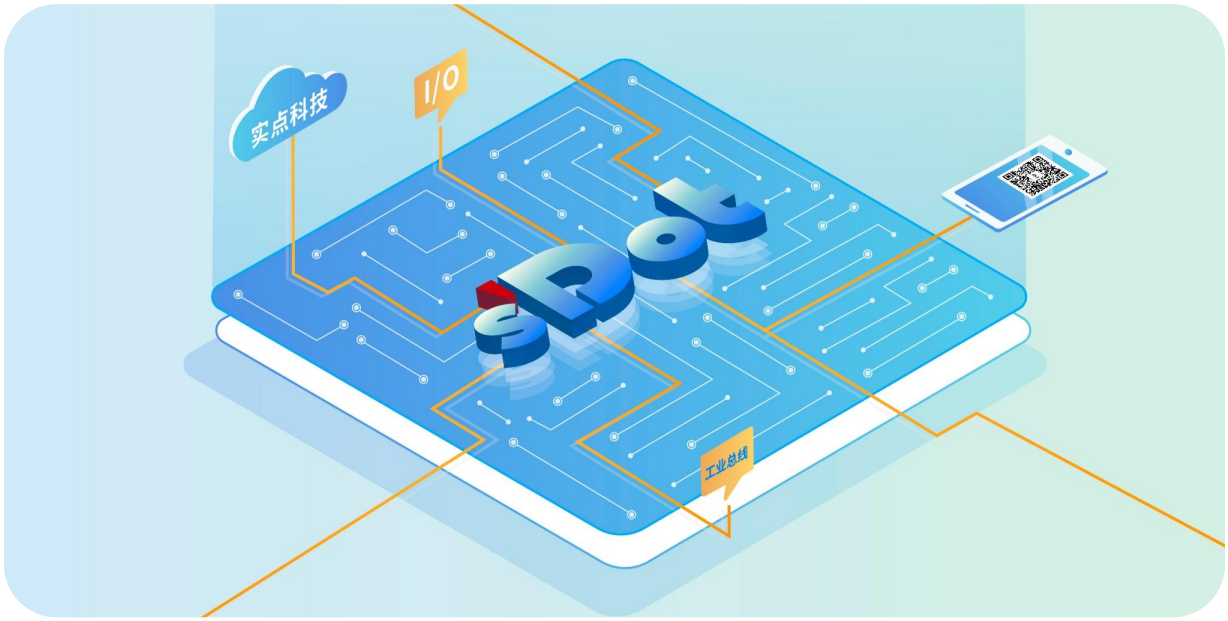

XB6S-PS20D

SSI absolute encoder counting module

User Manual

Nanjing Solidot Electronic Technology Co., Ltd.

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1 Product Overview

1.1 Product Introduction

XB6S-PS20D is a slice SSI absolute encoder counting module, which adopts X-bus bottom bus, adapts to our XB6S series coupler module, and supports dual-channel SSI encoder input, counting, probe latching and other functions. The module occupies a small space, has high data reliability and high real-time performance, and can be widely used in various industrial system equipment.

1.2 Product Features

- Dual Channel
  Supports two-channel SSI encoder input.
- Support setting data bit length and position
  The frame length, LSB and MSB are programmable.
- Support two encoding displays
  Gray code and binary code.
- Support bidirectional counting
  The encoder rotates forward and reverse, and the counting direction can be flexibly adapted.
- Probe latch function
  Supports latching the current count value when the voltage of the probe input pin changes.
- Small size
  Compact structure and small space occupation.
- Easy diagnosis
  The innovative channel indicator light design is close to the channel, clear at a glance, and easy to detect and maintain.
- Easy configuration
  The configuration is simple and supports all major master stations.
- Easy to install
  DIN 35 mm standard rail installation
  It adopts spring-type terminal blocks, making wiring convenient and quick.

2 Product Parameters

2.1 General parameters

Interface parameters	
Product Model	XB6S-PS20D
Bus protocol	X-bus
Process data volume: Downstream	2Bytes
Process data volume: Uplink	26Bytes
Channel Type	Encoder input channel: 2 groups of SSI absolute encoder channels
	Probe input channels: 4 channels (1 encoder with 2 probe functions), PNP/NPN
	Ordinary digital input channels: 2aisle (1 channel encoder with1Road Ordinary Digital input), PNP/NPN
	Ordinary digital output channels: 8 channels (1 channel encoder with 4road Ordinary digital Output), NPN
Refresh rate	1ms
Technical Parameters	
System input power	5VDC (4.5V~5.5V)
Rated current consumption	160mA
Power consumption	0.75W
Encoder input	2 channels
Encoder signal type	Differential signal, 5V
Data frame length	10~40 people
Positional value format	Support Gray code or binary
Position value LSB/MSB	Configurable
SSI encoder clock frequency	≤2.0MHz
Reading interval	Configurable

Probe function (high-speed hardware latch)	Support
Dimensions	106.4×25.7×72.3mm
Operating temperature	-20℃~+60℃
Storage temperature	-40℃~+80℃
weight	110g
Wiring method	Screw-free quick plug
Installation	35mm standard rail installation
Relative humidity	95%, non-condensing
Protection level	IP20

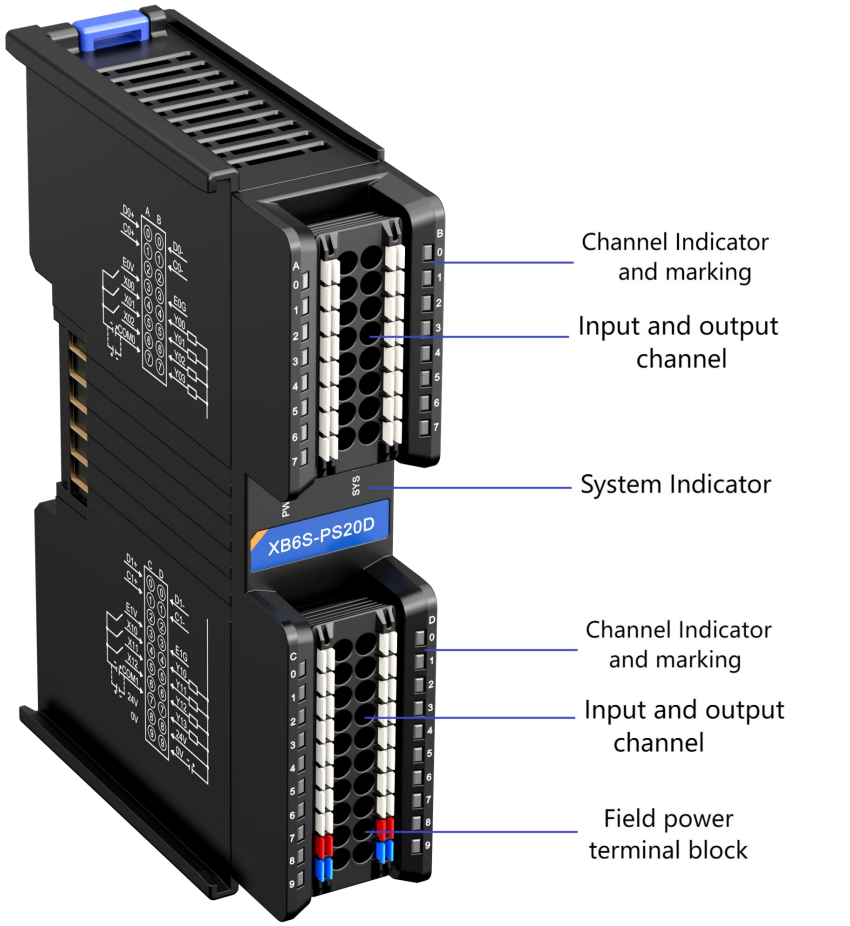
2.2 Digital parameters

Digital input	
Rated voltage	24VDC (20.4V~28.8V)
Signal Points	6
Signal Type	NPN/PNP
OFF voltage/OFF current	-3V~+5V/0.9mA or less
ON voltage/ON current	11V~30V/2.1mA or above
Input Current	4mA
Isolation method	Optocoupler Isolation
Isolation withstand voltage	500VAC
Channel indicator light	Green LED light
Digital output	
Rated voltage	24VDC (20.4V~28.8V)
Signal Points	8
Signal Type	NPN
Load Type	Resistive load, inductive load
Single channel rated current	Max: 500mA
Port protection	Over current protection
Isolation method	Optocoupler Isolation
Isolation withstand voltage	500VAC
Channel indicator light	Green LED light

3 Panel

3.1 Panel structure

Product Parts Name



3.2 Indicator light function

Name	Logo	Color	State	Status description
Power indicator	PWR	Green	Always on	Power supply is normal
			Off	The product is not powered on or the power supply is abnormal
System operation indicator	SYS	Green	Always on	The system is running normally
			Flashing 1Hz	No business data interaction, waiting to establish business data interaction
			Flashing 10Hz	Firmware Upgrade
			Off	System not working
Data line channel indicator	0	Green	Always on	Channel has signal input
			Off	The channel has no input or the signal input is abnormal
Clock line channel indicator	1	Green	Always on	Channel has signal output
			Off	The channel has no output or the signal output is abnormal
Input channel indicator	4~6 (left side)	Green	Always on	Channel has signal input
			Off	The channel has no input or the signal input is abnormal
Output channel indicator	4~7 (right side)	Green	Always on	Channel has signal output
			Off	The channel has no output or the signal output is abnormal

4 Installation and removal

4.1 Installation Guide

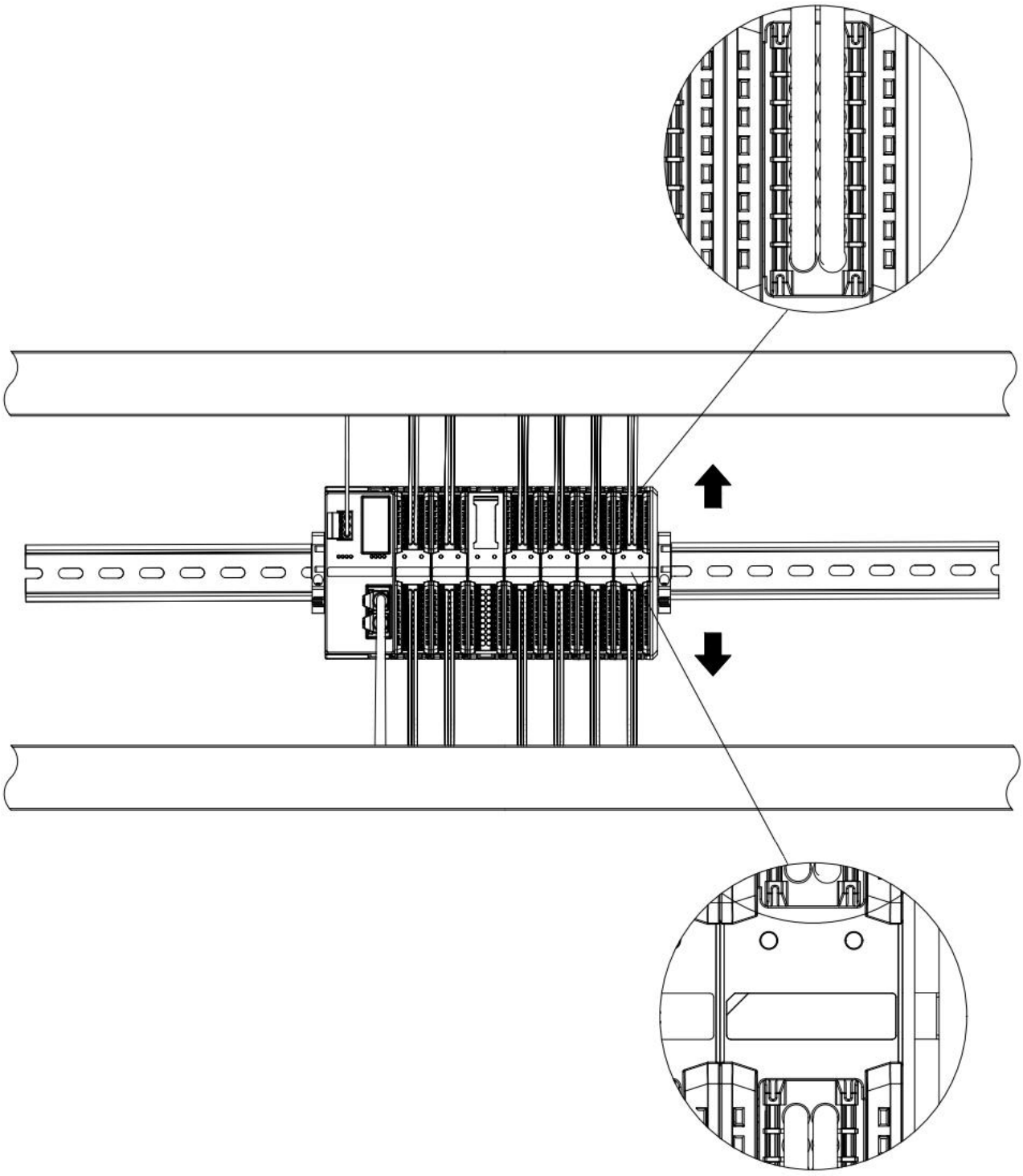
Installation\removal precautions

- **The module protection level is IP20. The module needs to be installed in a cabinet and used indoors.**
- **Ensure that the cabinet has good ventilation measures (such as installing an exhaust fan in the cabinet).**
- **Do not install this device near or over any equipment that may cause overheating.**
- **Be sure to install the module vertically on the fixed rail and maintain air circulation around it (there should be at least 50 mm of air circulation space above and below the module).**
- **After installing the module, be sure to install the guide rail fixings at both ends to secure the module.**
- **Installation and removal must be performed with the power turned off.**
- **After the module is installed, it is recommended to wire and route the cables in an up-and-down manner.**

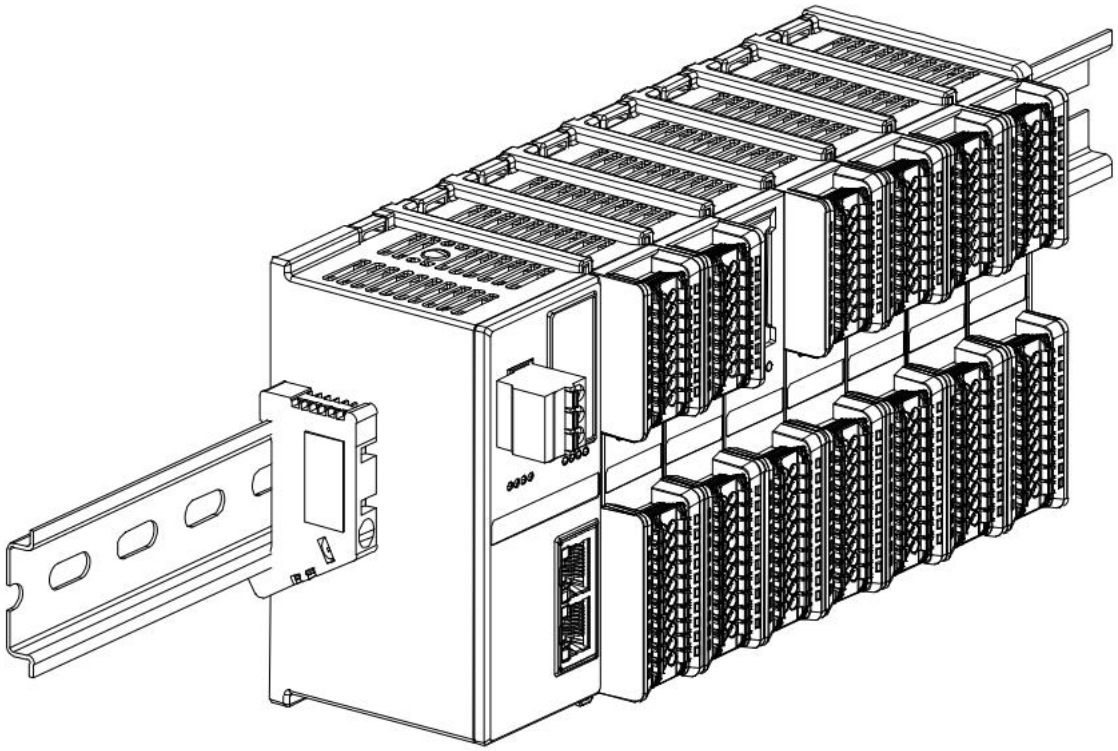
⚠ Warning

- If used in a manner not specified in the product user manual, the protection provided by the equipment may be impaired.

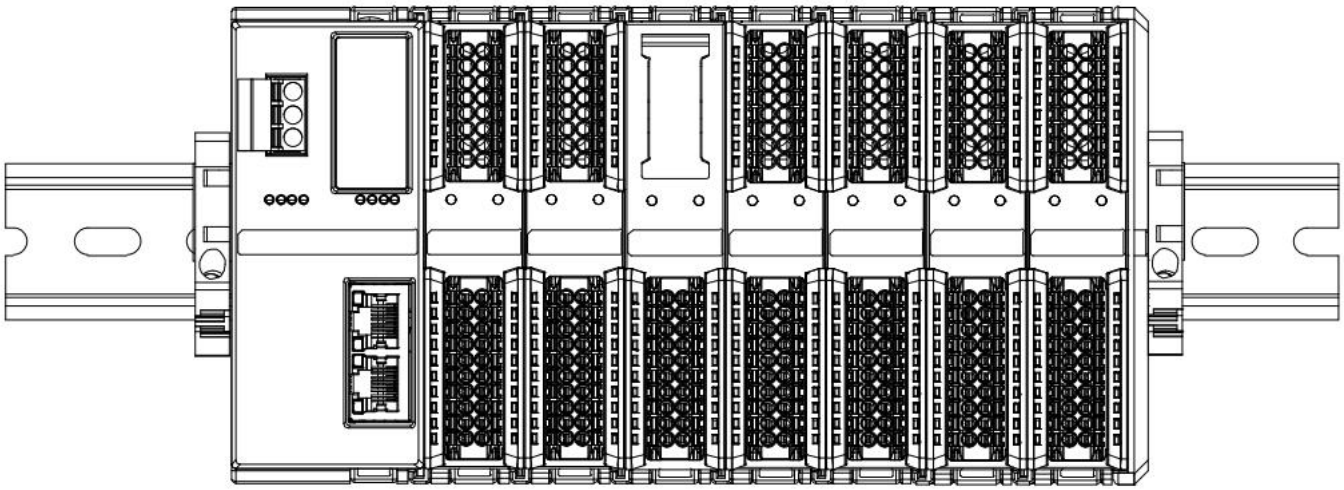
Module installation diagram, minimum clearance between top and bottom (≥ 50mm)



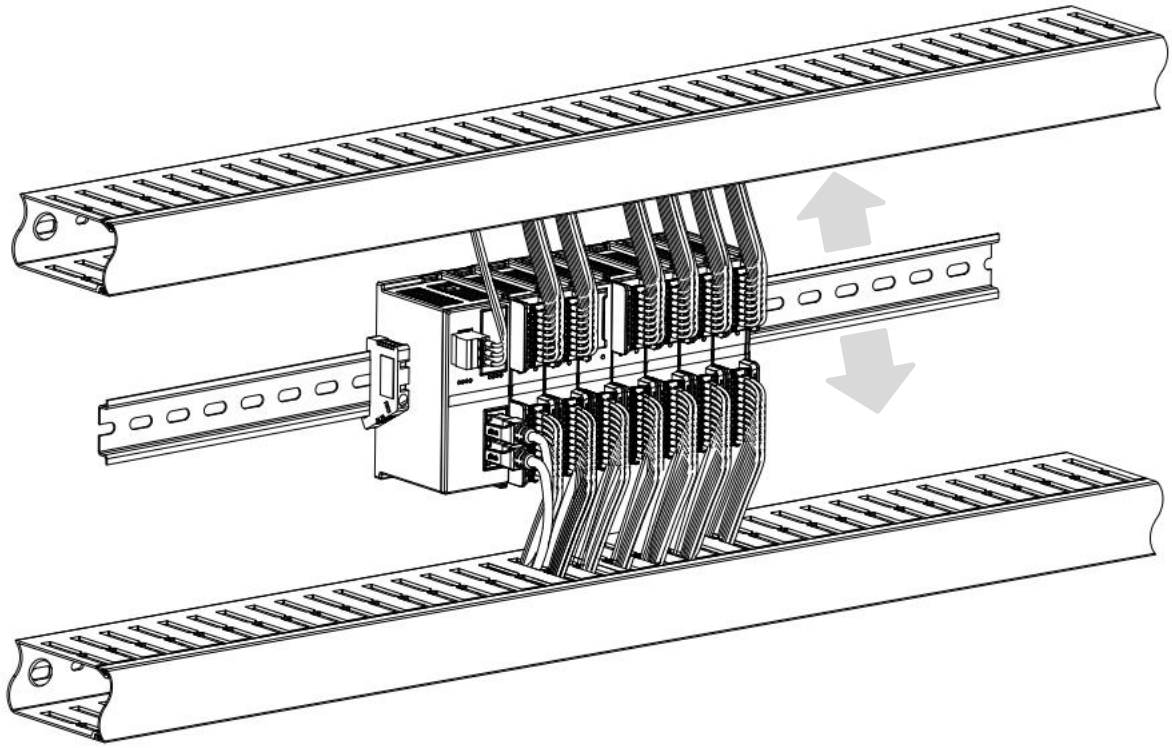
Ensure the module is installed vertically on the fixed rail



Be sure to install the rail fixings



Module upper and lower wiring diagram



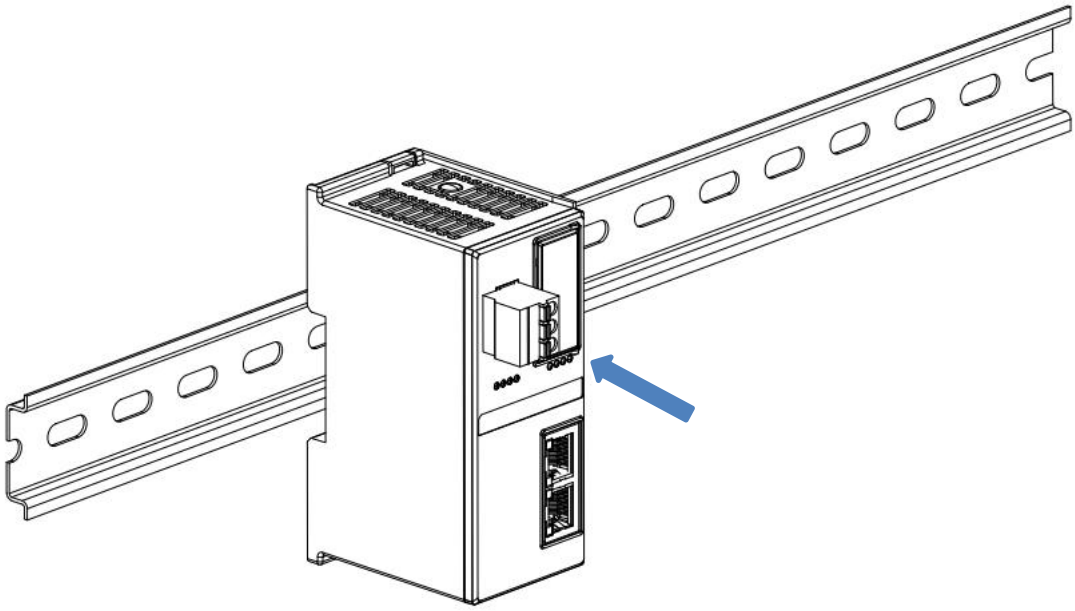
4.2 Installation and removal steps

Module installation and removal	
Module installation steps	1. Install the coupler module on the fixed guide rail first.
	2. Install the required I/O modules or functional modules in sequence on the right side of the coupler module.
	3. After installing all required modules, install the terminal cover to complete the module assembly.
	4. Install the guide rail fixings at both ends of the coupler module and the terminal cover to fix the module.
Module disassembly steps	1. Loosen the guide rail fixings at both ends of the module.
	2. Use a flat-blade screwdriver to pry open the module buckle.
	3. Pull out the disassembled module.

4.3 Installation and disassembly diagram

Coupler module installation

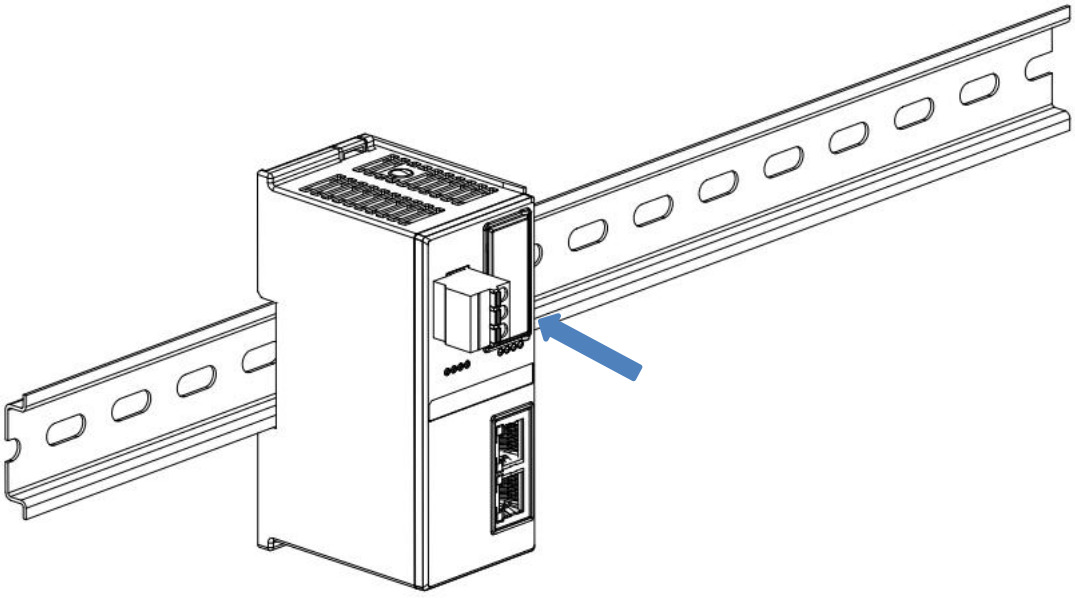
- Align the coupler module vertically with the guide rail slot, as shown in Figure ① below.



①

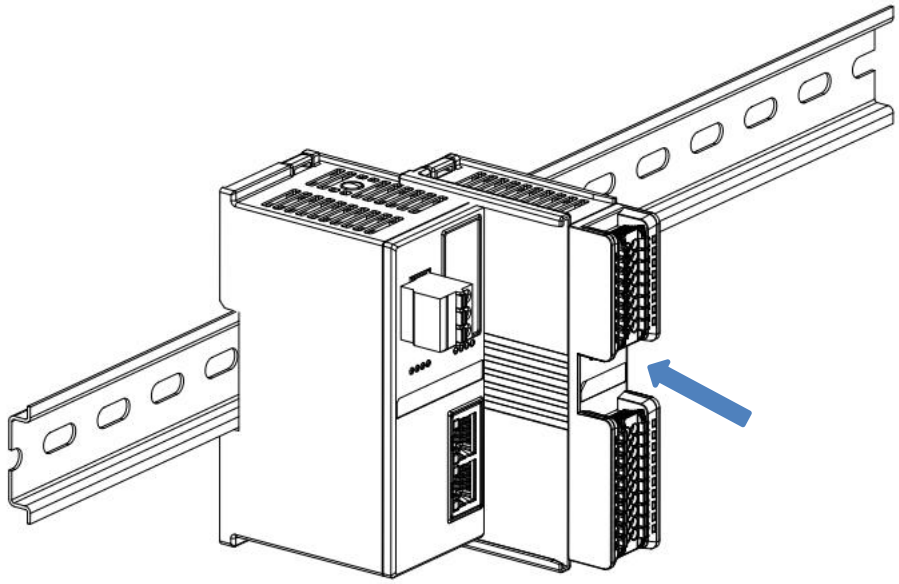
- Press the coupler module towards the guide rail with force until you hear a "click" sound. The module is then installed in place, as shown in Figure ② below.

②

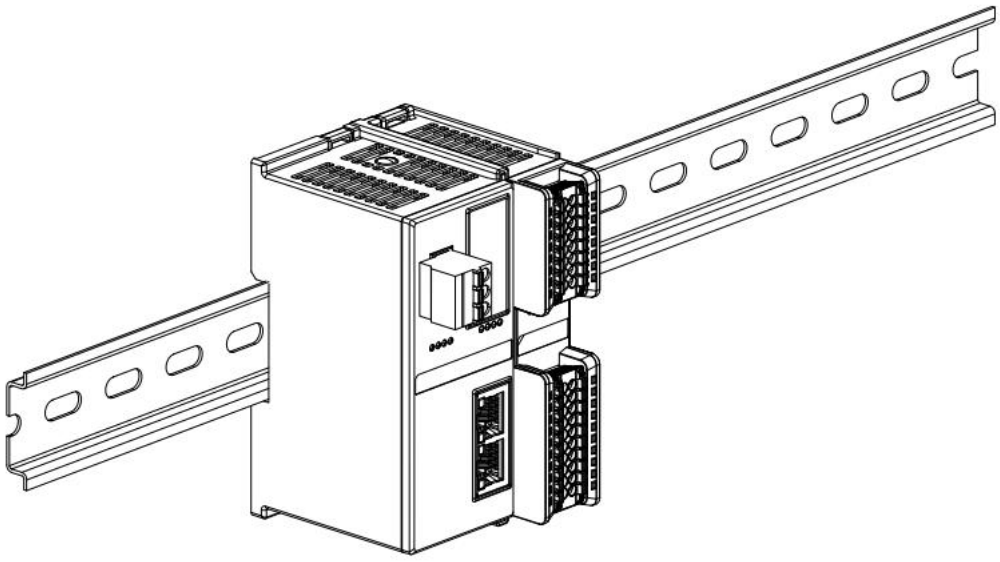


I/O Module Installation

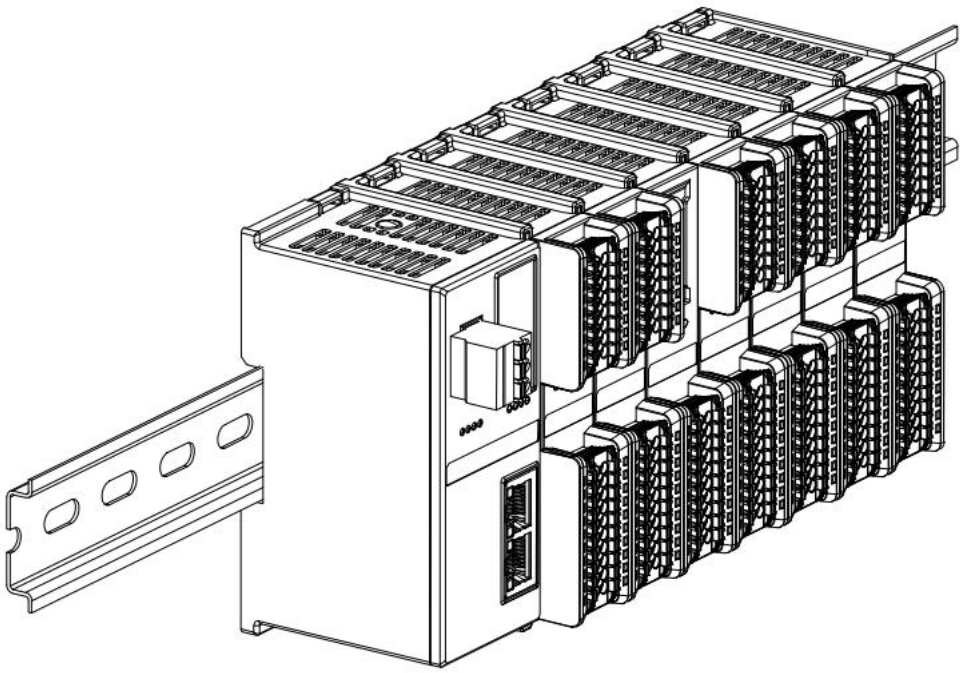
- Follow the steps above to install the coupler module and install the required I/O modules or functional modules one by one. Push them in as shown in Figures ③, ④, and ⑤ below. When you hear a "click", the module is installed in place.



③



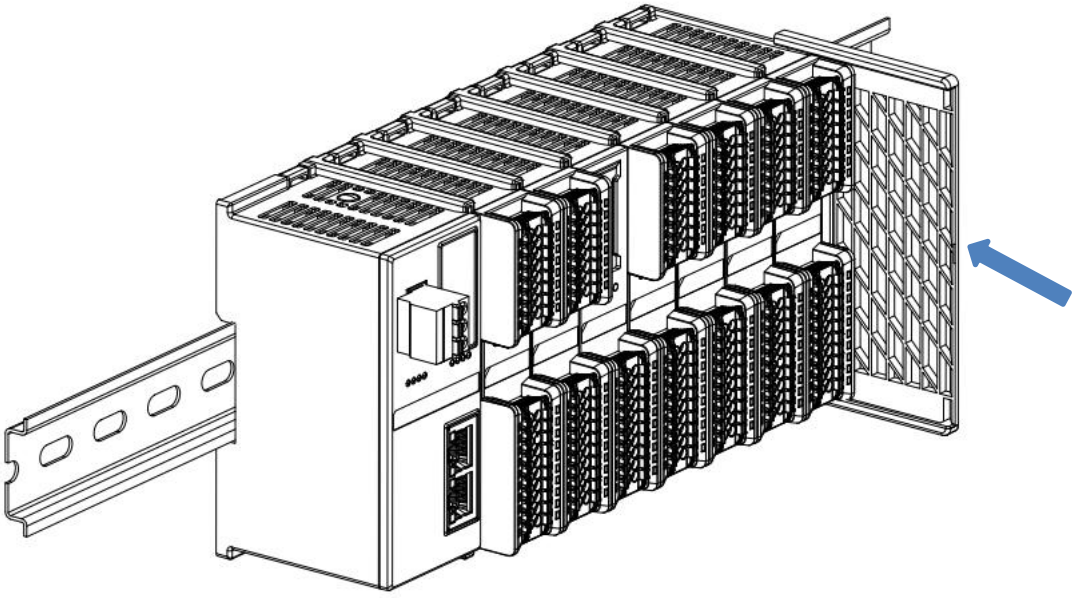
④



⑤

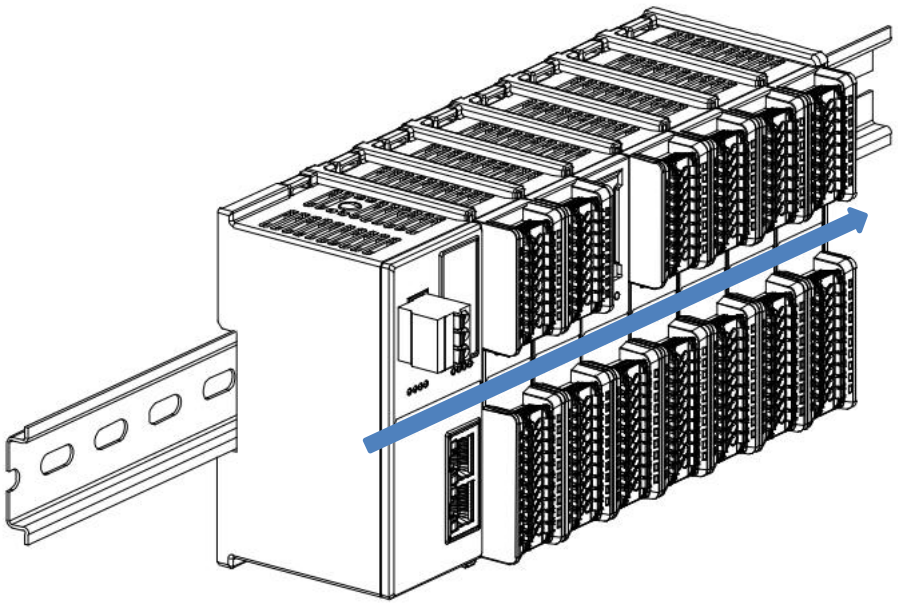
Terminal cover installation

- Install the terminal cover on the right side of the last module, aligning one side of the terminal cover groove with the guide rail. For installation, refer to the installation method of the I/O module and push the terminal cover inwards into place, as shown in Figure ⑥ below.



⑥

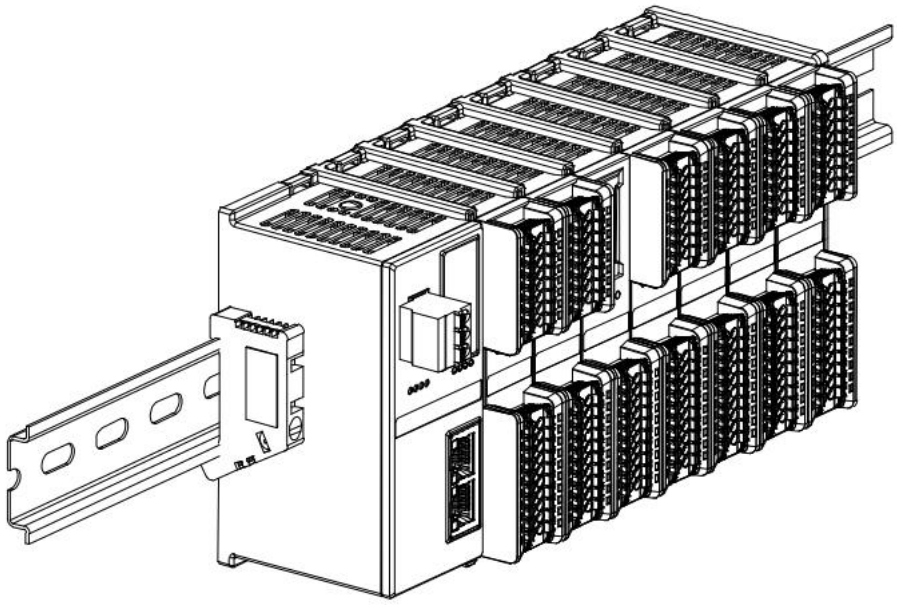
- After the terminal cover is installed, check whether the front of the entire module is flat, and ensure that all modules and end covers are installed in place and the front is flush, as shown in Figure ⑦ below.



⑦

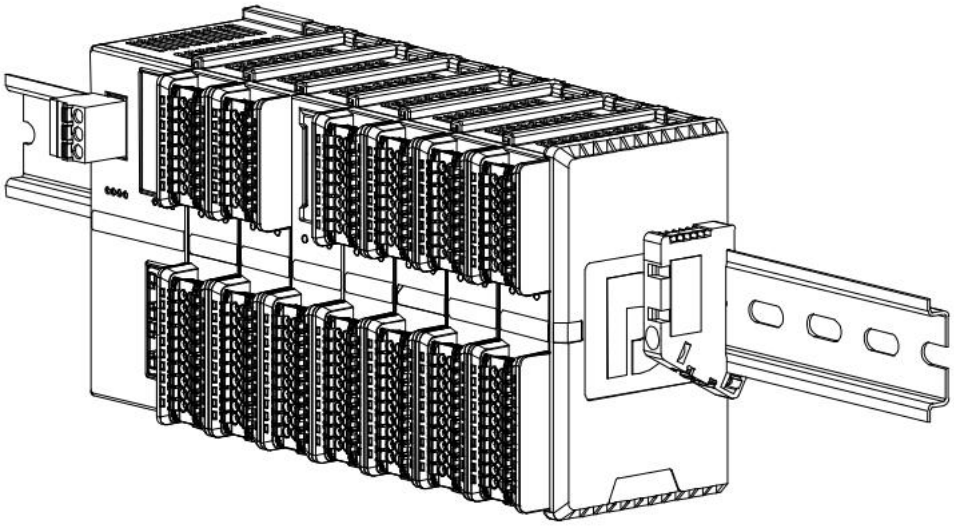
Guide rail fixing installation

- Install and tighten the guide rail fixings close to the left side of the coupler, as shown in Figure ⑧ below.



⑧

- Install the rail fixing on the right side of the terminal cover. First push the rail fixing toward the coupler to ensure that the module is installed firmly, and then tighten the rail fixing with a screwdriver, as shown in Figure ⑨ below.

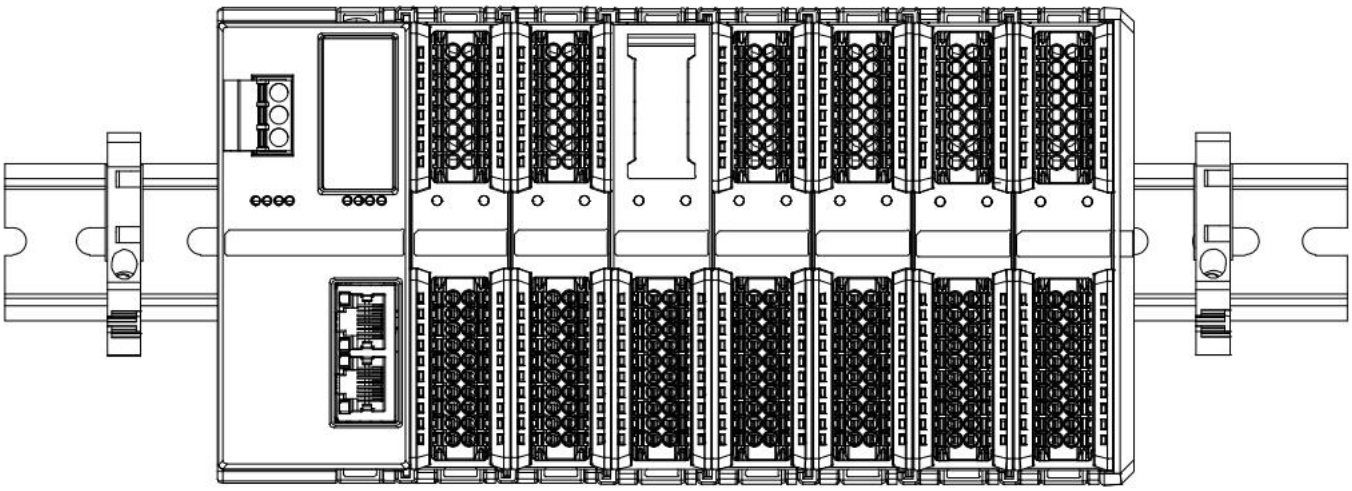


⑨

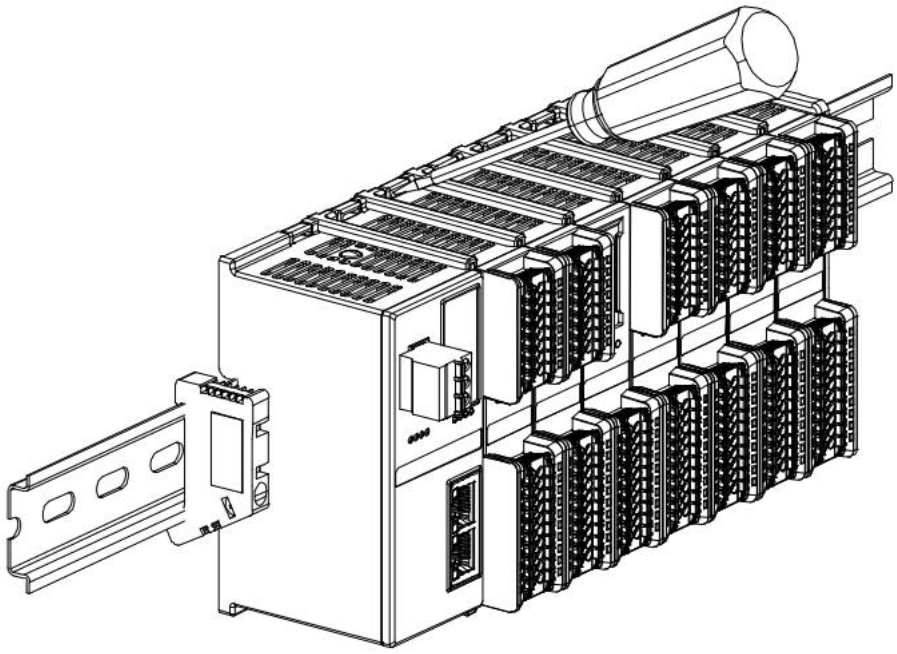
Disassembly

- Use a screwdriver to loosen the guide rail fixing at one end of the module and move it to one side to ensure that there is a gap between the module and the guide rail fixing, as shown in Figure ⑩ below.

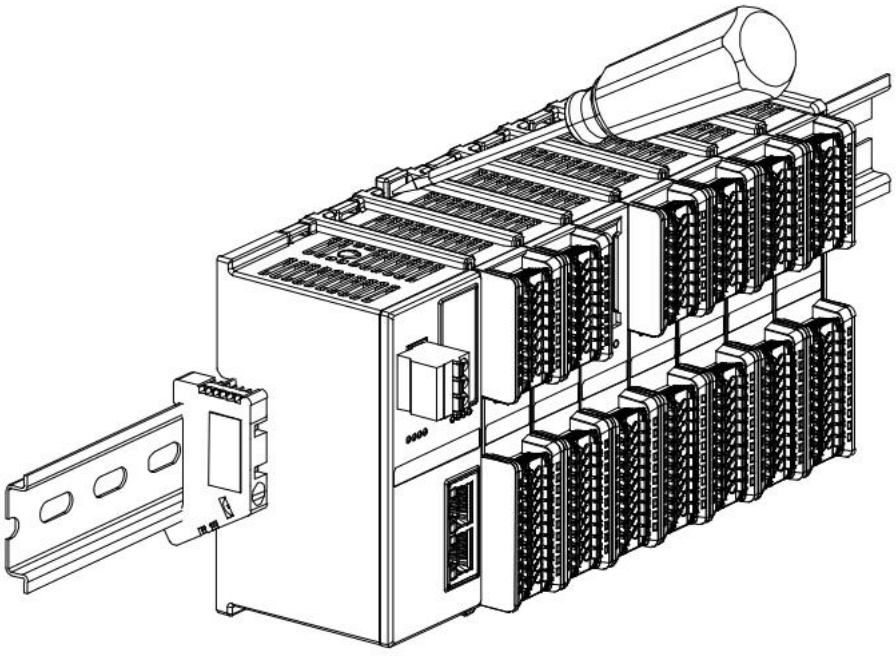
⑩



- Insert a flat-head screwdriver into the buckle of the module to be removed, and apply force sideways in the direction of the module (until you hear a sound), as shown in the following figure⑪and⑫Note: Each module has a buckle on the top and bottom, and the same method is used for both.

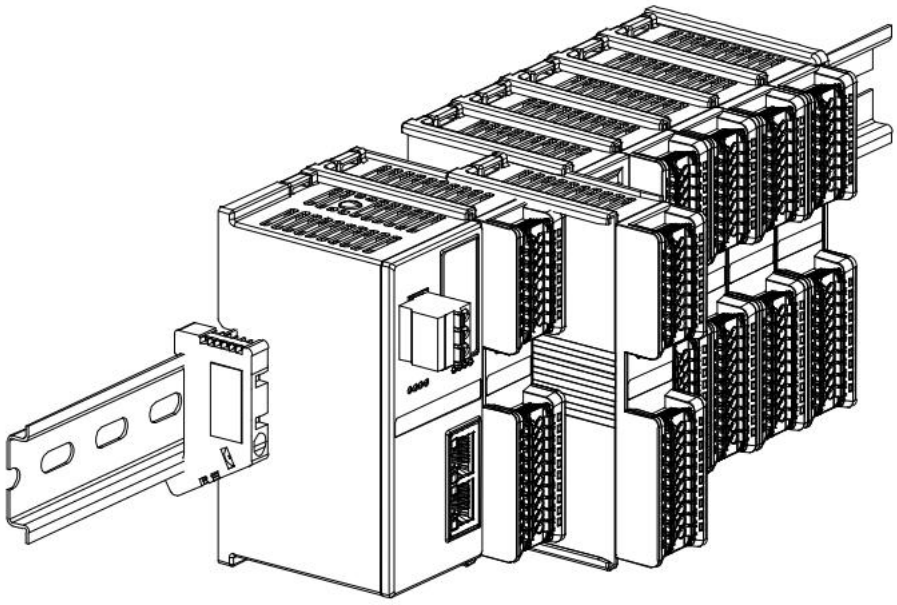


⑪



⑫

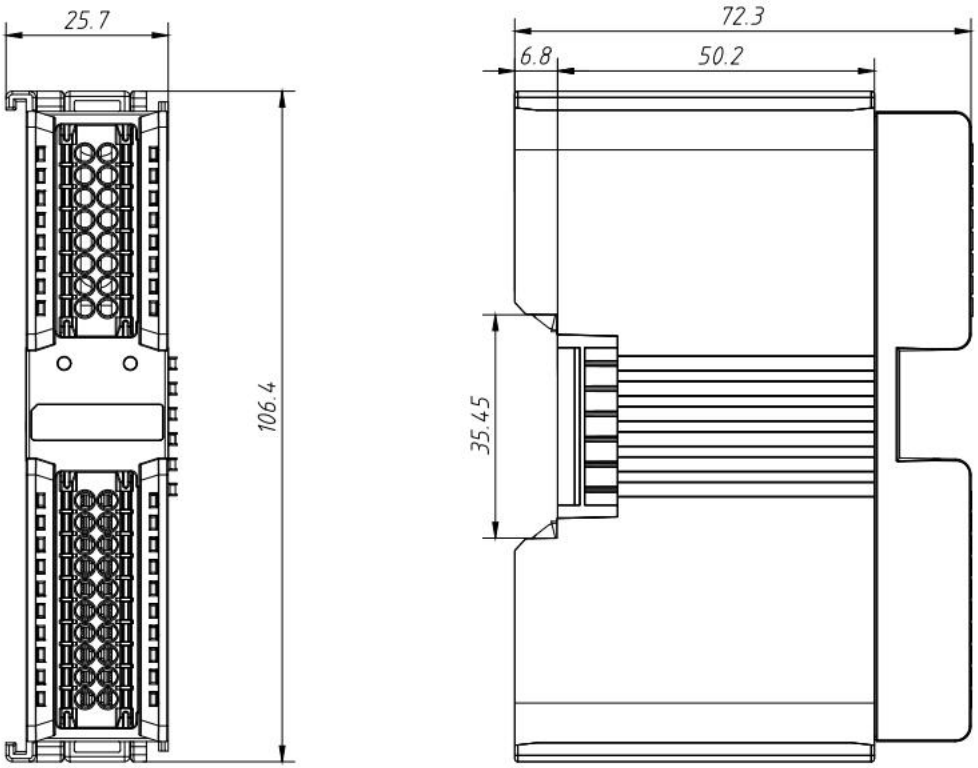
- Follow the opposite operation of installing the module to remove the module, as shown below⑬shown.



⑬

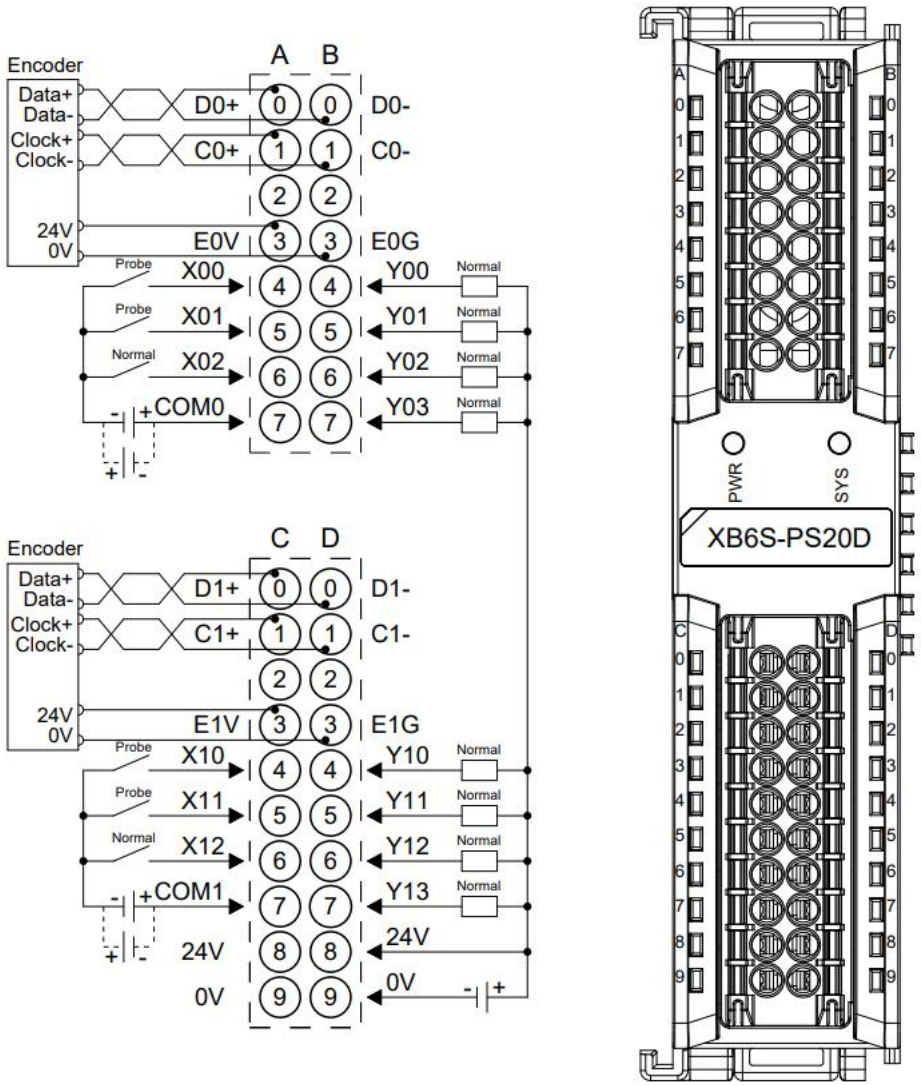
4.4 Dimensions

Dimensions (unit: mm)



5 Wiring

5.1 Wiring Diagram



- For personal and equipment safety, it is recommended to disconnect the power supply when performing wiring operations.
- 24V internal conduction; 0V internal conduction.
- COM0 and COM1 are the common terminals of the input channels; NPN/PNP compatible.
- The load common power supply must use the same power supply as the module.

5.2 Terminal Block Definition

Encoder0					
A			B		
Terminal marking	**Terminal Definition**	**Illustrate**	**Terminal marking**	**Terminal Definition**	**Illustrate**
0	D+	Encoder data signal input+	0	D-	Encoder data signal input-
1	C+	Encoder clock signal output+	1	C-	Encoder clock signal output -
2	NC	Empty terminal	2	NC	Empty terminal
3	E0V	24V encoder power supply	3	E0G	0V encoder power supply
4	X00	DI channel 0 (probe function)	4	Y00	DO channel 0
5	X01	DI channel 1 (probe function)	5	Y01	DO channel 1
6	X02	DI Channel 2	6	Y02	DO channel 2
7	COM0	Input channel common terminal	7	Y03	DO channel 3
Encoder1					
C			D		
Terminal marking	**Terminal Definition**	**Illustrate**	**Terminal marking**	**Terminal Definition**	**Illustrate**
0	D+	Encoder data signal input+	0	D-	Encoder data signal input-
1	C+	Encoder clock signal output+	1	C-	Encoder clock signal output -
2	NC	Empty terminal	2	NC	Empty terminal
3	E1V	24V encoder power supply	3	E1G	0V encoder power supply
4	X10	DI channel 0 (probe function)	4	Y10	DO channel 0

5	X11	DI channel 1 (probe function)	5	Y11	DO channel 1
6	X12	DI Channel 2	6	Y12	DO channel 2
7	COM1	Input channel common terminal	7	Y13	DO channel 3
8	24V	Field side power supply 24V	8	24V	Field side power supply 24V
9	0V	Field side power supply 0V	9	0V	Field side power supply 0V

6 Use

6.1 Process data

6.1.1 Uplink data

Uplink data 26 bytes (13 bytes for each encoder, encoder [n] value 0~1)				
Name	**Meaning**	**Value range**	**Data Types**	**Length**
E[n] Input CH0 (Latch)	Encoder probe input signal channel 0	0: No signal input 1: There is signal input	bool	1st
E[n] Input CH1 (Latch)	Encoder probe input signal channel 1	0: No signal input 1: There is signal input	bool	1st
E[n] Input CH2	Encoder common input signal channel 2	0: No signal input 1: There is signal input	bool	1st
E[n] Latched Flag CH0	Encoder probe input channel 0 latch completion flag	0: 1->0 latched once, flipped once 1: 0->1 latch once, flip once	bool	1st
E[n] Latched Flag CH1	Encoder probe input channel 1 latch completion flag	0: 1->0 latched once, flipped once 1: 0->1 latch once, flip once	bool	1st
E[n] Count Value	Encoder count value	0~2^32-1	unsigned32	4 bytes
E[n] Latch Value CH0	Encoder probe input channel 0 latch value	0~2^32-1	unsigned32	4 bytes
E[n] Latch Value CH1	Encoder probe input channel 1 latch value	0~2^32-1	unsigned32	4 bytes

Uplink data description:

- **Encoder probe input signal channel E[n] Input CH0/CH1 (Latch)**
  Each encoder is equipped with 2 probe input channels, indicating the presence or absence of input signals from the corresponding probe input channels.
  When the probe input channel latch function is not enabled, it can be used as a normal digital input channel.

- **Encoder common input signal channel E[n] Input CH2**
  Each encoder is equipped with one common digital input channel, indicating the presence or absence of the corresponding DI channel input signal.

- **Encoder probe input channel latch completion flag E[n] Latched Flag CH0/CH1**
  One encoder is equipped with two probe input channels. After the probe input channel completes a latch, the flag bit will flip from 0->1 or 1->0.
  Example 1: The latch completion flag of encoder 0 probe input channel 1 is 0. After completing one latch, the flag becomes 1. After completing another latch, the flag becomes 0.

- **Encoder count value E[n] Count Value**
  The encoder count value is the current count value of the corresponding encoder, and the value range is 0~2^32-1. The actual count range of a certain encoder is determined by the LSB position and MSB position of the encoder, and the encoder count range is 0~2MSB-LSB+1-1.

- **Encoder probe input channel latch value E[n] Latch Value CH0/CH1**
  Each encoder is equipped with 2 probe input channels. By inputting a signal that meets the set conditions into the probe input channel, the current count value of the corresponding encoder can be quickly latched, and the value range is 0~2^32-1. The actual count range of an encoder is determined by the LSB position and MSB position of the encoder. The count range of the encoder is $0\sim2^{MSB-LSB+1}-1$; the value range of the latch value is the same as the count value, which is also $0\sim2^{MSB-LSB+1}-1$.

6.1.2 Downlink data

Downlink data 2 bytes (1 byte for each encoder, encoder [n] value is 0~1)				
Name	**Meaning**	**Value range**	**Data Types**	**Length**
E[n] Output CH0	Encoder output channel 0	0: Output high level 24V 1: Output low level 0V	bool	1st
E[n] Output CH1	Encoder output channel 1	0: Output high level 24V 1: Output low level 0V	bool	1st
E[n] Output CH2	Encoder output channel 2	0: Output high level 24V 1: Output low level 0V	bool	1st
E[n] Output CH3	Encoder output channel 3	0: Output high level 24V 1: Output low level 0V	bool	1st
E[n] Latch CH0 Enable	Encoder probe input channel 0 latch enable	0: Incapacity 1: Enable	bool	1st
E[n] Latch CH1 Enable	Encoder probe input channel 1 latch enable	0: Incapacity 1: Enable	bool	1st

Downlink data description:

- **Encoder output channel (normal output) E[n] Output CH0/CH1/CH2/CH3**
  Digital channel output (NPN type output): Set to "0" to output high level 24V, set to "1" to output low level 0V.

- **Encoder probe input channel latch enable E[n] Latch CH0/CH1 Enable**
  If the encoder input latch channel enable flag is set to 1, the latch function is enabled; if it is set to 0, the latch function is disabled.

6.2 Configuration parameter definition

The module configuration has a total of 16 parameters, and the two encoders each have 8 configuration parameters, which are configured independently. The configuration parameters are introduced using encoder 0 as an example, as shown in the following table.

Function	Parameter name	Value range	default value
Encoder SSI frame length	E0 Frame Length	10~40	13
The clock frequency when the encoder reads data	E0 Clock Frequency	0:2MHz	0
		1:1.5MHz	
		2: 1MHz	
		3:500KHz	
		4: 250KHz	
		5:125KHz	
Encoder interval time	E0 Interval Time	1~50000 (unit: 100us)	1
Encoder encoding method	E0 Encoder Type	0: Binary	1
		1: Gray (Gray code)	
LSB number of the encoder position value	E0 LSB Position	0~39	0
MSB bit number of the encoder position value	E0 MSB Position	1~40	12
Encoder 0 Probe Mode	E0 Latch Mode	0: CH0 Single, CH1 Single Channel 0 single, channel 1 single	0
		1: CH0 Repeat, CH1 Single Channel 0 repeat, channel 1 single	
		2: CH0 Single, CH1 Repeat Channel 0 single, channel 1 repeated	
		3: CH0 Repeat, CH1 Repeat Channel 0 repeat, channel 1 repeat	
Encoder 0 probe trigger edge	E0 Latch Edge	0: CH0 Raising, CH1 Raising Channel 0 rising edge, channel 1 rising edge	0
		1: CH0 Falling, CH1 Raising Channel 0 falling edge, channel 1 rising edge	
		2: CH0 Raising, CH1 Falling Channel 0 rising edge, channel 1 falling edge	
		3: CH1 Falling, CH1 Falling Channel 0 falling edge, channel 1 falling edge	

Parameter Description:

Encoder SSI Frame Length

LSB Position of the position value

MSB Position of the position value

The frame length parameter, combined with the position number LSB and MSB parameters, can set the resolution and total value of the encoder count. The resolution is the value that increases per encoder rotation.

Clock Frequency when reading data

The default value of the clock frequency is 0, which is 2MHz.

Interval Time

The default value is 1, i.e. 100us, and the setting range is 1~50000 (100us).

Encoder Type

The default value is 1, which enables Gray code conversion. Setting it to 0 disables Gray code conversion and uses binary code.

The probe function parameters include two parameters: **probe mode Latch Mode and probe trigger edge Latch Edge**. Each encoder is equipped with 2 probe input channels. By inputting corresponding signals to the probe input channels, the count value of the corresponding encoder can be latched.

Probe Mode: The probe mode parameter can configure each probe function channel of the encoder to single/continuous mode.

If the probe function channel is configured in single-shot mode, after the probe function is enabled, when the channel inputs a signal that meets the set conditions, the count value can be latched once; when a signal that meets the set conditions is input again subsequently, the count value will no longer be latched unless the probe function channel is re-enabled.

If the probe function channel is configured in continuous mode, after the probe function is enabled, each time the channel inputs a signal that meets the set conditions, the count value can be latched once, and the count value can be latched multiple times.

Probe trigger edge: Each probe function channel of the encoder can be configured as rising edge/falling edge trigger through the probe trigger edge parameter. The latch trigger signal of the two probe function channels of each encoder can be configured separately, and the latch value can be displayed separately.

The probe input channel is compatible with PNP/NPN signals through the COM terminal. When the COM terminal is connected to 0V, the input signal is PNP type, the input high level 24V signal is valid, and the input low level 0V signal is invalid; when the COM terminal is connected to 24V, the input signal is NPN type, the input low level 0V signal is valid, and the input high level 24V signal is invalid.

Rising edge triggering means that the probe input channel is triggered from an invalid signal to a valid signal, and falling edge triggering means that it is triggered from a valid signal to an invalid signal.

6.3 Module Configuration Description

6.3.1 Application in TwinCAT3 software environment

1、Preparation

- **Hardware Environment**
  - **Module model XB6S-PS20D**
  - **EtherCAT Coupler, End Cover**

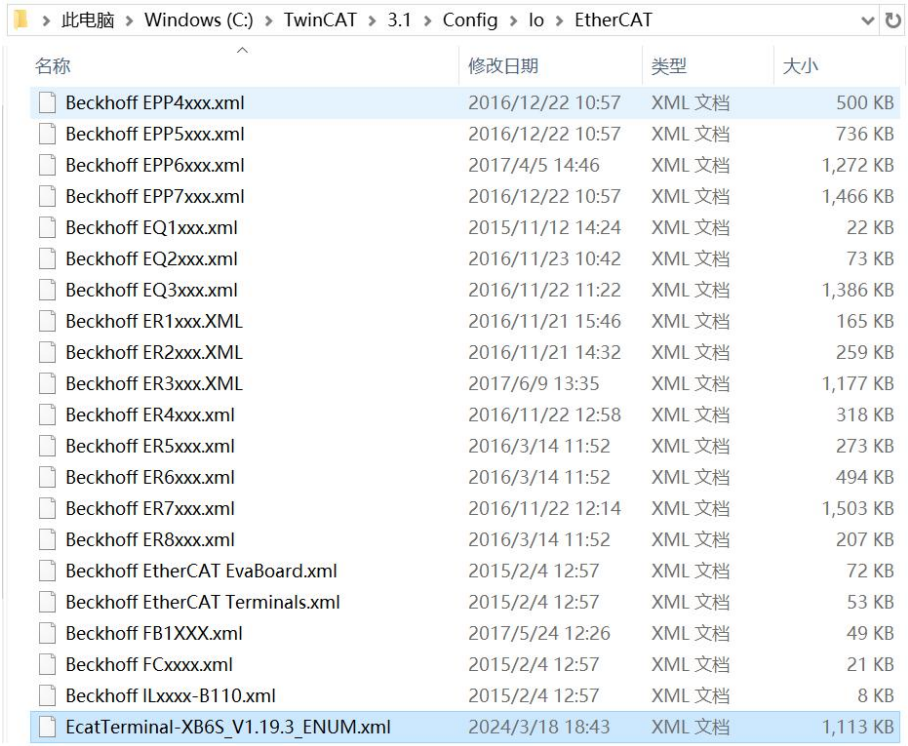
  This description takes the XB6S-EC2002 coupler as an example
  - **A computer with TwinCAT3 software pre-installed**
  - **EtherCAT dedicated shielded cable**
  - **Handwheel/encoder/orthogonal pulse generator and other equipment**
  - **Switching power supply**
  - **Module mounting rails and rail fixings**
  - **Device Profile**

    Configuration file acquisition address:https://www.solidotech.com/documents/configfile
- **Hardware configuration and wiring**

  Please follow the4 Installation and removal""5 Wiring**Request action**

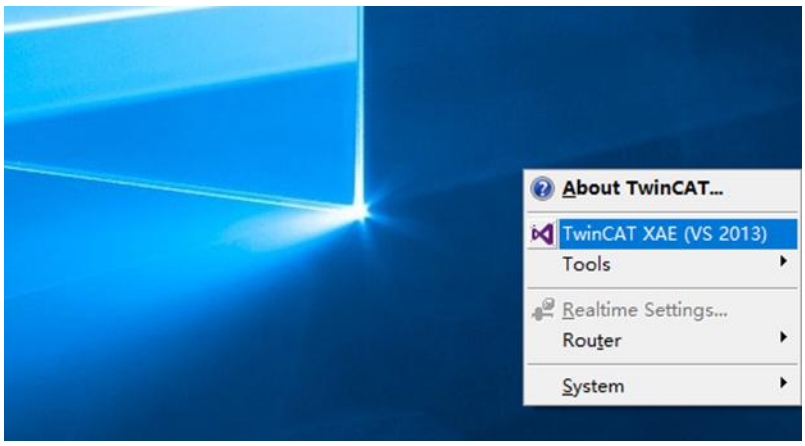
2、Pre-configured configuration files

Place the ESI configuration file (EcatTerminal-XB6S_V1.19.3_ENUM.xml) in the TwinCAT installation directory "C:\TwinCAT\3.1\Config\Io\EtherCAT", as shown in the figure below.

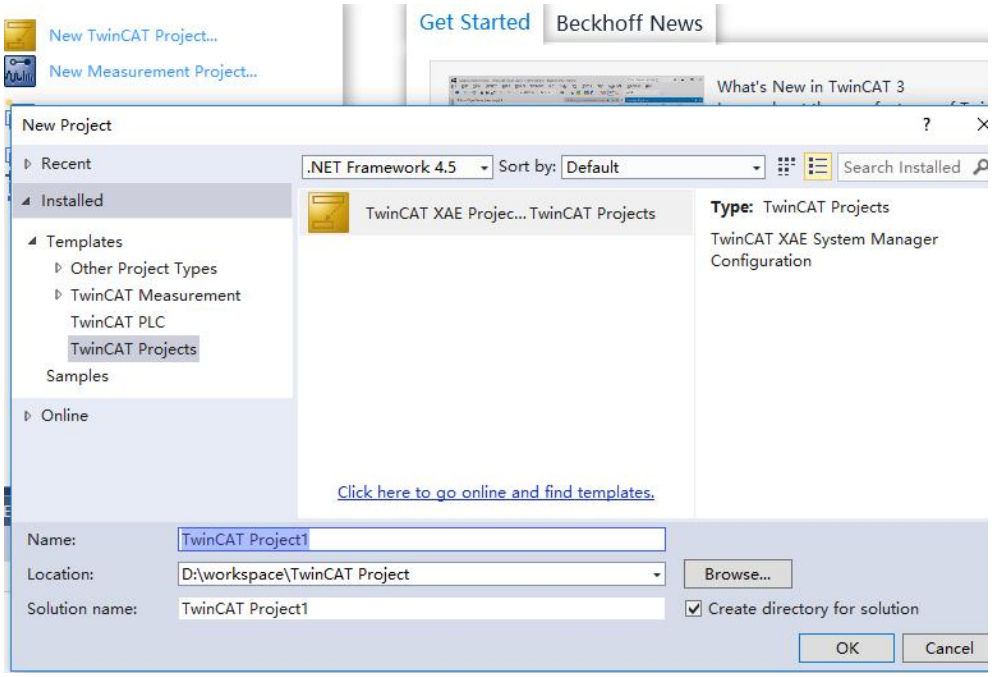


3、Create a project

a. Click the TwinCAT icon in the lower right corner of the desktop and select "TwinCAT XAE (VS xxxx)" to open the TwinCAT software, as shown in the figure below.

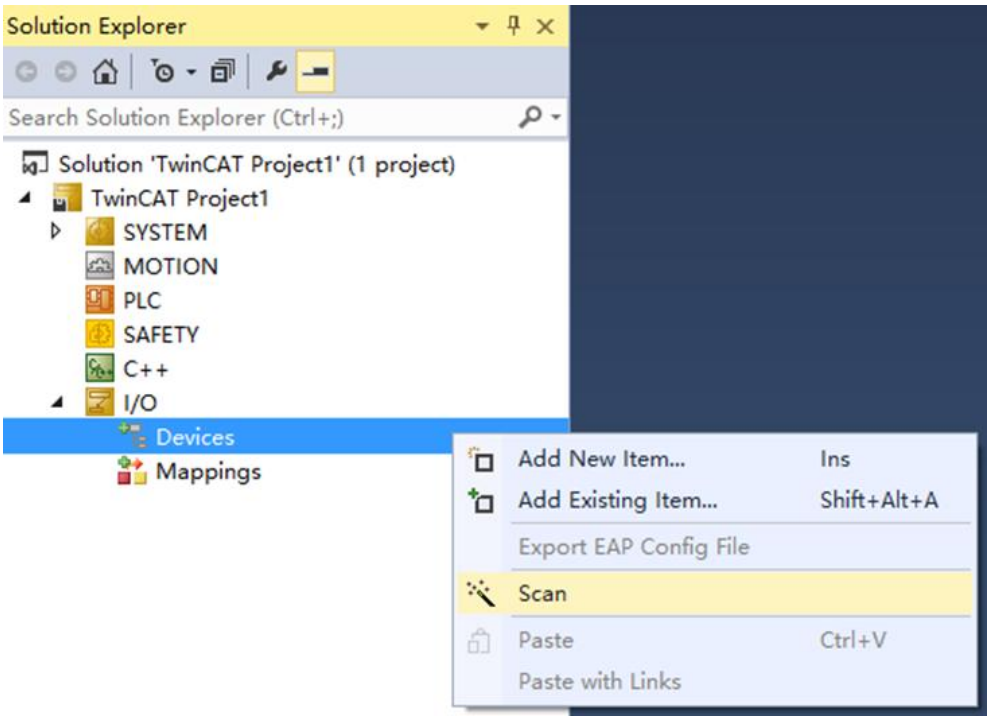


b. Click "New TwinCAT Project". In the pop-up window, "Name" and "Solution name" correspond to the project name and solution name respectively, and "Location" corresponds to the project path. You can select the default for these three items, then click "OK". The project is created successfully, as shown in the figure below.



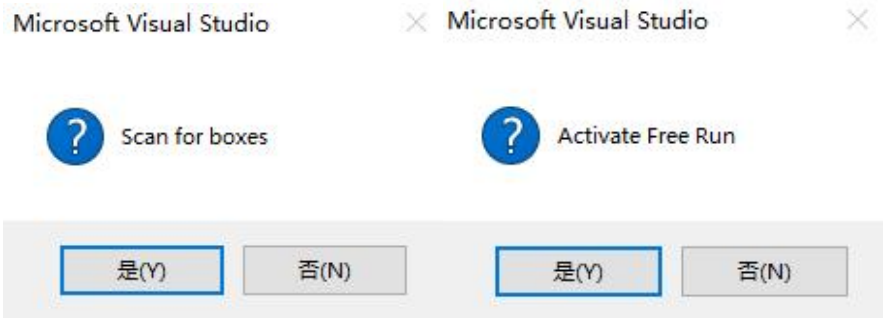
4、Scan Devices

a. After creating the project, right-click the "Scan" option under "I/O -> Devices" to scan the slave devices, as shown in the figure below.

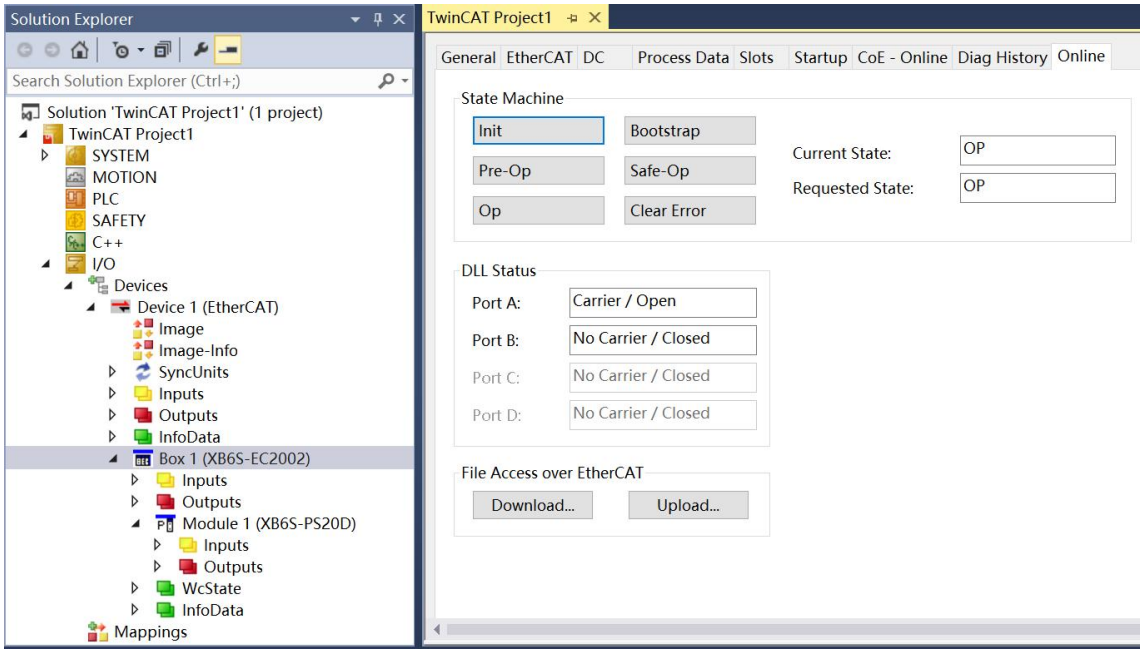


b. Check the "Local Area Connection" network card, as shown in the figure below.

c. In the pop-up window "Scan for boxes", click and select "Yes"; in the pop-up window "Activate Free Run", click and select "Yes", as shown in the following figure.

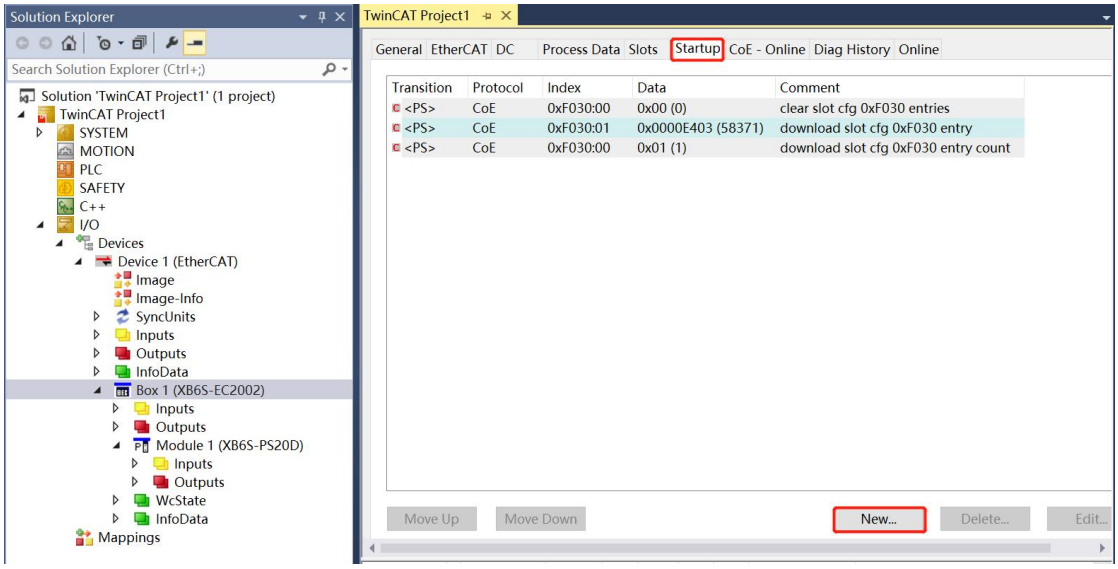


d. After scanning the device, you can see Box 1 (XB6S-EC2002) and Module 1 (XB6S-PS20D) in the left navigation tree. In "Online", you can see that TwinCAT is in "OP" state, and the RUN light of the slave device is always on, as shown in the figure below.

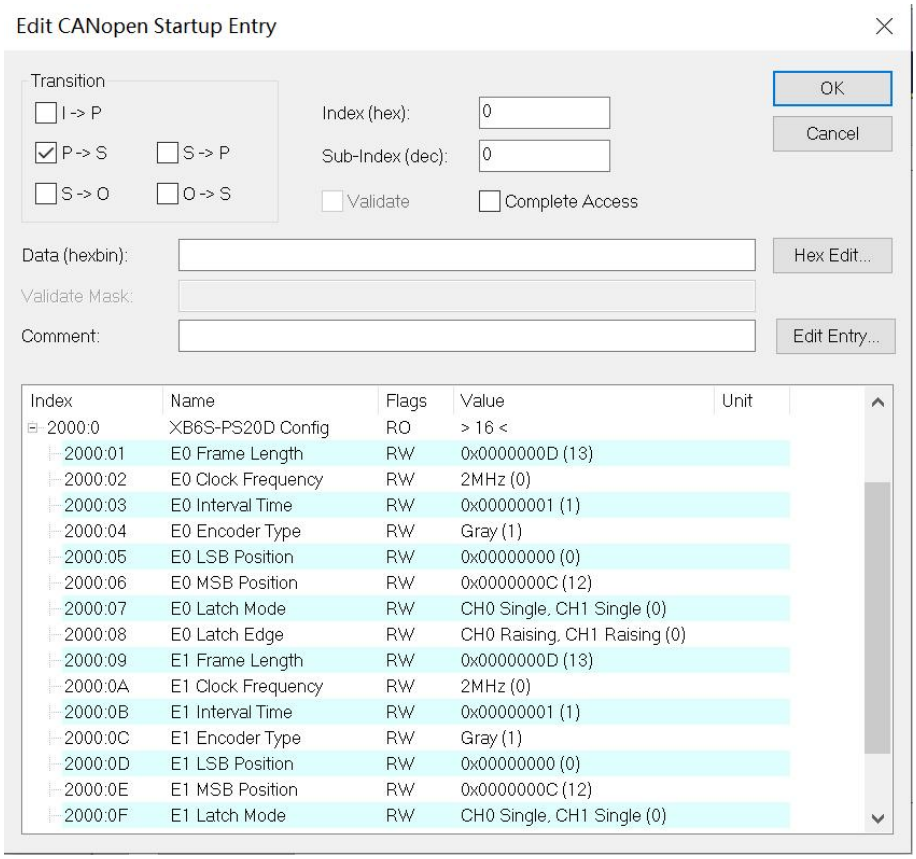


5、Verify basic functionality

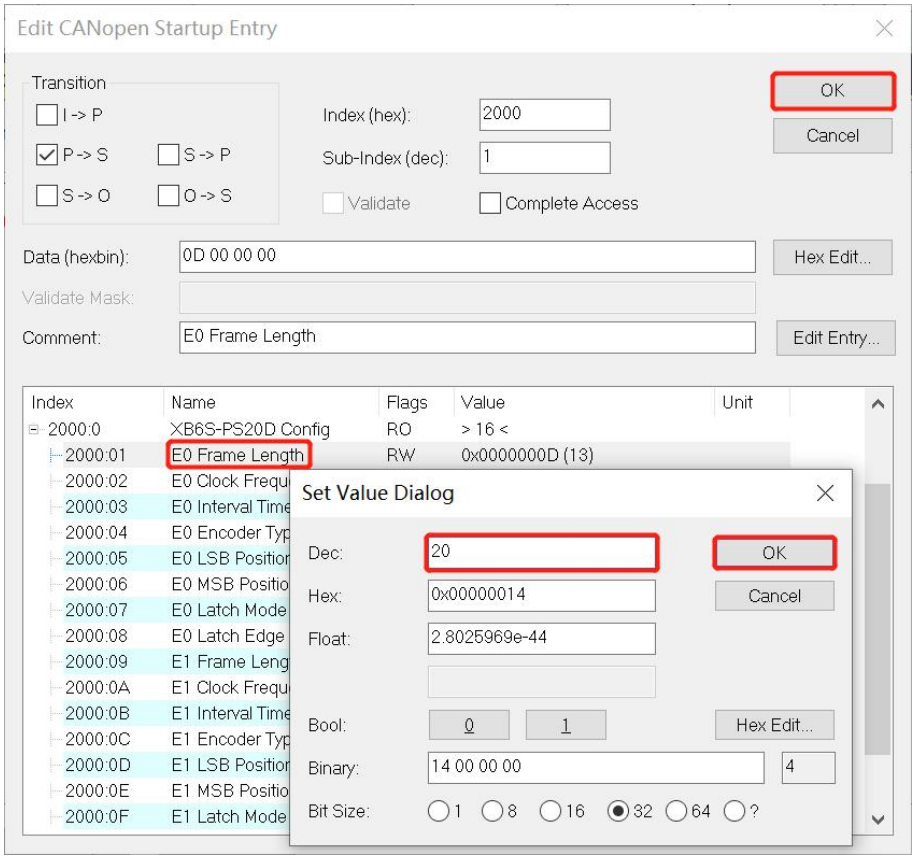
a. Click "Box1 -> Startup -> New" in the left navigation tree to enter the configuration parameter editing page, as shown in the figure below.



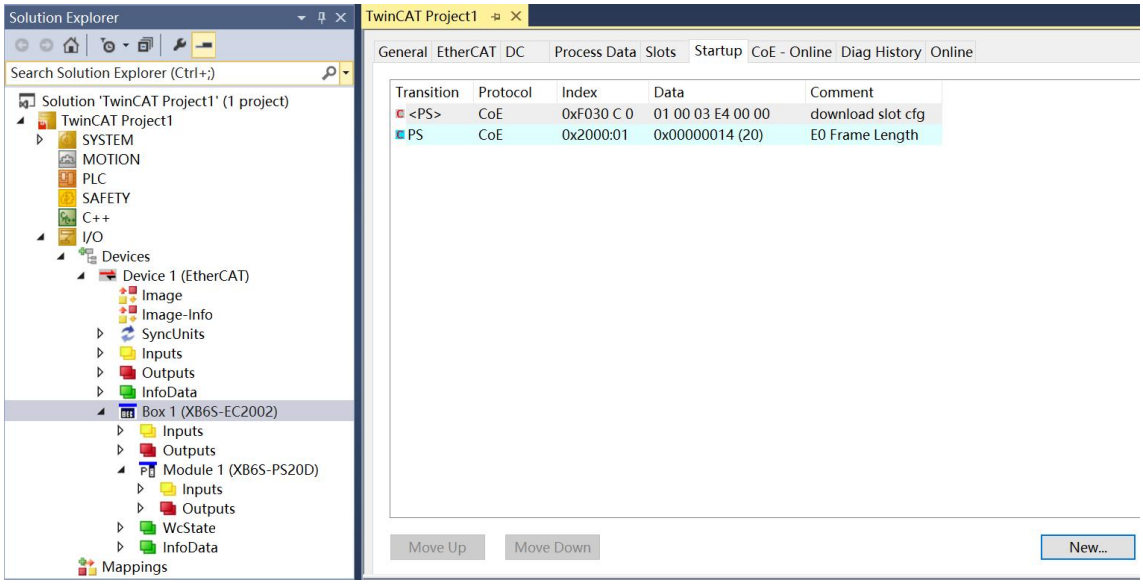
b. In the Edit CANopen Startup Entry pop-up window, click the "+" in front of Index 2000:0 to expand the configuration parameter menu. You can see 16 configuration parameters. Click any parameter to set the related configuration, as shown in the figure below.



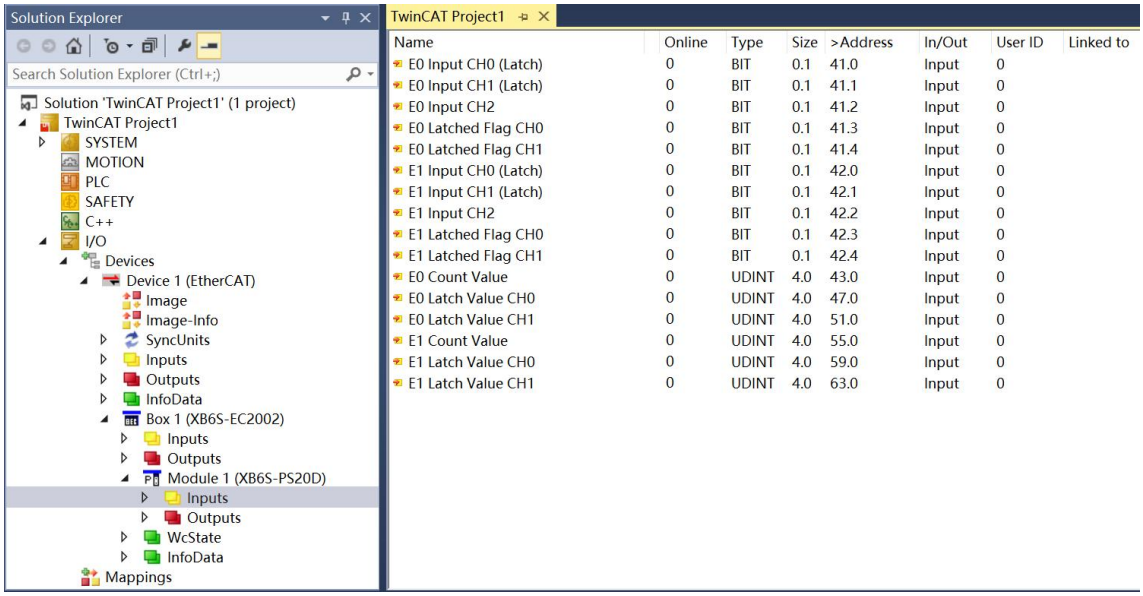
c. For example, to modify the SSI frame length parameter of encoder 0, double-click "E0 Frame Length" and modify the parameter value, as shown in the following figure.



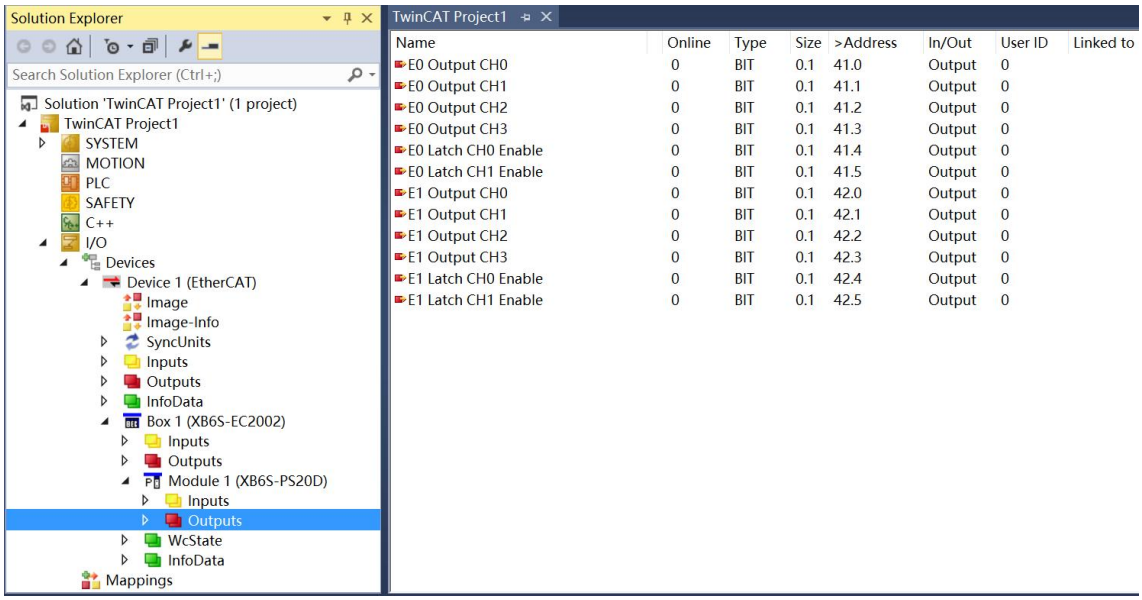
d. After the parameter modification is completed, the modified parameter items and parameter values can be seen under Startup, as shown in the figure below. After the parameter setting is completed, the Reload operation and the module power-on are required to realize the automatic transmission of parameter settings by the master station.



e. The left navigation tree "Module 1 -> Inputs" displays the upstream data of the module and is used to monitor the input of the module, as shown in the following figure.



f. The left navigation tree "Module 1 -> Outputs" displays the downstream data of the module, which is used to control the output of the module, as shown in the following figure.



Module Functionality Examples

- **Encoder 0 is connected, the encoder is rotated to count, and the encoder 0 probe input channel 0 is latched**

a. Configure the configuration parameters as shown in the figure below. Note: During the application process, the configuration parameters need to be set according to the parameters of the encoder.

a) The encoder 0 SSI frame length is set to 25, that is, the E0 Frame Length is set to 25;

b) The clock frequency when encoder 0 reads data is set to 1MHz, that is, E0 Clock Frequency is set to 2:1MHz;

c) The encoder 0 interval time is set to 50ms, that is, the E0 Interval Time is set to 500;

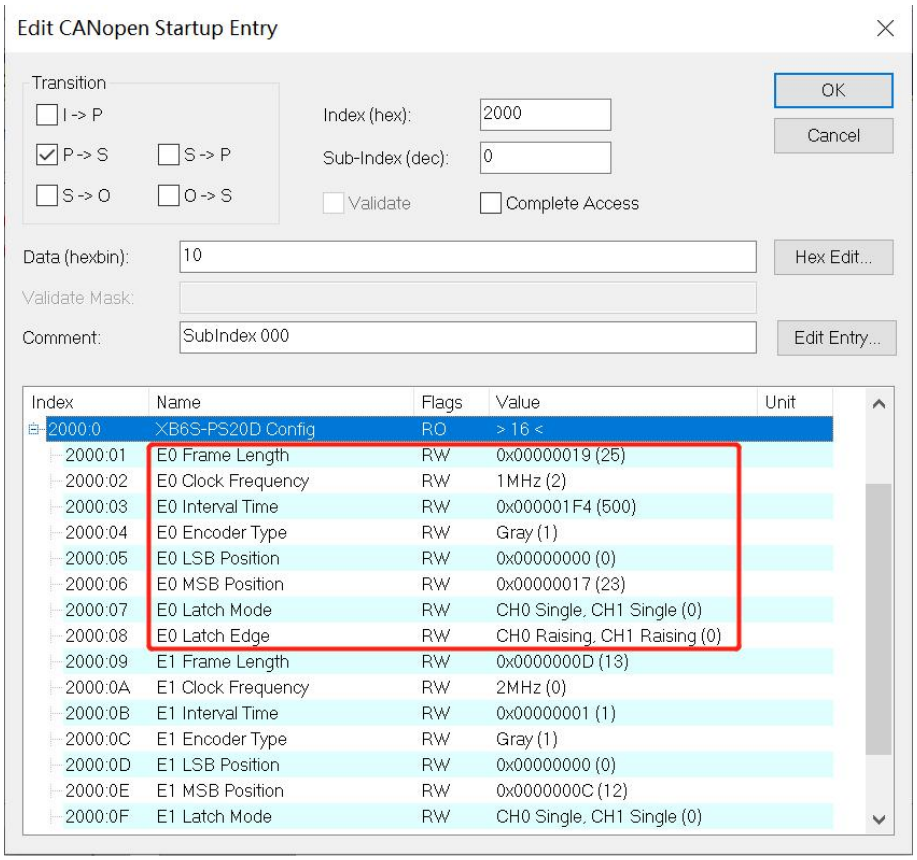
d) The encoding mode of encoder 0 is set to Gray code, that is, E0 Encoder Type is set to 1: Gray;

e) The LSB position number of the encoder 0 position value is set to 0, that is, E0 LSB Position is set to 0;

f) The MSB position number of encoder 0 position value is set to 23, that is, E0 MSB Position is set to 23;

g) The encoder 0 probe mode is set to channel 0 single, channel 1 single, that is, E0 Latch Mode is set to 0: CH0 Single, CH1 Single;

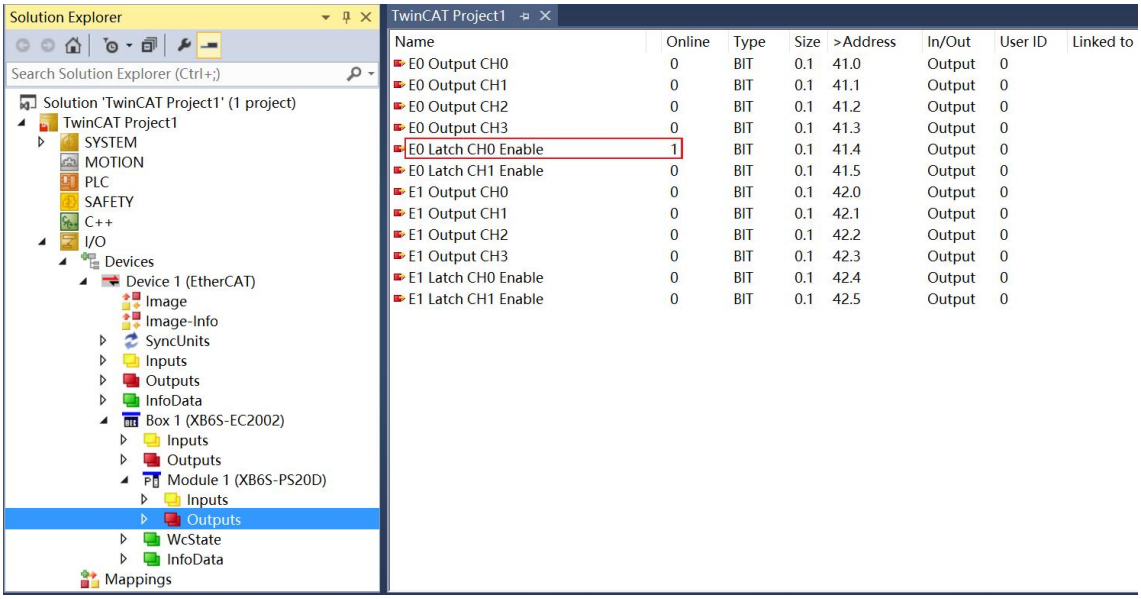
h) The encoder 0 probe trigger edge is set to the rising edge of channel 0 and the rising edge of channel 1, that is, E0 Latch Edge is set to 0: CH0 Raising, CH1 Raising.



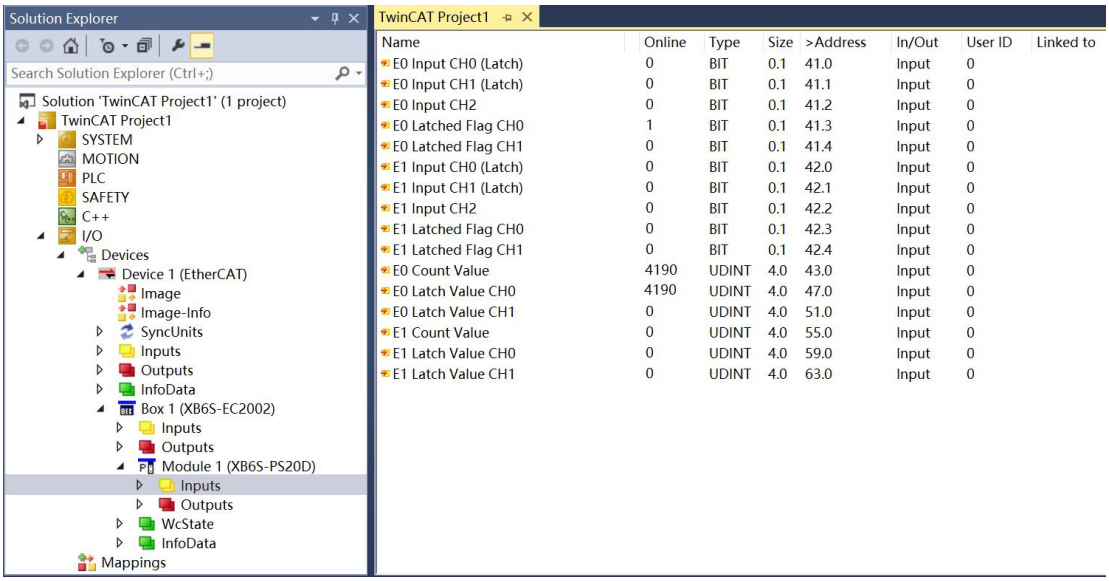
After the parameter setting is completed, the Reload operation is required and the module is powered on again to enable the master station to automatically send the parameter settings.

b. Set the encoder 0 probe input channel 0 latch enable, as shown in the figure below.

a) The downstream data E0 Latch CH0 Enable is set to 1.



c. Encoder 0 starts to rotate. After the counting is completed, encoder 0 probe input channel 0 inputs a valid signal. The encoder 0 count value is 4190, the probe input channel 0 latch value is 4190, and the encoder probe input channel 0 latch completion flag value flips once to 1, as shown in the figure below.



6.3.2 Application in Sysmac Studio software environment

1、Preparation

- **Hardware Environment**
  - **Module model XB6S-PS20D**
  - **EtherCAT Coupler, End Cover**

  This description takes the XB6S-EC2002 coupler as an example
  - **A computer with Sysmac Studio software pre-installed**
  - **An Omron PLC. This description takes model NJ301-1100 as an example.**
  - **EtherCAT dedicated shielded cable**
  - **Handwheel/encoder/orthogonal pulse generator and other equipment**
  - **Switching power supply**
  - **Device Profile**

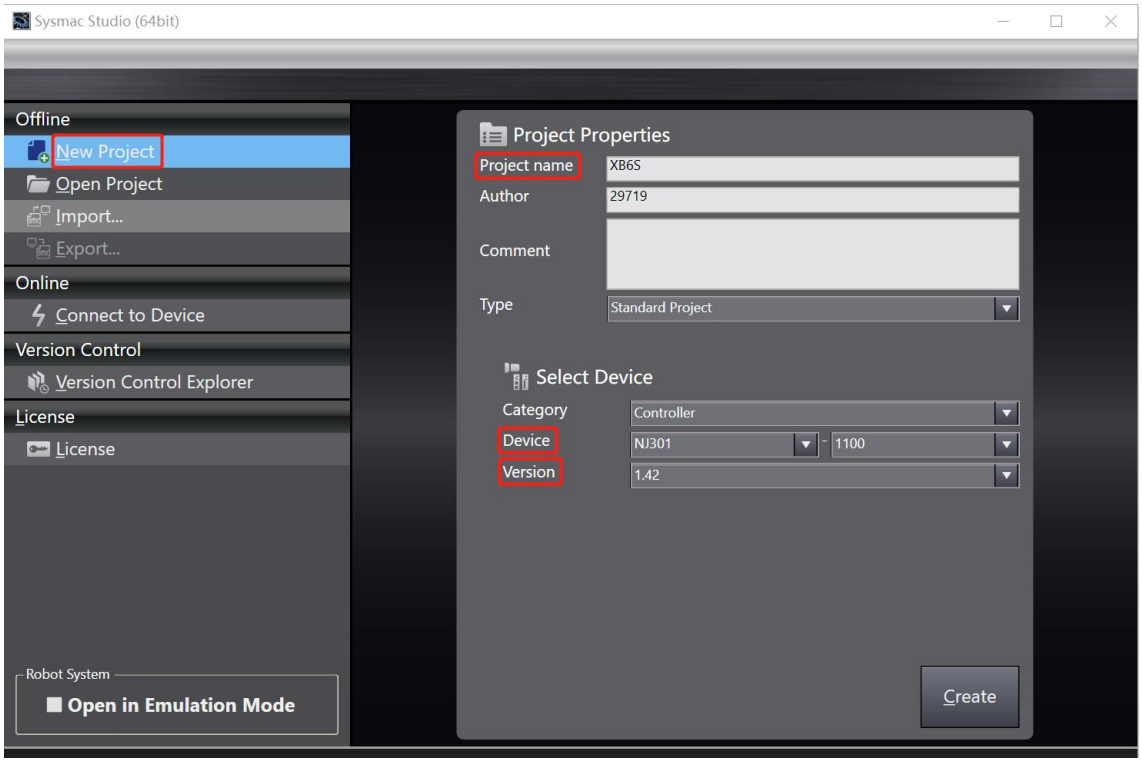
    Configuration file acquisition address:https://www.solidotech.com/documents/configfile
- **Hardware configuration and wiring**

  Please follow the4 Installation and removal"and"5 WiringRequest action
- **Computer IP requirements**

  Set the IP address of the computer and the IP address of the PLC, and ensure that they are in the same network segment.

2、New Construction

a. Open Sysmac Studio and click New Project.

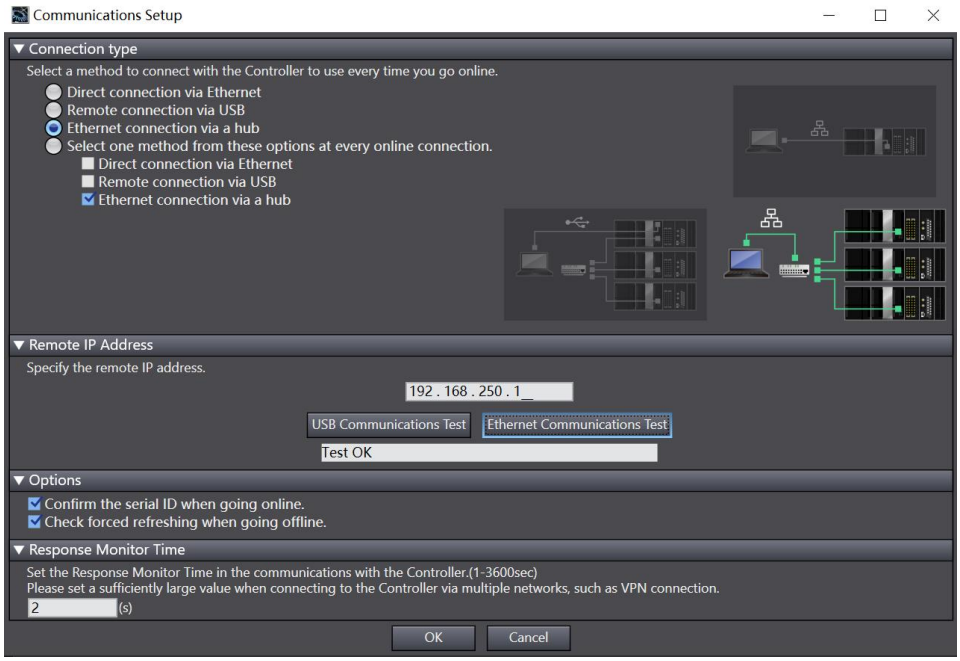


- Project name: Custom.

- Select the device: Select the corresponding PLC model in "Device" and the corresponding version number of the PLC in "Version".

b. After entering the project properties, click Create.

c. Click "Controller -> Communications Setup" in the menu bar, select the method to be used each time you connect to the controller while online, and enter the "Remote IP Address", as shown in the figure below.

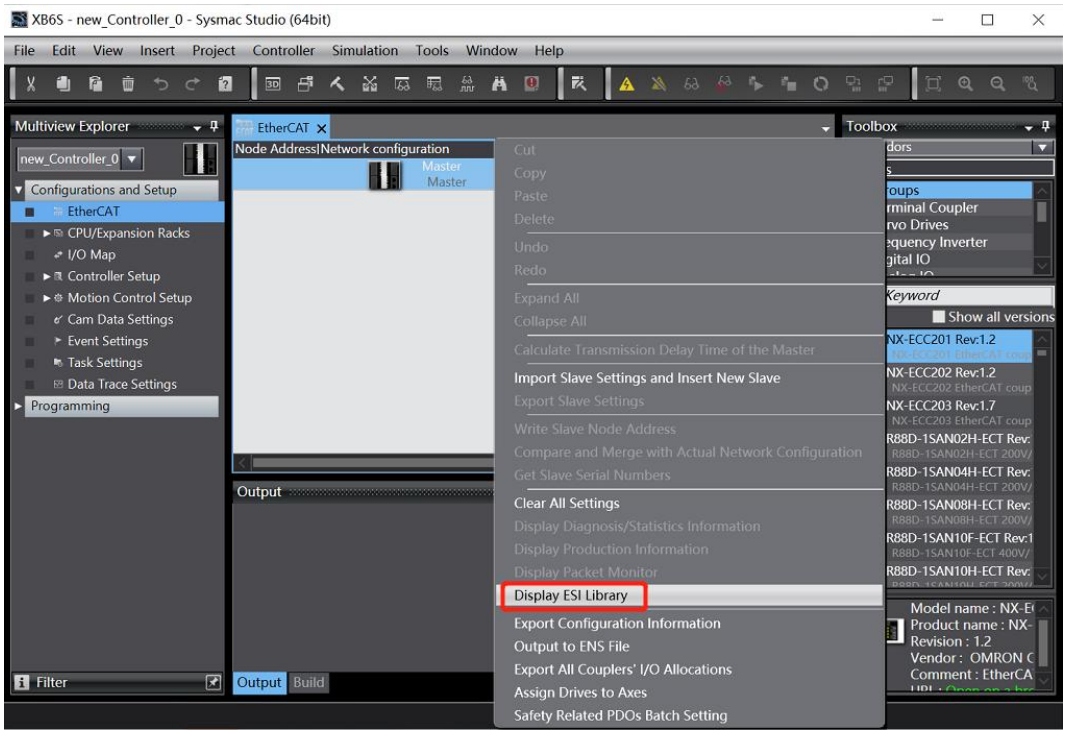


d. Click Ethernet Communication Test. The system displays that the test is successful.

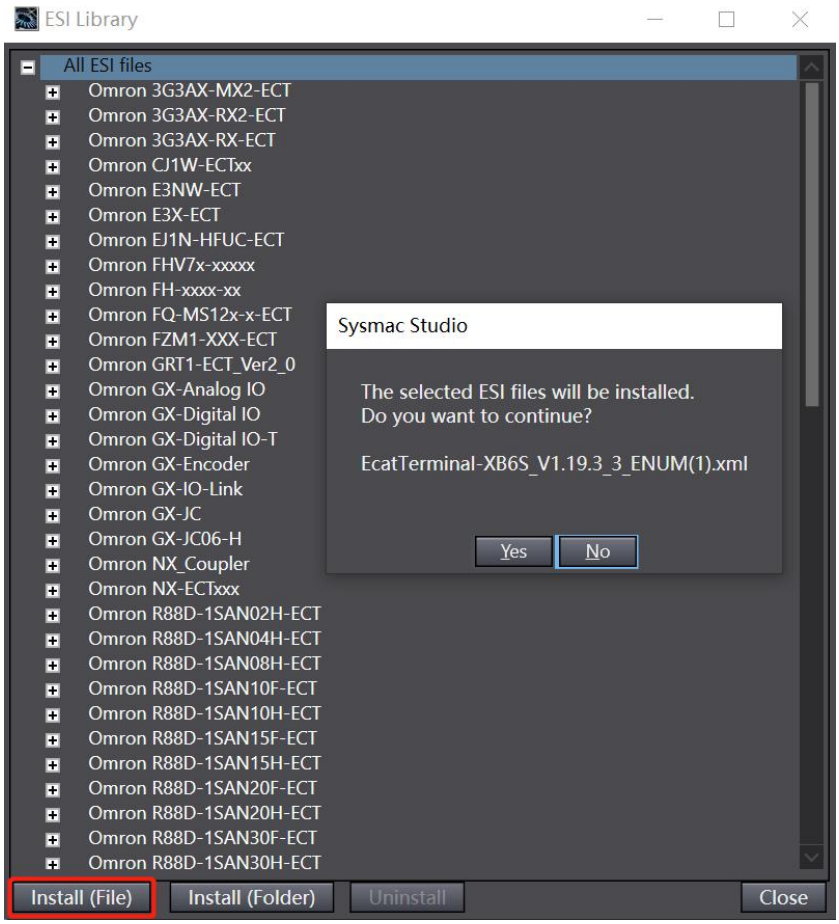
3、Installation XML File

a. In the left navigation tree, expand Configurations and Setup and double-click EtherCAT.

b. Right-click "Master" and select "Display ESI Library", as shown in the following figure.



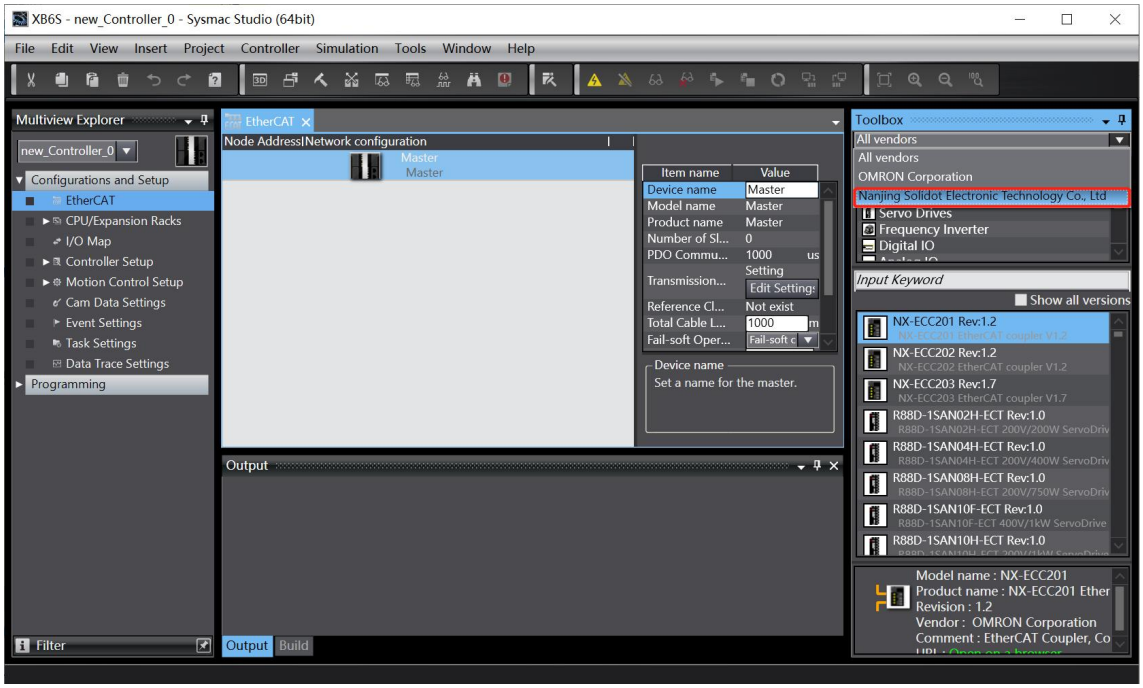
c. In the pop-up "ESI Library" window, click "Install (File)", select the XML file path of the module, and click "Yes" to complete the installation, as shown in the following figure.



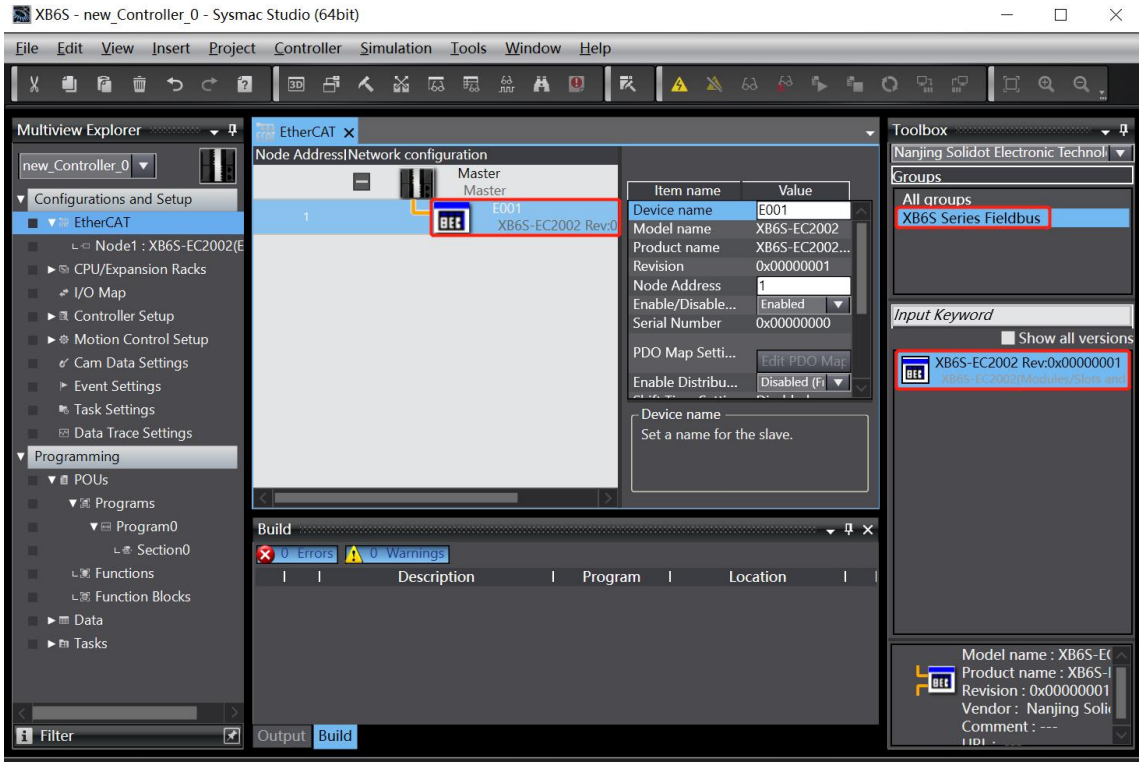
4、Add a device

There are two ways to add devices: online scanning and offline adding. This description takes offline adding as an example.

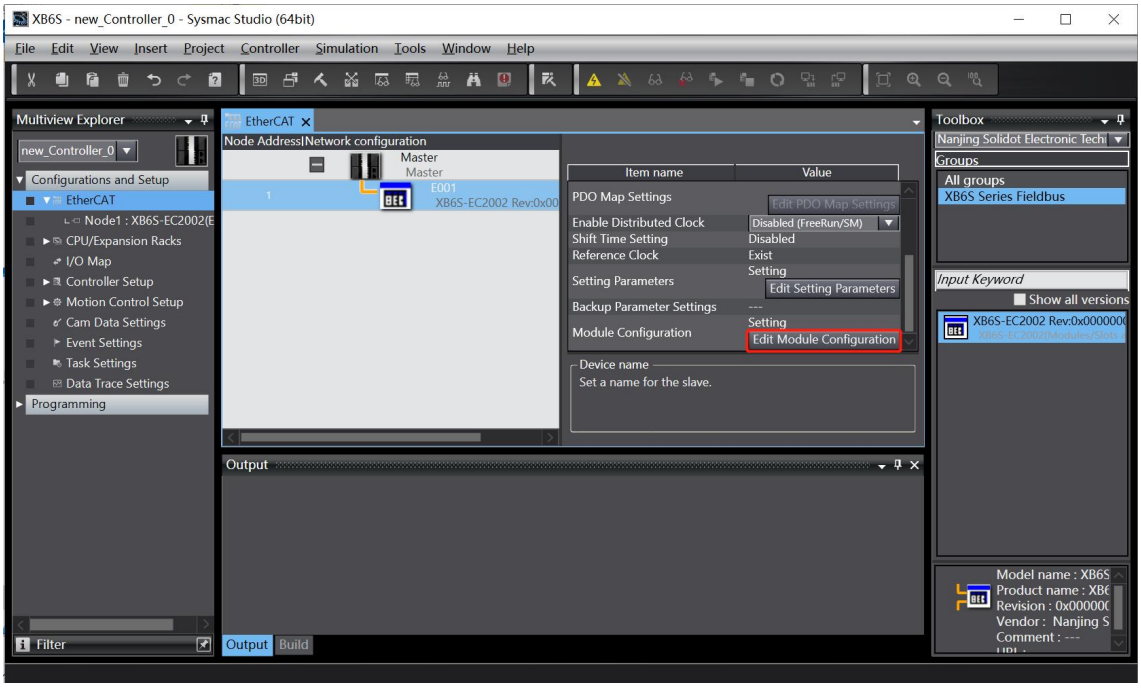
a. Under the "Toolbox" column on the right, click to expand all suppliers and select "Nanjing Solidot Electronic Technology Co., Ltd.", as shown in the figure below.



b. Click to select XB6S Series Fieldbus, double-click the XB6S-EC2002 coupler module, and add a slave device, as shown in the following figure.

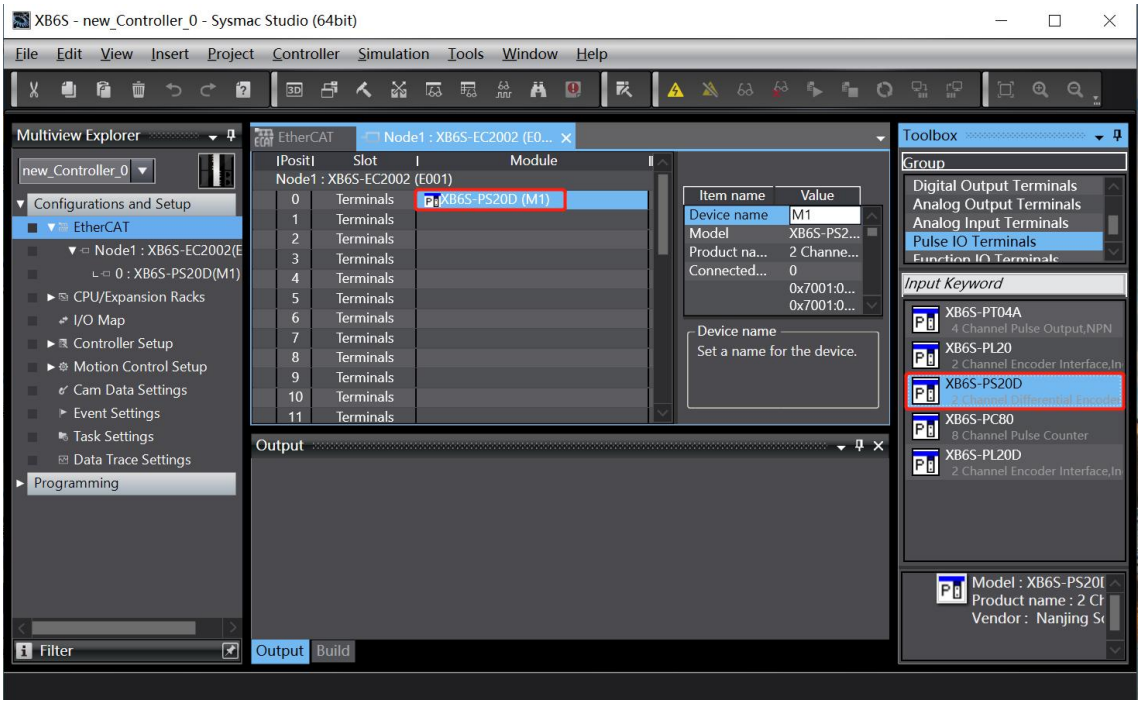


c. On the EtherCAT main page, select the XB6S-EC2002 coupler module that you just added and select “Edit Module Configuration”, as shown in the figure below.



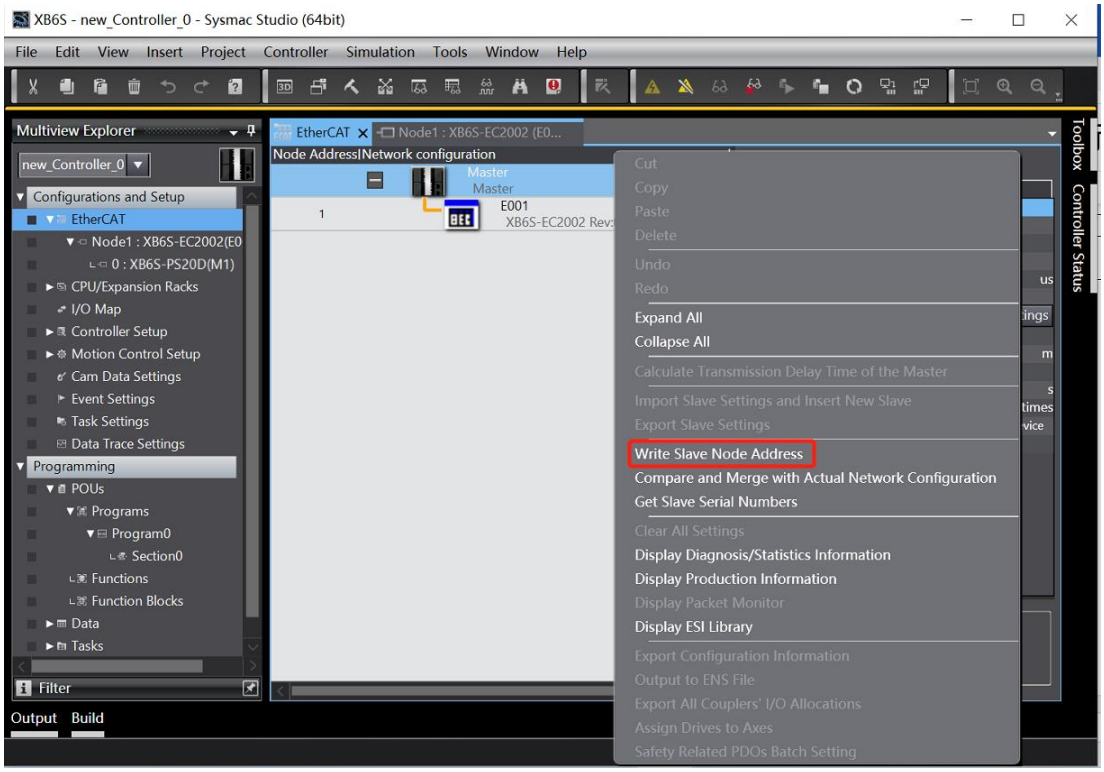
d. Position the cursor in "Module", click the module in the toolbox module list on the right, and add I/O modules one by one according to the order of I/O module configuration.

Note: The order and model must be consistent with the physical topology!

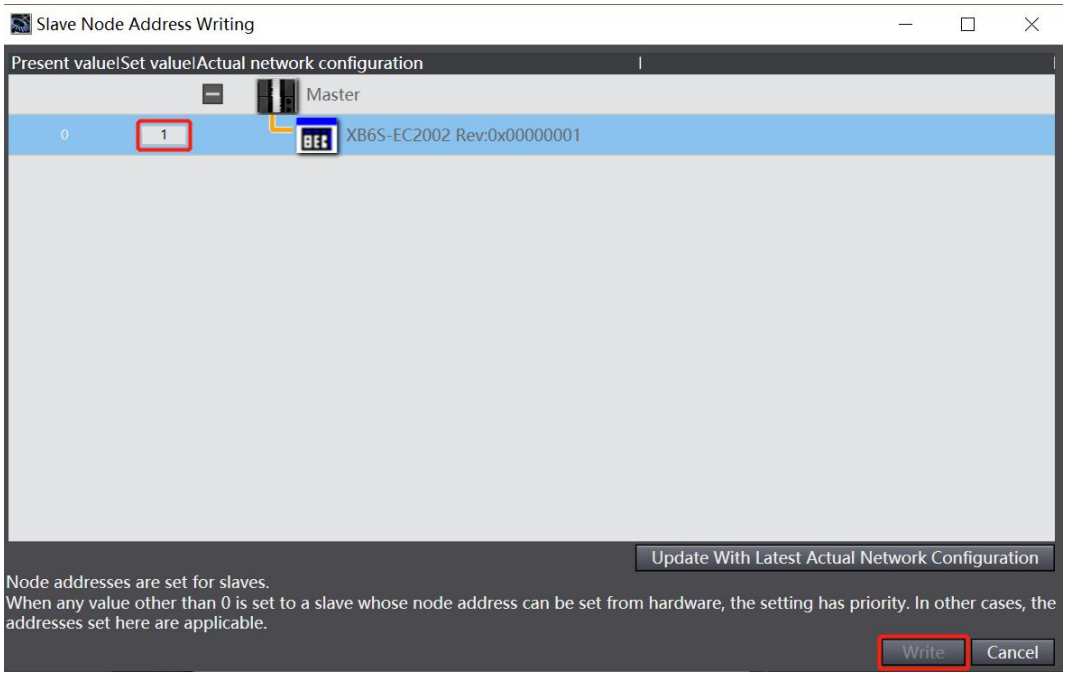


5、Set the node address

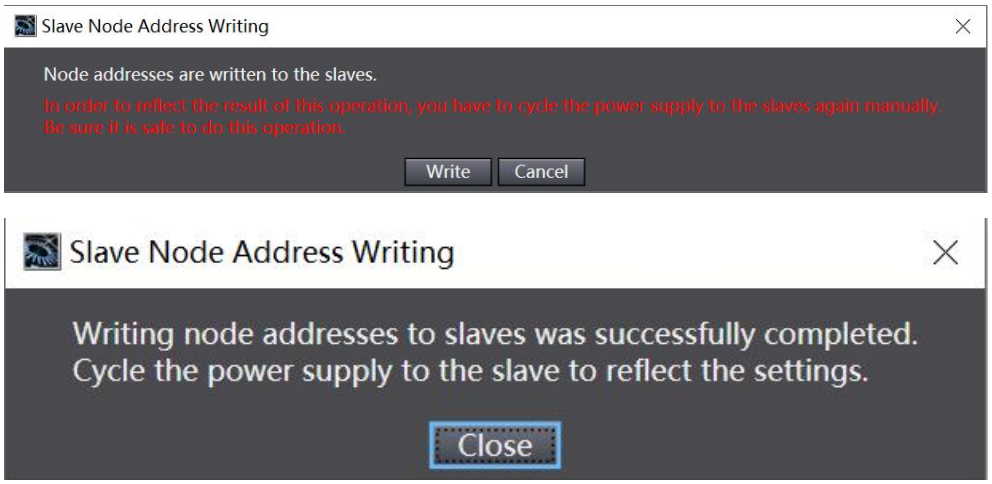
a. Click "Controller->Online" in the menu bar to switch the controller to online status. Right-click the master device and click "Write Slave Node Address", as shown in the figure below.



b. In the window for setting the node address, click the value under Setting Value, enter the node address, and click Write to change the node address of the slave device, as shown in the following figure.

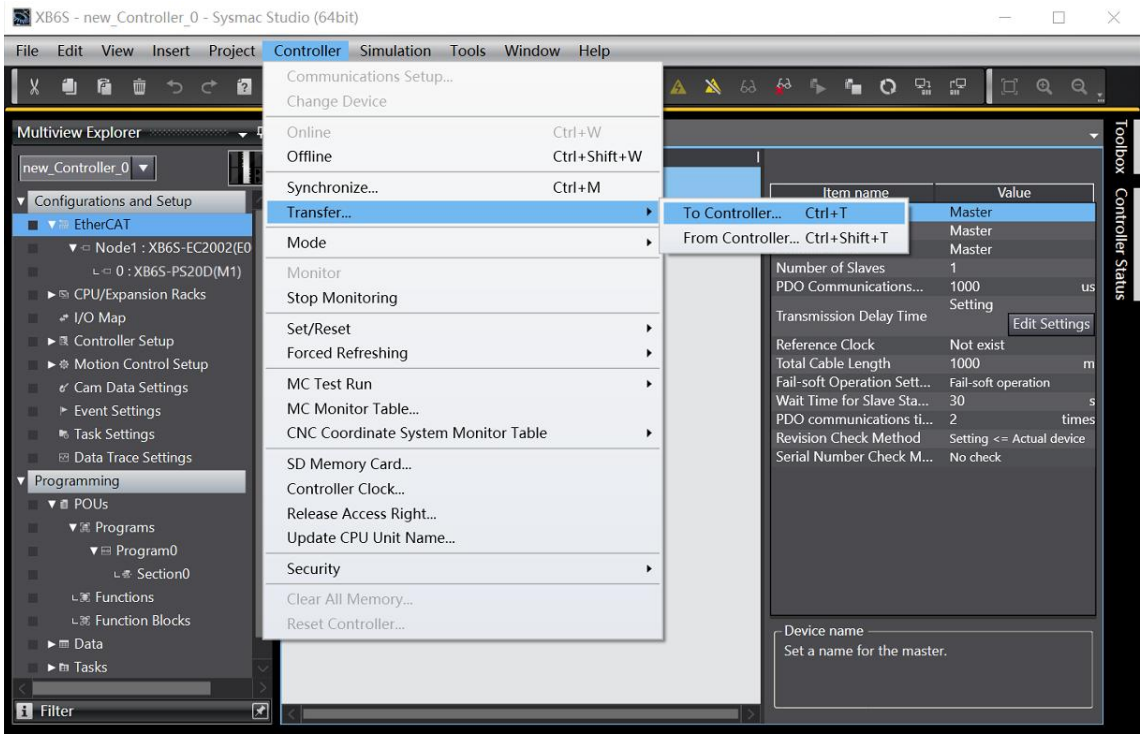


c. After writing, a power-on prompt pops up, as shown in the figure below. Click "Write" and then restart the power of the slave device according to the prompt.

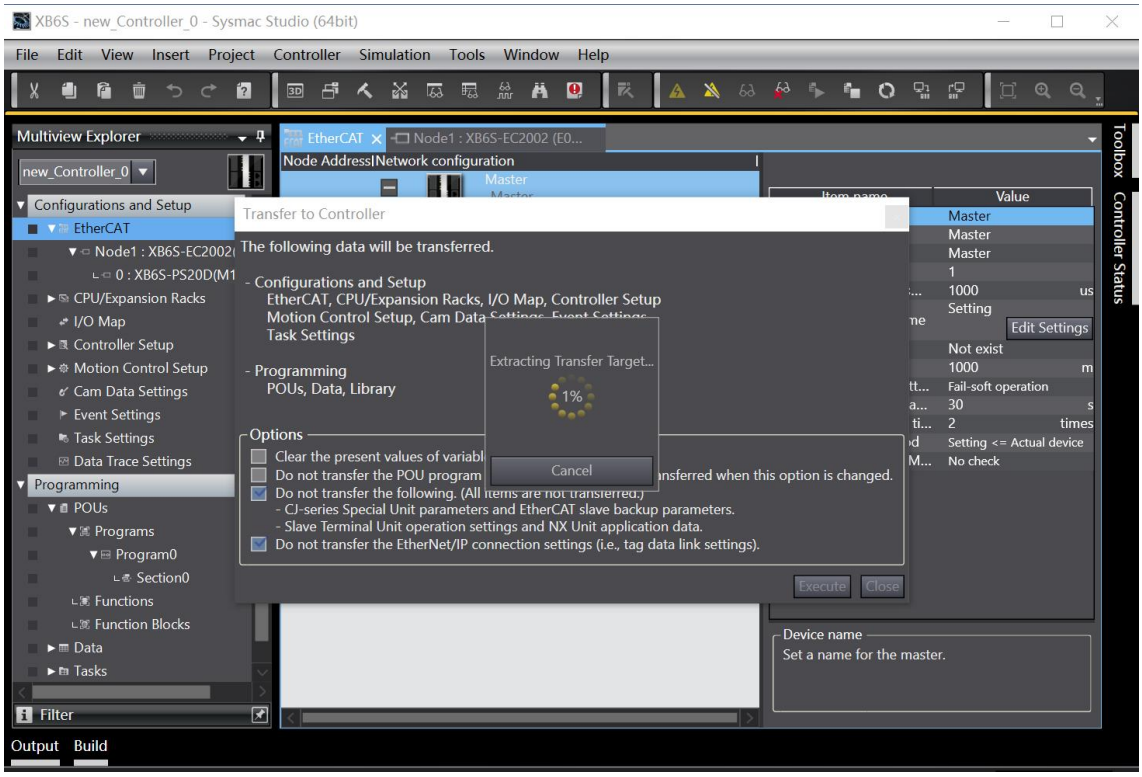


6、Download the configuration to the PLC

a. Click the menu bar "Controller -> Teleport (A) -> Teleport to Controller (T)" button, as shown in the figure below.

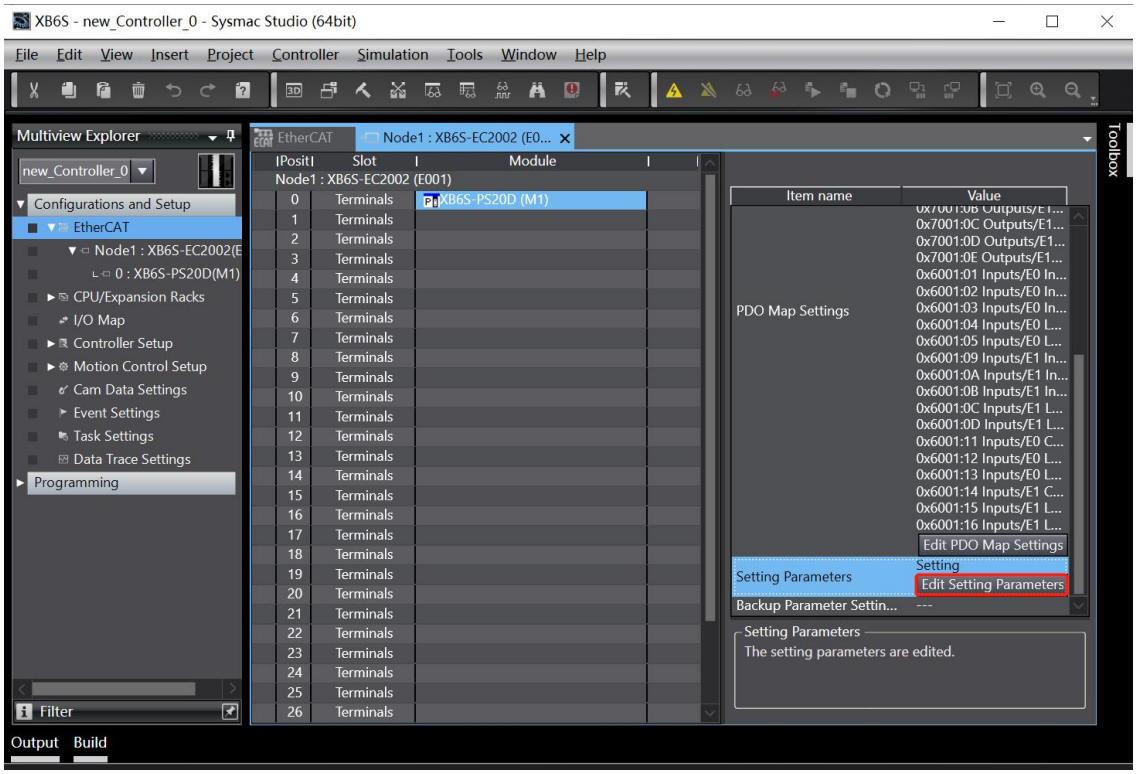


b. Download the configuration to the PLC. A pop-up window will pop up to confirm the transfer. Click "Execute". In the subsequent pop-up windows, click "Yes/OK" in sequence, as shown in the figure below. After the download is complete, you need to power on again.



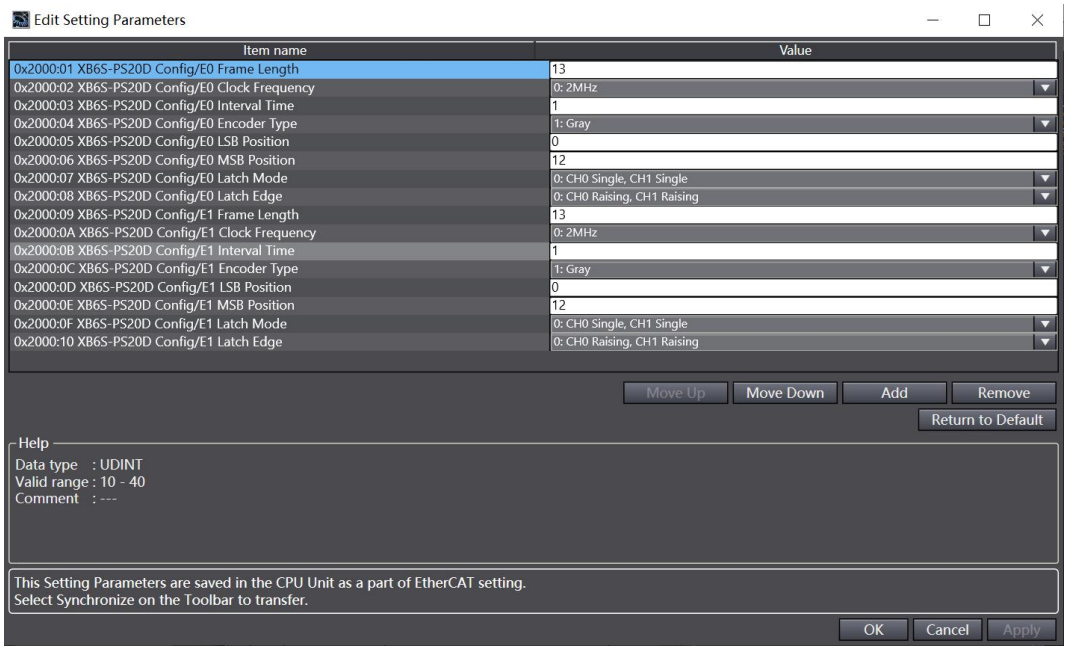
7、Parameter settings

a. Switch the configuration to offline state, edit the module configuration page on node 1, select the XB6S-PS20D module, and click "Edit Setting Parameters", as shown in the figure below.

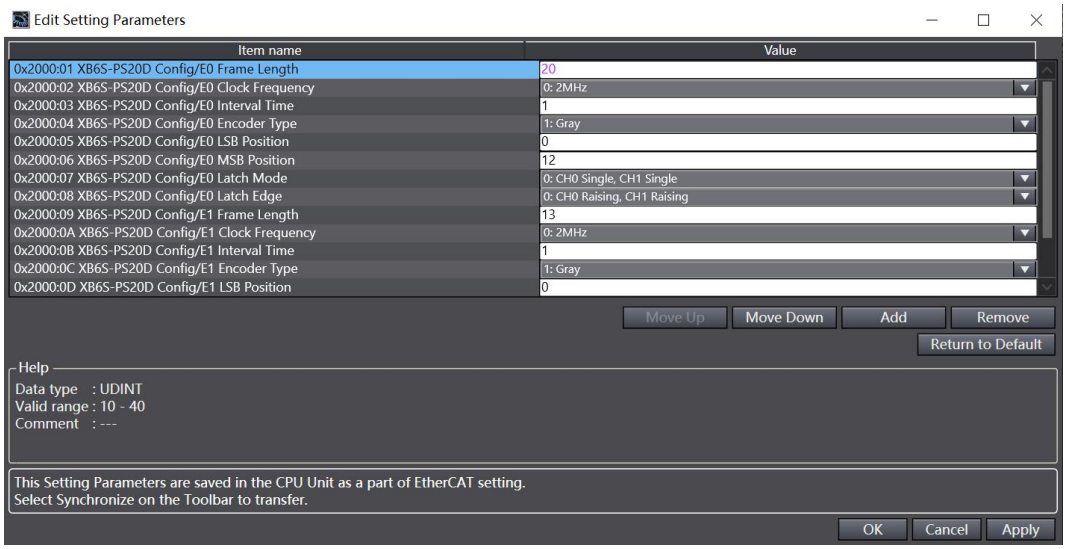


Note: IfThe PLC firmware version is too low, and the EC_CoESDOWrite and EC_CoESDORead instructions are required to write and read the SDO address.

b. existOn the XB6S-PS20D parameter setting page, you can see 16 configuration parameters. Click any parameter to set the related configuration, as shown in the figure below.

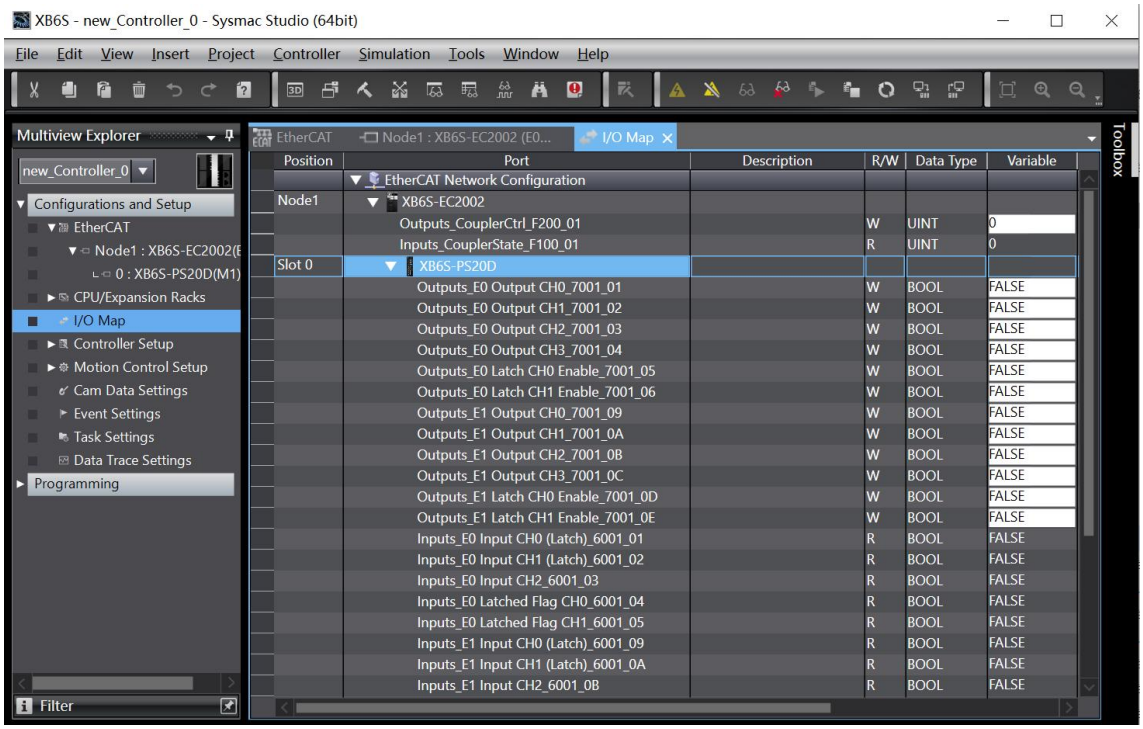


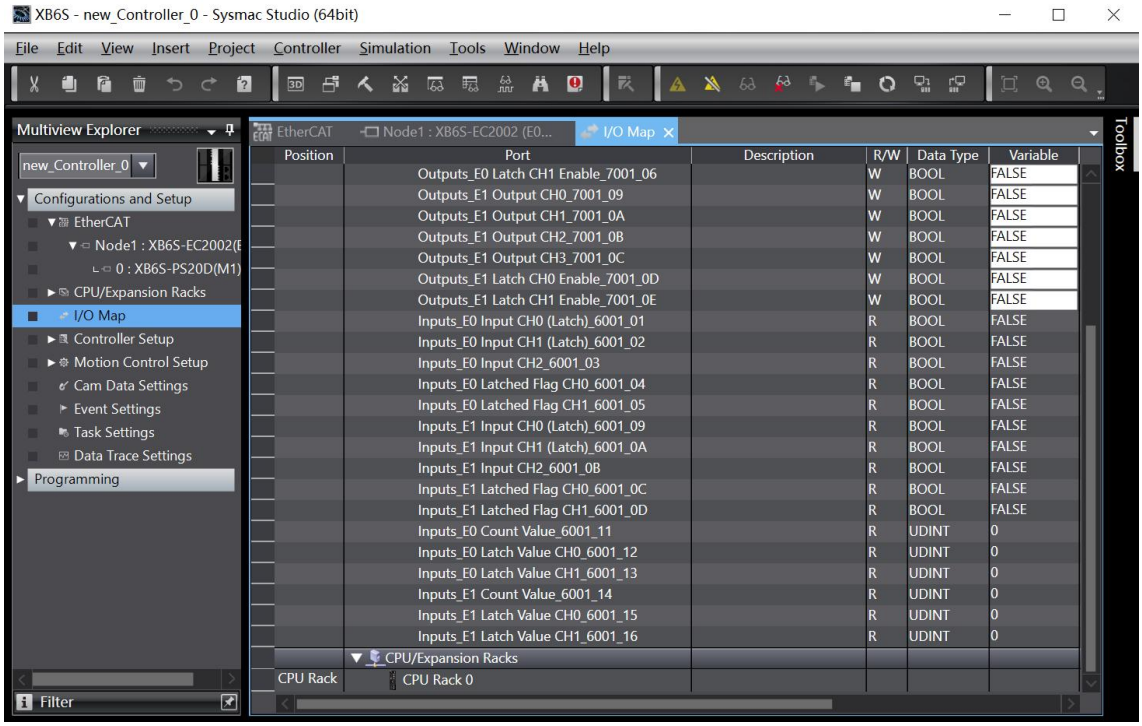
c. For example, to modify the SSI frame length parameter of encoder 0, double-click "E0 Frame Length" to modify the parameter value, as shown in the figure below. After all parameters are configured, you need to re-download the program to the PLC, and the PLC and module need to be powered on again.



8、I/O Function

a. Double-click I/O Mapping in the left navigation tree to view the mapping table of the modules in the topology, so as to monitor the channel input and output values, as shown in the following figure.





Module Functionality Examples

- **Encoder 0 is connected, the encoder is rotated to count, and the encoder 0 probe input channel 0 is latched**

a. Configure the configuration parameters as shown in the figure below. Note: During the application process, the configuration parameters need to be set according to the parameters of the encoder.

a) The encoder 0 SSI frame length is set to 25, that is, the E0 Frame Length is set to 25;

b) The clock frequency when encoder 0 reads data is set to 1MHz, that is, E0 Clock Frequency is set to 2:1MHz;

c) The encoder 0 interval time is set to 50ms, that is, the E0 Interval Time is set to 500;

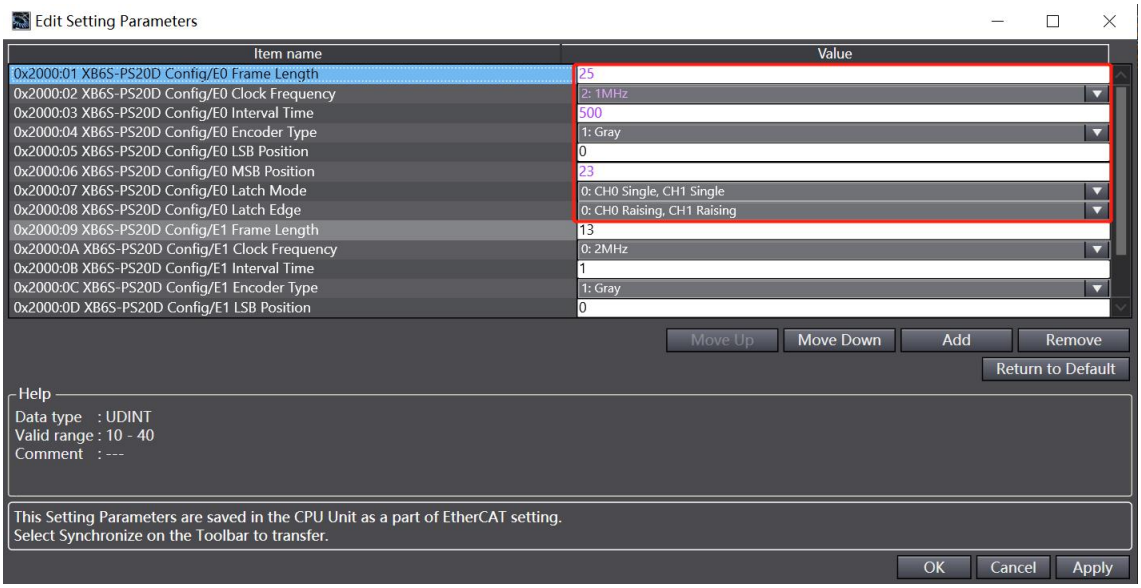
d) The encoding mode of encoder 0 is set to Gray code, that is, E0 Encoder Type is set to 1: Gray;

e) The LSB position number of the encoder 0 position value is set to 0, that is, E0 LSB Position is set to 0;

f) The MSB position number of encoder 0 position value is set to 23, that is, E0 MSB Position is set to 23;

g) The encoder 0 probe mode is set to channel 0 single, channel 1 single, that is, E0 Latch Mode is set to 0: CH0 Single, CH1 Single;

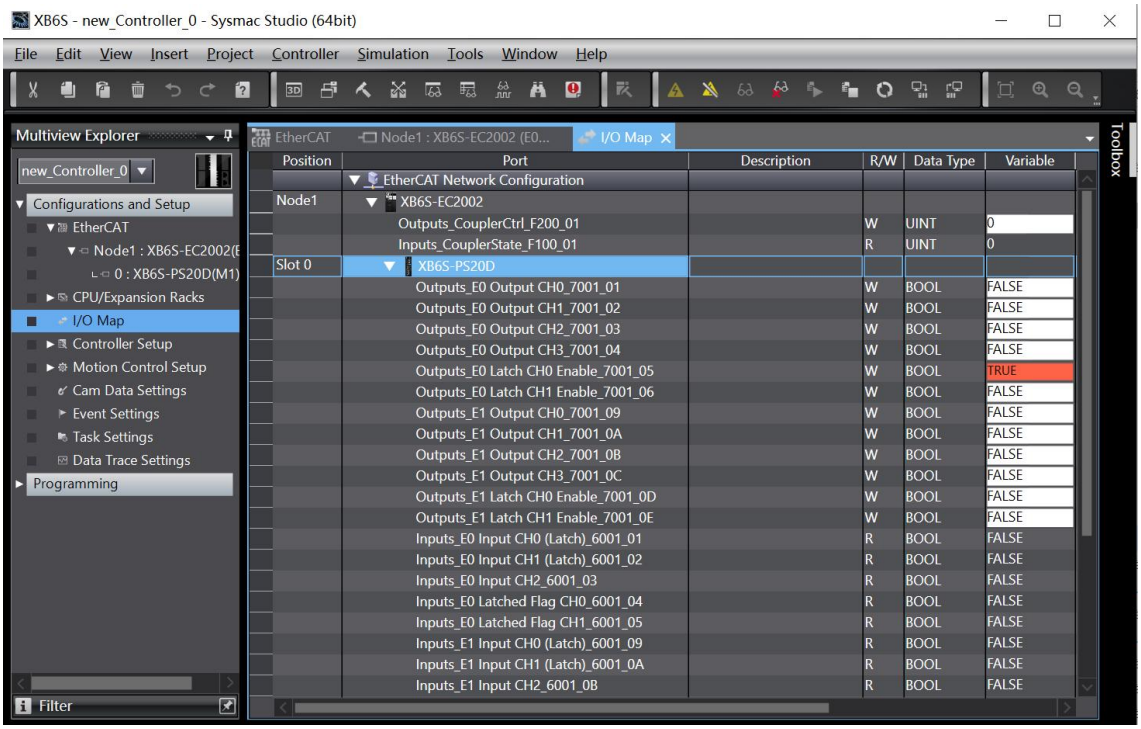
h) The encoder 0 probe trigger edge is set to the rising edge of channel 0 and the rising edge of channel 1, that is, E0 Latch Edge is set to 0: CH0 Raising, CH1 Raising.



After the parameter setting is completed, the Reload operation is required and the module is powered on again to enable the master station to automatically send the parameter settings.

b. Set the encoder 0 probe input channel 0 latch enable, as shown in the figure below.

a) The downstream data E0 Latch CH0 Enable is set to 1.



c. Encoder 0 starts to rotate. After the counting is completed, encoder 0 probe input channel 0 inputs a valid signal. The encoder 0 count value is 4190, the probe input channel 0 latch value is 4190, and the encoder probe input channel 0 latch completion flag value flips once to 1, as shown in the figure below.