PROFINET
XB6 Series Slice I/O
User Manual

Nanjing Solidot Electronic Technology Co., Ltd.

Trademark notice

 and other Solidot trademarks are all trademarks of Nanjing Solidot Electronic Technology Co., Ltd. All other trademarks or registered trademarks referred to in this document belong to their respective owners.

Note

The products, services or features you purchase shall be subject to the commercial contracts and terms of Solidot. All or part of the products, services or features given in this document may not be within the scope of your purchase or use. Unless otherwise agreed in the contracts, Solidot does not make any express or implied statement or warranty for the content of this document

Due to product version upgrading or other reasons, the content of this document is subject to changes from time to time. Unless otherwise agreed, this document shall be only used as reference. None of the statements, information and suggestions in this document shall constitute any express or implied warranty.

Nanjing Solidot Electronic Technology Co., Ltd.

Address: Angying Building, No. 91 Shengli Road, Jiangning Zone, Nanjing, Jiangsu

Postal code: 211106

Telephone: 4007788929

Website: https://www.solidotech.com/en

Table of Contents

1 Product Overview

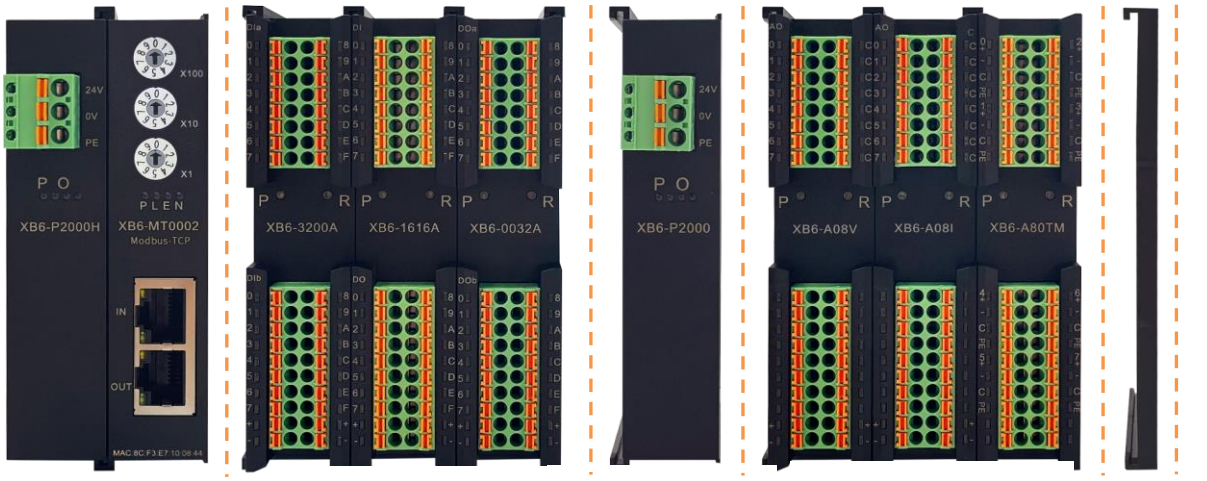
1.1 Product Introduction

XB6 series slice I/O modules feature a combination of couplers and I/O modules. The couplers connect extendable I/O modules to a real-time industrial Ethernet system. The I/O modules communication backplane is equipped with X-bus to provide high real-time performance and connects a variety of modules. It helps users collect high-speed data, optimize system configuration, simplify field wiring, and improve system reliability.

1.2 Product Feature

- **Fewer nodes required**
  A node consists of a bus coupler, 1~32 X-bus series I/O modules and an end cover.
- **Diverse functional expansion options**
  Flexible expansion is supported, and a complete range of IO types are provided. It is possible to integrate digital, analog, temperature, pulse and other modules to meet different application needs
- **Flexible configuration**
  Multiple types of slice I/O modules are offered for free combination
- **High compatibility**
  The coupler communication interface conforms to industrial Ethernet communication standards and supports mainstream PROFINET master stations.
- **Small footprint**
  Compact structure and small footprint.
- **Easy diagnosis**
  An innovative channel indicator design is adopted. As the indicators are placed close to the channels, channel status is displayed intuitively and clearly, facilitating detection and maintenance.
- **High speed**
  X-bus on the backplane leads to a maximum scan cycle of 1ms
- **Easy installation**
  Installation on standard DIN 35 mm rails.
  Spring terminal blocks are used for convenient and fast wiring.

1.3 Application Configuration



Application method:

Different modules can be combined, including power supply, coupler, digital, analog, relay, temperature, and other modules.

Application configuration:

Different I/O module combinations can be adopted depending on master station access capacity, number of stations, I/O points, function type, and other requirements.

Configuration rules:

From left to right, the modules should be arranged in the order of power supply, coupler module, I/O modules, and cover plate (must be configured).

2 Designation Rules

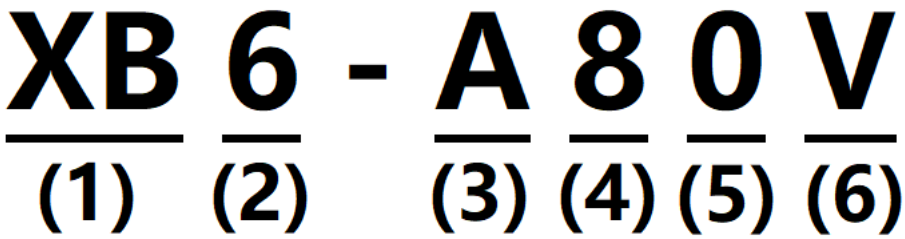
2.1 Designation Rules

2.1.1 Coupler Designation Rules

XB 6 - PN 20 02 ST
(1) (2) (3) (4) (5) (6)

Item	Value	Description of the values
(1)	Bus type	XB：X-bus backplane bus
(2)	Product line	6：Slice I/O
(3)	Bus protocol	PN：PROFINET MT：Modbus TCP CL：CC-Link EI：EtherNet/IP EC：EtherCAT CB：CC-Link IE Field Basic CT：CC Link IE TSN
(4)	Power supply	20：2A
(5)	Number of Bus Interfaces	02：2*RJ45
(6)	Module type	ST：Kit of power supply, coupler, and cover plate

2.1.2 I/O Modules Designation Rules



Item	Value	Description of the values				
(1)	Bus type	XB：X-bus				
(2)	Product line	6：Slice I/O				
(3)	I/O module type	A：Analog Blank：Digital				
(4)	Number of inputs	Analog：0、4、8 Digital：0、8、16、32				
(5)	Number of outputs	Analog：0、4、8 Digital：0、8、16、32				
(6)	I/O characteristics	**Digital**			**Analog**	
		Code	Input	Output	Code	Description
		A	NPN	NPN、0.25 A	V	-10~+10 V、0~+10 V
		B	PNP	PNP、0.5 A	I	4~20 mA、0~20 mA
		BW	PNP	PNP、0.25A	VW	-10~+10 V、0~+10 V
		N	NPN/PNP	-	IW	4~20 mA、0~20 mA
		AN	-	NPN、0.25A	TM	Resistance Temperature Detector (RTD), thermocouple (TC)
		BN	-	PNP、0.5A		

2.2 List of common modules

Model	Product description	
XB6-MT2002ST	Modbus TCP coupler kit (power supply + coupler + cover plate)	
XB6-P2000	Extension power module	
XB6-3200A	32-channel digital input module, NPN type	
XB6-3200B	32-channel digital input module, PNP type	
XB6-0032A	32-channel digital output module, NPN type	
XB6-0032B/XB6-0032BW	32-channel digital output module, PNP type	
XB6-1600A	16-channel digital input module, NPN type	
XB6-1600B	16-channel digital input module, PNP type	
XB6-0016A	16-channel digital output module, NPN type	
XB6-0016B/XB6-0016BW	16-channel digital output module, PNP type	
XB6-0800A	8-channel digital input module, NPN type	
XB6-0800B	8-channel digital input module, PNP type	
XB6-0008A	8-channel digital output module, NPN type	
XB6-0008B/XB6-0008BW	8-channel digital output module, PNP type	
XB6-1616A	16-channel digital I/O module, NPN type	
XB6-1616B/XB6-1616BW	16-channel digital I/O module, PNP type	
XB6-3200N	32-channel digital input, NPN/PNP compatible	
XB6-0032AN	32-channel digital output, NPN type	
XB6-0032BN	32-channel digital output, PNP type	
XB6-A80V	8-channel analog voltage input module	Optional ranges: 0~+10 V -10~+10 V
XB6-A40V	4-channel analog voltage input module	
XB6-A08V	8-channel analog voltage output module	
XB6-A04V	4-channel analog voltage output module	
XB6-A80I	8-channel analog current input module	Optional ranges: 0~20 mA 、4~20 mA
XB6-A40I	4-channel analog current input module	
XB6-A08I	8-channel analog current output module	
XB6-A04I	4-channel analog current output module	
XB6-A80VW	8-channel analog voltage input module	Optional ranges: 0~+10 V -10~+10 V
XB6-A40VW	4-channel analog voltage input module	
XB6-A08VW	8-channel analog voltage output module	
XB6-A04VW	4-channel analog voltage output module	
XB6-A80IW	8-channel analog current input module	Optional ranges: 0~20 mA 、4~20 mA
XB6-A40IW	4-channel analog current input module	
XB6-A08IW	8-channel analog current output module	
XB6-A04IW	4-channel analog current output module	
XB6-0012J	12-channel relay output module	
XB6-A40TM	4-channel thermal resistor and thermocouple temperature collection module	
XB6-A80TM	8-channel thermal resistor and thermocouple temperature collection module	
XX6-C18_2	Common terminal extended module	

3 Product Parameters

3.1 General parameters

General technical parameters		
Size	Power module	106X61X22.5 mm
	Coupler module	106X61X22.5 mm
	I/O module	106X73X25.7 mm
Weight	Power module	110 g
	Coupler module	80 g
	I/O module	90 g
Working temperature	-10~+60℃	
Storage temperature	-20℃~+75℃	
Relative humidity	95%, non-condensing	
Protection degree	IP20	

3.2 Power parameters

Power parameters		
Power module	Working power supply	18~36 VDC
	Output voltage	5 VDC
	Output current	2A
Coupler module	Working power supply	5 VDC
	Working current	400 mA
I/O module	Working power supply	5 VDC

3.3 Interface parameters

PROFINET interface parameters	
Bus protocol	PROFINET
Number of I/O stations	Based on the PLC
Data transmission medium	Ethernet CAT5 cable
Transmission distance	≤100 m (distance between stations)
Transmission rate	100 Mbps
Bus interface	2×RJ45

3.4 Digital parameters

Digital input	
Nominal voltage	24 VDC（±25%）
Number of inputs	8、16、32
Signal type	NPN/ PNP
“0” Signal Voltage (PNP)	-3~+3 V
“1” Signal Voltage (PNP)	15~30 V
“0” Signal Voltage (NPN)	15~30 V
“1” Signal Voltage (NPN)	-3~+3 V
Input filter	3 ms
Input current	4 mA
Isolation method	Optically-coupled isolation
Electrical isolation	500 V
Channel indicator	Green LED
Digital output	
Nominal voltage	24 VDC（±25%）
Number of outputs	8、16、32
Signal type	NPN/ PNP
Load type	resistive load, inductive load
Single-channel rated current (A/B)	NPN Type Max：250 mA PNP Type Max：500 mA BW Type Max：250mA
Port protection	Overvoltage and overcurrent protection
Isolation method	Optically-coupled isolation
Electrical isolation	500 V
Channel indicator	Green LED

Relay output	
Nominal voltage	24 VDC（±25%）
Number of outputs	12
Isolation method	Optocoupler, relay isolation
Rated load	5 A
Channel indicator	Green LED

3.5 Analog parameters

3.5.1 Technical parameter

Analog input			
Number of inputs	4、8		
Input signal (voltage type)	0~+10 V、-10 V~+10 V(adjustable range)		
Input signal (current type)	0~20 mA、4~20 mA(adjustable range)		
Resolution	16 bits		
Sampling rate	XB6-A40V、XB6-A80V	≤1 ksps	
	XB6-A40VW、XB6-A80VW	≤62.5 sps	
	XB6-A40I、XB6-A80I	≤1 ksps	
	XB6-A40IW	≤100 sps	
	XB6-A80IW	≤62.5 sps	
Accuracy	XB6-A40V、XB6-A80V	±0.1%	
	XB6-A40VW、XB6-A80VW	±0.3%	
	XB6-A40I、XB6-A80I	±0.1%	
	XB6-A40IW、XB6-A80IW	±0.3%	
Internal resistance (voltage type)	≥2 kΩ		
Internal resistance (current type)	100 Ω		
Electrical isolation	500 V		
Channel indicator	绿色 LED 灯		
Temperature input			
Number of channels	4、8		
Sensor type	Thermocouple	Thermal resistor	Resistor
Connection type	2 wire method	2 / 3 wire method	2 wire method
	K：-200~1370℃ J：-200~1200℃ E：-200~1000℃ S： -50~1690℃ B： 50~1800℃	Pt100：−200~850℃ Pt200：−200~600℃ Pt500：−200~600℃ Pt1000：−200~600℃	15Ω~3kΩ
Accuracy	±0.5%	±1℃	±0.1%
Sensitivity	0.1℃		±0.1Ω
Resolution	16 bits (int type)		
Channel indicator	Green LED		

Analog output		
Number of outputs	4、8	
Output signal (voltage type)	0~+10 V、-10~+10 V(adjustable range)	
Output signal (current type)	0~20 mA、4~20 mA(adjustable range)	
Resolution	16 bits	
Accuracy	XB6-A04V、XB6-A08V	±0.1%
	XB6-A04VW、XB6-A08VW	±0.3%
	XB6-A04I、XB6-A08I	±0.1%
	XB6-A04IW、XB6-A08IW	±0.3%
Load impedance (voltage type)	≥2 kΩ	
Load impedance (current type)	≤200 Ω	
Electrical isolation	500 V	
Channel indicator	Green LED	

3.5.2 Voltage I/O range selection and code value table

Voltage I/O range selection and cold value range				
Range selection	0	1	2	3
Range	-10 V~+10 V	0~+10 V	-10 V~+10 V	0~+10 V
Code value range	-32768~32767	0~32767	-27648~27648	0~27648
Voltage input formula	D=(65535/20)*U	D=(32767/10)*U	D=(55296/20)*U	D=(27648/10)*U
Voltage output formula	U=(D*20)/65535	U=(D*10)/32767	U=(D*20)/55296	U=(D*10)/27648
Code value table	See Table 3-1 Voltage code values			

Note: D: code value; U: voltage

Table 3-1 Voltage code values

Range / Voltage	0 (default)	1	2	3
	Code value	Code value	Code value	Code value
-10	-32768	-	-27648	-
-9	-29491	-	-24883	-
-8	-26214	-	-22118	-
-7	-22937	-	-19354	-
-6	-19661	-	-16589	-
-5	-16384	-	-13824	-
-4	-13107	-	-11059	-
-3	-9830	-	-8294	-
-2	-6554	-	-5530	-
-1	-3277	-	-2765	-
0	0	0	0	0
1	3277	3277	2765	2765
2	6554	6553	5530	5530
3	9830	9830	8294	8294
4	13107	13107	11059	11059
5	16384	16384	13824	13824
6	19661	19660	16589	16589
7	22937	22937	19354	19354
8	26214	26214	22118	22118
9	29491	29490	24883	24883
10	32767	32767	27648	27648
	D= (65535/20) *U	D= (32767/10) *U	D= (55296/20) *U	D= (27648/10) *U
	U= (D*20) /65535	U= (D*10) /32767	U= (D*20) /55296	U= (D*10) /27648

3.5.3 Current I/O range selection and code value table

Analog current I/O range selection and code value range				
Range selection	0	1	2	3
Range	4~20 mA	0~20 mA	4~20 mA	0~20 mA
Code value range	0~65535		0~27648	
Current input formula	D=65535/16*I-16384	D=(65535/20)*I	D=(27648/16)*I-6912	D=(27648/20)*I
Current output formula	I=(D+16384)*16/65535	I=(D*20)/65535	I=((D+6912)*16)/27648	I=(D*20)/27648
Code value table	See Table 3-2			

Note: D: Code value; I: current

Table 3-2 Current code values

Range selection / Range / Current	0 (default)	1	2	3
	4-20mA	0-20mA	4-20mA	0-20mA
	Code value	Code value	Code value	Code value
0	-	0	-	0
1	-	3277	-	1382
2	-	6554	-	2765
3	-	9830	-	4147
4	0	13107	0	5530
5	4096	16384	1728	6912
6	8192	19661	3456	8294
7	12288	22937	5184	9677
8	16384	26214	6912	11059
9	20479	29491	8640	12442
10	24575	32768	10368	13824
11	28671	36044	12096	15206
12	32767	39321	13824	16589
13	36863	42598	15552	17971
14	40959	45875	17280	19354
15	45055	49151	19008	20736
16	49151	52428	20736	22118
17	53247	55705	22464	23501
18	57343	58982	24192	24883
19	61439	62258	25920	26266
20	65535	65535	27648	27648
21	65535	65535	29376	29030
22			31104	30413
22.81			32511	31538
22.96			32767	31743
23				31795
23.52				32511
23.70				32767
24				
25				
	D=65535/16*I-16384	D= (65535/20) *I	D= (27648/16) *I-6912	D= (27648/20) *I

Notes:

In Range 2, when input current > 22.81 mA, the code value displayed is always 32767; when the specified Code value > 32511, the output current is always 22.81 mA.

In Range 3, when input current > 23.52 mA, the code value displayed is always 32767; when the specified code value > 32511, the output current is always 23.52 m.

3.6 Common terminal expansion module parameters

Common terminal	
Rated voltage	125 VDC/AC 250V
Rated current	8 A
Number of common terminals	2 sets

4 Panel

4.1 Coupler panel

4.1.1 Coupler Structure

Name and function description of product components

4.1.2 Indicator function

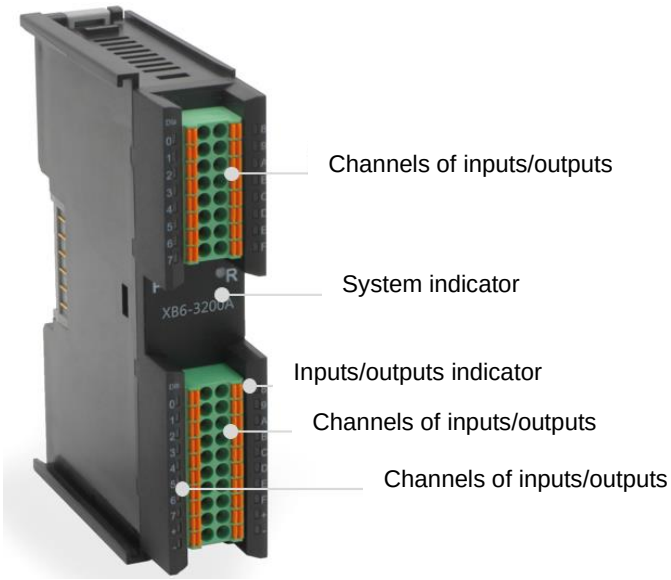
Description of IDs and indicators of the power module				
ID	**Description**	**Color**	**Status**	**Status description**
P	5V indicator	Green	ON	Normal status of working power supply
			Flashing	80% overload. The power supply to real stage load is cut off
			OFF	Unpowered or abnormal power supply
O	Overload indicator	Red	OFF	No overload
			ON	90% overload
			Flashing	80% overload. The power supply to real stage load is cut off

Description of IDs and indicators of the coupler module				
Name	**ID**	**Color**	**Status**	**Status description**
Power indicator	P	Green	ON	Normal status of power supply
			OFF	Unpowered or abnormal power supply
System indicator	L	Green	ON	The I/O module is connected, X-bus system is interacted
			Flashing 1Hz	The I/O module is connected, X-bus system is ready to interact
			Flashing 5Hz	The I/O module is not connected, X-bus system configuration abnormal
			OFF	The I/O module is not connected or abnormal connection
Warning indicator	B	Red	OFF	PROFINET bus parameters are set normally
			Flashing	PROFINET bus parameters are not set or abnormal
Network status indicator	R	Green	ON	The system is operating normally
			OFF	The system is operating abnormally

Network port status indicator			
ID	**Color**	**Status**	**Status description**
IN	Green	ON	Network connection established
		OFF	Absent or abnormal network connection
	Yellow	Flashing	Connection established with data interaction
		OFF	Absent or abnormal network connection
OUT	Green	ON	Network connection established
		OFF	Absent or abnormal network connection
	Yellow	Flashing	Connection established with data interaction
		OFF	Absent or abnormal network connection

4.2 I/O modules panel

Name and function description of modules



I/O module Indicator description			
ID	**Color**	**Status**	**Status description**
P	Green	ON	Normal status of working power supply
		OFF	Unpowered or abnormal power supply
R	Green	ON	Normal system operation
		Flashing 1 Hz	I/O module connected, X-bus system ready for interaction
		OFF	Unpowered, no X-bus data interaction, or abnormal status
Input channel indicator	Green	ON	Presence of signal input in module detection channel
		OFF	Absence of signal input in module channel or abnormal signal input
Output channel indication	Green	ON	Presence of signal output in module channel
		OFF	Absence of signal output in module channel or abnormal signal output

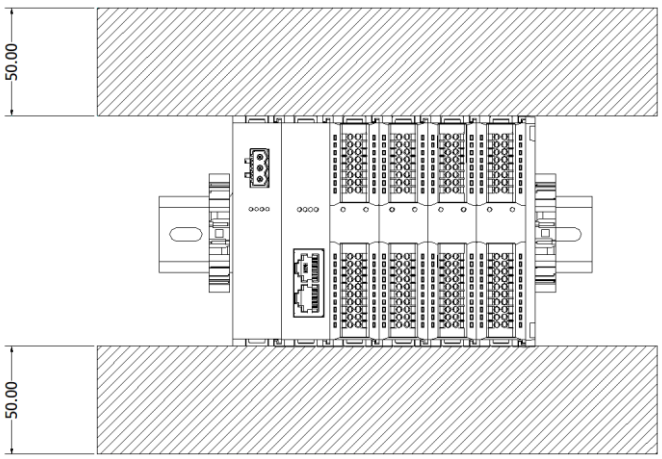
5 Installation and Disassembly

5.1 Installation instructions

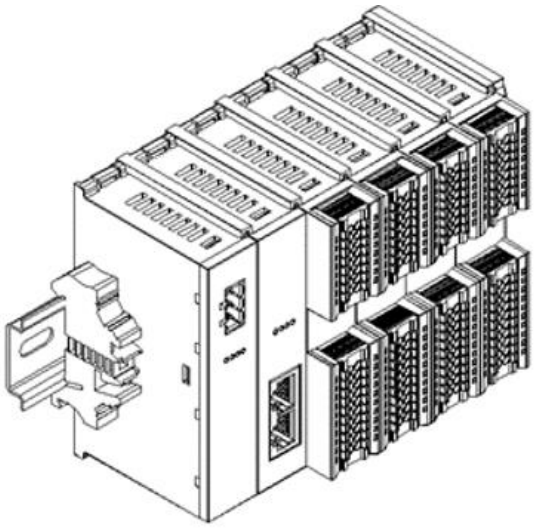
Installation and disassembly precautions

- Ensure that the cabinet is well ventilated. (such as the addition of exhaust fans to cabinets)
- Do not install this equipment near or above any equipment that may cause overheating.
- Make sure to install the module vertically and maintain adequate air circulation around it (at least 50 mm air circulation space should be provided above and below the module).
- After the modules are installed, remember to install guide rail fasteners at both ends to fix them.
- Installation/disassembly operation may only be carried out after the power supply is cut off.

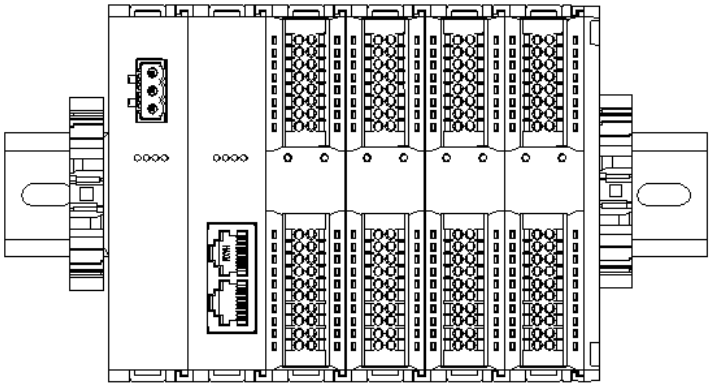
Minimum clearance for module installation (≥50 mm)



Make sure the modules are installed vertically



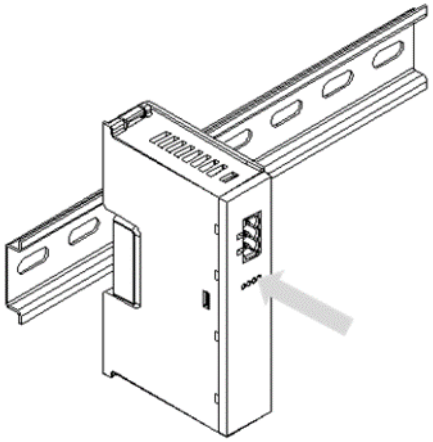
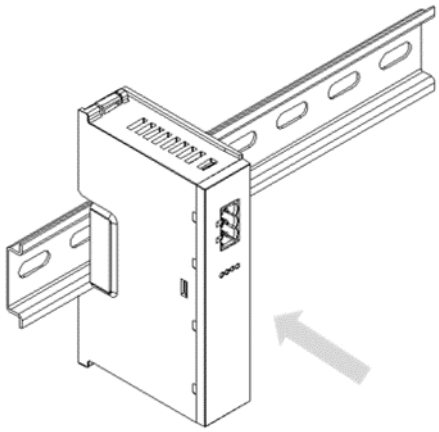
Make sure to install guide rail fasteners

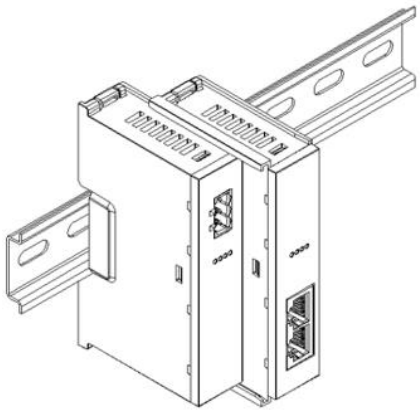


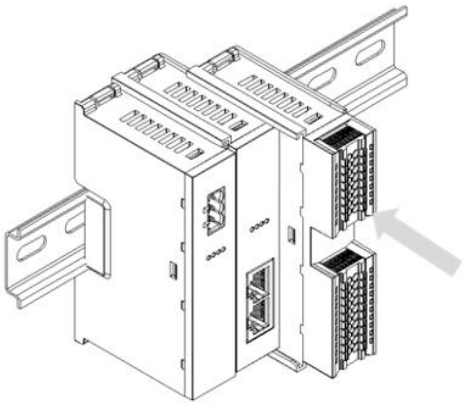
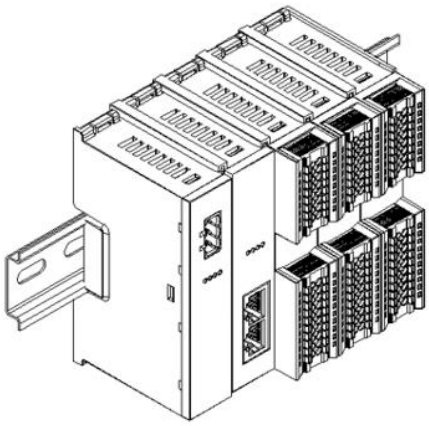
5.2 Installation and disassembly steps

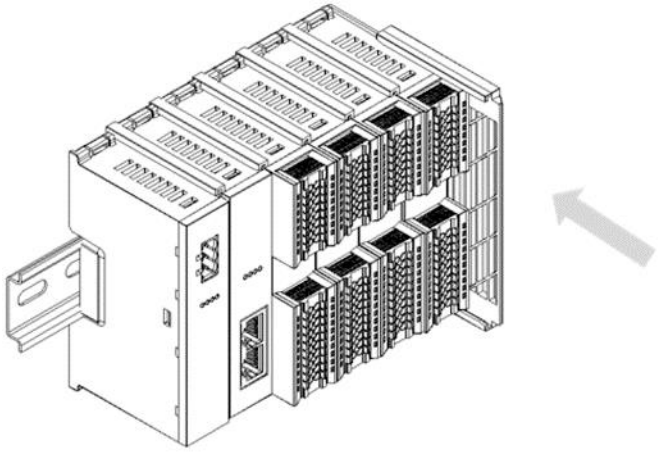
Module installation and disassembly	
Module installation steps	1. Install the power module on the fixed guide rail first.
	2. Install the coupler and the required I/O modules on the right side of the power module.
	3. After installing all required I/O modules, install the end cover to complete module assembly.
	4. Install guide rail fasteners at both ends of the power module and end cover to fix the module.
Module disassembly steps	1. Loosen the rail fasteners at both ends of the module.
	2. Pry loose the module snap fitting with a slotted screwdriver.
	3. Pull out the removed module.

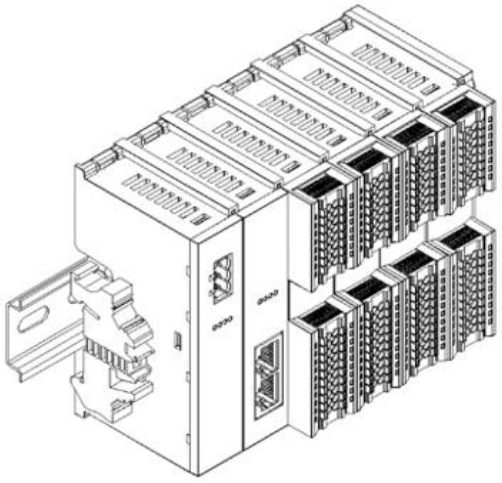
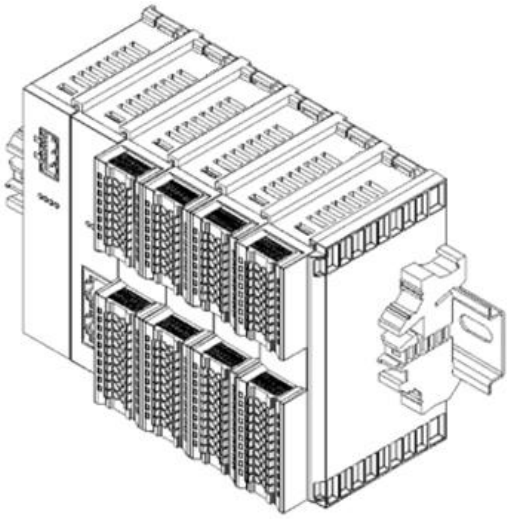
5.3 Installation schematic diagrams

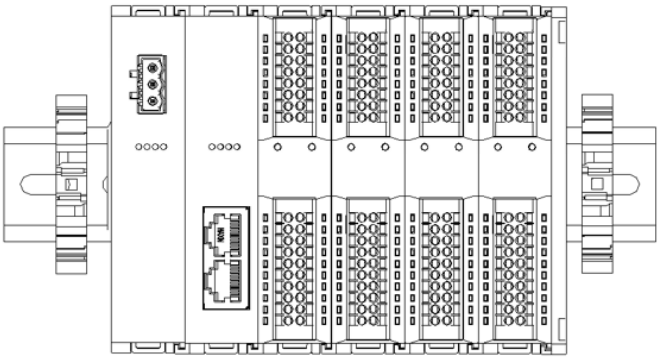
Power module installation	Steps
 ①	Align the power module guide rail slot vertically with the guide rail, as shown in the figure①
 ②	Press the power module with force until a "click" sound is heard. The module is now installed in place, as shown in the figure②

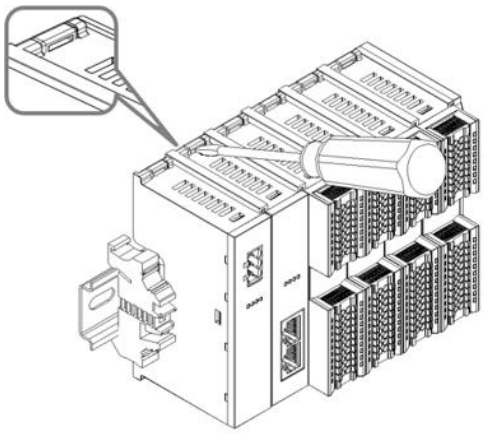
Coupler module installation	Steps
 ③	Align the left slot of the coupler module with the right side of the power module, and push it in as shown in the figure ③. Press the module with force into the guide rail until a "click" sound is heard. The module is now installed in placed.

I/O module installation	Steps
 ④  ⑤	Install the required IO modules one by one using the same the steps as coupler module installation, as shown in the figure④⑤

End cover installation	Steps
 ⑥	Install the end cover on the right side of the last module, as shown in the figure⑥, using the same installation method as the coupler module.

Installation of guide rail fasteners	Steps
 ⑦	Install a guide rail fastener next to the left side of the coupler, and lock it tightly, as shown in the figure⑦
 ⑧	Install a guide rail fastener on the right side of the end cover. In this process, first push the guide rail fastener towards the coupler to ensure that the module is installed firmly, and then lock the fastener with a screwdriver, as shown in the figure⑧

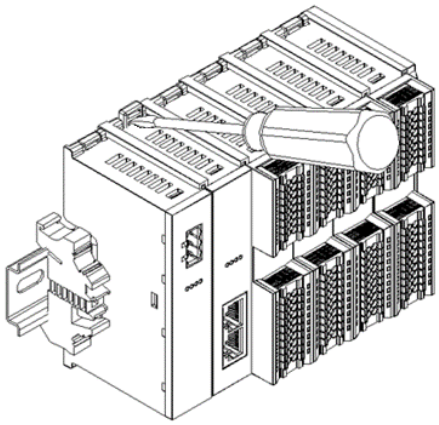
Disassembly	Steps
 ⑨	Using a screwdriver, loosen the guide rail fastener at one end of the module, and move it to one side to create a gap between the module and the fastener, as shown in the figure⑨



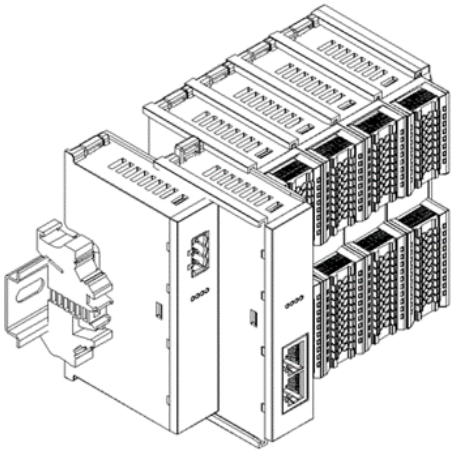
⑩

Insert the slotted screwdriver into the snap fitting of the module to be removed, and exert force along lateral direction of the module (until a click sound is heard), as shown in the figure⑩⑪

Note: Each module has two snap fittings, one on the top and the other at the bottom. Both should be operated in this way



⑪

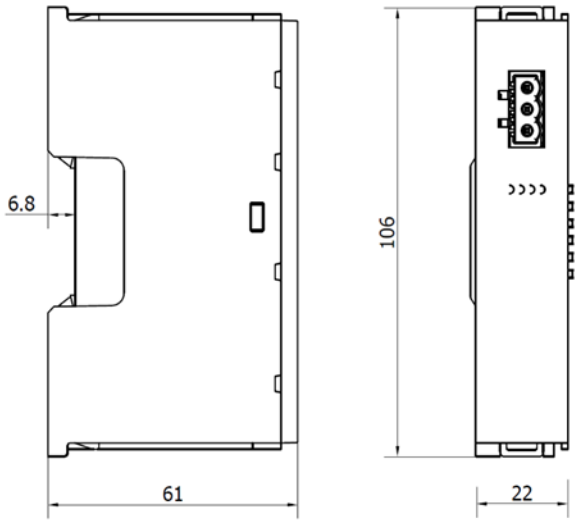


⑫

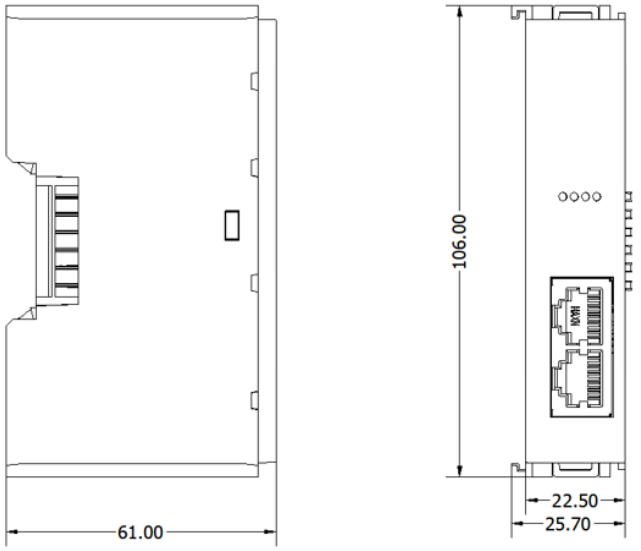
Remove the module in the reverse order of installation, as shown in the figure⑫**.**

5.4 Dimension

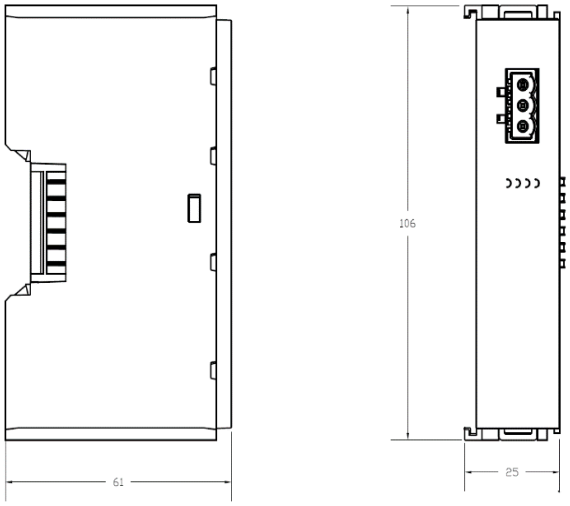
Power module dimensions (Unit: mm)



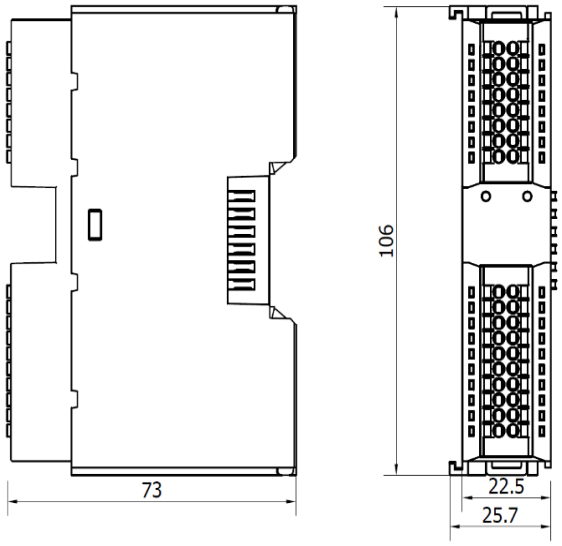
Coupler module dimensions (Unit: mm)



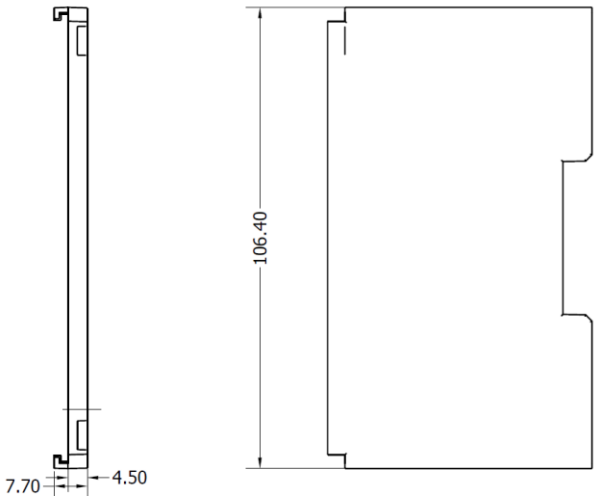
Extension power module dimensions (Unit: mm)



I/O module dimensions (Unit: mm)



End cover module dimensions (Unit: mm)



Note: All installed with DIN 35 mm standard guide rail, specification 35*7.5*1.0 (unit mm)

6 Wiring

6.1 Wiring terminal

Wiring terminal		
Signal wire terminal	Number of poles	16 P
	Number of poles	20 P
	Wire gauge	22~17 AWG 0.3~1.0 mm²
Power terminal	Number of poles	3P
	Wire gauge	22~16 AWG 0.3~1.5 mm²
Bus interface	2*RJ45	Category 5 or better UTP or STP (STP preferred)

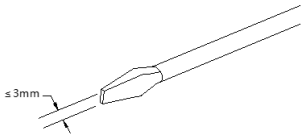
6.2 Wiring instructions and requirements

Power wiring precautions

- The power supply on the module system side and that on the field side should be wired separately. Mixing should be avoided.
- PE should be grounded reliably.

Wiring tool required

As the terminals are based on a screw-free design, cable installation and removal can be realized with a slotted screwdriver (size: ≤ 3 mm).



Stripping length required

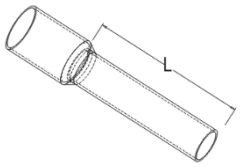
Recommended stripping length: 10 mm

Wiring method

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

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

Terminal specifications are shown in the following table:

Specification of tubular insulated terminal		
Specification	Model	Cable section area (mm²)
 Length of tubular insulated terminal L ≥10 mm	E0310	0.3
	E0510	0.5
	E7510	0.75
	E1010	1.0
	E1510	1.5

Power supply wiring: 3P terminal of power module

Connect the DC24V power module using the given wiring method based on the circuit shown in the figure below, and meanwhile ground the PE reliably (twisted pair cable is recommended for power supply)

- Figure 6-1: Wiring diagram of coupler, IO modules, and power module in sequence

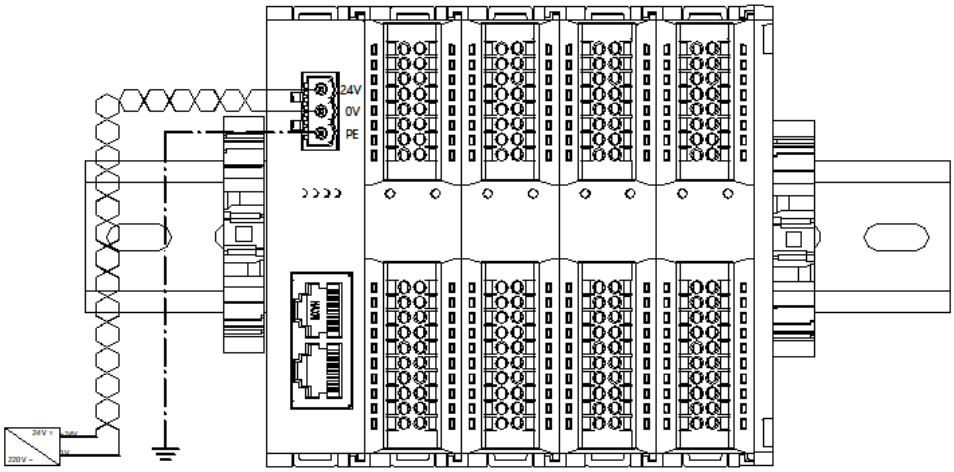


Figure 6-1

- Figure 6-2: Wiring diagram of coupler, IO modules, power module, IO modules, and power module in sequence

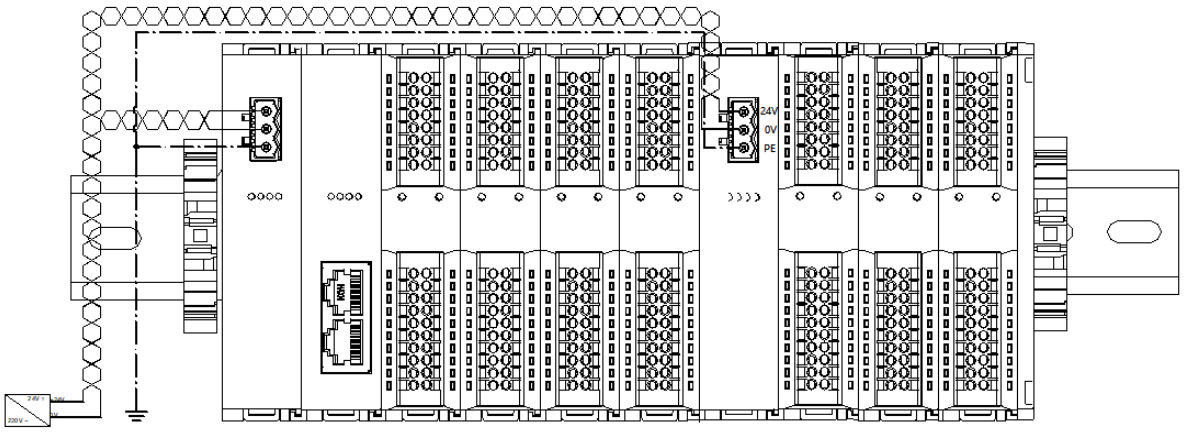
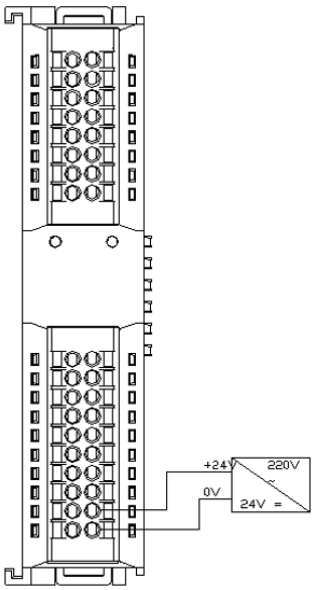


Figure 6-1

Load power supply wiring: 20P terminal on the field side

Press the signal cable into the wiring terminal by referring to the I/O module wiring diagram and wiring method. 24 VDC power supply is used for loads. Using the given wiring method, connect the power supply according to the circuit shown in the left figure. Refer to 6.4 I/O module wiring diagram for details.

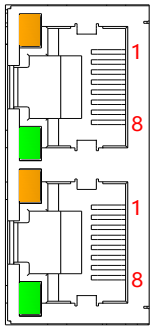


Signal terminal wiring: 16P\20P terminal

Press the signal cable into the wiring terminal by referring to the I/O module wiring diagram and wiring method.

Bus wiring: Industrial Ethernet bus communication interface

The standard RJ45 network interface with a standard crystal connector is used, and the pin assignment is shown in the figure below.



Pin	Signal
1	TD+
2	TD-
3	RD+
4	—
5	—
6	RD-
7	—
8	—

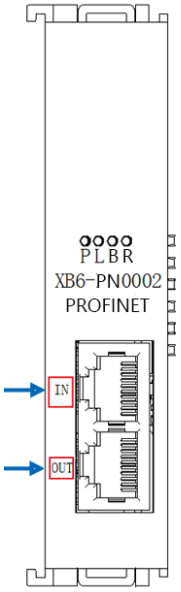
☛ Precautions

- Category 5 or higher-level double-shielded (braided wire + aluminum foil) STP cable is recommended as communication cable
- The cable between any two devices should not exceed 100 m

6.3 XB6-PN0002 communication interface wiring

Some of the XB6-PN0002 coupler network ports silk-screened ID are and identified as IN/OUT, as shown in the figure below.

When wiring, you need to connect the network topology according to the corresponding scenario example, otherwise communication failure may occur.

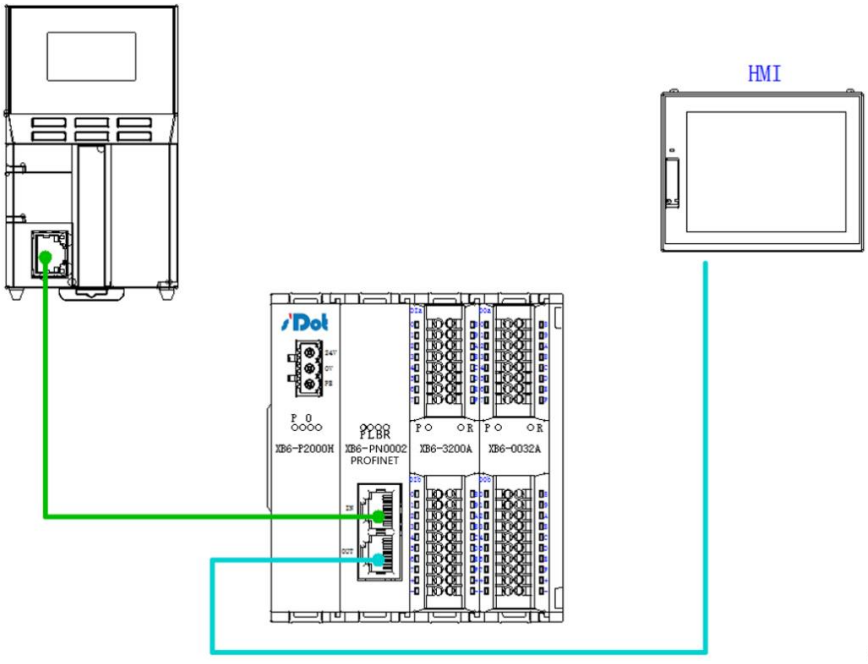


6.3.1 Scenario 1: Only one XB6-PN0002 module in the network

When there is only one group of XB6-PN0002 modules in the network:

- "IN" port is connected to any network port of the previous node device;
- "OUT" port is connected to any network port of the latter node device, as shown in the figure below.

When connecting to devices of other manufacturers, the network topology specification of the corresponding manufacturer should be followed.

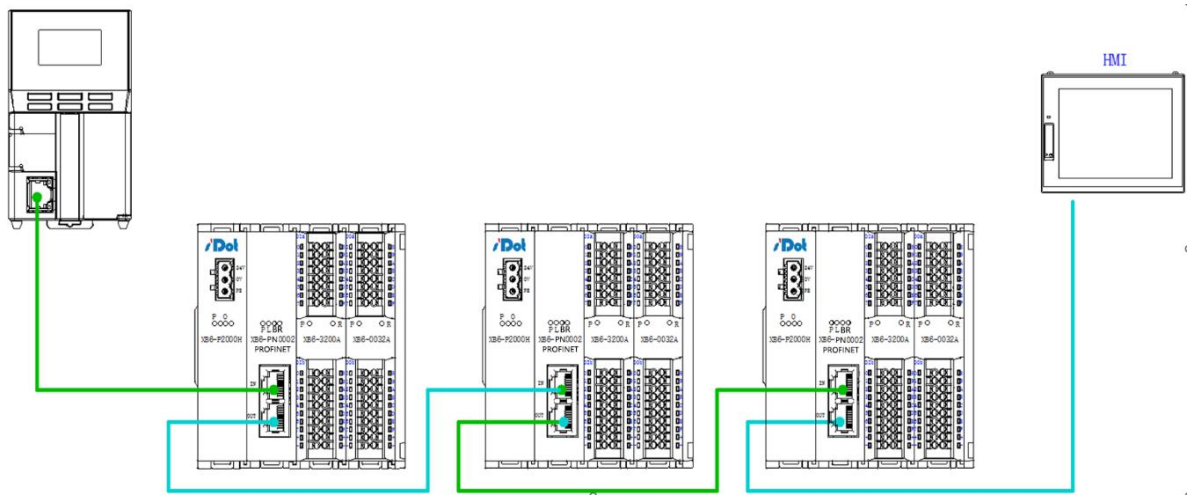


6.3.2 Scenario 2: Multiple XB6-PN0002 modules in the network

When there are multiple XB6-PN0002 modules in the network:

- The first module's "IN" port is connected to any network port of the previous node device;
- The last module's "OUT" port is connected to any network port of the latter node device;
- The connection between modules must follow the principle of "IN" to "OUT", as shown in the figure below.

When connecting to devices of other manufacturers, the network topology specification of the corresponding manufacturer should be followed.

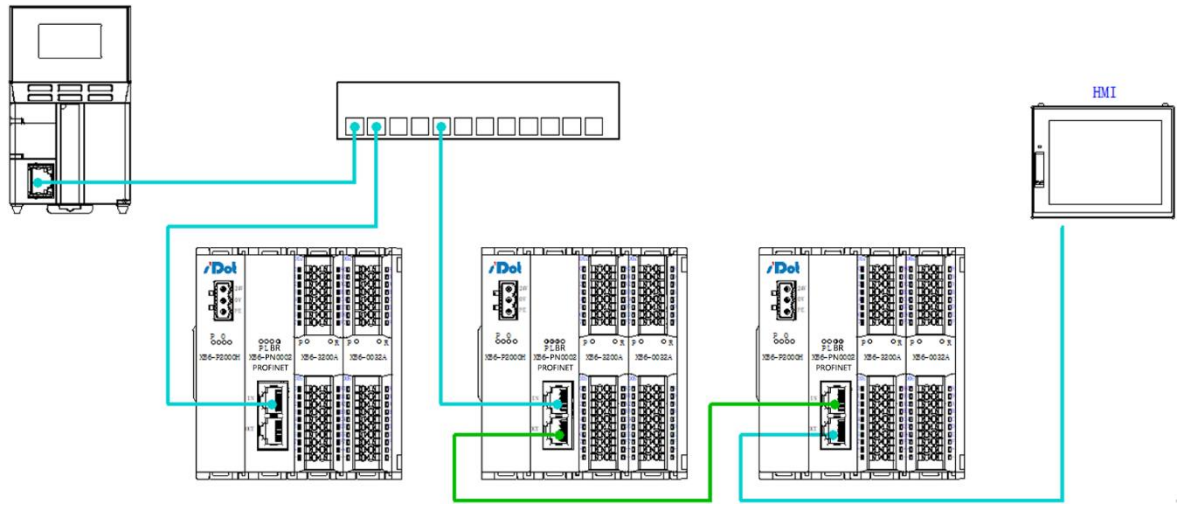


6.3.3 Scenario 3: Using a switch in a network

When a switch is used in the network:

- The "IN" port of the module is connected to any network port of the switch;
- The connection between the modules must follow the "IN" to "OUT" principle, as shown in the figure below.

When connecting to devices of other manufacturers, the network topology specification of the corresponding manufacturer should be followed

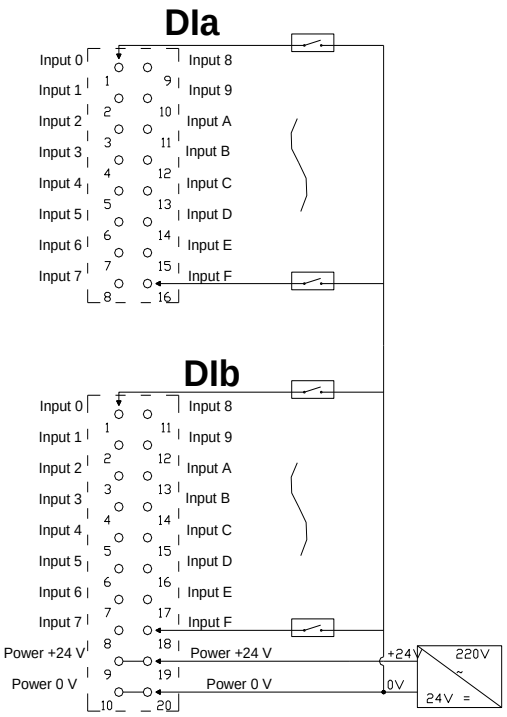


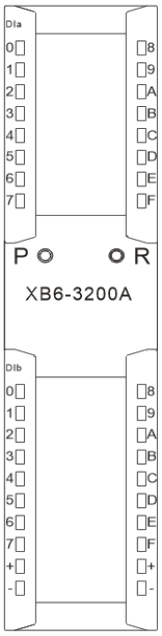
6.4 I/O module wiring diagrams

XB6-3200N, XB6-0032AN, XB6-0032BN Wiring diagrams refer to the “XB6 Series_MIL Connector Type IO User Manual”.

6.4.1 XB6-3200A

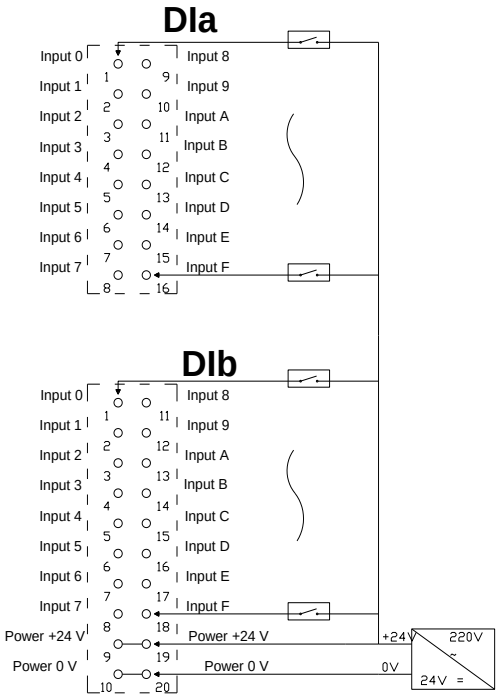
XB6-3200A	Module Panel



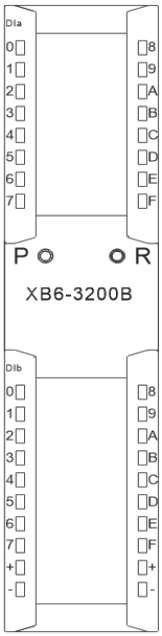


6.4.2 XB6-3200B

XB6-3200B

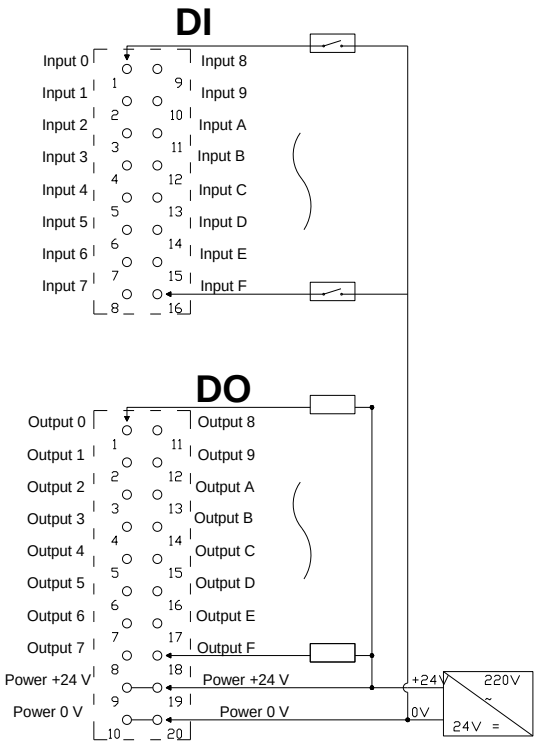


Module Panel

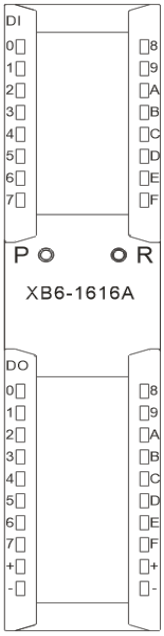


6.4.3 XB6-1616A

XB6-1616A

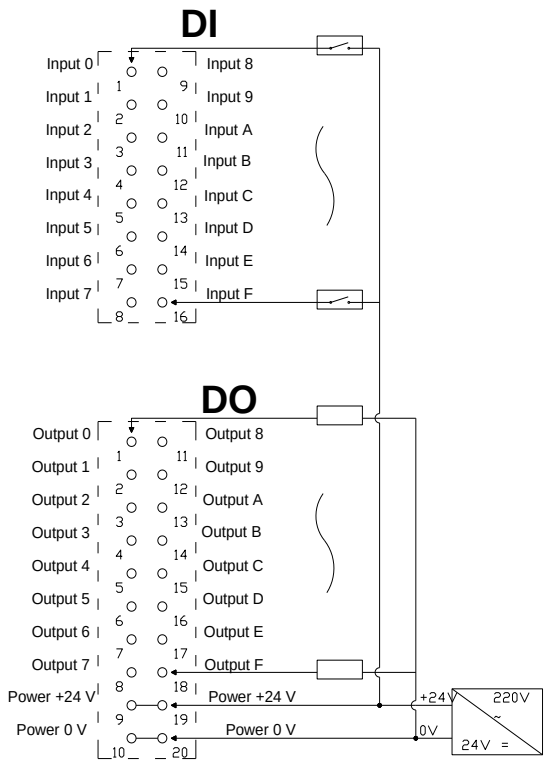


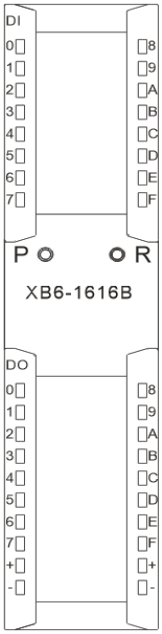
Module Panel



6.4.4 XB6-1616B

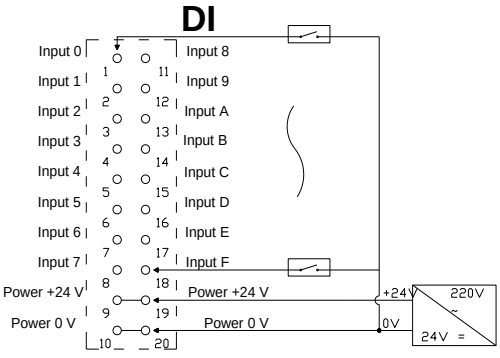
XB6-1616B	Module Panel

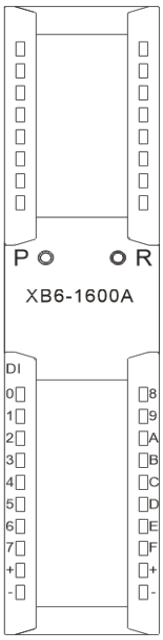




6.4.5 XB6-1600A

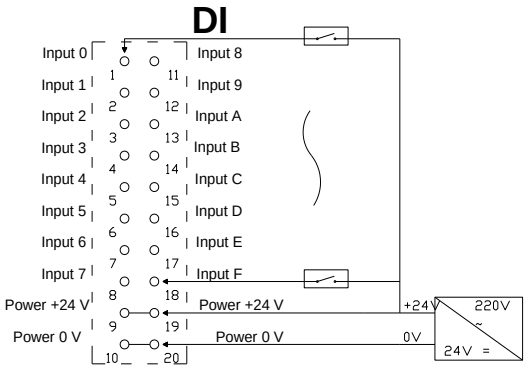
XB6-1600A	Module Panel

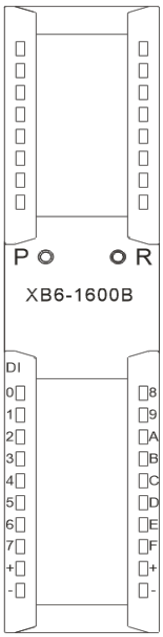




6.4.6 XB6-1600B

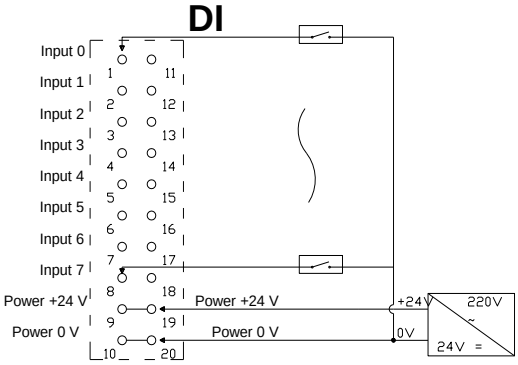
XB6-1600B	Module Panel

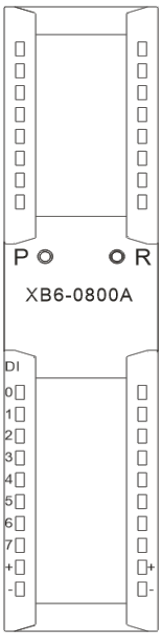




6.4.7 XB6-0800A

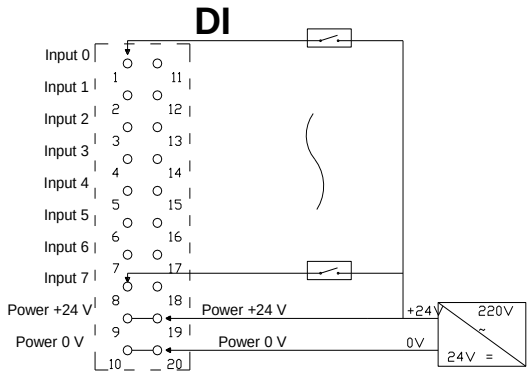
XB6-0800A	Module Panel

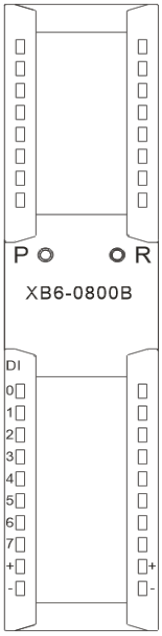




6.4.8 XB6-0800B

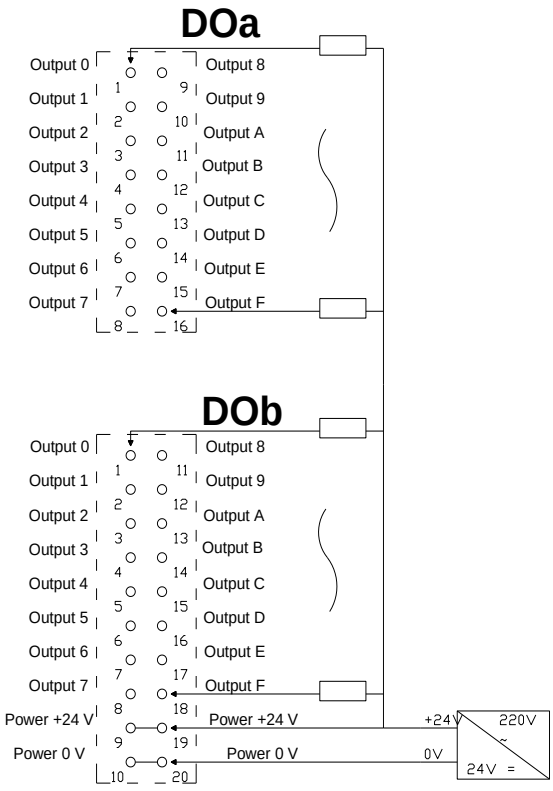
XB6-0800B	Module Panel

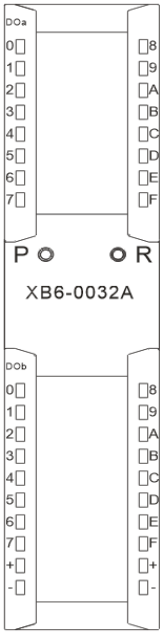




6.4.9 XB6-0032A

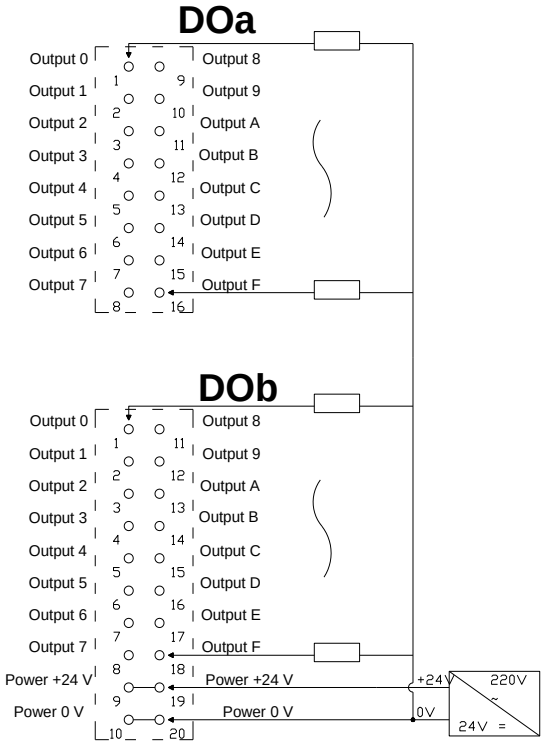
XB6-0032A	Module Panel



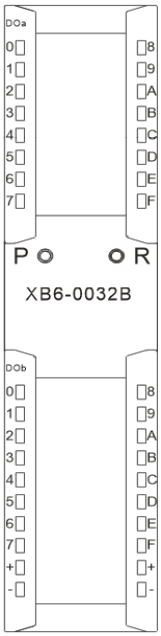


6.4.10 XB6-0032B

XB6-0032B

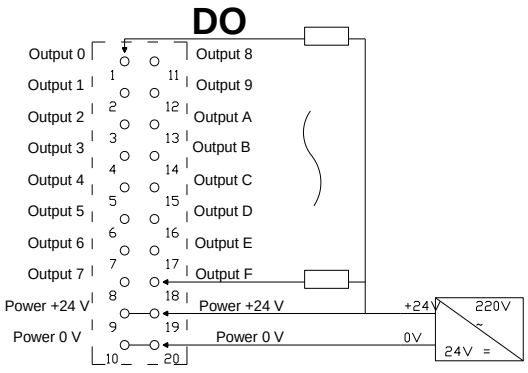


Module Panel

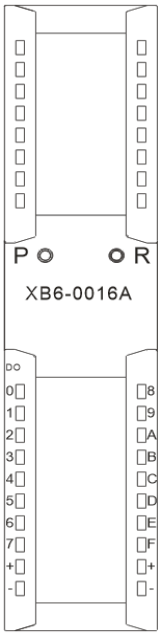


6.4.11 XB6-0016A

XB6-0016A

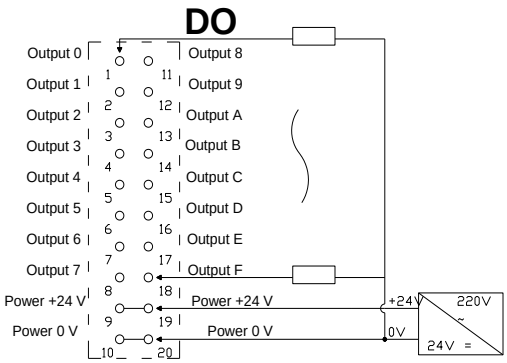


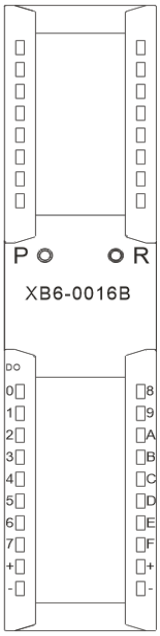
Module Panel



6.4.12 XB6-0016B

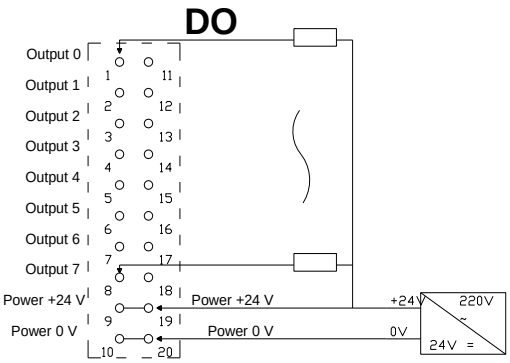
XB6-0016B	Module Panel

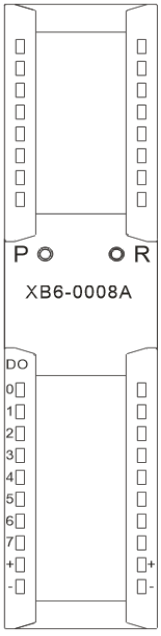




6.4.13 XB6-0008A

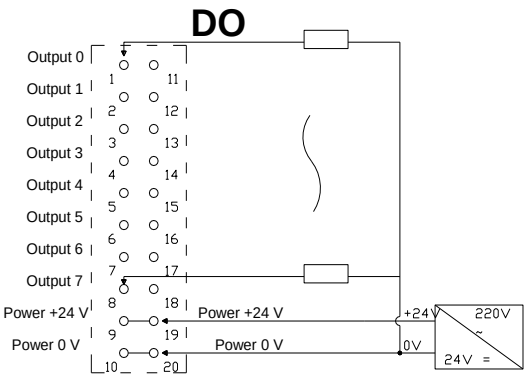
XB6-0008A	Module Panel

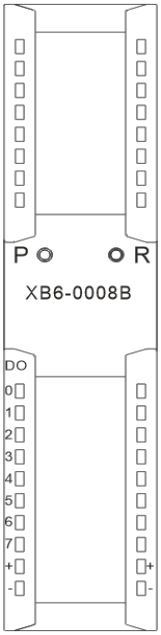




6.4.14 XB6-0008B

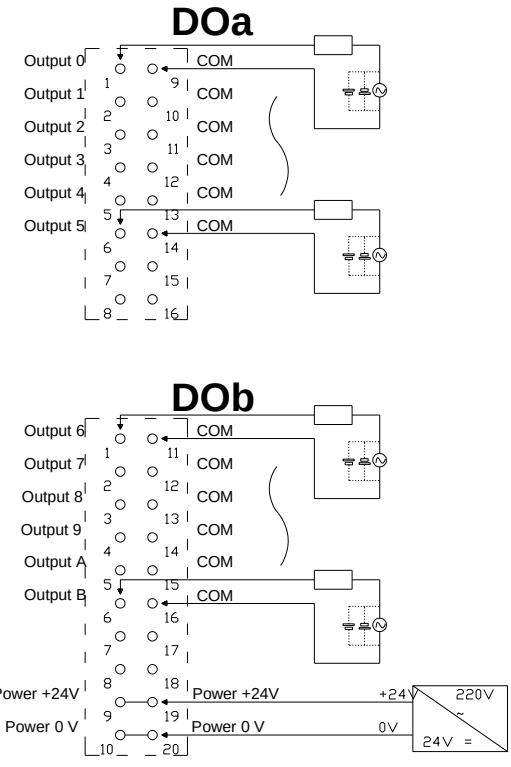
XB6-0008B	Module Panel

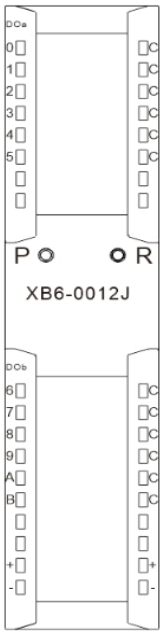




6.4.15 XB6-0012J

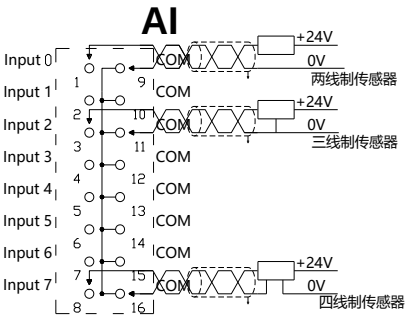
XB6-0012J	Module Panel

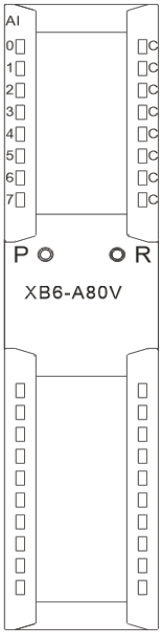




6.4.16 XB6-A80V/XB6-A80I

XB6-A80V/XB6-A80I	Module Panel





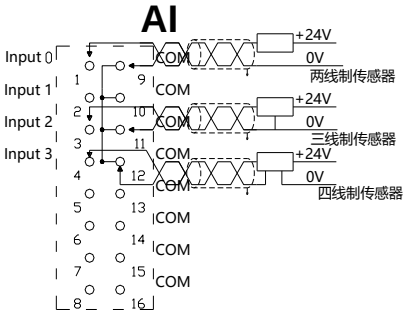
*Signal cable: shielded twisted pair cable is recommended

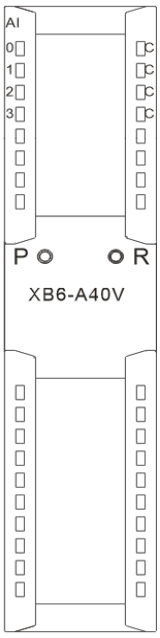
Note:

The screen printing of module XB6-A80I is XB6-A80I.

6.4.17 XB6-A40V/XB6-A40I

XB6-A40V/XB6-A40I	Module Panel





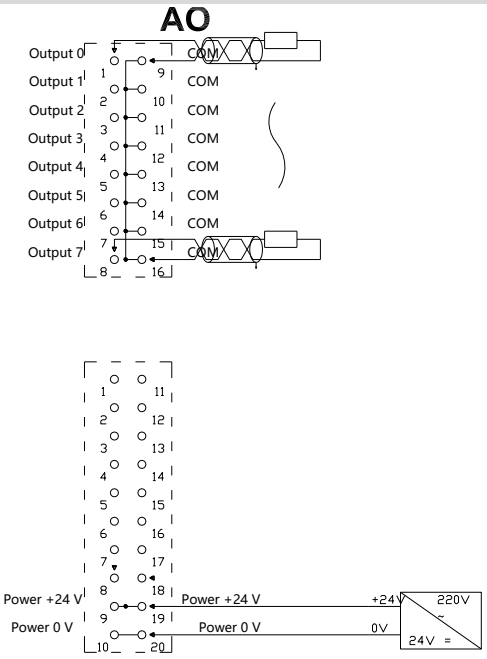
*Signal cable: shielded twisted pair cable is recommended

Note:

The screen printing of module XB6-A40I is XB6-A40I.

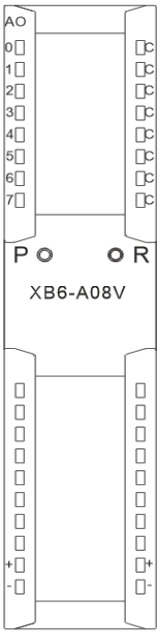
6.4.18 XB6-A08V/XB6-A08I

XB6-A08V/XB6-A08I



*Signal cable: shielded twisted pair cable is recommended

Module Panel

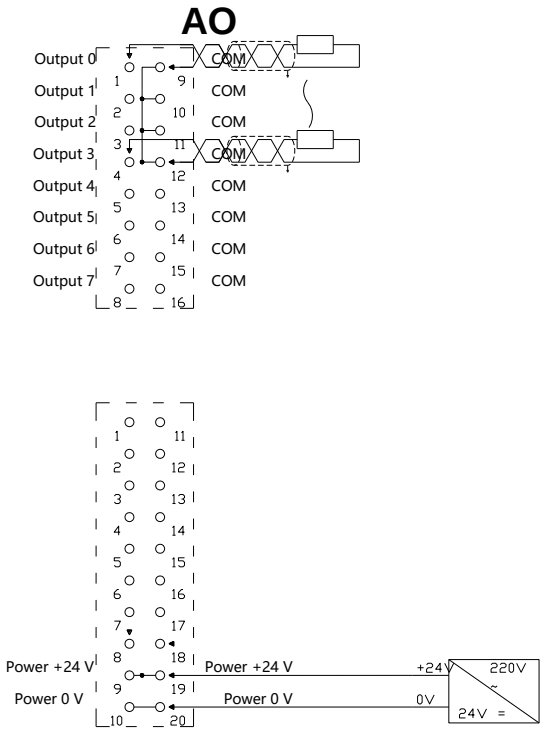


Note:

The screen printing of module XB6-A08I is XB6-A08I.

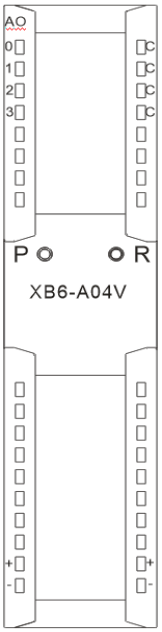
6.4.19 XB6-A04V/XB6-A04I

XB6-A04V/XB6-A04I



*Signal cable: shielded twisted pair cable is recommended

Module Panel

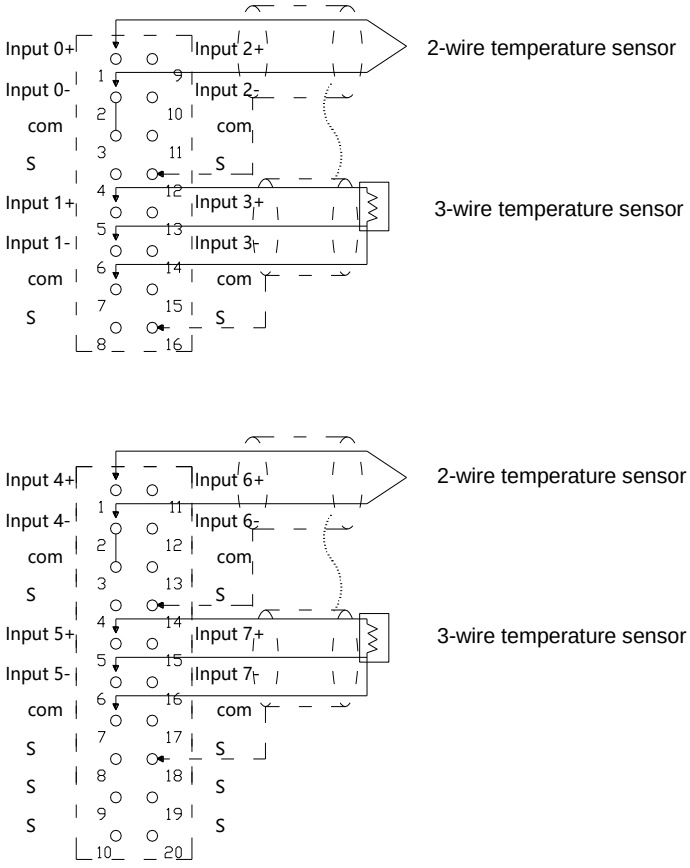


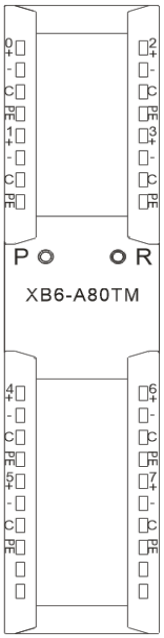
Note:

The screen printing of module XB6-A04I is XB6-A04I.

6.4.20 XB6-A80TM

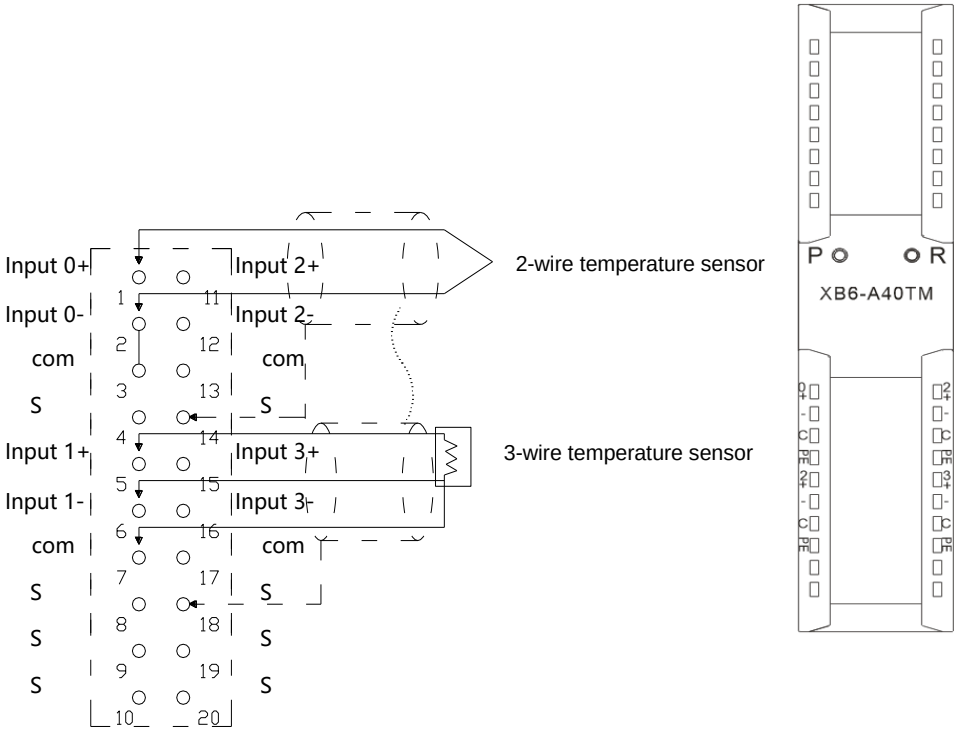
XB6-A80TM	Module Panel





6.4.21 XB6-A40TM

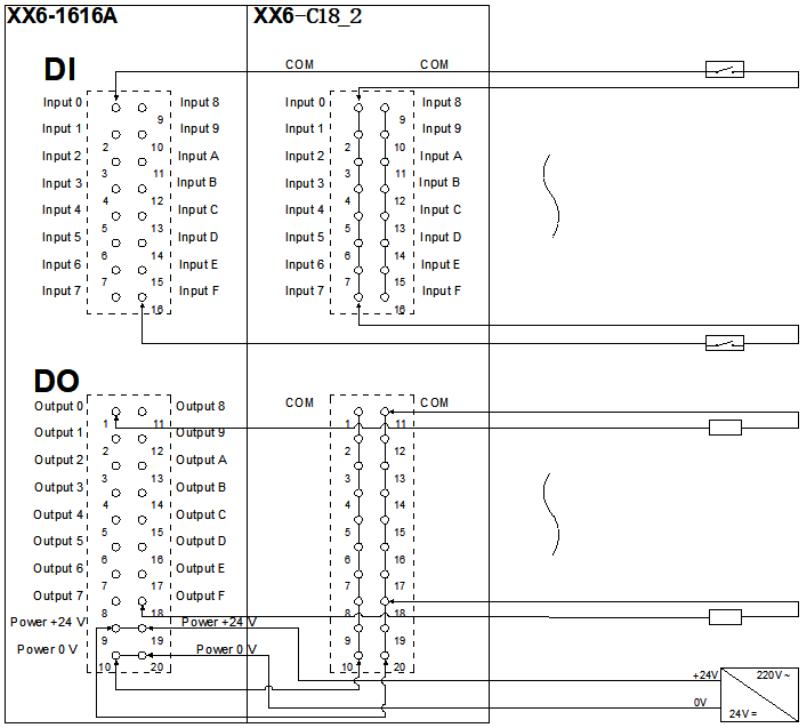
XB6-A40TM	Module Panel



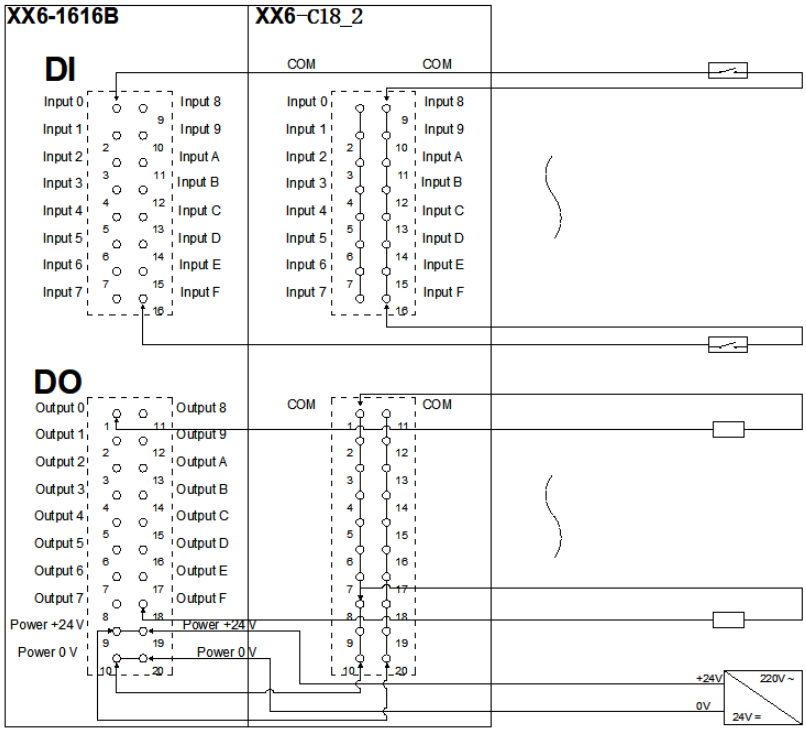
6.5 Common terminal expansion module wiring diagrams

The wiring method of two-wire and three-wire sensors is described in this section, taking the two modules of XX6-1616A/B as examples.

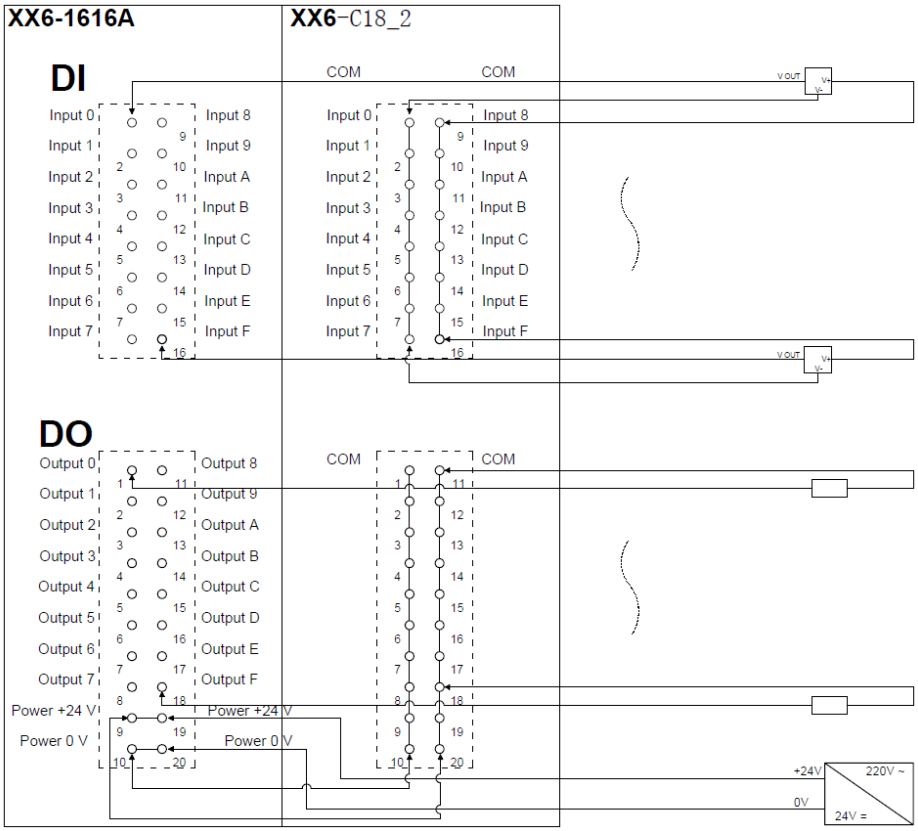
Wiring method of two-wire sensor (NPN type)



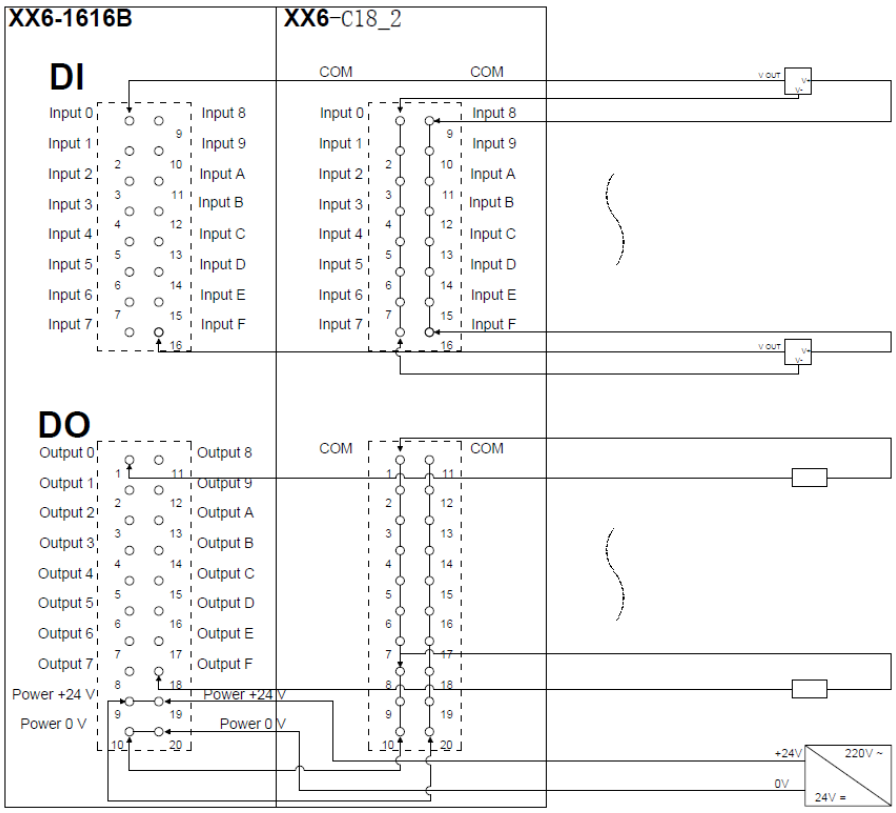
Wiring method of two-wire sensor (PNP type)



Wiring method of three-wire sensor (NPN type)



Wiring method of three-wire sensor (PNP type)



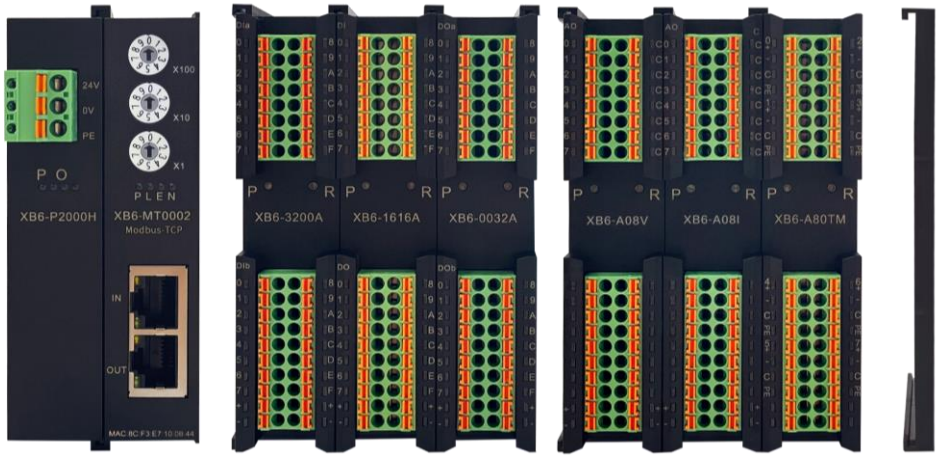
7 Operation

7.1 Module application

Two combinations are available for the product as shown below, each containing a coupler, I/O modules and an end cover.

First product combination (coupler, I/O modules, end cover)

Coupler I/O modules End cover



Second product combination (coupler, I/O modules, extension power module, I/O modules, end cover)

Coupler I/O modules extension power module I/O modules end cover

Please refer to the following principles for the number of I/O modules to be configured:

1. The number of IO modules that can be supported by a coupler is not higher than 32.
2. The number of analog modules should not exceed 12, and the number of 8-channel analog inputs should not exceed 8.

7.2 Module parameters configuration function

7.2.1 Digital input filtering

Digital input filtering can prevent unexpected rapid changes in program response input signals. Such changes may result from jumping of switch contact or electrical noise. The default value of digital input filtering is currently fixed at 3ms and all clutters within 3ms can be filtered out. Separate channel configuration is not allowed. The 3ms input filtering time means that a single signal changing from 0 to 1 or from 1 to 0 can only be detected after 3ms has lapsed following such change, while a single high pulse or low pulse shorter than 3ms will not be detected

Configuration method

See 7.3 Bus module configuration description

*** After the modification, it is recommended to repower the module**

7.2.2 Analog filtering configuration function

- **Analog input filtering function**

  The analog input filtering function can average the data internally after A/D conversion to reduce the fluctuation effect on input signals due to noise.

  Analog inputs are subject to moving average processing based on the specified A/D conversion times.

- **Filtering function configuration**

  Each channel can be configured separately. Configuration range: 1~200, default: 10.

  Sampling rate of 8-channel module: 1.25 KHZ/8 channels (800 us/8 channels)

  Sampling rate of 4-channel module: 2.5 KHZ/4 channels (400 us/4 channels)

Configuration method

See 7.3 Bus module configuration description

*** After the modification, it is recommended to repower the module**

7.2.3 Digital output clearing and holding function

Output holding: When the communication is disconnected, the module output channel will maintain its output

Output clearing: When the communication is disconnected, the module output channel will clear its output

Configuration method

See 7.3 Bus module configuration description

*** After the modification, it is recommended to repower the module**

7.2.4 Analog range selection

The analog range setting function is used to set the analog range (see 3.5 Analog Parameters for details).

Configuration method

See 7.3 Bus module configuration description

*** After the modification, it is recommended to repower the module**

7.3 Bus module configuration description

7.3.1 Application in TIA Portal V14 software environment

1. **Preparations**

Hardware environment

A computer installed with TIA Portal V14 software

A Siemens PLC

Dedicated PROFINET shielded cables

A switching power supply

Module installation guide rail and fasteners

Module model:

Type	Model	Number
PLC	S7-1200	1
Coupler	XB6-PN2002ST	1
I/O Modules	XB6-3200B	1
	XB6-3200A	1
	XB6-1616B	1
	XB6-A80V	1
End cover	XB6-CVR00	1

Device configuration files

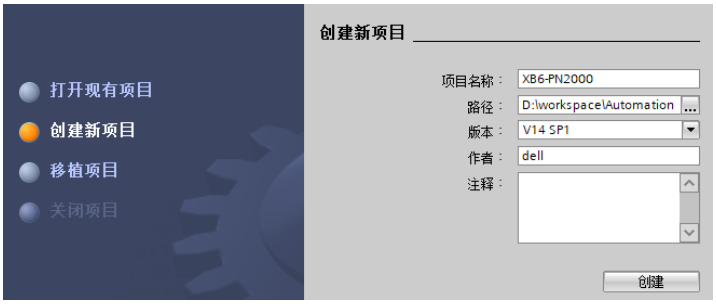
Website of configuration files: https://www.solidotech.com/documents/configfile

Hardware configuration and wiring

Please operate according to "5 Installation and Disassembly" and "6 Wiring".

2. Project Creation

1. Open the TIA Portal V14 software.
2. Click "Create New Project"



Project name: Customize, can keep the default.

Path: The project keeps the path, which can be kept as default.

Version: Keep the default.

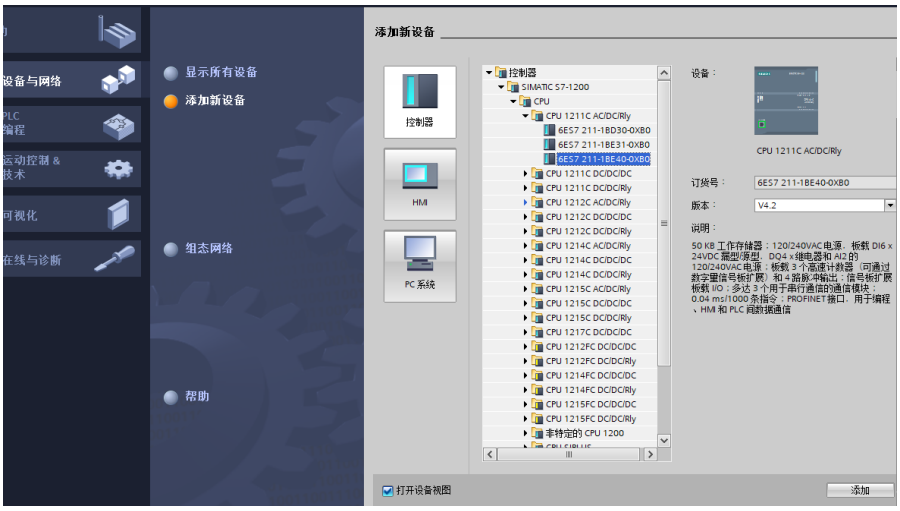
Author: You can keep the default.

Comment: Custom, can be left blank.

3. Adding a PLC

1. Click "Configure a device"

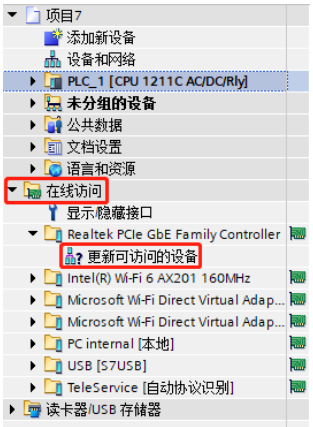
2. click "Add new device", select the PLC model you are currently using, and click "Add", as shown in the below figure



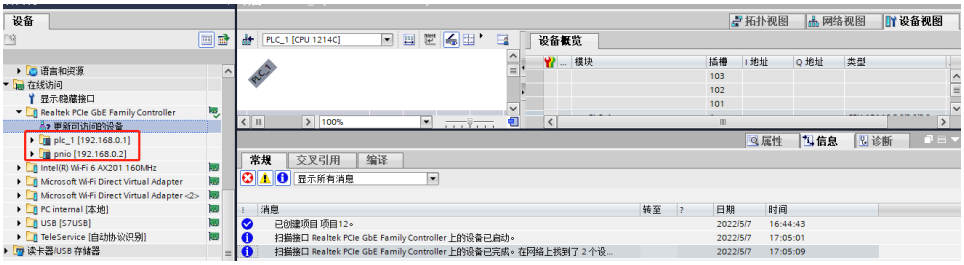
Check to see that the PLC has been added to the device navigation tree.

4. Scan devices

1. Click "Online Access" -> "Update accessible devices" in the left navigation tree, as shown in the figure below.



After the update, the connected slave devices are displayed, such as the below figure.



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

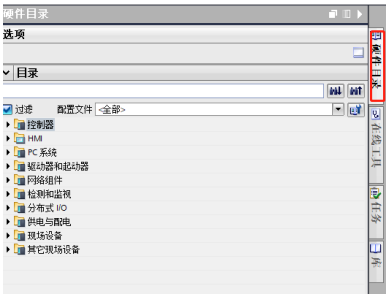
5. Add a GSD configuration file

1. In the menu bar, click "Options > Manage general station description files (GSD)".
2. Click "Source path" to select the file.

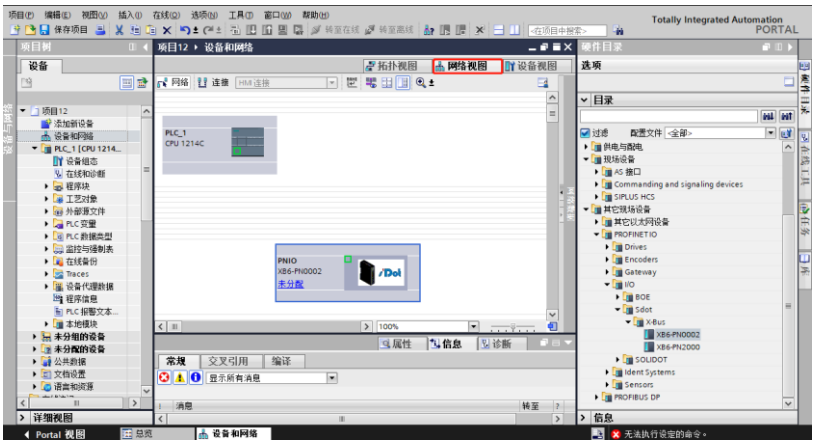
   Check whether the status of the GSD file to be added is "Not yet installed", if it is installed, click “Cancel” to skip the installation step.

6. Add a slave device and modify the device name and IP address

1. Double-click "Devices and networks" on the left navigation bar.
2. Click the "Hardware Directory" vertical button on the right side to display the following directory.

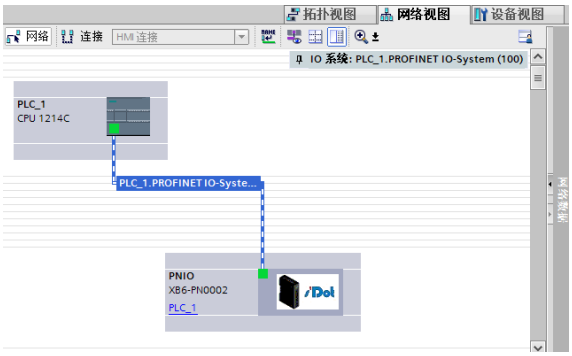


3. Select "Other Field Devices > PROFINET IO > I/O > Sdot > X-Bus > XB6-PN0002".
4. Drag or double-click "XB6-PN0002" to the "Network View", as shown in the below figure.

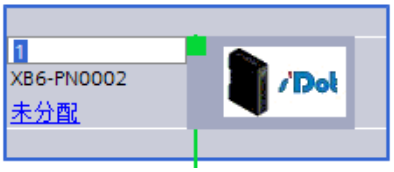


5. Click "Unassigned (blue font)" on the slave device and select "PLC_1.PROFINET interface_1", as shown in the figure below

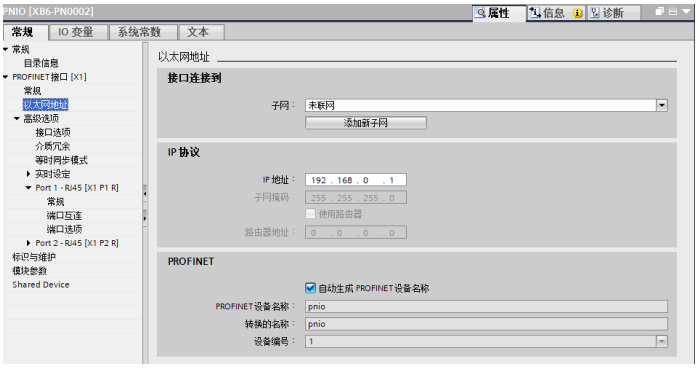
After the connection is completed, as shown in the figure below.



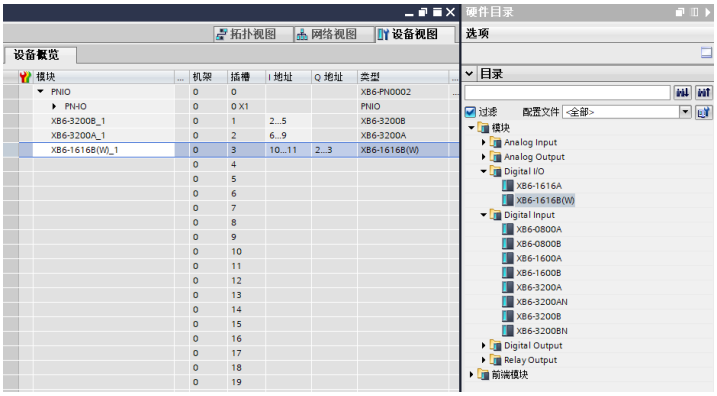
6. Click on the device name and rename the device, as shown in the figure below.



7. Open "Device View" and change the IP address in "Properties", as shown in the following figure.

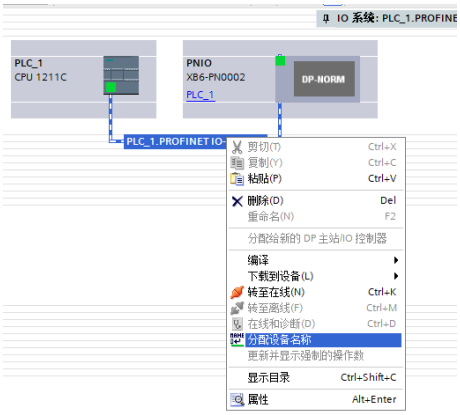


8. Add I/O modules according to the actual topology in the "Modules" directory on the right (the order must be consistent with the actual topology, otherwise the communication will not be successful), as shown in the figure below.

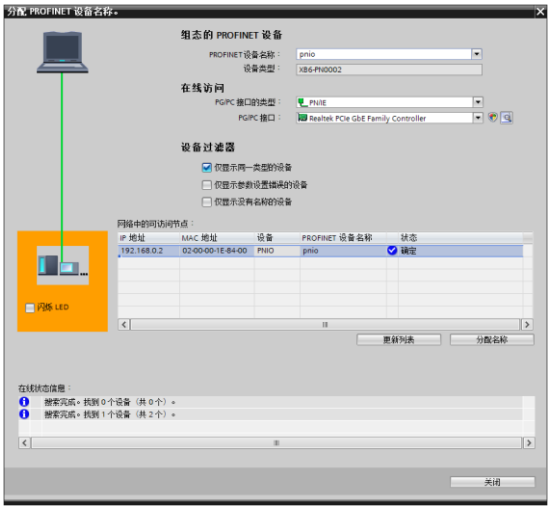


Up to 32 modules can be added, I/O address is assigned by the system, or you can change it by yourself

9. Switch to "Network View", right-click on the connection line between PLC and PNIO, and select "Assign Device Name".



10. The "Assign PROFINET Device Name" window pops up, as shown in the following figure.



Check whether the MAC address on the coupler silkscreen is the same as the MAC address of the assigned device name.

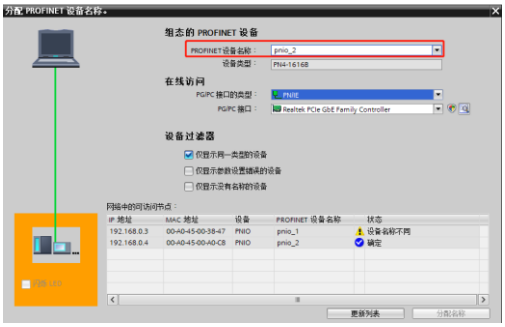
PROFINET device name: The name set in "Assign IP address and device name to slave".

Type of PG/PC interface: PN/IE.

PG/PC interface: The actual network adapter used. 11.

11. Select the slave device in turn, click Update List, and then click Assign Name.

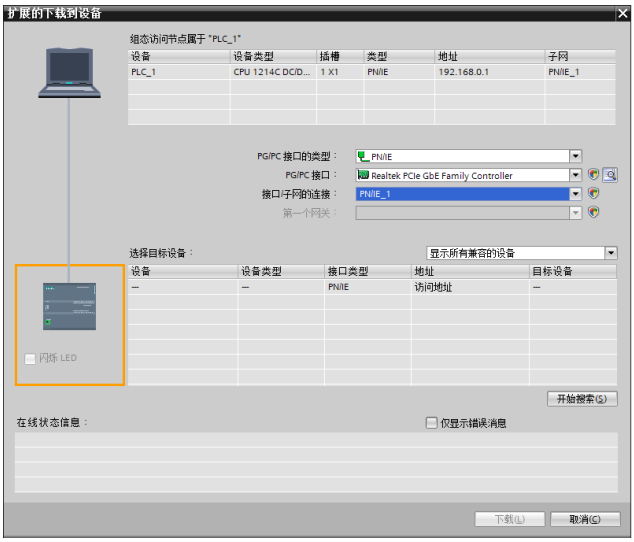
    Check whether the status of the node in "Accessible Nodes in Network" is "OK", for example, as shown in the figure below.



Click Close to close the page.

7. Download the configuration structure

1. In the "Network View", select PLC
2. Click the button in the menu bar to download the current configuration to the PLC.
3. In the pop-up "Extended Download to Device" screen, configure as shown below.



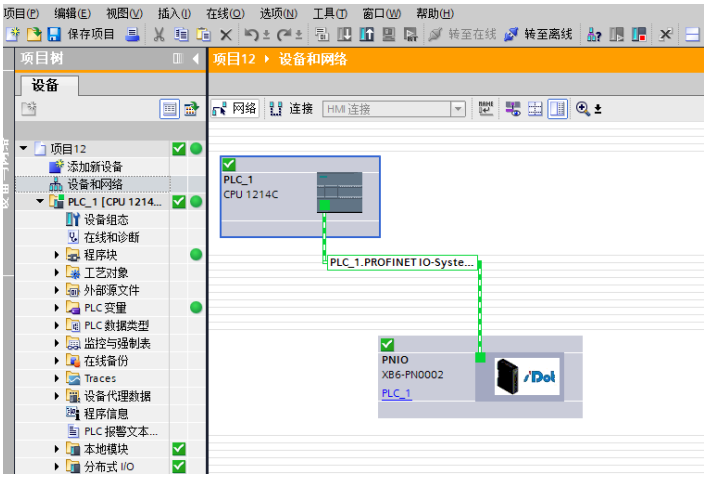
4. Click the "Start Search" button.
5. Click "Download".
6. Select "Continue without synchronization".

7. Select "Stop All".

8. Click "Load".
9. Click "Finish".
10. Power the device back on.

8. Communication Connection

1. Click  button.
2. Click the "Go to Online" button to connect successfully, as shown in the figure below.



9. Check the device indicator

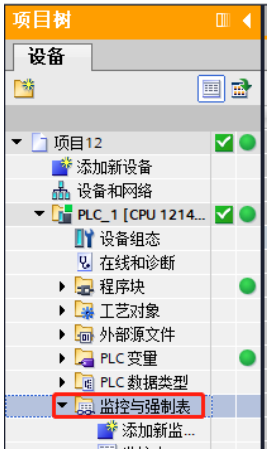
XB6-P2000H: P light is always on in green.

XB6-PN0002: P light is always on, L light is always on, B light is not on, R light is always on.

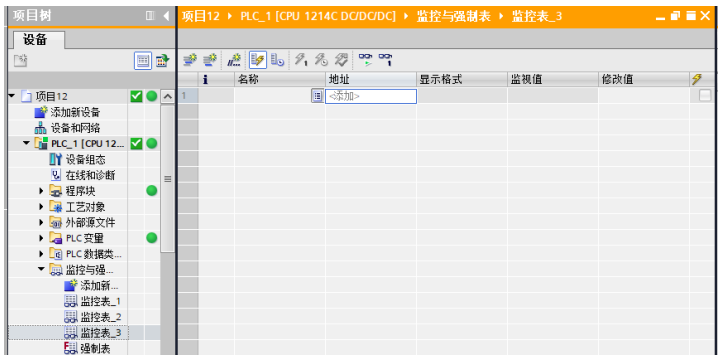
I/O module: P light is always on, R light is always on.。

10. I/O Verification

1. Expand the project navigation on the left side and select "Monitor & Force Table", as shown in the figure below.



2. Double click "Add New Monitoring Table" to add a new monitoring table to the system, for example, as shown in the figure below.

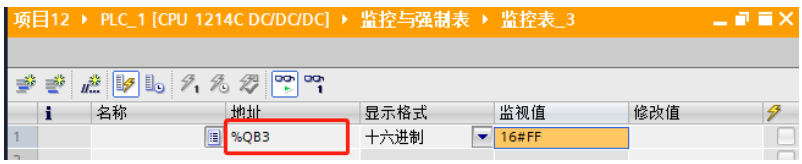


3. Click  button.

Open "Device Overview" to view the channel Q address (the channel address of the output signal) or I address (the channel address of the input signal). For example, the "Q Address" of the XB6-1616B module is 2 to 3, as shown in the figure below.

4. Enter "QB3" in the address cell of the monitoring table, as shown in the figure below.

5. Press "Enter" and the system will display as follows.

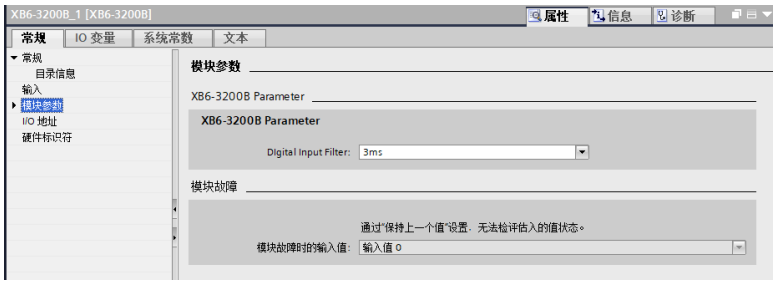


6. Enter the value in the Modify Value cell and click Write to view the channel indicator. 8.
7. Enter IB+"I address" in the address bar to monitor the input module.

11. Parameter Setting

Setting the input filter

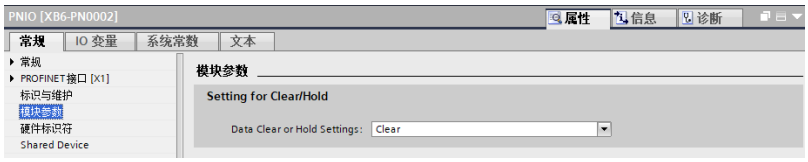
1. Open the Device View.
2. Select the input module and click "Module Parameters" to set the filtering, as shown in the figure below.



After the configuration is finished, you need to re-power the module.

Set the output clear hold

1. Open Device View.
2. Select the output module, click "Module Parameters", and set the clear hold, as shown in the following figure.



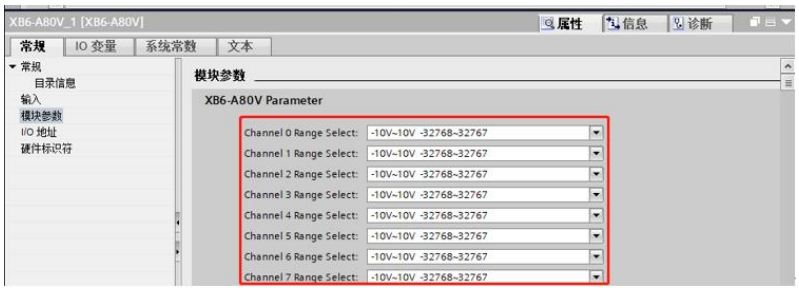
Hold: Hold the output, the module output channel will keep output when the network communication is disconnected.

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

After the configuration is finished, it needs to be re-powered.

Set the analog range

1. Open the “Device View”.
2. Select the analog module and click "Module Parameters" to set the analog range, for example, the following figure.



The default range “-10~10V -32768~32767”。

After the configuration is finished, it needs to be re-powered.

7.3.2 Application in STEP 7-MicroWIN SMART software environment

1. Preparations

Hardware environment

A computer installed with STEP 7-MicroWIN SMART software

A Siemens PLC

Dedicated PROFINET shielded cables

A switching power supply

Module installation guide rail and fasteners

Module model::

Type	Model	Number
PLC	S7-200 SMART	1
Coupler	XB6-PN2002ST	1
I/O Modules	XB6-3200A	1
	XB6-0032A	4
	XB6-0032B	1
	XB6-A40V	1
End cover	XB6-CVR00	1

Device configuration files

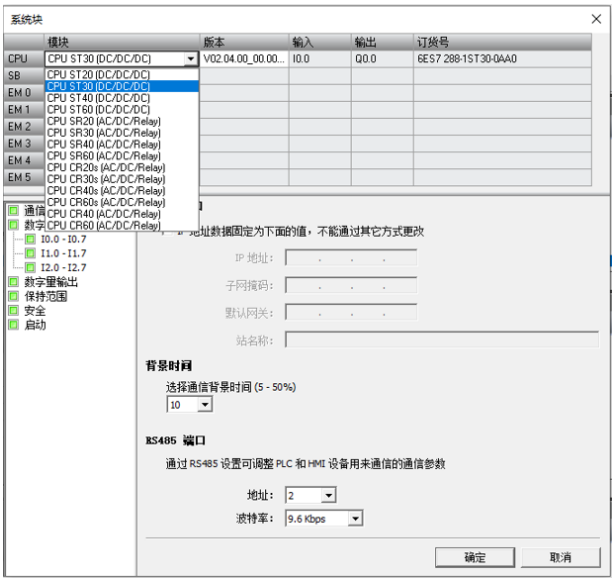
Website of configuration files: https://www.solidotech.com/documents/configfile

Hardware configuration and wiring

Please operate according to "5 Installation and Disassembly" and "6 Wiring".

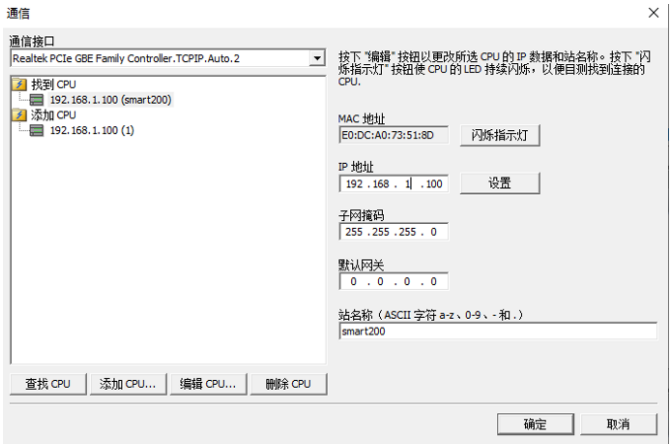
2. Add a CPU

1. Open the STEP 7-MicroWIN SMART software.
2. Double click the left navigation tree button CPU ST30 to bring up the "System Block" window
3. Select the CPU model, as shown in the figure below.



4. Double-click the Navigation Tree button 通信 to bring up the "Communication" screen.
5. Click 查找 CPU button.

6. Click the "Settings" button to modify the IP address.



3. Manage GSD files

Add GSD files

1. Click "File -> GSDML Management".
2. Click the "Browse" button.
3. Select the GSDML file you want to import.

Delete a GSD file

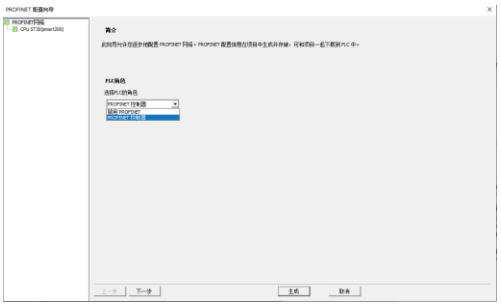
1. Click "File -> GSDML Management".
2. Select the GSDML files to be deleted in the check box.
3. Click "Delete".

4. Device Naming

1. Select "Tools -> Find PROFINET Devices".
2. Click "Find Device".
3. Click Edit to change the device name.

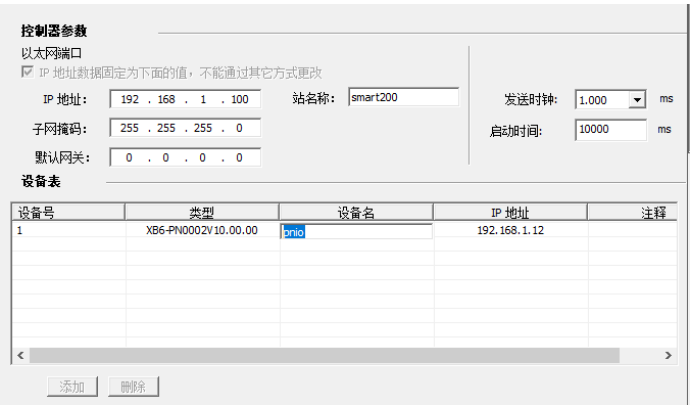
5. Configuring PROFINET Networks 1.

1. Click Tools -> PROFINET to open the PROFINET Configuration Guide.
2. Select the PLC role as "PROFINET Controller".



3. Click on "Next".

4. Configure the controller parameters as shown in the figure below.



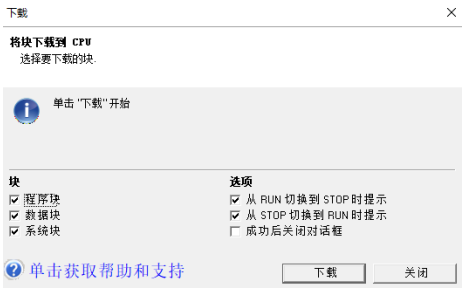
The device name should be the same as the module name, and the IP address should be set in the same network segment as the PLC.

5. Click Next to add I/O modules, for example, as shown in the following figure.

6. Click "Next" and click "Generate" button.

6. Download the program

1. Click the "Download" button, the following dialog box will pop up.

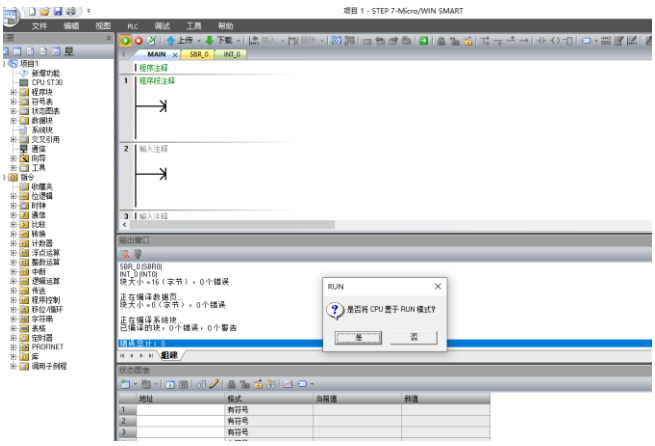


2. Click "Download".

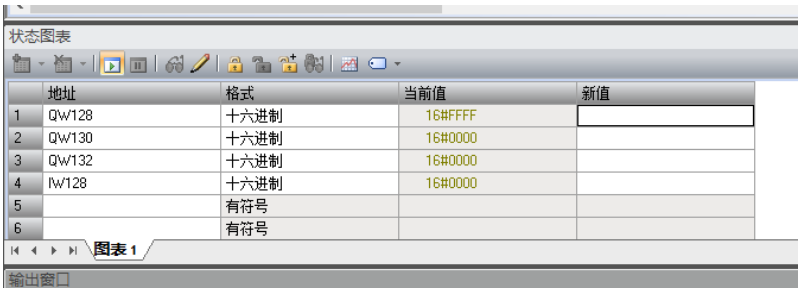
After the download is completed, re-power the module to process.

7. Test Data

1. Click the "RUN" button to put the CPU in RUN mode.



2. Click "OK".
3. Double click "Status Icon -> Chart 1" in the navigation tree, the system displays the status icon.
4. Enter the corresponding channel address and data format, where you can force and input monitoring for I/O modules, as shown in the figure below.



8 FAQ

8.1 When updating accessible devices, the device is not found

1. Make sure that the botu software is installed correctly.
2. Make sure there is no other software occupying the network adapter used by the Botu software.
3. Make sure the network cable, network card and network port can work properly.
4. IP address or MAC address conflict.。

8.2 Load button is gray when downloading configurations

1. Confirm that there is no forced value in the PLC.
2. Verify that the PLC is in stop state.