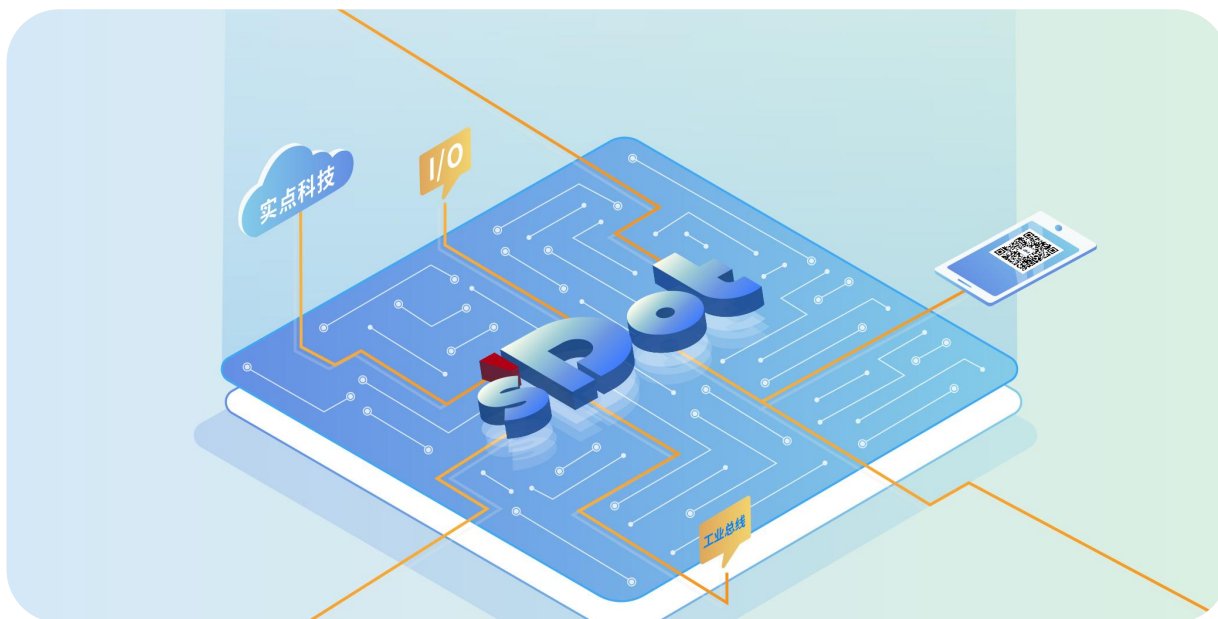




PROFINET

PN7A Series Integrated I/O

User Manual



Nanjing Solidot Electronic Technology Co., Ltd.

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1 Product Overview

1.1 Product Introduction

The PN7A series integrated I/O modules adopt the PROFINET industrial Ethernet bus interface and are PROFINET slave devices with standard I/O architecture. They are compatible with PROFINET networks from multiple manufacturers, providing users with a variety of options for high-speed data acquisition, optimized system configuration, simplified field wiring, and improved system reliability.

1.2 Product Features

- **Configurable inputs and outputs**
Input or output functions can be switched by configuring DIO channel parameters.
- **IP67 protection rating**
Suitable for harsh industrial environments.
- **Small size**
Suitable for applications with limited space.
- **Fast**
Based on high-performance communication chips.
- **Easy to diagnose**
The innovative channel indicator light design is placed close to the channel, making the channel status clear at a glance and facilitating inspection and maintenance.
- **Easy configuration**
It is easy to configure and supports major mainstream PROFINET master stations.
- **Simple and quick wiring**
Using standard cables simplifies wiring.

2 Naming Rules

2.1 Naming Rules

PN **7A** - **08** **08** **A** **+**
(1) **(2)** **(3)** **(4)** **(5)** **(6)** **(7)**

Serial Number	Meaning	Value description		
(1)	Bus Protocol	PN: PROFINET protocol		
(2)	Protection level	7A: IP67		
(3)	I/O types	Default: Digital		
(4)	Number of input signal points	16: 16-channel input	08: 8-channel input	00:0 channel input
(5)	Number of output signal points	16: 16-channel output	08: 8-channel output	00:0 channel output
(6)	signal type	A: NPN		B: PNP
(7)	Channel characteristics	+: Channel can be configured for input/output		Default: Channel type is fixed and cannot be configured.

2.2 Model List

Model	Product Description
PN7A-1600A	16-channel digital input module, NPN type
PN7A-1600B	16-channel digital input module, PNP type
PN7A-0808A	8-channel digital input/output module, NPN type

PN7A-0808B	8-channel digital input/output module, PNP type
PN7A-0016A	16-channel digital output module, NPN type
PN7A-0016B	16-channel digital output module, PNP type
PN7A-0016A+	16-channel configurable digital input/output module, NPN type
PN7A-0016B+	16-channel configurable digital input/output module, PNP type

3 Product Parameters

3.1 General parameters

Interface parameters	
Bus Protocol	PROFINET
Bus interface	2×M12-D, 4Pin, Hole End
Electrical isolation	500VAC
Data transmission medium	UTP or STP of Category 5 or higher (STP recommended)
Transmission distance	≤100m (distance between stations)
Technical parameters	
Configuration method	via the main site
Power interface	2×M12-L, 5Pin, Pin & Hole End
Power supply	24 VDC (18V ~ 30V)
US total current	Max: 16A
US consumes current	≤40mA
UL Total Current	Max: 16A
UL consumes current	25mA +Sensor supply current +Load output current
Electrical isolation between GNDS and GNDL	yes
weight	660g
size	225.5×62.5×32.6mm
Operating temperature	-25°C to +70°C
Storage temperature	-40°C ~ +85°C
relative humidity	95%, no condensation
Protection level	IP67

3.2 Digital parameters

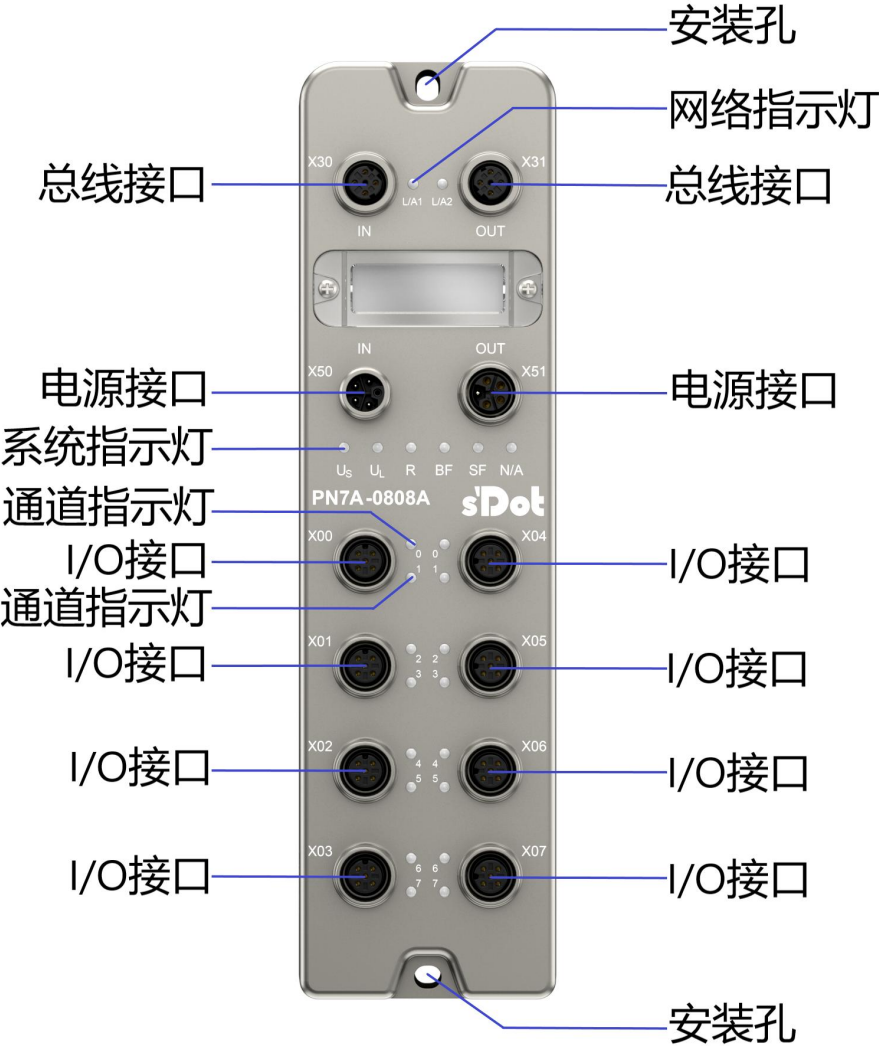
Digital input						
Product Model	PN7A-1600A	PN7A-1600B	PN7A-0808A	PN7A-0808B	PN7A-0016A	PN7A-0016B
Rated voltage	24 VDC (18V~30V)				-	
signal points	16		8			
Input Interface	8×M12-A, 5Pin, Hole End					
signal type	NPN	PNP	NPN	PNP		
"0" signal voltage	15~30V	-3~+3V	15~30V	-3~+3V		
"1" signal voltage	-3~+3V	15~30V	-3~+3V	15~30V		
Input filtering	3ms					
Input current	4mA					
Total power supply for sensors	Max: 2A (from UL)					
Isolation methods	Optical isolation					
Isolation and withstand voltage	500VAC					
Channel indicator lights	Green LED lights					
Digital output						
Rated voltage	-		24 VDC (18V~30V)			
signal points			8		16	
Output interface			8×M12-A, 5Pin, Hole End			
signal type			NPN	PNP	NPN	PNP
Load type			Resistive load, inductive load			
Single-channel rated current			Max: 500mA (from UL)			
Total output current			Max: 4A (from UL)		Max: 8A (from UL)	
Port protection			Overcurrent protection			
Isolation methods			Optical isolation			
Isolation and withstand voltage			500VAC			
Channel indicator lights			Green LED lights			

Digital input		
Product Model	PN7A-0016A+	PN7A-0016B+
Rated voltage	24 VDC (18V~30V)	
signal points	Inputs and outputs are configurable, with a maximum of 16 points.	
Input Interface	M12-A, 5-pin, pin end	
signal type	NPN	PNP
"0" signal voltage	15~30V	-3~+3V
"1" signal voltage	-3~+3V	15~30V
Input filtering	3ms	
Input current	4mA	
Total power supply for sensors	Max: 2A (from UL)	
Isolation methods	Optical isolation	
Isolation and withstand voltage	500VAC	
Channel indicator lights	Green LED lights	
Digital output		
Rated voltage	24 VDC (18V~30V)	
signal points	Inputs and outputs are configurable, with a maximum of 16 points.	
Output interface	M12-A, 5-pin, pin end	
signal type	NPN	PNP
Load type	Resistive load, inductive load	
Single-channel rated current	Max: 500mA (from UL)	
Total output current	Max: 8A (from UL)	
Port protection	Overcurrent protection	
Isolation methods	Optical isolation	
Isolation and withstand voltage	500VAC	
Channel indicator lights	Green LED lights	

4 Panel

4.1 Product Structure

Product Parts Names

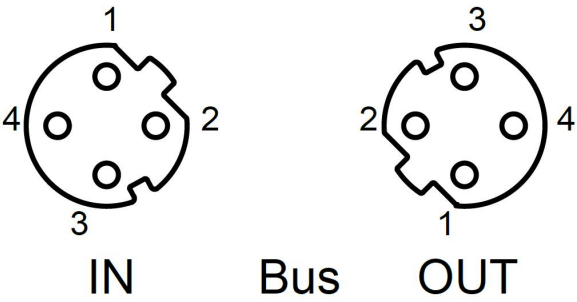


4.2 Indicator light function

Name	Logo	Color	State	Status Description
Network indicator IN	L/A1	green	ON	Establish network connection
			blinking	Network connection and data exchange
			Extinguish	No data interaction or anomaly
Network indicator light OUT	L/A2	green	ON	Establish network connection
			blinking	Network connection and data exchange
			Extinguish	No data interaction or anomaly
System power indicator	US	green	ON	Power supply is normal
			Extinguish	The product is not powered on or the power supply is abnormal.
Load power indicator	UL	green	ON	Power supply is normal
			Extinguish	The product is not powered on or the power supply is abnormal.
RUN status indicator	R	green	ON	The module is running normally.
			Extinguish	Module malfunction
System alarm indicator	SF	red	ON	The system is malfunctioning.
			Extinguish	The system is running normally or not powered on.
Network alarm indicator	BF	red	ON	Network connection error
			Extinguish	Network connection is normal
Input channel indicator	0 ~ F	green	ON	The module channel has a signal input.
			Extinguish	The module channel has no signal input or the signal input is abnormal.
Output channel indicator	0 ~ F	green	ON	The module channel has signal output.
			Extinguish	The module channel has no signal output or the signal output is abnormal.

4.3 Bus interface definition

Bus interface connection view (M12-D, 4Pin, hole end)



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, 5Pin, pin end & hole end)

Definitions

IN

OUT

Pin	Function	Wire core color
1	+24V US	Brown
2	0V GNDL	white
3	0V GNDS	blue
4	+24V UL	black
5	PE	Ash

4.5 I/O interface definition

I/O interface connection view (M12-A, 5Pin, hole end)

Definitions

DI

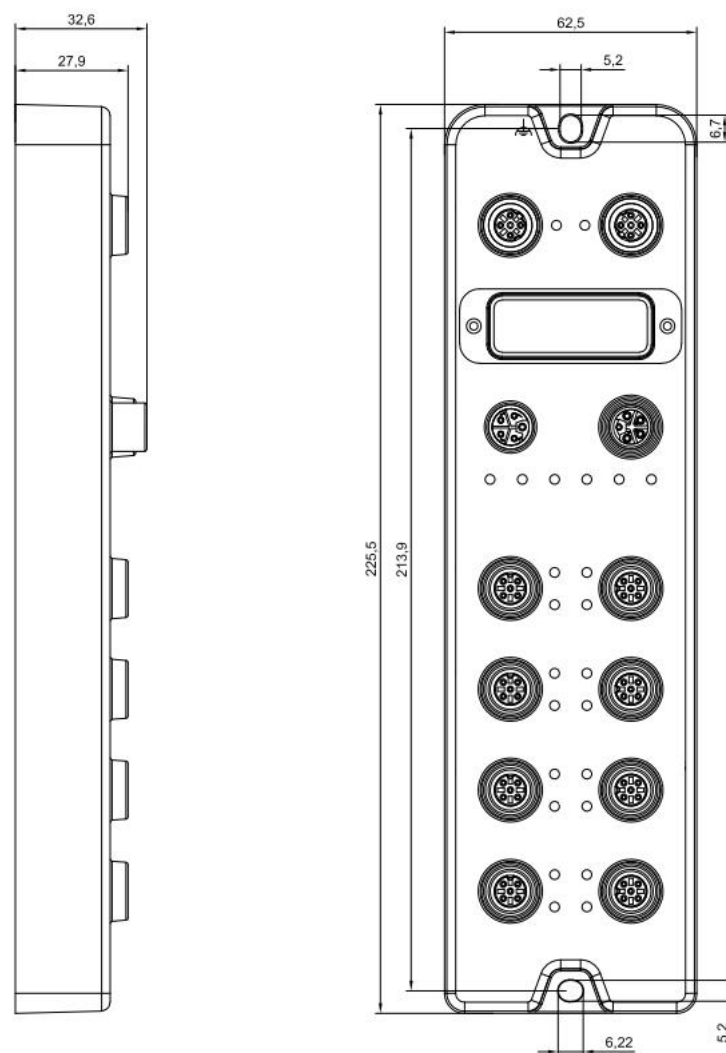
DO

Pin	Function	Wire core color
1	+24V UL / NC	Brown
2	DI/DO B	white
3	0V GNDL	blue
4	DI/DO A	black
5	PE	Ash

5 Installation and connection Wire

5.1 Outline Dimensions

External dimensions (unit: mm)



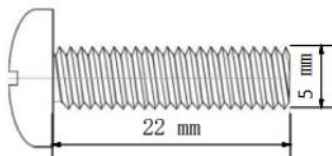
5.2 Installation environment requirements

To fully utilize the performance and improve the reliability of the PN7A module, please avoid installing it in the following locations:

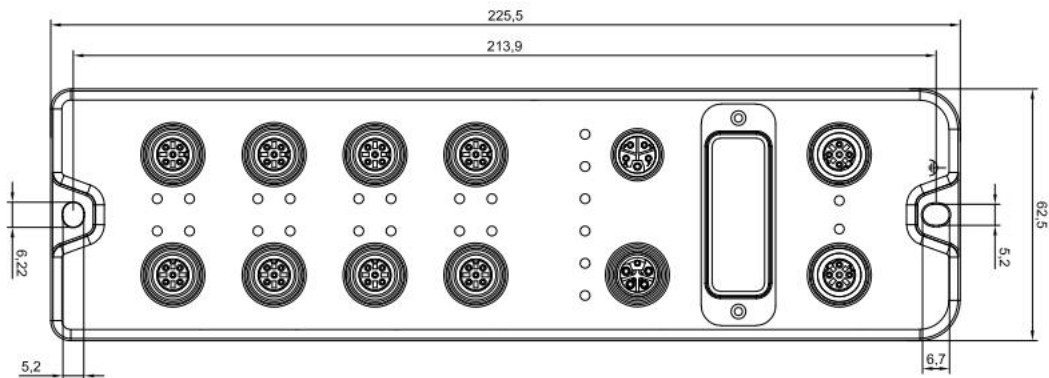
- Places with direct sunlight
- Locations where ambient temperature or relative humidity exceeds module specifications
- Places with corrosive or flammable gases
- Places where there are droplets of acid, oil, or chemicals
- Places with dust, iron filings, and flying sparks
- Locations where the module 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 M5*22mm or larger to secure the module body.



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

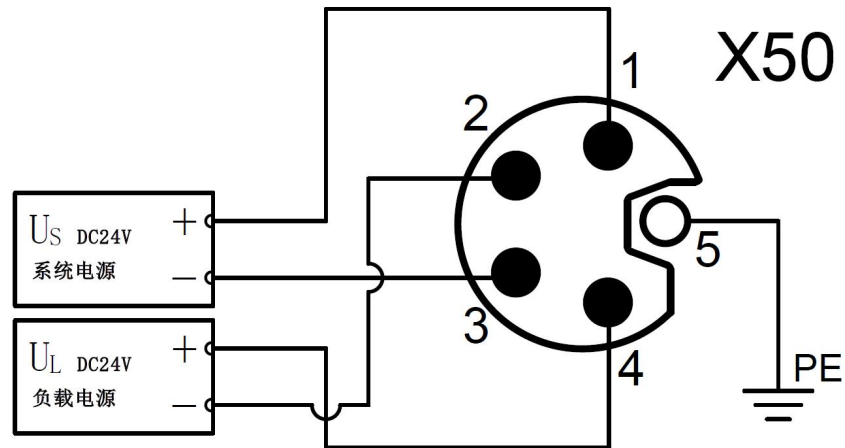


Precautions

- 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

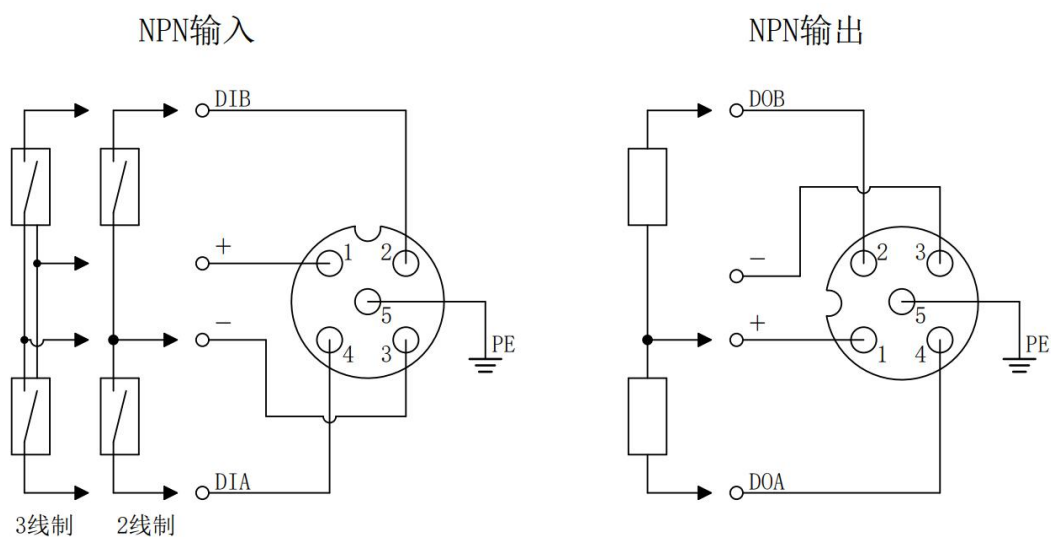
5.4.1 Power interface wiring diagram

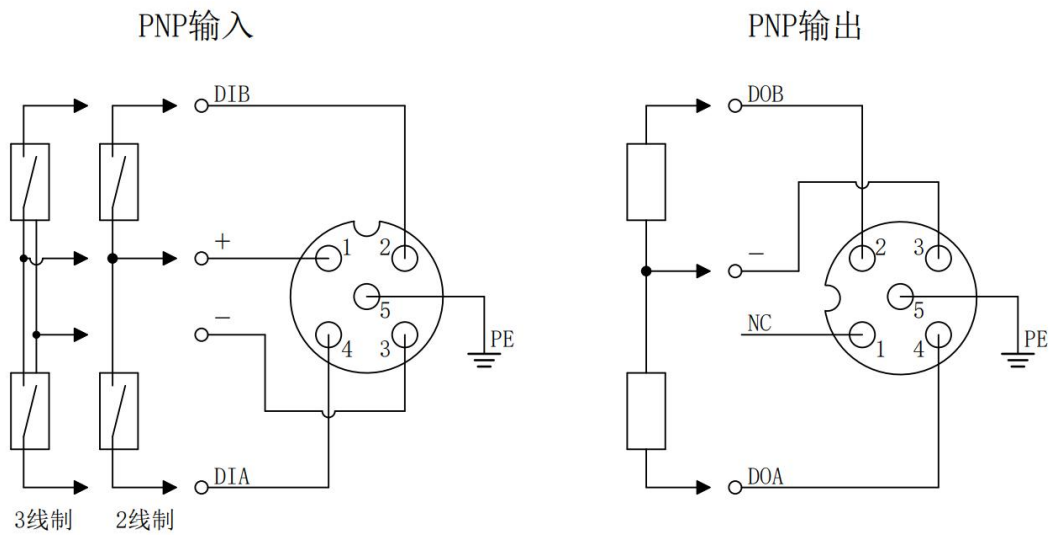


⚠ Precautions

- It is recommended that the system power supply and the load power supply be powered by 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





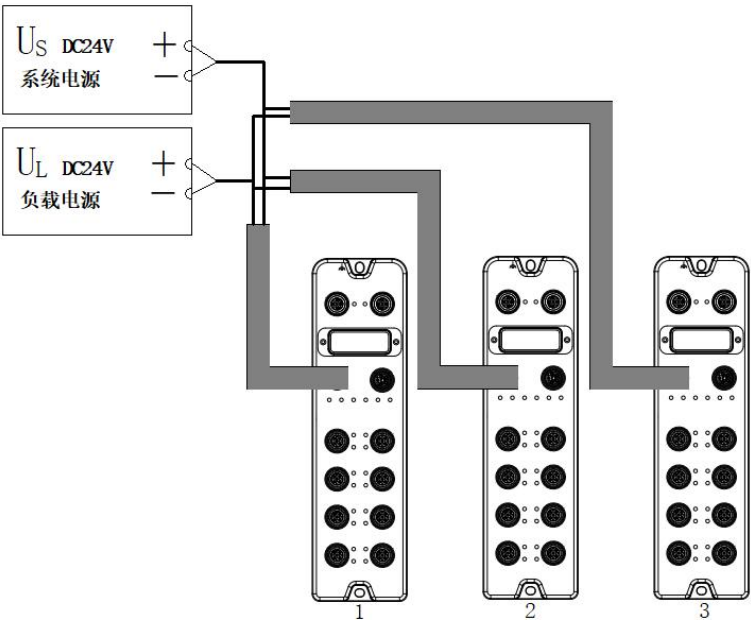
⚠ Precautions

- Install the module's waterproof cap on unused connector interfaces and tighten it to avoid compromising the IP67 protection rating.
- Pin 1 of the PNP output interface is NC, while pin 1 of other types of interfaces is +24V UL.

6 Power supply rules

6.1 Direct power supply rules

Each module is powered directly from the switching power supply, without using an OUT interface. The total current consumption of the load power supply for each module should be $\leq 8A$.



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

Total current consumed by the power supply (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, module 1 is PN7A-1600A, module 2 is PN7A-0808A, and module 3 is PN7A-0016A. 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 1-4	Pin4	DI (Input current 4mA)	3-wire sensor	Current consumption: 30mA
		Pin2	DI (Input current 4mA)		Current consumption: 30mA
	Ports 4~8	Pin4	DO	Solenoid valve	Load current: 500mA
		Pin2	DO		Load current: 500mA
Module 3	Ports 1-8	Pin4	DO	Solenoid valve	Load current: 500mA
		Pin2	DO		Load current: 500mA

The total current consumption is calculated, and the current consumption of a single module is calculated as shown in the table below:

Module Name	Power type	Total current consumption calculation items	Calculation results
Module 1	System power US	System current consumption	Module system-side power consumption 40mA
	Load power supply UL	Module input current and sensor current consumption	For all ports (Sensor current consumption) + (Channel input current * Number of input points) = (30mA*16) + (4mA*16) =544mA
Module 2	System power US	System current consumption	Module system-side power consumption 40mA
	Load power supply UL	Module input current and sensor current consumption	For ports 1-4 (Sensor current consumption) + (Channel input current * Number of input points) = (30mA*8) + (4mA*8) =272mA

		Load output current	For ports 5~8 Channel output current * number of output points =500mA*8 =4A
Module 3	System power US	System current consumption	Module system-side power consumption 40mA
	Load power supply UL	Load output current	For ports 1-8 Channel output current * number of output points =500mA*16 =8A

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

- For the system power supply US, each module consumes 40mA of current.
- For load power supply UL:

The load power supply UL of module 1 (PN7A-1600A) consumes 544mA, which is less than the maximum load power supply UL current of 8A.

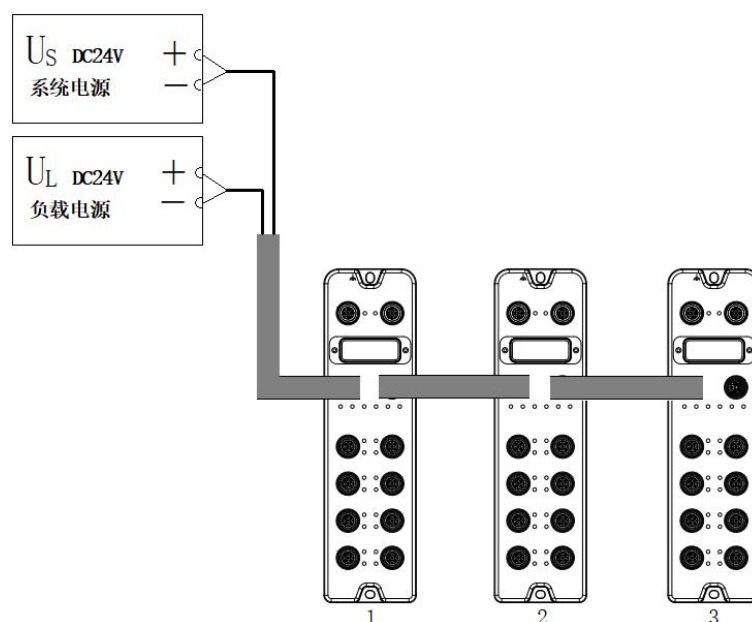
The load power supply UL of module 2 (PN7A-0808A) consumes a current of 272mA+4A=4.272A, which is less than the maximum current of the module load power supply UL of 8A.

The load power supply UL of module 3 (PN7A-0016A) consumes 8A of current, which is equal to the maximum current of the module's load power supply UL, which is 8A.

In this example, the requirement is met because the total current consumption of each module meets the requirement that the total current consumption of the module load power supply is $\leq 8A$.

6.2 Series power supply rules

The modules are connected in series via the OUT interface. The total current consumption of the load power supply of each module should be $\leq 8A$, and the total current consumption of the system power supply and load power supply of all modules should be $\leq 16A$.



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

Total current consumed by the power supply (A)	Voltage drop (V) in the internal circuit of the module	Voltage drop (V) at different cable lengths			
		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 consumed by the power supply of each module's load should be $\leq 8A$.
- As shown in the figure above, when power is supplied in series, the total current consumed by the system power supply and load power supply of all modules should meet the rule of $"1+2+3" \leq 16A$.

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

For example, module 1 is PN7A-1600A, module 2 is PN7A-0808A, and module 3 is PN7A-0016A. The usage of each module is similar to...[Example of calculating the total current consumption of the module when directly powered](#)" same.

Calculate the total current consumption:

$$US = 40mA + 40mA + 40mA = 120mA$$

$$UL = 544mA + 4.272A + 8A = 12.816A$$

In this example, the requirement is met because the total current consumed by the system power supply US and the load power supply UL of all modules meets the rule "1+2+3"≤16A.

☛ Precautions

- In series power supply mode, if the total current consumed by the system power supply US or the total current consumed by the load power supply UL exceeds 16A, please change some modules to direct power supply mode to ensure that the total current consumed by the system power supply US or the total current consumed by the load power supply UL is ≤16A.
-

7 Use

7.1 Parameters and function configuration

7.1.1 Digital input filtering function

Digital input filtering prevents unexpected rapid changes in the input signal from causing the program to respond, which may be due to switch contact skipping or electrical noise. Digital input filtering is currently fixed at 3ms, filtering out noise within that 3ms range; individual channels cannot be configured.

A 3ms input filtering time means that a single signal changing from "0" to "1" or from "1" to "0" takes 3ms to be detected, while a single high pulse or low pulse shorter than 3ms will not be detected.

7.1.2 Output clear and hold function

The clear/hold function targets the module's output signals. This function can be configured to control the module's output actions in abnormal bus conditions.

Maintain output: The module's output channel continues to output even when communication is interrupted.

Clear output: When communication is disconnected, the module output channel clears the output.

7.1.3 Channel input/output configuration

For modules with configurable input and output, parameters can be configured to enable each channel to perform input or output functions, and each channel can be configured individually.

This manual uses TIA Portal V17 as an example to introduce parameter configuration methods. For detailed steps, please refer to [link/reference].[Parameter settings](#).

7.2 Configuration module application

7.2.1 Application in the TIA Portal V17 software environment

1、Preparation

- **Hardware environment**

- **Module model PN7A-0016A+**
- **One computer, pre-installed with TIA Portal V17 software.**
- **PROFINET dedicated shielded cable**
- **This instruction manual uses a Siemens S7-1200 CPU1214C DC/DC/DC converter as an example.**
- **One switching power supply**
- **Module mounting rails and rail fasteners**
- **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](#) "Required Operation"

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.



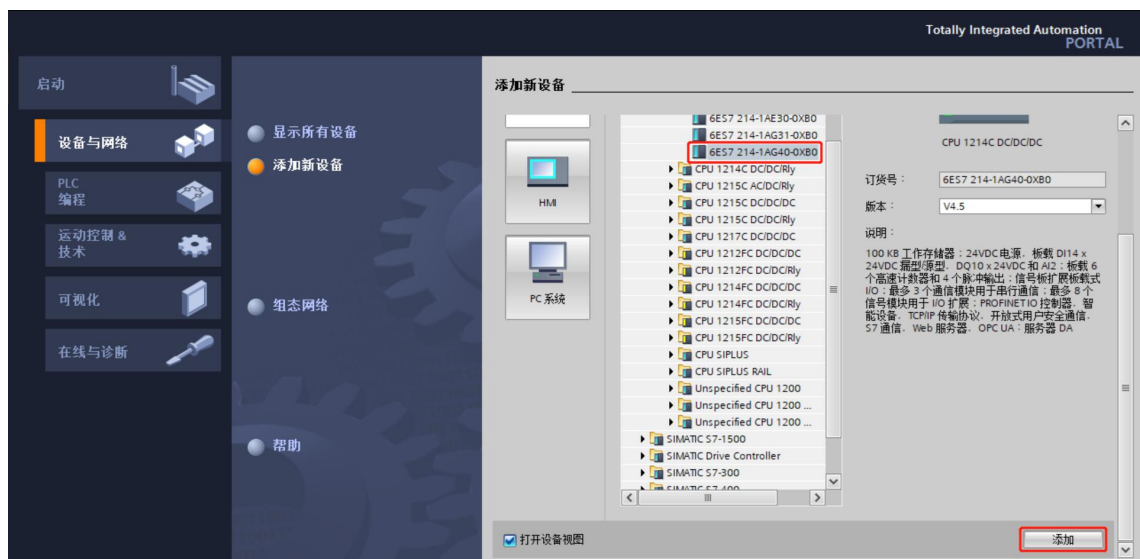
- ◆ Project name: Custom, you can keep the default.
- ◆ Path: The path where the project is saved. You can keep the default path.
- ◆ Version: You can keep the default.
- ◆ Author: You can keep the default setting.
- ◆ Note: This is customizable and can be left blank.

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.

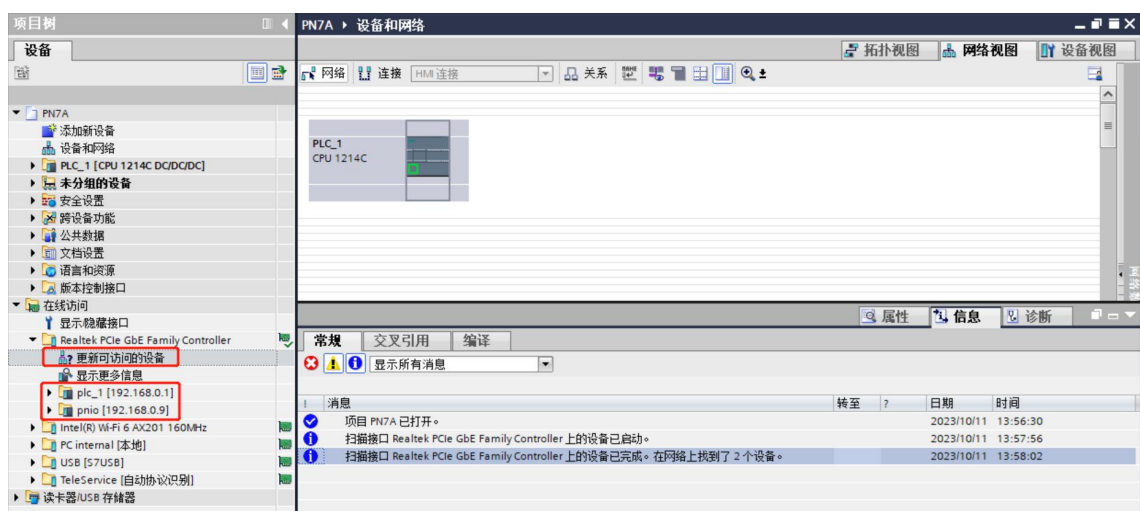


4. Scan connection device

- 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.

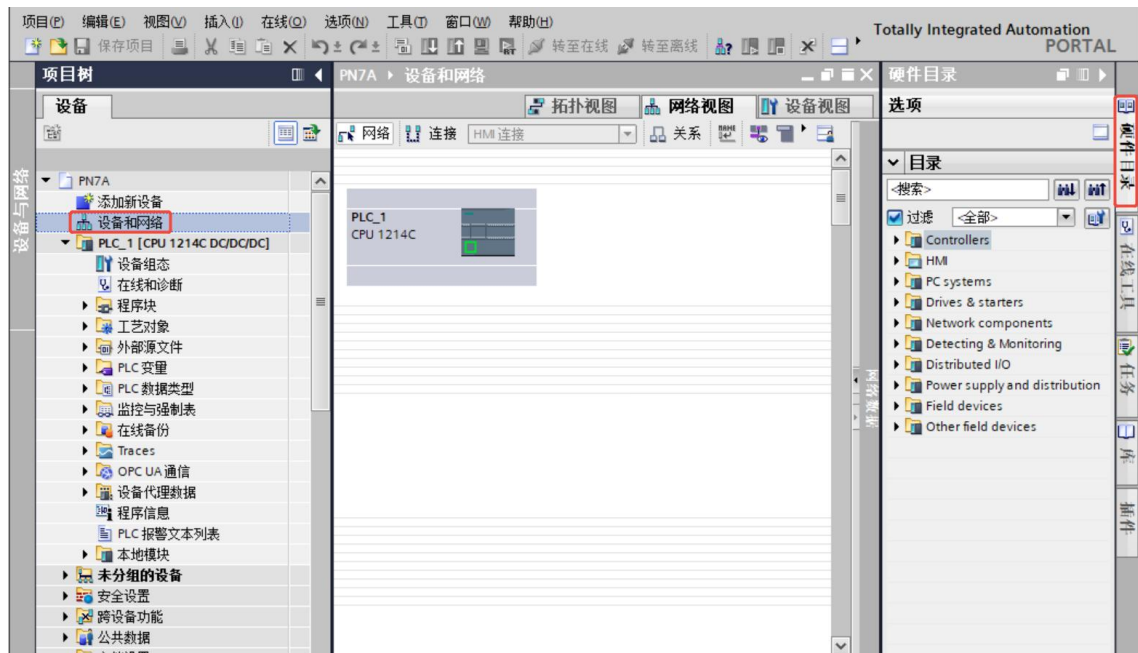
5、 Add GSD configuration file

- In the menu bar, select "Options -> Manage General Station Description Files (GSDML)(D)".
- Click "Source Path" to select the file.
- Check if the status of the GSD file to be added is "Not installed". If not installed, click the "Install" button. If already installed, click "Cancel" to skip the installation steps.

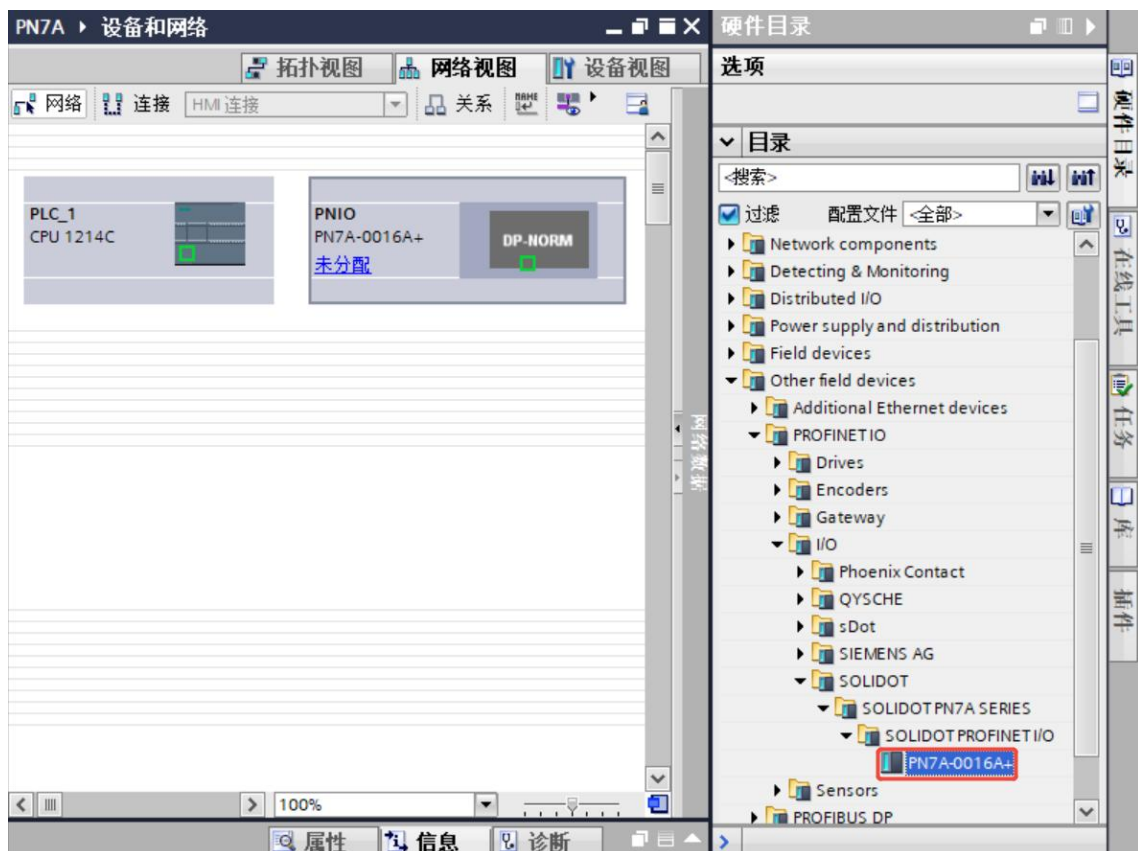


6、 Add slave device

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



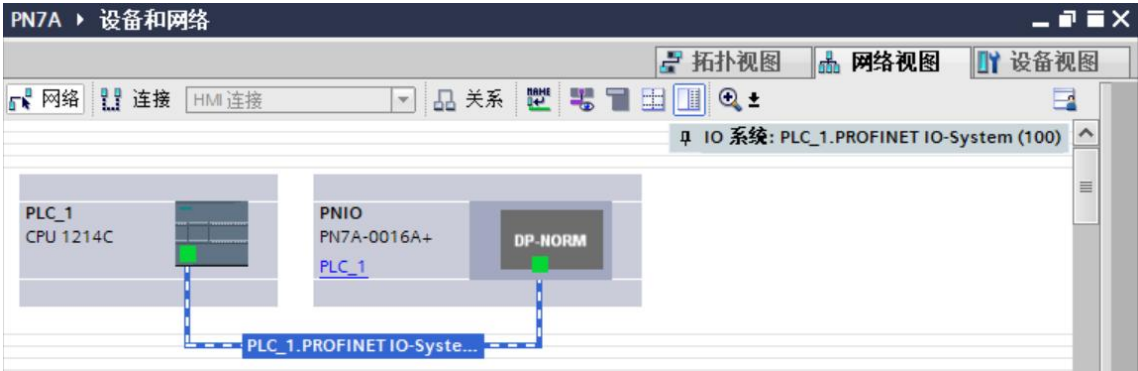
- c. In the hardware catalog search box, enter "PN7A-0016A+" to search for the module. After the search is complete, drag or double-click "PN7A-0016A+" to the "Network View," as shown in the figure below. To connect multiple modules, add them sequentially according to the actual topology under the "Hardware Catalog" on the right.



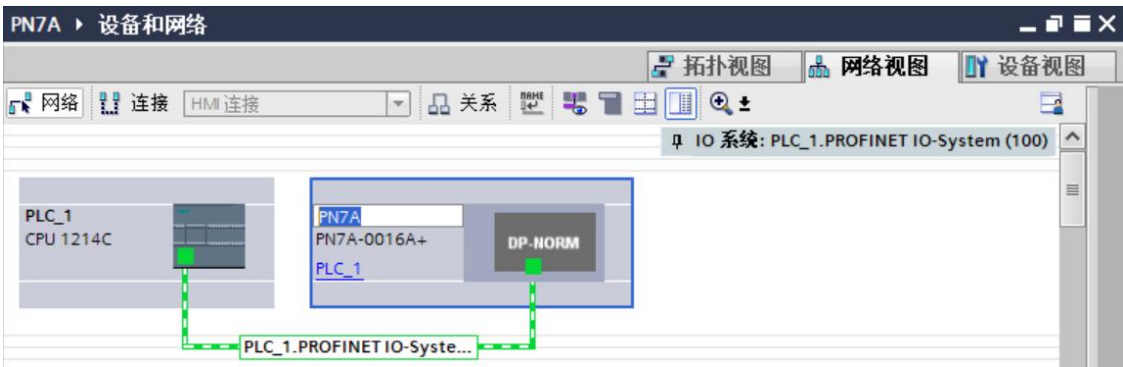
- d. Click "Unassigned (blue text)" on the slave device, and select "PLC_1.PROFINET Interface_1", as shown in the figure below.



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.

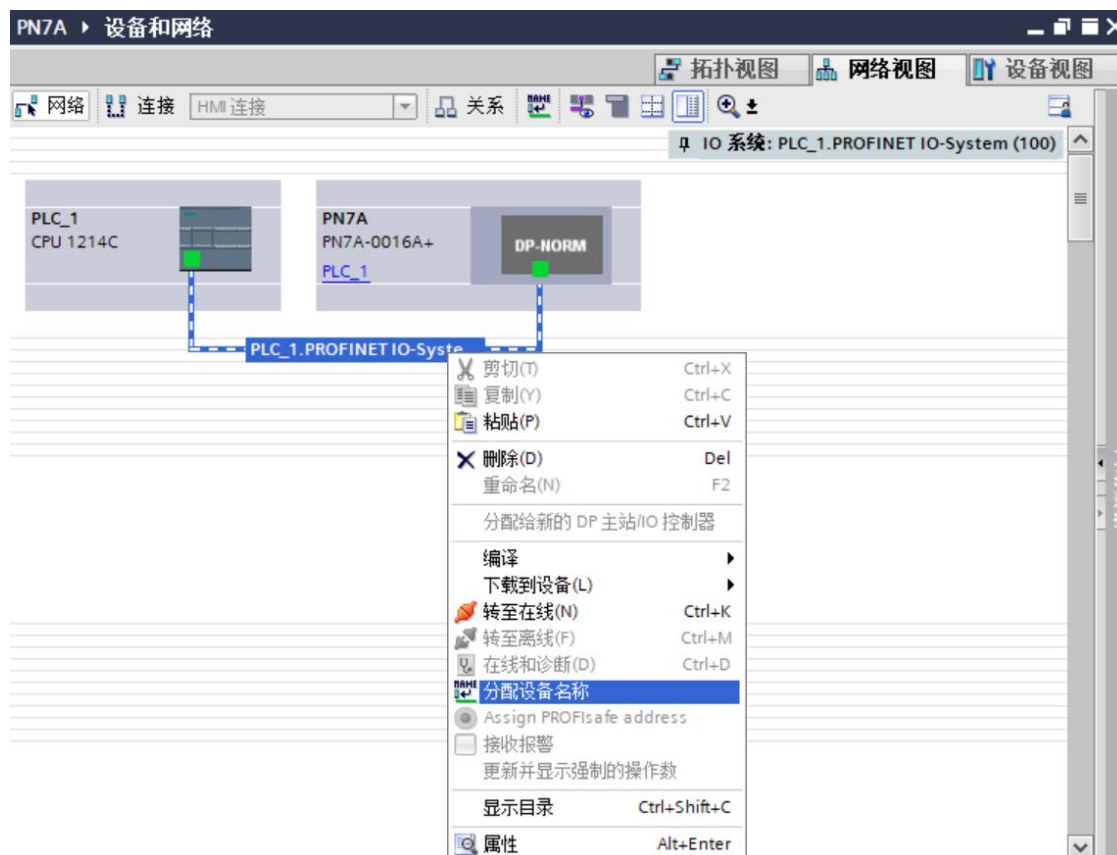


g. Click "Device View" to enter the device overview, where you can see the topology configuration information, including the I/O addresses automatically assigned by the system. The I/O addresses can be changed manually, as shown in the figure below.

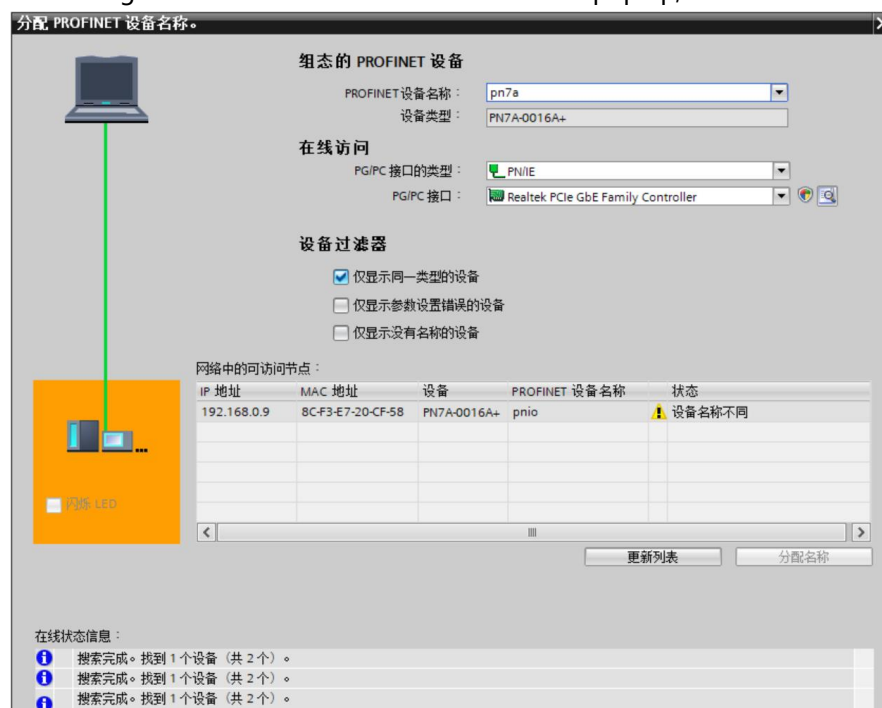


7、Assign device name

- a. Switch to "Network View", right-click the connection cable between the PLC and PN7A, and select "Assign Device Name", as shown in the figure below.



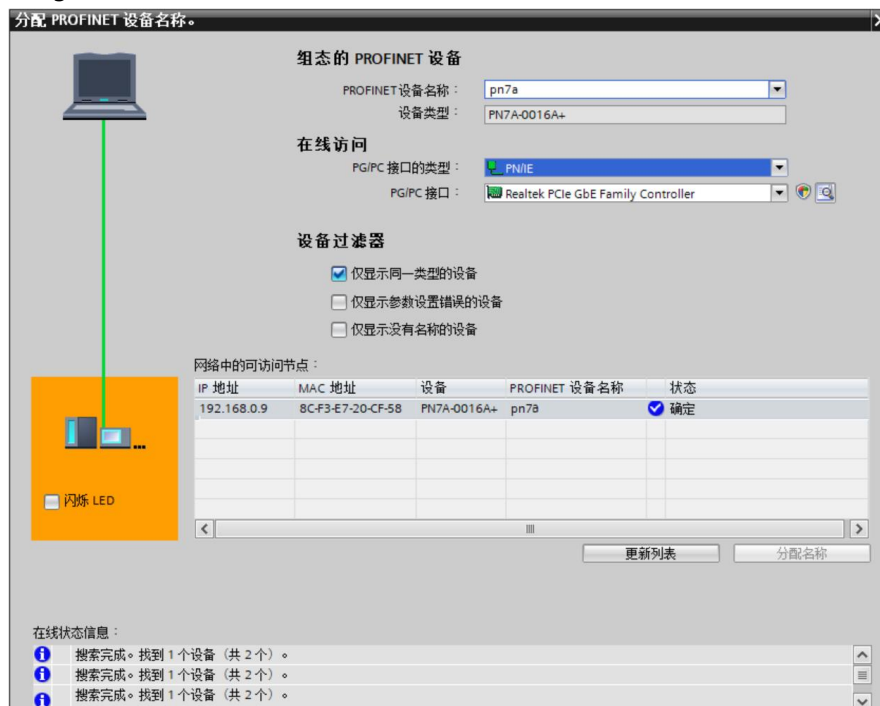
- b. A "Assign PROFINET Device Name" window will pop up, as shown in the figure below.



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".

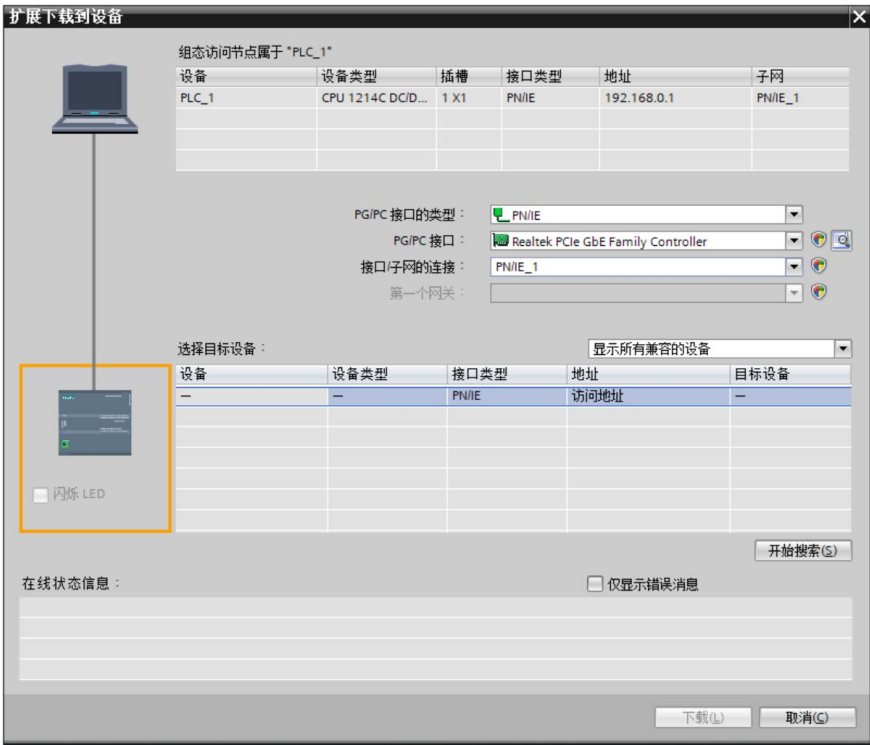
- ◆ The type of PG/PC interface is PN/IE.
 - ◆ PG/PC interface: The actual network adapter used.
- c. Select the slave devices in sequence, click "Update List", and then click "Assign Name". Check whether the status of the node in "Accessible Nodes in the Network" is "OK", as shown in the figure below.



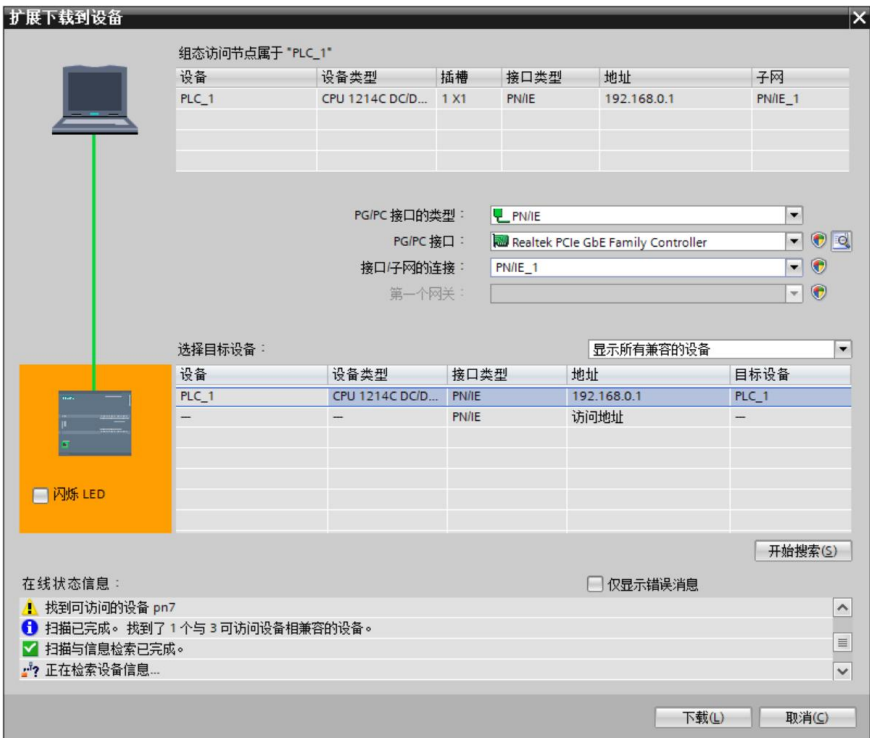
- d. Click "Close".

8、Download configuration structure

- In the "Network View", select PLC.
- Click the  button in the menu bar to download the current configuration to the PLC.
- In the pop-up "Extend to Downloads to Devices" interface, configure as shown in the image below.



d. Click the "Start Search" button, 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".

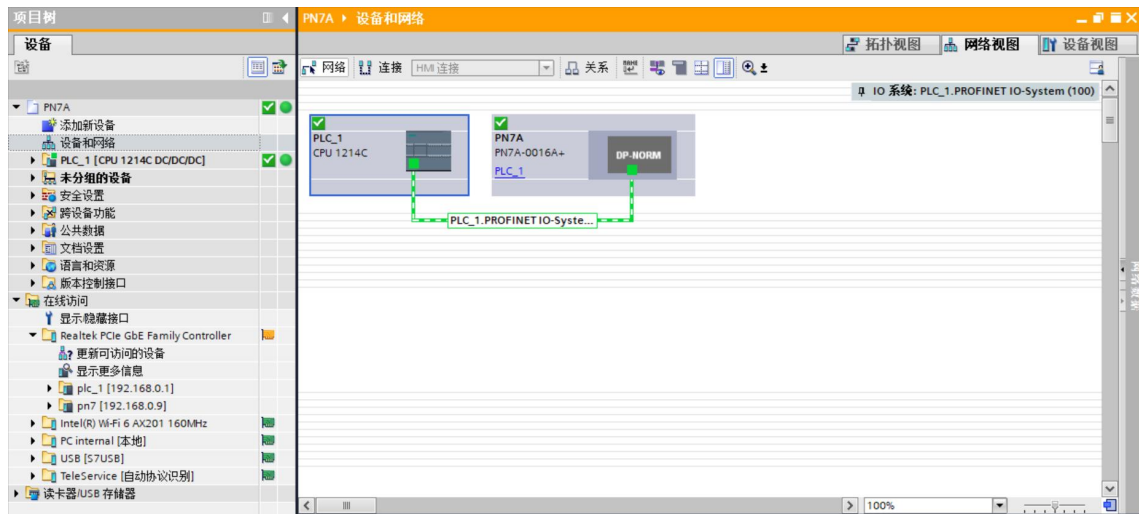
i. Click "Finish".

j. Power on the device again.

9、Communication connection

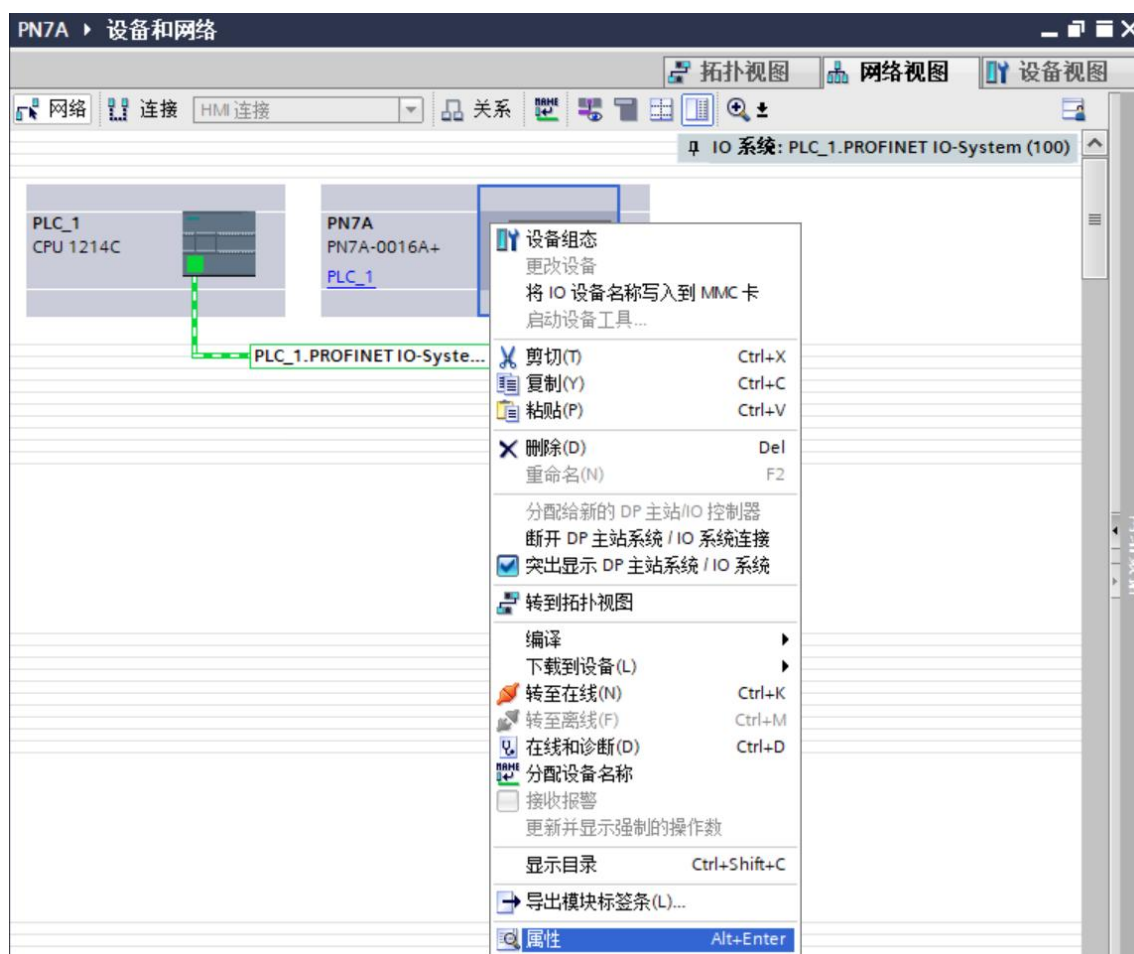


- a. Click the button, then click the "Go to Online" button. If all icons are green, the connection is successful, as shown in the image below.

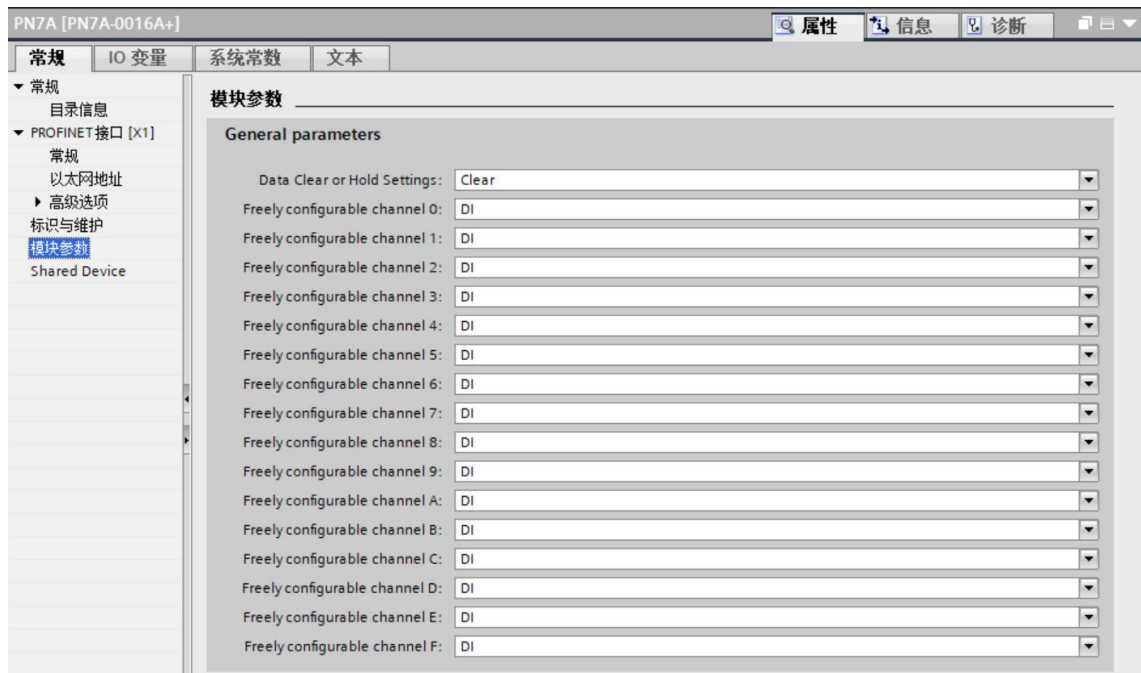


10、Parameter settings

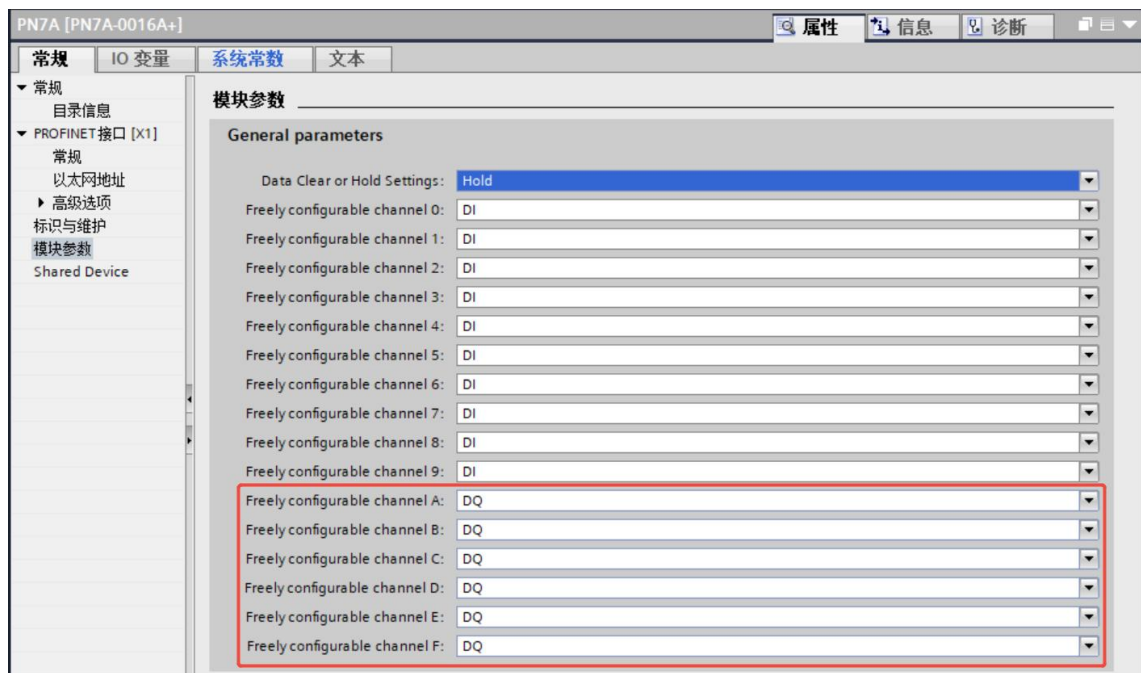
- a. Open the "Network View". In offline mode, right-click the coupler view icon and click "Properties", as shown in the image below.



- b. On the properties page, click "Module Parameters," as shown in the image below. The output clear/hold parameters and channel input/output configuration parameters can be configured according to actual usage needs. After configuration, re-download the program to the PLC; both the PLC and the module need to be powered on again.

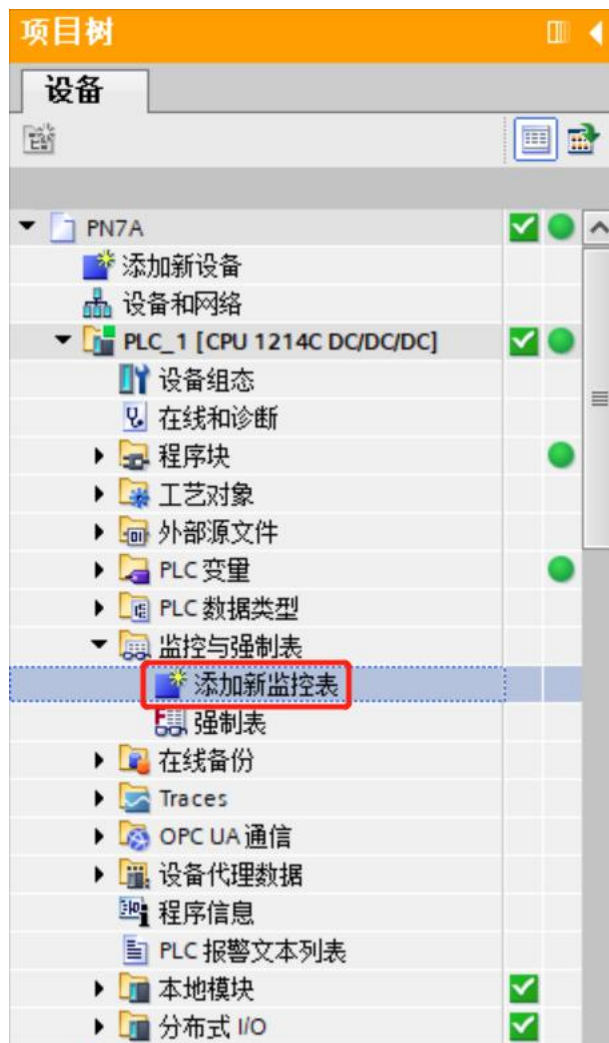


- c. For example, configure channels 0-9 as input types and channels A-F as output types, as shown in the figure below. After configuration, re-download the program to the PLC, and then power on both the PLC and the module.

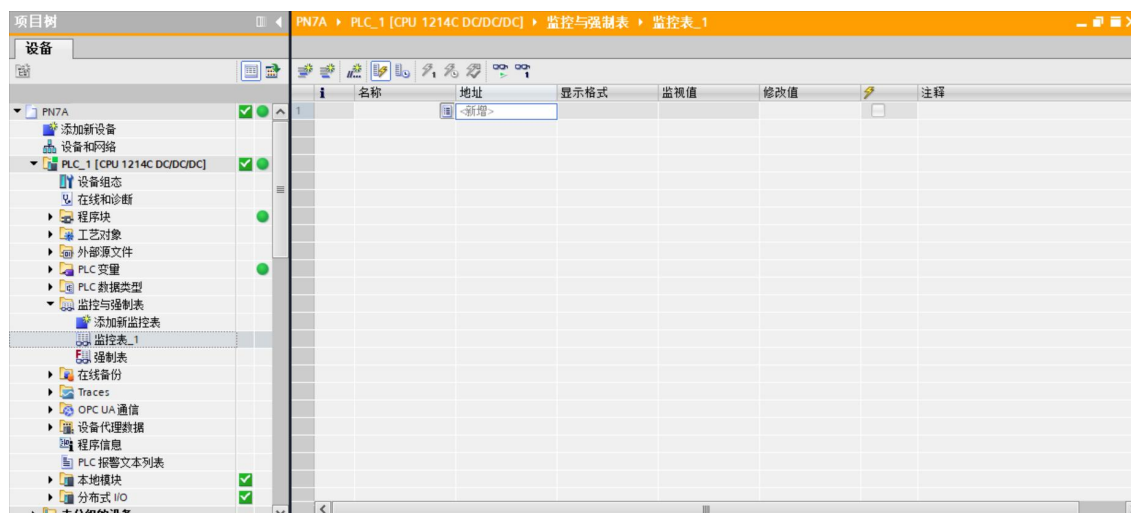


11、 Functional verification

- 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 module PN7A-0016A+ in the device overview. For example, the "Q address" of the PN7A-0016A+ module is 2~3, and the "I address" is 2~3, 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
PN7A	0	0			PN7A-0016A+	1234567	V10.00.00	
PNIO	0	0 X1			PNIO			
INI/OUT_1	0	1	2...3	2...3	INI/OUT		1.0	

- d. In the address cells of the monitoring table, enter the input/output channel addresses. Module channels 0-9 are input types, and configuration channels A-F are output types. For example, enter "%I2.0"~"%I3.7", "%Q2.0"~"%Q3.7", press "Enter", and after completing all the fields, click [link to entry].  The button is used to monitor the data, as shown in the figure below. Input channels 0~9 correspond to "%I2.0"~"%I3.1" in the monitoring table, and output channels A~F correspond to "%Q3.2"~"%Q3.7" in the monitoring table.

	i	名称	地址	显示格式	监视值	修改值		注释
1			%I2.0	布尔型	FALSE			
2			%I2.1	布尔型	FALSE			
3			%I2.2	布尔型	FALSE			
4			%I2.3	布尔型	FALSE			
5			%I2.4	布尔型	FALSE			
6			%I2.5	布尔型	FALSE			
7			%I2.6	布尔型	FALSE			
8			%I2.7	布尔型	FALSE			
9			%I3.0	布尔型	FALSE			
10			%I3.1	布尔型	FALSE			
11			%I3.2	布尔型	FALSE			
12			%I3.3	布尔型	FALSE			
13			%I3.4	布尔型	FALSE			
14			%I3.5	布尔型	FALSE			
15			%I3.6	布尔型	FALSE			
16			%I3.7	布尔型	FALSE			
17			%Q2.0	布尔型	FALSE			
18			%Q2.1	布尔型	FALSE			
19			%Q2.2	布尔型	FALSE			
20			%Q2.3	布尔型	FALSE			
21			%Q2.4	布尔型	FALSE			
22			%Q2.5	布尔型	FALSE			
23			%Q2.6	布尔型	FALSE			
24			%Q2.7	布尔型	FALSE			
25			%Q3.0	布尔型	FALSE			
26			%Q3.1	布尔型	FALSE			
27			%Q3.2	布尔型	FALSE			
28			%Q3.3	布尔型	FALSE			
29			%Q3.4	布尔型	FALSE			
30			%Q3.5	布尔型	FALSE			
31			%Q3.6	布尔型	FALSE			
32			%Q3.7	布尔型	FALSE			
33		<新增>						

- e. In the "Modify Value" cells from "%Q3.2" to "%Q3.7", enter "1" and click...  Press the write button and you will see the corresponding output channel A~F indicator lights illuminate, as shown in the figure below.

	i	名称	地址	显示格式	监视值	修改值		注释
1			%I2.0	布尔型	 FALSE		☐	
2			%I2.1	布尔型	 FALSE		☐	
3			%I2.2	布尔型	 FALSE		☐	
4			%I2.3	布尔型	 FALSE		☐	
5			%I2.4	布尔型	 FALSE		☐	
6			%I2.5	布尔型	 FALSE		☐	
7			%I2.6	布尔型	 FALSE		☐	
8			%I2.7	布尔型	 FALSE		☐	
9			%I3.0	布尔型	 FALSE		☐	
10			%I3.1	布尔型	 FALSE		☐	
11			%I3.2	布尔型	 FALSE		☐	
12			%I3.3	布尔型	 FALSE		☐	
13			%I3.4	布尔型	 FALSE		☐	
14			%I3.5	布尔型	 FALSE		☐	
15			%I3.6	布尔型	 FALSE		☐	
16			%I3.7	布尔型	 FALSE		☐	
17			%Q2.0	布尔型	 FALSE		☐	
18			%Q2.1	布尔型	 FALSE		☐	
19			%Q2.2	布尔型	 FALSE		☐	
20			%Q2.3	布尔型	 FALSE		☐	
21			%Q2.4	布尔型	 FALSE		☐	
22			%Q2.5	布尔型	 FALSE		☐	
23			%Q2.6	布尔型	 FALSE		☐	
24			%Q2.7	布尔型	 FALSE		☐	
25			%Q3.0	布尔型	 FALSE		☐	
26			%Q3.1	布尔型	 FALSE		☐	
27			%Q3.2	布尔型	 TRUE	TRUE	☒ 	
28			%Q3.3	布尔型	 TRUE	TRUE	☒ 	
29			%Q3.4	布尔型	 TRUE	TRUE	☒ 	
30			%Q3.5	布尔型	 TRUE	TRUE	☒ 	
31			%Q3.6	布尔型	 TRUE	TRUE	☒ 	
32			%Q3.7	布尔型	 TRUE	TRUE	☒ 	
33		 <新增>					☐	

- f. When an effective voltage is input to input channels 2 and 3 of the module, the input value can be monitored in “%I2.2” ~ “%I2.3” , as shown in the figure below.

	i	名称	地址	显示格式	监视值	修改值	注释
1			%I2.0	布尔型	☐ FALSE		
2			%I2.1	布尔型	☐ FALSE		
3			%I2.2	布尔型	☒ TRUE		
4			%I2.3	布尔型	☒ TRUE		
5			%I2.4	布尔型	☐ FALSE		
6			%I2.5	布尔型	☐ FALSE		
7			%I2.6	布尔型	☐ FALSE		
8			%I2.7	布尔型	☐ FALSE		
9			%I3.0	布尔型	☐ FALSE		
10			%I3.1	布尔型	☐ FALSE		
11			%I3.2	布尔型	☐ FALSE		
12			%I3.3	布尔型	☐ FALSE		
13			%I3.4	布尔型	☐ FALSE		
14			%I3.5	布尔型	☐ FALSE		
15			%I3.6	布尔型	☐ FALSE		
16			%I3.7	布尔型	☐ FALSE		
17			%Q2.0	布尔型	☐ FALSE		
18			%Q2.1	布尔型	☐ FALSE		
19			%Q2.2	布尔型	☐ FALSE		
20			%Q2.3	布尔型	☐ FALSE		
21			%Q2.4	布尔型	☐ FALSE		
22			%Q2.5	布尔型	☐ FALSE		
23			%Q2.6	布尔型	☐ FALSE		
24			%Q2.7	布尔型	☐ FALSE		
25			%Q3.0	布尔型	☐ FALSE		
26			%Q3.1	布尔型	☐ FALSE		
27			%Q3.2	布尔型	☒ TRUE	TRUE	☒ !
28			%Q3.3	布尔型	☒ TRUE	TRUE	☒ !
29			%Q3.4	布尔型	☒ TRUE	TRUE	☒ !
30			%Q3.5	布尔型	☒ TRUE	TRUE	☒ !
31			%Q3.6	布尔型	☒ TRUE	TRUE	☒ !
32			%Q3.7	布尔型	☒ TRUE	TRUE	☒ !
33		<新增>					

7.2.2 Application in the STEP 7-MicroWIN SMART software environment

1、Preparation

● Hardware environment

- **Module model PN7A-0016A+**
- **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**
- **Module mounting rails and rail fasteners**
- **Device configuration file**

Configuration file retrieval

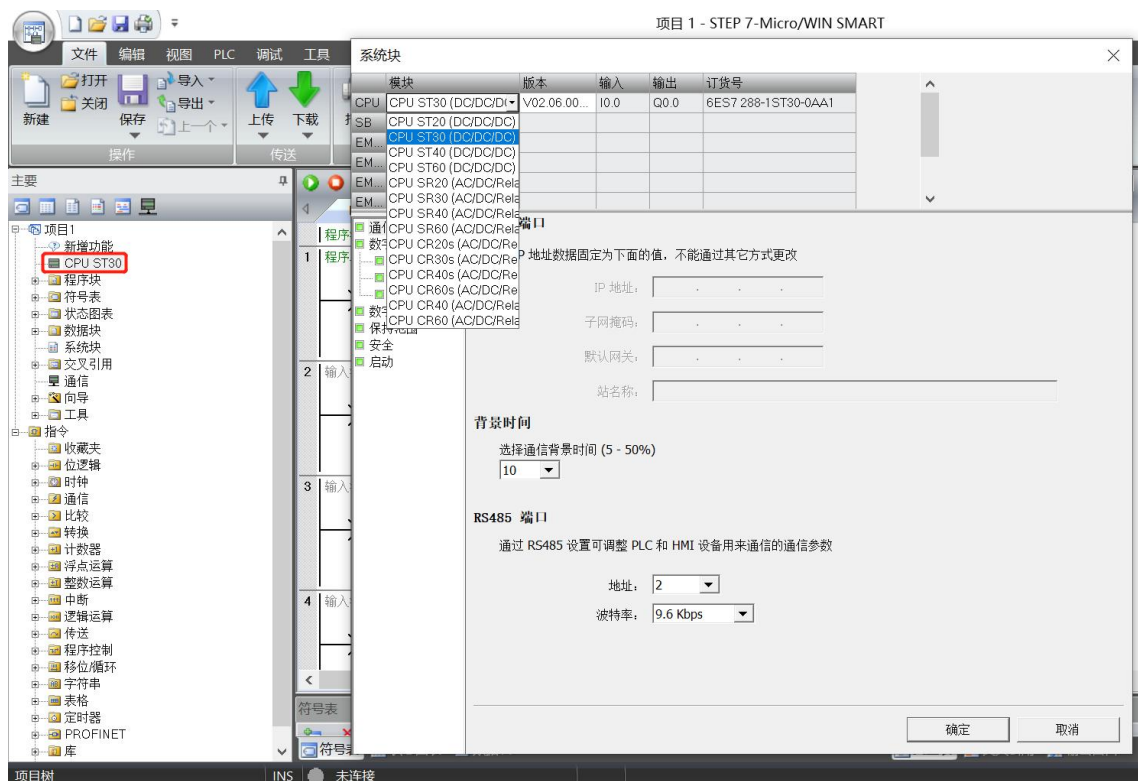
address: <https://www.solidotech.com/cn/resources/configuration-files>

● Hardware configuration and wiring

Please follow the instructions. [5 Installation and wiring](#) "Required Operation"

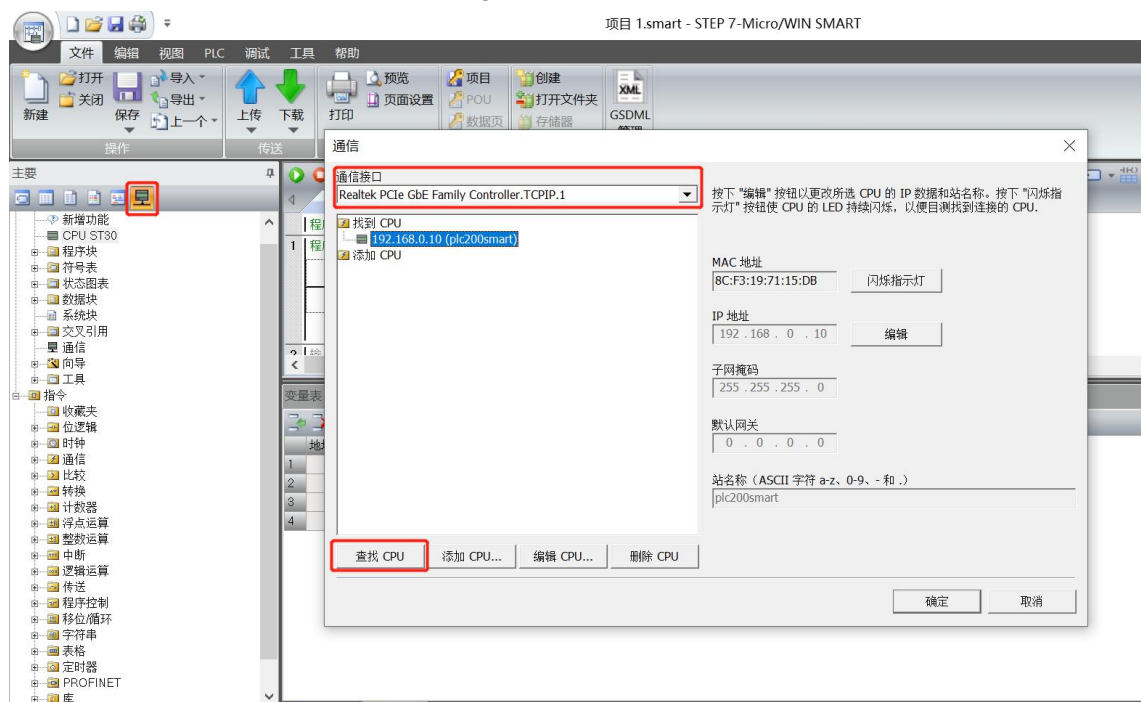
2、Add PLC

- 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 the "OK" button, 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 the "Find CPU" button to find the PLC, as shown in the figure below.

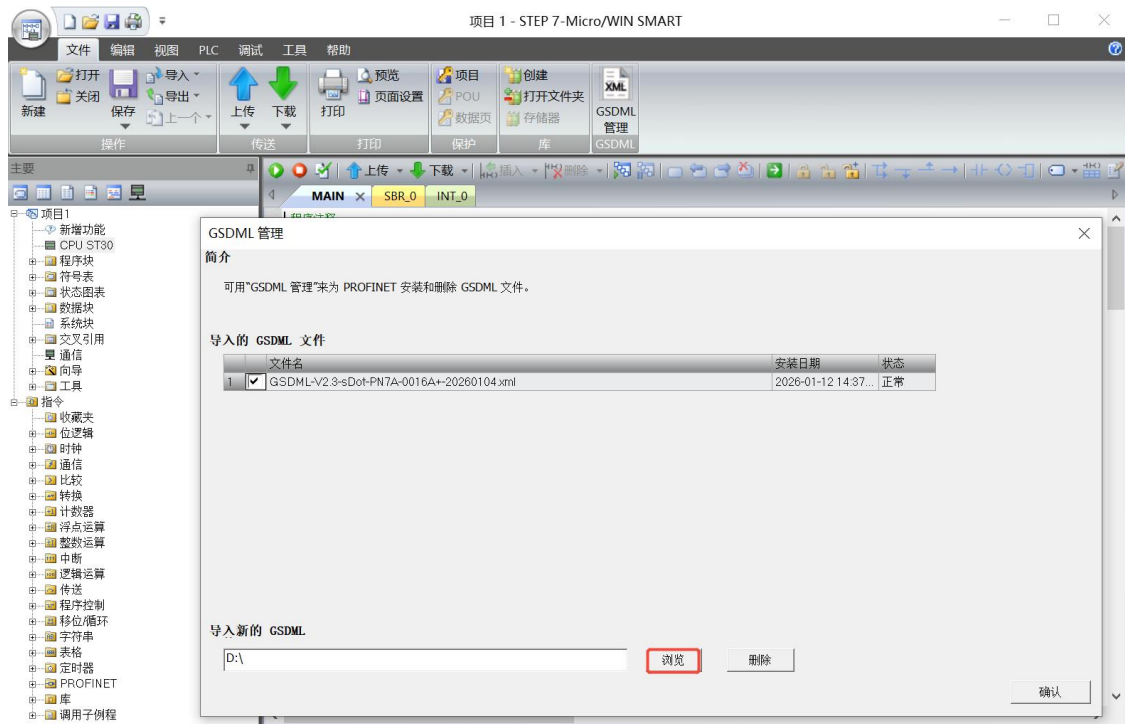


- d. Click the "Edit" button in the communication window. The edit button will switch to the settings button, and the IP address input box will light up. Modify the IP address to be on the same network segment as the computer interface's IP address. After modification, click the "Settings" button again, and then click the "OK" button, as shown in the figure 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.



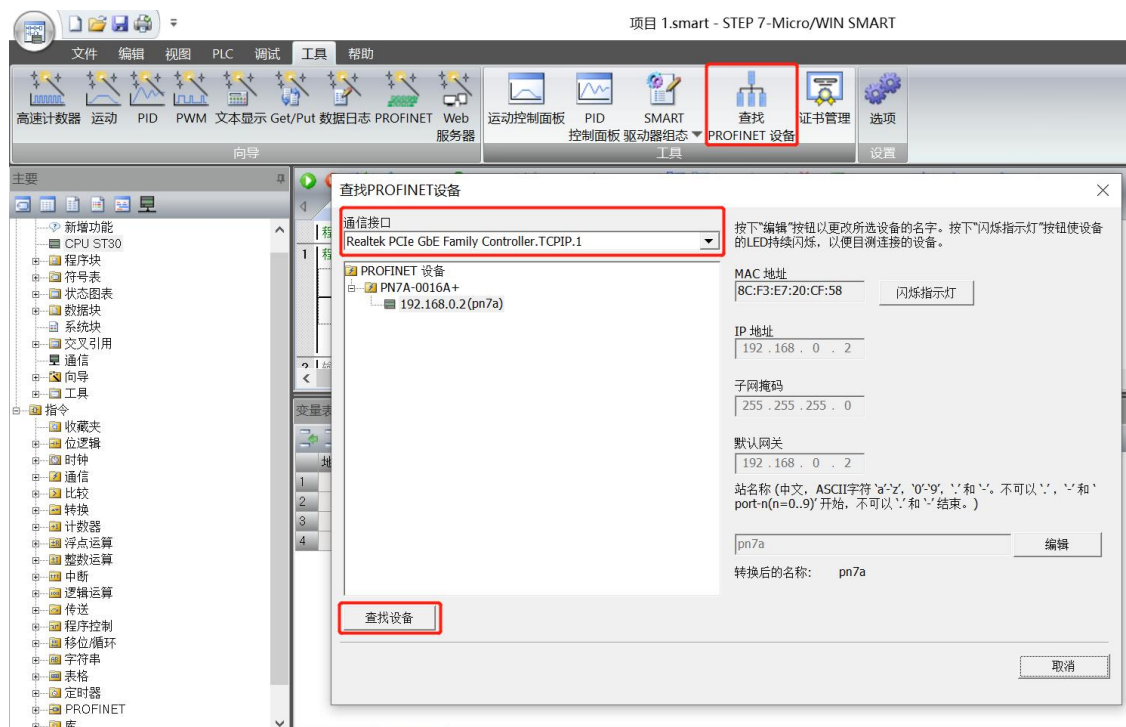
3、Import GSD file

- a. Click "File -> GSDML Management" in the menu bar, then click...GSDMLIn the management window, click the "Browse" button and select the file you want to import.GSDMLFile, click the "OK" button.As shown in the figure 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 the "Edit" button to edit the module name. After editing, click the "Settings" button, as shown in the image below.



5. Configure PROFINET network

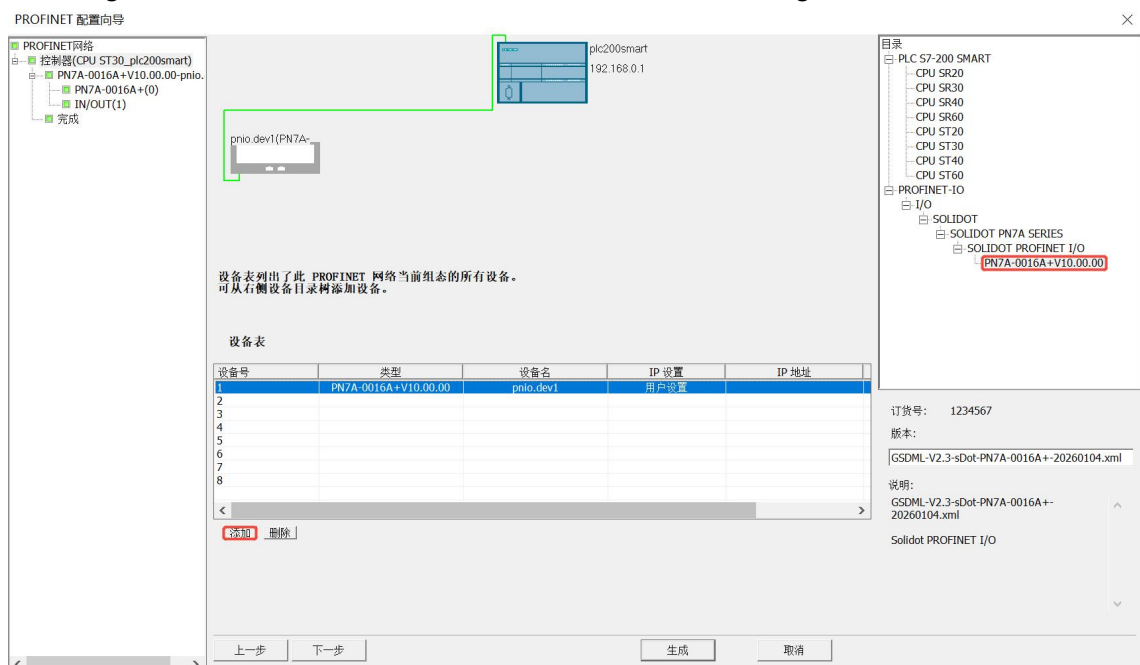
- a. Click "Tools -> PROFINET" in the menu bar to open the PROFINET Configuration Wizard, as shown in the figure below.



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

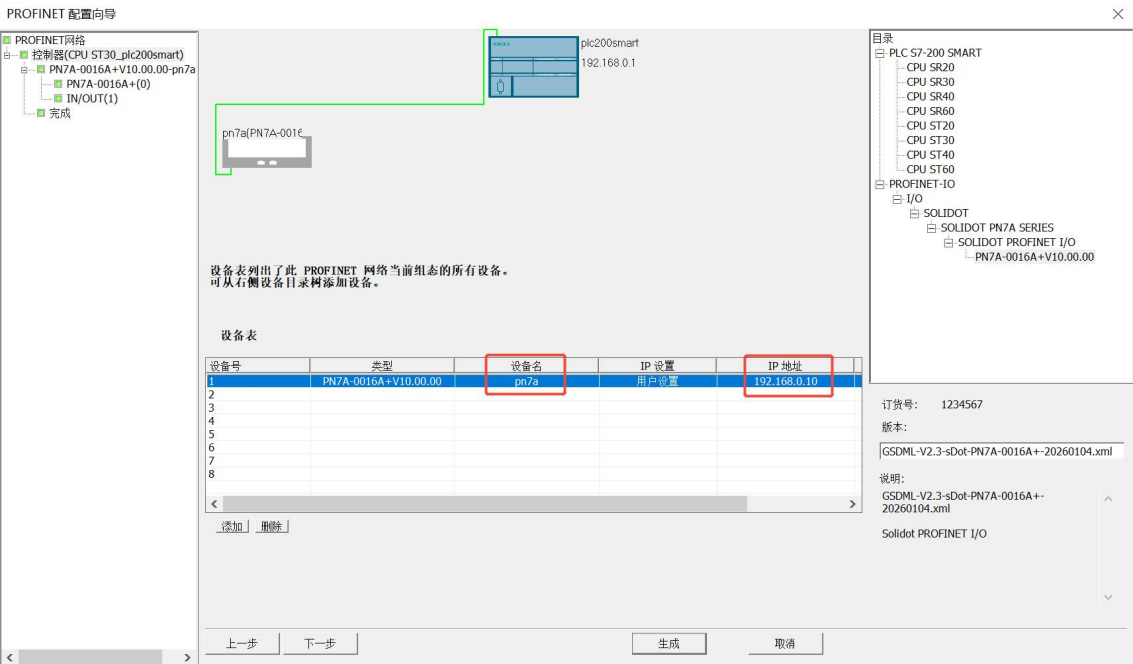


- c. Click "Next" to enter the controller configuration page. Add a device from the device directory tree on the right. Select PN7A-0016A+ and click "Add", as shown in the figure below.



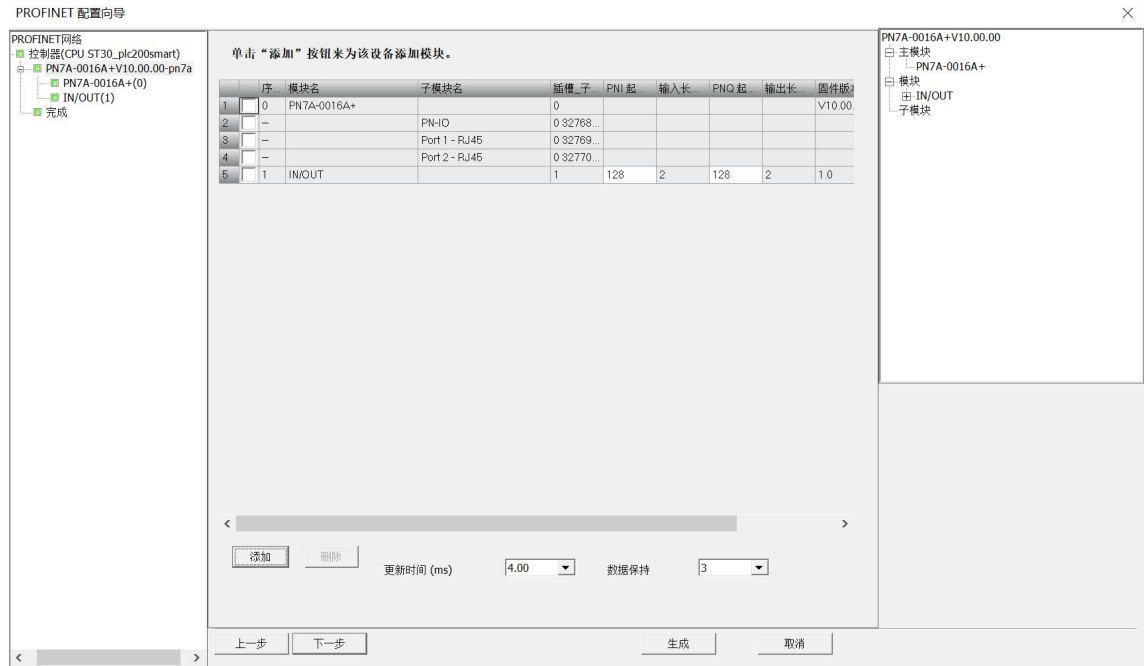
- d. Double-click the input box below the device name and enter the device name, which must match the name set when searching for the device. Double-click the input box below the IP address and

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.

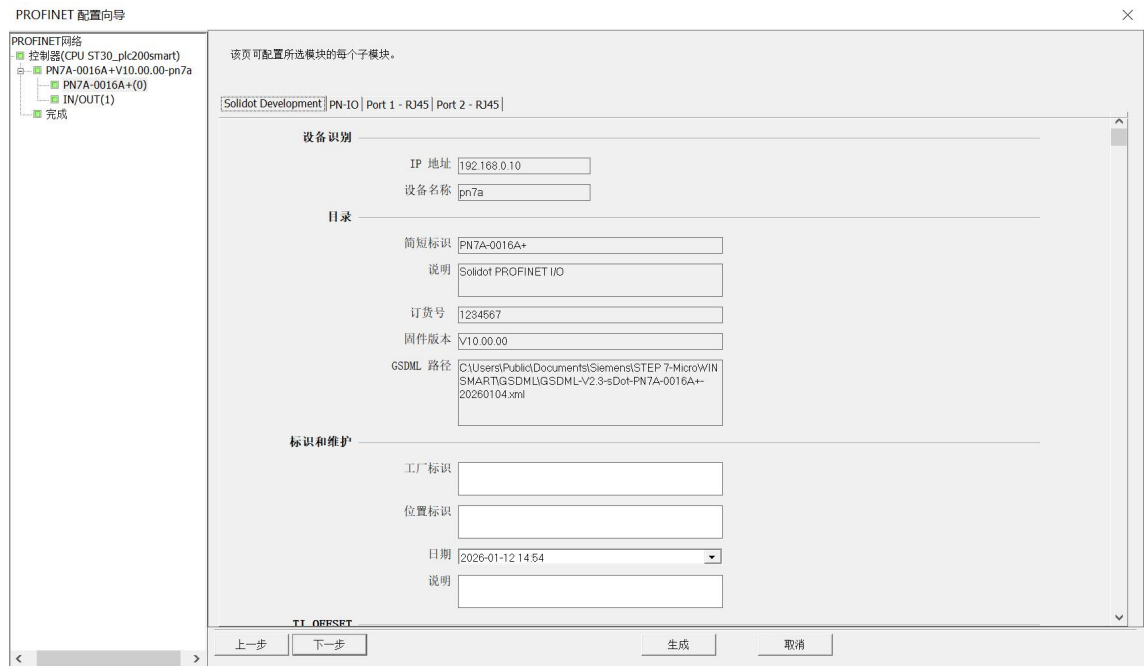


Note: The device name must match the module name, and the IP address must be set to be on the same network segment as the PLC.

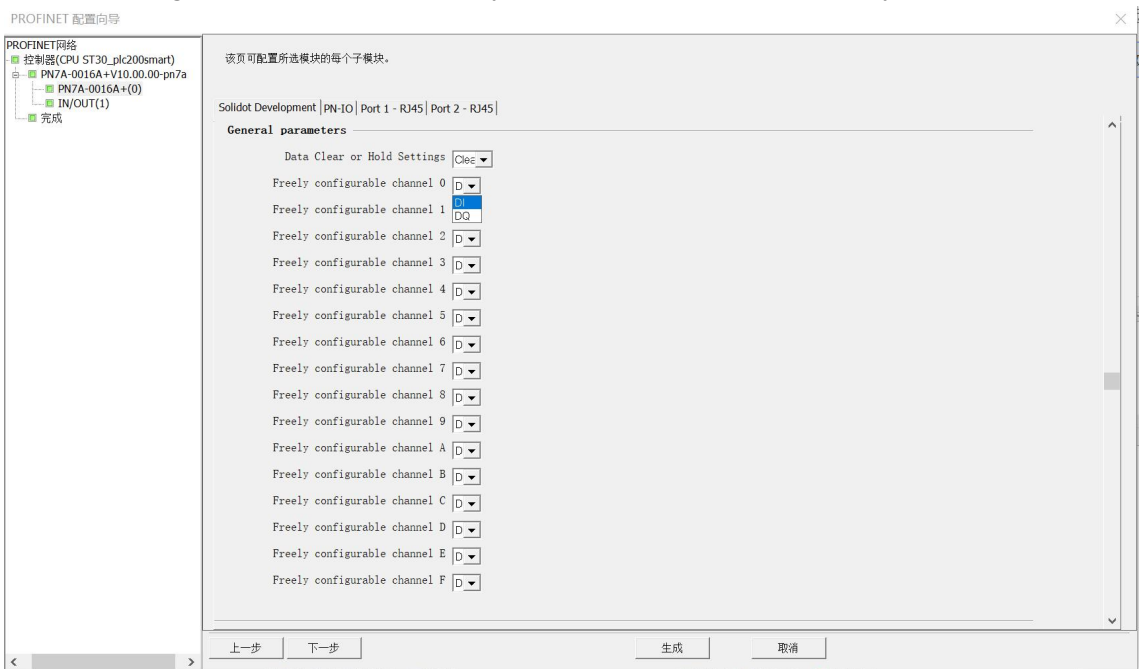
- e. Click "Next" and you will see that the starting address of the module's input and output are both 128, as shown in the figure below.



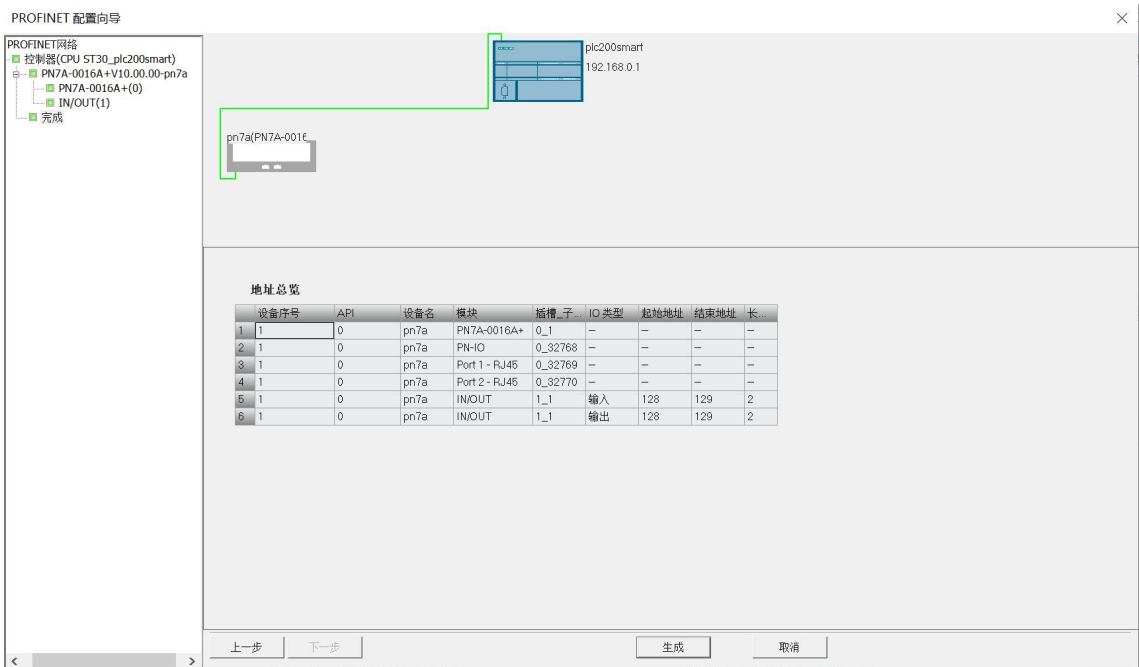
- f. Click "Next" to see the module's device information, as shown in the image below.



- g. The module information dropdown page displays the module's parameter configuration information, as shown in the image below. The output clear/hold parameters and channel input/output configuration parameters can be configured according to actual usage needs. For example, configure channels 0-9 as input types and channels A-F as output types.

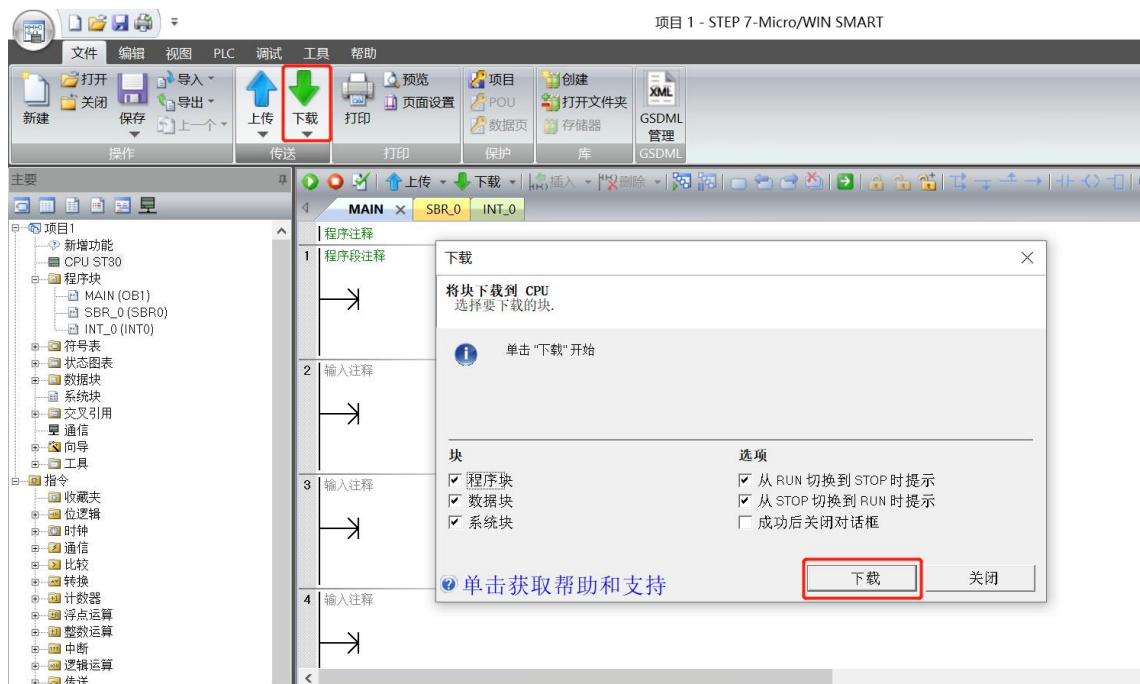


- h. Click "Next," then click "Next" again. The network configuration is shown in the following figure. Click "Generate" to complete the configuration.



6. Download program

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



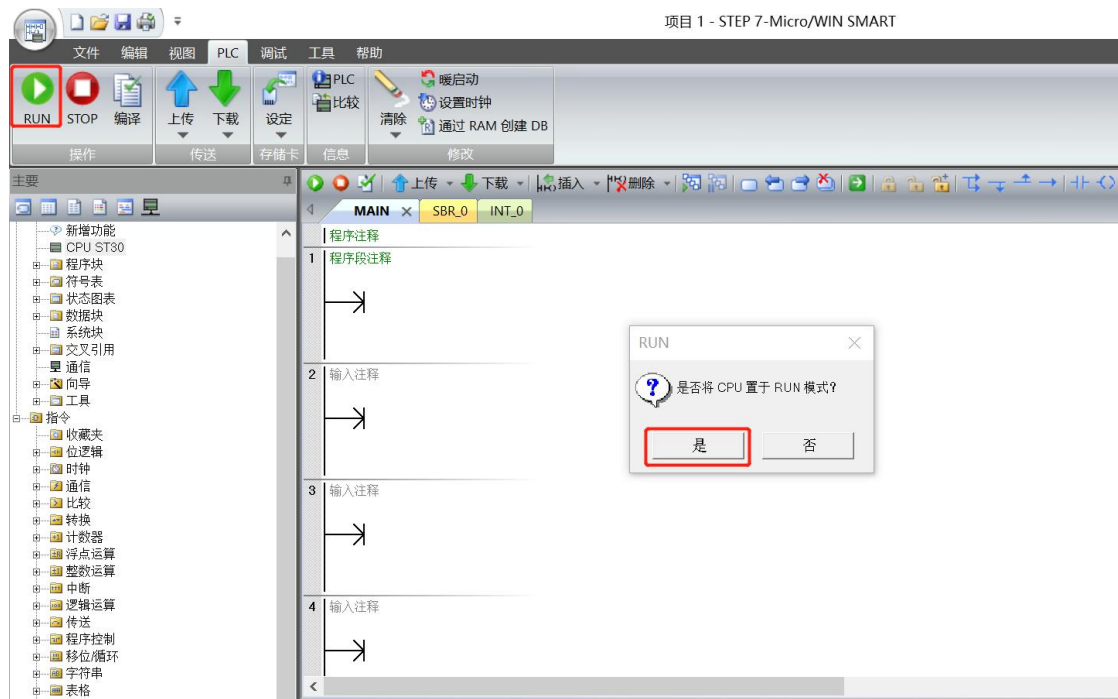
- b. Once the download window indicates that the download has been completed successfully, click "Close".



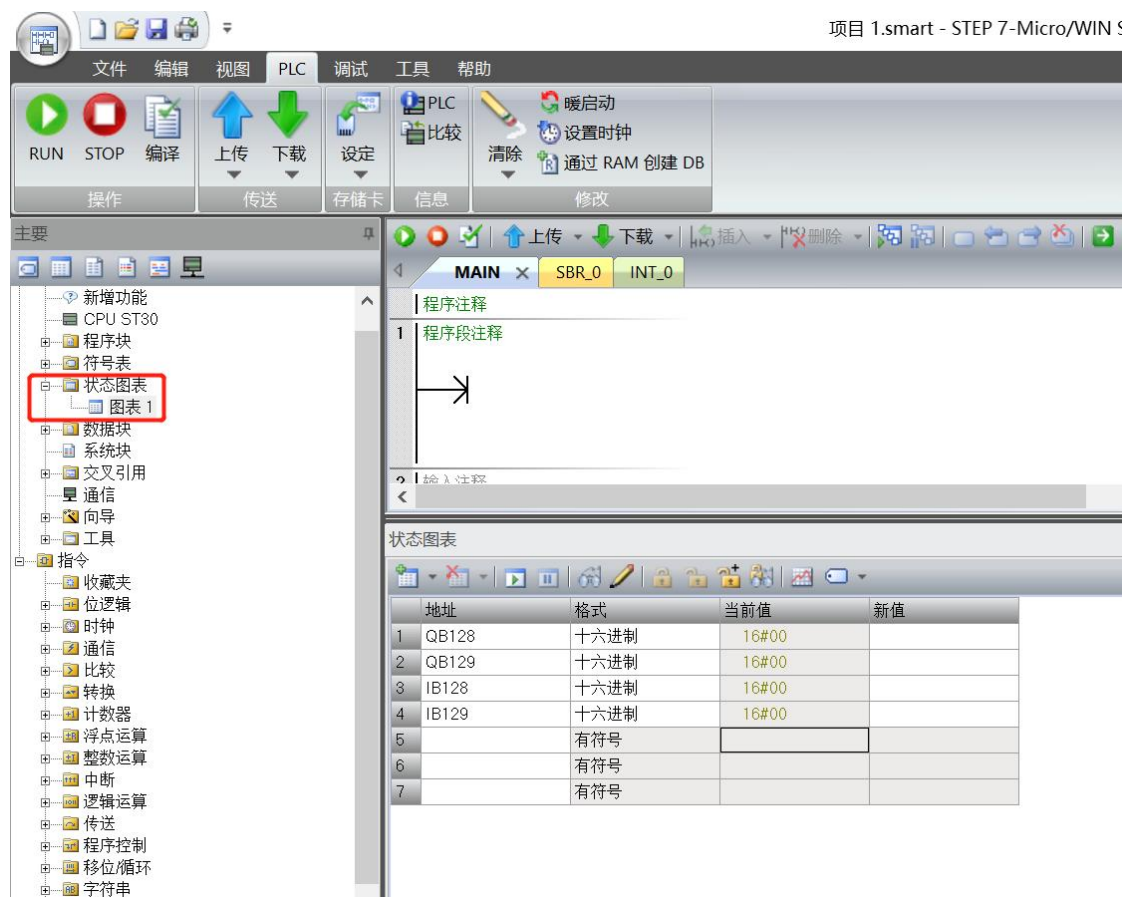
Note: After downloading, power on the module again.

7、Functional verification

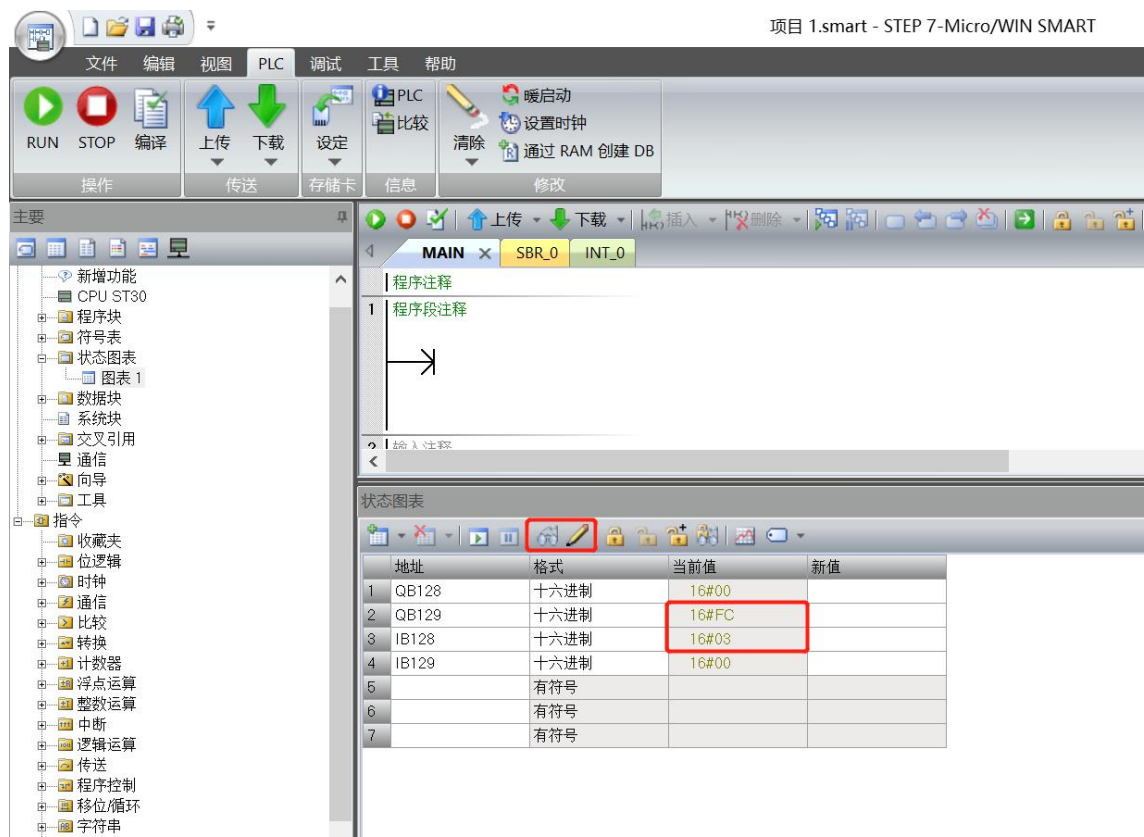
- a. Click the "PLC -> RUN" button in the menu bar. A confirmation window will pop up. Click the "Yes" button to confirm, as shown in the figure below.



- 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 output row QB129 of the status chart, you can write the output value. For example, writing "252" will set all six output channels A to F to 1, and all output channel lights will illuminate. When there is a valid voltage input to input channels 0 to 1 of the module, the input value can be monitored in IB128, as shown in the figure below.



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.