



Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual

Serial \rightleftharpoons Ethernet

Serial Server



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Notes on Use

This manual applies to NE2 series serial servers, the software functions of the whole series are identical, only the hardware interface, power supply range, whether isolation, shell material and so on. Please note that the detailed differences are shown in the following parameter comparison table.

Parameter Comparison Table

| Product Model | Shell material | Serial port category | Working Voltage (V) | Product Size (mm) | Number of network ports | Isolated or not | POE powered |
|---------------|----------------|----------------------|---------------------|-------------------|-------------------------|-----------------|-------------|
| NE2-D11 | PC | RS485 | DC 8~28 | 93×28×27 | 1 | × | × |
| NE2-D12 | PC | RS232 | DC 8~28 | 93×28×27 | 1 | × | × |
| NE2-D13 | PC | TTL | DC 8~28 | 93×28×27 | 1 | × | × |
| NE2-D11P | PC | RS485 | DC 8~28 | 93×28×27 | 1 | √ | × |
| NE2-D12P | PC | RS232 | DC 8~28 | 93×28×27 | 1 | √ | × |
| NE2-D13P | PC | TTL | DC 8~28 | 93×28×27 | 1 | √ | × |
| NE2-D14 | Aluminum | RS485/232/422 | DC 8~28 | 82×84×25 | 1 | × | × |
| NE2-D14E | Aluminum | RS485/232/422 | DC 8~28 | 82×84×25 | 1 | × | √ |
| NE2-D14P | Aluminum | RS485/232/422 | DC 8~28 | 82×84×25 | 1 | √ | × |
| NE2-D14PE | Aluminum | RS485/232/422 | DC 8~28 | 82×84×25 | 1 | √ | √ |
| NE2-H14 | Aluminum | RS485/232/422 | DC 8~28 | 82×84×25 | 2 | × | × |
| NE2-H14P | Aluminum | RS485/232/422 | DC 8~28 | 82×84×25 | 2 | √ | × |
| NE2-D11A | PC | RS485 | AC 85~265 | 110×66×30 | 1 | × | × |
| NE2-D12A | PC | RS232 | AC 85~265 | 110×66×30 | 1 | × | × |
| NE2-D11AP | PC | RS485 | AC 85~265 | 110×66×30 | 1 | √ | × |
| NE2-D12AP | PC | RS232 | AC 85~265 | 110×66×30 | 1 | √ | × |

1 Product Introduction

1.1 Brief Introduction

NE2 series single serial port server is used to realize the bi-directional transparent transmission of data from serial port to Ethernet port. With a variety of Modbus gateway modes and MQTT/HTTPC IoT gateway modes, it can meet the networking function of all kinds of serial devices/PLCs; it adopts industrial-grade design standard to ensure the reliability of the equipment.

Serial server realizes transparent transmission of serial data from serial port side to TCP/IP packets from Ethernet port side, users do not need to care about the specific details, and the device completes the protocol conversion internally.

If there are problems in the process of use, you can refer to our application cases on the official website.

1.2 Features

- RJ45 supports 10/100M Ethernet interface, cross direct connection adaptive;
- The product supports 2-channel Socket, each channel supports TCP Server, TCP Client, UDP Server, UDP Client, HTTPC, MQTT, and the server mode supports 5-channel connection in a single channel;
- Some models support RS485/232/422/TTL multiple serial protocols (see parameter comparison table for details);
- Some models support POE powered (see parameter comparison table for details);
- Supports power + signal double isolation (see parameter comparison table);
- Supports three configuration methods: configuration tool, web page and AT command;
- Supports DHCP function;
- Supports DNS (domain name resolution) and can customize domain name resolution server;
- Supports multiple Modbus gateways (simple protocol conversion, multi-host mode, stored gateway, configurable gateway, active upload mode);
- Supports fast access to AliCloud, Baidu Cloud, OneNET, Huawei Cloud, and version 3.1.1 standard MQTT servers;
- Supports HTTP protocol (GET/POST request);
- Supports virtual serial port;
- Supports disconnection reconnection and timeout restart function;
- Supports Keepalive mechanism, which can quickly detect network anomalies and reconnect quickly;
- Supports short connection function, and the short connection interval can be customized;
- All modes support heartbeat packet and registration packet functions;
- Support one-key restore factory settings;
- Supports online upgrade function.

2 Quick Start



If there is any problem in the process of using, click the link of the official website:
<https://www.cdebyte.com/Modem>

Note: NE2 series software functions are identical, only hardware differences, this chapter uses NE2-D11 as an

explanation.

2.1 Preparation for Use

Before using the serial server (hereinafter referred to as "device"), you need to prepare the network cable, computer, USB to serial converter and other related accessories. The details are as follows:

| | | |
|--|--|--|
|  |  |  |
| <p>NE2-D11</p> | <p>Network Cable</p> | <p>Computer</p> |
|  |  |  |
| <p>DC 12V Switching Power Supply</p> | <p>USB to RS485</p> | <p>Several Cables</p> |

2.2 Device Wiring

2.2.1 Network Cable Connection

Use a standard RJ45 network cable with one end connected to the RJ45 port of the NE2 device and one end connected to the computer or switch/router port;

2.2.2 Serial Port Connection

RS485 connection:

A of NE2 is connected to A of USB to RS485;

B of NE2 is connected to B of USB to RS485;

RS422 connection:

T+ of NE2 is connected to R+ of USB to RS422;

T- of NE2 connected to R- of USB to RS422;

R+ of NE2 connected to T+ of USB to RS422;

R- of NE2 connected to T- of USB to RS422;

RS232 connection:

TXD of NE2 connected to RXD of USB to 232;

RXD of NE2 is connected to TXD of USB to 232.

GND of NE2 is connected to GND of USB to 232.

DB9 female connector of NE2 is connected to the male connector of USB to 232 interface;

DB9 line sequence 2:TXD 3:RXD 5:GND.

TTL connection:

TXD of NE2 is connected to RXD of USB to TTL interface.

RXD of NE2 is connected to TXD of USB to TTL; GND of NE2 is connected to GND of USB to TTL.

GND of NE2 is connected to GND of USB to TTL.

Note: TTL level is 3.3V

2.2.3 Power Connection

Connect V+ of NE2 to DC 12V switching power supply V+;

Connect V- of NE2 to DC 12V switching power supply V-;

Or connect with DC power supply connector (outer warp 5.5mm, inner diameter 2.1mm).

Note: **NE2-D11A, NE2-D12A, NE2-D11AP, NE2-D12AP** are AC 85~265V power supply, only need to talk about the zero fire wire connected separately.

2.3 Software Setup

2.3.1 Network Test Environment

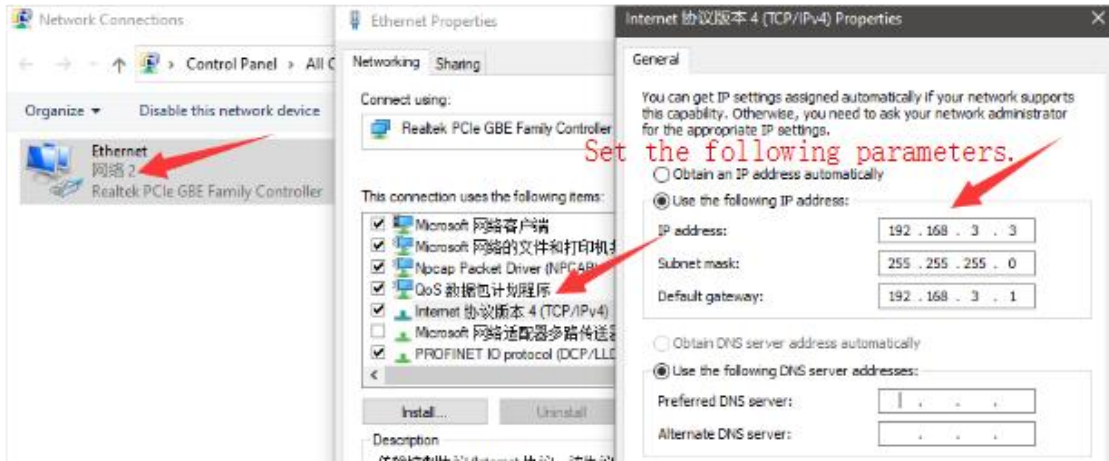
Avoid problems such as server search failure and inability to open web pages in the actual application process. First of all, check the settings of your computer.

(1) Close the firewall and antivirus software of the computer;

(2) Configure the network card connected to the device;

(3) This case for the device directly connected to the computer test, you need to configure the computer for the static IP (computer directly connected to the serial server, there is no router to assign, the computer can not get the IP address), the use of switches or routers need to ensure that the device and the computer is on the same network (for example: 192.168.3.xxx);

(4) Here configure the static IP of the computer as 192.168.3.4 (the same network segment as the serial server), configure the subnet mask as 255.255.255.0, and configure the default gateway as 192.168.3.1;



2.3.2 Default Parameters

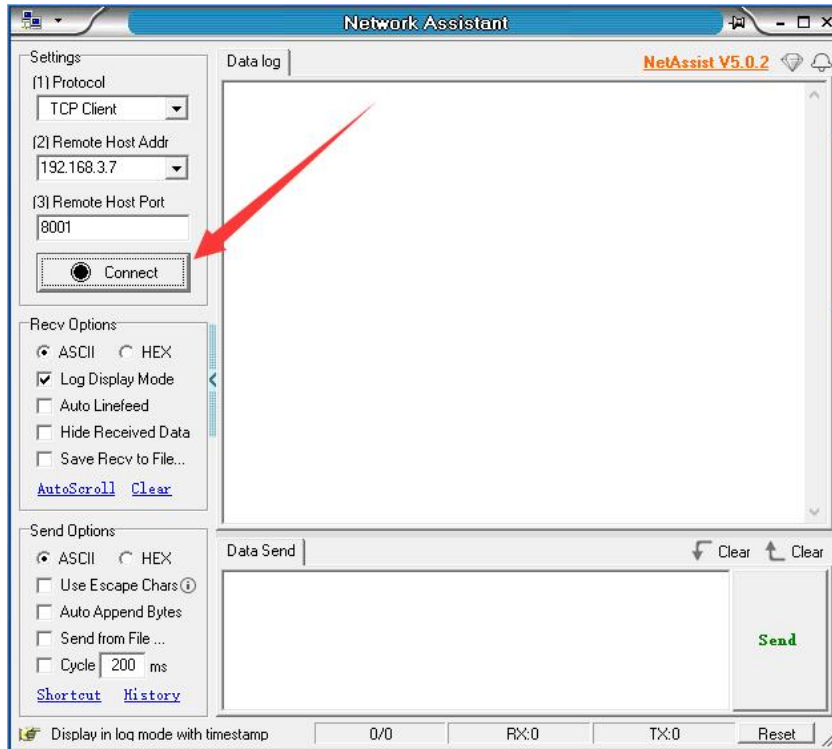
| Item | Default parameters |
|------------------------|--------------------|
| IP Address | 192.168.3.7 |
| Default Local Port | 8886 |
| Subnet Mask | 255.255.255.0 |
| Default Gateway | 192.168.3.1 |
| Default Operating Mode | TCP Server |
| Serial Port Baud Rate | 115200 |
| Serial Port Parameter | 8 / None / 1 |

2.3.3 Data Transmission Tests

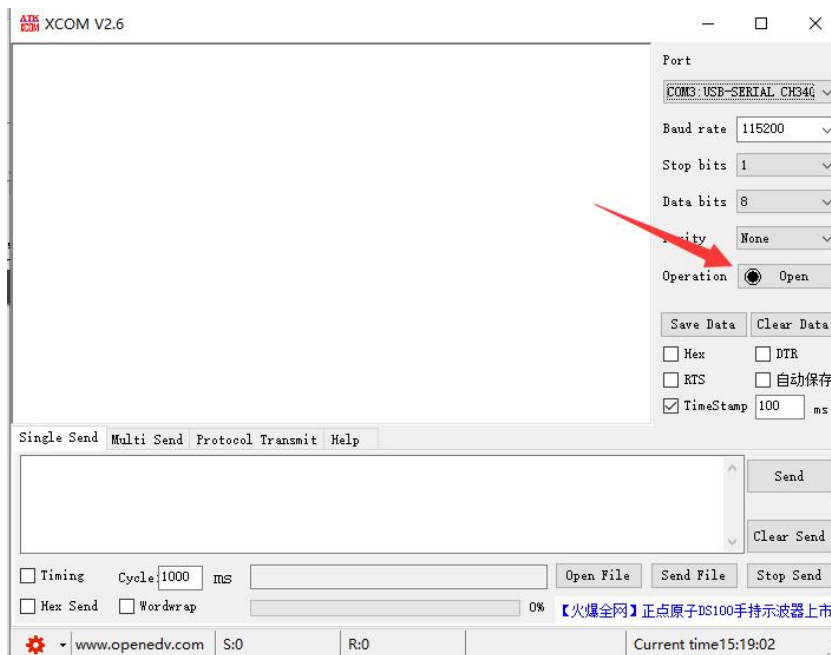
After the above operation steps, along with the factory default parameters of the device, perform the following operations to realize the transparent transmission test of data.

The steps are as follows:

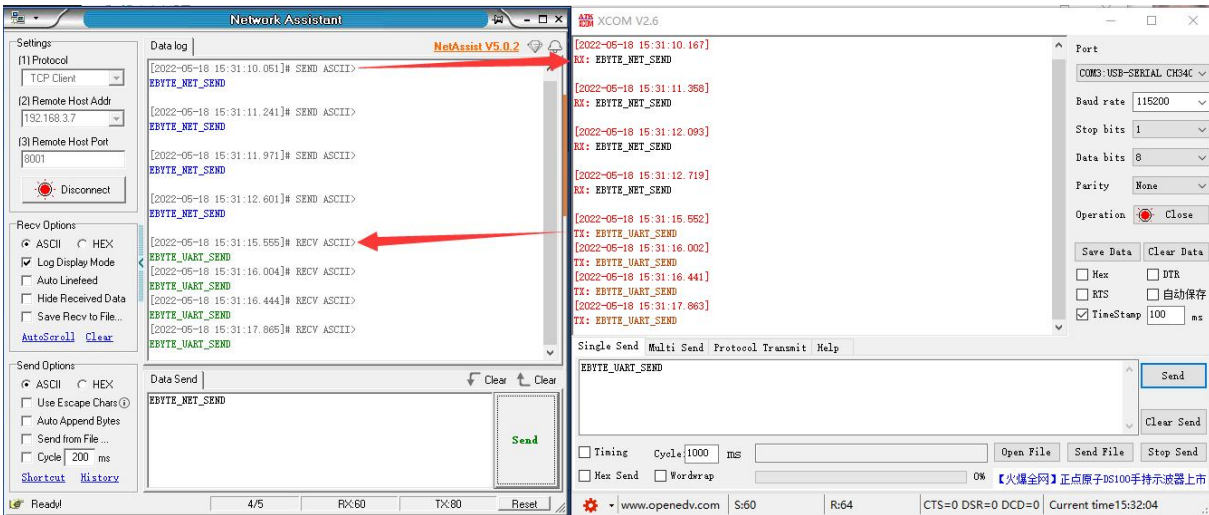
- (1) Open the Test TCP/IP Debugging Assistant software.
- (2) "Network Settings" area, select the TCP client mode (TCP Client), the remote host address corresponds to (device default local IP :192.168.3.7), the remote host port corresponds to the device factory local port 8886, click Connect.
- (3) Wait for the computer to connect to the serial server, and the LINK light of the serial server is always on after the connection is completed.



(4) Open the serial port assistant, set the serial port baud rate to 115200, set the serial port parameter to 1/8/None, click to open the serial port.



(5) Data transmission test, the serial port assistant (serial port side) to send test data, network debugging assistant (network side) to receive test data. Network debugging assistant (network side) to send test data, serial port assistant (serial port side) to receive test data. Realize duplex communication (i.e. local to network two-way data sending and receiving).



3 Product Overview

3.1 Technical Parameters

Common Parameter

| Item | Instruction |
|----------------------------------|---|
| Working Mode | TCP Server(Default), TCP Client, UDP Server, UDP Client, HTTP Client, MQTT Client |
| Socket Connection | TCP server supports 5 client connections |
| Network Protocol | TCP/UDP, MQTT, HTTP, IPv4, DHCP, DNS |
| IP Acquisition Method | Static IP (default), DHCP |
| DNS Domain Name Resolution | support |
| Domain Name Resolution Server | 114.114.114.114 (customizable) |
| Configuration | Web pages, parameter configuration tools, AT commands |
| IP Address | 192.168.3.7 (customizable) |
| User ID | admin (customizable) |
| Password | admin (customizable) |
| Local port | 8886 (customizable) |
| Subnet mask | 255.255.255.0 (customizable) |
| Gateway | 192.168.3.1 (customizable) |
| Serial Port Cache | 10kByte or 1024 packets |
| Packing Mechanism | Maximum 1024Byte, 1~80 byte idle time |
| Serial Port Baud Rate | 600~460800 bps (default 115200) |
| Data Bit | 5、6、7、8 (default) |
| Stop bit | 1 (default)、1.5、2 |
| Parity Bit | None (default)、 Odd、 Even |
| Working Temperature and Humidity | -40 ~ +85°C、5% ~ 95%RH (condensationless) |

| | |
|----------------------------------|--|
| Storage Temperature and Humidity | -40 ~ +105°C、5% ~ 95%RH (condensationless) |
| Protection Class | Industrial EMC Level 3 |
| Isolated Voltage | 1.5KV (Isolated version support only) |
| Electrostatic Protection | Contact 4KV, Air 8KV |
| Pulse group | Differential mode 1KV, common mode 2KV |

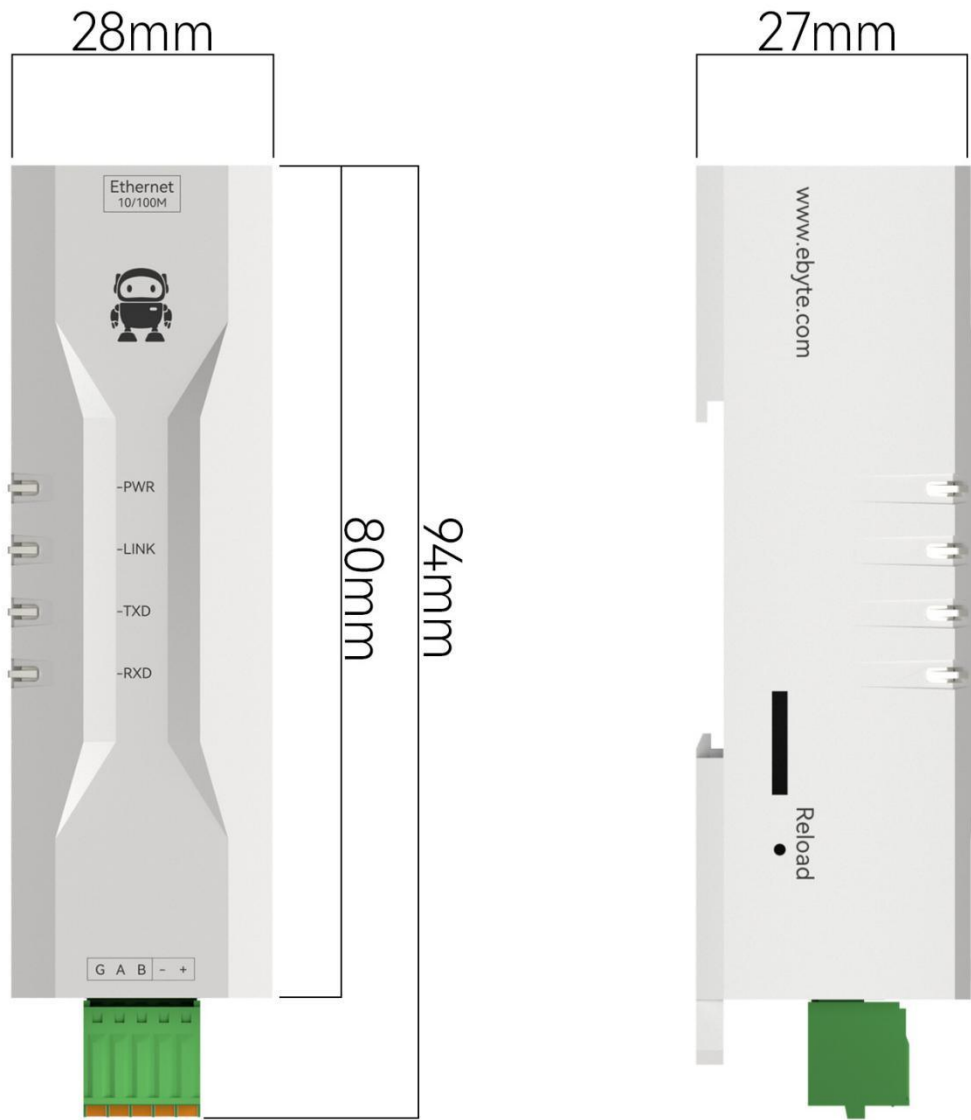
Differential Parameters

| Product Model | Shell material | Serial Port Category | Operating voltage (V) | Product Size (mm) | Number of network ports | Isolated | POE Powered | Power Connector |
|---------------|----------------|---|-----------------------|-------------------|-------------------------|----------|-------------|---------------------|
| NE2-D11 | PC | RS485 3P 2.54mm Connector | DC 8~28 | 93×28×27 | 1 | × | × | 2P 2.54mm Connector |
| NE2-D12 | PC | RS232 3P 2.54mm Connector | DC 8~28 | 93×28×27 | 1 | × | × | 2P 2.54mm Connector |
| NE2-D13 | PC | 3.3V TTL 3P 2.54mm Connector | DC 8~28 | 93×28×27 | 1 | × | × | 2P 2.54mm Connector |
| NE2-D11P | PC | RS485 3P 2.54mm Connector | DC 8~28 | 93×28×27 | 1 | √ | × | 2P 2.54mm Connector |
| NE2-D12P | PC | RS232 3P 2.54mm Connector | DC 8~28 | 93×28×27 | 1 | √ | × | 2P 2.54mm Connector |
| NE2-D13P | PC | 3.3V TTL 3P 2.54mm Connector | DC 8~28 | 93×28×27 | 1 | √ | × | 2P 2.54mm Connector |
| NE2-D14 | Aluminum | RS485 2P 3.81mm Connector RS232 DB9 Female RS422 4P 3.81mm Connector | DC 8~28 | 82×84×25 | 1 | × | × | 2P 3.81mm Connector |

| | | | | | | | | |
|-----------|----------|---|--------------|-----------|---|---|---|------------------------|
| NE2-D14E | Aluminum | RS485 2P 3.81mm Connector RS232 DB9 Female RS422 4P 3.81mm Connector | DC 8~28 | 82×84×25 | 1 | × | √ | 2P 3.81mm Connector |
| NE2-D14P | Aluminum | RS485 2P 3.81mm Connector RS232 DB9 Female RS422 4P 3.81mm Connector | DC 8~28 | 82×84×25 | 1 | √ | × | 2P 3.81mm Connector |
| NE2-D14PE | Aluminum | RS485 2P 3.81mm Connector RS232 DB9 Female RS422 4P 3.81mm Connector | DC 8~28 | 82×84×25 | 1 | √ | √ | 2P 3.81mm Connector |
| NE2-H14 | Aluminum | RS485 2P 3.81mm Connector RS232 DB9 Female RS422 4P 3.81mm Connector | DC 8~28 | 82×84×25 | 2 | × | × | 2P 3.81mm Connector |
| NE2-H14P | Aluminum | RS485 2P 3.81mm Connector RS232 DB9 Female RS422 4P 3.81mm Connector | DC 8~28 | 82×84×25 | 2 | √ | × | 2P 3.81mm Connector |
| NE2-D11A | PC | RS485 3P 3.81mm Connector | AC 85~265 | 110×66×30 | 1 | × | × | 2P 5.08mm Connector |

| | | | | | | | | |
|-----------|----|---------------------------------|--------------|-----------|---|---|---|------------------------|
| NE2-D12A | PC | RS232 3P 3.81mm Connector | AC 85~265 | 110×66×30 | 1 | × | × | 2P 5.08mm Connector |
| NE2-D11AP | PC | RS485 3P 3.81mm Connector | AC 85~265 | 110×66×30 | 1 | √ | × | 2P 5.08mm Connector |
| NE2-D12AP | PC | RS232 3P 3.81mm Connector | AC 85~265 | 110×66×30 | 1 | √ | × | 2P 5.08mm Connector |

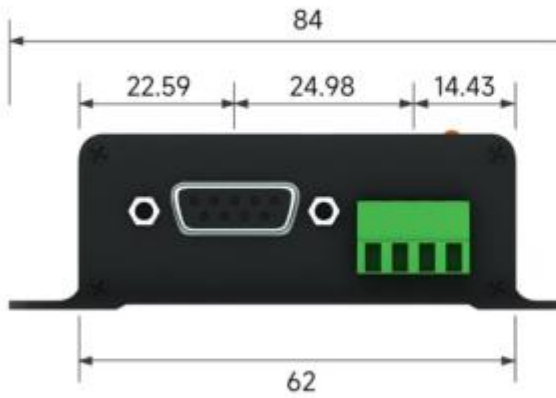
3.2 Mechanical Dimensions



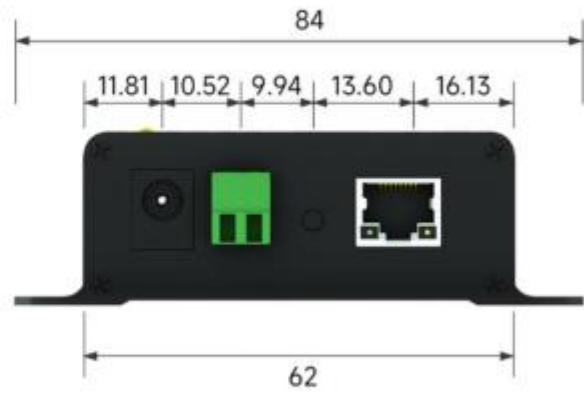
Note: This chart applies to NE2-D11, NE2-D12, NE2-D13, NE2-D11P, NE2-D12P, NE2-D13P.



TOP

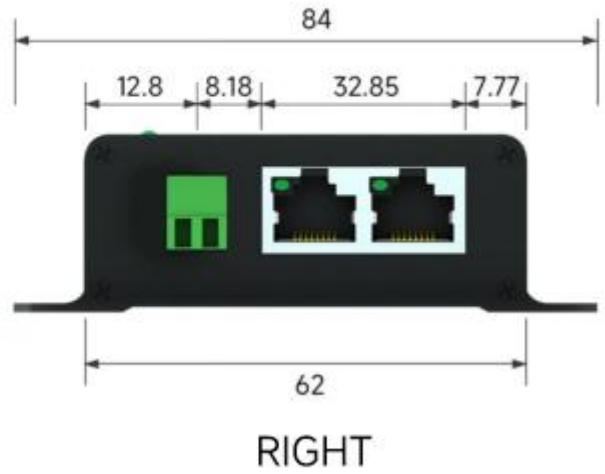
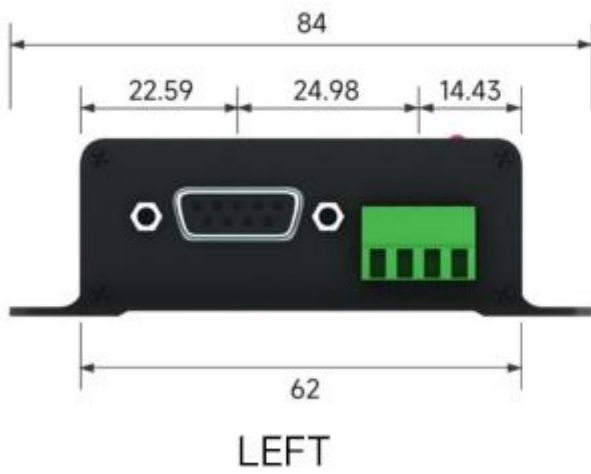


LEFT

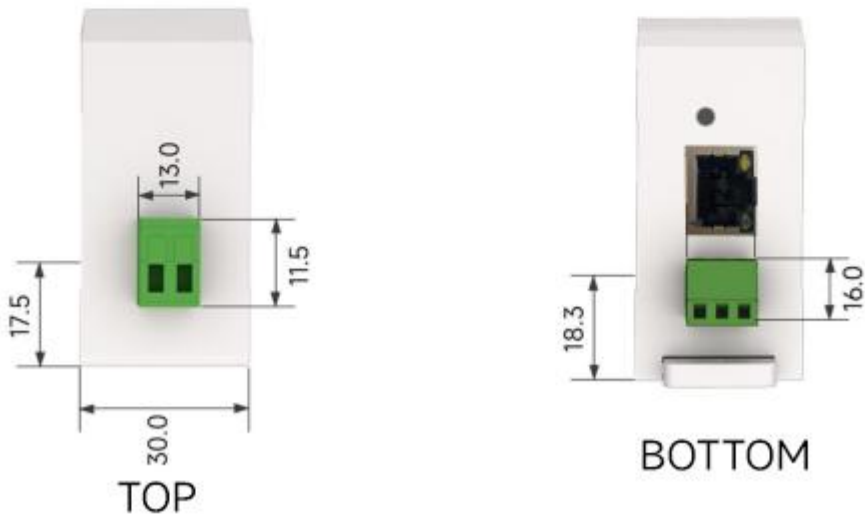
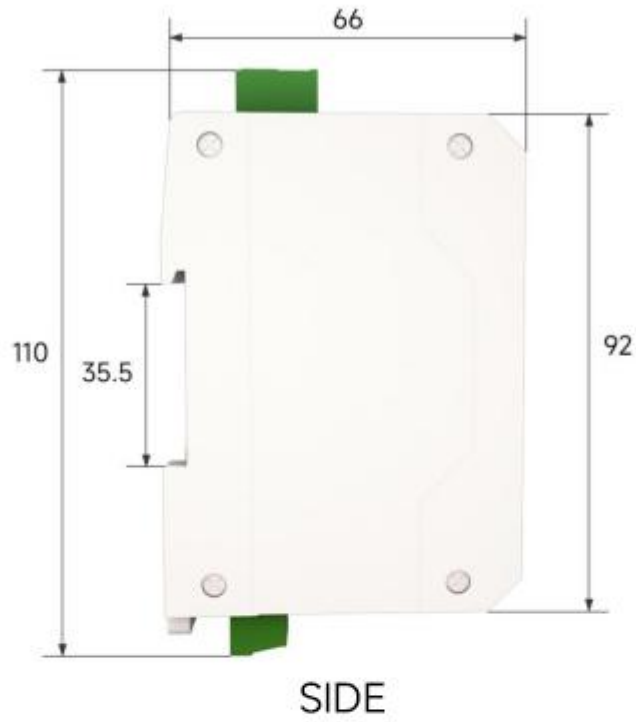


RIGHT

Note: This chart applies to NE2-D14, NE2-D14E, NE2-D14P, NE2-D14PE.

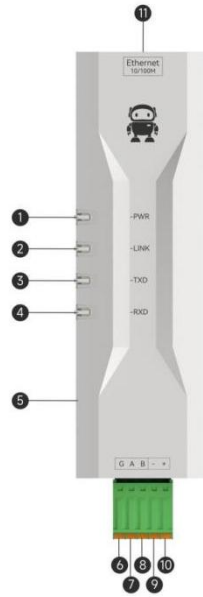


Note: This chart applies to NE2-H14, NE2-H14P.



Note: This chart applies to NE2-D11A, NE2-D12A, NE2-D11AP, NE2-D12AP.

3.3 Pin Definitions



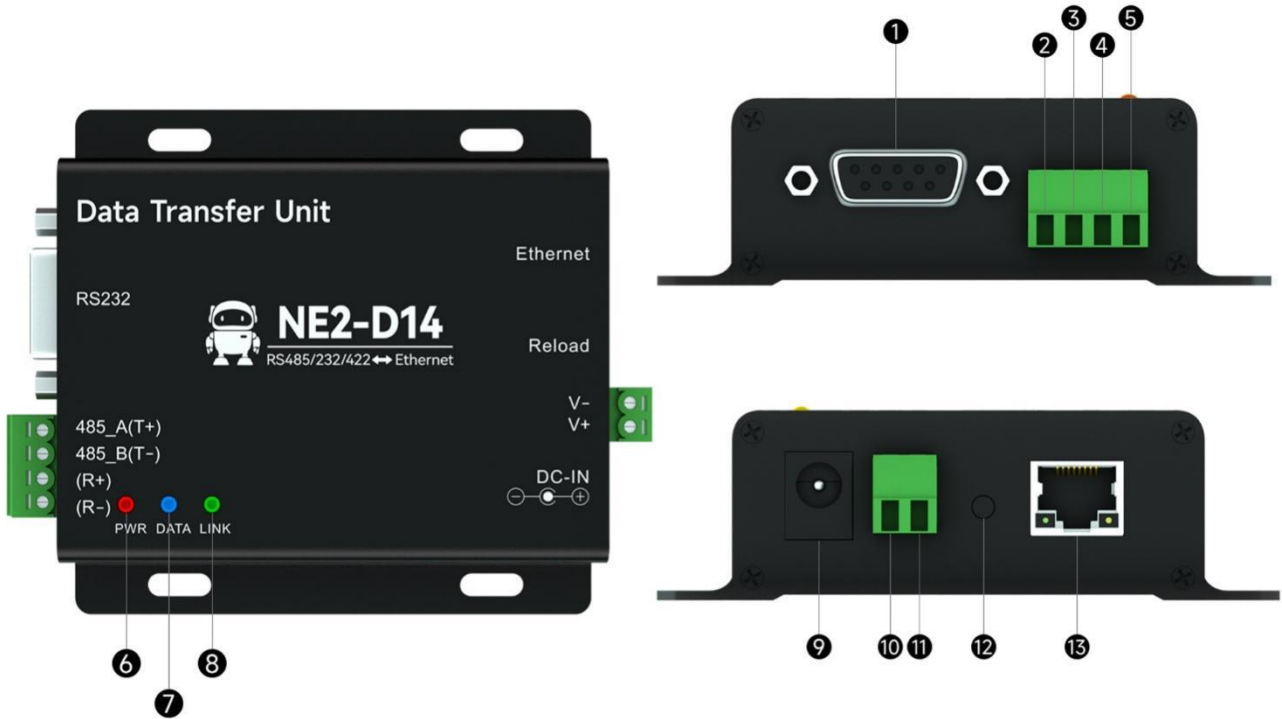
| No. | Name | Function | Instruction |
|-----|----------|-----------------------------------|---|
| 1 | POWER | Power indicator (blue) | Always on: power on Normally off: power off |
| 2 | LINK | Connection indicator (yellow) | Out: cable not connected Blinking: the network cable is connected normally but the link is not connected Always on: any network link is successfully connected or in UDP mode |
| 3 | TXD | Serial transmit indicator (green) | Blinking: Serial port outputs data to the client device |
| 4 | RXD | Serial Receive Indicator (Yellow) | Blinking: Client device outputs data to NE2-D11 serial port |
| 5 | Reload | Factory reset button | Press and hold for 5-10S to indicate that the device is restored to the factory settings. |
| 6 | G | GND | Connect RS485 cable shield or RS232-G |
| 7 | A/T | 485-A or 232/TTL-TXD | Connection to RS485-A interface or RS232/TTL-RXD interface |
| 8 | B/R | 485-B or 232/TTL-RXD | Connection to RS485-B interface or RS232/TTL-TXD interface |
| 9 | - | Power supply - | Connect 8~28v power supply V- |
| 10 | + | Power supply + | Connect 8~28v power supply V+ |
| 11 | Ethernet | Network Port | Standard RJ45 interface, 10/100M cross direct connection adaptive |

[Note] POWER is on when the network cable is not connected, the rest of the lights are off, the device is in standby mode; restore the factory settings, all the lights are on.

[Note] Network port indicator green light is 100M indicator, yellow light is 10M indicator, under normal circumstances

for the light (generally 100M light), there is data sending and receiving blinking.

Note: Applicable to NE2-D11, NE2-D12, NE2-D13, NE2-D11P, NE2-D12P, NE2-D13P.



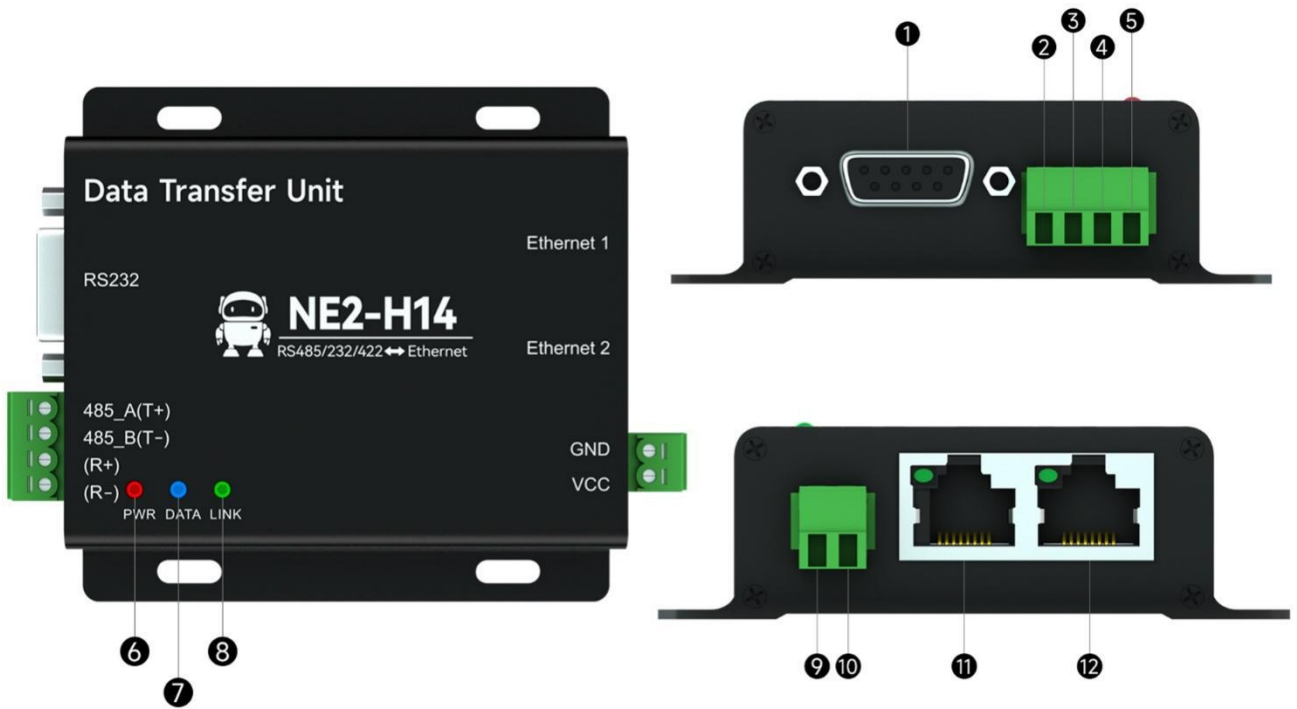
| No. | Name | Function | Instruction |
|-----|-----------|-------------------------------|---|
| 1 | RS232 | RS232 Connector | Standard DB9-RS-232 Female Wire Sequence 2: TXD 3: RXD 5:GND |
| 2 | 485-A(T+) | RS485/RS422 Connector | A for RS-485 interface, T+ for RS-422 transmission |
| 3 | 485-A(T+) | RS485/RS422 Connector | B for RS-485 interface, T- for RS-422 transmission |
| 4 | (R+) | RS422 Connector (R+) | RS-422 received R+ |
| 5 | (R-) | RS422 Connector (R-) | RS-422 Received R- |
| 6 | PWR | Power indicator (red) | Bright: Power on Off: Power disconnected |
| 7 | DATA | Data send/receive indicator | Blue light blinking: network port has data sent to the serial port Green light blinks: data is sent from the network port to the serial port Off: No data interaction |
| 8 | LINK | Link connection light (green) | Out: cable not connected Blinking: the network cable is connected normally but the link is not connected Always on: any network link is successfully connected or in UDP mode |

| | | | |
|----|----------|-----------------------|--|
| 9 | DC-IN | DC female power input | DC 8 to 28V input, do not input at the same time as the Phoenix terminal. |
| 10 | VCC | DC power input | 3.81mm Phoenix terminal, DC 8 to 28V positive, do not DC header input at the same time |
| 11 | GND | DC power output | 3.81mm Phoenix terminal, DC 8 to 28V negative, do not DC header input at the same time |
| 12 | Reload | Factory reset button | Press and hold for 5 seconds to restore the device to factory |
| 13 | Ethernet | network interface | Standard RJ45 connector |

[Note] :POWER is on when the network cable is not connected, the rest of the lights are off, the device is in standby mode; restore the factory settings, all the lights are on.

[Note]: The green light of the network port indicator is the 100M indicator, the yellow light is the 10M indicator, which is on under normal circumstances (generally 100M is on), and blinks when there is data sending and receiving.

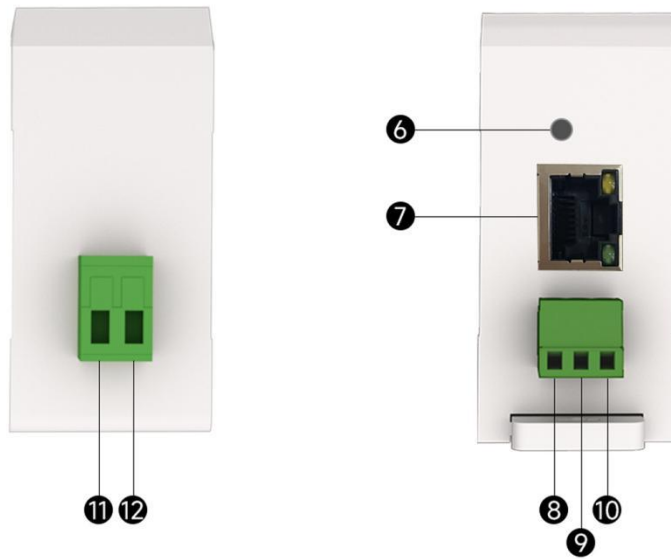
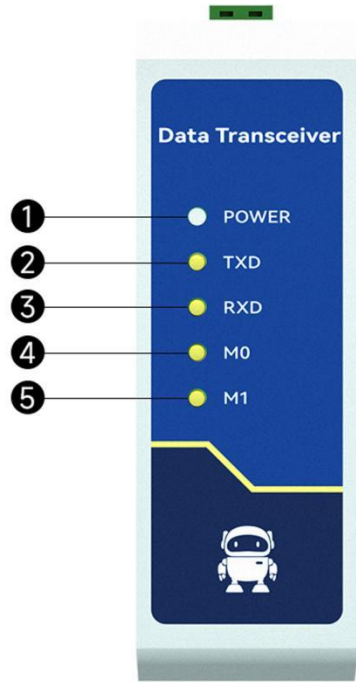
Note: Applicable to NE2-D14, NE2-D14E, NE2-D14P, NE2-D14PE.



| No. | Name | Function | Instruction |
|-----|-----------|-----------------------|---|
| 1 | RS232 | RS232 Connector | Standard DB9-RS-232 Female Wire Sequence 2: TXD 3: RXD 5:GND |
| 2 | 485-A(T+) | RS485/RS422 Connector | A for RS-485 interface, T+ for RS-422 transmission |
| 3 | 485-A(T+) | RS485/RS422 Connector | B for RS-485 interface, T- for RS-422 transmission |
| 4 | (R+) | RS422 Connector (R+) | RS-422 received R+ |
| 5 | (R-) | RS422 Connector (R-) | RS-422 received R- |
| 6 | PWR | Power indicator (red) | Bright: Power on |

| | | | |
|----|---------|-------------------------------|---|
| | | | Off: Power disconnected |
| 7 | DATA | Data send/receive indicator | Blue light blinking: network port has data sent to the serial port Green light blinks: data is sent from the network port to the serial port Off: No data interaction |
| 8 | LINK | Link connection light (green) | Extinguished: equipment abnormal Blinking: the device is running normally Always on: any network link is connected successfully or in UDP mode |
| 9 | V+ | DC power input | 5.08mm Phoenix terminal, DC 8 to 28V positive |
| 10 | V- | DC power output | 5.08mm Phoenix Terminal, DC 8 to 28V Negative |
| 11 | WAN/LAN | network port | Standard RJ45 interface, 10/100M adaptive, cascable |
| 12 | WAN/LAN | network port | Standard RJ45 interface, 10/100M adaptive, cascable |

Note: Applicable to NE2-H14, NE2-H14P

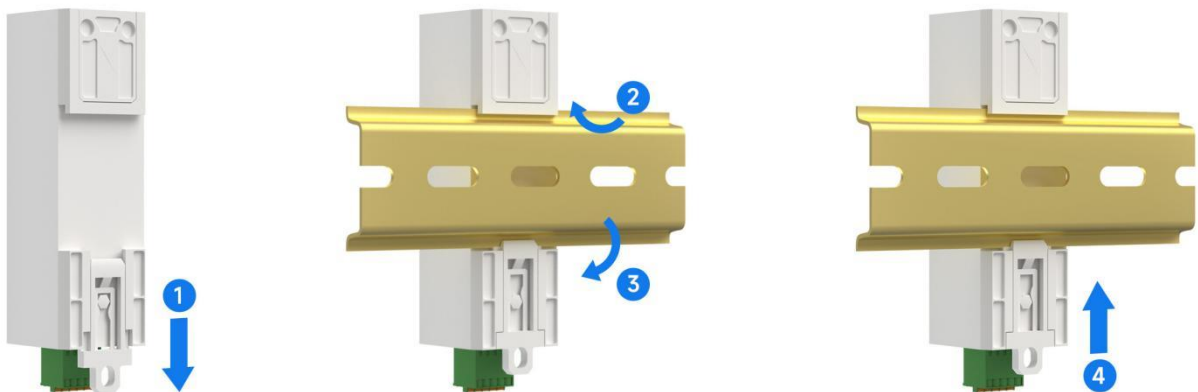


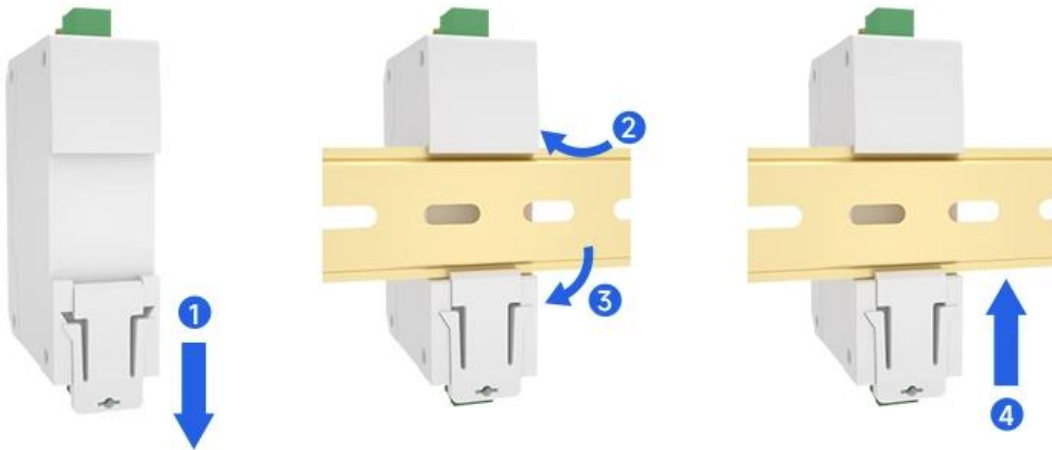
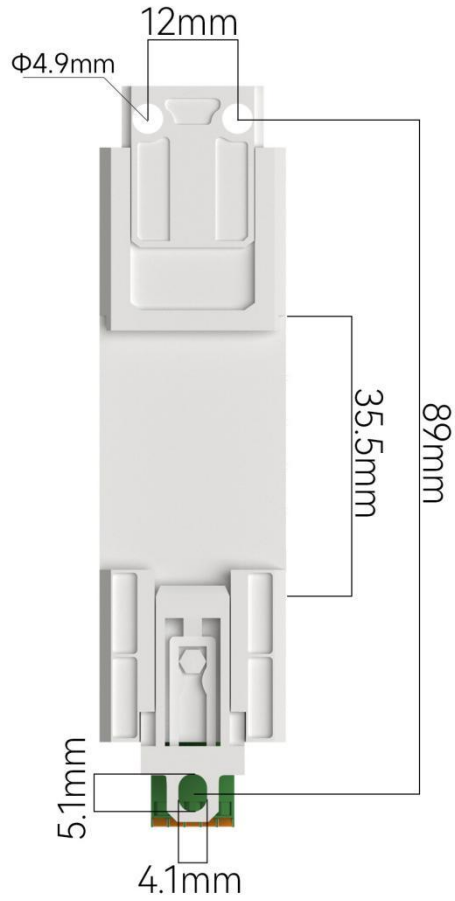
| No. | Name | Function | Instruction |
|-----|-------|----------------------------------|--|
| 1 | POWER | Power indicator (blue) | Bright: Power on Off: Power disconnected |
| 2 | TXD | Serial transmit indicator (red) | Blinking: Serial port outputs data to the client device |
| 3 | RXD | Serial receive indicator (green) | Blinking: client device outputs data to NE2-D11 serial port |
| 4 | M0 | Link indicator (green) | Blinking: The network cable is connected normally but the link is not connected; Bright: the network link is successfully connected |

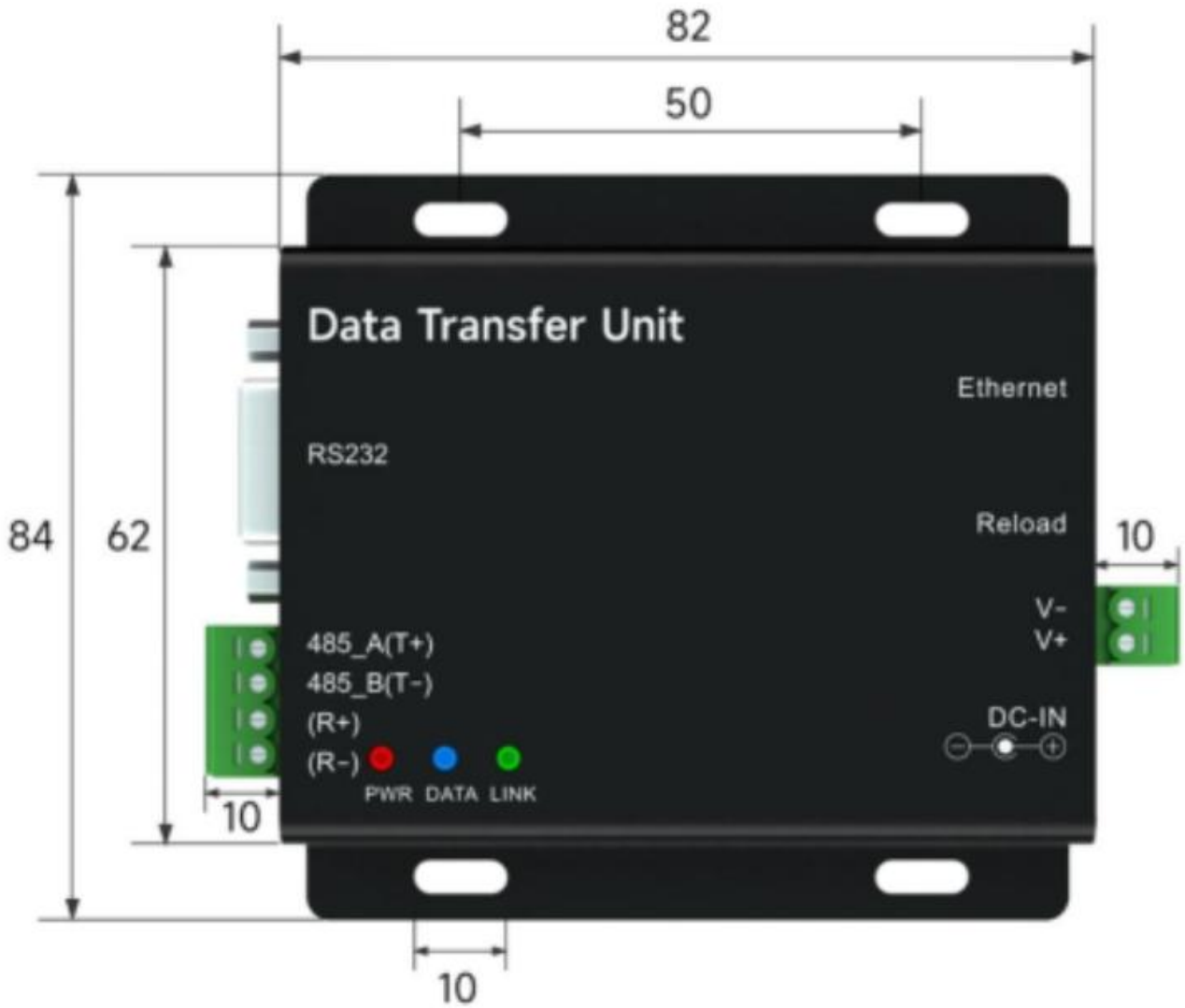
| | | | |
|----|----------|--|--|
| 5 | M1 | Network negotiation indicator (red and green) | Out: Network cable is not connected Green on: indicates 100M network Green on: Physical layer has data interaction Red on: 10M network Red on: Physical layer has data interaction |
| 6 | RELOAD | Factory reset button | Press and hold for 5-10S to restore the device to factory settings. |
| 7 | Ethernet | network port | Standard RJ45 interface, 10/100M cross-direct connection adaptive |
| 8 | G | grounding | signal ground |
| 9 | A/TXD | A/TXD | Connect to RS485-A or RS232-RXD |
| 10 | B/RXD | B/RXD | Connects to RS485-B or RS232-TXD |
| 11 | L | AC 85~265V Input | 2P 5.08mm terminal block |
| 12 | N | | |

3.4 Installation Methods

The unit is rail or locating hole mounted.







4 Product Features

4.1 Basic Parameters of the Machine

4.1.1 Basic Parameters

SN code is the traceability code written when the equipment is shipped from the factory, highlighting the equipment factory batch number, which can only be read, not written.

Device model is the full name of the current device model, you can go to the official website to get information through this model.

Firmware version is the current factory firmware model of the device, you can download the latest firmware updates to the official website.

MAC address is the physical address of the chip, which is the unique identification code.

4.1.2 IP Address Types

The IP address is the module's identification on the LAN and is unique on the LAN. Therefore, it cannot be duplicated with other devices on the same LAN. The IP address of the module can be obtained in two ways: static IP and DHCP.

(1) Static IP: Static IP needs to be set manually by the user, and the user should pay attention to write IP, subnet mask and gateway at the same time in the process of setting. Static IP is suitable for the scenario that needs to keep statistics on IP and devices and corresponds to each other one by one.

Advantage: The devices that cannot be assigned IP address can be searched through the whole network segment broadcast mode, which is convenient for unified management;

Disadvantage: Different LANs have different network segments, so normal TCP/UDP communication is not possible.

(2) Dynamic DHCP: The main function of DHCP is to obtain IP address, gateway address, DNS server address and other information from the gateway host dynamically, thus eliminating the tedious steps of setting IP address. It is suitable for the scenarios that do not have any requirement on IP, and do not force the IP to correspond to the module one by one.

Advantages: Access to routers and other devices with DHCP Server can communicate directly, reducing the trouble of setting IP address gateway and subnet mask.

Disadvantage: If the module is connected to a network without DHCP Server, such as a direct connection with a computer, the module will not work properly.

The subnet mask is mainly used to determine the network number and host number of the IP address, indicating the number of subnets, and determining whether the module is in a subnet.

Subnet mask must be set, we commonly used class C subnet mask: 255.255.255.0, the network number for the first 24 bits, the host number for the last 8 bits, the number of subnets is 255, the module IP in the range of 255, it is considered that the module IP in this subnet.

Gateway is the network number of the network where the module's current IP address is located. If you access a device such as a router when connecting to an external network, the gateway is the route.

4.1.3 Domain Name Resolution (DNS)

Domain name resolution converts a domain name into an IP address recognized by the network through a domain name resolution (DNS) server. This way, when the IP address of the server is a non-fixed IP address, you can try to use the domain name resolution function so that no matter how the IP address of the server is changed, as long as the corresponding domain name remains unchanged, the setup parameters of the NE2-D11 do not need to be changed. The domain name resolution (DNS) server address of the serial server supports user-defined, which can realize domain name resolution by customizing the domain name resolution server in case of router domain name server abnormality. The device will report the resolution request to the customized domain name resolution (DNS) server during domain name resolution, and then return the device connection parameter (usually IP address) after the resolution is completed.

If the target IP address is a domain name, the maximum configurable domain name length is 256 bytes. After failing to connect to the target server, the module will continue to resolve the domain name periodically.

In DHCP mode, the domain name resolution (DNS) server address is obtained automatically (synchronized with the router domain name resolution address) and cannot be modified.

In static IP mode, the default DNS server address is 114.114.114.114, or you can customize the DNS server.

4.2 Network Working Modes

4.2.1 TCP Server-Side Mode

TCP Server means TCP server. In TCP Server mode, the device listens to the local port, accepts the connection request from the client and establishes the connection for data communication, which is usually used for the communication with the TCP client in the LAN, when it is used as the server mode, the device supports 5-channel client connection, and it can support 10-channel client connection if the two Sockets start the server mode at the same time.

When Modbus gateway function is disabled, the device will send the data received from the serial port to all the client devices that have established connection with the device, and it supports up to 5 client connections, and when Modbus gateway function is enabled, the non-Modbus data will be cleared and not forwarded.

4.2.2 TCP Client Mode

TCP Client is the TCP client. When the device is working, it will initiate a connection request to the server and establish a connection, which is used to realize the interaction between serial port data and server data.

The use of the client requires the configuration of the exact configuration of the target IP address/domain name, the target port.

Note: Client mode local port is recommended to be 0 (dynamic port).

4.2.3 UDP Server Mode

UDP Server means that the device enables communication with UDP protocol without verifying the source IP address of the data, and after each UDP packet is received, it saves the source IP address of the packet as well as the source port and sets it as the target IP and port, so the data sent by the device only sends the packet to the source IP

address and port of the last time the device receives the data.

This mode is usually used in scenarios where multiple network devices communicate with this device with high frequency and TCP Server cannot fulfill the conditions.

Using UDP Server requires the remote UDP device to send data first, otherwise it cannot send data normally.

[Note]: In UDP mode, the data sent from the network to the device should be less than 1024 bytes per packet, and data beyond that will be lost.

4.2.4 UDP Client Mode

UDP Client is a connectionless transport protocol that provides a simple and unreliable transaction-oriented messaging service. There is no connection to establish or disconnect, only the destination IP and destination port need to be configured to send data to the other party. It is usually used in data transmission scenarios where there is no requirement for packet loss, where packets are small and sent quickly, and where the data is destined for a specified IP.

In UDP Client mode, the device will only communicate with the configured (destination IP and destination port) remote UDP device.

In this mode, the destination address is set to 255.255.255.255, and the sent data will be broadcasted in the whole network segment, but the transmitting and receiving devices need to make sure that the ports are the same, and at the same time, the device can also receive the broadcast data.

Note: In UDP mode, the length of a single packet cannot exceed 1024 bytes.

4.2.5 HTTP Client Mode

This mode can realize the HTTP group packet function, providing two modes, GET and POST, the customer can configure the URL, Header and other parameters by themselves, the device (serial port server) to send the group packet, to realize the fast communication between the serial port device and the HTTP server, it is recommended to use the random port and turn on the short connection when using the HTTP client mode, so as to save the resources of the HTTP server.

1. Get

Test the device HTTP-GET request using the HTTP mode of OneNET multiprotocol access as shown below.

(1) Return data configuration with packet header:

| | |
|---------------------|-------------------------|
| Basic parameters | |
| Work Mode | HTTP client |
| Local port | 8886 |
| Remote IP | 192.168.3.3 |
| Remote port | 8888 |
| HTTP parameters | |
| HTTP request method | GET |
| No HTTP header | Disable |
| HTTP URL | /1.php? |
| Http head | User-Agent: Mozilla/5.0 |

(2) Return data configuration without packet header:

Basic parameters

Work Mode: HTTP client Local port: 8886

Remote IP: 192.168.3.3

Remote port: 8888

HTTP parameters

HTTP request method: GET No HTTP header: **Enable**

HTTP URL: /1.php?

Http head: User-Agent: Mozilla/5.0

2 POST

Test the device HTTP-POST request using OneNET Multi-Protocol Access in HTTP mode as shown below.

(1) Return data configuration with packet header:

Basic parameters

Work Mode: HTTP client Local port: 0

Remote IP: ap: [redacted] t

Remote port: 80

HTTP parameters

HTTP request method: POST No HTTP header: Disable

HTTP URL: [redacted]

Http head: Host [redacted]

(2) Return data configuration without packet header:

Basic parameters

Work Mode: HTTP client Local port: 0

Remote IP: ap: [redacted]

Remote port: 80

HTTP parameters

HTTP request method: POST No HTTP header: Enable

HTTP URL: [redacted]

Http head: api. [redacted]
Host

4.2.6 MQTT Client Mode

4.2.6.1 Standard MQTT3.1.1 Connections

Here the standard MQTT3.1.1 connection to Tencent's standard MQTT3.1.1 server as an example, you can get from the Tencent server to the standard description of the "three elements" as shown in the figure below:

Client ID ELD0ERCUKDDEV01 [复制](#)

MQTT Username ELD0ERCUKDDEV01;12010126;B3GLI;1667511713 [复制](#)

MQTT Password 80ff56c... 6fca10b;hmacsha256 [复制](#)

The parameter configuration description is shown below:

| Basic parameters | | | |
|------------------|------------------------------|-----------------|-----|
| Work Mode | Mqtt client | | |
| Remote IP | www... | | |
| Remote port | 1883 | | |
| MQTT parameter | | | |
| MQTT server | standard 3.1.1 | Keepalive cycle | 120 |
| Device name | test-iot | | |
| username | 1234/all | | |
| Password | 123456789 | | |
| Subscribe topic | all/00000009000000094411/sub | Qos | 0 |
| Publish topic | all/00000009000000094411/sub | Qos | 0 |

4.3 Serial Port Parameters

Serial port parameters include: baud rate, data bits, parity bits, stop bits.

Baud rate: serial communication rate, configurable 600, 1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200, 230400, 460800bps.

Data Bit: Length of data bit, range 5, 6, 7, 8.

Parity Bit: Parity bit for data communication, supports None, Odd, Even.

Stop bit: can be set in the range of 1, 1.5, 2.

By setting the serial port parameters and keeping the same parameters with the serial port of the connected device, you can ensure the normal operation of the communication.

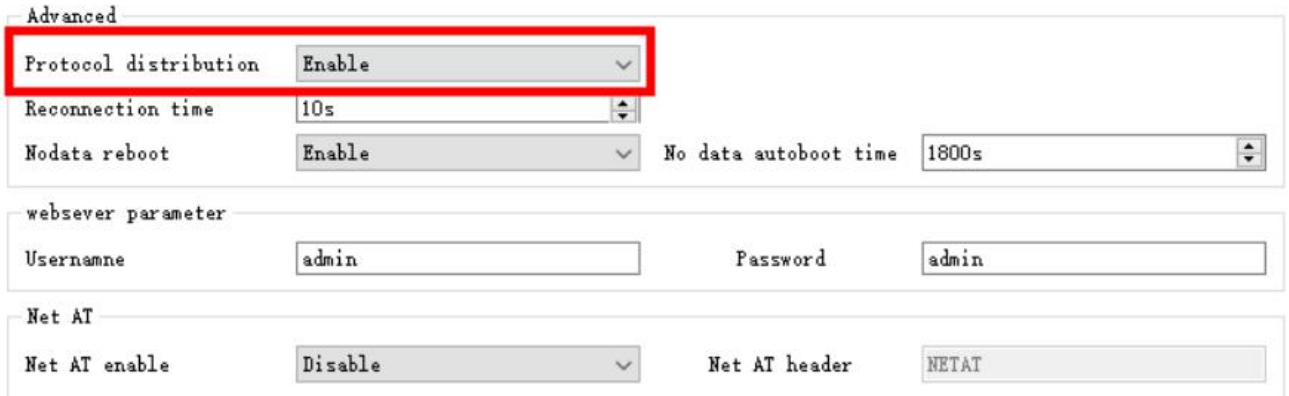
| Serial port parameter | | | |
|-----------------------|--------|----------------------|------|
| Boud rate | 115200 | databit | 8 |
| Parity | NONE | Stop bit | 1 |
| Frame interval | 1 | Maximum frame length | 1024 |

4.4 Advanced Parameters

4.4.1 Link Protocol Distribution

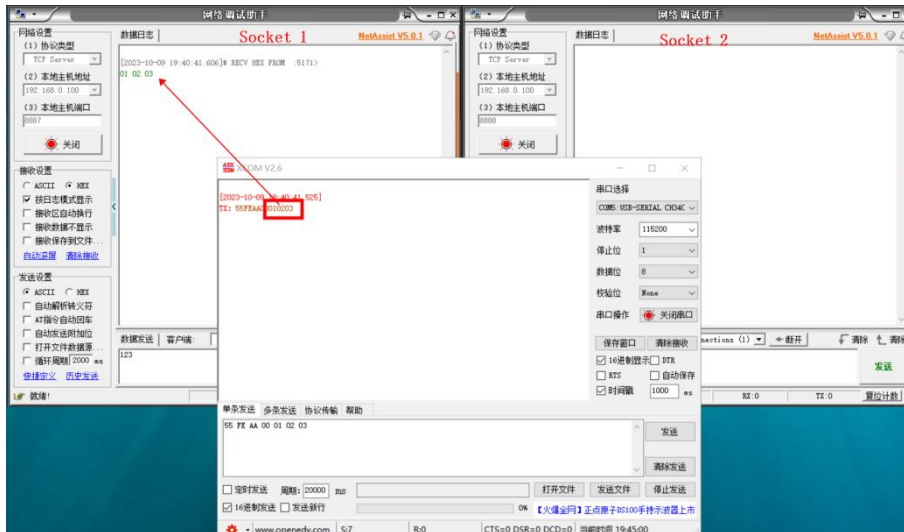
Support socket distribution protocol, you can send data to different links through a specific protocol, you can also differentiate the data received by different links by adding packet header and footer.

Upper computer software configuration steps:

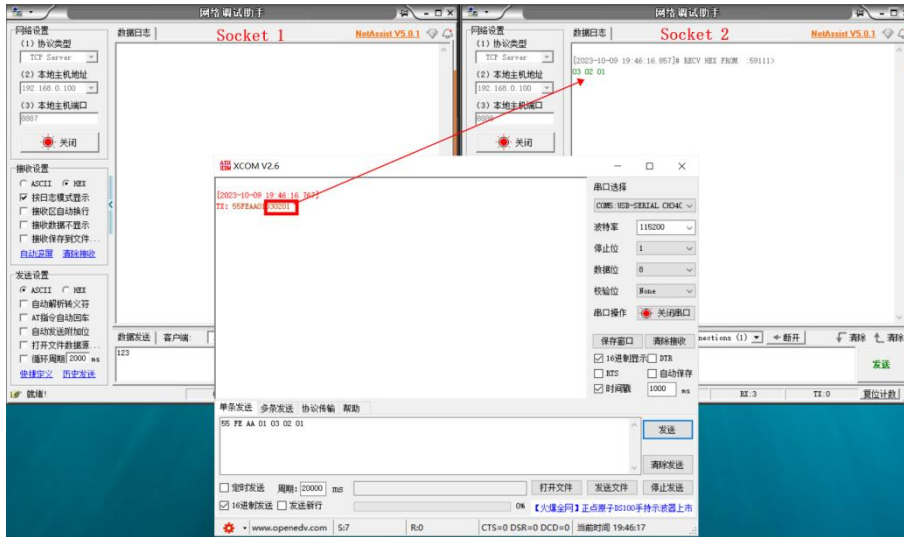


When the multi-link protocol distribution mode is turned on, the following possibilities will be available. In this case, link 1 is connected to server port 8887 and link 2 is connected to server port 8888 as an example:

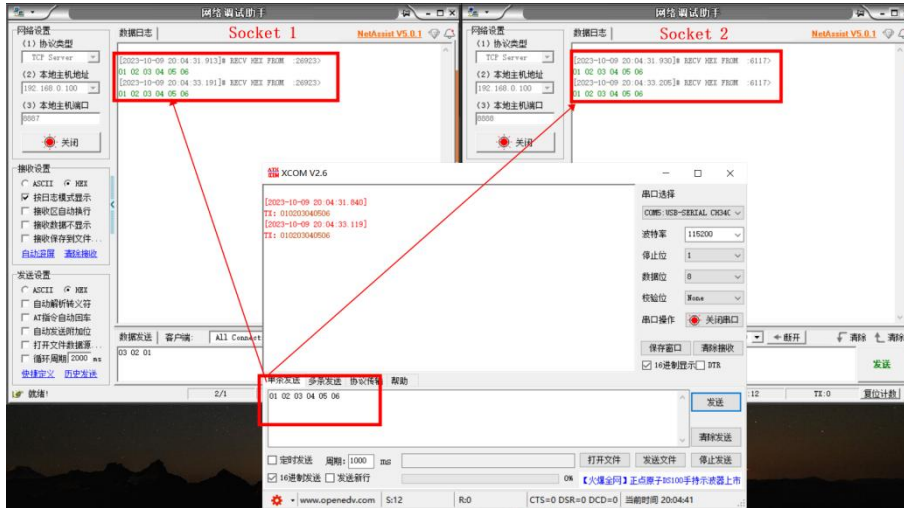
1.The serial port sends data to satisfy the data header of 55 FE AA 00, that is, to meet the requirements, that is, 55 FE AA 00 + data, then the data will only be transmitted to Socket1, and the received content contains only data without the data header;



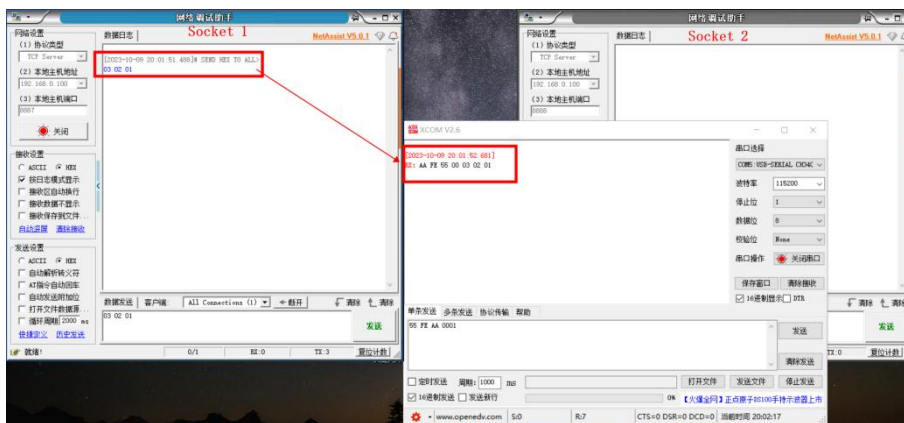
2. The serial port sends data to satisfy the data header of 55 FE AA 01, that is, to meet the requirements, that is, 55 FE AA 01 + data, then the data will only be transmitted to Socket2, and the received content contains only data, not data header;



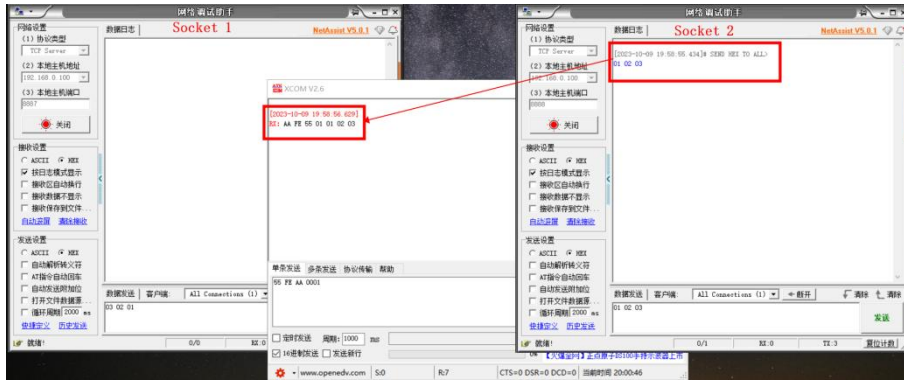
3. Serial port to send data for any data, will transfer the data to the two sockets



4.Socket 1 sends any data, and when the serial port receives it, it adds the data header AA FE 55 00 before the data.



5 Socket 2 sends any data, and when the serial port receives it, it prefixes the data with the data header AA FE 55 01



4.4.2 Disconnect and Reconnect Function

In client mode, the device tries to actively connect to the server at the specified time after network disconnection.

Disconnection reconnection time: the time interval between each attempt by the device to re-establish the network, 0 for fast reconnection, 0~65535 configurable.

4.4.3 Timeout Restart Function

Support timeout reboot function (default: 1800 seconds), this function is mainly used to ensure that the device works stably for a long time, and the device will reboot operation if it does not receive the data sent from the network within the set timeout reboot time, so as to avoid the impact of abnormal situations on communication.

When the timeout restart function is turned on, the timeout restart time setting parameter range is (60-65535) seconds.

4.4.4 Short Connection Function

In TCP client and HTTP client mode, it supports network short connection (the function is disabled by default). TCP short connection is mainly used to save server resource overhead, and is generally applied to the scenario of multi-point (multi-client) to one-point (server).

When the short connection function is turned on, the device will only request to connect with the server when sending information. After the connection is successful, the device will automatically disconnect if the serial port does not receive data or the network port does not send or receive data within a set period of time.

When the short connection function is turned on, the short connection time setting parameter range is (1-65535) seconds.

4.4.5 Connecting the Empty Cache Function

The device is in client mode, when the TCP connection is not established, the data received by the serial port will be put in the cache area, the serial port receiving cache is 1024 packets or 10k, which is larger than the cache space will overwrite the earliest received data, after the network connection is successful, you can choose to clear the serial port cache or send the cache through the network by configuration.

Enable: The device does not save the data received by the serial port before the connection is established.

Disable: The network will receive the cached data from the serial port after the connection is established.

4.4.6 Heartbeat Packet Function

The device supports both serial heartbeat packets and network heartbeat packets. Serial heartbeat packet data points to the serial port and network heartbeat packet points to the network, which can be set separately.

4.4.6.1 Serial Heartbeat Packets

Serial heartbeat packet data pointing to the serial port, can be set in the serial port parameters. SN, MAC, and customized content can be selected, and 0~65535 seconds can be set. The serial port heartbeat packet adopts the idle heartbeat packet, that is, the serial port starts timing at the idle time, and sends the configured content to the serial port when the serial port heartbeat packet time arrives. The configuration mode is shown in the following figure:

The screenshot shows a configuration window titled "Keepalive". It contains the following fields:

- "Heartbeat pack mc" dropdown menu set to "SN".
- "Heartbeat cycle" spinner box set to "65535s".
- "Use Customize" text box containing "usart keepalive".
- A "HEX" checkbox which is currently unchecked.

If you configure the content of the serial heartbeat packet as customized data, the maximum length of the heartbeat packet can be configured to be 128 bytes, and after checking the hexadecimal option, the data sent will be hexadecimal data.

4.4.6.2 Network Heartbeat Packets

Network heartbeat packets are for Ethernet links, effective only in client mode, and support both hexadecimal and ASCII sending. Network heartbeat packets are not MQTT heartbeats, they are data sent actively by the microcontroller according to the configuration. Network heartbeat packets run independently in both links and do not affect each other. SN, MAC, and customized content can be selected, and 0~65535 seconds can be set. The network heartbeat packet adopts the mandatory heartbeat packet, that is, it starts timing when the link connection is successful, and sends the configured content to the server when the heartbeat packet cycle time arrives. The configuration mode is shown in the figure below:

The screenshot shows a configuration window titled "Advance para". The "Keepalive mode" section is highlighted with a red box and contains the following fields:

- "Short connection" dropdown menu set to "Disable".
- "Short connection time" spinner box set to "0".
- "NET connected clear cache" dropdown menu set to "Enable".
- "Keepalive mode" dropdown menu set to "Send SN".
- "Keepalive cycle" spinner box set to "3".
- "Use Customize" text box containing "net sockA keepalive message".
- A "HEX" checkbox which is currently unchecked.
- "Registration mode" dropdown menu set to "Disable".
- "Use Customize" text box containing "net sockA register message".
- A "HEX" checkbox which is currently unchecked.

If you configure the content of the network heartbeat packet as customized data, the heartbeat packet can be

configured to be up to 128 bytes in length, and after checking the hexadecimal option, the data sent is hexadecimal data.

4.4.7 Registration Package Functions

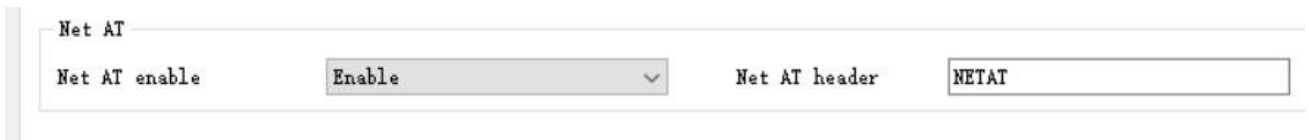
In client mode, users can choose to send registration packets to distinguish data or link sources, and the registration packets run independently in two links without affecting each other. When you use it, you need to select the registration packet mode, and you can choose the following modes:

1. the connection sends SN;
2. connection sending MAC;
3. connection sends customized content;
4. connection sending SN per packet;
5. sending MAC per packet;
6. send customized content per packet;

Where send per packet means to add the registration packet content before each packet. When setting up a customized registration packet, the hexadecimal option can be checked. When customizing the content of the registration packet, the maximum length of the registration packet can be configured to be 128 bytes.

4.5 Network AT Commands

The device supports network AT commands, which can be enabled by modifying the parameters through the host computer. After enabling, the command header can be customized.

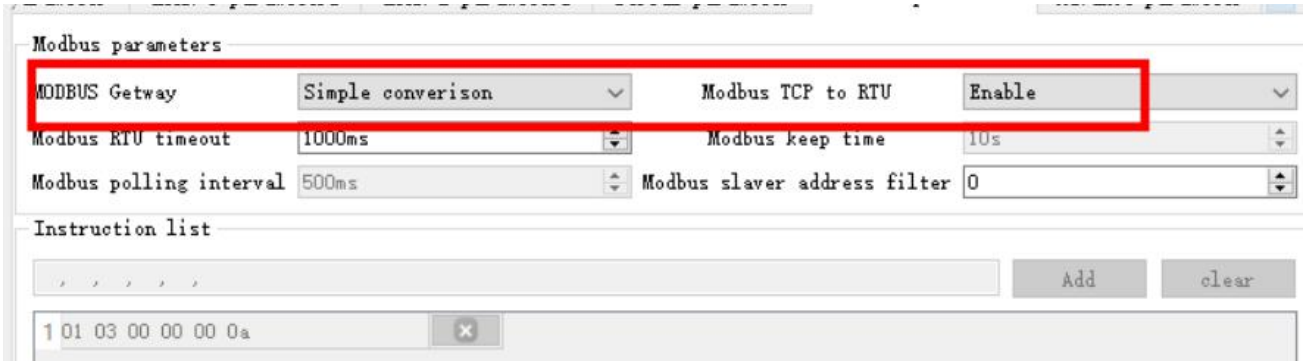


If the current AT command header is NETAT, you can send commands through the network to query and configure the parameters after the link is successfully connected, such as sending NETAT+SN, you will receive a data reply +OK=20231214test. after turning on the network AT enable, the device will parse the data header to see if it is correct, such as "NETAT ", such as sending data NETAT123 this data will be reported as an error by the device, the reason is that the device will be recognized as the current send is a command, and is an illegal command, so the data will not be sent down, you need to pay attention to the use of.

4.6 Modbus Gateway

Note: The device supports two links, and the Modbus gateway setting is valid for both links.

4.6.1 Simple Protocol Transformation Model



After turning on the simple protocol conversion, TCP to RTU on: Interchange Modbus RTU protocol with Modbus TCP protocol, non-Modbus data (RTU/TCP) is directly discarded.

TCP to RTU off: No protocol conversion but checksums Modbus data, non-Modbus data (RTU/TCP) is discarded. Simple protocol conversion can work in any mode (TCP client, TCP server, UDP client, UDP server, MQTT client, HTTP client), no matter what mode it works in there can only be one Modbus master.

Upper Configuration:

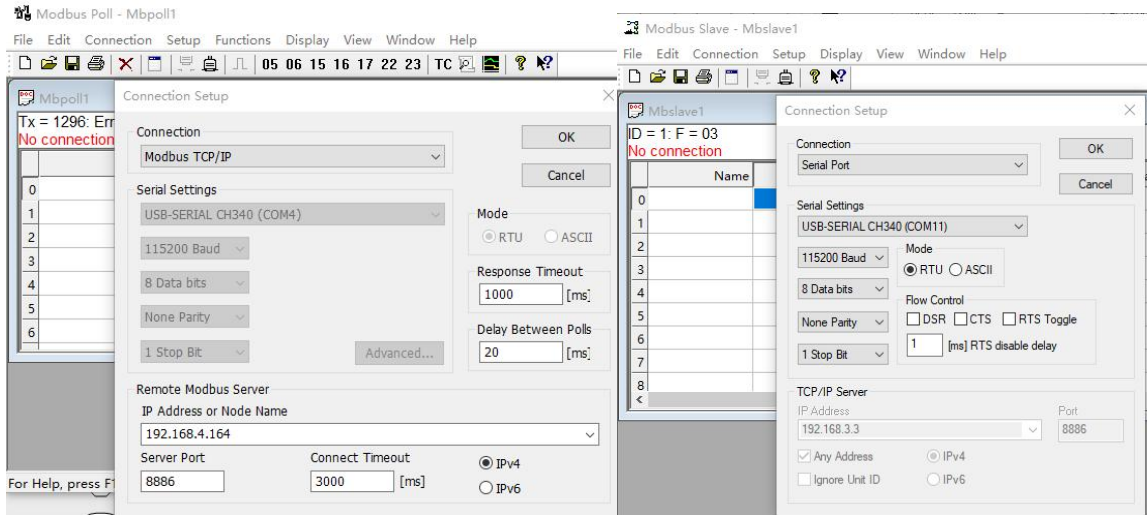
| Network parameter | | | |
|-------------------|---------------|---------|-----------------|
| DHCP | Disable | Gateway | 192.168.4.1 |
| Local IP | 192.168.4.164 | DNS | 114.114.114.114 |
| Mask | 255.255.255.0 | | |
| DNS2 | 61.139.2.69 | | |

| Serial port parameter | | | |
|-----------------------|--------|----------------------|------|
| Boud rate | 115200 | databit | 8 |
| Parity | NONE | Stop bit | 1 |
| Frame interval | 1 | Maximum frame length | 1024 |

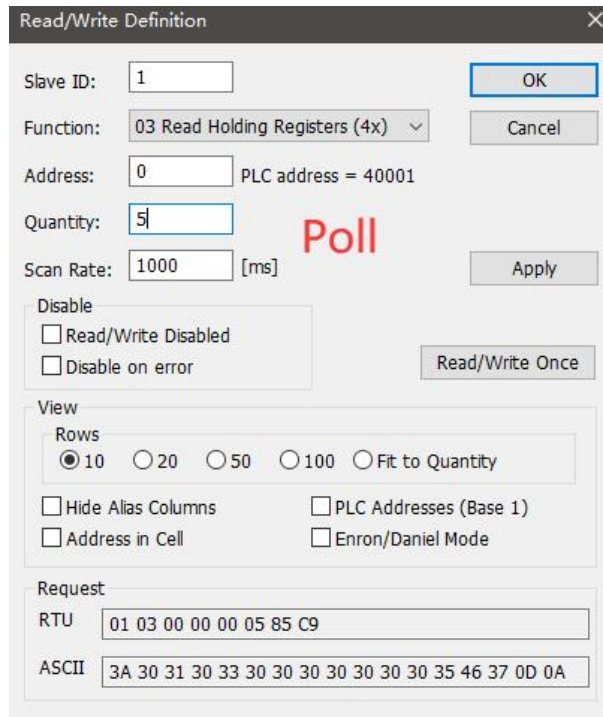
| Serial port parameter | | | |
|-----------------------|--------|----------------------|------|
| Boud rate | 115200 | databit | 8 |
| Parity | NONE | Stop bit | 1 |
| Frame interval | 1 | Maximum frame length | 1024 |

Modbus Poll and Modbus Slave software debugging:

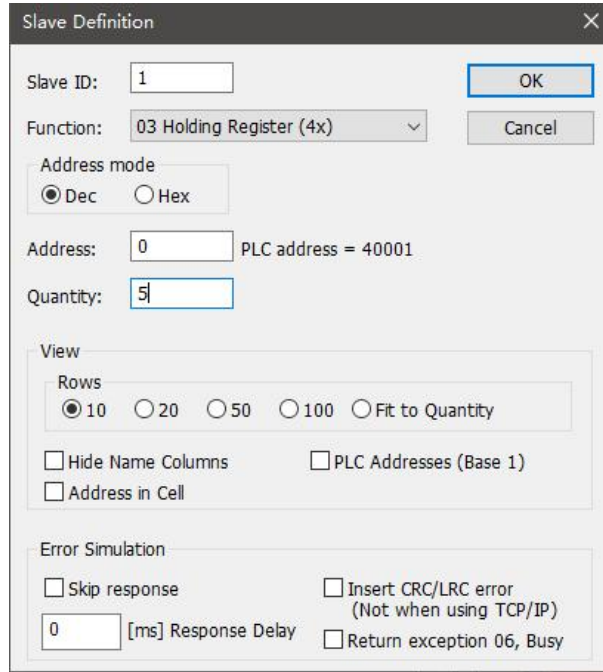
Software connection setup:



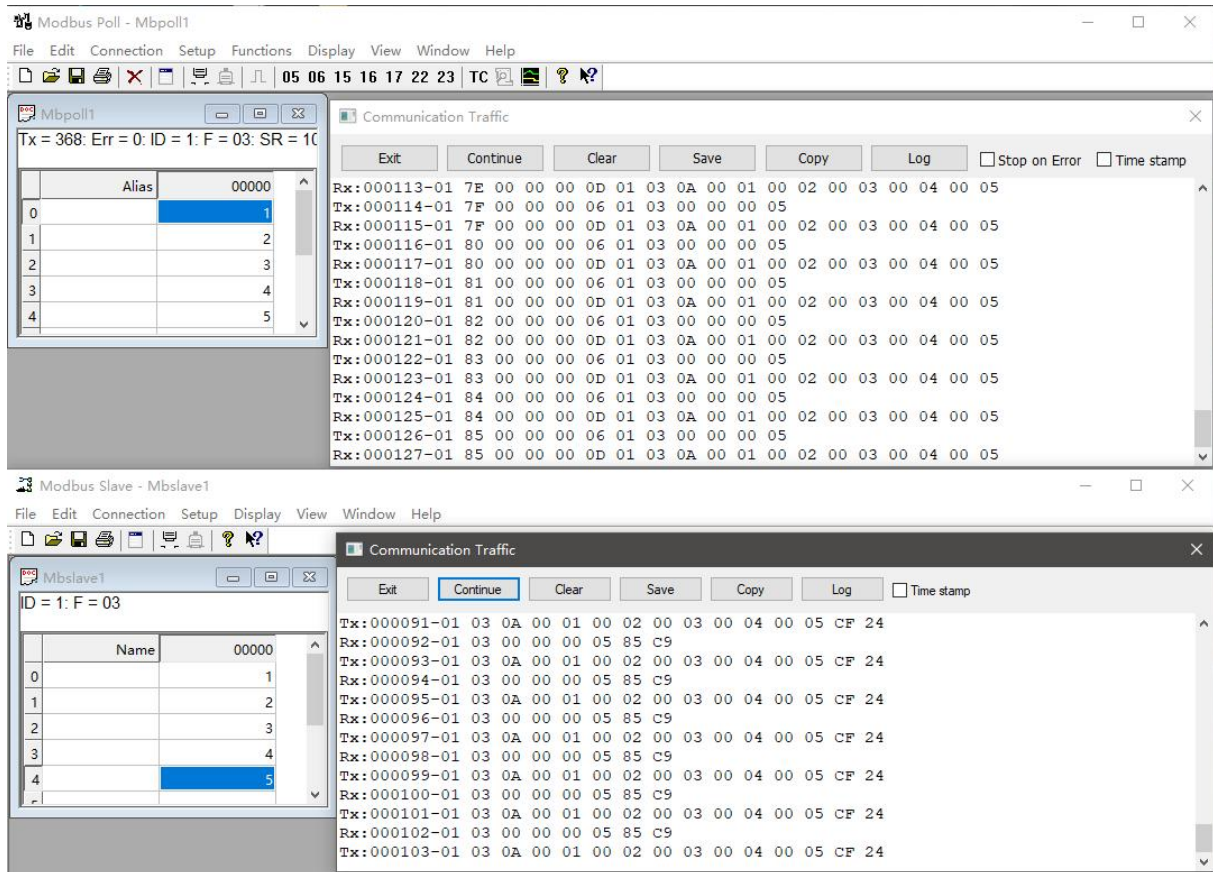
Modbus Poll and Modbus Slave software debugging: software register reading and emulation configuration:
Poll menu select Setup→Read/Write Definition



Slave menu selection Setup →Slave Definition



Communication demo:



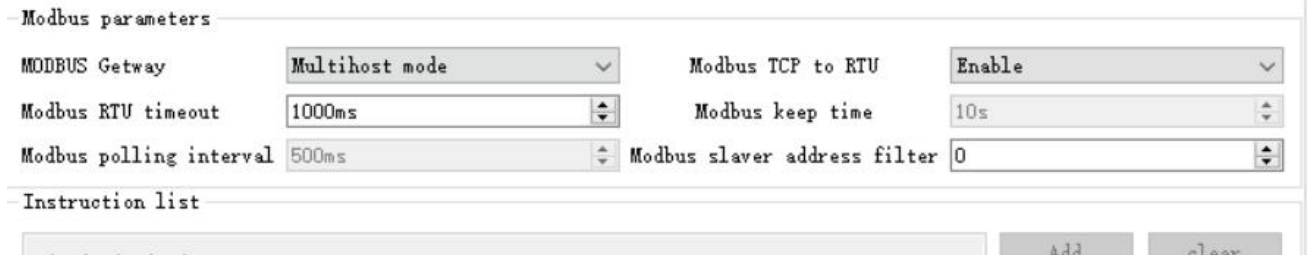
4.6.2 Multi-Host Mode

Multi-master mode can handle up to 5 Modbus TCP hosts, when more than one Modbus hosts access at the same time Modbus gateway will carry out the bus occupancy scheduling (RS-485 bus can only handle one request at a time,

and multi-master mode will be based on the sequence of the TCP request for sorting and processing, and the other links are waiting), so as to solve the problem of bus conflict (currently only support 5 host connections), only support working in TCP server mode, the slave can only work on the serial port, otherwise it can not work properly. support 5 hosts connection), only support work in TCP server mode, the slave can only be in the serial port, otherwise it can not work properly.

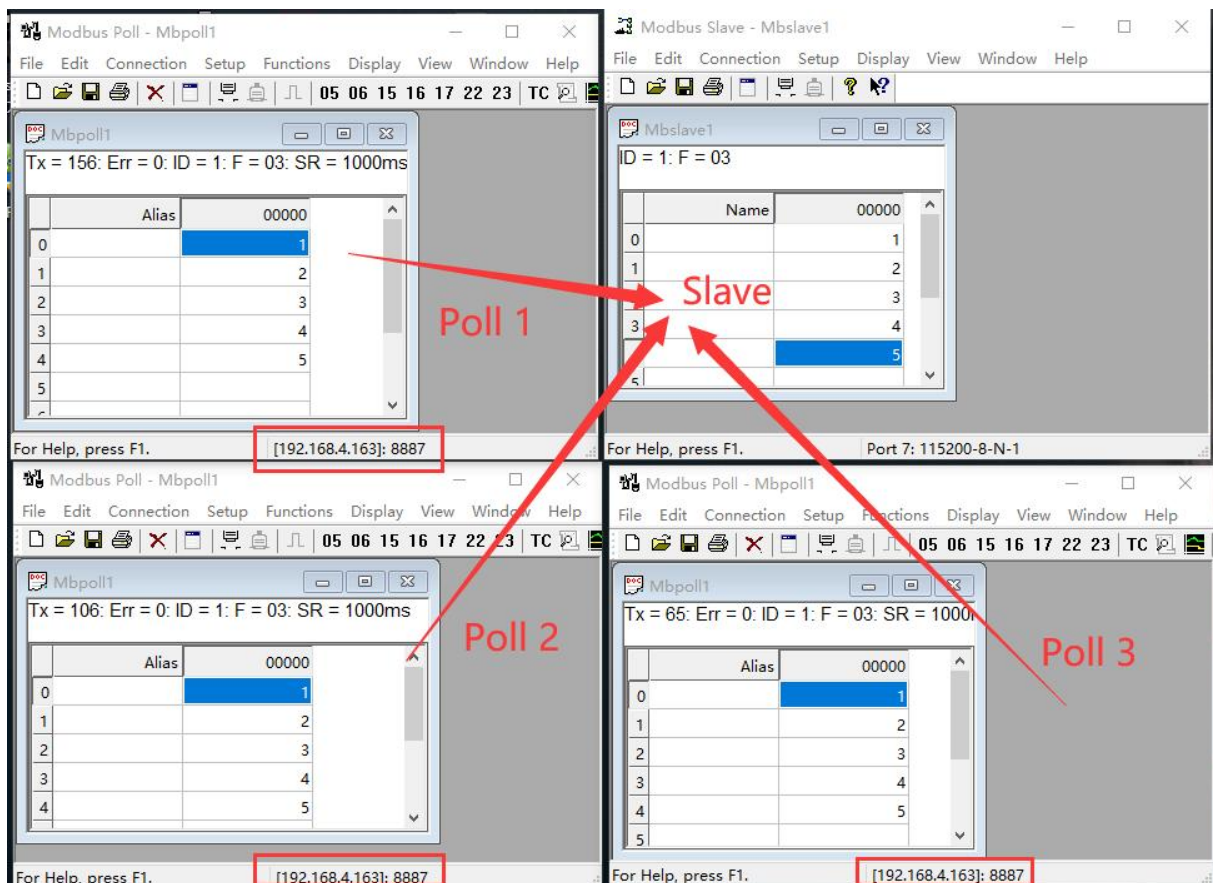
It is recommended to configure it as "Simple Protocol Conversion" when there are no multiple hosts.

Host computer configuration:



Modbus Poll and Modbus Slave software debugging:

Refer to "Simple Protocol Conversion" for software configuration and register configuration, and enable multiple Modbus Poll software at the same time (3 channels, for example, can support up to 5 channels).



4.6.3 Storage Gateway

The storage type gateway not only arbitrates the bus data but also stores the repeated read commands. When different hosts request the same data, the gateway does not need to inquire the register status of the RTU device several

times, but directly returns the cached data in the storage area, which greatly enhances the processing capability of the gateway for multi-host requests, and at the same time shortens the time consumed by the whole request process. Users can customize the command polling interval and command storage time in the storage area according to their needs.

The Storage Gateway, as an optimization of the performance of multi-host requests, also works only in TCP server mode, which improves the response speed on the network side.

Feature:

- (1) The gateway has a 10K cache for storing instructions and returning results (reading 10 holding registers, for example, can store 300 instructions and returning results);
- (2) RTU response timeout or the last reply time exceeds the instruction storage time, the device automatically empties the cache to ensure the real-time and authenticity of the data;
- (3) The polling interval can be customized, 0-65535ms;
- (4) The gateway will poll the RTU device according to the instruction storage time used for configuration, and if the MODBUS host does not query the instruction again at the storage time, the gateway will automatically delete the stored instruction and release the cache;
- (5) The first instruction and control instructions (05, 06, 0F, 10 function codes) will directly access the RTU device;
- (6) Only 01, 02, 03, 04 Modbus function code query results are supported to be stored;

Storage Gateway Upper Configuration:

| Modbus parameters | | | |
|-------------------------|------------------|------------------------------|--------|
| MODBUS Getway | Storable gateway | Modbus TCP to RTU | Enable |
| Modbus RTU timeout | 1000ms | Modbus keep time | 10s |
| Modbus polling interval | 500ms | Modbus slaver address filter | 0 |

| Instruction list | |
|---|--|
| <input type="text" value=""/> <input type="button" value="Add"/> <input type="button" value="clear"/> | |

4.6.4 Configurable Gateways

The gateway automatically polls the RTU device registers according to the pre-configured MODBUS commands (only the configuration of MODBUS read commands is supported), and the commands not in the storage table will directly operate the RTU device. Frequently read commands can be stored in advance in the gateway, which can shorten the response time (polling the configured commands). Due to the above features, only Modbus slaves can be connected to the serial port side of the configurable gateway.

Host computer configuration:

| Modbus parameters | | | |
|-------------------------|----------------------|------------------------------|--------|
| MODBUS Getway | Configurable gateway | Modbus TCP to RTU | Enable |
| Modbus RTU timeout | 1000ms | Modbus keep time | 10s |
| Modbus polling interval | 500ms | Modbus slaver address filter | 0 |

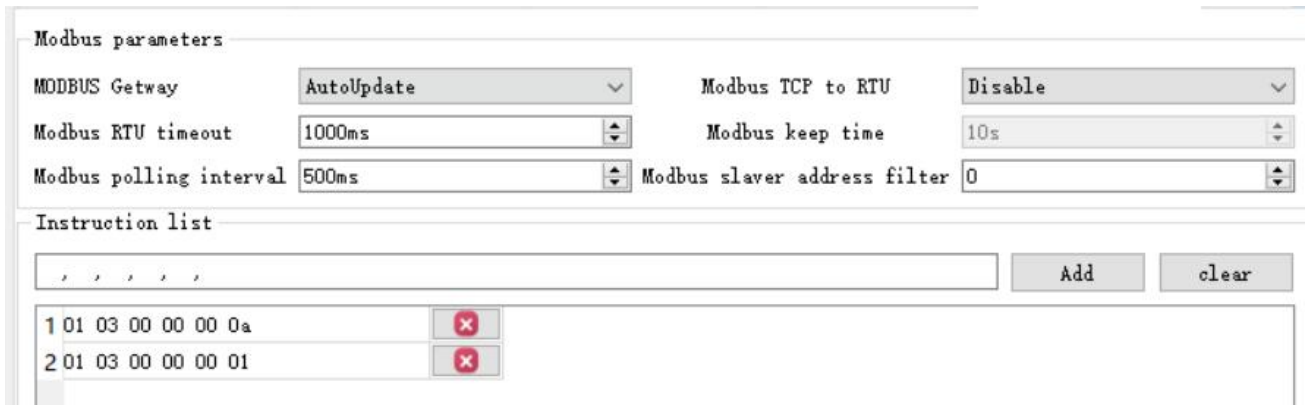
| Instruction list | |
|---|----------------------------------|
| <input type="text" value=""/> <input type="button" value="Add"/> <input type="button" value="clear"/> | |
| 1 01 03 00 00 00 0a | <input type="button" value="x"/> |
| 2 01 03 00 00 00 01 | <input type="button" value="x"/> |

Instruction storage instructions (add, instruction errors and formatting errors can not be added), delete instructions just click on the right side of the instruction fork.

4.6.5 Automatic Uploads

In client mode (TCP client, UDP client, MQTT client, HTTP client) the gateway automatically polls the stored commands in the command table and uploads them to the server. You can select the feedback format (Modbus RTU format or Modbus TCP format) and the command polling interval (0-65535ms) according to your needs.

For pre-stored commands, please refer to "Configurable Gateway - Command Storage Description", and automatically upload to the host computer for configuration:



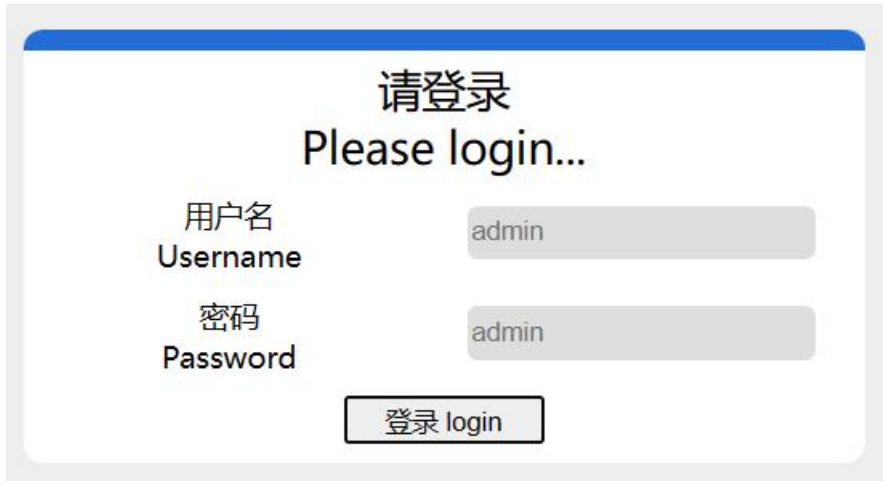
4.7 Introduction to Basic Functions

4.7.1 Web Page Configuration

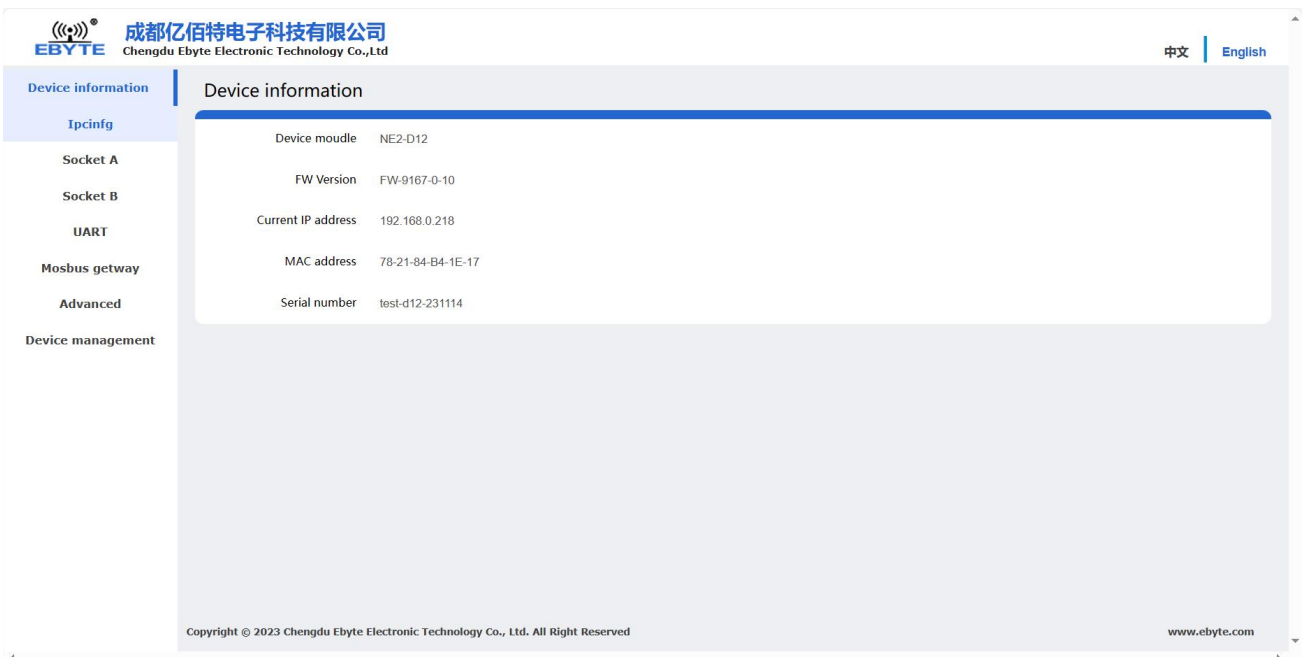
The device has a built-in web server, which is convenient for users to set and query the parameters through webpage.

Operation mode (Microsoft Edge version 94.0.992.50 for example, Google kernel browser is recommended, only IE10 or above kernel browser is supported):

- Open the browser, enter the IP address of the device in the address bar, default 192.168.3.7 (IP address and computer need to keep the same network segment), forget the local IP can be queried by AT command and configuration software;



- Click login, default account admin, default password admin (already entered, you can click login directly)



- The main interface pops up on the webpage, you can query and set the related parameters;
- Click "Save Parameters" in the device management to save the configuration parameters;

4.7.2 Restoring Factory Settings

Press and hold the Reload button on the device for 5-10 seconds until all LEDs are fully illuminated to release the button.

4.7.3 AT Instruction Configuration

Parameter query and modification of the device can be accomplished through AT commands. For specific AT commands, please refer to "AT Command Set".

4.7.4 Configuration Tool Software Settings

Open the configuration tool software, search for the device, double-click the recognized device, and the parameter query configuration interface will pop up. You can customize and modify the relevant parameters according to your needs, then save the configuration and restart the device to complete the parameter modification.

[Note]:

Do not use more than one host computer in the same LAN environment, multi-network card industrial control machine needs to be temporarily disabled not to use the network card, otherwise the host computer will appear abnormal (the same device is displayed several times, search for devices and other abnormalities occur)

The host computer shields the wireless network card, so you must connect the network cable to use the host computer, the wireless network card can be configured through the web page.

4.7.5 Random Local Ports

TCP clients, UDP clients, HTTP clients, and MQTT clients can configure the local port to 0 (using a random local port). Random ports must not be used in server mode or the client will not be able to establish a connection correctly.

Using a random port connection can quickly re-establish the connection when the device accidentally disconnects from the server, preventing the server from rejecting the connection due to four incomplete waves, and it is recommended to use a random port in client mode.

The device automatically enables random ports when configuring HTTP client and MQTT client modes.

4.7.6 Remote Upgrade

In order to facilitate the later maintenance and upgrade functions and replace different firmware, the serial port server supports online upgrade, through the upgrade firmware provided by our company users can upgrade or replace the current firmware through the host computer.

Network Upgrade Firmware Procedure:

Step 1: Go to the official website to download the host computer and "product firmware";

Send Inquiry
Purchase
File Downloads

Specification
Parameters
Pin Definition
Order Way
File Downloads
Video Tutoria
Series Products

Company Profile

Company Profile

↓

Development Testin

Virtual serial port

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configuration tool

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XCOM

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NetAssist

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Product Descriptio

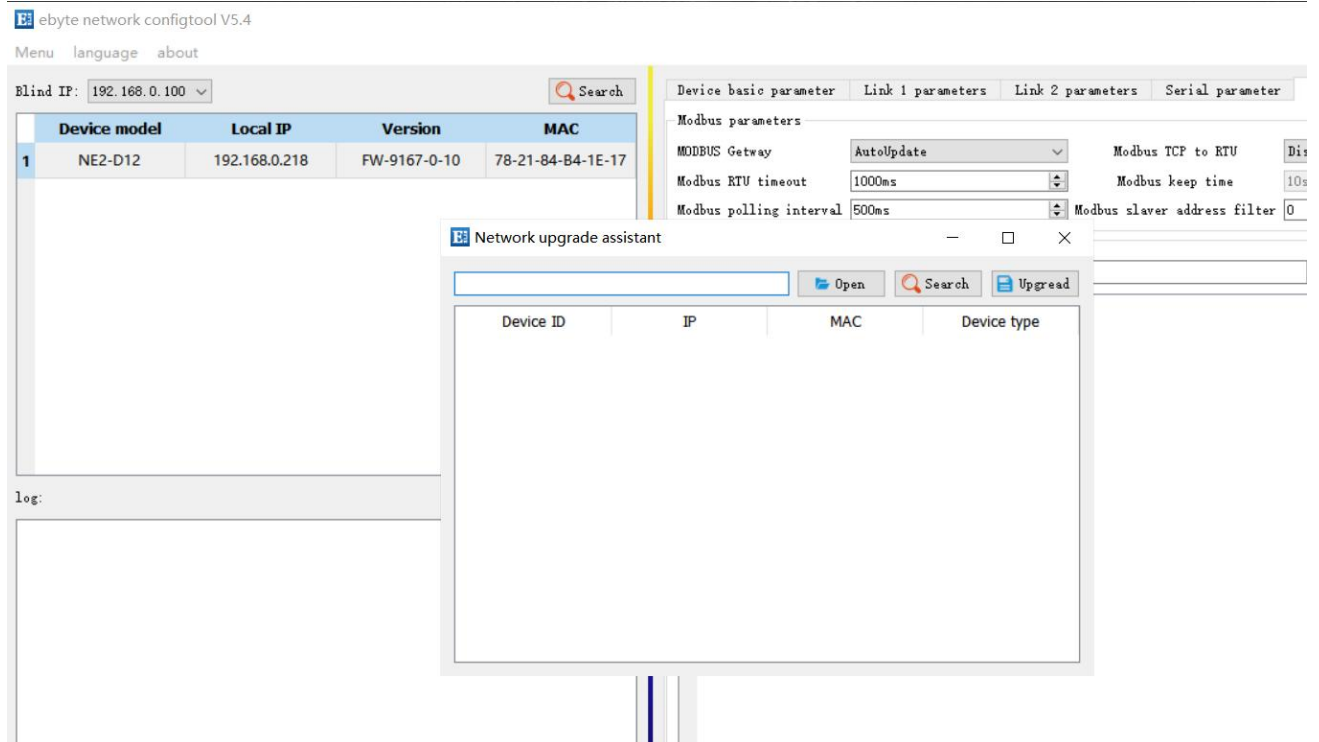
AT command

↓

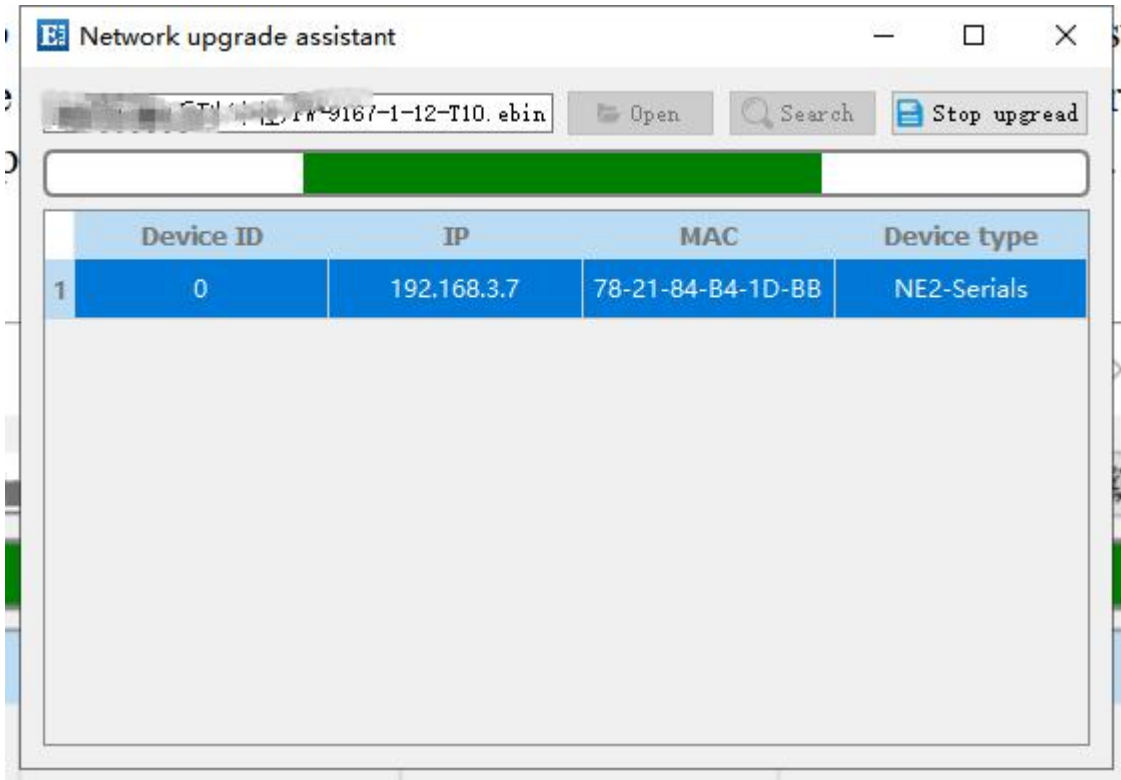
manual

↓

Step 2: Open the host computer, click "Menu" and select "Device Upgrade Assistant";

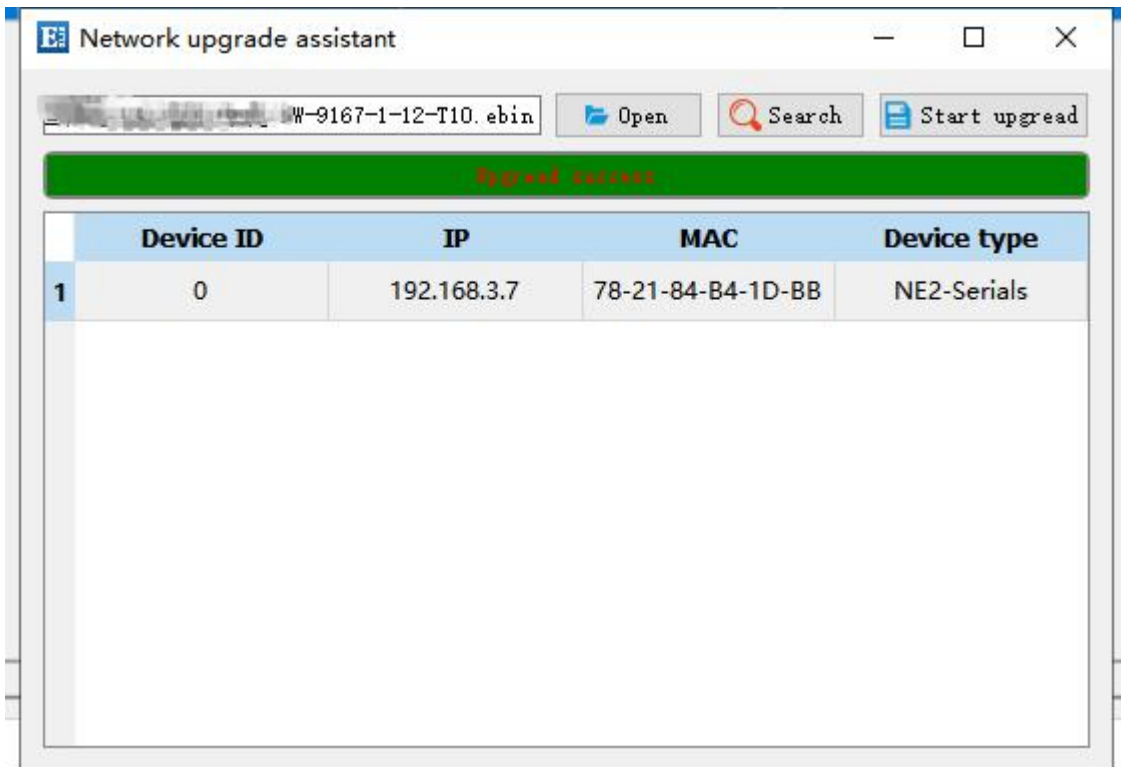


Step 3: In the pop-up "Device Network Upgrade Assistant" dialog box, click "Search for devices" (the computer and the device should be in the same network segment), search for the device and click "Stop Searching". Click "Stop Searching" when you have found the device;



Step 4: Click "Select Firmware", select the corresponding firmware, and then click "Open";

Step 5: Select the device to be upgraded, click "Upgrade", the progress bar will start to change, wait for the upgrade to complete. (From clicking "Upgrade" to start transferring the firmware, there will be about 7 seconds that the device will not respond, which is normal, please be patient and wait for the upgrade.)



Web Upgrade Firmware Procedure:

Step 1: Go to the official website to download the host computer and "product firmware";

Send Inquiry
Purchase
File Downloads

| | | | | | | |
|---------------|------------|----------------|-----------|----------------|---------------|-----------------|
| Specification | Parameters | Pin Definition | Order Way | File Downloads | Video Tutoria | Series Products |
|---------------|------------|----------------|-----------|----------------|---------------|-----------------|

Company Profile

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Development Testin

| | |
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| Virtual serial port | ↓ |
| configuration tool | ↓ |
| XCOM | ↓ |
| NetAssist | ↓ |

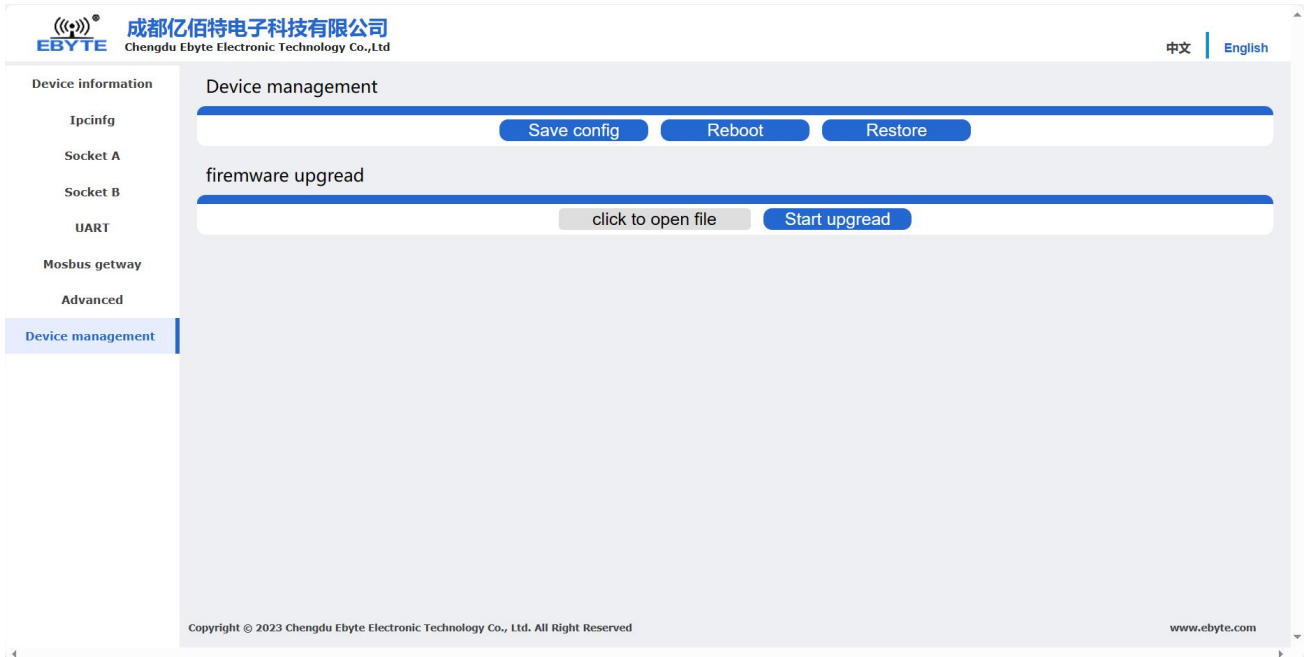
Product Descriptio

| | |
|------------|---|
| AT command | ↓ |
| manual | ↓ |

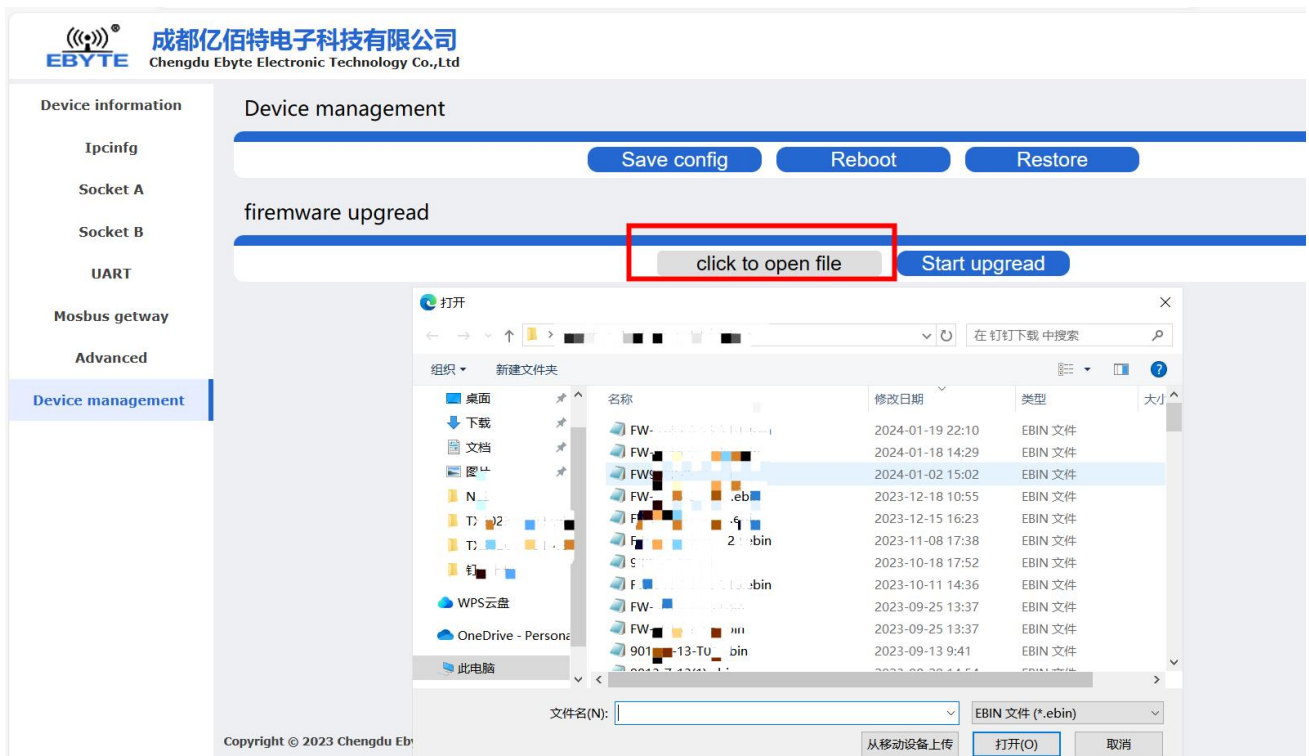
Step 2: Open the upper computer and search for the current IP of the device, default 192.168.3.7, enter the current IP in the webpage and enter the webpage configuration;



Step 3: Click on Device Management;



Step 4: Click "Click to select file", select the corresponding firmware, then click "Open", and then click "Start Upgrade";



Step 5: Click "Start Upgrade", the progress bar starts to change, wait for the upgrade to complete.

[Note]: If the upgrade fails, just upgrade again.

[Note]: From clicking "Upgrade" to start transferring the firmware there will be about 7 seconds the device will not respond, is a normal phenomenon, please wait patiently for the upgrade!

- The final explanation right belongs to Chengdu Ebyte Electronic Technology Co.,Ltd.

Revision history

| Version | Date | Description | Issued by |
|---------|-----------|-----------------|-----------|
| 1.00 | 2024-7-25 | Initial version | LYL |
| | | | |

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Technical support: service@cdebyte.com

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Web: www.cdebyte.com

Address: B5 Mould Park, 199# Xiqu Ave, High-tech District, Sichuan, China

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