Modbus Gateway
（Modbus TCP / Modbus RTU）
ENB-302MT

User Manual

REV 2.0

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1 About This Document

1.1 General

This document describes every parameters of the gateway ENB-302MT and provides using methods and some announcements that help users use the gateway. Please read this document before using the gateway.

For further information, documentation etc., please visit the SiboTech website: http://www.sibotech.net/En/

1.2 Important user information

The data and examples in this document can not be copied without authorization. Sibotech maybe upgrades the product without notifying users.

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The product has many applications. The users must make sure that all operations and results are in accordance with the safety of relevant field, and the safety includes laws, rules, codes and standards.

2 About the Gateway

2.1 Function

ENB-302MT is a Modbus gateway which can achieve the interconnection between Ethernet devices and serial devices. Through the Modbus TCP protocol and Modbus RTU protocol conversion of the product, users can easily interconnect Modbus devices. Modbus RTU port supports both RS485 and RS232, but the same product can only achieve a kind of port, users can specify the port in the order according to actual needs.

2.2 Features

♦ Provide two operating modes:

Modbus RTU slave mode: Modbus TCP masters communicate with Modbus RTU slaves through the gateway；

Modbus RTU master mode: Modbus TCP salves communicate with Modbus RTU masters through the gateway.

♦ Redundant power supply

♦ Two independent RS485 interfaces or RS232 interfaces 1KV optical isolation

♦ Ethernet 10/100M adaptive

♦ IP address conflict detection

♦ Modbus TCP connection can support up to 36

♦ Modbus TCP support 512 requests at the same time

♦ Support mapping of slave ID

♦ Automatic routing function

♦ Support priority control of master requests

♦ Support network security setting

♦ Support debugging function

♦ Provide free configuration software MT-123

2.3 Technical specifications

[1] Achieve the conversation of Modbus TCP and Modbus RTU;

[2] Ethernet 10/100M adaptive;

[3] Support communicates with up to 36 Modbus TCP clients and 512 requests at the same time;

[4] Support access up to 36 different IPs or different ports of the Modbus TCP server;

[5] Can limit the communication range of the client's IP address;

[6] Two serial interfaces are both RS485or RS232, half-duplex, and baud rate support: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 and 230400bps; parity mode support: none, odd, even, mark, space; 1 or 2 stop bits;

[7] Two independent RS485 interfaces or RS232 interfaces 1KV optical isolation;

[8] Power supply: 24VDC (11V ~ 30V), 90mA (24VDC);

[9] Working temperature: -20 ℃ ~ 60 ℃, relative humidity: 5% ~ 95% (no condensation);

[10] Dimensions: 40mm (Width) *125mm (Height) *110mm (Depth);

[11] Installation: 35mm rail;

[12] Protection class: IP20;

[13] Test standard: EMC test standards

2.4 Attention

♦ To prevent stress, prevent module panel damage;

♦ To prevent bump, module may damage internal components;

♦ Power supply voltage control in the prospectus, within the scope of the requirements to burn module;

♦ To prevent water, water module will affect the normal work;

♦ Please check the wiring, before any wrong or short circuit.

2.5 Related products

Related products include:

ENB-302MI, ENB-302M and so on.

More information about these products, please visit: http://www.sibotech.net/En/, or dial technical support line: +86-21-5102 8348

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3 Hardware Description

3.1 Appearance

Indicators

Power

Ethernet RJ-45 interface

RS-485/RS-232 interface Ⅰ

RS-485/RS-232 interface Ⅱ

Configuration switches
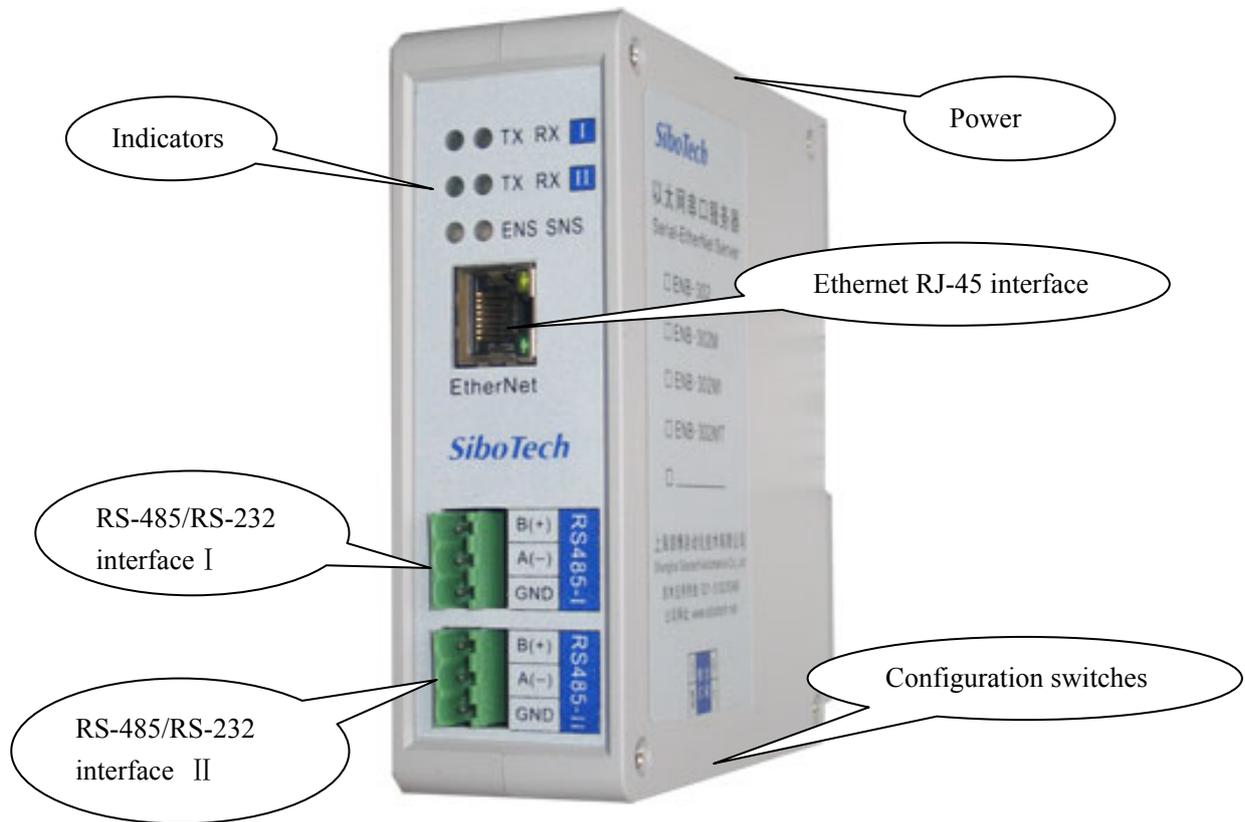
3.2 Indicators

Indicators	Status	Descriptions
ENS	Always green	Modbus TCP connection has been established at least one
	Green flashing	Modbus TCP connection is not established
	Always red	IP address indicates a conflict
	Red flashing	Modbus TCP connection are disconnected and no longer exists; DHCP, BOOTP , IP address conflict detection
	Red flashing (3 seconds)	Modbus TCP connection are disconnected
SNS	Always green	Serial port ready to send and receive data
	Red flashing	Automatic routing conflict
ENS (Orange)　and SNS (Orange)	Light at one time	Start status
	Flash alternately	Configuration mode

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（Orange: Red and green light at one time）	Flash alternately (3 seconds)	Using locate function

3.3 Configuration switches

Configuration switch locate on the bottom, bit 1 is mode select bit, bit 2 is function set bit.

Off ■ ■
On   1   2
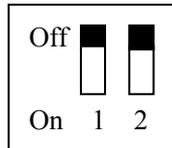
Mode bit (bit 1)	Function bit (bit 2)	Description
Off	Off	Operation mode, allowing read and write configuration data
Off	On	Operation mode, read and write configuration data against
On	Off or On	Configuration mode, IP address is fixed at 192.168.0.10, this mode can only read and write configuration data, can not communication between Modbus TCP and Modbus RTU devices.

Note: Restart ENB-302MT after resetting the configuration and the configuration can take effect!

3.4 Interface

3.4.1 Power interface

ENB-302MT has two power interfaces, with power redundancy function, when one the way to power failure, power can continue to supply the other way.

1   GND

2   NC

3   24V+

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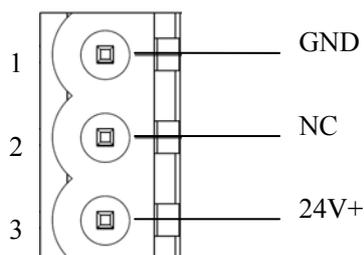
Pin	Function
1	GND,
2	NC, no connection
3	24V+ , DC

If you are using two power supply, when the way in which the power fails, the other way you can continue to supply power to ensure normal operation.

Power supply wiring as shown below:

DC power: +24V Ⅰ   Power interface of ENB-302MI

Must be connected

DC power: +24V Ⅱ   Power interface of ENB-302MI
（the other）

Optionally be connected
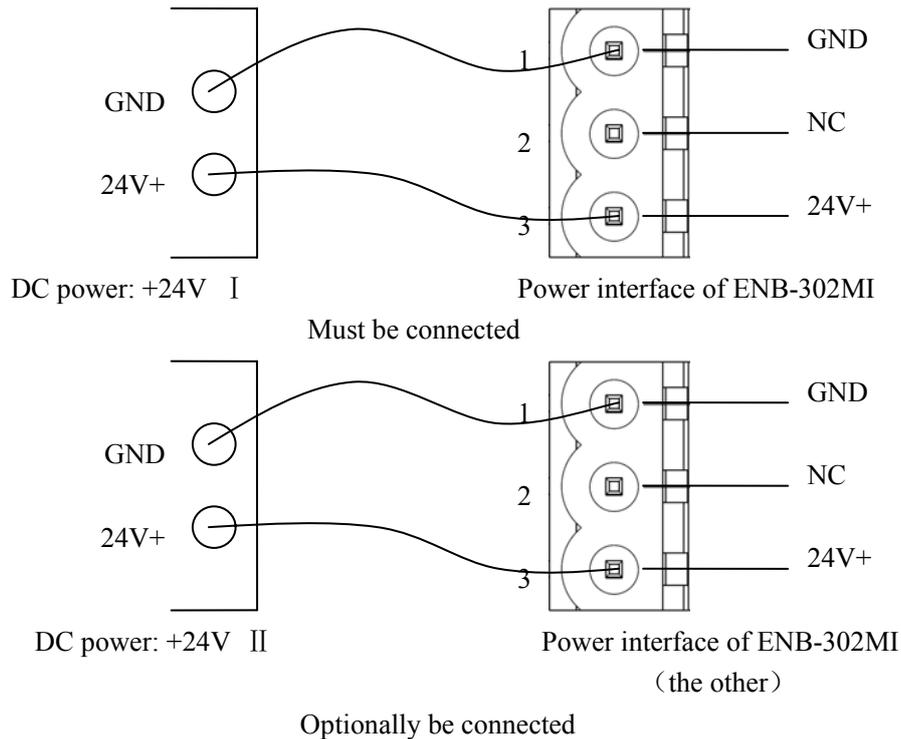
3.4.2 Ethernet interface
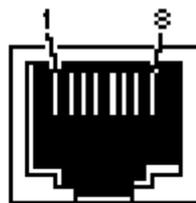
RJ-45 port

Ethernet interface apply RJ-45 connector, 10/100M adaptive.

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Pin	Signal Description
S1	TXD+，Transmit Data+, Output
S2	TXD-，Transmit Data-, Output
S3	RXD+，Receive Data+, Input
S4	Bi-directional Data+
S5	Bi-directional Data-
S6	RXD-，Receive Data-, Input
S7	Bi-directional Data+
S8	Bi-directional Data-

3.4.3 RS-232/RS-485 interface

ENB-302MT support standard RS485 and RS232 interfaces.

RS232 interface:
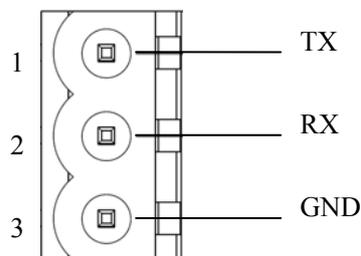
Pin	Signal Description
1	TX, connect with TX of user device
2	RX, connect with RX of user device
3	GND

RS485 interface:
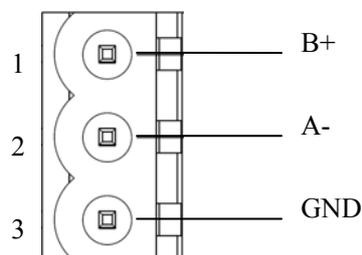
| Pin	Signal Description
1	B+，RS485
2	A-，RS485
3	GND

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The RS-485 interface of ENB-302MT is standard, and the RS-485 characteristics of the product are shown as follows:

1. The basic characteristics of RS-485 transmission technology

① Network topology: Linear bus, there are active bus termination resistors at both sides.

② Transfer rate: 300 bps~115.2Kbps.

③ Media: Shielded twisted-pair cable and also can cancel the shielding, depending on environmental conditions (EMC).

④Site number: 32 stations per subsection (without repeater), and can up to 127 stations (with RS485 repeater).

⑤Plug connection: 3-pin pluggable terminal.

2. The main points on RS-485 transmission equipments installation

①All the equipments be connected with RS-485 bus;

②Subsection can be connected up to 32 sites;

③The farthest end of each bus has a termination resistor—120Ω 1/2W to ensure reliable operation of the network.

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4 Instructions of Configuration Software

Take the product CD into the computer CD drive, open the CD, and install the configuration software MT-123. You can easily follow the prompts to complete the installation. Then open the configuration software and finish the configuration of ENB-302MT!

Note: The factory set of ENB-302MI is DHCP, if the network is no DHCP Server, you can set mode bit (bit 1) to 1(On), and restart ENB-302MT, then the fixed IP address of ENB-302MT is 192.168.0.10, mask is 255.255.255.0, gateway address is 192.168.0.1.

4.1 Note before configuration

MT-123 is a product based on Windows platform, and used to configure parameters of ENB-302MT.

The user to run the software, make sure the user's computer and the ENB-302MT need to configure in the same network.

Double-click the icon to access the main interface:

4.2 Search equipment

Before configurating parameters of ENB-302MT, the user need search the gateway using the software. The software provides two ways to search the gateway for the user.

4.2.1 Search all equipments of Ethernet

Click "Search equipment" button of the main interface, the software will search all of the available ENB-302MT equipments and list them in the main interface.

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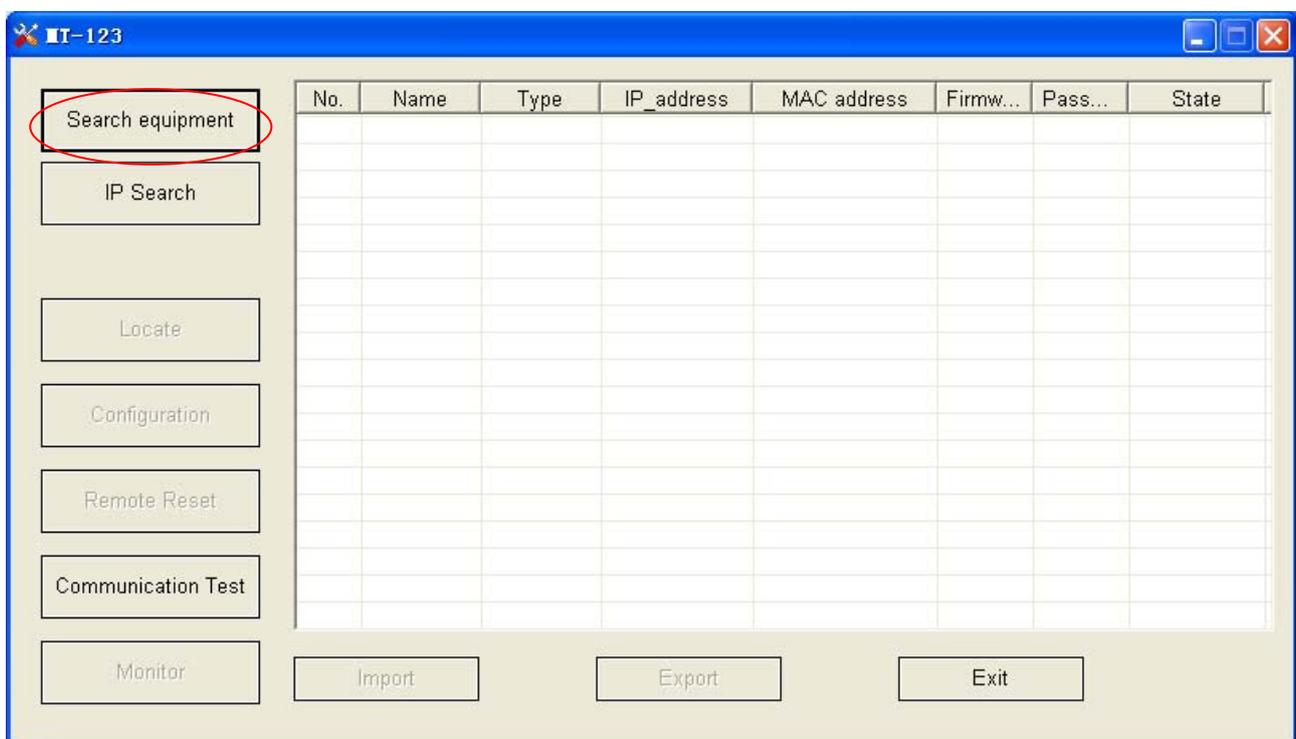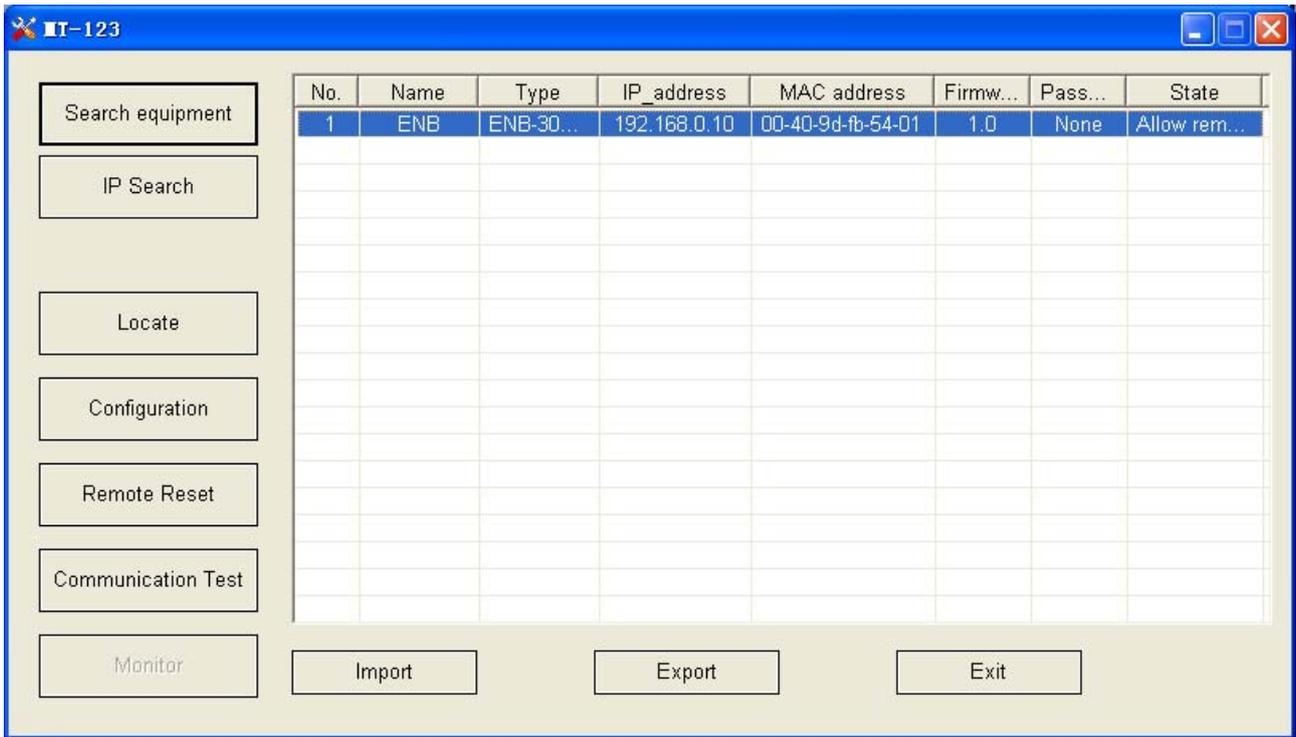
4.2.2 IP search

Click "IP search" button of the main interface will pop up a dialog box, and user need enter the IP address of ENB-302MT.

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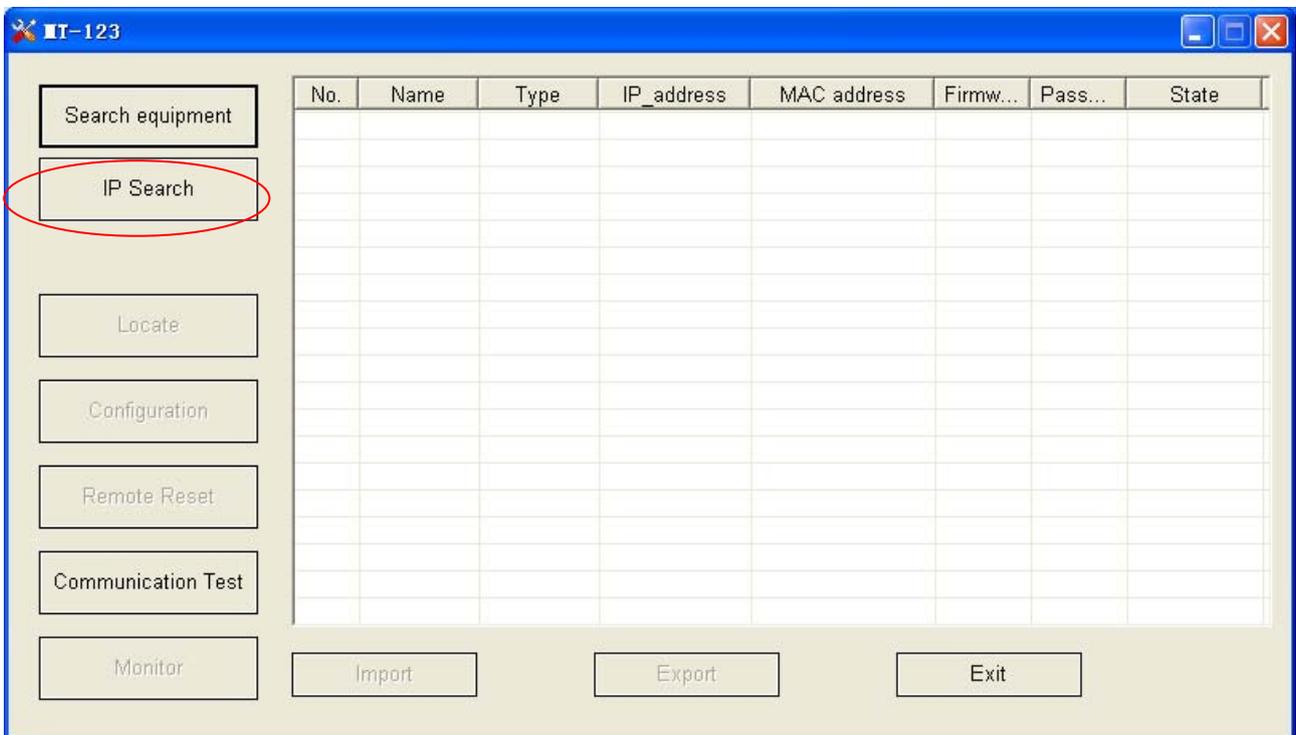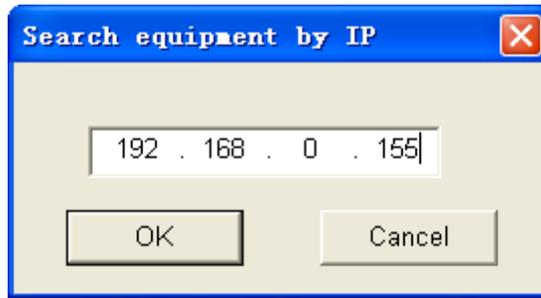
After entering the correct IP address, the software will search ENB-302MT with the IP address in the network, and list the information of the equipment in the main interface.

Note: If the users select the "IP search", the users need enter correct IP address or it will not search equipment.

4.3 Configuration

Select the equipment to be configured in the list, and the "Locate", "Configuration", "Remote Reset", "Import" and "Export" buttons become available:
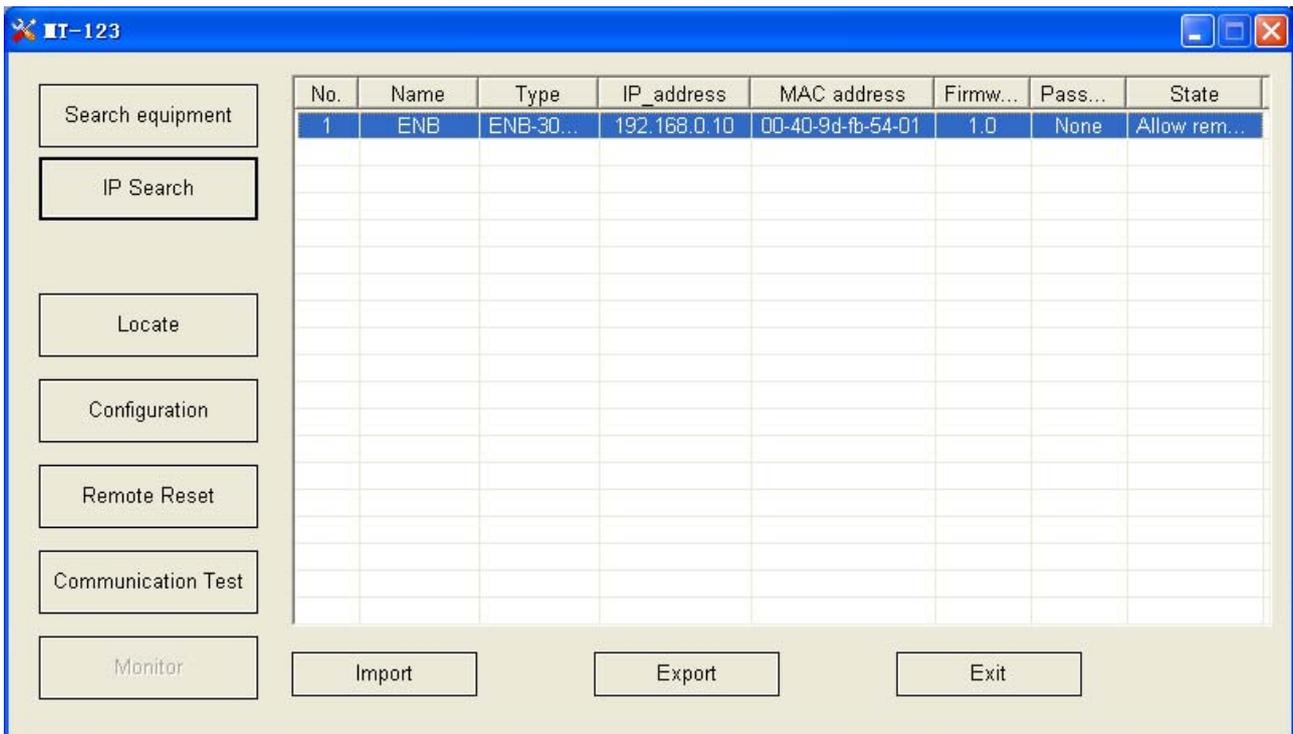
Click "Configuration" button, a password authentication dialog box will pop up if the equipment has been set with a password:

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Pass the password authentication or no password and then enter configuration interface:
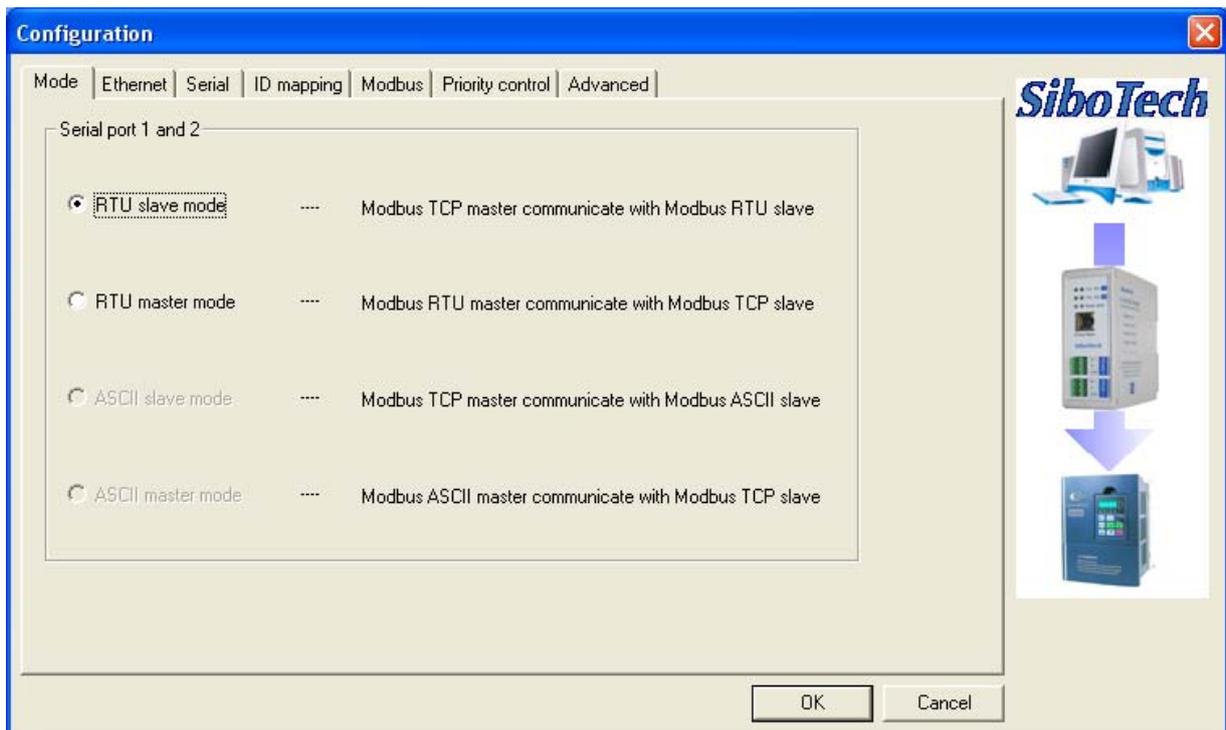
4.3.1 Operating Modes

ENB-302MT provides two operating modes:

Modbus RTU slave mode----Modbus TCP master communicate with Modbus RTU slave through the gateway；

Modbus RTU master mode----Modbus TCP salve communicate with Modbus RTU master through the gateway.

The other two modes: "ASCⅡ salve mode" and "ASCⅡ master mode" will open in a future release.

Operating mode of ENB-302MTis defined by the serial equipment, for example, when want to achieve the communication between Modbus TCP master device and Modbus RTU slave device，the users need to select

"RTU slave mode" of ENB-302MT.

4.3.2 Ethernet parameters

Ethernet parameters include: "Name", "IP configuration mode", "IP address", "Subnet mask", "Gateway address", "DNS1", "DNS2".
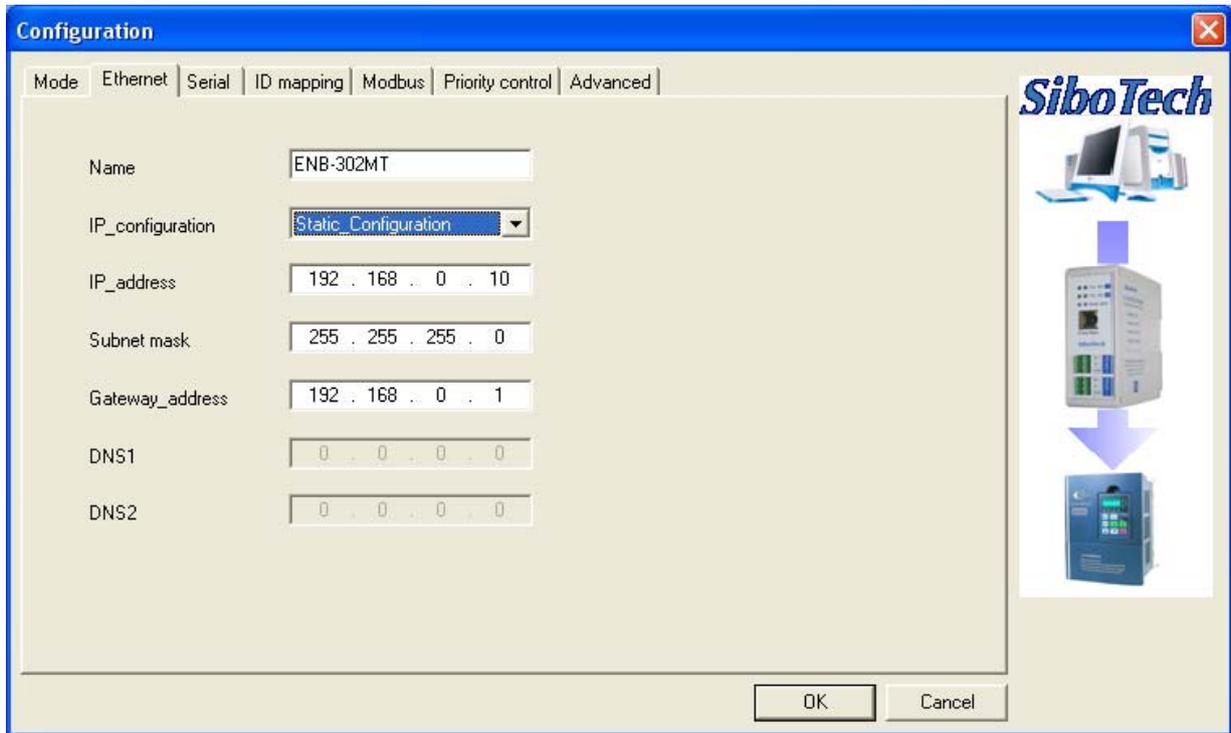

Name —— Enter a name to identify the device in order to distinguish from other equipment;

IP_configuration —— Set the device's IP address configuration mode;

IP address —— Set the device's IP address;

Subnet mask —— Set subnet mask of the device;

Gateway_address —— Set gateway address of the device;

DNS1 —— 0.0.0.0 (currently only support 0.0.0.0)

DNS2 —— 0.0.0.0 (currently only support 0.0.0.0)

Note: The name can not have spaces, up to 20 characters, it is best not to use Chinese.

4.3.3 Serial parameters

Serial parameters include: "Baud rate", "Parity", "Stop bits", "Data bits".

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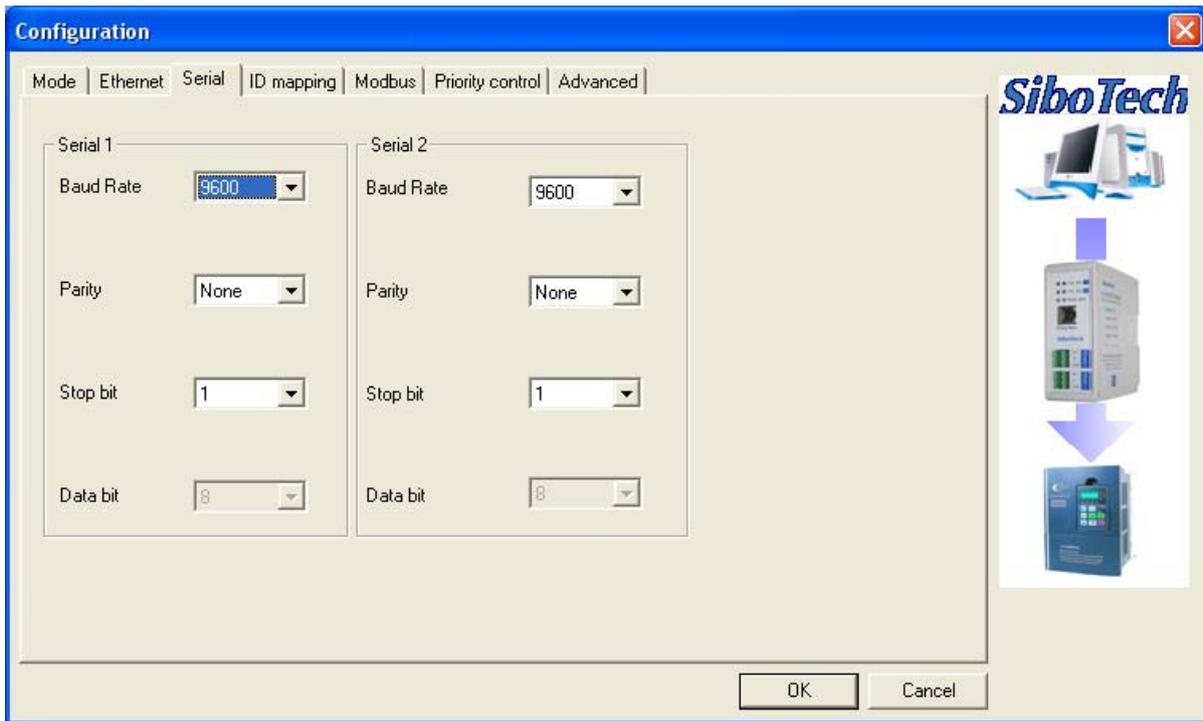
Baud rate   ——   1200、2400、4800、9600、19200、38400、57600、115200、230400bps;

Parity   ——   None, Odd, Even, Mark, Space;

Stop bit   ——   1, 2;

Data bit   ——   8 (currently only support 8 data bits)

4.3.4 ID mapping

Specify request packets send to which serial port or send to which server.

![SiboTech]
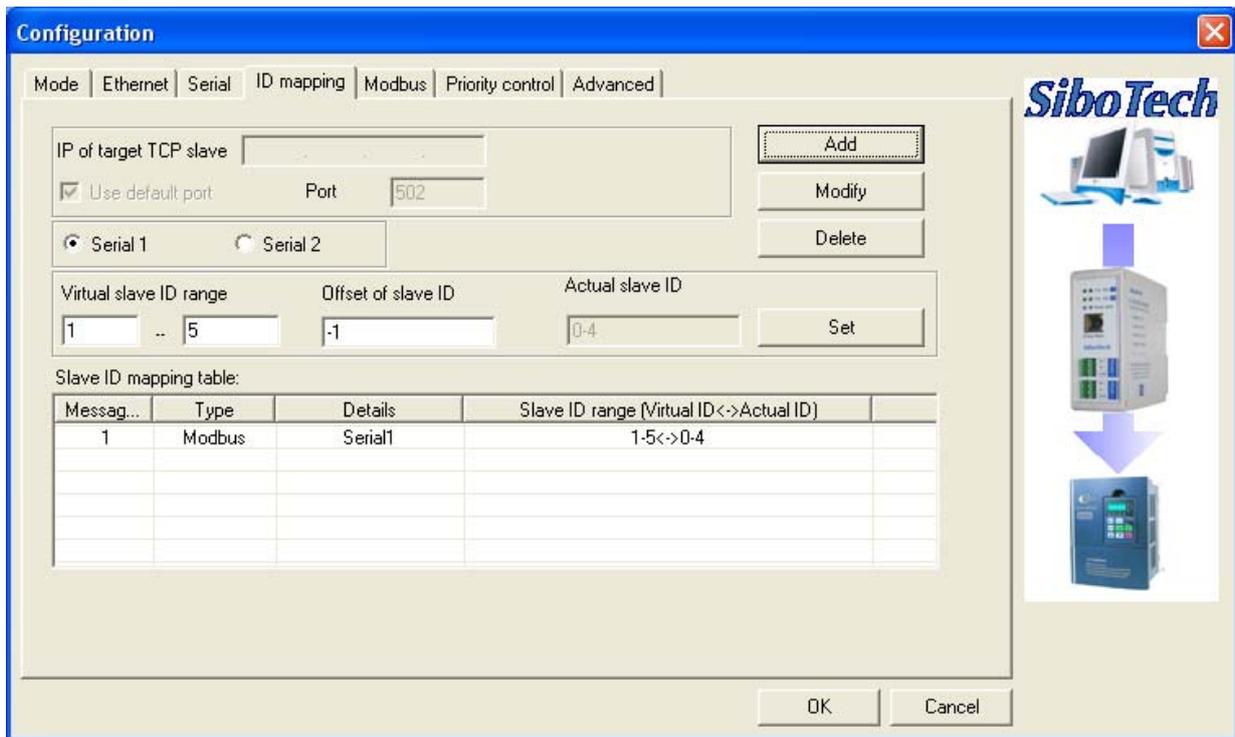
Virtual slave ID range   ——   Ether an ID range, the left is minimum, the right is maximum (not more than 247);

Offset of slave ID   ——   D-value of virtual ID with actual ID (can be negative);

Actual salve ID range   ——   By clicking "Set" button to calculate;

When select "RTU slave mode", the users need to specify the serial port to be mapped.

When select "RTU master mode", the users need to set "IP address of target TCP slave", that is the IP address of the server to be connected.

After setting "Virtual slave ID range" and "Offset of slave ID", click "Set" button, "Actual salve ID range" value is automatically calculated.

When click "Add" button, users can add a message in "Slave ID mapping list".

When want to modify the added information, users fist select the information you want to modify, and then set "Virtual slave ID range" and "Offset of slave ID", click "Modify" button.

When want to delete the added information, users need select the information you want to delete, and click "Delete" button.

Tip: 1. "Add" and "Modify" button both have "Set" function, users do not need to click "Set" then click "Add" or "Modify".

2. Support up to 36 messages.

4.3.5 Modbus parameters

Set "Character time out", "Response time out" and "Delay between polls" of Modbus RTU in the follow interface:
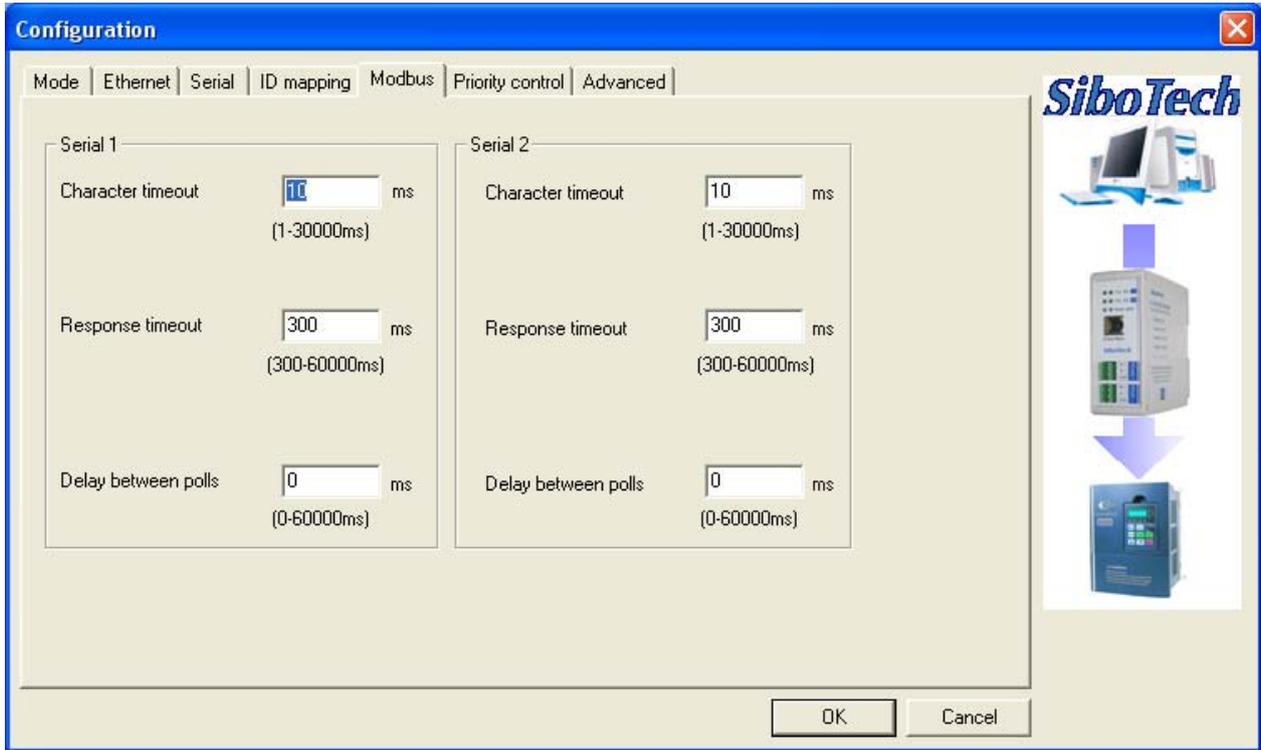
4.3.6 Priority control

Ethernet speed is faster than serial port, and it will cause the frame line, then you can set priority of frames.

After enabling "Priority control", user can set, and only "RTU salve mode" supports the function:

Specify the main client —— The requests of specified client priority to send;

Specify the request —— The requests of specified slave ID (virtual ID) or function codes priority to send.

Priority of requests:

Conditions	Priority
Comply with specified the main master, and comply with specified the request	High
Comply with specified the main master, or comply with specified the request	In

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Not comply with priority conditions	Low

Use method of "Add", "Modify" and "Delete" button in the interface is the same with "ID mapping" interface.
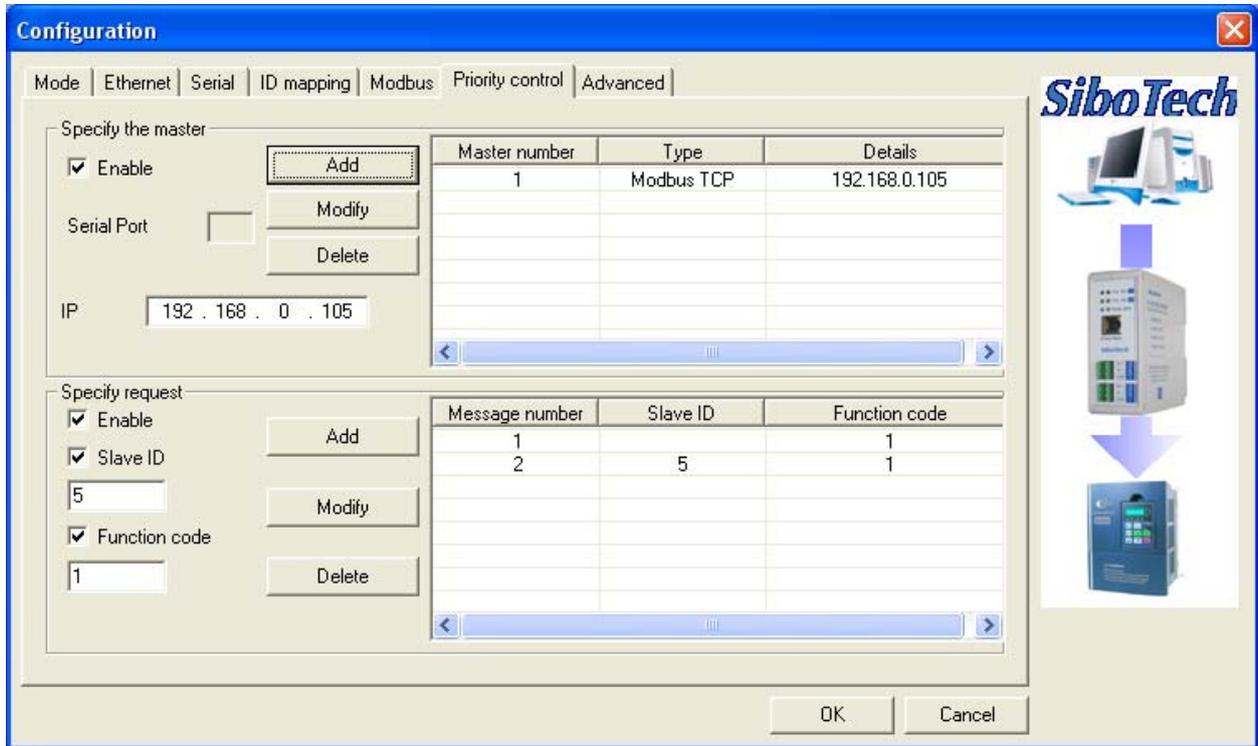
4.3.7 Advanced parameters

Advanced parameters include: "Password", "Port", "Startup delay of serial"，"Default value"，"Idle time of TCP connection and Keep-Alive", "Limitation of communication IP range".

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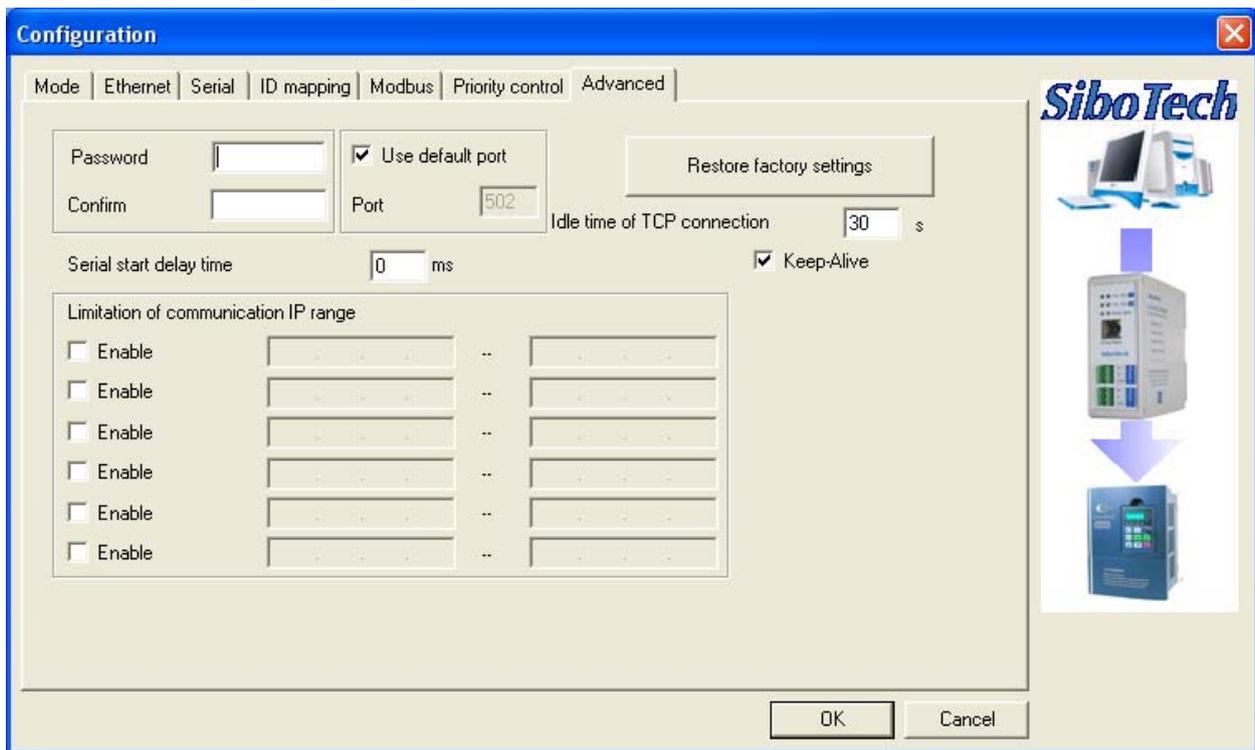
Password   ——   After setting the password, users need to enter the password when configurate

parameters again. If users want to delete the password, just put your password is set to empty.

Default value   ——   When user click "Default value", the previous configuration information will

be lost.

Idle time of TCP connection and Keep-Alive   ——   When a TCP connection idle time reaches the set

value, if select "Keep-Alive", then send keep-alive message; If not, then disconnect the TCP connection. The

function is only valid when ENB-302MT is Modbus TCP server.

Limitation of communication IP range   ——   Set the range of communication IP to limit the client to

connect to ENB-302MT.

Note: After configuring parameters, users need click "OK" button to write the configuration to the equipment. If
      you do not want to write to the configuration, click "Cancel" button.

4.4 Locate

When the user manage multiple ENB-302MT, you can use "Locate" function determine equipment that you

want to configure。

Users click on the "Locate", and the equipment is in Ethernet, the orange light of the equipment will flash 3

seconds then the user can find it.

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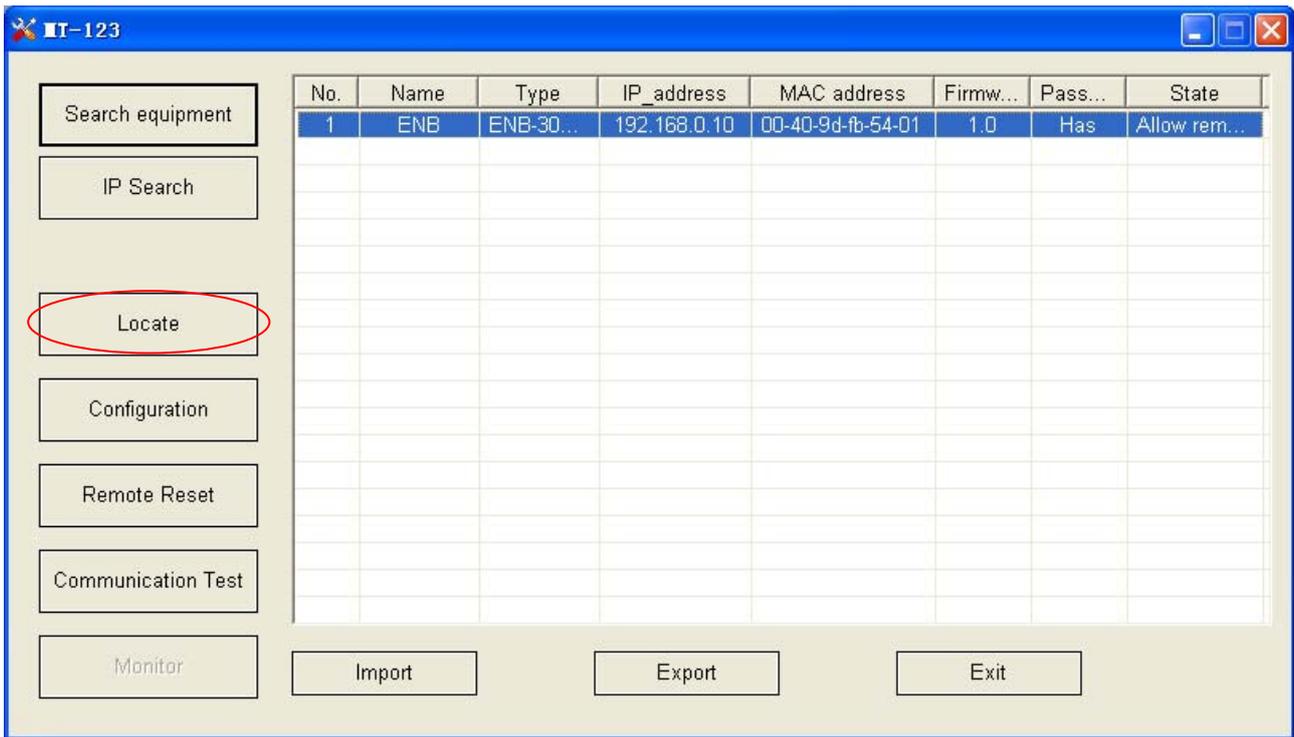
4.5 Remote reset

The function of "remote reset" is restarting the selected device. Select the equipment in the list first, click "Remote reset" button, it will pop up a confirmation dialog, then click "OK" to complete the operation.

4.6 Import/Export

Import —— Import the parameters (txt) to the software;

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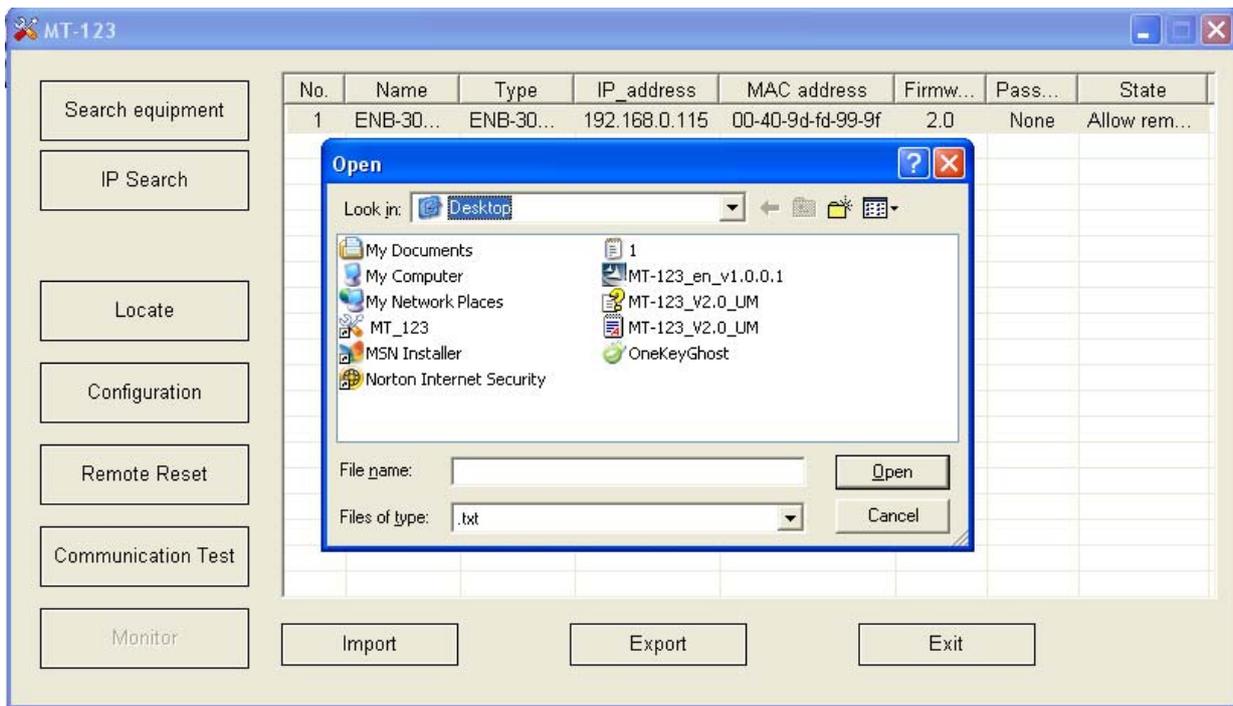
Export　　——　　Save the parameters to the local computer.
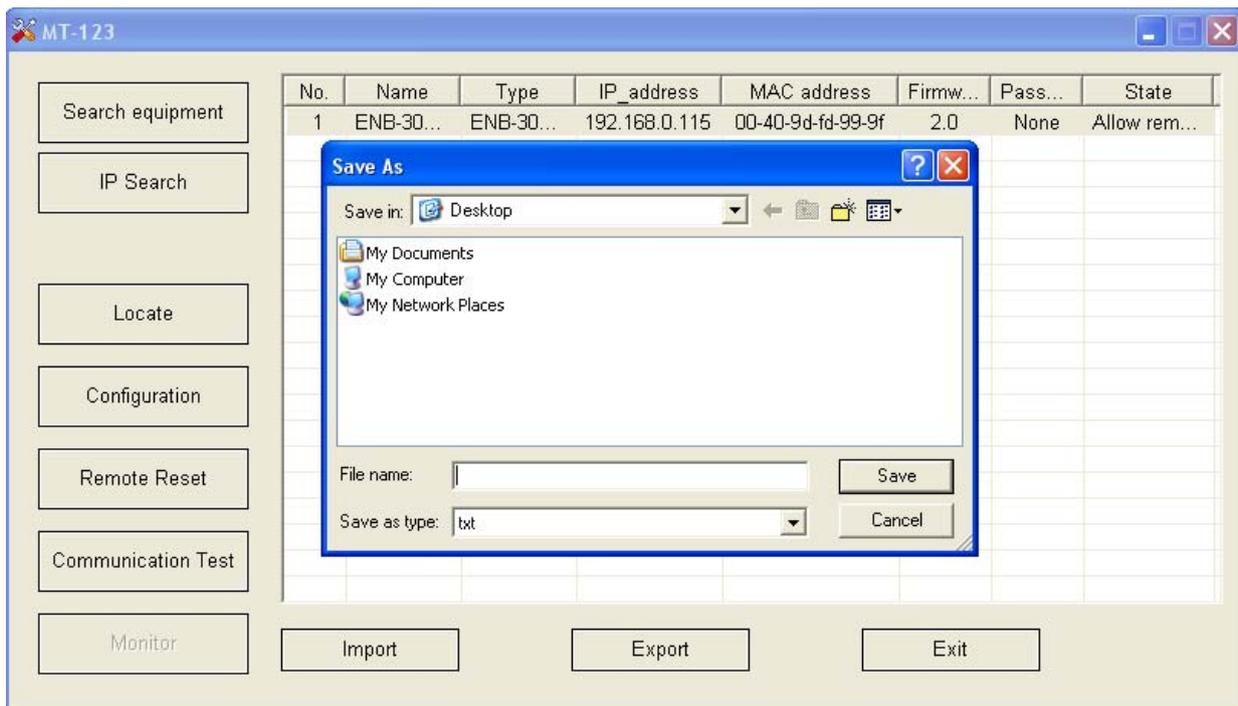
Select the equipment in the list, click "Import" or "Export" button, and select the path to complete the operation.

Note: When the parameters are saved into a txt document, you can change the data of the document, but please ensure the accuracy of the data, or incorrect data will be handled in accordance with the default value.

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Do not change the keywords and do not add address.
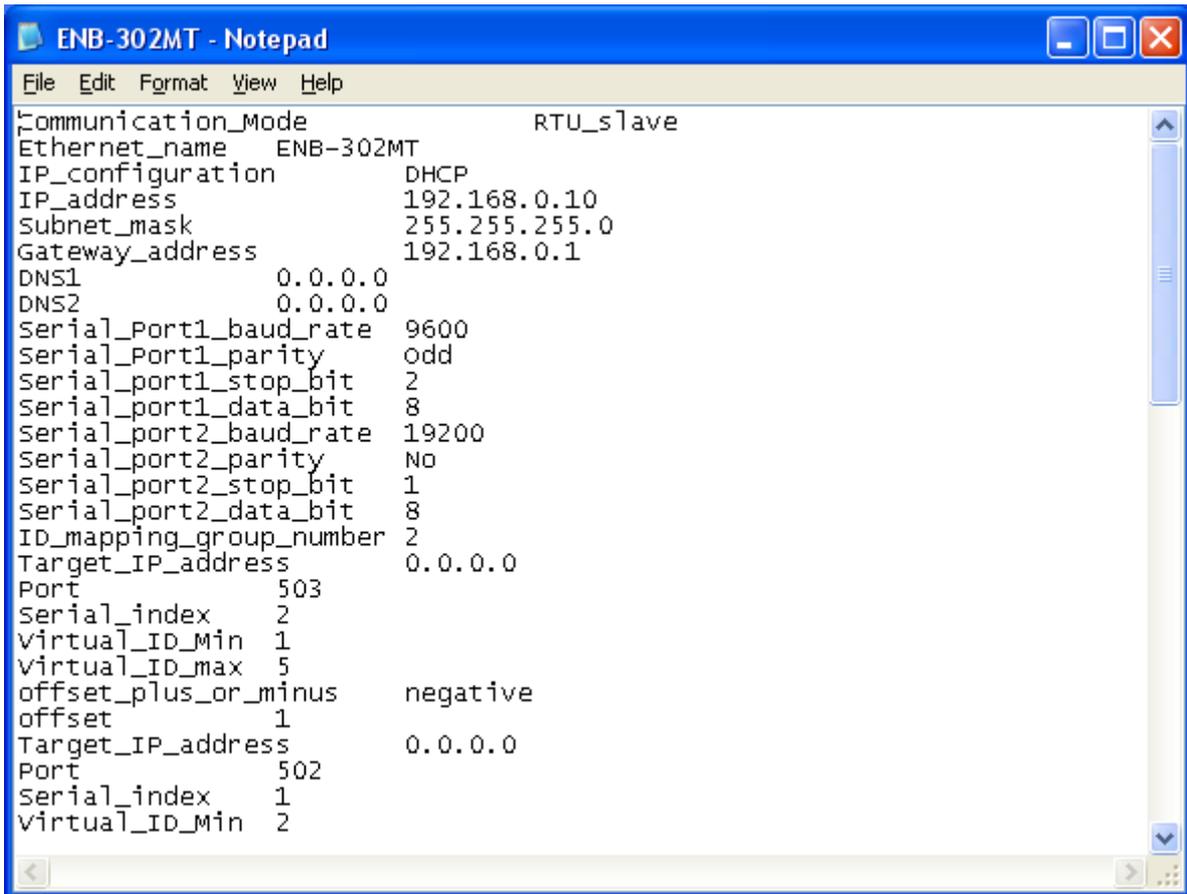
```
ENB-302MT - Notepad
File  Edit  Format  View  Help
Communication_Mode               RTU_slave
Ethernet_name     ENB-302MT
IP_configuration        DHCP
IP_address              192.168.0.10
Subnet_mask             255.255.255.0
Gateway_address         192.168.0.1
DNS1             0.0.0.0
DNS2             0.0.0.0
Serial_Port1_baud_rate  9600
Serial_Port1_parity     Odd
Serial_port1_stop_bit   2
Serial_port1_data_bit   8
Serial_port2_baud_rate  19200
Serial_port2_parity     No
Serial_port2_stop_bit   1
Serial_port2_data_bit   8
ID_mapping_group_number 2
Target_IP_address       0.0.0.0
Port            503
Serial_index    2
Virtual_ID_Min  1
Virtual_ID_max  5
offset_plus_or_minus    negative
offset          1
Target_IP_address       0.0.0.0
Port            502
Serial_index    1
Virtual_ID_Min  2
```

4.7 Communication test

"Communication test" can manually send Modbus TCP request to test serial devices. Click "Communication test" button and it will pop-up the follow interface:

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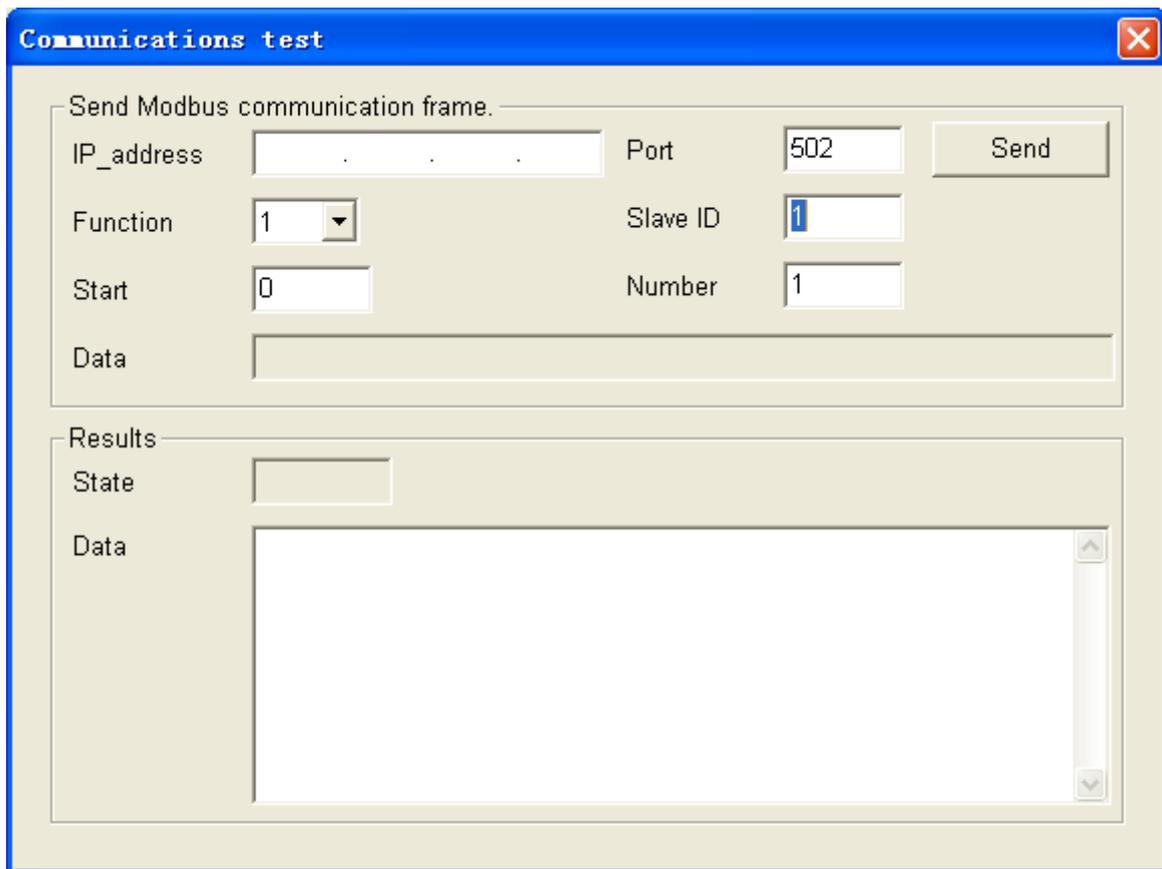
|		
IP address	——	The IP address of ENB-302MT to be connected;
Port	——	The port of ENB-302MT to be connected, and the default is 502;
Function code	——	Support function code: "1", "2", "3", "4", "5", "6" , "15"and "16";
Slave ID	——	Slave address (virtual ID);
Starting address	——	Starting address of registers or coils;
Number	——	Number of registers or coils;
Data (above)	——	The data to be sent;
State	——	Status of response, there is "no response", "right response", and "wrong response";
Data (below)	——	Show the content of response.

Note：The format of input data is hexadecimal, must follow such as "12 ff 0c" format. The format of response data is also hexadecimal.

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5 Typical Application

ENB-302MT can connect Modbus master/slave devices to Ethernet. ENB-302MT is a bridge in the communication, and completes the conversation of Modbus TCP and Modbus RTU.

The following is some typical application of ENB-302MT.

## 5.1 Ethernet master communicate with multiple serial slaves
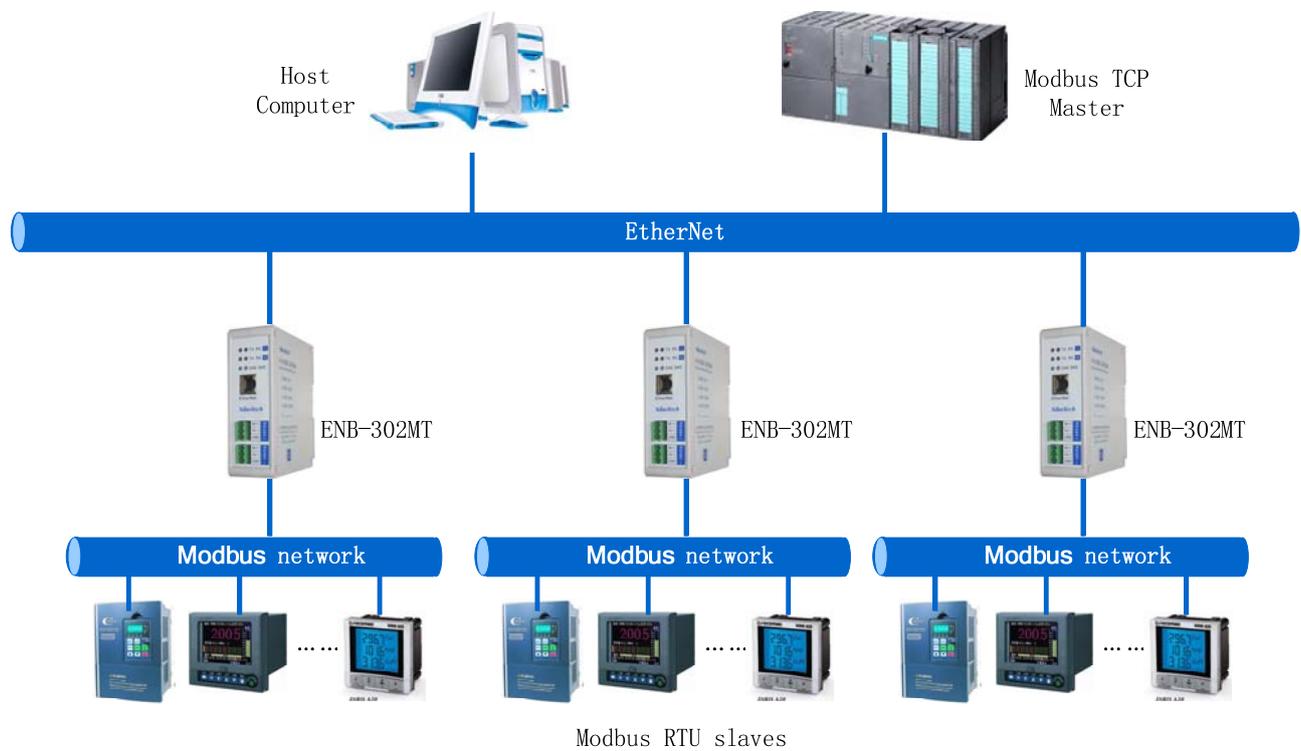
5.2 Serial master communicate with multiple Ethernet slaves
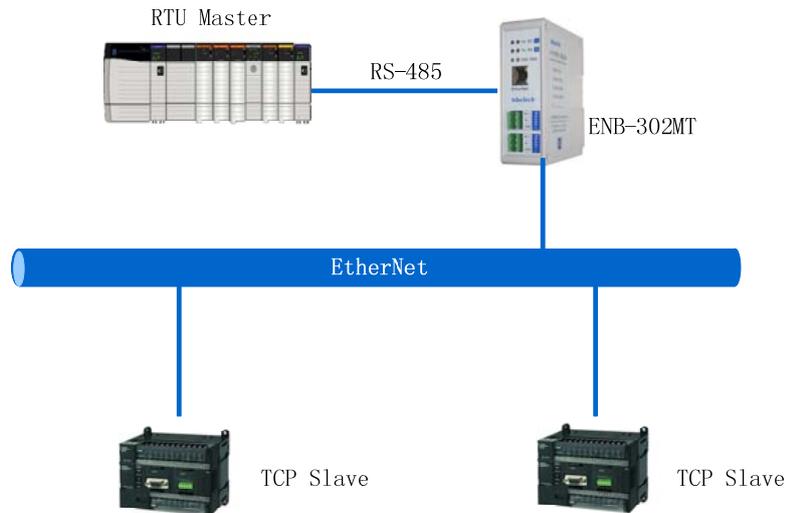
## 5.3 Serial master communicate with serial slave through Ethernet

Serial devices communicate via Ethernet can extend the transmission distance.
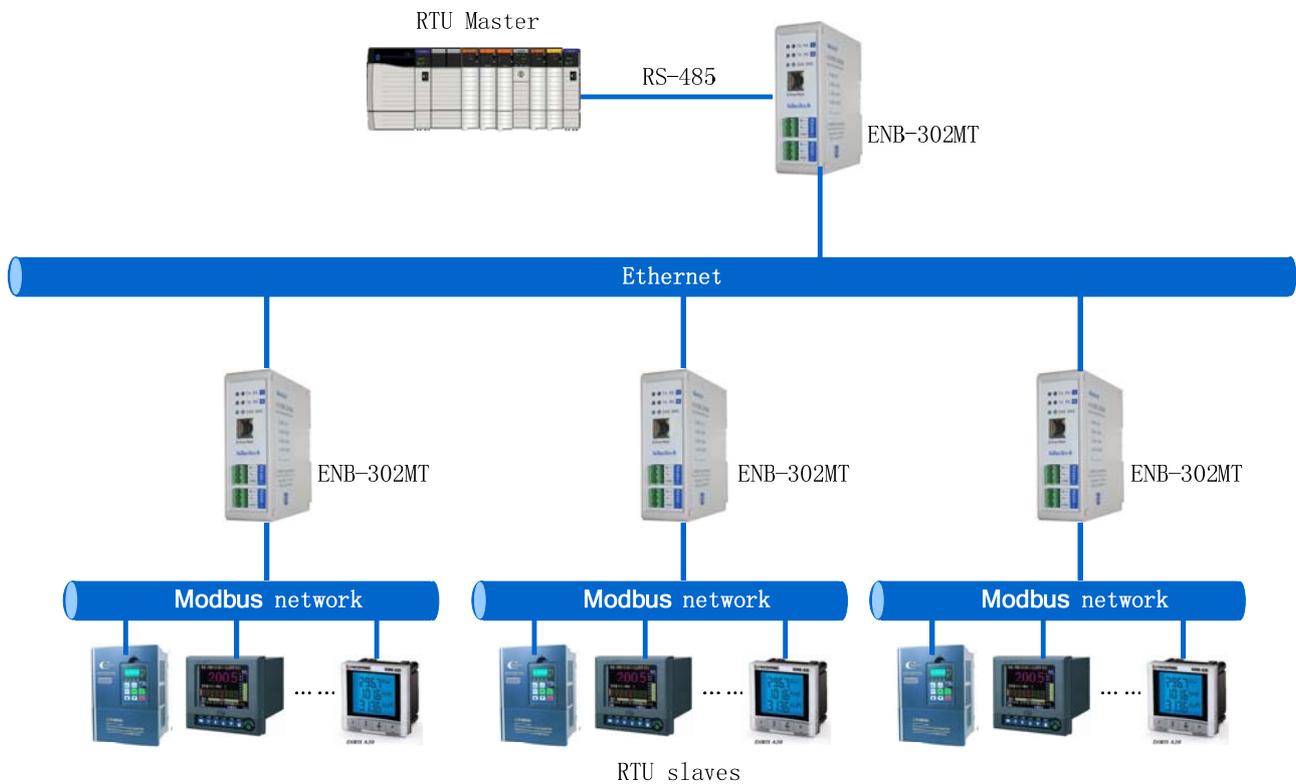
6 Installation

6.1 Mechanical Dimensions

Size: 40mm (Width)*125mm (Height)*110mm (Depth)
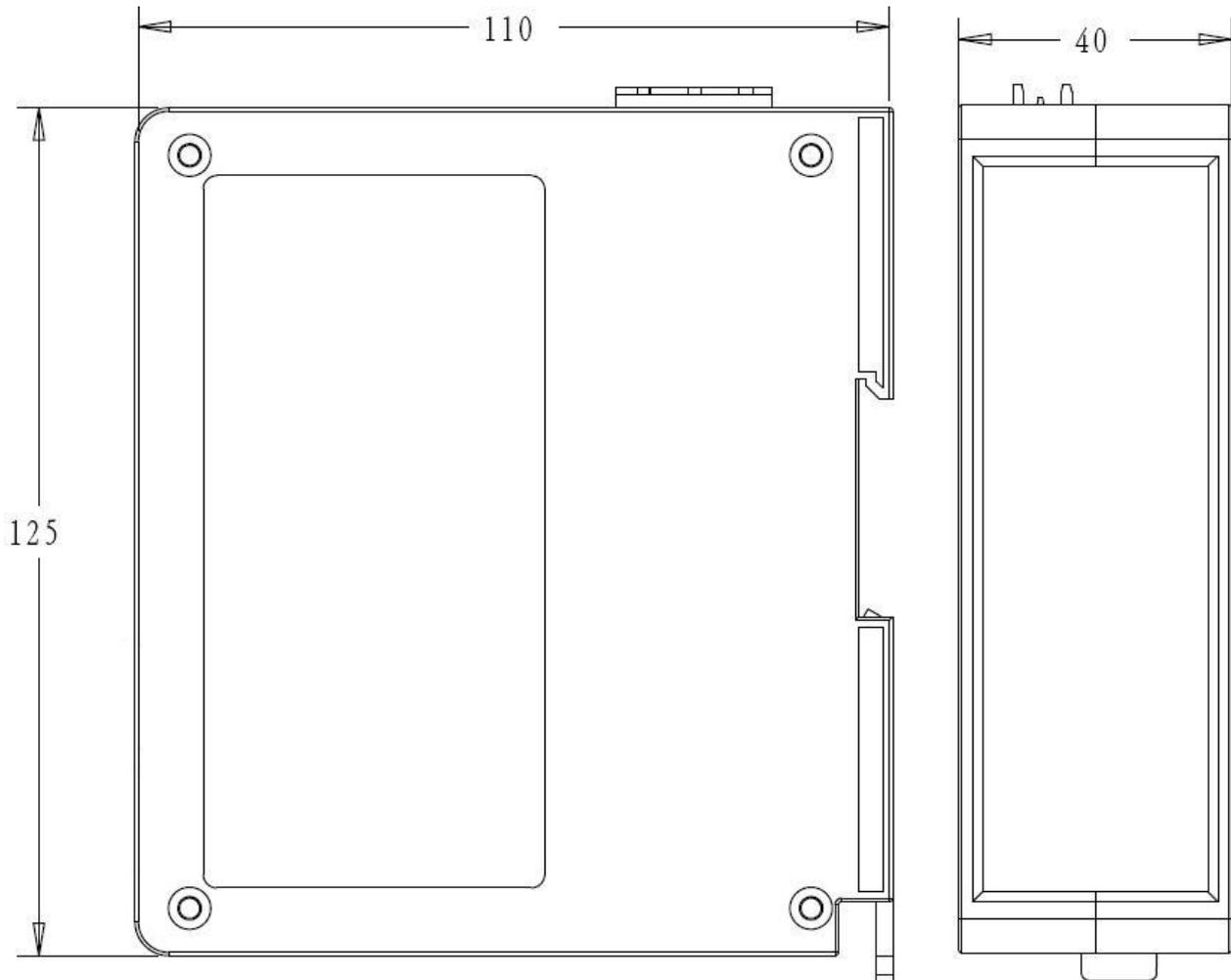
6.2 Installation

35mm DIN rail mounting

① → ② → ③

用力方向

用力方向

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