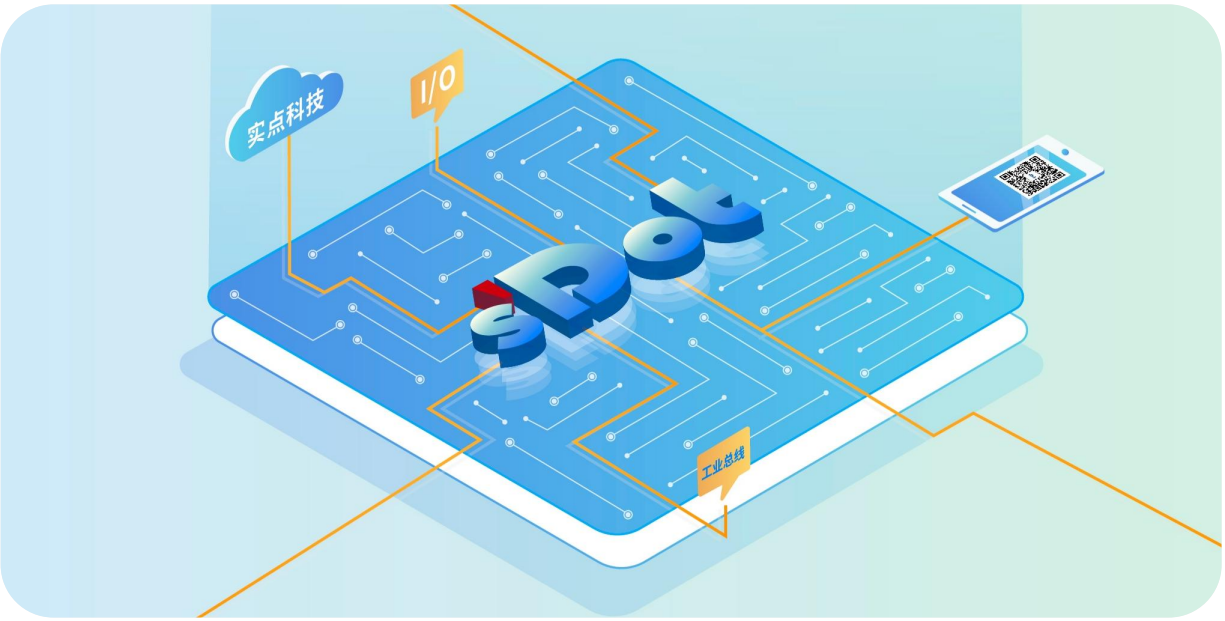

PROFINET

XB6S Series slice I/O

User Manual

Nanjing Solidot Electronic Technology Co., Ltd.

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Nanjing Solidot Electronic Technology Co., Ltd.
Address: 11th Floor, Ang Ying Building, No. 91 Shengli Road, Jiangning District, Nanjing, Jiangsu Province
Zip code: 211106
Tel: 4007788929
Website: http://www.solidotech.com

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1 Product Overview

1.1 Product Introduction

XB6S series slice I/O modules adopt the structure of a combination of couplers and I/O modules. The coupler connects the expandable I/O modules to the real-time industrial Ethernet system. The backplane adopts the X-bus bus, and the coupler module is responsible for fieldbus communication, thus realizing the function of real-time data exchange between various I/O modules and couplers/controllers.

The XB6S series slice I/O modules are rich in variety and have high real-time performance, providing users with guarantees for high-speed data acquisition, optimized system configuration, simplified on-site wiring, and improved system reliability.

1.2 Product Features

- **Occupies fewer nodes**
  A node consists of a bus coupler, 1 to 32 XB6S series I/O modules, 1 to 32 XBF series expansion I/O modules and a terminal cover.
- **Rich functional expansion**
  It supports flexible expansion and has a full range of I/O types. It can integrate a variety of digital modules, analog modules, and temperature modules to meet the needs of different application scenarios.
- **Flexible configuration**
  Various types of slice I/O modules can be combined arbitrarily.
- **Strong compatibility**
  The coupler communication interface complies with communication standards and supports mainstream PROFINET master stations.
- **Small size**
  Compact structure and small space occupation.
- **Easy diagnosis**
  The indicator lights are fully designed, the module status is clear at a glance, and detection and maintenance are convenient.

- **Fast**
  The backplane uses X-bus: the maximum scanning cycle is 1ms.
- **Easy to install**
  DIN 35 mm standard rail installation.
  It adopts spring-type terminal blocks, making wiring convenient and quick.

1.3 Application

The coupler module is connected to the controller at the application site, and the I/O module is responsible for connecting to the input and output sensors at the application site. The general process of data collection and processing control is as follows:

a. The input I/O module collects various signals on site and sends them to the coupler via the internal bus;
b. The controller reads and processes the data from the coupler via the fieldbus or industrial Ethernet, and then writes the output data into the coupler;
c. The coupler then writes the output data to the output I/O module through the internal bus, thereby realizing the control of the device.

The expandable I/O modules include digital input module, digital output module, digital input and output module, analog input module, analog output module, temperature module, etc.

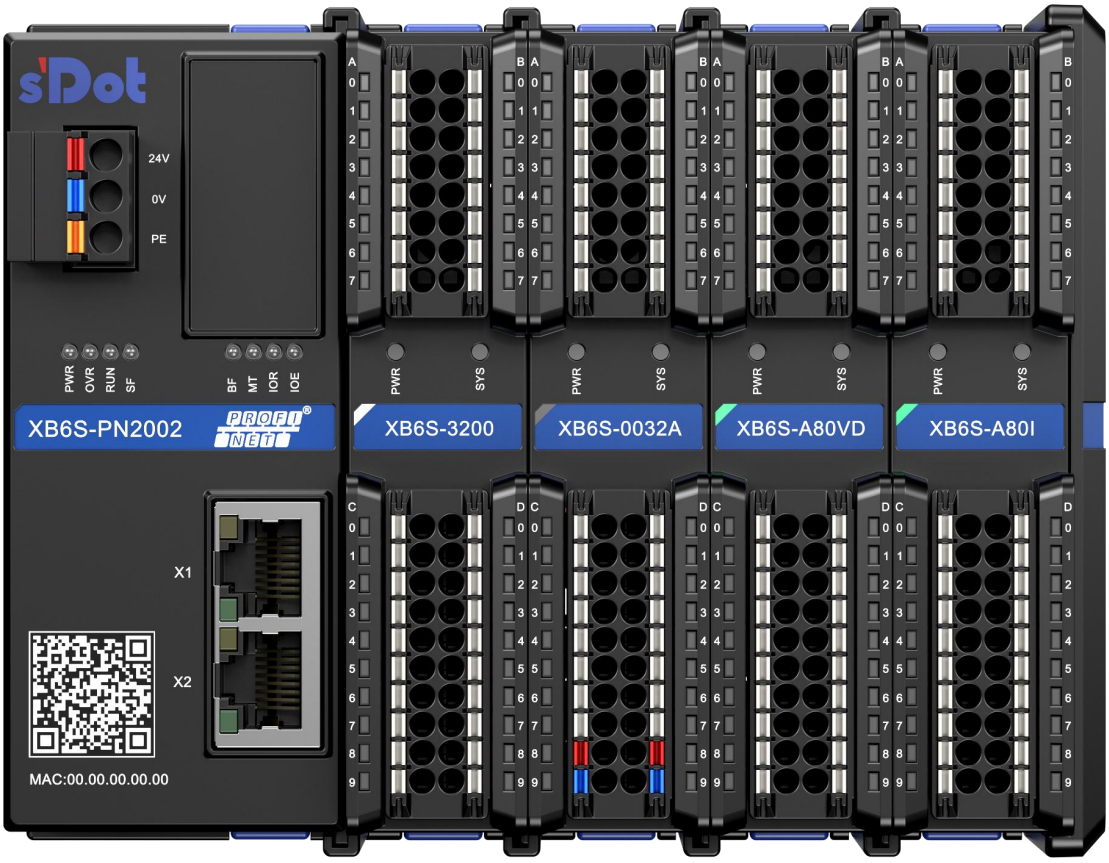
Application: The application method adopts the combination of modules such as coupler, digital , analog, temperature, and extended power supply.

Application configuration: According to the requirements of master station access capability, number of sites, I/O points, function type, etc., it can adapt to different types of I/O module combination configurations.

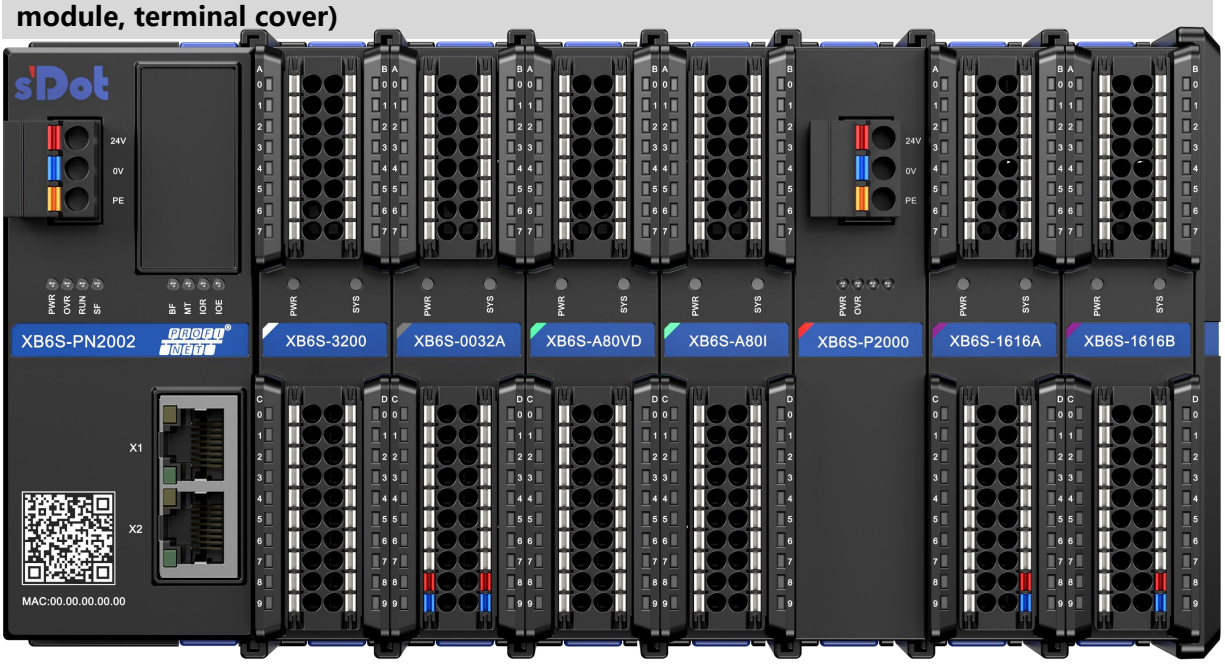
Configuration rules: The modules from left to right are coupler module, power module, I/O module, terminal cover (mandatory), etc.

The product adopts the application mode of the combination of coupler, I/O module and terminal cover, and there are two combinations as follows.

Product combination 1 (coupler module, I/O module, terminal cover)



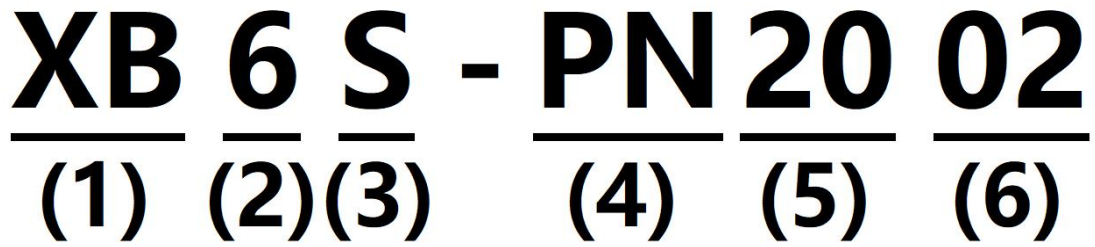
Product combination 2 (coupler module, I/O module, expansion power module, I/O module, terminal cover)



2 Naming convention

2.1 Naming convention

2.1.1 Coupler naming convention



Serial Number	Meaning	Description
(1)	Bus Type	XB: X-bus
(2)	Product range	6: Slice type
(3)	Product Version	S: Strengthen, an upgraded version
(4)	Bus protocol	EC: EtherCAT PN: PROFINET
(5)	Power	20: 2A
(6)	Number of network ports	02: Dual network ports

2.1.2 I/O module naming convention

XB 6 S - A 8 0 V

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

Serial Number	Meaning	Description				
(1)	Bus Type	XB: X-bus				
(2)	Product range	6: Slice type				
(3)	Product Version	S: Strengthen, an upgraded version				
(4)	I/O module types	A: Analog Default: Digital				
(5)	Input signal points	Analog: 0, 4, 8 Digital: 00, 08, 16, 32				
(6)	Output signal points	Analog: 0, 4, 8 Digital: 00, 08, 16, 32				
(7)	Input and output characteristics	**Digital quantity**			**Analog**	
		Coding	Input	Output	Coding	Illustrate
		A	NPN/PNP compatible	NPN	V	Single-ended signal, adjustable range: Disable, -10V~+10V, 0V~10V, -5V~+5V, 0V~5V, 1V~5V
		B		PNP	VD	Differential signal, adjustable range: Disable, -10V~+10V, 0V~10V, -5V~+5V, 0V~5V, 1V~5V
		Default	NPN/PNP compatible	/	I	Single-ended signal, adjustable range: Disable, 4mA~20mA, 0mA~20mA
		J	/	Relay	ID	Differential signal, adjustable range: Disable, 4mA~20mA, 0mA~20mA, -20mA~+20mA
					TM	Temperature collection of thermal resistors, thermocouples, etc.

2.2 Module List

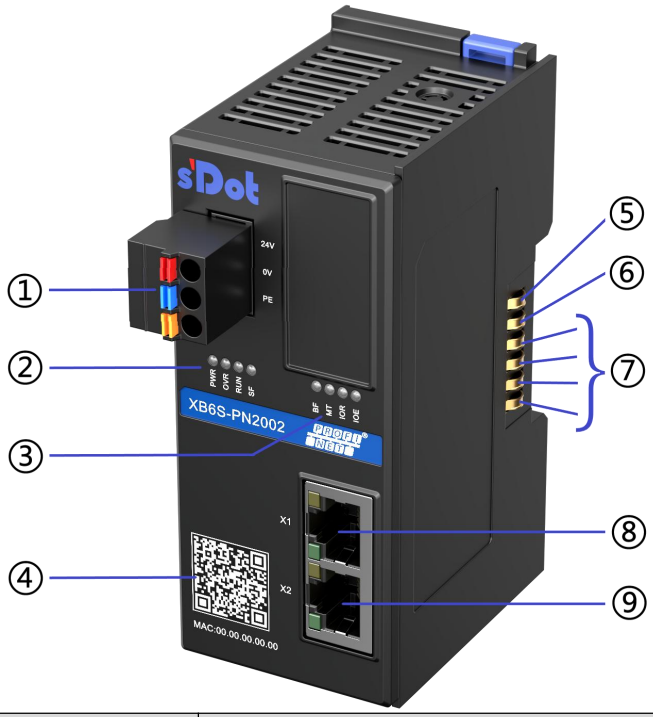
Model	Product Description	
XB6S-PN2002	PROFINETCoupler module	
XB6S-3200	32-channel digital input module, input NPN/PNP compatible, input filter default 3ms	
XB6S-1600	16-channel digital input module, input NPN/PNP compatible, input filter default 3ms	
XB6S-0800	8-channel digital input module, input NPN/PNP compatible, input filter default 3ms	
XB6S-0032A	32-channel digital output module, output NPN type	
XB6S-0032B	32-channel digital output module, output PNP type	
XB6S-1616A	16-channel digital input and 16-channel digital output module Input NPN/PNP compatible, input filter default 3ms, output NPN type	
XB6S-1616B	16-channel digital input and 16-channel digital output module Input NPN/PNP compatible, input filter default 3ms, output PNP type	
XB6S-0016A	16-channel digital output module, output NPN type	
XB6S-0016B	16-channel digital output module, output PNP type	
XB6S-0008A	8-channel digital output module, output NPN type	
XB6S-0008B	8-channel digital output module, output PNP type	
XB6S-0012J/6	12-channel relay output module (Note: The "/" in the model number can be omitted, XB6S-0012J/6 and XB6S-0012J6 are the same module)	
XB6S-A80VD	8-channel analog voltage input module	Differential signal, adjustable range: Disable, -10V~+10V, 0V~10V, -5V~+5V, 0V~5V, 1V~5V
XB6S-A80V	8-channel analog voltage input module	Single-ended signal, adjustable range: Disable, -10V~+10V, 0V~10V, -5V~+5V, 0V~5V, 1V~5V
XB6S-A40VD	4-channel analog voltage input module	Differential signal, adjustable range: Disable, -10V~+10V, 0V~10V, -5V~+5V, 0V~5V, 1V~5V
XB6S-A40V	4-channel analog voltage input module	Single-ended signal, adjustable range: Disable, -10V~+10V, 0V~10V, -5V~+5V, 0V~5V, 1V~5V
XB6S-A80ID	8-channel analog current input module	Differential signal, adjustable range: Disable, 4mA~20mA, 0mA~20mA, -20mA~+20mA
XB6S-A80I	8-channel analog current input module	Single-ended signal, adjustable range: Disable, 4mA~20mA, 0mA~20mA
XB6S-A40ID	4-channel analog current input module	Differential signal, adjustable range: Disable, 4mA~20mA, 0mA~20mA, -20mA~+20mA
XB6S-A40I	4-channel analog current input module	Single-ended signal, adjustable range: Disable, 4mA~20mA, 0mA~20mA
XB6S-A08V	8-channel analog voltage output module	Single-ended signal, adjustable range: Disable, -10V~+10V, 0V~10V, -5V~+5V, 0V~5V, 1V~5V
XB6S-A04V	4-channel analog voltage output module	Single-ended signal, adjustable range: Disable, -10V~+10V, 0V~10V, -5V~+5V, 0V~5V, 1V~5V
XB6S-A08I	8-channel analog current output module	Single-ended signal, adjustable range: Disable, 4mA~20mA, 0mA~20mA

XB6S-A04I	4-channel analog current output module	Single-ended signal, adjustable range: Disable, 4mA~20mA, 0mA~20mA
XB6S-A80TM	8-channel thermal resistor and thermocouple temperature acquisition module (for module introduction, please refer to the official website module user manual)	
XB6S-A40TM	4-channel thermal resistor and thermocouple temperature acquisition module (for module introduction, please refer to the official website module user manual)	
XB6S-PL20	2-channel single-ended incremental encoder counting module (for module introduction, please refer to the official website module user manual)	
XB6S-PS20D	2-channel SSI absolute encoder counting module (for module introduction, please refer to the official website module user manual)	
XB6S-PC80	8-channel pulse counting module (for module introduction, please refer to the official website module user manual)	
XB6S-PT04A	4-channel PTO pulse output module (for module introduction, please refer to the official website module user manual)	
XB6S-C01SP	1-channel serial communication module (for module introduction, please refer to the official website module user manual)	
XB6S-P2000	Extension power module	
XB6S-CVR00	Terminal cover	

3 Module Introduction

3.1 PROFINET Coupler

3.1.1 Panel structure



Serial Number	Name	Illustrate
①	Power Terminal Blocks	3P spring-loaded terminal blocks
②~③	Module indicators and indicator markings	Indicates coupler power status and system operation status
④	Module QR code	Scan the code to get module related information
⑤	Power+	5V
⑥	power supply-	0V

⑦	X-bus communication signal	Communication signal
⑧	Bus interface X1	RJ45 interface
⑨	Bus interface X2	RJ45 interface

3.1.2 Indicator light function

PROFINET coupler indicator light definition				
Logo	**Name**	**Color**	**State**	**Status description**
PWR	Power indicator	Green	Always on	The module power supply is working properly
			Off	The module is not powered or the power supply is abnormal.
OVR	Overload indicator light	Red	Off	Not overloaded
			Always on	The load reaches more than 90% (±5%)
RUN	Operation status indicator	Green	Always on	The device starts normally
			Flash	Master startup failed
			Off	The device cannot start
SF	System abnormality indicator	Red	Always on	There is PROFINET alarm information
			Off	No PROFINET alarm information
BF	Bus abnormality indicator	Red	Always on	No Internet connection
			Flash	No PROFINET connection is established with the controller
			Off	Establishing a PROFINET connection with the controller
MT	Maintenance indicator	Yellow	Always on	Maintenance is required and an alarm is generated
			Off	No maintenance required, no alarms
IOR	IO communication indicator	Green	Always on	I/O Process data has been established
			Flashing 1Hz	No business data interaction
			Flashing 10Hz	Coupler firmware upgrade
IOE	IO abnormal indicator	Red	Always on	Communication abnormality
			Flashing 1Hz	There is an alarm I/O module abnormality
			Off	No abnormality in communication

Network Status Indicator Definition				
Logo	**Name**	**Color**	**State**	**Status description**
X1	Network status indicator	Orange	Flash	The connection is established and data is exchanged
			Off	No data interaction or exception
		Green	Always on	Establishing a network connection
			Off	No network connection established or abnormal

X2	Network status indicator	Orange	Flash	The connection is established and data is exchanged
			Off	No data interaction or exception
		Green	Always on	Establishing a network connection
			Off	No network connection established or abnormal

3.1.3 Product Parameters

3.1.3.1 Interface parameters

PROFINET interface parameters	
Bus protocol	PROFINET
Number of slaves	Depends on the number of slaves supported by the master
Data transmission medium	Ethernet CAT5 Cable
Transfer rate	100Mbps
Minimum cycle time	1ms
Transmission distance	≤100m (station distance)
Bus interface	2 × RJ45
Maximum number of modules connected in series	32
Input and output process data volume	1024Bytes[1]

Note[1]: The total length of uplink and downlink data shall not exceed 1024 bytes.

3.1.3.2 Power parameters

Power parameters	
Input voltage	SELV Input 24VDC (18V~36V)
Input Current	Max: 600mA (24VDC)
Backplane supply current	Max: 2A
Backplane supply voltage	5VDC

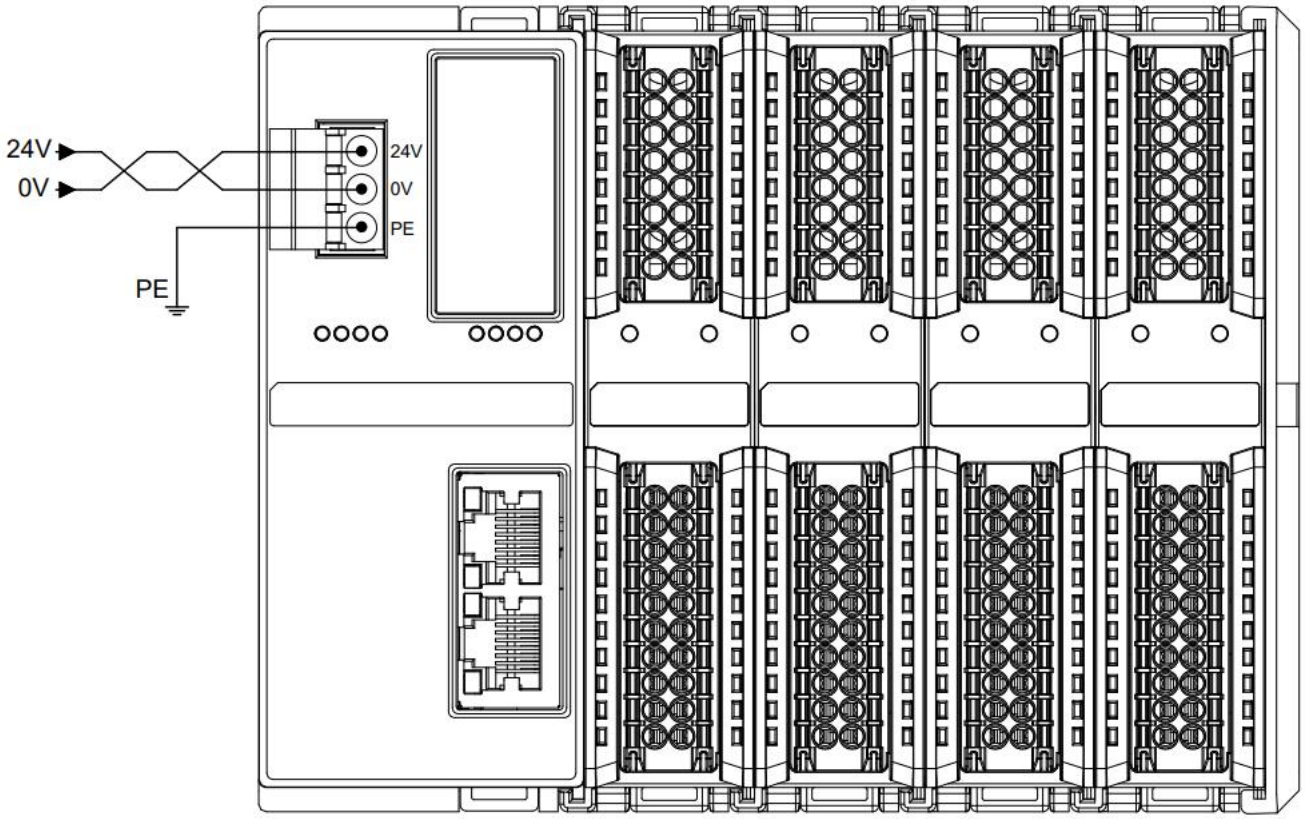
3.1.3.3 General parameters

General technical parameters		
Specifications and dimensions		106.4 × 43 × 61mm
Weight		160g
Usage Environment	Operating temperature	-20℃~+60℃
	Storage temperature	-40℃~+80℃
	Relative humidity	95%, non-condensing
	Altitude	≤2000m
	Vibration resistance	IEC 60068-2-6 Sinusoidal vibration 5Hz~8.4Hz,3.5mm,8.4Hz~150Hz,1g X/Y/Z three axial,10 Cycle/Axial (100min)
	Impact resistance	IEC 60068-2-27 Mechanical shock 150m/s2,11ms, ±X/Y/Z six directions 3 Second-rate/Direction, total 18 Second-rate

	Protection level	IP20	
	Over voltage category	I	
	Pollution degree	Level 2	
	Electrostatic Discharge	Level 3	Contact ±8KV Air ±8KV, IEC61000-4-2
	Surge	Level 3	1KV DM 2KV CM, IEC61000-4-5
	Electrical fast pulse group	Level 4	Power line ±4KV, IEC61000-4-4
PROFINET IO RT		Support	
Abnormal self-recovery		Support	
Hardware detection function		Support	
diagnosis		Support	
Alerts		Support	
MRP		Support	
Firmware Upgrade		Support	
Short circuit protection		Support (automatic recovery mechanism)	
Reverse polarity protection		Support (automatic recovery mechanism)	
Surge protection		Support	
CE certification		/	
		/	
UL certification		/	
RoHS Certification		/	
REACH Certification		/	

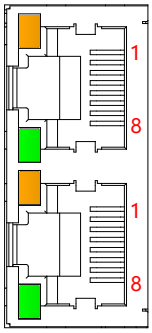
3.1.4 Power wiring diagram

Use a 24VDC power module and refer to the wiring method. Connect the power supply according to the circuit shown in the figure below, and ground PE reliably (twisted pair cable is recommended for the power cable).



3.1.5 Bus wiring

It uses a standard RJ45 network interface and a standard crystal connector, and the pin assignments are shown in the following table.



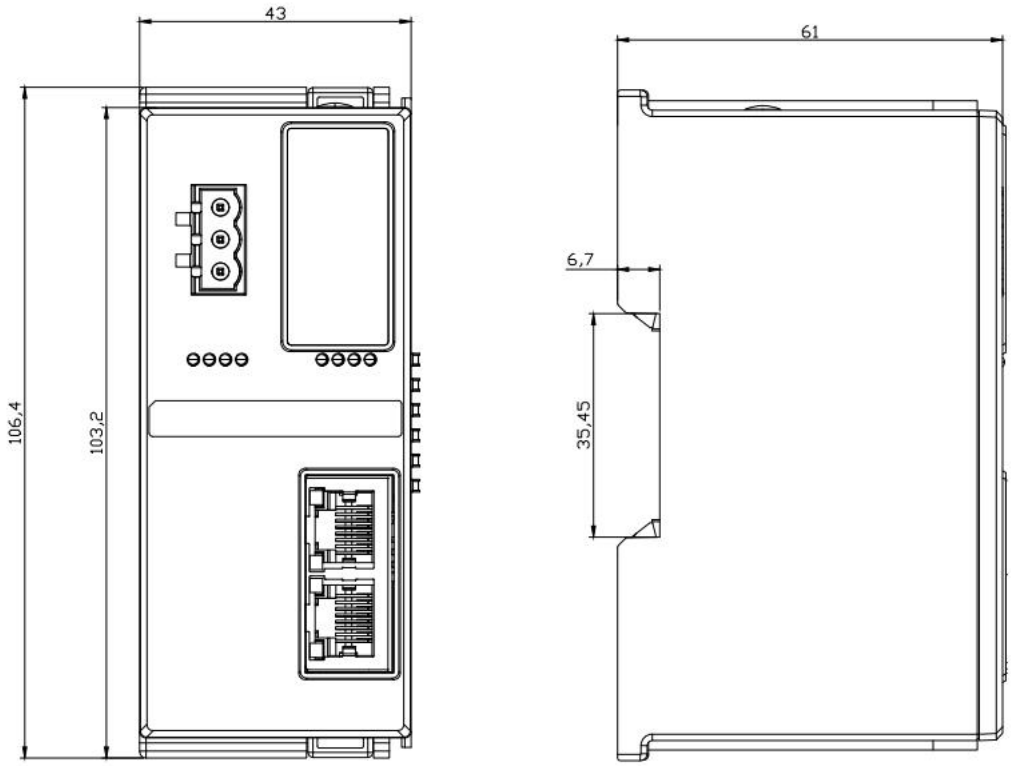
Pin Number	Signal
1	TD+
2	TD-
3	RD+
4	—
5	—
6	RD-
7	—
8	—

☛ Precautions

- It is recommended to use double-shielded (braided mesh + aluminum foil) STP cable of category 5 or higher as the communication cable.
- The length of the cable between devices cannot exceed 100m.

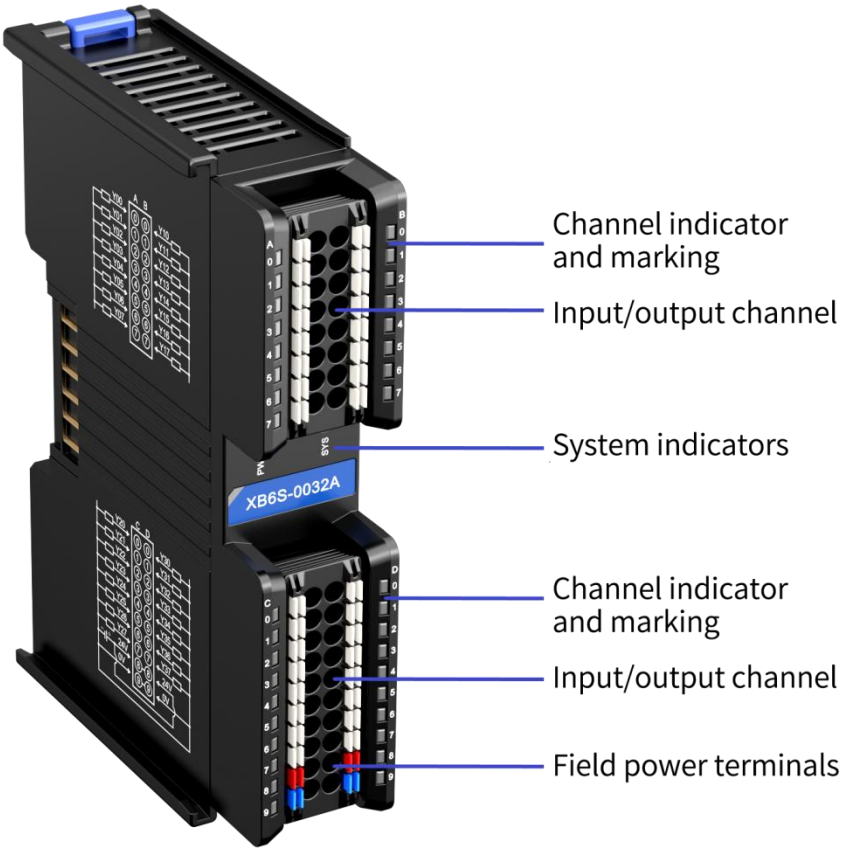
3.1.6 Dimensions

Coupler dimensions (mm)



3.2 Digital I/O Modules

3.2.1 Panel structure



3.2.2 Indicator light function

Digital I/O module indicator light definition				
Logo	**Name**	**Color**	**State**	**Status description**
PWR	Power indicator	Green	Always on	Power supply is normal
			Off	The product is not powered on or the power supply is abnormal
SYS	Operation status indicator	Green	Always on	The system is running normally
			Flashing 1Hz	No business data interaction, waiting to establish business data interaction
			Flashing 10Hz	Firmware Upgrade
			Off	System not working
0~7	Input channel indicator	Green	Always on	The module channel has signal input
			Off	The module channel has no signal input or the signal input is abnormal
0~7	Output channel indicator	Green	Always on	The module channel has signal output
			Off	The module channel has no signal output or the signal output is abnormal

3.2.3 Technical Parameters

3.2.3.1 Digital Input Module Parameters

Digital input			
Product Model	XB6S-3200	XB6S-1600	XB6S-0800
Bus input power rated voltage	5VDC (4.5V~5.5V)		
Bus input power rated current	≤100mA	≤80mA	≤60mA
Input rated voltage	24VDC (20.4V~28.8V)		
Typical input current	5mA/ch (24VDC)		
Input signal points	32	16	8
Input signal type	NPN/PNP compatible		
Input signal form	Voltage direct input form Sink input: NPN open collector input Source input: PNP open collector input		
OFF voltage/OFF current	-3V~+5V/0.9mA or less		
ON voltage/ON current	11V~30V/2.1mA or above		
Reaction time	<50us		
Input filtering	No filter, 0.1ms, 0.2ms, 0.5ms, 1ms, 2ms, 3ms (factory setting), 4ms...18ms, 19ms, 20ms		
Maximum input frequency	150Hz (filter time: 3ms)		
Input Impedance	5.4KΩ		
Isolation method	Optocoupler Isolation		
Isolation withstand voltage	500VAC		
Rated current consumption	100mA	80mA	60mA
Power consumption	0.5W	0.4W	0.3W
Digital input type	Type1/Type3		
Channel indicator light	Green LED light		

3.2.3.2 Digital input and output module parameters

Digital input		
Product Model	XB6S-1616A	XB6S-1616B
Bus input power rated voltage	5VDC (4.5V~5.5V)	
Bus input power rated current	≤130mA	≤100mA
Input rated voltage	24VDC (20.4V~28.8V)	
Typical input current	5mA/ch (24VDC)	
Input signal points	16	16
Input signal type	NPN/PNP compatible	
Input signal form	Voltage direct input form Sink input: NPN open collector input Source input: PNP open collector input	
OFF voltage/OFF current	-3V~+5V/0.9mA or less	
ON voltage/ON current	11V~30V/2.1mA or above	
Reaction time	<50us	
Input filtering	No filter, 0.1ms, 0.2ms, 0.5ms, 1ms, 2ms, 3ms (factory setting), 4ms...18ms, 19ms, 20ms	
Maximum input frequency	150Hz (filter time: 3ms)	
Input Impedance	5.4KΩ	
Isolation method	Optocoupler Isolation	
Isolation withstand voltage	500VAC	
Rated current consumption	130mA	100mA
Power consumption	0.65W	0.5W
Digital input type	Type1/Type3	
Channel indicator light	Green LED light	
Digital output		
Output signal points	16	16
Output signal type	NPN	PNP
Field side input voltage range	24VDC (20.4V~28.8V)	
Output voltage drop	<1V	
Output load type	Resistive load, inductive load, lamp load	
Single channel rated current	Max: 0.5A (seeFigure 1)	
Leakage Current	<10uA	
Reaction time	<150us	
Output channel protection	Short circuit protection (automatic recovery mechanism)	

Module protection	Reverse connection protection (automatic recovery mechanism), field-side surge protection
Isolation method	Optocoupler Isolation
Isolation withstand voltage	500VAC
Channel indicator light	Green LED light

3.2.3.3 Digital output module parameters

Digital output				
Product Model	XB6S-0016A	XB6S-0016B	XB6S-0032A	XB6S-0032B
Bus input power rated voltage	5VDC (4.5V~5.5V)			
Bus input power rated current	≤110mA	≤90mA	≤150mA	≤110mA
Field side input voltage range	24VDC (20.4V~28.8V)			
Output signal points	16	16	32	32
Output signal type	NPN	PNP	NPN	PNP
Output voltage drop	< 1V			
Output load type	Resistive load, inductive load, lamp load			
Single channel rated current	Max: 0.5A (seeFigure 1)			
Leakage Current	<10uA			
Reaction time	<150us			
Output channel protection	Short circuit protection (automatic recovery mechanism)			
Module protection	Reverse connection protection (automatic recovery mechanism), field-side surge protection			
Isolation method	Optocoupler Isolation			
Isolation withstand voltage	500VAC			
Rated current consumption	110mA	90mA	150mA	110mA
Power consumption	0.55W	0.45W	0.75W	0.55W
Channel indicator light	Green LED light			

3.2.3.4 Relay output module parameters

Relay output	
Product Model	XB6S-0012J/6
Bus input power rated voltage	5VDC (4.5V~5.5V)
Bus input power rated current	≤100mA
Field side input voltage range	24VDC (20.4V~28.8V)
Output signal points	12
Output format	Relay
Output load type	Resistive load, inductive load, lamp load
Single channel rated	24VDC

voltage	
Single channel rated current	Max: 2A (seeFigure 2)
Hardware output response time	10ms/10ms
Module protection	Field side reverse connection protection (automatic recovery mechanism), field side surge protection
Isolation method	Optocoupler isolation + relay isolation
Isolation withstand voltage	1500VAC
Rated current consumption	100mA
Power consumption	0.5W
Mechanical life	Minimum 20 million operations (18,000 operations/hour)
Electrical life	Minimum 100,000 operations (2A, 24VDC, inductive load)
Channel indicator light	Green LED light

3.2.3.5 General technical parameters

General technical parameters	
Specifications and dimensions	106.4 × 25.7 × 72.3mm
Weight	32-channel DIO: 110g
	16-channel DIO: 90g
	XB6S-0012J/6: 135g
Operating temperature	-20℃~+60℃
Storage temperature	-40℃~+80℃
Relative humidity	95%, non-condensing
Altitude	≤2000m
Pollution degree	Level 2
Protection level	IP20
Safety Certification	UL certification, CE certification
Green Environmental Certification	RoHS certification, REACH certification

Figure 1:

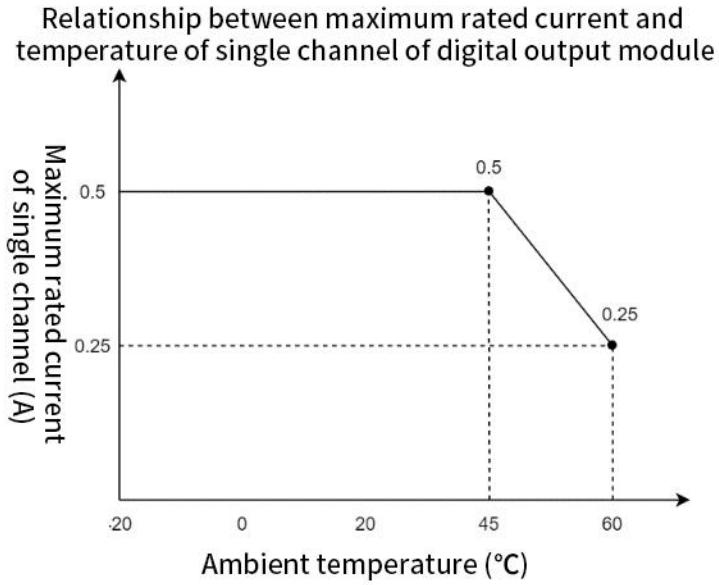
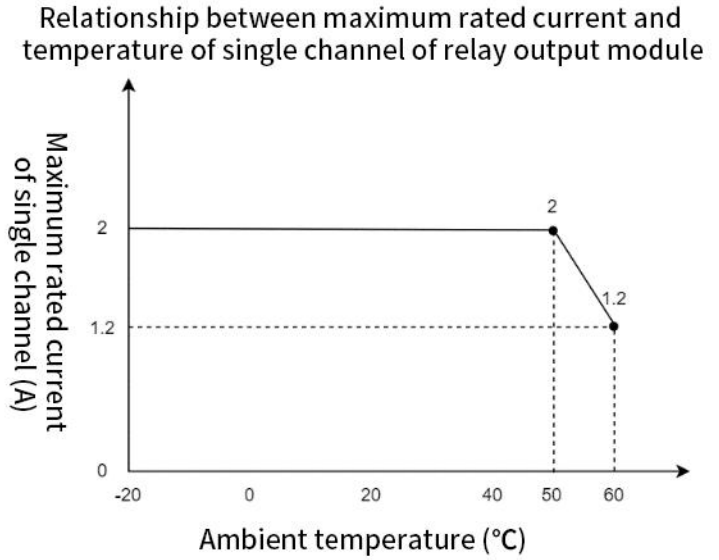
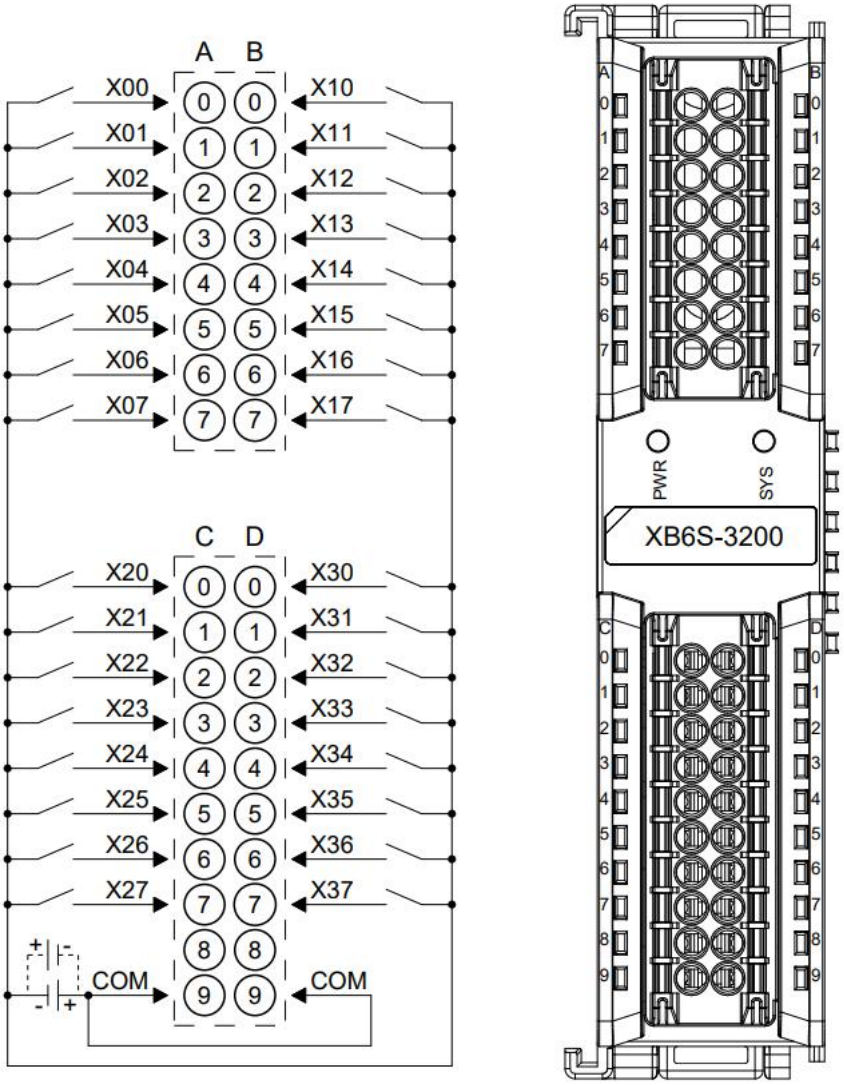


Figure 2:



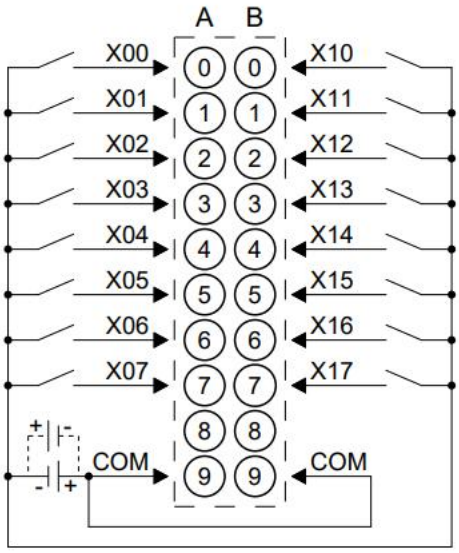
3.2.4 Wiring Diagram

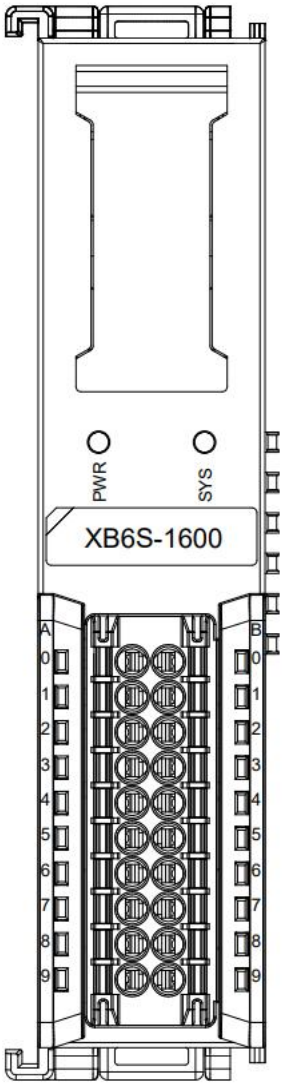
3.2.4.1 XB6S-3200



*COM internal conduction; NPN/PNP compatible

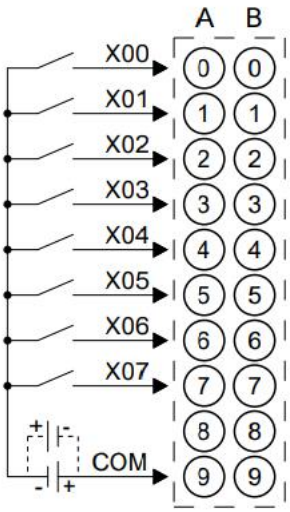
3.2.4.2 XB6S-1600

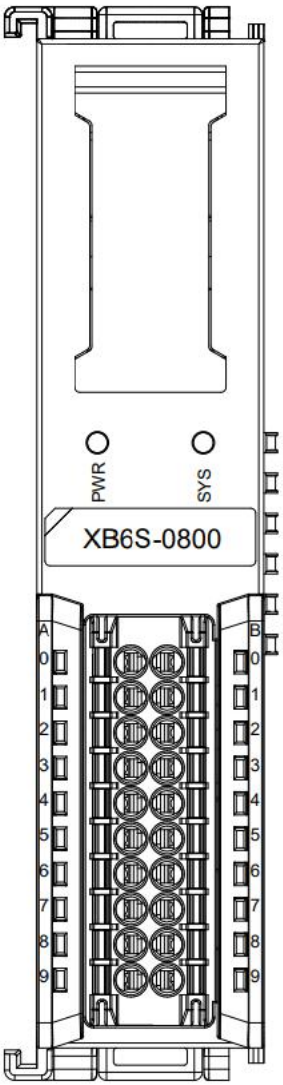




*COM internal conduction; NPN/PNP compatible

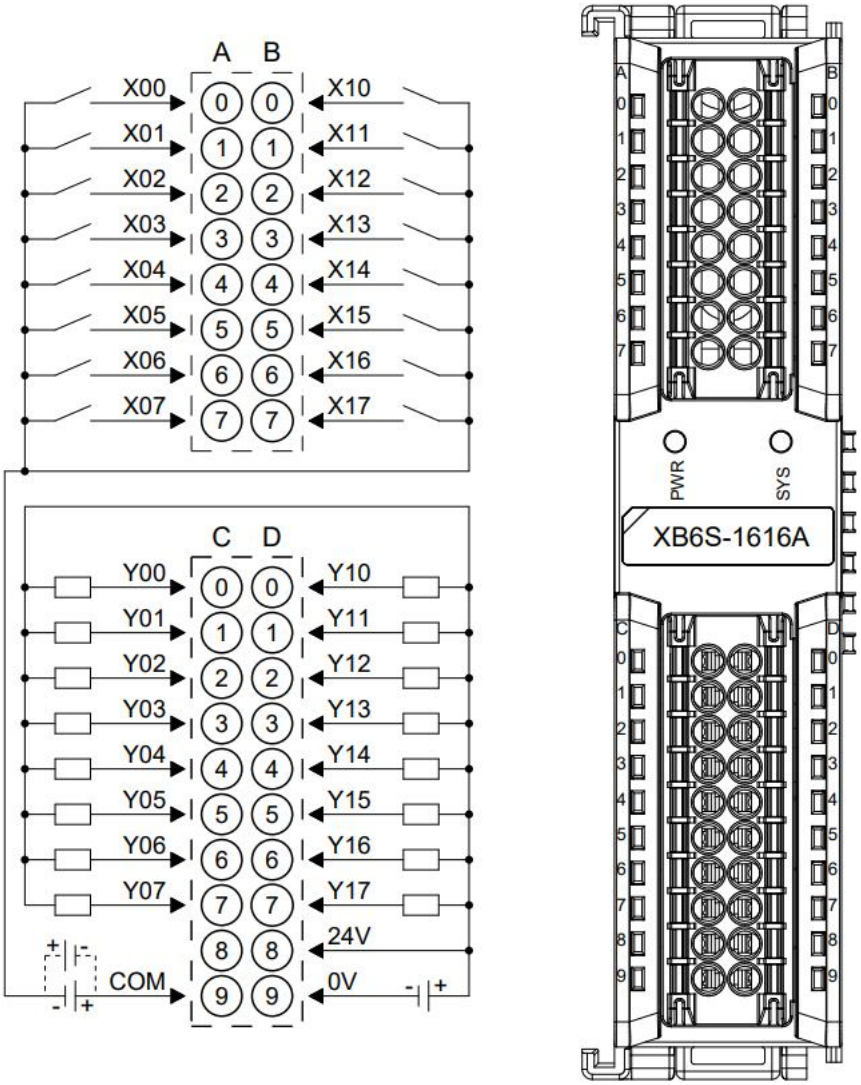
3.2.4.3 XB6S-0800





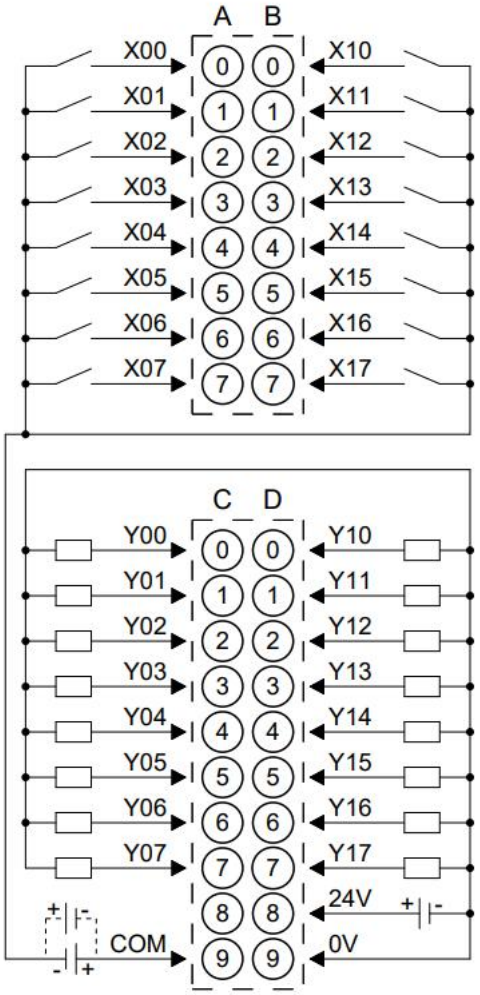
* NPN/PNP compatible

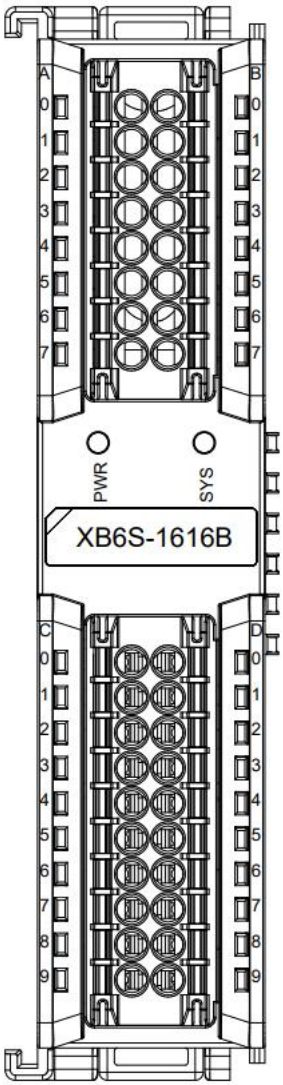
3.2.4.4 XB6S-1616A



*DI is NPN/PNP compatible, DO is NPN

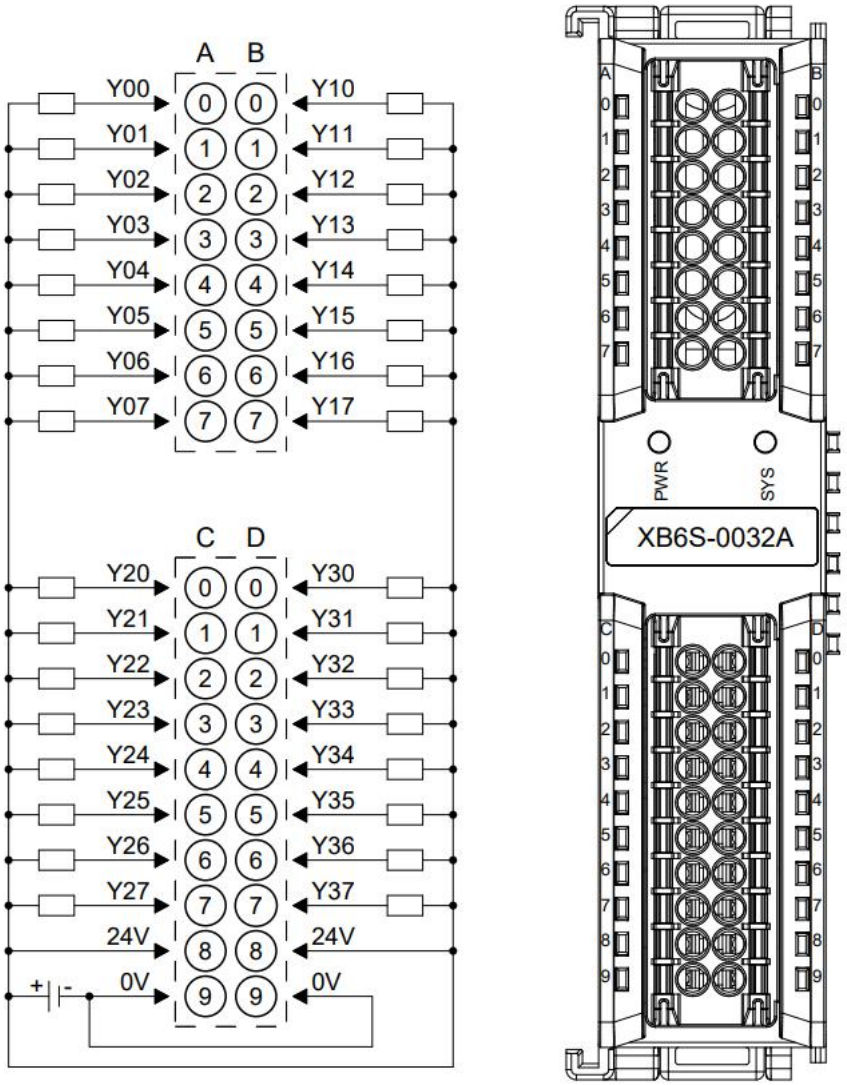
3.2.4.5 XB6S-1616B





*DI is NPN/PNP compatible, DO is PNP

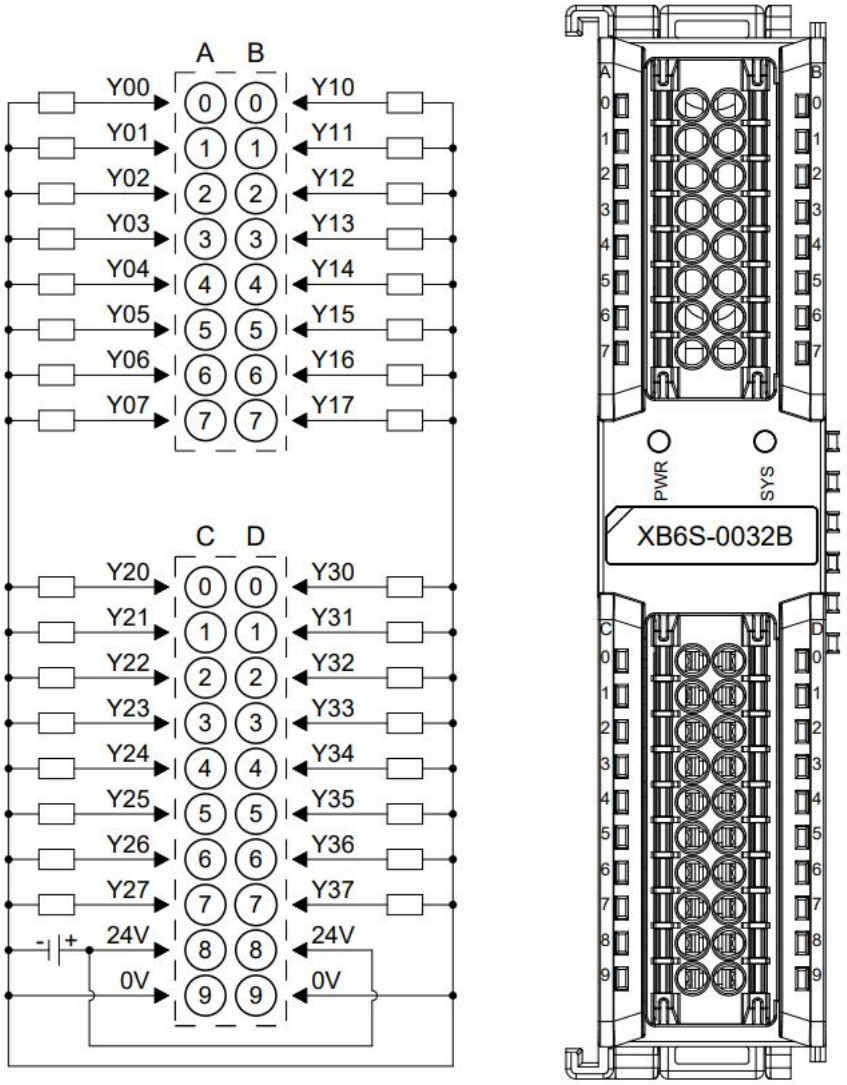
3.2.4.6 XB6S-0032A



*24V internal conduction; 0V internal conduction

*The load common power supply must use the same power supply as the module

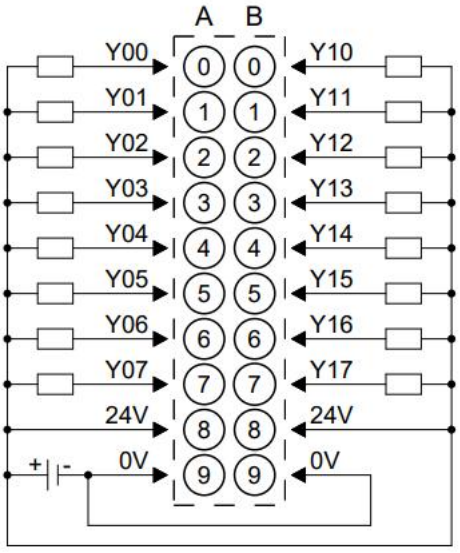
3.2.4.7 XB6S-0032B

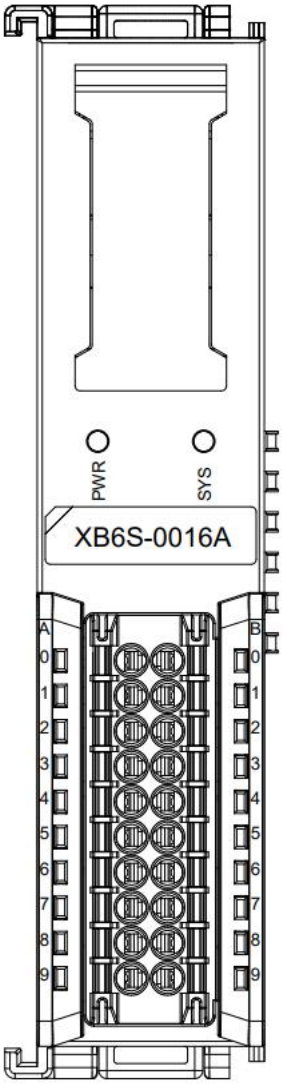


*24V internal conduction; 0V internal conduction

*The load common power supply must use the same power supply as the module

3.2.4.8 XB6S-0016A

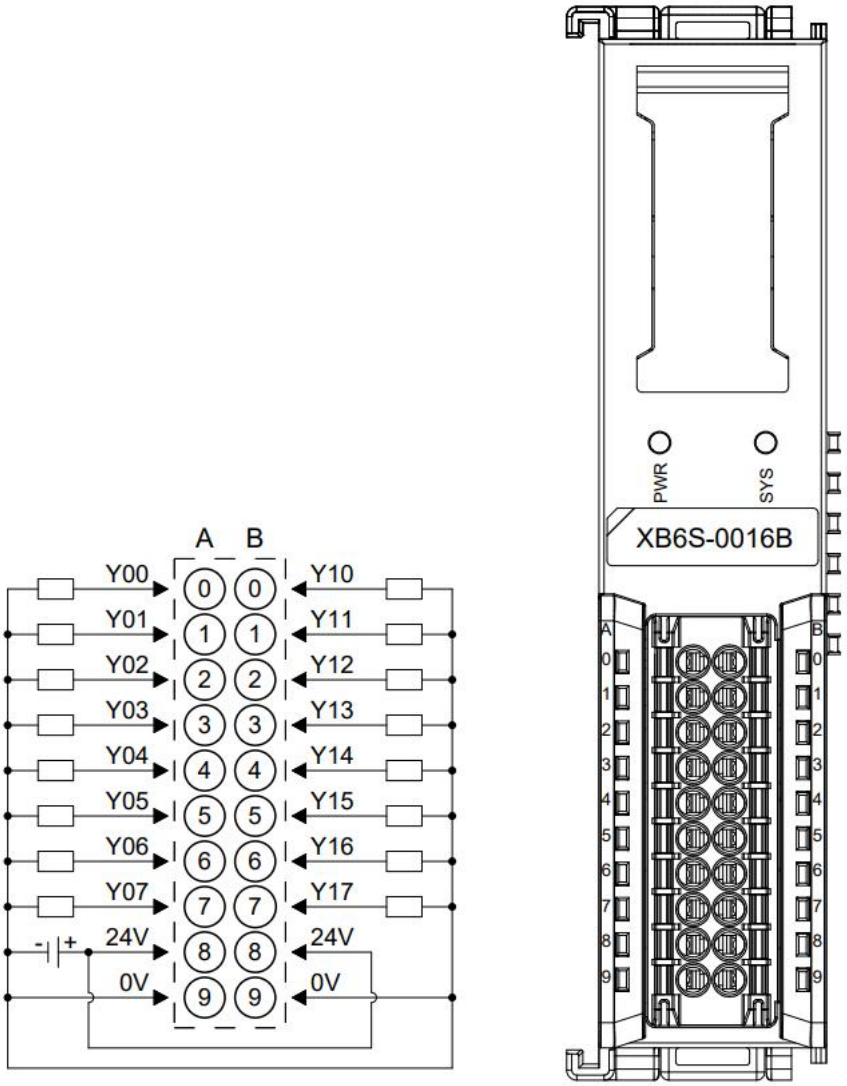




*24V internal conduction; 0V internal conduction

*The load common power supply must use the same power supply as the module

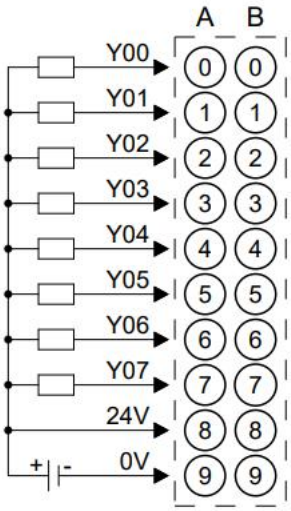
3.2.4.9 XB6S-0016B

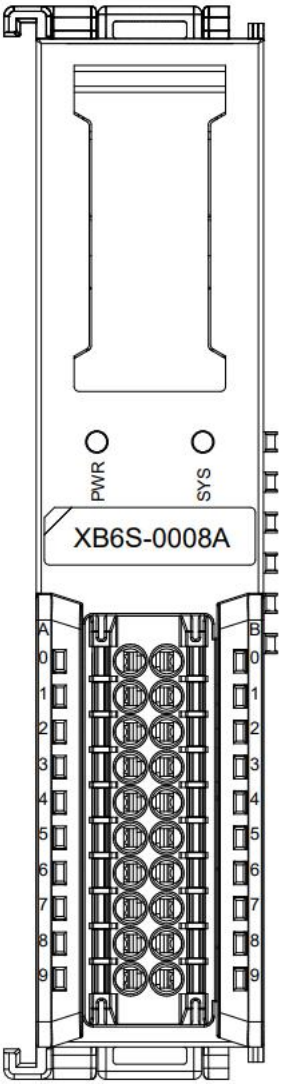


*24V internal conduction; 0V internal conduction

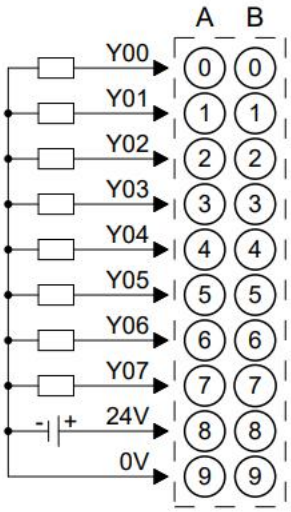
*The load common power supply must use the same power supply as the module

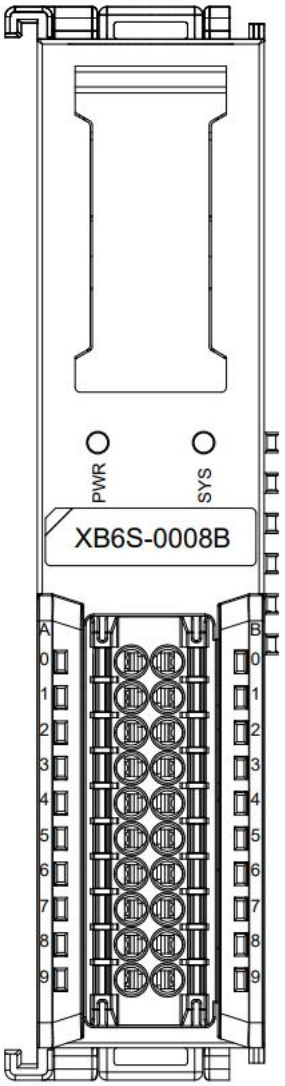
3.2.4.10 XB6S-0008A



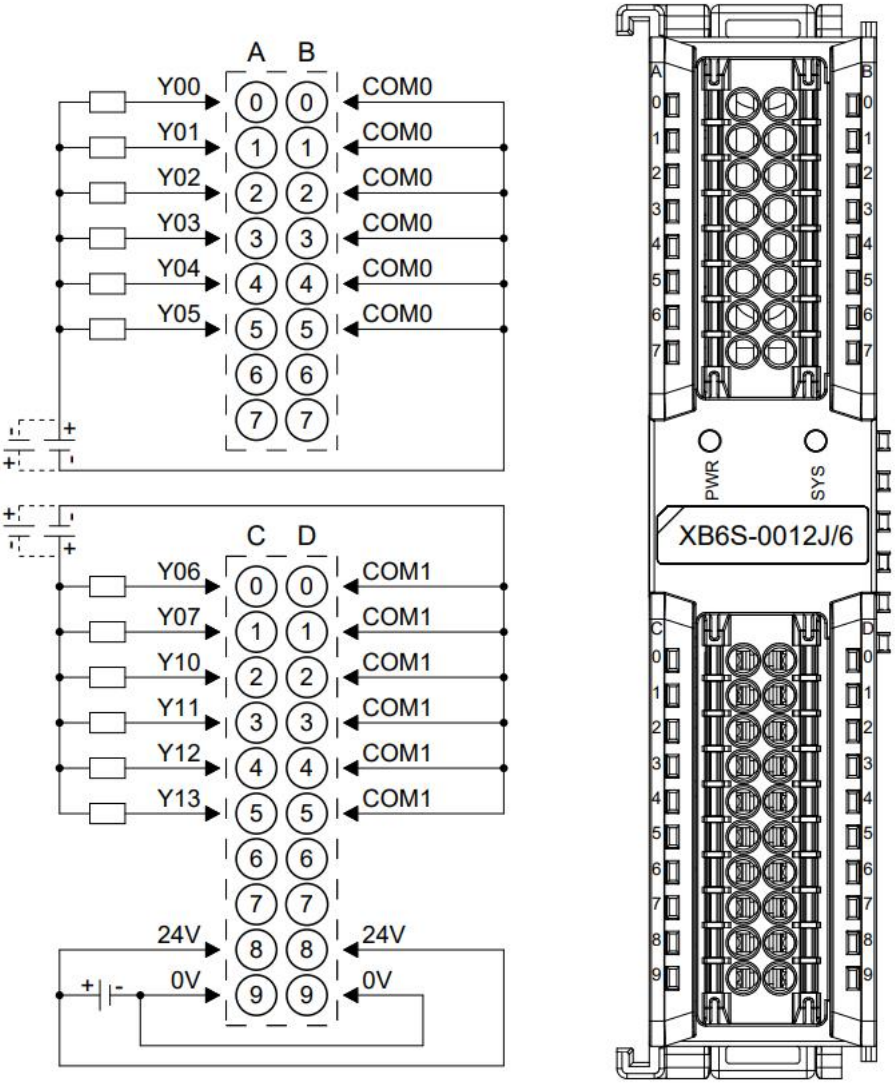


3.2.4.11 XB6S-0008B





3.2.4.12 XB6S-0012J/6

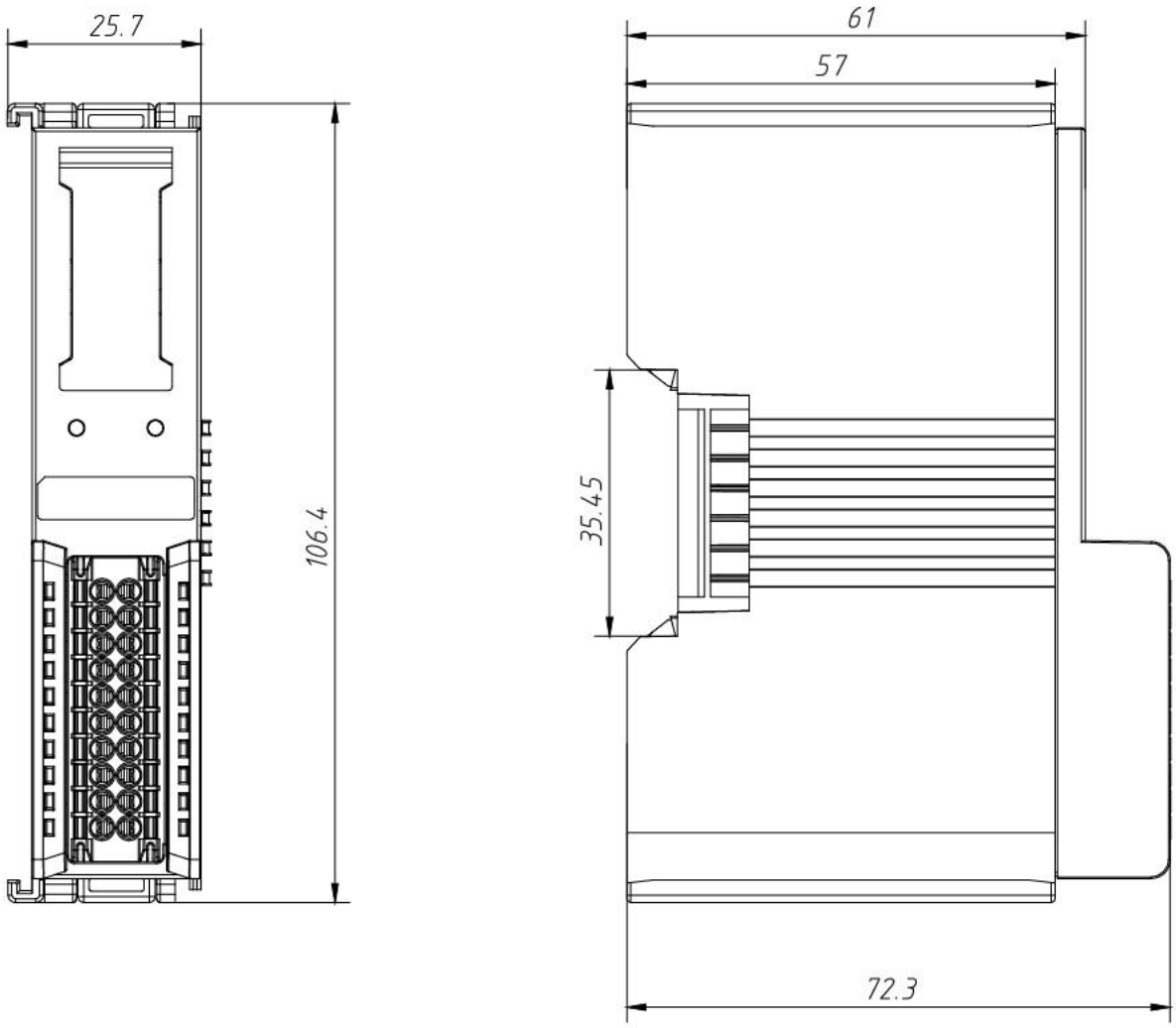


*24V internal conduction; 0V internal conduction

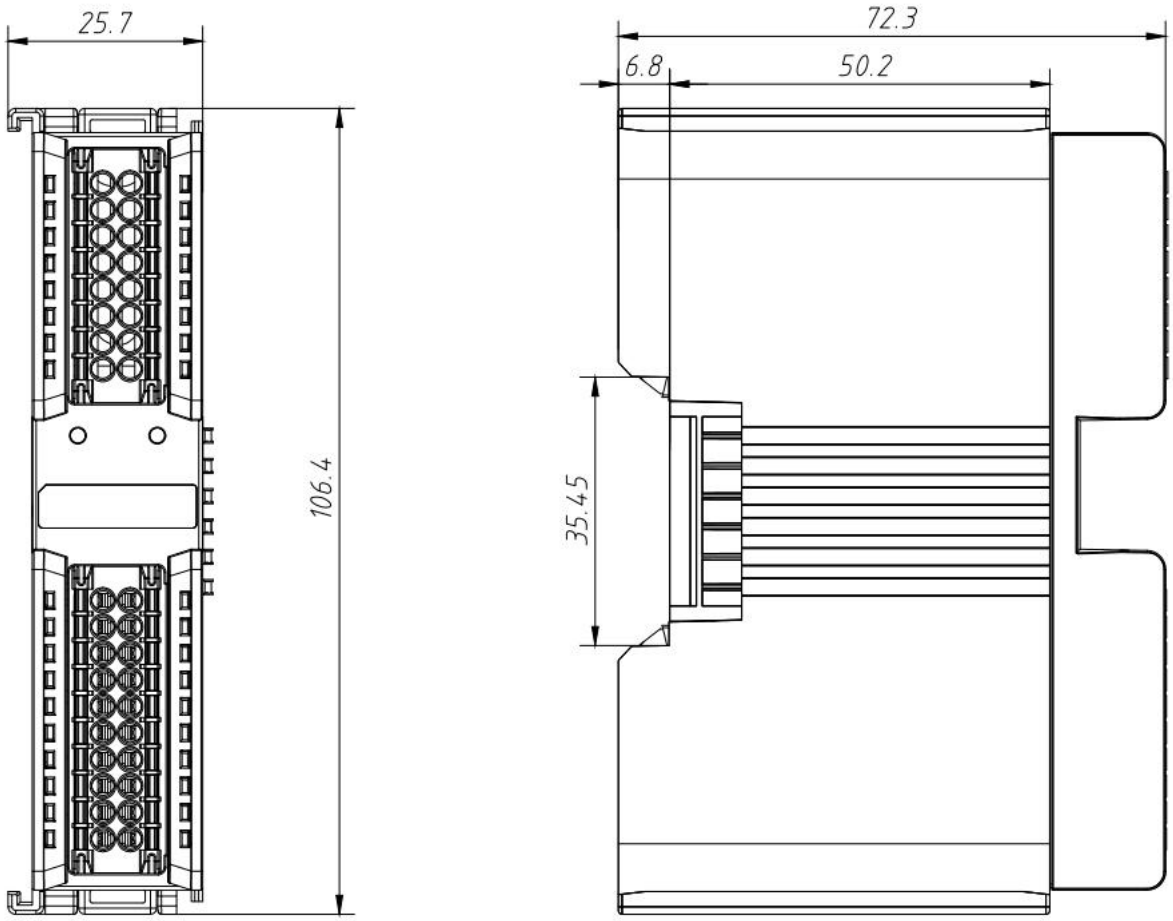
*COM0 is internally conductive; COM1 is internally conductive

3.2.5 Dimensions

8/16-channel digital I/O module dimensions (in mm)

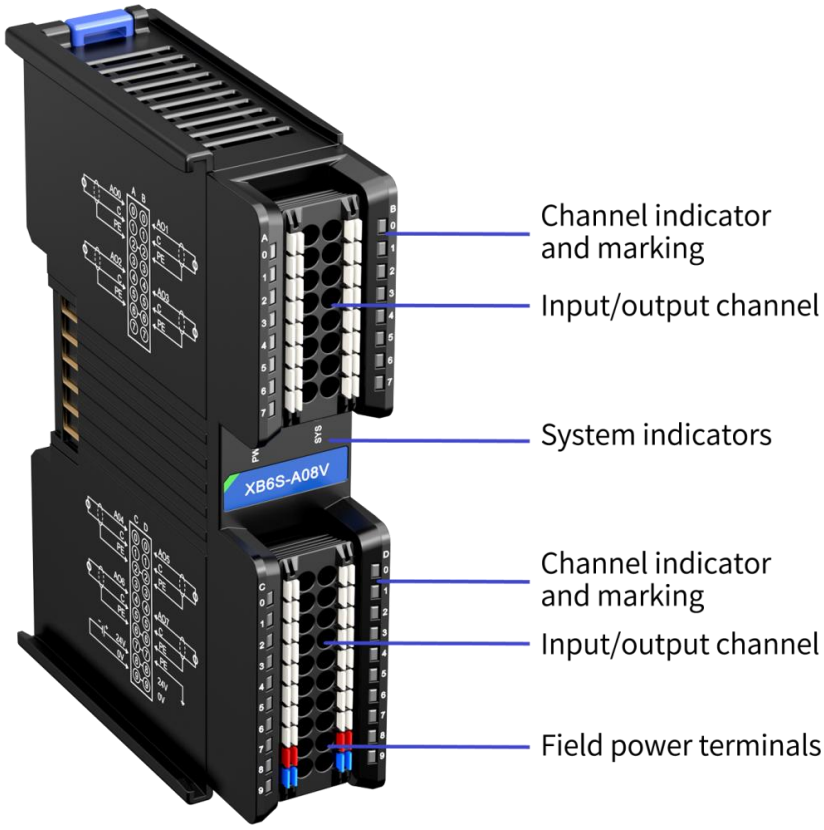


32-channel digital I/O module dimensions (in mm)



3.3 Analog I/O Modules

3.3.1 Panel structure



3.3.2 Indicator light function

Analog I/O module indicator light definition				
Logo	**Name**	**Color**	**State**	**Status description**
PWR	Power indicator	Green	Always on	Power supply is normal
			Off	The product is not powered on or the power supply is abnormal
SYS	Operation status indicator	Green	Always on	The system is running normally
			Flashing 1Hz	No business data interaction, waiting to establish business data interaction
			Flashing 10Hz	Firmware Upgrade
			Off	System not working
0~7	Input channel indicator	Green	Always on	The module channel has signal input
			Off	The module channel has no signal input or the signal input is abnormal
0~7	Output channel indicator	Green	Always on	The module channel has signal output
			Off	The module channel has no signal output or the signal output is abnormal

3.3.3 Technical Parameters

3.3.3.1 Analog input module parameters

Analog input		
Product Model	XB6S-A80VD	XB6S-A80ID
Bus input power rated voltage	5VDC (4.5V~5.5V)	
Bus input power rated current	≤210mA	
Enter points	8	8
Input Type	Voltage Type	Current Type
Input signal	Disable、-10V~+10V、0V~10V、-5V~+5V, 0V~5V, 1V~5V (range adjustable, default is 0V~10V)	Disable, 4mA~20mA, 0mA~20mA, -20mA~+20mA (The range is adjustable, the default is 4mA~20mA)
Input signal type	Differential signal	
Channel response time	550us/ch 850us/8ch	
Resolution	16 bits	
Sampling rate (all channels)	≤1ksps	
Accuracy	±0.1% at 25°C, ±0.3% over the entire temperature range	
Input filtering	Support	
Smoothing series	1~200	
Input impedance (voltage)	⩾1MΩ	-
Input impedance (current)	-	≤250Ω
Common mode voltage range	12VAC	-
Maximum voltage allowed by the channel (voltage)	30V	-
Maximum current allowed by the channel (current)	-	30mA
The system cannot be affected	When the ±15V power supply is damaged and short-circuited, the system +5V power supply cannot be affected	
Potential isolation	No isolation between channels, isolation between channels and backplane bus, isolation between channels and supply voltage	
Input overload protection	Support clamp protection	Support current limiting protection
Input protection	±30V	±30mA
Isolation withstand voltage	500VDC	
Rated current consumption	210mA	
Power consumption	1.05W	
Channel indicator light	Green LED light	

Analog input		
Product Model	XB6S-A80V	XB6S-A80I
Bus input power rated voltage	5VDC (4.5V~5.5V)	
Bus input power rated current	≤260mA	≤110mA
Enter points	8	8
Input Type	Voltage	Current
Input signal	Disable、-10V~+10V、0V~10V、-5V~+5V, 0V~5V, 1V~5V (range adjustable, default is 0V~10V)	Disable, 4mA~20mA, 0mA~20mA (range adjustable, default is 4mA~20mA)
Input signal type	Single-ended signal	
Channel response time	560us/ch 770us/8ch	
Resolution	16 bits	
Sampling rate (all channels)	≤1ksps	
Accuracy	±0.1% at 25°C, ±0.3% over the entire temperature range	
Input filtering	Support	
Smoothing series	1~200	
Input impedance (voltage)	⩾400kΩ	-
Input impedance (current)	-	≤100Ω
Maximum voltage allowed by the channel (voltage)	30V	-
Maximum current allowed by the channel (current)	-	30mA
The system cannot be affected	When the ±15V power supply is damaged and short-circuited, the system +5V power supply cannot be affected	
Potential isolation	No isolation between channels, isolation between channels and backplane bus, isolation between channels and supply voltage	
Input overload protection	Support clamp protection	Support current limiting protection
Input protection	±30V	±30mA
Isolation withstand voltage	500VDC	
Rated current consumption	260mA	110mA
Power consumption	1.35W	0.55W
Channel indicator light	Green LED light	

Analog input		
Product Model	XB6S-A40VD	XB6S-A40ID
Bus input power rated voltage	5VDC (4.5V~5.5V)	
Bus input power rated current	≤150mA	
Enter points	4	4
Input Type	Voltage	Current
Input signal	Disable、-10V~+10V、0V~10V、-5V~+5V, 0V~5V, 1V~5V (range adjustable, default is 0V~10V)	Disable, 4mA~20mA, 0mA~20mA, -20mA~+20mA (range adjustable, default is 4mA~20mA)
Input signal type	Differential signal	
Channel response time	300us/ch 600us/4ch	
Resolution	16 bits	
Sampling rate (all channels)	≤1ksps	
Accuracy	±0.1% at 25°C, ±0.3% over the entire temperature range	
Input filtering	Support	
Smoothing series	1~200	
Input impedance (voltage)	⩾1MΩ	-
Input impedance (current)	-	≤250Ω
Common mode voltage range	12VAC	-
Maximum voltage allowed by the channel (voltage type)	30V	-
Maximum current allowed by the channel (current type)	-	30mA
The system cannot be affected	When the ±15V power supply is damaged and short-circuited, the system +5V power supply cannot be affected	
Potential isolation	No isolation between channels, isolation between channels and backplane bus, isolation between channels and supply voltage	
Input overload protection	Support clamp protection	Support current limiting protection
Input protection	±30V	±30mA
Isolation withstand voltage	500VDC	
Rated current consumption	150mA	
Power consumption	0.75W	
Channel indicator light	Green LED light	

Analog input		
Product Model	XB6S-A40V	XB6S-A40I
Bus input power rated voltage	5VDC (4.5V~5.5V)	
Bus input power rated current	≤180mA	≤100mA
Enter points	4	4
Input Type	Voltage Type	Current Type
Input signal	Disable、-10V~+10V、0V~10V、-5V~+5V, 0V~5V, 1V~5V (range adjustable, default is 0V~10V)	Disable, 4mA~20mA, 0mA~20mA (The range is adjustable, the default is 4mA~20mA)
Input signal type	Single-ended signal	
Channel response time	400us/ch 700us/4ch	300us/ch 600us/4ch
Resolution	16 bits	
Sampling rate (all channels)	≤1ksps	
Accuracy	±0.1% at 25°C, ±0.3% over the entire temperature range	
Input filtering	support	
Smoothing series	1~200	
Input impedance (voltage type)	⩾400kΩ	-
Input impedance (current type)	-	≤100Ω
Maximum voltage allowed by the channel (voltage type)	30V	-
Maximum current allowed by the channel (current type)	-	30mA
The system cannot be affected	When the ±15V power supply is damaged and short-circuited, the system +5V power supply cannot be affected	
Potential isolation	No isolation between channels, isolation between channels and backplane bus, isolation between channels and supply voltage	
Input overload protection	Support clamp protection	Support current limiting protection
Input protection	±30V	±30mA
Isolation withstand voltage	500VDC	
Rated current consumption	180mA	100mA
Power consumption	0.95W	0.5W
Channel indicator light	Green LED light	

3.3.3.2 Analog output module parameters

Analog output		
Product Model	XB6S-A08V	XB6S-A08I
Bus input power rated voltage	5VDC (4.5V~5.5V)	
Bus input power rated current	≤100mA	
Field side input voltage range	24VDC (20.4V~28.8V)	
Output points	8	8
Output Type	Voltage	Current
Output signal	Disable、-10V~+10V、0V~10V、-5V~+5V, 0V~5V, 1V~5V (range adjustable, default is 0V~10V)	Disable, 4mA~20mA, 0mA~20mA (range adjustable, default is 4mA~20mA)
Channel response time	400us/ch 400us/8ch	400us/ch 400us/8ch
Resolution	16 bits	
Accuracy	±0.1% at 25℃, ±0.3% over the entire temperature range	
Load impedance (voltage)	≥2kΩ (1kΩ accuracy: ±3‰ at 25℃, ±5‰ at full temperature)	-
Load impedance (current)	-	≤500Ω
The system cannot be affected	When the ±15V power supply is damaged and short-circuited, the system +5V power supply cannot be affected	
Output protection	Overload protection, open circuit protection, short circuit protection (all with automatic recovery mechanism)	
Potential isolation	No isolation between channels, isolation between channels and backplane bus, isolation between channels and supply voltage	
Isolation withstand voltage	500VDC	
Rated current consumption	100mA	
Power consumption	0.5W	
Clear and keep optional functions in non-OP state	Support	
Channel indicator light	Green LED light	

Analog output		
Product Model	XB6S-A04V	XB6S-A04I
Bus input power rated voltage	5VDC (4.5V~5.5V)	
Bus input power rated current	≤80mA	
Field side input voltage range	24VDC (20.4V~28.8V)	
Output points	4	4
Output Type	Voltage	Current
Output signal	Disable、-10V~+10V、0V~10V、-5V~+5V, 0V~5V, 1V~5V (range adjustable, default is 0V~10V)	Disable, 4mA~20mA, 0mA~20mA (The range is adjustable, the default is 4mA~20mA)
Channel response time	200us/ch 200us / 4ch	
Resolution	16 bits	
Accuracy	±0.1% at 25°C, ±0.3% over the entire temperature range	
Load impedance (voltage)	⩾2kΩ (1kΩ accuracy: ±3‰ at 25℃, ±5‰ at full temperature)	-
Load impedance (current)	-	≤500Ω
The system cannot be affected	When the ±15V power supply is damaged and short-circuited, the system +5V power supply cannot be affected	
Output protection	Overload protection, open circuit protection, short circuit protection (all with automatic recovery mechanism)	
Potential isolation	No isolation between channels, isolation between channels and backplane bus, isolation between channels and supply voltage	
Isolation withstand voltage	500VDC	
Rated current consumption	80mA	
Power consumption	0.4W	
Clear and keep optional functions in non-OP state	Support	
Channel indicator light	Green LED light	

3.3.3.3 General technical parameters

General technical parameters	
Specifications and dimensions	106.4 × 25.7 × 72.3mm
Weight	8-channel AIO: 125g
	4-channel AIO: 105g
Operating temperature	-20℃~+60℃
Storage temperature	-40℃~+80℃
Relative humidity	95%, non-condensing
Altitude	≤2000m
Pollution degree	Level 2
Protection level	IP20
Safety Certification	UL certification, CE certification
Green Environmental Certification	RoHS certification, REACH certification

3.3.4 Analog voltage parameters

3.3.4.1 Voltage input range selection table

Voltage input range selection and code value range					
Range selection	Range	Code value range	Voltage input calculation formula	Voltage output calculation formula	Code value correspondence table
0	Disable: indicates that the channel is disabled.				
1	-10V~+10V	-32768~32767	D=(65535/20)*U	U=(D*20)/65535	See also3.3.4.3 Voltage Input Code Value Table
2	0V~10V	0~32767	D=(32767/10)*U	U=(D*10)/32767	
3	-10V~+10V	-27648~27648	D=(55296/20)*U	U=(D*20)/55296	
4 (default)	0V~10V	0~27648	D=(27648/10)*U	U=(D*10)/27648	
5	-5V~+5V	-27648~27648	D=(55296/10)*U	U=(D*10)/55296	
6	0V~5V	0~27648	D=(27648/5)*U	U=(D*5)/27648	
7	1V~5V	0~27648	D=(27648/4)*U-6912	U=(D+6912)*4/27648	

Note: D represents the code value, U represents the voltage, and the analog voltage input module range defaults to 4: 0V~10V (0~27648).

3.3.4.2 Voltage output range selection table

Voltage output range selection and code value range					
Range selection	Range	Code value range	Voltage input calculation formula	Voltage output calculation formula	Code value correspondence table
0	Disable: indicates that the channel is disabled.				
1	-10V~+10V	-32768~32767	D=(65535/20)*U	U=(D*20)/65535	See also3.3.4.4 Voltage output code value table
2	0V~10V	0~32767	D=(32767/10)*U	U=(D*10)/32767	
3	-10V~+10V	-27648~27648	D=(55296/20)*U	U=(D*20)/55296	
4 (default)	0V~10V	0~27648	D=(27648/10)*U	U=(D*10)/27648	
5	-5V~+5V	-27648~27648	D=(55296/10)*U	U=(D*10)/55296	
6	0V~5V	0~27648	D=(27648/5)*U	U=(D*5)/27648	
7	1V~5V	0~27648	D=(27648/4)*U-6912	U=(D+6912)*4/27648	

Note: D represents the code value, U represents the voltage, and the analog voltage output module range defaults to 4: 0V~10V (0~27648).

3.3.4.3 Voltage Input Code Value Table

Range / Voltage	-10V~+10V	0V~10V	-10V~+10V	0V~10V
	-32768~32767	0~32767	-27648~27648	0~27648
	Code value	Code value	Code value	Code value
-10.13	-	-	-27980	-
-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	-
-0.13	-426	-384	-359	-332
-0.06	-197	-197	-166	-156
0	0	0	0	0
1	3277	3277	2765	2765
2	6554	6554	5530	5530
3	9830	9830	8294	8294
4	13107	13107	11059	11059
5	16384	16384	13824	13824
6	19661	19661	16589	16589
7	22937	22937	19354	19354
8	26214	26214	22118	22118
9	29491	29491	24883	24883
10	32767	32767	27648	27648
10.12	-	-	27980	27980
Code value formula	Code value =(65535/20)*Voltage	Code value =(32767/10)*Voltage	Code value =(55296/20)*Voltage	Code value =(27648/10)*Voltage
Voltage formula	Voltage =(Code value*20) /65535	Voltage =(Code value*10) /32767	Voltage =(Code value*20) /55296	Voltage =(Code value*10) /27648

Note: ① When the voltage input module range is selected as -10V~+10V (-32768~32767), it supports the overflow function, that is, when the channel input voltage is greater than 10V, the maximum code value 32767 is displayed; when the input channel input voltage is less than -10V, the minimum code value is displayed.-32768.

②When the voltage input module range is selected as 0V~10V (0~32767), it supports underflow, overshoot, overflow and underflow alarm functions. Overshoot means that the channel input range exceeds the range and enters overshoot, and the normal calculation code value is displayed within -0.13V~+10V. When the channel input voltage is greater than 10V, the maximum code value 32767 is

displayed; when the input channel input voltage is less than -0.13V, the minimum overshoot code value is displayed.-384,Simultaneous alarm.

③Voltage input module range selection -10V~+10V(-27648~27648) supports overshoot, overflow, underflow and underflow alarm functions. Overshoot means that the channel input range exceeds the range and enters overshoot, and the normal calculation code value is displayed within -10.13V~+10.12V. Underflow means that when the channel input voltage is greater than 10.12V, the maximum overshoot code value 27980 is displayed, and an alarm is issued at the same time; when the input channel input voltage is less than -10.13V, the minimum overshoot code value is displayed-27980, alarm at the same time.

④Voltage input module range selection 0V~10V (0~27648) supports overshoot, overflow, underflow and underflow alarm functions. Overshoot means that the channel input range exceeds the range and enters overshoot, and the normal calculation code value is displayed within -0.13V~+10.12V. Underflow means that when the channel input voltage is greater than 10.12V, the maximum overshoot code value 27980 is displayed, and an alarm is issued at the same time; when the input channel input voltage is less than -0.13V, the minimum overshoot code value is displayed-332, alarm at the same time.

Range / Voltage	-5V~+5V	0V~5V	1V~5V
	-27648~27648	0~27648	0~27648
	Code value	Code value	Code value
-5.07	-27980	-	-
-5	-27648	-	-
-4	-22118	-	-
-3	-16588	-	-
-2	-11060	-	-
-1	-5530	-	-
-0.07	-332	-332	-
0	0	0	-
0.94	5198	5198	-345
1	5530	5530	0
2	11060	11060	6912
3	16588	16588	13824
4	22118	22118	20736
5	27648	27648	27648
5.06	27980	27980	27933
Code value formula	Code value=(55296/10)*Voltage	Code value=(27648/5)*Voltage	Code value=(27648/4)*Voltage-6912
Voltage formula	Voltage=(Code value*10)/55296	Voltage=(Code value*5)/27648	Voltage=(Code value+6912)*4/27648

Note:① Voltage input module range selection Overshoot, overflow, underflow and underflow alarm functions are supported when -5V~+5V(-27648~27648). Overshoot means that the channel input range exceeds the range and enters overshoot, and the normal calculation code value is displayed within -5.07V~+5.06V. Underflow means that when the channel input voltage is greater than 5.06V, the

maximum overshoot code value 27980 is displayed, and an alarm is issued at the same time; when the input channel input voltage is less than -5.07V, the minimum overshoot code value -27980 is displayed, and an alarm is issued at the same time.

②Voltage input module range selection 0V~5V (0~27648) supports overshoot, overflow, underflow and underflow alarm functions. Overshoot means that the channel input range exceeds the range and enters overshoot, and the normal calculation code value is displayed within -0.07V~+5.06V. Underflow means that when the channel input voltage is greater than 5.06V, the maximum overshoot code value 27980 is displayed, and an alarm is issued at the same time; when the input channel input voltage is less than -0.07V, the minimum overshoot code value is displayed-332, alarm at the same time.

③Voltage input module range selection 1V~5V (0~27648) supports overshoot, overflow, and overflow alarm functions. Overshoot means that the channel input range exceeds the range and enters overshoot, and the normal calculation code value is displayed within 0.94V~5.06V. Overflow means that when the channel input voltage is greater than 5.06V, the maximum overshoot code value 27933 is displayed, and an alarm is issued at the same time; when the input channel input voltage is less than 0.94V, the minimum overshoot code value is displayed-345, alarm at the same time.

3.3.4.4 Voltage output code value table

Range / Voltage	-10V~+10V	0V~10V	-10V~+10V	0V~10V
	-32768~32767	0~32767	-27648~27648	0~27648
	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	6554	5530	5530
3	9830	9830	8294	8294
4	13107	13107	11059	11059
5	16384	16384	13824	13824
6	19661	19661	16589	16589
7	22937	22937	19354	19354
8	26214	26214	22118	22118
9	29491	29491	24883	24883
10	32767	32767	27648	27648
Code value formula	Code value =(65535/20)*Voltage	Code value =(32767/10)*Voltage	Code value =(55296/20)*Voltage	Code value =(27648/10)*Voltage
Voltage formula	Voltage =(Code value*20) /65535	Voltage =(Code value*10) /32767	Voltage =(Code value*20) /55296	Voltage =(Code value*10) /27648

Note: ①The voltage output module supports **overflow and underflow** functions.When the voltage output module range is selected as -10V~+10V or 0V~10V and the code value is set greater than the maximum code value corresponding to the range, all channels output 10V voltage;

When the voltage output module range is -10V~+10V and the code value is set to be less than the minimum code value corresponding to the range, all channels output -10V voltage;

When the voltage output module range is selected as 0V~10V and the code value is set to be less than the minimum code value corresponding to the range, all channels output 0V voltage.

Range / Voltage	-5V~+5V	0V~5V	1V~5V
	-27648~27648	0~27648	0~27648
	Code value	Code value	Code value
-5	-27648	-	-
-4	-22118	-	-
-3	-16588	-	-
-2	-11060	-	-
-1	-5530	-	-
0	0	0	-
1	5530	5530	0
2	11060	11060	6912
3	16588	16588	13824
4	22118	22118	20736
5	27648	27648	27648
Code value formula	Code value=(55296/10)*Voltage	Code value=(27648/5)*Voltage	Code value=(27648/4)*Voltage-6912
Voltage formula	Voltage=(Code value*10)/55296	Voltage=(Code value*5)/27648	Voltage=(Code value+6912)*4/27648

Note:①The voltage output module supports **overflow and underflow** functions.When the voltage output module range is -5V~+5V/0V~5V/1V~5V and the code value is set greater than the maximum code value corresponding to the range, all channels output 5V voltage;

When the voltage output module range is -5V~+5V and the code value is set to be less than the minimum code value corresponding to the range, all channels output -5V voltage;

When the voltage output module range is selected as 0V~5V and the code value is set to be less than the minimum code value corresponding to the range, all channels output 0V voltage;

When the voltage output module range is selected as 1V~5V and the code value is set to be less than the minimum code value corresponding to the range, all channels output 1V voltage.

3.3.5 Analog current parameters

3.3.5.1 Current input range selection table

Current input range selection and code value range					
Range selection	Range	Code value range	Current input calculation formula	Current output calculation formula	Code value correspondence table
0	Disable: indicates that the channel is disabled.				
1	4mA~20mA	0~65535	D=(65535/16)*I-16384	I=(D+16384)*16/65535	See also3.3.5.3 Current input code value table
2	0mA~20mA	0~65535	D=(65535/20)*I	I=(D*20)/65535	
3 (default)	4mA~20mA	0~27648	D=(27648/16)*I-6912	I=((D+6912)*16)/27648	
4	0mA~20mA	0~27648	D=(27648/20)*I	I=(D*20)/27648	
5	-20mA~+20mA	0~65535	D=(65535/40)*(I+20)	I=(D*40)/65535-20	

Note: D represents the code value, I represents the current, and the default range of the analog current input module is 3: 4mA~20mA (0~27648).

Range 5: -20mA~+20mA (0~65535) is unique to the current input differential signal module.

3.3.5.2 Current output range selection table

Current output range selection and code value range					
Range selection	Range	Code value range	Current input calculation formula	Current output calculation formula	Code value correspondence table
0	Disable: indicates that the channel is disabled.				
1	4mA~20mA	0~65535	D=(65535/16*I)-16384	I=(D+16384)*16/65535	See also3.3.5.4 Current output code value table
2	0mA~20mA	0~65535	D=(65535/20)*I	I=(D*20)/65535	
3 (default)	4mA~20mA	0~27648	D=(27648/16)*I-6912	I=((D+6912)*16)/27648	
4	0mA~20mA	0~27648	D=(27648/20)*I	I=(D*20)/27648	

Note: D represents the code value, I represents the current, and the analog current output module range is 3 by default: 4mA~20mA (0~27648).

3.3.5.3 Current input code value table

Range / Current	4mA~20mA	0mA~20mA	4mA~20mA	0mA~20mA	-20mA~+20mA
	0~65535	0~65535	0~27648	0~27648	0~65535
	Code value	Code value	Code value	Code value	Code value
-20	-	-	-	-	0
-15	-	-	-	-	8192
-10	-	-	-	-	16384
-9	-	-	-	-	18022
-8	-	-	-	-	19661
-7	-	-	-	-	21299
-6	-	-	-	-	22937
-5	-	-	-	-	24576
-4	-	-	-	-	26214
-3	-	-	-	-	27852
-2	-	-	-	-	29491
-1	-	-	-	-	31129
0	-	0	-	0	32768
1	-	3277	-	1382	34406
2	-	6554	-	2765	36044
3	-	9830	-	4147	37683
4	0	13107	0	5530	39321
5	4096	16384	1728	6912	40959
6	8192	19661	3456	8294	42598
7	12288	22937	5184	9677	44236
8	16384	26214	6912	11059	45875
9	20479	29491	8640	12442	47513
10	24575	32768	10368	13824	49151
11	28671	36044	12096	15206	50790
12	32767	39321	13824	16589	52428
13	36863	42598	15552	17971	54066
14	40959	45875	17280	19354	55705
15	45055	49151	19008	20736	57343
16	49151	52428	20736	22118	58982
17	53247	55705	22464	23501	60620
18	57343	58982	24192	24883	62258
19	61439	62258	25920	26266	63897
20	65535	65535	27648	27648	65535
20.19	-	-	28034	27917	-
20.24	-	-	28085	27986	-
Code value formula	Code value = 65535/16*current-16384	Code value = (65535/20) * current	Code value = (27648/16)*current-6912	Code value = (27648/20) * current	Code value =(65535/40)*(current+20)

Note: **Range 5: -20mA~+20mA (0~65535) is unique to the current input differential signal module.**

① When the current input module range is selected as 4mA~20mA (0~65535), it supports the **overflow and underflow** function, that is, when the channel input current is greater than 20mA, the maximum code value 65535 is displayed; when the input channel input current is less than 4mA, the minimum code value is displayed.0.

②When the current input module range is selected from 0mA to 20mA (0 to 65535), it supports **overflow and underflow** functions, that is, when the channel input current is greater than 20mA, the maximum code value 65535 is displayed.; When the input channel input current is less than 0mA, the minimum code value 0 is displayed.

③When the current input module range is 4mA~20mA (0~27648), it supports **overflow, overshoot, overflow and underflow alarm** functions. Overshoot means that the channel input range exceeds the range and enters overshoot, and the normal calculation code value is displayed within 4mA~20.24mA. Overflow and underflow means that when the channel input current is greater than 20.24mA, the maximum overshoot code value is displayed.28085, and alarm at the same time; when the input channel input current is less than 4mA, the overshoot minimum code value 0 is displayed.

④When the current input module range is 0mA~20mA (0~27648), it supports **overflow, overshoot, overflow and underflow alarm** functions. Overshoot means that the channel input range exceeds the range and enters overshoot, and the normal calculation code value is displayed within 0mA~20.24mA. Overflow means that when the channel input current is greater than 20.24mA, the maximum overshoot code value is displayed.27986When the input current of the input channel is less than 0mA, the overshoot minimum code value 0 is displayed.

⑤When the current input module range is selected as -20mA~+20mA (0~65535), it supports **overflow and underflow** functions, that is, when the channel input current is greater than 20mA, the maximum code value 65535 is displayed.; Input channel input is less than-20mAWhen the current is on, the minimum code value 0 is displayed.

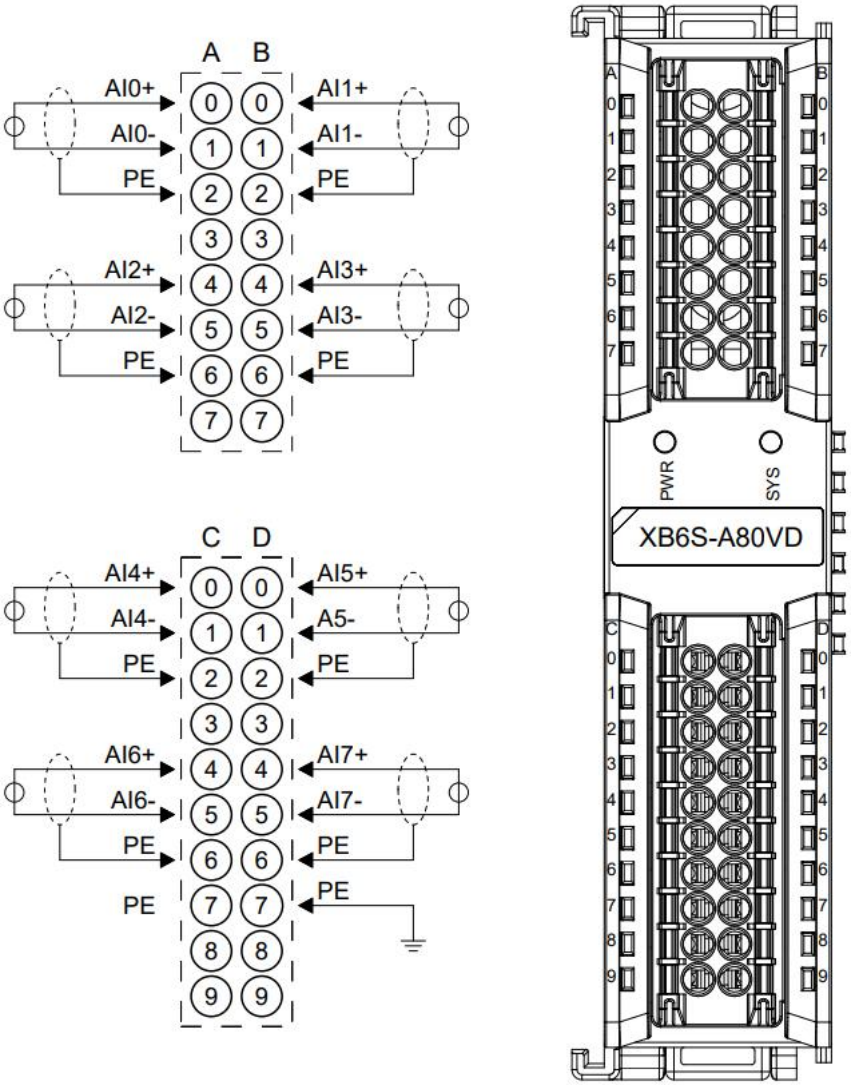
3.3.5.4 Current output code value table

Range / Current	4mA~20mA	0mA~20mA	4mA~20mA	0mA~20mA
	0~65535	0~65535	0~27648	0~27648
	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
22.81	-	-	32511	31538
23.52	-	-	-	32511
Code value formula	Code value = 65535/16*current-16384	Code value = (65535/20) * current	Code value = (27648/16)*current-6912	Code value = (27648/20) * current

Note: ① When the current output module range is selected as 4mA~20mA (0~27648) and 0mA~20mA (0~27648), it supports **overshoot, overflow and underflow**. That is, when the current output module range is selected as 4mA~20mA (0~27648) and the code value is set greater than32511When the current output module is set to 0mA~20mA (0~27648), the code value is set to be greater than32511When , each channel outputs 23.52mA current.

3.3.6 Wiring Diagram

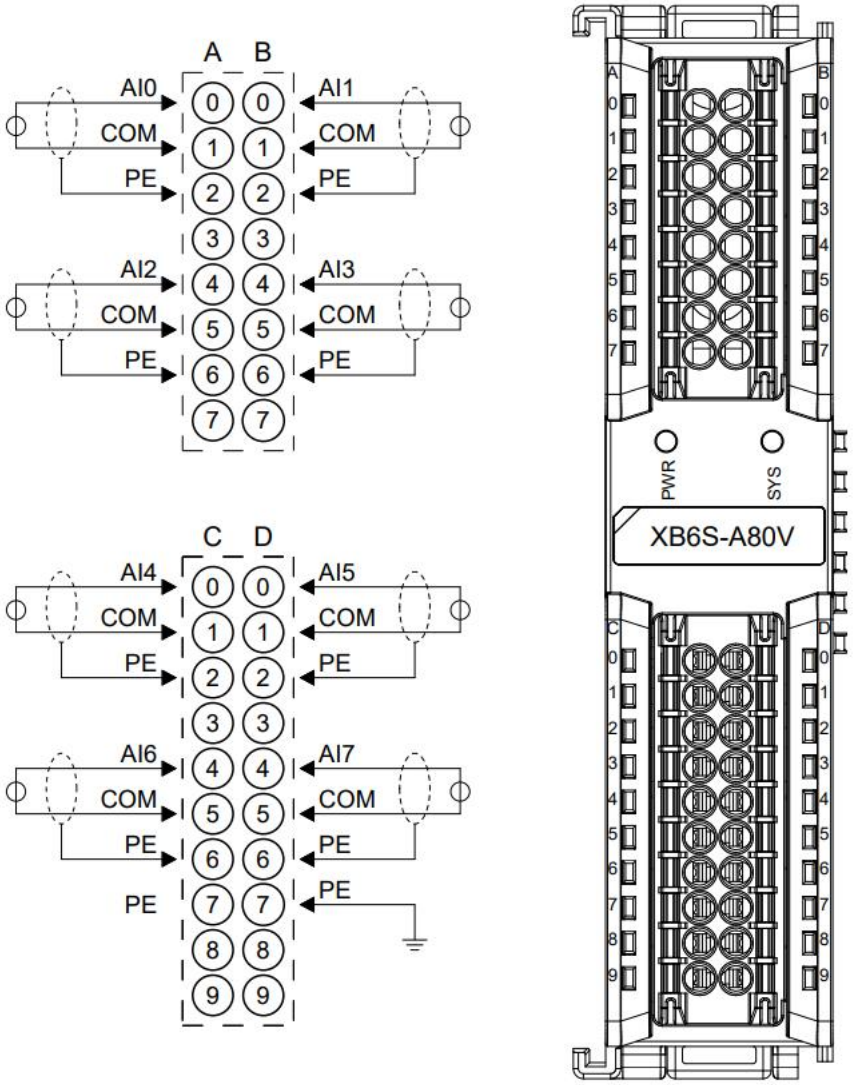
3.3.6.1 XB6S-A80VD



*All PE are internally conductive

*It is recommended to use shielded twisted pair cables, connect the shield layer to the PE port, and ground it reliably

3.3.6.2 XB6S-A80V

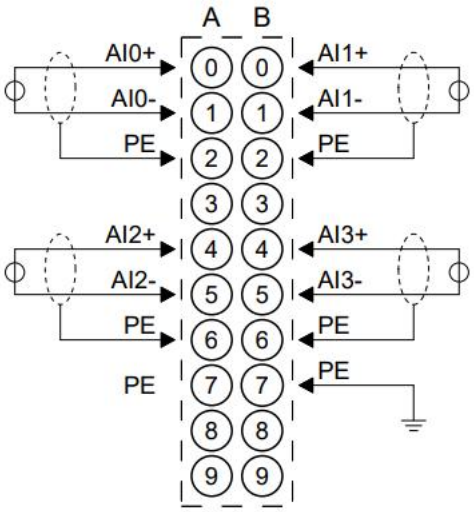


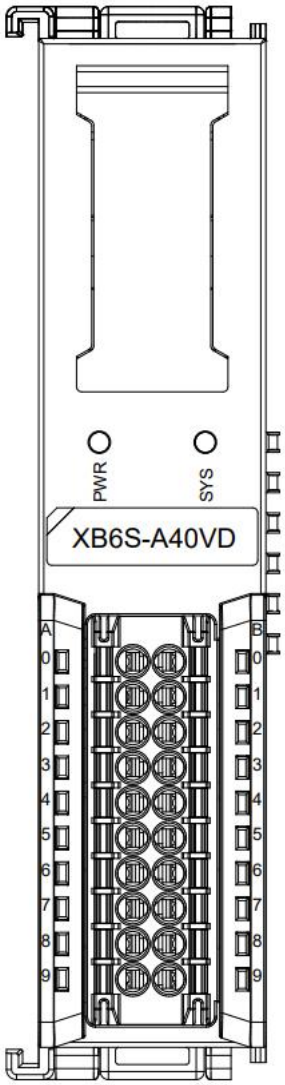
*COM is internally conductive, PE is internally conductive

*All channel loads must be from the same source

* Shielded twisted pair cables are recommended for signal cables

3.3.6.3 XB6S-A40VD

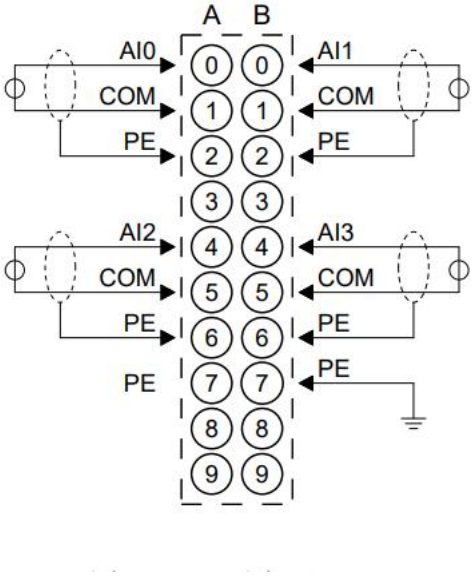


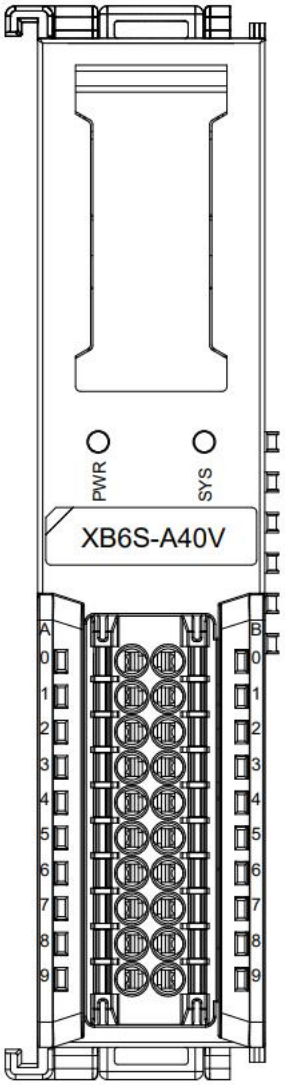


*All PE are internally conductive

*It is recommended to use shielded twisted pair cables, connect the shield layer to the PE port, and ground it reliably

3.3.6.4 XB6S-A40V



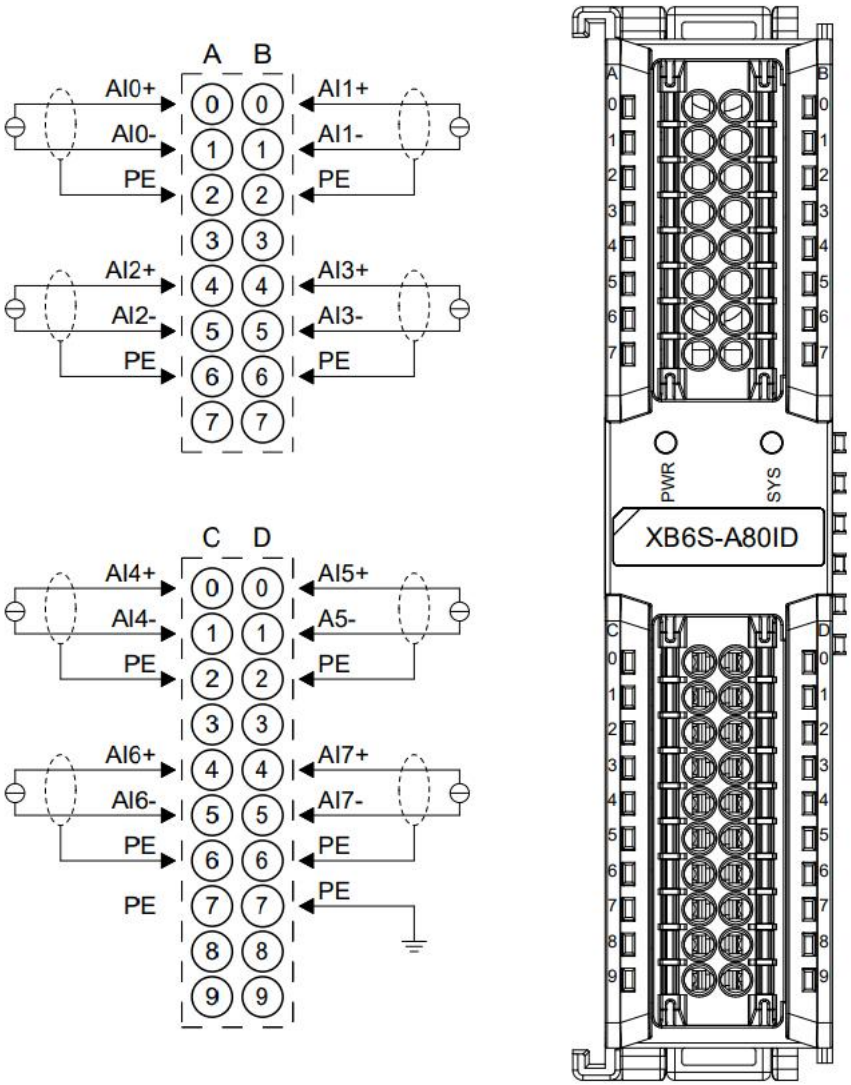


*COM is internally conductive, PE is internally conductive

*All channel loads must be from the same source

* Shielded twisted pair cables are recommended for signal cables

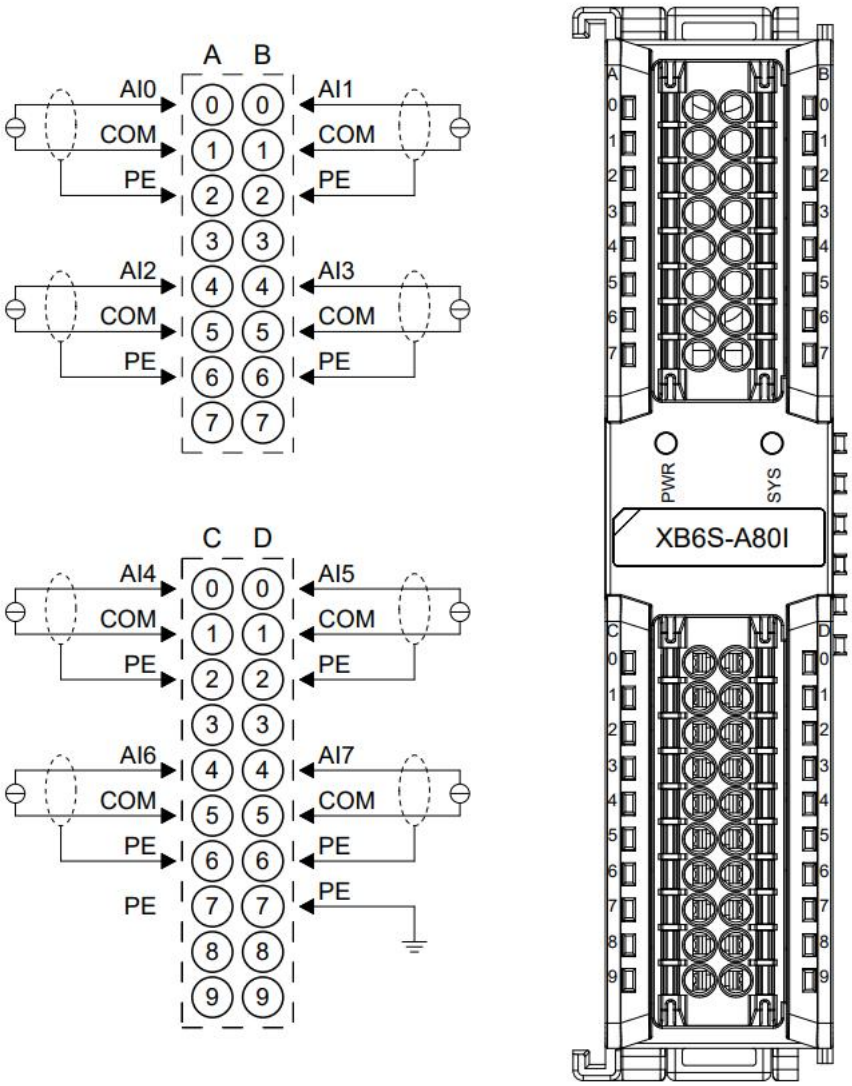
3.3.6.5 XB6S-A80ID



*All PE are internally conductive

*It is recommended to use shielded twisted pair cables, connect the shield layer to the PE port, and ground it reliably

3.3.6.6 XB6S-A80I

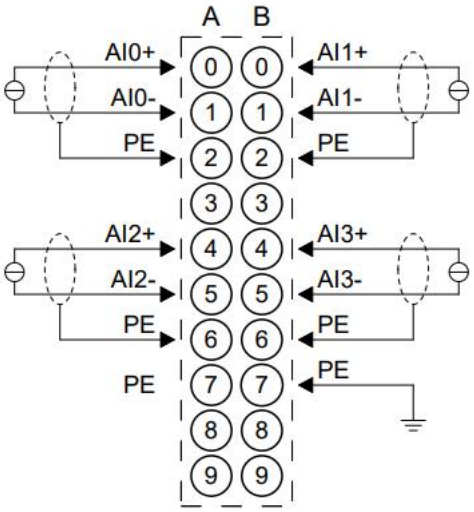


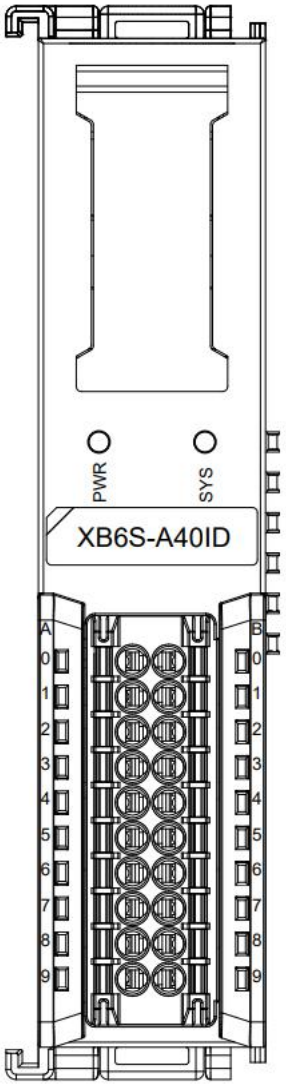
*COM is internally conductive, PE is internally conductive

*All channel loads must be from the same source

* Shielded twisted pair cables are recommended for signal cables

3.3.6.7 XB6S-A40ID

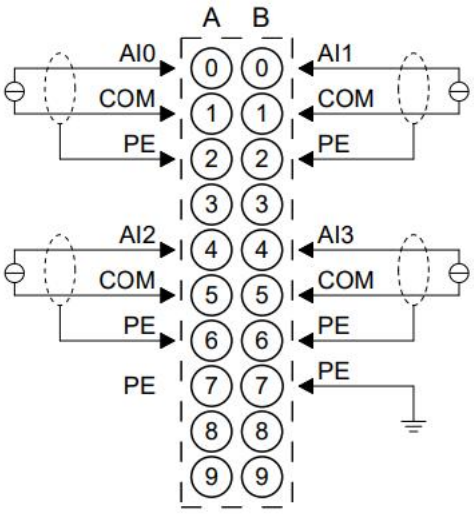


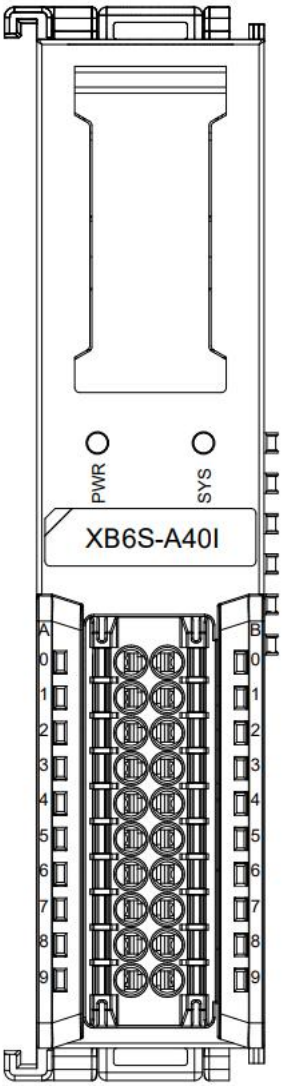


*All PE are internally conductive

*It is recommended to use shielded twisted pair cables, connect the shield layer to the PE port, and ground it reliably

3.3.6.8 XB6S-A40I



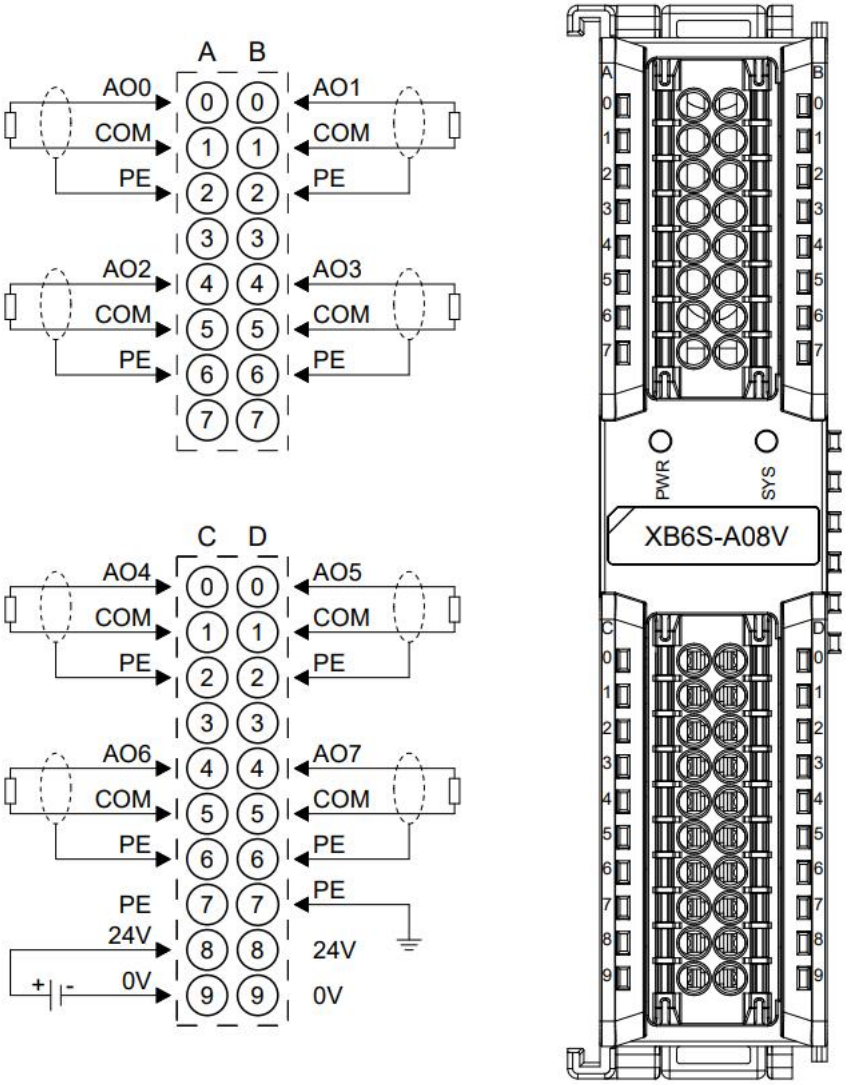


*COM is internally conductive, PE is internally conductive

*All channel loads must be from the same source

* Shielded twisted pair cables are recommended for signal cables

3.3.6.9 XB6S-A08V

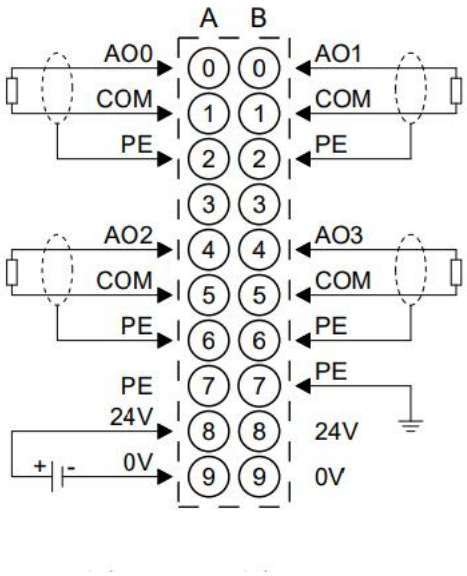


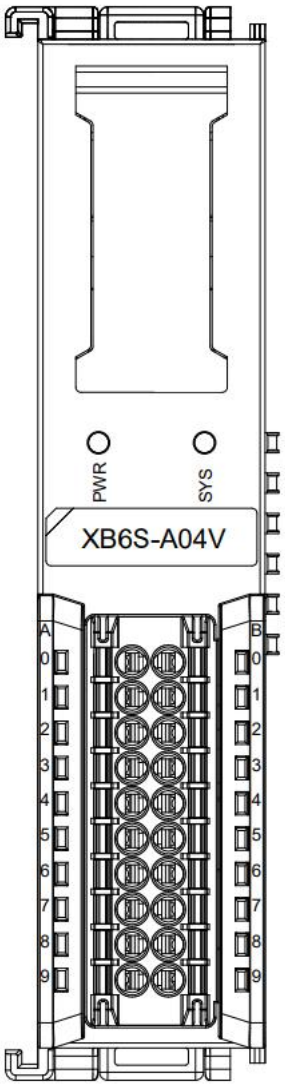
*COM is internally conductive, PE is internally conductive

*All channel loads must be from the same source

* Shielded twisted pair cables are recommended for signal cables

3.3.6.10 XB6S-A04V



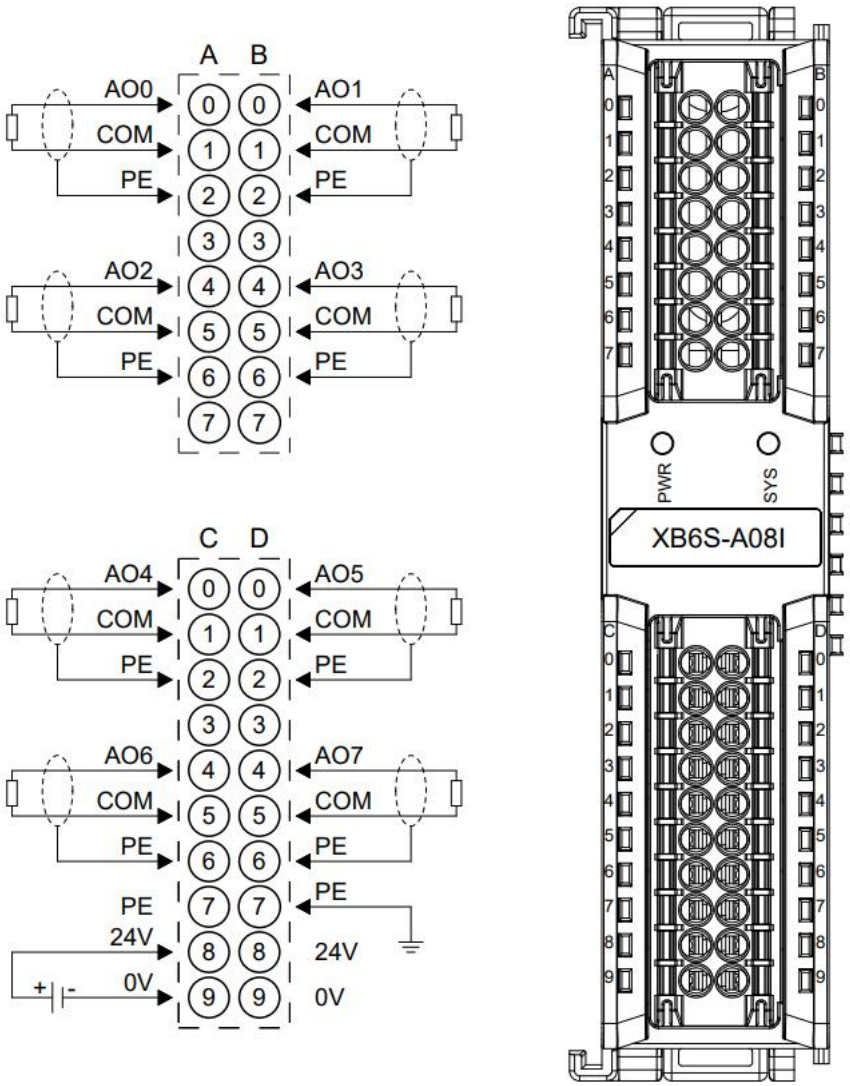


*COM is internally conductive, PE is internally conductive

*All channel loads must be from the same source

* Shielded twisted pair cables are recommended for signal cables

3.3.6.11 XB6S-A08I

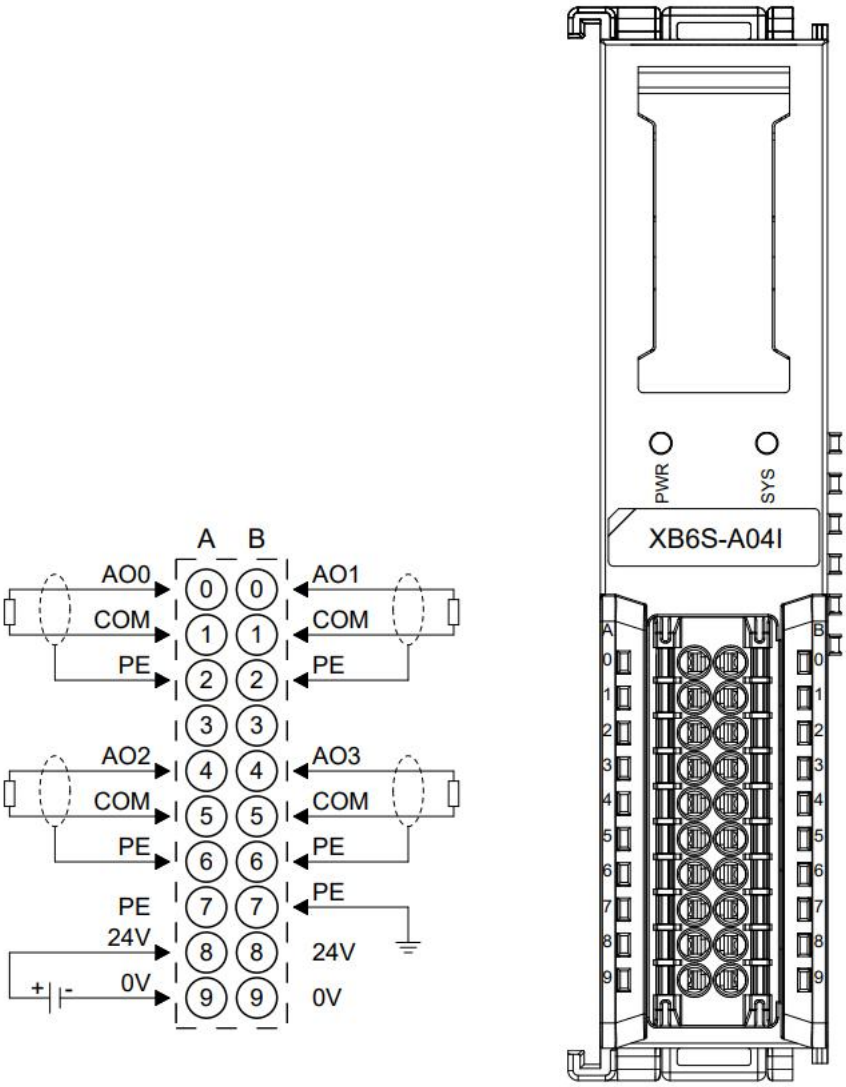


*COM is internally conductive, PE is internally conductive

*All channel loads must be from the same source

* Shielded twisted pair cables are recommended for signal cables

3.3.6.12 XB6S-A04I



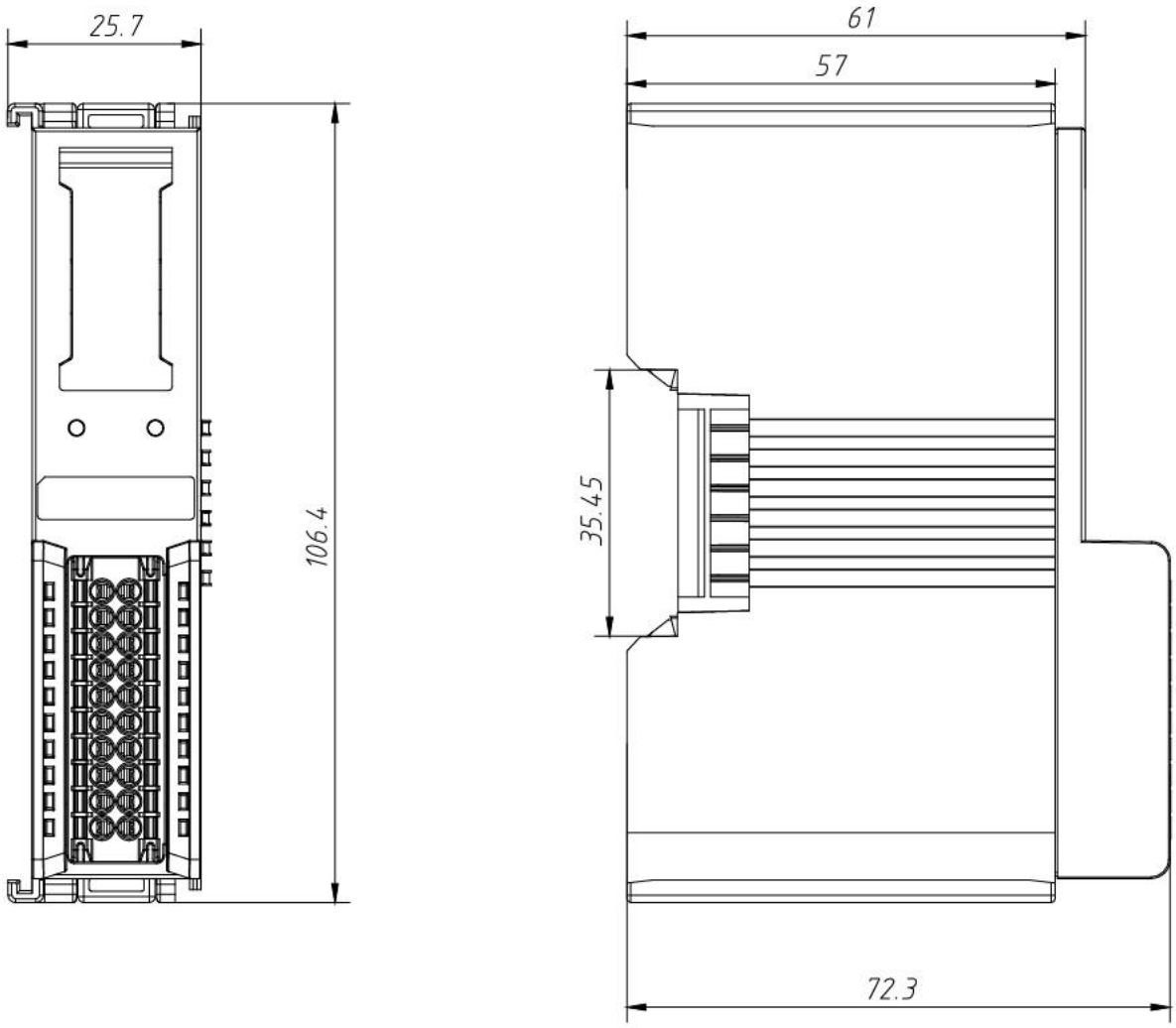
*COM is internally conductive, PE is internally conductive

*All channel loads must be from the same source

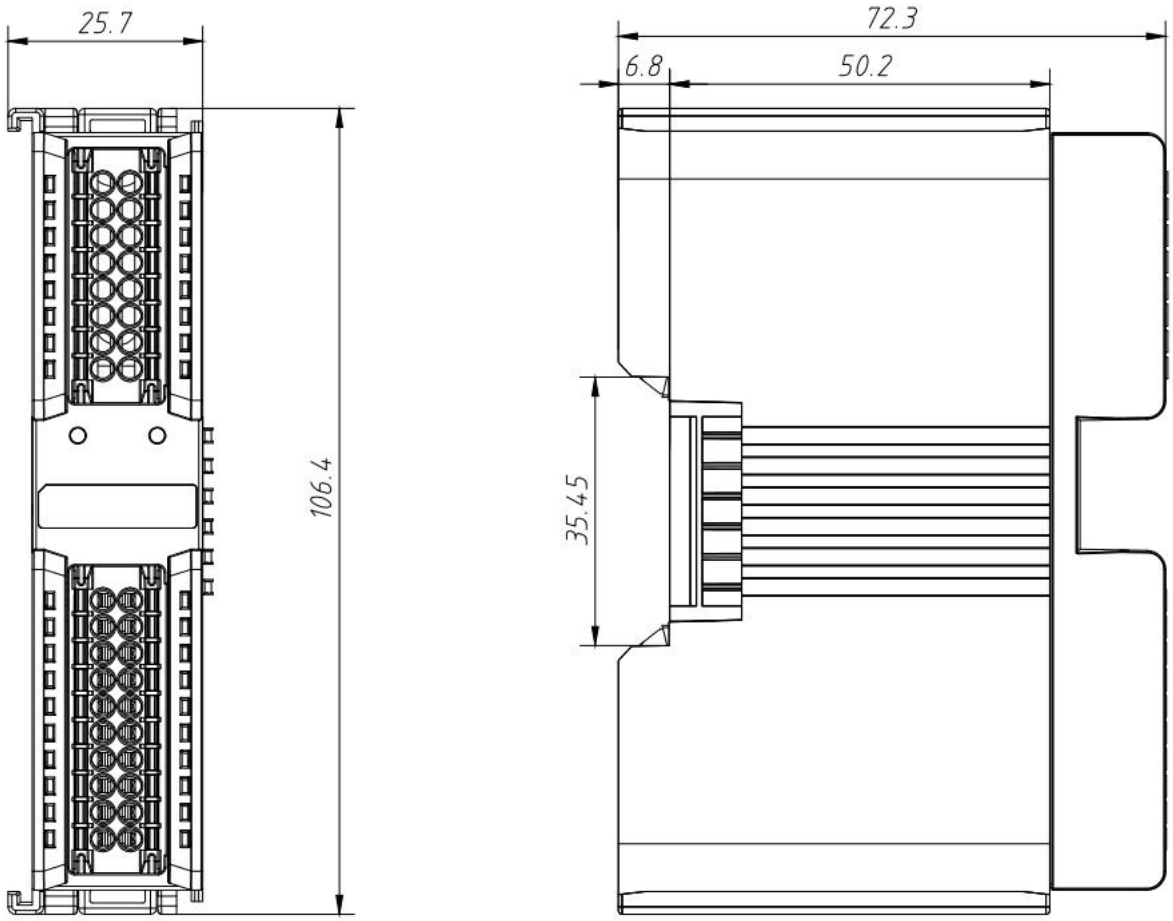
*Shielded twisted pair cables are recommended for signal cables

3.3.7 Dimensions

4-channel analog I/O module dimensions (in mm)



8-channel analog I/O module dimensions (in mm)



3.4 Extension power module

3.4.1 Panel structure

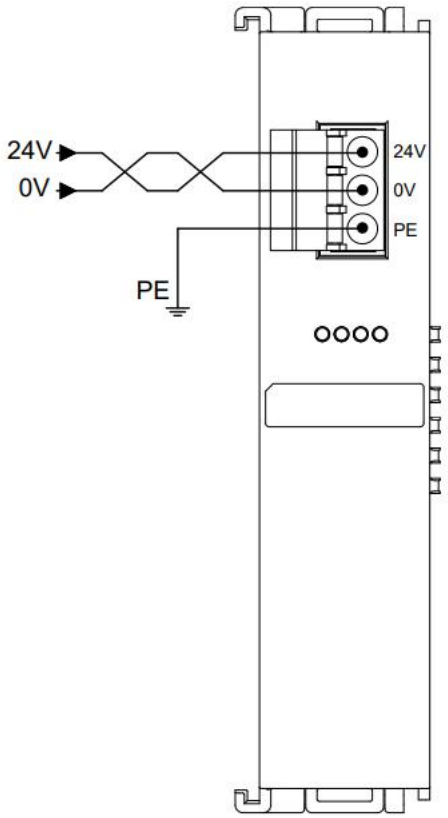
3.4.2 Indicator light function

Definition of indicator lights on the extended power module				
Logo	**Name**	**Color**	**State**	**Status description**
PWR	Power indicator	green	Always on	The module power supply is working properly
			Off	The module is not powered or the power supply is abnormal.
OVR	Overload indicator light	red	Off	Not overloaded
			Always on	The load reaches more than 90% (±5%)

3.4.3 Technical Parameters

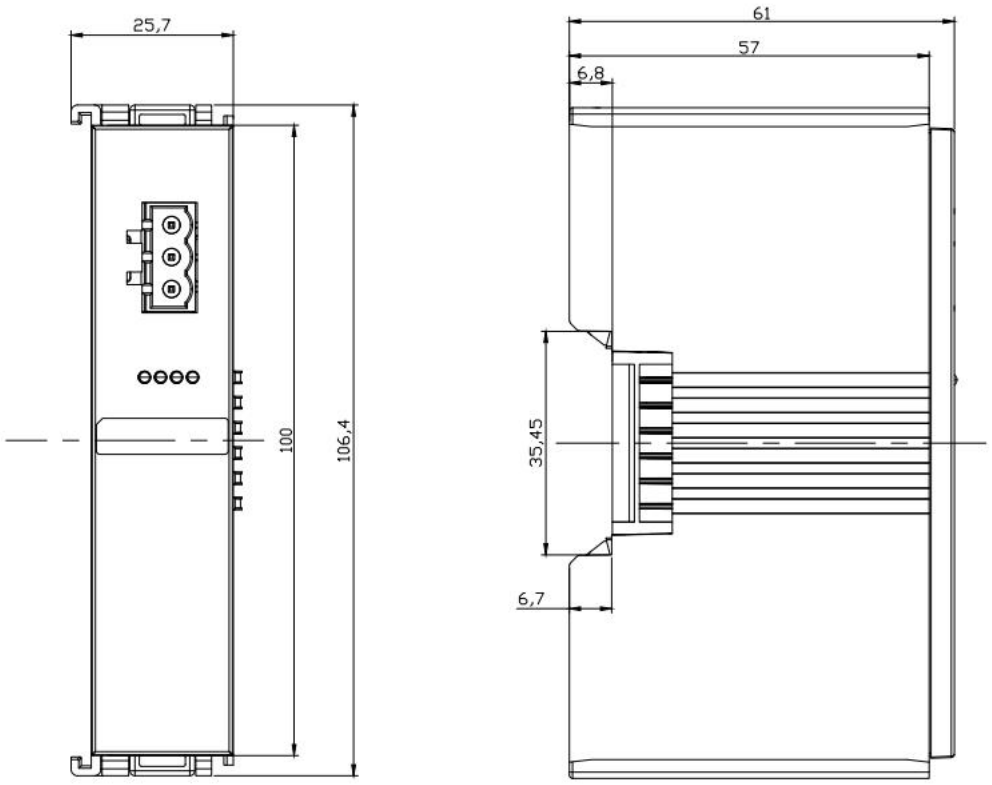
Power parameters	
Input voltage	SELV Input 24VDC (18V~36V)
Input Current	600mA (24VDC)
Output voltage	5VDC
Output Current	2A
General technical parameters	
Specifications and dimensions	106.4 × 25.7 × 61mm
weight	110g
Operating temperature	-20℃~+60℃
Storage temperature	-40℃~+80℃
Relative humidity	95%, non-condensing
Altitude	≤2000m
Pollution degree	Level 2
Short circuit protection	Support (automatic recovery mechanism)
Reverse polarity protection	Support (automatic recovery mechanism)
Surge protection	Support
Protection level	IP20
Safety Certification	UL certification, CE certification
Green Environmental Certification	RoHS certification, REACH certification

3.4.4 Wiring Diagram



3.4.5 Dimensions

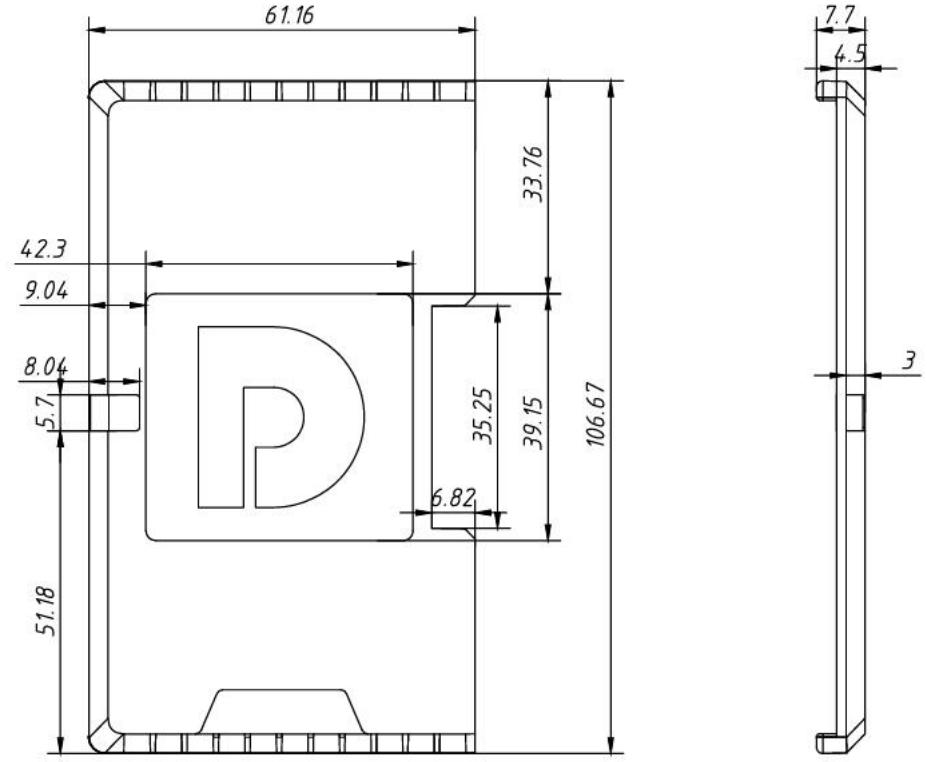
Extended power supply dimensions (in mm)



3.5 Terminal cover

3.5.1 Dimensions

Terminal cover dimensions (in mm)



Note: All are installed using DIN 35 mm standard rails, with DIN rail specifications of 35*7.5*1.0 and 35*15*1.0 (in mm).

4 Installation and removal

4.1 Installation Guide

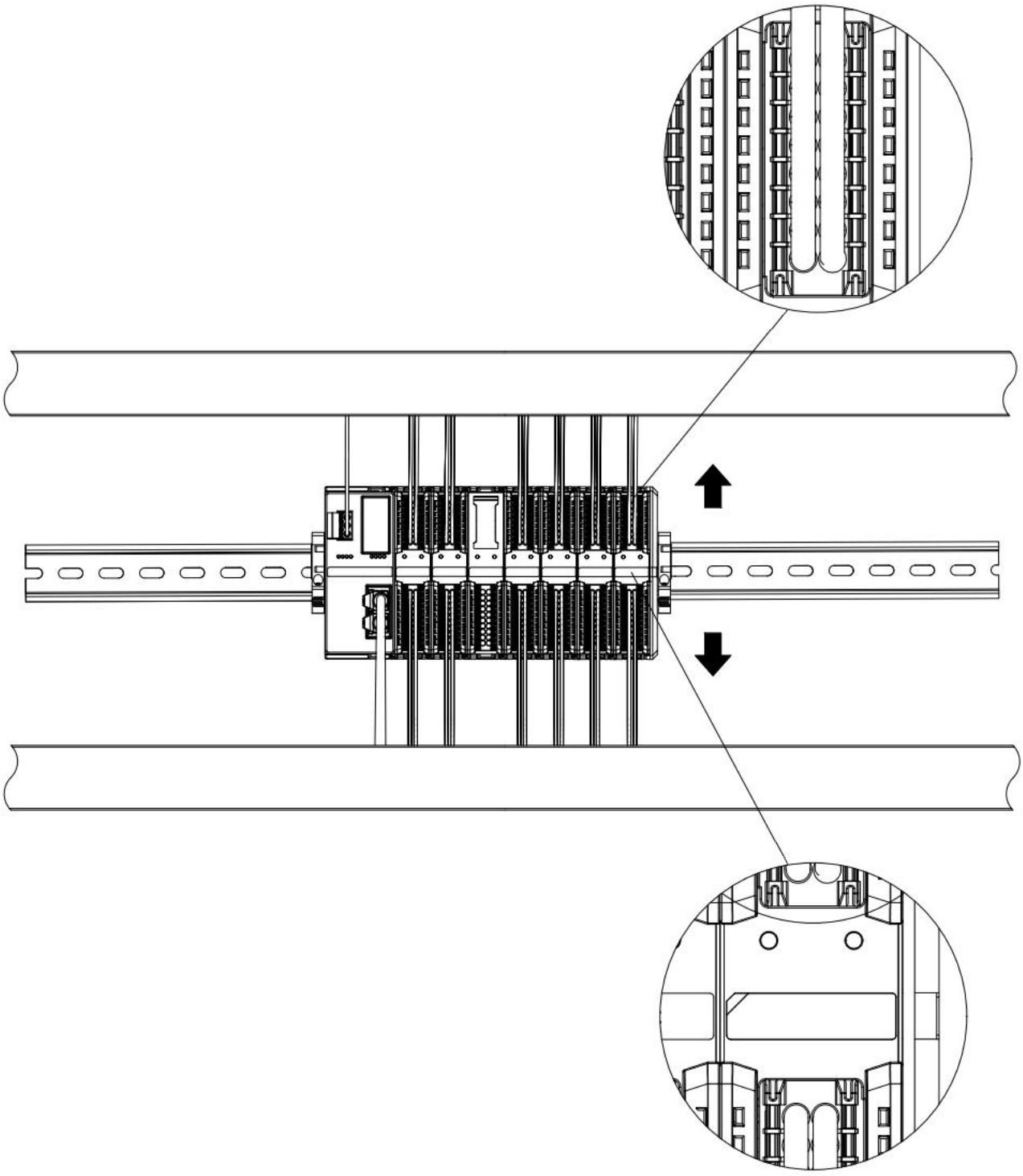
Installation\removal precautions

- **The module protection level is IP20. The module needs to be installed in a cabinet and used indoors.**
- **Ensure that the cabinet has good ventilation measures (such as installing an exhaust fan in the cabinet).**
- **Do not install this device near or over any equipment that may cause overheating.**
- **Be sure to install the module vertically on the fixed rail and maintain air circulation around it (there should be at least 50 mm of air circulation space above and below the module).**
- **After the module is installed, be sure to install the guide rail fixings at both ends to secure the module.**
- **Installation and removal must be performed with the power turned off.**
- **After the module is installed, it is recommended to wire and route the cables in an up-and-down manner.**

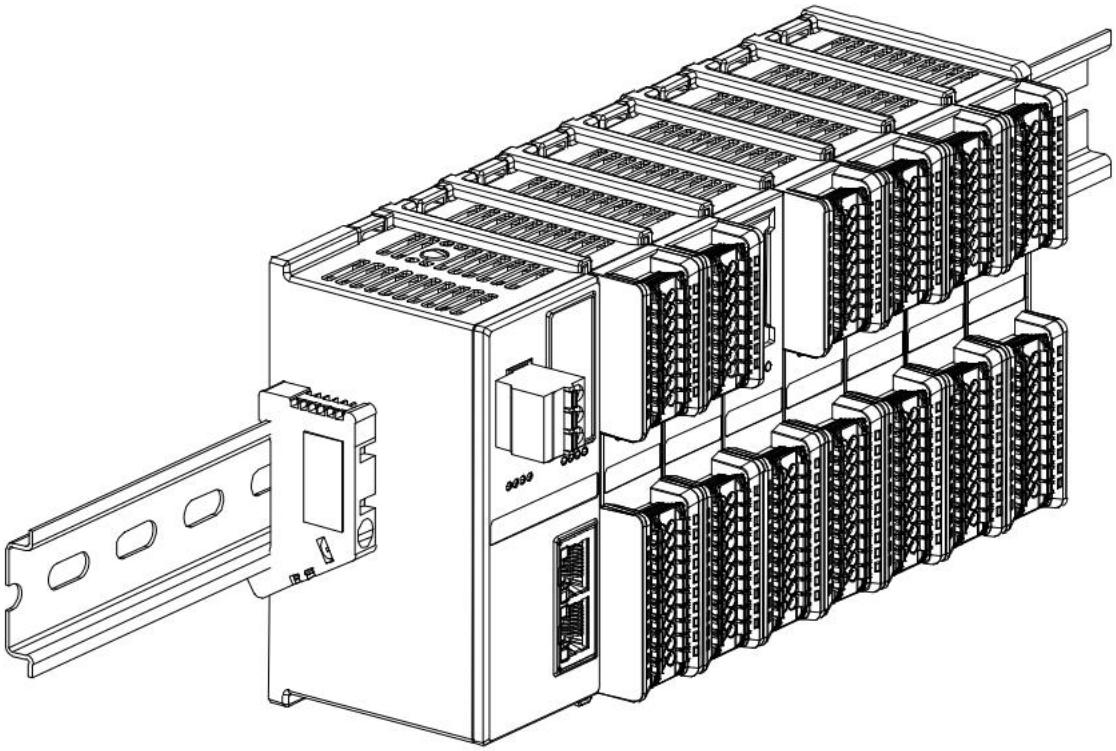
⚠ Warning

- If used in a manner not specified in the product user manual, the protection provided by the equipment may be impaired.

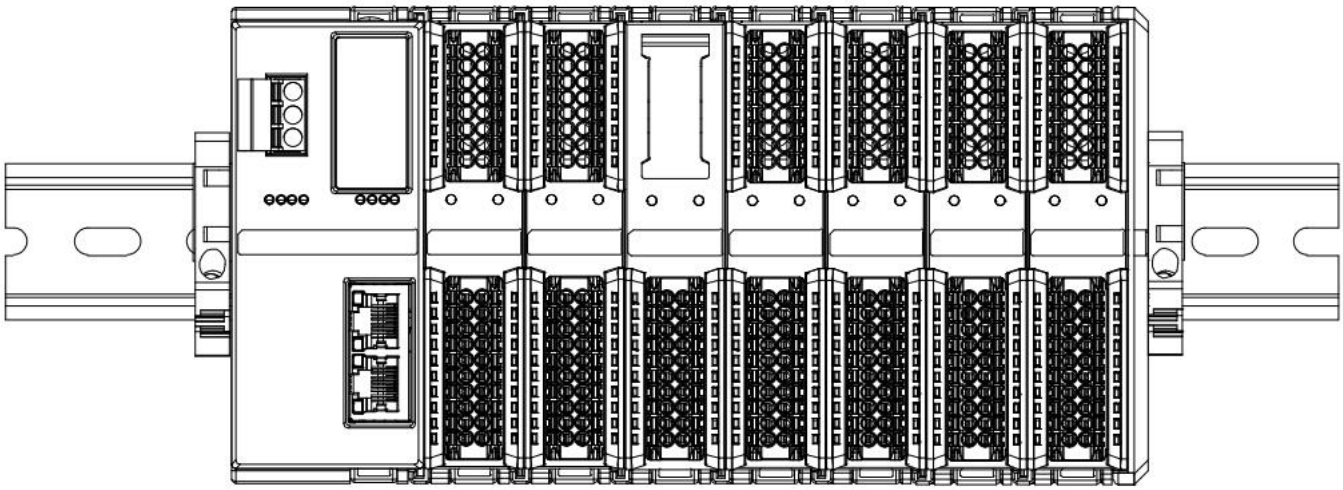
Module installation diagram, minimum clearance between top and bottom (≥ 50mm)



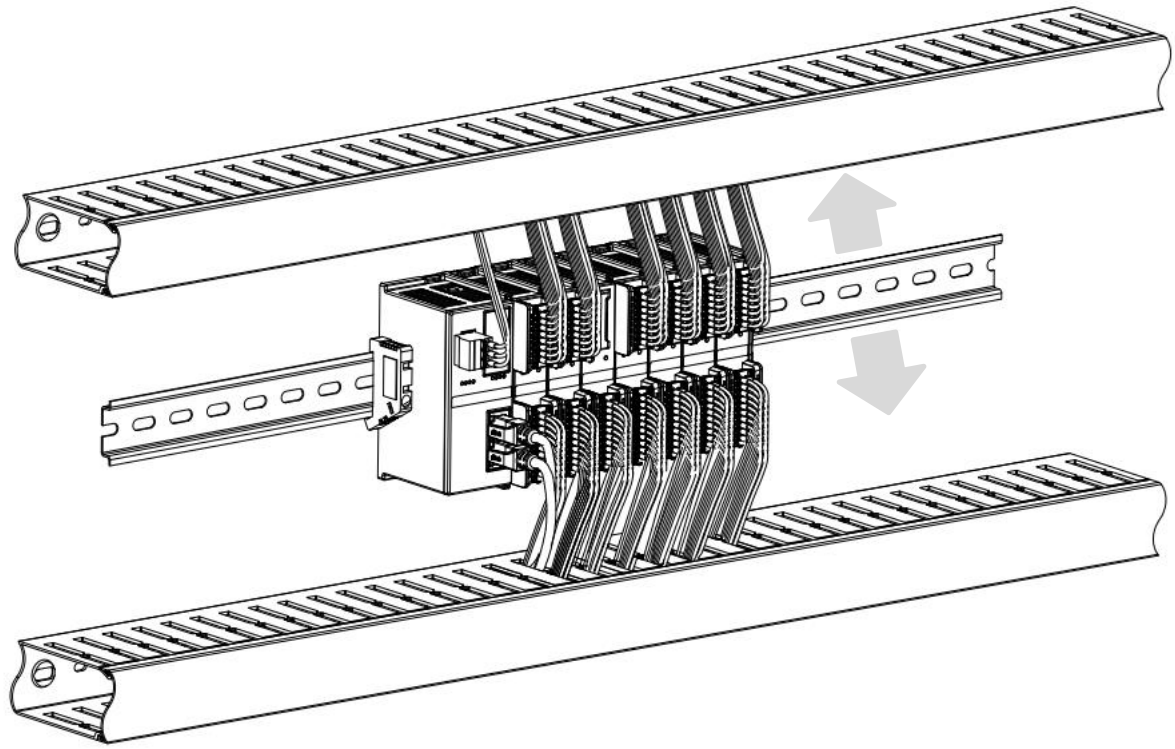
Ensure the module is installed vertically on the fixed rail



Be sure to install the rail fixings



Module upper and lower wiring diagram



4.2 Installation and removal steps

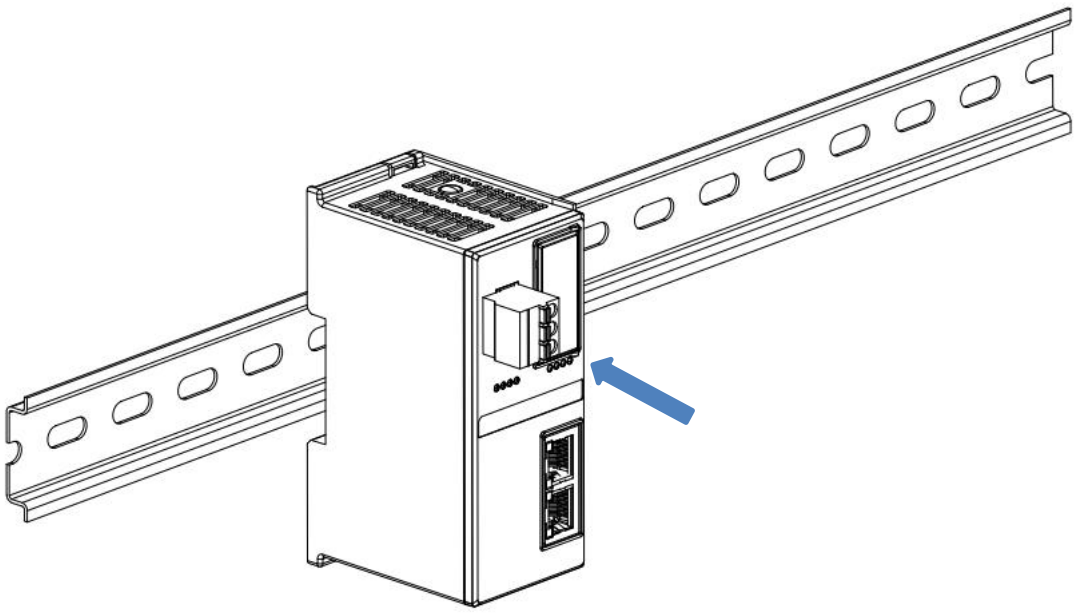
Module installation and removal	
Module installation steps	1. Install the coupler module on the fixed guide rail first.
	2. Install the required I/O modules or functional modules in sequence on the right side of the coupler module.
	3. After installing all required modules, install the terminal cover to complete the module assembly.
	4. Install the guide rail fixings at both ends of the coupler module and the terminal cover to fix the module.
Module disassembly steps	1. Loosen the guide rail fixings at both ends of the module.
	2. Use a flat-blade screwdriver to pry open the module buckle.
	3. Pull out the disassembled module.

4.3 Installation and disassembly diagram

Coupler module installation

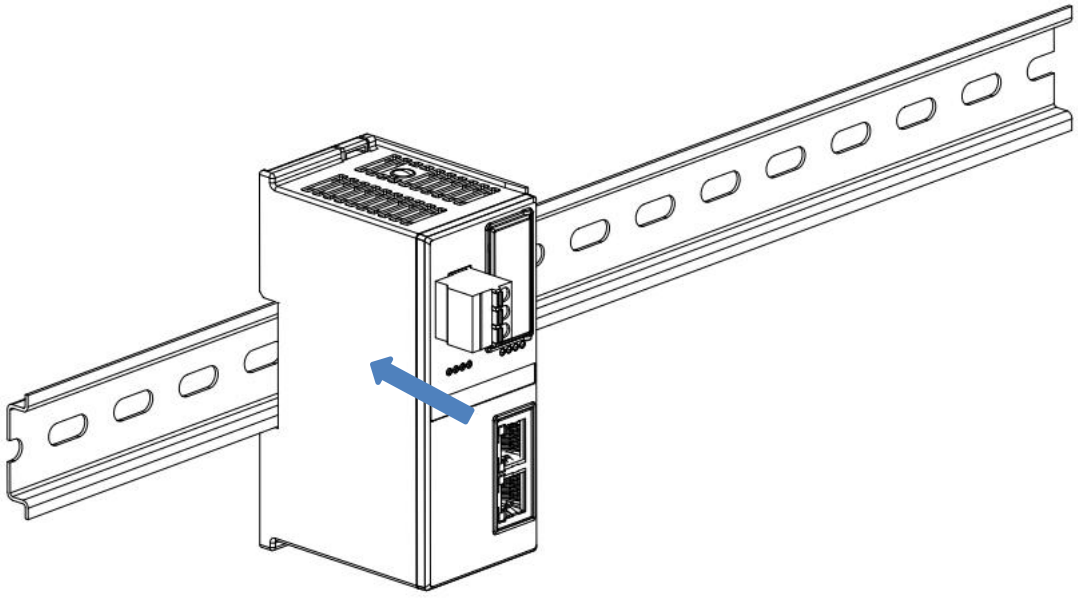
- Align the coupler module vertically with the guide rail slot, as shown in Figure ① below.

①



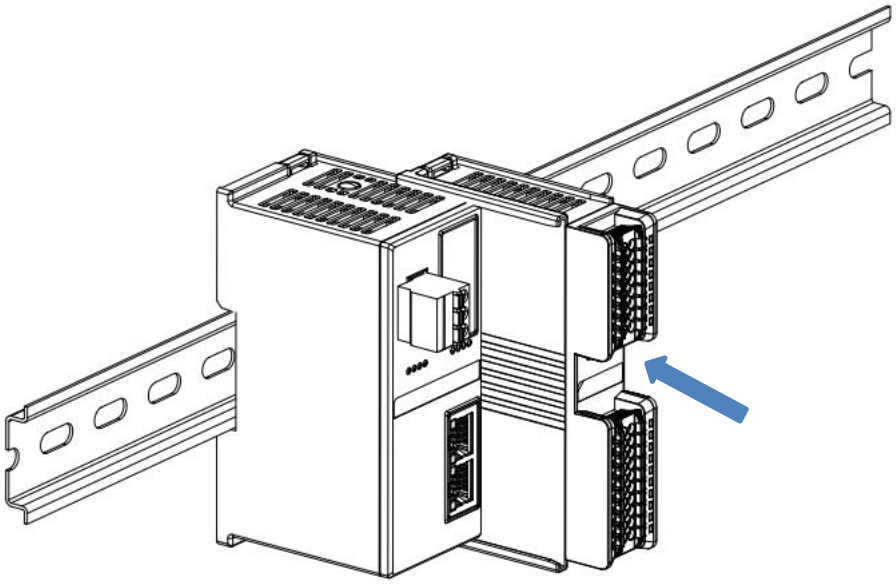
- Press the coupler module towards the guide rail with force until you hear a "click" sound. The module is then installed in place, as shown in Figure ② below.

②

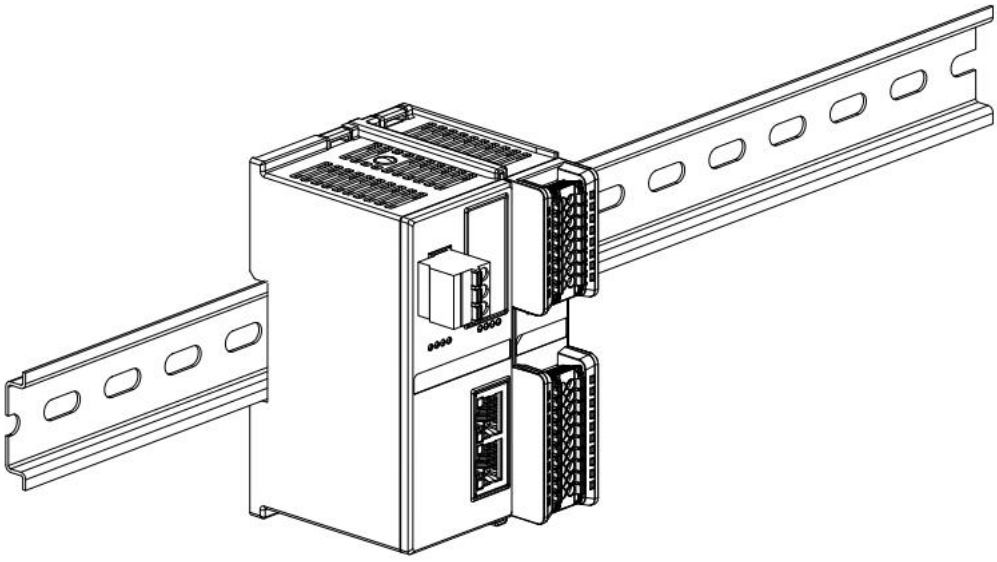


I/O Module Installation

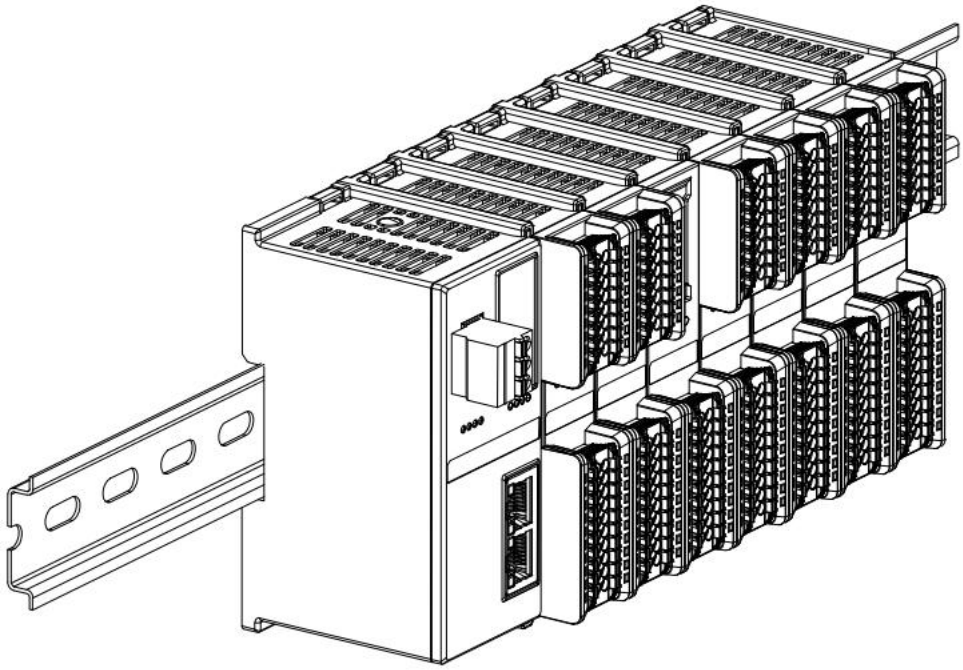
- Follow the steps above to install the coupler module and install the required I/O modules or functional modules one by one. Push them in as shown in Figures ③, ④, and ⑤ below. When you hear a "click", the module is installed in place.



③



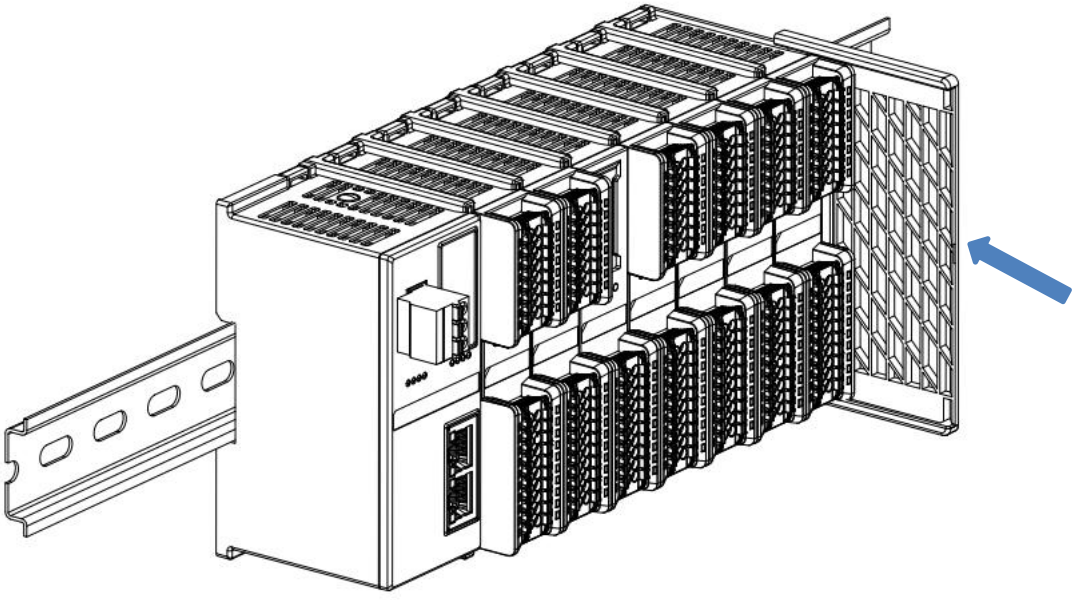
④



⑤

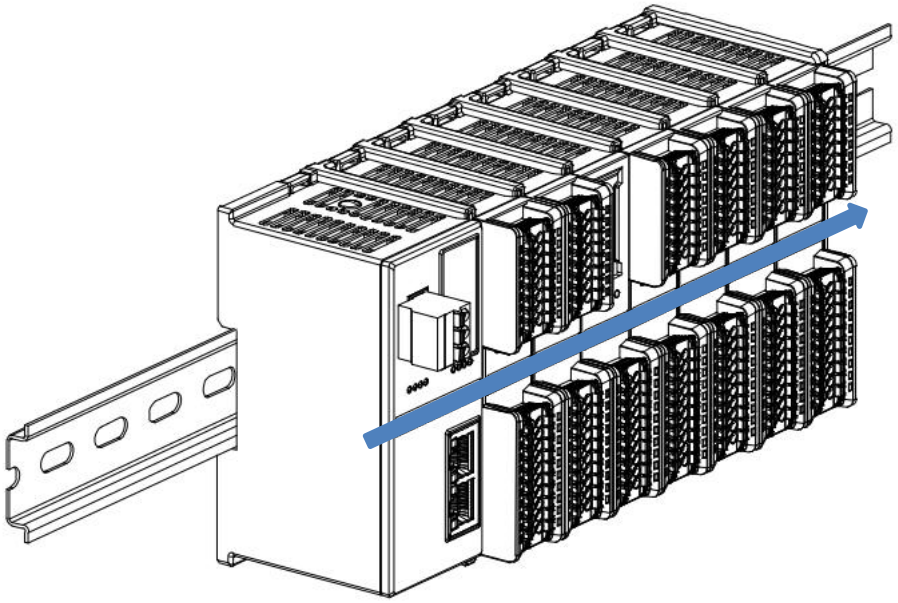
Terminal cover installation

- Install the terminal cover on the right side of the last module, aligning one side of the terminal cover groove with the guide rail. For installation, refer to the installation method of the I/O module and push the terminal cover inwards into place, as shown in Figure ⑥ below.



⑥

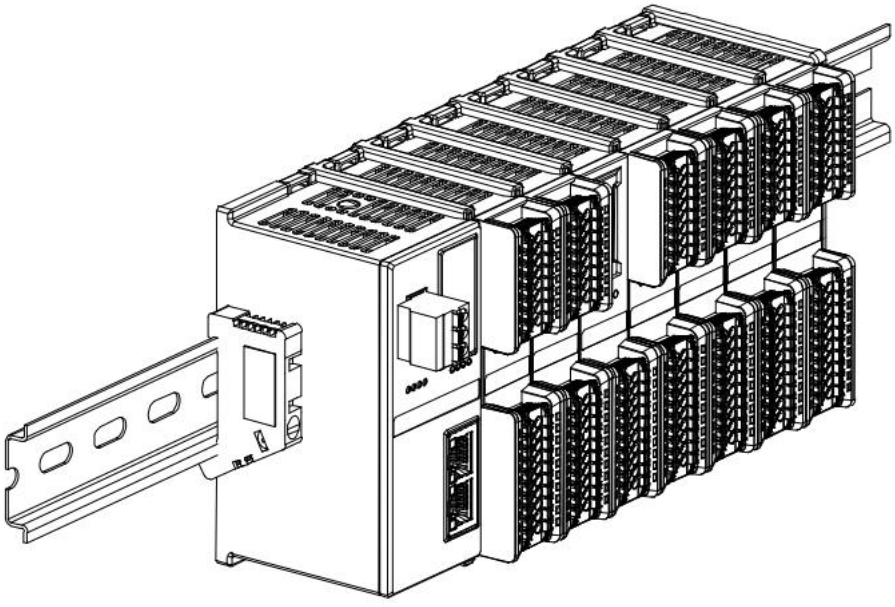
- After the terminal cover is installed, check whether the front of the entire module is flat, and ensure that all modules and end covers are installed in place and the front is flush, as shown in Figure ⑦ below.



⑦

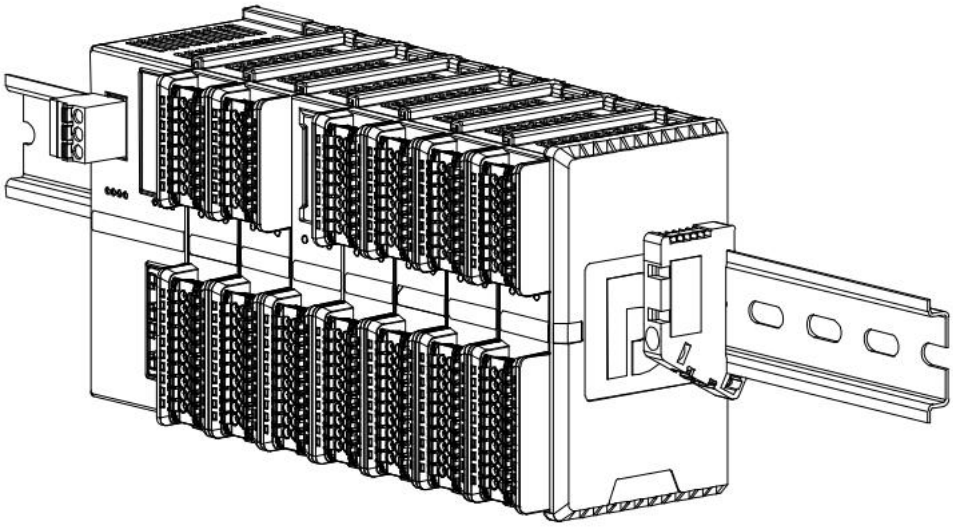
Guide rail fixing installation

- Install and tighten the guide rail fixings close to the left side of the coupler, as shown in Figure ⑧ below.



⑧

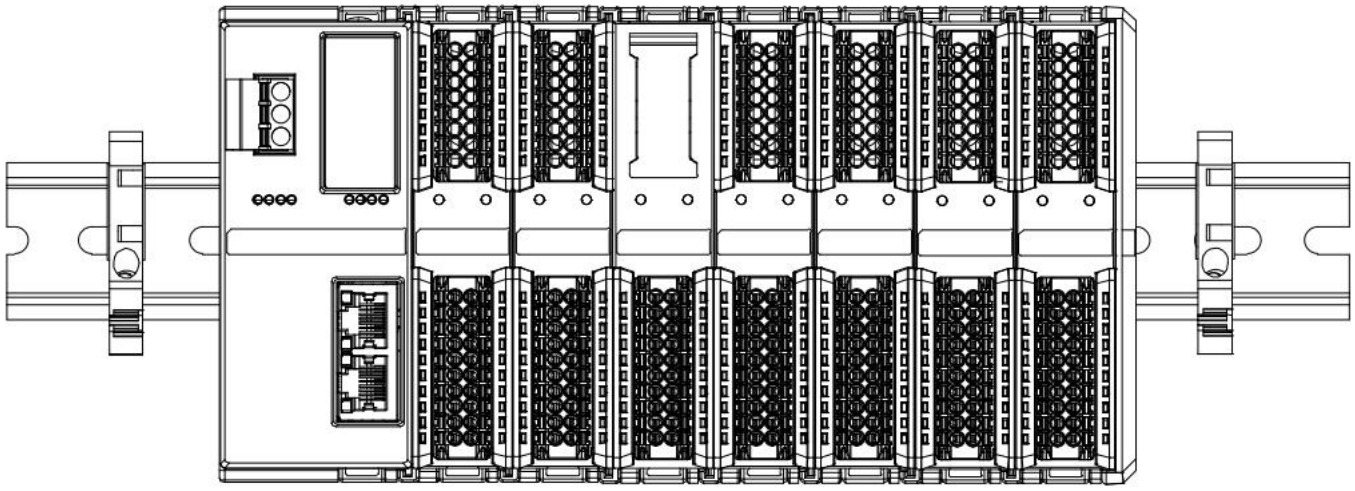
- Install the rail fixing on the right side of the terminal cover. First push the rail fixing toward the coupler to ensure that the module is installed firmly, and then tighten the rail fixing with a screwdriver, as shown in Figure ⑨ below.



⑨

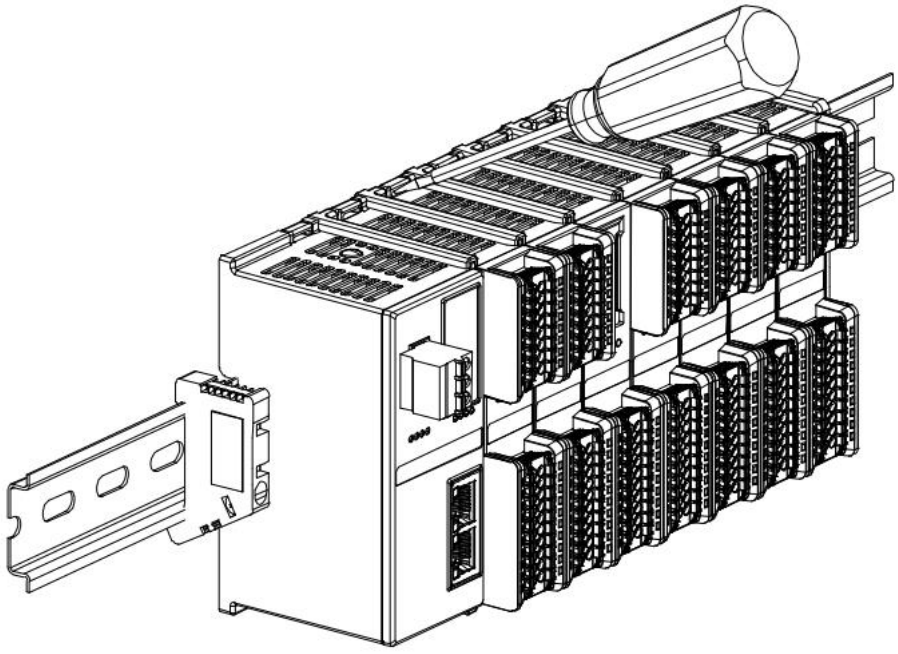
Disassembly

- Use a screwdriver to loosen the guide rail fixing at one end of the module and move it to one side to ensure that there is a gap between the module and the guide rail fixing, as shown in Figure ⑩ below.

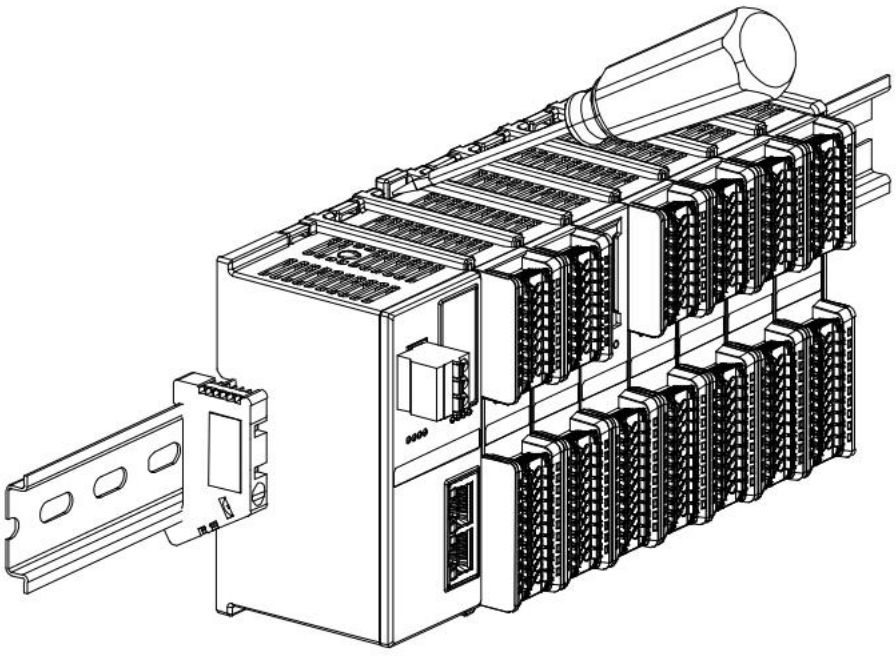


⑩

- Insert a flat-head screwdriver into the buckle of the module to be removed, and apply force sideways in the direction of the module (until you hear a sound), as shown in the following figure⑪and⑫Note: Each module has a buckle on the top and bottom, and both modules are operated in the same way.

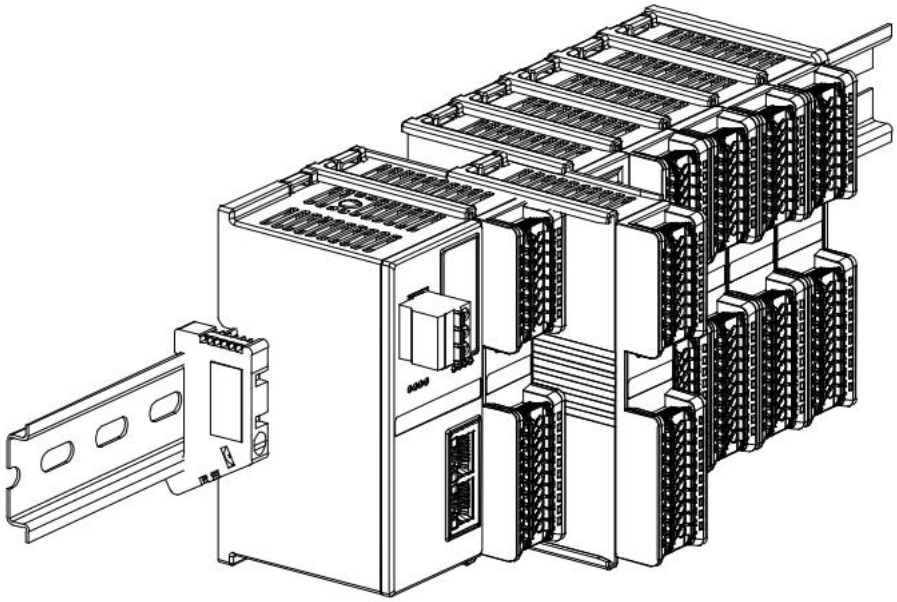


⑪



⑫

- Follow the opposite operation of installing the module to remove the module, as shown below⑬.



⑬

5 wiring

5.1 Terminal Blocks

⚠ Warning

Terminal Blocks		
Power Terminals	Rated voltage	320V
	Rated current	20A
	Number of poles	3P
	Wire diameter	22~16 AWG 0.3~1.5 mm²
Signal line terminals (i.e. input and output terminals)	Rated voltage	200V
	Rated current	9.5A
	Number of poles	16P+20P
	Wire diameter	22~17 AWG 0.3~1.0 mm²
Bus interface	2 × RJ45	Category 5 or higher UTP or STP (STP is recommended)

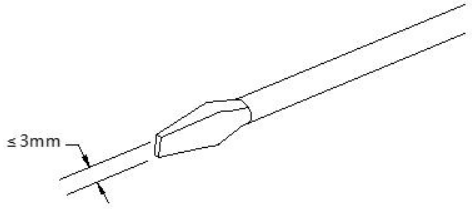
5.2 Wiring Instructions and Requirements

Power Wiring Precautions

- The module system side power supply and field side power supply are configured and used separately. Do not mix them.
- PE must be grounded reliably.

Wiring tool requirements

The power terminals and signal line terminals adopt a screw-free design, the cables can be installed and removed using a flat-blade screwdriver (specification: ≤3mm).



Stripping length requirements

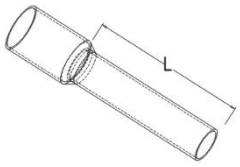
The recommended cable stripping length for power and signal line terminals is 10 mm.

Wiring method

For single-strand rigid wire, after stripping the wire to the corresponding length, press the button and insert the single-strand wire directly into the corresponding end hole.

For multi-strand flexible wires, after stripping the corresponding length of wire, you can directly connect or use the corresponding standard specifications of cold-pressed terminals (tubular insulated terminals, reference specifications are shown in the following table) in combination, and press the button to directly insert the insulated terminal into the corresponding end hole.

The specifications of power terminals and signal line terminals are shown in the following table:

Specifications of tubular insulation terminals		
Specifications	model	Conductor cross-sectional area mm²
 Tube type insulated terminalLThe length is10mm	E0310	0.3
	E0510	0.5
	E7510	0.75
	E1010	1.0
	E1510	1.5

Warning

- Only copper wires may be used for wiring.
- Utilisez uniquement des conducteurs en cuivre.

Warning

- Cable temperature: 80℃.

6 Use

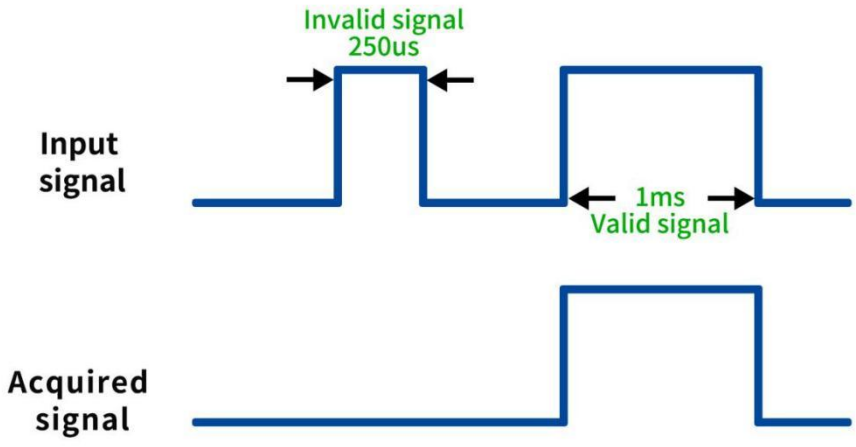
6.1 Parameter Description

6.1.1 Digital input filtering

Digital input filtering prevents the program from responding to unexpected rapid changes in input signals that may be caused by switch contact bounce or electrical noise. Digital input filtering supports single module settings, and each module can be configured separately, not channels.

The digital input filter time is currently configured as 3ms by default, and the supported setting range is no filtering, 0.1ms, 0.2ms, 0.5ms, 1ms, 2ms, 3ms (factory setting), 4ms...18ms, 19ms, 20ms. When configured as 3ms, noise within 3ms can be filtered out. The 3ms input filter time means that a single signal can only be detected if it changes from "0" to "1", or from "1" to "0" for 3ms, while a single high pulse or low pulse shorter than 3ms will not be detected.

Function description: When the input filter is configured to 1ms, the clutter within 1ms can be filtered out. As shown in the figure below, when there is a 250us signal input, it will be regarded as an invalid signal, and a single high pulse or low pulse shorter than 1ms will not be detected; signals of 1ms and above can be collected.



6.1.2 Digital output signal clear/hold

The clear/hold function is for modules with output channels. This function can configure the output mode of the output channel when the module is in a non-OP state (stop running or the coupler network cable is disconnected). This parameter supports the following output states:

Clear output: When the communication is disconnected, the module output channel automatically clears the output, that is, outputs 0.

Output valid value: When the communication is disconnected, the module output channel always outputs the valid value, that is, output 1.

Keep the last output value: When the communication is disconnected, the module output channel keeps the last output value.

The digital clear and hold function supports module overall settings (template mode) and single channel settings (single channel mode). Any channel can be set in single channel mode or template mode. The single channel mode has a higher priority than the template mode. The specific configuration method is shown in the following table. The default is to clear the module output as a whole.

Clear the hold parameters of the digital output module			
Parameter name	Parameter meaning	Parameter options	default value
Template Mode	Template Mode	Preset Low clears the output, that is, outputs 0	Preset Low
		Preset High outputs a valid value, that is, outputs 1	
		Keep Mode maintains the last output value	
Channel x Mode Enable	Single channel mode setting	Follow Template maintains the template mode, that is, does not enable the single-channel mode	Follow Template
		Preset Low clears the output, that is, outputs 0	
		Preset High outputs a valid value, that is, outputs 1	
		Keep Mode maintains the last output value	

6.1.3 Digital input value when module fails

When a module fails, the input value of the digital input module can be preset as needed, and you can choose to input 0 or keep the last input value.

6.1.4 Analog range setting

Analog range setting Range Select is used to set the analog range. Each channel can be configured separately (see3.3.4 and 3.3.5 Analog Parameters).

6.1.5 Analog input filtering

- **Analog input filter function**

The analog input filter function can average the data after A/D conversion internally to reduce the impact of fluctuations in the input signal due to noise, etc.

The analog input is processed by moving average with the specified number of A/D conversions.

- **Filter function configuration**

  Each channel can be configured individually, with a configuration range of 1 to 200, and 10 times by default.

  The sampling rate of the 8-channel module is: 2.5KHz/8 channels (400us/8 channels).

6.1.6 Analog output signal clear/hold

The clear/hold function is for modules with output channels. This function can configure the output mode of the output channel when the module is in a non-OP state (stop running or the coupler network cable is disconnected). This parameter supports the following output states:

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

Keep output: When the communication is disconnected, the module output channel keeps outputting.

Output preset value: When communication is disconnected, the module output channel outputs the preset value.

The analog clear hold function supports module overall settings (template mode) and single channel settings (single channel mode). Any channel can be set in single channel mode or template mode. The single channel mode has a higher priority than the template mode. The specific configuration method is shown in the following table. The default is to keep the module output as a whole.

Analog output module clears and holds parameters			
Parameter name	Parameter meaning	Parameter value meaning	default value
Template Setting	Template Mode	Clear all channels to clear output	Hold
		Hold all channels to hold output	
		Preset all channel output preset value	
Channel x Abnormal Output	Single channel clear/hold configuration	Follow Template template mode value, that is, do not enable single channel mode	Preset
		Clear single channel clear output	
		Hold single channel hold output	
		Preset single channel output preset value	
Channel x Default Value Config	Single channel presets	Code value, output code value corresponding to the current/voltage value (Corresponding range code value table)	0

Note: When the overall setting (template mode) of the module is configured as Preset, that is, the preset value of all channel output takes effect, the preset value is based on the preset code value of channel 0 in the single channel preset value, and all channels are output.

6.1.7 Analog value power-off preservation

Analog parameters support abnormal power failure and communication disconnection. All module configuration parameters can be saved. Analog modules support power failure saving by default.

6.1.8 Coupler parameters

6.1.8.1 Alarm function settings

In the coupler module parameters, you can set whether the alarm function is enabled or not. The alarm function is enabled by default.

6.1.8.2 PLC stop status output control

In the coupler module parameters, you can set the output status of DO (digital output) and DO (analog output) when the PLC is stopped. For details, see the following table:

PLC stop status output control		
Parameter name	Parameter value meaning	default value
PLC stop state DO control	Hold output	Hold
	Output Clear 0 means output clear 0	
	Output Set 1 means output set to 1	
PLC stop state AO control	Hold output	Hold
	Output Clear 0 means output clear 0	

This manual uses TIA Portal V17 as an example to introduce the parameter configuration method of the XB6S-PN2002 coupler + I/O module combination. For detailed steps, seeParameter settings in section 6.5.1After the modification is completed, it is recommended to power on again.

6.2 Alarm function

6.2.1 Coupler common fault code

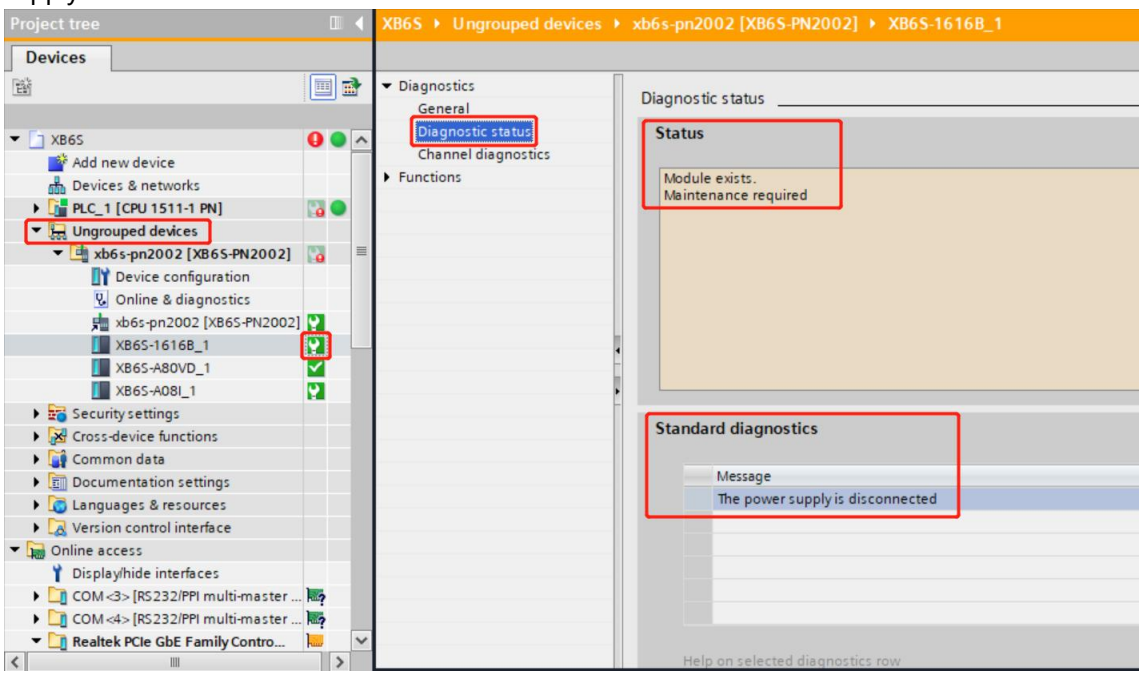
Category	Serial number	Error Type	Error Code	Event Name	Event code (2#)	Event code (10#)	Event code (16#)	Treatment
Common Errors	2	Online upgrade error	1	Firmware upgrade exception	0000000010000001	129	0x0081	Try to upgrade again to check whether there is interference in the environment, whether the firmware is too large, etc.
			2	The firmware does not match the current module model	0000000010000010	130	0x0082	Check whether the file is correct, whether the module has any abnormality or interference, etc.
	3	Voltage error	5	Load side voltage is not connected	0000000011000101	197	0x00C5	Check whether the power supply on the field side is connected
	6	Channel Error	4	Channel overflow	0000000110000100	388	0x0184	Check whether the input signal of the corresponding channel exceeds the measurement range and whether the output signal exceeds the configurable range
	7	Parameter error	0	Abnormal parameter setting	0000000111000000	448	0x01C0	Check module parameter settings
	63	X-bus communication error	1	X-bus initialization failed	0000111111000001	4033	0x0FC1	Check whether the module connection is normal

			2	X-bus token timeout	0000111111000010	4034	0x0FC2	Check whether the module has any abnormality or interference.
			3	X-bus module is offline	0000111111000011	4035	0x0FC3	Check whether the module is online or has interference, etc.
			4	Parsing data CRC error	0000111111000100	4036	0x0FC4	Check whether the module has any abnormality or interference.
Analog	1	XB6S-A80TM	0	Disconnection	0010000001000000	8256	0x2040	Check whether the corresponding channel wiring is normal
Gateway	0	XB6S-C01SP	0	General parameter error	0100000000000000	20480	0x5000	Check whether the common parameters exceed the parameter limit
			1	Communication node parameter error	0100000000000001	20481	0x5001	Check whether the communication node format and node settings are consistent with the communication mode and control mode.
			2	Process data error	0100000000000010	20482	0x5002	When the parameter configuration is complete and there are no other alarms, power off and then power on again to rescan the module.
			3	Modbus Register Map Conflict	0100000000000011	20483	0x5003	Compare the start address and length settings of each Modbus

								write instruction of communication node parameter 1 to see if there is any overlap in the range
			4	Modbus node ID setting error	0100000000000100	20484	0x5004	Check whether the slave ID range of communication node parameter 2 is between 1 and 247.

6.2.2 Fault code check

Taking TIA Portal V17 as an example, when a device fails during project operation, click the wrench icon to the right of the device name below the project tree to view detailed diagnostic status and alarm information. As shown in the figure below, if the power is disconnected, check whether the power supply on the field side is connected.



6.3 MRP ring redundancy

PROFINET's media redundancy mechanism can ensure the normal operation of the entire system when a disconnection/connection failure occurs somewhere in the PROFINET network. The typical reconfiguration time is 200ms, and each ring network supports up to 50 devices.

Media redundancy is achieved by transforming the linear network topology into a ring network topology. There is a redundancy manager in the media redundant ring network, and the other nodes (PROFINET IO controllers/devices) are called redundant clients. When a disconnection/connection failure occurs somewhere in the PROFINET network, the redundancy manager will detect the failure and reconstruct the interrupted network so that the system can continue to operate.

The media redundant network structure has the following advantages:

- The redundant media structure significantly increases the availability of the device, since the failure of a single device has no impact on communication.
- The required repair work can be carried out without any time pressure, as the plant does not need to be shut down during the repair process.
- When a network failure occurs, rapid network diagnosis can be performed and troubleshooting can be accelerated.
- In the event of a failure, the costs incurred due to production downtime are reduced.

Configuration of MRP ring rules:

- All ring nodes must support MRP and the MRP protocol must be enabled.
- All devices must be interconnected via the ring ports.
- All devices in the ring belong to the same redundancy domain.
- In a ring network, a maximum of 50 devices can be connected, otherwise the reorganization time will exceed 200ms.
- One device in the ring can function as the redundancy manager, while the other devices are redundancy clients.
- All partner ports in the ring have the same settings.

The MRP network reconstruction time is 200ms, and IO communication is interrupted during the reconstruction. Therefore, in order to ensure that there is no IO station drop and fault reporting during the network reconstruction, the watchdog time of the IO device needs to be set to more than 200ms.

For details on the media redundancy function, see Introduction to ring network redundancy configuration in Chapter 6.5.2.

6.4 Hardware Detection

The module supports Siemens TIA Portal automation software to automatically scan IO modules. For detailed operation methods, see Chapter 6.5.1 Hardware Detection Adding Devices.

6.5 PROFINET coupler configuration application

6.5.1 Application in TIA Portal V17 software environment

1、Preparation

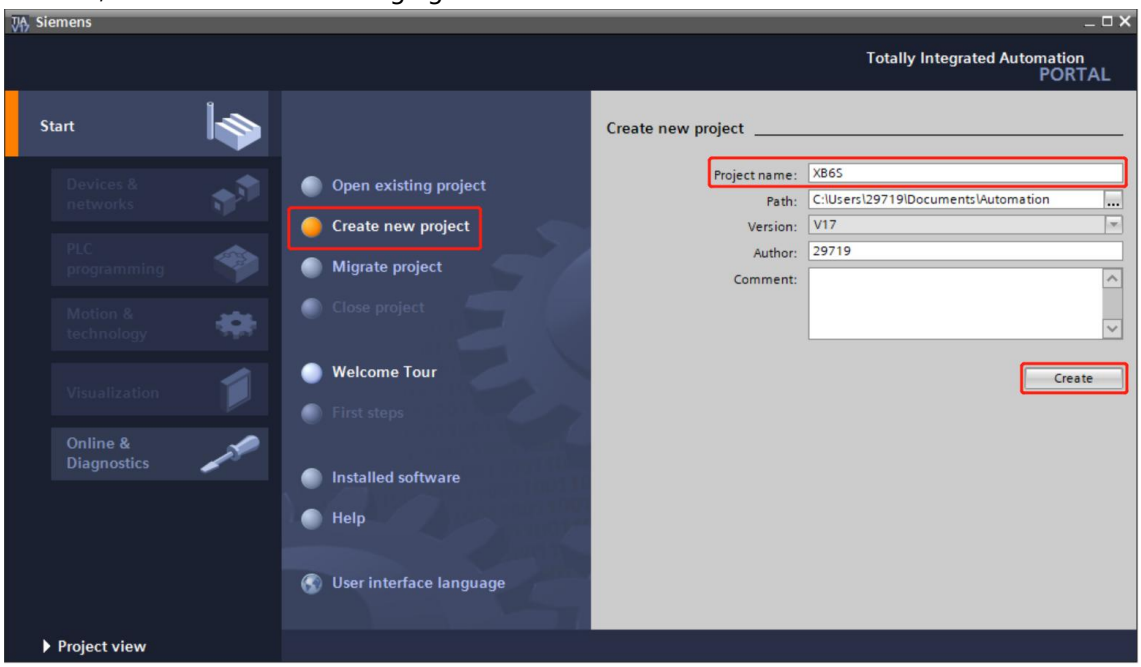
- **Hardware Environment**
  - **Module preparation. This description takes the XB6S-PN2002+XB6S-1616B+XB6S-A80VD+XB6S-A08I topology as an example.**
  - **A computer with TIA Portal V17 software pre-installed**
  - **A Siemens PLC. This description takes Siemens S7-1500 CPU 1511-1 PN as an example.**
  - **Special shielded cable**
  - **Switch power supply**
  - **Device Profile**

    Configuration file acquisition address: https://www.solidotech.com/documents/configfile
- **Hardware configuration and wiring**

  Please follow the 4 Installation and removal"and" 5 Wiring Request action

2、New Construction

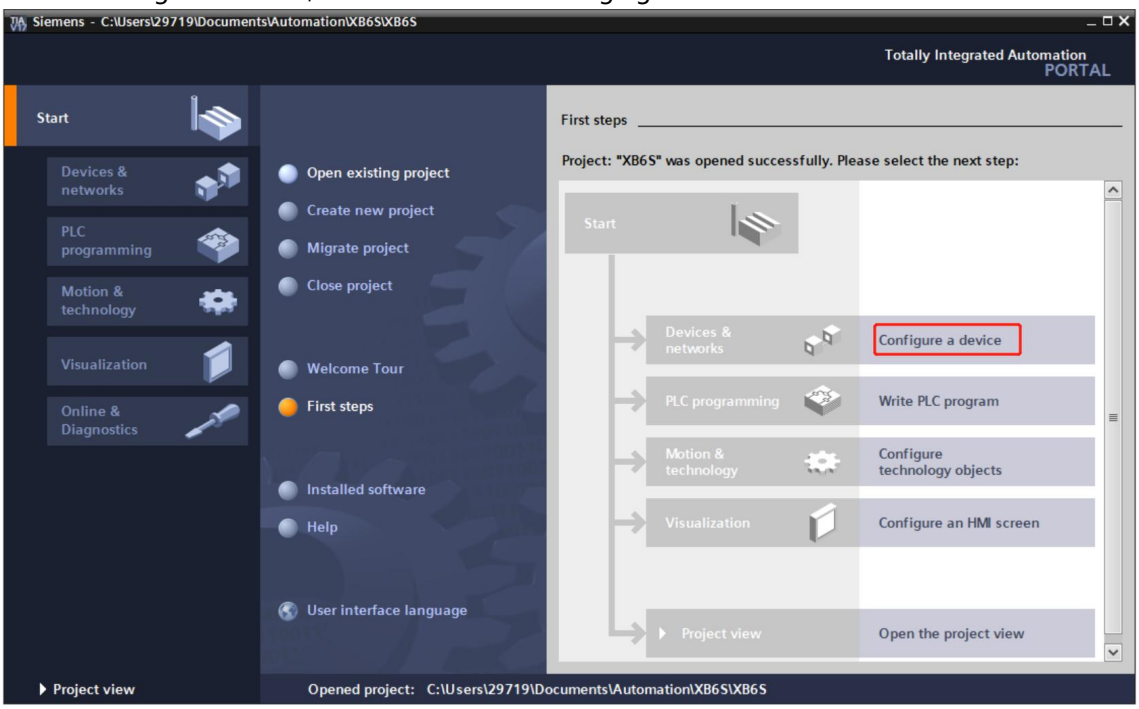
a. Open TIA Portal V17 software, click "Create new project", enter all the information and click "Create", as shown in the following figure.



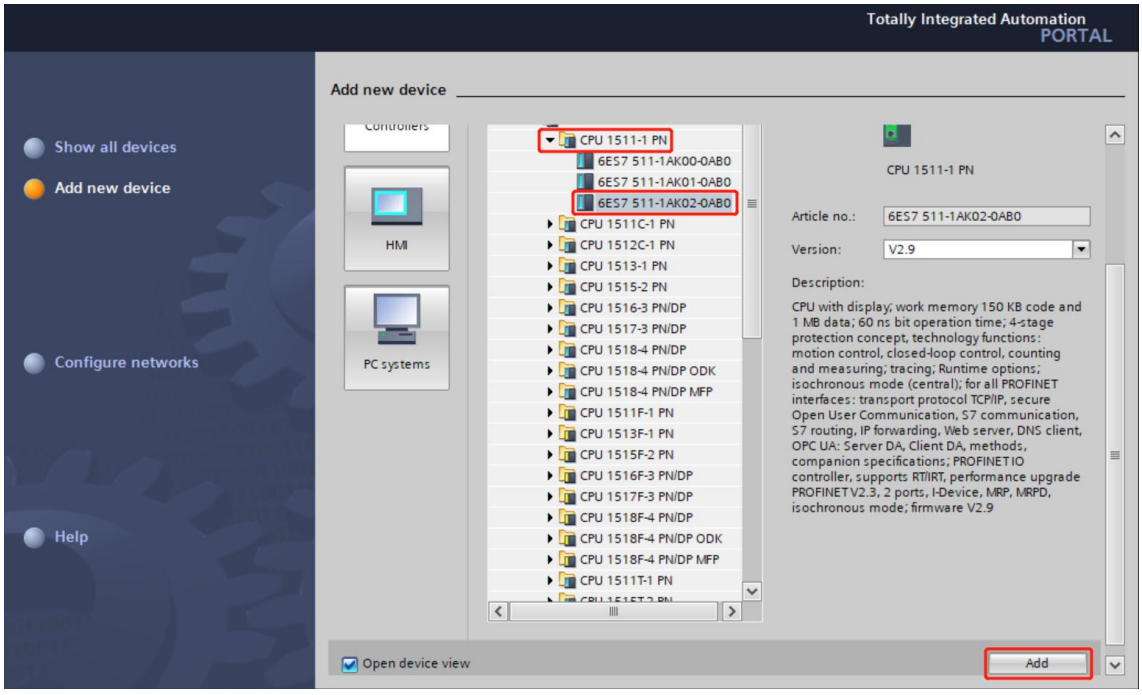
- Project name: Customized, can keep the default.
- Path: The project path can be kept as default.
- Version: You can keep the default value.
- Other author: can keep the default.
- Comment: Customized, optional.

3、Add a PLC controller

a. Click Configure a device, as shown in the following figure.

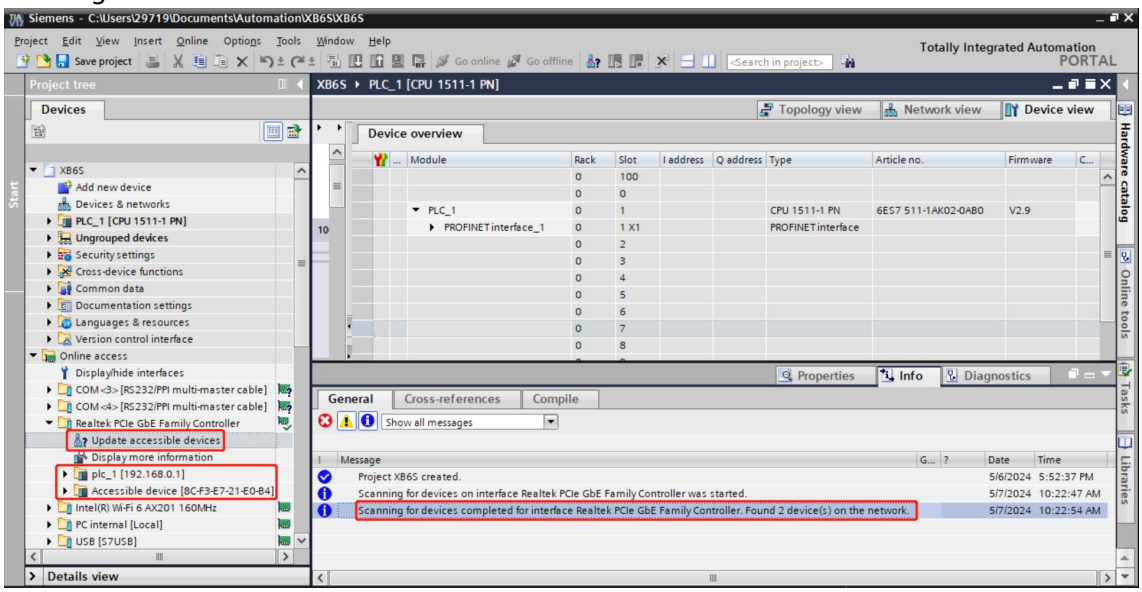


b. Click "Add new device", select the PLC model currently used, and click "Add", as shown in the figure below. After adding, you can see that the PLC has been added to the device navigation tree.



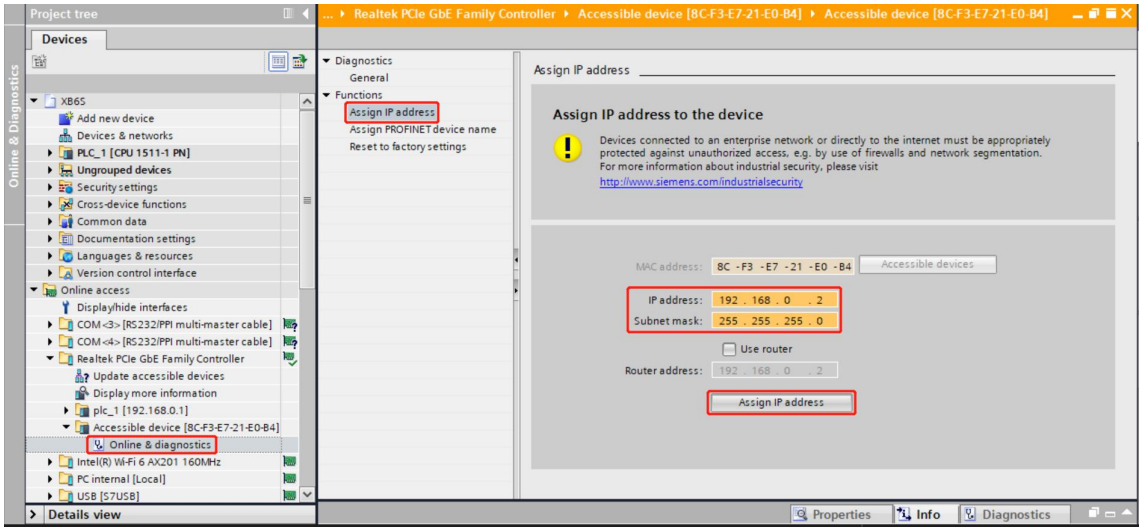
4、Scan for connected devices

a. Click "Online access-> Update accessible devices" in the left navigation tree, as shown in the figure below. After the update is complete, the connected slave devices are displayed, as shown in the figure below.

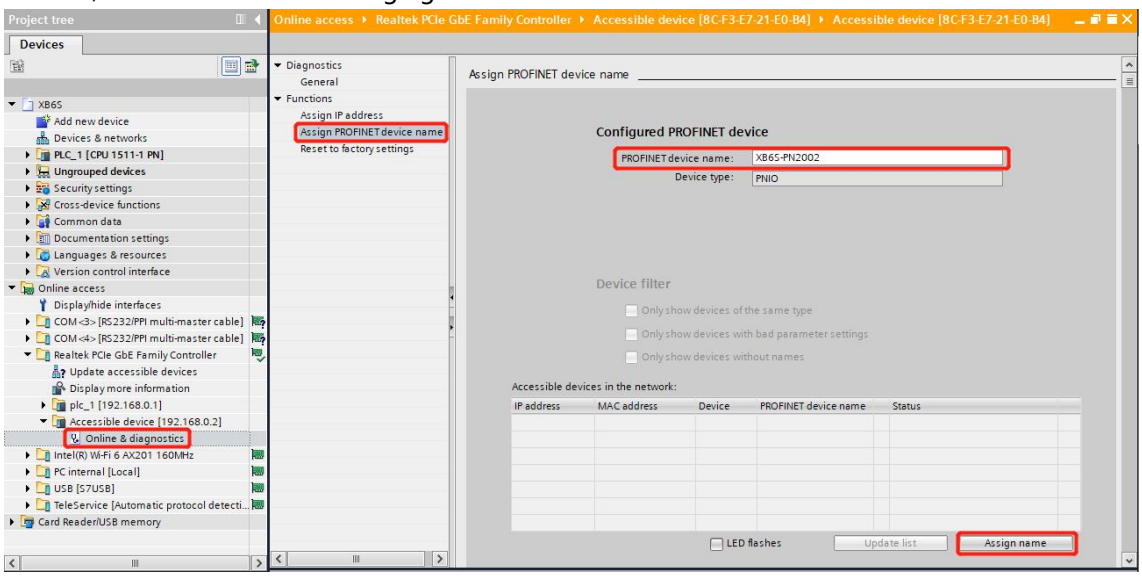


The computer's IP address must be in the same network segment as the PLC. If not, change the computer's IP address and repeat the above steps.

b. Double-click "Online diagnostics" under the slave device in the left navigation tree. In the "Functions" menu, you can assign the IP address and device name of the current slave. Click "Assign IP address", fill in "Subnet mask", then fill in "IP address", and click "Assign IP address" at the bottom, as shown in the figure below.

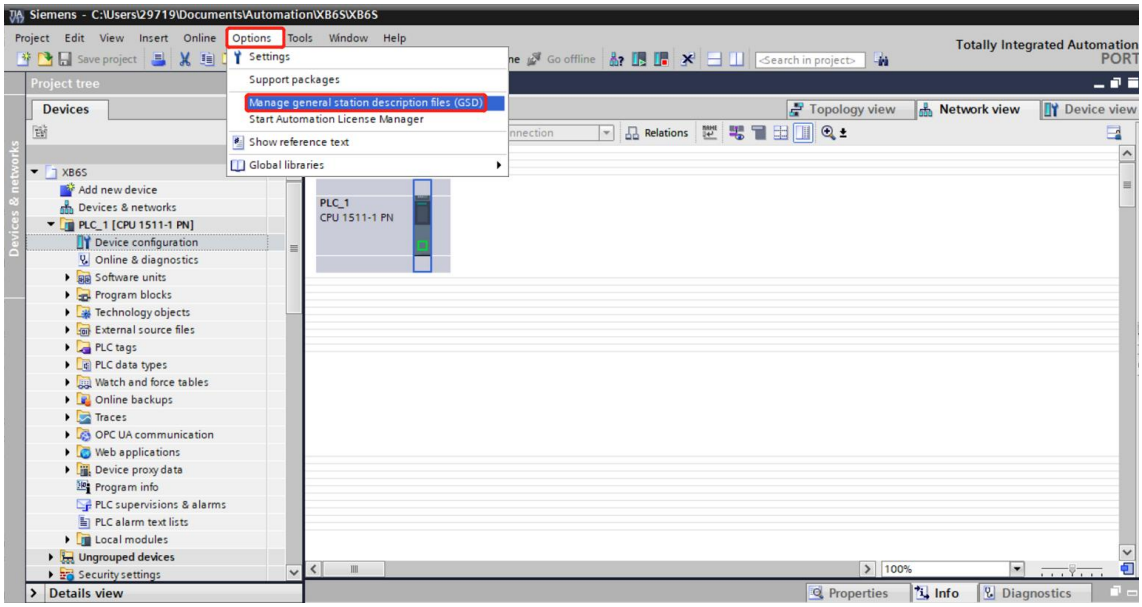


c. Click "Assign PROFINET device name", fill in the "PROFINET device name" and click "Assign name", as shown in the following figure.

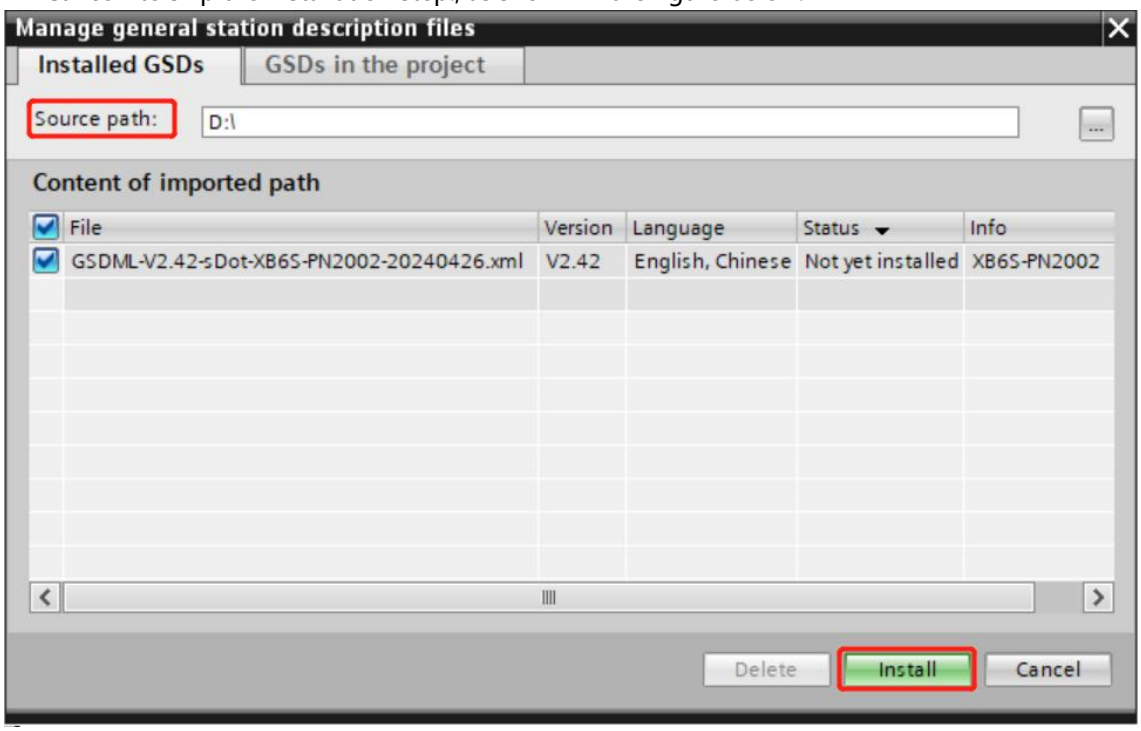


5、Adding a GSD Configuration File

a. In the menu bar, select "Options-> Manage general station description files (GSDML) (D)", as shown in the figure below.

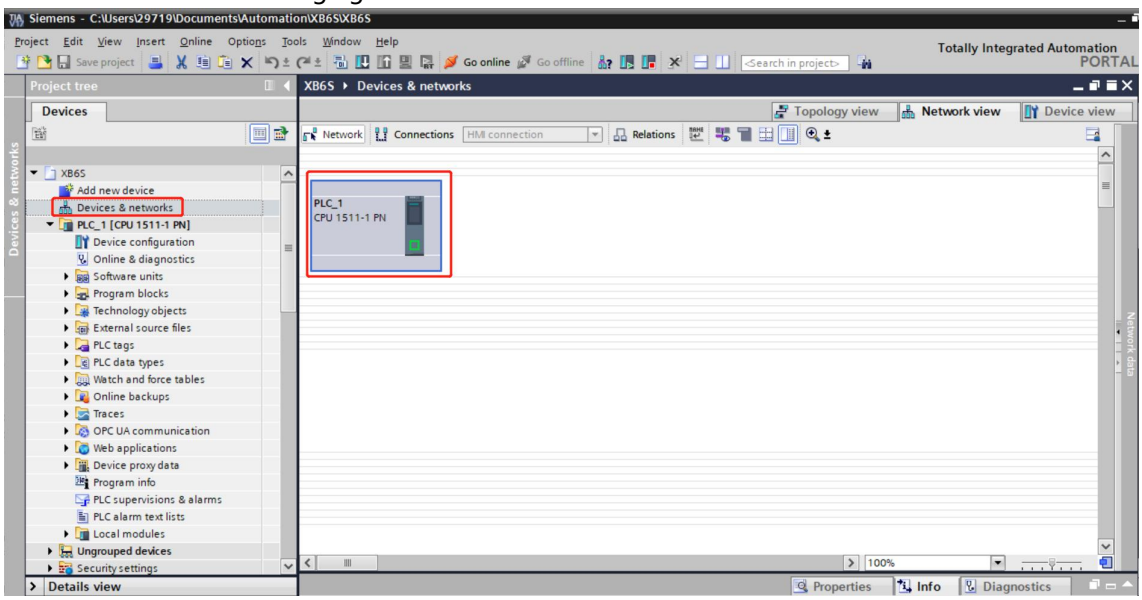


b. Click "Source path" to select a folder, and check whether the status of the GSD file to be added is "Not installed yet". If it is not installed, click the "Install" button. If it is already installed, click "Cancel" to skip the installation step., as shown in the figure below.

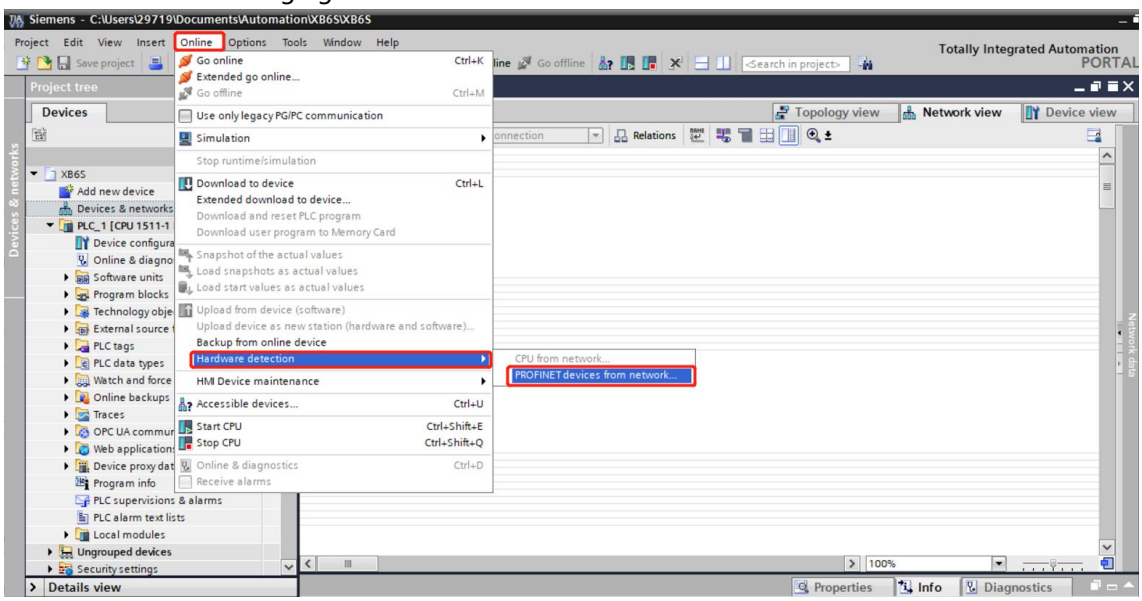


6、Hardware detection to add devices

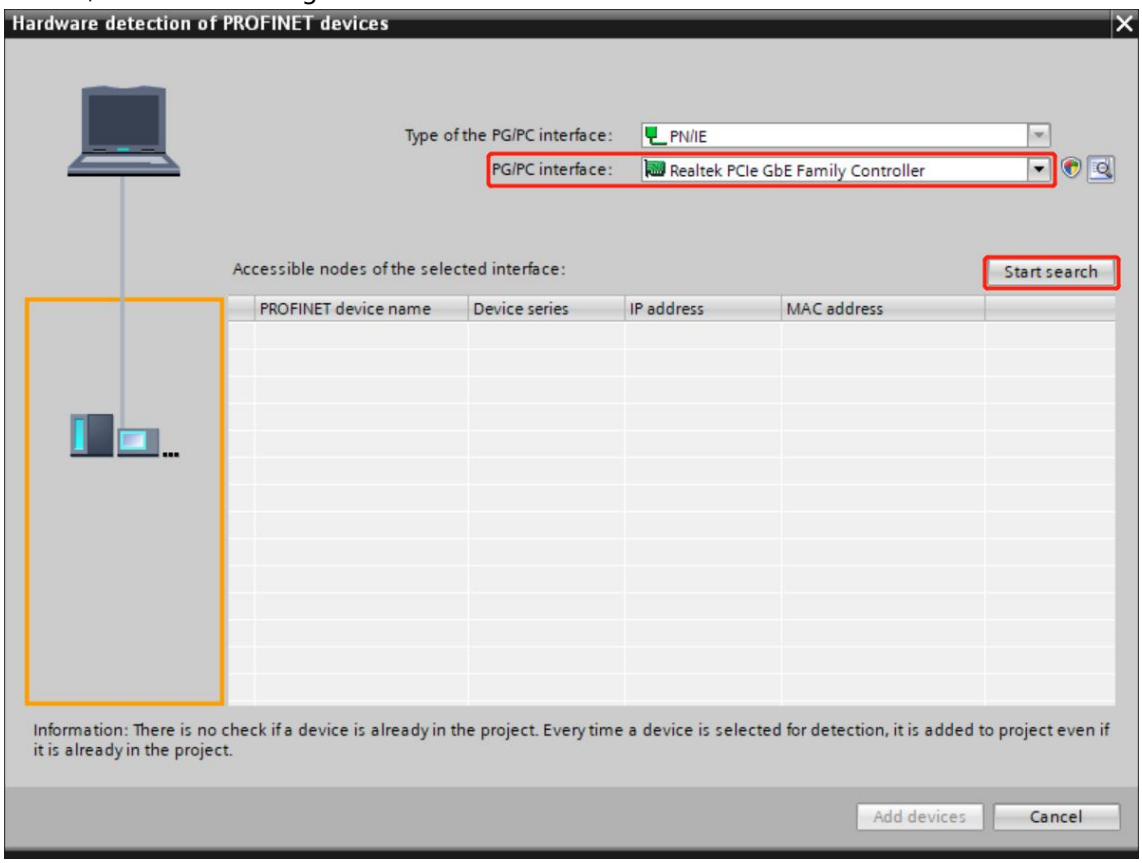
a. Double-click "Devices & networks" in the left navigation tree and select PLC in the network view, as shown in the following figure.



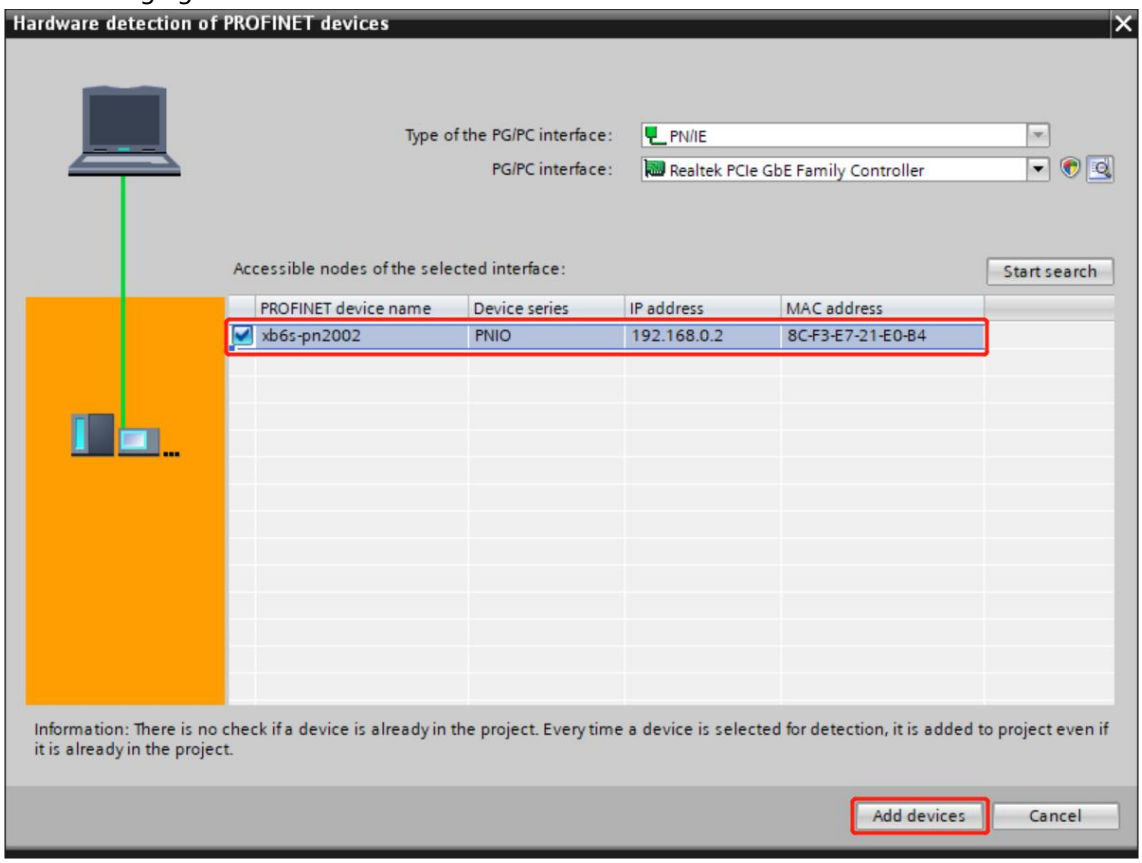
b. In the menu bar, select "Online -> Hardware detection -> PROFINET devices from network", as shown in the following figure.



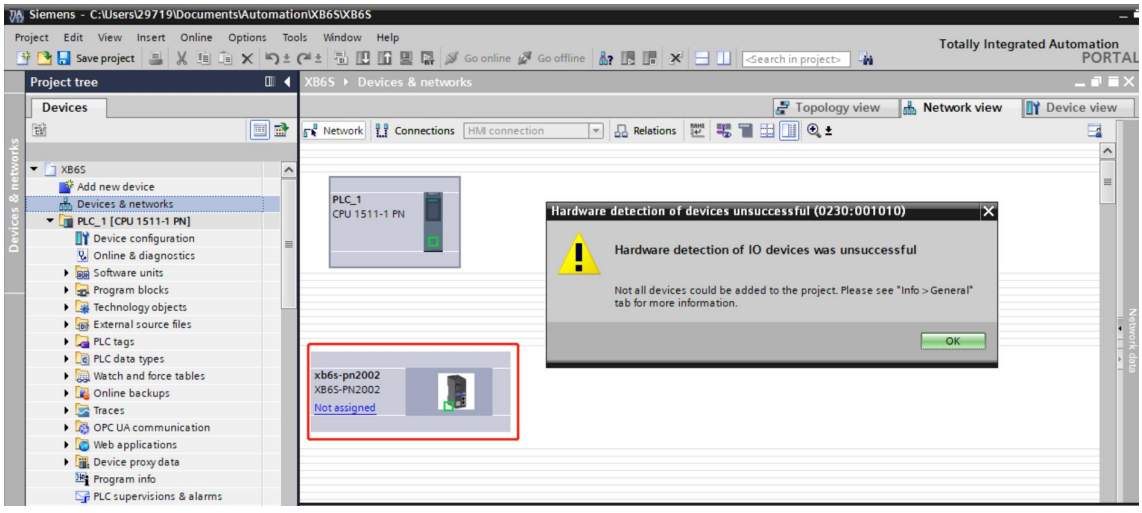
c. The hardware detection window pops up. Select the correct PG/PC interface and click "Start search", as shown in the figure below.



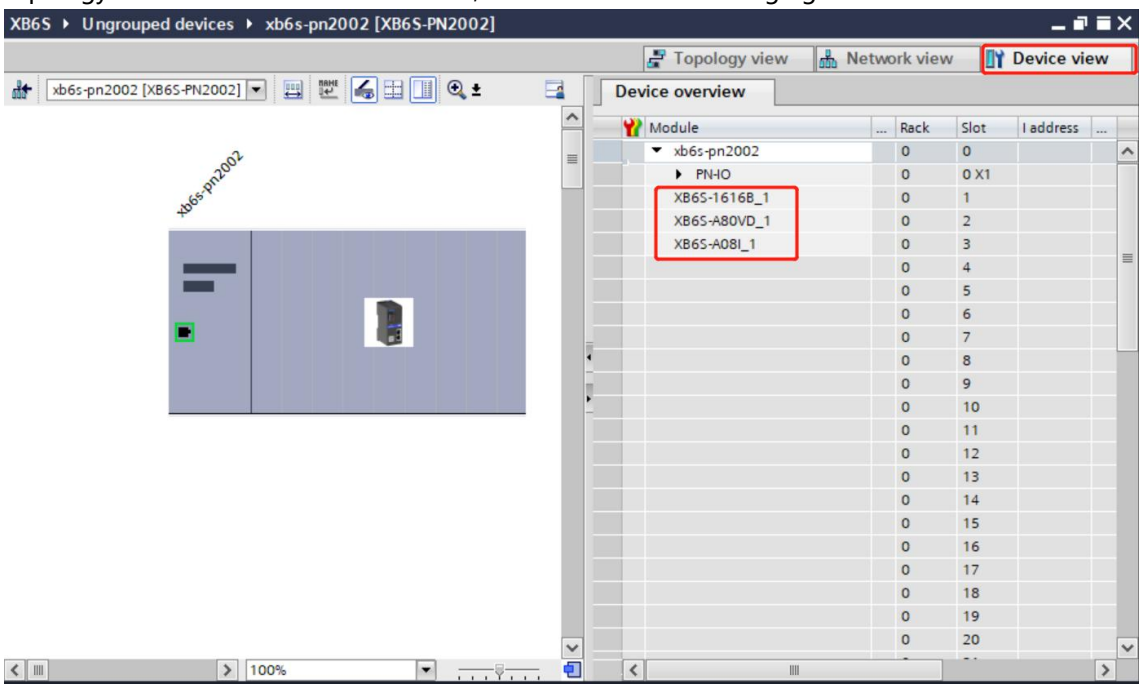
d. Detect the coupler devices in the network, select the coupler, and click Add devices, as shown in the following figure.



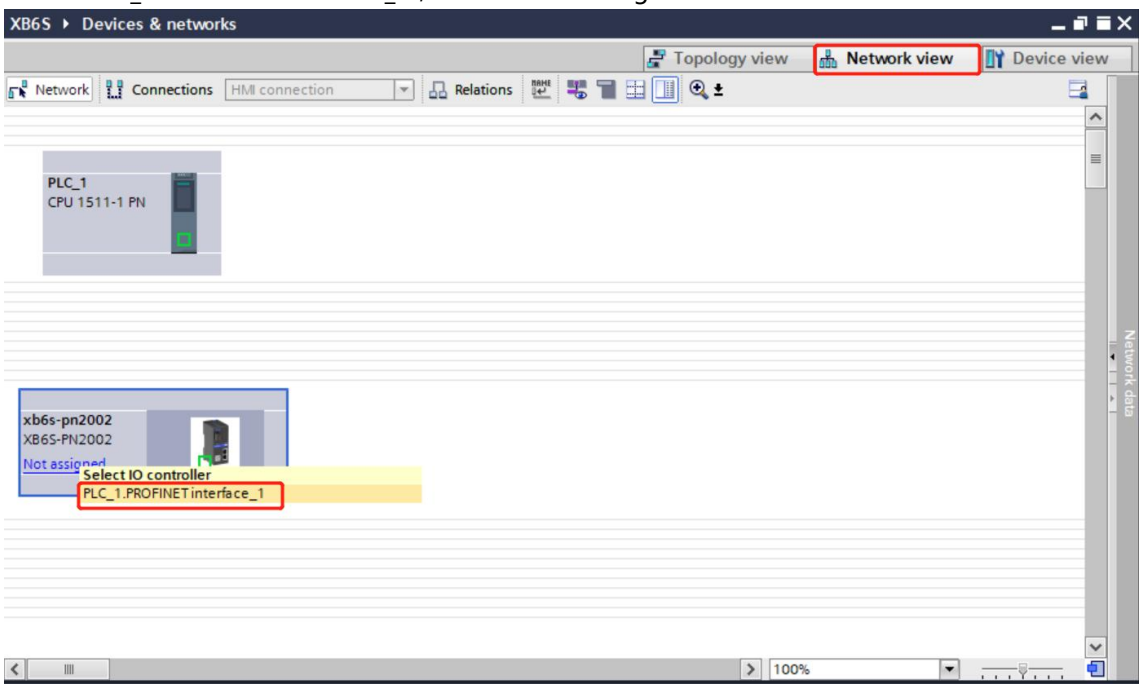
e. After the coupler is added successfully, you can see the coupler icon in the network view, as shown in the figure below.



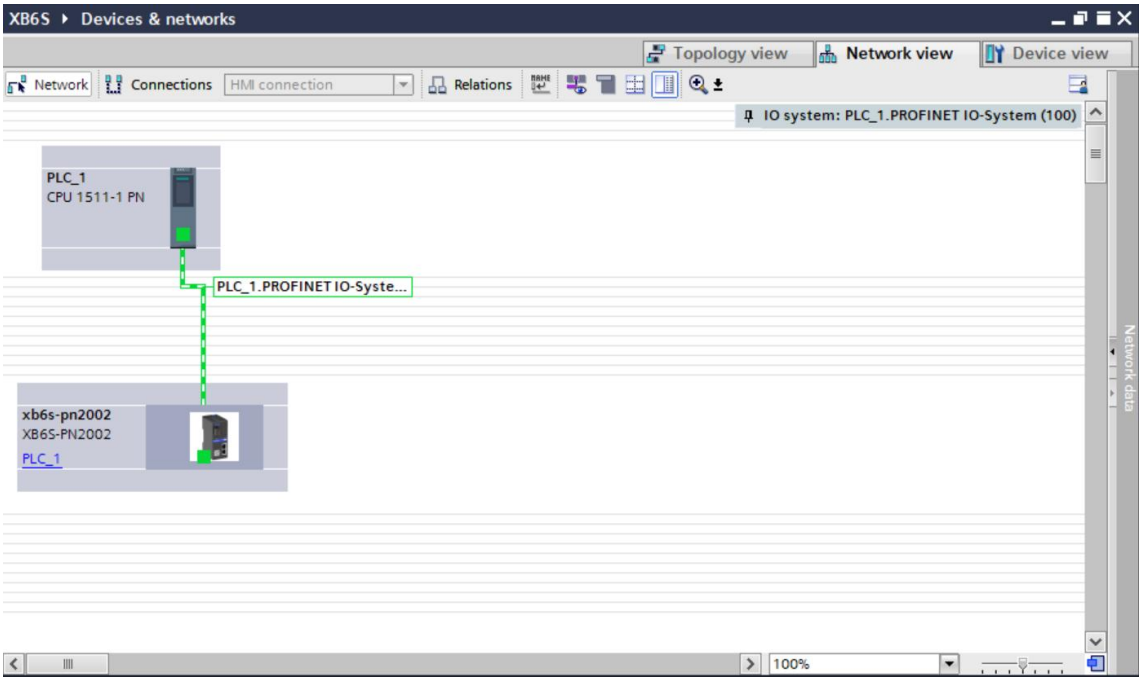
f. Select the coupler icon and switch to the device view. You can see that all IO devices in the topology have been detected and added, as shown in the following figure.



g. Switch to the network view, click "Not assigned (blue font)" on the coupler or slave device, and select "PLC_1.PROFINET interface_1", as shown in the figure below.

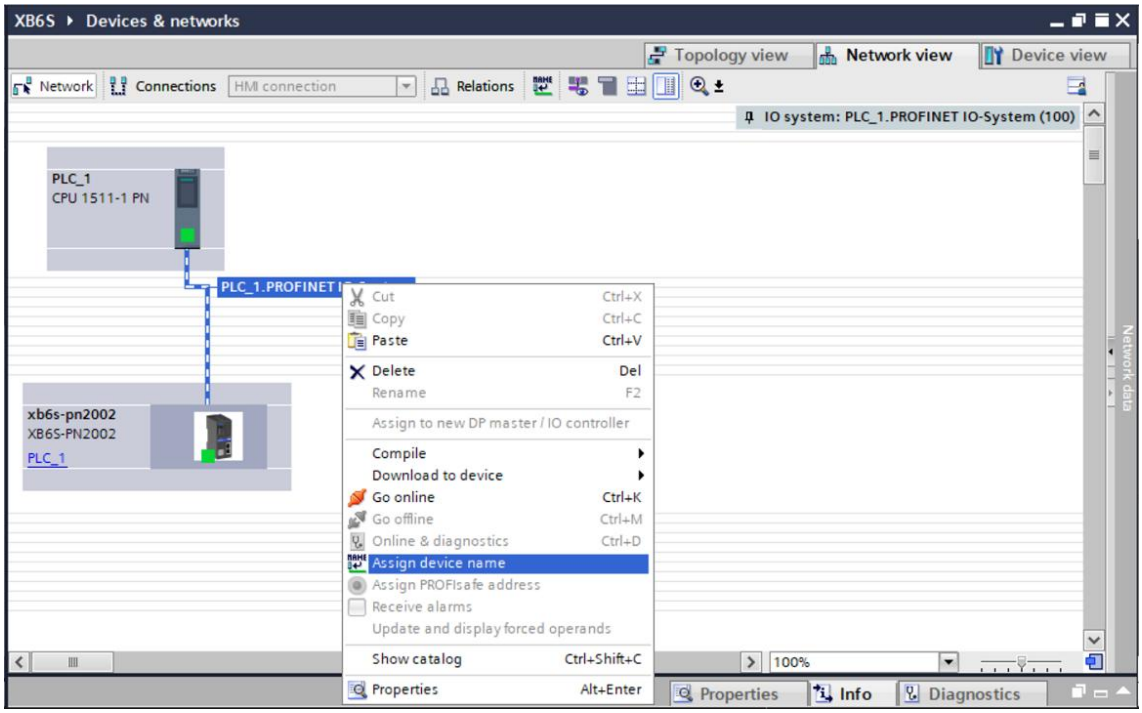


h. After the connection is completed, it will look like the following figure.

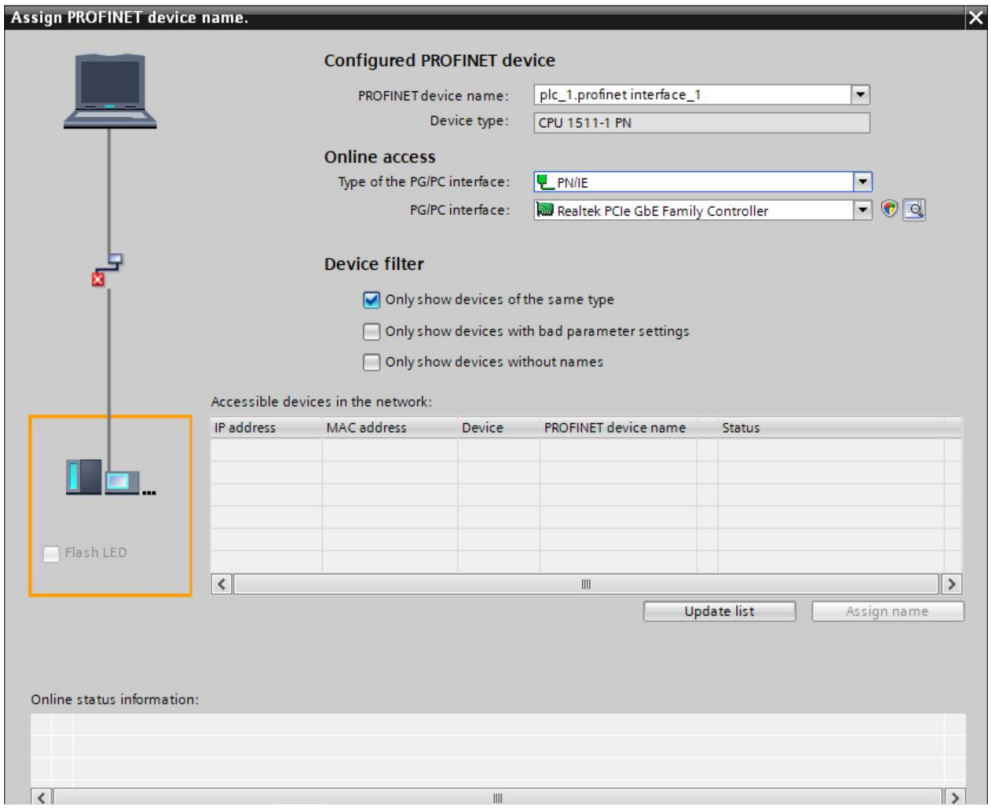


7、Assigning a Device Name

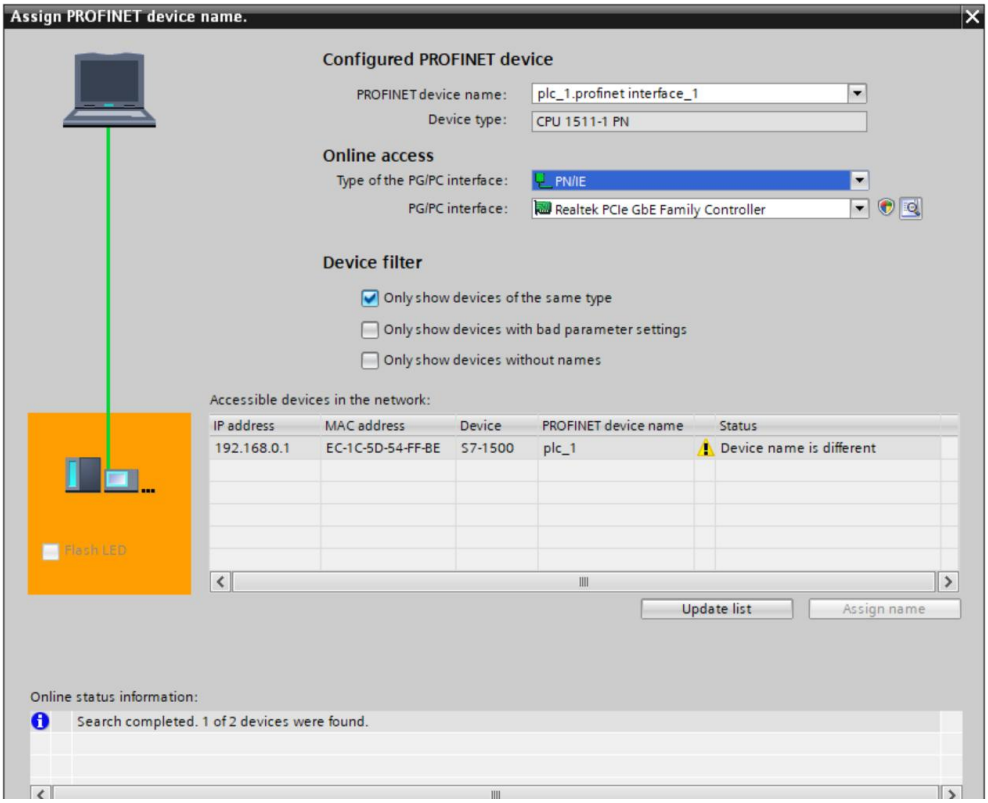
a. In the network view, right-click the connection line between the PLC and the coupler and select "Assign device name", as shown in the figure below.



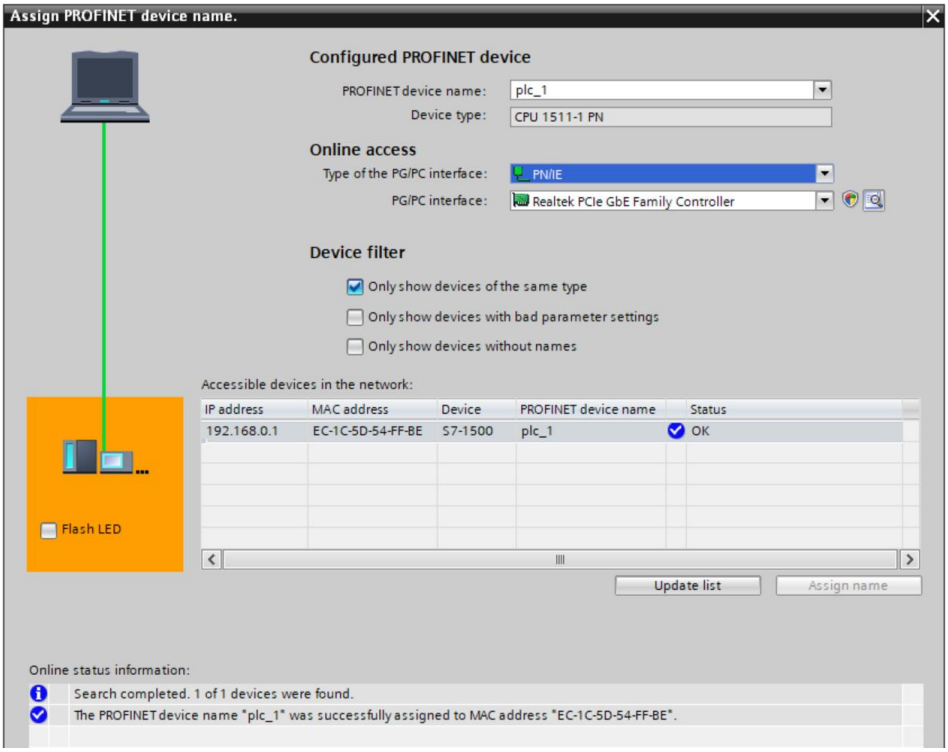
b. The "Assign PROFINET device name" window pops up, as shown in the figure below.



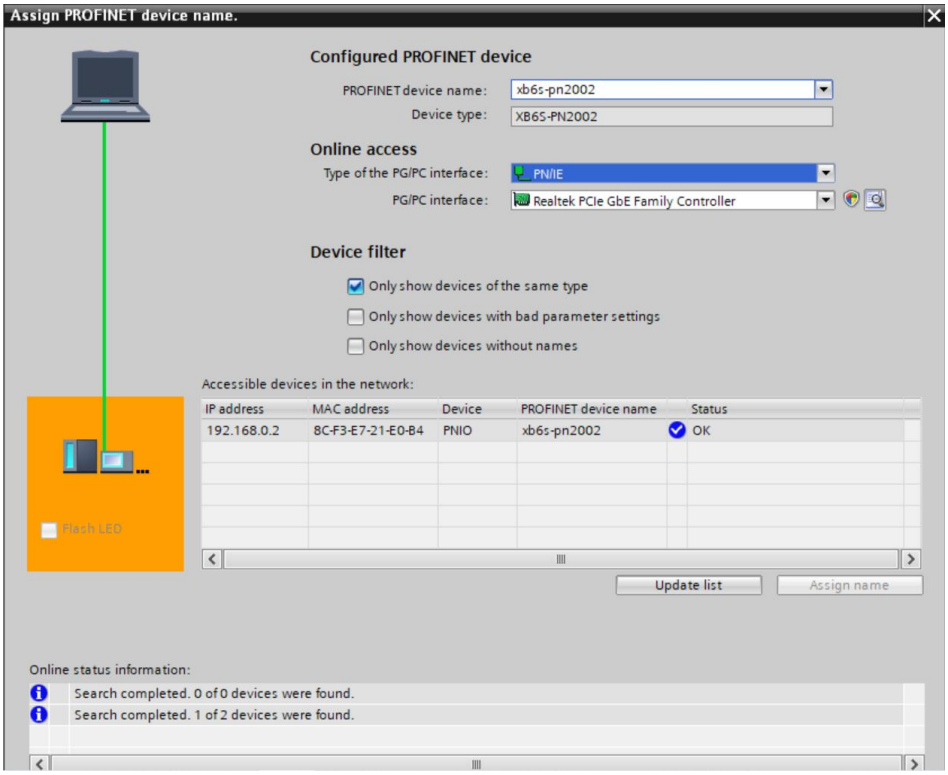
c. Select PLC as the device name and click "Update list". After the update is completed, it will be as shown in the figure below.



d. Check whether the node status in Accessible nodes in the network is OK. If it is not OK, select the device and click Assign name, as shown in the following figure.



e. Select the coupler as the device name, click "Update list", and assign the name in the same way after updating, as shown in the figure below.

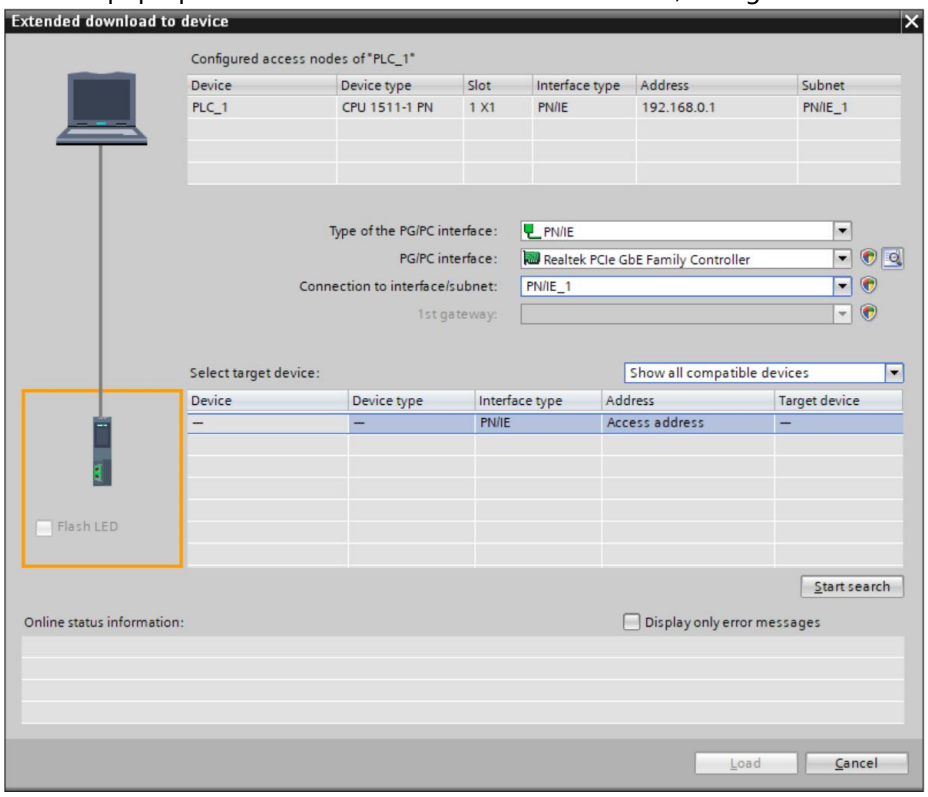


f. Check whether the MAC address on the module screen printing is the same as the MAC address of the assigned device name. Click Close.

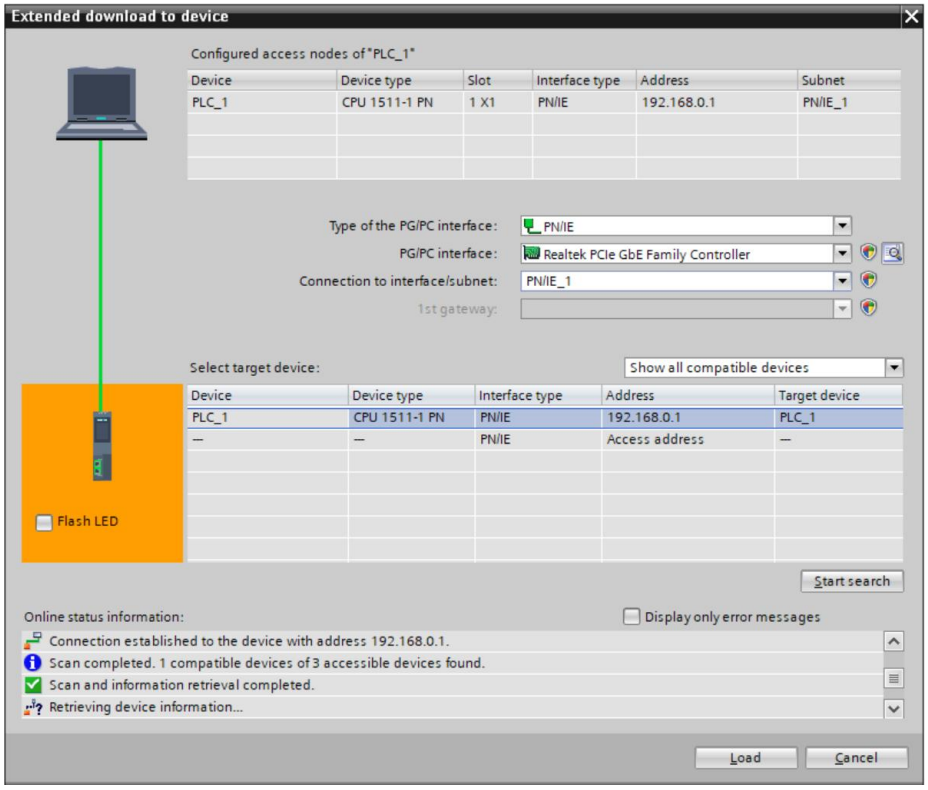
8、Downloading the configuration structure

a. In the network view, select the PLC. First click the Compile button in the menu bar, then click the Download button to download the current configuration to the PLC.

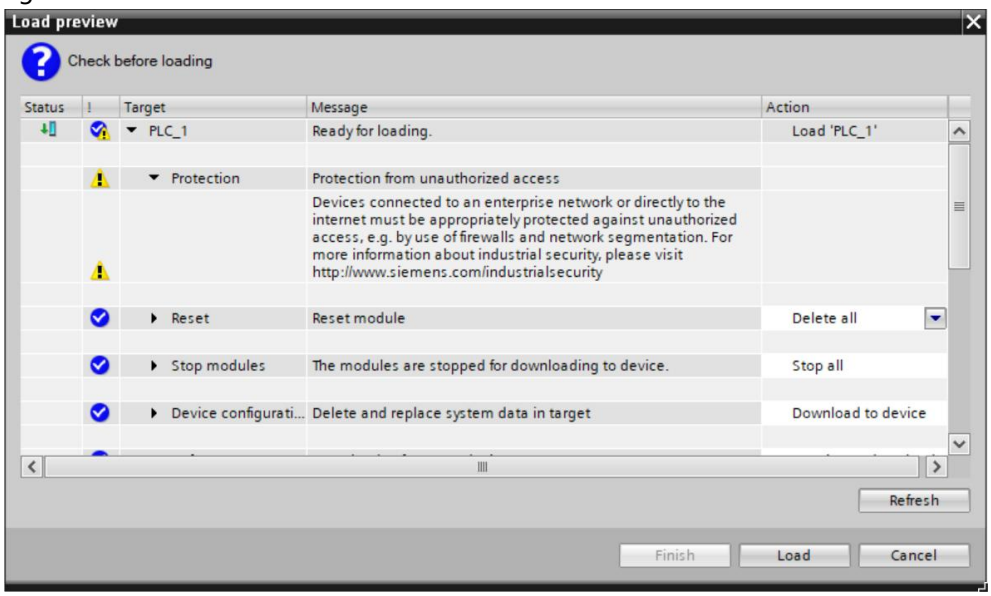
b. In the pop-up "Extended Download to Device" interface, configure as shown below.



c. Click the "Start search" button, as shown in the figure below.



d. Click Load Download and the download preview window pops up, as shown in the following figure.



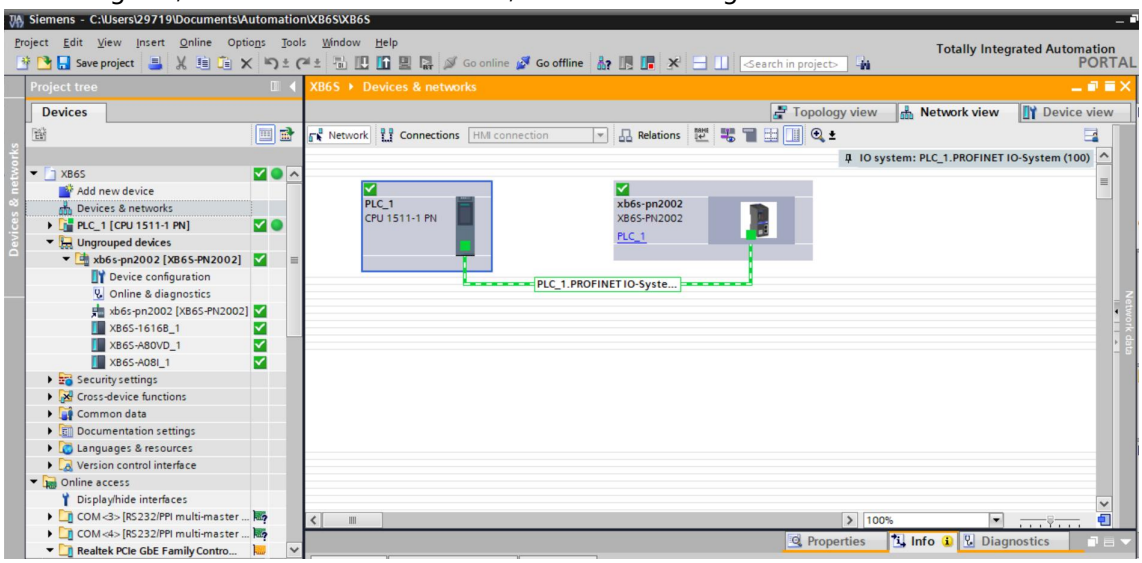
e. Click Load.

f. Click Finish.

g. Power on the device again.

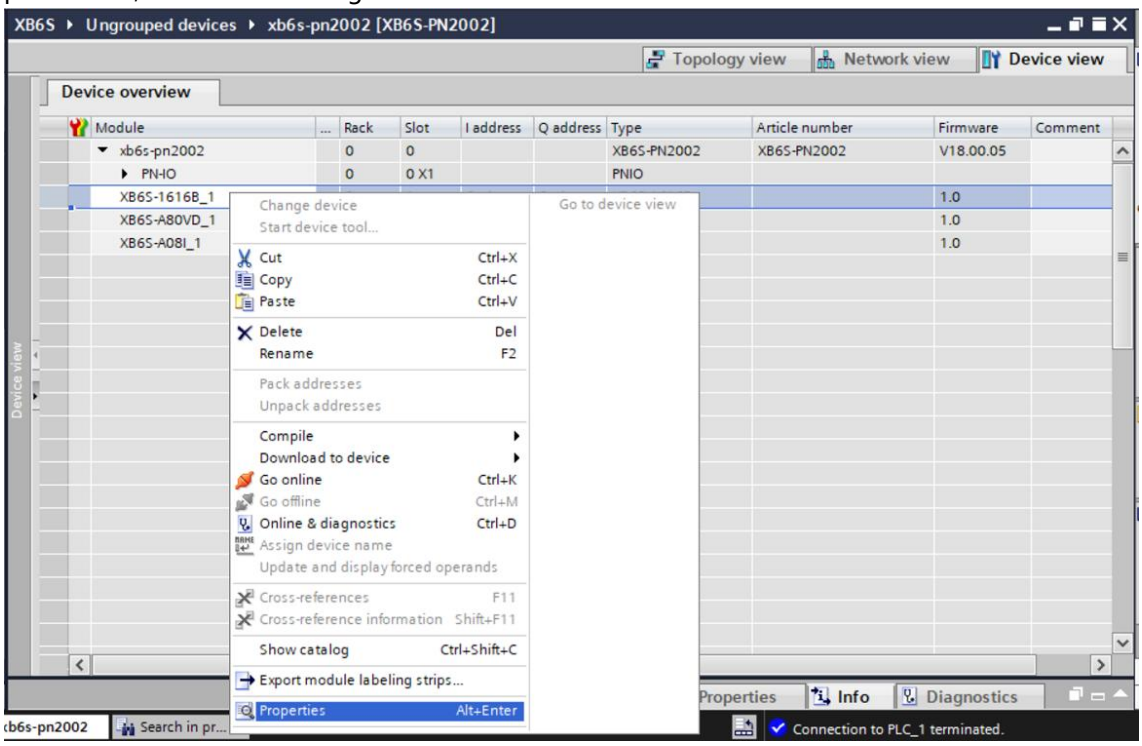
9、Communication connection

a. Click the "Start CPU" button in the menu bar, and then click the "Go online" button. If the icons are all green, the connection is successful, as shown in the figure below.

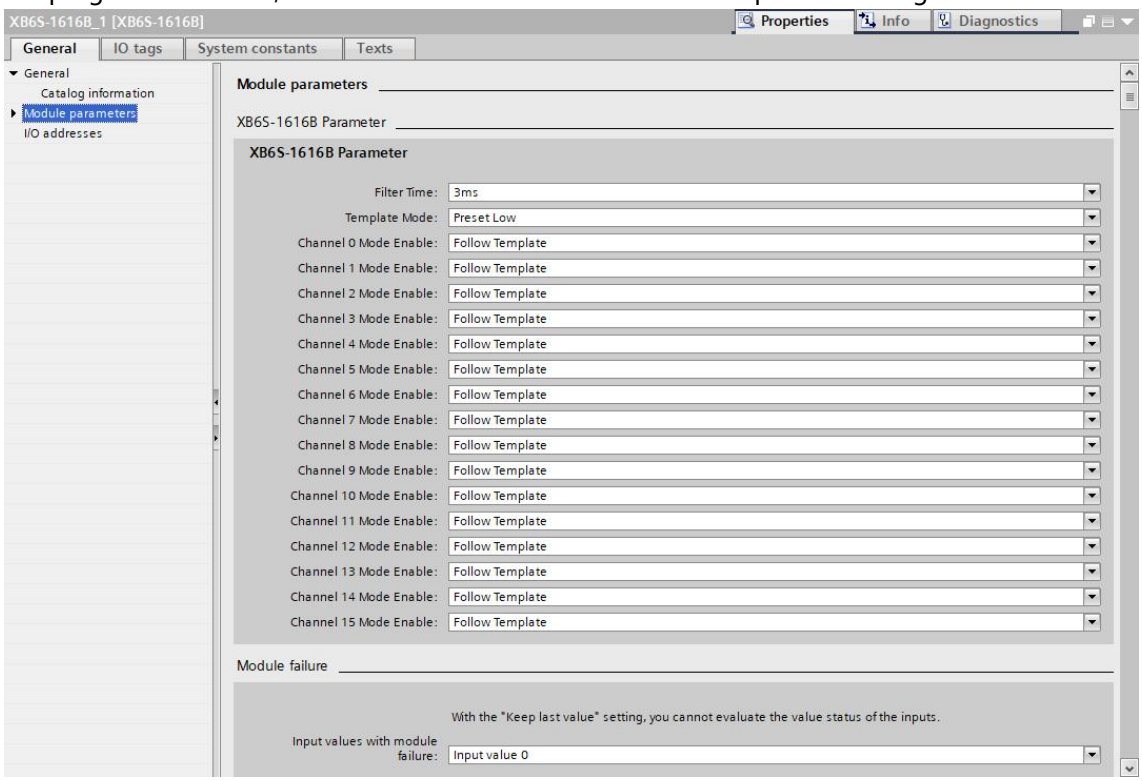


10、 Parameter settings

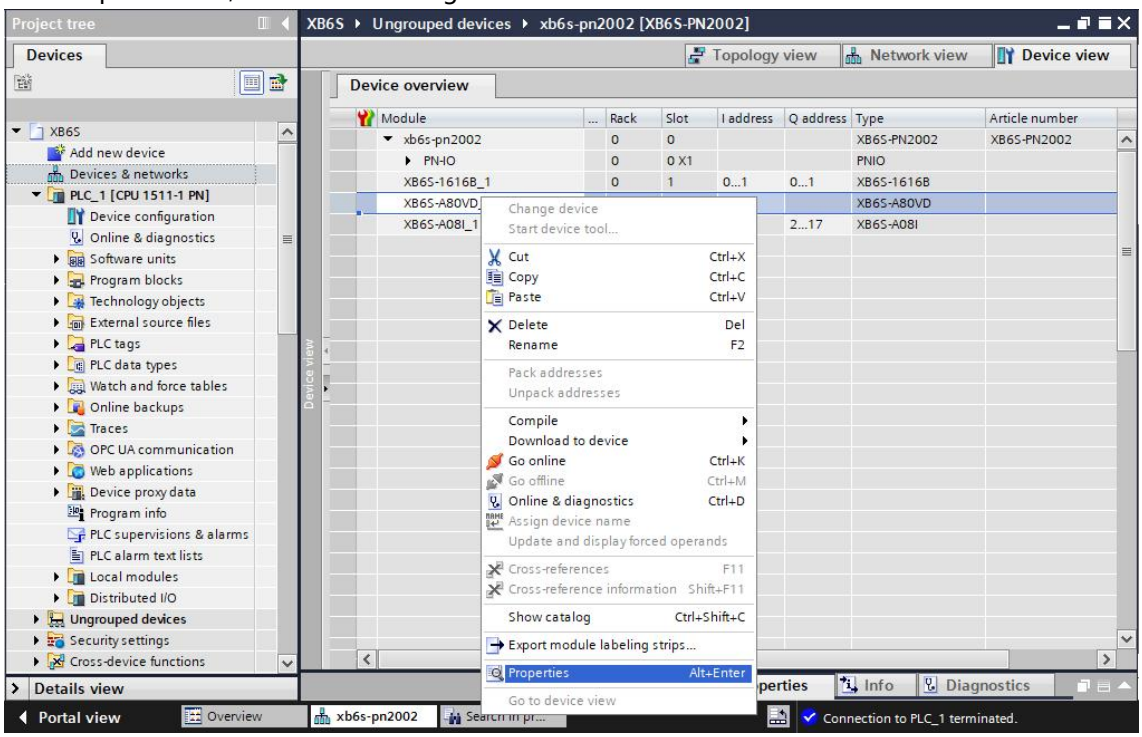
a. In offline state, open the "Network View", select the coupler module, switch to the device view, right-click the XB6S-1616B module, and click the "Properties" button to view and set the module parameters, as shown in the figure below.



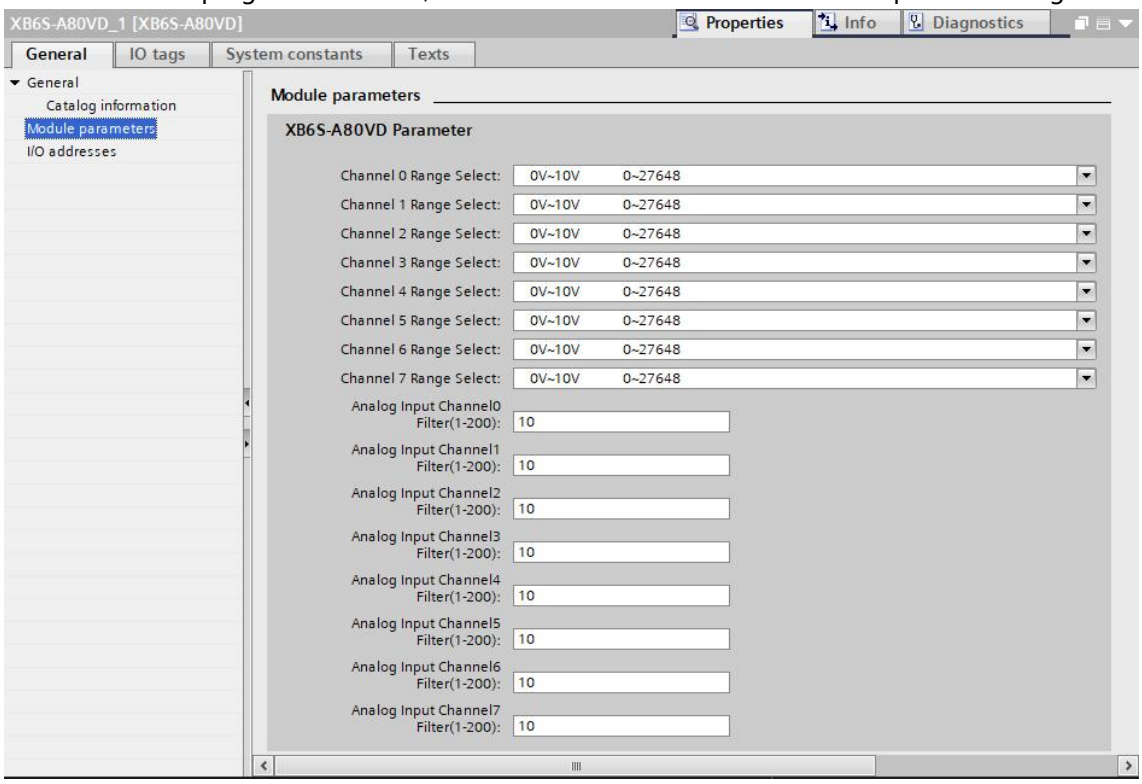
b. On the XB6S-1616B property page, click "Module parameters", as shown below. The parameters can be configured according to actual needs. After the configuration is completed, re-download the program to the PLC, and the PLC and the module need to be powered on again.



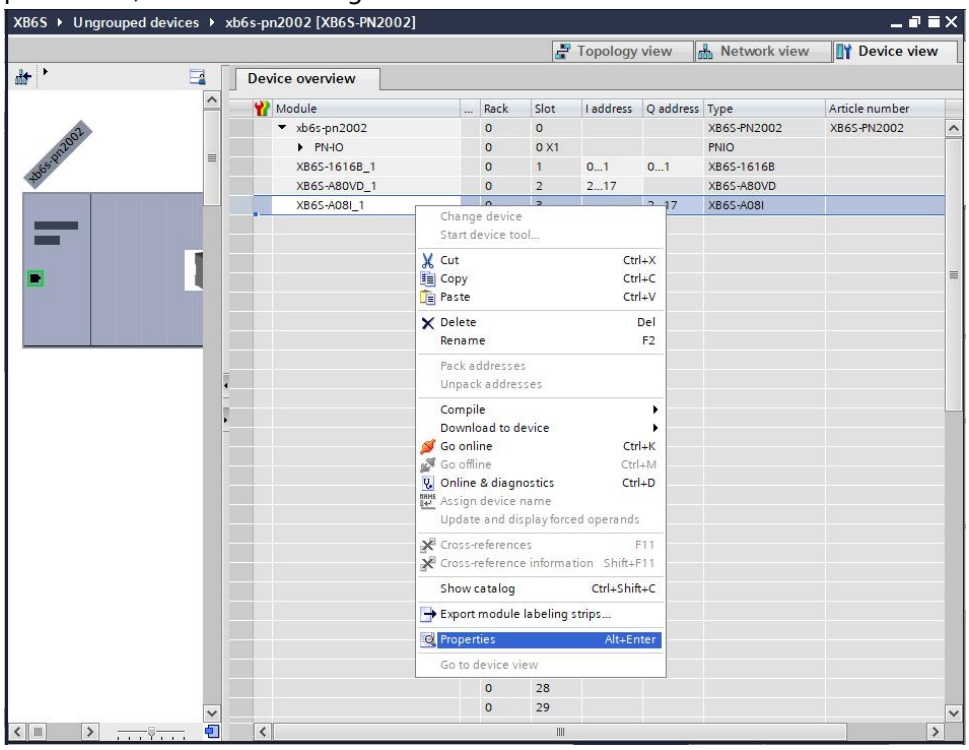
c. Right-click the XB6S-A80VD module and click the "Properties" button to view and set the module parameters, as shown in the figure below.



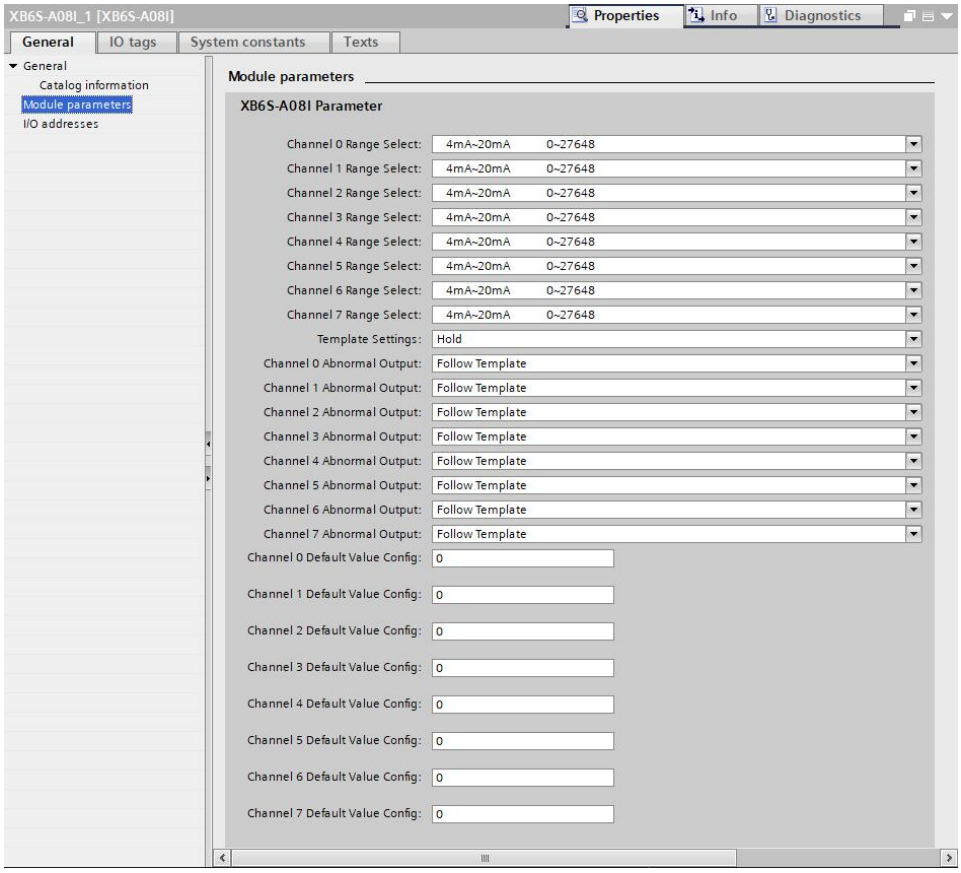
d. Exist On the XB6S-A80VD property page, click "Module parameters", as shown below. The parameters can be configured according to actual needs. After the configuration is completed, re-download the program to the PLC, and the PLC and the module need to be powered on again.



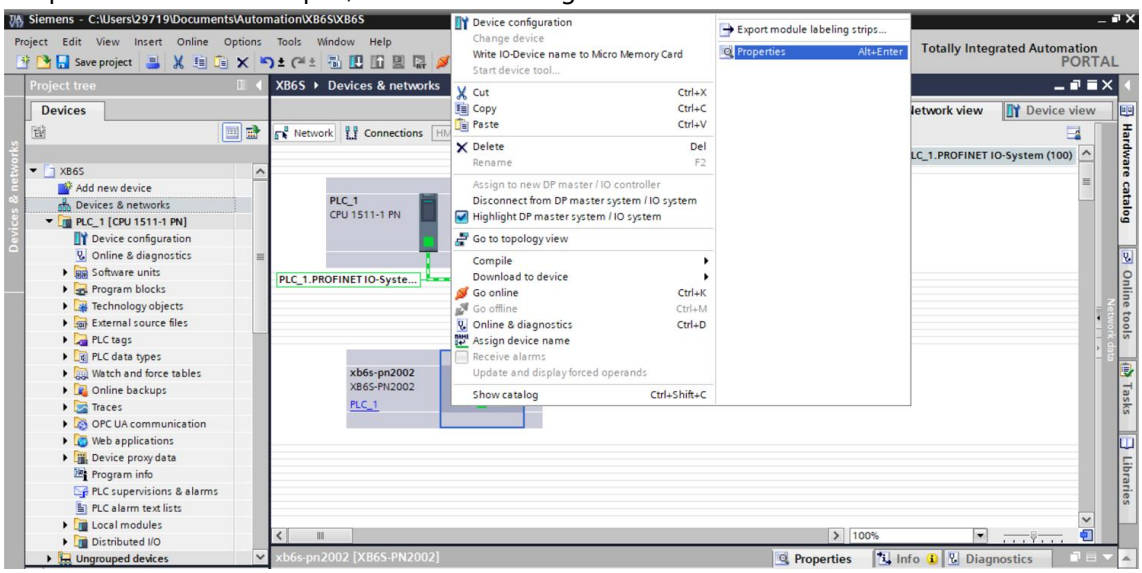
e. Right-click the XB6S-A08I module and click the "Properties" button to view and set the module parameters, as shown in the figure below.



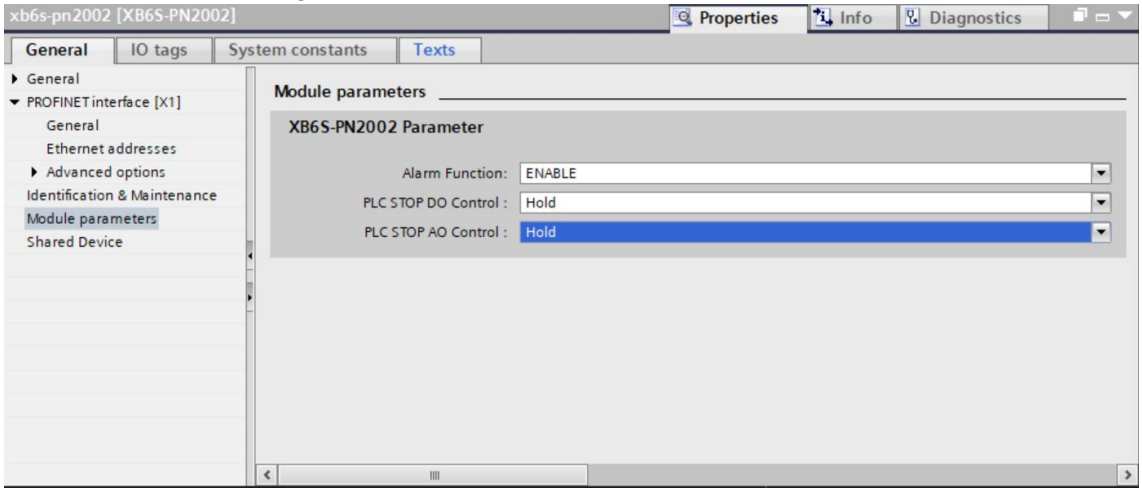
f. Exist On the XB6S-A08I property page, click "Module parameters", as shown below. The parameters can be configured according to actual needs. After the configuration is completed, re-download the program to the PLC, and the PLC and the module need to be powered on again.



g. Right-click the coupler icon in the network view and click the "Properties" button to view and set the parameters of the coupler, as shown in the figure below.

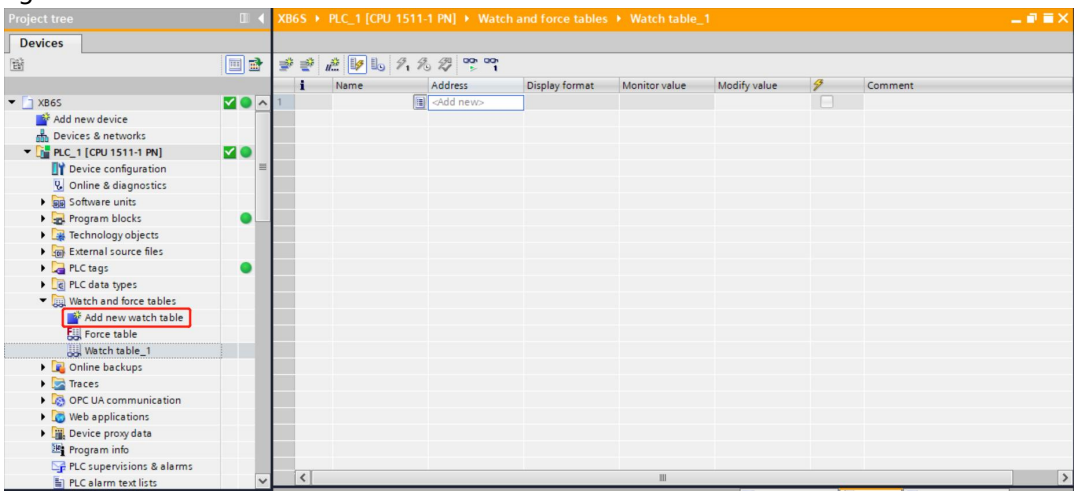


h. On the coupler properties page, click "Module parameters", as shown in the figure below. The two parameters of whether the alarm function is enabled or not and the output control of AO and DO in the PLC stop state can be configured according to actual needs. After the configuration is completed, re-download the program to the PLC, and the PLC and the module need to be powered on again.

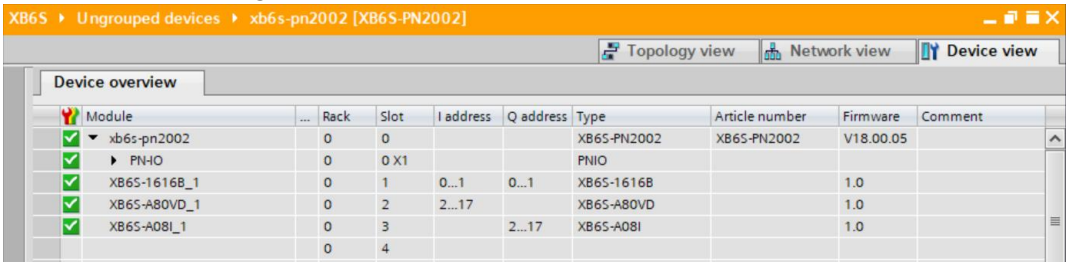


11、 Functional Verification

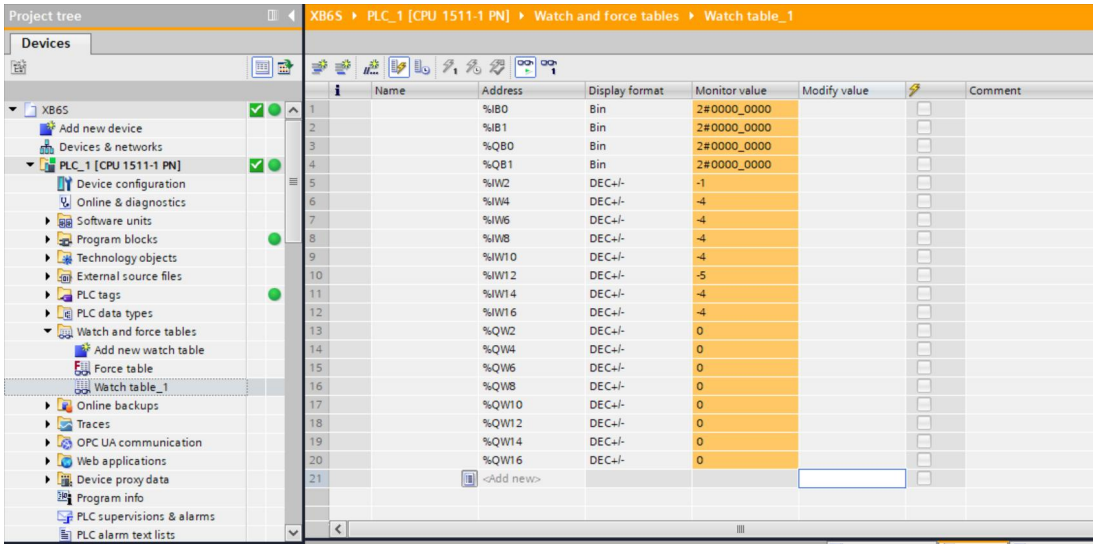
a. Expand the project navigation on the left and select "Watch and force tables", double-click "Add new watch table", and the system will add a new monitoring table, as shown in the following figure.



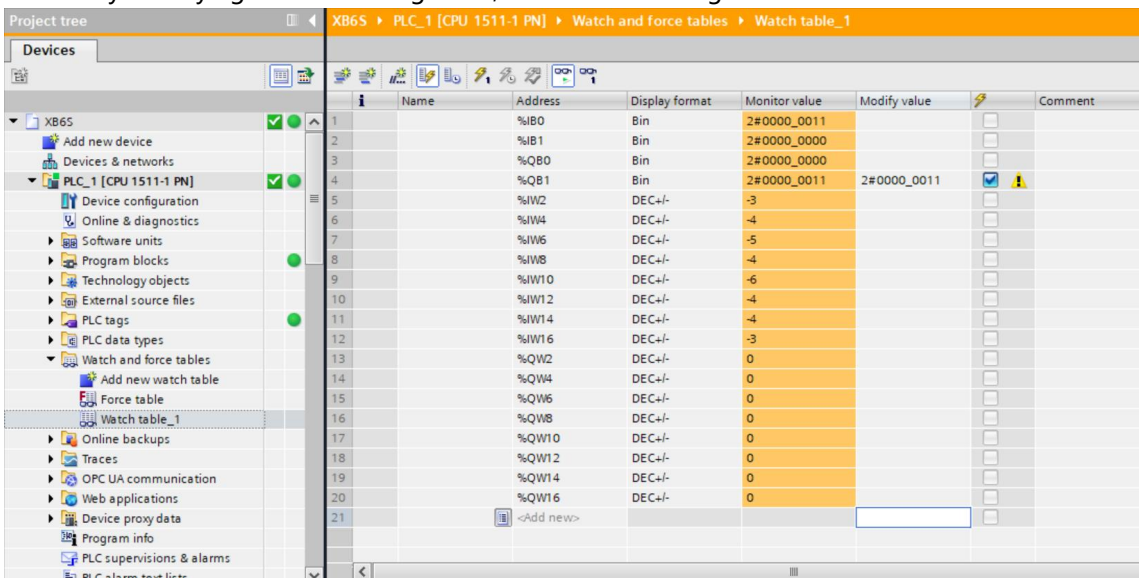
b. Open the "Device View" and check the channel I address (channel address of input signal) and Q address (channel address of output signal) of each module in the device overview.
For example, the "I address" of the XB6S-1616B module is 0 to 1, and the "Q address" is 0 to 1, as shown in the figure below.



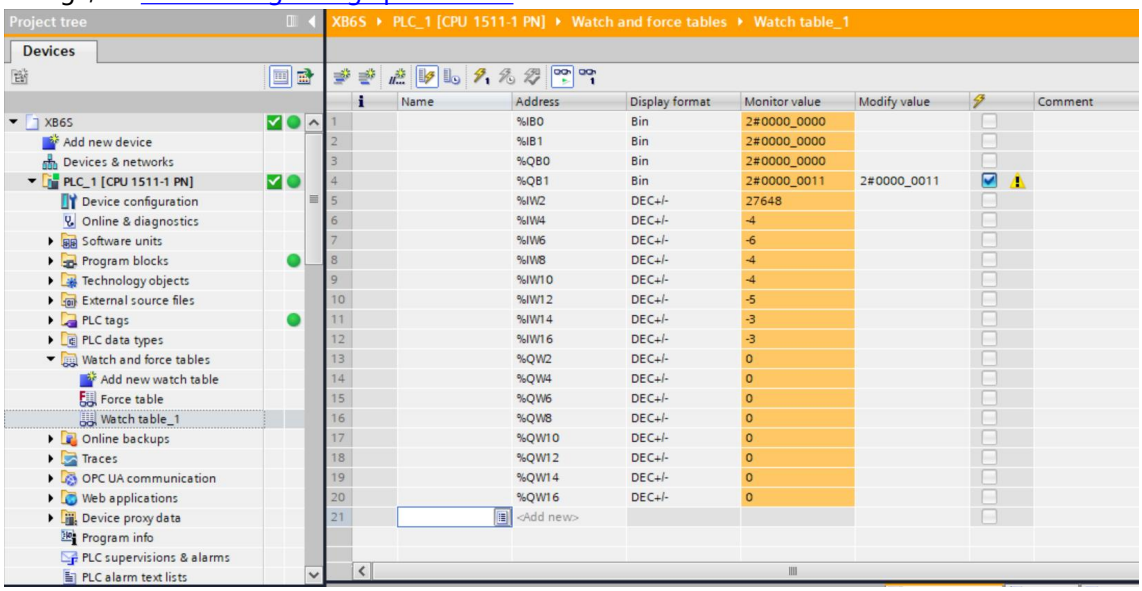
c. Fill in the input and output channel addresses in the address cells of the monitoring table, such as writing "IB0" to "IB1", "QB0" to "QB1", and press the "Enter" key. After all the entries are completed, click  button to monitor the data, as shown in the figure below.



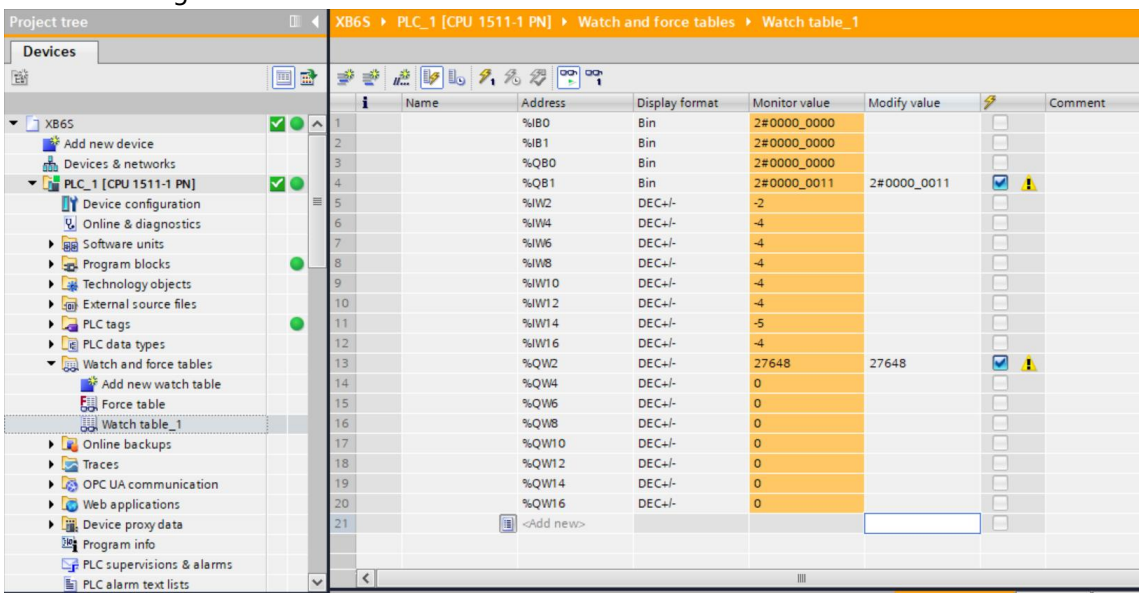
d. Taking the input channel 0 and channel 1 of the XB6S-1616B module as an example, when there is valid voltage input to the module input channel 0 and channel 1, it can be observed in the monitoring value cell of the monitoring table; the output channel can be forced to output control by modifying the monitoring value, as shown in the figure below.



e. Take channel 0 of the XB6S-A80VD module as an example. When there is voltage input in channel 0, the input voltage code value can be monitored in the monitoring table, as shown in the figure below. For details on the corresponding relationship between the code value and the voltage, see3.3.4 Analog voltage parameters.



f. Take channel 0 of the XB6S-A08I module as an example. If you want channel 0 to output, you can enter a value in the modification value cell of the monitoring table. The corresponding relationship between the code value and the current is detailed in3.3.5 Analog current parameters, click After writing, you can see that the corresponding channel light is on, as shown in the figure below.



6.5.2 Ring network redundancy configuration application

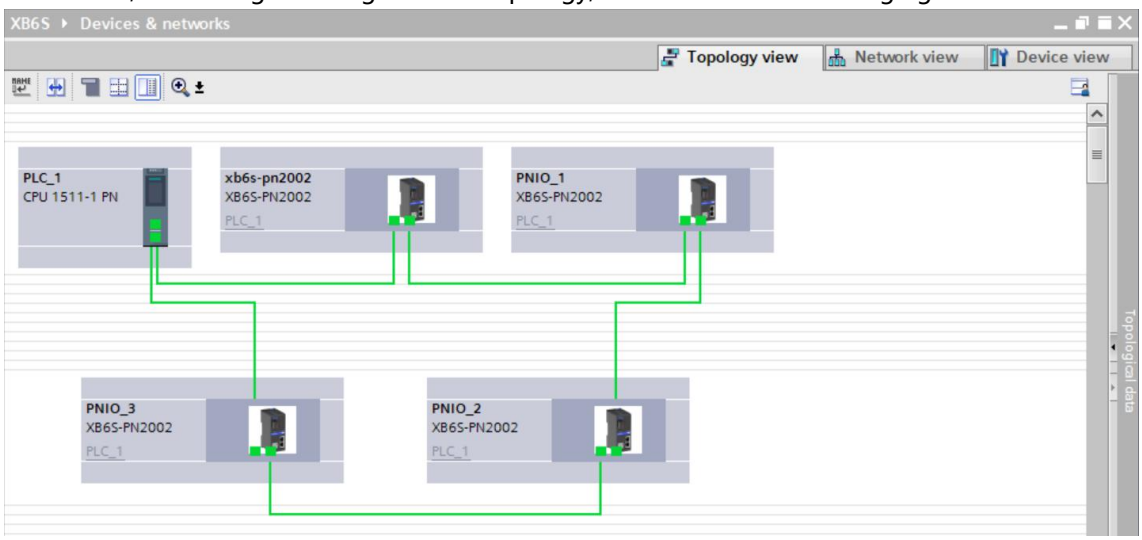
1、Preparation

- **Hardware Environment**
  - **Module preparation. This description takes the XB6S-PN2002+XB6S-PN2002+XB6S-PN2002+ XB6S-PN2002 network topology as an example.**
  - **A computer with TIA Portal V17 software pre-installed**
  - **A Siemens PLC. This description takes Siemens S7-1500 CPU 1511-1 PN as an example.**
  - **Special shielded cable**
  - **Switching power supply**
  - **Device Profile**
    Configuration file acquisition address:https://www.solidotech.com/documents/configfile
- **Hardware configuration and wiring**
  Please follow the4 Installation and removal"and"5 WiringRequest action

2、Ring redundancy

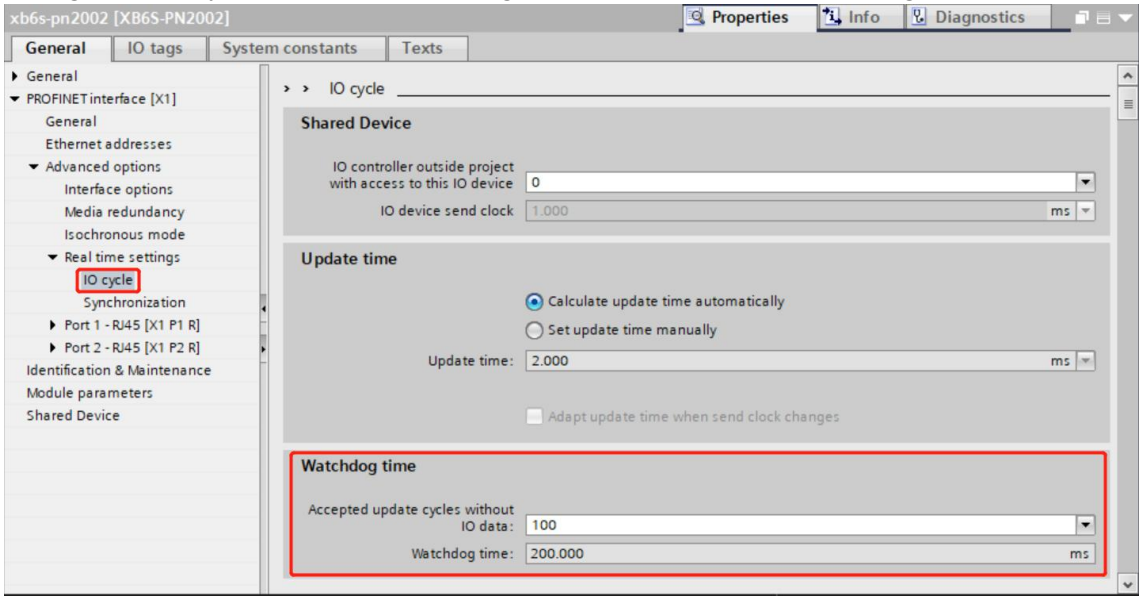
a. Create a project in TIA Portal V17 software and add the PLC+XB6S-PN2002+XB6S-PN2002+XB6S-PN2002+ XB6S-PN2002 network topology to the network configuration. The steps for configuring the file and adding devices are the same as those in section 6.5.1.

b. Create a topology configuration in the topology view, connect the two interfaces of each device end to end, and configure a ring network topology, as shown in the following figure.

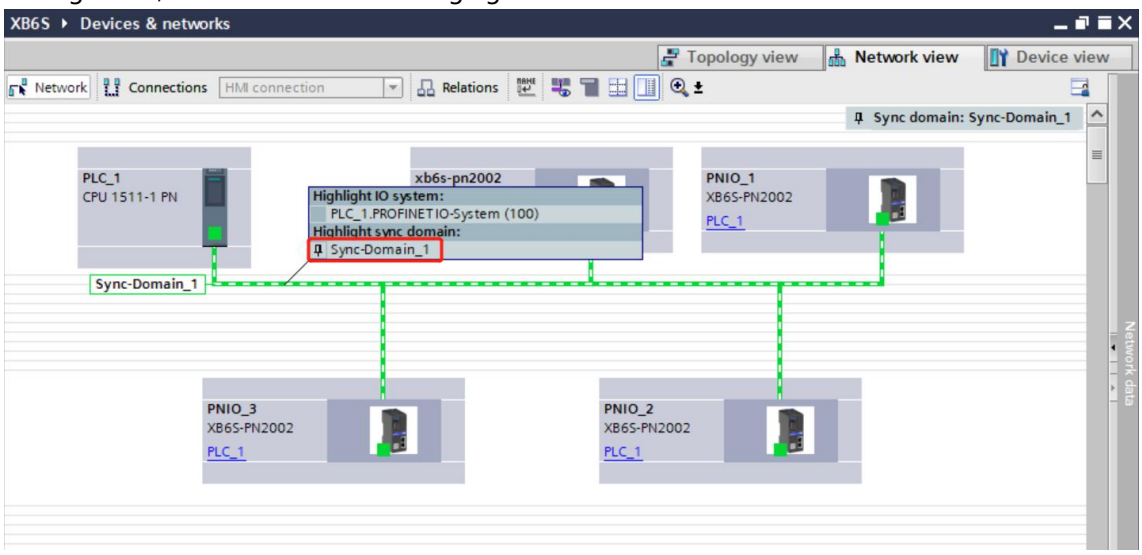


c. Assign a device name to each device (PLC and coupler) in the network view.

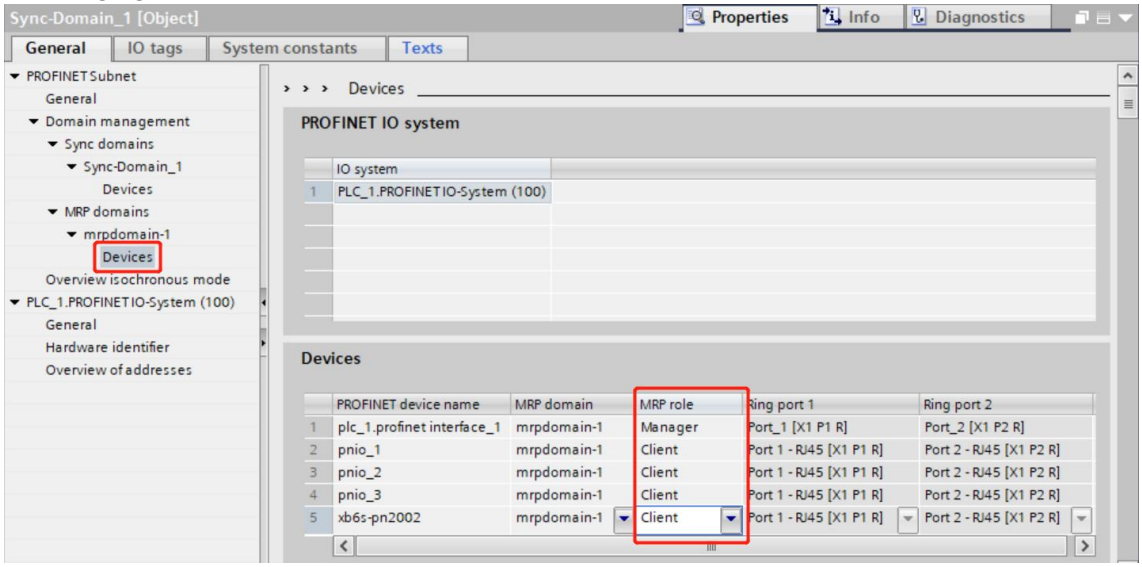
d. Set the IO cycle for each device (PLC and coupler). Taking the coupler as an example, right-click the coupler icon in the network view, click the "Properties" button, find the watchdog time setting in the IO cycle, and set the watchdog time to 200ms, as shown in the figure below.



e. Highlight the Sync Domain in the Network view and click Sync Domain Network to enter Domain Management, as shown in the following figure.

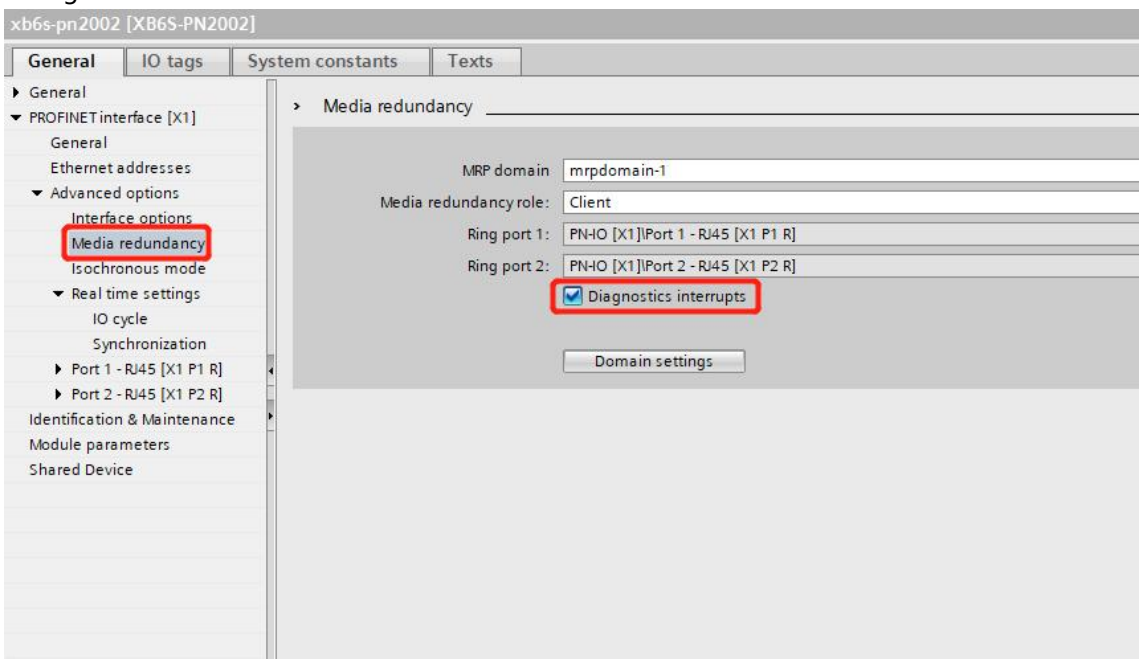


f. On the MRP domain management page, assign the MRP role and ring network port to each device. In this example, set the PLC as the manager and the coupler as the client, as shown in the following figure.



g. After compiling and downloading the program, enter the online topology view to check whether the device status is normal.

h. Check the diagnostic interrupt function, and a diagnostic interrupt will be generated when the wiring or port on the ring network port is wrong or the ring network is disconnected, as shown in the figure below.



i. In the topology view, when a port error or device failure occurs, you can quickly view the fault point.