Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual



【8DO】

MA01 -XXCX0080

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1.Product introduction

MA01 -XXCX0080 is a supporting configuration software or PLC, through the serial port (RS485) issued instructions to control the 8 relay switch output (DO), to achieve remote control function of the serial I/O networking module (also known as "remote IO").

Features

- Support for modbus RTU protocols;
- Support for all types of configuration software / PLC / touch screen;
- RS485 controls the IO;
- DC 8to28V power supply;
- 8 switch output DO(relay);
- Switch output(DO)supports level mode, pulse mode;
- Communication Baud Rate 1200to115200(default 9600),supports custom settings;
- Support for 1to247 substations,5-bit dial switch can be set 1to31 address code, greater than 31 can be set by software.



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2.Quick start

If there is a problem during use, click on the official website link: https://www.ebyte.com/product-class.aspx

2.1 Use preparation

Serial I/O networked devices ("IO devices") are required to prepare computers, converters, power supplies, screwdrivers and other related accessories before use. Here's how it works:

Table 2-1-1 Preparation List

serial number	Devices	quantity
1	IO devices	1
2	USB re-serial converter	1
3	Configure the tool software	1
4	Computer	1
5	Power adapter(12V/1A).	1
6	Screwdriver (one word SL 2).	1
7	Signal generator (or sensor)	1

2.2 Equipment wiring

Note: When performing wiring operations on the equipment, never work with the power on to avoid equipment damage and potential safety accidents.

2.2.1 Power wiring

Power supply, powered by DC 8to28V, or DC 12V or 24V.

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Figure 2-2-1 Power wiring diagram

2.2.2 Communication Wiring RS485

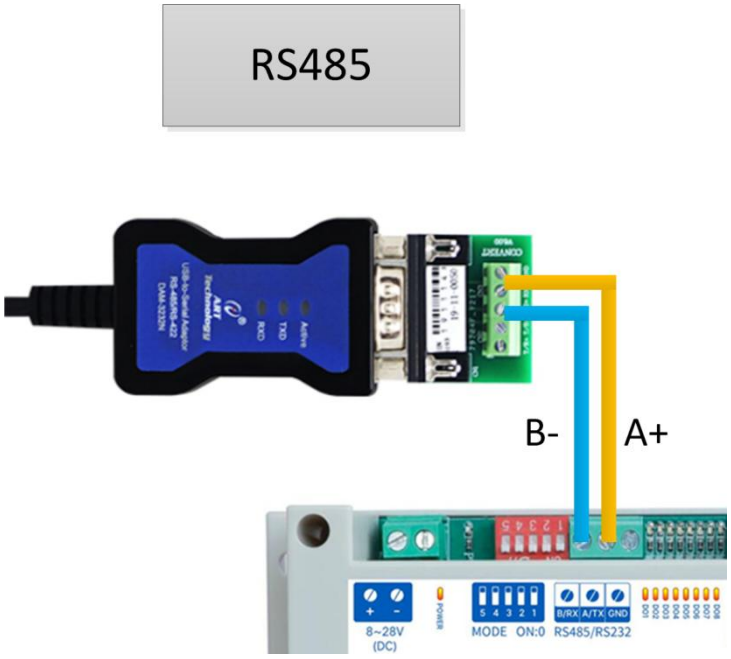


Figure 2-2-2 Communication RS485 Wiring Diagram

2.2.3 Overall wiring diagram

（1）After power is on on the device, the power LED(POWER)is on and the power supply to the device is ok.
（2）Analog input AI wiring, as shown by connecting the signal generator to the analog input AI port.
（3）Switch output DO wiring, as shown by connecting the load to the switch output DO port.

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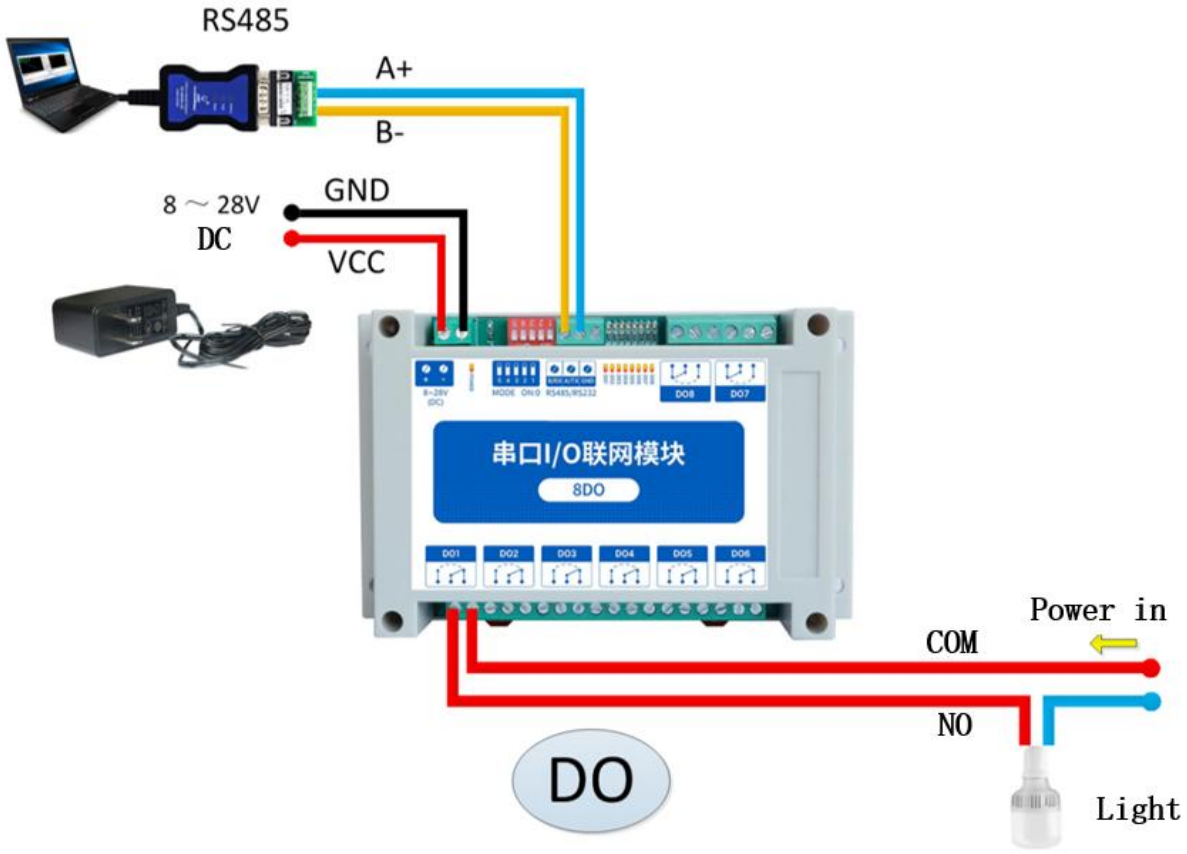


Figure 2-2-3 Overall wiring diagram

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2.3 Software settings

2.3.1 Device connection



Figure 2-3-1 Software Interface

How to do this:

（1）Open the serial port, find the corresponding device port number, Baud rate default 9600,click "Open serial port."

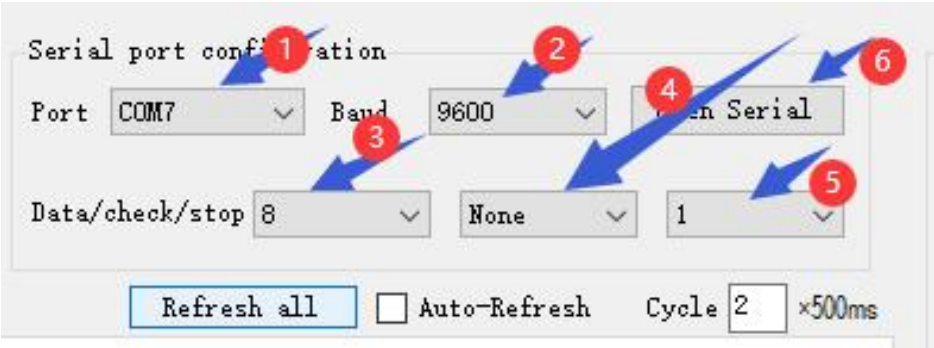


Figure 2-3-2 Opens the serial port

（2）In the device window, click "Search device" and the log window on the right starts refreshing the search information. After the device section of the device window shows the connected device, click the "Stop Search" menu. Then select the device click, the connection is successful.

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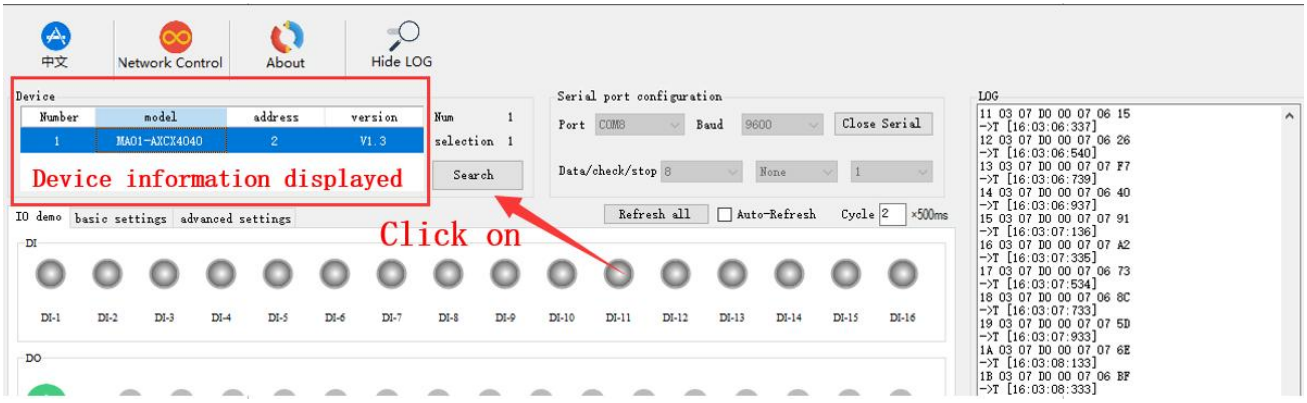


Figure 2-3-3 Connecting devices

2.3.2 Device testing

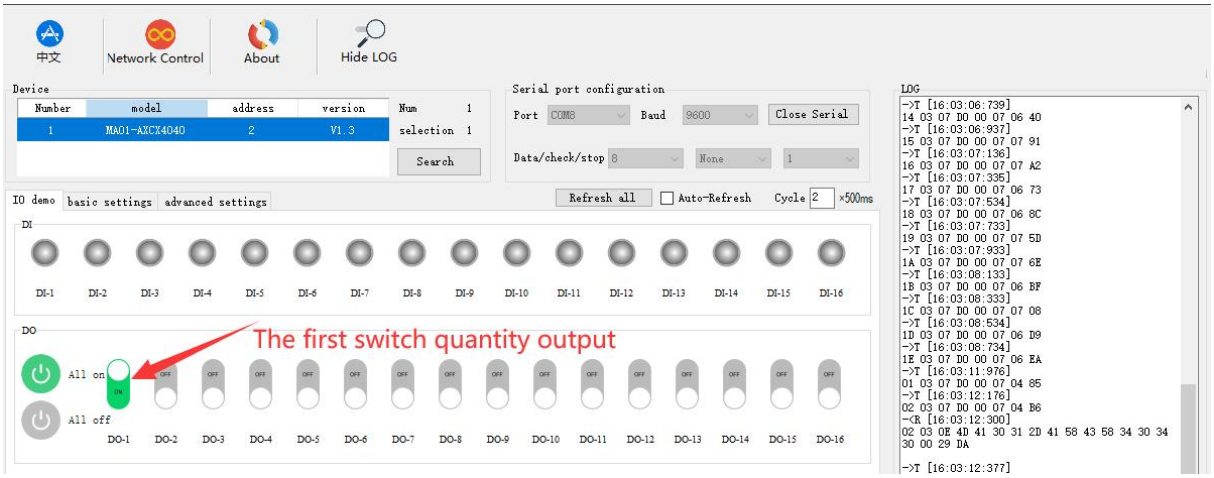


Figure 2-3-4 Device Testing

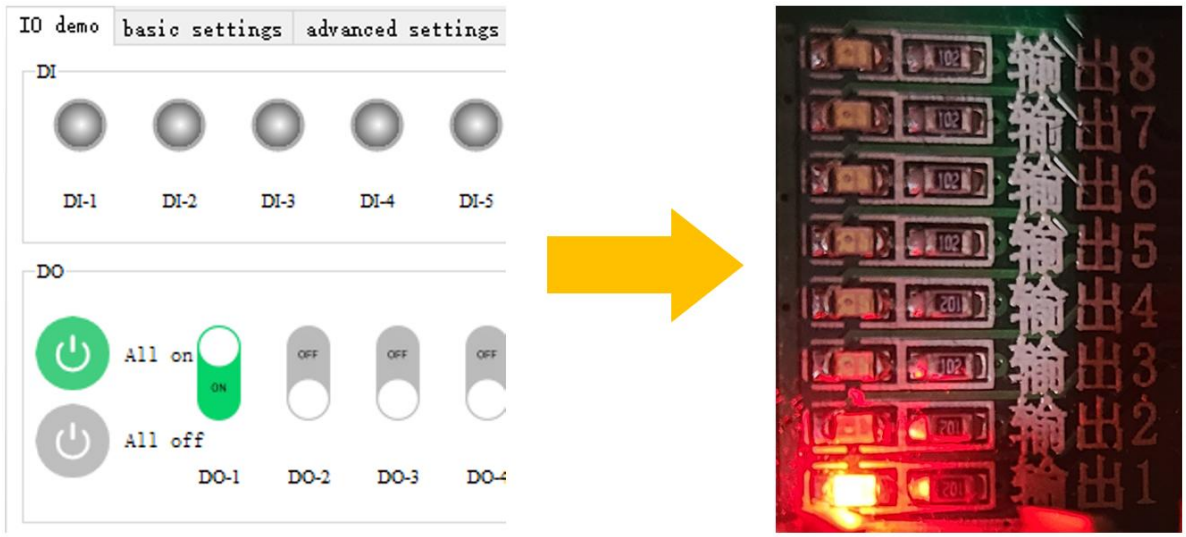


Figure 2-3-5 Actual test results

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3.Product overview

3.1 Product specifications

Table 3-1-1 Product Specifications

Product model	specification	The switch quantity is entered DI	The analog input AI	Switch volume output DO	RS485	RS232
MA01-AXCX4020	4DI+2DO	4 way	—	2 way	●	×
MA02-AXCX4020		4 way	—	2 way	×	●
MA01-XACX0420	4AI+2DO	—	4 way	2 way	●	×
MA02-XACX0420		—	4 way	2 way	×	●
MA01-AACX2220	2DI+2AI+2DO	2 way	2 way	2 way	●	×
MA02-AACX2220		2 way	2 way	2 way	×	●
MA01-AXCX4040	4DI+4DO	4 way	—	4 way	●	×
MA02-AXCX4040		4 way	—	4 way	×	●
MA01-XACX0440	4AI+4DO	—	4 way	4 way	●	×
MA02-XACX0440		—	4 way	4 way	×	●
MA01-AACX2240	2DI+2AI+4DO	2 way	2 way	4 way	●	×
MA02-AACX2240		2 way	2 way	4 way	×	●
MA01-XXCX0080	8TH	—	—	8 way	●	×
MA02-XXCX0080		—	—	8 way	×	●

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3.2 Technical parameters

Table 3-2-1 Technical Parameters

category	name	parameter
power supply	Operating voltage	DC 8 to 28V
	Operating current	50mA @12V
	The power supply indicates	Green LED indication
Serial	Communication interface	RS485
	baud rate	1200 to 115200 bps (default 9600 bps)
	The data bit	8 (Fixed).
	Check bit	No checks, parity, parity (default no checks)
	Stop bit	1 (fixed).
	Communication protocol	Modbus RTU protocol
	The device address	1 to 247(default address 32:Software1, hardware 31).
DO output	The number of DO roads	8 way
	The DO output type	Type C relay (normally open and normally closed)
	DO output mode	Level mode, pulse mode
	Relay contact capacity	30V/10A☆250V/10A
	The output indicates	Red LED indication
other	Product size	145 mm x 90 mm x 40 mm (W.W.W. High)
	Product weight	250g ± 5g
	Working temperature and humidity	-40 to 85 degrees C, 5% to 95% RH (no condensation)
	Store temperature and humidity	-60 to 125 degrees C, 5% to 95% RH (no condensation)
	How to install it	Positioning hole installation, rail installation

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3.3 Port Description



Figure 3-3-1 Interface Diagram

Table 3-3-1 Port Feature Table

numbering	Pins	illustrate	remark
1	+	Power supply . .	It is recommended that RVV 2 x 0.75 wire
2	-	Ground -	
3	B/RX	RS485 corresponds to B	It is recommended that RVSP 3 x 0.5 wire
4	A/TX	RS485 corresponds to A	
5	GND	The signal is grounded	
6	DO1	Switch output channel 1	Relays have normal open and normal closed ends
7	DO2	Switch output channel 2	
8	DO3	Switch output channel 3	
9	DO4	Switch output channel 4	
10	DO5	Switch output channel 5	
11	DO6	Switch output channel 6	
12	DO7	Switch output channel 7	
13	DO8	Switch output channel 8	

3.4 Dimensions

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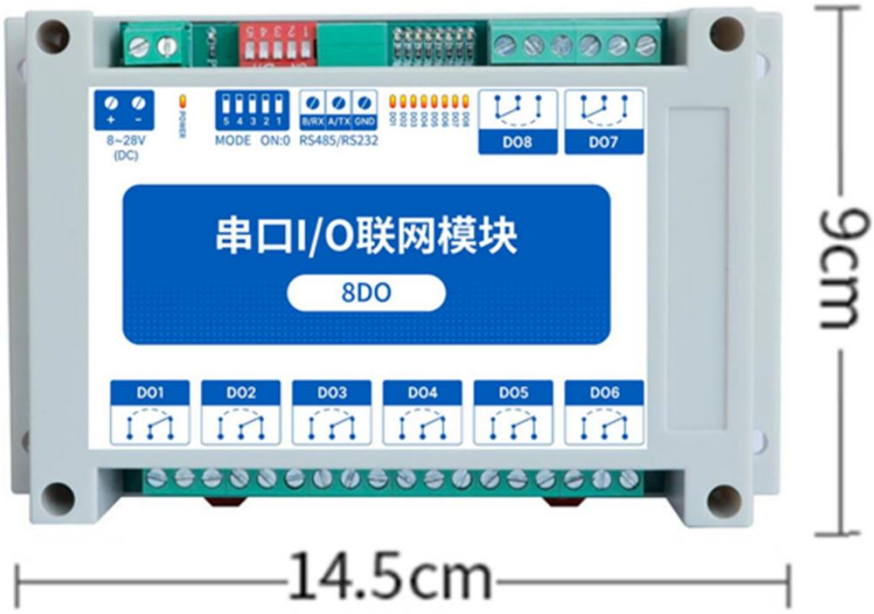


Figure 3-4-1 Dimensions

3.5 How to install

The device supports positioning hole installation or railing.

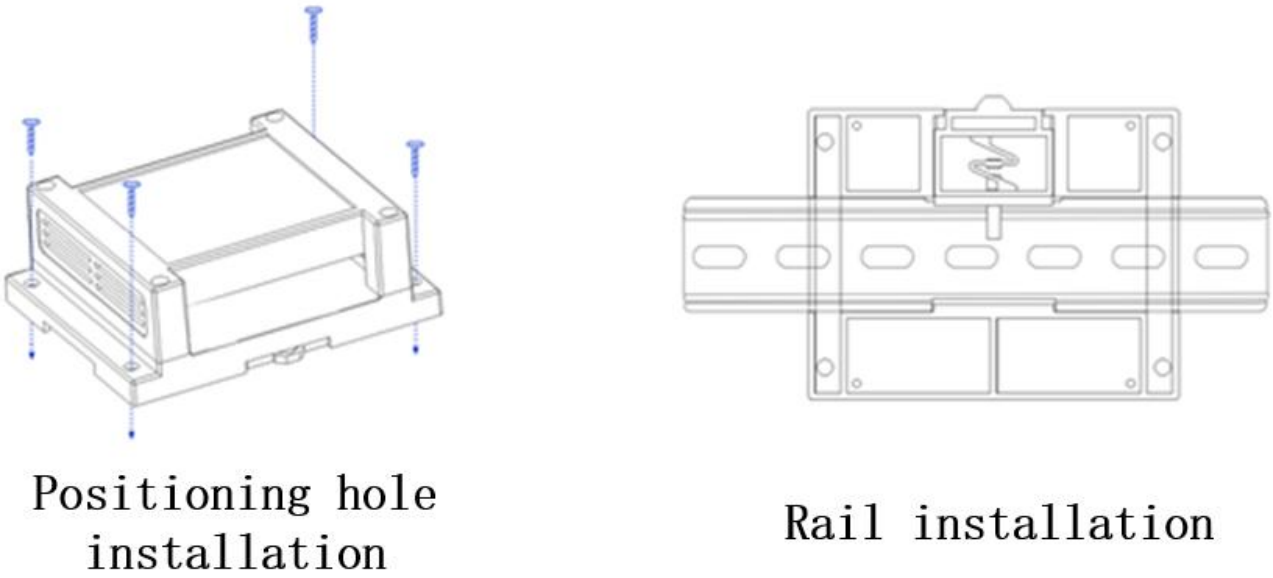


Figure 3-5-1 How to install

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4.Product functions

4.1 Switch output DO

4.1.1 Switch output DO description

Switch output DOwith level mode, pulse mode, follow mode (follow DIonly). With the Type C relay output (normally on and normally closed), the single output supports a maximum load (contact capacity) of 30V/10A or 250V/10A.

Each DO output is designed with an output indicator (red LED indication) indicating that the output port is off. When the LED is on, it means that the relay is sucked (normally on, normally closed and disconnected); When the LED is off, the relay is not sucked (normally open, normally closed).

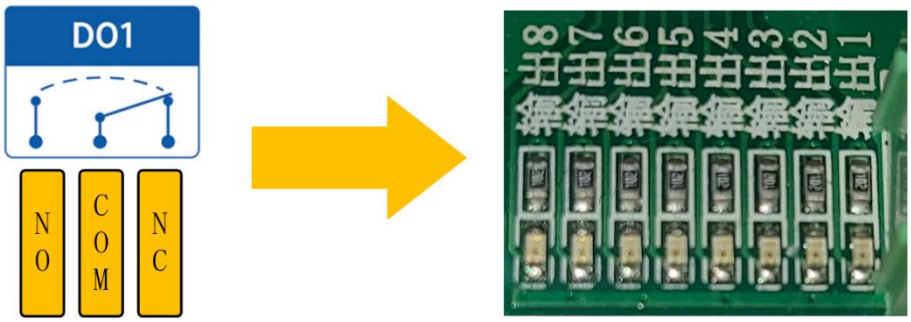


Figure 4-1-1 Switches output DO interface

4.2.2 Switch output DO mode settings

(1) level mode

Depending on the level set by the user, the switching characteristics of the level mode are similar to those of the self-locking switch.

(2)pulse mode

When the switch output DO is on, the switch output DO switches off automatically after the set pulse width time (in ms) is maintained. Pulse width settings range from 50to65535(default 50).

(3) Follow the mode

After the user sets the follow mode, set the following input after. The switch output DO side is consistent with the DI input.

Note: Multiple switch output DO ends can be set to follow one DI input, not one switch output DO side to follow multiple DI inputs.

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4.2 Device address

4.2.1 Device address

Device address composition: Hardware address and software offset address

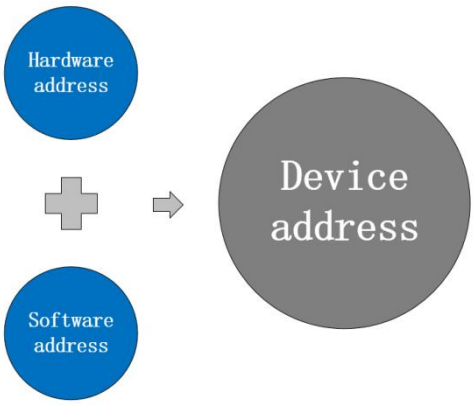


Figure 4-2-1 Device Address

The device address defaultsto: 32(hardware address 31 plus software address 1 - device address 32).
Device address settings range:1to247.
Hardware address: Implemented by dial switch(5-bit) dial setting (factory default is 31).
Software address: Implemented by the configuration tool software setting Offset Address (factory default is 1).
Example:
If the hardware address is set to 5and the software address is set to 113,the device addressis 118.

4.2.2 Hardware address (dial switch).

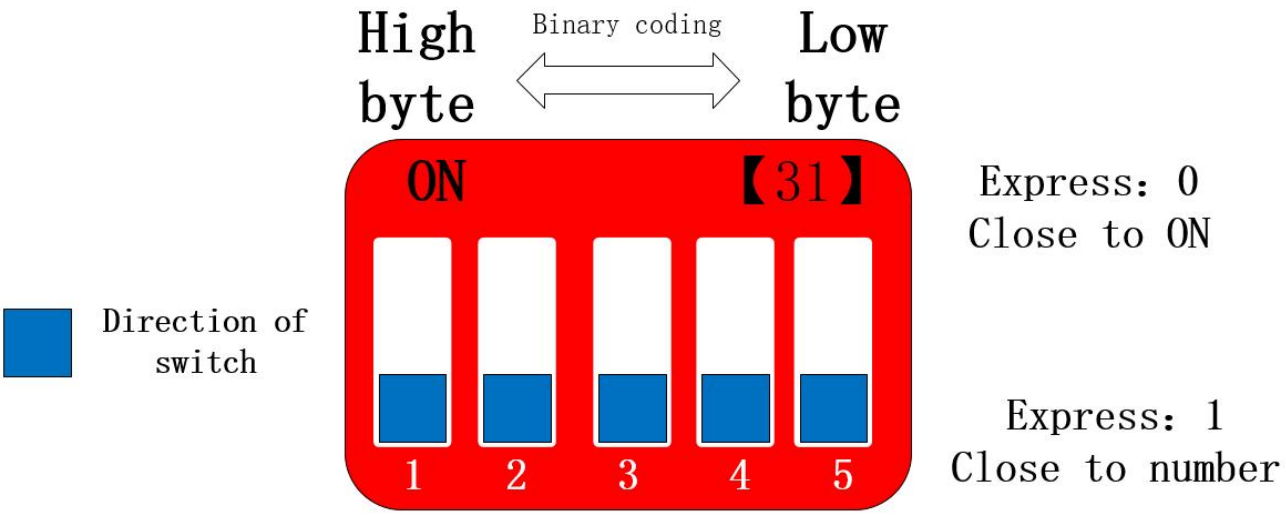


Figure 4-2-2 Hardware Address (Dial Switch)

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Hardware address: The dial switch switches different hardware addresses, and binary represents a 5-digit dial switch. The "5" direction indicates the low bit and the "1" direction indicates the high bit. Hardware address range adjustable range 0 to 31.

Hardware Address Dial Settings Description:

Example 1: Set hardware address 0, binary encoding.

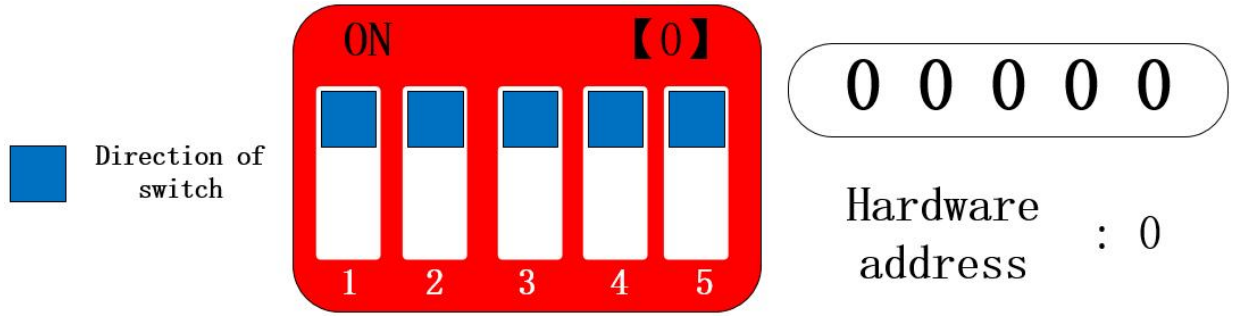


Figure 4-2-3 Hardware Address 0

Example 2: Set hardware address 8, binary encoding.

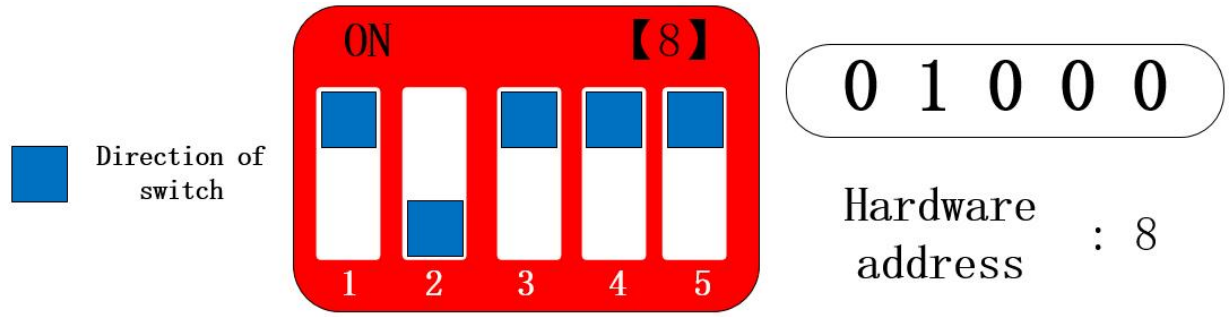


Figure 4-2-4 Hardware Address 8

Example 3: Set hardware address 31, binary encoding.

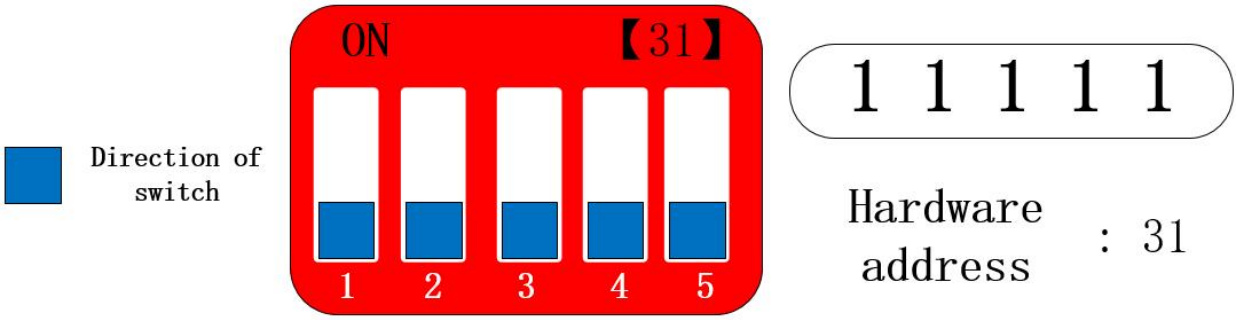


Figure 4-2-5 Hardware Address 31

Hardware address, can be customized according to the actual situation, the setting method as shown in the above example.

If multiple devices are required to connect to a single RS485 bus, they can hang on up to 32 devices (just set up a hardware address) via a hardware address.

If you need more than 32 devices to connect to a single RS485 bus, you need to set up a software address (offset address) to connect up to 247 devices to a single bus.

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After you change the address, you need to power down restart before the new address set is effective.

4.2.3 Software address (offset address).

Software address: Users can make different settings depending on the scene. The software address setting range is 1 to2 24(device address: 1 to 247), and the software address defaults to 1.

After you change the address, you need to power down restart before the new address set is effective.

Changing the software address is done through the configuration tool software, as shown in the figure:



Figure 4-2-7 Software Address (Offset Address)

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5.Port wiring

5.1 Switch output DO port wiring

5.1.1 Output direct control load (small power device within 1kW).

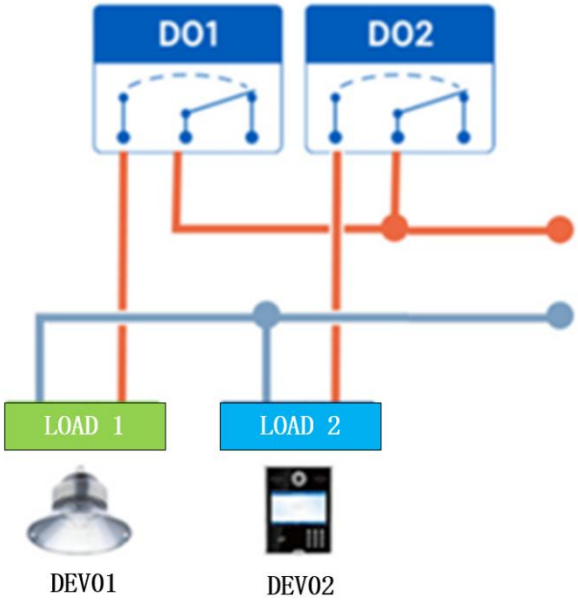


Figure 5-1-1 Output Direct Control Load Wiring Diagram

5.2.2 Output Control Contactor (Contactor Control High Power 220V Device).

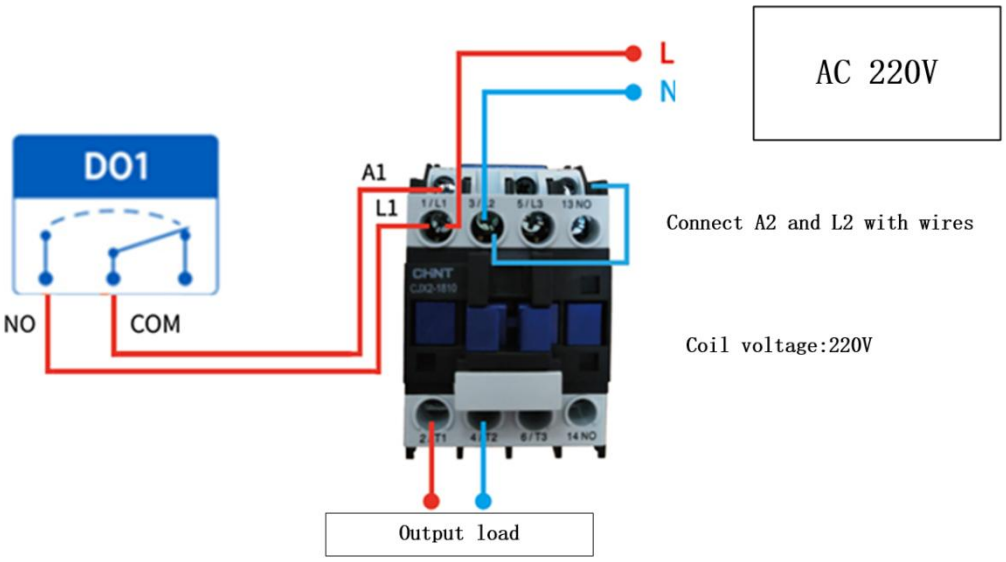


Figure 5-2-2 Output Control Contactor Wiring Diagram

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Note: The figure above takes the contactor coil voltage AC 220V as an example, **the coil voltage may be different from contactor.**

5.2.3 Output Control Contactor (Contactor Control High Power 380V Device).

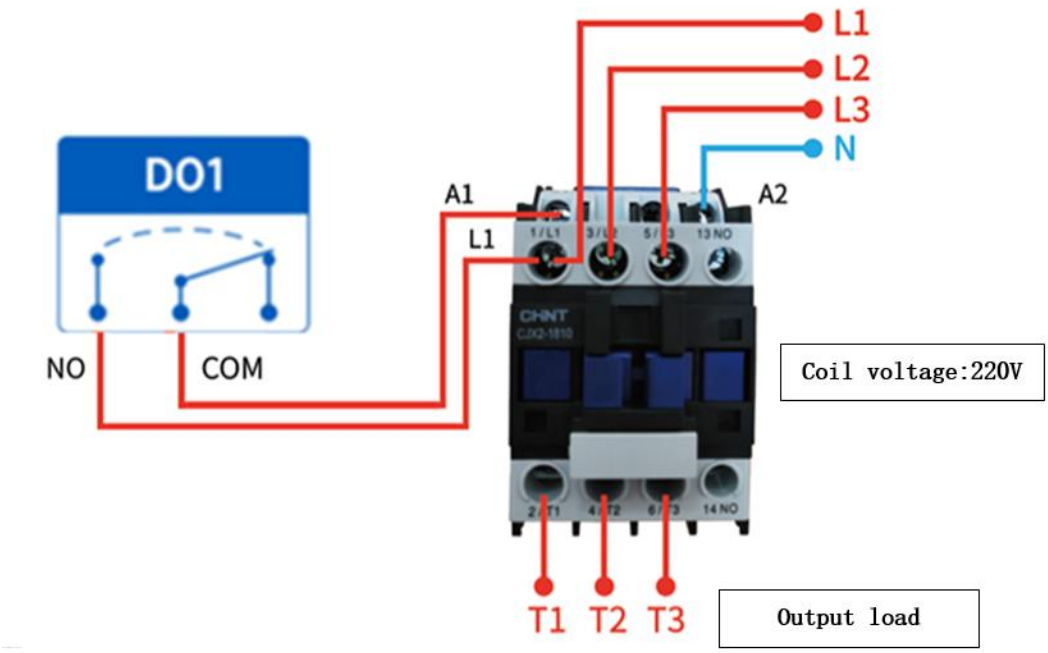


Figure 5-2-3 Output Control Contactor Wiring Diagram

Note: The figure above takes the contactor coil voltage AC 220V as an example, **the coil voltage may be different from contactor.**

6.The use of software

6.1 Software installation

The configuration tool software is driver-free and is ready to use by double-clicking directly on the .exe file open.



Figure 6-1-1 Software Installation File

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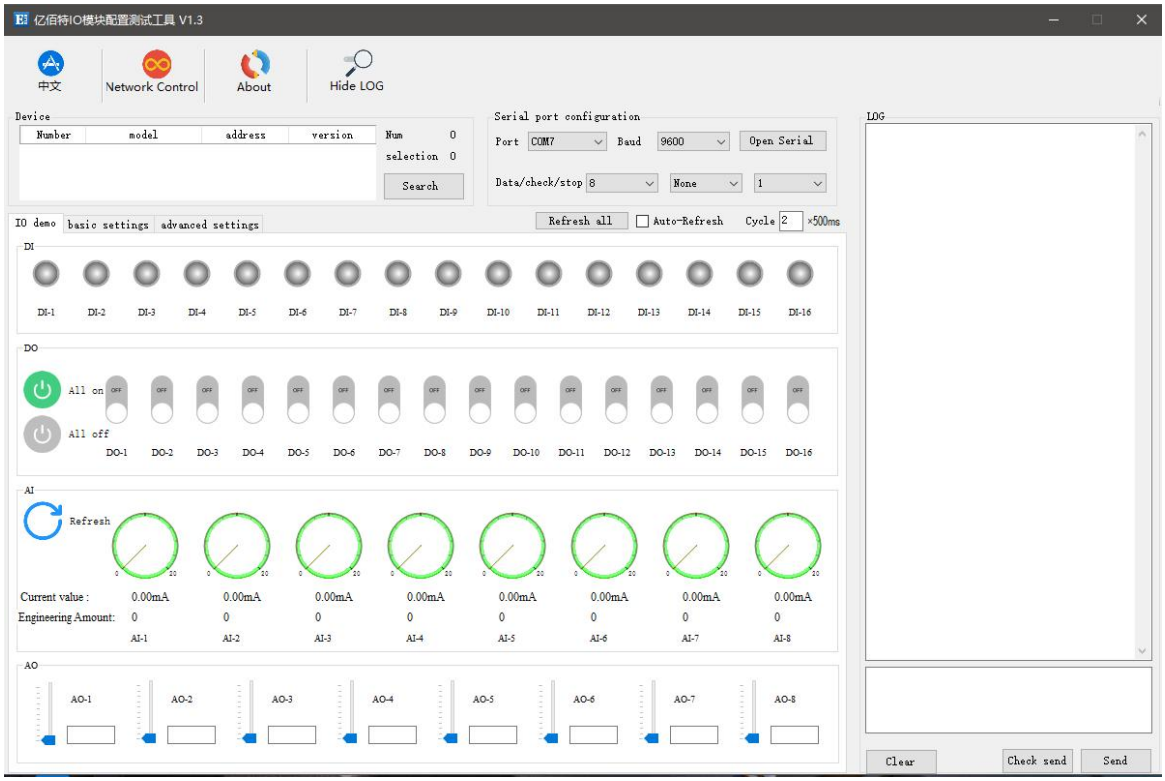


Figure 6-1-2 The software installation successfully opens the interface

6.2 Introduction to software features

6.2.1 IO demo interface



Figure 6-2-1 Software IO Demo Interface

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（1）The device window

Displays the current connection device information (serial number, device model, device address, firmware version).

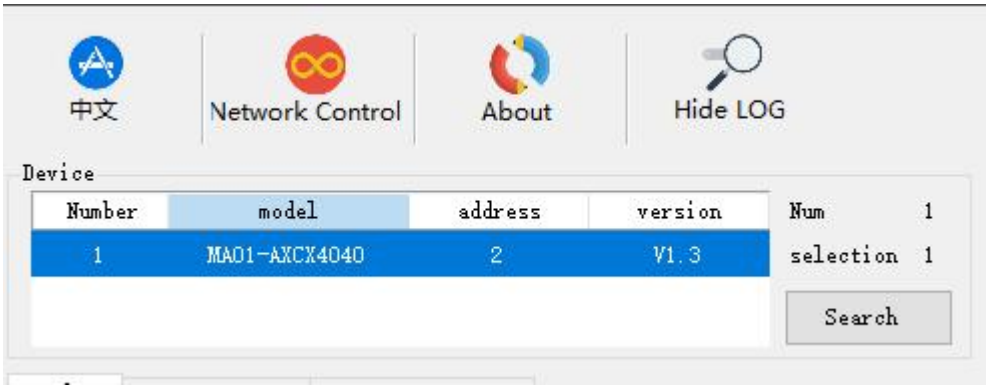


Figure 6-2-2 Device Window Interface

（2）Serial parameter window

Displays serial parameter information (port, baud rate, data bit, check bit, stop bit, etc.) and opens serial port.



Figure 6-2-3 Serial Parameter Window Interface

（3）The log window

Displays the device configuration, the operation log information during use (send, return data instructions).

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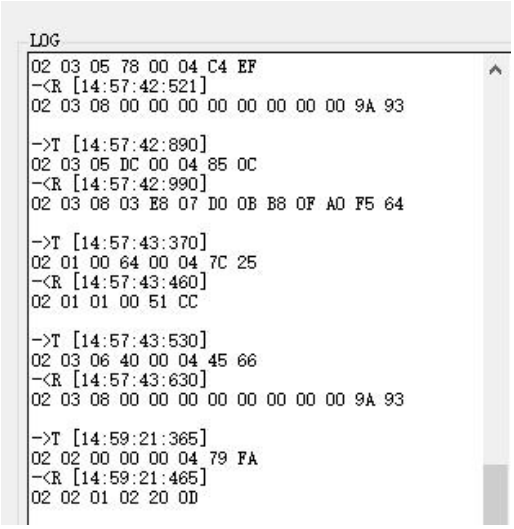


Figure 6-2-4 Log Window Interface

（4）Switch input DI(this feature is limited to DI-enabled devices).

Displays the status of the digital input DI port.

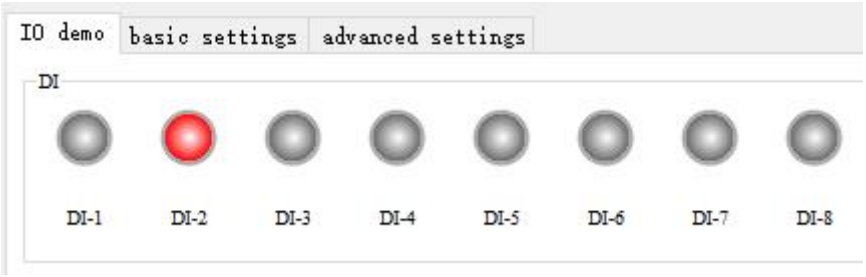


Figure 6-2-4 Switch Input DI interface

（5）Switch output DO

Displays the status of the DO port of the switch output, and the graphical settings switch output of the DO port is on and off.

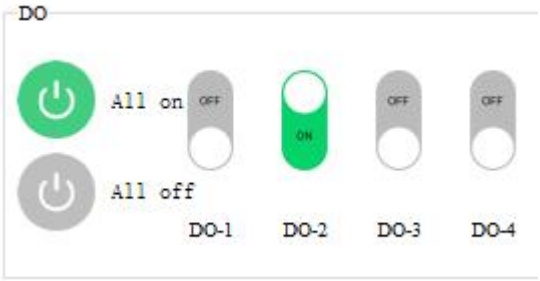


Figure 6-2-5 Switch Output DO interface

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（6）Analog input AI(this feature is limited to AI-enabled devices).

Displays the status of the analog input AI port (current, engineering volume), indicated by a graphical pin.



Figure 6-2-6 Simulates input AI interface

（7）Refresh the settings

Supports manual refresh, automatic refresh status. The auto-refresh state can customize the refresh cycle, which is a multiple of 500ms.

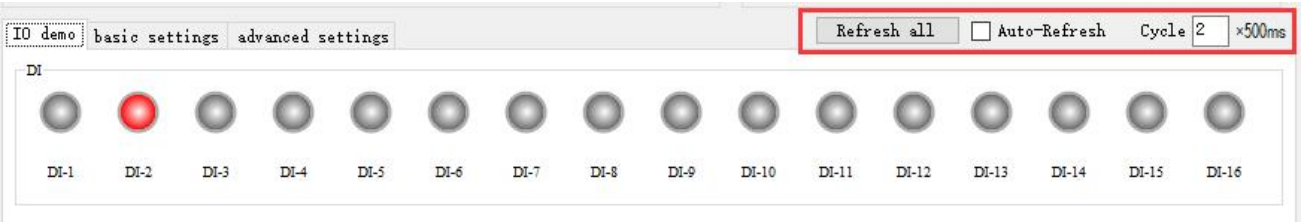


Figure 6-2-7 Refresh the settings interface

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6.2.2 Basic setup interface

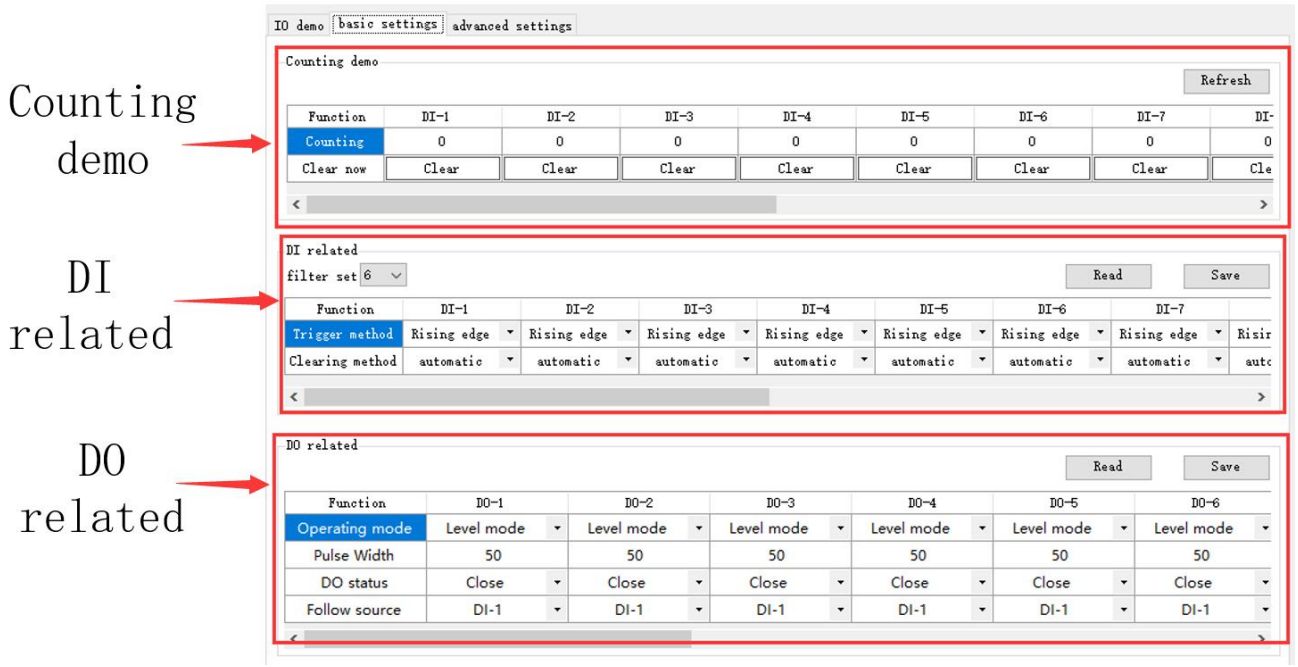


Figure 6-2-8 Basic setup interface

(1)Count demo

Displays DI count information, zeroing settings. This feature is limited to DI-enabled devices

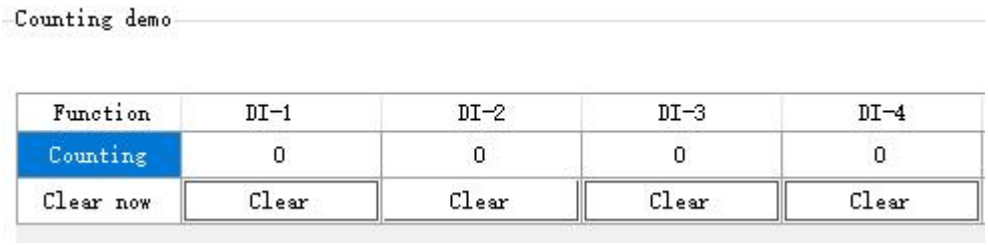


Figure 6-2-9 Count Demo Interface

(2) DI-related

Set up the DI function. Set the filter parameters(1to16),trigger(rising, falling, level), and zeroing (automatic, manual). This feature is limited to DI-enabled devices

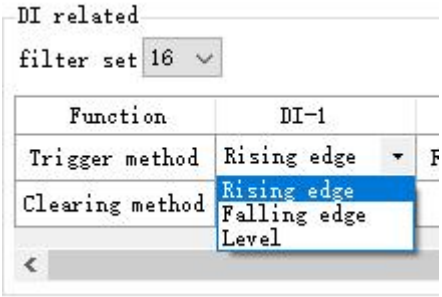


Figure 6-2-10 "DI-related" interface

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(3) DO-related

Set the DO function, set the operating mode (level mode, pulse mode, follow mode), set the pulse width (pulse mode only),power up theDO state (on, off), follow the source (follow the setting DIx).

Note: Multiple switch output DO ends can be set to follow one DI input, not one switch output DO side to follow multiple DI inputs. Follow mode is limited to DI-enabled devices

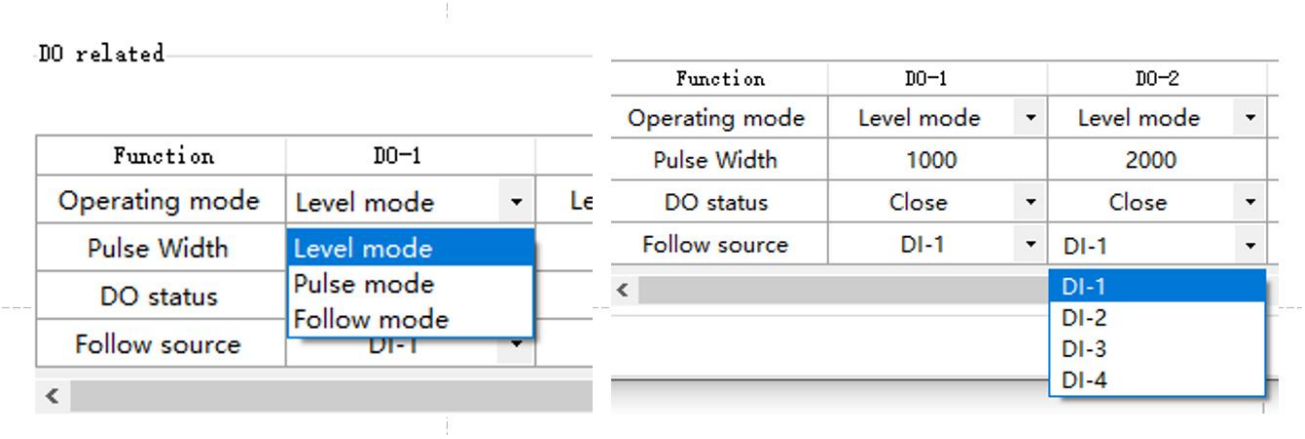


Figure 6-2-11 "DO-related" interface

6.2.3 Advanced Settings Interface

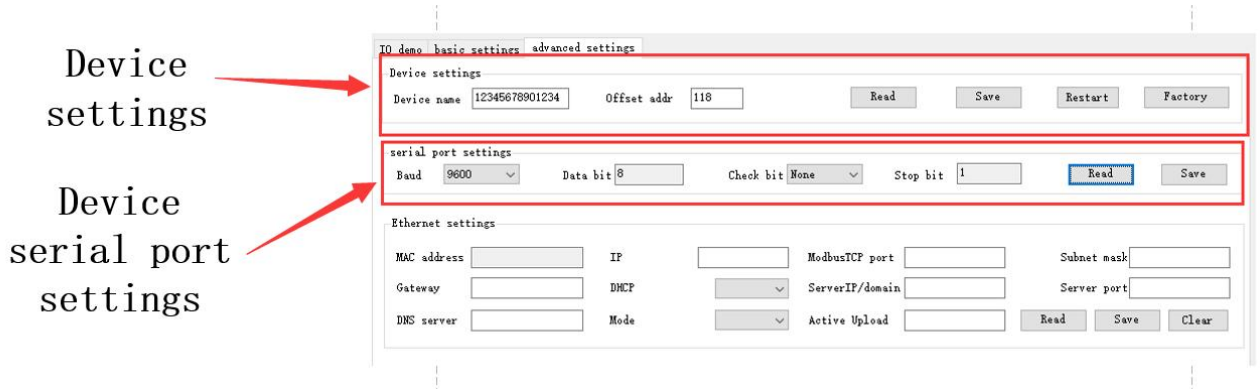


Figure 6-2-12 Advanced Settings Interface

(1)Device settings

Advanced setup interface, support for device name settings, offset address (software address), read parameters, turn on write protection, turn off write protection, restart modules, restore factory settings.

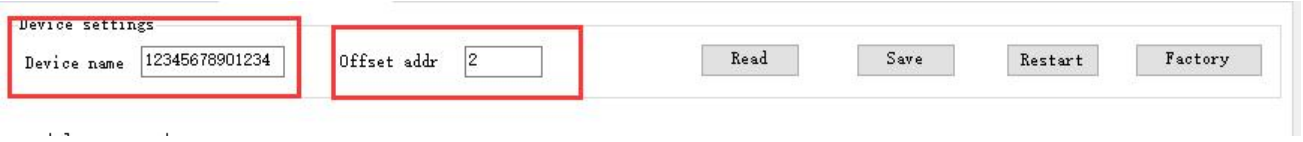


Figure 6-2-13 Device Settings Interface

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(2)Device serial settings

Supports setting Baud Rate(1200,2400, 4800,9600,19200,38400,57600,115200)by default 115200.

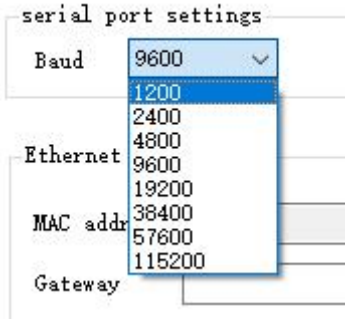


Figure 6-2-14 Baud Rate Settings Interface

Supports setting check bits, which can be set (none, parity, parity), and no checks by default.

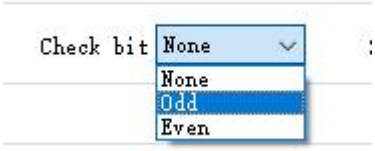


Figure 6-2-16 Check bit settings interface

6.3 Device status query

The configuration software supports device status queries, and once the device is connected, the device status can be queried through the Refresh All Data menu.

Example: The configuration software is connected to 2 devices, try to query select one of the devices, click on the "Refresh all data" menu, complete the device status query.

(1)IO demo interface

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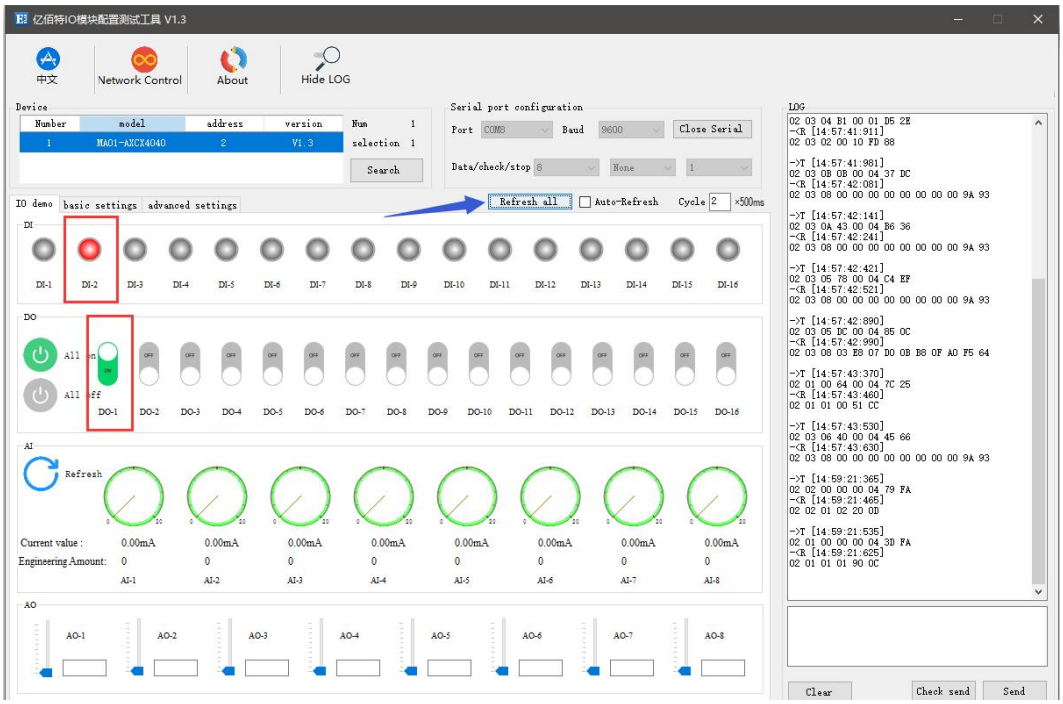


Figure 6-3-1 Device Status Query(IO Demo Interface).

(2)Basic setup interface

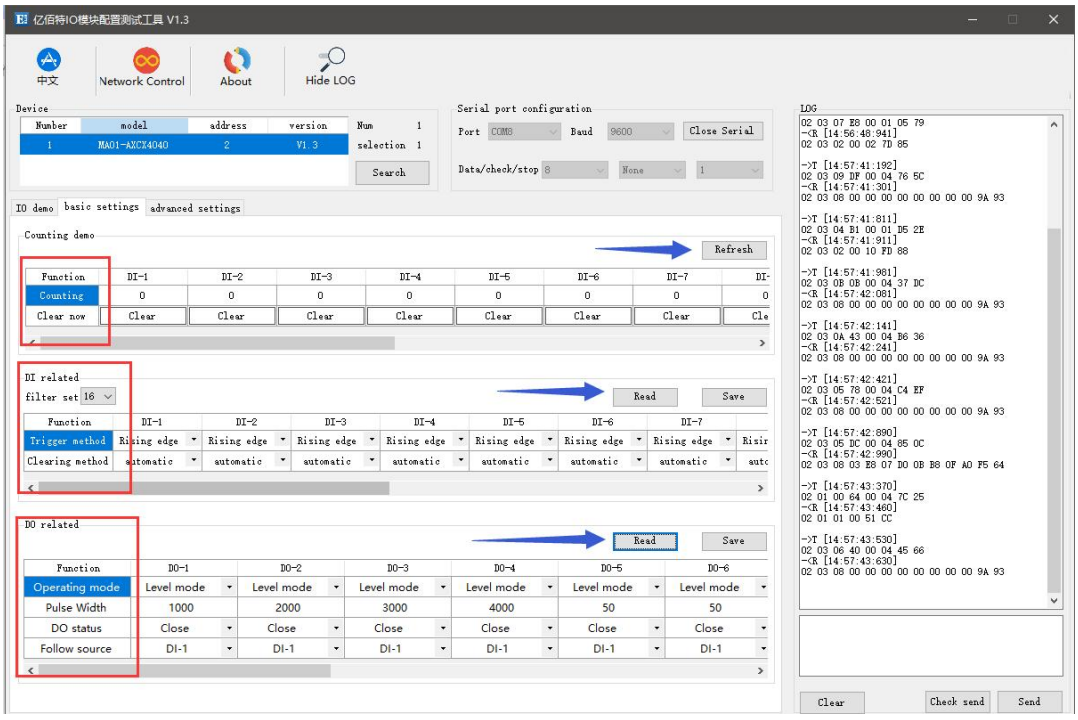


Figure 6-3-2 Device Status Query (Basic Settings Interface).

(3)Advanced settings interface

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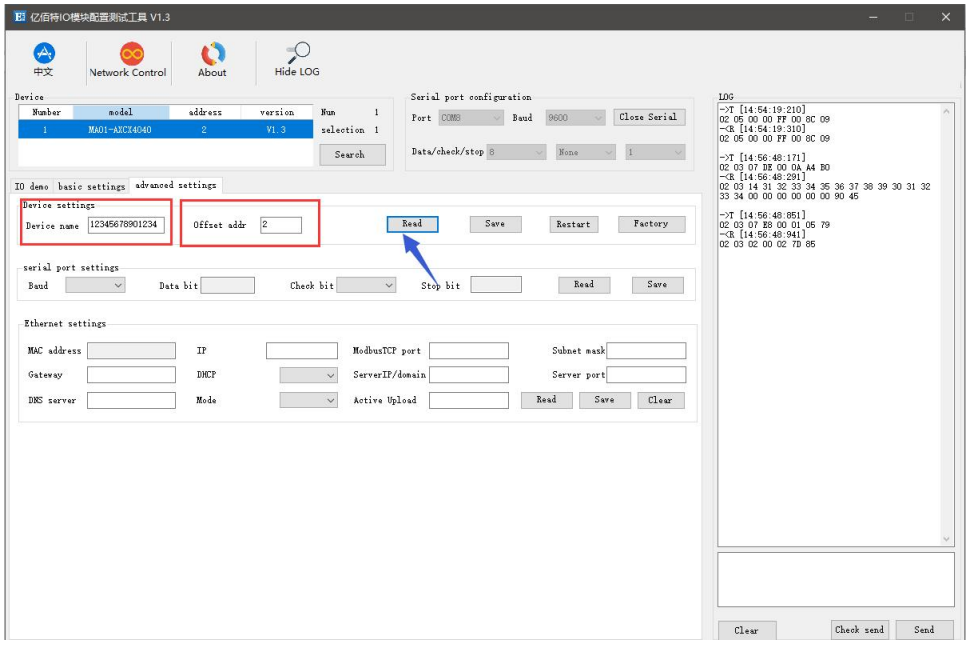


Figure 6-3-3 Device Status Query (Advanced Settings Interface).

6.4 Device status control

Device status control, device support for Modbus standard command control. Configuration software graphical control is also supported.

Example: Control the device and turn on the DO-1 output port.

Method 1:Software graphical operation, click on the menu button control.

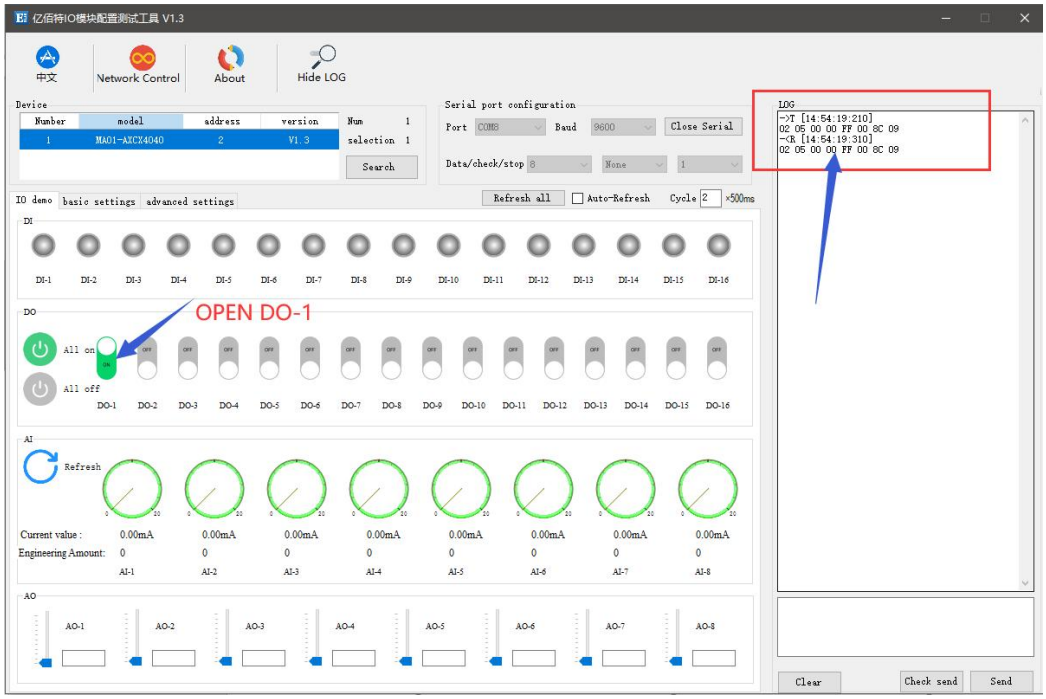


Figure 6-4-1 Software Graphic Operation

Method 2:Enter instruction control.

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Device address:1

Function: Turn on the DO-1 output

Send:01 05 00 00 FF 00 8C 3A (with CRC check bit).

Return:01 05 00 00 FF 00 8C 3A (with CRC check bit).

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7. Modbus uses

Note: Some manufacturers require adding 1 to the decimal register address.

7.1 Register List

Table 7-1-1 Register List

Register address	Number	The contents of the register	state	The range of data	The applicable function code
(00000)0x0000	8	Do status	RW	0x00-0xFF, write changes the current DO state, and read gets the current DO state.	0x01、0x05、0x0F
(00100)0x0064	8	The status of the DO when it is powered on	RW	0x00-0xFF, set the power-on state of the DO, write, and the next time you restart, the state of the DO is the state of the setting.	0x01、0x05、0x0F
(41400)0x0578	8	DO mode of operation	RW	0x0000-0x0002, 0x0000 level mode (default mode), 0x0001 pulse mode, 0x0002 follow mode.	0x03、0x06、0x10
(41500)0x05DC	8	DO pulse width	RW	0x32-0xFFF (50-65535), duration of pulse, in ms.	0x03、0x06、0x10
(41600)0x0640	4	Set the DO to follow the channel	RW	0x0001-0x0008, 0x0001 represents the first input.	0x03、0x06、0x10
(42000)0x07D0	7	Module model	R	See model definition table.	0x03
(42012)0x07DC	2	The firmware version	R	Firmware version number.	0x03
(42014)0x07DE	10	The name of the module	RW	The name is up to 20 bytes long, including ""	0x03、0x06、0x10
(42024)0X07E8	1	Module Software Address	RW	0x01-0xE0。	0x03、0x06、0x10
(42025)0X07E9	1	Restore the default parameters	RW	Write 5BB5 and the set parameters revert to the default parameters.	0x03、0x06、0x10
(42026)0x07EA	1	The device restarts	RW	Write 5BB5 and the device restarts immediately	0x03、0x06、0x10
(42100)0x0834	1	Baud rate code	RW	The default is 0x0003, or 9600. 0x0000, i.e. 1200; 0x0001, or 2400; 0x0002, or 4800; 0x0003, or 9600; 0x0004, i.e. 19200; 0x0005, or 38400; 0x0006, or 57600; 0x0007, or 115200;	0x03、0x06、0x10
(42102)0x0836	1	The way to check	RW	The default value is 0x0000, which is no check. 0x0000, i.e. no checks;	0x03、0x06、0x10

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				0x0001, i.e. odd check; 0x0002, i.e. parity;	

7.2 Instruction format (partial).

Note: The following Modbus commands are all in hexadecimal format.

7.2.1 Read DO output coil status

Use the 01 function code to read the output coil status, for example, read the two output coil states

20	01	00 00	00 02	XX XX
Device Modbus address	The function code	Register start address	The number of output coils read	CRC check code

When the above command is sent to the device via the 485 bus, the device returns the following values:

20	01	01	02	XX XX
Device Modbus address	The function code	The number of bytes of the data	The status data returned	CRC check code

The status data returned above 02 indicates that the output DO2 on .

7.2.2 Read Hold Register

Use the 03 function code to read one or more register values, for example, read DO1 operating mode.

20	03	05 78	00 01	XX XX
Device Modbus address	The function code	Register start address	The register to read quantity	CRC check code

When the above command is sent to the device via the 485 bus, the device returns the following values:

20	03	02	00 00	XX XX
Device Modbus address	The function code	The number of bytes of the data	The data returned	CRC check code

The above 00 00 indicates that DO1 is level mode.

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7.2.3 Write a single hold register

Write a single hold register using the 06 function code, for example, set the operating mode of DO1 to pulse mode

20	06	05 78	00 01	XX XX
Device Modbus address	The function code	Register address	Write the value	CRC check code

When the above command is sent to the device via the 485 bus, the device returns the following values:

20	06	05 78	00 01	XX XX
Device Modbus address	The function code	Register address	Write the value	CRC check code

If the modification is successful, the 0x0578 register data is 0x0001.

7.2.4 Write multiple hold registers

Write multiple hold register commands using 10 function codes, for example, set the do1-DO4 operating mode at the sametime.

20	10	05 78	00 04	08	0001 0002	XX XX
Device Modbus address	The function code	Register start address	The number of registers	The number of bytes written to the data	The data written	CRC check code

When the above command is sent to the device via the 485 bus, the device returns the following values:

20	10	05 78	00 04	XX XX
Device Modbus address	The function code	Register address	The number of registers	CRC check code

If the modification is successful, the values of thefour consecutive registers with 0x 0578 as the starting address are 0 x0001, 0x0002, 0x0003, 0x0000.

7.2.5 Write a single DO coil status

Use the 05 command to write a single command, for example, to set do1 to pulse mode

20	05	00 00	FF 00	XX XX
Device Modbus address	The function code	Register address	Write the value Coil action: On	CRC check code

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When the above command is sent to the device via the 485 bus, the device returns the following values:

20	05	00 00	FF 00	XX XX
Device Modbus address	The function code	Register address	Write the value	CRC check code

DO1 coil on.

7.2.6 Write multiple DO coil states

Use the 0F function code to write a single command, for example, set do1 to pulse mode

20	0F	00 00	00 04	01	06	XX XX
Device Modbus address	The function code	The starting address	The number of coils	The number of bytes of the data	Control the data for the coil (bit operation)	CRC check code

When the above command is sent to the device via the 485 bus, the device returns the following values:

20	0F	00 00	OO O4	XX XX
Device Modbus address	The function code	Register address	The number of coils	CRC check code

DO2, DO3 coil on.

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