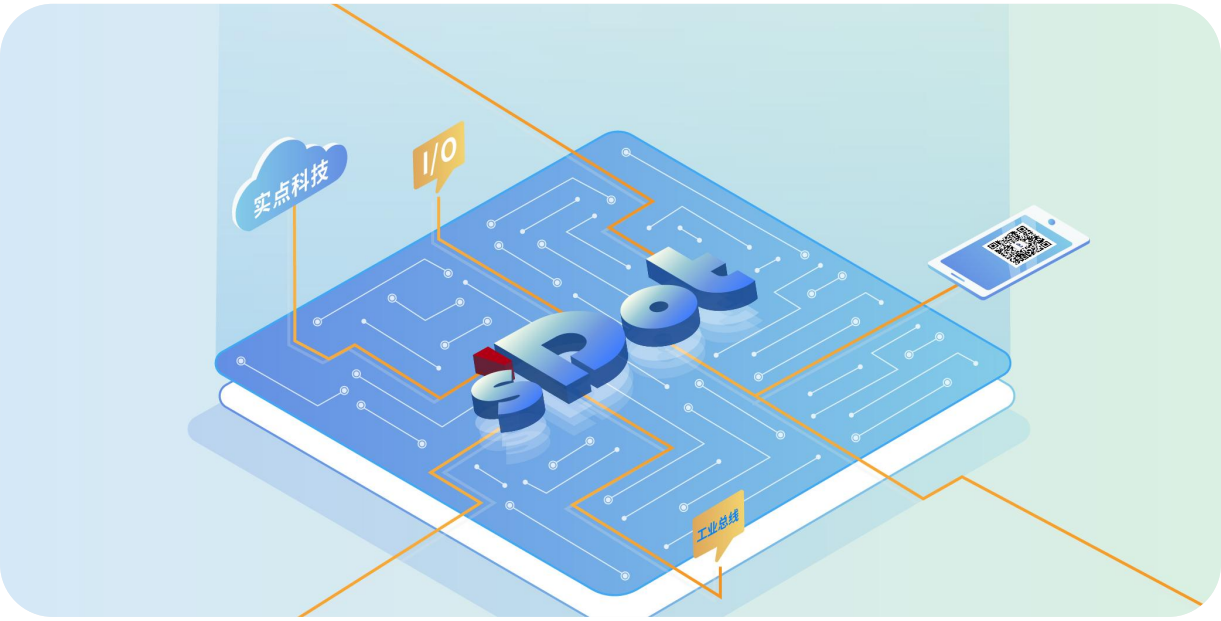

IO-Link Master

IOL7-PN01B-8A-1

User Manual

Nanjing Solidot Electronic Technology Co., Ltd.

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Table of contents

1 Product Overview

1.1 Product Introduction

The IOL7-PN01B-8A-1 is an IOL7 series master station IP67 module, a standard IO-Link master station device with an IO architecture.The device supports the PROFINET industrial Ethernet bus interface on the bus side and the IO-Link protocol on the user side, serving as a gateway device for both bus slaves and IO-Link masters. Both the bus and IO-Link interfaces are compatible with devices from multiple manufacturers, offering high compatibility and providing various options for user data acquisition, system configuration optimization, simplified field wiring, and improved system reliability.

1.2 Product Features

- Up to IP67 protection rating
  Suitable for harsh industrial environments
- Standardization
  Based on the IO-Link standard V1.1.3, it can remotely control IO-Link slave devices and is easy to operate.
- IO-Link communication
  It has 8 IO-Link ports, allowing connection of up to 8 IO-Link devices(Class-A type)
- Parameter settings
  Device parameter backup: Automatically restores the parameters of connected IO-Link devices.
  Port parameter backup: When enabled, the system automatically backs up the configuration parameters of the slave station when it first connects to the port. Subsequent slave stations connected to this port will run according to these backed-up parameters.
- Short circuit overcurrent protection
  Pin2 (DO mode) and Pin4 (DO mode) have short-circuit overcurrent protection.
- Pin2 supports overcurrent recovery.
  Supports automatic and manual recovery
- High compatibility
  Support for slave devices with special process data lengths

- Small size
  Suitable for applications with limited space
- Easy to diagnose
  The innovative channel indicator design, placed close to the channel, makes the communication status of Pin2 and Pin4 clear at a glance, facilitating testing and maintenance.
- Easy configuration
  Simple configuration and supports all major mainstream PLCs
- Simple and quick wiring
  Using standard cables simplifies wiring.

2 Naming Rules

2.1 Naming Rules

IOL 7 - PN 01 B - 8A -1

(1) (2) (3) (4) (5) (6) (7)

Serial Number	Meaning	Value Description
(1)	Product Technology	IOL: Short for IO-Link
(2)	Protection Level	7: IP67
(3)	Bus Protocol	EC: Abbreviation for EtherCAT protocol PN: Abbreviation for PROFINET protocol
(4)	Product Serial Number	01: Product Series Number
(5)	Signal Type	A: NPN B: PNP
(6)	I/O Interface	8A: 8 x Class-A ports
(7)	Product Version	Omitted: Initial version of the main website module -1: Upgraded main site module (Pin2 adds DO functionality, etc.)

2.2 Model List

Model	Product Description
IOL7-PN01B-8A-1	PROFINET bus protocol 8 x Class-A port IO-Link master

3 Product Parameters

3.1 General parameters

Interface parameters	
Bus protocol	PROFINET
Bus interface	2 x M12-D, 4-pin, female, blue
Electrical isolation	500 VAC
Number of I/O stations	According to the main site
Data transmission medium	UTP or STP of Category 5 or higher (STP recommended)
Transmission distance	≤100 m (station-to-station distance)
Transmission rate	100 Mbps
Technical parameters	
Configuration method	via the main site
Power interface	2 x M12-L, 5-pin, pin & socket, red
Power supply	24 VDC (18V～30V)
U_S total current	Max: 9A
U_S consumes current	≤100 mA
U_A total current	Max: 9A
U_A consumes current	0 mA
Power supply reverse polarity protection	support
Weight	480g
Size	225×62×35.1mm
Operating temperature	-25℃ to +70℃
Storage temperature	-40℃～+85℃
Relative humidity	95%, no condensation
Protection level	IP67

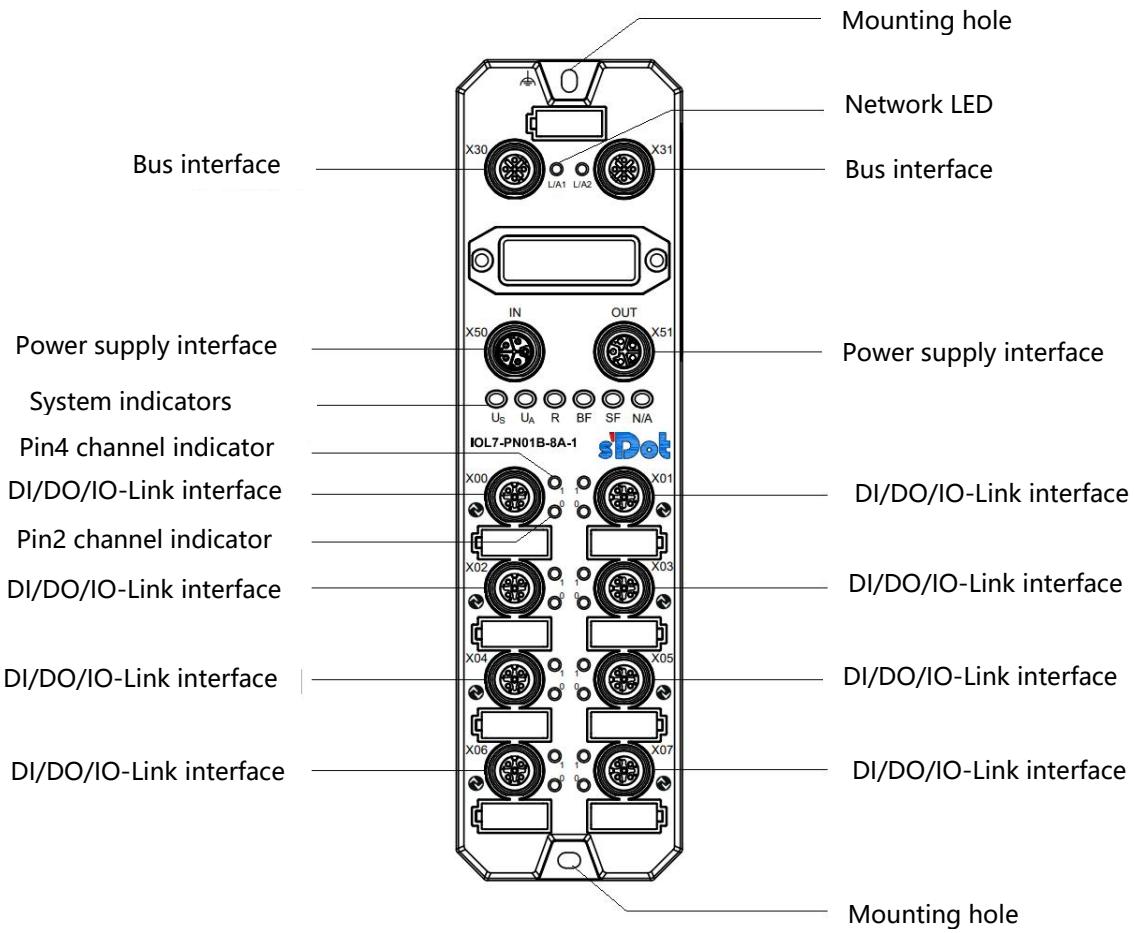
3.2 Digital parameters

Product Model	**IOL7-PN01B-8A-1**
bus protocol	PROFINET
Rated voltage	24 VDC (18V ~ 30V)
DI/DO/IO-Link interface	8 x M12-A, 5Pin, female
IO-Link channel count	8
IO-Link version	V1.1.3
IO-Link transmission rate	COM1 (4.8kbps), COM2 (38.4kbps), COM3 (230.4kbps)
Number of input channels	Maximum 16
Input signal type	PNP
Input filter	Supported, fixed configuration is 3ms
Input current	200 mA
Output maximum number of channels	Maximum 16
Maximum output current of single channel	Pin4: 0.5A
	Pin2: 2A
Output signal type	PNP
Load type	Resistive load, inductive load
Total output current	U_S、U_A maximum 9 A
Port protection	Overcurrent protection
Isolation methods	US and UA are not isolated.
Channel indicators	support

4 Panel

4.1 Product Structure

Product Parts Names



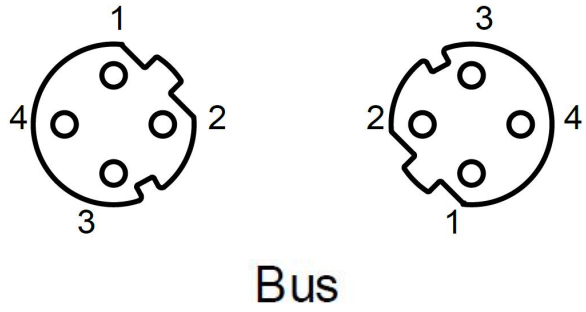
4.2 Indicator function

Name	Logo	Color	Status	Status Description
Network indicator IN	L/A1	GREEN	ON	Establish network connection
			FLGrayING	Network connection and data exchange
			OFF	No data interaction or anomaly
Network indicator OUT	L/A2	GREEN	ON	Establish network connection
			FLGrayING	Network connection and data exchange
			OFF	No data interaction or anomaly
System power indicator	US	GREEN/RED	GREEN ON	Power supply is normal
			RED FLGrayING	The system power supply is greater than 11V and less than 18V.
			OFF	The product is not powered on or the power supply is abnormal.
Auxiliary power indicator	UA	GREEN/RED	GREEN ON	Power supply is normal
			RED FLGrayING	Auxiliary power supply greater than 11V and less than 18V
			OFF	The product is not powered on or the power supply is abnormal.
Operating status indicator	R	GREEN	ON	The system is running normally.
			OFF	Work abnormality
System error indicator	SF	RED	ON	The PROFINET master system is malfunctioning.
			OFF	PROFINET master system is running normally or not powered on
Bus fault indicator	BF	RED	ON	No network connection
			FLGrayING	No PROFINET connection established with the controller
			OFF	Establish PROFINET connection with controller
Pin4 Channel Indicator	1	YELLOW/RED/GREEN	YELLOW ON	Pin4 is in a state of input or output of 1
			RED ON	Pin4 overcurrent
			RED FLGrayING	IO-Link error
			GREEN ON	IO-Link communication connection successful
			GREEN FLGrayING	IO-Link communication not connected
			OFF	The state of Pin4 input or output is 0
Pin2 Channel indicator	0	YELLOW/RED	YELLOW ON	Pin2 input or output state is 1

			RED ON	Pin2 overcurrent
			RED FLGrayING	Pin1 overcurrent (LED1 and LED0 flGray simultaneously)
			OFF	The state of Pin2 input or output is 0

4.3 Bus interface definition

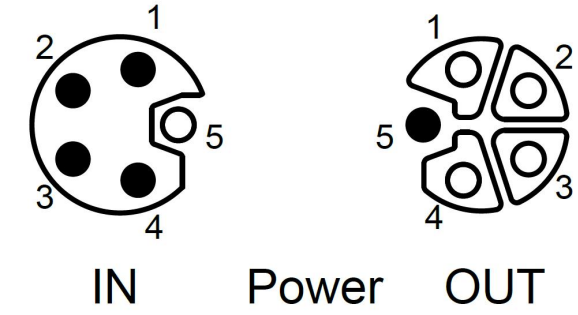
Bus interface connection view (M12-D, female)	Definitions



Pin	Function
1	TX+, send data+
2	RX+, receiving data+
3	TX-, Send data -
4	RX-, Data Receiver-

4.4 Power interface definition

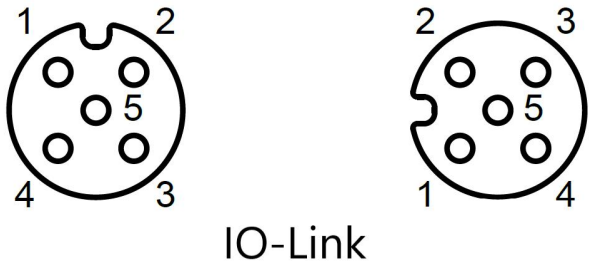
Power interface connection view (M12-L, pin & socket)	Definitions



Pin	Function	Wire core color
1	+24V U_S	Brown
2	0V GND_A	White
3	0V GND_S	Blue
4	+24V U_A	Black
5	PE	Gray

4.5 I/O interface definition

I/O interface connection view (M12-A, female)	Definitions



Pin	Function	Wire core color
1	+24V US	Brown
2	DI/DO	White
3	0V GND_S	Blue
4	DI/DO/IO-Link	Black
5	PE	Gray

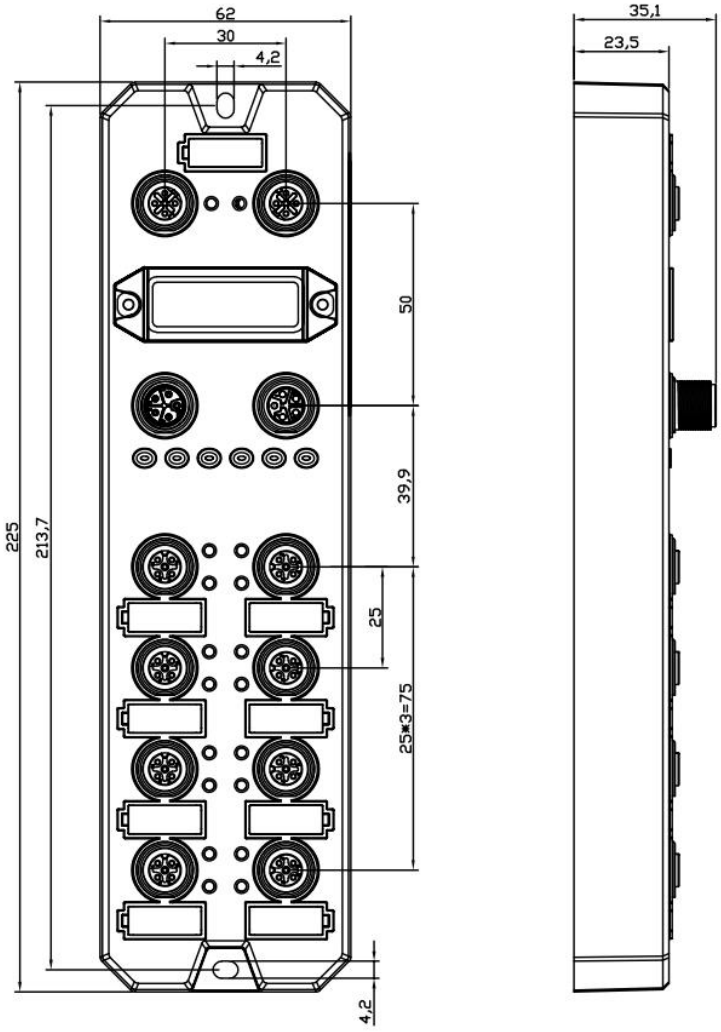
☛ Precautions

- Pin1 and Pin3 are powered by the system power supply U_S, and Pin4 signal output is also powered by U_S,.
- Pin2 power comes from U_A. If the Pin2 output function is not used, U_A can be left unconnected.

5 Installation and wiring

5.1 Outline dimension drawing

External dimensions (unit: mm)



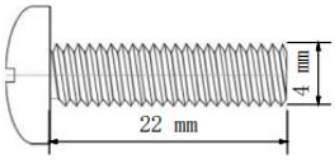
5.2 Installation environment requirements

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

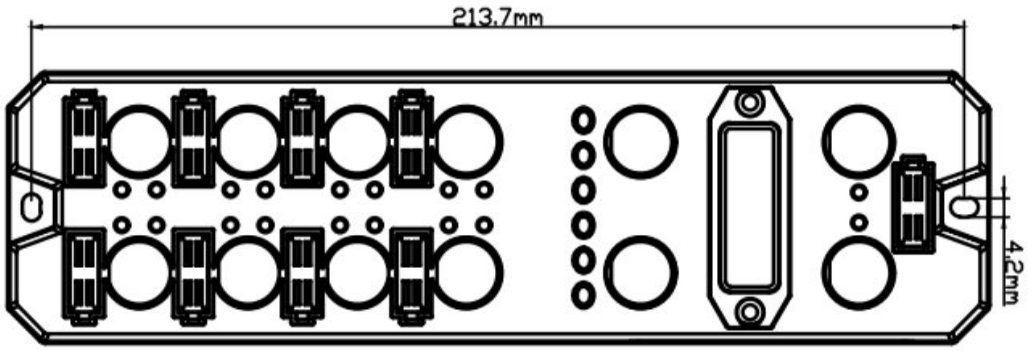
- Places with direct sunlight
- Locations where ambient temperature or relative humidity exceeds module specifications
- Places with corrosive or flammable gases
- Places where there are droplets of acid, oil, or chemicals
- Places with dust, iron filings, and flying sparks
- Locations where the module body is directly subjected to impact or vibration
- Places with strong electric fields, magnetic fields, radiation, and electrostatic interference.
- There are power lines and AC high-voltage power lines nearby.

5.3 Module installation

◆ Please use screws of M4*22mm or larger to secure the module body.



◆ The dimensions of the mounting holes for the module are shown in the figure below.

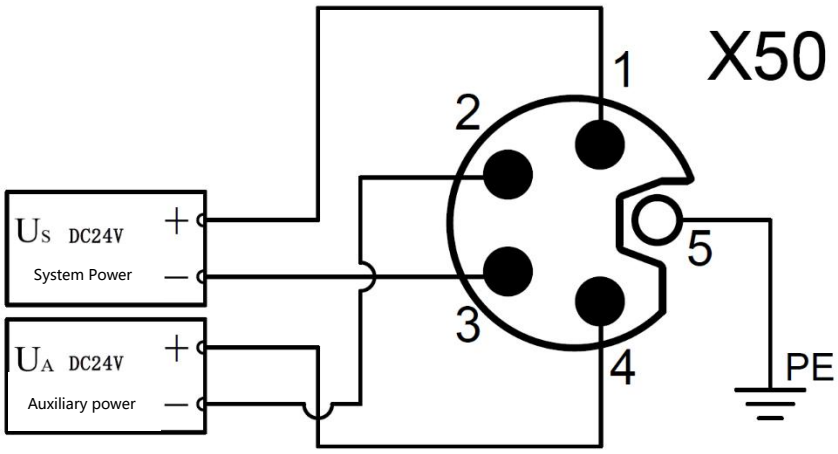


☛ Precautions

- The transparent cover on the module is a pre-installed cover for the rotary switch. The cover is already secured at the factory. Please do not disassemble it at will to avoid damaging the IP67 protection rating.
- Please secure the module properly. If it is not securely fixed, vibration may cause a malfunction.

5.4 Wiring instructions

5.4.1 Power interface wiring diagram

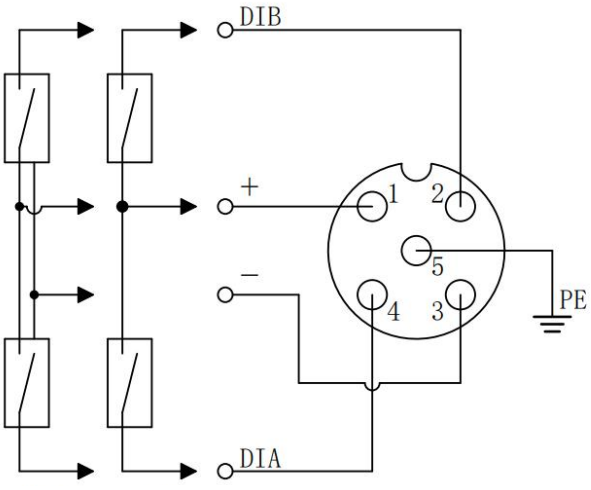


☛ Precautions

- It is recommended that the system power supply and auxiliary power supply use different switching power supplies to ensure operational stability.
- Please refer to the power supply rules "Power supply rules" chapter.

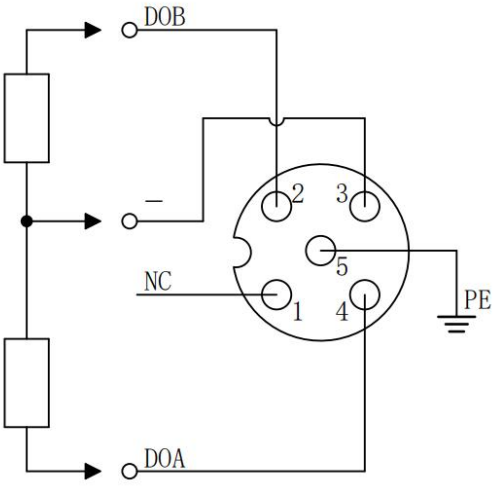
5.4.2 I/O Interface Wiring Diagram

PNP INPUT



3-wire 2-wire

PNP OUTPUT



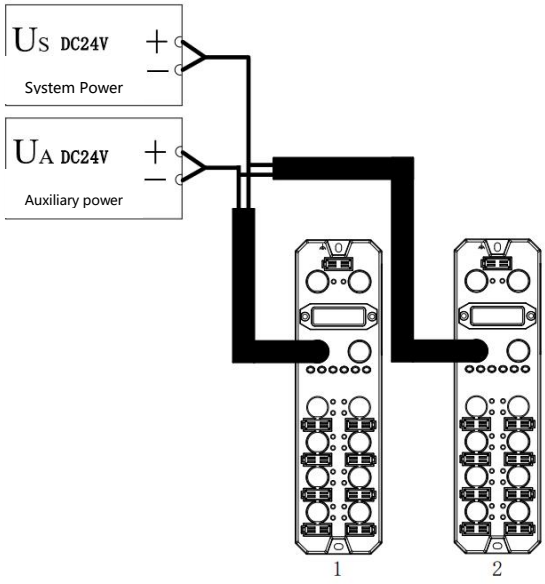
☛ Precautions

- Install the module's waterproof cap on unused connector interfaces and tighten it to avoid compromising the IP67 protection rating.

6 Power supply rules

6.1 Direct power supply rules

Each module is powered directly from the switching power supply, without using the OUT interface. The total current consumed by each module's U_S pin should be ≤9A, and the total current consumed by each module's U_A pin should be ≤9A.



The voltage drop in the power cable varies depending on the total current consumed by the module power supply and the cable material. The table below shows the voltage drop when using our standard cable.

Total Power Supply Current Consumption (A)	Voltage drop (V) at different cable lengths			
	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 calculating the total current consumption of the module when directly powered

For example, if both modules are IOL7-PN01B-8A-1, the usage of each module is shown in the table below:

Module Name	I/O ports			External connection devices	
	port name	Pin Name	I/O mode	Product Name	Specification
Module 1	Ports 1-8	Pin4	DI (Input current 4mA)	3-wire sensor	Current consumption: 30mA
		Pin2	DI (Input current 4mA)		Current consumption: 30mA
Module 2	Ports 1-8	Pin4	DO	Solenoid valve	Load current: 500mA
		Pin2	DO	Solenoid valve	Load current: 500mA

The total current consumption and the calculated current for a single module are shown in the table below:

Module Name	Power type	Total current consumption calculation items	Calculation results
Module 1	System power U_S	System current consumption	Module system-side power consumption 35mA
	System power U_S	Module input current and sensor current consumption	For all ports (Sensor current consumption) + (Channel input current * Number of input points) = (30mA * 16) + (4mA * 16) = 544 mA
Module 2	System power U_S	System current consumption	Module system-side power consumption 35mA
	System power U_S	Pin4 Load Output Current	For ports 1~8 Pin4 Channel output current * Number of output points = 500mA * 8 = 4A
	Auxiliary power supply U_A	Pin2 load output current	For ports 1~8 Pin2 Channel output current * Number of output points

			= 500mA * 8 = 4A

In summary, the current consumption of each module is as follows:

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

The system power supply U_S of module 1 (IOL7-PN01B-8A-1) consumes a current of 35mA + 544mA = 579mA, which is less than the maximum current of the module's system power supply U_S of 9A.

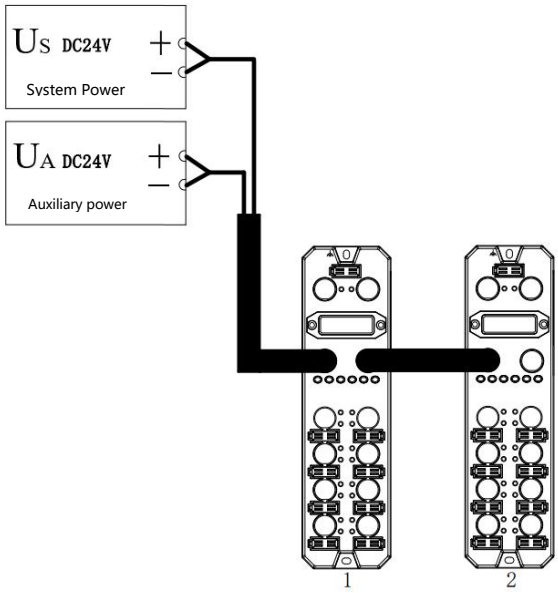
The system power supply U_S of module 2 (IOL7-PN01B-8A-1) consumes a current of 35mA + 4A = 4.035A, which is less than the maximum current of the module's system power supply U_S of 9A.

The auxiliary power supply U_A of module 2 (IOL7-PN01B-8A-1) consumes 4A of current, which is less than the maximum current of 9A of the module's auxiliary power supply U_A.

In this example, the requirement is met because the total current consumed by each module (U_S) is ≤9A and the total current consumed by each module (U_A) is ≤9A.

6.2 Series power supply rules

The modules are connected in series via the OUT interface. The total current consumed by the US of each module should be ≤9A, the total current consumed by the UA should be ≤9A, and the total current consumed by the US and UA of all modules should be ≤9A.



When powered in series, the current consumed by the modules connected in series flows through the module, resulting in a voltage drop in the internal circuit of the module. The voltage drop in the power cable varies depending on the total current consumed by the module power supply and the cable material. The table below shows the voltage drop when using our standard cables.

Total Power Supply Current Consumption (A)	Voltage drop (V) in the internal circuit of the module	Voltage drop (V) at different cable lengths			
		1m	3m	5m	10m
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 consumed by each module's U_S should be ≤9A, and the total current consumed by each module's U_A should be ≤9A.
- As shown in the figure above, when powered in series, the total current consumed by U_S and U_A of all modules should meet the rule that "module 1 + module 2" ≤ 9A.

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

For example, both modules are IOL7-PN01B-8A-1, and the usage of each module is identical to the "Example of calculating the total current consumption of the module when directly powered".

Calculate the total current consumption:

U_S = 579mA + 4.035A = 4.614A, U_A = 4A.

In this example, the requirement is met because the total current consumed by U_S and U_A of all modules satisfies the rule "module 1 + module 2" ≤ 9A.

7 Use

7.1 Parameter and process data description

7.1.1 Output clear and hold function

The clear/hold function applies to the output signals of each port. This function allows configuration of the module's output action in abnormal bus conditions. Three types of operations are supported:

Low-level output (Clear 0): When communication is interrupted, 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 last value: When communication is lost, the module output channel maintains the last state level.

7.1.2 Pin2 circuit overcurrent recovery mode function

When an overcurrent fault occurs in Pin2, automatic recovery and manual recovery are supported. These can be set in the main station module parameters, with automatic recovery being the default.

- **The configuration method for PROFINET master station parameters is demonstrated using TIA Portal V17 software. For specific steps, refer to 7.2.1 Main site parameter configuration in section**

7.1.3 ISDU remote configuration function

The PROFINET master station only supports ISDU write operations before configuration. Before operation, the slave station ISDU information should be obtained. For details, please refer to Chapter 6 of the **IOL7 Series Hub User Manual_Vx.xx.pdf**

The IOL7-16CB-M12 slave station supports configuration of port direction, input filter, and factory reset functions. The following example demonstrates how to configure these three functions, with port 1 connected to the IOL7-16CB-M12 and port 1 displaying status 3 (IO-Link OP status).

1、PROFINET Master Configuration ISDU Parameters

Due to the limitations of the agreement,PROFINET master stations do not support ISDU read operations; they only support ISDU write operations before configuration. For multiple write operations, configuration operations can be issued multiple times. Slave stations typically support saving configurations, and the configuration is not lost even after power failure. The PROFINET master station's Index, Subindex, and Length fields can only contain decimal (DEC) values and do not require a Control field.

Example 1: Configure the IOL7-16CB-M12 with the first 8 channels as inputs and the last 8 channels as outputs. Refer to section 6.5.2 in **IOL7 Series Hub User Manual_Vx.xx.pdf**, Index is set to 66 (0x0042), Subindex is set to 0 (0x00), Length is set to 2 (0x02), and Data is set to 00FF.

Example 2: Configure the IOL7-16CB-M12 to have 3.2ms input filter on the first 8 channels and input filter disabled on the last 8 channels. Refer to section 6.5.8 in **IOL7 Series Hub User Manual_Vx.xx.pdf**, Index is set to 73 (0x0049), Subindex is set to 0 (0x00), Length is set to 16 (0x10), and Data is set to 05050505050505050808080808080808.

Example 3: Restore IOL7-16CB-M12 to factory settings. Refer to section 6.3 in **IOL7 Series Hub User Manual_Vx.xx.pdf**, Index is set to 2 (0x0002), Subindex is set to 0 (0x00) 0x00, Length is set to 1 (0x01), and Data is set to 82.

- **Configuration Methods for PROFINET Master ISDU Function Using TIA Portal V17 Software as an Example. See details in 7.2.1 ISDU parameter configuration in section for specific steps**

7.1.4 DI/DO/IO-Link mode functionality

1、 Port DI/DO mode

◆ The 01 series PROFINET master station supports standard DI/DO modes on all ports, Pin2 and Pin4. Simply select the corresponding standard DI or standard DO mode in the module; the default is standard DI mode.

2、 Port IO-Link mode

◆ The 01 series PROFINET master station supports IO-Link mode on all its pin 4 ports.

◆ Normally, the length of the slave process data should be consistent with the configured module data length, but compatibility is also acceptable. For example, if the slave process data input is 2 bytes, the module can also choose to input more than 2 bytes, such as 4 bytes; however, it cannot choose to input less than 2 bytes, as the device status will indicate an input length mismatch.

Reference value for slave data length in Appendix C. If no slave data length module is available, select a module with a length greater than the slave data length; or according to Section 7.3 Custom Data Length Module and choose the slave data length module.

- **Configuration Methods for PROFINET Master DI/DO/IO-Link Mode Functions Using TIA Portal V17 Software as an Example. See details for specific steps in DI/DO/IO-Link settings in section 7.2.1.**

7.1.5 Upstream and downstream process data

Slot0 data definition table for PROFINET master station model IOL7-PN01B-8A-1:

Type	Byte Offset	Length	Description
Input process data (12 bytes)	0	1 byte	Pin 2 Standard Input Mode Input Value
	1	1 byte	Pin 4 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 station status
	11	1 byte	Input data validity, default 0xFF, reserved

Output process data (2 bytes)	0	1 byte	Port Pin2 Standard Output Mode Output Value
	1	1 byte	Port Pin 4 Standard Output Mode Output Value

Note: For port status details, please refer to Appendix B.

7.2 PROFINET master station configuration application

7.2.1 Application in the TIA Portal V17 software environment

1、Preparation

- **Hardware environment**
  - **Taking the module model IOL7-PN01B-8A-1 as an example**
    The X00 port connects to the IOL7 slave module IOL7-16CB-M12.
  - **One computer, pre-installed with TIA Portal V17 software.**
  - **PROFINET dedicated shielded cable**
  - **One Siemens PLC; this instruction manual uses a Siemens S7-1200 CPU 1214C DC/DC/DC as an example.**
  - **One switching power supply**
  - **Device configuration file**
    Configuration file retrieval address:https://www.solidotech.com/cn/resources/configuration-files
- **Hardware configuration and wiring**
  Please follow the instructions "5 Installation and Wiring"

2、New construction projects

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

- Project name: customizable, you can keep the default.
- Path: Keep the project path; you can keep the default.
- Version: You can keep the default.
- Author: You can keep the default setting.
- Note: customizable and can be left blank.

3、 Add PLC controller

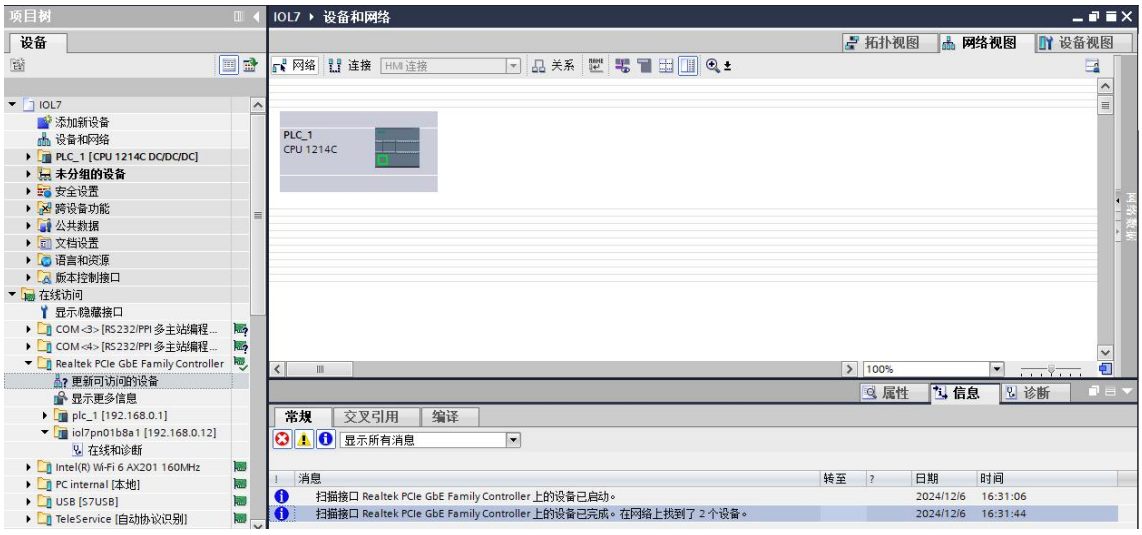
a. Click "Configure Devices", as shown in the figure below.

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

4、Scan connection device

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

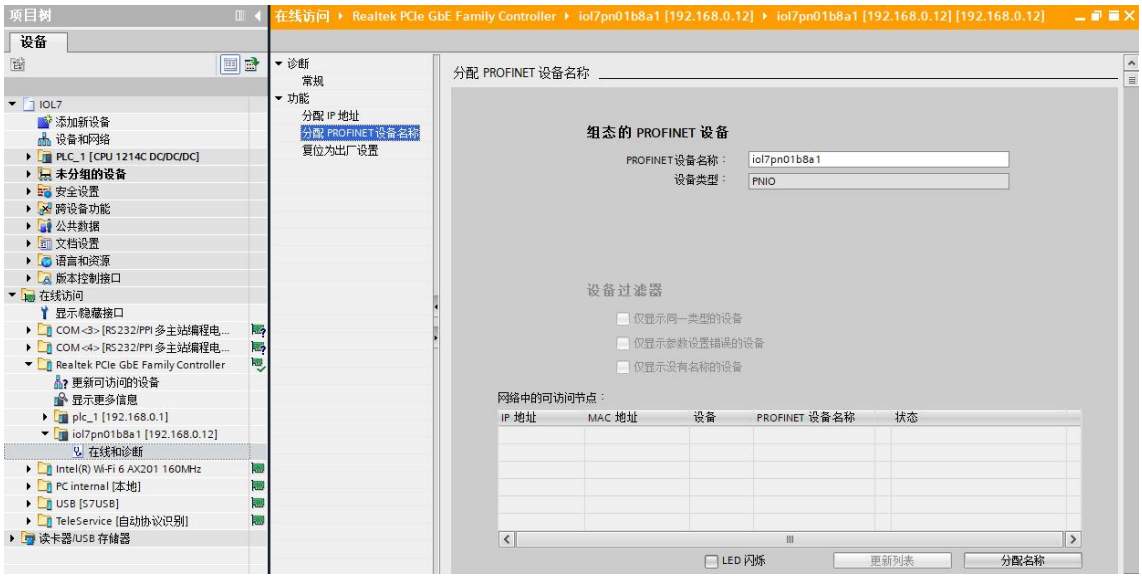
b. The update is complete, and the connected slave devices are displayed, as shown in the figure below.



The computer's IP address must be on the same network segment as the PLC. If they are not on the same network segment, change the computer's IP address and repeat the above steps.

c. Double-click "Online and Diagnostics" under the slave device in the left navigation tree. Under the "Function" menu, you can assign the IP address and device name to the current slave device. Click "Assign IP Address", first fill in the "Subnet Mask", then fill in the "IP Address", and click "Assign IP Address" at the bottom, as shown in the figure below.

d. Click "Assign PROFINET Device Name", enter the "PROFINET Device Name", and click "Assign Name", as shown in the figure below.



5、 Add GSD configuration file

a. In the menu bar, select "Options -> Manage General Station Description Files (GSDML)(D)".

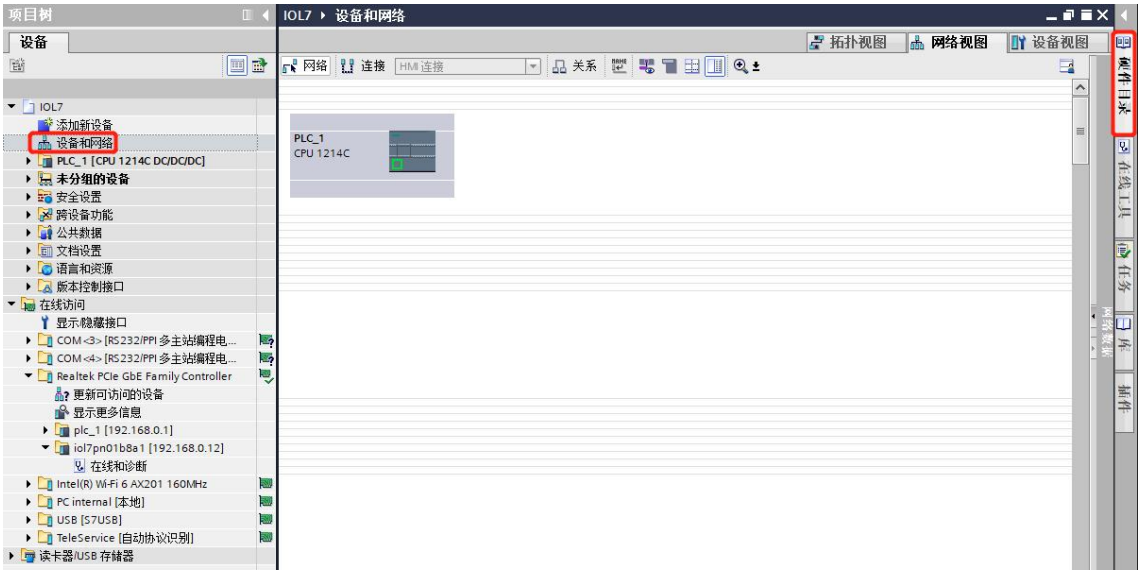
b. Click "Source Path"Select the folder where the GSD files are stored..

c. Check if the status of the GSD file to be added is "Not installed". If not, click "Install". If already installed, click "Cancel" to skip the installation steps.

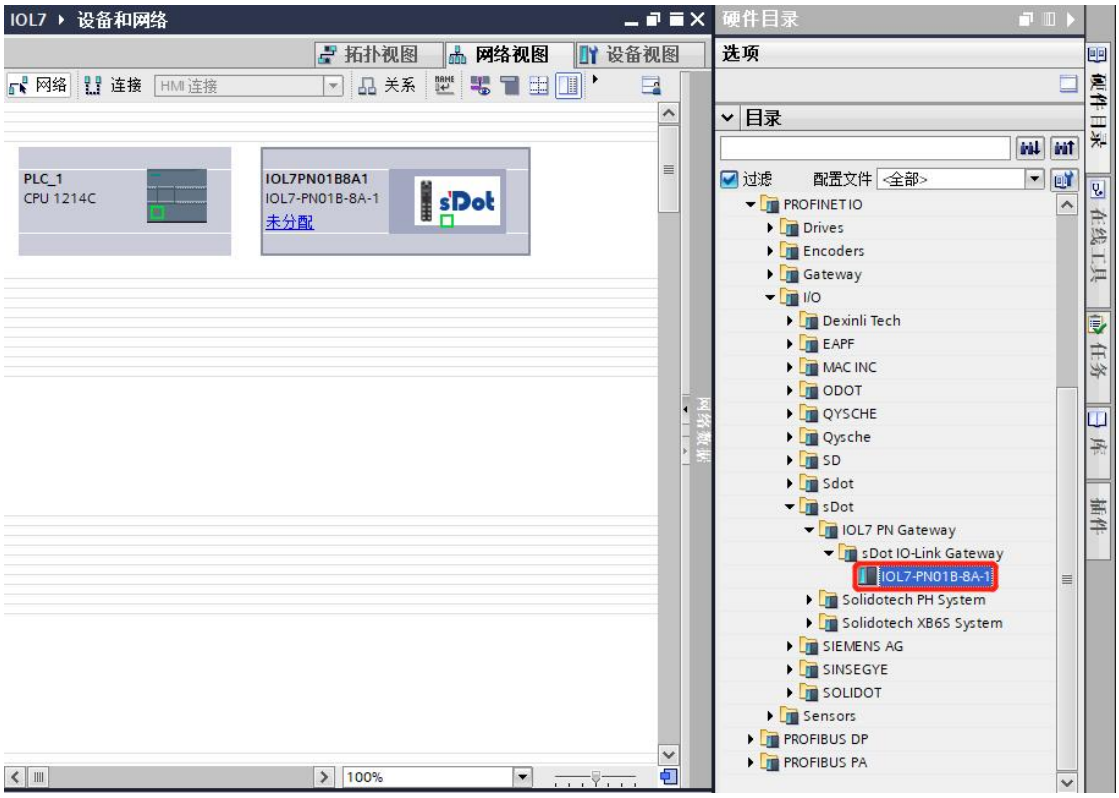
6、 Add slave device

a. Double-click "Devices and Networks" in the left navigation tree.

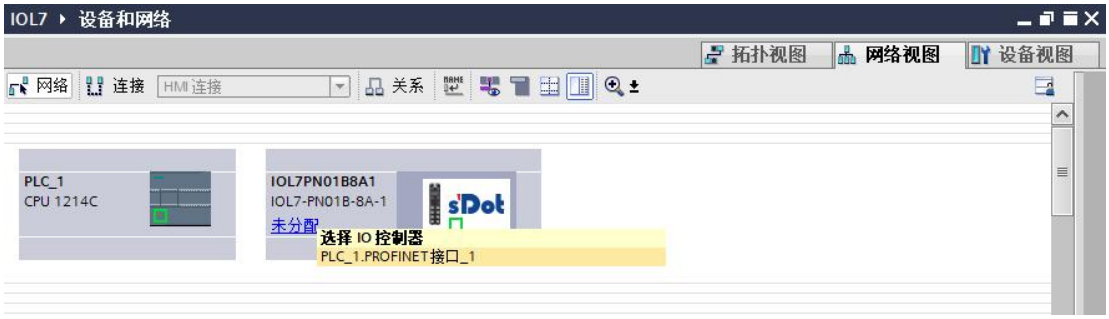
b. Click the vertical "Hardware Catalog" button on the right, and the catalog will be displayed as shown in the image below.



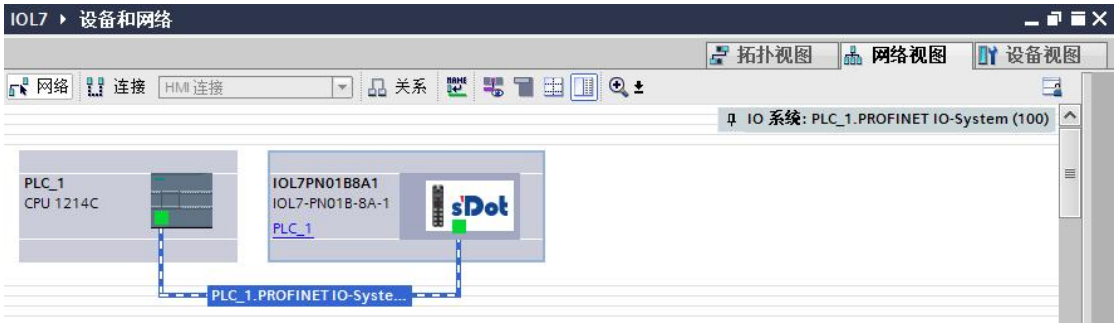
c. Locate the "IOL7-PN01B-8A-1" module in the hardware directory, and drag or double-click "IOL7-PN01B-8A-1" to the "Network View," as shown in the image below. To connect multiple modules, add them sequentially according to the actual topology in the "Hardware Directory" on the right.



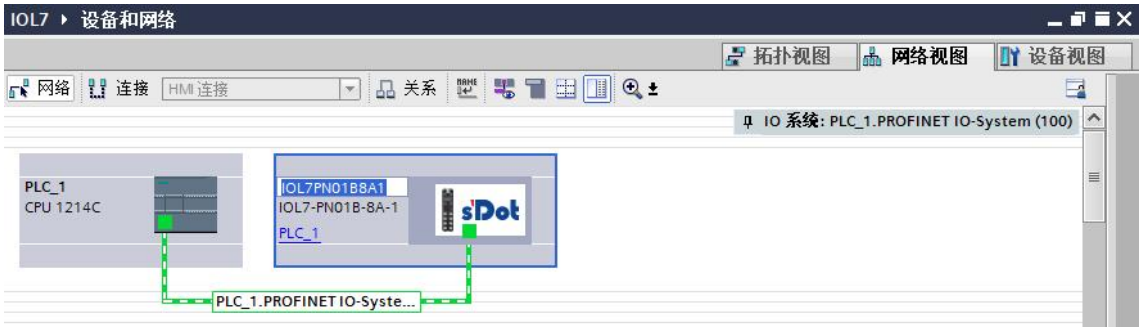
d. Click "Unassigned (blue text)" on the slave device, and select "PLC_1.PROFINET Interface_1", as shown in the figure below.



e. Once the connection is complete, it will look like the image below.



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

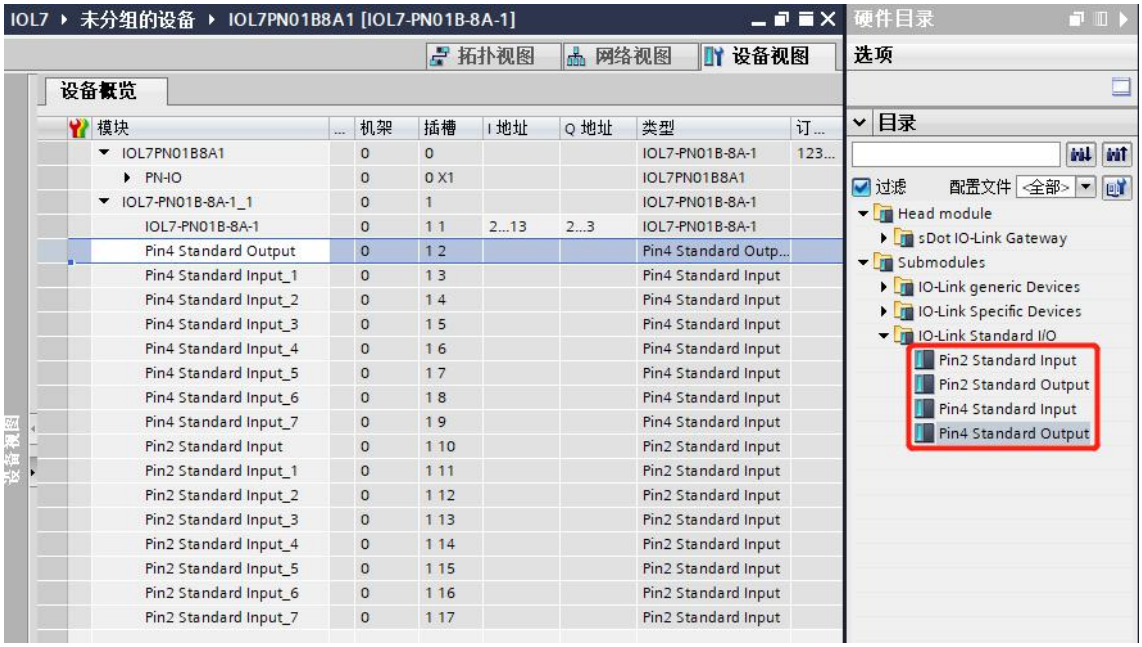


7、 DI/DO/IO-Link settings

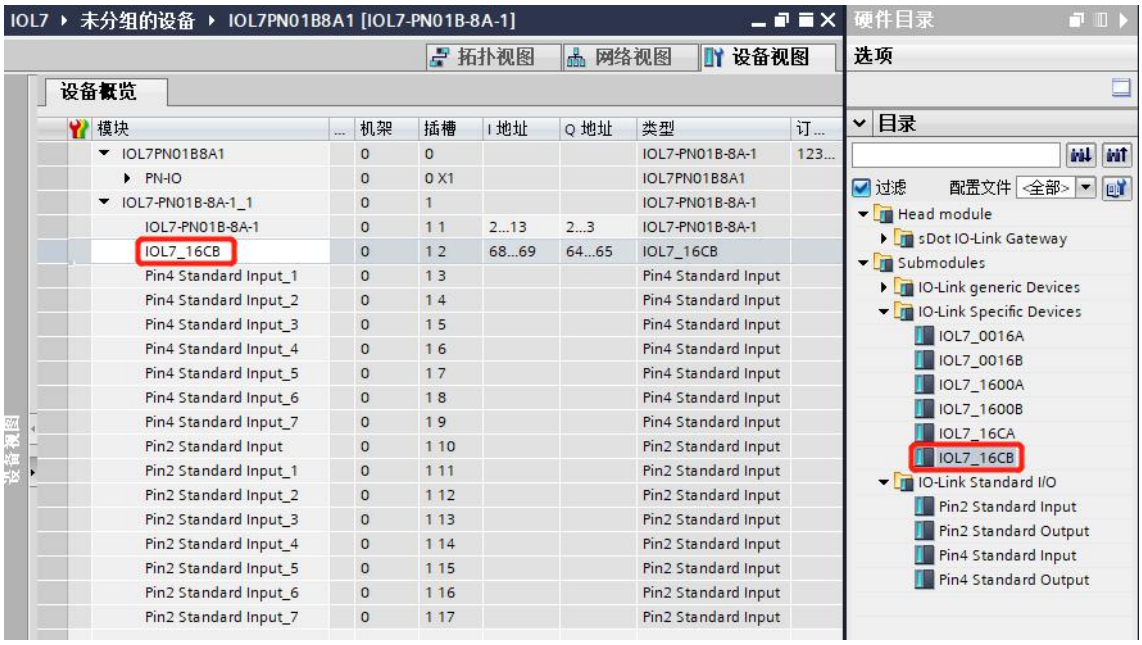
a. Click "Device View" to access the device overview, where you can view topology configuration information, including system-assigned I/O addresses. These I/O addresses can be modified manually, as shown below. Pin4 Standard Input ~ Pin4 Standard Input 7 can be configured as DI/DO/IO-Link. Pin2 Standard Input ~ Pin2 Standard Input 7 can be configured as DI/DO.

模块	...	机架	插槽	I 地址	Q 地址	类型	订货号	固件	注释
IOL7PN01B8A1		0	0			IOL7-PN01B-8A-1	1234567	V18.00.05	
PN-IO		0	0 X1			IOL7PN01B8A1			
IOL7-PN01B-8A-1_1		0	1			IOL7-PN01B-8A-1		1.0	
IOL7-PN01B-8A-1		0	1 1	2...13	2...3	IOL7-PN01B-8A-1		1.0	
Pin4 Standard Input		0	1 2			Pin4 Standard Input			
Pin4 Standard Input_1		0	1 3			Pin4 Standard Input			
Pin4 Standard Input_2		0	1 4			Pin4 Standard Input			
Pin4 Standard Input_3		0	1 5			Pin4 Standard Input			
Pin4 Standard Input_4		0	1 6			Pin4 Standard Input			
Pin4 Standard Input_5		0	1 7			Pin4 Standard Input			
Pin4 Standard Input_6		0	1 8			Pin4 Standard Input			
Pin4 Standard Input_7		0	1 9			Pin4 Standard Input			
Pin2 Standard Input		0	1 10			Pin2 Standard Input			
Pin2 Standard Input_1		0	1 11			Pin2 Standard Input			
Pin2 Standard Input_2		0	1 12			Pin2 Standard Input			
Pin2 Standard Input_3		0	1 13			Pin2 Standard Input			
Pin2 Standard Input_4		0	1 14			Pin2 Standard Input			
Pin2 Standard Input_5		0	1 15			Pin2 Standard Input			
Pin2 Standard Input_6		0	1 16			Pin2 Standard Input			
Pin2 Standard Input_7		0	1 17			Pin2 Standard Input			

b. When configuring DI/DO for the main station module IOL7-PN01B-8A-1, select the X00~X07 ports corresponding to Pin4/Pin2 Standard Input ~ Pin4/Pin2 Standard Input 7. Right-click to delete them, then double-click under the "Hardware Directory" on the right to add Pin4/Pin2 Standard Input/Standard Output, as shown in the figure below.

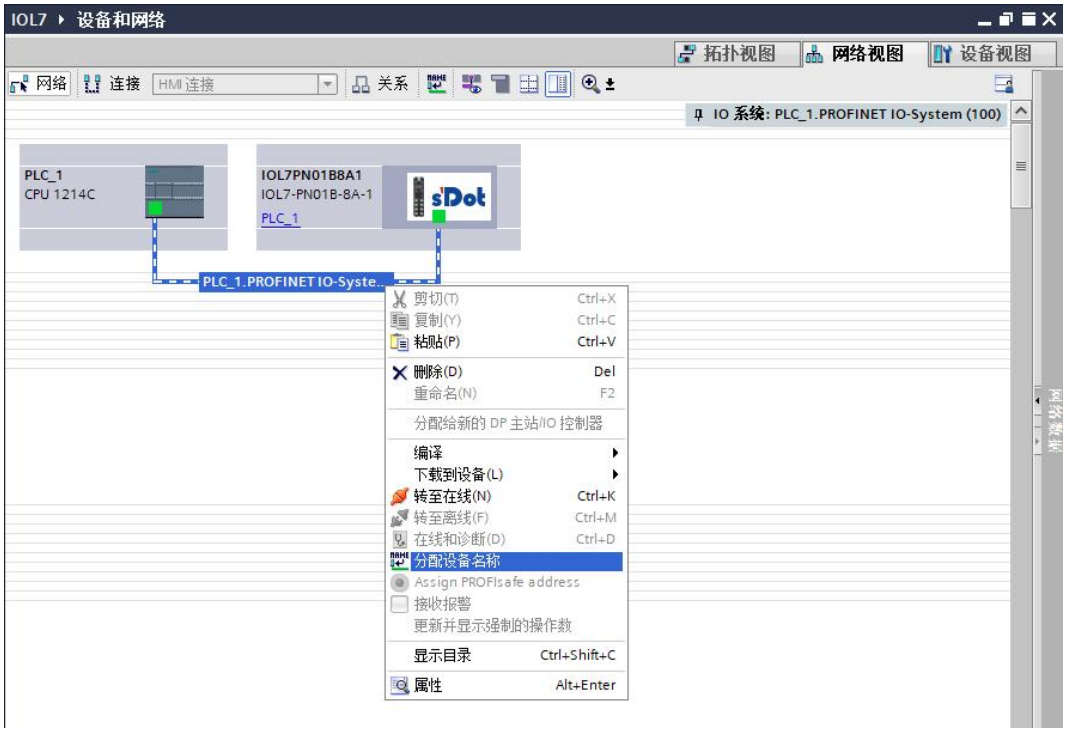


c. The IOL7-16CB-M12 module is connected to the X00 port Pin4 of the master module IOL7-PN01B-8A-1. Locate the module in the "Hardware Directory" on the right, right-click "Pin4 Standard Input" and select "Delete". Then double-click "IOL7_16CB" to add the IOL7 slave to the configuration, as shown in the figure below.

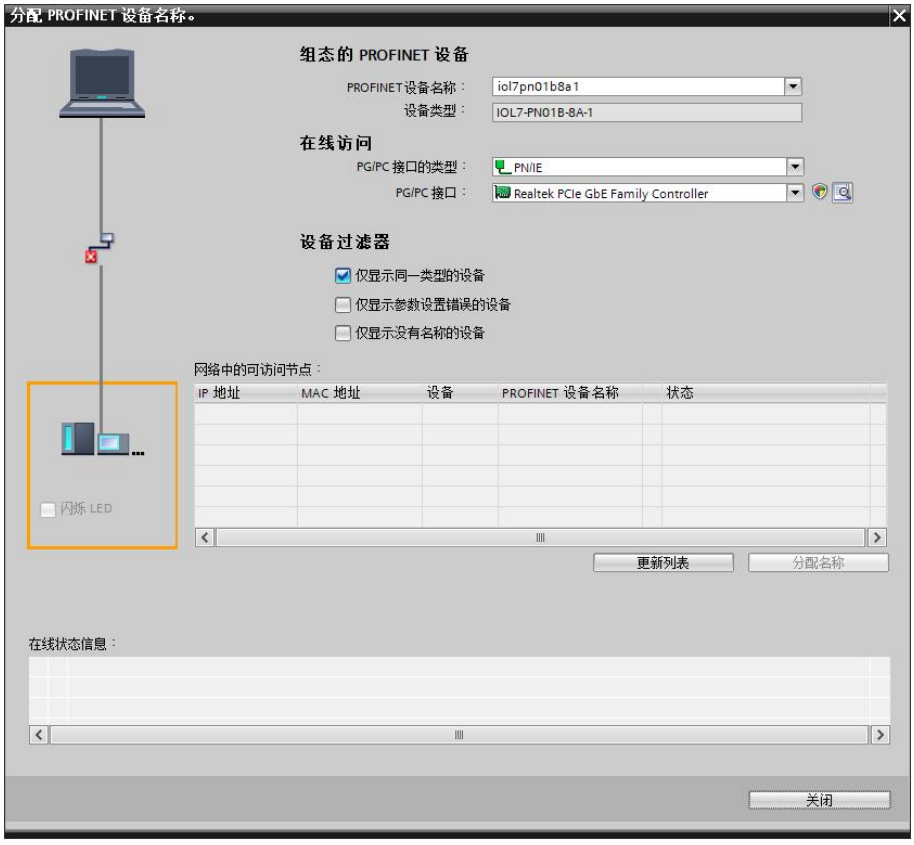


8、Assign device name

a. Switch to "Network View", right-click the connection cable between the PLC and module IOL7-PN01B-8A-1, and select "Assign Device Name", as shown in the figure below.



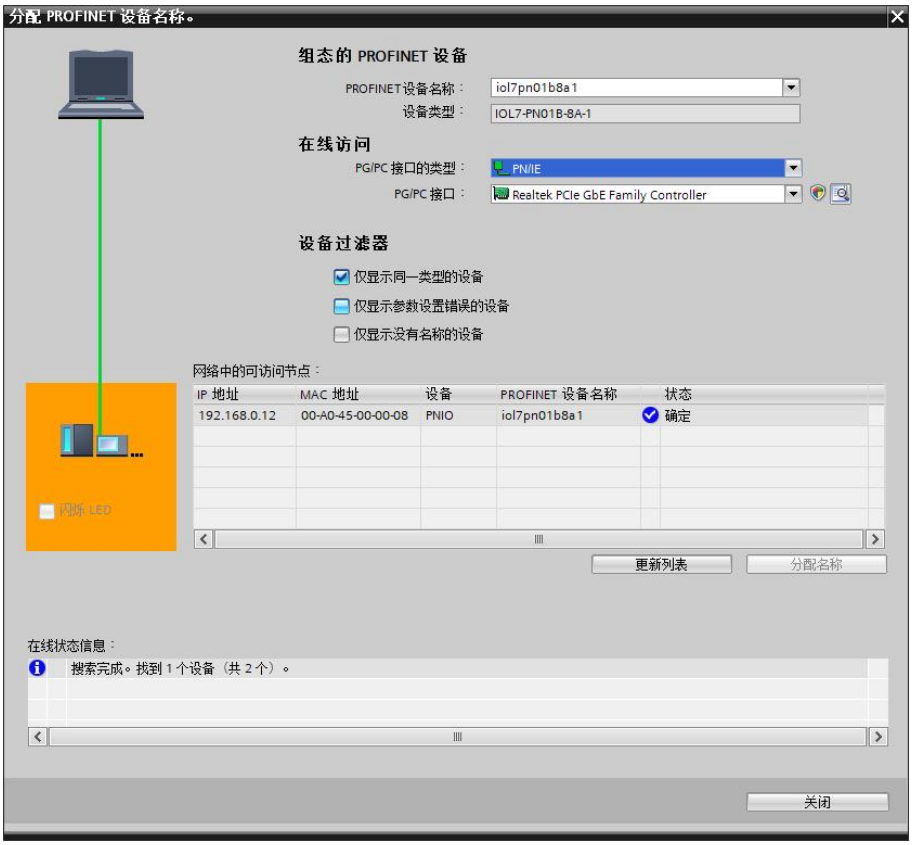
b. A "Assign PROFINET Device Name" window will pop up, as shown in the figure below.



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

- PROFINET device name:Assign the name set in "PROFINET device name".
- PG/PC interface type: PN/IE.
- PG/PC interface: The actual network adapter used.

c. Select the slave devices in sequence, click "Update List", and then click "Assign Name". Check whether the status of the node in "Accessible Nodes in the Network" is "OK", as shown in the figure below.



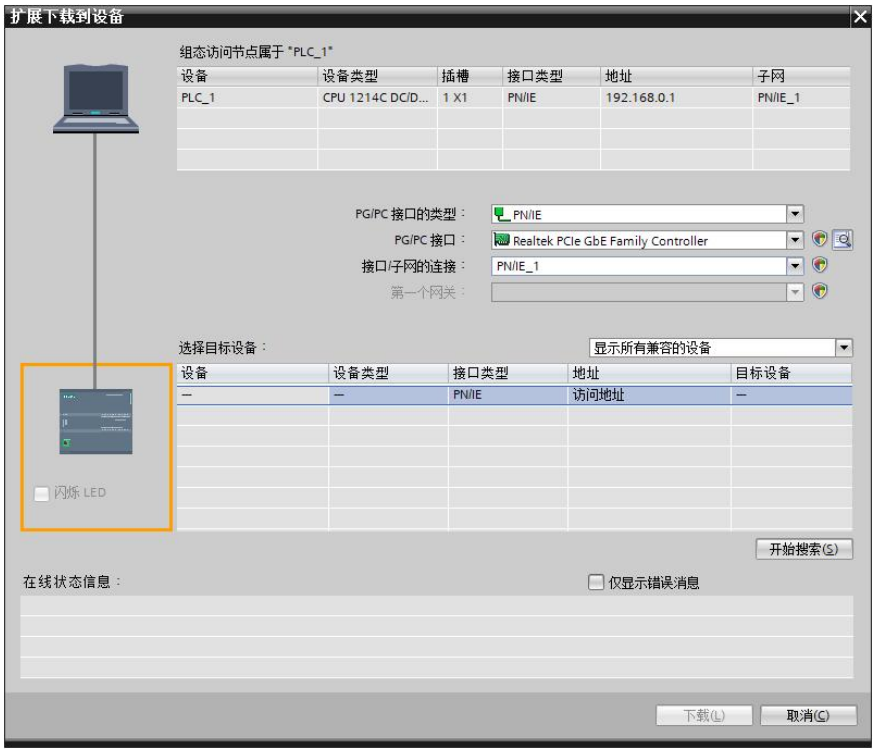
d. Click "Close".

9、Download configuration structure

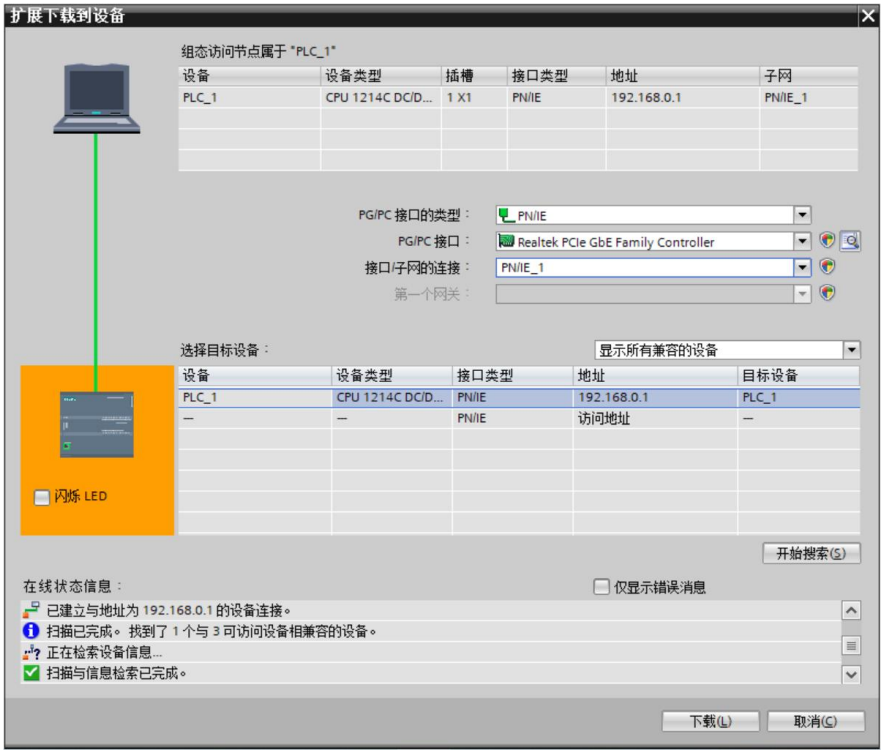
a. In the "Network View", select PLC.

b. Click the button in the menu bar to download the current configuration to the PLC.

c. In the pop-up "Download extension to device" interface, configure as shown in the image below.



d. Click "Start Search", as shown in the image below.



e. Click "Download".

f. Select "Continue without stepping", as shown in the image below.

g. Select "Stop All".

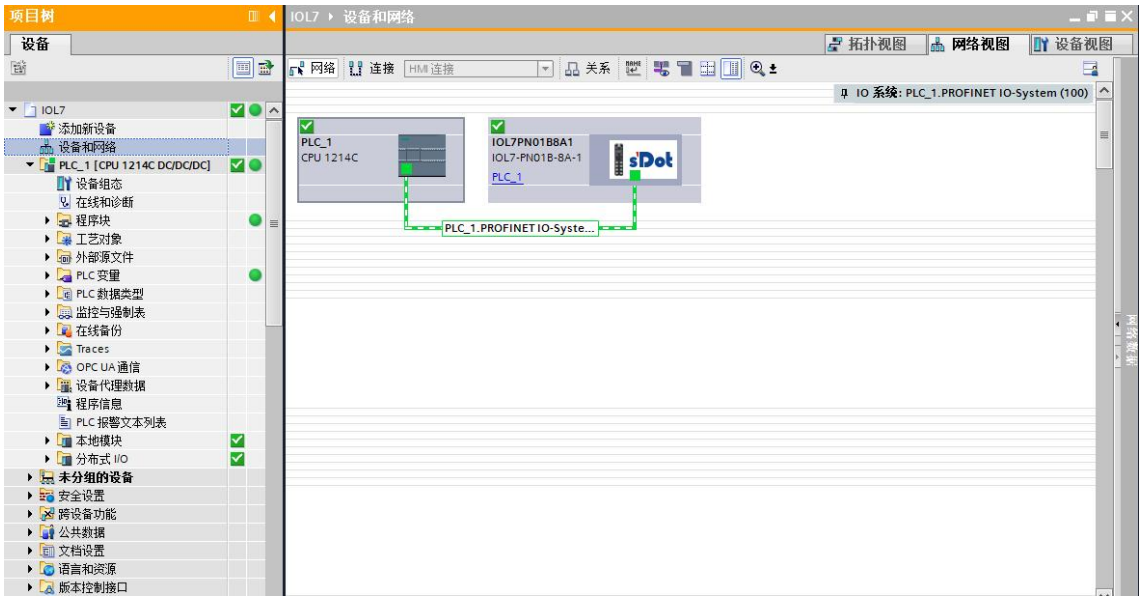
h. Click "Load".

i. Click "Finish".

j. Power on the device again.

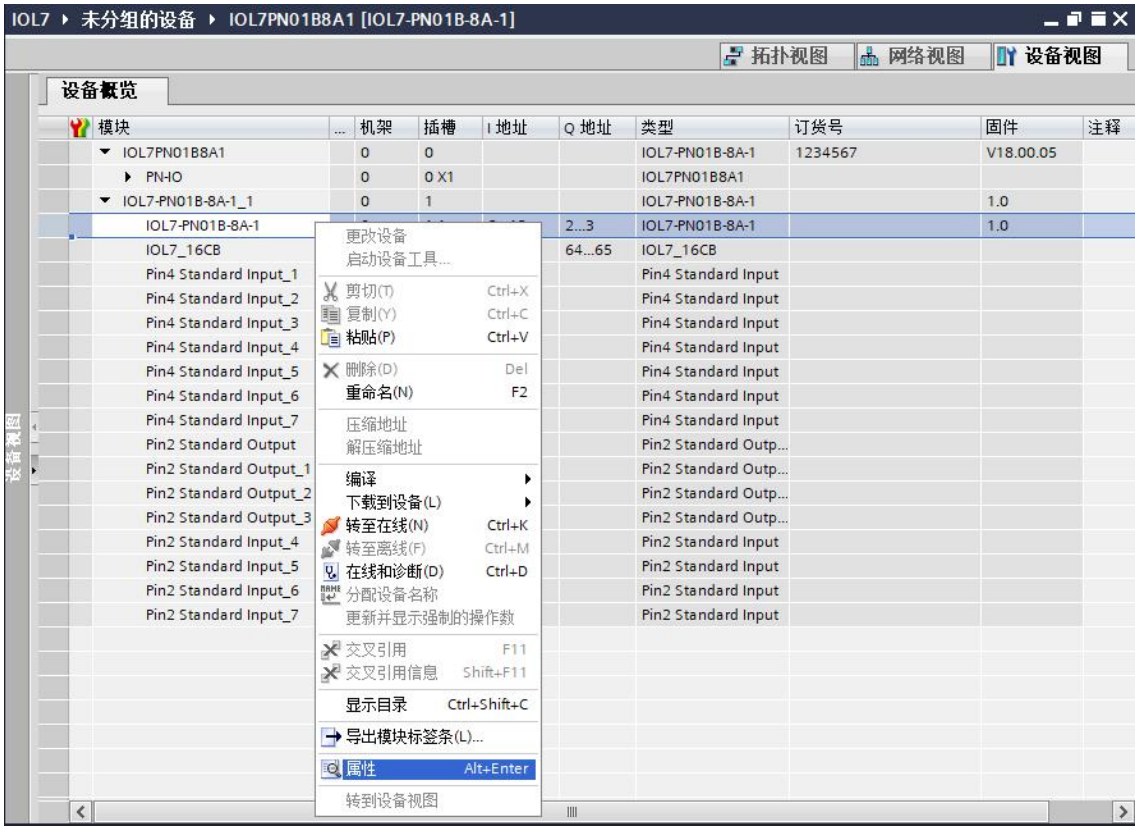
10、 Communication connection

a. Click the button then click "Go to Online". When all icons are green, the connection is successful, as shown in the image below.

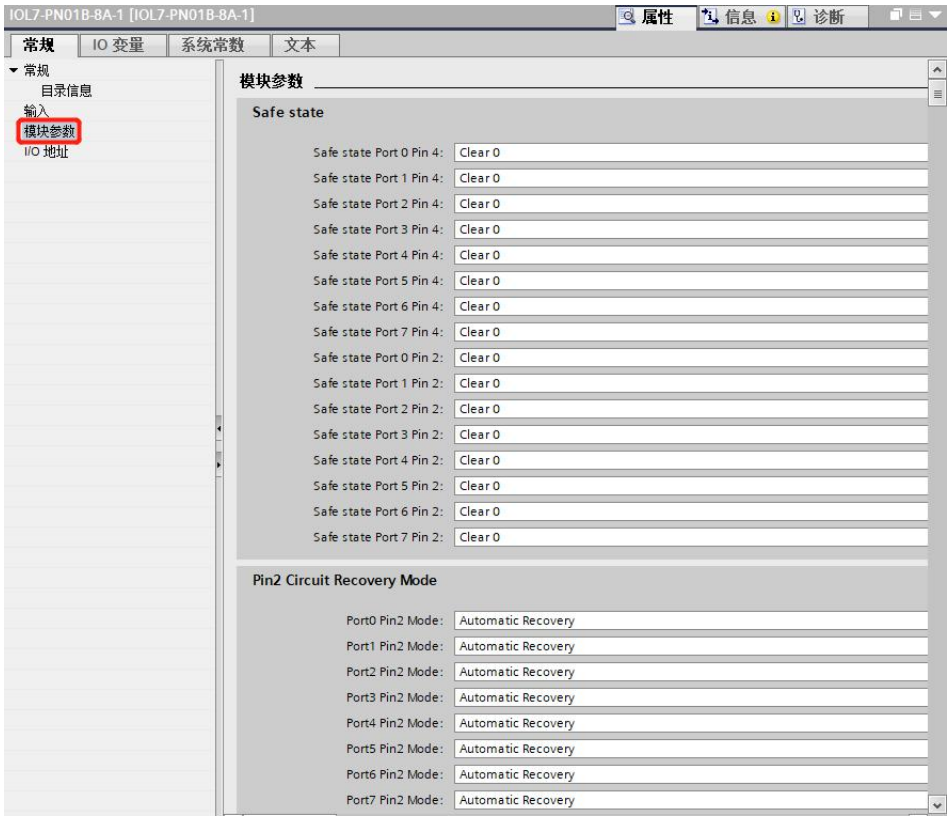


11、 Main site parameter configuration

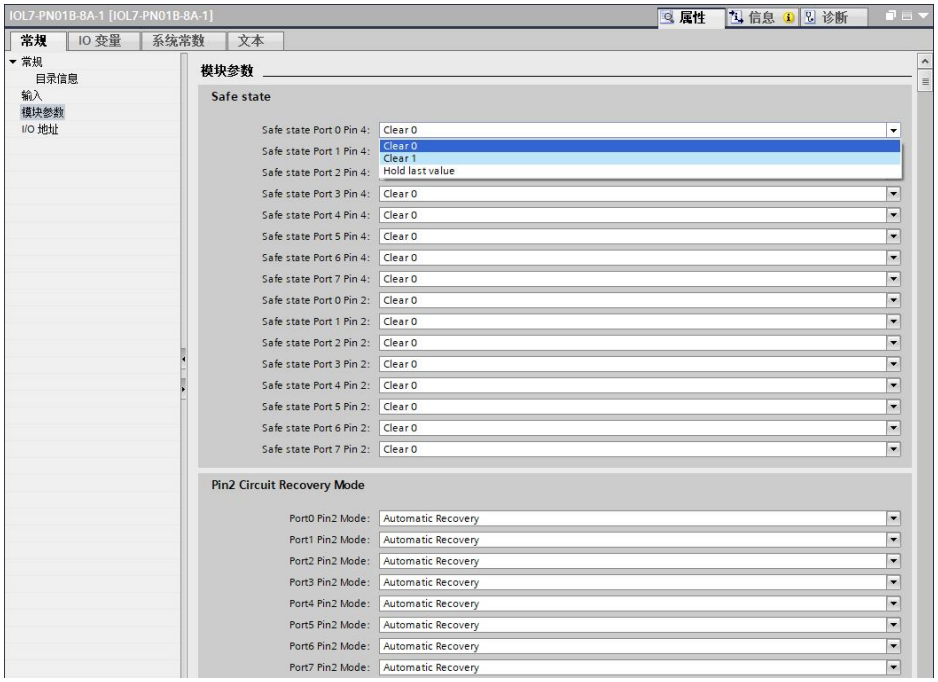
a. Open "Device View". In offline mode, right-click the module name "IOL7-PN01B-8A-1" and click "Properties", as shown in the figure below.



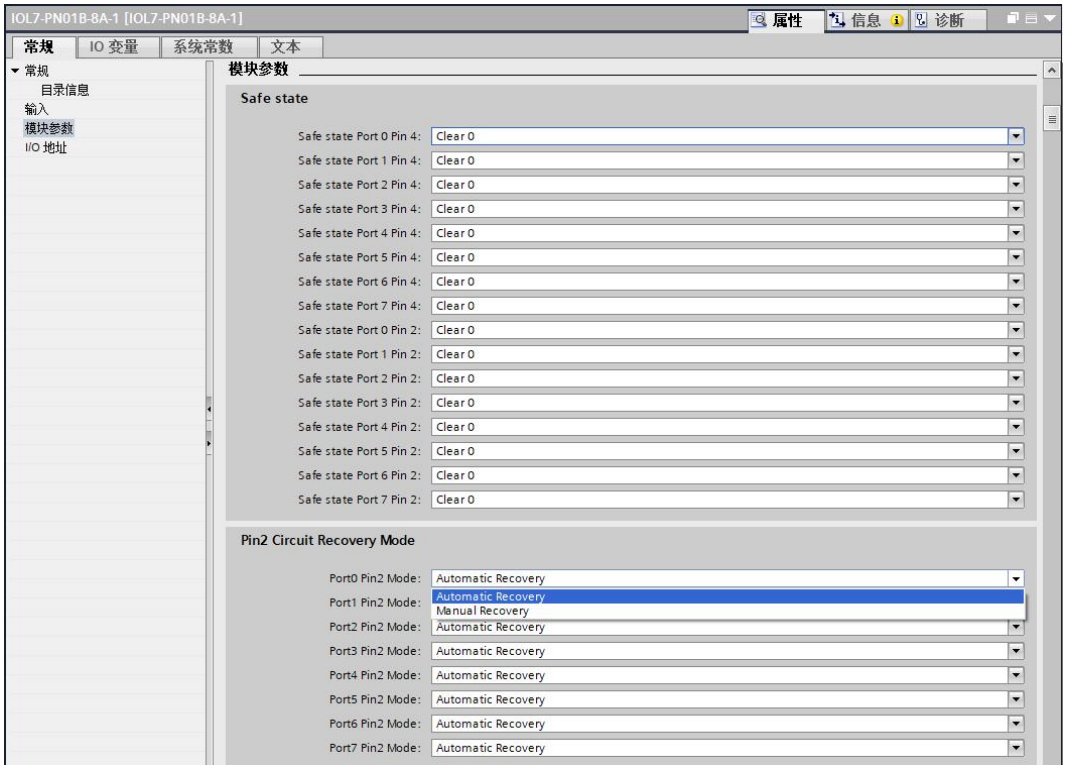
b. On the properties page, click "Module Parameters," as shown in the image below. The parameters can be configured according to actual usage needs. After configuration, re-download the program to the PLC, and then power on both the PLC and the module.



c. To clear the hold function settings: Taking Port 0 Pin 4 as an example, on the parameter page of module IOL7-PN01B-8A-1, click the radio button to the right of "Safe state Port 0 Pin 4" to make the setting selection, as shown in the figure below. After configuration, re-download the program to the PLC, and both the PLC and the module need to be powered on again.

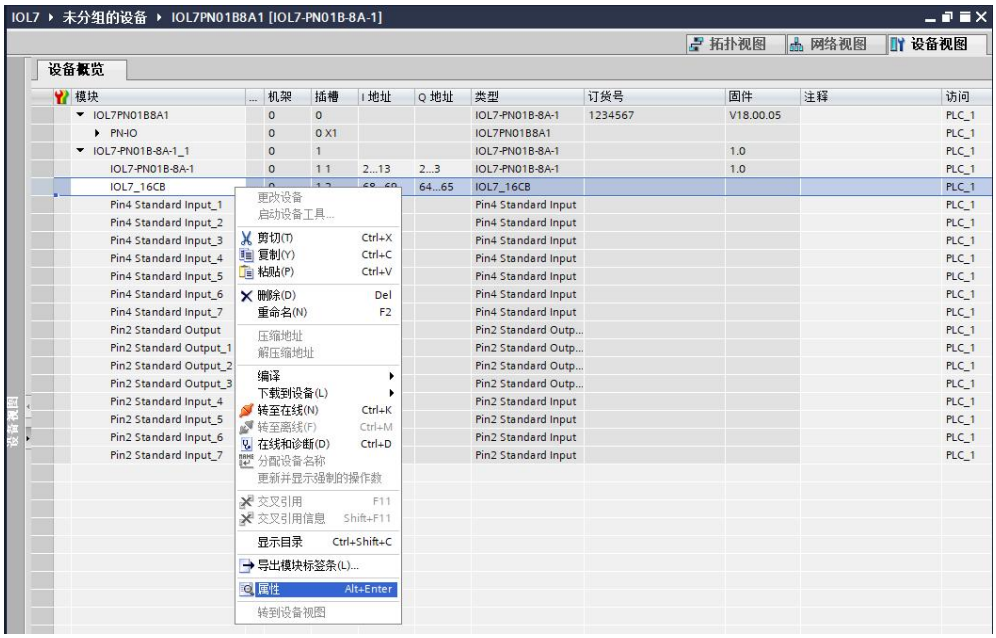


d. Pin2 overcurrent recovery function setup method: Taking Port 0 Pin2 as an example, on the parameter page of module IOL7-PN01B-8A-1, click the radio button to the right of "Port0 Pin2 Mode" in Pin2 Circuit Recovery Mode to make the setting selection, as shown in the figure below. After configuration, re-download the program to the PLC, and the PLC and module need to be powered on again.

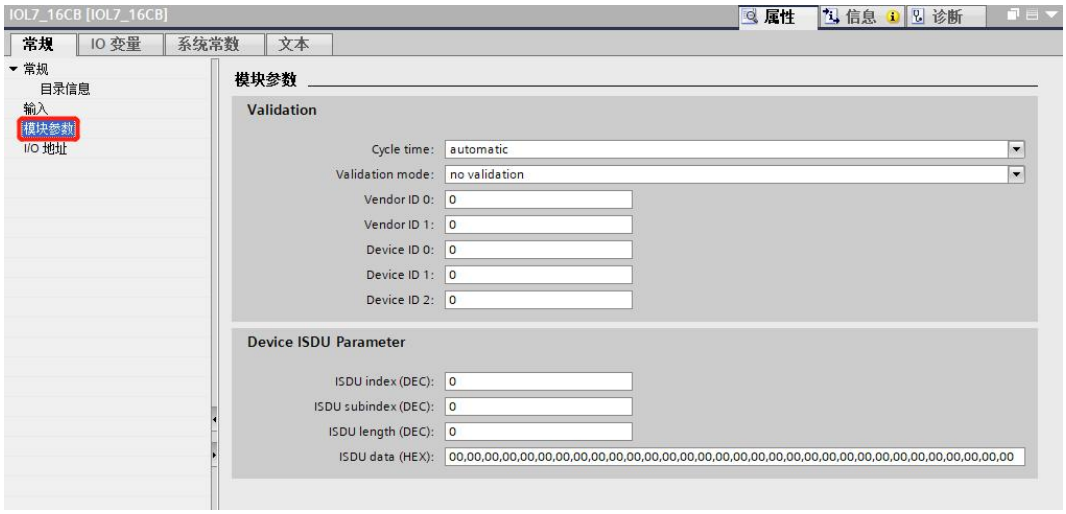


12、 Slave ISDU parameter configuration

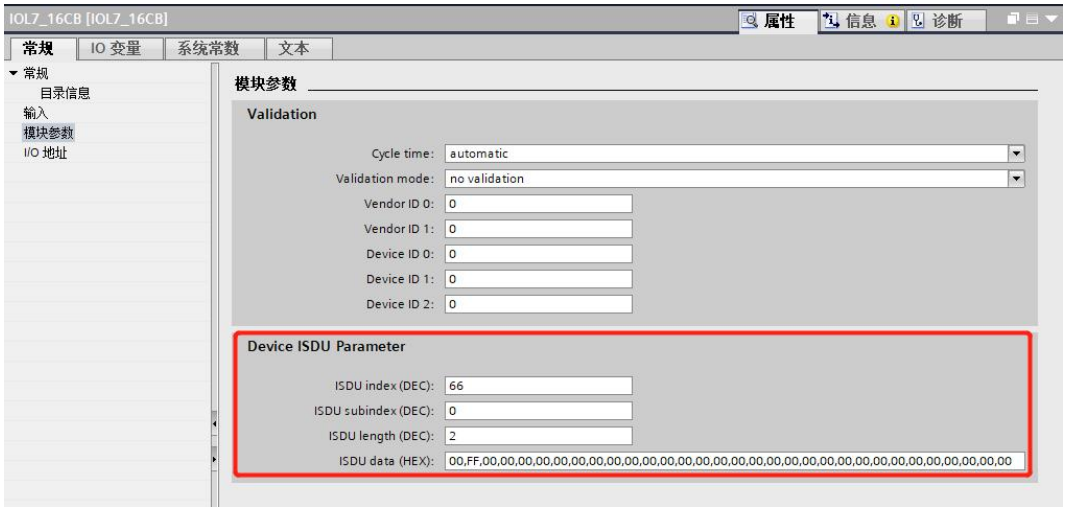
a. On the "Device View" page, in offline mode, right-click the slave module name "IOL_16CB" and click "Properties", as shown in the figure below.



b. On the properties page, click "Module Parameters," as shown in the image below. The parameters can be configured according to actual usage needs. After configuration, re-download the program to the PLC, and then power on both the PLC and the module.

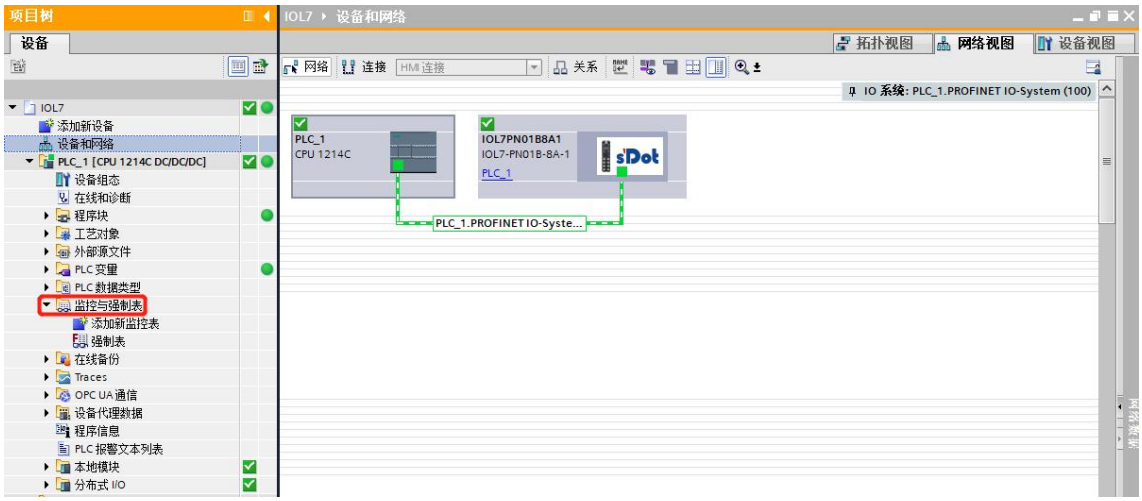


c. Taking the configuration of the IOL7-16CB-M12 with the first 8 channels as inputs and the last 8 channels as outputs as an example, refer to Section 6.5.2 of the IOL7 Series Hub User Manual_Vx.xx.pdf. The settings required are: Index set to 66 (0x0042), Subindex set to 0 (0x00), Length set to 2 (0x02), Data to 00FF, as shown in the figure below. After configuration, re-download the program to the PLC. Both the PLC and module require a power cycle.

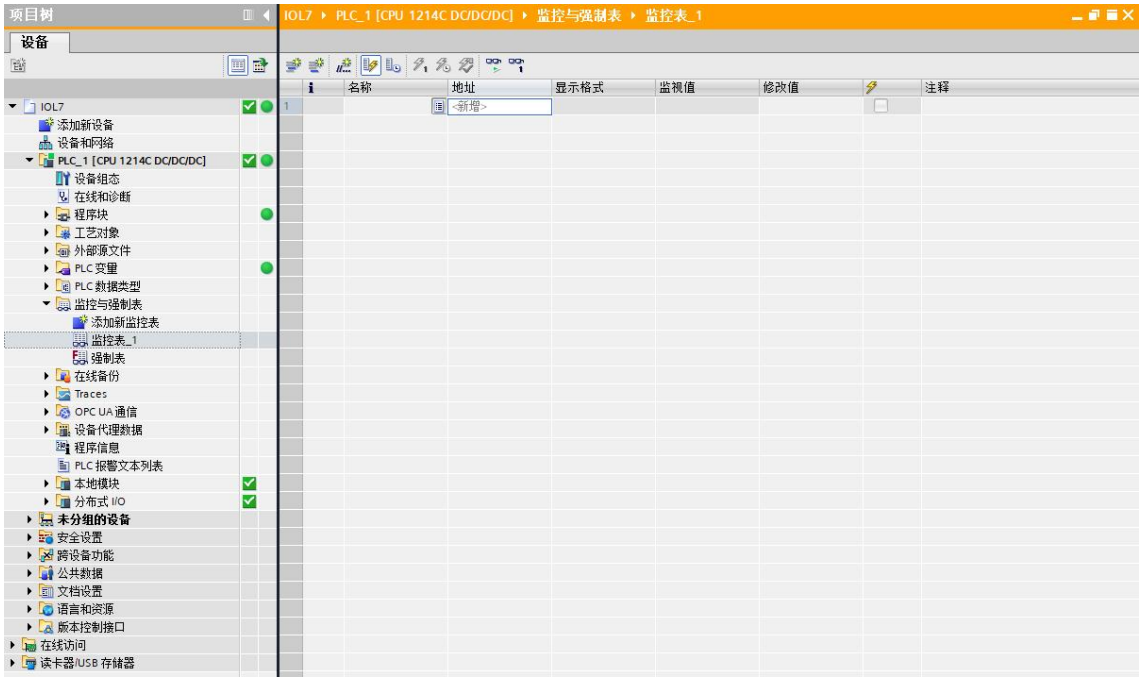


13、 Functional verification

a. Expand the project navigation on the left and select "Monitoring and Enforcement Tables", as shown in the image below.

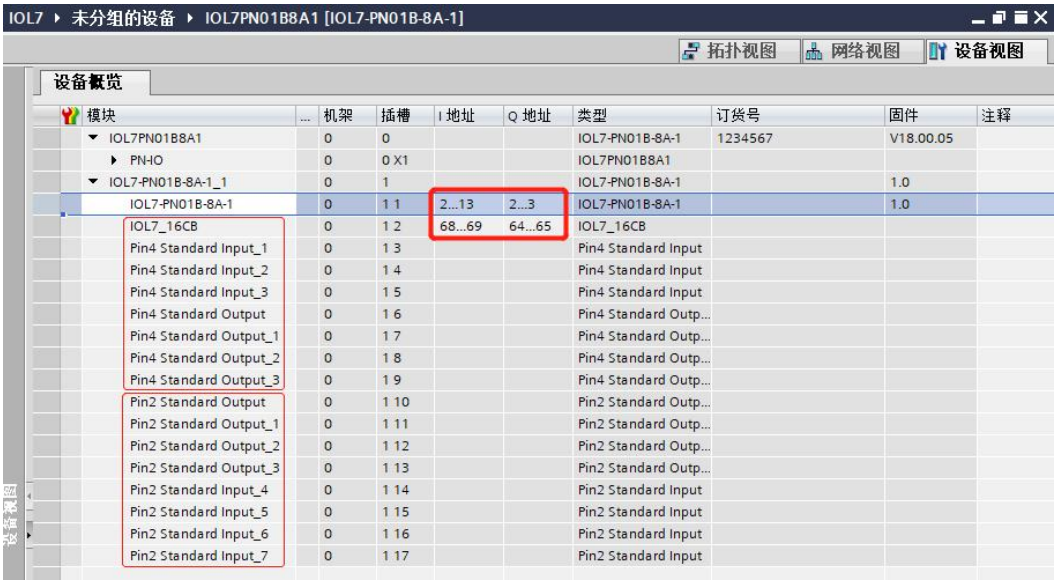


b. Double-click "Add New Monitoring Table" to add a new monitoring table, as shown in the image below.



c. Open "Device View" and view the channel Q address (channel address of output signal) and I address (channel address of input signal) of the master module IOL7-PN01B-8A-1, and the channel Q address (channel address of output signal) and I address (channel address of input signal) of the slave module IOL7_16CB in the device overview.

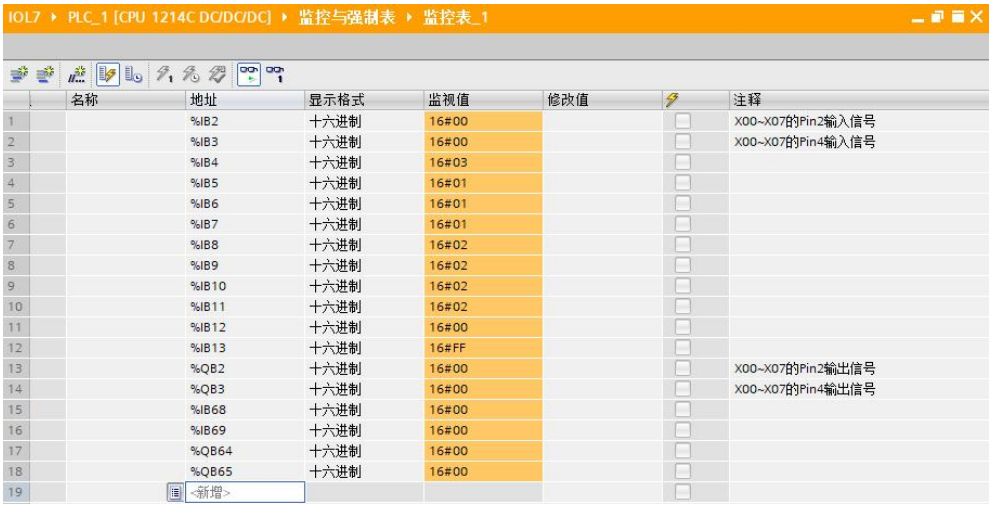
For example, the "Q address" of the IOL7-PN01B-8A-1 module is 2, and the "I address" is 2~13; the "Q address" of the slave module IOL7_16CB is 64~65, and the "I address" is 68~69, as shown in the figure below.



模块	...	机架	插槽	I 地址	Q 地址	类型	订货号	固件	注释
IOL7PN01B8A1		0	0			IOL7-PN01B-8A-1	1234567	V18.00.05	
PN-IO		0	0 X1			IOL7PN01B8A1			
IOL7-PN01B-8A-1_1		0	1			IOL7-PN01B-8A-1		1.0	
IOL7-PN01B-8A-1		0	1 1	2...13	2...3	IOL7-PN01B-8A-1		1.0	
IOL7_16CB		0	1 2	68...69	64...65	IOL7_16CB			
Pin4 Standard Input_1		0	1 3			Pin4 Standard Input			
Pin4 Standard Input_2		0	1 4			Pin4 Standard Input			
Pin4 Standard Input_3		0	1 5			Pin4 Standard Input			
Pin4 Standard Output		0	1 6			Pin4 Standard Outp...			
Pin4 Standard Output_1		0	1 7			Pin4 Standard Outp...			
Pin4 Standard Output_2		0	1 8			Pin4 Standard Outp...			
Pin4 Standard Output_3		0	1 9			Pin4 Standard Outp...			
Pin2 Standard Output		0	1 10			Pin2 Standard Outp...			
Pin2 Standard Output_1		0	1 11			Pin2 Standard Outp...			
Pin2 Standard Output_2		0	1 12			Pin2 Standard Outp...			
Pin2 Standard Output_3		0	1 13			Pin2 Standard Outp...			
Pin2 Standard Input_4		0	1 14			Pin2 Standard Input			
Pin2 Standard Input_5		0	1 15			Pin2 Standard Input			
Pin2 Standard Input_6		0	1 16			Pin2 Standard Input			
Pin2 Standard Input_7		0	1 17			Pin2 Standard Input			

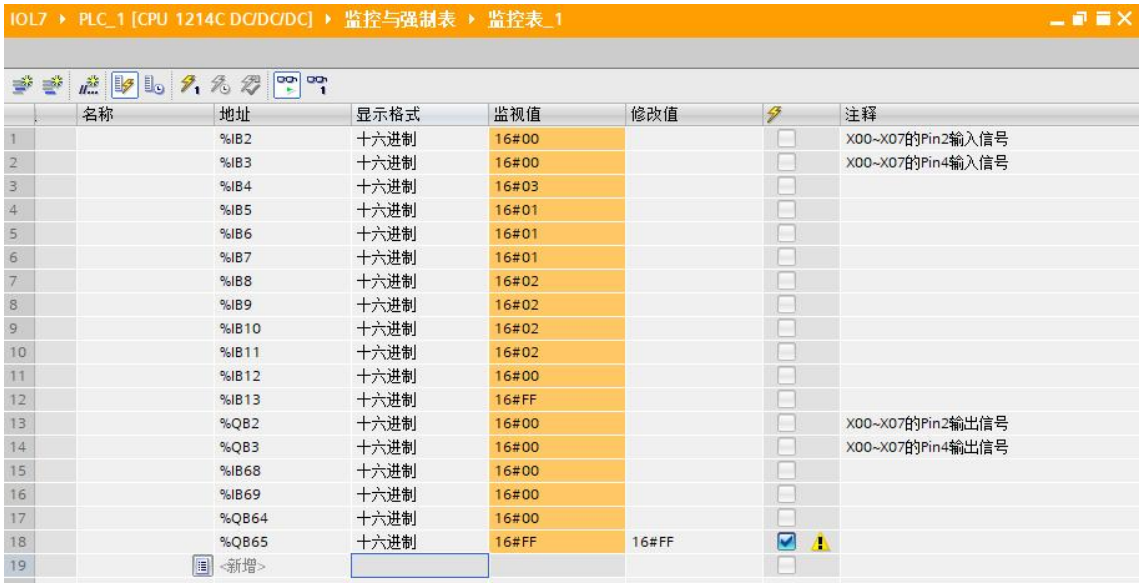
In the master station module IOL7-PN01B-8A-1, IB2 represents the monitored value of the Pin2 input signal of X00~X07, IB3 represents the monitored value of the Pin4 input signal of X00~X07, and IB4~IB13 represent the module status information. By default, all I/O interfaces of the master station module are input channels. When an interface of the master station module is configured as an output channel, QB2 represents the Pin2 output signal of X00~X07, and QB3 represents the Pin4 output signal of X00~X07.

d. Enter the input/output channel address in the address cell of the monitoring table, press "Enter", and after completing all the fields, click the button , which allows you to monitor the data, as shown in the image below.



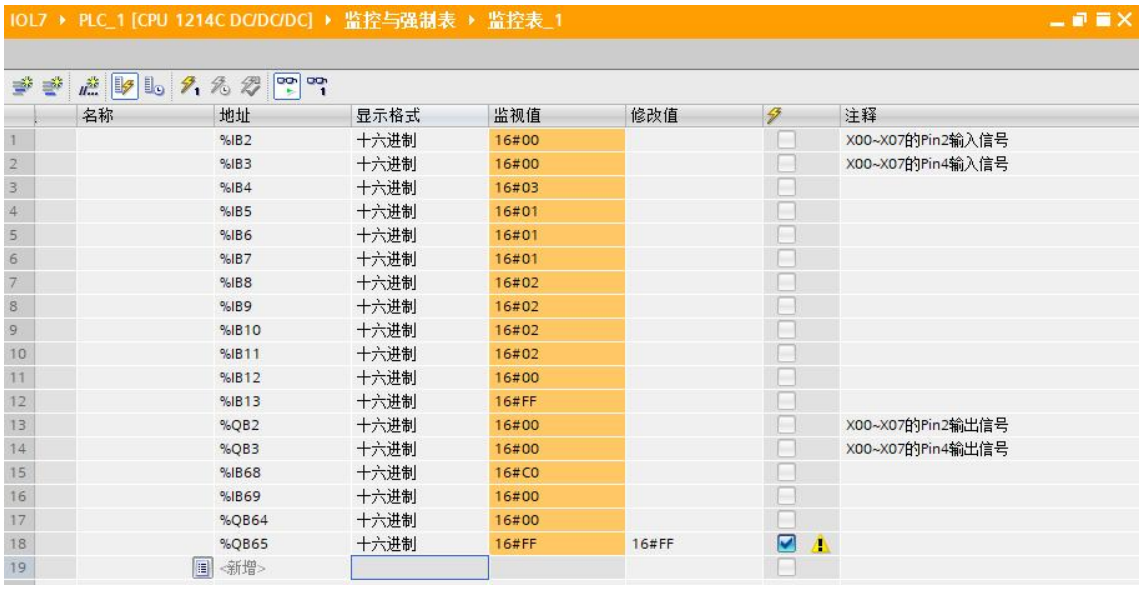
	名称	地址	显示格式	监视值	修改值		注释
1		%IB2	十六进制	16#00			X00~X07的Pin2输入信号
2		%IB3	十六进制	16#00			X00~X07的Pin4输入信号
3		%IB4	十六进制	16#03			
4		%IB5	十六进制	16#01			
5		%IB6	十六进制	16#01			
6		%IB7	十六进制	16#01			
7		%IB8	十六进制	16#02			
8		%IB9	十六进制	16#02			
9		%IB10	十六进制	16#02			
10		%IB11	十六进制	16#02			
11		%IB12	十六进制	16#00			
12		%IB13	十六进制	16#FF			
13		%QB2	十六进制	16#00			X00~X07的Pin2输出信号
14		%QB3	十六进制	16#00			X00~X07的Pin4输出信号
15		%IB68	十六进制	16#00			
16		%IB69	十六进制	16#00			
17		%QB64	十六进制	16#00			
18		%QB65	十六进制	16#00			
19		<新增>					

e. Taking the configuration of the IOL7-16CB-M12 with the first 8 channels as inputs and the last 8 channels as outputs as an example, IB68 represents the input signal values for slave modules X00 to X03, while QB65 represents the output signal values for slave modules X04 to X07. Enter "FF" in the "Modified Value" cell of QB65, click the button to write, and observe the indicator lights for all 8 channels of slave modules X04–X07 illuminate, as shown in the figure below.



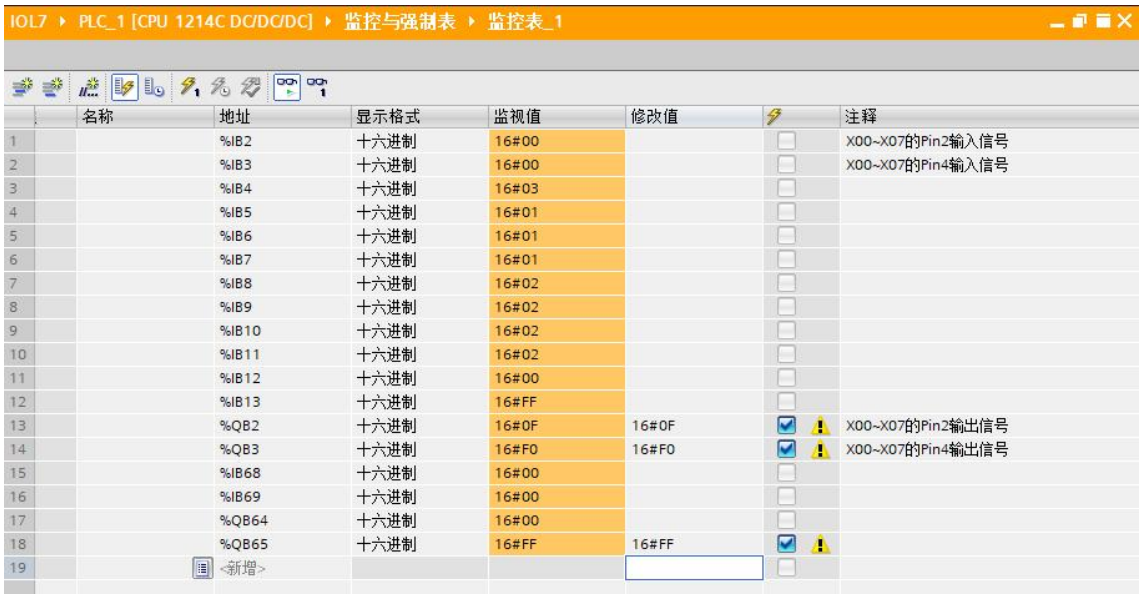
	名称	地址	显示格式	监视值	修改值		注释
1		%IB2	十六进制	16#00			X00~X07的Pin2输入信号
2		%IB3	十六进制	16#00			X00~X07的Pin4输入信号
3		%IB4	十六进制	16#03			
4		%IB5	十六进制	16#01			
5		%IB6	十六进制	16#01			
6		%IB7	十六进制	16#01			
7		%IB8	十六进制	16#02			
8		%IB9	十六进制	16#02			
9		%IB10	十六进制	16#02			
10		%IB11	十六进制	16#02			
11		%IB12	十六进制	16#00			
12		%IB13	十六进制	16#FF			
13		%QB2	十六进制	16#00			X00~X07的Pin2输出信号
14		%QB3	十六进制	16#00			X00~X07的Pin4输出信号
15		%IB68	十六进制	16#00			
16		%IB69	十六进制	16#00			
17		%QB64	十六进制	16#00			
18		%QB65	十六进制	16#FF	16#FF		
19		<新增>					

f. When the slave module X00 receives an effective voltage, the input value “16#C0” can be monitored in IB68, which is “2#11000000”, as shown in the figure below.



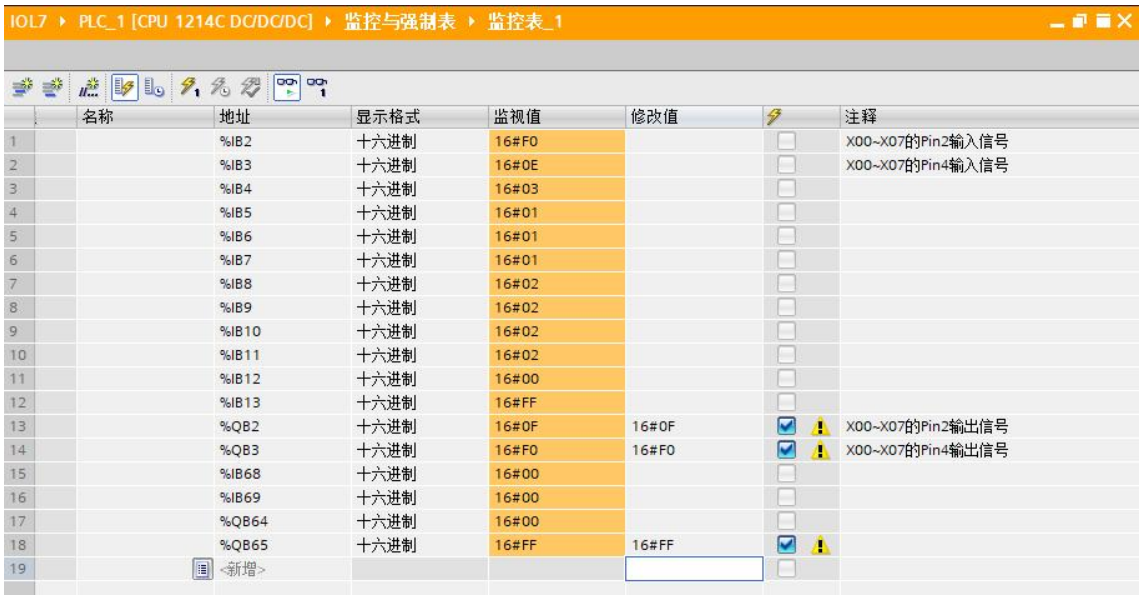
	名称	地址	显示格式	监视值	修改值		注释
1		%IB2	十六进制	16#00			X00~X07的Pin2输入信号
2		%IB3	十六进制	16#00			X00~X07的Pin4输入信号
3		%IB4	十六进制	16#03			
4		%IB5	十六进制	16#01			
5		%IB6	十六进制	16#01			
6		%IB7	十六进制	16#01			
7		%IB8	十六进制	16#02			
8		%IB9	十六进制	16#02			
9		%IB10	十六进制	16#02			
10		%IB11	十六进制	16#02			
11		%IB12	十六进制	16#00			
12		%IB13	十六进制	16#FF			
13		%QB2	十六进制	16#00			X00~X07的Pin2输出信号
14		%QB3	十六进制	16#00			X00~X07的Pin4输出信号
15		%IB68	十六进制	16#C0			
16		%IB69	十六进制	16#00			
17		%QB64	十六进制	16#00			
18		%QB65	十六进制	16#FF	16#FF		
19		<新增>					

g. Output signal 1 from Pin 2 of X00~X03 and output signal 1 from Pin 4 of X04~X07 on the IOL7-PN01B-8A-1 module, i.e., QB2 input "0F" and QB3 input "F0". Click the button to write, and observe the corresponding 8 channel indicator lights on the module illuminate, as shown in the figure below.



	名称	地址	显示格式	监视值	修改值		注释
1		%IB2	十六进制	16#00			X00~X07的Pin2输入信号
2		%IB3	十六进制	16#00			X00~X07的Pin4输入信号
3		%IB4	十六进制	16#03			
4		%IB5	十六进制	16#01			
5		%IB6	十六进制	16#01			
6		%IB7	十六进制	16#01			
7		%IB8	十六进制	16#02			
8		%IB9	十六进制	16#02			
9		%IB10	十六进制	16#02			
10		%IB11	十六进制	16#02			
11		%IB12	十六进制	16#00			
12		%IB13	十六进制	16#FF			
13		%QB2	十六进制	16#0F	16#0F		X00~X07的Pin2输出信号
14		%QB3	十六进制	16#F0	16#F0		X00~X07的Pin4输出信号
15		%IB68	十六进制	16#00			
16		%IB69	十六进制	16#00			
17		%QB64	十六进制	16#00			
18		%QB65	十六进制	16#FF	16#FF		
19		<新增>					

h. When a valid signal is input to Pin2 of X04~X07 and Pin4 of X01~X03 of IOL7-PN01B-8A-1, the input value "16#F0" (which is "2#11110000") can be monitored in IB2, and the input value "16#0E" (which is "2#00001110") can be monitored in IB3, as shown in the figure below.



	名称	地址	显示格式	监视值	修改值		注释
1		%IB2	十六进制	16#F0			X00~X07的Pin2输入信号
2		%IB3	十六进制	16#0E			X00~X07的Pin4输入信号
3		%IB4	十六进制	16#03			
4		%IB5	十六进制	16#01			
5		%IB6	十六进制	16#01			
6		%IB7	十六进制	16#01			
7		%IB8	十六进制	16#02			
8		%IB9	十六进制	16#02			
9		%IB10	十六进制	16#02			
10		%IB11	十六进制	16#02			
11		%IB12	十六进制	16#00			
12		%IB13	十六进制	16#FF			
13		%QB2	十六进制	16#0F	16#0F		X00~X07的Pin2输出信号
14		%QB3	十六进制	16#F0	16#F0		X00~X07的Pin4输出信号
15		%IB68	十六进制	16#00			
16		%IB69	十六进制	16#00			
17		%QB64	十六进制	16#00			
18		%QB65	十六进制	16#FF	16#FF		
19		<新增>					

7.2.2 Application in the STEP 7-MicroWIN SMART software environment

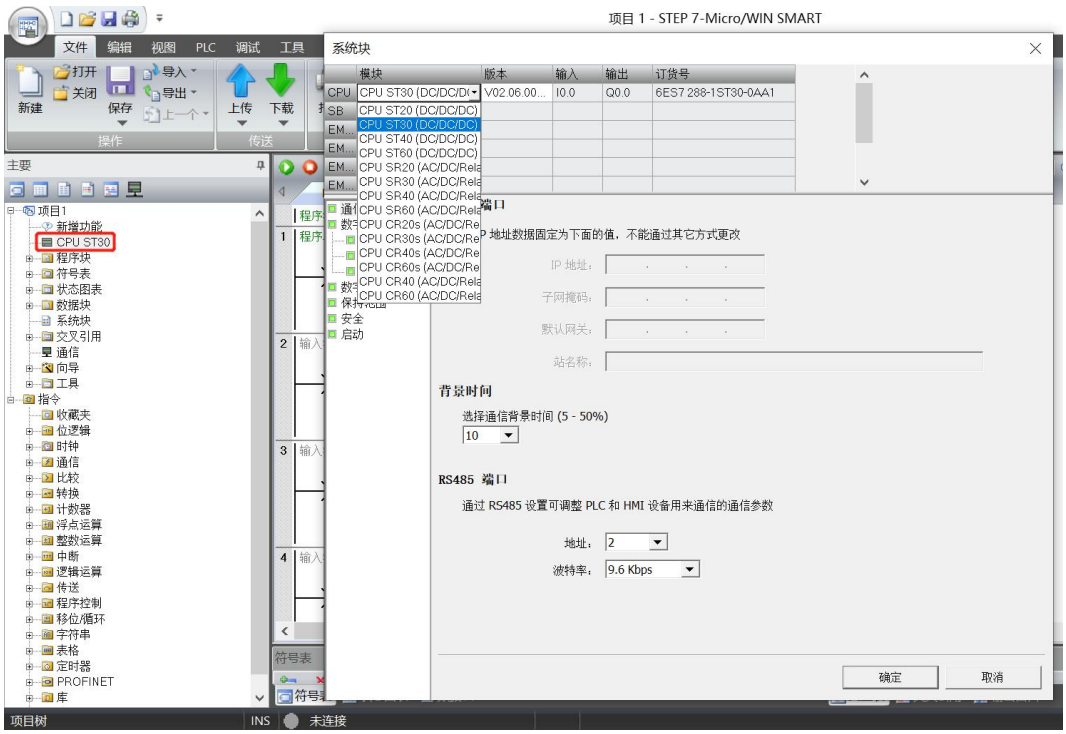
1、Preparation

- **Hardware environment**
  - **Module model IOL7-PN01B-8A-1**
    The X00 port connects to the IOL7 slave module IOL7-16CB-M12.
  - **One computer, pre-installed with STEP 7-MicroWIN SMART V2.6 software.**
  - **PROFINET dedicated shielded cable**
  - **This instruction manual uses a Siemens S7-200 SMART PLC as an example.**
  - **One switching power supply**
  - **Device configuration file**
    Configuration file retrieval address:https://www.solidotech.com/cn/resources/configuration-files
- **Hardware configuration and wiring**
  Please follow the instructions 5 Installation and Wiring

2、Add PLC

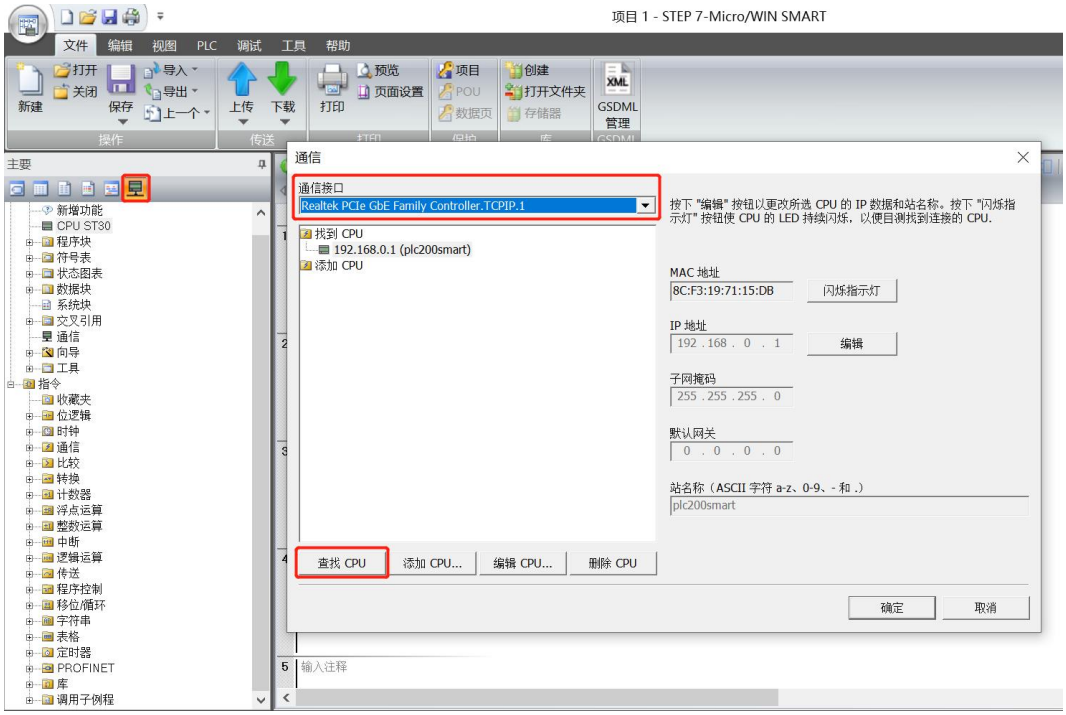
a. Open the STEP 7-MicroWIN SMART software.

b. Double-click the left navigation tree CPU ST30 Click the button to bring up the "System Block" window, select the CPU model corresponding to the PLC, and click "OK", as shown in the figure below.



c. Click the left navigation tree 通信 Click the button to bring up the "Communication" window.

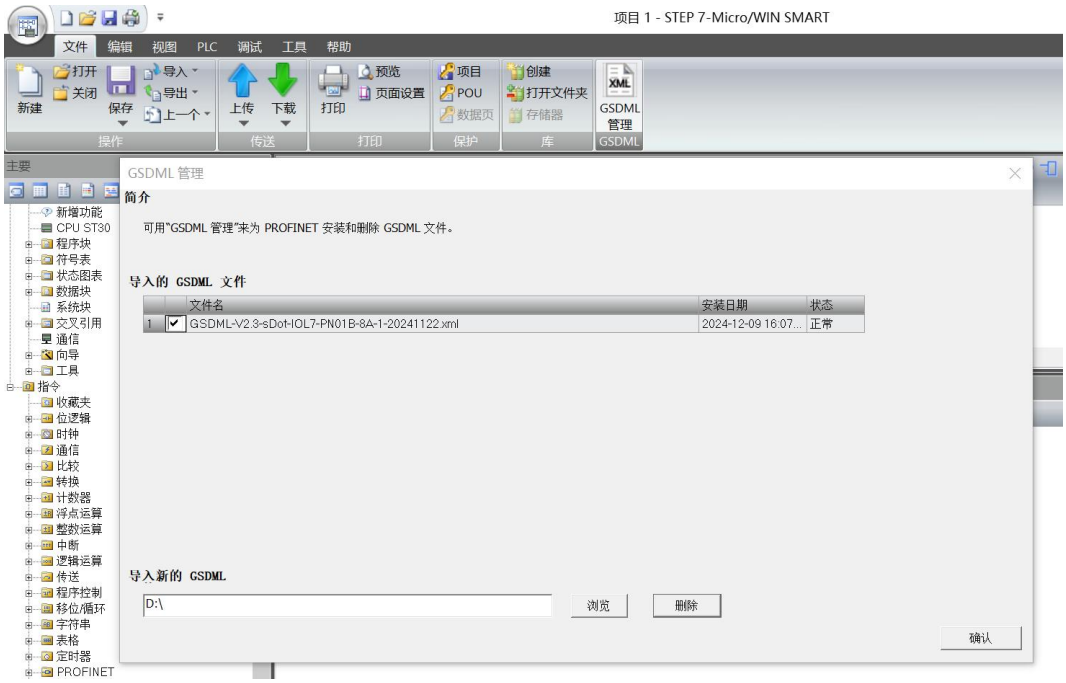
Switch the communication interface to the interface actually used by the PLC. Click "Find CPU" to find the PLC, as shown in the figure below.



d. Click "Edit" in the communication window. The edit button will switch to the settings button. The IP address input box will light up. Modify the IP address to be on the same network segment as the computer interface's IP address. After modification, click "Settings" again, and then click "OK" to complete the settings, as shown in the image below. Note: You can also modify only the computer's Ethernet interface IP address, ensuring it's on the same network segment as the PLC address.

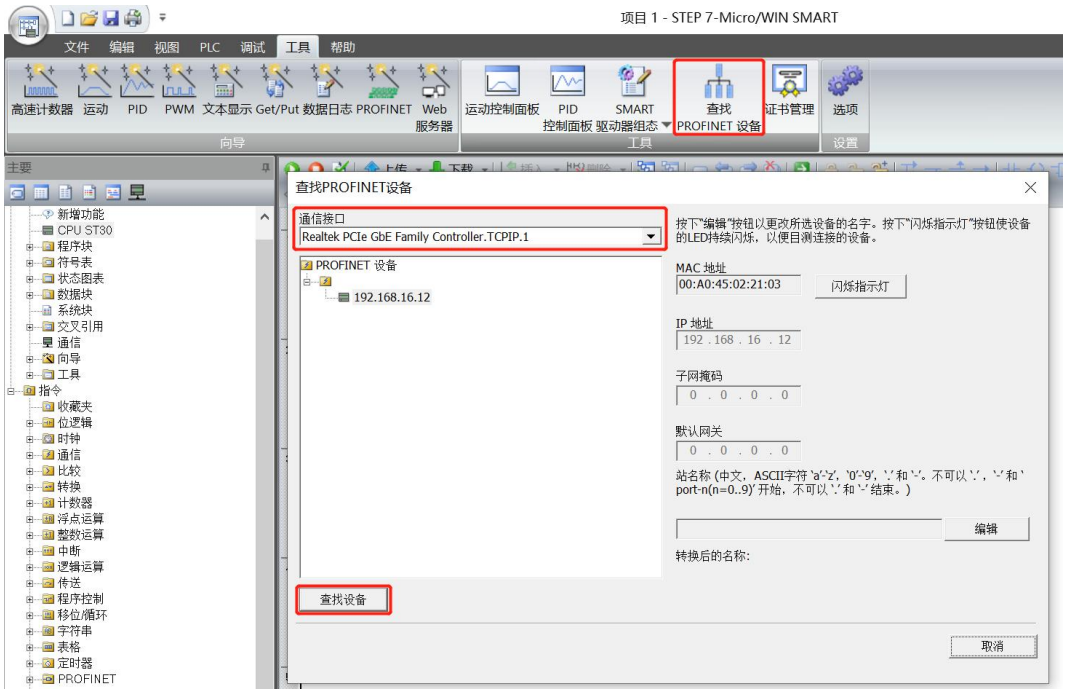
3、Import GSD file

a. Click "File -> GSDML Management" in the menu bar. In the GSDML Management window, click "Browse," select the GSDML file to import, and click "Confirm," as shown below.



4、Find the device

a. Click "Tools -> Find PROFINET Devices" in the menu bar. A window for finding PROFINET devices will pop up. Switch the communication interface to the interface actually used by the PLC and click "Find Devices", as shown in the figure below.



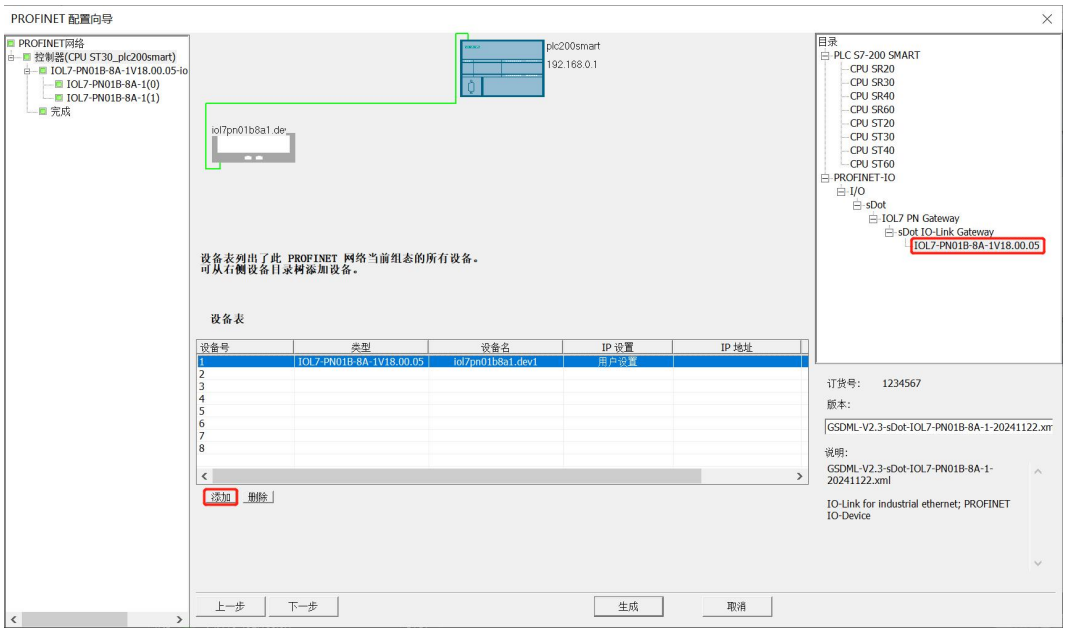
b. Click "Edit" to edit the module name. After editing, click "Settings", as shown in the image below.

5、Configure PROFINET network

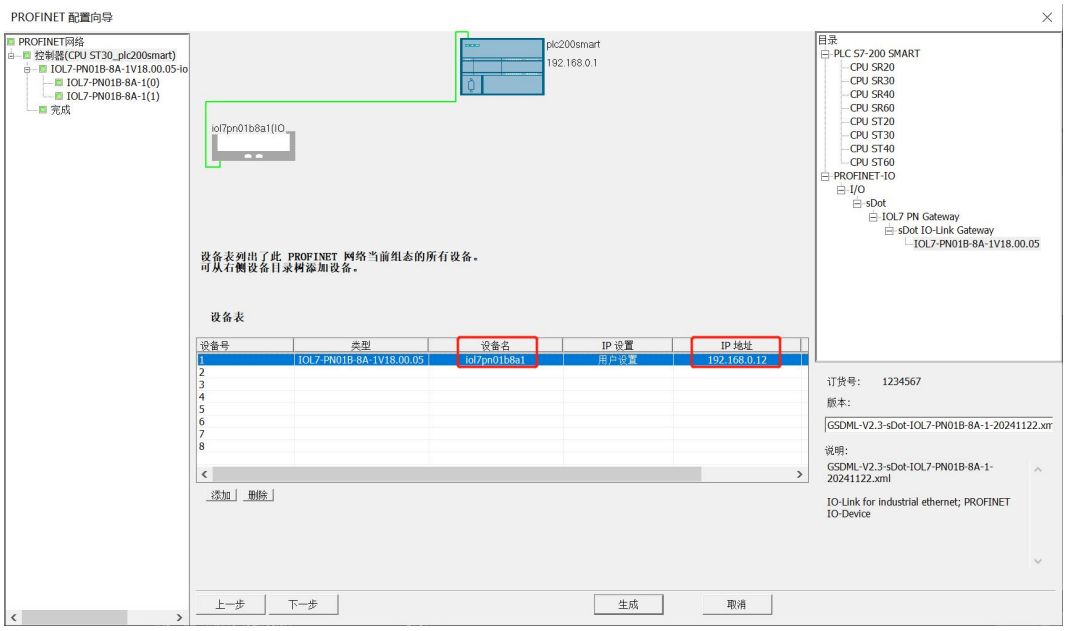
a. Click "Tools -> PROFINET" in the menu bar to open the PROFINET Configuration Wizard, as shown in the figure below.

b. On the PROFINET configuration wizard page, select the PLC role as "Controller", as shown in the figure below.

c. Click "Next" to enter the controller configuration page. Add a device from the device directory tree on the right. Select IOL7-PN01B-8A-1 and click "Add", as shown in the figure below.

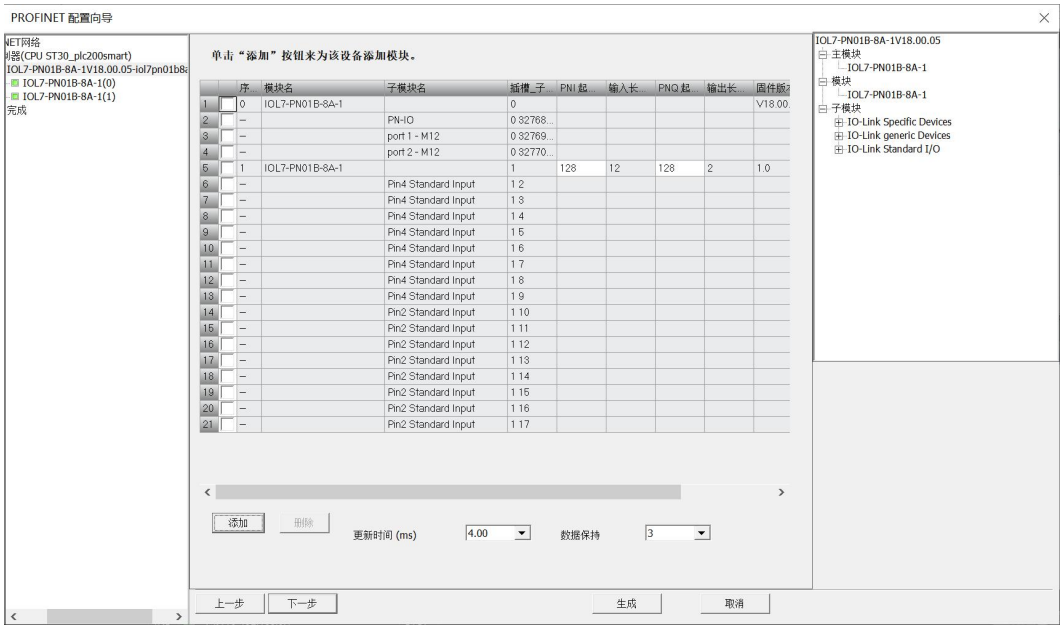


d. Double-click the input box below the device name and enter the device name, which must match the name set when searching for the device. Double-click the input box below the IP address and enter the IP address. After entering the IP address, the result will look like the image below. If there are other modules in the configuration, you can add and configure them in the same way.



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

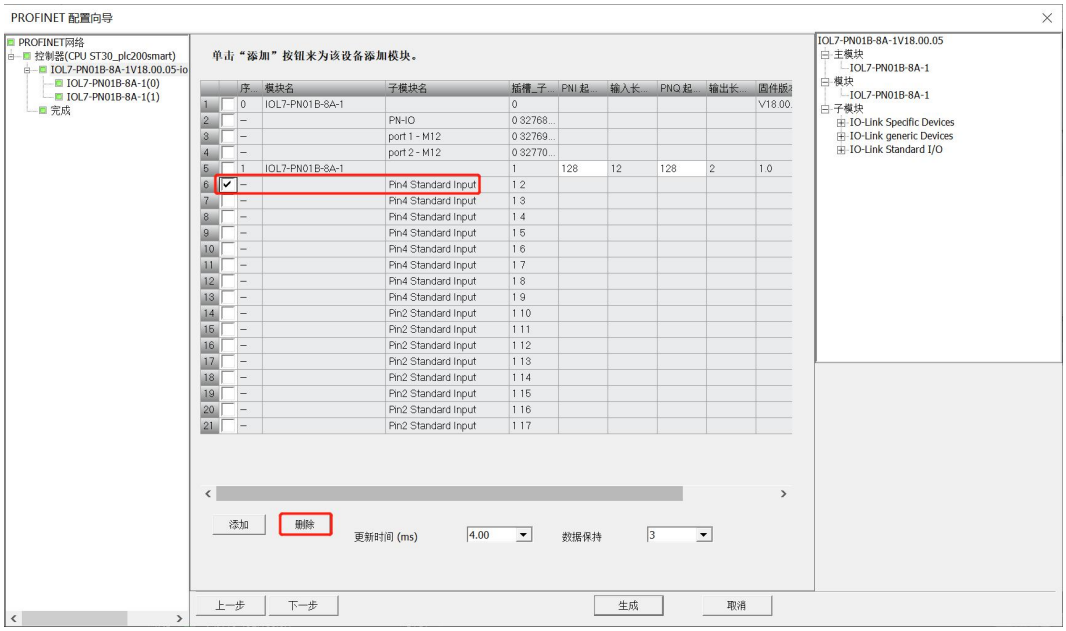
e. Click "Next" to complete the network configuration. As shown in the figure below, you can see that the starting address of the module's input and output are both 128.



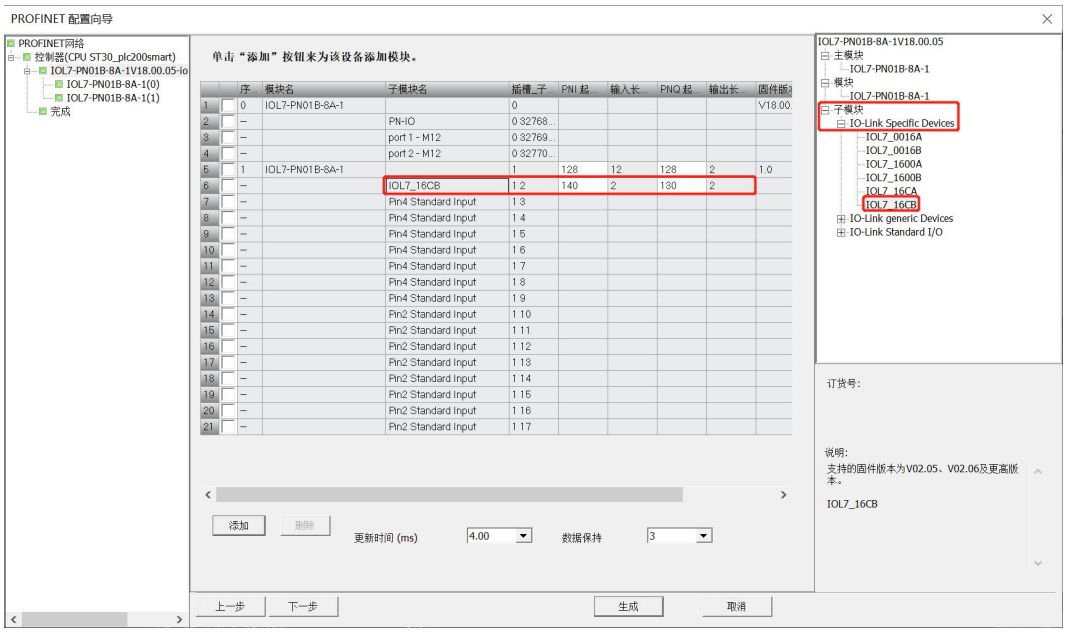
6、 DI/DO/IO-Link settings

a. The master station port 0 has been connected to the slave module IOL7-16CB-M12. Check the power indicator of IOL7-16CB-M12; the power indicator is constantly on.

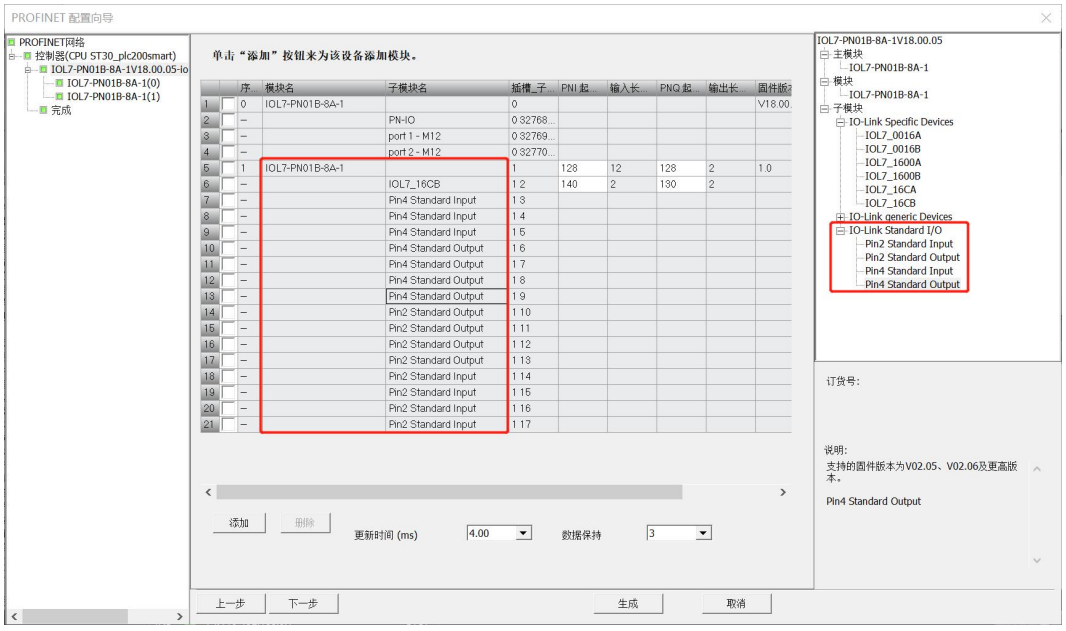
b. In the PROFINET configuration wizard interface, check "Pin4 Standard Input 1 2", which means selecting IO-Link Port 0, and click "Delete", as shown in the figure below.



c. After deletion, select "IOL7-16CB" on the right, click "Add" or select and drag it to Port 0, as shown in the figure below.



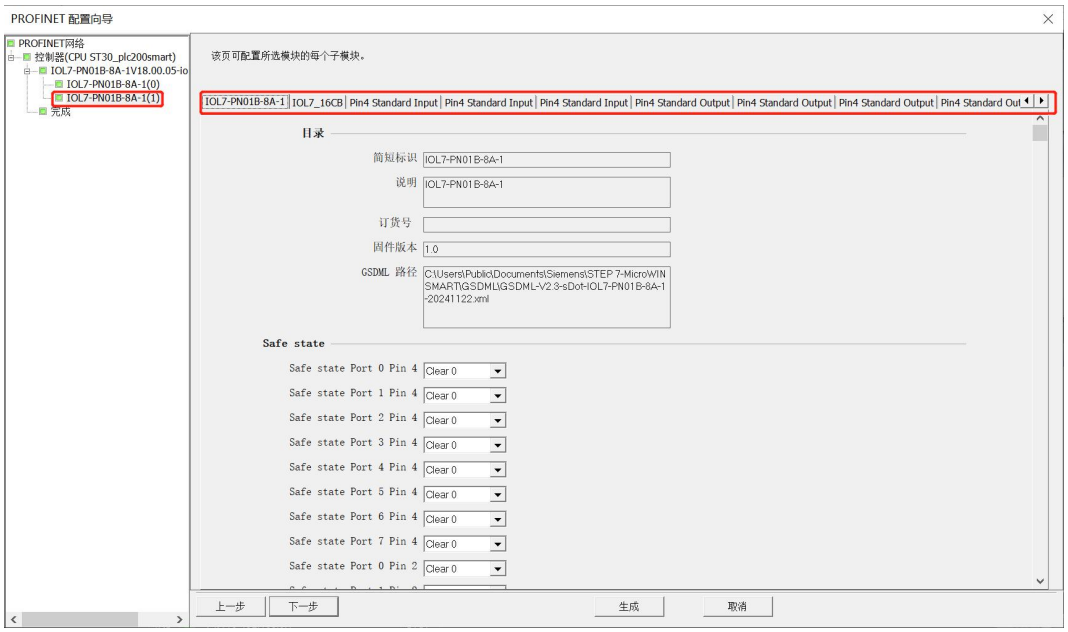
d. Configure the other ports of Pin2 and Pin4 as "Pin2/4 Standard Input/Output" using the same method. After configuration, the Pin2 and Pin4 ports on the left side are shown in the figure below. The configuration method for other ports in DI/DO/IO-Link mode is the same as the method described here.



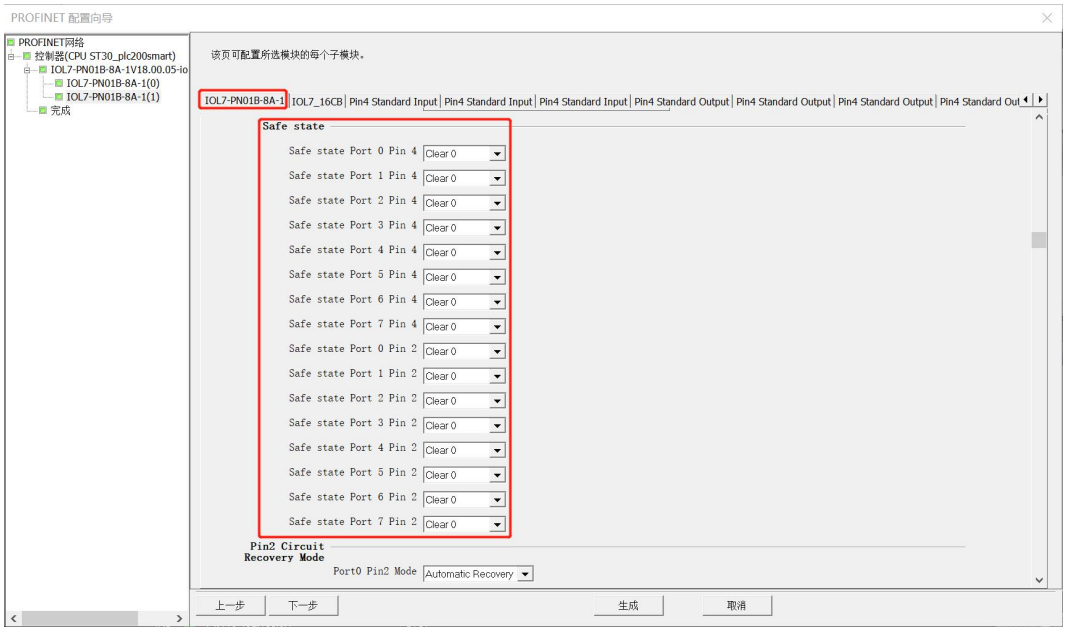
e. Click "Generate" to complete the network configuration; or click "Next" to configure the parameters.

7、Parameter configuration

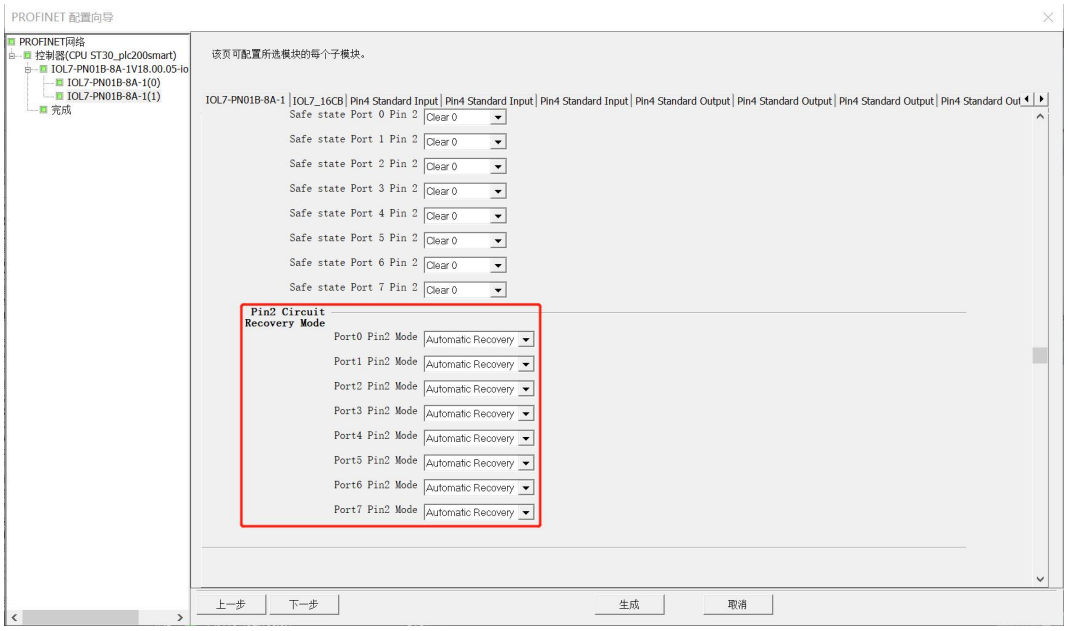
a. After completing the DI/DO/IO-Link settings, click "Next" in the PROFINET configuration wizard interface to view and configure the parameters, as shown in the figure below.



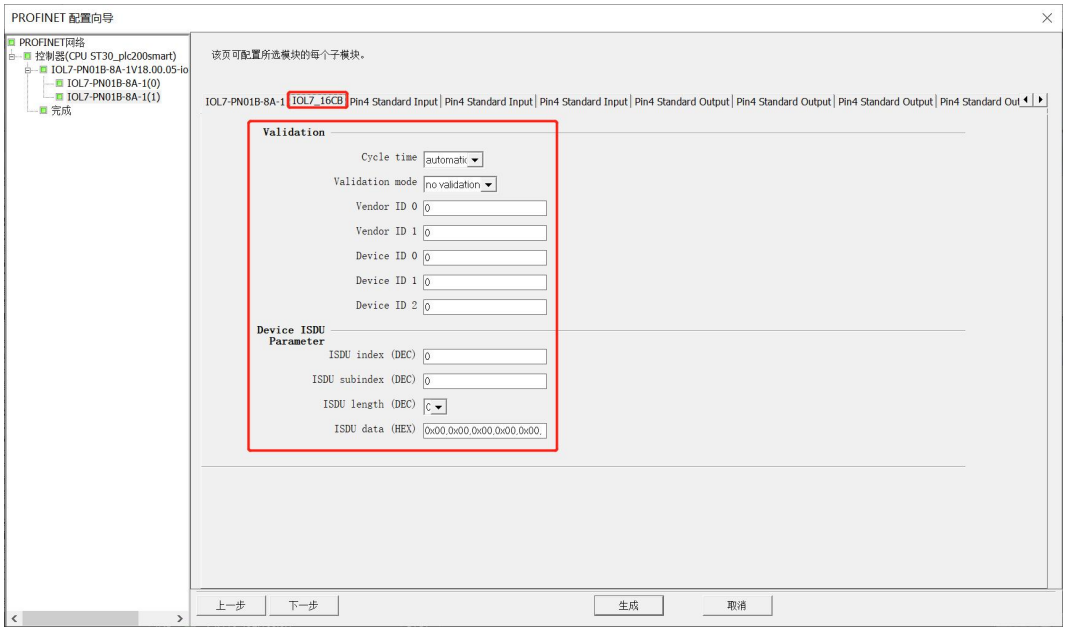
b. The drop-down menu on the main site configuration page allows you to configure the output clear and retain function, as shown in the image below.



c. Continuing down the scroll bar, you can also configure the Pin2 overcurrent recovery function, as shown in the image below.

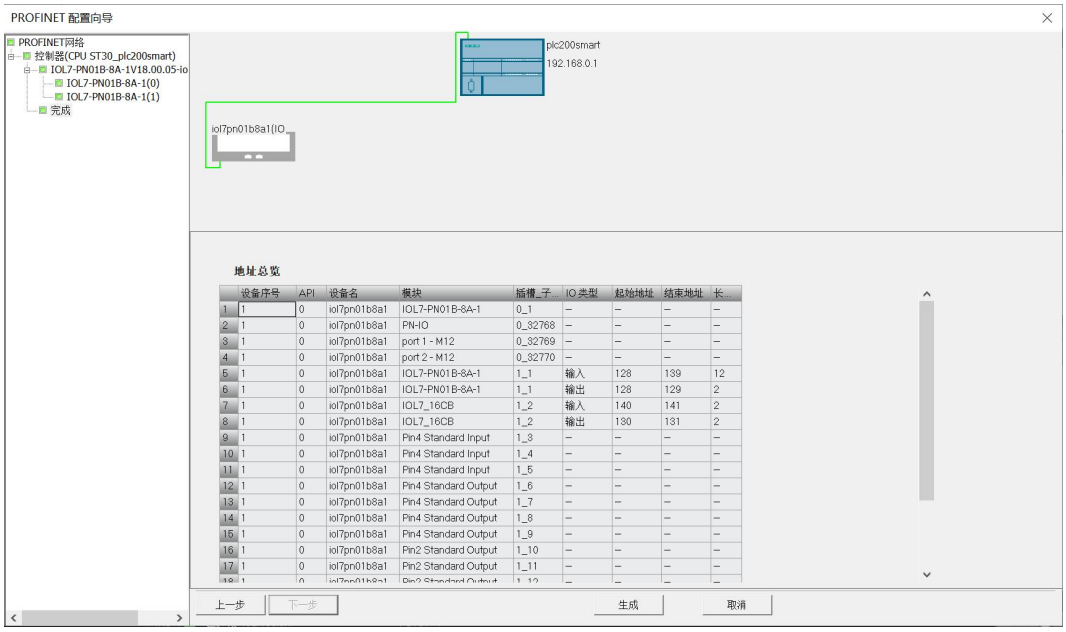


d. Switch to the slave configuration page to view the ISDU configuration, as shown in the image below.



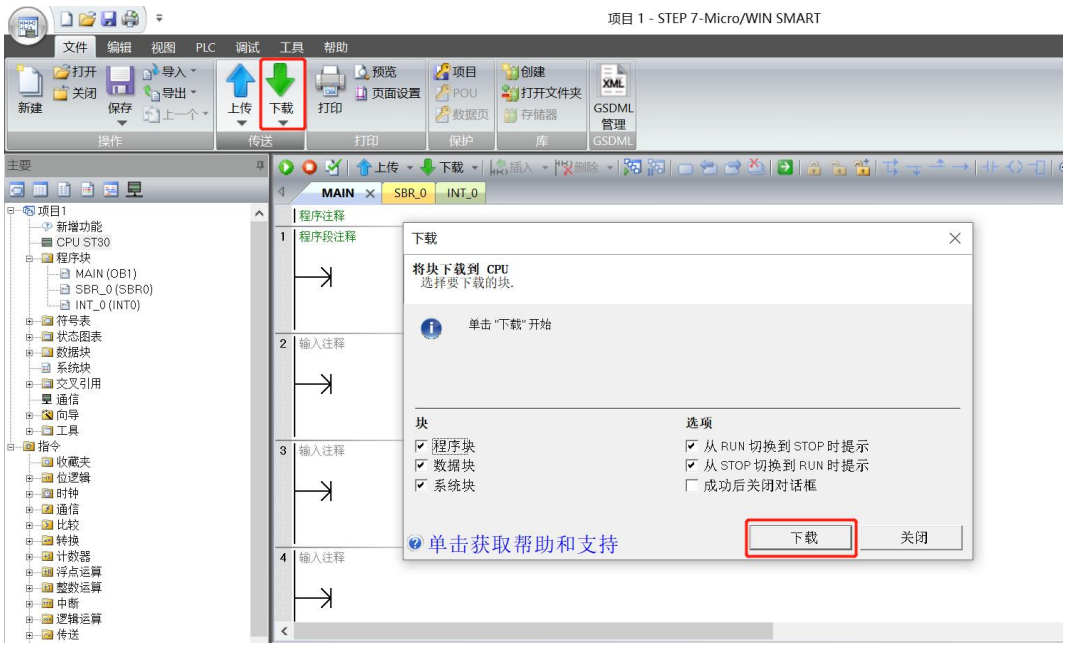
Note: Due to limitations of the SMART software, modification of ISDU parameters is not supported.

e. Click "Next", then click "Generate" to complete the network configuration and parameter configuration, as shown in the figure below.



8、Download program

a. Click "File -> Download" in the menu bar. A download window will pop up. Click "Download", as shown in the image below.

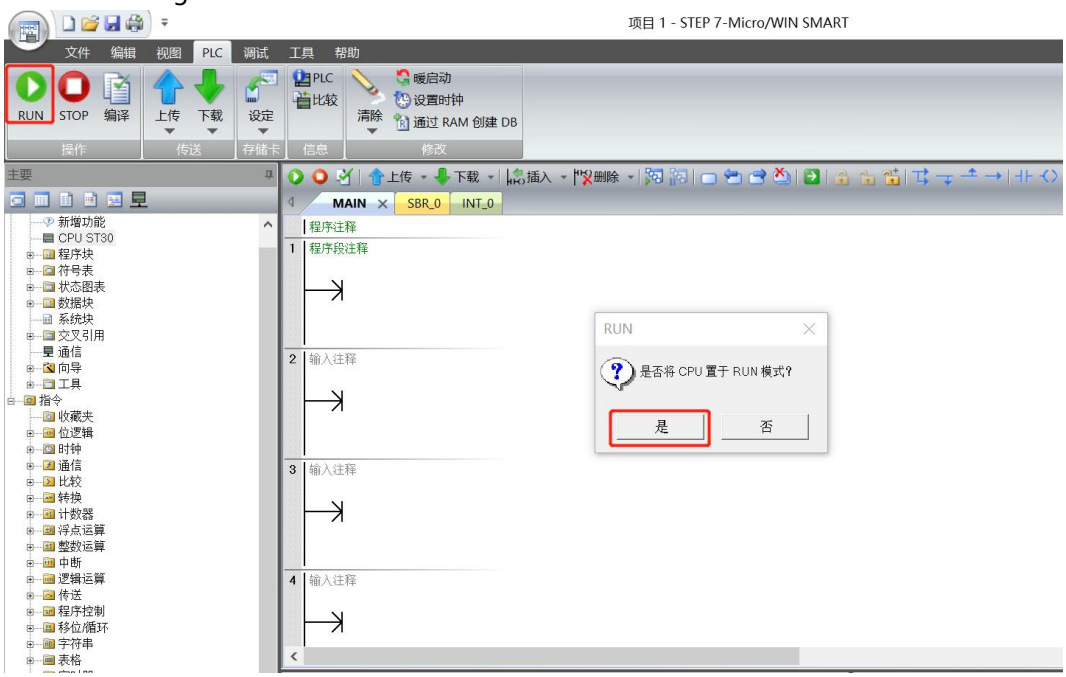


b. Once the download window indicates that the download has been completed successfully, click "Close".

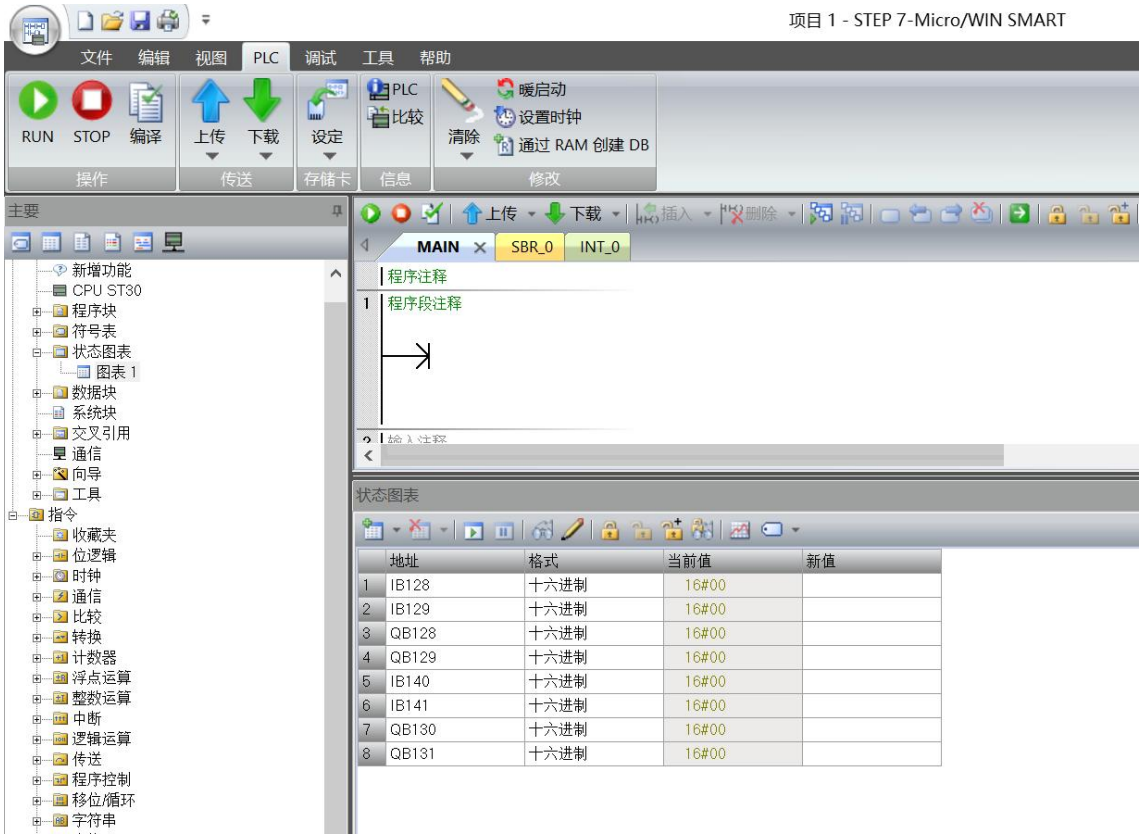
Note: After downloading, power on the module again.

9、 Functional verification

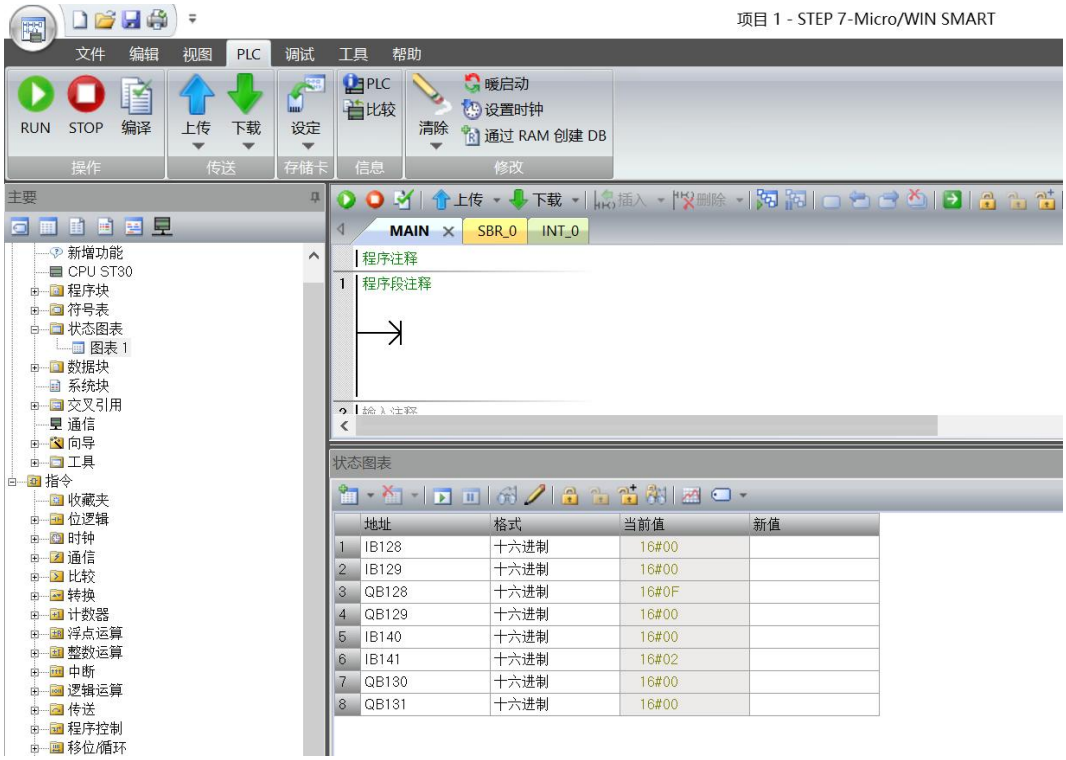
a. Click "PLC -> RUN" in the menu bar. A confirmation window will pop up. Click "Yes" to confirm, as shown in the figure below.



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



c. In the new value input box corresponding to QB128 in the status chart, you can write an output value. For example, writing "0F" will set the Pin2 output channel value of Port0~3 to 1, and all the Pin2 output channel lights of Port0~3 will light up. When there is a valid voltage input to the Pin2 port input channel of the slave module X07, the input value can be monitored in IB145, as shown in the figure below.



Note: In this example, the slave module connected to the master station's X00 port Pin4 is set to IO-Link mode, Pin4 of X01~X03 is set to DI mode, and Pin4 of X04~X07 is set to DO mode. The IB129 is used to input the monitoring address of the channel on the master station's X01~X03 Pin4 ports, and the QB129 is used to output the monitoring address of the channel on the master station's X04~X07 Pin4 ports.

Pin 2 of X00~X03 is set to DO mode, and Pin 2 of X04~X07 is set to DI mode. IB128 is used to input the monitoring address of the main station's Pin 2 port X04~X07, and QB128 is used to output the monitoring address of the main station's Pin 2 port X00~X03.

QB130 is the monitoring address for the output channels of slave devices X00~X03, QB131 is the monitoring address for the output channels of slave devices X04~X07, IB140 is the monitoring address for the input channels of slave devices X00~X03, and IB141 is the monitoring address for the input channels of slave devices X04~X07.

7.3 Custom data length module

Appendix A defines process data modules with varying byte lengths for different protocol masters. These modules generally meet the interface requirements of mainstream slave devices on the market. However, in practical applications, certain slave devices still use process data lengths that cannot be matched with the modules. For example, a slave device may have an input process data length of 16 bytes and an output process data length of 32 bytes. Compatibility can be achieved by using an input process data length of 32 bytes and an output process data length of 32 bytes, or by customizing the process data length. This section describes how to customize the process data length.

7.3.1 PROFINET Master Custom Module

In the PROFINET master station device configuration file, "module" is called a submodule. To add a custom submodule, you can obtain information such as the submodule ID and process data length from the submodule product manual, modify the configuration file, and update the host computer GSD file.

☛ Precautions

- If you are unsure how to implement a custom data length module or modify the configuration file, please consult technical support first and do not attempt any actions without authorization.

8 FAQ

8.1 When updating accessible devices, no device can be found.

1. Confirm that the TIA Portal software is installed correctly.
2. Confirm that no other software is using the network adapter used by the TIA Portal software.
3. Confirm that the network cable, network card, and network port are working properly.
4. Check for IP address or MAC address conflicts.

8.2 The load button is grayed out when downloading configuration.

1. Confirm that there are no forced values in the PLC.
2. Confirm that the PLC is in a stopped state.

9 Appendix

9.1 Appendix A

The IOL7 series PROFINET master station configuration file defines modules for different byte input process data lengths, output process data lengths, and input/output combined process data lengths, as 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 is 4 bytes, and the output process data length is 16 bytes.
IOL_I/O_04/32 Byte	Input process data length is 4 bytes, and the output process data length is 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 is 8 bytes, and the output process data length is 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 is 16 bytes, and the output process data length is 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 is 32 bytes, and the output process data length is 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 Bits 0...3 indicate the IO-Link port status and Bits 4...7 indicate IO-Link port error messages.

Bit0...3 is defined as follows:

Value (DEC)	Description
0	Port not activated
1	The port is in input mode.
2	The port is in output mode.
3	The port is in IO-Link mode and communication is normal.
4	The port is in IO-Link mode, and communication is abnormal.

Bit4...7 is defined as follows:

Value (DEC)	Description
0	No errors
1	Watchdog Abnormal
2	Cache overflow
3	Invalid device ID
4	Invalid vendor ID
5	Invalid IO-Link version
6	Invalid frame capability
7	Ineffective cycle time
8	Invalid input process data length
9	Invalid output process data length
10	No device detected
11	PreOP status error

For example: If a port is configured in IO-Link mode but no slave device is actually connected, the status will show 0xA4. If a port is configured in IO-Link mode but the input data length does not match, the status will show 0x84.

The IO-Link master status is represented by 1 byte, as defined below:

Value (DEC)	Description
0	No Errors
1	Undervoltage
2	Overvoltage
3	Overcurrent, Overload
4…255	Reserved

9.3 Appendix C

The 1-byte process data length defined in the IO-Link standard has different meanings represented by different bits. See Appendix B.1.6 of "IOL-Interface-Spec_10002_V113_Jun19.pdf".

Bit	Description
0...4	Length
5	Reserved
6	Standard input or standard output mode support
7	Byte marker bit. When set, the data length is the value of bits 0...4 plus 1; when not set, the value of bits 0...4 represents the length in bits.

Ignoring Bit6, the simple correspondence between its value and the length of the process data is as follows:

byte	Description
0x01	The process data length is 1 bit, typically used for standard input or standard output.
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

The slave ISDU may return an error, and the error codes are defined as follows. Please refer to Appendix C ErrorTypes of "IOL-Interface-Spec_10002_V113_Jun19.pdf".

Error code	Description
0x8000	Device application layer error
0x8011	Unreachable index
0x8012	Unreachable sub-index
0x8020	Service temporarily unavailable
0x8021	Local control services temporarily unavailable
0x8022	Equipment control services temporarily unavailable
0x8023	Access Denied
0x8030	Parameters out of range
0x8031	Parameter Above Limit
0x8032	Parameters below limit
0x8033	Parameter length too long
0x8034	Parameter Length Too Short
0x8035	Function unavailable
0x8036	Functionality temporarily unavailable
0x8040	Invalid parameter set
0x8041	Inconsistent parameter set
0x8082	Application not ready
0x81xx	Vendor Specific

