



PROFIBUS-DP

XB6 Series Slice I/O

User Manual



Nanjing Solidot Electronic Technology Co., Ltd

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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>

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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 control 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.

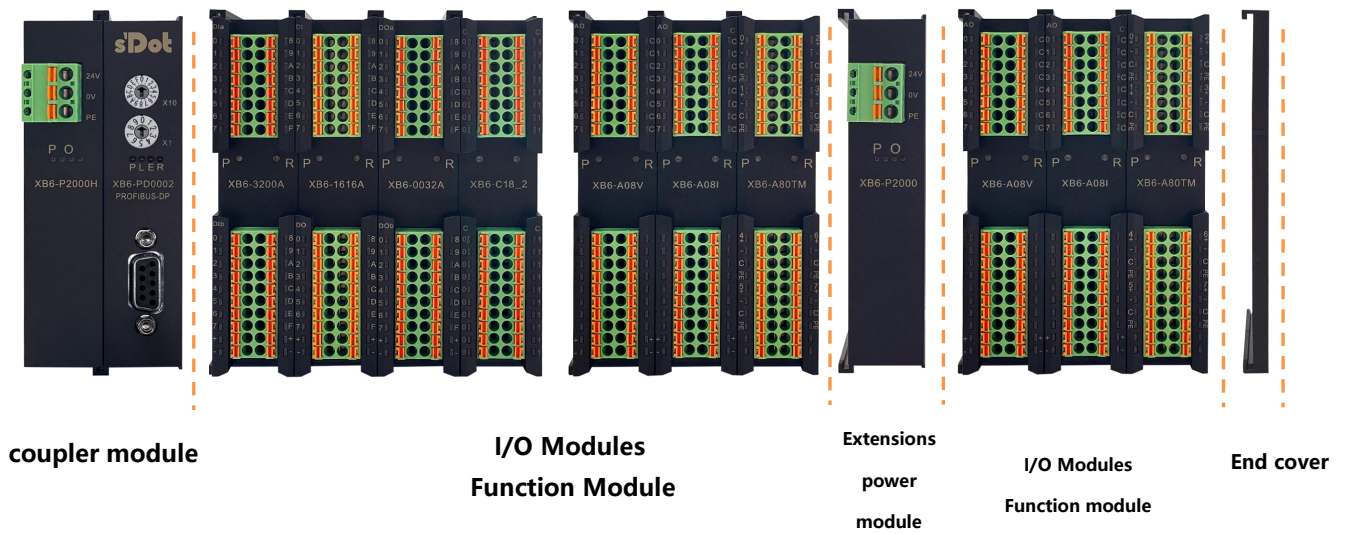
1.2 Product Feature

- **Fewer nodes occupied**
A node consists of a bus coupler, 1 to 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 communication standards and supports mainstream PROFIBUS-DP master stations.
- **Transmission Rate Adaptive**
Transmission rate support range 9.6 Kbps ~ 12 Mbps.
- **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.

- **Quick**
The backplane utilizes the X-bus: scanning period max. 1 ms.
- **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 - PD 20 02 ST
(1) (2) (3) (4) (5) (6)

serial number	hidden meaning	Description of values
(1)	Bus Type	XB: X-bus backplane bus
(2)	Product Series	6: slice
(3)	Bus protocol	PD: PROFIBUS-DP CL: CC-Link PN: PROFINET 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: Dual bus interface (Profibus connector supports connection of the former and latter stations)
(6)	Module Type	ST: Kit of power supply, coupler, and cover plate

2.1.2 I/O module Designation rules

XB **6** - **A** **8** **0** **V**
(1) **(2)** **(3)** **(4)** **(5)** **(6)**

serial number	hidden meaning	Description of values				
(1)	Bus Type	XB: X-bus				
(2)	Product Series	6: slice				
(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, 0.5A	V	-10~+10 V, 0~+10 V
		B	PNP	PNP, 0.5A	I	4~20 mA, 0~20 mA
		BW	PNP	PNP, 0.25A	TM	Resistance Temperature Detector (RTD), thermocouple (TC)
		N	NPN/PNP	-		
		AN	-	NPN, 0.1A		
BN	-	PNP, 0.1A				

2.2 List of Common Modules

model number	Product Description	
XB6-PD2002ST	PROFIBUS-DP 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 input/output module, NPN type	
XB6-1616B/XB6-1616BW	16-channel digital input/output module, PNP type	
XB6-3200N	32 channels of digital inputs, 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	
XB6-0012J	12-Channel Relay Output Module	
XB6-A40TM	4-channel RTD and thermocouple temperature acquisition module	
XB6-A80TM	8-channel RTD and thermocouple temperature acquisition module	
XX6-C18_2	Public Side Extension Module	

3 Product Parameters

3.1 General parameters

General technical parameters		
Size	Power module	106X61X22.5 mm
	Coupler module	106X61X22.5 mm
	I/O Modules	106X73X25.7 mm
weights	Power module	110 g
	Coupler module	80 g
	I/O Modules	90 g
Operation temperature	-10°C~+60°C	
Storage temperature	-20°C~+75°C	
Relative humidity	95%, non-condensing	
Protection class	IP20	

3.2 Power supply parameters

Power supply parameters		
Power module	Working power supply	24 VDC (18V~30V)
	Output voltage	5 VDC
	Output Current	2 A
Coupler module	Working power supply	5 VDC
	Working Current	100 mA
I/O Module	Working power	5 VDC

3.3 Interface parameters

PROFIBUS-DP interface parameters (XB6-PD0002 coupler)				
Bus protocol	PROFIBUS-DP			
Data transmission medium	PROFIBUS-DP special cable (shielded twisted pair RS-485 communication cable)			
Range of communication functions	DPV0			
Transmission rate	9.6 Kbps ~ 12 Mbps			
Automatic detection of transmission rate	Supported			
Transmission rate versus bus length	9.6 Kbps ~ 187.5 Kbps	500 Kbps	1500 Kbps	3000 Kbps ~ 12000 Kbps
	≤1000 m	≤400 m	≤200 m	≤100 m
Maximum transmission current	70 mA			
Maximum I/O communication data length	160 Bytes input 160 Bytes output			
Bus interface	PROFIBUS-DP interface, RS-485 DP communication 9-pin socket			

3.4 Digital parameters

Digital input	
rated voltage	24 VDC (18V~30V)
Number of signal points	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
Isolated Withstand Voltage	500 VAC
Channel Indicator	Green LED light
Digital output	
Rated voltage	24 VDC (18V~30V)
Number of signal points	8, 16, 32
Signal Type	NPN/ PNP
Load Type	Resistive load, inductive load
Single channel rated current	NPN type Max: 500 mA PNP type Max: 500 mA BW type Max: 250mA

port protection	Overvoltage and overcurrent protection
Isolation method	Optically-coupled isolation
Isolated Withstand Voltage	500 VAC
Channel Indicator	Green LED light
Relay output	
Rated voltage	24 VDC (18V~30V)
Number of signal points	12
Isolation method	Optocouplers, Relays
Rated load	2 A
Channel Indicator	Green LED light

3.5 Analog parameters

3.5.1 Technical Parameters

Analog input			
Input Points	4, 8		
Input signal (voltage type)	0~+10 V, -10 V~+10 V (range adjustable)		
Input signal (current type)	0~20 mA, 4~20 mA (range adjustable)		
Resolution	16 bits		
Sampling rate	XB6-A40V, XB6-A80V, XB6-A40I, XB6-A80I	≤1 ksp/s	
Accuracy	XB6-A40V, XB6-A80V, XB6-A40I, XB6-A80I	±0.1%	
Input Impedance (Voltage Type)	≥2 kΩ		
Input impedance (current type)	100 Ω		
Isolated Withstand Voltage	500 VAC		
Channel Indicator Lights	Green LED light		
Temperature Input			
channel number	4, 8		
Sensor type	Thermocouple	Thermal resistor	Resistor
connective type	2-wire method	2-wire, 3-wire method	2-wire method
	K: -200~1370°C J: -200~1200°C E: -200~1000°C S: -50~1690°C B: 50~1800°C	Pt100: -200~850°C Pt200: -200~600°C Pt500: -200~600°C Pt1000: -200~600°C	15Ω~3kΩ
Accuracy	± 0.3%	±1°C	±0.1%
Sensitivity	0.1°C		±0.1Ω
Resolution	16 bits (int type)		
Channel Indicator	Green LED light		

Analog output		
Output Points	4, 8	
Output signal (voltage type)	0~+10 V, -10~+10 V (range adjustable)	
Output signal (current type)	0~20 mA, 4~20 mA (range adjustable)	
Resolution	16 bits	
Accuracy	XB6-A04V, XB6-A08V, XB6-A04I, XB6-A08I	±0.1%
Load impedance (voltage type)	≥2 kΩ	
Load impedance (current type)	≤200 Ω	
Isolated Withstand Voltage	500 VAC	
Channel Indicator Lights	Green LED light	

Note: Analog voltage modules do not support up and down overflow and overshoot, analog current modules support up and down overflow and overshoot.

3.5.2 Voltage Input/Output Range Selection and Code Value Table

Voltage I/O range selection and code value range				
Range Selection	0	1	2	3
Measurement 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 Value .			

Note: D: code value; U: voltage.

Table 3-1 Voltage Code Values

Range Voltage	0 (default)	1	2	3
	-10 V~+10 V	0~+10 V	-10 V~+10 V	0~+10 V
	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
	$D = (65535/20) * U$	$D = (32767/10) * U$	$D = (55296/20) * U$	$D = (27648/10) * U$
	$U = (D*20) / 65535$	$U = (D*10) / 32767$	$U = (D*20) / 55296$	$U = (D*10) / 27648$

Note: For analog voltage input modules, the maximum code value is displayed when the channel input voltage exceeds 10V. For analog voltage output module, if the code value setting exceeds the maximum code value corresponding to the range in the table, all channels will output 10V.

3.5.3 Current Input/Output Range Selection and Code Value Table

Analog Current Input/Output Range Selection and Code Value Range				
Range Selection	0	1	2	3
Measurement 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 Current Code Values.			

Note: D: Code value; I: current.

Tables 3-2 Current Code Values

Range Selection Range	0 (default)	1	2	3
	4~20mA	0~20mA	4~20mA	0~20mA
Current	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				31743
23				31795
23.52			32767	32511
23.70				32767
24				
25				
	$D=65535/16*I-16384$	$D= (65535/20)*\text{current}$	$D= (27648/16)* I- 6912$	$D= (27648/20)*I$

Note: When the input current of range 2 > 22.81 mA, the code values all show 32767; when the specified code value is > 32511, the output current is 22.81 mA.

When range 3 input current > 23.52 mA, the code values all show 32767; when specified code values > 32511, the output current is 23.52 mA.

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



serial number	name (of a thing)	clarification
①	Power supply terminal block	Spring-loaded terminal blocks
②	Guideway slot	For DIN 35mm rail fixing
③	Power marking, indicator light	Indicates power status
④	Rotary switch and marking	Setting the station number
⑤	System identification, indicator	Indicates power supply and module operation status

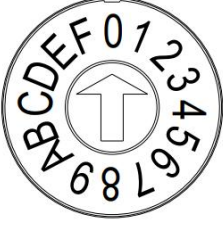
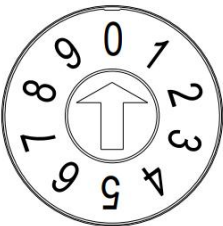
⑥	DP bus interface	RS-485 DP communication 9-pin socket
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4.1.2 Rotary switch

Rotary Dial Description





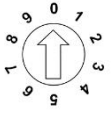
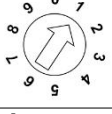
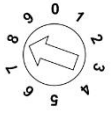

The XB6-PD2002ST coupler kit and I/O module combination structure acts as a DP slave in a PROFIBUS-DP network with an adaptable transmission rate (baud rate), which needs to be set first to its station number in the network.

The station number is set using rotary dip switches, and the rotary switches and meanings are shown in the table below:

Markings	Usage	Setting range	figure	note
 X10	Setting the tens/hundreds digit	0~C	sixteenth digits	The station number setting range is 0~127, X10 is the high (ten/hundred) digit dialing code, X1 is the low (single) digit dialing code, station number = high digit x 10 + low digit.
 X1	Setting single digit	0~9	ten digits	

Note: The station number setting range is 0 to 127, 0 is generally used for programming devices, 1 is generally used for operator stations, 126 is reserved for factory devices that do not have switch settings and must be re-addressed over the network, and 127 is used for broadcasting, so the valid address range for DP devices is 2 to 125.

Schematic diagram of station number rotary dialing setting

Station number setting	Dialing code setting	Set value	Station number value
X10	Tenth/Hundredth Digit Dialing Code	0~C	X10
		0	0
		1	10
	⋮	⋮	⋮
		B	110
		C	120
X1	single-digit dialing code	0~9	X1
		0	0
		1	1
	⋮	⋮	⋮
		8	8
		9	9

Remarks:

1. Please use a slotted screwdriver with an opening of 2mm.
2. If it is necessary to change the station number during communication, after setting the new station number, power must be reapplied for the new setting to take effect.
3. If the station number is out of the setting range, the module will have a communication error or will not be able to connect to the master station.

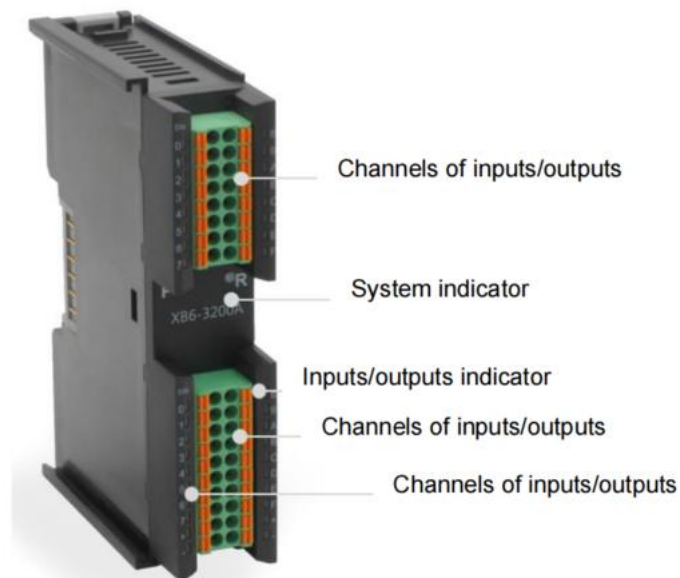
4.1.3 Indicator light function

Description of IDs and indicators of the power module			
ID	Color	state of affairs	State Description
P	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	Red	OFF	Not overloaded
		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	state of affairs	State 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	E	Red	ON	Module operating abnormally (e.g. topology inconsistency, overload of the number of connected modules, abnormal initialization, PROFIBUS-DP communication disconnection)
			OFF	Module works without anomaly
Operation status indicator	R	Green	ON	The system is operating normally
			OFF	Operating abnormality (PROFIBUS-DP communication disconnected)

4.2 I/O Module Panel

Names and function descriptions of modules



I/O Module Indicator Description			
markings	color	state of affairs	State 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 Indication	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

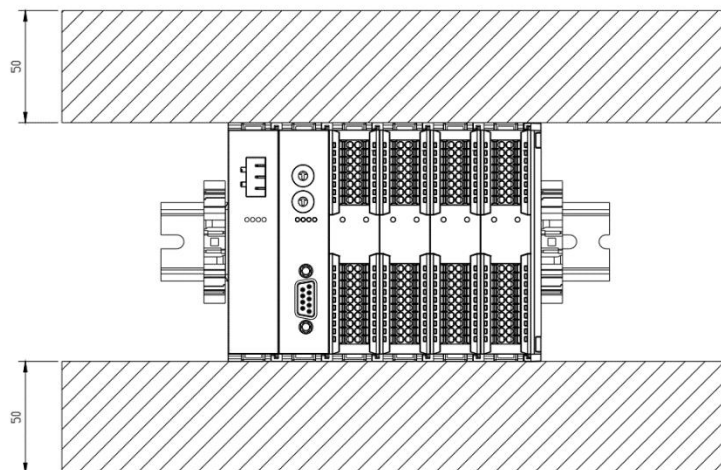
5 Installation and Disassembly

5.1 Installation Instruction

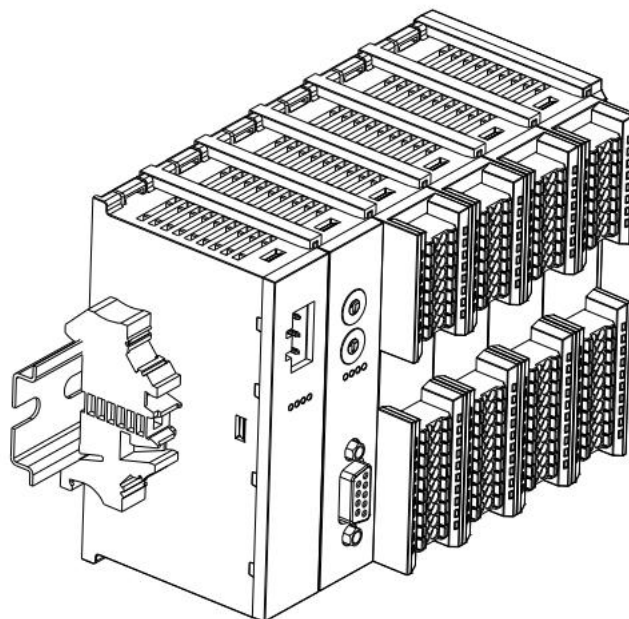
Installation and disassembly precautions

- Ensure that the cabinet is well ventilated ((such as the addition of exhaust fans to cabinets).
- Do not install this equipment next to or above equipment that may cause overheating.
- Be sure to install the module vertically and maintain air circulation around it (at least 50 mm air circulation space 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.

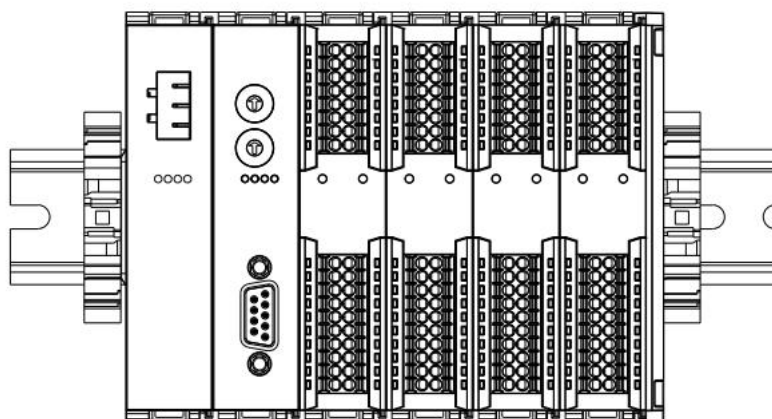
Minimum clearance for module mounting ($\geq 50\text{mm}$)



Ensure that the module is installed vertically



Make sure to install the rail fasteners



5.2 Installation and disassembly steps

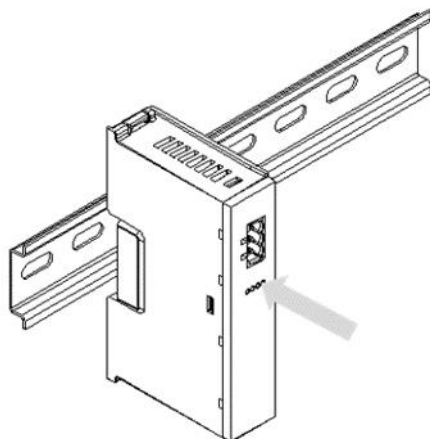
Module Installation and Removal	
Module Installation Steps	1. Install the power module on the fixed guide rail first.
	2. Install the coupler and the required I/O modules on the right side of the power module.
	3. After installing all required I/O modules, install the end cover to complete module assembly.
	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 diagram

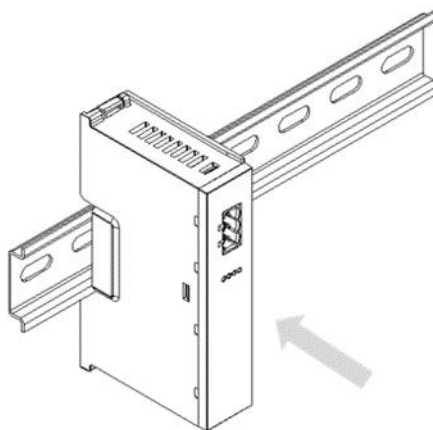
Power Module Installation

Steps



①

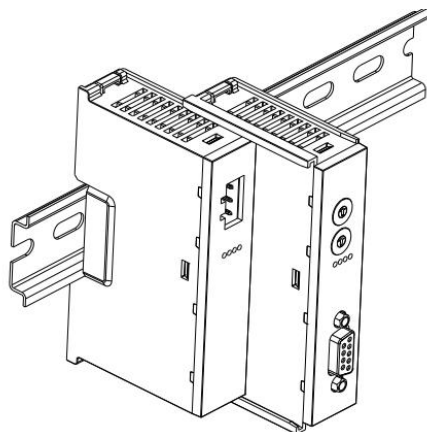
Align the power module guide rail slot vertically with the guide rail, as shown in the figure①



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

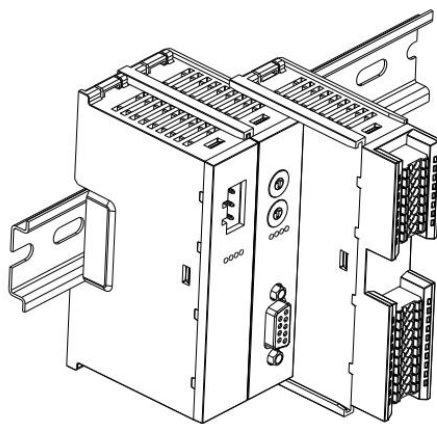


③

Steps

Align the left slot of the coupler module with the right side of the power supply module and push it in as shown in figure ③ on the left. Press firmly on the power module, and when you hear a "click" sound, the module is installed in place.

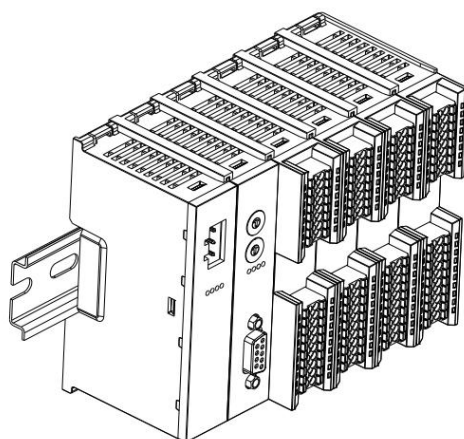
I/O Module Installation



④

Steps

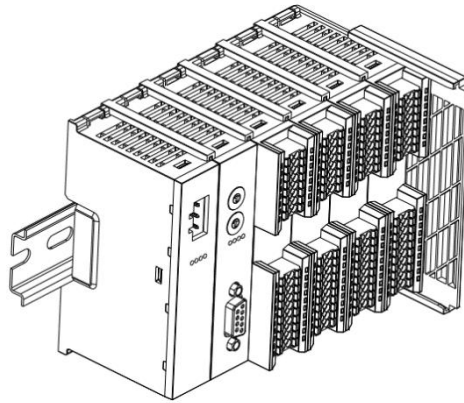
Install the required I/O modules one by one as shown in Figures ④ and ⑤ on the left, following the procedure of installing the coupler module in the previous step.



⑤

End cap retrofit

Steps



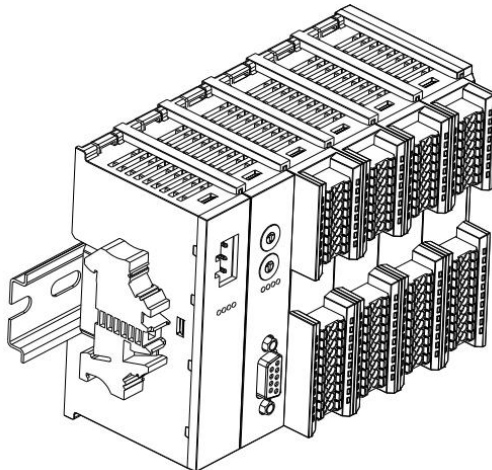
⑥

Install the end cap on the right side of the last module as shown in Figure⑥ on the left, and refer to the installation method of the coupler module.



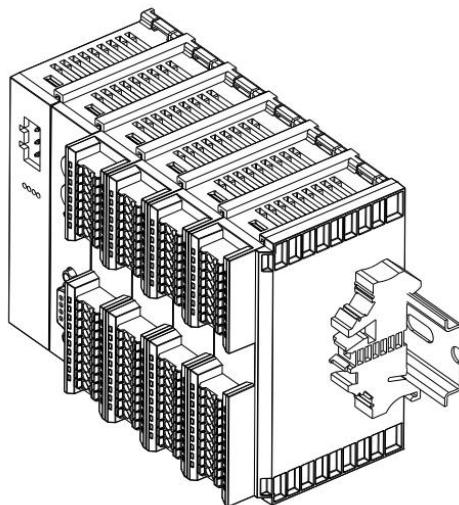
Retrofitting of guide rail fixings

Steps



⑦

Install and lock the rail retainer firmly against the left side face of the coupler, as shown in Figure⑦ at left.

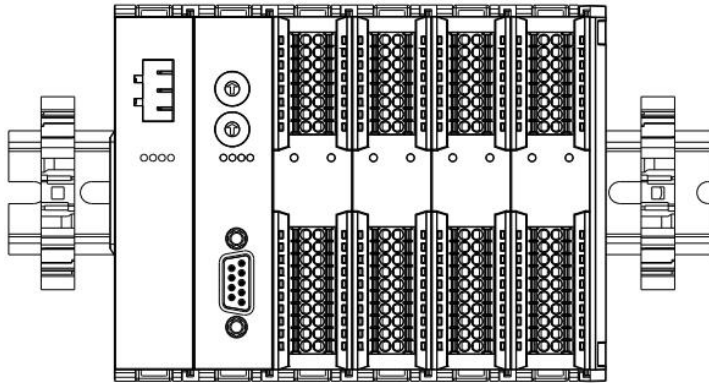


⑧

Install the rail fixture on the right side of the end cap, first push the rail fixture firmly in the direction of the coupler to ensure that the module is mounted tightly, and use a screwdriver to lock the rail fixture as shown in Figure⑧ on the left.

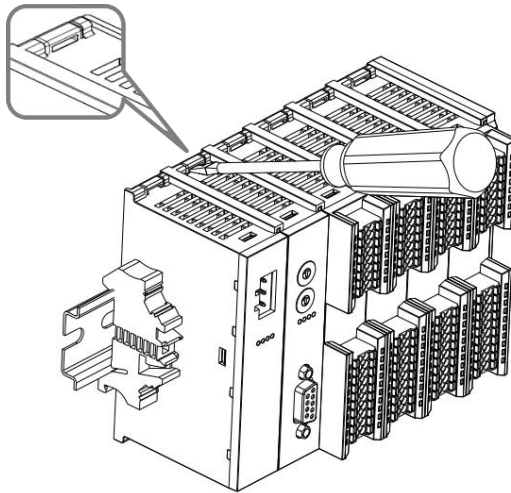
Disassembly

Steps



Loosen the rail retainer at one end of the module with a screwdriver and move it to one side, making sure there is clearance between the module and the rail retainer, as shown in Figure⑨ on the left.

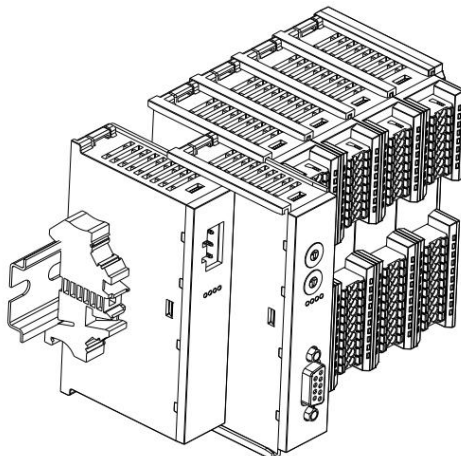
⑨



Insert a flat head start into the snap of the module to be removed, and apply pressure sideways in the direction of the module (hear the rattling sound), as shown in Figure⑩ on the left.

Note: Each module has a snap at the top and bottom, all operate in this way.

⑩



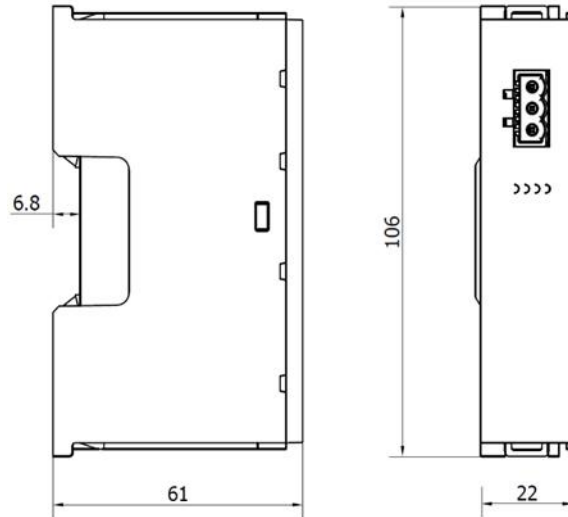
Remove the module by doing the opposite of installing the module, as shown in the left figure

⑪.

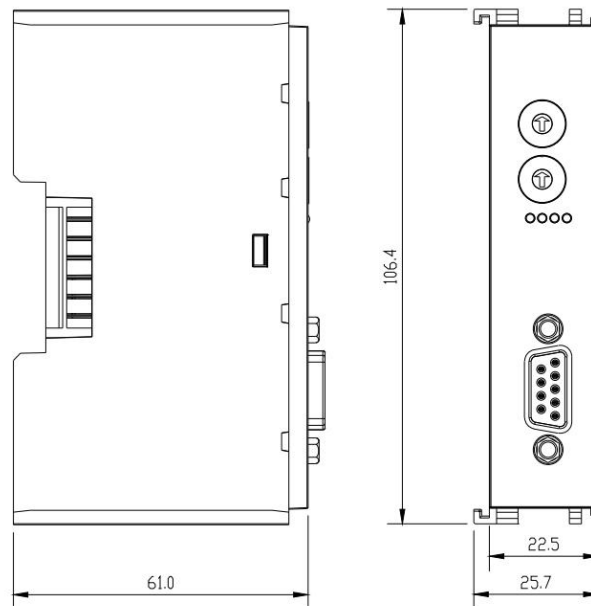
⑪

5.4 Dimension

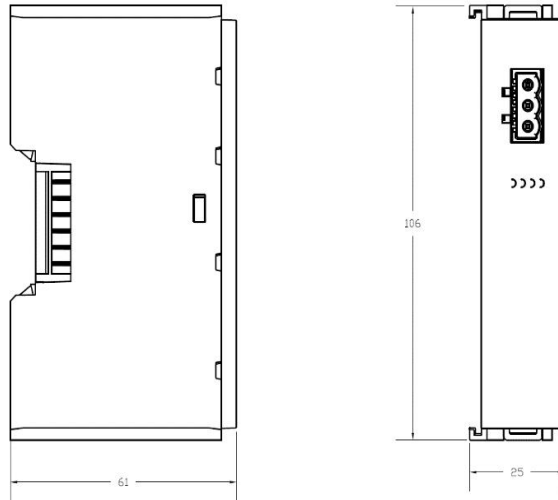
Power module dimensions (Unit: mm)



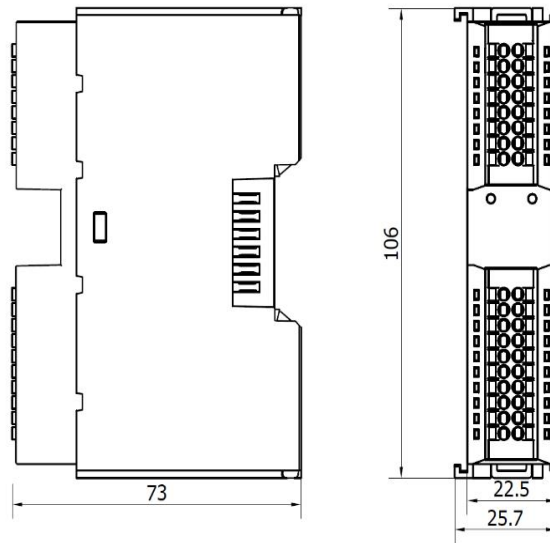
Coupler module dimensions (Unit: mm)



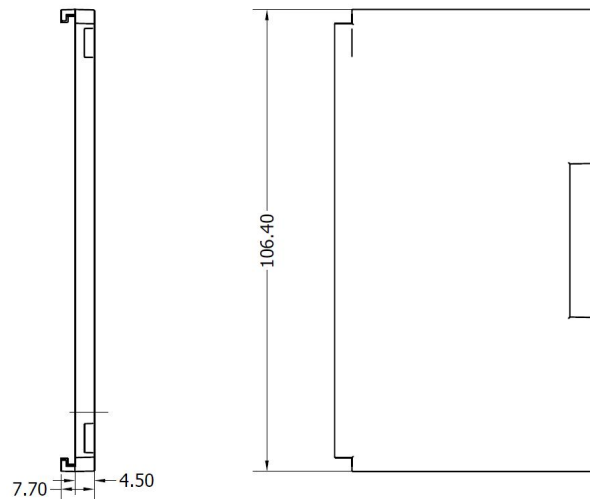
Extension power module dimensions (Unit: mm)



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 mm ²
Power terminal	Number of poles	3P
	Wire gauge	22~16 AWG 0.3~1.5 mm ²
Bus interface	PROFIBUS-DP interface	RS-485 DP communication 9-pin socket
	Communication connectors	Profibus connector (DP communication 9-pin RS485 plug)
	Communication cable	Shielded Twisted Pair RS-485 Communication Cable

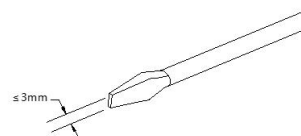
6.2 Wiring instructions and requirements

Power wiring precautions

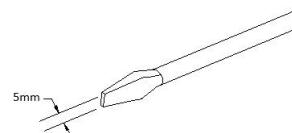
- The power supply on the module system side and that on the field side should be wired separately. Mixing should be avoided. PE must be reliably grounded.
- PE should be grounded reliably.

Wiring tool required

The power supply and signal line terminals adopt the screwless design, and the installation and removal of the cables can be operated with a slotted screwdriver (size: $\leq 3\text{mm}$).



The bus interface is an RS-485 DP communication 9-pin socket, and a Profibus bus connector is required between the module and the communication cable.



Insert the connector into the bus connector of the coupler after aligning the connector with the socket, and then tighten the screws on the connector with a slotted screwdriver. Both the installation and removal of the connector can be operated with a slotted screwdriver (size: $\leq 5\text{mm}$).

Stripping Length Requirements

The recommended cable stripping length for the power and signal line terminals is 10 mm.



Wiring method

For single stranded hard wires, after stripping the corresponding length of wire, press down the button while inserting the single stranded wire.

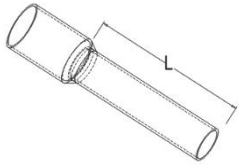


Multi-stranded flexible wires, after stripping the corresponding length of wire, can be directly connected or supporting the use of the corresponding standard specifications of the cold compression end (tube-type insulated terminal, the

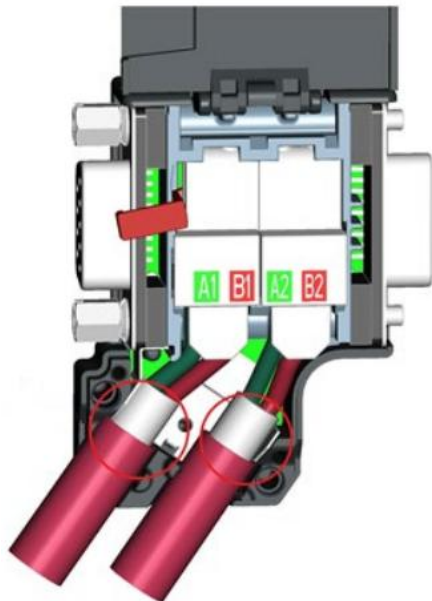


reference specifications are shown in the table below), press down the button at the same time the line will be inserted.

Terminal specifications are shown in the following table:

Tube Insulation End Specification Sheet		
Specification	Model	Cable section area (mm ²)
 <p>Length of tubular insulated terminal L ≥ 10 mm</p>	E0310	0.3
	E0510	0.5
	E7510	0.75
	E1010	1.0
	E1510	1.5

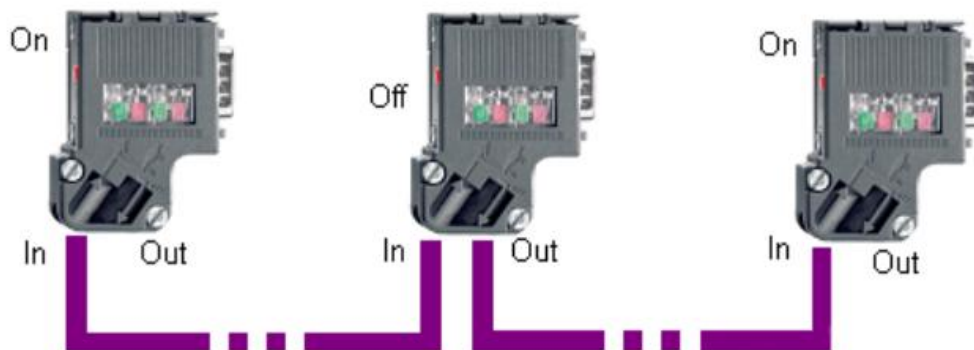
Bus connector wiring method



The bus connector and the communication cable need to be connected to each other as shown in the figure on the left, steps are as follows:

1. Strip the insulation of the communication cable by about 5mm with a wire stripping tool.
2. Insert the two wires of the communication cable into the junction box, the green wire corresponds to ports A1 and A2 and the red wire corresponds to ports B1 and B2.
3. Once the wire insertion is complete, fix the wires with the screws on the junction box.
4. Press the cable into the groove at the bottom of the junction box.
5. Cover the connector housing cover and tighten with screws.
6. There is a red toggle switch on the Profibus connector. When use it, needs to toggle the toggle switches on the first and last two connecting terminal devices to the ON position, and the bus connector at the middle end to the OFF position.

- When multiple couplers are connected, the bus connector is wired as shown below.



Note: The bus connector at the end of the network should have the DP cable connected to the "In" connector and the terminating resistor should be in the "On" position. The terminating resistor at the middle of the network should be placed in the "Off" position.

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

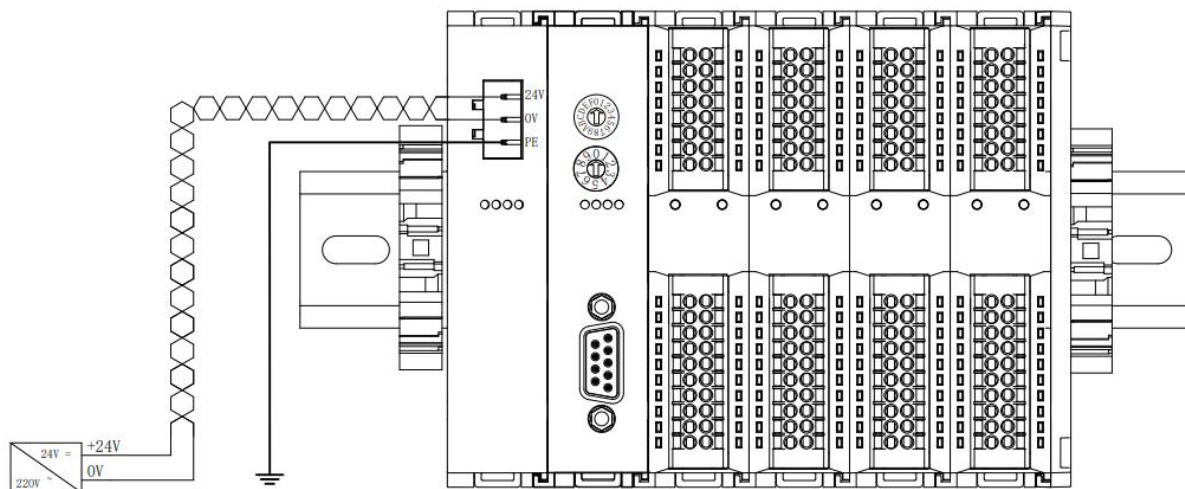
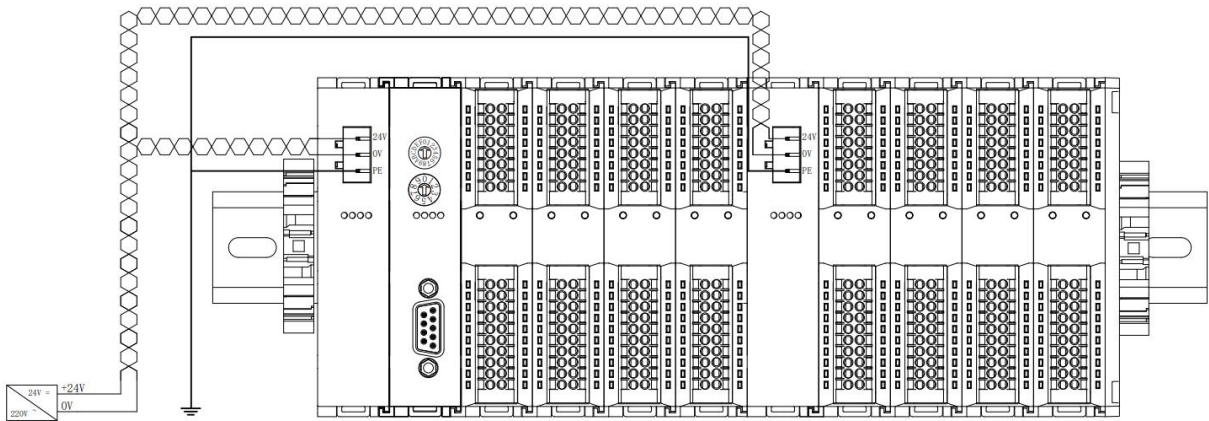


Figure 6-1

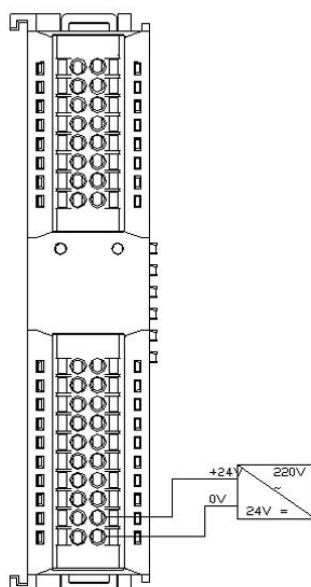
- Figure 6-2: Wiring diagram of coupler, IO modules, power module, IO modules, and power module in sequence



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

Refer to the corresponding I/O module wiring diagram and wiring method to press the signal wire cable into the terminal block.

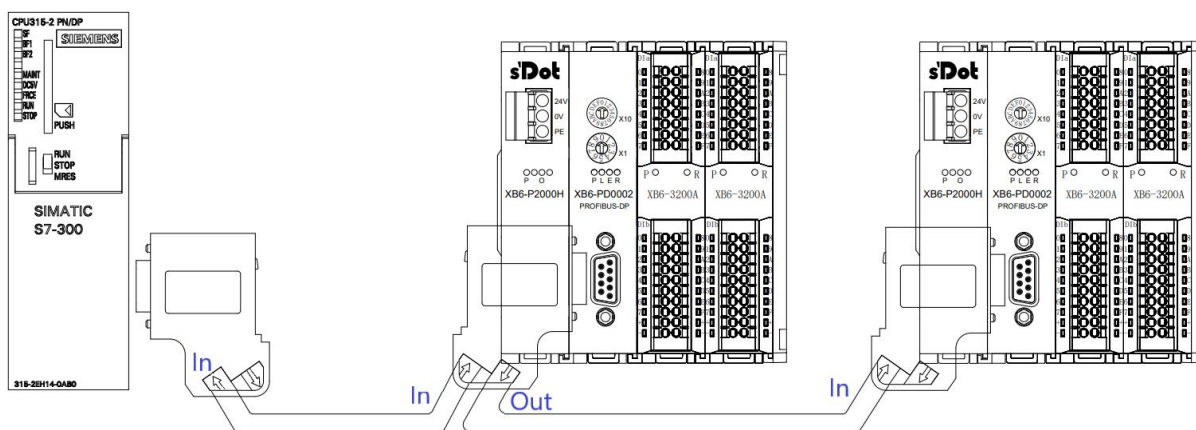
The load power supply is powered by 24 VDC power supply. Referring to the wiring method, connect the power supply according to the circuit shown in the following figure (refer to [6.3 I/O Module Wiring Diagram](#) for details).



Signal terminal wiring: 16P\20P terminal

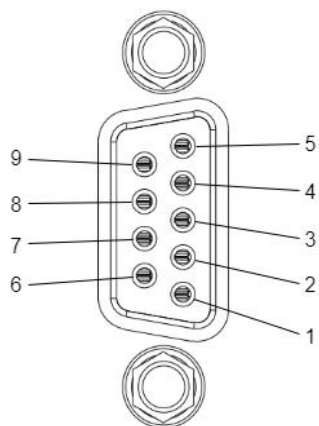
Press the signal cable into the wiring terminal by referring to the I/O module wiring diagram and wiring method.

Bus topology



Bus connection

The bus cable is recommended to use a special PROFIBUS-DP cable with the bus wiring sequence shown



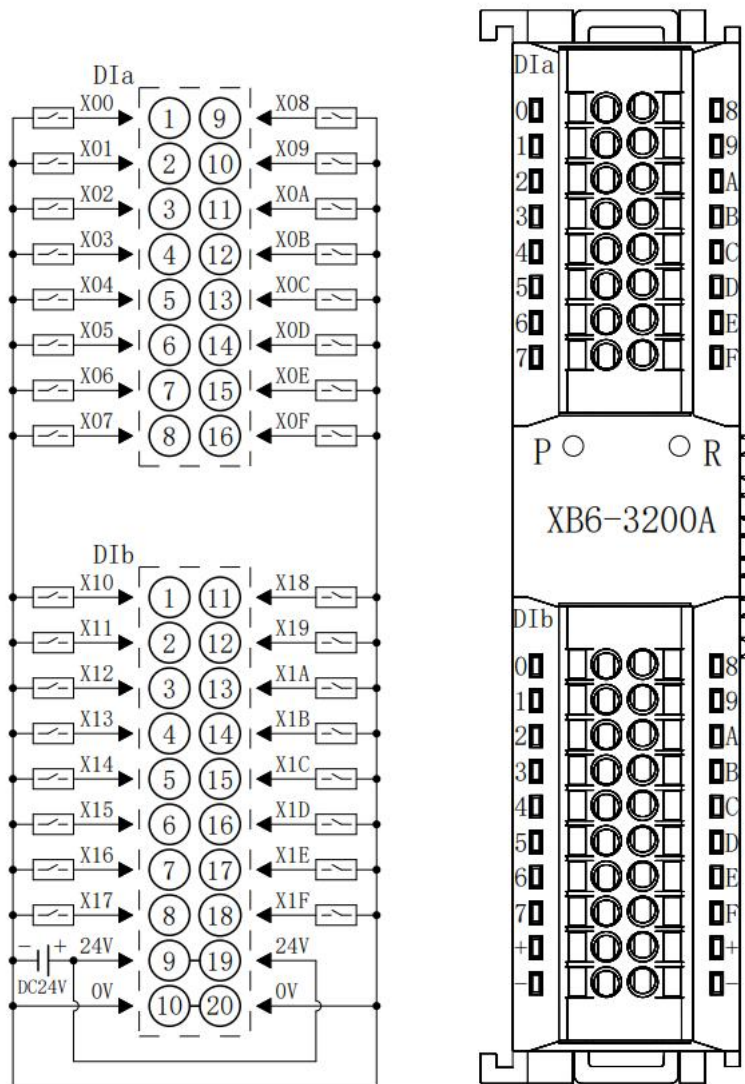
in the figure below.

Pin	clarification
1	Reserved
2	Reserved
3	RxD/TxD-P: Data cable B
4	CNTR-P: RTS
5	DGND: Ground for data signals and VPs
6	VP: +5V supply for bus termination resistors only.
7	Reserved
8	RxD/TxD-P: Data Line A
9	Reserved
housings	Grounding Connector

6.3 I/O module wiring diagram

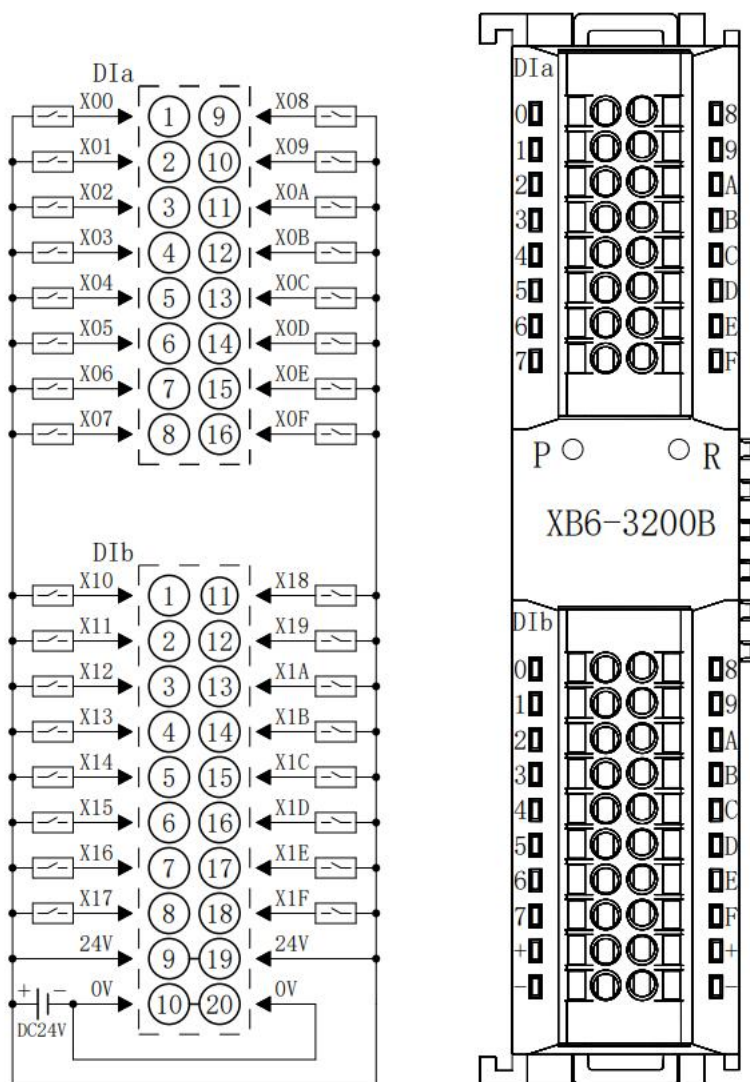
XB6-3200N, XB6-0032AN, XB6-0032BN wiring diagrams refer to the XB6 Series_MIL Connector Type IO User's Manual.

6.3.1 XB6-3200A



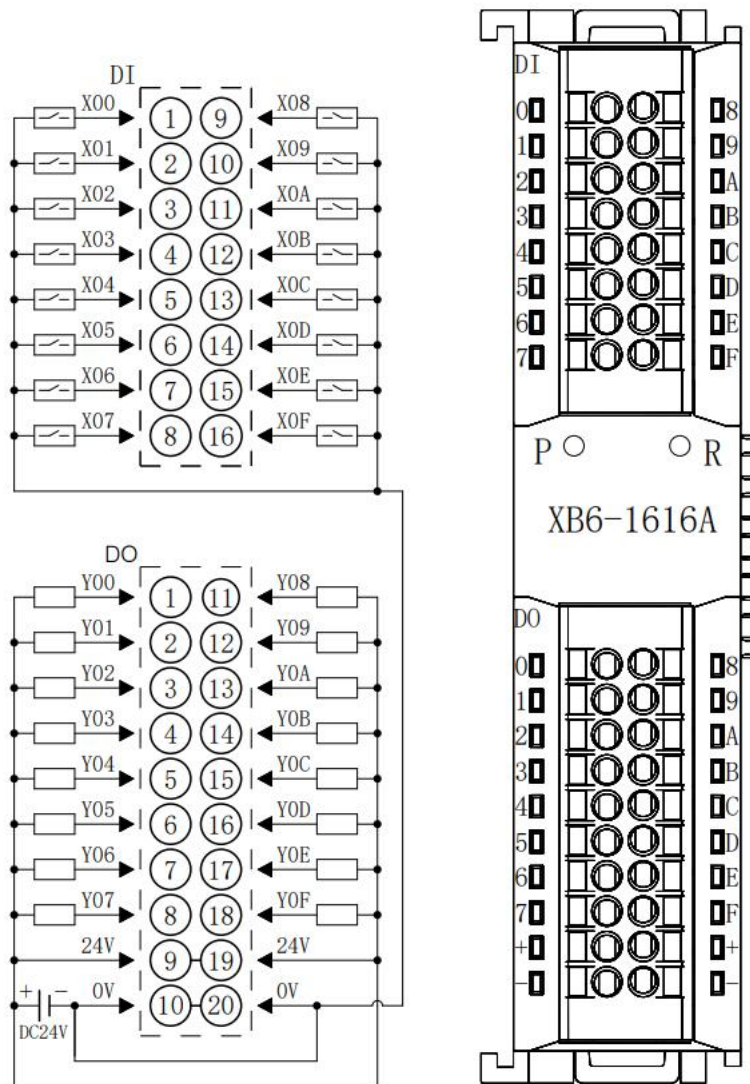
24V internal conduction; 0V internal conduction

6.3.2 XB6-3200B



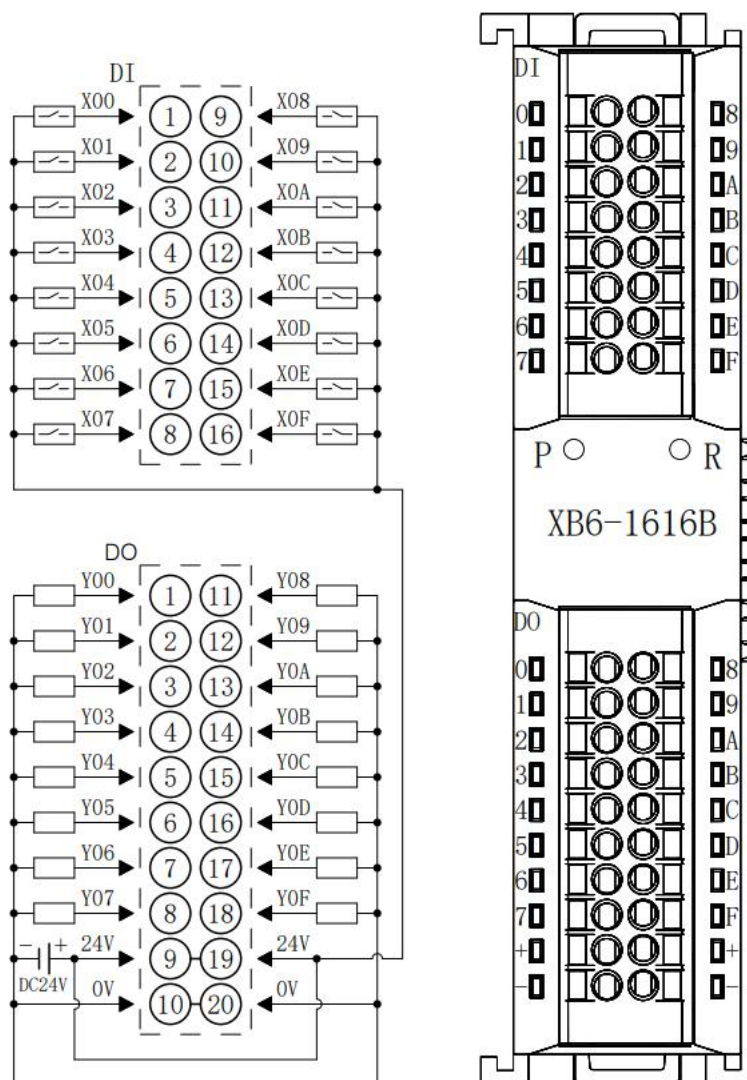
24V internal conduction; 0V internal conduction

6.3.3 XB6-1616A



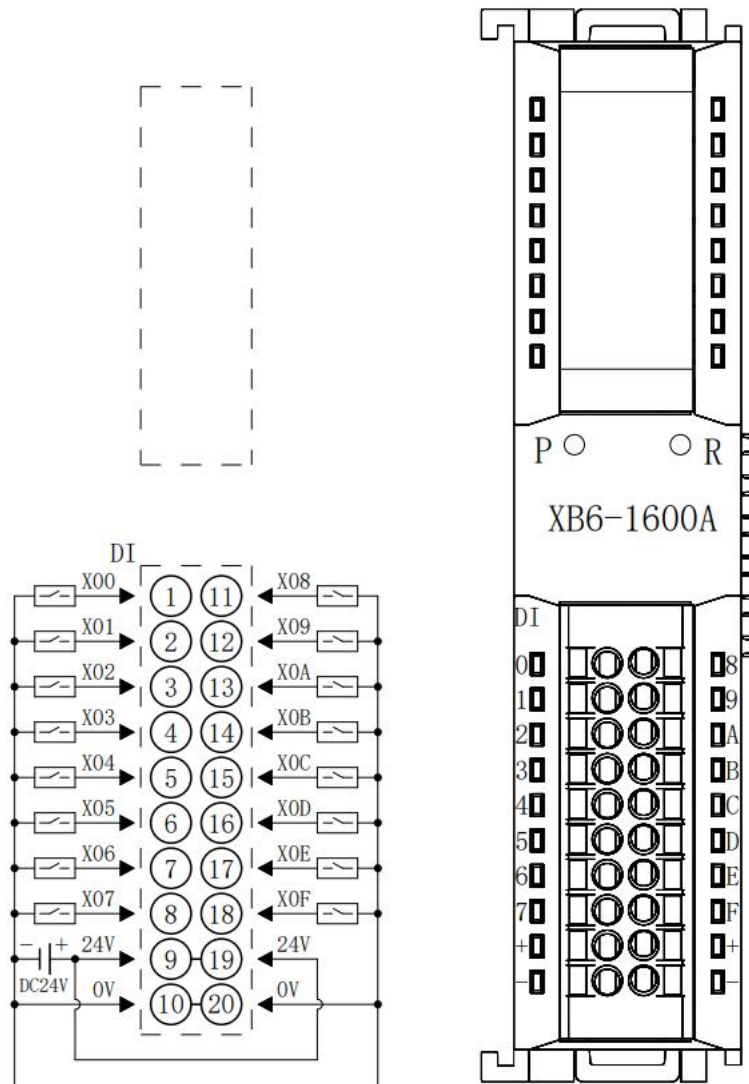
24V internal conduction; 0V internal conduction

6.3.4 XB6-1616B



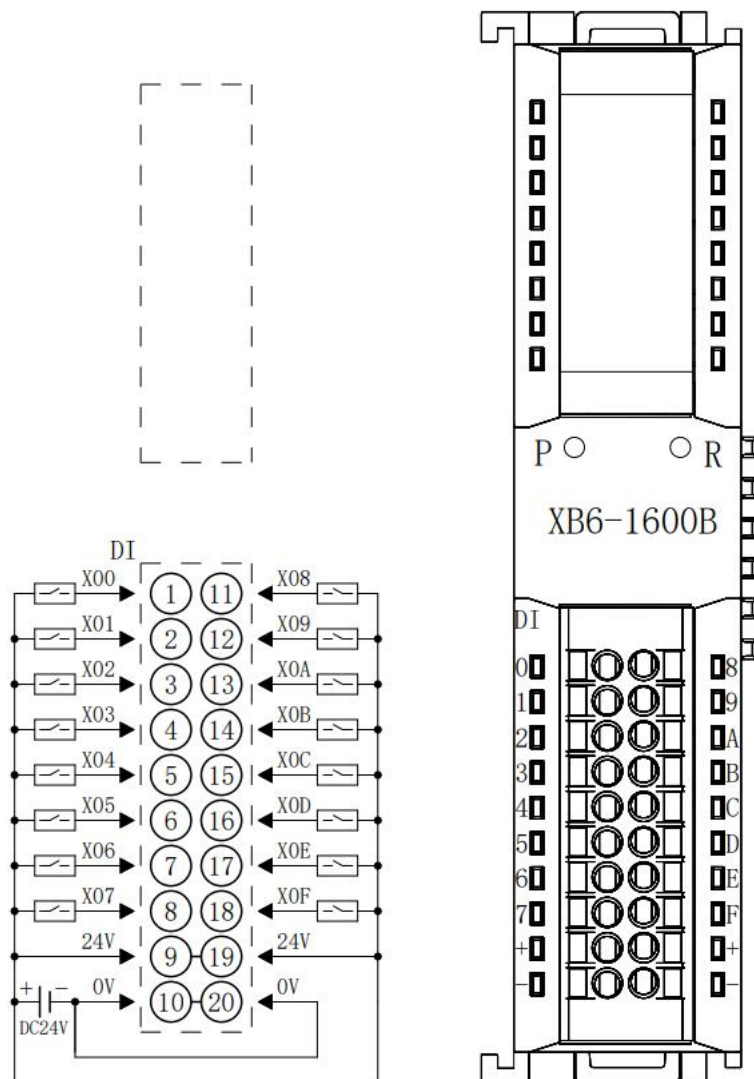
24V internal conduction; 0V internal conduction

6.3.5 XB6-1600A



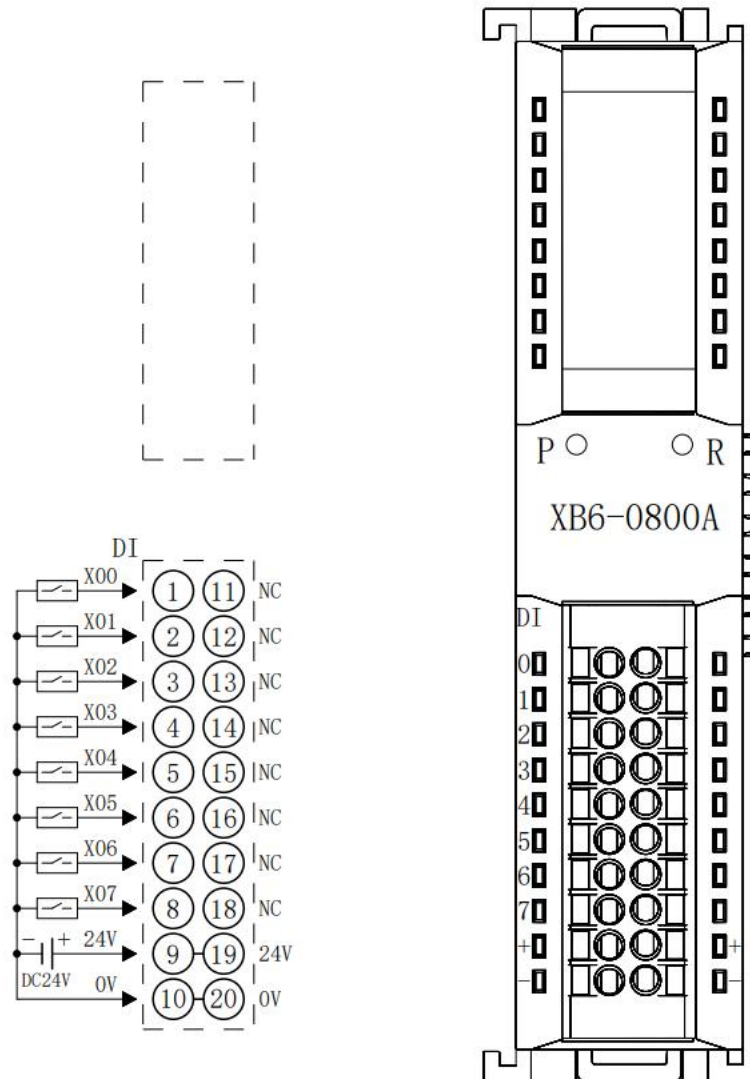
24V internal conduction; 0V internal conduction

6.3.6 XB6-1600B



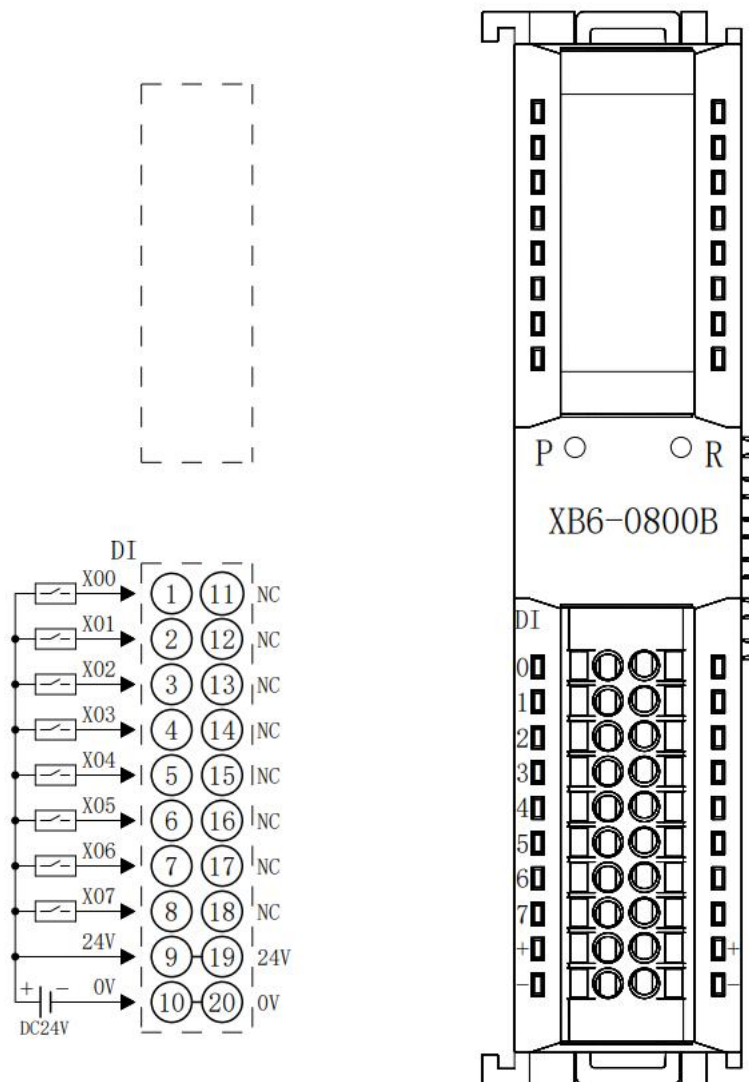
24V internal conduction; 0V internal conduction

6.3.7 XB6-0800A



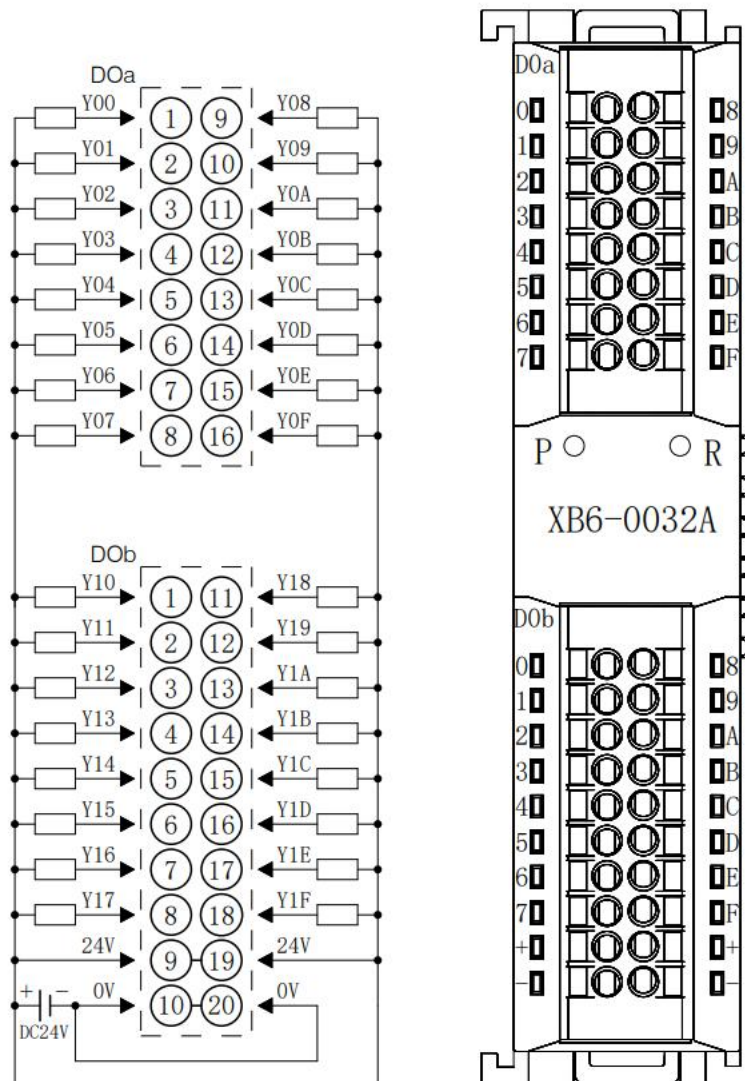
24V internal conduction; 0V internal conduction

6.3.8 XB6-0800B



24V internal conduction; 0V internal conduction

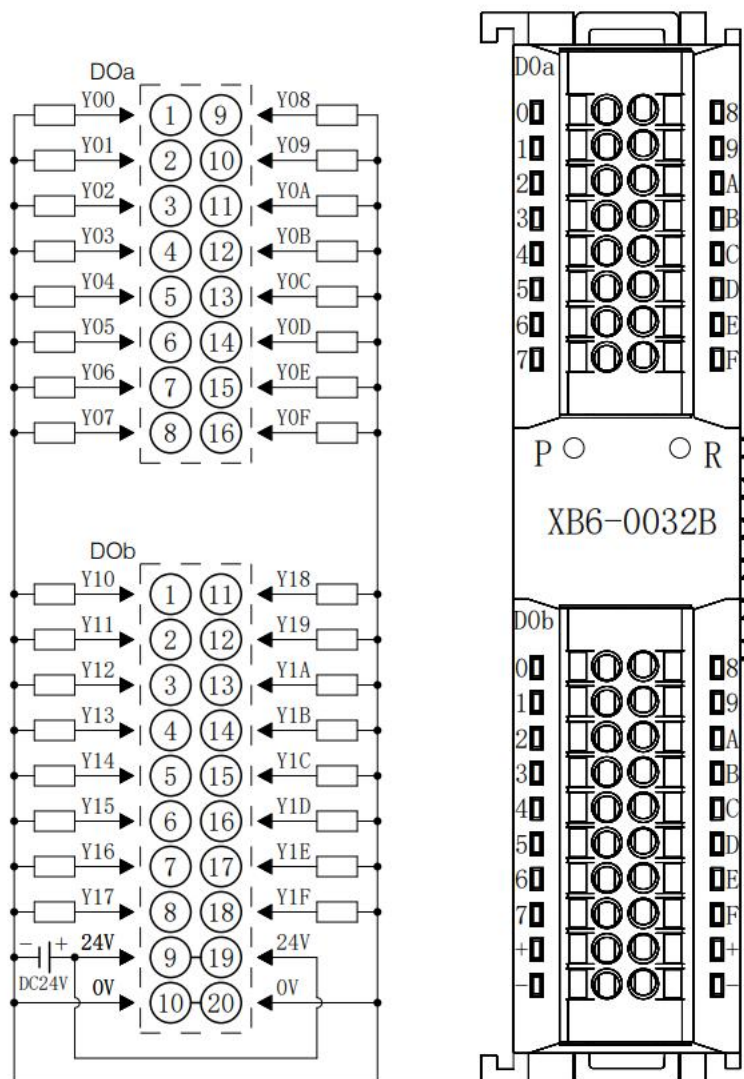
6.3.9 XB6-0032A



※24V internal conduction; 0V internal conduction

※The load common terminal power supply must use the same power supply as the module

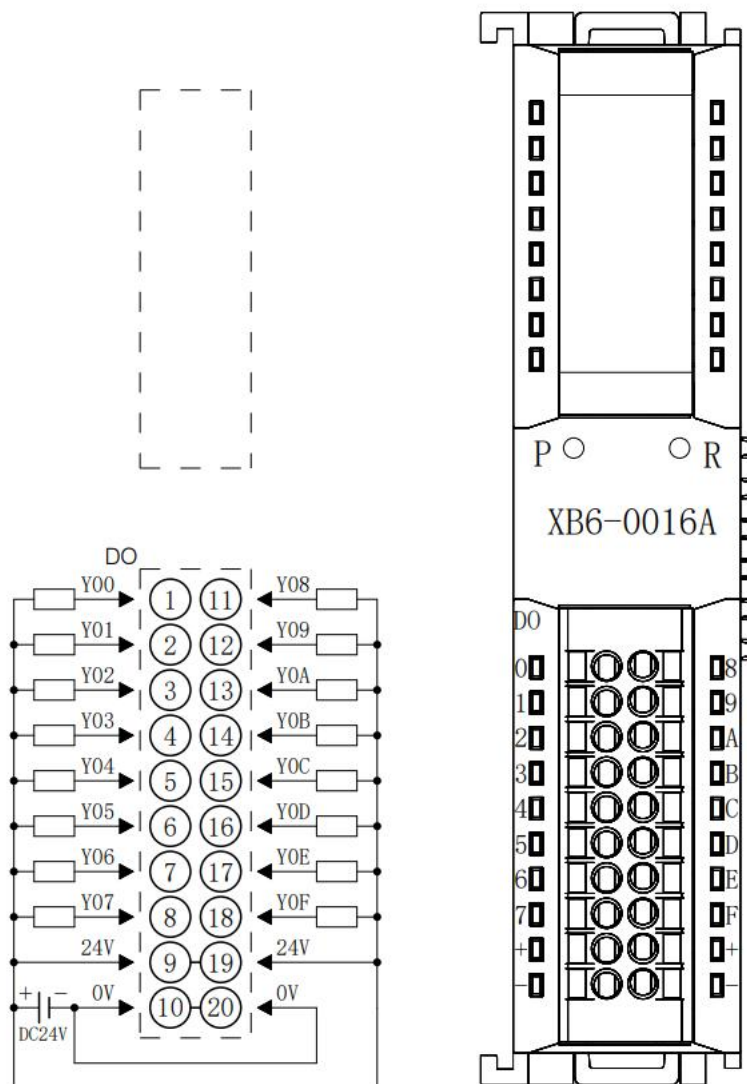
6.3.10 XB6-0032B



※24V internal conduction; 0V internal conduction

※The load common terminal power supply must use the same power supply as the module

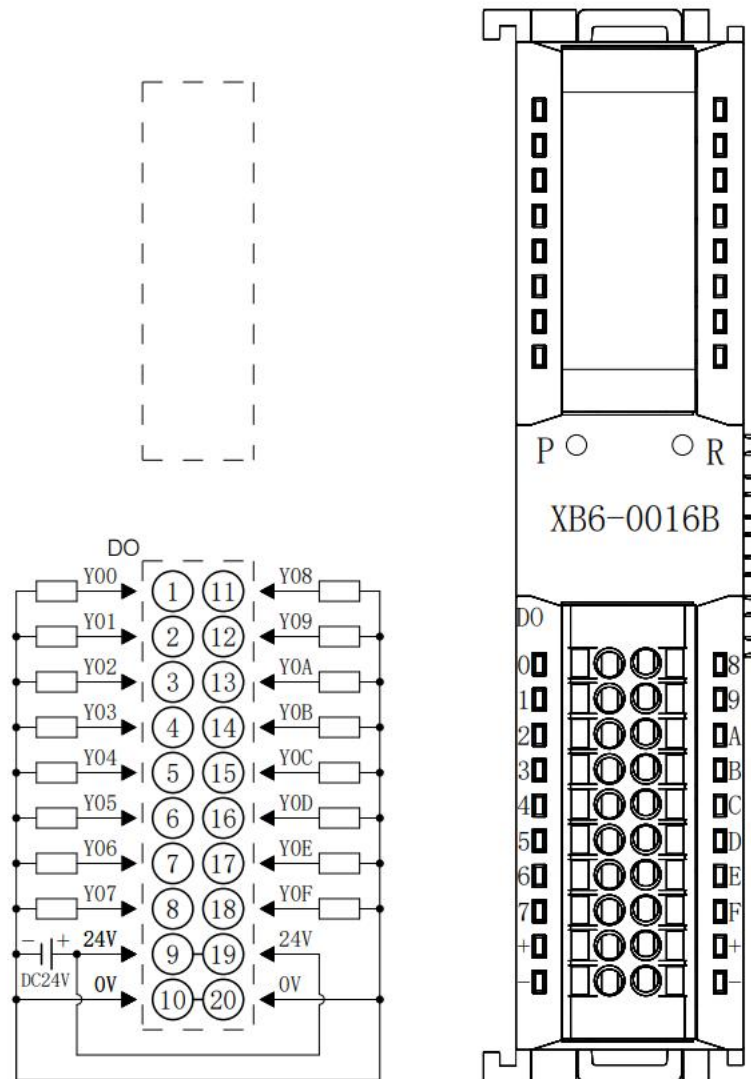
6.3.11 XB6-0016A



※24V internal conduction; 0V internal conduction

※The load common terminal power supply must use the same power supply as the module

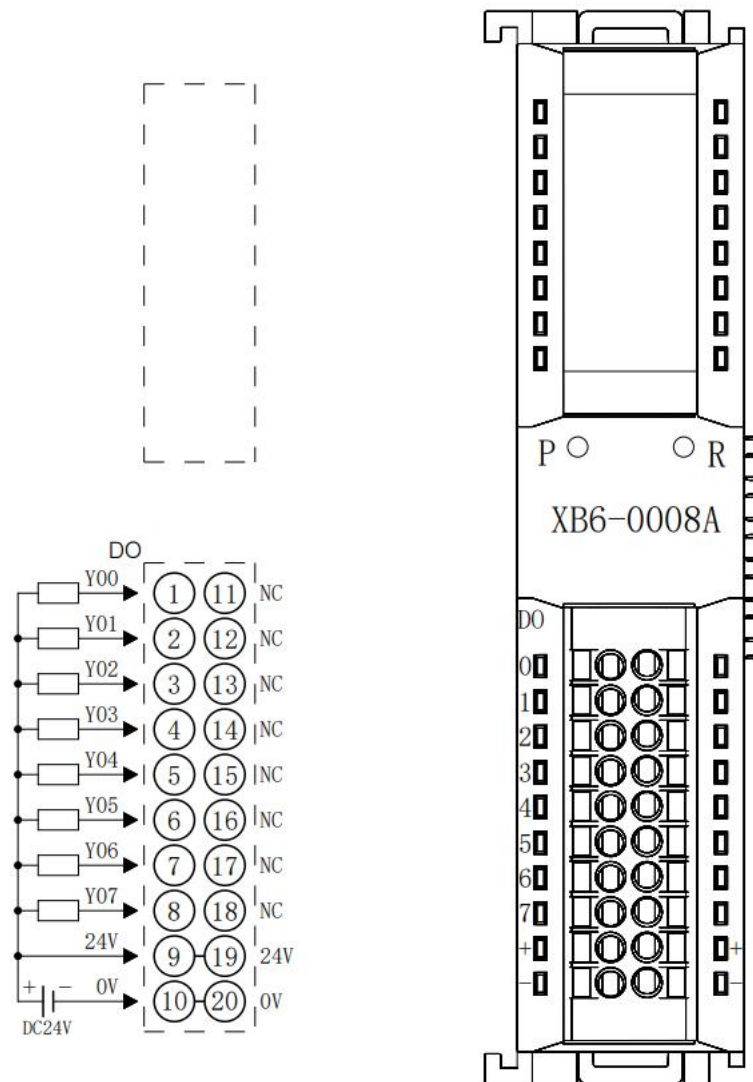
6.3.12 XB6-0016B



※24V internal conduction; 0V internal conduction

※The load common terminal power supply must use the same power supply as the module

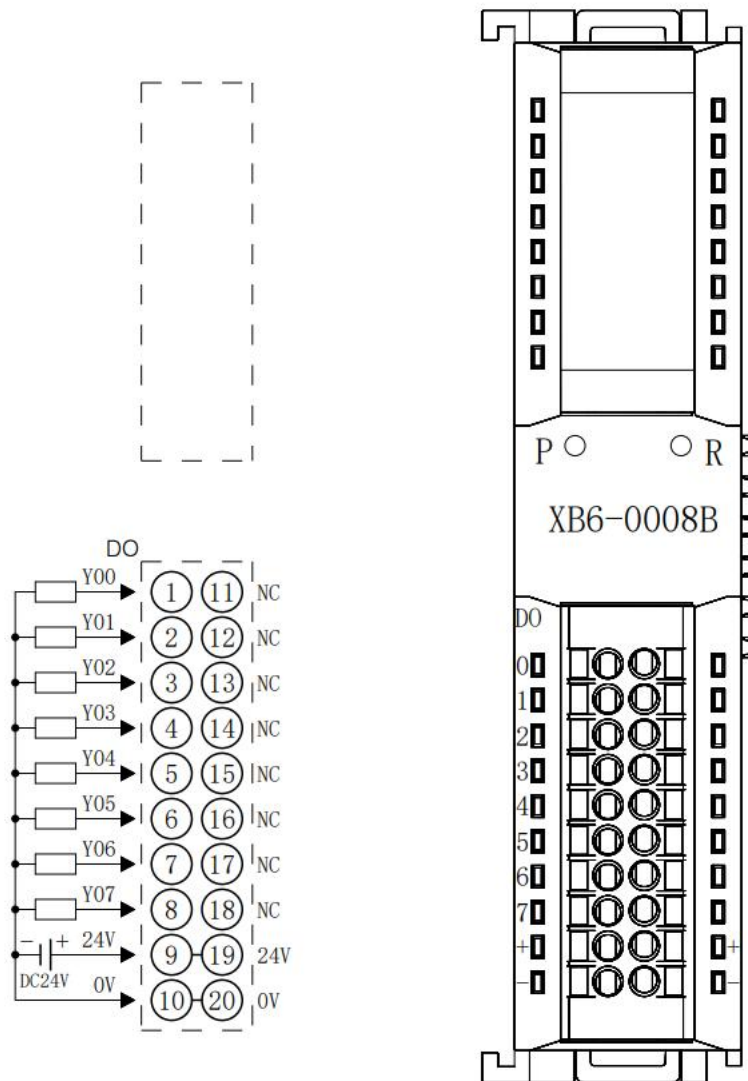
6.3.13 XB6-0008A



※24V internal conduction; 0V internal conduction

※The load common terminal power supply must use the same power supply as the module

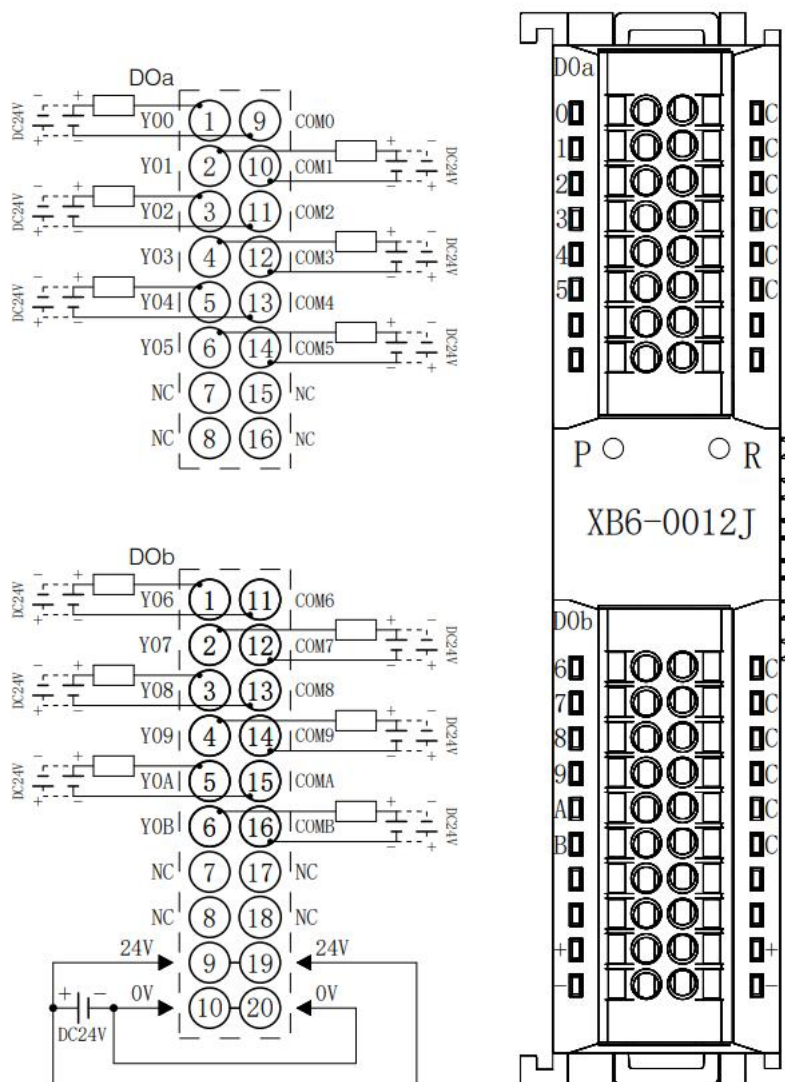
6.3.14 XB6-0008B



※24V internal conduction; 0V internal conduction

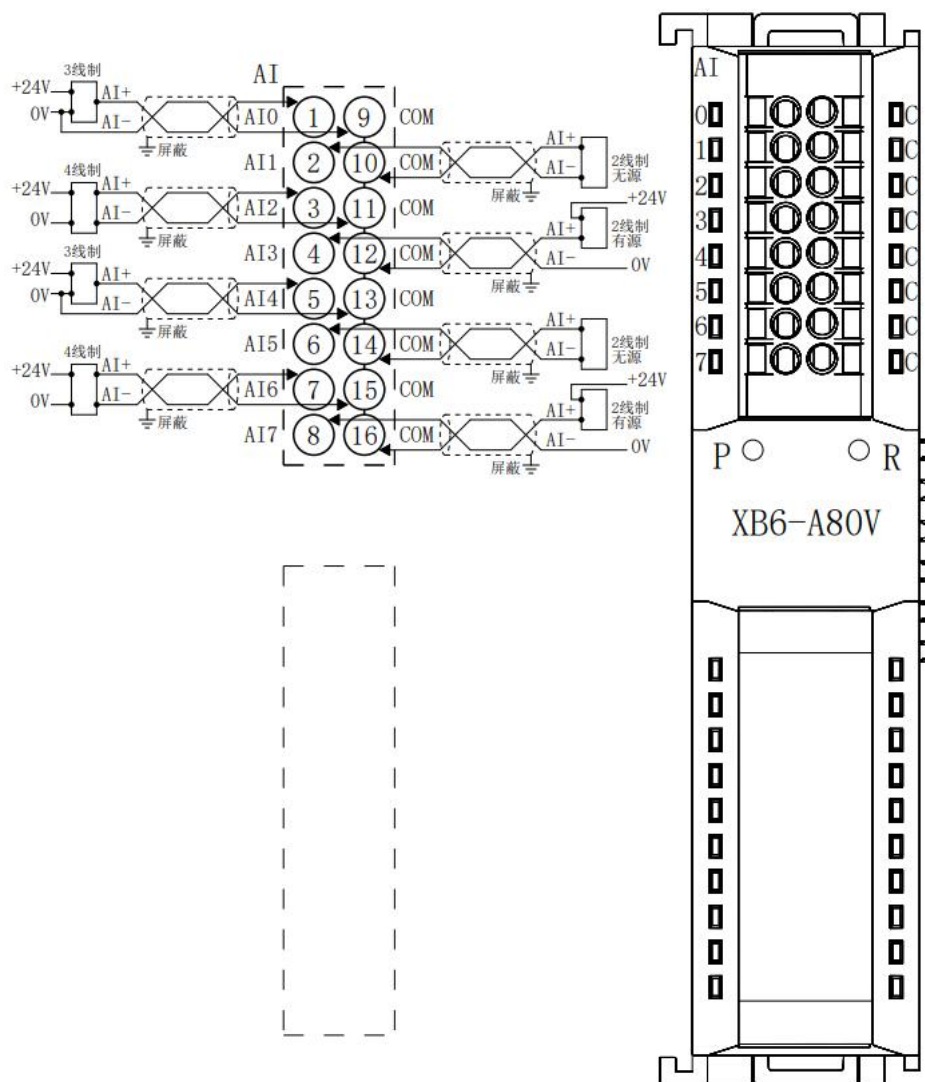
※The load common terminal power supply must use the same power supply as the module

6.3.15 XB6-0012J



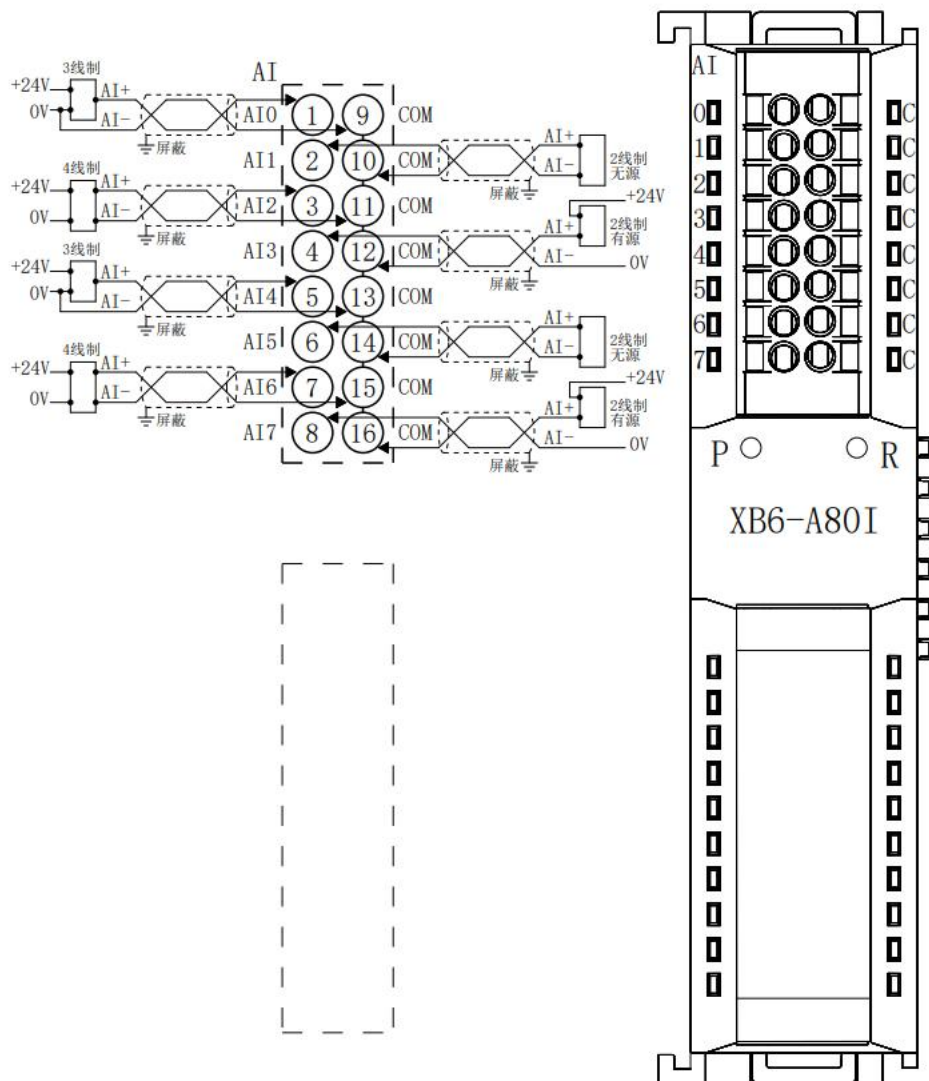
- ※24V internal conduction; 0V internal conduction
- ※The load common terminal power supply must use the same power supply as the module
- ※COM can be connected to the positive or negative pole, no internal communication, DC0-48V is supported

6.3.16 XB6-A80V

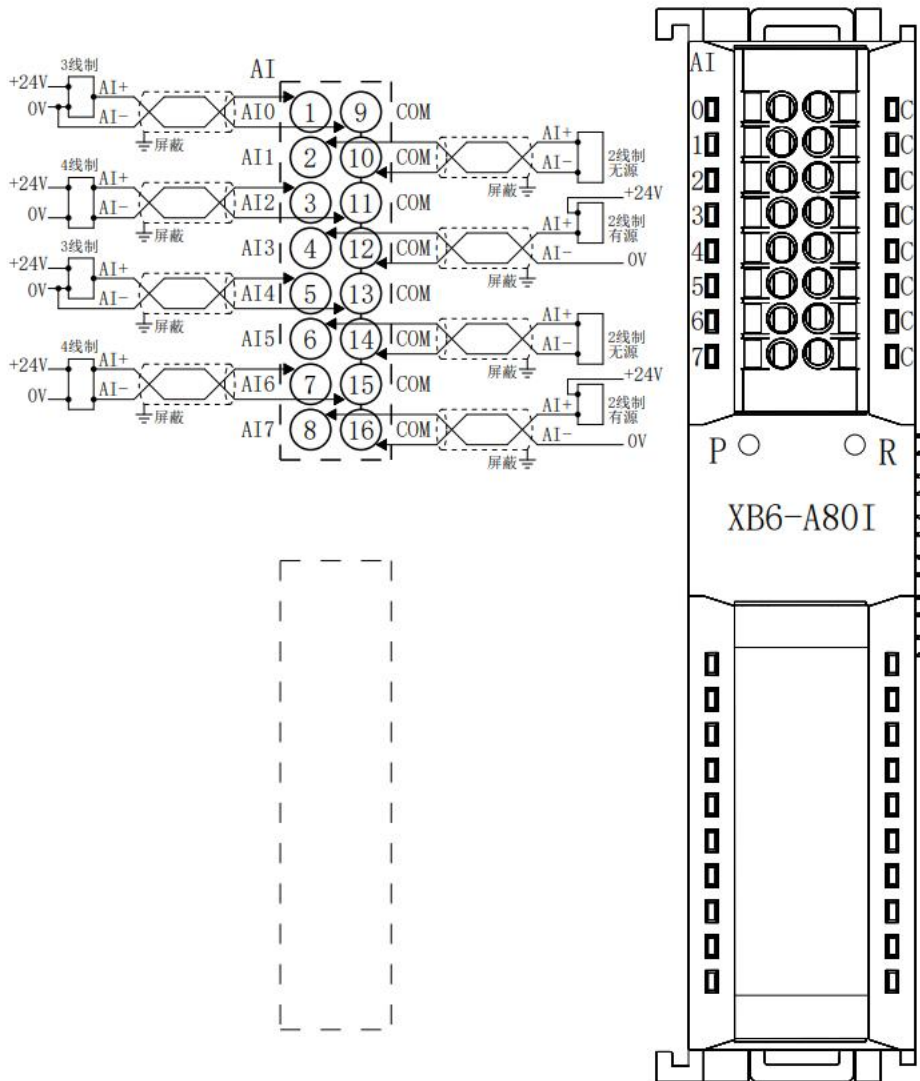


- ※COM internal conduction
- ※All channel loads require power

6.3.17 XB6-A80I

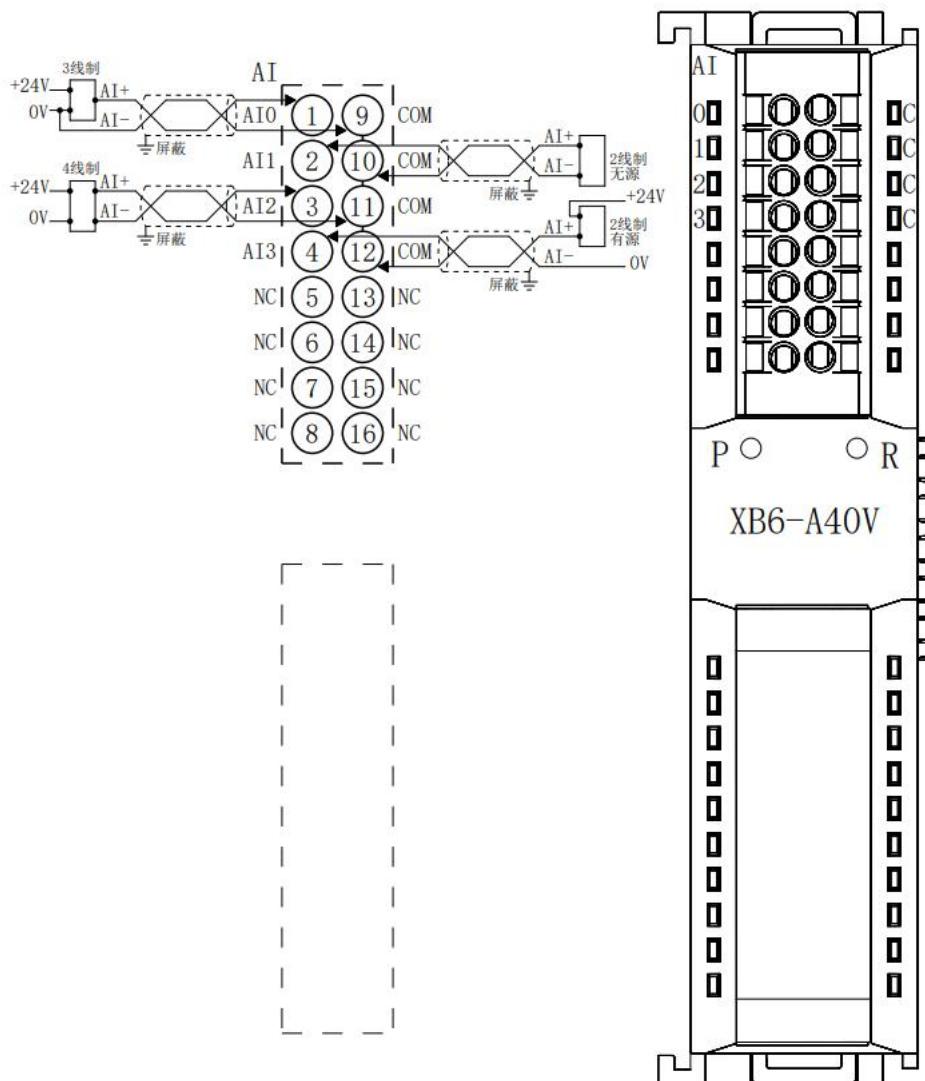


- ※COM internal conduction
- ※All channel loads require power



- ※COM internal conduction
- ※All channel loads require power

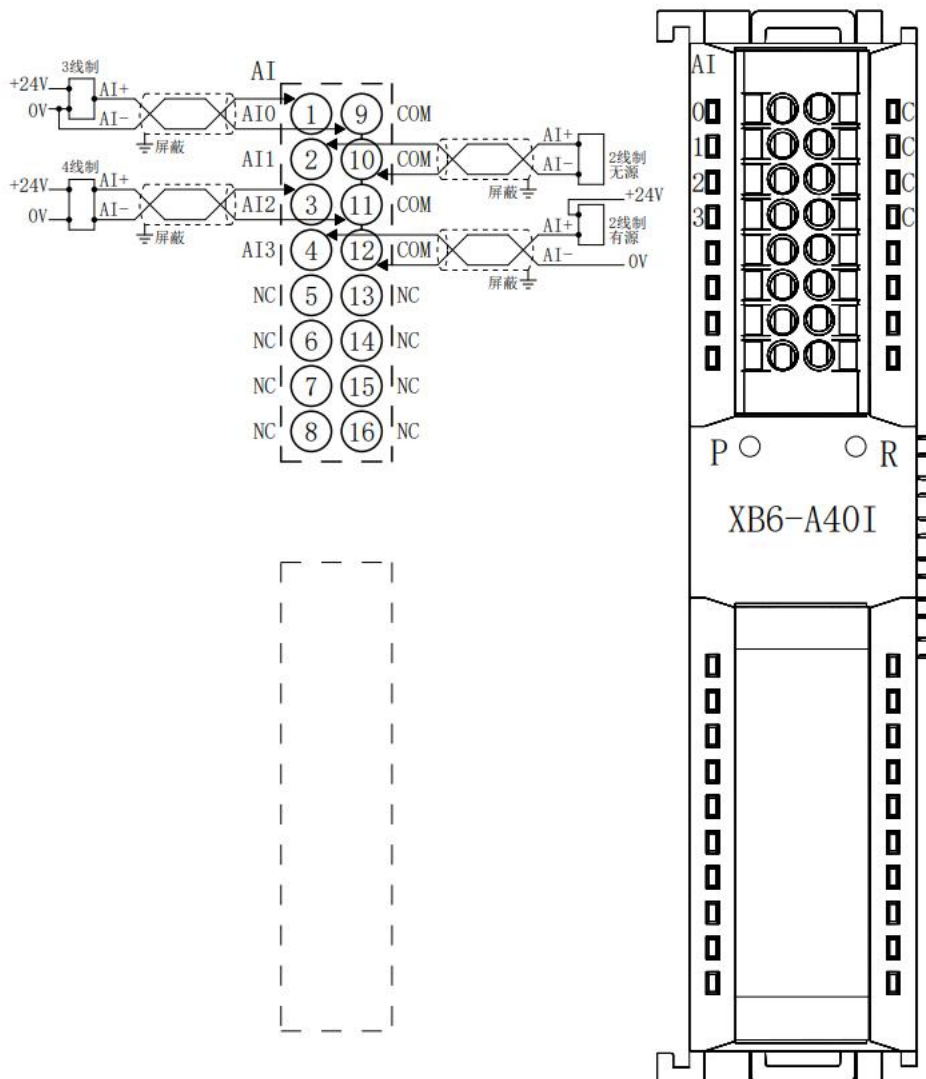
6.3.18 XB6-A40V



※COM internal conduction

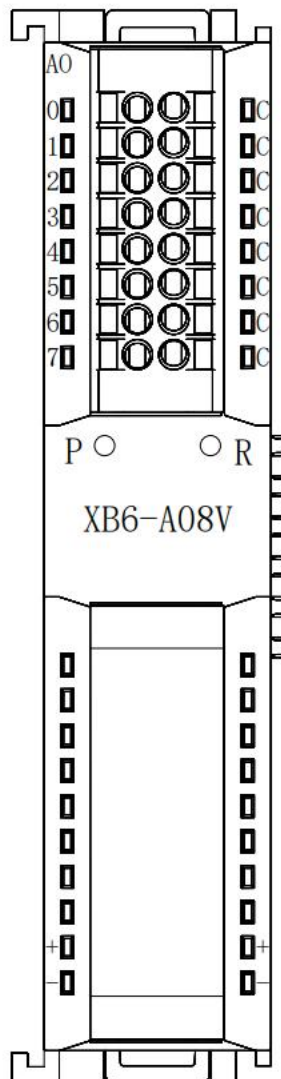
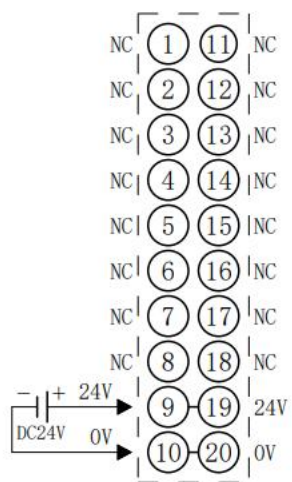
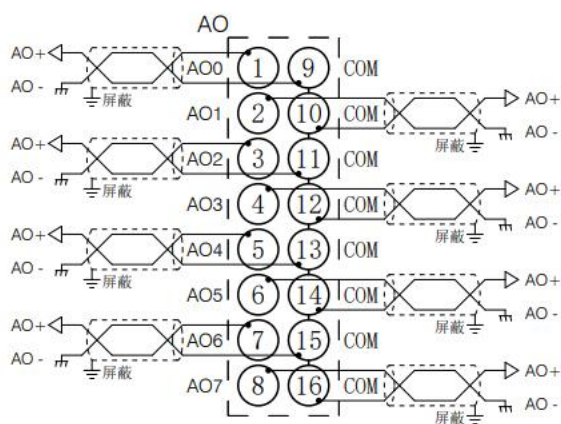
※All channel loads require power

6.3.19 XB6-A40I



- ※COM internal conduction
- ※All channel loads require power

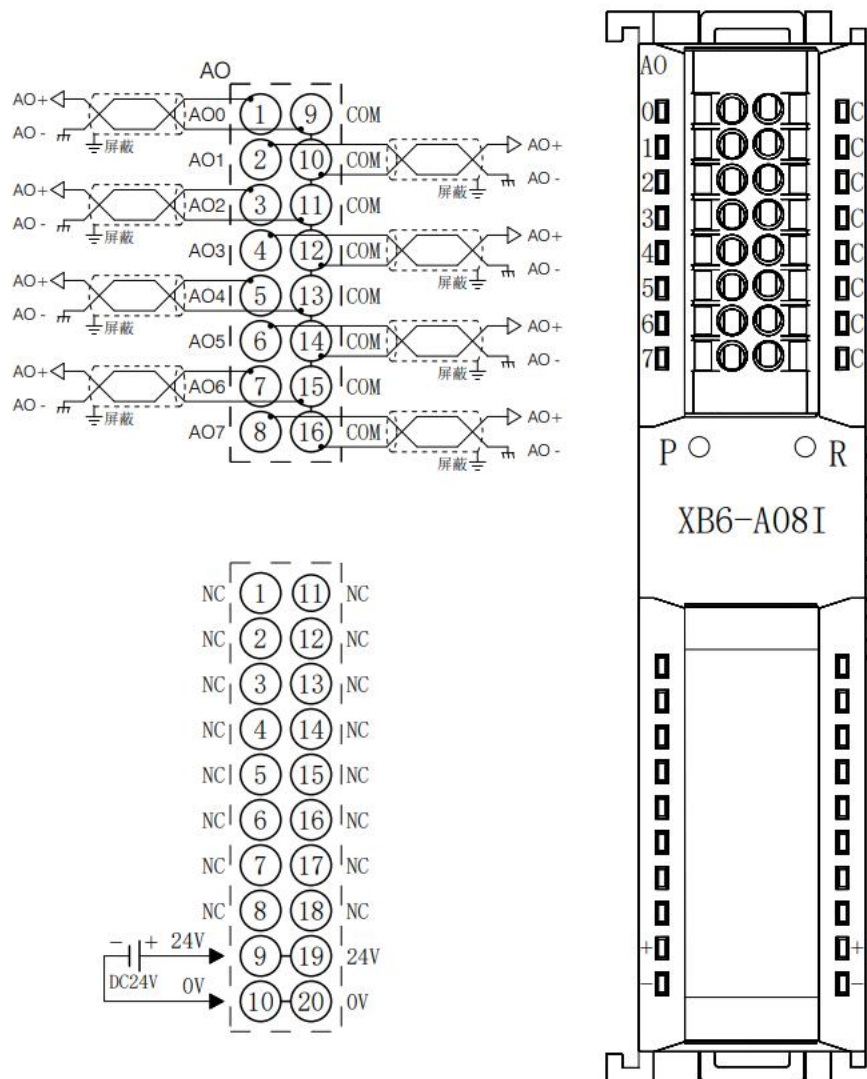
6.3.20 XB6-A08V



※COM internal conduction

※24V internal conduction; 0V internal conduction

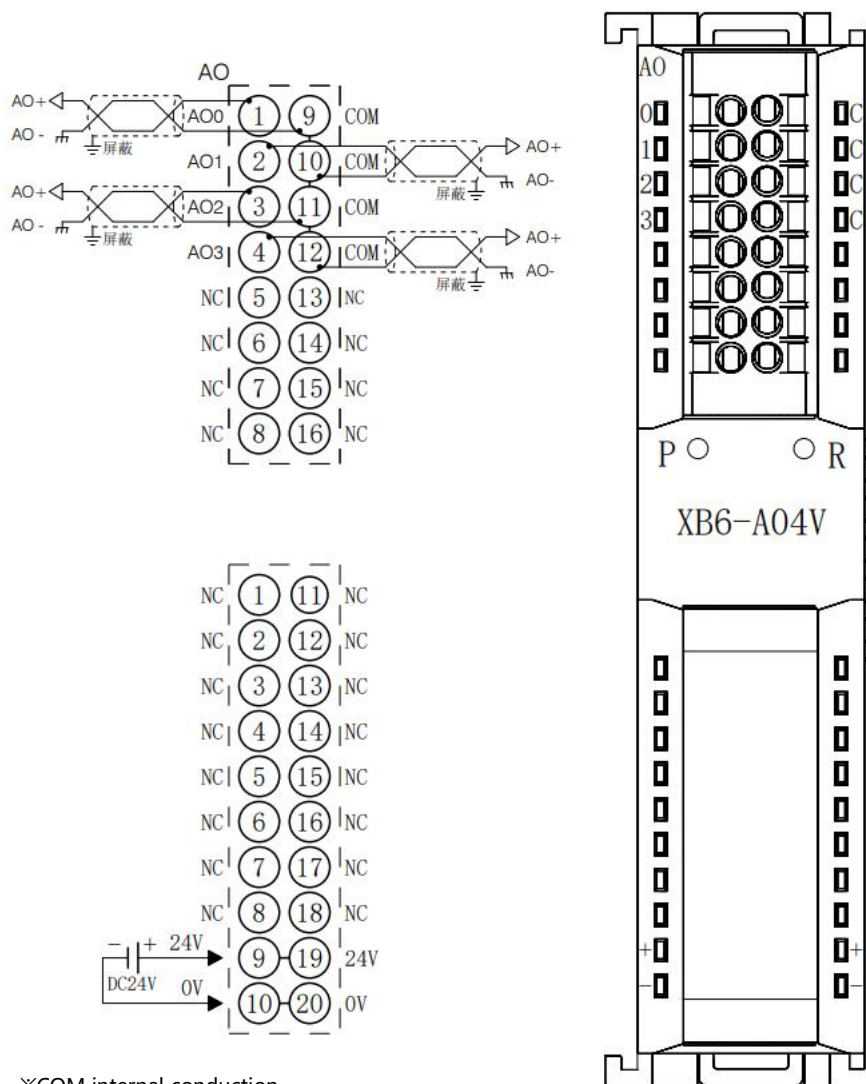
6.3.21 XB6-A08I



※COM internal conduction

※24V internal conduction; 0V internal conduction

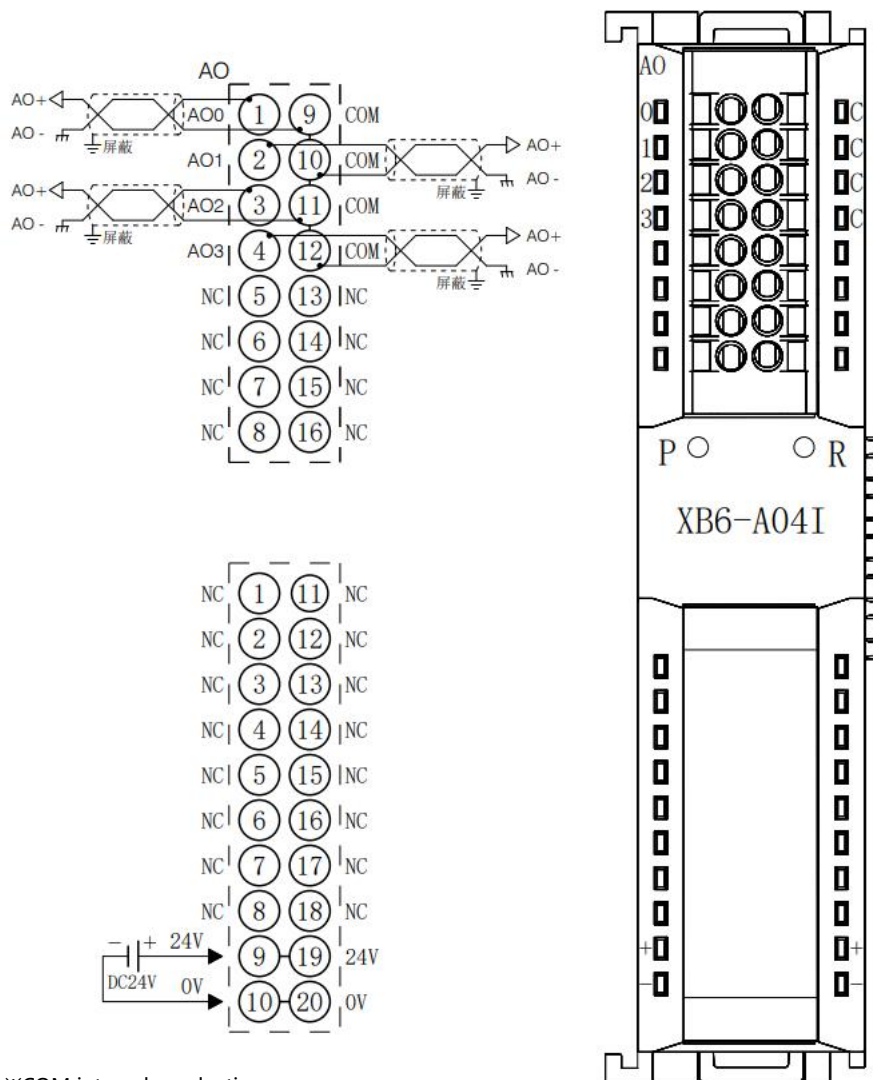
6.3.22 XB6-A04V



※COM internal conduction

※24V internal conduction; 0V internal conduction

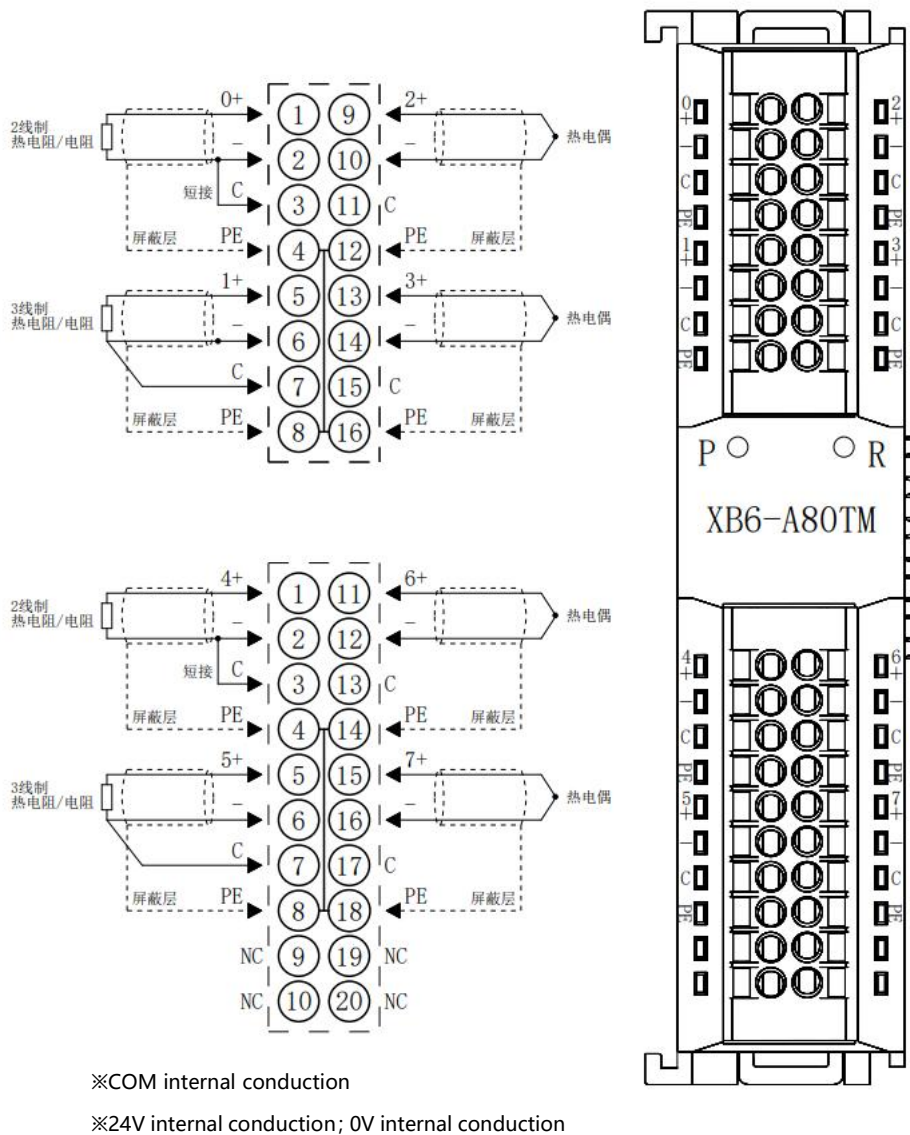
6.3.23 XB6-A04I



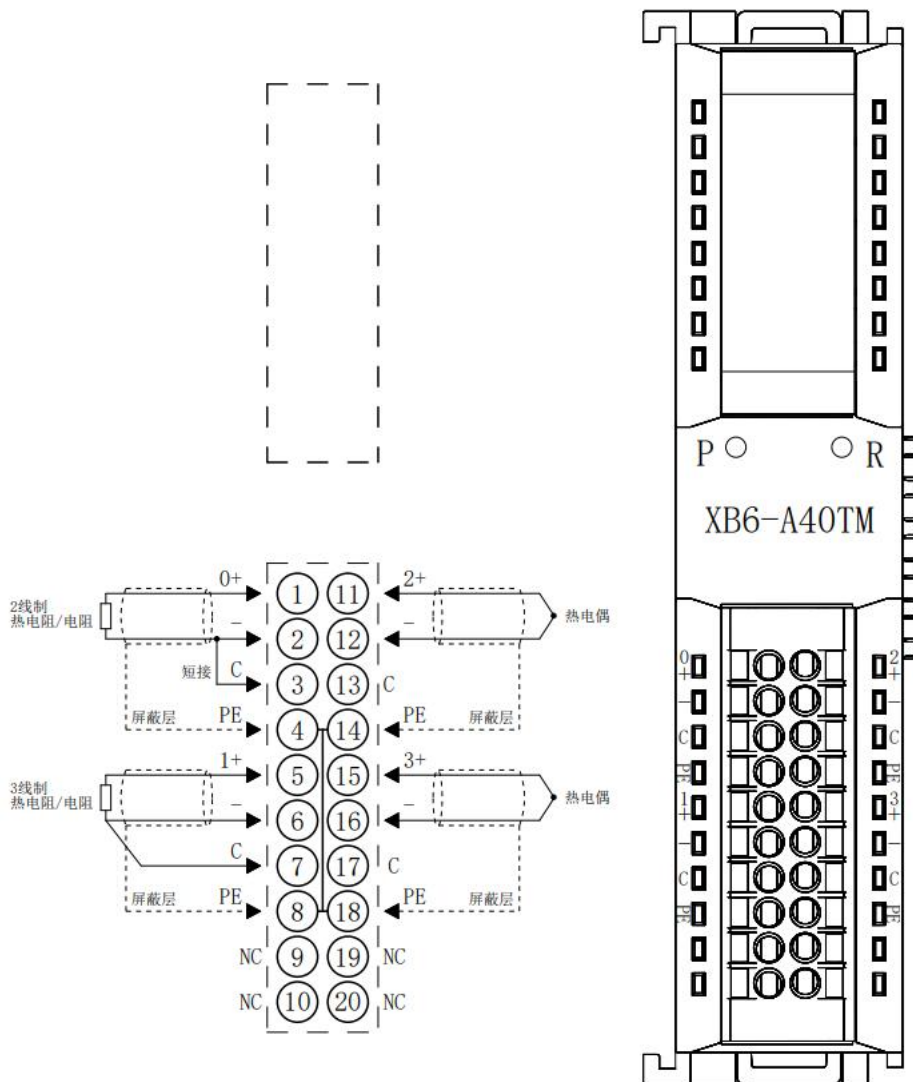
※COM internal conduction

※24V internal conduction; 0V internal conduction

6.3.24 XB6-A80TM



6.3.25 XB6-A40TM

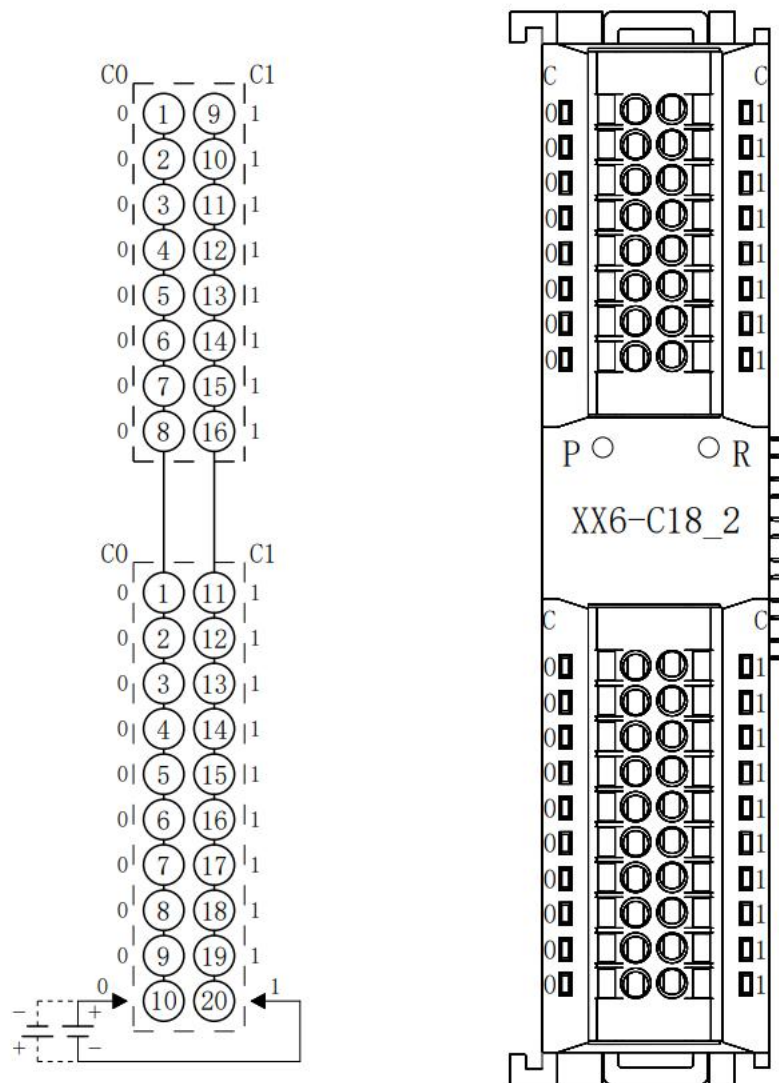


※PE internal conduction

※2-wire thermal resistor needs to short-circuit "-" and "C" externally

※4-wire sensors need to be changed to 2-wire or 3-wire access

6.4 Common Expansion Module Wiring Diagram



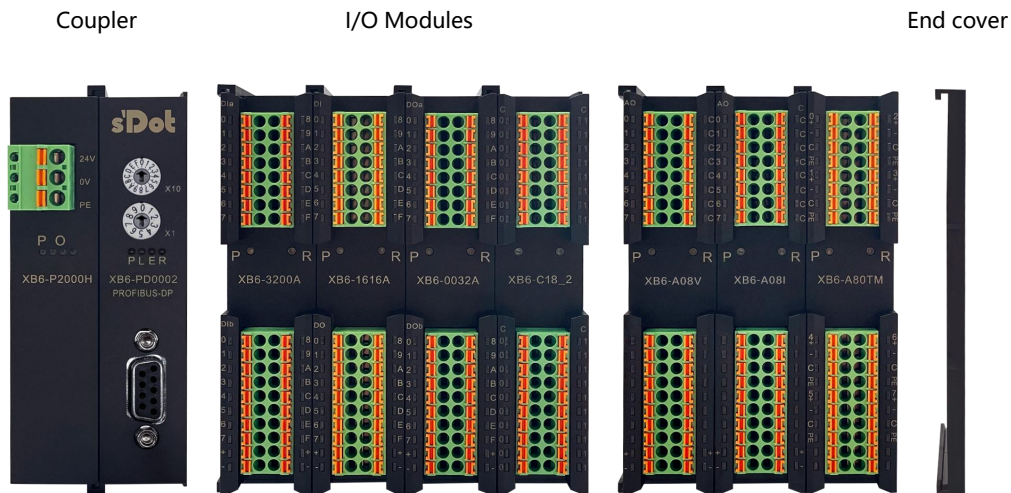
※CO column is internally conductive;
 CI column is internally conductive

7 Operation

7.1 Module application

The products are applied using a combination of couplers, I/O modules, and end caps in the following two combinations.

Product combination type I (coupler, I/O module, end cap)



Product combination type II (coupler, I/O module, power supply module, I/O module, end cover)

Coupler

I/O Module

Power Module

I/O Module

End cover

**Refer to the following principles for the number of I/O module configurations:**

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 6.

Limitations on the number of power supply and extended power module configurations:

1. If the number of I/O modules configured in the system exceeds 10, it is necessary to increase the expansion power module, and the number of I/O modules configured after the expansion power module is ≤ 12 .

7.2 I/O module parameter 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

7.2.2 Analog Filter configuration

- 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)

7.2.3 Analog range selection

Analog support range selection function, all channels unified configuration, the specific range see "[analog parameters](#)".

See [7.3 Bus Module Configuration Description for parameter configuration methods](#).

7.3 Bus Module Configuration Description

7.3.1 Application in TIA Portal V17 software environment

1、Preparations

- **Hardware environment**

- **Module preparation**

This description uses the XB6-PD2002ST Module Kit, XB6-1616B, XB6-A04V and end cover as examples.

- **A computer installed with TIA Portal V17 software**

- **PROFIBUS-DP special communication cable (RS485 communication cable)**

- **A Siemens PLC, this description takes S7-300 CPU315-2 PN/DP 6ES7315-2EH14-0AB0 for example**

The IP address of the computer's Ethernet interface needs to be set to ensure that it is on the same network segment as the PLC.

- **A switching power supply**

- **Module installation guide rail and fasteners**

- **Device Configuration Files**

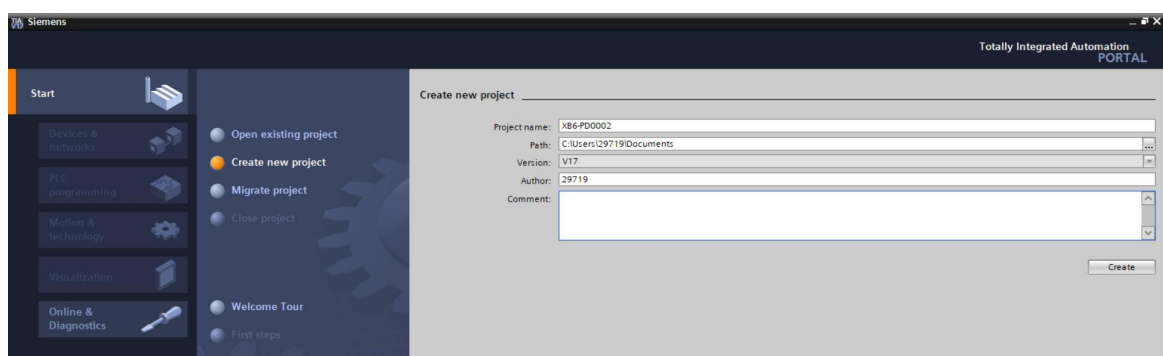
Configuration file access: <https://www.solidotech.com/documents/configfile>

- **Hardware configuration and wiring**

Please operate according to "[5 Mounting and dismounting](#)" and "[6 Wiring](#)".

2、Project Creation

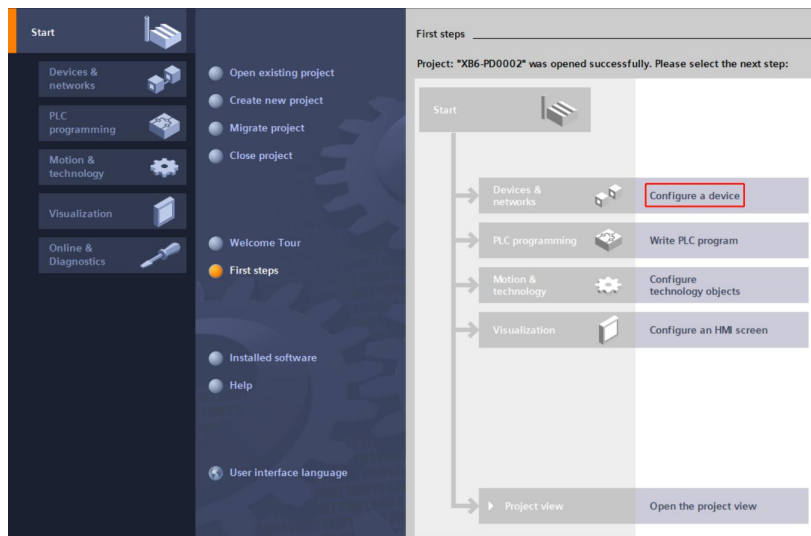
- a. Open TIA Portal V17 software, click "Create New Project", enter the information and click "Create" button, as shown below.



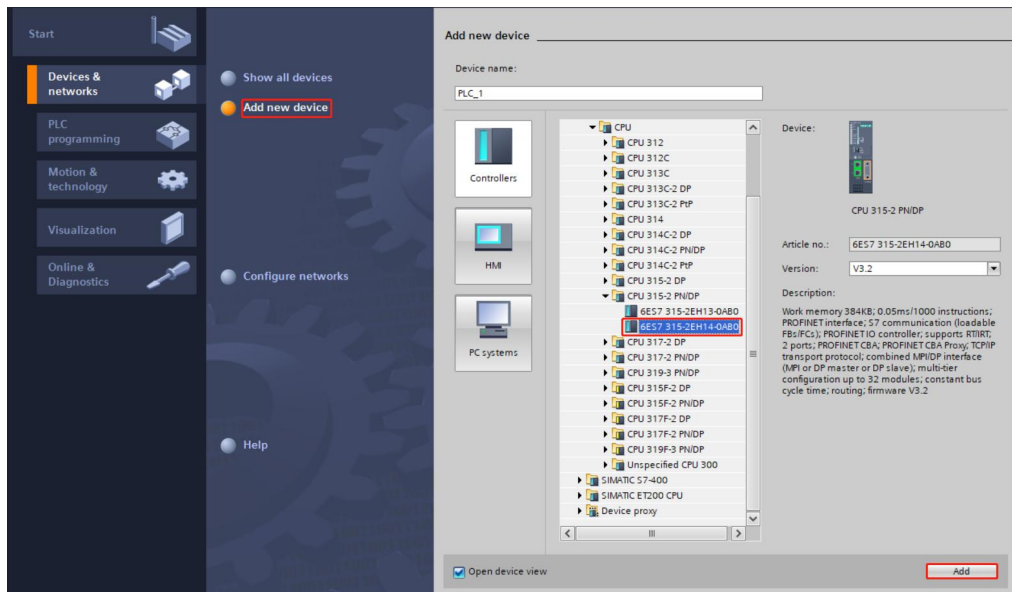
- ◆ Project name: Customize, can keep the default.
- ◆ Path: The project keeps the path, which can be kept as default.
- ◆ Version: Can keep the default.
- ◆ AUTHOR: Can keep the default.
- ◆ Comment: Customize, can keep the default.

3. Adding a PLC controller

- a. Click "Configure A Device" , as shown in the following figure.

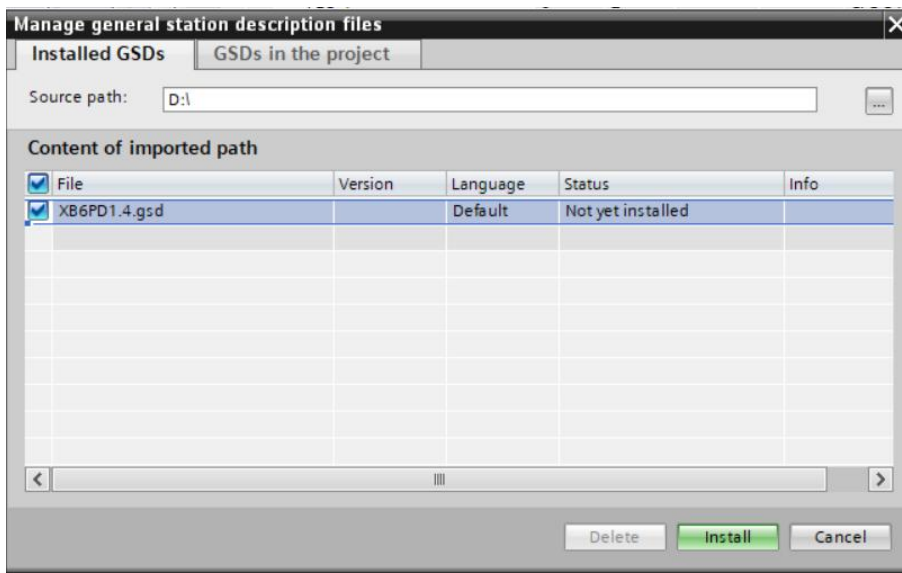


- b. Click "Add New Device", select the PLC model you are currently using, and click the "Add" , as shown in the following figure. After adding, you can see that the PLC has been added to the device navigation tree.



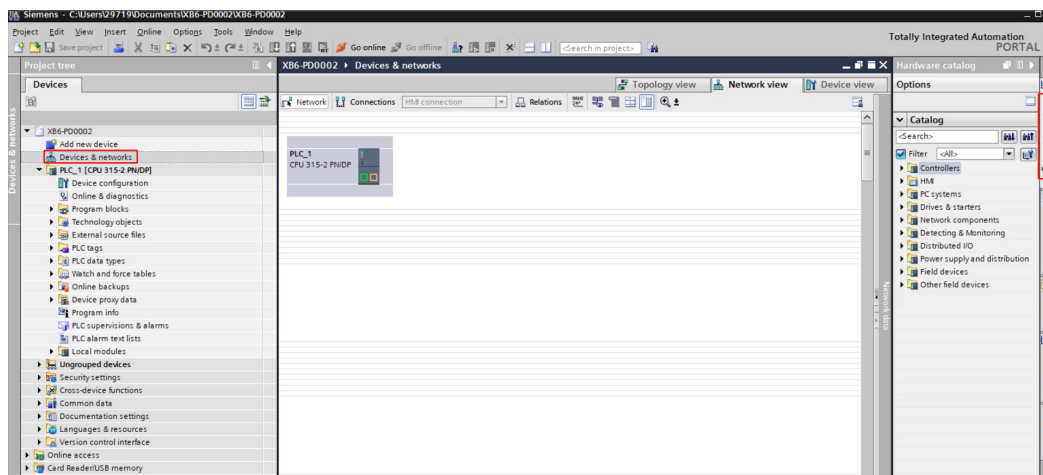
4. Adding GSD profile

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



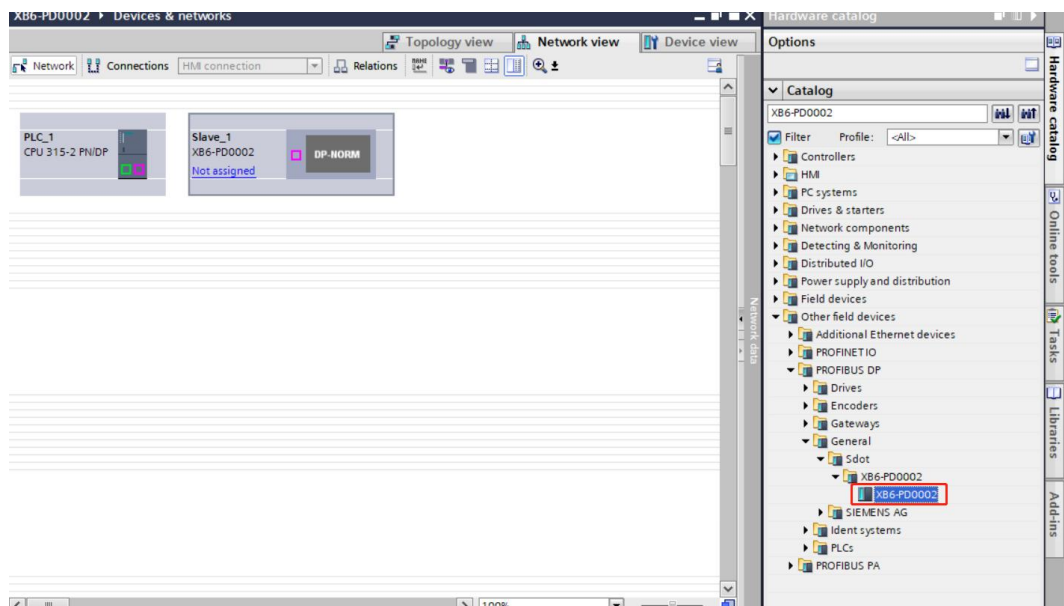
5. Adding Slave Devices

- a. Double-click the left navigation tree "Devices and Networks", and then Click the "Hardware catalog" vertical button on the right side to display the following directory.

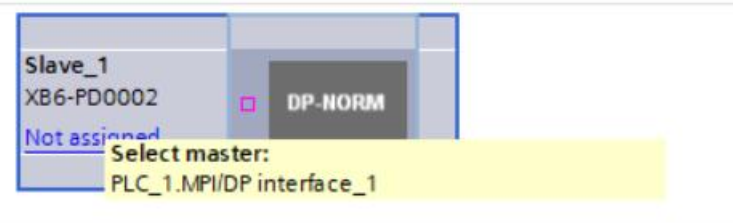


- b. Enter "XB6-PD2002" in the search box of the hardware directory to search for the coupler. After searching, drag or double click "XB6-PD0002" to the "Network View", as shown in the following

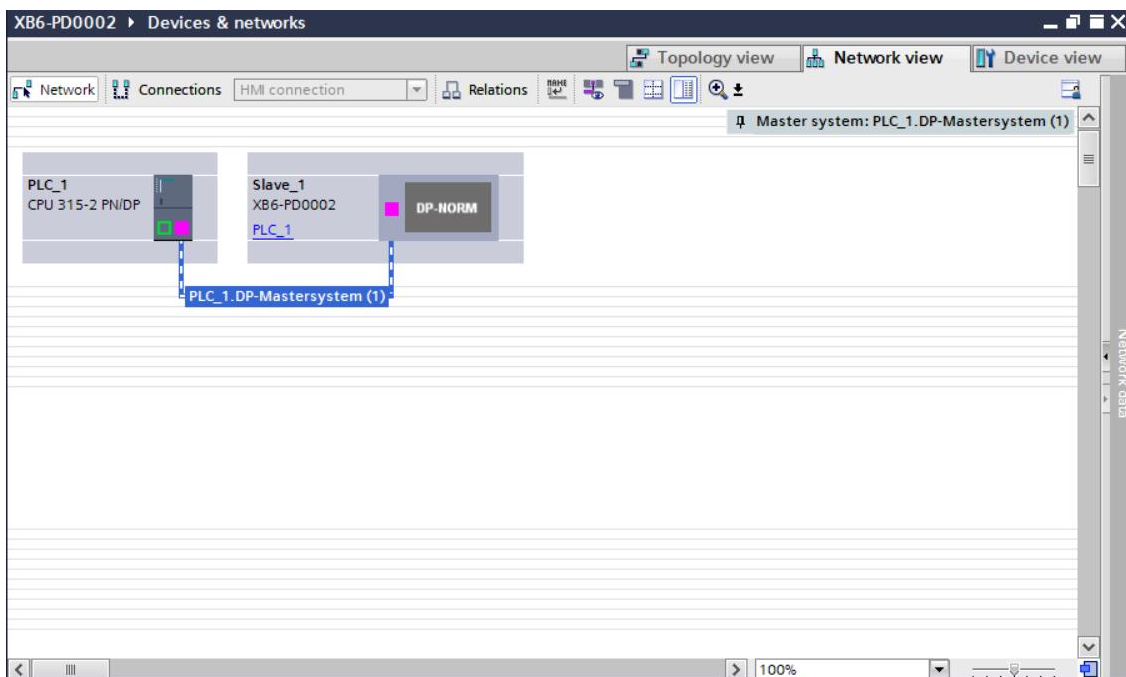
figure.



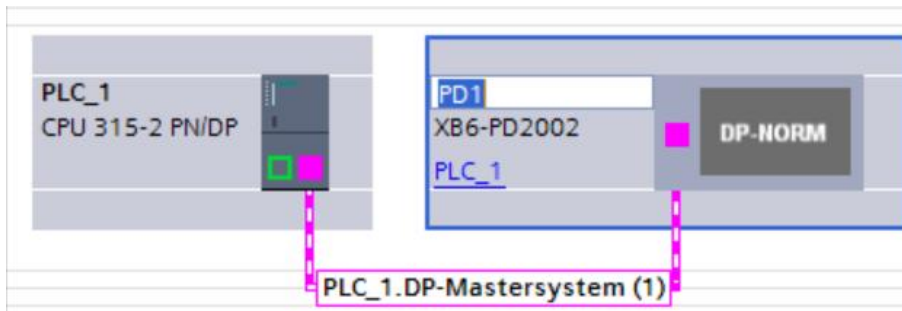
- c. Click "Unassigned (blue font)" on the slave device and select "PLC_1.MPI/DP Interface_1" as shown below.



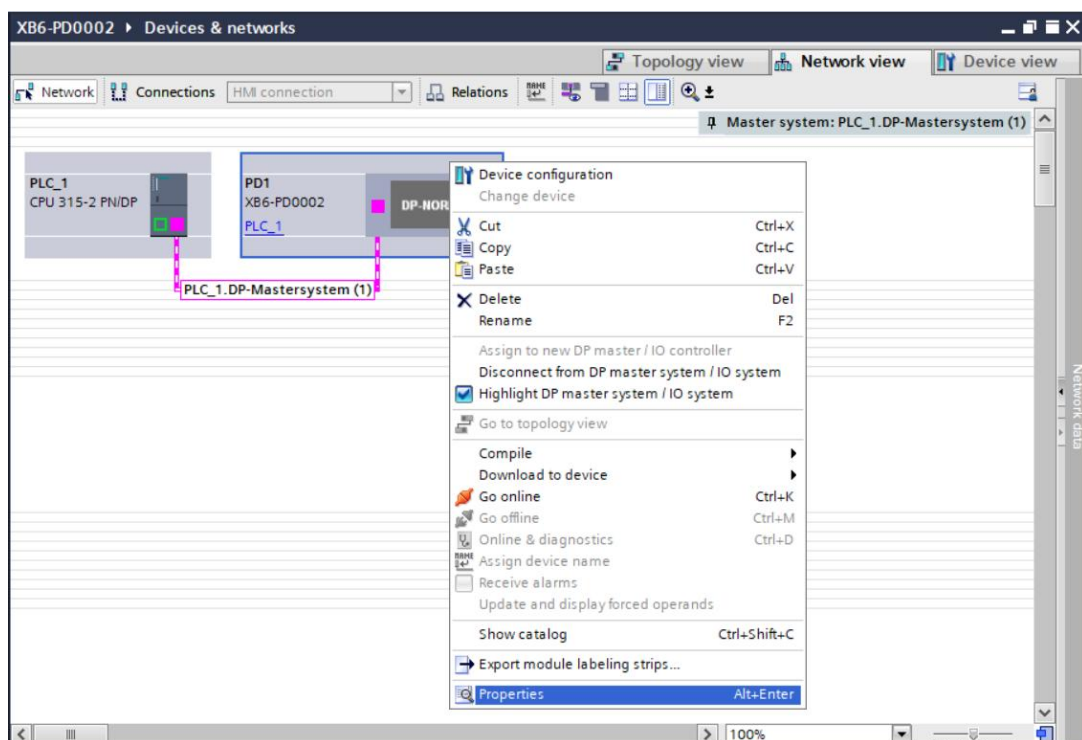
- d. When the connection is complete, it is shown in the following figure.



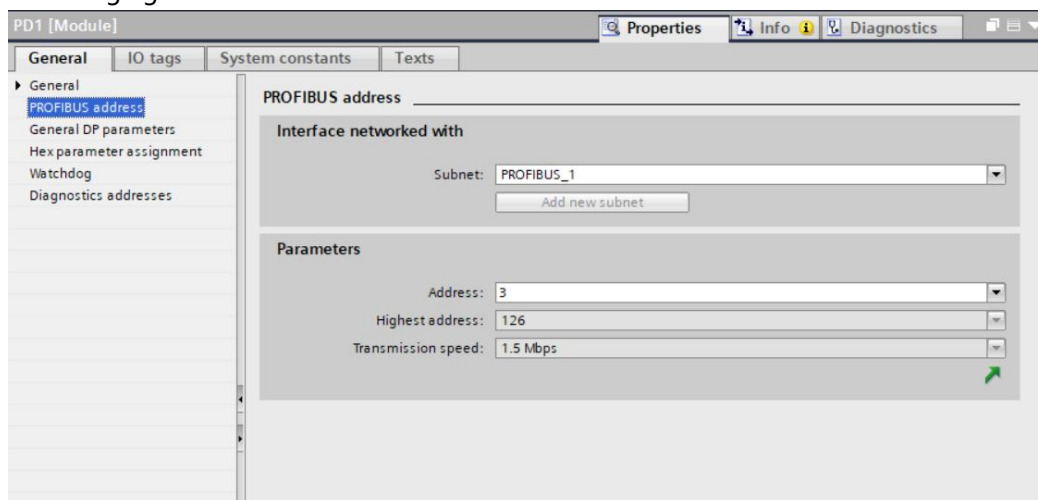
- e. Click on the device name to rename the device, as shown below.



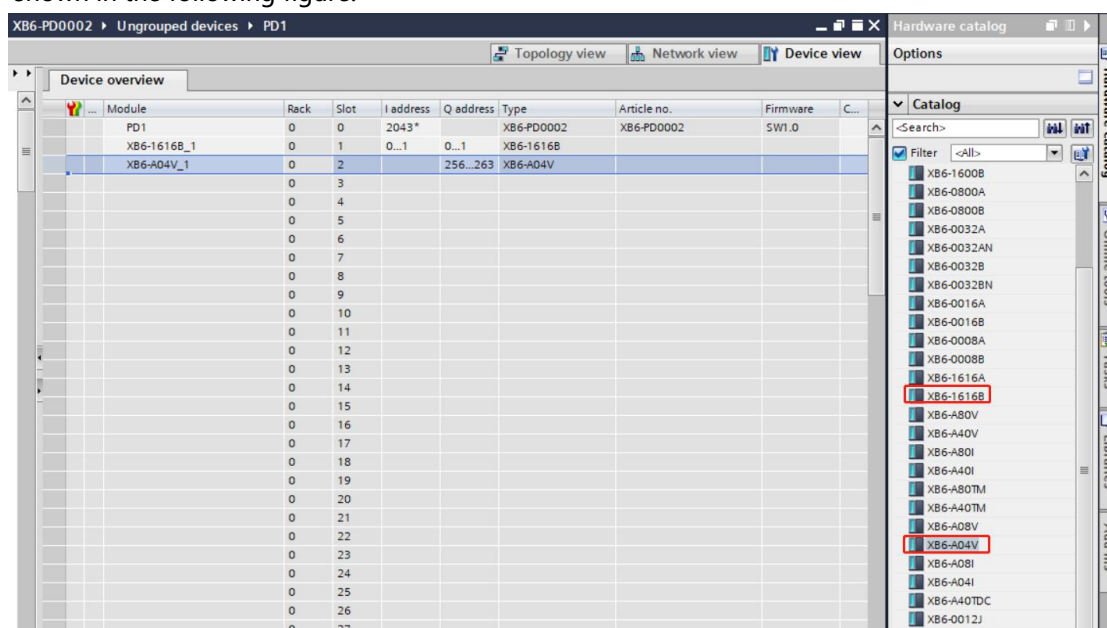
- f. Right-click on the Coupler View icon section and click “Properties” to see the Properties menu, as shown in the following figure.



- g. In "Properties", you can view the coupler's station address and transmission rate and other parameters, you need to set the coupler's dip switches with the same address, as shown in the following figure.



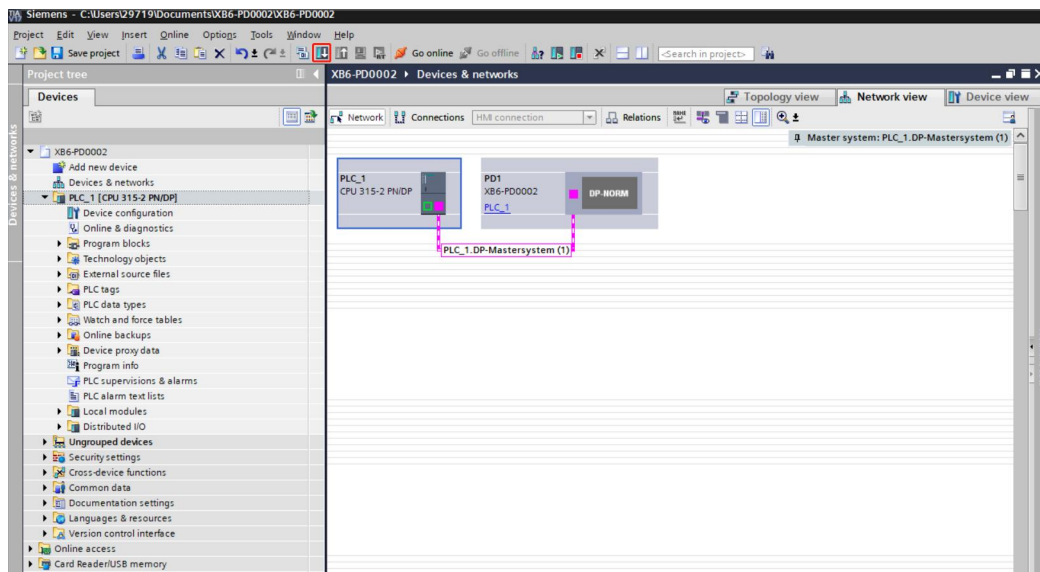
- h. Click "Device View" to enter the device overview of the coupler, and under the "Modules" directory on the right side, add the I/O modules according to the actual topology (the order must be consistent with the actual topology, otherwise the communication will not be successful), as shown in the following figure.



Note: Up to 32 modules can be added. I/O addresses are assigned by the system or can be changed.

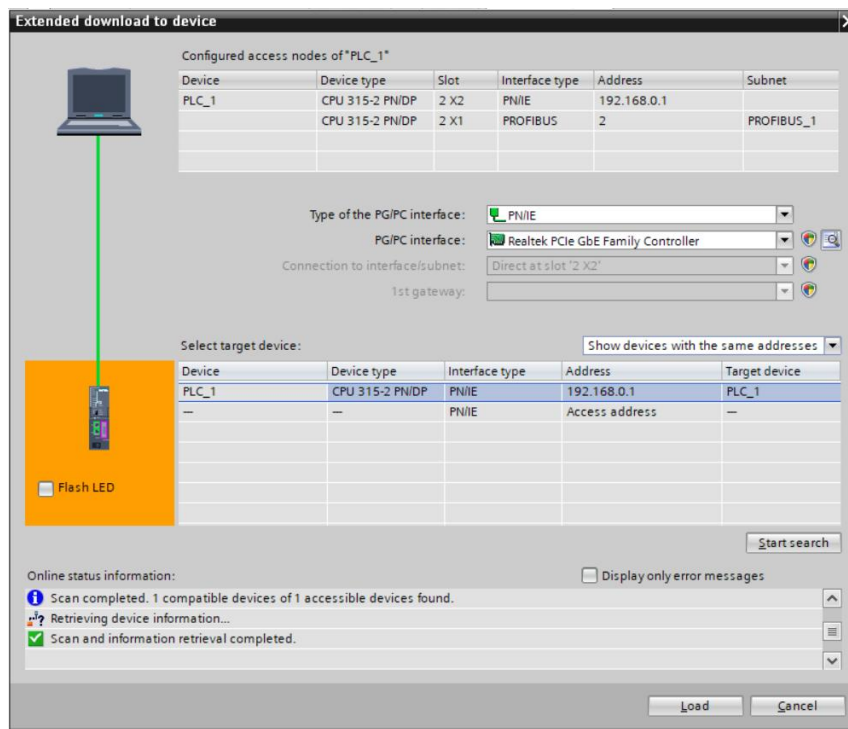
6. Download Configuration Structure

- a. After the I/O modules are added, switch to "Network View". In the "Network View", select PLC and click the "Download to Device" button on the toolbar, as shown in the following figure.

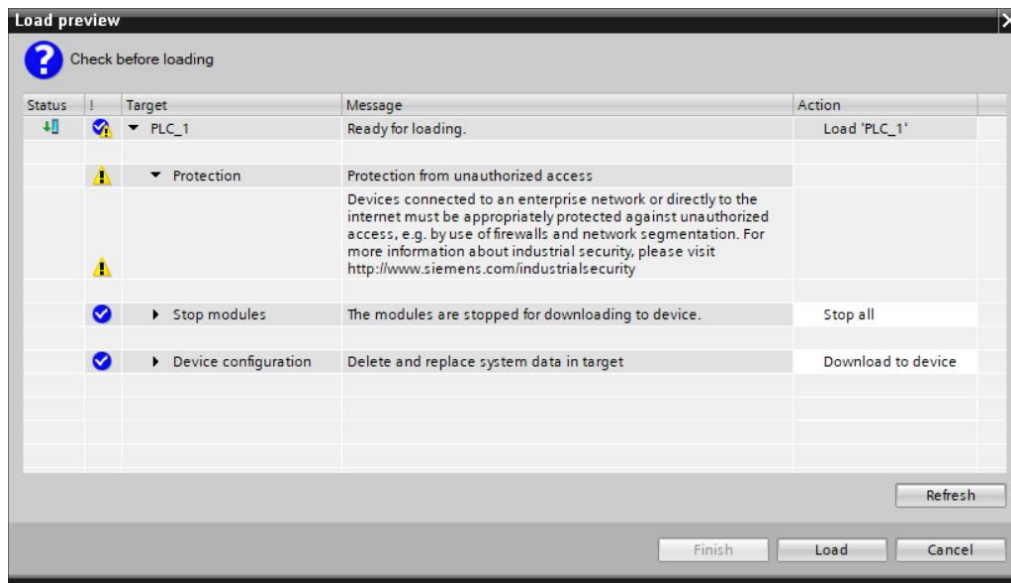


Note: Perform this operation whenever the topology is changed, otherwise the PLC may report an error.

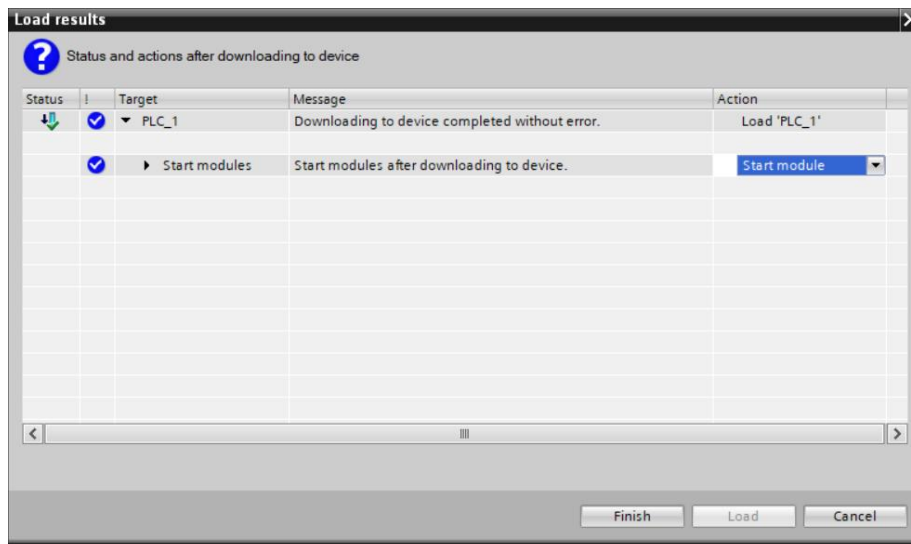
- b. In the Extension Download to Device window, click the "Start Search" button, and when the search is complete, click the "Download" button, as shown in the following figure.



- c. Go to the download preview page and click the "Load" button as shown below.



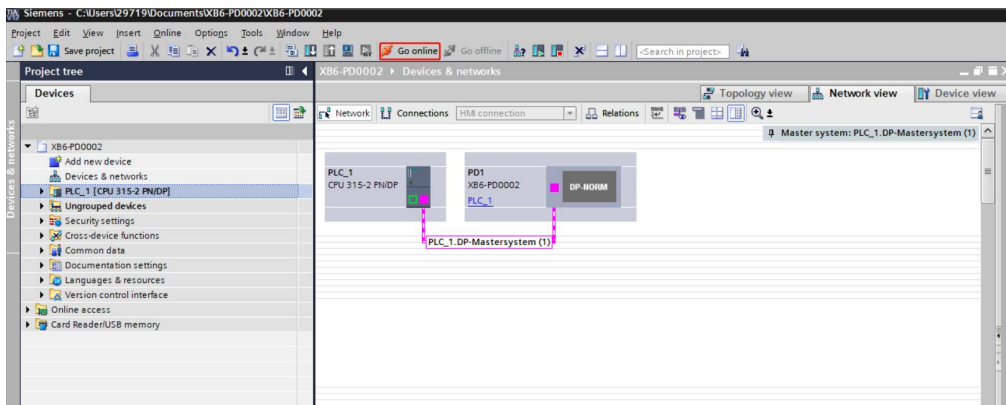
- d. Go to the download results page and click the "Finish" button, as shown below.



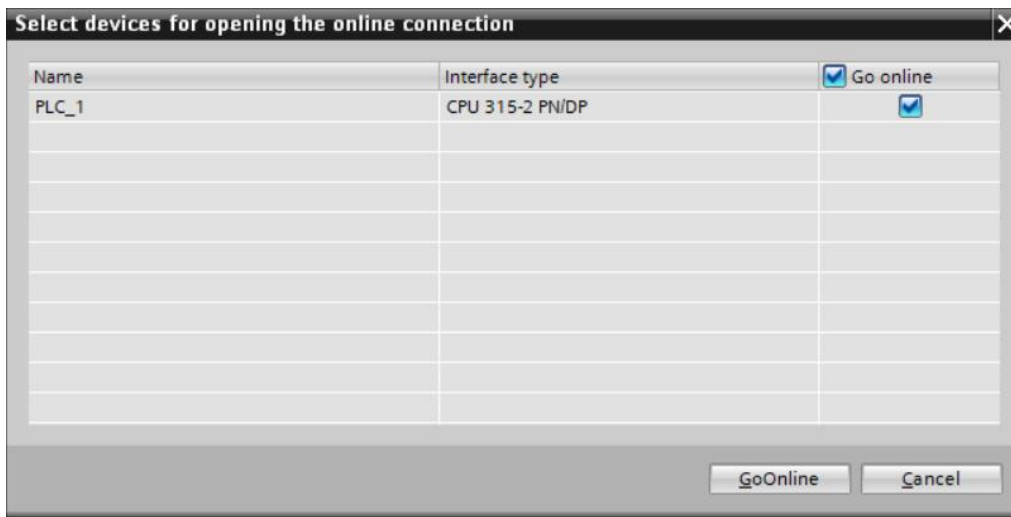
- e. Power the unit back up.

7. communication link

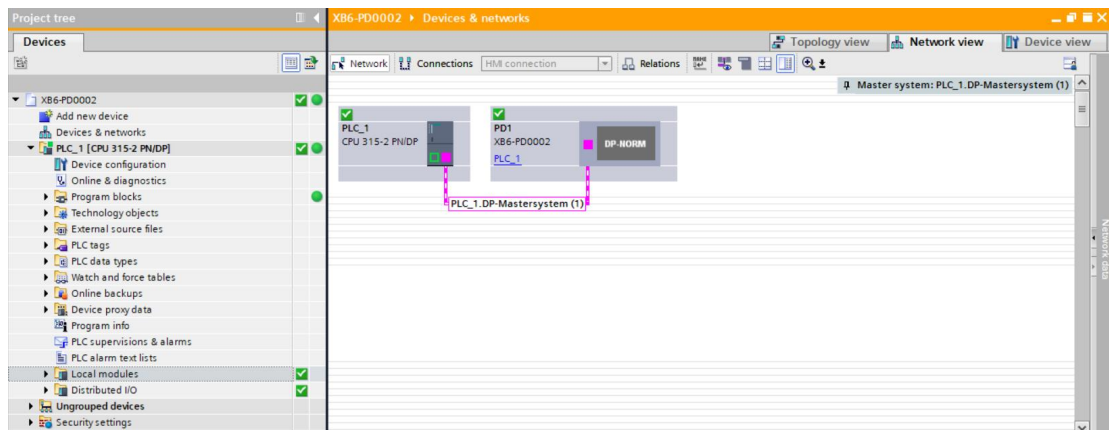
- a. Click the "Go Online" button on the toolbar, as shown below.



- b. In the Select Device window, check PLC and click the Go Online button as shown below.



- c. After successful connection, the left navigation tree and network view are shown below.



8. Check the device indicator

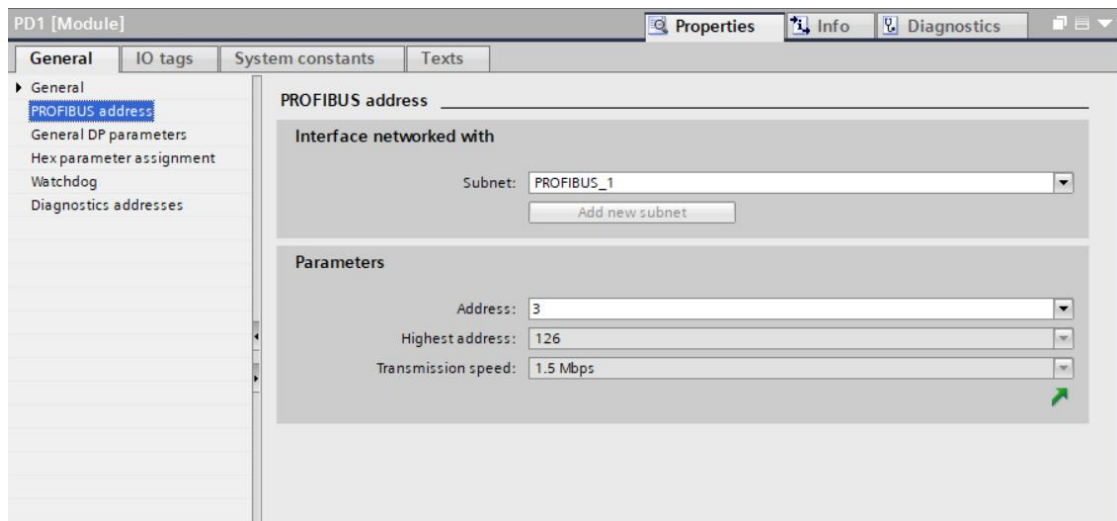
XB6-P2000H: P lamp is always on in green.

XB6-PD0002: P lamp green is always on, L lamp is always on, B lamp is not on, R lamp is always on.

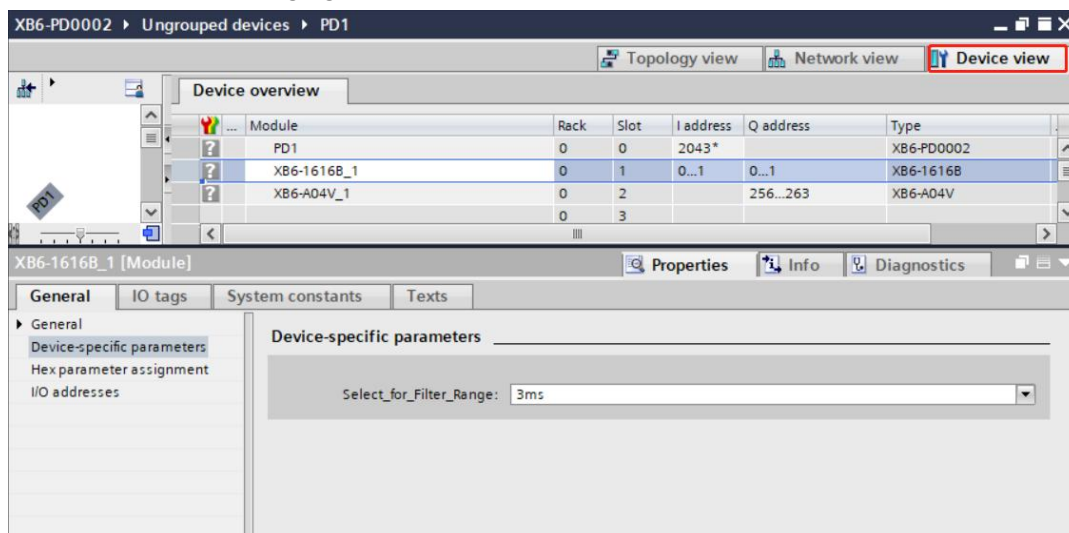
Modules XB6-1616B and XB6-A04V: P lamp is always on, R lamp is always on.

9. Parameter setting

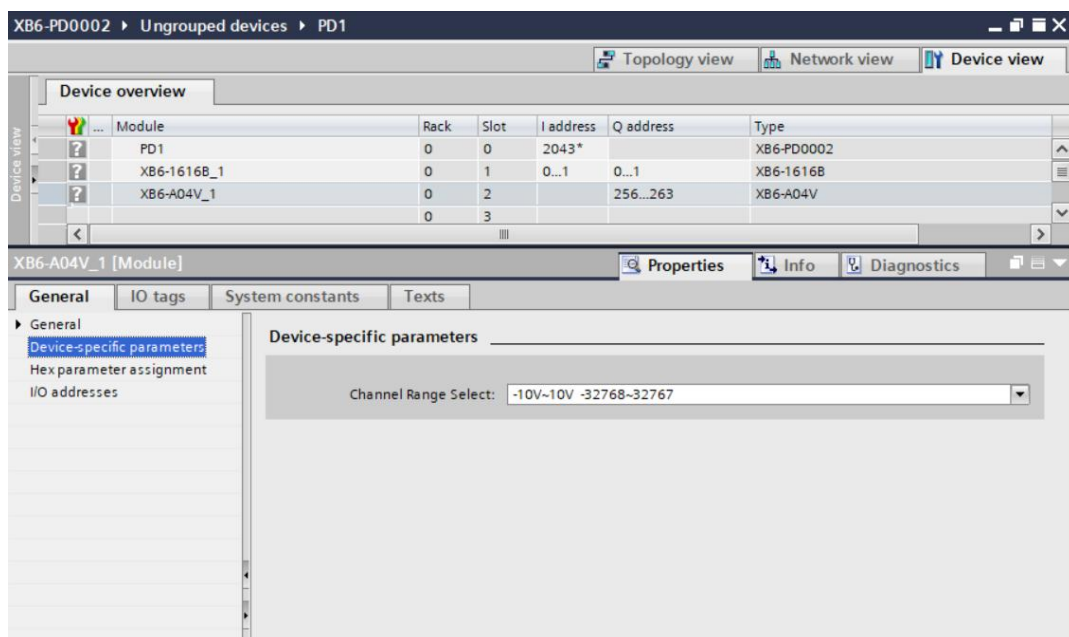
- a. Turn the device to offline state, open the "Network View", select the coupler module, right-click "Properties", you can view and set the coupler parameters, address and transmission rate, etc., as shown in the following figure.



- b. Click "Device View" to enter the device overview page, right-click the XB6-1616B module, click the "Properties" button, you can view and set the parameters of the module, such as filter parameters, as shown in the following figure.



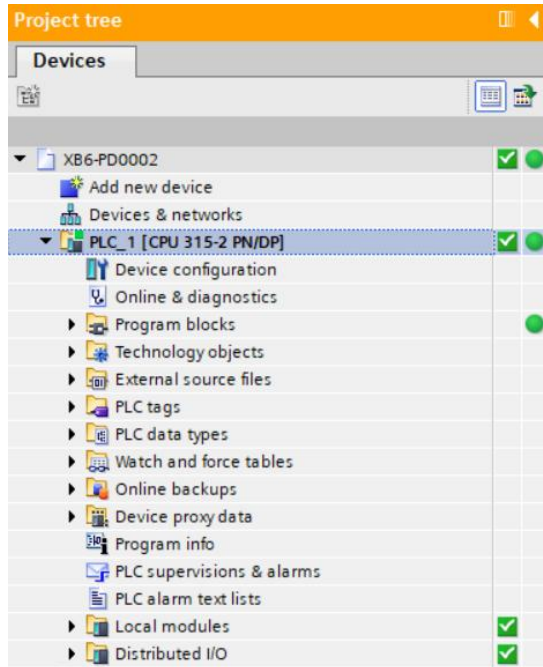
- c. Right-click on the XB6-A04V module and click the "Properties" button to view and set the parameters of the module, such as setting the analog range, as shown in the figure below.



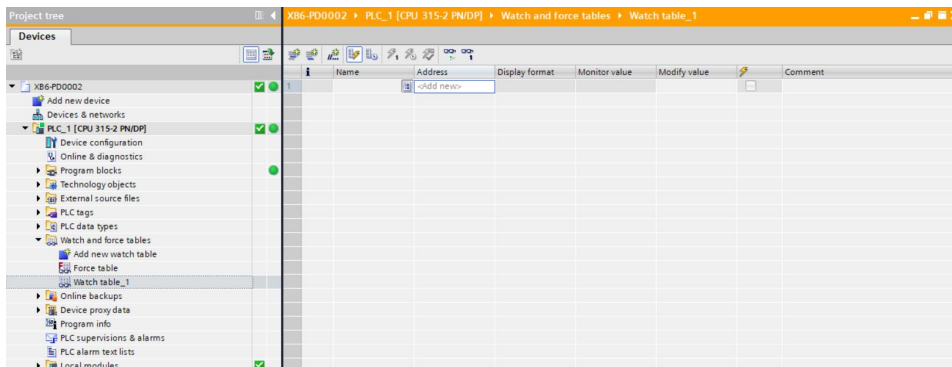
- d. Parameters can be configured according to the actual use of the need to configure, after the configuration is complete, re-download the program to the PLC, PLC and the module need to be re-powered.

10、 Functional verification

- a. Expand the left side of the project navigation, select "Monitor and Force Meter", as shown in the following figure.



- b. Double-click "Add New Monitor Table", the system adds a new monitor table, as shown in the following figure.



- c. Click the  button.

- d. Open the Device View and check the channel Q address (channel address of the output signal) or I address (channel address of the input signal) of the module in the device overview. For example, you can see the "Q address" and "I address" of XB6-1616B and XB6-A04V modules as shown in the following figure.

Module	Rack	Slot	I address	Q address	Type	Article no.
PD1	0	0	2043*		XB6-PD0002	XB6-PD0002
XB6-1616B_1	0	1	0...1	0...1	XB6-1616B	
XB6-A04V_1	0	2		256...263	XB6-A04V	
	0	3				

- e. Fill in the address cell of the monitoring table with the addresses of the input and output channels, such as "QB0... QB0...QB1", "IB0... QB0...QB1", "IB0...IB1", "QB256... QB263", press "Enter", as shown below.

Name	Address	Display format	Monitor value	Modify value	Comment
	%QB0	Hex	16#00		
	%QB1	Hex	16#00	<input type="checkbox"/>	
	%IB0	Hex	16#00	<input type="checkbox"/>	
	%IB1	Hex	16#00	<input type="checkbox"/>	
	%QB256	Hex	16#00	<input type="checkbox"/>	
	%QB257	Hex	16#00	<input type="checkbox"/>	
	%QB258	Hex	16#00	<input type="checkbox"/>	
	%QB259	Hex	16#00	<input type="checkbox"/>	
	%QB260	Hex	16#00	<input type="checkbox"/>	
	%QB261	Hex	16#00	<input type="checkbox"/>	
	%QB262	Hex	16#00	<input type="checkbox"/>	
	%QB263	Hex	16#00	<input type="checkbox"/>	
	<Add new>			<input type="checkbox"/>	

- f. Enter the value in the "Modified Value" cell, click the button to write, the modified value of "QB0" from "0" to "1". The modified value of "QB0" is written from "0" to "1", and you can see the data in the QB0 address monitoring value, and the channel indicator is always on at the same time.

	Name	Address	Display format	Monitor value	Modify value		Comment
1		%QB0	Hex	16#01	16#01	<input checked="" type="checkbox"/>	!
2		%QB1	Hex	16#00		<input type="checkbox"/>	
3		%IB0	Hex	16#00		<input type="checkbox"/>	
4		%IB1	Hex	16#00		<input type="checkbox"/>	
5		%QB256	Hex	16#00		<input type="checkbox"/>	
6		%QB257	Hex	16#00		<input type="checkbox"/>	
7		%QB258	Hex	16#00		<input type="checkbox"/>	
8		%QB259	Hex	16#00		<input type="checkbox"/>	
9		%QB260	Hex	16#00		<input type="checkbox"/>	
10		%QB261	Hex	16#00		<input type="checkbox"/>	
11		%QB262	Hex	16#00		<input type="checkbox"/>	
12		%QB263	Hex	16#00		<input type="checkbox"/>	
13		<Add new>				<input type="checkbox"/>	

- g. In the monitoring table, the IB address monitors the input channels of the module.