



EtherNet/IP
C2S-EI Series Valve Terminal
User Manual




Guangdong Coyo Precision Machinery Manufacturing Co., Ltd

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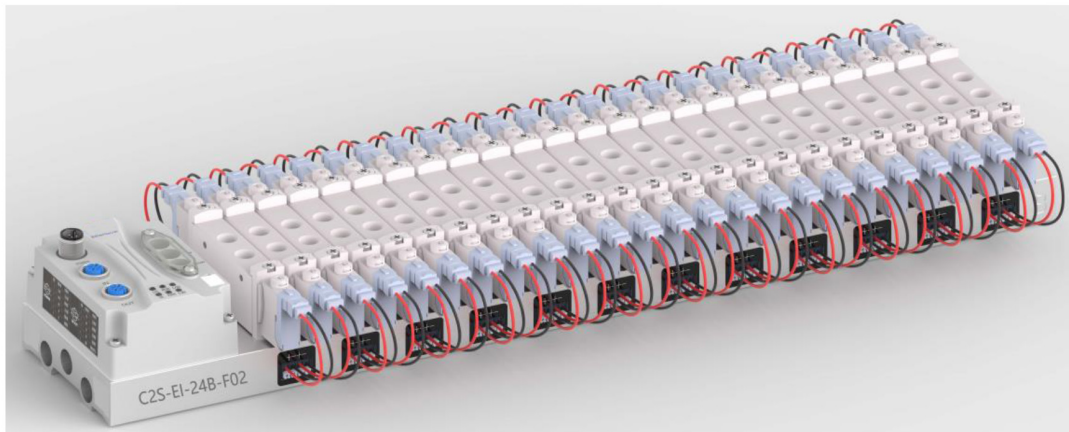
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1 Product Overview

1.1 Product Introduction

The C2S-EI series valve terminal is a control module integrating valve terminal technology and EtherNet/IP bus technology. It can realize centralized and distributed control, optimize system design, facilitate construction, and simplify debugging, performance testing & diagnostic maintenance of complex systems in the industrial field. The product adopts a modular structure and occupies little space with the addition of pluggable terminals, leading to fast wiring. Moreover, it has easy configuration and supports most of the mainstream EtherNet/IP master stations, so it can be widely used in industrial control systems.



1.2 Product Features

- Support EtherNet/IP industrial Ethernet protocol
- Support cascade communication with M12 bus interface
- Support up to 24 double solenoid valves
- Modular structure and small footprint
- Simple wiring, fast construction and easy maintenance
- Support mainstream solenoid valves and customization, providing easy and fast choices
- Support remote diagnosis, which reduces troubleshooting difficulties

2 Designation Rules

2.1 Designation Rules

C2S - **EI** - **24** **B** - **F01**
(1) **(2)** **(3)** **(4)** **(5)**

Item	Value	Description of the values
(1)	Product line	C2S
(2)	Bus type	EI: EtherNet/IP
(3)	Valve positions	08: 8 12: 12 16: 16 20: 20 24: 24
(4)	Valve Type	B: Double solenoid (Single solenoid supported)
(5)	Solenoid valves model number	See below Solenoid Valve Model Code Table

Solenoid Valve Model Code Table:

Brand	Code	Valve Distance	Seires	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	VUUG-LK10	vuvg-lk10-t32/ vuvg-lk10-m52 vuvg-lk10-B52/ vuvg-lk10-p52
			VUUG-L10	vuvg-l10-t32/ vuvg-l10-m52 vuvg-l10-B52/ vuvg-l10-p52
	F02	16	VUUG-LK14	vuvg-lk14-t32/ vuvg-lk14-m52 vuvg-lk14-B52/ vuvg-lk14-p52
			VUUG-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 (K value) in mm.

2.2 Model List

Model Number	Product Description
C2S-EI-08B-()	Valve terminal with 8 valve positions (double solenoid valves)
C2S-EI-12B-()	Valve terminal with 12 valve positions (double solenoid valves)
C2S-EI-16B-()	Valve terminal with 16 valve positions (double solenoid valves)
C2S-EI-20B-()	Valve terminal with 20 valve positions (double solenoid valves)
C2S-EI-24B-()	Valve terminal with 24 valve positions (double solenoid valves)

Note: “()” represent solenoid valve model code, support customization.

3 Product Parameters

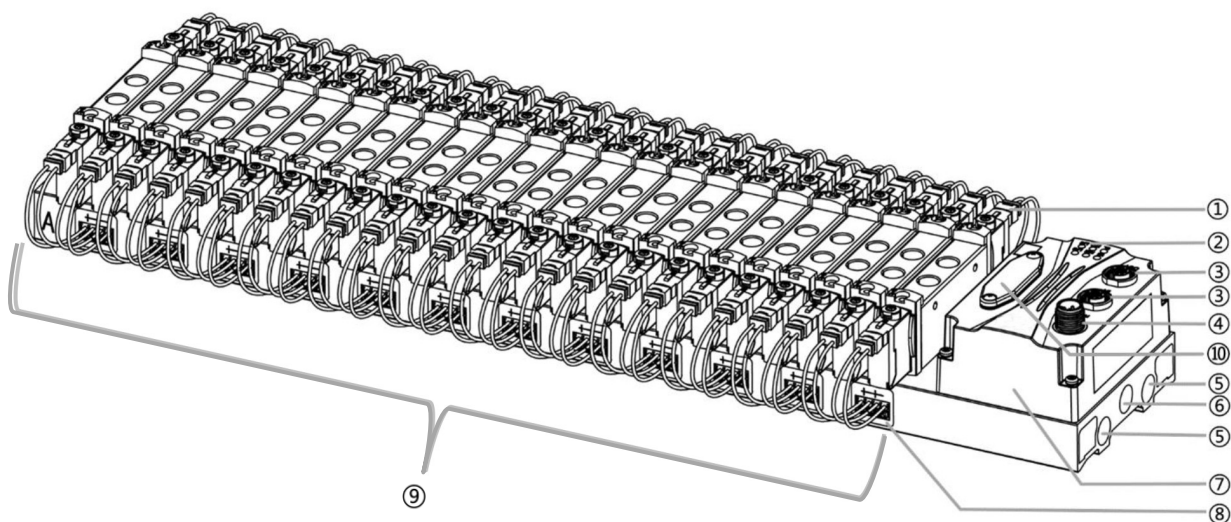
3.1 General Parameters

Interface Parameter	
Bus protocol	EtherNet/IP
Data transmission medium	CAT5e: UTP or STP (STP recommended)
Transmission distance	≤100 m (distance between stations)
Transmission rate	100 Mbps
Bus interface	2xM12, 4Pin, D-code, female
Technical Parameters	
System power supply	18~36 VDC
Rated current consumption	30 mA
Electrical isolation	500 V
Load power	24 VDC (±25%)
Number of outputs	0~48
Single channel current	Max: 250 mA
Power interface	M12, 5Pin, A-code, male
Power interface surge protection	YES
Power interface reverse connection protection	YES
Channel short circuit protection	YES
Channel open-circuit diagnostics	YES
Channel short-circuit diagnostics	YES
Weight	Depand on different models
Size	Depand on different models (See 5.1 Outline Dimensional Drawing)
Working temperature	-5~+50°C
Storage temperature	-20~+75°C
Relative humidity	95%, non-condensing
Protection degree	IP20

4 Panel

4.1 Product Structure

Name and function description of each parts of the product



Code	Name	Description
①	Solenoid valves	See " Solenoid Valve Model Code Table "
②	LED indicator	Power ID, operation and bus status
③	Bus interface	2xM12, 4Pin, D-code, female
④	Power interface	1xM12, 5Pin, A-code, male
⑤	Exhaust port	G1/4
⑥	Intake port	G1/4
⑦	Communication unit	Valve terminal communication and controller
⑧	Solenoid valve wiring socket	4Pin
⑨	Manifold base	Main structure, silk screened with "A" and "B" on both ends
⑩	Rotary switch	Set IP address, reset settings

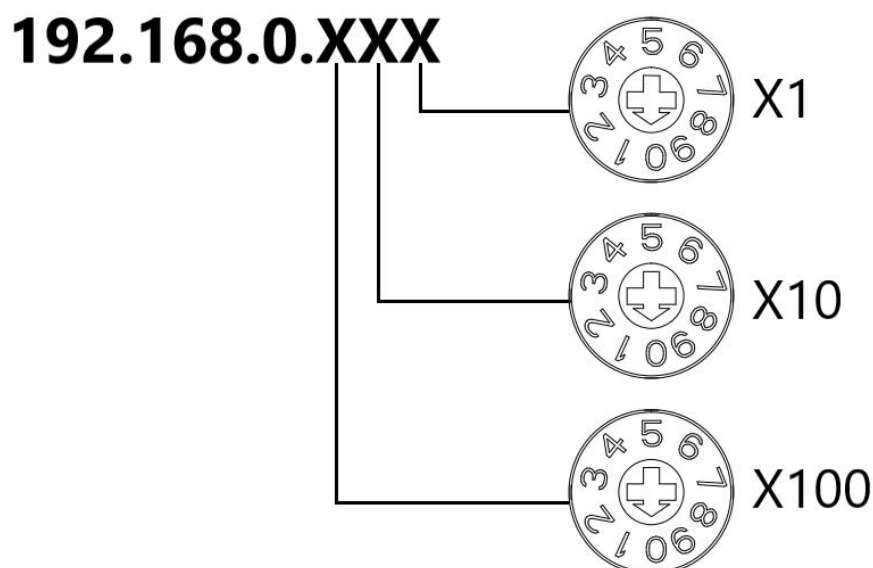
4.2 Indicator Function

Name	ID	Color	Status	Status description
System power indicator	US	Green	ON	Normal status of working power supply
			OFF	Unpowered or abnormal power supply
Load power indicator	UL	Green	ON	Normal status of working power supply
			OFF	Unpowered or abnormal power supply
Network indicator IN	L/A0	Green	Flashing	Network connection established with data interaction
			OFF	No data interaction or abnormal connection
Network indicator OUT	L/A1	Green	Flashing	Network connection established with data interaction
			OFF	No data interaction or abnormal connection
Operation status indicator	RUN	Green	ON	Network connection established
			Flashing	1Hz: The device has not established a connection, but an IP address was obtained; the IP address is duplicated; the device is undergoing a power-up test
			OFF	The device has not been given an IP address or is in an unpowered state
Alarm indicator	ERR	Red	ON	The valve is shorted/over-tempered or is being restored to factory settings
			OFF	Normal system operation or power off

4.3 Rotary Switch

IP address setting

A rotary switch can be used to specify the setting method of the module IP address.



Set value (decimal)	IP address setting method
001 to 254	Set IP address low 1Byte. Set the IP address in the range of 1 to 254 with "x100" for the hundredth digit, "x10" for the tenth digit, and "x1" for the single digit. IP Address High 3Byte continues the value previously set via the host computer. When the IP address is set to a value other than 000 by rotary switch in the factory state, the high 3Byte is 192.168.0.
000, 255-998	When the rotary switch is set to 255 or above, after the module is powered up, start in the same way as the previous startup and parameters.
999	Reset Settings.

The factory rotary switch is set to "000".

Remarks:

- Tool selection**
Screwdriver specifications: 2 mm opening.
- The rotary switch IP must be set in the event of a power off. If the IP address needs to be changed during communication, the new setting must be re-powered to take effect.**

Reset function

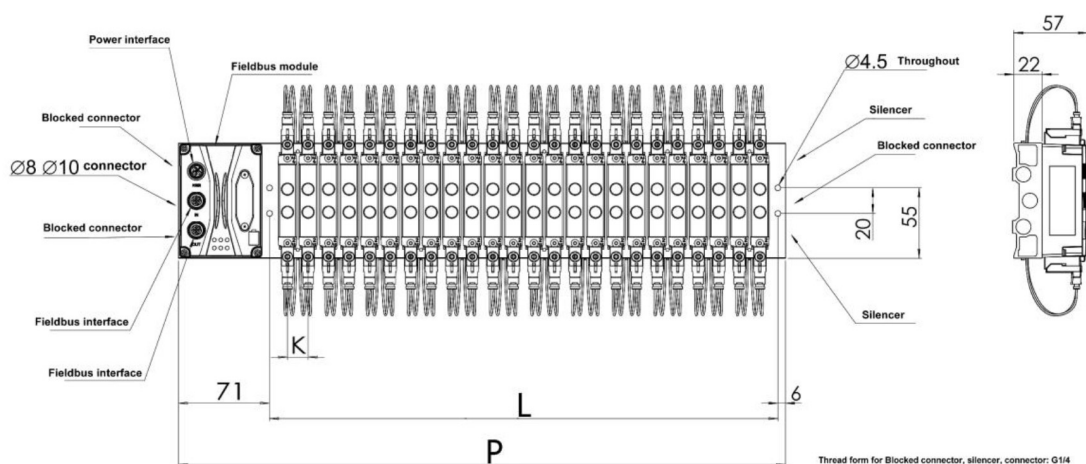
Restoration of factory settings can be executed by special operation of the rotary switch.

For details on how to do this, see: [7.4 Restoring Factory Settings](#).

5 Installation

5.1 Outline Dimensional Drawing

Outline Specifications (mm)



L size											
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											
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

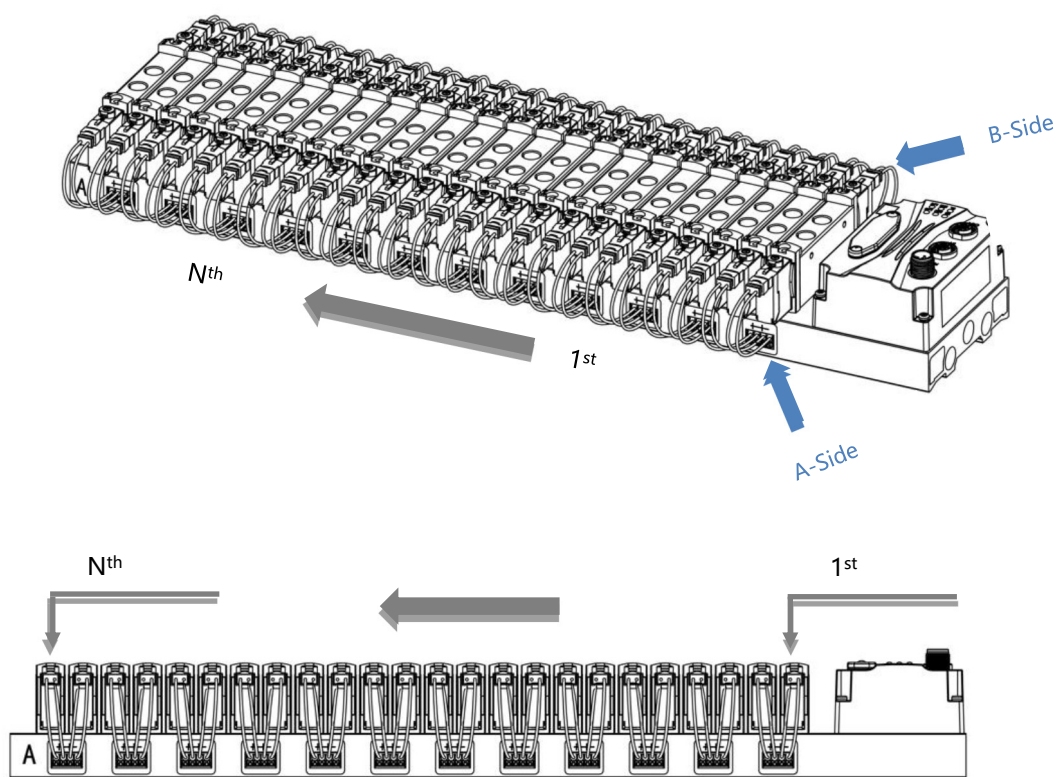
5.2 Solenoid Valve Assembly Sequence

- **Supported solenoid valve for valve terminal**
For details, see [Solenoid Valve Model Code Table](#)
- **Solenoid valve assembly sequence**

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

Assembly sequence for double solenoid valves: Starting from the communication unit end, install valves from the 1st to the Nth position in sequence, as is shown in the figure below.

Assembly sequence for single solenoid valves: Starting from the communication unit end, install valves from the 1st to the Nth position on the A side, as is shown in the figure below.

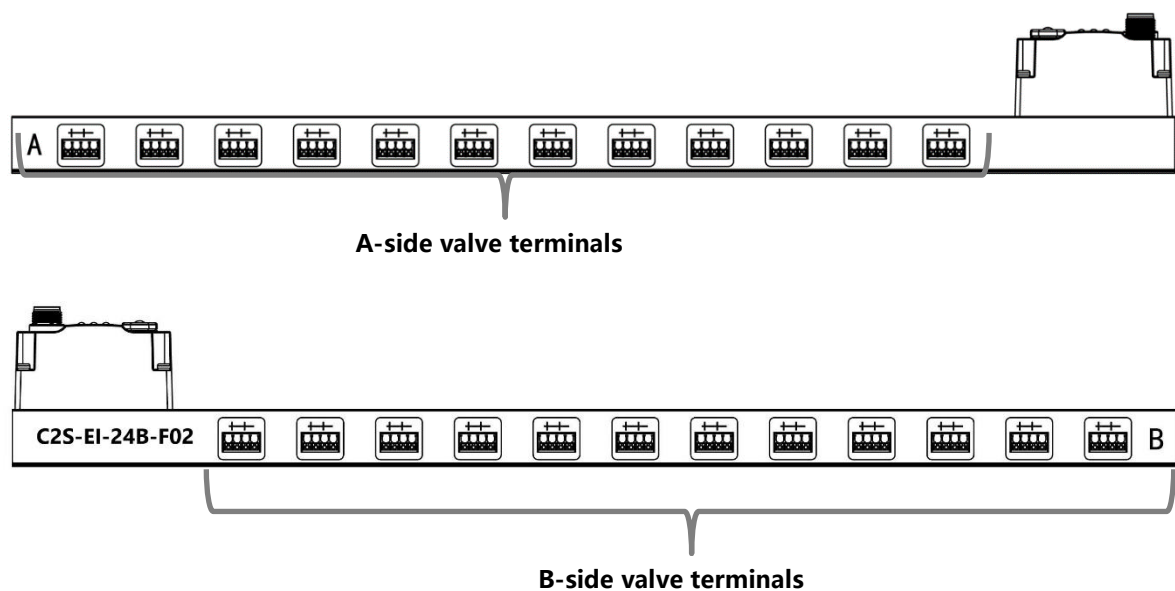


6 Wiring

6.1 Solenoid Valve Wiring

Terminal Connectors Distribution

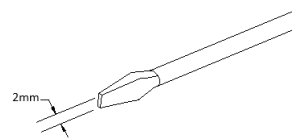
Terminal connectors are distributed on both sides of the valve terminal manifold base, A-side and B-side respectively. A and B side can be distinguished according to the silkscreen on the end of the manifold base. Take C2S-EI-24B-F02 as an example, the distribution of A-side and B-side terminal connectors is shown in the figure below.



Wiring Terminals		
Terminal	Number of poles	4P
	Wire gauge	22~17 AWG 0.3~1.0 mm ²

Wiring Tool Requirements

As the terminals are based on a screw-free design, cable installation and removal can be realized with a slotted screwdriver (size: ≤ 2 mm).



Stripping length requirements

Recommended stripping length: 10 mm



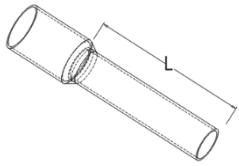
Wiring Method

For a single-strand hard wire, after stripping a required length, press the button while inserting the single-strand wire



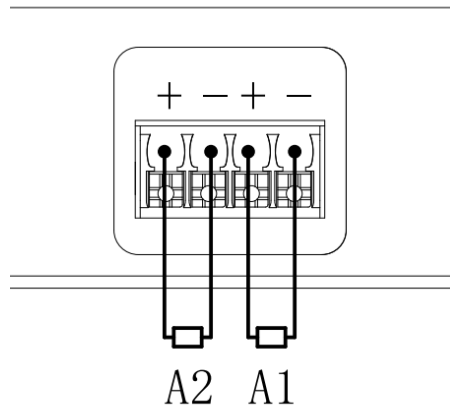
For a multi-strand flexible wire, after stripping a required length, directly connect it or use a compatible cold-pressed terminal (tubular insulated terminal, as shown in the table below). Press the button while inserting the wire.



Specification of tubular insulated terminal		
Specification	Model	Cable section area (mm ²)
 <p>Length of tubular insulated terminal $L \geq 10$ mm</p>	E0310	0.3
	E0510	0.5
	E7510	0.75
	E1010	1.0

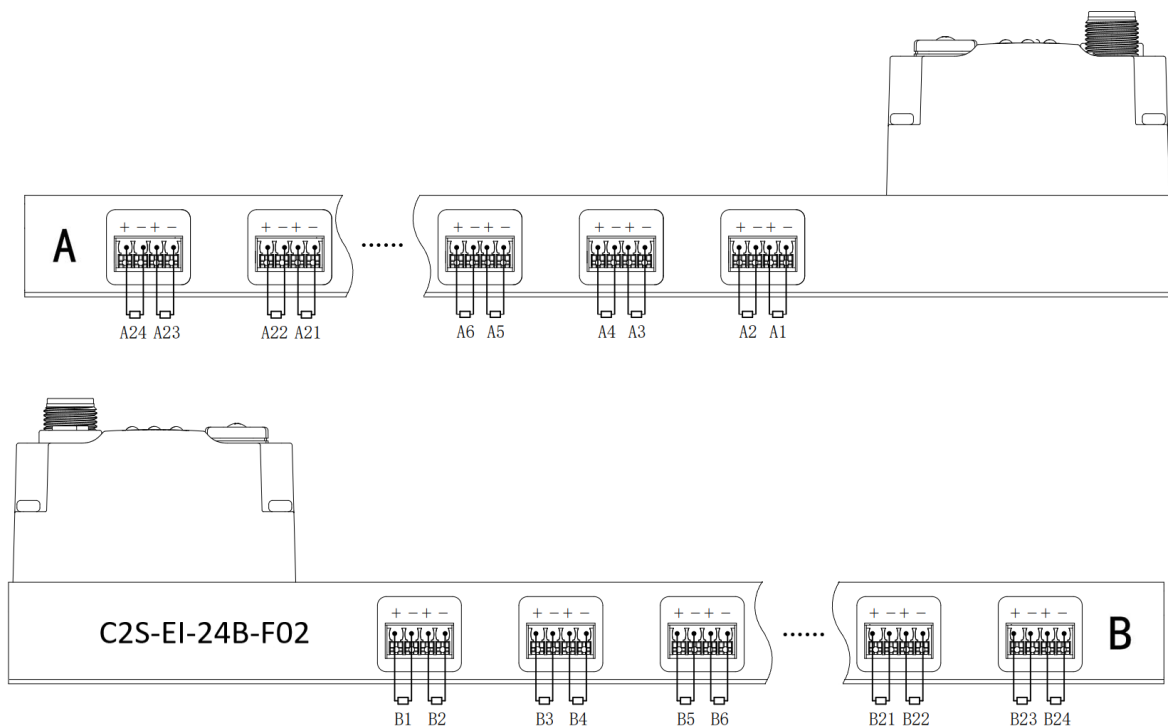
● **Solenoid valve wiring**

The number of 4-pin sockets, which are installed on both side of the manifold base, based on the number of valve positions of different valve terminal models. A pair of “+” and “-” can drive a solenoid valve coil. As shown in the figure below, A1 and A2 can drive a solenoid valve coil respectively.



● **Valve terminal wiring**

Starting from the communication unit end, the solenoid valve coils on the A side of the manifold base correspond to B side, 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 Assembly Sequence](#)".
- AX and BX can be connected to a double solenoid valve, and AX can be connected to a single solenoid valve. For wiring, please strictly follow the table below, otherwise the solenoid valve will not work or misoperate. "X" means no wiring.

Double solenoid valve wiring (all valves are double solenoid valves)									
Terminals	A1	B1	A2	B2	A3	B3	A4	B4	....
Solenoid valve number	1		2		3		4		....

Terminals	.....	A22	B22	A23	B23	A24	B24
Solenoid valve number	.....	22		23		24	

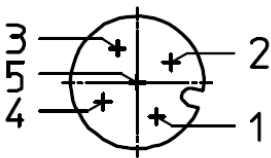
Note: C2S-EI-24B-() valve terminal and 24 solenoid valves were taken as an example. Wirings are different considering different specifications of the valve terminal.

Double solenoid valve wiring (all valves are single solenoid valves)									
Terminals	A1	B1	A2	B2	A3	B3	A4	B4	....
Solenoid valve number	1	X	2	X	3	X	4	X	....

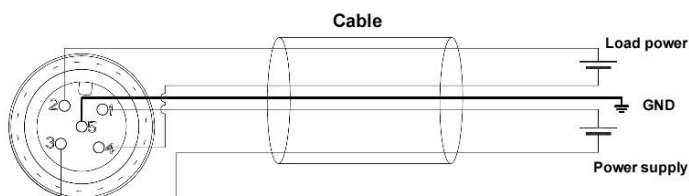
Terminals	.....	A22	B22	A23	B23	A24	B24
Solenoid valve number	.....	22	X	23	X	24	X

Note: C2S-EI-24B-() valve terminal and single solenoid valve were taken as an example. Wirings are different considering different specifications of the valve terminal.

6.2 Power Wiring

Power interface, M12, A-code			
	Pin	Functions	Cable Core Color
	1	24 VDC, Operating Power	Brown
	2	24 VDC, Load Power	White
	3	GND, Operating Power	Blue
	4	0 V, Load Power	Black
	5	PE, Protective Earthing	Gray

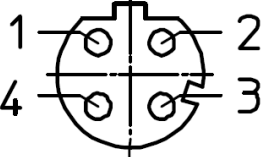
The power supply wiring is shown below:



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

Fieldbus Interface, M12, D-code		
	Pin	Function
	1	TD+, Transmit Data+
	2	RD+, Receive Data+
	3	TD-, Transmit Data-
	4	RD-, Receive Data-
-	Housing, Shielded/Protected Ground	

⚠ Precautions

- Double shielded cables of category 5 or higher (braided mesh + aluminum foil) like STP cables are recommended.
- The length of the cables between the devices must not exceed 100 m.

7 Operation

7.1 Control Method

Solenoid valves installed on the valve terminal are controlled by bytes and one byte control 4 valves. They can also be controlled by bits, in which 8 bits in a group, controlling 1 to 8 channels. The channel value of 1 means solenoid valve is open, the channel value of 0 means solenoid valve is closed. 24 double solenoid valves have 6 groups of control positions and control 48 channels. Take 24-position double 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]
Coils	A1	B1	A2	B2	A3	B3	A4	B4
Solenoid Valve Number	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]
Coils	A5	B5	A6	B6	A7	B7	A8	B8
Solenoid Valve Number	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]
Coils	A9	B9	A10	B10	A11	B11	A12	B12
Solenoid Valve Number	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]
Coils	A13	B13	A14	B14	A15	B15	A16	B16
Solenoid Valve Number	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]
Coils	A17	B17	A18	B18	A19	B19	A20	B20
Solenoid Valve Number	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]
Coils	A21	B21	A22	B22	A23	B23	A24	B24
Solenoid Valve Number	21		22		23		24	

7.2 Diagnostic Function

The C2S-EI valve terminal has an open load, a short-circuit and over temperature detection. An open load 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 works the same as the control method as it sends diagnostic information in byte or bit.

Under the condition that the valve is closed, the value 0 means normal status and 1 means the valve is in open-circuit condition. Under the condition that the valve is opened, the value 0 means normal status and 1 means the valve is in short-circuit or over temperature condition.

The channel diagnostic information of open load, short-circuit and over temperature corresponds the solenoid valve coils. Taking open-circuit diagnosis 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]
Coils	A1	B1	A2	B2	A3	B3	A4	B4
Solenoid Valve Number	1		2		3		4	

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

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]
Coils	A5	B5	A6	B6	A7	B7	A8	B8
Solenoid Valve Number	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]
Coils	A9	B9	A10	B10	A11	B11	A12	B12
Solenoid Valve Number	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]
Coils	A13	B13	A14	B14	A15	B15	A16	B16
Solenoid Valve Number	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]
Coils	A17	B17	A18	B18	A19	B19	A20	B20
Solenoid Valve Number	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]
Coils	A21	B21	A22	B22	A23	B23	A24	B24
Solenoid Valve Number	21		22		23		24	

7.3 IP Settings and Modifications

7.3.1 Setting the IP Address by Rotary Switch

- **Set the IP address with the rotary switch in the factory state**
IP address is 192.168.0.XXX (XXX is the setting value of the rotary switch, range 1~254).
- **Set the IP address with the rotary switch in a state where the IP address has already been set by the host computer**
The IP address follows the high 3byte and the low 1byte of the IP address set via the host computer as the setting value of the rotary switch.
For example, when changing the setting of the rotary switch after setting it to 172.10.0.12 via the upper unit, the IP address is 172.10.0.XXX (XXX is the setting value of the rotary switch (1 to 254).

Precautions

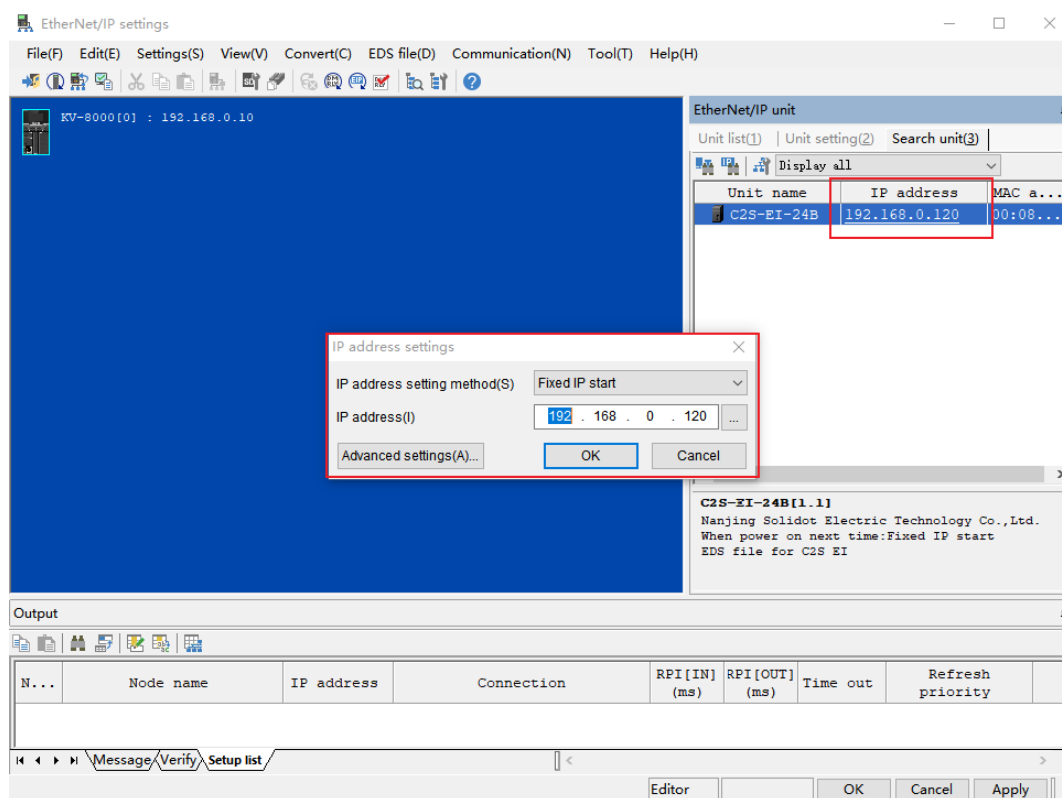
For the description and operation of the rotary switch, see "[4.3 Rotary Switch](#)".

- **When the module is shipped from the factory, the rotary switch is set to "000" and the IP address defaults to 192.168.0.120.**
- **After the modification by the host computer is completed, the module modifies the startup method to fixed IP startup and restarts automatically. The module starts with the IP address consisting of the rotary switch setting value and the assigned network segment.**
- **Abnormal rotary switch setting: When the rotary switch is set to 255 or 255 or more, the module starts with the previous startup parameters and method after powering up.**

7.3.2 Setting the IP Address via the Host Computer Software

This section introduces how to change the IP address with the KEYENCE KV-8000 and the upper computer KV STUDIO Ver.10G as examples.

- After finding the device, click the "IP address" to modify it, and select "Fixed IP start" as the IP address setting method. Click the "OK" button after the modification is completed, as shown in the figure below.



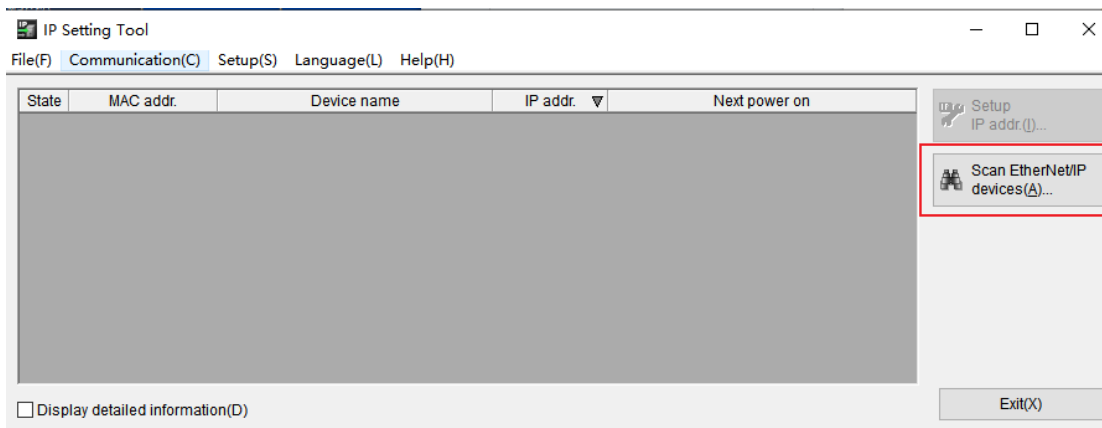
Precautions

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

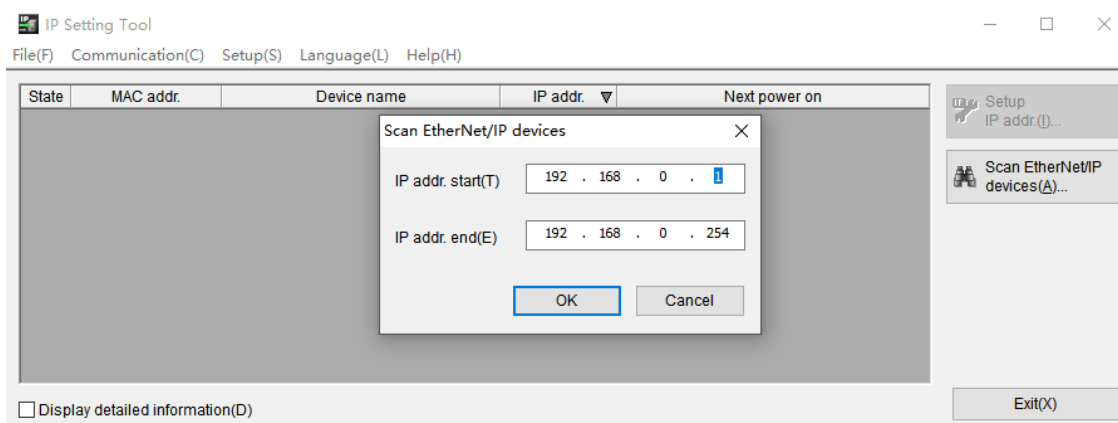
7.3.3 Setting the IP Address with IP Setting Tool

After the device is powered on, wait for 15s and the device will complete the network service startup. After that, the first scan will be performed by IP Setting Tool to set the IP address.

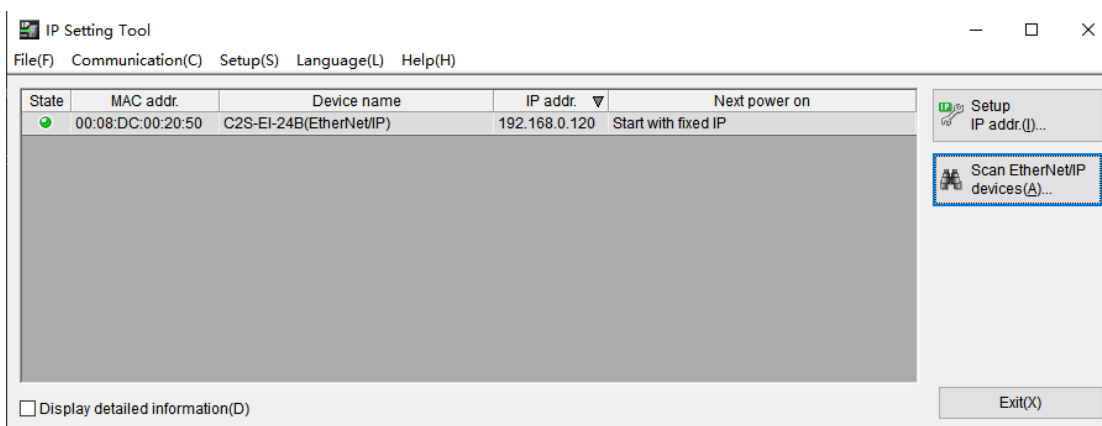
1. Open the IP Setting Tool and click the “Scan EtherNet/IP devices” button.



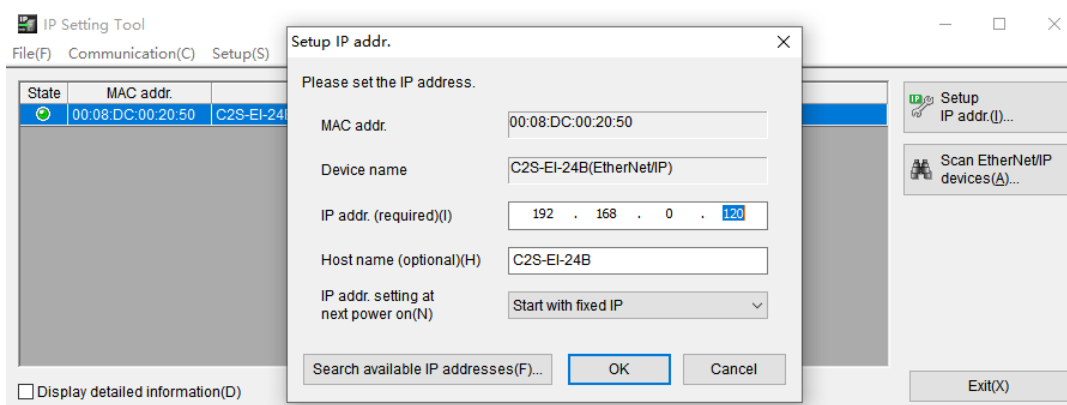
2. Set the IP segment and click OK.



The scanned device is shown in the figure below.



3. Double-click the device and set the IP address in the "Setup IP addr." pop-up window, as shown below.



7.4 Restore Factory Settings

If the IP address is forgotten, lost or other abnormalities occur during use, the module can be reset by the IP address reset function. The module can restore factory settings through the special operation of the rotary switch as follows:

- Scenario 1: The device performs a factory reset while it's powered on and in use.
 - 1) Set the rotary switch to 999 and wait for 2s, then the ERR indicator lights up and the module will automatically restore factory settings;
 - 2) After the module is restored to factory settings, the IP address is cleared and the startup method is BOOTP;
 - 3) ① Set the rotary switch to 000, 255 or 255 or more (except 999), and the IP address will be restored to the factory address(192.168.0.120), after re-powering up.
 - ② Set the rotary switch to 001~254, and after re-powering up, the IP address is 192.168.0.XXX (XXX is the setting value of the rotary switch, range 1~254).
- Scenario 2: The device performs a factory reset while it's powered off.
 - 1) Set the rotary switch to 999 and power up the module, the module will automatically restore factory settings;
 - 2) After the module is restored to factory settings, the IP address is cleared and the startup method is BOOTP;
 - 3) ① Set the rotary switch to 000, 255 or 255 or more (except 999), and the IP address will be restored to the factory address (192.168.0.120) after re-powering up.
 - ② Set the rotary switch to 001~254, and the IP address is 192.168.0.XXX after re-powering up (XXX is the setting value of the rotary switch, range 1~254).

7.5 Parameter Description

7.5.1 Output Signal Clear/Hold Function

The output signal of the valve terminal has clear/hold function, and it can configure the output action of the valve terminal in the abnormal state of the bus.

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

Hold Output: When communication is disconnected, the output channel keeps on outputting.

The function supports all-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 KV STUDIO Ver.10G as an example to introduce the parameter configuration method, the specific steps are detailed in [7.6.1 Parameter Setting](#).

7.6 Configuration Applications

7.6.1 Application In KV STUDIO Software Environment

1、 Preparations

● Hardware Environment

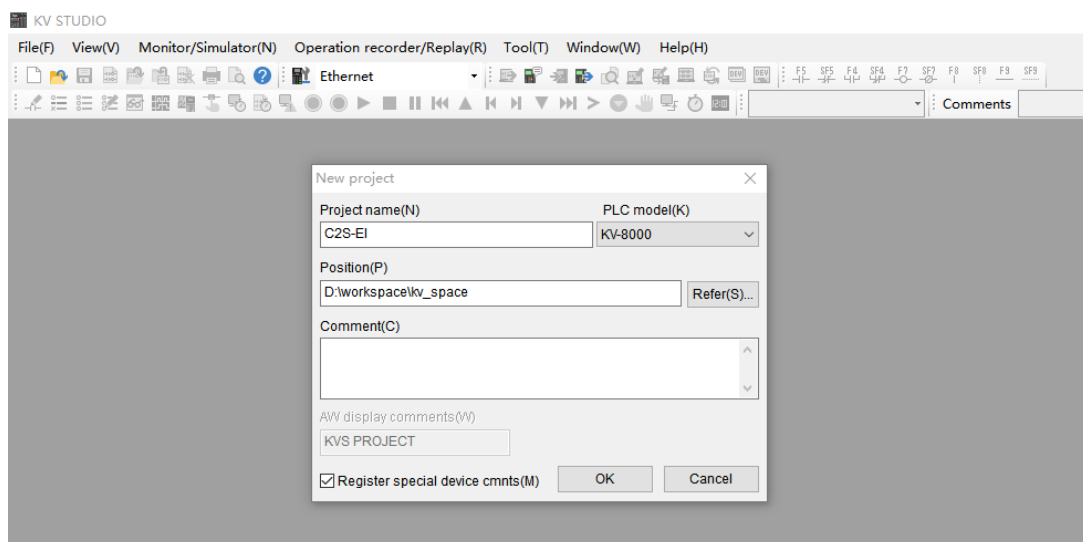
- Valve terminal model C2S-EI-24B
- A computer with KV STUDIO Ver.10G software
- Shielded cables for valve terminals
- One KEYENCE PLC, KV-8000 is used as an example
- One switching power supply
- Device configuration files
Configuration file access: <https://www.gdcoyo.com/bus-valve-island/bus-valve-island.html>
- **Note:** Valve terminal configuration files of a high number of valve positions are compatible with valve terminals with a lower number of valve positions, e.g., a C2S-EI-20B valve island can use a C2S-EI-24B file.

● Hardware Configuration and Wiring

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

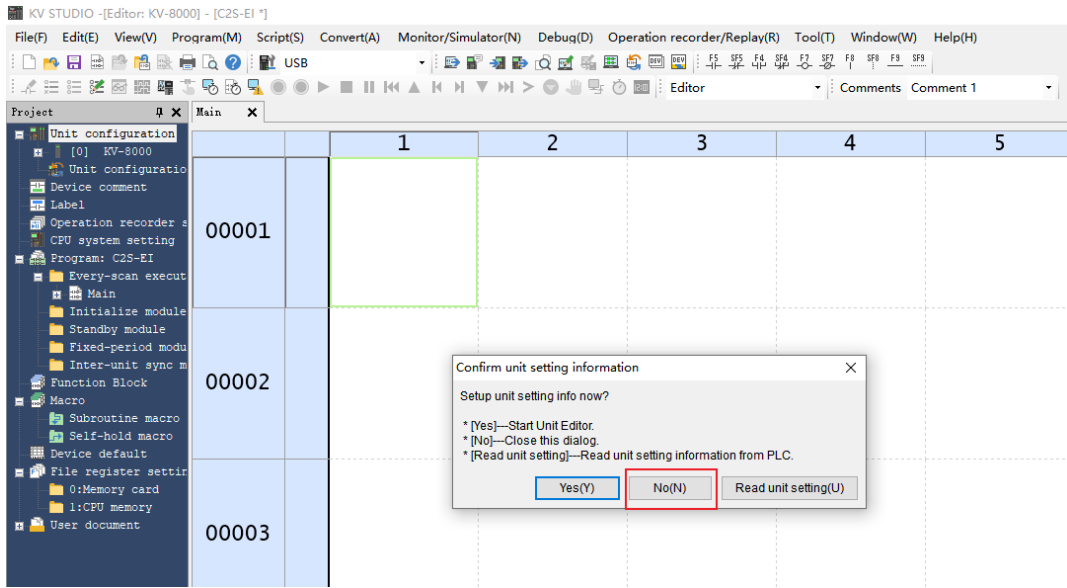
2、 New project

- a. Open the KV STUDIO software, select "File" -> "New Project".
- b. In the pop-up box, fill in the "Project name", select "PLC model", "Position", as shown in the figure below.



- ◆ Project name: Customized
- ◆ PLC model: View the PLC and select the model, e.g., KV-8000.


- c. The "Confirm unit setting information" window pops up, and you can select "Yes", "No" or "Read unit setting". In this example, select "No" to continue the operation, as shown in the figure below.

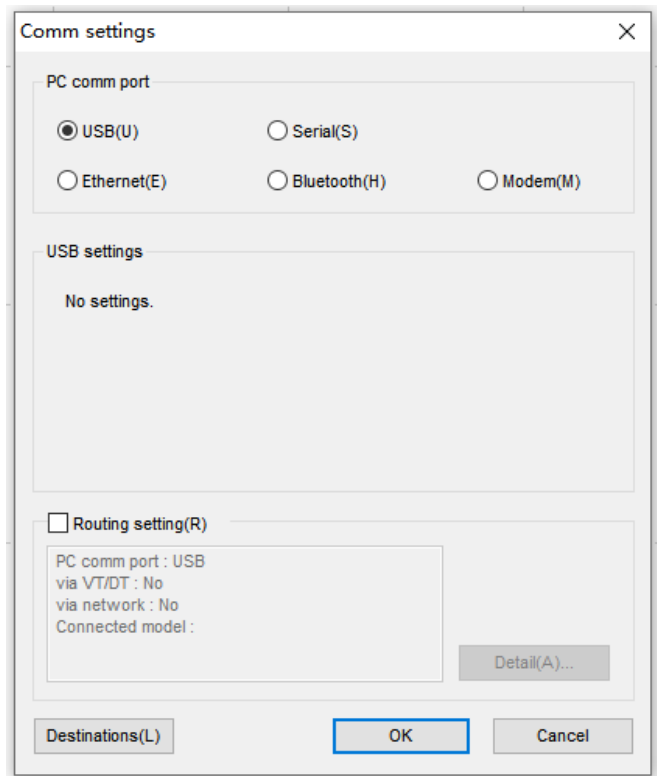


3. Communication settings

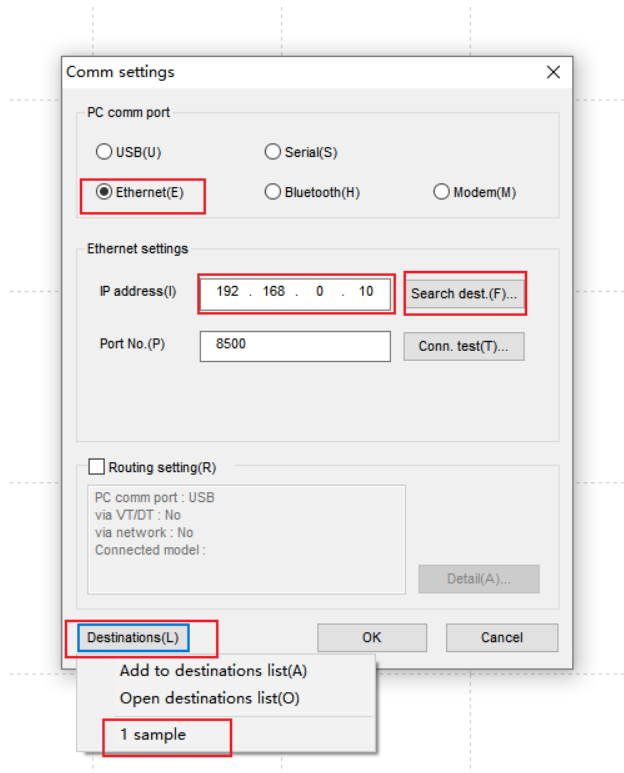
Select the communication method, if the PLC and the host computer software are connected through a network cable, select "Ethernet", if connected through USB, select "USB".

"Ethernet" Operations

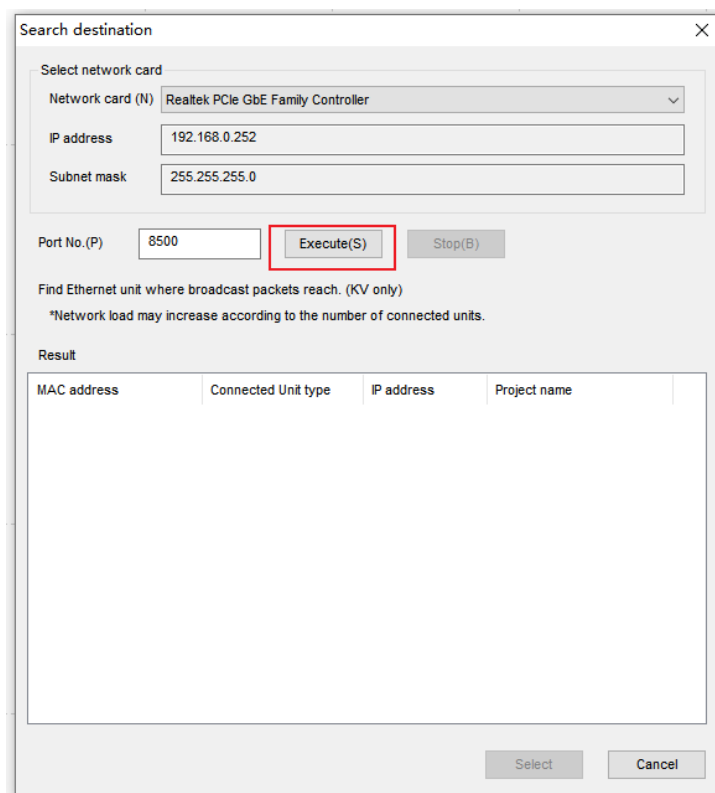
- a.  Click the button on the menu bar to display the "Comm settings" window as shown below.



- b. Select "Ethernet", click "Destinations", select "1 sample", configure the IP address, and click "Search dest.(F)", as shown in the following figure, the IP address is configured in the "192.168.0" network segment.



- c. In the "Search destination" pop-up window, select the network card and click "Execute(S)", as shown in the following figure.



- d. Select the found PLC and click "Select" as shown in the following figure.

Search destination

Select network card

Network card (N) Realtek PCIe GbE Family Controller

IP address 192.168.0.252

Subnet mask 255.255.255.0

Port No.(P) 8500 Execute(S) Stop(B)

Find Ethernet unit where broadcast packets reach. (KV only)
*Network load may increase according to the number of connected units.

Result

MAC address	Connected Unit type	IP address	Project name
00-01-FC-ED-53-73	KV-8000	192.168.0.10	环网岛重复上下电点高通...

Select Cancel

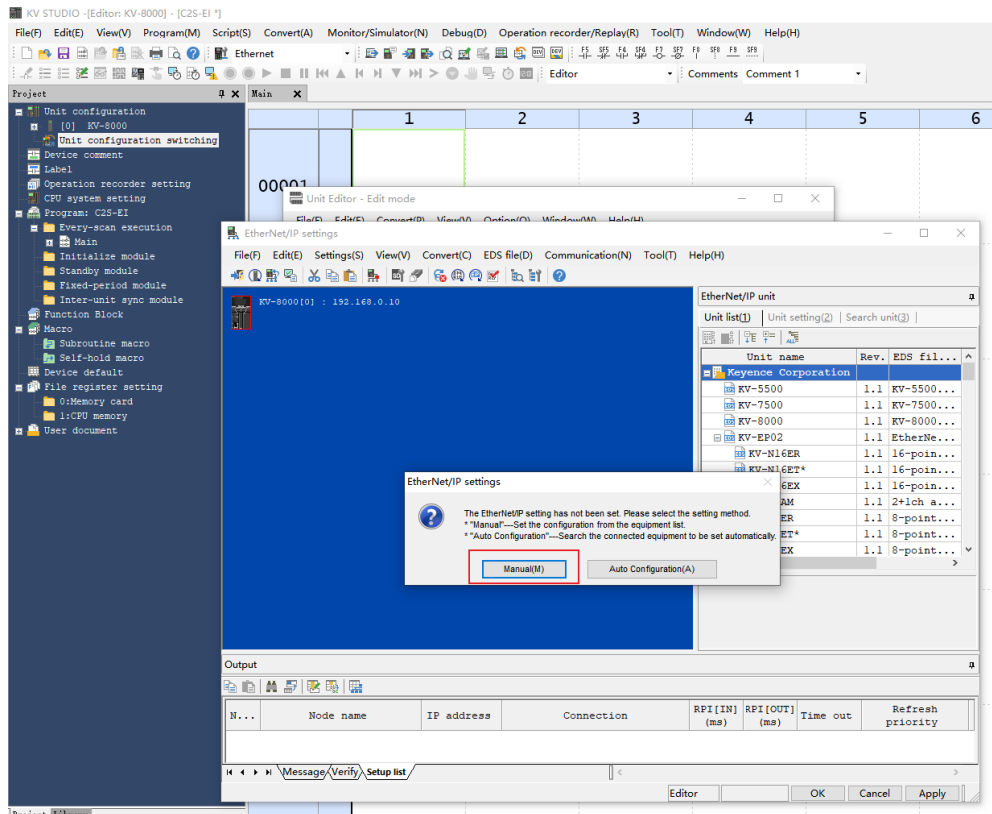
- e. Click the "OK" button on the Communication Settings window.

"USB" Operations

Select "USB" on the "Comm settings" screen.

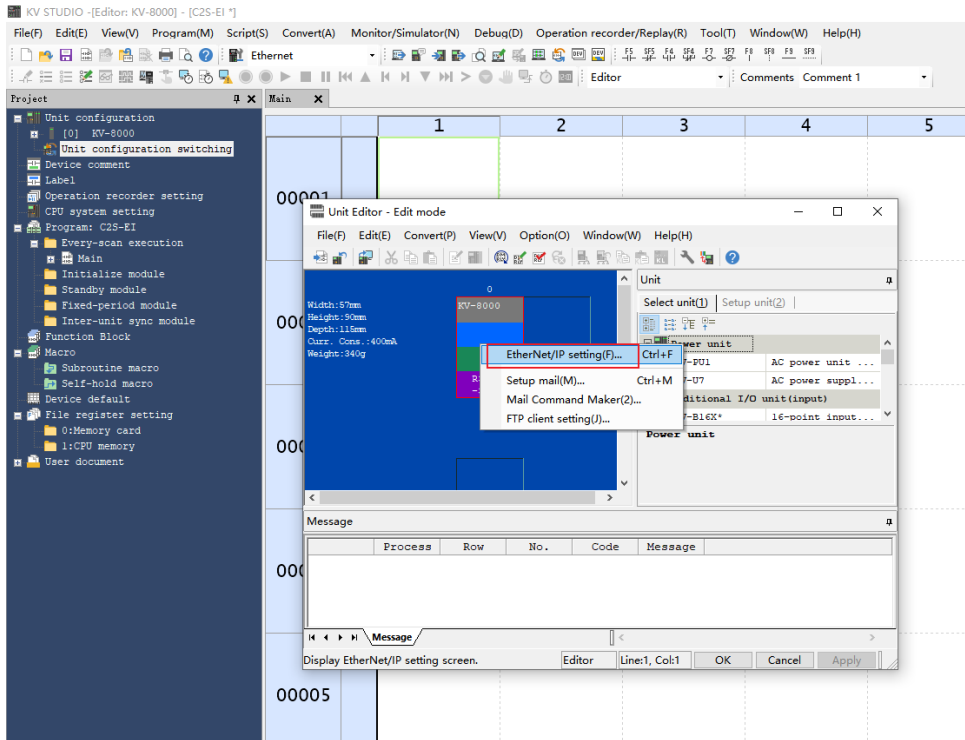
4. EtherNet/IP settings

- a. Double click "Unit Configuration -> KV-8000" in the left navigation tree to bring up the "EtherNet/IP settings" window. Select "Manual" or "Auto Configuration" based on needs. Select "Manual" to continue the operation as shown in the figure below. When the setting is completed, click "OK" to close the window.

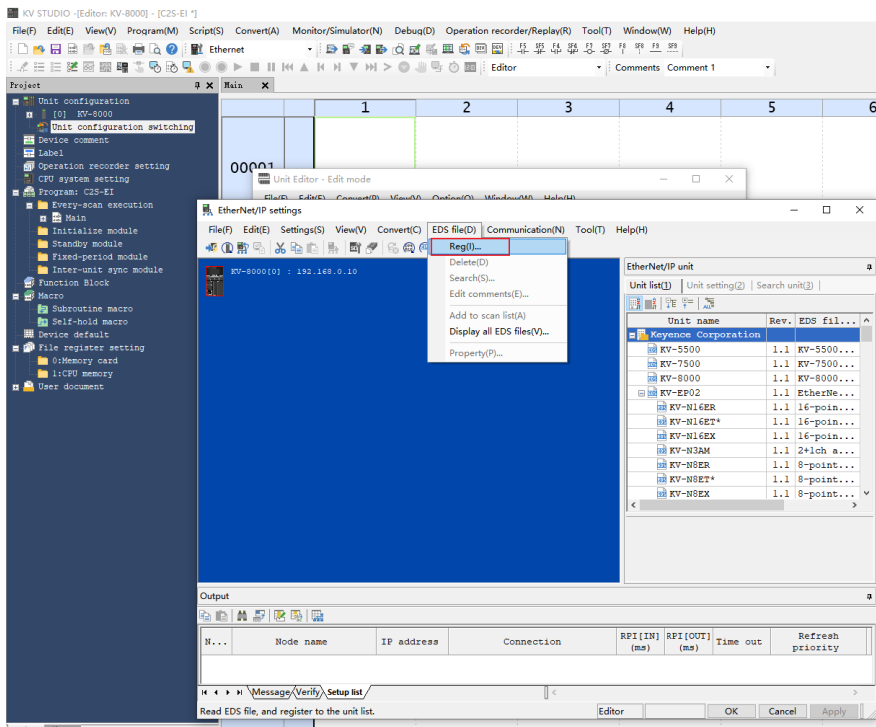


5. Installation of EDS files

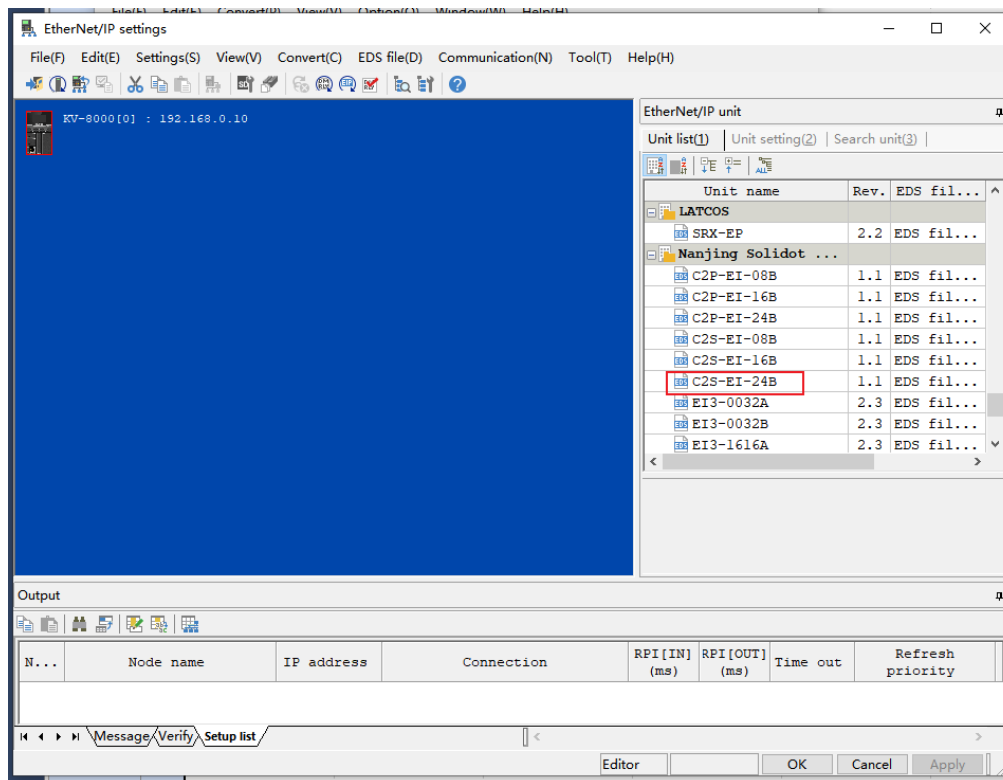
- a. Right-click on the "KV-8000" in the "Unit Editor" window and select "EtherNet/IP setting" to enter the settings page as shown below.



- b. Click "EDS file" in the menu bar of the "EtherNet/IP settings" screen, and then click "Reg" as shown in the following figure.



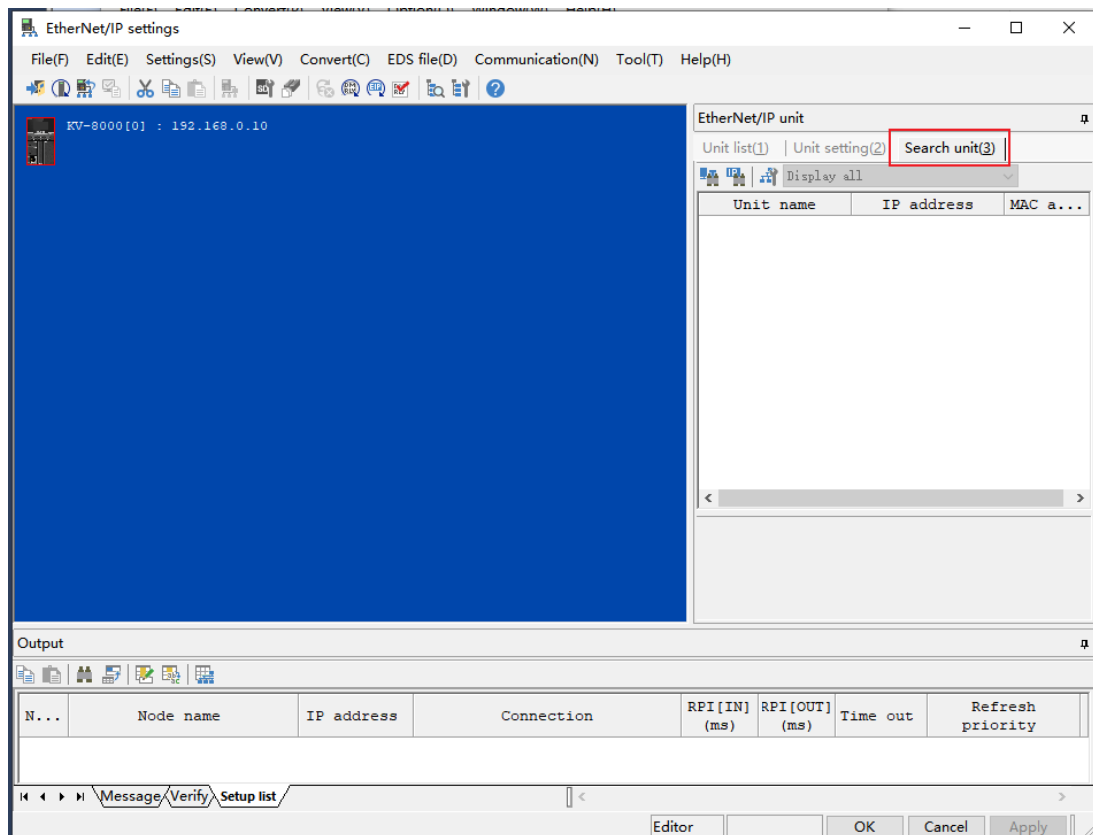
- c. In the folder where the EDS file is placed, select the EDS file of the corresponding model and click "OK", the configuration file installation is completed, as shown in the following figure.




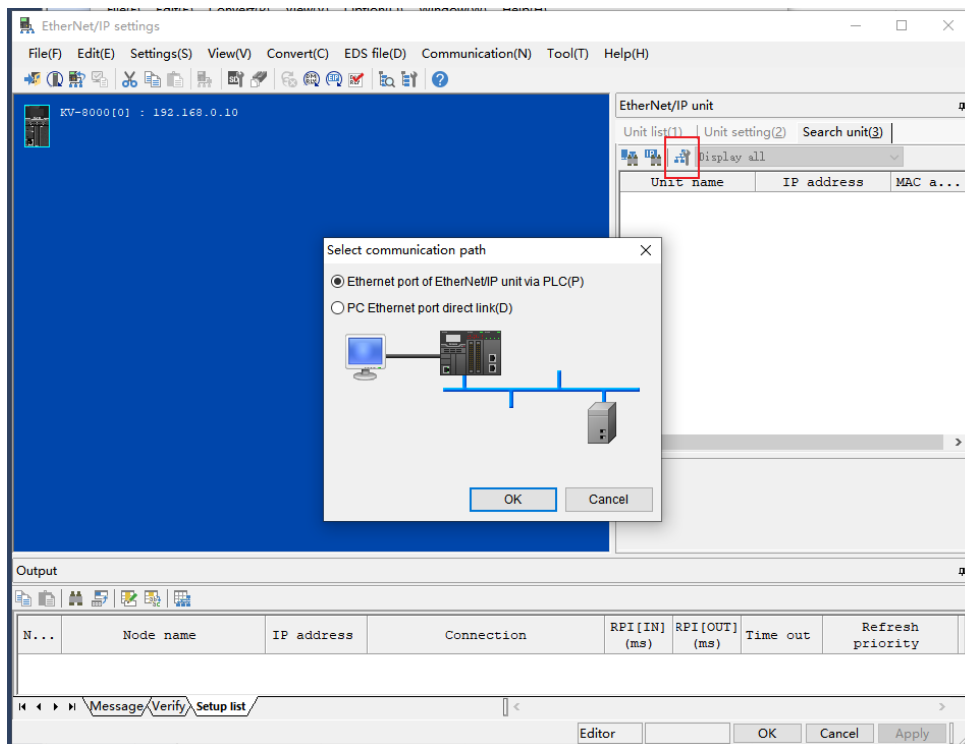
6. Topological configuration

Topology configuration can be "manually added" and "auto-configured". In this configuration manual configuration is used.

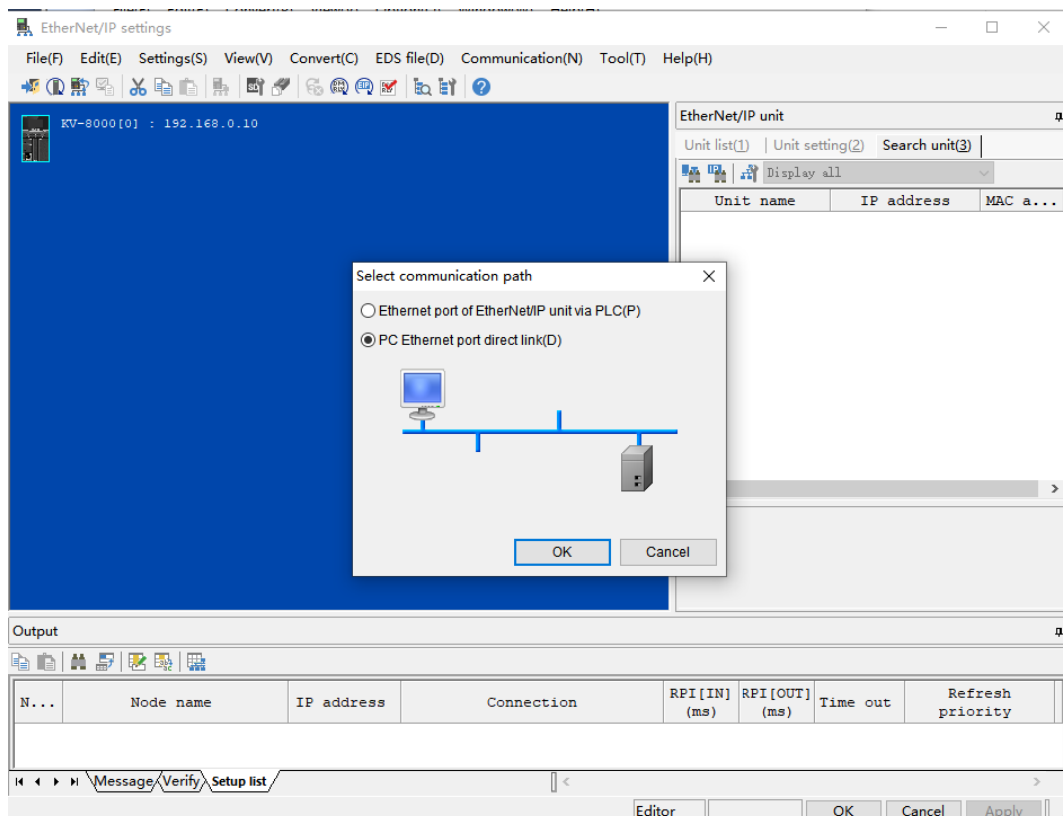
- a. Enter the "EtherNet/IP settings" page and switch to the "Search unit" tab, as shown in the following figure.



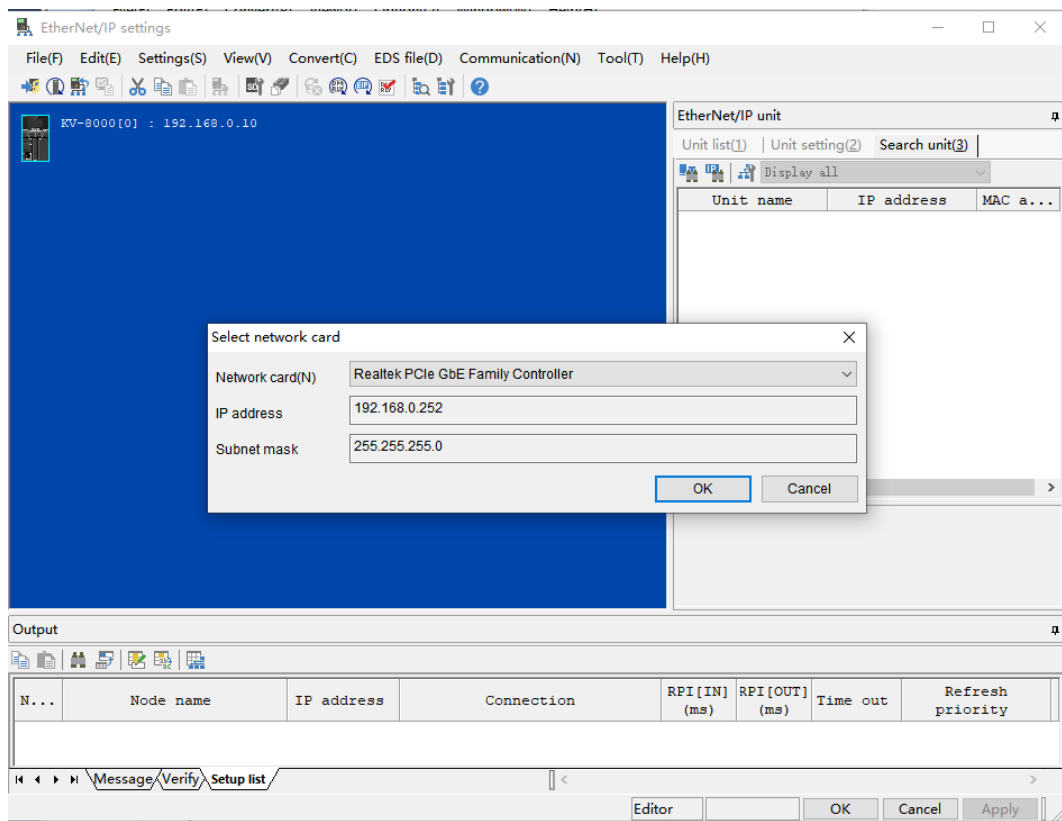
- b. Click  , select the communication path, and the USB connection method is shown in the following figure.




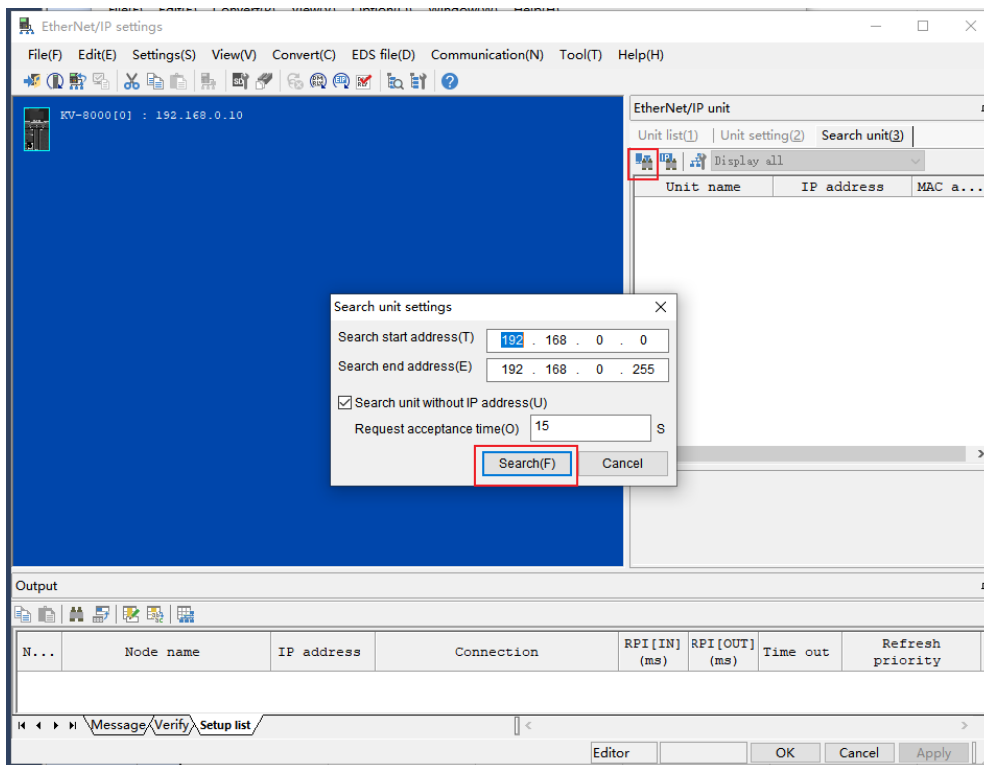
c. "PC Ethernet port direct link" as the connection method is shown in the following figure.



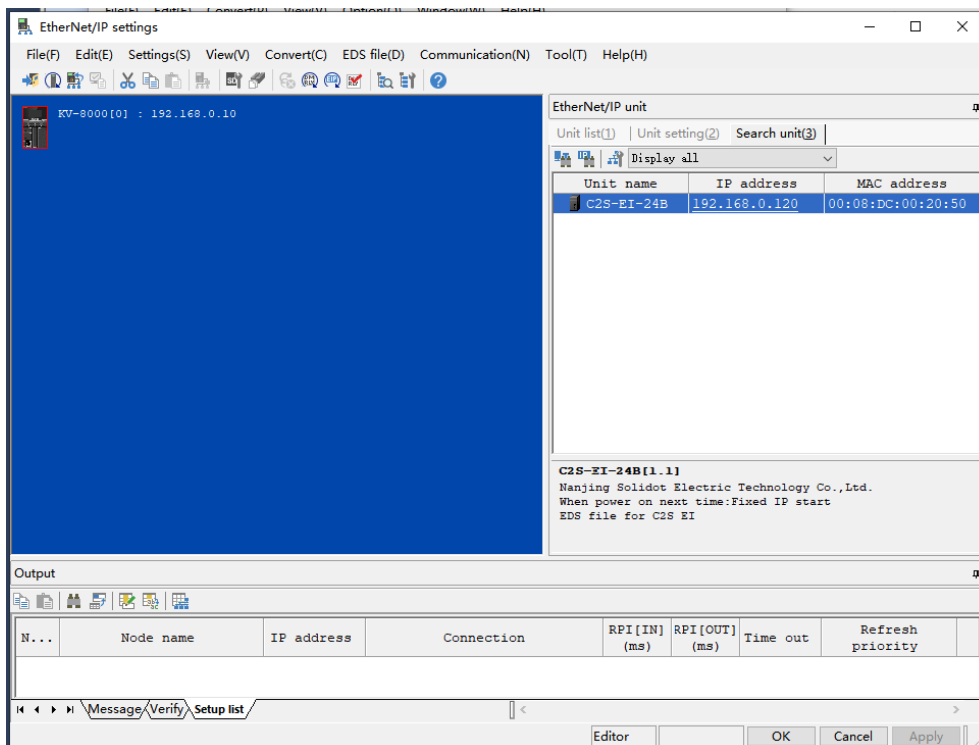
d. Select "PC Ethernet port direct link" to bring up the "Select network card" window, and set the local NIC and IP address, as shown in the following figure.



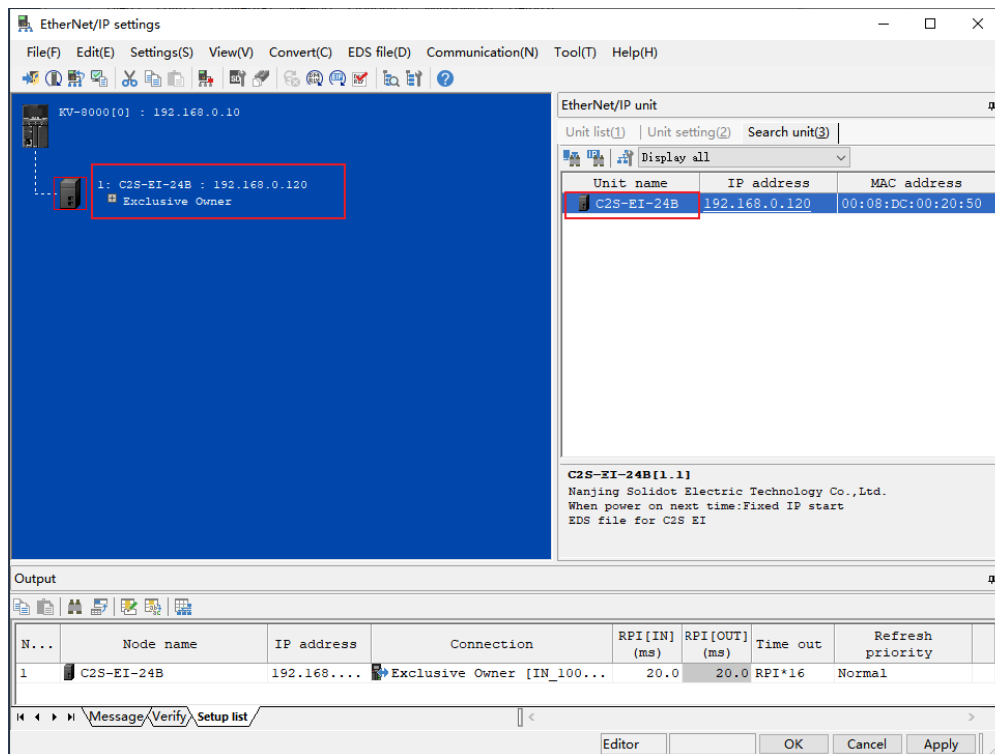
- e. Click  to search for devices in the network. Set the IP address segment for searching, and click "Search" as shown in the following figure.



- f. When the search is complete, the display is shown below.



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



7、 Setting the IP address

In the interface of the found device, double-click the IP address column and configure the IP address in the pop-up box. The default address network segment is 192.168.0.

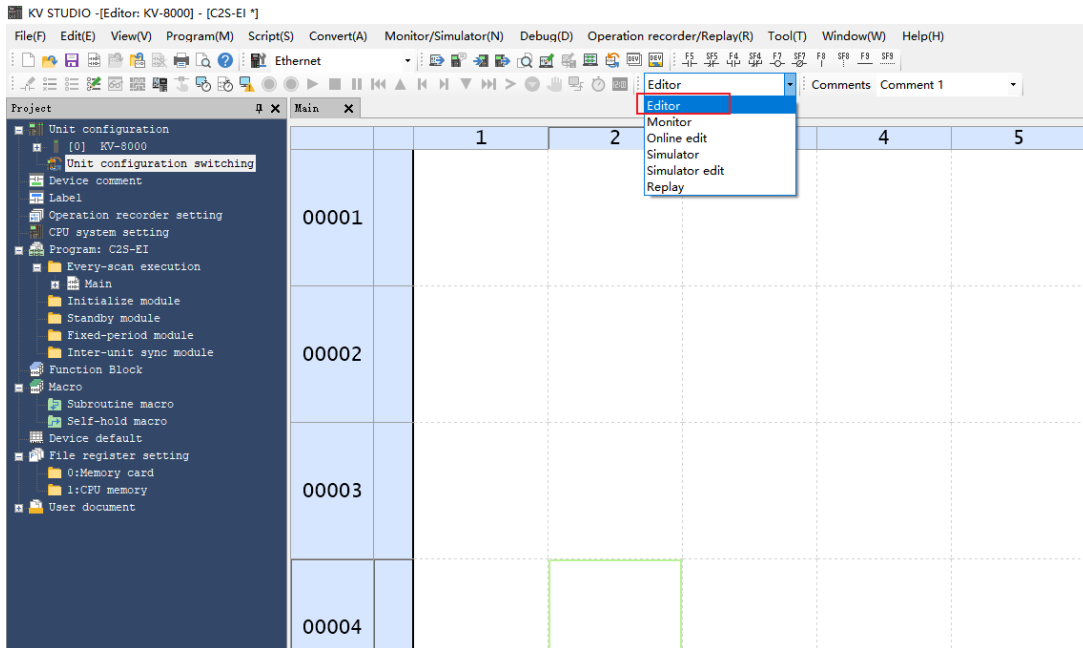
Description:

- The timeout for setting the IP address needs to be configured to 60s.
- If the dip switch has been configured with an IP address, it takes precedence.

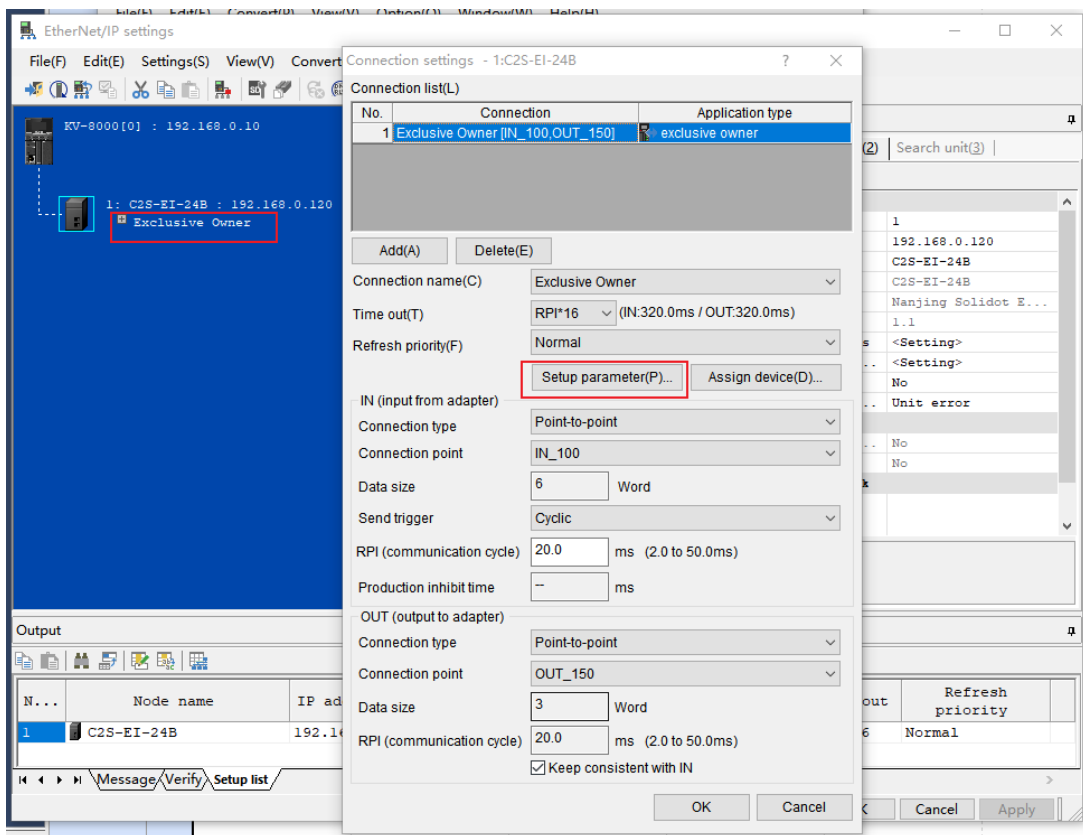
In this example, the default IP address of C2S-EI-24B is 192.168.0.120.

8. Parameter setting

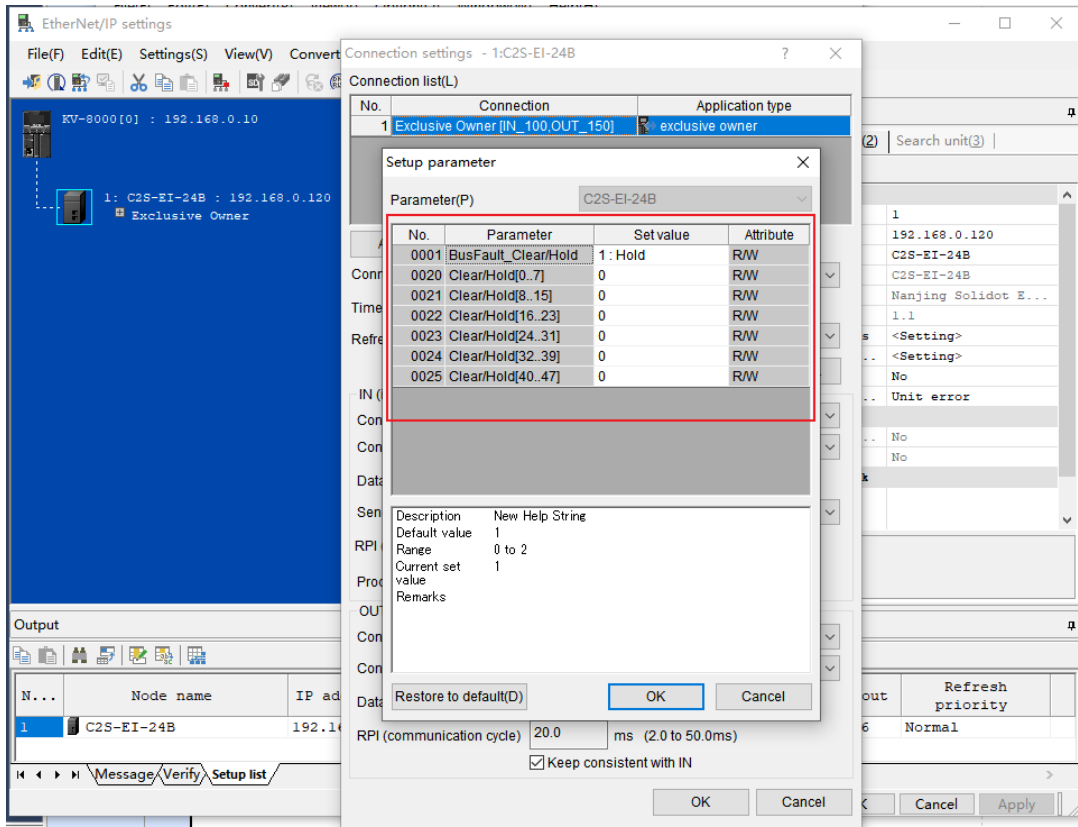
- a. Click the Switch Mode option in the menu bar to switch to **"Editor"** mode, as shown in the following figure.



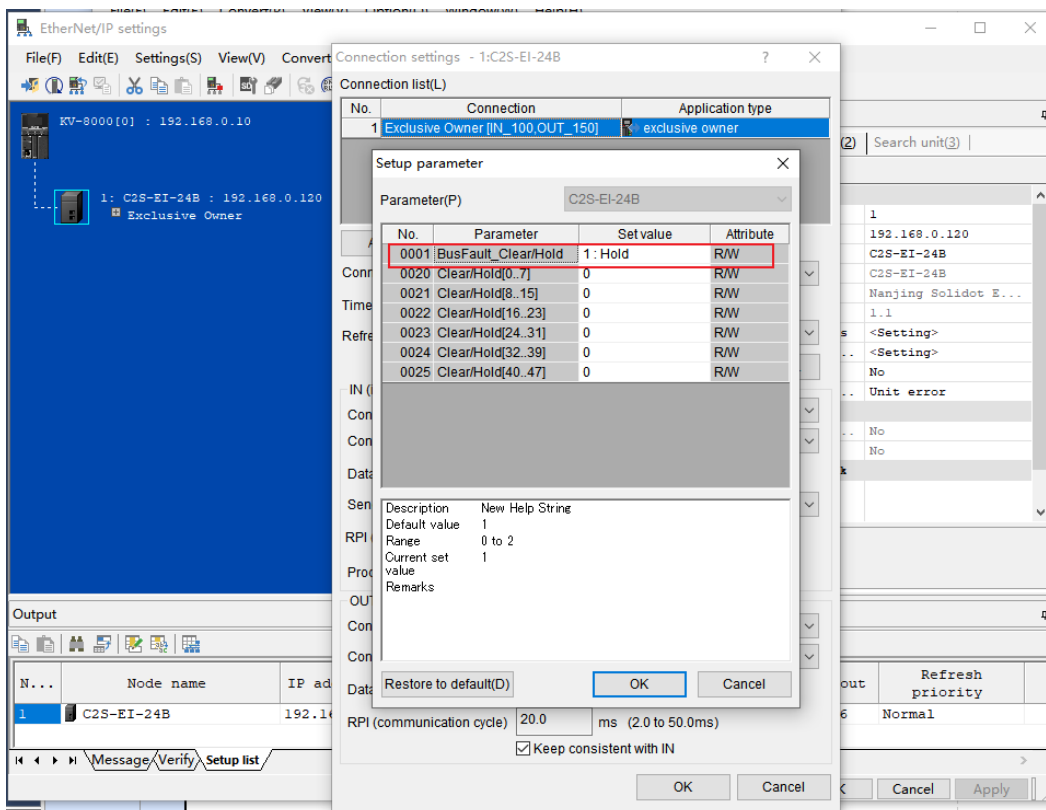
- b. Enter the **"Ethernet/IP settings"** screen and click **"Exclusive Owner"** to bring up the **"Connection settings"** window. In the window, click **"Setup parameter"** as shown below.



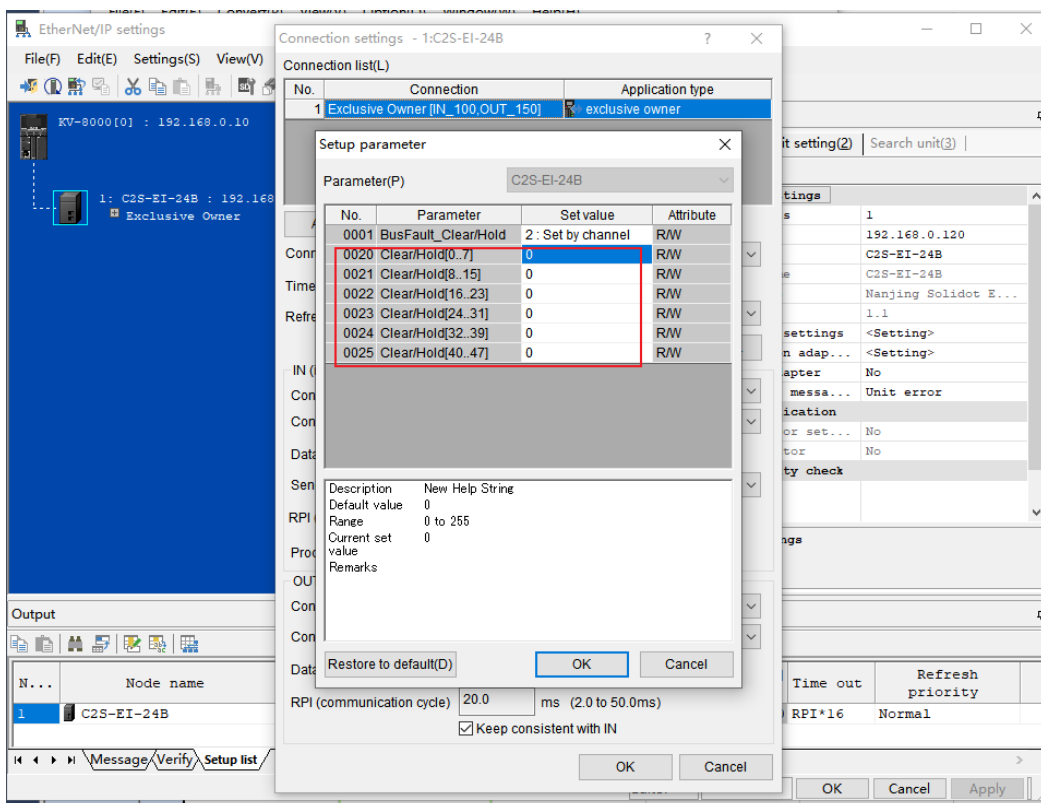
- c. In the "Setup parameter" window, you can configure the parameters of the valve terminal. The clear/hold function of the output signals in the valve terminal C2S-EI series is shown in the following figure.



- d. For Output signal's clear/hold function, double click the set value of parameter "BusFault Clear/Hold" to change values, **0** means clear and **1** means hold. When set value is **2**, it means single-channel setup or group setup and the following 0020~0025 parameters are valid, as shown in the figure below. Click "OK" to save the parameter, click "Apply" in the "EtherNet/IP settings" window and download it to the controller to make the parameter take effect.



- e. For output signal's clear/hold function, if 0001 "BusFault Clear/Hold" is set to 2, double-click on the set value of the grouping parameter of 0020~0025 below, you can set clear/hold per single channel, as shown in the figure below. Click "OK" to save the parameter, and then click "Apply" in the "EtherNet/IP Settings" window and download it to the controller to make the parameter take effect.

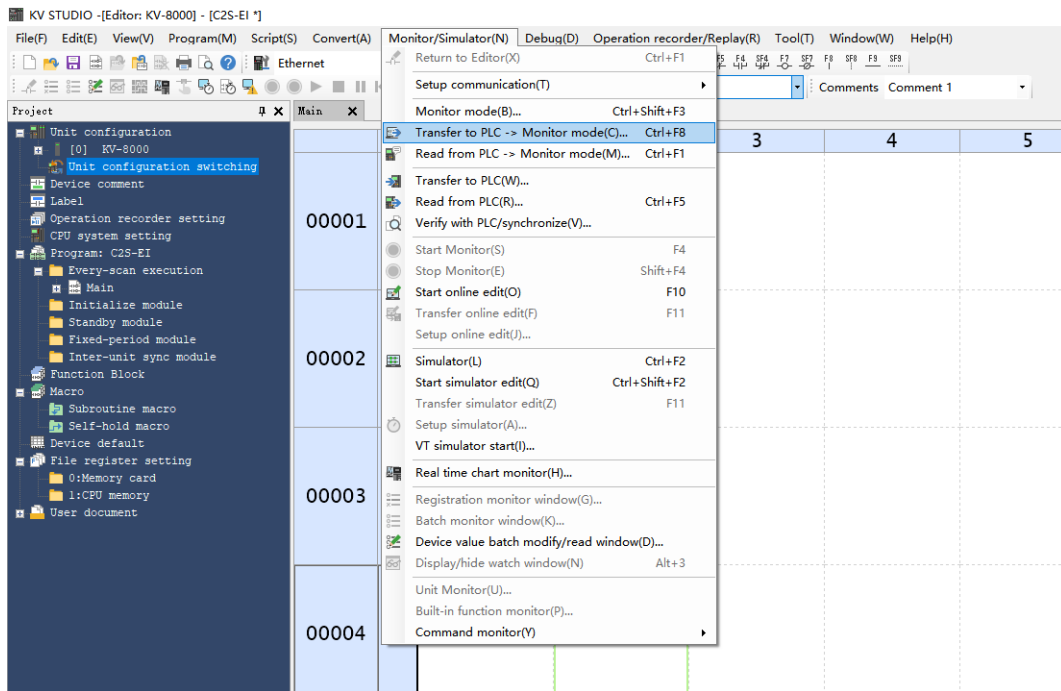


- f. When the configuration is complete, click the "OK" button in the "Setup parameter" window.
- g. In the "Connection settings" window, click the "OK" button.
- h. In the "EtherNet/IP settings" window, click the "Apply" button and click the "OK" button.
- i. In the "Unit Editor" window, click the "Apply" button and click the "OK" button.

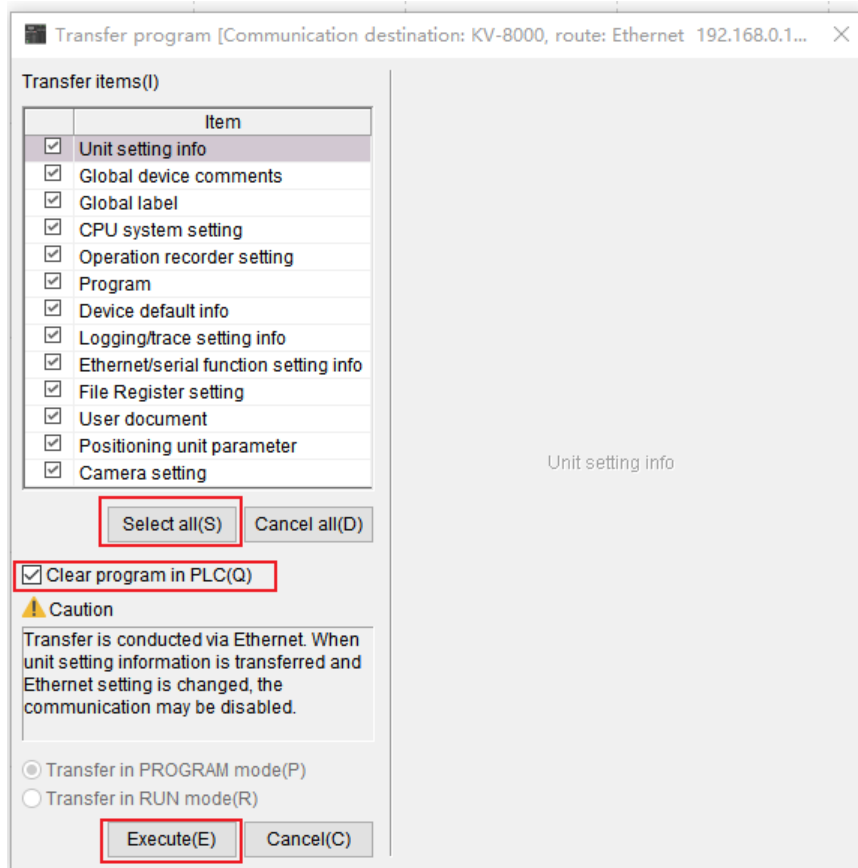
9. Configuration download

After module configuration and parameter setting are completed, download to PLC to operate.

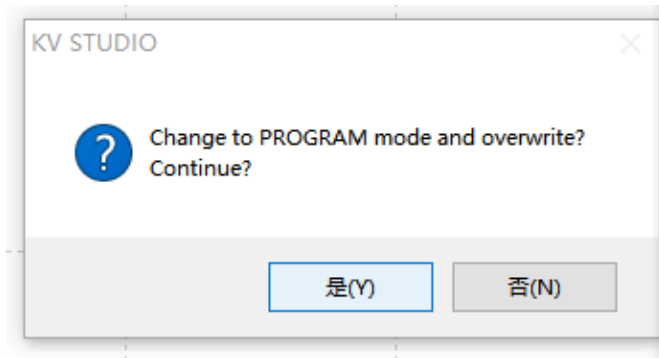
- a. Click "Monitor/Simulator (N) -> Transfer to PLC -> Monitor mode (C)" in the menu bar as shown below.



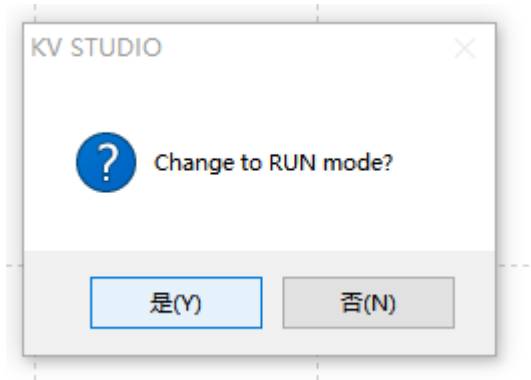
- b. The Transfer Program window pops up, check "Clear program in PLC", click "Select all", click "Execute" to download the program to the PLC, as shown in the following figure.



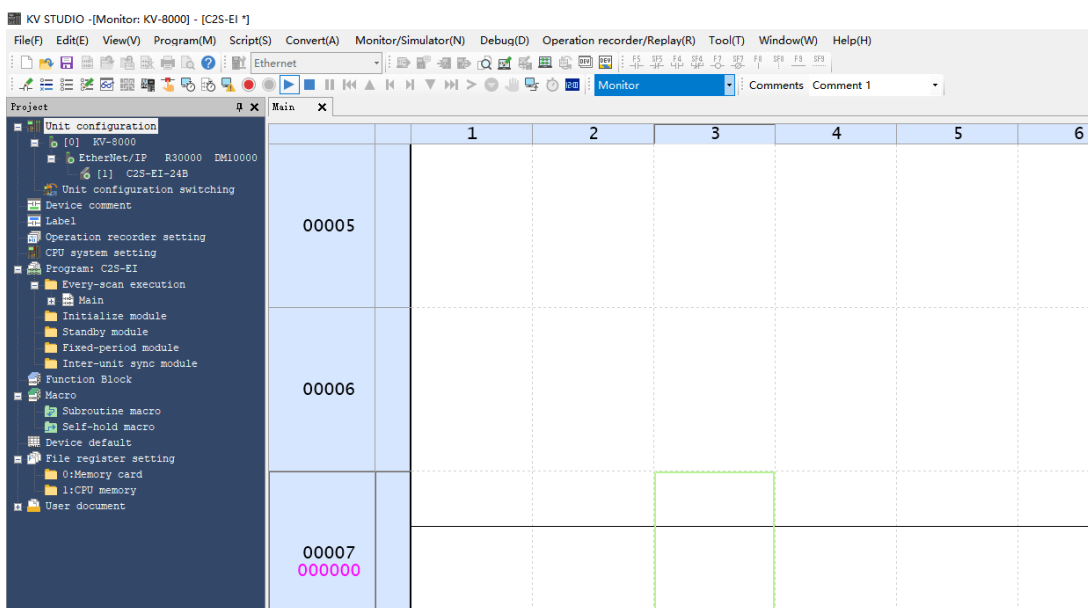
- c. A prompt box pops up "Change to PROGRAM mode and overwrite? Continue?" Click to select "Yes" as shown below.



- d. After overwrite is completed, a pop-up box will appear, "Change to RUN mode", click and select "Yes", as shown in the figure below, to enter the monitoring mode.

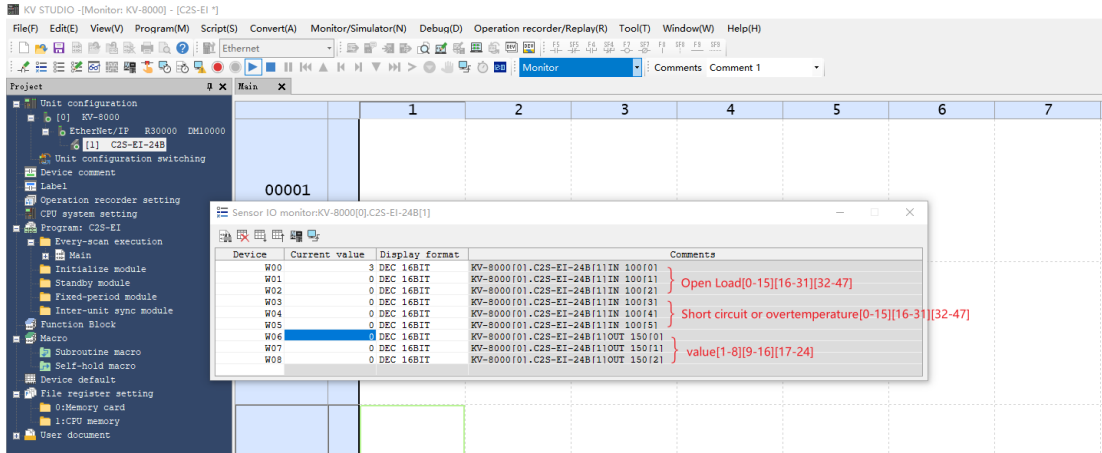


- e. After the configuration is downloaded, it is shown in the following figure.



10、 Data monitoring

- a. In monitor mode, double click "C2S-EI-24B" icon to open the monitor table, you can monitor the module as shown in the following figure.

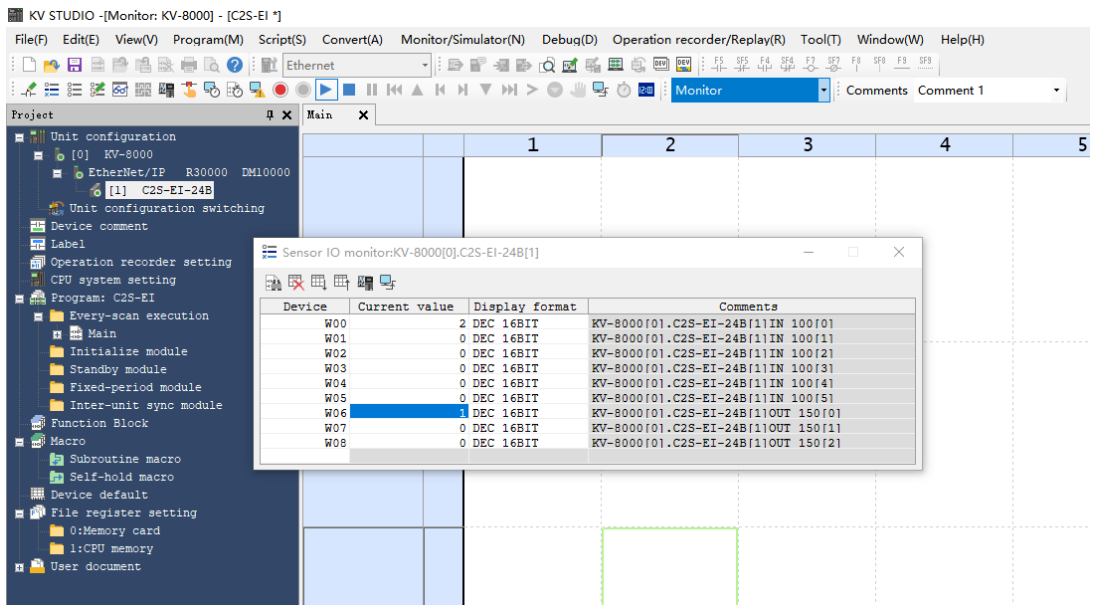


W00~W02 are the monitoring values for the open load detection function of the valve terminal.

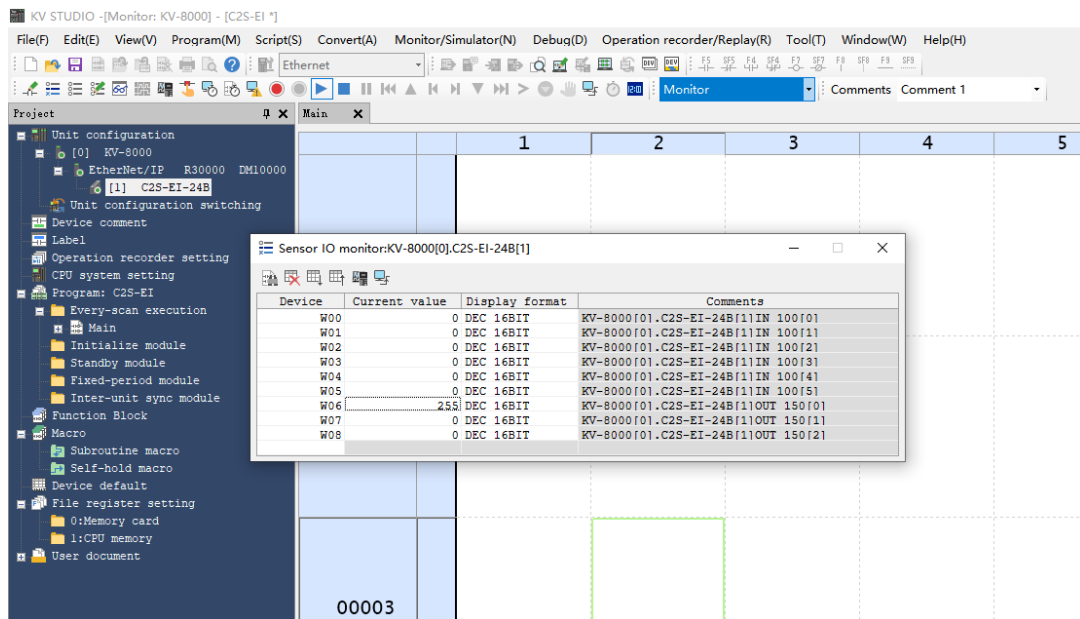
W03~W05 are the monitoring values for the short circuit or over temperature detection function of the valve terminal.

W06~W08 are output control function of the valve terminal

- b. To turn on any of the solenoid valve coil outputs of the valve island, take the first channel as an example, you can double-click on the current value of W06 and enter 1 to turn on the first solenoid coil channel, as shown below.



- c. If you need to control a group of solenoid valve coil outputs, take the first group of channels as an example, you can double-click the current value of W06 to enter **255** to turn on the first group of solenoid valve coil channels, as shown in the following figure.



7.6.2 Application In CODESYS V3.5 Software Environment

1、Preparations

● Hardware Environment

- Valve terminal model C2S-EI-24B
- One computer pre-installed with CODESYS V3.5 software
- Shielded cable for valve terminal
- One switching power supply
- Device configuration files

Configuration file access: <https://www.gdcoyo.com/bus-valve-island/bus-valve-island.html>

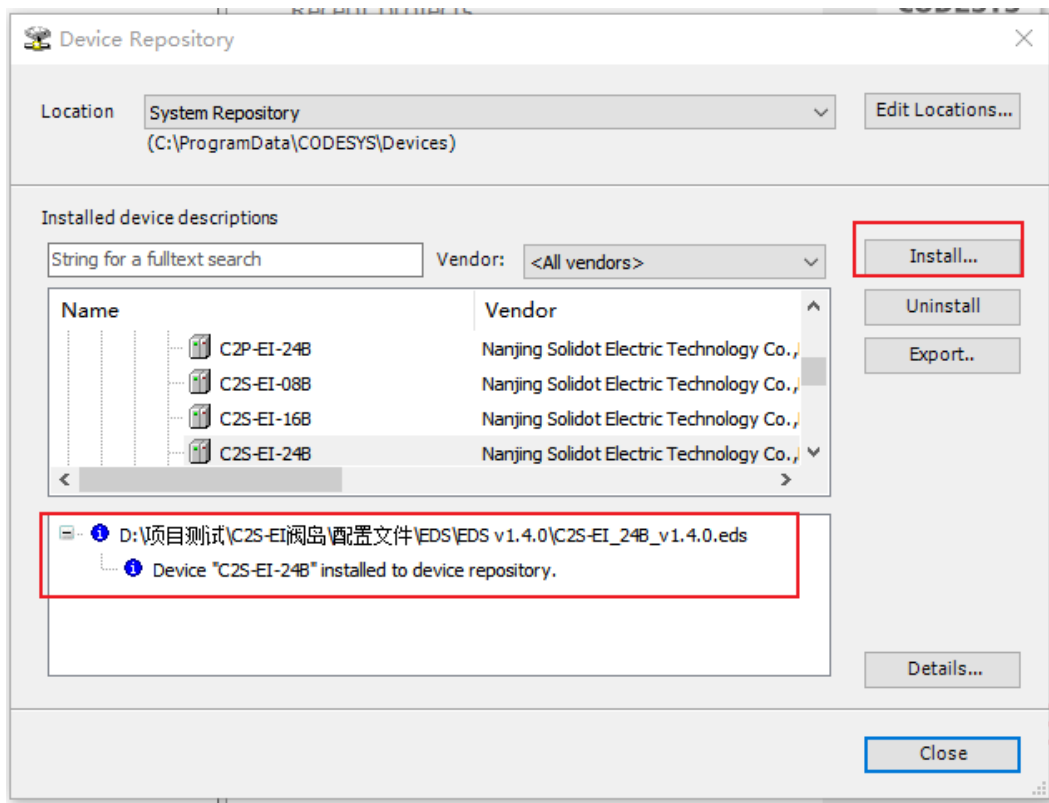
Note: Valve terminal configuration files of a high number of valve positions are compatible with valve terminals with a lower number of valve positions, e.g., a C2S-EI-20B valve island can use a C2S-EI-24B file.

● Hardware Configuration and Wiring

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

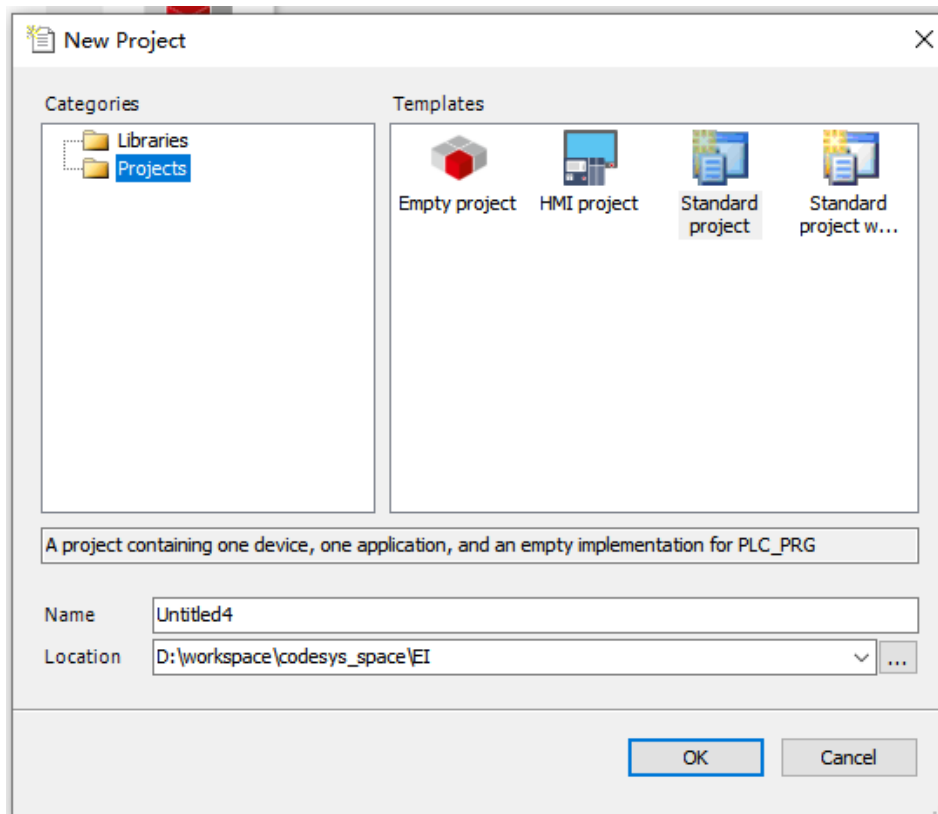
2、Installation configuration files

- a. Open CODESYS software and select "Tools -> Device Repository" to install the EhterNet/IP EDS device descriptions file.
- b. The Device Repository window pops up, click "Install", select the relevant EDS file to install. Successful installation shows that the device "xxxx" installed to the device repository, as shown in the following figure.



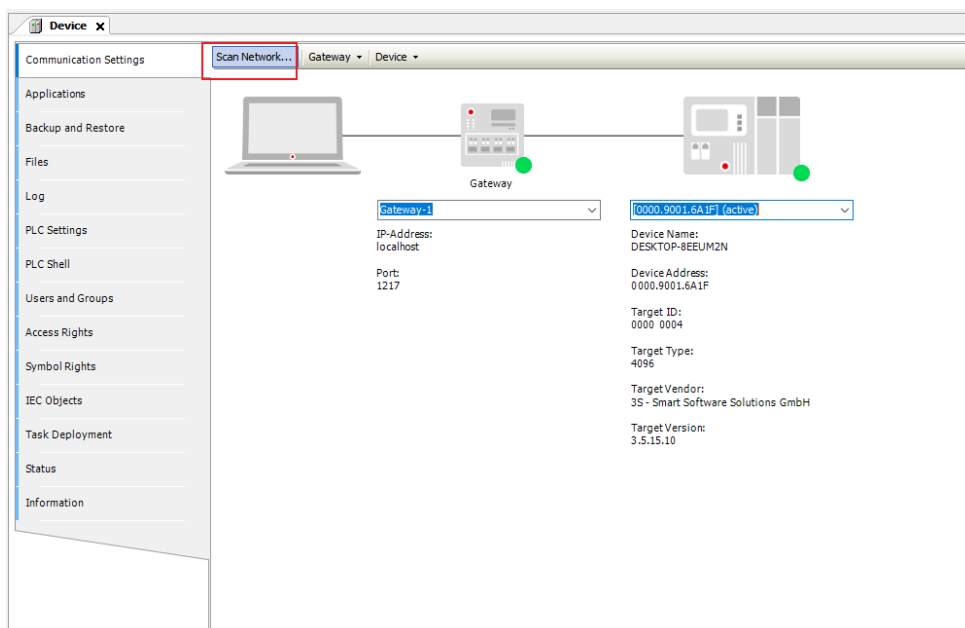
3. New project

- a. Click "File", select "New Project", enter the project name, click "OK", as shown below.



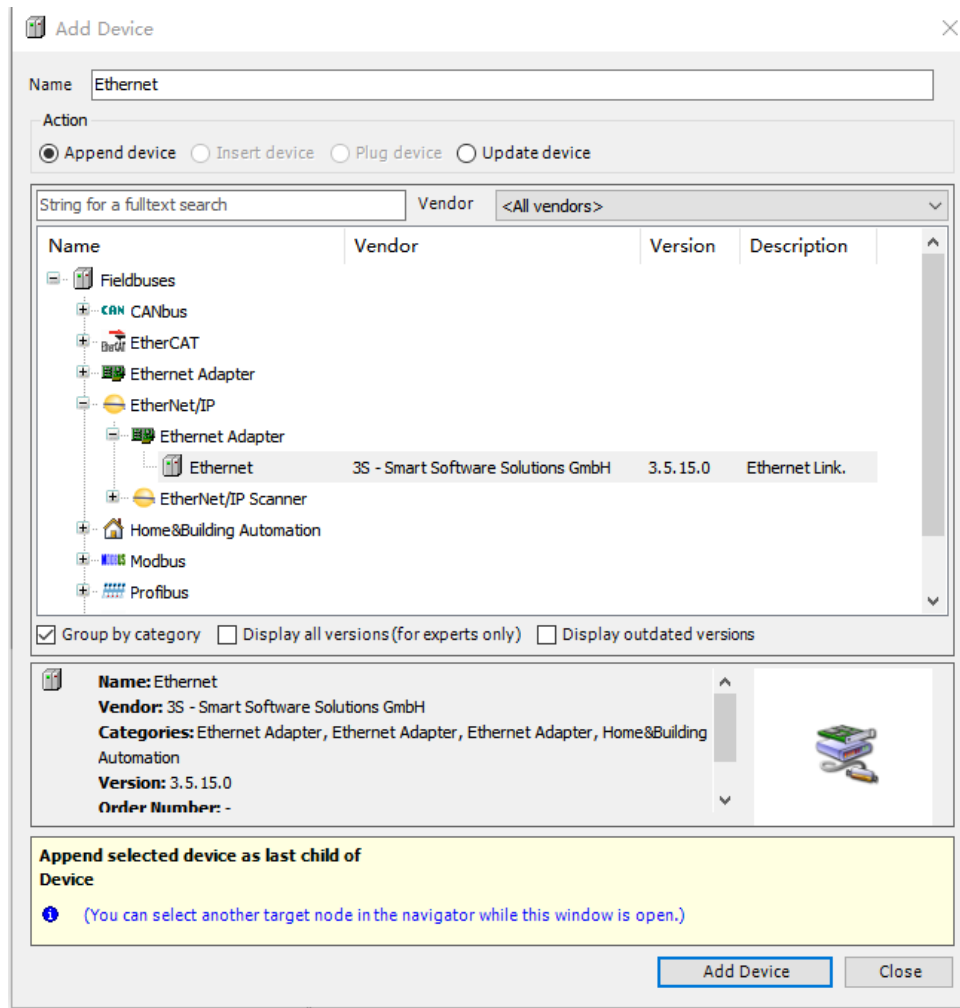
4. Add "Ethernet"

- a. Start the PLC with "CODESYS Control Win V3 - x64 SysTray".
- b. Double-click "Device (CODESYS Control Win V3 X64)" in the left navigation tree and click "Scan Networks".
- c. Select devices, scan for networks, and networks are active, as shown in the following figure.

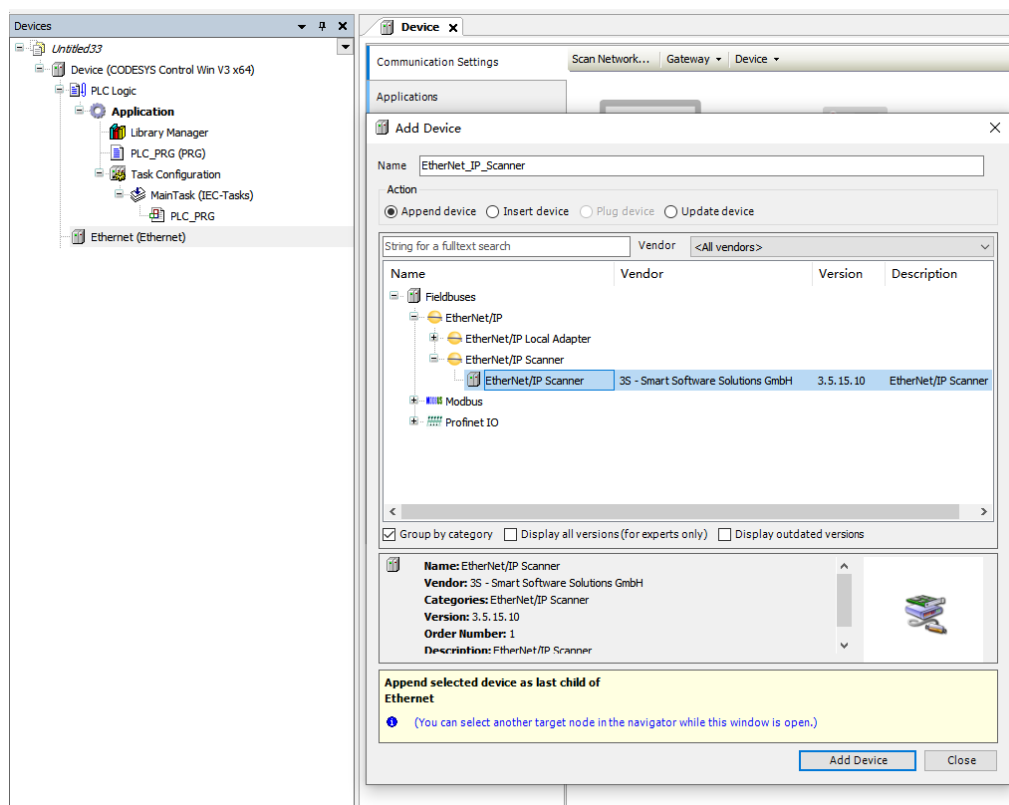


- d. Right click on "Device(CODESYS Control Win V3 X84) " in the left navigation tree and select "Add Device".


- e. The Add Device window pops up, select "EtherNet/IP -> Ethernet Adapter -> Ethernet", click "Add Device", as shown in the following figure.

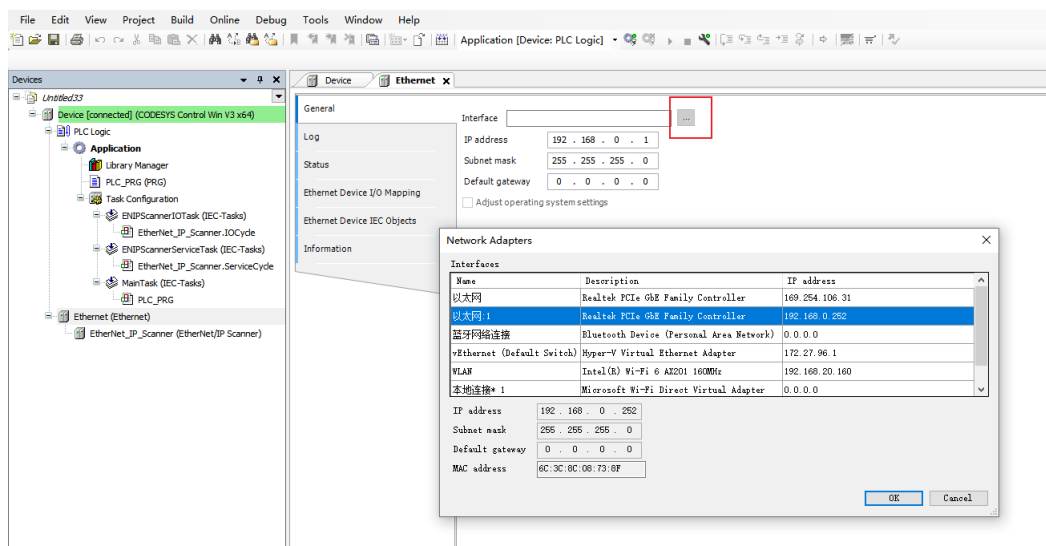


- f. Right-click "Ethernet (Ethernet)" in the left navigation tree and select "Add Device".
- g. Select "EthernetIP -> Ethernet/IP Scanner -> Ethernet/IP Scanner" and click "Add Device" as shown below.




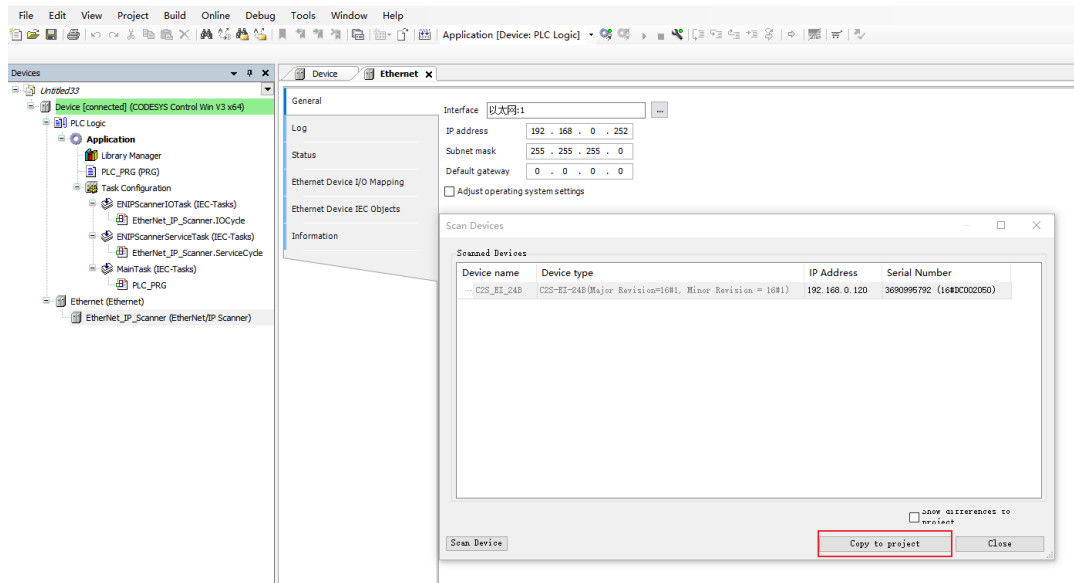
5. Configure "Ethernet/IP"

- Double-click on "Ethernet (Ethernet)" in the left navigation tree to open the configuration window.
- In the General tab, click  on the right side of the Interface, select "Network Adapters", and finally click "OK", as shown in the following figure.

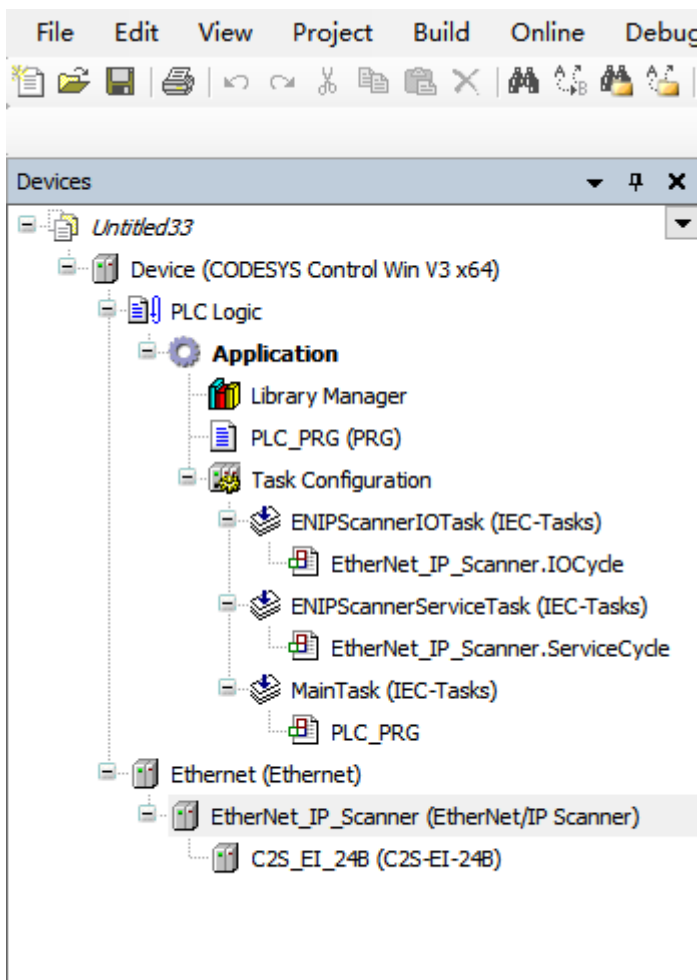


6. Add Device

- Click  to log in to the device.
- Right-click on "EtherNet_IP_Scanner (EtherNet/IP Scanner)" in the left navigation tree and select "Scan Devices".
- After scanning, select "C2S-EI-24B" and click "Copy to project" as shown in the following figure.



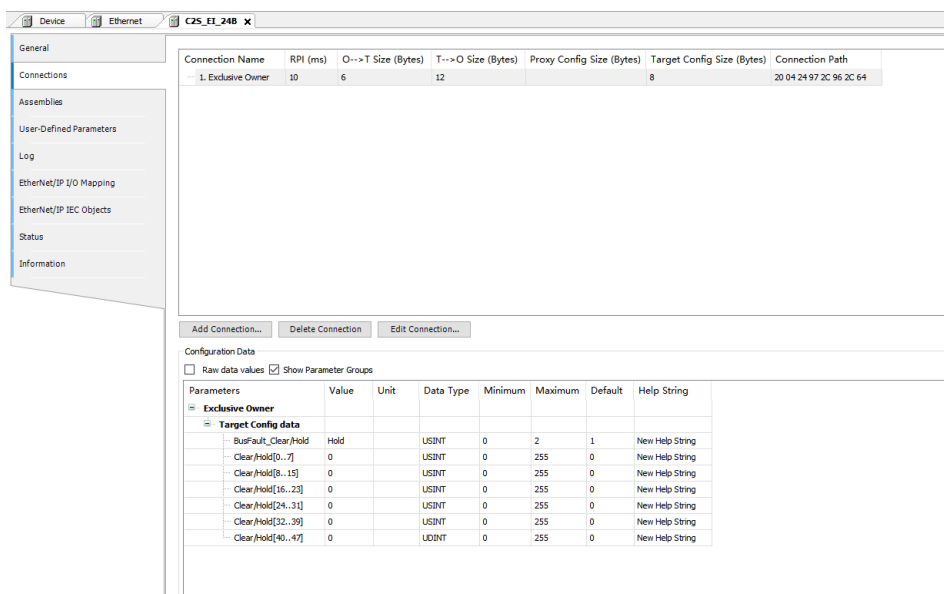
- d. The device has been added, as shown below.



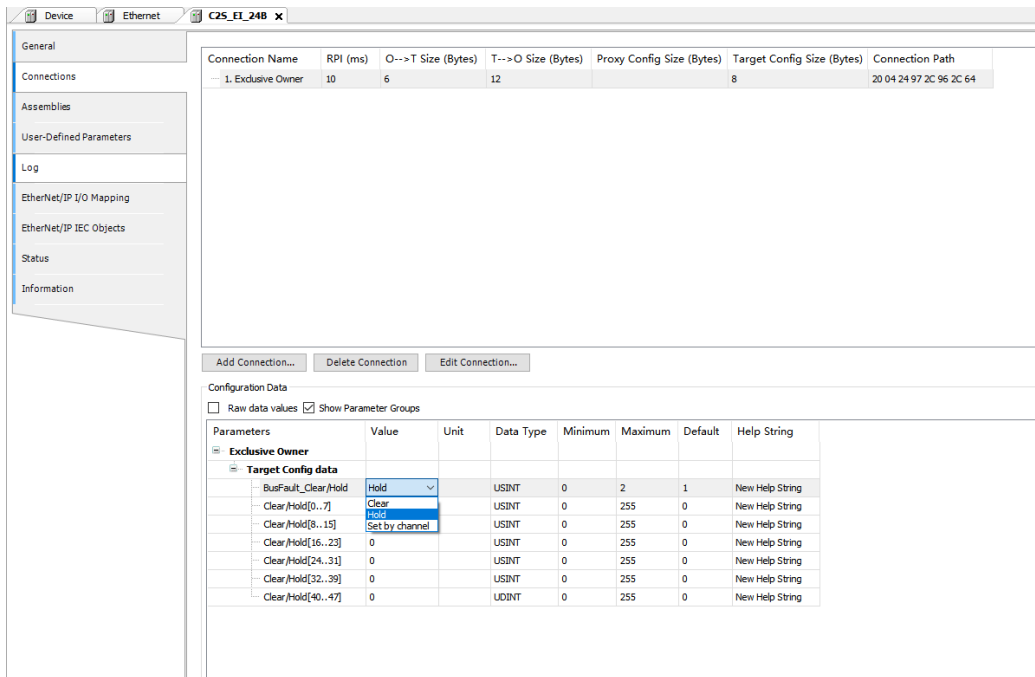
7、Parameter settings

The parameter setting function is used to configure the clear/hold function of the valve terminal.

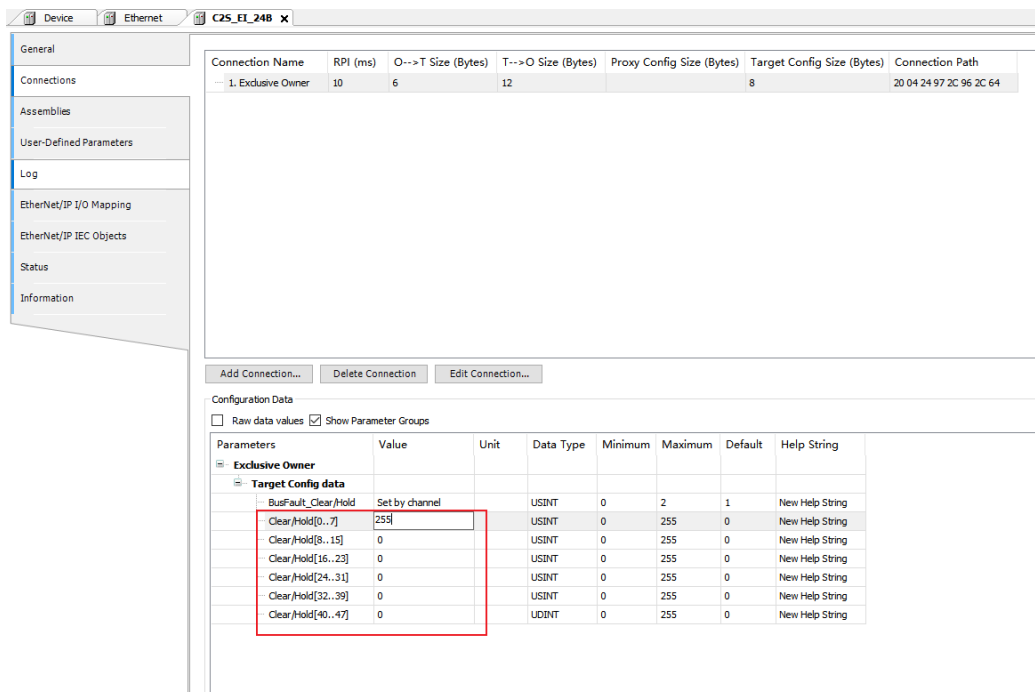
- a. Double-click the device to open the "Device Configuration" window, switch to the "Connections" page, as shown below.



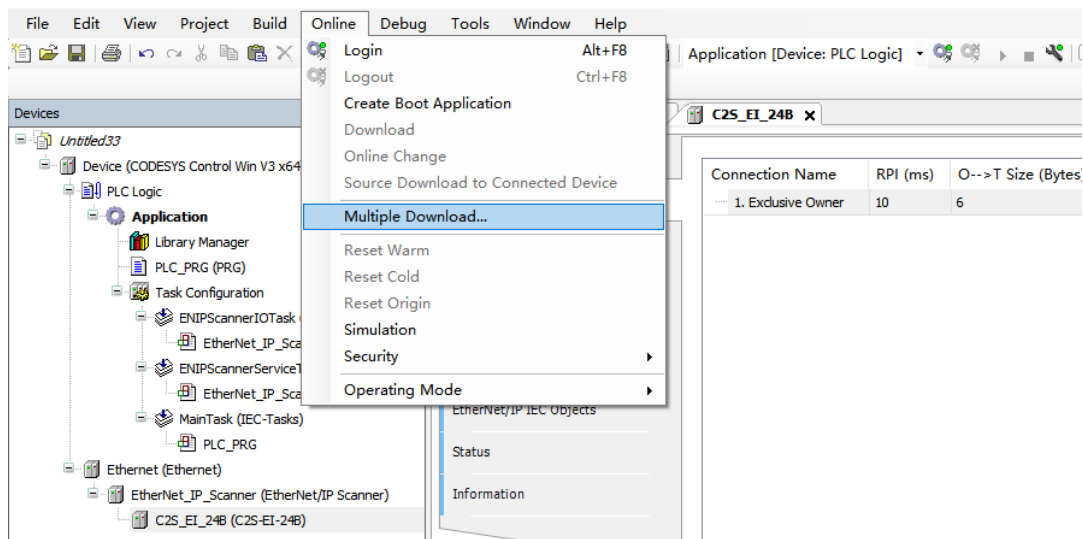
b. Output signal clear/hold parameter function, click the value of the parameter "BusFault Clear/Hold", you can select "Clear", "Hold", or "Set by channel". When you select "Set by channel", the Clear/Hold[0..7] ~ Clear/Hold[40..47] parameters are valid, as shown in the figure below.



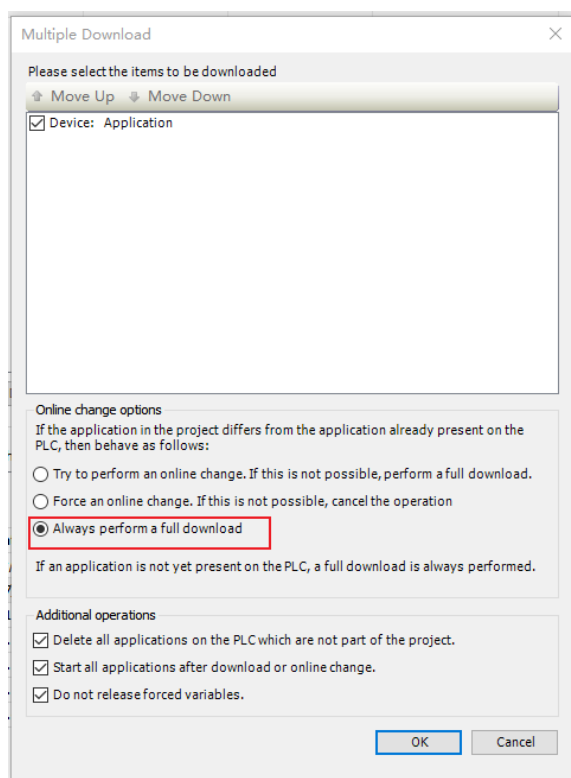
c. Under "Set by channel", double-click the value of Clear/Hold [0..7], you can set the value by channel, as shown in the figure below.



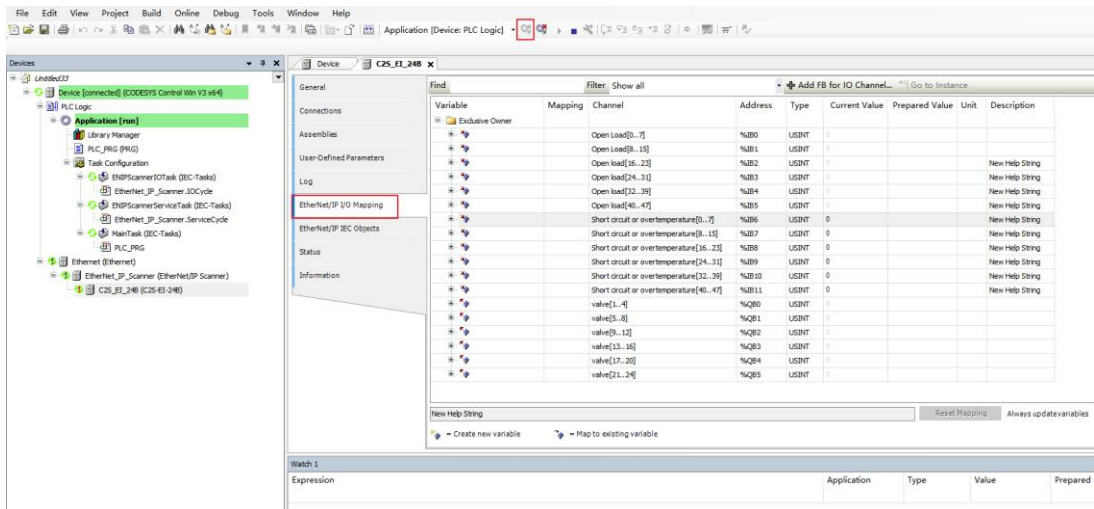
- d. Click "Online -> Multi-Download..." in the menu bar, as shown below.




- e. Multiple Download window will pop up, select "Always perform a full download", click "OK", as shown in the figure below.

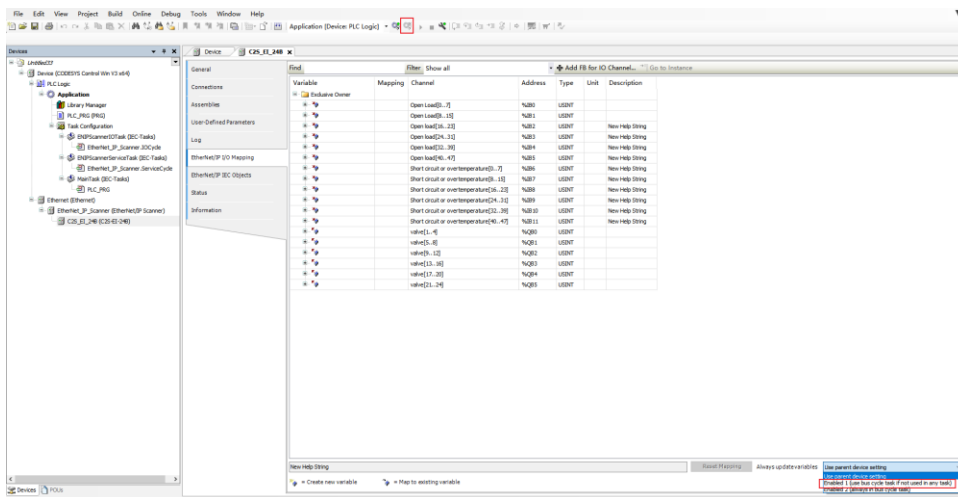


- f. Once the download is complete, click  and the system is online as shown below.

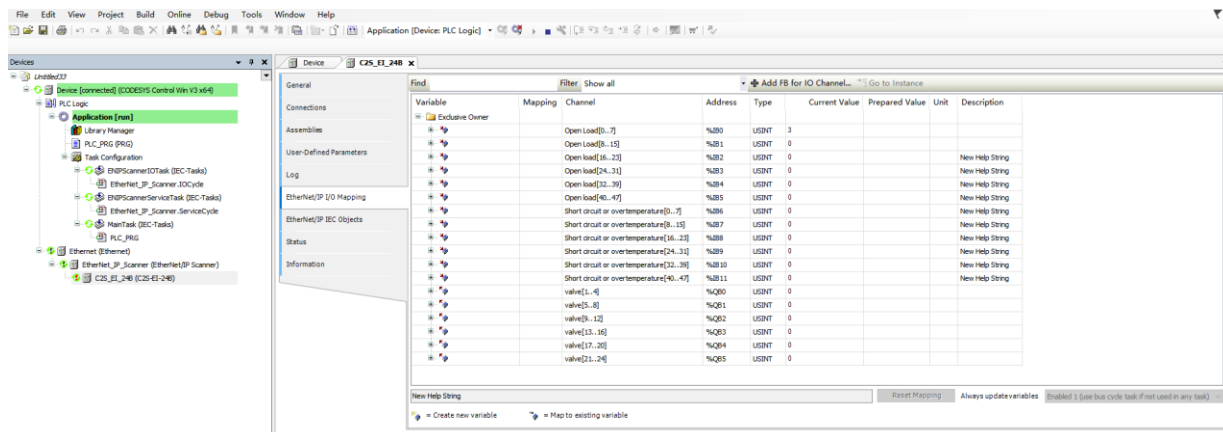


8、Data monitoring

- a. Click the  button to log out and switch to the "EtherNet/IP I/O Mapping" tab.
- b. Select "Enable 1" mode from the drop-down list in the lower right corner, as shown below.



c. Click  to log in and monitor the page as shown below.



- **Open Load Detection**

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

- **Short Circuit/Over Temperature Detection**

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], in total 48 channels can be diagnosed independently.

- **Valve Terminal Output Control Function**

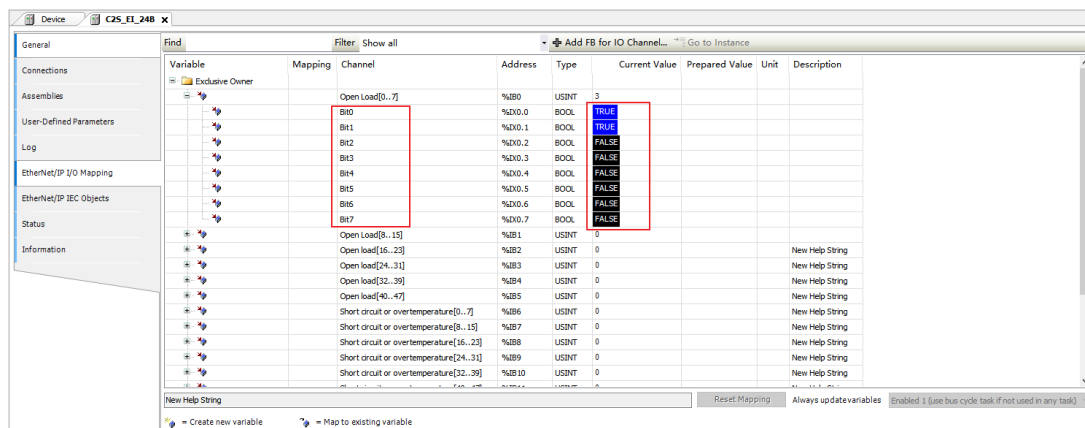
24 double solenoid valve are grouped into 6 groups of channels according to the driver chip types, which are valve[1..4], valve[5..8], valve[9..12], valve[13..16], valve[17..20], valve[21..24]. Each group has 8 channels, so there is a total of 48 channels output control .

d. **Open load detection**

The diagnostic value is valid when the channel solenoid coil output is off (value is 0).

In the "Current Value" of channel Open load[0..7], you can view the solenoid valve open load diagnostic value of each group of channels of the valve terminal. A group of channels with normal status of solenoid valve coils is **0**, and an open circuit status is not **0**.

Click "+" to expand Open load [0..7], you can view the open load diagnostic value of each channel's solenoid valve, the value **1** means the open load status, the value **0** means normal status, as shown in the figure below.

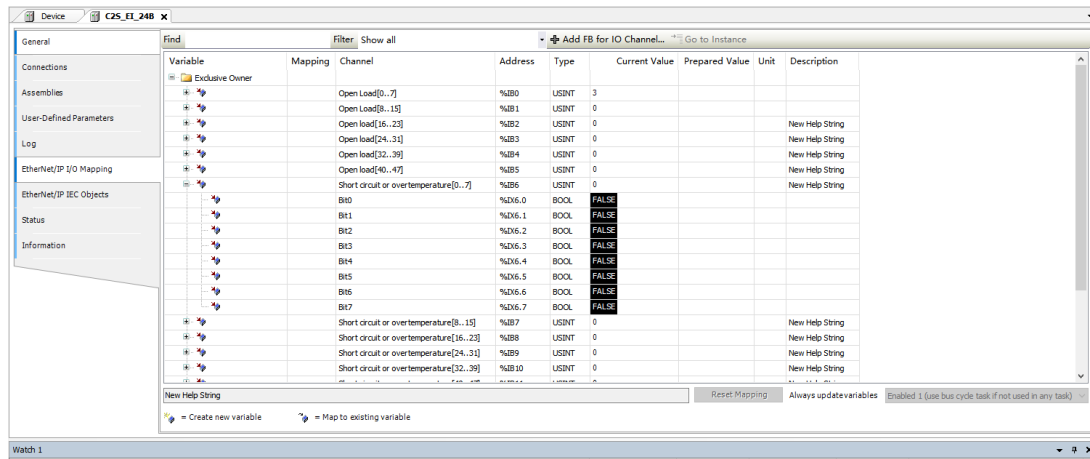


e. Short circuit or overtemperature detection

The diagnostic value is valid when the channel solenoid coil output is on (the value is 1).

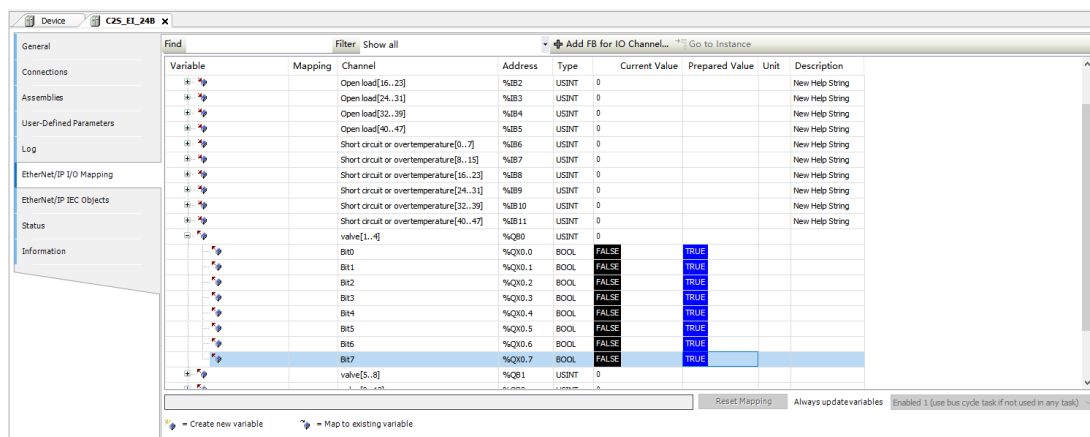
In the "Current Value" of channel Open load[0..7], you can view the solenoid valve short circuit/overtempertaure diagnostic value of each group of channels of the valve terminal. A group of channels with normal status of solenoid valve coils is **0**, and a short circuit/overtempertaure status is not **0**.

Click "+" to expand short circuit/overtempertaure [0..7], you can view the short circuit/overtempertaure diagnostic value of each channel's solenoid valve, the value **1** means the short circuit/overtempertaure status, the value **0** means normal status, as shown in the figure below.



f. Channel output control

If any solenoid valve coil of the valve terminal need to start the output, take the first channel as an example, you can click "+" to expand the valve[1...4], write "1" in "prepared value" of channel Bit0, press "Ctrl+F7" to enter, then the first solenoid valve coil channel should open, as shown below. To open other channels output, follow the above steps.



8 FAQ

8.1 Inability of Scanning Modules

1. Check network cable connections

Use windows command to the IP address of the ping module, if ping is on, then check the status of the indicator, if not, then check the network cable connection. If the network cable connection is normal, set the request acceptance time to 60s in the device scanning and then rescan the module. If an unknown device was found, then this module's IP has not been assigned, re-assign the IP address. If you still can not scan for the module, then check the status of the indicator.

2. Check indicator status

If the RUN light flashes, the IP address exists. The IP of the controller and module may not be in the same network segment, restore the module to factory settings and then reset the IP address. RUN light flashing may also means the module detects duplicate IP address in the network, it is recommended to troubleshoot duplicate IP devices and deal with them.

8.2 Abnormal IP Address Assignment

1. Unable to scan the device under factory settings

Modify the request acceptance time to 60s.

2. Using BOOTP to assign timeout for IP address

Click Advanced Settings in IP Address Settings and set the timeout time to 60s. If the timeout time has already been set to 60s, check whether the IP addresses of the controller and allocated module are in the same network segment.

3. Loss of assigned IP address after power failure

This is caused by not setting the module with a fixed IP after using BOOTP to assign an IP address.

4. Unable to use rotary switc to change IP address

The IP address setting is out of the regulated range or the IP address setting is 0. Verify that if the rotary switch settings are as expected.

8.3 Inability of Scanning Devices with IP Setting Tool

When the device cannot be scanned using the IP Setting Tool tool, you can try the following methods.

- First, use the cmd command route print to view all the network segments of the routing table, and use the host computer software to set the IP address of the valve terminal so that the IP address is inconsistent with all the network segments of the routing table.
- After an interval of five minutes, re-power on the device, power on 15s, and then scan. Try few times more if the device cannot be found.