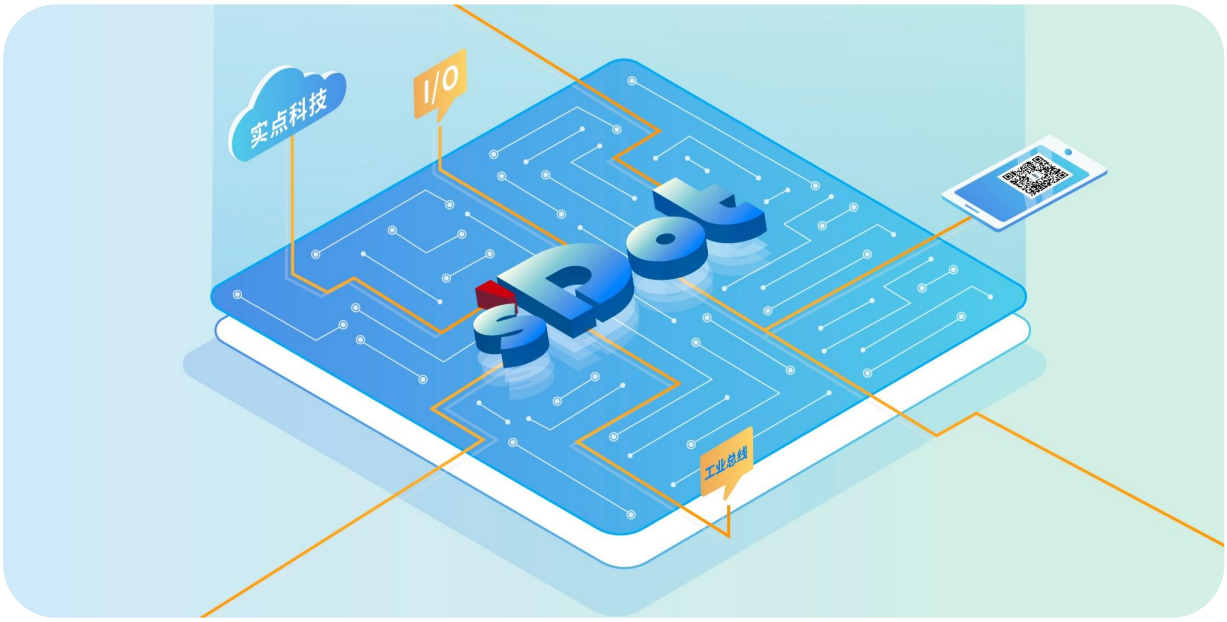

EtherCAT

EC4 Series Integrated I/O

User Manual

Nanjing Solidot Electronic Technology Co., Ltd.

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Table of Contents

1 Product Overview

1.1 Product profile

EC4 series integrated I/O modules equipped with EtherCAT industrial Ethernet bus feature small footprint, high real-time performance, and a rich variety of module types. They provide users with a range of options for achieving high-speed data collection, optimal system configuration, simple on-site wiring, and improved system reliability.

1.2 Product features

- Small footprint

  Compact structure and small footprint, only measuring 102 mm × 72 mm × 25 mm

- High speed

  Based on high-performance EtherCAT ASIC communication chips and parallel interface, and fast in speed

- Rich functional expansion options

  A full range of I/O types are available to support flexible expansion. A rich variety of digital, analog, temperature, pulse, and other modules can be integrated to meet demand of different application scenarios.

- Easy diagnosis

  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 configuration

  The modules are easy to configure, and support all mainstream EtherCAT master stations.

- Easy installation

  Installation on standard DIN 35 mm rails

  Elastic terminal blocks are used for convenient and fast wiring.

2 Designation Rules

2.1 Designation rules

EC 4 - A 8 0 V

(1) (2) (3) (4) (5) (6)

No.	Type	Description				
(1)	Bus protocol	EC: EtherCAT protocol abbreviation				
(2)	Product line	4: Integrated I / O				
(3)	I/O kind	D: Digital A: Analog				
(4)	Number of input points	Analog: 0,4,8 digital : 0,8,16,24,32				
(5)	Number of output points	Analog: 0,4,8 digital : 0,8,16,24,32				
(6)	Input output features	**Digital**			**Analog**	
		Code	input	output	Code	
		A	NPN, 3ms	NPN, 0.5A	I	4~20 mA, 0~20 mA
		B	PNP, 3ms	PNP, 0.5A	V	-10~+10 V, 0~+10 V
		BW	PNP、3ms	PNP, 0.25A		
		J	-	relay		
			NPN/PNP compatible, 3ms			
		P	NPN/PNP compatible, 3ms	PNP		

2.2 Model list

Model	Product description	
EC4-3200A	32-channel digital input module, NPN type	
EC4-3200B	32-channel digital input module, PNP type	
EC4-0032A	32-channel digital output module, NPN type	
EC4-0032B	32-channel digital output module, PNP type	
EC4-1616A	16-channel digital input-output module, NPN type	
EC4-1616B	16-channel digital input and output module, PNP type	
EC4-1600A	16-channel digital input module, NPN type	
EC4-1600B	16-channel digital input module, PNP type	
EC4-0016A	16-channel digital output module, NPN type	
EC4-0016B	16-channel digital output module, PNP type	
EC4-0032BW	32-channel digital output module, PNP type(Single channel rated current Max: 250mA)	
EC4-0016BW	16-channel digital output module, PNP type(Single channel rated current Max: 250mA)	
EC4-1616BW	16-channel digital input and output module, PNP type(Single channel rated current Max：250mA)	
EC4-0808A	8-channel digital input and output module, NPN type	
EC4-0808B	8-channel digital input and output module, PNP type	
EC4-2408A	24-channel digital input, 8 channel digital output module, NPN type	
EC4-2408B	24 channel digital input, 8 channel digital output module, PNP type	
EC4-0824A	8-channel digital input, 24 channel digital output module, NPN type	
EC4-0824B	8-channel digital input, 24-channel digital output module, PNP type	
EC4-0012J	12-channel relay output module	
EC4-1612J	16-channel digital input (NPN / PNP type), 12-channel relay output module	
EC4-1616P	16-channel digital input and output module, input compatible with NPN/PNP, output PNP type	
EC4-A80V	8-channel analog voltage input module	Optional ranges: -10~+10 V, 0~+10 V
EC4-A40V	4-channel analog volume voltage input module	
EC4-A08V	8-channel analog voltage output module	
EC4-A04V	4-channel analog volume voltage output module	
EC4-A80I	8-channel analog current input module	Optional ranges: 4~20 mA, 0~20 mA
EC4-A40I	4-channel analog current input module	
EC4-A08I	8-channel analog current output module	
EC4-A04I	4-channel analog current output module	
XX 4-C10_4	Common terminal extended module	

3 Product Parameters

3.1 General parameters

Interface parameters	
Bus protocol	EtherCAT
Number of I/O stations	Depending on master station configuration
Data transmission medium	Ethernet/EtherCAT CAT5 cable
Transmission distance	≤100 m (distance between stations)
Transmission speed	100 Mbps
Fieldbus connection	2×RJ45
Technical parameters	
Configuration method	Through the main station
Power supply rating (range)	SELV Input 24 VDC （18V~36V ）
Electrical isolation	500 VAC
Weight	About 140g
Dimensions	102mm×72mm×25 mm
Working temperature	-10℃~+60℃
Storage temperature	-20℃~+75℃
Relative humidity	95%, with no condensation
Altitude	≤2000m
Pollution level	Level 2
Usage environment	Indoor use
Protection degree	IP20

3.2 Digital parameters

Digital input	
Rated voltage	SELV Input 24 VDC （18V~30V ）
Number of signal points	8, 16, 24, 32
Signal type	NPN /PNP
"0" Signal voltage (NPN)	15~30 V
"1" Signal voltage (NPN)	-3~+3 V
"0" Signal voltage (PNP)	-3~+3 V
"1" Signal voltage (PNP)	15~30 V
Input filtering	3 ms
Input current	4 mA
Isolation method	Optical coupling isolation
Isolation with stand voltage	500 V AC
Channel indicator	Green LED
Digital output	
Rated voltage	SELV Input 24 VDC （18V~30V ）
Number of signal points	8, 16, 24, 32
Signal type	NPN /PNP
Load type	Resistive load, inductive load
Single-channel rated current	NPN type Max: 500 mA PNP type Max: 500 mA
Port protection	Over voltage and over current protection
Isolation method	Optically-coupled isolation
Isolation with stand voltage	500 VAC
Channel indicator	Green LED
Relay output	
Rated voltage	SELV Input 24 VDC （18V~30V ）
Number of signal points	12
Isolation method	Optically-coupled, relay
Rated load	Relay single port: 2 A Common port: 8 A Whole module: 16 A
Connecting mode of the common terminal	4 points/1 common terminal
Channel indicator light	Green LED

3.3 Analog parameter

3.3.1 Technical parameter

Analog input	
Number of input points	4, 8
Input signal (voltage type)	-10~+10 V (-32768~32767) 0~+10 V (0~32767)
Input signal (current type)	0~20 mA (0~65535) 4~20 mA (0~65535)
Resolution	16 bits
Sampling rate	≤1 ksps
Accuracy	±0.1%
Input impedance (voltage type)	≥2 kΩ
Input impedance (current type)	100 Ω
Isolation with stand voltage	500 V AC
Channel indicator	Green LED
Analog output	
Number of output points	4, 8
Output signal (voltage-type)	-10~+10 V (-32768~32767) 0~+10 V (0~32767)
Output signal (current type)	0~20 mA (0~65535) 4~20 mA (0~65535)
Resolution	16 bits
Accuracy	±0.1%
Load impedance (voltage type)	≥2 kΩ
Load impedance (current type)	≤200 Ω
Isolation withstand voltage	500 V AC
Channel indicator	Green LED

3.3.2 Voltage I/O range selection and code value table

Voltage I/O range selection and code value range		
Range selection	0	1
Range	-10 ~+10 V	0~+10 V
Code value range	-32768~32767	0~32767
Voltage input formula	D =(65535/20)*U	D =(32767/10)*U
Voltage output formula	U =(D*20)/ 65535	U =(D *10)/32767
Code values table	Please see Table 1.	

Note: D: code value; U: voltage.

Table 1. Voltage code value table

range / **voltage**	**0 (-10~+10 V)**	**1 (0~+10 V)**
	Code value	**Code value**
-10	-32768	-
-9	-29491	-
-8	-26214	-
-7	-22938	-
-6	-19661	-
-5	-16384	-
-4	-13107	-
-3	-9830	-
-2	-6554	-
-1	-3277	-
0	0	0
1	3277	3277
2	6554	6553
3	9830	9830
4	13107	13107
5	16384	16384
6	19661	19660
7	22938	22937
8	26214	26214
9	29491	29490
10	32767	32767
	Code value = (65535 / 20) * voltage	Code value = (32767 / 10) * voltage
	Voltage = (code value * 20) / 65535	Voltage = (code value * 10) / 32767

3.3.3 Current I/O range selection and code value table

Current I/O range selection and code value range		
Range selection	0	1
Range	4~20 mA	0~20 mA
Code value range	0~65535	0~65535
Current input formula	D =(65535/16)*I-16384	D =65535/20*I
Current output formula	I =(D +16384)*16/65535	I =D*20/65535
Code values table	See Table 2 Current Value Table.	

Note: D: Code value; I: current.

Table 2. Current code value table

range / **current**	**0 (4~20 mA)**	**1 (0~20 mA)**
	Code value	**Code value**
0	-	0
1	-	3277
2	-	6554
3	-	9830
4	0	13107
5	4096	16384
6	8192	19661
7	12288	22937
8	16384	26214
9	20479	29491
10	24575	32768
11	28671	36044
12	32767	39321
13	36863	42598
14	40959	45875
15	45055	49151
16	49151	52428
17	53247	55705
18	57343	58982
19	61439	62258
20	65535	65535
	Code value =65535 / 16 * current-16384	Code value =65535 / 20 * current
	Current = (code value + 16384) * 16 / 65535	Current = code value * 20 / 65535

3.4 Common terminal expansion module parameters

Common terminal	
Rated voltage	125 VDC/250 VAC
Rated current	8 A
Number of common terminals	4 sets(10 P/set)

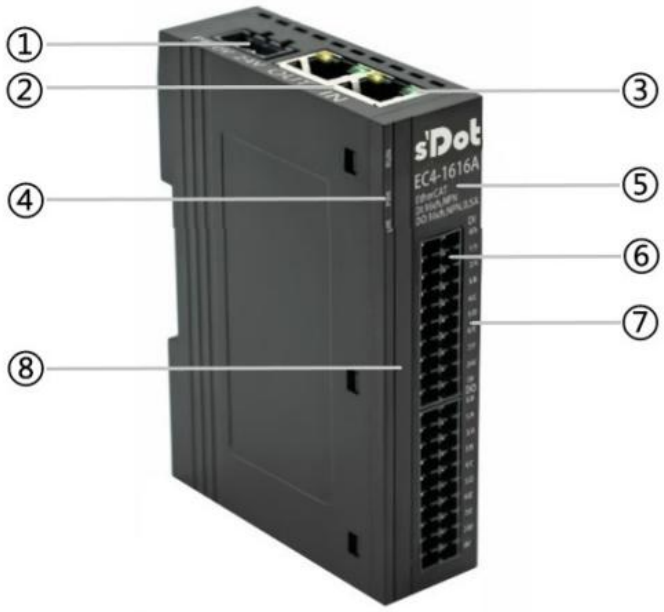
3.5 Electrical parameters

Electrical parameters	
Rated voltage	SELV Input 24 VDC（18V~36V）
Rated power	≤500mA（24 VDC）

4 Panel

4.1 Product mix

Name and function description



	Name	Description
①	Power interface	3Pin push in terminal
②	Fieldbus connection	2×RJ45
③	Network port indicator	Link and data transmission status
④	System indicator	Indicates the module status
⑤	Module identification	Mark the module model, bus type, etc
⑥	Channel interface	The 2×20Pin push in terminal
⑦	Channel ID	Corresponding channel position identification
⑧	Channel indicator	Indicates the corresponding channel signal status

4.2 Indicator light function

Name	ID	Color	Status	Description
Power	PWR	Green	ON	Normal status of working power supply
			OFF	Unpowered or abnormal power supply
Operating status indicator	RUN	Green	ON	Normal system operation
			OFF	In initialization or unpowered
			Flashing	5 Hz: Pre-OP status 2 Hz: Safe-OP status
Warning indicator	ERR	Red	ON	Special system operation occurred
			OFF	The system is running normally or is not powered up
Network port status indicator	IN	Green	ON	Network connection established
			OFF	Absent or abnormal network connection
		Yellow	Flashing	Connection established with data interaction
			OFF	No data interaction or abnormal status
	OUT	Green	ON	Network connection established
			OFF	Absent or abnormal network connection
		Yellow	Flashing	Connection established with data interaction
			OFF	No data interaction or abnormal status
Input channel status indicator	0 ~ F	Green	ON	Presence of signal input in module channel
			OFF	Absence of signal input in module channel or abnormal signal input
Output channel status indicator	0 ~ F	Green	ON	Presence of signal output in module channel
			OFF	Absence of signal output in module channel or abnormal signal output

5 Installation and Disassembly

Installation\disassembly precautions

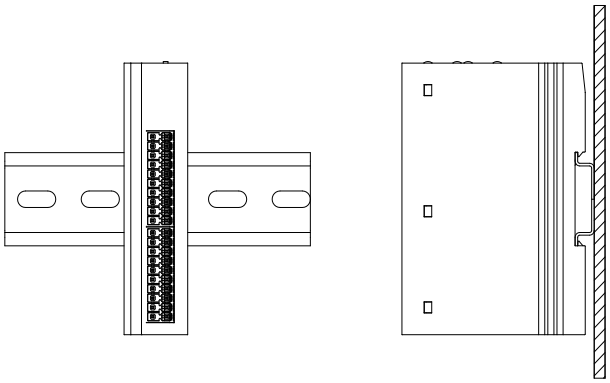
- Ensure that the cabinet is well ventilated (e.g., equipped with a fan).
- Do not install this equipment near or above any equipment that may cause overheating.
- Make sure to install modules vertically and maintain adequate clearance between the modules and nearby devices.
- Installation/disassembly operation may only be carried out after the power supply is cut off.

⚠ Warning

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

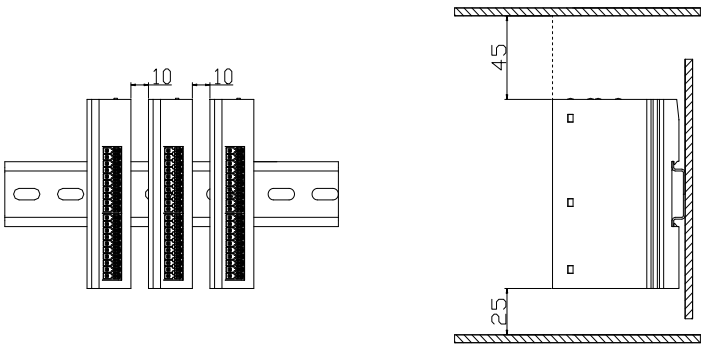
Installation direction

In order to maintain normal heat dissipation of the modules, make sure to install them vertically to ensure smooth airflow inside them.



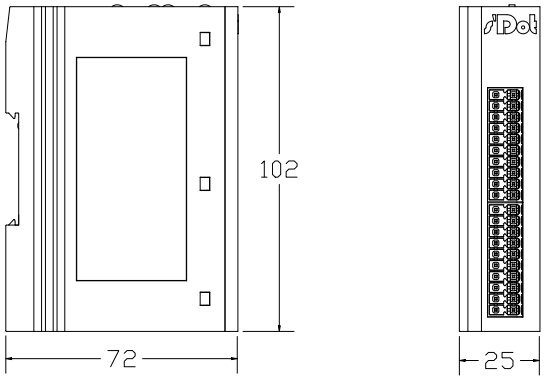
Minimum clearance

The protection degree of the modules is IP20, and they need to be installed inside boxes or cabinets. During installation, please follow the minimum distances (unit: mm) shown in the following figures between modules and those between modules and heating devices, other devices, or wiring slots.



5.1 Dimensions

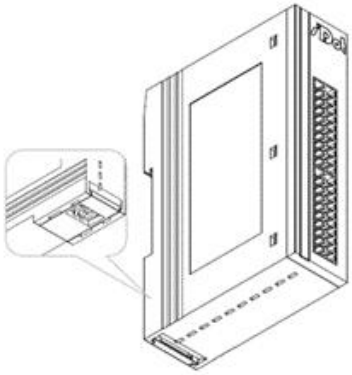
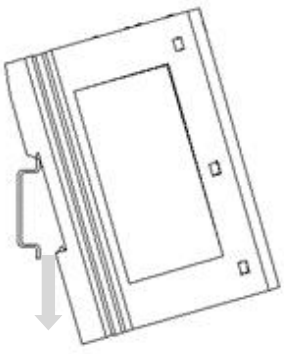
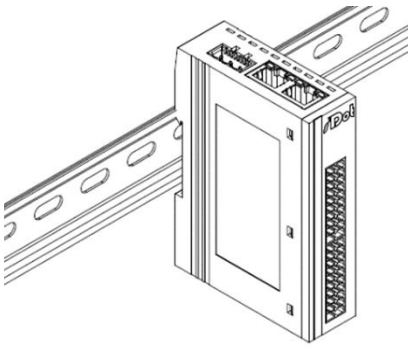
Dimension specification (in mm)



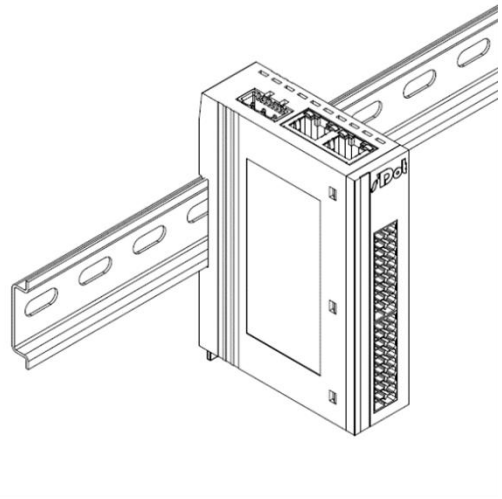
Install:

1. Up and down alignment;
2. DIN 35 mm Guide rail, buckle type installation.

5.2 Installation and disassembly

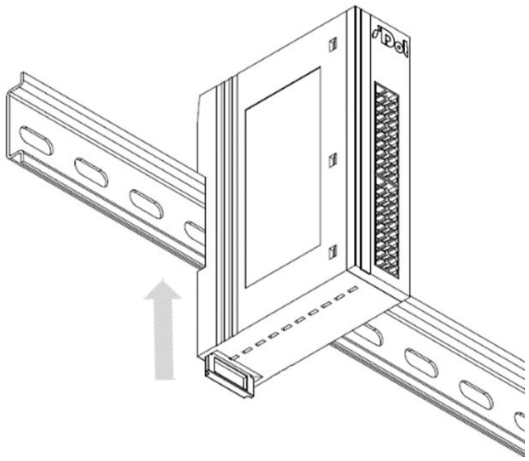
Installation	Step
 ①  ②	Push the buckle at the bottom of the module outward, push the buckle to Figure ① ②, and hear the "click" sound.
 	The upper edge of the module buckle is aligned with the upper edge of the guide rail and put the module into the guide rail as shown in Figure ③ and ④.

③ ④



The module placement is shown in Figure ⑤.

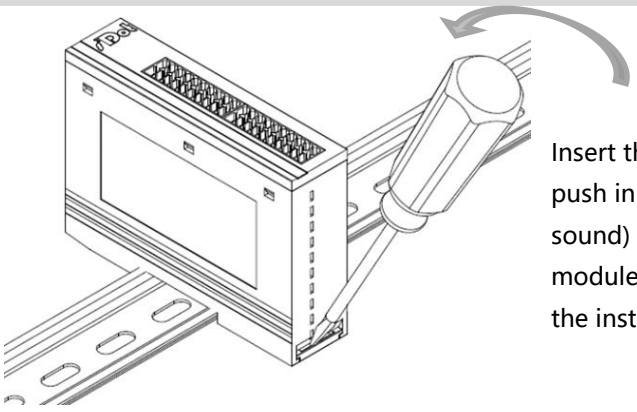
⑤



Push the buckle to the direction of the guide rail, hear the sound, and complete the module installation, as shown in Figure ⑥.

⑥

Disassembly	Step



Insert the word flat head into the buckle and push in the direction of the module (hear the sound) as shown in Figure ⑦. Disassemble the module according to the opposite operation of the installation module.

⑦

6 Wiring

6.1 Wiring terminal

⚠ Warning

Wiring terminal		
Signal wire terminal	Rated voltage	200V
	Rated current	9.5A
	Number of poles	2×20 P
	Line diameter	22~17 AWG 0.3~1.0 mm²
Power supply terminal	Rated voltage	320V
	Rated current	20A
	Number of poles	3P
	Wire gauge	22~16 AWG 0.3~1.5 mm²
Fieldbus connection	2×RJ45	Ethernet/Ether CAT CAT5 cable

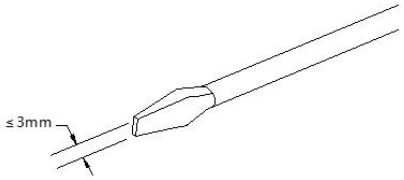
6.2 Wiring instructions and requirements

Power supply wiring precautions

- The module system side power supply and the field side power supply are configured separately. Do not mix them.
- The PE shall be reliably grounded.

Requirements for the wiring tools

The terminal adopts the screw-free design, and the installation and disassembly of the cables can be used One-type screwdriver operation (specification: ≤3mm).



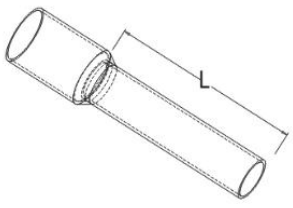
Deplication length requirements

The recommended stripping length is 10 mm.

Wiring method

Single strand hard wire, after stripping the corresponding length of the wire, the down button will insert the single strand at the same time.

Multiple flexible wire, after stripping the corresponding length, use the corresponding standard cold pressure terminal (pipe insulation terminal, reference specification is shown in the following table), and lower the pressure button to insert the wire at the same time.

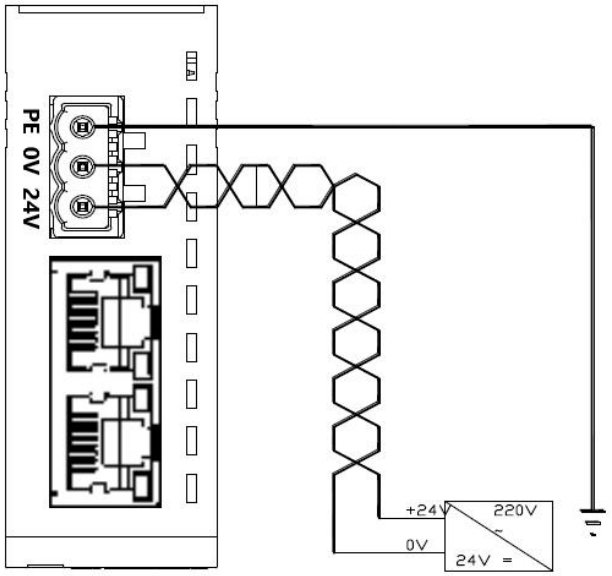
Specification table of pipe-type insulated end head		
Specification	Model	Cable section area mm²
 Length of the tube-type insulated terminal L is 10 mm	E0310	0.3
	E0510	0.5
	E7510	0.75
	E1010	1.0
	E1510	1.5

Warning

- Only copper wires can be used for wiring.

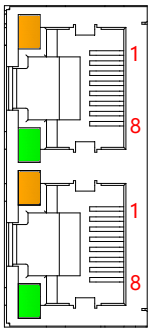
Power supply wiring

The module power supply is DC24V, and twisted pair is recommended for the power cord. The power supply wiring is shown in the following figure.



Bus wiring

Standard RJ 45 network interface and standard crystal connector, pin allocation as shown in the following figure.



The pin number	signal
1	T D+
2	T D-
3	R D+
4	one
5	one
6	R D-
7	one
8	one

☛ matters need attention

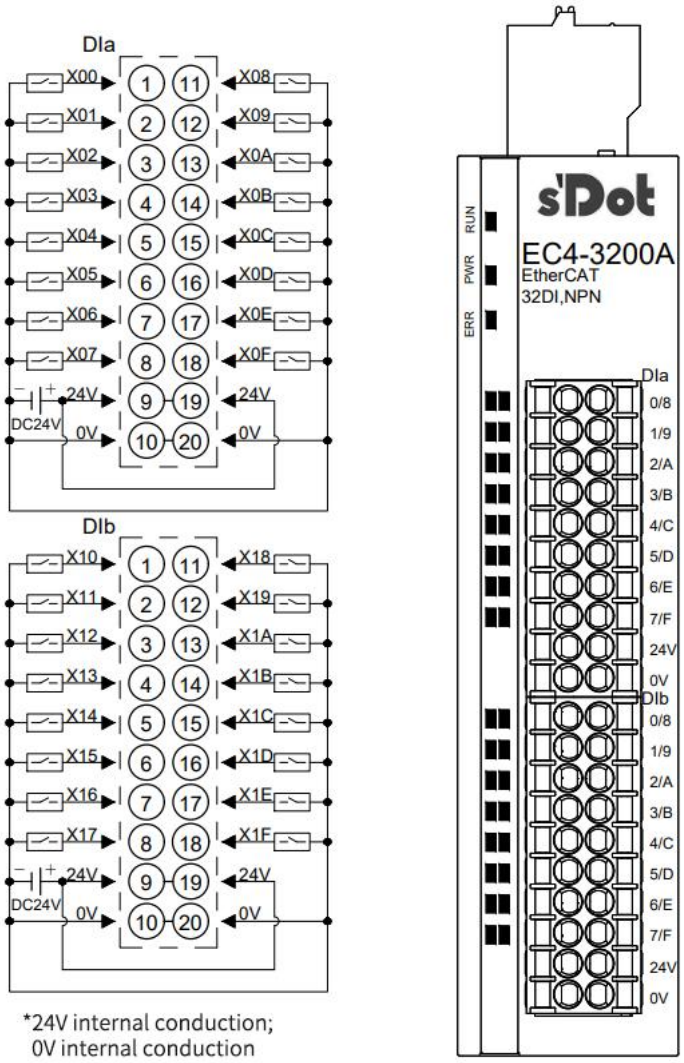
- Category 5 or higher-level double-shielded (braided wire + aluminum foil) STP cable is recommended as communication cable.
- The length of cables between devices should not exceed 100 m.

Signal and load power supply wiring

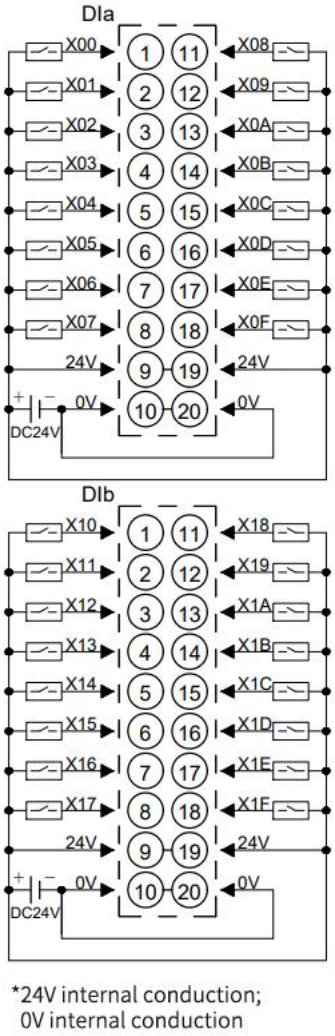
The load power supply uses DC 24V power supply. For the load power supply and signal line, refer to the wiring diagram of the corresponding I / O module and the wiring method to press the cable into the terminal (refer to6.3 I / O module wiring diagram).

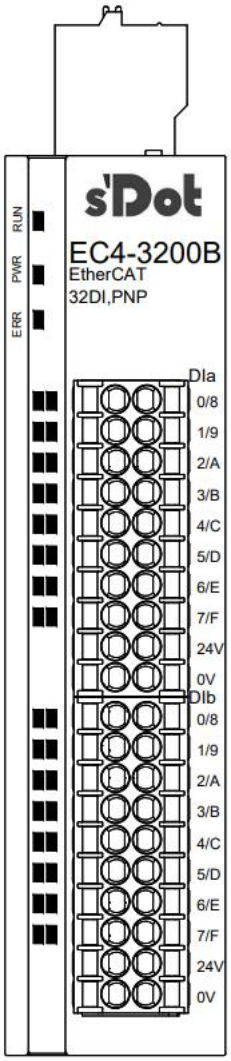
6.3 Wiring diagrams

6.3.1 EC4-3200A

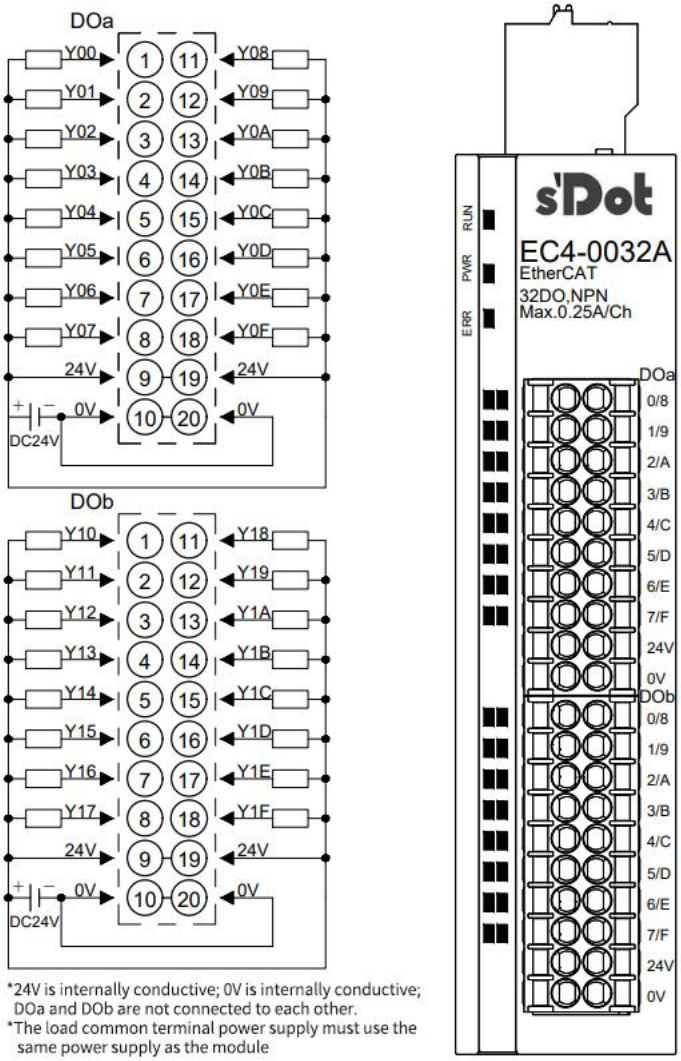


6.3.2 EC4-3200B



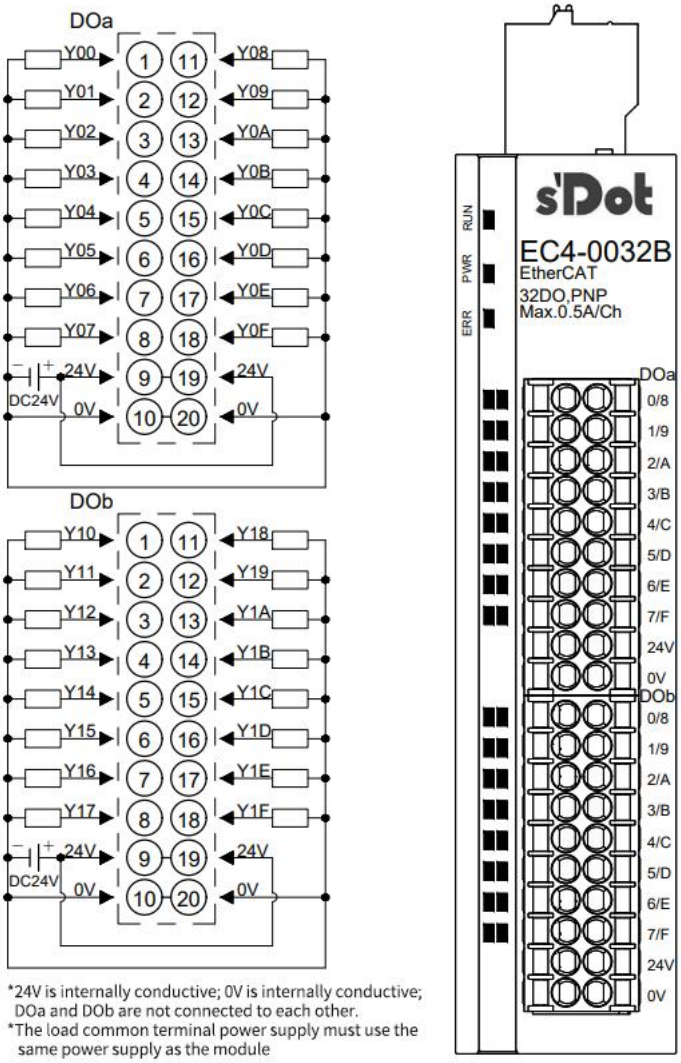


6.3.3 EC4-0032A



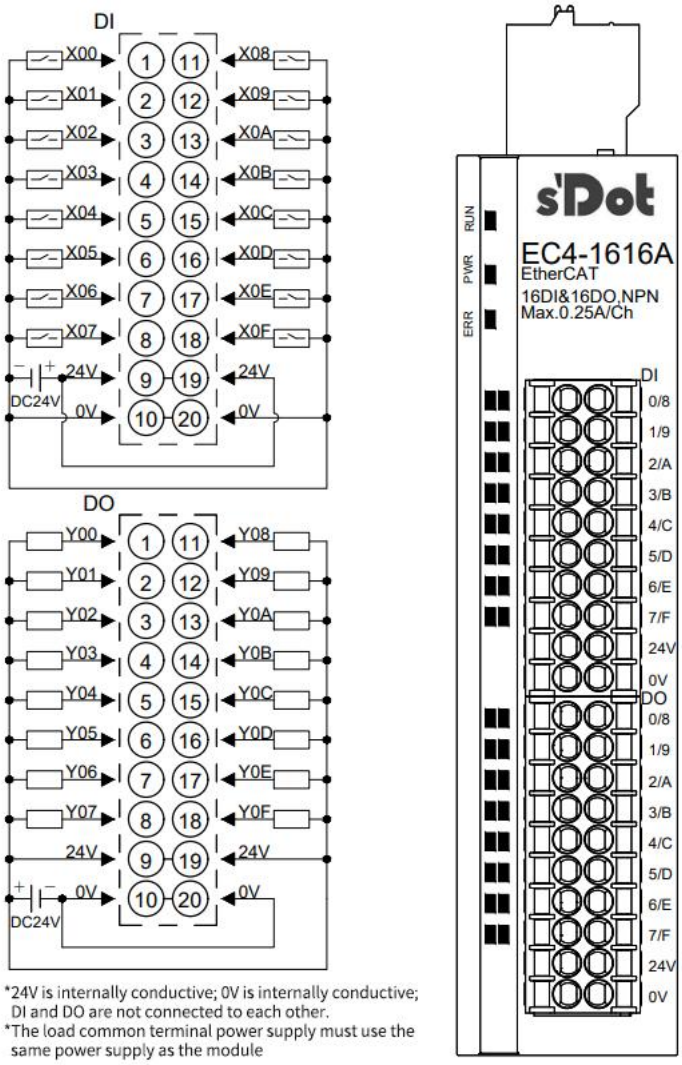
*24V is internally conductive; 0V is internally conductive; DOa and DOb are not connected to each other.
*The load common terminal power supply must use the same power supply as the module

6.3.4 EC4-0032B



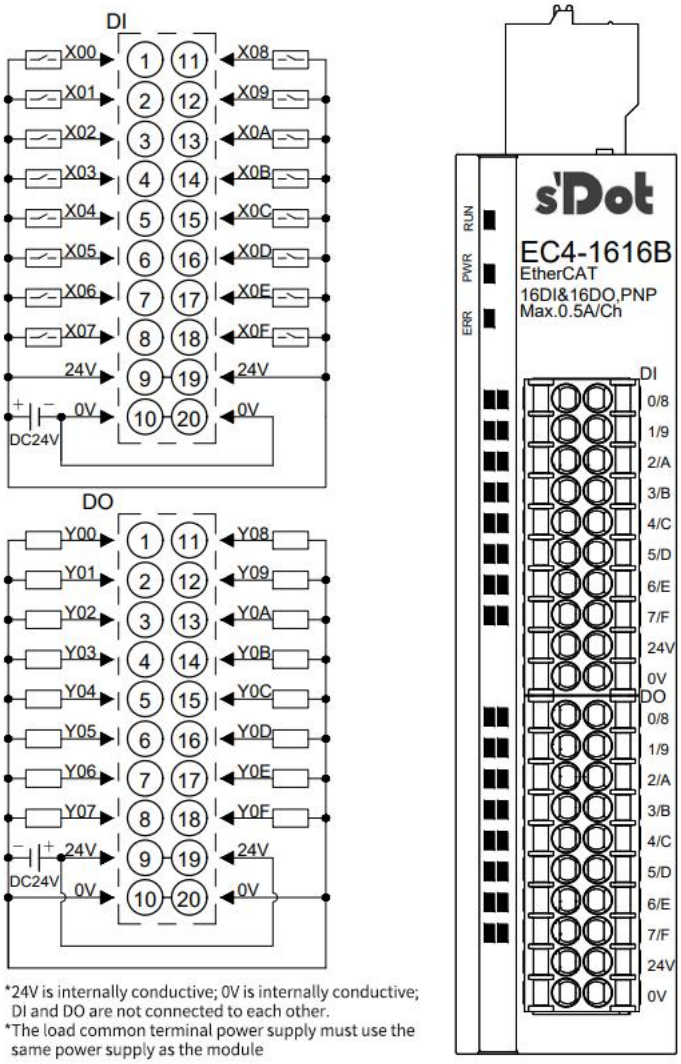
*24V is internally conductive; 0V is internally conductive; DOa and DOb are not connected to each other.
*The load common terminal power supply must use the same power supply as the module

6.3.5 EC4-1616A



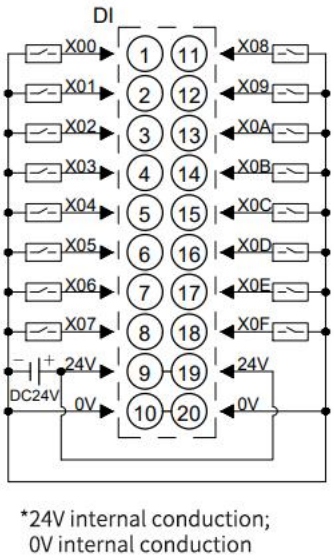
*24V is internally conductive; 0V is internally conductive; DI and DO are not connected to each other.
*The load common terminal power supply must use the same power supply as the module

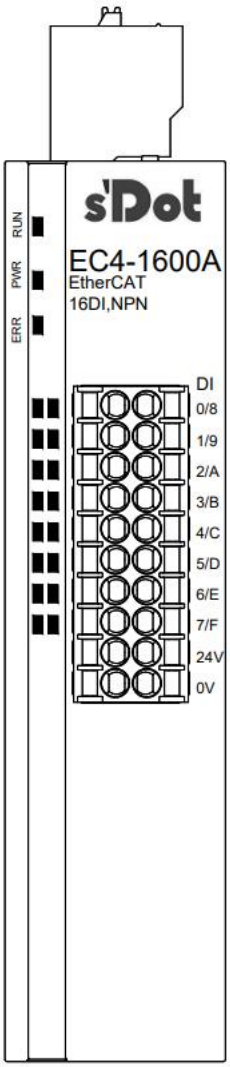
6.3.6 EC4-1616B



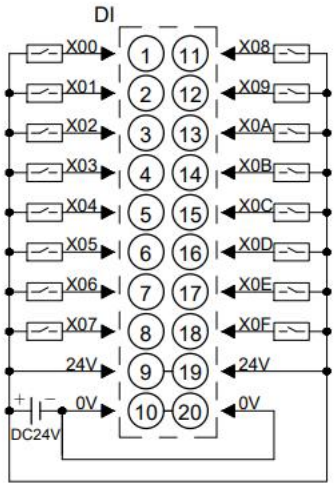
*24V is internally conductive; 0V is internally conductive; DI and DO are not connected to each other.
*The load common terminal power supply must use the same power supply as the module

6.3.7 EC4-1600A

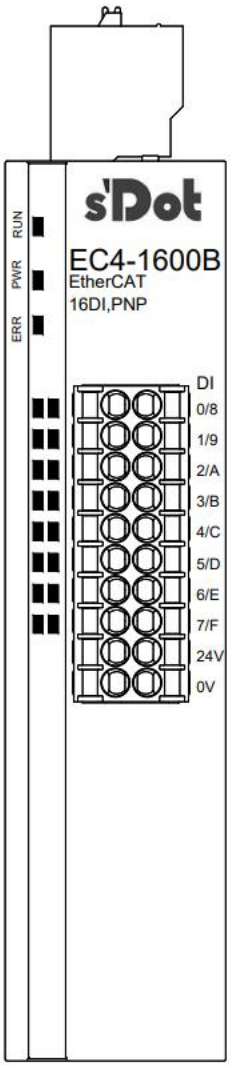




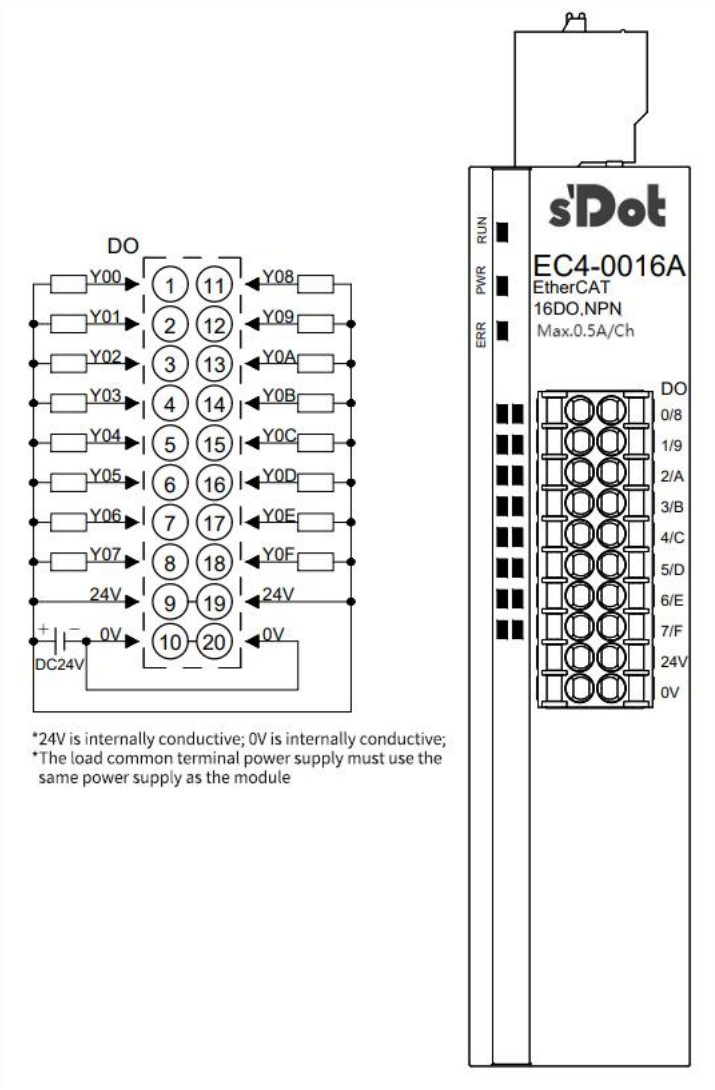
6.3.8 EC4-1600B



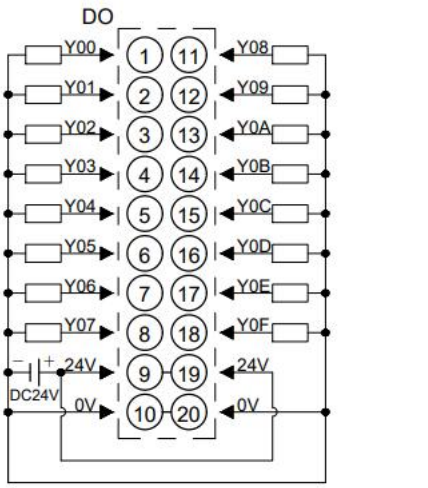
*24V internal conduction;
0V internal conduction



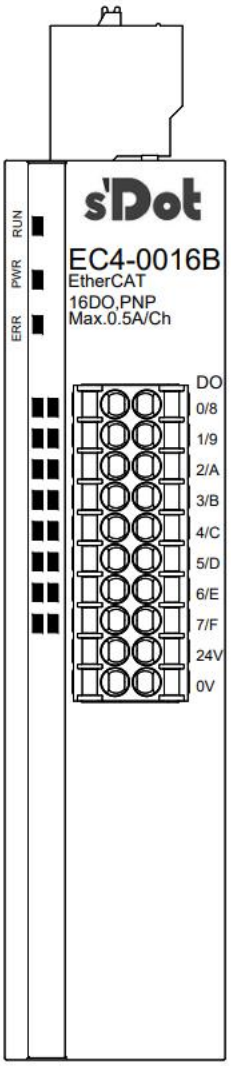
6.3.9 EC4-0016A



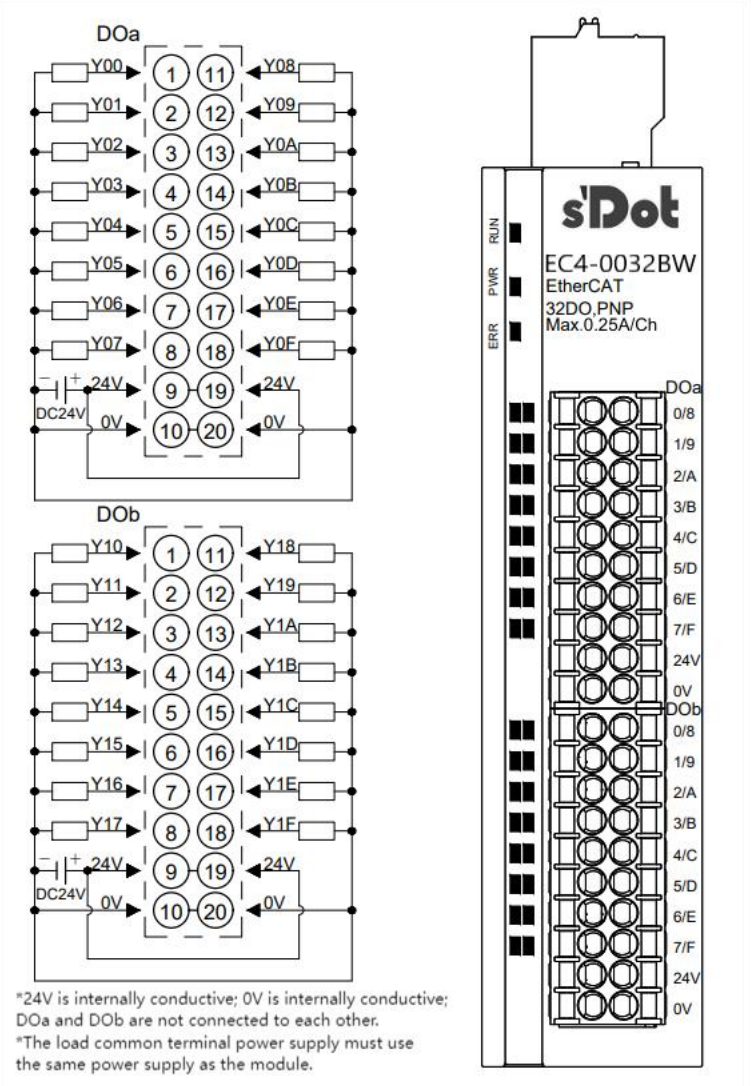
6.3.10 EC4-0016B



*24V is internally conductive; 0V is internally conductive;
*The load common terminal power supply must use the same power supply as the module

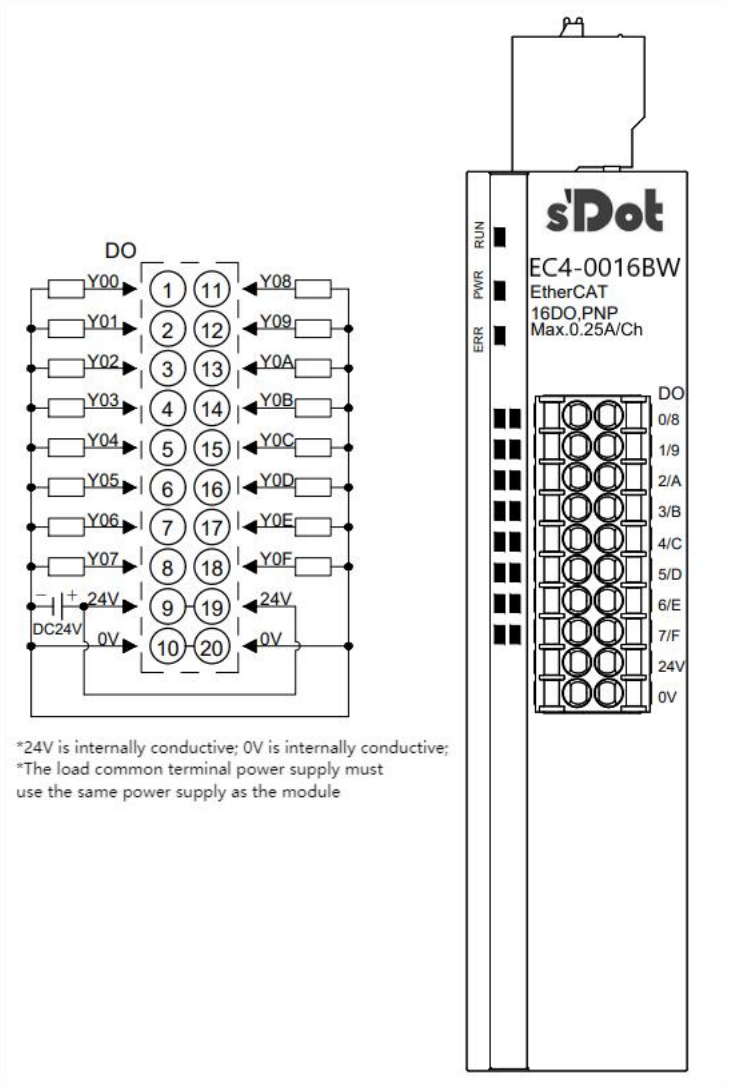


6.3.11 EC4-0032BW

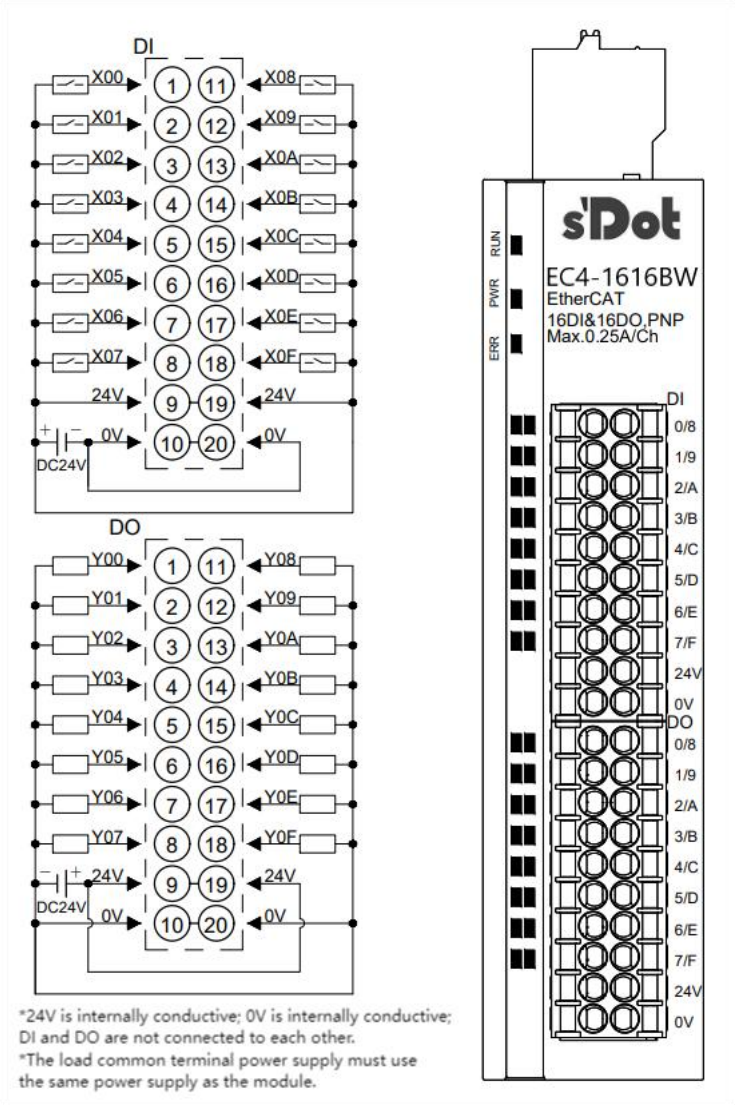


*24V is internally conductive; 0V is internally conductive; DOa and DOb are not connected to each other.
*The load common terminal power supply must use the same power supply as the module.

6.3.12 EC4-0016BW

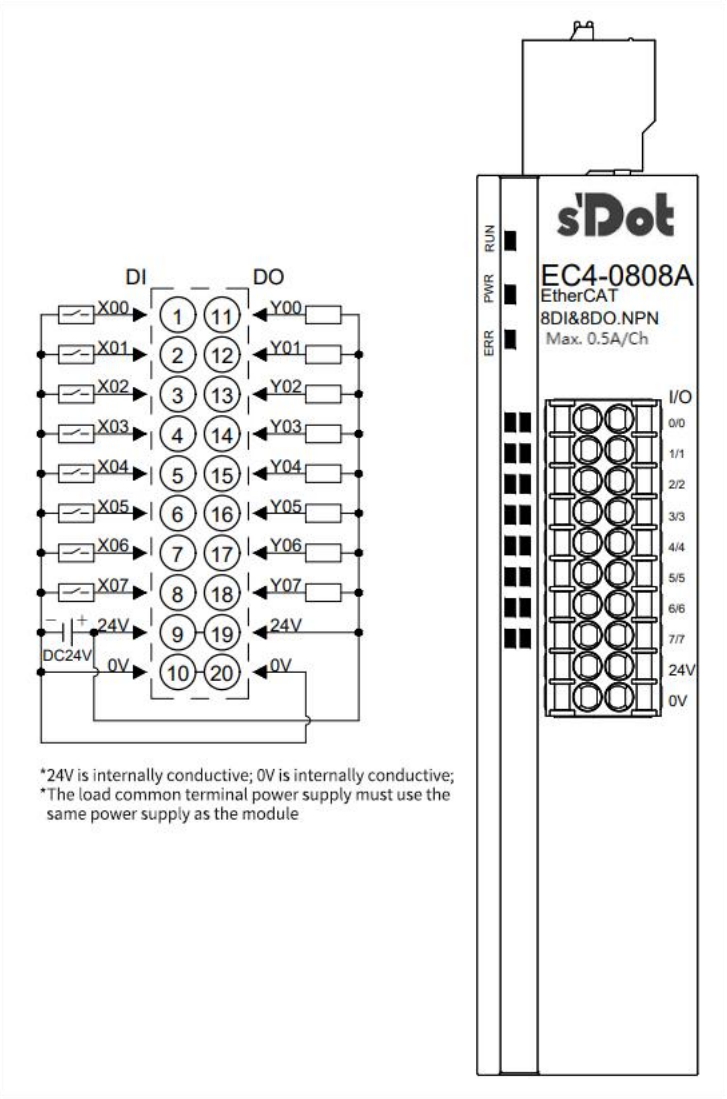


6.3.13 EC4-1616BW

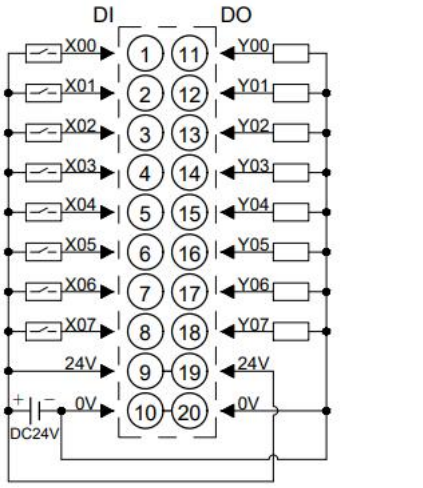


*24V is internally conductive; 0V is internally conductive; DI and DO are not connected to each other.
*The load common terminal power supply must use the same power supply as the module.

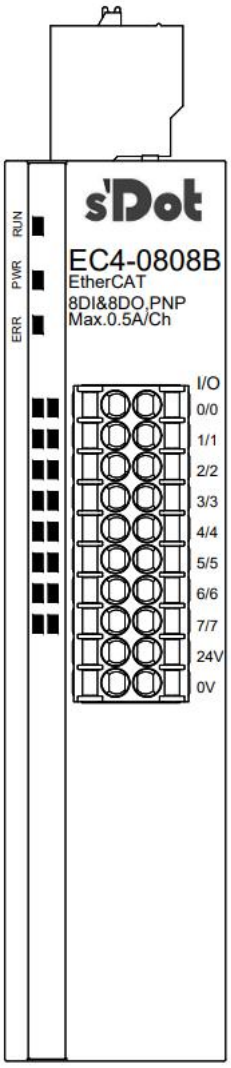
6.3.14 EC4-0808A



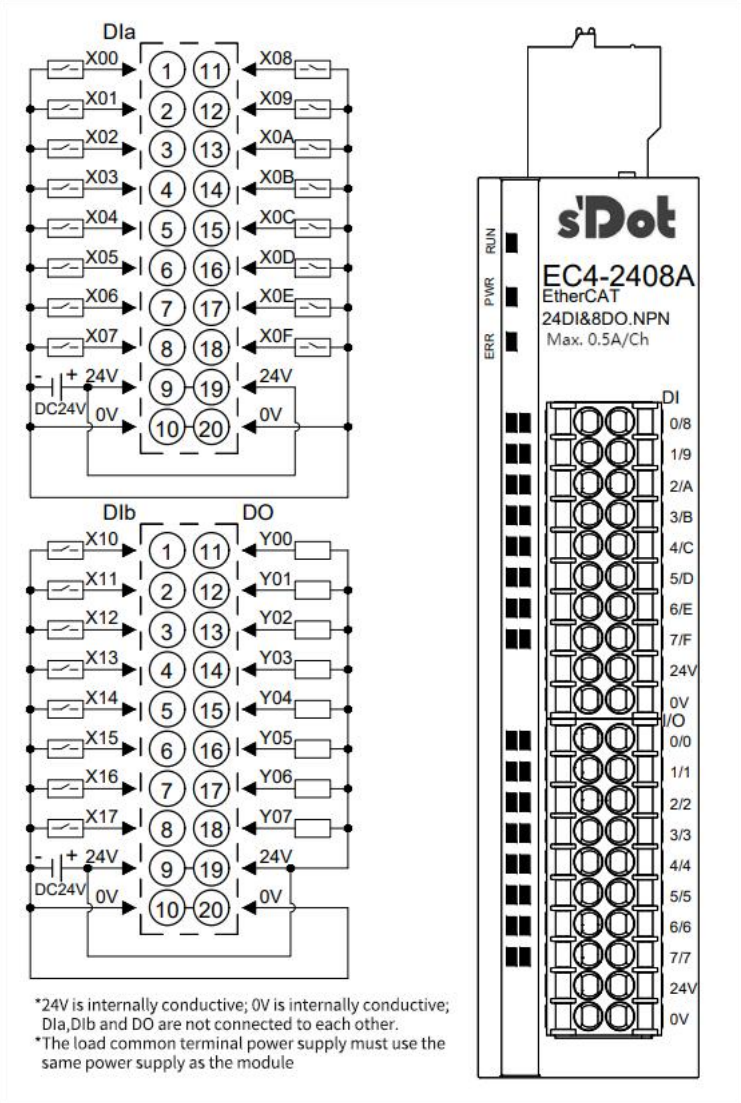
6.3.15 EC4-0808B



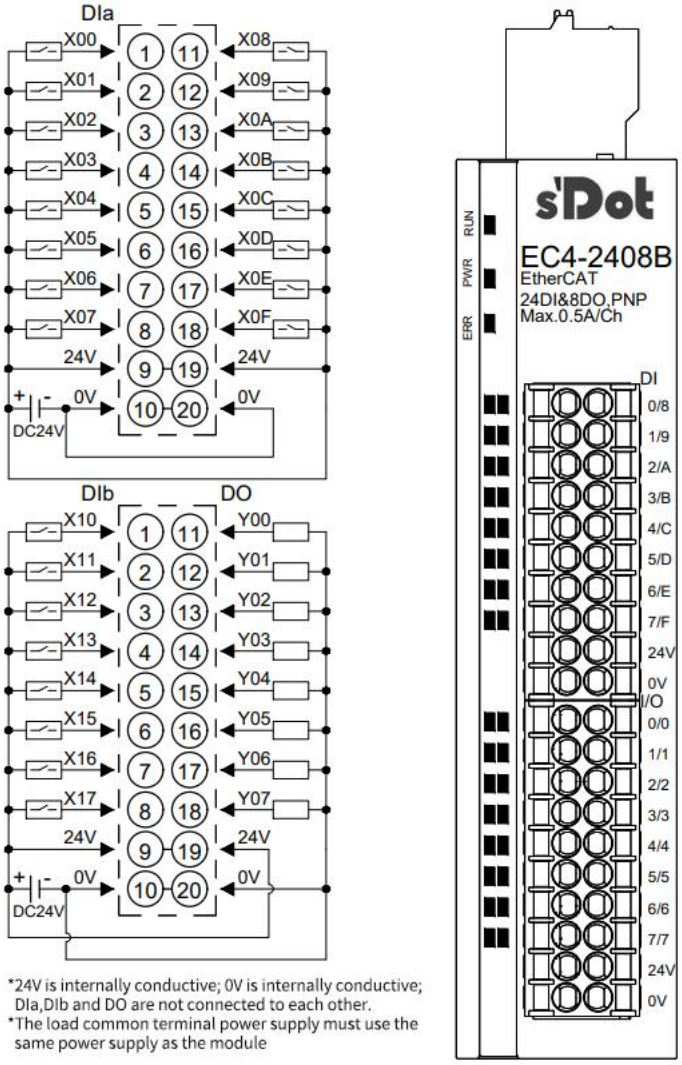
*24V is internally conductive; 0V is internally conductive;
*The load common terminal power supply must use the same power supply as the module



6.3.16 EC4-2408A

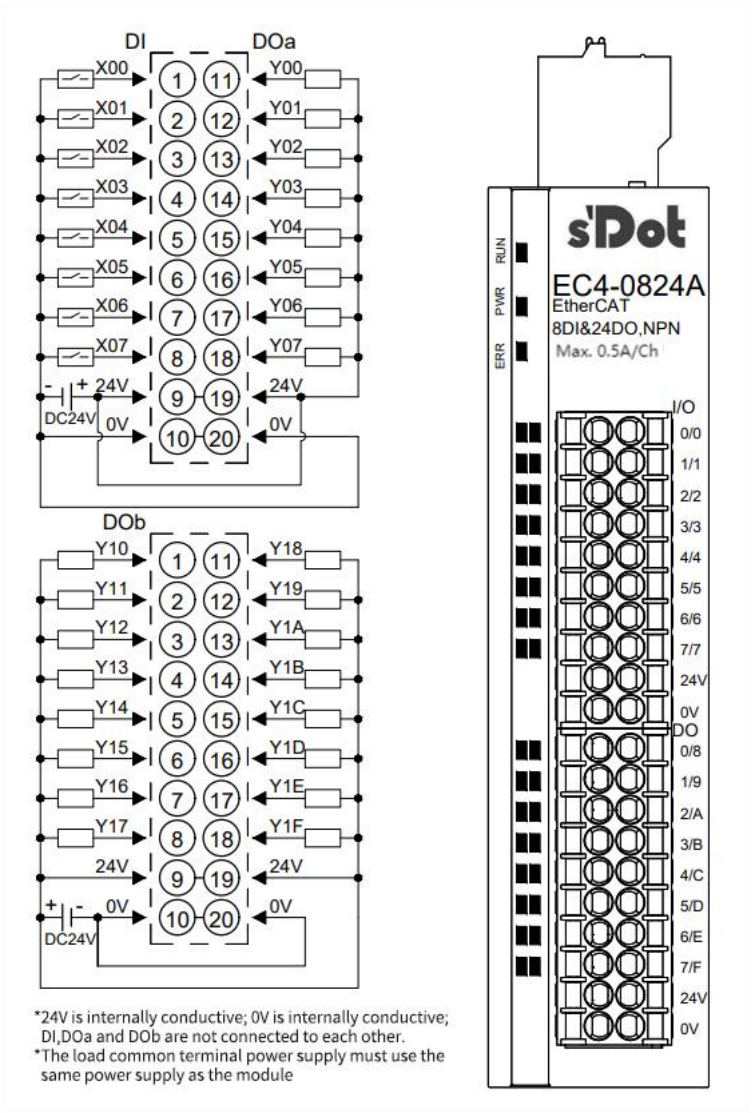


6.3.17 EC4-2408B

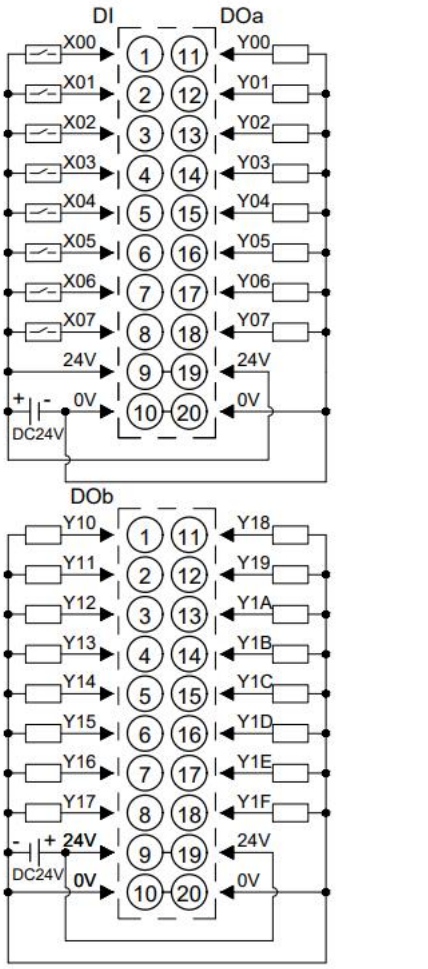


*24V is internally conductive; 0V is internally conductive; DIa,DIb and DO are not connected to each other.
*The load common terminal power supply must use the same power supply as the module

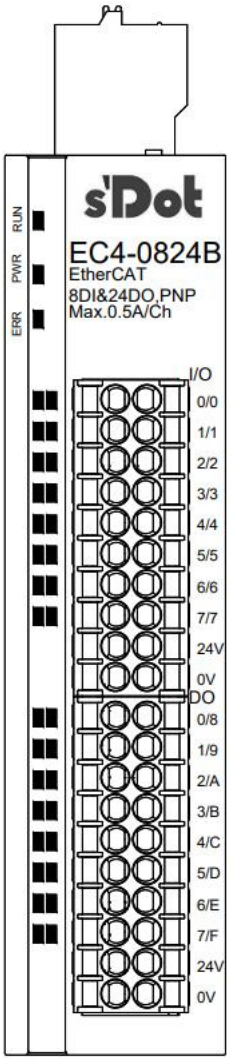
6.3.18 EC4-0824A



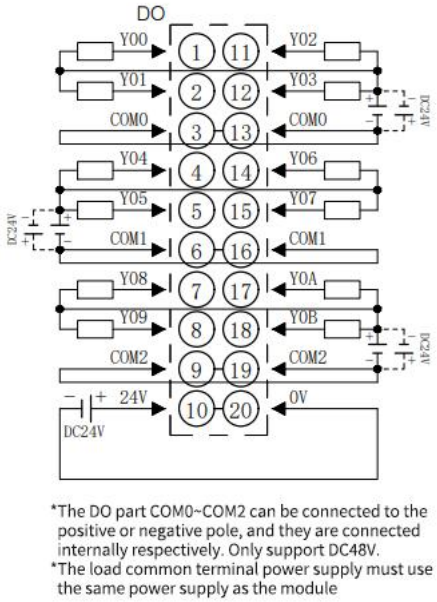
6.3.19 EC4-0824B



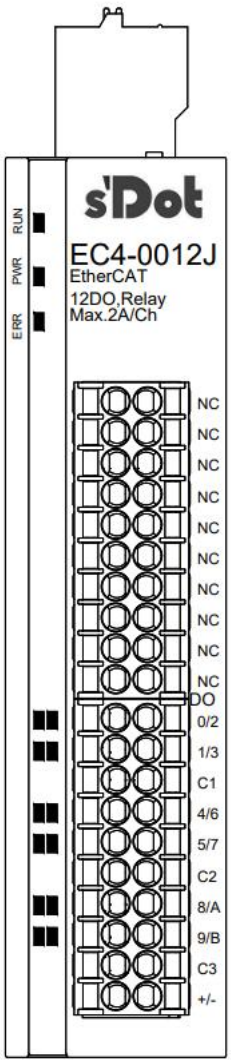
*24V is internally conductive; 0V is internally conductive; DI,DOa and DOb are not connected to each other.
*The load common terminal power supply must use the same power supply as the module



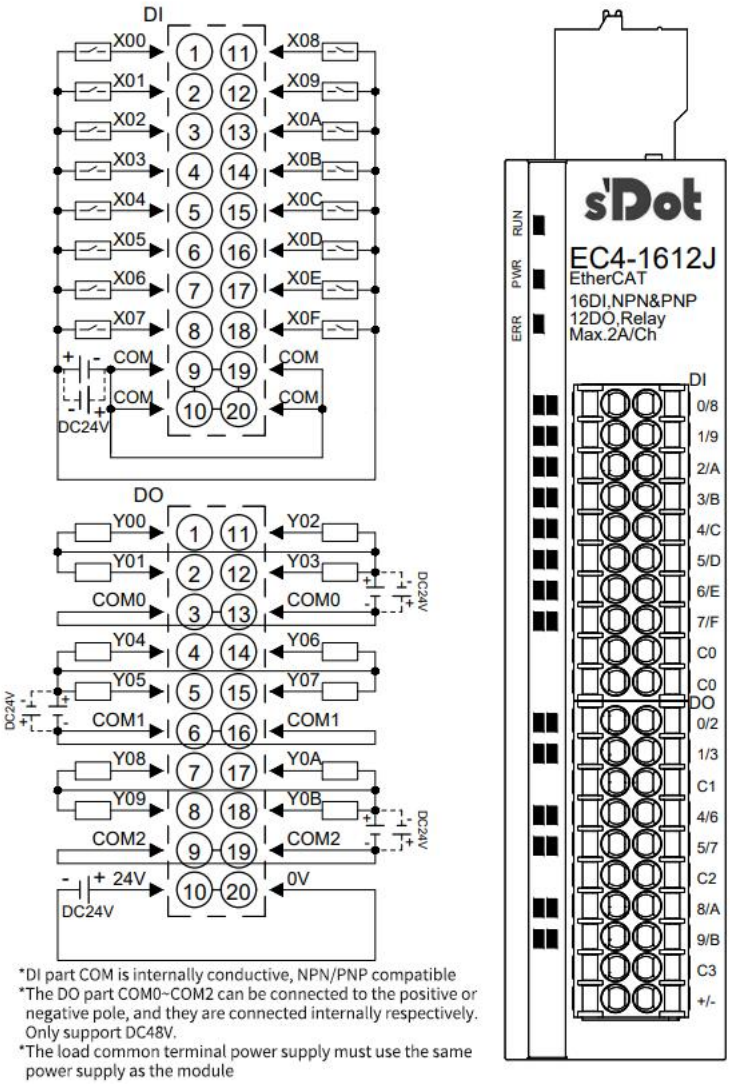
6.3.20 EC4-0012J



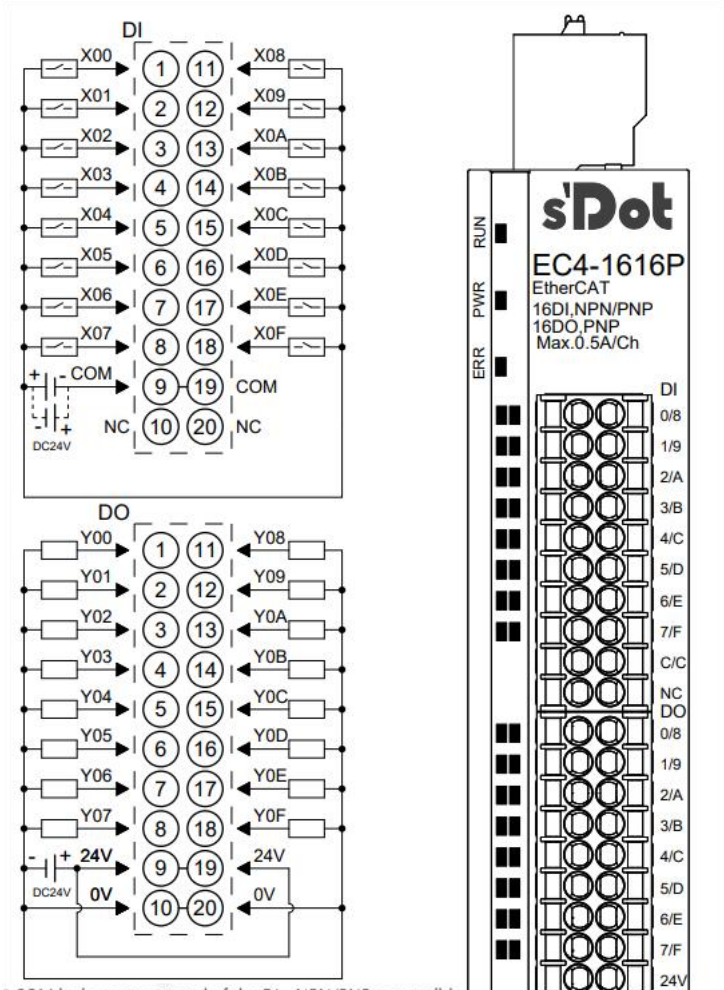
*The DO part COM0~COM2 can be connected to the positive or negative pole, and they are connected internally respectively. Only support DC48V.
*The load common terminal power supply must use the same power supply as the module



6.3.21 EC4-1612J

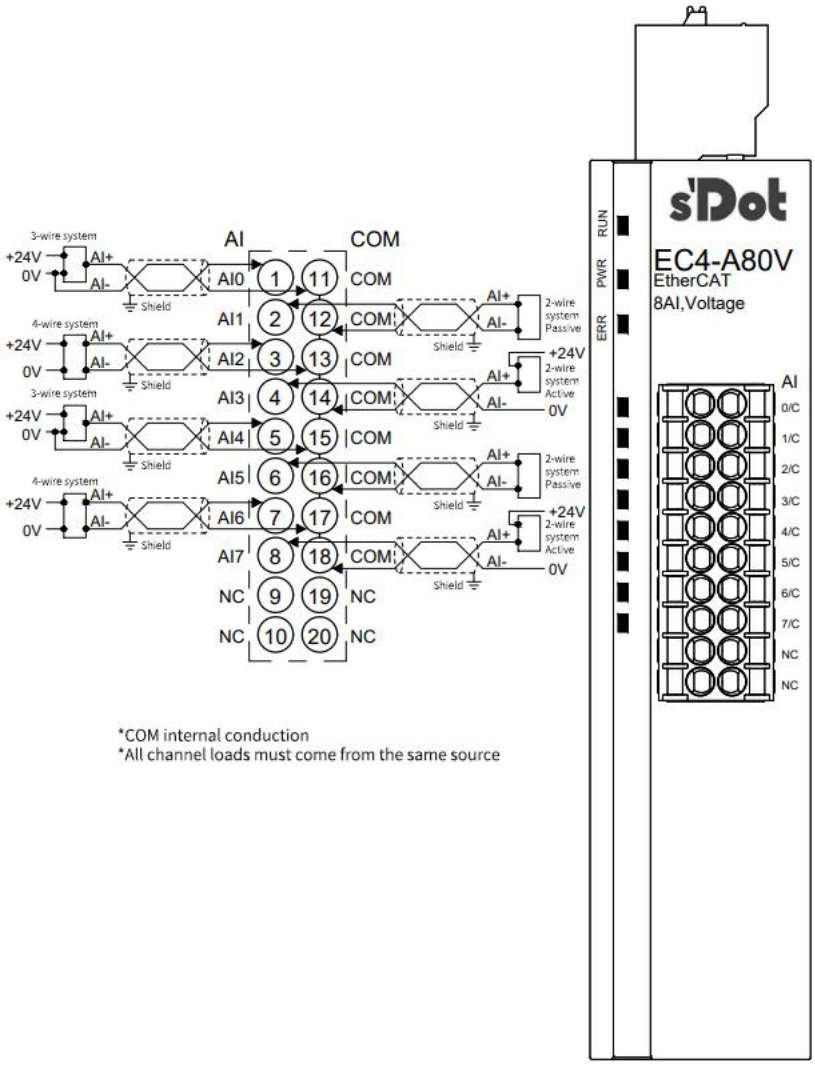


6.3.22 EC4-1616P

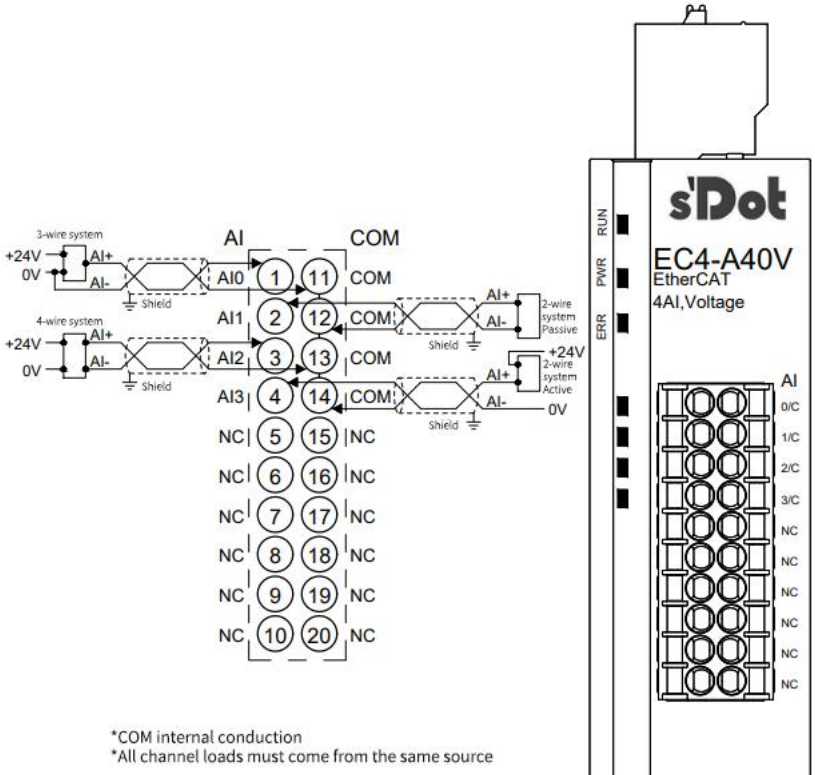


* COM is the common end of the DI, NPN/PNP compatible.
* DO part 24V internally respectively;
0V nternally respectively.
* The load common terminal power supply must use the same as the module.

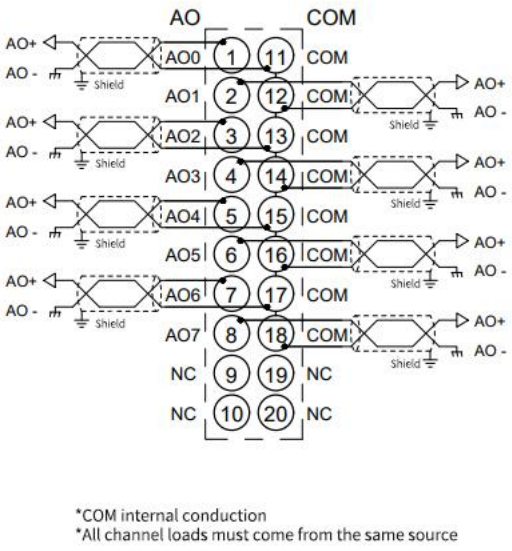
6.3.23 EC4-A80V



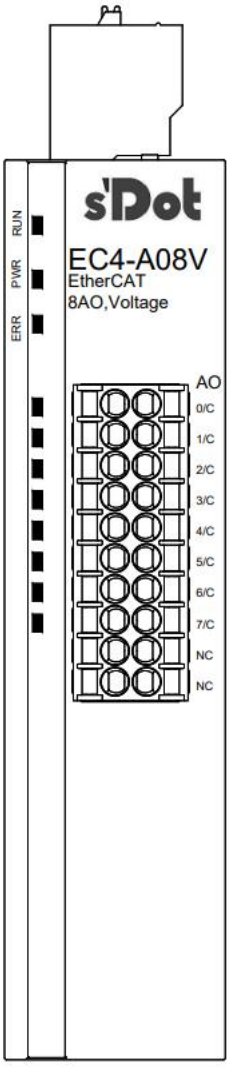
6.3.24 EC4-A40V



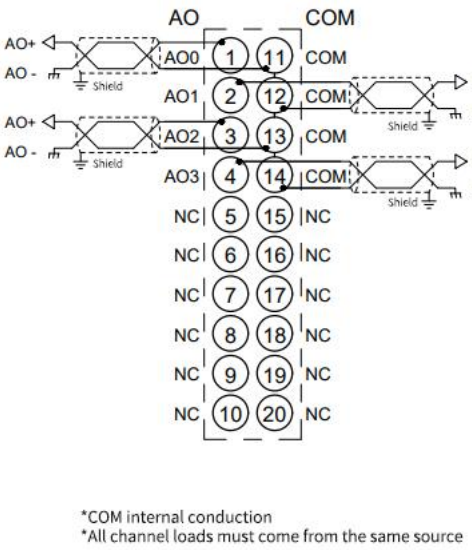
6.3.25 EC4-A08V



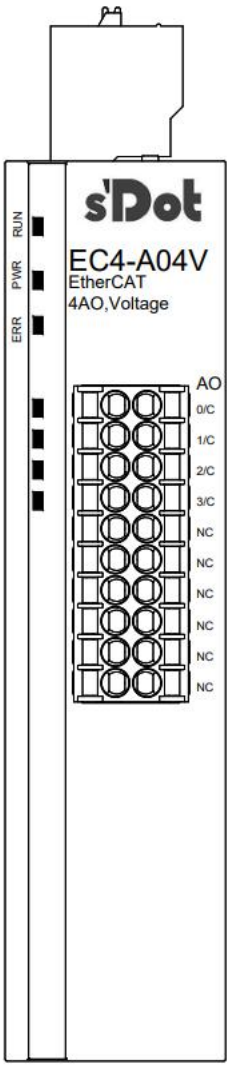
*COM internal conduction
*All channel loads must come from the same source



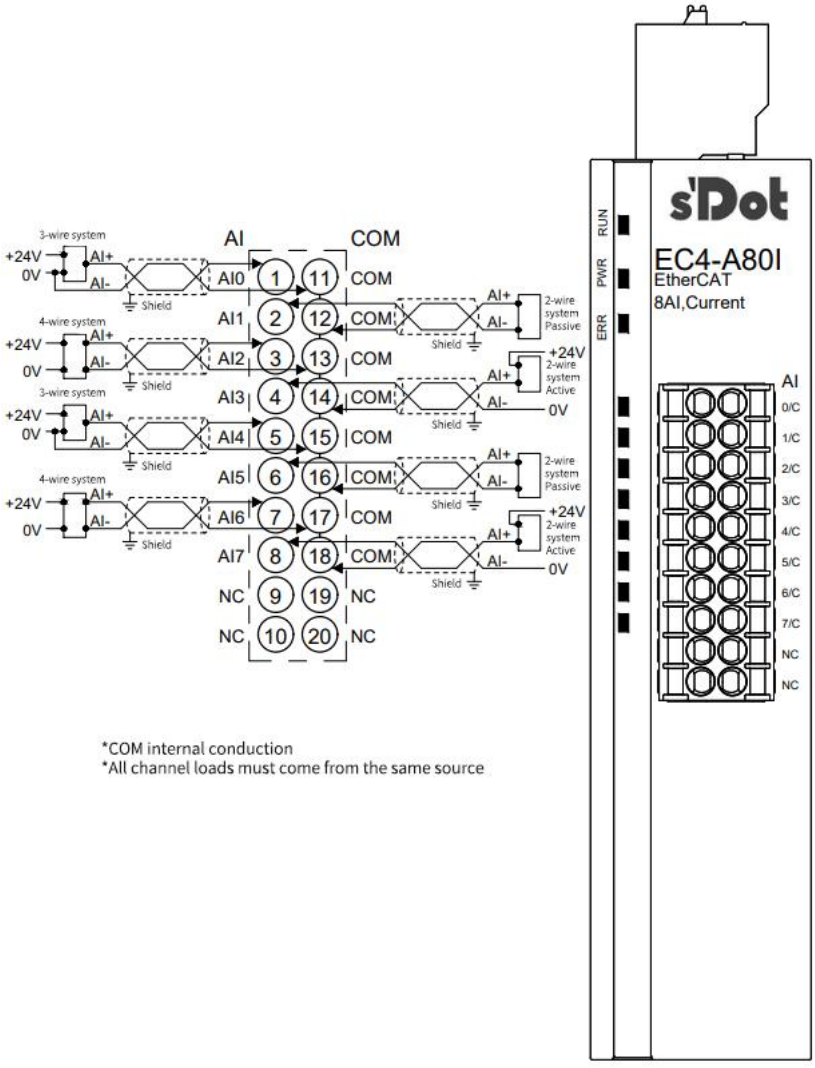
6.3.26 EC4-A04V



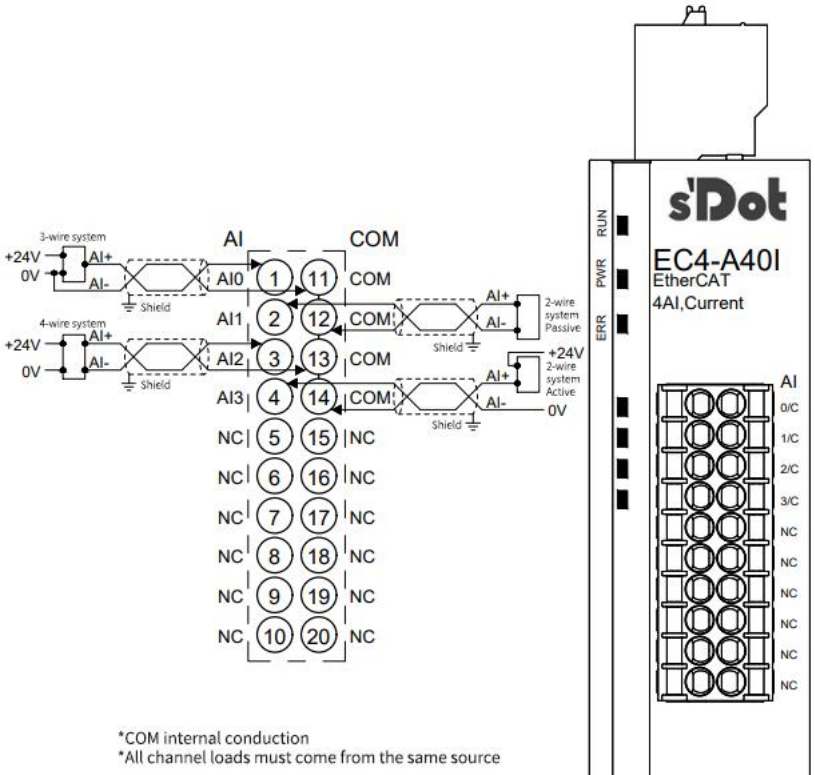
*COM internal conduction
*All channel loads must come from the same source



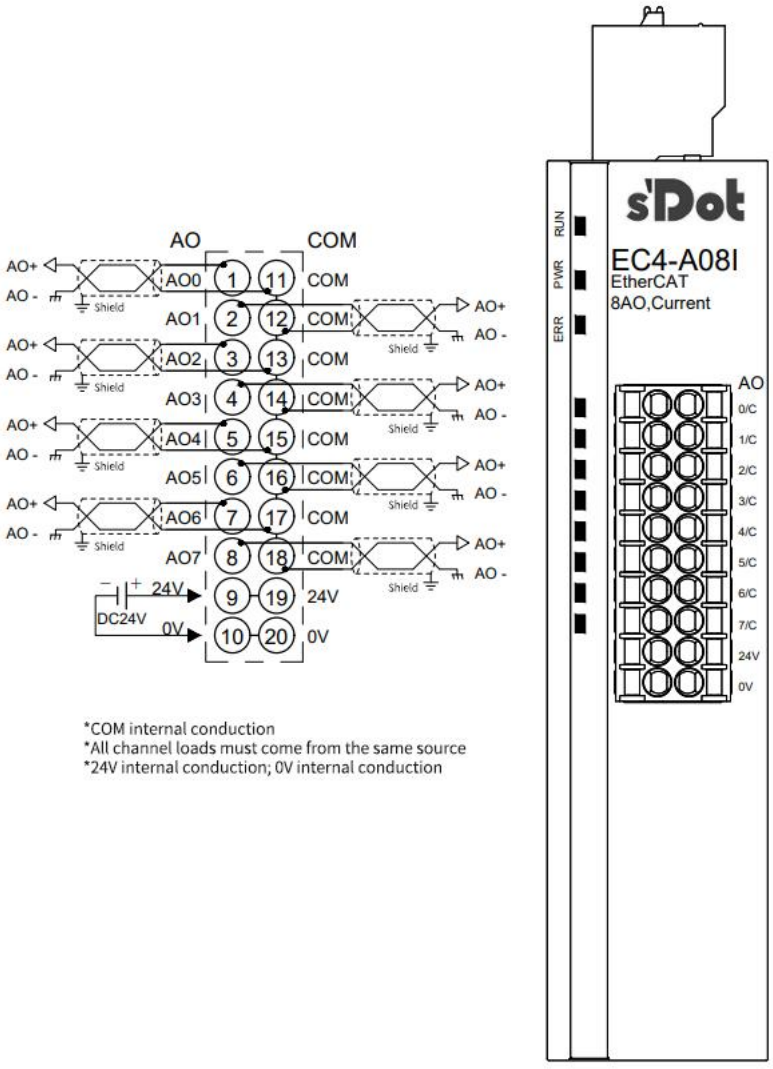
6.3.27 EC4-A80I



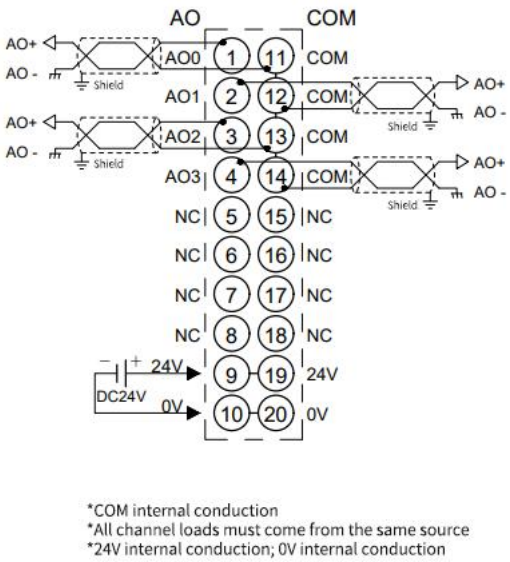
6.3.28 EC4-A40I



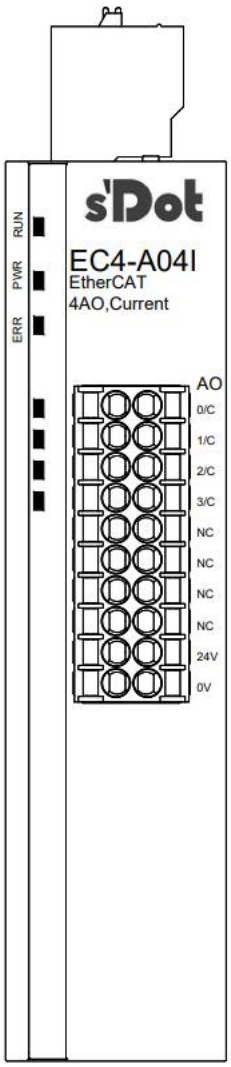
6.3.29 EC4-A08I



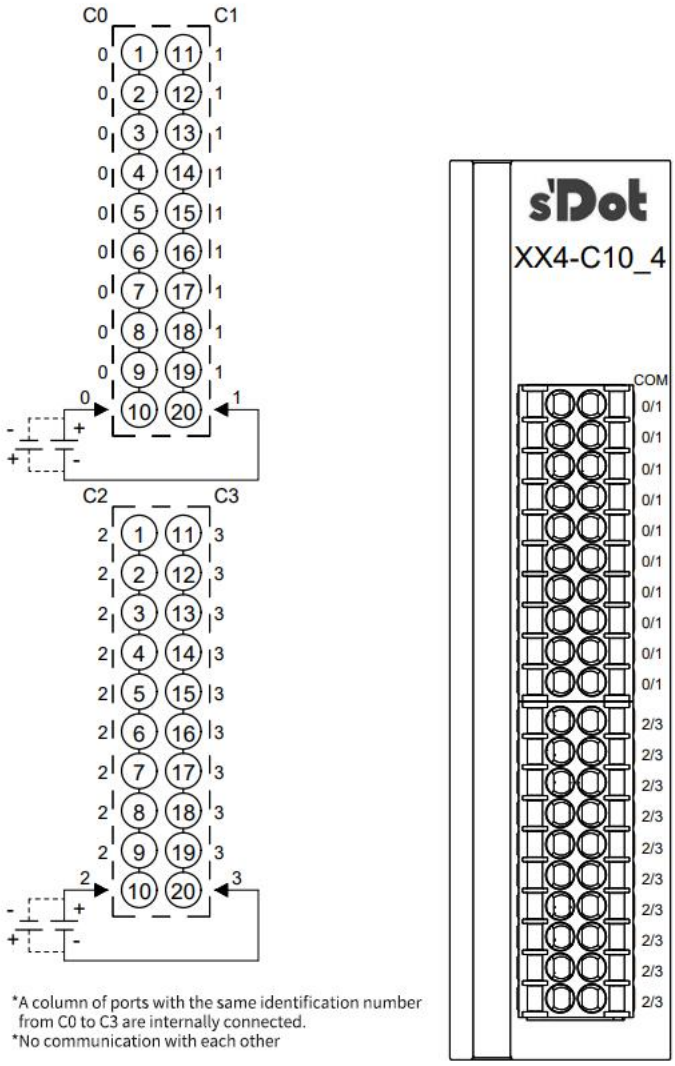
6.3.30 EC4-A04I



*COM internal conduction
*All channel loads must come from the same source
*24V internal conduction; 0V internal conduction



6.3.31 XX 4-C 10_4



7 Operation

7.1 Parameters and functional configuration

This manual uses the Twin CAT3 software platform as an example to introduce the module parameters, functions, and configuration methods.

7.1.1 Digital output clearing/holding function

The clearing/holding function is for modules with output that can be configured for module output actions in an abnormal bus state.

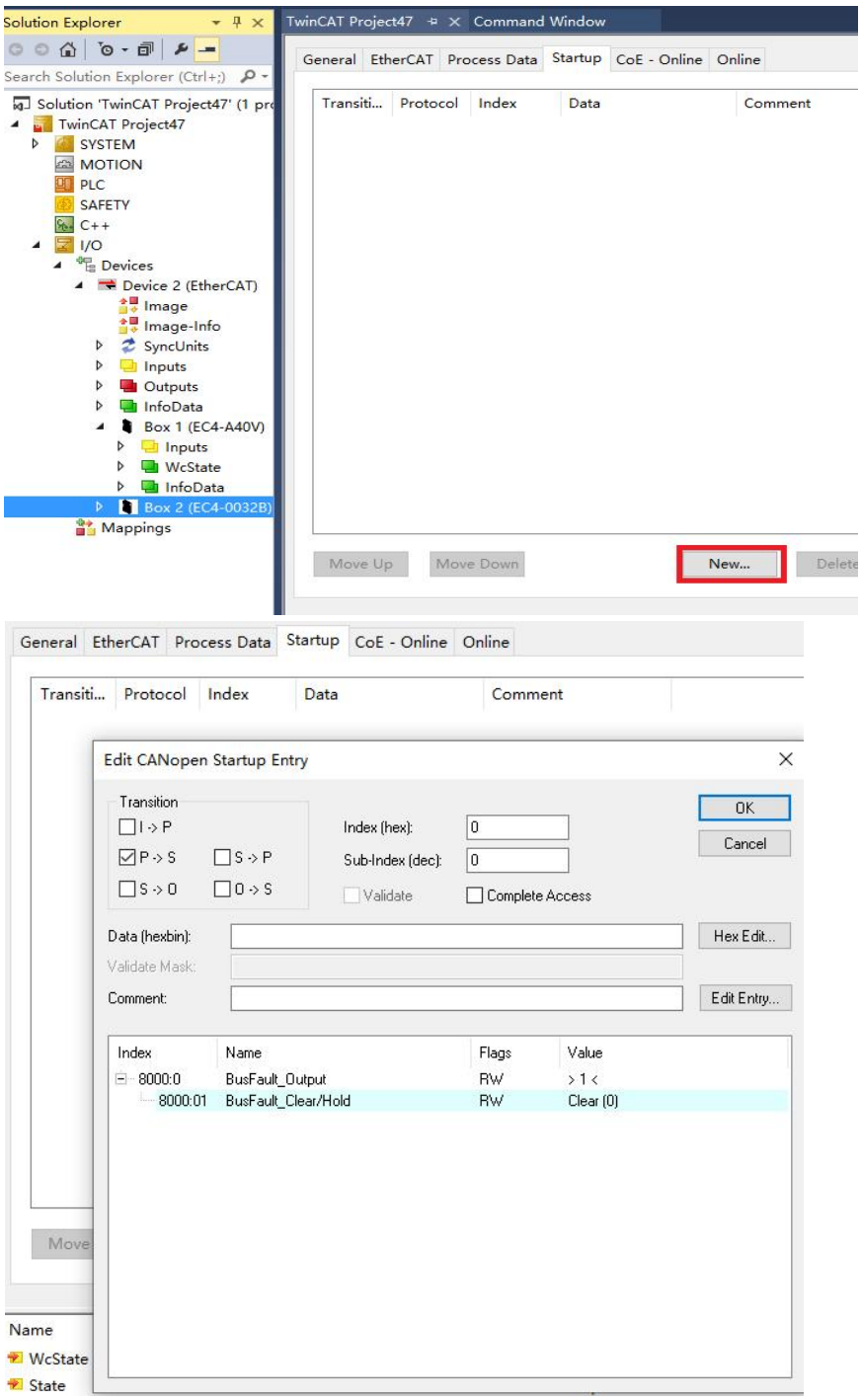
Empty output: the module output channel will automatically empty the output when the communication is disconnected

Maintain output: The module output channel keeps the output when the communication is disconnected

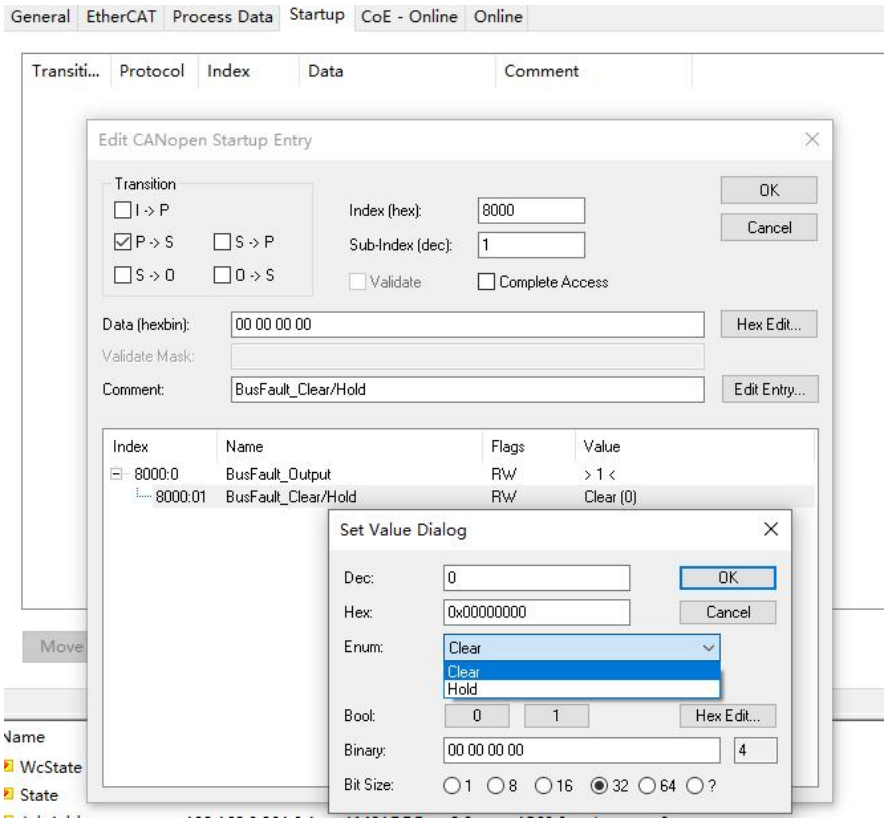
In the case of abnormal bus, the temporary default is the empty state.

- **collocation**

  A、 In the configuration interface, click "New" in "Startup" to enter the "Edit CAN open Startup Entry" interface, as shown in the figure below.



B、 Double-click "8000:01 B us F ault_C lear / Hold" to clear / hold function settings, as shown in the following figure.



Note: After the configuration is complete, download the configuration and the program again.

7.1.2 Digital input filtering time

Digital input filtering prevents unexpected rapid changes in the input pointsignal that may be caused by switch contact jumps or electrical noise. The digital input filter is currently fixed and configured as 3ms, which can filter out the clutter within 3ms, and the channel cannot be configured separately.

The input filter time of 3 ms indicates that a single signal changes from "0" to "1" or from "1" to "0" for 3 ms can be detected, while a single high or low pulses shorter than 3 ms will not be detected.

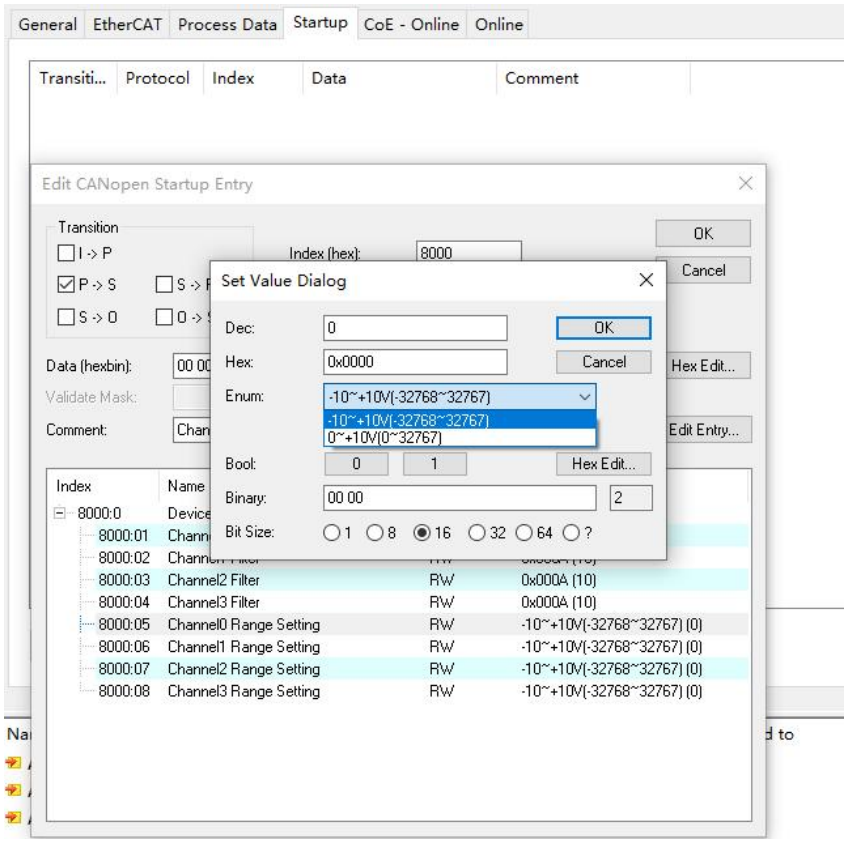
7.1.3 Analog range configuration function

Analog range setting function for the analog input and output module, can set the analog range range.(For details, see"3.3 analog quantity parameters")

- **collocation**

A、 In the configuration interface, click "New" in the "Startup" to enter the "E dit CAN open Startup E ntry" interface.

B、 Double-click 8000:05 C hannel 0 R ange S etting to select the range range setting.



Note: After the configuration is complete, download the configuration and the program again.

7.1.4 Analog filtering parameter configuration function

- **Analog quantity input filter function**

Analog input filtering function, the A / D transformed data can be averaged internally, used to reduce the fluctuation of the input pointsignal due to noise.

The analog quantity input is processed on a moving average with the specified A / D conversion times.

- **Filter function configuration**

Each channel can be configured separately, configuration range: 1~1024; default 10;

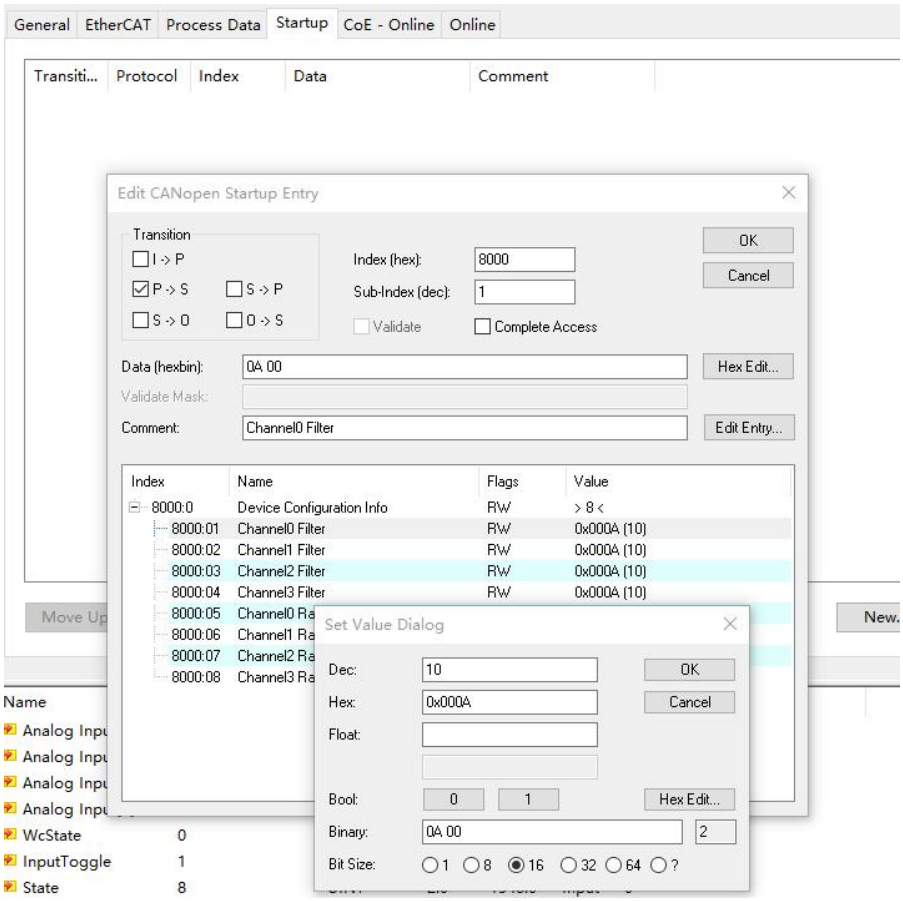
The sampling rate of 8-channel module is: 1.25 KHZ / 8 channel (800us / 8 channel);

The sampling rate of 4-channel module is: 2.5 KHZ / 4 channel (400us / 4 channel).

- **collocation**

A、 In the configuration interface, click "New" in the "Startup" to enter the "E dit CAN open Startup E ntry" interface.

B、 Double-click 8000:05 C hannel 0 F ilter to select range range settings.



Note: After the configuration is complete, download the configuration and the program again.

7.2 Module configuration description

7.2.1 Application in TwinCAT3 software environment

1、 dead work

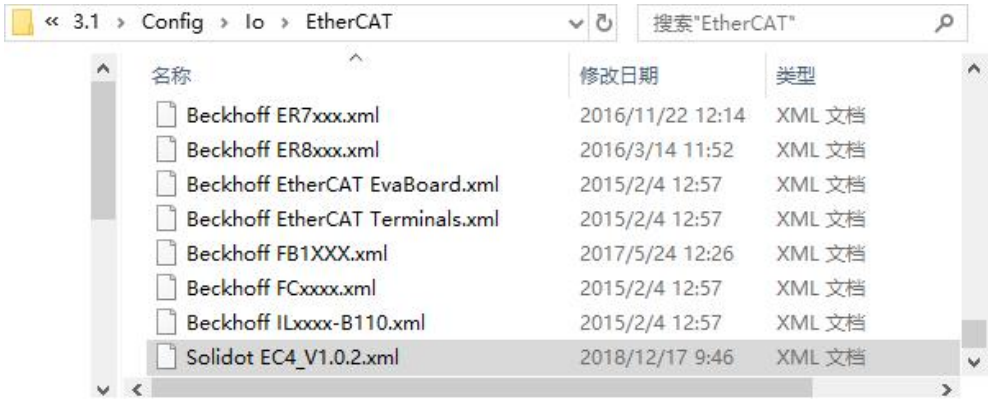
- **hardware environment**
  - **Module model E C4-A04V**
  - **One computer, pre-installed with Twin CAT3 software**
  - **Ether CAT Special shielding cable**
  - **Switch power supply**
  - **Module installation of guide rail and guide rail fixings**
  - **Device configuration file**

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

  Please follow the"5 Install and remove it" "6 The wiring"Requires the operation

2、 Preset profile

Place the ESI profile (Solidot EC4_V1.0.2.xml) under the TwinCAT installation directory C: \ TwinCAT \ 3.1 \ Config \ Io \ EtherCAT, as shown in the following figure.



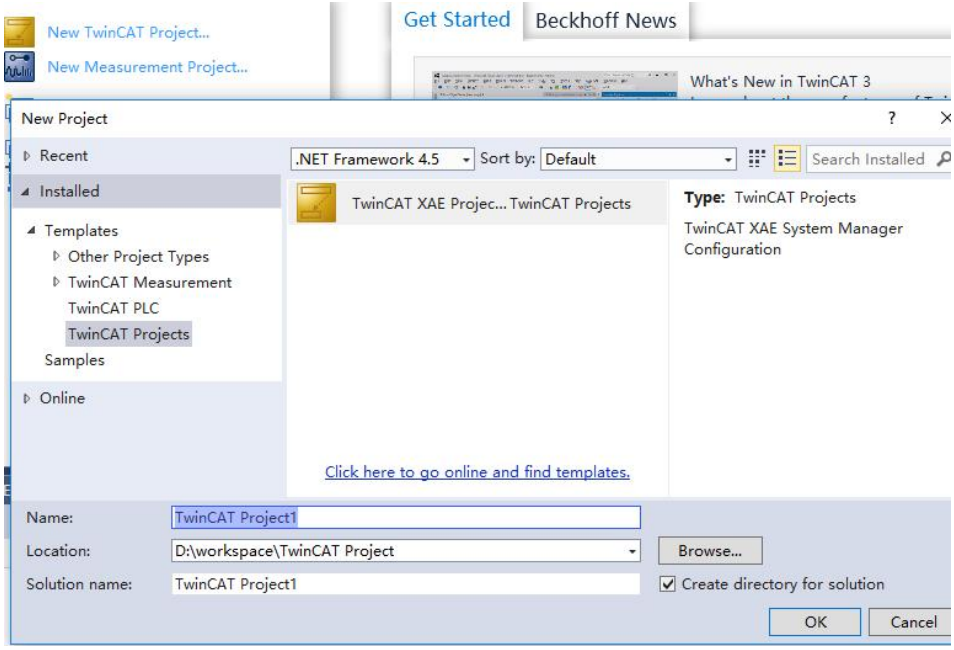
3、scanner

a. Run the T win CAT3 software

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

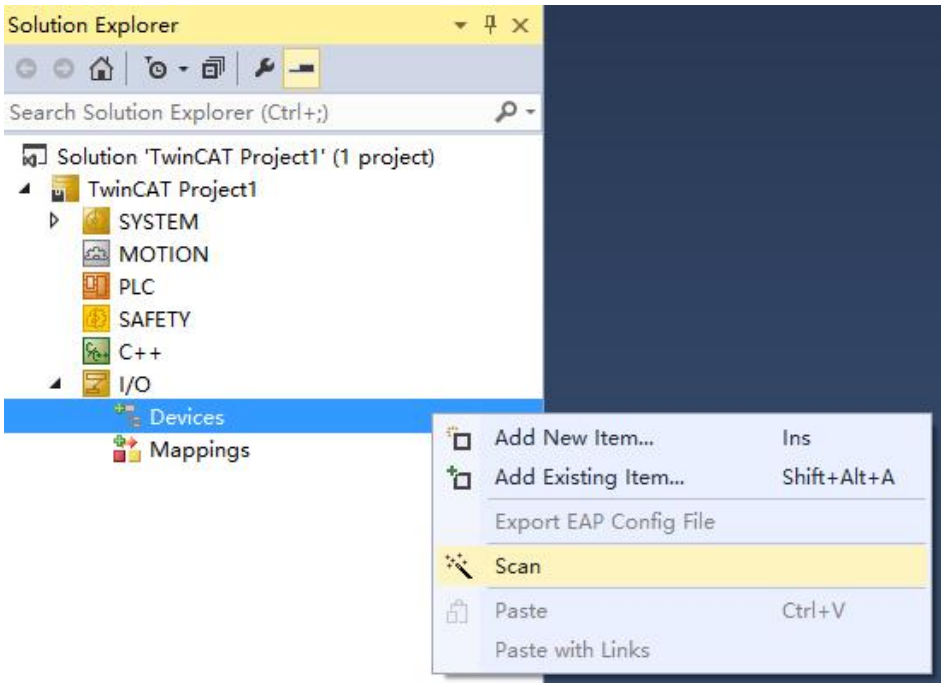
b. Create the project

Select "New TwinCAT Project", "Name" and "Solution name" will correspond to the project name and solution name respectively, "Location" will correspond to the project path, these three items can choose the default, and then click "OK", the project has been successfully created, as shown in the following figure.

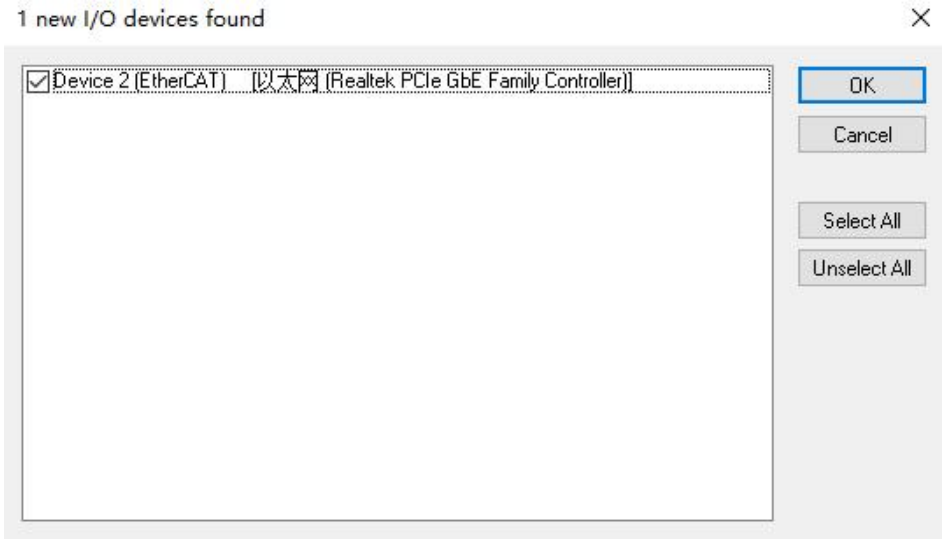


c. scanner

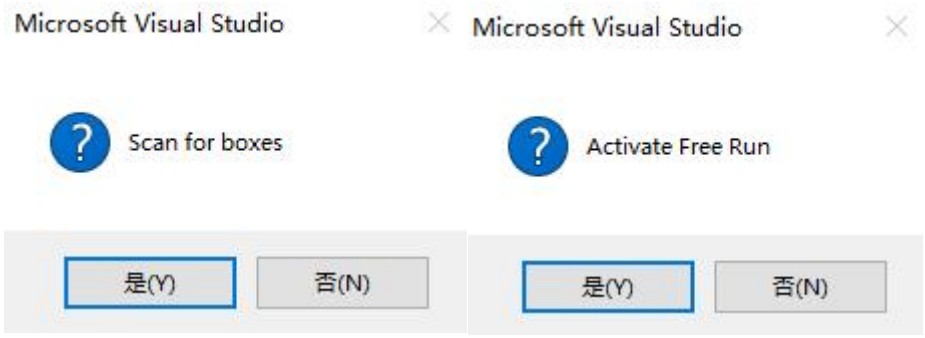
After creating the project, right-click the Scan option under I / O-> Devices to scan the station device, as shown in the figure below.



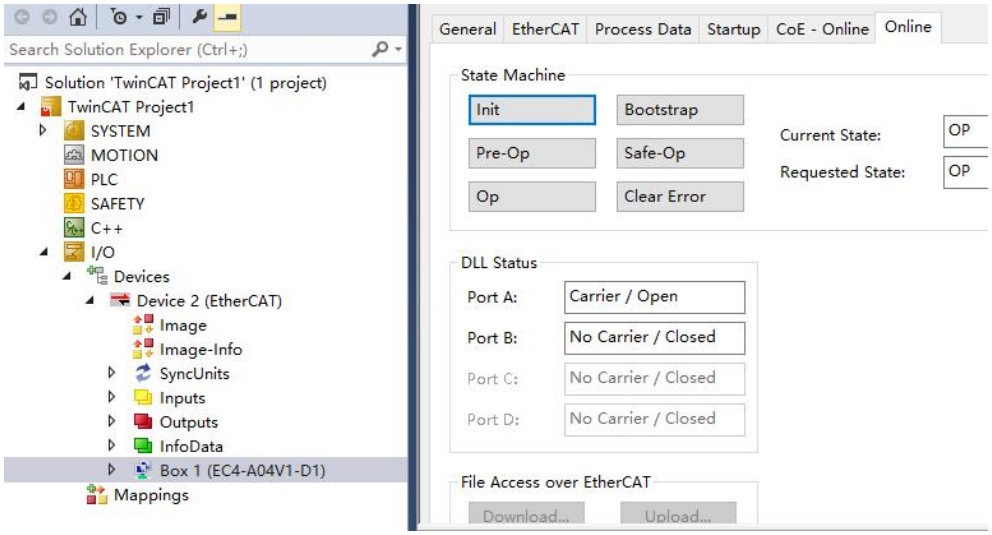
Check the "local connection" network card, as shown in the figure below.



Scan for boxes Select Yes, and Activate for Run select Yes, as shown in the figure below.



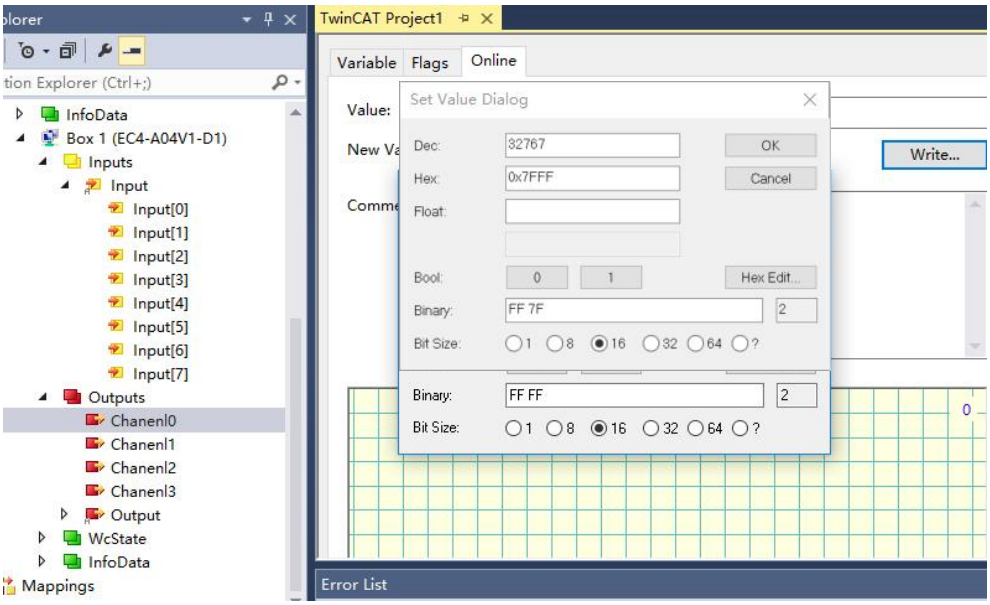
After scanning the device, you can see the TwinCAT in the "OP" state at the "Online", and the slave device RUN light can be observed long on.



4、 Data interaction

Analog output operation: take channel 0 output as an example, if the station equipment analog output channel 0 output 10V voltage, can in TwinCAT Outputs corresponding "Online", "Chanenl0" left click "Write", in the corresponding dialog, can see the corresponding channel light on, with the

voltmeter measurement analog output channel 0, can get 10V voltage.



7.2.2 Application in CODESYS V3.5 software environment

1、dead work

- **hardware environment**
  - **Module model E C4-A 80V**
  - **One computer, pre-installed with CODESYS V3.5 software**
  - **Ether CAT Special shielding cable**
  - **Switch power supply**
  - **Module installation of guide rail and guide rail fixings**
  - **Device configuration file**

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

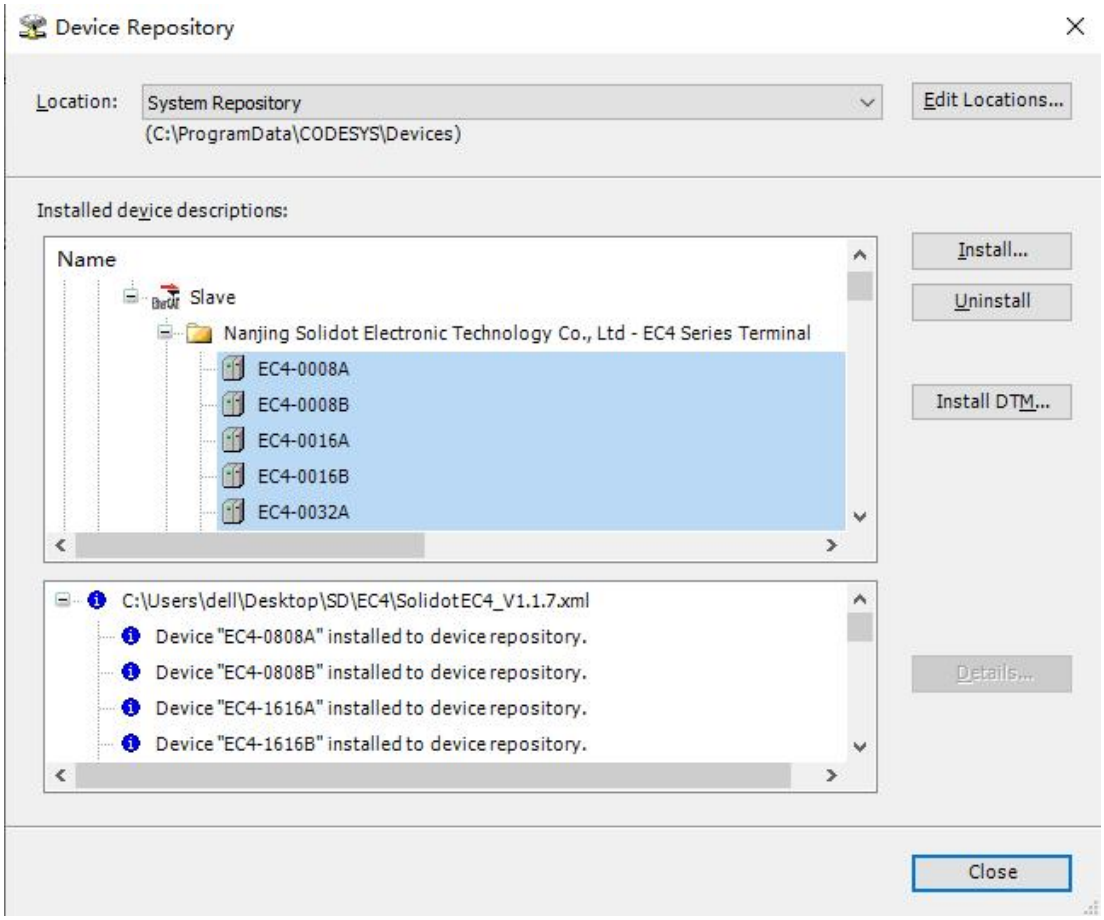
  Please follow the"5 Installation and wiring"And"6 The wiring"Requires the operation

2、 Install the profile

a. Log in to the CODESYS.

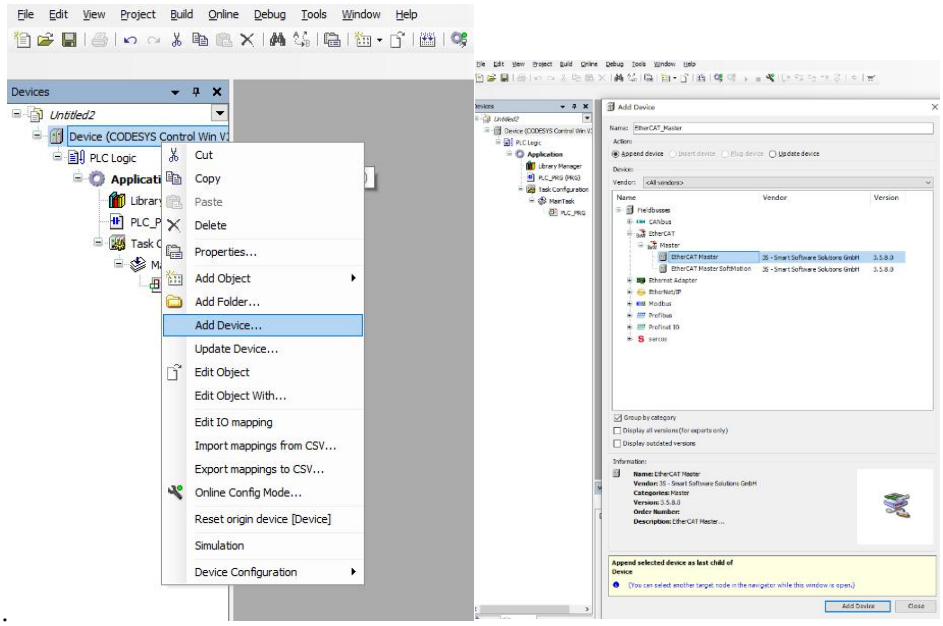
b. Select the Tools-> Device Repository item.

c. Click Install to select the E th erCAT XML device description file (Solidot EC4_V1.1.7.xml). Successfully installation with "Device xxxx installed to device repository" as shown in the following figure.



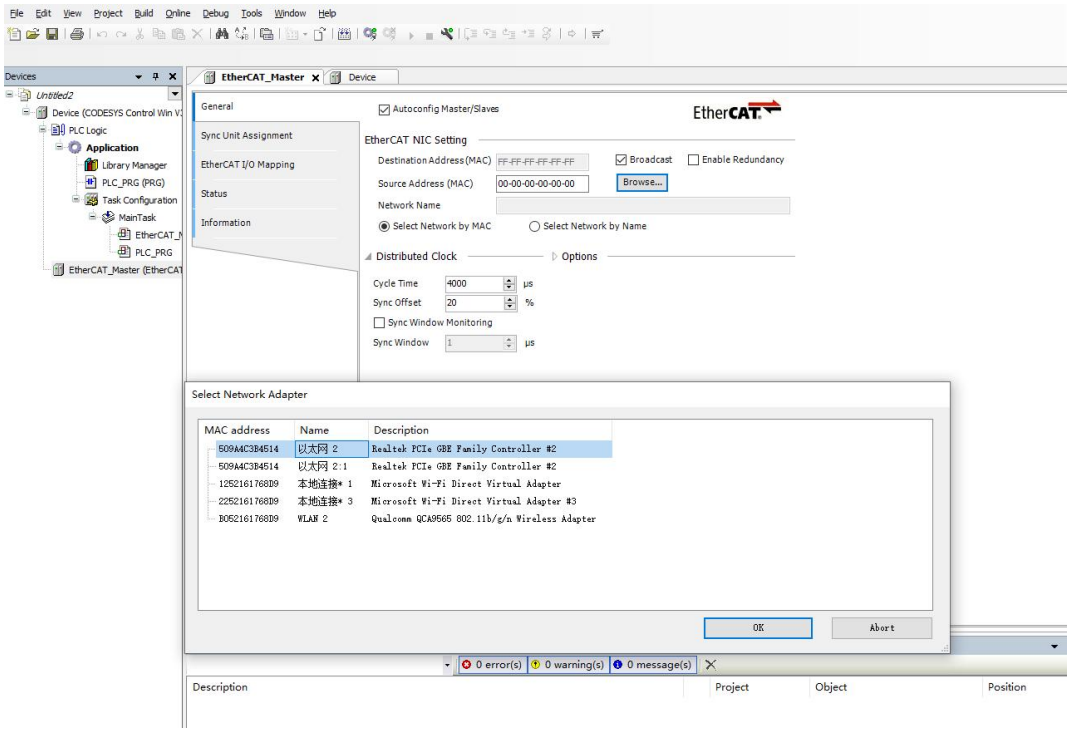
3、 Add the EtherCAT Master

a. Select "Ether C AT-> Master-> EtherCAT Master" and add it, as shown in the figure below



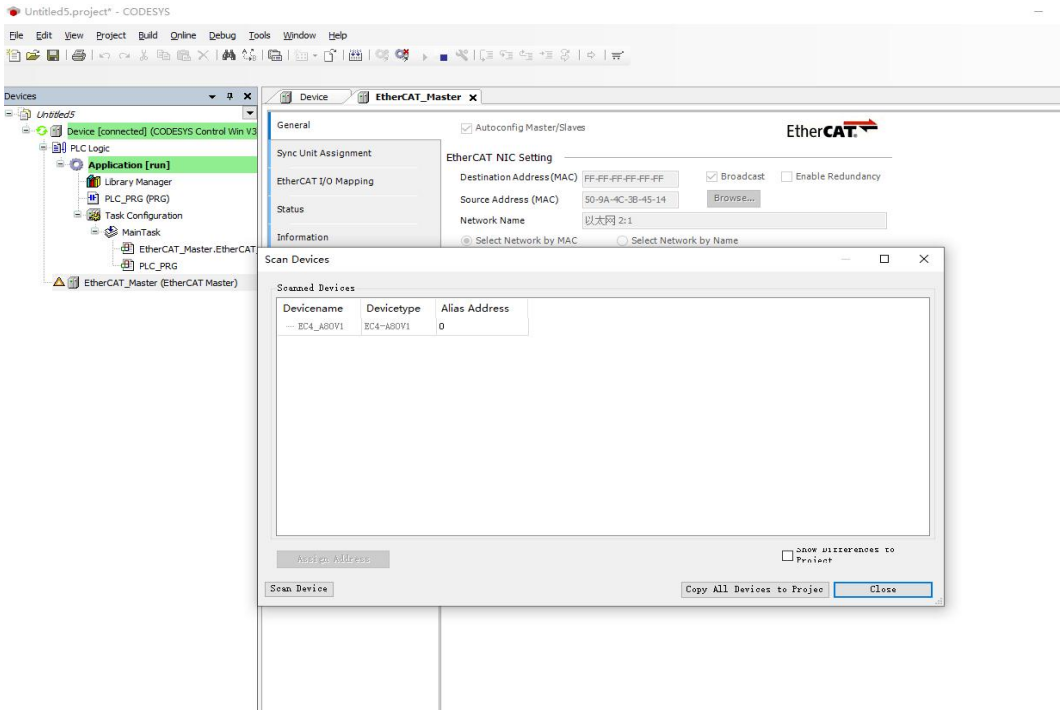
4、 Configure the EtherCAT Master

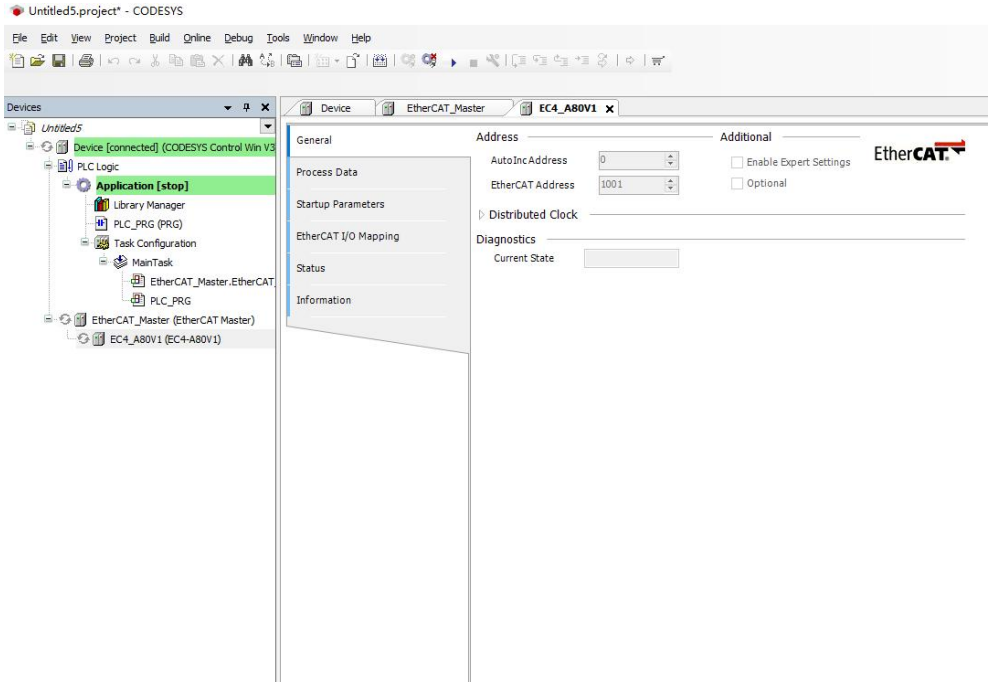
a. Click Browse to select Co d e s ys Ethernet Adapter Ethernet 2, as shown below.



5、scanner

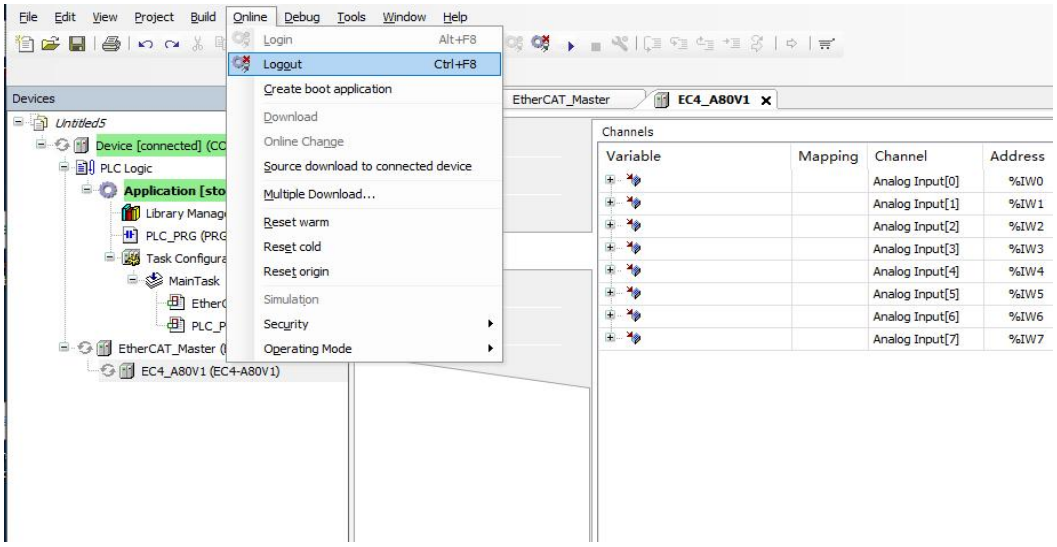
a. Before the first scan you must go to PLC, select and install the device as shown in the figure below.



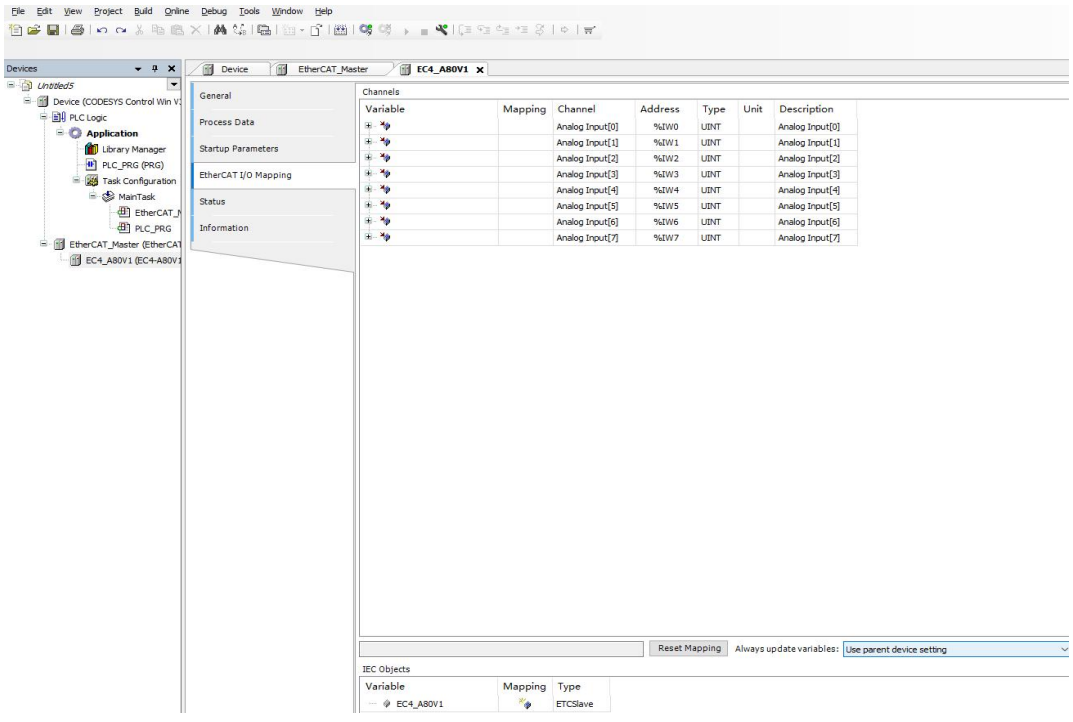


6、 Test the IO module

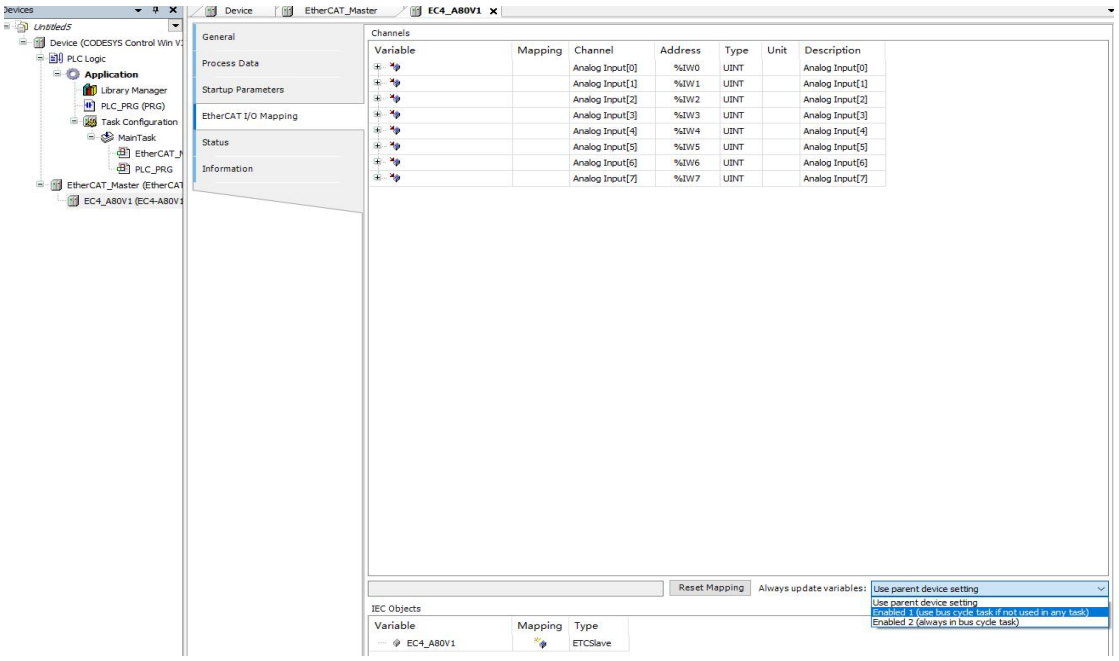
a. Exit the PLC and login to the "L ogout", as shown in the figure below.



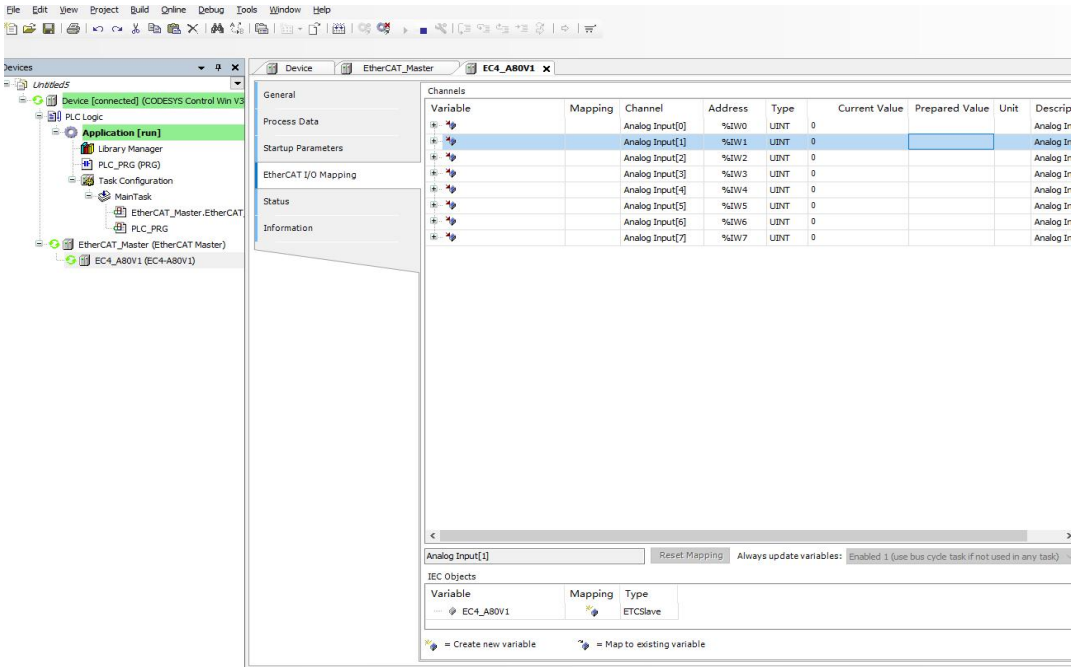
b. Select "E t herCAT I / O Mapping" in the module E C4-A80V1 menu folder, as shown in the figure below.



c. In the lower right corner of the page, select "E nabled 1" mode, as shown in the figure below.



d. Log back in, and run the software, and test the module, as shown in the figure below.



7.2.3 Application in Sysmac Studio software environment

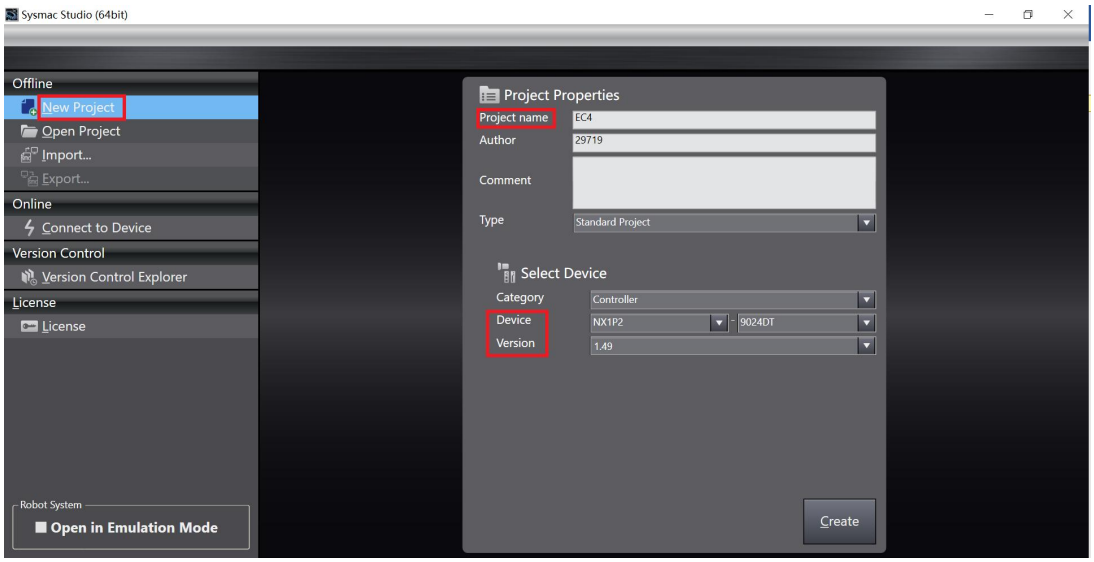
1、dead work

- **hardware environment**
  - **Module model EC 4-1616B**
  - **One computer, pre-installed with Sysmac Studio software**
  - **The Omron PLC has one set**
    Take the model N X1P 2-9024 DT as an example
  - **EtherCAT Special shielding cable**
  - **Switch power supply**
  - **Device Profile**
    Profile acquisition address:https://www.solidotech.com/documents/configfile
- **Hardware configuration and wiring**
  Please follow the"5 Installation and wiring"And"6 The wiring"Requires the operation
- **Computer IP requirements**

Set the IP address of the computer and the IP address of the PLC to ensure that it is in the same network segment.

2、new construction

a. Open the Sysmac Studio software and click the New Project button.

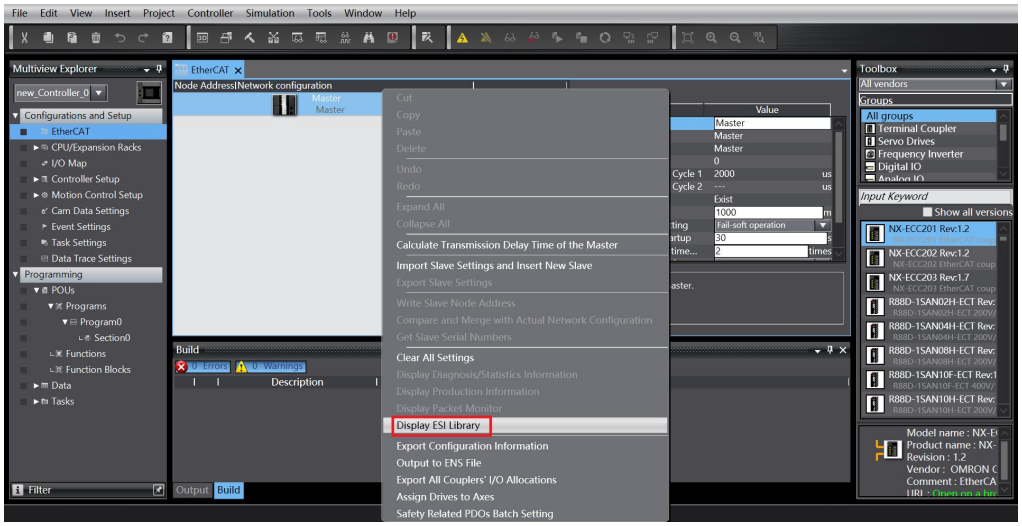


- Project name: custom-defined.
- Select equipment: "Device" selects the corresponding PLC model, and "Version" recommends selecting V 1.40 and above.

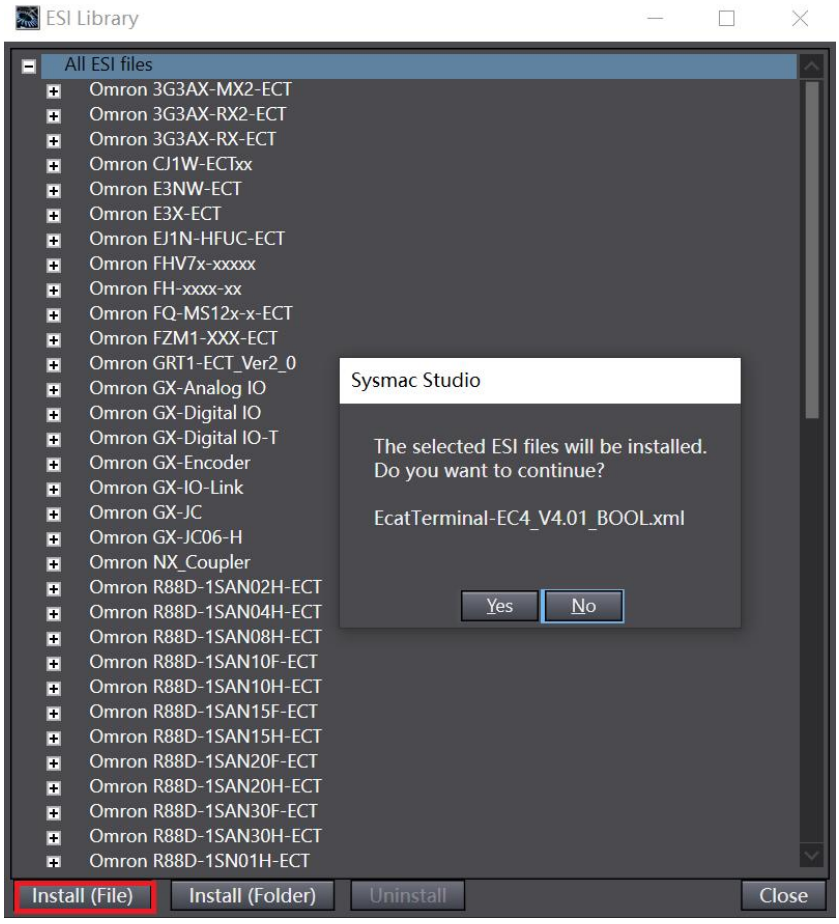
b. When the project property input is complete, click the Create button.

3、 Install the XML file

a. In the left navigation tree, expand Configuration and Settings, double-click EtherCAT, right-click Home Device, and select Display ESI Library, as shown in the figure below.

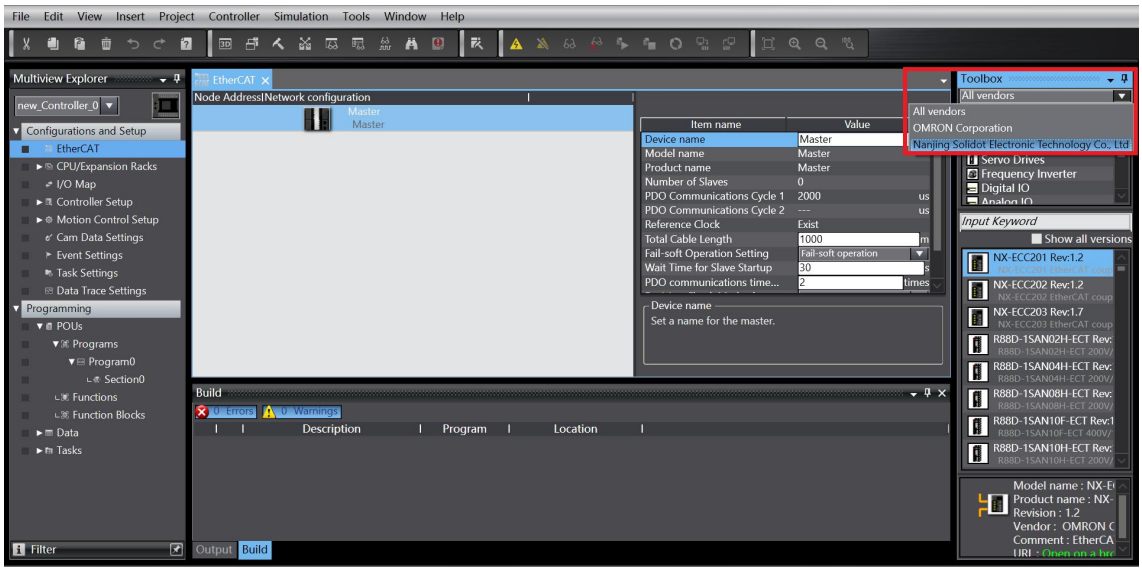


b. In the ESI Library window, click the Install (File) button, select the XML file path, and click the button Yes to complete the installation.

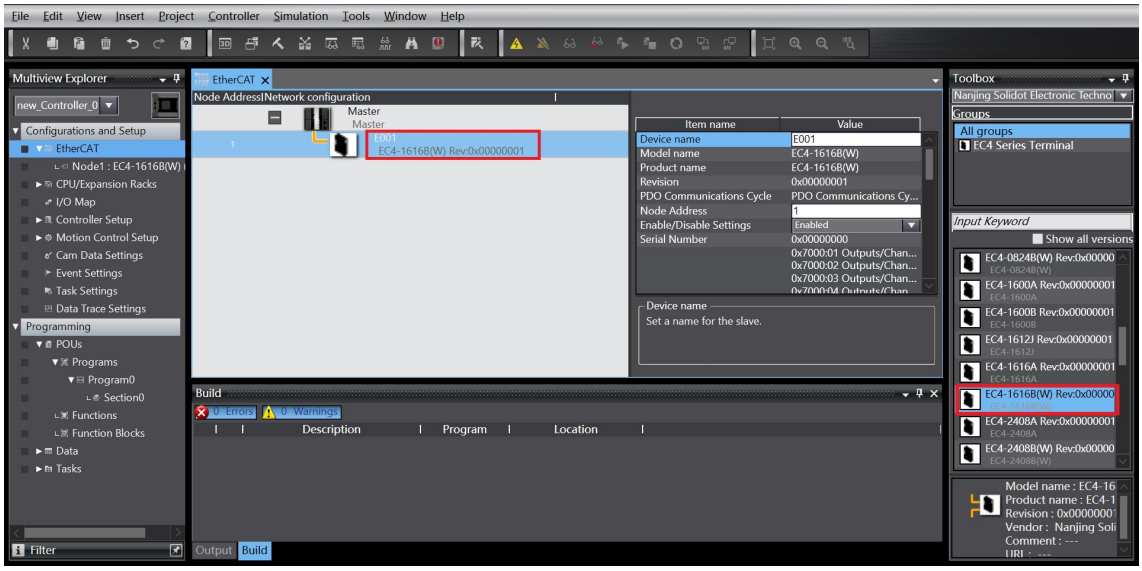


4、 Add from the device

a. Under the Toolbox bar on the right, click Expand All Suppliers, and select Nanjing Solidot Electronic Technology Co., Ltd.", As shown in the figure below.

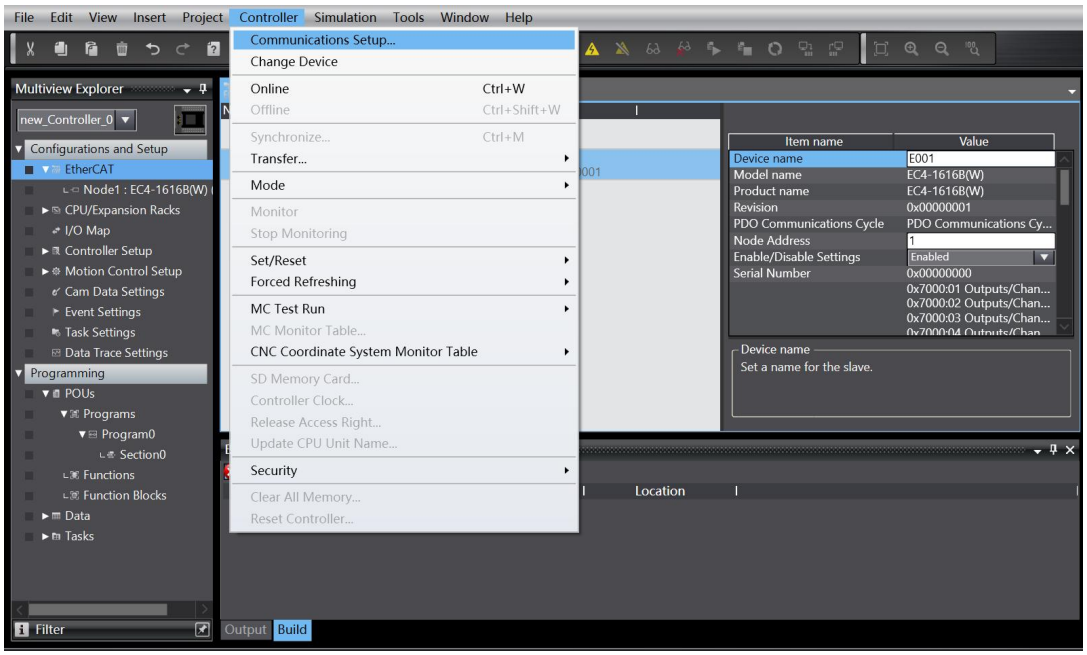


b. Double-click the module to add the slave device, as shown below.

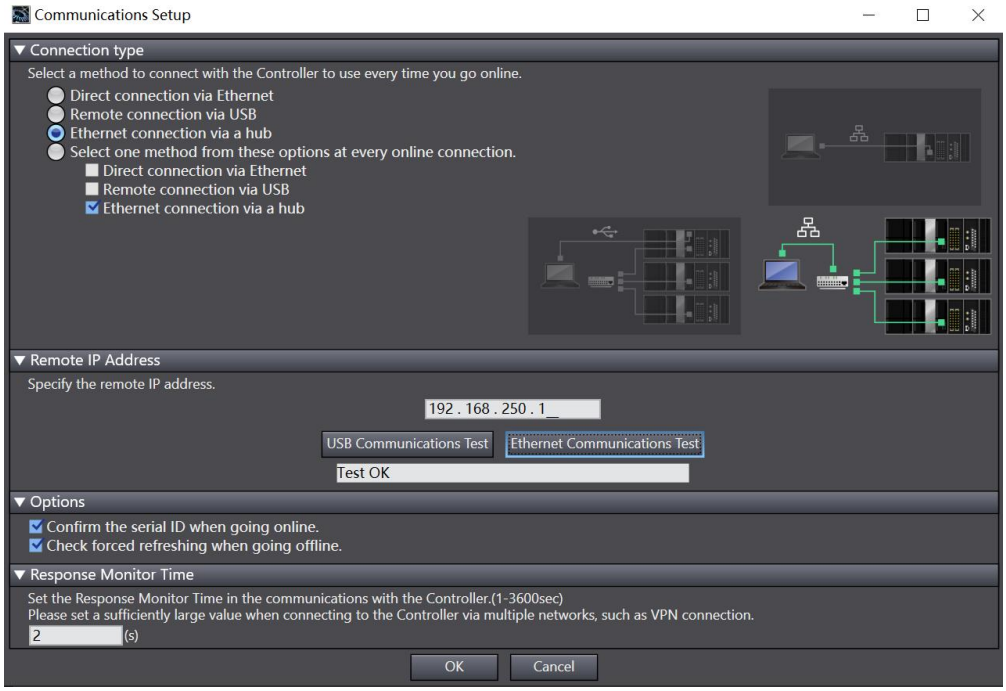


5、 Communication Settings

a. Click the menu bar "Controller-> Communication Setup" to display the communication settings window, as shown in the figure below.

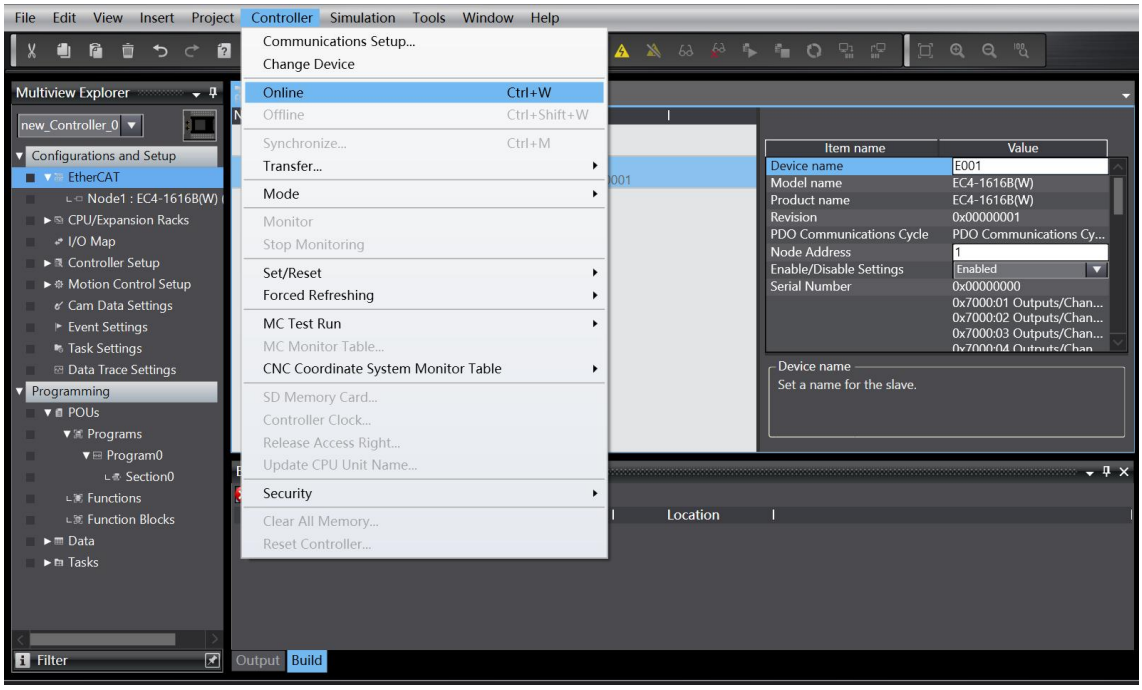


b. In the communication setting window, the connection type selects "Ethernet connection via a hub", selects the method "Ethernet connection via a hub" used when connecting to the controller, the remote IP address fills in the IP address of the corresponding PLC, click "Ethernet Communications Test", if the communication is normal, then "Test Success" is displayed in the box below. Make sure the communication is OK and click the OK button, as shown in the figure below.

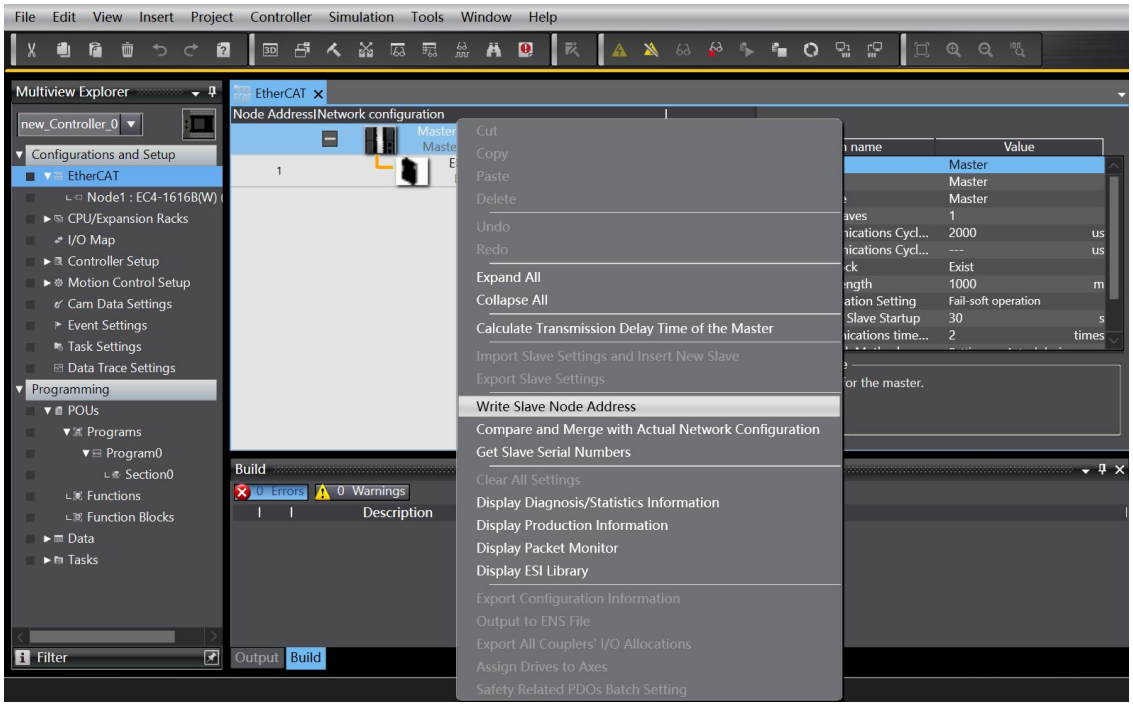


6、 Set the node address

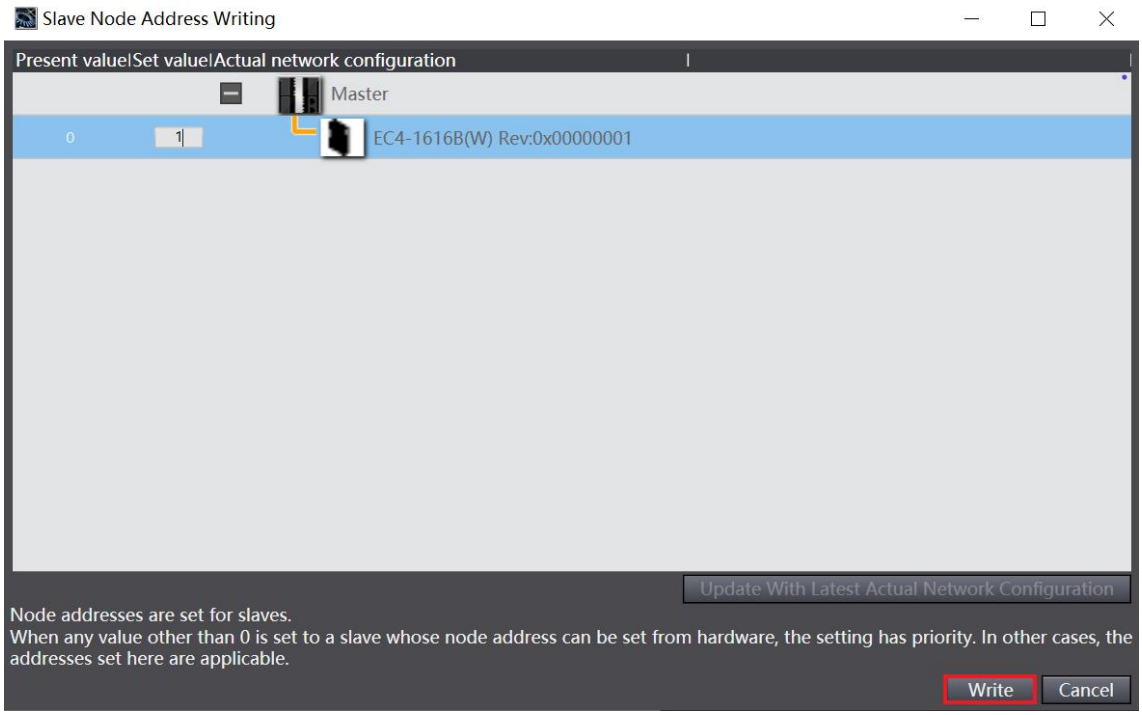
a. Click the menu bar "Controller-> Online" to turn the controller to online status as shown in the figure below.



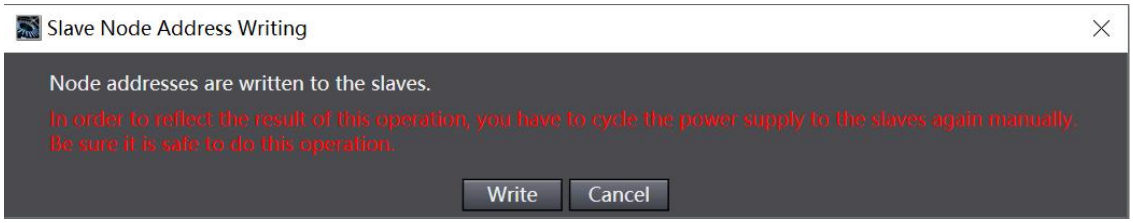
b. Right-click the main device and click to select Write to the slave device node address, as shown in the figure below.

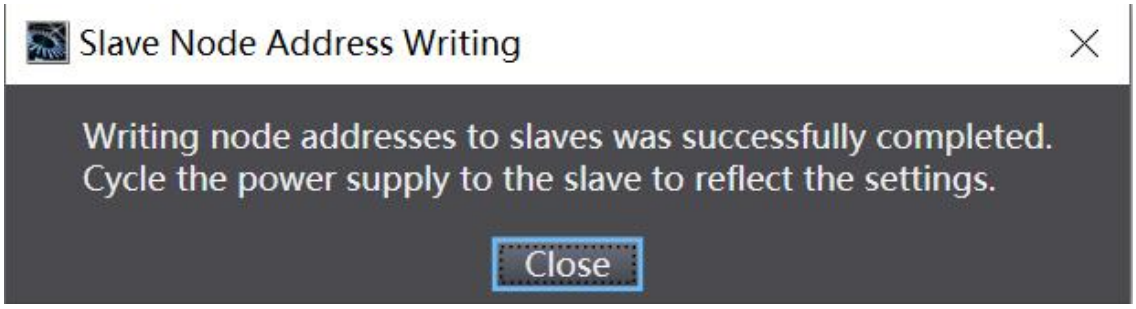


c. In the window that sets the node address, click the numerical value under the setting value, enter the node address, and click the "Write" button to change the slave device node, address, as shown in the figure below.



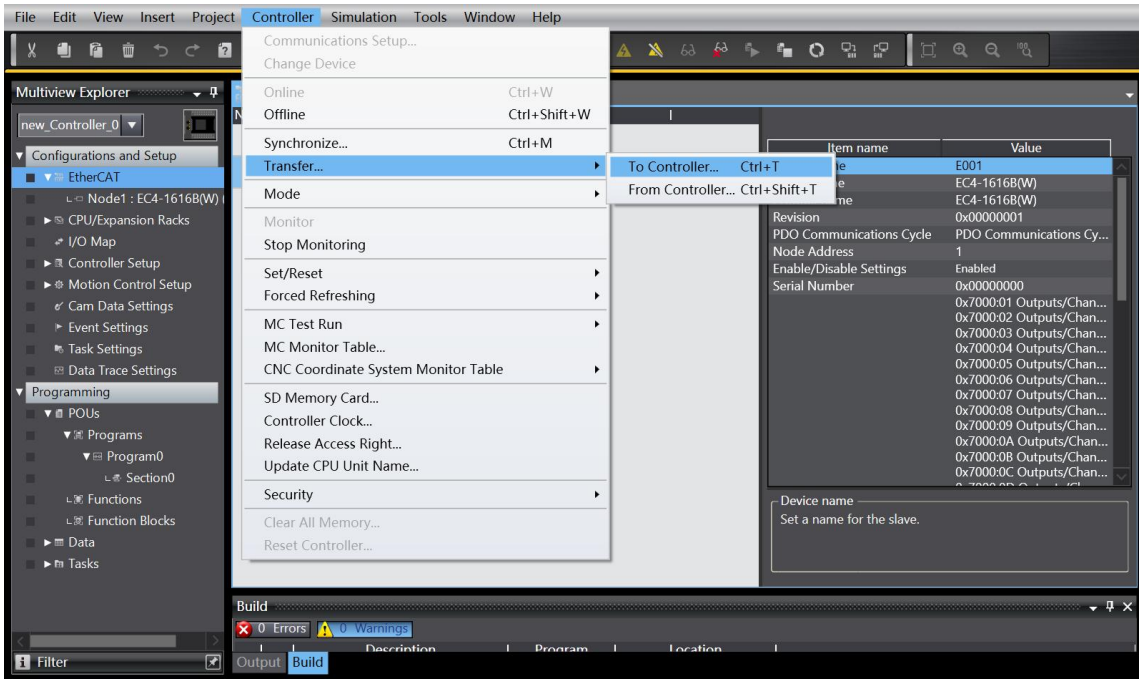
d. After writing, the pop-up prompt appears again, as shown in the figure below, click "Write", and then restart the power supply from the device according to the prompt.



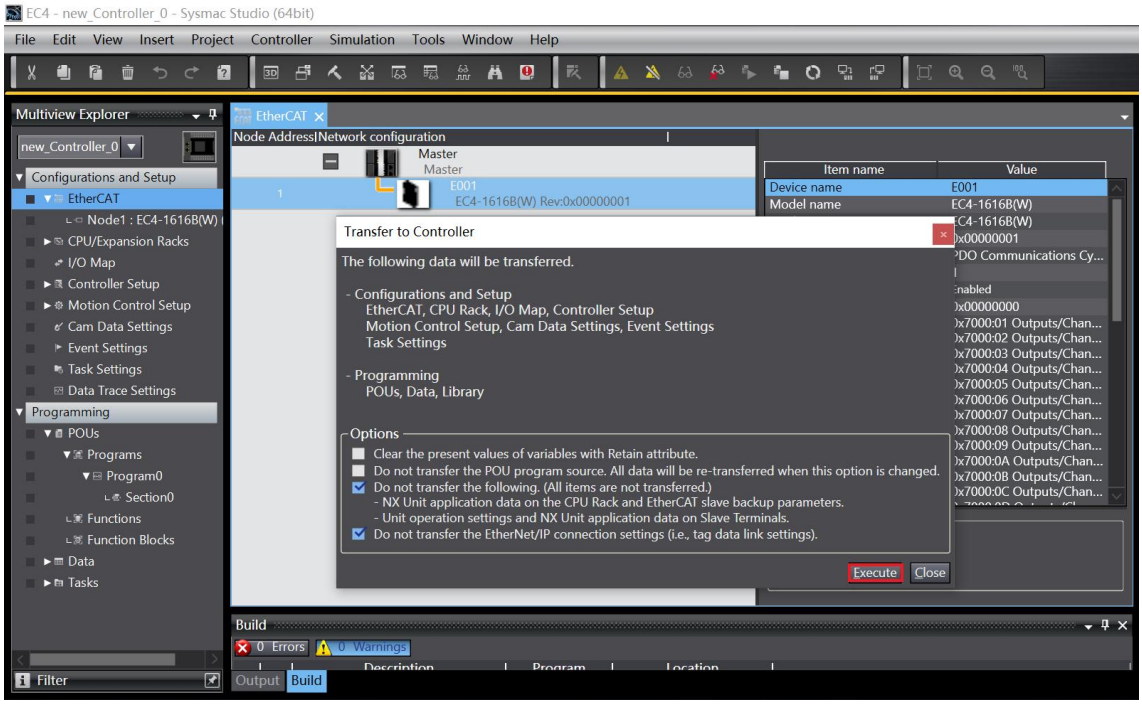


7、 Downloads the configuration to the PLC

a. Click the menu bar "Controller-> Transfer(A) -> To Controller (T)" button to transfer the configuration to the controller, as shown in the figure below.

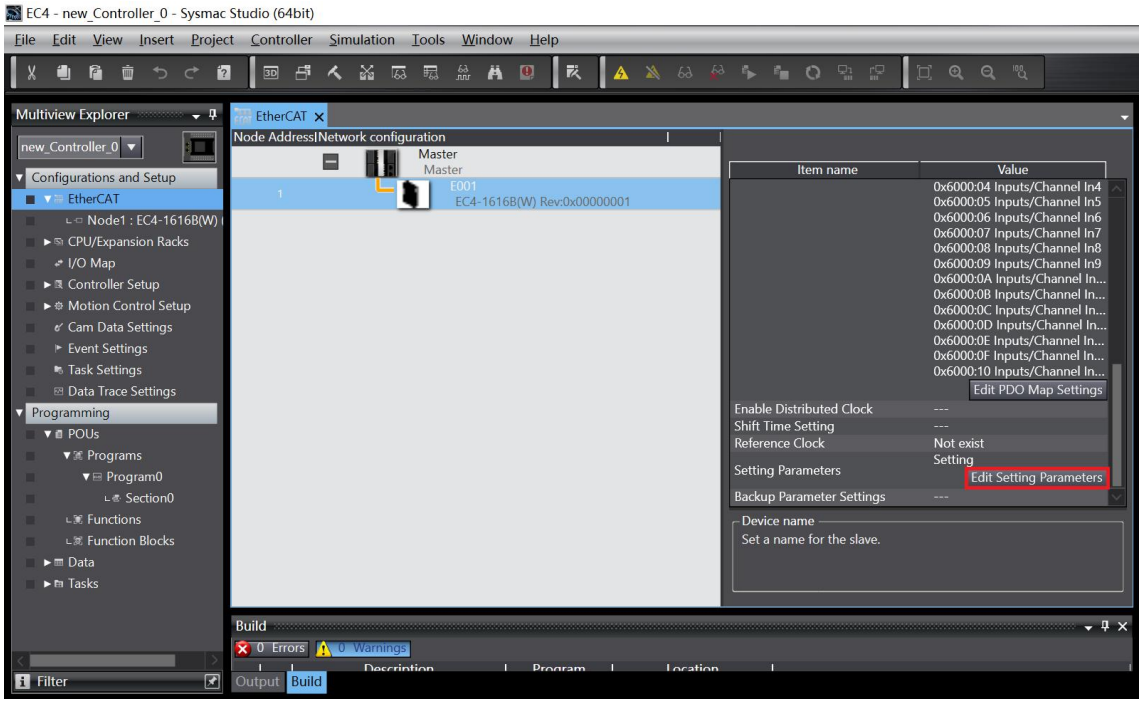


b. Popup the transmission confirmation window, click the "Execute" button, and then the popup will click "Yes / OK", as shown in the following figure. After downloading, you need to power on again.



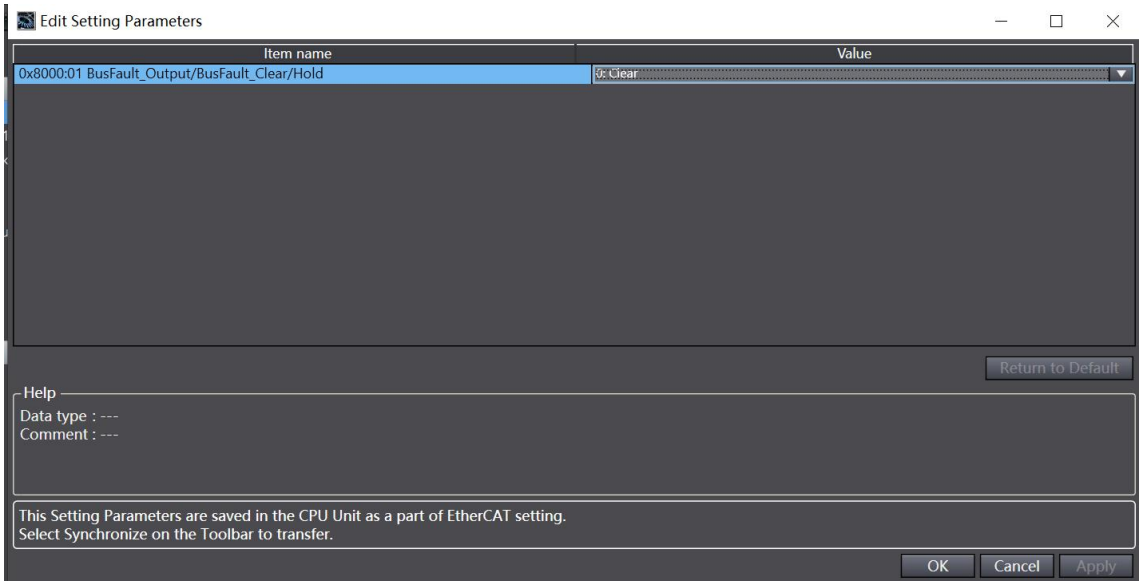
8、 Module parameter configuration

a. Switch the configuration to the offline state, in the EtherCAT main page, select EC4 module and click "Edit Setting Parameters", as shown in the figure below.



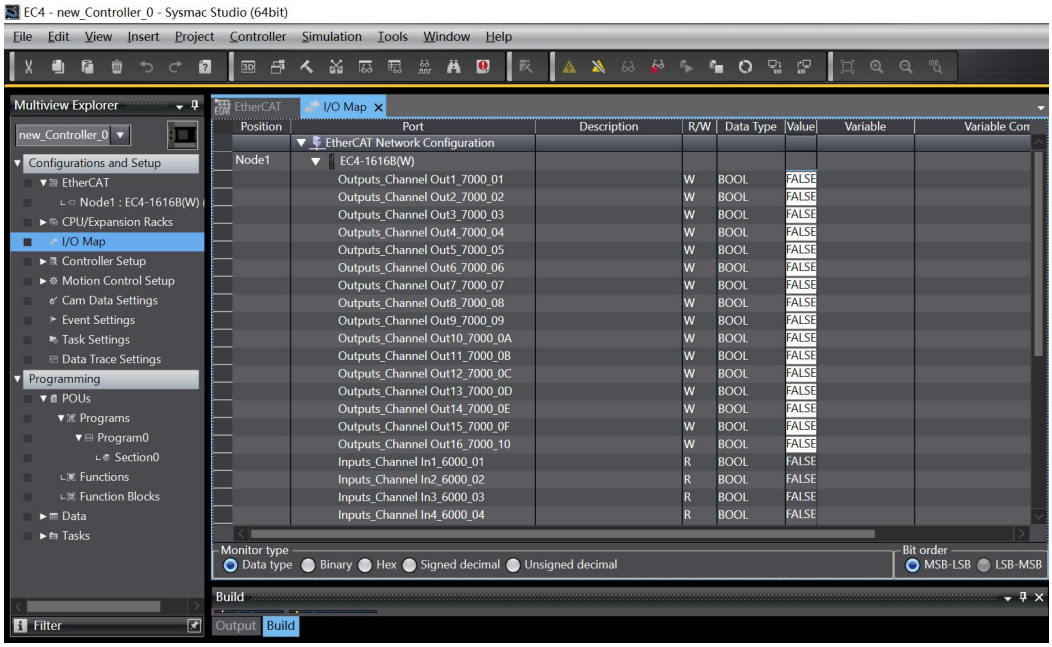
Note: If the PLC firmware version is too low, write and read the EC_CoESDOWrite and EC_CoESDORead instructions for the SDO address.

b. On the parameter setting page, the output point signal empty / hold function can be configured for "0" and after the configuration, click OK and click Apply. After all the parameters are configured, the program needs to be downloaded again to the PLC. The PLC and the module need to be powered on again.

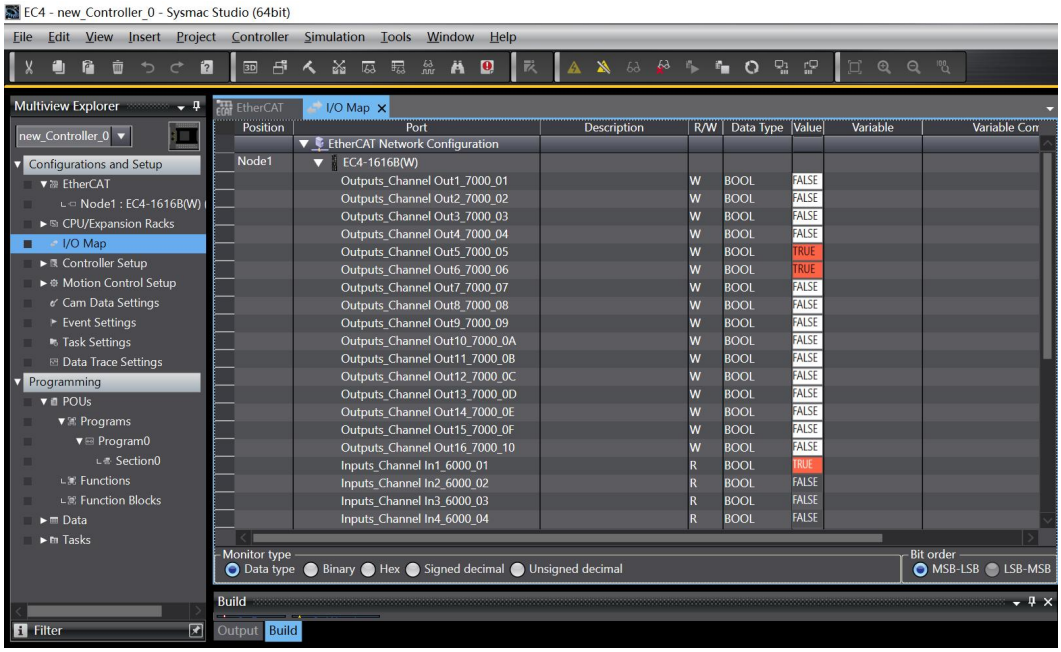


9、 Test the IO module

a. After switching on again, the lower right corner can see the PLC as the operation mode. Double-click the "I/O Map" in the left navigation tree to monitor and force the input and output signals, as shown in the figure below.



b. For the digital input channel 1, if the slave device input channel 1 has an effective voltage input, it can be observed in Input points_Channel In 1_6000_01 in the I / O map. If you want to output channel 5 and channel 6 output, you can write "1" on Out put points_ Channel Out 5_7000_05 and _ Out put points_ Channel Out 6_7000_06. After the operation, you can see the corresponding channel light is on, as shown in the figure
below.



8 FAQ

8.1 Failure to find a device in the software

1. Confirm that the ESI profile is installed correctly.
2. Confirm that the ESI profile, version is accurate.
3. Whether to restart the Twin CAT software after installing the ESI profile.

8.2 Failure to start operation of a device

1. Confirm whether the project is established correctly.
2. Confirm the relevant setting of the node station number.
3. Make sure if the power supply is normal.
4. EtherCAT The communication line is normal.
5. Re-power the device after changing from the device node address.