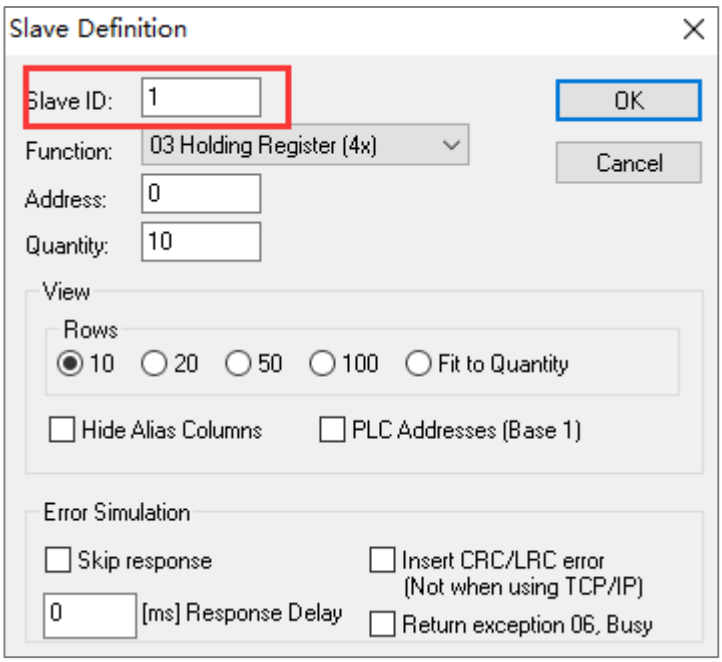


4 Other parameters remain the default, click "Submit".

Step 6 Run "Modbus Poll" and “Modbus Slave” software to configure master and slave information.

1 Open “Modbus Slave” software, click "Setup > Slave Definition".

2 Enter "1" in the "Slave ID" text box.



3 Other parameters remain the default, click "OK".

4 Click " Connection > Connection Setup ".

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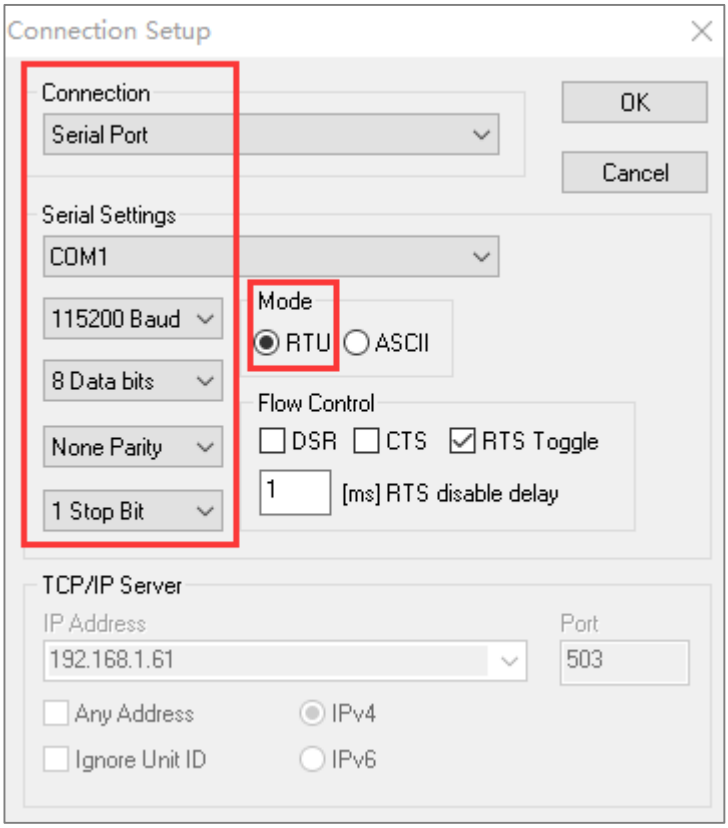


5 Click the "Connection" drop-down list box and select "serial port".

6 In the "Serial Settings" option box, configure serial port information such as serial number, baud rate, data bit, parity bit and stop bit.

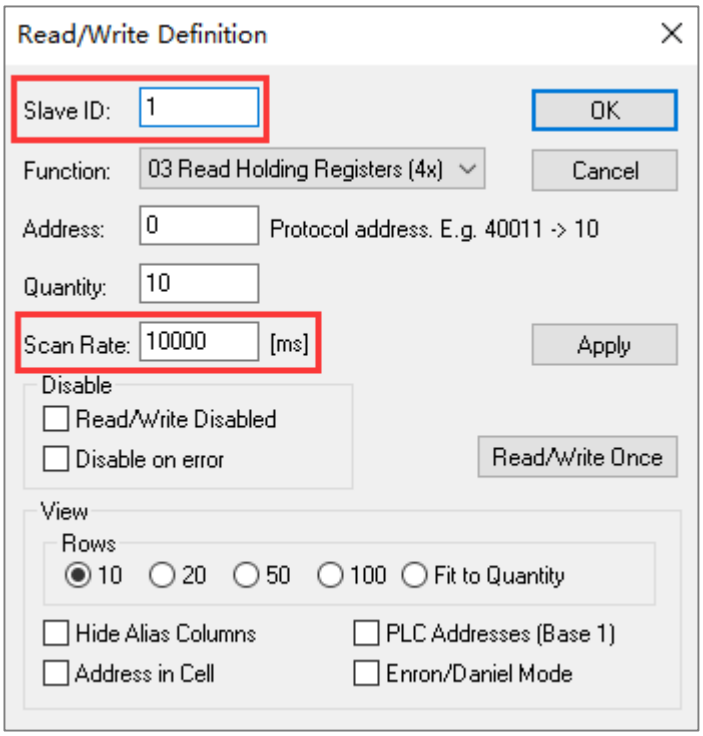
7 Select the "RTU" mode in the "Mode" option.

8 Other parameters remain the default, click "OK".

9 Run the “Modbus Poll” software, click "Setup > Read / Write Definition".

10 Enter "1" in the "Slave ID" text box.

11 Enter "10000" in the "Scan Rate" text box.



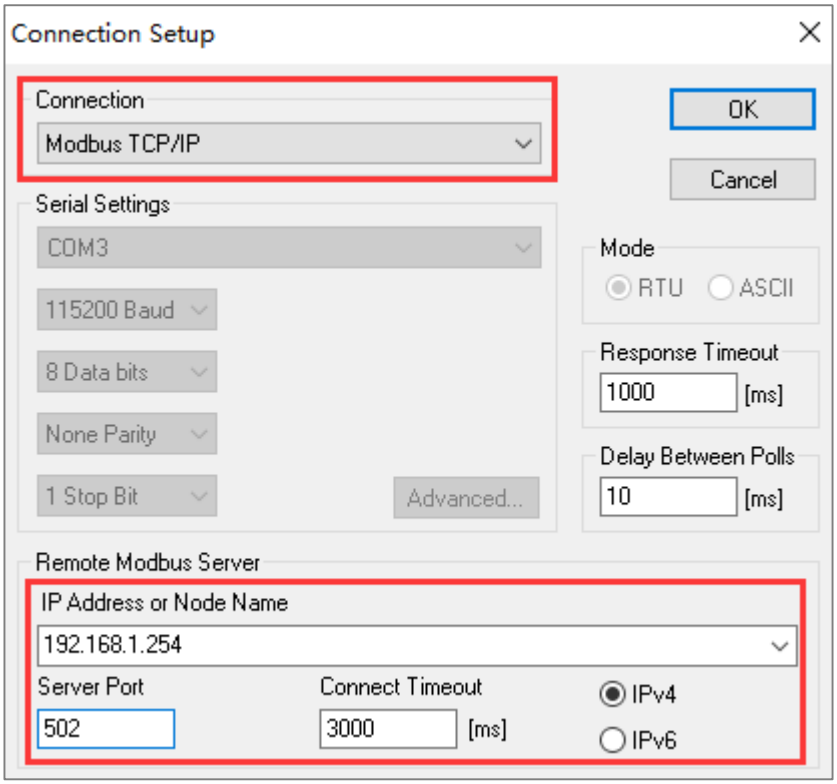
12 Other parameters remain the default, click "OK".

13 Click " Connection > Connection Setup ".

14 Click the "Connection" drop-down list box and select "Modbus TCP / IP".

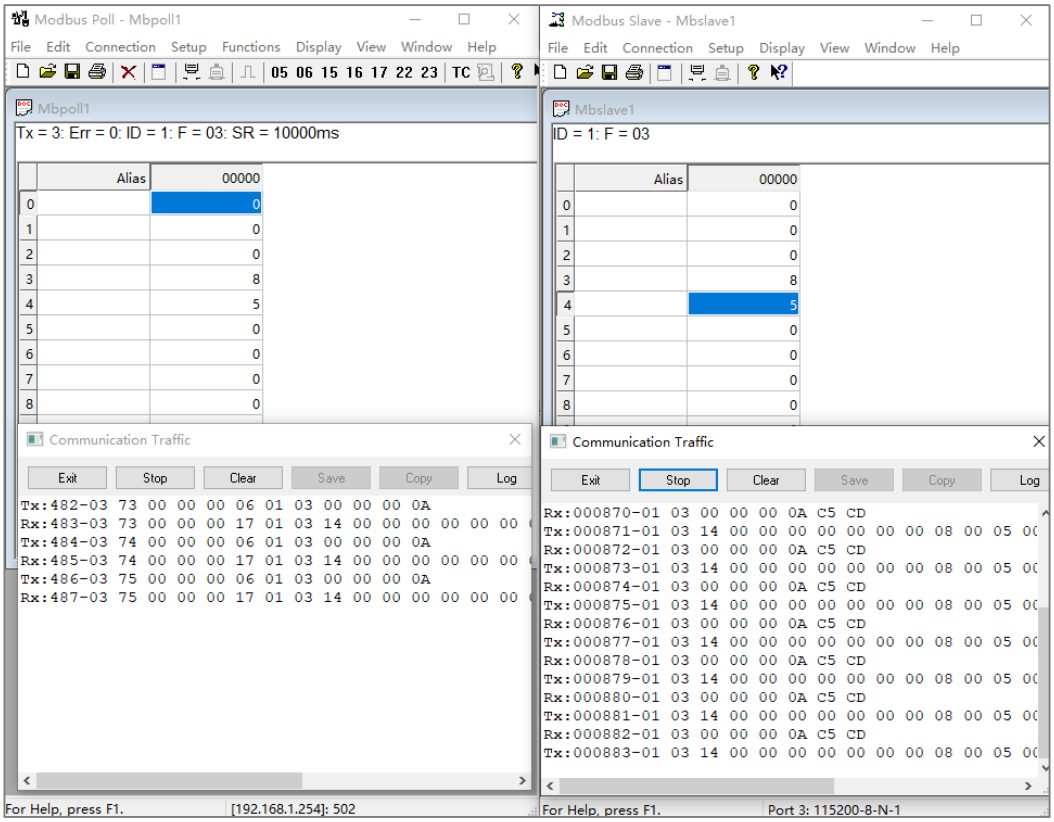
15 Enter IP address "192.168.1.254" in the "IP Address" text box of the "Remote Modbus Server" area.

16 Enter port number "502" in the “Server Port" text box of the "Remote Modbus Server" area.

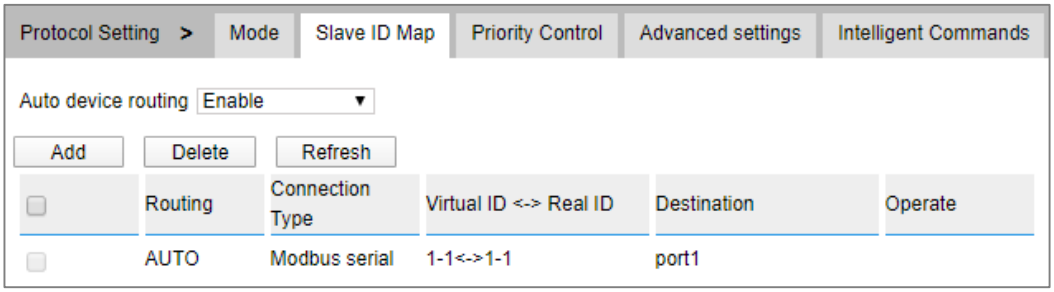


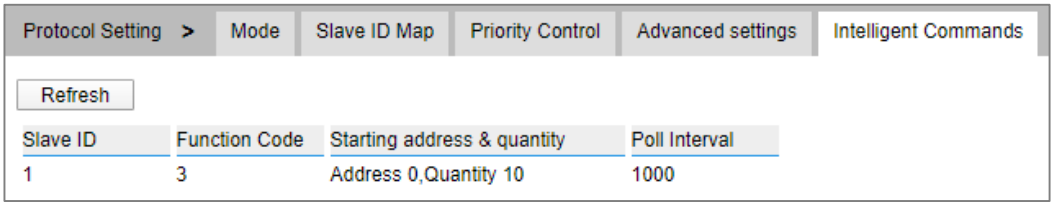
17 Other parameters remain the default, click "OK".

Step 7 Check the normal communication between the TCP master and the RTU slave. Click " Display > Communication Traffic" to check master and slave communication data. Master station reads data every 10 seconds, while the device reads data every 2 seconds via smart command as the picture below.



Step 8 Check automatic route and smart command. Device can route slave ID table automatically as shown in the following figure.





10.6 Demand priority and TCP port / IP address route

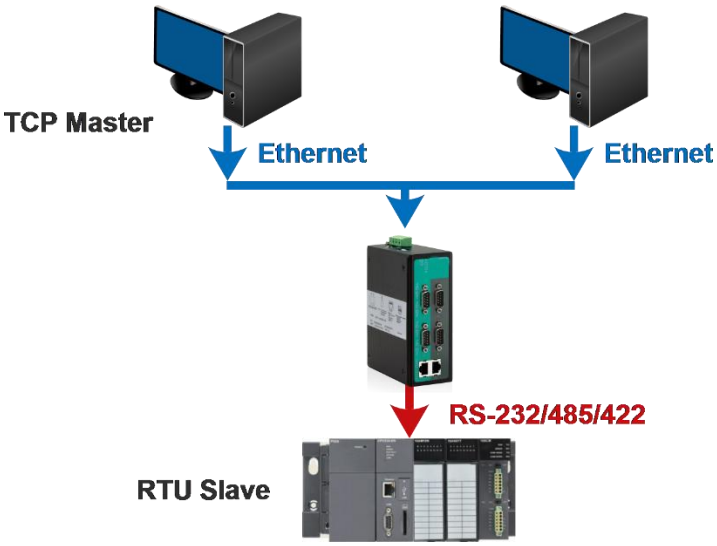
Device can specify data priority that master device requests, and forward data according to specified TCP port, master address or data priority in Modbus RTU/ASCII Slave mode. Device must sent each request individually and wait for response before sending next request due to Modbus RTU/ASCII Slave device can not process multiple requests simultaneously. Response time will be effected if requests pills up. This can cause

problems with critical requests that require an immediate response. With priority control, you can specify that certain requests are sent to the front of the queue for more immediate response time.

Device can route and forward data from specified TCP port and IP address to specified serial port in Modbus RTU/ASCII Slave mode.

Background introduction

When the user needs to implement the Modbus TCP master device to communicate with the Modbus RTU slave device, use the Modbus gateway device and set the device's operating mode to RTU Slave. IP address can be used for routing and one master data can be specified as high priority when device and master IP address are not in the same network segment.



Note:

The device picture mentioned in above figure is only an example , and the actual appearance of the device is subject to the device obtained.

The parameters of the TCP master station1 are as follows:

- IP address: 172.13.100.110
- Destination IP address: 172.13.100.210
- Target TCP Port: 30000

The parameters of the TCP master station2 are as follows:

- IP address: 172.13.100.120
- Destination IP address: 172.13.100.210
- Target TCP Port: 30000

The parameter information of Modbus gateway is as follows:

- IP address: 192.168.1.254

The parameters of the RTU slave are as follows (parameters in default):

- Slave ID: 1
- Baud rate: 115200

- Parity bit: None
- Data bit: 8
- Stop bit: 1

Configuration Steps

Note
The screenshot reference model for this manual is 4 RS-232/485/422 + 2 100M copper ports. In addition to the supported serial type (RS-232, RS-422, RS-485), the number of network ports and the number of serial ports, the interface functions and interface operations of other types of products are the same.

Step 1 Connect the COM serial port of the computer and the COM1 serial port of the Modbus gateway using a cable or a converter.

Step 2 Connect the network interface 1 of Modbus gateway to the LAN of computer using a Ethernet cable.

Step 3 Configure the IP address of the Modbus gateway.

1 Login in the Web configuration interface, choose "Network Setting".

2 In the "LAN1 address" option box, enter the "IP address", "Subnet Mask" and "Gateway address" corresponding to the Modbus gateway.

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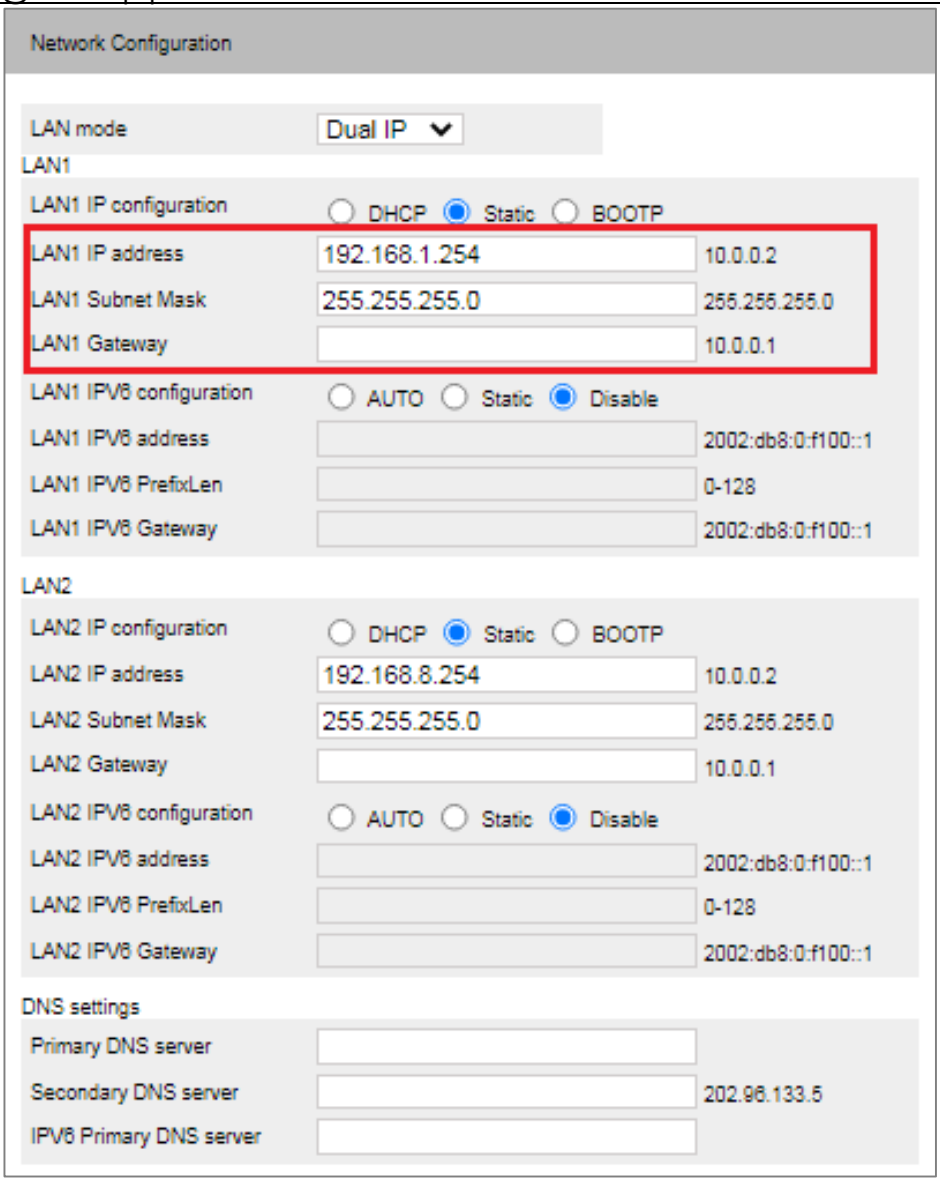

3 Other parameters remain the default, click "Submit".

Step 4 Configure the operation Mode and smart command parameters of the Modbus gateway.

1 Log in to the Web configuration interface and select "Protocol Setting > Mode".

2 In the Port1 entry, click Edit under operation, as shown in the following figure.

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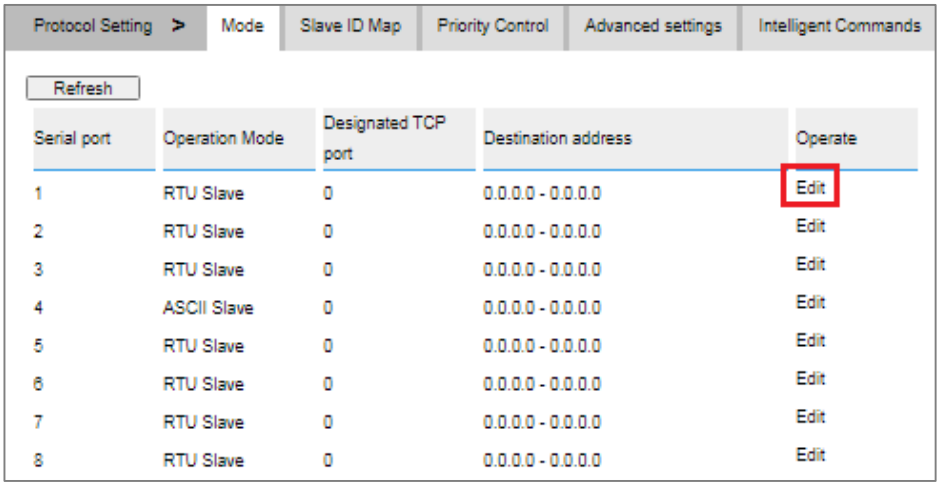
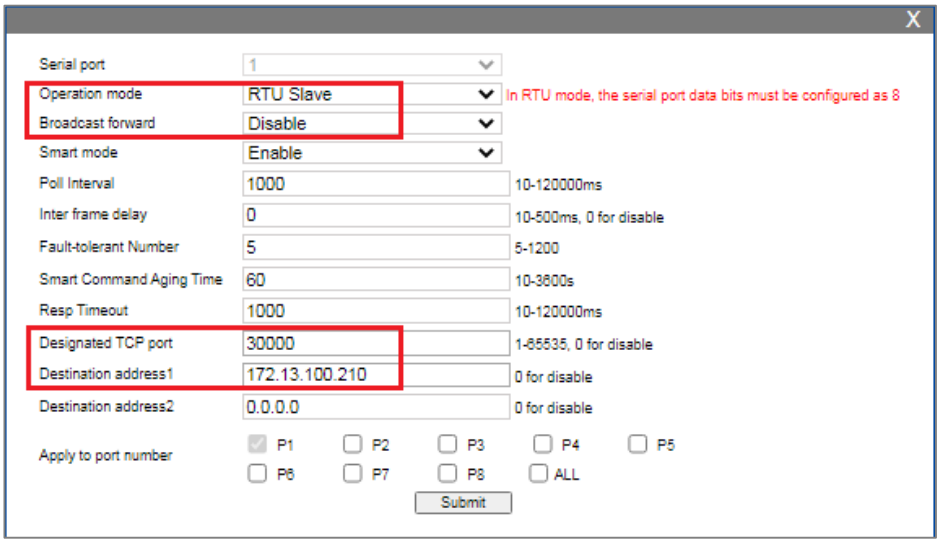


3 Configure the operation Mode of the serial port1 in edit window of serial port1, as shown in the following figure.



- Click the "Operation Mode" drop-down list and select "RTU Slave".
- Click ”Smart mode” drop-down list and select “Disable”.
- Enter the port number "30000" in the "Dest TCP port" text box.
- Enter IP address 1 "172.13.100.210” in the "Dest IP Address 1" text box.
- Other parameters remain the default, click "Submit".

4 Select “Protocol Setting > Priority Control”, and enable master priority.

- Select "Enable" in the drop-down list of "Enable Designated Master", as the picture below.

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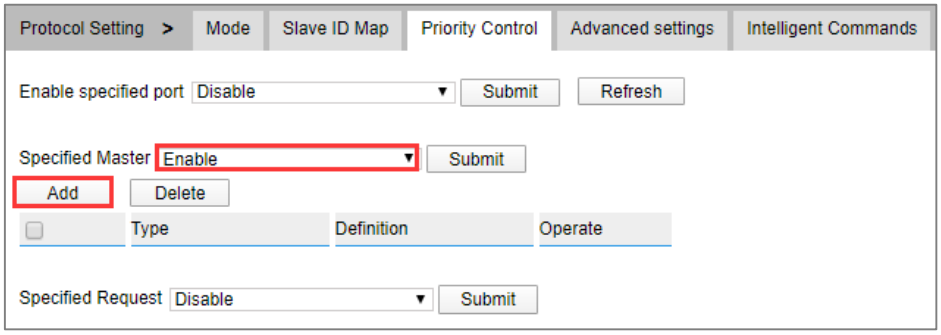
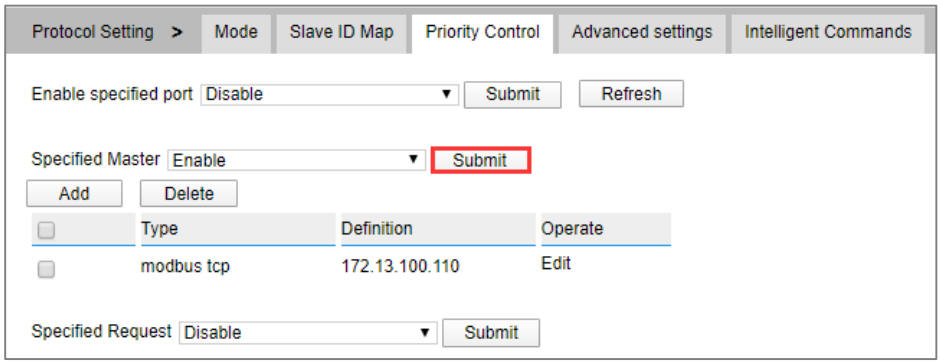


- Click “Add” button below "Enable Designated Master".
- Click “Master” drop-down list and select “IP address” in add window.
- Enter theIP address "172.13.100.110" of mater 1 in “IP address” text box.

- Click "Apply" button, as the picture above.

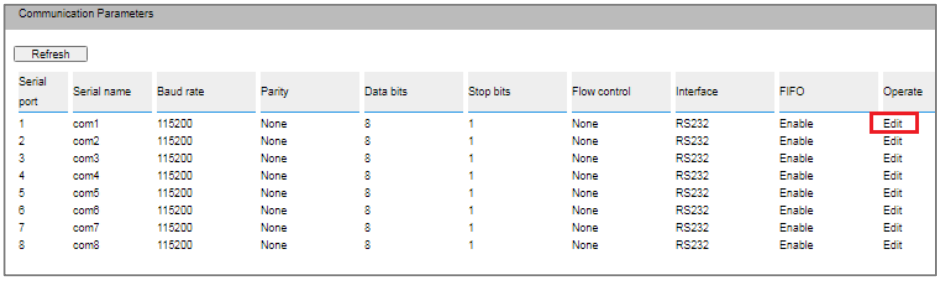


- Other parameters remain the default, click "OK” as shown in the picture above.

Step 5 Configure serial port1 parameters of the Modbus gateway.

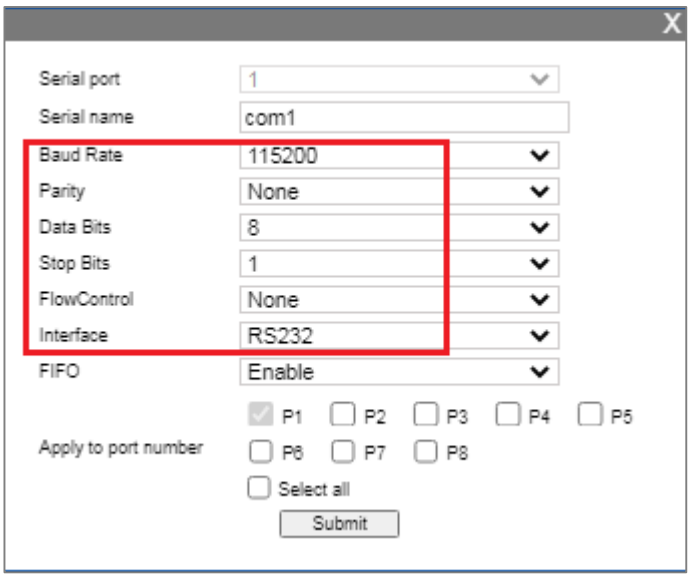
1 Log in to the Web configuration interface and select "Serial Settings".

2 In the Port1 entry, click Edit under operation, as shown in the following figure.



3 Set the “BaudRate”, “Parity”,“Stop Bits”,“Data Bits” and “Interface” in the “COM

Parameter" option box.



4 Other parameters remain the default, click "Submit".

Step 6 Run "Modbus Poll" and "Modbus Slave" software to configure master and slave information.

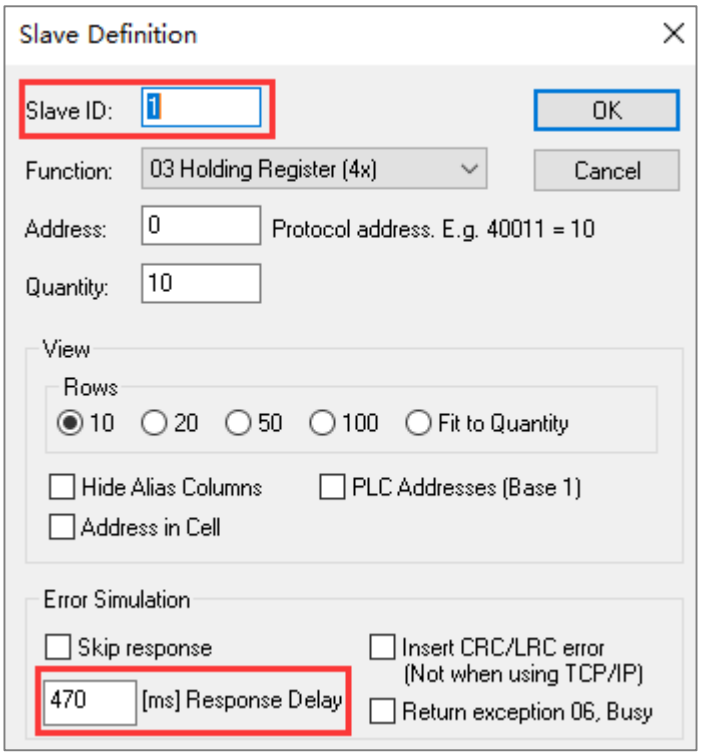
1 Open "Modbus Slave" software, click "Setup > Slave Definition".

2 Enter "1" in the "Slave ID" text box.

3 Enter response delay time "470" milliseconds in "Response Delay" text box.

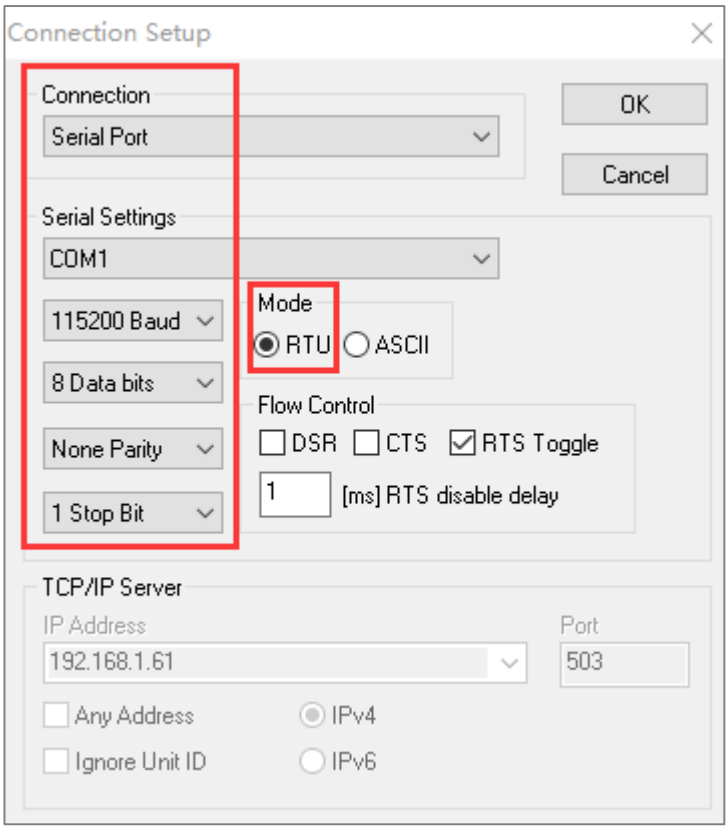
Note:

The value of response delay can be fine-tuned according to the actual network condition to find the critical value.



4 Other parameters remain the default, click "OK".

5 Click " Connection > Connection Setup ".



6 Click the "Connection" drop-down list box and select "serial port".

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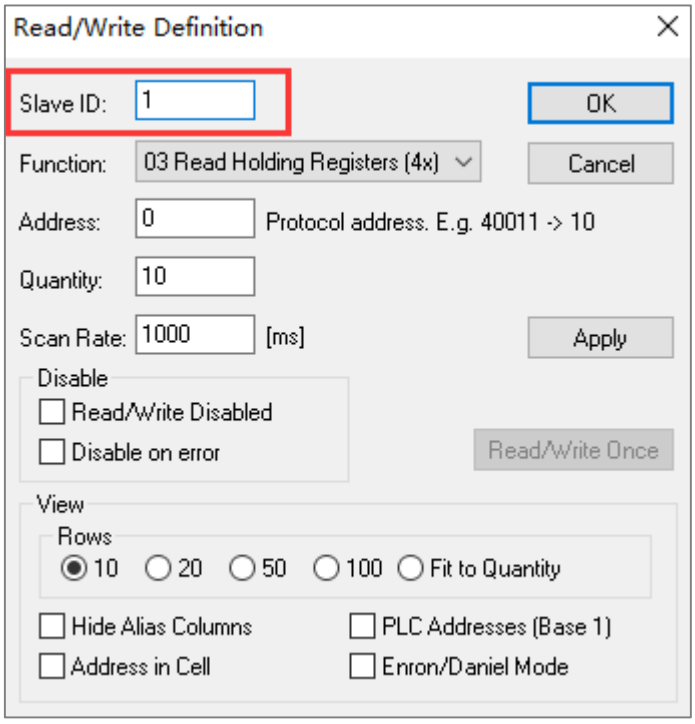
7 In the "Serial Settings" option box, configure serial port information such as serial number, baud rate, data bit, parity bit and stop bit.

8 Select the "RTU" mode in the "Mode" option.

9 Other parameters remain the default, click "OK".

10 Open “Modbus Poll” software in computer 1 and computer 2 to simulate master station 1 and master station 2, click "Setup> Read / Write Definition".

11 Computer 1 (master station 1): enter "1" in the "Slave ID" text box , as the picture below.



12 Computer 2 (master station 2): enter "1" in the "Slave ID" text box and “5” in “Quantity” text box, as the picture below.

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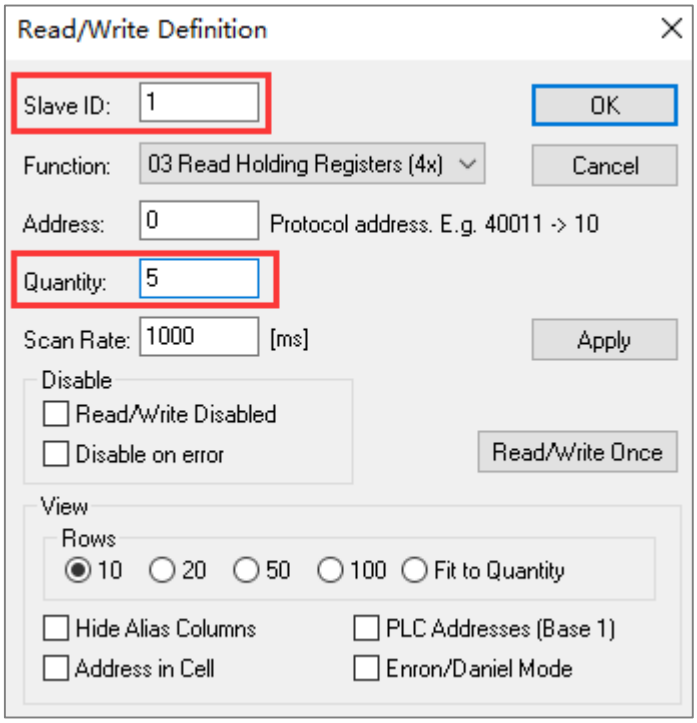


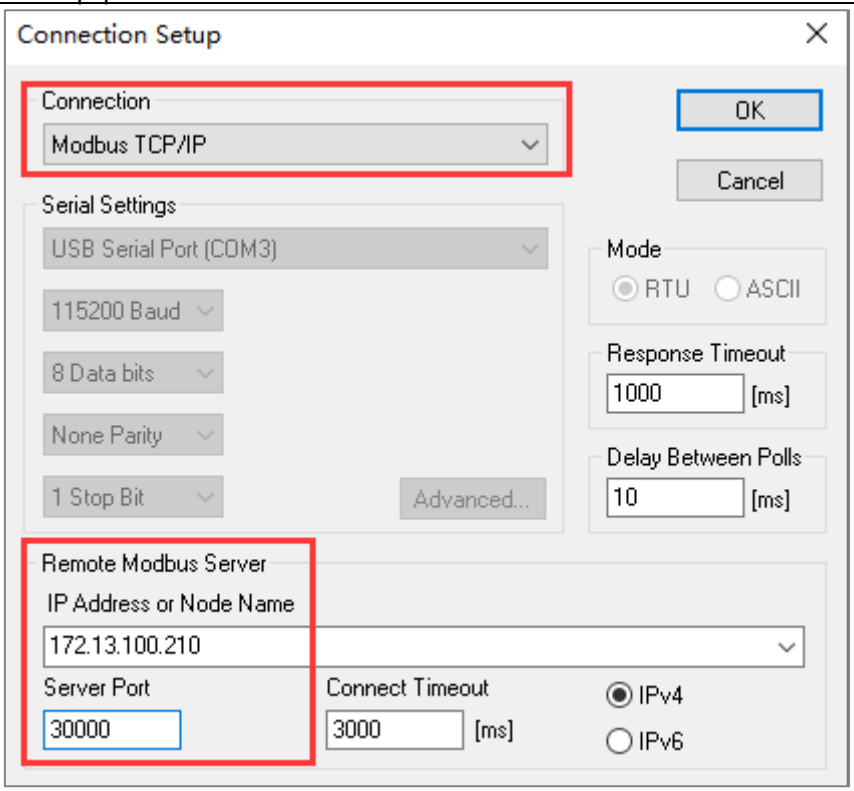
13 Other parameters remain the default, click "OK".

14 Click " Connection > Connection Setup ".

15 Click the "Connection" drop-down list box and select "Modbus TCP / IP".

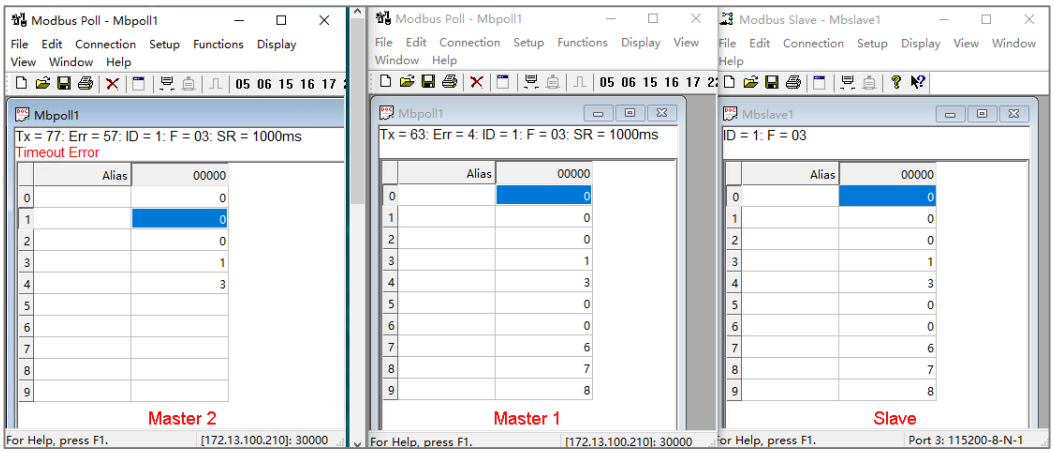
16 Enter the destination IP address "172.13.100.210" in the "IP Address" text box of the "Remote Modbus Server" area.

17 Enter destination TCP port number "30000" in the "Server Port" text box of the "Remote Modbus Server" area.



18 Other parameters remain the default, click "OK".

Step 7 Check the communication between the TCP master and the RTU slave. Master station 1 and master station2 read data every 1 second, master station1 with higher priority keeps normal communication while data timeout occurs in master station2, as shown in the following figure.



Click " Display > Communication Traffic" to check communication data in slave simulation software "Modbus Slave". Device will send request command to slave station in priority when response timeout occurs in master station 1, as shown in the following figure.

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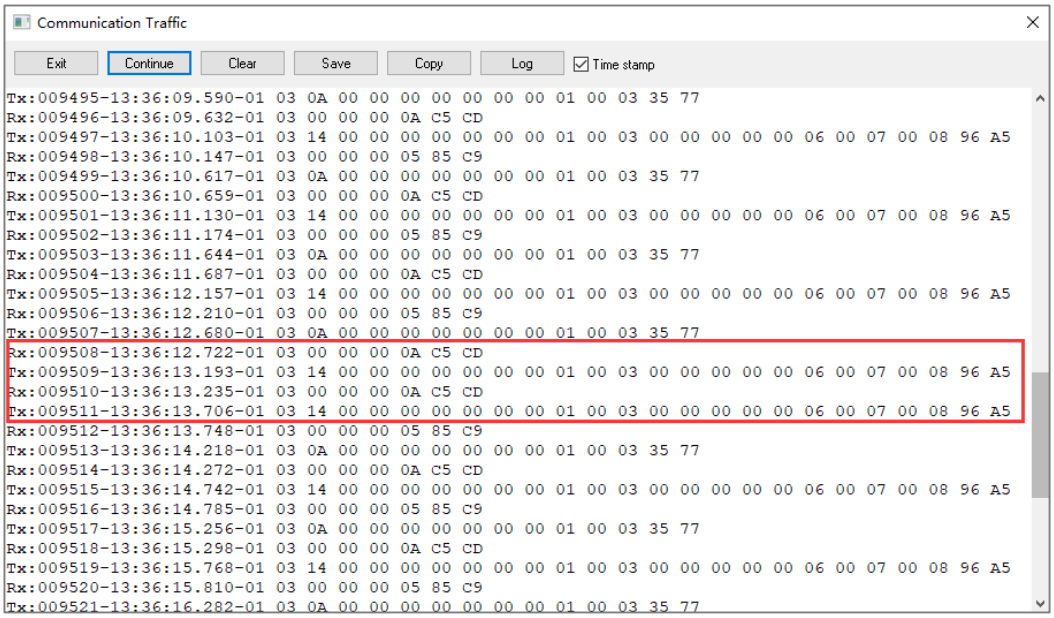

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11 Customer case

Modbus gateway has been successfully used in many industries, to solve many problems of industrial communications, to meet customer demand for cost-effectiveness. We have a number of successful customer cases, if you do not find the same case, it doesn't mean our MODBUS gateway product is not suitable for you, please contact customer service. We will do our best for your service!

Replace serial Master with TCP master, change the original device Slave ID

In this case, client's old control system includes multiple sub-system based on serial port, and a serial Master stations directly controls a serial Slave device in each sub-system, as picture below.

The new system using the Modbus gateway is connected to each of the serial Slave devices, so the Ethernet SCADA can control them. But Slave ID in the network cannot be duplicated, so some devices need to change the ID so that the network can identify them.

Use TCP Master in place of serial port master, do not change the original device Slave ID

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In the previous case, some devices use a fixed ID that can not be changed. The access network requires a multi-port Modbus gateway and uses the Virtual Slave ID. The new system is easy to use.

Reserve serial port Master, at the same time add TCP Master

In this case, the serial port Master requires the direct control of the device, and the waiting time is short, it is unable to be replaced.

Simultaneous integration Modbus RTU, Modbus ACSII, Modbus TCP

There are a large number of different types of hybrid equipment in the factory floor, including instruments and meters, manufacturing machines and PLC controllers. To integrate these devices into the network, it takes into account a variety of factors, including different communication parameters, different protocols. Modbus gateway equipment has

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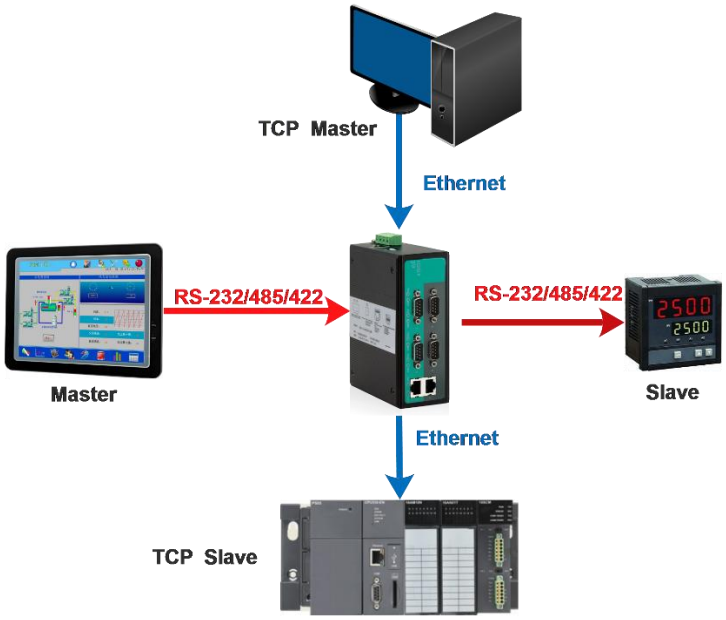
a powerful function, allowing the integration of a variety of different Modbus systems, supporting a variety of communication methods and protocols.



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Part Two: Principle

12 Modbus Overview

About this chapter

Content	Link
This Chapter	12.1 Protocol implementation 12.2 Master and slave working state diagram 12.3 Modbus communication principle 12.4 Transmission mode 12.5 Modbus basic architecture diagram

12.1 Protocol implementation

The MODBUS Serial Line protocol is a Master-Slaves protocol. At the same time, only one master node is connected to the bus, and one or more child nodes (the maximum number is 247) are connected to the same serial bus.

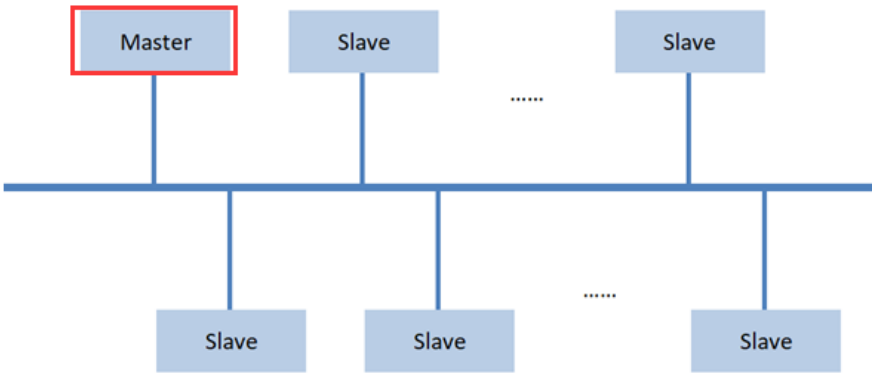
A MODBUS communication is always initiated by the master. The slave nodes will never transmit data without receiving a request from the master node.

The slave nodes will never communicate with each other.

The master node initiates only one MODBUS transaction at the same time.

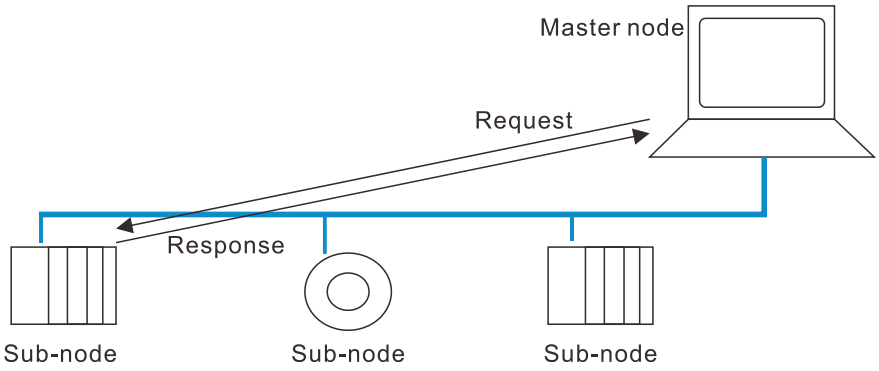
The master node issues a MODBUS request to the slave nodes in two modes: Unicast mode, Broadcast mode

Master station and Slave station

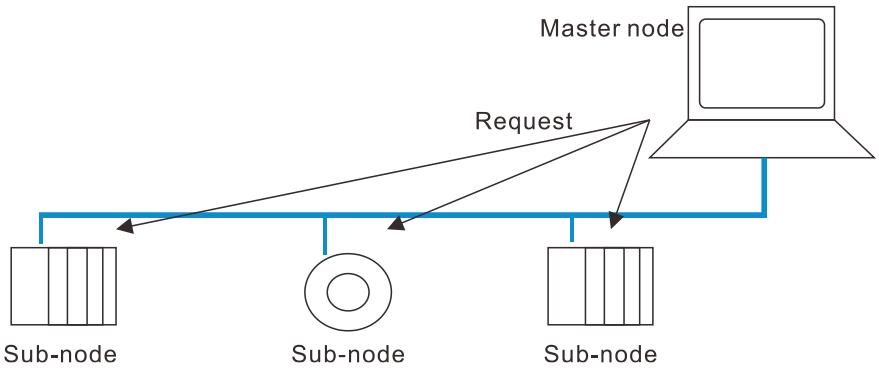


Unicast mode and broadcast mode

Multipoint structure diagrams in unicast mode are as follow:

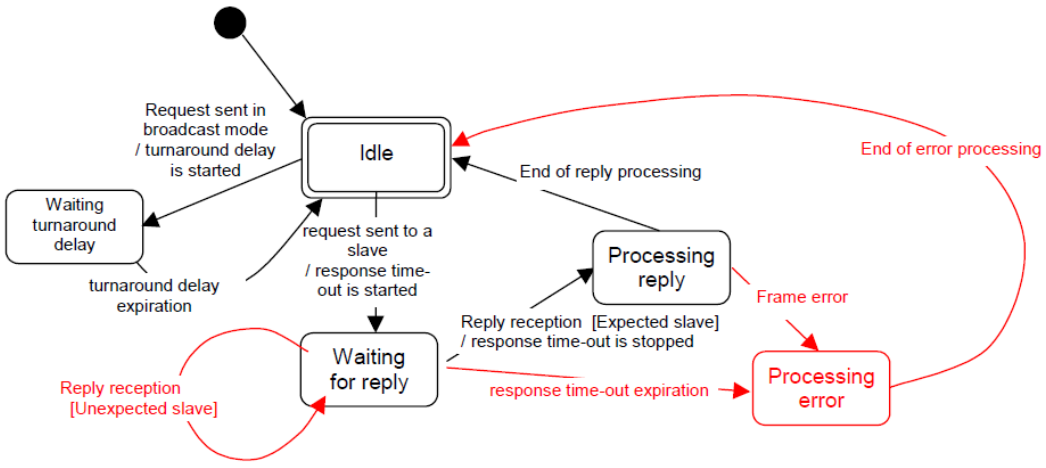


Multipoint structure diagrams in broadcast mode are as follow:

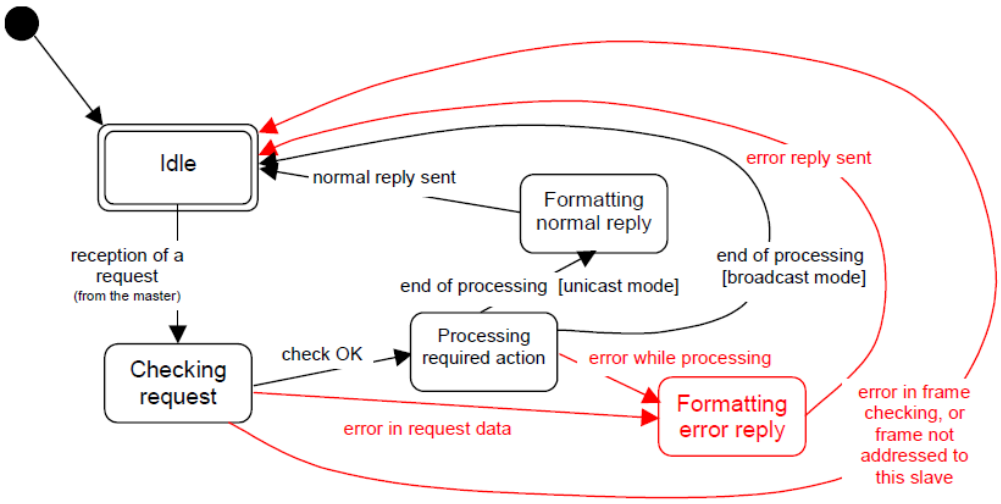


12.2 Master and slave working state diagram

Master Work state



Slave Work state



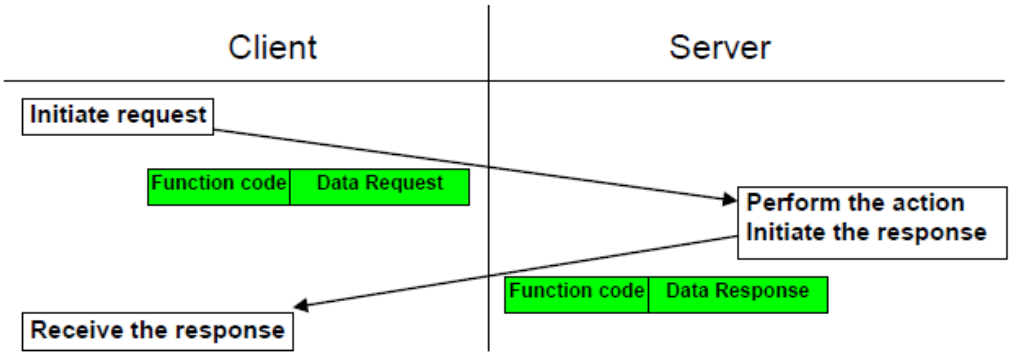
12.3 Modbus communication principle

Modbus protocol is a client / server application layer protocol, the communication process follows the following process:

- The client sends a request to the server.
- The server analyzes and processes the client requests，and sends the results to the client.
- If an error occurs, the server will return an exception code to the client

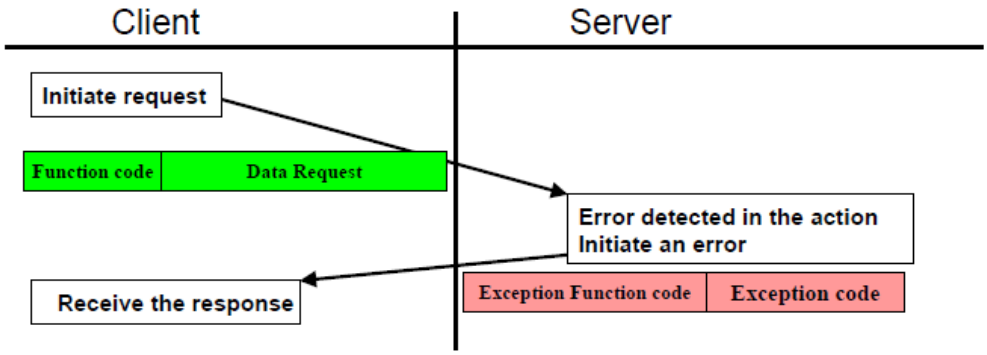
  The message data bits sent by client to server includes additional information, which is used by server to perform the operation defined by function code. If there is no error associated with requesting the Modbus function in a correctly received Modbus ADU, the response data sent by the server to the client will include request data; If there is an error related to requesting a Modbus function, the message data field will include an exception code that the server application can use the code to determine the next operation.
- Error-free handing:

  The slave will receive the request after the host sends a data request. If the slave checks the check code successfully, indicating that the processing is error free, it will execute the operation of the function code.



- Abnormal response handling

  After the host sends the data request, the slave receives the request and verifies that the check code fails, indicating that the sending has an error. Return error code and abnormal code.



12.4 Transmission mode

Modbus RTU

When devices communicate on a MODBUS serial line using the RTU (Remote Terminal Unit) mode, each 8–bit byte in a message contains two 4–bit hexadecimal characters.

Key Benefits: Higher data density, higher throughput rates at the same baud rate than ASCII mode, and more data.

Interoperability between Modbus devices only each device has the same mode RTU or ASCII, the default setting must be RTU mode.

The RTU message frame:

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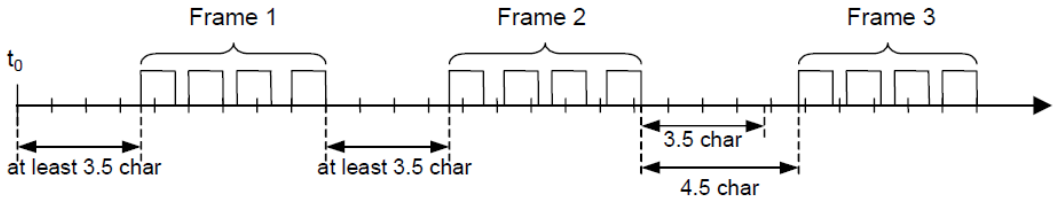

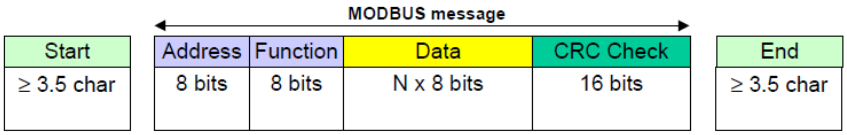

Modbus ASCII

When devices are setup to communicate on a MODBUS serial line using ASCII (American Standard Code for Information Interchange) mode, each 8–bit byte in a message is sent as two ASCII characters.

This mode is used when the physical communication link or the capabilities of the device does not allow the conformance with RTU mode requirements regarding timers management.

Advantages: The time interval for sending characters can be up to 1 second without error.

Disadvantages: Since one byte requires two characters, this mode is less efficient than RTU.

ASCII message frame.

Start	Address	Function	Data	LRC	End
1 char :	2 chars	2 chars	0 up to 2x252 char(s)	2 chars	2 chars CR,LF

When using ASCII mode, each 8-bit byte in the message is converted to 2 ASCII characters for transmission. The main advantage of the ASCII mode is that the characters can allow up to 1 second intervals without error.

RTU and ASCII mode comparison:

Modbus RTU and ASCII mode comparison		
Mode	RTU	ASCII
Coding System	8-bit binary	Hexadecimal
	Two hexadecimal character contains 8-bits of data within each ASCII character of the message	One hexadecimal character contains 4-bits of data within each ASCII character of the message
Bits per Byte	1 start bit	1 start bit
	8 data bits	7/8 data bits

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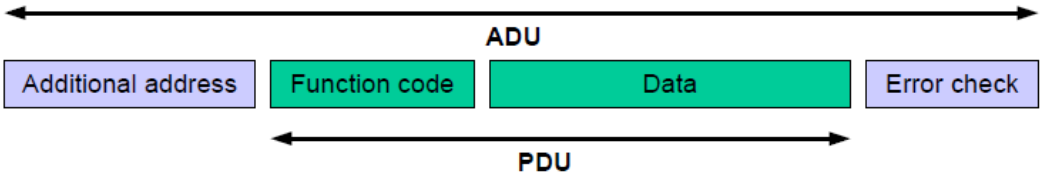
Modbus RTU and ASCII mode comparison		
	Odd / even parity 1 bit	
	No odd / even parity check	
	If there is a odd / even parity check for 1 stop bits	
	If there is no odd / even parity check for 2 stop bits	
Error check	CRC	LRC

Modbus TCP

The Modbus protocol defines a simple protocol data unit (PDU) independent of the underlying communication layers. The mapping of Modbus protocol on specific buses or network can introduce some additional fields on the application data unit (ADU).

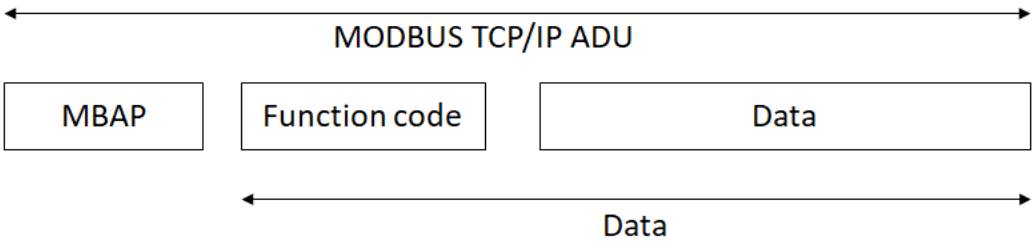
General Modbus frame:



The Modbus application data unit is built by the client that initiates a Modbus transaction. The function indicates to the server what kind of action to perform.

Modbus application data unit on TCP / IP:
Modbus requests or responses in a Modbus TCP / IP network

Modbus request / response on TCP / IP:



Use a special message header on TCP / IP to identify the Modbus application data unit. This header is called the MBAP header (Modbus protocol header).
This header provides some differences from the Modbus RTU application data units used on the serial link:

- Replace the Modbus slave address field commonly used on the Modbus serial link with a single byte unit identifier in the MBAP header. This unit identifier is used for communication of devices that use a single IP address to support multiple independent Modbus terminal units, such as bridges, routers, and gateways.
- All MODBUS requests and responses are designed in such a way that the receiver

can verify the completed message. For a function code with a fixed length of the Modbus PDU, the function code is sufficient. For a function code that carries a variable data in a request or response, the data field needs to include the number of bytes.

- When Modbus is carried over TCP, even if packets are divided into multiple packets, the additional length information is carried on the MBAP packet header so that the receiver can identify the message boundary. The presence of explicit and implicit length rules and the use of the CRC-32 error check code (on the Ethernet) will produce minimal undetected interference to the request or response message.

MBAP header description

The MBAP header includes the following fields:

Field	Length	Description	Client	Server
Transaction identifier	2 bytes	The identifier of the MODBUS request / response transaction	start up	The server is replicated from the received request
Protocol identifier	2 bytes	0 = MODBUS protocol	start up	The server is replicated from the received request
Length	2 bytes	The number of bytes below	start up (request)	Server (response) start up
Unit identifier	1 byte	The serial number of the remote slave connected to the serial link or other bus	start up	The server is replicated from the received request

The message header is 7 bytes long:

- Transaction Identifier: Used for transactional pairing. In response, the Modbus server replicates the transaction identifier of the request.
- Protocol identifier: multiplexing within the system. The Modbus protocol is recognized by a value of 0.
- Length: The length field is the number of bytes in the next field, including the cell identifier and the data field.
- Unit identifier: Use this field for intra-system routing. Dedicated to communication over Modbus or Modbus + serial link slaves via a gateway between an Ethernet TCP-IP network and a Modbus serial link. The Modbus client sets this field in the request, and the server must return the domain with the same value in the response.

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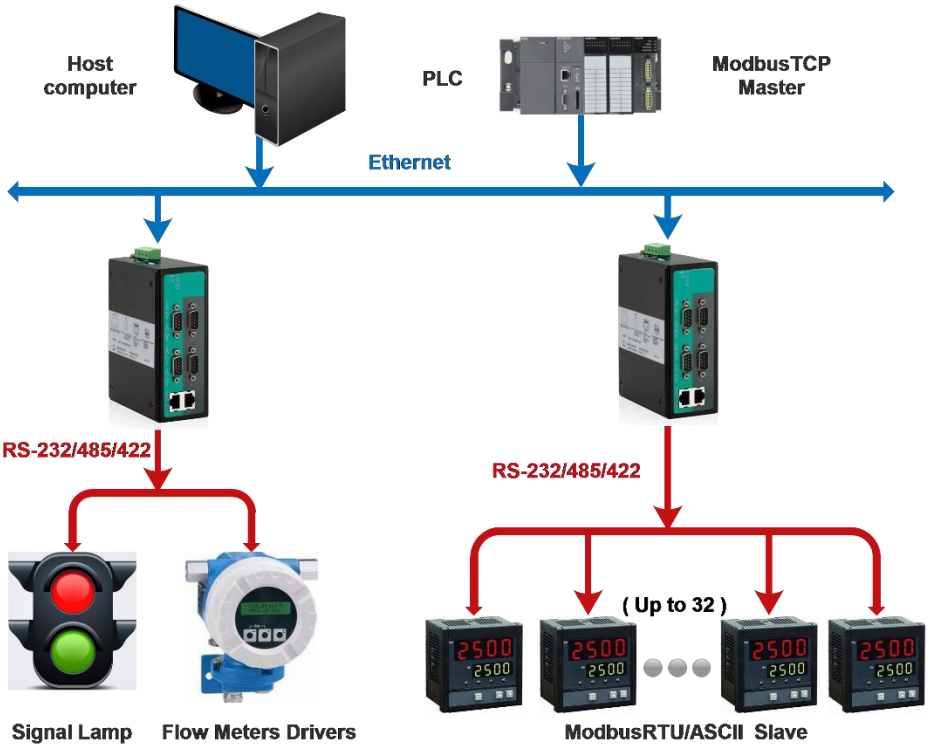
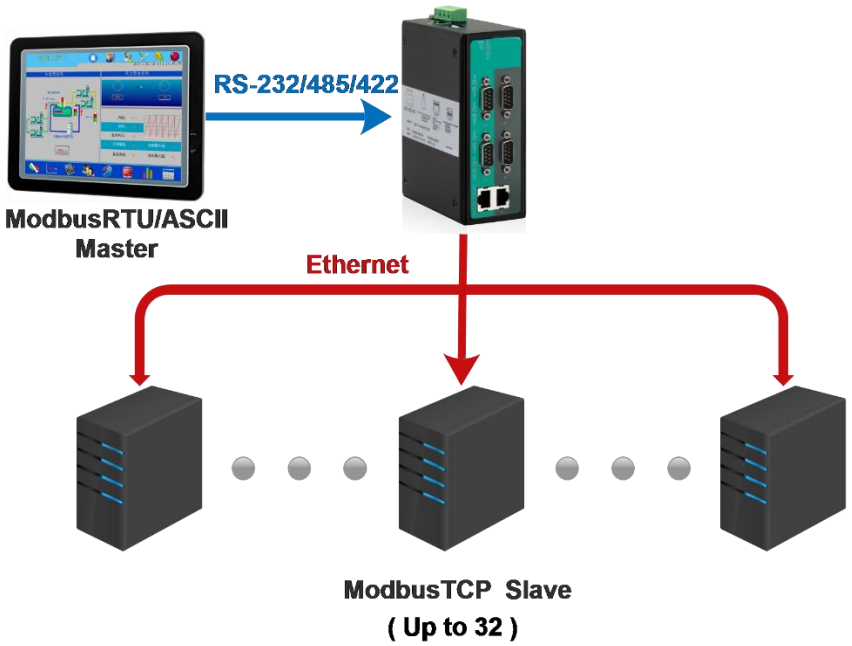
12.5 Modbus basic architecture diagram

Modbus Basic Architecture Figure1:



Modbus Basic Architecture Figure2:



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13 Modbus Settings

About this chapter

Content	Link
This Chapter	13.1 Modbus parameter settings **Error! Reference source not found. Error! Reference source not found.**Slave ID Map

13.1 Modbus parameter settings

Initial delay

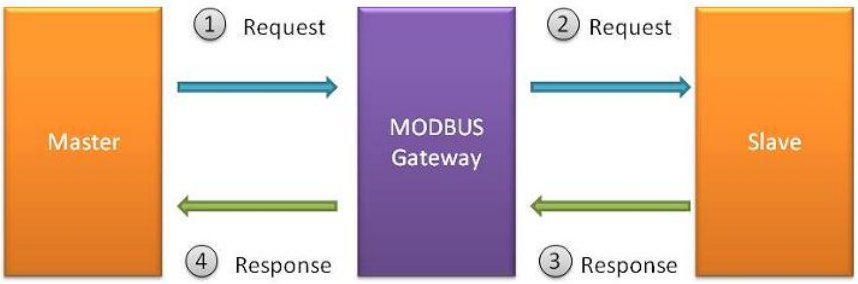
When the Modbus gateway device is powered on, it will take a delay time to actually start Modbus. This parameter is because the Modbus slave device initialization time is relatively long, in order to avoid their initialization has not been completed before the request frame access, so the gateway set the initialization delay time to decide to initialize the time to issue the first request frame Delay.

TCP Modbus Anomaly

This parameter is used to display Modbus TCP abnormal in Modbus monitoring software. The default gateway sends Modbus TCP abnormal to Modbus monitoring software.

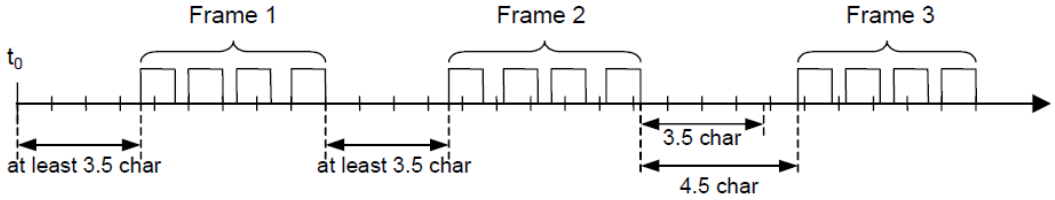
Response timeout

Modbus is a master-slave protocol, The master needs a response timeout when accessing the slave, and this time is the gateway‘s "response timeout.” The parameters exist between Step ② and ③in the next figure . After the gateway forwards the request to the slave device, if the response of the slave device is not received within the parameter time, it is a timeout response, and the abnormal response is sent back to the master device.



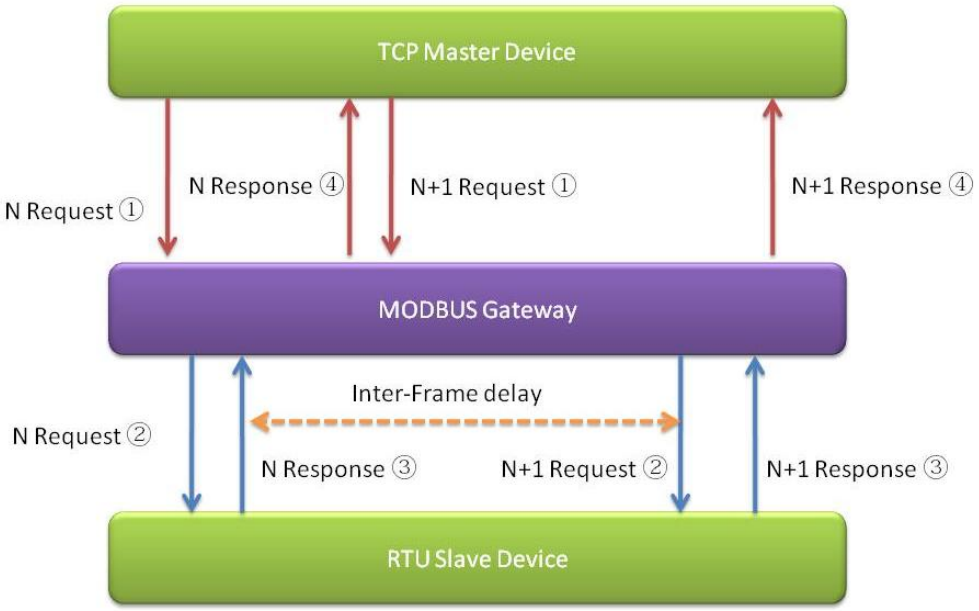
Character interval

The interval between a single character and the next character in a frame RTU message. When the value is 0, the default is 3.5T time, equal to 3.5 characters time. In some customer site, the serial device does not have FIFO cache, one by one to send and receive, take a long time, did not meet the Modbus protocol on the standard time. But the character interval allows customers to customize the time, compatible with poor time requirements for older devices.



Inter-Frame delay

That is, the current RTU response and the next RTU request between the time intervals, the default is 0ms. This function is to prevent the slave device from not being able to quickly process the RTU request and set the time interval for the RTU slave device to have sufficient time to process the request.



13.2 Slave ID Map

The Modbus protocol specifies that all slave devices must have a unique ID number (1 ~ 247). This ID number is used to identify the slave address in response to a request from the master device. Modbus device ID number is set by the manufacturer.

In the Slave ID Map, each slave device has two ID addresses that the virtual ID address and the real ID address. The real ID exists in the slave device, and the other device directly accesses the slave device via the real ID. The virtual ID exists in the gateway, the only access address of the slave device at the gateway, and the other devices indirectly access the slave device using the virtual ID through the gateway.

ID message processing flow:

①The master device uses the virtual ID to access the gateway;

②The gateway converts the virtual ID into a real ID to access the slave device;

③The slave device uses the real ID to send back the response;

③The Gateway converts the real ID into a virtual ID and then sent back the response.

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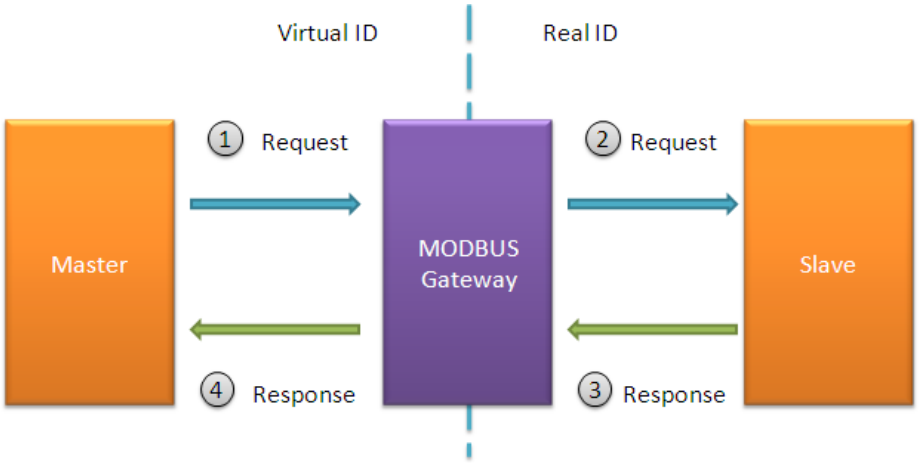

The gateway implements the function of ID mapping by setting the ID range and the ID offset. The ID range starts from the slave start ID to the slave end ID. Only channels with channel type slaves can be mapped, including serial port (RTU Slave or ASCII Slave) and TCP Slave. Slave ID Map formula is as follows: “Virtual ID + ID Offset = Real ID” The ranges of the Virtual ID and Real ID in the formula are 1 to 247.