



**IO-Link**

**IOL7 Series Master**

**User Manual**



Nanjing Solidot Electronic Technology Co., Ltd.

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# Table of Contents

1 Product Features.....	1
1.1 Product overview.....	1
1.2 Product Features.....	1
2 Designation Rules.....	2
2.1 Designation Rules.....	2
2.2 Model List.....	3
3 Product Parameters.....	4
3.1 General parameters.....	4
3.2 Digital parameter.....	5
3.2.1 EtherCAT Bus Module Parameters.....	5
3.2.2 PROFINET bus module parameters.....	6
3.2.3 EtherNet/IP Bus Module Parameters.....	7
4 Panel.....	8
4.1 Product structure.....	8
4.2 Indicator light function.....	9
4.3 Bus Interface Definitions.....	10
4.4 Power Connector Definition.....	10
4.5 I/O Connector Definitions.....	11
5 Installation and wiring.....	12
5.1 Dimensions.....	12
5.2 Installation Environmental Requirements.....	13
5.3 Module Installation.....	13
5.4 Wiring instructions.....	14
5.4.1 Power connector wiring diagram.....	14
5.4.2 I/O Interface Wiring Diagram.....	14
6 Power supply rules.....	16
6.1 Direct power supply rules.....	16
6.2 Tandem power supply rules.....	19
7 Operation.....	21

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7.1 Parameter description .....	21
7.1.1 Output clear hold function .....	21
7.1.2 ISDU Remote Configuration Function .....	22
7.1.3 DI/DO /IO-Link mode function .....	24
7.2 EtherCAT Master Configuration Application .....	26
7.2.1 Application in TwinCAT3 software environment .....	26
7.2.2 Application in CODESYS V3.5 software environment .....	38
7.2.3 Application in Sysmac Studio software environment .....	45
7.3 PROFINET Master Configuration Application .....	57
7.3.1 Application in TIA Portal V17 software environment .....	57
7.3.2 Application in STEP 7-MicroWIN SMART software environment .....	75
7.4 EtherNet/IP Master Configuration Application .....	87
7.5 Customized Data Length Module .....	87
7.5.1 EtherCAT Master Customization Module .....	87
7.5.2 PROFINET master customization module .....	87
8 FAQ .....	88
8.1 Device cannot be found in the software .....	88
8.2 Device cannot enter OP state .....	88
8.3 Device not found when updating accessible devices .....	88
8.4 Load button is grayed out when downloading configuration .....	88
9 Appendix .....	89
9.1 Appendix A .....	89
9.2 Appendix B .....	91
9.3 Appendix C .....	92
9.4 Appendix D .....	93
9.5 Appendix E .....	94

# 1 Product Features

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## 1.1 Product overview

IOL7 series master IP67 module is an IO-Link master device with standard IO structure, supporting EtherCAT and PROFINET industrial Ethernet bus interface on the bus side, and IO-Link protocol on the user side, and it is a gateway device belonging to the bus slave as well as the IO-Link master. Both the bus interface and the IO-Link interface can be interfaced with devices from multiple vendors with high compatibility, providing a variety of choices for user data acquisition, optimizing system configuration, simplifying on-site wiring, and improving system reliability.

## 1.2 Product Features

- Up to IP67 protection  
Suitable for harsh industrial environments
- Standardization  
Based on IO-Link standard V1.1.3, IO-Link slave devices can be remotely controlled for easy operation.
- High compatibility  
Supports slave devices with special process data lengths
- Compactness  
For applications where space is at a premium
- Easy diagnosis  
Innovative channel indicator design, close to the channel, channel status at a glance, easy to detect and maintain
- Easy configuration  
Simple configuration and support for all major PLCs.
- Easy and fast wiring  
Simple wiring with standard cables

# 2 Designation Rules

## 2.1 Designation Rules

**IOL 7 - EC 01 B - 8A**  
**(1) (2) (3) (4) (5) (6)**

Serial number	Definition	Description of values
(1)	Product Technology	IOL: short for IO-Link
(2)	protection class	7: IP67
(3)	bus protocol	EC: EtherCAT protocol abbreviation PN: PROFINET protocol abbreviation EI: Abbreviation for EtherNet/IP Protocol
(4)	Product Serial Number	01: Serial number of product series
(5)	Signal Type	A: NPN B: PNP
(6)	I/O Interface	8A: 8 x Class-A ports 4A4B: 4 x Class-A ports, 4 x Class-B ports 8B: 8 x Class-B ports

## 2.2 Model List

<b>Model</b>	<b>Product Description</b>
IOL7-EC01B-8A	EtherCAT bus protocol 8 x Class-A ports for IO-Link masters
IOL7-EC01B-4A4B	EtherCAT bus protocol 4 x Class-A, IO-Link master with 4 x Class-B ports
IOL7-EC01B-8B	IO-Link master with 8 x Class-B ports for EtherCAT bus protocols
IOL7-PN01B-8A	PROFINET bus protocol 8 x Class-A ports for IO-Link masters
IOL7-PN01B-4A4B	PROFINET bus protocol 4 x Class-A, IO-Link master with 4 x Class-B ports
IOL7-PN01B-8B	PROFINET bus protocol 8 x Class-B ports for IO-Link masters
IOL7-EI01B-8A	EtherNet/IP bus protocol 8 x Class-A port IO-Link masters
IOL7-EI01B-4A4B	EtherNet/IP bus protocol 4 x Class-A, IO-Link master with 4 x Class-B ports
IOL7-EI01B-8B	IO-Link master with 8 x Class-B ports for EtherNet/IP bus protocols

# 3 Product Parameters

## 3.1 General parameters

Interface parameter	
bus protocol	EtherCAT, PROFINET, EtherNet/IP
bus interface	2 x M12, 4Pin, D-code, Blue
electrical isolation	500 V
Number of I/O stations	According to the master station
data transmission medium	Category 5+ UTP or STP (STP recommended)
transmission distance	≤100 m (station to station)
transmission rate	100 Mbps
Technical Parameters	
Configuration	Through the master
Power connector	2×M12, 5Pin, L-code, Red
power supply	18~36VDC
	Reverse polarity protection
U <sub>S</sub> Total current	Max: 16A
U <sub>S</sub> Current consumption	≤100mA
U <sub>A</sub> Total current	Max: 16A
U <sub>A</sub> Current consumption	0mA
Electrical isolation between U <sub>S</sub> and U <sub>A</sub>	be
weights	480g
sizes	225×62×35.1mm
operating temperature	-25~+70°C
Storage temperature	-40~+85°C
relative humidity	95%, non-condensing
protection class	IP67

## 3.2 Digital parameter

### 3.2.1 EtherCAT Bus Module Parameters

Product Model	IOL7-EC01B-8A	IOL7-EC01B-4A4B	IOL7-EC01B-8B
bus protocol	EtherCAT		
rated voltage	24 VDC ( $\pm 25\%$ )		
DI/DO/IO-Link Interface	8×M12, 5Pin, A-code	4×M12, 5Pin, A-code 4×M12, 5Pin, B-code	8×M12, 5Pin, B-code
Number of IO-Link channels	8		
IO-Link version	V1.1		
IO-Link Transfer Rate	COM1 (4.8kbps), COM2 (38.4kbps), COM3 (230.4kbps)		
Number of input channels	Maximum 16	Maximum 12	Maximum 8
Input Signal Type	PNP		
Input Filtering	Supported, fixed configuration is 3ms		
Input Current	200 mA		
Maximum number of output channels	Maximum 8	Maximum 8	Maximum 8
Maximum output current for a single channel	1.6A		
Output Signal Type	PNP		
Load Type	Resistive loads, inductive loads		
Total output current	$U_S, U_A$ 16 A max.		
port protection	overcurrent protection		
Isolation method	$U_A$ Not used	$U_S$ and $U_A$ isolated	
Channel Indicator Lights	Supported		

## 3.2.2 PROFINET bus module parameters

Product Model	IOL7-PN01B-8A	IOL7-PN01B-4A4B	IOL7-PN01B-8B
bus protocol	PROFINET		
rated voltage	24 VDC ( $\pm 25\%$ )		
DI/DO/IO-Link Interface	8×M12, 5Pin, A-code	4×M12, 5Pin, A-code 4×M12, 5Pin, B-code	8×M12, 5Pin, B-code
Number of IO-Link channels	8		
IO-Link version	V1.1		
IO-Link Transfer Rate	COM1 (4.8kbps), COM2 (38.4kbps), COM3 (230.4kbps)		
Number of input channels	Maximum 16	Maximum 12	Maximum 8
Input Signal Type	PNP		
Input Filtering	Supported, fixed configuration is 3ms		
Input Current	200 mA		
Maximum number of output channels	Maximum 8	Maximum 8	Maximum 8
Maximum output current for a single channel	1.6A		
Output Signal Type	PNP		
Load Type	Resistive loads, inductive loads		
Total output current	$U_S, U_A$ 16 A max.		
port protection	overcurrent protection		
Isolation method	$U_A$ Not used	$U_S$ and $U_A$ isolated	
Channel Indicator Lights	Supported		

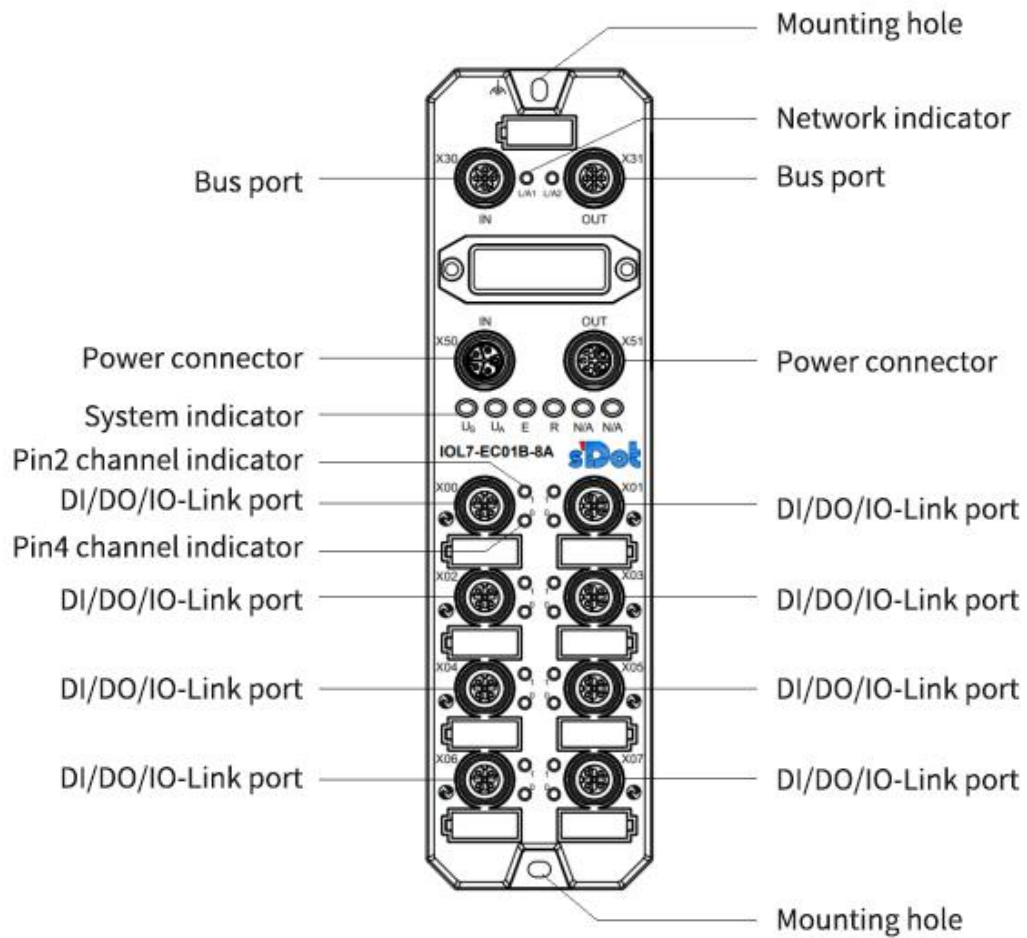
### 3.2.3 EtherNet/IP Bus Module Parameters

Product Model	IOL7-EI01B-8A	IOL7-EI01B-4A4B	IOL7-EI01B-8B
bus protocol	EtherNet/IP		
rated voltage	24 VDC ( $\pm 25\%$ )		
DI/DO/IO-Link Interface	8×M12, 5Pin, A-code	4×M12, 5Pin, A-code 4×M12, 5Pin, B-code	8×M12, 5Pin, B-code
Number of IO-Link channels	8		
IO-Link version	V1.1		
IO-Link Transfer Rate	COM1 (4.8kbps), COM2 (38.4kbps), COM3 (230.4kbps)		
Number of input channels	Maximum 16	Maximum 12	Maximum 8
Input Signal Type	PNP		
Input Filtering	Supported, fixed configuration is 3ms		
Input Current	200 mA		
Maximum number of output channels	Maximum 8	Maximum 8	Maximum 8
Maximum output current for a single channel	1.6A		
Output Signal Type	PNP		
Load Type	Resistive loads, inductive loads		
Total output current	$U_S, U_A$ 16 A max.		
port protection	overcurrent protection		
Isolation method	$U_A$ Not used	$U_S$ and $U_A$ isolated	
Channel Indicator Lights	Supported		

# 4 Panel

## 4.1 Product structure

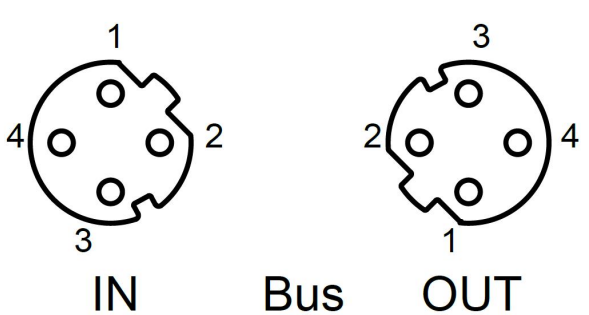
**Name of each part of the product**



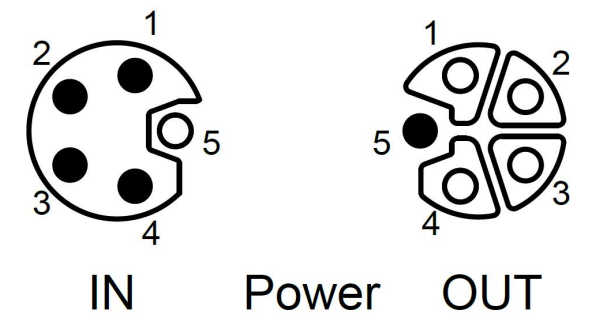
## 4.2 Indicator light function

Name	markings	color	state of affairs	State Description
Network indicator IN	L/A1	GREEN	GREEN	establish a network connection
			FLASHING	Network connection with data interaction
			OFF	No data interaction or exception
Network indicator OUT	L/A2	GREEN	GREEN	establish a network connection
			FLASHING	Network connection with data interaction
			OFF	No data interaction or exception
System power indicator	U <sub>S</sub>	GREEN	GREEN	Power supply is normal
			OFF	The product is not powered up or the power supply is abnormal
Auxiliary power indicator	U <sub>A</sub>	GREEN	GREEN	Power supply normal
			OFF	The product is not powered up or the power supply is abnormal
Operation status indicator RUN	R	GREEN	GREEN	Normal operation of the system
			FLASHING	2Hz: the device is in Pre-OP state 1Hz: device is in Safe-OP state
			OFF	Device is in Init or unpowered state
warning indicator (EC master reserved)	E	RED	GREEN	Abnormal system operation
			FLASHING	Device is down or slave is misconfigured
			OFF	System running normally or not powered up
warning indicator (PN master)	SF	RED	GREEN	PROFINET master system working abnormally
			OFF	PROFINET master system running normally or not powered up
	BF	RED	GREEN	PROFINET master network connection abnormality
			OFF	PROFINET master network connection is normal
Pin2 Channel Indicator	1	GREEN	GREEN	Module channels have signal inputs
			OFF	No signal input or abnormal signal input on module channel
Pin4 channel indicator	0	GREEN	GREEN	Module channel has signal output high or input high, IO-Link module normal
			FLASHING	IO-Link module status abnormal
			OFF	Module channel has signal output low or input low

### 4.3 Bus Interface Definitions

Bus Interface Connection View (M12, D-code, Hole End)	Description of definitions										
 <p style="text-align: center; margin-top: 10px;">IN                  Bus                  OUT</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #cccccc;"> <th style="text-align: center; padding: 5px;">Pin</th> <th style="text-align: center; padding: 5px;">functionality</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">1</td> <td style="padding: 5px;">TX+, data for transmission+</td> </tr> <tr> <td style="text-align: center; padding: 5px;">2</td> <td style="padding: 5px;">RX+, data for reception+</td> </tr> <tr> <td style="text-align: center; padding: 5px;">3</td> <td style="padding: 5px;">TX-, Data for Transmission-</td> </tr> <tr> <td style="text-align: center; padding: 5px;">4</td> <td style="padding: 5px;">RX-, data for reception-</td> </tr> </tbody> </table>	Pin	functionality	1	TX+, data for transmission+	2	RX+, data for reception+	3	TX-, Data for Transmission-	4	RX-, data for reception-
Pin	functionality										
1	TX+, data for transmission+										
2	RX+, data for reception+										
3	TX-, Data for Transmission-										
4	RX-, data for reception-										

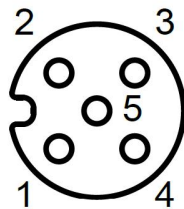
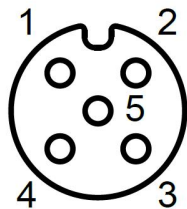
### 4.4 Power Connector Definition

Power connector connection view (M12, L-code, pin end & hole end)	Description of definitions																		
 <p style="text-align: center; margin-top: 10px;">IN                  Power                  OUT</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #cccccc;"> <th style="text-align: center; padding: 5px;">Pin</th> <th style="text-align: center; padding: 5px;">Functionality</th> <th style="text-align: center; padding: 5px;">Core Color</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">1</td> <td style="padding: 5px;">+24V U<sub>S</sub></td> <td style="text-align: center; padding: 5px;">Brown</td> </tr> <tr> <td style="text-align: center; padding: 5px;">2</td> <td style="padding: 5px;">0V GND<sub>A</sub></td> <td style="text-align: center; padding: 5px;">White</td> </tr> <tr> <td style="text-align: center; padding: 5px;">3</td> <td style="padding: 5px;">0V GND<sub>S</sub></td> <td style="text-align: center; padding: 5px;">Blue</td> </tr> <tr> <td style="text-align: center; padding: 5px;">4</td> <td style="padding: 5px;">+24V U<sub>A</sub></td> <td style="text-align: center; padding: 5px;">Black</td> </tr> <tr> <td style="text-align: center; padding: 5px;">5</td> <td style="padding: 5px;">PE</td> <td style="text-align: center; padding: 5px;">Gray</td> </tr> </tbody> </table>	Pin	Functionality	Core Color	1	+24V U <sub>S</sub>	Brown	2	0V GND <sub>A</sub>	White	3	0V GND <sub>S</sub>	Blue	4	+24V U <sub>A</sub>	Black	5	PE	Gray
Pin	Functionality	Core Color																	
1	+24V U <sub>S</sub>	Brown																	
2	0V GND <sub>A</sub>	White																	
3	0V GND <sub>S</sub>	Blue																	
4	+24V U <sub>A</sub>	Black																	
5	PE	Gray																	

## 4.5 I/O Connector Definitions

I/O Connector Connection View (M12,  
A-code/B-code, Hole End)

Description of definitions



IO-Link

Pin	Functionality	Core Color
1	+24V $U_S$	Brown
2	DI/DO/+24V $U_A$	White
3	0V $GND_S$	Blue
4	DI/DO/IO-Link	Black
5	PE/0V $GND_A$	Gray

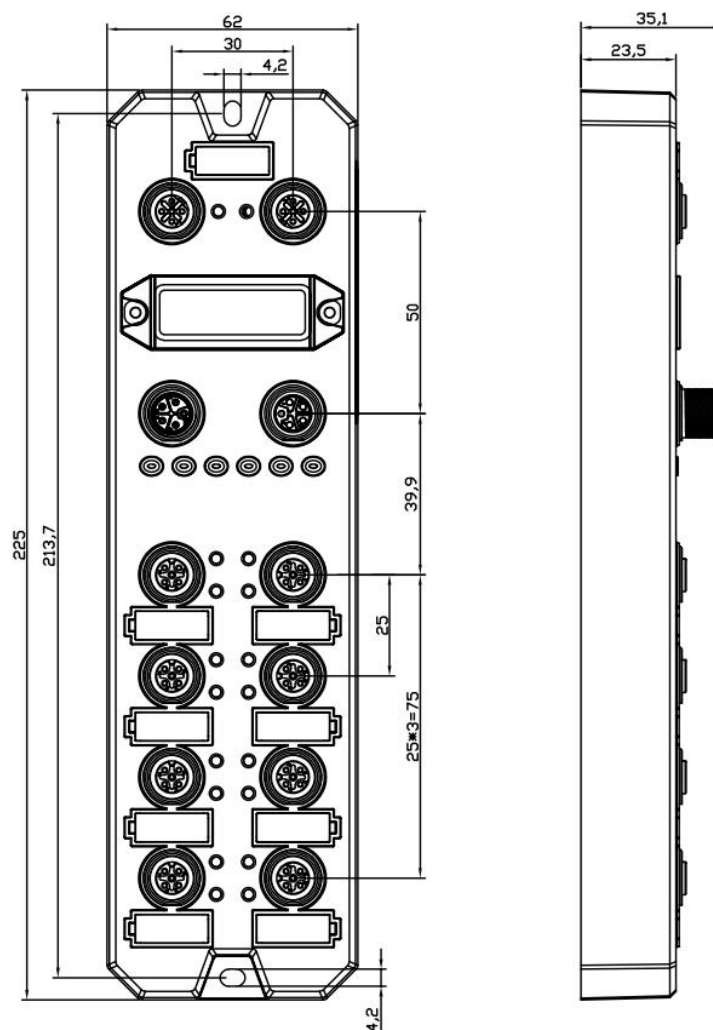
### ⚠ Precautions

- Series 01 Pin2 can only be used as a DI.
- All Class-A interfaces of the 01 series Pin1 and Pin3 are powered from the system power supply  $U_S$ , and Pin4 signal output power is also provided by  $U_S$ .
- All Class-B interfaces of the 01 series Pin2 and Pin5 are powered from the auxiliary power supply  $U_A$ , and Pin4 signal output power is provided by  $U_S$ .

# 5 Installation and wiring

## 5.1 Dimensions

### Housing specifications (unit mm)



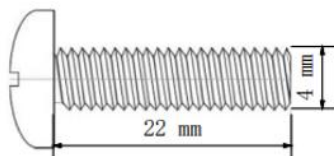
## 5.2 Installation Environmental Requirements

To fully utilize the performance of the IOL7 module and enhance its reliability, avoid installing it in the following locations:

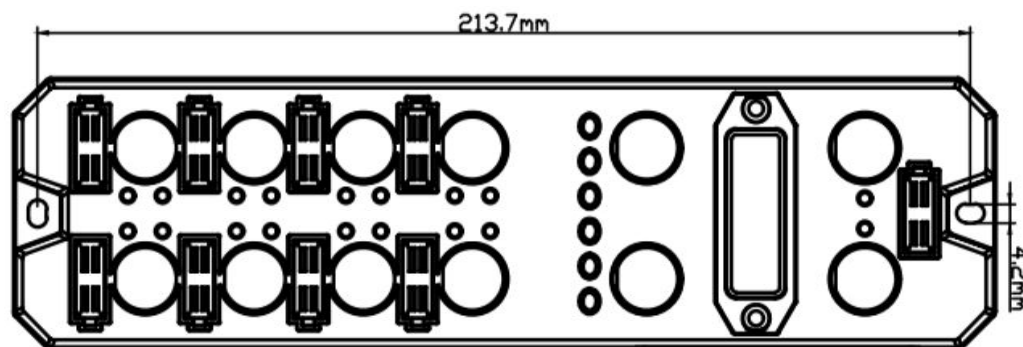
- location under direct sunlight
- Locations where ambient temperature or relative humidity exceeds module specifications
- Places with corrosive gas, flammable gas
- Places with acid, oil, chemical droplets
- Places where there are dust, iron chips, sparks splash
- Places where the module body is directly exposed to shocks and vibrations.
- Places with strong electric and magnetic fields, radiation and static interference
- Places with power lines and AC strong wires nearby

## 5.3 Module Installation

- ◆ Please use screws of M4\*22mm or above to fasten and install the module body.



- ◆ The mounting hole dimensions for the module are shown below.

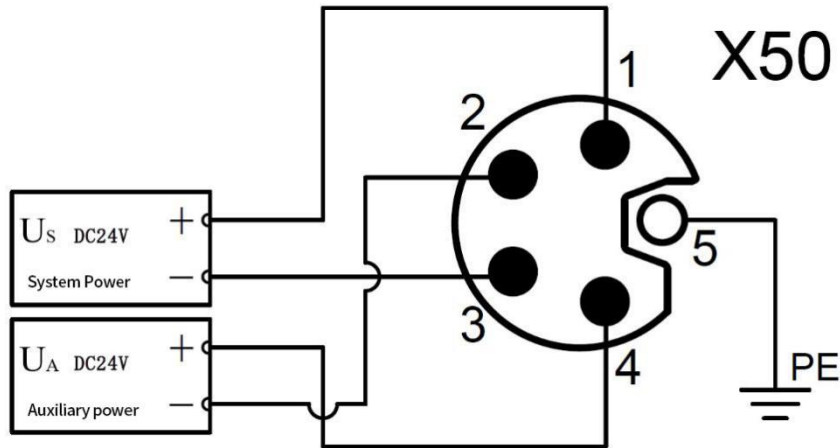


### ☛ Precautions

- The transparent cover on the module is the reserved cover for the rotary switch, which is fastened at the factory, so please do not disassemble it to avoid damaging the IP67 protection level.
- Please fix the module correctly, if it is not fixed securely it may fail due to vibration.

## 5.4 Wiring instructions

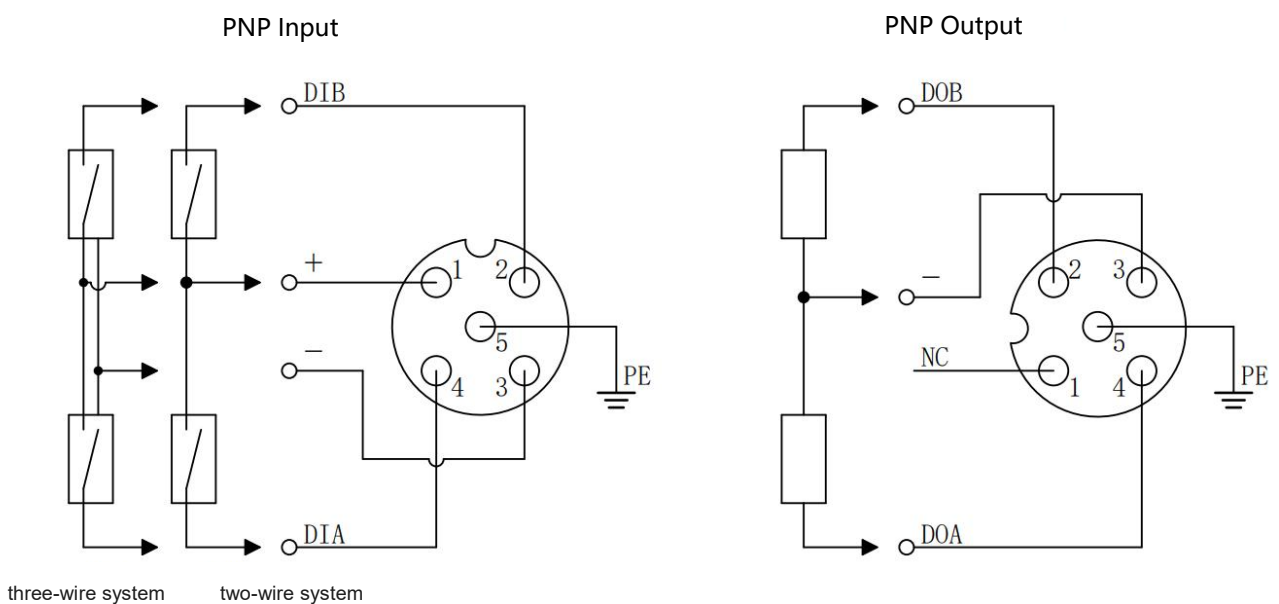
### 5.4.1 Power connector wiring diagram



**caveat**

- It is recommended that the system power supply and auxiliary power supply are powered by different switching power supplies to ensure the stability of operation.
- Refer to the "[Power Supply Rules](#)" section for power supply rules.

### 5.4.2 I/O Interface Wiring Diagram



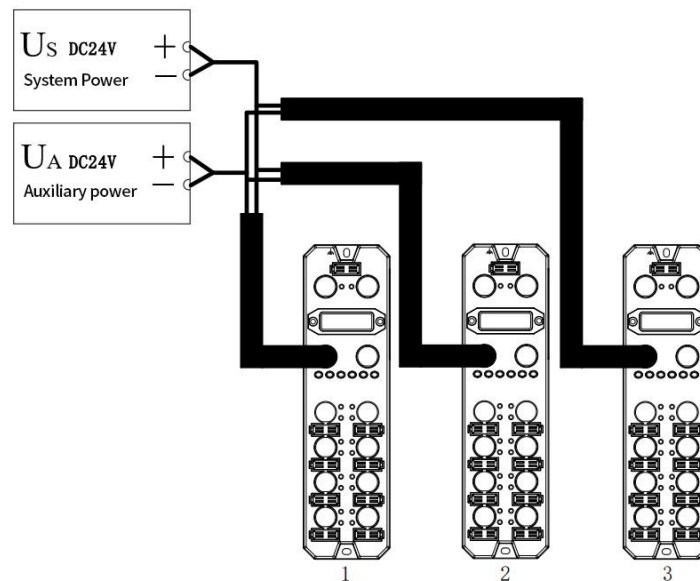
**☛ Precaution**

- 
- Please install the module's matching waterproof cap on the unused connector interface and tighten it so as not to jeopardize the IP67 protection rating.
-

# 6 Power supply rules

## 6.1 Direct power supply rules

The power supply for each module is connected directly from the switching power supply without using the OUT connector. The total current consumption of each module's auxiliary power supply should be  $\leq 16A$ .



The voltage drop in the power supply cable varies depending on the total current consumption of the module's auxiliary power supply and the cable material, and the following table shows the voltage drop when using our standard cables.

Total current consumption of the power supply (A)	Voltage drop at different cable lengths (V)			
	1m	3m	5m	10m
8	0.64	1.12	1.60	2.72
7	0.56	0.98	1.40	2.38
6	0.48	0.84	1.20	2.04

5	0.40	0.70	1.00	1.70
4	0.32	0.56	0.80	1.36
3	0.24	0.42	0.60	1.02
2	0.16	0.28	0.40	0.68
1	0.08	0.14	0.20	0.34

■ Example of calculation of total module current consumption with direct power supply

For example, both modules are IOL7-EC01B-8A, and each module is used as shown in the table below:

Module name	I/O Ports			Externally connected devices	
	port name	Pin Name	I/O Mode	brand name	norm
Module 1	Port 1~8	Pin4	DI (input current 4mA)	3 Wire Sensors	Current consumption: 30mA
		Pin2	DI (input current 4mA)		Current consumption: 30mA
Module 2	Port 1~8	Pin4	DO	solenoids	Load current: 500mA
		Pin2	DI	3 Wire Sensors	Current consumption: 30mA

Calculate the total consumption current and the individual module calculation current as shown in the table below:

Module name	Power supply type	Total Consumption Current Calculation Items	calculation result
Module 1	System power supply $U_s$	System consumption current	Module system side power consumption 35mA
	System power supply $U_s$	Module input current and sensor consumption current	For all ports (Sensor consumption current) + (Channel input current * Number of input points) = (30mA * 16) + (4mA * 16) = 544 mA
Module 2	System power supply $U_s$	System consumption current	Module system side power consumption 35mA
	System power supply $U_s$	Module input current and sensor consumption current	For port 1~8 Pin2 (Sensor consumption current) + (Channel input current * Number of input points) = (30mA * 8) + (4mA * 8) = 272 mA

		Load Output Current	For port 1~8 Pin4 Channel Output Current * Number of Output Points $= 500\text{mA} * 8$ $= 4\text{A}$
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In summary, the current consumption of each module is as follows:

- For the system power supply  $U_S$ , each module consumes a current of 35mA.

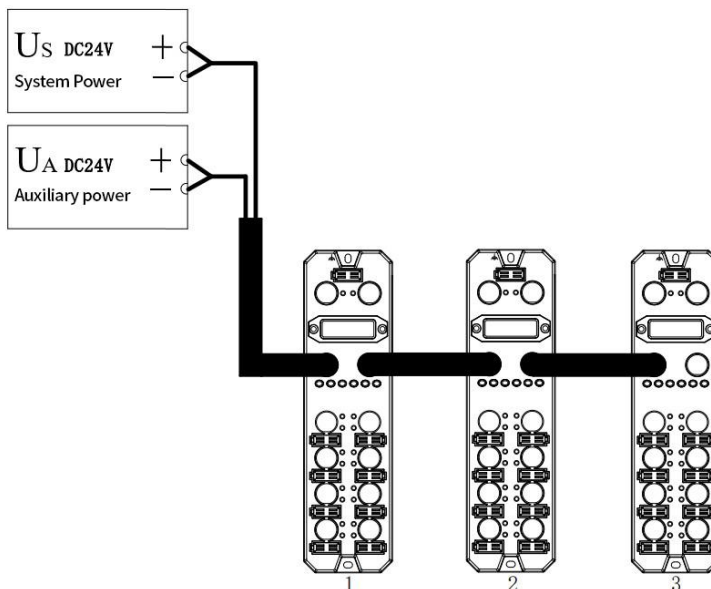
The auxiliary power supply  $U_A$  for module 1 (IOL7-EC01B-8A) consumes  $35\text{ mA} + 544\text{ mA} = 579\text{ mA}$ , which is less than the module auxiliary power supply  $U_A$  maximum current of 16A.

The auxiliary power supply  $U_A$  for module 2 (IOL7-EC01B-8A) consumes  $35\text{ mA} + 272\text{ mA} + 4\text{A} = 4.307\text{A}$ , which is less than the module auxiliary power supply  $U_A$  maximum current of 16A.

In this example, the requirement is satisfied because the total consumption current total of each module satisfies the sum of the module auxiliary power supply consumption current  $\leq 16\text{A}$ .

## 6.2 Tandem power supply rules

Modules are supplied in series with each other through the OUT interface. The total consumption current of the auxiliary power supply of each module should be  $\leq 16A$ , and the total consumption current of the system power supply and auxiliary power supply of all modules should be  $\leq 16A$ .



When power is supplied in series, the module will have the consumption current of the series-connected module flowing inside the module, thus generating a voltage drop in the internal circuit of the module. The voltage drop in the power cable varies according to the total consumption current of the module's auxiliary power supply and the cable material, the following table shows the voltage drop when using our standard cables.

Total current consumption of the power supply (A)	Voltage drop in the internal circuit of the module (V)	Voltage drop at different cable lengths (V)			
		1m	3m	5m	10m
16	0.64	1.28	2.24	3.20	5.44
15	0.60	1.20	2.10	3.00	5.10
14	0.56	1.12	1.96	2.80	4.76
13	0.52	1.04	1.82	2.60	4.42
12	0.48	0.96	1.68	2.40	4.08
11	0.44	0.88	1.54	2.20	3.74
10	0.40	0.80	1.40	2.00	3.40
9	0.36	0.72	1.26	1.80	3.06
8	0.32	0.64	1.12	1.60	2.72
7	0.28	0.56	0.98	1.40	2.38
6	0.24	0.48	0.84	1.20	2.04
5	0.20	0.40	0.70	1.00	1.70
4	0.16	0.32	0.56	0.80	1.36
3	0.12	0.24	0.42	0.60	1.02

2	0.08	0.16	0.28	0.40	0.68
1	0.04	0.08	0.14	0.20	0.34

### ☛ Precautions

- 
- The total current consumption of the auxiliary power supply of each module shall be  $\leq 16A$ .
  - As shown in the above figure, the total consumption current of the system power supply and auxiliary power supply of all modules in series should meet the rule of "1+2+3"  $\leq 16A$ .
- 

### ■ Example of calculating the total current consumption of a module when powered in series

For example, if both modules are IOL7-EC01B-8A, the usage of each module is the same as in the ["Example of Calculating the Total Current Consumption of a Module When Directly Powered"](#).

Calculate the total consumption current:

$$U_s = 579mA + 4.307A = 4.886A$$

In this example, the requirement is met because the sum of the current consumption of the system power supply  $U_s$  of all modules satisfies the rule "1+2+3"  $\leq 16A$ .

### ☛ Precaution

- 
- Use of 4A4B or 8B models should take into account that the total consumption of the auxiliary power supply for Class-B interfaces under both power supply rules is  $\leq 16A$ .
-

# 7 Operation

---

## 7.1 Parameter description

### 7.1.1 Output clear hold function

The Clear/Hold function targets the output signals of each port, and this function can configure the output action of the module in the abnormal state of the bus. Three types of operations are supported:

Low level output (Clear 0): when communication is disconnected, the module output channel outputs a low level.

High Level Output (Clear 1): When communication is disconnected, the module output channel outputs a high level.

Hold output: When the communication is disconnected (Hold last value), the output of the module output channel always keeps the last state level.

- **The EtherCAT master output clear hold function is configured using the TwinCAT3 software as an example, see [chapter 7.2.1 Parameter Configuration](#) for details.**
- **The PROFINET master output clear hold function uses the TIA Portal V17 software as an example to introduce the configuration method, see the [master parameter configuration in chapter 7.3.1](#) for details.**

## 7.1.2 ISDU Remote Configuration Function

EtherCAT master supports ISDU read/write operation, PROFINET master only supports ISDU write operation before configuration. Before the operation, you should get the information related to the ISDU of the slave station, and the specific information can be viewed in **the "IOL7 Series Hub User's Manual\_Vx.xx.pdf"**, Chapter 6 section.

The solidot slave IOL7-16CB-M12 supports the functions of configuring the port direction, input filtering function, and restoring factory settings. The following is an example of how to configure these three functions according to Port 1 connected to the slave IOL7-16CB-M12 with Port 1 status displaying 3 (IO-Link OP status).

### 1、 EtherCAT master ISDU parameter reading and writing

**Example 1:** Configure the first 8 channels of the IOL7-16CB-M12 as inputs and the last 8 channels as outputs. Refer to section 6.5.2 of **IOL7 Series Hub User Manual\_Vx.xx.pdf**, Index is set to 0x0042, Subindex is set to 0x00, Length is set to 2 (0x02), Data is set to 00FF, and Control selects Write.

**Example 2:** Configure the first 8 channels of the IOL7-16CB-M12 for Input Filtering 3.2ms and the last 8 channels for Input Filtering Off. Refer to **IOL7 Series Hub User's Manual\_Vx.xx.pdf**, section 6.5.8, Index is set to 0x0049, Subindex is set to 0x00, Length is set to 0x10, Data is set to 05050505050505050808080808080808, and Control is selected as Write.

**Example 3:** Restore IOL7-16CB-M12 factory settings. Refer to section 6.3 of **IOL7 Series Hub User Manual\_Vx.xx.pdf**, Index is set to 0x0002, Subindex is set to 0x00, Length is set to 0x01, Data is set to 82, and Control selects Write.

### Precautions

- For ISDU operation, it is better to set Control to NULL first, fill Index, Subindex, Length, Data with data, and then set Control.
- Read operations do not need to fill in Length, Data.
- After a write operation, the Error Code returns 0, indicating correctness, which can be verified by a readback operation.
- If the operation returns an error code with a non-zero value, it indicates that an error exists, and the problem can be localized by the meaning of the error code; see Appendix [D](#) for slave return error codes.

### 2、 PROFINET master configuration ISDU parameters

Due to the limitations of the protocol, PROFINET master does not support ISDU read operation, but only supports ISDU write operation before configuration. If more than one write operation is needed, the configuration operation can be issued several times, and the slave station usually supports saving the configuration and does not lose the configuration when power is added. The difference between the ISDU operation of the PROFINET master and the EtherCAT master lies in the fact that the Index, Subindex, and Length fields of the PROFINET master can only be filled in with the decimal DEC value, and the Control item is not needed.

**Example 1:** Same requirements as above, Index is set to 66 (0x0042), Subindex is set to 0 (0x00), Length is set to 2 (0x02), and Data is set to 00FF.



### 7.1.3 DI/DO /IO-Link mode function

#### 1、 Port DI/DO mode

- ◆ Series 01 EtherCAT, PROFINET master each port Pin2 does not support the DO function, does not support the configuration, the default standard DI mode. PROFINET master reserved Pin2 configuration items, but not operable.
- ◆ Each port Pin4 of 01 series EtherCAT and PROFINET master supports standard DI/DO modes, you can select the corresponding standard DI and standard DO modes in the module, and the default standard DI mode.
- ◆ The EtherCAT master takes the TwinCAT3 environment as an example. The port standard DI mode, the process data is embodied in Digital Inputs Mapping, and the port standard DO mode, the process data is embodied in Digital Outputs Mapping.
- ◆ Standard DI/DO mode for PROFINET master ports, refer to [Appendix E](#) for process data.

#### 2、 Port IO-Link Mode

- ◆ Each port of the 01 series EtherCAT and PROFINET master supports IO-Link mode.
- ◆ Take TwinCAT3 environment as an example, after the port is configured in IO-Link mode, you can check the "TxPDO IO-Link Status" to get the status of the port configuration, and the definition of the status is shown in [Appendix B](#).
- ◆ Under normal circumstances, the slave process data length should be consistent with the configuration of the corresponding module data length, but also compatible. For example, if the slave process data is input 2 bytes, the module can also choose to input more than 2 bytes, such as input 4 bytes; however, it can not choose to input less than 2 bytes, and the device status will indicate that the input length does not match.
- ◆ If you do not obtain the slave device input and output process data length before configuring the IO-Link mode, and you are not sure how to select the corresponding module, the EtherCAT master, for example, in the TwinCAT3 environment, can view the port Info information by selecting any module and the device re-enters the OP state.

For example, port 0, where 9000:24 displays the length of real input process data read by the master from the slave, and 9000:25 displays the length of real output process data read by the master from the slave, and the length value refers to [Appendix C](#). If there is no corresponding slave data length module, you can select a module with a length value greater than the slave data length; or [customize the data length module](#) according to 7.5, and select the slave data length module. length module according to [7.5 Customized Data Length Module](#).

- **The DI/DO/IO-Link mode function of the EtherCAT master is described in the TwinCAT3 software as an example of how to configure it. For details of the steps, see DI/DO/IO-Link Settings in [chapter 7.2.1](#).**

- The PROFINET master DI/DO/IO-Link mode function introduces the configuration method using the TIA Portal V17 software as an example, and the specific steps are described in the DI/DO/IO-Link settings in [chapter 7.3.1](#).

## 7.2 EtherCAT Master Configuration Application

### 7.2.1 Application in TwinCAT3 software environment

#### 1、Preparation

- **hardware environment**

- **Module Model IOL7-EC01B-8A**  
**X00 port access to IOL7 slave module IOL7-16CB-M12**
- **A computer with pre-installed TwinCAT3 software**
- **Shielded cables for EtherCAT**
- **One switching power supply**
- **Device Configuration Files**

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

- **Hardware configuration and wiring**

Follow "[5 Installation and Wiring](#)".

#### 2、Preset Profiles

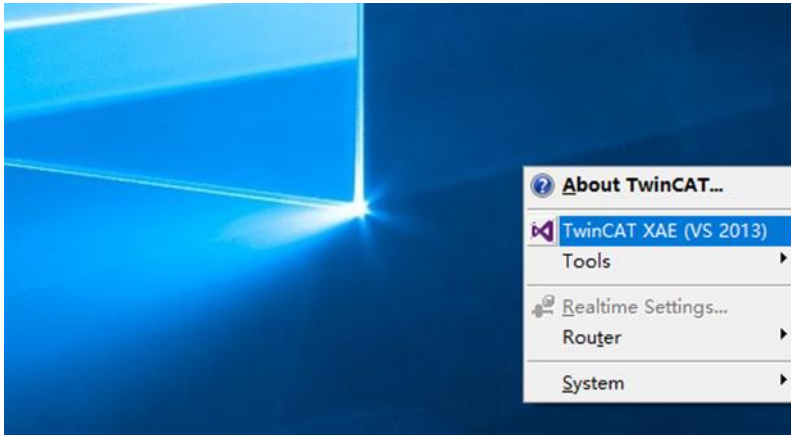
Place the ESI configuration file (Solidot EC IO-Link Gateway ESI V1.0.2.xml) in the TwinCAT installation directory under "C:\TwinCAT\3.1\Config\Io\EtherCAT" as shown below.

此电脑 > Windows (C:) > TwinCAT > 3.1 > Config > Io > EtherCAT

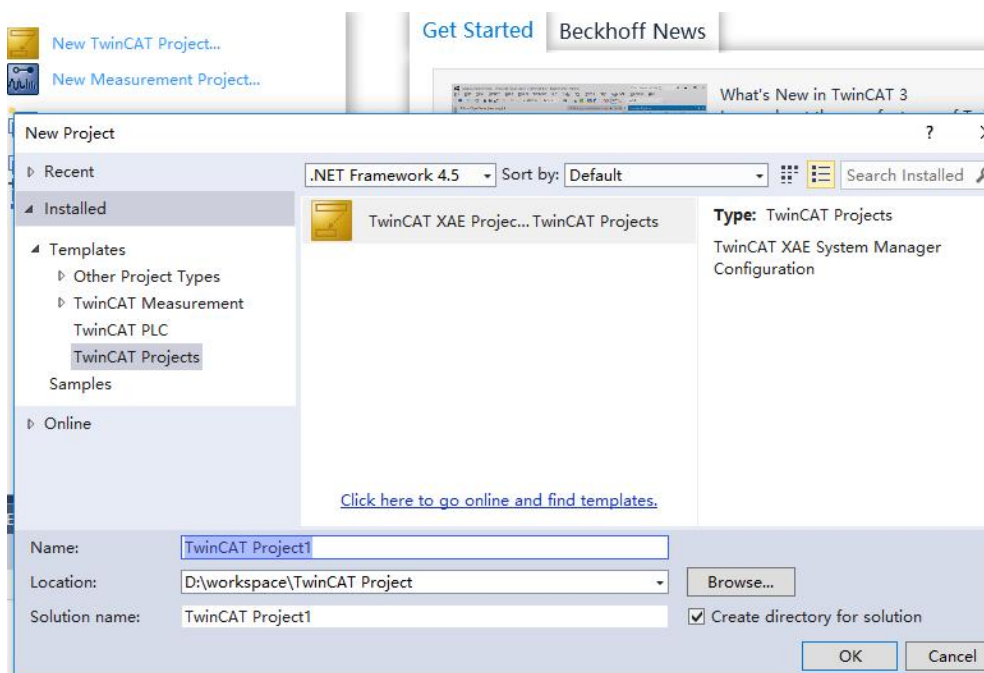
名称	修改日期	类型	大小
Beckhoff EPP1xxx.xml	2017/12/14 11:34	XML 文档	480 KB
Beckhoff EPP2xxx.xml	2017/12/28 12:22	XML 文档	1,811 KB
Beckhoff EPP3xxx.xml	2017/12/8 8:48	XML 文档	2,099 KB
Beckhoff EPP4xxx.xml	2016/12/22 10:57	XML 文档	500 KB
Beckhoff EPP5xxx.xml	2016/12/22 10:57	XML 文档	736 KB
Beckhoff EPP6xxx.xml	2017/4/5 14:46	XML 文档	1,272 KB
Beckhoff EPP7xxx.xml	2016/12/22 10:57	XML 文档	1,466 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
Solidot EC IO-Link Gateway ESI V1.0.2.xml	2023/4/5 12:56	XML 文档	707 KB

### 3. Create Project

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

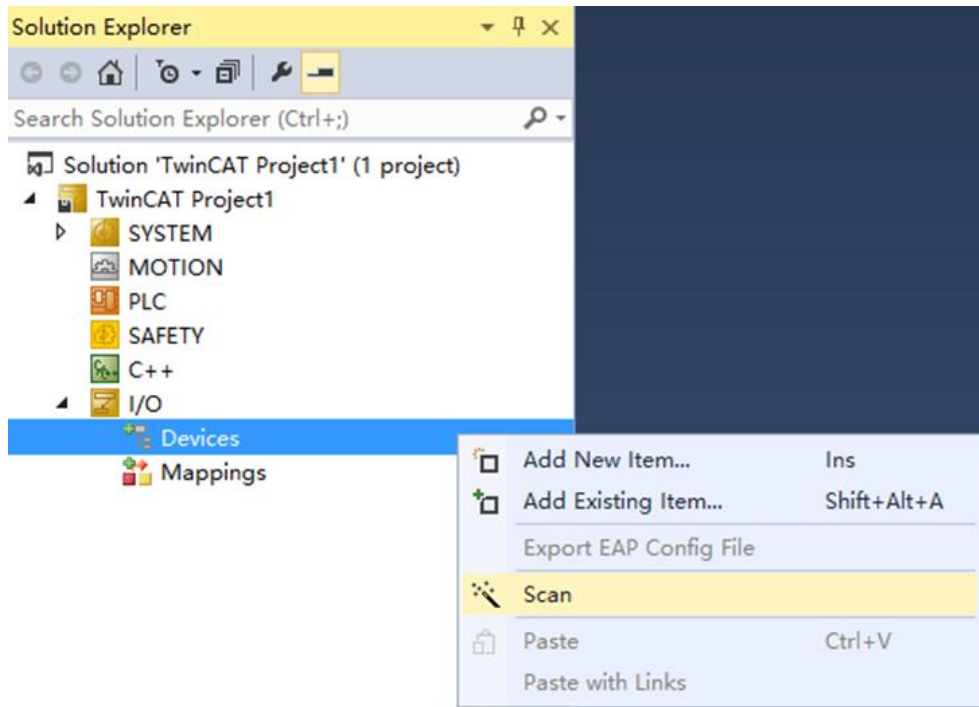


- b. Click "New TwinCAT Project", in the pop-up window, "Name" and "Solution name" correspond to the project name and solution name respectively. In the pop-up window, "Name" and "Solution name" correspond to the project name and solution name, respectively, and "Location" corresponds to the project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



#### 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 below.



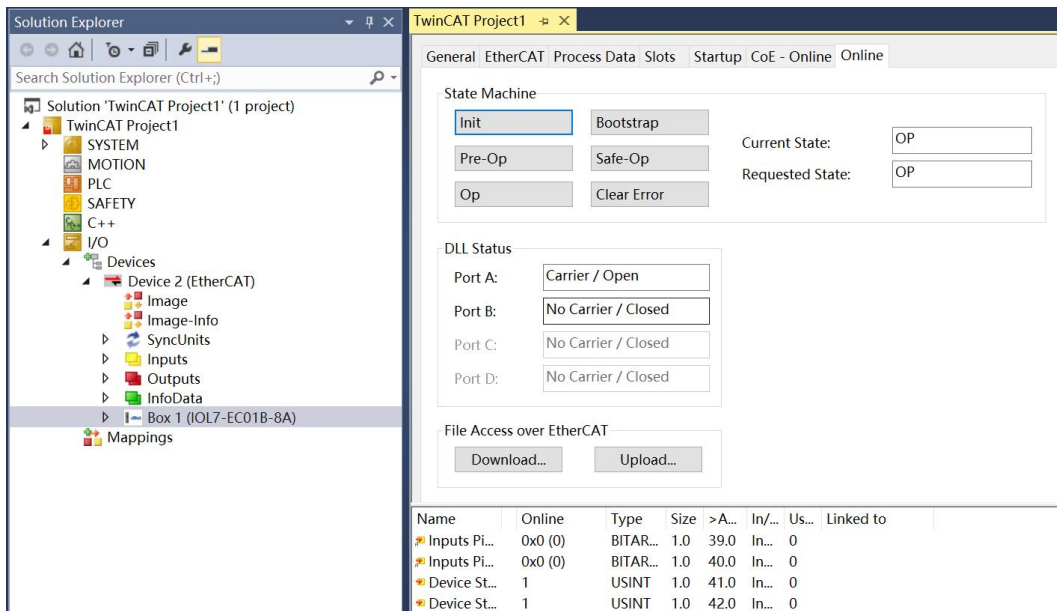
- b. Check the "Local Connection" box, as shown below.



- 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". "Yes", as shown in the figure below.

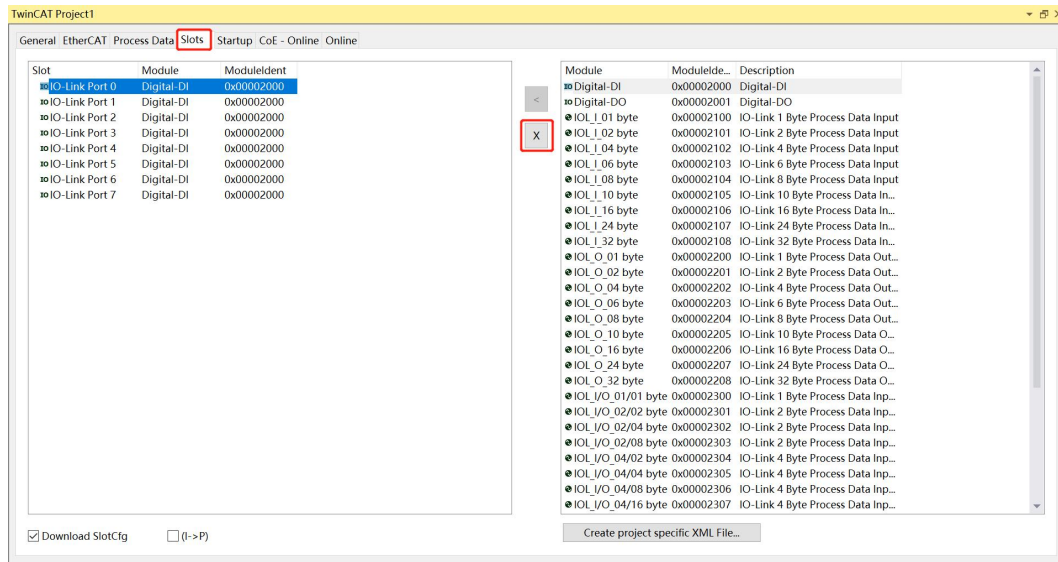


- d. After scanning the device, you can see Box1 in the left navigation tree, and you can see TwinCAT in the "OP" state in the "Online" section, and you can observe that the RUN light of the slave device is always on, as shown in the figure below.

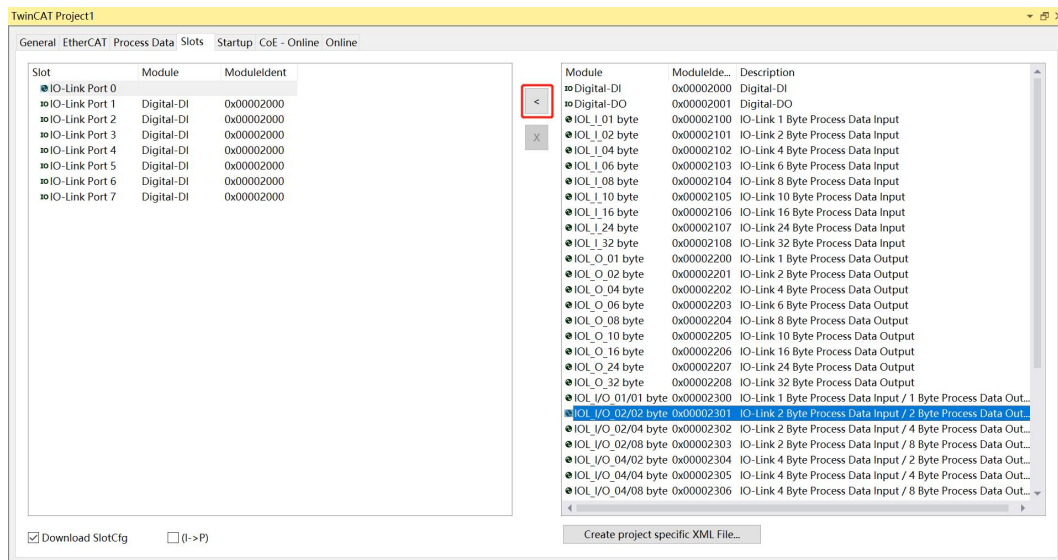


### 5. DI/DO/IO-Link Settings

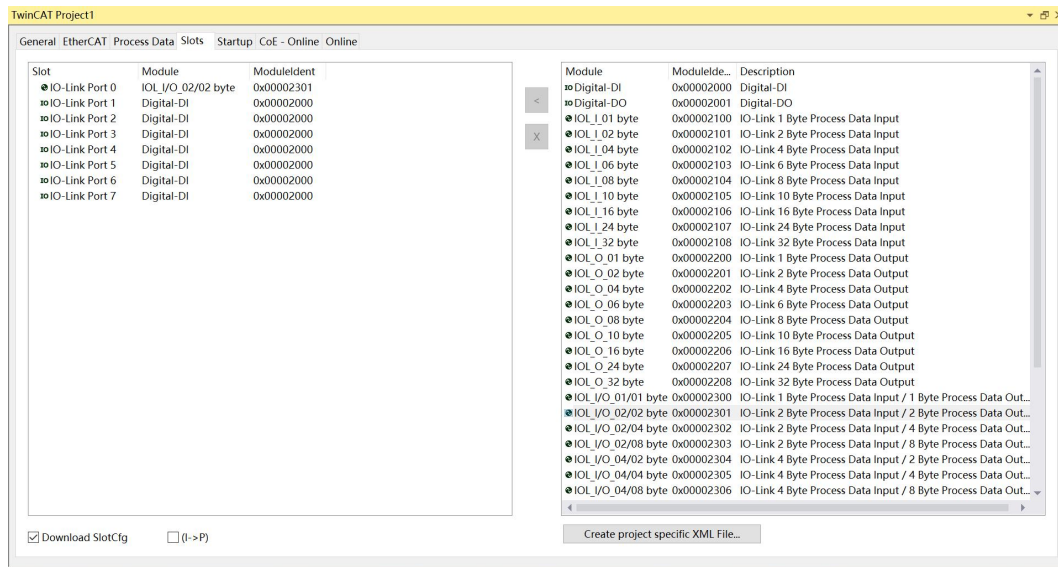
- a. Master port 0 has been connected to the slave module IOL7-16CB-M12, check the IOL7-16CB-M12 power lamp, the power lamp is always on.
- b. Click "Slots" in the right side configuration interface of the master station, select IO-Link Port 0 and click "Delete", as shown below.



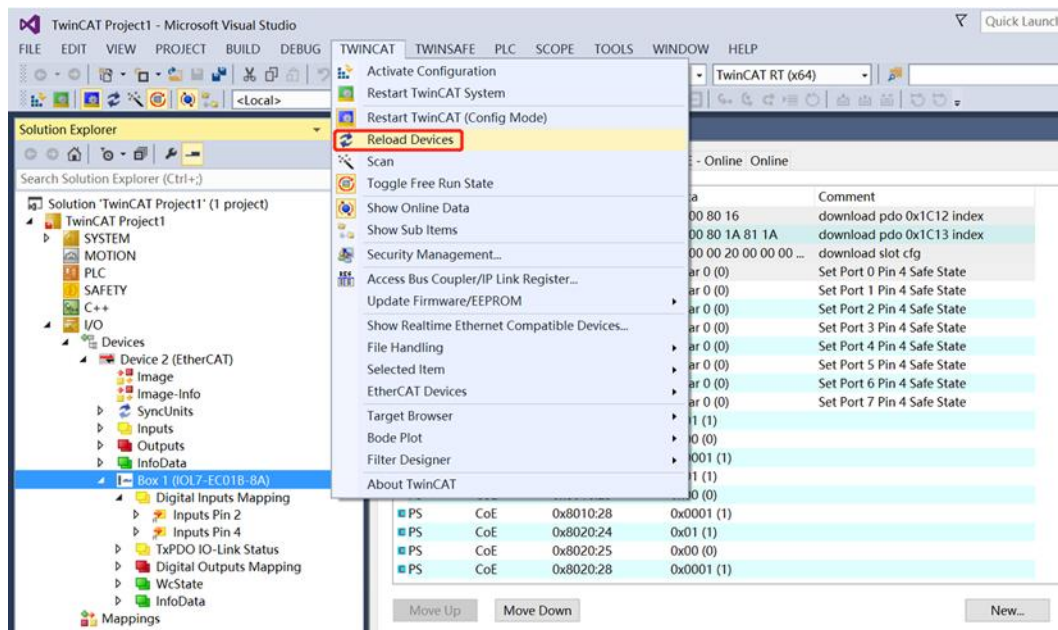
- c. After the deletion is completed, select "IOL\_I/O\_02/02 byte" on the right side, and click the "<" button to move left, as shown below. (Note: The IOL7-16CB-M12 can be configured with a maximum of 16 channels of input or 16 channels of output, so select IOL\_I/O\_02/02 byte.)



- d. After adding, Port0~7 on the left side is shown as below. Other port configuration DI/DO/IO-Link method is the same as the method here.



- e. After the configuration is complete, you need to perform Reload operation, click the menu bar "TWINCAT -> Reload Devices" option, as shown below.





- b. Click "New" at the bottom of the "Startup" interface to enter the "Edit CANopen Startup Entry" interface, as shown below.

Edit CANopen Startup Entry
✕

Transition

I->P

P->S     S->P

S->O     O->S

Index (hex):

Sub-Index (dec):

Validate     Complete Access

OK

Cancel

Data (hexbin):

Validate Mask:

Comment:

Hex Edit...

Edit Entry...

Index	Name	Flags	Value	Unit
+ 10F1.0	Error Settings		> 2 <	
+ 1C32.0	SM output parameter		> 32 <	
+ 1C33.0	SM input parameter		> 32 <	
+ 7100.0	Digital Outputs		> 1 <	
+ 8000.0	IOL Settings Port 0		> 40 <	
+ 8010.0	IOL Settings Port 1		> 40 <	
+ 8020.0	IOL Settings Port 2		> 40 <	
+ 8030.0	IOL Settings Port 3		> 40 <	
+ 8040.0	IOL Settings Port 4		> 40 <	
+ 8050.0	IOL Settings Port 5		> 40 <	
+ 8060.0	IOL Settings Port 6		> 40 <	
+ 8070.0	IOL Settings Port 7		> 40 <	
+ 8100.0	IOL ISDU Config Port 0		> 6 <	
+ 8110.0	IOL ISDU Config Port 1		> 6 <	
+ 8120.0	IOL ISDU Config Port 2		> 6 <	
+ 8130.0	IOL ISDU Config Port 3		> 6 <	

Edit CANopen Startup Entry
✕

Transition

I->P

P->S     S->P

S->O     O->S

Index (hex):

Sub-Index (dec):

Validate     Complete Access

OK

Cancel

Data (hexbin):

Validate Mask:

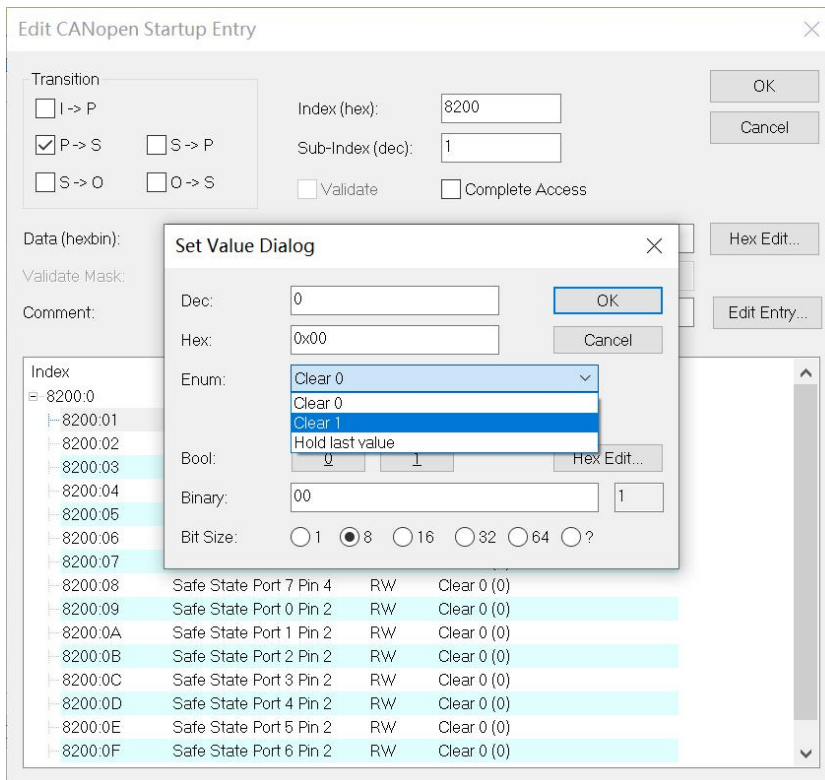
Comment:

Hex Edit...

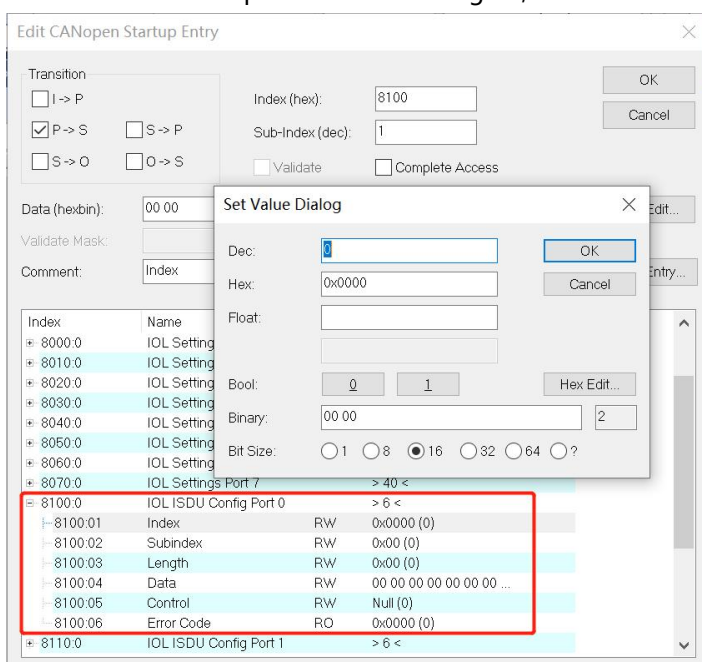
Edit Entry...

Index	Name	Flags	Value	Unit
+ 8020.0	IOL Settings Port 2		> 40 <	
+ 8030.0	IOL Settings Port 3		> 40 <	
+ 8040.0	IOL Settings Port 4		> 40 <	
+ 8050.0	IOL Settings Port 5		> 40 <	
+ 8060.0	IOL Settings Port 6		> 40 <	
+ 8070.0	IOL Settings Port 7		> 40 <	
+ 8100.0	IOL ISDU Config Port 0		> 6 <	
+ 8110.0	IOL ISDU Config Port 1		> 6 <	
+ 8120.0	IOL ISDU Config Port 2		> 6 <	
+ 8130.0	IOL ISDU Config Port 3		> 6 <	
+ 8140.0	IOL ISDU Config Port 4		> 6 <	
+ 8150.0	IOL ISDU Config Port 5		> 6 <	
+ 8160.0	IOL ISDU Config Port 6		> 6 <	
+ 8170.0	IOL ISDU Config Port 7		> 6 <	
+ 8200.0	Safe State Configuration		> 16 <	
+ F030.0	Configured Module Ident List		> 8 <	

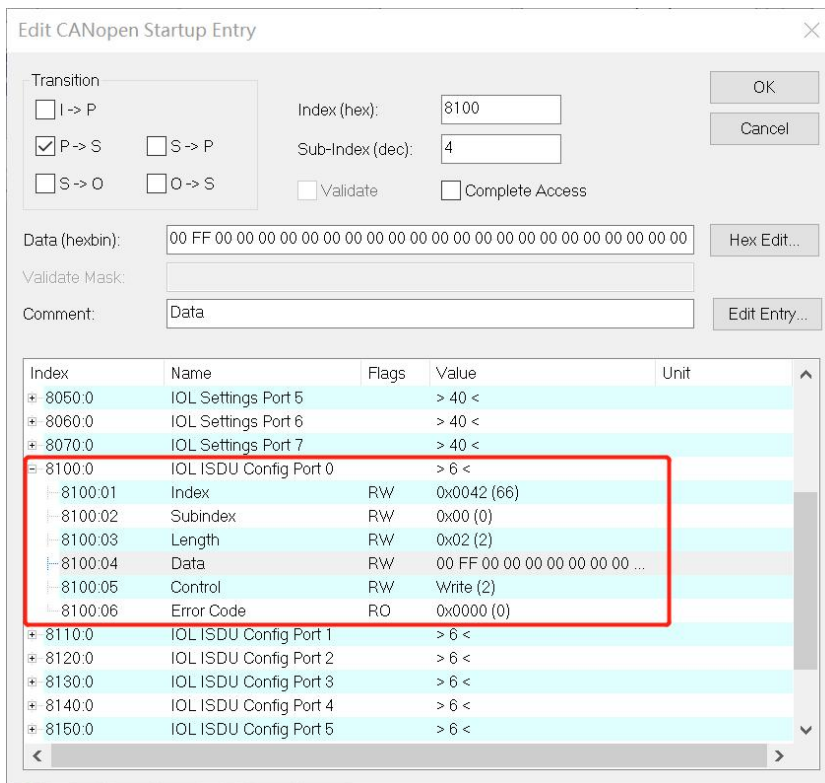
- c. Configuration method of output clear/hold function: Take Port 0 Pin 4 as an example, click "New" to enter the interface of "Edit CANOpen Startup Entry", and double click "8200:01" to configure the clear/hold function, as shown below. Click "New" to enter the "Edit CANOpen Startup Entry" interface, double-click "8200:01" to configure the clear/hold function, as shown in the figure below. After the configuration is completed, click "OK".



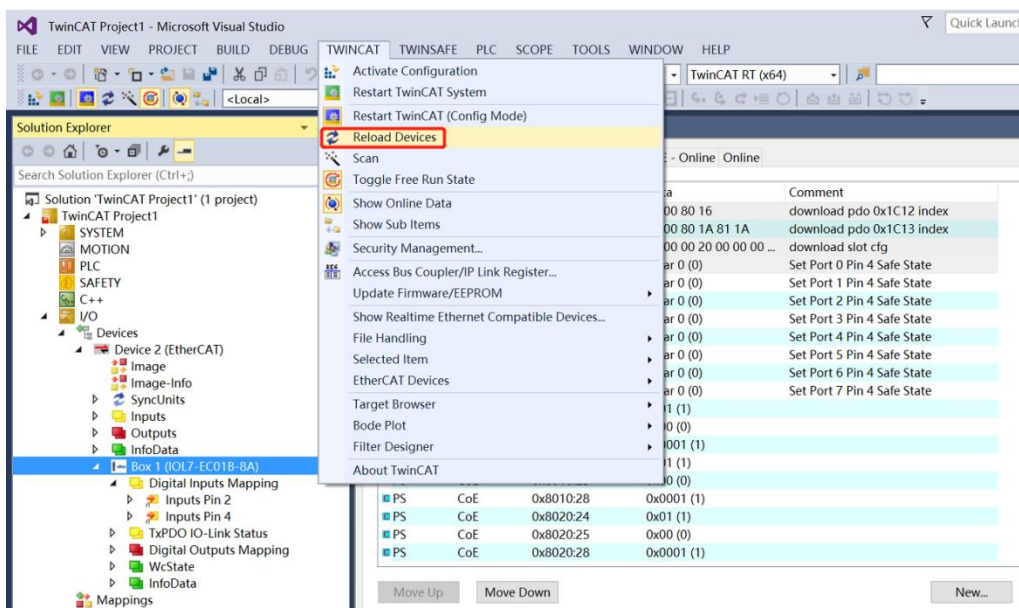
- d. ISDU function configuration method: Take Port 0 for example, click "New" to enter "Edit CANOpen Startup Entry" interface, double click "8100:01" and other parameters to configure. Double click "8100:01" and other parameters to configure, as shown in the figure below.



- e. ISDU function to configure the port direction as an example, the 16 channels of IOL7-16CB-M12 are all in input mode by default, configure them to the first 8 channels as input and the last 8 channels as output. Refer to "IOL7 Series Hub User's Manual\_Vx.xx.pdf" section 6.5.2, Index is set to 0x0042, Subindex is set to 0x00, Length is set to 2(0x02), Data is set to 00FF, Control selects Write, and then configure the IOL ISDU Config in order. Configure the parameters below Port 0 as shown in the figure below. After the configuration is completed, click "OK".

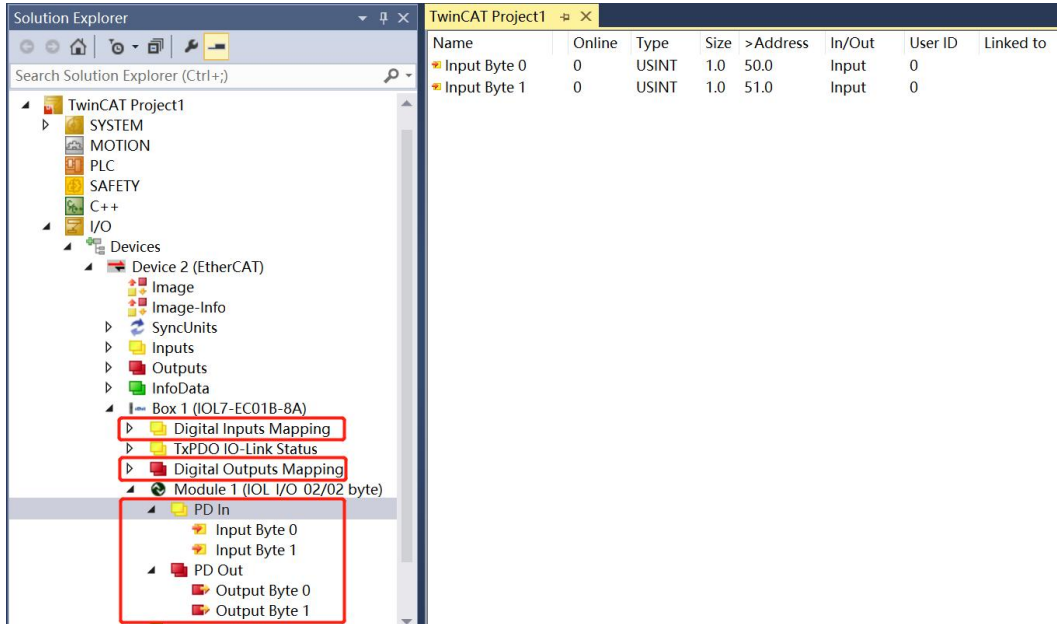


- f. After the output clear/hold function, ISDU function and other parameters are set, you need to perform Reload operation, click "TWINCAT -> Reload Devices" option in the menu bar, as shown below.

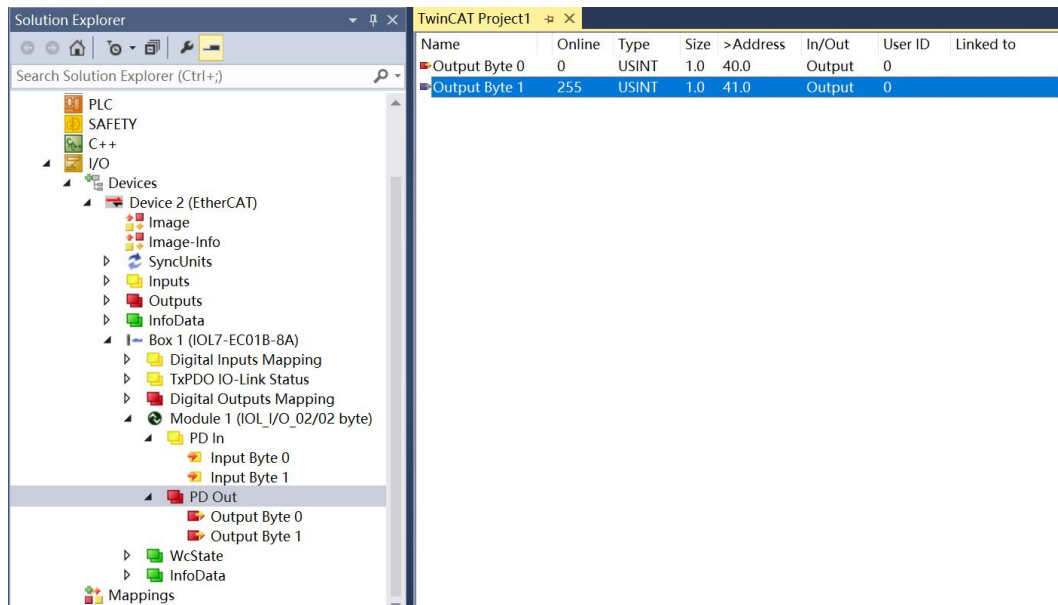


### 7、 Function verification

- a. In the left navigation tree, the port standard DI mode, the process data is reflected in Digital Inputs Mapping; the port standard DO mode, the process data is reflected in Digital Outputs Mapping; the port IO-Link mode, the process data is reflected in Module 1->PD In/Out, as shown below.



- b. Take master X00 port to access IOL7 slave IOL7-16CB-M12, configure the first 8 channels of IOL7-16CB-M12 to be input and the last 8 channels to be output for example, Input Byte 0 indicates the input signal value of slave module X00~X03, Output Byte 1 indicates the output signal value of slave module X04~X07. Write "255" in Output Byte 1, and you will see the 8 channel indicators of slave module X04~X07 light up, as shown in the figure below.



- c. When a valid voltage is input to the slave module X00, the input value "192" can be monitored in Input Byte 0 as "2#11000000", as shown in the figure below.

The screenshot displays the TwinCAT software interface. On the left, the Solution Explorer shows a tree view of the project structure. The 'PD In' folder is selected, showing 'Input Byte 0' and 'Input Byte 1'. On the right, a table displays the online data for these inputs.

Name	Online	Type	Size	>Address	In/Out	User ID	Linked to
Input Byte 0	192	USINT	1.0	50.0	Input	0	
Input Byte 1	0	USINT	1.0	51.0	Input	0	

## 7.2.2 Application in CODESYS V3.5 software environment

### 1、Preparation

- **hardware environment**

- **Module model IOL7-EC01B-8A for example**
- **X00 port access to IOL7 slave module IOL7-16CB-M12**
- **A computer with CODESYS V3.5 pre-installed, CODESYS Control Win V3 - x64 SysTray software**
- **Shielded cables for EtherCAT**
- **One switching power supply**
- **Device Configuration Files**

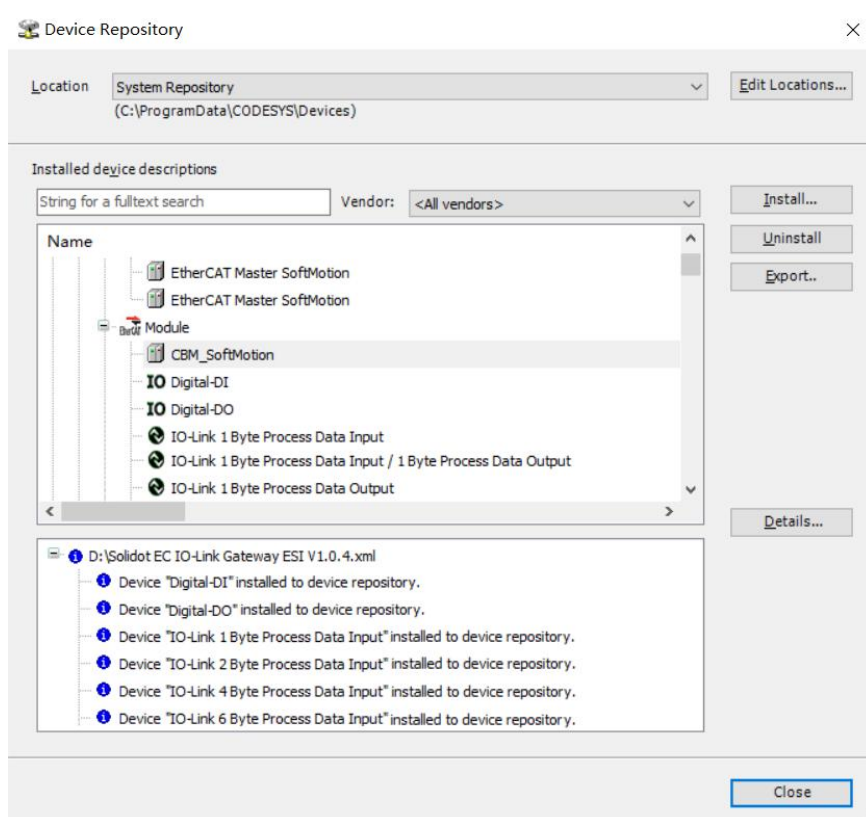
Configuration file access: <https://www.solidotech.com/documents/configfile>

- **Hardware configuration and wiring**

Follow "[5 Installation and Wiring](#)".

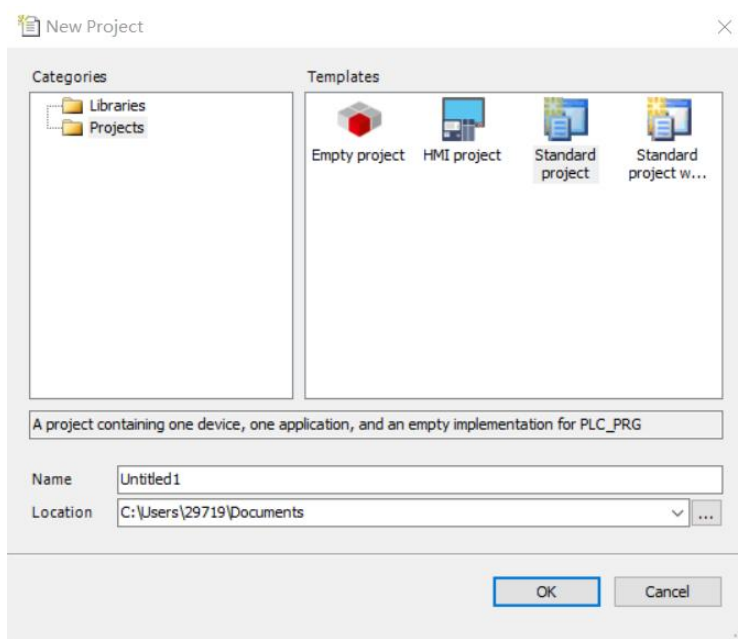
### 2、Installing a device configuration file

- Log in to CODESYS.
- Select "Tools -> Device Repository".
- Click "Install", select the relevant XML file for installation, the file format is Solidot EC IO-Link Gateway ESI V1.0.2.xml. Successful installation shows "Device xxxx has been installed to the device repository. Successful installation displays "Device xxxx has been installed to the device repository", as shown below.



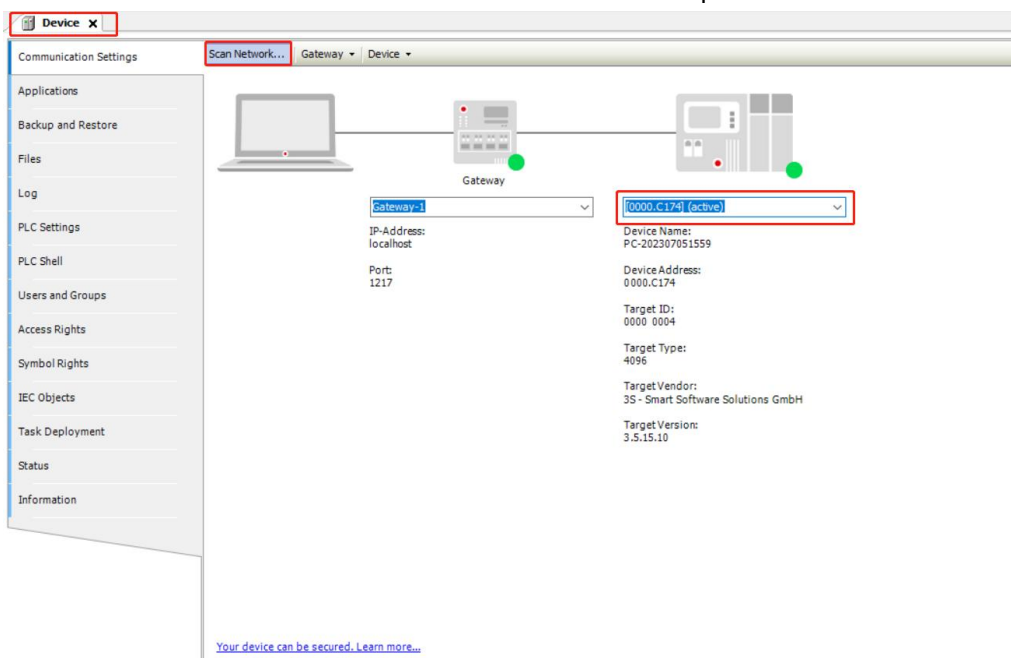
### 3. New Project

Click "File -> New Project" as shown below.



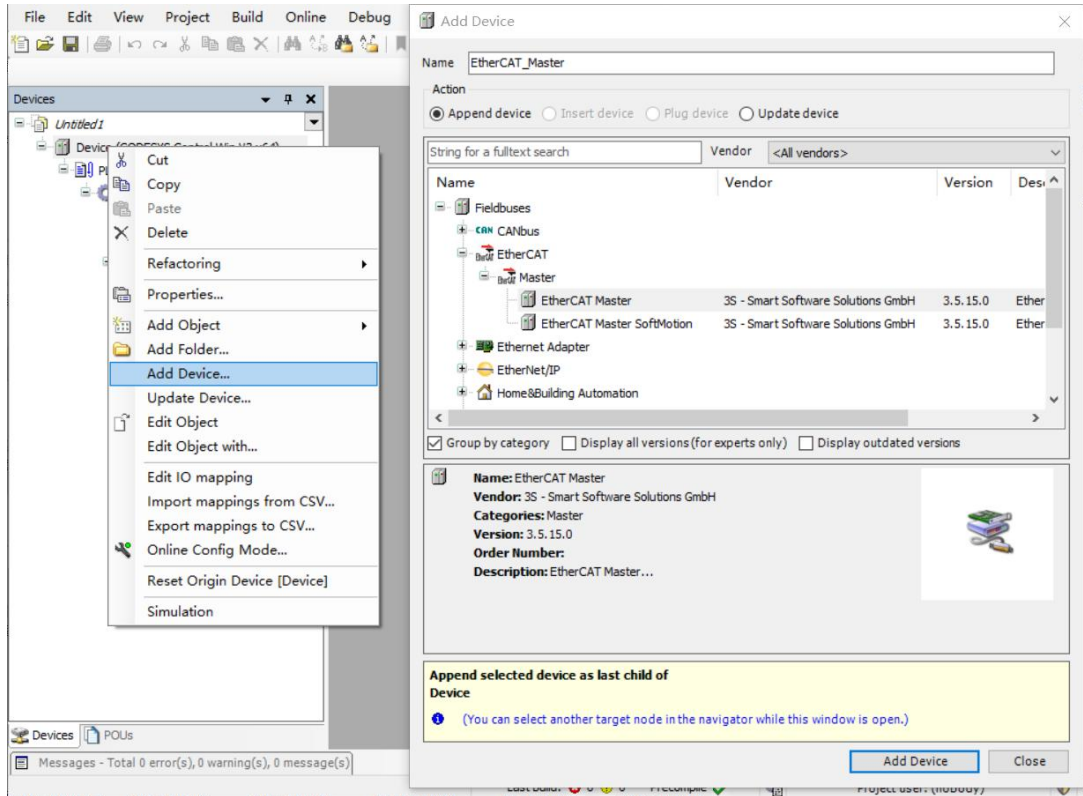
### 4. Scanning network

- a. To start the PLC with "CODESYS Control Win V3 - x64 SysTray", locate "CODESYS Control Win V3 - x64 SysTray" in the lower right hand corner of the computer and Right-click on "CODESYS Control Win V3 - x64 SysTray" in the lower right corner of the computer and select "Start PLC".
- b. Double-click "Device (CODESYS Control Win V3 X64)" in the left navigation tree of CODESYS, and click "Scan Networks".
- c. Select the device and choose the correct controller network path as shown below.



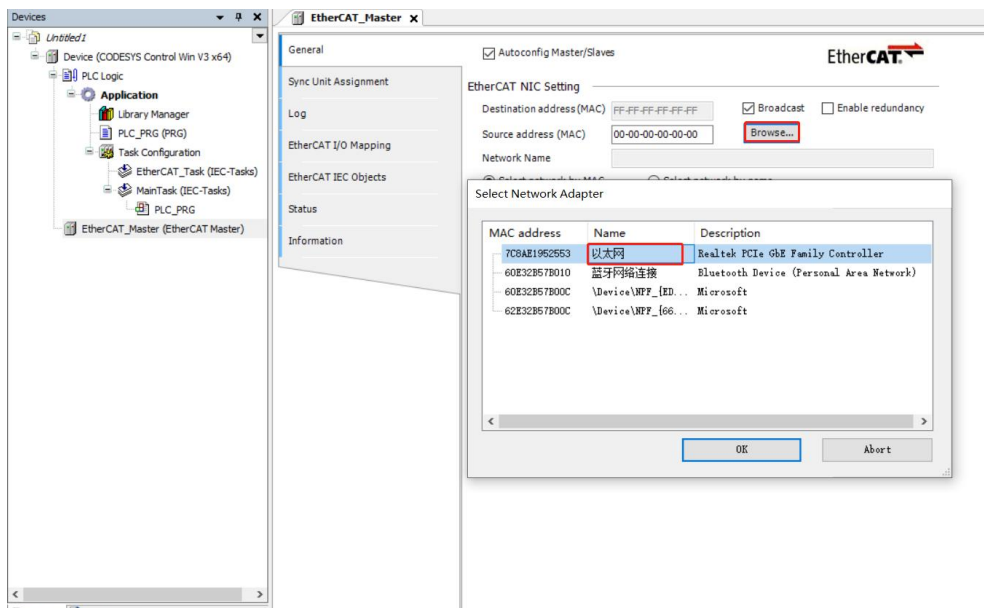
### 5. Add EtherCAT Master

Right-click "Device(CODESYS Control Win V3 X64)" in the left navigation tree of CODESYS, click "Add Device", select "EtherCAT -> Master -> EtherCAT Master" and add it.



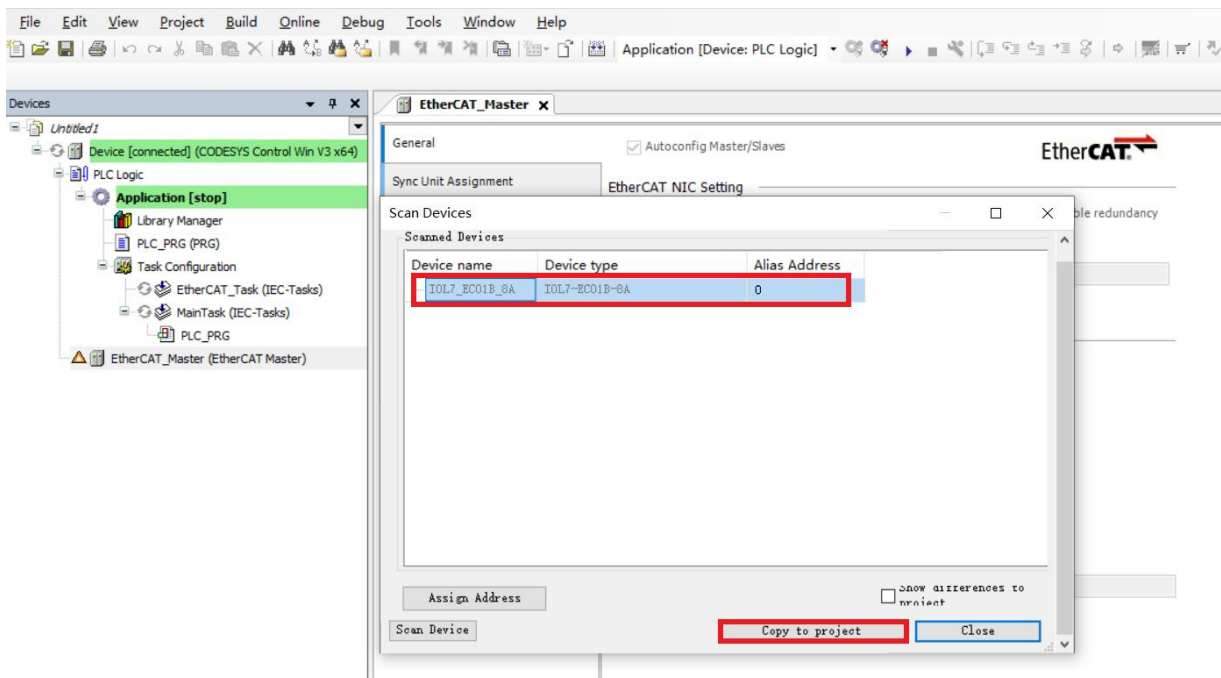
### 6. Configuring the EtherCAT Master

Double click "EtherCAT\_Master(EtherCAT Master)" in the left navigation tree to open the right main menu, click "Browse" and select Ethernet.

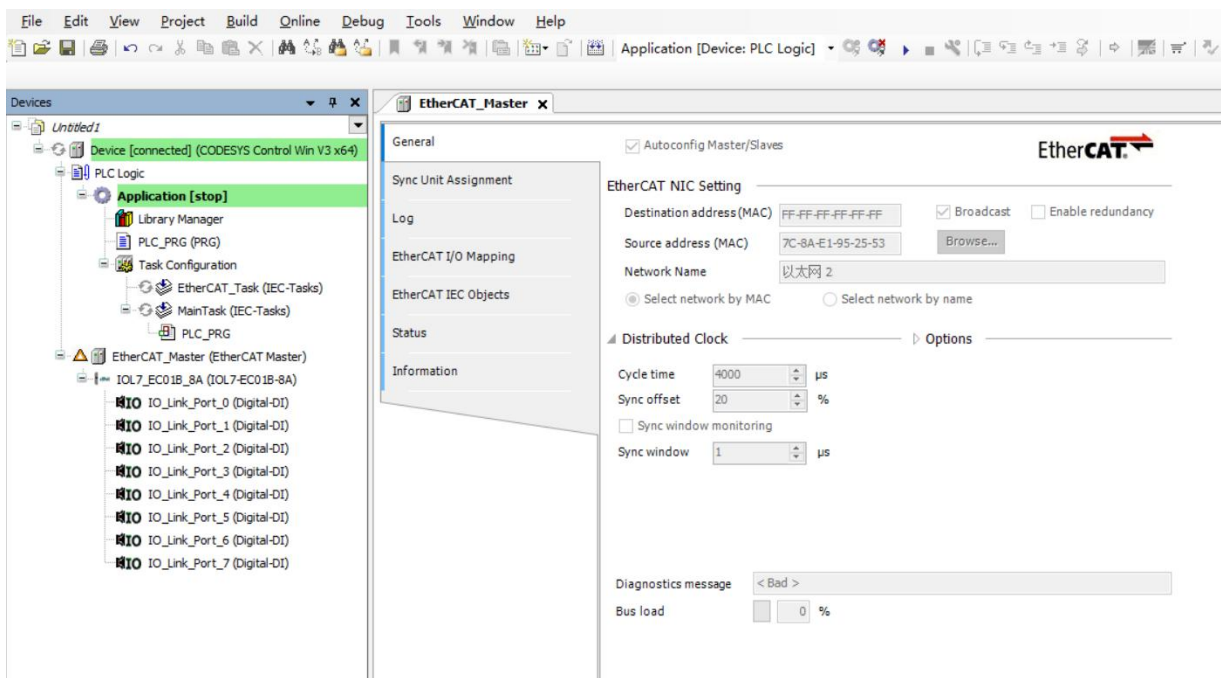


### 7. Scanning device

- a. Before scanning for the first time, you must log in the program to PLC, right-click "EtherCAT\_Master(EtherCAT Master)" in the left navigation tree to select the scanning device, after scanning to the corresponding device, select the module, click "Copy to project", as shown below.

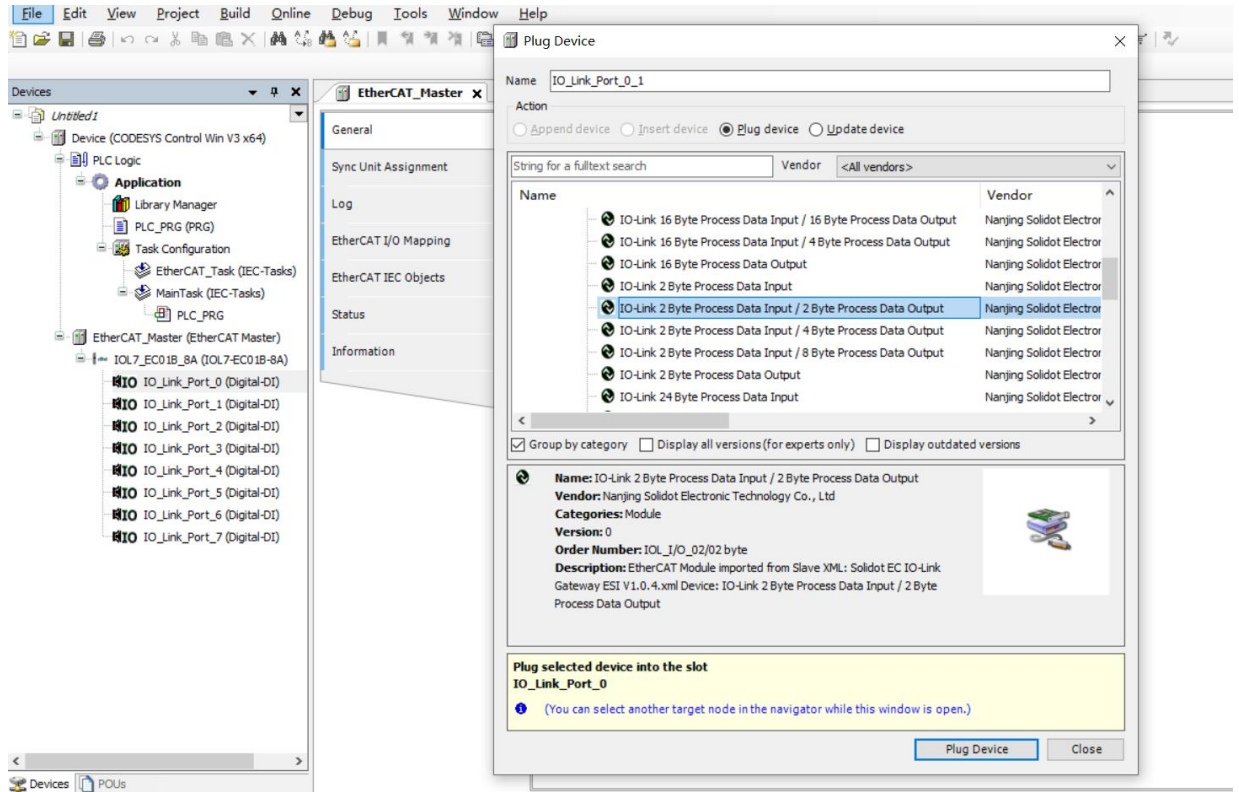


- b. After successful copying, it is shown below.

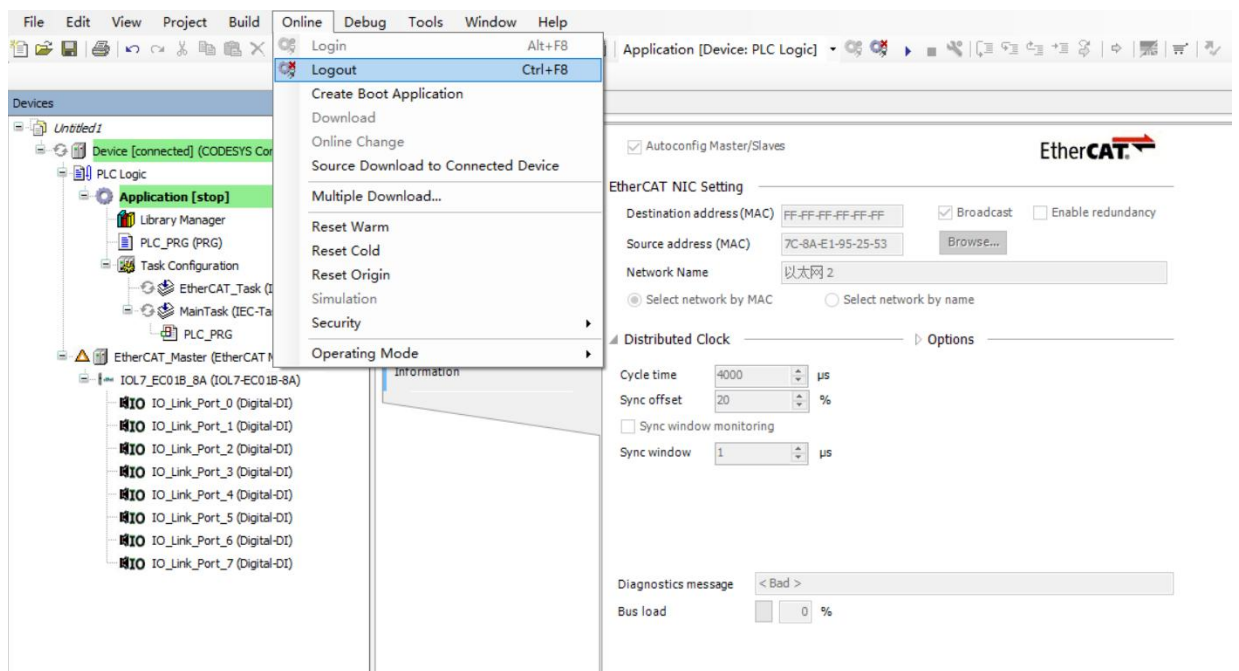


### 8、 Test IO Module

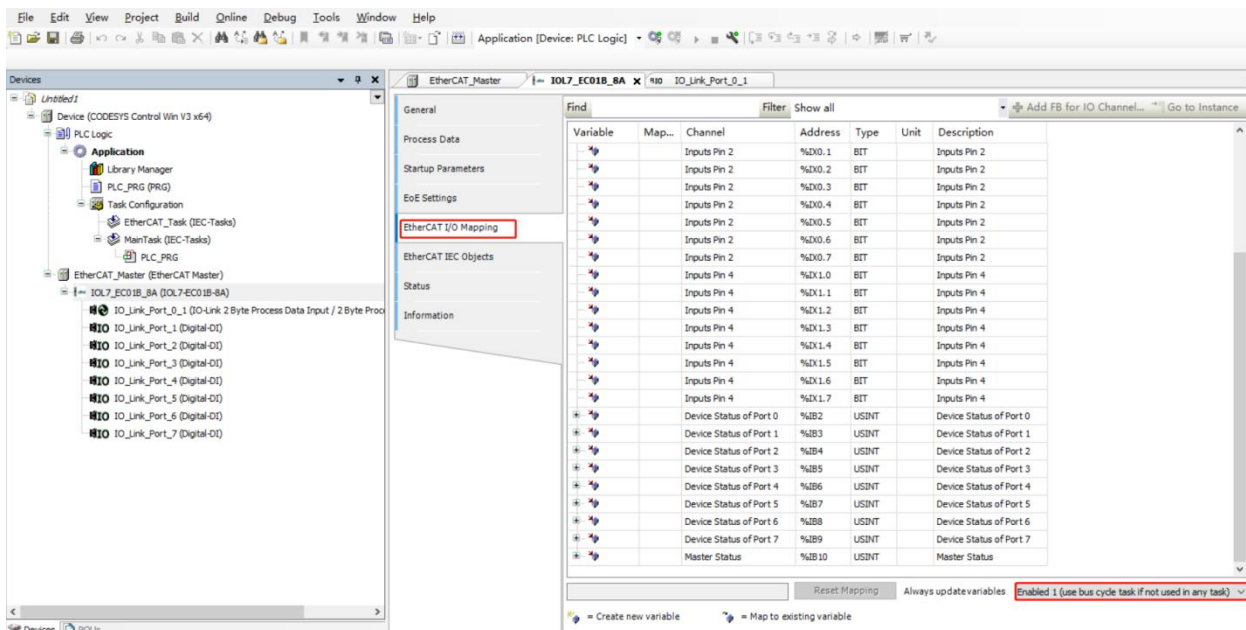
- a. To configure the IO module bus mode, select IO\_Link\_Port\_0, right-click "Plug Device", and select IO-Link 2 Byte Process Data Input /2 Byte Process Data Output, as shown below.



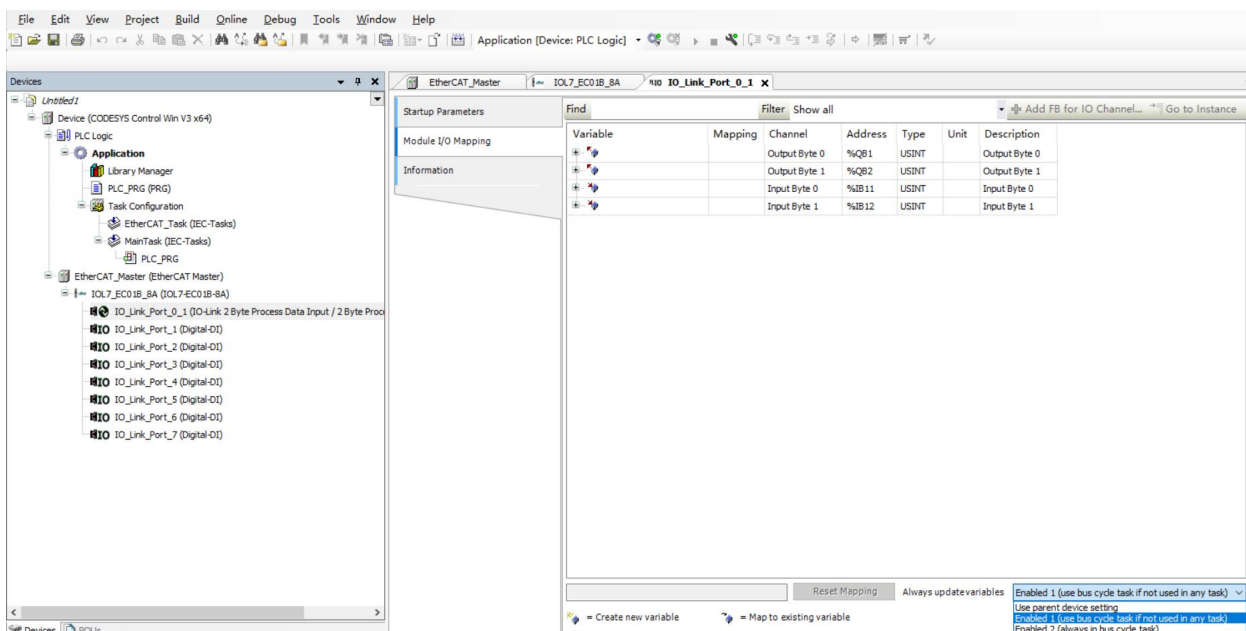
- b. Click "Online -> Logout" in the menu bar to exit the PLC as shown below.



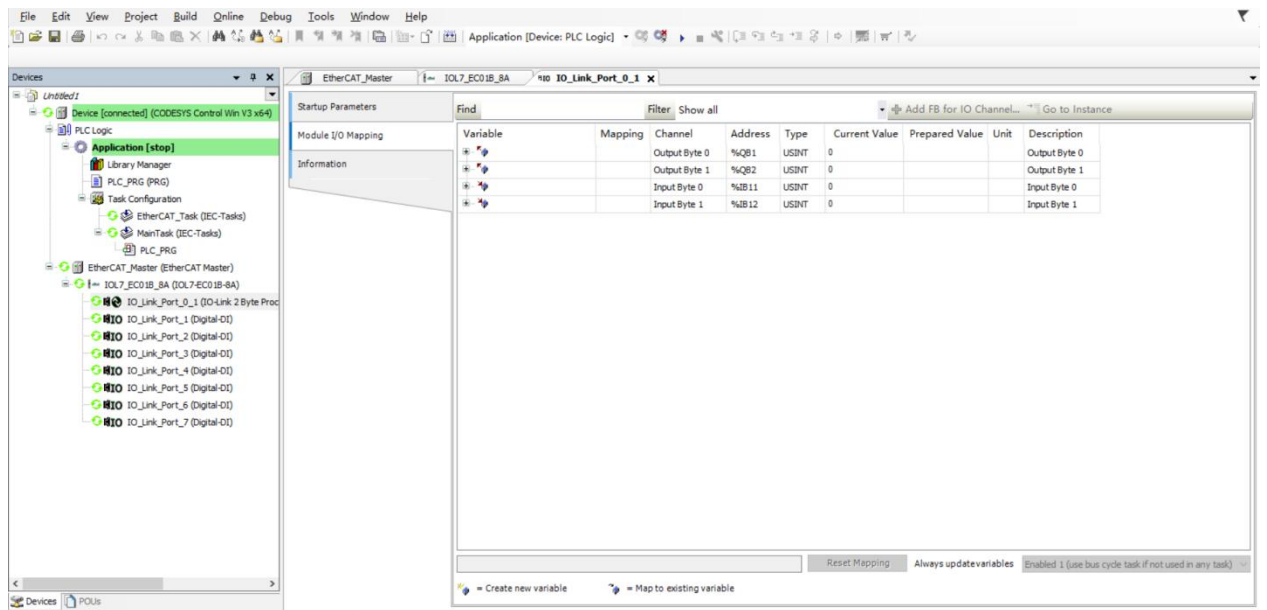
- c. Check "EtherCAT I/O Mapping" in the menu folder of the module IOL7-EC01B-8A.
- d. In the "Always update variables" menu at the bottom right corner of the page, select the "Enabled 1" mode, as shown below.



- e. Double click on IO-Link\_Port\_0 and select "EtherCAT I/O Mapping" in the menu folder.
- f. In the "Always update variables" menu at the bottom right corner of the page, select the "Enabled 1" mode, as shown below.



g. Log back in and run the software and test the module as shown below.



## 7.2.3 Application in Sysmac Studio software environment

### 1、 preliminary

- **hardware environment**

- **Module model number IOL7-EC01B-8A for example**
- **X00 port access to IOL7 slave module IOL7-16CB-M12**
- **One computer with Sysmac Studio software pre-installed**
- **One Omron PLC**
- **This description is based on model NJ301-1100 as an example.**
- **Shielded cables for EtherCAT**
- **One switching power supply**
- **Device Configuration Files**

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

- **Hardware configuration and wiring**

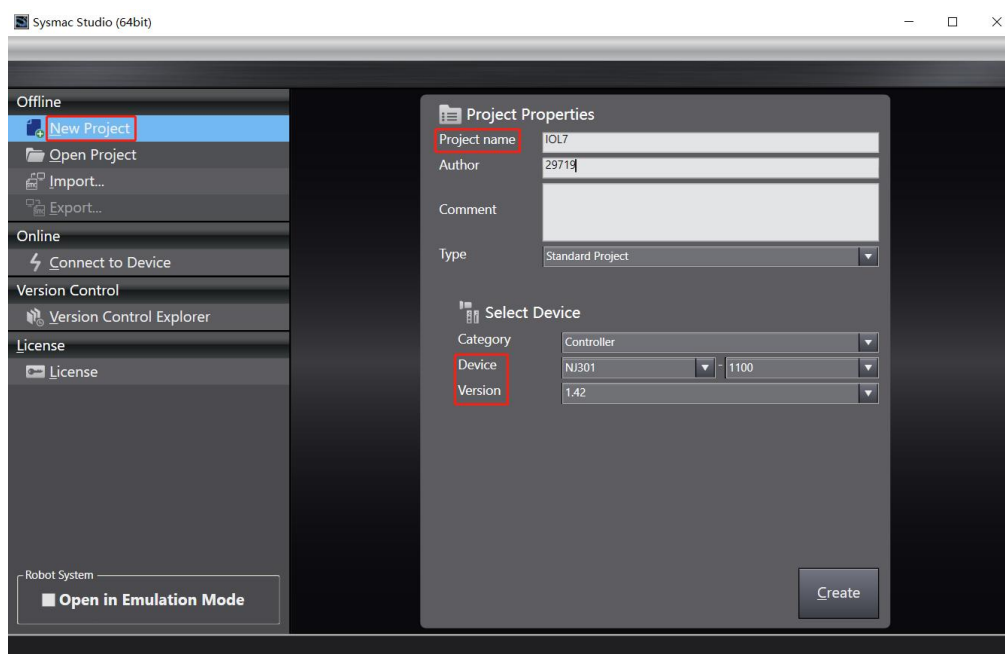
Follow "[5 Installation and Wiring](#)".

- **Computer IP requirements**

Set the IP address of the computer and the IP address of the PLC to make sure they are on the same network segment.

### 2、 New Project

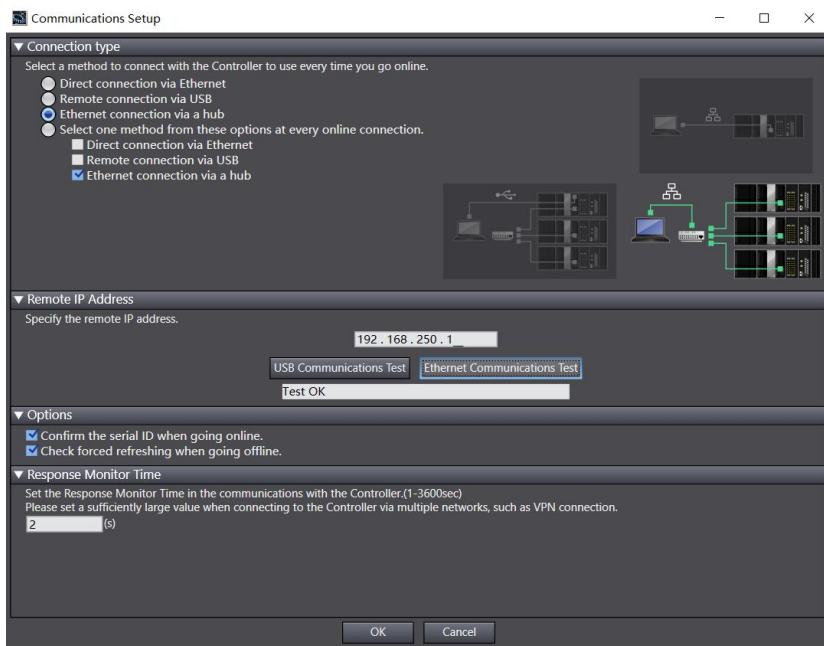
- Open the Sysmac Studio software and click "New Project".



- Project name: customization.
- Select device: "Device" selects the corresponding PLC model, and recommend selecting "Version" V1.40 and above.

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

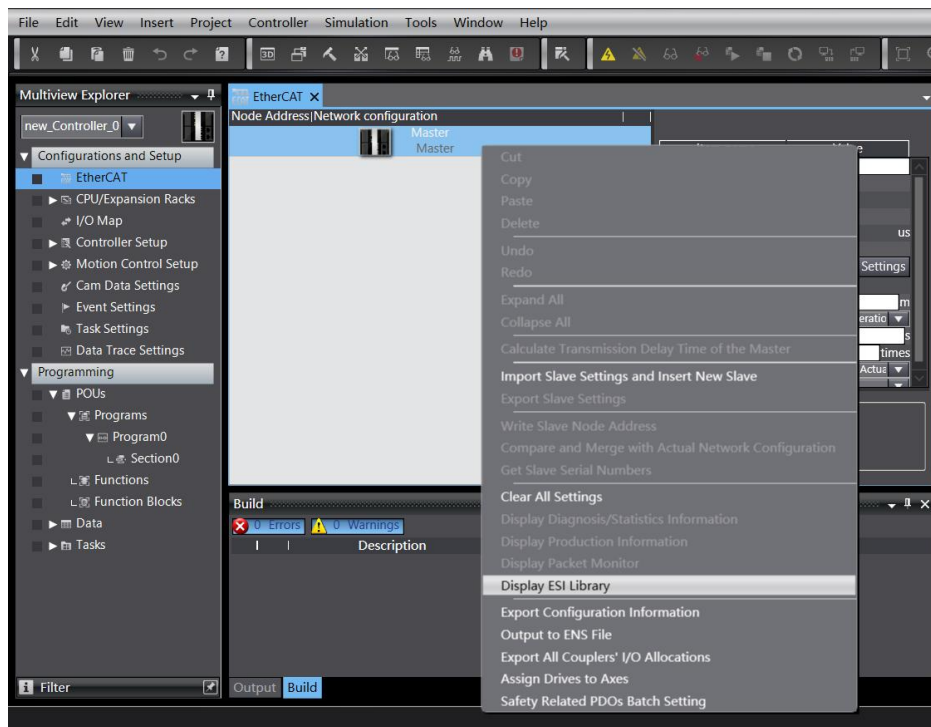
- c. Click "Controller -> Communication Settings" in the menu bar, select the method to be used every time you connect to the controller when you are online, and enter "Remote IP Address" as shown below.



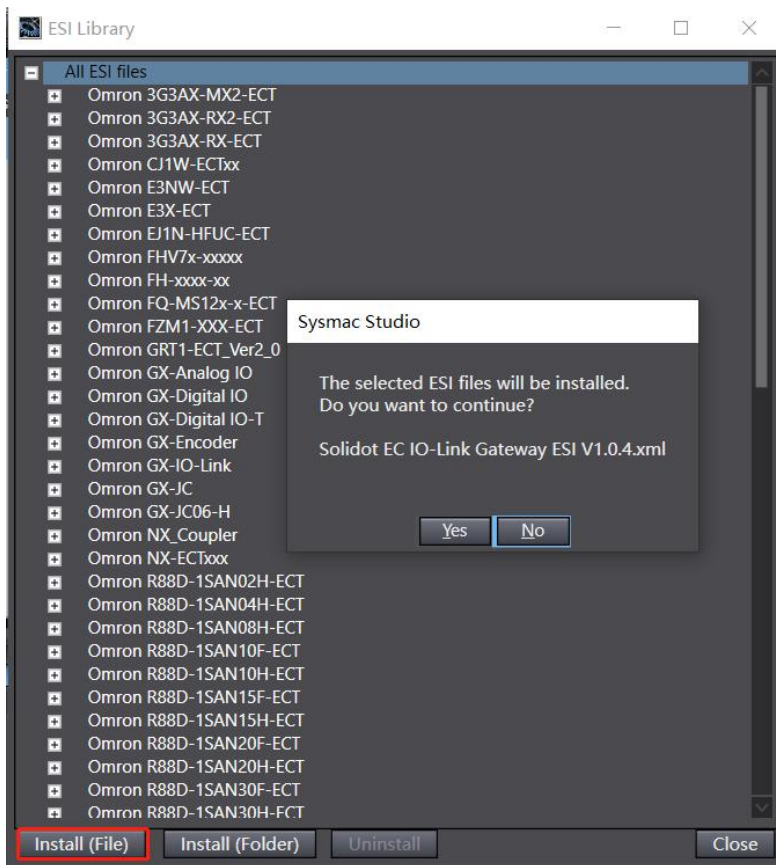
- d. Click "Ethernet communication test", the system shows that the test is successful.

### 3. Installation of XML files

- a. Expand "Configurations and Setup" in the left navigation tree and double-click on "EtherCAT".
- b. Right-click on "Master" and select "Display ESI Library" as shown below.



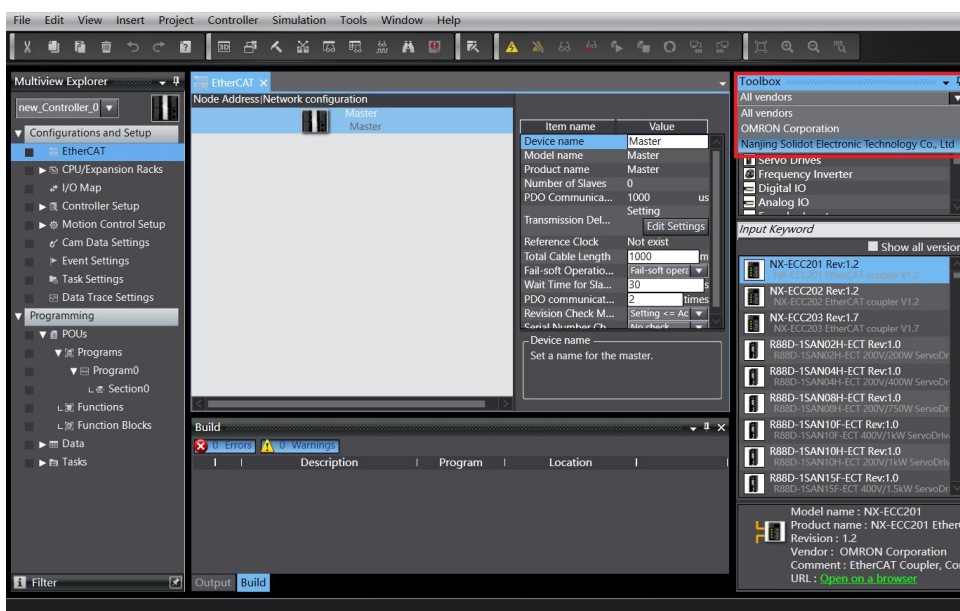
- c. In the pop-up "ESI Library" window, click "Install (file)", select the XML file path, click "Yes" to complete the installation.



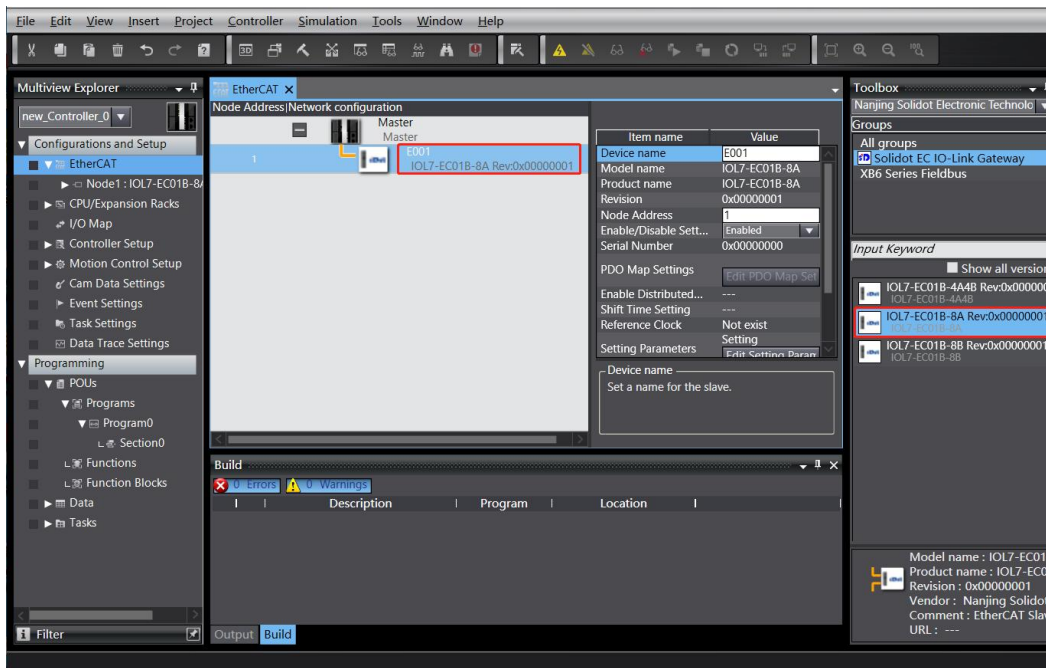
#### 4. Add Device

There are two ways to add devices: online scanning and offline adding, and this note introduces offline adding as an example.

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

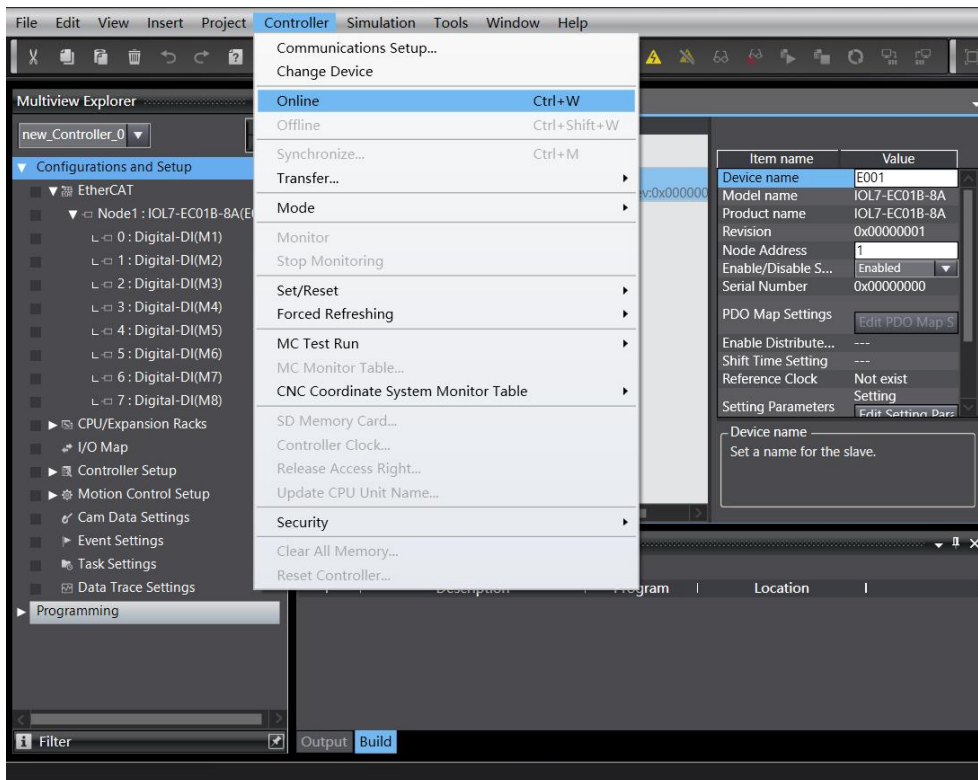


- b. Click "Solidot EC IO-Link Gateway" to select the product serie, and select the product model at the bottom, double click "IOL7-EC01B-8A" to add the device, as shown below.

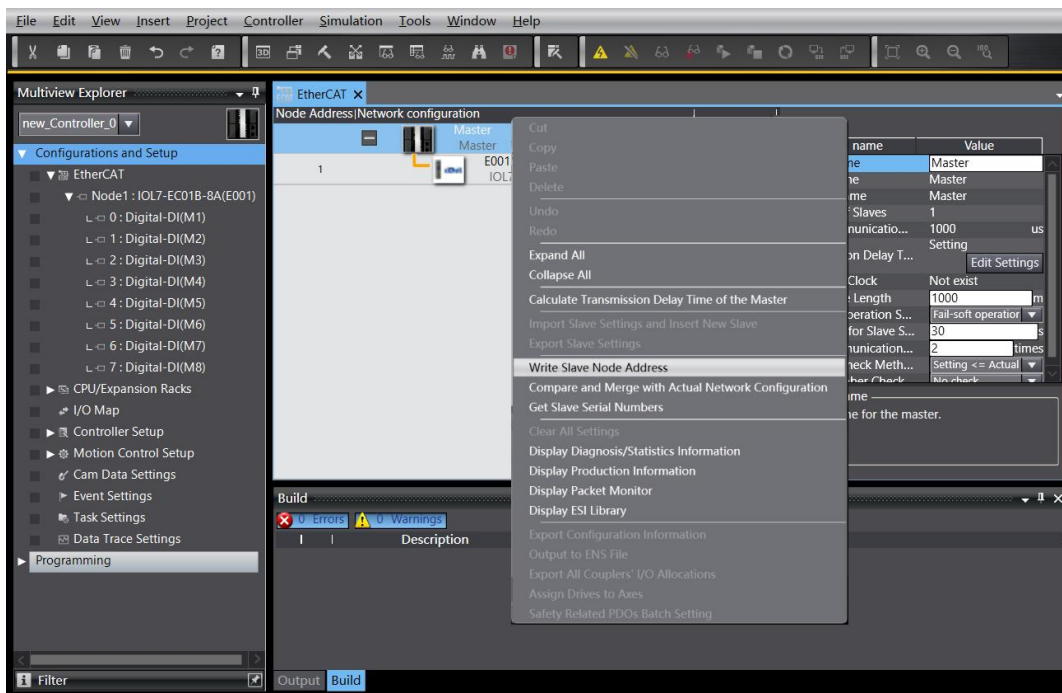


### 5. Setting the node address

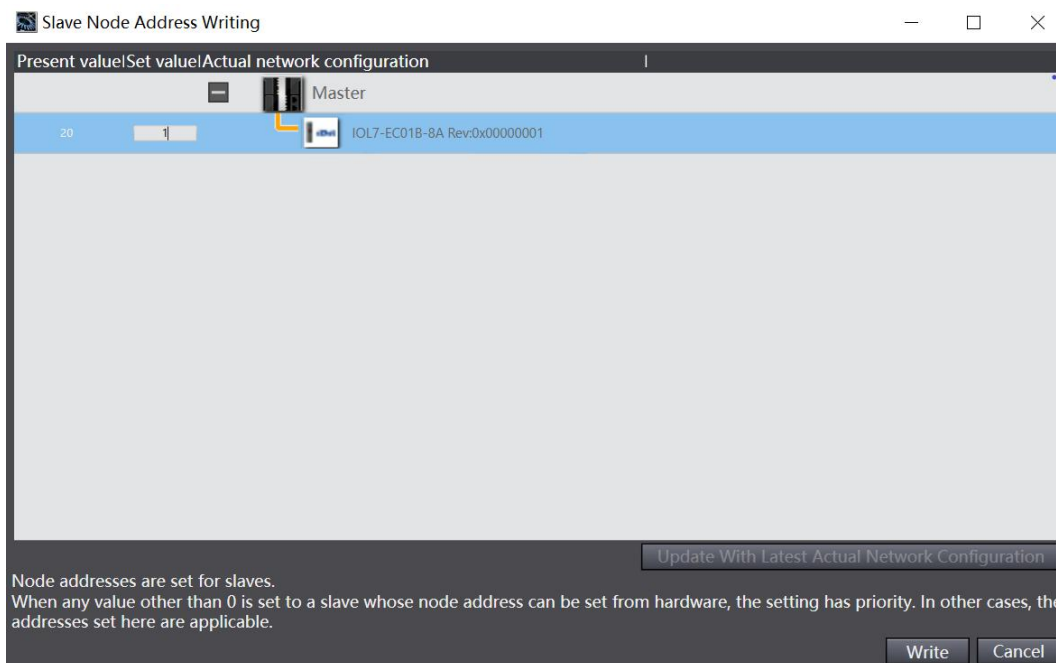
- a. Click "Controller -> Online" in the menu bar to turn the controller to online status, as shown below.



- b. Right-click on the master device, click and select "Write Slave Device Node Address" as shown below.



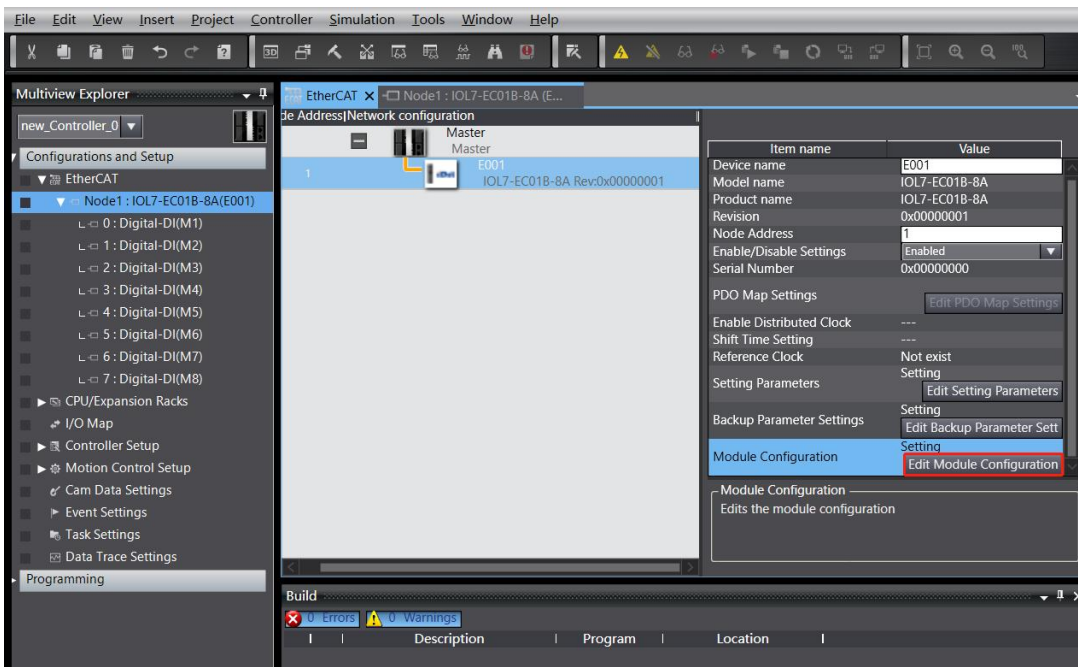
- c. In the Set Node Address window, click the value under Set Value, enter the node address, and click Write to change the slave device node address, as shown below.



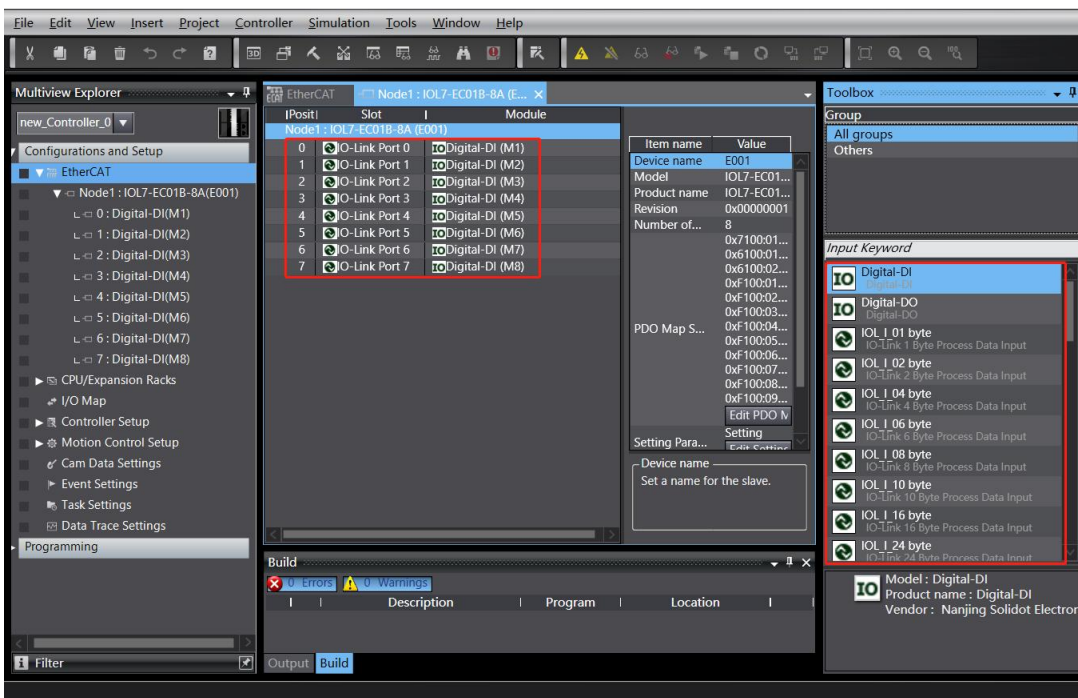
- d. Power down and reboot the slave device when prompted after the node address is successfully written.

### 6. DI/DO/IO-Link Settings

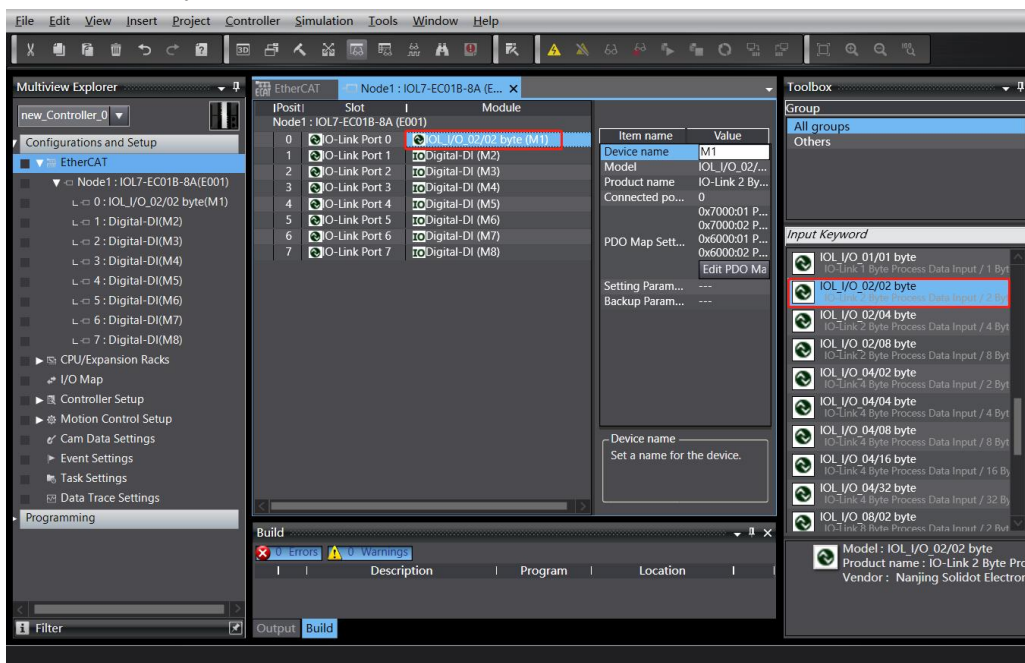
- a. In the offline state, in the EtherCAT main page, click to select "IOL7-EC01B-8A", and then click "Edit Module Configuration" on the right side menu, as shown below.



- b. In the Module Configuration page, you can see the function of the master port 0~7. You can update the DI/DO/IO-Link configuration in the toolbox on the right side, as shown below.

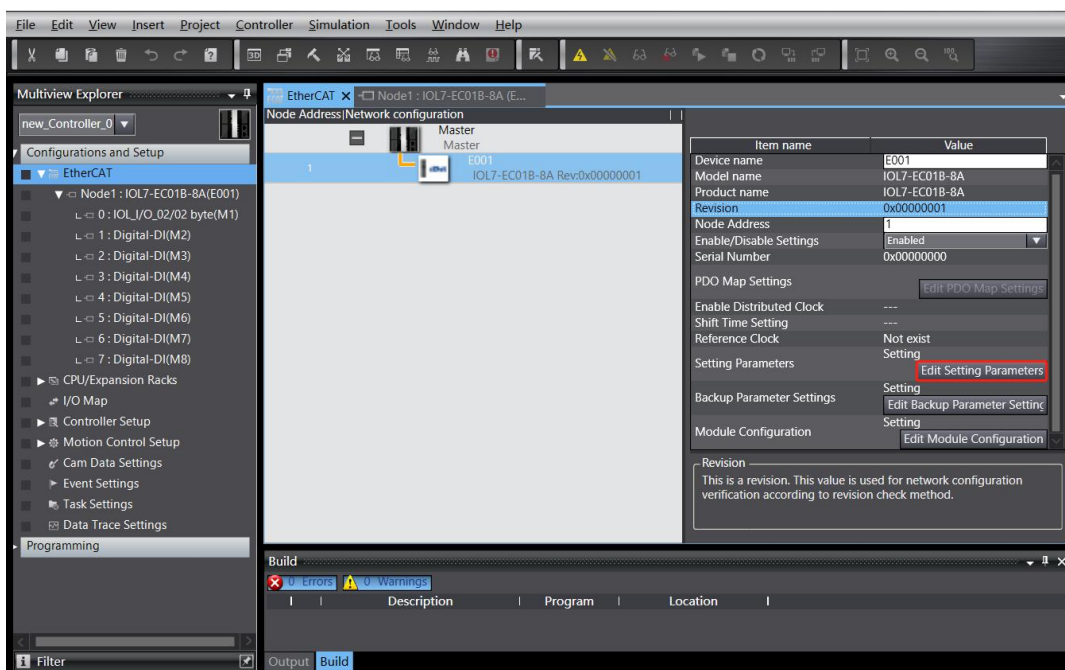


- c. Take the X00 port of master module IOL7-PN01B-8A connected to IOL7-16CB-M12 module as an example to introduce the DI/DO/IO-Link configuration method. Right-click "Digital-DI (M1)" and select "Delete", then find the slave module under "Toolbox" on the right side, and double-click "IOL\_I/O\_02/02". IOL\_I/O\_02/02 byte" to add IOL7 slave to the configuration, as shown below. (Note: IOL7-16CB-M12 can be configured up to 16 channels input or 16 channels output, so choose 02/02 byte.)

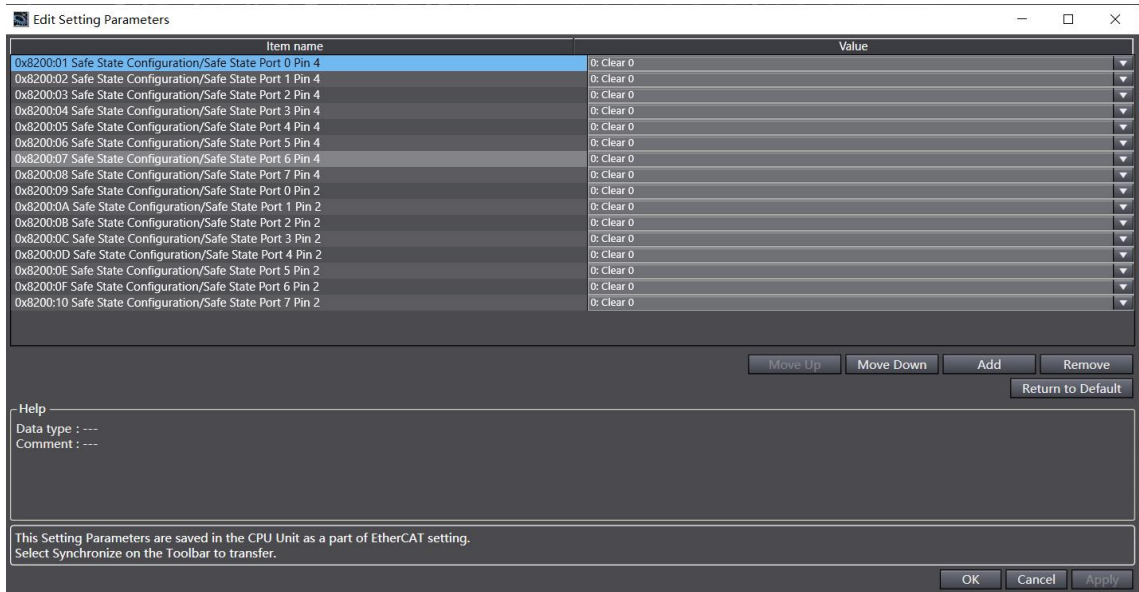


## 7. Module Parameter Configuration

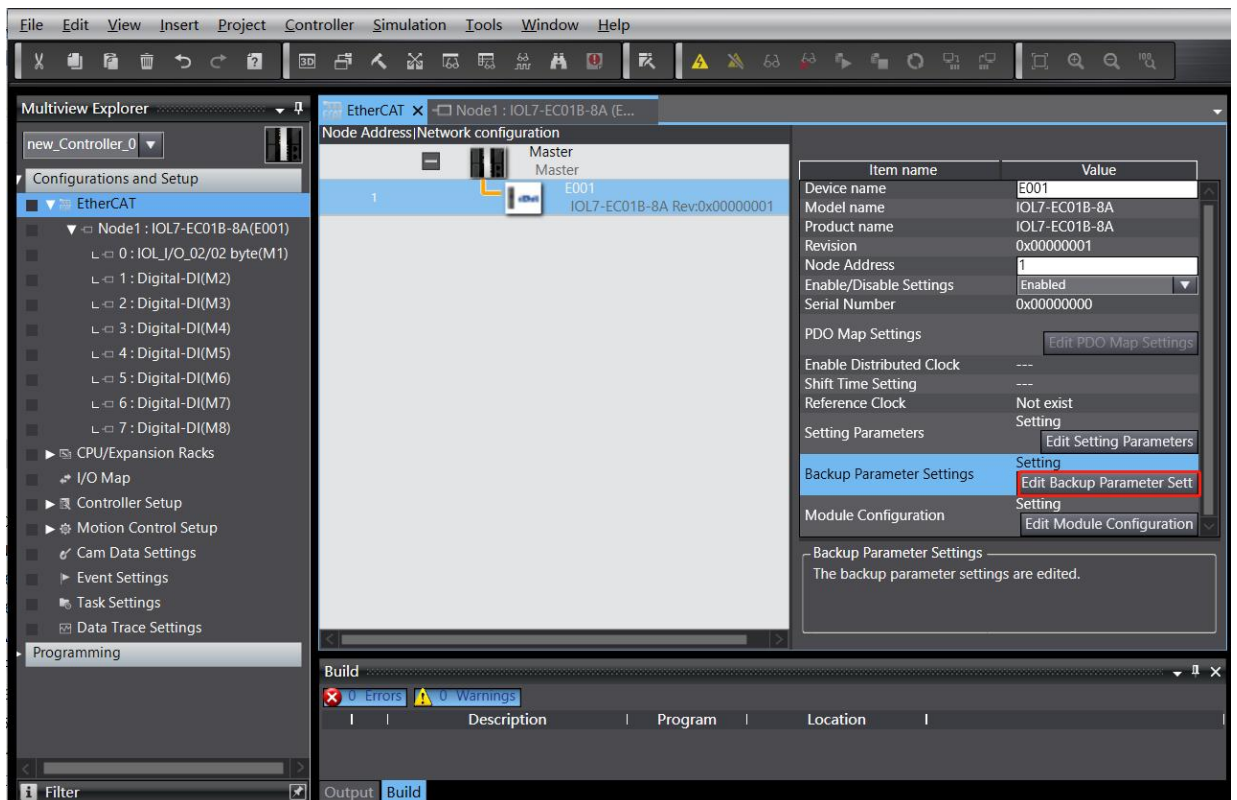
- a. Offline, in the EtherCAT main page, click to select "IOL7-EC01B-8A", and then click "Edit Setting Parameters" on the right side menu, as shown below.



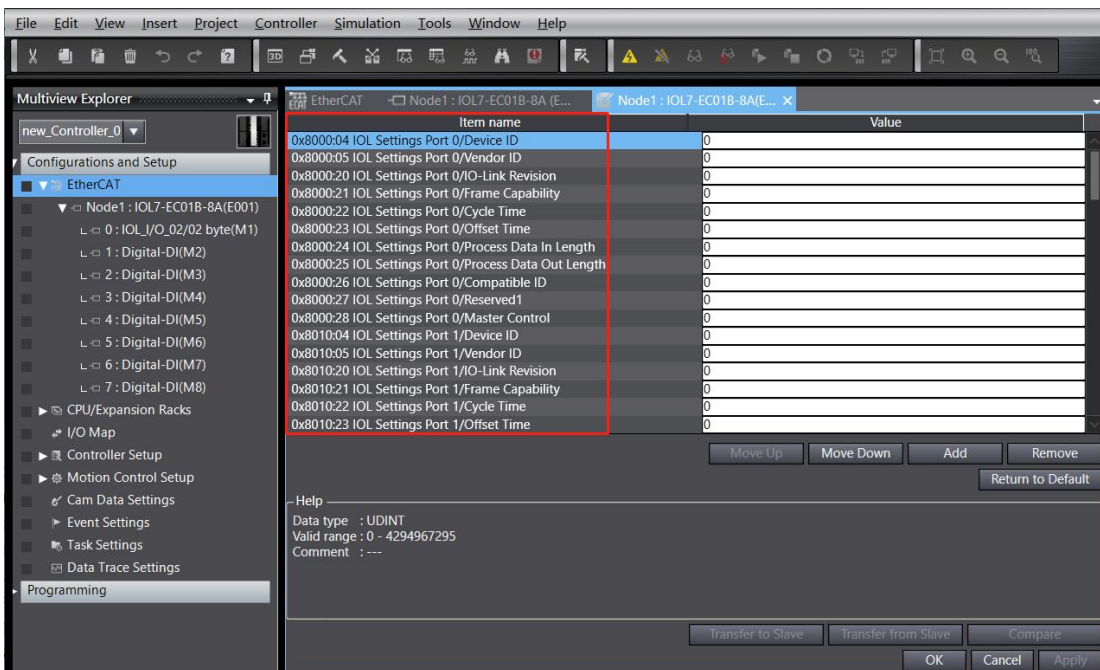
- b. In the Initialization Parameter Setting page, you can configure the output clear hold function for master ports 0~7 as shown below.



- c. In the EtherCAT main page, click to select "IOL7-EC01B-8A", and then click "Edit Backup Parameter Settings" in the right menu, as shown below.

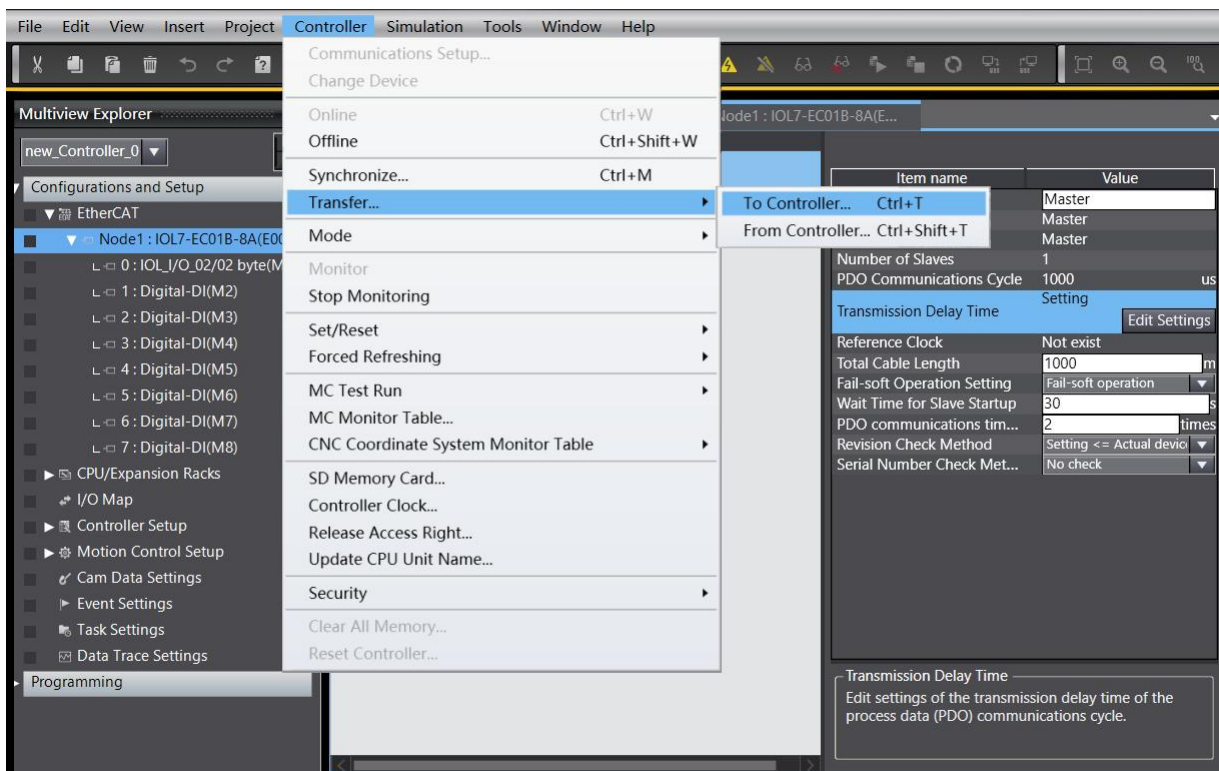


- d. In the Backup Parameter Setting page, you can view the IO-Link information of the master ports 0~7, as shown below.

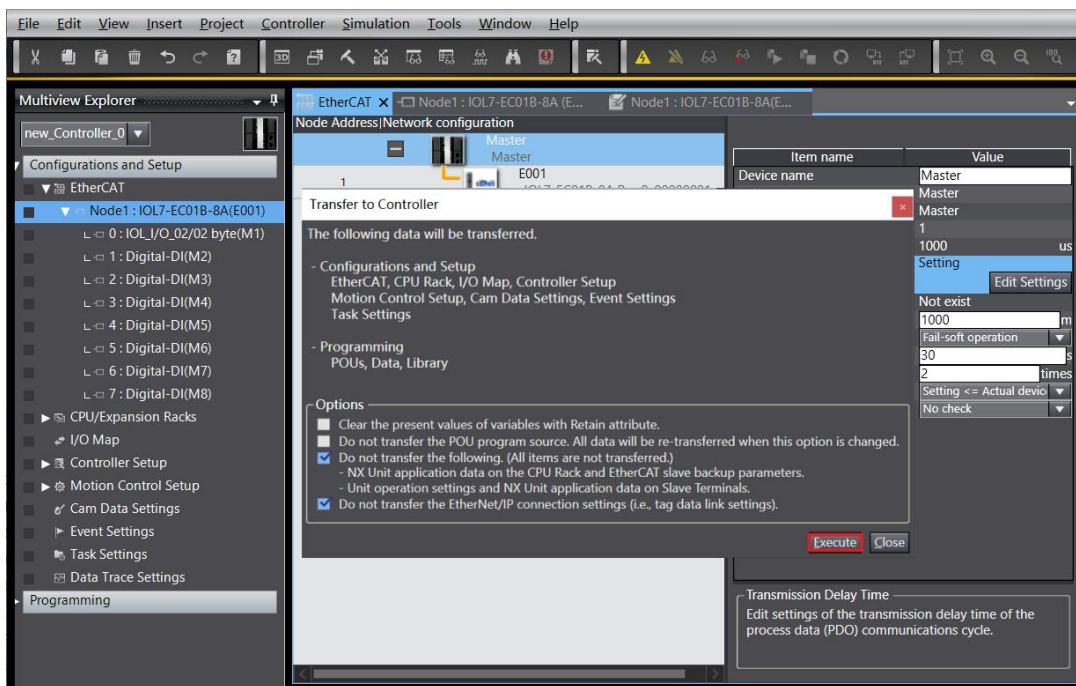


### 8. Download configuration to PLC

- a. In online status, click "Controller -> Transfer in (A) -> To Controller (T)" in the menu bar, as shown below.

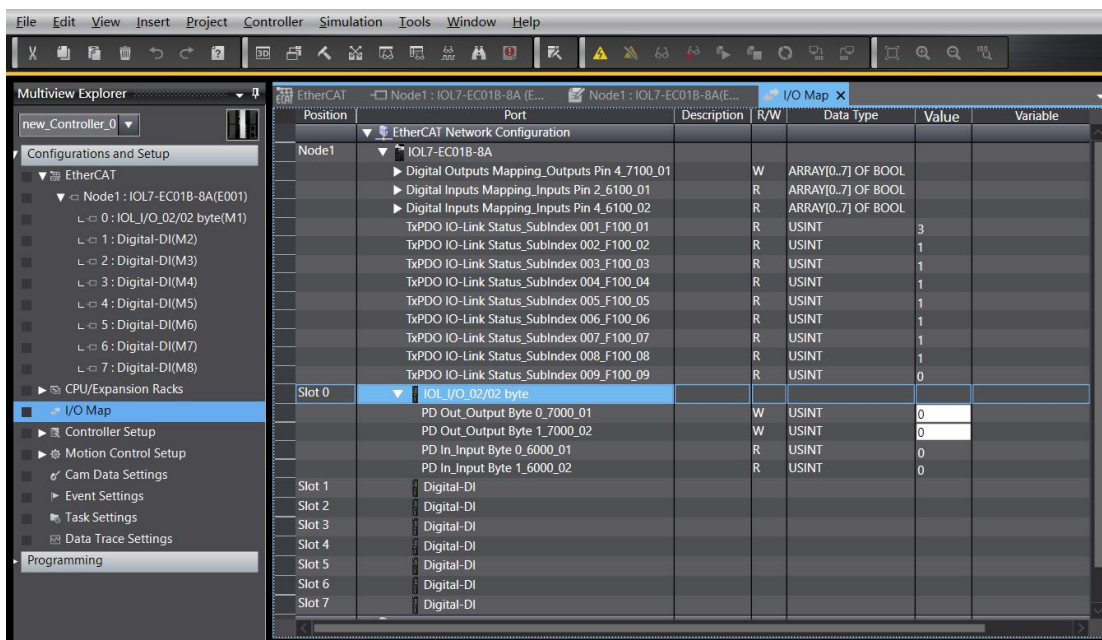


- b. Pop-up transmission confirmation window, click "Execute", and then click "Yes / OK", as shown in the figure below, after the download is complete, you need to re-power.



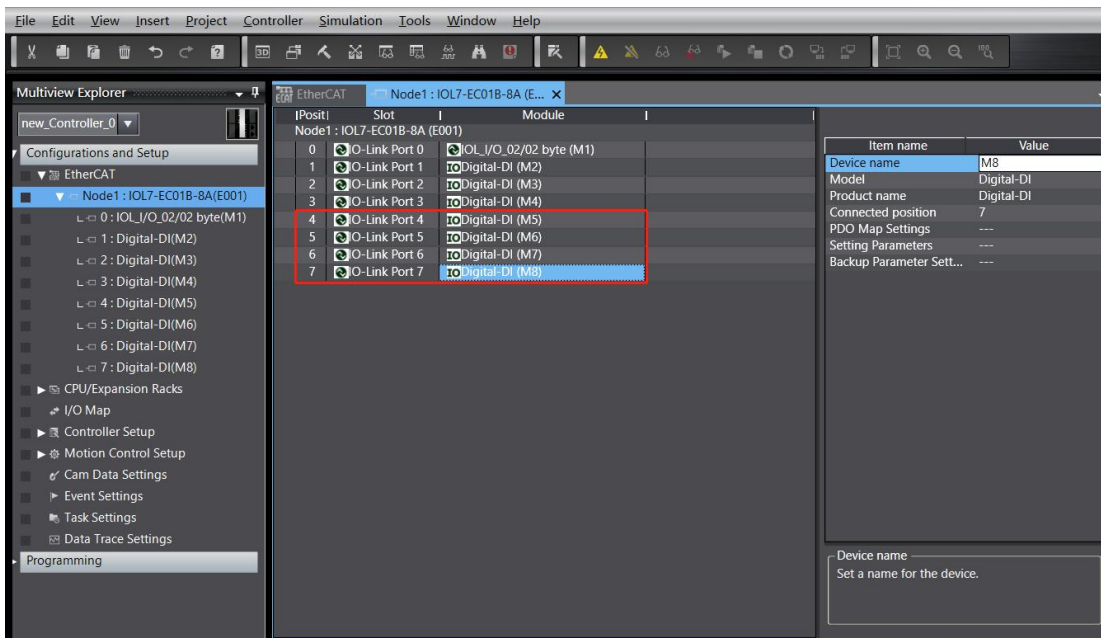
### 9. Viewing Functions

- a. After restarting the power, you can see the PLC is in operation mode in the lower right corner, double click "I/O Map" in the navigation tree on the left side, you can monitor the input/output signals and force them to be output, as shown in the figure below.

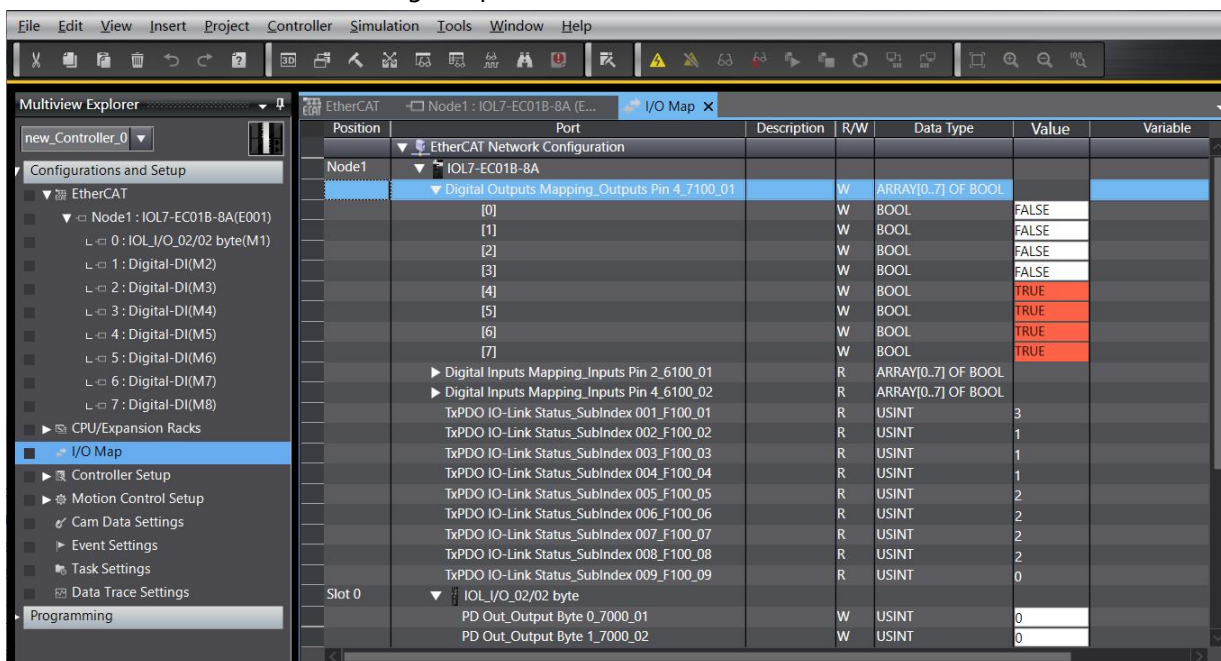


- Digital Outputs Mapping\_Outputs Pin 4\_7100\_01 Output value of Pin4 port of master Port0~7
- Digital Inputs Mapping\_Inputs Pin 2\_6100\_01 Input value of Pin2 port of master Port0~7

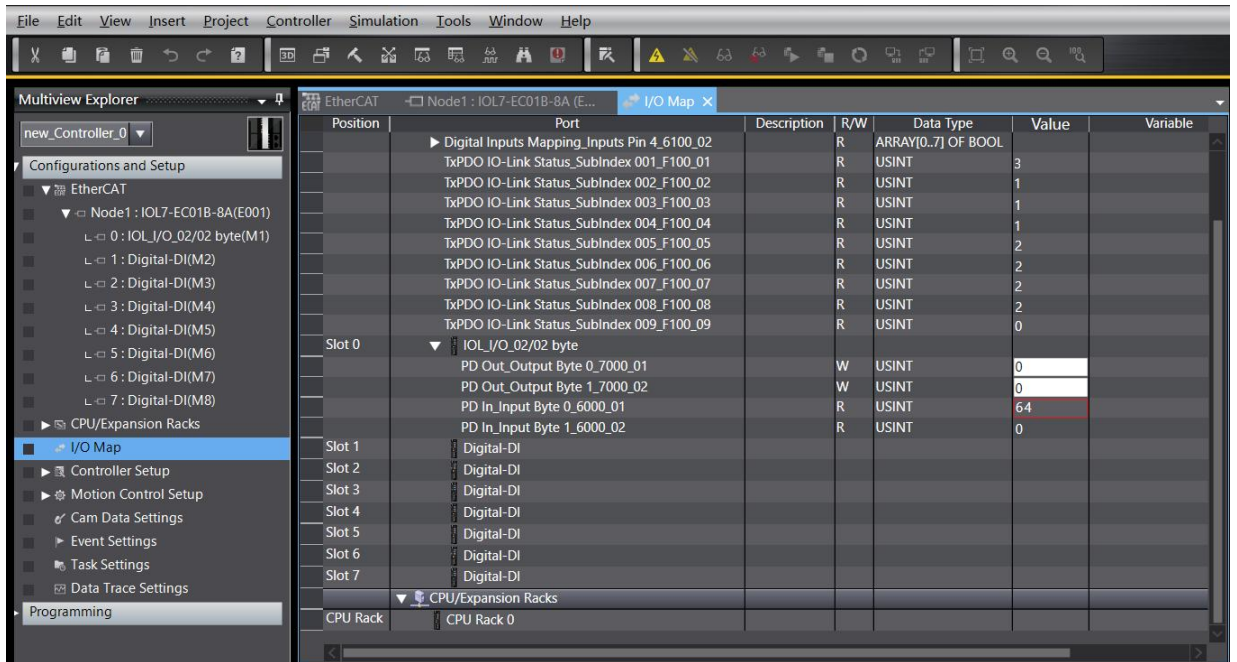
- Digital Inputs Mapping\_Inputs Pin 4\_6100\_02 Input value of Pin4 port of master Port0~7
  - The Input and Output below the IOL\_I/O\_02/02 byte in slot 0 are the input and output values of the slave.
- b. Master Port0 access slave IOL7-16CB-M12 for IO-Link mode, Port1~3 for DI mode, Pin4 of Port4~7 for DO mode, as an example to introduce the input/output viewing function, as shown below.



- c. In the "I/O Map" page, expand "Digital Outputs Mapping\_Outputs Pin 4\_7100\_01", write "1" at "Value" of Port4~7, and you can see that the indicator of Pin4 of IO-Link master device lights up as shown below. Write "1" in the "Value" of Port4~7, and you can see that the Pin4 indicator of Port4~7 of IO-Link master device lights up, as shown below.



- d. When the X00 port of the slave IOL7-16CB-M12 has a valid voltage input, it can be observed in "PD In\_Input Byte 0\_6000\_01" under IOL\_I/O\_02/02 byte in "I/O Map", as shown in the figure below.



## 7.3 PROFINET Master Configuration Application

### 7.3.1 Application in TIA Portal V17 software environment

#### 1、 preliminary

- **hardware environment**

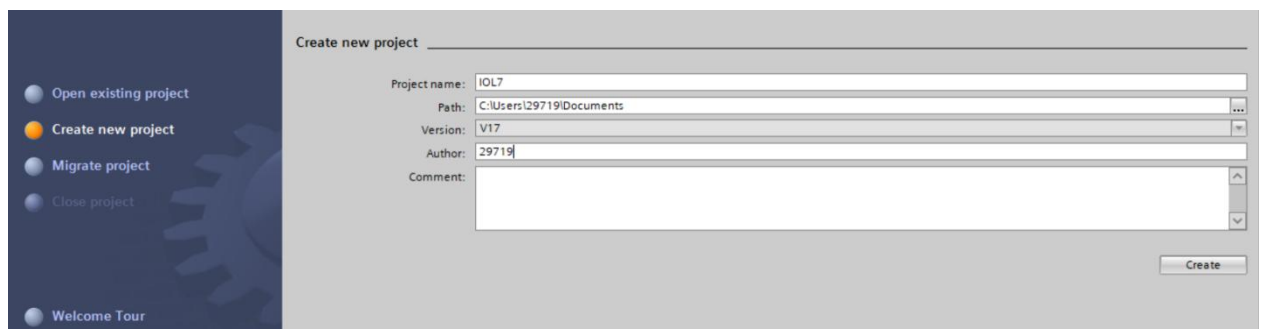
- **Example of module model number IOL7-PN01B-8A**  
**X00 port access to IOL7 slave module IOL7-16CB-M12**
- **One computer with pre-installed TIA Portal V17 software**
- **Shielded cables for PROFINET**
- **One Siemens PLC, this description takes Siemens S7-1200 CPU 1214C DC/DC/DC as an example**
- **One switching power supply**
- **Device Configuration Files**  
Configuration file access: <https://www.solidotech.com/documents/configfile>

- **Hardware configuration and wiring**

Follow "[5 Installation and Wiring](#)".

#### 2、 New construction

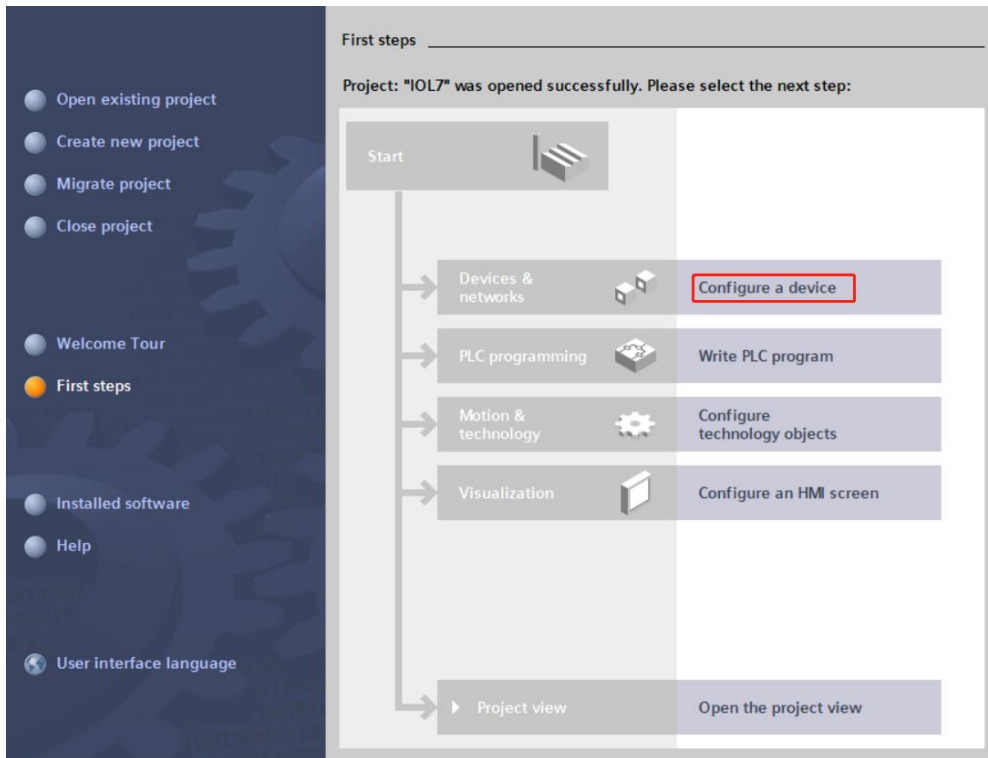
- a. Open TIA Portal V17 software, click "Create New Project", enter the information and click "Create", as shown below.



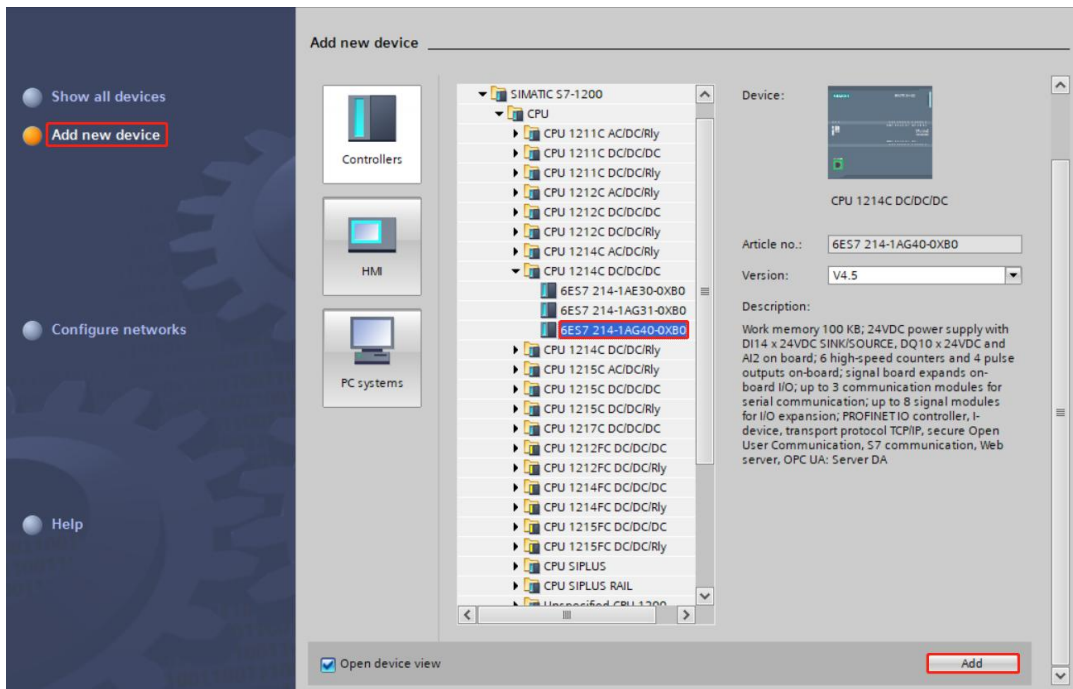
- ◆ Item name: customizable, can be left as default.
- ◆ Path: the project keeps the path, which can be left as default.
- ◆ Version: can be left as default.
- ◆ AUTHOR: The default can be maintained.
- ◆ Note: Customizable, may not be filled in.

### 3. Adding a PLC controller

- a. Click "Configure a device", as shown below.

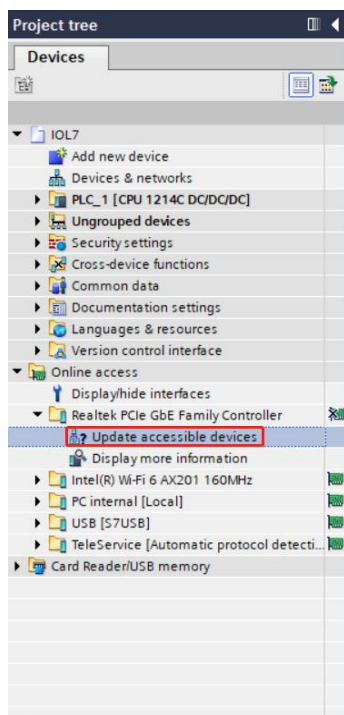


- b. Click "Add New Device", select the PLC model you are currently using, and click "Add", as shown below. After adding, you can see that the PLC has been added to the device navigation tree.

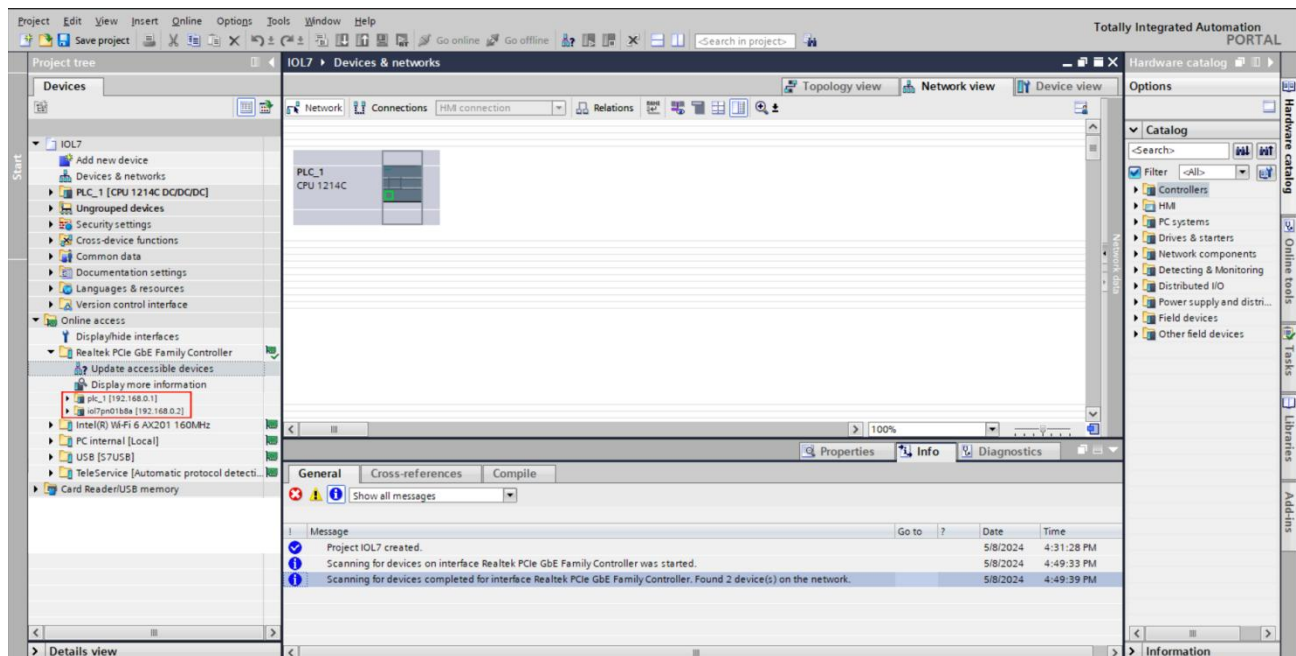


## 4. Scanning connected devices

- a. Click "Online Access -> Update Accessible Devices" in the left navigation tree as shown below.

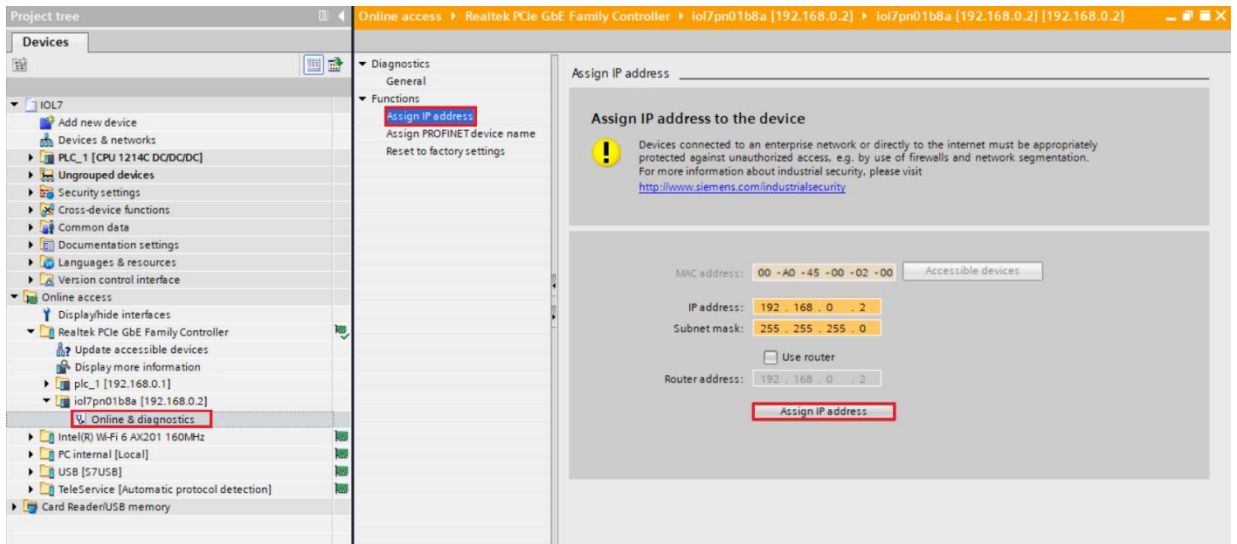


- b. When the update is complete, the connected slave devices are displayed, as shown below.

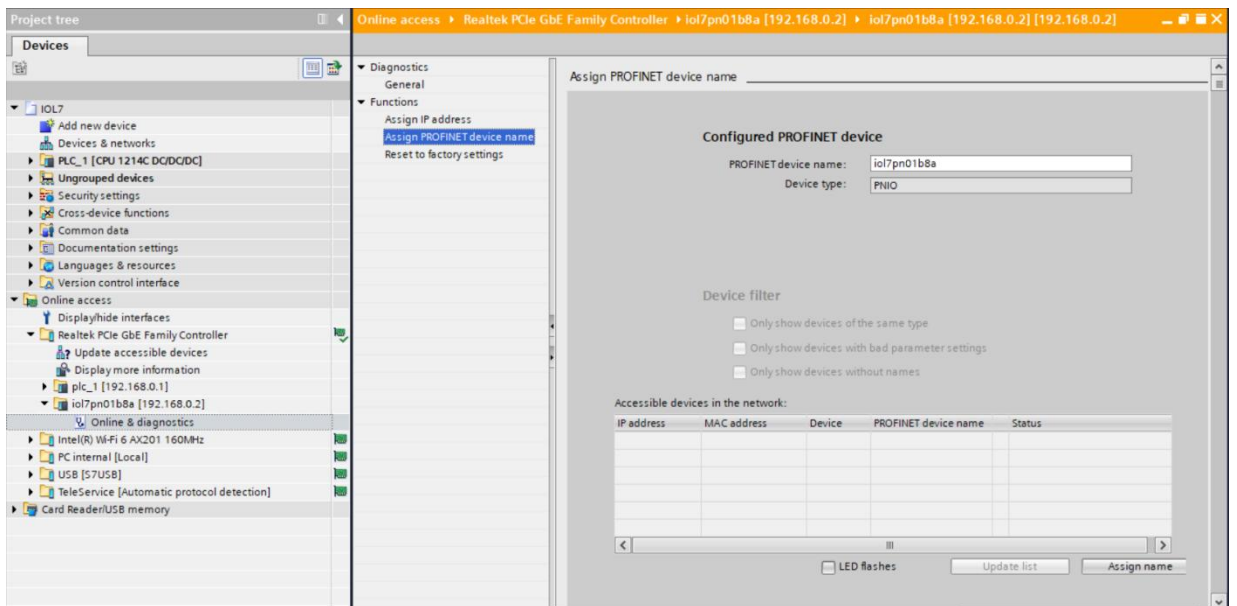


The IP address of the computer must be in the same network segment as the PLC, if not, modify the IP address of the computer and repeat the above steps.

- c. Double-click "Online & Diagnostic" under Slave Devices in the left navigation tree, and you can assign the IP address and configuration name of the current slave under the "Function" menu. Click "Assign IP Address", fill in "Subnet Mask", then "IP Address", and click "Assign IP Address" at the bottom. Click "Assign IP Address" at the bottom of the screen, as shown in the figure below.

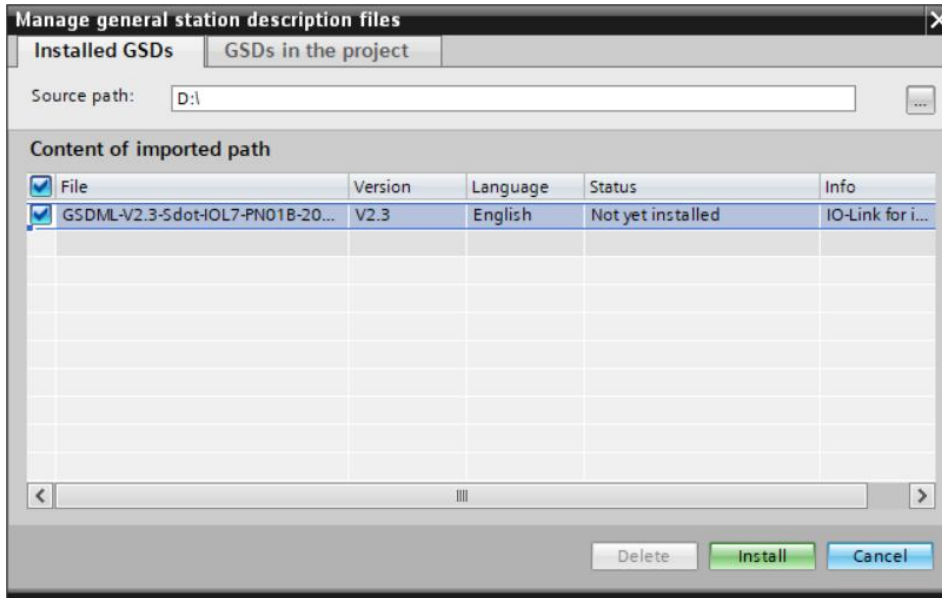


- d. Click "Assign PROFINET Device Name", fill in "PROFINET Device Name", and click "Assign Name", as shown below.



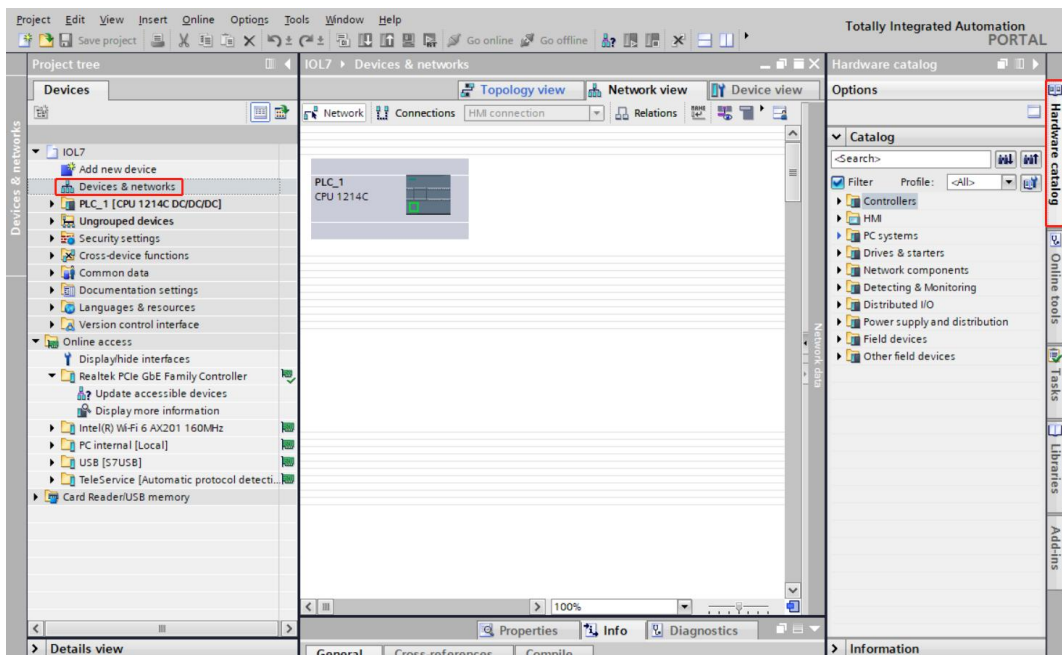
### 5. Adding a GSD Configuration File

- In the menu bar, select "Options -> Manage General Station Description Files (GSDML) (D)".
- Click "Source Path" to select the folder where the GSD file is stored.
- Check if the status of the GSD file you want to add is "Not yet installed", click "Install" if it is not installed, or "Cancel" if it is already installed to skip the installation step.

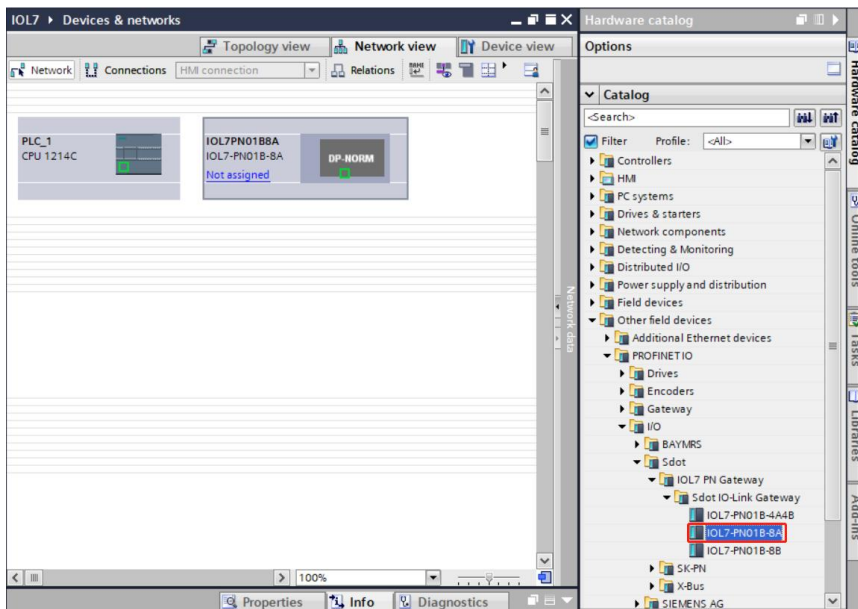


### 6. Adding Slave Devices

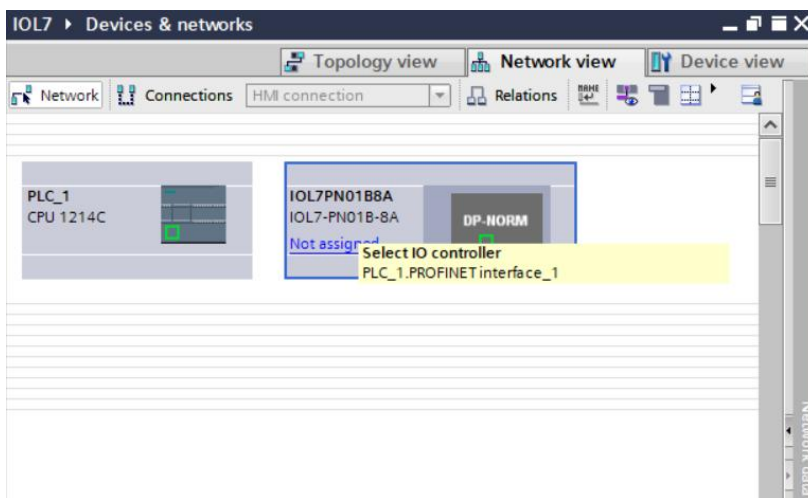
- Double-click on "Devices & Networks" in the left navigation tree.
- Click the "Hardware Catalog" vertical button on the right, the catalog is displayed as shown below.



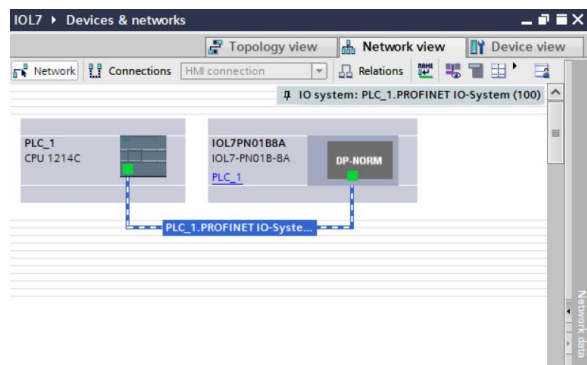
- c. Locate the "IOL7-PN01B-8A" module in the hardware directory, drag or double-click the "IOL7-PN01B-8A" module to the "Network View", as shown below. The following figure shows. If you want to connect more than one module, you can add modules according to the actual topology under "Hardware Catalog" on the right side.



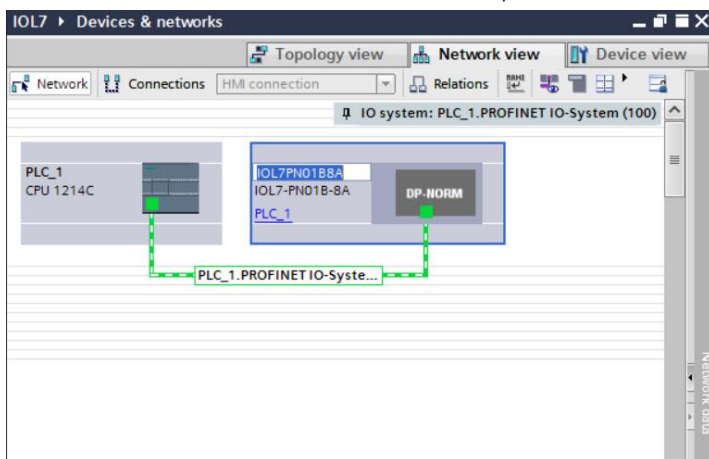
- d. Click "Unassigned (blue font)" on the slave device and select "PLC\_1.PROFINET Interface\_1" as shown below.



- e. When the connection is complete, it is shown in the following figure.

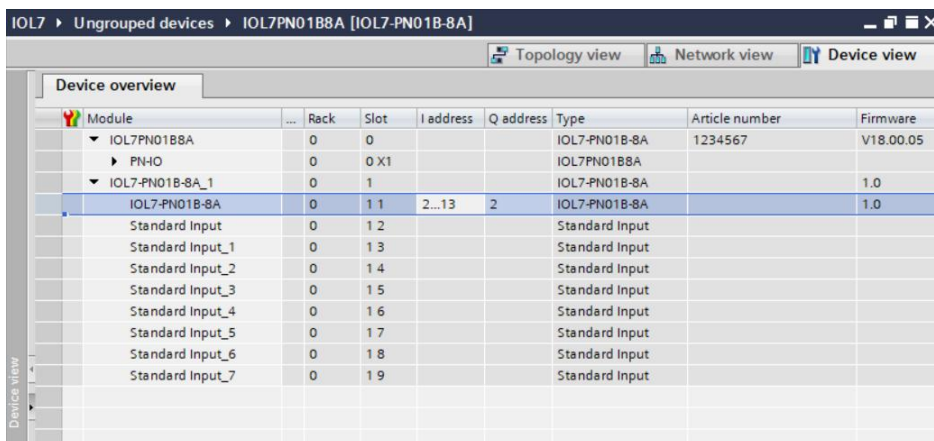


- f. Click the device name to rename the device, as shown below.

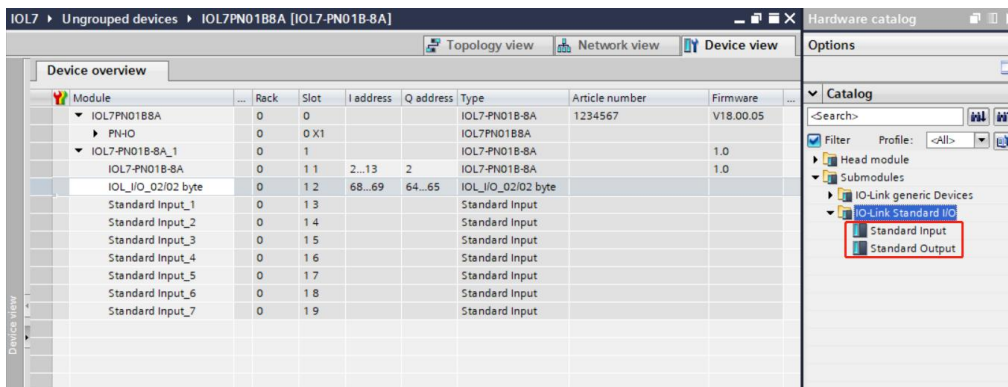


### 7、DI/DO/IO-Link Setting

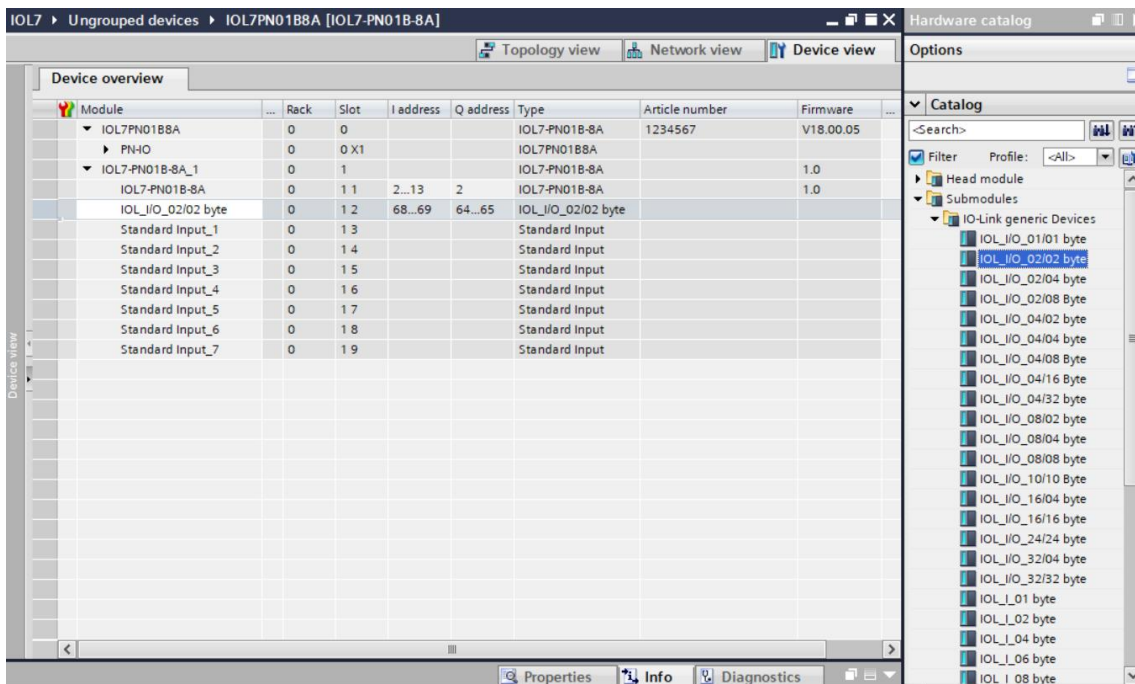
- a. Click "Device View" to enter the device overview, you can see the topology configuration information, including the I/O address automatically assigned by the system, the I/O address can be changed by yourself, as shown below. Standard Input ~ Standard Input 7 can be configured DI/DO/IO-Link.



- b. When configuring DI/DO of master module IOL7-PN01B-8A, select X00~X07 ports corresponding to Standard Input ~ Standard Input 7, right-click to delete, and then double-click to add Standard Input/Standard Output under "Hardware Catalog" on the right side. Standard Output, as shown in the figure below.

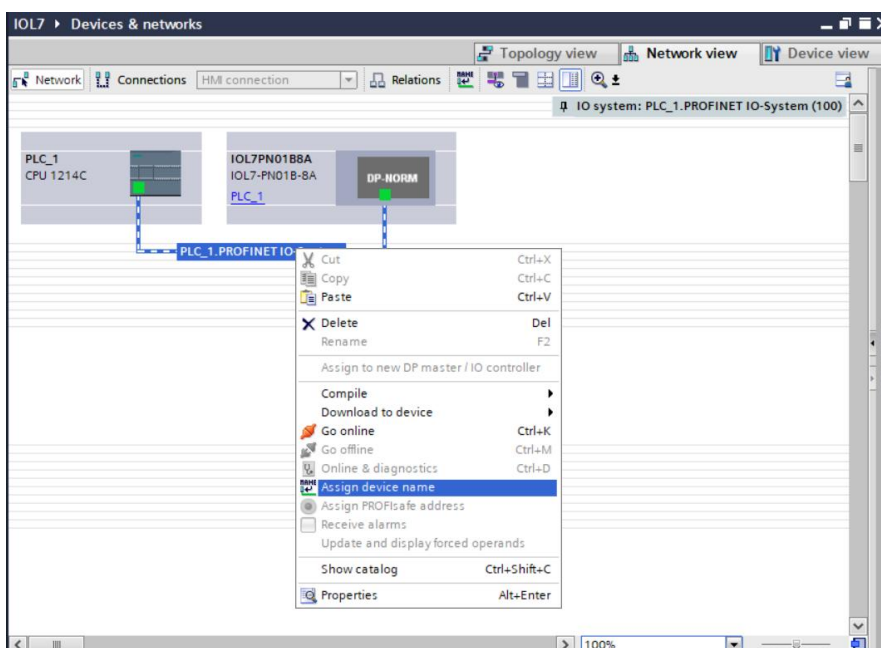


- c. The X00 port of the master module IOL7-PN01B-8A is connected to the IOL7-16CB-M12 module, find the module under the "Hardware Catalog" on the right side, right-click on "Standard Input" and select "Delete". Right click on "Standard Input" and select "Delete", then double click on "IOL\_I/O\_02/02 byte" to add IOL7 slave to the configuration, as shown in the figure below. (Note: IOL7-16CB-M12 can be configured up to 16 channels input or 16 channels output, so select 02/02 byte.)

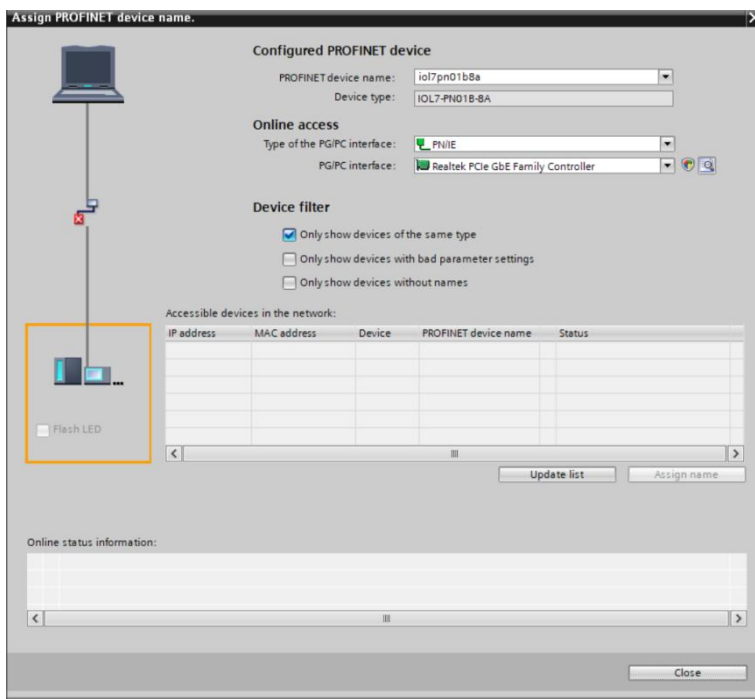


### 8. Assign device name

- a. Switch to "Network View", right-click the connection cable between PLC and module IOL7-PN01B-8A, and select "Assign Device Name" as shown below.



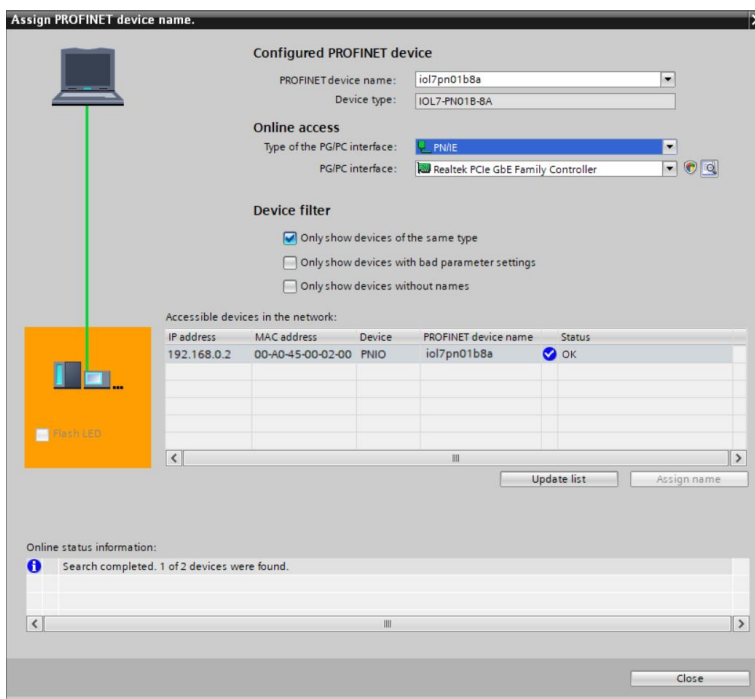
b. The "Assign PROFINET Device Name" window pops up as shown below.



Check to see if the MAC address on the module silkscreen is the same as the MAC address of the assigned device name.


- ◆ PROFINET device name: Name set in "Assign PROFINET device name".
- ◆ Type of PG/PC interface: PN/IE.
- ◆ PG/PC interface: the actual network adapter used.

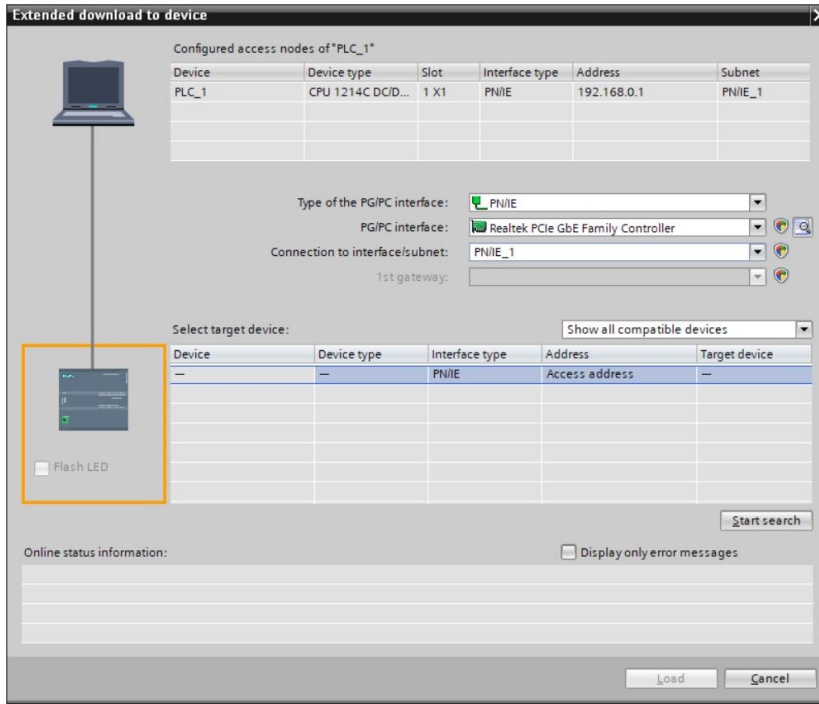
c. Select the slave device in turn, click "Update List" , and click "Assign Name" . Check whether the status of the node is "OK" in "Accessible nodes in the network", as shown below.



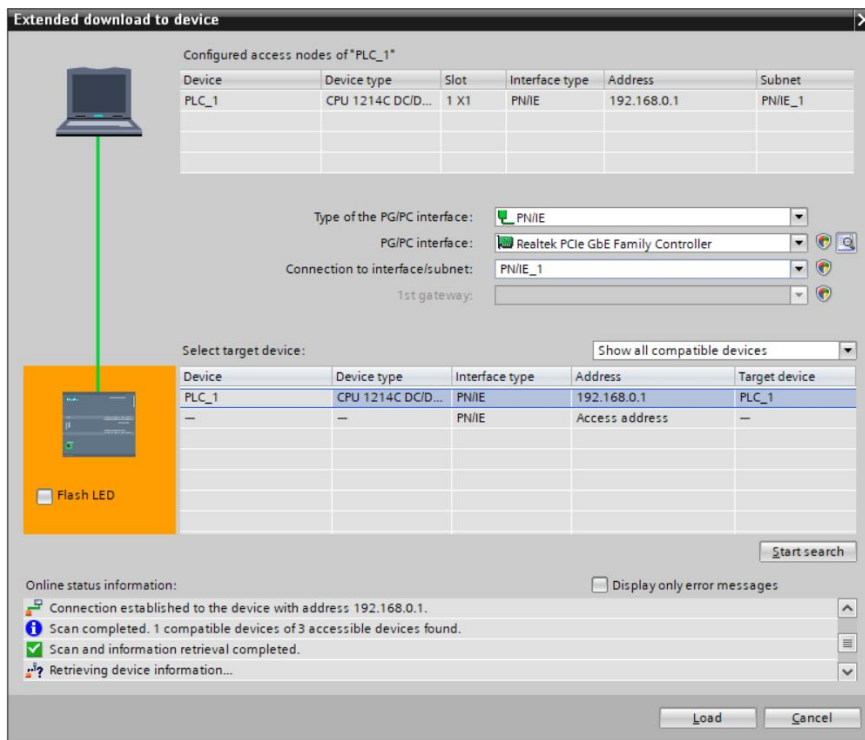
d. Click "Close" .

### 9、 Download Configuration Structure

- a. In "Network View" , check PLC.
- b. Click the  button in the menu bar to download the current configuration to the PLC.
- c. In the pop-up interface of "Extended Download to Device", the configuration is shown in the following figure.

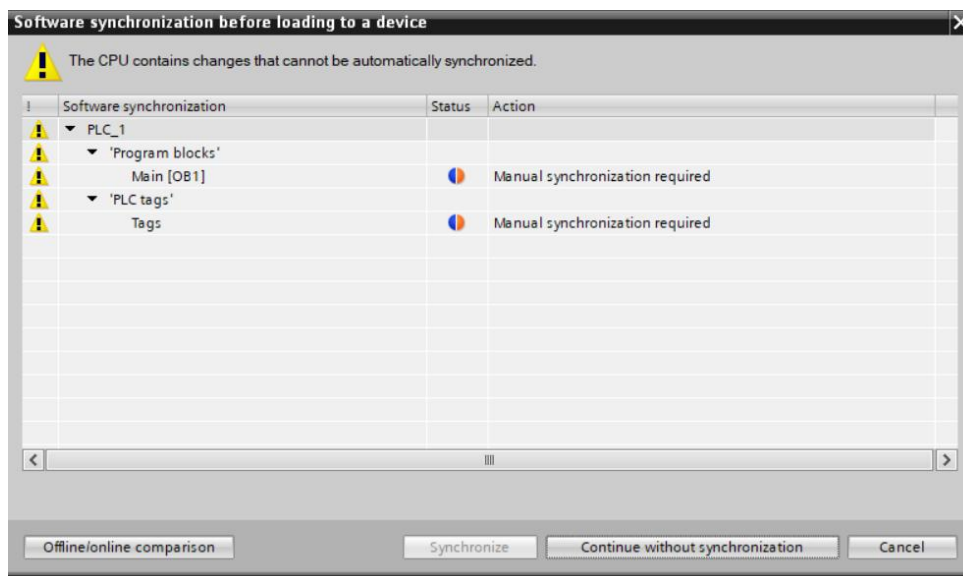


- d. Click "Start Search" as shown below.

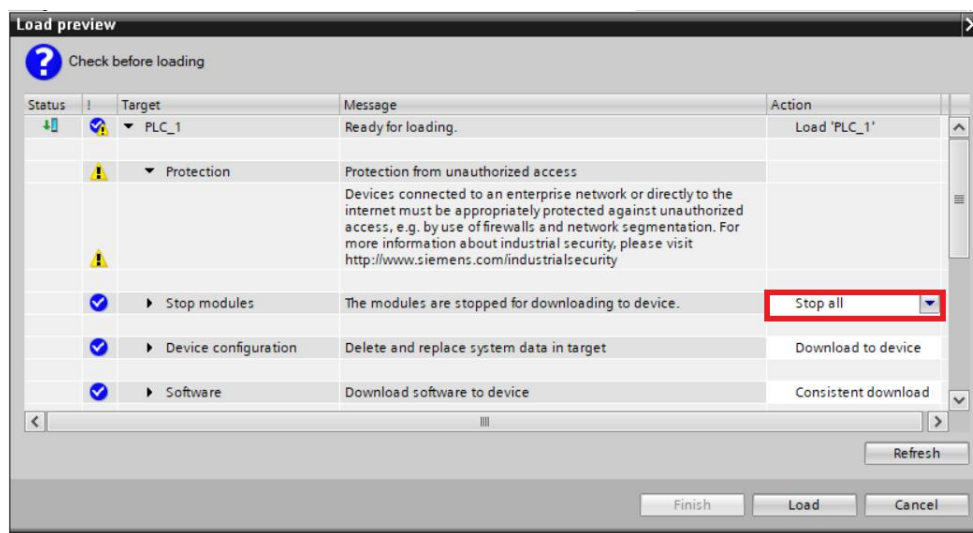


- e. Click on "Download".

- f. Select "Continue without synchronization" as shown below.




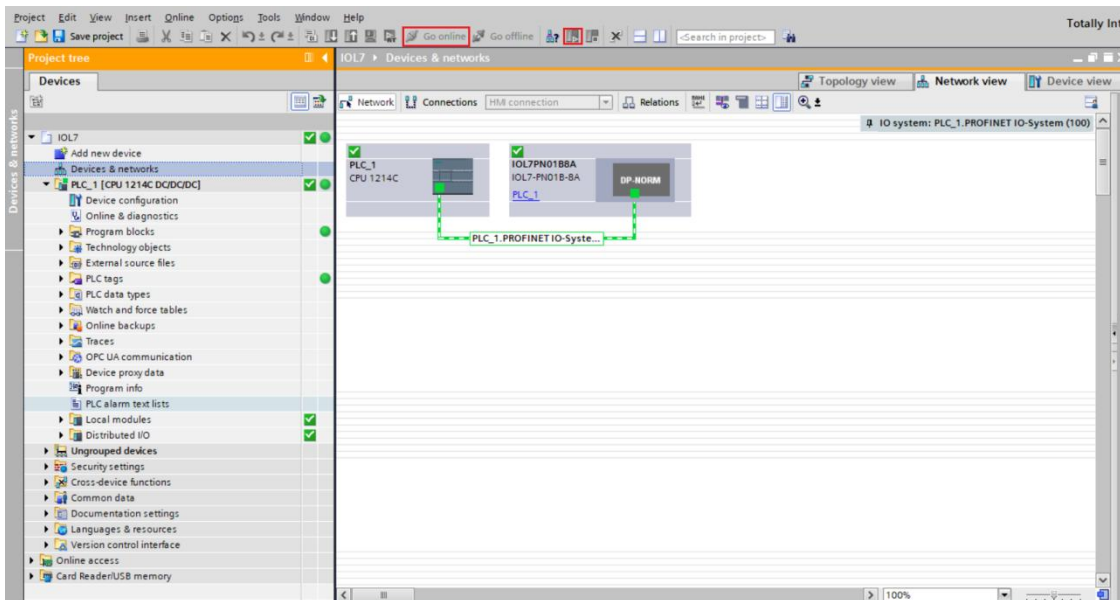
- g. Select "Stop All".



- h. Click "Load" .  
 i. Click "Finish" .  
 j. Power on the device again.

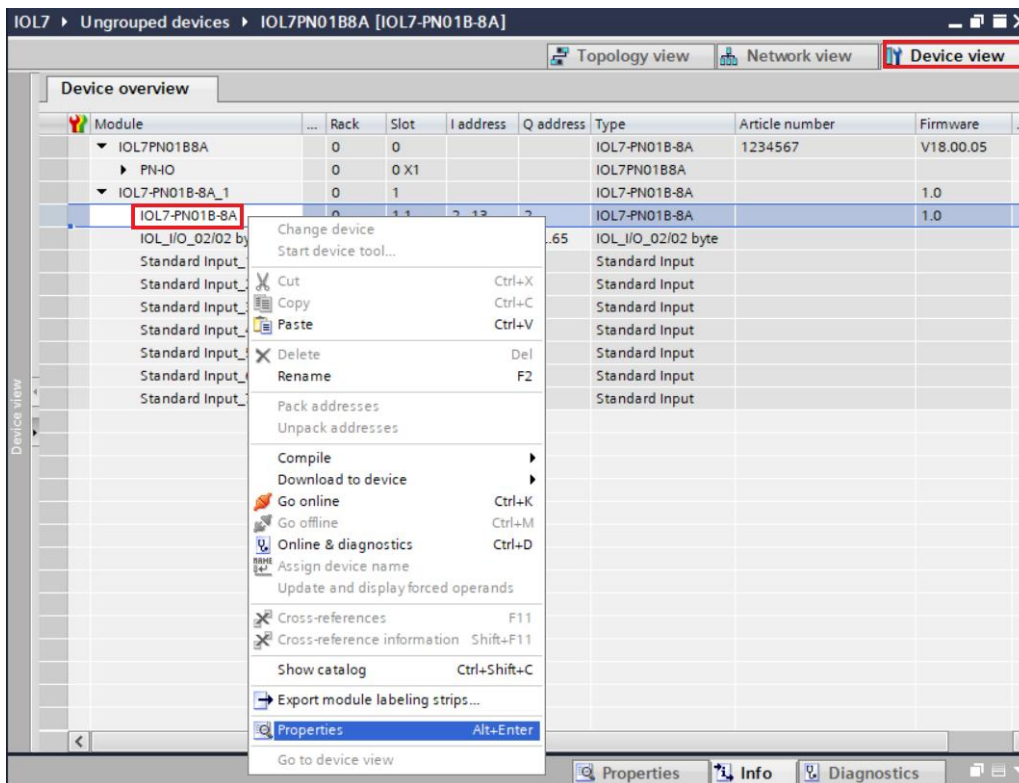
### 10、 Communication connection

- a. Click the  button, and then click "Go Online", the icons are green, that is, the connection is successful, as shown in the figure below.

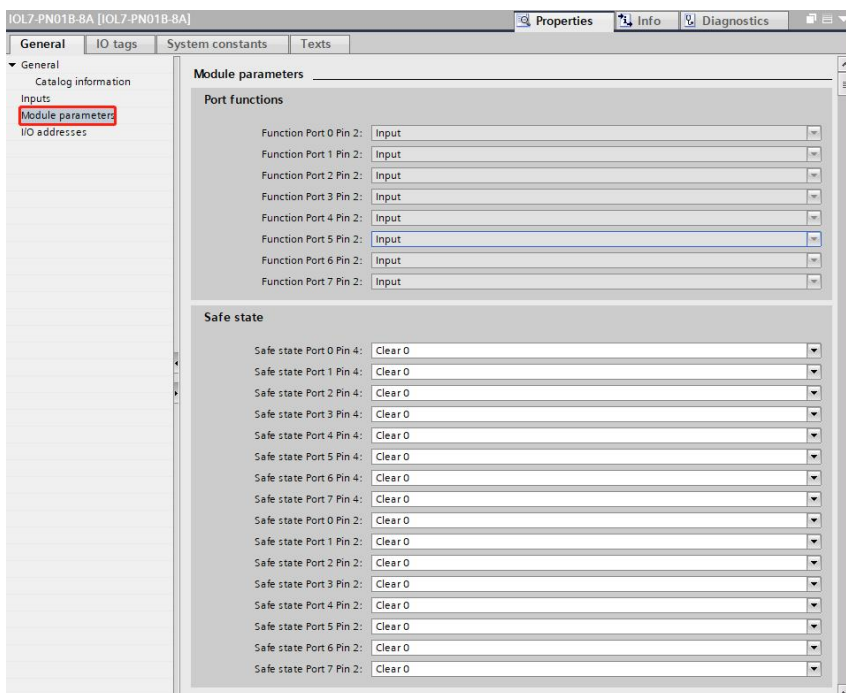


### 11、 Master Parameter Configuration

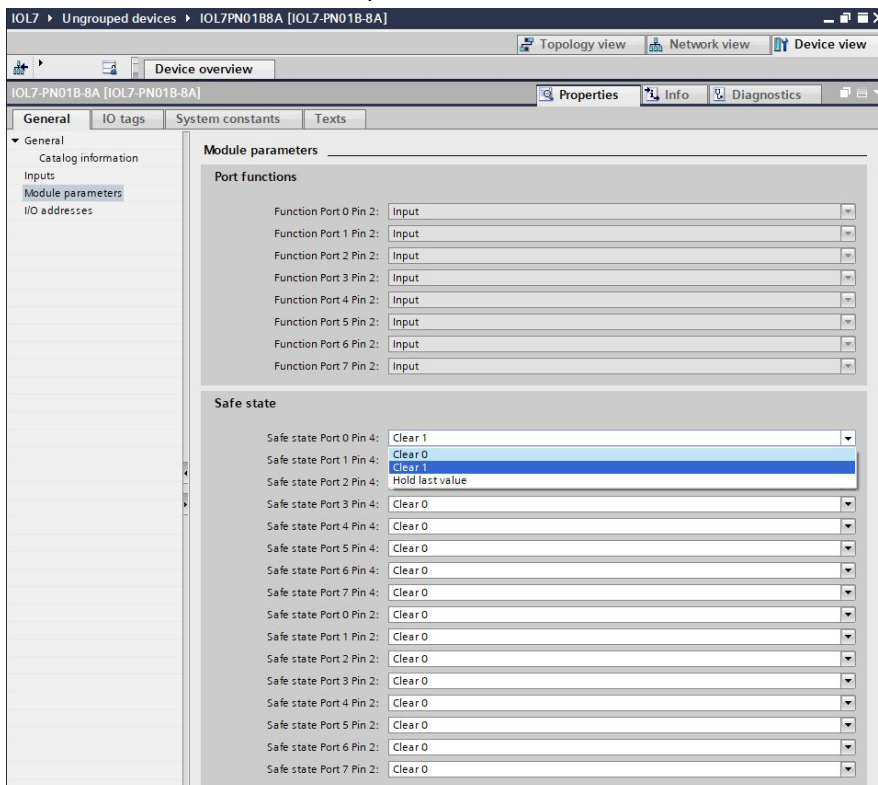
- a. Open "Device View", in the offline state, right-click the module name "IOL7-PN01B-8A", click "Properties", as shown below.



- b. In the property page, click "Module Parameters", as shown below. Parameters can be configured according to the actual use of the need to configure, after the completion of the configuration, re-download the program to the PLC, the PLC and the module need to be re-powered.



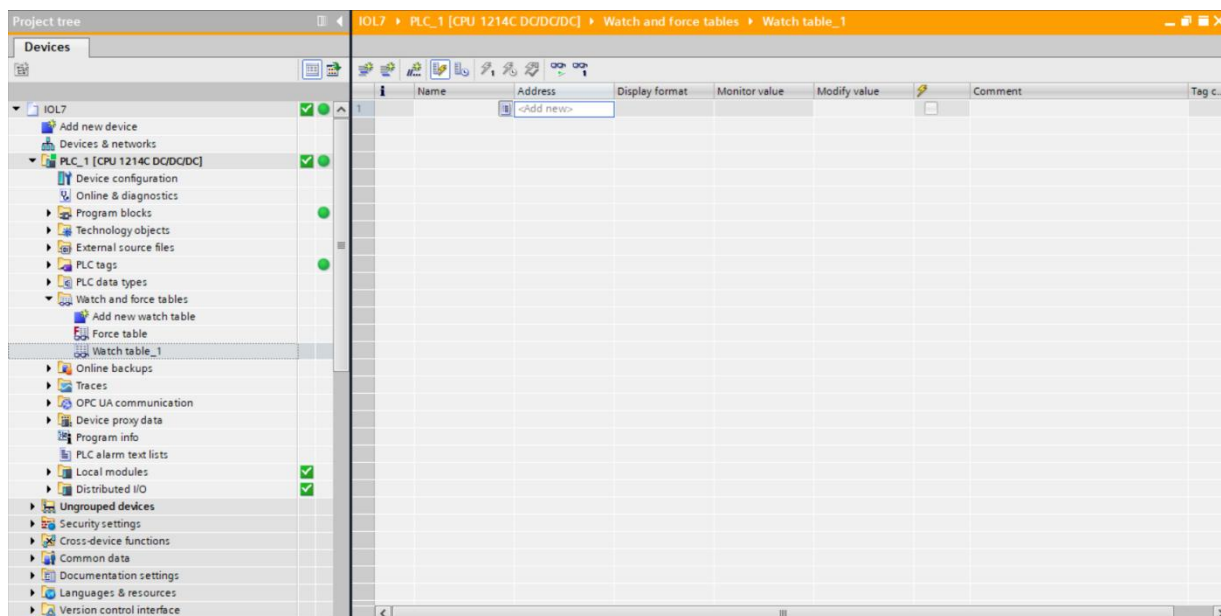
- c. Setting method of clear hold function: Take Port 0 Pin 4 as an example, in the parameter page of module IOL7-PN01B-8A, click the radio box on the right side of "Safe state Port 0 Pin 4" to set the selection, as shown below. After the configuration is completed, re-download the program to PLC, PLC and module need to be re-powered.







b. Double-click "Add New Watch Table", the system adds a new watch table, as shown below.




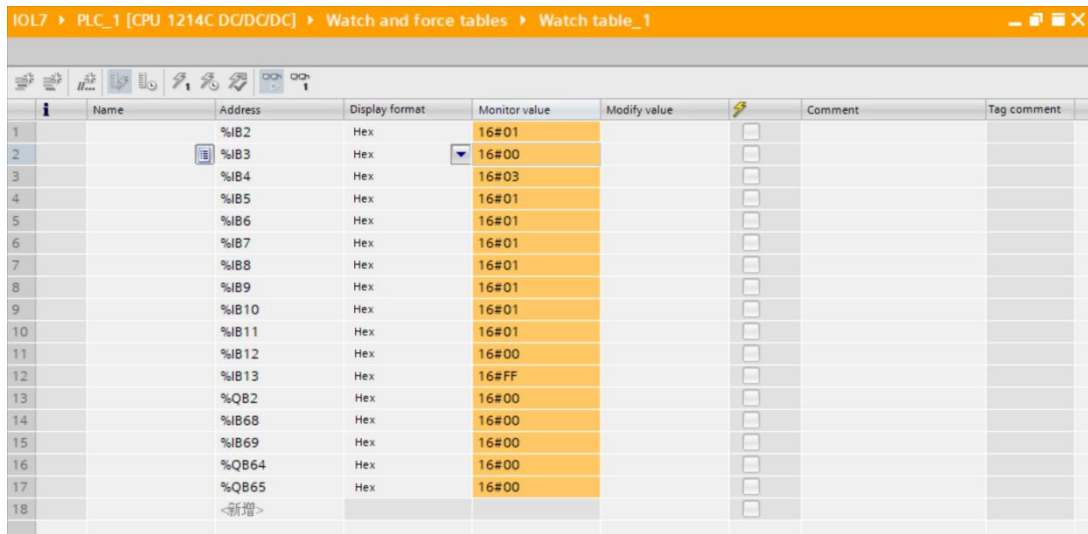
c. Open the "Device View" and check the channel Q address (channel address of the output signal) and I address (channel address of the input signal) of the master module IOL7-PN01B-8A and the channel Q address (channel address of the output signal) and I address (channel address of the input signal) of the slave module IOL\_I/O\_02/02 byte in the device overview. address (channel address of the input signal) of the slave module IOL\_I/O\_02/02 byte.

For example, the "Q address" of IOL7-PN01B-8A module is 2 and "I address" is 2~13; the "Q address" of slave module IOL\_I/O\_02/02 byte is 64~65 and "I address" is 68~69, as shown in the figure below. The "Q address" of the slave module IOL\_I/O\_02/02 byte is 64~65, and the "I address" is 68~69, as shown in the figure below.


Module	Rack	Slot	I address	Q address	Type	Article number	Firmware	Comment	Access
IOL7PN01B8A	0	0			IOL7-PN01B-8A	1234567	V18.00.05		PLC_1
PN-IO	0	0 X1			IOL7PN01B8A				PLC_1
IOL7-PN01B-8A_1	0	1			IOL7-PN01B-8A		1.0		PLC_1
IOL7-PN01B-8A	0	1 1	2...13	2	IOL7-PN01B-8A		1.0		PLC_1
IOL_I/O_02/02 byte	0	1 2	68...69	64...65	IOL_I/O_02/02 byte				PLC_1
Standard Input_1	0	1 3			Standard Input				PLC_1
Standard Input_2	0	1 4			Standard Input				PLC_1
Standard Input_3	0	1 5			Standard Input				PLC_1
Standard Input_4	0	1 6			Standard Input				PLC_1
Standard Input_5	0	1 7			Standard Input				PLC_1
Standard Input_6	0	1 8			Standard Input				PLC_1
Standard Input_7	0	1 9			Standard Input				PLC_1

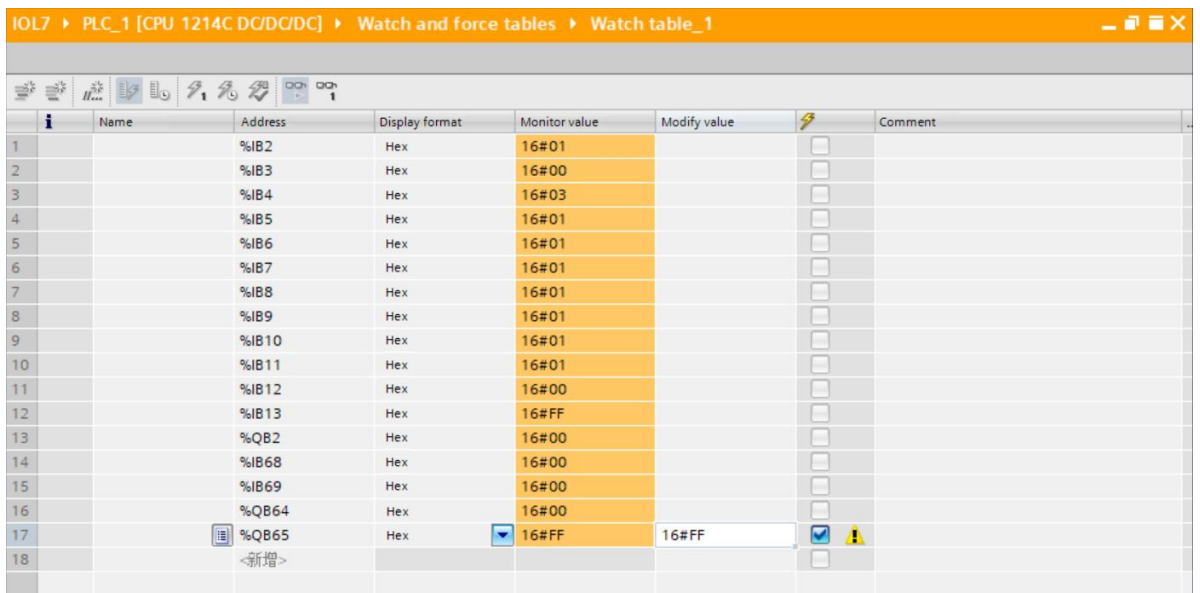
IB2 of the master module IOL7-PN01B-8A indicates the monitoring value of Pin2 input signal of X00~X07, IB3 indicates the monitoring value of Pin4 input signal of X00~X07, and IB4~IB13 indicate the parameter information; by default, the I/O interfaces of the master module are all input channels, and when there are interfaces of the master module configured as output channels, QB2 indicates the Pin4 output signal of X00~X07. QB2 indicates the Pin4 output signal of X00~X07 when the master module has interface configured as output channel.


- d. Fill in the address cell of the monitoring table with the address of the input and output channels, press the Enter key, and then click the  button to monitor the data, as shown below.



	Name	Address	Display format	Monitor value	Modify value		Comment	Tag comment
1		%IB2	Hex	16#01		<input type="checkbox"/>		
2		%IB3	Hex	16#00		<input type="checkbox"/>		
3		%IB4	Hex	16#03		<input type="checkbox"/>		
4		%IB5	Hex	16#01		<input type="checkbox"/>		
5		%IB6	Hex	16#01		<input type="checkbox"/>		
6		%IB7	Hex	16#01		<input type="checkbox"/>		
7		%IB8	Hex	16#01		<input type="checkbox"/>		
8		%IB9	Hex	16#01		<input type="checkbox"/>		
9		%IB10	Hex	16#01		<input type="checkbox"/>		
10		%IB11	Hex	16#01		<input type="checkbox"/>		
11		%IB12	Hex	16#00		<input type="checkbox"/>		
12		%IB13	Hex	16#FF		<input type="checkbox"/>		
13		%QB2	Hex	16#00		<input type="checkbox"/>		
14		%IB68	Hex	16#00		<input type="checkbox"/>		
15		%IB69	Hex	16#00		<input type="checkbox"/>		
16		%QB64	Hex	16#00		<input type="checkbox"/>		
17		%QB65	Hex	16#00		<input type="checkbox"/>		
18		<新增>				<input type="checkbox"/>		

- e. Take the configuration of IOL7-16CB-M12 that the first 8 channels are inputs and the last 8 channels are outputs as an example, IB68 represents the input signal value of slave module X00~X03, and QB65 represents the output signal value of slave module X04~X07. Input "FF" in the "Modify Value" cell of QB65, click  button to write, and see the 8 channel indicators of slave module X04~X07 light up, as shown below.



	Name	Address	Display format	Monitor value	Modify value		Comment	Tag comment
1		%IB2	Hex	16#01		<input type="checkbox"/>		
2		%IB3	Hex	16#00		<input type="checkbox"/>		
3		%IB4	Hex	16#03		<input type="checkbox"/>		
4		%IB5	Hex	16#01		<input type="checkbox"/>		
5		%IB6	Hex	16#01		<input type="checkbox"/>		
6		%IB7	Hex	16#01		<input type="checkbox"/>		
7		%IB8	Hex	16#01		<input type="checkbox"/>		
8		%IB9	Hex	16#01		<input type="checkbox"/>		
9		%IB10	Hex	16#01		<input type="checkbox"/>		
10		%IB11	Hex	16#01		<input type="checkbox"/>		
11		%IB12	Hex	16#00		<input type="checkbox"/>		
12		%IB13	Hex	16#FF		<input type="checkbox"/>		
13		%QB2	Hex	16#00		<input type="checkbox"/>		
14		%IB68	Hex	16#00		<input type="checkbox"/>		
15		%IB69	Hex	16#00		<input type="checkbox"/>		
16		%QB64	Hex	16#00		<input type="checkbox"/>		
17		%QB65	Hex	16#FF	16#FF	<input checked="" type="checkbox"/>		
18		<新增>				<input type="checkbox"/>		

- f. When the slave module X00 inputs a valid voltage, the input value "16#C0" can be monitored in IB68 as "2#11000000" as shown in the figure below.

	Name	Address	Display format	Monitor value	Modify value		Comment
1		%IB2	Hex	16#01		<input type="checkbox"/>	
2		%IB3	Hex	16#00		<input type="checkbox"/>	
3		%IB4	Hex	16#03		<input type="checkbox"/>	
4		%IB5	Hex	16#01		<input type="checkbox"/>	
5		%IB6	Hex	16#01		<input type="checkbox"/>	
6		%IB7	Hex	16#01		<input type="checkbox"/>	
7		%IB8	Hex	16#01		<input type="checkbox"/>	
8		%IB9	Hex	16#01		<input type="checkbox"/>	
9		%IB10	Hex	16#01		<input type="checkbox"/>	
10		%IB11	Hex	16#01		<input type="checkbox"/>	
11		%IB12	Hex	16#00		<input type="checkbox"/>	
12		%IB13	Hex	16#FF		<input type="checkbox"/>	
13		%QB2	Hex	16#00		<input type="checkbox"/>	
14		%IB68	Hex	16#C0		<input type="checkbox"/>	
15		%IB69	Hex	16#00		<input type="checkbox"/>	
16		%QB64	Hex	16#00		<input type="checkbox"/>	
17		%QB65	Hex	16#FF	16#FF	<input checked="" type="checkbox"/>	!
18		<新增>				<input type="checkbox"/>	

## 7.3.2 Application in STEP 7-MicroWIN SMART software environment

### 1、 Preliminary


- **hardware environment**

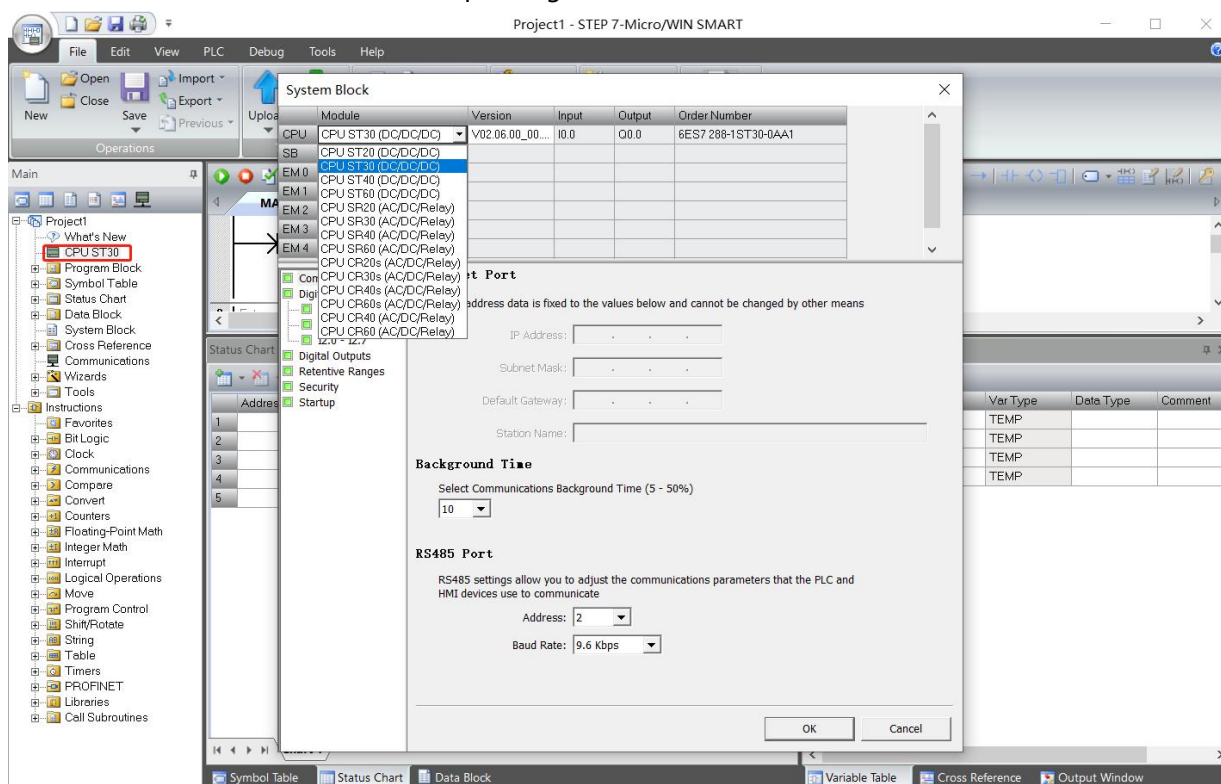
- **Module Model IOL7-PN01B-8A**  
**X00 port access to IOL7 slave module IOL7-16CB-M12**
- **A computer with pre-installed STEP 7-MicroWIN SMART V2.6 software**
- **Shielded cables for PROFINET**
- **One Siemens PLC, this description takes Siemens S7-200 SMART for example**
- **One switching power supply**
- **Device Configuration Files**  
Configuration file access: <https://www.solidotech.com/documents/configfile>


- **Hardware configuration and wiring**

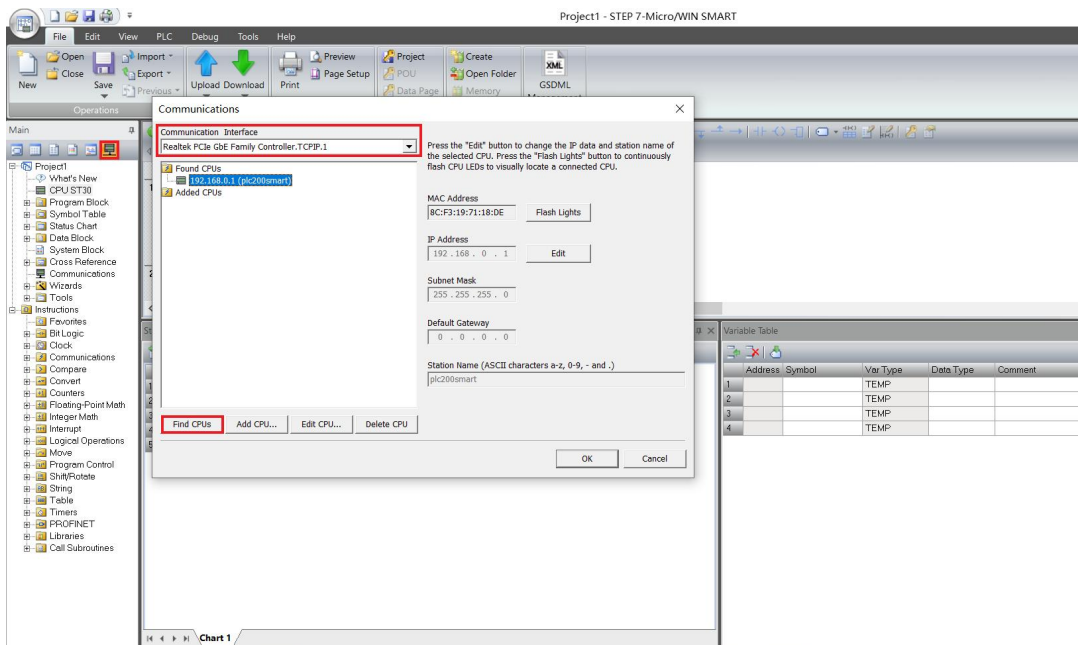
Follow "[5 Installation and Wiring](#)".

### 2、 Add PLC

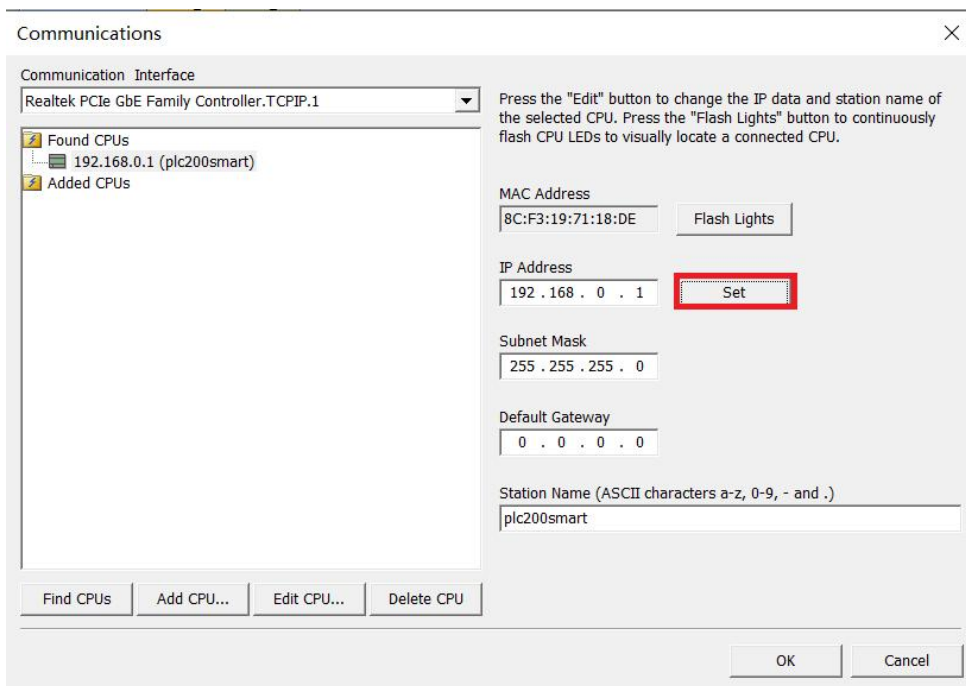
- Open the STEP 7-MicroWIN SMART software.
- Double-click the  CPU ST30 button on the left navigation tree to bring up the "System Block" window, select the CPU model corresponding to the PLC, and click "OK", as shown below.



- c. Click the button  on the left navigation tree to bring up the "Communications" window, switch the communication interface to the interface actually used by the PLC, and click "Find CPUs" to find the PLC, as shown below.

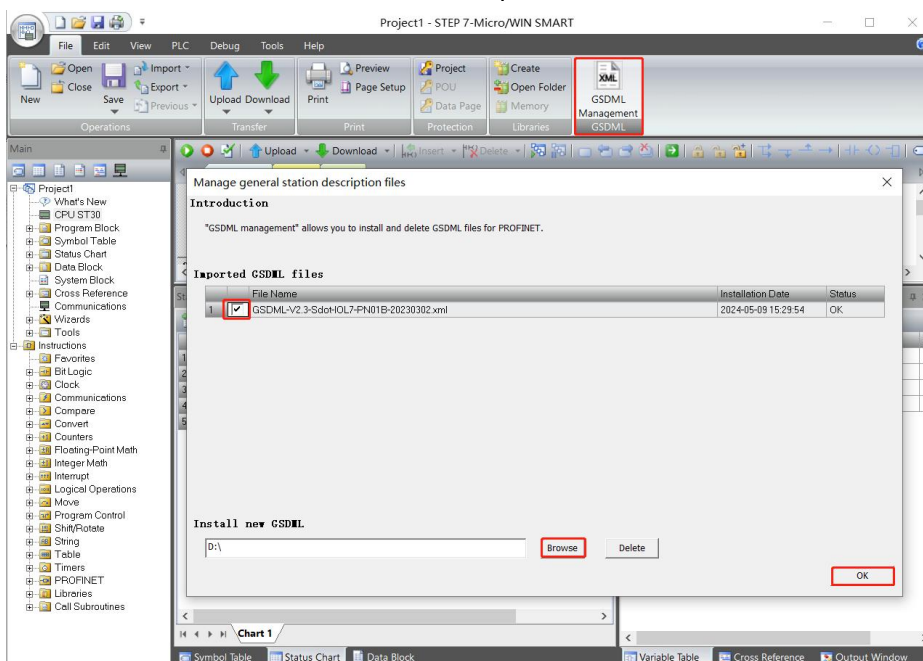


- d. Click "Edit" in the communication window, the Edit button is switched to the Set button, the IP address input box is lit, modify the IP address and the IP address of the computer interface with the same network segment, modify the completion of the click on the "Set" again, click "OK" after the completion of the settings, as shown below. Note: You can only modify the IP address of the computer's Ethernet interface, and the PLC address can be the same network segment.



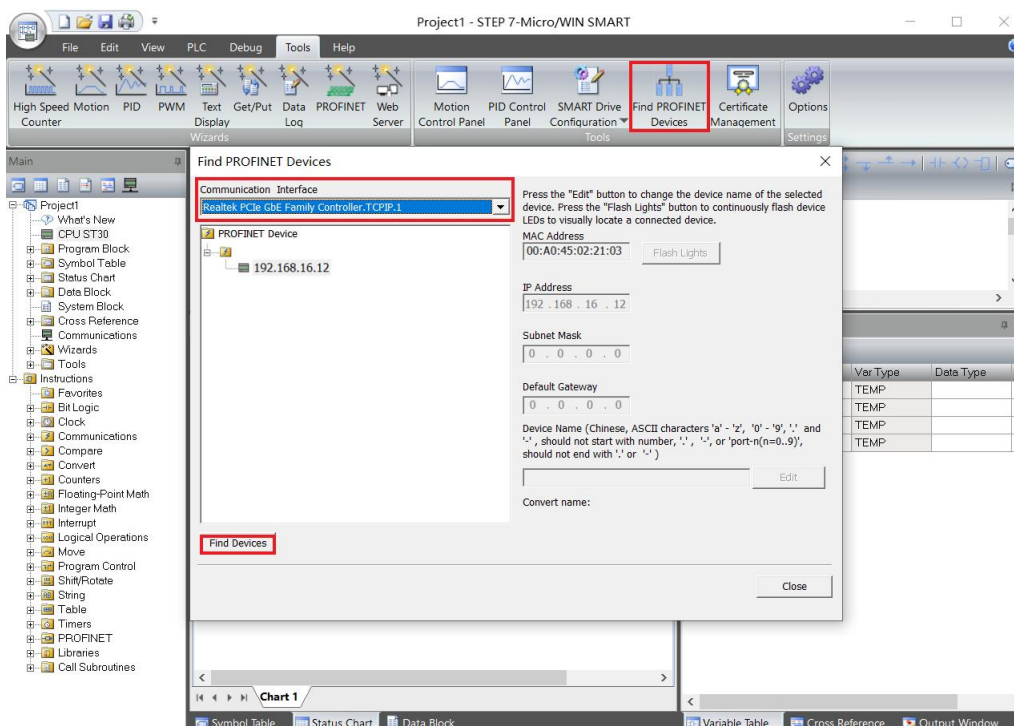
### 3. Importing GSD files

- a. Click "File -> GSDML Management" in the menu bar, click "Browse" in the GSDML management window, and select the GSDML file to be imported file and click "OK", as shown in the figure below.

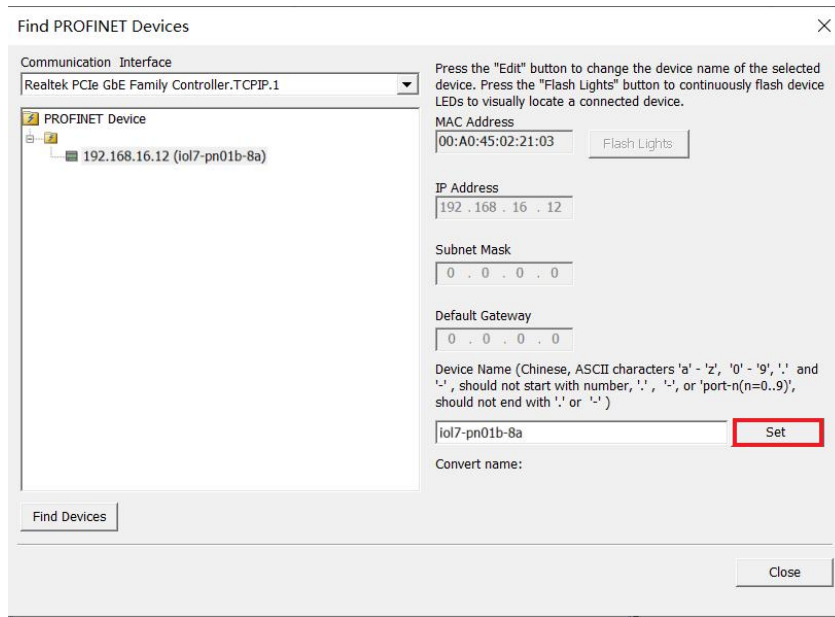


### 4. Find Equipment

- a. Click the menu bar "Tools -> Find PROFINET devices", pop-up window to find PROFINET devices, switch the communication interface for the actual use of the PLC interface, click "Find devices", as shown below.

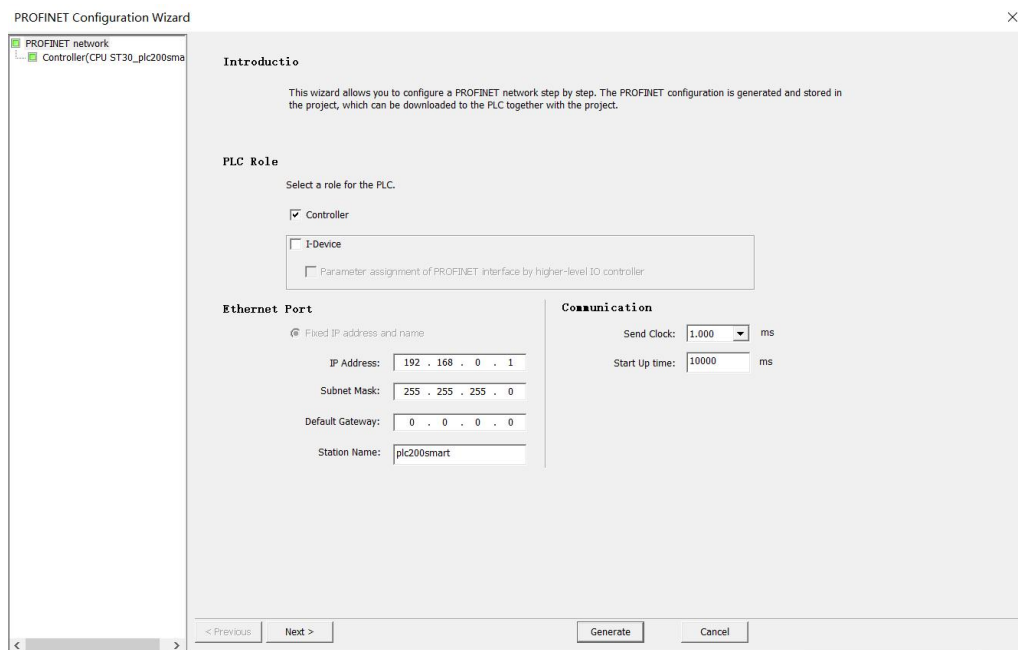


- b. Click "Edit" to edit the module name, after editing, click "Set", as shown in the figure below.

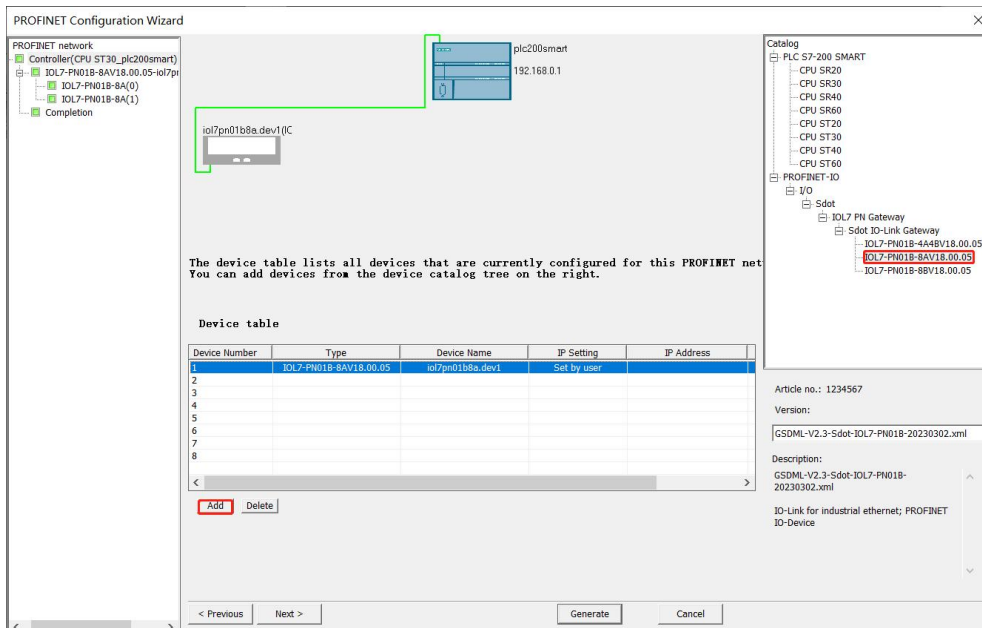


## 5. Configuration of PROFINET networks

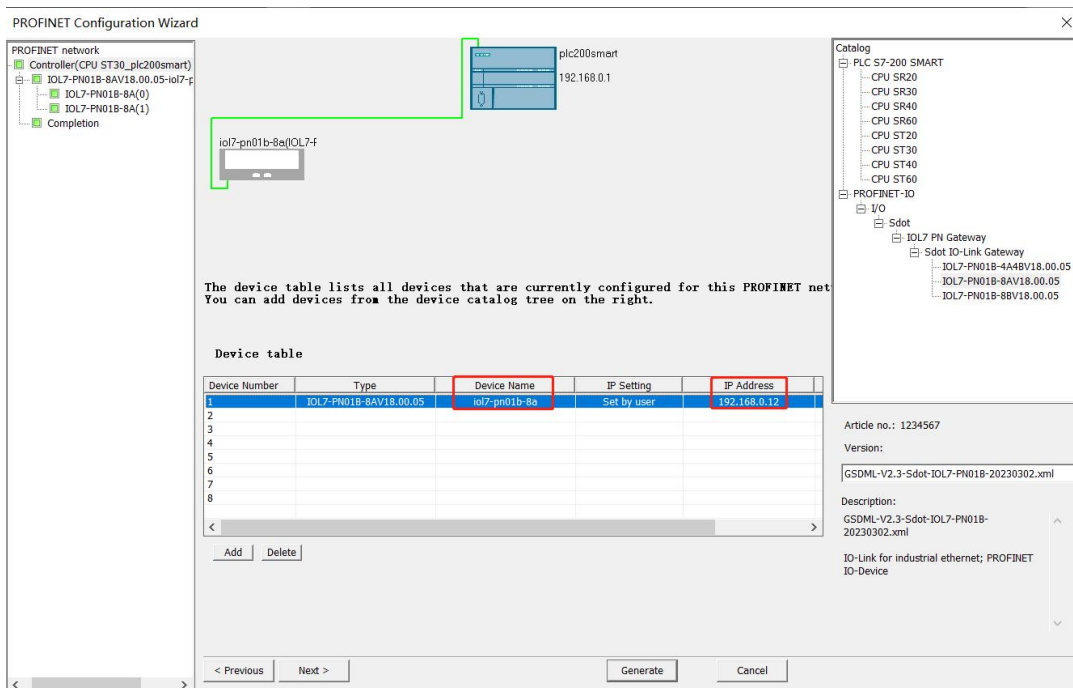
- a. Click "Tools -> PROFINET" in the menu bar to open the PROFINET Configuration Wizard.
- b. On the PROFINET Configuration Wizard page, select the role of the PLC as "Controller" as shown below.



- c. Click Next to enter the Controller Configuration page, add a device from the device catalog tree on the right, select IOL7-PN01B-8A, and click Add, as shown below.

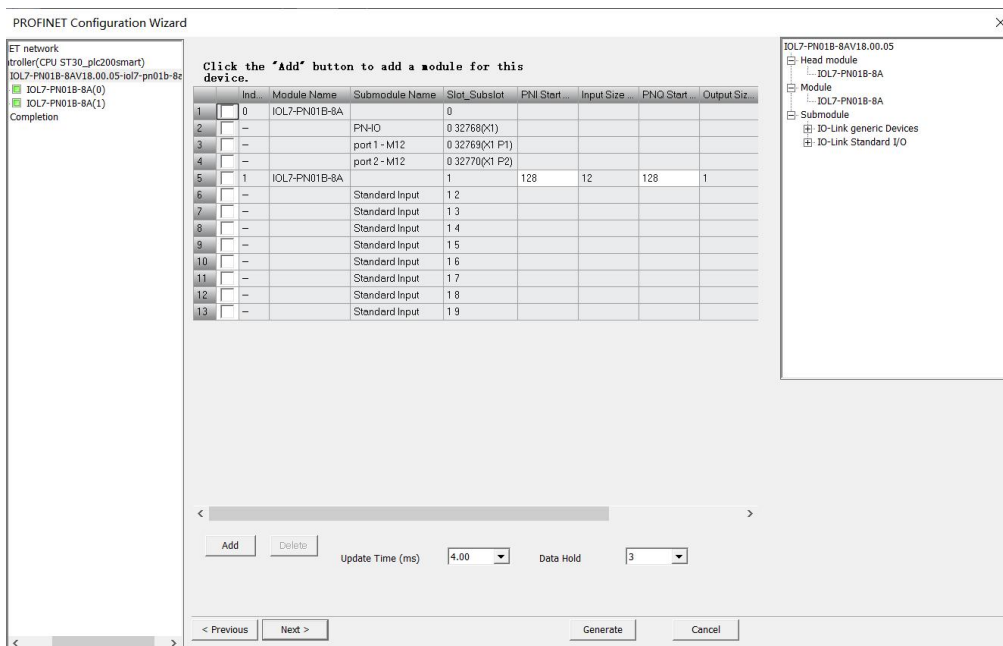


- d. Double-click the input box below the device name to enter the device name, which needs to be the same as the name set when finding the device; double-click the input box below the IP address to enter the IP address, and when the input is completed, it is shown in the following figure. If there are other modules in the configuration, you can add and configure other modules in the same way.



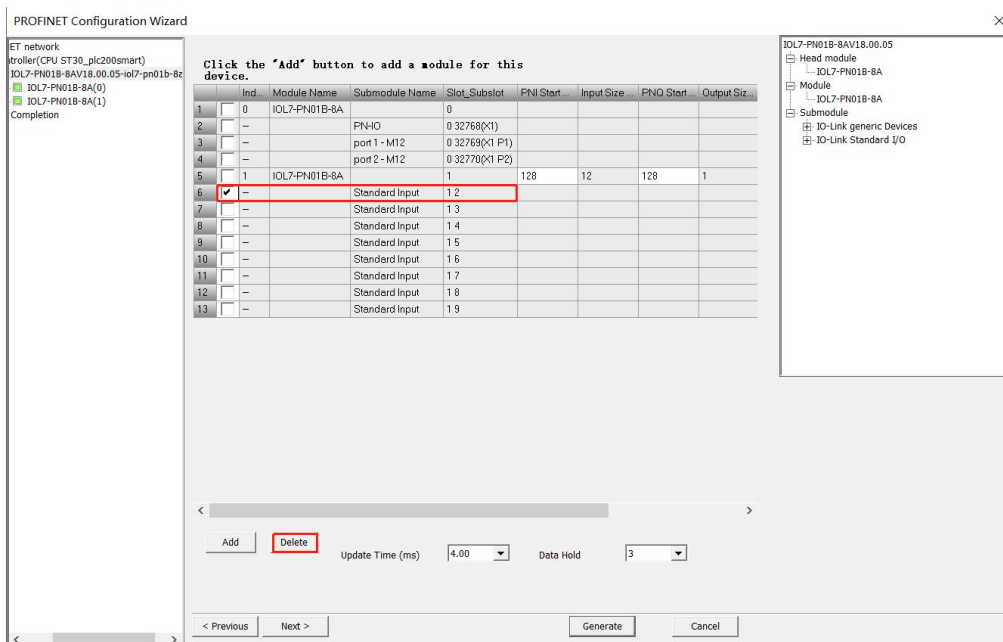
Note: The device name needs to be the same as the module name, and the IP address needs to be set in the same network segment as the PLC.

- e. Click "Next", the network configuration is complete, as shown in the figure below, you can see that the starting address of the module's inputs and outputs are all 128.

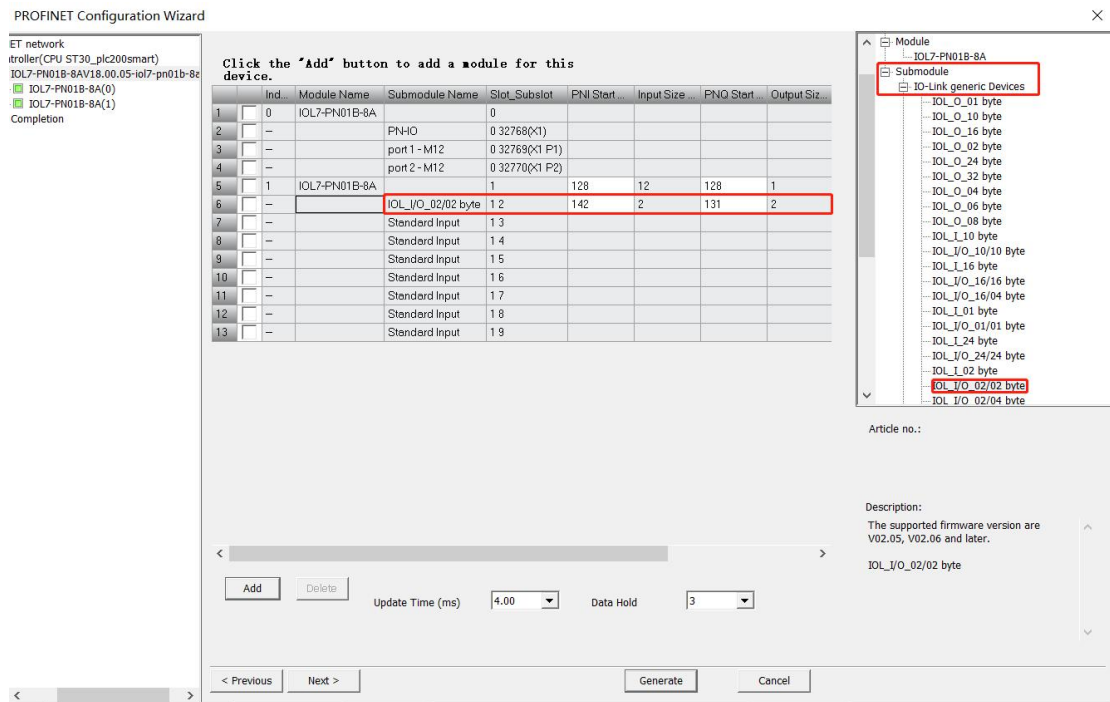


### 6. DI/DO/IO-Link Settings

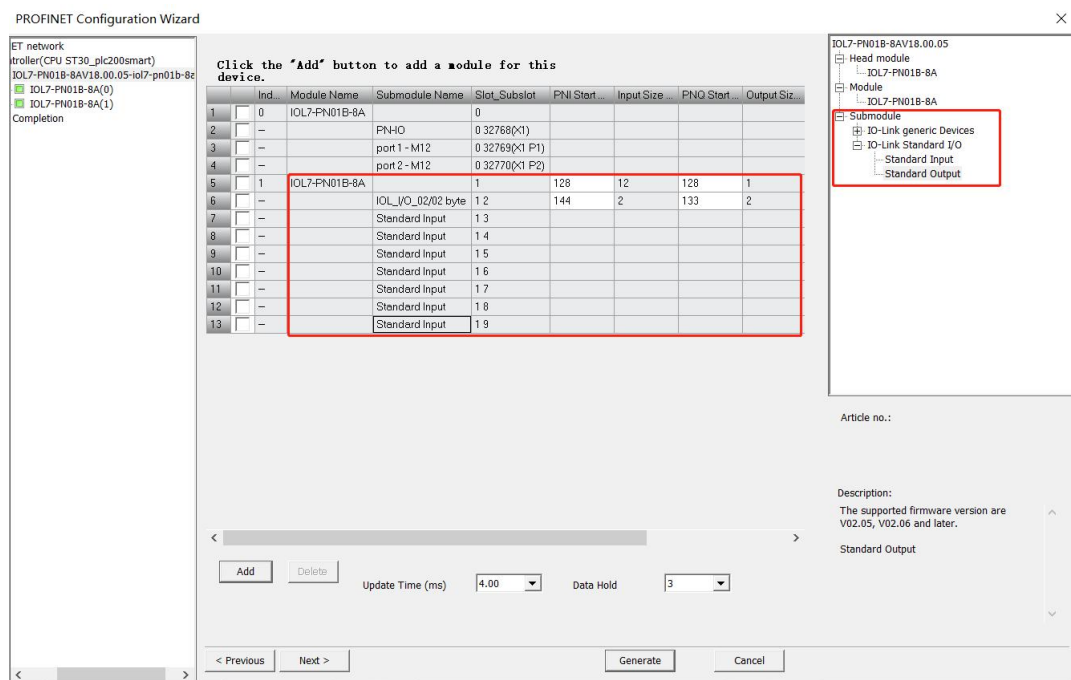
- a. Master port 0 has been connected to the slave module IOL7-16CB-M12, check the IOL7-16CB-M12 power lamp, the power lamp is always on.
- b. In the PROFINET Configuration Wizard interface , check "Standard Input 1 2", that is, select IO-Link Port 0 and click "Delete", as shown below.



- c. After deleting, select "IOL\_ I/O\_02/02 byte" on the right side, click "Add" or select and drag it to Port 0, as shown below. (Note: The IOL7-16CB-M12 can be configured with a maximum of 16 channels of input or 16 channels of output, so select IOL\_ I/O\_02/02 byte).



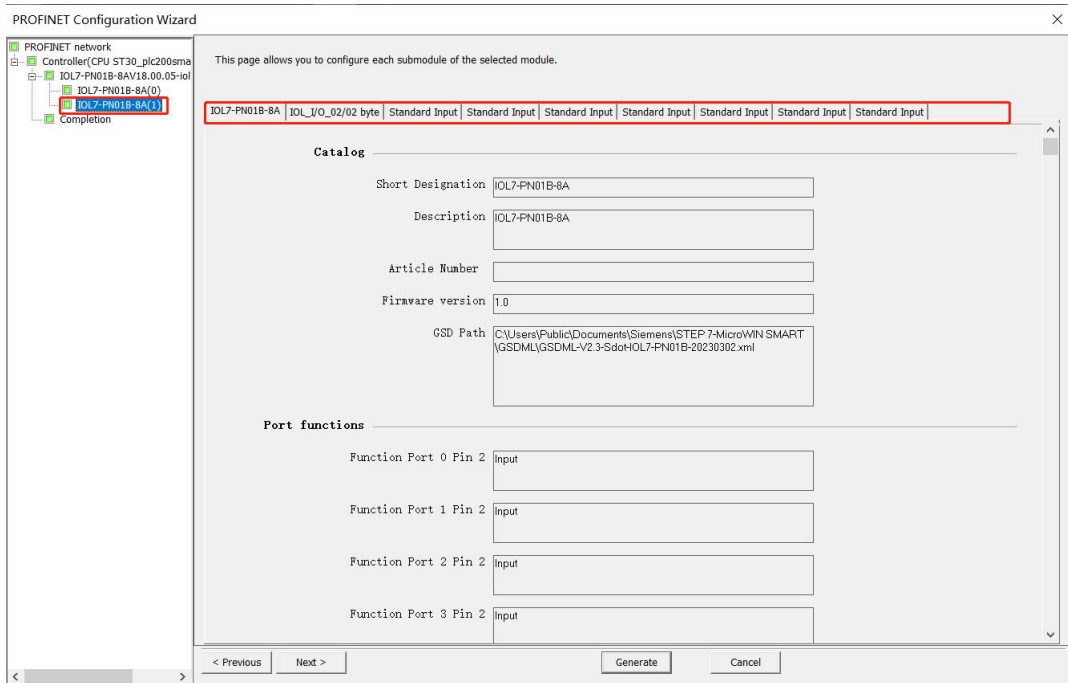
- d. In the same way, configure Port4~7 as "Standard Output", after the configuration is completed, the left Port0~7 is shown in the following figure. The configuration method of other ports DI/DO/IO-Link mode is the same as here.



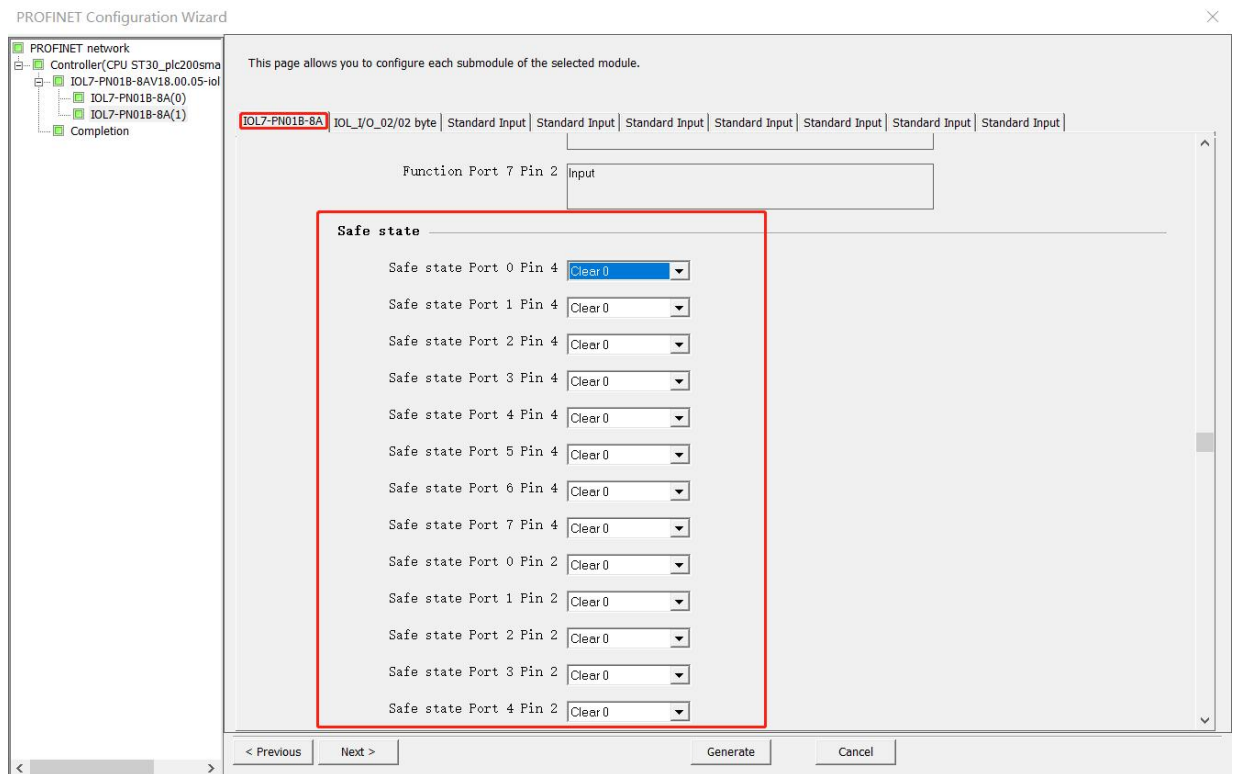
- e. Click "Generate" to complete the configuration of the configuration network; or click "Next" to configure the parameters.

## 7. Parameter Configuration

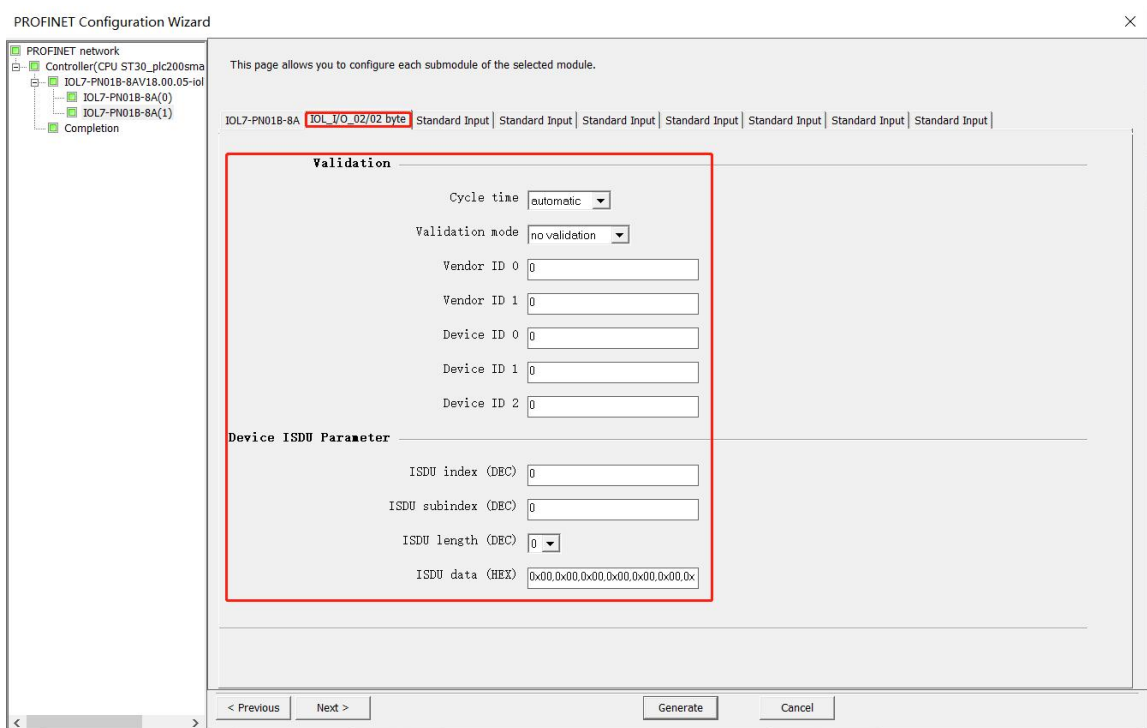
- a. After completing the DI/DO/IO-Link settings, click "Next" in the PROFINET Configuration Wizard interface to view and configure the parameters as shown below.



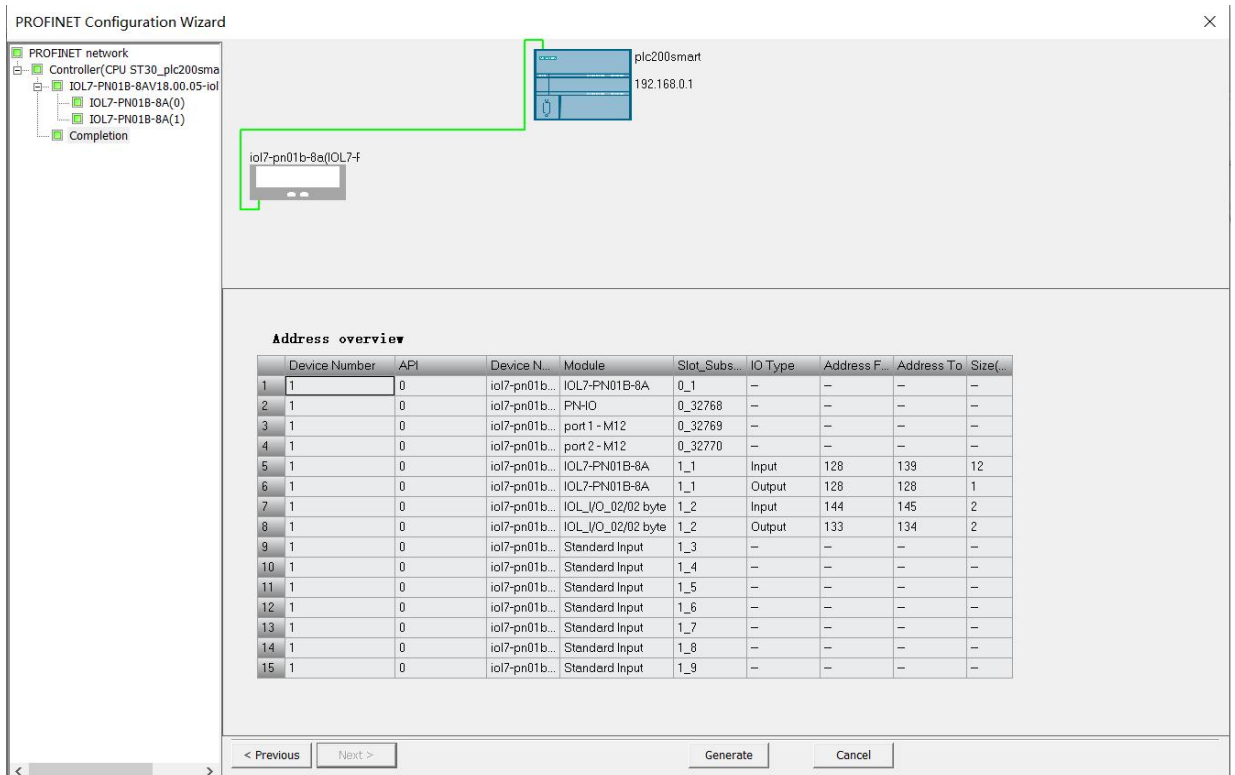
- b. Scroll down the Master Configuration page to configure the Output Clear Hold function as shown below.



- c. Switch to the Slave Configuration page to enable ISDU configuration, as shown below.

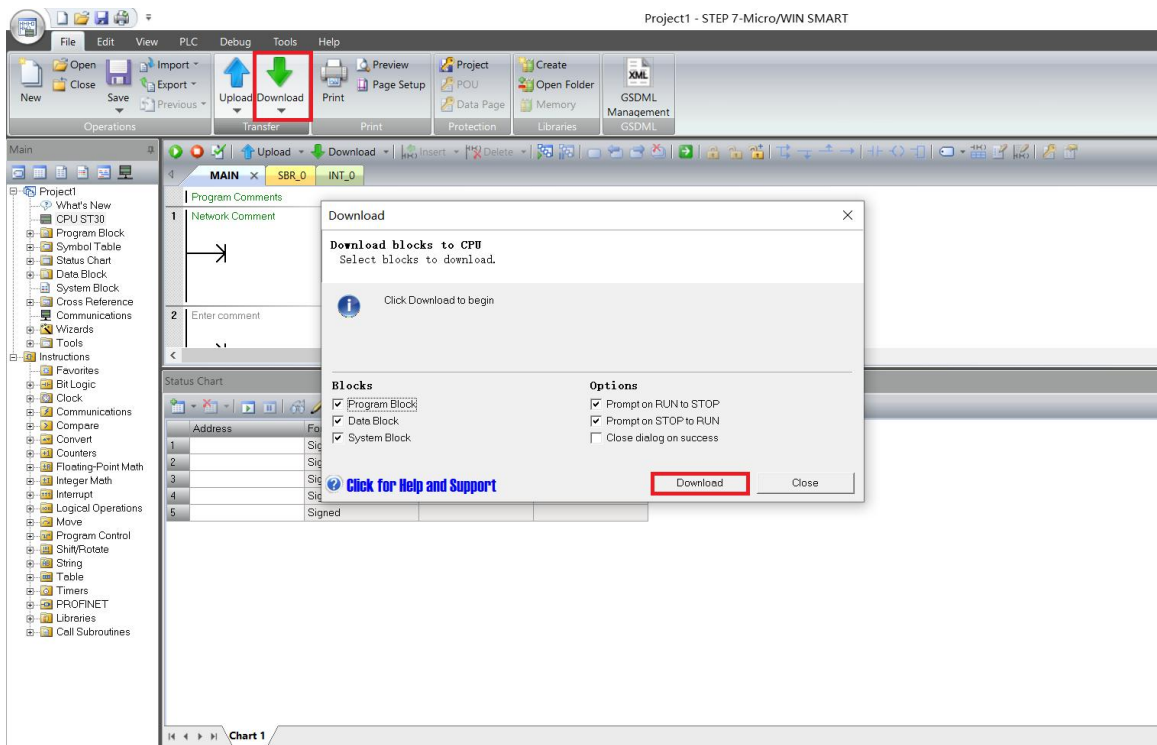


- d. Click Next and Generate to complete the configuration of the network and parameters, as shown below.

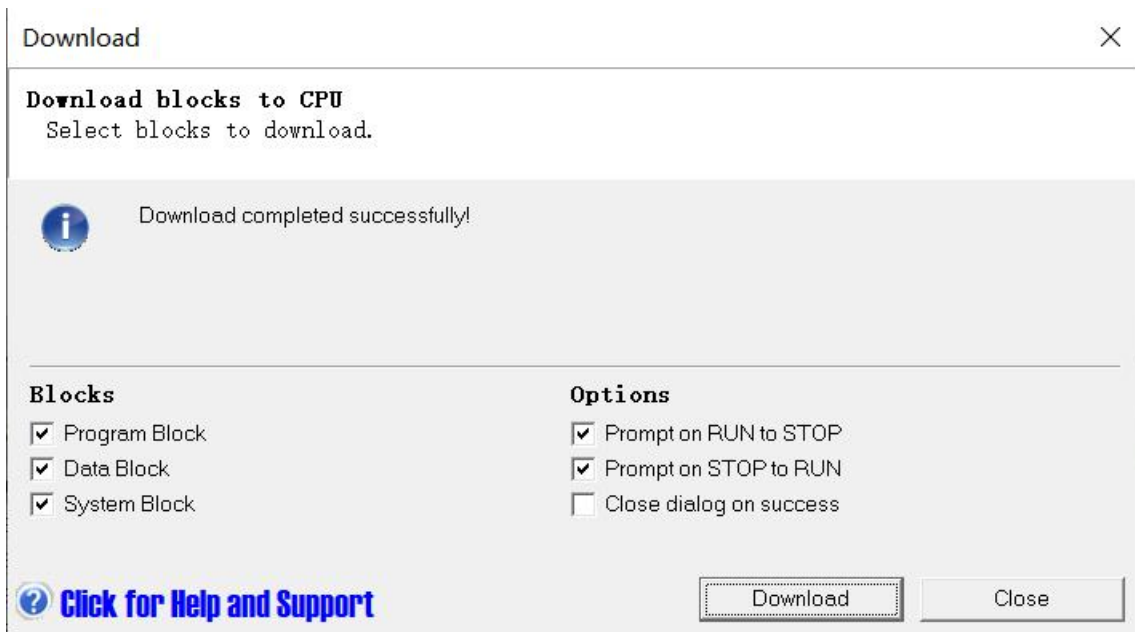


### 8. download program

- a. Click the menu bar "File -> Download", the download window pops up, click "Download", as shown in the figure below.



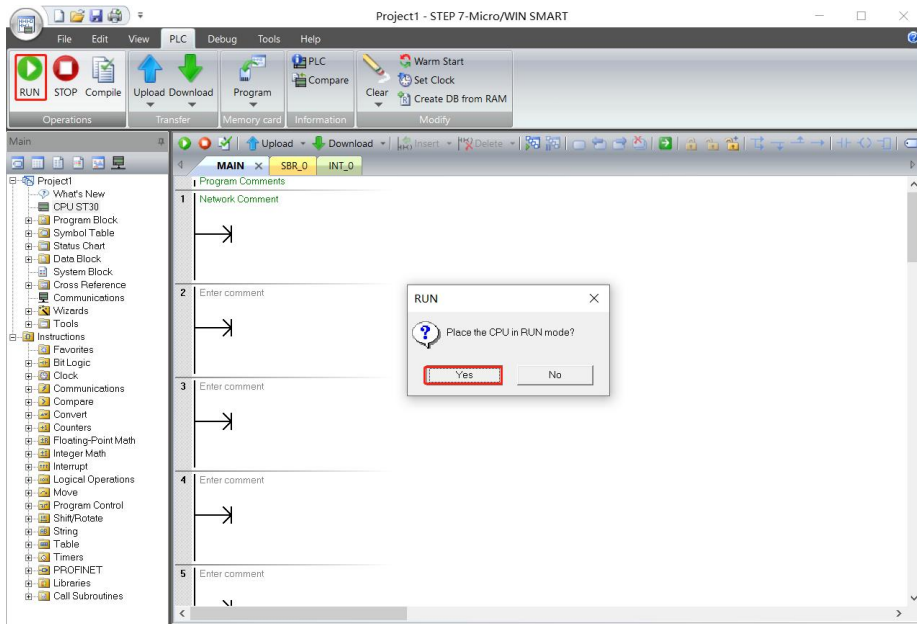
- b. When the download window indicates that the download has been successfully completed, click "Close".



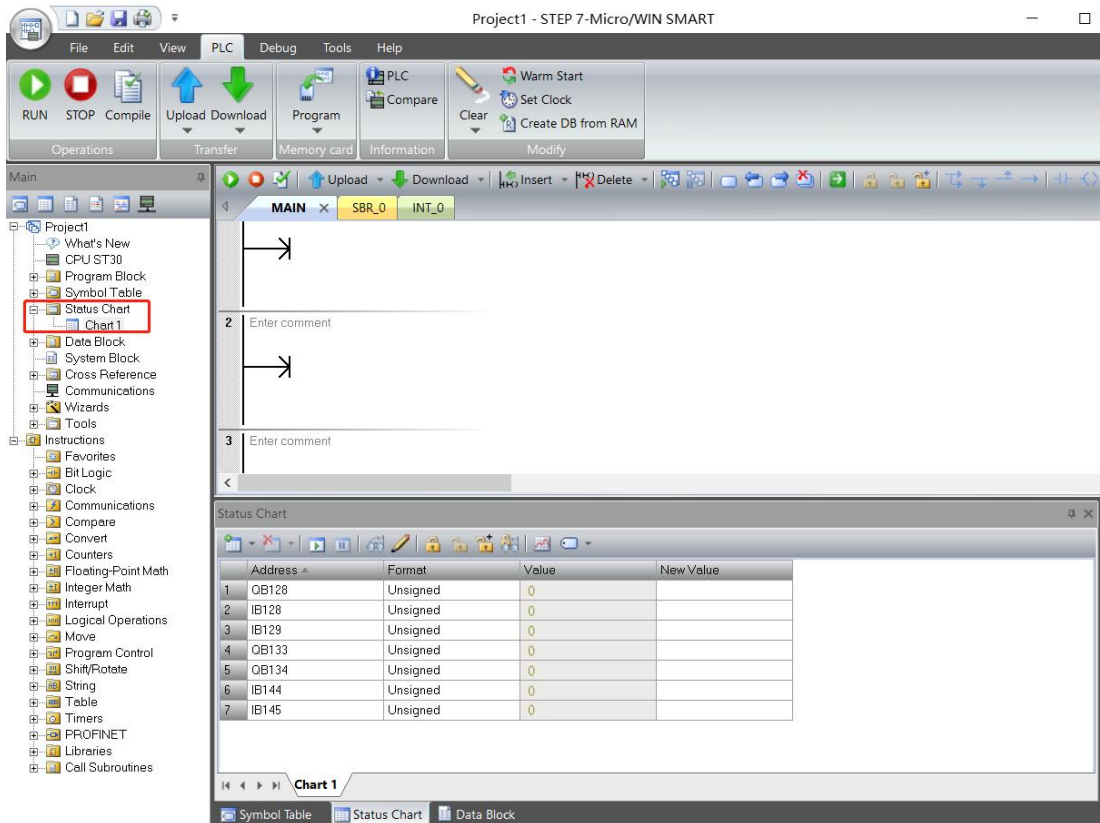
Note: After the download is complete, power the module back up for processing.

### 9、 Functional verification

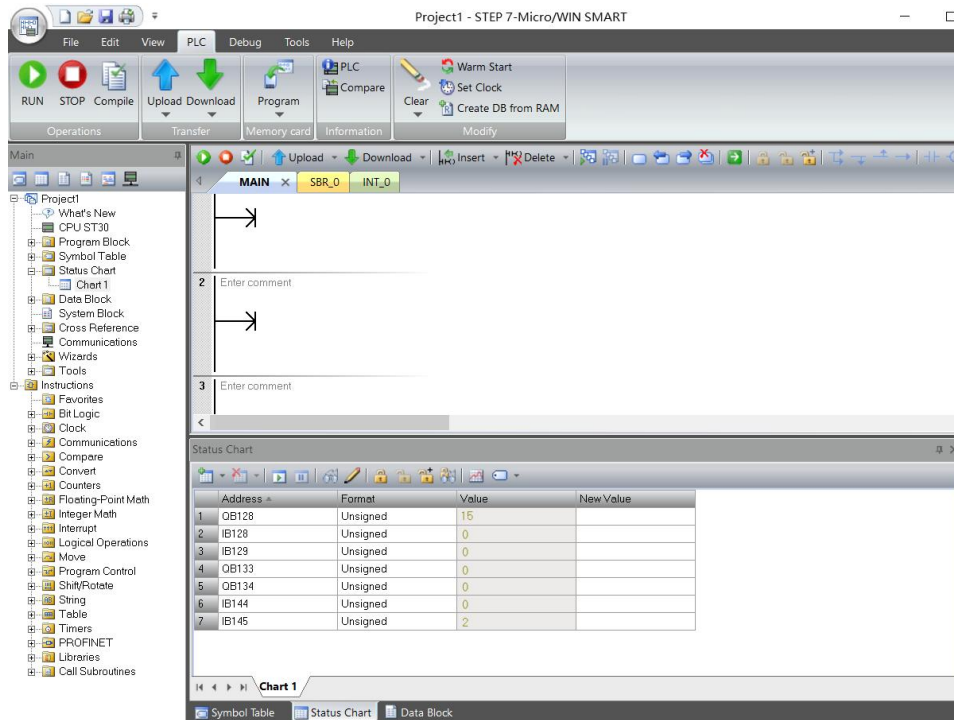
- a. Click "PLC -> RUN" in the menu bar, a confirmation window will pop up, click "Yes" to confirm, as shown below.



- b. Click "Status Chart -> Chart 1" in the left navigation tree, and input the corresponding channel address and data format in Chart 1, you can perform forced output and input monitoring operation for IO module here.



- c. In the new value input box corresponding to QB128 in the output line of the status chart, you can write the output value, such as writing "15", then the value of Pin4 output channel of Port4~7 will be set to 1, and the lamps of Pin4 output channel of Port4~7 will all light up. When there is a valid voltage input to the input channel of Pin2 port of X07 of the slave module, the input value can be monitored in IB145, as shown below.



Note: In this example, the master X00 port access slave module is set to IO-Link mode, Pin2 of X01~X07 and Pin4 of X01~X03 are set to DI mode, and Pin4 of X04~X07 are set to DO mode. IB128 is the address of Pin2 port input channel monitoring for masters X01~X07, IB129 is the address of Pin4 port input channel monitoring for masters X01~X03, and QB128 is the address of Pin4 port output channel monitoring for masters X04~X07. QB133 is the output channel monitoring address of slave devices X00~X03, QB134 is the output channel monitoring address of slave devices X04~X07, IB144 is the input channel monitoring address of slave devices X00~X03, and IB145 is the input channel monitoring address of slave devices X04~X07.

## 7.4 EtherNet/IP Master Configuration Application

To be added.

## 7.5 Customized Data Length Module

[Appendix A](#) in different protocols master defined different byte length of the process data module, these modules basically meet the market mainstream slave equipment docking requirements, but the actual use of some of the slave equipment used in the process data length can not be matched with the module in the phenomenon. For example, a slave has an input process data length of 16 bytes and an output process data length of 32 bytes; using an input process data length of 32 bytes and an output process data length of 32 bytes can be compatible, or customized process data length. This section describes how to customize the process data length.

### 7.5.1 EtherCAT Master Customization Module

1. Determine the slave process data length value, which can be obtained from the Port Info information as described in chapter 7.1.4, or obtain such information from the slave manual;
2. Modify the configuration file to add modules, the module ID is defined as 0x0001xxyy, xx means input process data length byte HEX value, yy means output process data length byte HEX value. Take 16 bytes input process data length 32 bytes output process data length as an example: module ID is defined as 0x00011020; add support module ID in each slot of Device;
3. Restart TwinCAT by placing the configuration file in the TwinCAT installation directory according to chapter 7.2.1;
4. Scan the device, update the device EEPROM, update successfully, power down and reboot.

### 7.5.2 PROFINET master customization module

In PROFINET master device configuration file, "module" is called sub-module, add customized sub-module, sub-module ID is the same as EtherCAT module ID, modify the configuration file, and update the GSD file of the host computer.

#### Precaution

- 
- If you are not sure how to implement the customized data length module and modify the configuration file, please consult the technical support first.
-

# 8 FAQ

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## 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 TwinCAT software was restarted after installing the ESI configuration file or whether Reload Device Descriptions was not performed.

## 8.2 Device cannot enter OP state

1. Confirmation of the correct establishment of the project.
2. Confirm the settings related to the node station number.
3. Verify that the equipment is powered properly.
4. EtherCAT communication line is normal.
5. whether to re-power the device after changing the slave device node address.

## 8.3 Device not found when updating accessible devices

1. Confirm that the PORTAL software is correctly installed.
2. Make sure that no other software is occupying the network adapter used by the PORTAL software.
3. Confirm that the network cable, network card, and network port are working properly.
4. Verify that the IP address or MAC address is not in conflict.

## 8.4 Load button is grayed out when downloading configuration

1. Verify that there are no mandatory values in the PLC.
2. Verify that the PLC is in the stopped state.

# 9 Appendix

## 9.1 Appendix A

Modules with different byte input process data lengths, output process data lengths, and combined input/output process data lengths have been defined in the IOL7 series EtherCAT master and PROFINET master configuration files and are listed in the table below:

Name	Description
Std Input	standard input
Std Output	standard output
IOL_I_01 Byte	Input process data length 1 byte
IOL_I_02 Byte	Input process data length 2 bytes
IOL_I_04 Byte	Input process data length 4 bytes
IOL_I_06 Byte	Input process data length 6 bytes
IOL_I_08 Byte	Input process data length 8 bytes
IOL_I_10 Byte	Input process data length 10 bytes
IOL_I_16 Byte	Input process data length 16 bytes
IOL_I_24 Byte	Input process data length 24 bytes
IOL_I_32 Byte	Input process data length 32 bytes
IOL_O_01 Byte	Output process data length 1 byte
IOL_O_02 Byte	Output process data length 2 bytes
IOL_O_04 Byte	Output process data length 4 bytes
IOL_O_06 Byte	Output process data length 6 bytes
IOL_O_08 Byte	Output process data length 8 bytes
IOL_O_10 Byte	Output process data length 10 bytes
IOL_O_16 Byte	Output process data length 16 bytes
IOL_O_24 Byte	Output process data length 24 bytes
IOL_O_32 Byte	Output process data length 32 bytes
IOL_I/O_01/01 Byte	Input process data length 1 byte, output process data length 1 byte
IOL_I/O_02/02 Byte	Input process data length 2 bytes, output process data length 2 bytes

IOL_I/O_02/04 Byte	Input process data length 2 bytes, output process data length 4 bytes
IOL_I/O_02/08 Byte	Input process data length 2 bytes, output process data length 8 bytes
IOL_I/O_04/02 Byte	Input process data length 4 bytes, output process data length 2 bytes
IOL_I/O_04/04 Byte	Input process data length 4 bytes, output process data length 4 bytes
IOL_I/O_04/08 Byte	Input process data length 4 bytes, output process data length 8 bytes
IOL_I/O_04/16 Byte	Input process data length 4 bytes, output process data length 16 bytes
IOL_I/O_04/32 Byte	Input process data length 4 bytes, output process data length 32 bytes
IOL_I/O_08/02 Byte	Input process data length 8 bytes, output process data length 2 bytes
IOL_I/O_08/04 Byte	Input process data length 8 bytes, output process data length 4 bytes
IOL_I/O_08/08 Byte	Input process data length 8 bytes, output process data length 8 bytes
IOL_I/O_10/10 Byte	Input process data length 10 bytes, output process data length 10 bytes
IOL_I/O_16/04 Byte	Input process data length 16 bytes, output process data length 4 bytes
IOL_I/O_16/16 Byte	Input process data length 16 bytes, output process data length 16 bytes
IOL_I/O_24/24 Byte	Input process data length 24 bytes, output process data length 24 bytes
IOL_I/O_32/04 Byte	Input process data length 32 bytes, output process data length 4 bytes
IOL_I/O_32/32 Byte	Input process data length 32 bytes, output process data length 32 bytes

## 9.2 Appendix B

The IO-Link port status is represented by 1 byte, where Bit0.... 3 indicate the IO-Link port status, Bit4... 7 indicates the IO-Link port error indication, refer to chapter 7 of ETG.5001.6220 S (D) V1.0.5.pdf.

### Bit0... 3 definitions:

Value (DEC)	Description
0	Port inactivation
1	Port is in input mode
2	Port is in output mode
3	Port is in IO-Link mode, communication is normal
4	The port is in IO-Link mode and the communication is abnormal.

### Bit4.... 7 definitions:

Value (DEC)	Description
0	No error
1	watchdog anomaly (computing)
2	cache overflow
3	Invalid Device ID
4	Invalid vendor ID
5	Invalid IO-Link version
6	Null Framing Capability
7	Invalid cycle time
8	Invalid Input Process Data Length
9	Invalid output process data length
10	No equipment detected
11	PreOP status error

For example: the port is configured for IO-Link mode and the slave is not actually accessed. the status prompts 0xA4. the port is configured for IO-Link mode but the length of the input process data does not match. the status prompts 0x84. the port is configured for IO-Link mode but the length of the input process data does not match.

The IO-Link master status is represented by 1 byte and is defined as follows:

Value (DEC)	Description
0	No error
1	phase sequence
2	overpressurization
3	Overcurrent, overload
4...255	reservations

## 9.3 Appendix C

The 1-byte process data length defined in the IO-Link standard, different Bit indicates different meanings, refer to Appendix B.1.6 of 《IOL-Interface-Spec\_10002\_V113\_Jun19.pdf》.

Bit	Description
0... .4	lengths
5	reservations
6	Whether standard input or standard output mode is supported
7	Byte marker bit, set, data length indicates 0... .4 length value plus 1; not set, 0... .4 length value indicates the bit length.

Disregarding Bit6, the correspondence between its value and process data length is simply expressed as follows:

Byte	Description
0x01	Process data length 1 bit, normally used for standard inputs or standard outputs
0x08	Process data length 1 byte
0x10	Process data length 2 bytes
0x18	Process data length 3 bytes
0x83	Process data length 4 bytes
0x84	Process data length 5 bytes
0x85	Process data length 6 bytes
0x86	Process data length 7 bytes
0x87	Process data length 8 bytes
0x88	Process data length 9 bytes
0x89	Process data length 10 bytes
0x8A	Process data length 11 bytes
0x8B	Process data length 12 bytes
0x8C	Process data length 13 bytes
0x8D	Process data length 14 bytes
0x8E	Process data length 15 bytes
0x8F	Process data length 16 bytes
0x90	Process data length 17 bytes
0x91	Process data length 18 bytes
0x92	Process data length 19 bytes
0x93	Process data length 20 bytes
0x94	Process data length 21 bytes
0x95	Process data length 22 bytes
0x96	Process data length 23 bytes
0x97	Process data length 24 bytes
0x98	Process data length 25 bytes
0x99	Process data length 26 bytes
0x9A	Process data length 27 bytes

0x9B	Process data length 28 bytes
0x9C	Process data length 29 bytes
0x9D	Process data length 30 bytes
0x9E	Process data length 31 bytes
0x9F	Process data length 32 bytes

## 9.4 Appendix D

It is possible for the slave ISDU to return an error, where the error code is defined as follows and can be found in Appendix C ErrorTypes of 《IOL-Interface-Spec\_10002\_V113\_Jun19.pdf》.

error code	Description
0x8000	Device application layer error
0x8011	Non-fetchable indexes
0x8012	Non-fetchable subindexes
0x8020	Temporary unavailability of services
0x8021	Local control services temporarily unavailable
0x8022	Temporary unavailability of equipment control services
0x8023	privilege error
0x8030	Parameter crossing range
0x8031	Parameter crossing limit values
0x8032	Parameter is below the limit value
0x8033	Parameter length too long
0x8034	Insufficient parameter length
0x8035	Function unavailable
0x8036	Functions temporarily unavailable
0x8040	Invalid parameter set
0x8041	Inconsistent parameter sets
0x8082	The application is not ready
0x81xx	Manufacturer Customization

## 9.5 Appendix E

Slot0 Data Definition Table for PROFINET Master Models IOL7-PN01B-8A and IOL7-PN01B-4A4B:

typology	byte offset	lengths	Description
Input process data (12 bytes)	0	1 byte	Port Pin2 Standard Input Mode Input Value
	1	1 byte	Port Pin4 Standard Input Mode Input Value
	2	1 byte	Port 0 Device Status
	3	1 byte	Port 1 Device Status
	4	1 byte	Port 2 Device Status
	5	1 byte	Port 3 Device Status
	6	1 byte	Port 4 Device Status
	7	1 byte	Port 5 Device Status
	8	1 byte	Port 6 Device Status
	9	1 byte	Port 7 Device Status
	10	1 byte	master state
	11	1 byte	Input data validity, default 0xFF, reserved
Output process data (1 byte)	0	1 byte	Port Pin4 Standard Output Mode Output Value

Slot0 data definition table for PROFINET master IOL7-PN01B-8B model:

typology	byte offset	lengths	Description
Input process data (11 bytes)	0	1 byte	Port Pin4 Standard Input Mode Input Value
	1	1 byte	Port 0 Device Status
	2	1 byte	Port 1 Device Status
	3	1 byte	Port 2 Device Status
	4	1 byte	Port 3 Device Status
	5	1 byte	Port 4 Device Status
	6	1 byte	Port 5 Device Status
	7	1 byte	Port 6 Device Status
	8	1 byte	Port 7 Device Status
	9	1 byte	master state
	10	1 byte	Input data validity, default 0xFF, reserved
Output process data (1 byte)	0	1 byte	Port Pin4 Standard Output Mode Output Value