XINJE

A-BOX(-U/4G/W)

Remote communication module

User manual

Wuxi Xinje Electric Co., Ltd.

Data No. MC12 20220505EN 2.2

Catalog

1. INTRODUCTION 1

1-1. PRODUCT OVERVIEW 1

1-2. BOX MANAGER TUTORIAL 5

2. PERFORMANCE PARAMETERS 14

2-1. STRUCTURE 14

2-2. DIMENSION 15

2-3. STATUS LIGHT 16

2-4. FLASH DISK 18

2-4-1. USB transparent transmission (only A-BOX-U supports) 18

2-5. SIM CARD 18

2-6. ETHERNET PORT 19

2-7. POWER SUPPLY 19

2-8. COMMUNICATION PORT 19

2-9. ANTENNA 21

2-10. RESET BUTTON 21

2-11. GENERAL SPECIFICATION 21

2-12. PRODUCT FEATURES 22

3. CONFIGURATION ENVIRONMENT 23

3-1. PREPARATION 23

3-1-1. A-BOX cannot access Internet, LAN connection 23

3-1-2. A-BOX can access Internet, WAN connection 25

3-2. SETUP WIZARD 25

3-2-1. Mode A (access to Internet via 4G) 26

3-2-2. Mode B (access to Internet via WIFI) 28

3-2-3. Mode C (access to Internet via Ethernet port) 30

3-3. ADVANCE SETTING 32

3-4. DATA MONITORING 33
3-4-1. MQTT server setting *34*
3-4-2. Add device *34*
3-4-3. Order total *39*
3-4-4. Serial port setting *42*
3-4-5. Free monitor *43*
3-4-6. System information *44*
3-5. REMOTE TRANSMISSION 45
3-5-1. Virtual serial port *45*
3-5-2. VPN *45*
3-5-3. USB transparent transmission (only supported by A-BOX-U) *47*
3-6. SYSTEM TOOLS 50
3-6-1. ABOX restart *50*
3-6-2. Initialization *51*
3-6-3. Device update *51*
3-6-4. SIM card information *53*
3-7. OPEN AND SAVE 54
4. TYPICAL FUNCTION APPLICATION 56
4-1. VIRTUAL SERIAL PORT 56
4-2. VPN 58
4-3. USB TRANSPARENT TRANSMISSION 62
4-4. DATA MONITORING 66
4-4-2. Write data order *77*
4-5. MODBUS TCP SERVER FUNCTION 79
5. TRANSPARENT TRANSMISSION CASE 1
5-1. XINJE XC SERIES SERIAL PORT TRANSPARENT TRANSMISSION 2
5-2. XINJE XD SERIES PLC SERIAL PORT TRANSPARENT TRANSMISSION 5
5-3. XINJE PLC ETHERNET PORT VPN 7
5-4. USB TRANSPARENT TRANSMISSION (TAKE XINJE HMI AS EXAMPLE) 10
5-5. SIEMENS S7-200 SERIAL PORT TRANSPARENT TRANSMISSION 13

5-6. Siemens 200-SMART series Ethernet port VPN transparent transmission 19
5-7. Siemens S7-1200/1500 series PLC Ethernet port VPN transparent transmission 23
5-8. Mitsubishi Fx3U series PLC serial port transparent transmission 26
5-9. Mitsubishi Q series PLC serial port transparent transmission 29
5-10. Mitsubishi Q/L series PLC Ethernet port VPN transparent transmission 32
5-11. Delta DVP series serial port PLC 36
5-12. Omron CP1E series PLC serial port transparent transmission 38
5-13. Omron CP1H series PLC Ethernet VPN transparent transmission 43
5-14. Rockwell (AB) L32E series VPN transparent transmission 47
5-15. Weinview MT8071iE HMI VPN transparent transmission 49
6. DATA MONITORING APPLICATION 53
6-1. Siemens S7-200 series serial port PLC (PPI) 54
6-2. Siemens S7-200SMART series Ethernet port PLC 57
6-3. Siemens S7-300/1200/1500 series Ethernet port PLC 60
6-4. Omron CP1E series serial port PLC 64
6-5. Omron CP1H series Ethernet port BD board FinsTCP communication 67
6-6. Mitsubishi FX series serial port PLC 71
6-7. Mitsubishi FX3U/3G series serial port PLC 75
6-8. Mitsubishi FX5U Ethernet PLC 80
6-9. Mitsubishi Q series Ethernet PLC 83
6-10. Mitsubishi L series Ethernet PLC 87
6-11. Xinje XC series serial port PLC 91
6-12. Xinje XD series serial port PLC 96
6-13. Xinje Ethernet port series PLC 100
6-14. Delta DVP series (Modbus ASC) 103
6-15. Delta DVP series (Modbus RTU) 106
6-16. Modbus Rtu device 109
6-17. Modbus TCP device 112
6-18. Ethernet/IP device 115
7. DETAILS OF MQTT NEW VERSION PROTOCOL 120

7-1. USER DATA 120

8. ALIBABA IOT PLATFORM 128

8-1. OVERVIEW 128

8-2. OPERATION STEPS 128

9. OPC DA FUNCTION 136

9-1. VERSION EXPLANATION 136

9-2. PREPARATION 137

9-3. OPC COMMUNICATION BETWEEN KINGVIEW SOFTWARE AND A-BOX 139

10. Q&A 146

1. Introduction

1-1. Product overview

In order to solve the problem of information isolation of automatic equipment, ABOX series of products can realize remote download program and device data monitoring of PLC, HMI, intelligent instrument lamp and other products. The network configuration of ABOX product is simple, no need for professional technology, and easy to use.

■ Compatibility

- Rich network access: 4G/WiFi/RJ45, adaptive Internet access
- Up to 2 channels of RS232/485/422 serial port
- Up to 3 channels 10/100M adaptive RJ45 interface
- Provide RJ45/WiFi network environment, allow varity of network equipments
- Compatible with various mainstream controllers in the market

■ Performance features

- 4G fits all kinds of network
- GPS function
- Serial port transparent transmission
- Ethernet VPN technology
- USB transparent transmission (only for A-BOX-U)
- Support bidirectional read/write function and Modbus TCP Server
- Support message cache and offline cache
- Support MQTT protocol
- Persistent online, redial and watchdog function

■ Model explanation

Model	Explanation
A-BOX	Basic version, no USB passthrough function
A-BOX-U	Add USB passthrough function on the basis of A-BOX function
A-BOX-4G	4G/Ethernet Internet access is supported, without WIFI function, without GPS and USB passthrough function
A-BOX-W	Support WIFI/Ethernet Internet access, without 4G function, without GPS

	and USB passthrough function

■ Version explanation

A-BOX, A-BOX-U

Hardware version	Firmware version	Config tool version	Explanation
H1	V1.0.0	XNetConfigTool V2.1.001	A-BOX initial version
H1	V1.0.23	XNetConfigTool V2.1.010	1.Add Siemens S7-200 smart, S7-300, S7-1200, S7-1500 network port protocol 2. Add Omron Finstcp protocol 3. Add serial port protocol of Mitsubishi FX series 4. Optimize login server and GPS acquisition program 5. WiFi Internet mode is added, WiFi light will flash quickly when WiFi is not connected
H1/H2	V1.0.24	XNetConfigTool V2.2.024	1. The number of instructions increased to 500 2. Optimization of Modbus function code 3. New Xinje_ XD5_ Modbus Protocol 4. Optimize XDE data reading 5. Optimize the input and output of Xinje protocol and Mitsubishi FX protocol 6. Siemens 200smart protocol can read and write multiple bits at a time
H1/H2	V1.0.25	XNetConfigTool V2.2.040	1. Improve Siemens 200 smart protocol 2. New USB interface transparent transmission function
H2	V2.1.0	BOX Manager V1.1.0 and above	1. Add MQTT protocol 2. The config tool changed to BOX Manager 3. Add Ali cloud MQTT protocol 4. Add write data function 5. Add Modbus-TCP Server function 6. Add FX5U, Mitsubishi Q/L, Omron serial port, Delta DVP

			protocol 7. 4G status indicator optimization, add identification card or unable to access the Internet state
H2	V2.1.1	BOX Manager V1.1.1 and above	1. Optimize MQTT protocol 2. When accessing Internet through WIFI, ESSID supports Chinese
H2	V2.2.0	BOX Manager V1.2.0 and above	1. New WIFI scanning and searching function 2. The white list function is added. Only IP addresses in the white list can access the internet 3. New function of searching multiple ABOX within LAN (WAN/LAN) 4. Optimize the interaction between BOX Manager and ABOX configuration 5. Upgrade the MQTT protocol of ABOX to Json format 6. Adding batch instructions 7. Add Excel import, export and edit functions for configuration tables 8. Optimize the problem of slow download speed of virtual serial port "Mode 1" 9. Optimize the black pop-up window when VPN is enabled 10. Add COM1 as Modbus RTU slave 11. New message caching function, which allows you to customize whether to cache data
H2	V2.2.1	BOX Manager V1.3.0 and above	1. Fix the problem when data command is configured to report at a fixed time, it is not reported at a fixed time 2. Fix the problem that fail to link server after MQTT ID password length greater than or equal to 32 bits 3. Optimize the table import and export function, and support point configuration 4. Optimize USB passthrough function (only A-BOX-U supports) 5. OPC DA communication function is added, which can communicate with Kingview and other software 6. New functions such as traffic query and phone charge recharging

			of IoT network card 7. New EIP communication protocol

A-BOX-4G, A-BOX-W

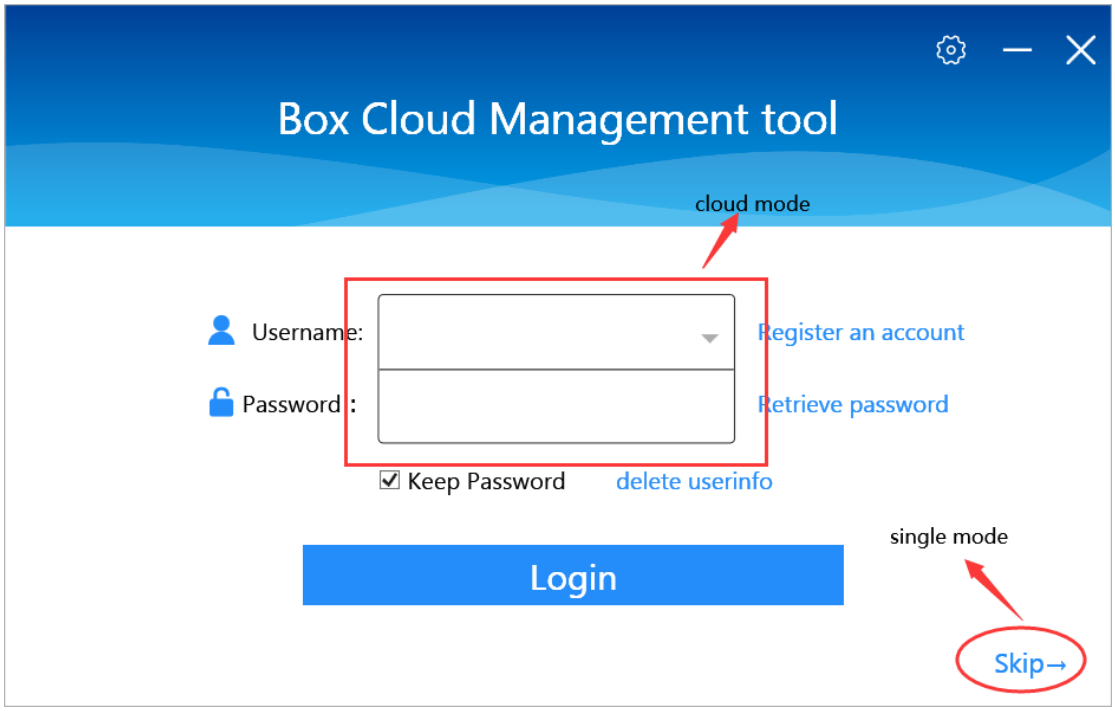
Hardware version	Firmware version	Config tool version	Explanation
H1	V2.0.10	BOX Manager V1.0.0 and above	1. Add MQTT protocol 2. The config tool changed to BOX Manager
H1/H2	V2.1.1	BOX Manager V1.1.0 and above	1. Add Ali cloud MQTT protocol 2. Add write data function 3. Add Modbus-TCP Server function 4. Add FX5U, Mitsubishi Q/L, Omron serial port, Delta DVP protocol 5. 4G status indicator optimization, add identification card or unable to access the Internet state 6. When accessing Internet through WIFI, ESSID supports Chinese
H1/H2	V2.2.0	BOX Manager V1.2.0 and above	1. New WIFI scanning and searching function 2. The white list function is added. Only IP addresses in the white list can access the internet 3. New function of searching multiple ABOX within LAN (WAN/LAN) 4. Optimize the interaction between BOX Manager and ABOX configuration 5. Upgrade the MQTT protocol of ABOX to Json format 6. Adding batch instructions 7. Add Excel import, export and edit functions for configuration tables 8. Optimize the problem of slow download speed of virtual serial port "Mode 1" 9. Optimize the black pop-up window when VPN is enabled 10. Add COM1 as Modbus RTU slave

			11. New message caching function, which allows you to customize whether to cache data
H2	V2.2.1	BOX Manager V1.3.0 and above	1. Fix the problem when data command is configured to report at a fixed time, it is not reported at a fixed time 2. Fix the problem that fail to link server after MQTT ID password length greater than or equal to 32 bits 3. Optimize the table import and export function, and support point configuration 4. OPC DA communication function is added, which can communicate with Kingview and other software 5. New functions such as traffic query and phone charge recharging of IoT network card (ABOX-4G) 6. New EIP communication protocol

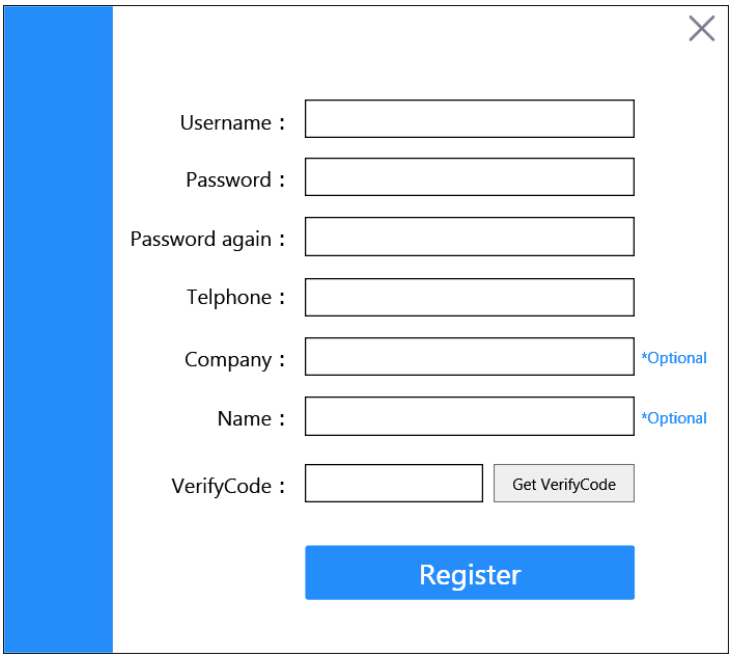
1-2. BOX Manager tutorial

Introduction: box manager provides Xinje cloud management, remote configuration and other services for Xinje A-BOX series products. It supports v2.0.0 or above, and is compatible with v1.0.23 and v1.0.25. Box manager also provides cloud management services for 4GBOX, WBOX, Ethernet PLC and other products.

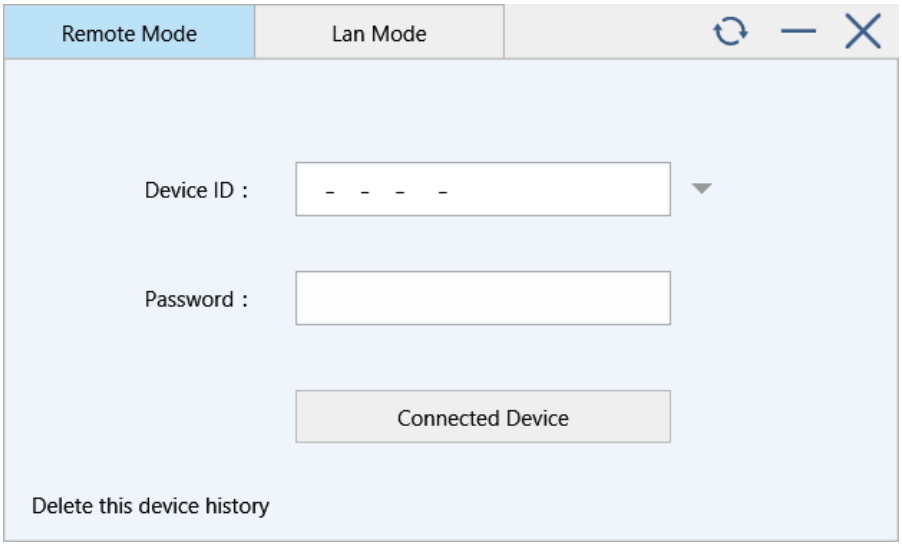
1. Box manager is divided into cloud mode and single mode.



Cloud mode: users can register their accounts through their mobile phone numbers and log in to the management tools through account passwords.



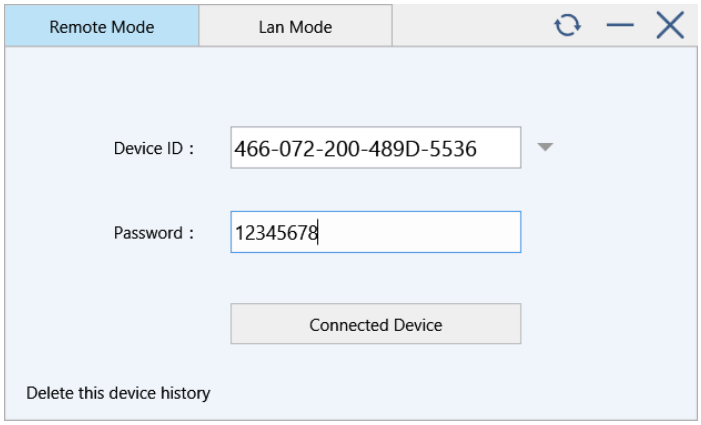
Single mode: click "skip" to enter the single mode. You can directly access ABOX by directly entering the ID number and password.



2. The single mode is divided into "remote connection" and "LAN connection".

(1) Remote connection

When ABOX logs on the server successfully, that is, the link light is always on, you can connect remotely through ABOX ID and password.

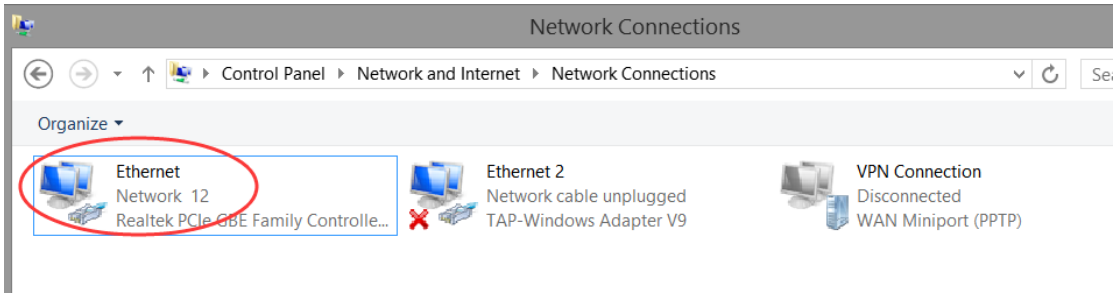


(2) LAN connection

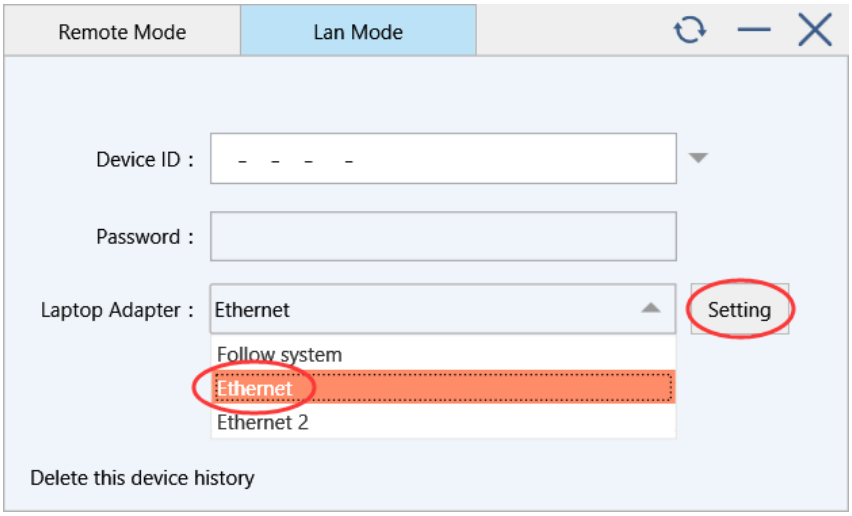
LAN connection means that ABOX is directly connected with computer by network cable, and ABOX is searched directly by binding Ethernet network card of computer.

LAN connection steps:

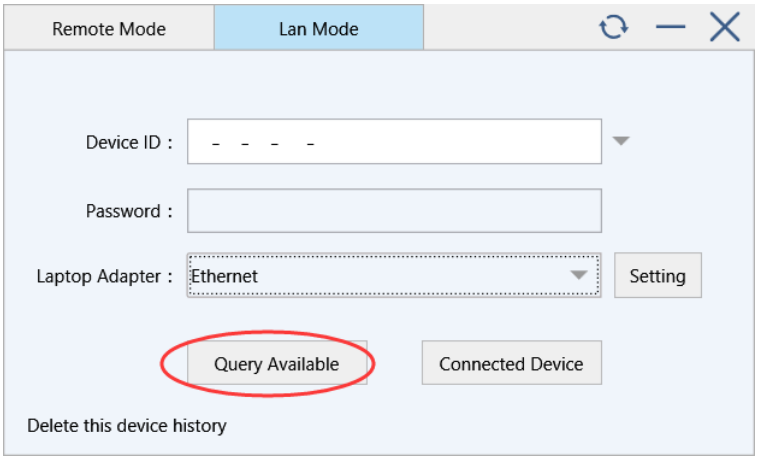
① Connect ABOX with the computer through Ethernet cable, and check the name of the network card of the computer in the network connection of the computer.



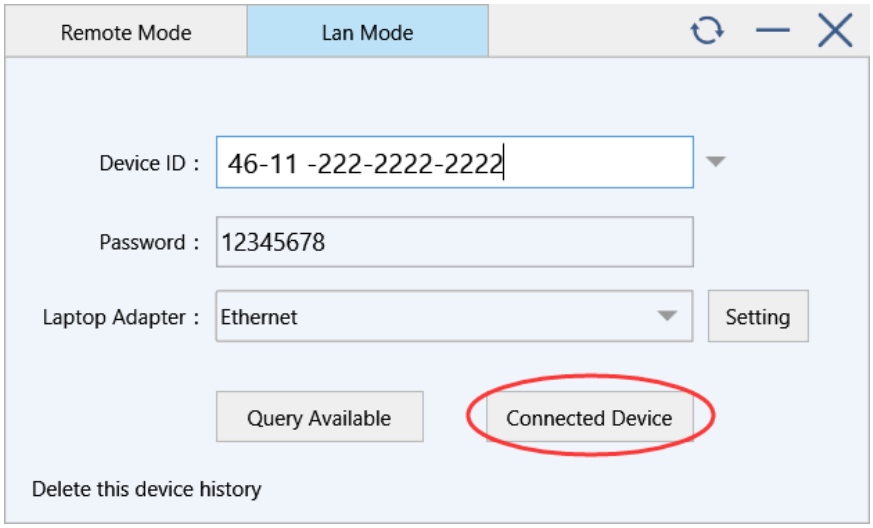
② Open the Box manager, click "skip" on the home page, enter "LAN connection", select the network card name in the above figure for the computer adapter, and click "setting".



③ Click "query available", and the ABOX ID will be automatically filled into the "device ID" box if the query is successful.



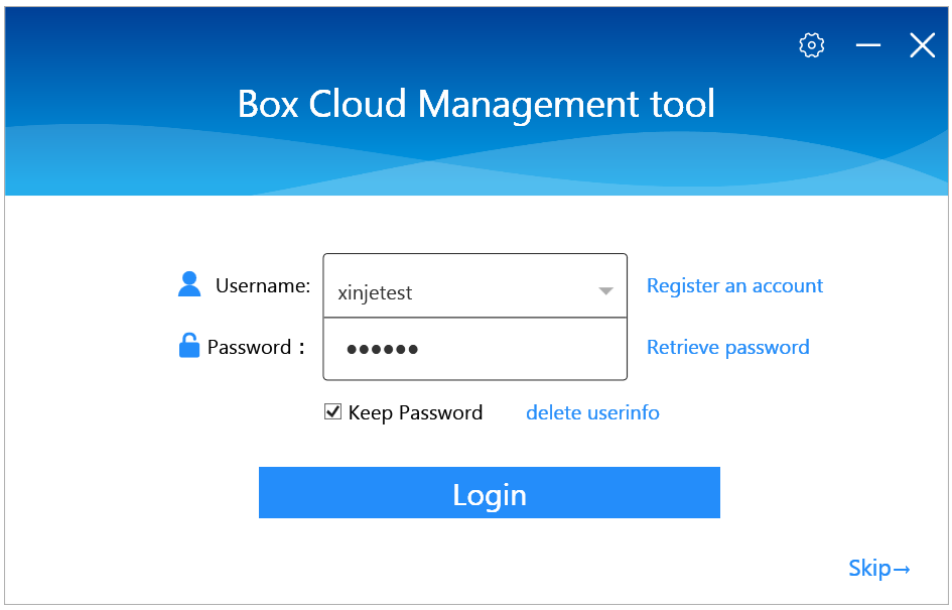
④ After entering the password, you can connect to the device. The default factory password of ABOX is 12345678.



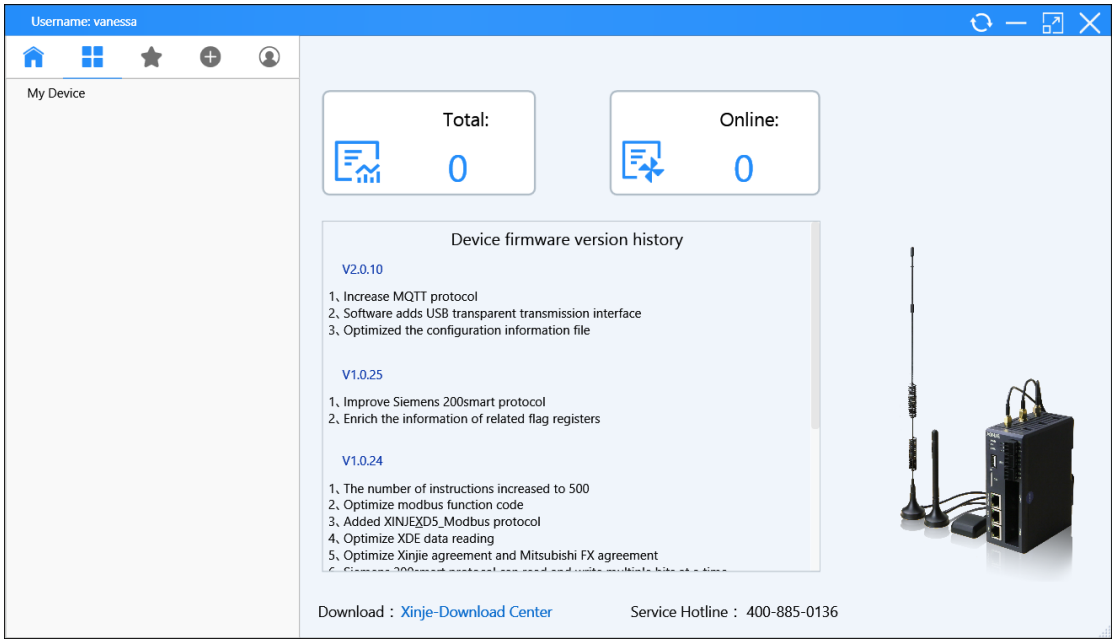
3. Networking mode

(1) Login

After registration, users can enter box management tool through user name and password. The user name can fill in the registered mobile phone number.

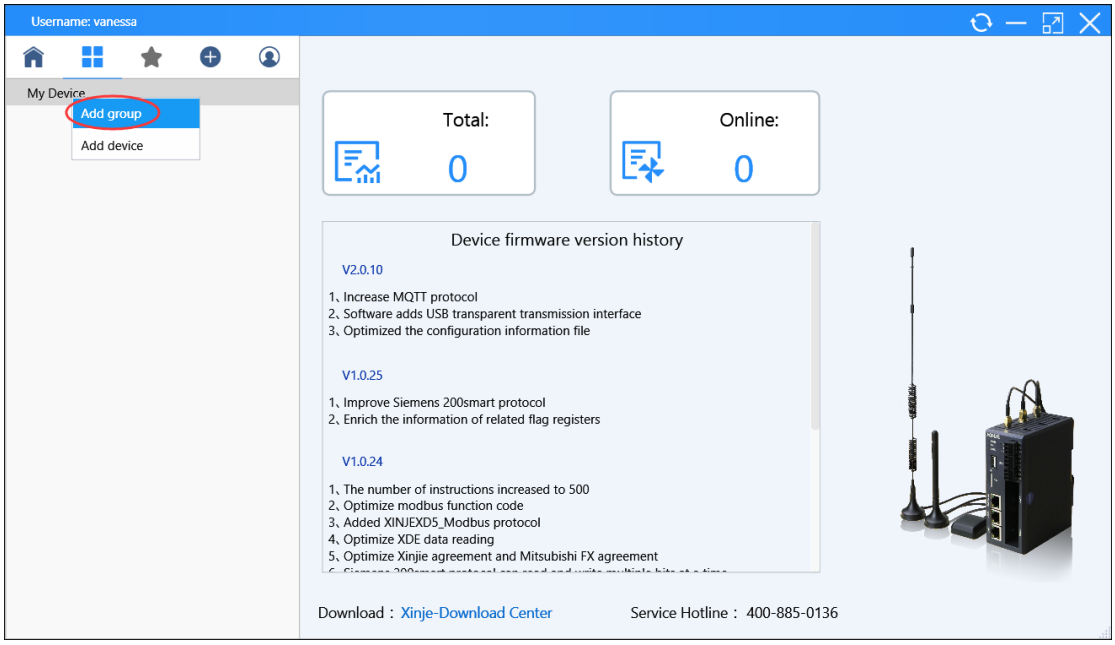


(2) Homepage



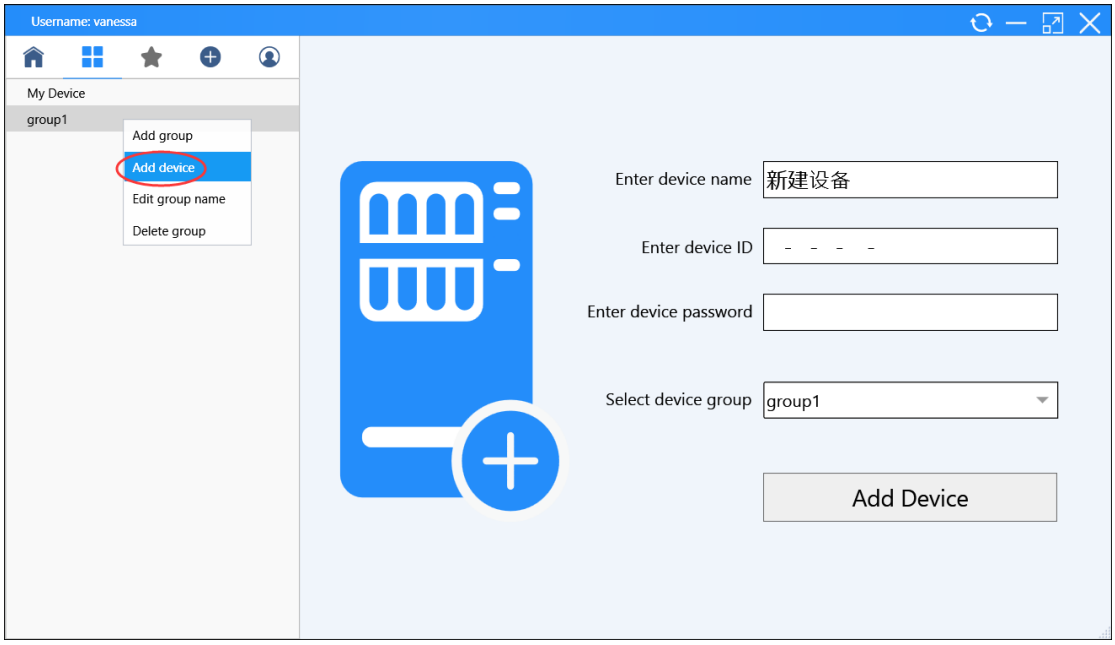
(3) Add group

Right click “my device” to add the group.



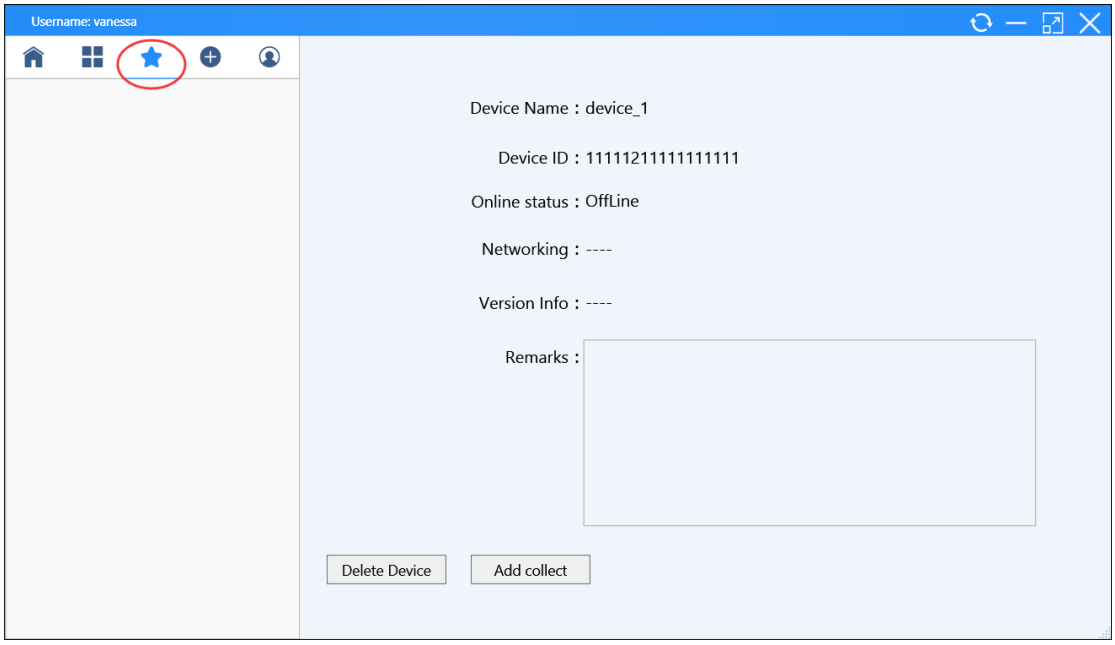
(4) Add device

Right click the group to add device.



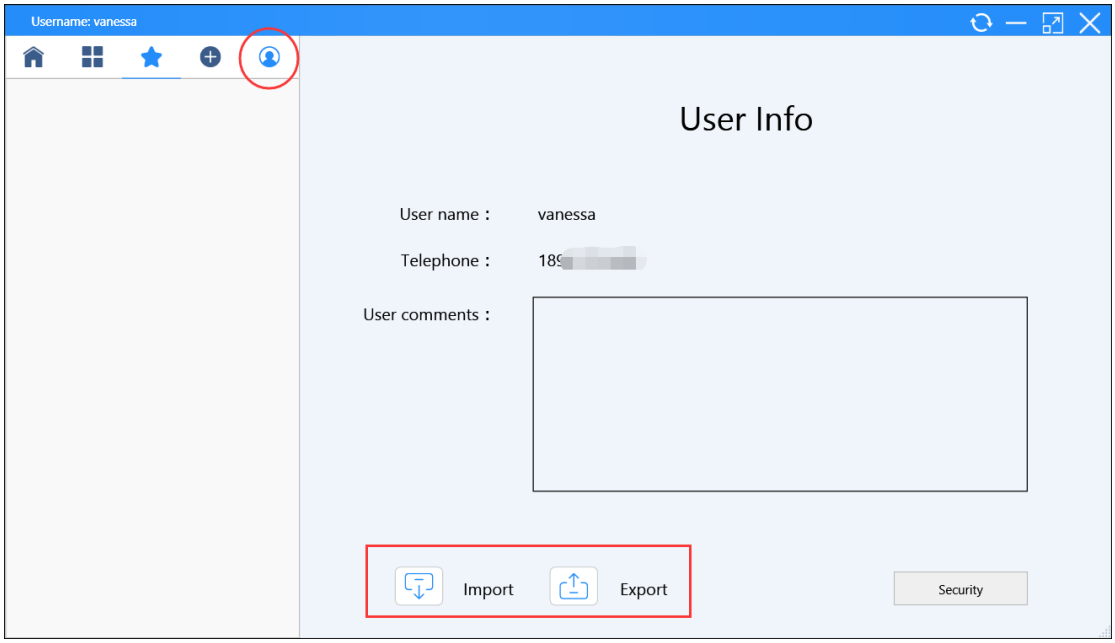
(5) Add the favorites

Add favorite devices, which can be quickly viewed in favorites list.



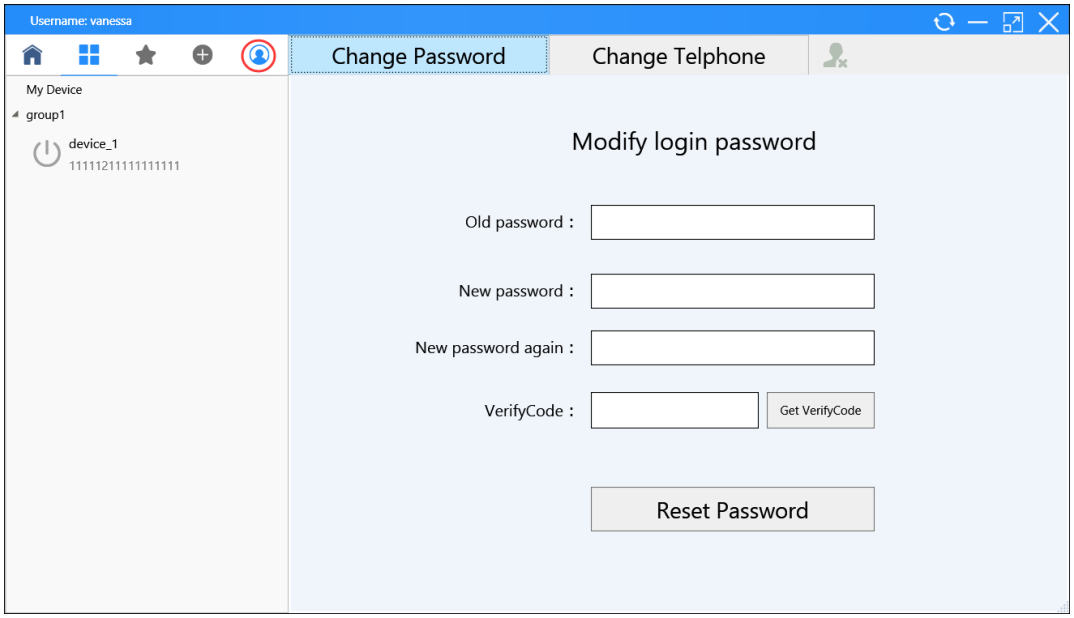
(6) Import and export the project

Export the current project and save the device list of the current account as a file. It can be imported with other accounts.



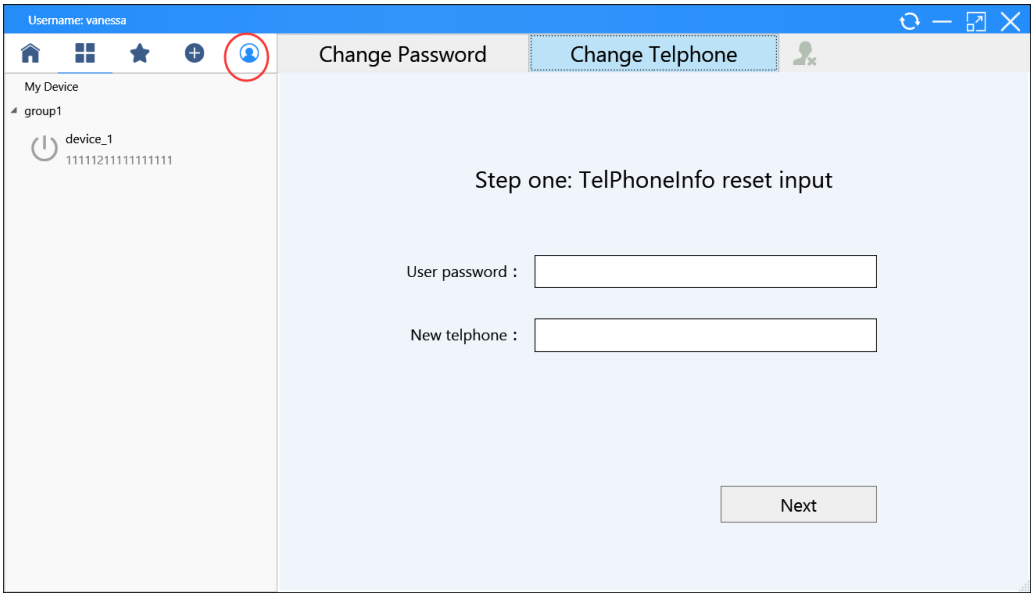
(7) Change password

Please change the password in user info --- security. Need to verify the original password and SMS.



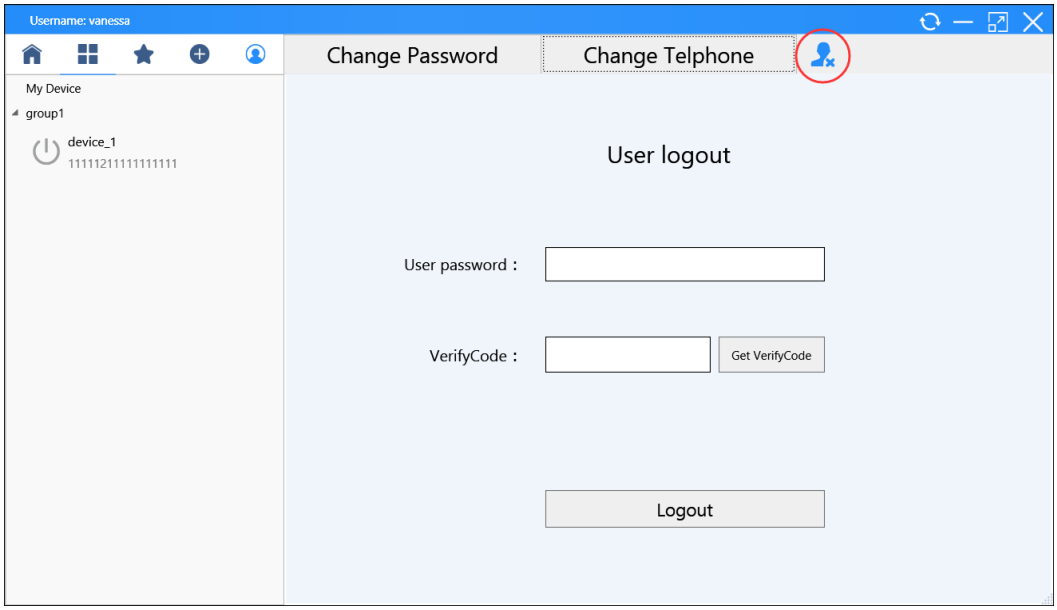
(8) change telephone

You can modify the mobile phone number of the current account in user info --- security. Need to verify the original password and SMS.



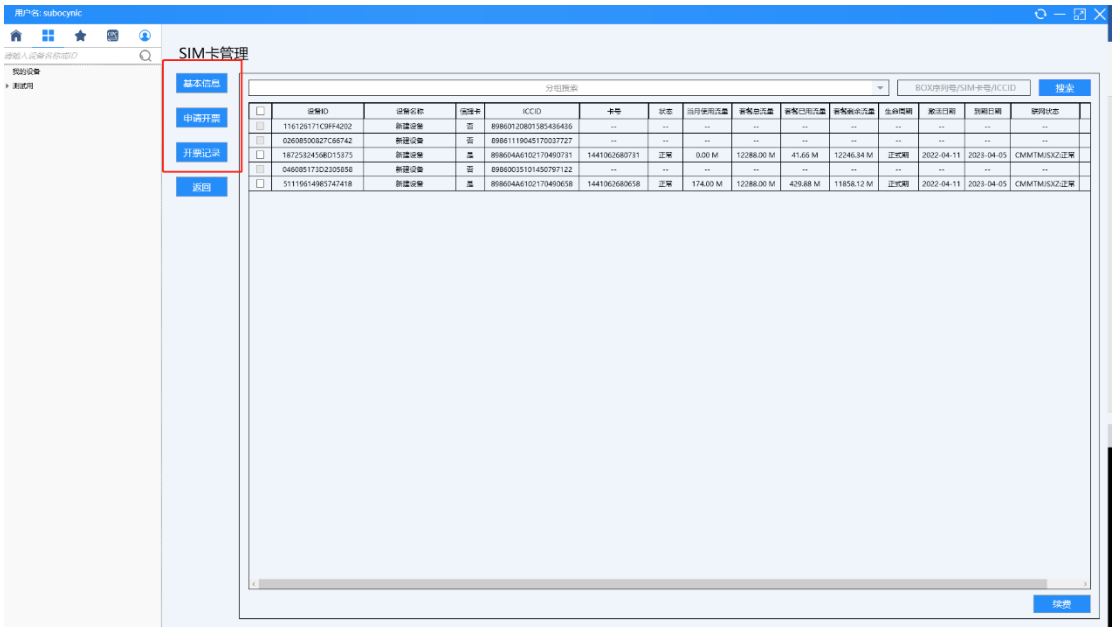
(9) User logout

Log off all configuration information of current user, including login account.



(10) SIM card

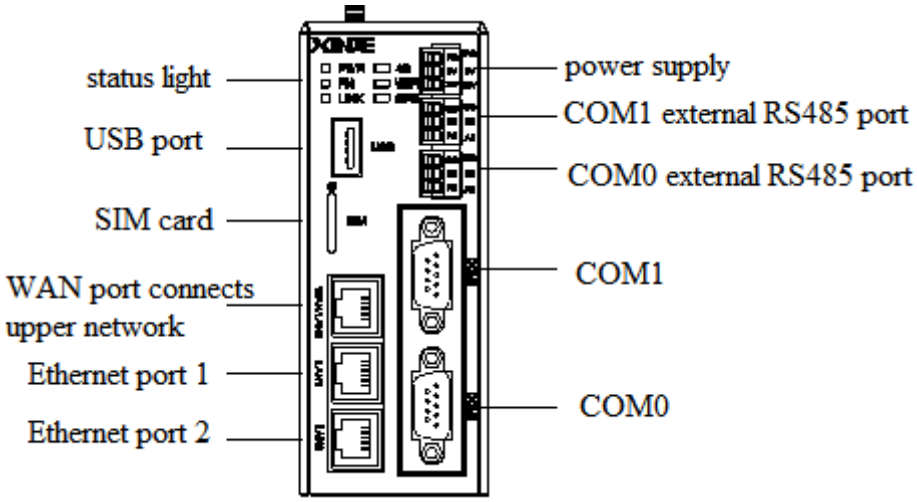
Here, you can view the information of the corresponding card and its usage. You can view the detailed card information for the IoT card of Xinje, and you can only view the ID number of the card for the IoT card of not Xinje. The current version only supports card query, but does not support order query, invoice printing and renewal.

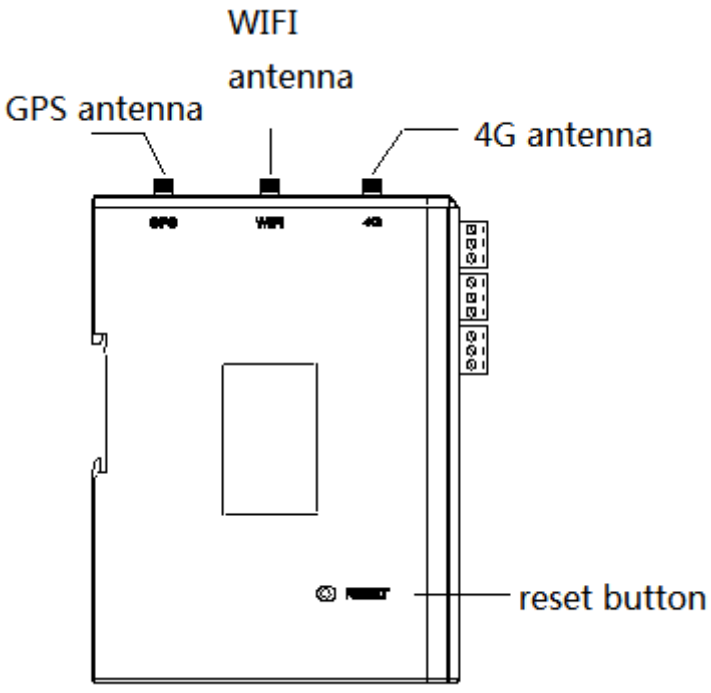


2. Performance parameters

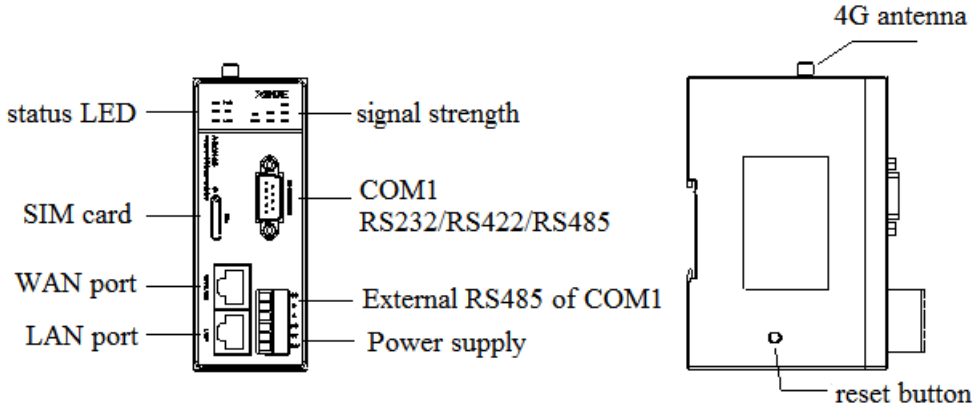
2-1. Structure

(1) A-BOX, A-BOX-U

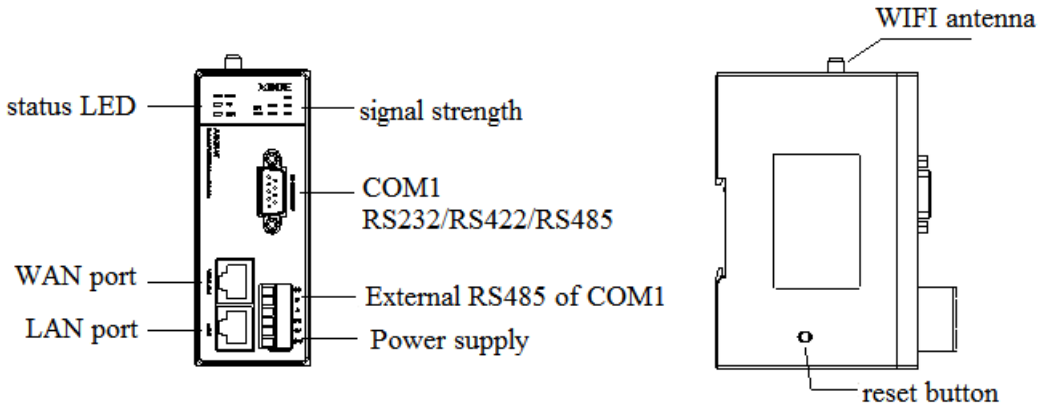




(2) A-BOX-4G

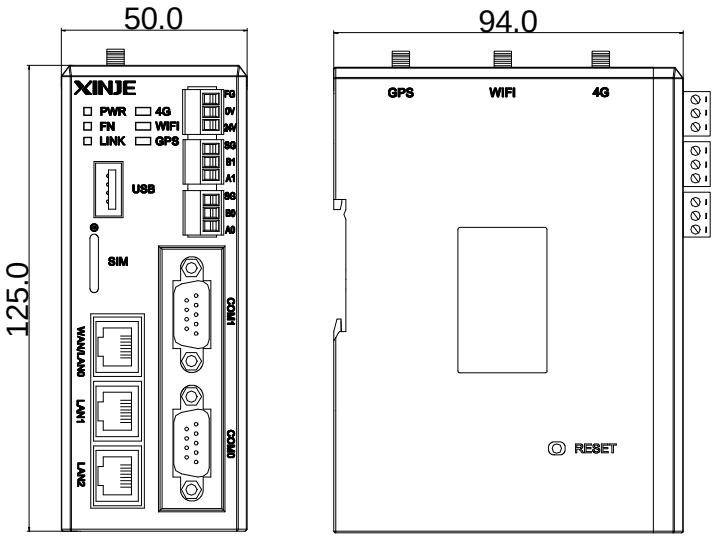


(3) A-BOX-W

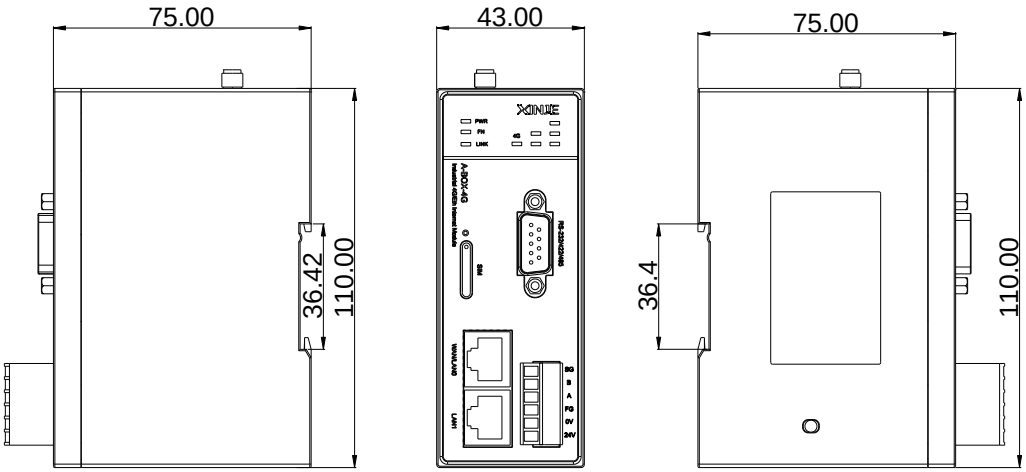


2-2. Dimension

The overall dimension of A-BOX(-U) is 50.0mm×125.0mm×94.0mm (W×H×D). Please install on the DIN46277(width is 35mm) rail.



The overall dimension of A-BOX-4G and A-BOX-W is 43.0mm×110.0mm×75.0mm (W×H×D). Please install on the DIN46277(width is 35mm) rail.



Note:

(1) during screw hole processing and wiring, please do not let the chip and wire chip fall into the module.

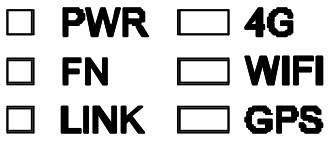
(2) before connecting, please confirm the specification of module and connecting equipment to ensure there is no error.

(3) when the connection is made, please note whether the connection is firm or not. If the connection falls off, the wrong data and short circuit will be caused. Installation, wiring, etc. shall be performed after the power supply is cut off.

2-3. Status light

(1) A-BOX, A-BOX-U

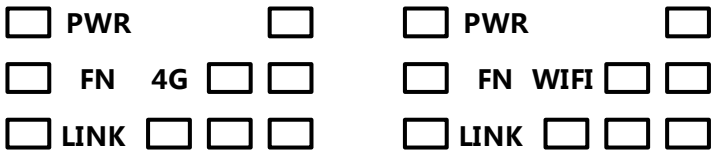
After the module is powered, the indicator light will be lit according to the function. The meaning is as follows:



Light	Description
PWR	Power supply indicator, normally on when power is on

FN	Flashing fast when the flash disk is updating firmware Flashing slowly when exporting the historical data Always ON in factory mode
LINK	Always lights when log on server succeeded Flashing in Virtual serial port/VPN mode If the configuration table is wrong (flashing quickly), please press and hold the reset key for 10s to initialize (version v1.0.23 or above)
4G	Normally OFF when not in 4G mode When in 4G mode, normally ON if it can normally access the network Fast flash (0.5s) if no card is detected in 4G mode (V2.1.0 or above) In 4G mode, the card is detected but cannot access the network normally. Slow flash (1.5s)
WIFI	Always lights in STA (station) mode Flashing quickly if not access WIFI (only for v1.0.23 and above) Flashing slowly in AP(hotspot) mode
GPS	Always lights when receiving the GPS information successfully

(2) A-BOX-4G, A-BOX-W



Light	Description
PWR	Power supply indicator, normally on when power is on
FN	Always lights in factory mode
LINK	Always lights when log on server succeeded Flashing in Virtual serial port/VPN mode

<table>
<tr><td></td><td colspan="2">If the configuration table is wrong (flashing quickly), please press and hold the reset key for 10s to initialize (version v1.0.23 or above)</td></tr>
<tr><td rowspan="3">Signal strength</td><td colspan="2">Normally OFF when not in 4G mode for A-BOX-4G
When in 4G mode, normally ON if it can normally access the network
Fast flash (0.5s) if no card is detected in 4G mode (V2.1.0 or above)
In 4G mode, the card is detected but cannot access the network normally. Slow flash (1.5s)</td></tr>
<tr><td colspan="2">Normally OFF in non WIFI mode for A-BOX-W module
Always ON when connected to specified WIFI network in WIFI mode
Flash if not access to WIFI network in A-4G mode</td></tr>
<tr><td>A-BOX-4G signal strength
<5: all OFF
5-15: The first column is always on
16-22: The first and second columns are always on
23-31: Three columns are always on</td><td>A-BOX-W signal strength
<-80: all OFF
-80~-65: The first column is always on
-65~-55: The first and second columns are always on
-55~0: Three columns are always on</td></tr>
</table>

2-4. Flash disk

A-BOX and A-BOX-U have USB port. To do the following operations, make sure the flash disk file system format is FAT32, otherwise it may fail.

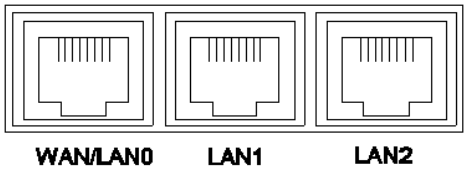
2-4-1. USB transparent transmission (only A-BOX-U supports)

The A-BOX-U has USB transparent transmission function, which can realize remote download of Xinje HMI and other devices through USB download cable.

2-5. SIM card

- SIM card dimension is Nano SIM card
- Support all the telecom operators

2-6. Ethernet port



- 10M/100M adaptive port
- When the accessing Internet mode is 4G or WIFI, the first port is LAN port

Note: A-BOX-4G(-W) is equipped with two Ethernet ports as standard.

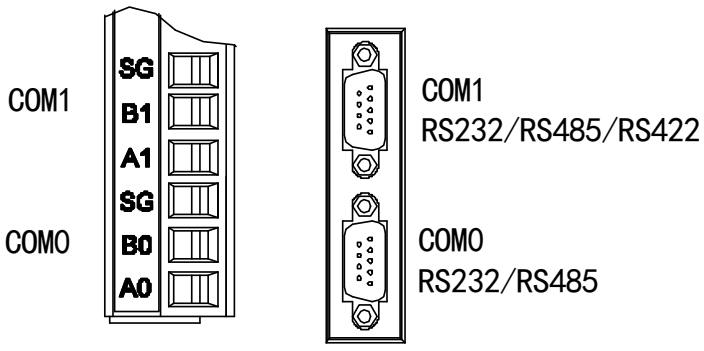
2-7. Power supply

FG
0V
24V

The module power supply is 24V DC, the allowable range is DC 21.6V~26.4V.

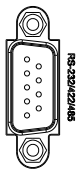
2-8. Communication port

A-BOX and A-BOX-U have two serial communication ports, namely COM0 and COM1. COM0 and COM1 can be used at the same time. RS232 and RS485 / RS422 of the same serial port cannot be used at the same time.

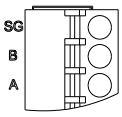


A-BOX, A-BOX-U

A-BOX-4G and A-BOX-W have one serial port, namely COM1. COM1 supports RS232 / RS422 / RS485.



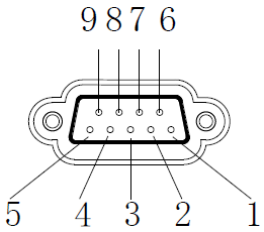
COM1
RS232/RS422/RS485



COM1 external RS485 port

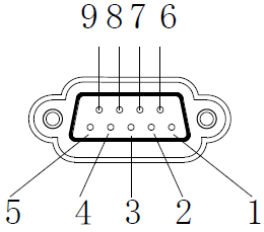
A-BOX-4G, A-BOX-W

COM0 port pin definition:



Pin no.	Name	Meaning
1	NC	Empty
2	RXD	RS232 receive data
3	TXD	RS232 send data
4	A	RS485+
5	GND	Signal ground
6	NC	Empty
7	B	RS485-
8	NC	Empty
9	NC	Empty

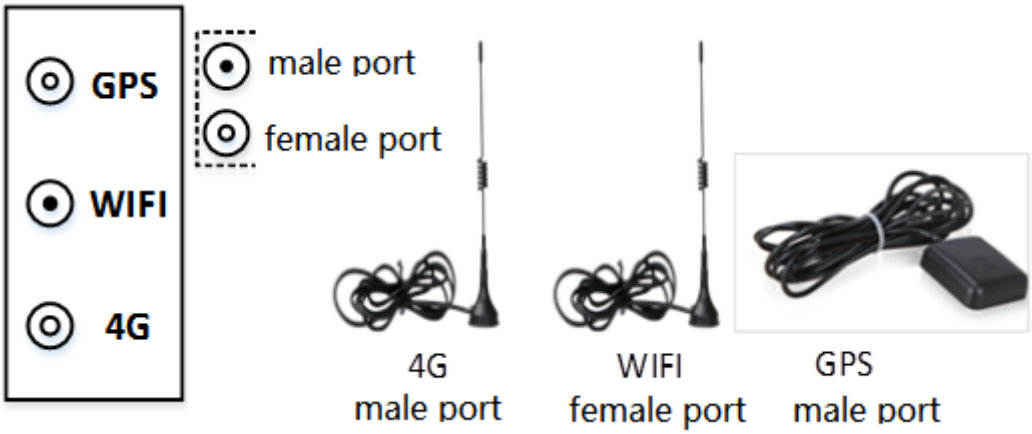
COM1 port pin definition:



Pin no.	Name	Meaning
1	TD+	RS422 send signal +
2	RXD	RS232 receive data
3	TXD	RS232 send data
4	A	RS485+
5	GND	Signal ground
6	TD-	RS422 send signal -
7	B	RS485-
8	RDD-	RS422 receive signal -
9	RDD+	RS422 receive signal +

2-9. Antenna

ABOX(-U) has three antenna interfaces which are 4G, WIFI, GPS, they are all extension antenna.



Note:

(1) A-BOX-4G only have a 4G antenna interface.

(2) A-BOX-W only have a WIFI antenna interface.

2-10. Reset button

Triggering mode	Function
0-5s	Start historical data export
5-15s	Restore factory initial setting
>30s	Factory mode

2-11. General specification

Item	Specification

Using environment	No corrosive gas
Environment temperature	0℃~60℃
Storage environment temperature	-20~70℃
Environment humidity	5~95%RH
Storage environment humidity	5~95%RH
Installation	Fix on the rail DIN46277 (width is 35mm) with M3 screw

2-12. Product features

Model	A-BOX	A-BOX-U	A-BOX-4G	A-BOX-W
CPU	MT7628			
FLASH	16MB SPI FLASH			
RAM	128MB			
Ethernet port	3 channels 10M/100M adaptive port		2 channels 10M/100M adaptive port	
Com port	COM0: RS232/RS485 COM1: RS232/RS485/RS422		COM1: RS232/RS485/RS422	
USB port	USB Host port		No USB port	
4G module	EC20 (China-India)		EC20-CN (China)	--
4G working band	GSM/GPRS: 900, 1800MHz EDGE: 900, 1800MHz UMTS: CDMA2000 (BC0) WCDMA (B1, B8) TD-SCDMA (B34, B39) LTE-FDD: (B1, B3, B8) LTE-TDD: (B38, B39, B40, B41) GNSS: GPS, GLONASS		LTE-FDD: B1/B3/B5/B8 LTE-TDD: B34/B38/B39/B40/B41 WCDMA: B1/B8 GSM: B3/B8	--
WIFI working band	2.4GHz		--	2.4GHz
Max transmitting	GSM/GPRS: 2W EDGE: 0.5W			

power	UMTS: 0.25W LTE: 0.25W			
Working temperature	-10℃～60℃			
Average standby current	<150mA 4W			
Internet access	4G/WIFI/Eth	4G/WIFI/Eth	4G/Eth	WIFI/Eth
Serial port transparent transmission	√	√	√	√
Ethernet port transparent transmission	√	√	√	√
USB port transparent transmission	--	√	--	--
GPS function	√	√	Base station positioning	--
Data monitoring	√	√	√	√

3. Configuration environment

3-1. Preparation

ABOX has WAN and LAN configuration mode. LAN configuration uses Ethernet cable (CAT5e) connecting to any LAN port. WAN configuration needs the module log on the server successfully. The defaulted parameters can be used, user no need to set the parameters.

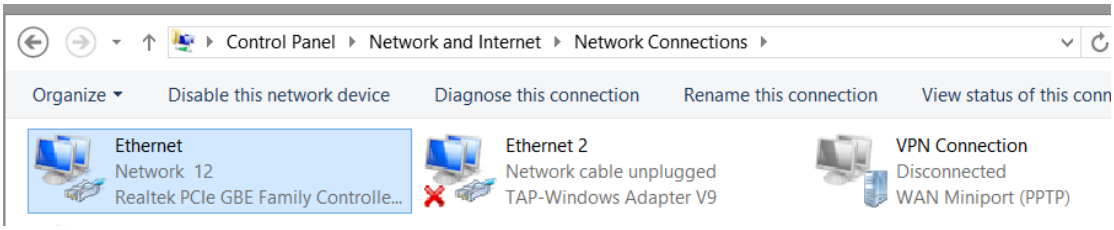
3-1-1. A-BOX cannot access Internet, LAN connection

When A-BOX cannot connect to the Ethernet, please use LAN connection.

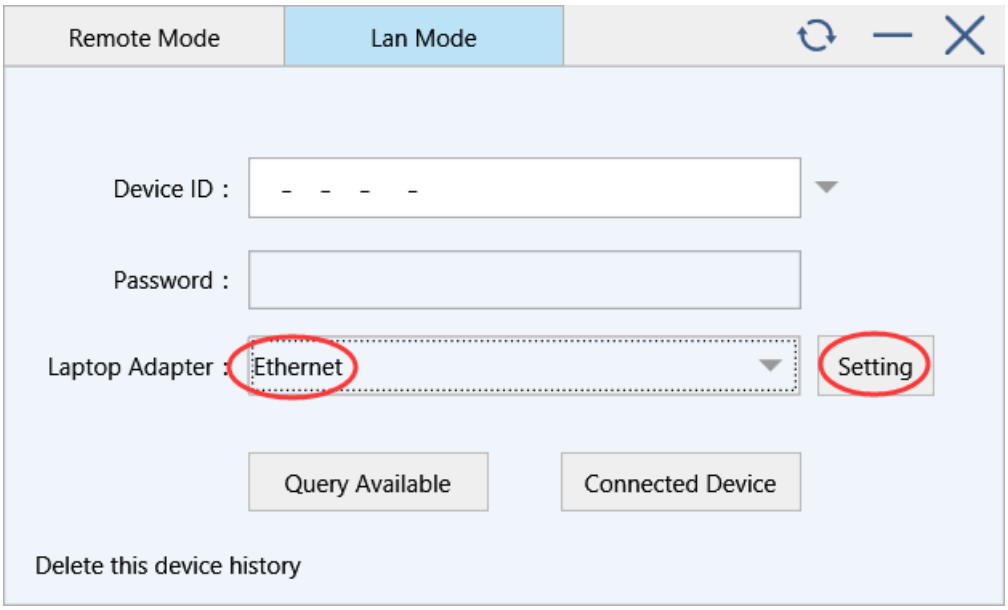
LAN connection means that A-BOX is directly connected with computer by network cable, and A-BOX is searched directly by binding Ethernet network card of computer.

LAN connection steps:

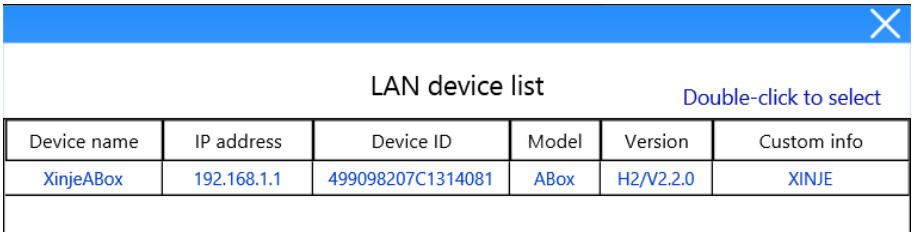
1. Connect the ABOX to PC with Ethernet cable, find the corresponding network card in the PC.



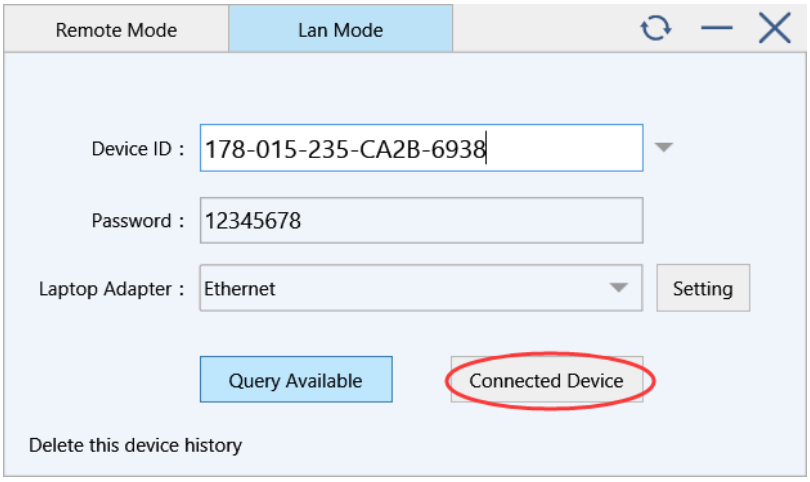
2. open BOX manager, click "skip" on the home page to enter "LAN connection". Select the name of the network card in the above figure for the computer adapter, and click "setting".



3. Click "query available", and the A-BOX ID will be automatically filled into the "device ID" box if the query is successful.



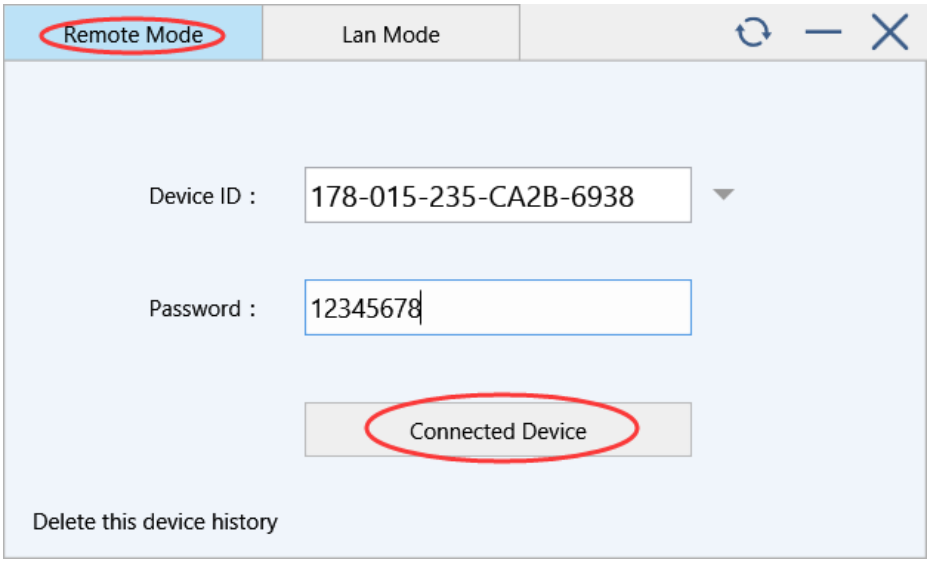
4. After entering the password, it can connect to the device. The default factory password of A-BOX is 12345678.



3-1-2. A-BOX can access Internet, WAN connection

When A-BOX can connect to the Ethernet, pleas use WAN connection.

When A-BOX successfully logs on to the server, that is, when the LINK light is always on, you can connect remotely through A-BOX ID and password, or add devices after logging in with account and password.



3-2. Setup wizard

4G / WiFi / Ethernet mode is provided for network access, and the parameters are configured by using the wizard.

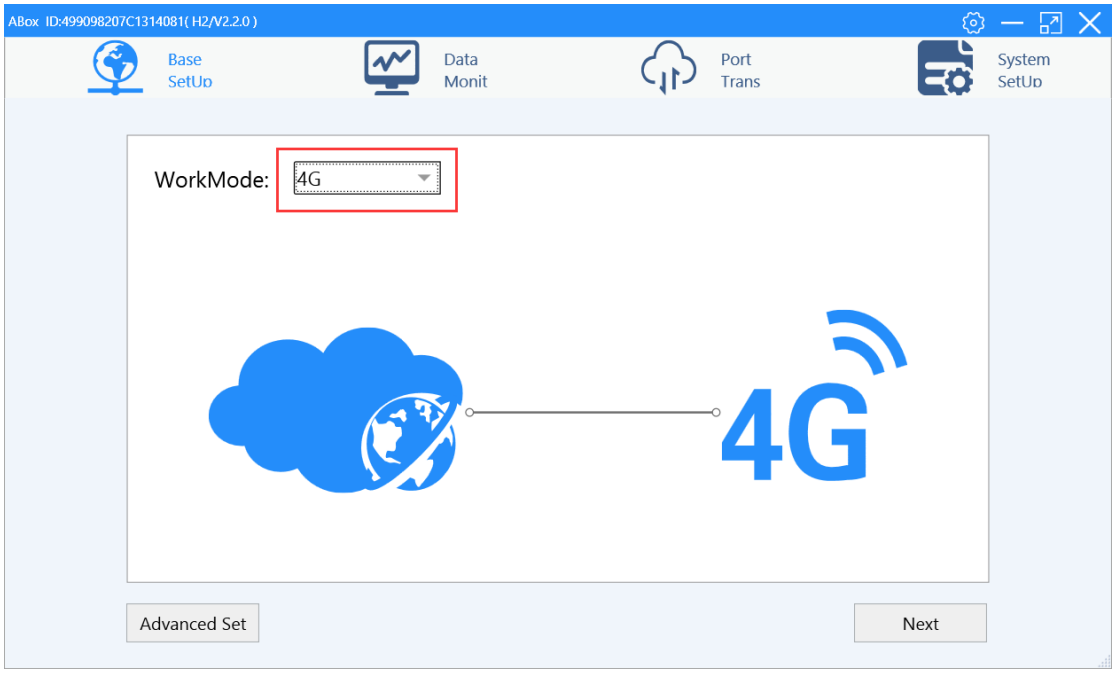
The default mode of A-BOX is 4G mode.

The factory default mode of A-BOX-4G is 4G mode.

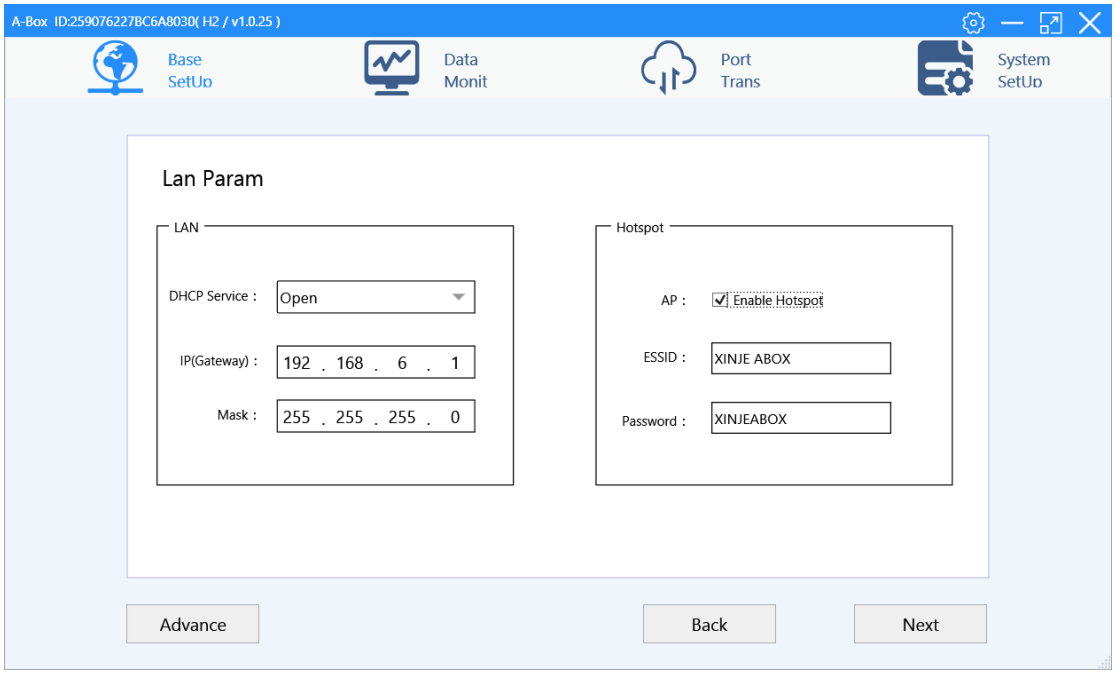
The default mode of A-BOX-W is WiFi mode, and the default WiFi name is A_Box, password 12345678.

3-2-1. Mode A (access to Internet via 4G)

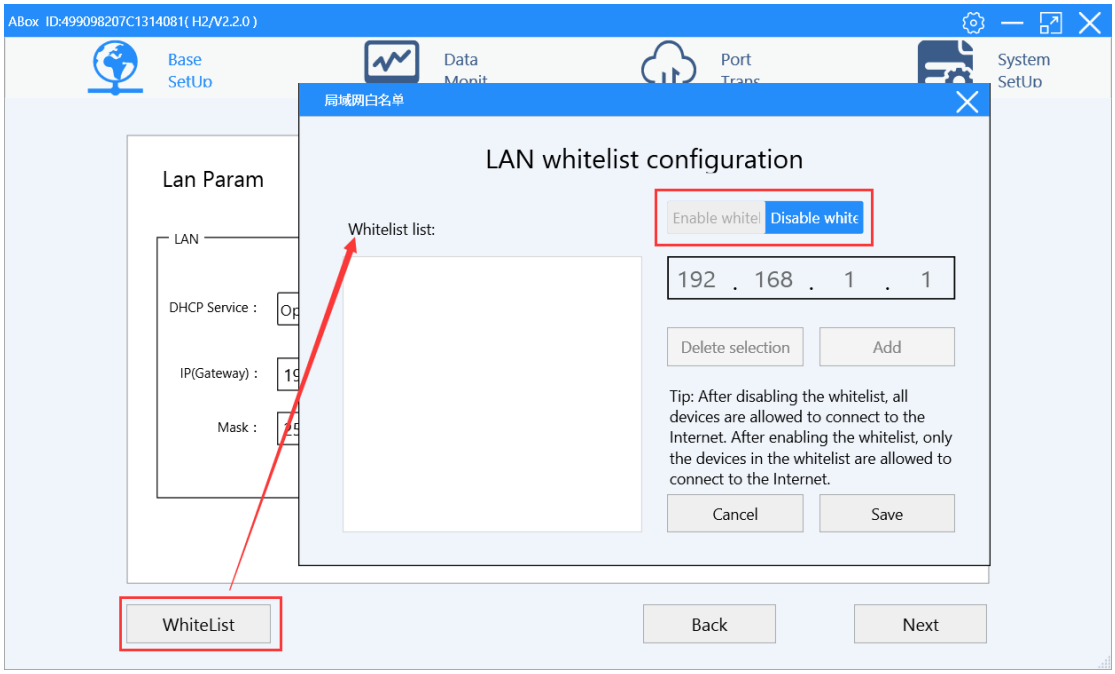
1. In working mode interface, choose work mode is 4G, click next.



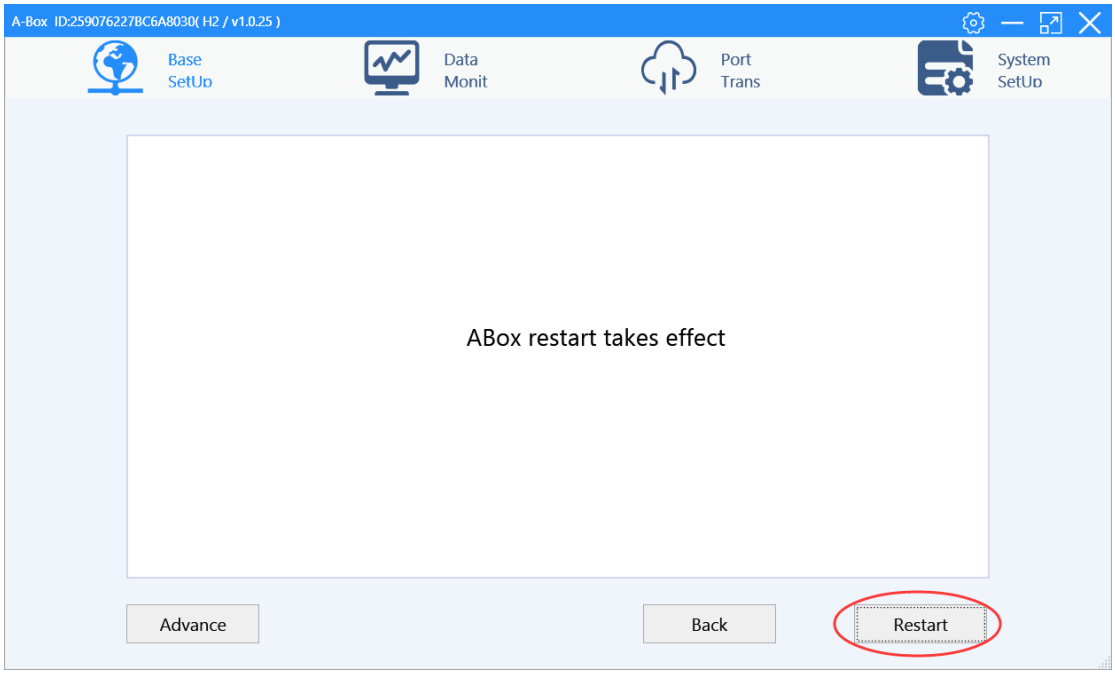
2. Set the LAN port parameters. LAN port provides network access capability for other network devices, enabling wireless hotspot function, the defaulted WIFI name is XINJE ABOX, defaulted password is XINJEABOX. A-BOX is equivalent to wireless router, which can provide hotspot for other devices.



Enabling the white list enables the devices in the gateway LAN to access the Internet (except for the directional traffic card).



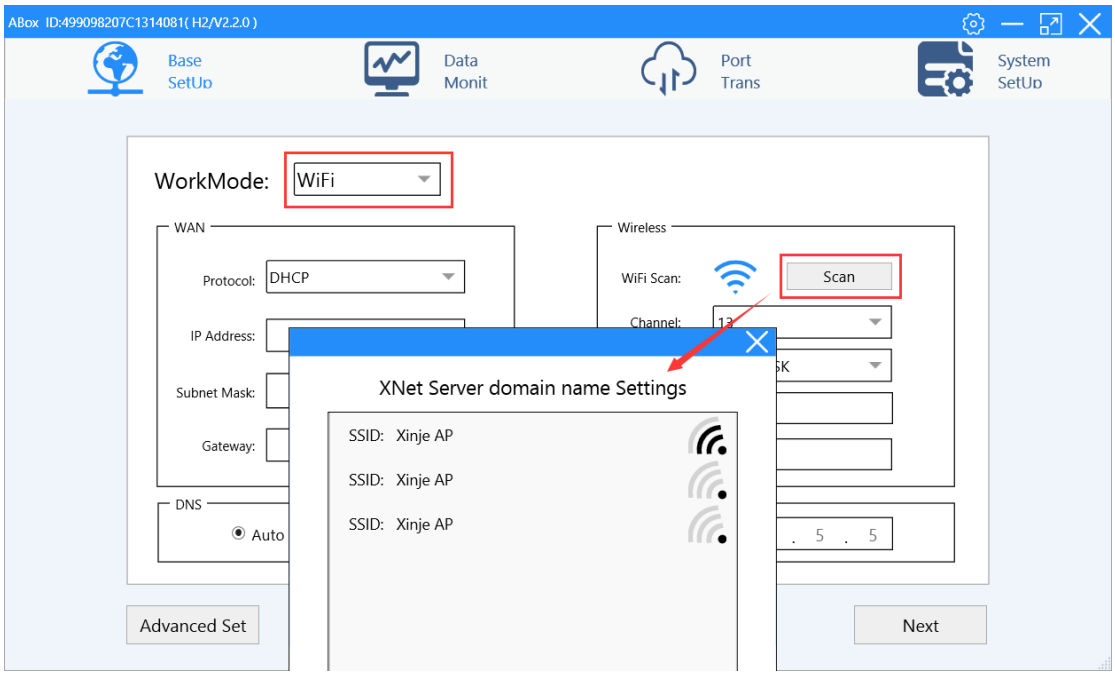
3. Click next, restart A-BOX to make the settings effective.



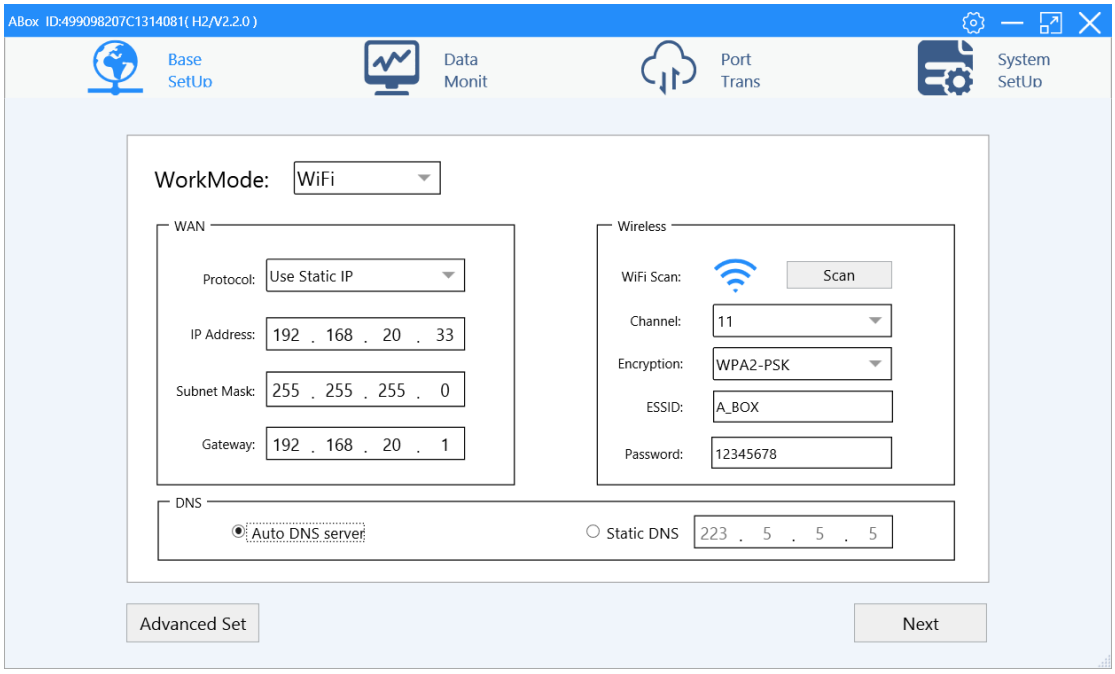
4. When the power is cut off, power on after the module is insert with SIM card. Log on the server after the function is initialized. 4G light is always on, LINK light is always on, WIFI light is flashing.

3-2-2. Mode B (access to Internet via WIFI)

1. In working mode interface, choose work mode is WiFi, click next.

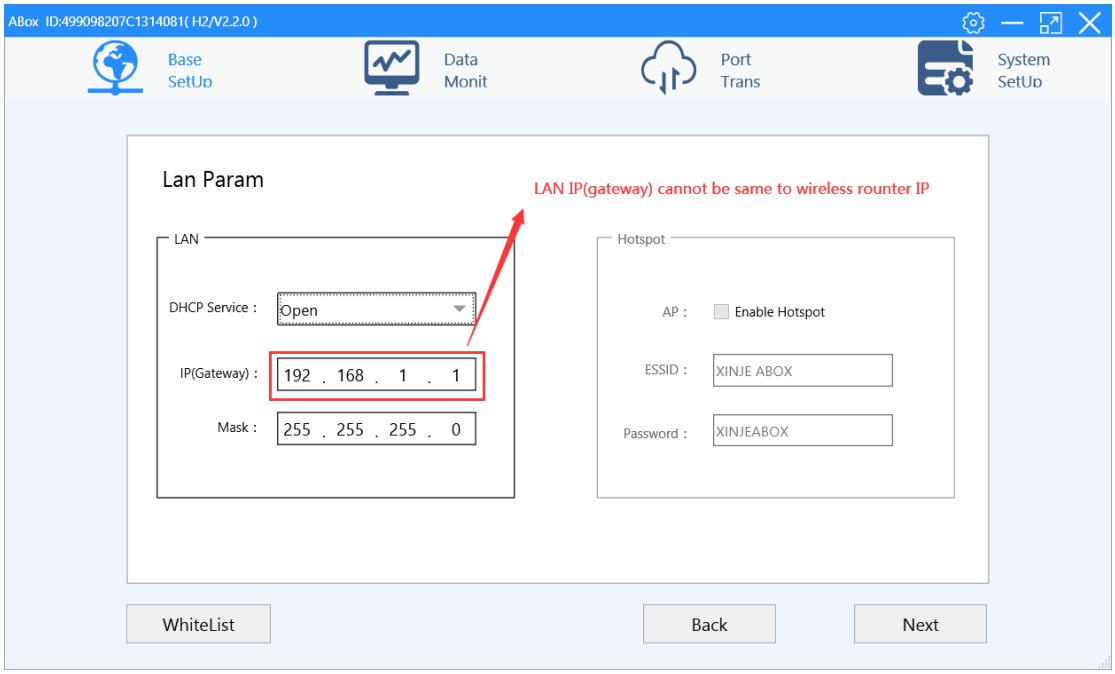


When some networks need to specify IP and DNS servers to access the Internet, you can select "Use static IP" and manually enter the DNS server.

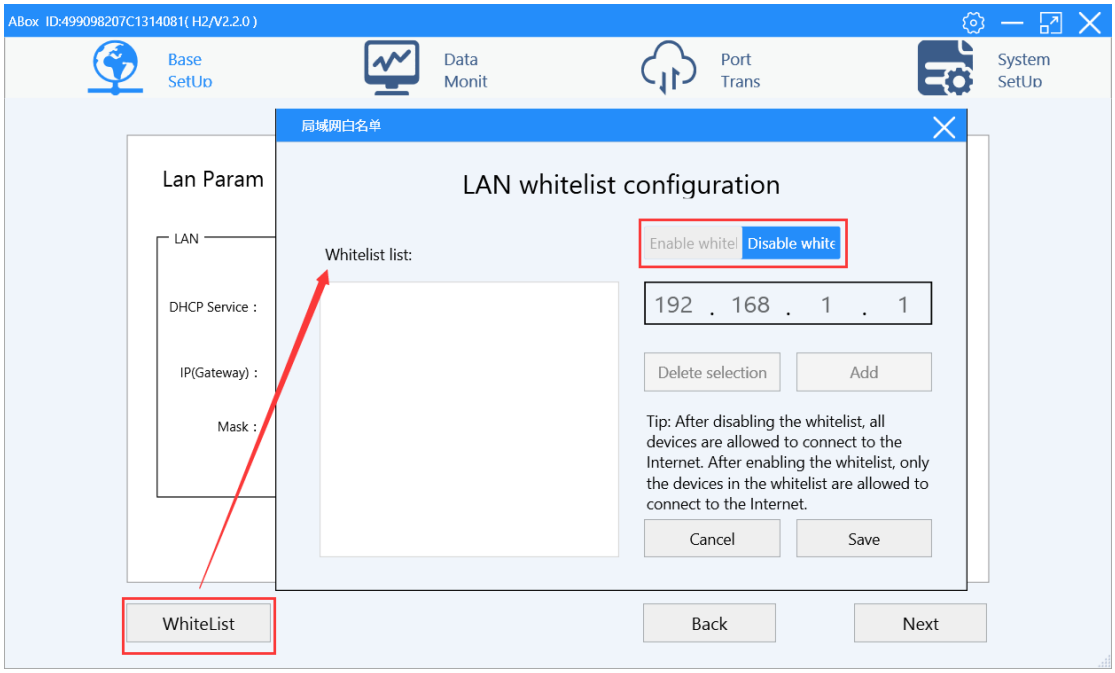


2. Click next, set the LAN parameters. It is recommended to enable the DHCP service. WiFi mode cannot provide hot spots.

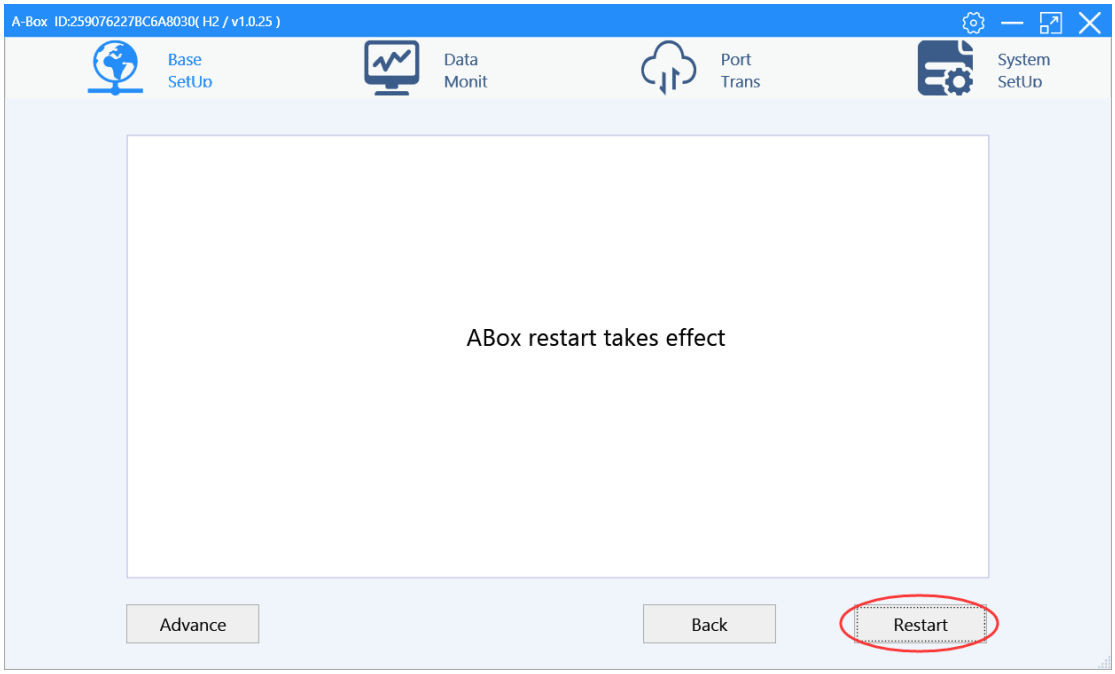
Note: The LAN gateway is different from the router gateway. Please check the router gateway parameters in advance.



Enabling the white list enables the devices in the gateway LAN to access the Internet.

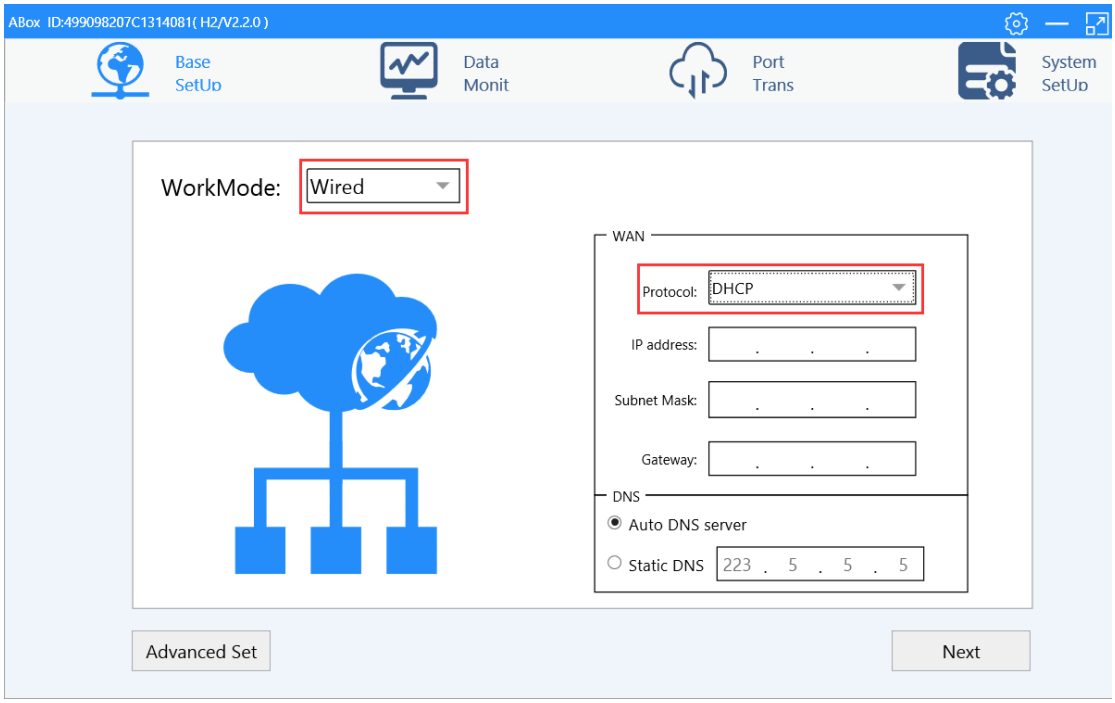


3. Click next, restart the A-BOX to make the settings effective. After successfully logging in to the server, the LINK light is always on and the WIFI light is always on.



3-2-3. Mode C (access to Internet via Ethernet port)

1. In the working interface, choose the work mode is wired, set wide area network (WAN port) parameters. You can select DHCP (automatic obtain) and Static (static allocation). DHCP is recommended. After setting, click Next.

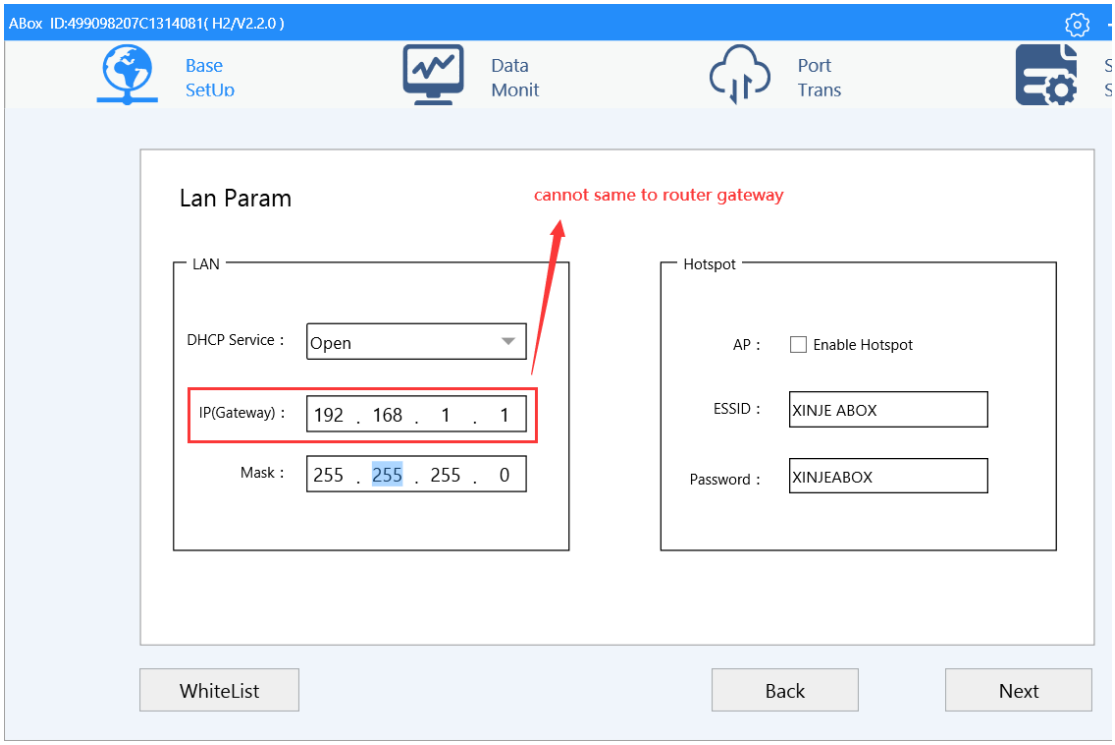


When some networks need to specify IP and DNS servers to access the Internet, you can select "use static IP" and manually enter the DNS server.

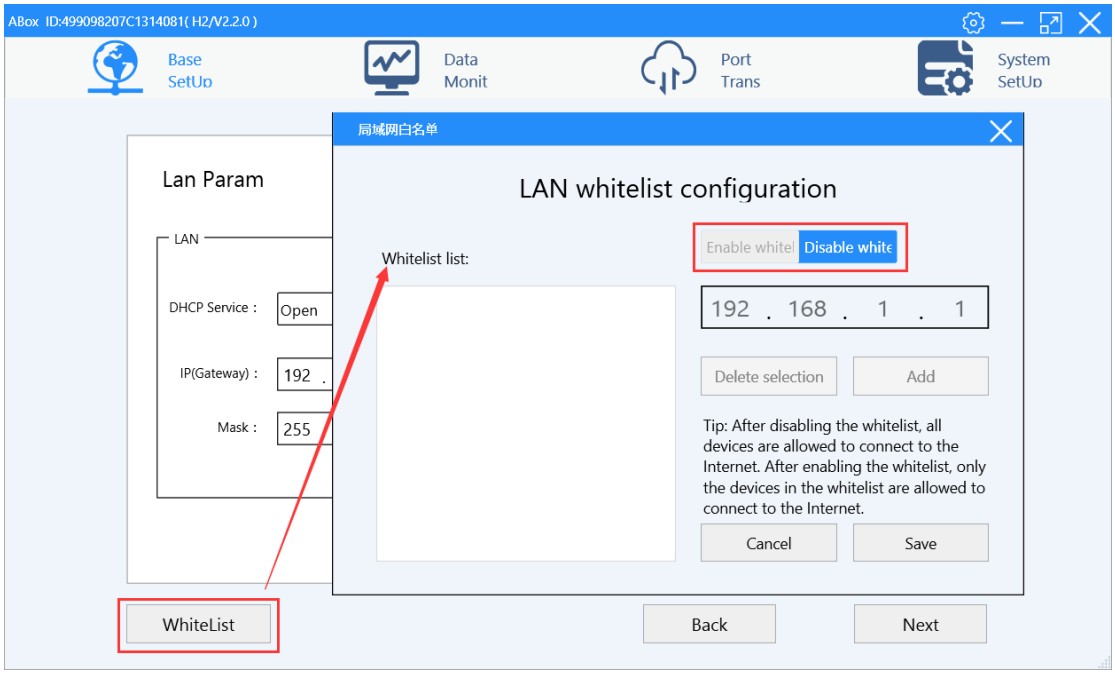
2. Set the WAN port parameters. It is recommended to enable the DHCP service on the LAN.

The network information of WAN and LAN ports shall not conflict. The LAN port provides network access capability for other network devices and enables the wireless hotspot function. The default WIFI name is "XINJE ABOX" and the default password is "XINJEABOX". ABOX is equivalent to the function of wireless router and can provide hot spots for other devices.

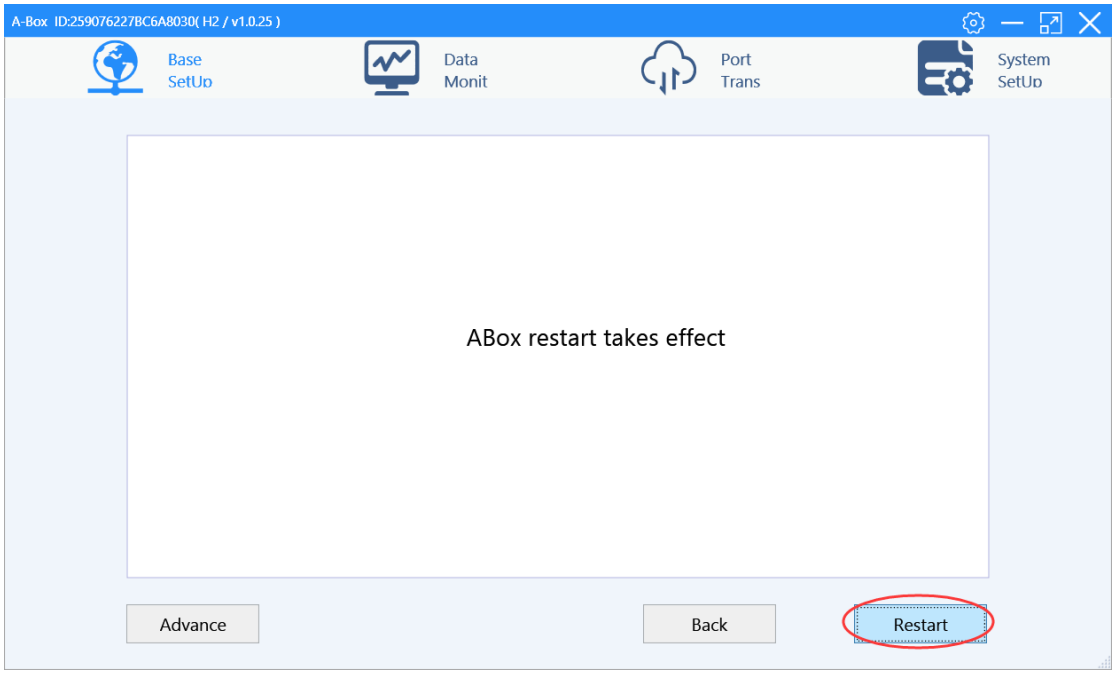
Note: The LAN gateway is different from the router gateway. Please check the router gateway parameters in advance.



Enabling the white list enables the devices in the gateway LAN to access the Internet.

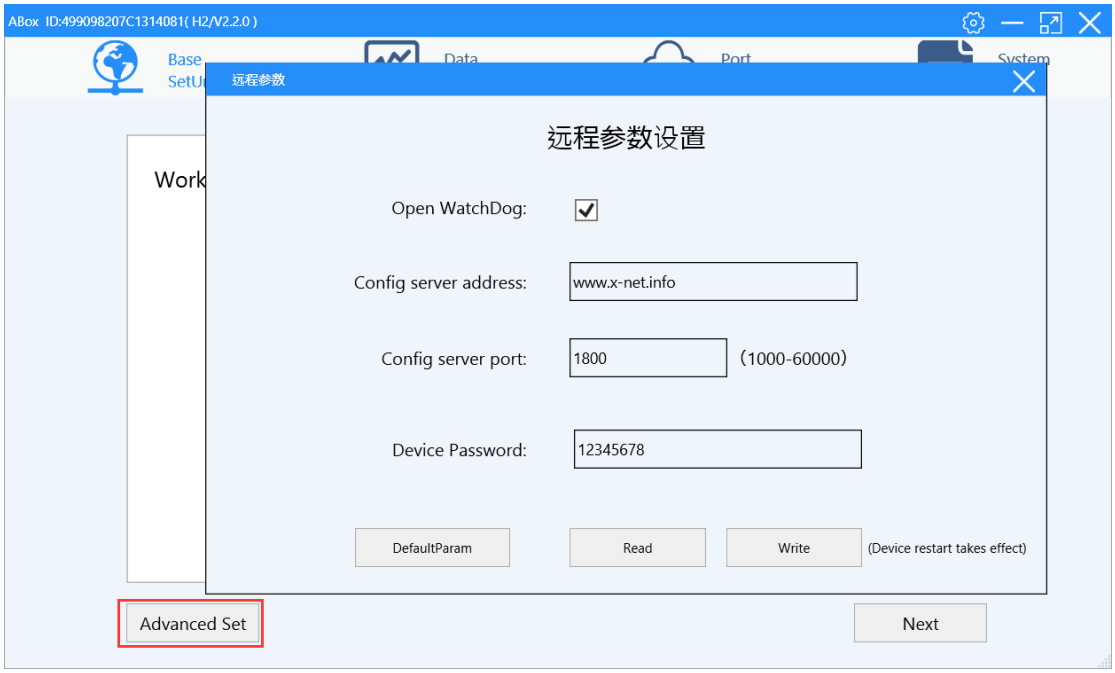


3. Click Next and the settings will take effect after restart. Connect the network cable that can access the Internet at the WAN port. After successfully logging in to the server, the LINK light is always on and the WIFI light is flashing.



3-3. Advance setting

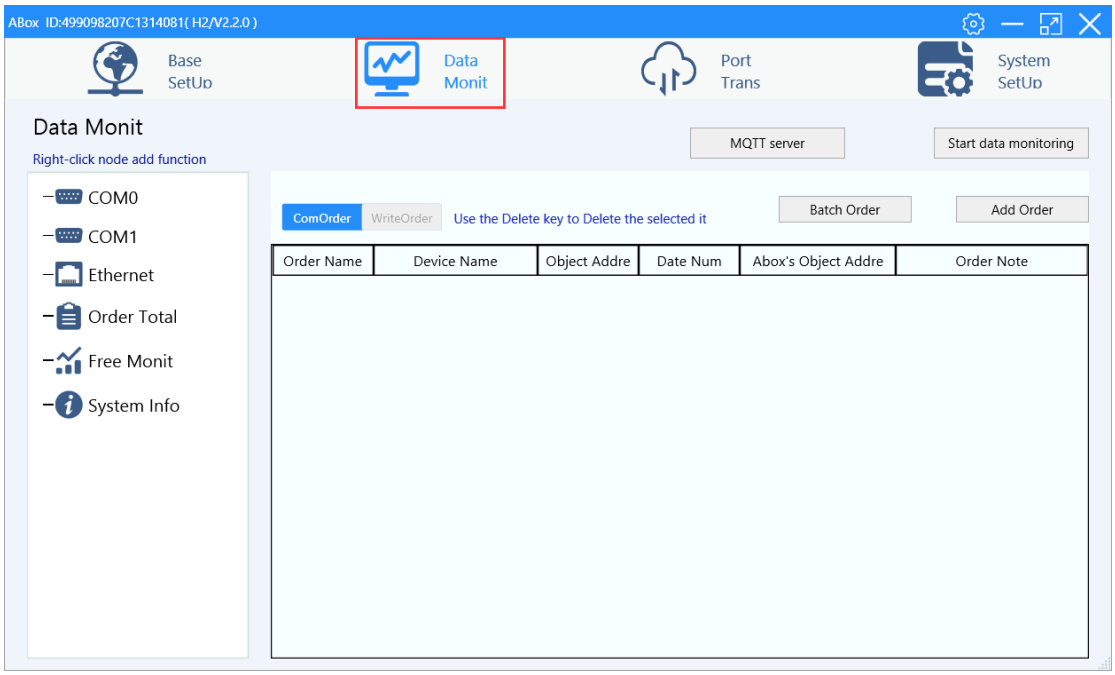
In the advanced settings, the user can modify the password of the device, other parameters no need to modify. The parameters can take effect only after they are written and restarted.



Parameter	Function
Open watchdog	The watchdog is enabled by default. If the module cannot detect the Internet access, restart the module two minutes later. If A-BOX is used as a switch, it is recommended to turn off the watchdog function. It takes effect after the device is restarted after confirmation.
Config server address	Default is www.x-net.info, Xinje server name.
Config server port	Default “1800”, Xinje server port.
Device password	Password authentication as A-BOX connection. The factory setting is 12345678. After A-BOX is initialized, the password is also 12345678. It can be letters plus numbers and is case sensitive. It takes effect after the device is restarted after confirmation.

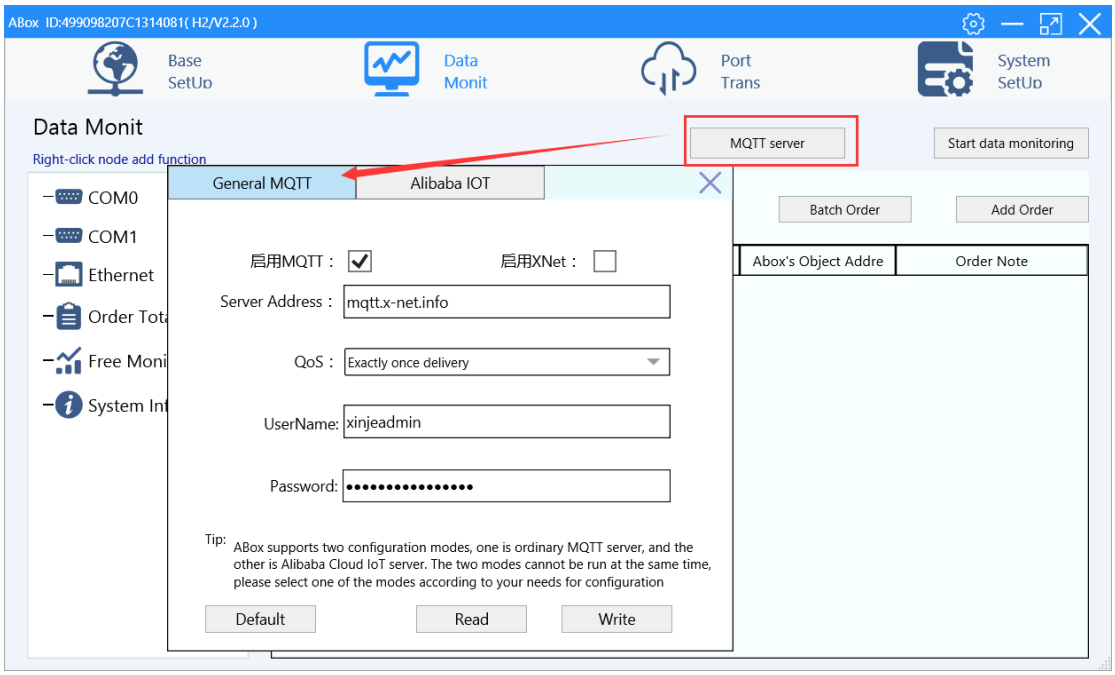
3-4. Data Monitoring

By adding serial port or network port equipment and adding data points to be monitored, remote data monitoring of Xinje cloud can be realized, or docking with third-party platform through MQTT protocol.



3-4-1. MQTT server setting

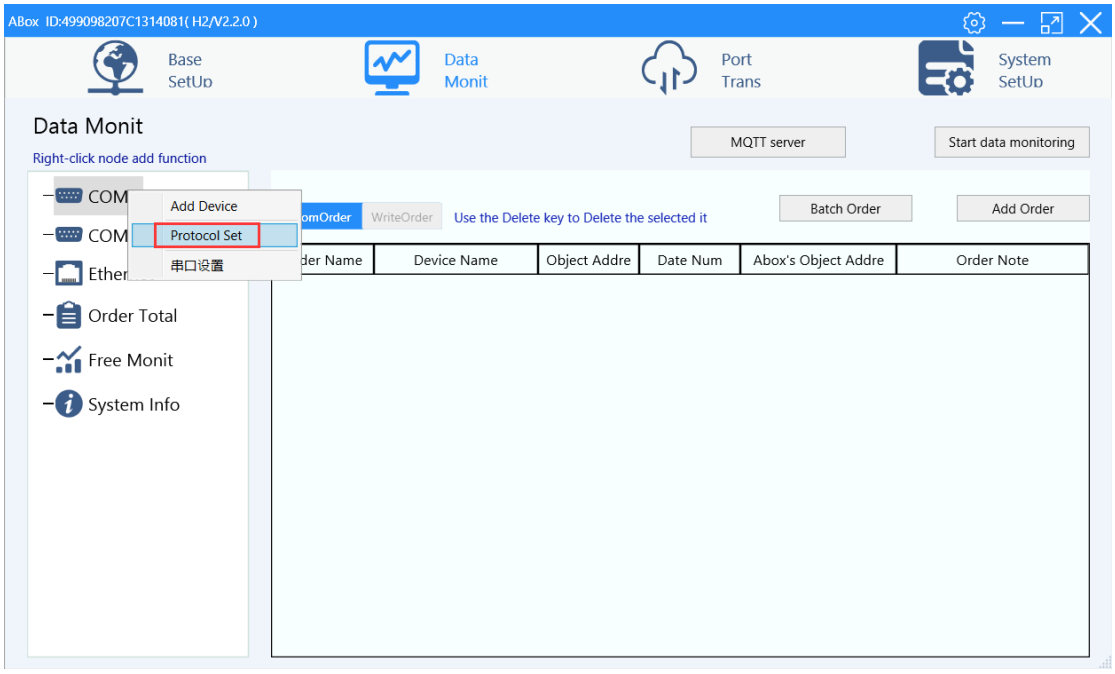
The MQTT protocol is enabled by default, and the MQTT proxy server of Xinje is used by default. Users can directly change to their own proxy server. The cloud platform corresponding to the Xinje MQTT protocol is limited to cloud V4.1 and above. XNet protocol can be used.



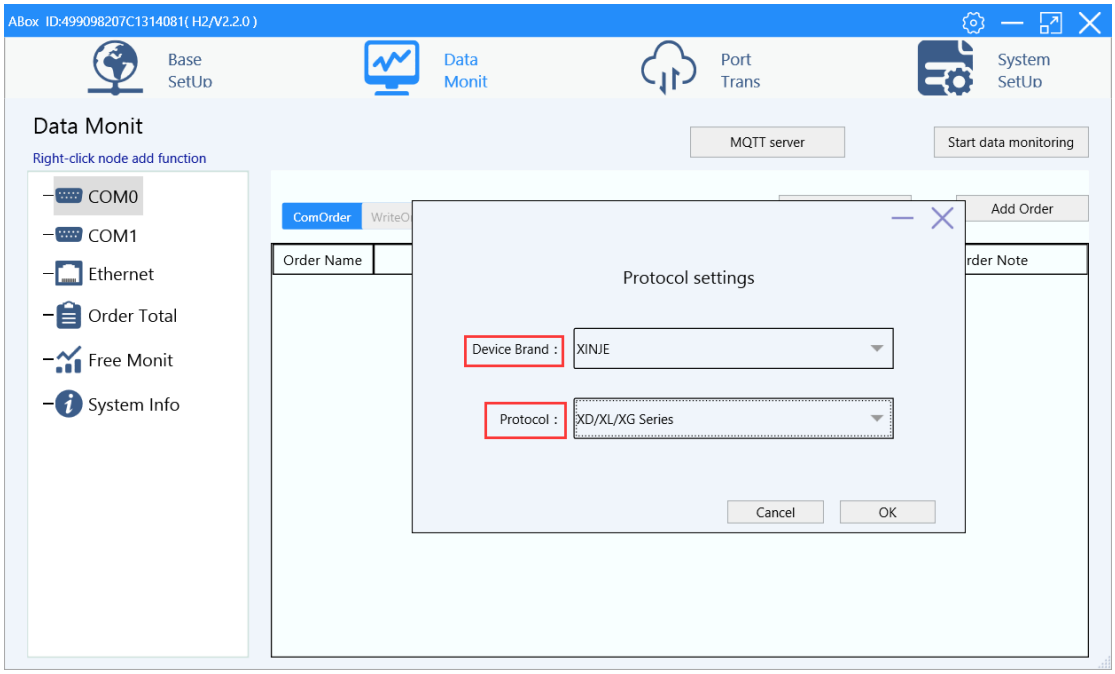
3-4-2. Add device

(1) Serial port device

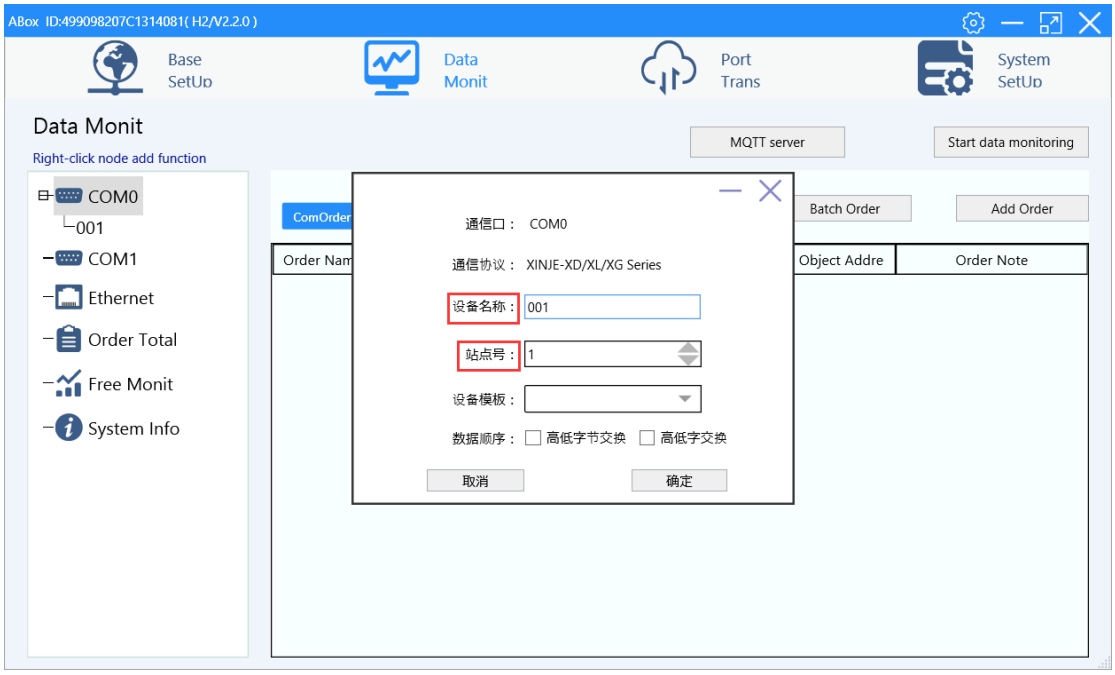
Right click the COM port, choose protocol set.



Choose the device brand and protocol.

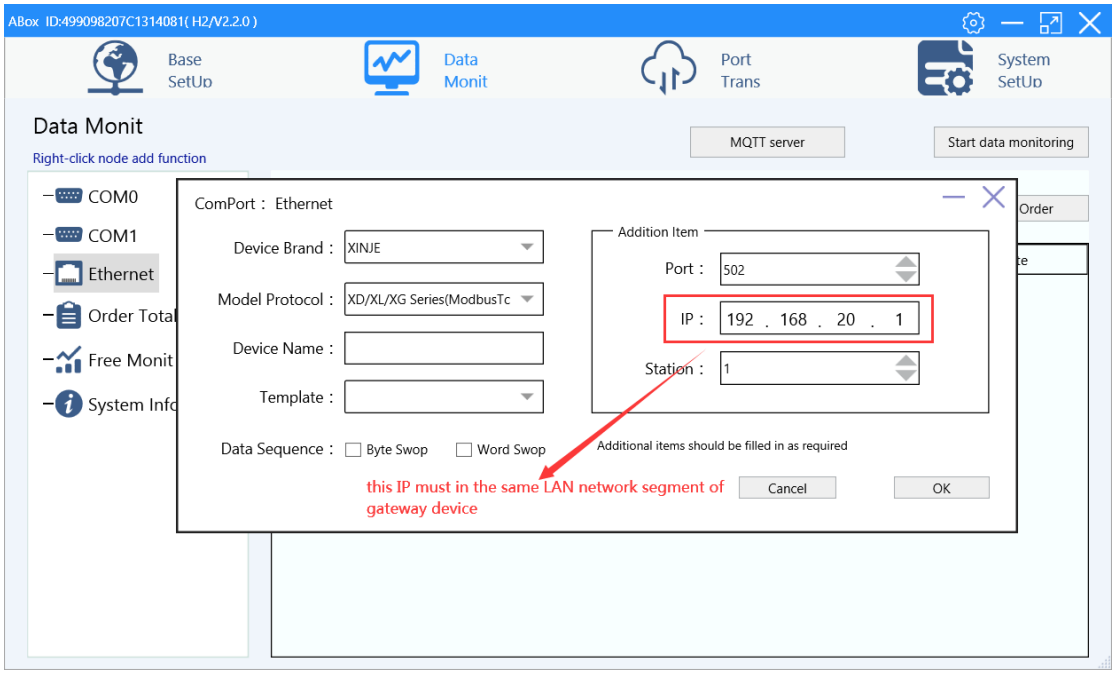


Right click the COM port to add device. Define the device name and station number. The function of the device template is to copy the configuration table when one A-BOX connects multiple devices of the same model and data point.



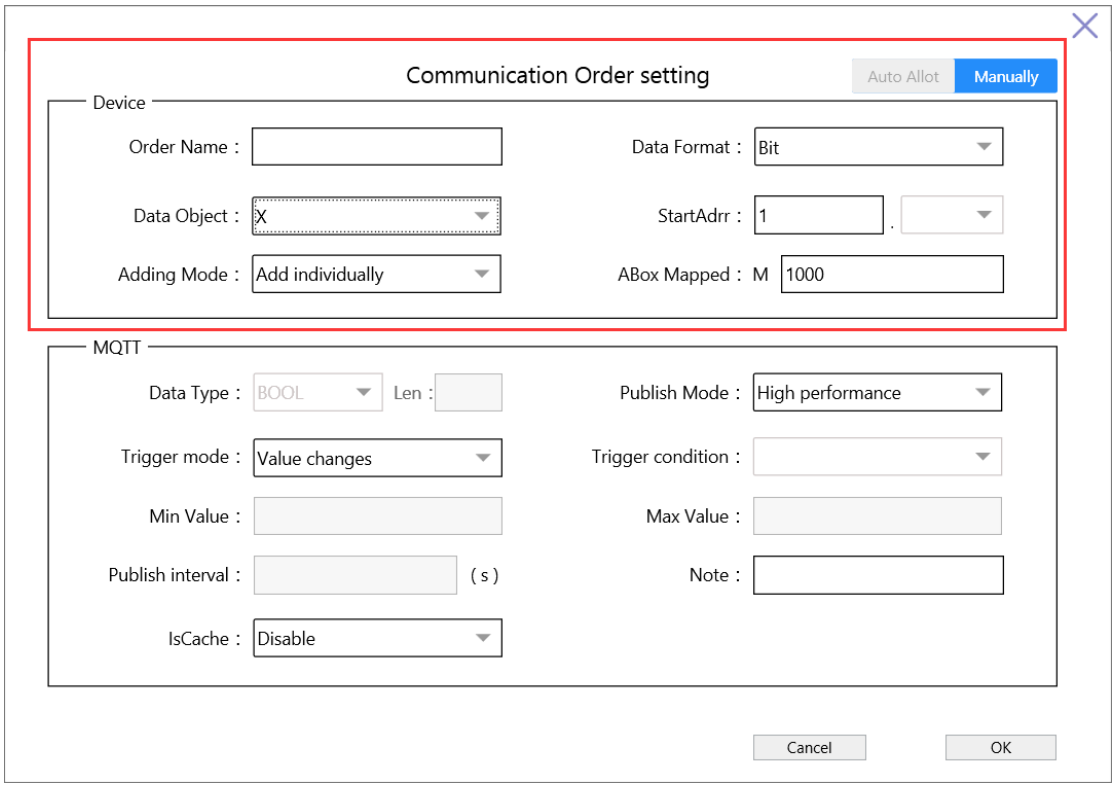
(2) Ethernet device

Right click Ethernet, click add device, choose device brand and model protocol. Input the PLC port, IP, station no., etc. The PLC IP must be in the same network segment with the LAN gateway of A-BOX.



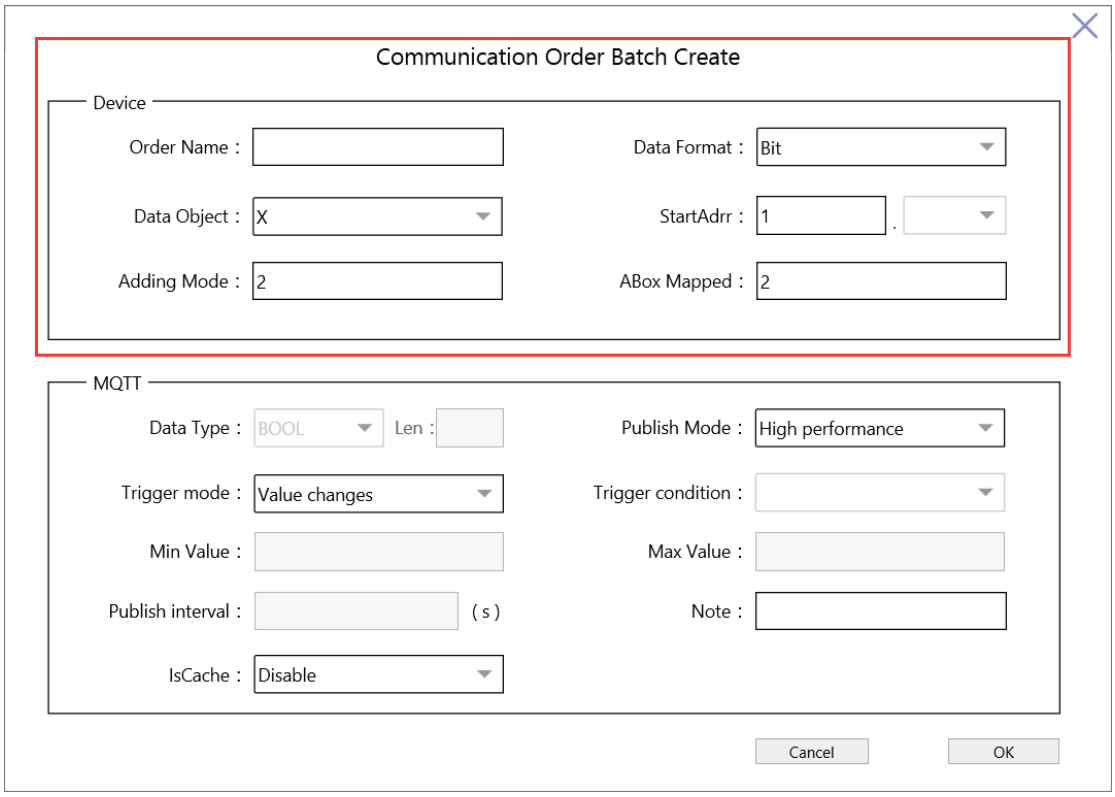
(3) Command setting

a. Add one order: right click the added device, choose the related device, click add order.



Parameter name	Function explanation
Order name	Remarks of the order
Data format	Types of data points, including Bit and Word
Data object	Specify the data point object of PLC, and automatically switch the digital value and data type according to the data specification
Start address	Specify the address of the PLC's data point
Adding mode	It is divided into add individually and batch addition. Data type and data quantity can be specified when adding in batches
ABOX mapped	Automatic assignment and manual setting can be selected. Cloud platform monitoring ABOX is actually monitoring the mapping address of ABOX.

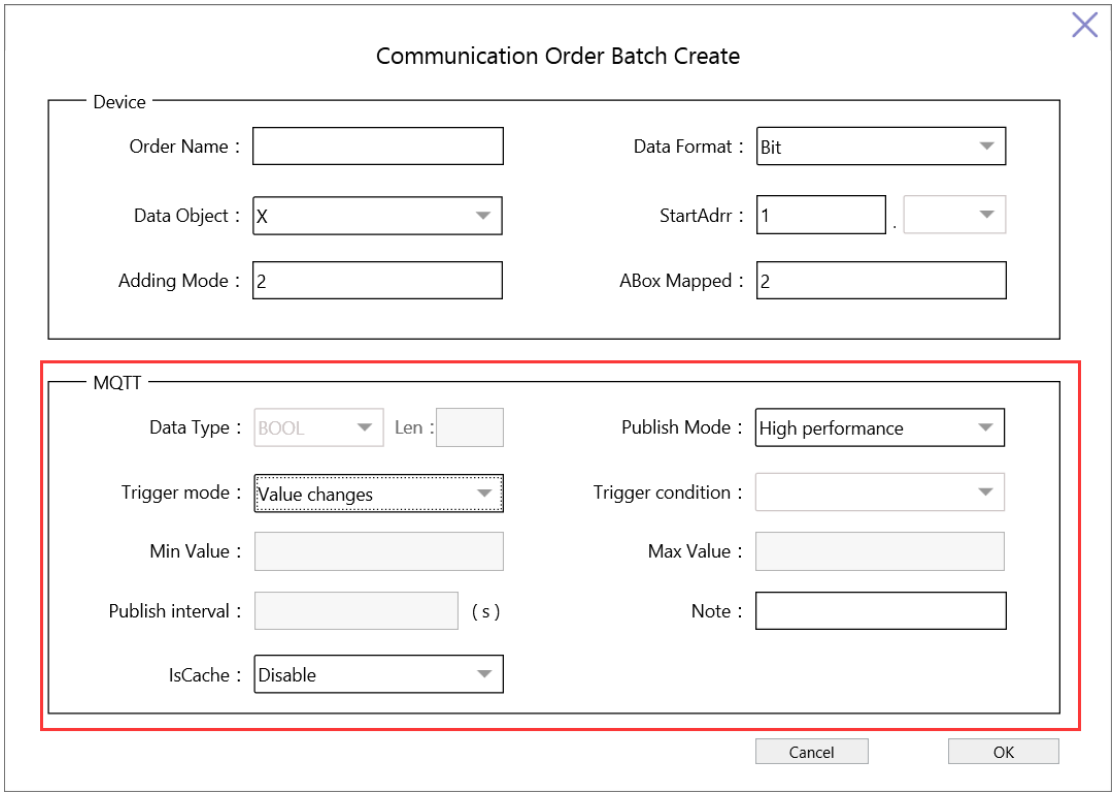
b. Batch order



Parameter name	Function explanation
Order name	Remarks of the order
Data format	Types of data points, including Bit and Word

Data object	Specify the data point object of PLC, and automatically switch the digital value and data type according to the data specification
Start address	Specify the address of the PLC's data point
Adding mode	Interval between each address
ABOX mapped	Number of addresses added

c. MQTT parameters



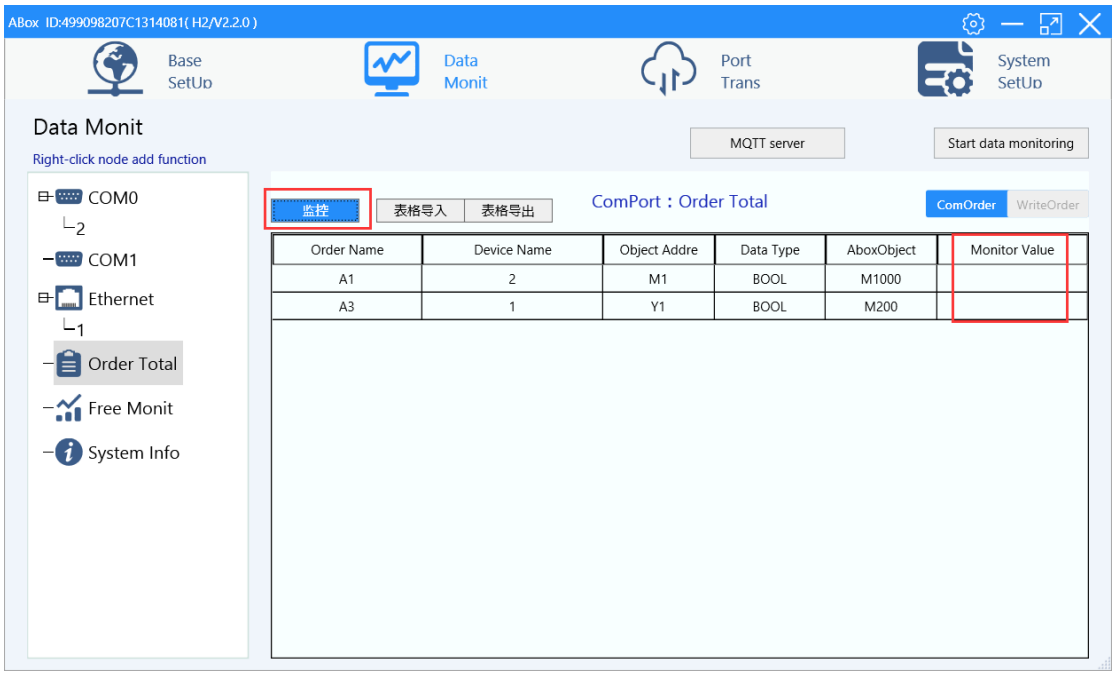
Parameter name	Function explanation
Data type	The data type include INT16U, INT16S, INT32U, INT32S, INT64S, Float, Double, Char[ ]
Publish mode	It is divided into response mode and high performance. Response mode: the platform releases a request and ABOX releases a piece of data. High performance: according to the data trigger conditions, if the conditions are met, the data will be published.
Trigger mode	It can be divided into trigger when the value changes, trigger when the condition is met, and trigger at a fixed time (high-performance mode).

Parameter name	Function explanation
Trigger condition	When the trigger condition is "meet condition trigger", meet condition trigger can set the range of actual data and maximum minimum value as the condition, including less than, in range, greater than, not equal to, and out of range
Publish interval	When the trigger condition is "fixed time trigger", data can be published regularly according to the set publish interval
Info cache	When the device is disconnected (not powered off), the data can be saved in the gateway after the message cache is enabled. Up to 30000 node data can be cached.

3-4-3. Order total

(1) Data monitor

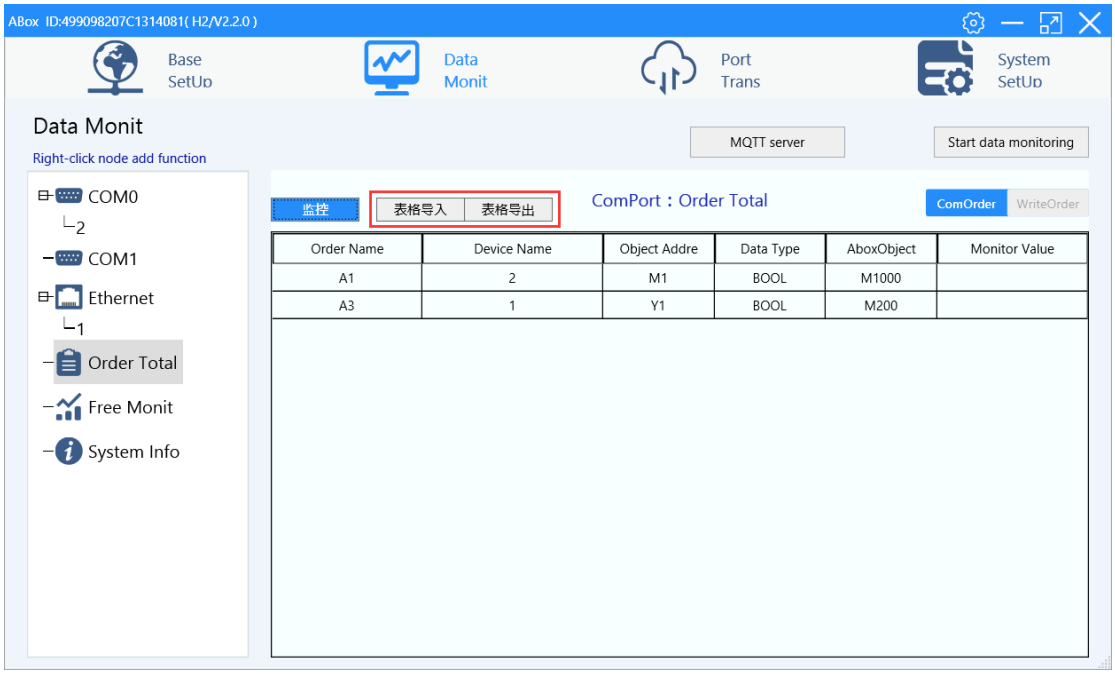
In the order total, you can view the instructions added by all devices. Click the "Monitoring" button to view the real-time value of the added data. In order to save data traffic cost, Monitoring is not enabled by default and needs to be enabled manually. Here, data monitoring can be read and written.

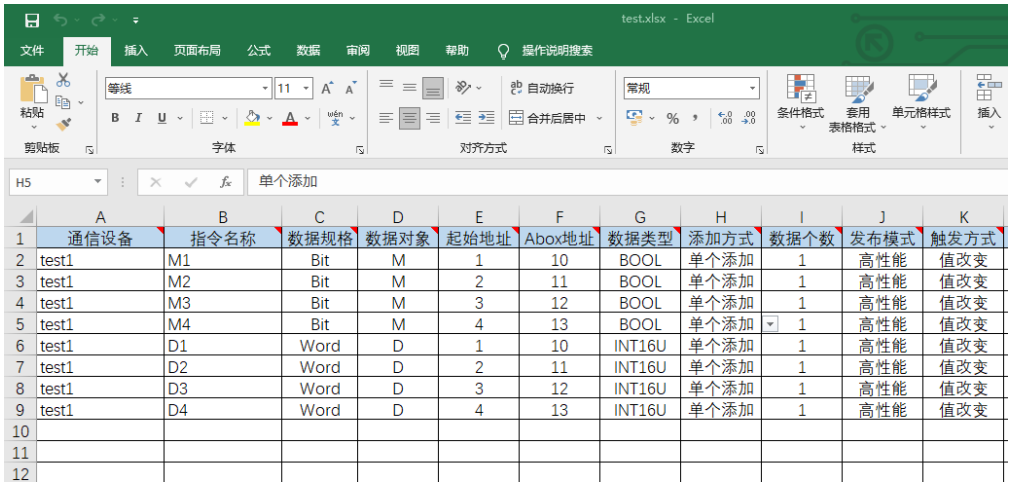


(2) Data table import and export

With the table export function, you can export the configured data points of the device locally, save them in Excel, edit them in Excel, and then import them into the device.

Note: Before importing the table, it is necessary to confirm that the "communication device" in the excel form exists in the gateway data monitoring configuration.





	A	B	C	D	E	F	G	H	I	J	K
1	通信设备	指令名称	数据规格	数据对象	起始地址	Abox地址	数据类型	添加方式	数据个数	发布模式	触发方式
2	test1	M1	Bit	M	1	10	BOOL	单个添加	1	高性能	值改变
3	test1	M2	Bit	M	2	11	BOOL	单个添加	1	高性能	值改变
4	test1	M3	Bit	M	3	12	BOOL	单个添加	1	高性能	值改变
5	test1	M4	Bit	M	4	13	BOOL	单个添加	1	高性能	值改变
6	test1	D1	Word	D	1	10	INT16U	单个添加	1	高性能	值改变
7	test1	D2	Word	D	2	11	INT16U	单个添加	1	高性能	值改变
8	test1	D3	Word	D	3	12	INT16U	单个添加	1	高性能	值改变
9	test1	D4	Word	D	4	13	INT16U	单个添加	1	高性能	值改变
10											
11											
12											

After the form is exported, it can be edited in the form, and the quick configuration of similar items can be achieved by copying the contents of the form.

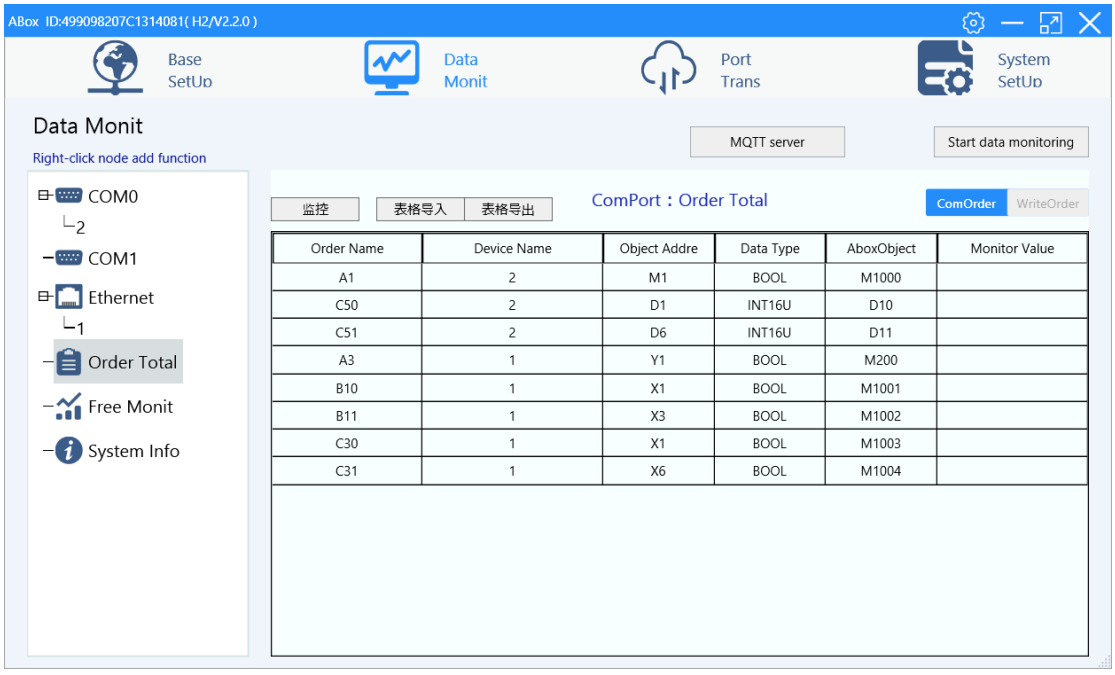
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	通信设备	指令名称	数据规格	数据对象	起始地址	Abox地址	数据类型	添加方式	数据个数	发布模式	触发方式	触发条件	最小值
2	test1	M1	Bit	M	1	10	BOOL	单个添加	1	高性能	值改变	小于	0
3	test1	M2	Bit	M	2	11	BOOL	单个添加	1	高性能	值改变	小于	0
4	test1	M3	Bit	M	3	12	BOOL	单个添加	1	高性能	值改变	小于	0
5	test1	M4	Bit	M	4	13	BOOL	单个添加	1	高性能	值改变	小于	0
6	test1	D1	Word	D	1	0	INT16U	单个添加	1	高性能	值改变	小于	0
7	test1	D2	Word	D	2	11	INT16U	单个添加	1	高性能	值改变	小于	0
8	test1	D3	Word	D	3	12	INT16U	单个添加	1	高性能	值改变	小于	0
9	test1	D4	Word	D	4	13	INT16U	单个添加	1	高性能	值改变	小于	0
10	test2	M11	Bit	M	1		BOOL	单个添加	1	高性能	值改变	小于	0
11	test2	M21	Bit	M	2		BOOL	单个添加	1	高性能	值改变	小于	0
12	test2	M31	Bit	M	3		BOOL	单个添加	1	高性能	值改变	小于	0
13	test2	M41	Bit	M	4		BOOL	单个添加	1	高性能	值改变	小于	0
14	test2	D11	Word	D	1		INT16U	单个添加	1	高性能	值改变	小于	0
15	test2	D21	Word	D	2		INT16U	单个添加	1	高性能	值改变	小于	0
16	test2	D31	Word	D	3		INT16U	单个添加	1	高性能	值改变	小于	0
17	test2	D41	Word	D	4		INT16U	单个添加	1	高性能	值改变	小于	0

manual build the communication device

order name cannot repeat

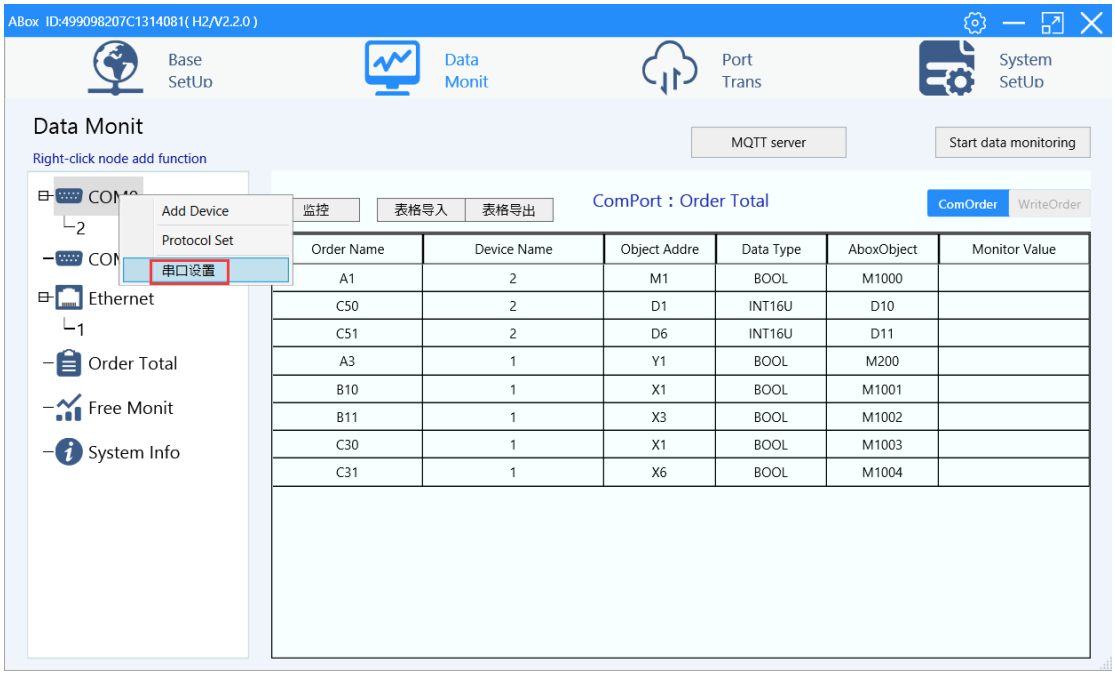
The address is empty and will be automatically assigned

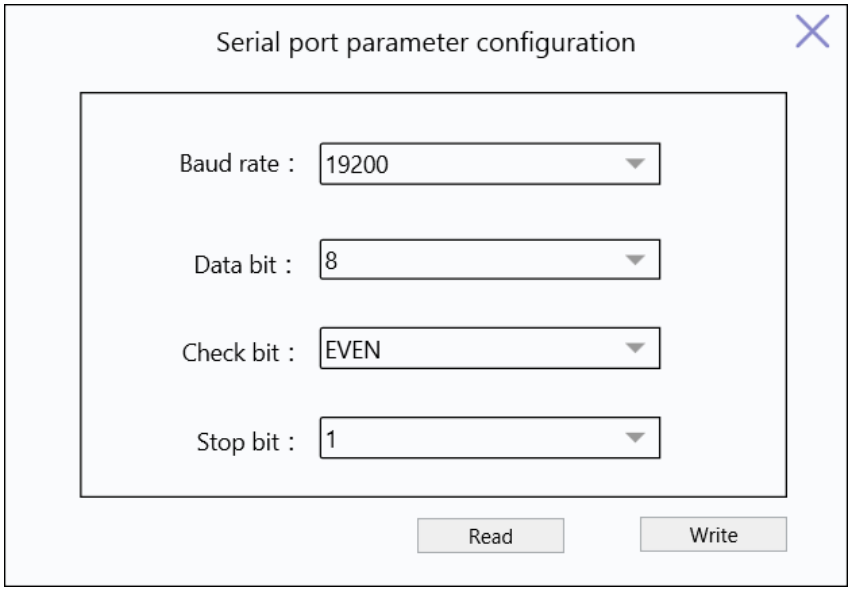
After copying the content, you need to modify the name of the communication device. The communication device here needs to be created manually in the BOX Manager. The order name cannot be the same as the name in the previous table, otherwise it cannot be written to the BOX Manager. The Abox address can be blank, which can be automatically assigned by the BOX Manager or set by the user himself. Please note that it cannot be duplicate with the previous address.



3-4-4. Serial port setting

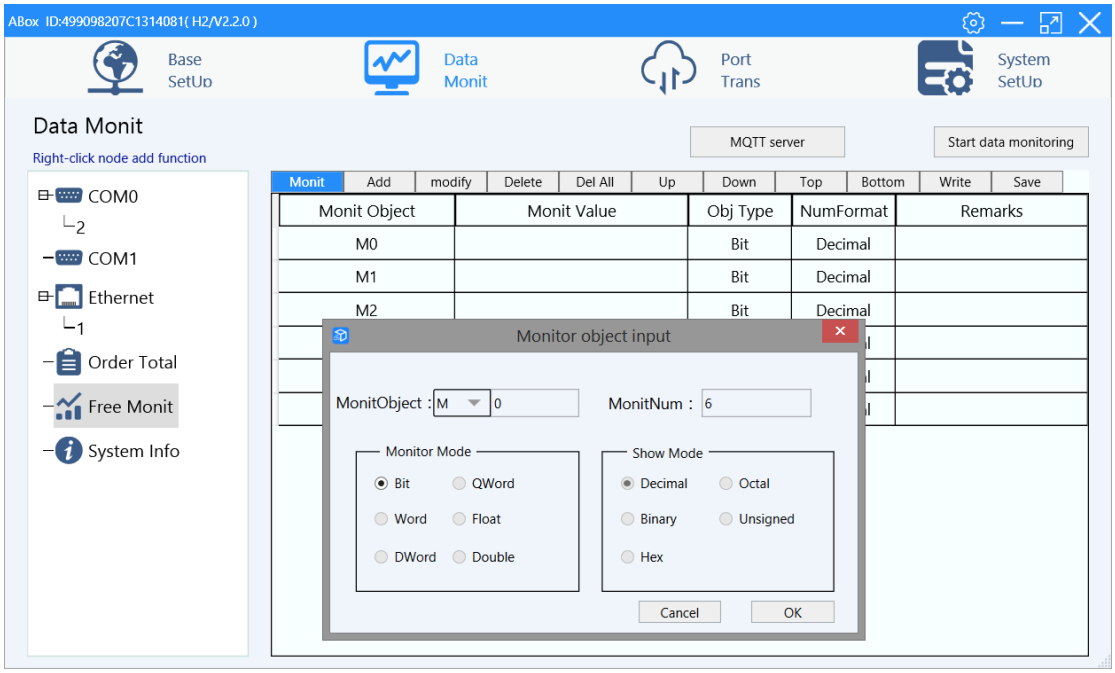
Right click the COM port, select serial port setting. Enable data monitoring to take effect after parameter writing.





3-4-5. Free monitor

Free monitoring monitors the internal objects of A-BOX. Free to add, view and modify data.

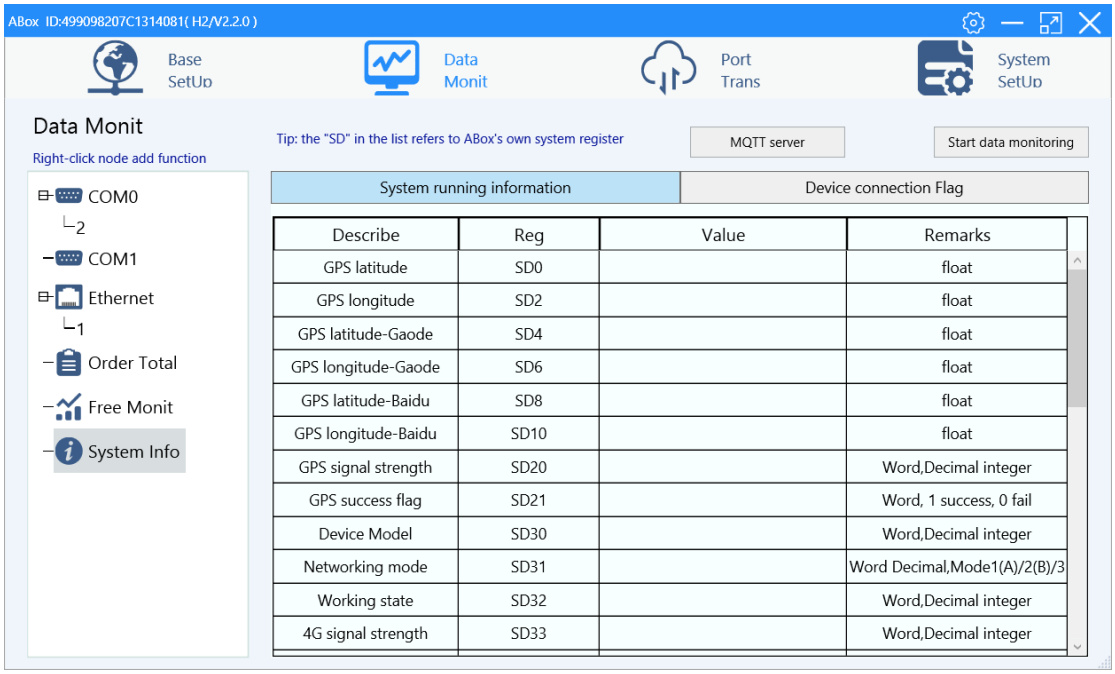


Double click "Monitoring Value" to write the current data.

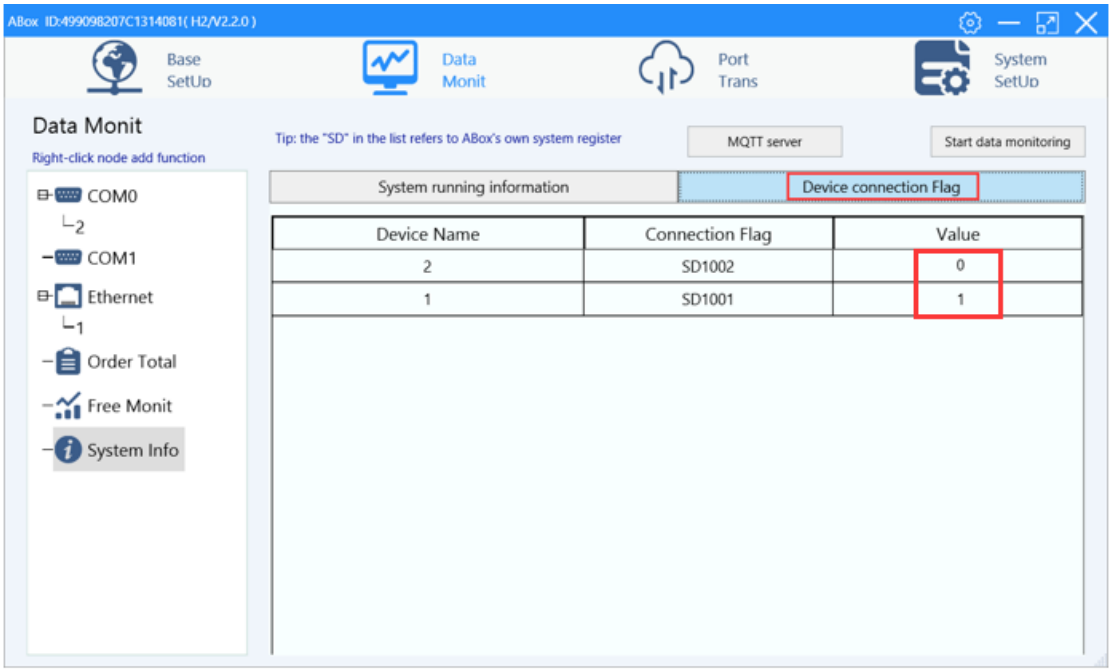
3-4-6. System information

The system information can view the operation status information of A-BOX, such as GPS coordinates, signal strength, equipment operation time, etc.

Note: the system information can only be read once when entering the current interface, not real-time information.



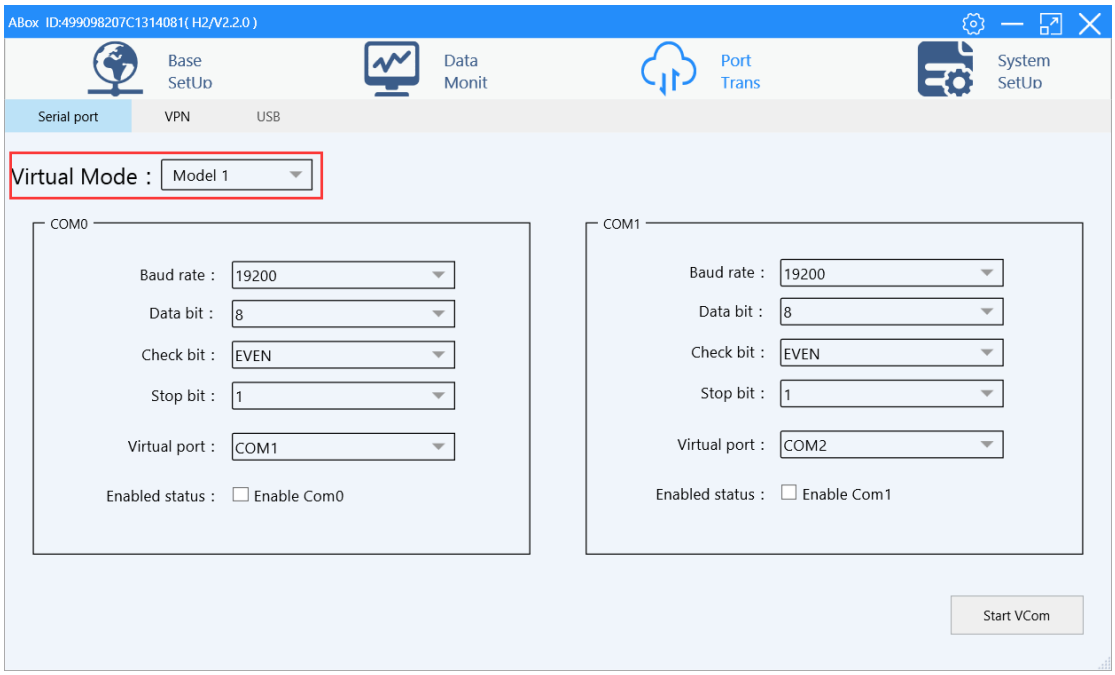
You can also view the communication device connection flag. Connection flag bit 1 indicates successful communication of the device, and 0 indicates communication failure



3-5. Remote transmission

3-5-1. Virtual serial port

That is, transparent transmission. The transmission network is only responsible for transmitting the services that need to be transmitted to the destination node, while ensuring the transmission quality. The virtual serial port function can enable the A-BOX serial port equipment to be completely taken over by remote computers and other equipment. The virtual serial port function supports LAN and WAN modes. Please refer to Section 4-1 for detailed usage. COM0 and COM1 can be used at the same time. RS232 and RS485/RS422 of the same serial port cannot be used at the same time.

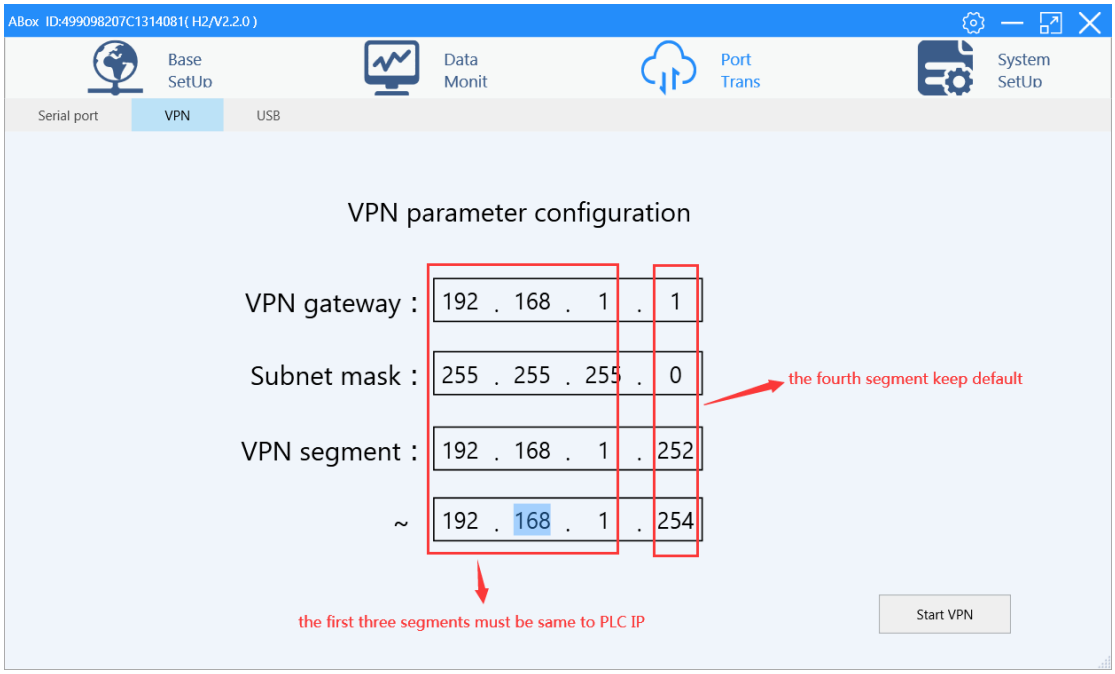


The virtual serial port currently supports two modes: mode 1: digital signature free. Mode 2: Digital signature needs to be disabled.

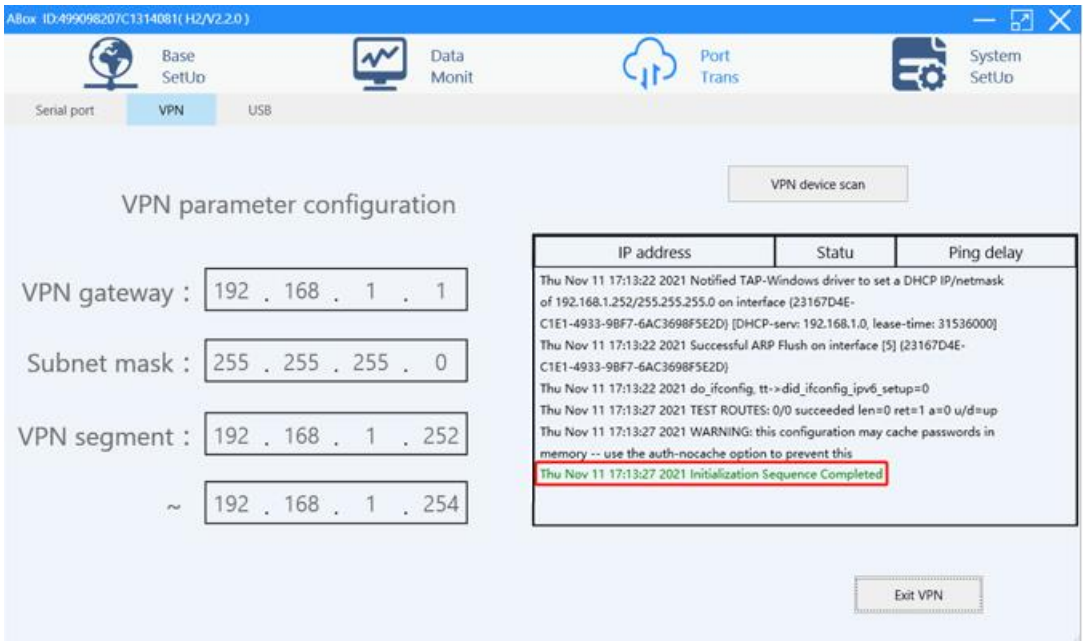
Note: When using mode 1 to transparently download programs, if the download speed is too slow, please switch to mode 2.

3-5-2. VPN

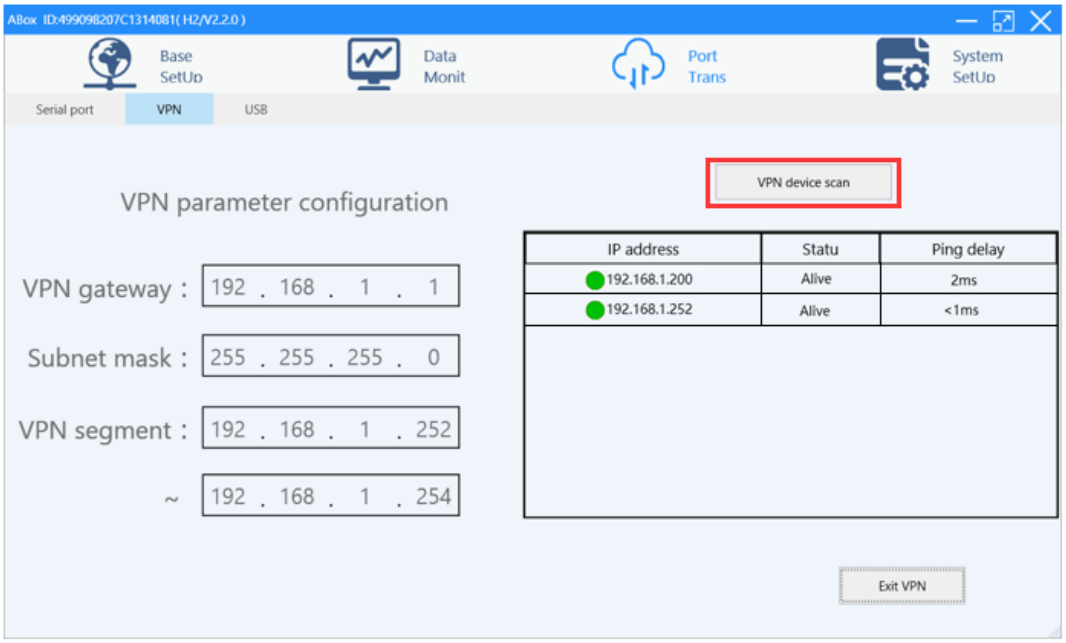
VPN is virtual private network, which establishes a private network on public network for encrypted communication. Connect the network interface device to ABOX directly through the network cable, the remote PC can control the device with network interface through Ethernet network after VPN. Virtual gateway and virtual network segment need to be in the same network segment. Please refer to chapter 4-2 for details.



After the VPN is started, the VPN startup information interface will appear. When the box displays "Initialization Sequence Completed", it indicates that the transparent transmission is successful.

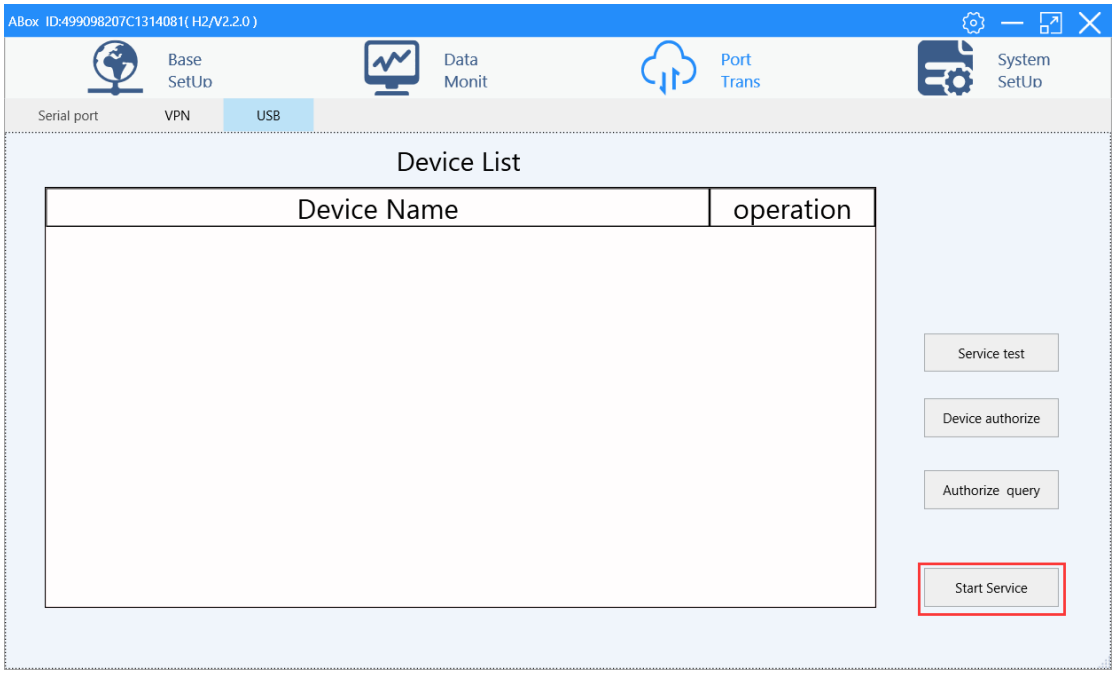


After the VPN is successful, IP scanning can be performed under the VPN network segment through "VPN device scan".

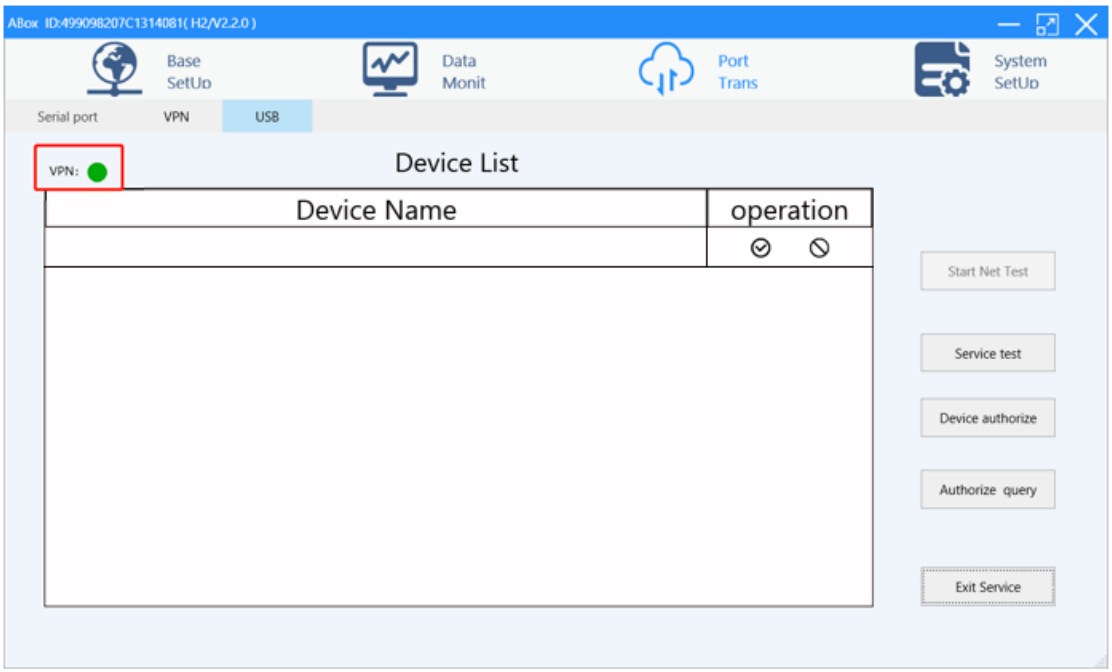


3-5-3. USB transparent transmission (only supported by A-BOX-U)

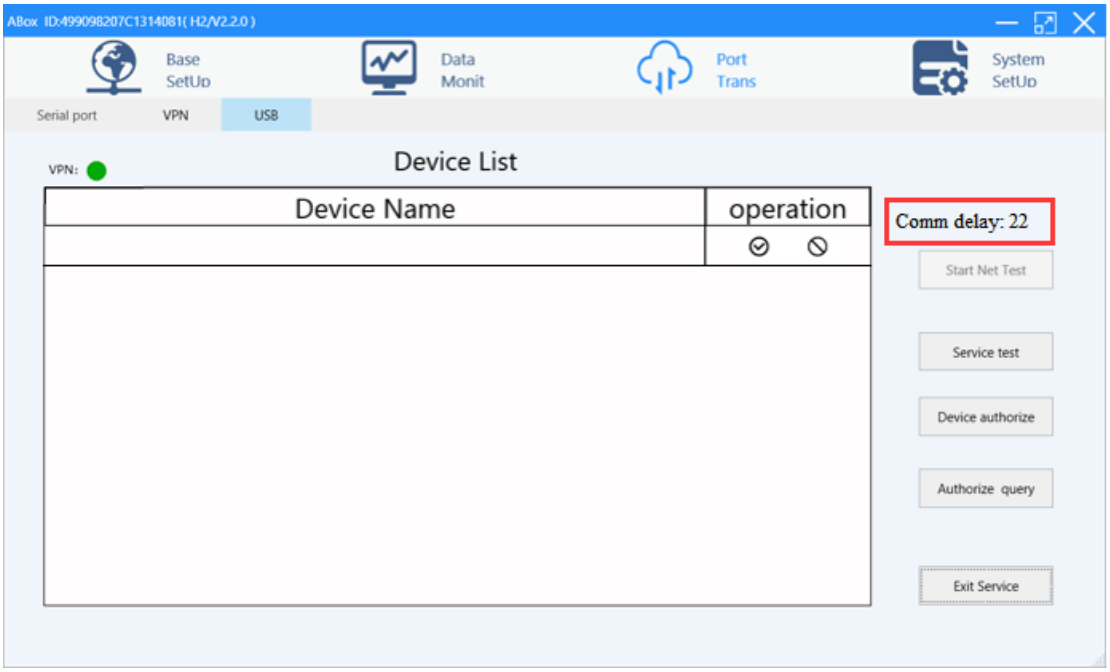
For USB port devices, such as HMI, remote upload and download programs can be realized through USB transparent transmission.



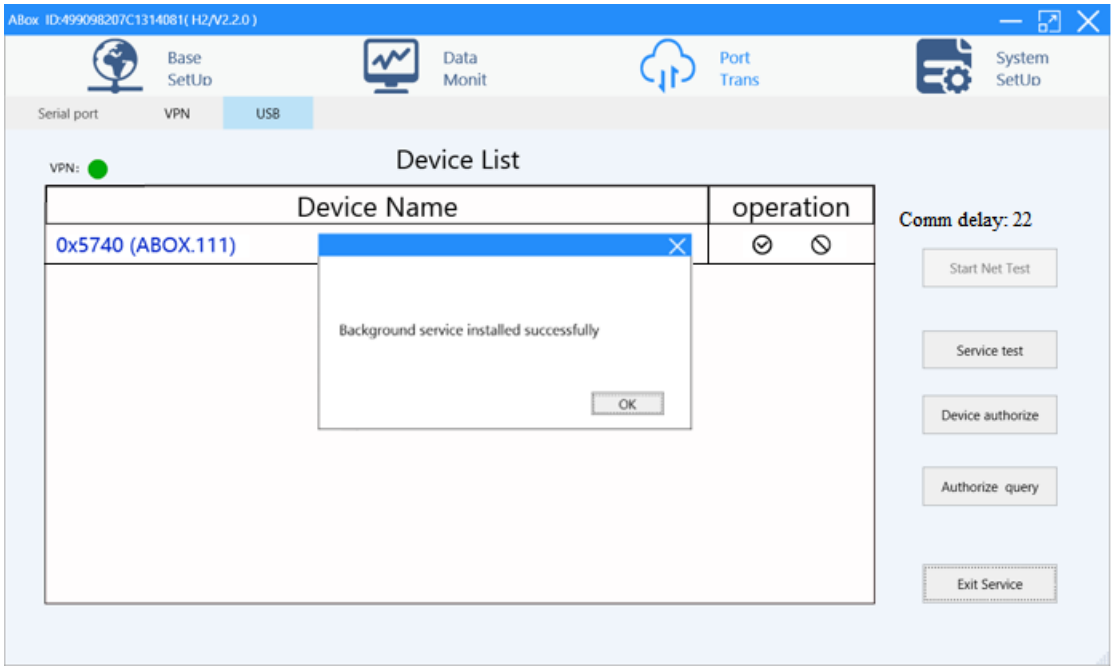
1. Start the service: click to enable the USB passthrough function. After clicking, when the VPN indicator turns green, it indicates that the service is successfully started.



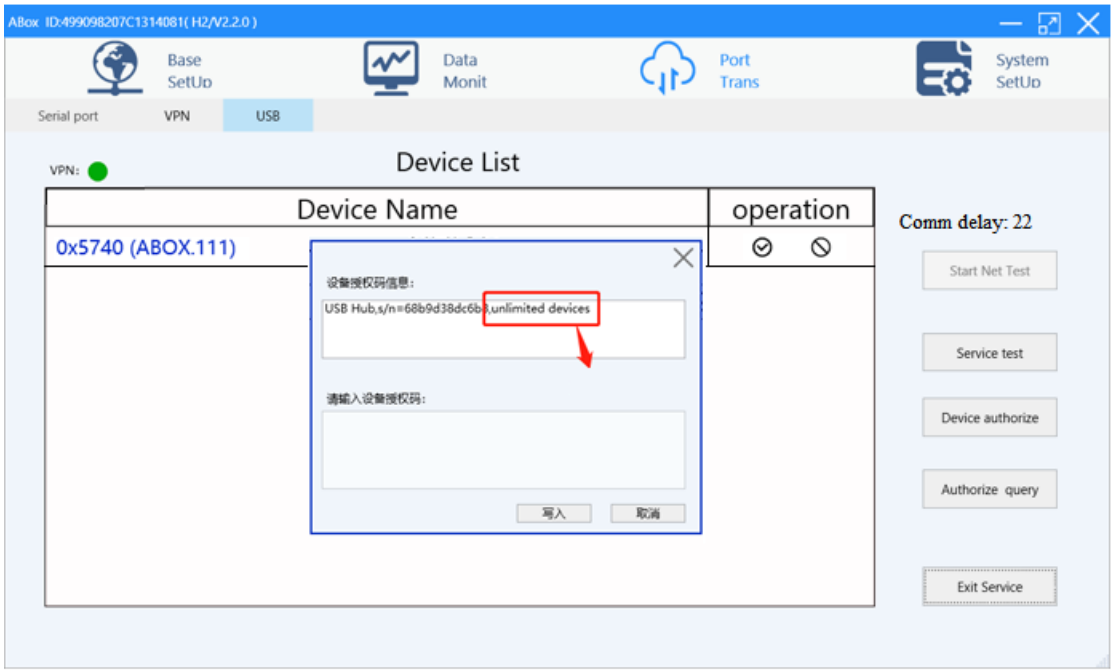
2. Start network test: After starting the service, click Start Net Test to view the current network delay, which is generally within 150ms when the signal is good.



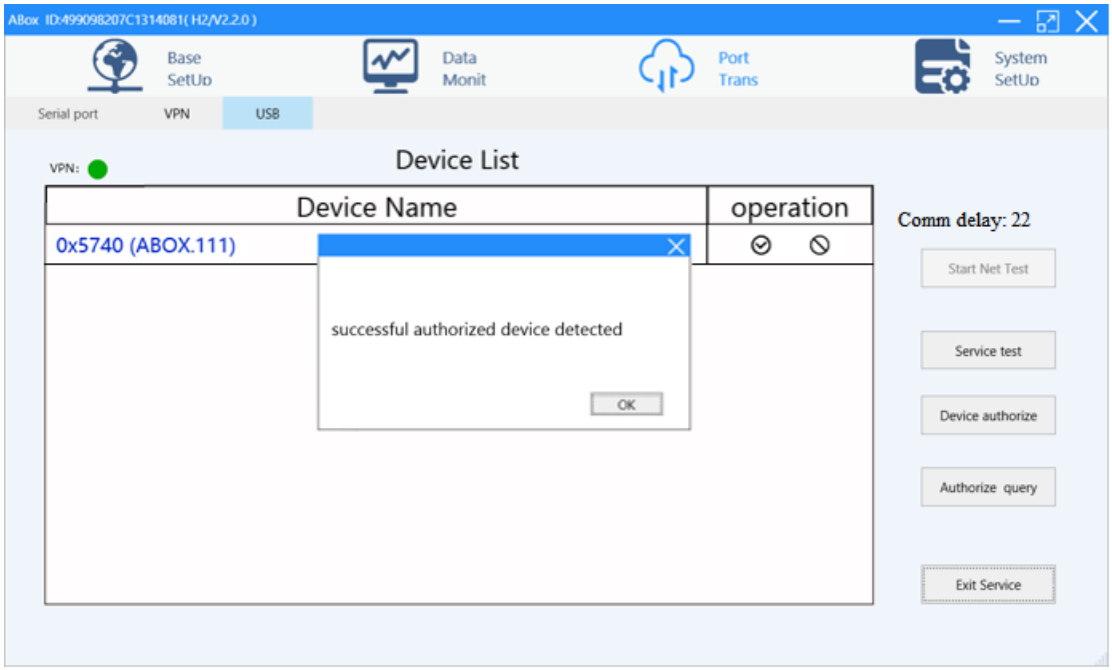
3. Service detection: check whether the transmission tool driver is installed.



4. Device authorization: check whether the connected device has the USB passthrough function. The display of "unlimited devices" indicates that the USB passthrough function has been enabled. If "devices" is displayed, the device is unauthorized and can be activated by purchasing "USB authorized passthrough function" separately.



5. Authorization query: check whether authorization is successful.

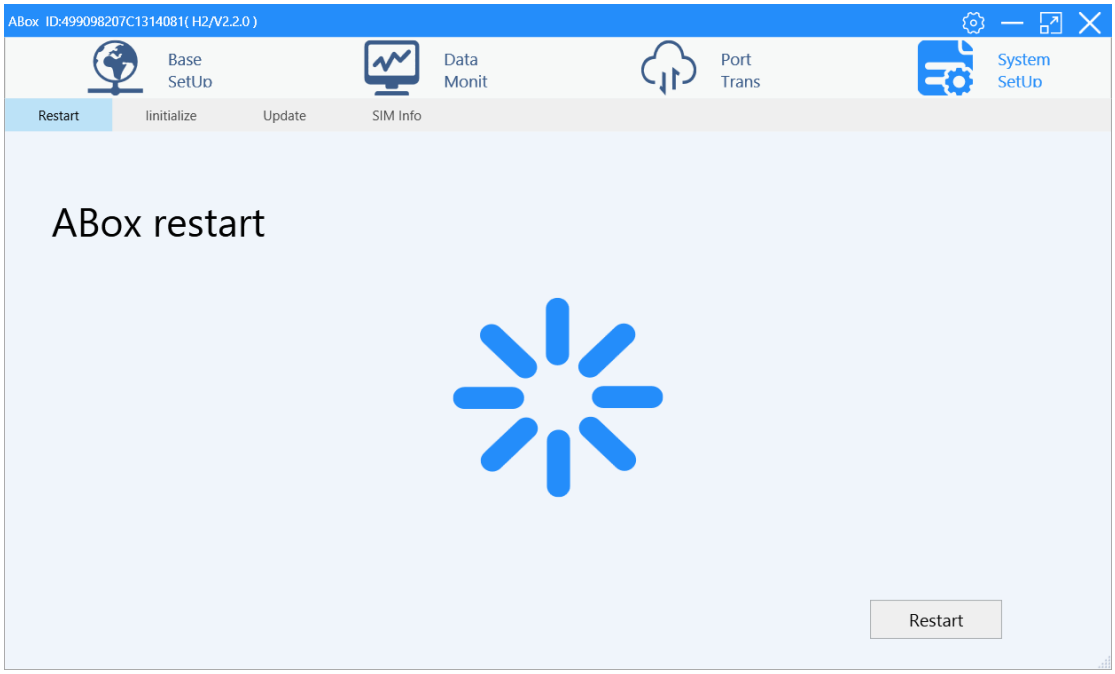


Please refer to Section 4-3 for specific usage.

3-6. System tools

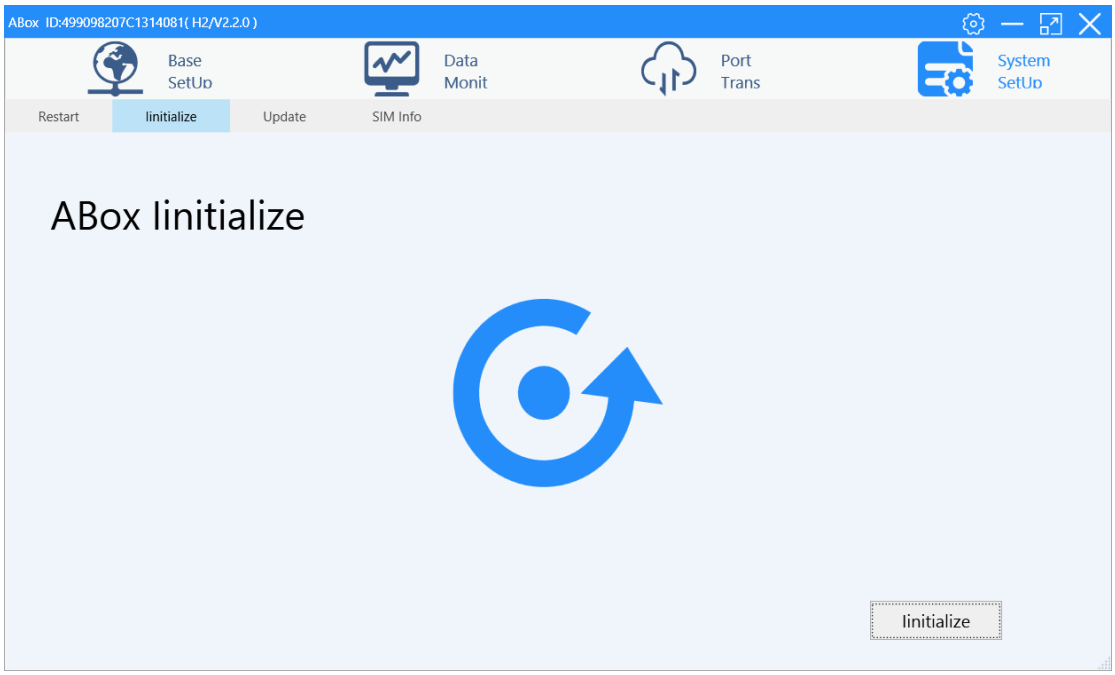
3-6-1. ABOX restart

Click restart to restart the ABOX, the configuration parameters in configuration tool will be effective.



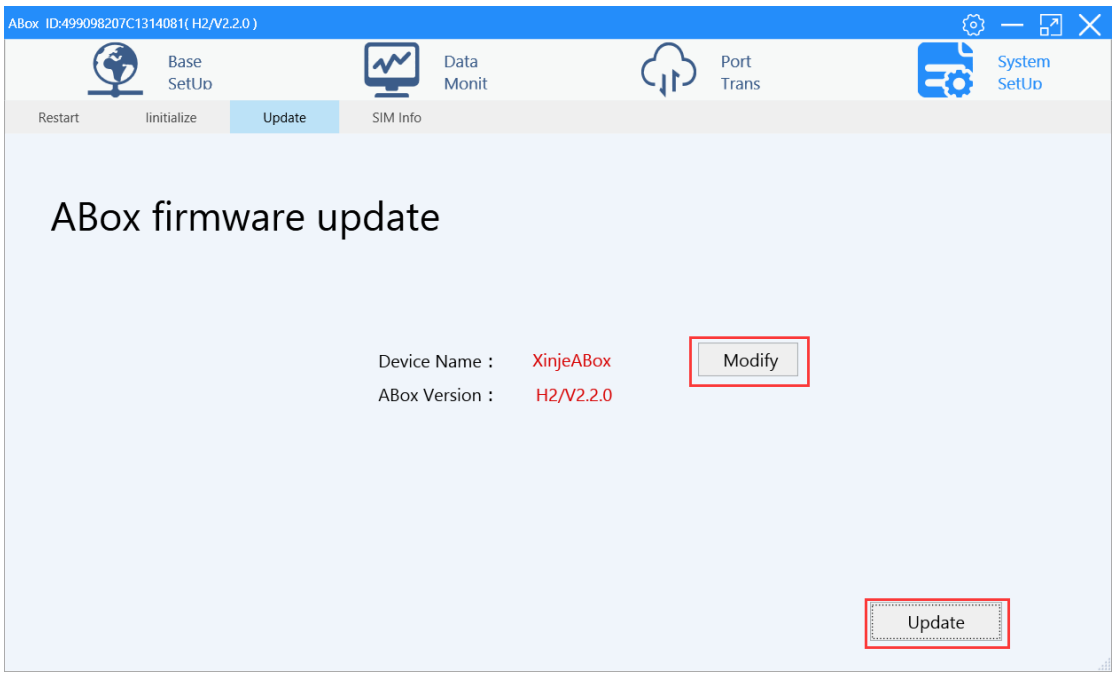
3-6-2. Initialization

Click ABOX initialization, restore the ABOX parameters to factory default settings. This operation will not change the ABOX firmware version.

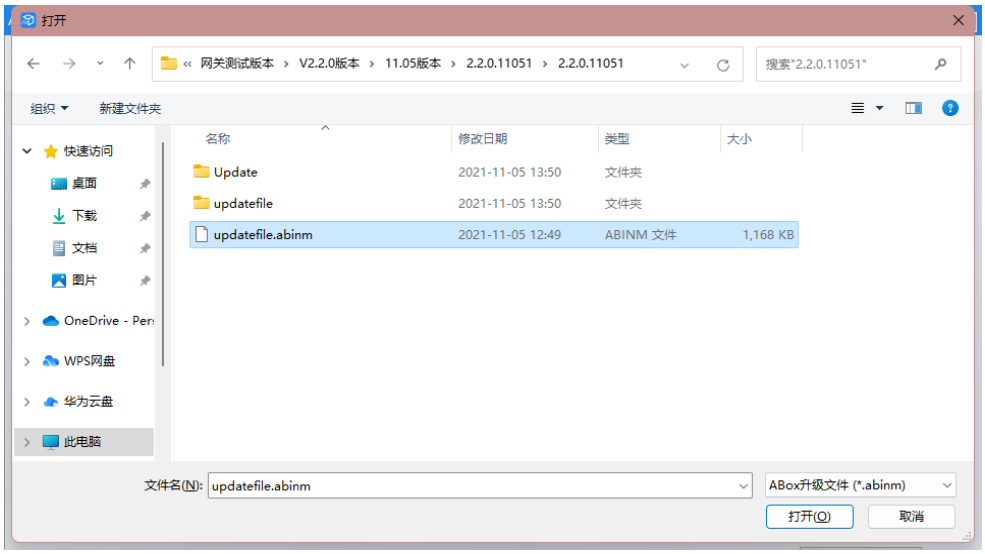


3-6-3. Device update

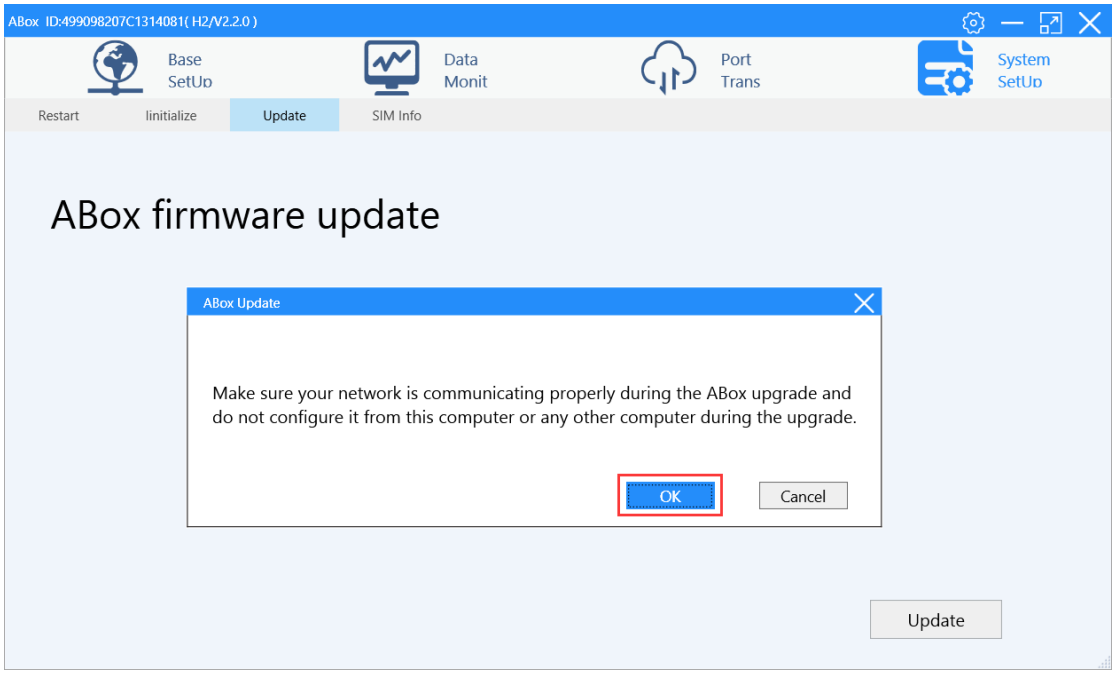
1. click ABOX update, choose the update file folder, click open.



Note: the device name can be changed.



2. Click OK.



3. After updating, restart the ABOX to make the new firmware effective.

Note: please contact us to get the update files.

3-6-4. SIM card information

When ABOX inserts a 4G card, the corresponding 4G card information can be queried. If it is a Xinje supporting IoT network card, the card details can be queried, including ICCID, card use status, total package usage, package used amount, package remaining amount, and current month usage. Only ICCID can be queried if it is not the supporting IoT network card of Xinje. Card information query requires hardware factory version at or above V2.2.0 and software version at or above V1.2.0.

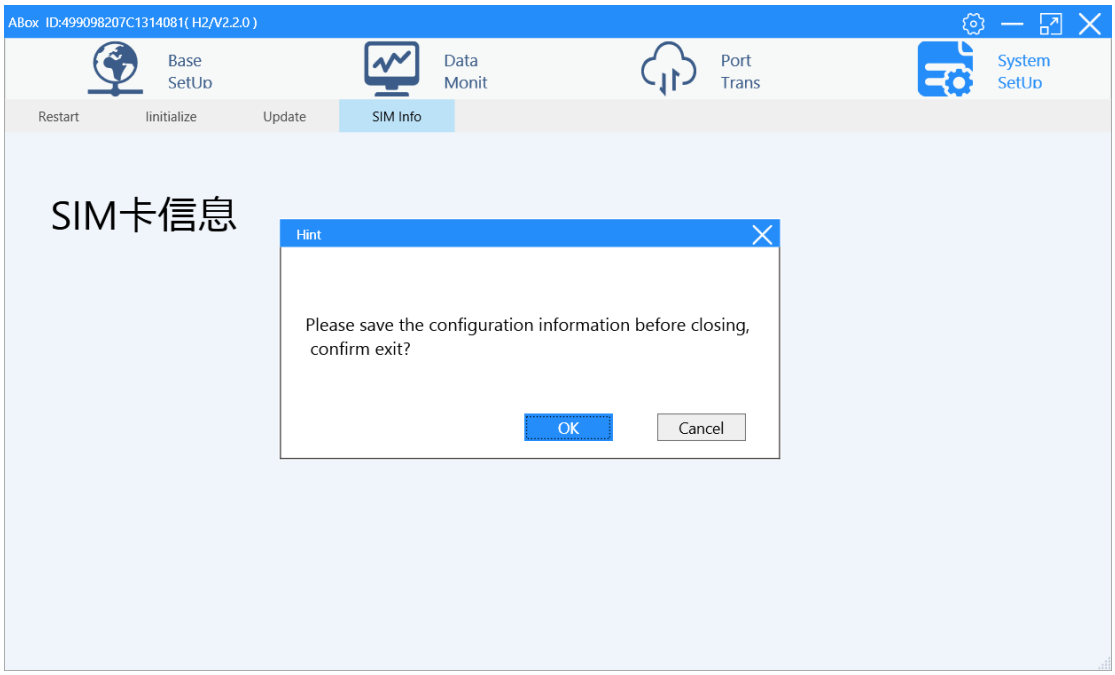
■ BOX, A-BOX-U

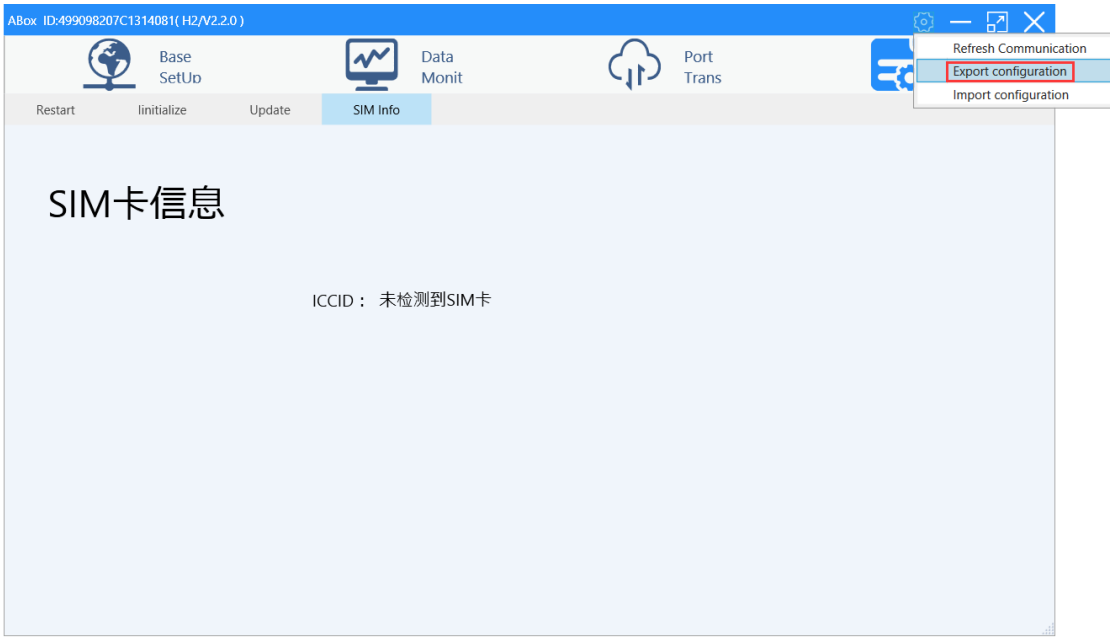
Hardware version	Firmware version	Config tool version	Whether card query is supported	Solution
H1	V1.0.0	XNetConfigTool V2.1.001	No	The H1 hardware version does not support the card function, and the H2 hardware version is required for the card checking function.
	V1.0.23	XNetConfigTool V2.1.010	No	
	V1.0.24	XNetConfigTool V2.2.024	No	
	V1.0.25	XNetConfigTool V2.2.040	No	
H2	V1.0.24	XNetConfigTool	No	Send back to factory to update

		V2.2.024		
	V1.0.25	XNetConfigTool V2.2.040	No	
	V2.1.0	BOX Manager V1.1.0 and up	No	
	V2.1.1	BOX Manager V1.1.1 and up	No	Upgrade with BOX Manager (V1.2.0) and above
	V2.2.0	BOX Manager V1.2.0 and up	Yes	-

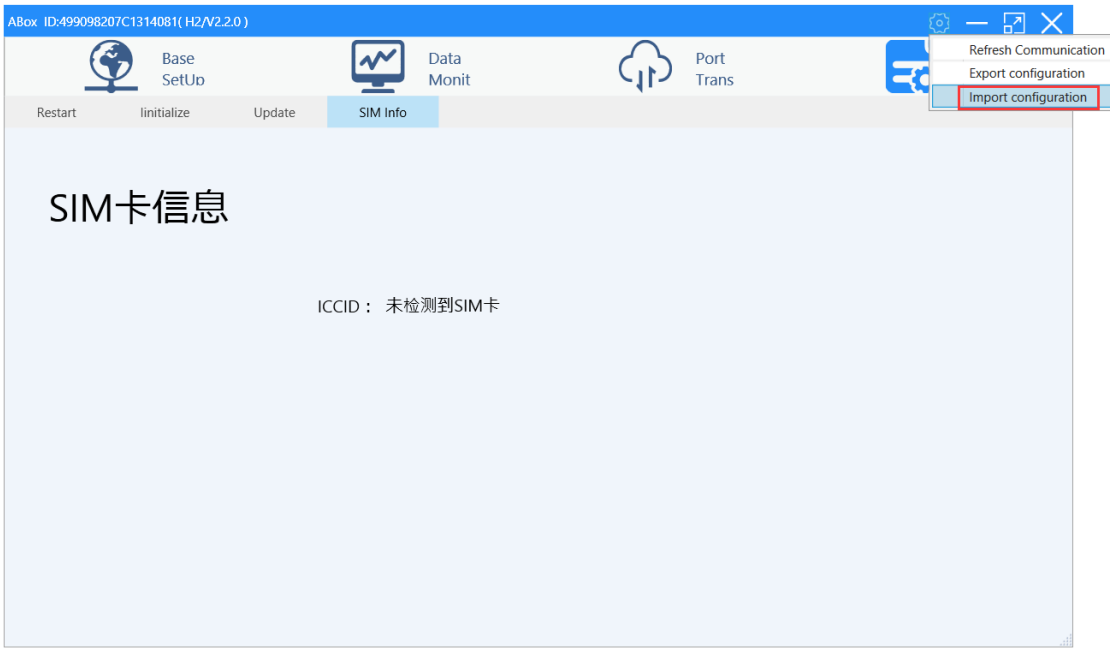
3-7. Open and save

When the configuration tool is closed, you will be prompted to save the configuration information to prevent loss.





All A-BOX configuration information can be saved as files, used as backups, and imported to other A-BOX.

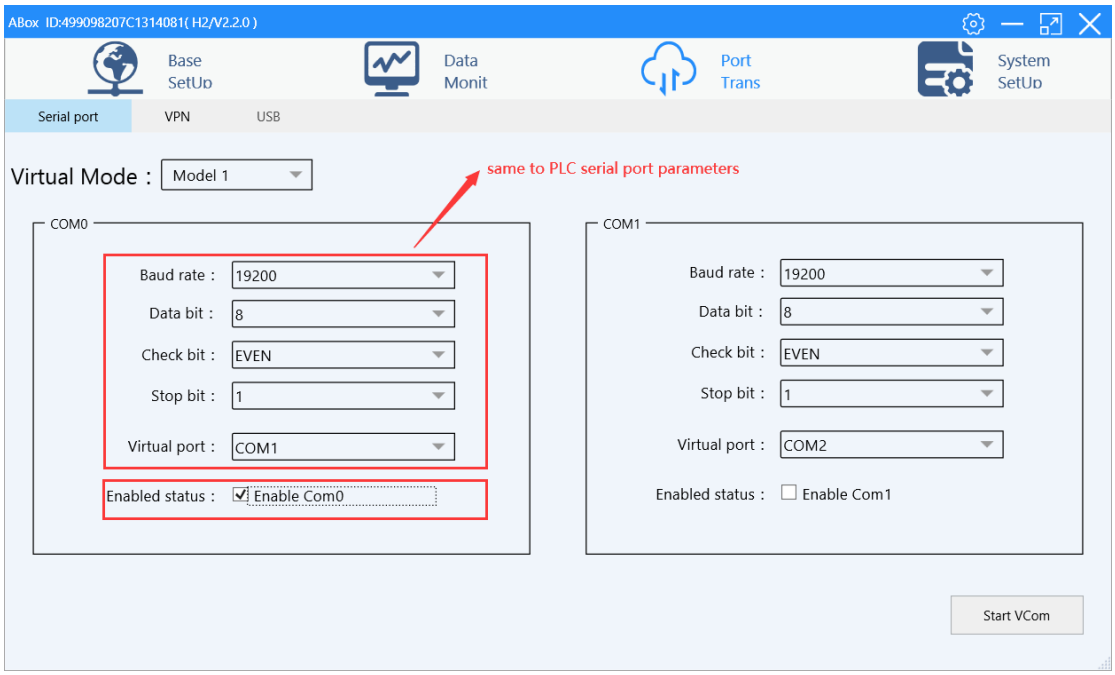


4. Typical function application

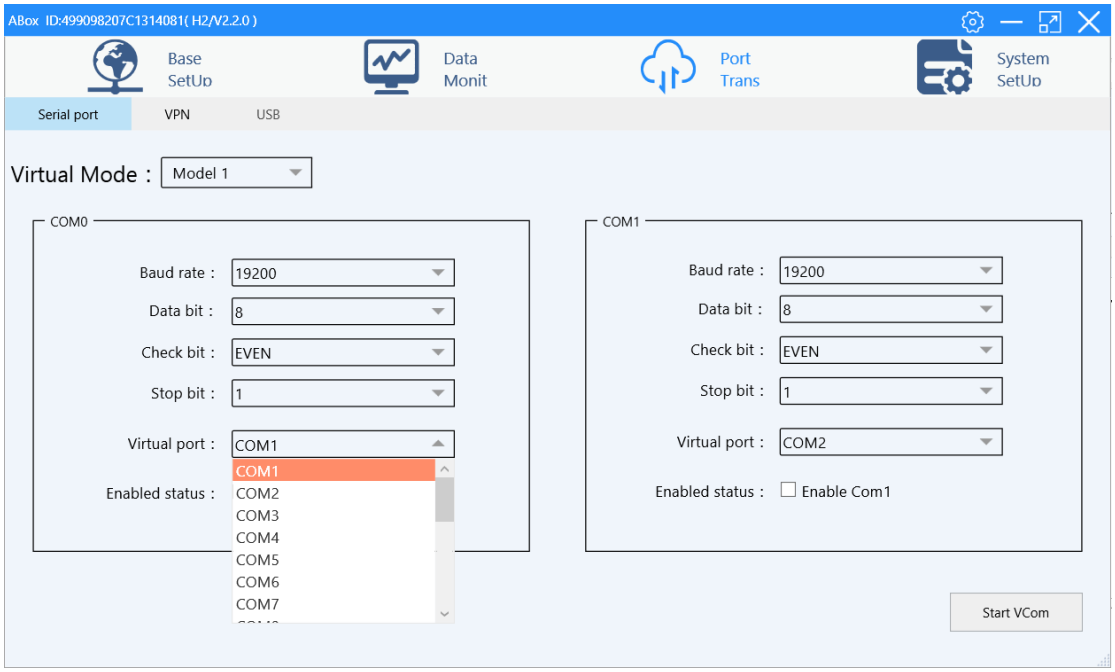
4-1. Virtual serial port

This application uses XINJE PLC XDH-30A16-E as an example.

1. Make sure the serial port parameters are consistent for PLC and ABOX. Select “enable com0”.

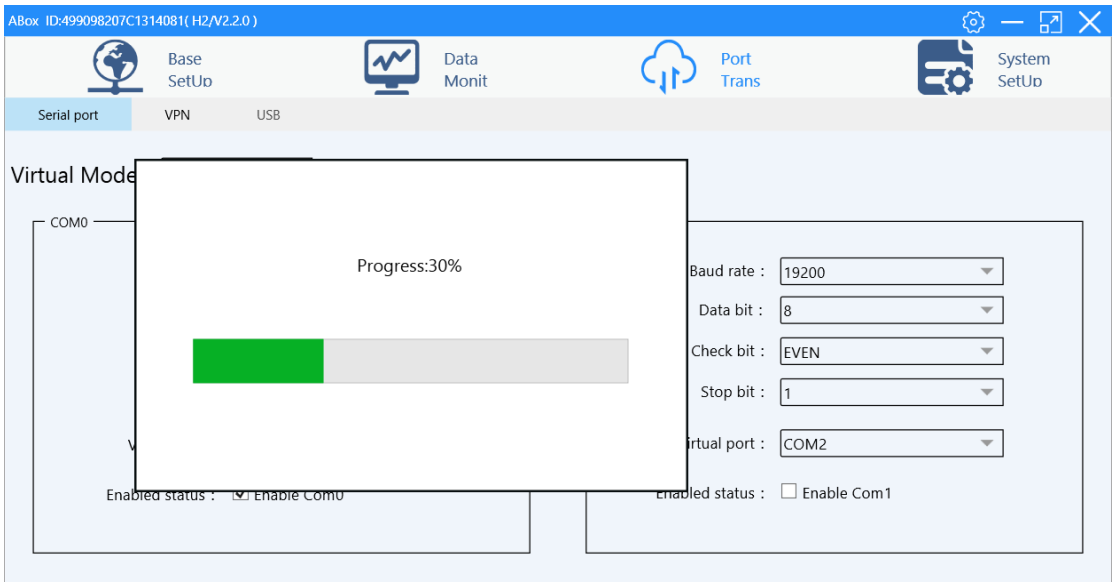


2. Click virtual serial port, choose the com port used by ABOX, choose the idle com port in my PC. Click “Start VCom”.



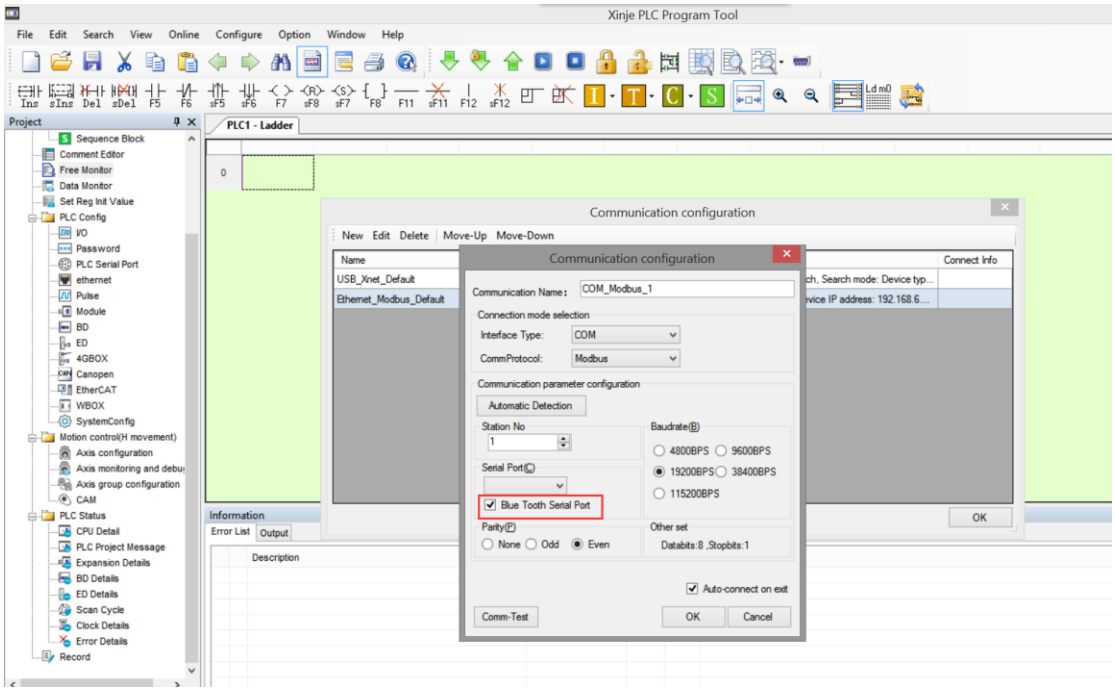
3. After the process of statup virtual serial port is completed, it will show the message “virtual

serial port is running".



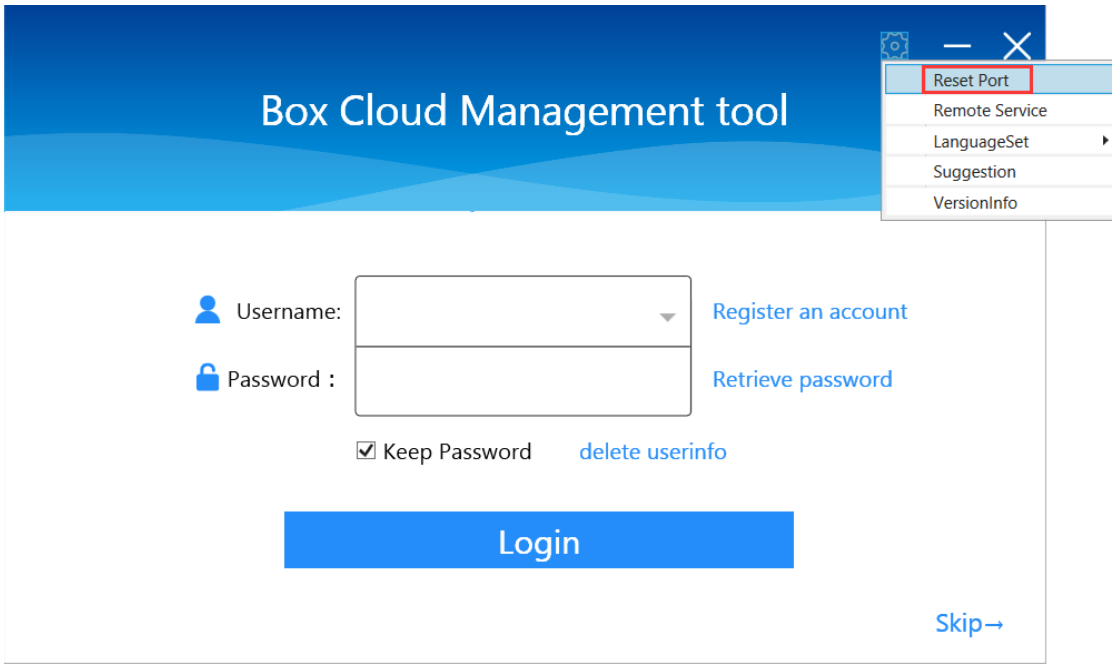
4. After creating the virtual serial port, open the PLC programming software, choose the virtual com port to build the connection, to realize the function of remote PLC program downloading, uploading and monitoring, debugging.

Note: please choose Bluetooth virtual serial port in the XC and XD series PLC software.



5. After finishing the use of virtual serial port, right click the XINJE software icon on the right bottom of PC to exit the virtual serial port.

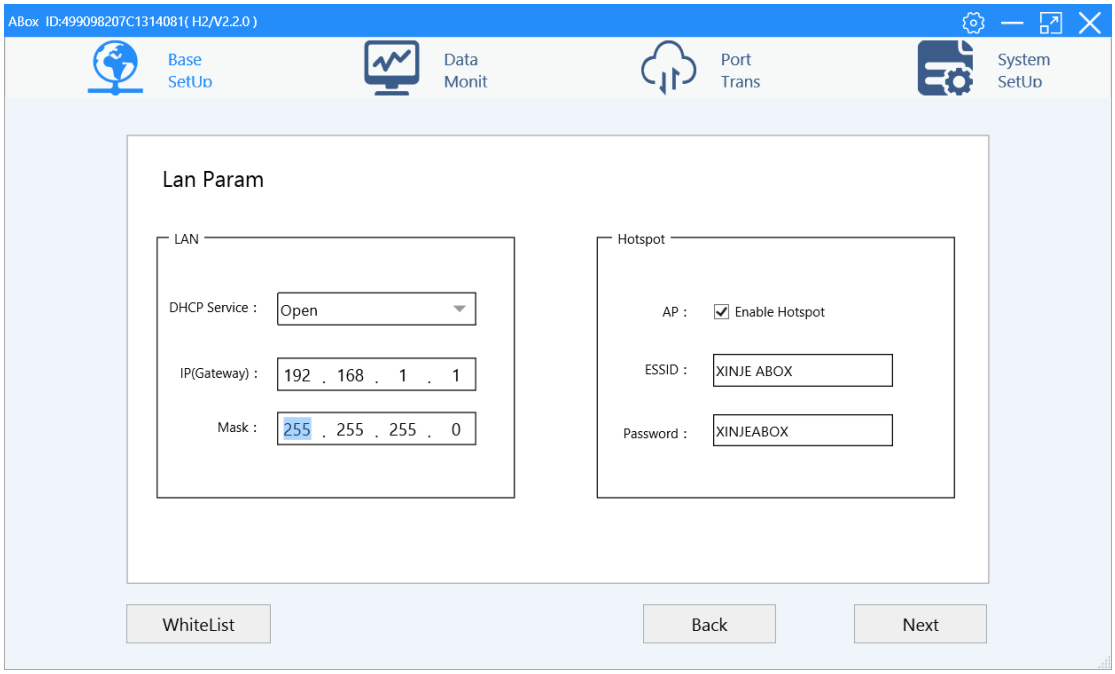
6. Some computers may show that the serial port is still occupied after it is released. At this time, please open the configuration tool, click tool/reset port to release the serial port.



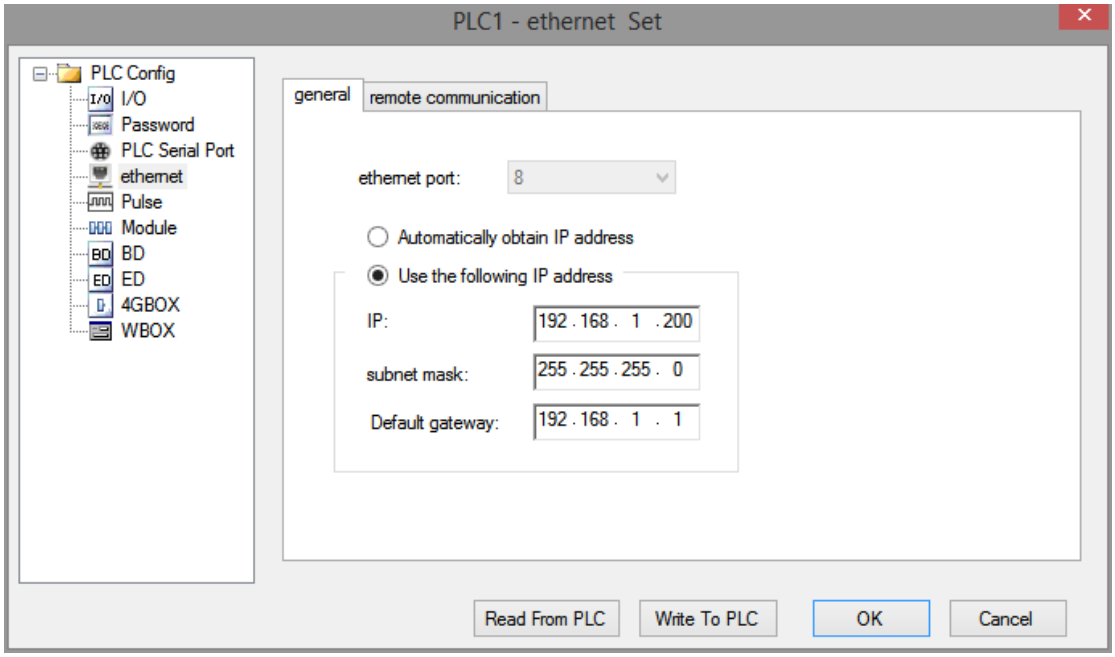
4-2. VPN

VPN is virtual private network, which establishes private network on public network for encrypted communication. PLC is connected to ABOX through Ethernet port, the remote PC can download to PLC directly through the Ethernet network.

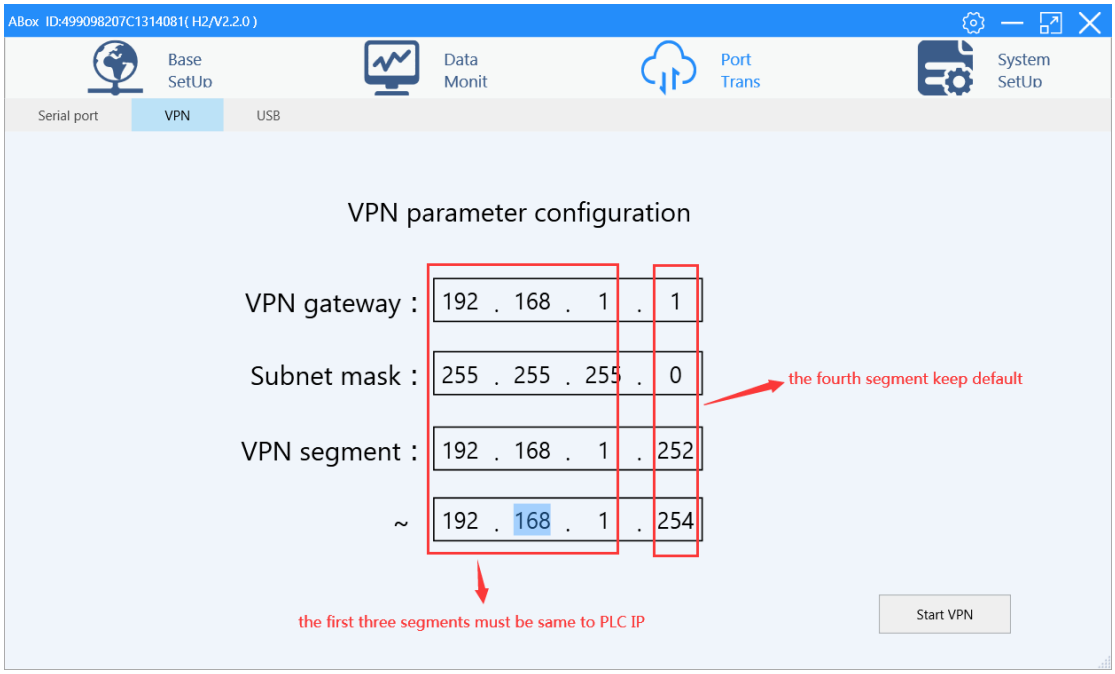
1. Connect the ABOX with configuration tool, and check the LAN parameters of ABOX. Confirm the ABOX LAN port gateway, the defaulted value is 192.168.1.1, the subnet mask is 255.255.255.0. VPN only can be used for remote logging on.



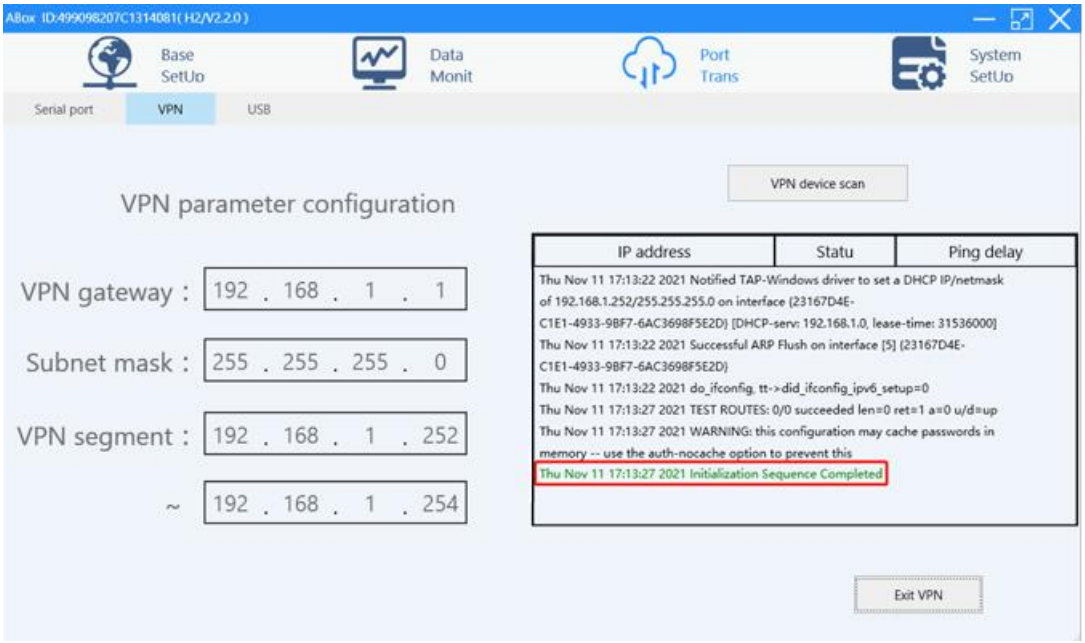
2. Fix the IP address of PLC Ethernet port which needs to VPN, the PLC IP address should be in the same gateway of ABOX, take the defaulted gateway as an example, PLC IP is 192.168.1.XX(XX range is 2~251). XINJE Ethernet series PLC settings are shown as below:



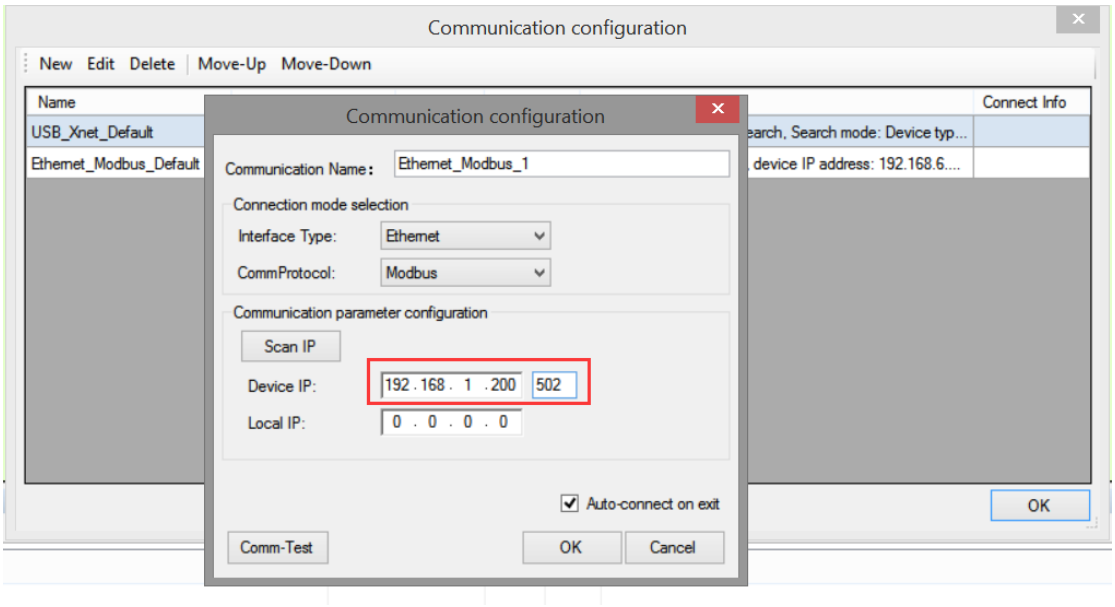
3. After configuring the PLC IP, connect the Ethernet cable to the ABOX LAN port, open the configuration tool after logging on the server successfully, connect the present ABOX, click Port trans/VPN, click “start VPN”.



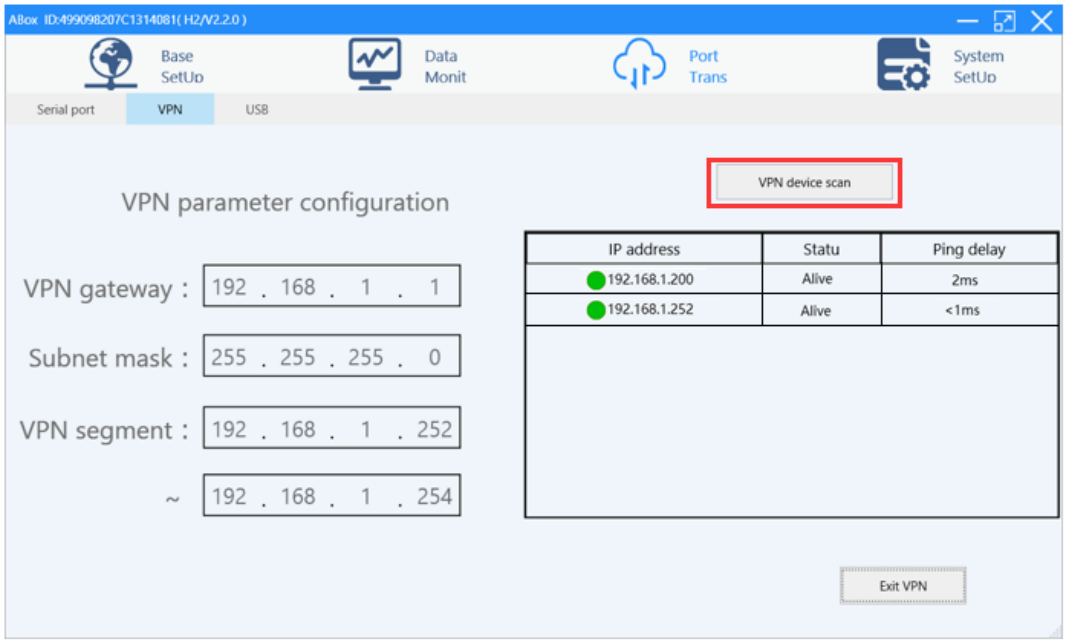
4. When it shows the following image “Initialization Sequence Completed”, it means the connection is successful, it can make the transparent transmission.



5. In the process of VPN transparent transmission, open the PLC software and directly connect to the IP address of the PLC to remotely download the PLC program.



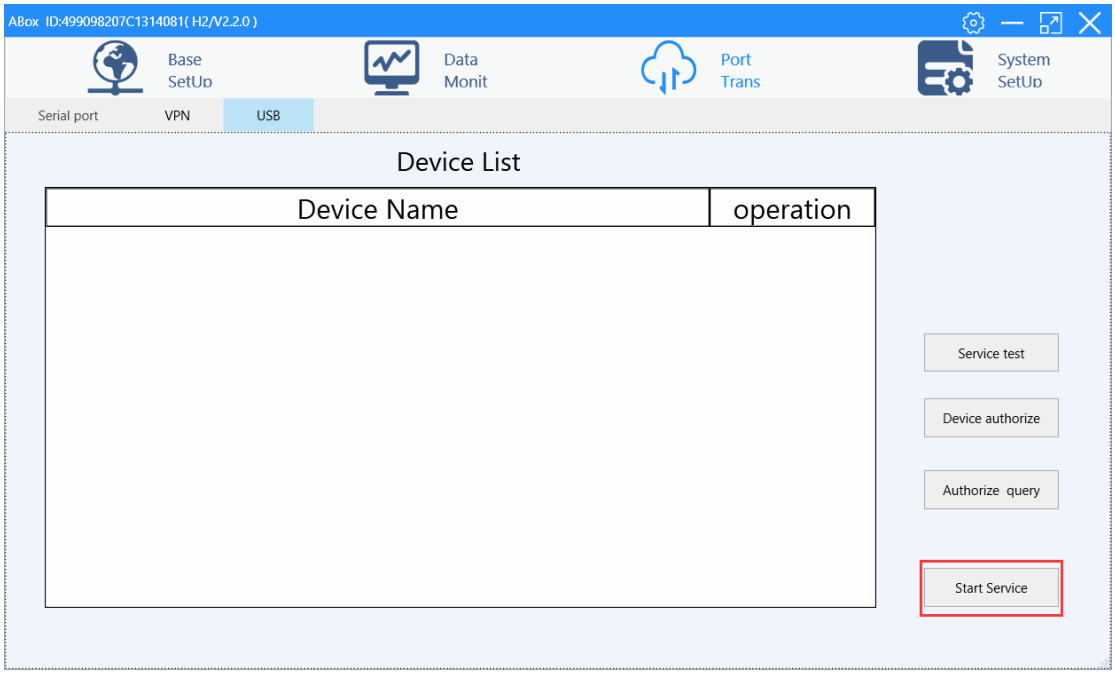
6. VPN network device scanning, can automatically search the IP under the LAN, click "Exit VPN" to end this transparent transmission.



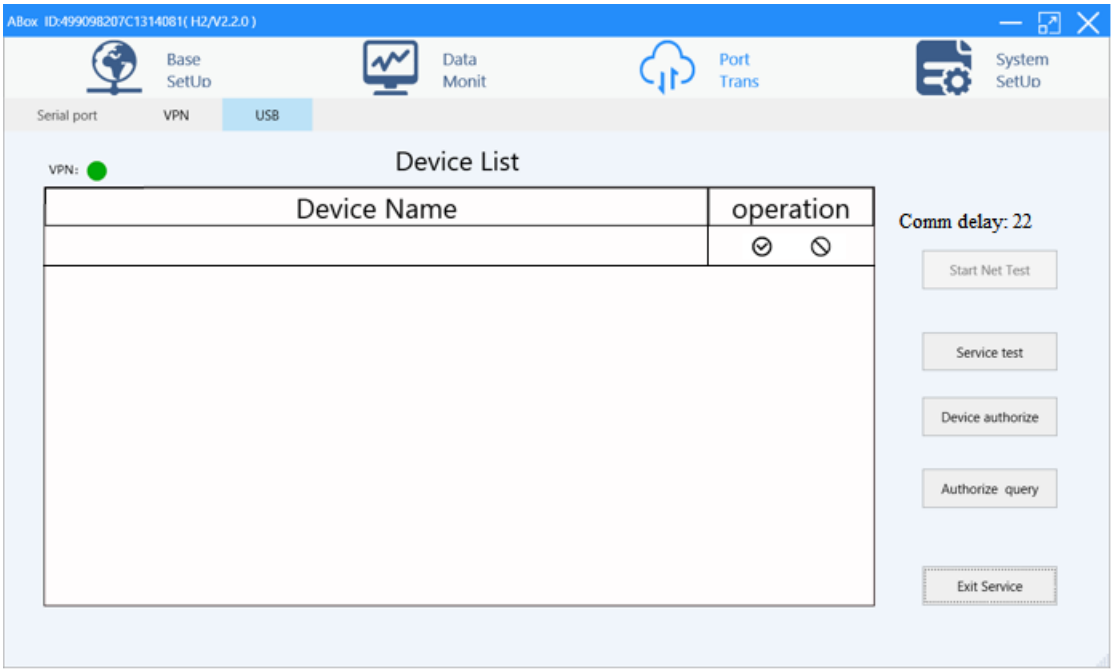
4-3. USB transparent transmission

This case takes the remote download of Xinje HMI with USB transparent transmission function as an example, and the specific use mode is as follows:

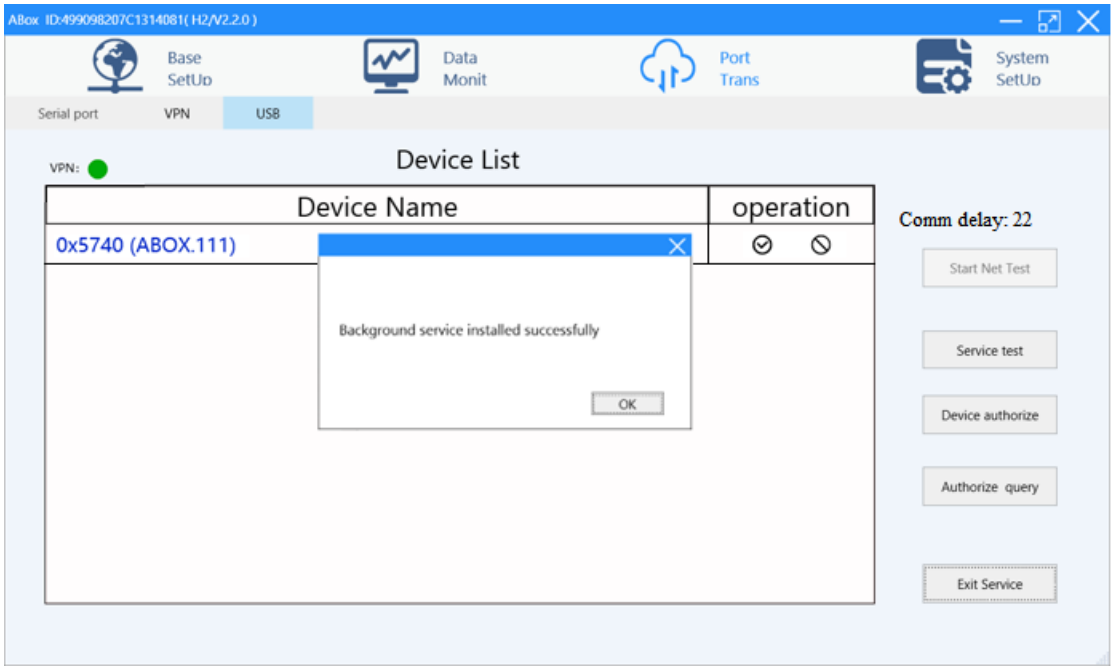
1. Open the configuration tool, connect remotely, click "USB ", click "Service test", and confirm that the passthrough tool driver installation is completed.



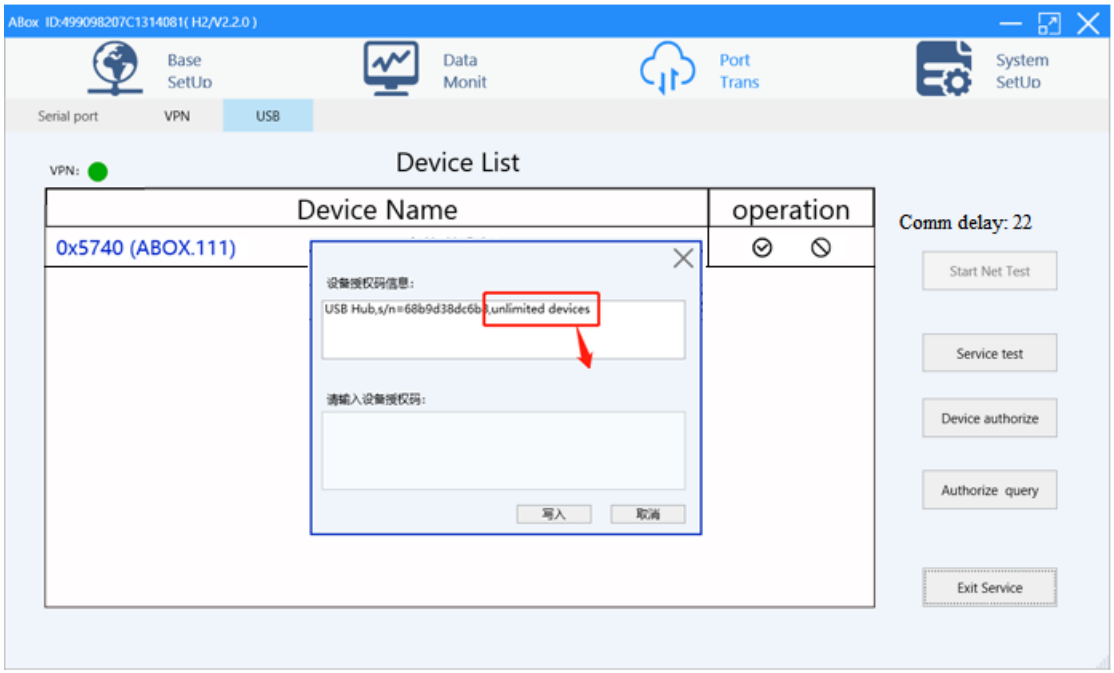
2. Click “start service”, start USB transparent transmission, click Start Net Test to view the current network delay, which is generally within 150ms when the signal is good.

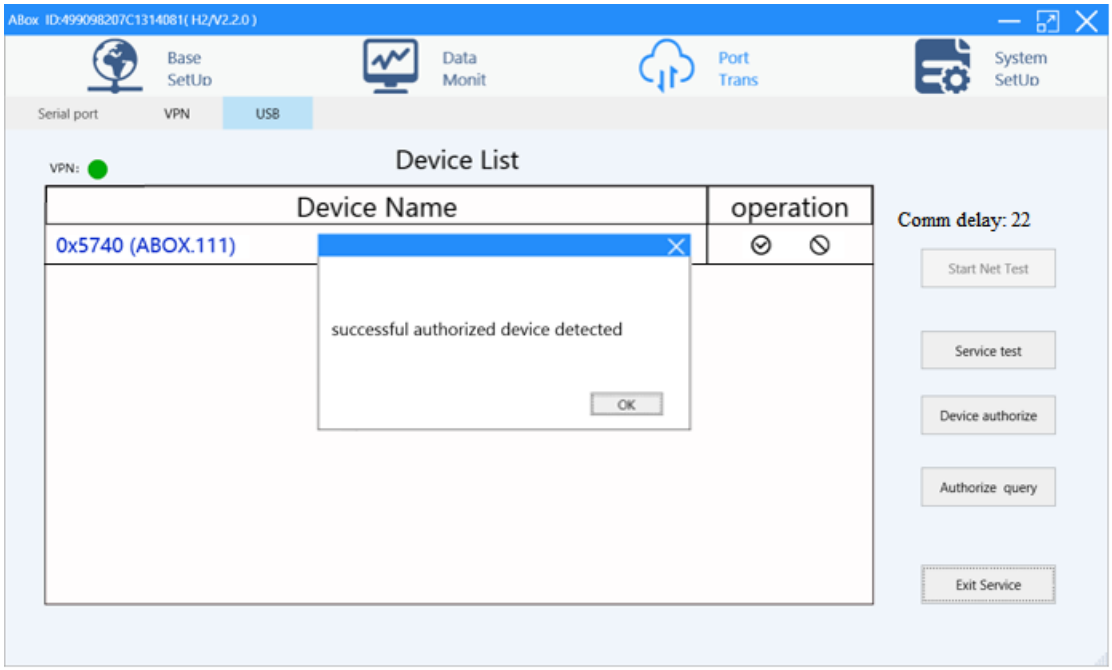


3. Service test: check whether the transmission tool driver is installed.

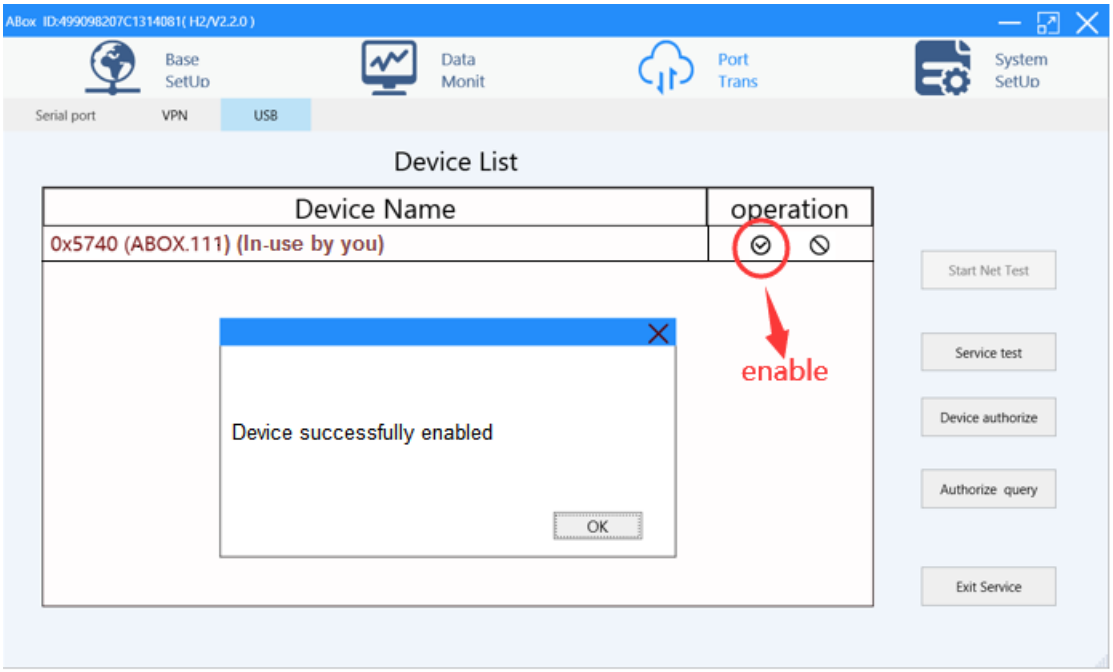


4. Click “ device authorize” or “authorize query”, confirm that the module has USB authorization.

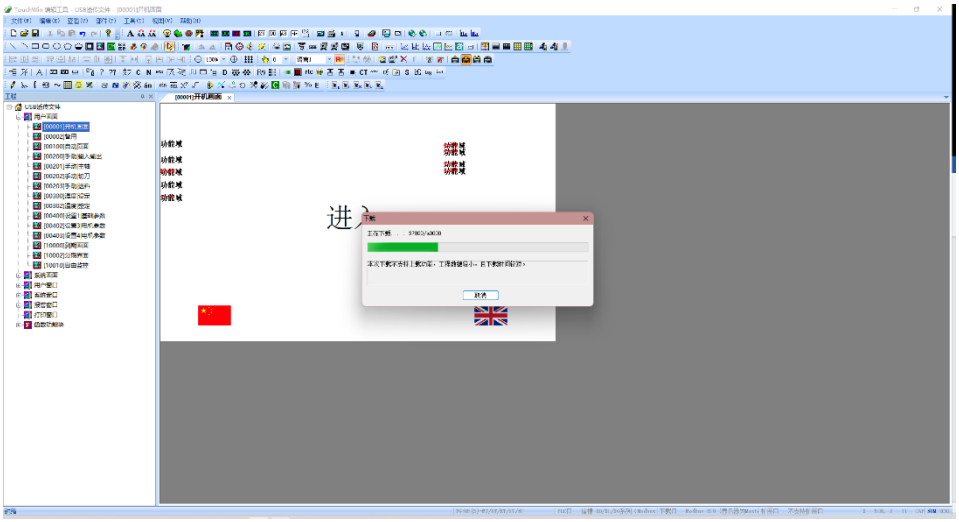




5. The USB cable is connected to the USB port and the HMI. The device detected by the USB port will pop up automatically in the device list. Click "√" to enable the current USB device.

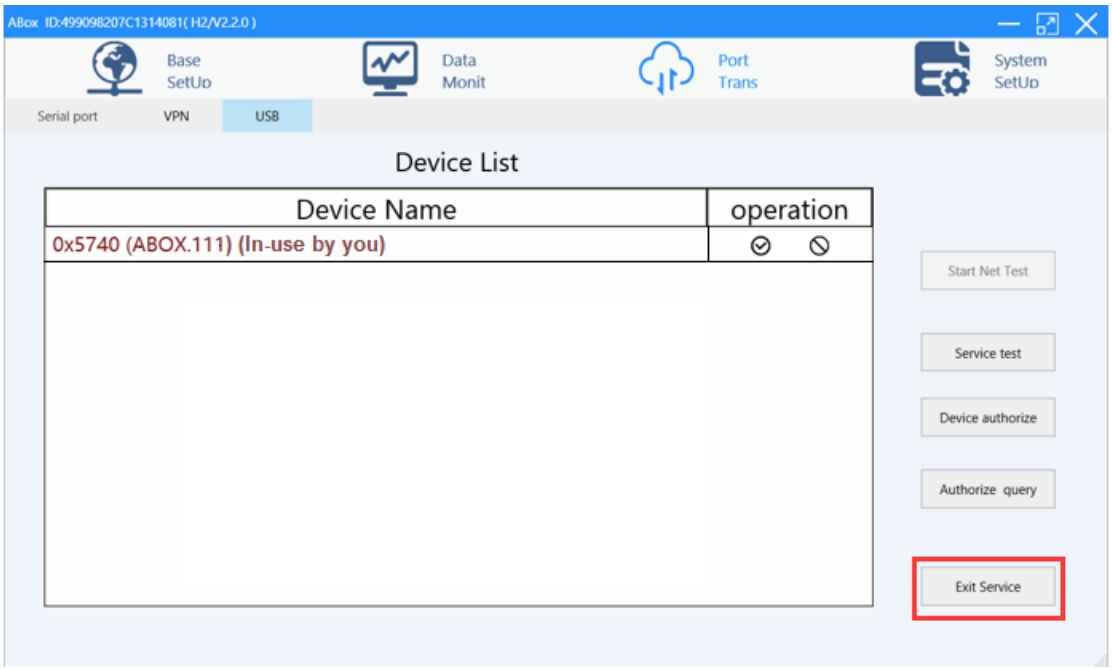


6. In the device list, "In use by you" is displayed behind the device name, indicating that the device is being used. Open the HMI editing software directly, and click Download after creating a new screen.



7. After use, click "Exit service" to exit USB passthrough.

Note: Directly closing the configuration tool will not exit the USB passthrough. After clicking Close, the configuration tool will be minimized to the lower right corner of the computer to run. The icon can be found. Right click the mouse, click "Open USB passthrough" to call up the configuration interface, and click "Exit Service" to exit the USB passthrough.

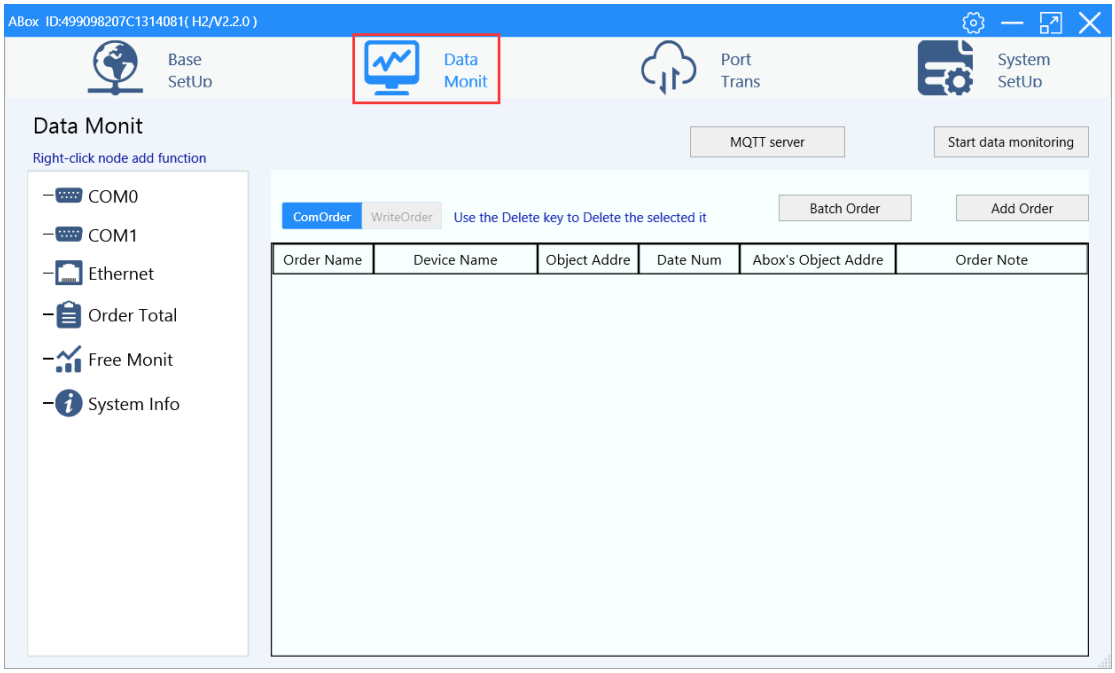


4-4. Data monitoring

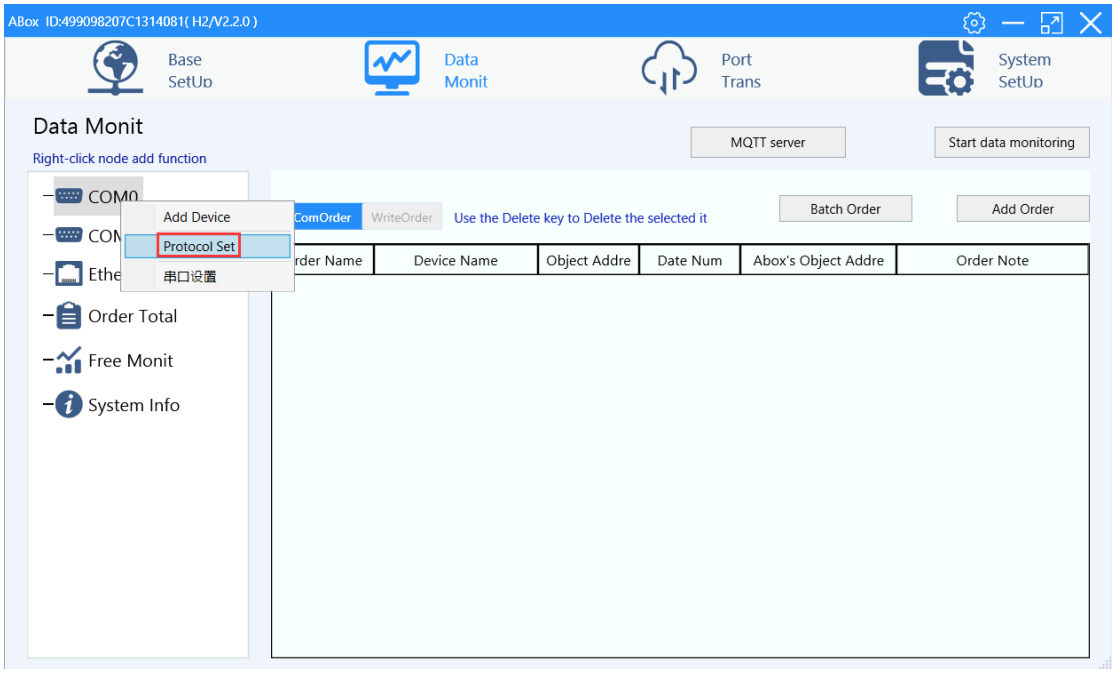
4-4-1. Communication command

Data monitoring needs the XINJE Cloud platform. Map the device address to ABOX internal address to realize real-time monitoring of PLC data by cloud platform.

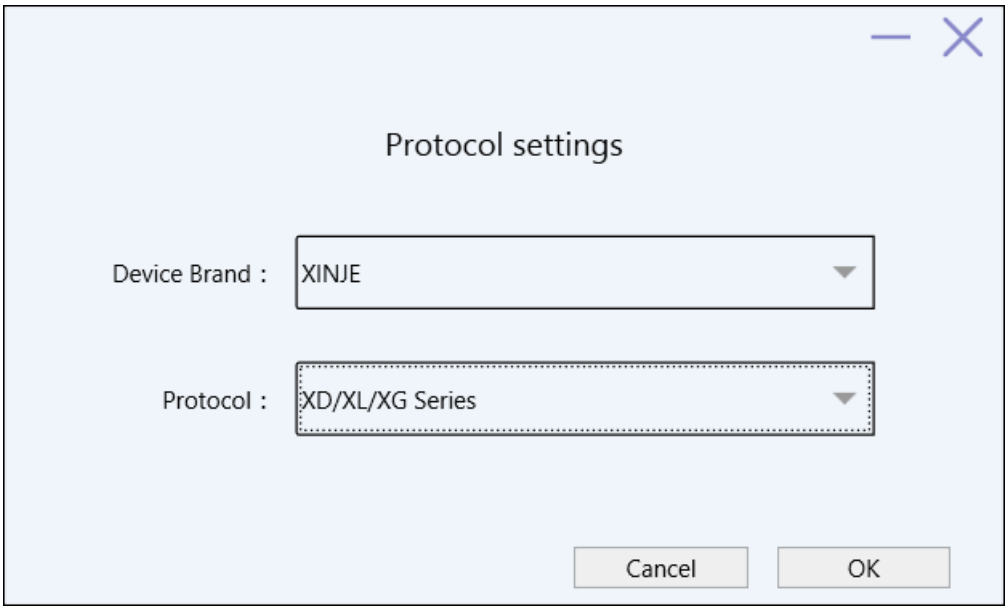
1. After connecting the ABOX, click data monitor, it supports serial port and Ethernet port devices. Take serial port COM0 connecting PLC as an example.



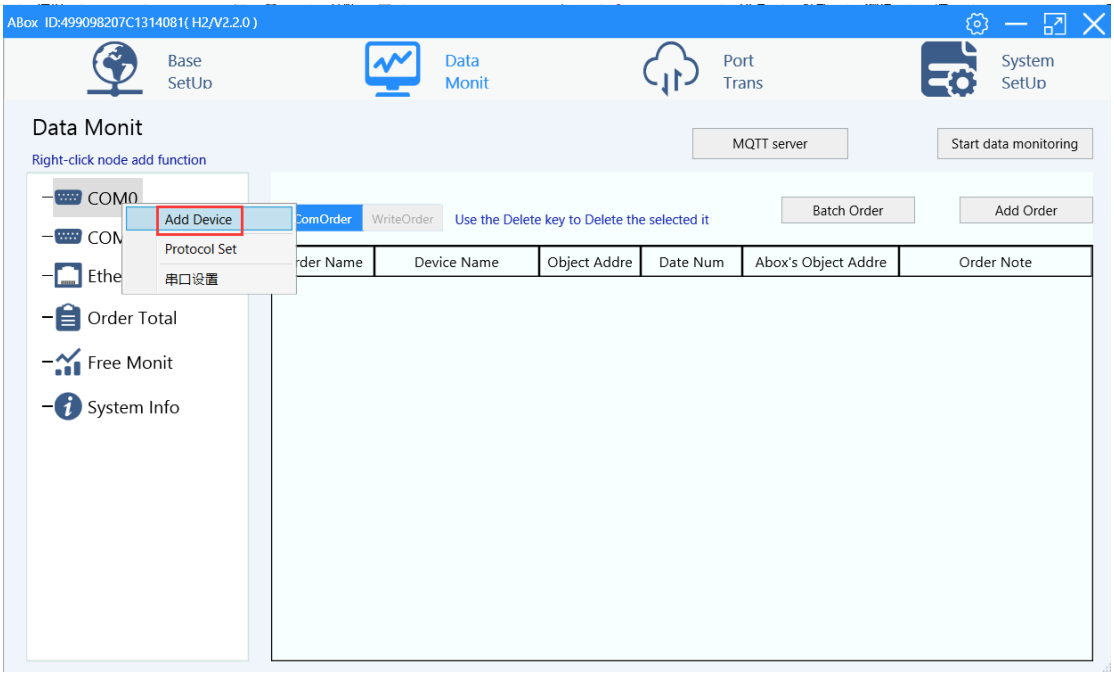
2. Right click COM0, click protocol set.



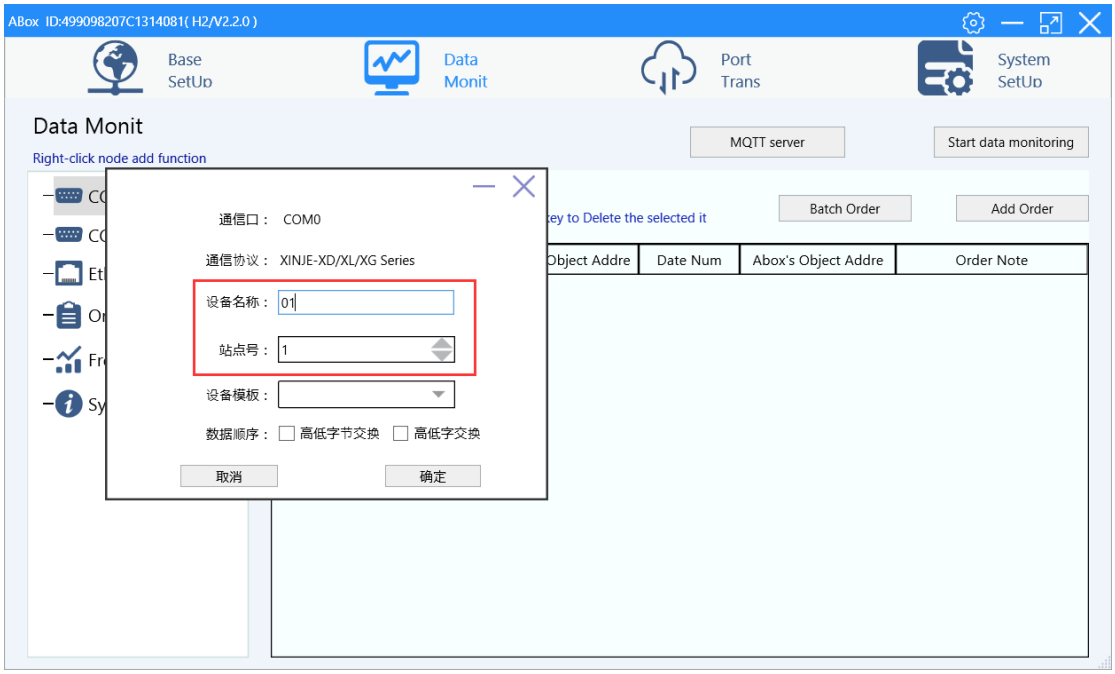
3. Choose “XINJE XD/XL/XG series” protocol.



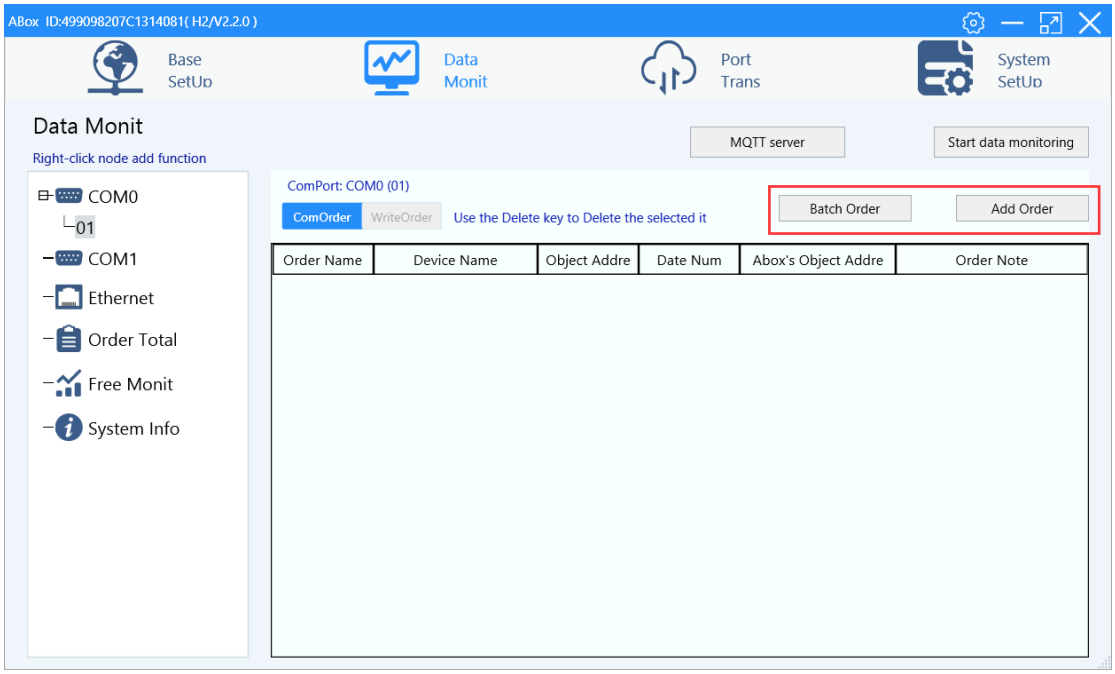
4. Right click “COM0”, click add device.



5. Fill in the PLC station no., please note different PLC address cannot be conflict. The device template is used to copy the configuration table between devices of the same model.

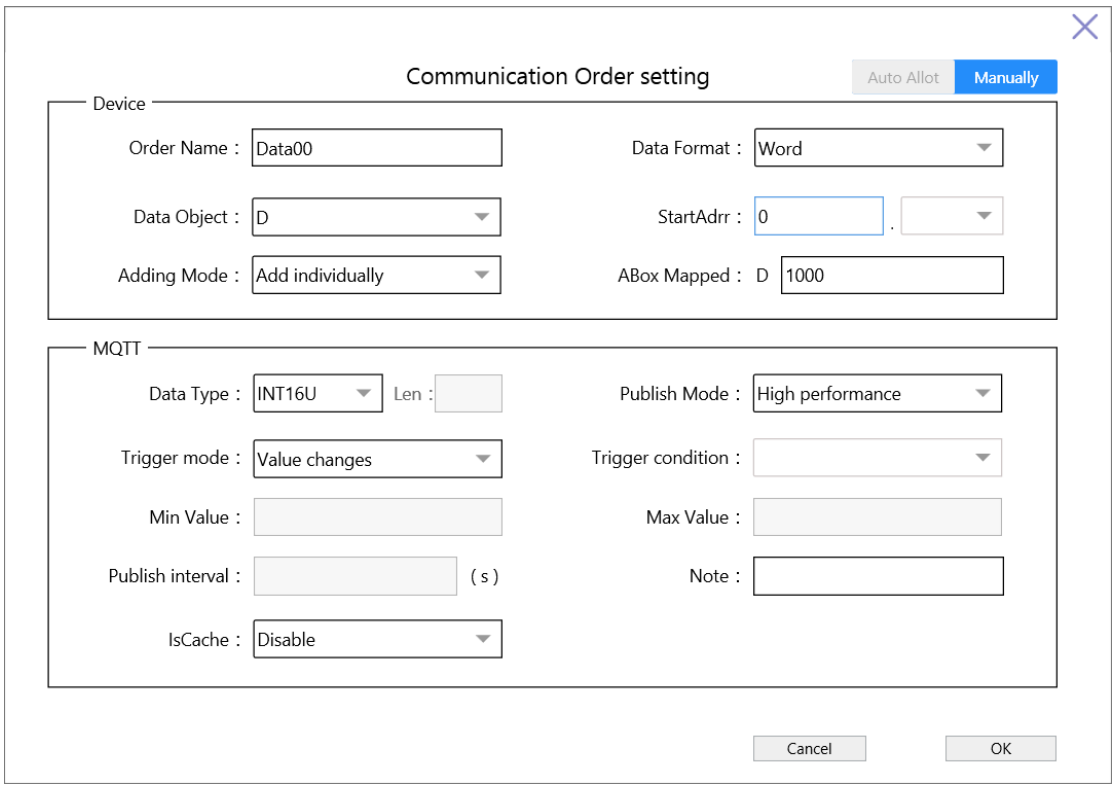


6. Right click the new device 01, click add order or batch order.



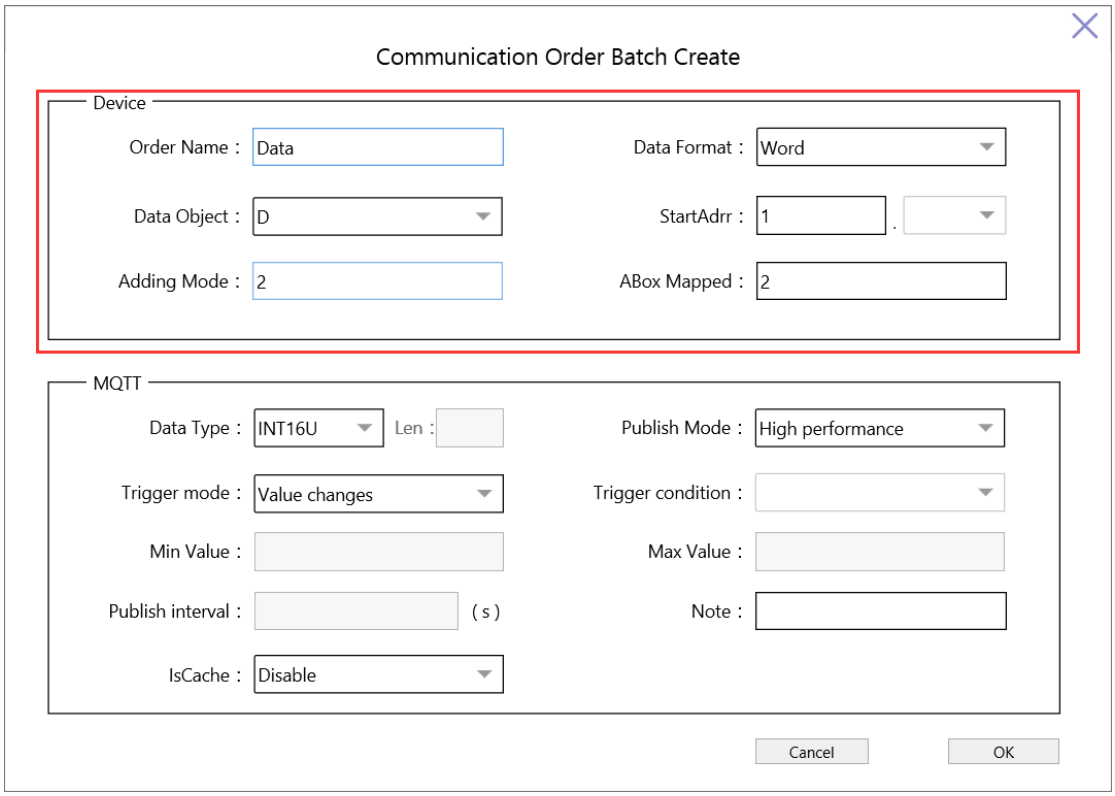
7. Communication order setting:

(1) Single order setting



Parameter	Function
Order name	Name the current order
Auto allot/manually	ABOX mapping address allocation method
Data format	Select Bit (coil) or Word (register)
Data object	PLC internal address
Start address	Specify the starting address of the PLC
Adding mode	Add individually: One order maps one address Batch add: One order maps multiple addresses (same data type)
Abox mapped	Content address of ABOX, including D, M and SD
Data type	Data types of PLC objects, including INT16U, INT16S, INT32U, INT32S, INT64S, Float, Double, Char [ ]

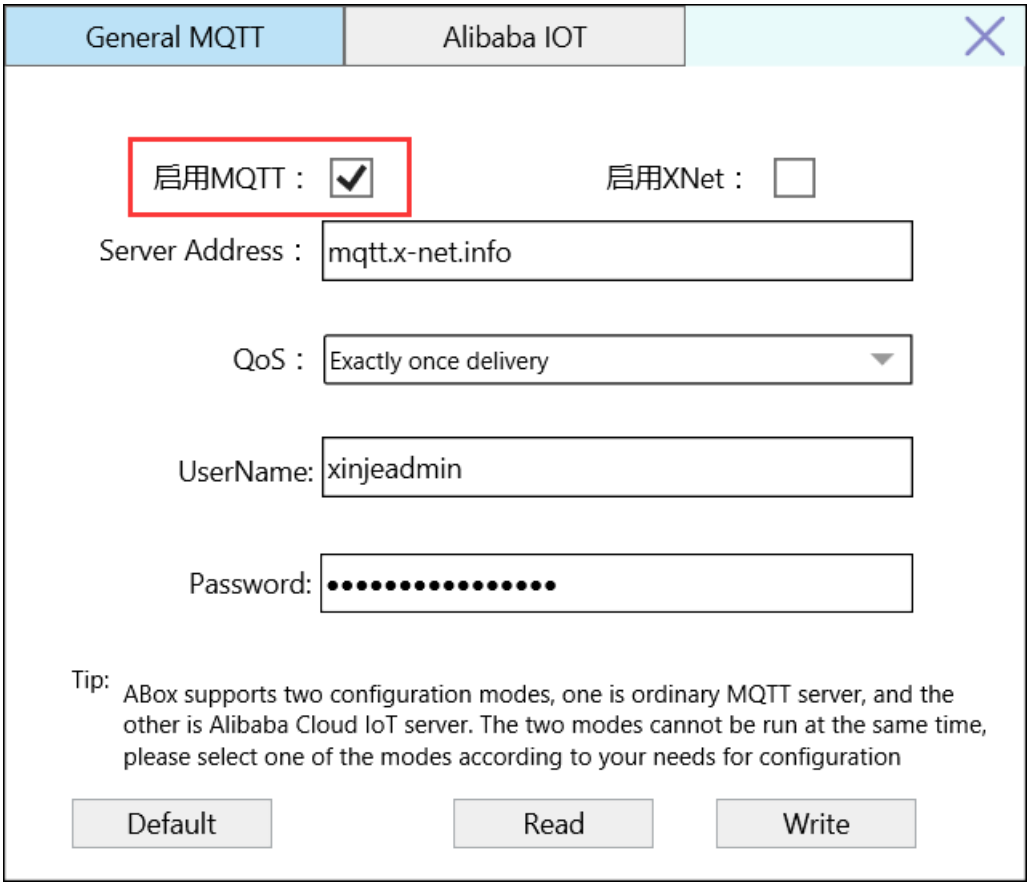
(2) Batch order setting



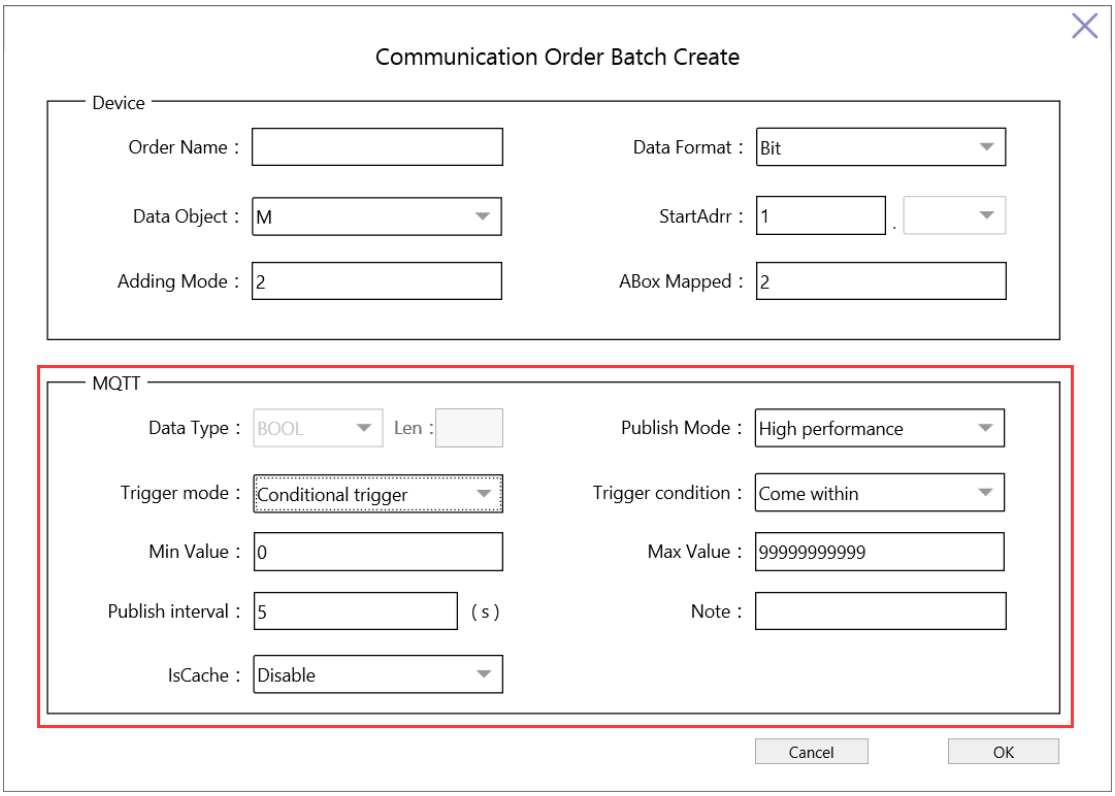
Parameter name	Function
Order name	Name the current order
Data format	Data point types include Bit and Word
Data object	Specify the data point object of PLC, and automatically switch the digital value and data type according to the data specification
Start address	Specify the address of the PLC's data point
Adding mode	Interval between each address
Abox mapped	Number of addresses added

(3) MQTT setting

The MQTT is enabled by default. The MQTT communication adopted by Xinje Cloud will be updated in Cloud V4.1, with XNet as the optional protocol.

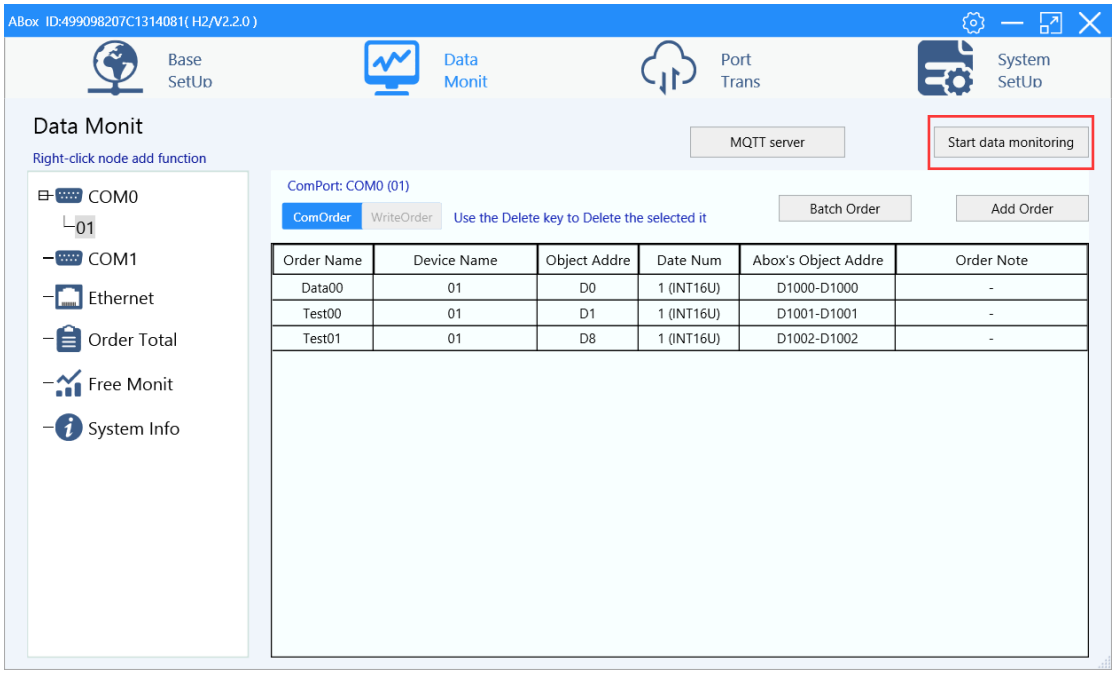


Parameter name	Function
Server address	The domain name of the MQTT proxy server. You can fill in the client's own MQTT server address. The default address is "mqtt. x-net. info".
Service quality (QOS)	Publish only once Publish successfully at least once (possibly multiple times) Ensure successful publishing once (once and only once)
User name, password	The user name and password for logging into the proxy server. The default is the user name and password of the Xinje server

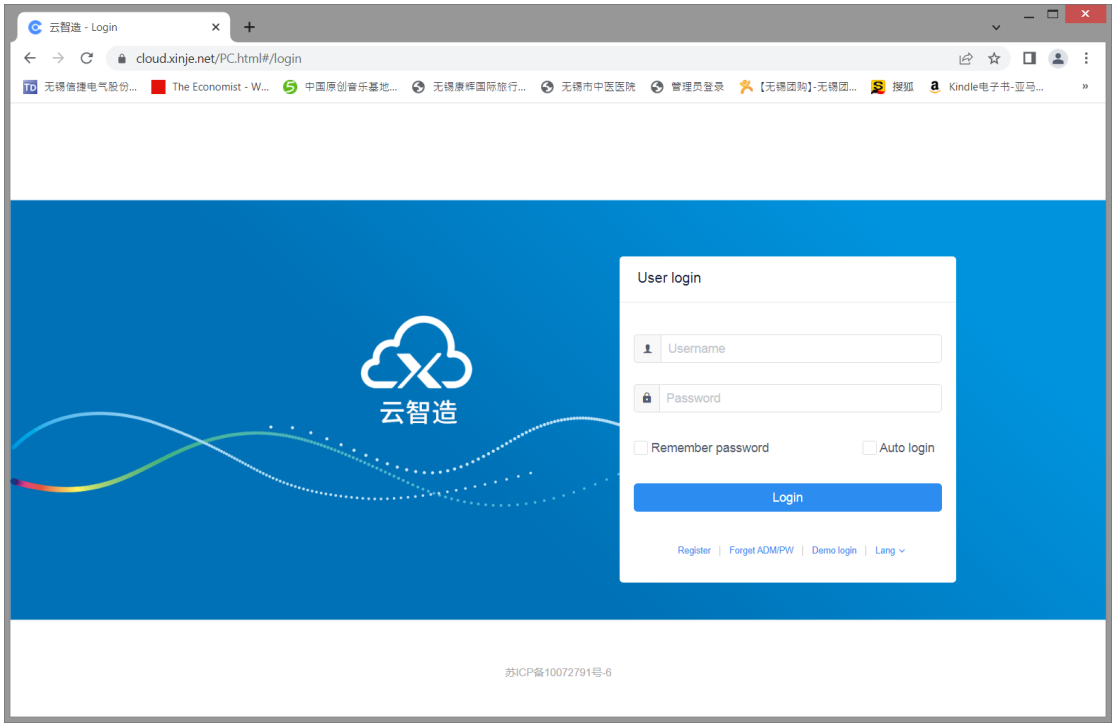


Parameter name	Function
Publish mode	Answer mode: the platform requests data once and ABOX replies once; High performance: ABOX judges the release conditions by itself, and releases data when the conditions are met.
Trigger mode	Triggering forms include: trigger when the value changes, trigger when the condition is met, and trigger at a fixed time (high performance)
Trigger condition	Triggering conditions include: less than, in range, greater than, not equal to, and out of range
Publish interval	Time interval for publishing data, in seconds

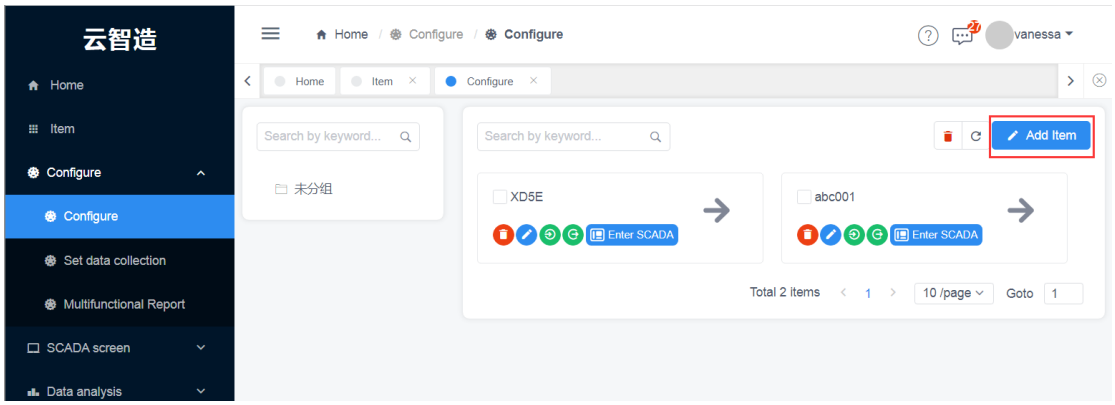
8. After adding, the instructions are as shown in the figure. Please note that the object addresses of A-BOX cannot conflict. After the data command is completed, click "Start Data Monitoring" to apply the settings.



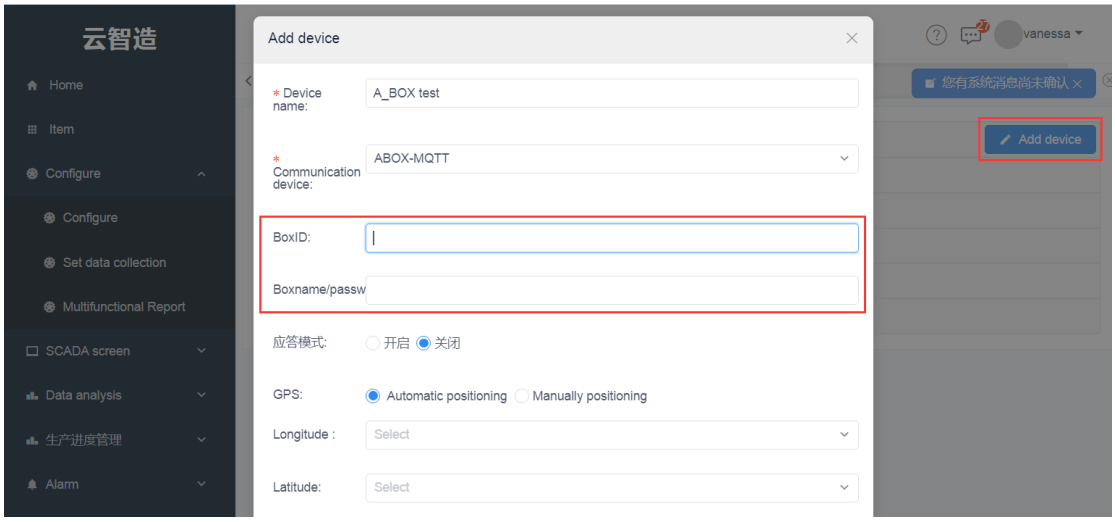
9. Open the Cloud platform in IE (https://cloud.xinje.net), fill in the user name and password.



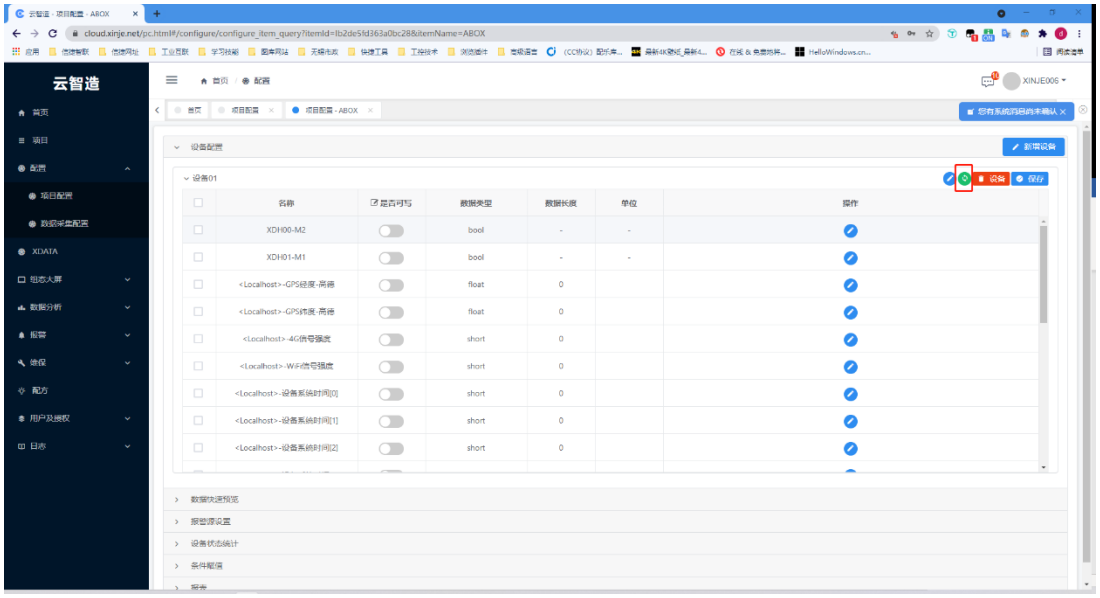
10. Create new device in configure.



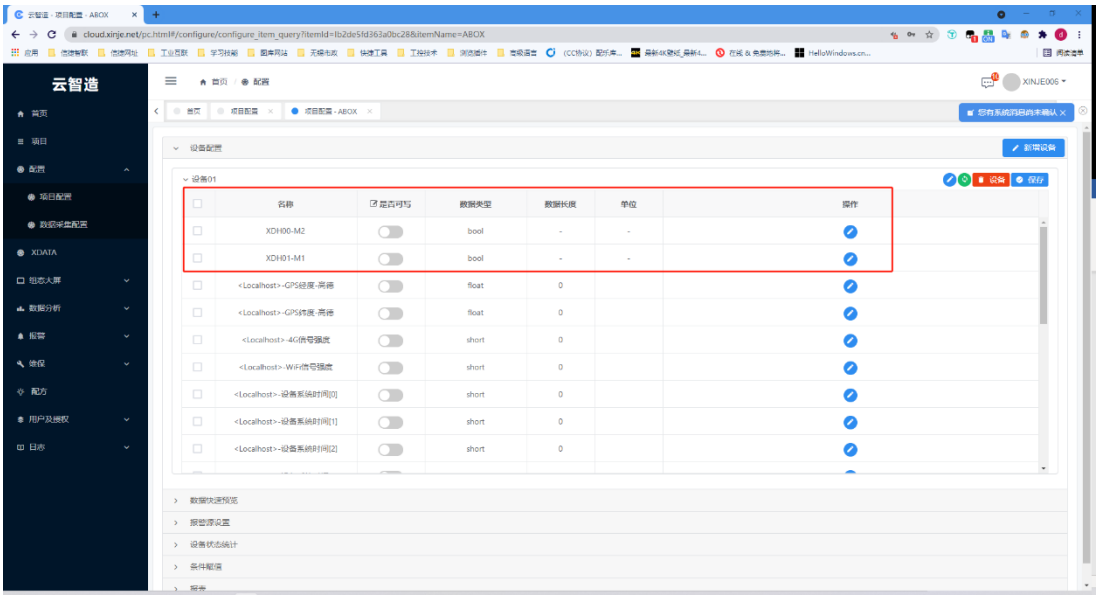
11. click add device in device configure. Select the ABOX, input ABOX ID and password.



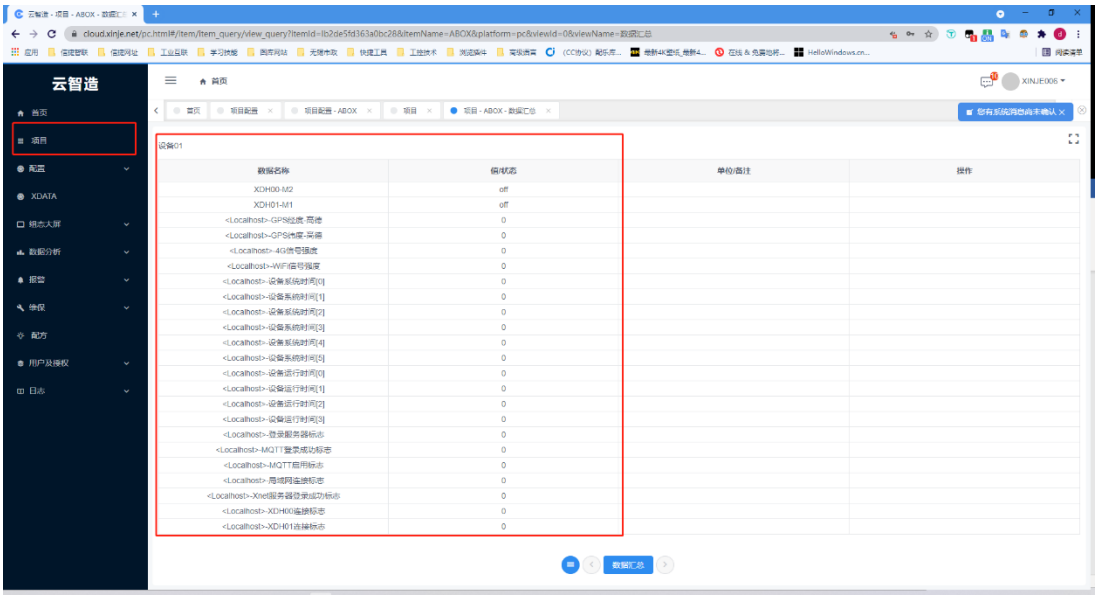
12. Synchronize the ABOX mapped address.



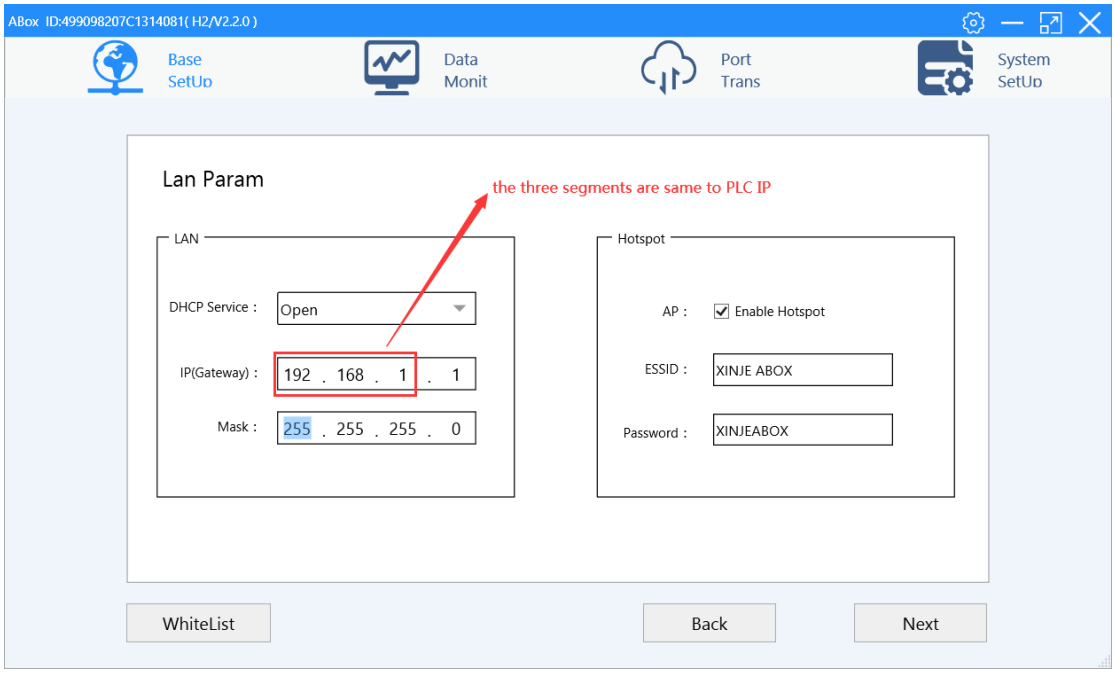
13. Edit the Synchronous data points.



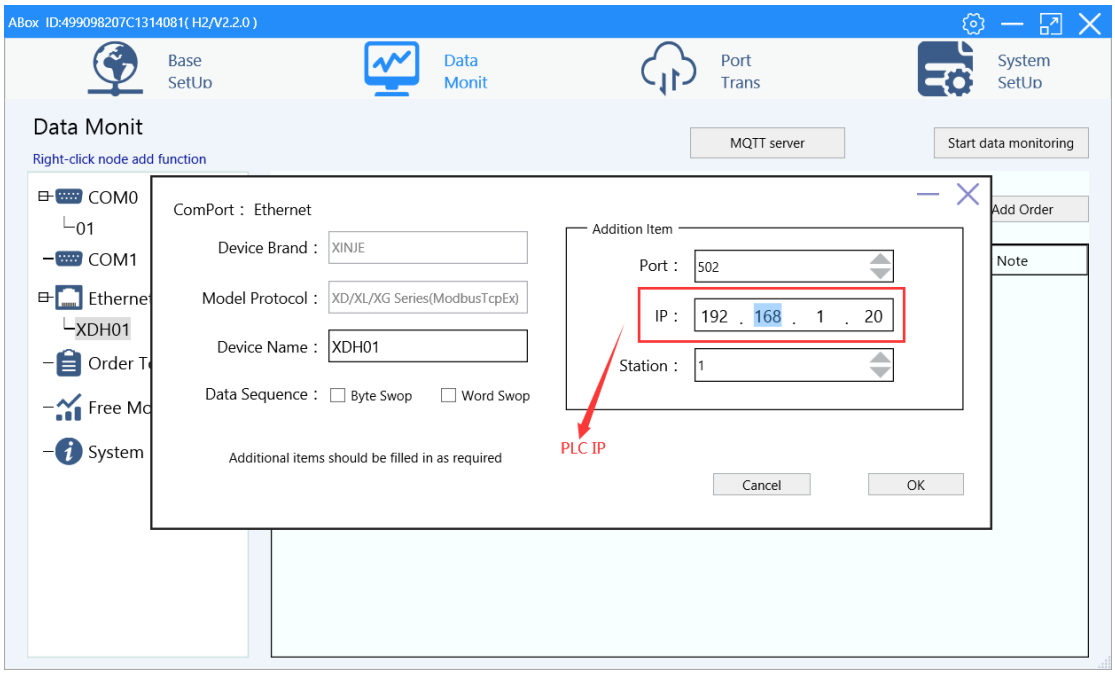
14. Check the device data in Item.



15. If it is an Ethernet device, confirm that the ABOX LAN gateway and PLC are in the same network segment.



16. Confirm the IP address and port of PLC or other network interface devices. Generally, the port number of Modbus TCP is 502. The PLC port of Xinje XDE series is 531, and the communication port of Siemens network port is 102. The same ABOX network interface supports the simultaneous use of multiple protocols.



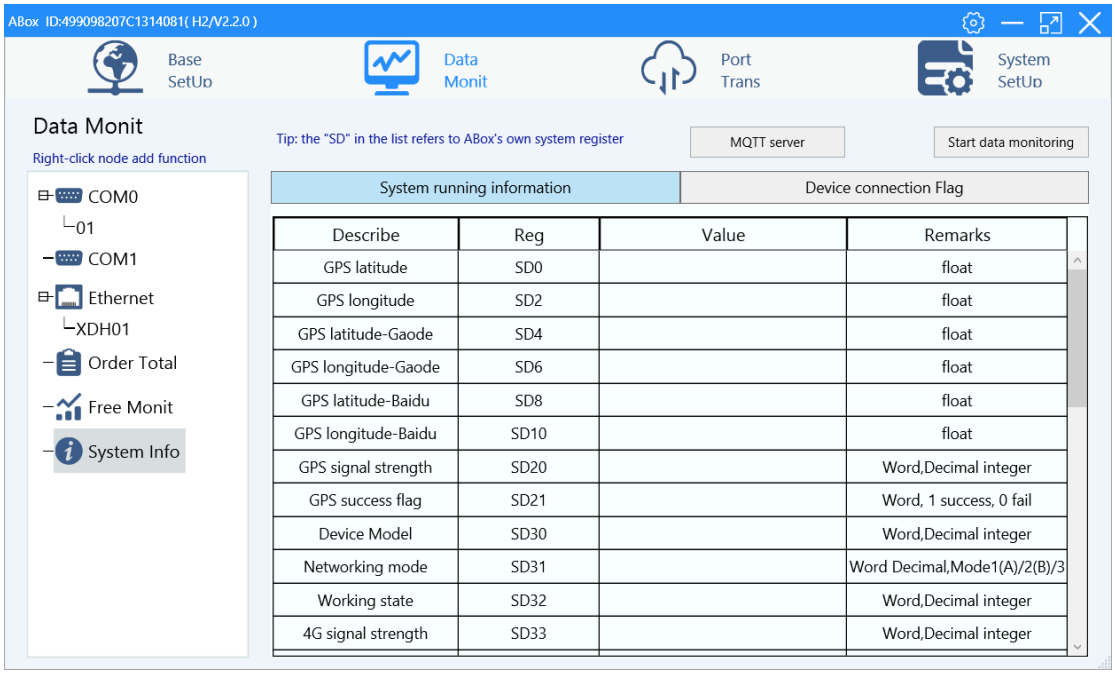
4-4-2. Write data order

"Write Data order": the source address is the A-BOX internal address (M, D, SD), and the destination address is the PLC address. The following functions can be used for reference. (Note: at least one communication command must be added)

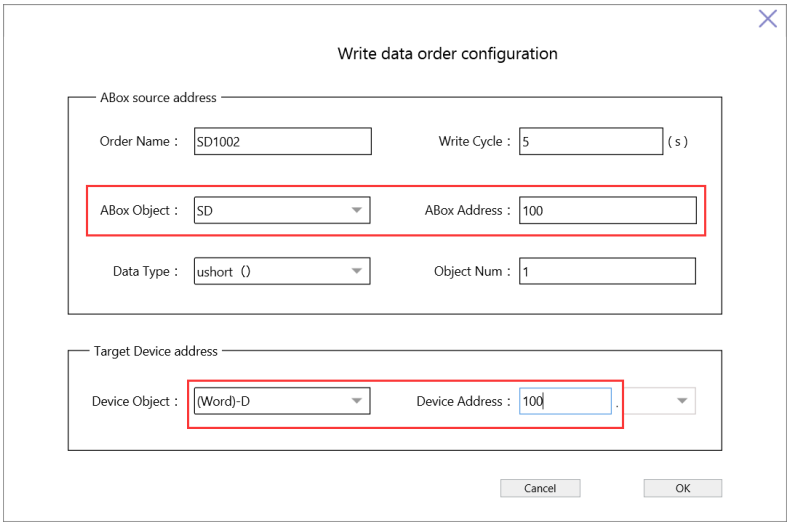
Note: When serial port transparent transmission and VPN are used, the write data function is invalid!

Function 1: Realize the machine locking function, and detect whether A-BOX is connected to PLC.

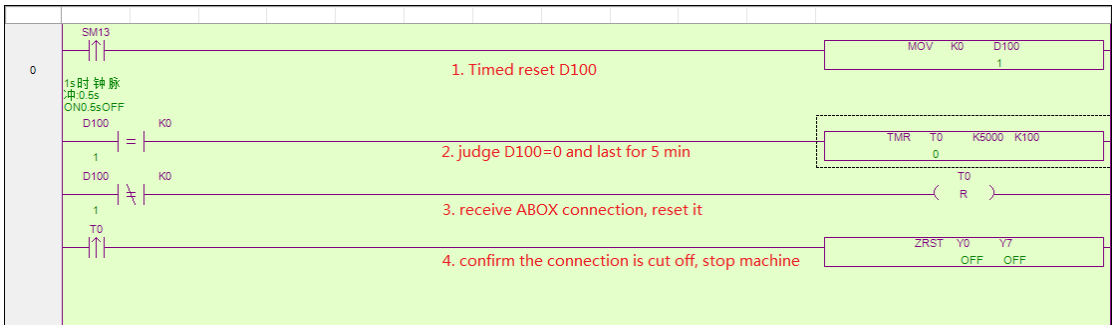
1. Read the special register of A-BOX to determine whether to disassemble the machine, such as SD100.



2. Add "Write data order" to map SD100 to D100 of PLC. Refresh cycle 5s, ABOX writes the value of SD100 to D100 of PLC every 5s.

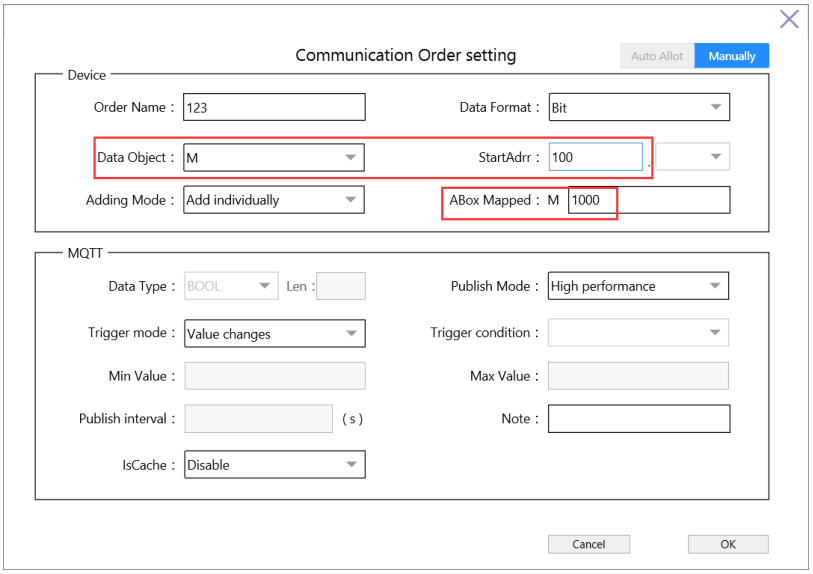


3. After the D100 value in the PLC is cleared regularly, it is judged whether the D100 value is still equal to "1", so as to use the "heartbeat detection" mechanism to judge whether the machine is disassembled.

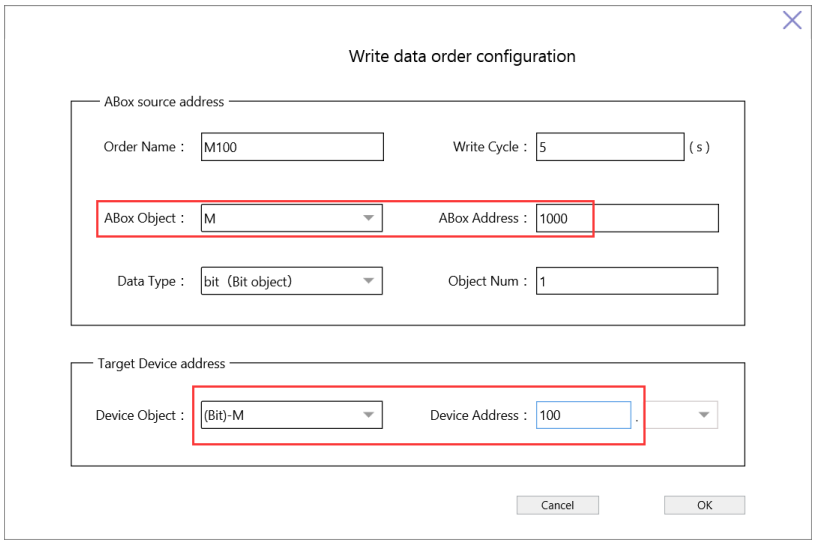


Function 2: Realize data interaction between PLC and PLC.

1. The PLC of COM0 adds order address M100, and maps to ABOX address M1000.



2. The PLC of COM1 adds write data order, maps the ABOX address M1000 to PLC2 M100.



4-5. Modbus TCP server function

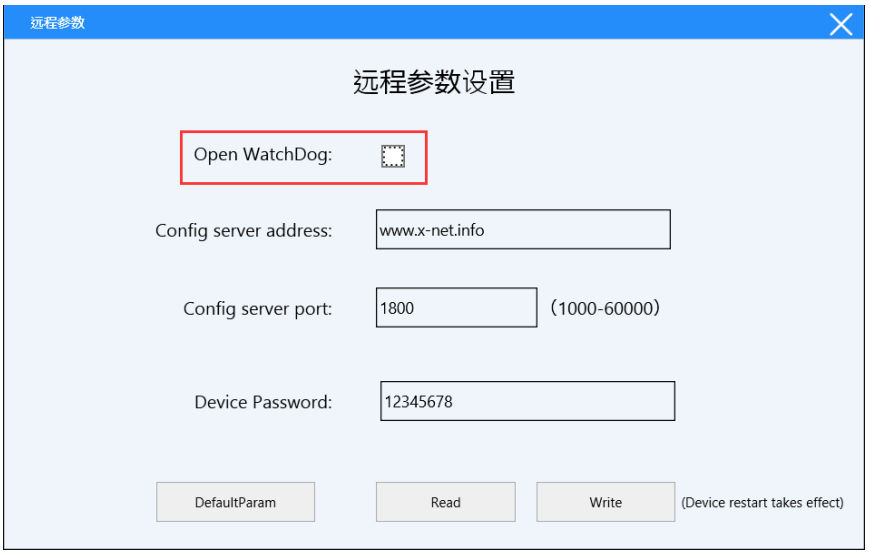
A-BOX supports 5 ModbusTCP Client connections at most.

1. A-BOX ModbusTCP address list

A-BOX address type	A-BOX address	Modbus address
M	0-65535	0x (0-65535)
D	0-65535	4x (0-65535)
SD	0-65535	3x (0-65535)

2. ModbusTCP Client access method: The target IP can be the LAN gateway of ABOX, or the IP assigned by the router when A-BOX is in WIFI mode or Ethernet Internet access mode. The port number is 502.

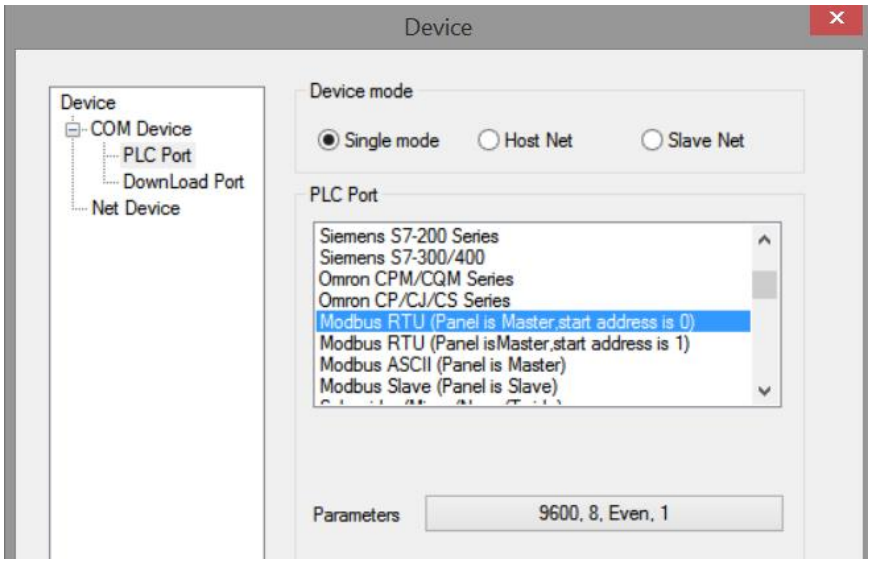
3. When using the LAN, the "watchdog" must be turned off. The role of "watchdog" is to ensure the stability of remote connection.



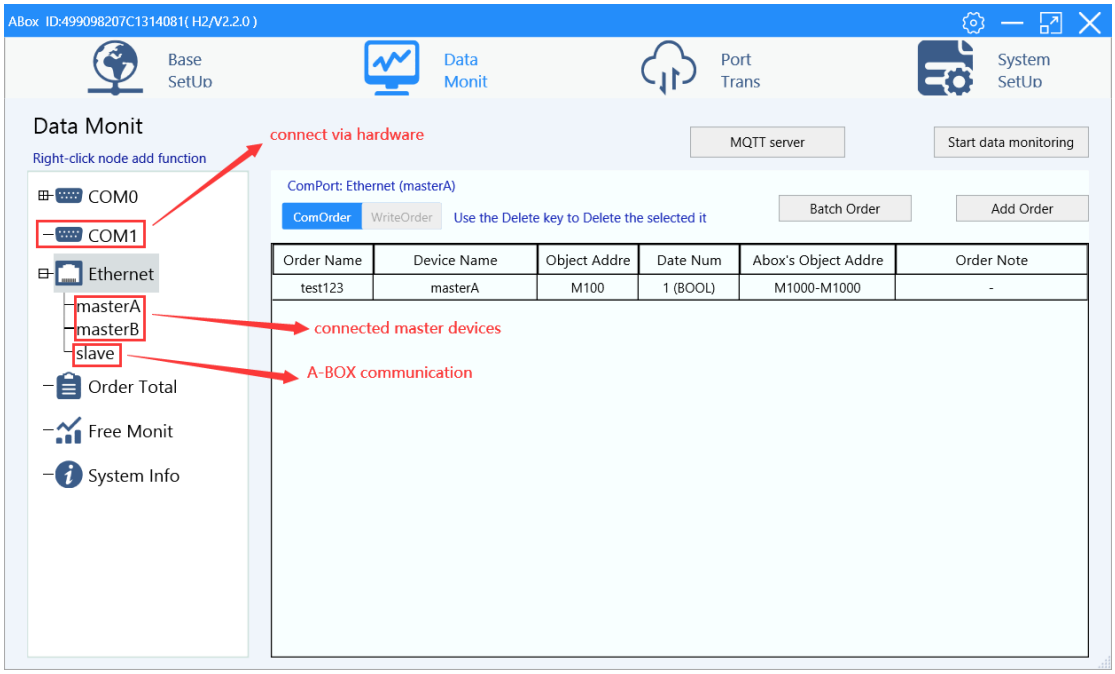
4-6. ModbusRTU slave station function

Only COM1 port of ABOX series products supports Modbus RTU slave function. Here, take Xinje XDH-30A16-E PLC and TG765-UT (P) as an example.

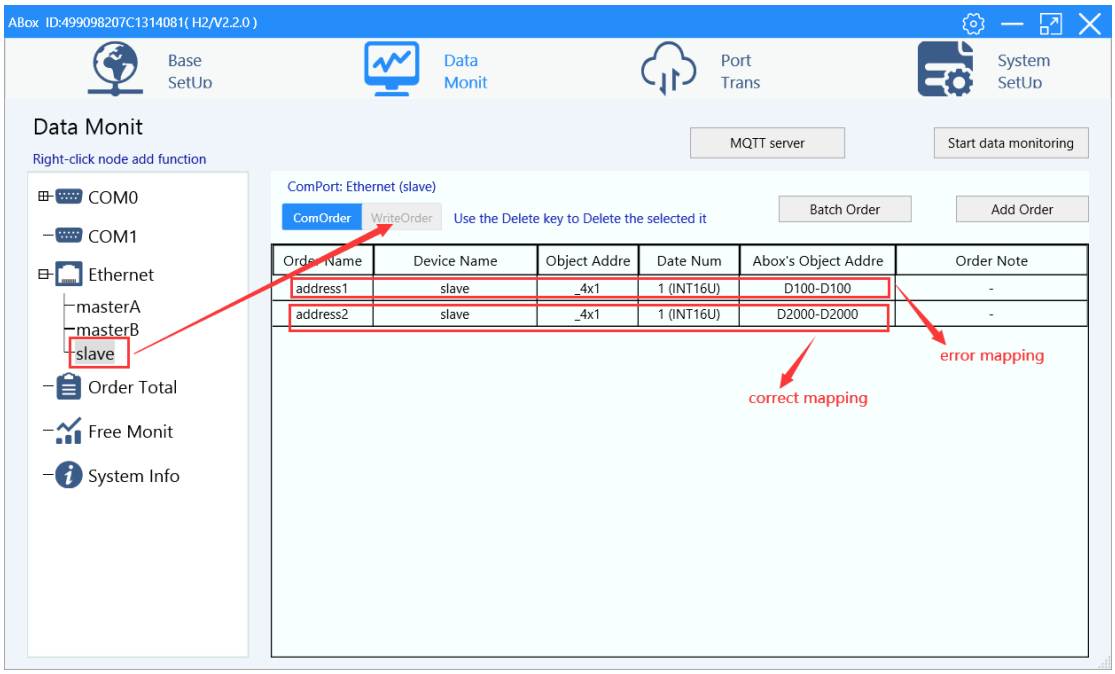
Connect TG765-UT (P) to COM1 port of A-BOX, set PLC of HMI as Modbus RTU (panel is master), and set communication parameters consistent with COM1 parameters of A-BOX.



Configure the Ethernet port (or COM0 port) in the BOX Manager management tool. Add the corresponding PLC address corresponding to the ABOX mapping address in the write data command to control it. Add the command in the communication command to establish communication between the ABOX and the device of the Ethernet port.



In the communication command configured in the slave station, the object address and the ABox object address are in the same storage area, so two addresses cannot be placed in the same storage area.



5. Transparent transmission case

ABOX transparent transmission is compatible with all brands of PLC, HMI and other serial port or Ethernet port devices, please refer to chapter 4 for details. The tested brands are shown as below:

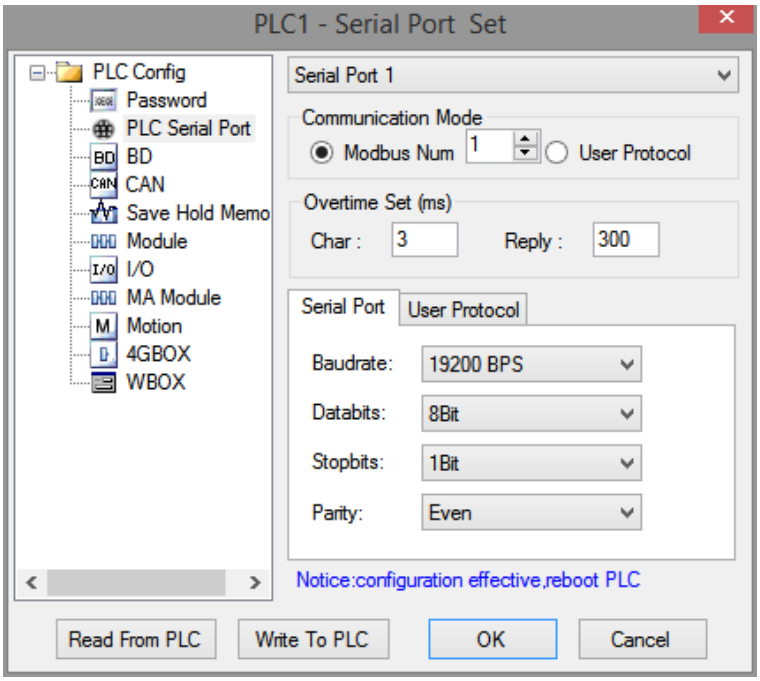
Brand	Series/ model	Serial port transparent transmission	VPN transparent transmission	USB transparent transmission
Xinje	XC series	Support	-	-
	XD/XL/XG series	Support	-	-
	XD5E series	Support	Support (ModbusTCP)	-
	HMI (except TGM)	-	-	Support
Mitsubishi	FX series	Support	-	-
	FX3U/G series	Support	Support	-
	FX5U series	Support	Support	-
	L series	-	Support	-
	Q series	-	Support	-
Omron	CP1E	Support	-	Support
	CP1H	Support	Support	Not support
	CJ-CS	Support	-	-
	CJ series (Ethernet)	-	Support	-
	CPM/CQM series	Support	-	-
Siemens	S7-200	Support	-	-
	S7-300	Support	Support	-
	S7-200 SMSRT	Support	Support	-
	S7-1200	-	Support	-
	S7-1500	-	Support	-
Rockwell (AB)	L32E	-	Support	-
Weinview	MT8071iE	-	Support	-
Delta	DVP series	Support	Support	-
	AH series	Support	Support	-
	AS series	Support	Support	-
Schneider	Modicon Micor series	Support	-	-
	Modicon M218 series	-	Support	Support
	Modicon Twido series	Support	-	-
ABB	AC500 series	-	Support	-

Yaskawa	MP series	-	Support	-
Keyence	KV5000/KV7500	-	Support	-
Koyo	S series	Support	-	-
	DL series	Support	-	-
Kinco	HMI	-	Support	Support

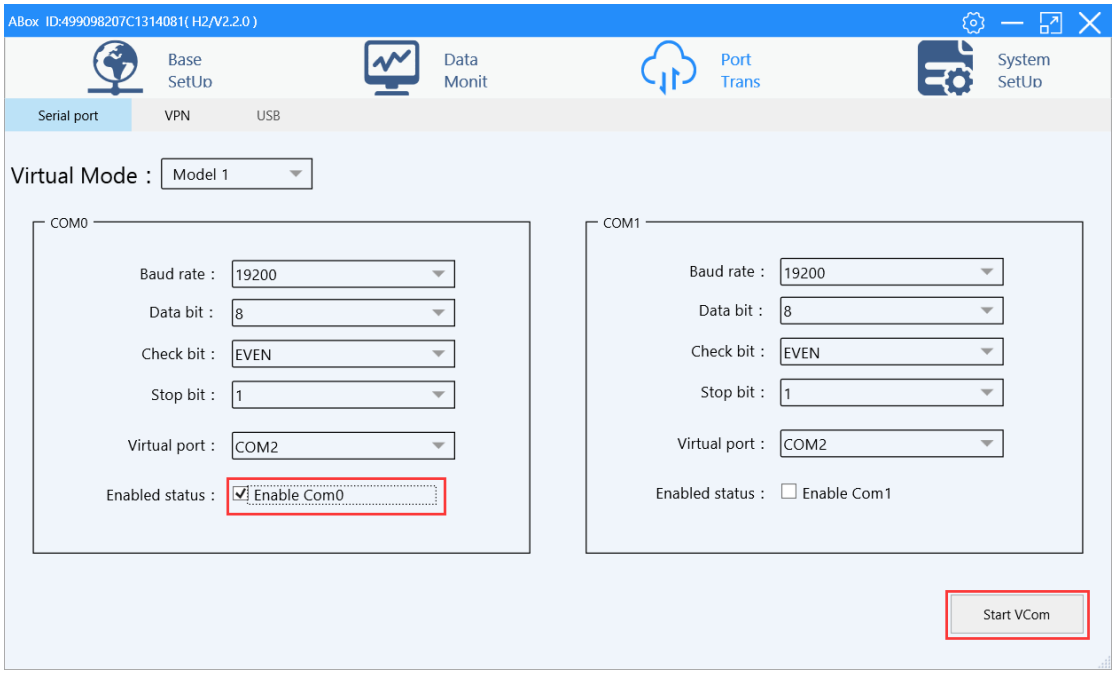
Note: Since Xinje XNET protocol cannot set the timeout, any PLC or HMI involving XNET protocol cannot transparently transmit the upload and download programs through XNET protocol. Please use modbus or Modbus TCP protocol.

5-1. XINJE XC series serial port transparent transmission

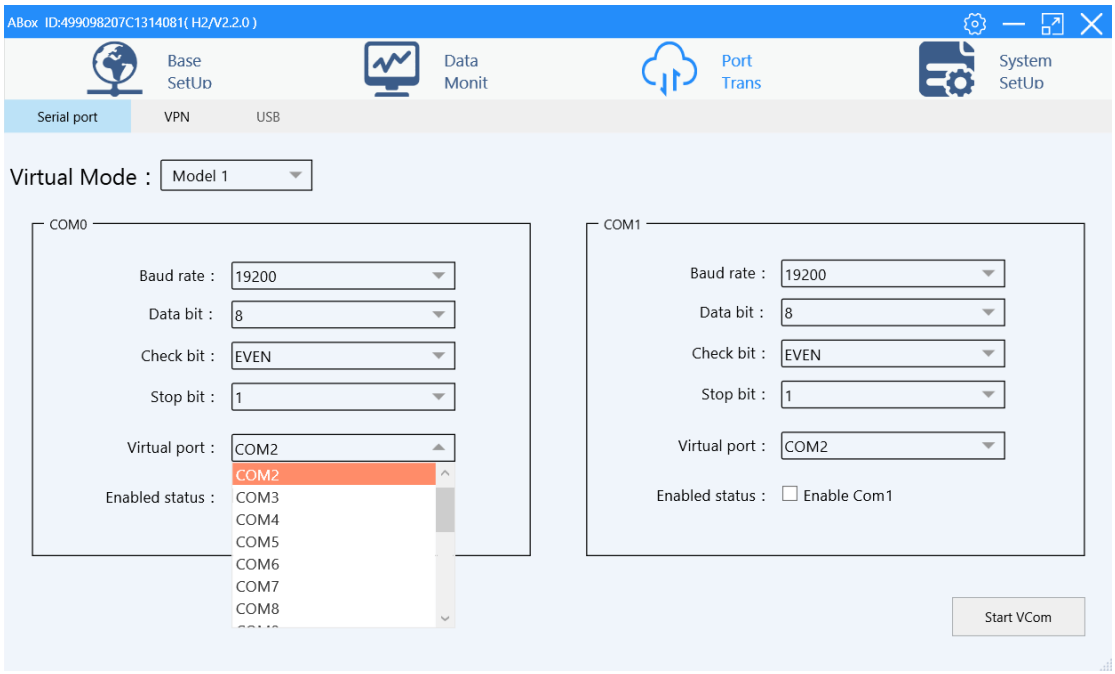
1. XINJE XC series serial port transparent transmission supports RS232 and RS485. XC series PLC defaulted serial port parameters are 19200, 8, 1, E.



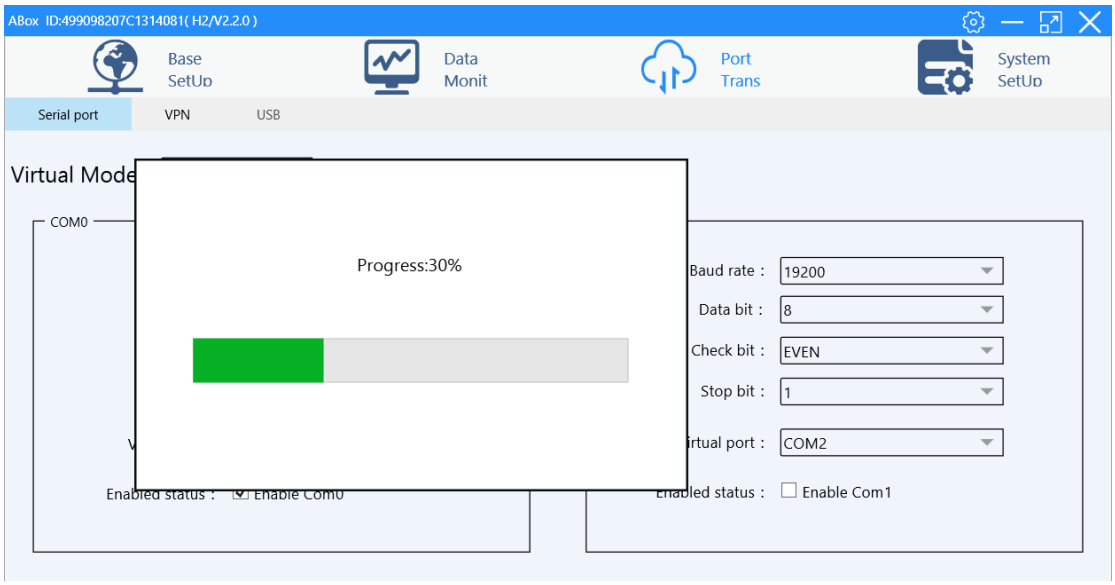
2. ABOX module COM0 and COM1 defaulted parameters are 19200, 8, 1, E. It only needs to connect ABOX and XC through RS232 or RS485.



3. Link the ABOX with the configuration tool, click virtual serial port, choose the com port of ABOX, choose the idle com port in my PC, click Start VCom.

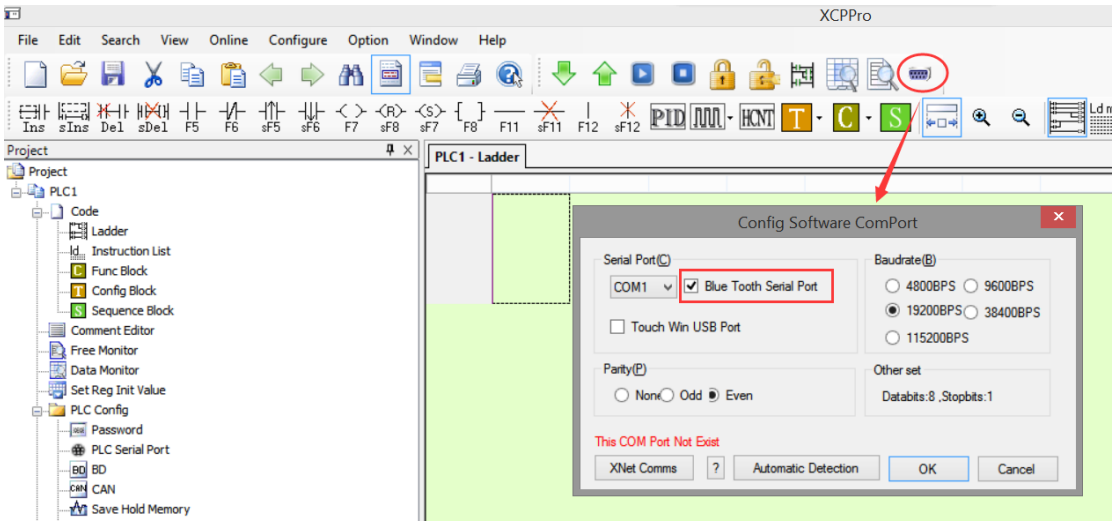


4. When the virtual serial port process is completed, it will show “virtual serial port is running”.



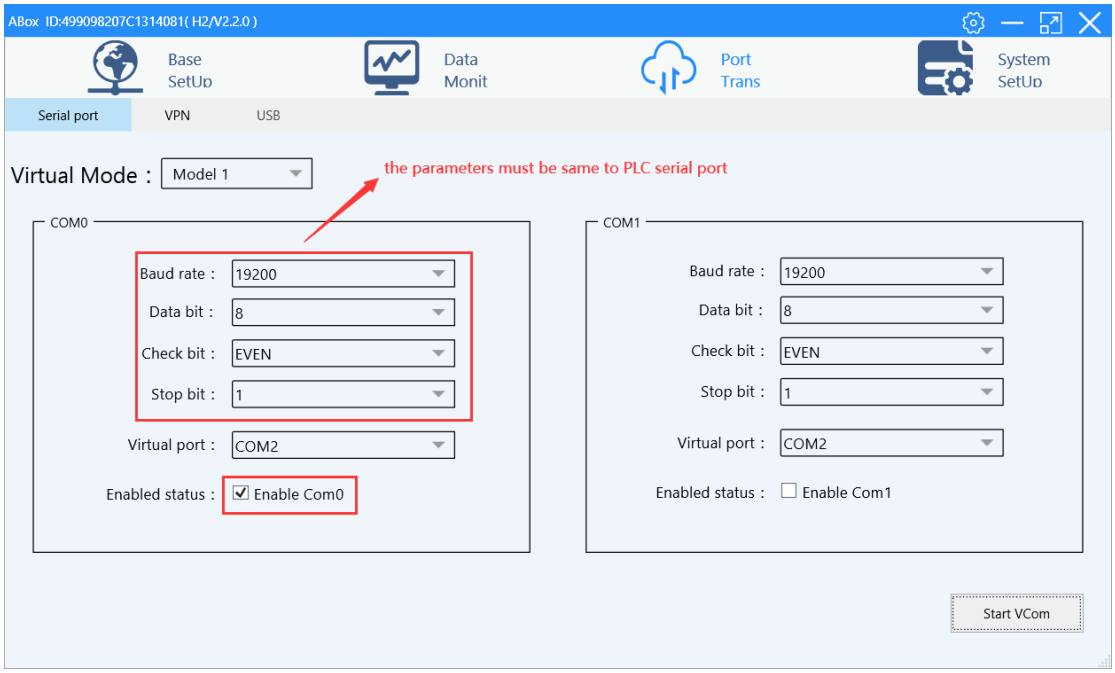
5. after creating the virtual serial port, open the PLC software, choose this virtual serial port to connect. It can realize remote PLC program downloading uploading and monitoring, debugging.

Note: for XC series software, please choose blue tooth serial port when using virtual serial port.

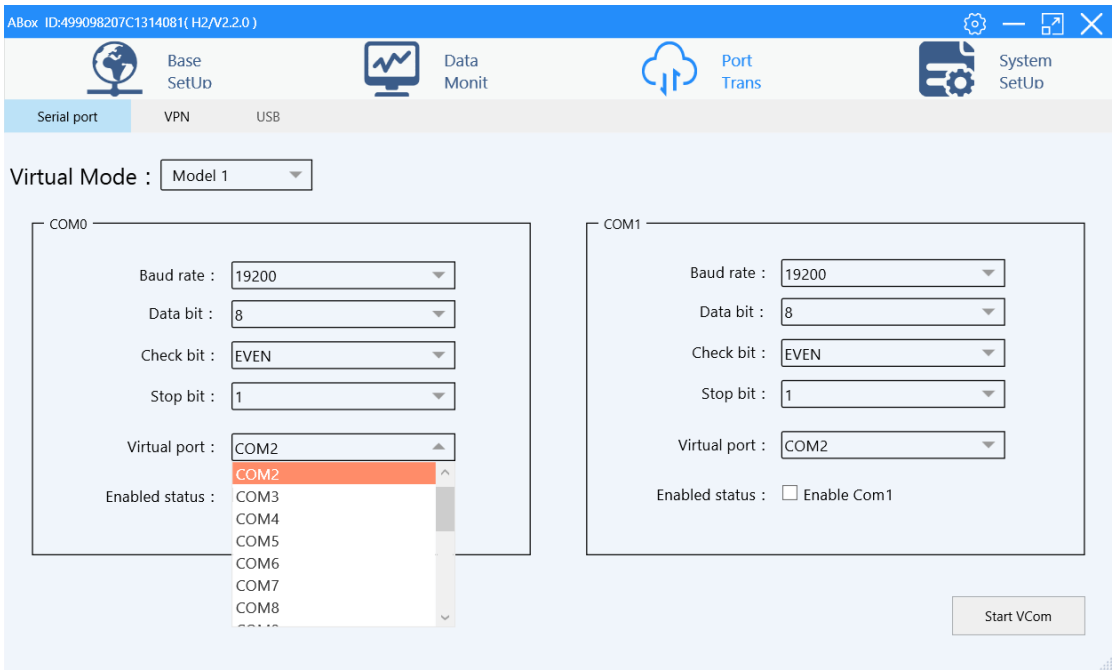


5-2. XINJE XD series PLC serial port transparent transmission

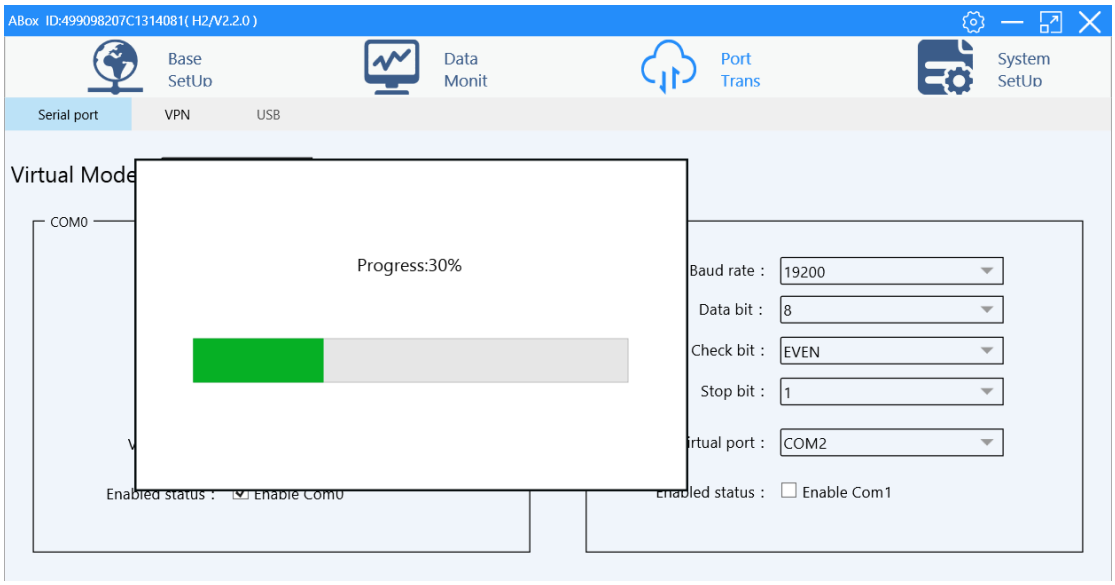
1. The configuration method is same to chapter 5-1. Make sure the PLC and ABOX serial port parameters are consistent.



2. Click the virtual serial port, choose the com port of ABOX, choose idle com port in my PC. Click Start VCom.

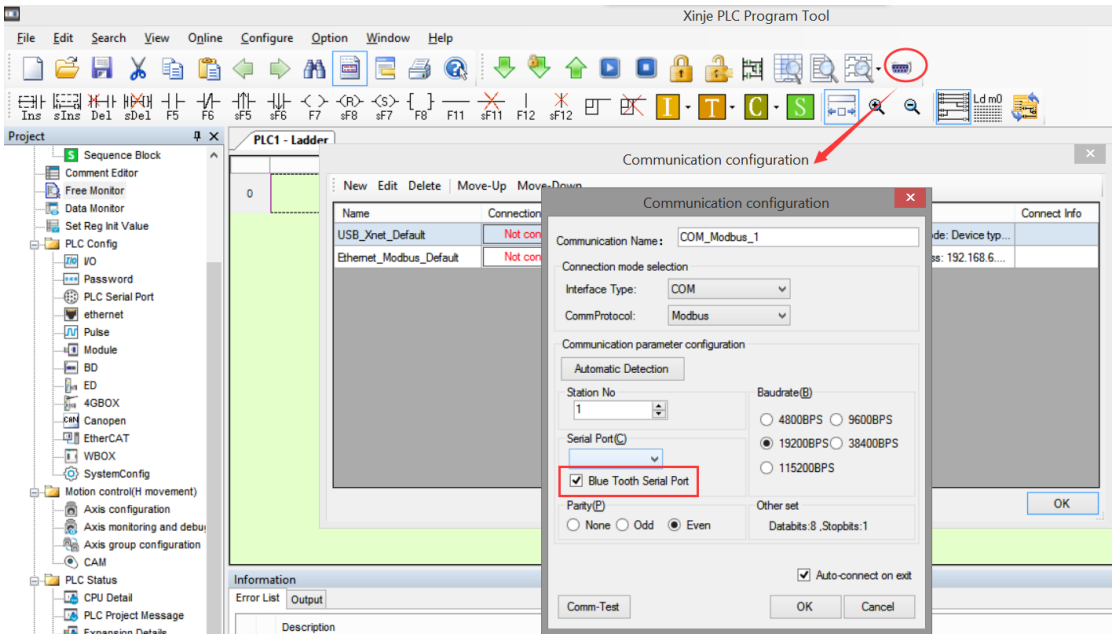


3. When the virtual serial port process is completed, it will show “virtual serial port is running”.



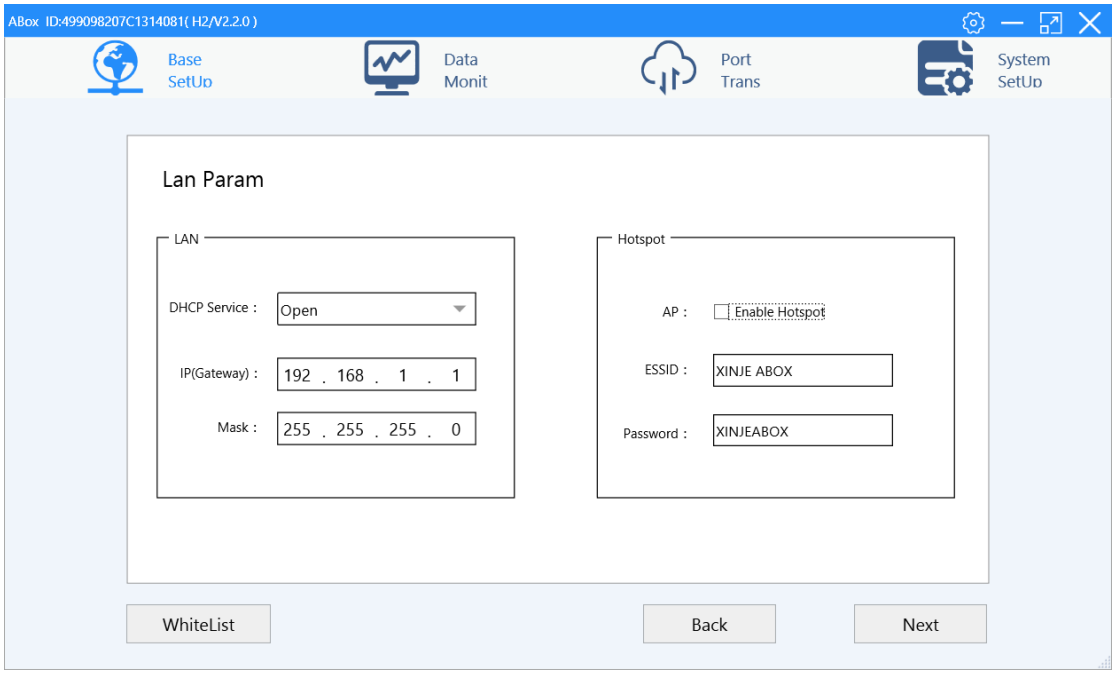
4. After creating the virtual serial port, open the PLC software, choose this virtual serial port to connect. It can realize remote PLC program downloading uploading and monitoring, debugging.

Note: for XD series software, please choose blue tooth serial port when using virtual serial port.

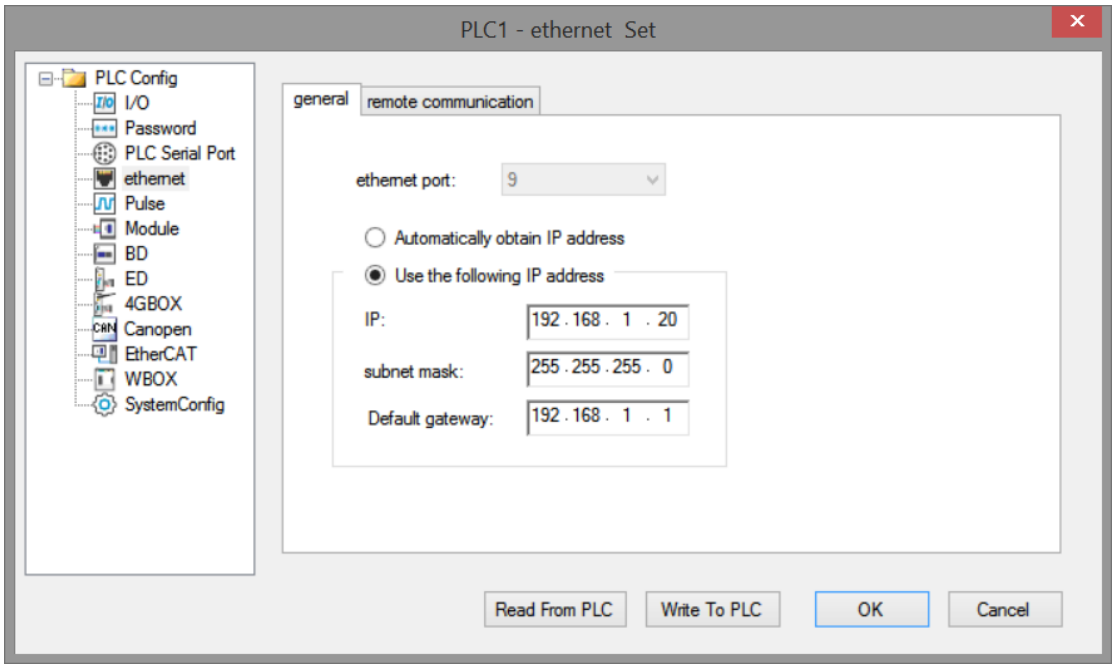


5-3. XINJE PLC Ethernet port VPN

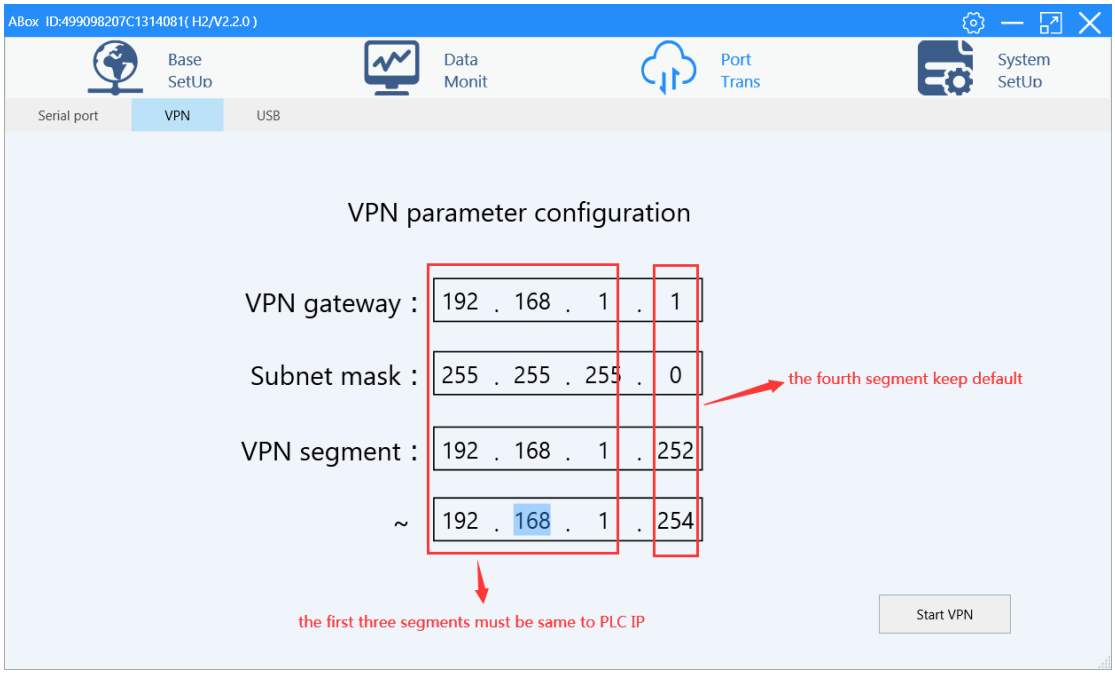
1. Use the configuration tool to connect A-BOX, check the LAN parameters of A-BOX, and confirm the LAN gateway of A-BOX. The default is 192.168.1.1, and the subnet mask is 255.255.255.0. VPN can only be used for remote login.



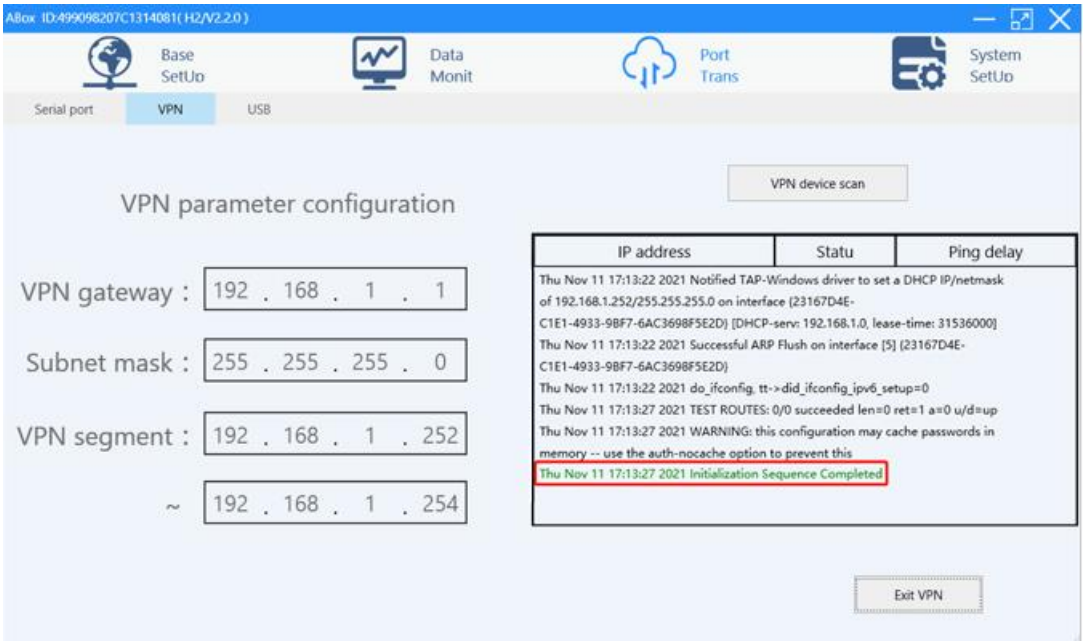
2. Fix the IP address of the Ethernet port of the PLC that needs VPN. The IP address of the PLC needs to be in the same gateway as A-BOX. Take the default gateway as an example. The IP address of the PLC is set to 192.168.1.XX (the range of XX is 2~251). The settings of Xinje XDE series are shown in the figure below:



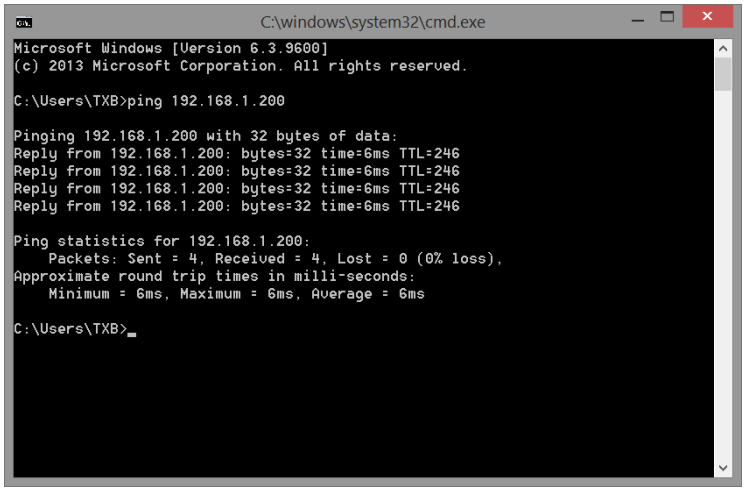
3. After configuring the IP address of the PLC, plug the network cable into the LAN port of A-BOX. After A-BOX logs in to the server successfully, open the configuration tool, connect the current A-BOX, open "VPN", and click "Start VPN".



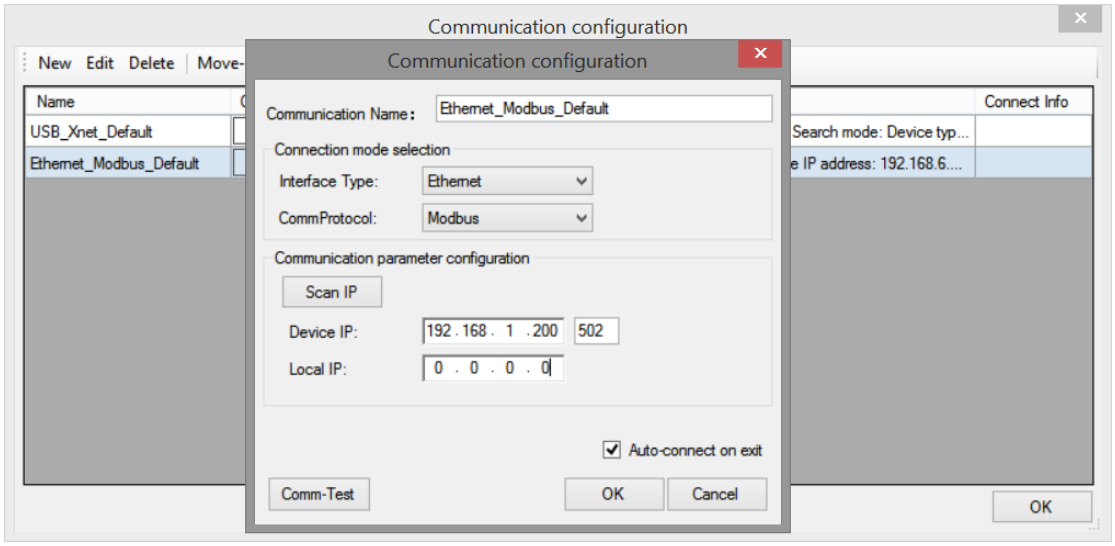
4. When it shows the following image “Initialization Sequence Completed”, it means the connection is successful, it can make the transparent transmission.



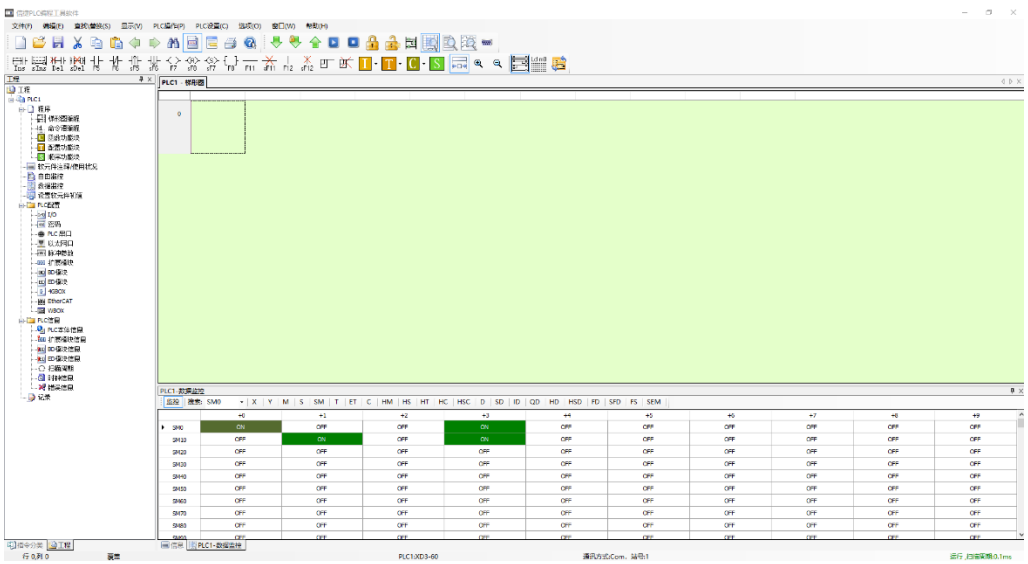
5. During VPN transparent transmission, you can also use "Windows+R" to open the "cmd" program. The ping command can test whether the connection is normal.



6. Open the XDPpro programming software. Version V3.7.0 or above is required. Select Ethernet Modbus when connecting. Do not select XNET for connection download!

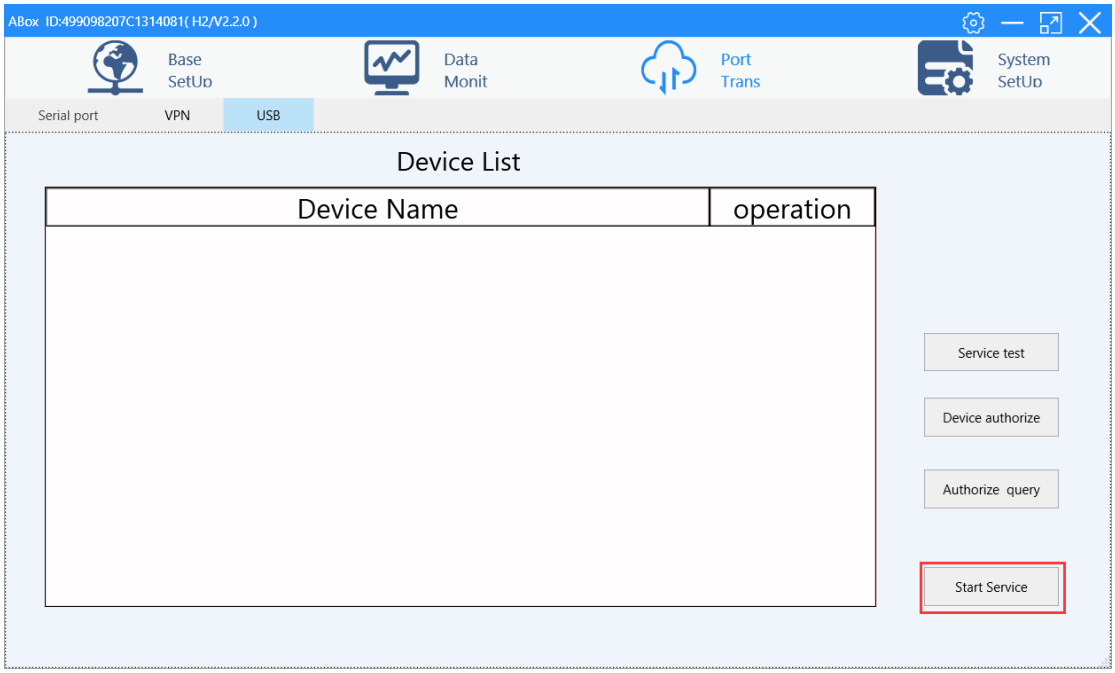


7. Connection succeeded.

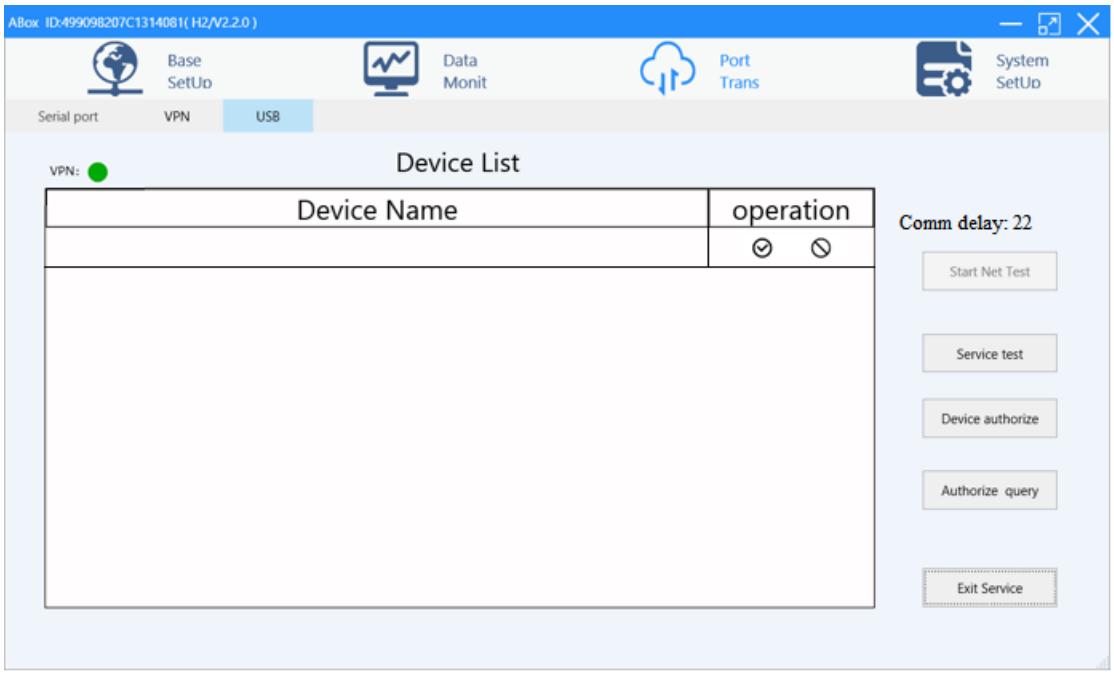


5-4. USB transparent transmission (take Xinje HMI as example)

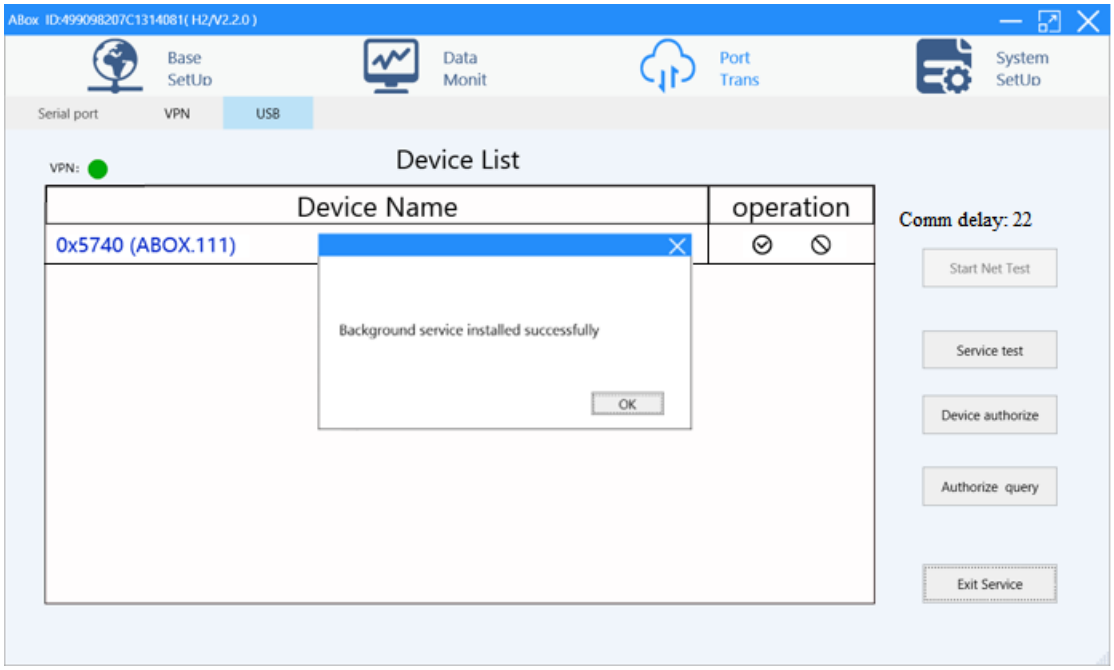
1. Open the configuration tool, connect remotely, click "USB ", click "Service test", and confirm that the passthrough tool driver installation is completed.



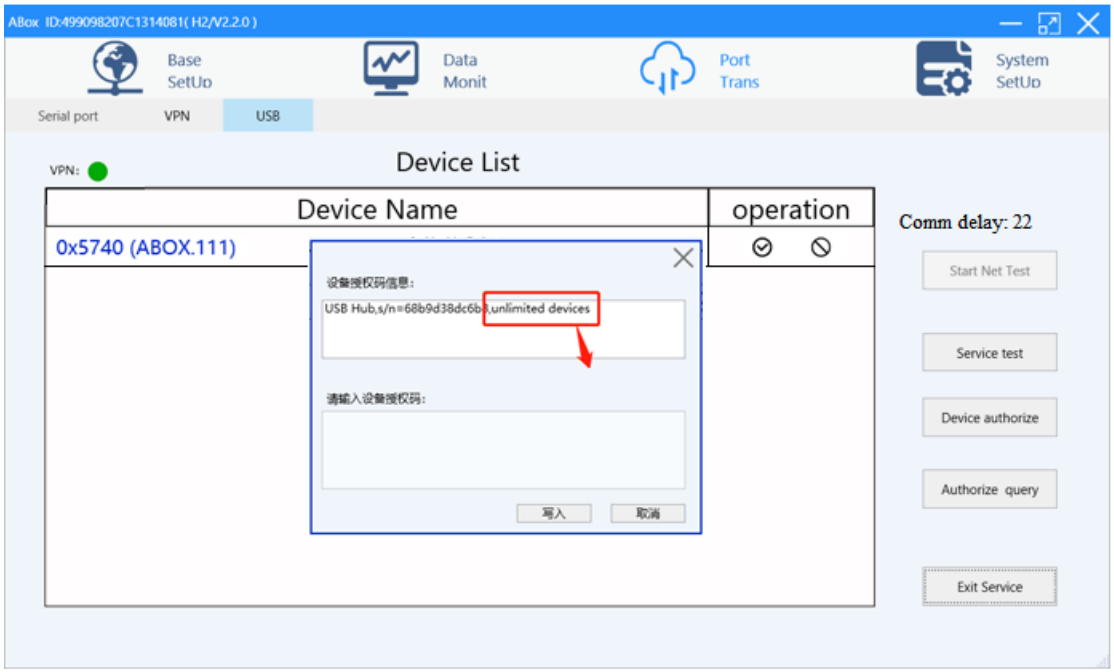
2. Click "Start Service" to start USB transparent transmission, and click “start net test” to view the current network delay, which is generally within 150ms when the signal is good.

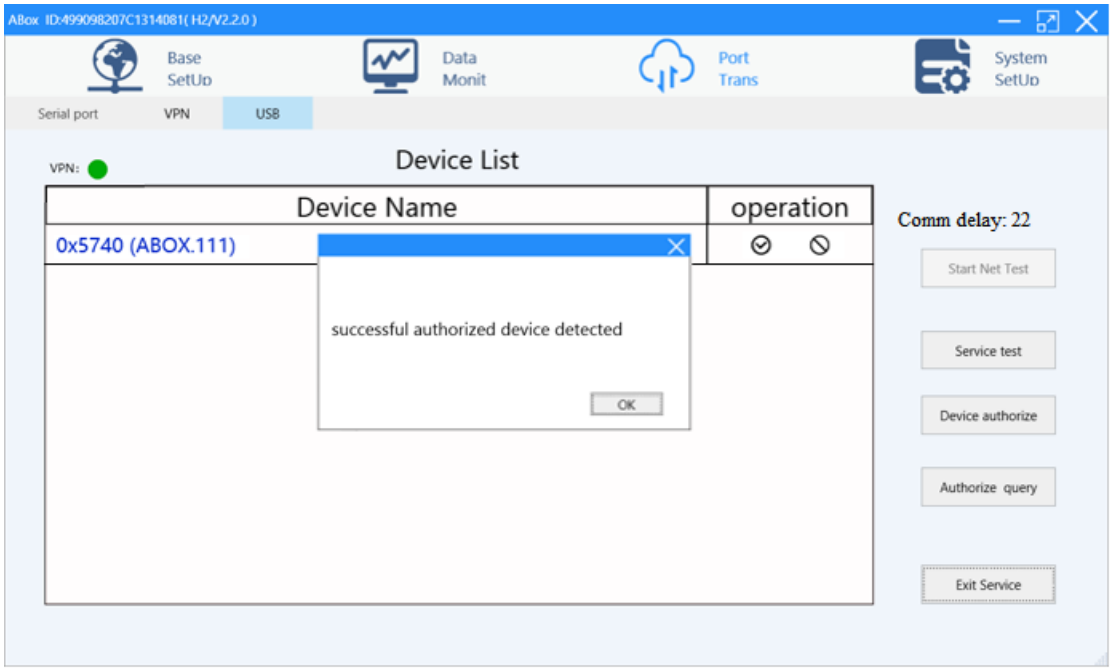


3. Service test: check whether the transmission tool driver is installed.

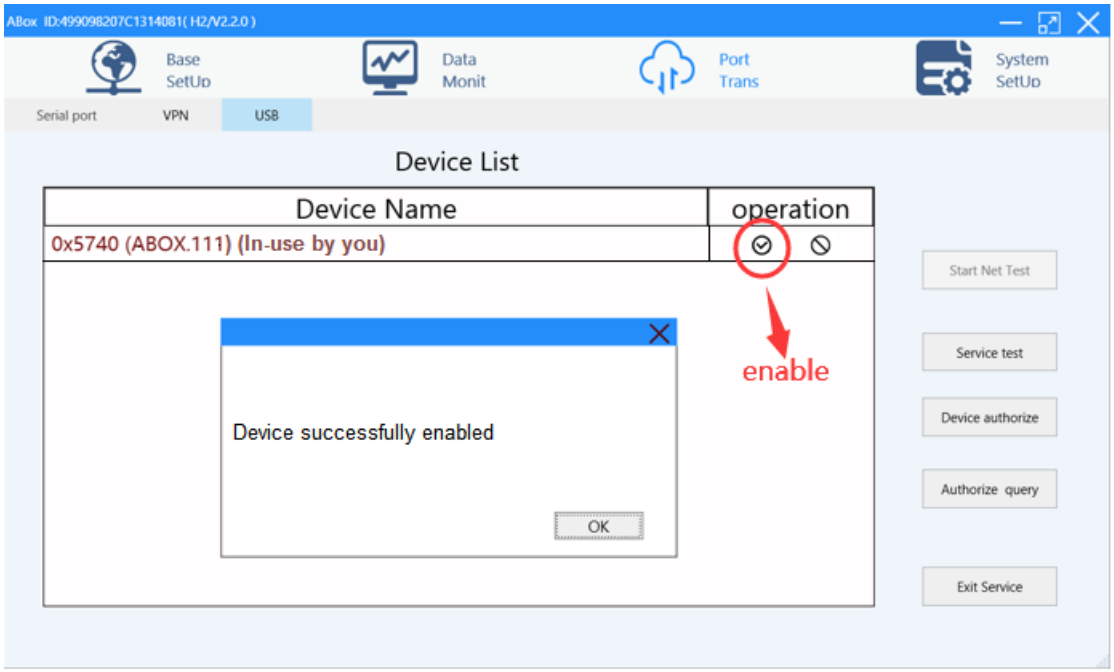


4. Click "Device Authorize" or "Authorization Query" to confirm that the module has USB authorization.

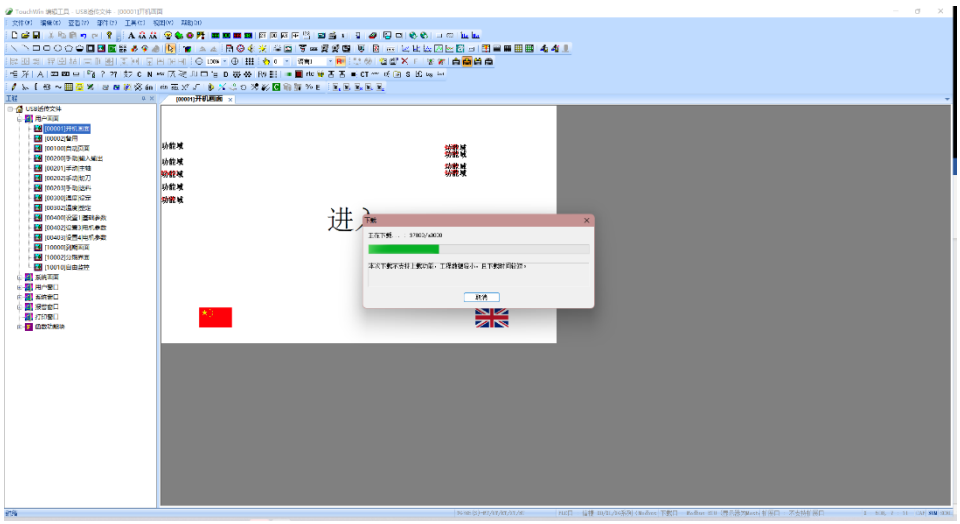




5. The USB cable is connected to the USB port and the HMI. The device detected by the USB port will pop up automatically in the device list. Click "√" to enable the current USB device.



6. In the device list, "In use by you" is displayed behind the device name, indicating that the device is being used. Open the HMI editing software directly, and click Download after creating a new screen.



7. After use, click "Exit service" to exit USB passthrough.

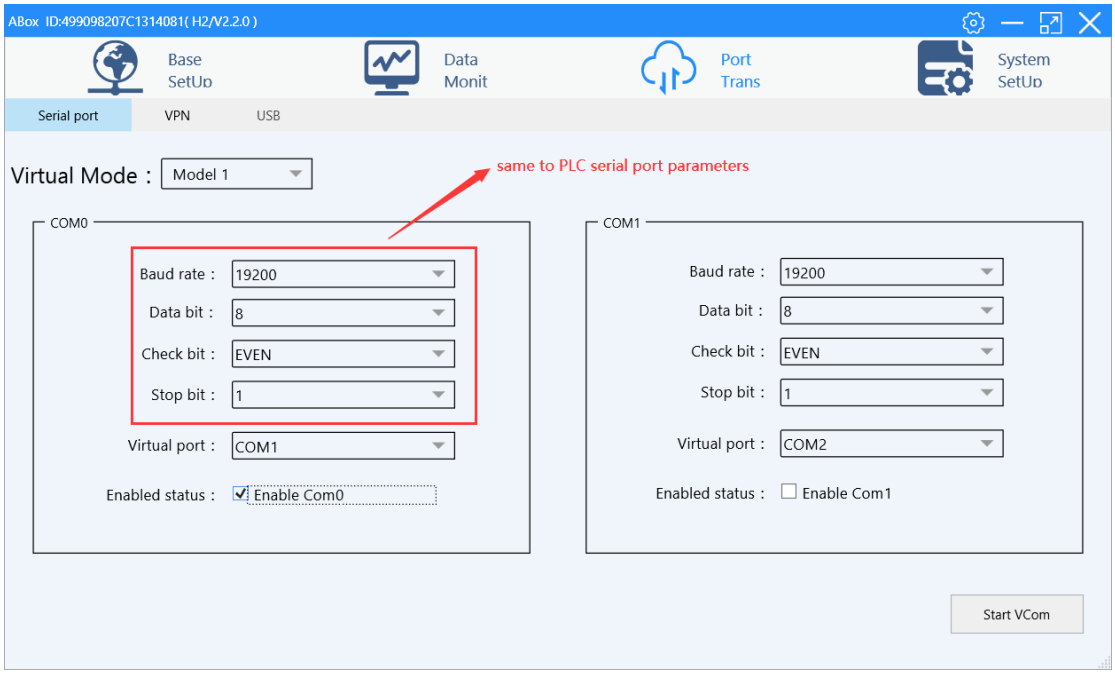
Note: Closing the configuration tool directly will not exit USB passthrough. After clicking Close, the configuration tool will be minimized to the lower right corner of the computer to run. You can find the icon, right-click the mouse, click "Open USB passthrough" to call up the configuration interface, and click "Exit Service" to exit USB passthrough.

5-5. Siemens S7-200 serial port transparent transmission

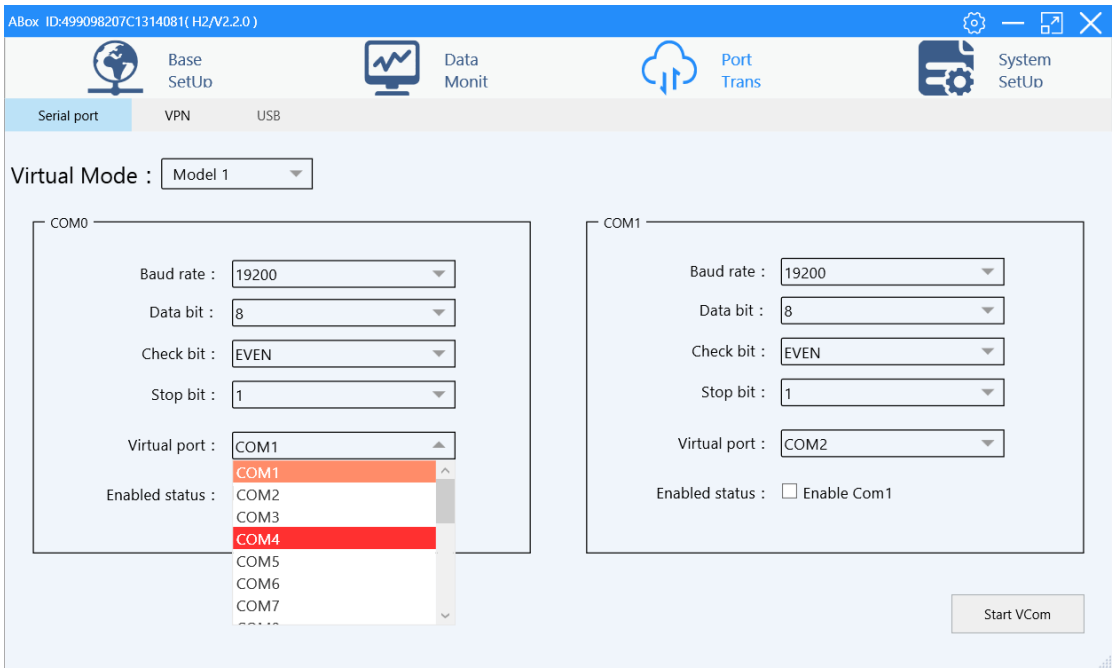
1. The port 0 serial port parameters of Siemens S7-200 are 9600, 8, 1, E by default. The communication between A-BOX and S7-200 adopts RS485 wiring mode:

A-BOX			S7-200	
Pin	Name		Pin	Name
4	A	⟷	3	A
7	B	⟷	8	B

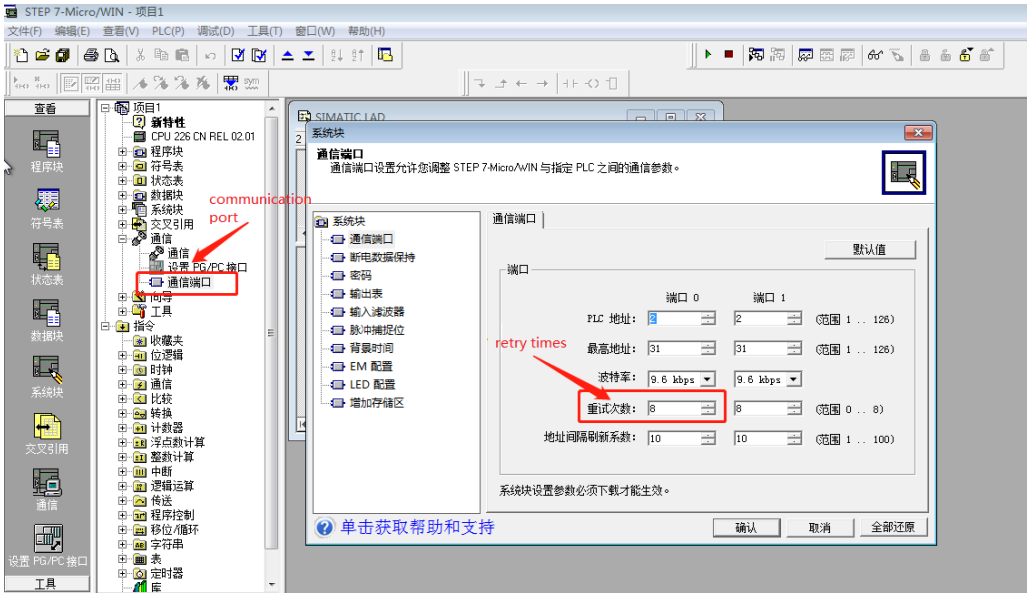
2. Use the configuration tool to remotely connect A-BOX, modify the serial port parameters of COM0 or COM1. In this case, connect COM0, change the serial port parameters of COM0 to 9600, 8, 1, E, and click "Write and take effect".



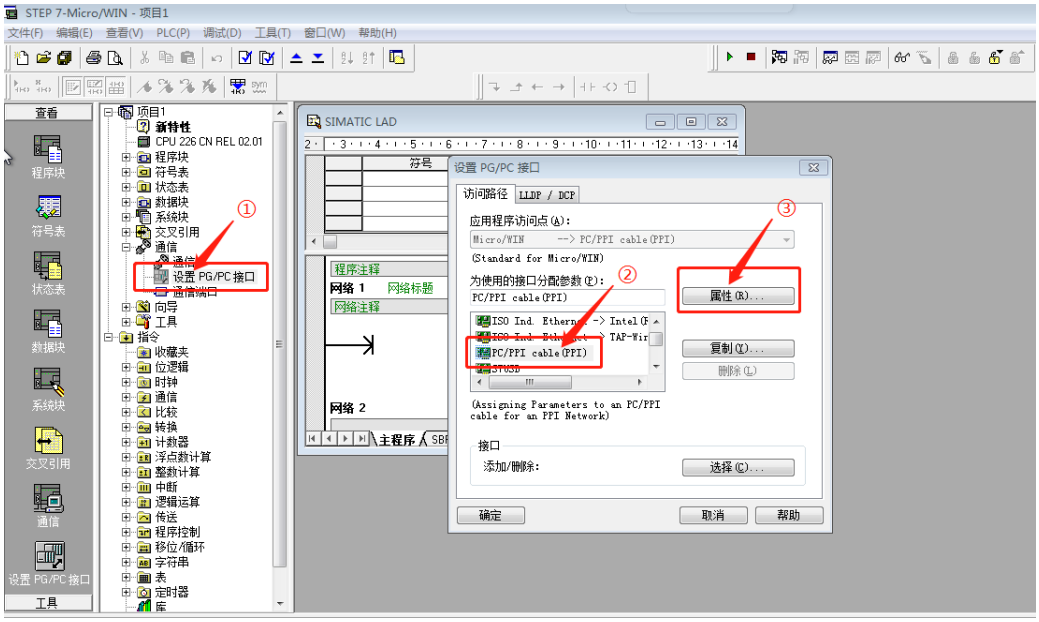
3. Select COM0, virtual to local COM4 port. Click Start Vcom.



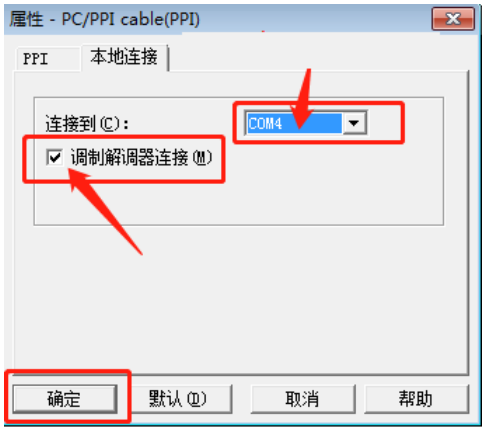
4. Open STEP7 software. Open communication port, set the retry times to 8.



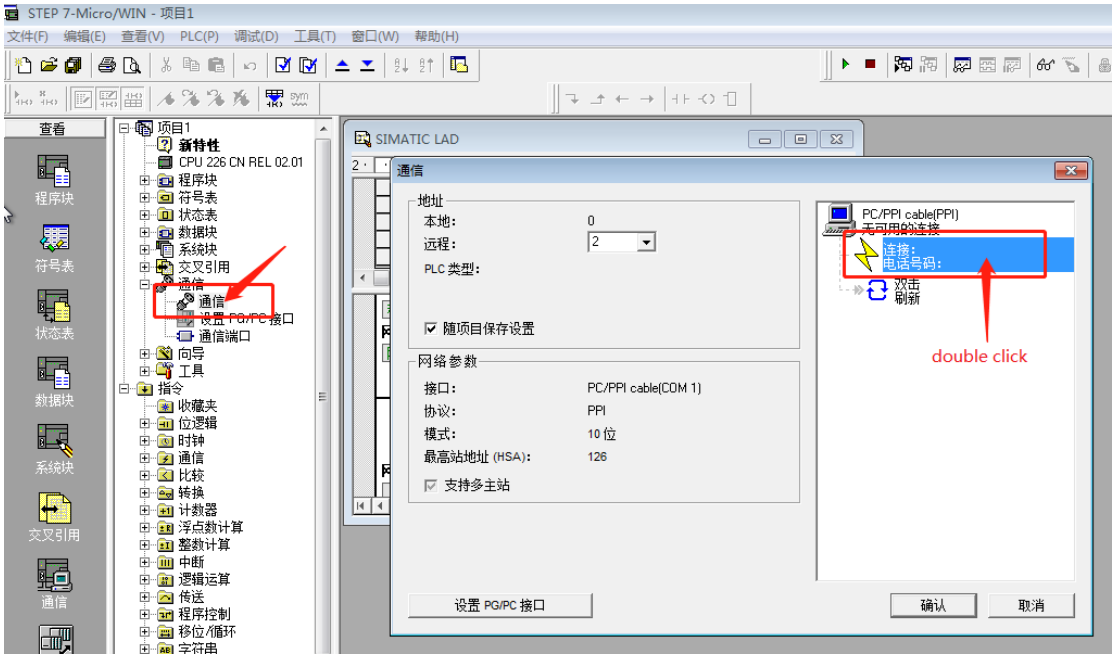
5. Click "Set PG/PC Interface", select "PC/PPI cable (PPI)", and click "Attribute".



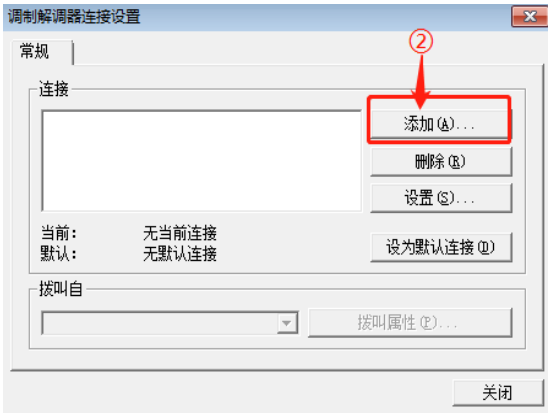
6. Select the virtual COM port and tick "Modem Connection".



7. Click communication, double click connect.



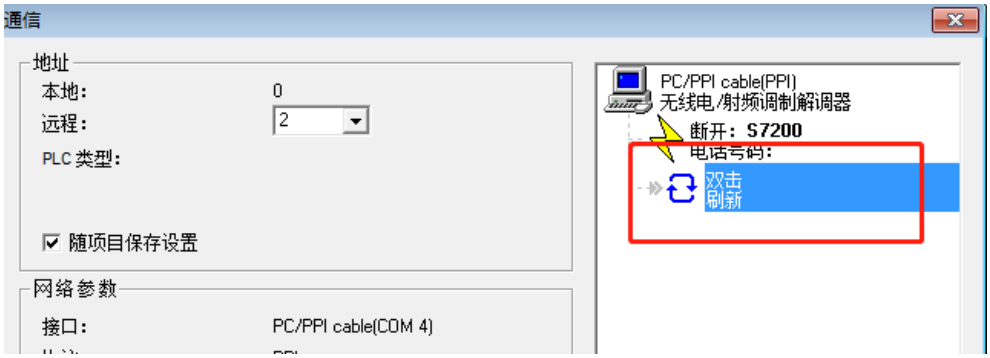
8. Click set, click add.



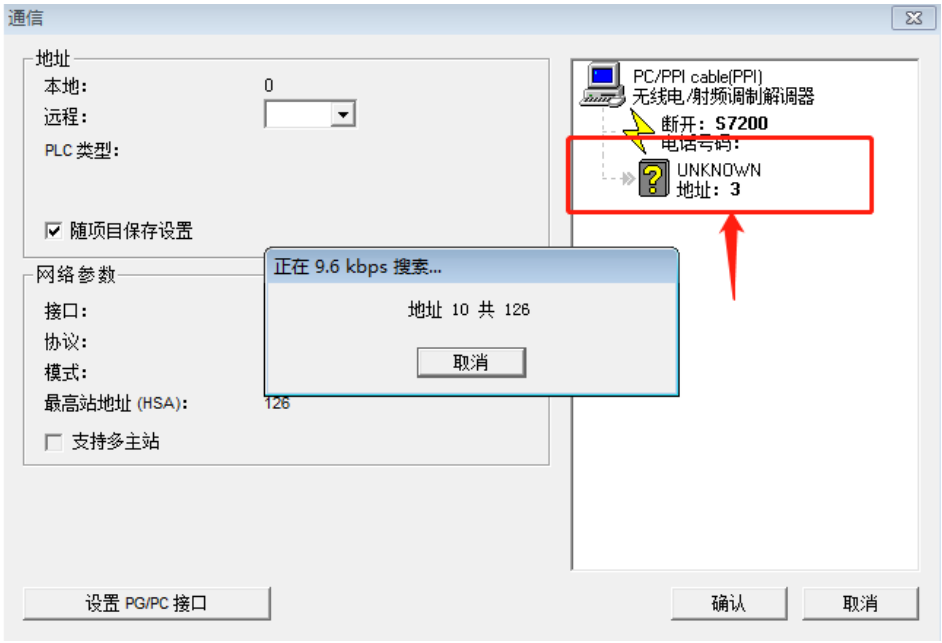
9. Select Radio/RF Modem and click Configure. Fill in the COM port created by A-BOX. In this case, the COM port is COM4, the baud rate is 9600, and the parity is even.

10. Click Connect in Modem Connection

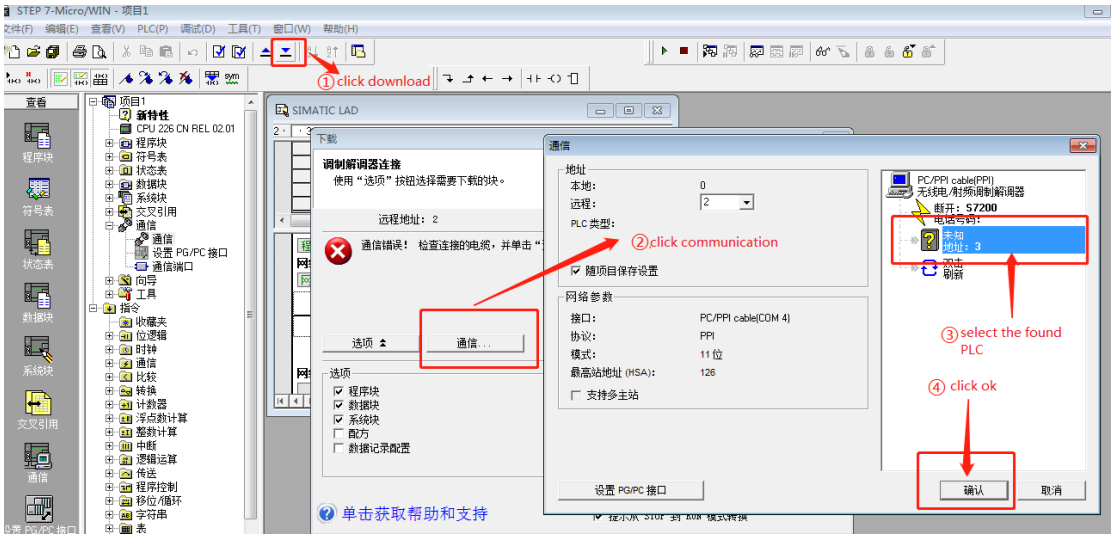
11. Click "Double click to refresh".



12. "UNKNOWN" will be displayed during refreshing, indicating that the PLC has been found successfully.



13. Download to the PLC.



14. Download is successful.

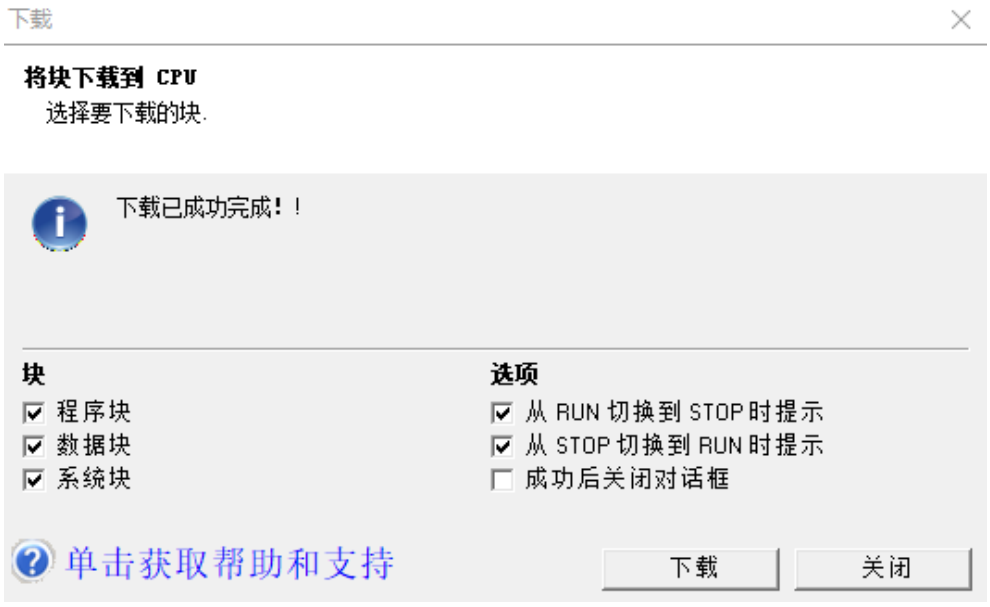
5-6. Siemens 200-SMART series Ethernet port VPN transparent transmission

1. The default IP address of Siemens S7200-SMART series PLC network port is 192.168.2.1. First, connect the PLC to the computer with a network cable, and fix the IP address of the computer as 192.168.2.xxx (for example, 192.168.2.200).

2. Open Siemens 200-SMART software, connect to the PLC.

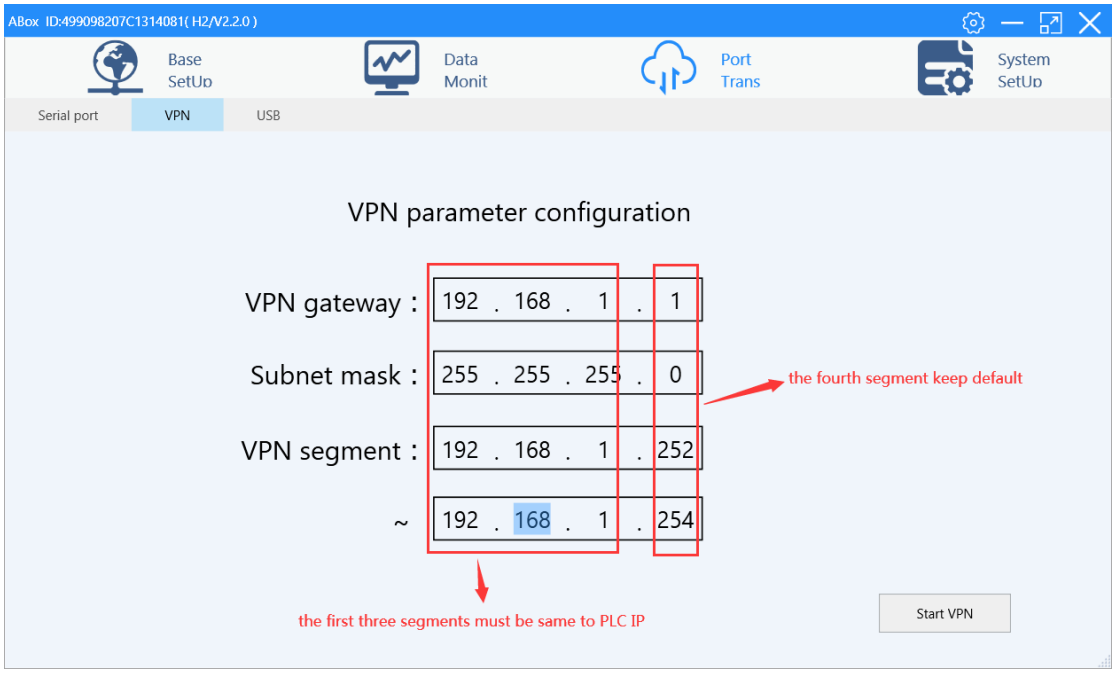
3. The default gateway of A-BOX is 192.168.1.1. Modify the IP address of Siemens PLC to 192.168.1.xxx.

4. Download the parameters to the PLC.

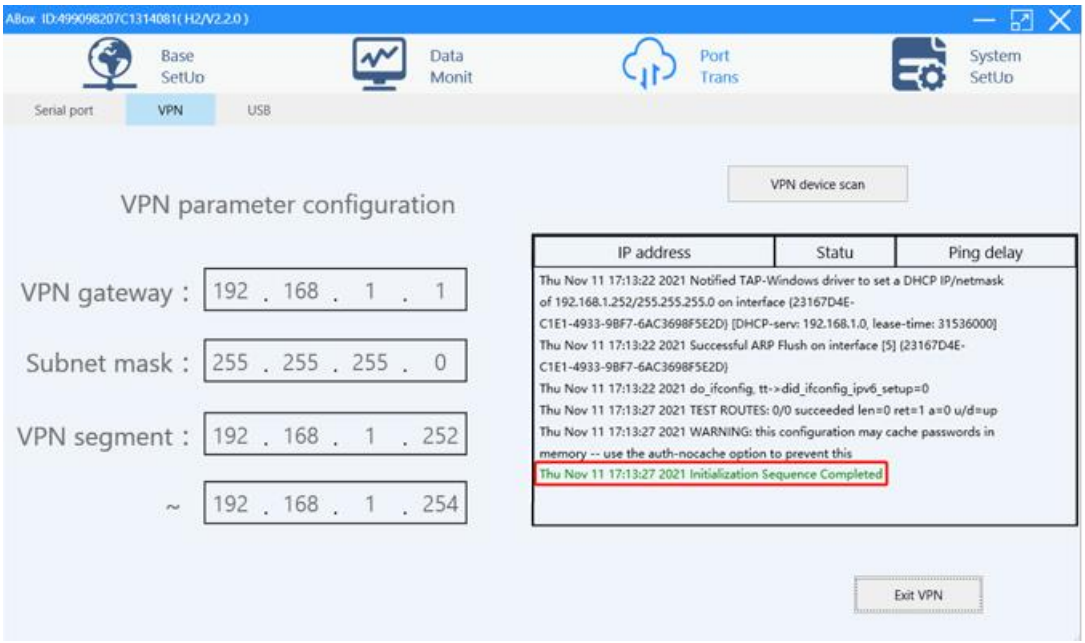


5. After downloading the parameters, connect the PLC to the LAN port of A-BOX with a network

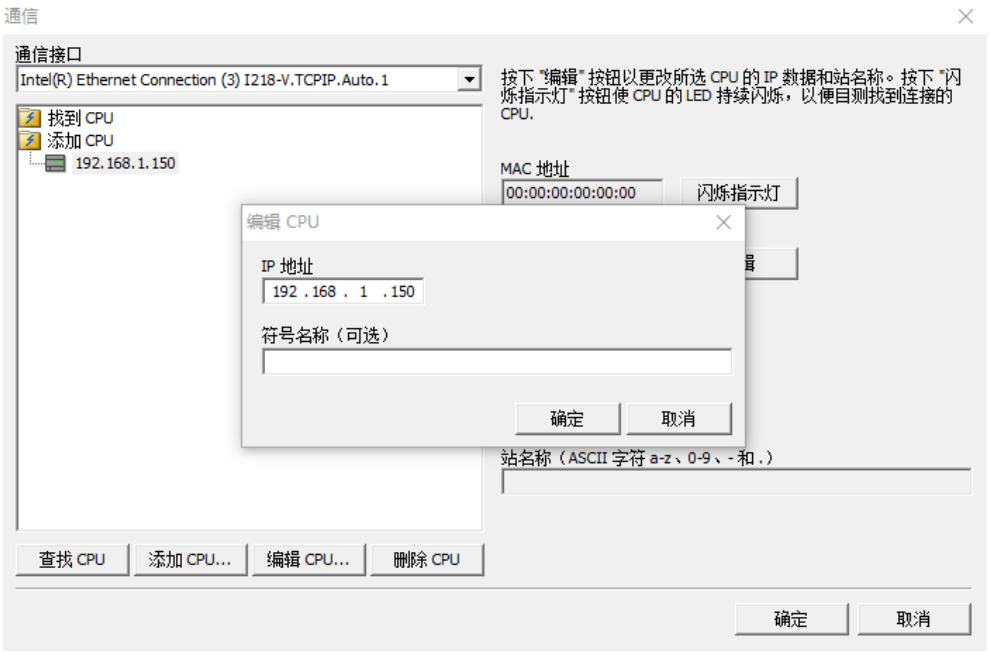
cable. After A-BOX logs in to the server, use the configuration tool to connect to the current A-BOX. In "User Functions" ->"VPN", click "Start VPN".



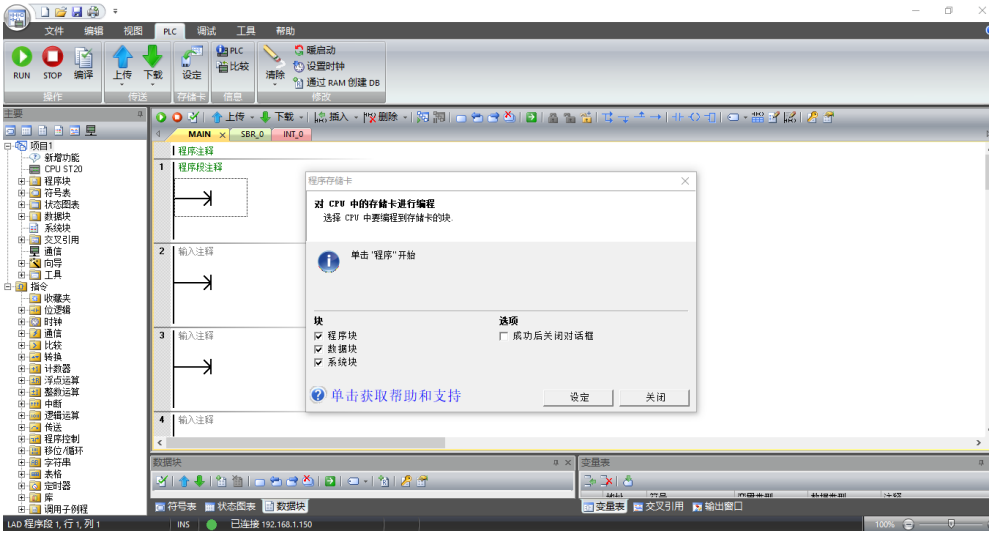
6. When it shows the following image “Initialization Sequence Completed”, it means the connection is successful, it can make the transparent transmission.



7. During VPN transparent transmission, you can also use ping command to test whether the connection is normal, and then open Siemens PLC software. In "PLC" ->"Setting", click Add CPU, and manually fill in the IP address 192.168.1.150 of PLC.

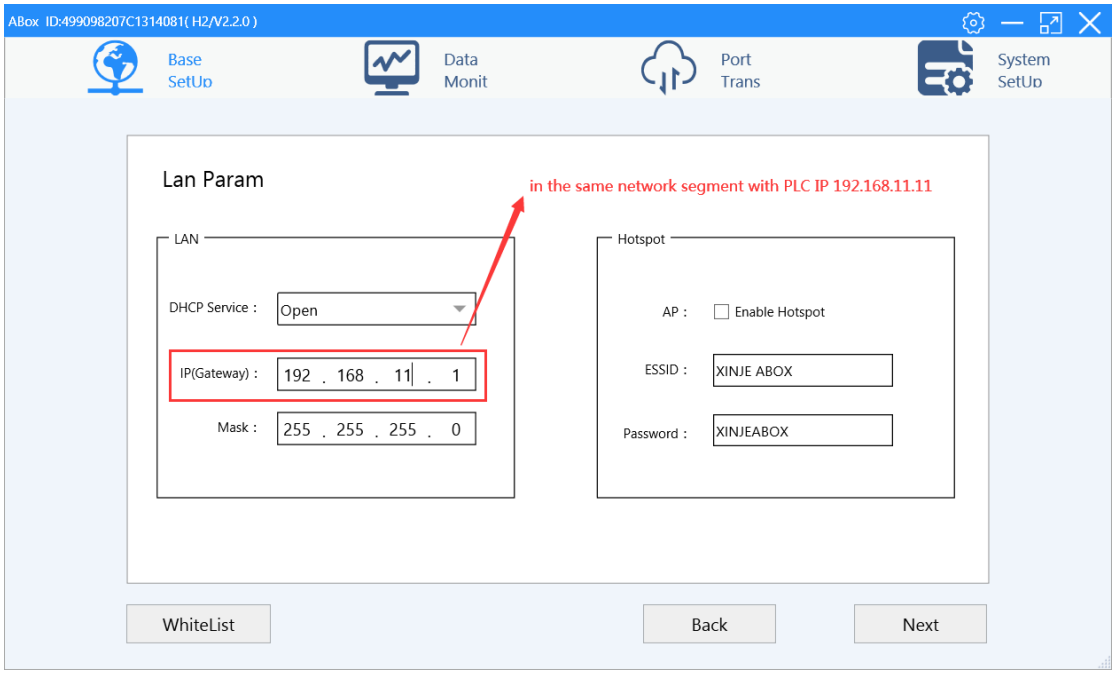


8. click ok to connect the PLC.

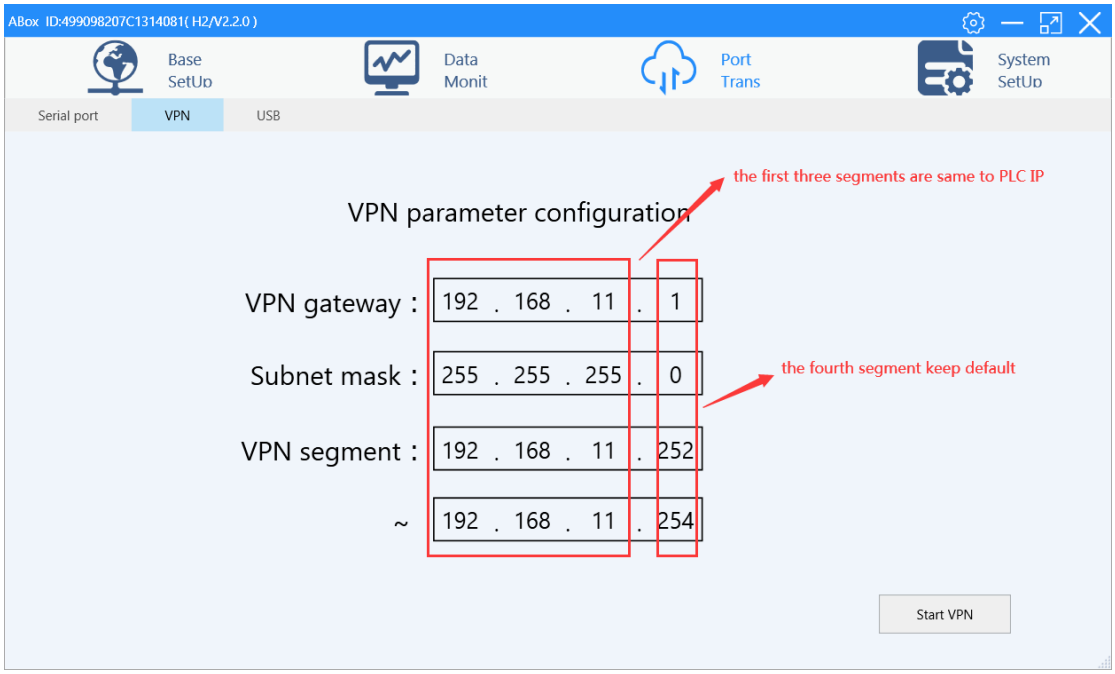


5-7. Siemens S7-1200/1500 series PLC Ethernet port VPN transparent transmission

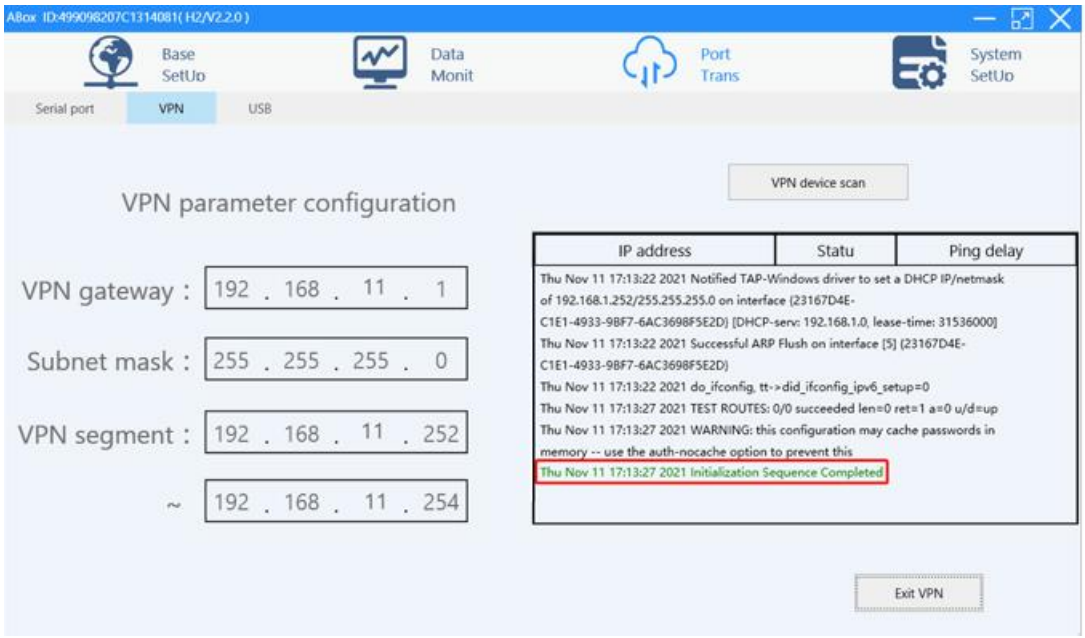
1. This case uses Siemens S7-1200 series PLC with IP address 192.168.11.11. First, use the configuration tool to remotely login to A-BOX. Change the LAN gateway of ABOX to 192.168.11.1.



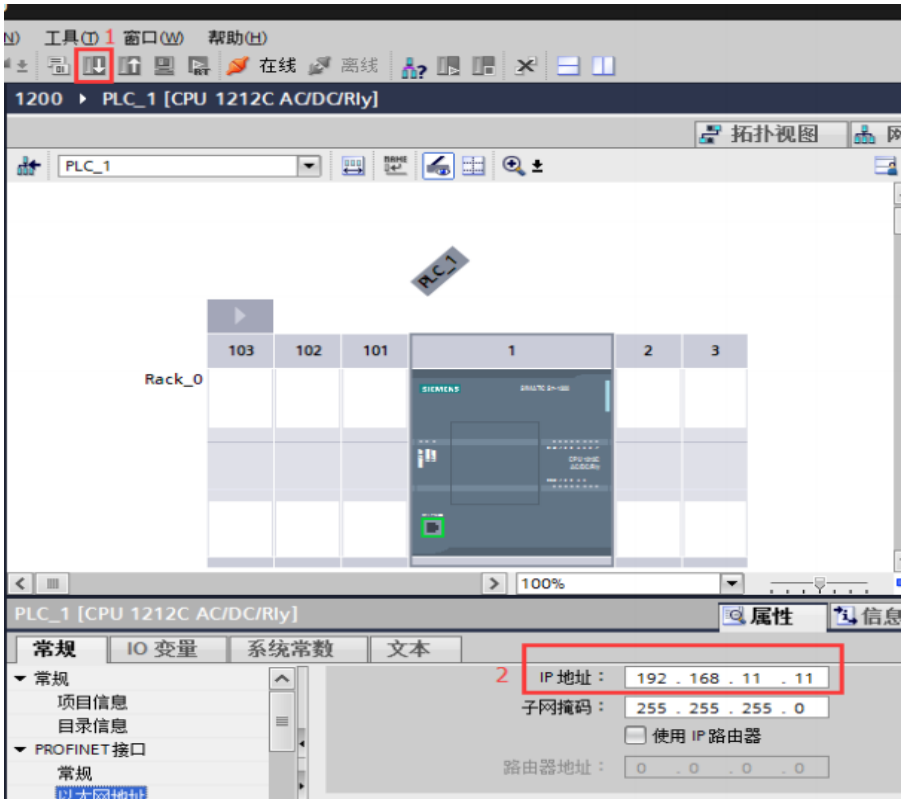
2. Set VPN parameters, click “start VPN”.



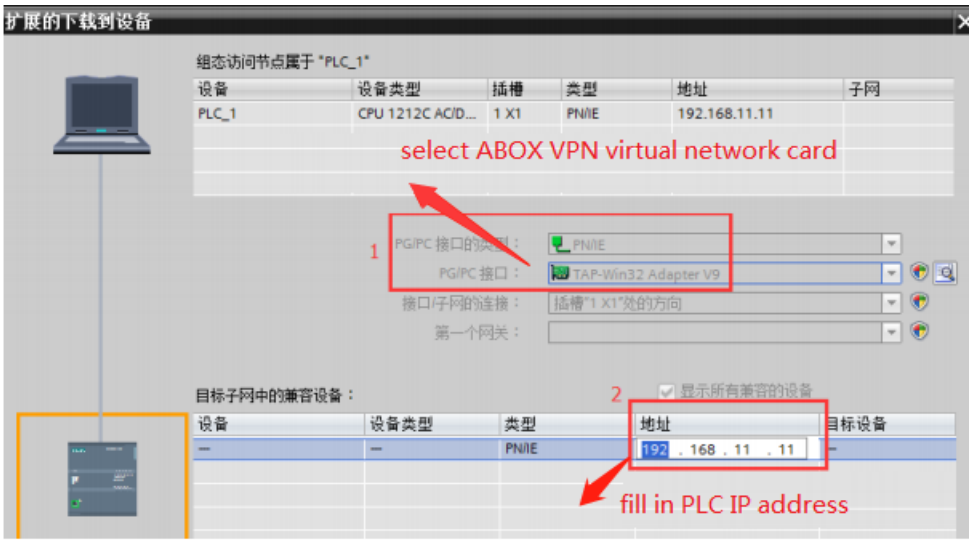
3. After the VPN is started, the VPN startup information interface will appear. When the box displays "Initialization Sequence Completed", it indicates that the transparent transmission is successful.



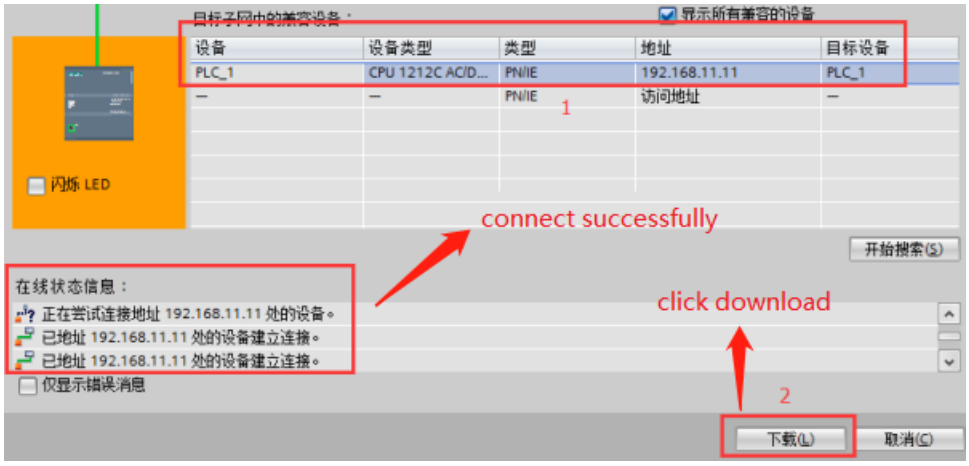
4. You can also use the ping command to test whether the connection is normal, then open the TIA portal software, select the corresponding PLC, set the IP address, and click Download.



5. Select PN/IE as the PG/PC interface type, VPN transparent private network card "TAP-Win32 Adapter V9" as the PG/PC interface type, and manually enter the IP address of the PLC.

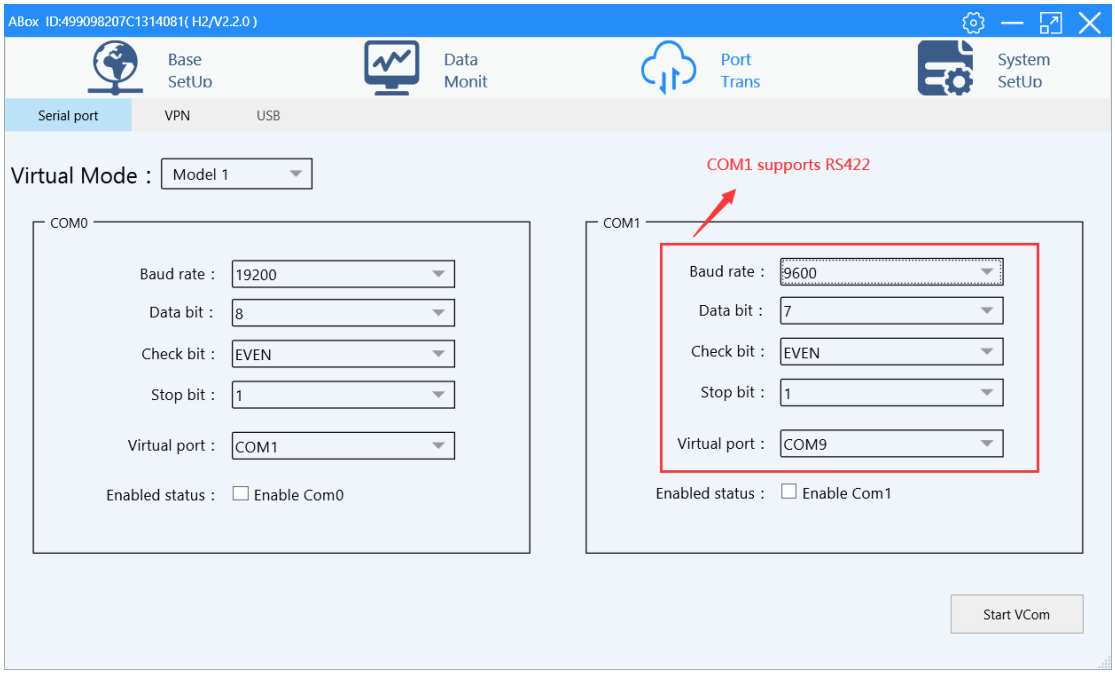


6. Connect successfully, click download.

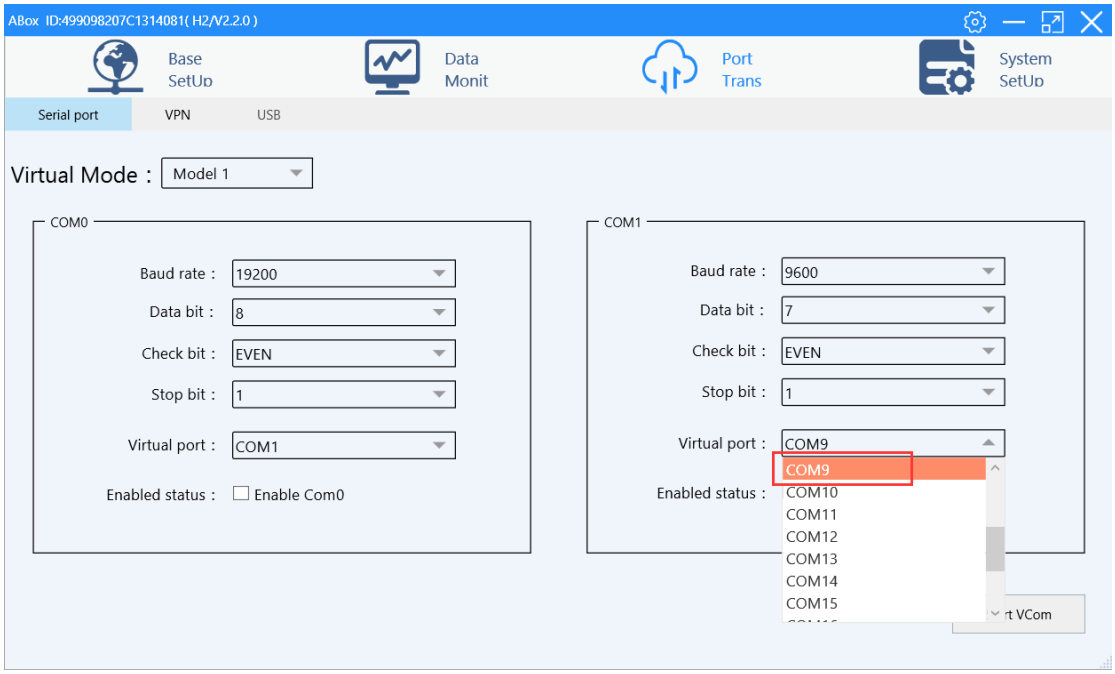


5-8. Mitsubishi Fx3U series PLC serial port transparent transmission

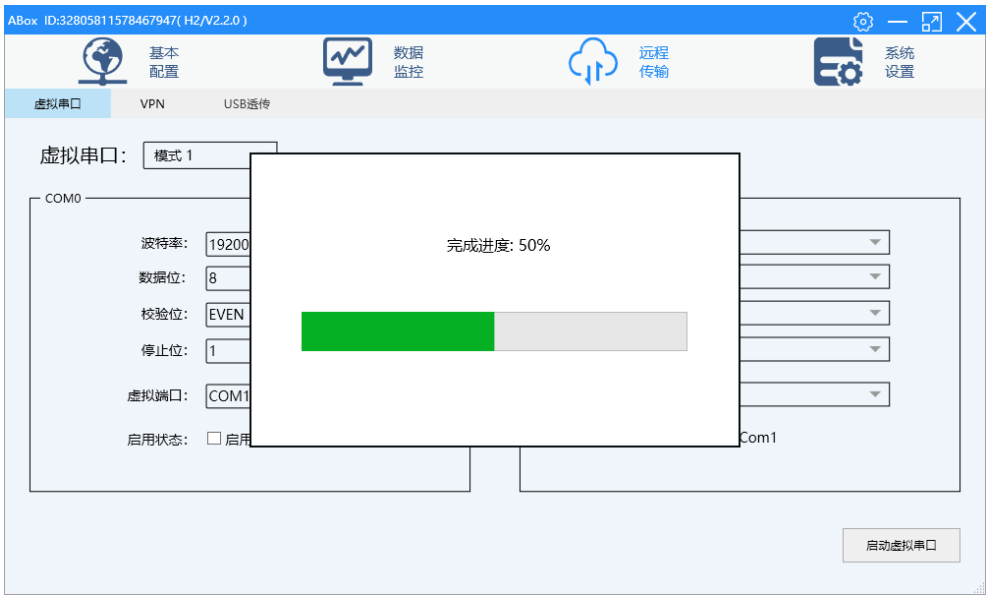
1. Use the FX programming cable to connect the A-BOX to the RS422 port of the FX3U, and set the COM1 serial port parameters of the A-BOX to 9600, 7, 1, E. COM0 does not support RS422, so COM1 is used.



2. After writing and taking effect, click the virtual serial port to virtual COM1 to the local port, such as COM9.

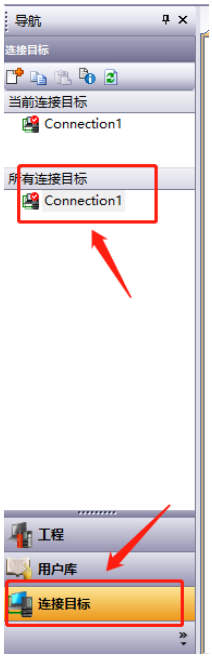


3. Start the virtual serial port.

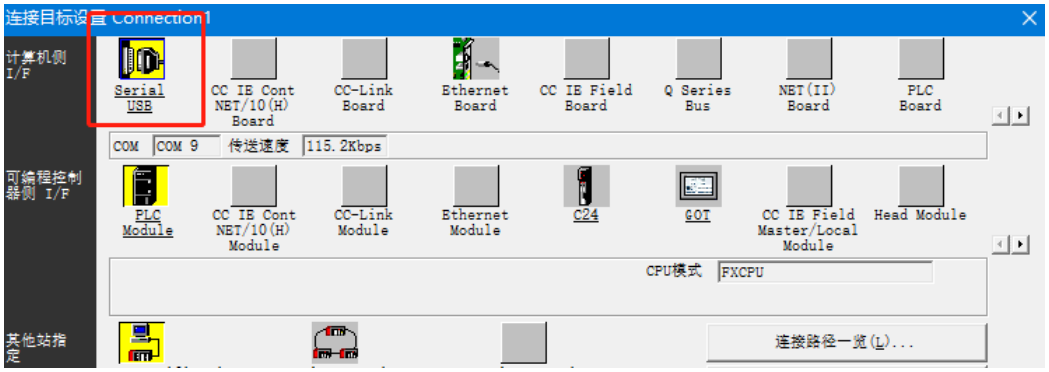


4. Open the Mitsubishi software GX Works2, create a new project.

5. Click the connection target, select the current connection target.

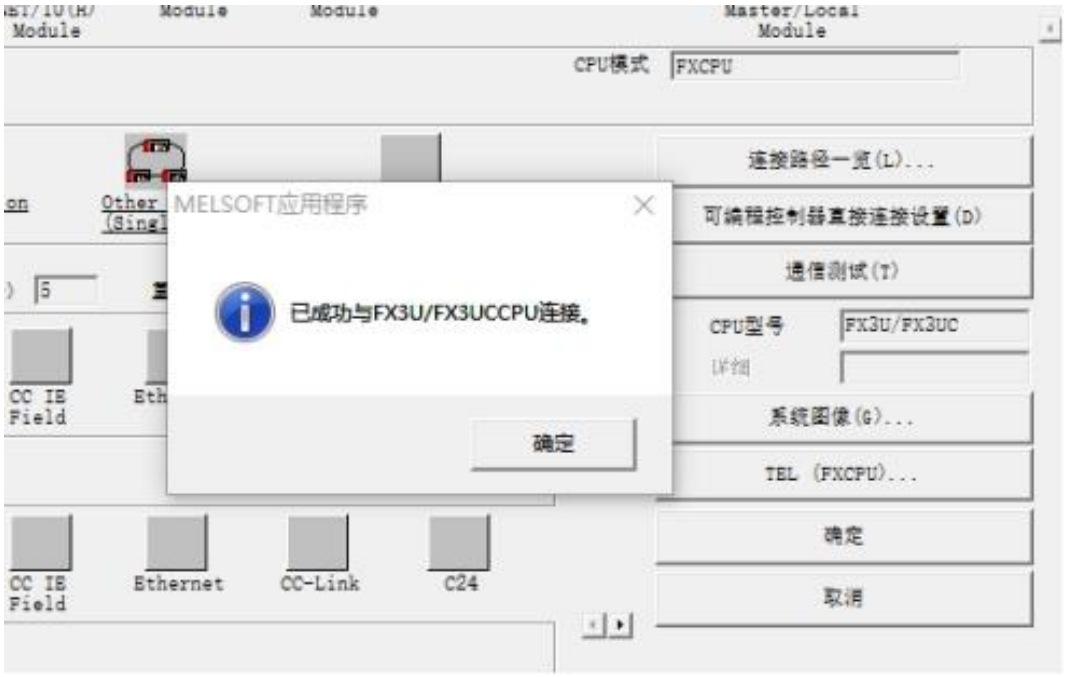


6. Click serial USB, configure the parameters.



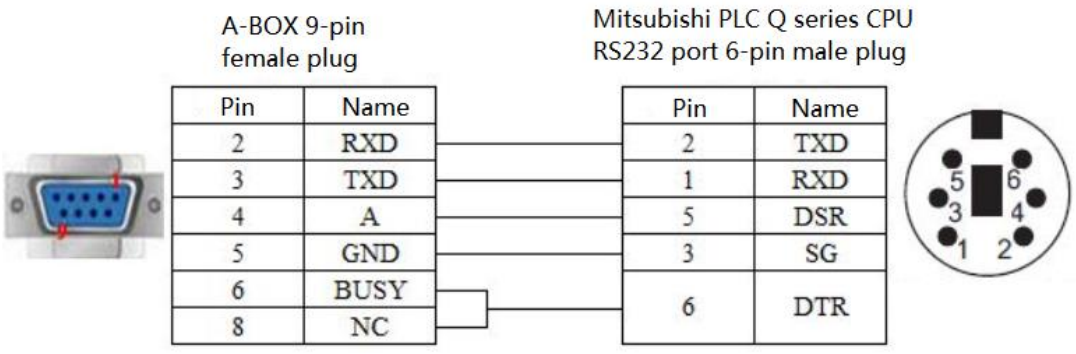
7. Select RS232C, COM port, A-BOX virtual local port COM9, the transmission rate is 9600, and modify the parity, data bit, and stop bit in the detailed settings.

8. Click communication test, it will show connection finished.

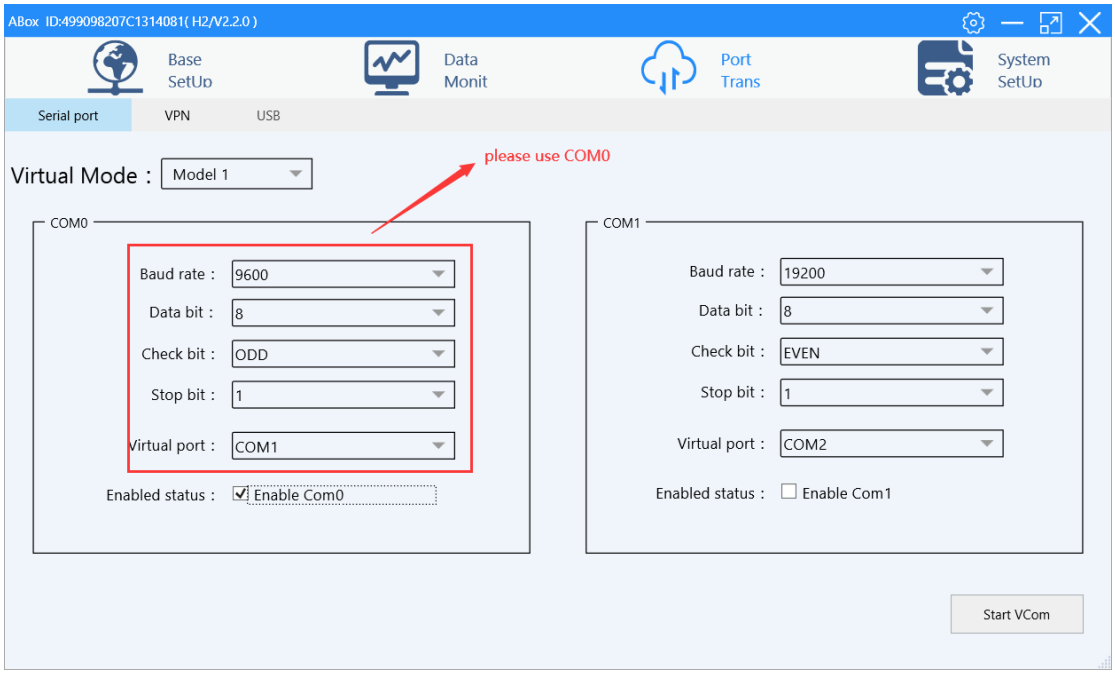


5-9. Mitsubishi Q series PLC serial port transparent transmission

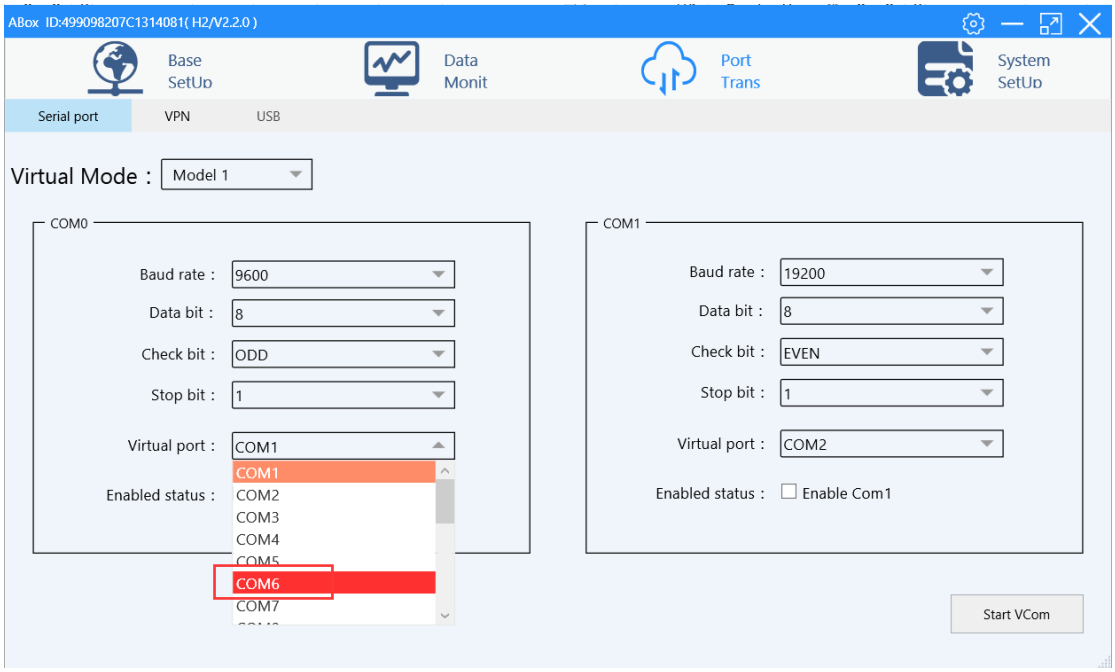
1. This case takes Mitsubishi Q02H as an example. The serial port on the Q02H body is RS232, which is connected to COM0 of A-BOX (not COM1). The wiring diagram is as follows:



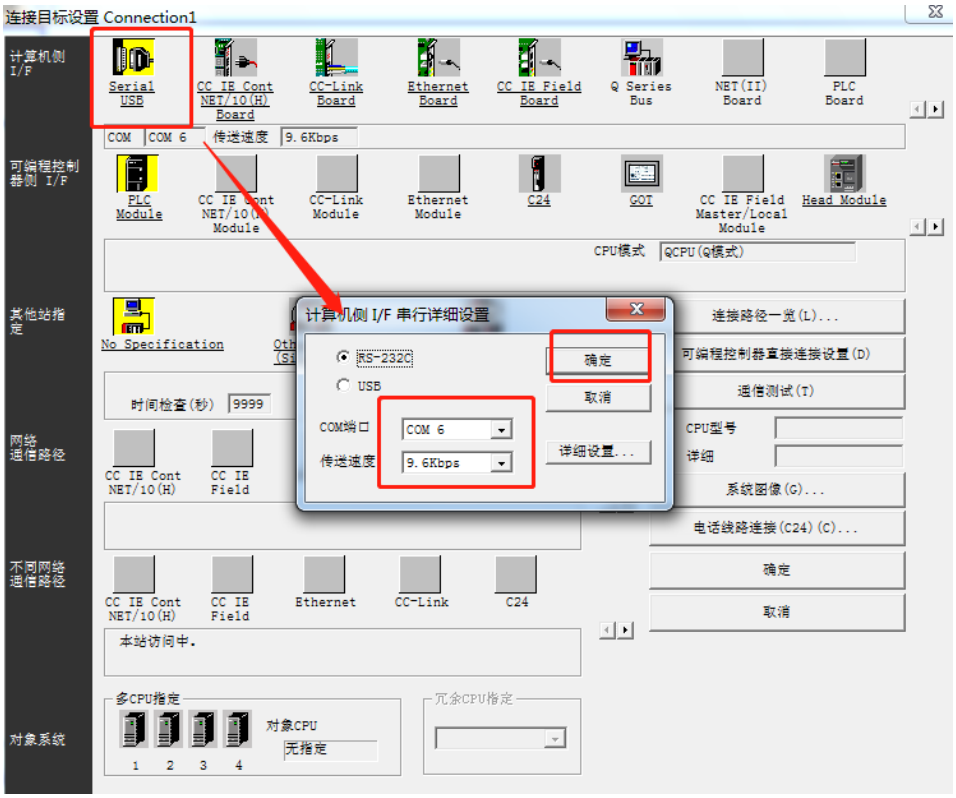
2. Connect A-BOX remotely. Set the serial port parameters of COM0 to 9600, 8, 1, odd. (Remember not to use 115200 bps).



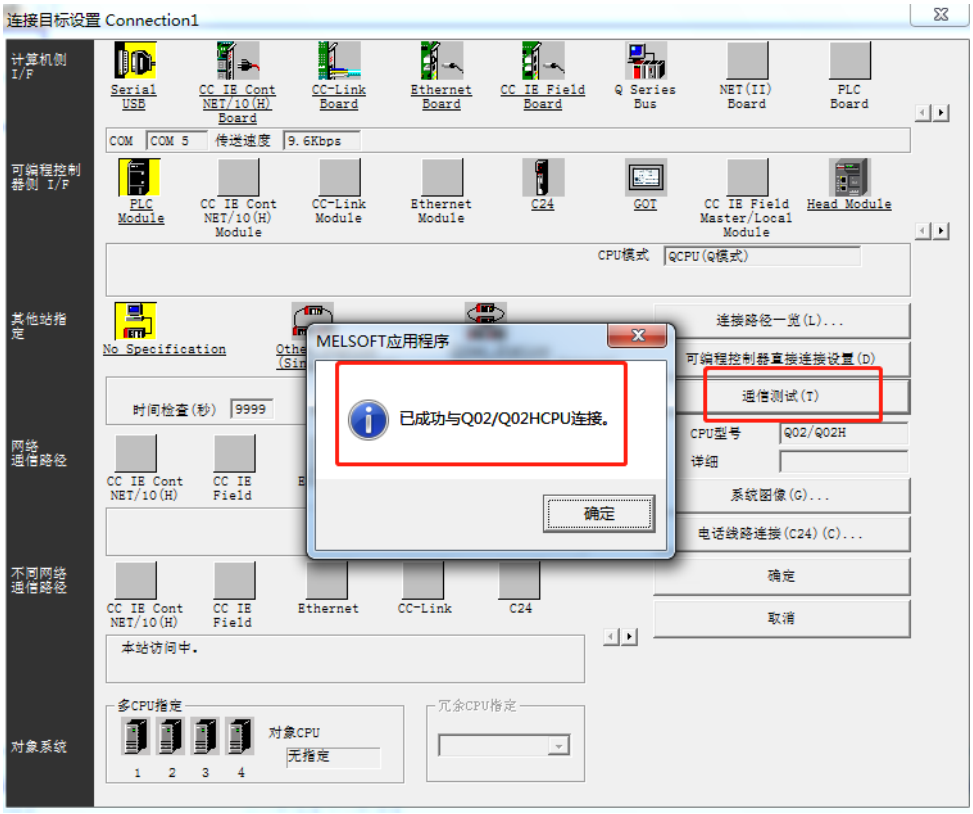
3. Set the COM0 to virtual serial port.



4. Open Mitsubishi GX Works2 software, set the serial port parameters.

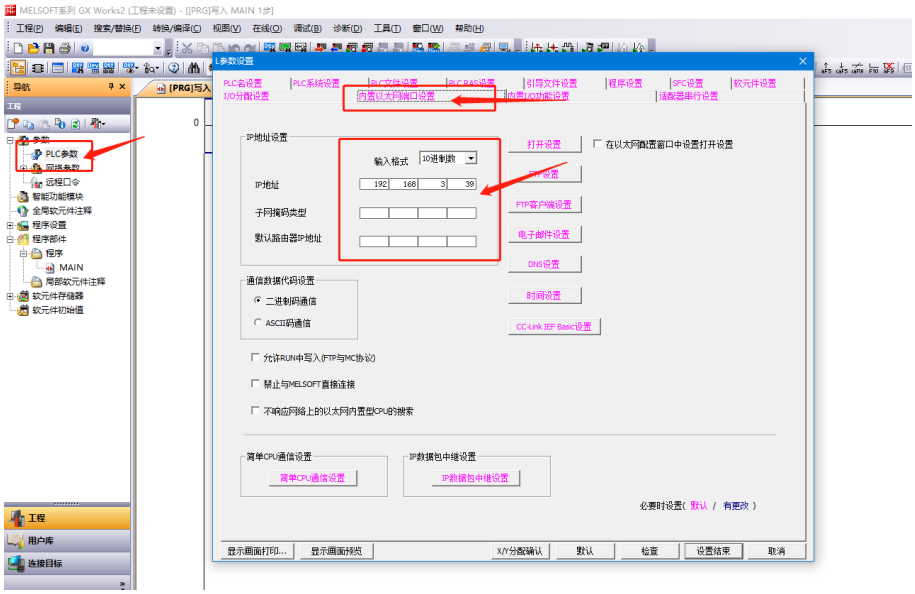


5. Click communication test, connecting successfully.

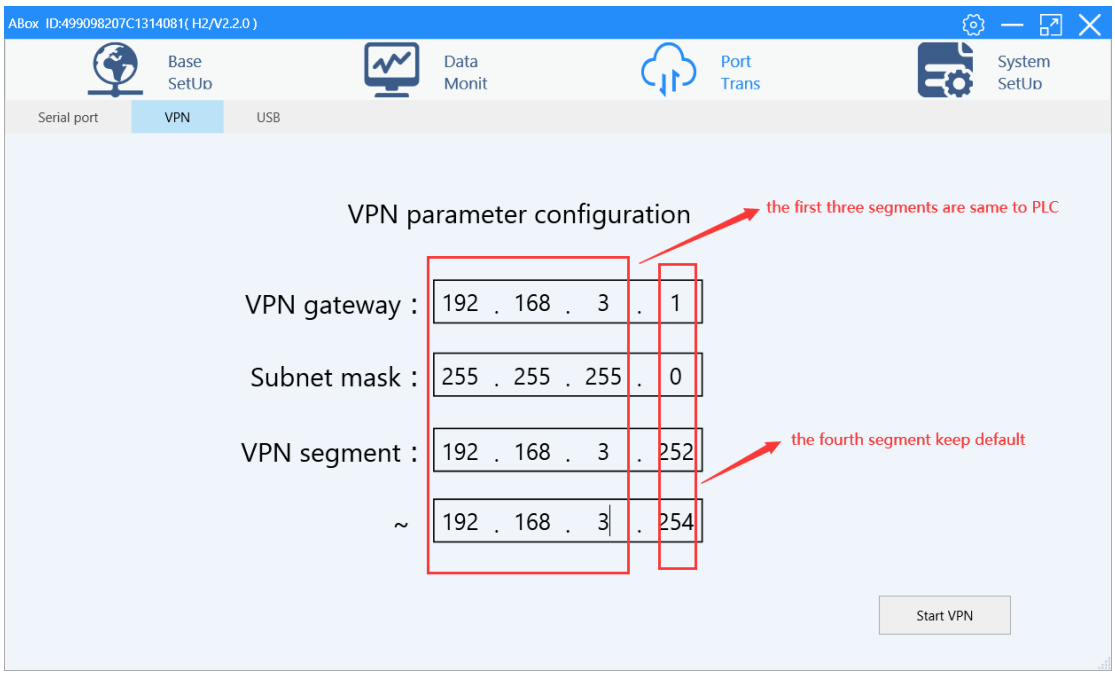


5-10. Mitsubishi Q/L series PLC Ethernet port VPN transparent transmission

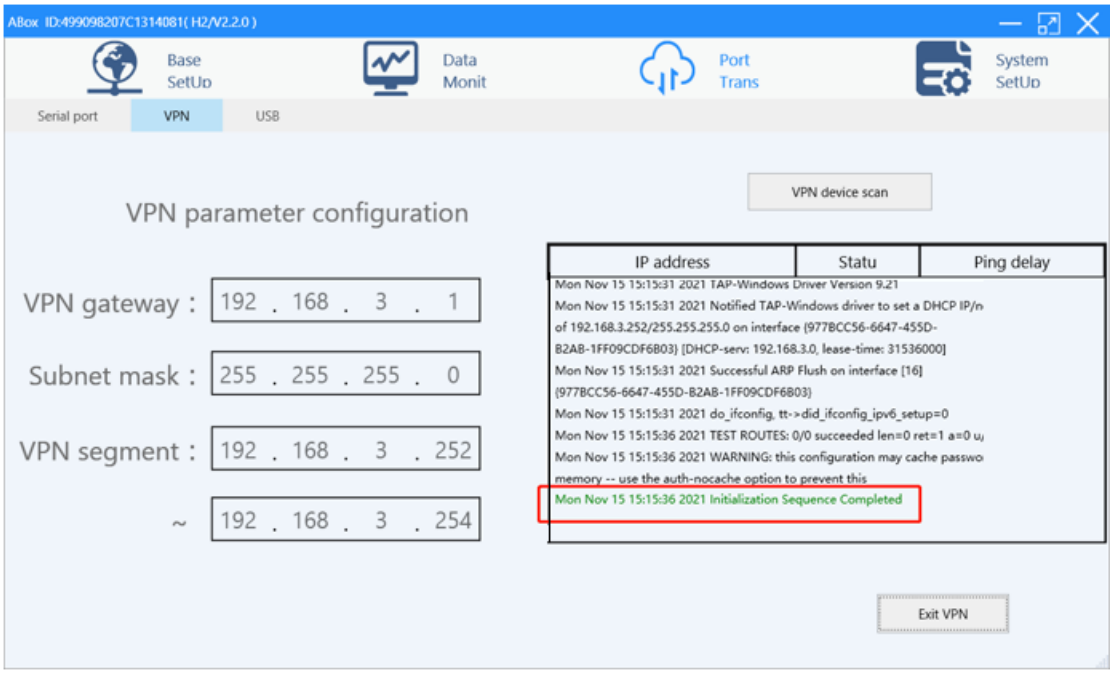
1. First, use the computer to connect to the PLC and check the IP address of the PLC.



2. Open ABOX configuration interface, click VPN, click Start VPN.

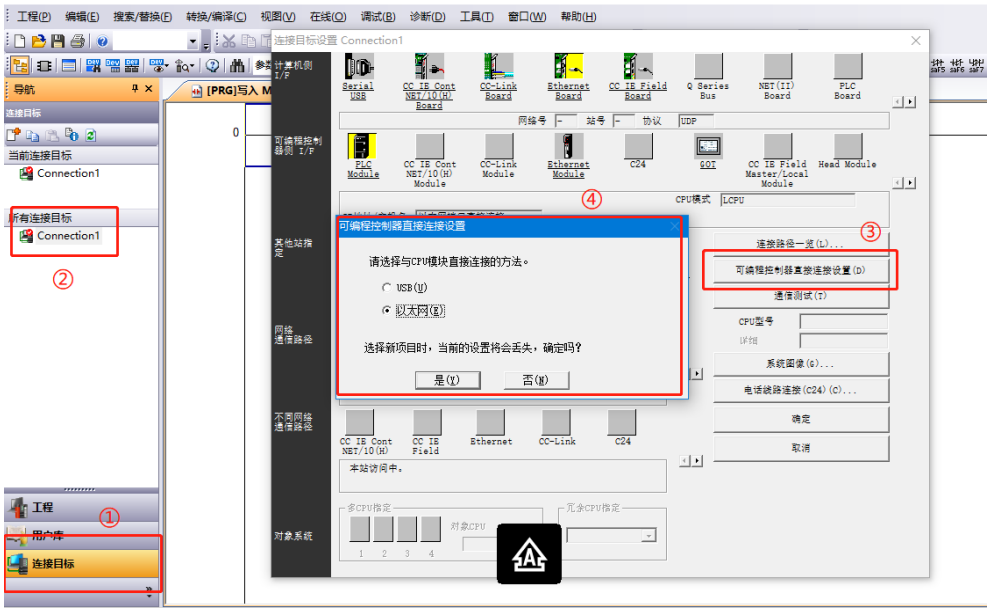


3. After the VPN is started, the VPN startup information interface will appear. When the box displays "Initialization Sequence Completed", it indicates that the transparent transmission is successful.

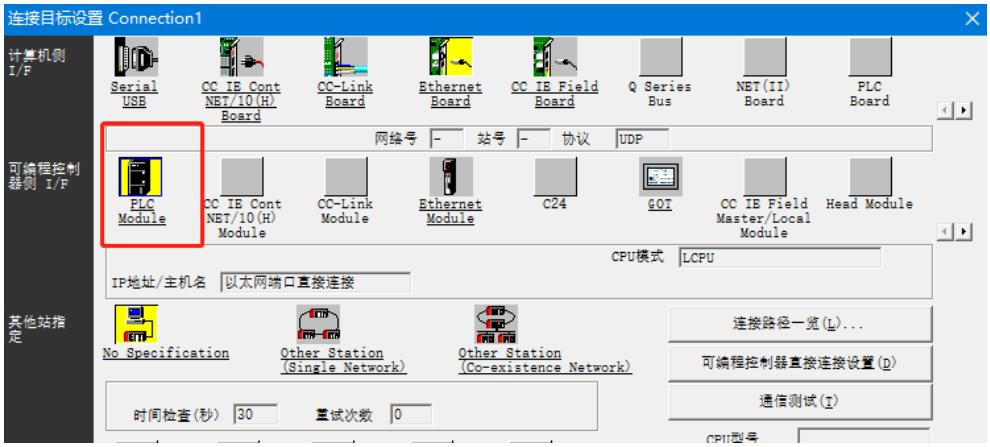


4. You can also use the ping command to test whether the connection is normal, then open the GX Works2 programming software, create a new project, and select the corresponding series and models.

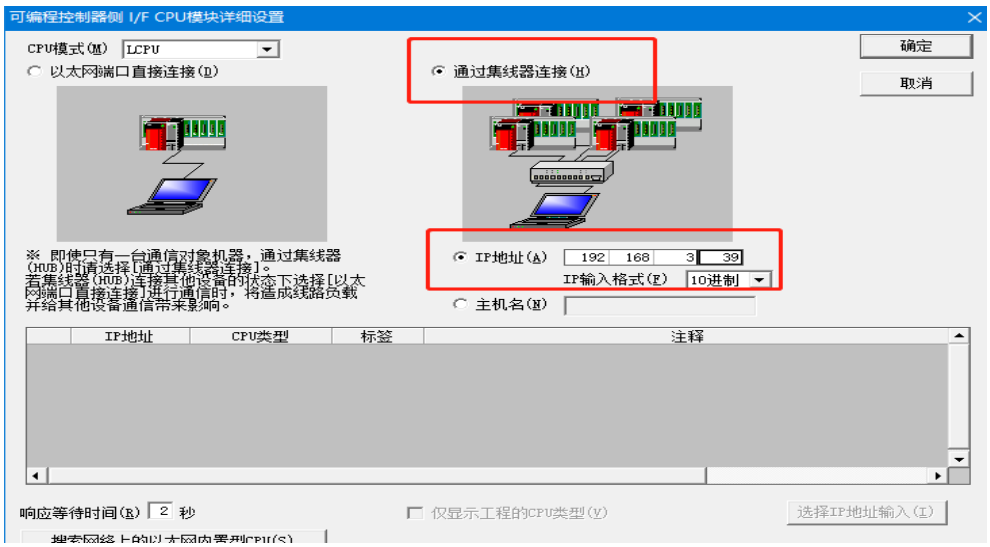
5. Select the connection mode is Ethernet.



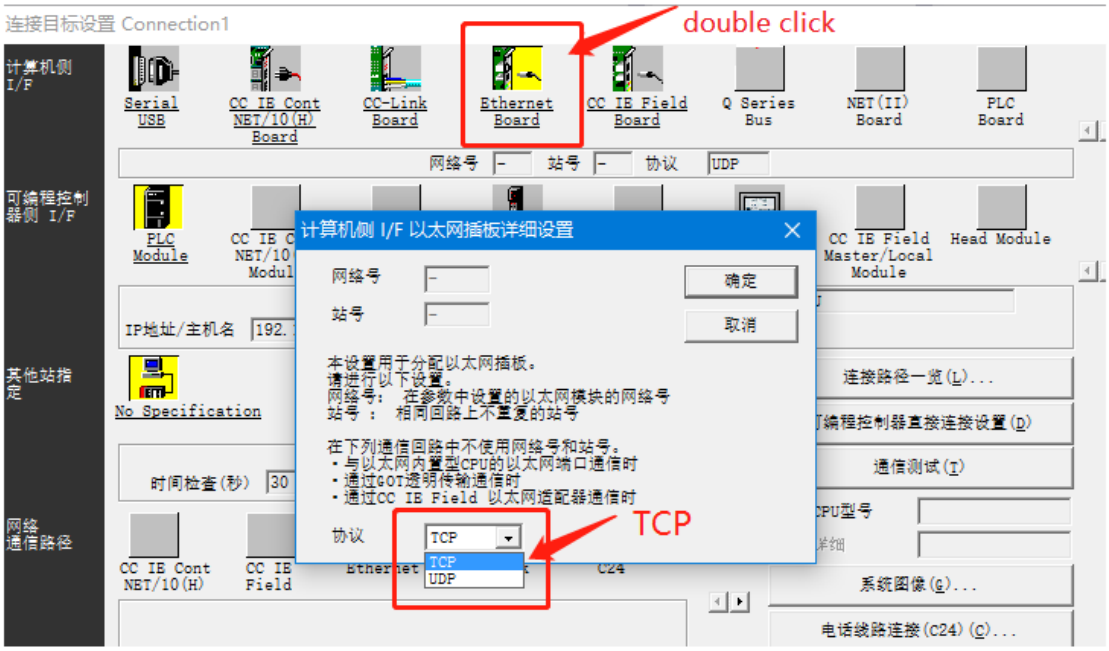
6. Click PLC module.



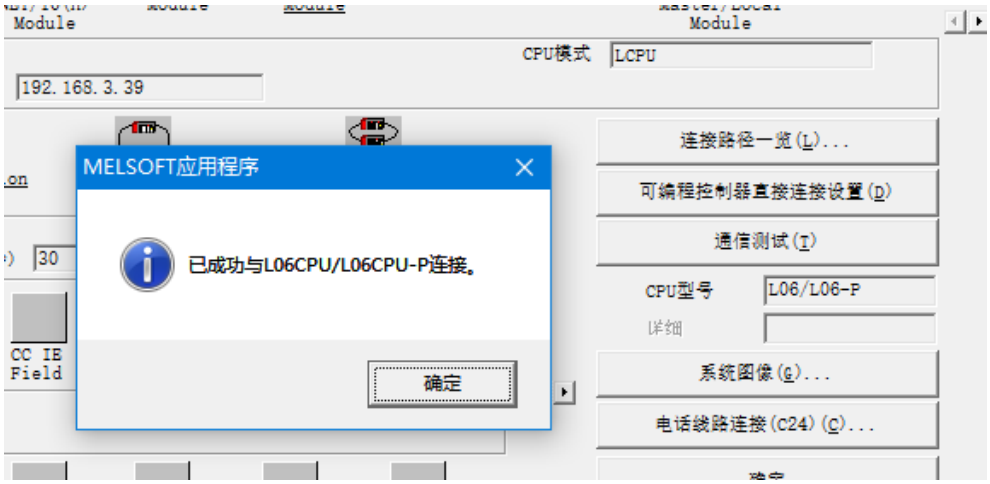
7. Select Connect via Hub and enter the IP address of the PLC.



8. Double click Ethernet board, select TCP protocol.

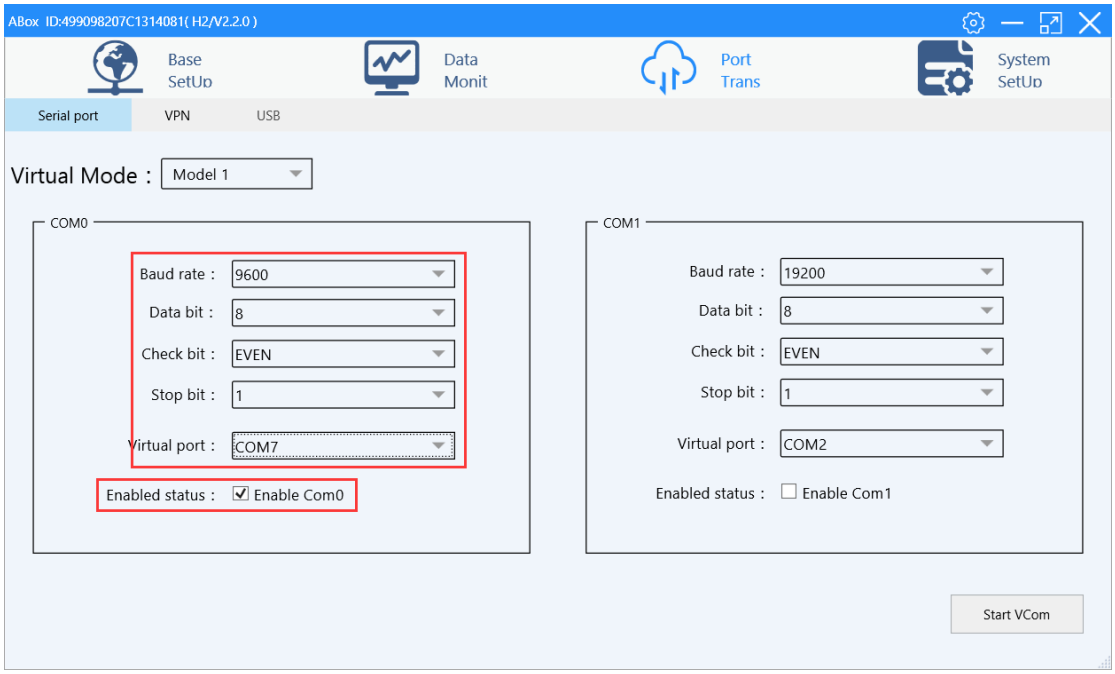


9. Click communication test, connected successfully.

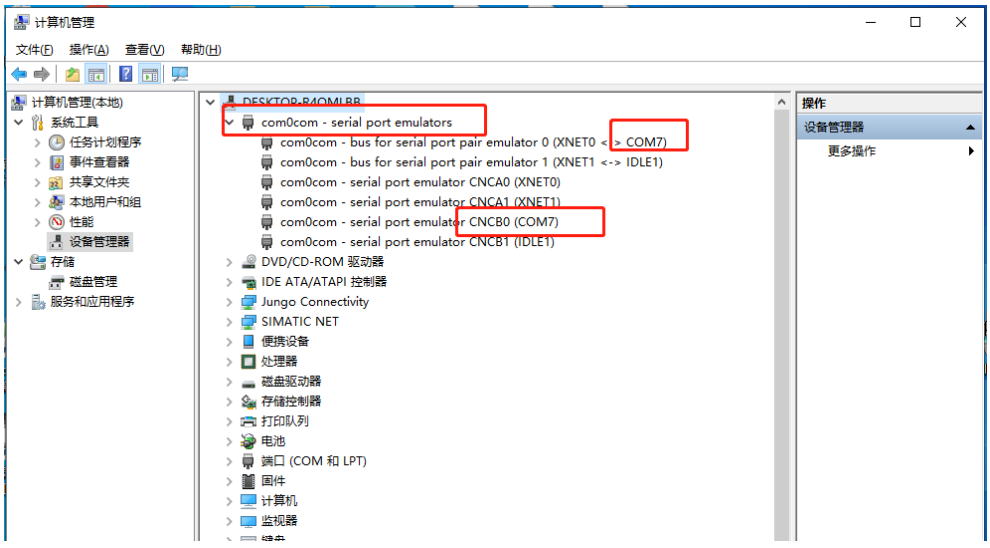


5-11. Delta DVP series serial port PLC

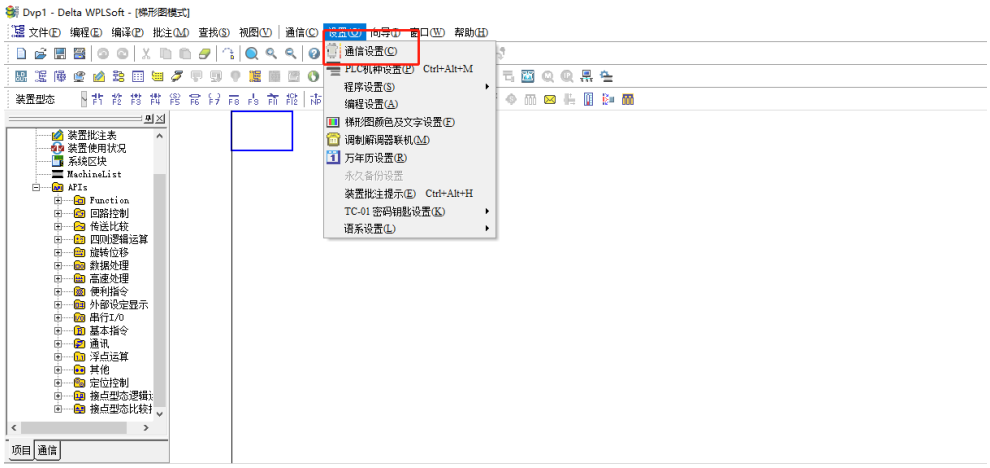
1. The PLC model in this case is DVP-60ES. First, you need to know the PLC serial port parameters. In this case, the PLC serial port parameters are 9600,7,1, E. Set A-BOX serial port parameters consistent with PLC.



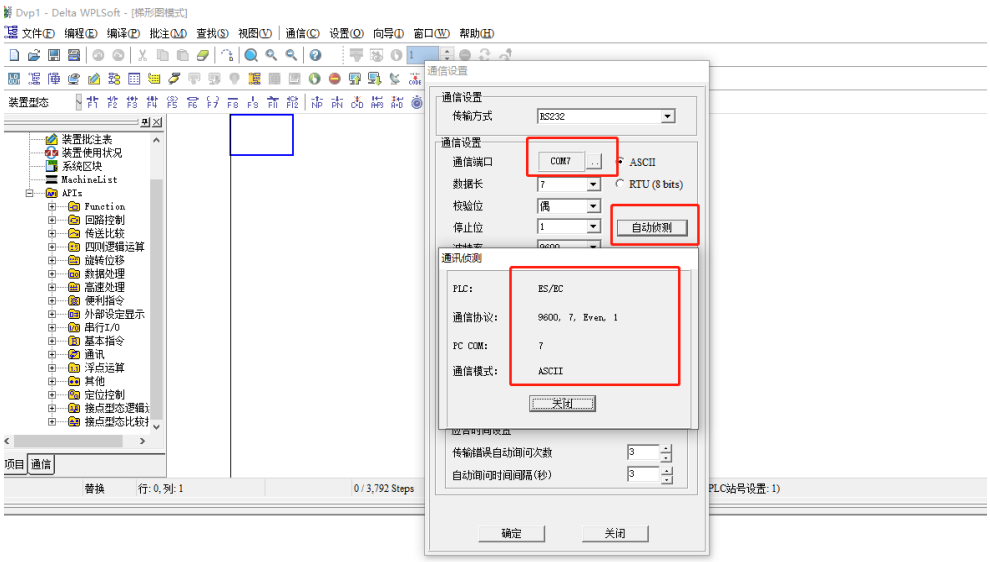
2. Use DVP cable to connect PLC to A-BOX. Start the virtual serial port. This case is virtual to local COM7. Check whether the driver is normal in the Device Manager.



3. Open WPLSoft, click communication setting.

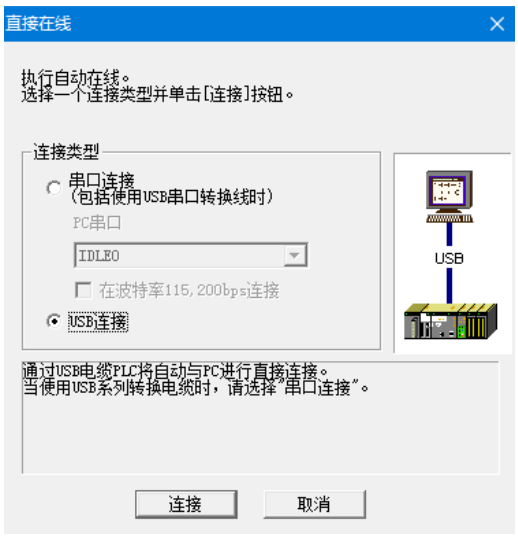


4. Select the virtual COM7 and click Auto Detect. Successfully connected PLC.

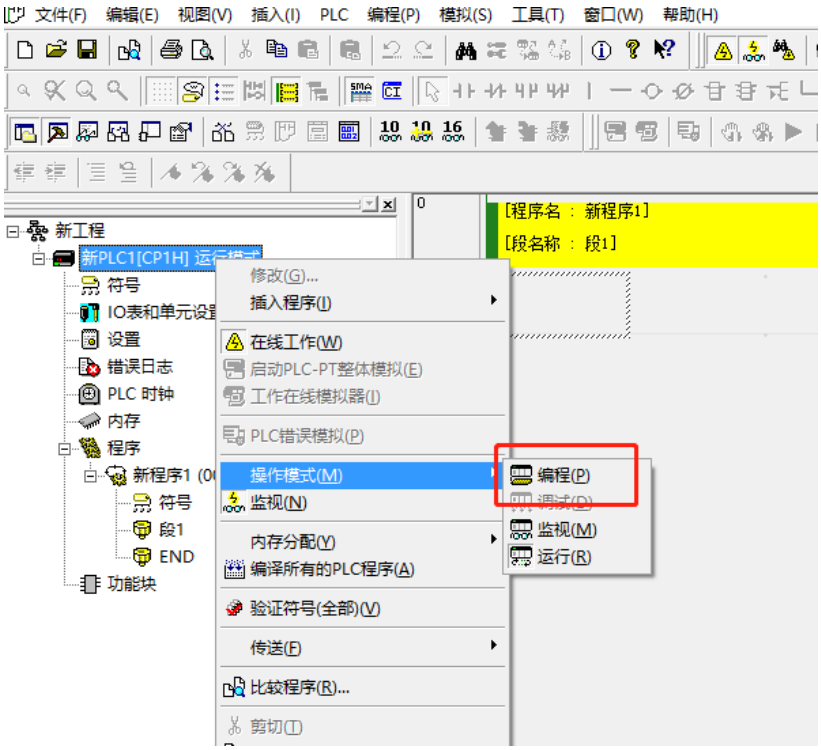


5-12. Omron CP1E series PLC serial port transparent transmission

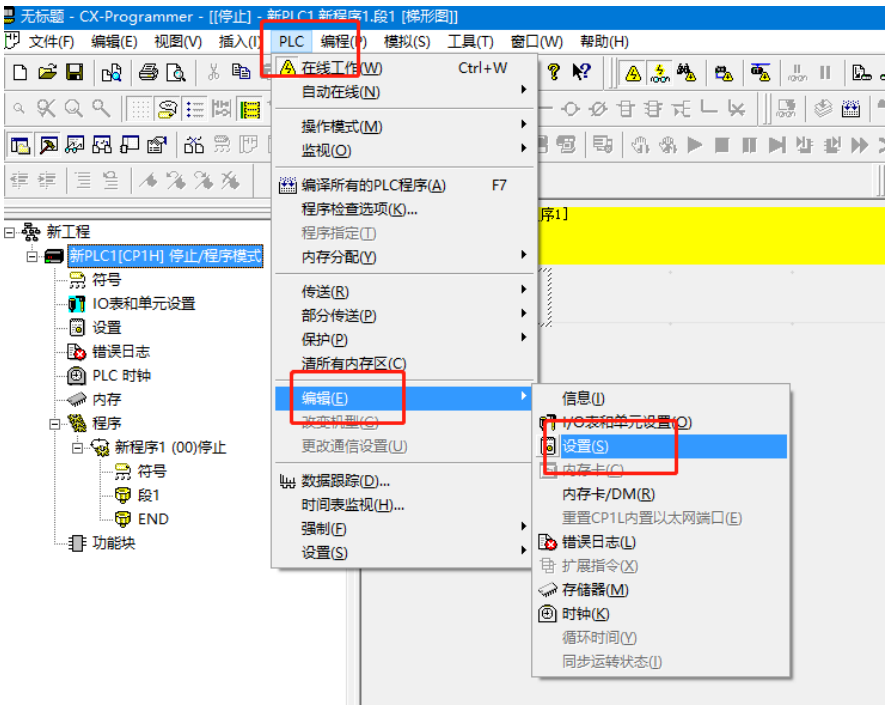
1. Connect CX programmer to PLC with USB cable.



2. Set Omron PLC to programming mode.

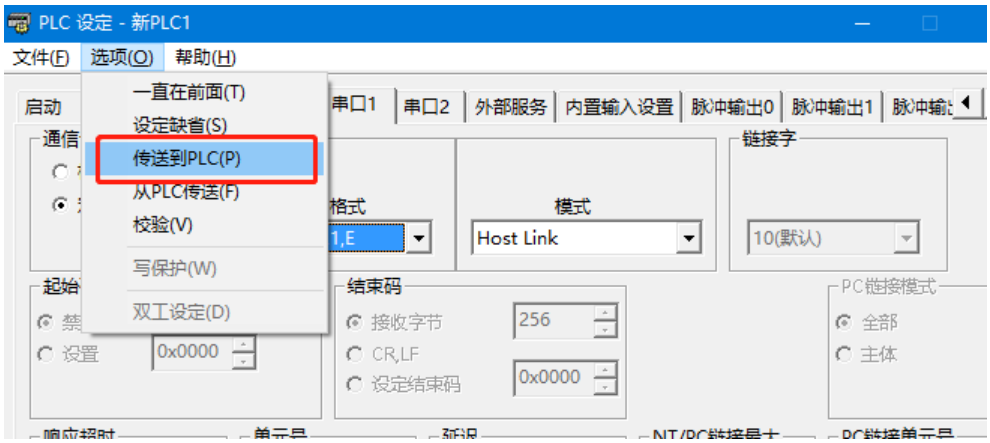


3. Open the setting interface.

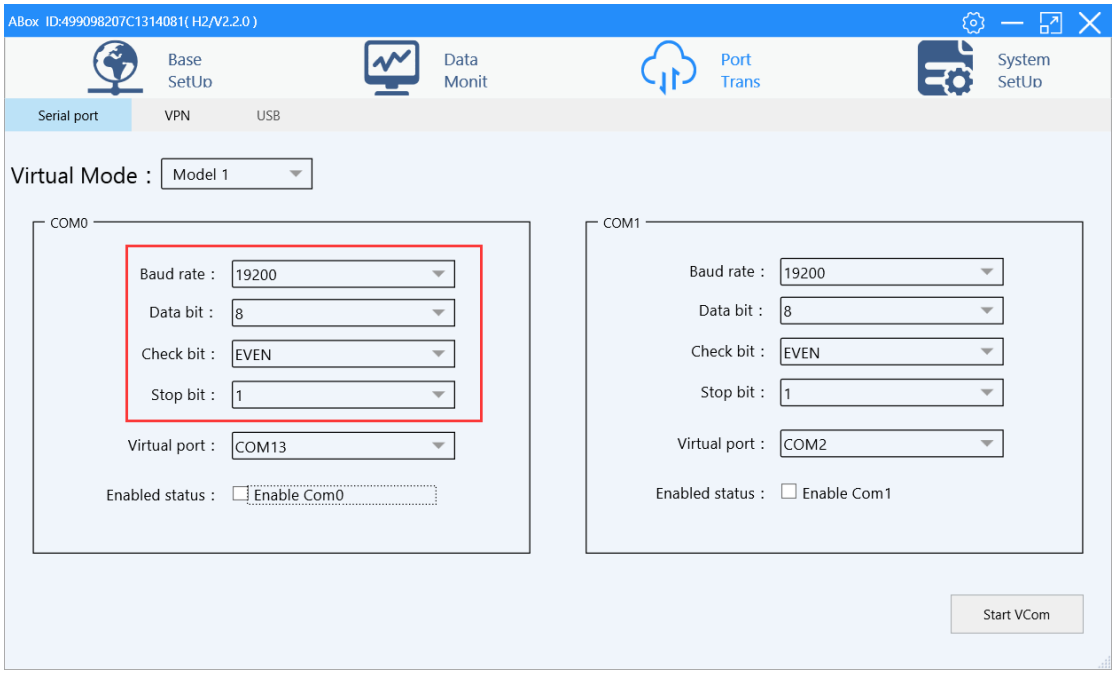


4. Modify the serial port parameters of RS232C of PLC to 19200, 8, 1, E, and the protocol is Host Link.

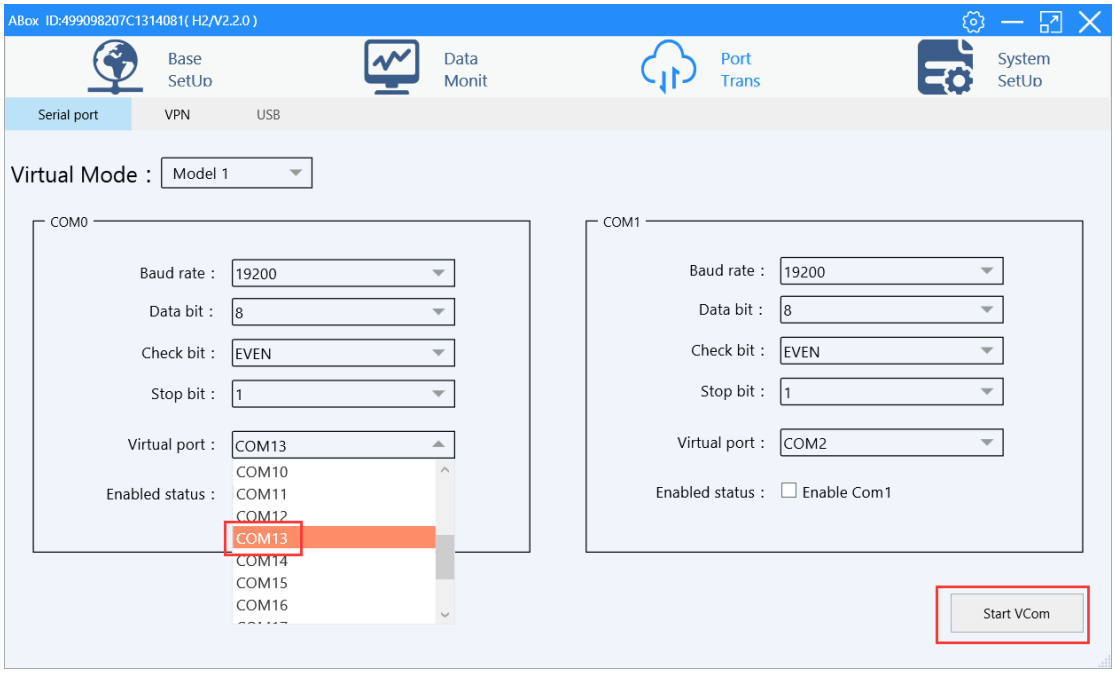
5. Write the parameters into PLC.



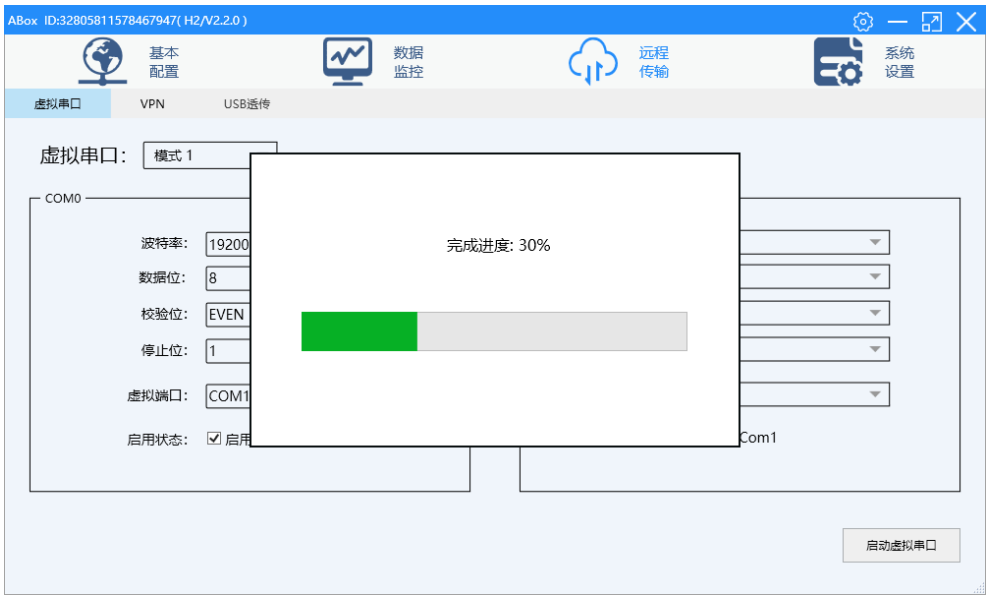
6. Use CPM cable to connect OMRON PLC with COM0/COM1 of ABOX, and change the serial port parameters of COM0/COM1 to 19200, 8, 1, E.



7. After writing, the COM0 virtual serial port is virtualized to the local COM13.

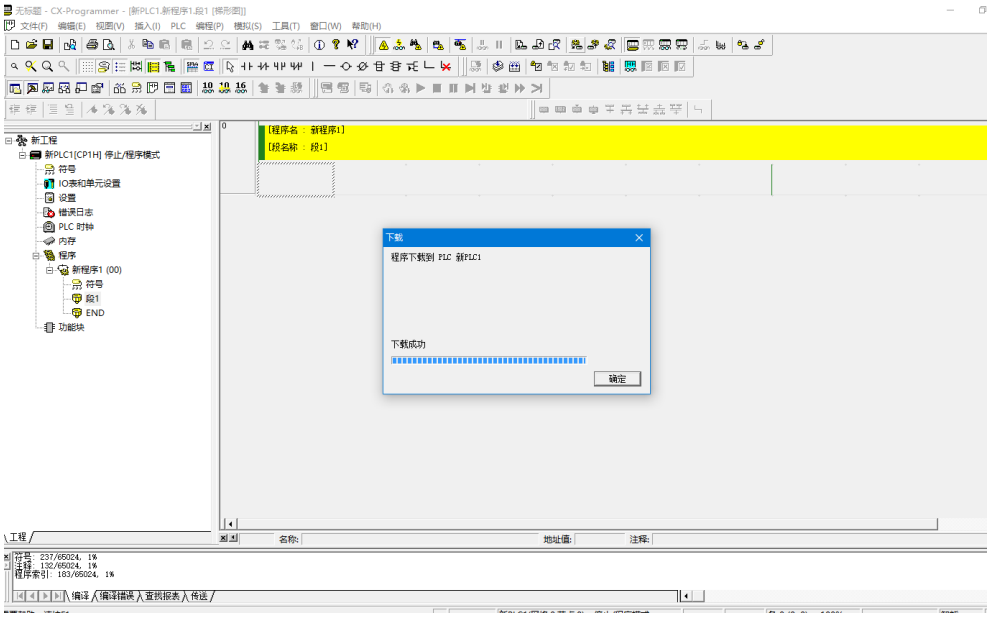


8. Start the virtual serial port.



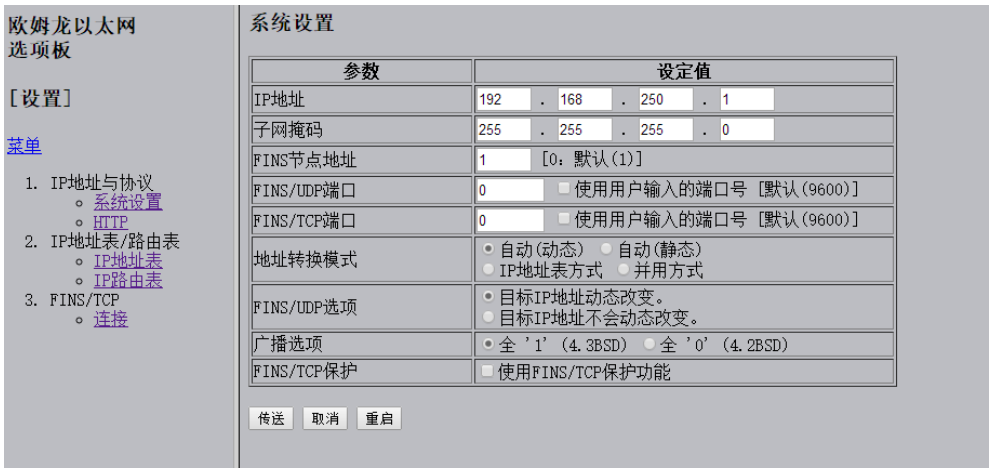
9. Serial port connection, select virtual COM port.

10. Connected successfully.

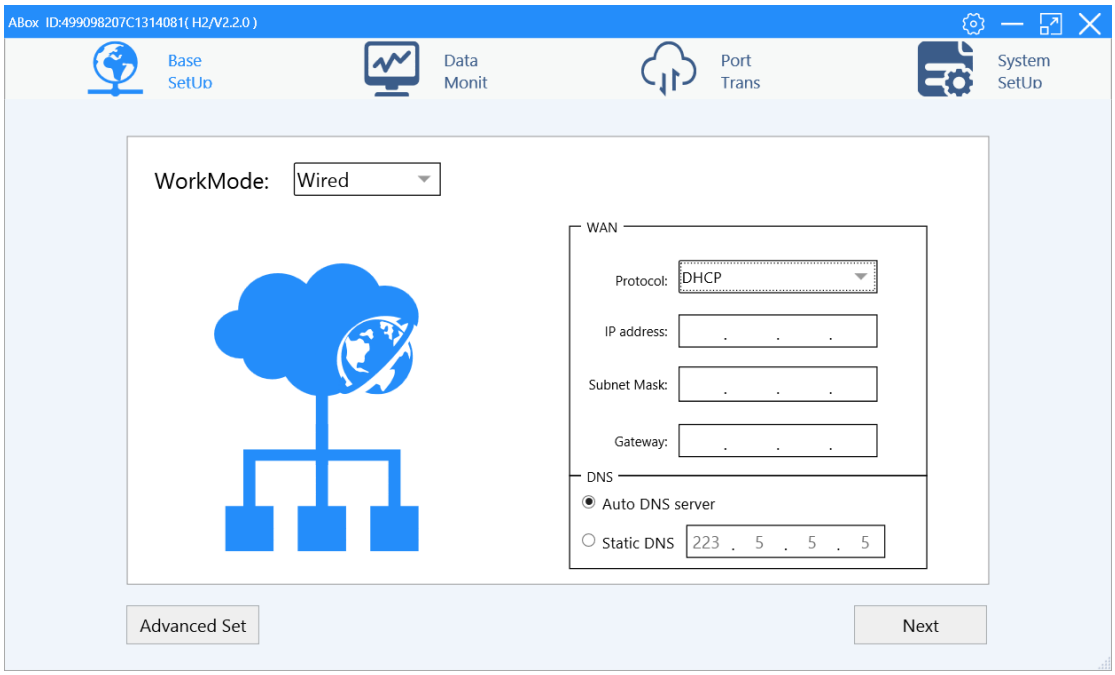


5-13. Omron CP1H series PLC Ethernet VPN transparent transmission

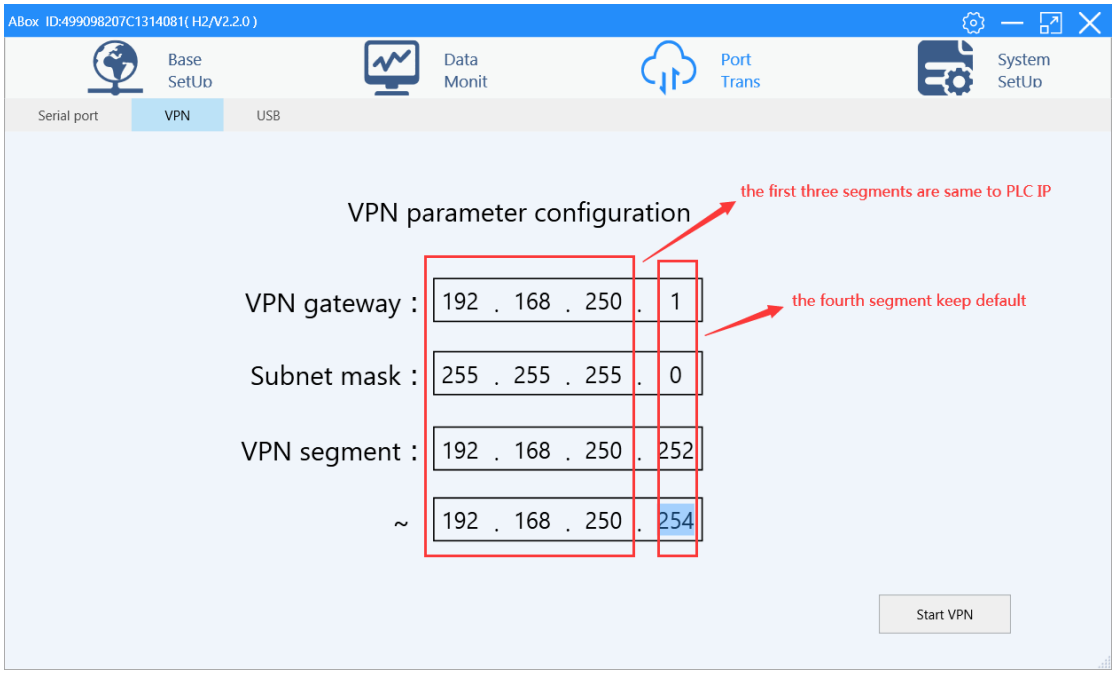
1. In this case, the PLC model is CP1H-X40DT-D-SC, and the network port BD board model is CP1W-C1F41. The default IP address is 192.168.250.1.



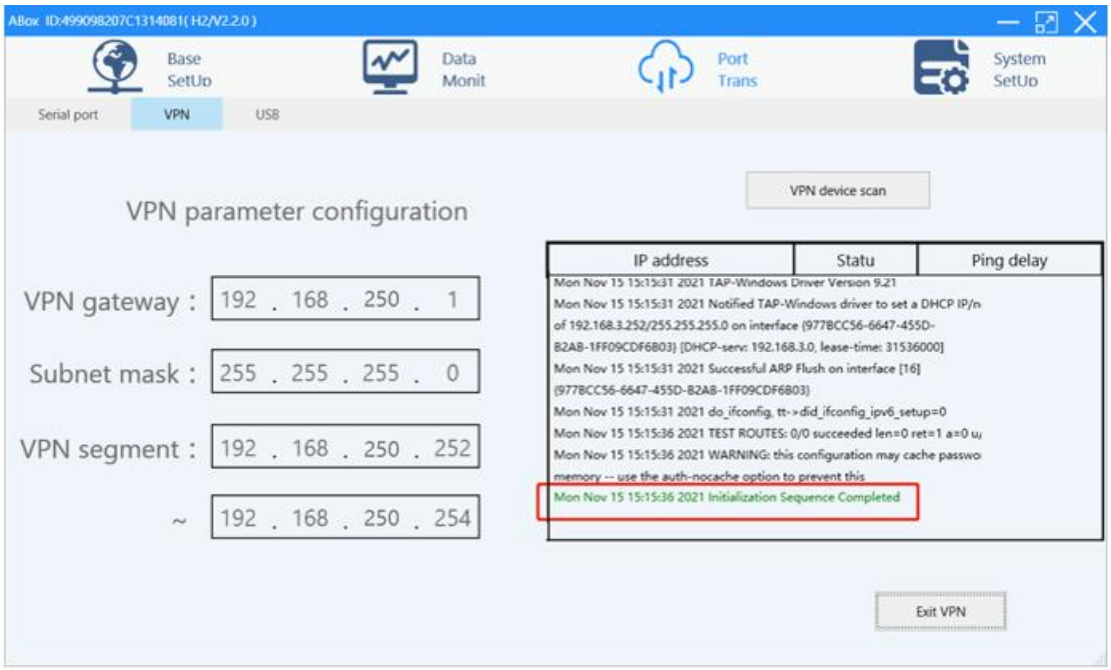
2. First, use the configuration tool to remotely login to A-BOX.



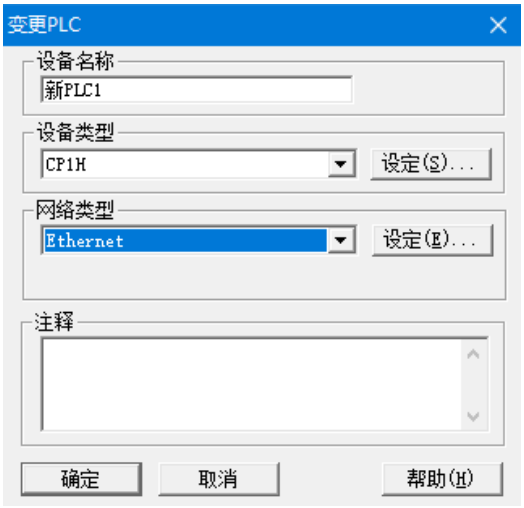
3. Set the VPN parameters, click Start VPN.



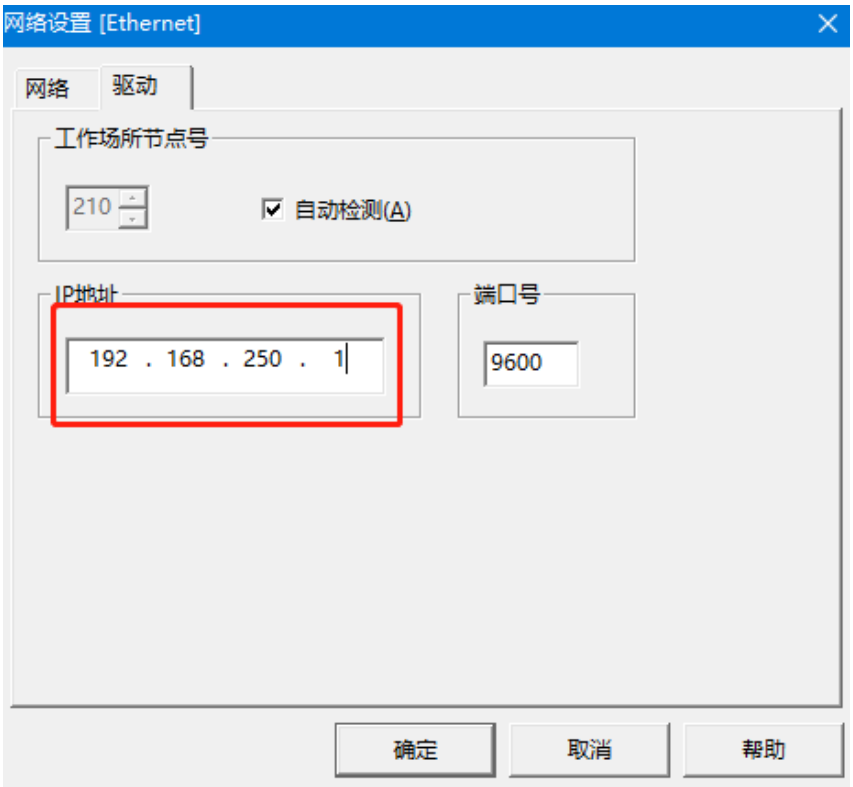
4. After the VPN is successful, the display is as follows:



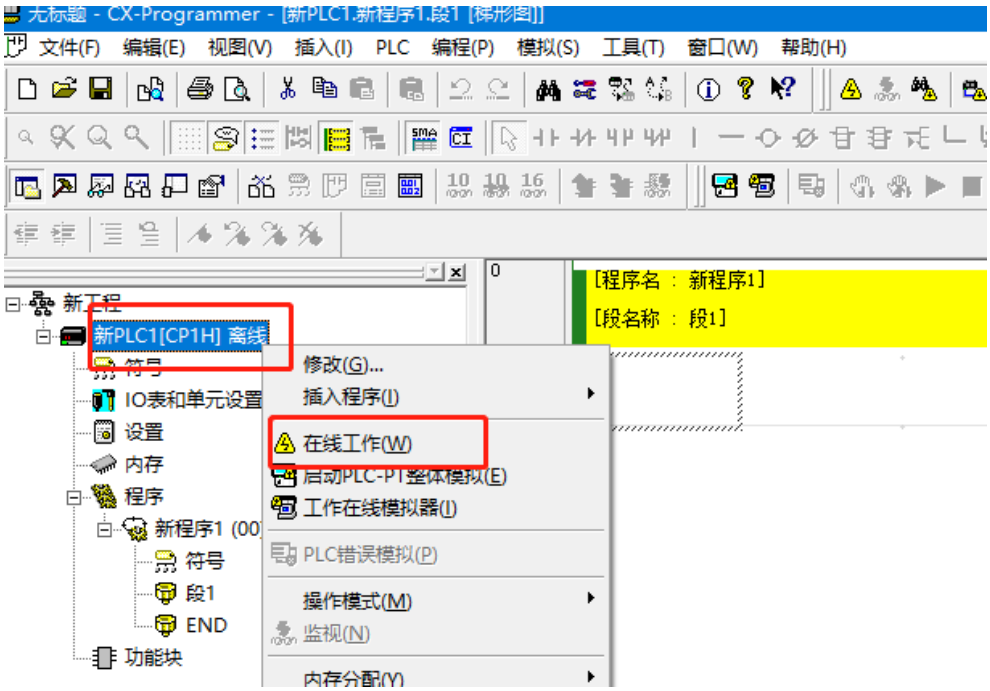
5. You can also use the ping command to test whether the connection is normal, then open the programming software, create a new PLC, and select "Ethernet" as the network type.



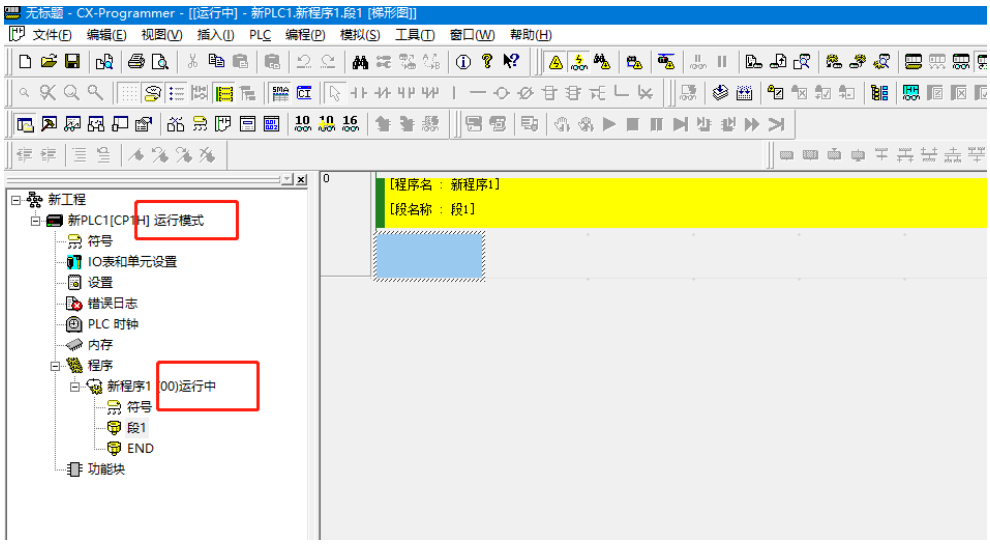
6. Click "Set" and enter the IP address of PLC in the drive.



7. Right click "New PLC1" and click "Online Work".

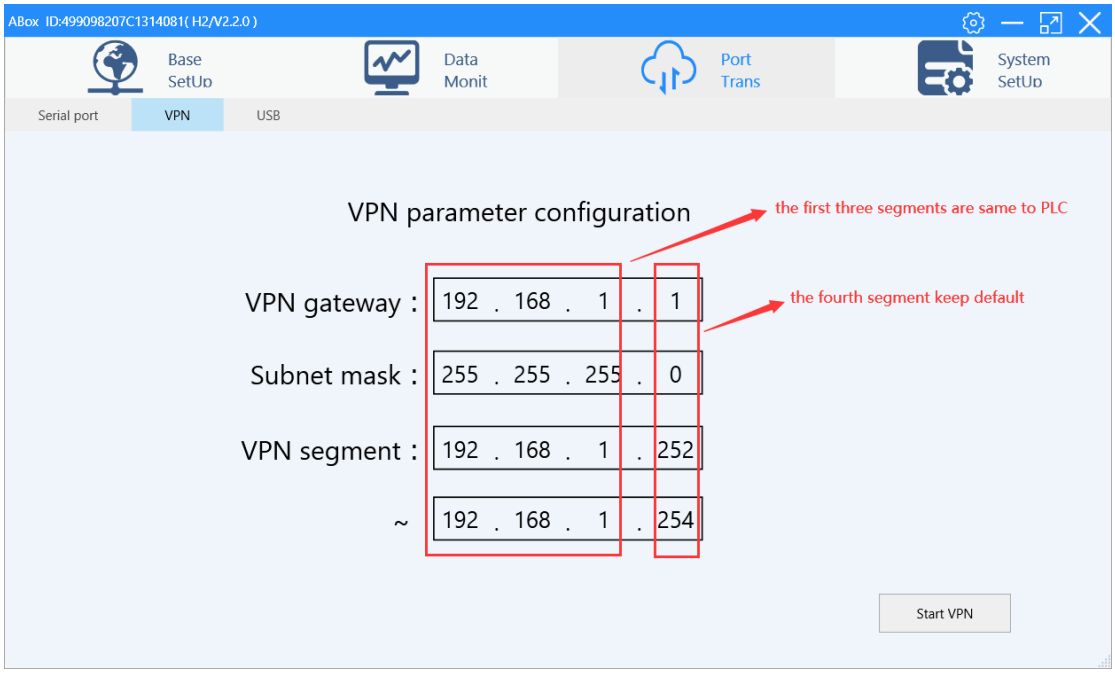


8. PLC successfully connected.

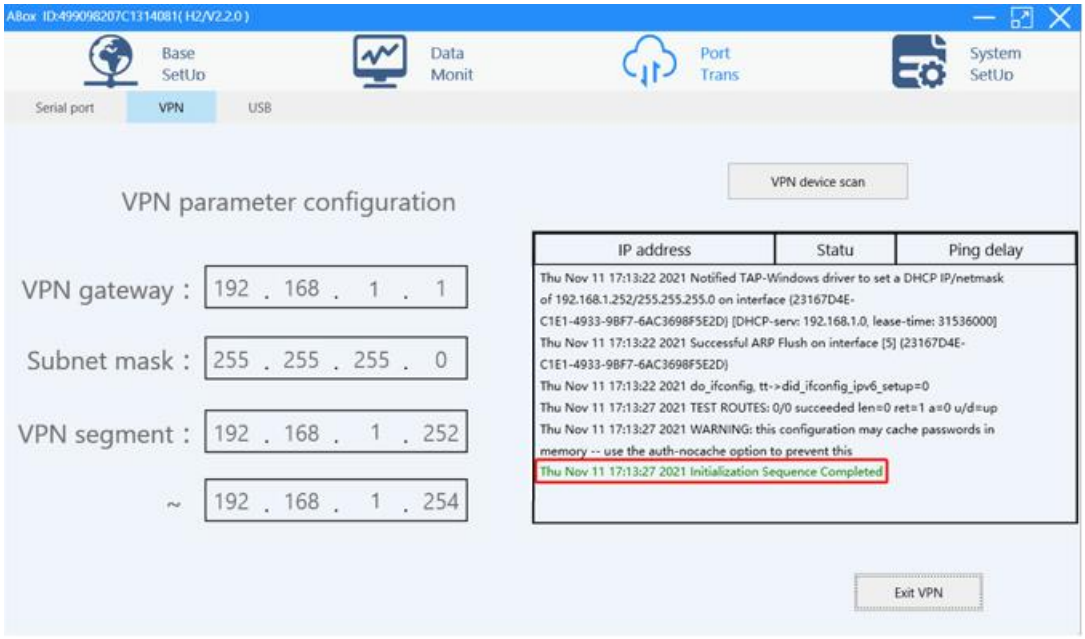


5-14. Rockwell (AB) L32E series VPN transparent transmission

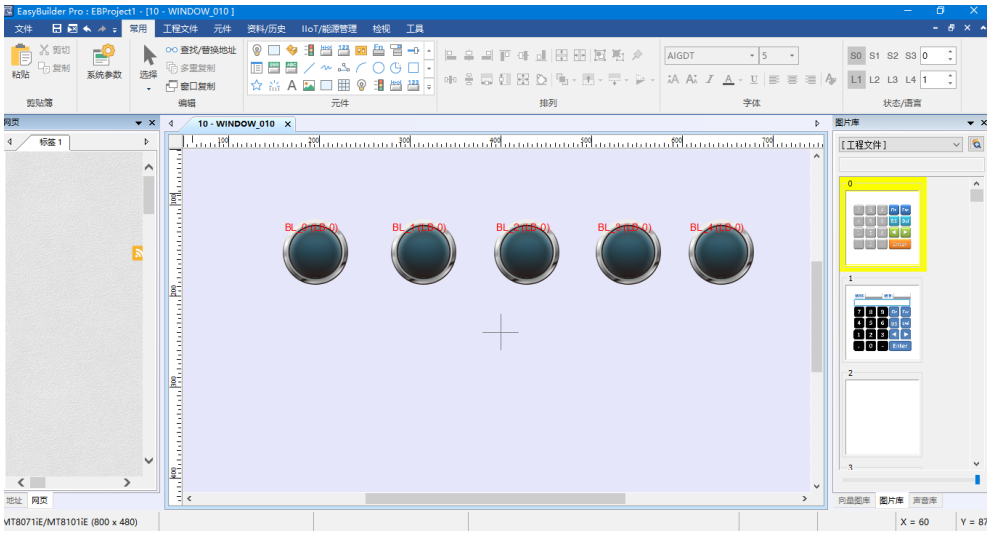
1. The PLC model in this case is L32E series. Open the configuration interface of ABOX, click "User Functions" -->"VPN", and directly click "Start VPN".



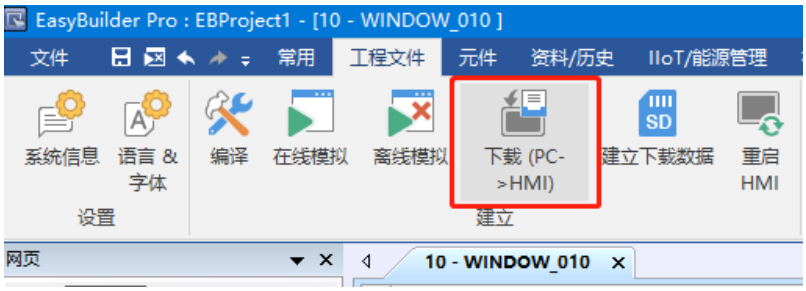
2. After the VPN is successful, the display is as follows:



3. You can also use the ping command to test whether the connection is normal, and then open the programming software to create a new project.

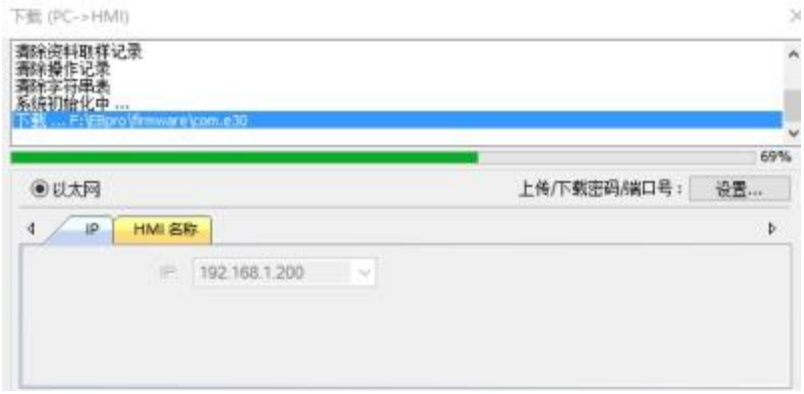


4. Click "Download (PC ->HMI)" in "Project File".



5. After the compilation, change the IP address to the HMI IP, i.e. 192.168.1.200.

6. Click download.



7. The downloading is finished.

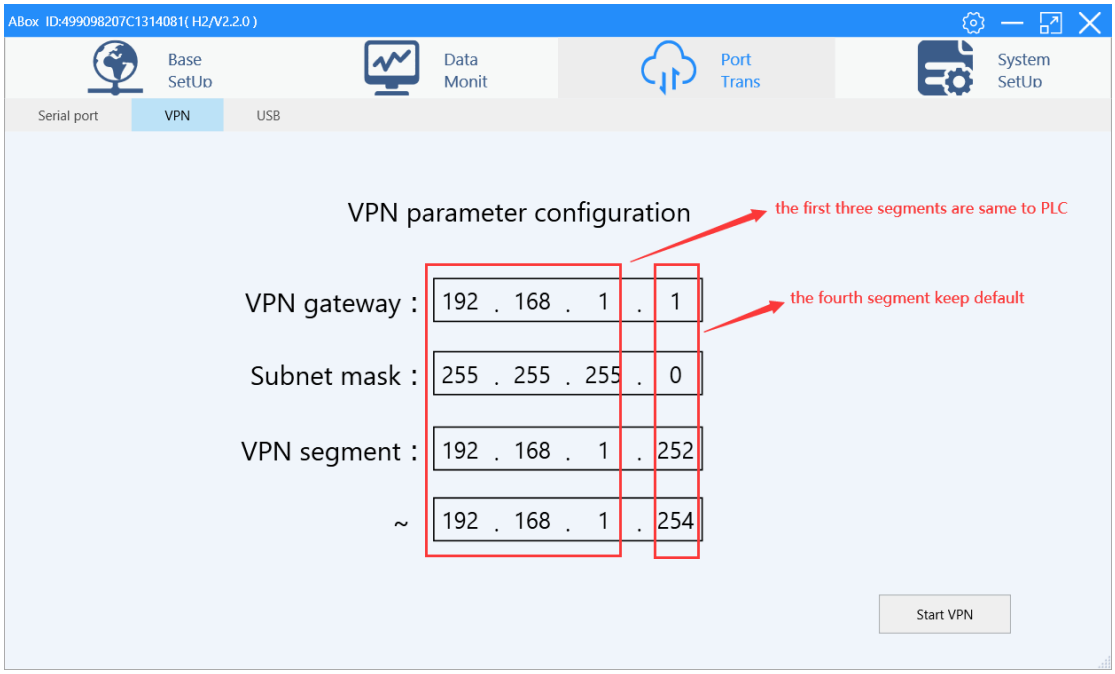
5-15. Weinview MT8071iE HMI VPN transparent transmission

1. First set the IP address of the HMI, click the arrow at the bottom right corner.

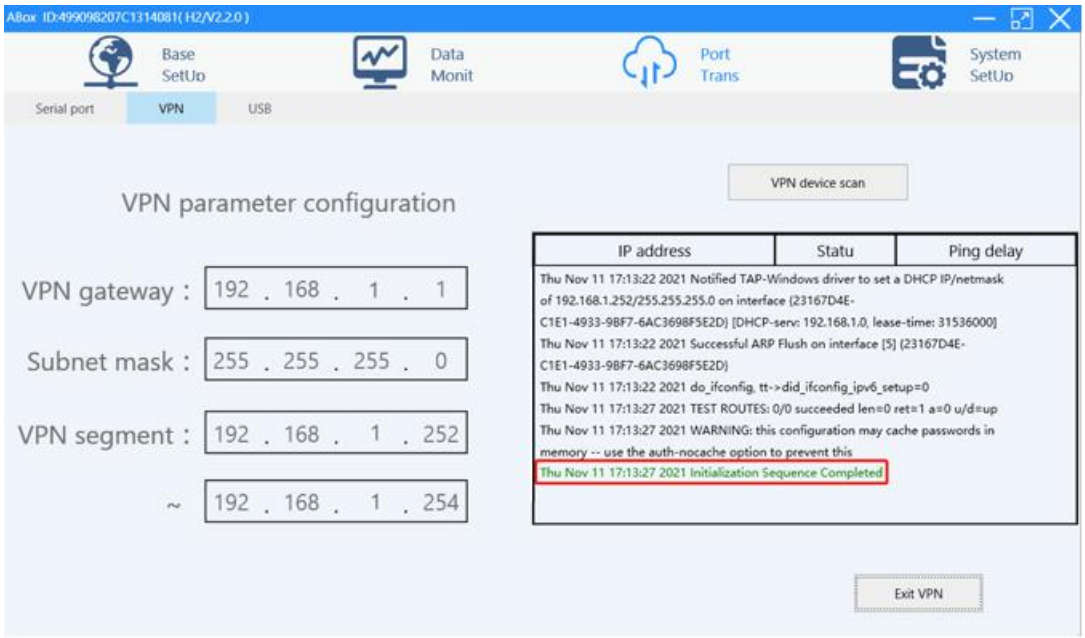
2. Click the setting key and enter the password to enter the IP address setting interface.

3. Set the IP address of the HMI, and put the IP address of the HMI and A-BOX in the same network segment.

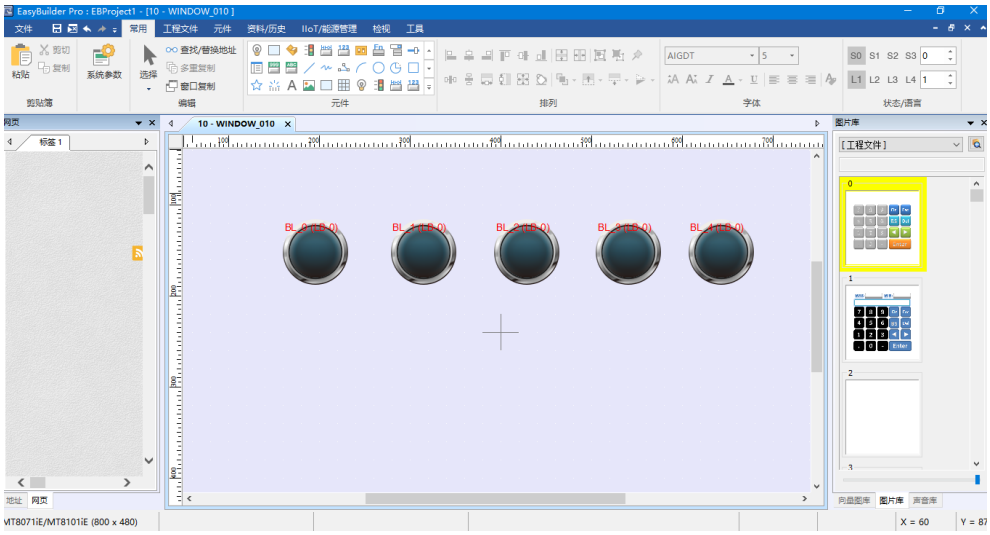
4. Open the configuration interface of ABOX, click "User Functions" -->"VPN", and directly click "Start VPN".



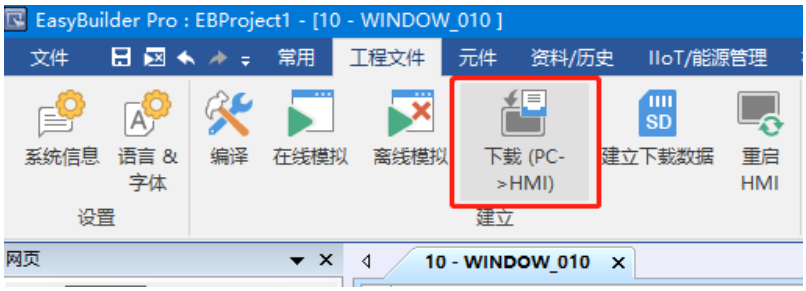
5. After the VPN is successful, the display is as follows:



6. You can also use the ping command to test whether the connection is normal, and then open the Weinview editing software to create a new project.

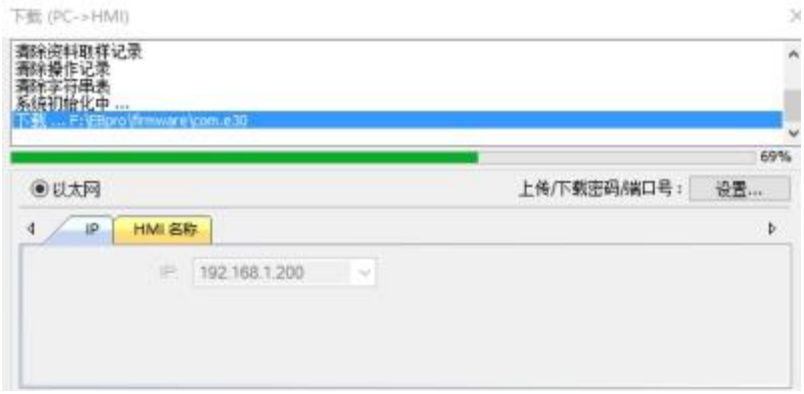


7. Click "Download (PC ->HMI)" in "Project File".



8. After the compilation, change the IP address to HMI IP, i.e. 192.168.1.200.

9. Click download.



10. The downloading is finished.

6. Data monitoring application

Data monitoring requires the use of the "Xinje Cloud" platform. The address of the device is mapped to the internal address of ABOX to achieve real-time monitoring of PLC data by the cloud platform.

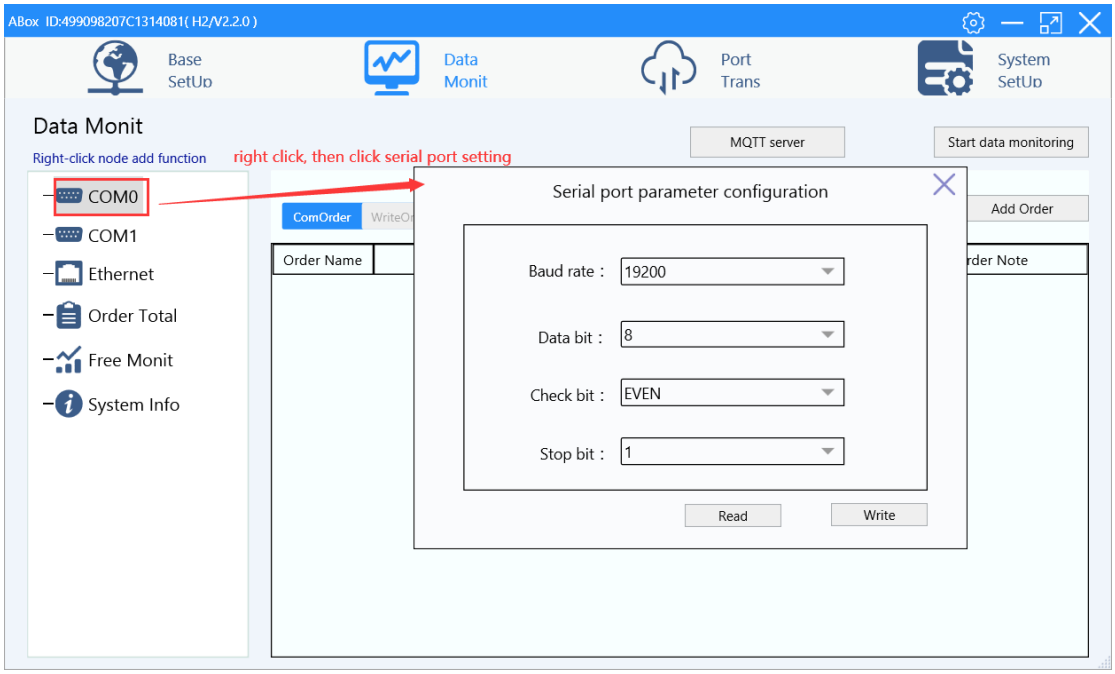
The completed protocols are as follows (based on V1.0.25):

Communication type	Protocol/brand
Serial port	Xinje XC series
	Xinje XD/XL/XG series
	ModbusRTU
	Siemens S7-200 PPI
	Mitsubishi FX series
	Mitsubishi FX3U/3G
	Omron CP/CJ.CS series
	Delta DVP series

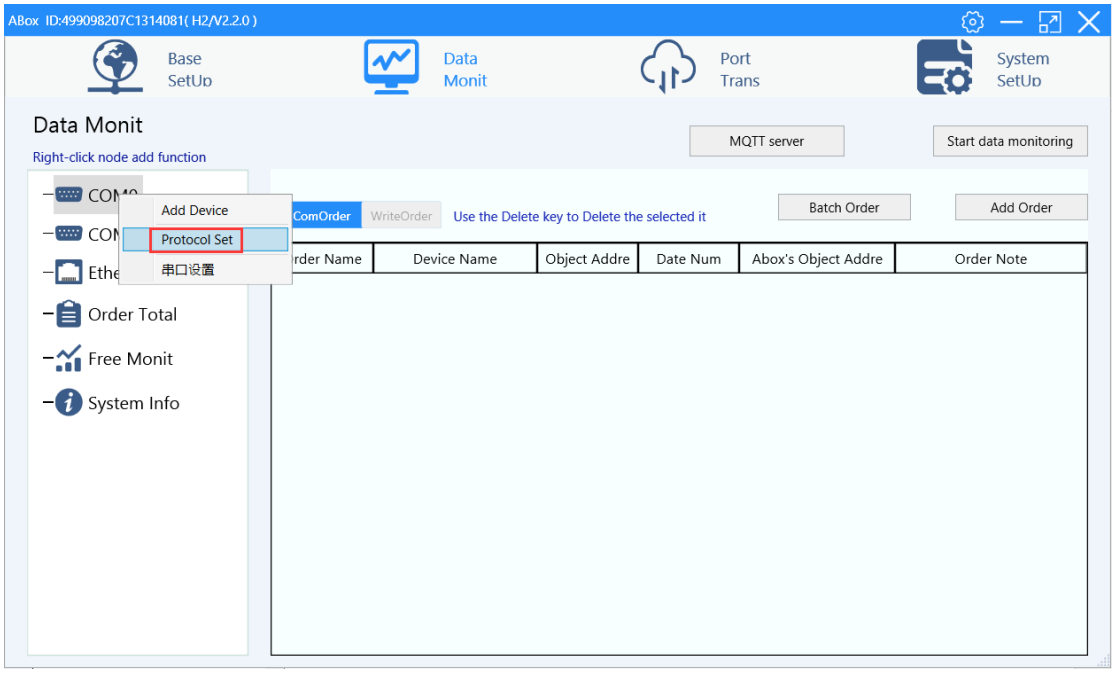
Ethernet port	ModbusTCP
	Xinje XDE_XNET
	Xinje XD_ModbusTCP
	Siemens S7200-smart
	Siemens S7-300 series (Only the Ethernet port of the main body is supported)
	Siemens S7-1200 series
	Siemens S7-1500 series
	Omron FinsTCP
	Mitsubishi FX5U
	Mitsubishi L series
	Mitsubishi Q series
	Support EIP protocol devices

6-1. Siemens S7-200 series serial port PLC (PPI)

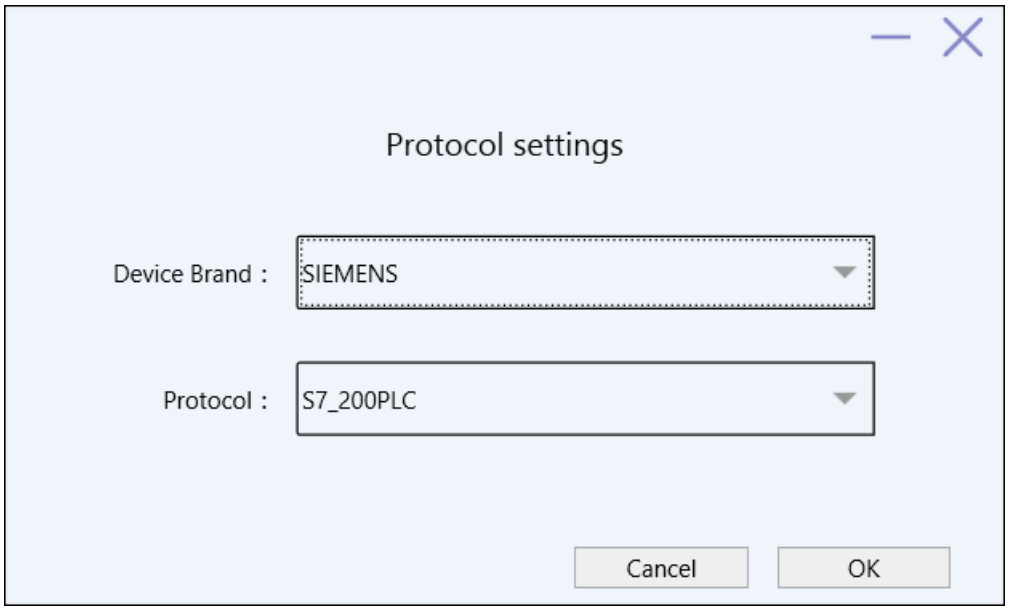
1. The serial port parameters of PLC in this case are 9600,8,1, E. Pins 3 and 8 of Siemens S7-200 correspond to A and B of A-BOX respectively. First, set the serial port parameters of A-BOX to be consistent with the PLC.



2. In the data monitor tab, right click COM0, click protocol set.

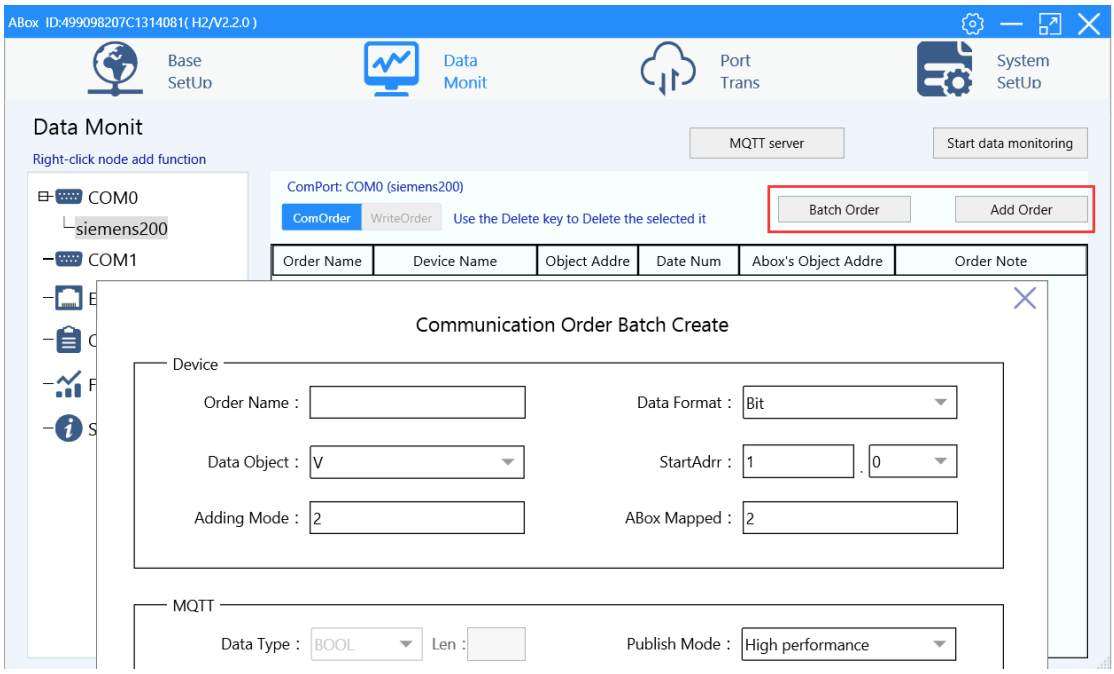


3. Select Siemens S7_200PLC for the communication protocol.

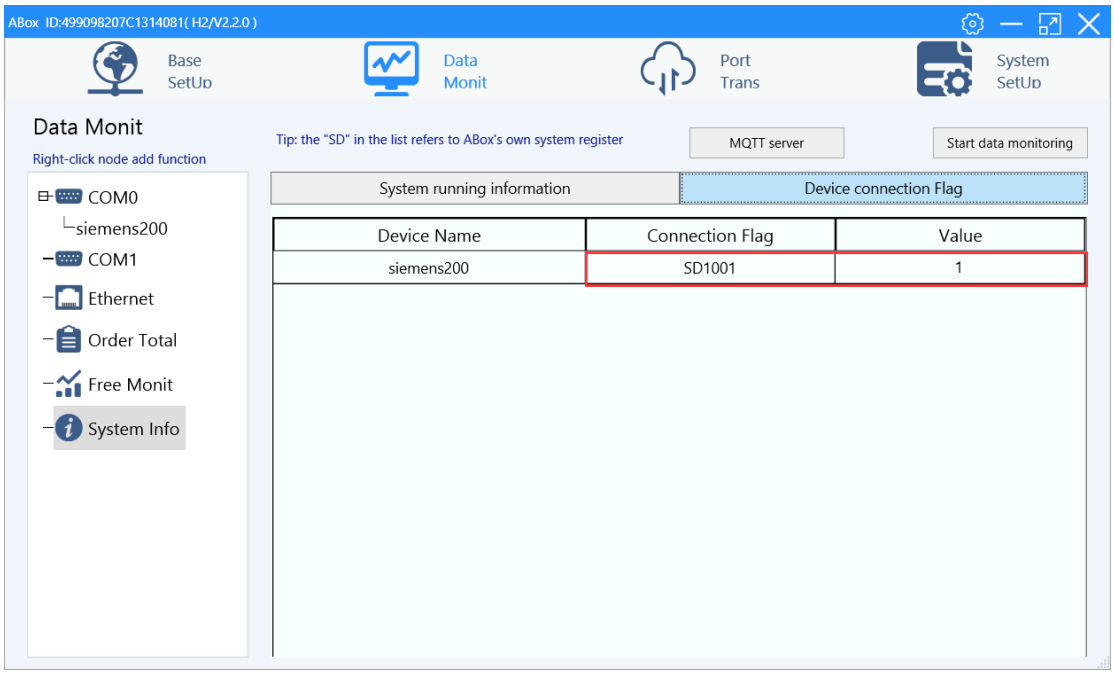


4. Right click COM0, click add device, the default station no. is 2.

5. Select "Siemens 200" and click "Add order" or "Batch order". For Word and DWord, the number of objects must not exceed 50. After adding instructions, please monitor the corresponding A-BOX address in the Xinje Cloud.

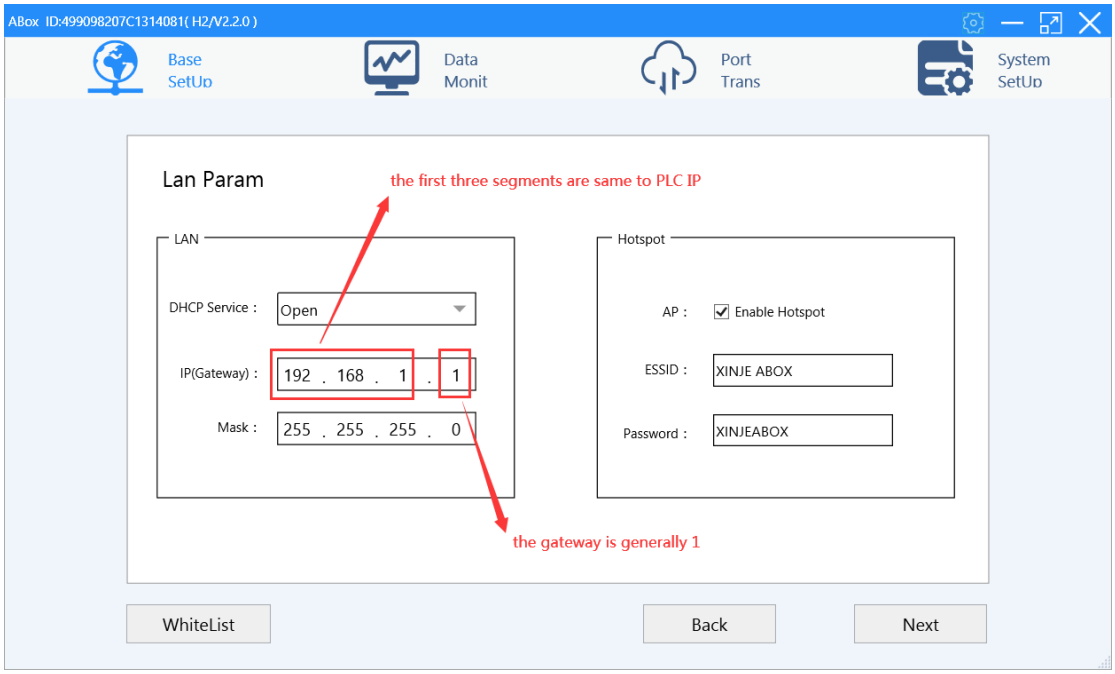


6. In "System information", check "Communication equipment connection flag" to see whether the communication between PLC and A-BOX is normal. The value is "1" when communication is normal, and the value of communication failure is "0".

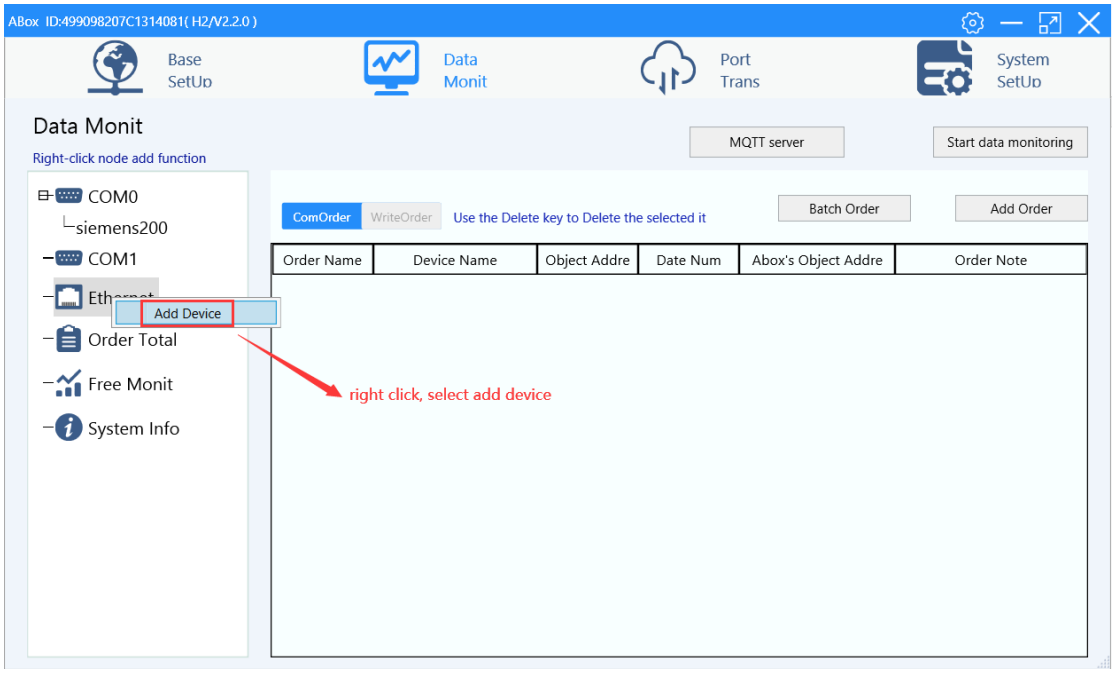


6-2. Siemens S7-200SMART series Ethernet port PLC

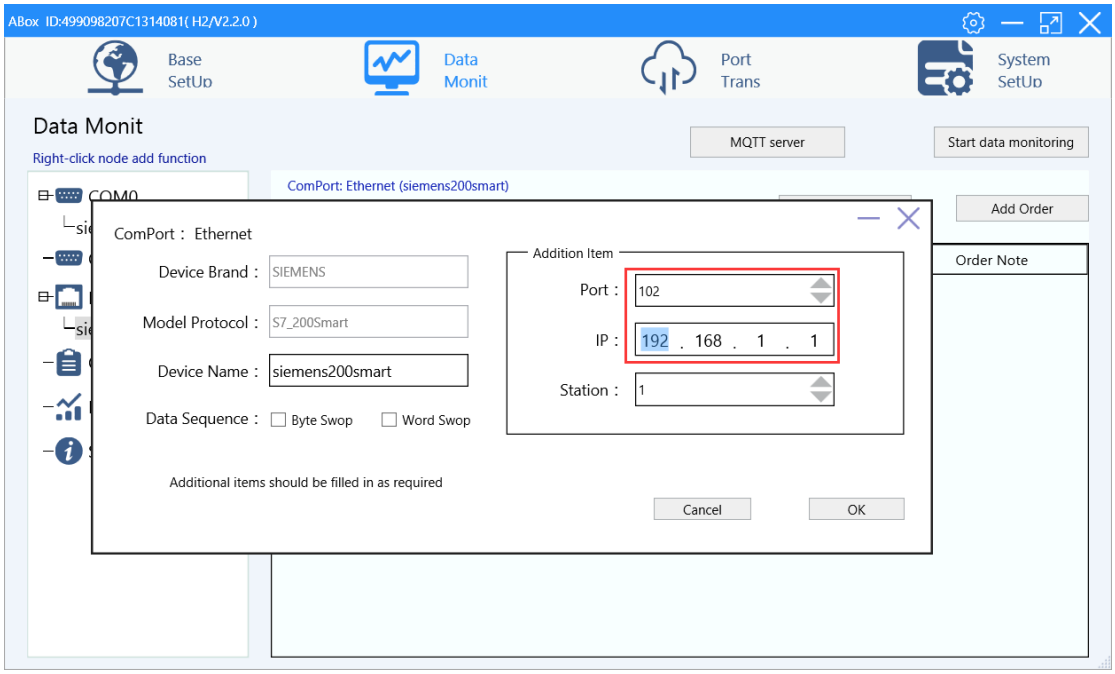
1. The IP address of the PLC in this case is 192.168.1.105. First, the LAN parameters of A-BOX should be on the same network as the IP address of the PLC.



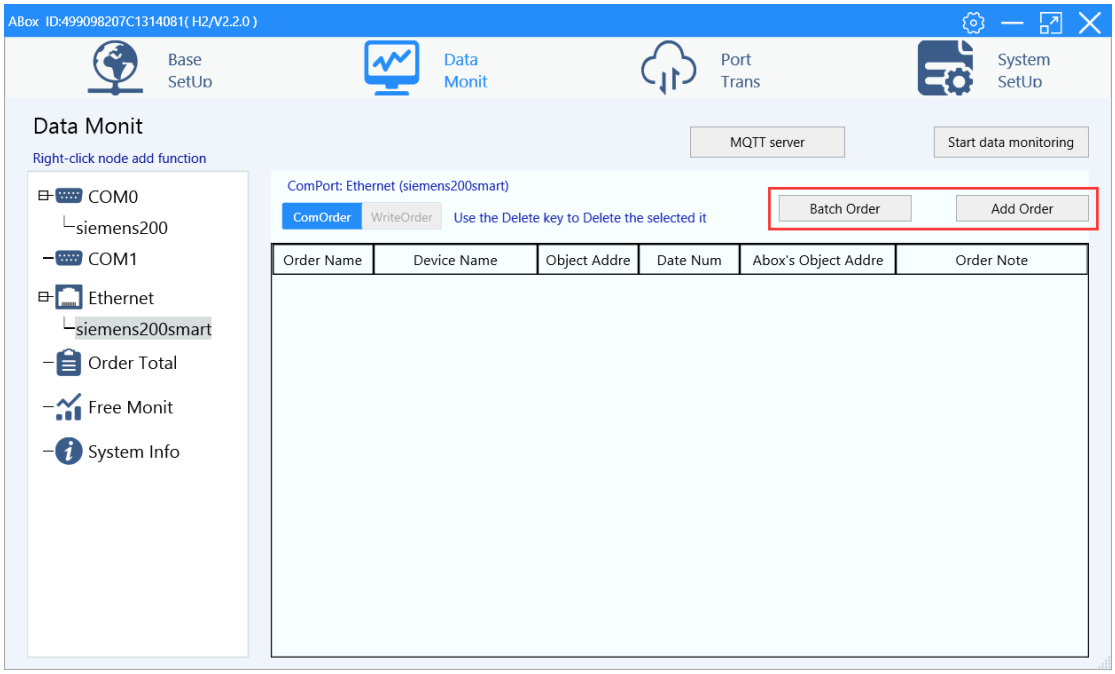
2. In "Data Monitoring", right-click "Ethernet" and click "Add Device".



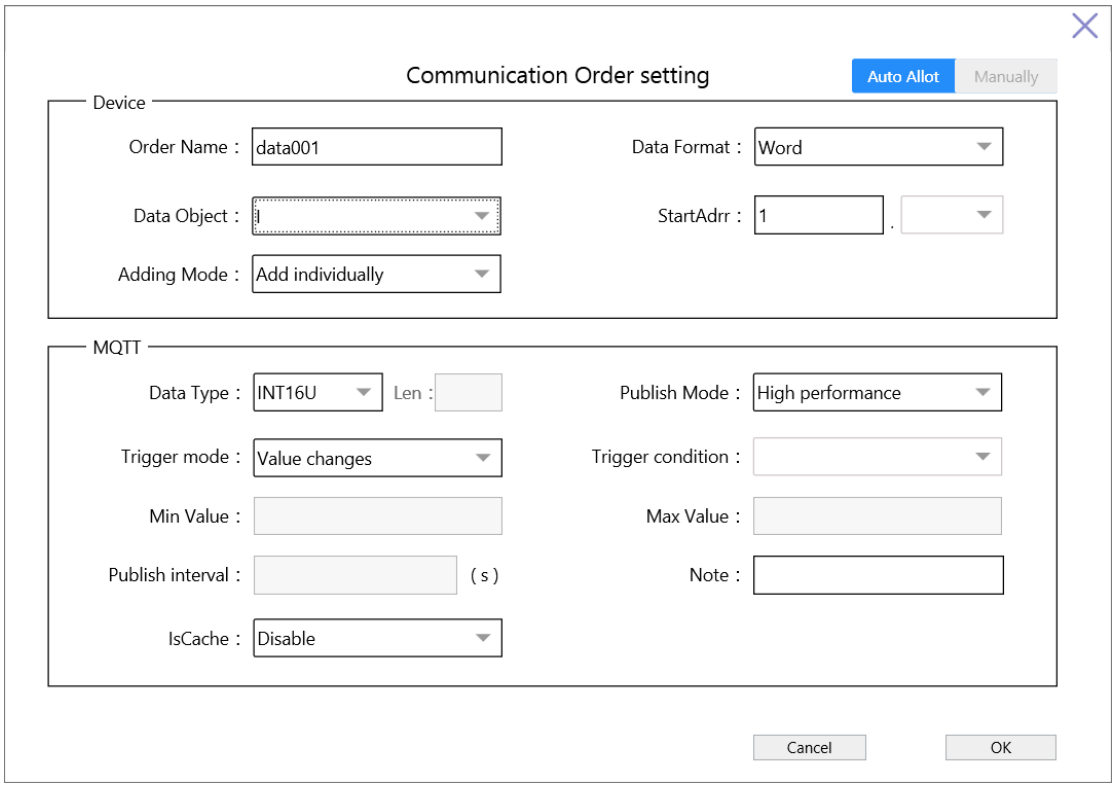
3. The protocol please select S7_200smart, fill in the PLC IP, the port number is 102.



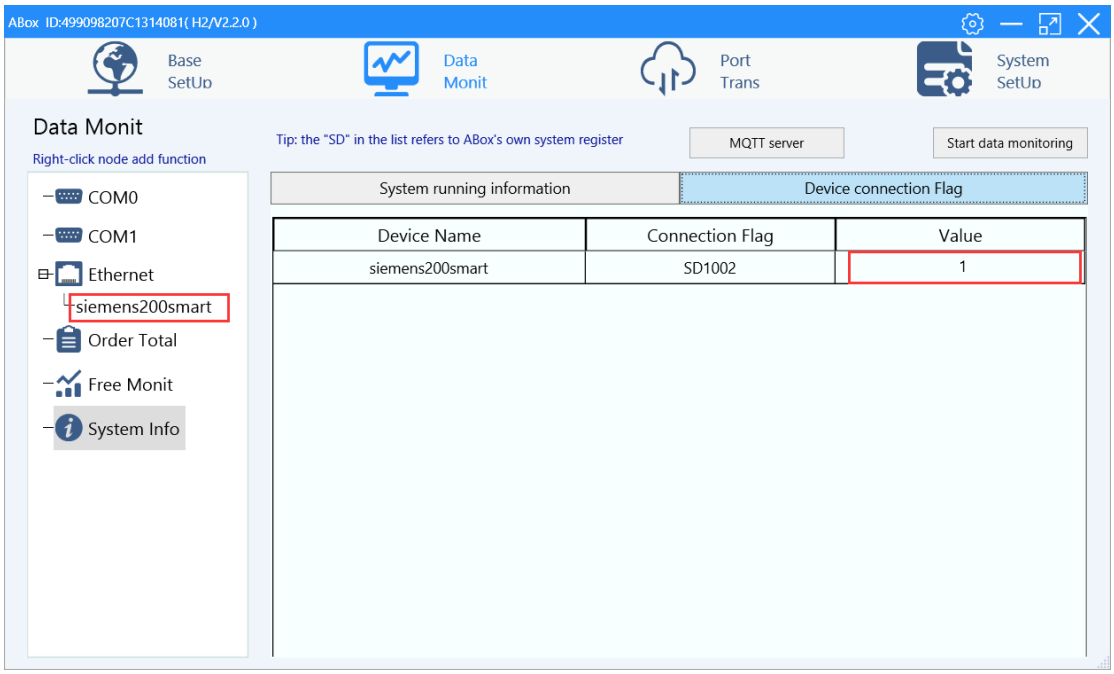
4. Select Siemens200smart, click Add order or Batch order.



5. For Word and DWord, the number of objects must not exceed 50. After adding instructions, please monitor the corresponding A-BOX address in the Xinje Cloud.



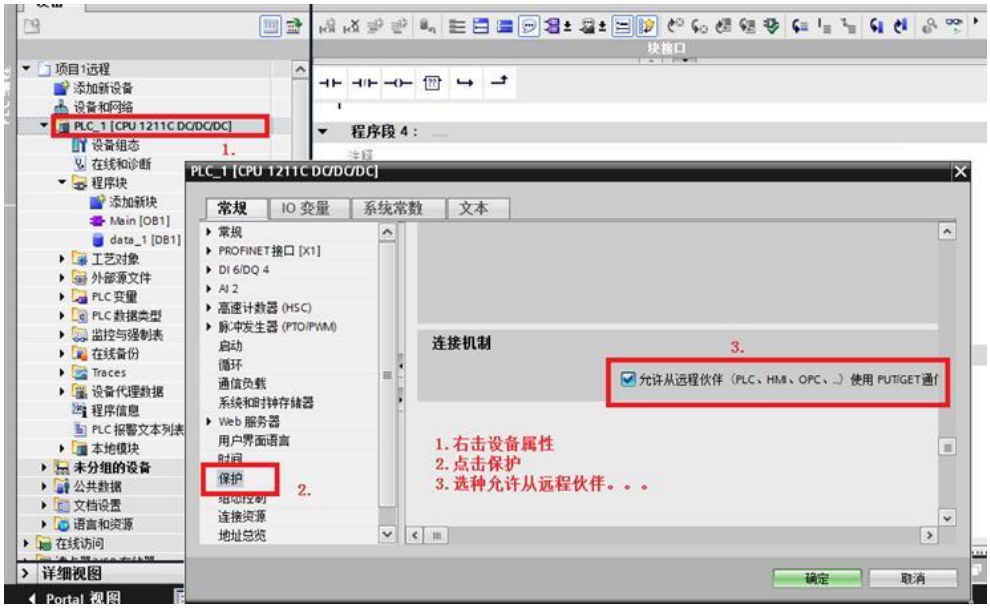
6. In "System information", check "Communication equipment connection flag" to see whether the communication between PLC and A-BOX is normal. The value is "1" when communication is normal, and the value of communication failure is "0".



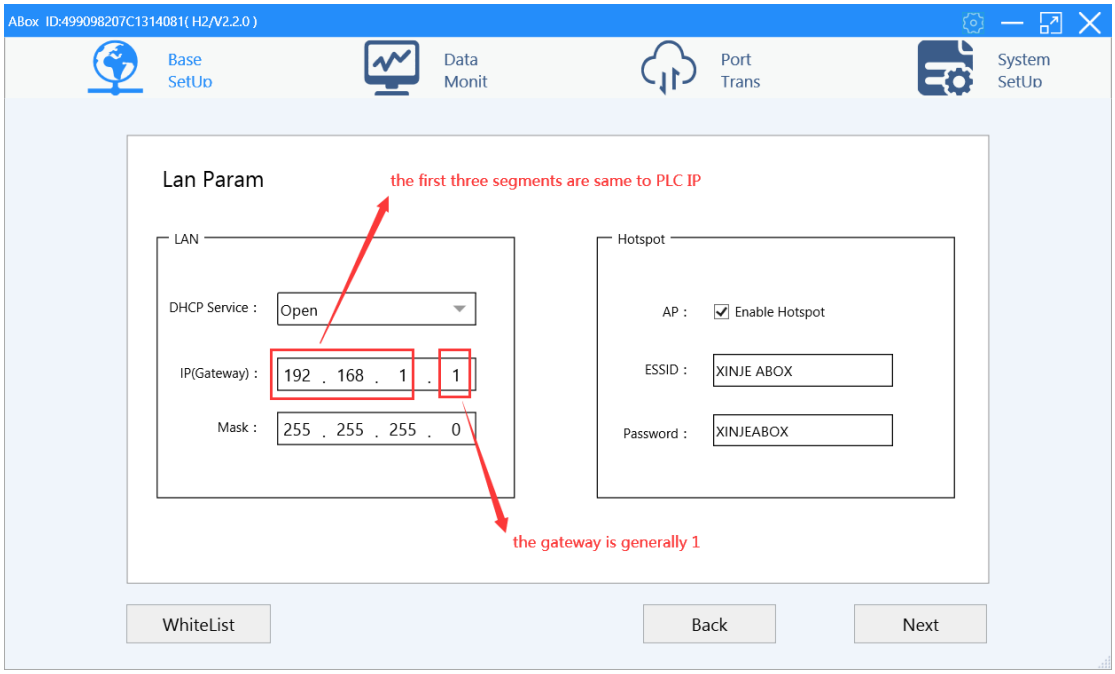
6-3. Siemens S7-300/1200/1500 series Ethernet port PLC

1. Before using Siemens S7-300/1200/1500 series PLC for data monitoring, the following two points need to be set in advance. After setting, download to PLC.

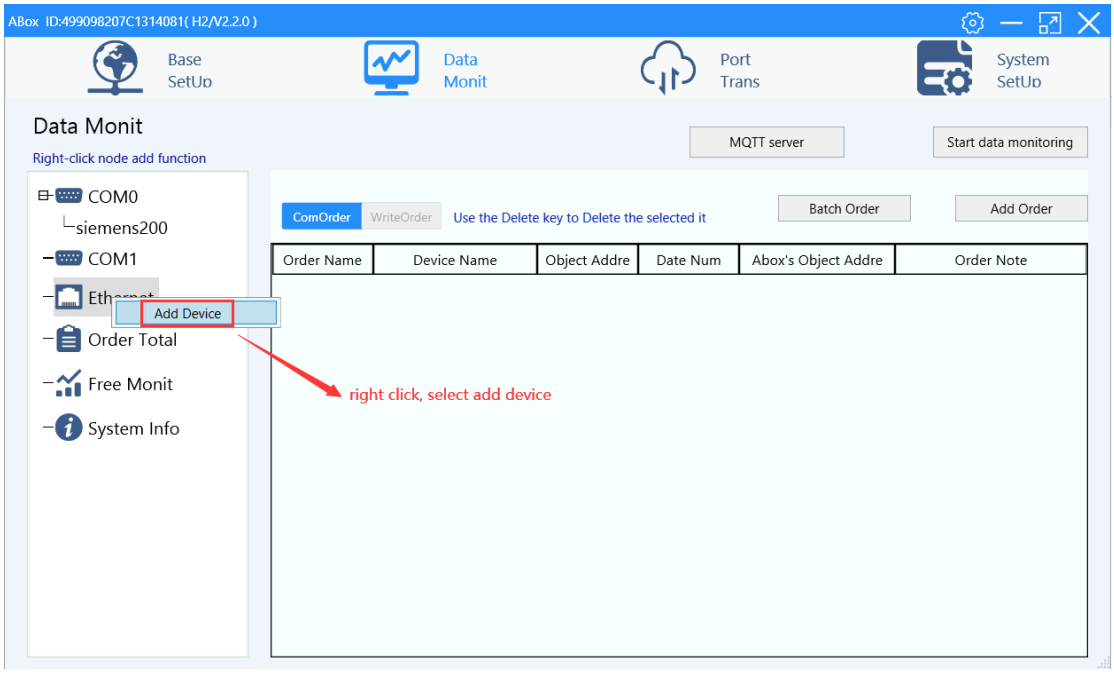
Note: S7-300 only supports the Ethernet port on the main body.



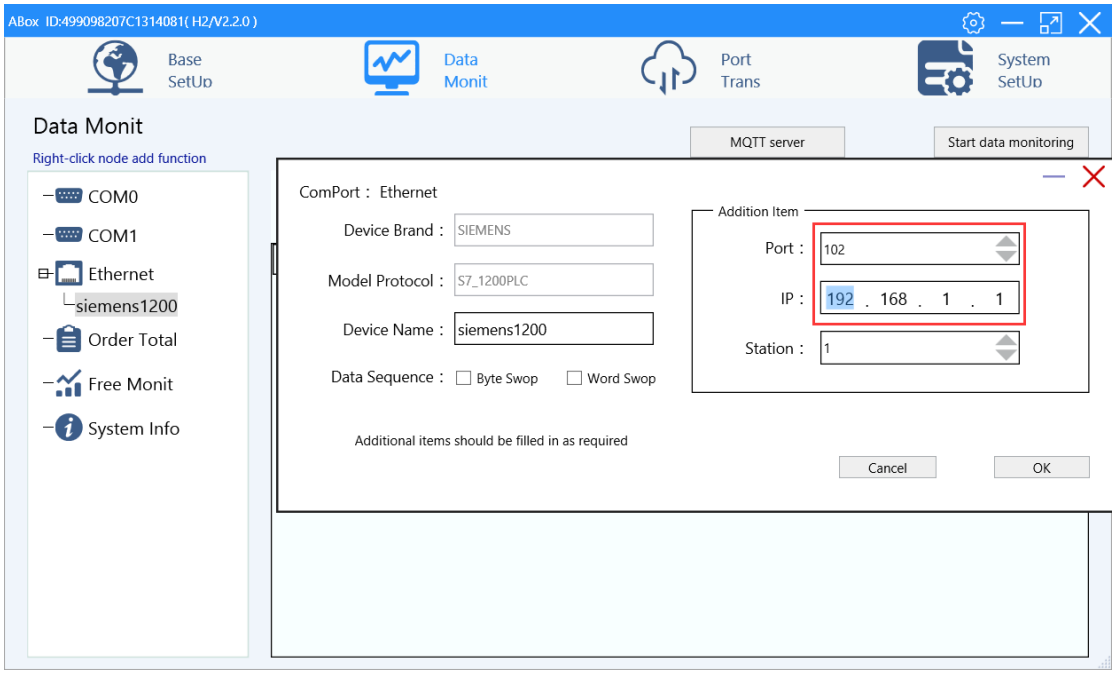
2. The IP address of the PLC in this case is 192.168.1.100. First, the LAN parameters of A-BOX should be on the same network as the IP address of the PLC.



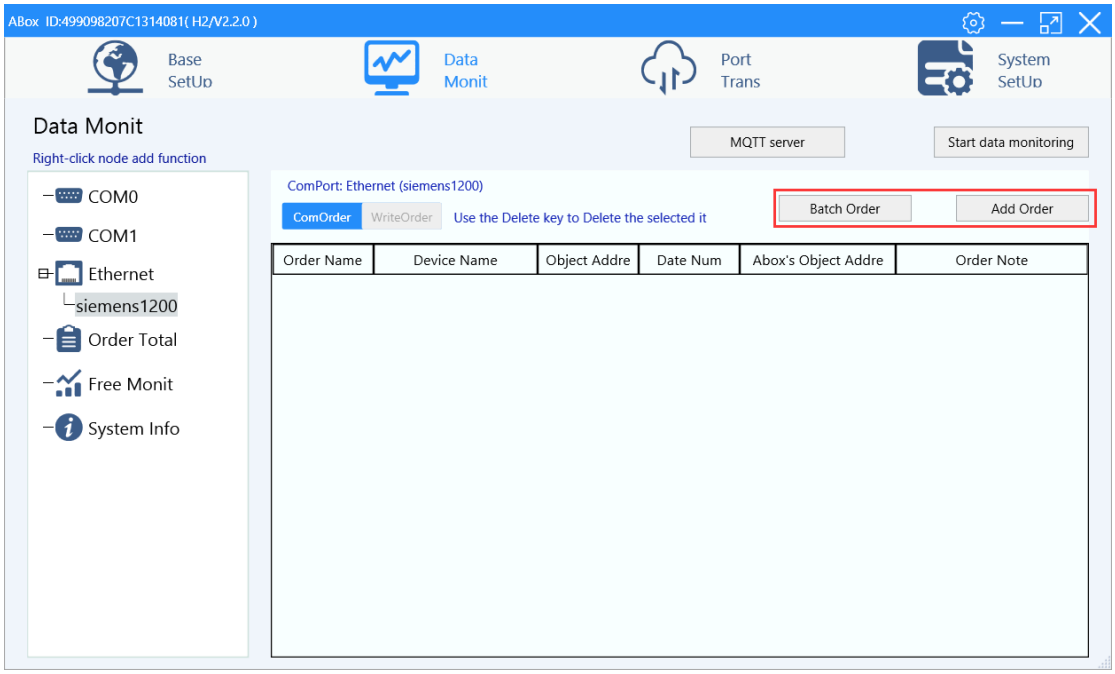
3. Right click the Ethernet, click add device.



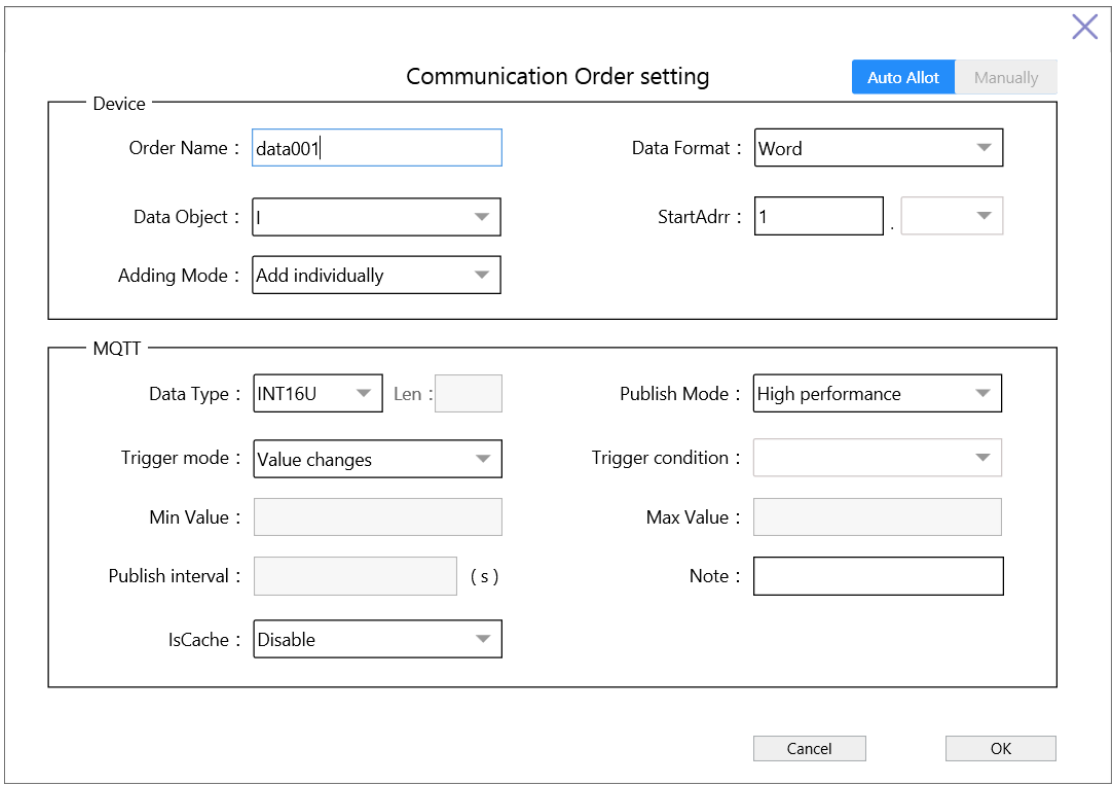
4. The protocol please select S7_1200PLC, fill in the PLC IP, the port number is 102 or 1.



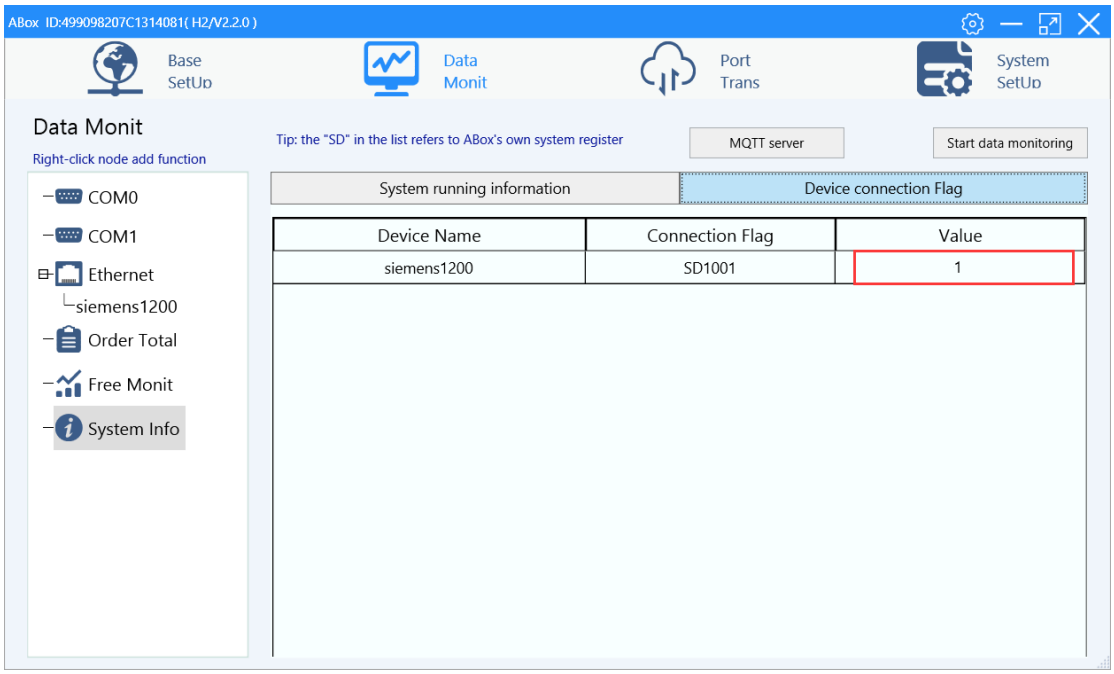
5. Select siemens1200, click add order or batch order.



6. For "bit", the number of objects can only be "1" temporarily. For Word and DWord, the number of objects must not exceed 50. After adding instructions, please monitor the corresponding A-BOX address in the Xinje Cloud.

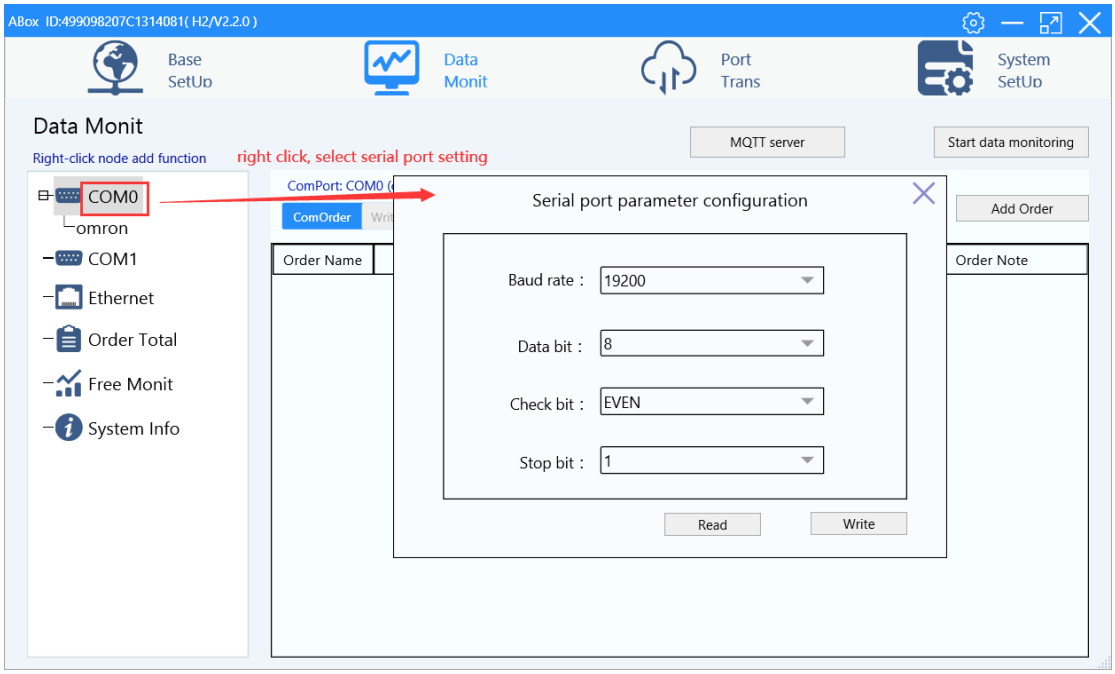


7. In "System information", check "Communication equipment connection flag" to see whether the communication between PLC and A-BOX is normal. The value is "1" when communication is normal, and the value of communication failure is "0".

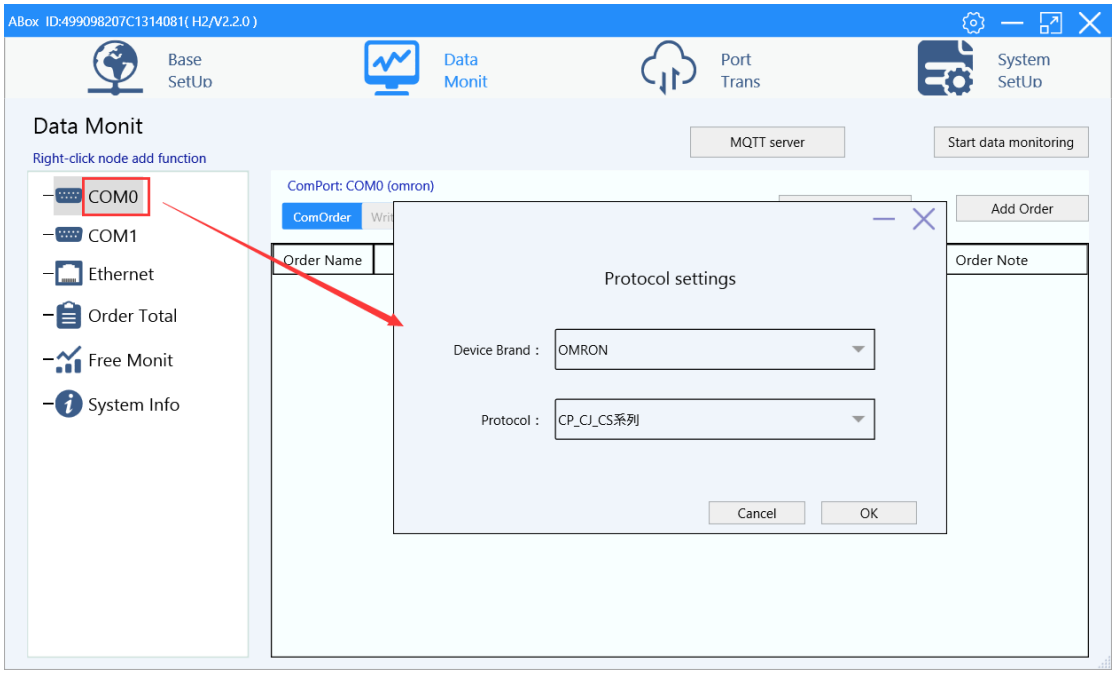


6-4. Omron CP1E series serial port PLC

1. In this case, the PLC model is CP1E-N30SDR-A, and the serial port parameters are 19200,8,1, E. First set A-BOX serial port parameters consistent with PLC.

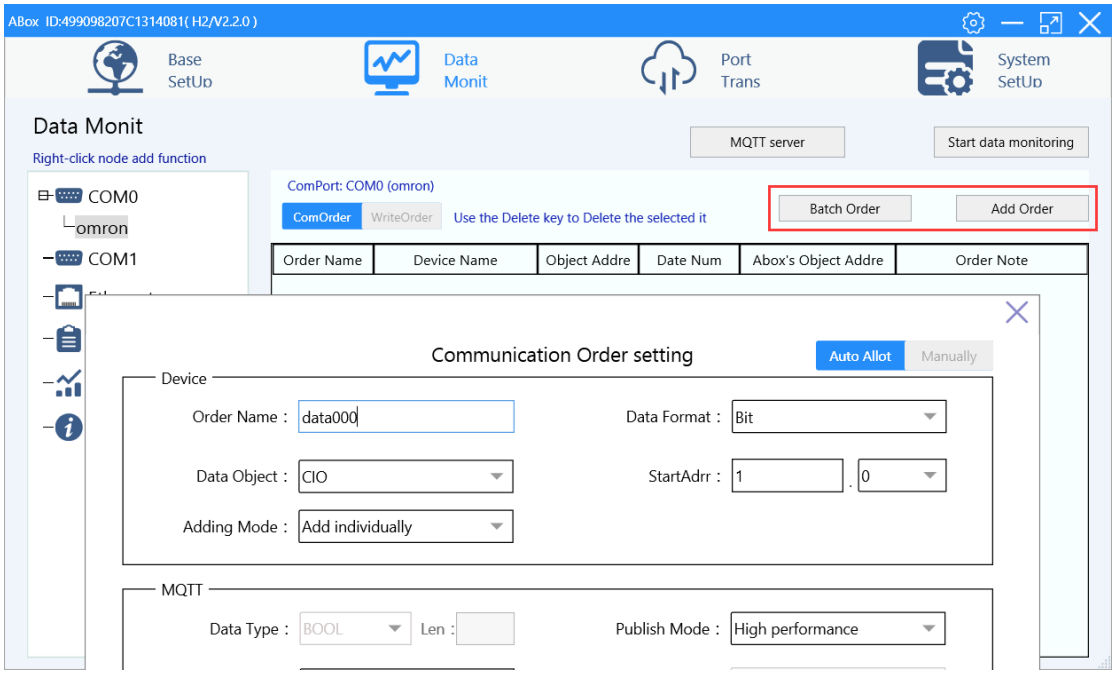


2. Right click COM0, select protocol set, select Omron CP_CJ_CS series.

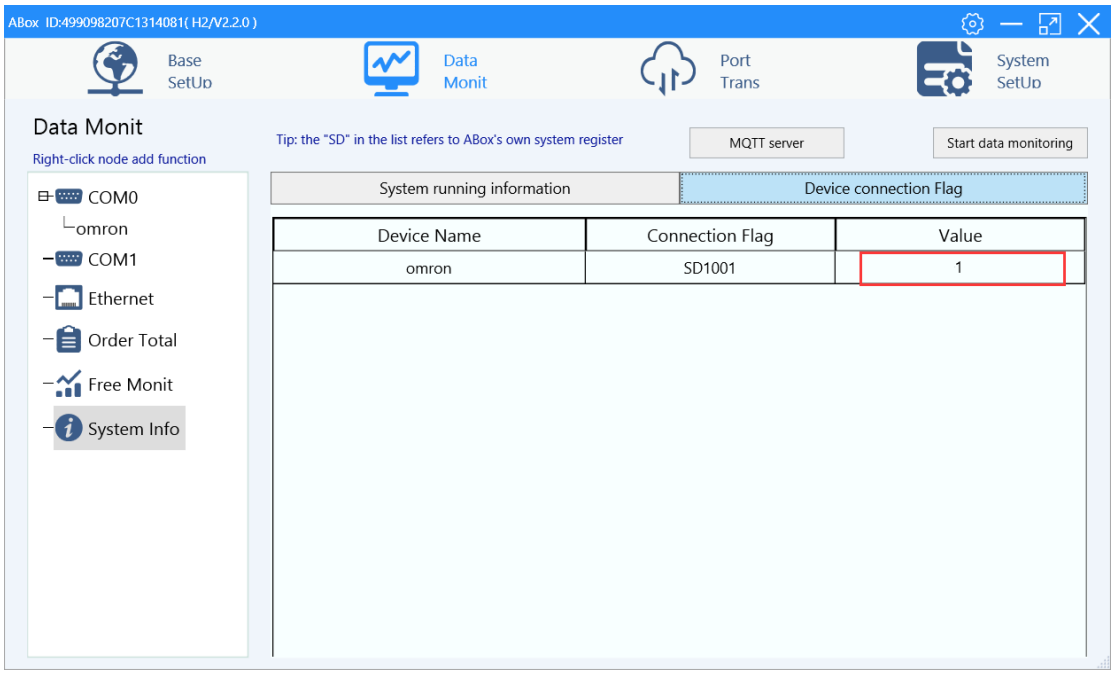


3. Right click COM0 to add device, set the station no. to 0.

4. Select Omron, click add order or batch order. Map to A-BOX address.

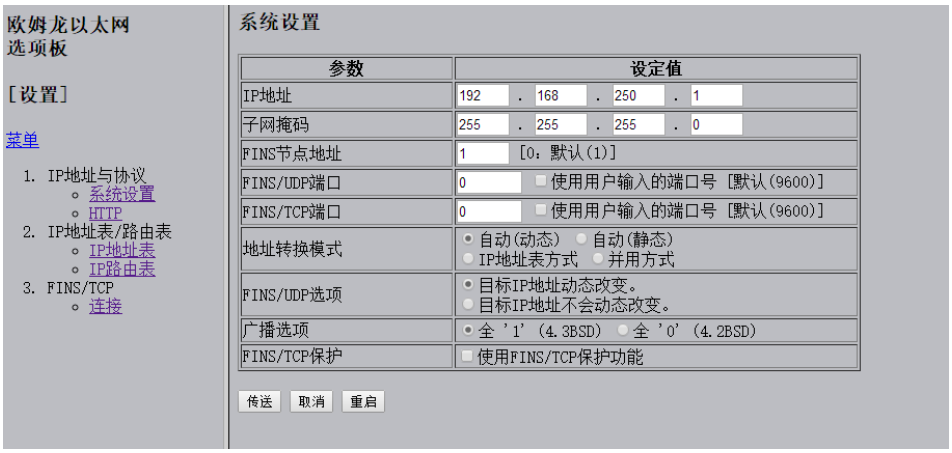


5. In "System information", check "Communication equipment connection flag" to see whether the communication between PLC and A-BOX is normal. The value is "1" when communication is normal, and the value of communication failure is "0".

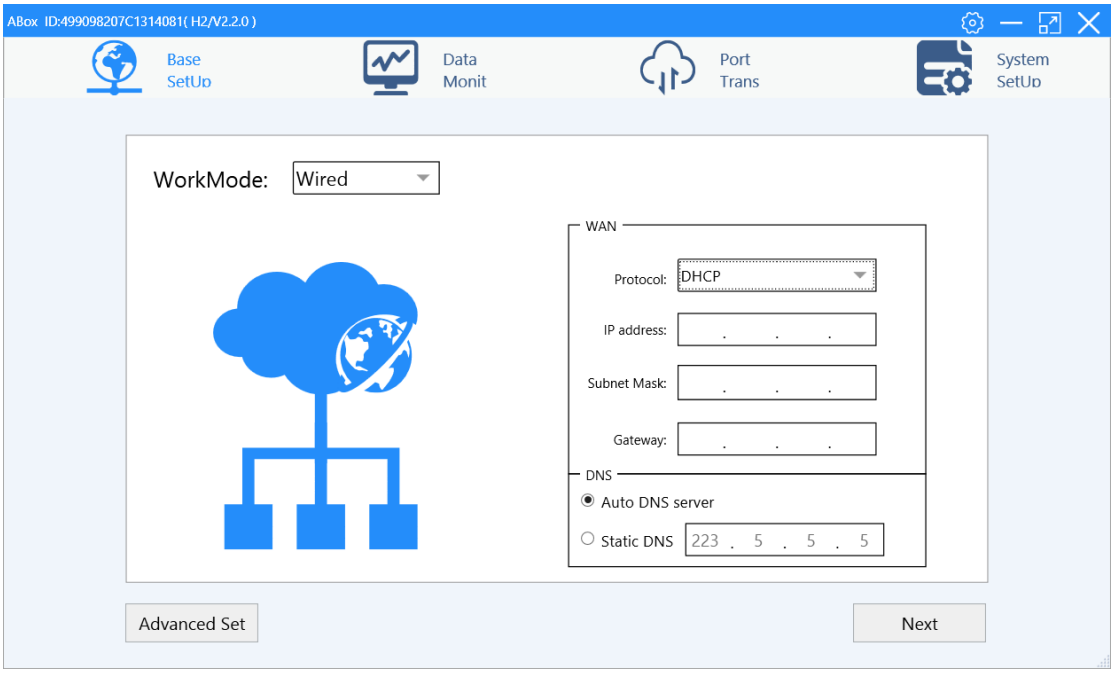


6-5. Omron CP1H series Ethernet port BD board FinsTCP communication

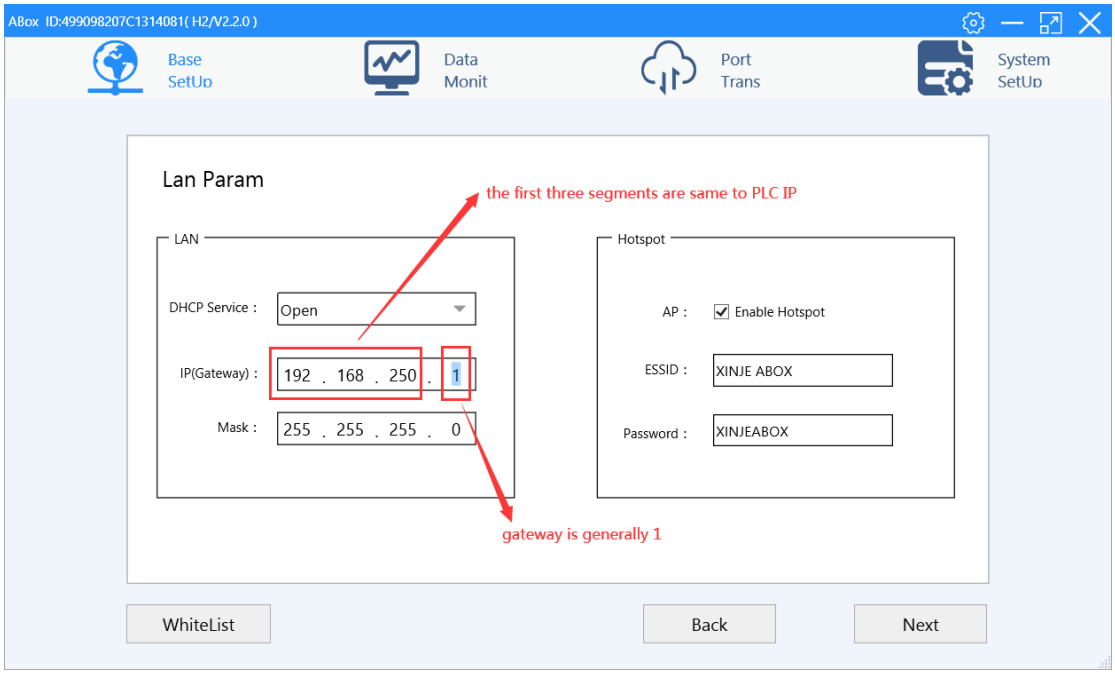
1. In this case, the PLC model is CP1H-X40DT-D-SC, and the network port BD board model is CP1W-C1F41. The default IP address is 192.168.250.1.



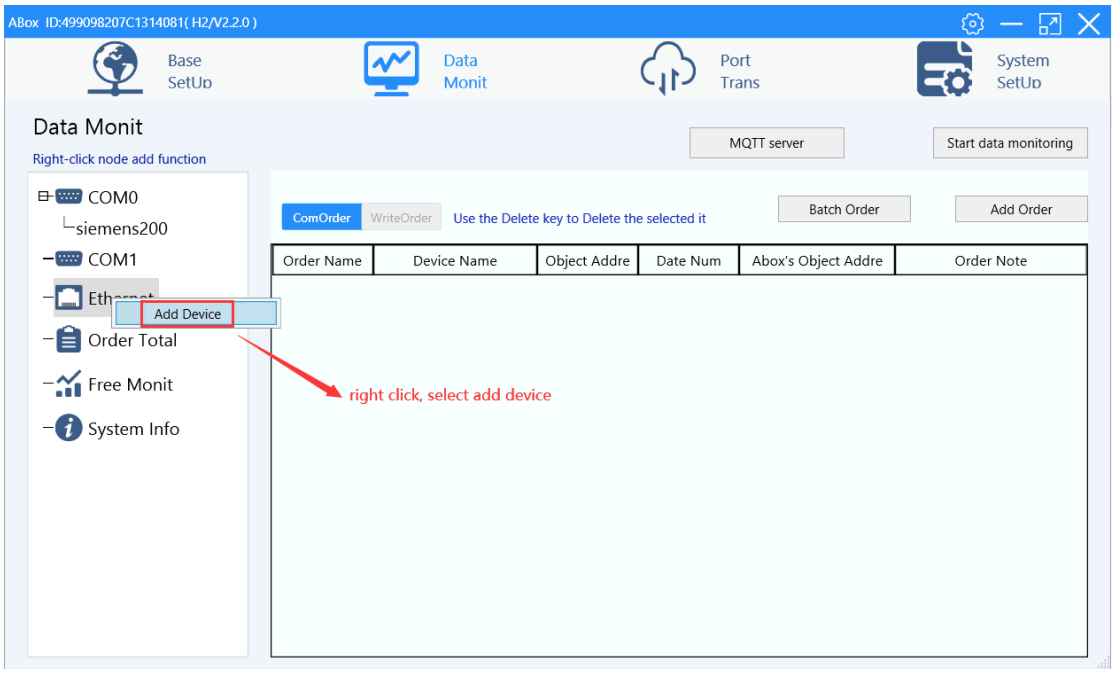
2. Connect A-BOX remotely through the configuration tool.



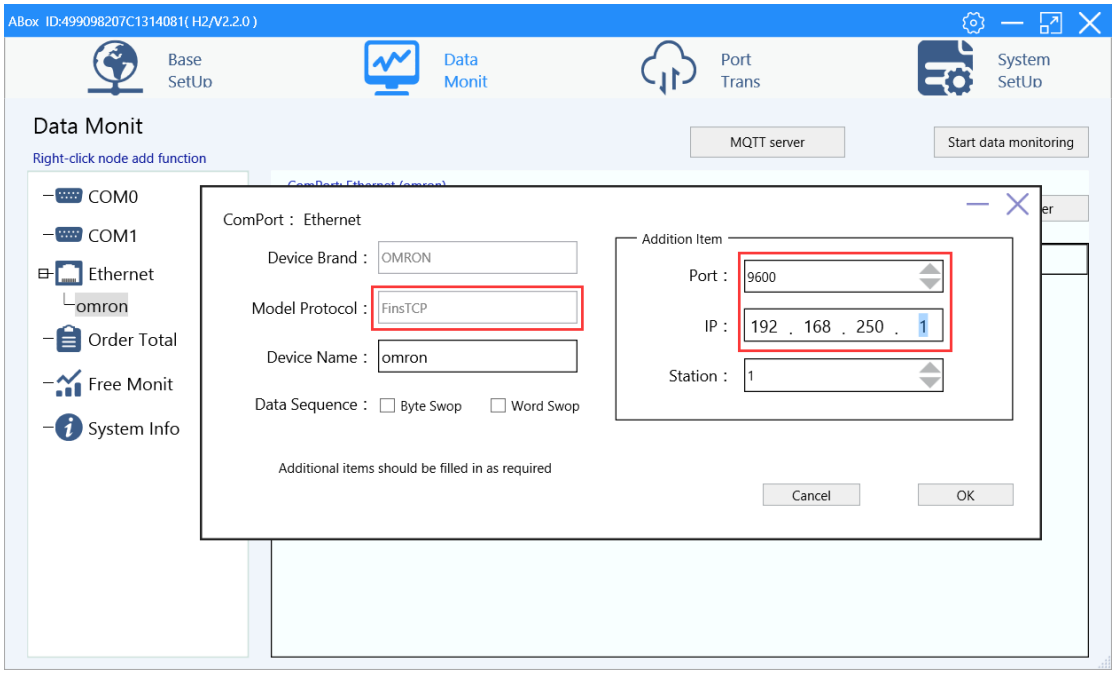
3. In the setup wizard, change the default gateway of the LAN parameters to be on the same network segment as the PLC, but it cannot conflict with the IP address of the PLC. For example, it is modified to 192.168.250.10.



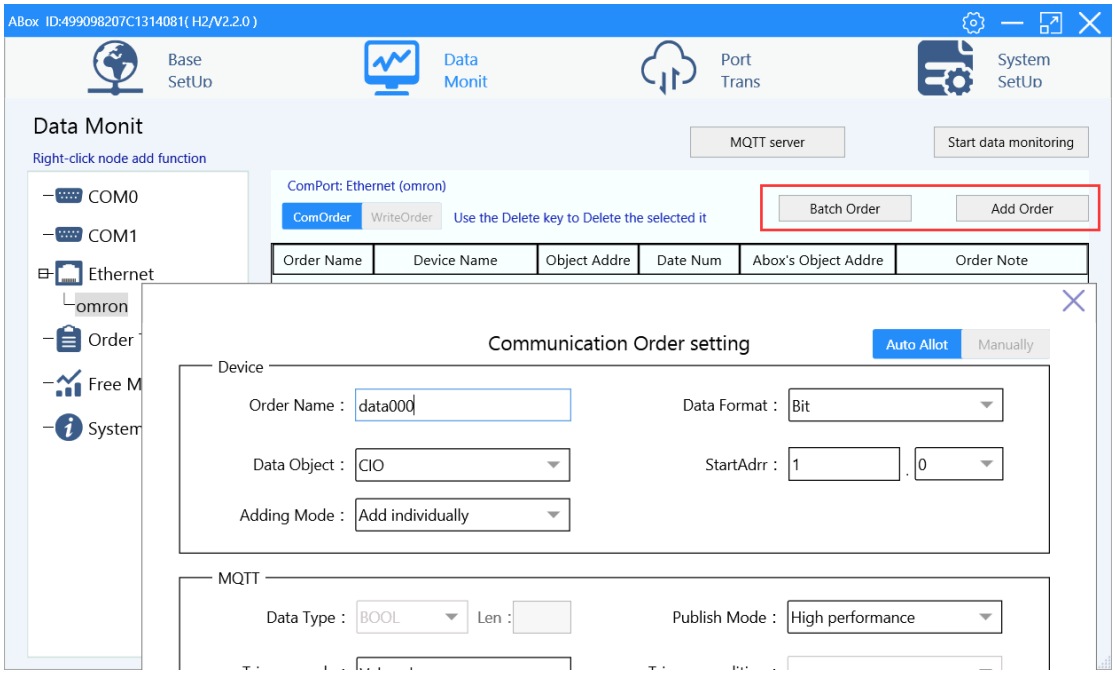
4. Right click Ethernet, click add device.



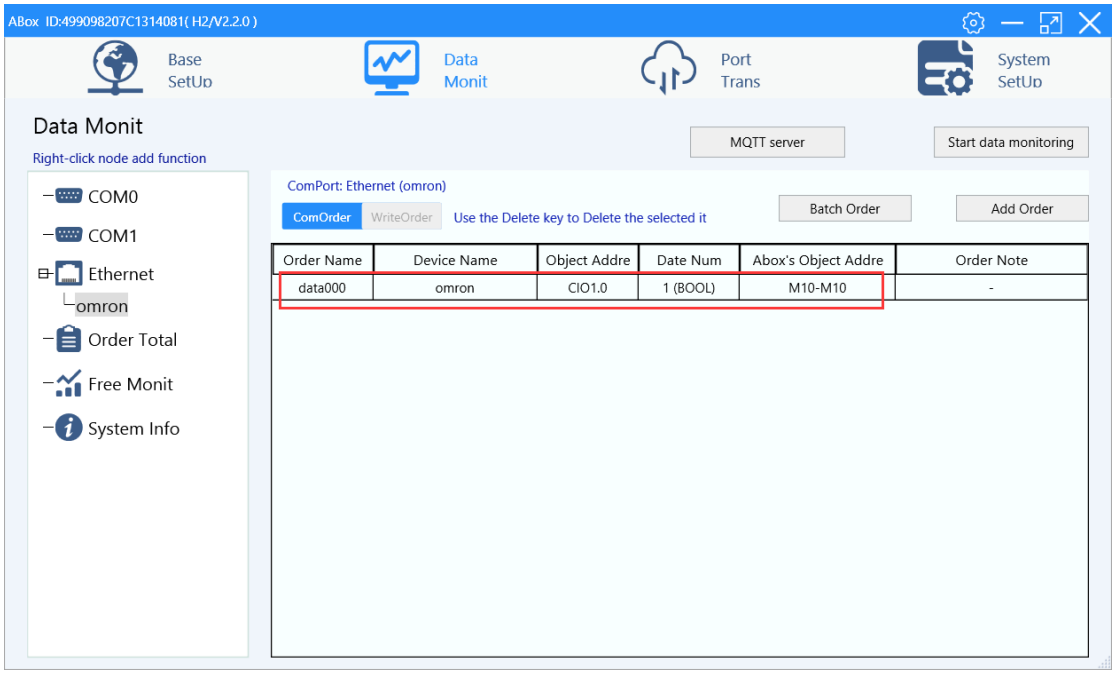
5. Select "Omron" - "FinsTCP" for communication protocol, fill in the IP address of PLC, and fill in "1 or 9600" for port number.



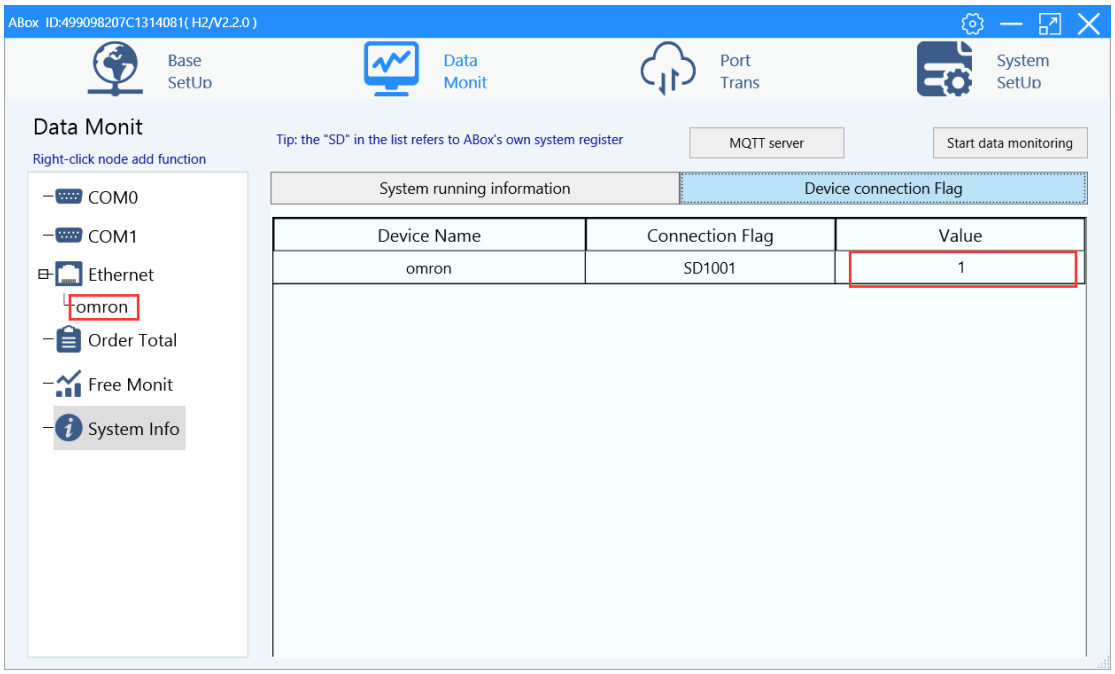
6. Select omron, click Add order or Batch order.



7. After adding instructions, please monitor the corresponding A-BOX address in the Xinje Cloud.

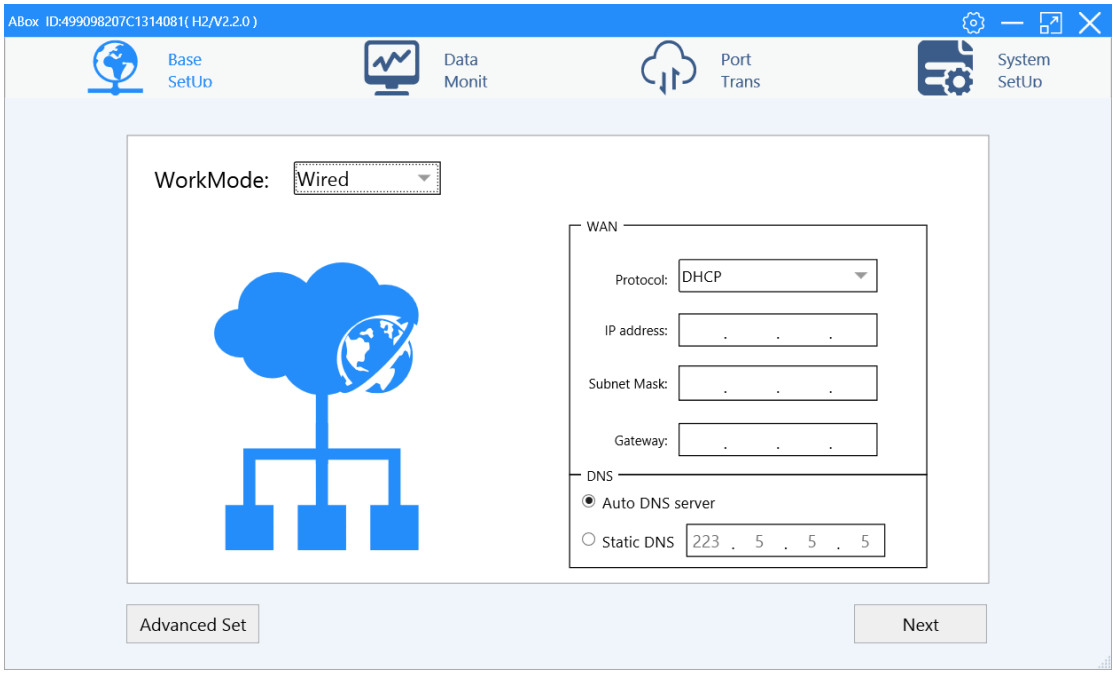


8. In "System information", check "Communication equipment connection flag" to see whether the communication between PLC and A-BOX is normal. The value is "1" when communication is normal, and the value of communication failure is "0".

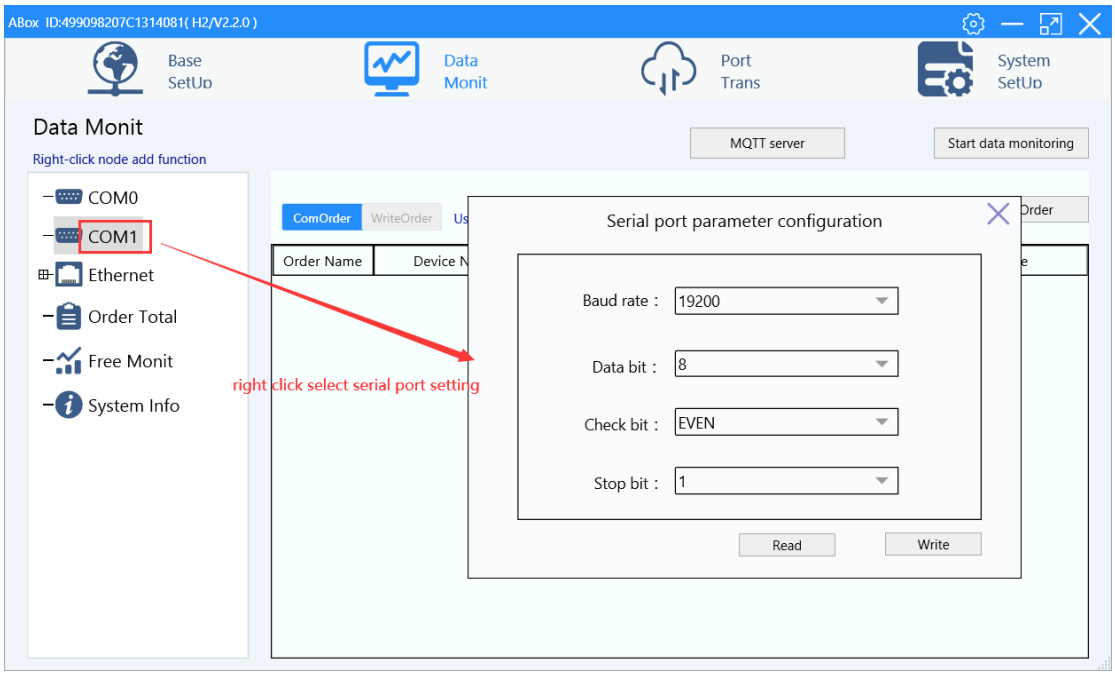


6-6. Mitsubishi FX series serial port PLC

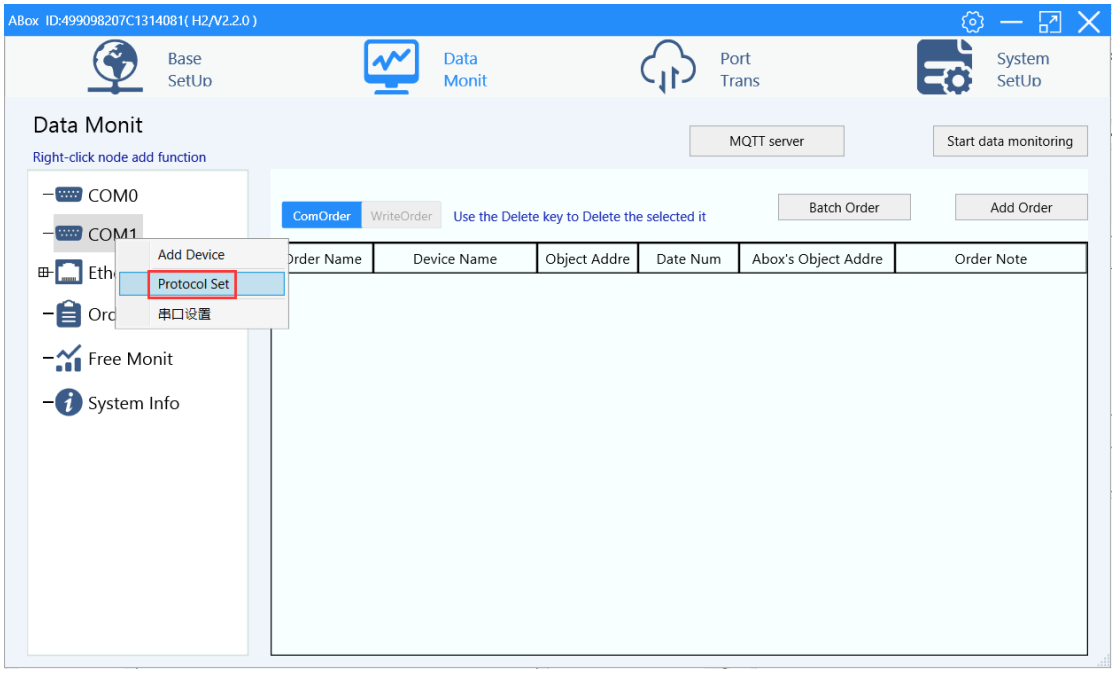
1. In this case, Mitsubishi FX1N-24MT is taken as an example. Serial port parameters are 9600, 7, 1 and E, and FX programming cable is used to connect to COM1 port of A-BOX. COM1 port supports RS422. First, connect A-BOX remotely with the configuration tool.



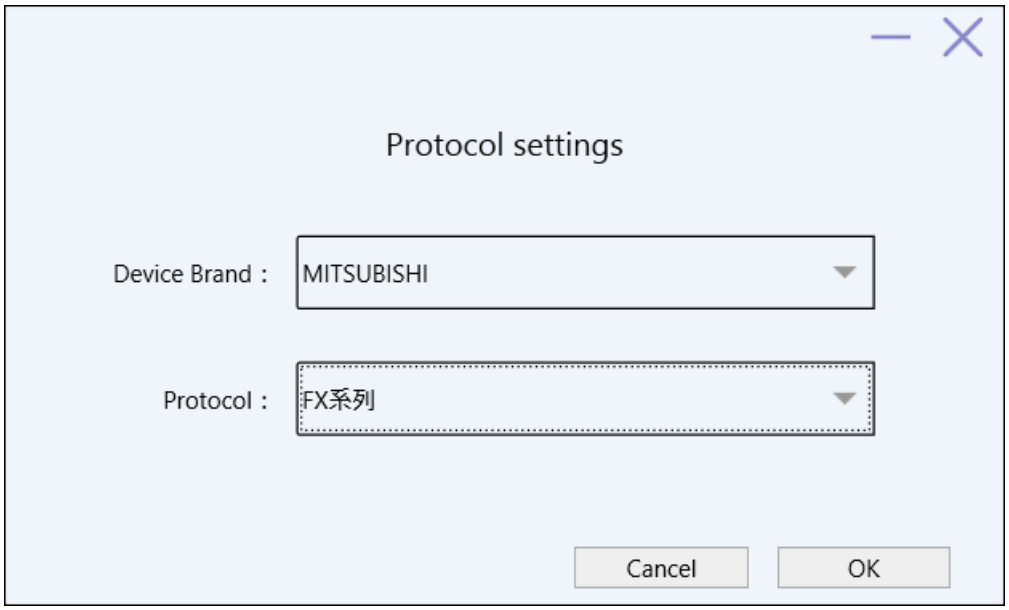
2. Modify the serial port parameters of COM1 port of A-BOX to be consistent with the PLC, and click "write" after configuration.



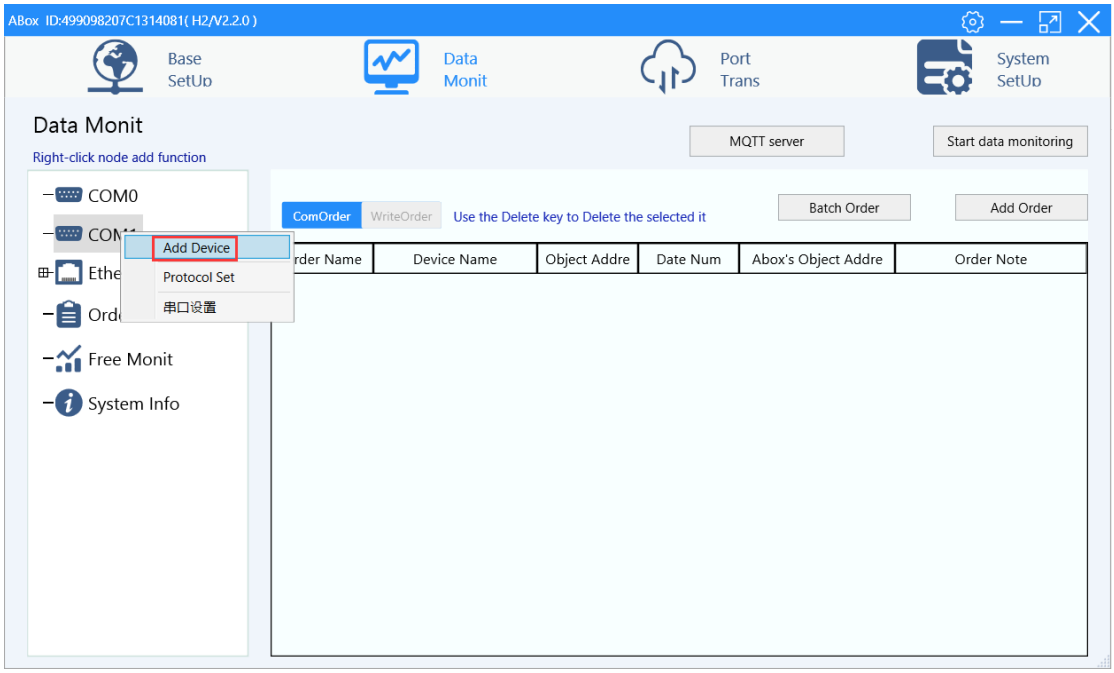
3. Right click COM1, click protocol set.



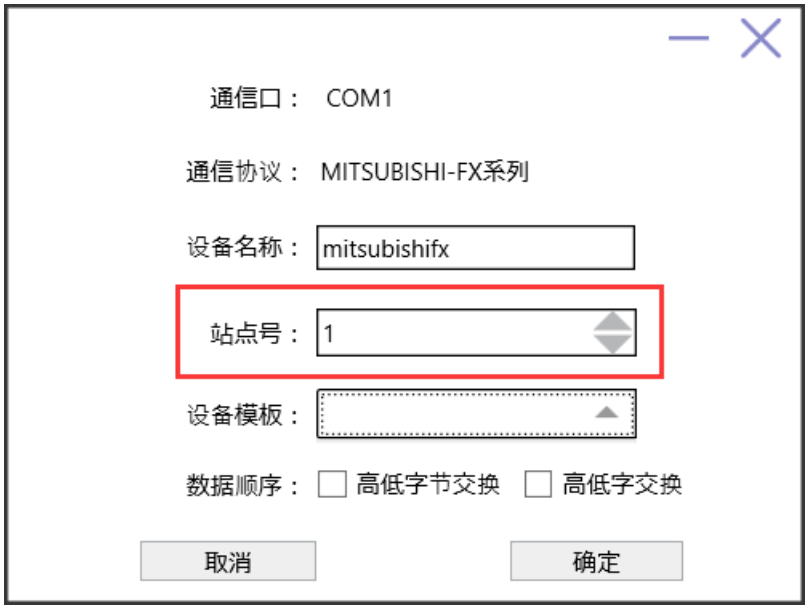
4. Select "Mitsubishi" - "FX series" for communication protocol.



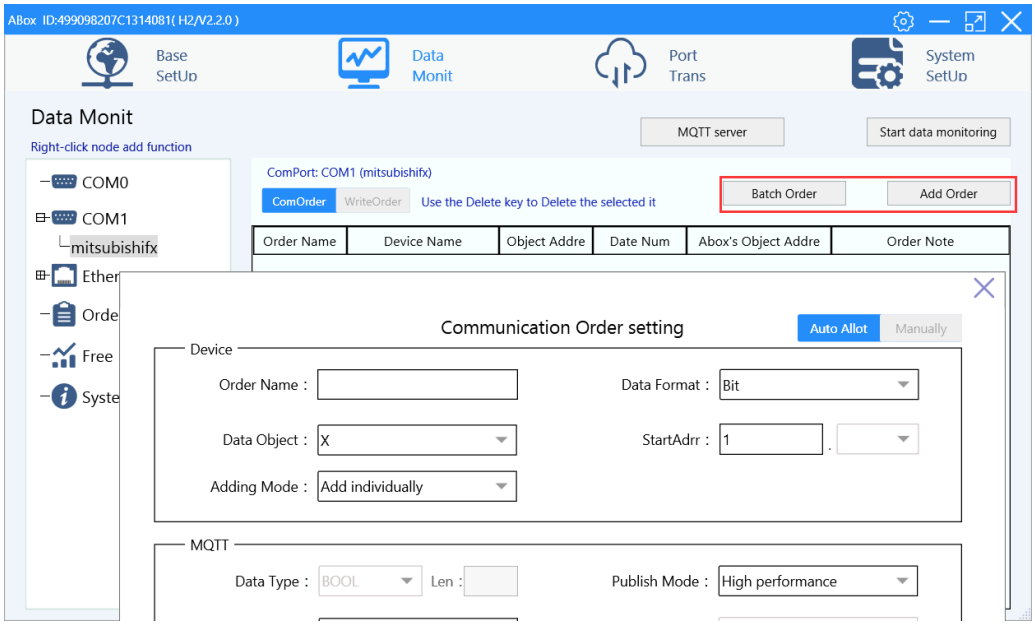
5. Right click COM1 to add device.



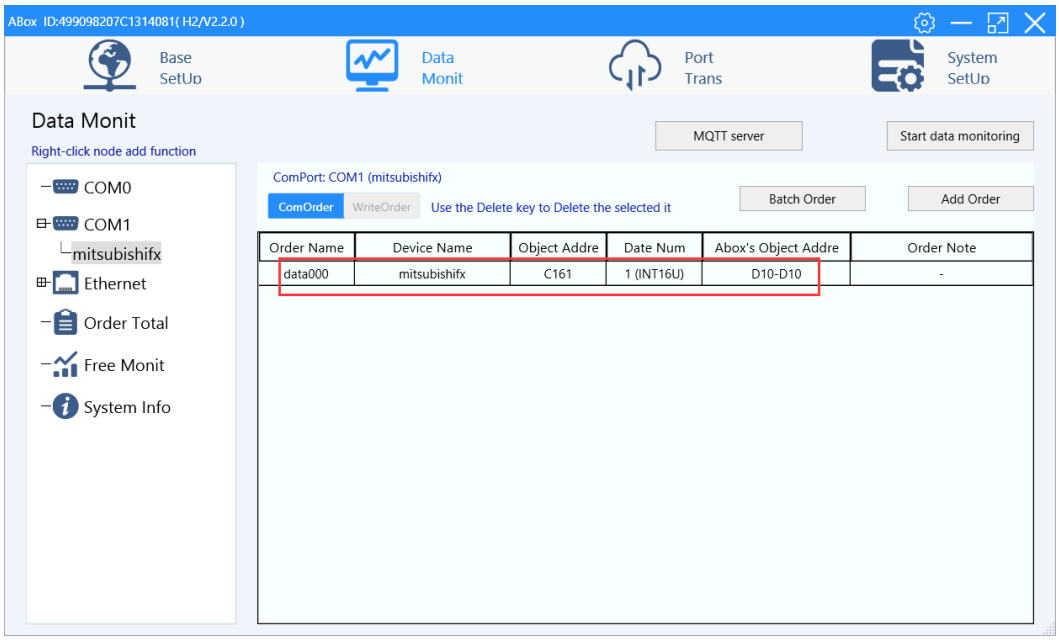
6. Specify the name of the device. The station number is 1 by default.



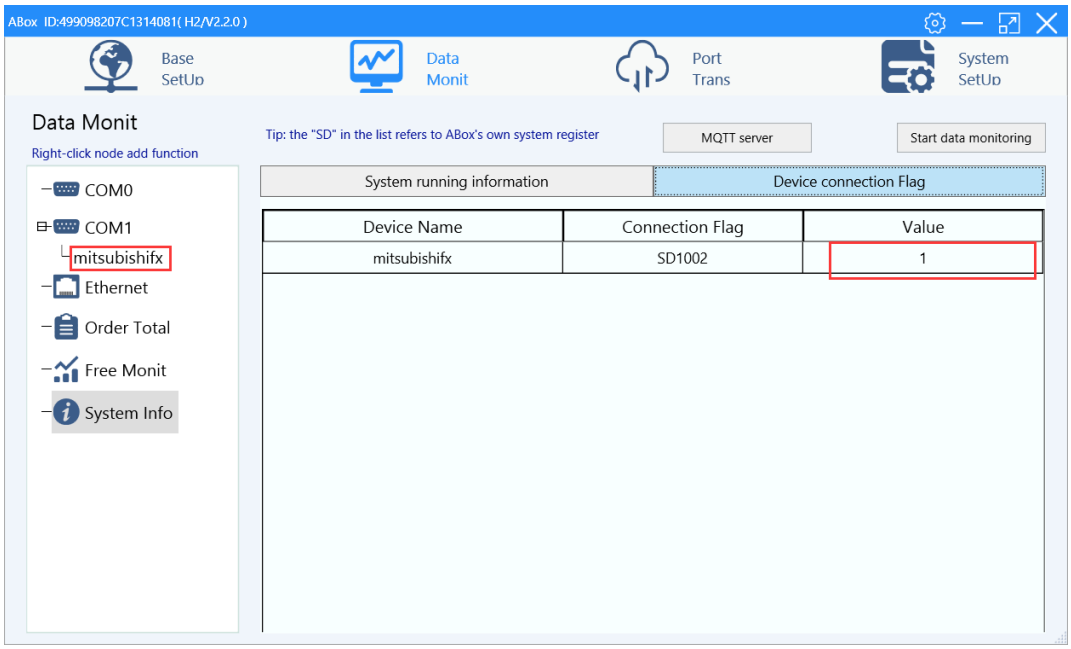
7. Select mitsubishifx, click Add order or Batch order. For Word, the number of objects cannot exceed 30.



8. After adding instructions, please monitor the corresponding A-BOX address in the Xinje Cloud.

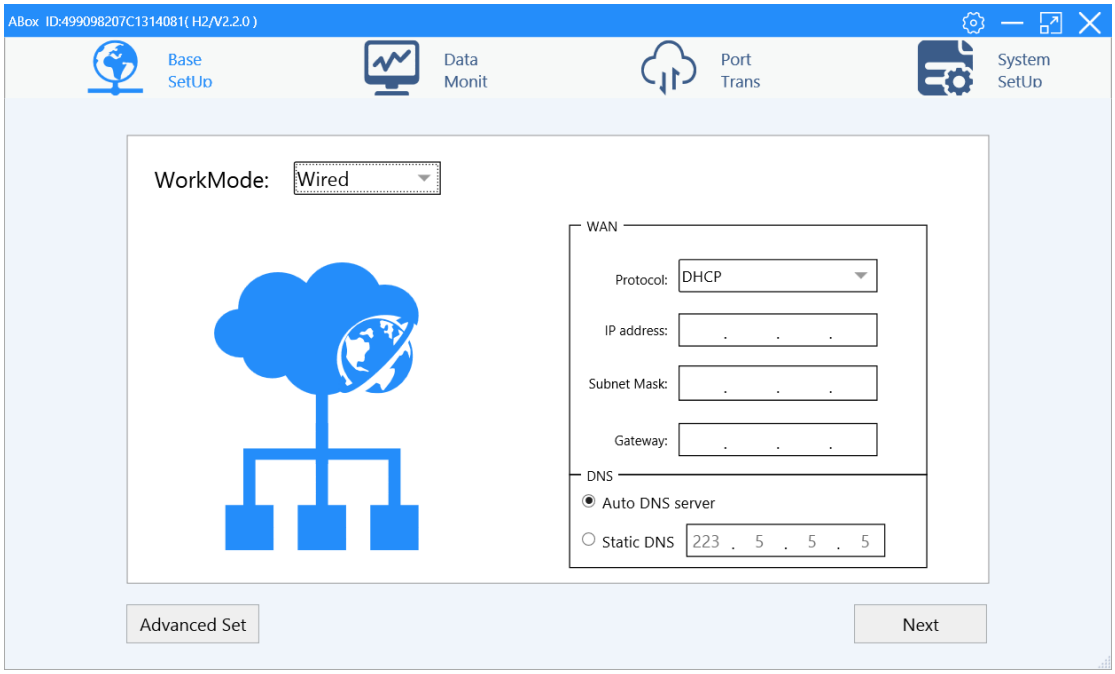


9. In "System information", check "Communication equipment connection flag" to see whether the communication between PLC and A-BOX is normal. The value is "1" when communication is normal, and the value of communication failure is "0".

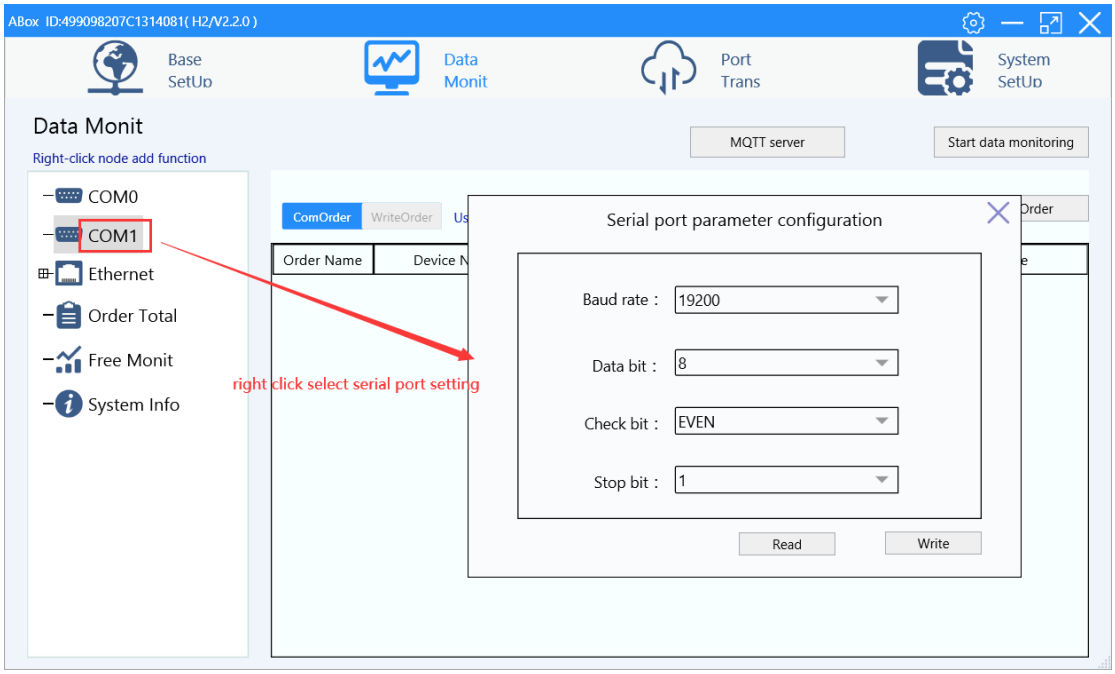


6-7. Mitsubishi FX3U/3G series serial port PLC

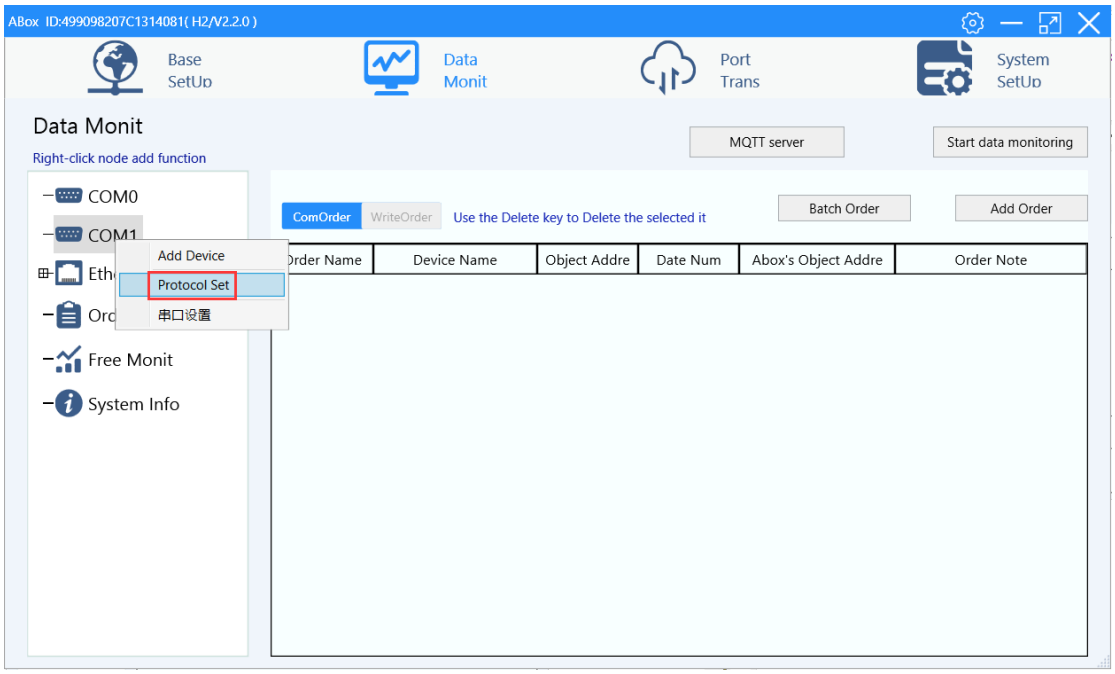
1. This case takes Mitsubishi FX3G-60M as an example. The serial port parameters are 9600, 7, 1, E. Connect the PLC and ABOX COM1 port with FX cable. The COM1 port of A-BOX supports RS422. First, connect A-BOX remotely with the configuration tool.



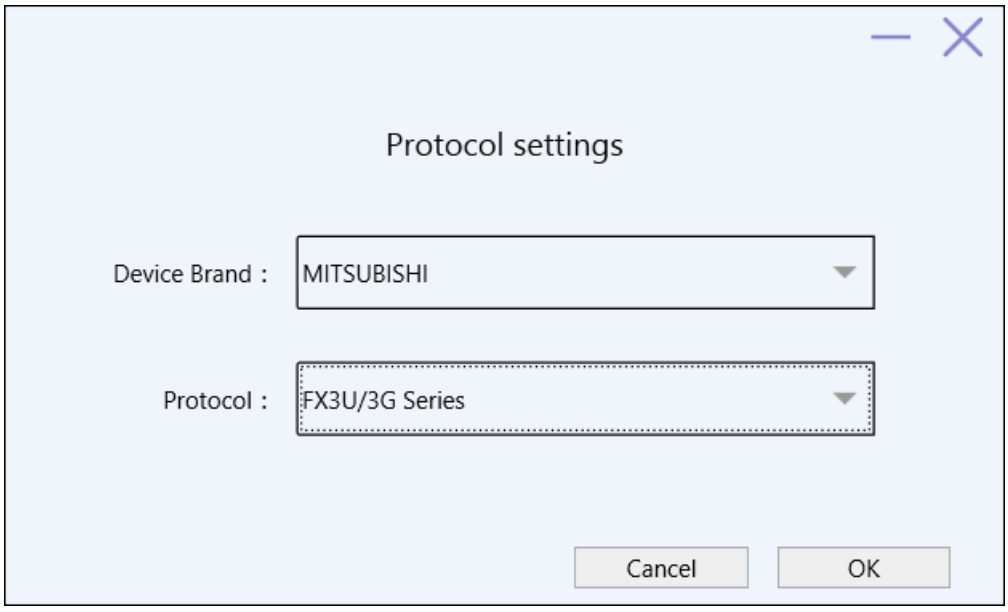
2. Modify the serial port parameters of COM1 port of A-BOX to be consistent with the PLC, and click "write" after configuration.



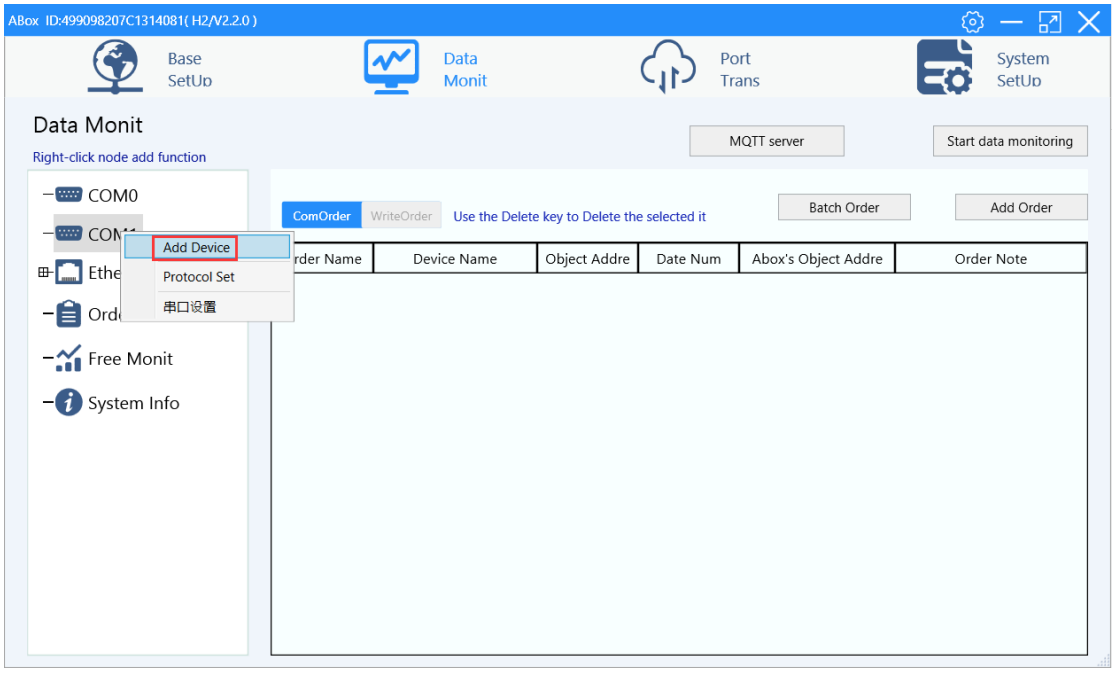
3. In "Data Monitoring", right-click "COM1" and click "Protocol Set".



4. The protocol please select Mitsubushi – FX3U/3G series.

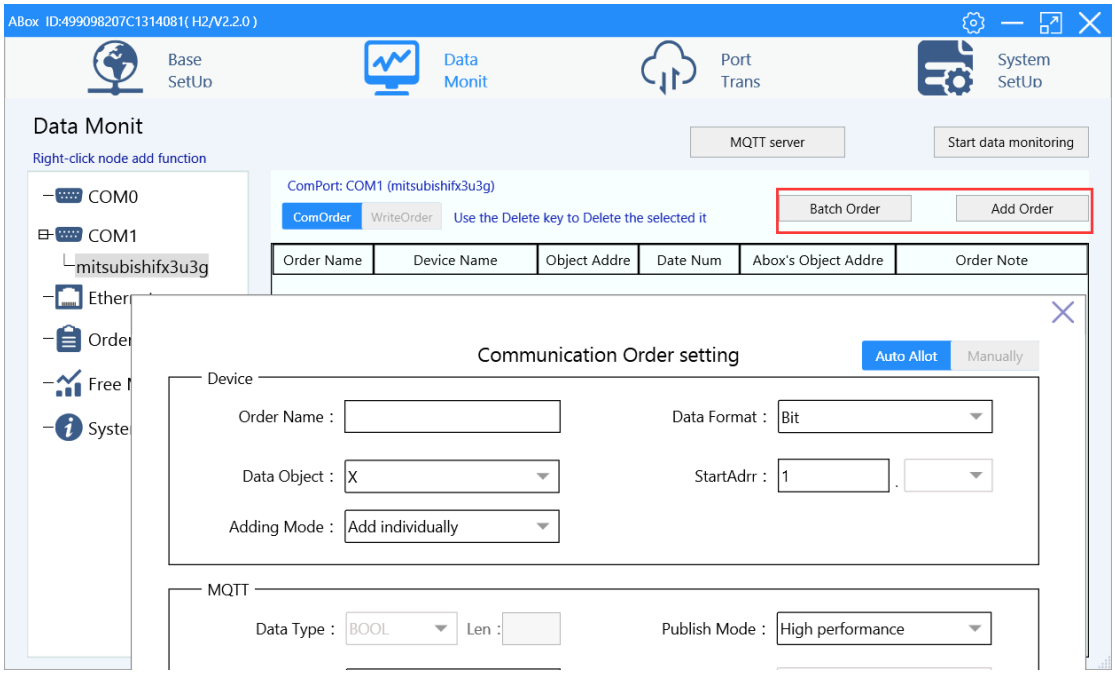


5. Right click COM1, click add device.

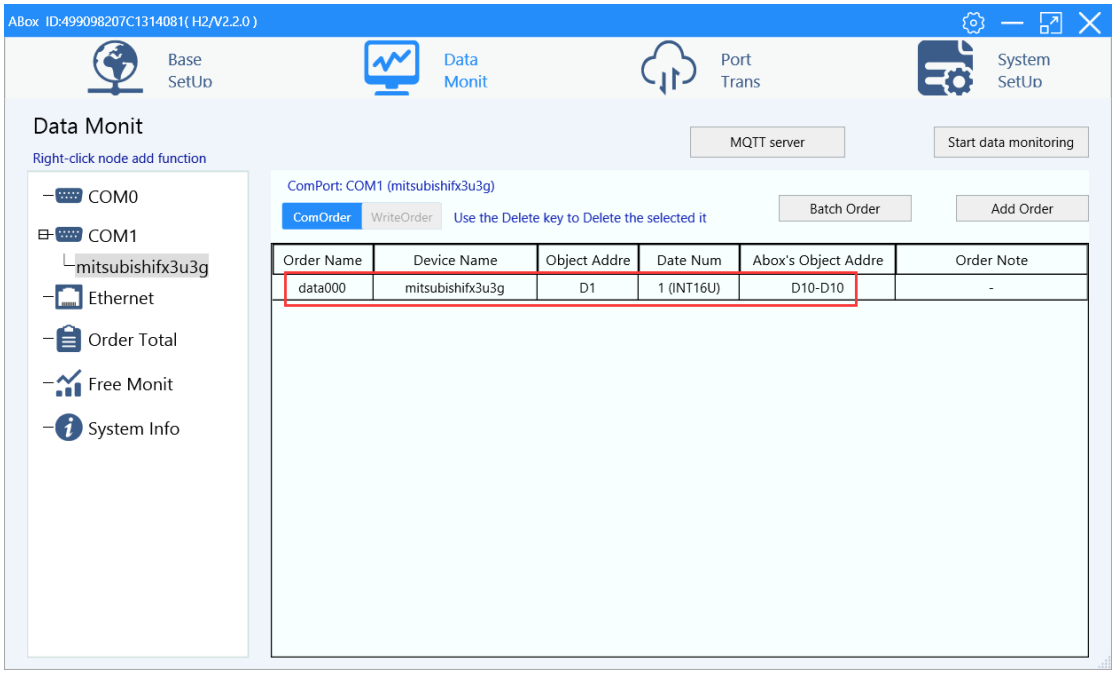


6. Fill in the device name, the station no. is 1 by default.

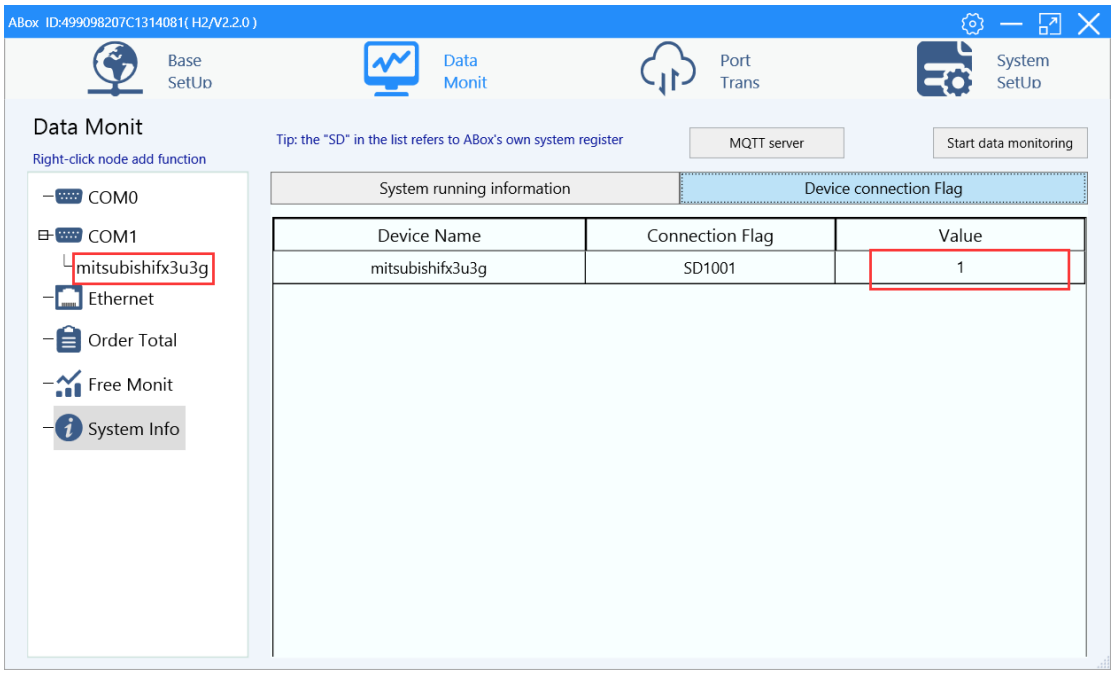
7. Select "Mitsubishi FX3U3G" and click "Add order" or "Batch order". For Word, the number of objects cannot exceed 30.



8. After adding instructions, please monitor the corresponding A-BOX address in the Xinje Cloud.

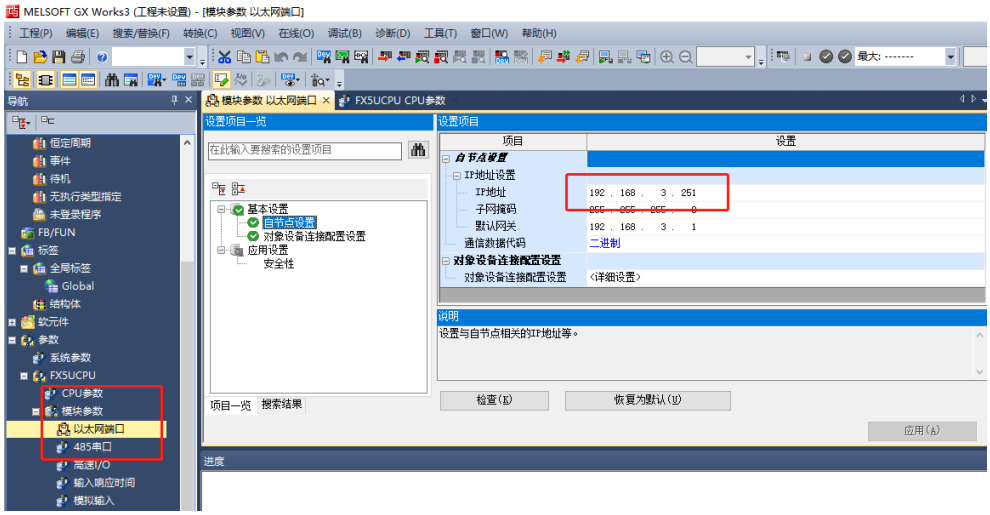


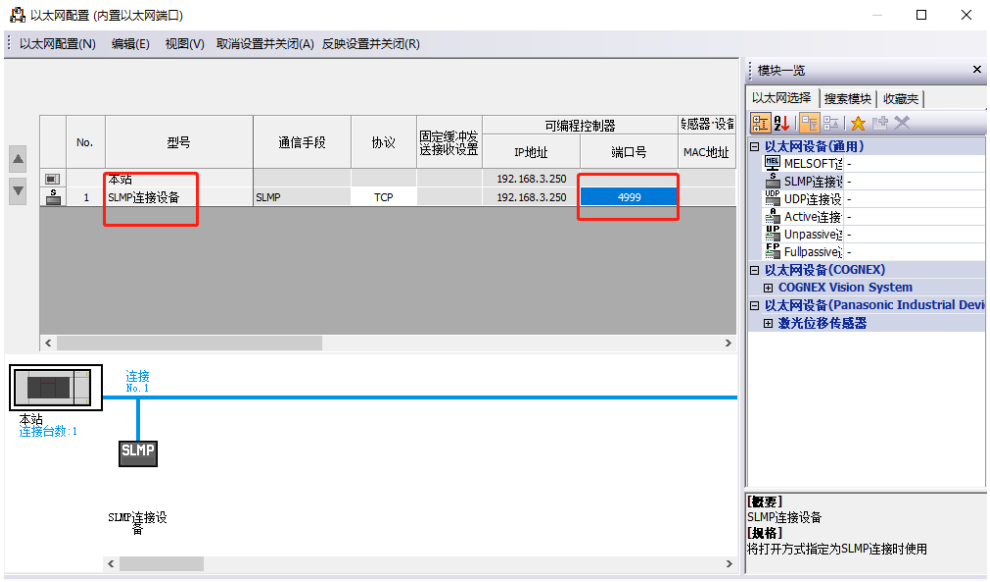
9. In "System information", check "Communication equipment connection flag" to see whether the communication between PLC and A-BOX is normal. The value is "1" when communication is normal, and the value of communication failure is "0".



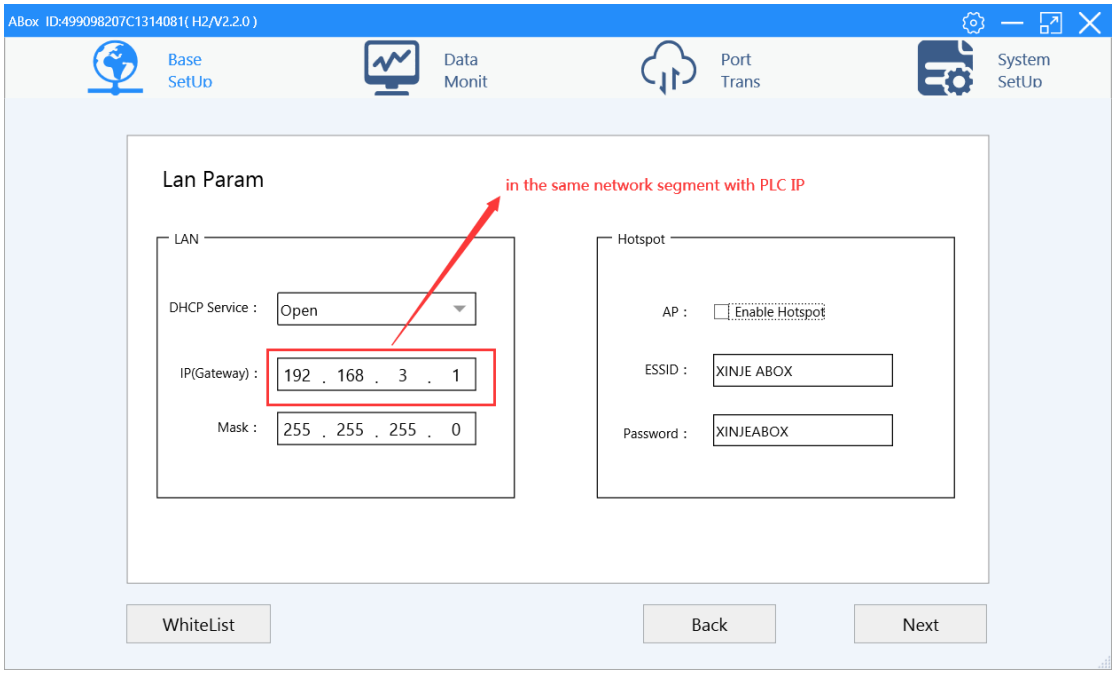
6-8. Mitsubishi FX5U Ethernet PLC

1. In this case, the PLC model is FX5U-32M. First, use the programming software to obtain the IP address of the PLC. The IP of the test PLC is 192.168.3.251. Select SLMP connection, and the port number is 4999 in this case.

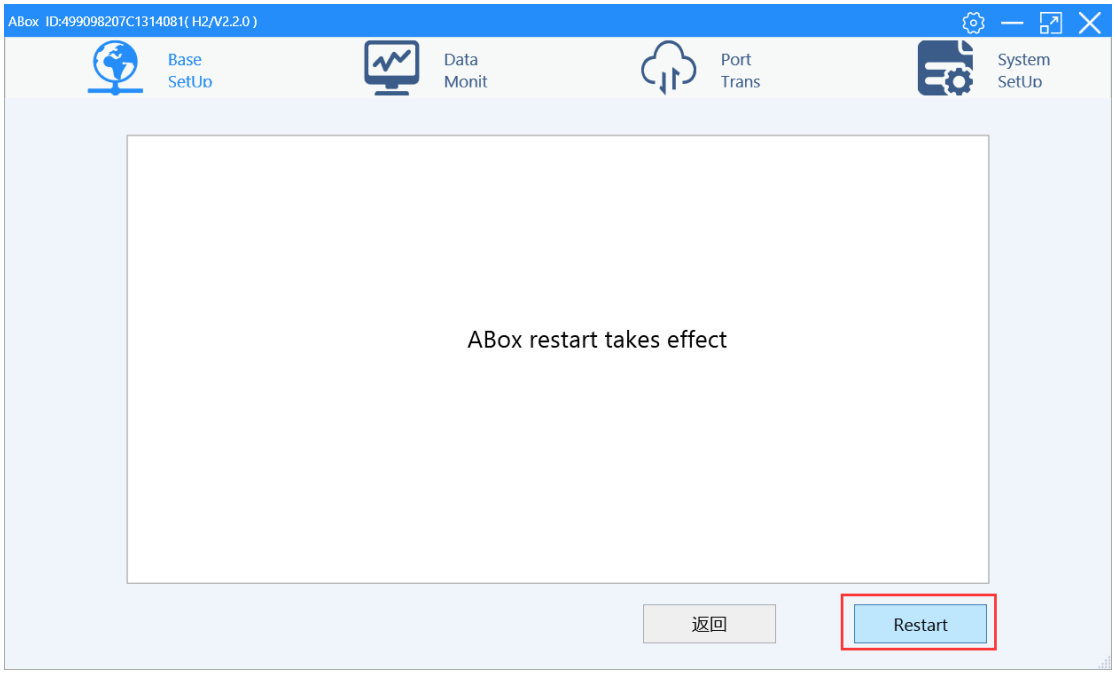




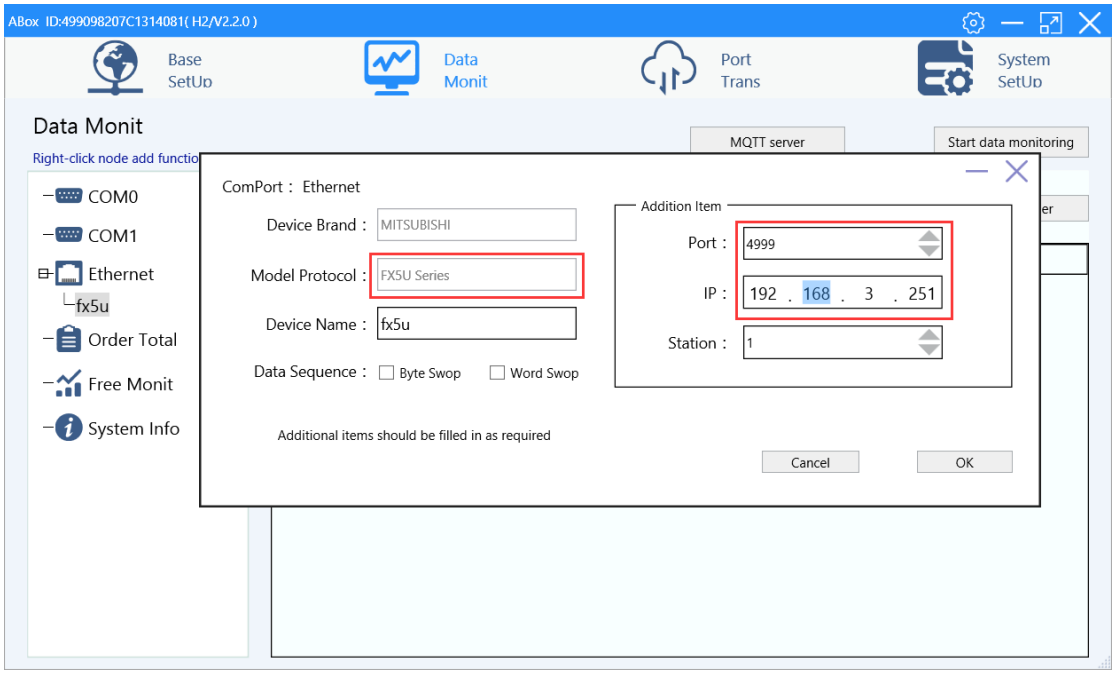
2. Use the BOX Manager to connect A-BOX. First, modify the LAN gateway of A-BOX. Make the LAN gateway of A-BOX and the IP address of PLC in the same network segment. In this case, the IP of PLC is 192.168.3.251, so the LAN gateway of A-BOX is set to 192.168.3.1.



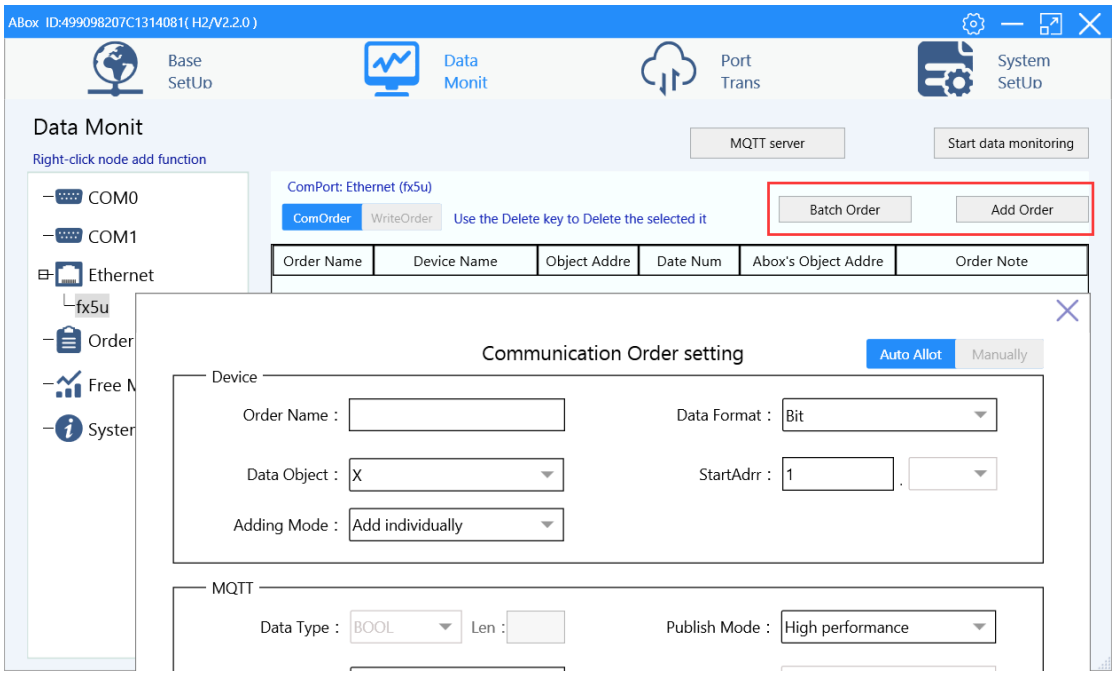
3. After setting the LAN gateway, restart the module at the last step.



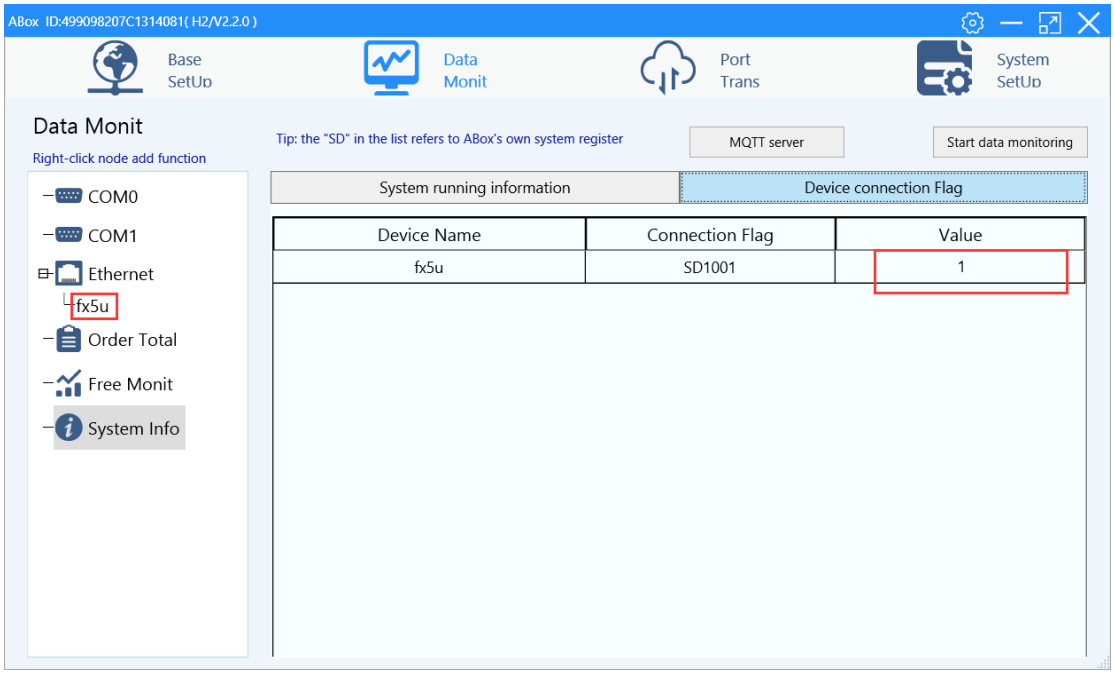
4. In "Data Monitoring", right-click "Ethernet" to add a device, select FX5U series as the model, 4999 as the port number of the PLC, and fill in the IP address of the PLC.



5. Select "FX5U" and click "Add order" or "Batch order". Configure the mapping relationship between PLC address and A-BOX address. Click "Start Data Monitoring" after adding.

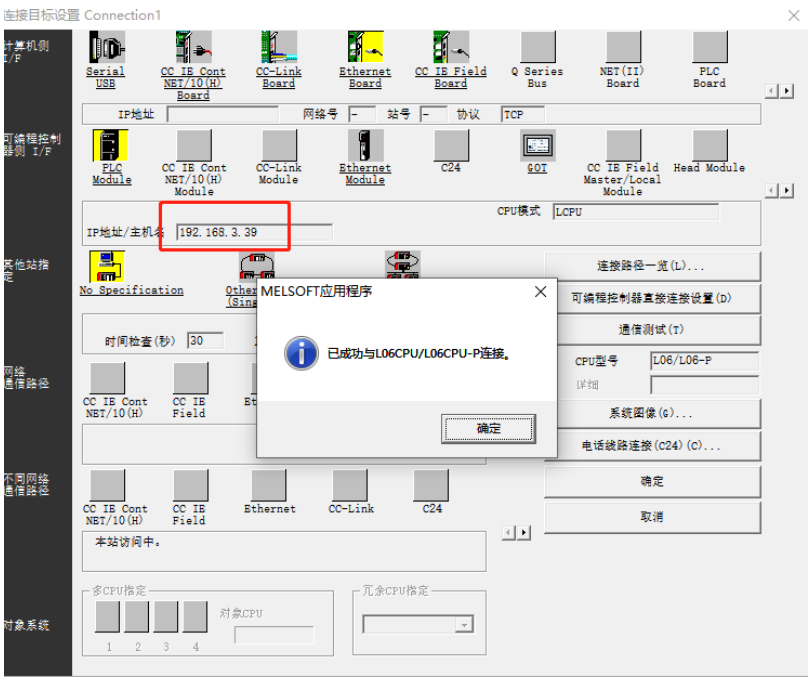


6. In "System information", check "Communication equipment connection flag" to see whether the communication between PLC and A-BOX is normal. The value is "1" when communication is normal, and the value of communication failure is "0".



6-9. Mitsubishi Q series Ethernet PLC

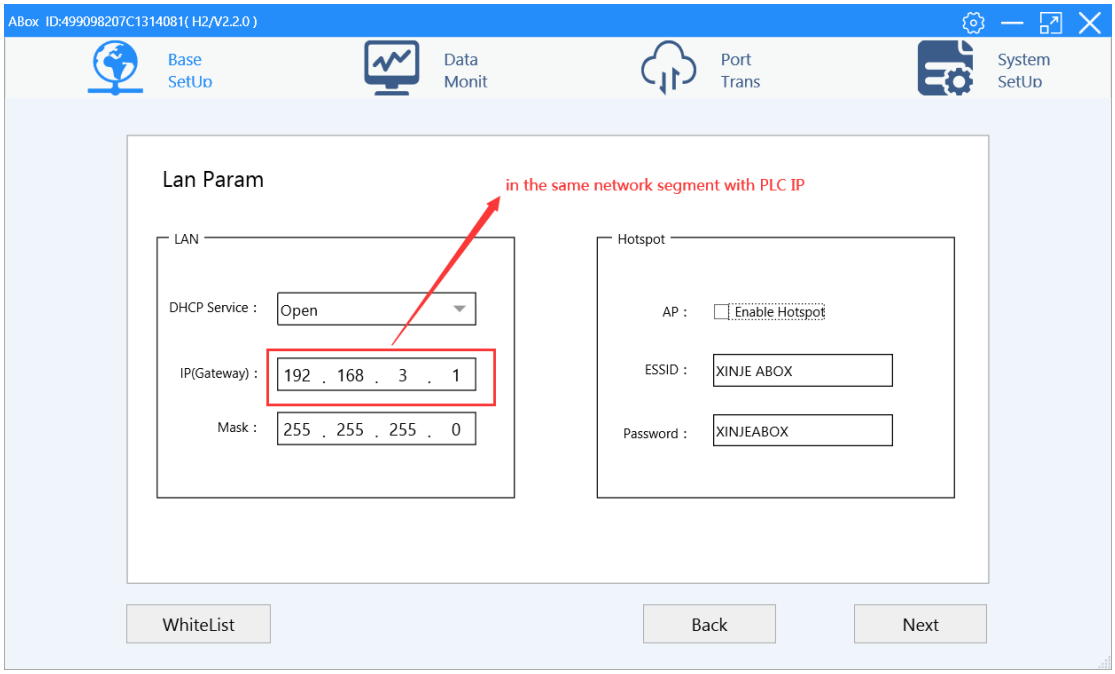
1. The PLC model in this case is Q03UDVCPU. First, use GX Works2 to connect to the PLC. The IP address of the PLC is 192.168.3.39.



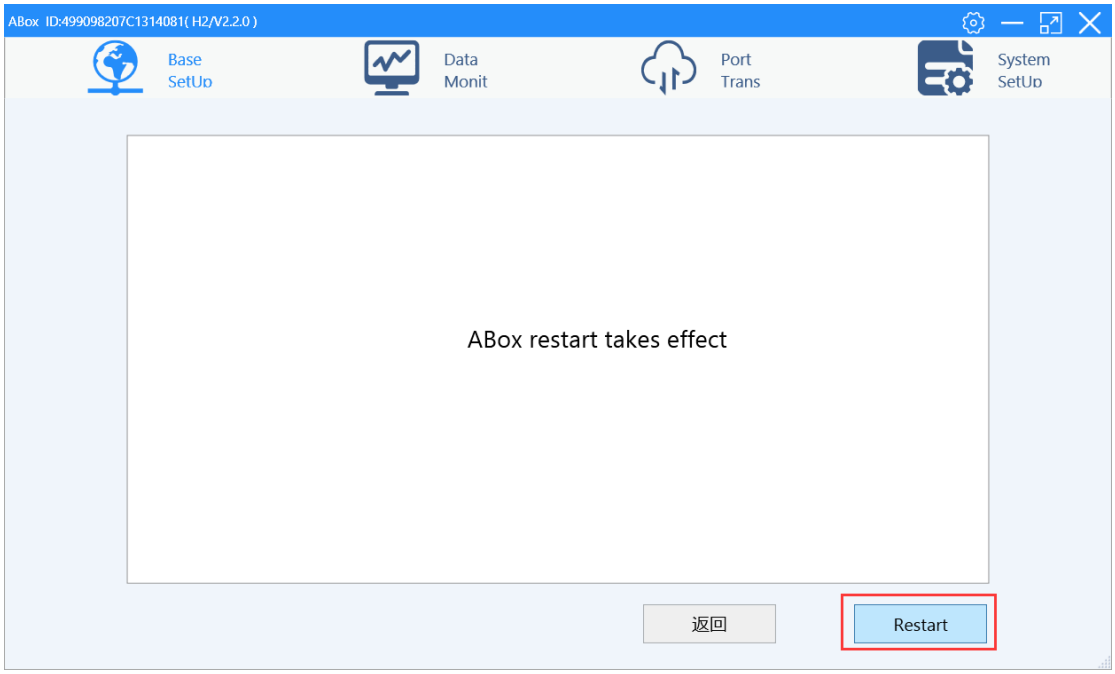
2. Find "Built in Ethernet Settings" in "PLC Parameters" and click "Open Settings".

3. Select TCP for "Protocol", select MC for "Opening Method", and fill in 1025 for "Local Port Number". The port number can be set arbitrarily. After setting, download the parameters to PLC. Power off and restart PLC to take effect.

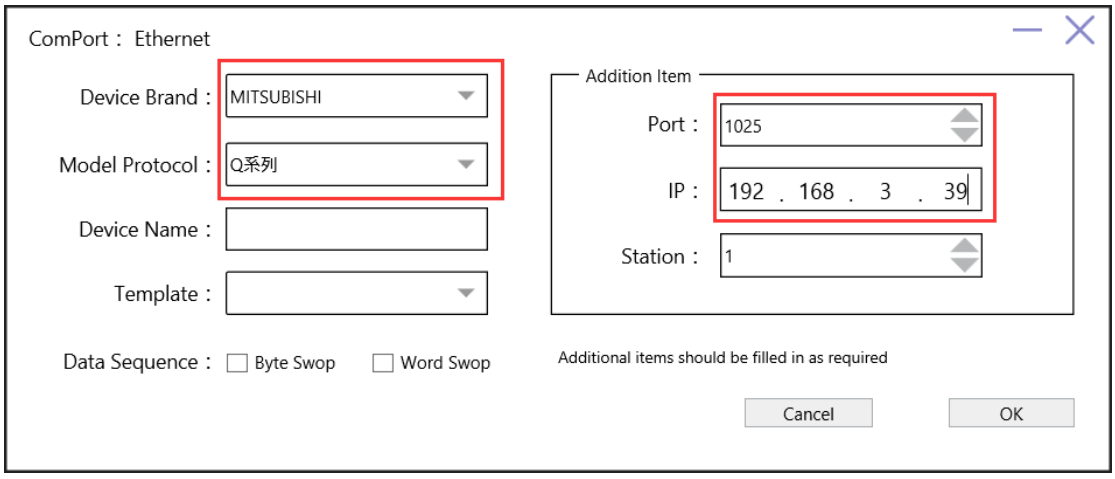
4. Use the BOX Manager to connect A-BOX. First, modify the LAN gateway of A-BOX. Make the LAN gateway of A-BOX and the IP address of PLC in the same network segment. In this case, the IP of PLC is 192.168.3.39, so the LAN gateway of A-BOX is set to 192.168.3.1.



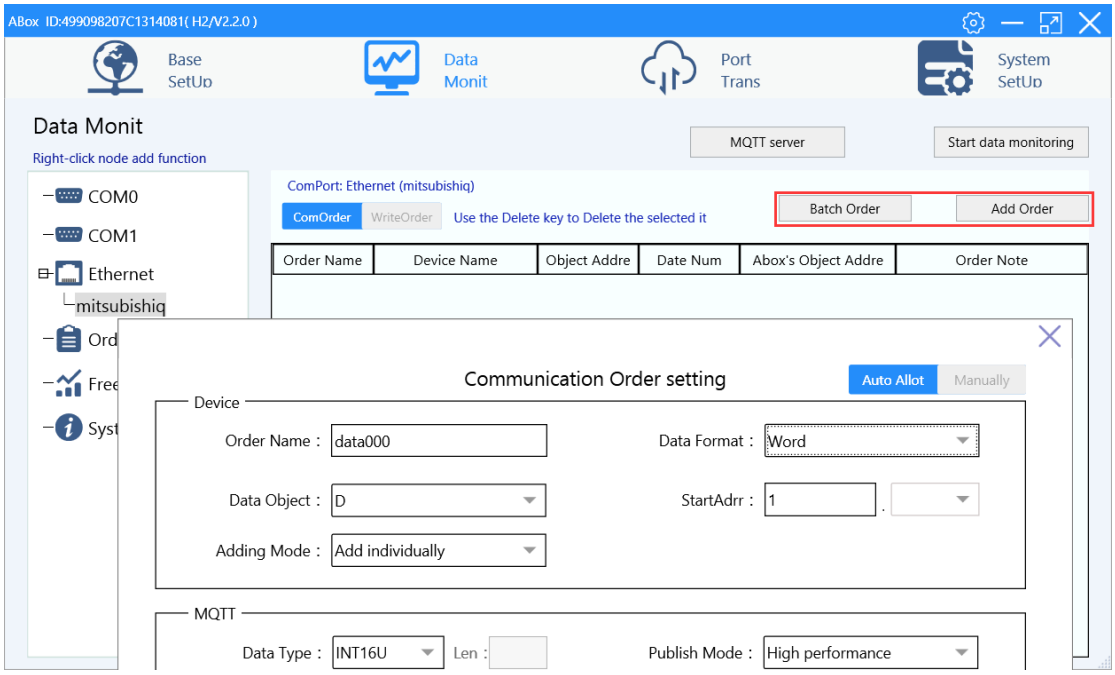
5. After setting the LAN gateway, restart the module at the last step.



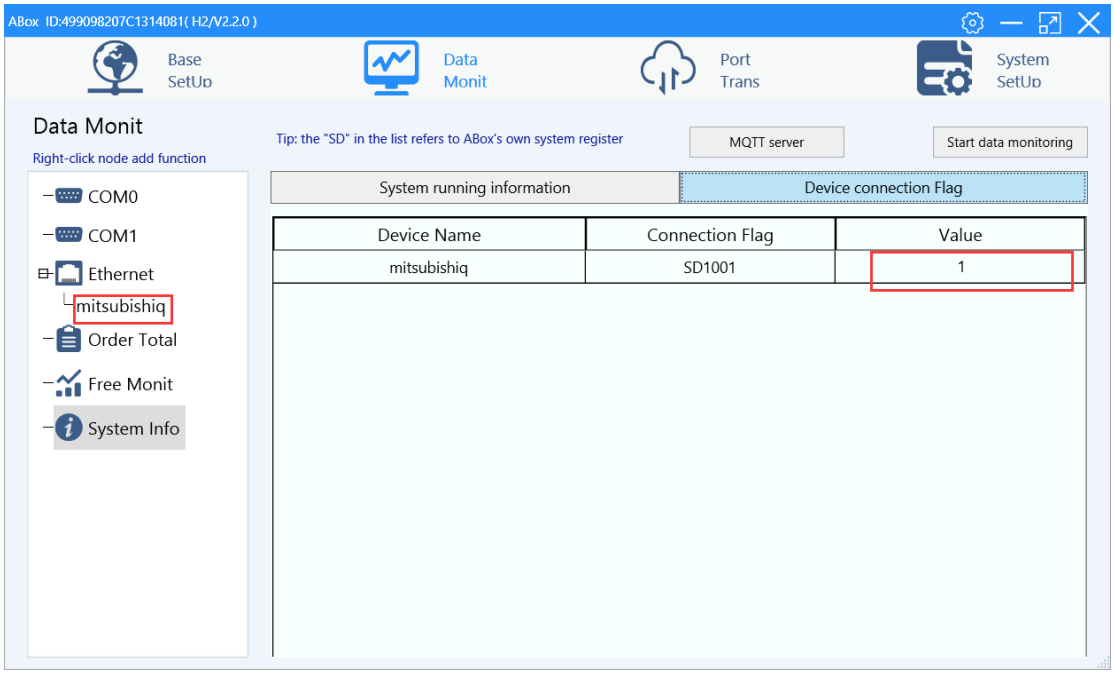
6. In "Data Monitoring", right-click "Ethernet" to add a device, select Q series as the model, fill in the port number set in GX Works2 for the port number, and fill in the IP address of the PLC.



7. Select "Mitsubishiq" and click "Add order" or "Batch order". Configure the mapping relationship between PLC address and A-BOX address. Click "Start Data Monitoring" after adding.

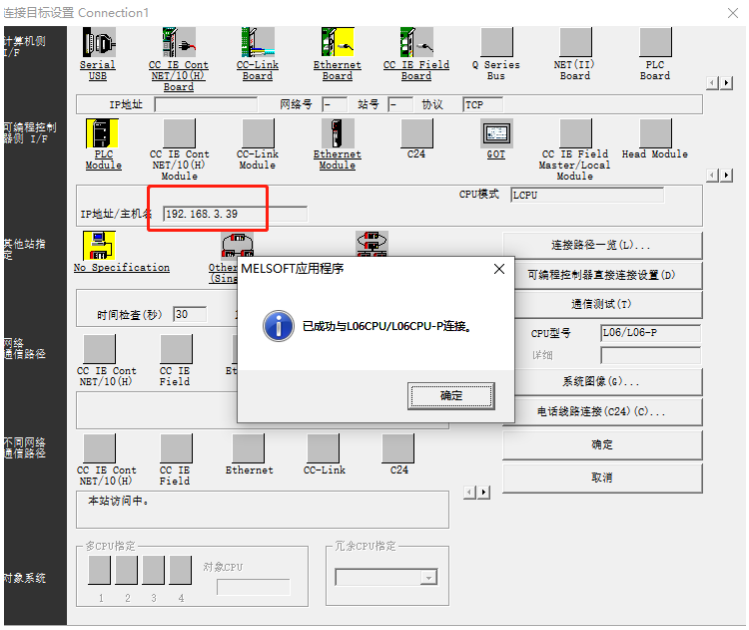


8. In "System information", check "Communication equipment connection flag" to see whether the communication between PLC and A-BOX is normal. The value is "1" when communication is normal, and the value of communication failure is "0".



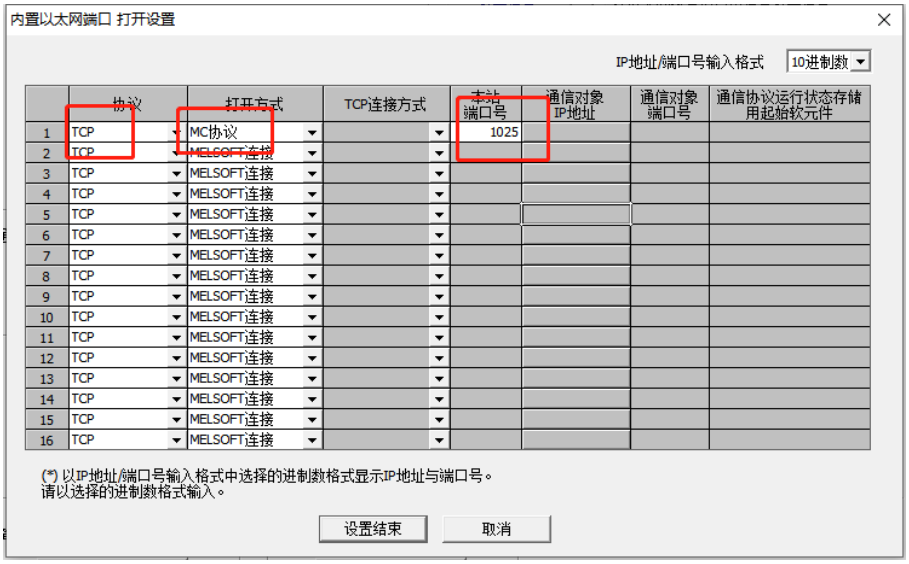
6-10. Mitsubishi L series Ethernet PLC

1. The PLC model in this case is L06CPU-CM. First, use GX Works2 to connect to the PLC. The IP address of the PLC is 192.168.3.39.

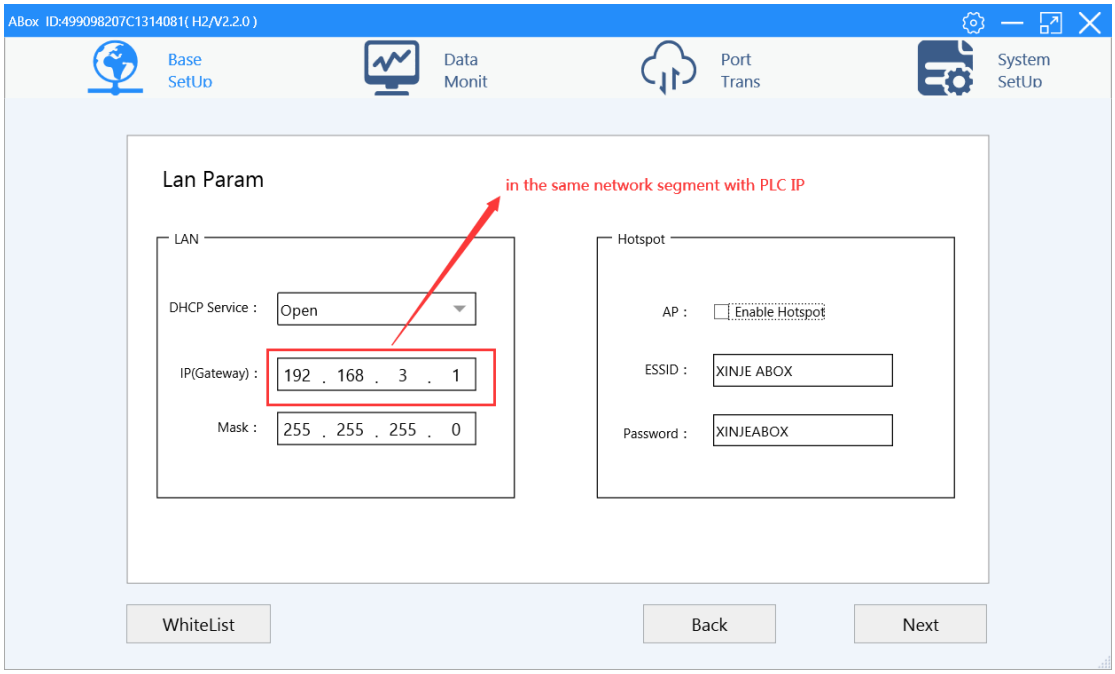


2. Find "Built in Ethernet Settings" in "PLC Parameters" and click "Open Settings".

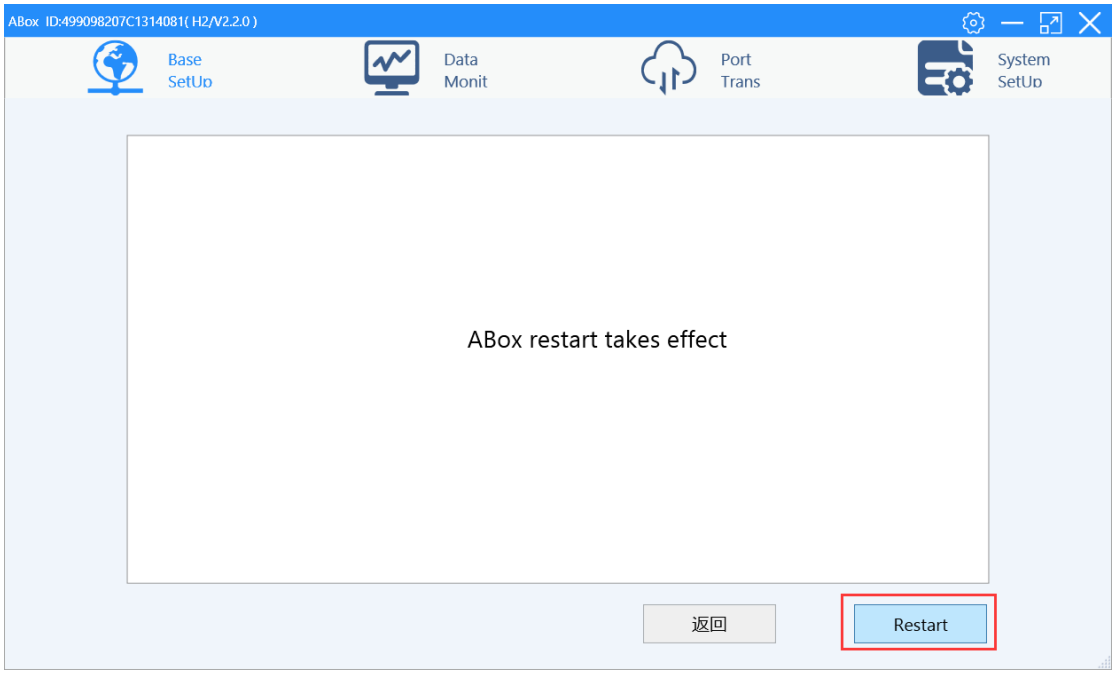
3. Select TCP for "Protocol", select MC for "Opening Method", and fill in 1025 for "Local Port Number". The port number can be set arbitrarily. After setting, download the parameters to PLC. Power off and restart PLC to take effect.



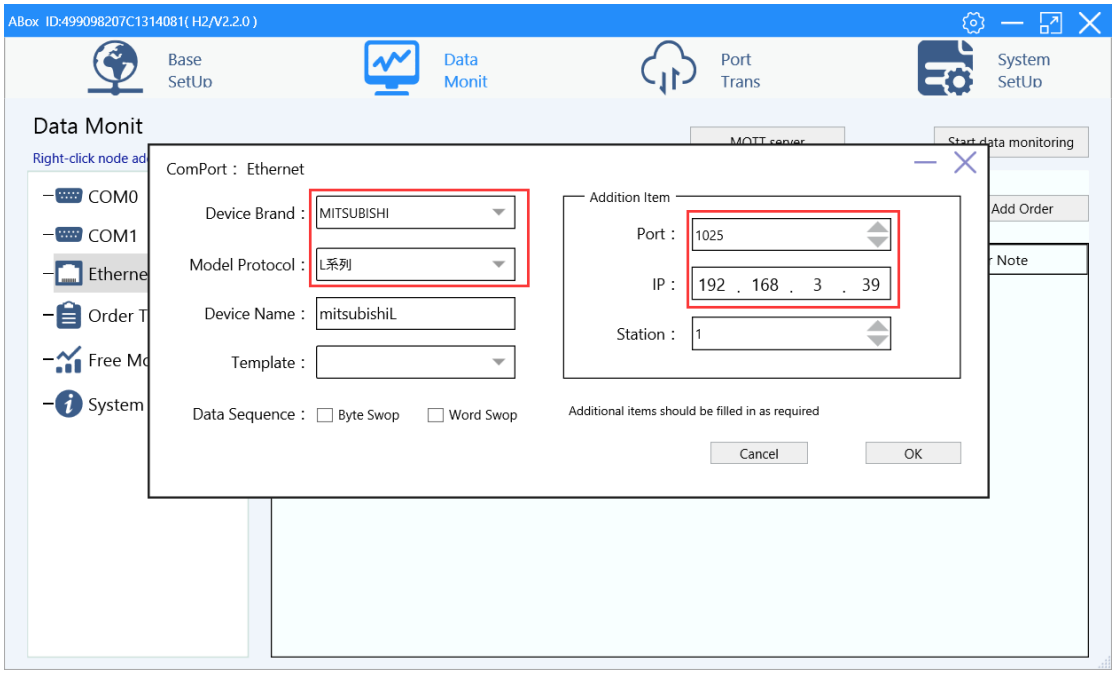
4. Use the BOX Manager to connect A-BOX. First, modify the LAN gateway of A-BOX. Make the LAN gateway of A-BOX and the IP address of PLC in the same network segment. In this case, the IP of PLC is 192.168.3.39, so the LAN gateway of A-BOX is set to 192.168.3.1.



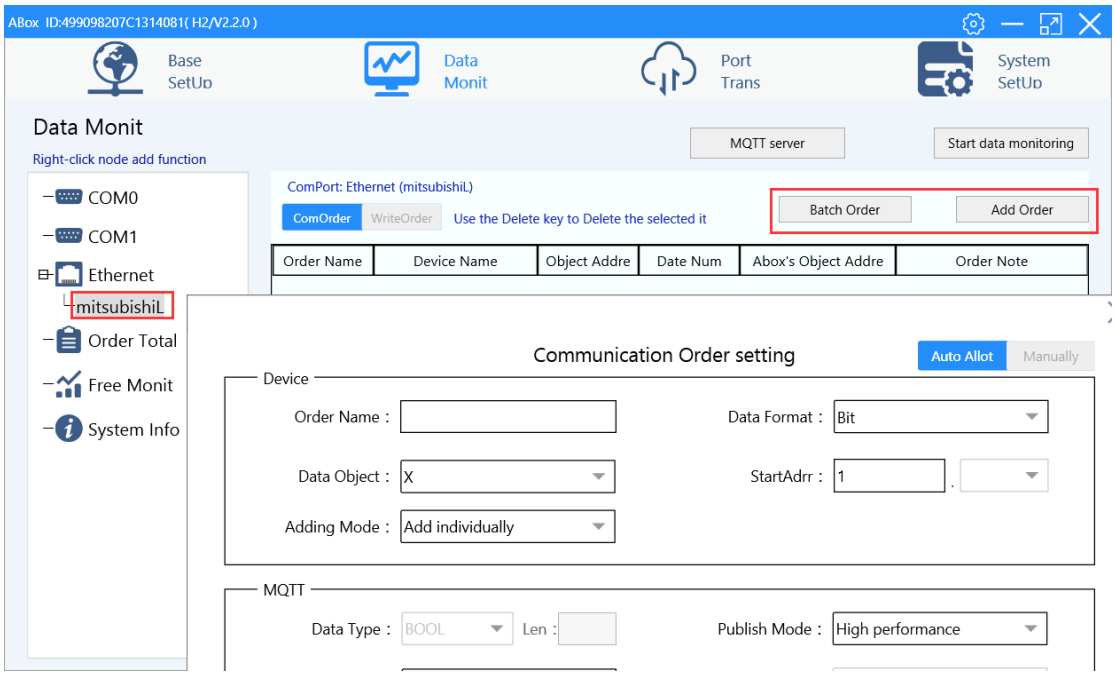
5. After setting the LAN gateway, restart the module at the last step.



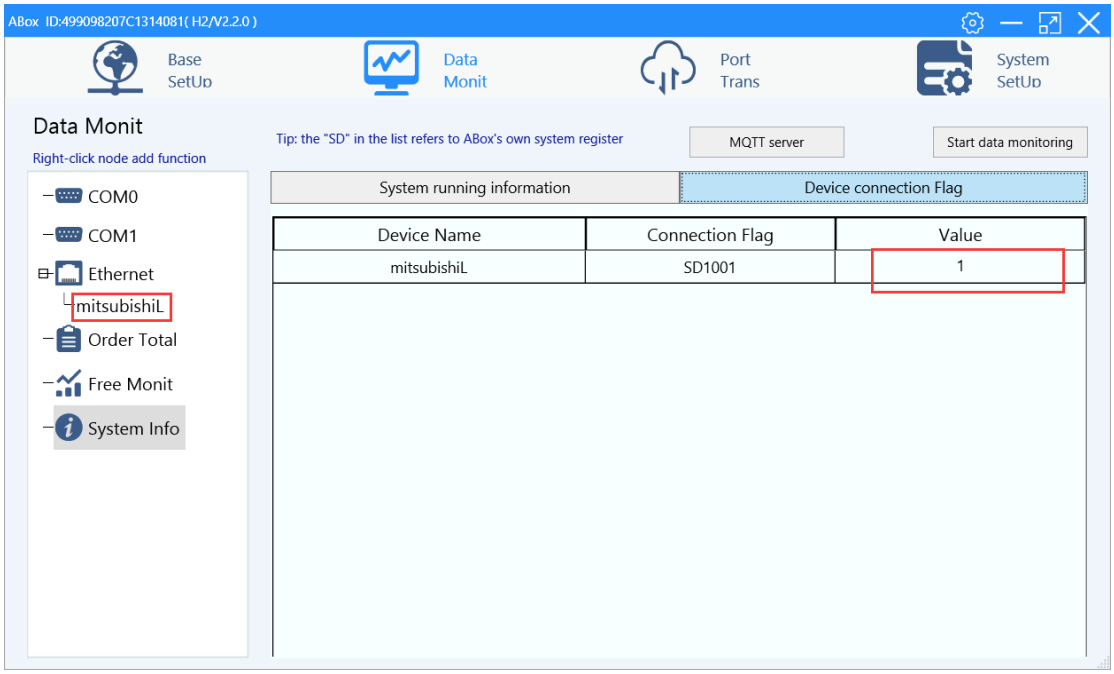
6. In "Data Monitoring", right-click "Ethernet" to add a device, select L series as the model, fill in the port number set in GX Works2 for the port number, and fill in the IP address of the PLC.



7. Select the added device, click Add order, and configure the mapping relationship between PLC address and A-BOX address. Click "Start Data Monitoring" after adding.

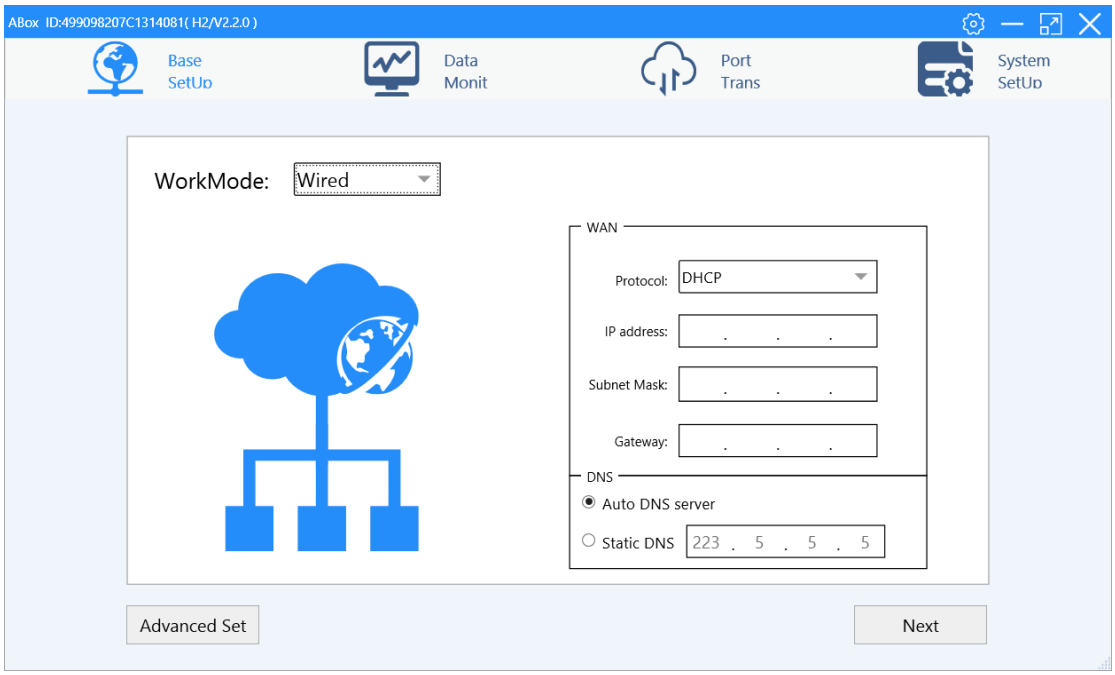


8. In "System information", check "Communication equipment connection flag" to see whether the communication between PLC and A-BOX is normal. The value is "1" when communication is normal, and the value of communication failure is "0".

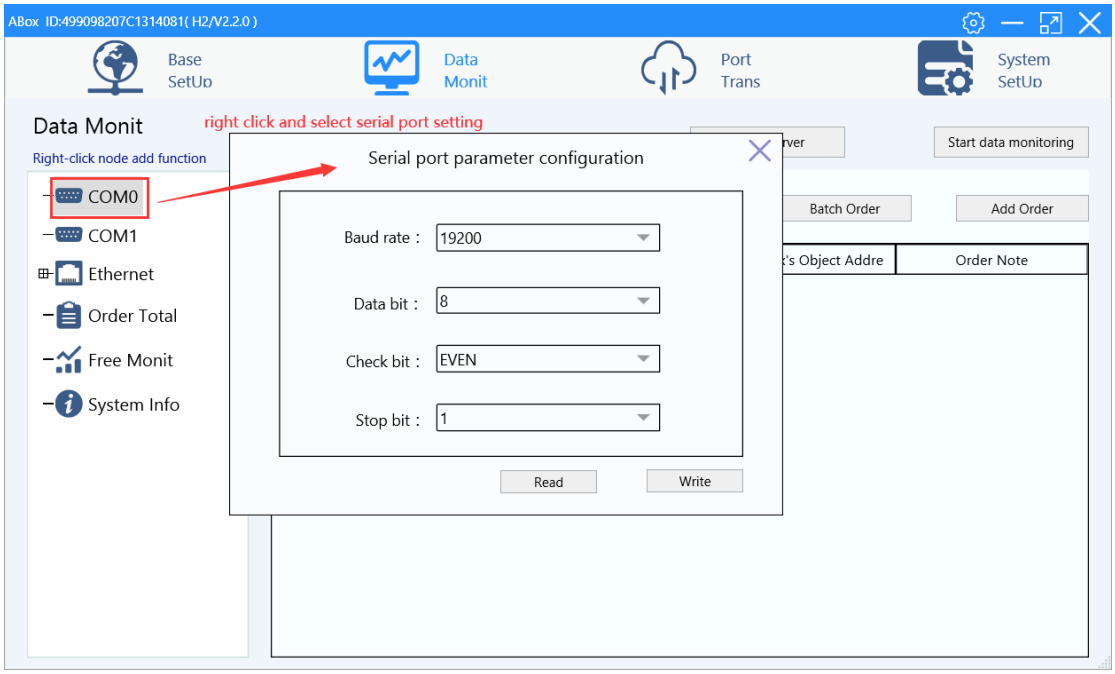


6-11. Xinje XC series serial port PLC

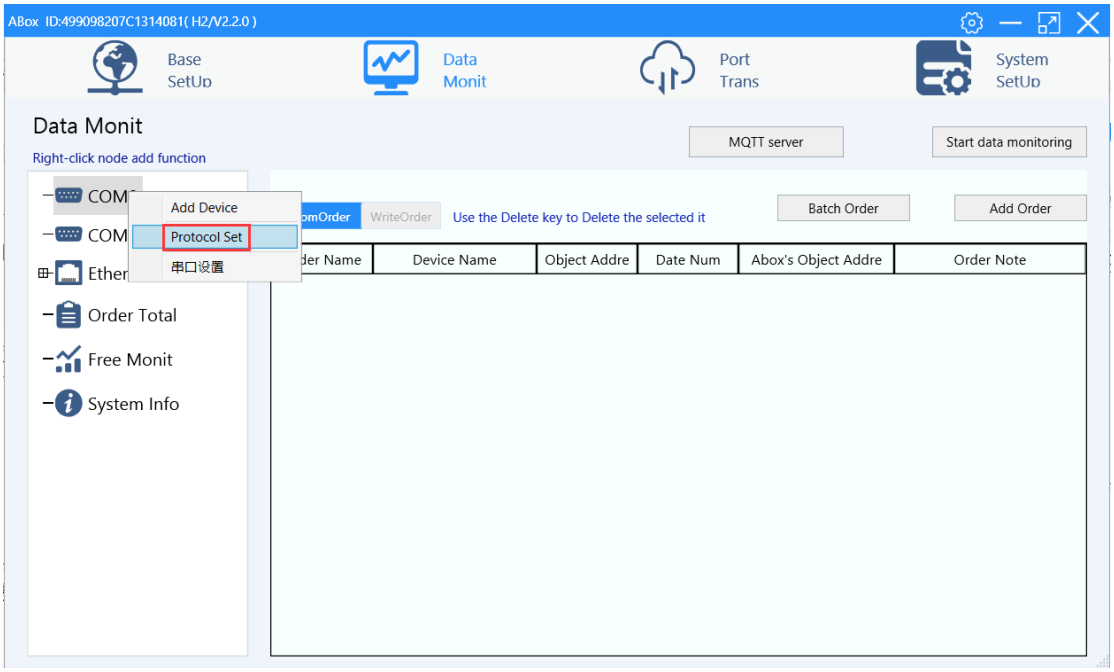
1. In this case, Xinje XC3-24R-E is taken as an example. Serial port parameters are 19200,8,1, E. DVP programming cables are used to connect to COM0 or COM1 port of A-BOX (here COM0 port is taken as an example). COM0 and COM1 ports support RS232 and RS485. First, connect A-BOX remotely with the configuration tool.



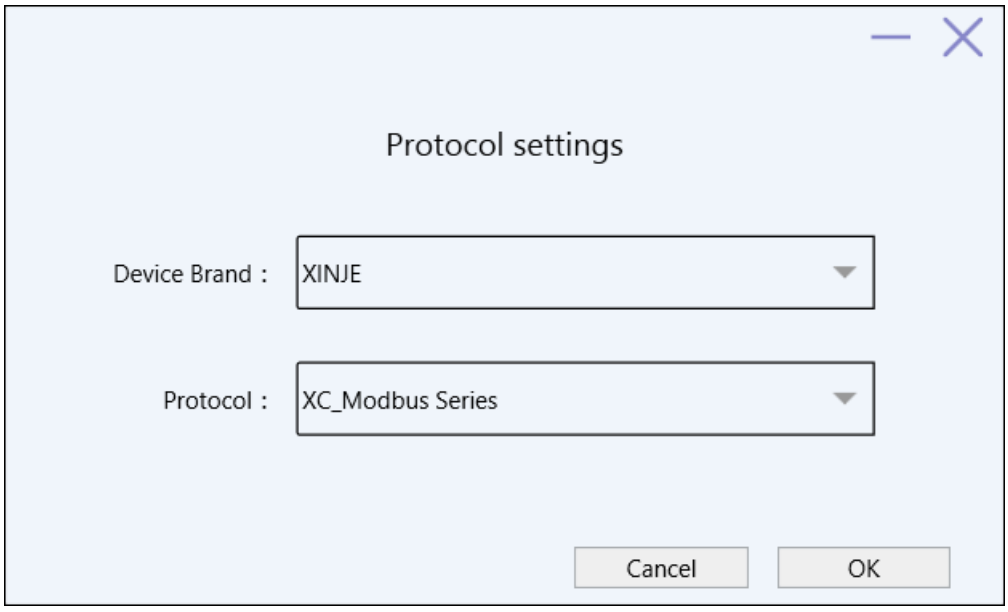
2. Modify the serial port parameters of COM0 port of A-BOX, which are consistent with the parameters of the connected PLC serial port. Click "Write" after the configuration is completed.



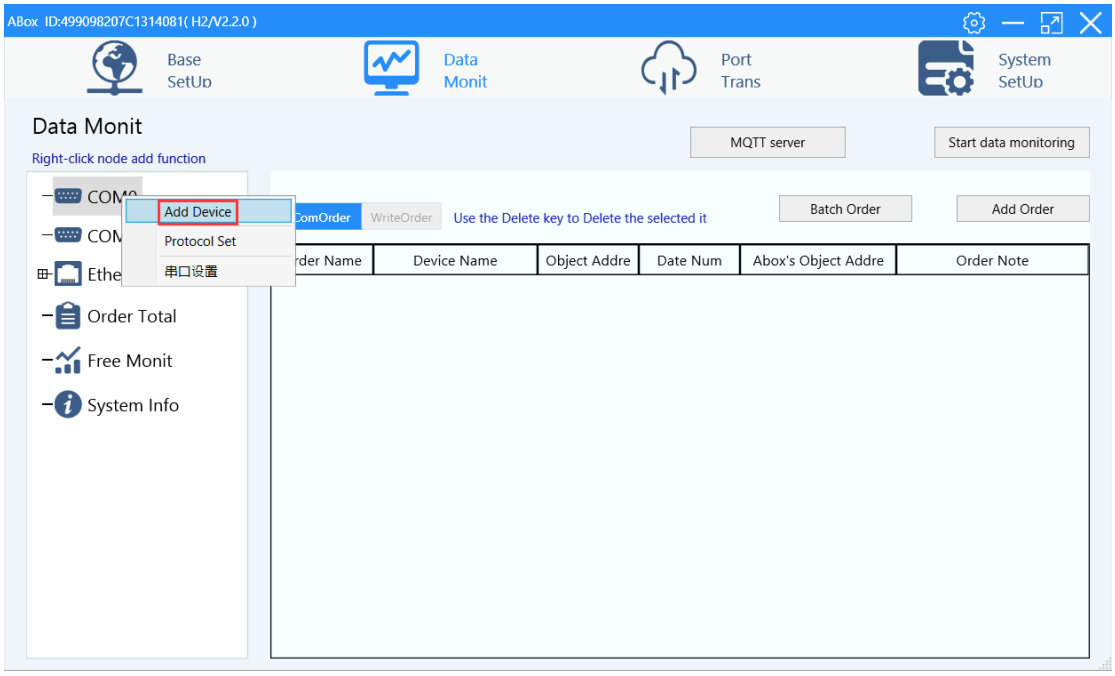
3. In "Data Monitoring", right-click "COM0" and click "Protocol Set".



4. Communication protocol please select "Xinje" - "XC_Modbus series".

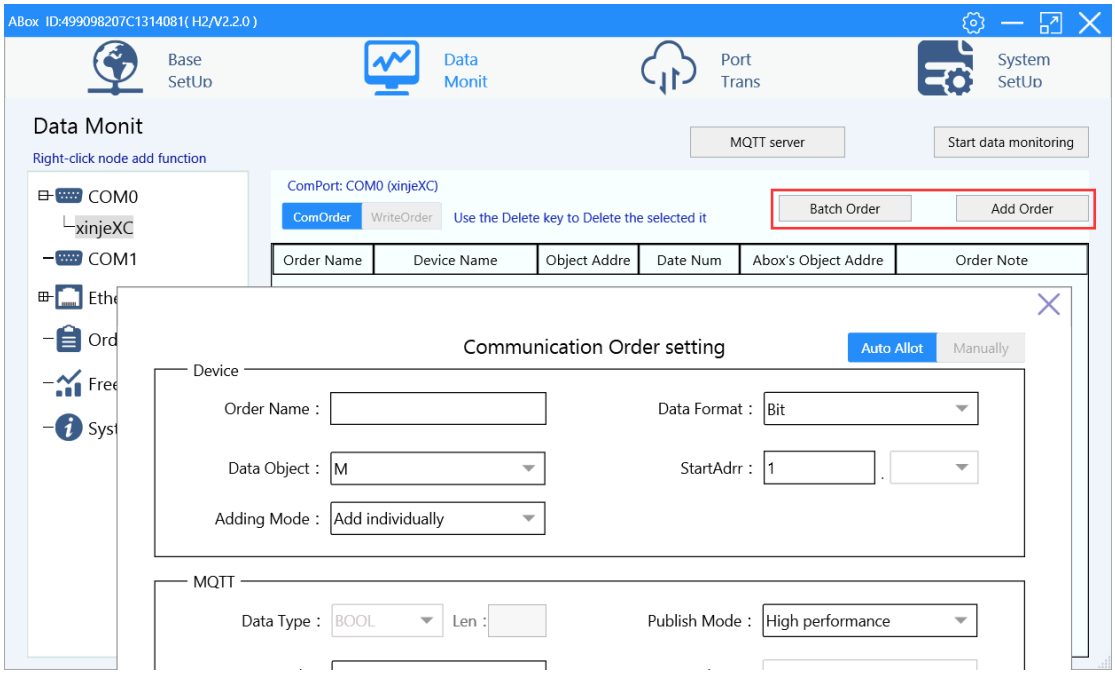


5. Right click COM0, click add device.

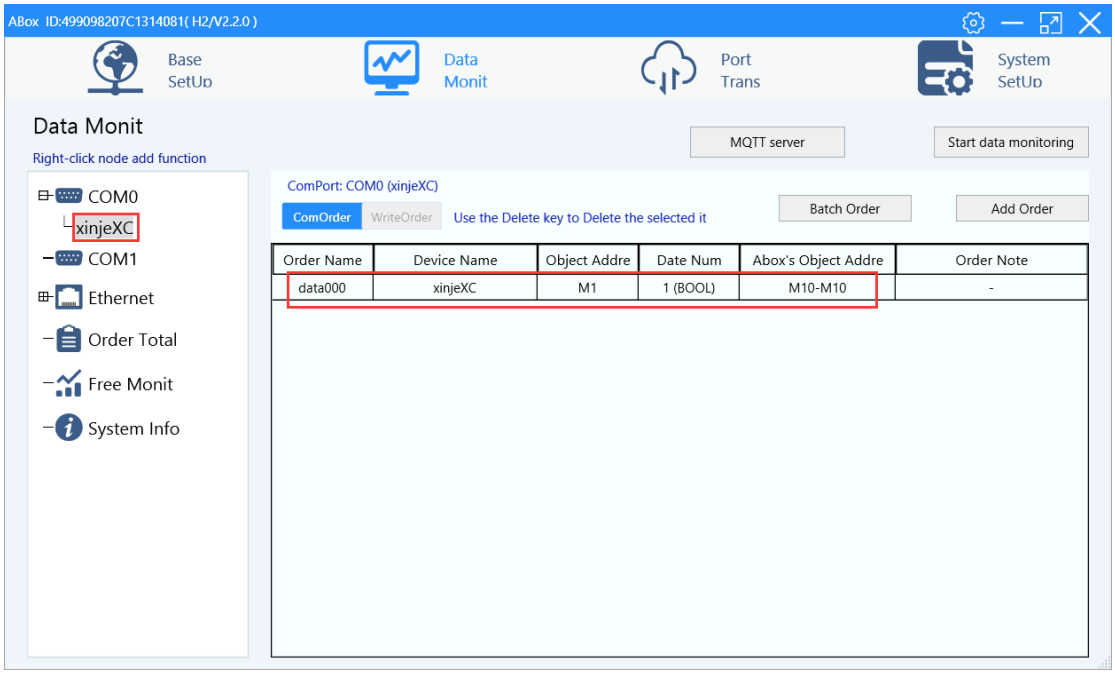


6. Specify the name, station number and connection flag of the equipment, and the station number shall be consistent with that of the PLC serial port.

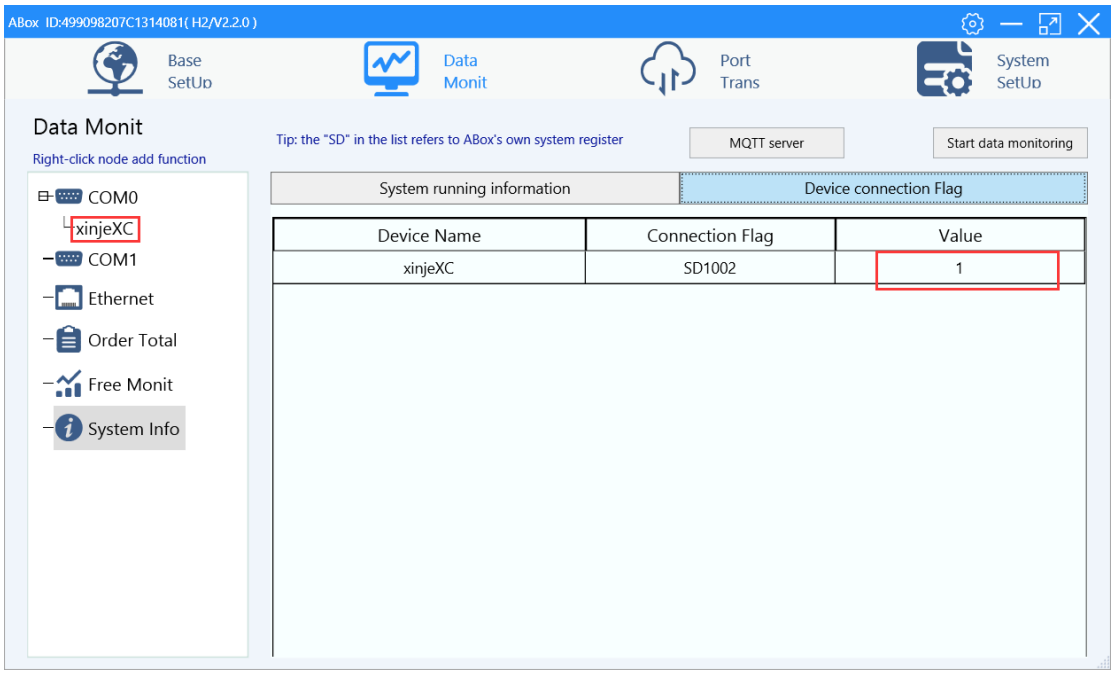
7. Select "XinjeXC" and click "Add order" or "Batch order". For "bit", the number of objects cannot exceed 100. For "word", the number of objects cannot exceed 50.



8. After adding instructions, please monitor the corresponding A-BOX address on the Xinje Cloud.

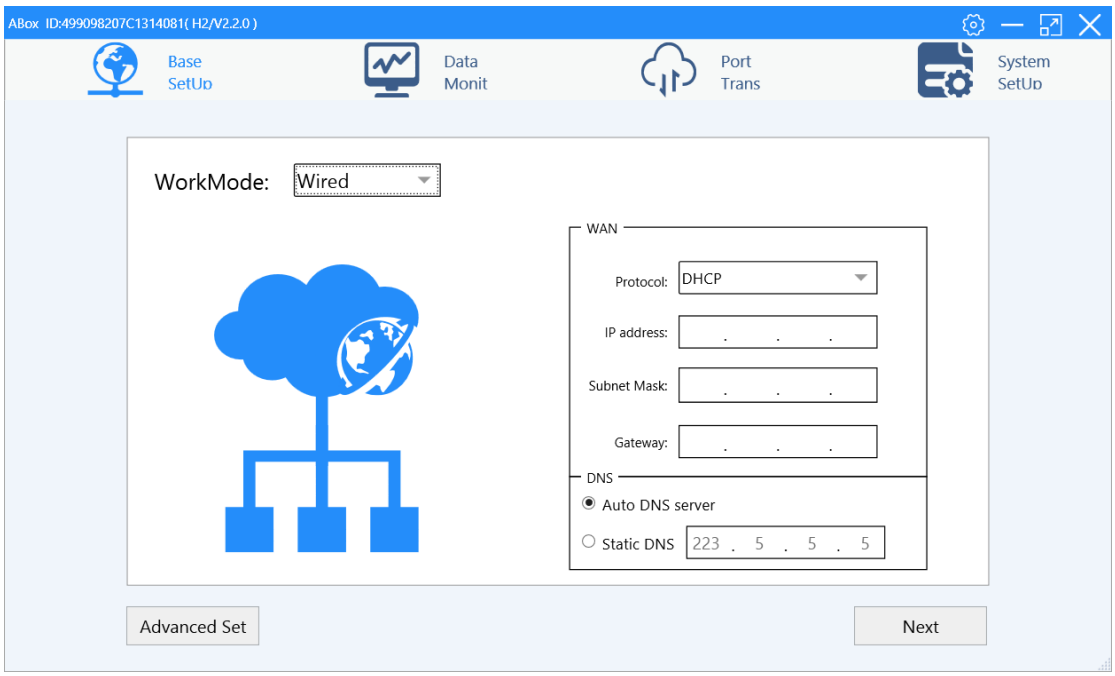


9. In "System information", check "Communication equipment connection flag" to see whether the communication between PLC and A-BOX is normal. The value is "1" when communication is normal, and the value of communication failure is "0".

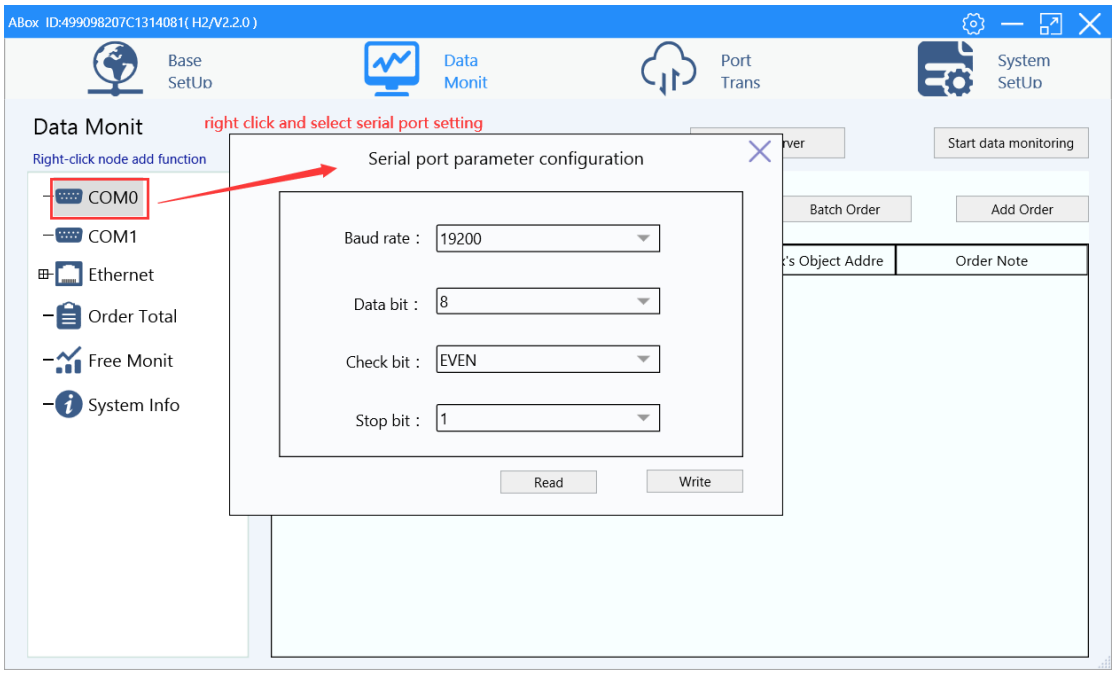


6-12. Xinje XD series serial port PLC

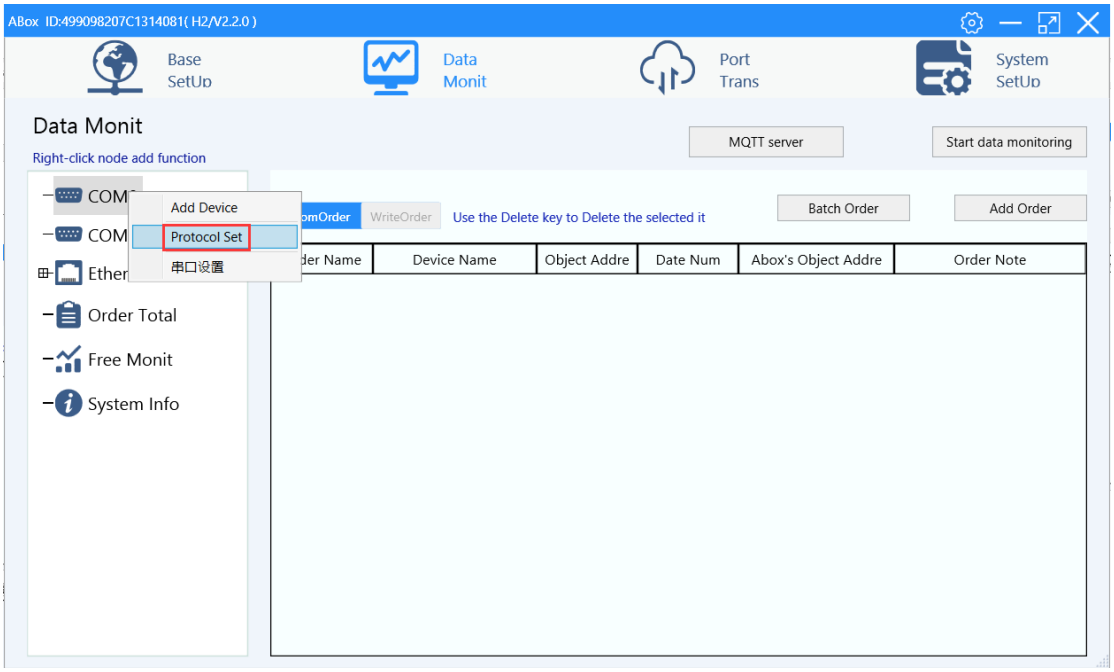
1. In this case, Xinje XDH-30A16-E is taken as an example. Serial port parameters are 19200,8,1, E. DVP programming cables are used to connect to COM0 or COM1 port of A-BOX (here COM0 port is taken as an example). COM0 and COM1 ports support RS232 and RS485. First, connect A-BOX remotely with the configuration tool.



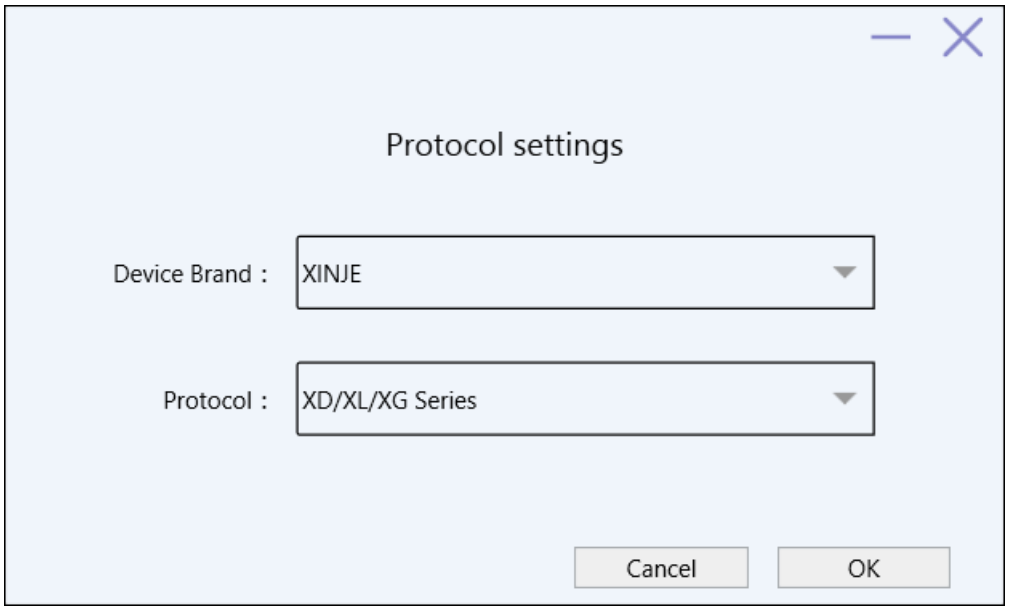
2. Modify the serial port parameters of COM0 port of A-BOX, which are consistent with the parameters of the connected PLC serial port. Click "Write" after the configuration is completed.



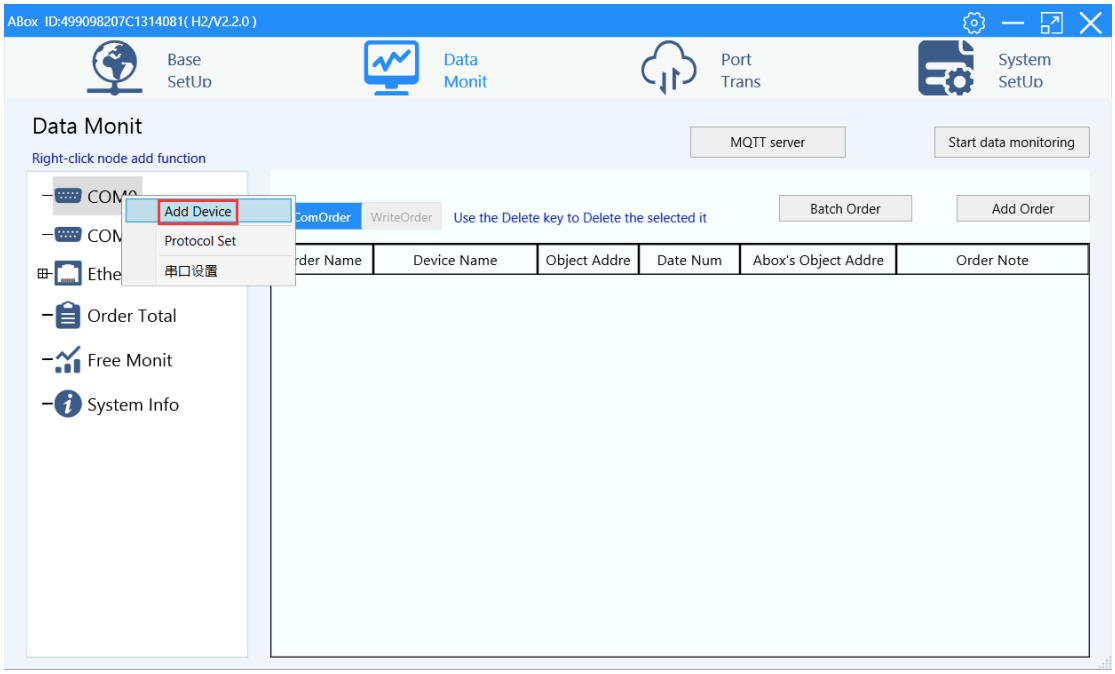
3. In "Data Monitoring", right-click "COM0" and click "Protocol Set".



4. Communication protocol please select "Xinje" - "XD/XL/XG series (Modbus)".

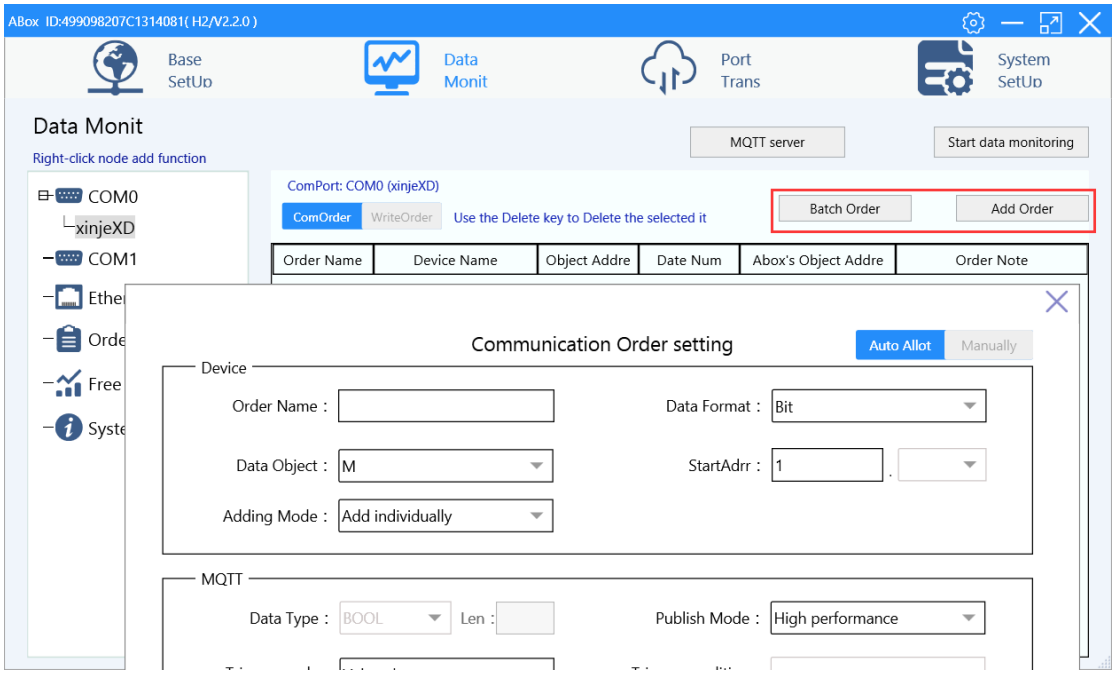


5. Right click COM0, click add device.

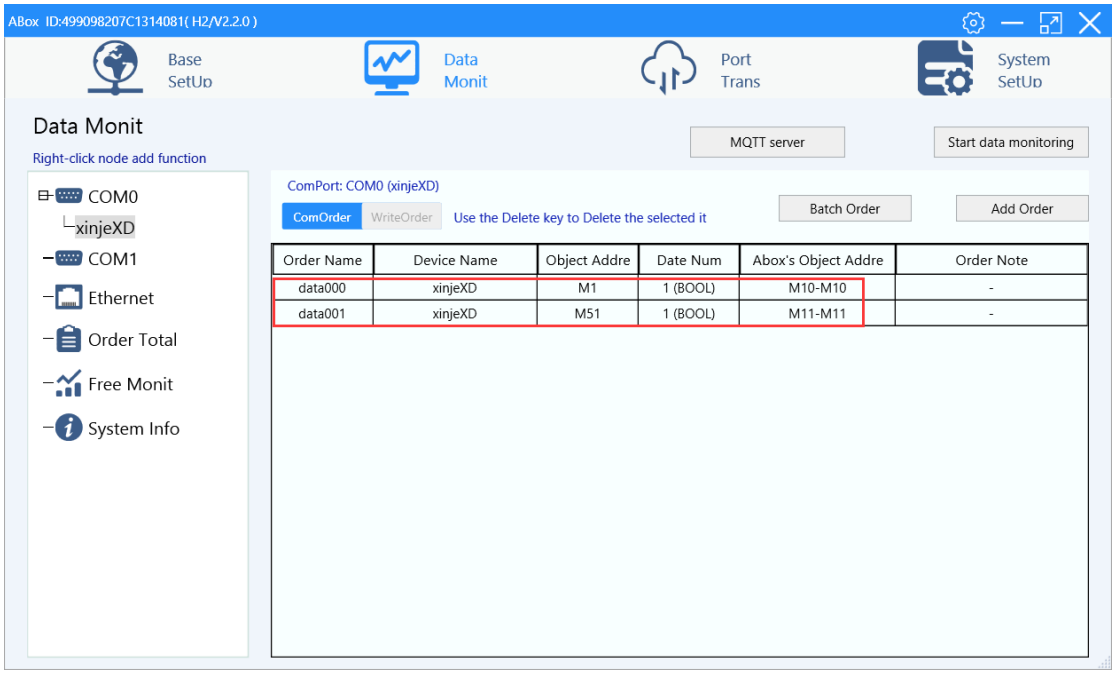


6. Specify the name, station number and connection flag of the equipment, and the station number shall be consistent with that of the PLC serial port.

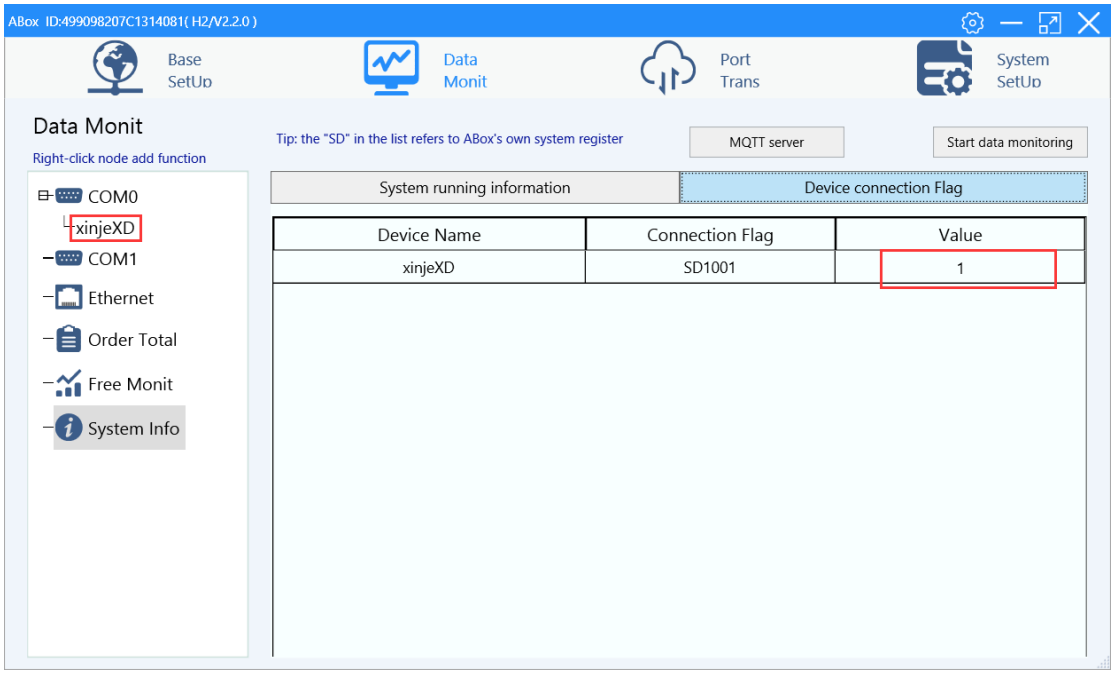
7. Select "Xinje XD" and click "Add order" or "Batch order". For "bit", the number of objects cannot exceed 100. For "word", the number of objects cannot exceed 50.



8. After adding instructions, please monitor the corresponding A-BOX address on the Xinje Cloud.

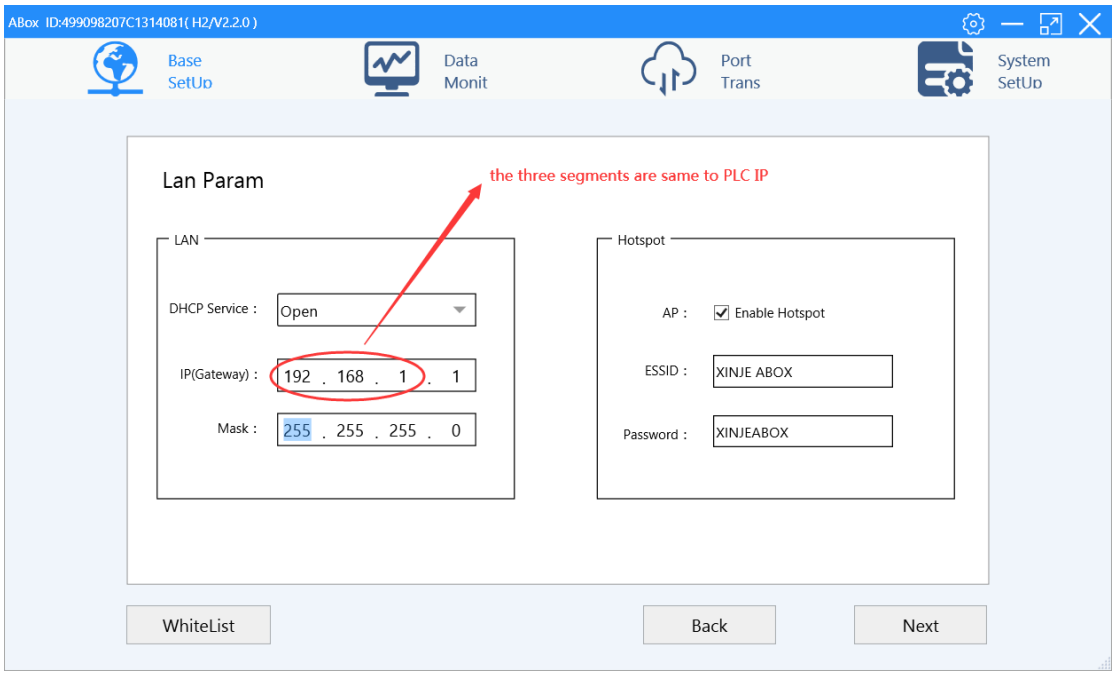


9. In "System information", check "Communication equipment connection flag" to see whether the communication between PLC and A-BOX is normal. The value is "1" when communication is normal, and the value of communication failure is "0".

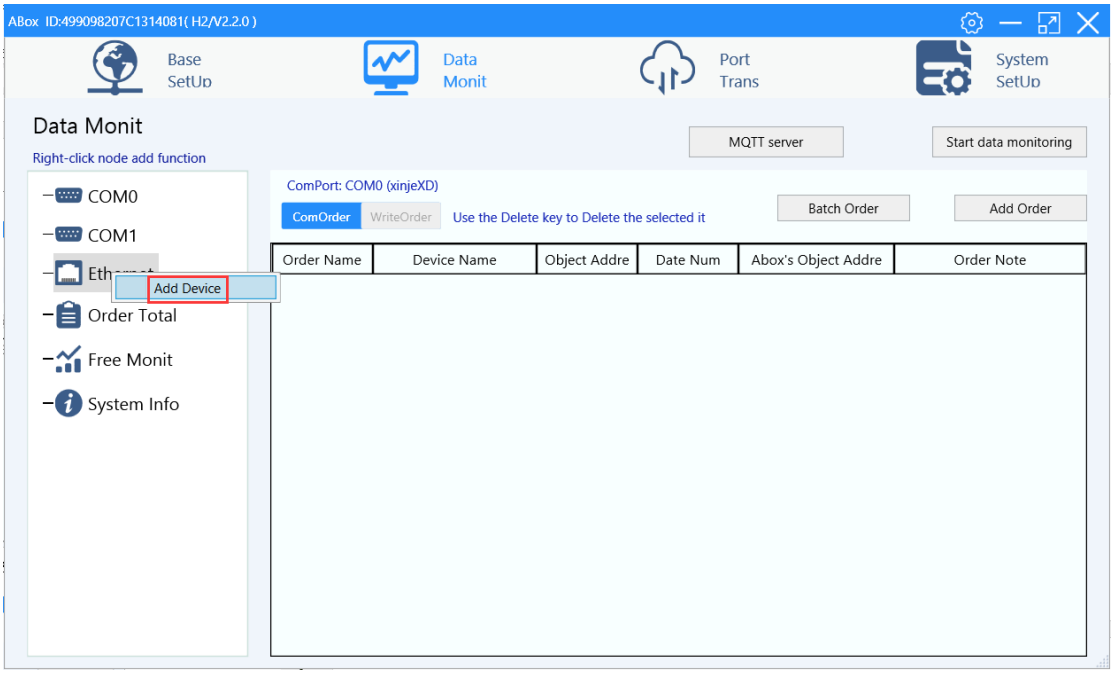


6-13. Xinje Ethernet port series PLC

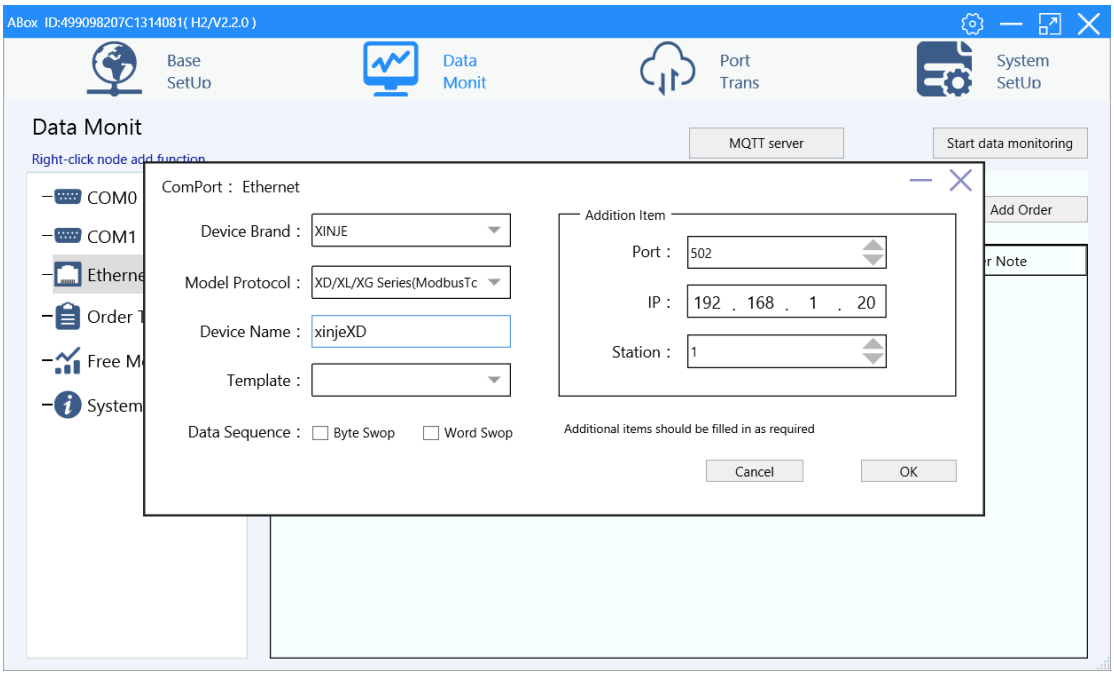
1. This case takes Xinje XDH-30A16-E as an example. First, set the Ethernet port of the PLC as a fixed IP, and the IP address of the PLC network port here is 192.168.1.100.



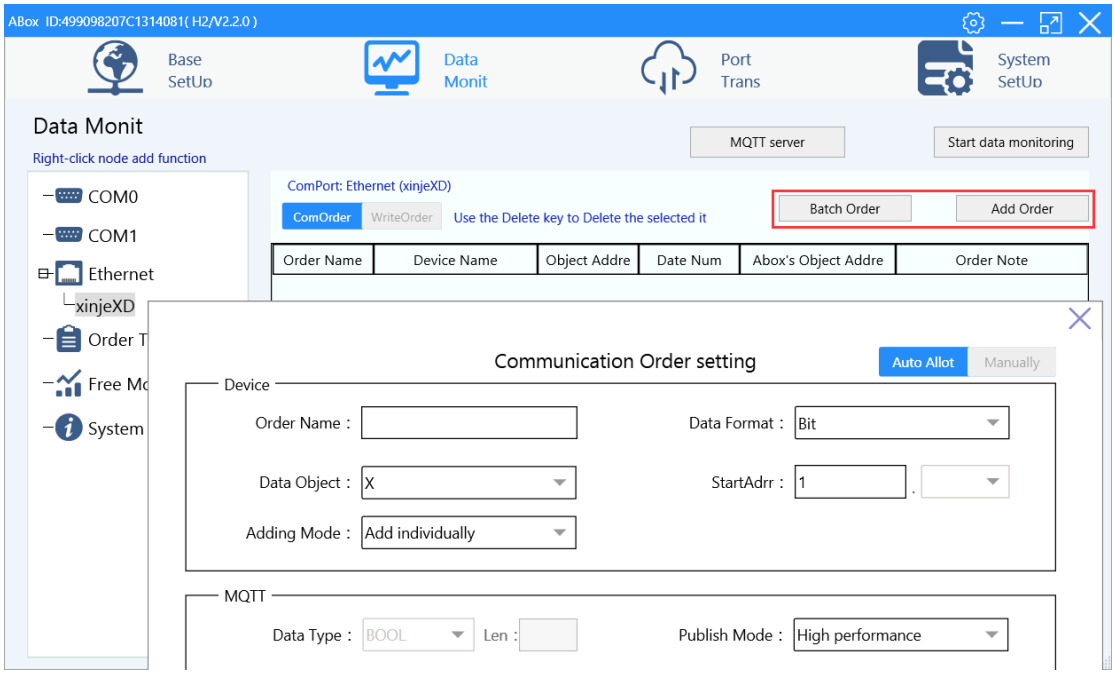
2. Set the A-BOX LAN port IP to the same network segment as the PLC.



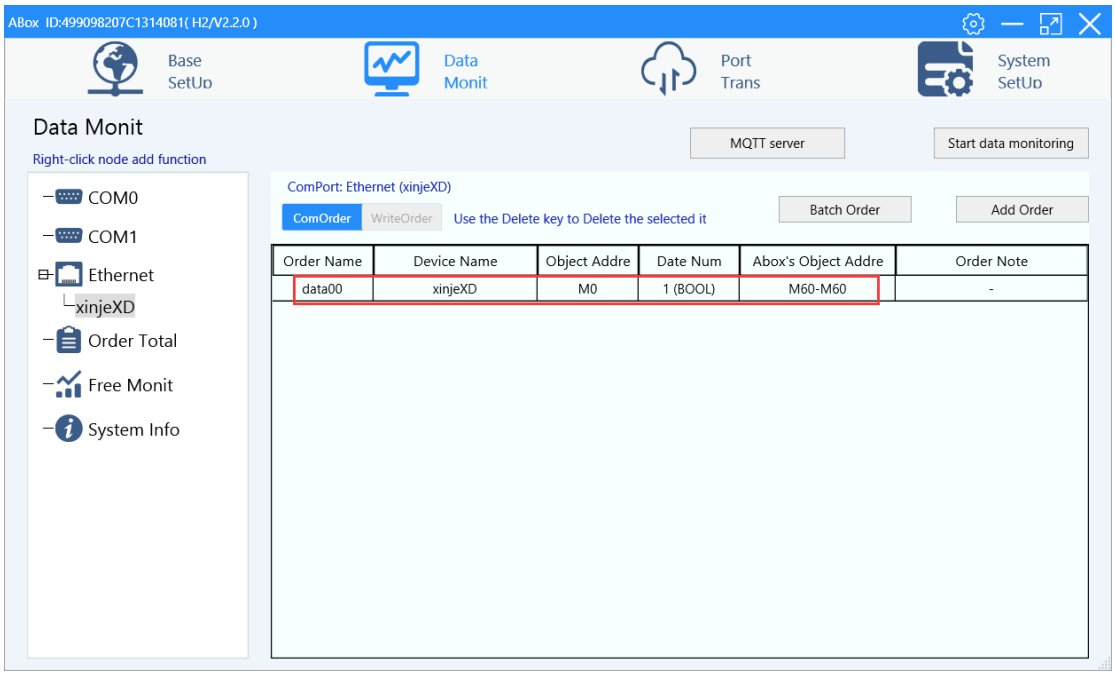
3. Use the configuration tool to remotely connect A-BOX, click Data Monitoring, right-click Ethernet, click Add Device.



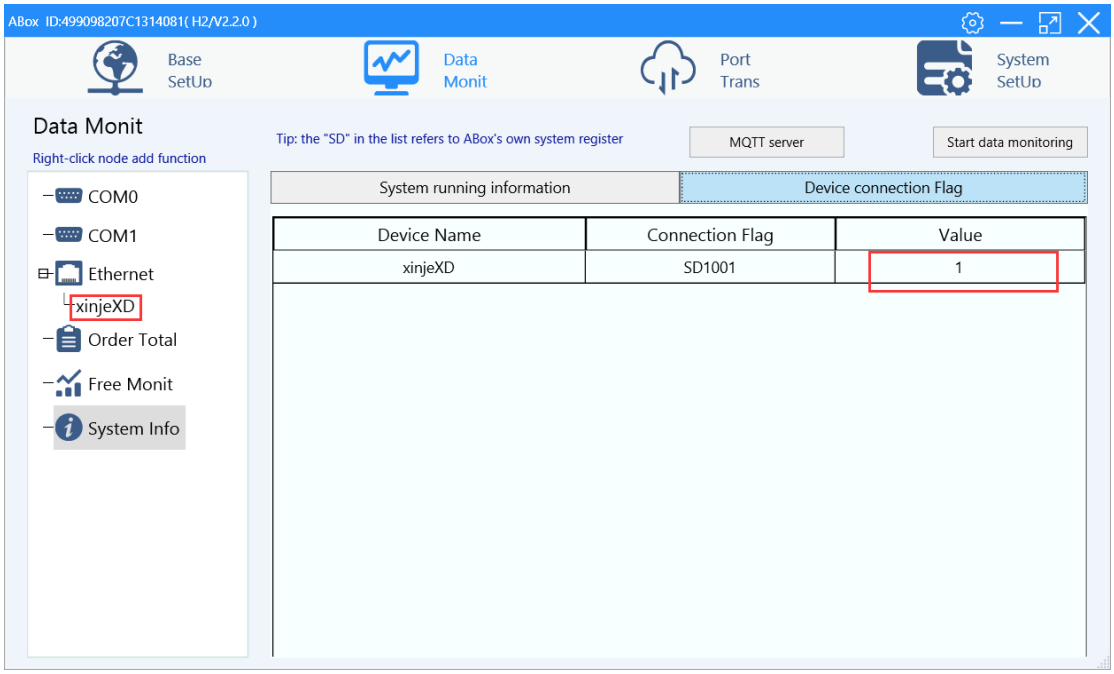
4. Select "Xinje" - "XD/XL/XG series (ModbusTcp)" as the communication protocol, port 502, specify the device name, and IP is the IP address of PLC.



5. Select "Xinje XD" and click "Add order" or "Batch order". For "bit", the number of objects cannot exceed 100. For "word", the number of objects cannot exceed 100.



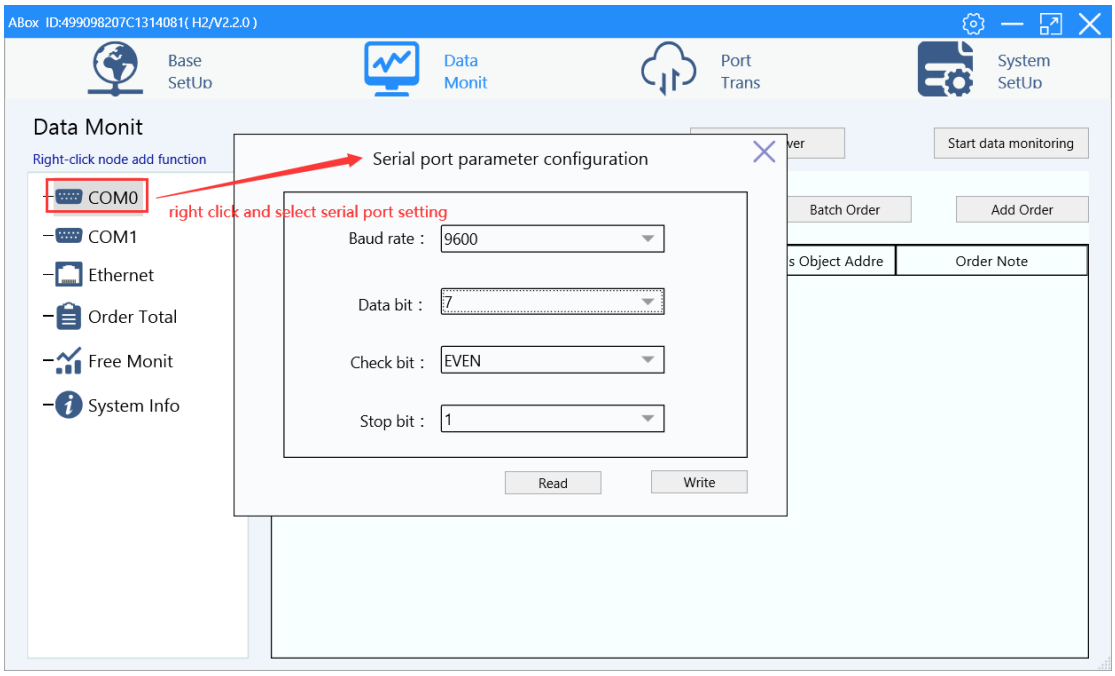
6. After adding instructions, please monitor the corresponding A-BOX address on the Xinje Cloud.



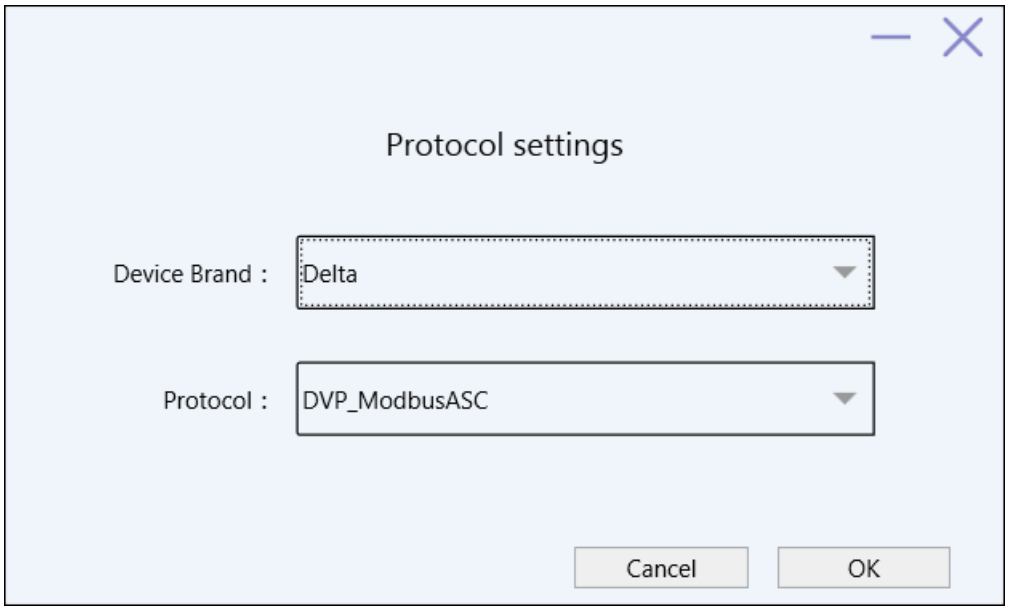
7. In "System information", check "Communication equipment connection flag" to see whether the communication between PLC and A-BOX is normal. The value is "1" when communication is normal, and the value of communication failure is "0".

6-14. Delta DVP series (Modbus ASC)

1. In this case, the PLC model is Delta DVP-60ES. The default serial port parameters of the RS232 port of the PLC are 9600, 7,1, even, and the default protocol is ModbusASC. Use DVP cable to connect PLC to A-BOX. This case connects COM0 of A-BOX. First, set the serial port parameters of A-BOX to be consistent with those of PLC.

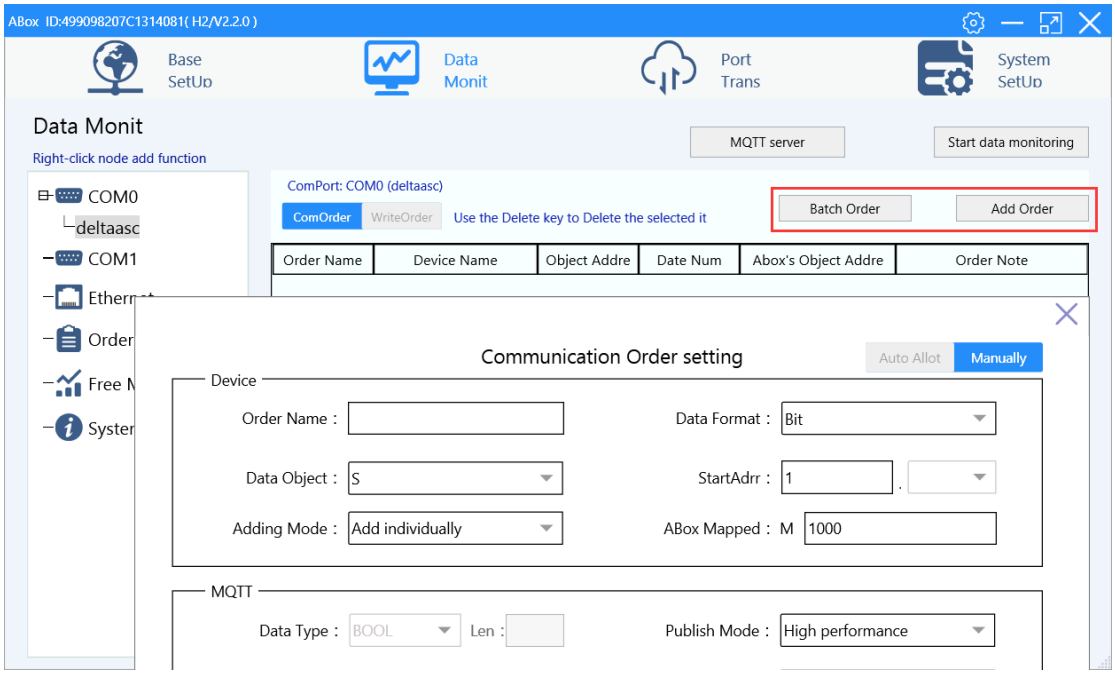


2. Right click COM0, click protocol set, select Delta-DVP_ModbusASC.

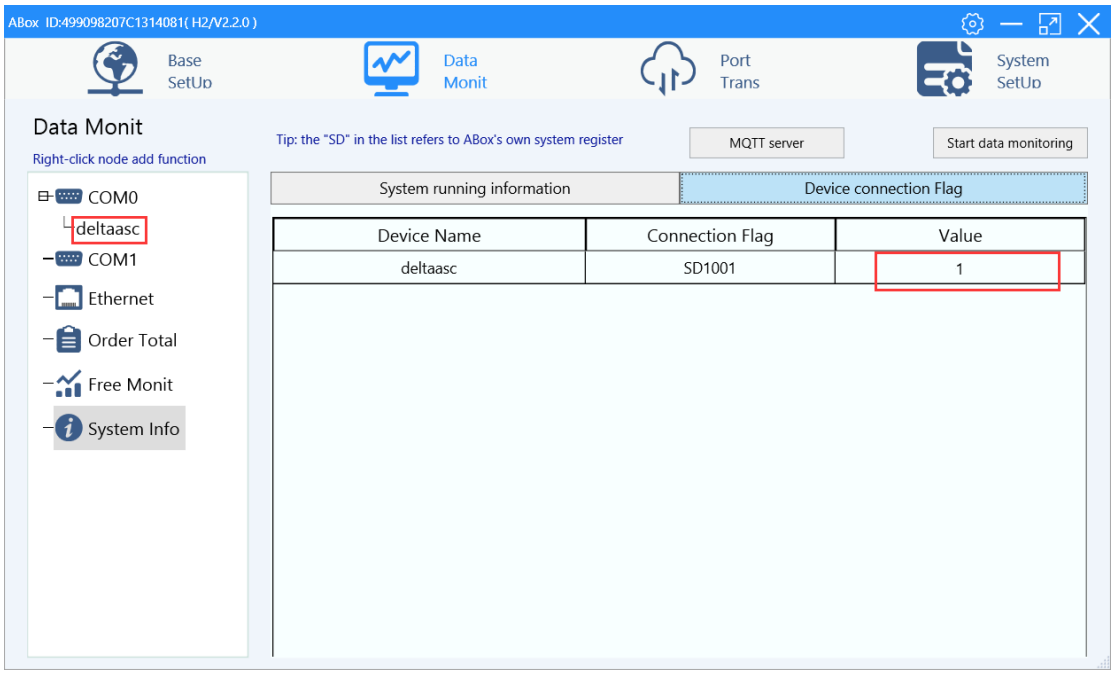


3. Right click COM0, click add device. The station no. is 1 by default.

4. Click Add order to configure the mapping relationship between PLC address and A-BOX address. Click "Start Data Monitoring" after adding. At present, 25 "WORD" types and 12 "DWORD" types have been added in batches.



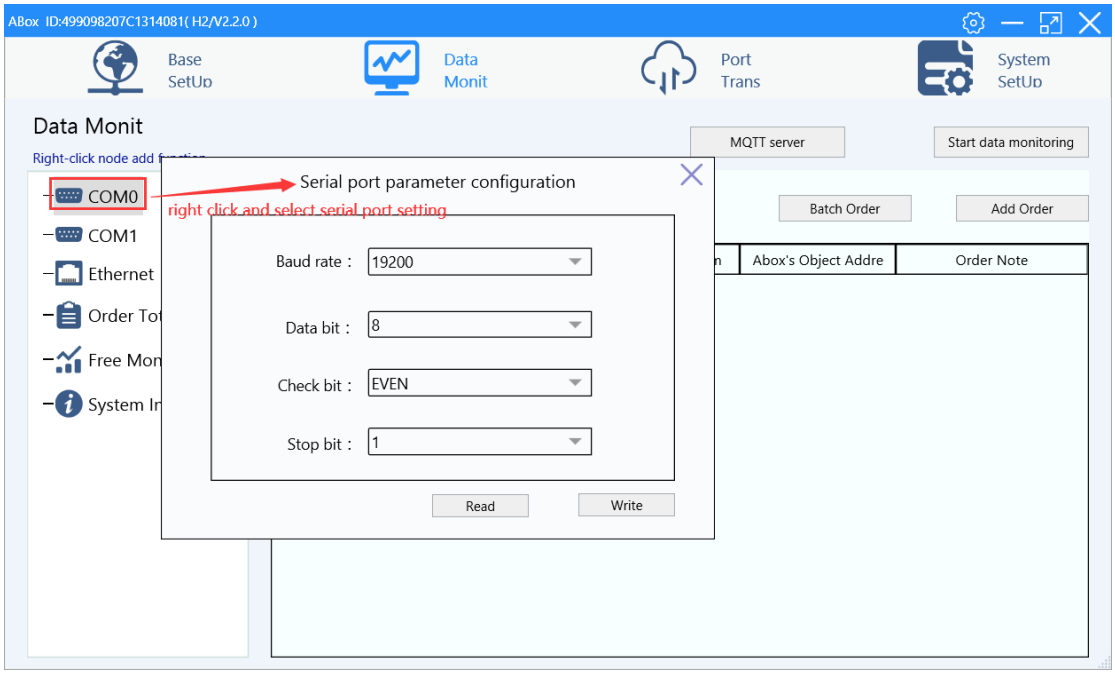
5. In "System information", check "Communication equipment connection flag" to see whether the communication between PLC and A-BOX is normal. The value is "1" when communication is normal, and the value of communication failure is "0".



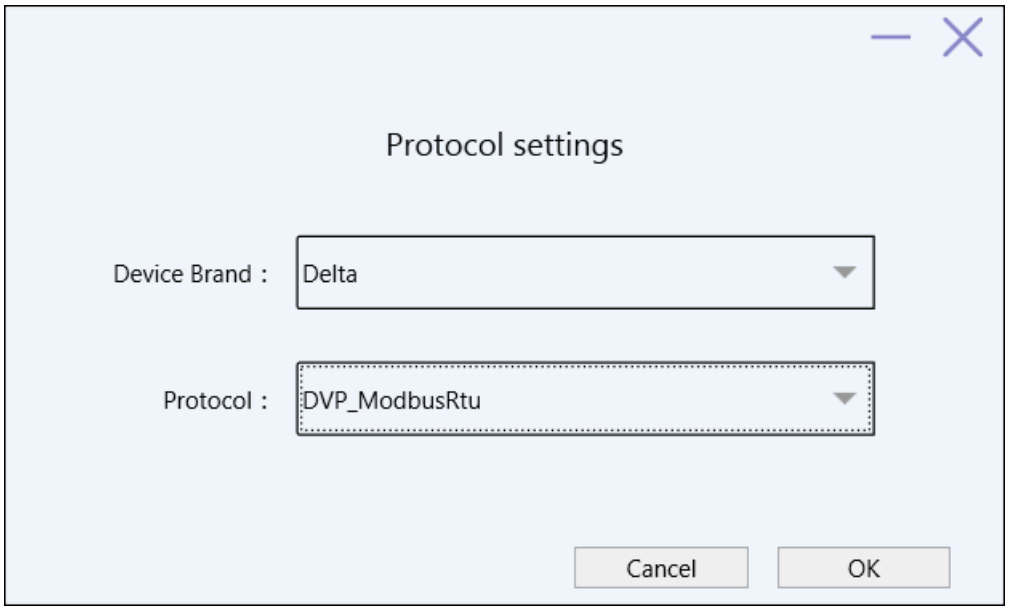
6-15. Delta DVP series (Modbus RTU)

1. In this case, the PLC model is Delta DVP-60ES. First, connect the PLC. Write a ladder diagram to set the RS485 parameter to ModbusRTU. In this case, set the serial port parameter to 19200, 8,1, E.

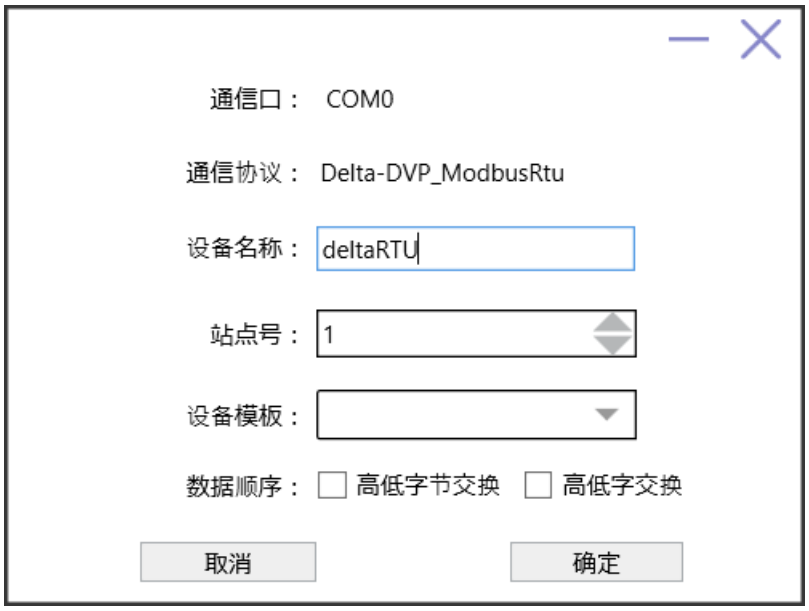
2. Use RS485 to connect PLC with A-BOX. This case connects COM0 of A-BOX. First, set the serial port parameters of A-BOX to be consistent with those of PLC.



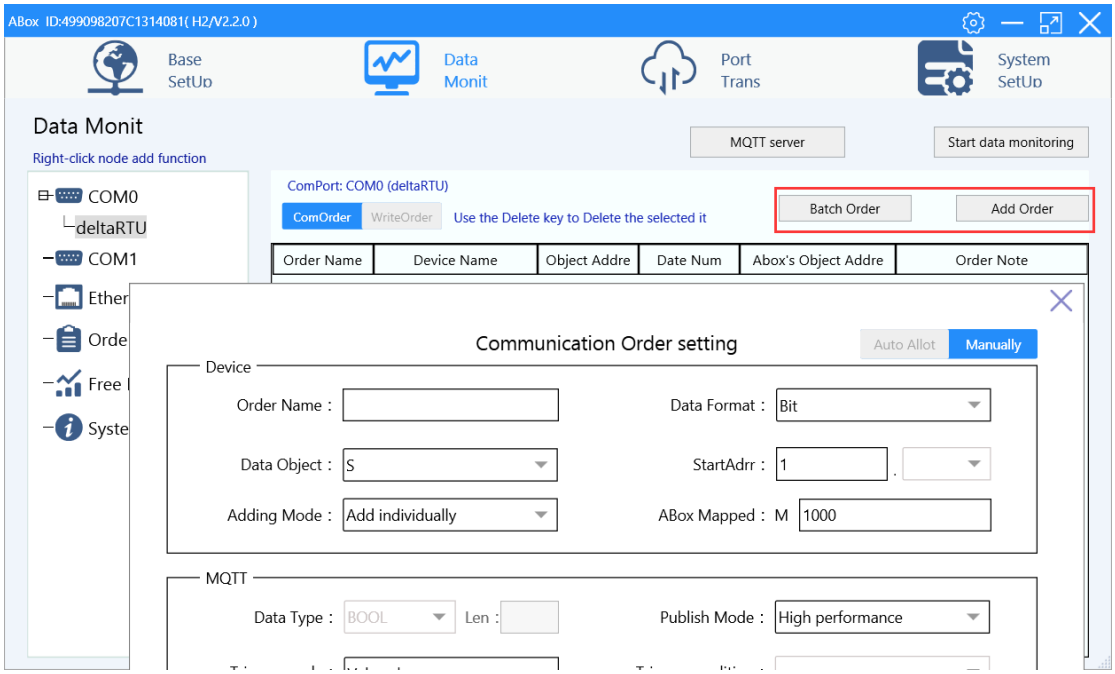
3. Right click COM0, click Protocol Set, and select "Delta" - "DVP_ModbusRTU".



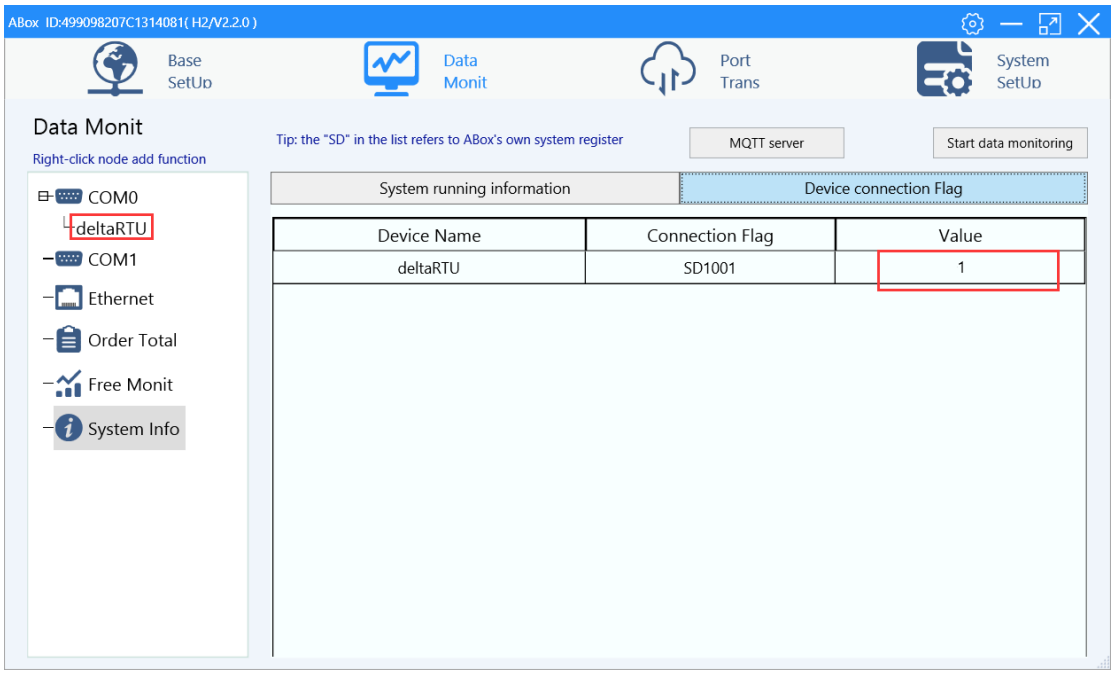
4. Right click COM0 and click Add Device. The default site number is "1".



5. Click Add order to configure the mapping relationship between PLC address and A-BOX address. Click "Start Data Monitoring" after adding. At present, 25 "WORD" types and 12 "DWORD" types are added in batches.

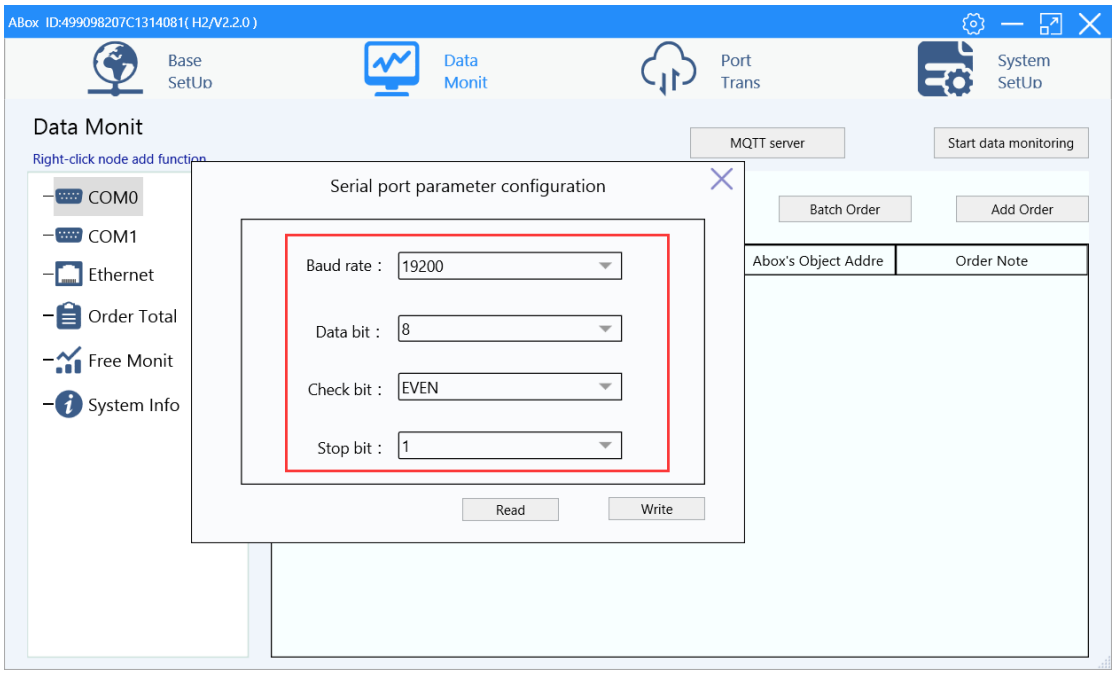


6. In "System information", check "Communication equipment connection flag" to see whether the communication between PLC and A-BOX is normal. The value is "1" when communication is normal, and the value of communication failure is "0".

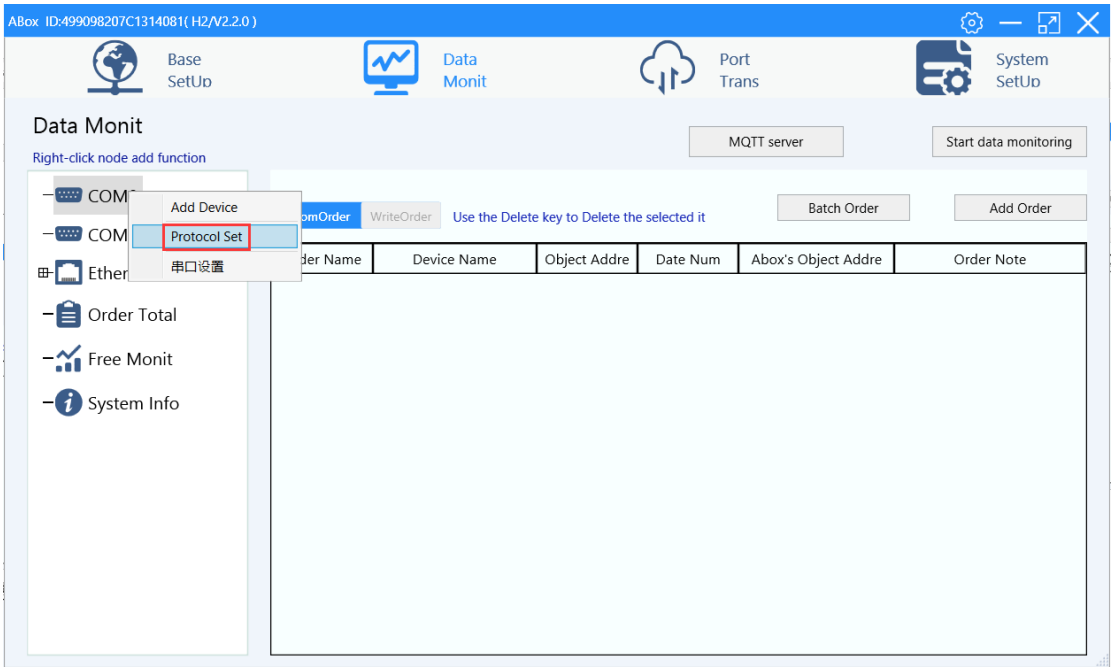


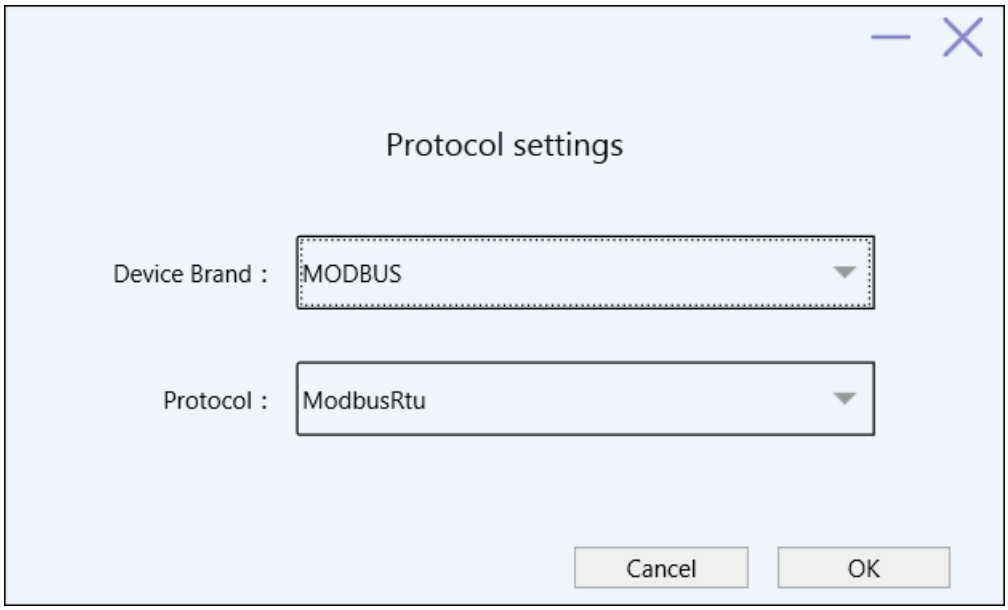
6-16. Modbus Rtu device

1. First, confirm that the device supports standard Modbus Rtu, COM0 port of Xinje A-BOX supports RS232 and RS485, COM1 port supports RS232, RS485 and RS422, correctly connect the A-BOX serial port with the corresponding device, confirm the serial port parameters of the device, modify the A-BOX serial port parameters to be consistent with the device serial port, write and take effect.

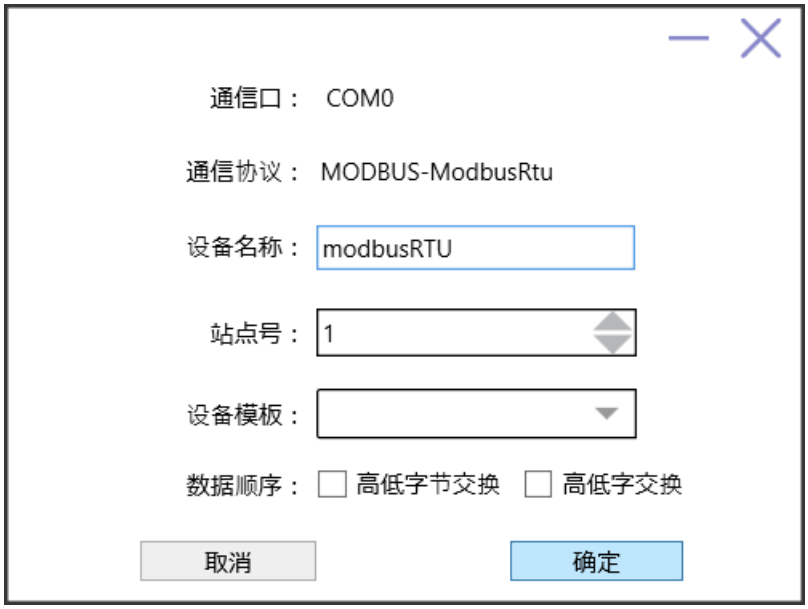


2. Click "Data Monitoring", right-click the corresponding COM port, click "Protocol Set", and select "ModbusRtu".

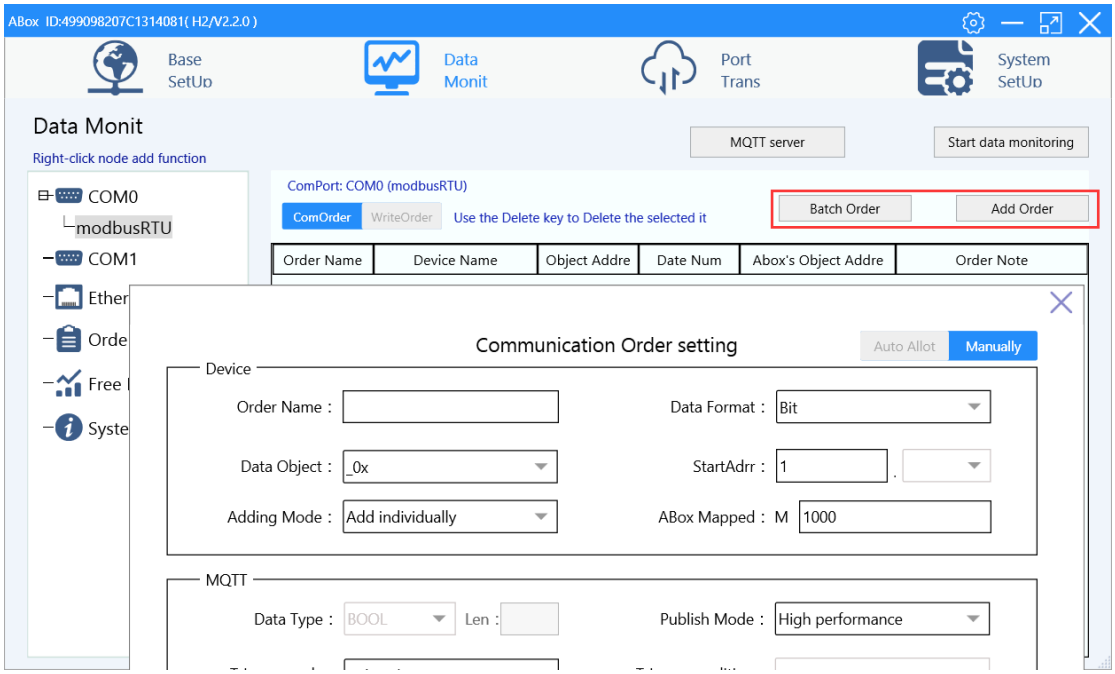




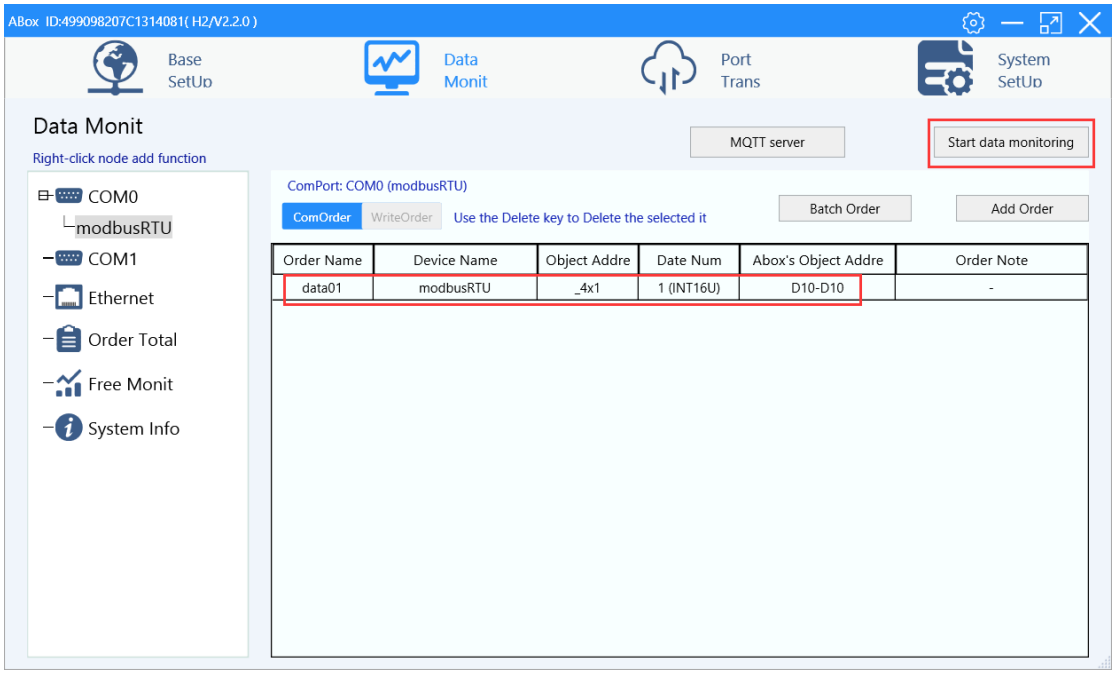
3. Right click the corresponding COM port, click Add Device, and specify the device name, station number, and connection flag.



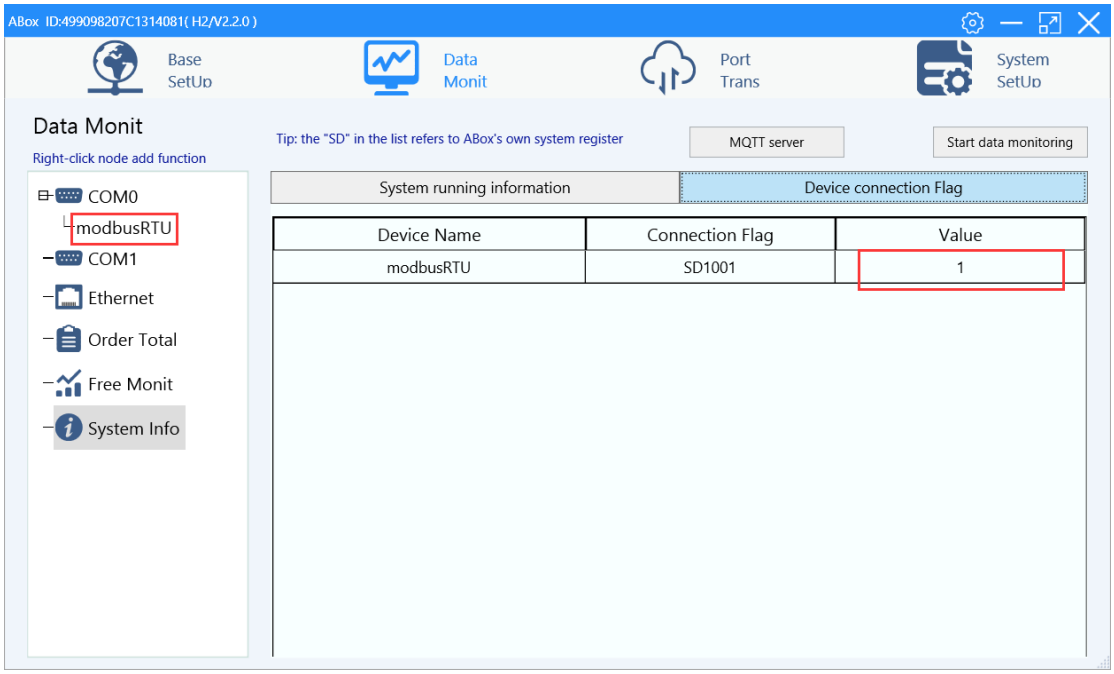
4. Select "ModbusRtu" and click "Add order" or "Batch order". For "bit", the number of objects cannot exceed 100. For "word", it is recommended that the number of objects should not exceed 50.



5. After adding instructions, please monitor the corresponding A-BOX address on the Xinje Cloud.

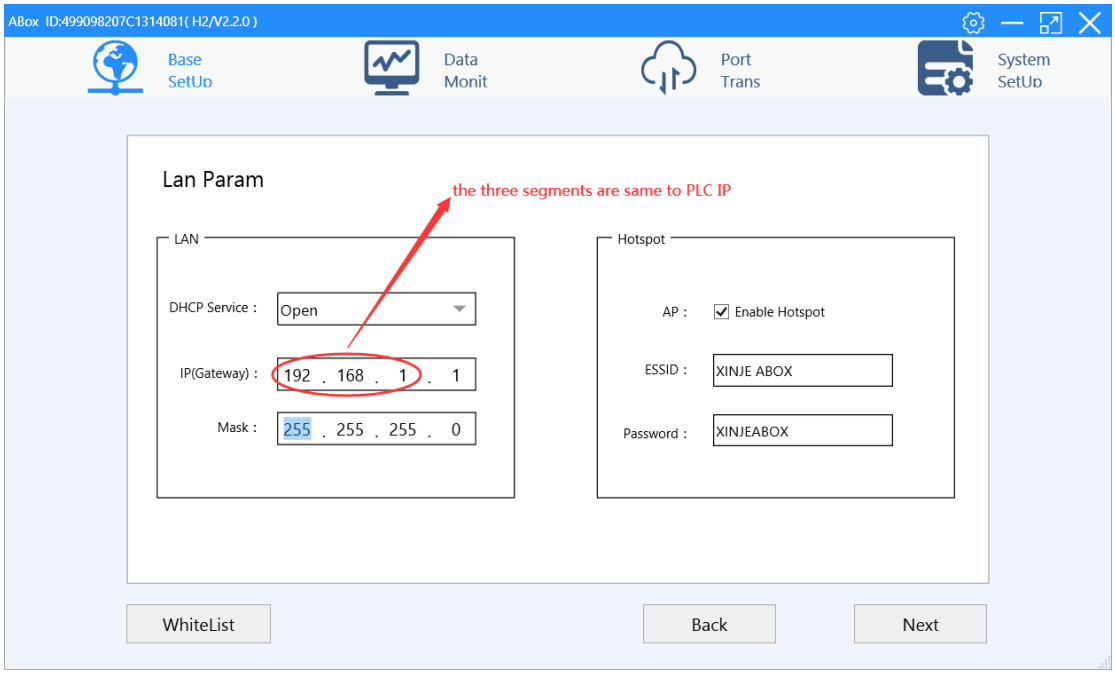


6. In "System information", check "Communication equipment connection flag" to see whether the communication between PLC and A-BOX is normal. The value is "1" when communication is normal, and the value of communication failure is "0".

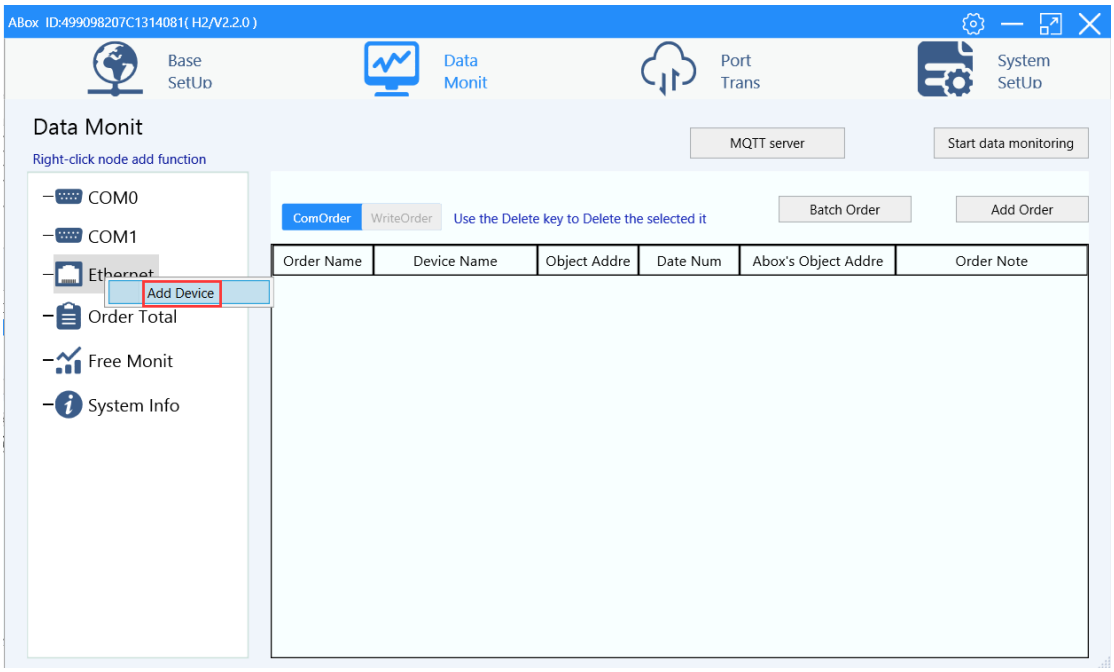


6-17. Modbus TCP device

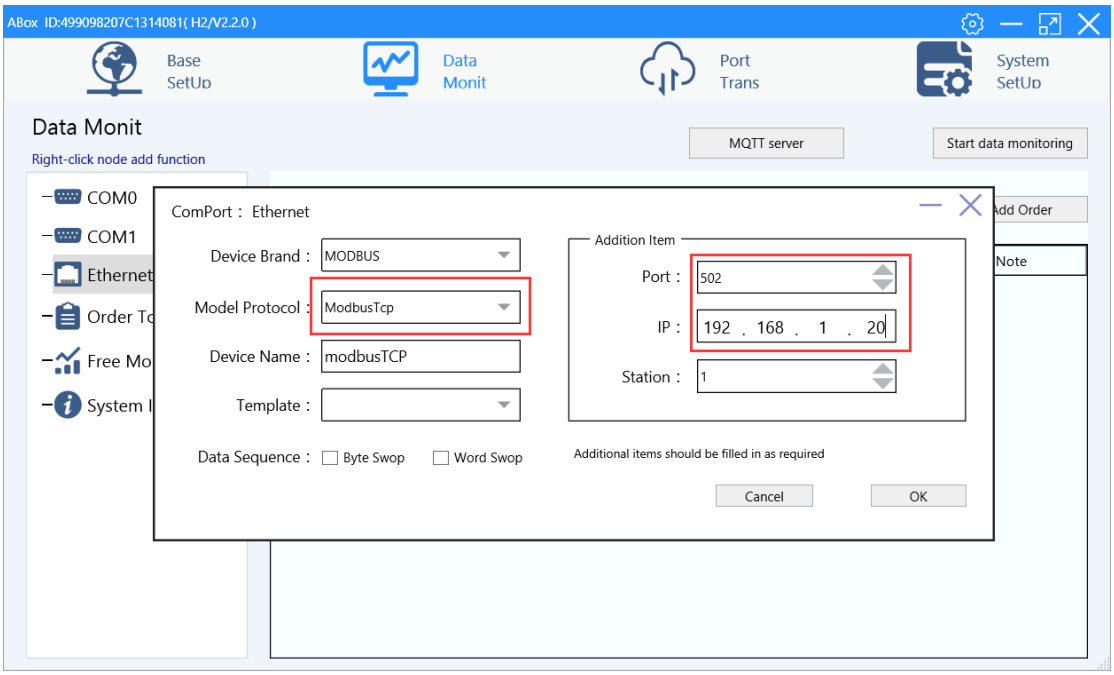
1. First, confirm that the device supports the standard Modbus TCP, and connect the A-BOX and the corresponding device with the network cable. The LAN port IP is set to be in the same network segment as the device IP.



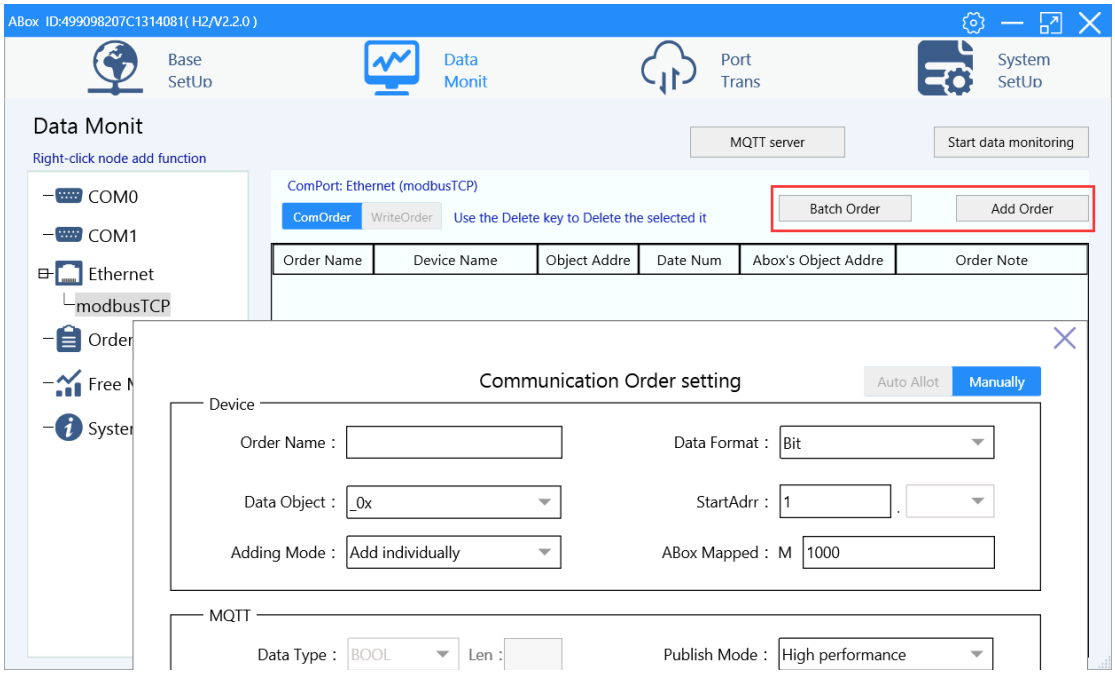
2. Use the configuration tool to remotely connect A-BOX, click "Data Monitoring", right-click "Ethernet", and click "Add Device".



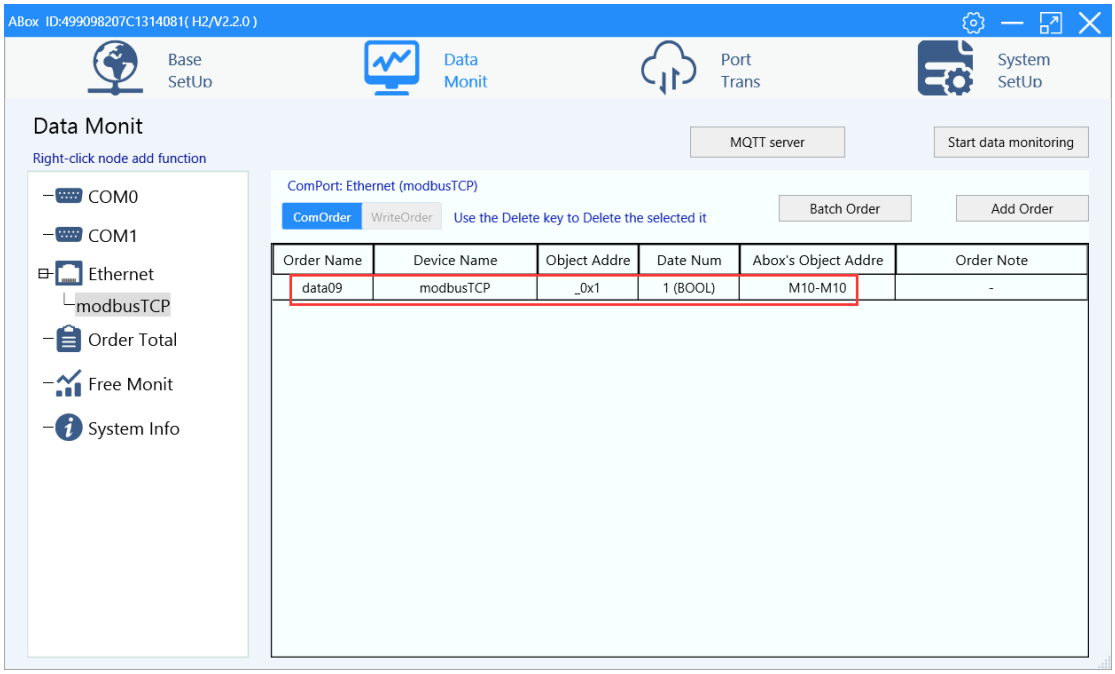
3. Select "Modbus Tcp" as the communication protocol, port number 502, and specify the device IP, name and connection flag.



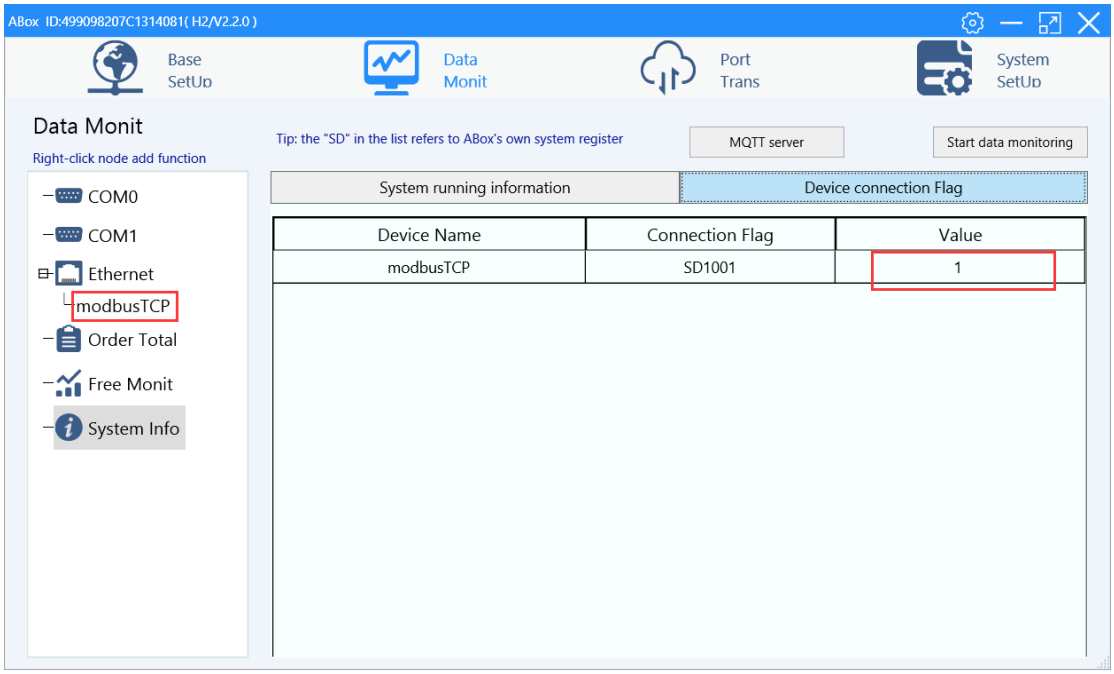
4. Select "ModbusTcp" and click "Add order" or "Batch order". For "bit", the number of objects cannot exceed 100. For "word", the number of objects cannot exceed 100.



5. After adding instructions, please monitor the corresponding A-BOX address on the Xinje cloud.



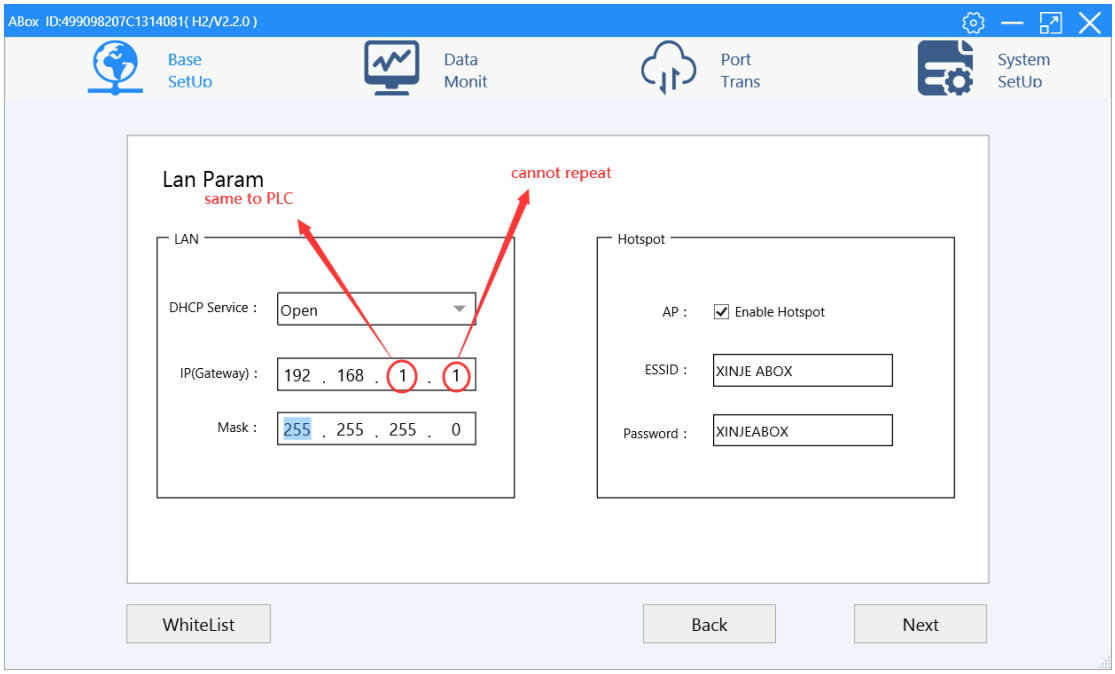
6. In "System information", check "Communication equipment connection flag" to see whether the communication between PLC and A-BOX is normal. The value is "1" when communication is normal, and the value of communication failure is "0".



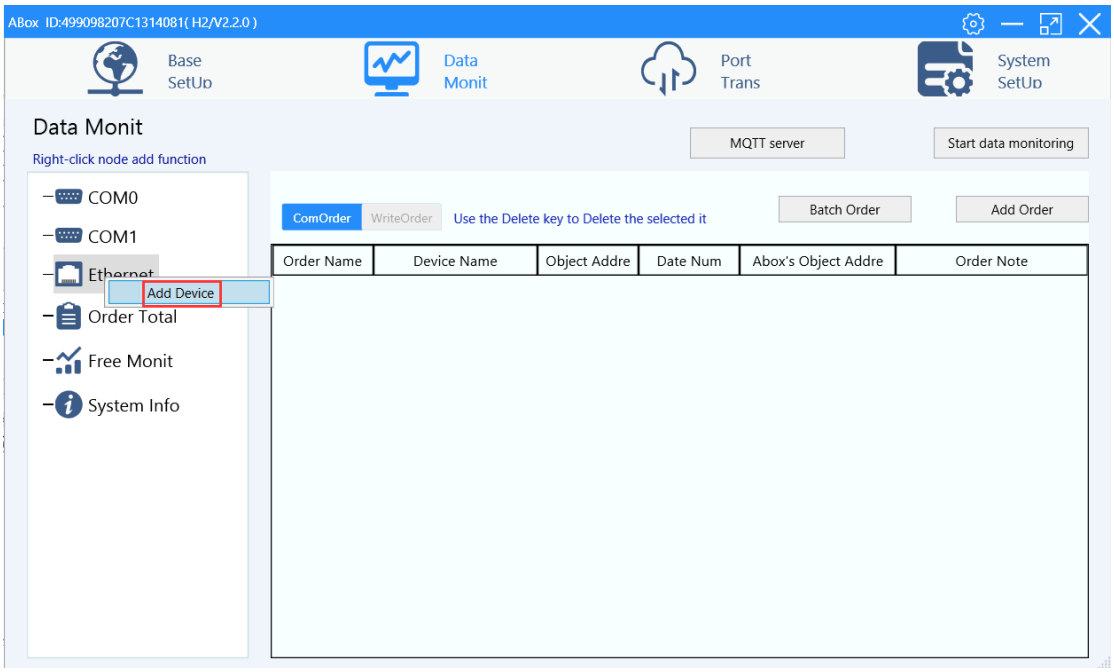
6-18. Ethernet/IP device

EIP communication requires Abox firmware version 2.2.1 or above and BOX Manager software version 1.3 or above. Here is an example of AllenBrandly's 1769-L32E.

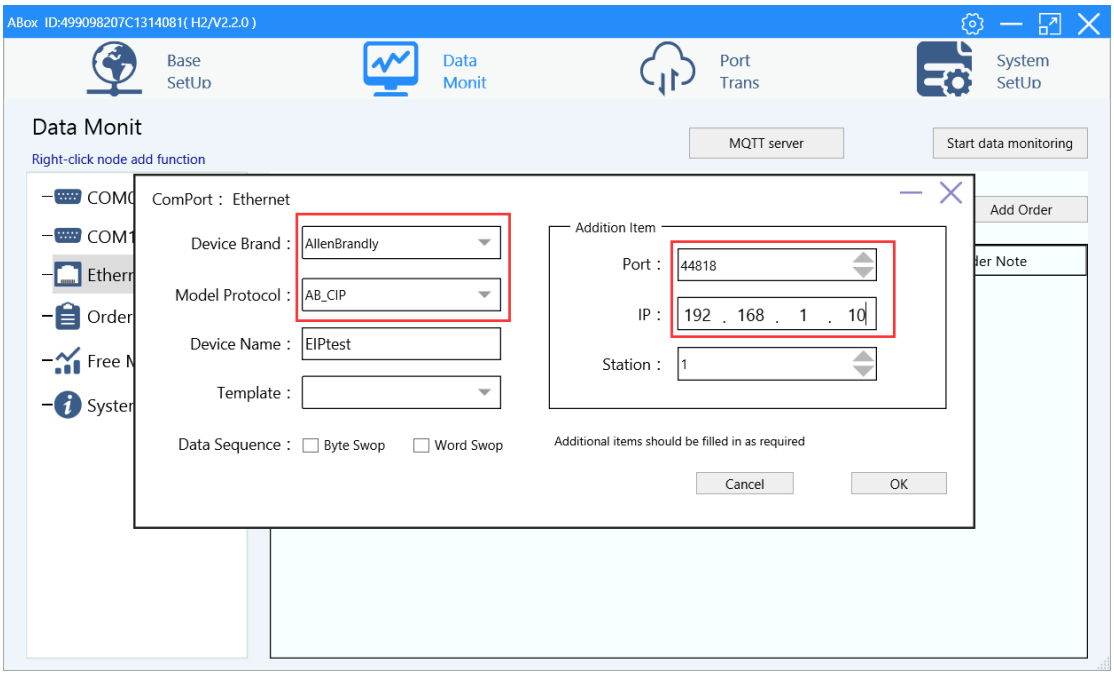
1. The IP address of the PLC in this case is 192.168.1.10. First, set the LAN parameters of A-BOX and the IP address of the PLC on the same network segment.



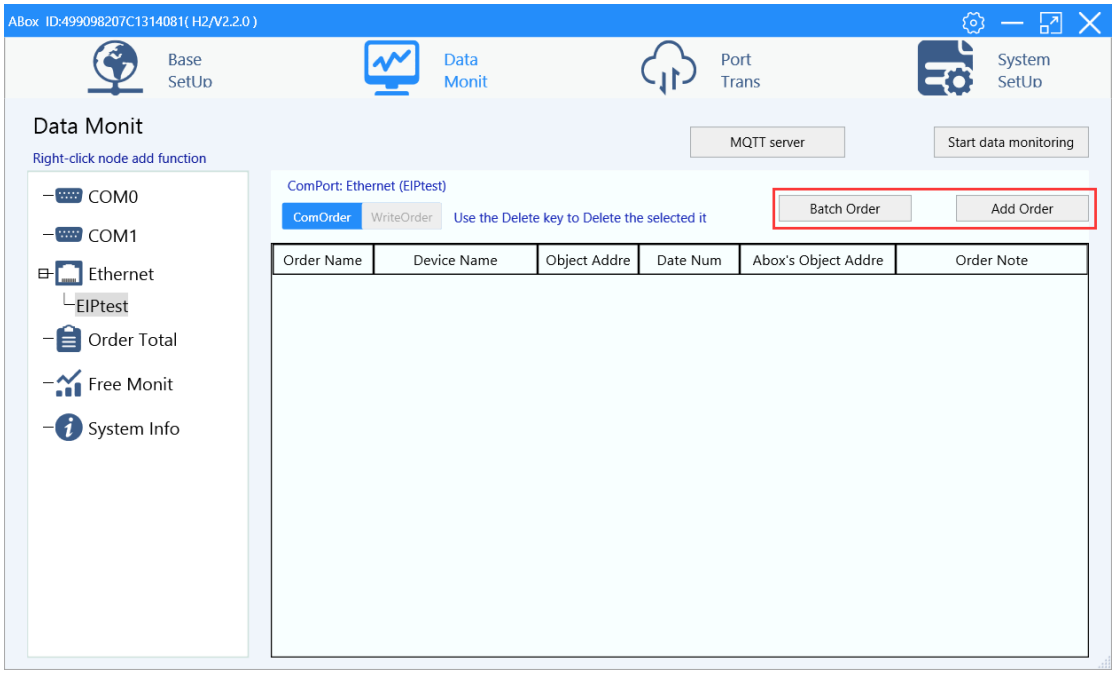
2. Use the network cable to connect PLC and A-BOX. In "Data Monitoring", right-click "Ethernet" and click "Add device".



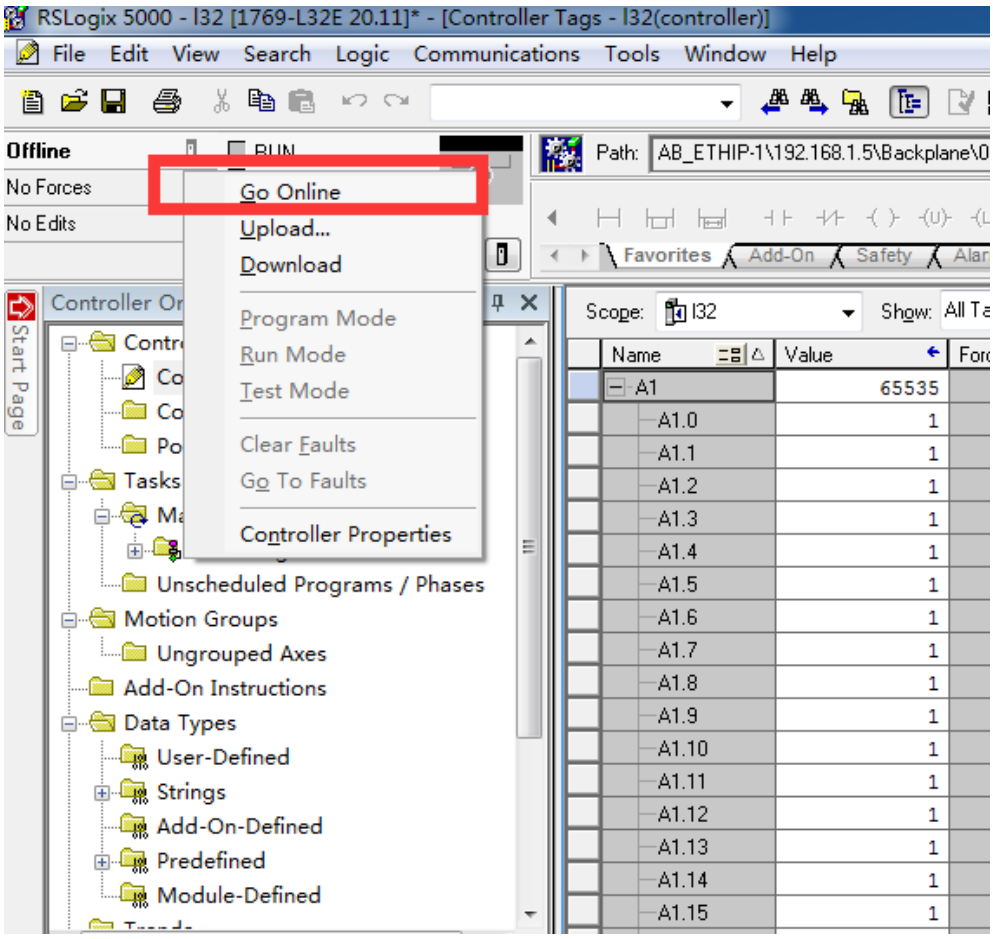
3. Select "AllenBrandly" as the device brand, "AB_CIP" as the model protocol, and "44818" as the port number.

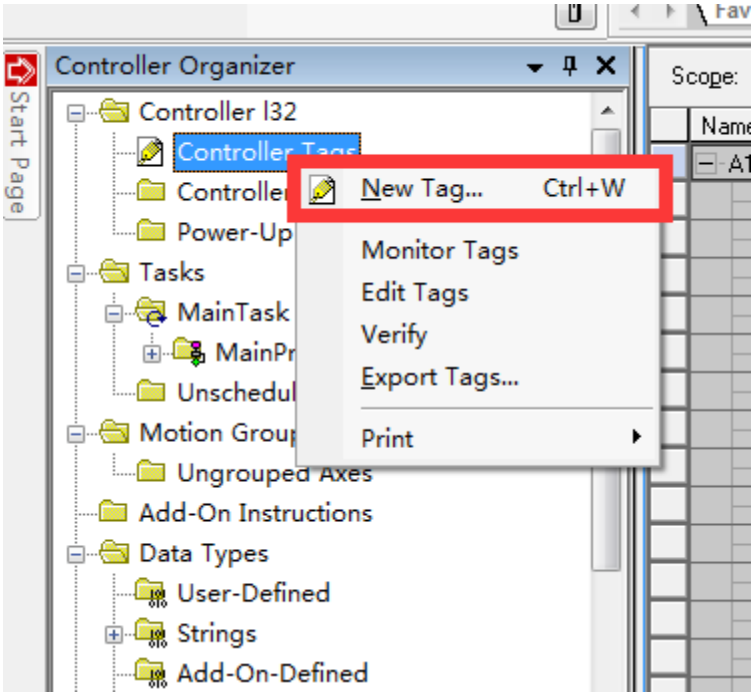


4. Select EIPtest, click Add order or Batch order.

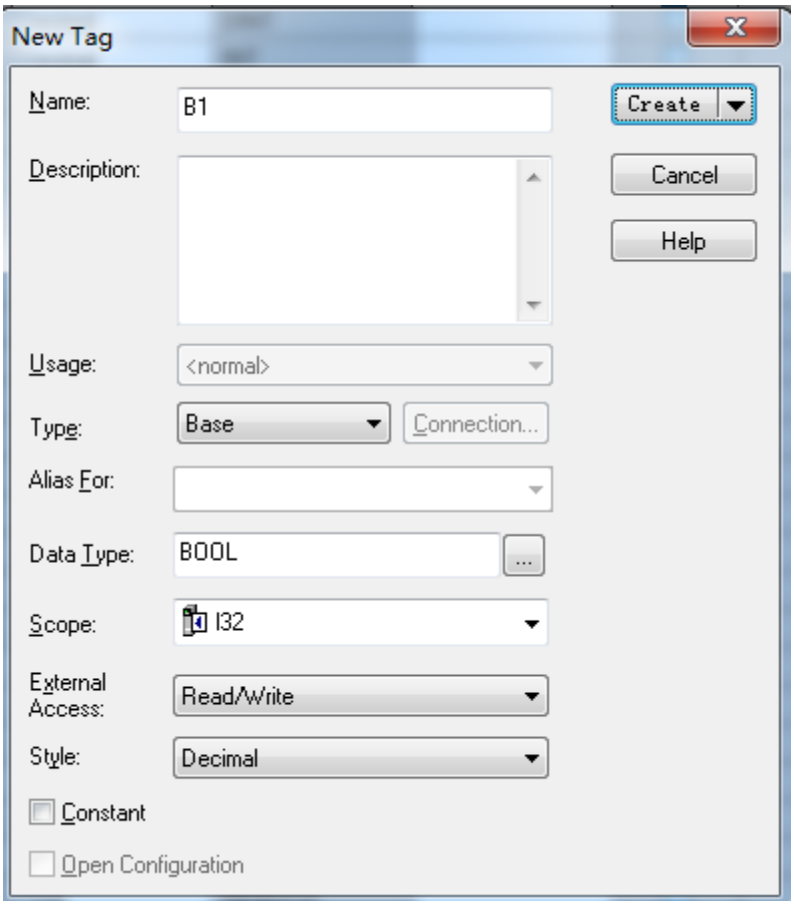


5. Open the rslogix500 programming software, select Go Online, and create a new Tag.

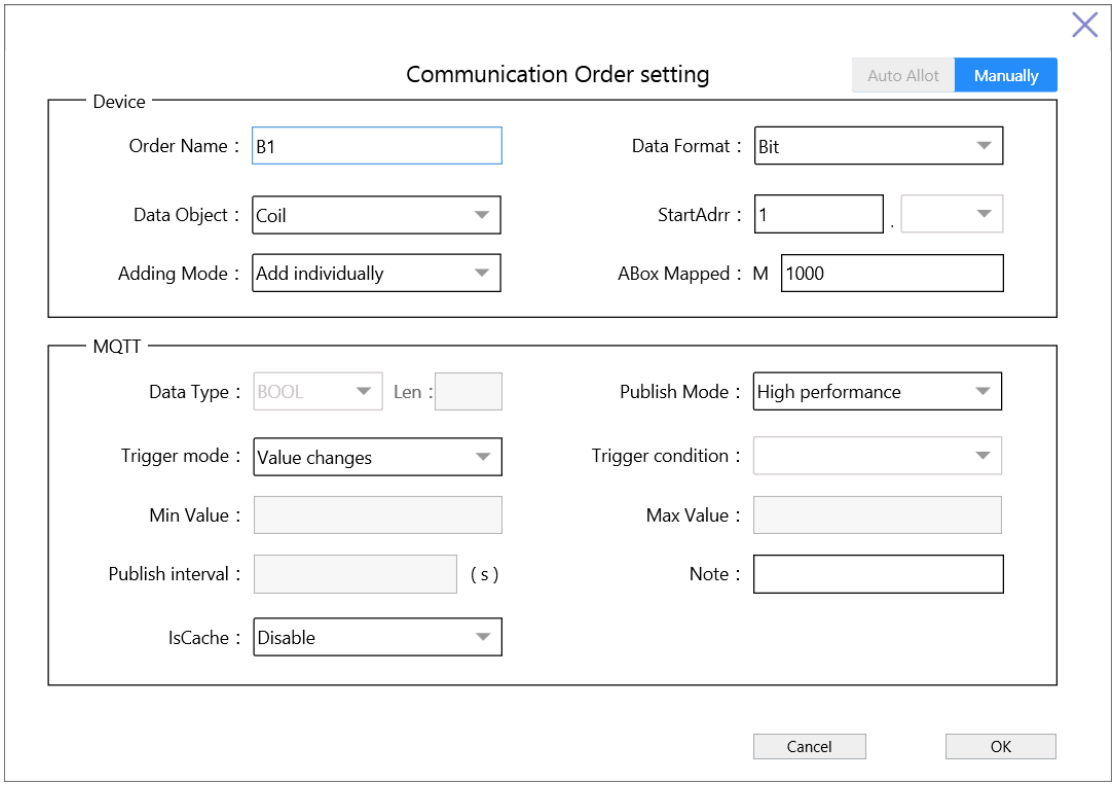




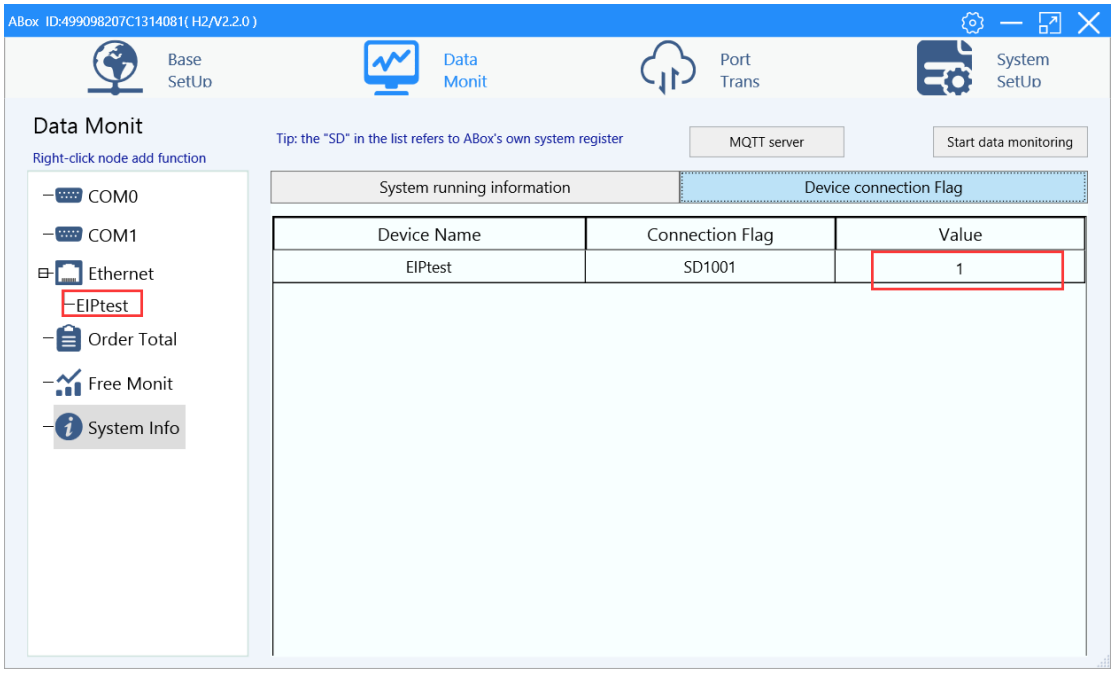
6. Set the point to be monitored in Tag.



7. Add corresponding instructions in A-BOX, INT in PLC corresponds to INT16S of ABOX, DINT corresponds to INT32S of ABOX, LINT corresponds to INT64S of ABOX, REAL corresponds to float of ABOX, LREAL corresponds to double of ABOX.



8. In "System information", check "Communication equipment connection flag" to see whether the communication between PLC and A-BOX is normal. The value is "1" when communication is normal, and the value of communication failure is "0".



7. Details of MQTT new version protocol

7-1. User data

(1) Client ID naming: IDPWDUserdata

(2) TOPIC

Function	Type	Topic	Explanation
Report configuration list	release	ID+PWD/pub_configlist	Retain type, click "Start Data Monitoring" to publish once
Report data	release	ID+PWD/pub_data	The device side actively reports real-time data
Data control request	subscribe	ID+PWD/write_data	Platform side sends data point control request
Data control reply	release	ID+PWD/write_reply	Data control result replied by the device side
Actively acquire data	subscribe	ID+PWD/access_data	Obtain the data

(3) Report configuration list

Title: ID+PWD/pub_configlist

Publishing conditions: the client clicks Start Data Monitoring once to publish once. Retain type.
The system data table is added by default.

Payload example:


```
{
"Unix": "1614576888000",
"Version": "V1.0",
"Configlist": {
    "device 1": [{
        "Order_name": "temperature",
"Order_ID": "43912342299231234+0",
        "Order_type": "INT8S"
    }, {
        "Order_name": "length",
"Order_ID": "43912342299231234+1",
        "Order_type": "Float"
```

```
        }, {
            "Order_name": "yield[6]",
"Order_ID": "43912342299231234+2",
            "Order_type": "Float"
        }],
        "device 2": [{
            "Order_name": "temperature",
"Order_ID": "43912342299231234+3",
            "Order_type": "INT8U"
        }, {
            "Order_name": "length",
"Order_ID": "43912342299231234+4",
            "Order_type": "Float"
        }, {
            "Order_name": "yield[6]",
"Order_ID": "43912342299231234+5",
            "Order_type": "Float"
        }],
        "Localghost": [{                    // System information list
            "Order_name": "GPS latitude",
"Order_ID": "43912342299231234+6",
            "Order_type": "Float"
        }, {
            "Order_name": "GPS longitude",
"Order_ID": "43912342299231234+7",
            "Order_type": "Float"
        }, {
            "Order_name": "system operation time[4]",
"Order_ID": "43912342299231234+8",
```

```
            "Order_type": "INT8S"
        }]
    }
    }
```


Parameters

Name	Explanation
Unix	Time of publication, UNIX timestamp in millisecond format
Version	Protocol version number. The current protocol version is fixed to "V1.0"
Configlist	Device List Root Node
Device 1, device 2	Device name added in Box Manager
Order_name	Instruction name. If the instruction name is followed by "[6]", it means that the instruction is added in batches, and the length is the number of batches
Order_ID	The instruction ID, unique, is the unique identifier used for the Xinje cloud platform binding data
Order_type	Data type (case sensitive) Bool/INT8U/INT8S/INT16U/INT16S/INT32U/INT32S/INT64S/Float/Double/Char[]

(4) Data report

Title: ID+PWD/pub_data

Report real-time data:


```
 {
 "Variant": [{
        "Unix": "1614576888000",
        "Version": "V1.0",
        "Pub_Data": {
            "device1": {
                "temperature": 23,
                "humidity": 50.23,
                "yield[6]": [12, 32, 43, 53, 15, 53]
```

```
            }
        }
    }]
    }
```

Parameters

Name	Explanation
Variant	Root node, array format
Unix	Time of publication, UNIX timestamp in millisecond format
Version	Protocol version number. The current protocol version is fixed to "V1.0"
Pub_data	Data root node
Device 1, device 2	Device name added in Box Manager.
Command key value pair	If the instruction name is followed by "[6]", it means that the instruction is batch adding, and the data value is the actual value of batch adding data

Report message cache data:

```
{
"Variant": [{
        "Unix": "1614576768000",        // The closer time one is on the top
        "Version": "V1.0",
        "Pub_Data": {
            "Device 1": {
                "temperature": 23,
                "length": 50,
                "yield[6]": [12, 32, 43, 53, 15, 53]
            },
            "device 2": {
                "temperature": 23,
                "length": 50,
                "yield[6]": [12, 32, 43, 53, 15, 53]
            }
```

```
            }
        },
        {
            "Unix": "1614576400000",
            "Version": "V1.0",
            "Pub_Data": {
                "device 1": {
                    "temperature": 44,
                    "length": 50,
                    "yield[6]": [12, 32, 43, 33, 15, 53]
                },
                "device 2": {
                    "temperature": 13,
                    "length": 60,
                    "yield[6]": [12, 32, 123, 53, 15, 53]
                }
            }
        }
]
}
```


(5) Data Control Request

Title: ID+PWD/write_data

Payload instance:

Write single or multiple pieces of data:


```
{
"Unix": "1614576888000",
"Version": "V1.0",
"Write_Data": {
        "device 1": {
```

```
            "temperature": 20,
            "length": 16,
            "yield[2]": 55,
            "yield[4]": 22
        },
        "device 2": {
            "temperature": 20,
            "length": 16,
            "yield[2]": 55,
            "yield[4]": 22
        }
}
}
```


Parameters

Name	Explanation
Unix	Time of publication, UNIX timestamp in millisecond format
Version	Protocol version number. The current protocol version is fixed to "V1.0"
Write_data	Root node
Device 1, device 2	Device name added in Box Manager
Command key value pair	If the instruction name is followed by "[]", it means that the instruction is added in batches, and "[2]" 2 is offset, which refers to the third output data

(6) Data Control Request Reply

Title: ID+PWD/write_reply


```
{
"Unix": "1614576888000",
"Version": "V1.0",
```

```
"Write_Reply": {
    "device 1": {
        "temperature": "OK",
        "length": "OK",
        "yield[2]": "OK",
        "yield[4]": "OK"
    },
    "device 2": {
        "temperature": "ERROR0",
        "": "ERROR1",
        "yield[2]": "ERROR2",
        "yield[4]": "ERROR0"
    }
}
}
```


Parameters

Name	Explanation
Unix	Time of publication, UNIX timestamp in millisecond format
Version	Protocol version number. The current protocol version is fixed to "V1.0"
Write_data	Root node
Device 1, device 2	Device name added in Box Manager
Command key value pair	If the instruction name is followed by "[]", it means that the instruction is added in batches, and "[2]" 2 is offset, which refers to the third output data Execution result: OK: successful execution ERROR0: Write value failed ERROR1: The instruction was not found ERROR2: Other errors

(7) Obtained data

Title: ID+PWD/access_data

{

"Unix": "1614576888000",

"Version": "V1.0",

"Content": "savedata"

}

Parameters

Name	Explanation
Unix	Time of publication, UNIX timestamp in millisecond format
Version	Protocol version number. The current protocol version is fixed to "V1.0"
Content	"Savedata": data of traffic saving mode "Alldata": all data "Systemdata": system data

After ABOX subscribes to the message, the returned data is published through "ID+PWD/pub_data".

8. Alibaba IoT platform

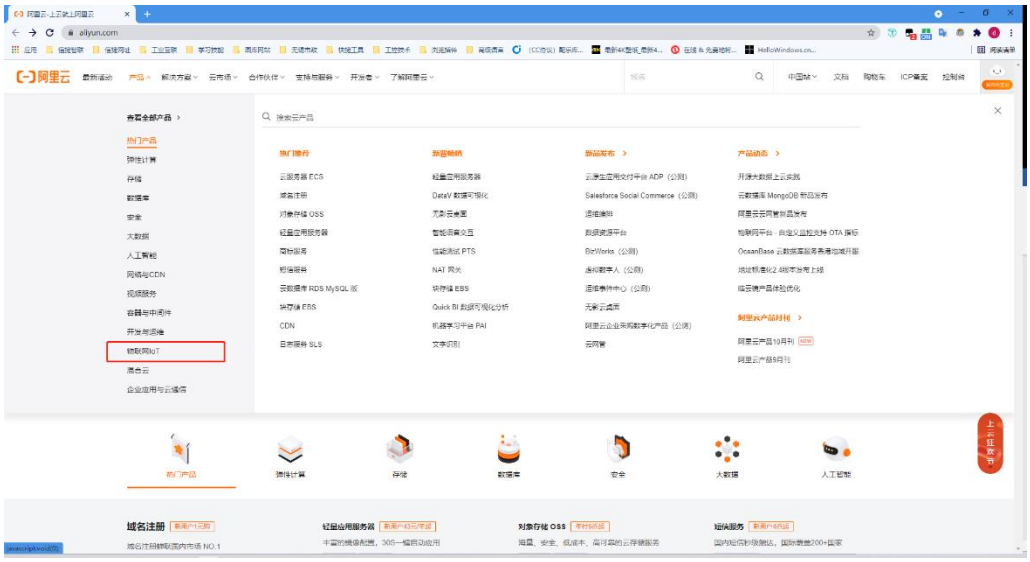
8-1. Overview

Alibaba Cloud Internet of Things platform provides secure and reliable connection and communication capabilities for devices, connecting massive devices downward, and supporting device data collection to the cloud. The cloud API is provided upward, and the server sends instructions to the device by calling the cloud API to achieve remote control.

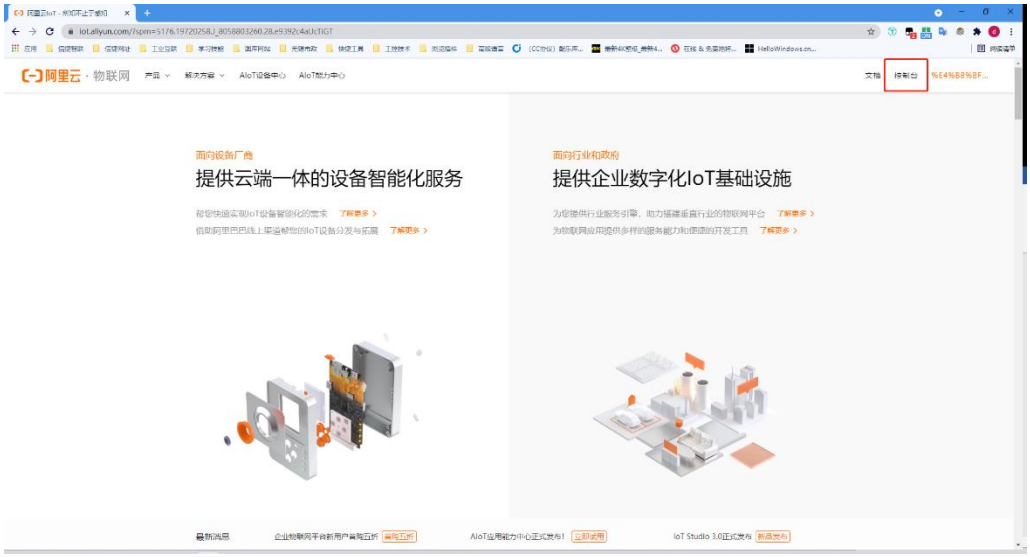
The IoT platform also provides other value-added capabilities, such as device management, rule engine, etc., enabling various IoT scenarios and industry developers. Xinje A-BOX series connects PLC data with Alibaba Cloud Internet of Things platform.

8-2. Operation steps

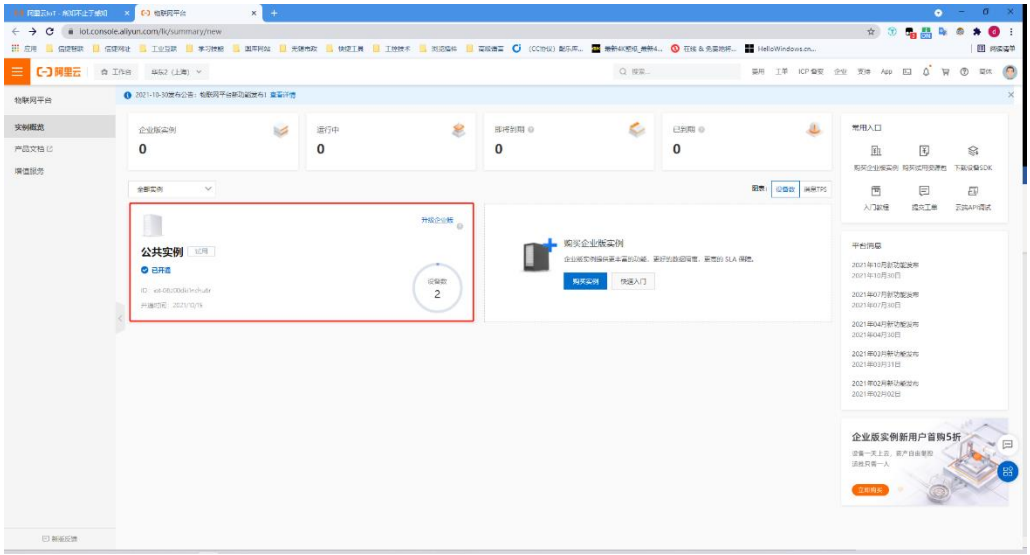
1. Log in to Alibaba Cloud account and find "IoT" in the product.



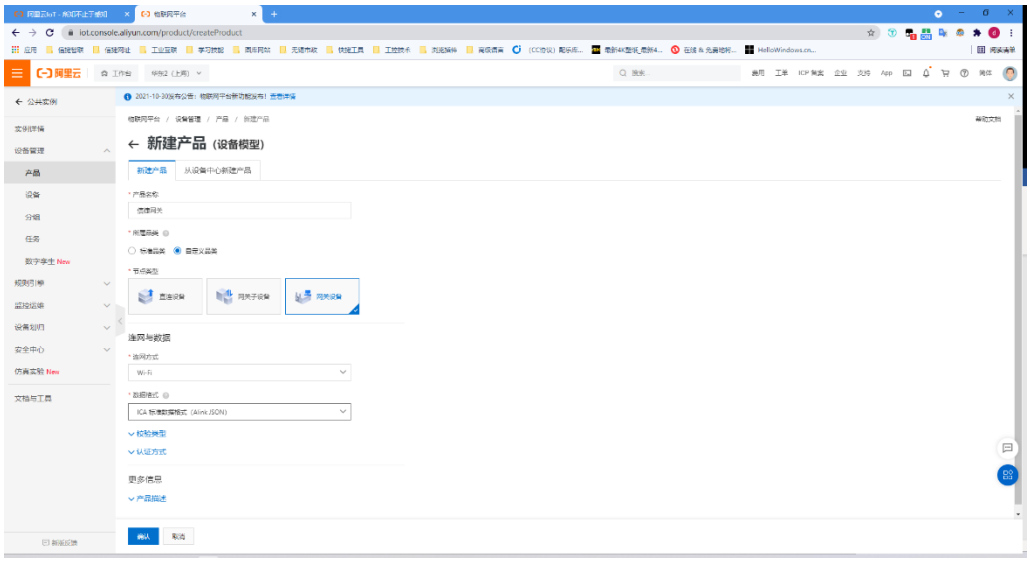
2. Find "Console" in "IoT".



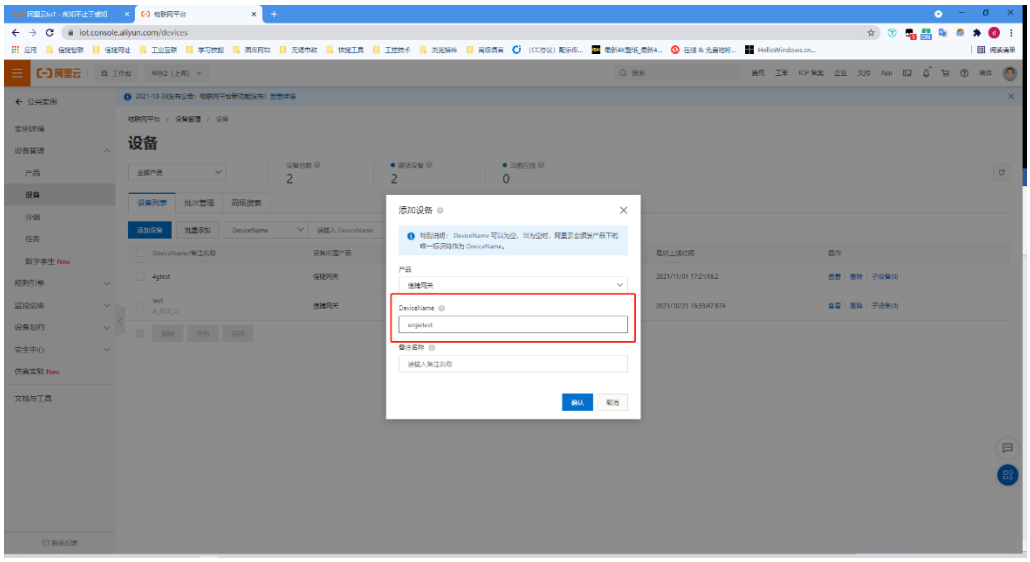
3. After entering the Console, click Public Instance



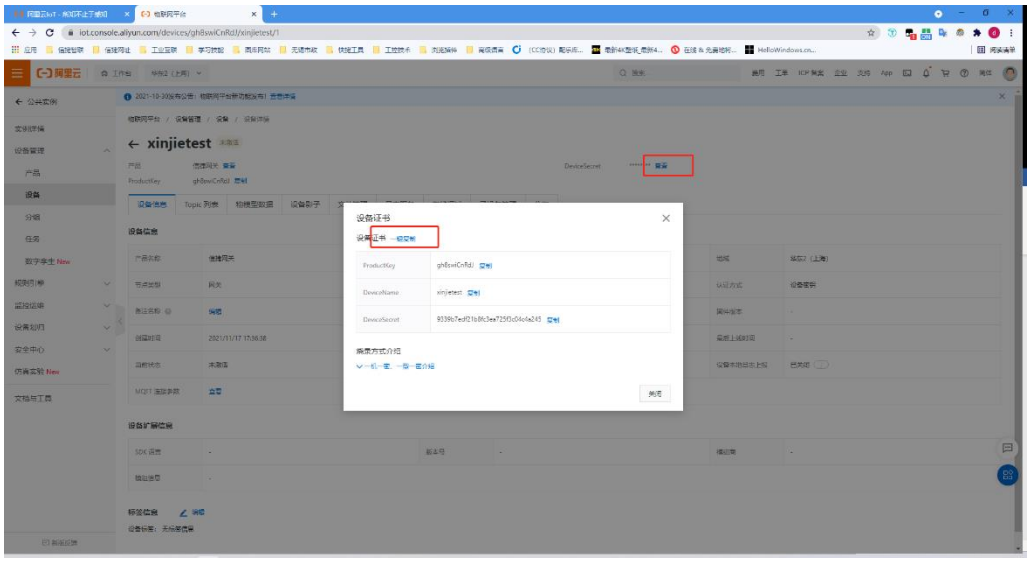
4. Create a product in the "Product" column of "Equipment Management" and confirm to save.



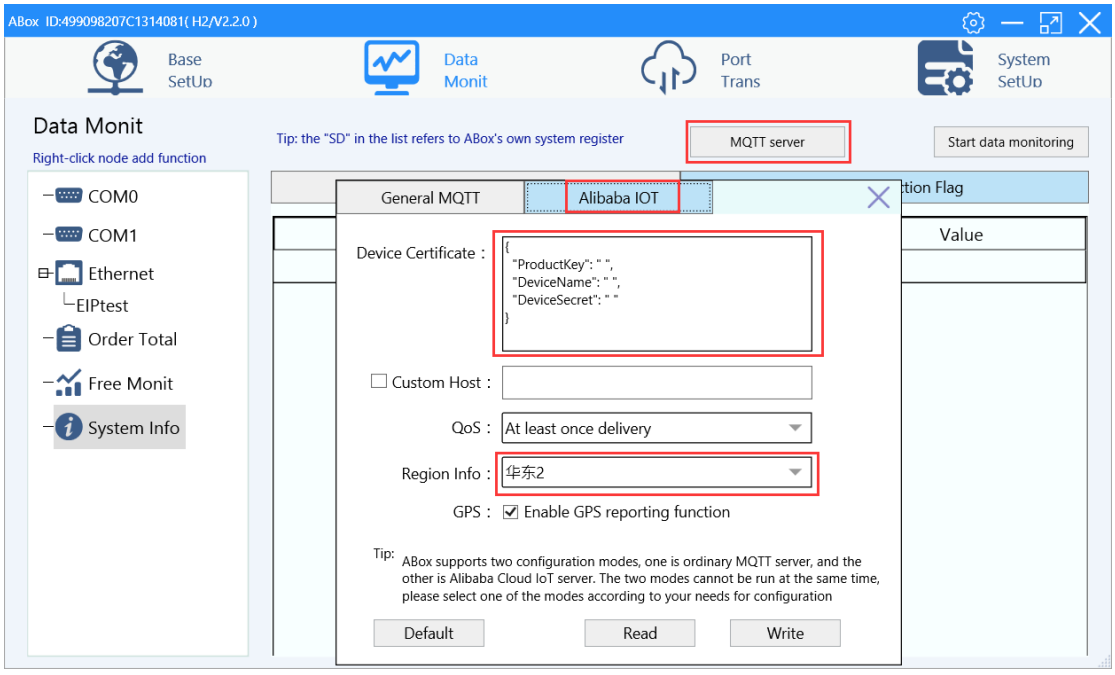
5. In "Device", click "Add Device" to set a "DeviceName" for the device.



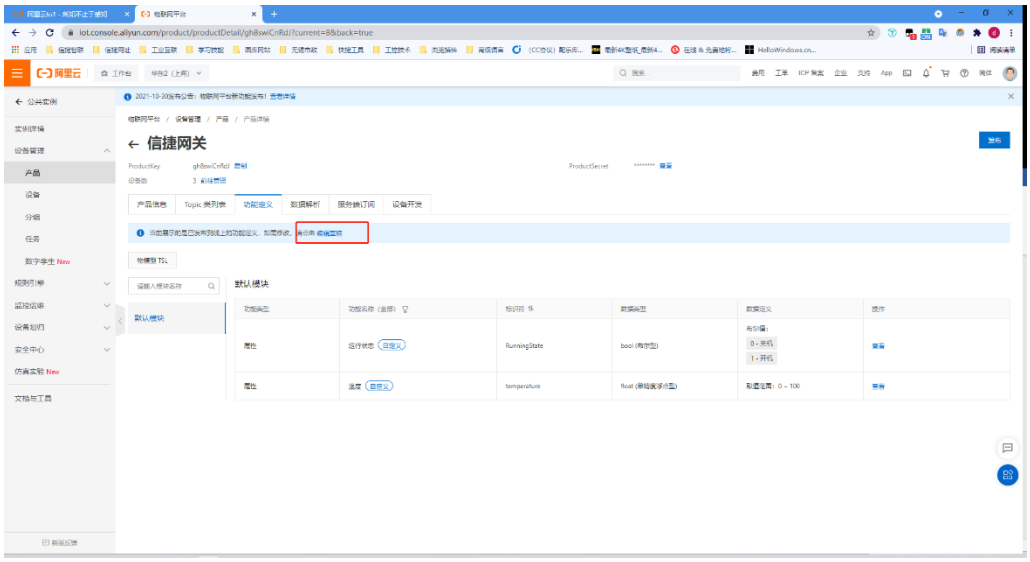
6. Click to enter the device and click "DeviceSecret" to view. "One click copy" the device certificate. Check that the "region" is "East China 2 (Shanghai)".



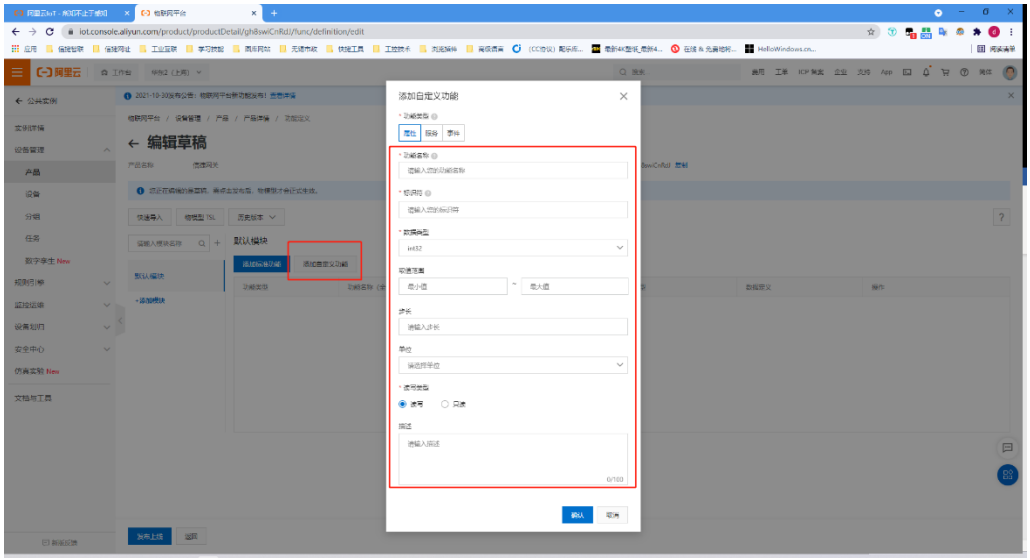
7. Connect A-BOX, select "Alibaba IoT" in "MQTT Server", paste the device certificate copied with one click into the input box, and select "East China 2" for regional information.



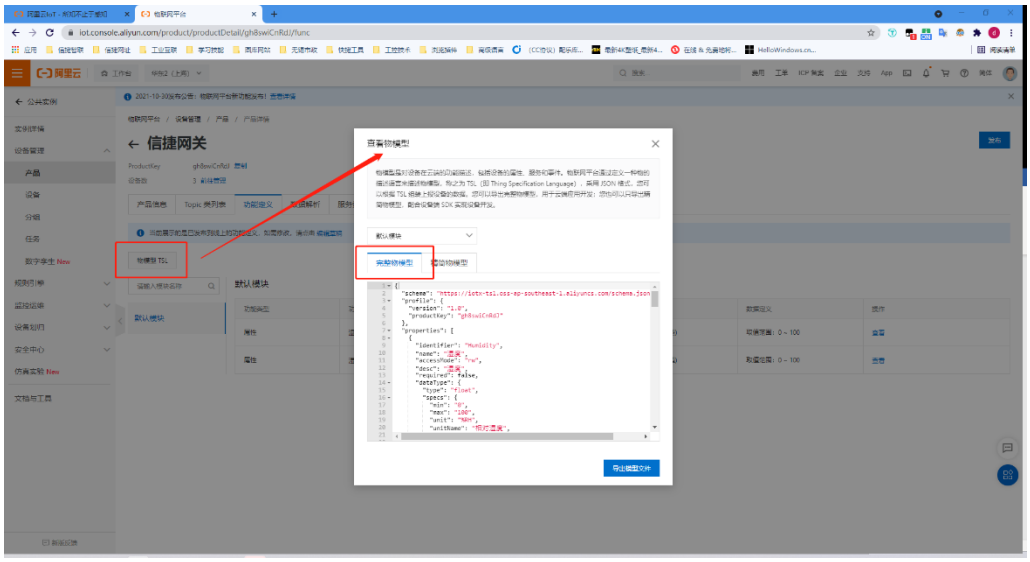
8. On the Alibaba Cloud Internet of Things platform, click "Function Definition" in the product and click "Edit Draft".



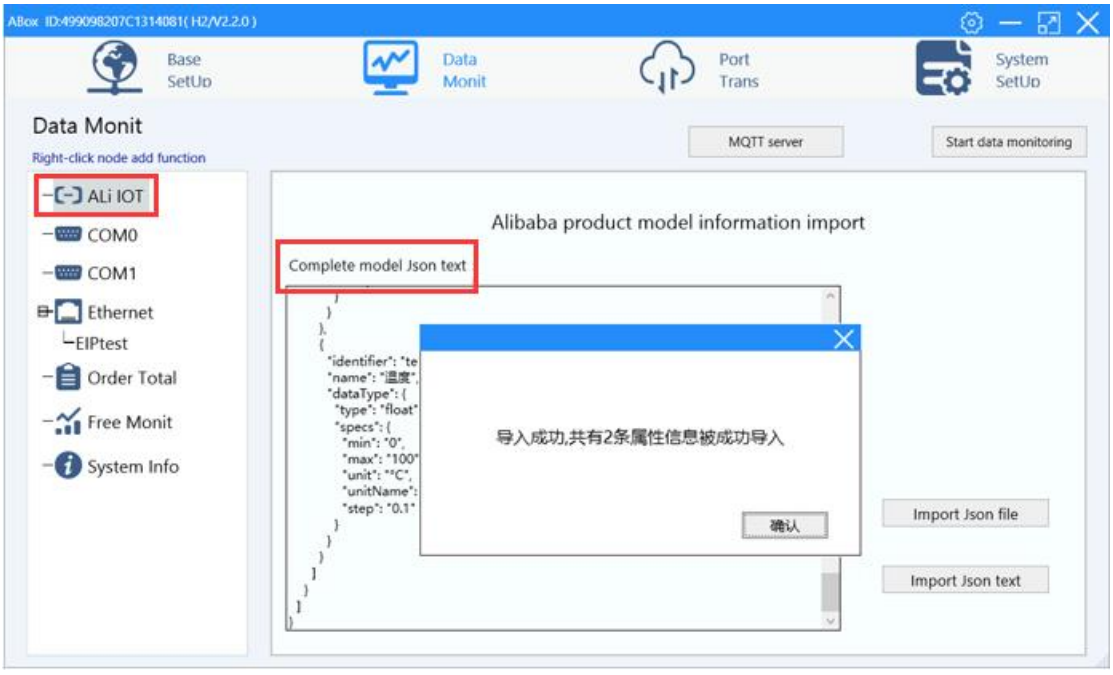
9. Click “Add User defined Function” to define data name, type, company, etc. After adding data, click Publish Online.



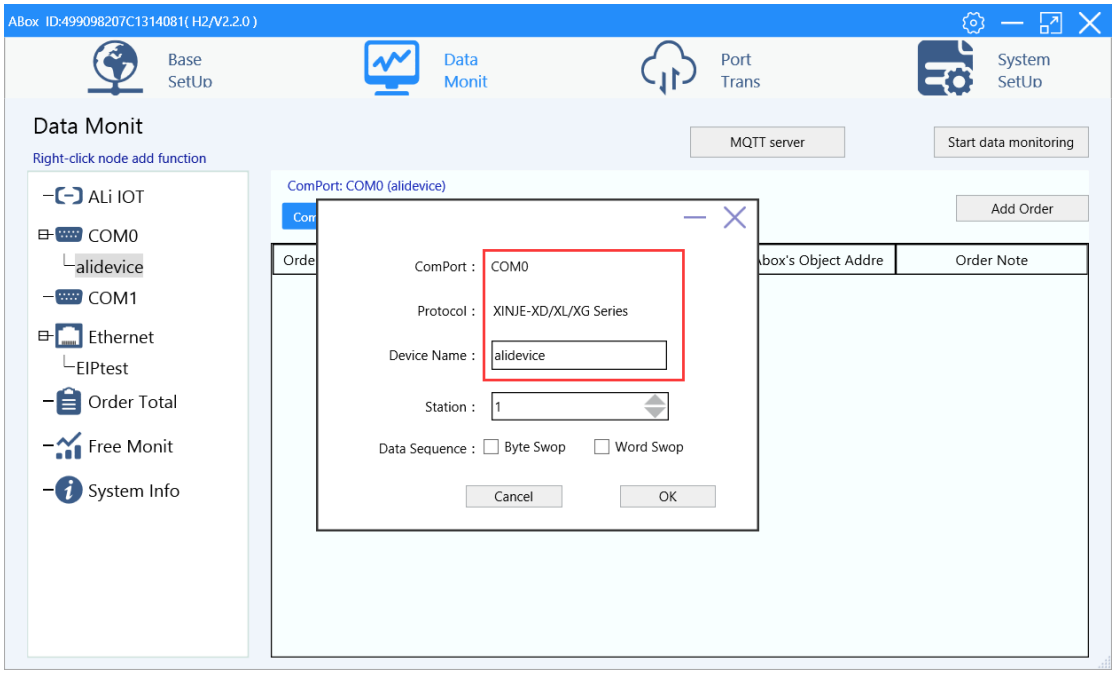
10. Click "Things Model TSL", in the perfect things model, select all and copy.



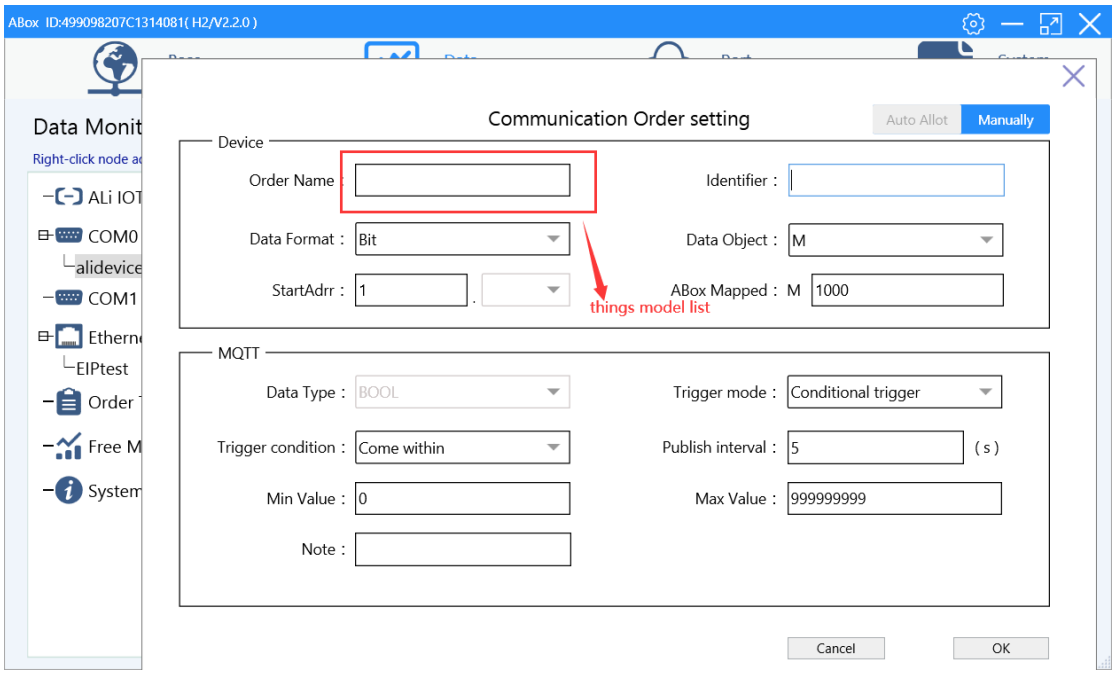
11. In the A-BOX configuration tool, paste in "Complete model Json text" of "Alibaba IoT". Click "Import Json text" after pasting.



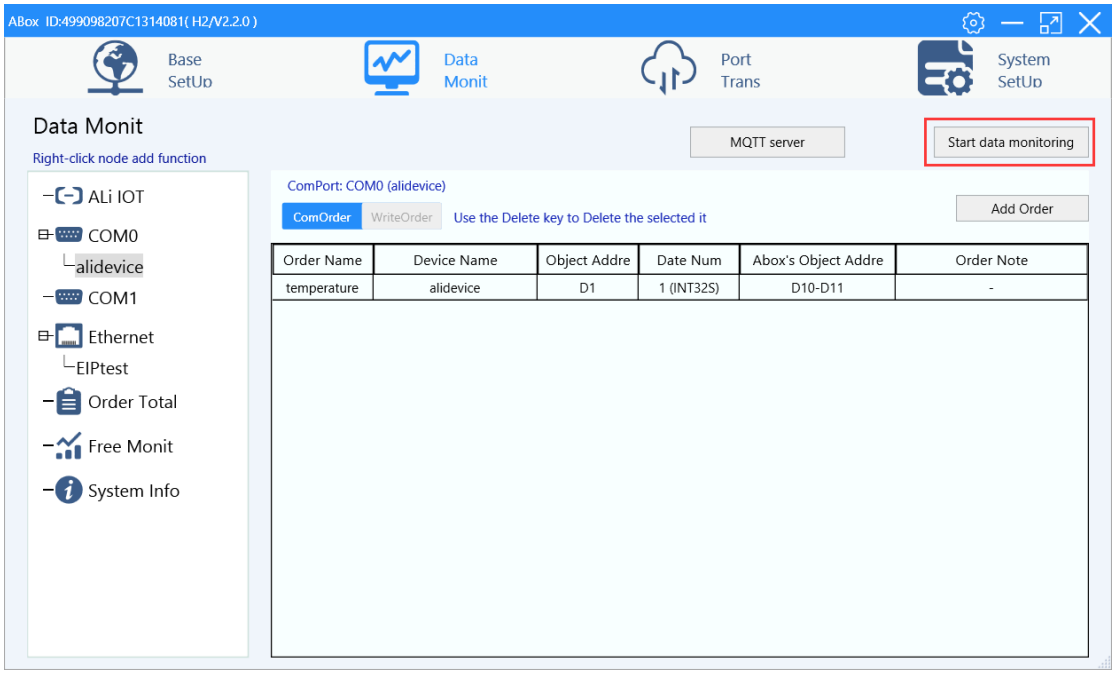
12. Configure the PLC connected with ABOX. In this case, the PLC connected is XDH. Select COM0, click add device.



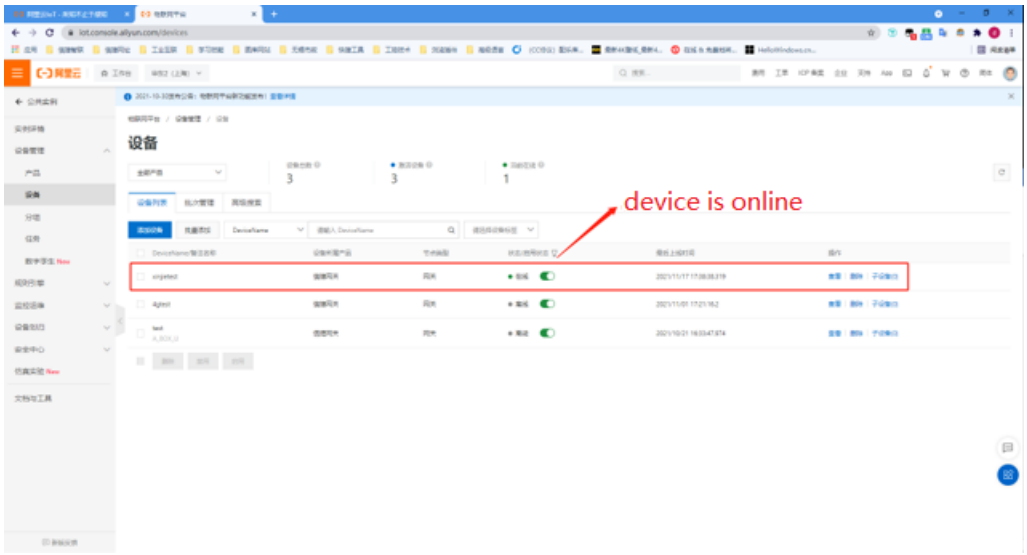
13. When adding instructions, it will automatically display the things model list added by the IoT platform, configure the address corresponding to PLC, and configure the triggering form of MQTT.



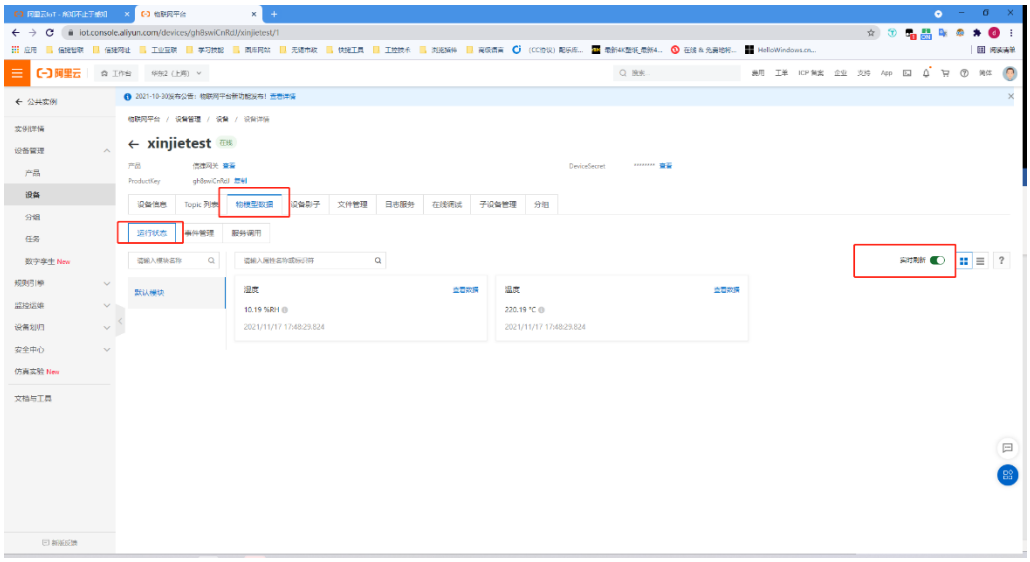
14. After data configuration, click "Start Data Monitoring".



15. On the Alibaba Cloud IoT platform, you can see that the device is online.



16. Click the device to view the data status in "Things Model Data".



9. OPC DA function

9-1. Version explanation

Hardware version	Firmware version	Config tool version	Support OPC DA function	Solution
H1	V1.0.0	XNetConfigTool V2.1.001	No	The H1 hardware version does not support the OPC DA function, and the H2 hardware version is required to use this function.
	V1.0.23	XNetConfigTool V2.1.010	No	
	V1.0.24	XNetConfigTool V2.2.024	No	
	V1.0.25	XNetConfigTool V2.2.040	No	
H2	V1.0.24	XNetConfigTool V2.2.024	No	Return to factory to update the firmware
	V1.0.25	XNetConfigTool V2.2.040	No	
	V2.1.0	BOX Manager V1.1.0 and up	No	

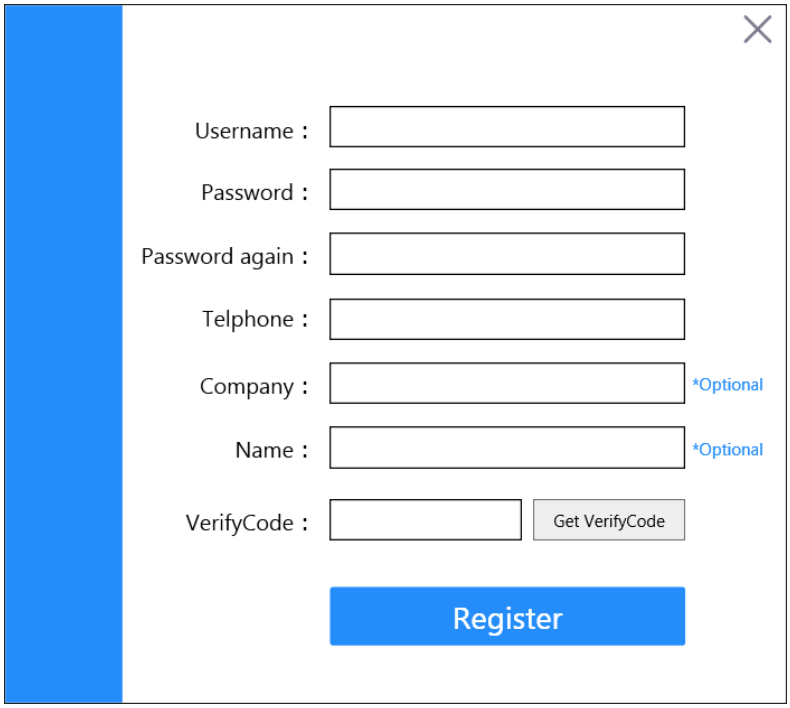
	V2.1.1	BOX Manager V1.1.1 and up	No	Upgrade with BOX Manager (V1.3.0) and above
	V2.2.0	BOX Manager V1.2.0 and up	No	
	V2.2.0	BOX Manager V1.3.0 and up	Yes	-

Note: At present, the OPC function is only for remote use in the WAN. LAN is not supported temporarily.

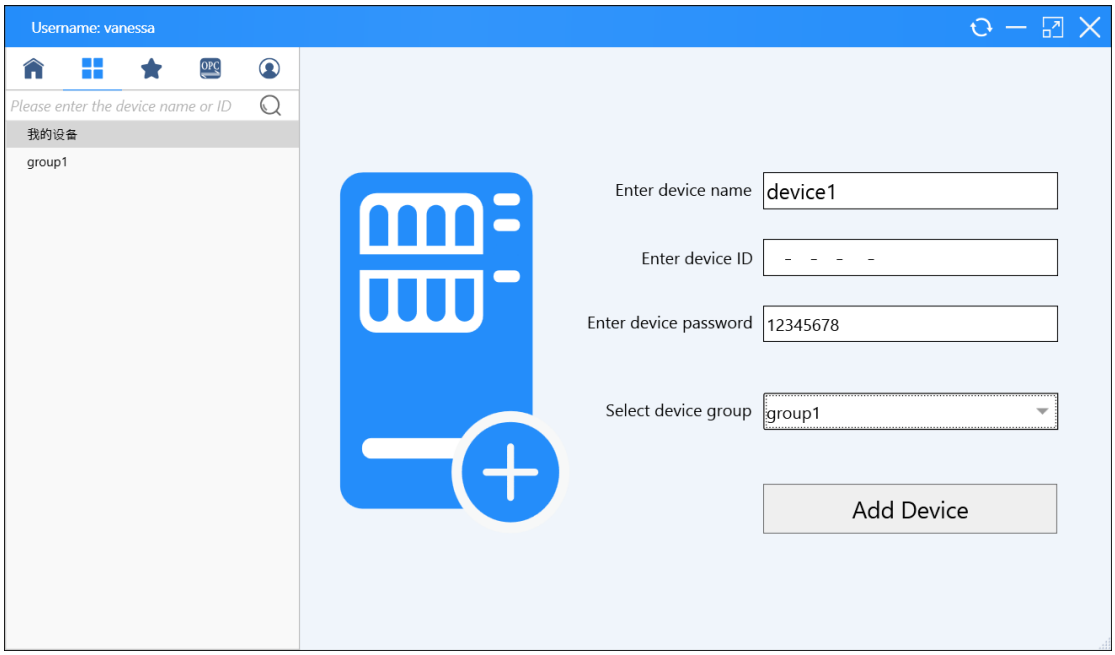
9-2. Preparation

OPC DA function has been added to BOX Manager V1.3, which can realize data communication between configuration software such as Kingview, Force Control, WINCC and A-BOX equipment. This paper introduces the simple application of OPC DA function with the Kingview software.

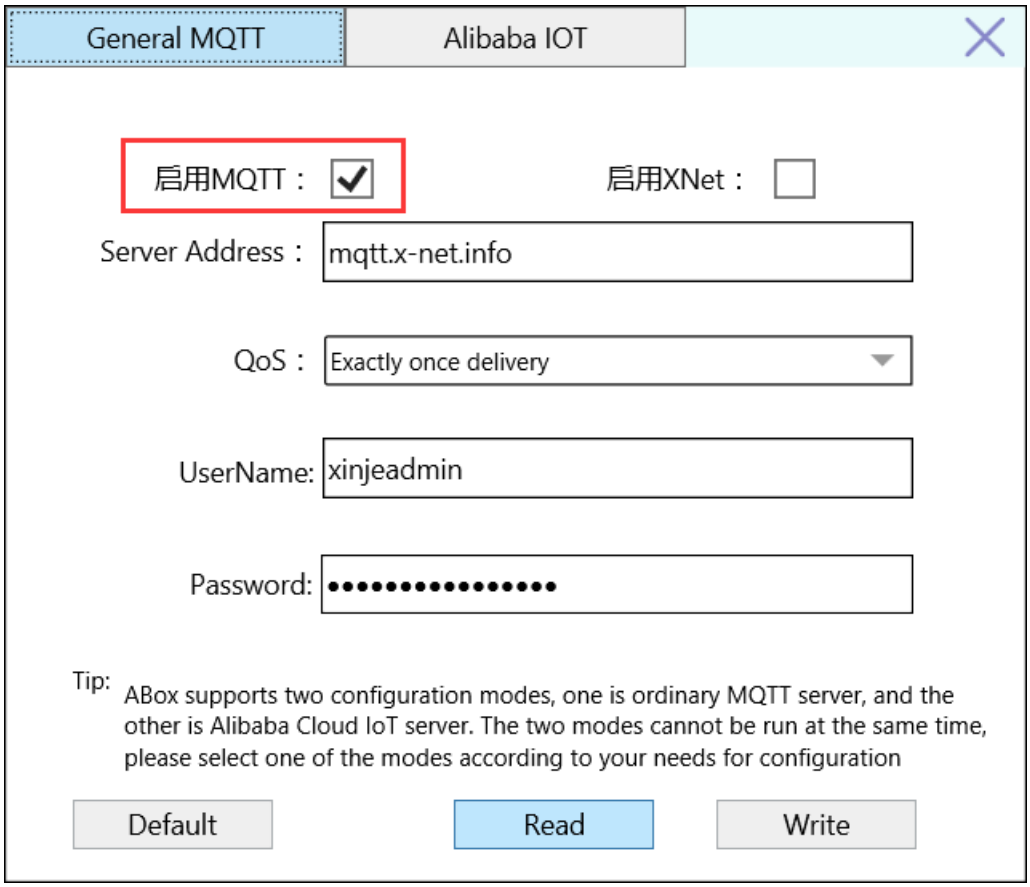
(1) First, the BOX Manager needs to use the account login mode, and log in after the account is registered.

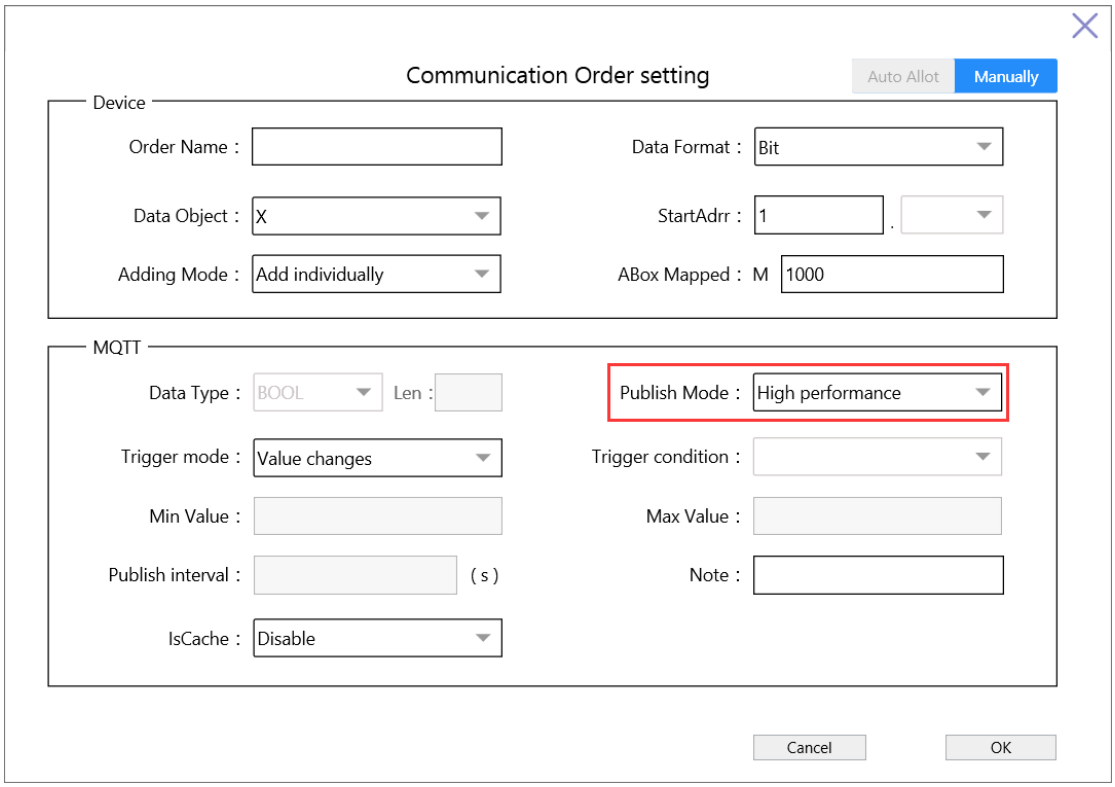


(2) Add device



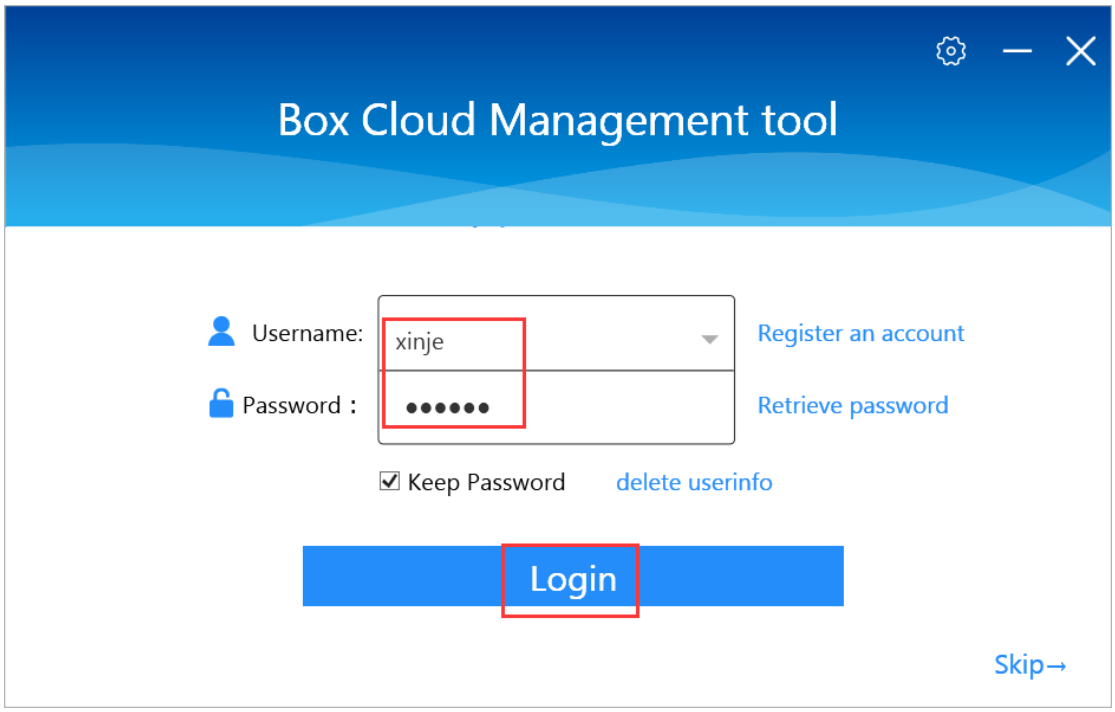
(3) Enter A-BOX to configure data monitoring. For data to be converted to OPC DA protocol, please check "Enable MQTT" when configuring data, and change the "publish mode" of the configured data to "high performance" mode.



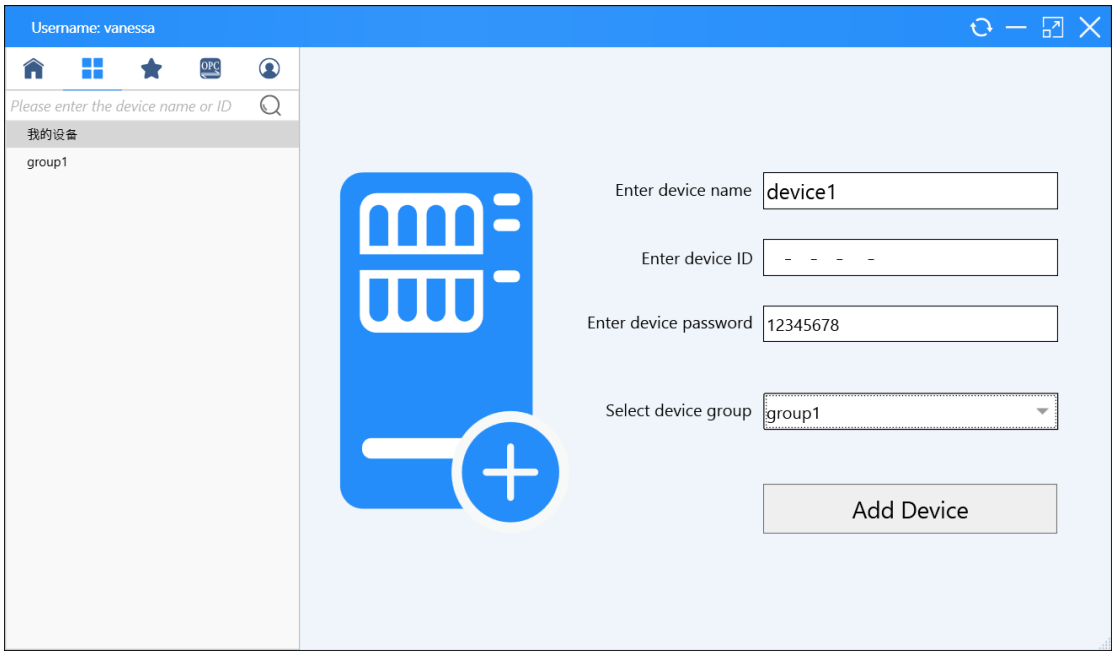


9-3. OPC communication between Kingview software and A-BOX

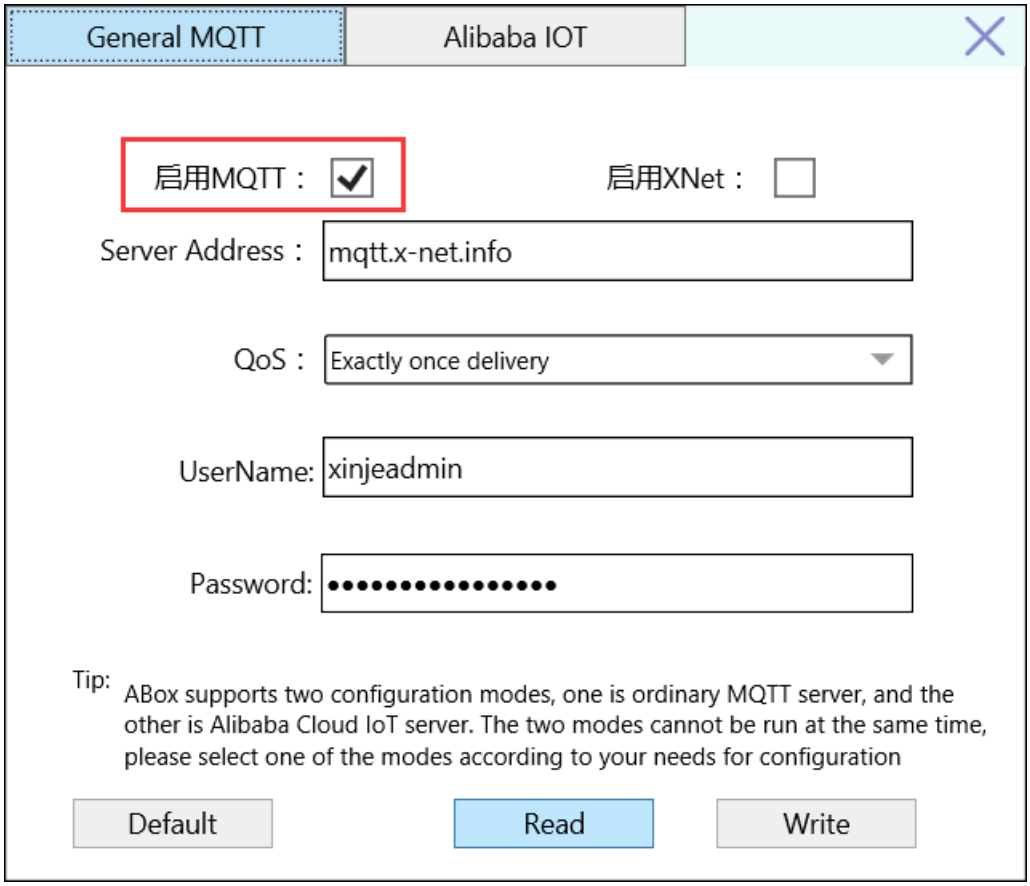
(1) Log in to the BOX Manager using the account login mode.



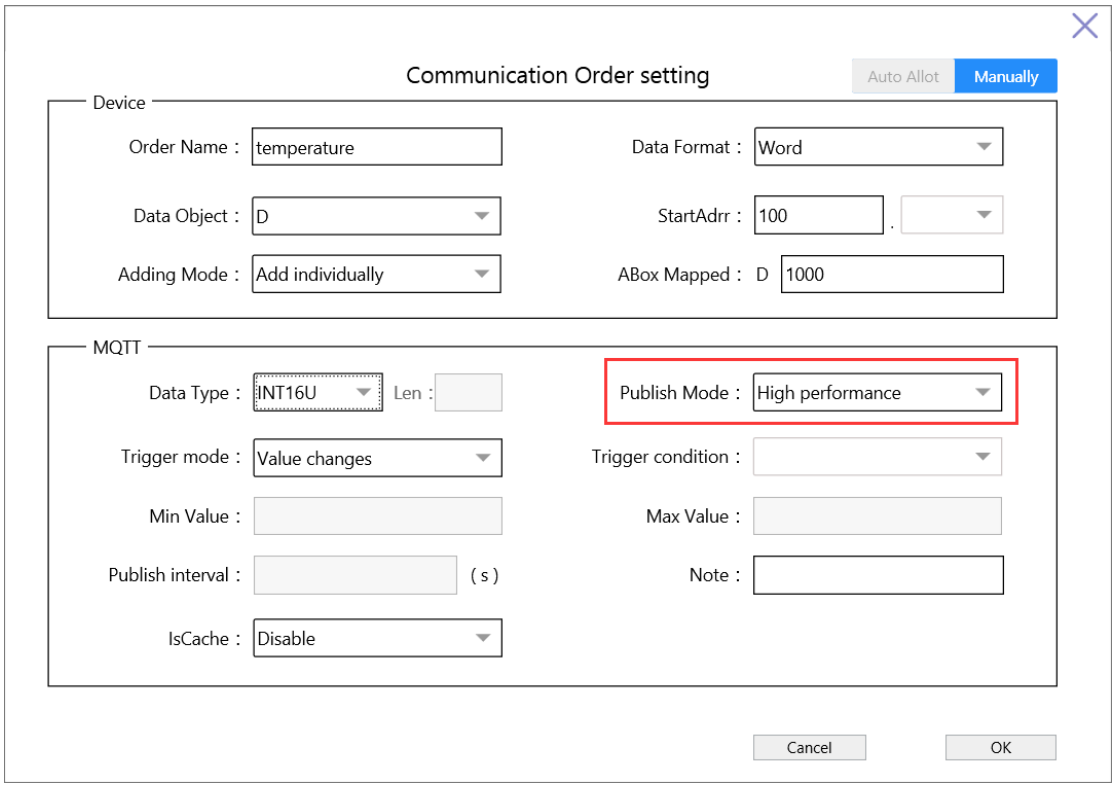
(2) Add device



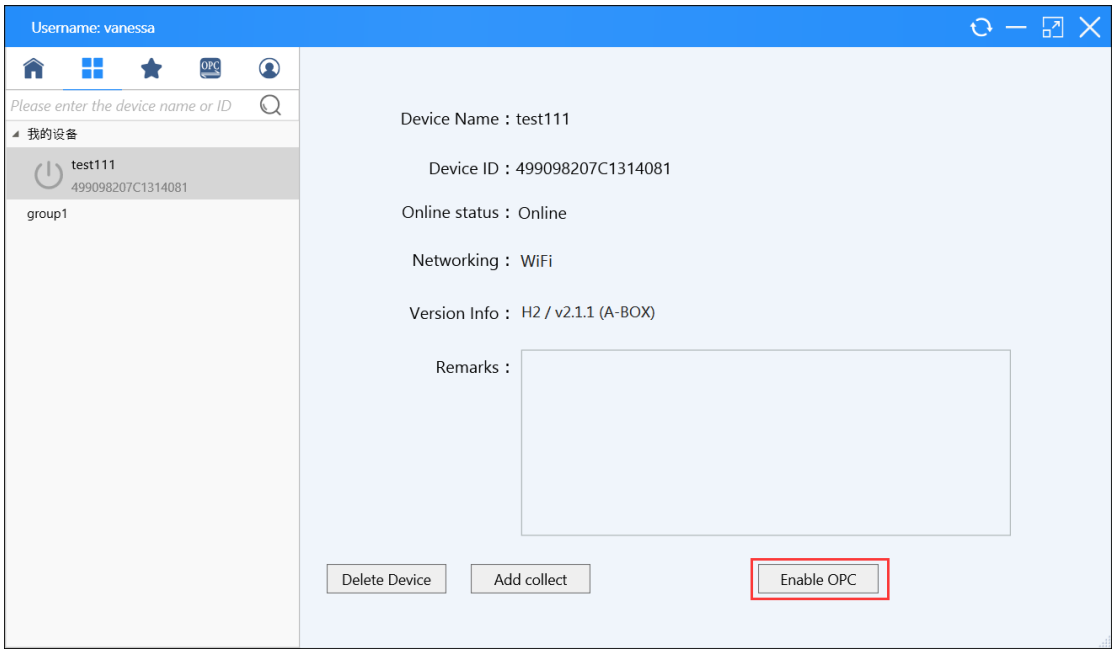
(3) Enter A-BOX to configure data monitoring. First, check "Enable MQTT" in "MQTT Server Settings", and other configuration information keep default.



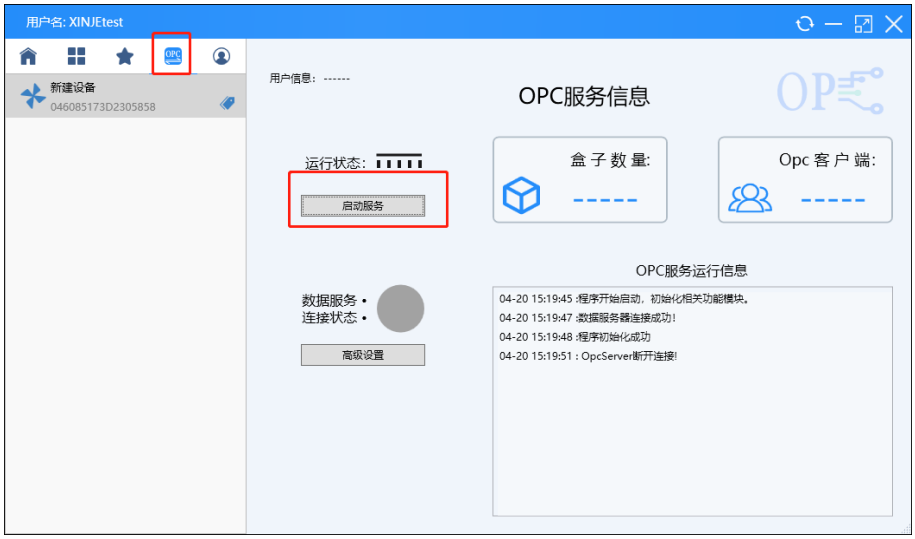
(4) According to the connected PLC, select the corresponding serial port or network port to create a new device, add the "communication command", and change the "publish mode" of the data to the "high-performance" mode. After configuring the data to be monitored, click "Start Data Monitoring".



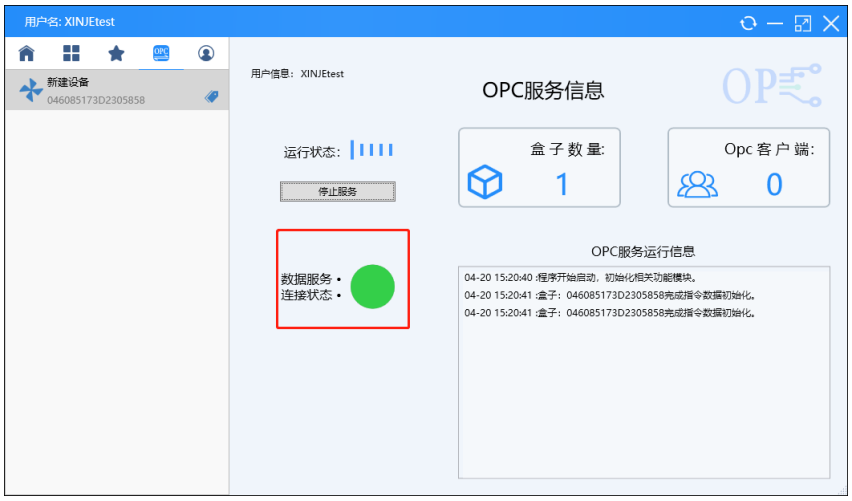
(5) Exit the current ABOX configuration. In the main screen, "Enable OPC" will be displayed, which will be enabled after clicking.



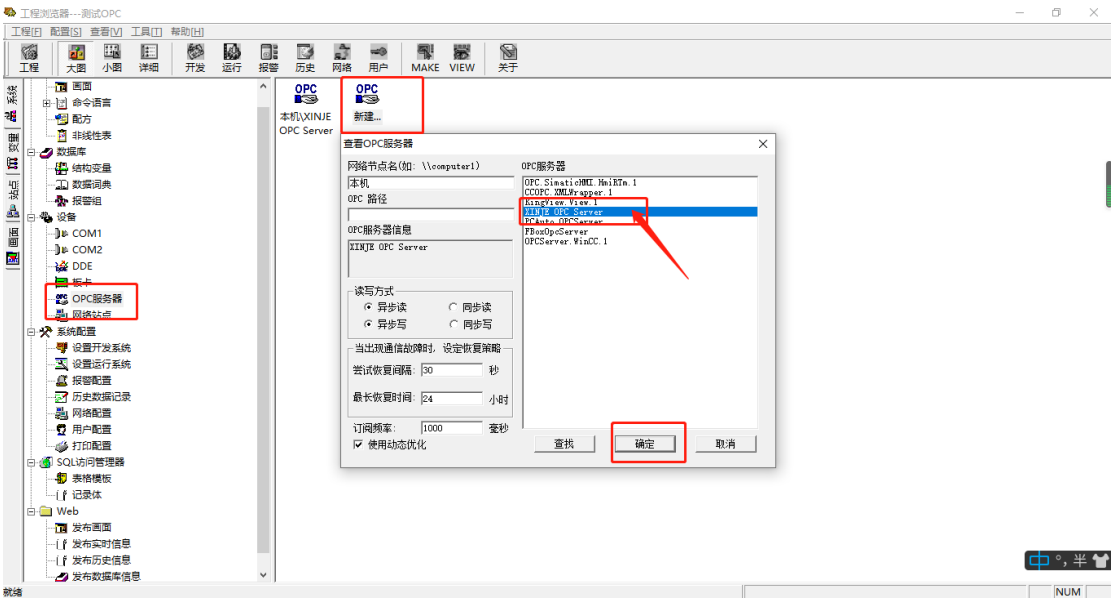
(6) In the menu bar, click OPC function option. Click "Enable Service" to start OPC Server function. In advanced settings, you can set whether to start automatically after power on, as well as server address and server port.



The status indicator turns green after successful startup.



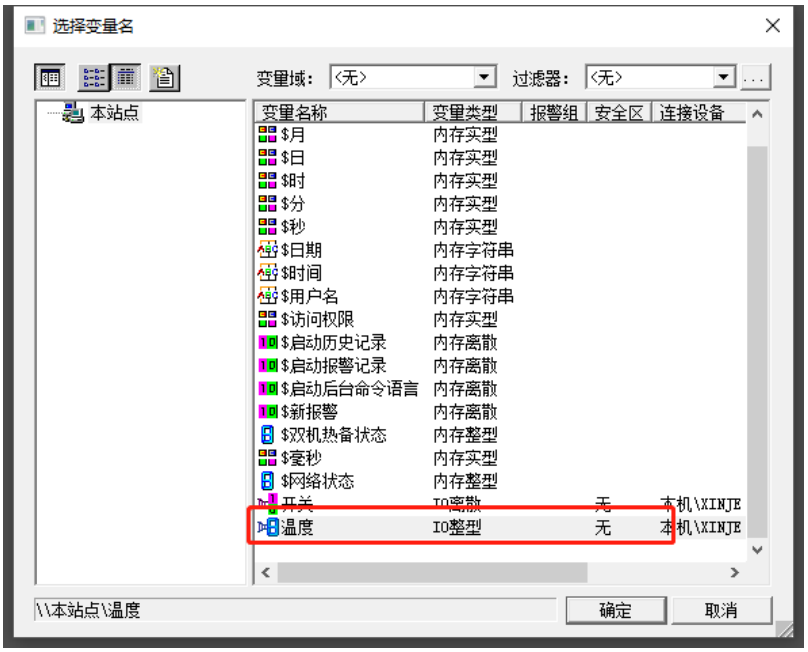
(7) After successful startup, open KingView software. Create a new project, after entering the project, click "OPC Server", create a new OPC Server, and select "XINJE OPC Server".



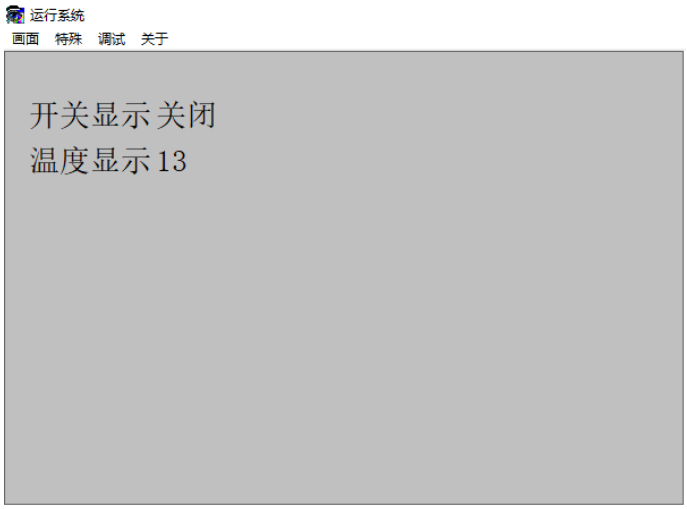
(8) Click "Data Dictionary" to create new data and variable type, and select "I/O Discrete", "I/O Integer" or "I/O Real" according to the variable type of PLC. Select "Local XINJE OPC Server" for "Connection Device". Select by OPC level in "Register" to determine the last data point. You can modify the read/write properties of data points on this page.

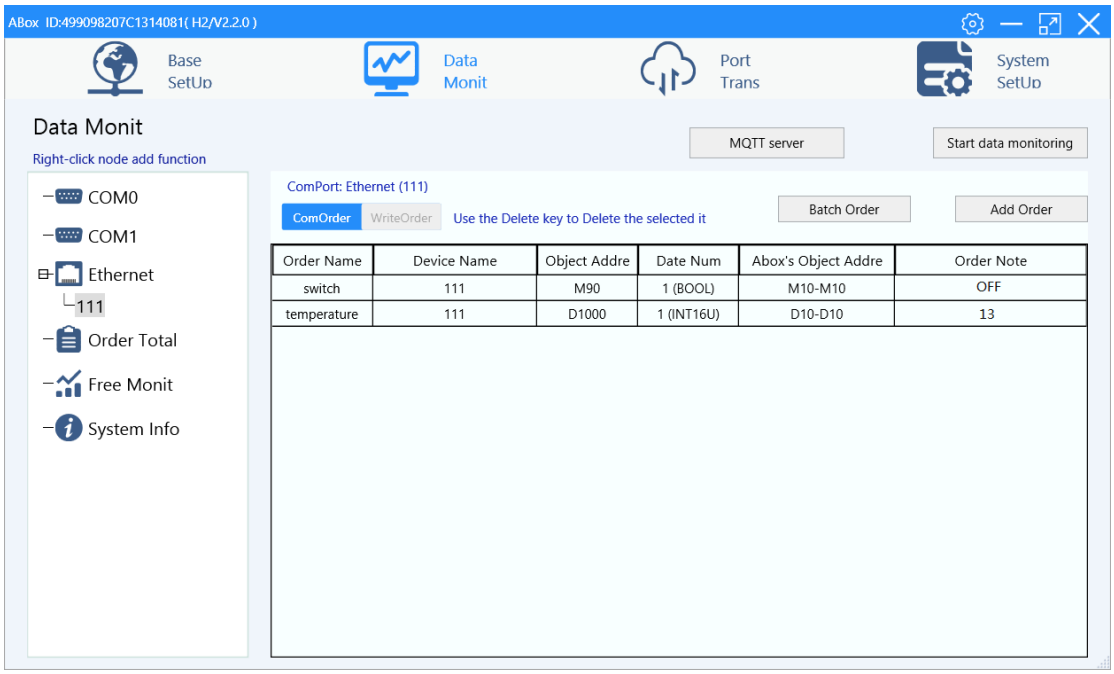
(9) Create a new screen, bind data, and set corresponding input/output attributes according to the attributes of data points.

Configured data dictionary before selecting:



(10) After saving, the operation screen can be seen that the screen in the operation system corresponds to the ABOX register and the data in the PLC.


运行系统
画面 特殊 调试 关于
开关显示 关闭
温度显示 13


ABox ID:499098207C1314081(H2/V2.2.0)
Base SetUp
Data Monit
Port Trans
System SetUp
Data Monit
Right-click node add function
MQTT server
Start data monitoring
COM0
COM1
Ethernet
111
Order Total
Free Monit
System Info
ComPort: Ethernet (111)
ComOrder
WriteOrder
Use the Delete key to Delete the selected it
Batch Order
Add Order
Order Name | Device Name | Object Addre | Date Num | Abox's Object Addre | Order Note
switch | 111 | M90 | 1 (BOOL) | M10-M10 | OFF
temperature | 111 | D1000 | 1 (INT16U) | D10-D10 | 13

10. Q&A

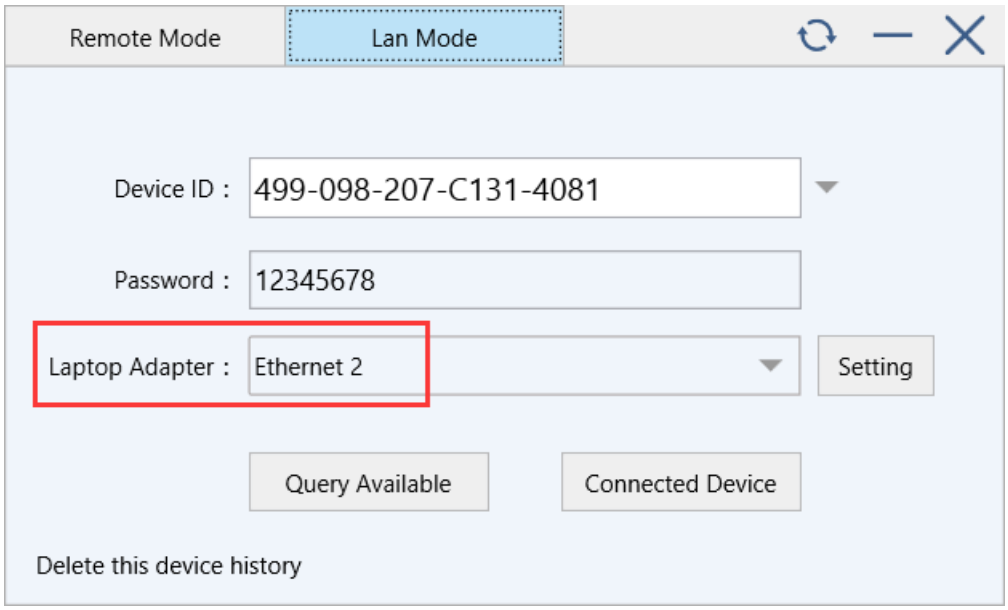
Q1: The A-BOX you just got is directly connected to the computer with the network cable, and the LAN is not connected.

A: There are several steps to solve the problem:

① Connect the network cable directly to the computer and check the IP address automatically obtained by the computer. The factory default assigned IP address of A-BOX series is 192.168.1.xxx. And use the "ping" command to ping whether 192.168.1.1 is pinged.

② If two IPV4 addresses appear in the computer network card details center, you need to uninstall the corresponding network card driver in the Device Manager, and then scan and install again.

③ Open the BOX Manager and confirm the LAN connection interface. The "Laptop Adapter" selects the Ethernet network card connecting A-BOX, click setting.



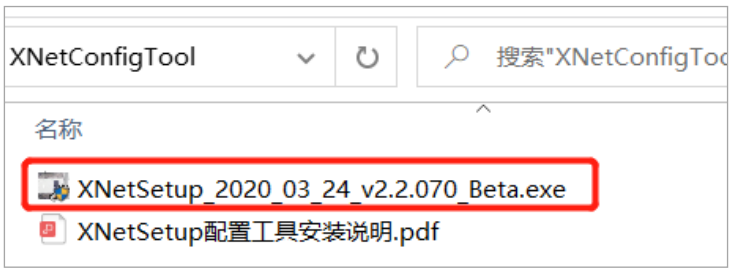
Q2: Why does the black box flash back or the VPN startup information gets stuck during VPN?

A: Check whether the TAP-Windows Adapter V9 driver is available in Network Connection.

If not, please reinstall "XNetConfigTool". Recheck the above drive after installation.

Q3: No authorization information is detected during USB passthrough.

A: In the computer "Control Panel", find "Bonjour" in the "Uninstall Program", and right-click to uninstall. Then install the Xnetconfig tool again.



XINJE

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