EtherNet/IP

EI3 Series Integrated I/O

User Manual

Nanjing Solidot Electronic Technology Co., Ltd

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1 Product Features

1.1 Product Overview

EI3 series integrated I/O module, using EtherNet/IP industrial Ethernet bus interface, is a standard IO structure EtherNet/IP slave equipment, which can be compatible with EtherNet/IP networks of multiple manufacturers, providing users with a variety of options for high-speed data acquisition, optimizing system configuration, simplifying field wiring, and improving system reliability.

1.2 Product Features:

- Input compatible functions
  The digital input signal is compatible with NPN and PNP
- Ultra-slim
  The height is only 35 mm
- High-speed
  100 Gigabit Industrial Ethernet port
- Easy to diagnose
  An innovative channel indicator design is adopted. As the indicators are placed close to the channels, channel status is displayed intuitively and clearly, facilitating detection and maintenance.
- Easy to configure
  The configuration is simple and supports all mainstream EtherNet/IP master stations
- Easy to install and wiring
  DIN 35 mm standard rail installation
  Screw-fixed terminal blocks are used for stable and fast wiring

2 Designation Rules

2.1 Designation Rules

EI 3 - ▢ 16 16 A
(1) (2) (3) (4) (5) (6)

numbering	meaning	Valid values		
(1)	Bus protocols	EI: EtherNet/IP		
(2)	Product range	3: Integrated I/O		
(3)	Type of I/O	Default: digital		
(4)	Input signal point numbers	16:16 channel input	32:32 channel inputs	00:0 channel input
(5)	Output signal point numbers	16:16 channel output	32:32 channel output	00:0 channel output
(6)	Signal type	A：NPN	B:PNP	Default: compatible with NPN&PNP

2.2 List of models

Model	Product Description:
EI3-1616A	16-channel digital I/O module, NPN type
EI3-0032A	32-channel digital output module, NPN type
EI3-3200	32-channel digital input module, NPN&PNP compatible
EI3-1616B	16-channel digital I/O module, PNP type
EI3-0032B	32-channel digital output module, PNP type

3 Product parameters

3.1 General parameters

Interface parameters	
Bus protocols	EtherNet/IP
Number of I/O stations	According to the master station
Data transmission medium	Class 5 or higher UTP or STP (STP recommended)
Transmission distance	≤100 m (distance from station)
Transmission rate	100 Mbps
Bus interface	2×RJ45
Technical parameters	
Configuration	Via the master station
Power supply	24 VDC(18V~36V)
Electrical isolation	500 VAC
Weight	170 g
Size	100×96×35 mm
Operating temperature	-10℃~+60℃
Storage temperature	-20℃~+75℃
Relative humidity	95%, non-condensing
Protection Class	IP20

3.2 Digital parameters

Digital inputs	
Rated voltage	24 VDC(18V~30V)
Number of signal points	16、32
Signal type	NPN/PNP
"0" signal voltage (PNP).	-3~+3 V
"1" Signal Voltage (PNP).	15~30 V
"0" signal voltage (NPN).	15~30 V
"1" Signal Voltage (NPN).	-3~+3 V
Input filtering	The default is 3 ms and is configurable
Input current	4 mA
Isolation method	Opto-coupling isolation
Isolation withstand voltage	500 VAC
Channel indicator	Green LED light
Digital output	
Rated voltage	24 VDC(18V~30V)
Number of signal points	16、32
Signal type	NPN/PNP
The type of load	Resistive loads, inductive loads
Single-channel current rating	Max: 500 mA
Common-side current	Max：10 A
Port Guard	Overcurrent protection
Isolation method	Opto-coupling isolation
Isolation withstand voltage	500 VAC
Channel indicator	Green LED light

4 Panel

4.1 Product Structure

The name and function description of each part of the product

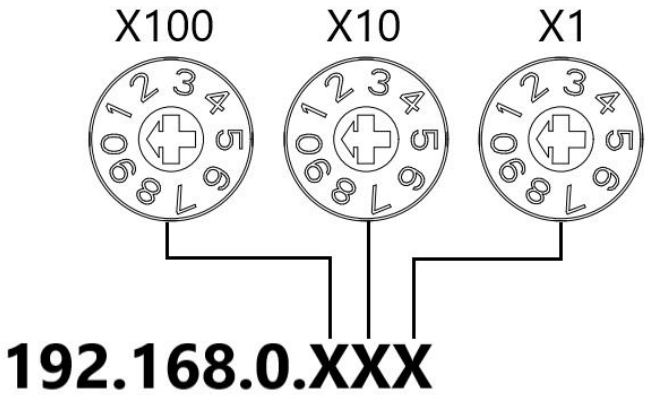
numbering	name	illustrate
①	Dust cover for terminal blocks	Can be opened directly
②	Rotary switches	Set the IP address and reset settings
③	System identification, indicator light	Indicates the power supply, module operation, and network port status
④	Module ID	Mark the product model, channel type
⑤	Rail card slots	Suitable for DIN 35 mm rail fixing
⑥	Bus interface	2×RJ45
⑦	Channel type identification	DI digital inputs DO digital output
⑧	Channel indicators, signs	Indicates the signal status of the corresponding channel

⑨	Terminal blocks	Screw-on terminal blocks
⑩	Snap fastening	Fixing rail clips

4.2 Rotary switches

IP address setting

You can use a rotary switch to specify how to set the IP address of the module.



Setpoint (decimal)	How to set the IP address
000	BOOTP-based settings
001～254	Set the lowest IP address to 1 byte. It can be set in the range of 1~254 by "×100" to 100 digits, "×10" to 10 digits, and "×1" to single digits. The IP address is 3 bytes at a high level, and the value set by the host computer is the same as the previous one. When the IP address is set to a value other than 000 by rotating the switch in the factory state, the high 3Byte is 192.168.0.
255～	When the rotary switch is set to 255 or above, the module will be powered on by the previous start mode and parameters.

The rotary switch at the factory is set to "000".

Remark:

1、 **Tool selection**
Screwdriver size: 2 mm opening.

2、 **The rotary switch IP must be set in the event of a power failure. If you need to change the IP address during communication, you must power it on again after the new settings are completed.**

Reset function

A factory reset can be performed by means of a special operation of the rotary switch.

For specific operation methods, please refer to: 7.2 Restore factory settings.

4.3 Indicator function

Name	Mark	Color	Status	Status description
Power indicator	P	green	ON	The power supply is normal
			OFF	The product is not powered on or the power supply is abnormal
Network indicator IN	L/A1	green	ON	Establish a network connection
			flashing	Network connection and data interaction
			OFF	No data interactions or anomalies
Network indicator OUT	L/A2	green	ON	Establish a network connection
			flashing	Network connection and data interaction
			OFF	No data interactions or anomalies
Network status indicator	NS	green	ON	The device is connected
			1Hz flashing	The device is undergoing a power start-up test.
			OFF	The device does not obtain an IP address, the device does not establish a connection but obtains an IP address, or the IP address is duplicated or the power is cut off.
Module status indicator	MS	red	ON	An unrecoverable major error occurred on the device
			1Hz flashing	The device is undergoing a power start-up test; A minor exception that is recoverable occurs on the device.
			OFF	The device is normal, and the power is cut off.
Enter the	00～1F	green	ON	The module channel has a signal input

channel status indicator			OFF	There is no signal input or abnormal signal input in the module channel
Output channel status indicator	00～1F	green	ON	The module channel has a signal output
			OFF	There is no signal output in the module channel or the signal output is abnormal

4.4 Product model and information identification

name	logotype	description
Module model	EI3-1616A	Module model
Bus protocols	EtherNet/IP	Bus protocols
Channel type	16DI+16DO	16 channels of digital input + 16 channels of digital output
	IN:TYP4mA(DC24V);NPN/PNP	Input channel: current 4mA, voltage 24V, compatible with NPN &PNP
	OUT:Max.0.5A/Ch; NPN	Output channel: single channel current up to 0.5A, NPN type

4.5 Terminal block identification

EI3-1616A/EI3-1616B

logotype	description
S24V	System power supply
S0V	
ON	Protecting earthing
WITH	Enter the public side
OF	Digital input channels
00~0F	Input channel
F24V	Operation power supply
F0V	
NC	Empty terminals
DO	Digital output channel
10~1F	Output channel

Note: EI3-1616A/EI3-1616B terminal blocks have the same markings.

EI3-0032A/EI3-0032B

logotype	description
S24V	System-side power supply
S0V	
ON	Protecting earthing
NC	Empty terminals
DOa	Digital output channel
Age	
00~0F	Output channel
10~1F	
F24V	Field-side power supply
F0V	

Note: EI3-0032A/EI3-0032B terminal blocks have the same markings.

EI3-3200

logotype	description
S24V	System-side power supply
S0V	
ON	Protecting earthing
COMA	Enter the public side
COMB	
Dio.	Digital input channels
DIb	
00~0F	Input channel
10~1F	
NC	Empty terminals

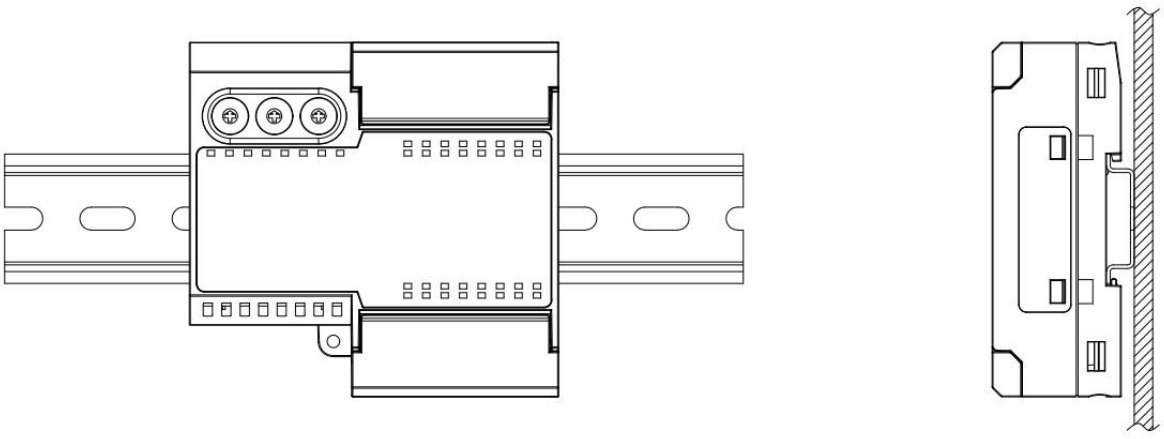
5 Installation and Disassembly

Precautions for installation and disassembly

- Ensure that the cabinet is well ventilated (e.g. install an exhaust fan in the cabinet).
- Do not install this device next to or on top of a device that may cause overheating.
- Be sure to install the module vertically, with sufficient spacing between the module and surrounding equipment.
- Installation/disassembly must be carried out in the state of cutting off the power supply.

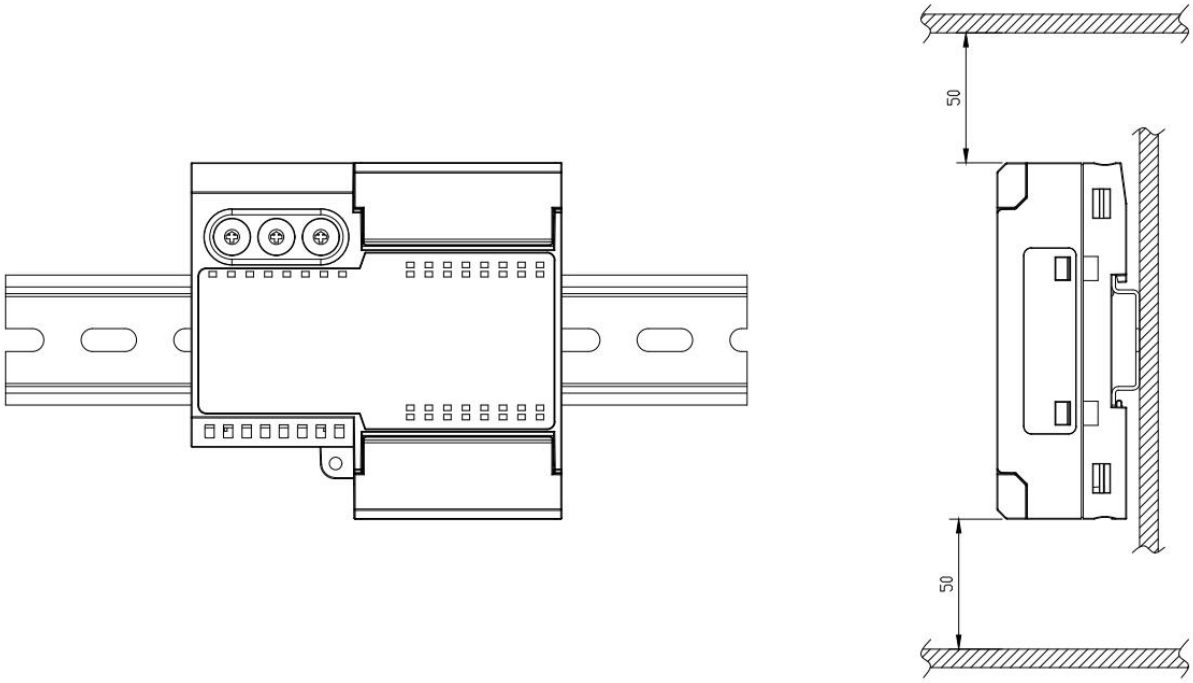
Installation instructions

In order to maintain normal heat dissipation of the module, it is necessary to install the module vertically to ensure smooth airflow inside the module.



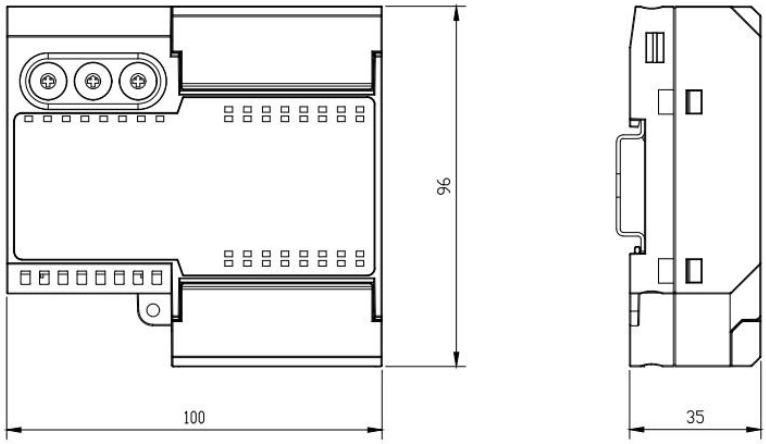
Minimum clearance

The protection level of the module is IP20, which needs to be installed in the box or cabinet, and when installing, the module and other modules or heating equipment, the module and other equipment or wiring slots, please follow the minimum clearance (unit: mm) shown in the figure below.



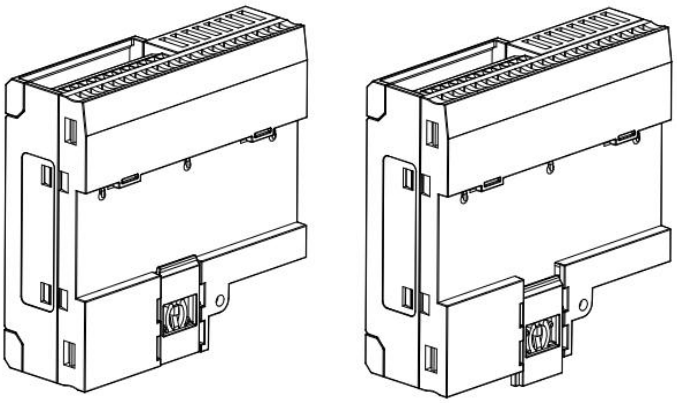
5.1 Exterior Dimension Drawing

Dimensions (unit:mm)



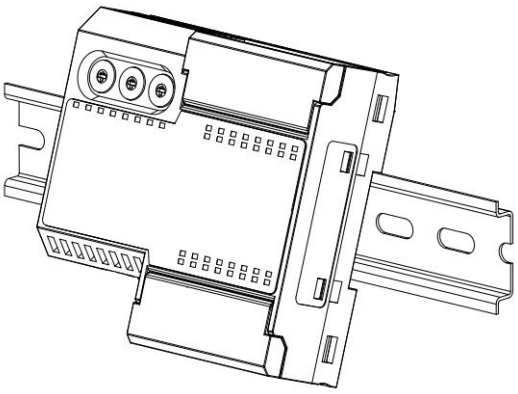
5.2 Installation and disassembly

Installation	steps



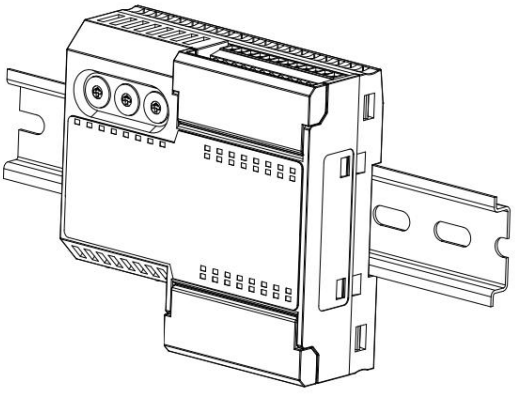
①　　②

Push the buckle at the bottom of the module outward, as shown in figure ① to the position as shown in figure ②, and hear a "click" sound.



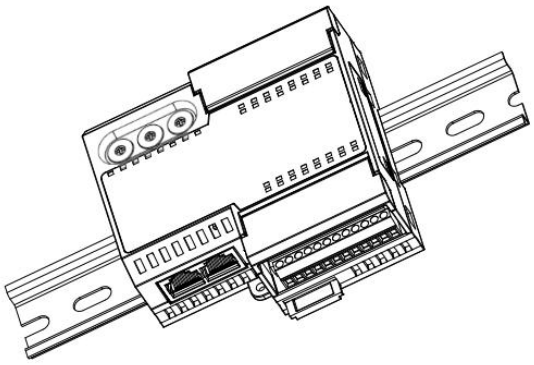
③

The upper edge of the module buckle is aligned with the upper edge of the guide rail, and the module is put into the guide rail, as shown in Figure ③.



④

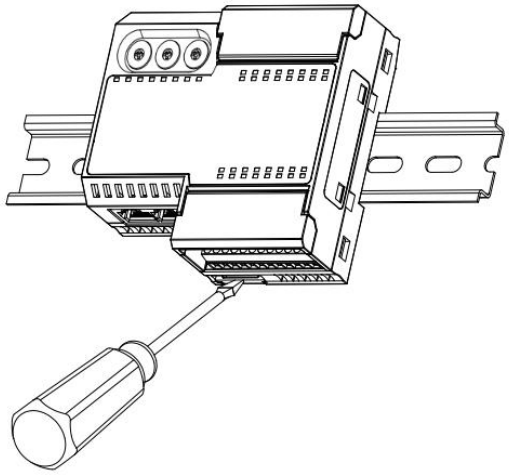
The module placement is shown in Figure ④.



⑤

Push the direction of the snap guide rail, hear the sound, and complete the module installation, as shown in Figure ⑤.

disassembly	steps



⑥

Insert the flat head into the buckle and force it in the direction of the module (hear the sound) as shown in Figure ⑥,
Disassemble the module in the opposite direction of the installation module.

6 Wiring

6.1 Terminal blocks

Terminal blocks		
Power and signal cable terminals	Number of poles	2 x 20 P
	Wire size	24~17 AWG 0.2~1.0 mm²
Bus interface	2 x RJ45	Class 5 or higher UTP or STP (STP recommended).

6.2 Wiring instructions and requirements

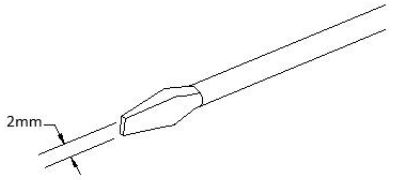
Power wiring precautions

- The power supply on the system side of the module and the power supply on the field side are configured separately and should not be mixed.
- PE needs to be reliably grounded.

Wiring tool requirements

The terminals are designed with fixing screws, which can be used for both cable installation and removal

Slotted screwdriver operation (specification: ≤2mm).



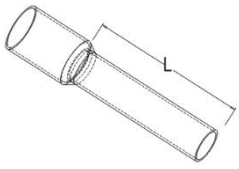
Stripping length requirements

The recommended stripping length is 6 mm.

Wiring method

For a single strand of hard wire, strip the wire of the corresponding length, insert the wire into the terminal and tighten the screws with a screwdriver.

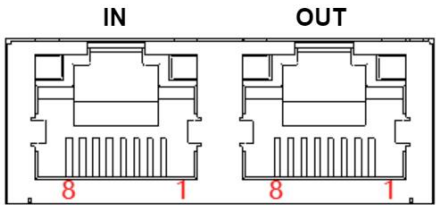
For multi-strand flexible wires, after stripping the wires of the corresponding length, use the cold-pressed terminals corresponding to the standard specifications (tubular insulated terminals, the reference specifications are shown in the table below), and the wires are inserted into the terminals and the screws are tightened with a screwdriver.

Specification table of tubular insulated ends		
Specifications:	Model	The cross-sectional area of the conductor is mm²
 The length of the tubular insulated terminal L is ≥6 mm	E0306	0.3
	E0506	0.5
	E0508	
	E7506	0.75
	E7508	
	E1006	1.0
	E1008	

- **Signal terminal wiring requirements**

  Refer to the wiring diagram and wiring method of the corresponding I/O module, and press the signal cable into the terminal block

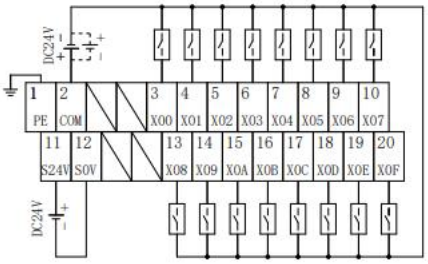
- **Bus wiring requirements**
  - Standard RJ45 network interface and standard crystal connector
  - The length of the cable between the devices must not exceed 100 m

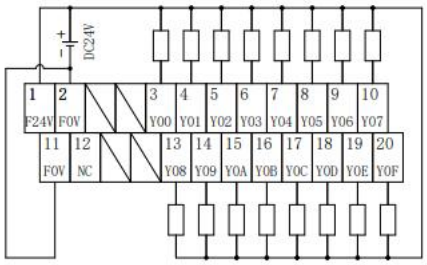


Pin number	Signal
1	TD+
2	E.G.-
3	RD+
4	One
5	One
6	RD-
7	One
8	One

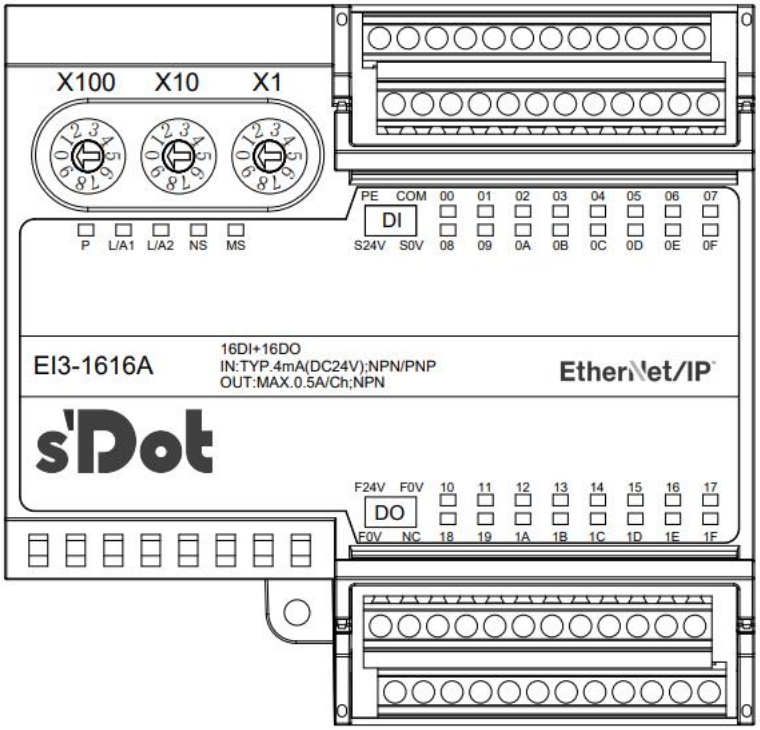
6.3 I/O module wiring diagram

6.3.1 EI3-1616A





*F 0V internal conduction

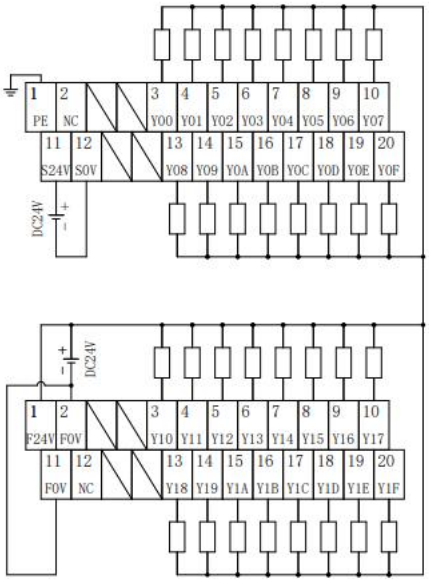


Pin number	direction	The name of the signal		Pin number	direction	The name of the signal
1	input	PE		11	input	S24V
2	input	COM		12	input	S0V
3	input	X00		13	input	X08
4	input	X01		14	input	X09
5	input	X02		15	input	X0A
6	input	X03		16	input	X0B
7	input	X04		17	input	X0C
8	input	X05		18	input	X0D
9	input	X06		19	input	X0E
10	input	X07		20	input	X0F

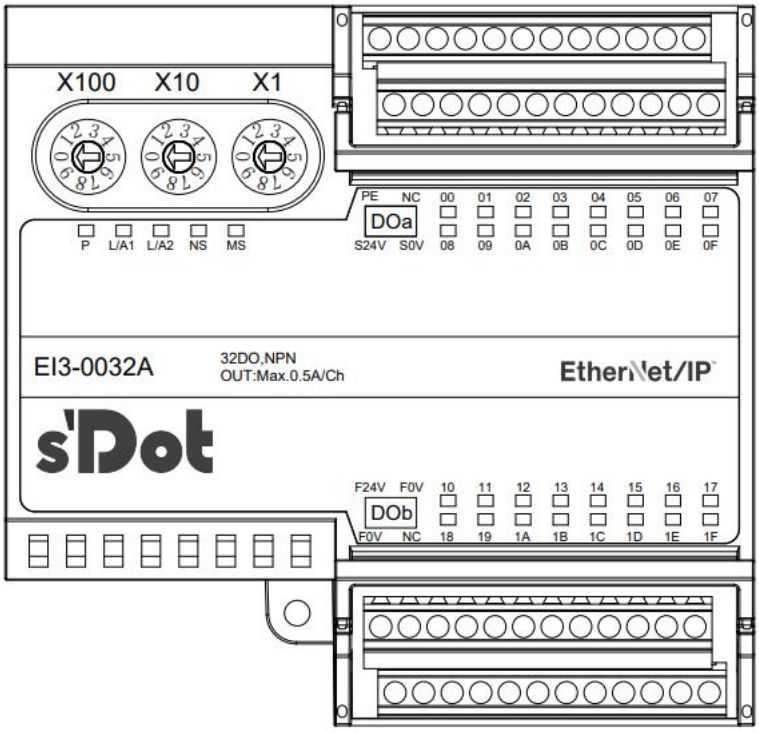
Pin number	direction	The name of the signal		Pin number	direction	The name of the signal
1	input	F24V		11	input	F0V
2	input	F0V		12	default	NC
3	output	Y00		13	output	Y08
4	output	Y01		14	output	Y09
5	output	Y02		15	output	Y0A
6	output	Y03		16	output	Y0B
7	output	Y04		17	output	Y0C
8	output	Y05		18	output	Y0D
9	output	Y06		19	output	Y0E
10	output	Y07		20	output	Y0F

Note: The rated current of the module terminal port is 8A, and when the total current of the output load of the module channel exceeds 8A, the two F0V ports need to be wired.

6.3.2 EI3-0032A



*F 0V internal conduction



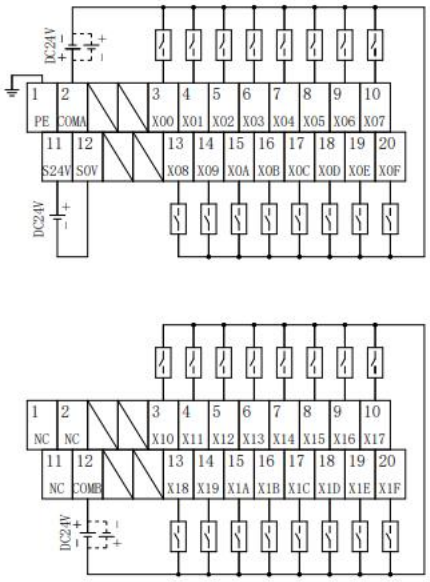
Pin number	direction	The name of the signal		Pin number	direction	The name of the signal
1	input	PE		11	input	S24V
2	default	NC		12	input	S0V
3	output	Y00		13	output	Y08
4	output	Y01		14	output	Y09
5	output	Y02		15	output	Y0A
6	output	Y03		16	output	Y0B
7	output	Y04		17	output	Y0C
8	output	Y05		18	output	Y0D
9	output	Y06		19	output	Y0E
10	output	Y07		20	output	Y0F

Pin number	direction	The name of the signal		Pin number	direction	The name of the signal
1	input	F24V		11	input	F0V
2	input	F0V		12	default	NC
3	output	Y10		13	output	Y18
4	output	Y11		14	output	Y19
5	output	Y12		15	output	Y1A
6	output	Y13		16	output	Y1B

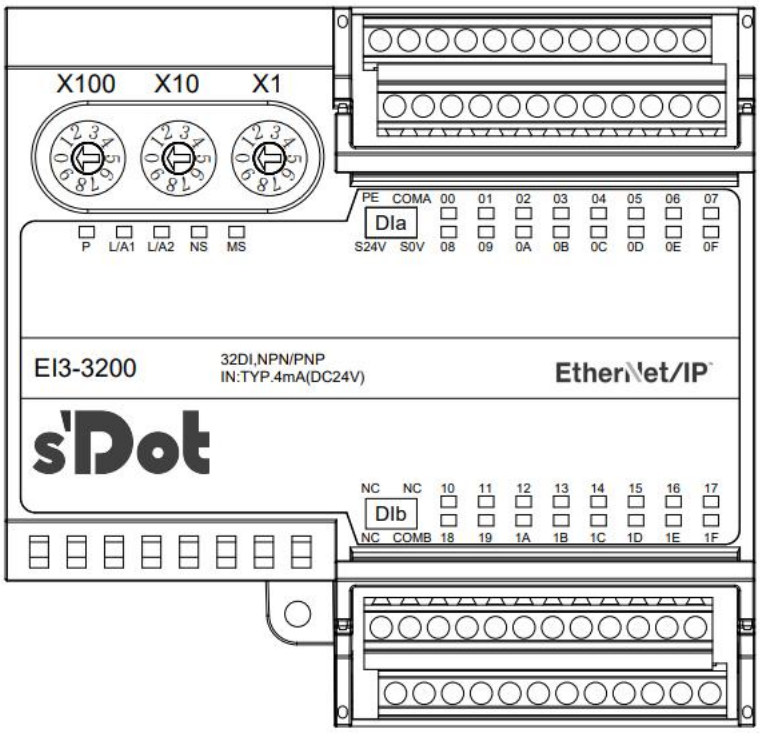
7	output	Y14		17	output	Y1C
8	output	Y15		18	output	Y1D
9	output	Y16		19	output	Y1E
10	output	Y17		20	output	Y1F

Note: The rated current of the module terminal port is 8A, and when the total current of the output load of the module channel exceeds 8A, the two F0V ports need to be wired.

6.3.3 EI3-3200



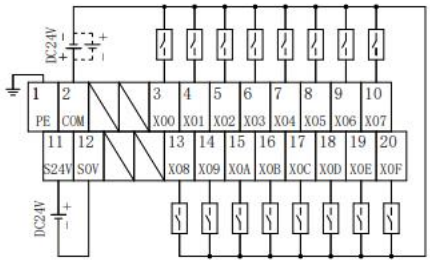
*No interoperability between COMA and COMB

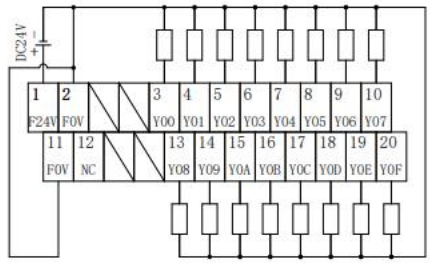


Pin number	direction	The name of the signal		Pin number	direction	The name of the signal
1	input	PE		11	input	S24V
2	input	COMA		12	input	S0V
3	input	X00		13	input	X08
4	input	X01		14	input	X09
5	input	X02		15	input	X0A
6	input	X03		16	input	X0B
7	input	X04		17	input	X0C
8	input	X05		18	input	X0D
9	input	X06		19	input	X0E
10	input	X07		20	input	X0F

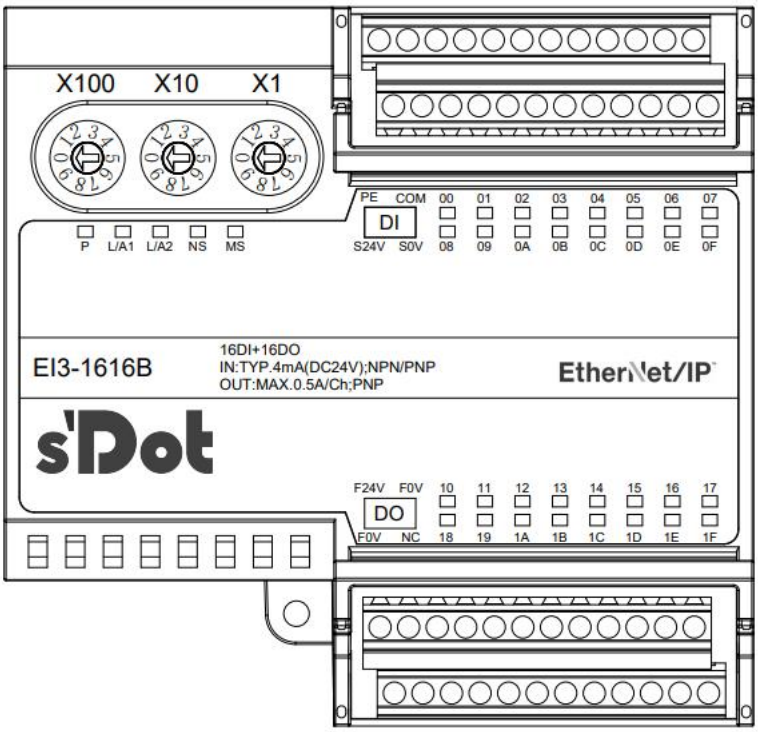
Pin number	direction	The name of the signal		Pin number	direction	The name of the signal
1	default	NC		11	default	NC
2	default	NC		12	input	COMB
3	input	X10		13	input	X18
4	input	X11		14	input	X19
5	input	X12		15	input	X1A
6	input	X13		16	input	X1B
7	input	X14		17	input	X1C
8	input	X15		18	input	X1D
9	input	X16		19	input	X1E
10	input	X17		20	input	X1F

6.3.4 EI3-1616B





*F 0V internal conduction

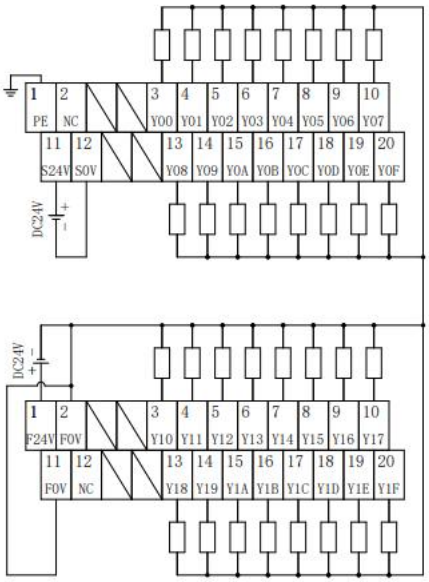


Pin number	direction	The name of the signal		Pin number	direction	The name of the signal
1	input	PE		11	input	S24V
2	input	WITH		12	input	S0V
3	input	X00		13	input	X08
4	input	X01		14	input	X09
5	input	X02		15	input	X0A
6	input	X03		16	input	X0B
7	input	X04		17	input	X0C
8	input	X05		18	input	X0D

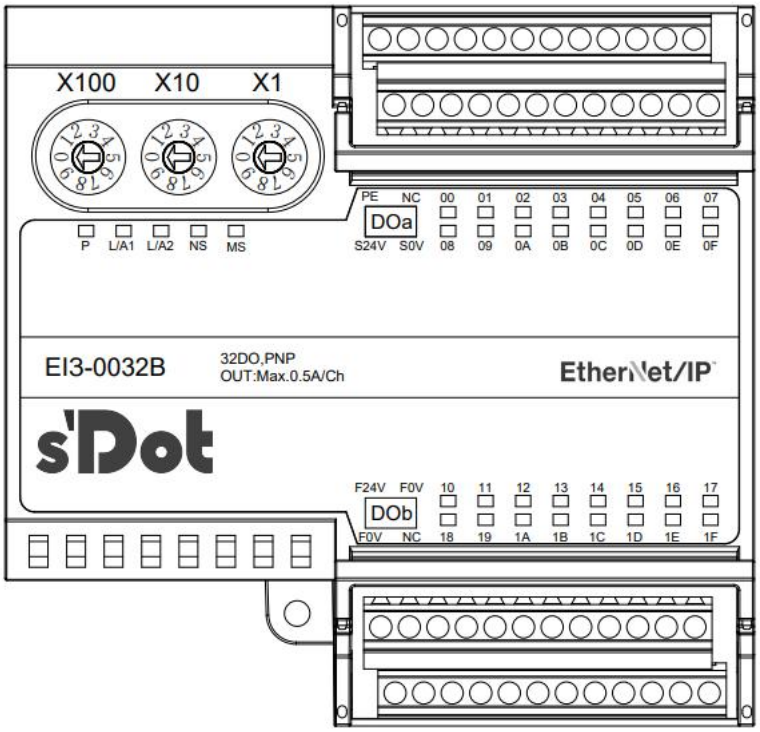
9	input	X06		19	input	X0E
10	input	X07		20	input	X0F
Pin number	**direction**	**The name of the signal**		**Pin number**	**direction**	**The name of the signal**
1	input	F24V		11	input	F0V
2	input	F0V		12	not	NC
3	output	Y00		13	output	Y08
4	output	Y01		14	output	Y09
5	output	Y02		15	output	Y0A
6	output	Y03		16	output	Y0B
7	output	Y04		17	output	Y0C
8	output	Y05		18	output	Y0D
9	output	Y06		19	output	Y0E
10	output	Y07		20	output	Y0F

Note: The rated current of the module terminal port is 8A, and when the total current of the output load of the module channel exceeds 8A, the two F0V ports need to be wired.

6.3.5 EI3-0032B



*F 0V internal conduction



Pin number	**direction**	**The name of the signal**		**Pin number**	**direction**	**The name of the signal**
1	input	PE		11	input	S24V
2	default	NC		12	input	S0V
3	output	Y00		13	output	Y08

4	output	Y01		14	output	Y09
5	output	Y02		15	output	Y0A
6	output	Y03		16	output	Y0B
7	output	Y04		17	output	Y0C
8	output	Y05		18	output	Y0D
9	output	Y06		19	output	Y0E
10	output	Y07		20	output	Y0F

Pin number	**direction**	**The name of the signal**		**Pin number**	**direction**	**The name of the signal**
1	input	F24V		11	input	F0V
2	input	F0V		12	default	NC
3	output	Y10		13	output	Y18
4	output	Y11		14	output	Y19
5	output	Y12		15	output	Y1A
6	output	Y13		16	output	Y1B
7	output	Y14		17	output	Y1C
8	output	Y15		18	output	Y1D
9	output	Y16		19	output	Y1E
10	output	Y17		20	output	Y1F

Note: The rated current of the module terminal port is 8A, and when the total current of the output load of the module channel exceeds 8A, the two F0V ports need to be wired.

7 Operation

7.1 IP settings and modifications

7.1.1 Set the IP address via the rotary switch

- **When the IP address is set by rotating the switch in the factory state**

  The IP address is 192.168.0.XXX (XXX is the set value of the rotary switch, range 1~254).

- **When the IP address has been set by the host computer, and the IP address is set by the rotary switch**

  The IP address continues to pass through the high position of the IP address set by the host computer by 3 bytes, and the low position of 1 byte is the set value of the rotary switch.

  For example, if you change the setting of the rotary switch after setting it to 172.10.0.12 on the host computer, the IP address is 172.10.0.XXX (XXX is the set value of the rotary switch (1~254).)

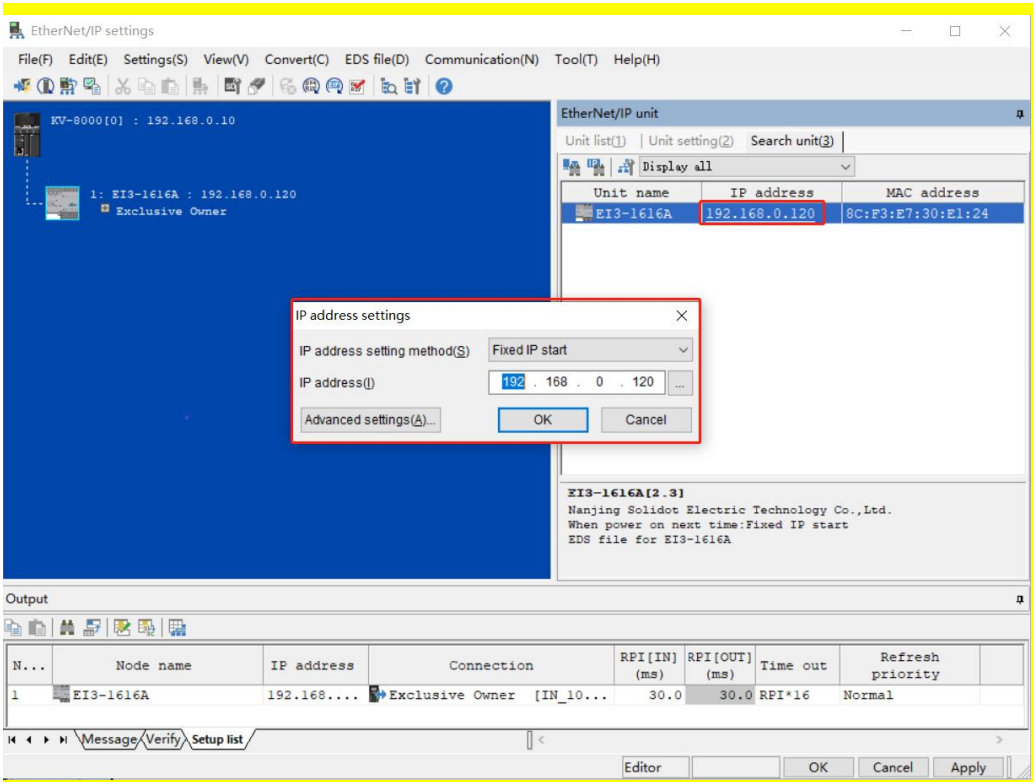
Precautions

- **Description and operation method of rotary switch" see 4.2 Rotary Switch".**
- **When the module leaves the factory, the rotary switch is set to "000", and the IP address is not assigned.**
- **After the host computer is modified, the module will change the startup mode to a fixed IP to start and restart automatically. The module is started with a rotary switch setting value and an IP address that is assigned to the network segment.**
- **Abnormal rotary switch setting: When the rotary switch is set to 255 or above, the module will be started by the previous start mode and parameters after powering on.**

7.1.2 Set the IP address through the host computer software

Using the KEYENCE KV-8000 and the host computer KV STUDIO Ver.10G as examples, this section describes how to modify the IP address.

a. After finding the device, click the IP address on the device to modify the IP address, and select Fixed IP Activation as the IP address setting method. Click OK after the modification is complete, as shown in the following figure.



Precautions

- **If you use BOOTP to modify the IP address, you need to set the request acceptance time during scanning and the timeout time when the IP address is set to 60s or more, and after the modification is completed, you need to set the module to a fixed IP to start, otherwise the assigned IP address will be lost after power failure.**

7.2 Restore Factory Settings

If the IP address is forgotten, lost, or other abnormal situations during use, the module can reset the module through the IP address reset function. The module can perform a factory reset operation by means of a special operation of the rotary switch, which is performed as follows:

1) Turn the rotary switch to 999 and power on the module;

2) After the module is powered on, the rotary switch is dialed back to 000 under the condition of uninterrupted power;

3) After the rotary switch is dialed back to 000, the module automatically restores the factory settings;

4) After the module is restored to factory settings, the IP address parameter is cleared, and the boot mode is BOOTP.

7.3 Parameter description

7.3.1 Digital input filter period setting

Digital input filtering prevents the program from responding to unexpectedly fast changes in the input signal that can occur due to switch contact hopping or electrical noise. For modules with input channels, the filtering time of the digital input can be selected by the filter period parameter setting, and the clutter within the set time can be filtered, and the channel cannot be configured separately.

For example, an input filtering time of 3 ms indicates that a single signal changes from "0" to "1", or from "1" to "0" for 3 ms before it can be detected, while a single high or low pulse shorter than 3 ms will not be detected.

7.3.2 Output signal clear/hold

The Clear/Hold function is for modules with output channels, and this function can be configured to perform the output action of the module in the event of a bus abnormality.

Clear output: When the communication is disconnected, the output channel of the module will automatically clear the output.

Hold Output: When the communication is disconnected, the output channel of the module keeps the output all the time.

7.3.3 Configure the output action of the module in the bus RUN/IDLE state

For modules with output channels, you can choose whether to hold or empty the output of the module when the bus state switches to the idle state.

This manual uses KV STUDIO Ver.10G as an example to introduce the module parameter configuration method, and the specific steps are detailed in Section 7.4.1 Parameter Setting.

7.4 Modular configuration applications

7.4.1 APPLICATION IN THE KV STUDIO SOFTWARE ENVIRONMENT

1、Preparation

- **Hardware environment**
  - **Model EI3-1616A**
  - **One computer, pre-installed KV STUDIO Ver.10G software**
  - **Ethernet-specific shielded cable**
  - **KEYENCE PLC, this description takes KV-8000 as an example**
  - **One switching power supply**
  - **Module installation rails and rail fixtures**
  - **Device profiles**

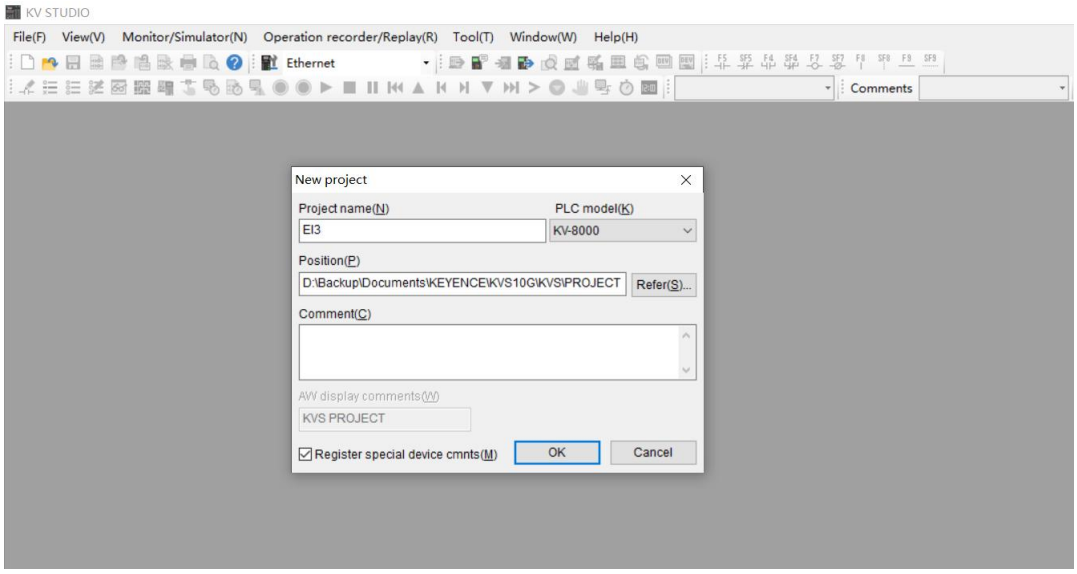
  Address for obtaining the configuration file: https://www.solidotech.com/documents/configfile
- **Hardware configuration and wiring**

  Please follow the requirements of "5 installation and disassembly" and "6 wiring".

2、Create a project

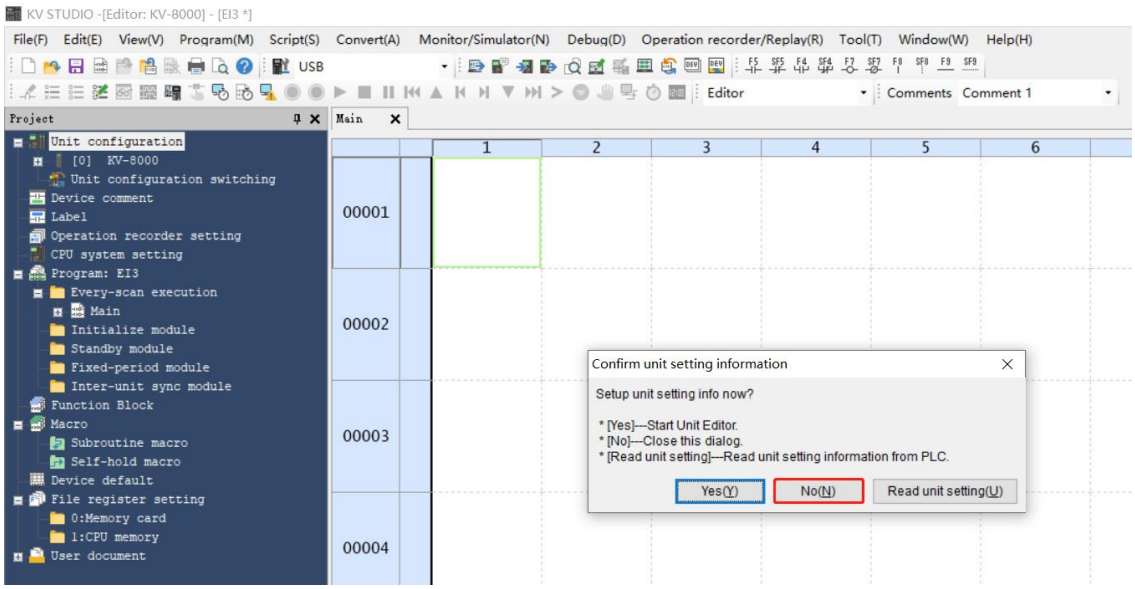
a. OPEN THE KV STUDIO SOFTWARE AND SELECT “FILE -> NEW PROJECT”.

b. In the pop-up box, enter “Project Name”, “PLC Model”, and “Position”, as shown in the following figure.



- ◆ Project Name: Customizable
- ◆ Supported models: View the appearance of the PLC and select the corresponding model, for example, KV-8000.

c. The "Confirm Unit Setting Information" window pops up, and you can choose to start the unit editor, close the dialog box, or read the unit configuration from the PLC as needed. Select “No” to demonstrate the operation, as shown in the following figure.

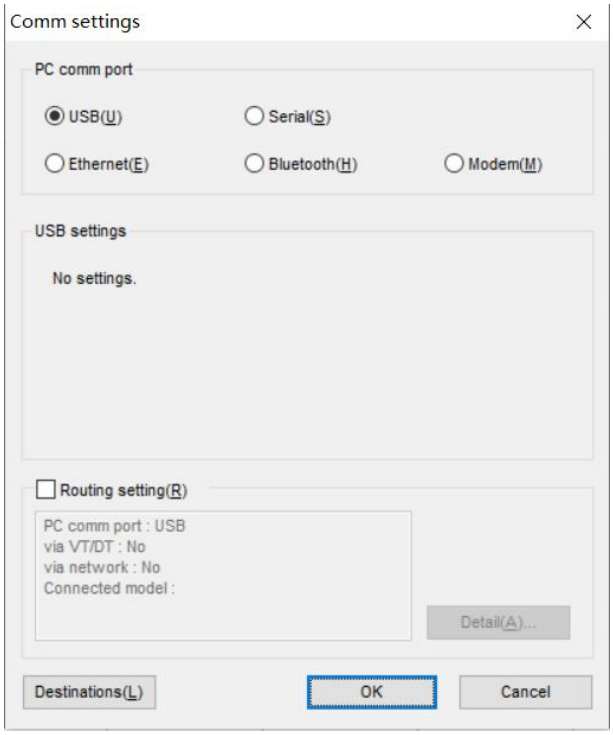


3、Communication settings

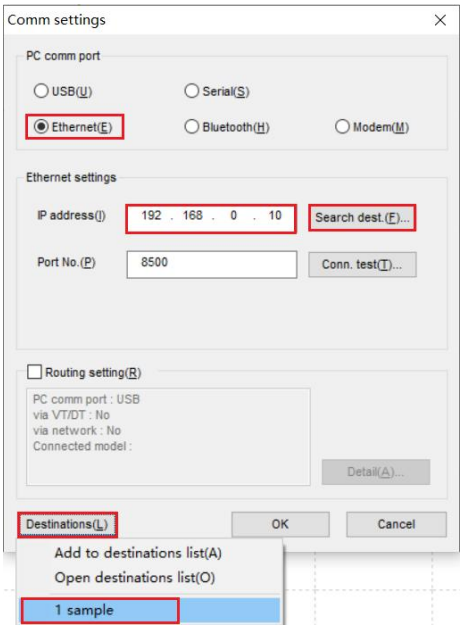
Select the communication mode, if the PLC is connected to the host computer software through the network cable, then select "Ethernet", if it is connected through USB, then select "USB".

Ethernet procedure

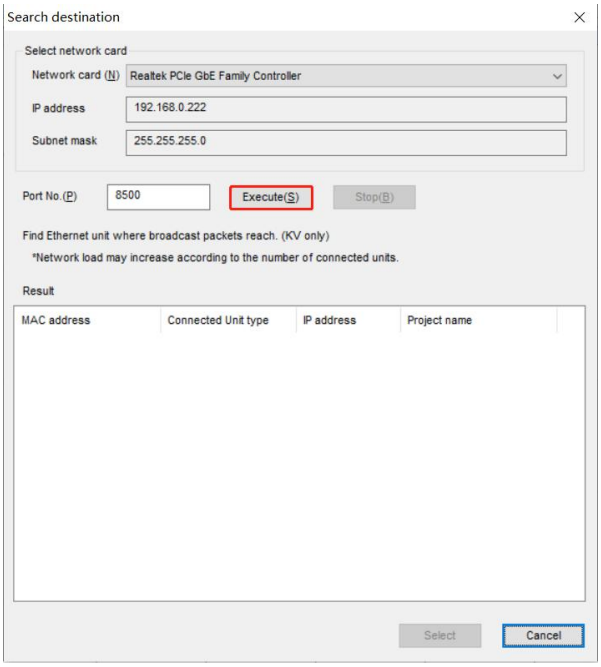
a. Click the button on the menu bar  to display the “Communication Settings” window, as shown in the following figure.



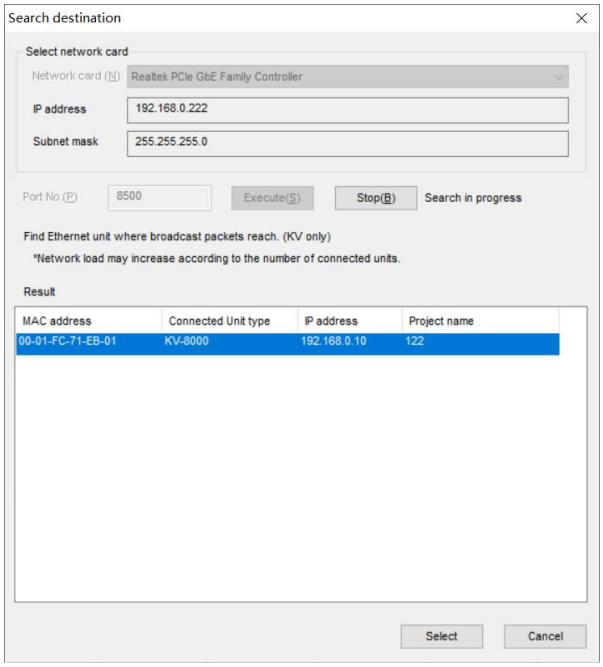
b. Select "Ethernet", click "Destinations", select "1 sample", set the IP address, and click "Search destination", as shown in the following figure, the IP address is configured in the "192.168.0" CIDR block.



c. In the Search Detection Target pop-up window, click "Execute", as shown in the following figure.



d. Select the found PLC and click “Select”, as shown in the following figure.



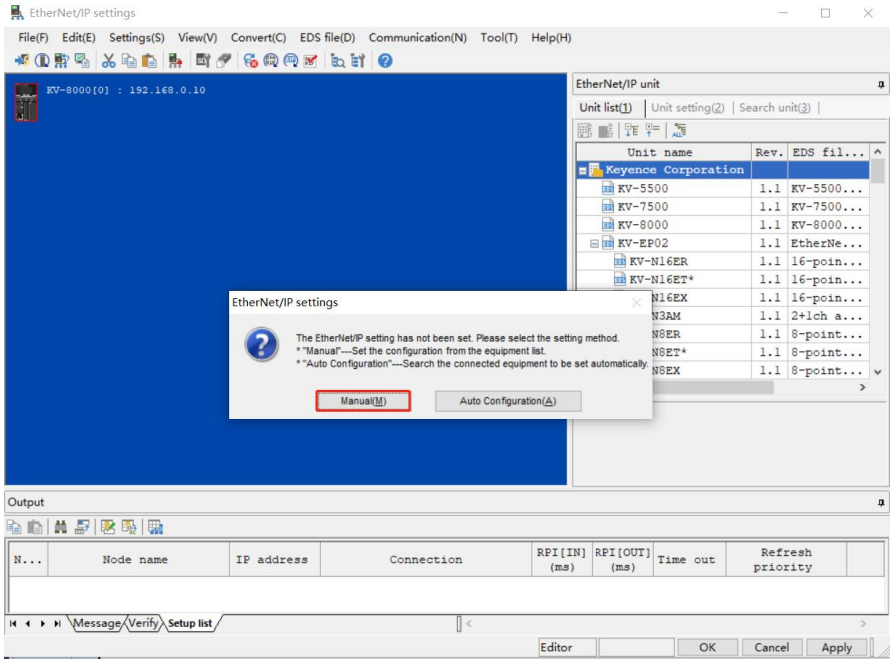
e. Click the "OK" button in the communication settings window.

"USB Connection" operation mode

On the "Communication Settings" screen, select USB.

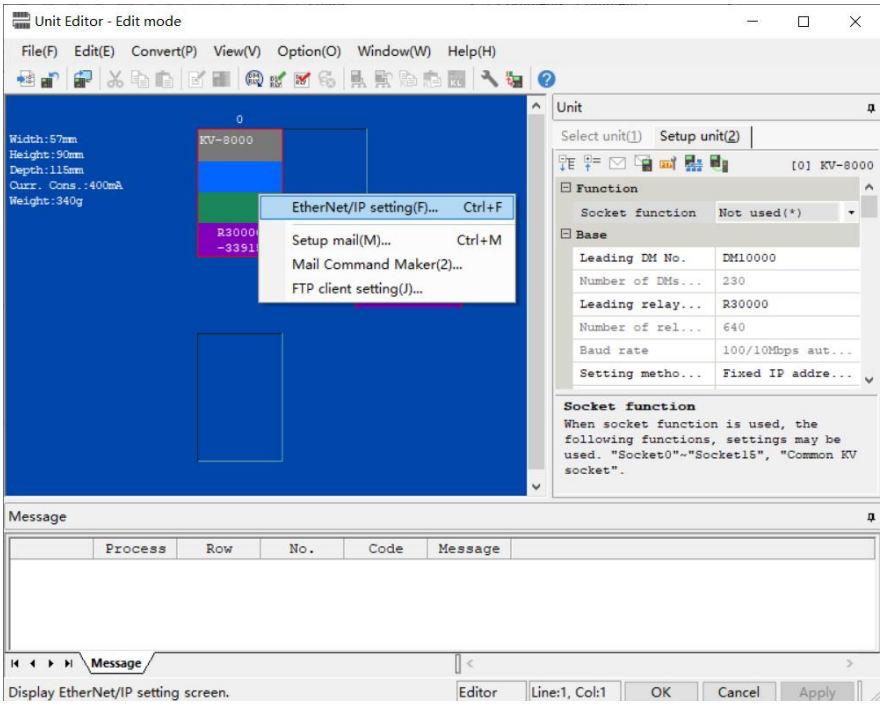
4、EtherNet/IP Settings

a. Double-click “Unit Configuration -> KV-8000 -> EtherNet/IP R30000 DMI10000” in the navigation tree on the left to display the “EtherNet/IP Settings” window. Select “Manual” or “Auto Configuration”, as needed. Here select "Manual" to demonstrate the operation, as shown in the following figure. When the settings are complete, click "OK" to close the window.

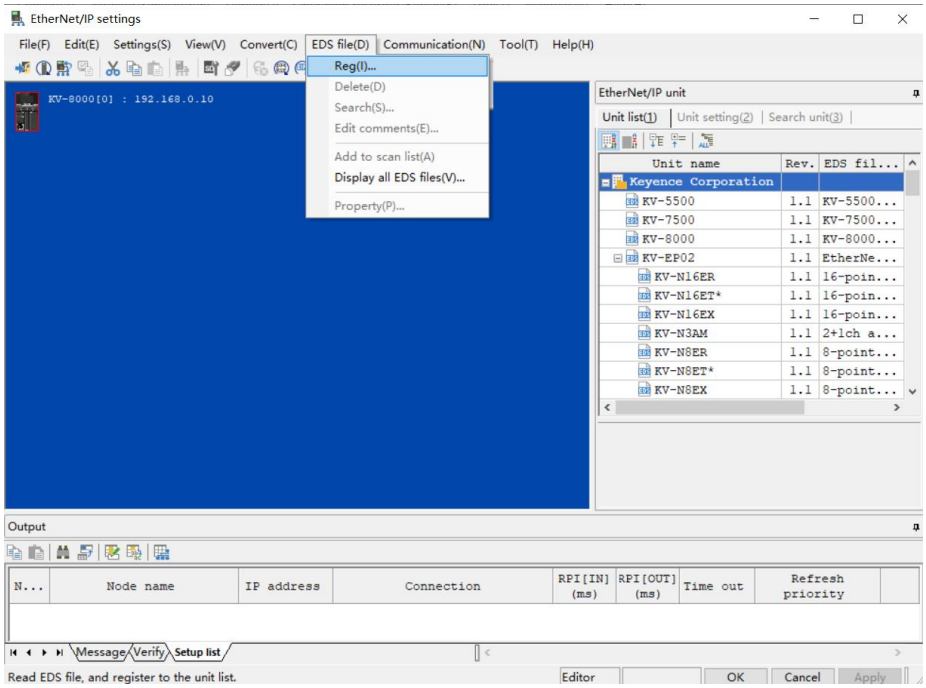


5、Install the EDS file

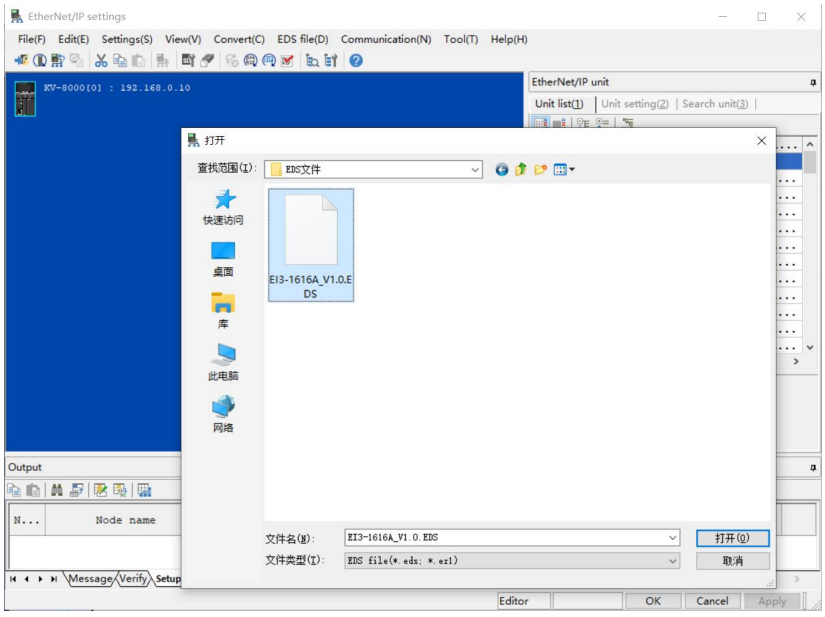
a. Right-click the KV-8000 in the unit editor window and select "EtherNet/IP Setting" to enter the settings page, as shown in the following figure.



b. Click “EDS File” in the menu bar of the EtherNet/IP Settings page and click “Reg”, as shown in the following figure.



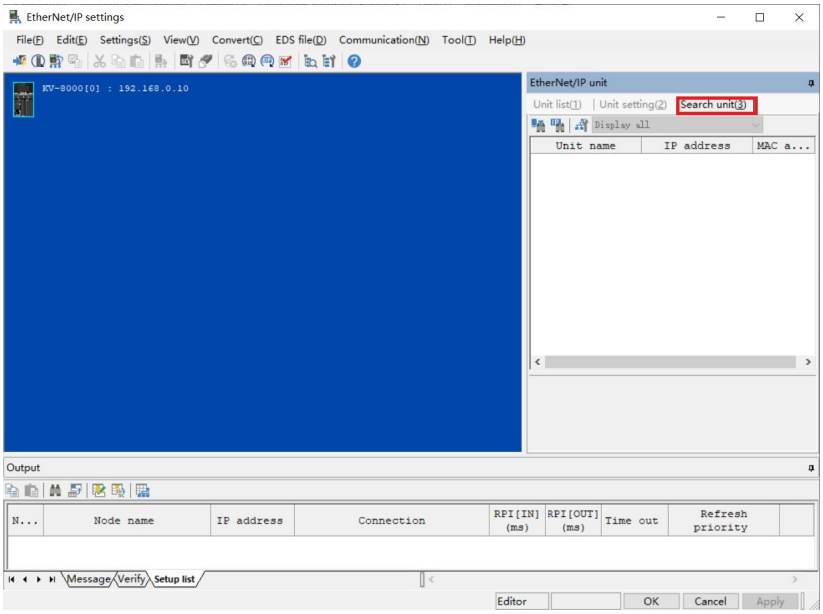
c. In the folder where the EDS file is stored, select the EDS file of the corresponding model and click “OK”, as shown in the following figure.



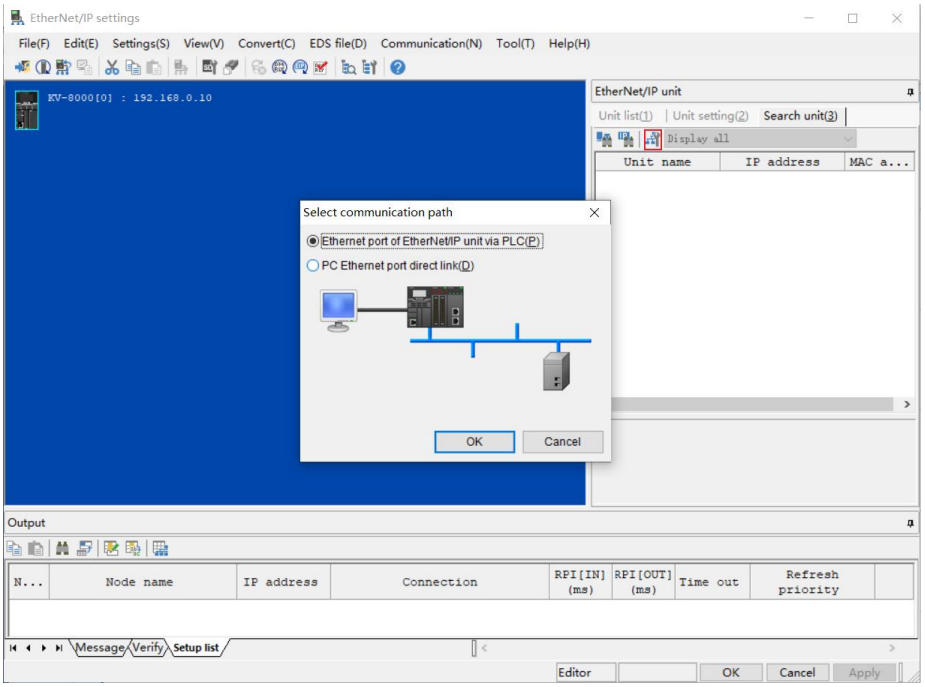
6、Topological configuration

The topology configuration can be “manually added” and “automatically configured”. Manual configuration is used for this configuration.

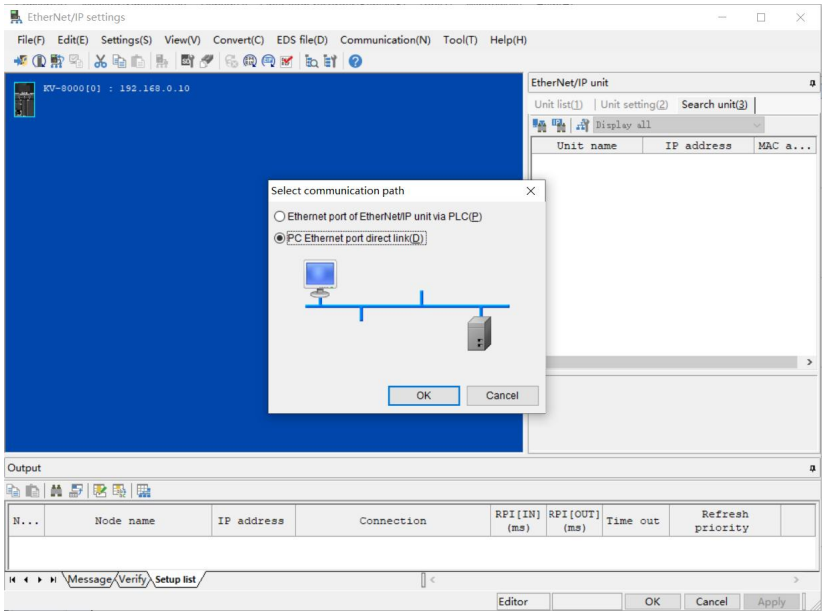
a. Go to the “EtherNet/IP Settings” page and switch to the “Search Unit” tab, as shown in the following figure.



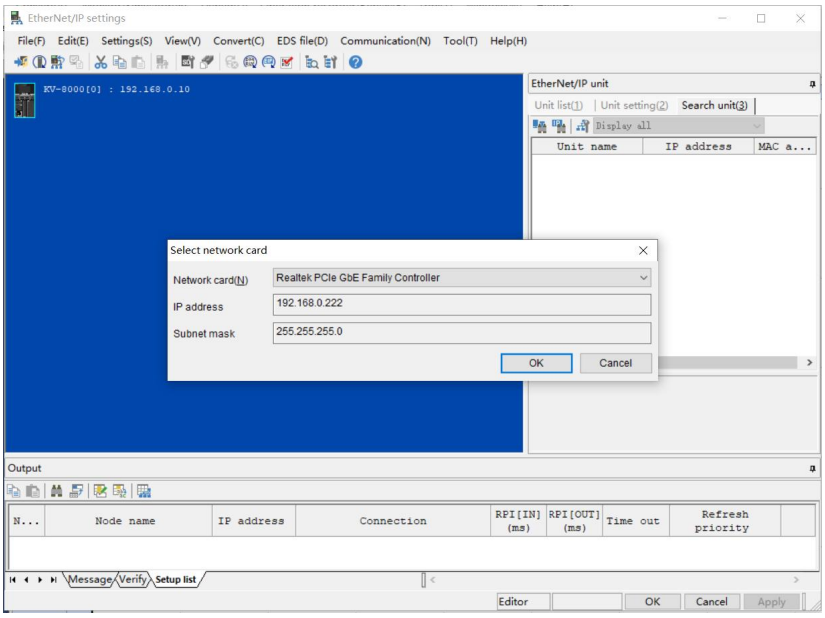
b. Click  to select the communication path, and the USB connection mode is shown in the following figure.



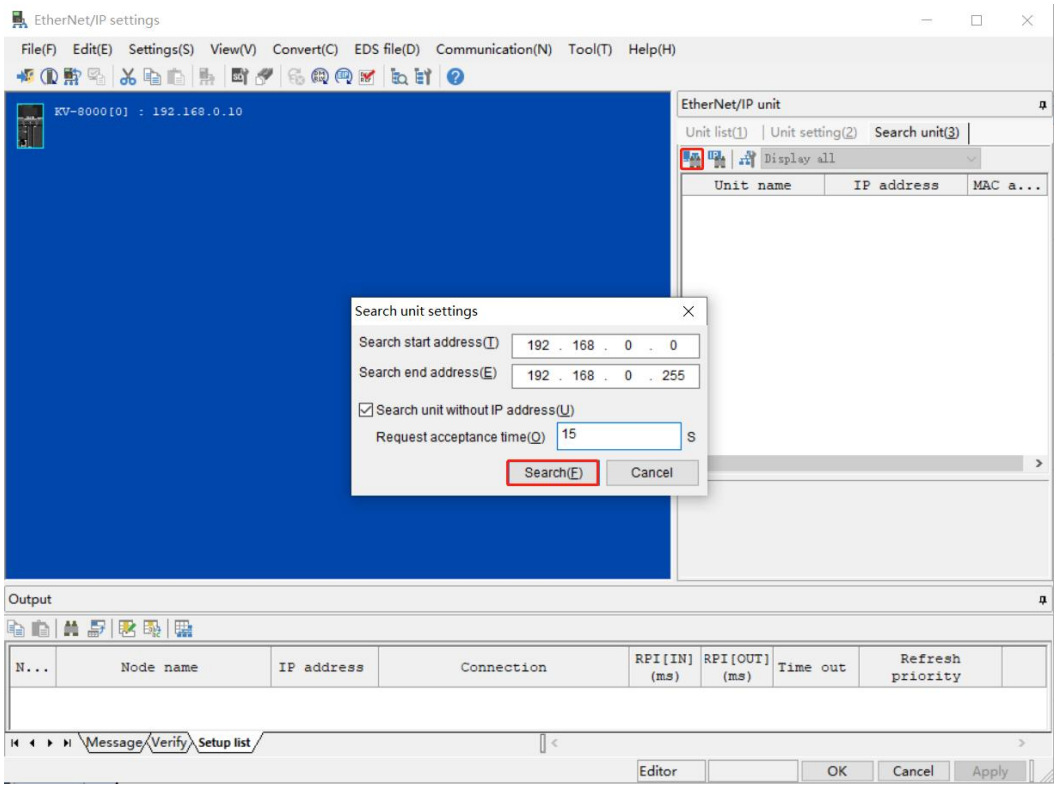
c. "PC Ethernet port direct link" is the network cable connection method, as shown in the following figure.



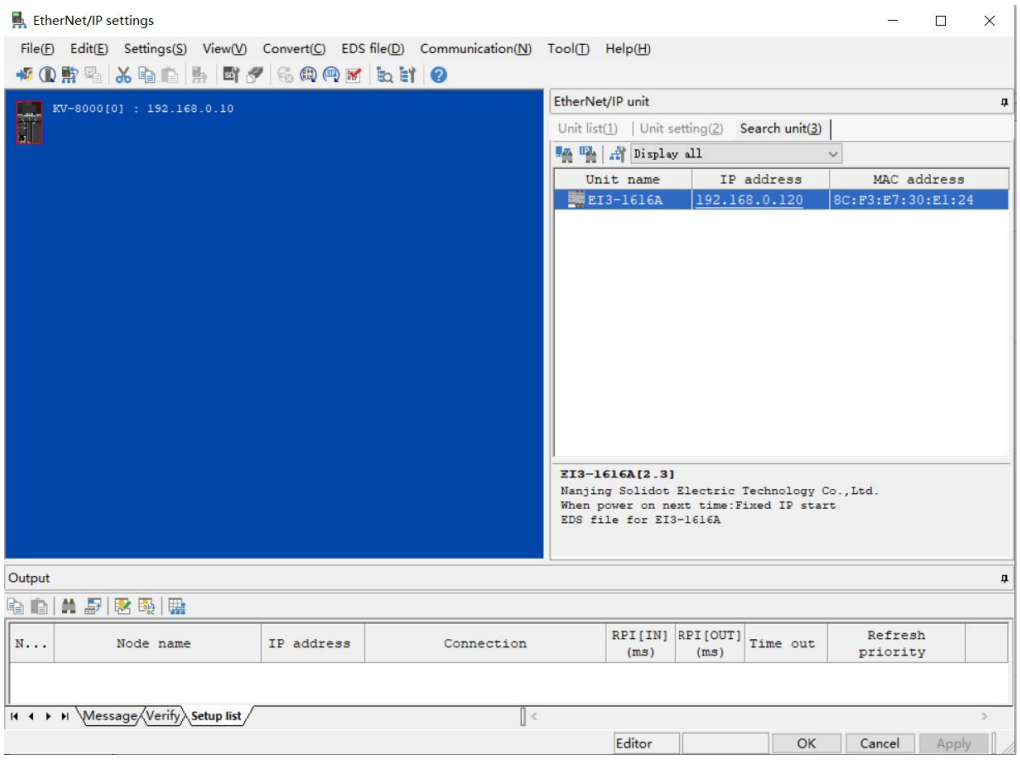
d. Select "PC Ethernet port direct link", and the "Select network card " window will pop up, and set the network card and IP address of the machine, as shown in the following figure.



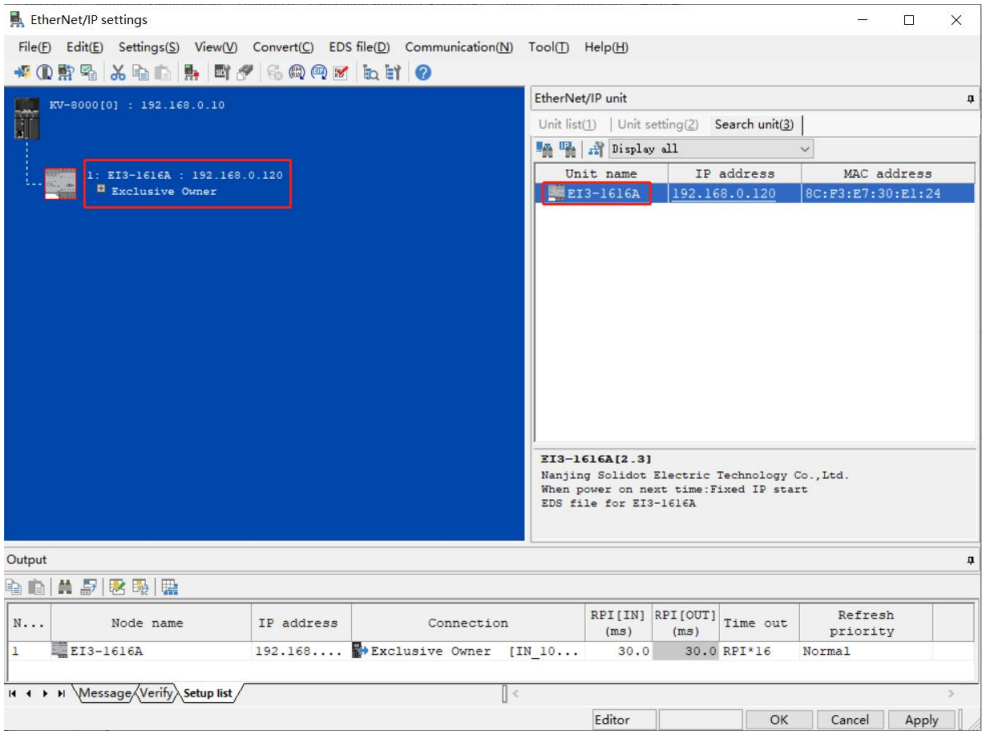
e. Click  to find the device connected to the network. Set the CIDR block of the IP address to be searched and click “Search”, as shown in the following figure.



f. After the search is complete, it is displayed as shown in the following image.



g. Double-click the found device to add it to the configuration, as shown in the figure below.



7、Set the IP address

On the Searched Device page, double-click the IP address bar and configure the IP address in the pop-up box. The default CIDR block is 192.168.0.

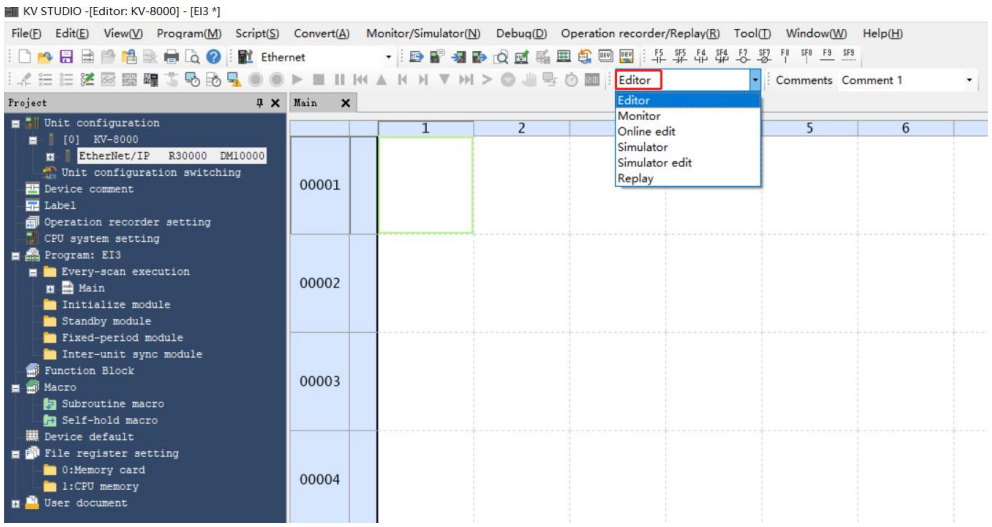
Notification:

- The timeout period for setting the IP address needs to be configured to 60s.
- If an IP address is configured for the DIP switch, the IP address of the DIP switch shall prevail.

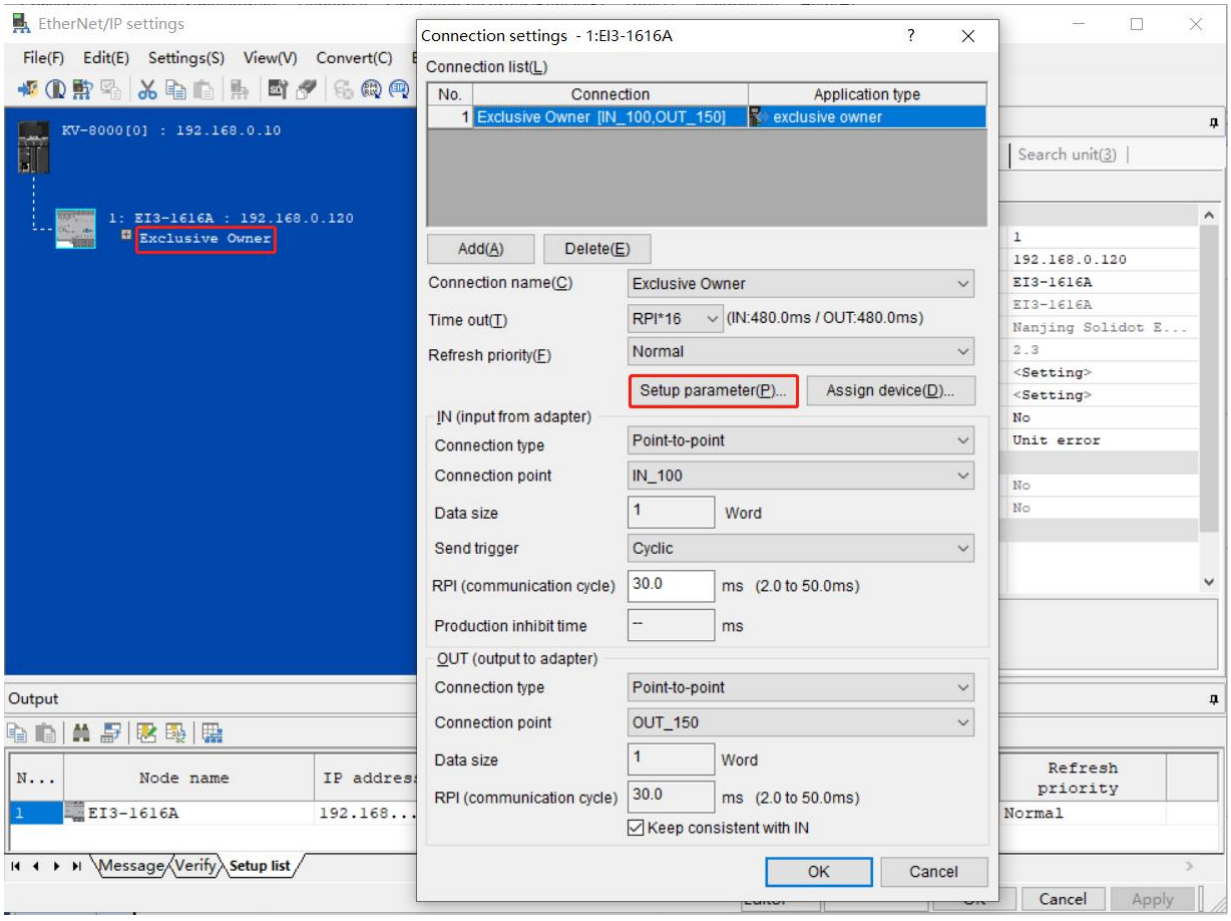
In this example, EI3-1616A sets the IP address by rotating the switch, and the IP address is set to 192.168.0.3.

8、Parameter setting

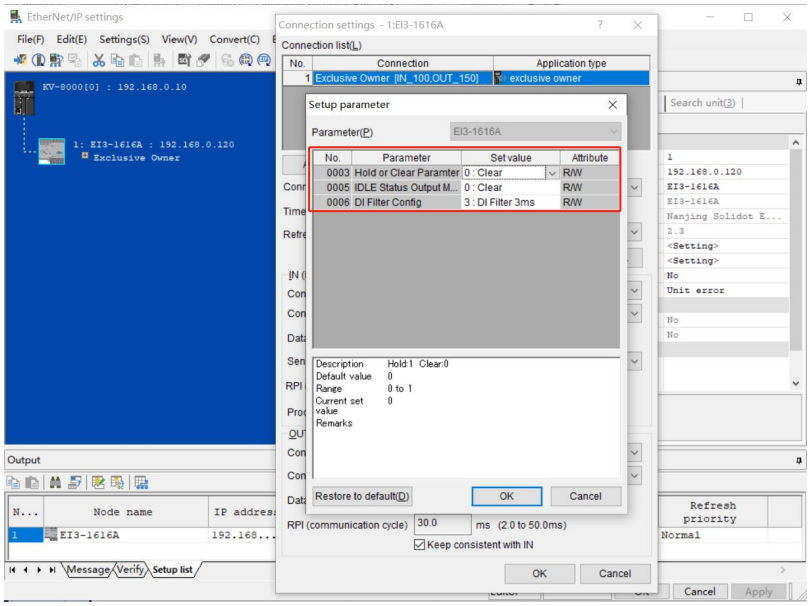
a. Click the Menu Bar Toggle Mode option to switch to editor mode, as shown in the following image.



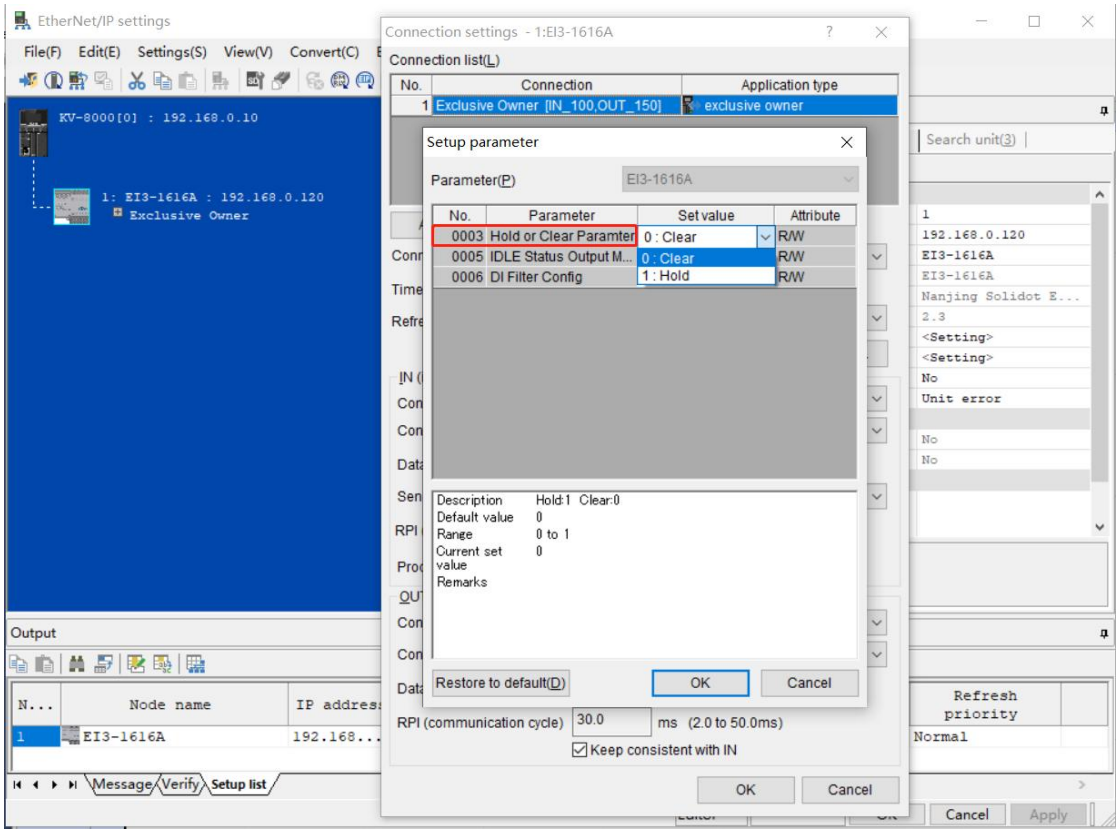
b. Go to the "EtherNet/IP Settings" page, click "Exclusive Owner", and the "Connection Settings" window pops up. In the "Connection Settings" window, click "Setup parameter", as shown in the following figure.



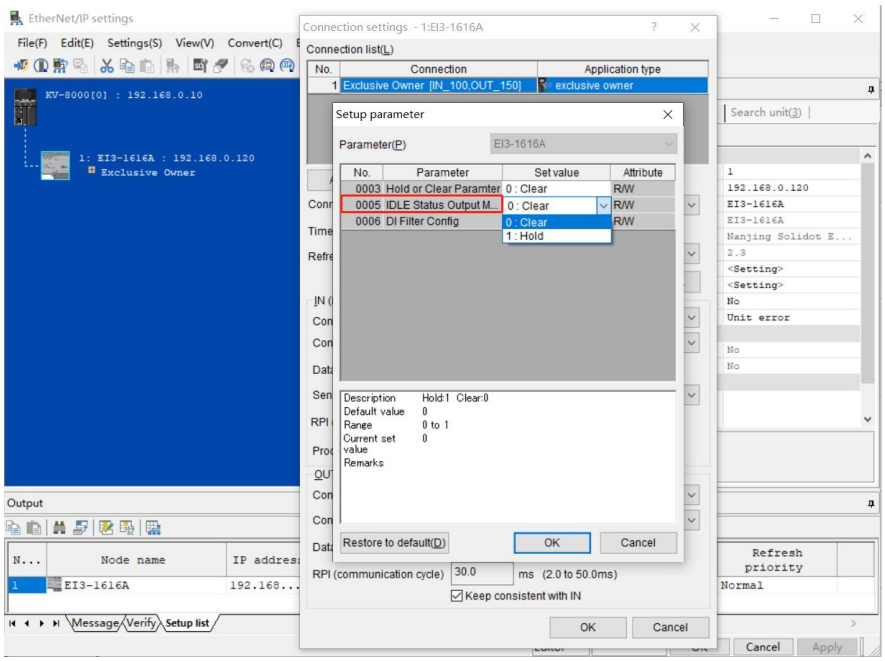
c. In the "Parameter Setting" window, you can configure the module parameters, and the EI3 series integrated IO parameters include three functions: output signal clearing/holding, module output action configuration in bus RUN/IDLE state, and input filter cycle setting, as shown in the following figure.



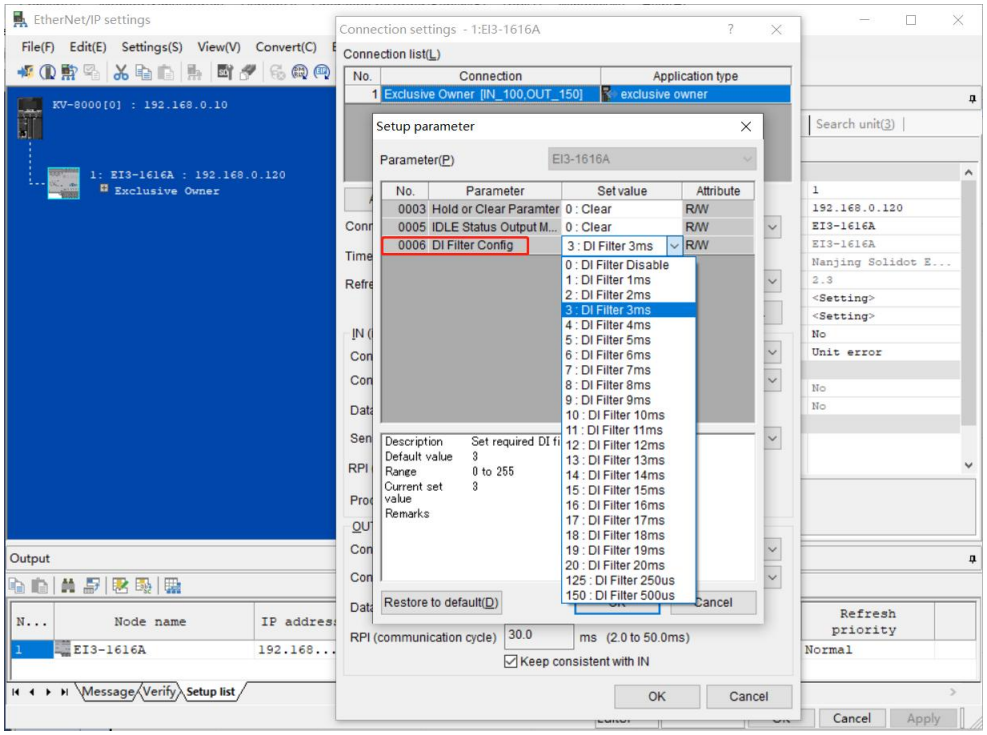
d. Click the "Hold or Clear Parameter" option, select **0** to clear, select **1** to hold, and the parameter is cleared by default, as shown in the following figure. After the settings are complete, click "OK" to save the parameters, click "Apply" in the "EtherNet/IP Settings" window, and download them to the controller for the parameters to take effect.



e. Click the "IDLE Status Output Mode", select **0** to clear, select **1** to hold, and the parameter is cleared by default, as shown in the following figure. After the settings are complete, click "OK" to save the parameters, click "Apply" in the "EtherNet/IP Settings" window, and download them to the controller for the parameters to take effect.



f. Enter the filter period setting function, click the "DI Filter Config" option, the default filter time of the DI filter is 3ms, and set the filter time by selecting the setting value of the corresponding filter time, as shown in the figure below. After the settings are complete, click "OK" to save the parameters, click "Apply" in the "EtherNet/IP Settings" window, and download them to the controller for the parameters to take effect.

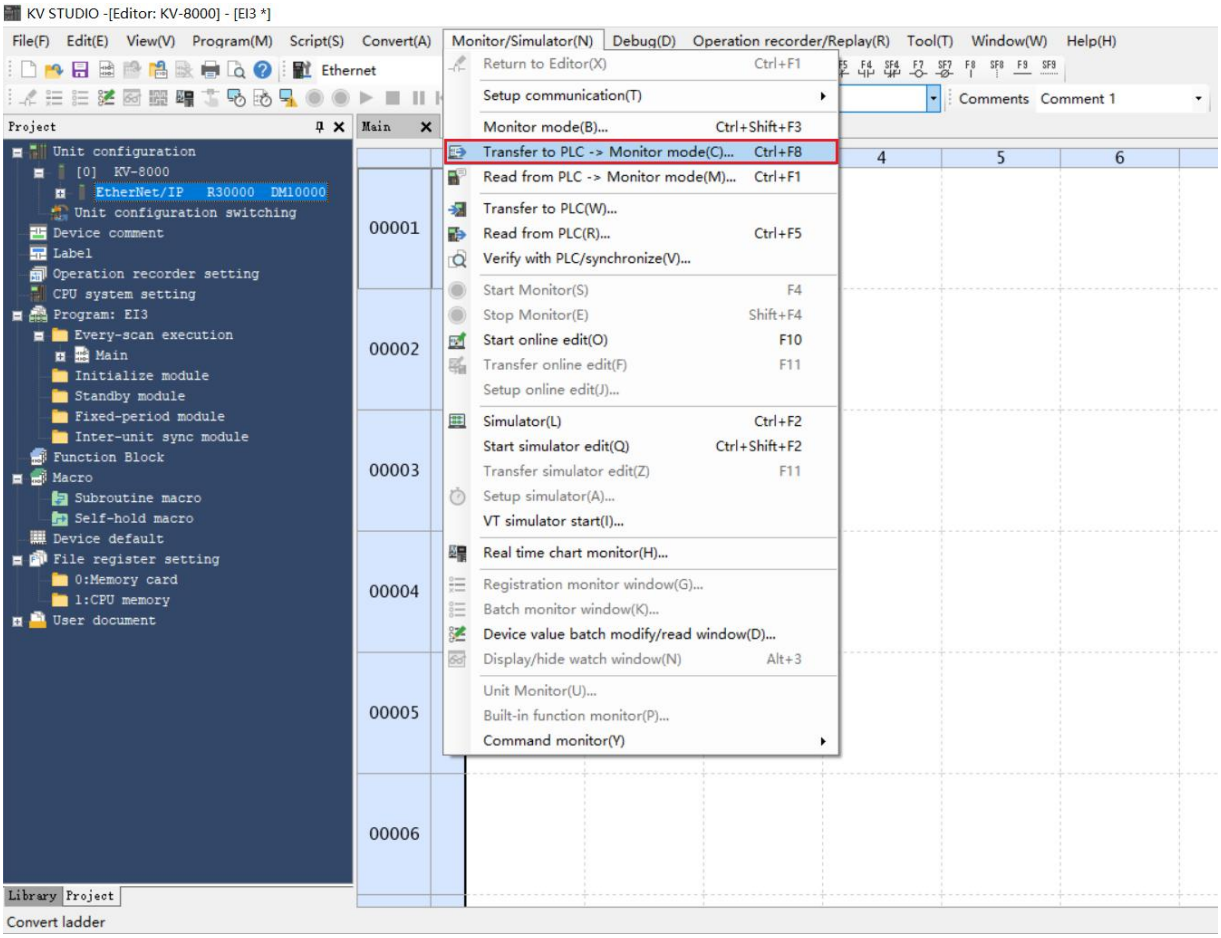


g. After the configuration is complete, click OK in the “Set up parameters” window.
h. In the “Connection Settings” window, click the “OK” button.
i. In the “EtherNet/IP Settings” window, click the “Apply” button, and then click the “OK” button.
j. In the “Unit Editor” window, click the “Apply” button, and then click the “OK” button.

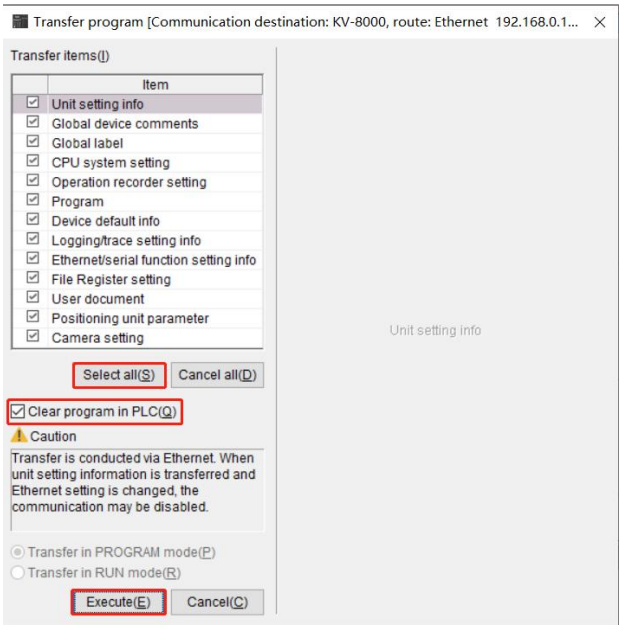
9、Configuration download

After the module configuration and parameter setting are completed, it is downloaded to the PLC for operation.

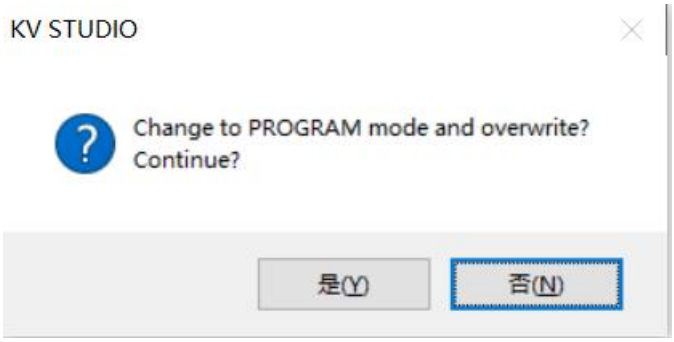
a. Click "Monitor/Simulator (N) -> Transfer to PLC -> Monitor Mode (C)" in the menu bar, as shown in the following figure.



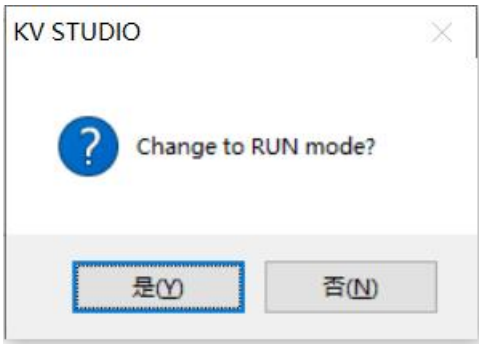
b. In the transfer program window, select “Clear Programs in PLC”, click “Select All”, and click “Execute” to download the program to the PLC, as shown in the following figure.



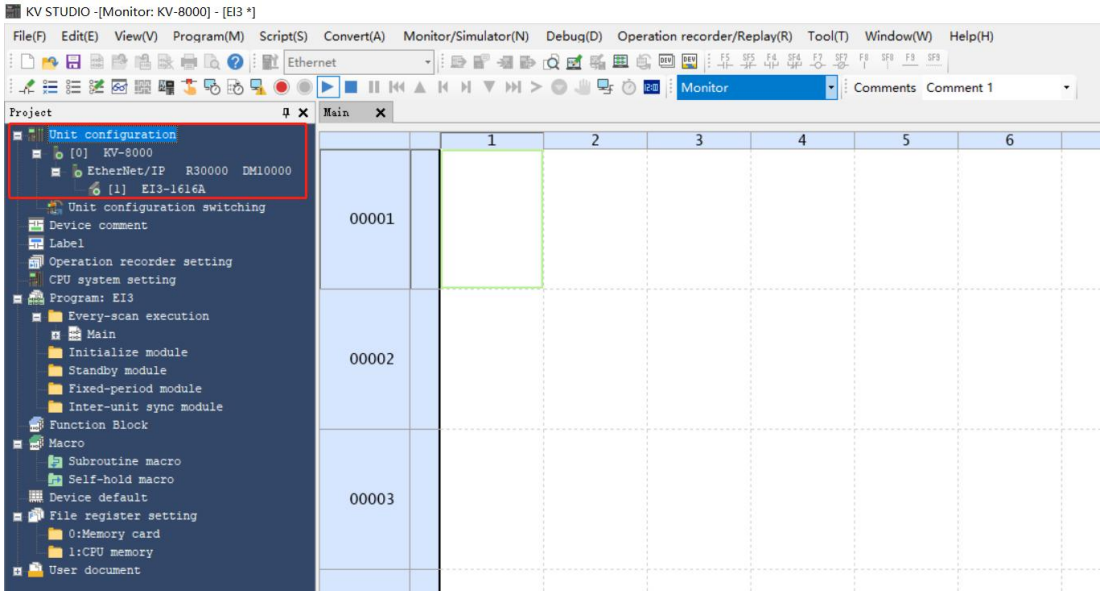
c. A prompt box pops up: "Change to PORGRAM mode and overwrite", click and select “Yes”, as shown in the following figure.



d. After the PLC is written, a dialog box is displayed: “Change to RUN mode?”, click “Yes”, as shown in the following figure, to enter the monitoring mode.

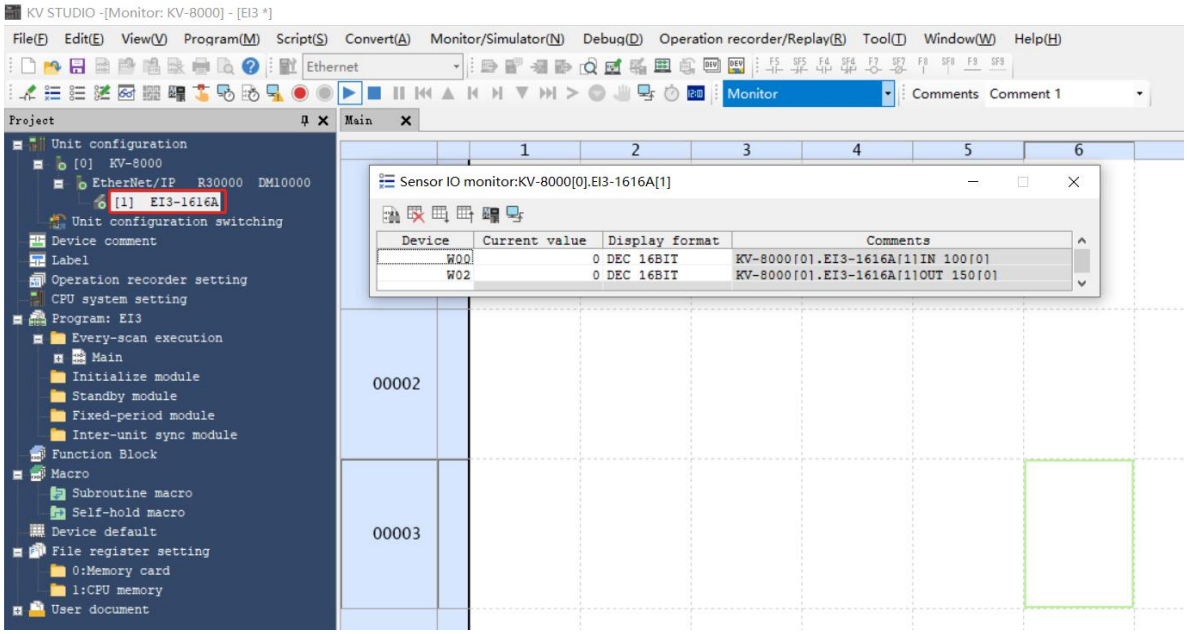


e. After the configuration download is completed, as shown in the following figure.

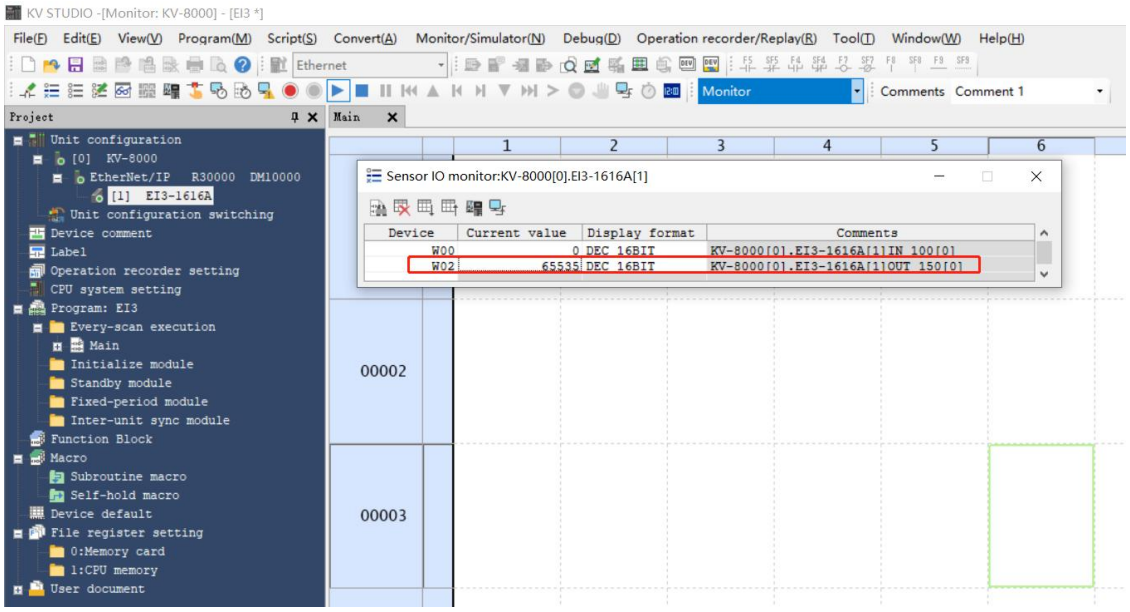


10、 Data monitoring

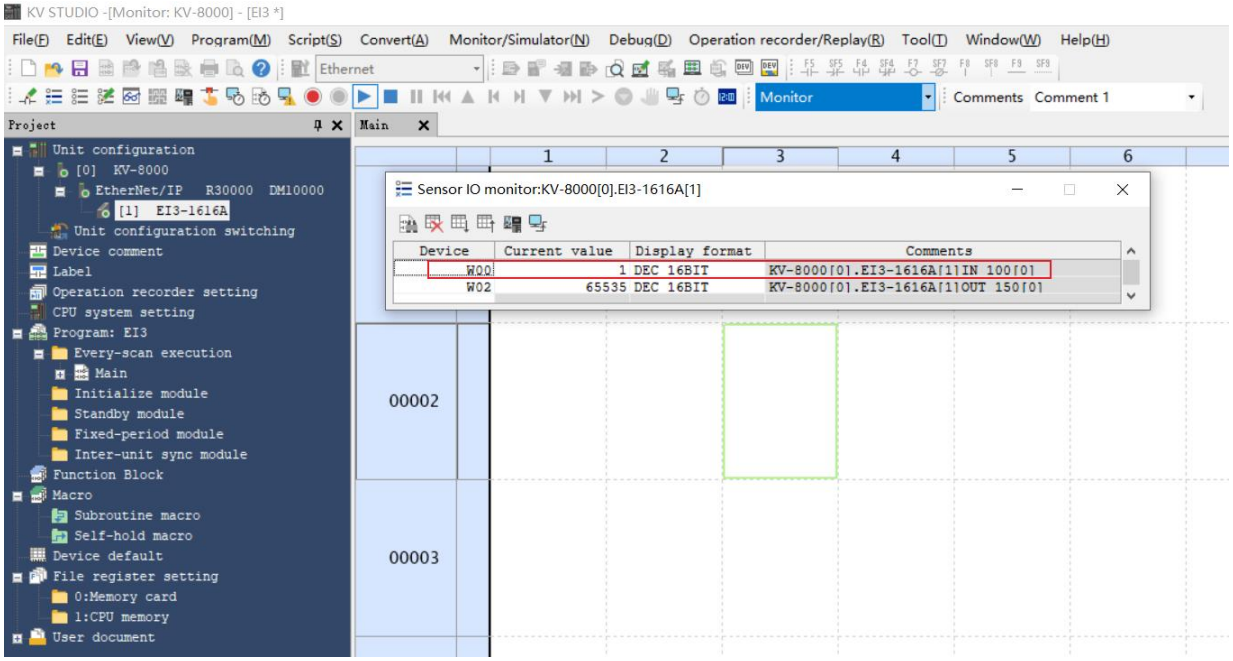
a. In monitor mode, double-click the “EI3-1616A” icon to open the monitoring table and monitor the module, as shown in the following figure.



b. In the Current Value input box of the output channel of the monitoring table, write 65535, and you can see that the indicators of 16 output channels are all lit up, as shown in the following figure.



c. When the input channel 1 of the module inputs an effective voltage, the input value can be monitored at the current value of the input channel in the monitoring table, as shown in the following figure.



7.4.2 Applications in the CX-One software environment

1、Preparation

- **Hardware environment**
  - **Model EI3-0032A**
  - **One computer with pre-installed CX-One software**
  - **Ethernet-specific shielded cable**
  - **One OMRON PLC, this description takes CJ2M-EIP21 as an example**
  - **One switching power supply**
  - **Module mounting rails and rail fixtures**
  - **Device profiles**

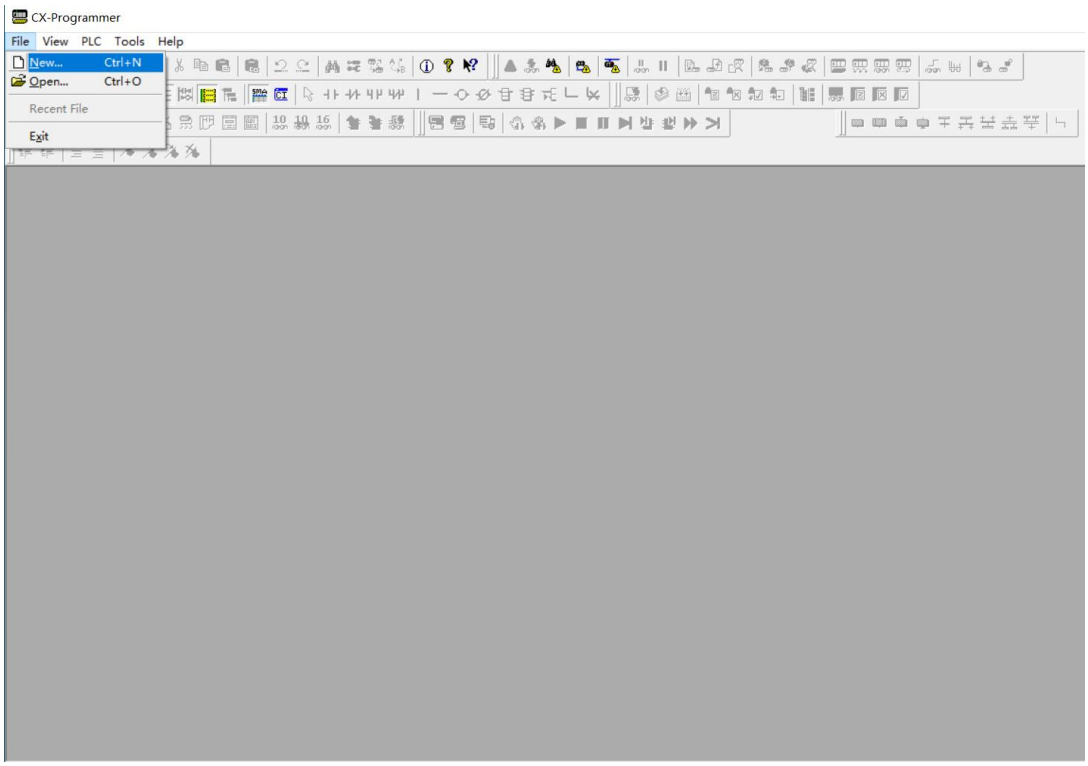
    Address for obtaining the configuration file:

    https://www.solidotech.com/documents/configfile
- **Hardware configuration and wiring**

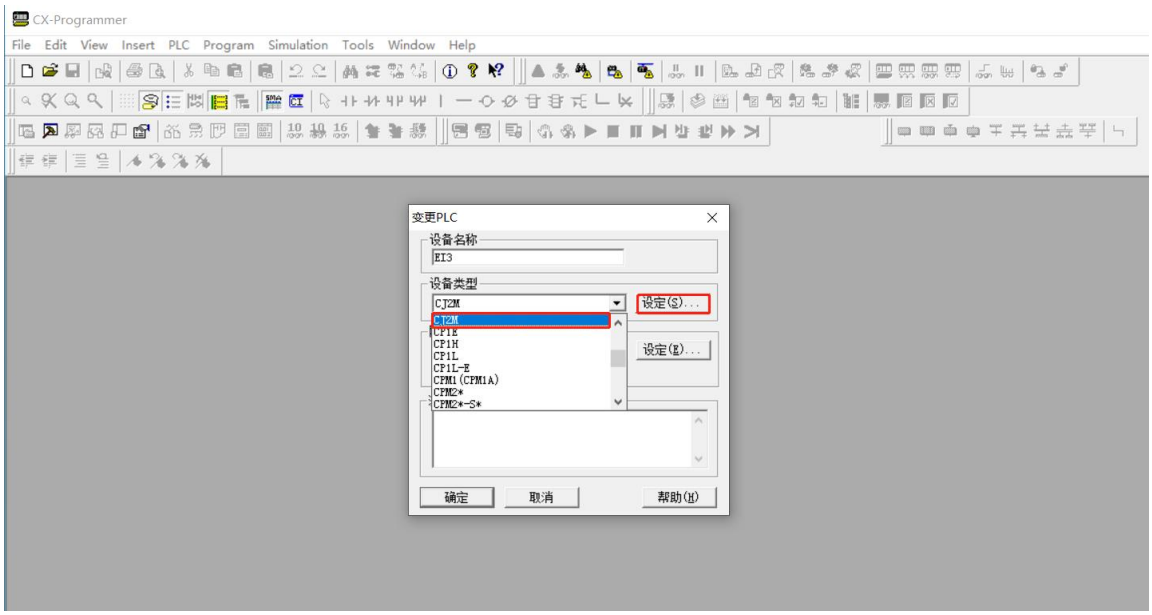
  Please follow the requirements of "5 installation and removal" and "6 wiring".

2、Create a new project

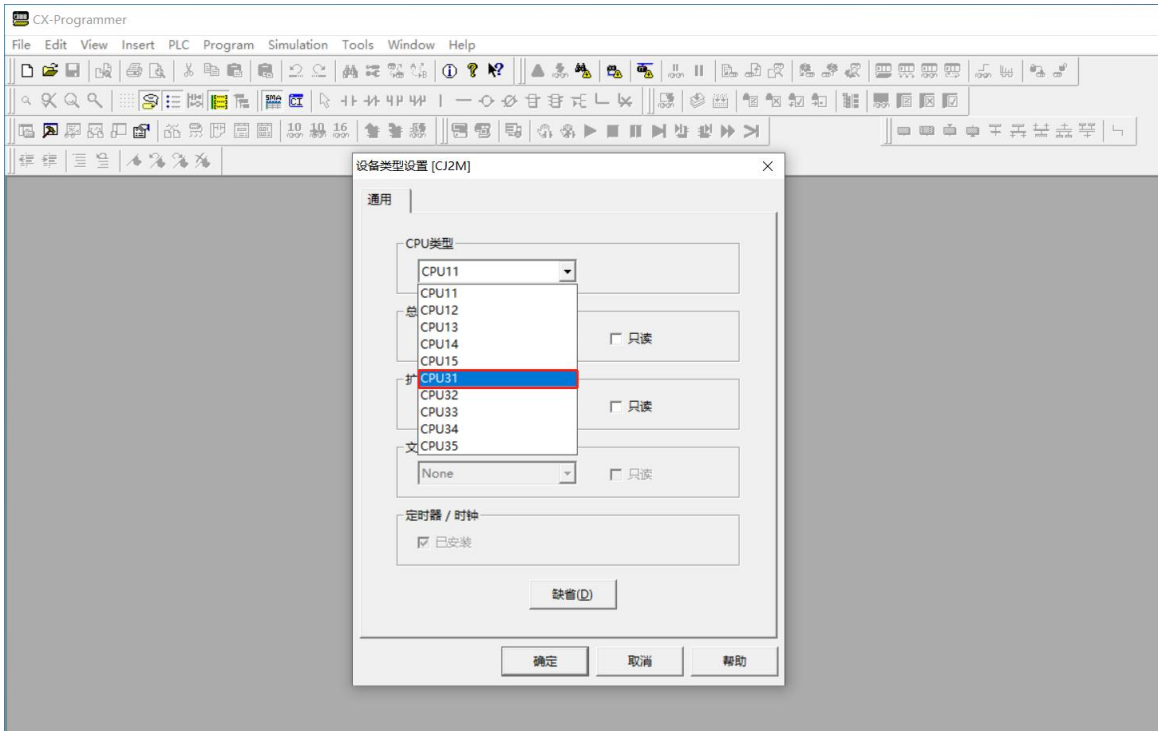
a. Open the CX-One software and click “File -> New”, as shown in the following figure.



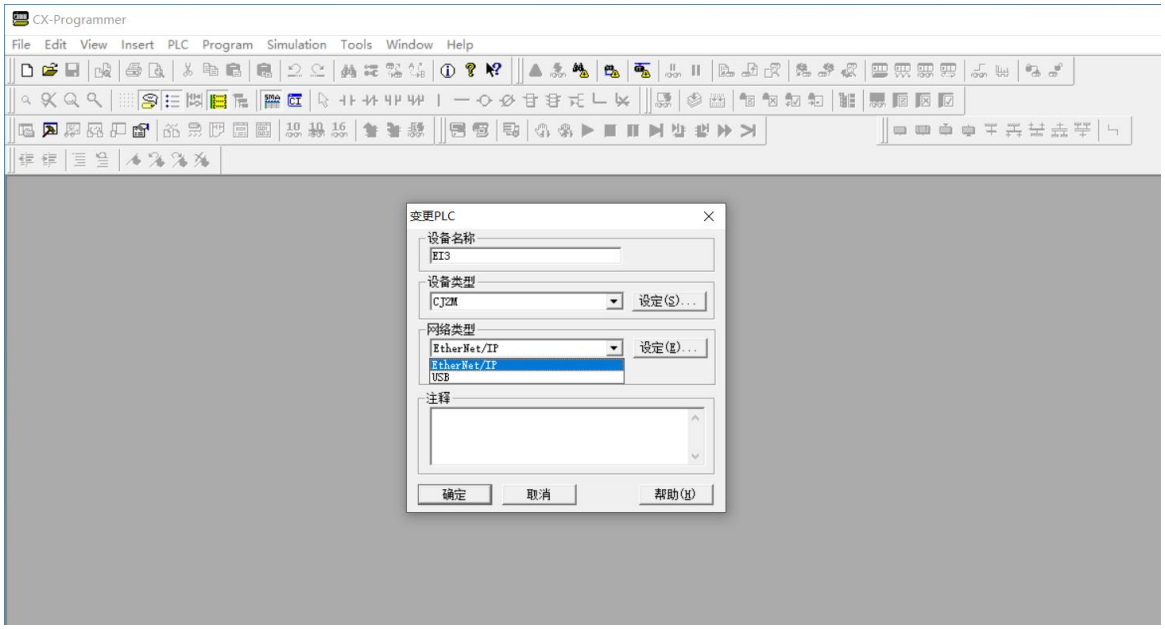
b. In the "Change PLC" window, customize the device name, select "Device Type", that is, PLC series, in this case, "CJ2M" series, and click "Settings", as shown in the following figure.



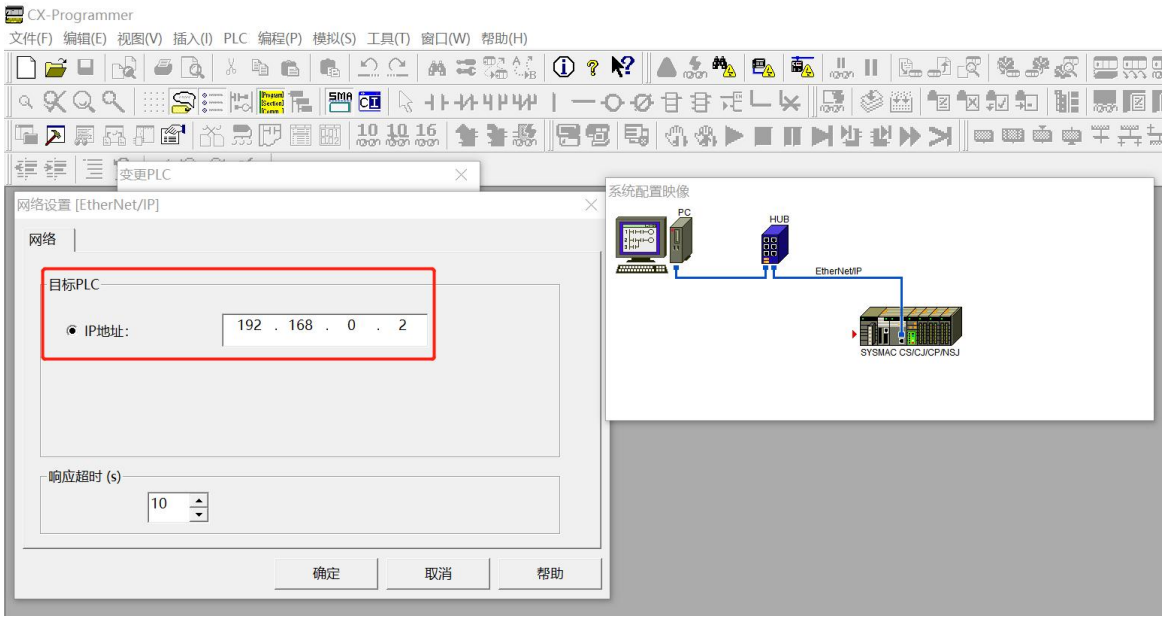
c. The "Device Type Settings" window pops up, check the appearance of the PLC, select the actual device type, in this example the CPU is "CPU31", set the CPU model, and click "OK", as shown in the figure below.



d. In the “Change PLC” window, select “Network Type” to the type to be connected. In this example, “EtherNet/IP” is selected, as shown in the following figure.



e. Click the "Settings" button on the right side of the network type, and the "Network Settings" window will pop up. Set the IP address in the network settings window to keep the IP addresses of the computer, PLC, and module in the same network segment. After the settings are complete, click “OK” and then click “OK” in the “Change PLC” window to create a new project, as shown in the following figure.

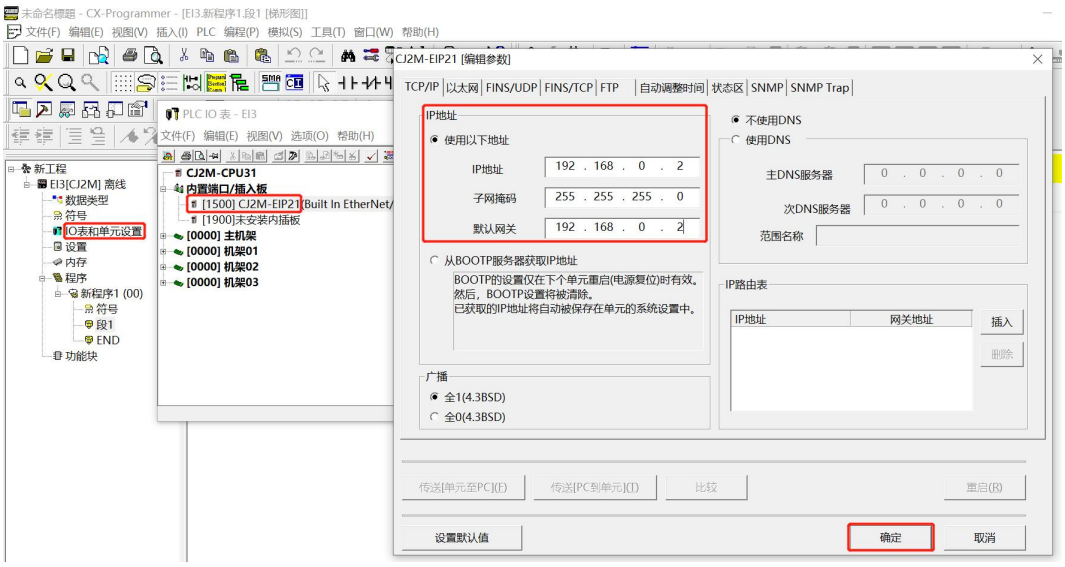


3、Set the IP address of the PLC

a. Double-click “I/O Table and Unit Settings” in the navigation tree on the left to open “PLC I/O Table”.

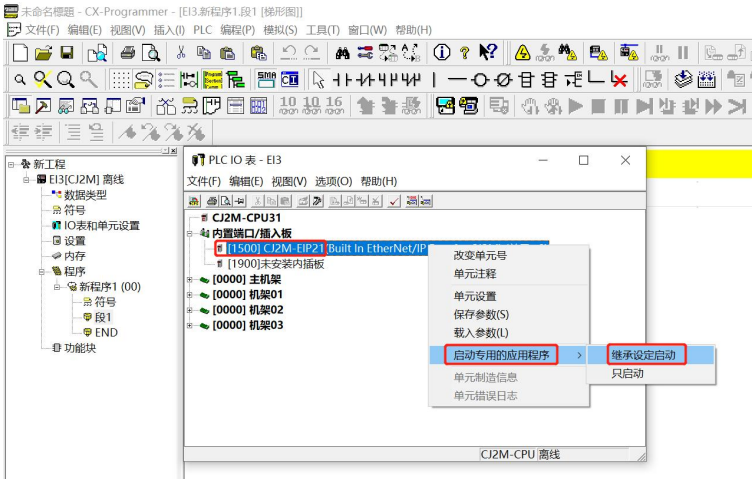
b. Expand the "Built-in Port/Plug-in Board" in the "PLC IO Table", double-click the PLC, that is, CJ2M-EIP21, to open the edit parameter window, and reset the IP address of the PLC (if not required, don’t do it).

c. In this example, set the IP address of the PLC to 192.168.0.2, click “OK” to set the IP address of the PLC, as shown in the following figure.

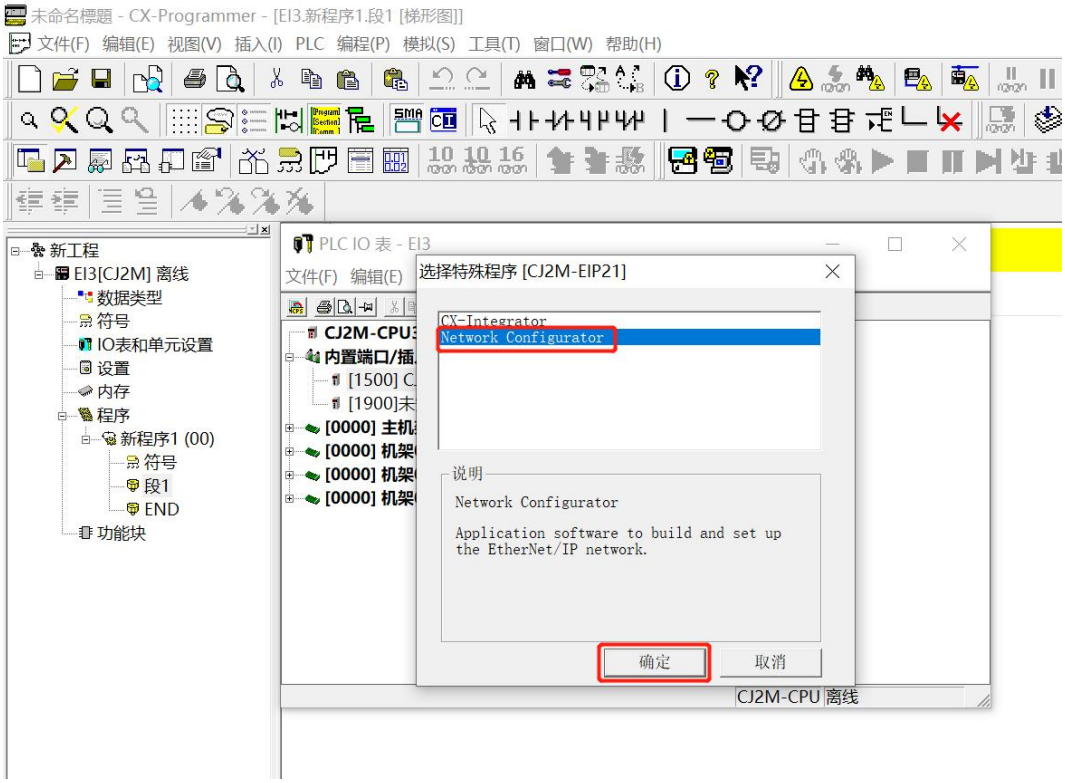


4、Install the EDS file

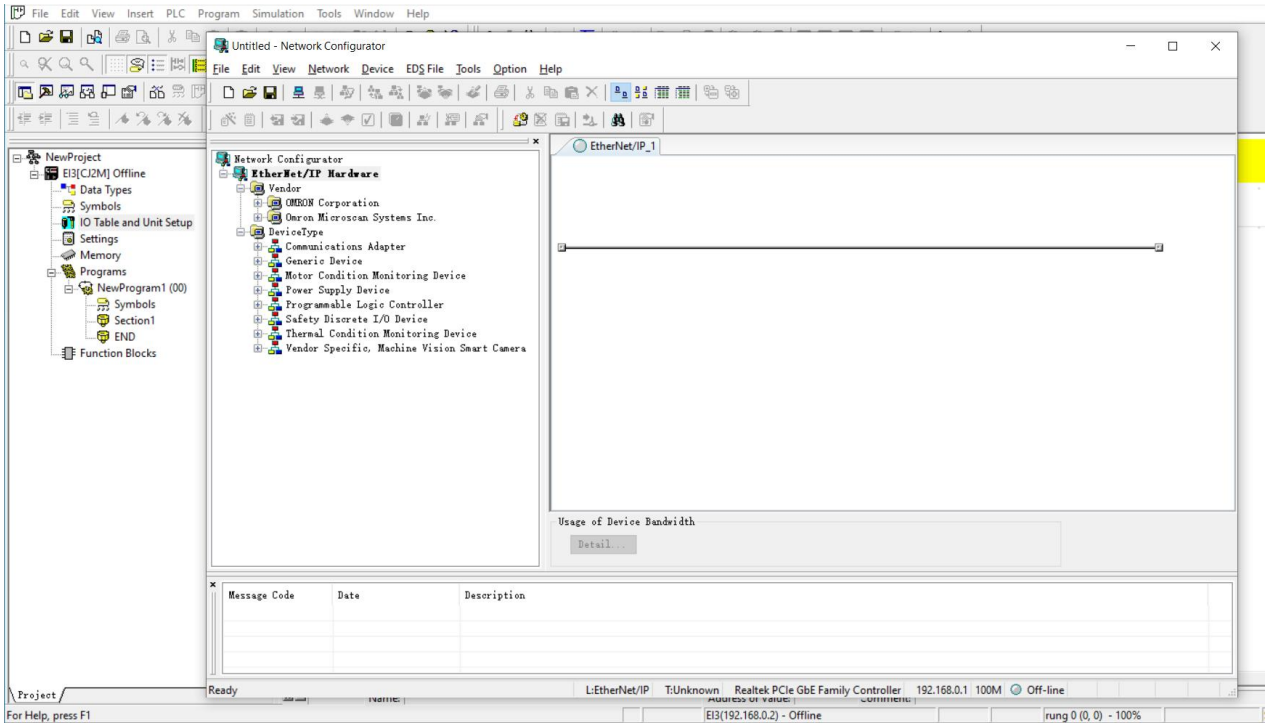
a. Right-click CJ2M-EIP21 in the “PLC IO table” and select “Startup Dedicated Application –> Inheritance Setting Startup”, as shown in the following figure.



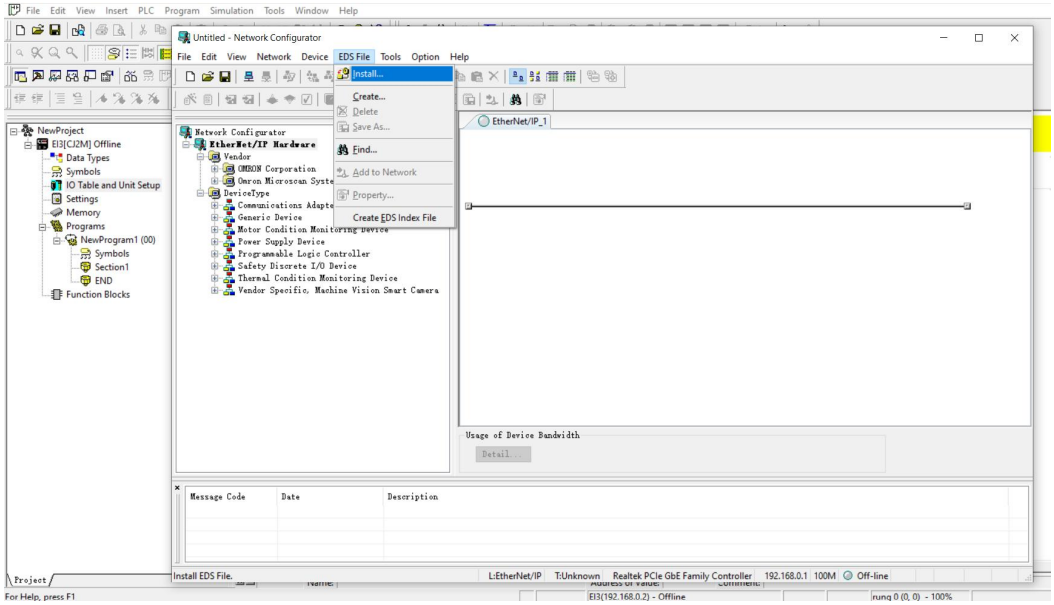
b. In the “Select Special Program” window, select “Network Configurator” and click “OK”, as shown in the following figure.



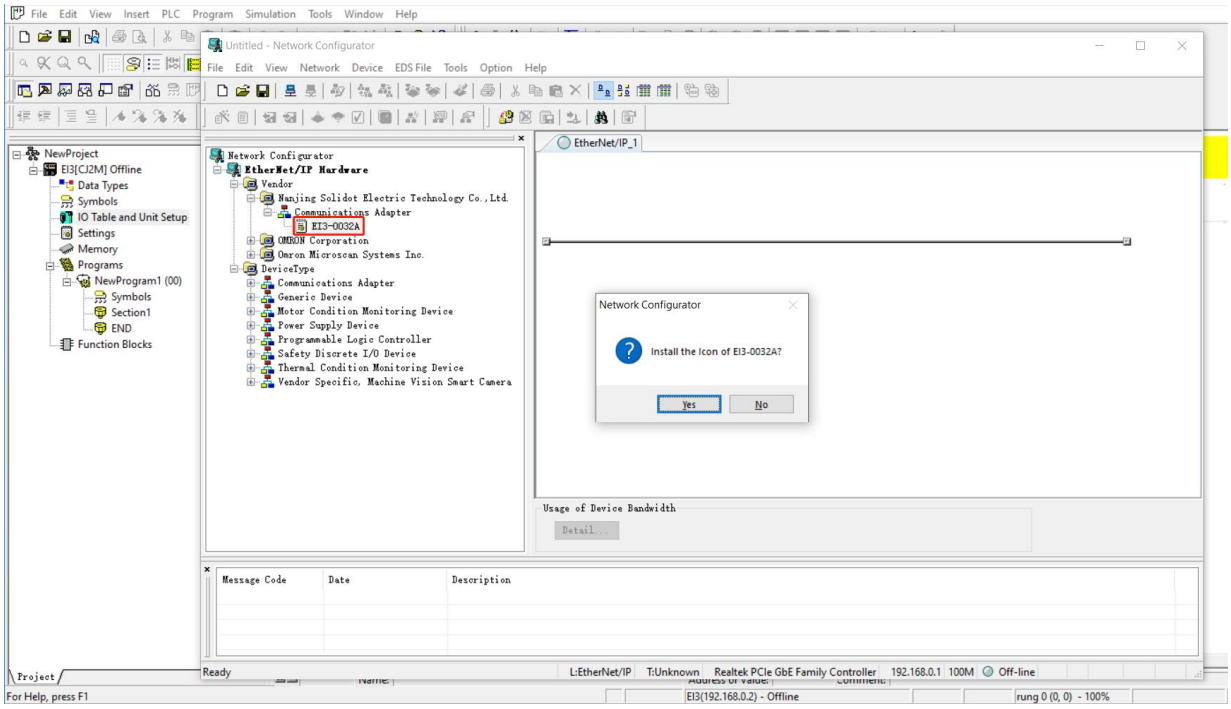
c. Enter the “Network Configurator” Setting interface, as shown in the following figure.



d. On the "Network Configurator" setting interface, select "EDS File -> Install", as shown in the following figure.

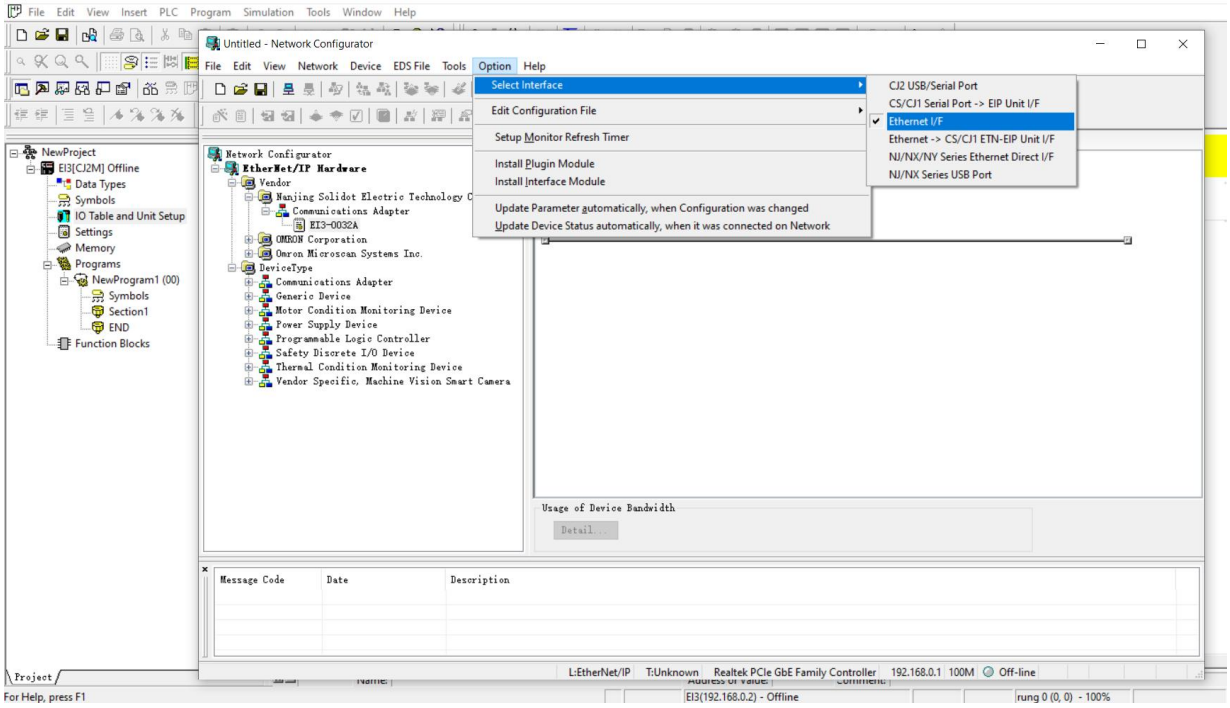


e. Select the "EDS file" to be installed, and the installation is complete. The installation icon window pops up, click "No", as shown in the following figure.

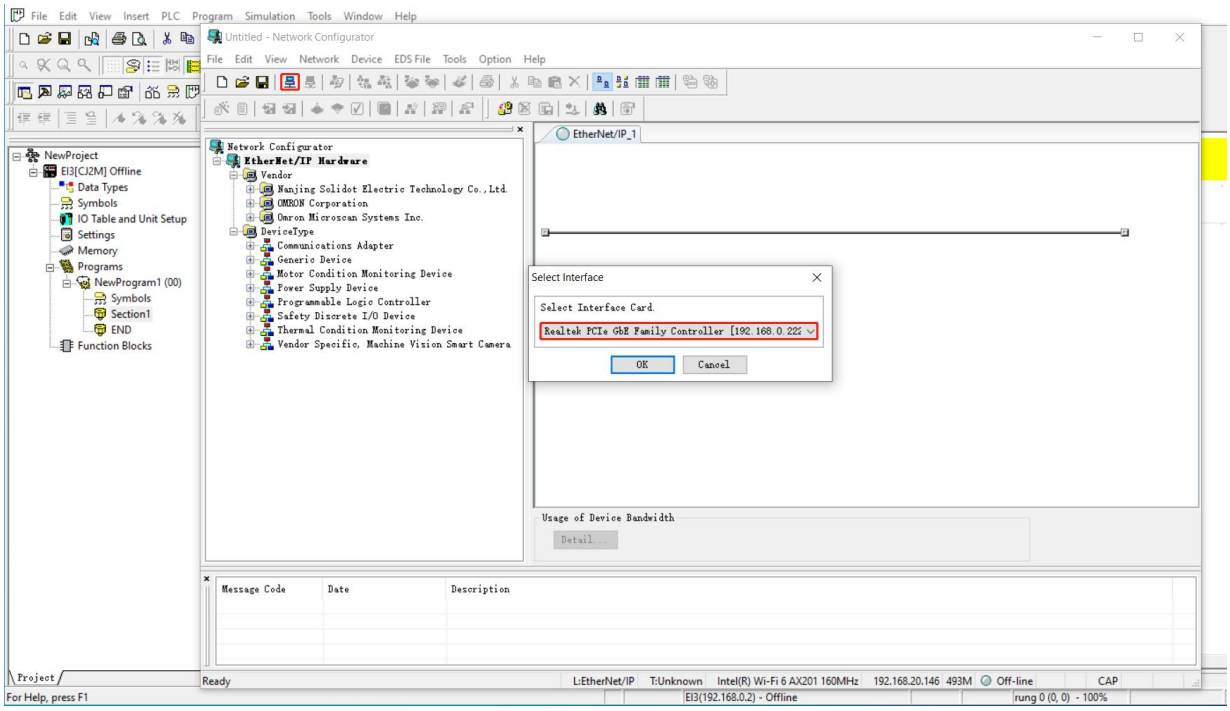


5、Hardware configuration

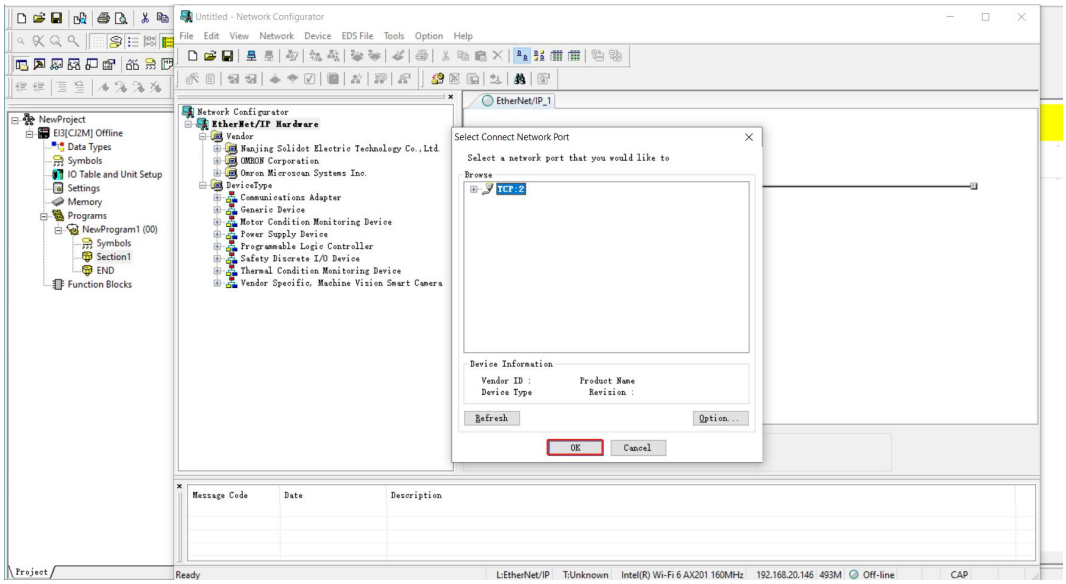
a. On "Network Configurator" setting interface, select "Option -> Select Interface", Switch the interface to "Ethernet I/F", as shown in the figure below



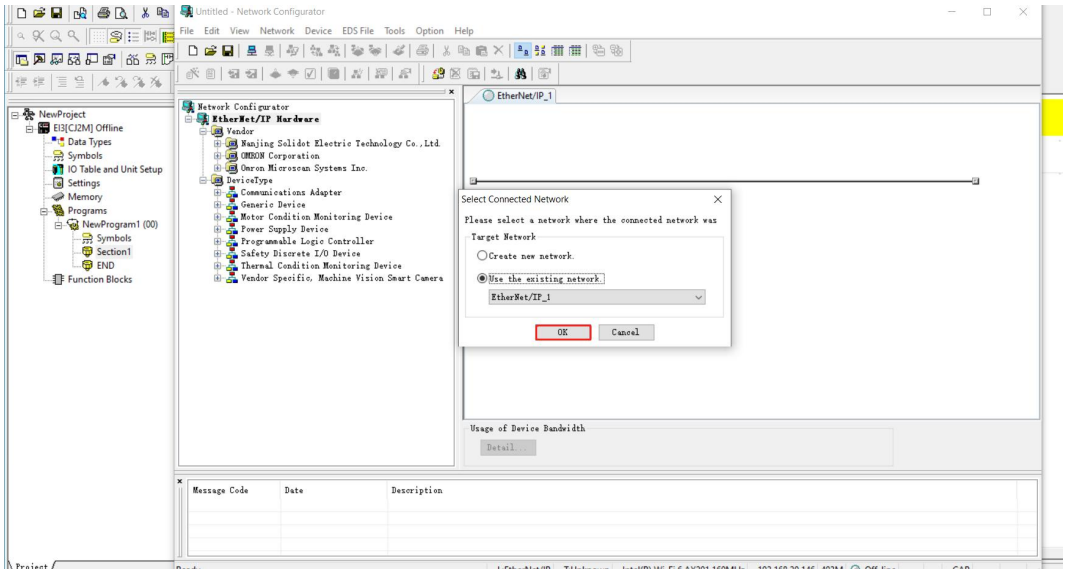
b. On the "Network Configurator" page, click  Connect on the toolbar to pop up the "Select Interface" window, select the NIC corresponding to the configuration port of the computer, and click "OK", as shown in the following figure.



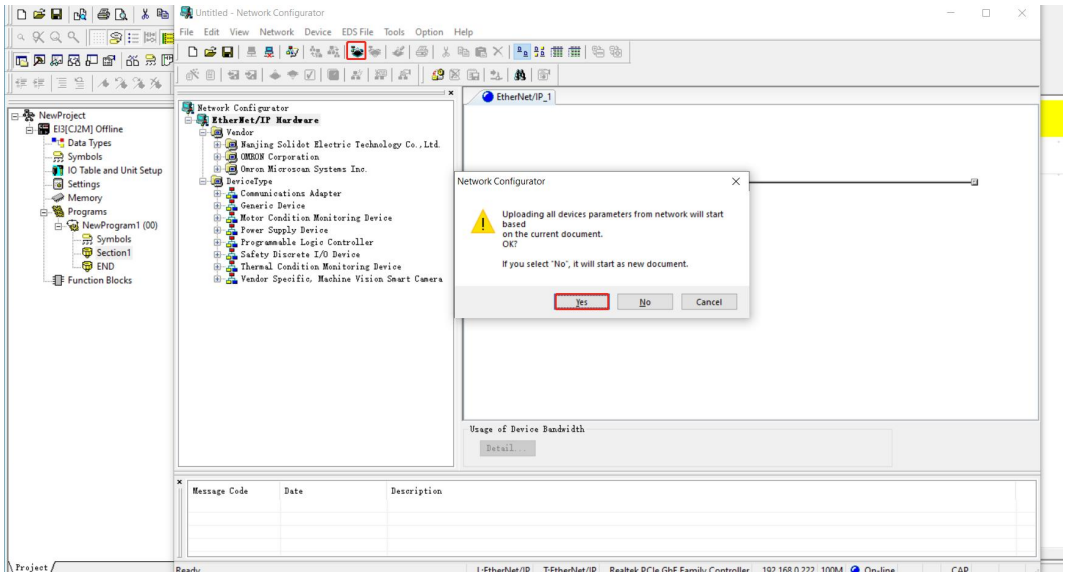
c. The "Select Connect Network Port" window pops up, click "OK", as shown in the figure below.



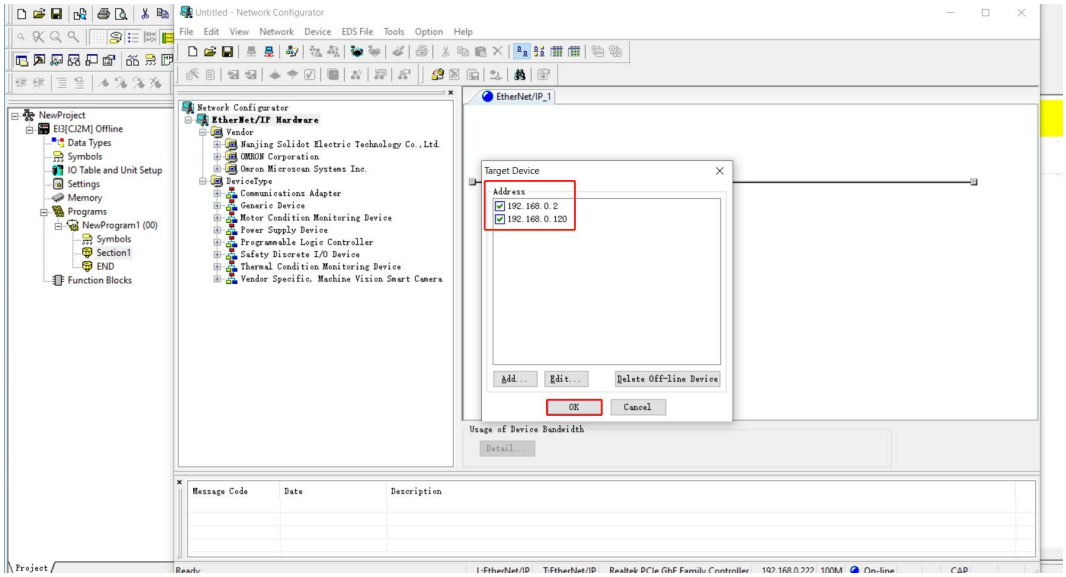
d. The "Select Connect Network Port" window pops up, click "OK", as shown in the figure below.。



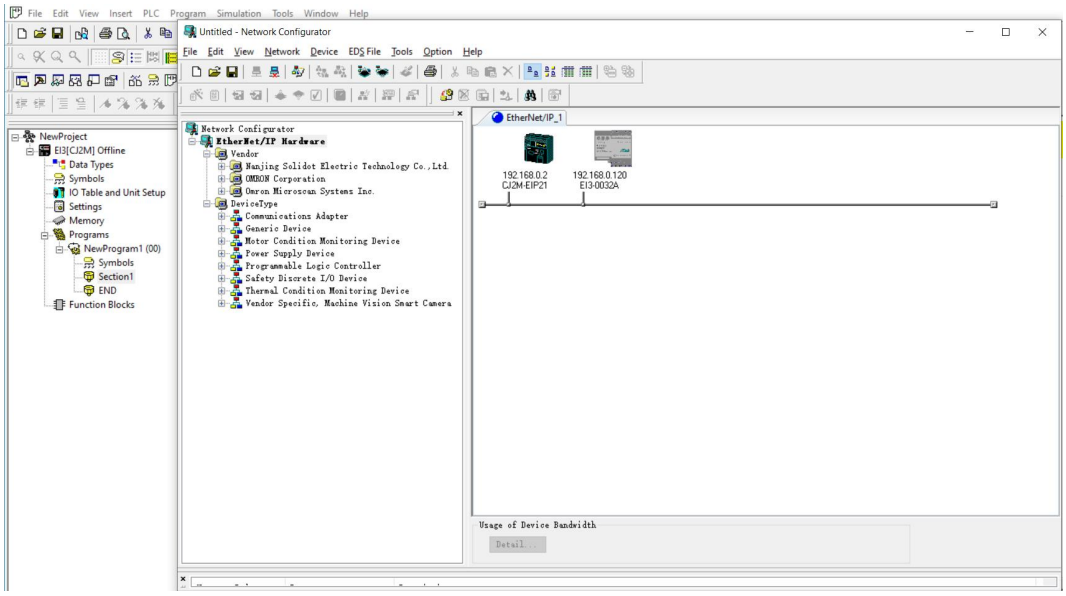
e. On the “Network Configurator” page, click  Upload Tool on the toolbar, and in the pop-up confirmation window, click “Yes”, as shown in the following figure.



f. The "Target Device" window pops up, select the device in the configuration according to the IP address, and click "OK", as shown in the figure below.

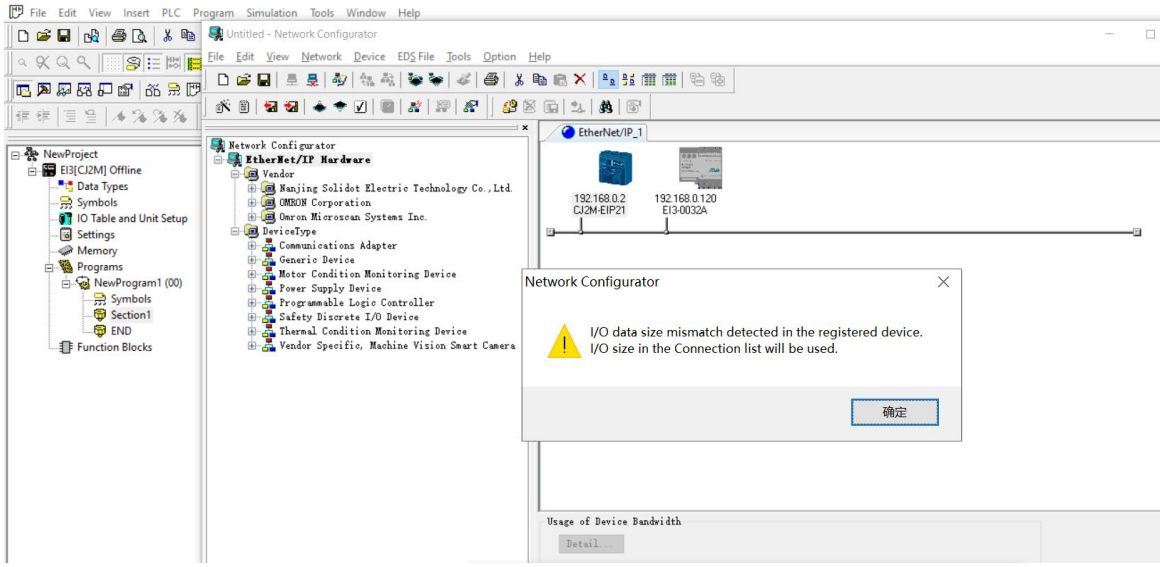


g. After the loading is complete, you can see that the device is added to the network, as shown in the following figure.

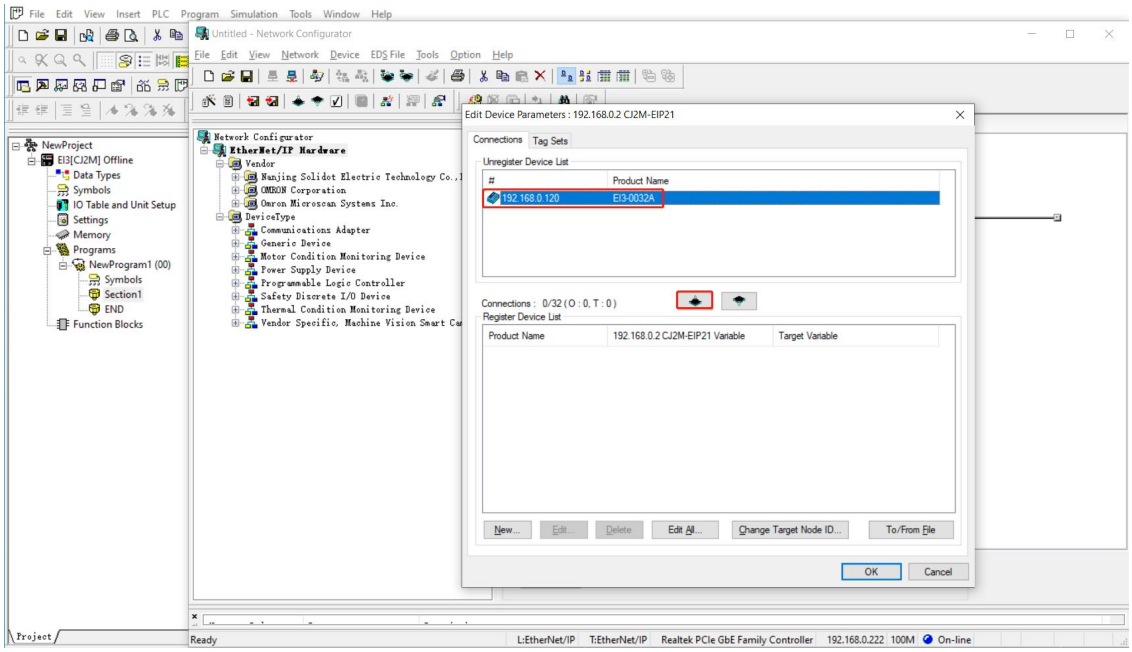


6、Set the label variable

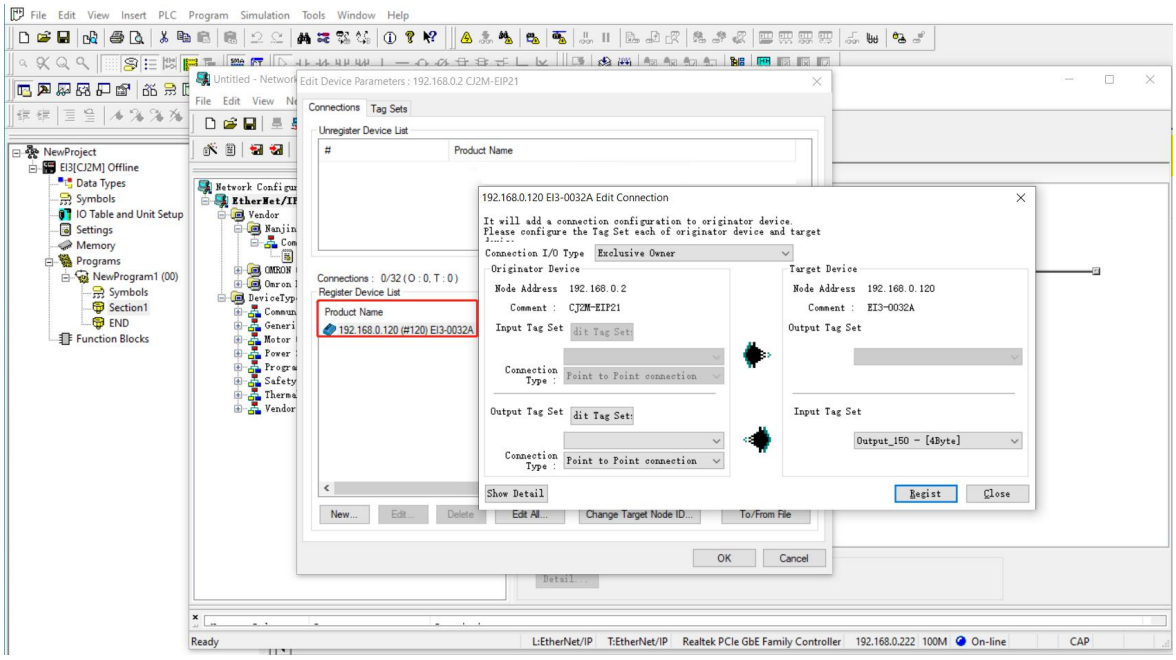
a. Double-click the PLC device in the configuration, multiple prompt boxes will pop up, and click “OK”，as shown in the following figure.



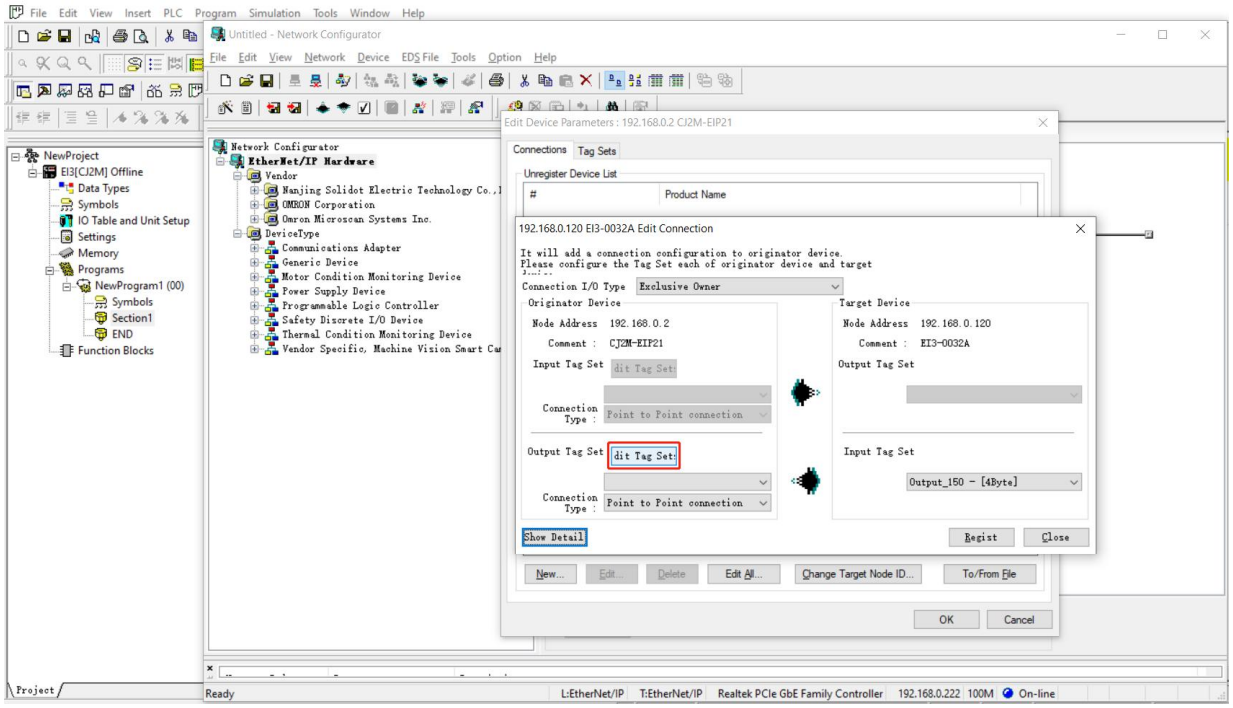
b. In the "Edit Device Parameters" window, select the device in the "Unregister Device List" menu and click  the button to register the device, as shown in the following figure.



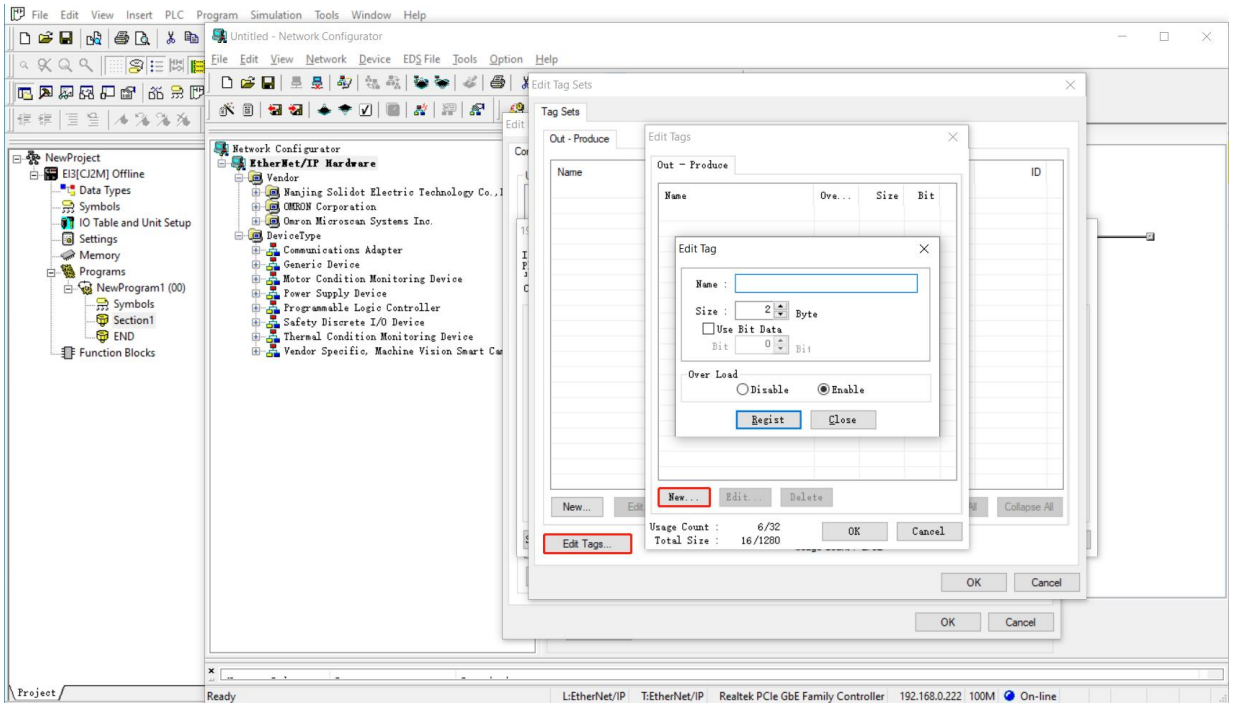
c. Double-click 192.168.0. in the Product Name3(#003)EI3-0032A, the Edit connection window of EI3-0032A is displayed, as shown in the following figure.



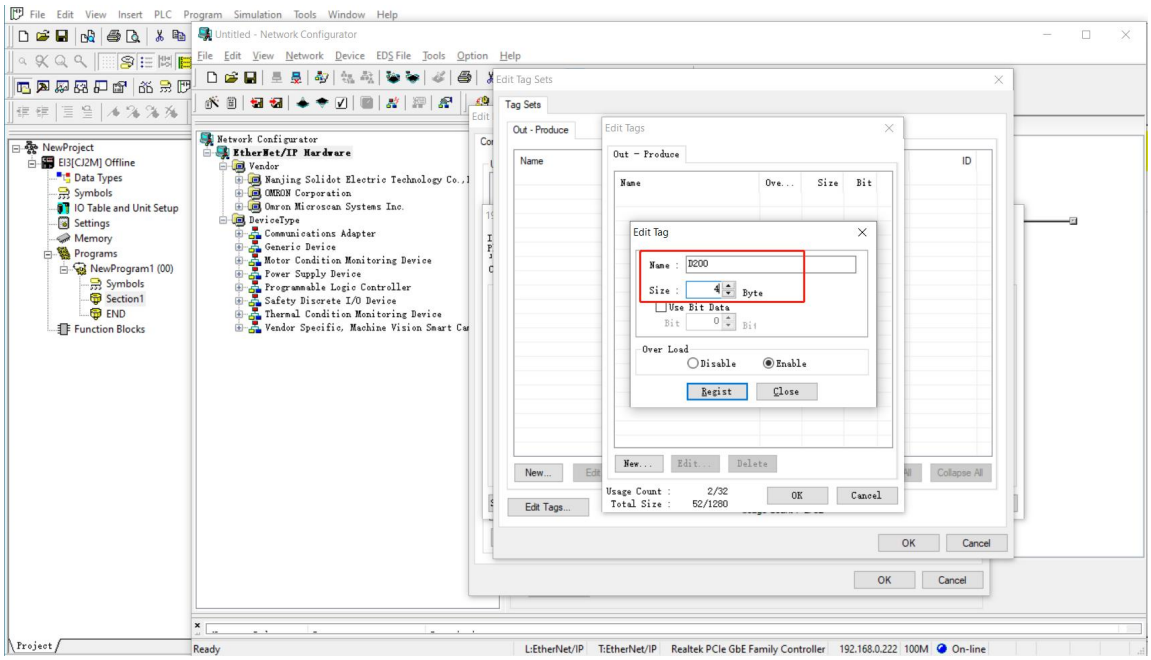
d. In the "Edit connection" window of EI3-0032A, click the "Edit Tag Set" button to the right of "Output Tag Set", as shown in the figure below.。



e. The "Edit Tag Set" window pops up, click the "Edit Tags" button, the "Edit Tags" window pops up, click the "New" button, the "Edit Tag" window pops up, as shown in the figure below.



f. In the "Edit Tag" window, you can set the downstream data. In this example, EI3-0032A occupies 4 bytes of data in the downlink, so set 4 bytes for size and D200 for Name, as shown in the following figure.



Name: the starting ID of the downstream data, which represents the starting ID of the output module in the configuration.

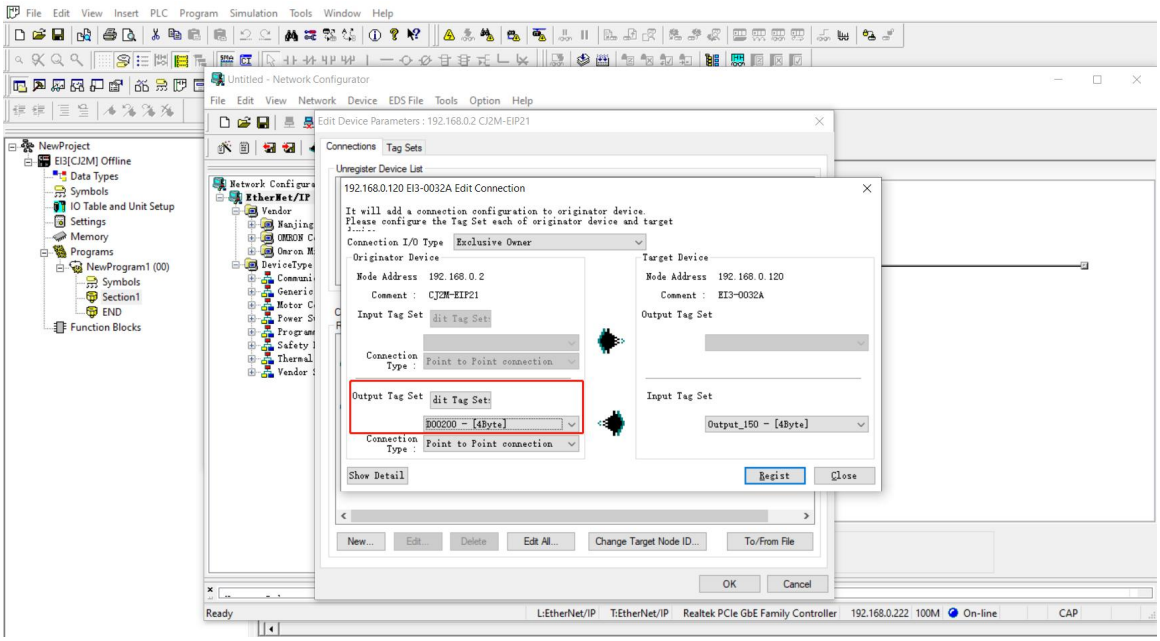
Size: downlink data.

The starting ID value of the downstream data must be greater than the starting ID of the upstream data + the upstream data.

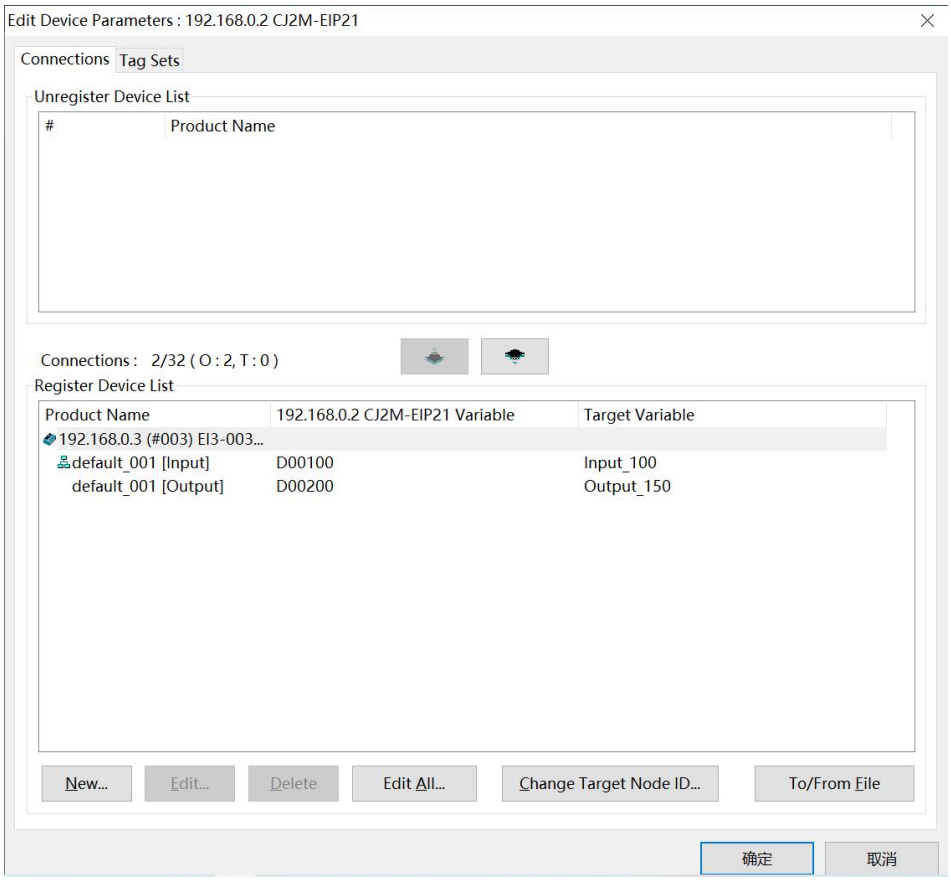
If other modules have downlink data, you can add tags as follows.

g. Click “Regist”, “Close”, “OK”, and “OK” to complete the output label variable settings. The method of setting the input label variable is the same as that of the output label.

h. In the “Edit connection” window of EI3-0032A, select “Downstream Data” from the checklist below the “Edit Tag Set” button on the right of “Output Tag Set”, as shown in the following figure.



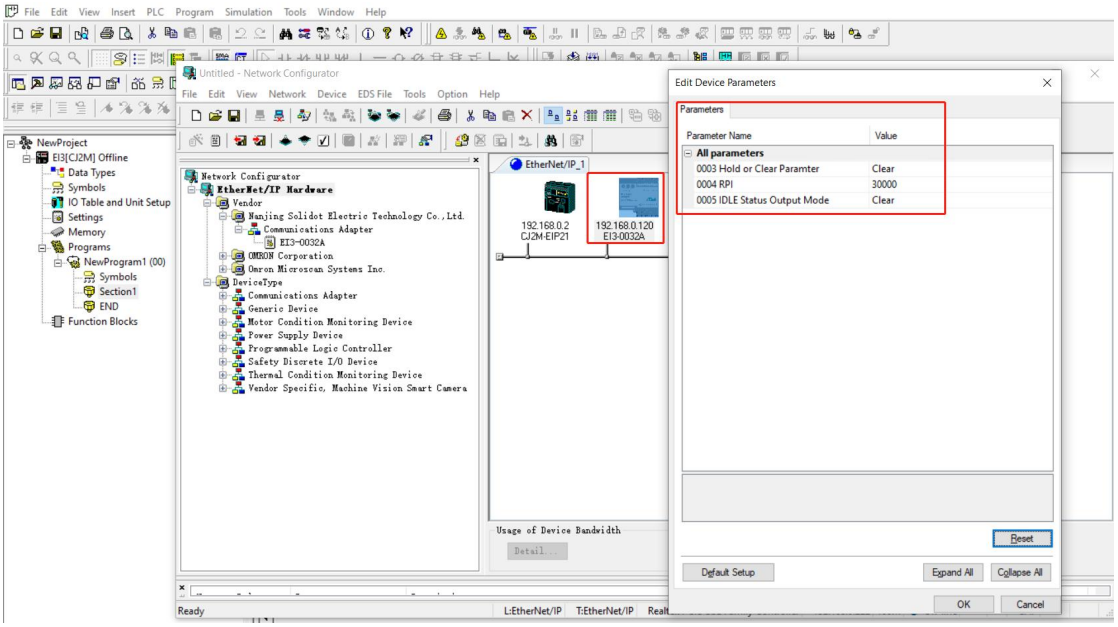
i. Click "Regist", click "Close", and click “OK” to complete the setting after the registration is completed, as shown in the following figure.



7、Parameter setting of the IO module

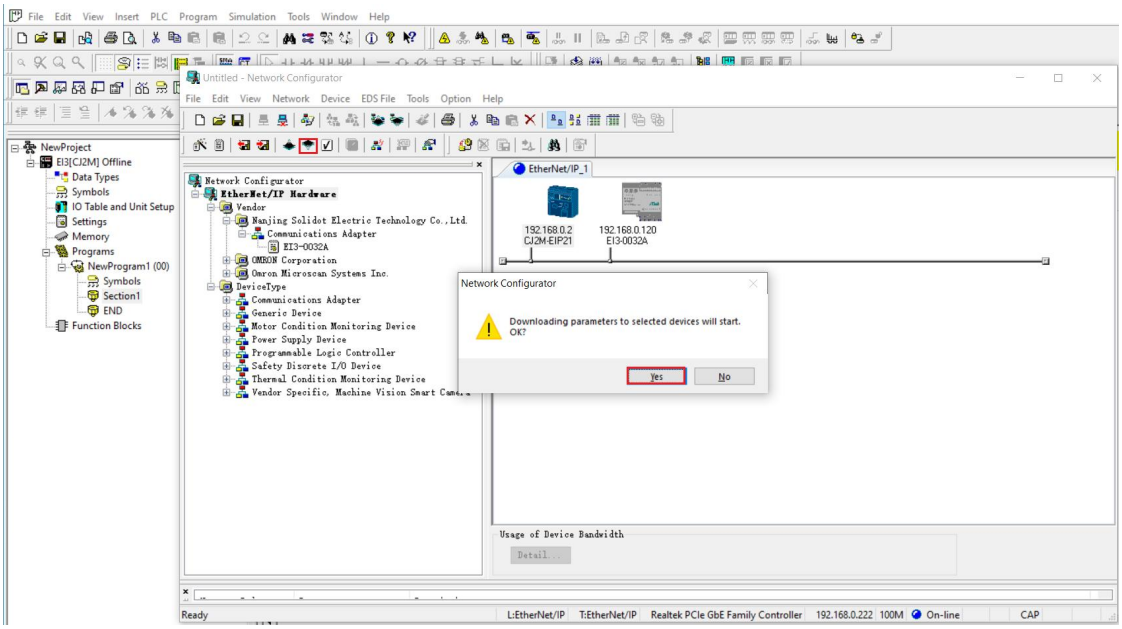
a. Double-click the IO module to enter the "Edit Device Parameters" menu.。

b. In the "Parameters" menu folder, you can configure parameters such as output clearing, holding, etc.

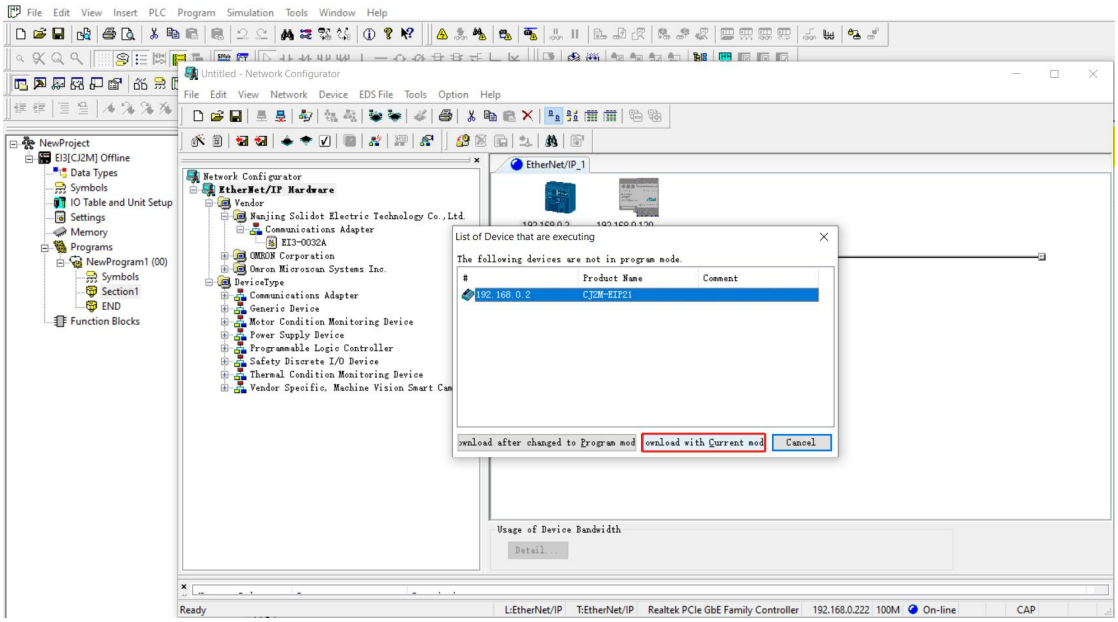


8、PLC download

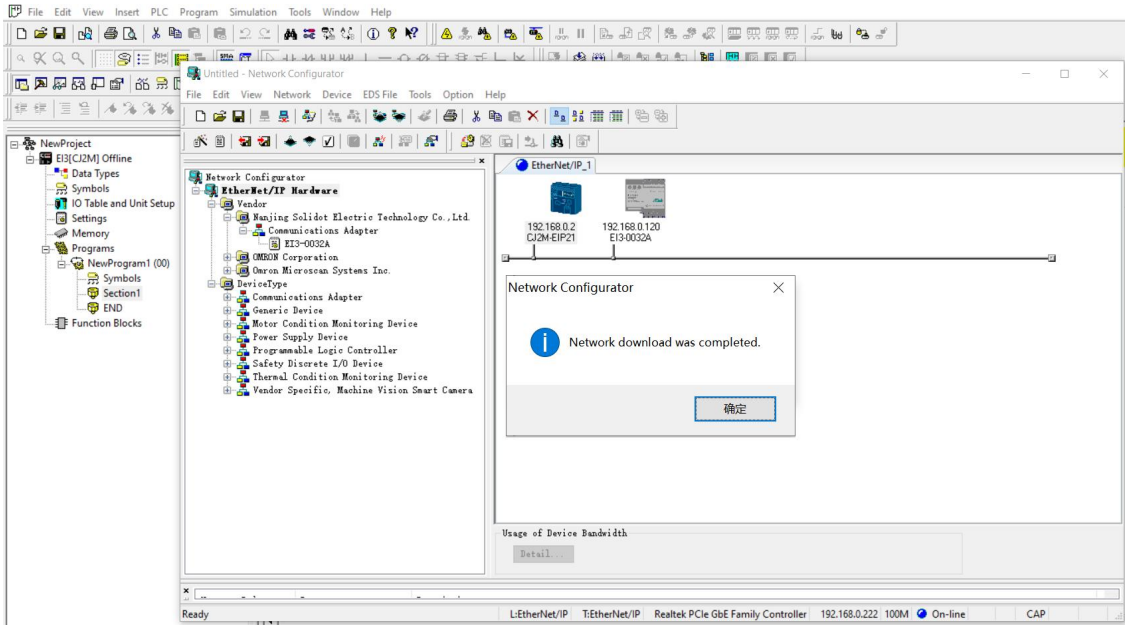
a. Select PLC "CJ2M-EIP21", click the "Download to Device" icon in the toolbar of the "Network Configurator" interface, and click "Yes" in the pop-up "Network Configurator" window, as shown in the figure below.



b. Select the module and click the "Download with Current mode" button, as shown in the figure below.



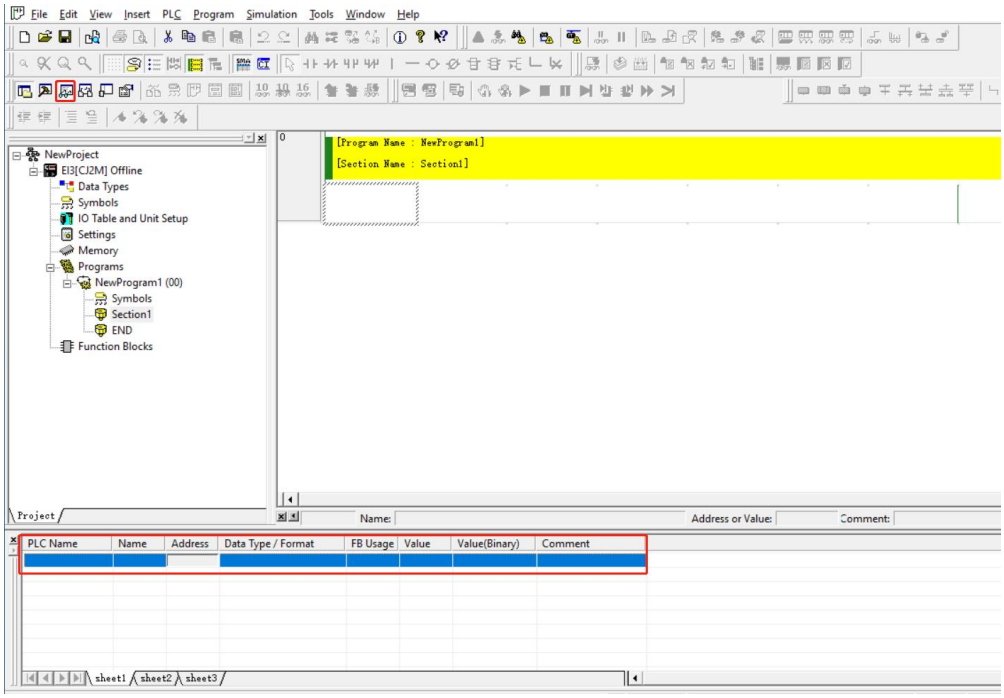
c. The download completion window is displayed, indicating that the download is complete, click "OK", as shown in the following figure.



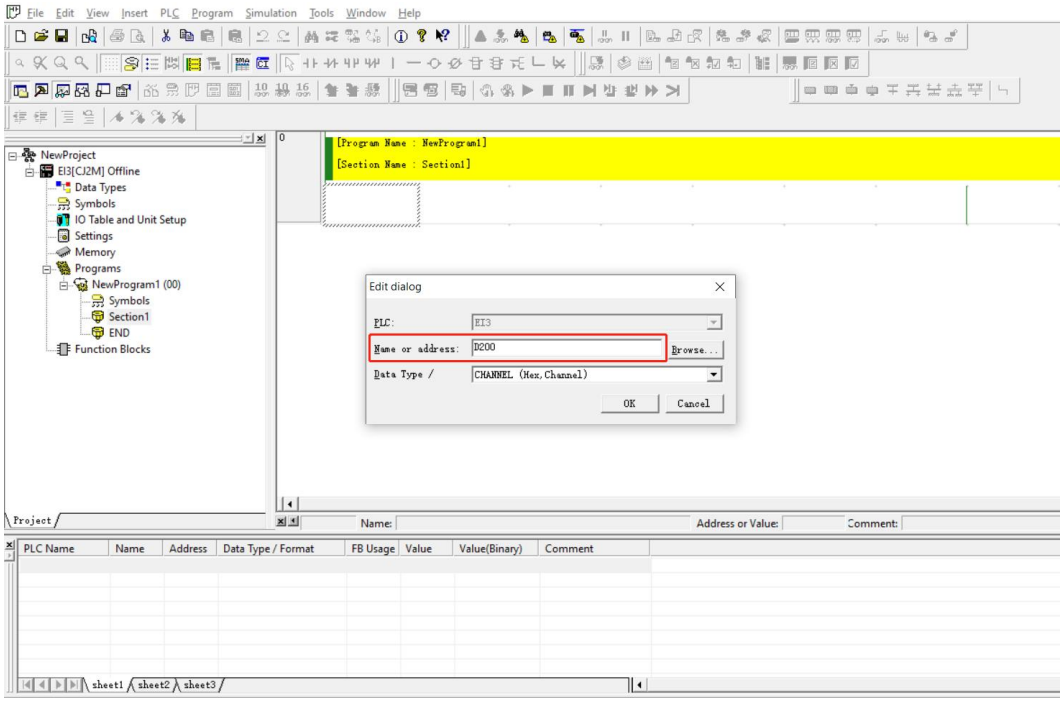
Note: After the download is completed, if the PLC reports a connection error, check the parameter configuration, and try to download it again after power-off and restart (download Network Configurator first, then CX-Programmer).

9、Data monitoring

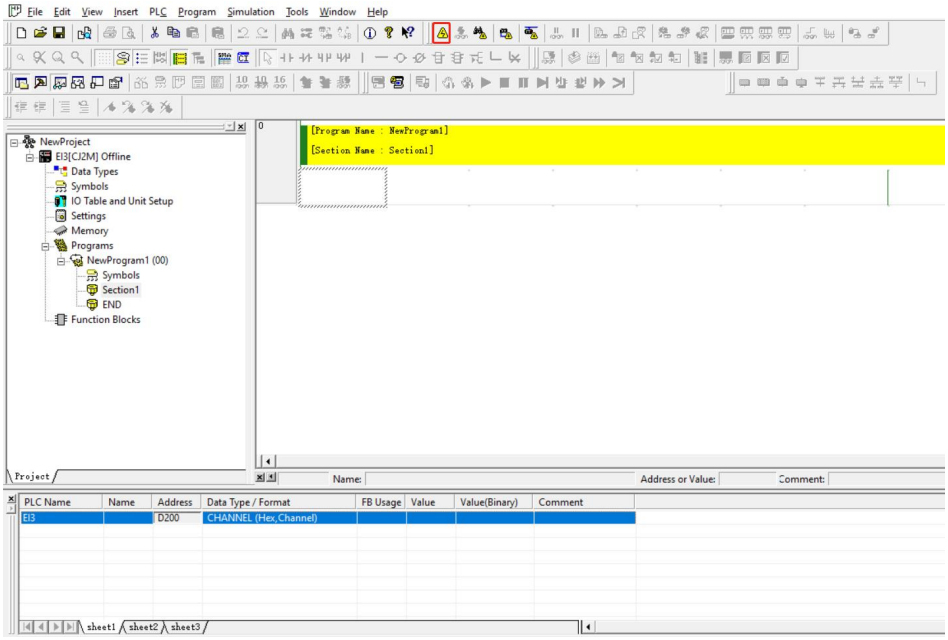
a. Switch to the CX-Programmer page, click the toolbar monitoring tool, and the monitoring page appears at the bottom of the page, as shown in the following figure.



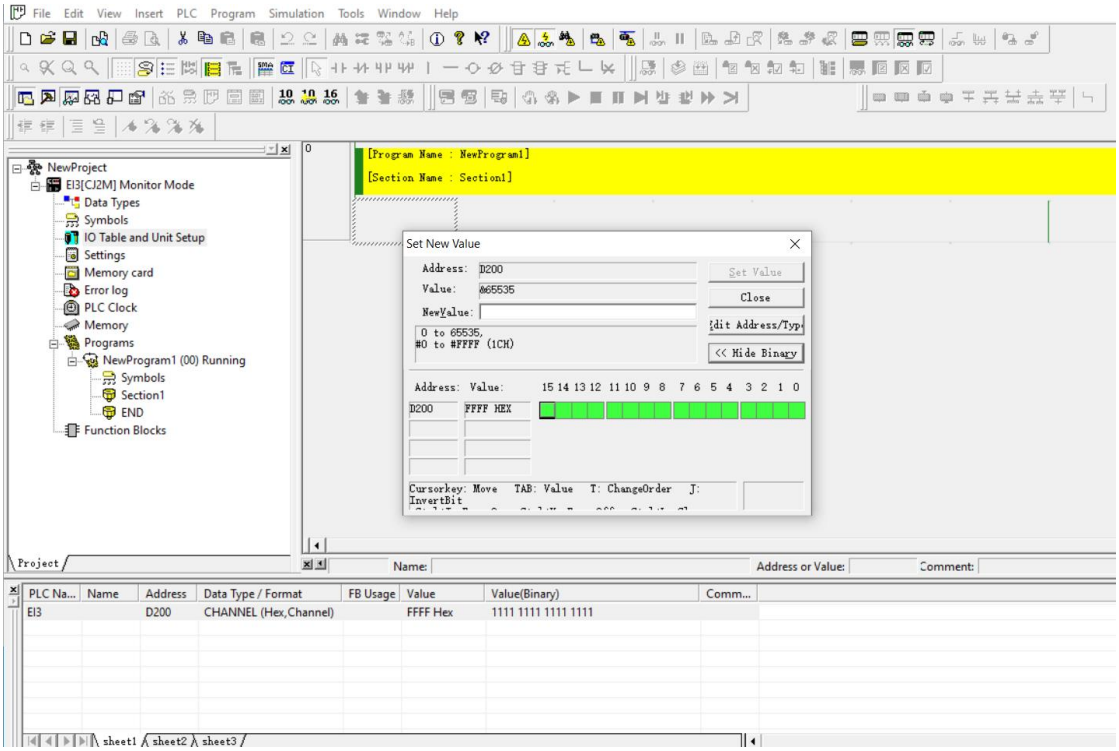
b. Double-click the monitor bar to pop up the "Edit Dialog". In the "Name&Address" column, write the registered address, as shown in the following figure.



c. Click the toolbar "Operation Online" button, and the PLC is online, as shown in the following figure.



d. Right-click on the monitor bar to enter a numeric value for forced output, as shown in the figure below.



8 FAQ

8.1 Unable to scan the module

1. Check the network line connection

Use the Windows command to ping the IP address of the module. If the ping succeeds, check the status of the indicator light. If the ping fails, check the network line connection. If there is no abnormality in the network line connection, set the request acceptance time during device scanning to 60s and scan again. module, if unknown devices can be scanned, the reason is that the module IP is not assigned, and the IP can be reassigned. If the corresponding module still cannot be scanned, check the status of the indicator light.

2. Check the indicator status

If the RUN light flashes, the IP address exists, but the controller and the module may not be in the same network segment, restore the module to factory settings and then reset the IP address, if the RUN light goes out and the ERR light flashes, the module detects that there may be duplicate IP addresses in the network. Troubleshoot and handle devices with duplicate IP addresses.

8.2 The IP address assignment is abnormal

1. The device cannot be scanned under the factory setting parameters

The time to receive a request when modifying a module lookup is 60 seconds.

2. Assigning IP address using BOOTP times out

Click Advanced Settings in IP address settings and set the timeout period to 60s. If this occurs when the timeout period is set to 60 seconds, check whether the controller address is on the same network segment as the IP address assigned to the module.

3. The assigned IP address is lost after a power outage

After using BOOTP to assign an IP address, the module is not set to a fixed IP address to boot.

4. Use the rotary switch to modify the IP address, and the IP address does not change

If the IP address setting is outside the specified range or the IP address is set to 0, check whether the rotary switch setting meets the expected value.