Wireless Modem

User Manual

M31 Series
Distributed IO Host
User Manual

Contents

1. Product description

1.1. Product introduction

The M31 series distributed IO host supports Modbus TCP protocol and Modbus RTU protocol for acquisition control. The device supports simultaneous access by 5 clients and supports function codes 01/02/03/04/05/06/15/16. The product adopts an scalable design in structure. During use, if the user finds that the current device has some functions When the needs cannot be met, you can select the corresponding IO expansion modules according to the missing functions and splice them together to achieve the functions. There is no need to purchase the whole machine. This saves costs and facilitates customers to access the current on-site environment the modules are self-contained. With status diagnosis function, it can monitor the communication status of IO modules in real time; it can support a maximum of 16 IO expansion modules .

1.2. Features

● Supports standard Modbus RTU protocol and Modbus TCP protocol and conversion;
● Support Modbus TCP/ RTU protocol Supports various configuration software/PLC/touch screens;
● RS485 acquisition control I/O;
● The network port collects and controls I/O and supports 5- way host access;
● Support custom Modbus address settings;
● Supports 8 baud rate configurations;
● Support DHCP and static IP;
● Support the installation of positioning holes and guide rails;
● Using distributed IO mode, up to 16 IO expansion modules can be connected ;

1.3. Product model list
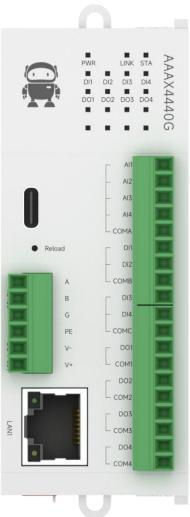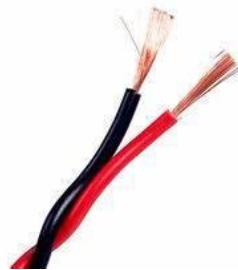
Product number	product specifications
M31-AAAX4440G	4DI+4AI+4DO
M31-AXXX8000G	8DI
M31-XXAX0080G	8DO
M31-AXAX4040G	4DI+4DO
M31-AXXXA000G	16DI
M31-XXAX00A0G	16DO
M31-AXAX8080G	8DI+8DO
M31-XAXX0800G	8AI

2.   Quick to use

[Note] This experiment needs to be conducted with the default factory parameters.
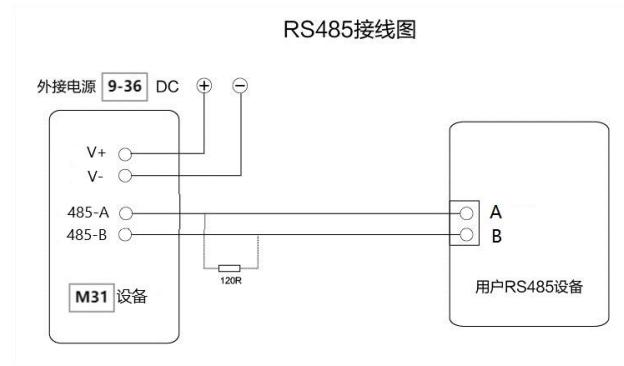
2.1. Equipment preparation

The following table shows the materials required for this test:

M31-AAAX4440G	12V switching power supply	USB to RS485
computer	One network cable	Some cables
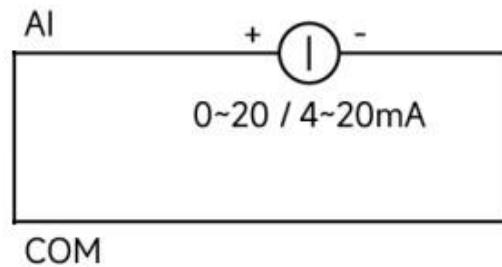
2.2. Device connection

2.2.1. RS485 connection
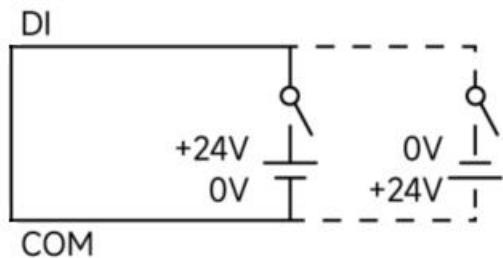
Note: When the 485 bus high-frequency signal is transmitted, the signal wavelength is shorter than the transmission line. The signal will form a reflected wave at the end of the transmission line, interfering with the original signal. Therefore, it is necessary to add a terminal resistor at the end of the transmission line to prevent the signal from being reflected after it reaches the end of the transmission line. The terminal resistor should be the same as the impedance of the communication cable, with a typical value of 120 ohms. Its function is to match the bus impedance and improve the anti-interference and reliability of data communication.

2.2.2. AI connection
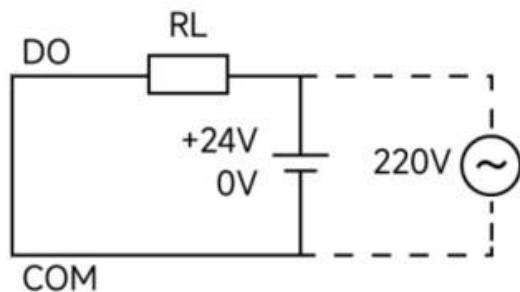
Note: AI is used with the COM side of adjacent wireframe selection.

2.2.3. DI connection

Note: DI only supports 12V ~ 24V input.
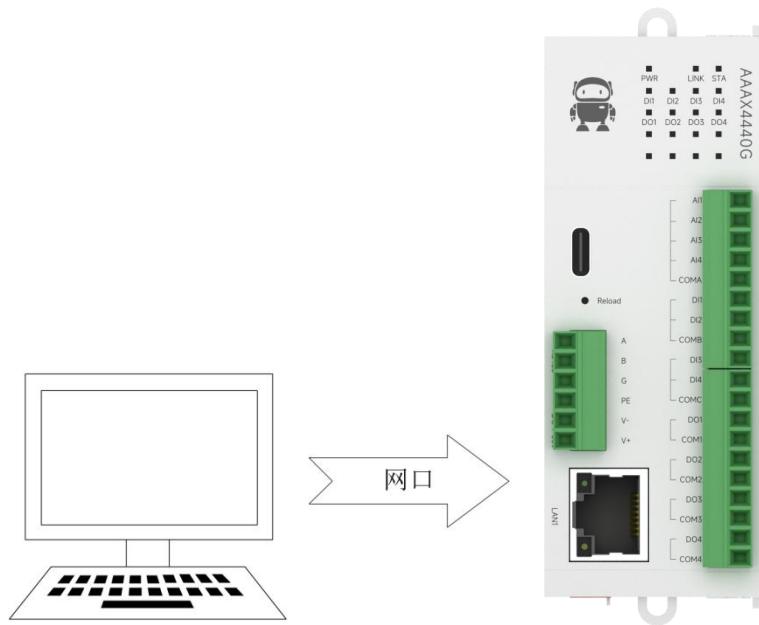
2.2.4. DO connection

Note: 1. A single relay supports a maximum of 5A.
2. The total current of each group (same COM common terminal) supports a maximum of 8A.

2.2.5. Simple to use
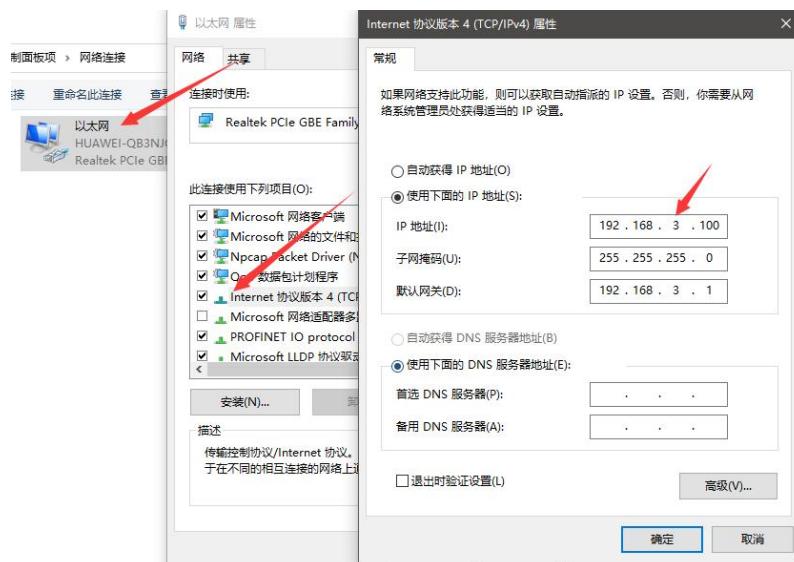
interface of M31-AAAX4440G through USB to RS485, A is connected to A, and B is connected to B.

Networking: Plug the network cable into the RJ45 port and connect to the PC.
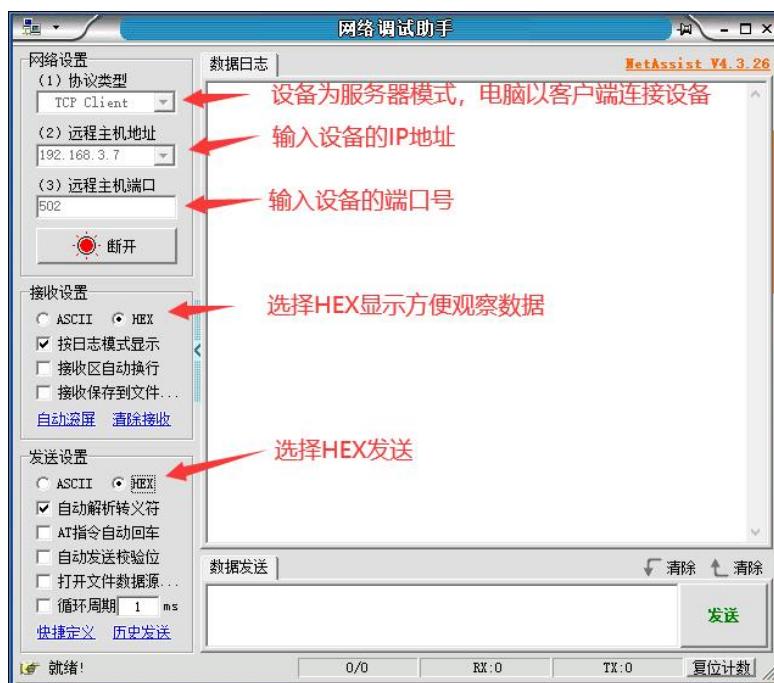
Power supply: Use DC-12V switching power supply (DC 9 ~ 36 V) to power M31-AAAX4440G .

2.3. Parameter configuration

Step 1: Modify the IP address of the computer to be consistent with the device. Here I changed it to 192.168.3.100 to ensure that it is in 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 close the firewall and try again;

Step 2：Open the network assistant, select TCP client, enter the remote host IP 192.168.3.7 (default parameters), enter the port number 502 (default parameters), and select HEX to send.

2.4. Control testing

2.4.1. Modbus TCP control

Use the network assistant to control the first DO output of M31-AAAX4440G .
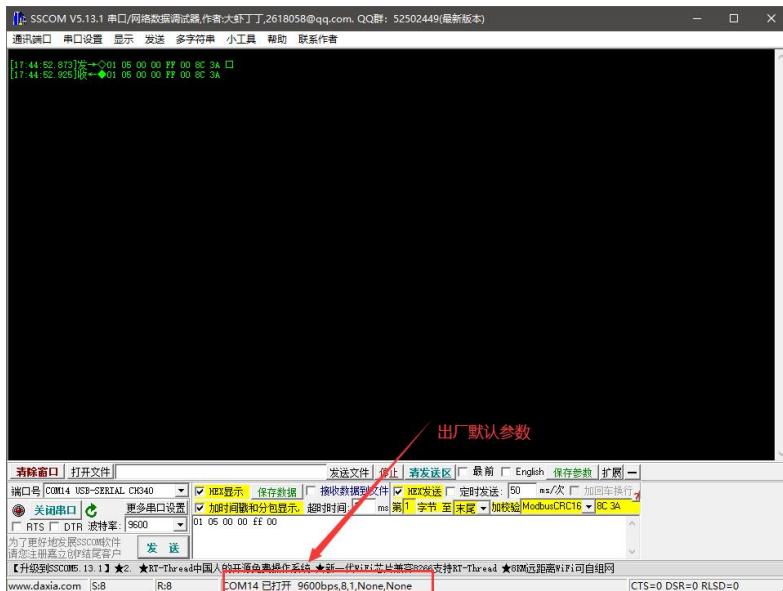
Other functions can be tested through the commands in the following table.

Function (function code)	instruction
Pull in the first line loop (0x05)	01 00 00 00 00 06 01 05 00 00 FF 00
Fully open command (0x0F)	02 00 00 00 00 08 01 0F 00 00 00 04 01 0F
Full close command (0x0F)	02 00 00 00 00 08 01 0F 00 00 00 04 01 00
Read all DI status (0x02)	01 00 00 00 00 06 01 02 00 00 00 0 4
Read all DO status (0x01)	01 00 00 00 00 06 01 01 00 00 00 04

2.4.2. Modbus RTU control

Use the serial port assistant to control the first DO output of M31-AAAX4440G .

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

Function (function code)	instruction
Pull in the first line loop (0x05)	01 05 00 00 FF 00 8C 3A
Fully open command (0x0F)	01 0F 00 00 00 04 01 0F 7E 92
Full close command (0x0F)	01 0F 00 00 00 04 01 00 3E 96
Read all DI status (0x02)	01 02 00 00 00 04 79 C9
Read all DO status (0x01)	01 01 00 00 00 04 3D C9

3. Technical index
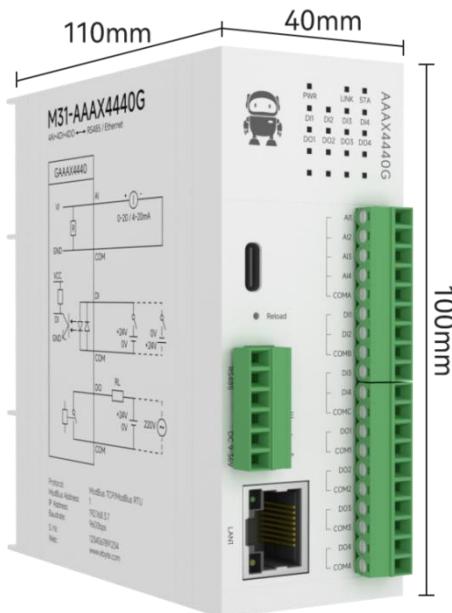
3.1. Parameters

category	name	parameter
power supply	Operating Voltage	DC 9 ～ 36V _
	Power indicator	PWR red LED indicator light
communication	Communication interface	RJ45, RS485
	baud rate	9600bps (optional)
	Protocol	Standard Modbus TCP, Modbus RTU protocol
MODBUS	Device address	be modified through Modbus instructions , host computer and hardware dialing
D I input	input type	NPN, PNP
	Input voltage	12~24V
	Collection frequency	Maximum 2.5 Hz
	Input instructions	DI green LED indicator light
AI input	Collection characteristics	Single-ended input
	input type	0-20mA, 4-20mA
	AI resolution	3‰
	Collection frequency	Maximum 2.5 Hz
	Input instructions	none
DO output	DO output type	Type A relay(Normally open)
	DO output mode	Level output
	Relay contact capacity	5A 30VDC, 5A 250VAC (the maximum supported total current of the same COM common terminal is 8A)
	Output instructions	DO green LED indicator light
other	Product Size	1 10 mm * 40 mm * 100 mm (length*width*height)
	Working temperature and humidity	-40～+85℃, 5%～95%RH (no condensation)
	Storage temperature and humidity	-40～+105℃, 5%～95%RH (no condensation)
	Installation method	Installation of positioning holes and guide rails

3.2. Device default parameters

category	name	parameter
Basic parameters	Modbus address	1
	baud rate	9600bps (9 options available)
	Check digit	None (default), Odd, Even
	data bits	8
	Stop bit	1
	DI filter parameters	6
	AI filter parameters	6
Network parameters	Operating mode	TCP server (up to 5 clients access)
	DHCP	closure
	Gateway address	192.168.3.1
	subnet mask	255.255.255.0
	Local IP	192.168.3.7
	native port	502
	Target IP	192.168.3.3
	target port	502
	DNS server	114.114.114.114
	Native MAC	Determined by chip (fixed)

3.3. Dimensions

3.4. LED indicator light description

M31-AAAX4440G:

Symbol	name	Function/Description
PWR	Power Indicator	Red LED light; on: the system power supply is normal; off: the system power supply is abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: no link; flashing quickly when there is data interaction
STA	Status Indicator	Blue LED light; flashes alternately to indicate normal operation; always on or off indicates abnormal device status.
DI1	DI1 input indicator light	Green LED light; on: DI1 valid input; off: DI1 invalid input
DI2	DI2 input indicator light	Green LED light; on: DI2 valid input; off: DI2 invalid input
DI3	DI3 input indicator light	Green LED light; on: DI3 valid input; off: DI3 invalid input
DI4	DI4 input indicator light	Green LED light; on: DI4 valid input; off: DI4 invalid input
DO1	DO1 output indicator light	Green LED light; on: DO1 relay is closed; off: DO1 relay is open
DO2	DO2 output indicator light	Green LED light; on: DO2 relay is closed; off: DO2 relay is open
DO3	DO3 output indicator light	Green LED light; on: DO3 relay is closed; off: DO3 relay is open
DO4	DO4 output indicator light	Green LED light; on: DO4 relay is closed; off: DO4 relay is off

M31-AXXX8000G:

Symbol	name	Function/Description
PWR	Power Indicator	Red LED light; on: the system power supply is normal; off: the system power supply is abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: no link; flashing quickly when there is data interaction
STA	Status Indicator	Blue LED light; flashes alternately to indicate normal operation; always on or off indicates abnormal device status.
DI1	DI1 input indicator light	Green LED light; on: DI1 valid input; off: DI1 invalid input
DI2	DI2 input indicator light	Green LED light; on: DI2 valid input; off: DI2 invalid input
DI3	DI3 input indicator light	Green LED light; on: DI3 valid input; off: DI3 invalid input
DI4	DI4 input indicator light	Green LED light; on: DI4 valid input; off: DI4 invalid input
DI5	DI5 input indicator light	Green LED light; on: DI5 valid input; off: DI5 invalid input
DI6	DI6 input indicator light	Green LED light; on: DI6 valid input; off: DI6 invalid input
DI7	DI7 input indicator light	Green LED light; on: DI7 valid input; off: DI7 invalid input
DI8	DI8 input indicator light	Green LED light; on: DI8 valid input; off: DI8 invalid input

M31-XXAX0080G:

Symbol	name	Function/Description
PWR	Power Indicator	Red LED light; on: the system power supply is normal; off: the system power supply is abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: no link; flashing quickly when there is data interaction
STA	Status Indicator	Blue LED light; flashes alternately to indicate normal operation; always on or off indicates abnormal device status.
DO1	DO1 output indicator light	Green LED light; on: DO1 relay is closed; off: DO1 relay is open
DO2	DO2 output indicator light	Green LED light; on: DO2 relay is closed; off: DO2 relay is open
DO3	DO3 output indicator light	Green LED light; on: DO3 relay is closed; off: DO3 relay is open
DO4	DO4 output indicator light	Green LED light; on: DO4 relay is closed; off: DO4 relay is off
DO5	DO5 output indicator light	Green LED light; on: DO5 relay is closed; off: DO5 relay is open
DO6	DO6 output indicator light	Green LED light; on: DO6 relay is closed; off: DO6 relay is open
DO7	DO7 output indicator light	Green LED light; on: DO7 relay is closed; off: DO7 relay is off
DO8	DO8 output indicator light	Green LED light; on: DO8 relay is closed; off: DO8 relay is open

M31-AXAX4040G:

Symbol	name	Function/Description
PWR	Power Indicator	Red LED light; on: the system power supply is normal; off: the system power supply is abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: no link; flashing quickly when there is data interaction
STA	Status Indicator	Blue LED light; flashes alternately to indicate normal operation; always on or off indicates abnormal device status.
DI1	DI1 input indicator light	Green LED light; on: DI1 valid input; off: DI1 invalid input
DI2	DI2 input indicator light	Green LED light; on: DI2 valid input; off: DI2 invalid input
DI3	DI3 input indicator light	Green LED light; on: DI3 valid input; off: DI3 invalid input
DI4	DI4 input indicator light	Green LED light; on: DI4 valid input; off: DI4 invalid input
DO1	DO1 output indicator light	Green LED light; on: DO1 relay is closed; off: DO1 relay is open
DO2	DO2 output indicator light	Green LED light; on: DO2 relay is closed; off: DO2 relay is open
DO3	DO3 output indicator light	Green LED light; on: DO3 relay is closed; off: DO3 relay is open
DO4	DO4 output indicator light	Green LED light; on: DO4 relay is closed; off: DO4 relay is off

M31-AXXXA000G:

Symbol	name	Function/Description
PWR	Power Indicator	Red LED light; on: the system power supply is normal; off: the system power supply is abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: no link; flashing quickly when there is data interaction
STA	Status Indicator	Blue LED light; flashes alternately to indicate normal operation; always on or off indicates abnormal device status.
DI1	DI1 input indicator light	Green LED light; on: DI1 valid input; off: DI1 invalid input
DI2	DI2 input indicator light	Green LED light; on: DI2 valid input; off: DI2 invalid input
DI3	DI3 input indicator light	Green LED light; on: DI3 valid input; off: DI3 invalid input
DI4	DI4 input indicator light	Green LED light; on: DI4 valid input; off: DI4 invalid input
DI5	DI5 input indicator light	Green LED light; on: DI5 valid input; off: DI5 invalid input
DI6	DI6 input indicator light	Green LED light; on: DI6 valid input; off: DI6 invalid input
DI7	DI7 input indicator light	Green LED light; on: DI7 valid input; off: DI7 invalid input
DI8	DI8 input indicator light	Green LED light; on: DI8 valid input; off: DI8 invalid input
DI9	DI9 input indicator light	Green LED light; on: DI9 valid input; off: DI9 invalid input
DI10	DI10 input indicator light	Green LED light; on: DI10 valid input; off: DI10 invalid input
DI11	DI11 input indicator light	Green LED light; on: DI11 valid input; off: DI11 invalid input

DI12	DI12 input indicator light	Green LED light; on: DI12 valid input; off: DI12 invalid input
DI13	DI13 input indicator light	Green LED light; on: DI13 valid input; off: DI13 invalid input
DI14	DI14 input indicator light	Green LED light; on: DI14 valid input; off: DI14 invalid input
DI15	DI15 input indicator light	Green LED light; on: DI15 valid input; off: DI15 invalid input
DI16	DI16 input indicator light	Green LED light; on: DI16 valid input; off: DI16 invalid input

M31-XXAX00A0G:

Symbol	name	Function/Description
PWR	Power Indicator	Red LED light; on: the system power supply is normal; off: the system power supply is abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: no link; flashing quickly when there is data interaction
STA	Status Indicator	Blue LED light; flashes alternately to indicate normal operation; always on or off indicates abnormal device status.
DO1	DO1 output indicator light	Green LED light; on: DO1 relay is closed; off: DO1 relay is open
DO2	DO2 output indicator light	Green LED light; on: DO2 relay is closed; off: DO2 relay is open
DO3	DO3 output indicator light	Green LED light; on: DO3 relay is closed; off: DO3 relay is open
DO4	DO4 output indicator light	Green LED light; on: DO4 relay is closed; off: DO4 relay is off
DO5	DO5 output indicator light	Green LED light; on: DO5 relay is closed; off: DO5 relay is open
DO6	DO6 output indicator light	Green LED light; on: DO6 relay is closed; off: DO6 relay is open
DO7	DO7 output indicator light	Green LED light; on: DO7 relay is closed; off: DO7 relay is off
DO8	DO8 output indicator light	Green LED light; on: DO8 relay is closed; off: DO8 relay is open
DO9	DO9 output indicator light	Green LED light; on: DO9 relay is closed; off: DO9 relay is off
DO10	DO10 output indicator light	Green LED light; on: DO10 relay is closed; off: DO10 relay is off
DO11	DO11 output indicator light	Green LED light; on: DO11 relay is closed; off: DO11 relay is open
DO12	DO12 output indicator light	Green LED light; on: DO12 relay is closed; off: DO12 relay is off
DO13	DO13 output indicator light	Green LED light; on: DO13 relay is closed; off: DO13 relay is off
DO14	DO14 output indicator light	Green LED light; on: DO14 relay is closed; off: DO14 relay is off
DO15	DO15 output indicator light	Green LED light; on: DO15 relay is closed; off: DO15 relay is off
DO16	DO16 output indicator light	Green LED light; on: DO16 relay is closed; off: DO16 relay is off

M31-AXAX8080G:

Symbol	name	Function/Description
PWR	Power Indicator	Red LED light; on: the system power supply is normal; off: the system power supply is abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: no link; flashing quickly when there is data interaction
STA	Status Indicator	Blue LED light; flashes alternately to indicate normal operation; always on or off indicates abnormal device status.
DI1	DI1 input indicator light	Green LED light; on: DI1 valid input; off: DI1 invalid input
DI2	DI2 input indicator light	Green LED light; on: DI2 valid input; off: DI2 invalid input
DI3	DI3 input indicator light	Green LED light; on: DI3 valid input; off: DI3 invalid input
DI4	DI4 input indicator light	Green LED light; on: DI4 valid input; off: DI4 invalid input
DI5	DI5 input indicator light	Green LED light; on: DI5 valid input; off: DI5 invalid input
DI6	DI6 input indicator light	Green LED light; on: DI6 valid input; off: DI6 invalid input
DI7	DI7 input indicator light	Green LED light; on: DI7 valid input; off: DI7 invalid input
DI8	DI8 input indicator light	Green LED light; on: DI8 valid input; off: DI8 invalid input
DO1	DO1 output indicator light	Green LED light; on: DO1 relay is closed; off: DO1 relay is open
DO2	DO2 output indicator light	Green LED light; on: DO2 relay is closed; off: DO2 relay is open
DO3	DO3 output indicator light	Green LED light; on: DO3 relay is closed; off: DO3 relay is open
DO4	DO4 output indicator light	Green LED light; on: DO4 relay is closed; off: DO4 relay is off
DO5	DO5 output indicator light	Green LED light; on: DO5 relay is closed; off: DO5 relay is open
DO6	DO6 output indicator light	Green LED light; on: DO6 relay is closed; off: DO6 relay is open
DO7	DO7 output indicator light	Green LED light; on: DO7 relay is closed; off: DO7 relay is off
DO8	DO8 output indicator light	Green LED light; on: DO8 relay is closed; off: DO8 relay is open

M31-XAXX0800G:

Symbol	name	Function/Description
PWR	Power Indicator	Red LED light; on: the system power supply is normal; off: the system power supply is abnormal
LINK	Link indicator	Yellow LED light; on: there is a link; off: no link; flashing quickly when there is data interaction
STA	Status Indicator	Blue LED light; flashes alternately to indicate normal operation; always on or off indicates abnormal device status.

3.5. Port and button description

M31-AAAX4440G:

Symbol	name	Function/Description
AI1	AI1 analog input	AI1 analog input interface, used in conjunction with COMA
AI2	AI2 analog input	AI2 analog input interface, used in conjunction with COMA
AI3	AI3 analog input	AI3 analog input interface, used in conjunction with COMA
AI4	AI4 analog input	AI4 analog input interface, used in conjunction with COMA
COMA	AI analog input common terminal	AI1-AI4 share the COMA public terminal
DI1	DI1 switch input	DI1 switch input interface, used in conjunction with COMB
DI2	DI2 switch input	DI2 switch input interface, used in conjunction with COMB
COMB	DI switch input common terminal	DI1-DI2 share the COMB common terminal
DI3	DI3 switch input	DI3 switch input interface, used in conjunction with COMC
DI4	DI4 switch input	DI4 switching input interface, used in conjunction with COMC
COMC	DI switch input common terminal	DI3-DI4 share the COMC common port
DO1	DO1 switch output	DO1 switching output interface, used in conjunction with COM1
COM1	COM terminal of DO1	COM terminal of DO1
DO2	DO2 switch output	DO2 switch output interface, used in conjunction with COM2
COM	COM terminal of DO2	COM terminal of DO2
DO3	DO3 switch output	DO3 switching output interface, used in conjunction with COM3
COM3	COM terminal of DO3	COM terminal of DO3
DO4	DO4 switch output	DO4 switching output interface, used in conjunction with COM4
COM4	COM terminal of DO4	COM terminal of DO4
Reload	Factory reset/auto-negotiation	Press and hold for 5-10 seconds to restore factory settings; double-click within 2 seconds to automatically negotiate the expansion module
A(RS485)	RS485 A interface	RS485 A interface
B(RS485)	RS485 B interface	RS485 B interface
G(RS485)	RS485G interface	RS485G interface
PE	ground	ground
V-(DC9-36V)	Negative pole of power supply	DC (9-36V) power supply negative interface
V+（DC9-36V）	Positive pole of power supply	DC (9-36V) power supply positive interface
LAN1	Network port	Standard RJ45 network cable interface

M31-AXXX8000G:

Symbol	name	Function/Description
DI1	DI1 switch input	DI1 switch input interface, used in conjunction with COM1
COM1	COM terminal of DI1	COM side of DI1
DI2	DI2 switch input	DI2 switch input interface, used in conjunction with COM2
COM2	COM side of DI2	COM2 end of DI2
DI3	DI3 switch input	DI3 switch input interface, used in conjunction with COM3
COM3	COM side of DI3	COM side of DI3
DI4	DI4 switch input	DI4 switch input interface, used in conjunction with COM4
COM4	COM side of DI4	COM side of DI4
DI5	DI5 switch input	DI1 switch input interface, used in conjunction with COM5
COM5	COM side of DI5	COM side of DI5
DI6	DI6 switch input	DI6 switch input interface, used in conjunction with COM6
COM6	COM side of DI6	COM side of DI6
DI7	DI7 switch input	DI7 switch input interface, used in conjunction with COM7
COM7	COM side of DI7	COM side of DI7
DI8	DI8 switch input	DI8 switch input interface, used in conjunction with COM8
COM8	COM side of DI8	COM side of DI8
VO+	Power output positive pole	The positive pole of the power supply output is consistent with the power supply voltage of the device.
VO+	Power output positive pole	The positive pole of the power supply output is consistent with the power supply voltage of the device.
VO-	Power output negative pole	The negative pole of the power supply output is the same as the power supply voltage of the device.
Reload	Factory reset/auto-negotiation	Press and hold for 5-10 seconds to restore factory settings; double-click within 2 seconds to automatically negotiate the expansion module
A(RS485)	RS485 A interface	RS485 A interface
B(RS485)	RS485 B interface	RS485 B interface
G(RS485)	RS485G interface	RS485G interface
PE	ground	ground
V-(DC9-36 V)	Negative pole of power supply	DC (9-36V) power supply negative interface
V+ （DC9-36 V）	Positive pole of power supply	DC (9-36V) power supply positive interface
LAN1	Network port	Standard RJ45 network cable interface

M31-XXAX0080G:

Symbol	name	Function/Description
DO1	DO1 switch output	DO1 switching output interface, used in conjunction with COM1
COM1	COM terminal of DO1	COM terminal of DO1
DO2	DO2 switch output	DO2 switch output interface, used in conjunction with COM2
COM2	COM terminal of DO2	COM terminal of DO2
DO3	DO3 switch output	DO3 switching output interface, used in conjunction with COM3
COM3	COM terminal of DO3	COM terminal of DO3
DO4	DO4 switch output	DO4 switching output interface, used in conjunction with COM4
COM4	COM terminal of DO4	COM terminal of DO4
DO5	DO5 switch output	DO5 switching output interface, used in conjunction with COM5
COM5	COM terminal of DO5	COM terminal of DO5
DO6	DO6 switch output	DO6 switching output interface, used in conjunction with COM6
COM6	COM terminal of DO6	COM terminal of DO6
DO7	DO7 switch output	DO7 switching output interface, used in conjunction with COM7
COM7	COM terminal of DO7	COM terminal of DO7
DO8	DO8 switch output	DO8 switching output interface, used in conjunction with COM8
COM8	COM terminal of DO8	COM terminal of DO8
VO+	Power output positive pole	The positive pole of the power supply output is the same as the power supply voltage of the device.
VO+	Power output positive pole	The positive pole of the power supply output is the same as the power supply voltage of the device.
VO-	Power output negative pole	The negative pole of the power supply output is the same as the power supply voltage of the device.
Reload	Factory reset/auto-negotiation	Press and hold for 5-10 seconds to restore factory settings; double-click within 2 seconds to automatically negotiate the expansion module
A(RS485)	RS485 A interface	RS485 A interface
B(RS485)	RS485 B interface	RS485 B interface
G(RS485)	RS485G interface	RS485G interface
PE	ground	ground
V-(DC9-36V)	Negative pole of power supply	DC (9-36V) power supply negative interface
V+ （DC9-36V）	Positive pole of power supply	DC (9-36V) power supply positive interface
LAN1	Network port	Standard RJ45 network cable interface

M31-AXAX4040G:

Symbol	name	Function/Description
DI1	DI1 switch input	DI1 switch input interface, used in conjunction with COM1
COM1	COM side of DI1	COM terminal of DI1
DI2	DI2 switch input	DI2 switch input interface, used in conjunction with COM2
COM2	COM side of DI2	COM2 end of DI2
DI3	DI3 switch input	DI3 switch input interface, used in conjunction with COM3
COM3	COM side of DI3	COM side of DI3
DI4	DI4 switch input	DI4 switch input interface, used in conjunction with COM4
COM4	COM side of DI4	COM side of DI4
DO1	DO1 switch output	DO1 switching output interface, used in conjunction with COM1
COM1	COM terminal of DO1	COM terminal of DO1
DO2	DO2 switch output	DO2 switch output interface, used in conjunction with COM2
COM2	COM terminal of DO2	COM terminal of DO2
DO3	DO3 switch output	DO3 switching output interface, used in conjunction with COM3
COM3	COM terminal of DO3	COM terminal of DO3
DO4	DO4 switch output	DO4 switching output interface, used in conjunction with COM4
COM4	COM terminal of DO4	COM terminal of DO4
VO+	Power output positive pole	The positive pole of the power supply output is consistent with the power supply voltage of the device.
VO+	Power output positive pole	The positive pole of the power supply output is consistent with the power supply voltage of the device.
VO-	Power output negative pole	The negative pole of the power supply output is the same as the power supply voltage of the device.
Reload	Factory reset/auto-negotiation	Press and hold for 5-10 seconds to restore factory settings; double-click within 2 seconds to automatically negotiate the expansion module
A(RS485)	RS485 A interface	RS485 A interface
B(RS485)	RS485 B interface	RS485 B interface
G(RS485)	RS485G interface	RS485G interface
PE	ground	ground
V-(DC9-36V)	Negative pole of power supply	DC (9-36V) power supply negative interface
V+ （DC9-36V）	Positive pole of power supply	DC (9-36V) power supply positive interface
LAN1	Network port	Standard RJ45 network cable interface

M31-AXXXA000G:

Symbol	name	Function/Description
DO1	DI1 switch input	DI1 switch input interface, used in conjunction with COMA
DI2	DI2 switch input	DI2 switch input interface, used in conjunction with COMA
DI3	DI3 switch input	DI3 switch input interface, used in conjunction with COMA
DI4	DI4 switch input	DI4 switch input interface, used in conjunction with COMA
COMA	DI switch input common terminal	DI1-DI4 share the COMA common port
DI5	DI5 switch input	DI5 switch input interface, used in conjunction with COMB
DI6	DI6 switch input	DI6 switch input interface, used in conjunction with COMB
DI7	DI7 switch input	DI7 switch input interface, used in conjunction with COMB
DI8	DI8 switch input	DI8 switch input interface, used in conjunction with COMB
COMB	DI switch input common terminal	DI5-DI8 share the COMB common terminal
DI9	DI9 switch input	DI9 switch input interface, used in conjunction with COMC
DI10	DI10 switch input	DI10 switch input interface, used in conjunction with COMC
DI11	DI11 switch input	DI11 switching input interface, used in conjunction with COMC
DI12	DI12 switch input	DI12 switch input interface, used in conjunction with COMC
DI13	DI13 switch input	DI13 switch input interface, used in conjunction with COMC
DI14	DI14 switch input	DI14 switch input interface, used in conjunction with COMC
DI15	DI15 switch input	DI15 switch input interface, used in conjunction with COMC
DI16	DI16 switch input	DI16 switch input interface, used in conjunction with COMC
COMB	DI switch input common terminal	DI9-DI16 share the COMC common terminal
Reload	Factory reset/auto-negotiation	Press and hold for 5-10 seconds to restore factory settings; double-click within 2 seconds to automatically negotiate the expansion module
A(RS485)	RS485 A interface	RS485 A interface
B(RS485)	RS485 B interface	RS485 B interface
G(RS485)	RS485G interface	RS485G interface
PE	ground	ground
V-(DC9-36V)	Negative pole of power supply	DC (9-36V) power supply negative interface
V+（DC9-36V）	Positive pole of power supply	DC (9-36V) power supply positive interface
LAN1	Network port	Standard RJ45 network cable interface

M31-XXAX00A0G:

| Symbol	name	Function/Description
DO1	DO1 switch output	DO1 switching output interface, used in conjunction with COMA
DO2	DO2 switch output	DO2 switching output interface, used in conjunction with COMA
DO3	DO3 switch output	DO3 switching output interface, used in conjunction with COMA
DO4	DO4 switch output	DO4 switching output interface, used in conjunction with COMA
COMA	COM side of DO	DO1-DO4 share COMA for use together
DO5	DO5 switch output	DO5 switching output interface, used in conjunction with COMB
DO6	DO6 switch output	DO6 switching output interface, used in conjunction with COMB
DO7	DO7 switch output	DO7 switching output interface, used in conjunction with COMB
DO8	DO8 switch output	DO8 switching output interface, used in conjunction with COMB
COMB	COM side of DO	DO5-DO8 share COMB for use together
DO9	DO9 switch output	DO9 switching output interface, used in conjunction with COMC
DO10	DO10 switch output	DO10 switching output interface, used in conjunction with COMC
DO11	DO11 switch output	DO11 switching output interface, used in conjunction with COMC
DO12	DO12 switch output	DO12 switching output interface, used in conjunction with COMC
DO13	DO13 switch output	DO13 switching output interface, used in conjunction with COMC
DO14	DO14 switch output	DO14 switching output interface, used in conjunction with COMC
DO15	DO15 switch output	DO15 switching output interface, used in conjunction with COMC
DO16	DO16 switch output	DO16 switching output interface, used in conjunction with COMC
COMC	COM side of DO	DO9-DO16 share COMC for use together
Reload	Factory reset/auto-negotiation	Press and hold for 5-10 seconds to restore factory settings; double-click within 2 seconds to automatically negotiate the expansion module
A(RS485)	RS485 A interface	RS485 A interface
B(RS485)	RS485 B interface	RS485 B interface
G(RS485)	RS485G interface	RS485G interface
PE	ground	ground
V-(DC9-36V)	Negative pole of power supply	DC (9-36V) power supply negative interface
V+（DC9-36V）	Positive pole of power supply	DC (9-36V) power supply positive interface
LAN1	Network port	Standard RJ45 network cable interface

M31-AXAX8080G:

Symbol	name	Function/Description
DO1	DI1 switch input	DI1 switch input interface, used in conjunction with COMA
DI2	DI2 switch input	DI2 switch input interface, used in conjunction with COMA
DI3	DI3 switch input	DI3 switch input interface, used in conjunction with COMA
DI4	DI4 switch input	DI4 switch input interface, used in conjunction with COMA
COMA	DI switch input common terminal	DI1-DI4 share the COMA common port
DI5	DI5 switch input	DI5 switch input interface, used in conjunction with COMB
DI6	DI6 switch input	DI6 switch input interface, used in conjunction with COMB
DI7	DI7 switch input	DI7 switch input interface, used in conjunction with COMB
DI8	DI8 switch input	DI8 switch input interface, used in conjunction with COMB
COMB	DI switch input common terminal	DI5-DI8 share the COMB public terminal
DO1	DO1 switch output	DO1 switching output interface, used in conjunction with COMC
DO2	DO2 switch output	DO2 switching output interface, used in conjunction with COMC
DO3	DO3 switch output	DO3 switching output interface, used in conjunction with COMC
DO4	DO4 switch output	DO4 switching output interface, used in conjunction with COMC
DO5	DO5 switch output	DO5 switching output interface, used in conjunction with COMC
DO6	DO6 switch output	DO6 switching output interface, used in conjunction with COMC
DO7	DO7 switch output	DO7 switching output interface, used in conjunction with COMC
DO8	DO8 switch output	DO8 switching output interface, used in conjunction with COMC
COMC	COM side of DO	DO1-DO8 share COMC and use together
Reload	Factory reset/auto-negotiation	Press and hold for 5-10 seconds to restore factory settings; double-click within 2 seconds to automatically negotiate the expansion module
A(RS485)	RS485 A interface	RS485 A interface
B(RS485)	RS485 B interface	RS485 B interface
G(RS485)	RS485G interface	RS485G interface
PE	ground	ground
V-(DC9-36V)	Negative pole of power supply	DC (9-36V) power supply negative interface
V+（DC9-36V）	Positive pole of power supply	DC (9-36V) power supply positive interface
LAN1	Network port	Standard RJ45 network cable interface

M31-XAXX0800G:

Symbol	name	Function/Description
AI1	AI1 analog input	AI1 analog input interface, used in conjunction with COM1
COM1	COM terminal of AI1	COM terminal of AI1
AI2	AI2 analog input	AI2 analog input interface, used in conjunction with COM2
COM2	COM terminal of AI2	COM terminal of AI2
AI3	AI3 analog input	AI3 analog input interface, used in conjunction with COM3
COM3	COM terminal of AI3	COM terminal of AI3
AI4	AI4 analog input	AI4 analog input interface, used in conjunction with COM4
COM4	COM terminal of AI4	COM terminal of AI4
AI5	AI5 analog input	AI5 analog input interface, used in conjunction with COM5
COM5	AI5 COM terminal	AI5 COM terminal
AI6	AI6 analog input	AI6 analog input interface, used in conjunction with COM6
COM6	COM terminal of AI6	COM terminal of AI6
AI7	AI7 analog input	AI7 analog input interface, used in conjunction with COM7
COM7	COM terminal of AI7	COM terminal of AI7
AI8	AI8 analog input	AI8 analog input interface, used in conjunction with COM8
COM8	AI8 COM terminal	AI8 COM terminal
VO+	Power output positive pole	The positive pole of the power supply output is consistent with the power supply voltage of the device.
VO+	Power output positive pole	The positive pole of the power supply output is consistent with the power supply voltage of the device.
VO-	Power output negative pole	The negative pole of the power supply output is the same as the power supply voltage of the device.
Reload	Factory reset/auto-negotiation	Press and hold for 5-10 seconds to restore factory settings; double-click within 2 seconds to automatically negotiate the expansion module
A(RS485)	RS485 A interface	RS485 A interface
B(RS485)	RS485 B interface	RS485 B interface
G(RS485)	RS485G interface	RS485G interface
PE	ground	ground
V-(DC9-36V)	Negative pole of power supply	DC (9-36V) power supply negative interface
V+（DC9-36V）	Positive pole of power supply	DC (9-36V) power supply positive interface
LAN1	Network port	Standard RJ45 network cable interface

3.6. DIP switch

DIP switch diagram:

Device address composition: hardware address + software offset address

The default device address is: 1 (hardware address 0 + software address 1 = device address 1).

Device address setting range: 1~255.

Hardware address: realized by DIP switch (4 bits) DIP setting (factory default is 0).

Software address: Implemented by setting the "offset address" in the configuration tool software (factory default is 1).

Example:

If the hardware address is set to 5 and the software address is set to 113, the device address is 118.

4. Product function introduction

4.1. IO expansion

The M31 series distributed IO host adopts an scalable structure design. The IO expansion module can be expanded with the M31 series host . You only need to connect the IO expansion module to the host slot, and then slide the lock down. , the host and the IO expansion module can be firmly connected together .

The specific operations are as follows:

● First, ensure that the host is not powered on, and then connect the IO expansion module to the host, as shown in the following figure:

● the IO expansion module is connected, power on the host, then plug in the network cable, and use the auto-negotiation function through the host computer (or double-click the Reload button on the device within two seconds to auto-negotiate) . After the negotiation is successful, the IO expansion The module can be operated through the serial port or network port on the host computer .

4.2. DI input

4.2.1. Input filtering

When the switch input DI collects signals, it needs to be maintained for multiple sampling periods before confirmation. The filter parameters can be set in the range of 1 to 16 (default is 6 sampling periods, 6*1kHz).

It can be configured through instructions and the host computer.

4.3. DO output

The output mode of the relay .

4.4. AI input

4.4.1. AI scope

Analog input AI measurement current signal, acquisition range 0~20mA or 4~20mA, accuracy 3‰, resolution 12 bits. Use single-ended input, sampling frequency 10Hz, input impedance 100Ω.

Set the sampling range of all AI channels, valid values are 1 and 0 (default 0).

Configured as 0: means 0~20mA

Configured as 1: indicates 4~20mA

[Note] AI configuration instructions

(1) The AI sampling range of each channel can be set . When the AI channel sampling range is configured as 4~20mA sampling, if the current signal is lower than 3.5 mA , it will be displayed as 0, and if it is higher than 3.5 mA and lower than 4mA, it will be displayed as 4 . There are no conversion restrictions for signals greater than 20mA, but they cannot exceed 25mA (exceeding 25mA will risk equipment damage).

The starting address of the AI channel sampling range parameter is 0x0DA C , the register type is a holding register, and the function codes are 0x06 and 0x10. When writing the AI channel sampling range parameter, if the written parameter value is not within the range of 0 to 1, the closest value will be automatically written. If the writing sampling range parameter is 2, the device will use 1 as the sampling range parameter. And Modbus does not return error instructions.

4.4.2. AI input engineering quantity integer value and engineering quantity

floating point value

There are two ways to read the current signal size collected by the device:

(1) Read the AI engineering quantity shaping value and directly convert it to the input current. The starting address of the AI engineering quantity integer value register is 0x00 00 , the register type is input register, and the read function code is 0x04. The value returned by this method is one register representing one channel, and the value read is 0~ 20000 . The method for calculating the current size is 0~20000 corresponding to 0~ 20mA . Right now:

Current = engineering value / 1000 (mA)

(2) Read the floating point value of the AI engineering quantity and use the IEE754 conversion tool to convert the hexadecimal data into a floating point number to obtain the input current. The starting address of the AI engineering quantity integer value register is 0x0 3E8 , the register type is input register, and the read function code is 0x04. This method returns two registers representing 1 channel.

4.4.3. AI filter parameters

The filter parameters of the AI channel can be set, the valid values are 1-16, and the default value is 6.

Filter parameter description:

(1) All AI channels share a filter parameter. The higher the parameter value, the more stable the output value and the slower the response.

(2) The AI channel filter parameter address is 0x0DA 2 , and the register type is a holding register. Function codes 0x06, 0x10.

(3) When writing AI filter parameters, if the written parameter value is not within the range of 1 to 16, the closest value will be automatically written. If the written filter parameter is 0, the device will use 1 as the filter parameter, and Modbus does not return error instructions.

4.5. Module information

4.5.1. Basic parameters

(1) Modbus address: The device address defaults to 1, supports modifying the address, and the address range is 1-247.

(2) Serial port baud rate: 8 options are available: 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400bps.

(3) Serial port check digit: NONE, ODD, EVEN optional.

(4) DI filter parameters: The filter parameters can be set in the range of 1 to 16 (default is 6 sampling periods, 6*1kHz)

(5) AI filter parameters: The filter parameters of the AI channel can be set. The valid values are 1-16, and the default value is 6.

4.5.2. Network parameters

Unless otherwise specified: the following network-related parameters default to IPv4-related parameters.

(1) Working mode: Switch the working mode of the module. Server: The device is equivalent to a server, waiting for the user's client to connect. The maximum number of connections is 4 . Client: The device actively connects to the target IP and port set by the user.

(2) DHCP: Set the method for the device to obtain IP: static or dynamic.

(3) Gateway address: gateway.

(4) Subnet mask: address mask, readable and writable.

(5) Local IP: Device IP address, readable and writable.

(6) Local port : The port number of the device, which is readable and writable.

(7) Target IP: When the device is working in client mode, the target IP or domain name to which the device is connected.

(8) Target port: When the device works in client mode, the target port to which the device connects.

(9) DNS server: The device is in client mode and resolves the server domain name.

(10) Network Modbus protocol: Modbus TCP and Modbus RTU protocols can be selected for use on the network port.

4.6. MODBUS parameter configuration

4.6.1. DI register list

DI status register:

name	access location	Register address	register area	Related function codes	Default state
DI 1	Host	0x0000	zone 1	R:0x02	0
DI 2	Host	0x000 1	zone 1	R:0x02	0
DI 3	Host	0x000 2	zone 1	R:0x02	0
DI 4	Host	0x000 3	zone 1	R:0x02	0
DI 5	IO expansion module	0x000 4	zone 1	R:0x02	0
...	IO expansion module	...	zone 1	R:0x02	0

DI filter register:

name	Register address	Register type	Data range/description	Related function codes	Default state
DI channel filter parameters	0x0DA3	holding register	All DI channel filter parameters, Valid values 1-16	R:0x03 W: 0x06,0x10	6

4.6.2. DO register list

DI status register:

name	access location	Register address	register area	Related function codes	Default state
D O1	Host	0x0000	Zone 0	R:0x01 W: 0x05,0x0F	0
D O2	Host	0x000 1	Zone 0	R:0x01 W: 0x05,0x0F	0
D O3	Host	0x000 2	Zone 0	R:0x01 W: 0x05,0x0F	0
D O4	Host	0x000 3	Zone 0	R:0x01 W: 0x05,0x0F	0
D O5	IO expansion module	0x000 4	Zone 0	R:0x01 W: 0x05,0x0F	0
...	IO expansion module	...	Zone 0	R:0x01 W: 0x05,0x0F	0

4.6.3. AI register list

AI engineering quantity shaping value register:

name	access location	Register address	register area	Data range/description	Related function codes	Default state
A I 1	Host	0x0000	Zone 3	Project quantity 0-20000 represents 0-20ma 2-byte integer, unit (uA)	R: 0x0 4	0
A I 2	Host	0x000 1	Zone 3	Project quantity 0-20000 represents 0-20ma 2-byte integer, unit (uA)	R: 0x0 4	0
A I 3	Host	0x000 2	Zone 3	Project quantity 0-20000 represents 0-20ma 2-byte integer, unit (uA)	R: 0x0 4	0
A I 4	Host	0x000 3	Zone 3	Project quantity 0-20000 represents 0-20ma 2-byte integer, unit (uA)	R: 0x0 4	0
A I 5	IO expansion module	0x000 4	Zone 3	Project quantity 0-20000 represents 0-20ma 2-byte integer, unit (uA)	R: 0x0 4	0
...	IO expansion module	...	Zone 3	Project quantity 0-20000 represents 0-20ma 2-byte integer, unit (uA)	R: 0x0 4	0

AI floating point value register:

name	access location	Register address	register area	Data range/description	Related function codes	Default state
A I 1	Host	0x0 3E8	Zone 3	Analog signal floating point value, 4-byte floating point number, unit (mA)	R: 0x0 4	0
A I 2	Host	0x0 3EA	Zone 3	Analog signal floating point value, 4-byte floating point number, unit (mA))	R: 0x0 4	0
A I 3	Host	0x0 3EC	Zone 3	Analog signal floating point value, 4-byte floating point number, unit (mA)	R: 0x0 4	0
A I 4	Host	0x0 3EE	Zone 3	Analog signal floating point value, 4-byte floating point number, unit (mA)	R: 0x0 4	0
A I 5	IO expansion	0x0 3F0	Zone 3	Analog signal floating point value, 4-byte floating point number, unit	R: 0x0 4	0

	module			(mA)		
...	IO expansion module	...	Zone 3	Analog signal floating point value, 4-byte floating point number, unit (mA)	R: 0x0 4	0

AI filter register:

name	Register address	register area	Data range/description	Related function codes	Default state
A I channel filter parameters	0x0DA 2	Zone 4	All AI channel filter parameters, Valid values 1-16	R:0x03 W: 0x06,0x10	6

AI sampling range register:

name	access location	Register address	register area	Data range/description	Related function codes	Default state
AI1 sampling range	Host	0x0DA C	Zone 4	Valid values are 0 and 1, 0 means 0-20mA, 1 means 4-20mA	R:0x03 W: 0x06,0x10	0
AI2 sampling range	Host	0x0DA D	Zone 4	Valid values are 0 and 1, 0 means 0-20mA, 1 means 4-20mA	R:0x03 W: 0x06,0x10	0
AI3 sampling range	Host	0x0DAE _	Zone 4	Valid values are 0 and 1, 0 means 0-20mA, 1 means 4-20mA	R:0x03 W: 0x06,0x10	0
AI4 sampling range	Host	0x0DA F	Zone 4	Valid values are 0 and 1, 0 means 0-20mA, 1 means 4-20mA	R:0x03 W: 0x06,0x10	0
AI5 sampling range	IO expansion module	0x0D B0	Zone 4	Valid values are 0 and 1, 0 means 0-20mA, 1 means 4-20mA	R:0x03 W: 0x06,0x10	0
...	IO expansion module	...	Zone 4	Valid values are 0 and 1, 0 means 0-20mA, 1 means 4-20mA	R:0x03 W: 0x06,0x10	0

4.6.4. Module related registers

Register function	Register address	register area	number	Data range/remarks	Related function codes
Serial baud rate code	0X7530	Zone 4	1	1:2400 2:4800 3:9600 4:19200 5:38400 6:57600 7:115200 8:230400	R:0x03 W: 0x06,0x10
Serial port check digit	0X7531	Zone 4	1	0:NONE 1:ODD 2: EVEN	R:0x03 W: 0x06,0x10
Network working mode	0X7532	Zone 4	1	0:TCPS 1:TCPC 2:UDPS 3:UDPC	R:0x03 W: 0x06,0x10
DHCP	0X7533	Zone 4	1	0: off, 1: on	R:0x03 W: 0x06,0x10
Device MAC address	0X7534	Zone 4	3		R:0x03
Local IP address	0X7537	Zone 4	2		R:0x03 W: 0x06,0x10
subnet mask	0X7539	Zone 4	2		R:0x03 W: 0x06,0x10
Gateway address	0X753B	Zone 4	2		R:0x03 W: 0x06,0x10
DNS server address	0X753D	Zone 4	2		R:0x03 W: 0x06,0x10
native port	0X7541	Zone 4	1	0-65535	R:0x03 W: 0x06,0x10
Target IP/domain name	0X7542	Zone 4	64	Maximum 128-byte string, domain name is also represented as a string	R:0x03 W: 0x06,0x10
target server port	0X7582	Zone 4	1	1-65535	R:0x03 W: 0x06,0x10
Network Modbus protocol	0X7583	Zone 4	1	When the network data is TCP data, this item needs to be set to 1. When the network data is RTU data, this item needs to be set to 0.	R:0x03 W: 0x06,0x10

|					
Address negotiation write register protection	0X7584	Zone 4	1	This write-protected register needs to be opened before sending the address negotiation command. Writing 1: means turning on the write-protected register	R:0x03 W: 0x06,0x10
address negotiation register	0X7585	Zone 4	1	Write 1: On behalf of starting address negotiation	R:0x03 W: 0x06,0x10
Current negotiation status register	0X7586	Zone 4	1	Check whether the current negotiation is completed, 0: The representative has not yet completed the negotiation. 1: Representative negotiation completed	R:0x03
Device exception code	0X758 7	Zone 4	1	Check the exception code of the current device. If it is 0, it means there is no exception, 1 means the slave does not reply, and 2 means the expansion module sequence is wrong (this error will directly cause the device to not work properly)	R:0x03
Extension module exception label	0X758 8	Zone 4	2	Check which expansion module is currently unresponsive. There are two 32-bit registers in total, which represent the expansion modules in sequence. If the bit on the corresponding serial number is 1, it means that there is an exception in this expansion module.	R:0x03
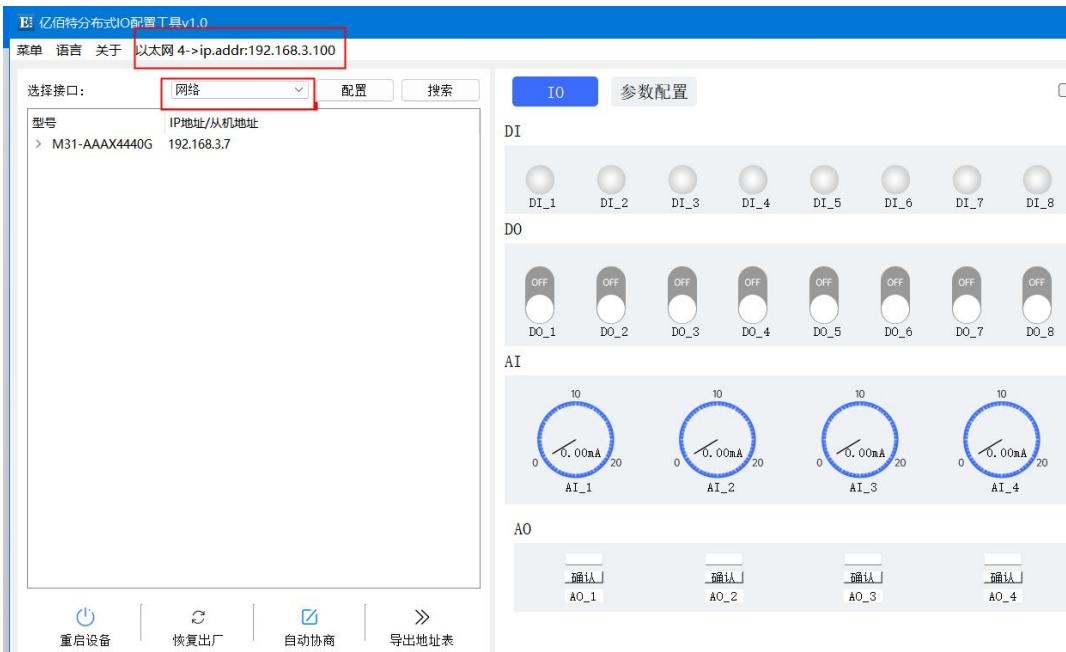
Note: According to the usage requirements, some software (such as KingView) requires the register address +1 to operate the register.

5. Host computer
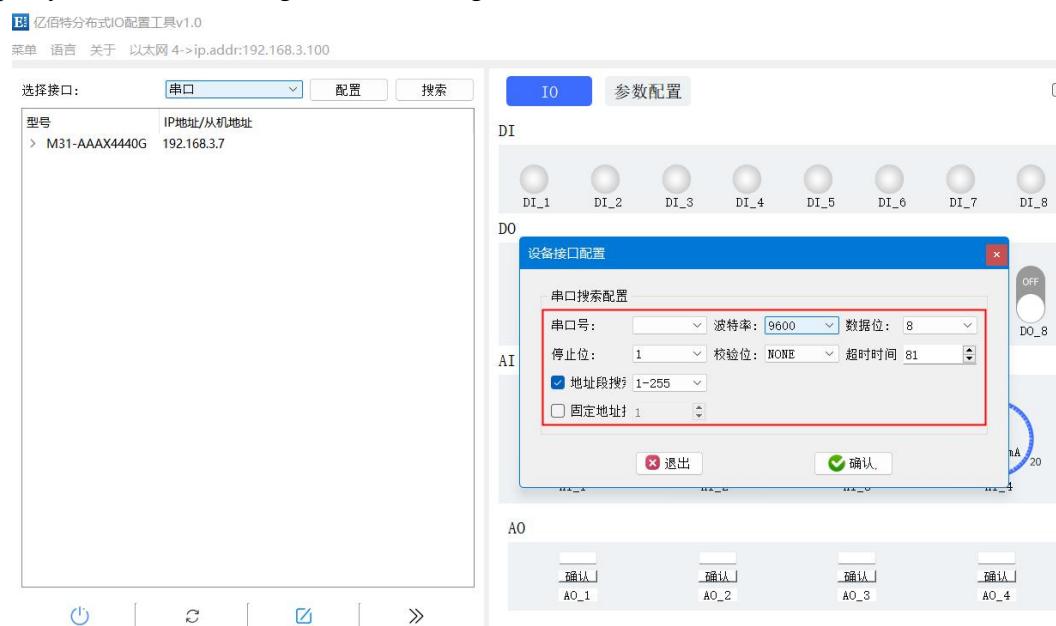
5.1. Connect and control

1. Host computer connection equipment

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

(2) If you select a serial port, you must select the corresponding serial port number, the same baud rate, data bits, stop bits, parity bits and address segment search range as the device, and then search.

2.Select the corresponding device to operate the corresponding IO.

5.2. Parameter configuration

1. For connecting devices, refer to " Connection and Control"

2. You can configure the basic parameters and network parameters of the device

3. After configuring the parameters, click Save Parameters. In the log output, you will see a prompt message indicating that the parameters have been saved successfully. The device will automatically restart . After the restart is completed, the modified parameters will take effect.

6. Revision History

Version	Revision date	Revision Notes	Maintenance man
1.0	2023-9-27	initial version	LT

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