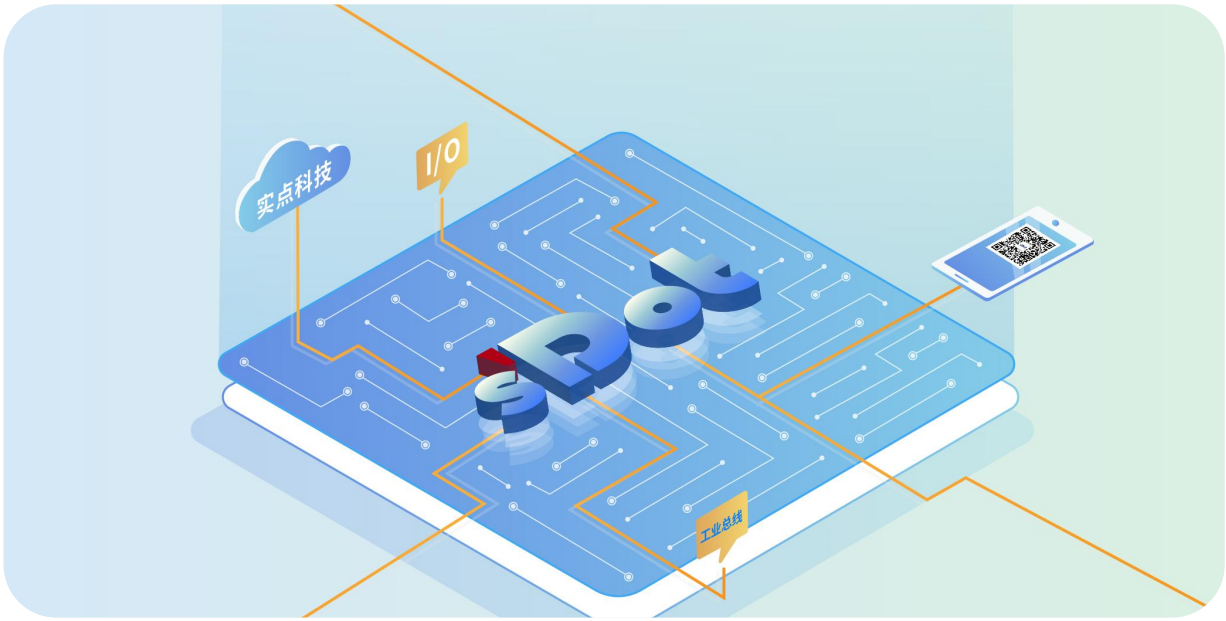

EtherCAT Junction

SW4-ECP06

User Manual

Nanjing Solidot Electronic Technology Co., Ltd.

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Nanjing Solidot Electronic Technology Co., Ltd.
Address: 11th Floor, Angying Building, 91 Shengli Road, Jiangning District, Nanjing, Jiangsu Province
Postal Code: 211106
Phone: 4007788929
Website:http://www.solidotech.com

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1 Product Overview

1.1 Product Introduction

SW4-ECP06 is a six-port EtherCAT junction module that uses the EtherCAT industrial Ethernet bus interface. It is compatible with EtherCAT networks from multiple manufacturers, supports cascading functions, supports DC clocks, can be flexibly combined into a variety of topological structures, and can be widely used in various industrial systems.

1.2 Product Features

- Six EtherCAT Ports
  RJ45 interface, supports junction cascading functionality
- DC clock support
  High signal synchronization stability and accuracy
- Compact size
  Suitable for space-constrained applications
- High-speed communication
  Based on high-performance EtherCAT ASIC communication chip, faster speed
- Easy configuration
  Simple configuration, supports major EtherCAT master stations
- Easy installation
  DIN 35mm standard rail mounting

2 Naming Convention

2.1 Naming Convention

SW 4 - EC P 06
(1) (2) (3) (4) (5)

Item	Meaning	Value Description
(1)	Function	SW: Short for Switch
(2)	Product Series	4: Vertical integrated module
(3)	Bus Protocol	EC: Short for EtherCAT protocol
(4)	Port Abbreviation	P: Short for Port
(5)	Number of Ports	06: 6 ports

3 Product Parameters

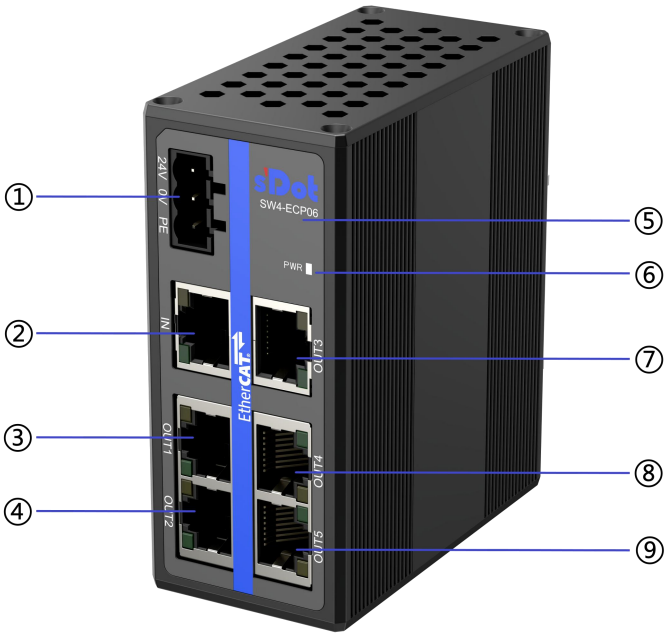
3.1 General Parameters

Interface parameters	
Product Name	SW4-ECP06
Bus Protocol	EtherCAT
Bus Interface	6◊RJ45 (1 In, 5 Out)
Electrical Isolation	500 VAC
Transmission Medium	Category 5 or above UTP/STP (recommended STP)
Hot-plug Support	Supported
Transmission Distance	≤100 m (station-to-station distance)
Transmission Rate	100 Mbps
DC Reference Clock	Supported
Technical Parameters	
Configuration Method	Through master station
Power Supply	SELV Input 24VDC (18V~36V)
Power Protection	Reverse polarity and short-circuit protection
Dimensions	90×40×87.8mm
Operating Temperature	-10℃~+60℃
Storage Temperature	-20℃~+75℃
Relative Humidity	95%, no condensation
Protection Level	IP20
Altitude	≤2000m
Pollution Degree	Grade 2

4 Panel

4.1 Product Structure

Names of each part of the product



No.	Name	Description
①	Power Interface	3P Terminal
②	Bus Interface IN	RJ45
③	Bus Interface OUT1	RJ45
④	Bus Interface OUT2	RJ45
⑤	Module Label	Module Identification
⑥	Indicator Lights and Labels	Indicate Power Status
⑦	Bus Interface OUT3	RJ45
⑧	Bus Interface OUT4	RJ45
⑨	Bus Interface OUT5	RJ45

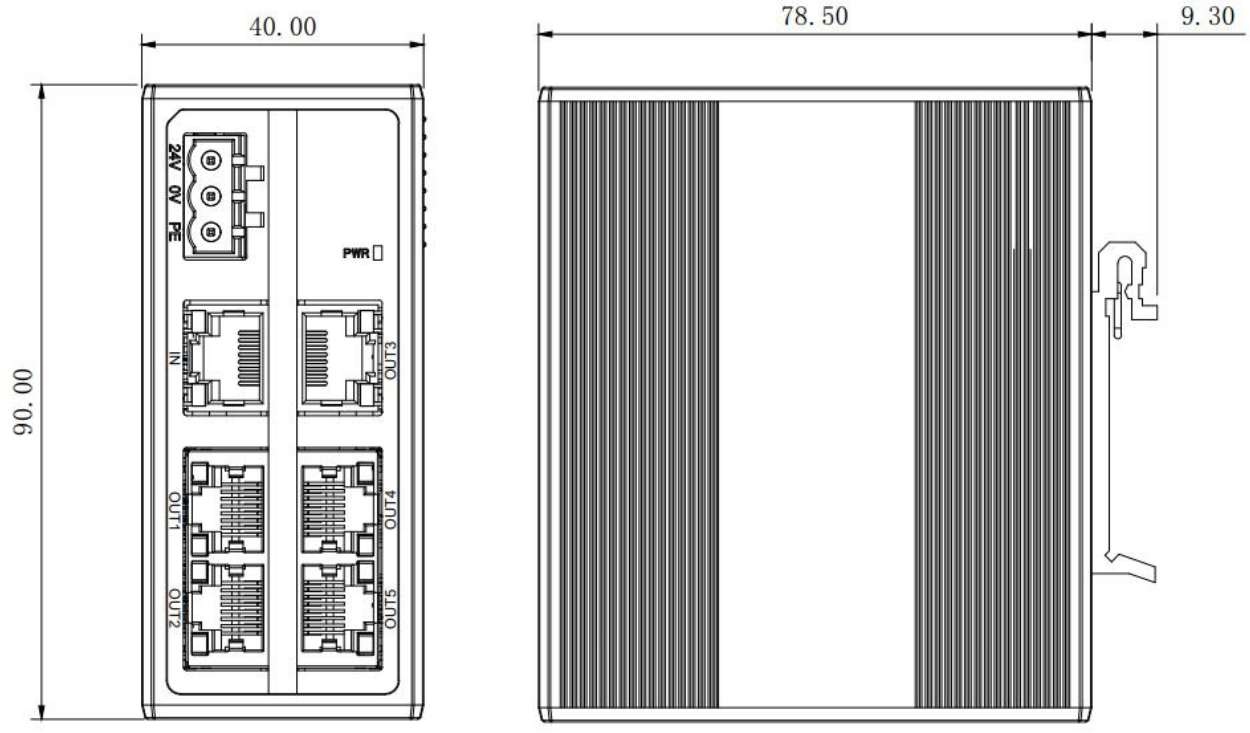
4.2 Indicator Light Functions

Name	Label	Color	Status	Description
Power Indicator	PWR	Green	On	Power supply is normal
			Off	Power supply is abnormal or not powered
Port Indicator	IN	Green	On	Establishing a network connection
			Blinking	Network connection and data exchange
			Off	No data interaction or exception
	OUT1~OUT5	Green	On	Establishing a network connection
			Blinking	Network connection and data exchange
			Off	No data interaction or exception

5 Installation and removal

5.1 Dimensions

Dimensions (unit: mm)



5.2 Installation and removal

The module is installed using a DIN 35 mm standard rail. The specific steps are shown in the following table:

Module installation and removal	
Module installation steps	1. Align the upper edge of the buckle on the back of the module with the upper edge of the guide rail and place the module into the guide rail.
	2. Press up the butterfly spring of the buckle on the back of the module to move the lower edge of the module buckle toward the guide rail.
	3. Push the buckle in the direction of the guide rail. When you hear a sound, the module is installed.
Module disassembly steps	1. Press the butterfly spring on the back of the module and apply force downward.
	2. After tightening the butterfly spring, remove the lower edge of the module buckle from the guide rail, and then remove the upper edge of the module buckle from the guide rail.

⚠ warning

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

6 Wiring

6.1 Terminal Blocks

⚠ warning

Terminal Blocks		
Power Terminals	Rated voltage	320V
	Rated current	20A
	Number of poles	3P
	Wire diameter	22~16 AWG 0.3~1.5 mm²
Bus interface	6 × RJ45	Category 5 or higher UTP or STP (STP is recommended)

6.2 Wiring Instructions and Requirements

6.2.1 Power Wiring

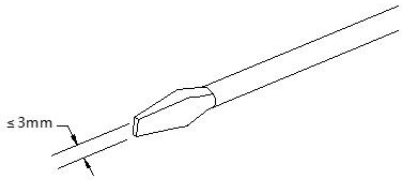
Power Wiring Precautions

- PE needs to be grounded reliably.

Wiring tool requirements

The power terminal adopts a screw-free design, which can be used for both installation and removal of cables

Operation: Flat-blade screwdriver (specification: ≤3 mm).



Stripping length requirements

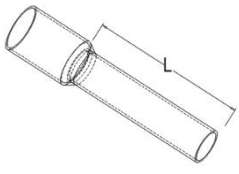
The recommended stripping length for the power terminals is 10 mm.

Wiring method

For single-strand rigid wire, after stripping the wire to the corresponding length, press the button and insert the single-strand wire directly into the corresponding end hole.

For multi-strand flexible wires, after stripping the wires to the corresponding length, you can directly connect or use the corresponding standard specifications of cold-pressed terminals (tubular insulated terminals, reference specifications are shown in the following table) in combination. Press the button and insert the insulated terminal directly into the corresponding end hole.

The power terminal specifications are shown in the following table:

Specifications of tubular insulation terminals		
Specifications	model	Conductor cross-sectional area mm^2
 Tube type insulated terminalLThe length is10mm	E0510	0.5
	E7510	0.75
	E1010	1.0
	E1510	1.5

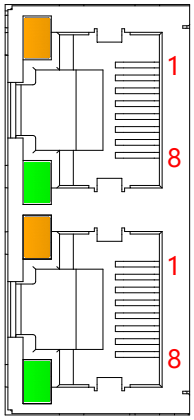
warning

- Only copper wires may be used for wiring.
- Cable temperature: 80℃.

6.2.2 Bus wiring

Bus wiring requirements

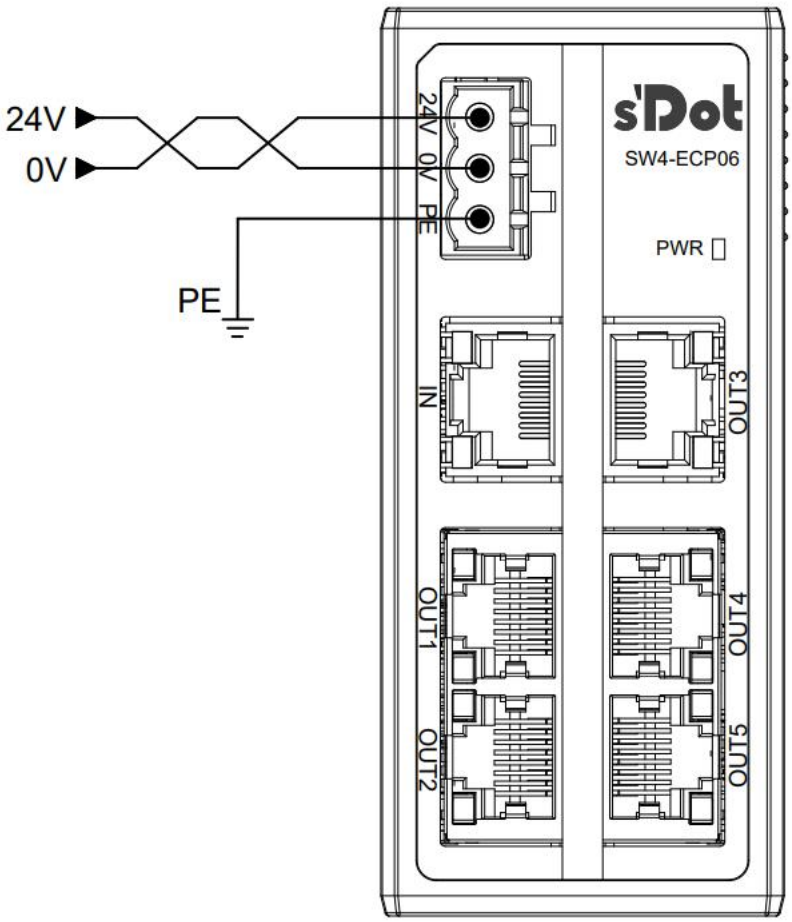
- Adopt standard RJ45 network interface and standard crystal connector
- The length of the cable between devices cannot exceed 100 m



Pin Number	Signal
1	TD+
2	TD-
3	RD+
4	one
5	one
6	RD-
7	one
8	one

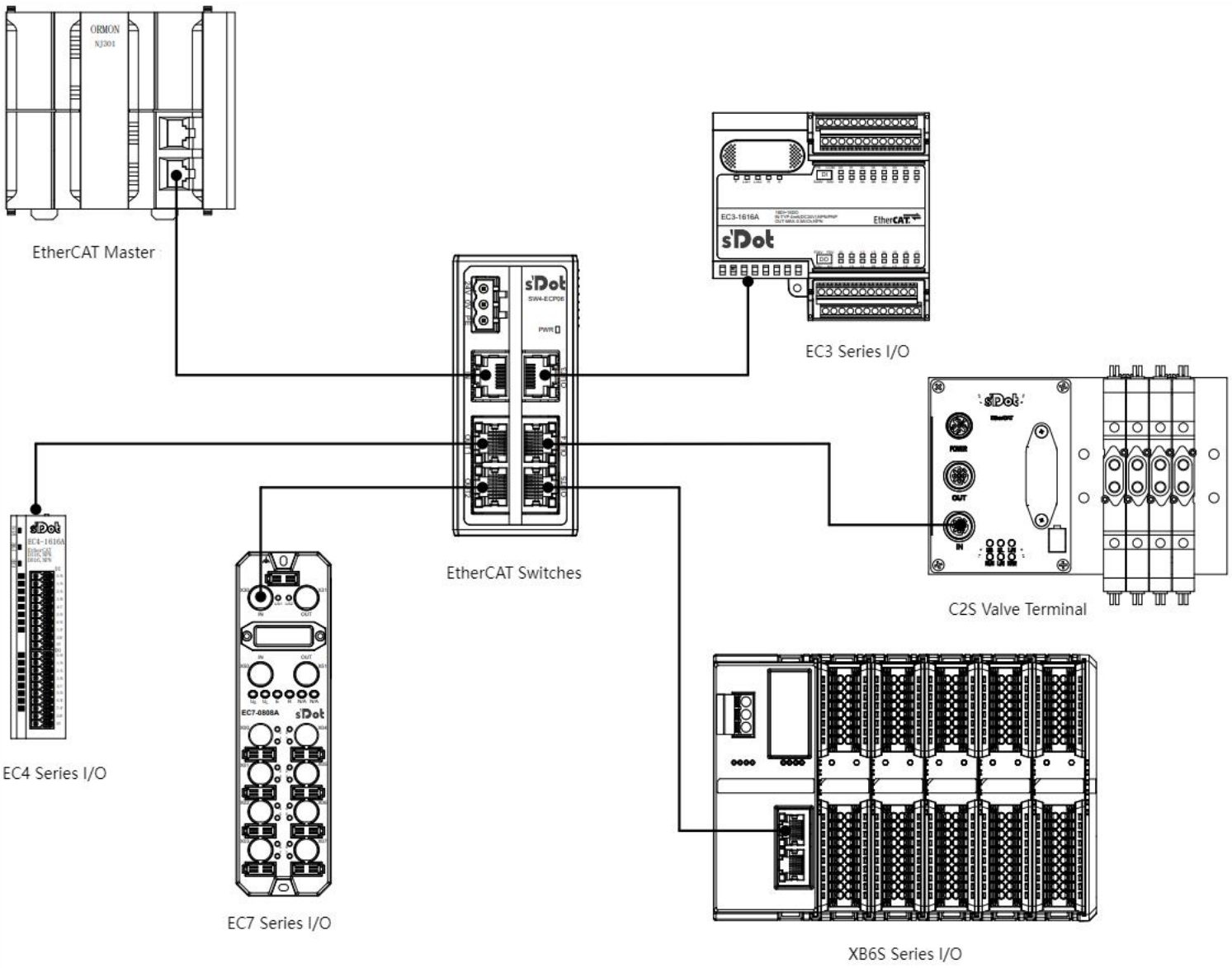
6.3 Wiring Diagram

6.3.1 Power wiring diagram



6.3.2junction topology diagram

Taking our EC series products as an example, the topological structure example of the junction



connection module is shown in the figure below.

7 Use

7.1 Configuration Application

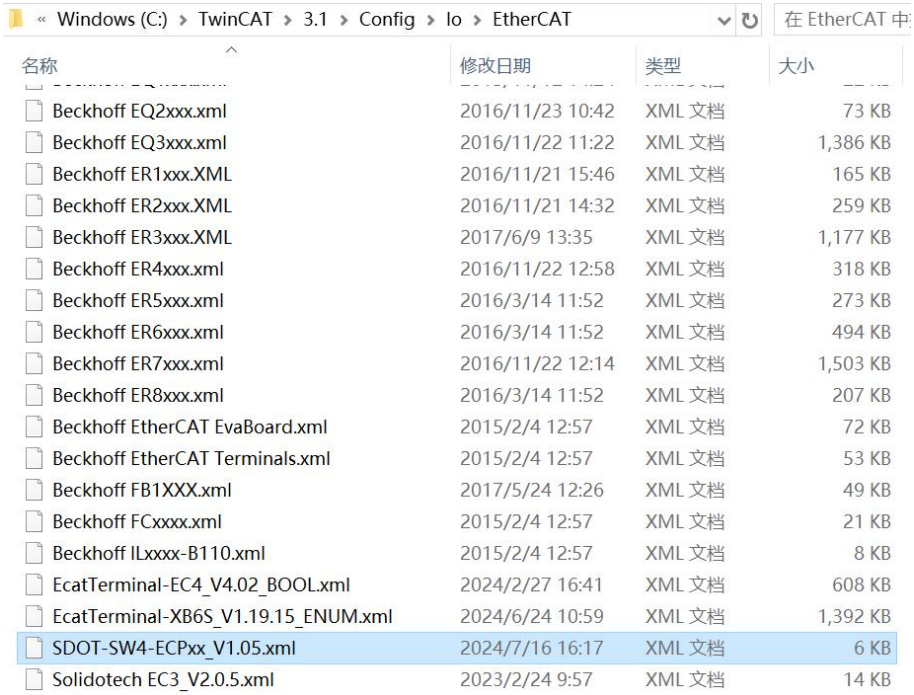
7.1.1 Application in TwinCAT3 software environment

1、Preparation

- **Hardware Environment**
  - **For example, the junction SW4-ECP06 uses OUT2 connected to EC3-1616A, OUT3 connected to XB6S-EC2002, and OUT4 connected to EC4-0032A**
  - **A computer with TwinCAT3 software pre-installed**
  - **EtherCAT dedicated shielded cable**
  - **Switching power supply**
  - **Device Profile**
    Configuration file acquisition address:https://www.solidotech.com/documents/configfile
- **Hardware configuration and wiring**
  Please follow the5 Installation and removal"and"6 WiringRequest action

2、 Pre-configured configuration files

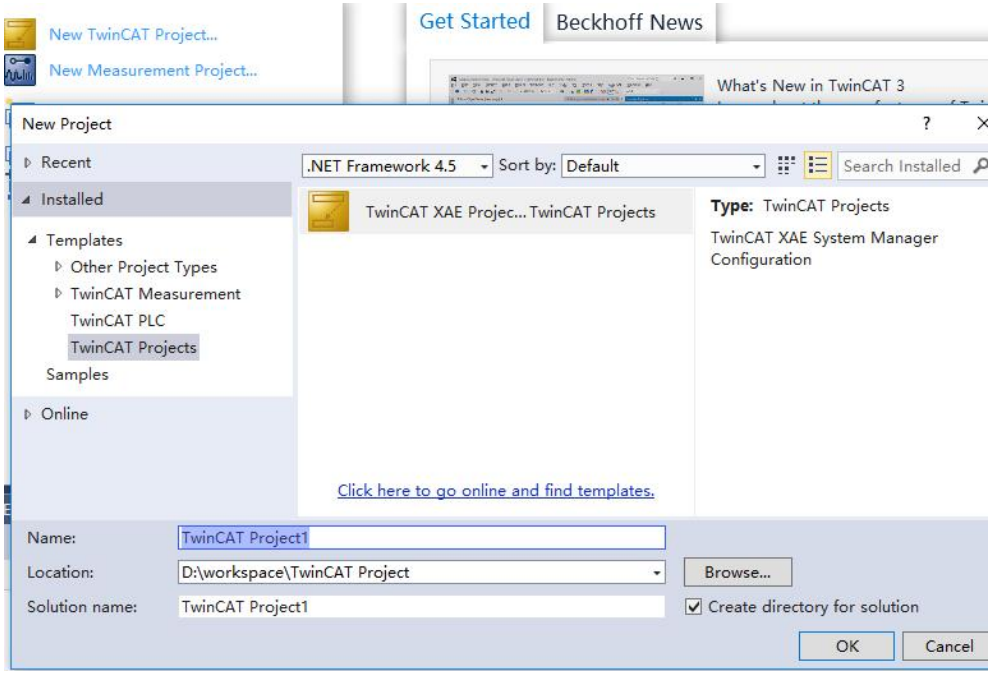
a. Place the ESI configuration file of the junction (SDOT-SW4-ECPxx_V1.05.xml) and the ESI configuration files of other modules in the topology configuration in the TwinCAT installation directory "C:\TwinCAT\3.1\Config\Io\EtherCAT", as shown in the figure below.



3、 Create a project

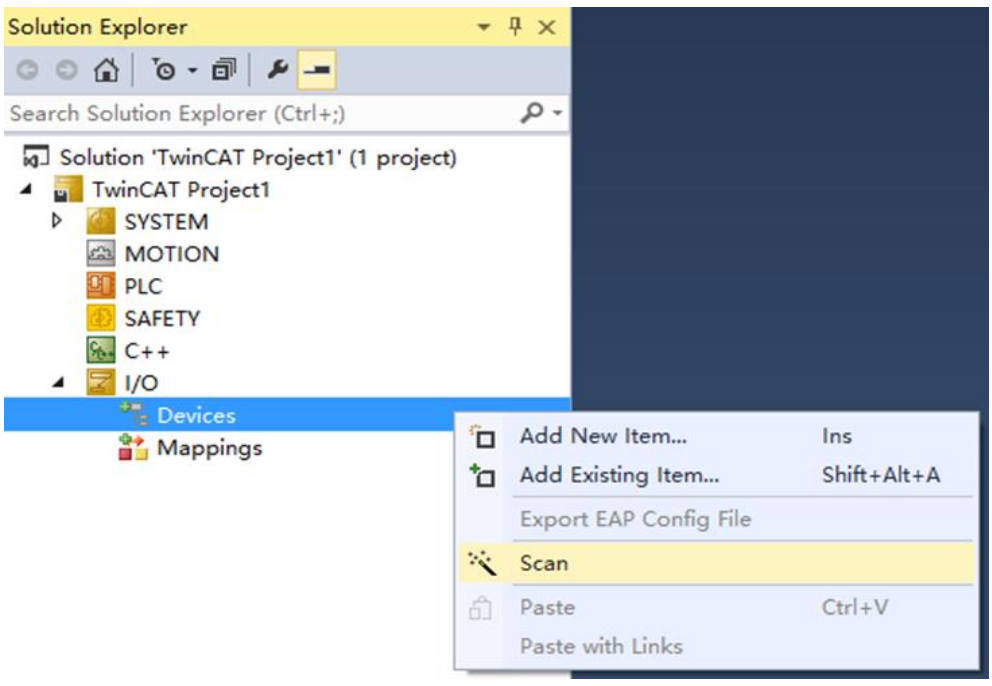
a. Click the TwinCAT icon in the lower right corner of the desktop and select "TwinCAT XAE (VS xxxx)" to open the TwinCAT software, as shown in the figure below.

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.

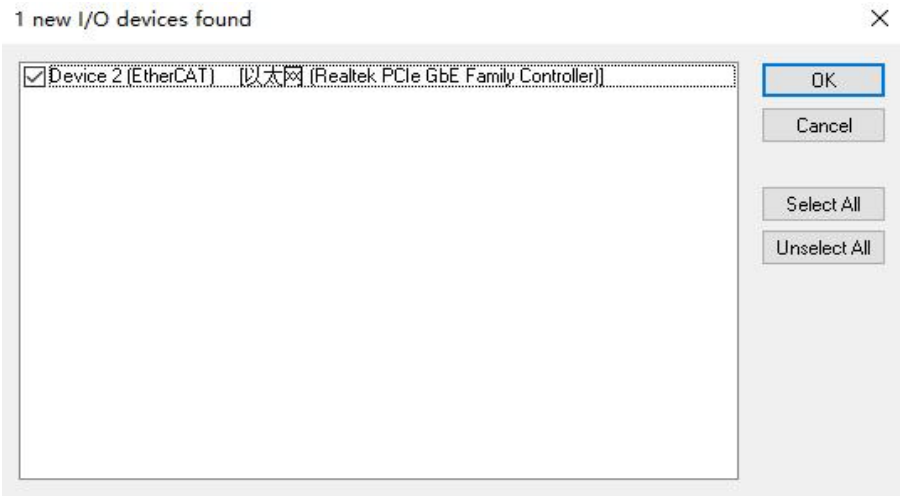


4、Scan Devices

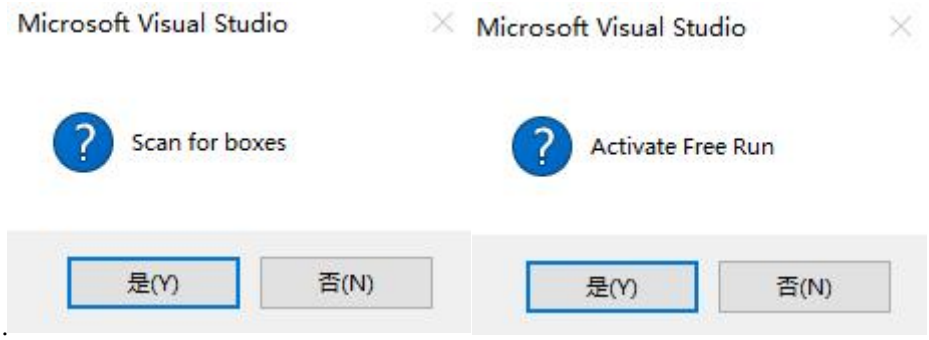
a. After creating the project, right-click the "Scan" option under "I/O -> Devices" to scan the slave devices, as shown in the figure below.



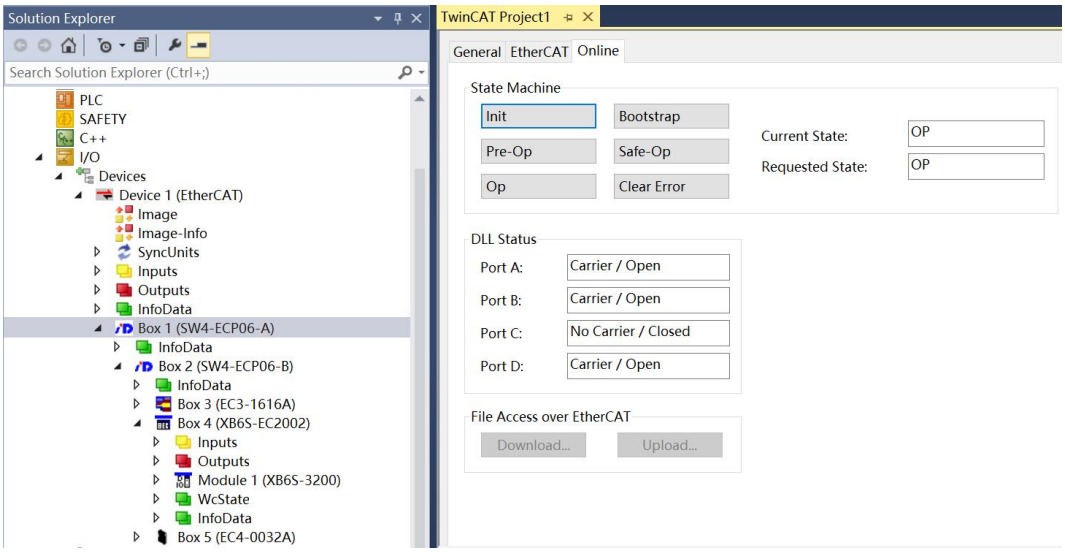
b. Check the "Local Area Connection" network card, as shown below.



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 figures.



d. After scanning the devices, Box1 is the junction SW4-ECP06, Box3 is EC3-1616A, Box4 is XB6S-EC2002, and Box5 is EC4-0032A, which is consistent with the connection configuration of the junction. In the "Online" of Box1, you can see that the junction is in the "OP" state, and the network port indicator of the junction can be observed to flash, as shown in the figure below.



e. After the configuration device scan is completed, you can operate related modules according to actual application needs.

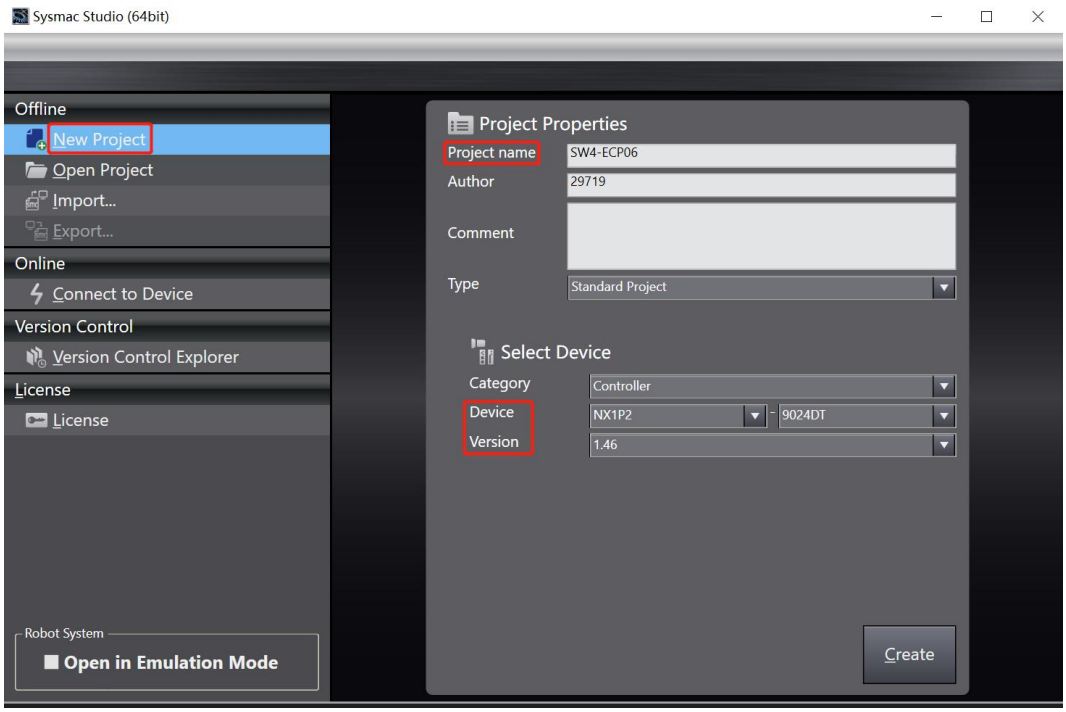
7.1.2 Application in Sysmac Studio software environment

1、 Preparation

- **Hardware Environment**
  - **For example, the junction SW4-ECP06 uses OUT2 connected to EC3-1616A, OUT3 connected to XB6S-EC2002, and OUT4 connected to EC4-0032A**
  - **A computer with Sysmac Studio software pre-installed**
  - **One Omron PLC**
    This description takes the model NX1P2-9024DT as an example
  - **EtherCAT dedicated shielded cable**
  - **Switching power supply**
  - **Device Profile**
    Configuration file acquisition address:https://www.solidotech.com/documents/configfile
- **Hardware configuration and wiring**
  Please follow the5 Installation and removal"and"6 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.

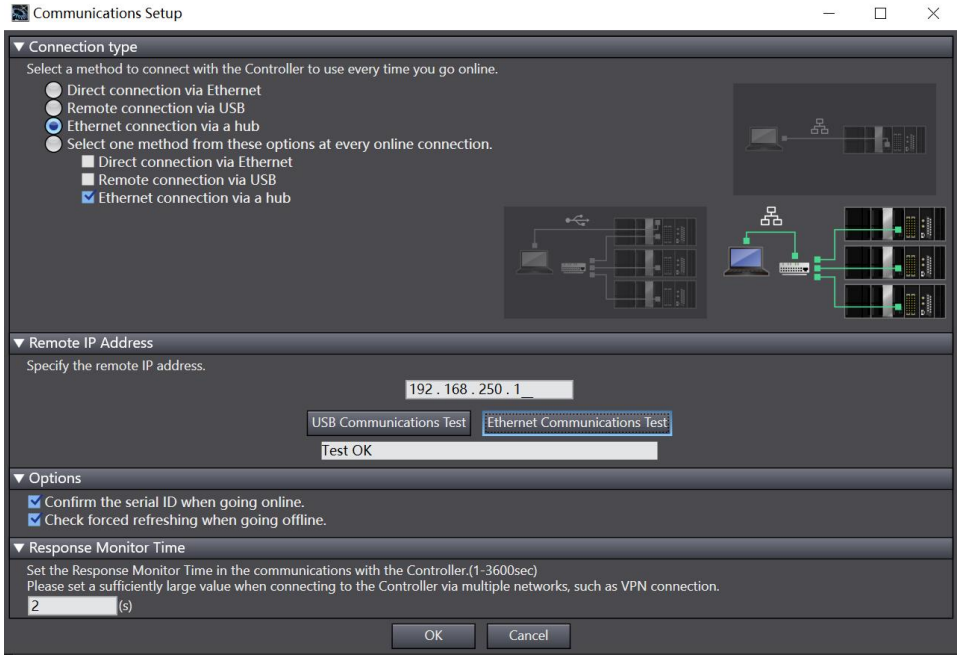


- Project name: Custom.

- Select device: Select the corresponding PLC model in "Device" and V1.40 or above is recommended for "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.

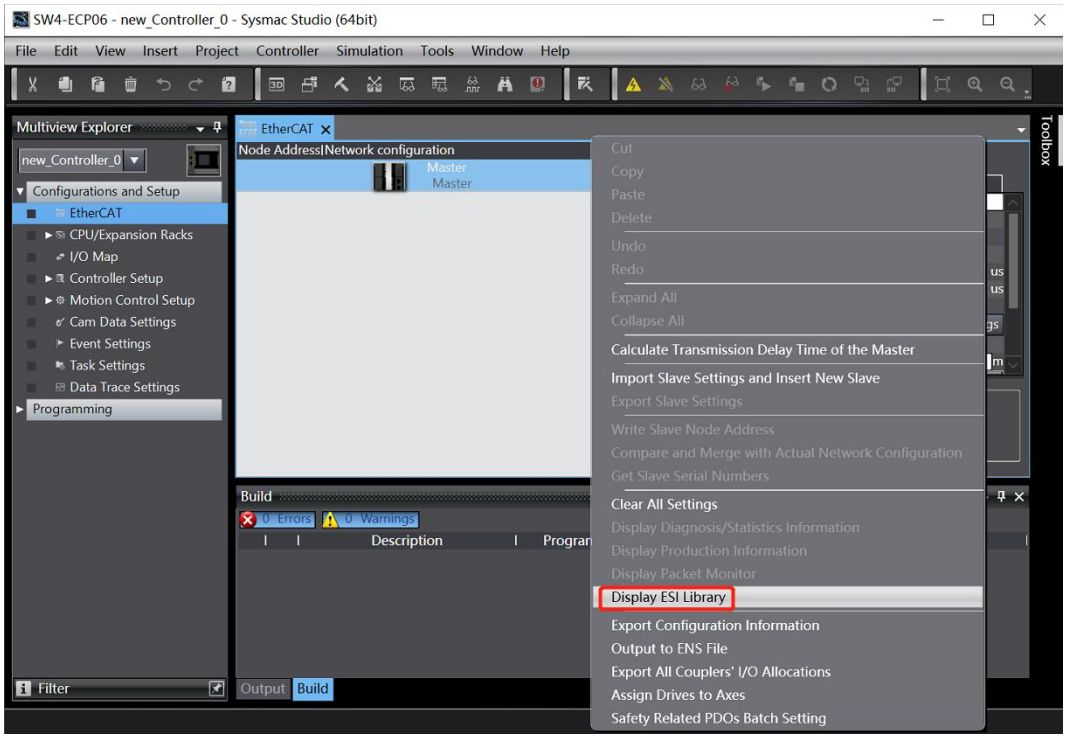


d. Click Ethernet Communication Test. The system displays that the test is successful.

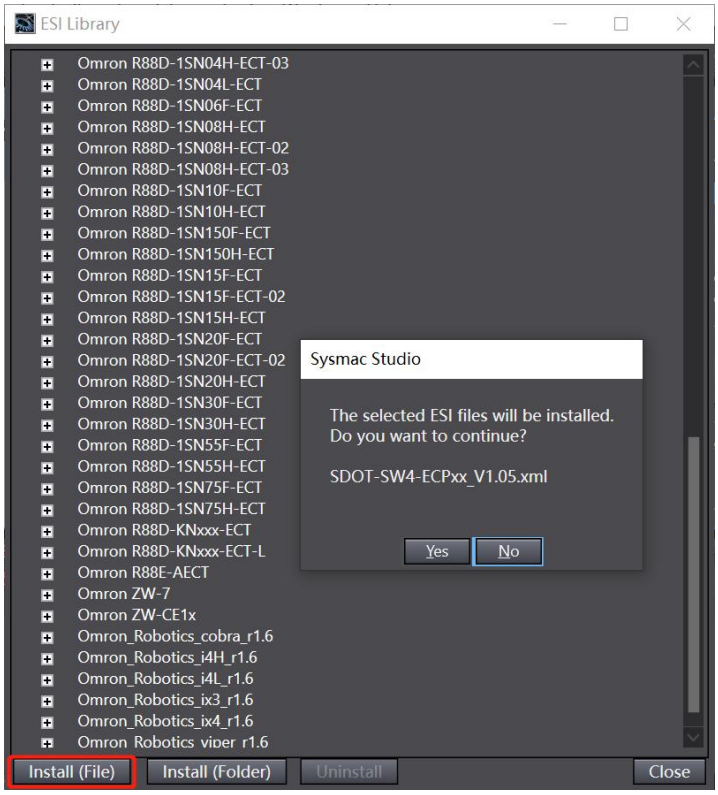
3、Installation XML File

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

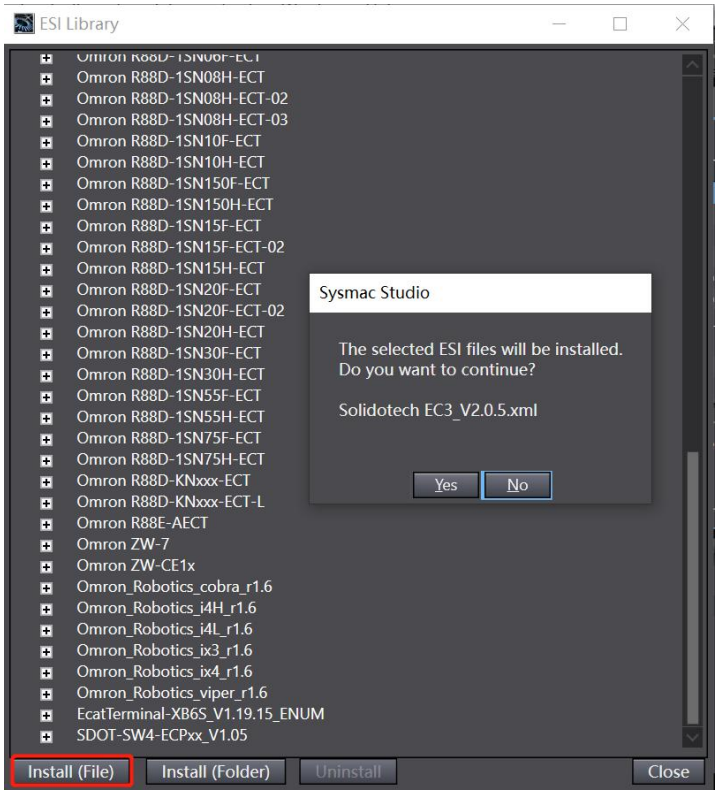
b. Right-click "Master" and select "Display ESI Library", as shown in the following figure.



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



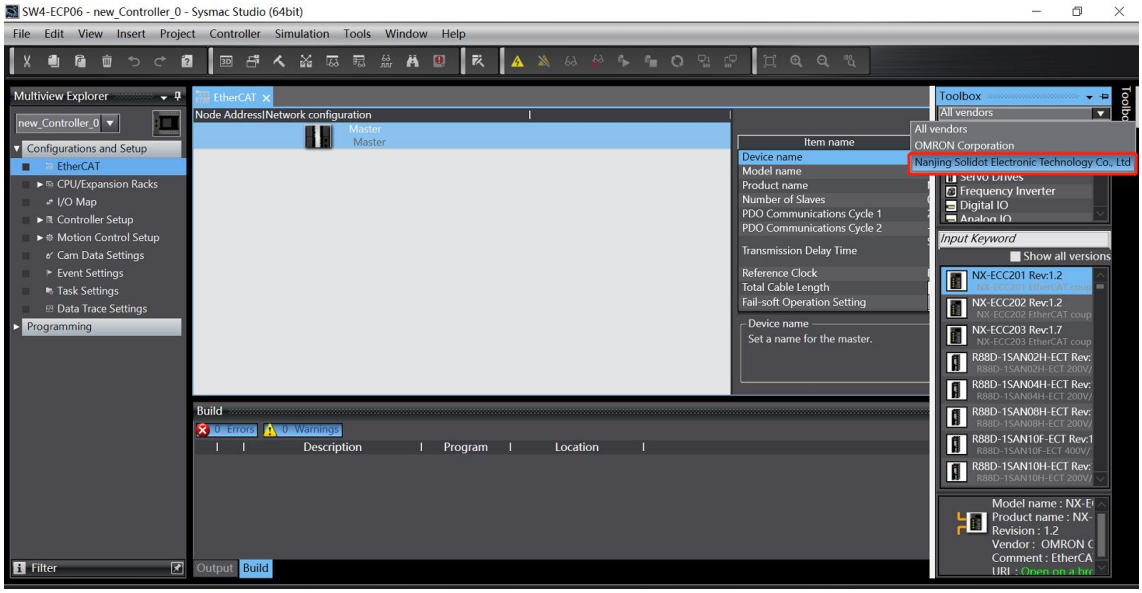
d. Click the "Install (File)" button again, select the XML file paths of other modules in the topology configuration and install them one by one. In this example, select the EC3 configuration file path and click the "Yes" button to complete the installation, as shown in the following figure.



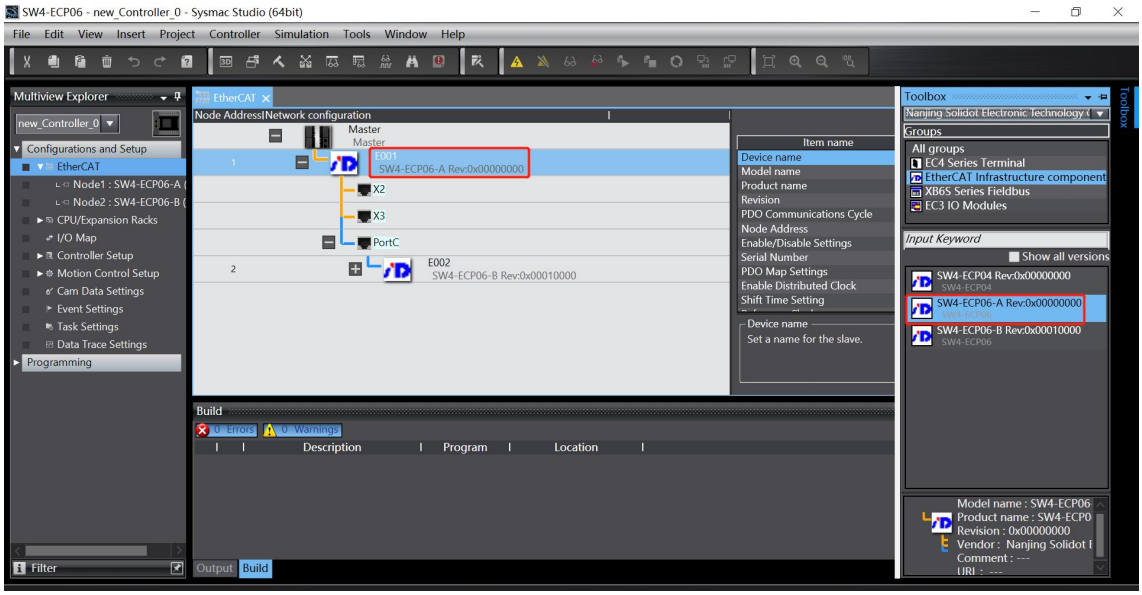
4、Adding devices and setting node addresses

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

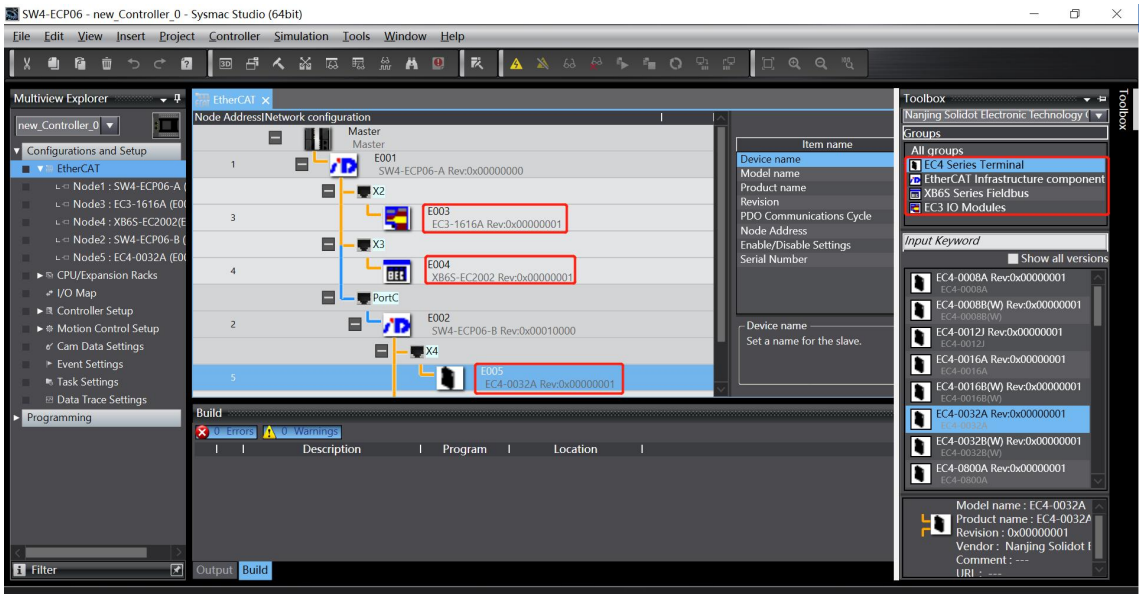
a. Under the "Toolbox" column on the right, click to expand all suppliers and select "Nanjing Solidot Electronic Technology Co., Ltd.", as shown in the figure below.



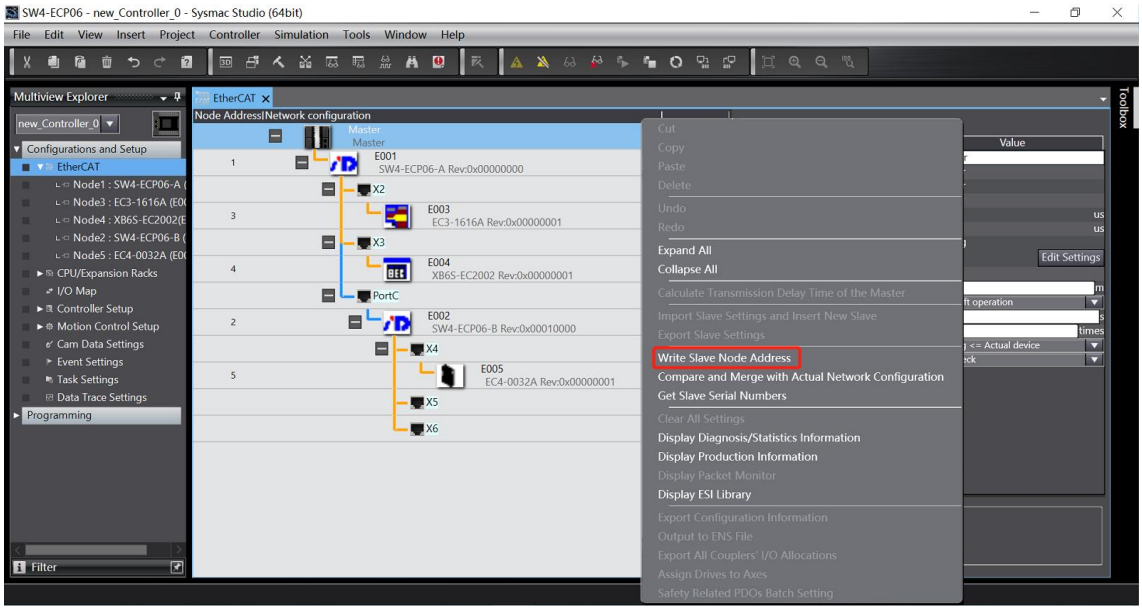
b. Click to select EtherCAT Infrastructure component, double-click the SW4-ECP06 module, and add a slave device, as shown in the following figure.



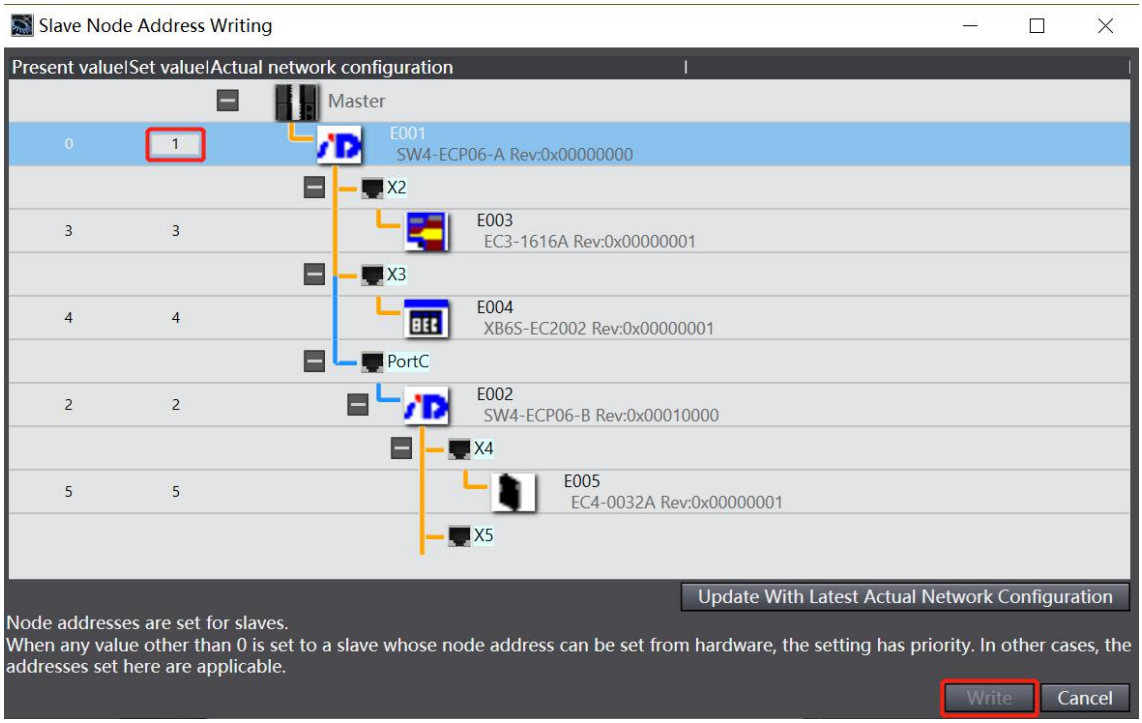
c. Add other modules according to the actual connection topology, as shown in the following figure.



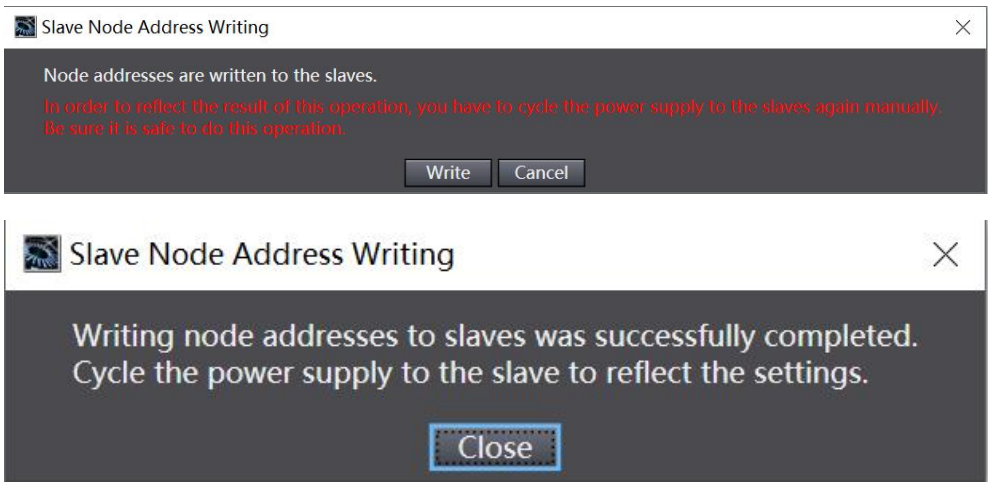
d. Click "Controller->Online" in the menu bar to switch the controller to online status. Right-click the master device and click "Write Slave Node Address", as shown in the figure below.



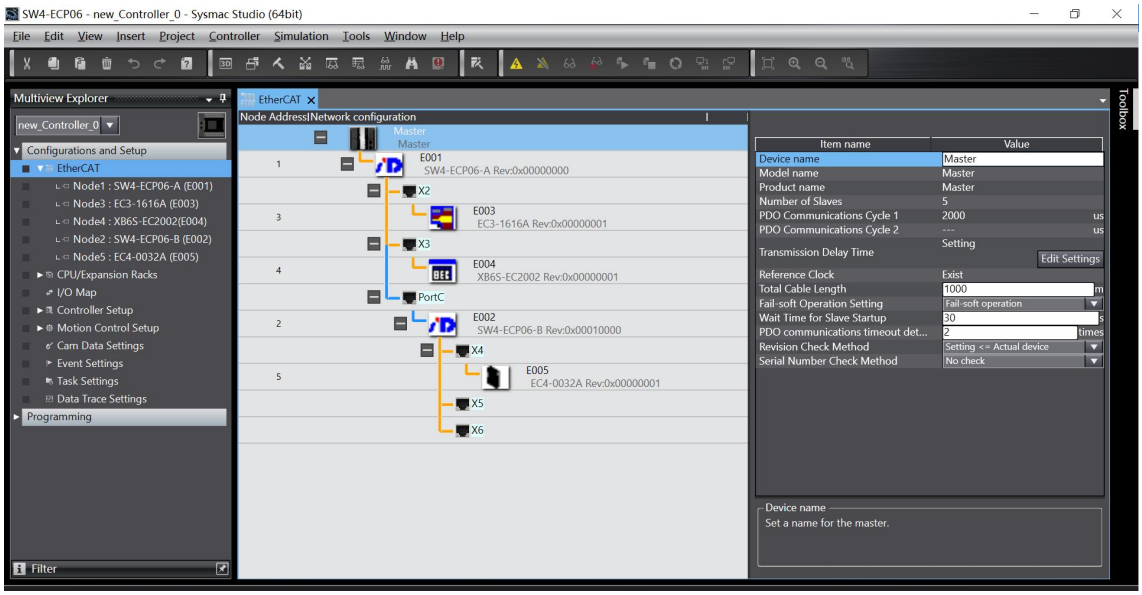
e. In the window for setting the node address, click the value under Setting Value, enter the node address, and click Write to change the node address of the slave device, as shown in the following figure.



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

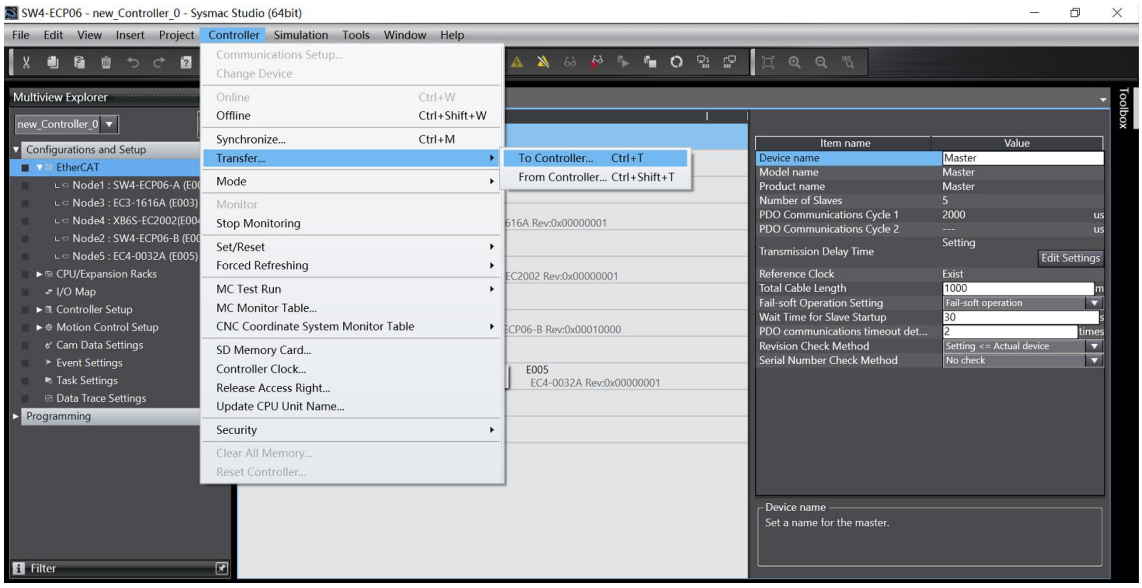


g. After the topology application is completed, close the dialog box and the topology configuration is displayed in the network settings screen, as shown in the figure below.

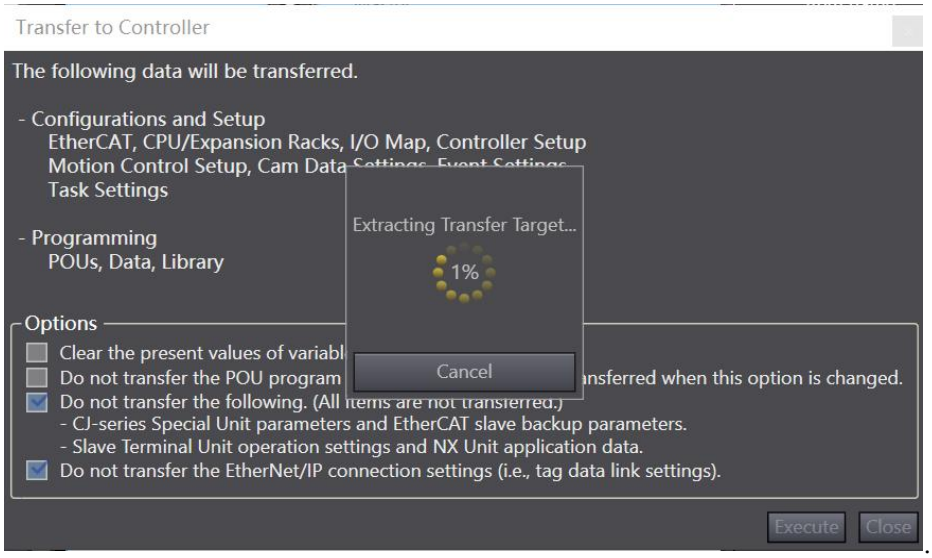


5、Download the configuration to the PLC

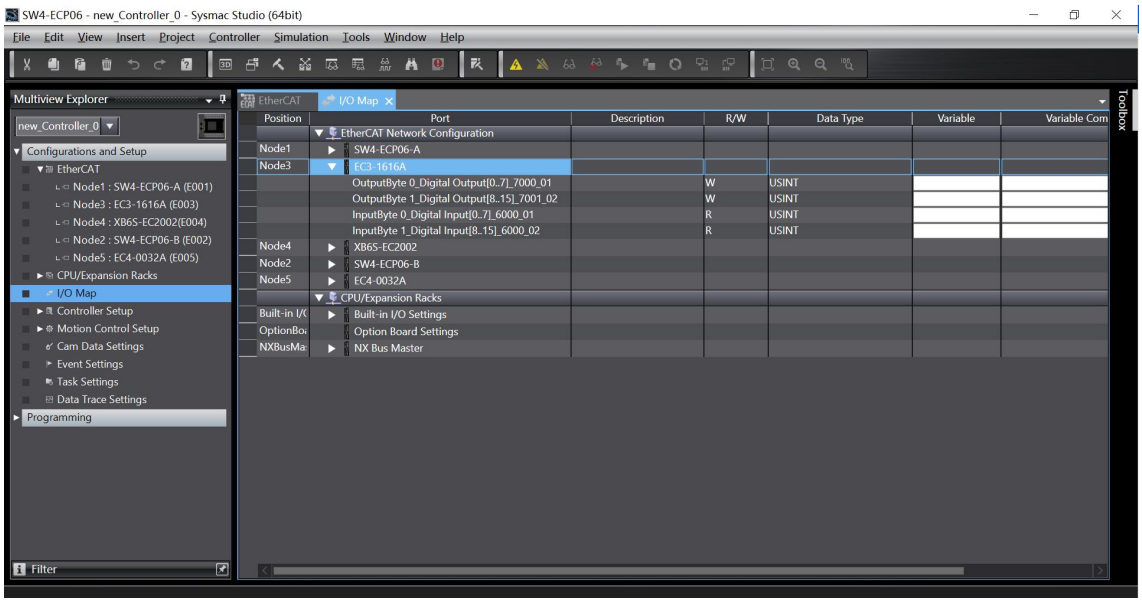
a. Click the menu bar "Controller -> Teleport (A) -> Teleport to Controller (T)" button, as shown in the figure below



b. Download the configuration to the PLC, as shown in the figure below. After the download is complete, you need to power on again.



c. Afterwards, you can operate related modules according to actual application needs, such as monitoring input and output signals and forcing output. Double-click "I/O Mapping" in the left navigation tree to perform specific operations, as shown in the figure below.



8 FAQ

8.1 The device cannot be found in the software

1. Check whether the ESI configuration file is installed correctly.
2. Check whether the ESI configuration file version is correct.
3. Whether to restart TwinCAT software after installing the ESI configuration file.

8.2 The device cannot enter OP state

1. Confirm whether the project is created correctly.
2. Confirm the node number related settings.
3. Check whether the device power supply is normal.
4. Is the EtherCAT communication line normal?
5. After changing the slave device node address, power on and off the device again.