

EBYTE ME31-XXXA0006 Network I/O Networking Module User **Manual**

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EBYTE ME31-XXXA0006 Network I/O Networking Module



This manual may be updated with product improvements, please refer to the latest version of the manual! Chengdu Yibaite Electronic Technology Co., Ltd. reserves the final interpretation and modification rights for all contents in this instruction!

Overview

Product Introduction

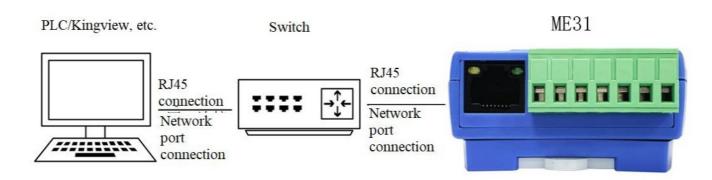
ME31-XXXA0006 is a network I/O networking module with 6 analog outputs (0-20mA/4-20mA) and supports Modbus TCP protocol or Modbus RTU protocol for acquisition and control. The device can also be used as a simple Modbus gateway (automatically send commands with non-local Modbus addresses through the serial port/network port).

Functional Features



- Support standard Modbus RTU protocol and Modbus TCP protocol;
- Support various configuration software/PLC/touch screen;
- RS485 acquisition control I/O;
- RJ45 acquisition control I/O, support 4-way host access;
- Support OLED display to display status information, and configure device parameters through buttons;
- 6 analog outputs (0-20mA/4-20mA)
- · Support custom Modbus address setting;
- Support 8 common baud rate configurations;
- · Support DHCP and static IP;
- Support DNS function, domain name resolution;
- Support Modbus gateway function;

Product Application Topology Diagram



Network interface application topology diagram



Serial port application topology diagram

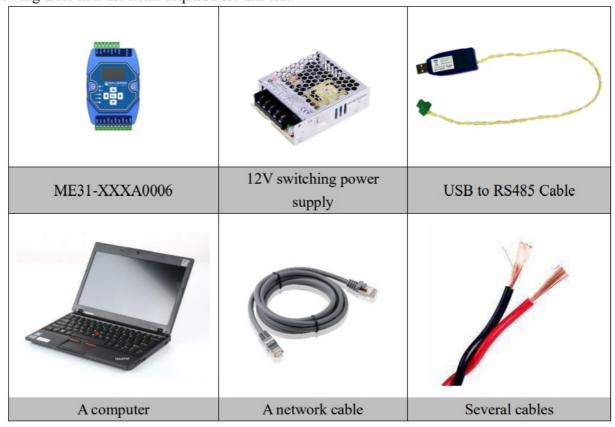
Quick use

Note This test needs to be carried out with the default factory parameters.

Device preparation

The following table lists the items required for this test:

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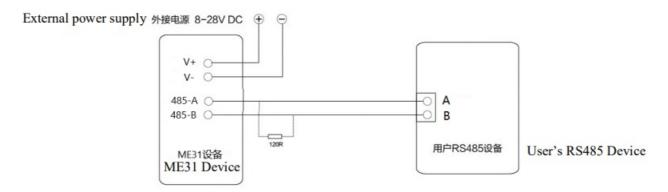


Device connection

RS485 connection

RS485 wiring diagram

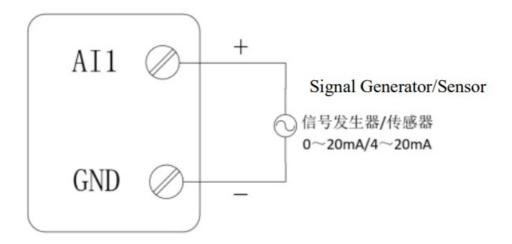
RS485接线图



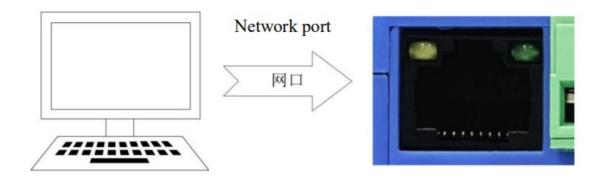
Note: When the 485 bus high-frequency signal is transmitted, the signal wavelength is shorter than the transmission line, and the signal will form a reflected wave at the end of the transmission line, which will interfere with the original signal. Therefore, it is necessary to add a terminal resistor at the end of the transmission line so that the signal does not reflect after reaching the end of the transmission line. The terminal resistance should be the same as the impedance of the communication cable, the typical value is 120 ohms. Its function is to match the

bus impedance and improve the anti-interference and reliability of data communication.

AO analog output connection



Simple use



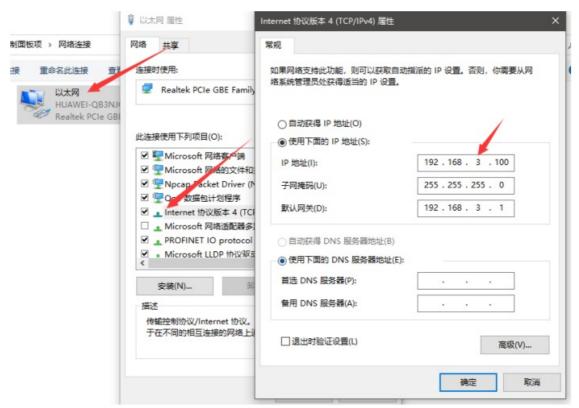
Wiring: The computer is connected to the RS485 interface of ME31-XXXA0006 through USB to RS485, A is connected to A, and B is connected to B.

Networking: Insert the network cable into the RJ45 port and connect to the PC.

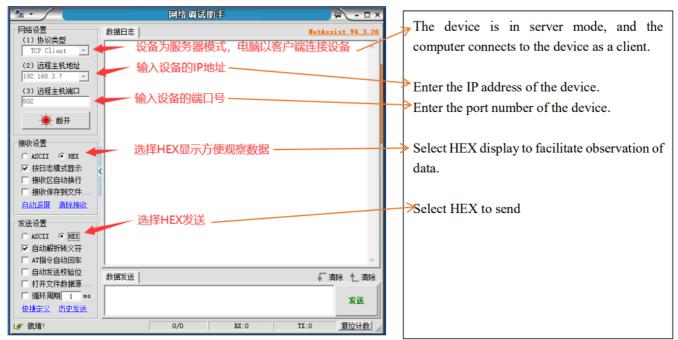
Power supply: Use DC-12V switching power supply (DC 8~28V) to power ME31-XXXA0006.

Parameter Configuration

Step 1: Modify the IP address of the computer to be consistent with the device. Here I am modifying it to 192.168.3.100 to ensure that it is on the same network segment as the device and that the IP is different. If you cannot connect to the device after the above steps, please turn off the firewall and try again;



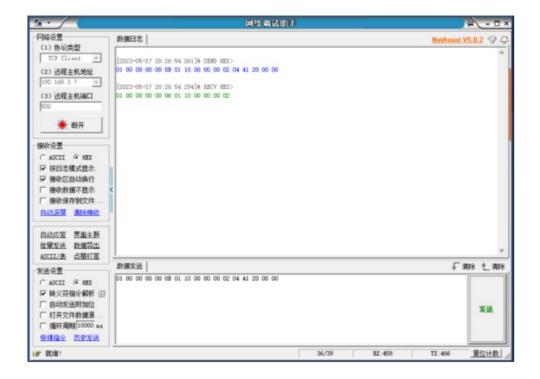
Step 2: Open the network assistant, select the TCP client, enter the remote host IP192.168.3.7 (default parameter), enter the port number 502 (default parameter), and select HEX to send.



Control Testing

Modbus TCP control

Use the network assistant to control the first AO output of ME31-XXXA0006 to 10mA.



Other functions can be tested through the commands in the table below.

Function (function code)	Command
Control AO1 output 10mA (0x10)	01 00 00 00 00 0B 01 10 00 00 00 02 04 41 20 00 00
Read AO1 output (0x03)	01 00 00 00 00 06 01 03 00 00 00 02

Modbus RTU control

Use the serial port assistant to read the current AO1 output of ME31-XXXA0006.



Other functions can be tested through the commands in the table below.

Function (function code)	Command
Read current AO1 output (0x03)	01 03 00 00 00 02 C4 0B
Control AO1 current output 10mA (0x10)	01 10 00 00 00 02 04 41 20 00 00 E6 59

Technical Specification

Specifications

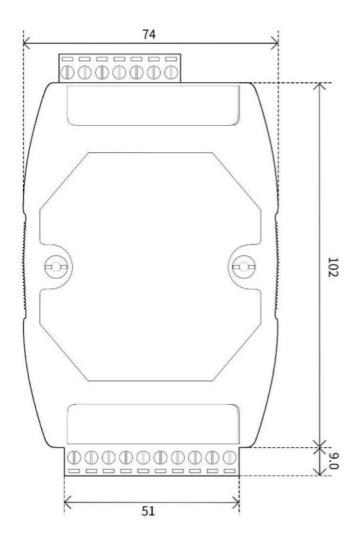
Category	Name	Parameters
Dawar awalu	Operating Voltage	DC8 28V
Power supply	Power indicator	Blue LED indication
	Communication Interface	RJ45, RS485
Serial port	Baud rate	9600bps (customizable)
	Protocol	Standard Modbus TCP, Modbus RTU protocol
MODBUS	Device address	Can be modified by Modbus command and host computer
	Number of AO channels	6 way
	AO output type	Current output, 2-wire connection
	AO output range	0 20mA \4 20mA
AO autaut	AO resolution	16 bits
AO output	Output accuracy	3‰
	Output indication	OLED screen display
	Product Size	121mm * 72mm * 34mm (L*W*H)
	Product weight	135 ±5 g
	Working temperature a nd humidity	-40 +85°C, 5% 95%RH (no condensation)
Other	Storage temperature and humidity	-40 +105°C, 5% 95%RH (no condensation)
	Installation method	Din-rail installation

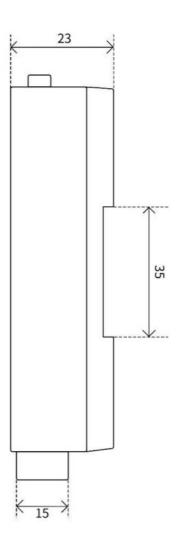
Device Default Parameters

Category	Name	Parameters
	Operating mode	TCP server (up to 4-way client access)
	Local IP	192.168.3.7
	local port	502
	Subnet mask	255.255.255.0
Ethernet parameters	Gateway address	192.168.3.1
	DHCP	Close

	Native MAC	Determined by the chip (fixed)
	Target IP	192.168.3.3
	Target port	502
	DNS server	114.114.114.114
	Active upload	Close
	Baud rate	9600bps (8 types)
	Check method	None (default), Odd, Even
Serial parameters	Data bit	8
	Stop bit	1
MODBUS parameter	Modbus master-slave	Slave
MODBOO parameter	Address	1

Mechanical Dimensional Drawing





Port and indicator light description



No.	Label	Illustrate	
1	TX LED	Serial port send data indicator light	
2	RX LED	Serial port receiving data indicator light	
3	LINK LED	Network connection light	
4	NET LED	Network data sending and receiving indicator light	
5	PWR LED	Power input indicator	
6	GND	Negative pole of power input terminal, DC 8V~28V, 5.08mm Phoenix terminal.	
7	VCC	Positive pole of power input terminal, DC 8V~28V, 5.08mm Phoenix terminal.	
8	AO3	Analog output current (positive pole), channel 3, 5.08mm Phoenix terminal.	
9	AGND	Analog output current (negative pole), channel 3, 5.08mm Phoenix terminal.	
10	AO4	Analog output current (positive pole), channel 4, 5.08mm Phoenix terminal.	
11	AGND	Analog output current (negative pole), channel 4, 5.08mm Phoenix terminal.	
12	AO5	Analog output current (positive pole), channel 5, 5.08mm Phoenix terminal.	
13	AGND	Analog output current (negative pole), channel 5, 5.08mm Phoenix termina	
14	AO6	Analog output current (positive pole), channel 6, 5.08mm Phoenix terminal.	
15	AGND	Analog output current (negative pole), channel 6, 5.08mm Phoenix terminal.	
16	Ethernet	Ethernet interface, standard RJ45 interface.	
17	AGND	Analog output current (negative pole), channel 2, 5.08mm Phoenix terminal.	
18	AO2	Analog output current (positive pole), channel 2, 5.08mm Phoenix terminal.	
19	AGND	Analog output current (negative pole), channel 1, 5.08mm Phoenix terminal.	
20	AO1	Analog output current (positive pole), channel 1, 5.08mm Phoenix terminal.	
21	GND	Signal ground, 5.08mm Phoenix terminal.	
		The A of the serial port is connected to the A interface of the external device,	

and the 5.08mm Phoenix terminal.

and the 5.08mm Phoenix terminal.

The B of the serial port is connected to the B interface of the external device,

Product Function Introduction

485-A

485-B

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AO output range

Analog output (AO), the current output type can be configured as 0~20mA or 4~20mA, the precision is 3‰, and the resolution is 16 bits.

The power-on default output value can be set (when the working mode is switched, the power-on value will be output according to the lowest value of the current range).

Modbus Gateway

The device can transparently transmit non-native Modbus commands from the network/serial port to the serial port/network, and the local Modbus commands are directly executed.

Modbus TCP/RTU protocol conversion

After it is turned on, the Modbus TCP data on the network side will be converted to Modbus RTU data.

Modbus Address Filtering

This function can be used when some host software or configuration screen is used as the host to access the serial port of the device, and the gateway function of the device is used, the slave is at the network end, and the Modbus TCP to RTU function is turned on. Multiple slaves on the bus may cause data confusion. At this time, enabling address filtering can ensure that only the specified address can pass through the device; when the parameter is 0, the data will be transparently transmitted; when the parameter is 1-255, only the set slave machine address data.

Modbus TCP Protocol Data Frame Description

TCP frame format

Transaction ID	Protocol ID	Length	Device address	Function code	Data segment	
2 Bit	2 Bit	N+2 Bit	1 Bit	1 Bit	N Bit	

- Transaction ID: It can be understood as the serial number of the Generally, 1 is added after each communication to distinguish different communication data messages.
- Protocol identifier: 00 00 means Modbus TCP
- Length: Indicates the length of the next data in

Example: get DI status

01 00	00 00	00 06	01	02	00 00 00 04
Transaction ID	Protocol ID	Length	Device address	Function code	Data segment

Modbus RTU protocol data frame description

RTU frame format

Device address	Function code	Data segment	Check codeCRC
1 Bit	1 Bit	N Bit	2 Bit

Example: get DI status command

01	02	00 00 00 04	79 C9
Device Modbus address	Function code	Data segment	CRC check code

Custom Module Information

Modbus Address

The device address is 1 by default, and the address can be modified, and the address range is 1-247.

Module Name

Users can configure the device name according to their own needs to distinguish, support English, digital format, up to 20 bytes.

Network parameters

Unless otherwise specified: the following network-related parameters default to IPV4-related parameters.

- MAC of the device: the user can obtain it by reading the specified register, and this parameter cannot be
- IP address: device IP address, readable and writable.
- Modbus TCP port: the port number of the device, readable and writable.
- · Subnet mask: address mask, readable and
- · Gateway address:
- DHCP: Set the way the device obtains IP: static (0), dynamic (1).
- Target IP: When the device works in client mode, the target IP or domain name of the device
- Destination port: When the device is working in client mode, the destination port of the device
- DNS server: The device is in the client mode and resolves the domain name of the server.
- Module working mode: switch the working mode of the module. Server: The device is equivalent to a server, waiting for the user's client to The maximum number of connections is 4. Client: The device actively connects to the target IP and port set by the user.
- Active upload: When this parameter is not 0, and the device is in the client mode, the discrete input status of
 the device will be uploaded to the server when it is connected for the first time or the input changes, and the
 analog input will be uploaded according to the configured time

Serial Port Parameters

Parameters for setting serial communication:

Default parameters:

• Baud rate: 9600 (03); Data bit: 8bit;

• Stop bit: 1bit;

Check digit: NONE(00);

Baud rate

Baud rate code value table	
0x0000	1200
0x0001	2400
0x0002	4800
0x0003	
default	9600
0x0004	19200
0x0005	38400
0x0006	57600
0x0007	115200

Check Digit

Check Digit	
0x0000(default)	NONE
0x0001	ODD
0x0002	EVEN

OLED display and parameter configuration

The display interface includes an information display page (AO input value display page) and a parameter setting page (some parameters).

Information Display Interface

Including the AO input value display page, short press the up and down buttons to switch the interface.

Equipment parameter display interface

Press the left button or right button to enter the password input interface, complete the correct password input, and the device parameter information interface will be displayed (password interface: default password: 0000; short press the middle to verify the password, the left and right buttons switch the password bit, and the up and down buttons switch the current bit value, the password has a total of 4 digits, and each input is a number ranging from 0-9):

The parameter setting interface from top to bottom is:

- 1. Modbus address;
- 2. Baud rate:
- 3. Data bits;
- 4. Check Digit;

- 5. Stop bit;
- 6. Local port;
- 7. Local IP address;
- 8. Gateway;
- 9. Subnet mask;
- 10. DNS;
- 11. MAC address;
- 12. DHCP;
- 13. Target IP;
- 14. Destination port;
- 15. Modbus TCP/RTU protocol conversion;
- 16. Active upload;
- 17. Modbus address filtering;

Equipment Parameter Configuration Interface

Press and hold the confirmation button to enter the password input interface, complete the correct password input, and enter the configuration interface (password interface: default password: 0000; short press the middle to verify the password, the left and right buttons switch the password bit, and the up and down buttons switch the value of the current bit, the password has a total of 4 digits, and each input range is a number from 0-9).

- Select the setting item, enter the parameter configuration page and short press the up and down keys to switch the setting item;
- Select the setting item, short press to confirm or right click, the setting item gets the cursor to represent the selection and enter the setting item;
- Adjust the parameter value: After selecting the setting item, the up and down keys can change the value or
 optional value; the left and right keys move the cursor in the parameter item;
- Confirm the parameter value: After adjusting the parameter value, press the enter key to exit the current setting item.

Save parameter settings and restart: After setting the parameters, move the cursor to save and restart, then short press the confirmation key to enter the confirmation save and restart state. Short press the confirmation key (press other keys to exit the confirmation state) to save the parameters and restart the device.

Exit without saving parameters: move the cursor to exit, then short press the confirmation key to enter the confirmation exit state, short press the confirmation key (press other keys to exit the confirmation state), and then exit the parameter configuration interface without saving the parameters.

Among them, the data bit and stop bit cannot be set. After the DHCP mode is turned on, the local IP address, gateway, and subnet mask cannot be configured and are only assigned by the router;

Screen Sleep

The device screen has a sleep function, which is off by default and can be set to on in the configuration interface.

In any interface, when there is no button operation for 180 seconds, the screen will enter the sleep mode. At this time, the interface displays Ebyte robot. Press any button can exit the sleep mode.

When the screen is in sleep mode, the running efficiency of device programs will be improved.

MODBUS parameter configuration

Note: According to the usage requirements, some software (such as KingView) requires adding +1 when converting from hexadecimal to decimal in order to operate on registers (all decimal values in the table have already been adjusted by +1).

AO Register List

Register fu nction	Registe r addre ss (HEX)	Registe r addre ss (DEC)	Registe r type	Numbe r	Operat e	Data Range/Remarks	Related function code
Analog output valu e	0x0000	4-0001	Holding register	12	RW	32-bit floating point type, unit mA	R 0x03 W 0x10
Analog out put value	0x0064	4-0101	Holding register	6	RW	Analog channel output quantit y, 2-byte integer, unit (uA)	R 0x03 W 0x10
AO output mode	0x0514	4-1301	Holding register	6	RW	AO channel output range 0x00 00: 0~20mA 0x0001: 4-20mA	R 0x03 W 0x06 0x10
AO power- on output i nitial value	0x00C8	4-0201	Holding register	12	RW	Output engineering quantity w hen the analog channel is pow ered on, a 4-byte floating point number, the default is 0	R 0x03 W 0x10

Module related registers

Register f unction	Register address (HEX)	Registe r address (DEC)	Registe r type	Numbe r	Operat e	Data Range/Remarks	Related functi on code
Module address	0x07E8	4-2025	Holding register	1	RW	Modbus address, 1 247 configurable addresses	R 0x03 W 0x06
Module model	0x07D0	4-2001	Holding register	12	R	Get the current model	R 0x03
Firmware version	0x07DC	4-2013	Holding register	1	R	Get firmware version number	R 0x03
Module name	0x07DE	4-2015	Holding register	10	RW	Custom module name	R 0x03 W 0x10
Module restart	0x07EA	4-2027	Holding register	1	w	Write 0x5BB5 to reboot.	W 0x06
Restore f actory parameter s	0x07E9	4-2026	Holding register	1	w	Write 0x5BB5 to restore factory settings.	W 0x06
Serial baud rate	0x0834	4-2101	Holding register	1	RW	See baud rate code table, Default is 9600 (0x0003)	R 0x03 W 0x06 0x10
Serial che ck digit	0x0836	4-2103	Holding register	1	RW	0x0000 no checksum (default) 0 x0001 odd parity 0x0002 even parity	R 0x03 W 0x0 6 0x10

Network related registers

Register f unction	Registe r addre ss (HEX)	Registe r addre ss (DEC)	Registe r type	Numbe r	Operat e	Data Range/Remarks	Related functi on code
Module M AC address	0x0898	4-2201	Holding register	3	R	Device MAC parameters	R 0x03
Local IP address	0x089B	4-2204	Holding register	2	RW	Default: 192.168.3.7	R 0x03 W 0x06 0x10
local port	0x089D	4-2206	Holding register	1	RW	1 65535, default: 502	R 0x03 W 0x06 0x10
Subnet m ask address	0x089E	4-2207	Holding register	2	RW	Default: 255.255.255.0	R 0x03 W 0x0 6 0x10
Gateway	0x08A0	4-2209	Holding	2	RW	Default: 192.168.3.1	R 0x03 W 0x06 0x10

DHCP mode setti ng	0x08A2	4-2211	Holding register	1	RW	0x0000 static IP (default) 0x0001 Obtain IP automatically	R 0x03 W 0x0 6 0x10
Target IP/domain name	0x08A3	4-2212	Holding register	64	RW	String format stored in IP/domain name Default IP: 192.168.3.3	R 0x03 W 0x0 6 0x10
Server por t	0x08E3	4-2276	Holding register	1	RW	0-65535, default 502	R 0x03 W 0x06 0x10
DNS server IP address	0x08E4	4-2277	Holding register	2	RW	Default 8.8.8.8	R 0x03 W 0x0 6 0x10
Module work mod e	0x08E6	4-2279	Holding register	1	RW	0x0000 server mode 0x0001 client mode	R 0x03 W 0x06 0x10
Active upload	0x08E7	4-2280	Holding register	1	RW	0x0000 disabled, others: 1 65535s cycle sending	R 0x03 W 0x06 0x10
MOSBUS TCP/RTU conversion enable	0x08E8	4-2281	Holding register	1	RW	0, close, 1 open protocol conversion	R 0x03 W 0x0 6 0x10
MODBUS address fil tering	0x08E9	4-2282	Holding register	1	RW	0: transparent transmission, 1- 255: when the data is not local, c heck the slave address of the co mmand, and it can be passed w hen it is the set value	R 0x03 W 0x0 6 0x10

Examples of Modbus command operation instructions

Read coil (DO) status

Use the read coil state (01) function code to read the output coil state, for example:

01	01	00 00	00 04	3D C9
Modbus address	Function code	Register first address	Number of output coils read	CRC check code

After sending the above command to the device through the 485 bus, the device will return the following values:

01	01	01	01	90 48
Modbus address	Function code	Bytes of data	Returned status dat a	CRC check code

The status data 01 returned above indicates that the output DO1 is turned on.

Control coil (DO) state

Support operation of single coil (05), operation of multiple coils (0F) function code operation. Use the 05 command to write a single command, for example:

01	05	00 00	FF 00	8C 3A
Modbus address	Function code	Register first address	Continuity: FF 00 Close: 00 00	CRC check code

After sending the above command to the device through the 485 bus, the device will return the following values:

01	05	00 00	FF 00	8C 3A
Modbus address	Function code	Register first address	Operation method	CRC check code

The DO1 coil is turned on.

Use 0F function code as the command to write multiple coils, for example:

C)1	0F	00 00	00 04	01	0F	7E 92
N	/lodbus	Function	Initial	Number of			CRC check
a	address	code	address	coils	Bytes of data	Control coil data	code

After sending the above command to the device through the 485 bus, the device will return the following values:

01	0F	00 00	OO O4	54 08
Modbus address	Function code	Register address	Number of coils	CRC check code

The coils are all on.

Read the holding register

Use 03 function code to read one or more register values, for example:

01	03	05 78	00 01	04 DF
Modbus address	Function code	Register first address	Number of registers read	CRC check code

After sending the above command to the device through the 485 bus, the device will return the following values:

01	03	02	00 00	B8 44
Modbus address	Function code	Bytes of data	Returned data	CRC check code

The above 00 00 means that DO1 is in level output mode.

Operation holding register

Support operation of single register (06), operation of multiple registers (10) function code operation.

Use 06 function code to write a single holding register, for example: set the working mode of DO1 to pulse mode:

01	06	05 78	00 01	C8 DF
Modbus address	Function code	Register address	Write value	CRC check code

After sending the above command to the device through the 485 bus, the device will return the following values:

01	06	05 78	00 01	C8 DF
Modbus address	Function code	Register address	Write value	CRC check code

If the modification is successful, the data in the 0x0578 register is 0x0001, and the pulse output mode is turned on.

Use function code 10 to write multiple holding register commands, for example: set the working mode of DO1 and DO2 at the same time.

01	10	05 78	00 02	04	00 01 00 01	5A 7D
Modbus	Function	Register head	Number of	Number of bytes of		CRC check
address	code	address	registers	written data	Written data	code

After sending the above command to the device through the 485 bus, the device will return the following values:

01	10	05 78	00 02	C1 1D
Modbus address	Function code	Register address	Number of registers	CRC check code

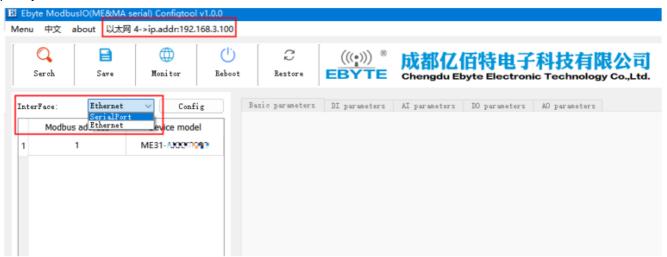
If the modification is successful, the values of the two consecutive registers starting with 0x0578 are 0x0001 and 0x0001 respectively, marking DO1 and DO2 to enable pulse output.

Configuration Software

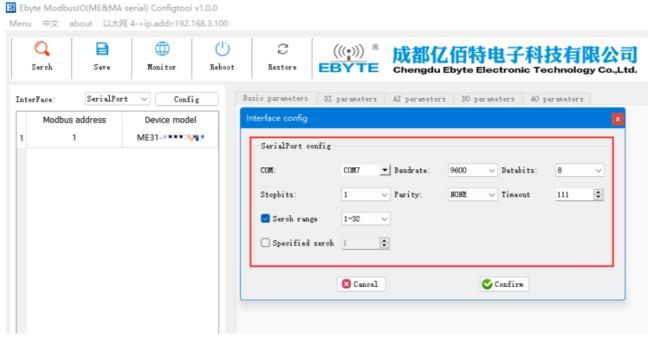
Acquisition and Control

Step 1: Connect the device to the configuration software.

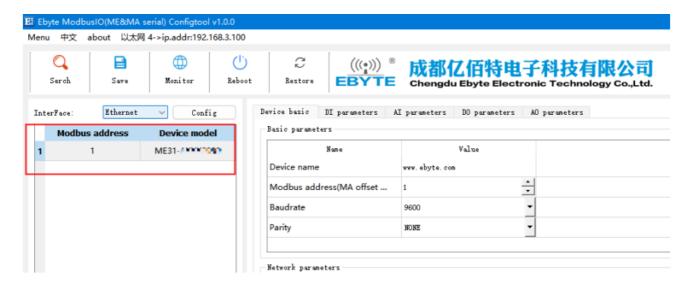
1. You can configure the device by selecting the interface (serial port/network port); if you choose the network port, you must first select the network card and then search for the device.



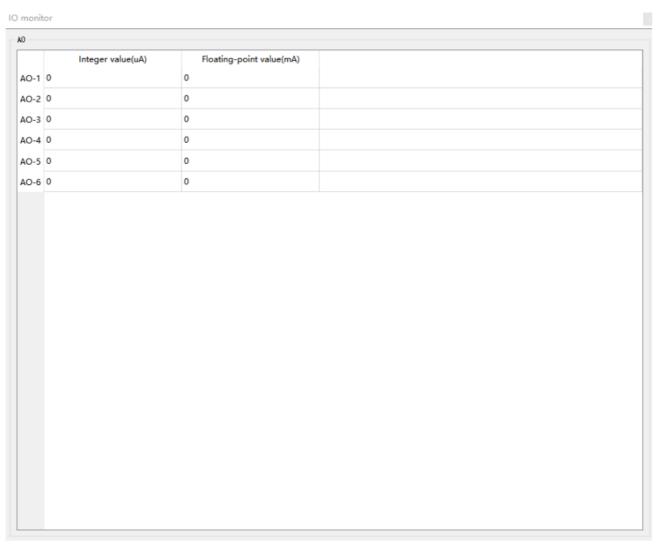
2. If you choose a serial port, you need to select the corresponding serial port number, and the same baud rate, data bit, stop bit, parity bit and address segment search range as the device, and then search.



Step 2: Select the corresponding device.



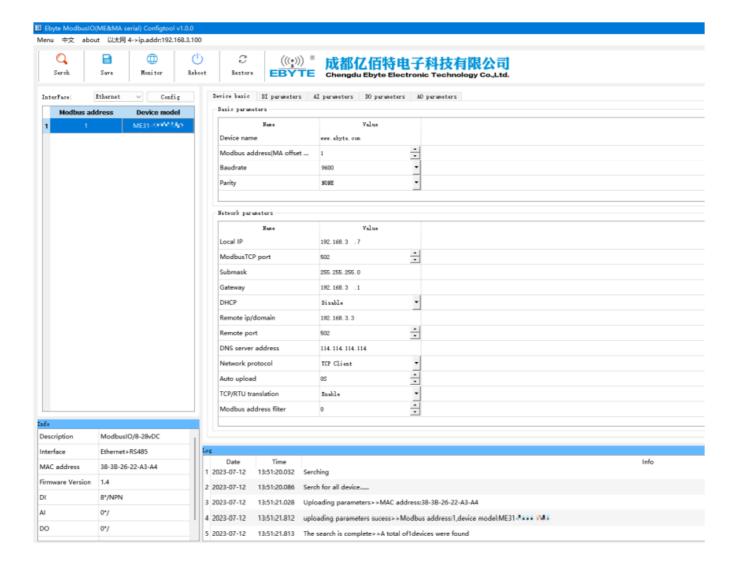
Step 3: Click the device online to enter the IO monitoring. The following is the IO monitoring screen display.



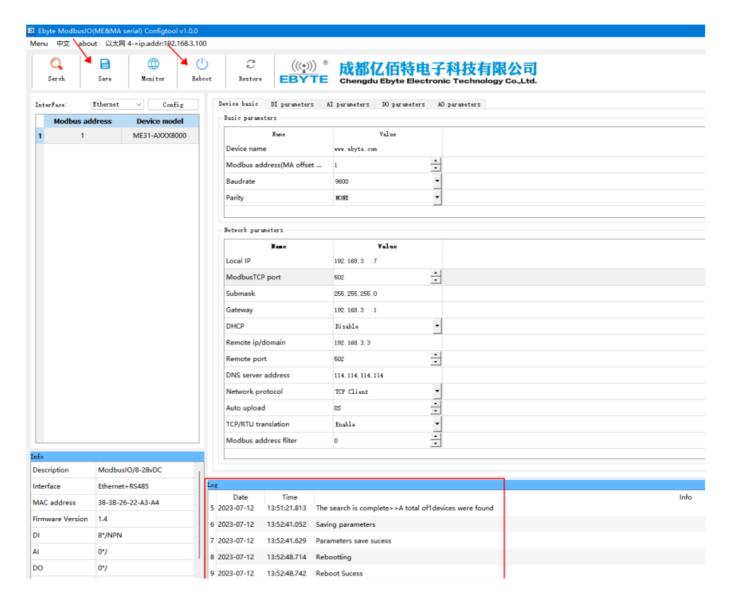
Parameter configuration interface

Step 1: Connect the device refer to "Acquisition and Control".

Step 2: You can configure device parameters, network parameters, DI parameters, AI parameters, DO parameters, and AO parameters (for example: if the device has no AO function, the AO parameters cannot be configured)



Step 3: After configuring the parameters, click Download Parameters. After the prompt message in the log output shows that the parameters are saved successfully, click Restart the device. After the device restarts, the modified parameters will take effect.



Revise history

Version	Revision date	Revision Notes	Maintenance man
1.0	2023-6-6	Initial version	LT
1.1	2024-10-18	Content revision	LT

About us

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Documents / Resources



EBYTE ME31-XXXA0006 Network I/O Networking Module [pdf] User Manual

ME31-XXXA0006, ME31-XXXA0006 Network IO Networking Module, ME31-XXXA0006, Network IO Networking Module, Networking Module

References

- <u>Китайские производители беспроводных модемов Lora, поставщики промышленных терминалов IoT</u>
- © EBYTE Fournisseur de composants électroniques-LoRa/WiFi/Bluetooth/ZigBee, puces IC,Solutions sur mesure
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- User Manual

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