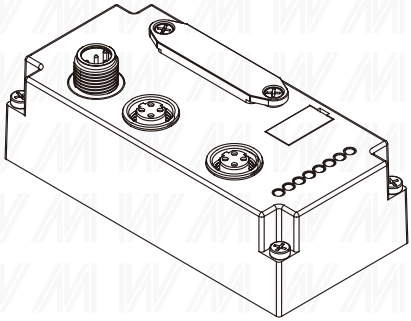
MVE2-MPL

100 / 156 / 188 / 220

Fieldbus System

User Manual E1.1.1

PROFINET | EtherNet/IP | EtherCAT | CC-Link IEFB



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Contents

Warranty

All products manufactured by Mindman are under warranty regarding defective materials for a period of one year, starting from the date of delivery to the original purchaser.

Warning

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If there has any question, please contact Mindman right away. Thanks.

1. Review

This manual is organized by organization, so the chapters are connected to each other.

1.1 Manual structure

1. Overview section
2. Basic safety information

1.2 Typography habits

List: Enumeration is displayed as a list with bullets.

- Vocabulary 1
- Vocabulary 2

Action: The action description is represented by a front triangle.

The result of the action is represented by an arrow.

▶ Military action description 1

→ Action results

▶ Military action description 2

The step program can also be displayed numerically in parentheses.

(1) Step 1

(2) Step 2

Syntax: Digit

Decimal numbers are displayed without additional indicators (e.g.,123), Hexadecimal number display with additional indicator hex (Such as: 00hex) Or with prefix "0X" (Such as: 0×00)

Cross reference: Cross referencing indicates where additional information about this topic can be found.

1.3 Symbol

Explanatory note: This symbol indicates a general note.

Pay attention: This symbol indicates the most important safety notice.

1.4 Acronym

FNI : Network interface

EMC : Electromagnetic compatibility

FE : Functional earthing

I : Standard input

O : Standard output

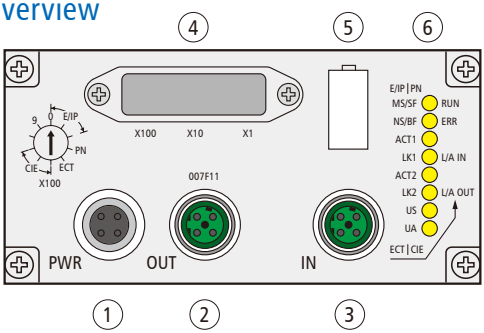
CIEFB: CC-Link IE Field Basic

1.5 Viewing angle deviation

The product views and explanations in this manual may deviate from the actual product.

2. Guide

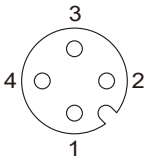
2.1 Module overview



No.	Name	Code	Description
1	Power connector	PWR	M12, A-Coded (male) 4PIN, communication module and solenoid valvepower supply
2	Bus communication interface	OUT	M12, D-Coded (female) 4PIN, PROFINET, EtherNet/IP, EtherCAT, CIEFB
3	Bus communication interface	IN	M12, D-Coded (female) 4PIN, PROFINET, EtherNet/IP, EtherCAT, CIEFB
4	DIP switch	–	Protocol switching, IP addressand coil settings
5	Identification board	–	Device identification board
6	LEDstatus indicator	–	Indicate running status

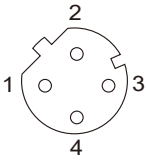
2.2 Electrical connections

Power connector



No.	Function	
1	UA	Solenoid valve power supply 24V
2	GND	Valve terminal/solenoid valve ground 0V
3	US	Valve island power supply 24V
4	GND	Valve terminal/solenoid valve ground 0V

Bus communication interface (OUT / IN)



No.	Function	
1	Tx+	Send data +
2	Rx+	Receive data +
3	Tx-	Send data -
4	Rx-	Receive data -

3. Technical Data

3.1 Operating conditions

Item	Parameter
Working temperature	-10～+50℃
Working humidity	35～85%RH (No condensation)
Working atmosphere	No corrosive gas
Storage temperature	-20～+60℃
Withstand voltage	500 VAC (1 minute)
Insulation resistance	500 VDC, ≥10MΩ
Waterproof level	IP54

3.2 Electric data

Item	Parameter
Power consumption of valve island (Ius)	≤0.1A (21.6～26.4VDC)
Total powerconsumption of	≤4A (22.8～26.4VDC)
Output low level	NPN(+COM)
Solenoid valve type	Single circuit less than 600mA withsurge protection 24V solenoid valve
Single load	≤0.4V

3.3 Communication specifications

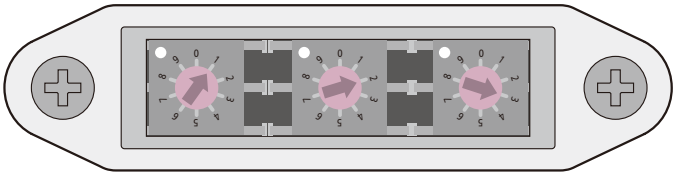
Item	Parameter
Protocol	PROFINET, EtherNet/IP, EtherCAT, CIEFB
Cable type	Shielded twisted pair cable minimumSTP CAT5/STP CAT 5e, in line with IEEE 802.3
Data transfer rate	100Mbps (PROFINET/ EtherCAT)
	10Mbps/ 100Mbps (elf-adaptive EtherNet/IP, CIEFB)
Number of outputcoils	Up to 48 channels
File format	PROFINET:XML EtherNet/IP: EDS EtherCAT:XML CIEFB: CSPP

4. Dial Code Settings

4.1 IP setting

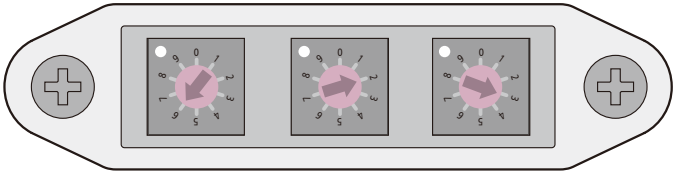
The default domain under different protocols as shown in the table below. Set the last digit of the IPaddress by dialing.

Letter of agreement	Default domain
EtherNet/IP	192.168.1.xxx
PROFINET	Invalid
EtherCAT	Invalid
CIEFB	192.168.3.xxx



EtherNet/IP protocol

Dial code to set the last digit of IP to X100=1, X10=2, X1=3,
and the IP address under is 192.168.1.123

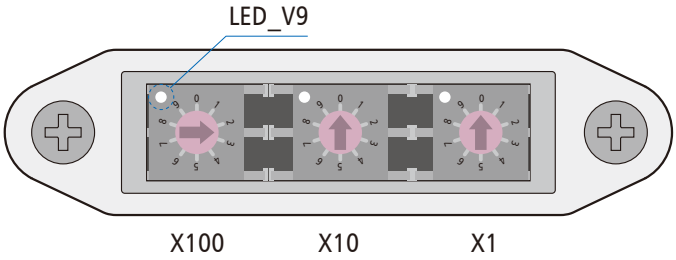


CIEFB protocol

Dial code to set the last digit of IP to X100=6, X10=2, X1=3,
and the IP address under 192.168.3.123 needs to subtract 500

4.2 Protocal switch setting

The color of LED_V9 above the DIP switch X100 indicates the current protocol



No.	X100	X10	X1	Letter of agreement	LED_V9
1	0～2	0～9	0～9	EtherNet/IP	Green
2	3	0	0	PROFINET	Orange
3	4	0	0	EtherCAT	blue
4	5～7	0～9	0～9	CIEFB	white

Steps:

1. The equipment is powered off, dial 900;
2. Power on the equipment and wait for 15s;
3. The equipment is powered off, and the dialing setting protocol is carried out according to the above table
4. Power on the equipment and wait for 30s; The device is powered off, dial the corresponding IP address (PROFINET, EtherCAT are invalid);

4.3. Coil number setting

1. The equipment is powered off, dial code 950 ;
2. Power on the device and wait for the green light inside the dial to flash;
3. After the green light flashes, turn the dial switch to set the number of coils (3S after stopping dialing, the set value takes effect)

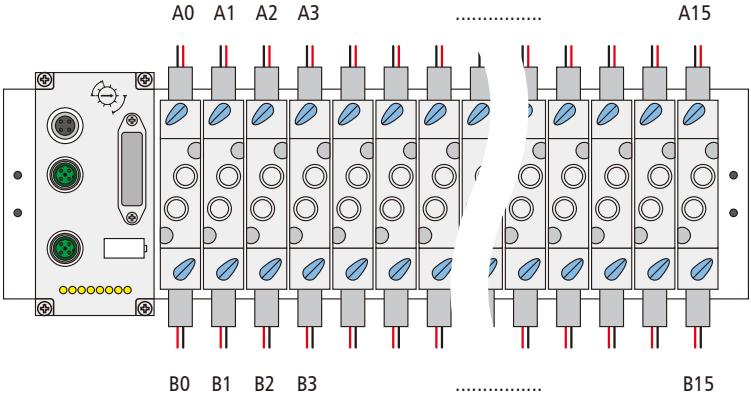
To

4. Power off the device, dial the corresponding IP address (PROFINET, EtherCAT are invalid);

5. Communication Module Data

5.1 Coil definition

As shown in the figure, define the upper coil as A0～A15 from left to right;
thelower coil as B0…B15 from left to right;



5.2 Enter diagnostic data

EtherNet/IP, PROFINET, EtherCAT protocol

Byte	Bit								Remark
	7	6	5	4	3	2	1	0	
0	–	–	–	US over-voltage	UA over-voltage	Operating temp.	US under-voltage	UA under-voltage	–
1	B3	A3	B2	A2	B1	A1	B0	A0	Short circuit diagnosis 0 normal 1 short circuit
2	B7	A7	B6	A6	B5	A5	B4	A4	
3	B11	A11	B10	A10	B9	A9	B8	A8	
4	B15	A15	B14	A14	B13	A13	B12	A12	
5	B19	A19	B18	A18	B17	A17	B16	A16	
6	B23	A23	B22	A22	B21	A21	B20	A20	
7	B3	A3	B2	A2	B1	A1	B0	A0	Open circuit diagnosis 0 normal 1 short circuit
8	B7	A7	B6	A6	B5	A5	B4	A4	
9	B11	A11	B10	A10	B9	A9	B8	A8	
10	B15	A15	B14	A14	B13	A13	B12	A12	
11	B19	A19	B18	A18	B17	A17	B16	A16	
12	B23	A23	B22	A22	B21	A21	B20	A20	

CIEFB protocol, RWR area

Byte	Bit								Remark
	7	6	5	4	3	2	1	0	
0	B3	A3	B2	A2	B1	A1	B0	A0	Short circuit diagnosis 0 normal 1 short circuit
1	B7	A7	B6	A6	B5	A5	B4	A4	
2	B11	A11	B10	A10	B9	A9	B8	A8	
3	B15	A15	B14	A14	B13	A13	B12	A12	
4	B19	A19	B18	A18	B17	A17	B16	A16	
5	B23	A23	B22	A22	B21	A21	B20	A20	
6	B3	A3	B2	A2	B1	A1	B0	A0	Open circuit diagnosis 0 normal 1 short circuit
7	B7	A7	B6	A6	B5	A5	B4	A4	
8	B11	A11	B10	A10	B9	A9	B8	A8	
9	B15	A15	B14	A14	B13	A13	B12	A12	
10	B19	A19	B18	A18	B17	A17	B16	A16	
11	B23	A23	B22	A22	B21	A21	B20	A20	

CIEFB protocol, RX area

Byte	Bit								Remark
	7	6	5	4	3	2	1	0	
0	–	–	–	US over-voltage	UA over-voltage	Operating temp.	US under-voltage	UA under-voltage	–

5.3 Output data

EtherNet/IP, PROFINET, EtherCAT protocol

Byte	Bit								Remark
	7	6	5	4	3	2	1	0	
0	B3	A3	B2	A2	B1	A1	B0	A0	Coil state 0 disconnected 1 output
1	B7	A7	B6	A6	B5	A5	B4	A4	
2	B11	A11	B10	A10	B9	A9	B8	A8	
3	B15	A15	B14	A14	B13	A13	B12	A12	
4	B19	A19	B18	A18	B17	A17	B16	A16	
5	B23	A23	B22	A22	B21	A21	B20	A20	
6	The reset coil is short-circuited or open. When the fault needs to be restored, first change to 0x5A, and then change to 0xA5 within 500ms to complete the reset.								–

CIEFB protocol, RY area

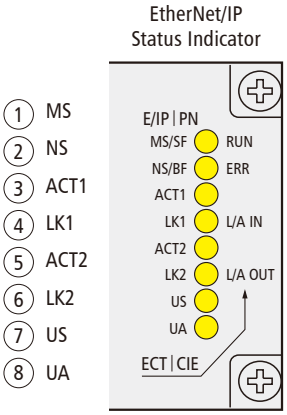
Byte	Bit								Remark
	7	6	5	4	3	2	1	0	
0	B3	A3	B2	A2	B1	A1	B0	A0	Coil state 0 disconnected 1 output
1	B7	A7	B6	A6	B5	A5	B4	A4	
2	B11	A11	B10	A10	B9	A9	B8	A8	
3	B15	A15	B14	A14	B13	A13	B12	A12	
4	B19	A19	B18	A18	B17	A17	B16	A16	
5	B23	A23	B22	A22	B21	A21	B20	A20	

CIEFB protocol, RWW area

Byte	Bit								Remark
	7	6	5	4	3	2	1	0	
6	The reset coil is short-circuited or open. When the fault needs to be restored, first change to 0x5A, and then change to 0xA5 within 500ms to complete the reset.								–

6. EtherNet/IP Communication Configuration

6.1 LED display and setting



No.	Code	Display		Function
1	MS	Green	Always on	Working status: the equipment is operating normally
			Flashing 1HZ	Standby: the device is not configured
		Green/ Red	Alternate flashing	Self-test: The device is undergoing a power-on test.
		Red	Flashing 1HZ	Recoverable failure
			Always on	Unrecoverable failure
			Shut down	US no input voltage
2	NS	Green	Always on	Connected
			Flashing 1HZ	Not connected
		Green/ Red	Alternate flashing	Self-test: The device is undergoing a power-on test
		Red	Flashing 1HZ	Connection timed out
			Always on	IP duplicate
			Shut down	US has no input voltage or no IP address

6.1 LED display and setting

EtherNet/IP communication configuration

No.	Code	Display		Function
3	ACT1	Yellow	Flashing	Device (IN) send/receive Ethernet frame
			Shut down	The device (IN) did not send/receive Ethernet frames
4	LK1	Green	Always on	Device (IN) connected to Ethernet
			Shut down	The device (IN) is not connected to the Ethernet
5	ACT2	Yellow	Flashing	Device (OUT) send/receive Ethernet frame
			Shut down	The device (OUT) does not send/receive Ethernet frames
6	LK2	Green	Always on	Device (OUT) connected to Ethernet
			Shut down	The device (OUT) is not connected to the Ethernet
7	US	Green	Always on	Input voltage is normal
		Red	Flashing	Low input voltage (<18V)
8	UA	Green	Always on	The output voltage is normal
		Red	Flashing	Low output voltage (<18V)
		Red	Always on	No output voltage (<11V)

Pay attention:
Recoverable failure: configuration issue or incorrect protocol switch.
Solution: switch to another protocol first, then switch back to the required protocol.

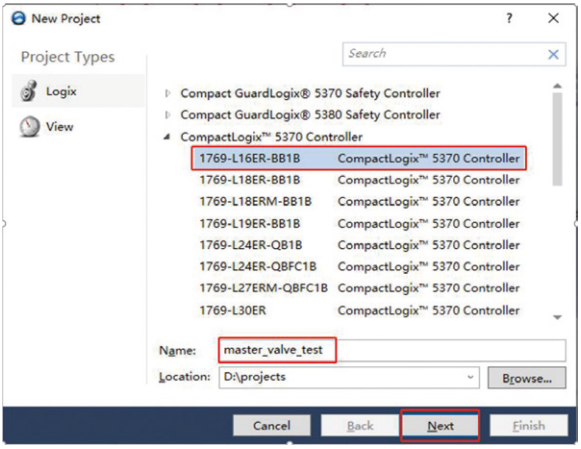
Non-recoverable failure: send it back to the manufacturer for inspection and repair.

6.2 Integrated in AB Studio 5000

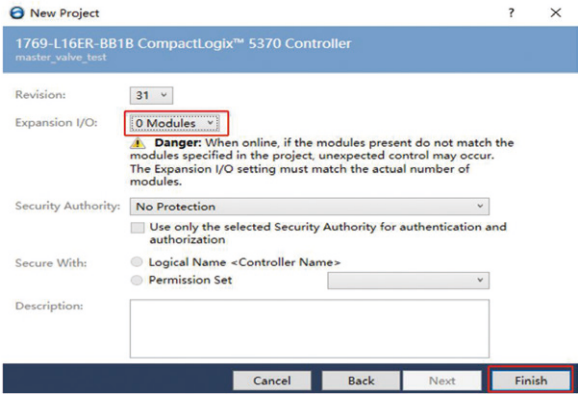
Here, you will see an example of how to integrate this moduleinto Studio 5000, taking L16CR PLC as an example:

6.2.1. New Construction:

Open Studio 5000 > NEW Project > choose 1769-L16ER-BB1B > input filename > click Next



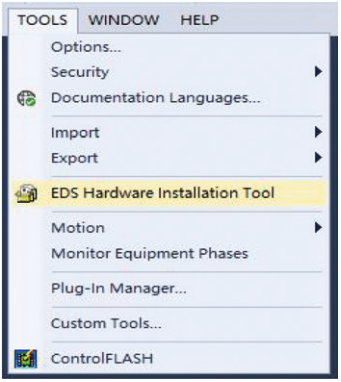
Select 0 Modules > click Finish



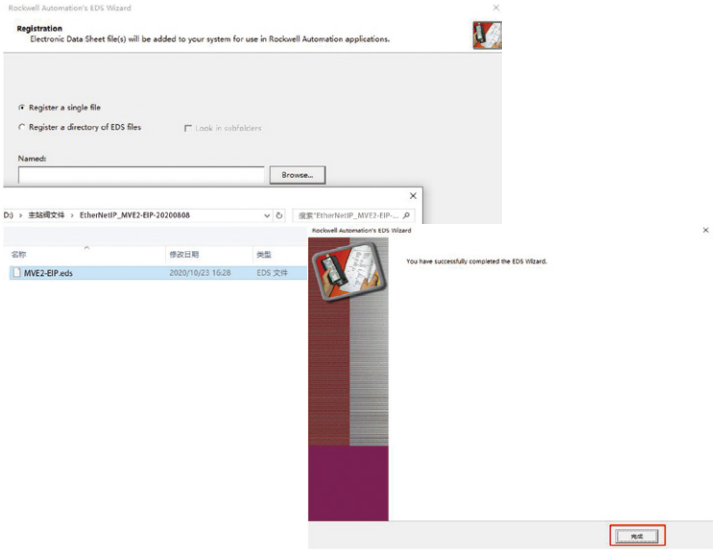
6.2.2. Import EDS configuration file

Configuration file MVE2-EIP.eds

Pull down TOOLS > select EDS Hardware Installation Tool

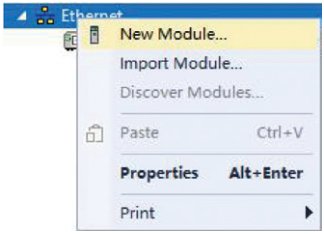


Continue to the next step to the figure below > click Browser > find the configuration file > next to completion

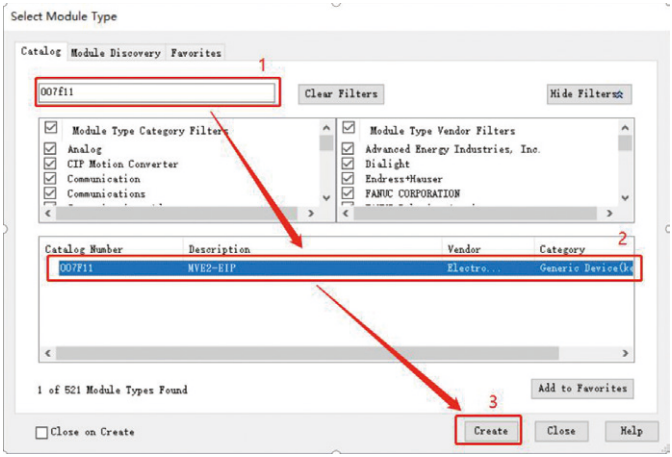


6.2.3. Add device

Right click EtherNet > New Module

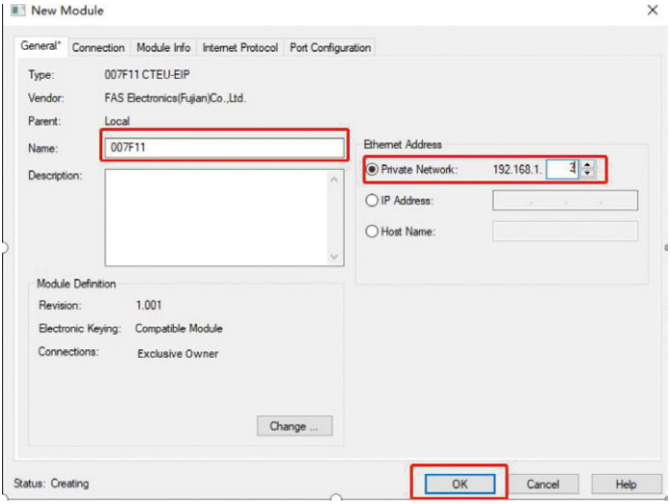


Search 007F11 > select the search result > Create

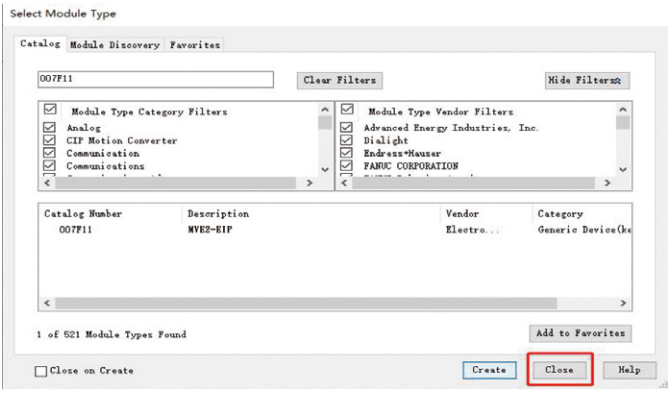


6.2.3. Add device

Name the new device > set the IP address (same as the dial code) > OK

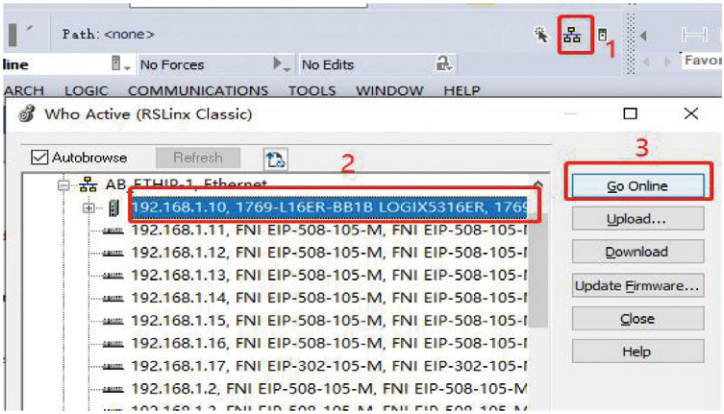


Close the interface

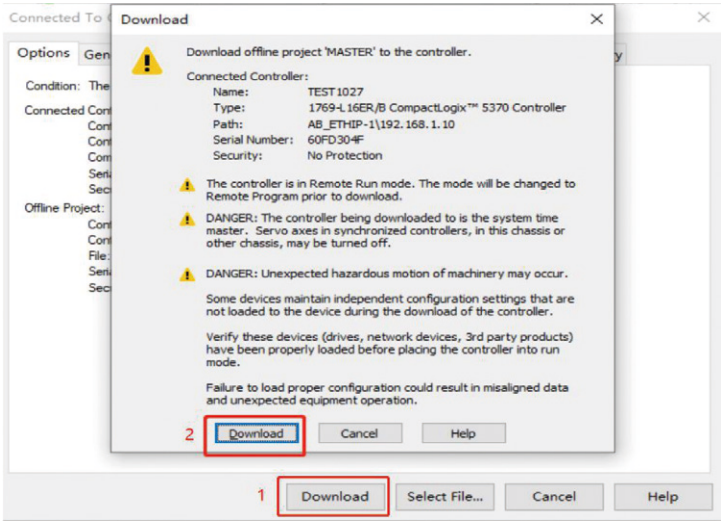


6.2.4. Connect to Ethernet

Search for equipment > select PLC-GO Online
(note: first confirm the correct valve island IP and protocol type)

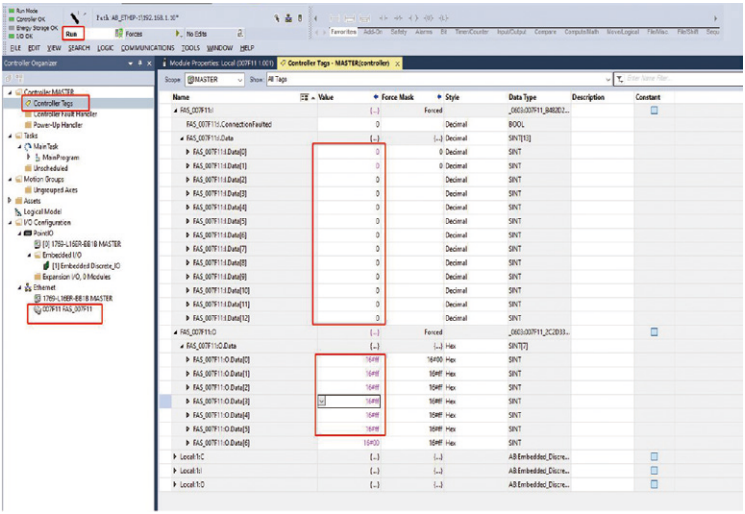


Download the PLC program (customers can write by themselves according to their needs, this example is empty)



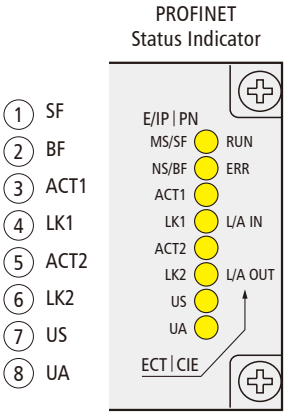
6.2.4. View input and output parameters

After the device is correctly connected, click Controller Tagsto view the input and output data of the module. There is noabnormality in the input monitoring in the figure below. After 007F11:O.Data[0:5] is set to 16#FF, all the 48 coils willoperate. Data content reference: Chapter 5 Communication Module Data



7. PROFINET Communication Configuration

7.1 LED display and setting



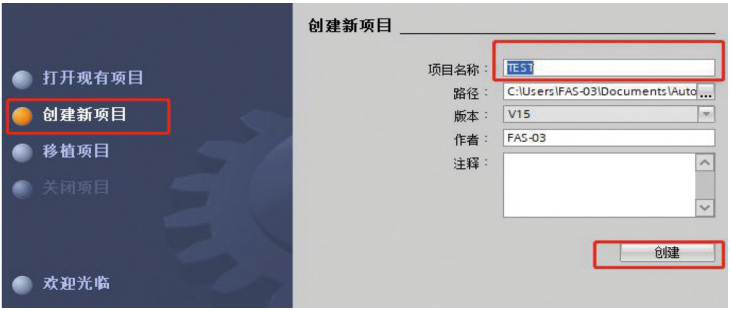
No.	Code	Display		Function
1	SF	Red	Shut down	Working fine
			Flashing 3s 1HZ	System error
			Always on	Working fine
2	BF	Red	Shut down	No data exchange
			Flashing	Bus start
			Always on	No configuration; or low-speed physical link; or no physical link
3	ACT1	Yellow	Flashing 1HZ	Device (IN) send/receive Ethernet frame
			Always on	The device (IN) did not send/receive Ethernet frames
4	LK1	Green	Always on	Device (IN) connected to Ethernet
			Shut down	The device (IN) is not connected to the Ethernet
5	ACT2	Yellow	Flashing	Device (OUT) send/receive Ethernet frame
			Shut down	The device (OUT) does not send/receive Ethernet frames
6	LK2	Green	Always on	Device (OUT) connected to Ethernet
			Shut down	The device (OUT) is not connected to the Ethernet
7	US	Green	Always on	Input voltage is normal
		Red	Flashing	Low input voltage (< 18 V)
8	UA	Green	Always on	The output voltage is normal
		Red	Flashing	Low output voltage (< 18 V)
			Always on	t (< 11 V)

7.2 Integrated in SiemensTIA Portal V15

Here, you will see an example of how to integrate this moduleinto TIA Portal V15, taking S7-1200 as an example:

7.2.1. New Construction

Create a new project > enter the project name > create



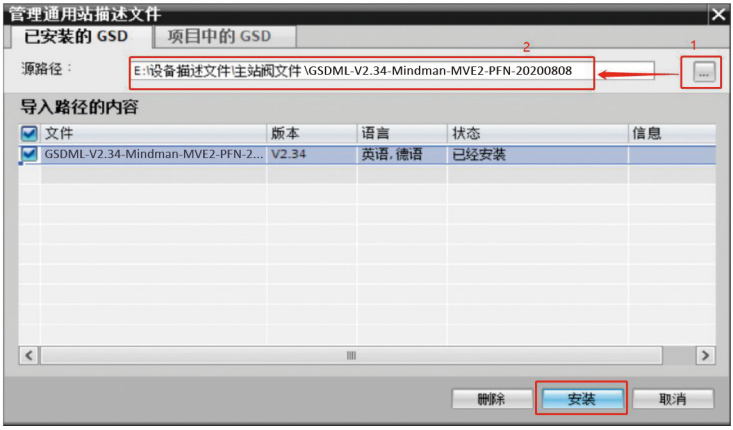
Equipment and network > add new equipment > select theappropriate PLC and CPU model > add

7.2.2. Import GSD configuration file

Configuration file: GSDML-V2.34-Mindman-MVE2-PFN-20200808

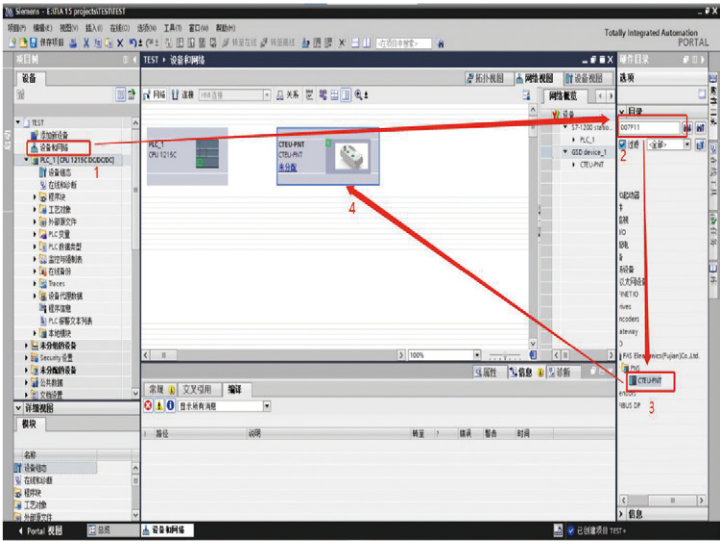
Option drop-down > manage general station description

1 browse GSD file path > complete

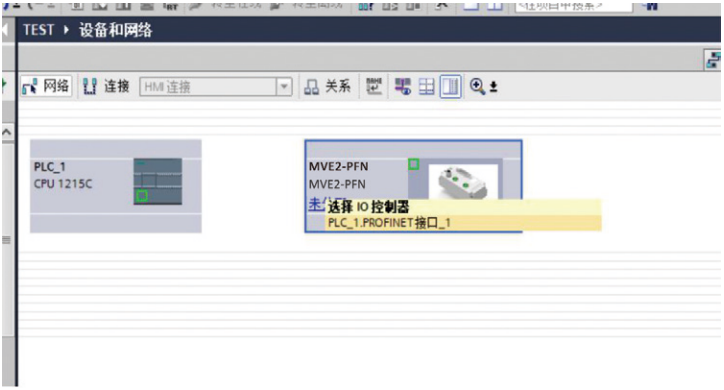


7.2.3. Add device

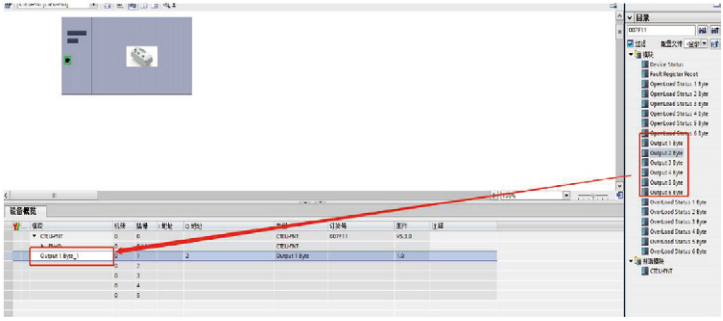
Device and network > search for 007F11 under the hardware catalog > drag MVE2-PFN into 4 places



Click Unassigned > select PLC.PROFINET interface 1



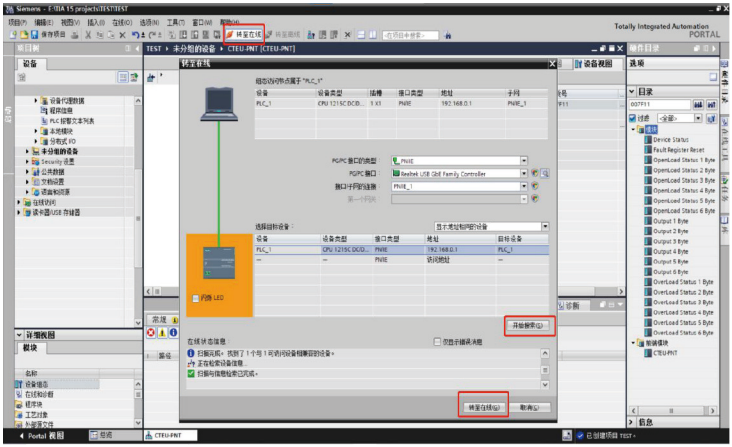
Double-click MVE2-PFN to enter the device overview, configure the output data size in slot 1 according to the number of coils; firstright click to delete the slot 1 configuration, and then drag theparameters to slot 1



Number of coils	Preferences
1...8	Output 1 Byte
9...16	Output 2 Byte
17...24	Output 3 Byte
25...32	Output 4 Byte
33...40	Output 5 Byte
41...48	Output 6 Byte

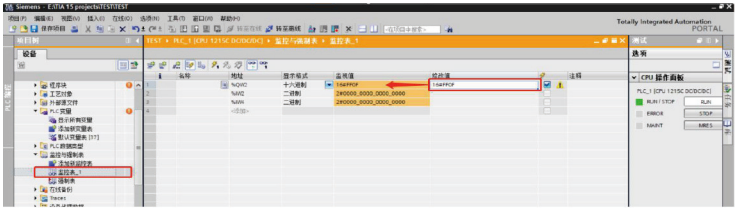
7.2.4. Connect PROFINET

Click to go online > start search > select PLC > go online
(note: make sure the protocol type is correct)



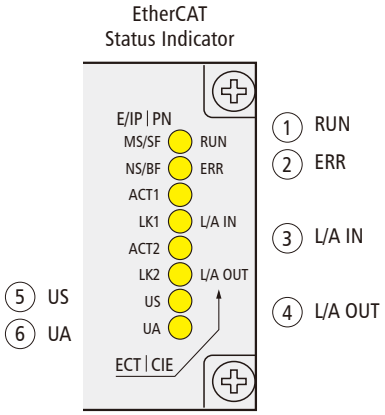
7.2.5. View input and output parameters

After the device is correctly connected, click the monitoring table to view the input and output data of the module. Datacontent reference: Chapter 5 Communication Module Data.



8. EtherCAT Communication Configuration

8.1 LED display and setting



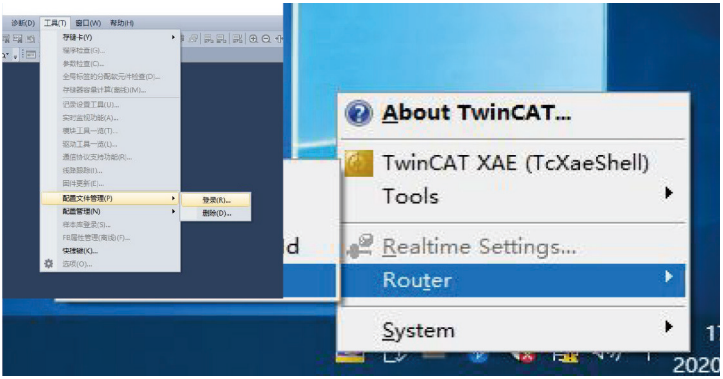
No.	Code	Display		Function
1	RUN	Green	Shut down	Device is in INIT state
			Flashing 2.5HZ	Pre-operation: The equipment is in pre-operationstate
			Flashing 1HZ	Safe operation: the equipment is in a safe operation state
			Always on	Running: the device is running
2	ERR	Red	Shut down	No error: EtherCAT communication of the deviceis working
			Flashing 2.5HZ	Invalid configuration
			Flashing 1HZ	Local error
			Flashing	Application monitoring time out
3	L/A IN	Green	Always on	Link: Connect to the Ethernet, do not send/receive EtherNet
			Flashing	Activity: The device connects to the EtherNet and sends/receives EtherNet
			Shut down	The device is not connected to the EtherNet
4	L/A OUT	Green	Always on	Link: Connect to the EtherNet, do not send/receive EtherNet
			Flashing	Activity: The device connects to the EtherNet and sends/receives EtherNet
			Shut down	The device is not connected to the EtherNet.
5	US	Green	Always on	Input voltage is normal
		Red	Flashing	Low input voltage (< 18 V)
6	UA	Green	Always on	The output voltage is normal
		Red	Flashing	Low output voltage (< 18 V)
			Always on	No output voltage (< 11 V)

8.2 Integrated in BECKHOFF TwinCATXAE

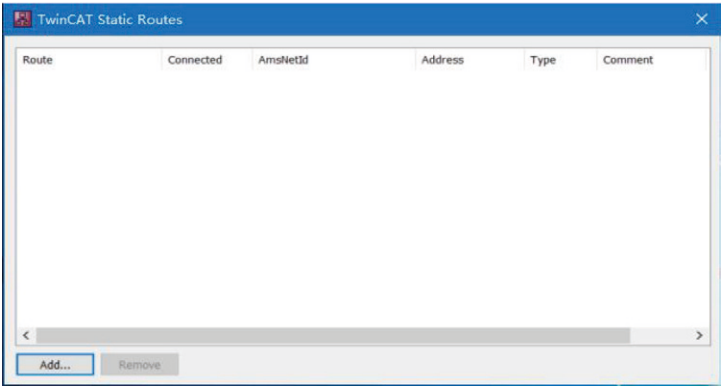
Here, you will see an example of how to integrate this module into TwinCAT XAE, taking CX5050 PLC as an example:

8.2.1. Add PLC path

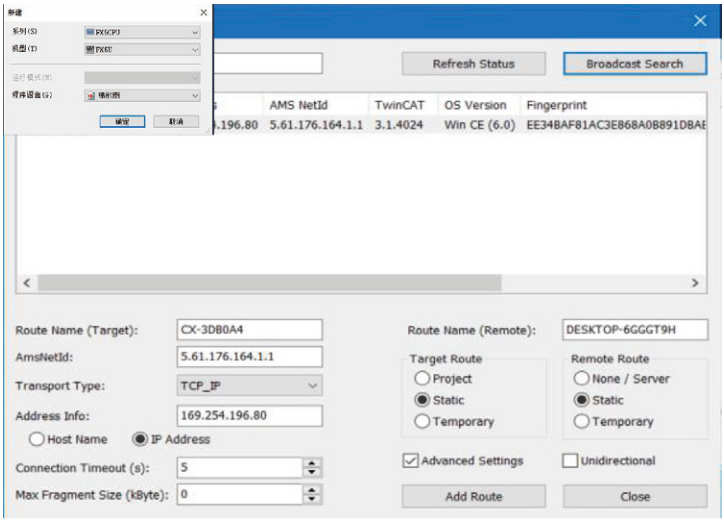
Open Edit Routes



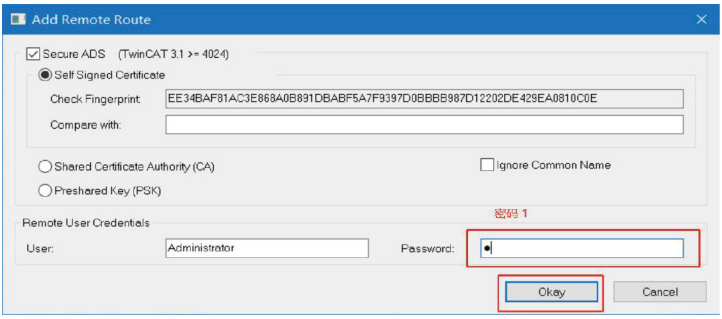
Click Add… ; Add Route Dialog



Broadcast Search > Select PLC(CX-3D0A4) > Add Route



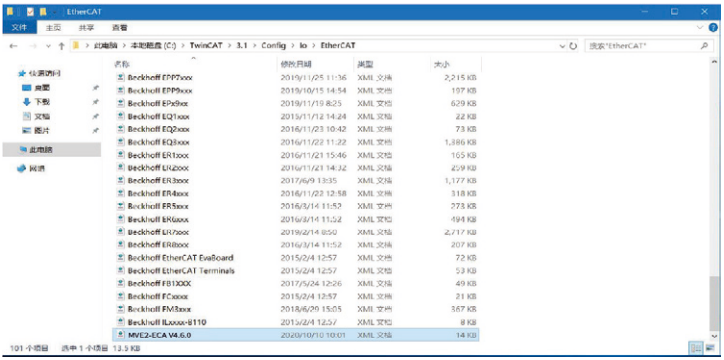
Enter the default password "1" > click OK to complete the PLC path addition



8.2.2. Add configuration file

Configuration file: MVE2-ECA V4.6.0

Copy the file to the following path to complete the configuration file addition:
C:\TwinCAT\3.1\Config\IO\EtherCAT

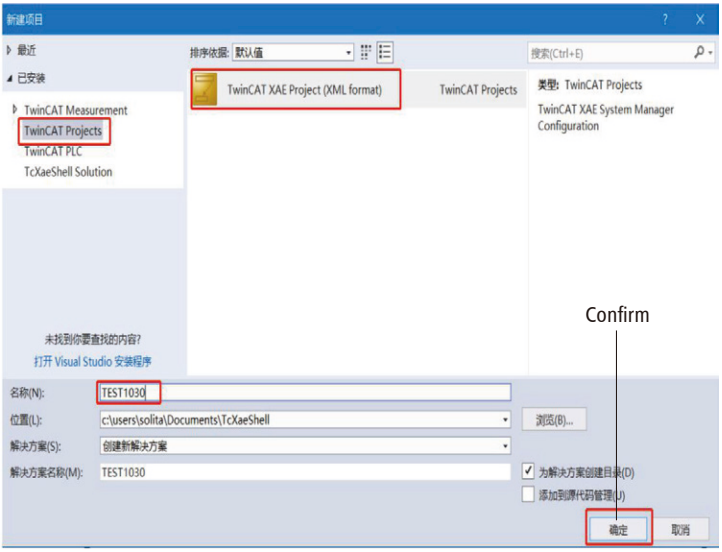


8.2.3. New Construction

Open TwinCAT XAE software

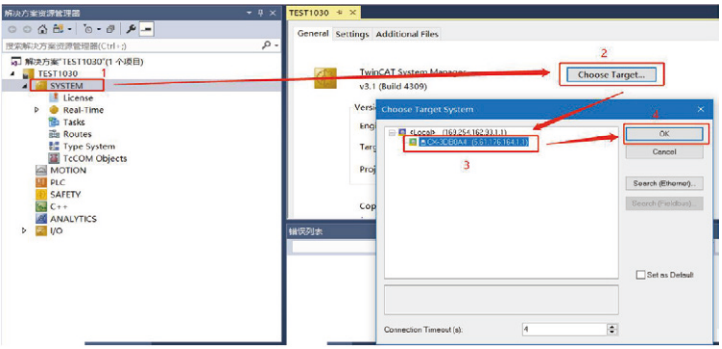
File > New > Project

Select TwinCAT XAE Project > enter name > Confirm



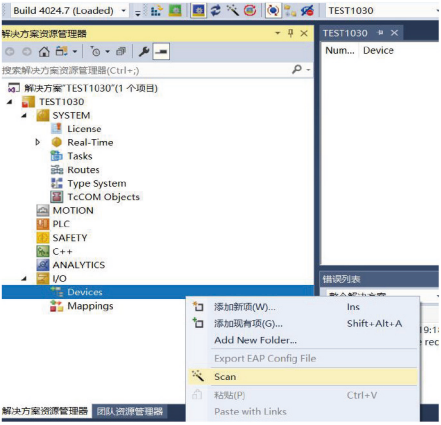
8.2.4. Select the target system

SYSTEM-Choose Target System > Select PLC(CX-3DB0A4) > OK



8.2.5. Add valve terminal

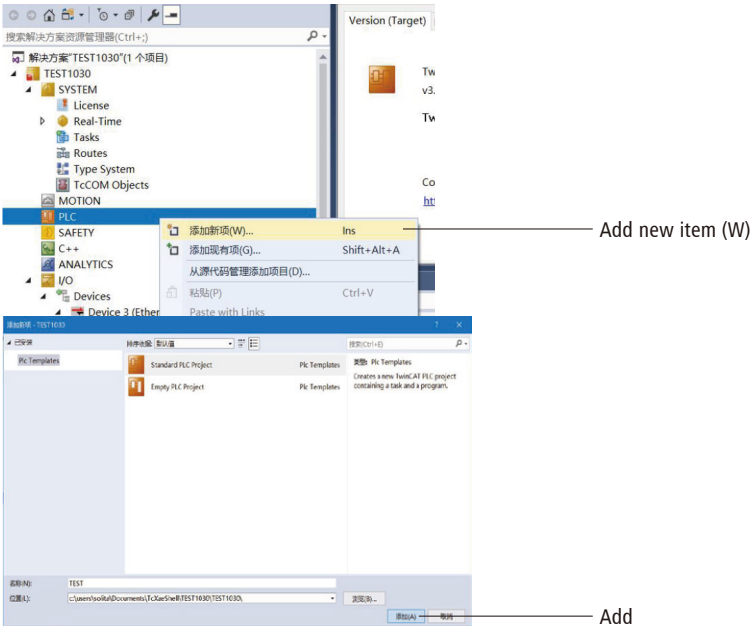
Pull down the IO option > DEVICES-SCAN; for the valve island



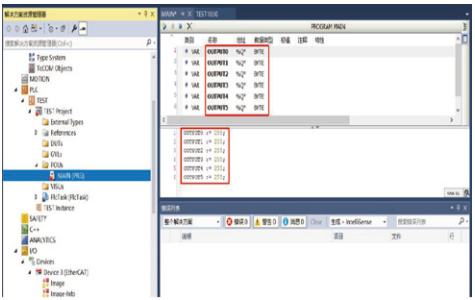
Select valve terminal Device 3 (EtherCAT) > OK

8.2.6. Link the PLC program to the valve terminal IO

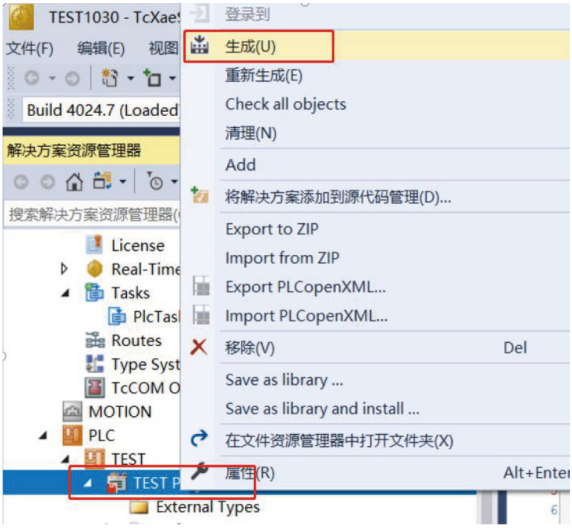
PLC > add new item > Standard PLC Project > input name > add



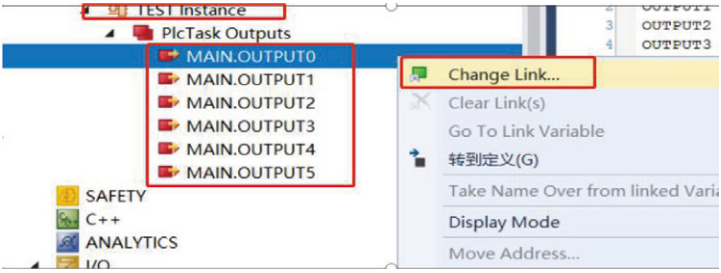
Define 6 BYTE variables in the PLC program and assign them a value of 255. 255 means that the 8 IO values of the variable connection are all 1. As shown in the figure below, the program realizes that all 48 IO outputs are 1.For specific IO settings, please refer to Chapter 5 Communication Module Data



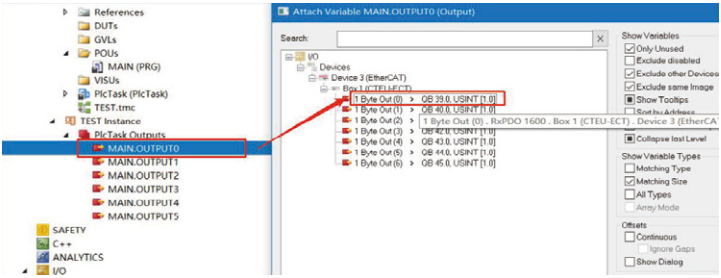
Right click the PCL program project (TEST Project) > Generate



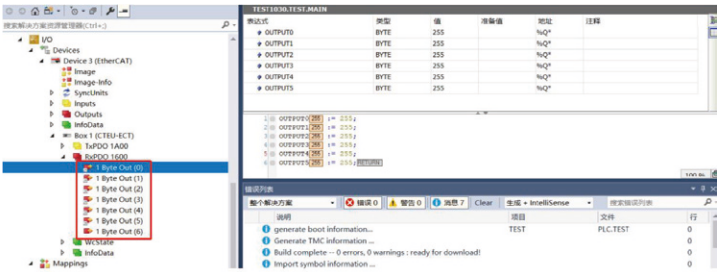
Pull down TEST Instance > select the parameter to be associated, right click > Change Link



Select the valve terminal parameters that need to be associated and complete the association

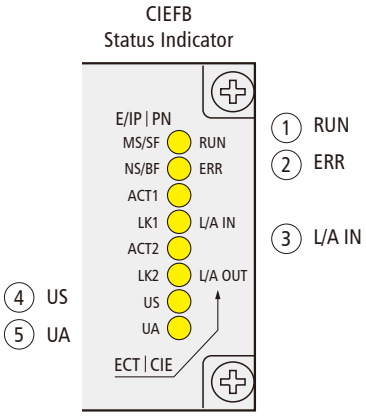


The following icon shows that the association has be successful.
After downloading the program, the output of the 48 coils is all 1.



9. CC-Link IEFB Communication Configuration

9.1 LED display and setting



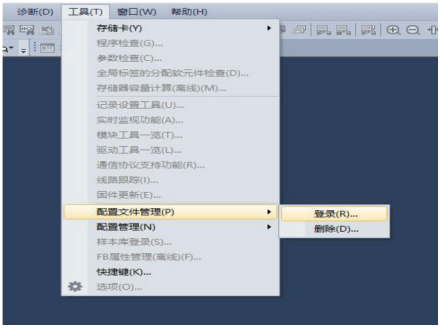
No.	Code	Display		Function
1	RUN	Green	Shut down	The module is not connected
			Flashing 2.5HZ	The module is not connected
			Flashing 1HZ	The module is not connected
			Always on	Operation: The device is in operational status
2	ERR	Red	Shut down	The module is functioning properly
			Always on	Communication error
3	L/A IN	Green	Always on	Connected but not communicating
			Flashing	The module is functioning properly
			Shut down	Not connected
4	US	Green	Always on	Input voltage is normal
		Red	Flashing	Low input voltage (<18V)
5	UA	Green	Always on	The output voltage is normal
		Red	Flashing	Low output voltage (<18V)
			Always on	No output voltage (<11V)

9.2 Integrated in mitsubishi FX5U

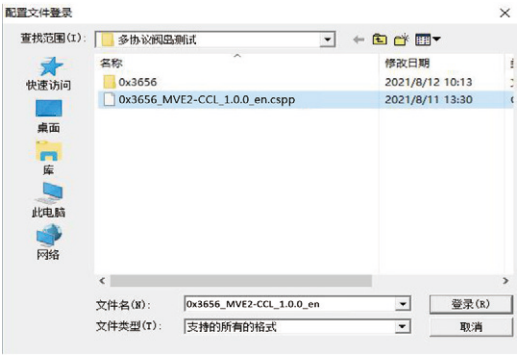
Here, you will see an example of how to integrate this module into GX Works3, taking FX5U PLC as an example:

9.2.1. Adding configuration files

Open software (without creating a new project) > Tool > Configuration file management > Login



Select the appropriate CSPP configuration file > Login

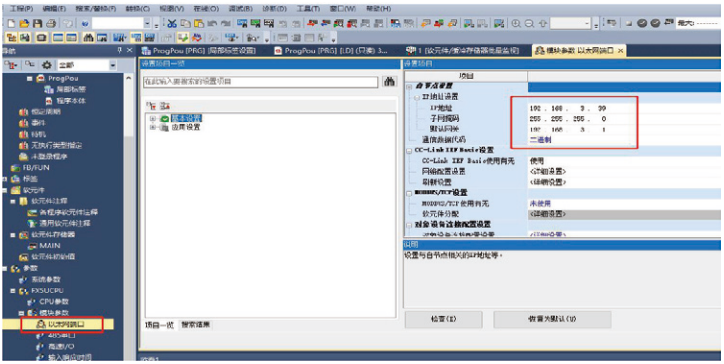


9.2.2. New project file

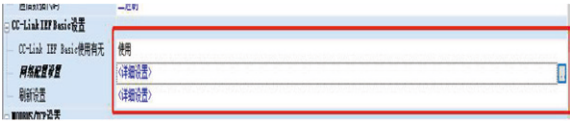
Project > New > Select series and model > Confirm

9.2.3. Basic configuration

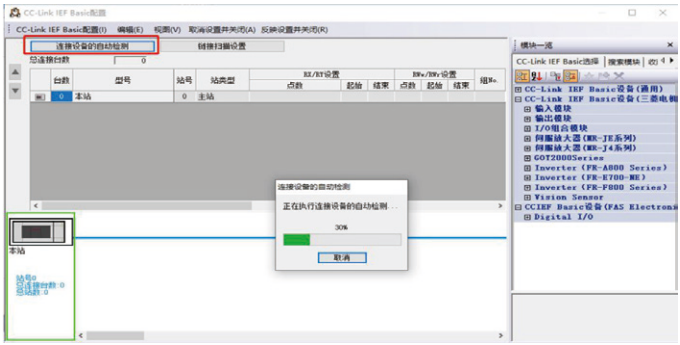
Parameters > Module parameters > EtherNet port > Set IP according to project requirements



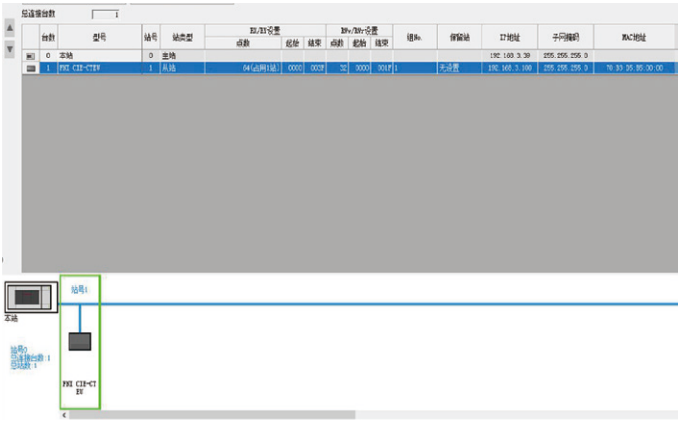
Setup using CC-Link IEF Basic



Network configuration settings > Double click for detailed settings > Automatic detection of connected devices



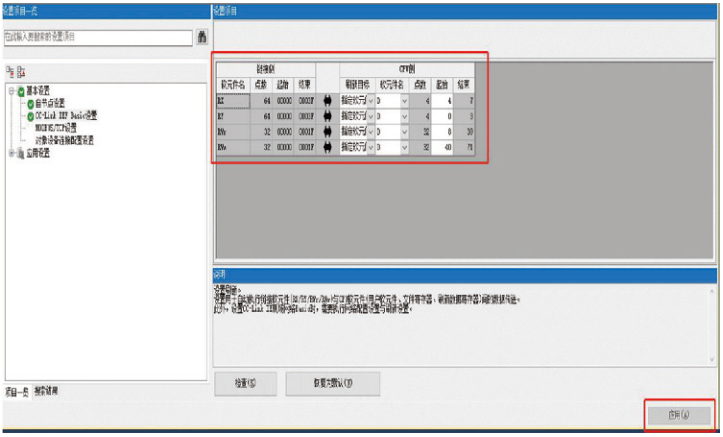
The connection shown in the figure below is successful



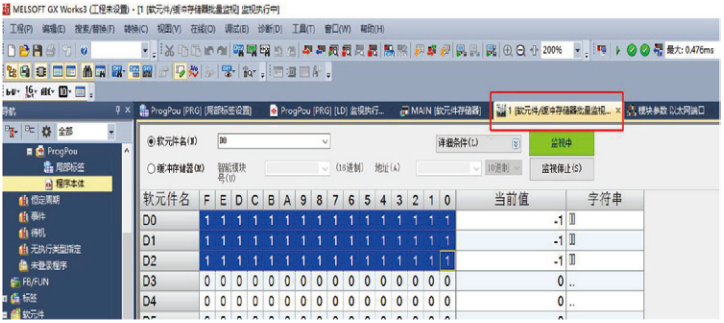
9.2.4. Configure the starting address

Refresh Settings > Double-click Detailed Settings

Specify the software component name and starting address



Soft component/buffer storage batch monitoring - Setting D0, D1, D2 (corresponding to RY output data) to 1, all 48 coils can be seen as output



10. Domain Change

In EtherNet/IP or CIEFB mode, it is necessary to change the default domain. For example, in EtherNet/IP mode, the default domain is 192.168.1.XXX, while in CIEFB mode, it is 192.168.3.XXX. The difference between the two protocols lies in their default domain settings.

10.1 Open configuration software

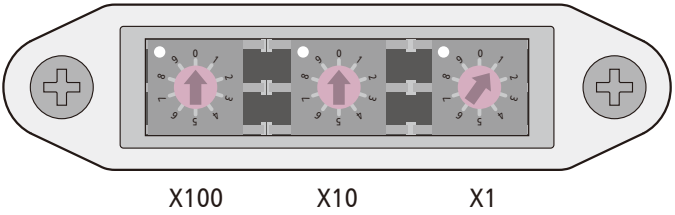
Open the configuration software MVE2Tool.exe.

Software interface introduction

10.2 Set IP

In EtherNet/IP mode: Set the DIP switch to 001, and the valve terminal address to 192.168.1.1 (Using EtherNet/IP as an example, the default domain for CIEFB is different).

In CIEFB mode: Set the DIP switch to 501, and the valve terminal address to 192.168.3.1.



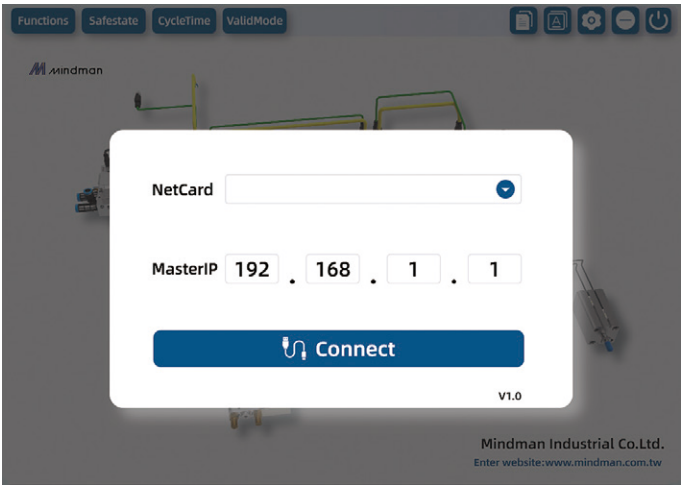
Set the network card and valve terminal in the same domain.
The computer IP address is configured as follows:

◉ The computer IP address is configured as follows (S)

IP Address (I):	192 . 168 . 1 . 200
Subnet Mask (U):	255 . 255 . 255 . 0
Default Gateway (D):	192 . 168 . 1 . 1

10.3 Connect the valve terminal

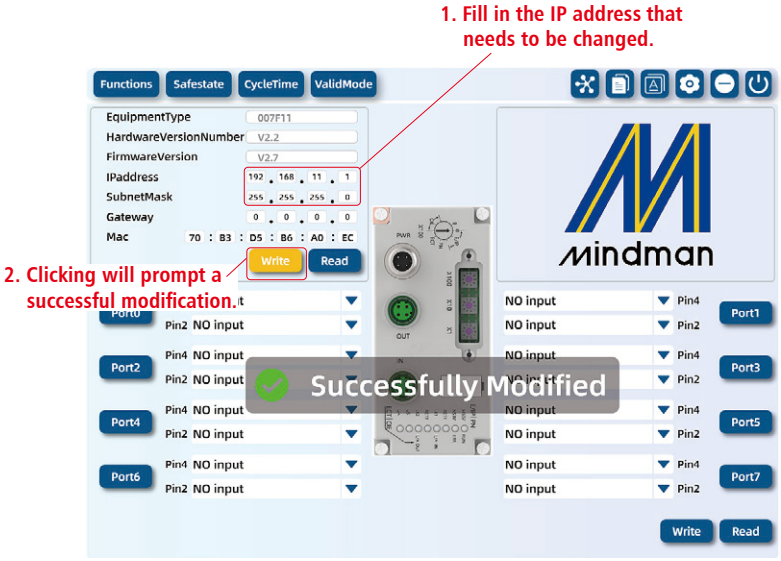
Please proceed with the valve island connection steps.



Click on the main window (enter the initial interface of the software) "Display Valve Manifold Interface", select the corresponding network card, fill in the correct valve terminal IP, and click "Connect". After the software prompts the successful connection, it will automatically switch to the function interface.

10.4 Write new address

Open the configurat



Attention:
After successfully modifying, the valve terminal needs to be powered off.
Then, use the DIP switch to modify the last digit of the valve terminal's IP address.

After modification, please annotate the new domain location on the identification board (Only applicable to two communication protocols: EtherNet/IP and CIEFB; PROFINET and EtherCAT do not require modification through this software.)

MEMO