



EtherCAT

C2P-EC Series Bus Valve Terminal

User Manual



Nanjing Solidot Electronic Technology Co., Ltd. 2024

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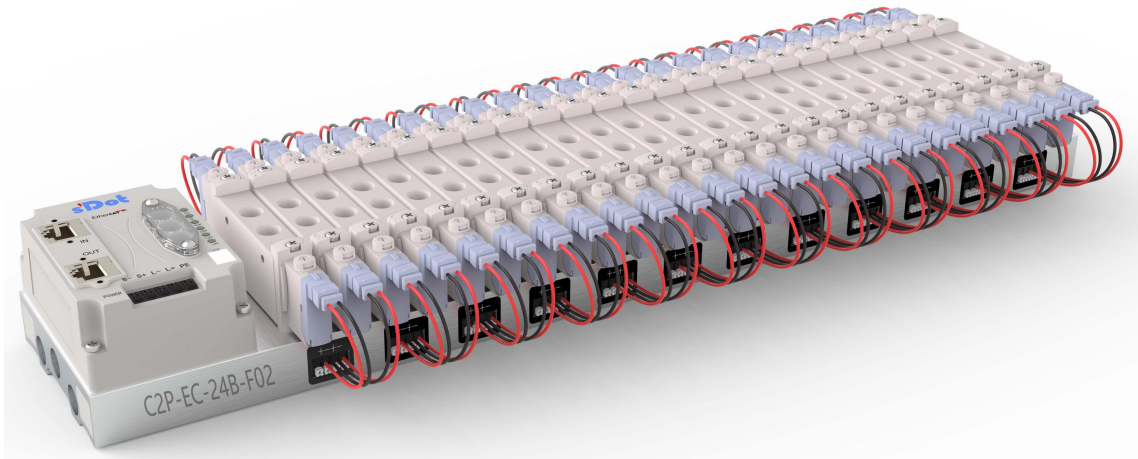
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1 Product Introduction

1.1 Product overview

C2P-EC series valve terminal is a control module integrating valve terminal technology and EtherCAT bus technology, through which decentralized control and centralized control of industrial sites can be realized, system design can be optimized, construction can be fast, and debugging, performance testing and diagnostic maintenance of complex systems can be simplified. The product adopts modular structure, occupies little space, the wiring terminal is pluggable, can be quickly wired, simple configuration, support the major mainstream EtherCAT master station, can be widely used in industrial control systems.



1.2 Product Characteristics

- Supports EtherCAT industrial Ethernet protocol
- RJ45 bus interface, support cascade communication
- Maximum support for 24-position dual-control solenoid valves
- Modular structure, small footprint
- Simple wiring, quick construction and easy maintenance
- Support customization, support mainstream solenoid valve, simple and fast selection

- Supports remote diagnosis to reduce troubleshooting difficulties

2 Designation Rules

2.1 Designation Rules

C2P - EC - 24 B - F01
(1) (2) (3) (4) (5)

Number	Meaning	Description of values				
(1)	Product type	C2P (RJ45 connector)				
(2)	Bus protocol	EC: EtherCAT protocol abbreviation				
(3)	Number of solenoid valve positions	08: 8 positions	12: 12 positions	16: 16 positions	20: 20 positions	24: 24 positions
(4)	Type of electric control	B: Dual electric control (compatible with single electric control)				
(5)	Solenoid valve model code	See solenoid valve model code table below				

Solenoid Valve Model Code List :

Branding	Code	Valve spacing	Range	Supported Solenoid Valve Models
AirTAC	A01	19	4V1	4V110/ 4V120/ 4V130
	A02	23	4V2	4V210/ 4V220/ 4V230
	A04	10.5	7V0	7V0510/ 7V0520/ 7V0530
	A05	16	7V1	7V110/ 7V120/ 7V130
	A06	19	7V2	7V210/ 7V220/ 7V230
	A07	19	5V1	5V110/ 5V120/ 5V130
	A08	23	5V2	5V210/ 5V220/ 5V230
FESTO	F01	10.5	VUVG-LK10	vuvg-lk10-t32/ vuvg-lk10-m52 vuvg-lk10-B52/ vuvg-lk10-p52
			VUVG-L10	vuvg-l10-t32/ vuvg-l10-m52 vuvg-l10-B52/ vuvg-l10-p52
	F02	16	VUVG-LK14	vuvg-lk14-t32/ vuvg-lk14-m52 vuvg-lk14-B52/ vuvg-lk14-p52
			VUVG-L14	vuvg-l14-t32/ vuvg-l14-m52 vuvg-l14-B52/ vuvg-l14-p52
SMC	S01	10.5	SY3	SY3120/ SY3220/ SY3320 SY3420/ SY3520
	S02	16	SY5	SY5120/ SY5220/ SY5320 SY5420/ SY5520
	S03	19	SY7	SY7120/ SY7220/ SY7320/ SY7420/ SY7520
CKD	C01	10.5	4GD1	4GD119R/ 4GD129R/ 4GD139R 4GD149R/ 4GD159R
	C02	16	4GD2	4GD219R/ 4GD229R/ 4GD239R 4GD249R/ 4GD259R

Note: Valve spacing unit: mm.

2.2 Model List

Model number	Product Description
C2P-EC-08B-()	8-position dual control solenoid valve
C2P-EC-12B-()	12-position dual control solenoid valve
C2P-EC-16B-()	16-position dual-control solenoid valve
C2P-EC-20B-()	20-position dual control solenoid valve
C2P-EC-24B-()	24-position dual-control solenoid valve

Note: () brackets represent solenoid valve model code, support self-selected customization.

Compatibility rules for solenoid valve xml configuration files with different bit numbers: 8-bit compatible with 6-bit and 4-bit; 12-bit compatible with 10-bit; 16-bit compatible with 14-bit; 20-bit compatible with 18-bit; 24-bit compatible with 22-bit.

3 Product Parameters

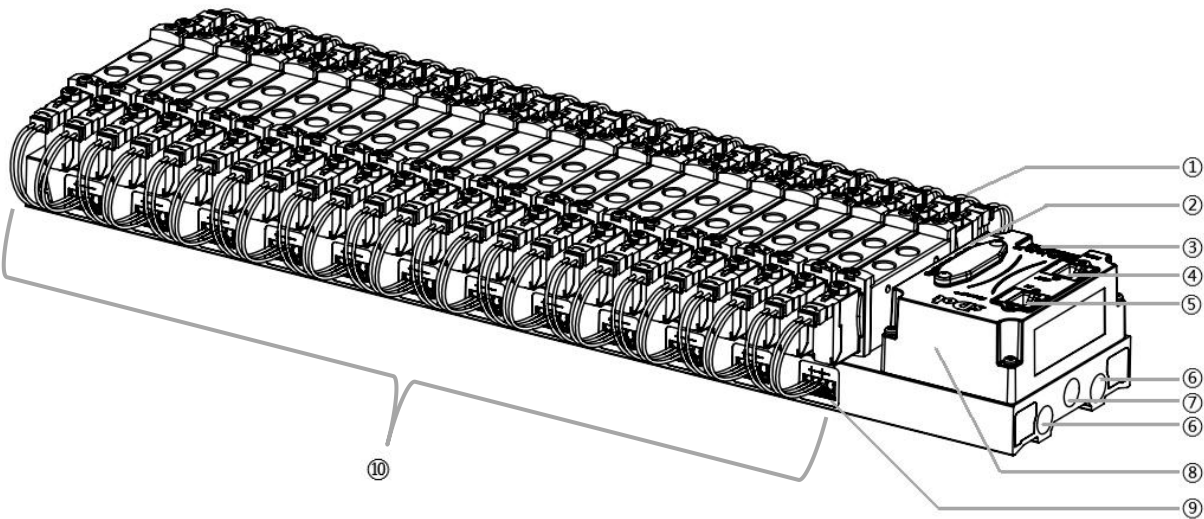
3.1 General parameter

Interface parameter	
Bus protocol	EtherCAT
Data transmission medium	Category 5+ UTP or STP (STP recommended)
Transmission distance	≤100 m (station to station)
Transmission rate	100 Mbps
Bus interface	2◇RJ45
Technical Parameters	
System power supply	18~36 VDC
Rated current consumption	30 mA
Electrical isolation	500 V
Load power	24 VDC (±25%)
Output points	0~48
Single channel current	Max: 250 mA
Power connection method	5Pin Pop-Up Terminal Block
Power interface surge protection	Support
Power connector reverse connection protection	Support
Channel short circuit protection	Support

Channel open diagnostics	Support
Channel short circuit diagnostics	Support
Weights	Varies by product model
Sizes	Differences by product model (see 5.1 External Dimensions for details)
Operating temperature	-5~+50°C
Storage temperature	-20~+75°C
Relative humidity	95%, non-condensing
Protection class	IP20

4 Panel

4.1 Product Structure



Name and function description of each part of the product

Number	Name	Description
①	Solenoids	See " Solenoid Valve Model Code List " for details.
②	LED indicator	Indicates power, operation and bus status
③	Power connector	5Pin Pop-Up Terminal Block
④	Bus interface	RJ45, Bus OUT Interface
⑤	Bus interface	RJ45, Bus IN Interface
⑥	A ventilation shaft	G1/4
⑦	Air intake	G1/4

⑧	Communications unit	Valve terminal communication and control body
⑨	Solenoid valve wiring socket	4 PIN pop-up terminal block
⑩	Manifold	Valve terminal body with a and b silkscreen on both ends

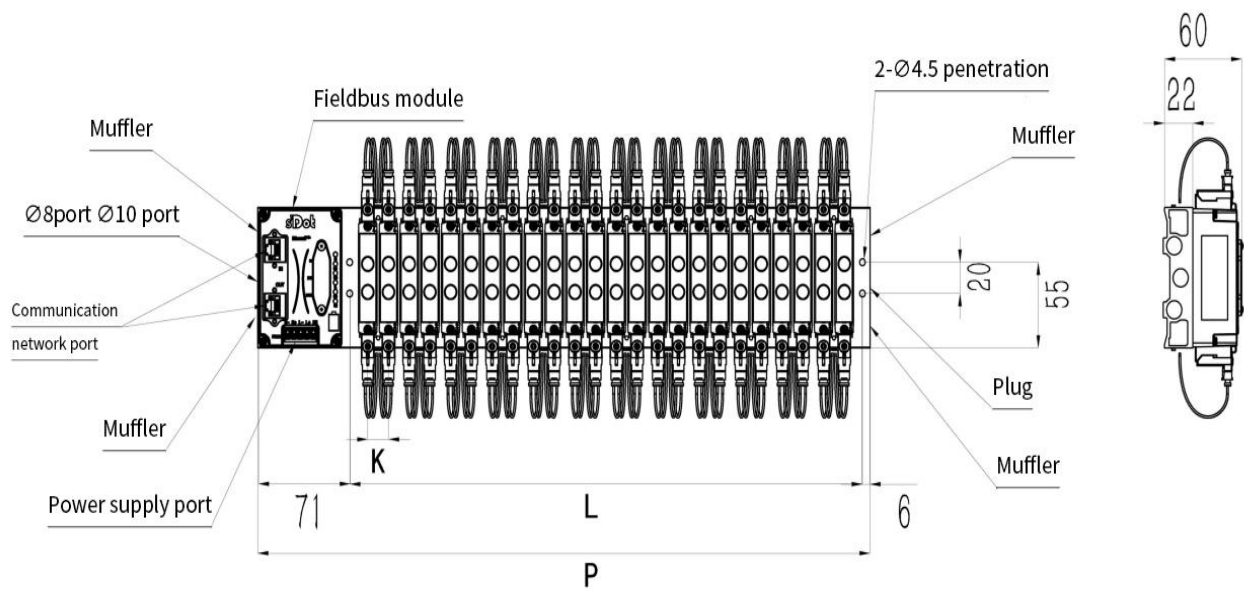
4.2 Indicator light function

Name	Markings	color	Status	Status Description
System power indicator	US	GREEN	ON	Power supply is normal
			OFF	The product is not powered up or the power supply is abnormal
Load power indicator	UL	GREEN	ON	Power supply is normal
			OFF	The product is not powered up or the power supply is abnormal
Network indicator IN	L/A0	GREEN	ON	Establish a network connection
			FLASHING	Network connection with data interaction
			OFF	No data interaction or exception
Network indicator OUT	L/A1	GREEN	ON	Establish a network connection
			FLASHING	Network connection with data interaction
			OFF	No data interaction or exception
Operation status indicator	RUN	GREEN	ON	Normal operation of the system
			FLASHING	3Hz: the device is in Pre-OP state 0.8Hz: device in Safe-OP state
			OFF	Device is in Init or unpowered state
Warning indicator	ERR	RED	ON	Channel shorted (channel must be open to be monitored)
			OFF	No short circuits on all channels (channels must be open to be monitored)

5 Installation

5.1 External Dimensions

External size (unit mm)



Plug, muffler, port adapters: G1/4

L size											
Number of position	4	6	8	10	12	14	16	18	20	22	24
K=10.5	59.5	80.5	101.5	122.5	143.5	164.5	185.5	206.5	227.5	248.5	269.5
K=16	76	108	140	172	204	236	268	300	332	364	396
K=19	88	126	164	202	240	278	316	354	392	430	468
K=23	103	149	195	241	287	333	379	425	471	517	563

P size											
Number of position	4	6	8	10	12	14	16	18	20	22	24
K=10.5	136.5	157.5	178.5	199.5	220.5	241.5	262.5	283.5	304.5	325.5	346.5
K=16	153	185	217	249	281	313	345	377	409	441	473
K=19	165	203	241	279	317	355	393	431	469	507	545
K=23	180	226	272	318	364	410	456	502	548	594	640

5.2 Solenoid valve installation sequence

- **Solenoid Valve For Valve Terminal**

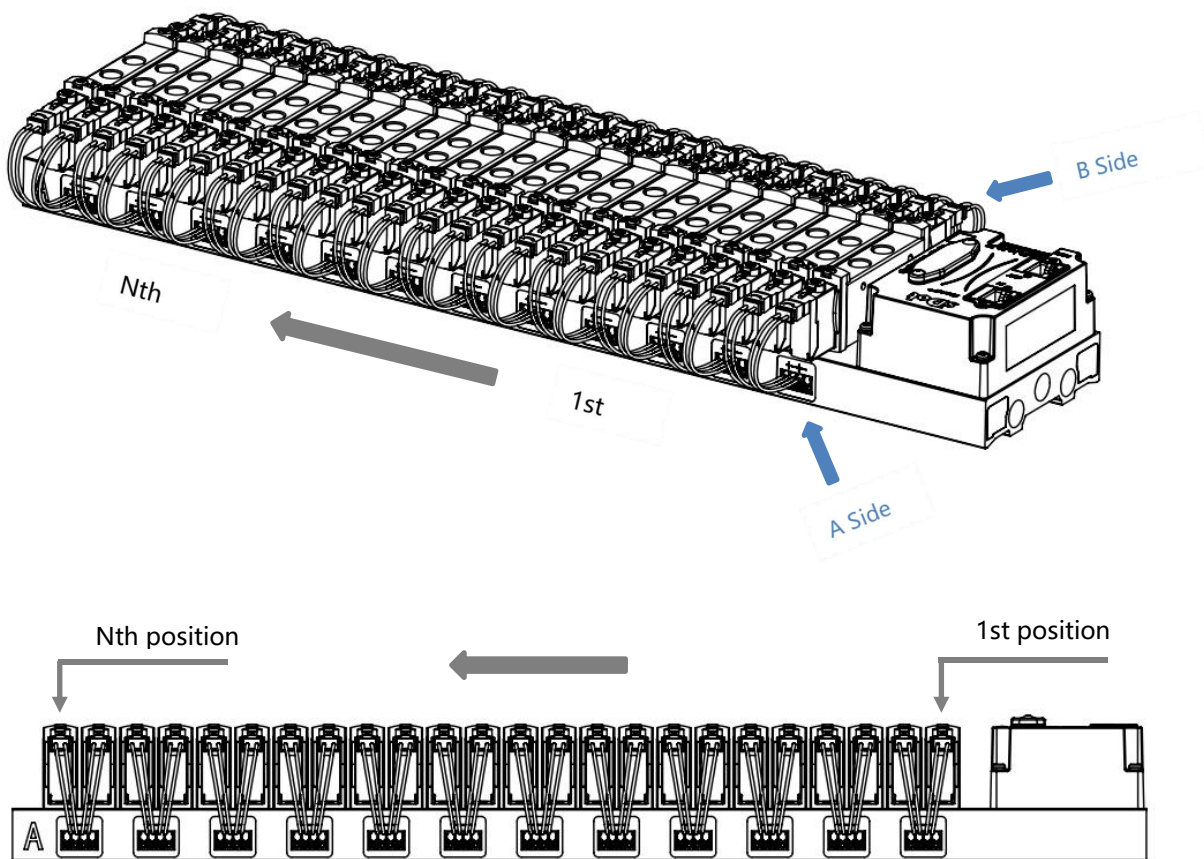
For details of solenoid valves for valve Terminal, see "[2.1 Naming Rules Solenoid Valve Model Code List](#)".

- **Solenoid valve installation sequence**

The solenoid valves are installed in order from the communication unit end.

Installation order for dual electronically controlled solenoid valve installation: Starting from the communication unit end, install the dual electronically controlled solenoid valve from the 1st position to the Nth position in sequence, and the installation order is shown in the figure below.

Installation order of single electronically controlled solenoid valve installation: Starting from the communication unit end, install the single electronically controlled solenoid valve in order from the 1st position to the Nth position, and the solenoid valve wiring can be done on the A side, and the installation order is shown in the figure below.

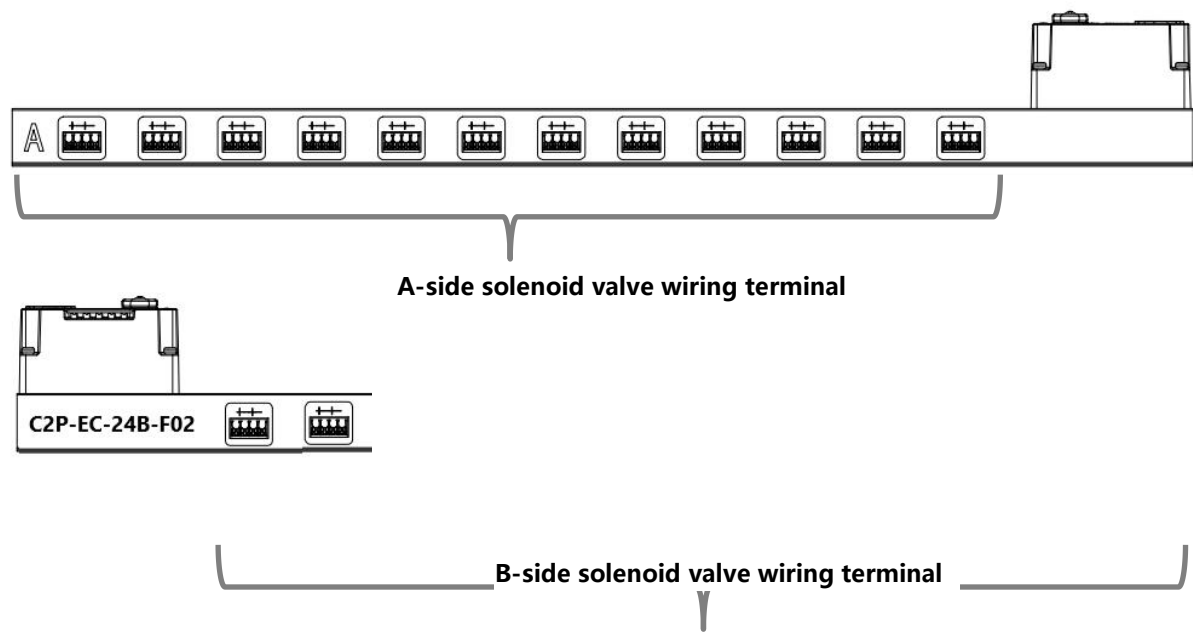


6 Wiring

6.1 Solenoid valve wiring

Valve Terminal Terminal Distribution

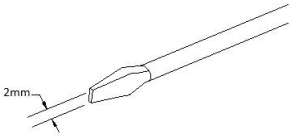
The valve terminal terminals are distributed on both sides of the valve terminal manifold, respectively, side A and side B. Side A and side B can be distinguished according to the silkscreen on the end of the valve terminal manifold. Take valve terminal C2P-EC-24B-F02 as an example, the distribution of A-side and B-side terminals is shown in the figure below.



Wiring terminal		
Terminals	Number of poles	4P
	wire diameter	22~17 AWG 0.3~1.0 mm²

Wiring Tool Requirements

The solenoid valve wiring terminal adopts screw-free design, and the installation and removal of cables can be operated with a screwdriver (specification: $\leq 2\text{mm}$).



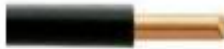
Stripped Wire Length Requirements

Recommended cable stripping length for solenoid valve wiring terminals 10 mm



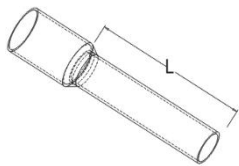
Wiring Method

For single stranded hard wires, after stripping the corresponding length of wire, press down the button while inserting the single stranded wire.



Multi-stranded flexible wires, after stripping the corresponding length of wire, can be directly connected or supporting the use of the corresponding standard specifications of the cold compression end (tube-type insulated terminal, the reference specifications are shown in the table below), press down the button at the same time the line will be inserted.

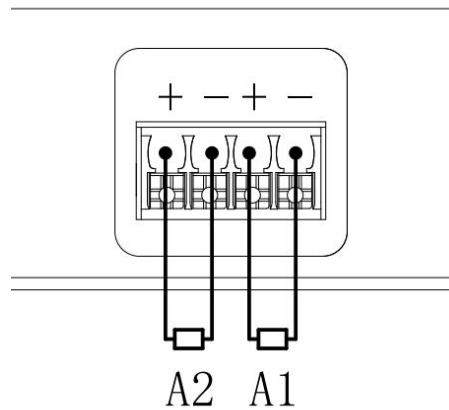


Tube Insulation End Specification Sheet		
specification	model number	Cross-sectional area of conductor mm ²
	E0310	0.3
	E0510	0.5
	E7510	0.75

Tube insulated terminal L with a length of 10 mm	E1010	1.0
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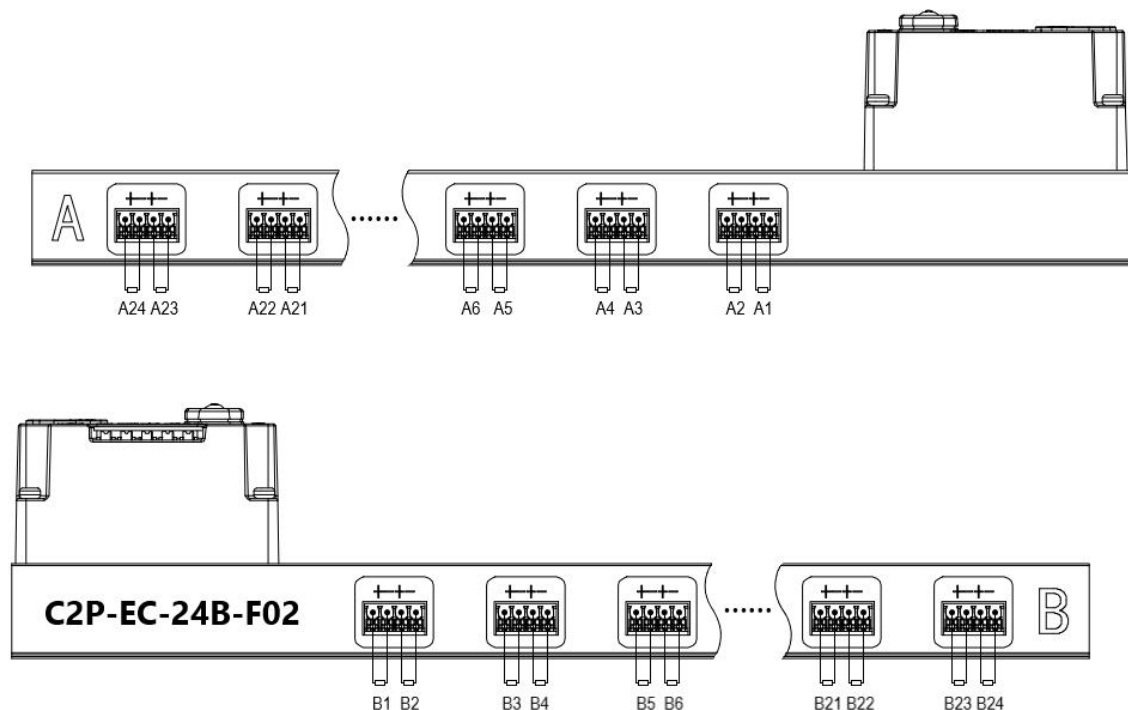
- **Solenoid valve wiring**

For different types of valve Terminal, 4Pin sockets with corresponding positions are configured on both sides of the manifold, and a set of "+" and "-" of the sockets can drive a solenoid valve coil. As shown in the figure below, A1 and A2 can drive one solenoid valve coil respectively.



- **Valve Terminal Wiring**

Starting from the communication unit end, the solenoid valve coils on the A and B sides of the manifold correspond one to the other, and the correspondence between the channels and the solenoid valve coils is shown in the figure below.



Solenoid valve wiring principles:

- Install the solenoid valve in accordance with "[5.2 Solenoid Valve Installation Sequence](#)".
- AX and BX can be connected to a double electric solenoid valve, and AX can be connected to a single electric solenoid valve. For wiring, please strictly follow the table below, otherwise the solenoid valves will not work or malfunction. "✗" means no wiring.

Dual control solenoid valve wiring (all valve pieces are dual control solenoid valves)									
terminals	A1	B1	A2	B2	A3	B3	A4	B4	
Solenoid Valve No.	1		2		3		4		

terminals		A22	B22	A23	B23	A24	B24
Solenoid Valve No.		22		23		24	

Note: This example takes C2P-EC-24B-() valve terminal, 24-position dual-control solenoid valve as an example, the rest of the different specifications of the valve terminal, there are differences in wiring.

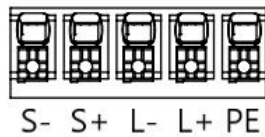
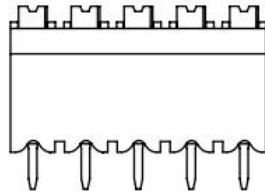
Dual-control solenoid valve wiring (all access valve pieces are single-control solenoid valves)									
terminals	A1	B1	A2	B2	A3	B3	A4	B4	
Solenoid Valve No.	1	✗	2	✗	3	✗	4	✗	

terminals		A22	B22	A23	B23	A24	B24
Solenoid Valve No.		22	✗	23	✗	24	✗

Note: This example to C2P-EC-24B-() valve terminal, only access to the single control solenoid valve as an example, the rest of the different specifications of the valve terminal, wiring differences.

6.2 Power Wiring

Power supply terminal S indicates the system power supply, L indicates the load power supply, wiring method and solenoid valve wiring method is consistent with the silkscreen and power parameters can be wired against the power supply, power supply 5P terminal as shown in the following figure:

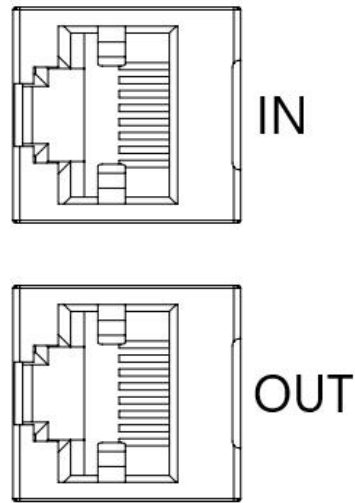


⚠ Precautions

- The module system-side power supply and the field-side power supply are configured and used separately, so do not mix them.
- PE needs to be reliably grounded.

6.3 Bus Wiring

The bus interface uses an RJ45 connector as shown below:



Precautions

- Adopt standard RJ45 network interface with standard crystal connector.
- The length of the cables between the devices must not exceed 100 m.

7 Operation

7.1 Control Method

Valve terminal solenoid valve control byte way, a byte control 4 valves; at the same time can be controlled in accordance with the bit way, a group of 8 position, control 1-→8 channels, the channel value of 1 is the corresponding solenoid valve is open, the channel value of 0 is the corresponding solenoid valve is closed. 24-position dual-control solenoid valves have a total of 6 groups of control positions, a total of 48 channel control. Take 24-position dual-control solenoid valve as an example to introduce the output control function of the valve terminal, the control mode is shown in the table below.

Control method	valve[1..4]							
Channel address	valve [1..4] [0]	valve [1..4] [1]	valve [1..4] [2]	valve [1..4] [3]	valve [1..4] [4]	valve [1..4] [5]	valve [1..4] [6]	valve [1..4] [7]
Transformers	A1	B1	A2	B2	A3	B3	A4	B4
Solenoid Valve No.	1		2		3		4	

Control method	valve[5..8]							
Channel address	valve [5..8] [0]	valve [5..8] [1]	valve [5..8] [2]	valve [5..8] [3]	valve [5..8] [4]	valve [5..8] [5]	valve [5..8] [6]	valve [5..8] [7]
Transformers	A5	B5	A6	B6	A7	B7	A8	B8
Solenoid Valve No.	5		6		7		8	

Control method	valve [9...12]							
Channel address	valve [9..12] [0]	valve [9...12] [1]	valve [9...12] [2]	valve [9...12] [3]	valve [9...12] [4]	valve [9...12] [5]	valve [9...12] [6]	valve [9...12] [7]
Transformers	A9	B9	A10	B10	A11	B11	A12	B12
Solenoid Valve No.	9		10		11		12	

Control method	valve [13...16]							
Channel address	Valve [13...16] [0]	Valve [13...16] [1]	Valve [13...16] [2]	Valve [13...16] [3]	Valve [13...16] [4]	Valve [13...16] [5]	Valve [13...16] [6]	valve [13...16] [7]
Transformers	A13	B13	A14	B14	A15	B15	A16	B16
Solenoid Valve No.	13		14		15		16	

Control method	valve[17..20]							
Channel address	valve [17...20] [0]	valve [17...20] [1]	Valve [17...20] [2]	valve [17...20] [3]	valve [17...20] [4]	valve [17...20] [5]	valve [17...20] [6]	valve [17...20] [7]
Transformers	A17	B17	A18	B18	A19	B19	A20	B20
Solenoid Valve No.	17		18		19		20	

Control method	valve [21...24]							
Channel address	valve [21...24] [0]	valve [21...24] [1]	valve [21...24] [2]	valve [21...24] [3]	valve [21...24] [4]	valve [21...24] [5]	valve [21...24] [6]	valve [21...24] [7]
Transformers	A21	B21	A22	B22	A23	B23	A24	B24
Solenoid Valve No.	21		22		23		24	

7.2 Diagnostic Function

The C2P-EC valve terminal has an open circuit diagnostic (Open load) and a short circuit or overtemperature diagnostic (Short circuit or overtemperature). An open circuit can only be monitored if the valve is closed and a short circuit can only be monitored if the valve is open.

The diagnostic function is the same as the control mode and also sends diagnostic information in Byte or bit. If the valve is closed, the diagnostic message Open load is normal if the value is 0, and 1 means the corresponding valve is open. Under the premise of valve opening, valve short circuit or overtemperature diagnostic information Short circuit or overtemperature value is 0 is normal, 1 represents the corresponding valve short circuit/overtemperature.

The channel diagnostic information and solenoid valve correspondence for Open load and Short circuit or overtemperature diagnostics are the same, taking Open load diagnostics as an example, the correspondence is shown in the table below.

Diagnostic function	Open load[0..7]							
Channel address	Open [0..7] [0]	Open[0..7] [1]	Open [0..7] [2]	Open [0..7] [3]	Open [0..7] [4]	Open [0..7] [5]	Open[0..7] [6]	Open[0..7] [7]
Transformers	A1	B1	A2	B2	A3	B3	A4	B4
Solenoid Valve No.	1		2		3		4	

Note: Open load is abbreviated as Open in the table, the same below.

Diagnostic function	Open load[8..15]							
Channel address	Open [8..15] [0]	Open [8..15] [1]	Open [8..15] [2]	Open [8..15] [3]	Open [8..15] [4]	Open [8..15] [5]	Open [8..15] [6]	Open [8..15] [7]
Transformers	A5	B5	A6	B6	A7	B7	A8	B8
Solenoid Valve No.	5		6		7		8	
Diagnostic function	Open load[16..23]							
Channel address	Open [16..23] [0]	Open [16...23] [1]	Open [16...23] [2]	Open [16...23] [3]	Open [16...23] [4]	Open [16...23] [5]	Open [16...23] [6]	Open [16...23] [7]
Transformers	A9	B9	A10	B10	A11	B11	A12	B12
Solenoid Valve No.	9		10		11		12	

Diagnostic function	Open load[24..31]							
Channel address	Open [24..31] [0]	Open [24..31] [1]	Open [24..31] [2]	Open [24..31] [3]	Open [24..31] [4]	Open [24..31] [5]	Open [24..31] [6]	Open [24..31] [7]
Transformers	A13	B13	A14	B14	A15	B15	A16	B16
Solenoid Valve No.	13		14		15		16	

Diagnostic function	Open load [32..39]							
Channel address	Open [32..39] [0]	Open [32..39] [1]	Open [32..39] [2]	Open [32..39] [3]	Open [32..39] [4]	Open [32..39] [5]	Open [32..39] [6]	Open [32..39] [7]
Transformers	A17	B17	A18	B18	A19	B19	A20	B20
Solenoid Valve No.	17		18		19		20	

Diagnostic function	Open load[40..47]							
Channel address	Open [40..47] [0]	Open [40..47] [1]	Open [40..47] [2]	Open [40..47] [3]	Open [40..47] [4]	Open [40..47] [5]	Open [40..47] [6]	Open [40..47] [7]
Transformers	A21	B21	A22	B22	A23	B23	A24	B24
Solenoid Valve No.	21		22		23		24	

7.3 Parameter description

7.3.1 Output signal clear/hold function

The Clear/Hold function is for the output signal of the valve terminal, and this function can configure the output action of the valve terminal in the abnormal state of the bus.

Clear Output: When communication is disconnected, the valve terminal output channel automatically clears the output.

Hold Output: The valve terminal output channel keeps on outputting when communication is disconnected.

The function supports full-channel setting, single-channel setting and 8-channel batch setting according to the driver chip grouping, which can better meet the actual use requirements.

This manual takes TwinCAT3 as an example to introduce the parameter configuration method, the specific steps are detailed in [7.4.1 Parameter Configuration](#).

7.4 Configuration Module Applications

7.4.1 Application in TwinCAT3 software environment

1、Preliminary

● Hardware Environment

- Valve Terminal Model C2P-EC-24B
- A computer with pre-installed TwinCAT3 software
- Shielded cable for valve terminal
- One switching power supply
- Device Configuration Files

Configuration file access: <https://www.solidotech.com/documents/configfile>

● Hardware configuration and wiring

Please follow "[5 Installation](#)" and "[6 Wiring](#)".

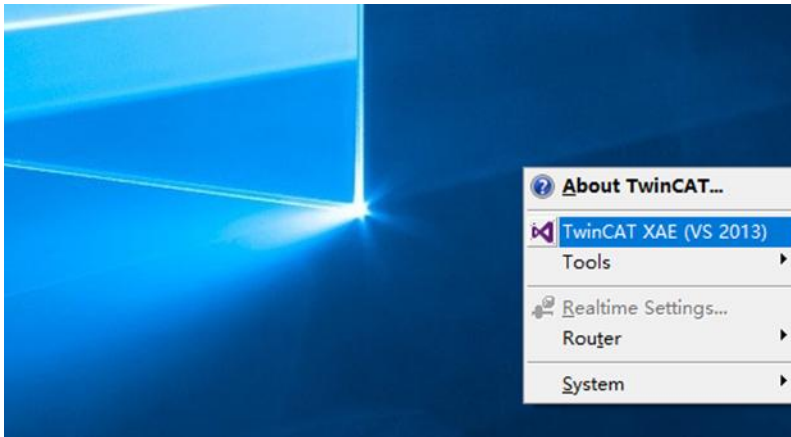
2、Preset Profiles

Place the ESI configuration file (C2P-EC_V1.0.1.xml) in the TwinCAT installation directory under "C:\TwinCAT\3.1\Config\Io\EtherCAT" as shown below.

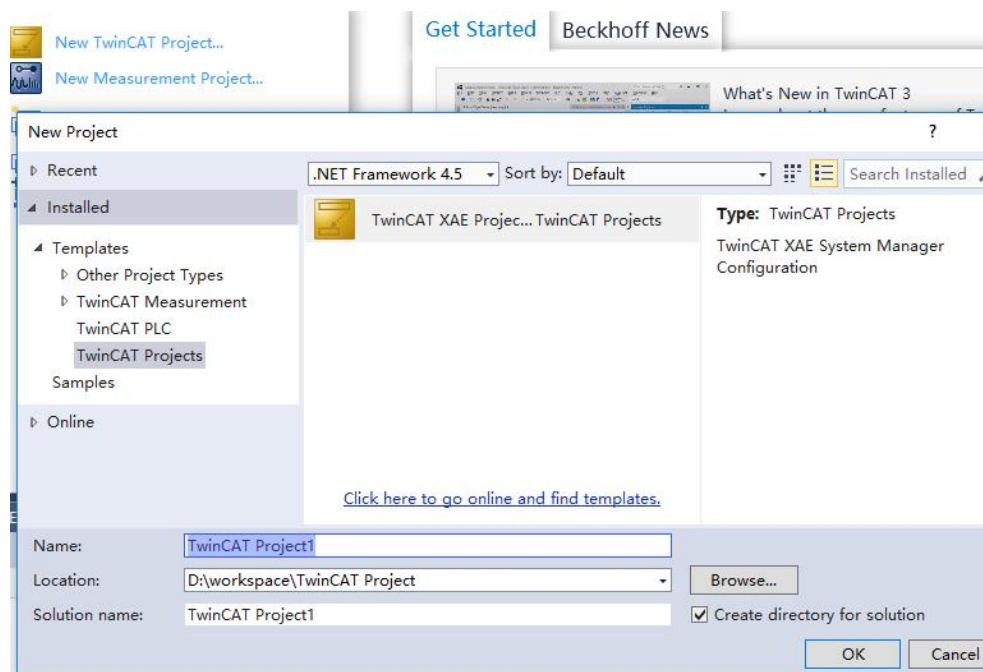
名称	修改日期	类型	大小
Beckhoff C2P-EC_V1.0.1.xml	2023/5/29 11:24	XML 文档	72 KB
Beckhoff EQ1xxx.xml	2015/11/12 14:24	XML 文档	22 KB
Beckhoff EQ2xxx.xml	2016/11/23 10:42	XML 文档	73 KB
Beckhoff EQ3xxx.xml	2016/11/22 11:22	XML 文档	1,386 KB
Beckhoff ER1xxx.XML	2016/11/21 15:46	XML 文档	165 KB
Beckhoff ER2xxx.XML	2016/11/21 14:32	XML 文档	259 KB
Beckhoff ER3xxx.XML	2017/6/9 13:35	XML 文档	1,177 KB
Beckhoff ER4xxx.xml	2016/11/22 12:58	XML 文档	318 KB
Beckhoff ER5xxx.xml	2016/3/14 11:52	XML 文档	273 KB
Beckhoff ER6xxx.xml	2016/3/14 11:52	XML 文档	494 KB
Beckhoff ER7xxx.xml	2016/11/22 12:14	XML 文档	1,503 KB
Beckhoff ER8xxx.xml	2016/3/14 11:52	XML 文档	207 KB
Beckhoff EtherCAT EvaBoard.xml	2015/2/4 12:57	XML 文档	72 KB
Beckhoff EtherCAT Terminals.xml	2015/2/4 12:57	XML 文档	53 KB
Beckhoff FB1XXX.xml	2017/5/24 12:26	XML 文档	49 KB
Beckhoff FCxxx.xml	2015/2/4 12:57	XML 文档	21 KB
Beckhoff ILxxx-B110.xml	2015/2/4 12:57	XML 文档	8 KB

3. Create Project

- a. Click on the TwinCAT icon in the lower right corner of the desktop and select "TwinCAT XAE (VS 2013)" to open the TwinCAT software, as shown below.

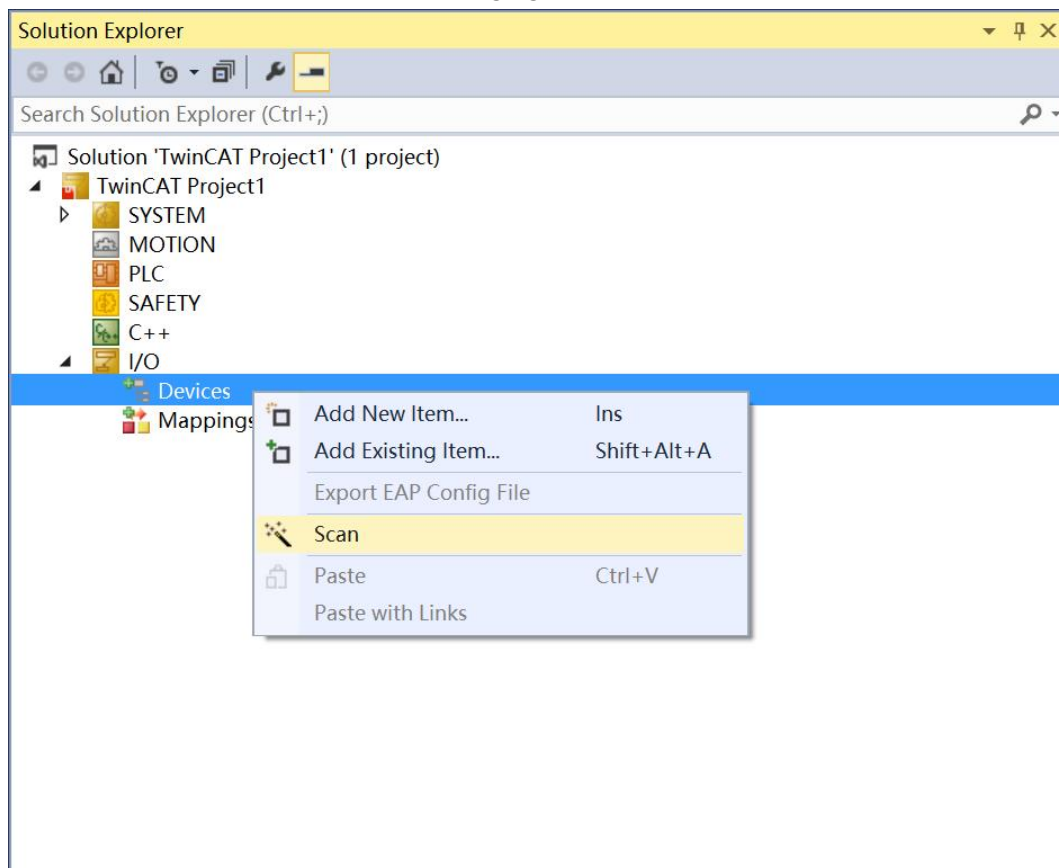


- b. Click "New TwinCAT Project", in the pop-up window, "Name" and "Solution name" correspond to the project name and solution name respectively. In the pop-up window, "Name" and "Solution name" correspond to the project name and solution name, respectively, and "Location" corresponds to the project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



4. Scanning device

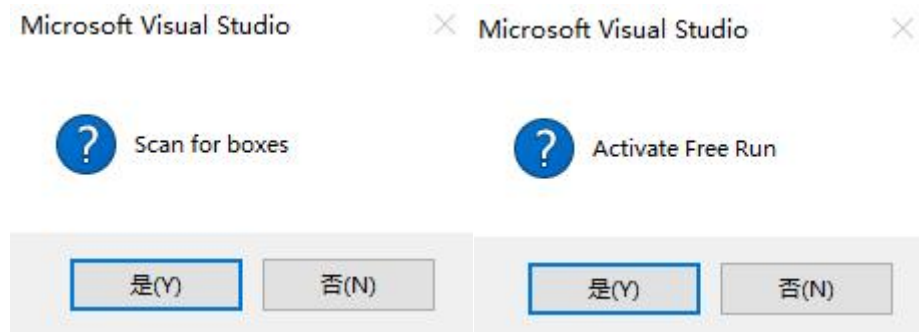
- a. After creating the project, right-click on the "Scan" option under "I/O -> Devices" to perform a slave device scan, as shown in the following figure.



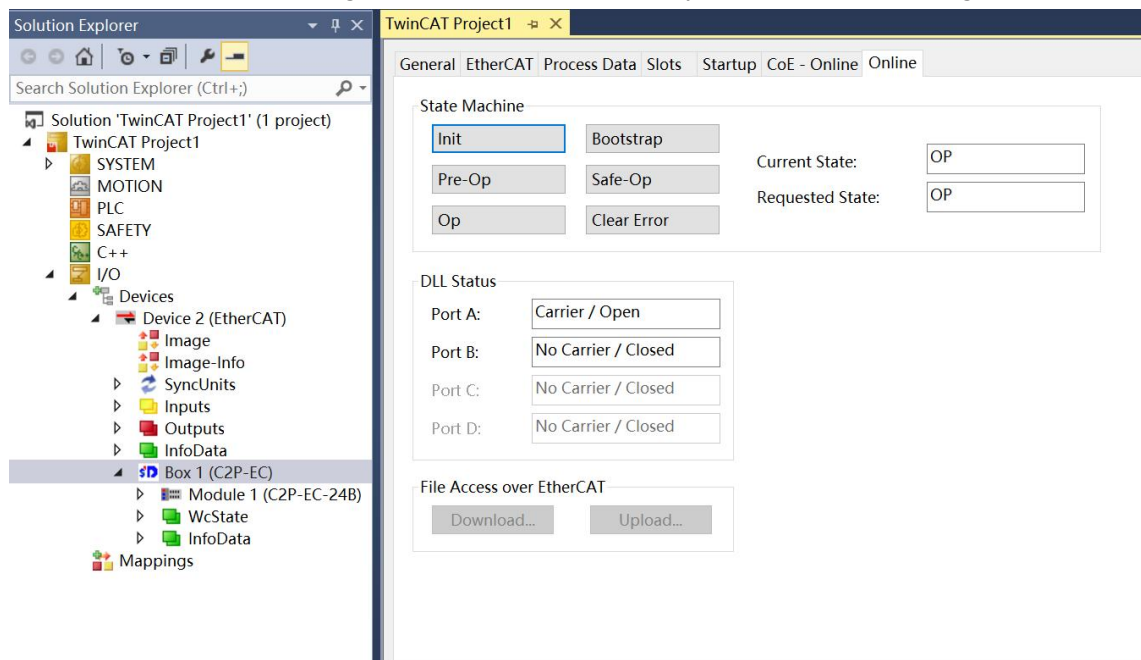
- b. Check the "Local Connection" box, as shown in the following figure.



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



- d. After scanning to the device, you can see Box1 (C2P-EC) -> Module1 (C2P-EC-24B) in the left navigation tree, double-click on the device, and you can see the device is in the "OP" state at "Online". Double click on the device, you can see the device is in "OP" state at "Online", and you can observe that the RUN light of the slave device is always on, as shown in the figure below.



5. View Feature Page

a. Valve Terminal Output Control Page

Click "Outputs" option in the left navigation tree "Box1 (C2P-EC) -> Module1 (C2P-EC-24B)" to expand the menu, you can view the output control function page of the valve terminal, 24-position dual-controlled Solenoid valve, according to the driver chip grouping, a total of 6 groups of channels, valve[1..4], valve[5..8], valve[9..12], valve[13..16], valve[17..20], valve[21..24], each group of 8 channels, a total of 48 channels output control, as shown below.

Name	Online	Type	Size	>Address	In/Out	User ID	Linked to
valve[1..4]	0x0 (0)	BITARR8	1.0	39.0	Output	0	
valve[5..8]	0x0 (0)	BITARR8	1.0	40.0	Output	0	
valve[9..12]	0x0 (0)	BITARR8	1.0	41.0	Output	0	
valve[13..16]	0x0 (0)	BITARR8	1.0	42.0	Output	0	
valve[17..20]	0x0 (0)	BITARR8	1.0	43.0	Output	0	
valve[21..24]	0x0 (0)	BITARR8	1.0	44.0	Output	0	

b. Valve Terminal Diagnostics Function Page

Click the "Inputs" option in the "Box1 (C2P-EC) -> Module1 (C2P-EC-24B)" expanding menu on the left navigation tree to view the Diagnostic Functions page for the valve terminal.

Open circuit diagnostics Open load[0..7], Open load[8..15], Open load[16..23], Open load[24..31], Open load[32..39], Open load[40..47], 48 channels can be diagnosed independently.

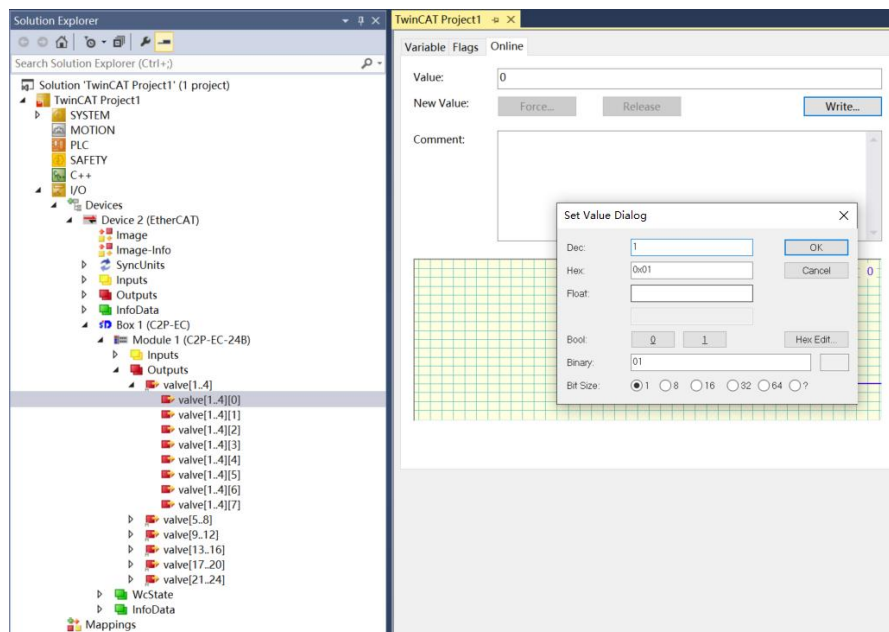
Short circuit/overtemperature diagnosis Short circuit or overtemperature[0..7], Short circuit or overtemperature[8..15], Short circuit or overtemperature[16..23], Short circuit or overtemperature[24..31], Short circuit or overtemperature[32..39], Short circuit or overtemperature[40..47], and 48 channels can be diagnosed independently, as shown below.

Name	Online	Type	Size	>Address	In/Out	User ID	Linked to
Open load[0..7]	0x0 (0)	BITARR8	1.0	39.0	Input	0	
Open load[8..15]	0x2 (2)	BITARR8	1.0	40.0	Input	0	
Open load[16..23]	0x0 (0)	BITARR8	1.0	41.0	Input	0	
Open load[24..31]	0x0 (0)	BITARR8	1.0	42.0	Input	0	
Open load[32..39]	0x0 (0)	BITARR8	1.0	43.0	Input	0	
Open load[40..47]	0x0 (0)	BITARR8	1.0	44.0	Input	0	
Short circuit or overtemperature[0..7]	0x0 (0)	BITARR8	1.0	45.0	Input	0	
Short circuit or overtemperature[8..15]	0x0 (0)	BITARR8	1.0	46.0	Input	0	
Short circuit or overtemperature[16..23]	0x0 (0)	BITARR8	1.0	47.0	Input	0	
Short circuit or overtemperature[24..31]	0x0 (0)	BITARR8	1.0	48.0	Input	0	
Short circuit or overtemperature[32..39]	0x0 (0)	BITARR8	1.0	49.0	Input	0	
Short circuit or overtemperature[40..47]	0x0 (0)	BITARR8	1.0	50.0	Input	0	

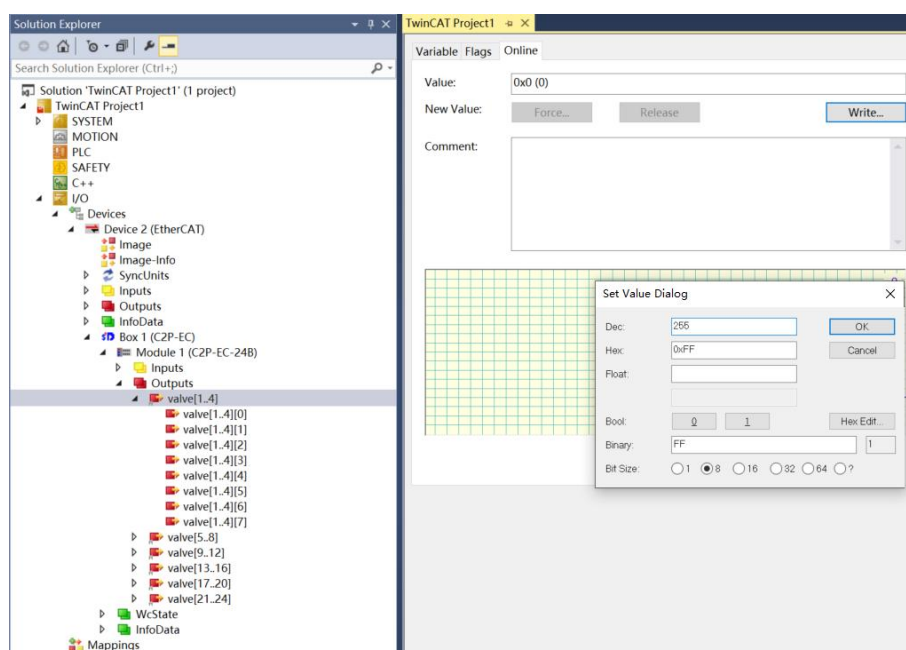
6. Data Interaction

a. Channel Output Control

If you want to turn on any solenoid coil output of the valve terminal, take the first channel as an example, you can click "valve[1..4] -> valve[1..4][0]" under Outputs in the left navigation tree, click "Write" at the corresponding "Online", enter the value "1" at the corresponding "Dec" in the dialog box, and click the "OK" button. you can open the first solenoid coil channel, as shown in the figure below.

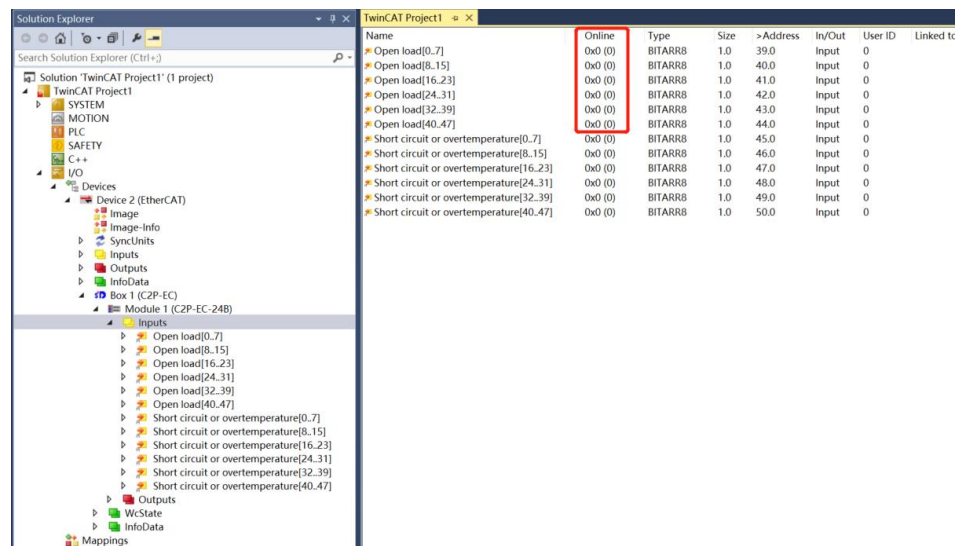


If you want to control the output of a group of solenoid valve coils, take the first group of channels as an example, you can click "valve[1...4]" under Outputs in the navigation tree on the left side, and then click "Write" in the corresponding "Online", enter the value "255" at "Dec" in the corresponding dialog box, and then click "OK" to open the first group of solenoid valve coil channels, as shown in the figure below.

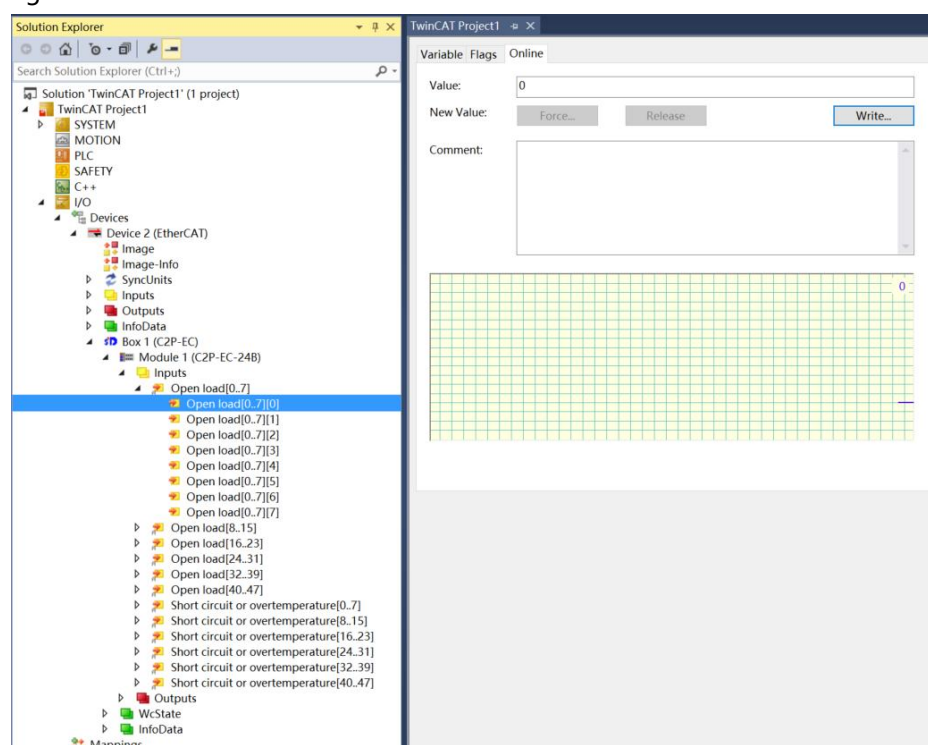


b. Open circuit diagnostic function

The diagnostic value of Open load is valid when the output of channel solenoid coil is off (i.e. 0). Click "Box1(C2P-EC)-> Module1(C2P-EC-24B)" to expand the "Inputs" option in the menu, and then in the right side of the "Online" corresponding to Open load, you can check the open solenoid valve value corresponding to each group of channels in the valve terminal as a whole. A group of channels with normal solenoid valve coils is **0**, and any solenoid valve with an open circuit is not **0**, as shown in the figure below.



Expand a set of Open loads in the left navigation tree and click on any channel to view the open diagnostic value of the solenoid valve. For example, click the folding symbol to expand Open load[0..7], click Open load[0..7][0], check the Value value of "Online" on the right side, if the value is **1**, then the valve is open-circuited, and if the value is **0**, then it is normal, as shown in the following figure.

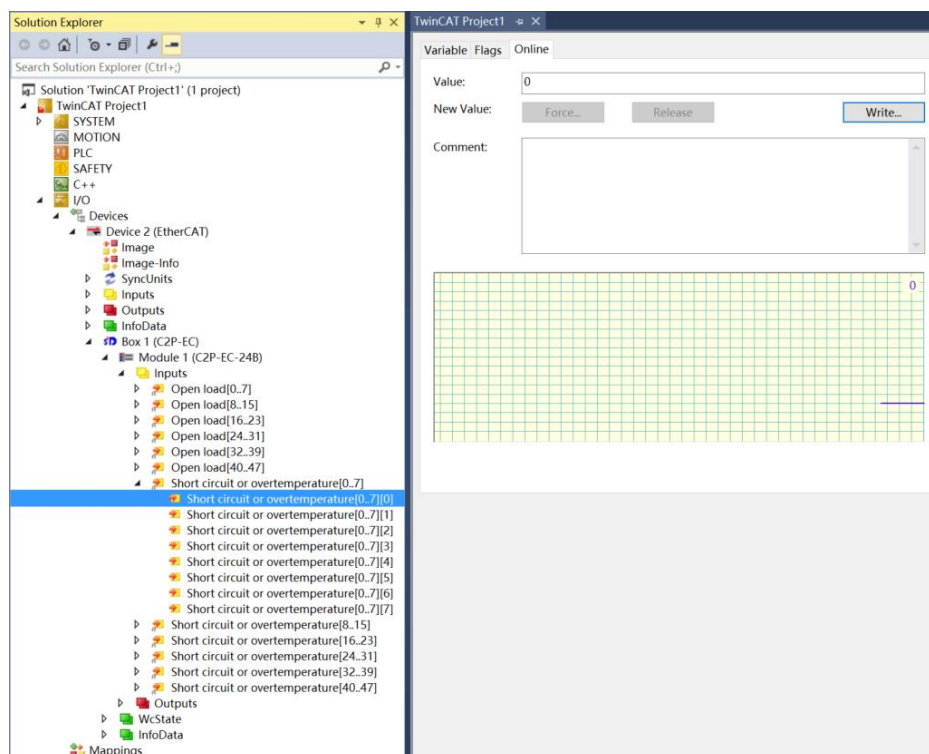


c. Short circuit/over temperature diagnostic function

Short circuit or overtemperature diagnostics are valid when the channel solenoid coil output is on (i.e. 1). Click the "Inputs" option in the "Box1 (C2P-EC) -> Module1 (C2P-EC-24B)" expanding menu, and at the "Online" on the right side of Short circuit or overtemperature, you can check the diagnostic value of the solenoid valve short circuit/overtemperature corresponding to each group of channels of the valve terminal as a whole, and the value will not be **0** if there is a solenoid valve with a short circuit/overtemperature, and it will be **0** if there is not a short circuit/overtemperature, as shown in the figure below.

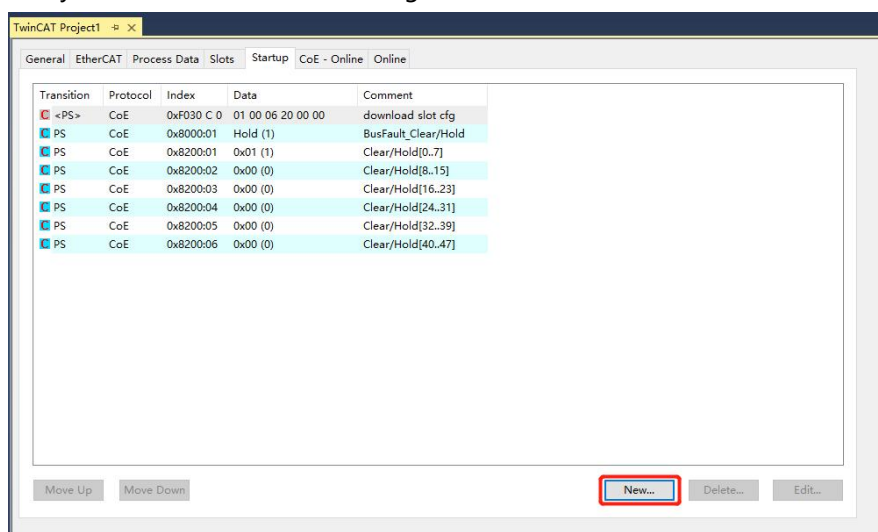
Name	Online	Type	Size	>Address	In/Out	User ID	Linked to
Open load[0..7]	0x0 (0)	BITARR8	1.0	39.0	Input	0	
Open load[8..15]	0x0 (0)	BITARR8	1.0	40.0	Input	0	
Open load[16..23]	0x0 (0)	BITARR8	1.0	41.0	Input	0	
Open load[24..31]	0x0 (0)	BITARR8	1.0	42.0	Input	0	
Open load[32..39]	0x0 (0)	BITARR8	1.0	43.0	Input	0	
Open load[40..47]	0x0 (0)	BITARR8	1.0	44.0	Input	0	
Short circuit or overtemperature[0..7]	0x0 (0)	BITARR8	1.0	45.0	Input	0	
Short circuit or overtemperature[8..15]	0x0 (0)	BITARR8	1.0	46.0	Input	0	
Short circuit or overtemperature[16..23]	0x0 (0)	BITARR8	1.0	47.0	Input	0	
Short circuit or overtemperature[24..31]	0x0 (0)	BITARR8	1.0	48.0	Input	0	
Short circuit or overtemperature[32..39]	0x0 (0)	BITARR8	1.0	49.0	Input	0	
Short circuit or overtemperature[40..47]	0x0 (0)	BITARR8	1.0	50.0	Input	0	

Expand the Short circuit or overtemperature group in the left navigation tree and click on any channel to view the short circuit/over temperature diagnostic values for the solenoid valve. For example, click the collapse symbol to expand Short circuit or overtemperature[0..7], click Short circuit or overtemperature[0..7][0], check the Value in the "Online" on the right side. If the value is **1**, then the solenoid valve is short circuit/over temperature, if the value is **0**, then the solenoid valve is not short circuit/over temperature, as shown in the following figure.

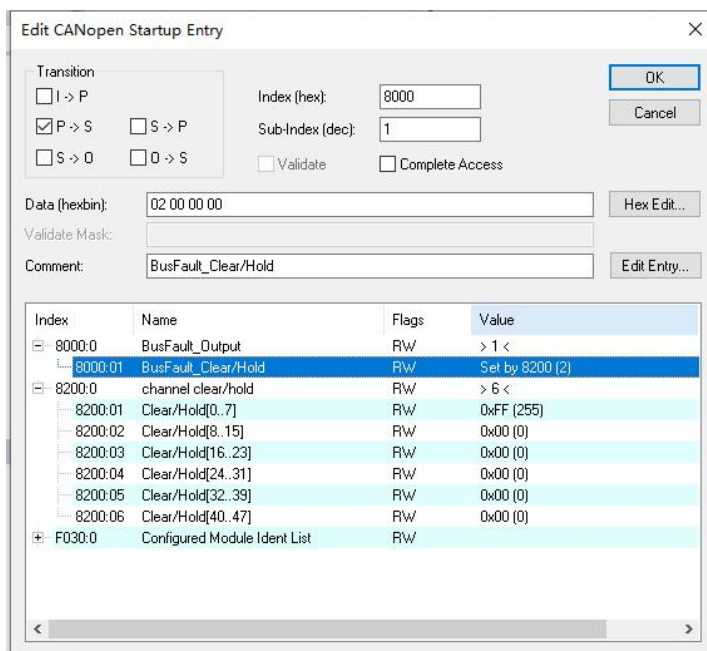


7. Parameter Configuration Method

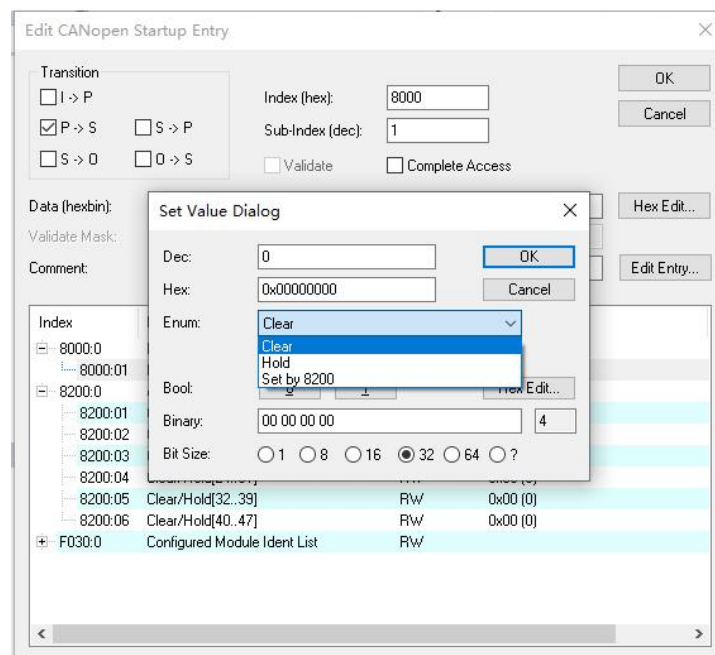
- After scanning the valve terminal in TwinCAT3 software, click "Box1 (C2P-EC) -> Module1 (C2P-EC-24B)" in the left navigation tree, and then click "Startup" in the right configuration interface. And then click the "New" button at the bottom to enter the "Edit CANopen Startup Entry" interface, as shown in the figure below.



- b. In the "Edit CANopen Startup Entry" interface, you can see the setting parameters 8000:0 and 8200:0. After expanding the parameters, 8000:0 is the function of setting parameters for all channels uniformly, and 8200:0 is the function of setting parameters for a single channel or a group of channels, as shown in the following figure.

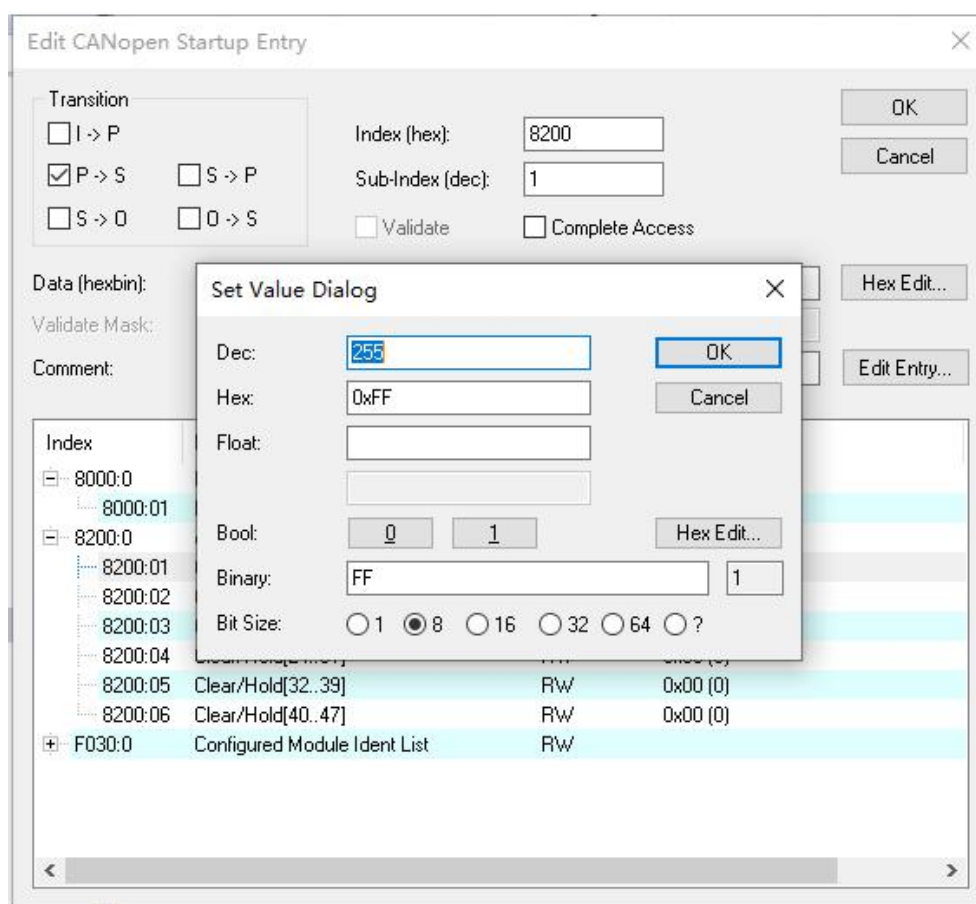


- c. In the "Edit CANopen Startup Entry" interface, double click "8000:01 BusFault_Clear/Hold", select "Clear" or "Hold" in the "Set Value Dialog" interface, click "OK" button to complete the setting, as shown in the figure below. After the configuration is completed, you need to perform the "Reload" operation for the settings to take effect. If you want to set single channel or group setting, select "Set by 8200", then 8000 will not take effect, and 8200 settings will take effect.



- d. When "8000:01 BusFault_Clear/Hold" is set to "Set by 8200", you can set the clear/hold function for single channel or group. For example, to set the clear/hold function of channel 0~7, in the "Edit CANopen Startup Entry" interface, double click "8200:01 Clear/Hold[0...7]" in the "Set Value Dialog" interface, and then enter the value in the input box corresponding to "Dec", a value of 1 for the channel will enable the hold function, and a value of 0 will enable the clear function. If you input **1**, only channel [0] will enable the hold function; if you input **255**, channel [0...7] will enable the hold function, and so on for the other 5 groups of channels.

When the settings are complete, click the "OK" button to finish the settings, as shown in the following figure. After the configuration is completed, you need to perform the "Reload" operation for the settings to take effect.



7.4.2 Application in Sysmac Studio software environment

1、 Preliminary

● Hardware Environment

- Valve terminal Model C2P-EC-24B
- One computer with Sysmac Studio software pre-installed
- One Omron PLC
 - This description is based on model NX1P2-9024DT as an example.
- Shielded cable for valve terminal
- One switching power supply
- Device Configuration Files

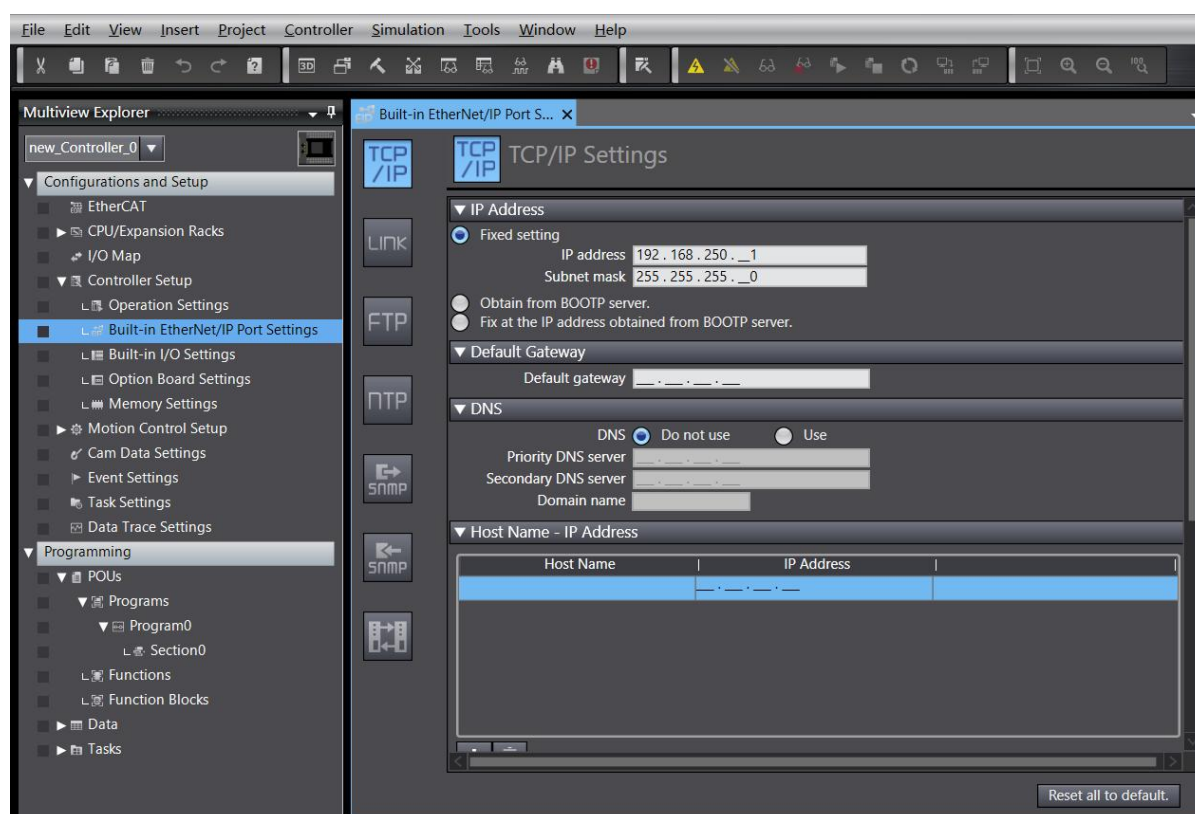
Configuration file access: <https://www.solidotech.com/documents/configfile>

● Hardware configuration and wiring

Please follow "[5 Installation](#)" and "[6 Wiring](#)".

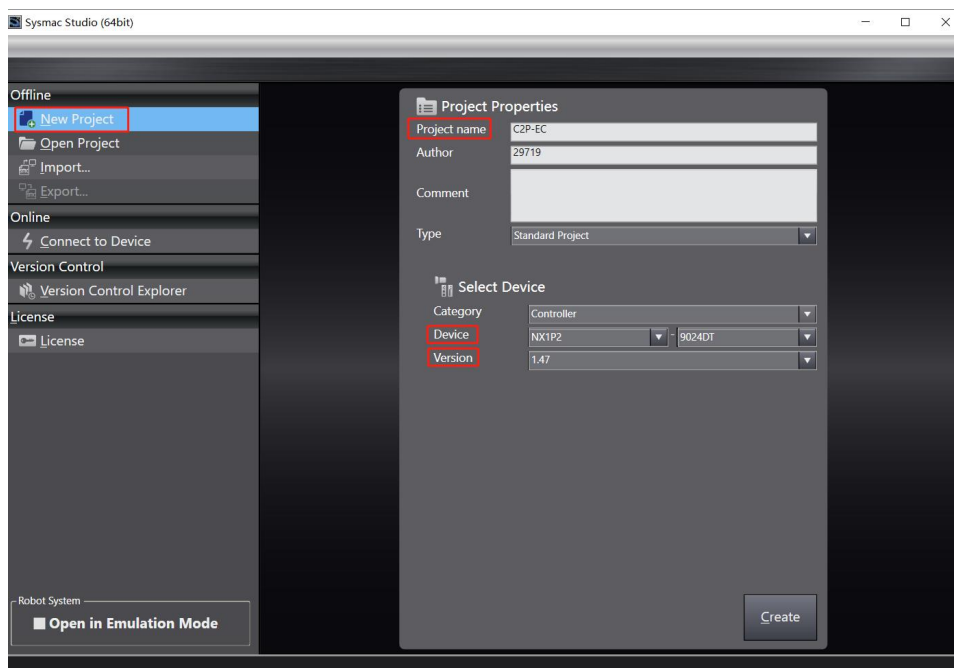
2、 Set IP

- a. Set the IP address of PC and PLC to make sure they are in the same network segment. If the IP of PLC is unknown, you can check it in "Configuration and Setup -> Controller Setup -> Built-in EtherNet/IP Port Settings" after creating the project, as shown in the figure below.



3. New project

- a. Open Sysmac Studio software, click "New Project", as shown in the following figure.

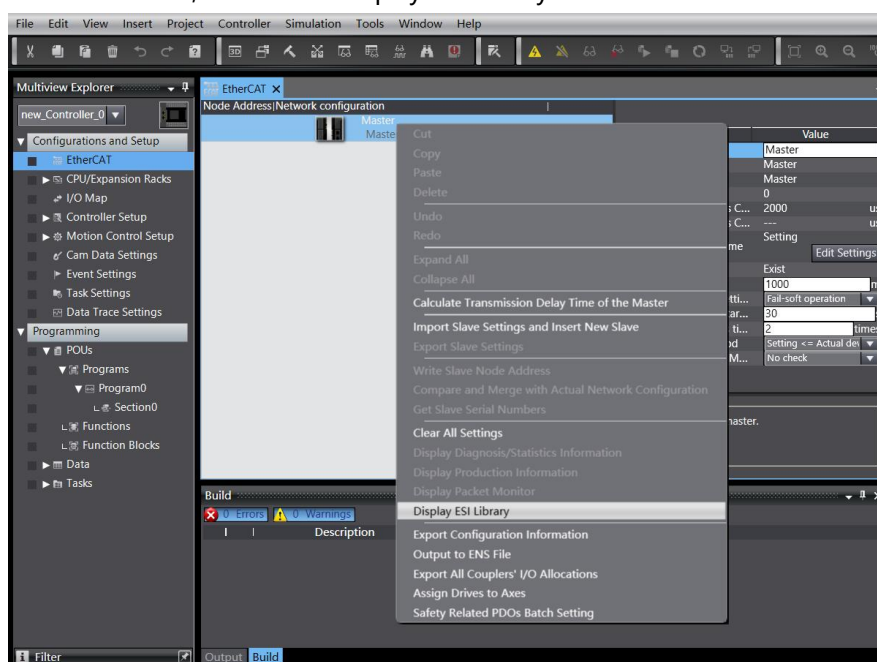


- Project name: Customize.
- Select Device: "Device" selects the corresponding PLC model, "Version" selects the corresponding version of PLC, and it is recommended to use PLC of V1.40 and above.

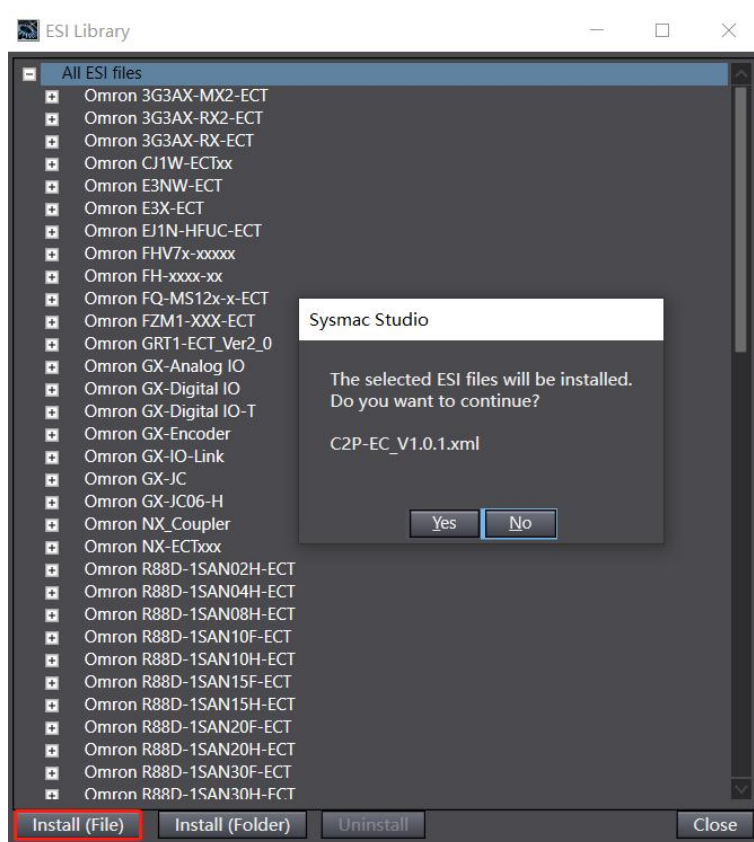
- b. When you have finished entering the project properties, click "Create".

4. Installation of XML files

- a. Expand "Configuration and Setup" in the left navigation tree, double-click "EtherCAT", right-click "Master Device", and select "Display ESI Library" as shown below.

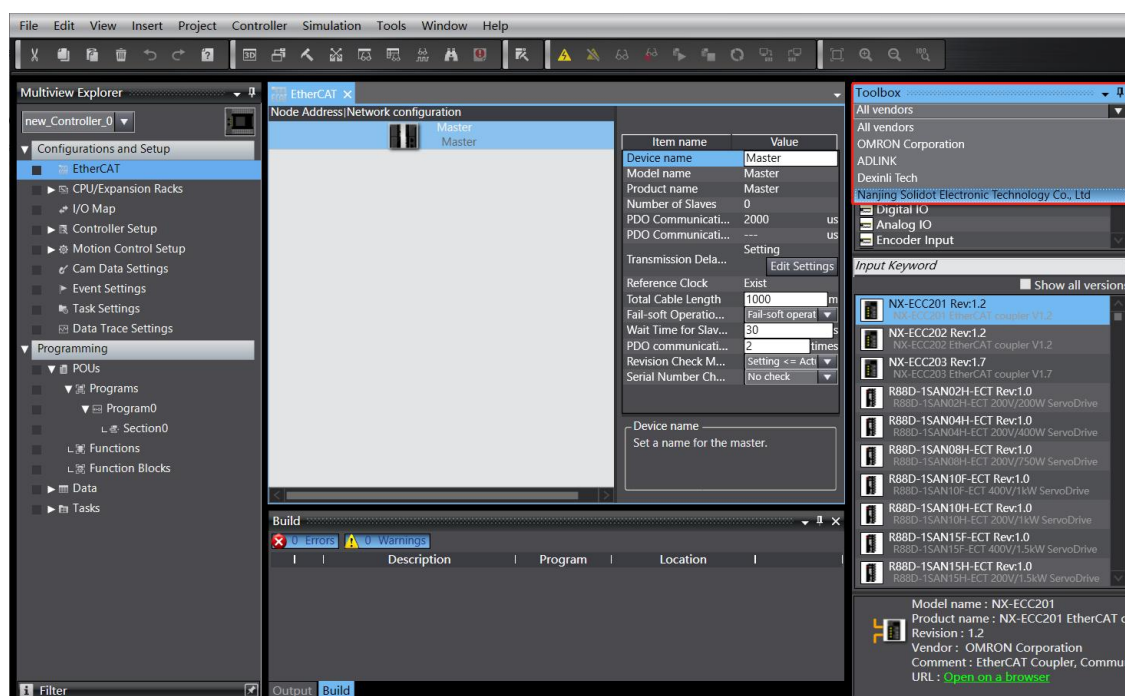


- b. In the pop-up "ESI Library" window, click "Install (file)" button, select the XML file path, click "Yes" to complete the installation, as shown below.

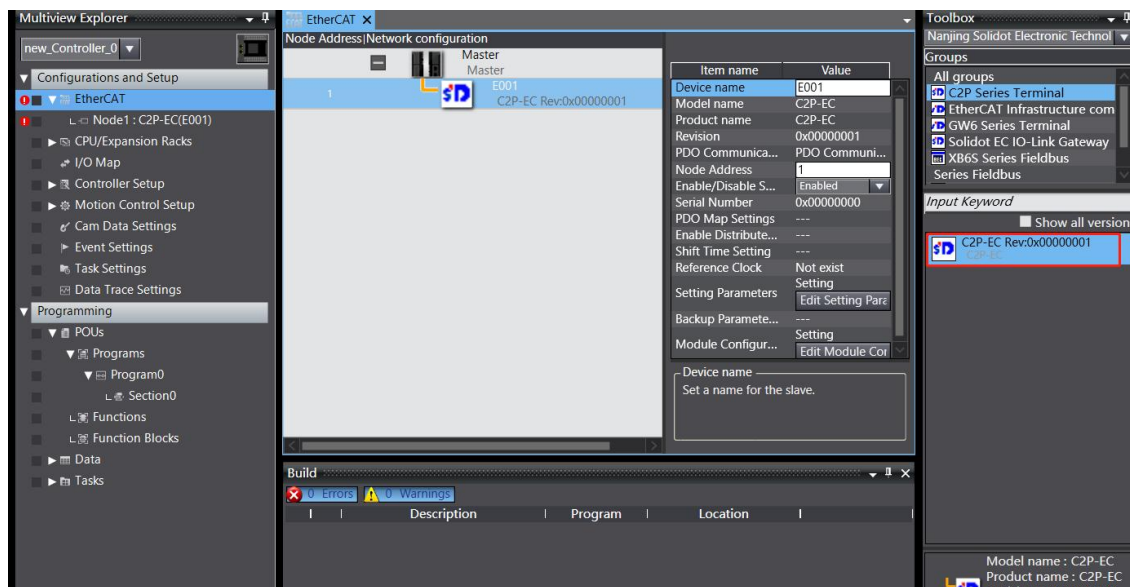


5. Adding Slave Devices

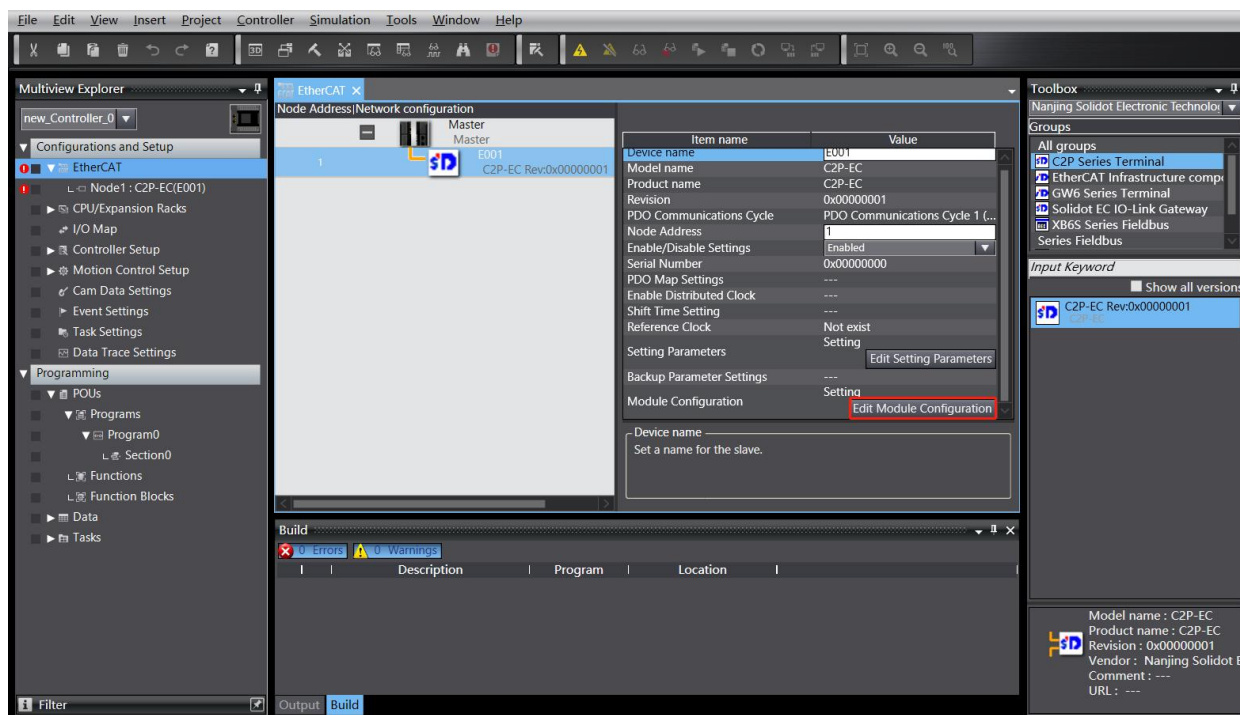
- a. In the right side of the "Toolbox" column, click to expand all suppliers, select "Nanjing Solidot Electronic Technology Co., Ltd."



- b. Click "C2P Series Terminal" to select the product series, select the product model at the bottom, and double-click "C2P-EC" to add the slave device, as shown in the following figure.

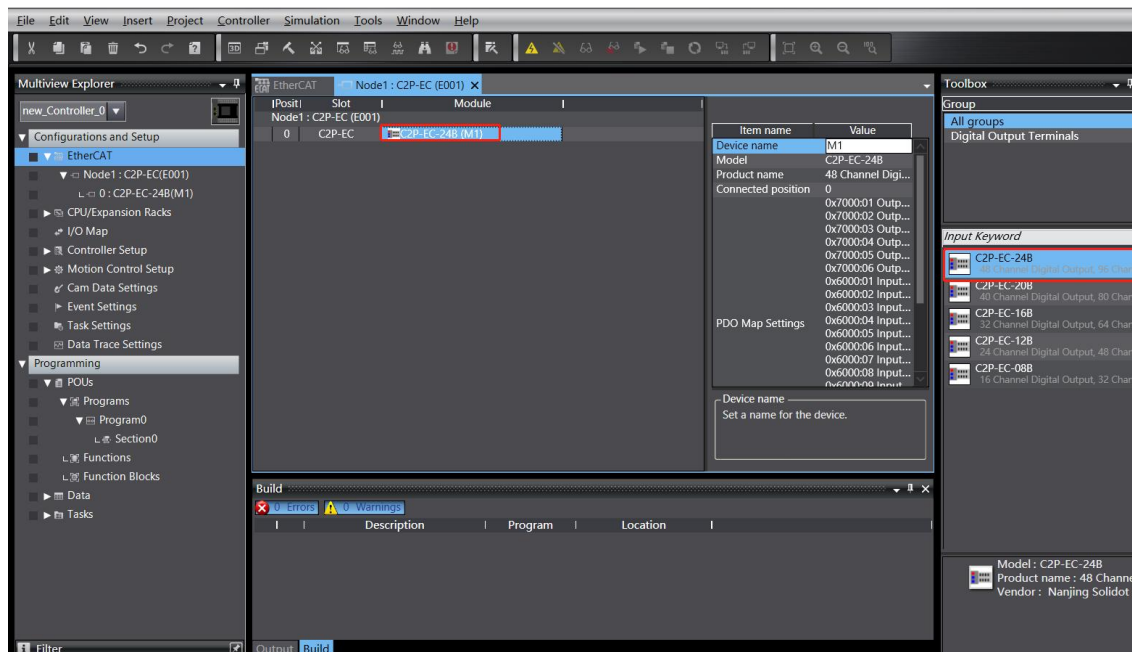


- c. In the EtherCAT main page, click "C2P-EC", click "Edit Module Configuration" in the right menu, as shown in the following figure.



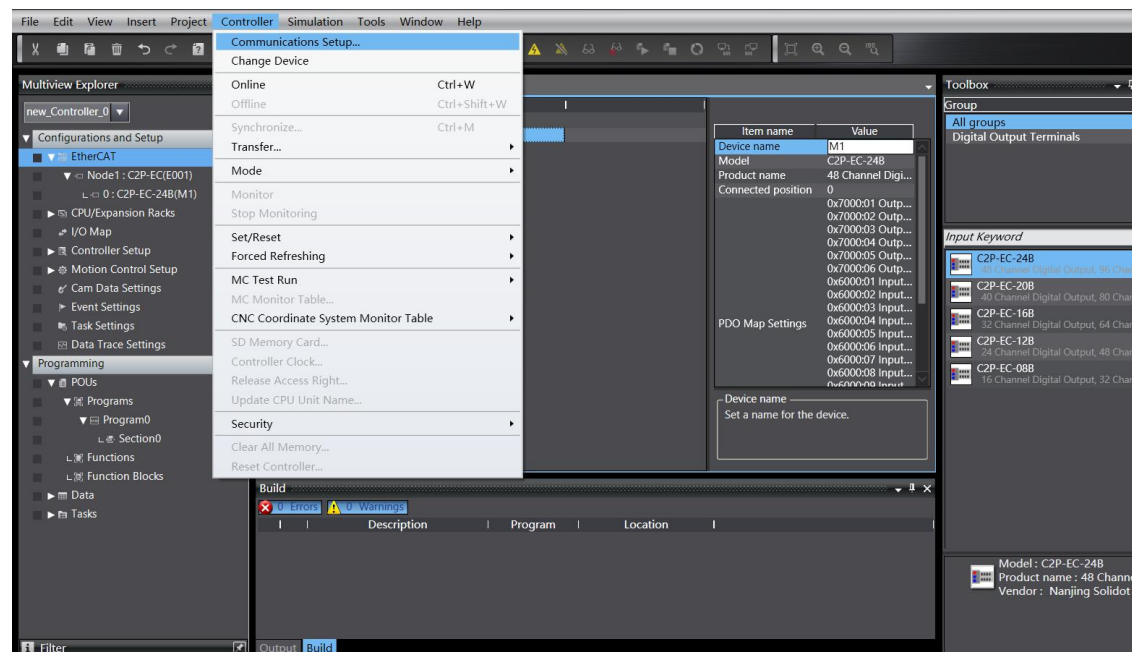
- d. In the main page of Module Configuration, click to check the position of slot 0, and then in the right side of the toolbox, you can see the module model number "C2P-EC-24B", double-click to add the module to the slot, as shown in the following figure. Add all modules one by one according to the actual installation topology.

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

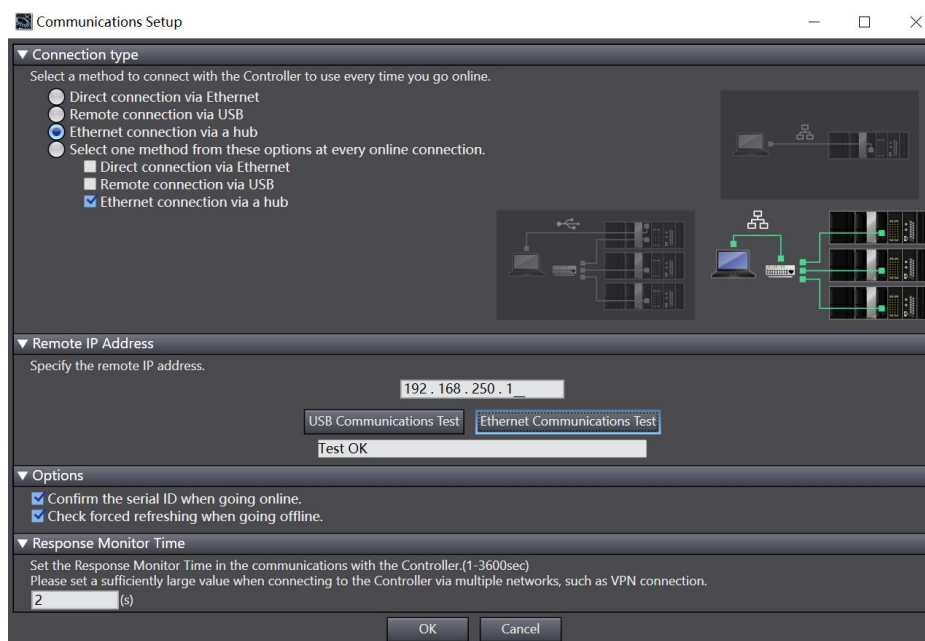


6. Communication settings

- a. Click "Controller -> Communications Setup" in the menu bar to bring up the Communication Settings window, as shown in the following figure.

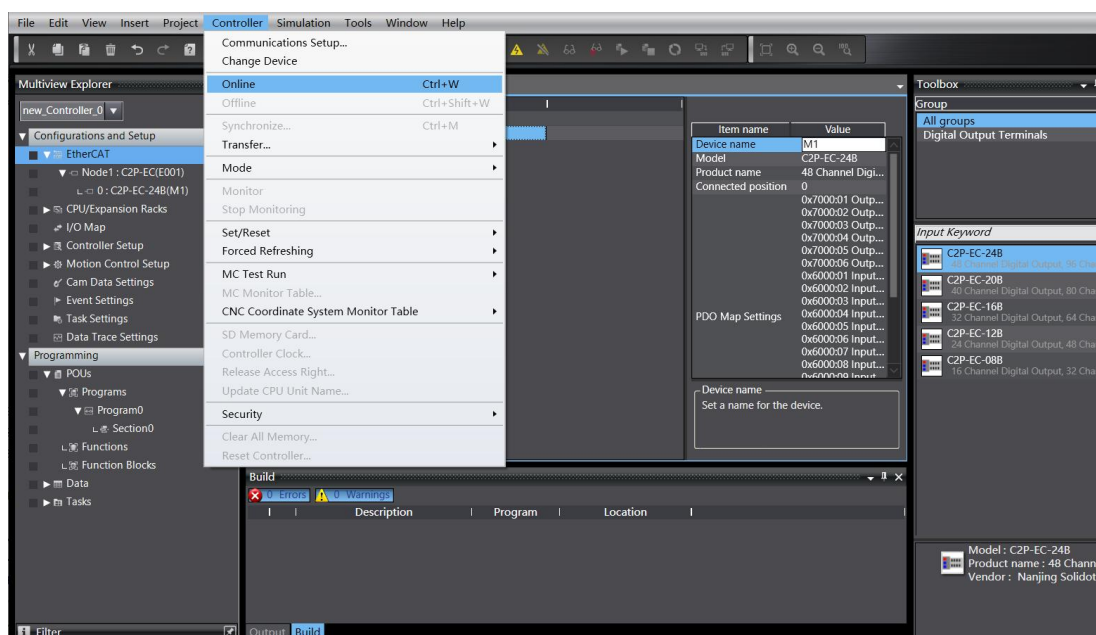


- b. In the communication setting window, select "Ethernet connection via a hub" for the connection type, select "Ethernet connection via a hub" as the method to be used every time you connect with the controller when you are online, fill in the IP address of the corresponding PLC for the remote IP address, click "Ethernet Communication Test", if the communication is normal, "Test OK" will be displayed in the box below. Determine the communication is normal, click "OK" button, as shown in the figure below.

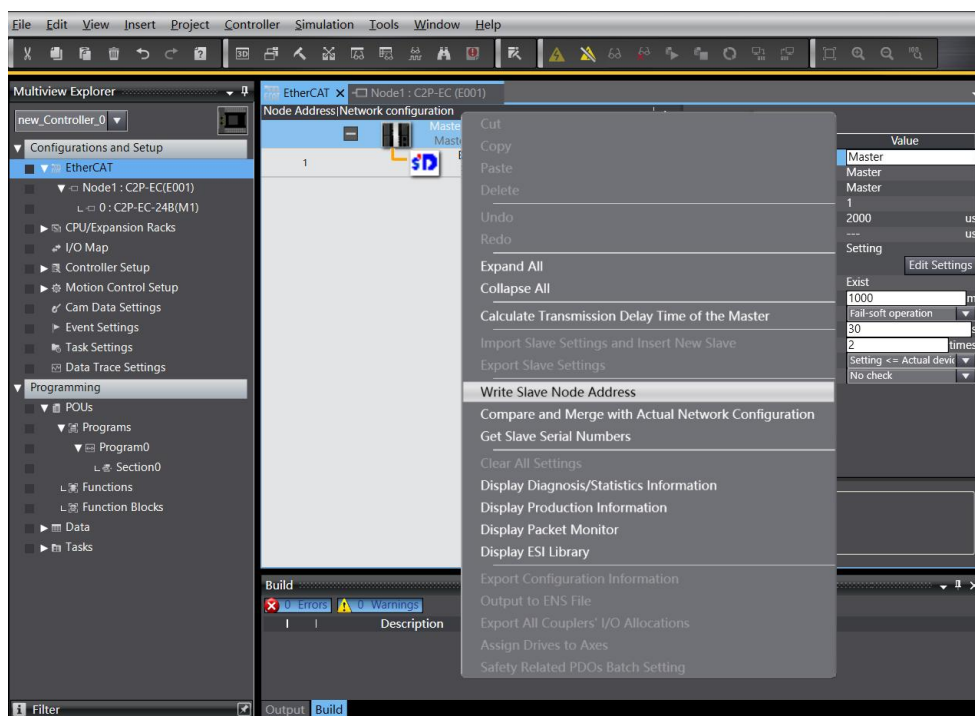


7. Setting the node address

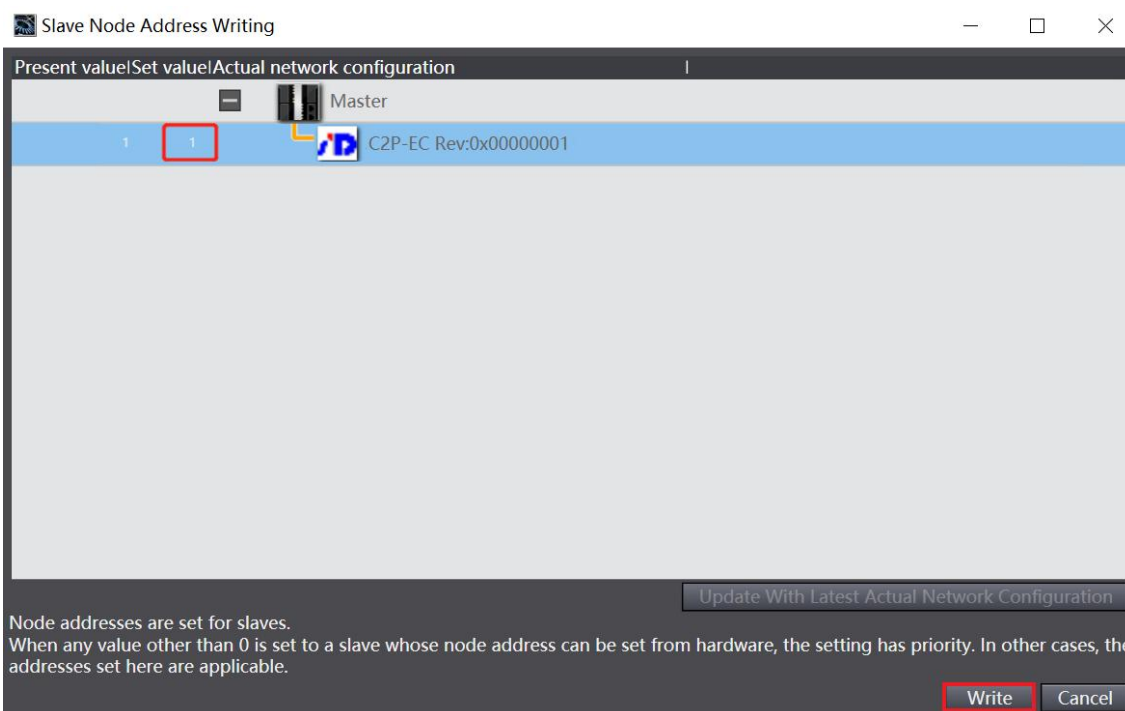
- a. Click "Controller -> Online" in the menu bar to turn the controller to online status, as shown in the following figure.



- b. Right-click on the master device, click and select "Write Slave Node Address" as shown in the following figure.



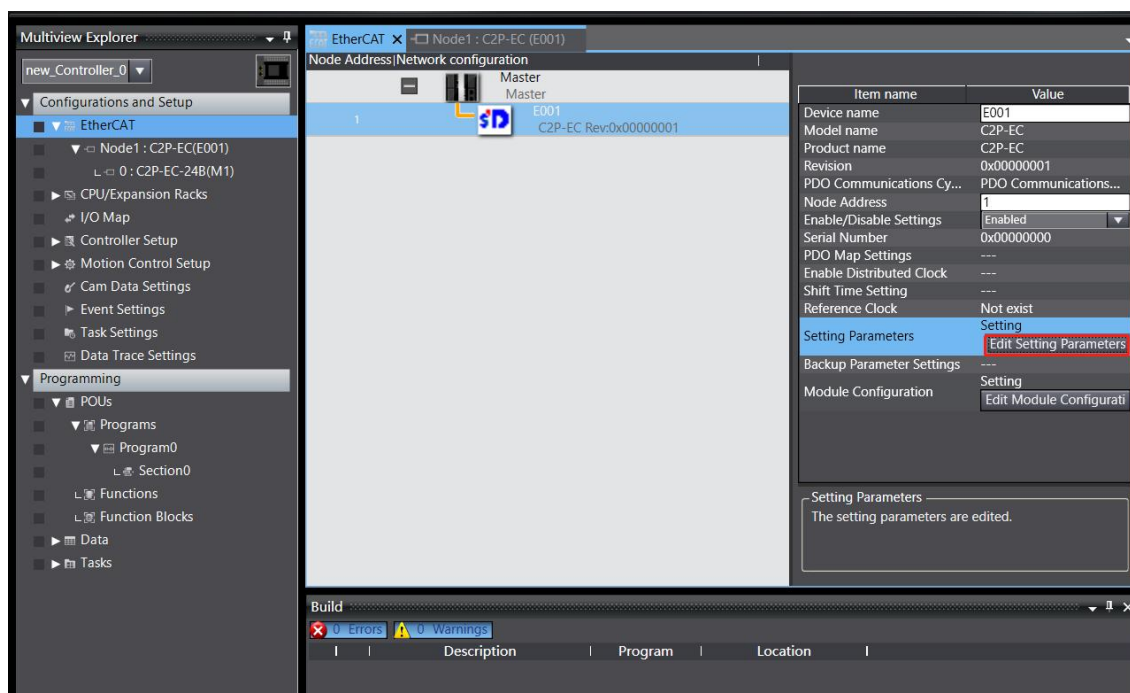
- c. In the Slave Node Address Writing window, click the value under Set Value, enter the node address, and click Write to change the slave device node address, as shown in the following figure.



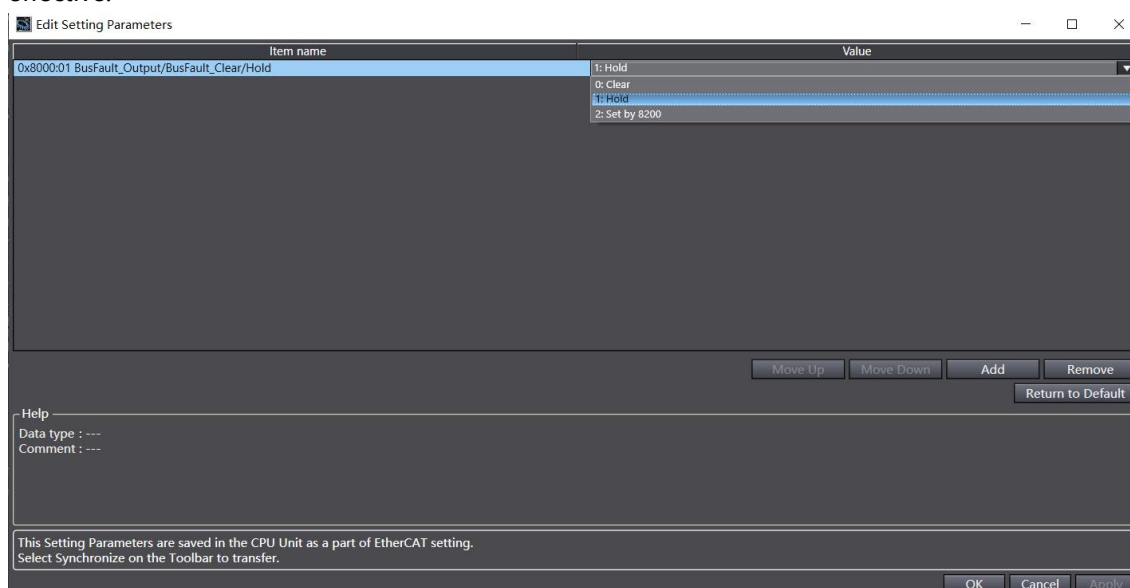
- d. Power down and reboot the slave device when prompted after the node address is successfully written.

8. Parameters Setup

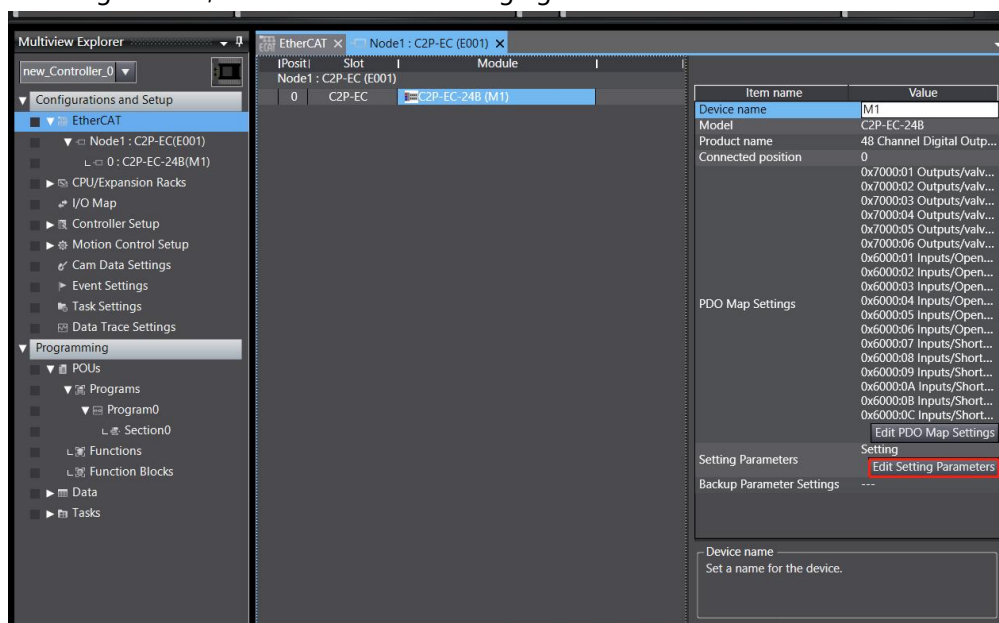
- a. Turn the controller to offline status, in the EtherCAT main page, click to select "C2P-EC", click the right side menu "Edit Setting Parameters", as shown in the following figure.



- b. In the Edit Setting Parameters window, you can see the parameter "0x8000:01 BusFault_Output/BusFault_Clear/Hold". This parameter is a unified setting parameter function for all channels of the valve terminal. Under the value, you can choose "0:Clear", "1:Hold" or "2:Set by 8200", which means the output signal is "Clear", "Hold" or "Set by 8200". Setting is complete, click the lower right corner of the "Apply", and then click "OK", as shown in the figure below. After the configuration is completed, you need to download the parameters to the PLC to make the settings effective.

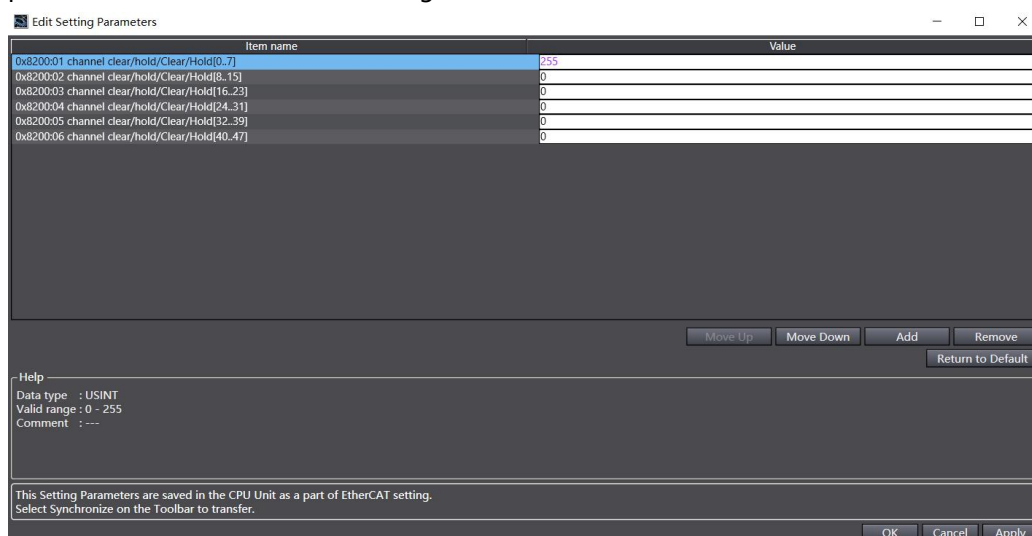


- c. In the main page of Node 1, click to select "C2P-EC-24B", and then click "Edit Setting Parameters" in the right menu, as shown in the following figure.



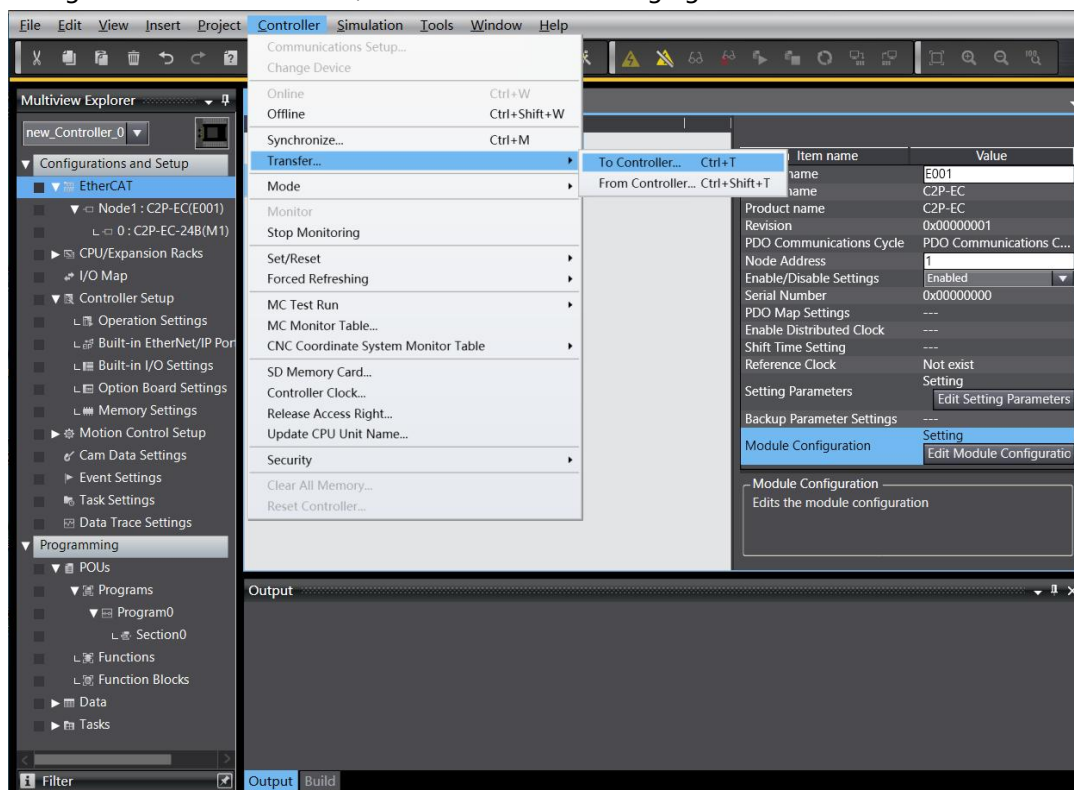
- d. In the Edit Initialization Parameter Setting window, you can see the parameter items "0x8200:01 channel clear/hold/Clear/Hold[0..7]" ~ "0x8200:06 channel clear/hold/Clear/Hold[40..47]". 8200 is a single channel setting or channel group setting parameter function, if you need to set single channel setting or group setting, 8000:01 setting item need to select "Set by 8200", then 8000 will not take effect, 8200 setting item will take effect.

For example, to set the clear and hold function of channel 0~7, enter the value in the parameter value input box corresponding to "0x8200:01 channel clear/hold/Clear/Hold[0..7]", and if the corresponding value of the channel is 1, then the hold function will be enabled, and if the value is 0, then the clear function will be enabled. If you input **1**, only channel [0] will enable the hold function; if you input **255**, channel [0..7] will enable the hold function, and so on for the other 5 groups of channels. After the setting is completed, click "Apply" in the lower right corner, and then click "OK", as shown in the figure below. After the configuration is completed, it is necessary to download the parameters to the PLC for the settings to take effect.

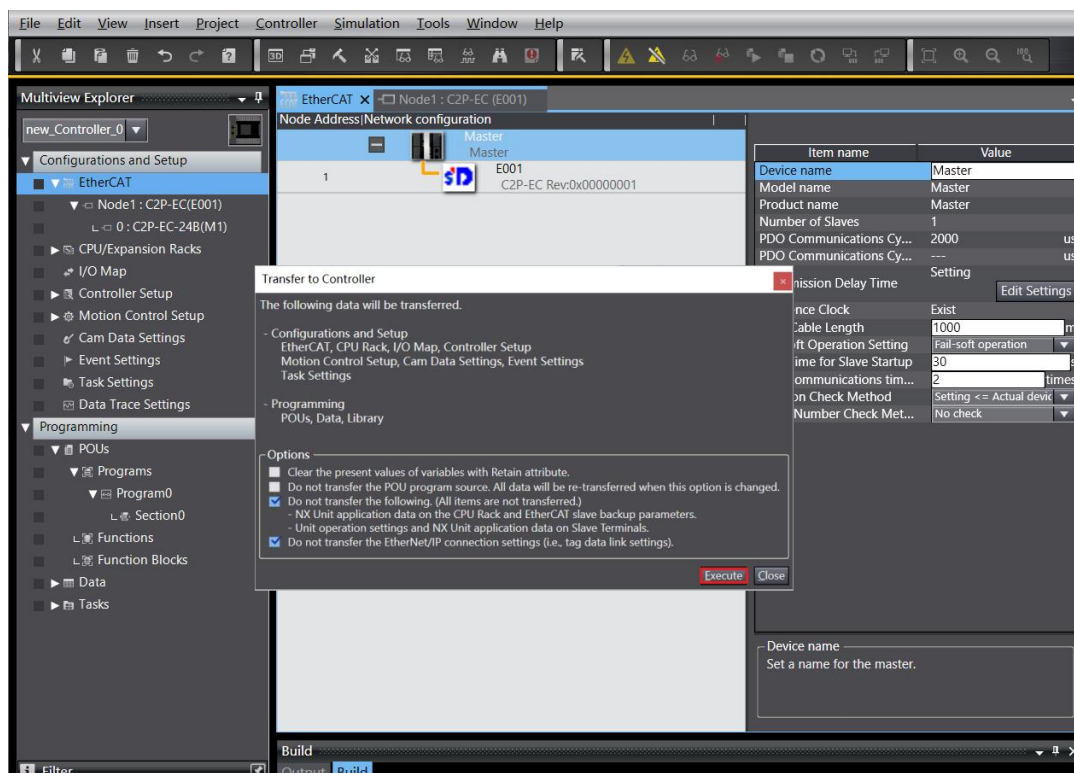


9、Download configuration to PLC

- Click the button "Controller -> Transfer... -> To Controller..." in the menu bar to transfer the configuration to the controller, as shown in the following figure.

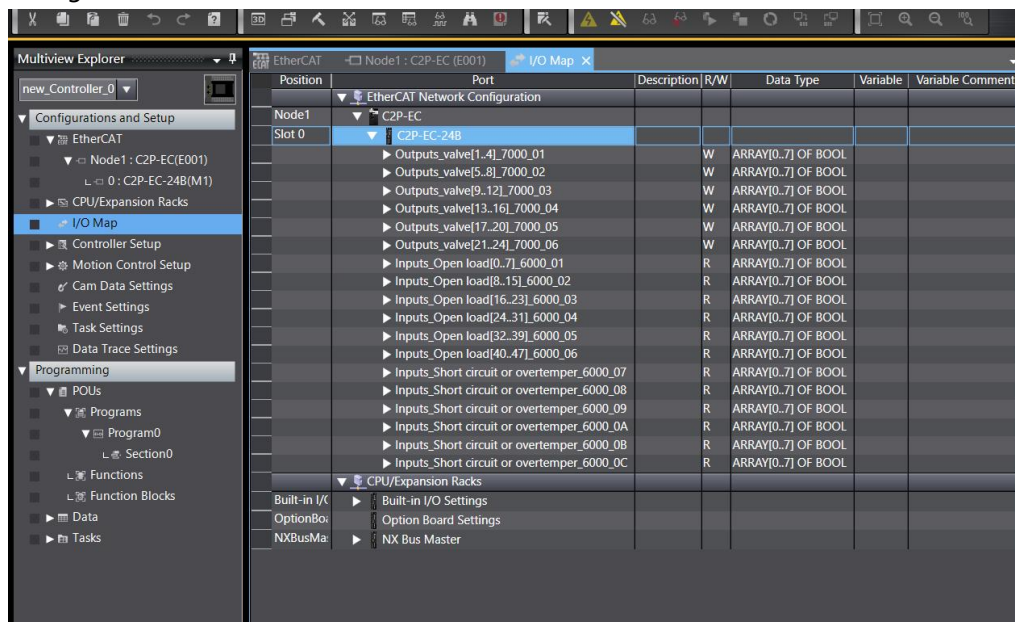


- Pop-up transmission confirmation pop-up window, click the "Execute" button, followed by a pop-up window in turn click "Yes / OK", as shown below.

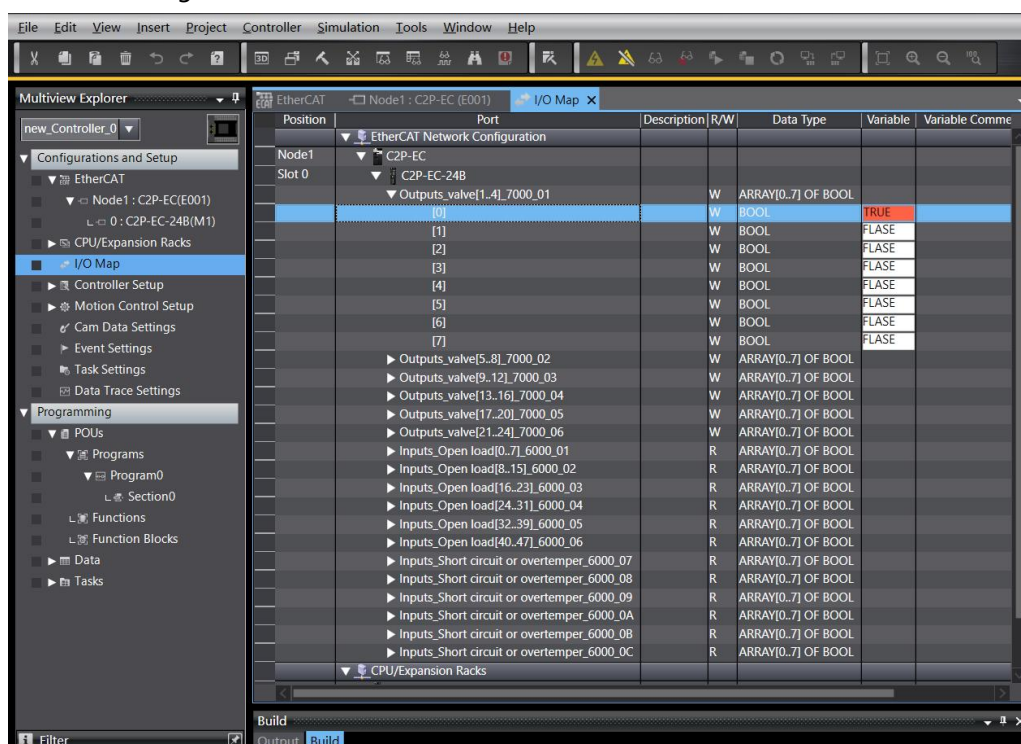


10. View valve terminal Features

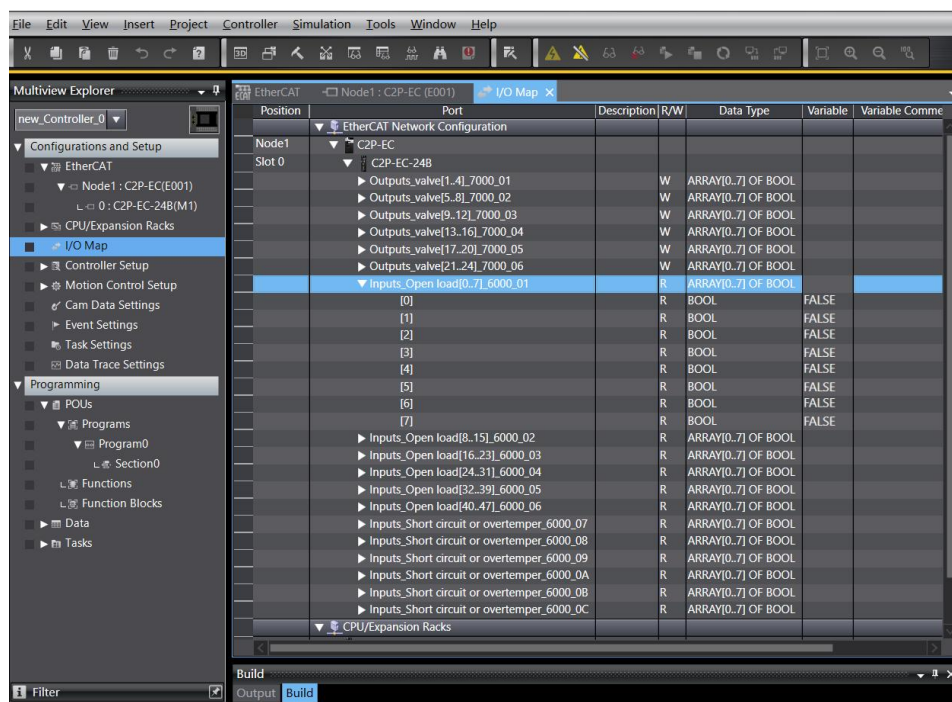
- a. Double-click "I/O Map" in the left navigation tree, you can see the valve terminal series: C2P-EC under the corresponding port in node 1 of the right main page, and you can see the device name: C2P-EC-24B in the position of slot 0, and you can see the diagnostic function and channel output control of the valve terminal by clicking the expand icon in front of the device name, as shown in the figure below.



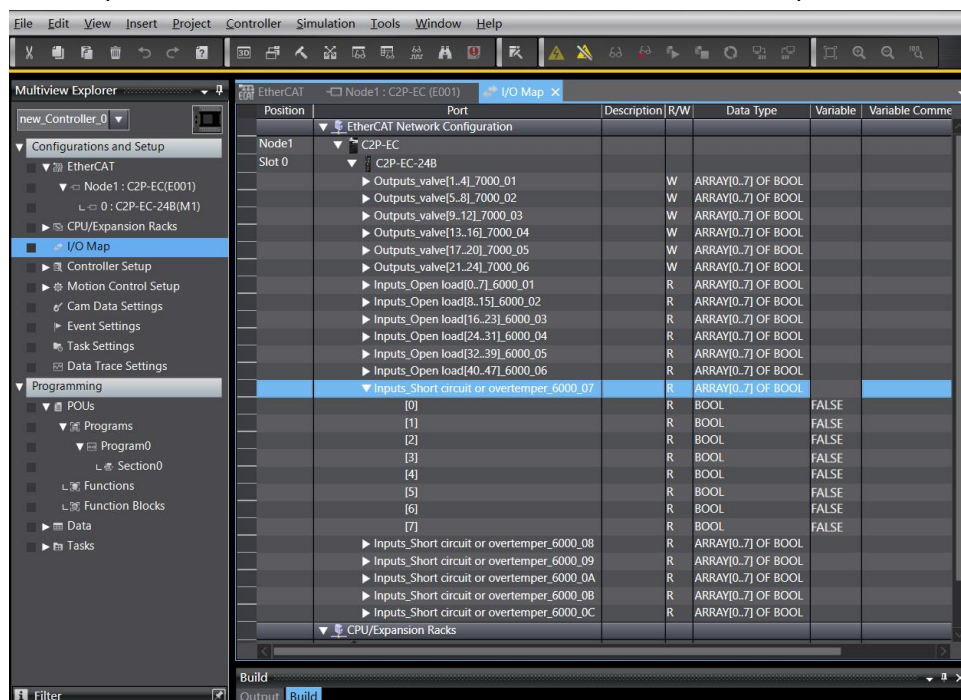
- b. Outputs_valve[1...4]~Outputs_valve[21...24] total 6 groups, 48 channels solenoid valve coil control function, select the corresponding channel, through the modification of the channel value of the solenoid valve coil control, the value of "TRUE" that is, open, the value of "FALSE" that is, close, as shown in the figure below.



- c. Inputs_Open load[0..7]~Inputs_Open load[40..47] total 6 groups, 48 channels of solenoid valve open diagnostic function, select the corresponding channel to view the diagnostic value, in the solenoid valve coil output off the premise of the diagnostic value is valid, the value of "TRUE" that is open, the value of "FALSE" that is normal, as shown in the figure below.



- d. Inputs_Short circuit or overtemper_6000_07~Inputs_Short circuit or overtemper_6000_0C total of 6 groups, 48 channels solenoid valve short circuit / overtemperature diagnostic function, select the corresponding channel to view the diagnostic value, in the solenoid valve coil output on the premise of the diagnostic value is valid, the value is "TRUE" that valve short circuit / overtemperature, the value is "FALSE" that no short circuit / overtemperature, as shown below.



8 FAQ

8.1 Device cannot be found in the software

1. Verify that the ESI configuration file is installed correctly.
2. Verify that the ESI profile version is accurate.
3. Whether the software is restarted after installing the ESI configuration file.

8.2 Device cannot enter OP state

1. Verify that the project is established correctly.
2. Confirm the node station number related settings.
3. Verify that the power supply to the unit is normal.
4. The EtherCAT communication cable is working properly.
5. Confirm the IP address of the computer.
6. Whether the device was re-powered after changing the slave device node address