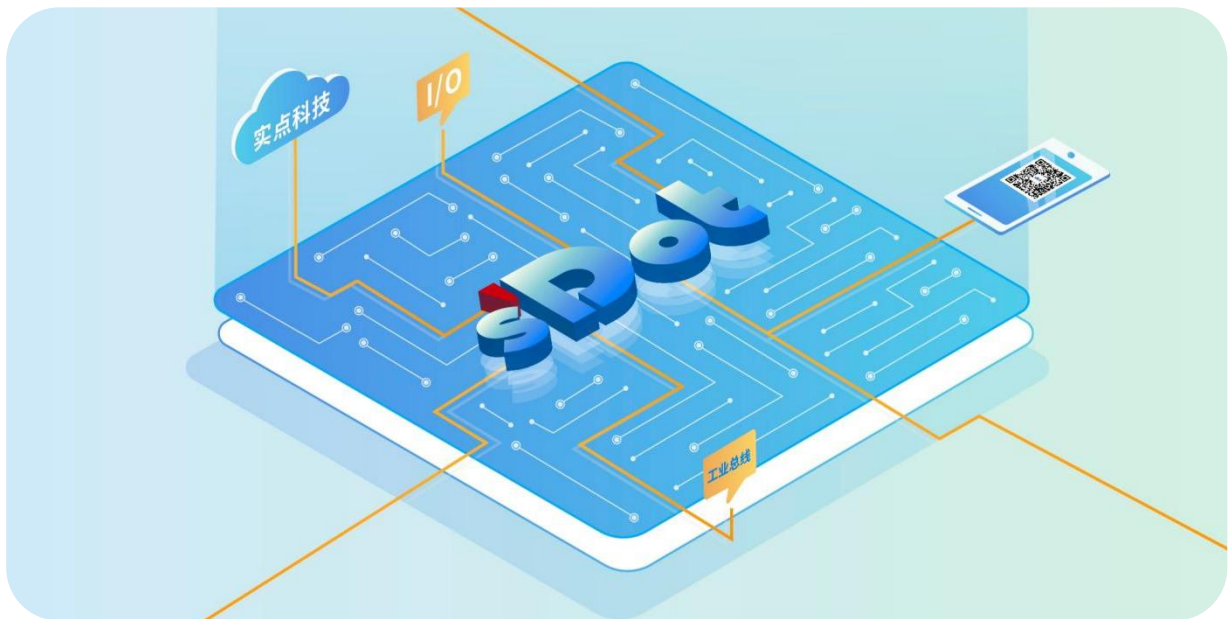




EtherCAT

XB6S Series Slice I/O

User Manual



Nanjing Solidot Electronic Technology Co., Ltd. 2024

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1 Product Introduction

1.1 Product overview

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

XB6S series Slice I/O modules are rich in variety and high in real-time, providing users with high-speed data acquisition, optimized system configuration, simplified field wiring, and improved system reliability.

1.2 Product features

- **Less nodes occupied**
A node consists of a bus coupler, 1~32 XB6S series I/O modules, 1~32 XBF series expansion I/O modules, and a end cap.
- **Extensive functionality**
Supports flexible expansion with a full range of I/O; can integrate a variety of digital modules, analog modules and temperature modules, etc., applicable to the needs of different applications.
- **Flexible configuration**
Various types of Slice I/O modules are available in any combination.
- **High compatibility**
The coupler communication interface complies with communication standards and supports mainstream EtherCAT masters.
- **Small volume**
Compact and small footprint.
- **Easy diagnosis**
Indicator light design is complete, the module status is clear at a glance, easy to detect and maintain.

- **High speed**

The backplane uses the X-bus: scanning period max. 1ms.

- **Easy installation**

DIN 35 mm standard rail mounting.

Adopts spring-type terminals for easy and quick wiring.

1.3 Application method

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

- a. Input I/O modules collect various signals from the field and send them to the coupler via an internal bus;
- b. The controller reads data from the coupler via fieldbus or industrial Ethernet and processes it, then writes the output data to the coupler;
- c. The coupler then writes the output data to the output I/O modules via the internal bus, thus enabling control of the device.

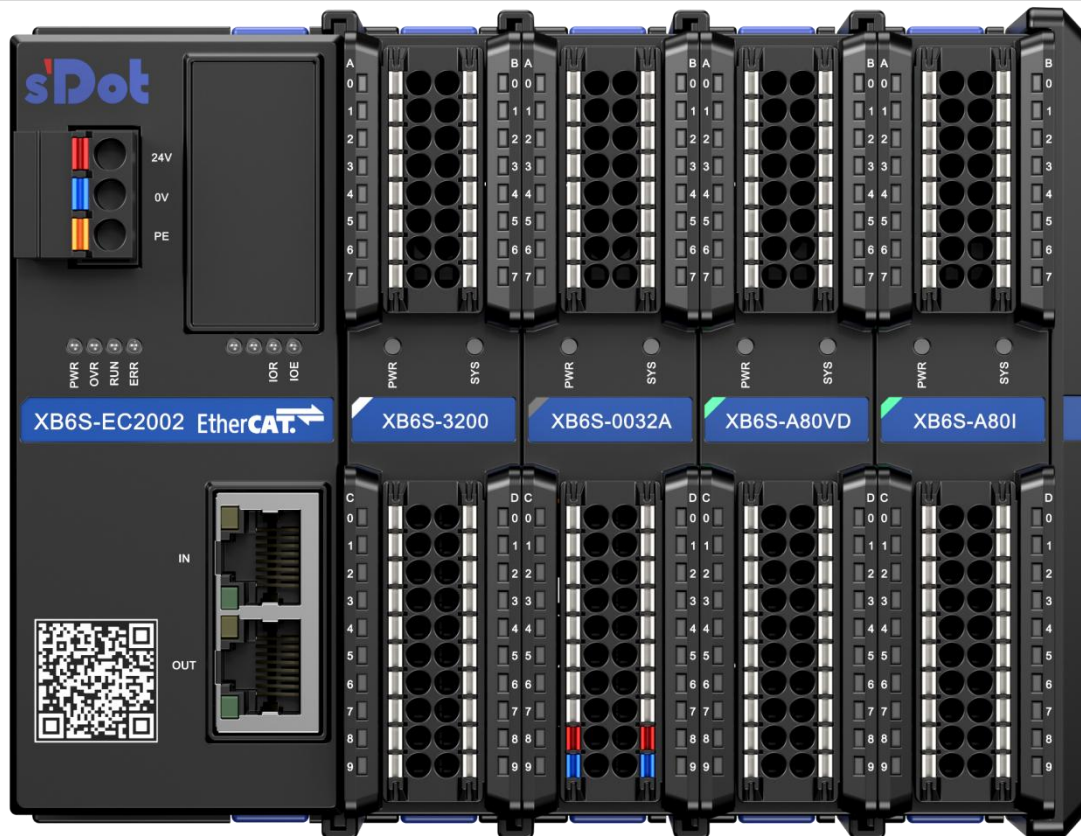
Expandable I/O modules include digital input modules, digital output modules, digital input and output modules, analog input modules, analog output modules, and temperature modules.

Application method: Application method using a combination of modules such as coupler, digital, analog, temperature, and extended power supply.

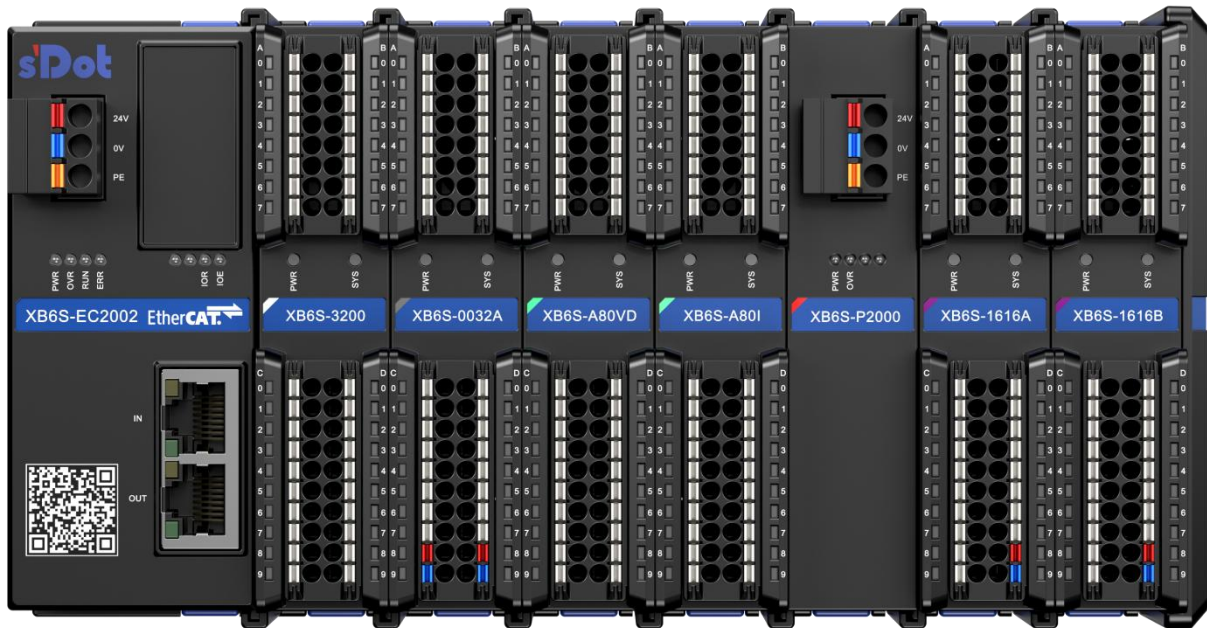
Application configuration: According to the requirements of access capacity of master station, number of stations, I/O points, function types, etc., it can be adapted to the combination configuration of different models of I/O modules.

Configuration rules: Modules are, from left to right, coupler module, power module, I/O module, end cap (must be configured) and so on.

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

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

Product combination mode II (coupler module, I/O modules, extended power module, I/O module, end cap)



2 Designation rules

2.1 Designation rules

2.1.1 Coupler designation rules

XB 6 S - EC 20 02
(1) (2)(3) (4) (5) (6)

Number	Name	Description of values
(1)	Bus type	XB: X-bus
(2)	Product series	6: Slice
(3)	Product versions	S: Strengthen, upgraded
(4)	Bus protocol	EC: EtherCAT PN: PROFINET
(5)	Power supply	20:2A
(6)	Number of network ports	02: Dual network ports

2.1.2 I/O module designation rules

XB **6** **S** - **A** **8** **0** **V**
(1) **(2)** **(3)** **(4)** **(5)** **(6)** **(7)**

Number	Name	Description of values				
(1)	Bus Type	XB: X-bus				
(2)	Product Series	6: Slice				
(3)	Product Versions	S: Strengthen, upgraded				
(4)	I/O Module Types	A: Analog Default: Digital				
(5)	Input Signal Points	Analog: 0, 4, 8 Digital: 00, 08, 16, 32				
(6)	Number of output signal points	Analog: 0, 4, 8 Digital: 00, 08, 16, 32				
(7)	Input/Output Characteristics	Digital			Analog	
		Code	importation	exports	Code	Definition
		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 (electronics)	ID	Differential signal with adjustable range: Disable, 4mA~20mA, 0mA~20mA, -20mA~+20mA
					TM	Temperature acquisition of RTDs, thermocouples, etc.

2.2 Module List

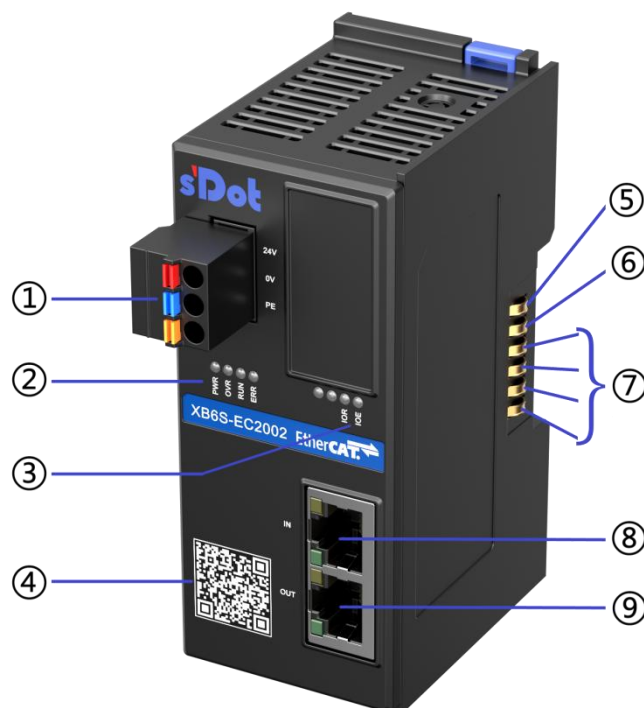
Model	Product Description	
XB6S-EC2002	EtherCAT Bus Coupler Module	
XB6S-EC2002-R1	EtherCAT Bus Coupler Module	
XB6S-3200	32-channel digital input module, input NPN/PNP compatible, input filter default 3ms	
XB6S-1600	16-channel digital input module, input NPN/PNP compatible, input filter default 3ms	
XB6S-0800	8-channel digital input module, input NPN/PNP compatible, input filter default 3ms	
XB6S-1616A	16-channel digital input 16-channel digital output module Input NPN/PNP compatible, input filter default 3ms, output NPN type	
XB6S-1616B	16-channel digital input 16-channel digital output module Input NPN/PNP compatible, input filter default 3ms, output PNP type	
XB6S-0032A	32-channel digital output module, output NPN type	
XB6S-0032B	32-channel digital output module, 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	
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, -10V~+10V, 0V~10V, -5V~+5V, 0V~5V, 1V~5V
XB6S-A80I	8-channel analog current input module	Single-ended signal, adjustable range: Disable, -10V~+10V, 0V~10V, -5V~+5V, 0V~5V, 1V~5V
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, 4mA~20mA, 0mA~20mA, -20mA~+20mA
XB6S-A04V	4-channel analog voltage output module	Single-ended signal, adjustable range: Disable, 4mA~20mA, 0mA~20mA
XB6S-A08I	8-channel analog current output module	Single-ended signal, adjustable range: Disable, -10V~+10V, 0V~10V, -5V~+5V, 0V~5V, 1V~5V
XB6S-A04I	4-channel analog current output module	Single-ended signal, adjustable range: Disable,

	output module	-10V~+10V, 0V~10V, -5V~+5V, 0V~5V, 1V~5V
XB6S-A80TM	8-channel RTD, thermocouple temperature acquisition module (For details of the module, please refer to the user manual of the module on the official website)	
XB6S-A40TM	4-channel RTD, thermocouple temperature acquisition module (For details of the module, please refer to the user manual of the module on the official website)	
XB6S-PL20	2-channel single-ended incremental encoder counting module (For details of the module, please refer to the user manual of the module on the official website)	
XB6S-PS20D	2-channel SSI absolute encoder counting module (For details of the module, please refer to the user manual of the module on the official website)	
XB6S-PC80	8-channel Pulse counting module (For details of the module, please refer to the user manual of the module on the official website)	
XB6S-PT04A	4-channel PTO Pulse output module (For details of the module, please refer to the user manual of the module on the official website)	
XB6S-C01SP	1-channel serial communication module (For details of the module, please refer to the user manual of the module on the official website)	
XB6S-P2000	Extended power module	
XB6S-P2000-R1	Extended power module	
XB6S-CVR00	End cap	

3 Module Introduction

3.1 EtherCAT Couplers

3.1.1 Panel structure



Number	Name	Definition
①	Power supply terminal block	3P spring-loaded terminal block
②	Module Indicators and Indicator marking	Indicates coupler power status, operation status
③	System indicators and indicator markings	Indicates system operational status
④	Module QR Code	Scan the code to get module related information
⑤	Power supply +	5V

⑥	Power supply -	0V
⑦	X-bus communication signals	Communication signal
⑧	Bus Interface IN	RJ45 interface
⑨	Bus Interface OUT	RJ45 interface

3.1.2 Indicator light function

EtherCAT Coupler Indicator Definition				
Markings	Name	Color	Status	Status Description
PWR	Power indicator	GREEN	ON	Module power supply is working properly
			OFF	Module not powered or abnormal power supply
OVR	Overload indicator	RED	OFF	Not overloaded
			ON	Load up to 90% ($\pm 5\%$) or more
RUN	EtherCAT operation status indicator	GREEN	ON	EtherCAT OP status
			Flashing 2.5Hz	EtherCAT PreOP Status
			Single flash (always on 200ms off 1s cycle change)	EtherCAT SafeOP Status
			Flashing 10Hz	BootStrap Status
			OFF	EtherCAT Init Status
ERR	EtherCAT Fault Indicator	RED	double flash ^[1]	EtherCAT Watchdog Timeout
			Single flash (always on 200ms off 1s cycle change)	Module local error
			Flashing 2.5Hz	General Configuration Errors
			OFF	EtherCAT communication is normal
IOR	IO communication indicator	GREEN	ON	I/O process data has been created
			Flashing 1Hz	No business data interaction
			Flashing 10Hz	Coupler Firmware Upgrade
IOE	IO Abnormal Indicator	RED	ON	communications anomaly
			Flashing 1Hz	Alarm I/O module exception exists
			OFF	No communication anomalies

Note [1]: Double flashing means 200ms off for 200ms of constant light, then 200ms off for 1000ms of constant light, and so on in a cycle of flashing.

Network Status Indicator Definitions				
Markings	Name	Color	Status	Status Description
IN	Network status indicator IN	Orange	FLASHING	Connection established with data interaction
			OFF	No data interaction or exception
		GREEN	ON	establish a network connection
			OFF	No network connection established or abnormal
OUT	Network status indicator OUT	Orange	FLASHING	Connection established with data interaction
			OFF	No data interaction or exception
		GREEN	ON	establish a network connection
			OFF	No network connection established or abnormal

3.1.3 Product Parameters

3.1.3.1 Interface parameter

EtherCAT Interface Parameters	
Bus protocol	EtherCAT
Number of slaves	Depending on the number of slaves supported by the master
Data transmission medium	Ethernet/EtherCAT CAT5 cable
Transmission rate	100Mbps
Minimum cycle time	250us
Transmission distance	≤100m (station to station)
Bus interface	2×RJ45
Maximum number of modules in series	32
Volume of input and output process data	1024Bytes ^[1]

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

3.1.3.2 Power supply parameters

Power supply 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 parameter

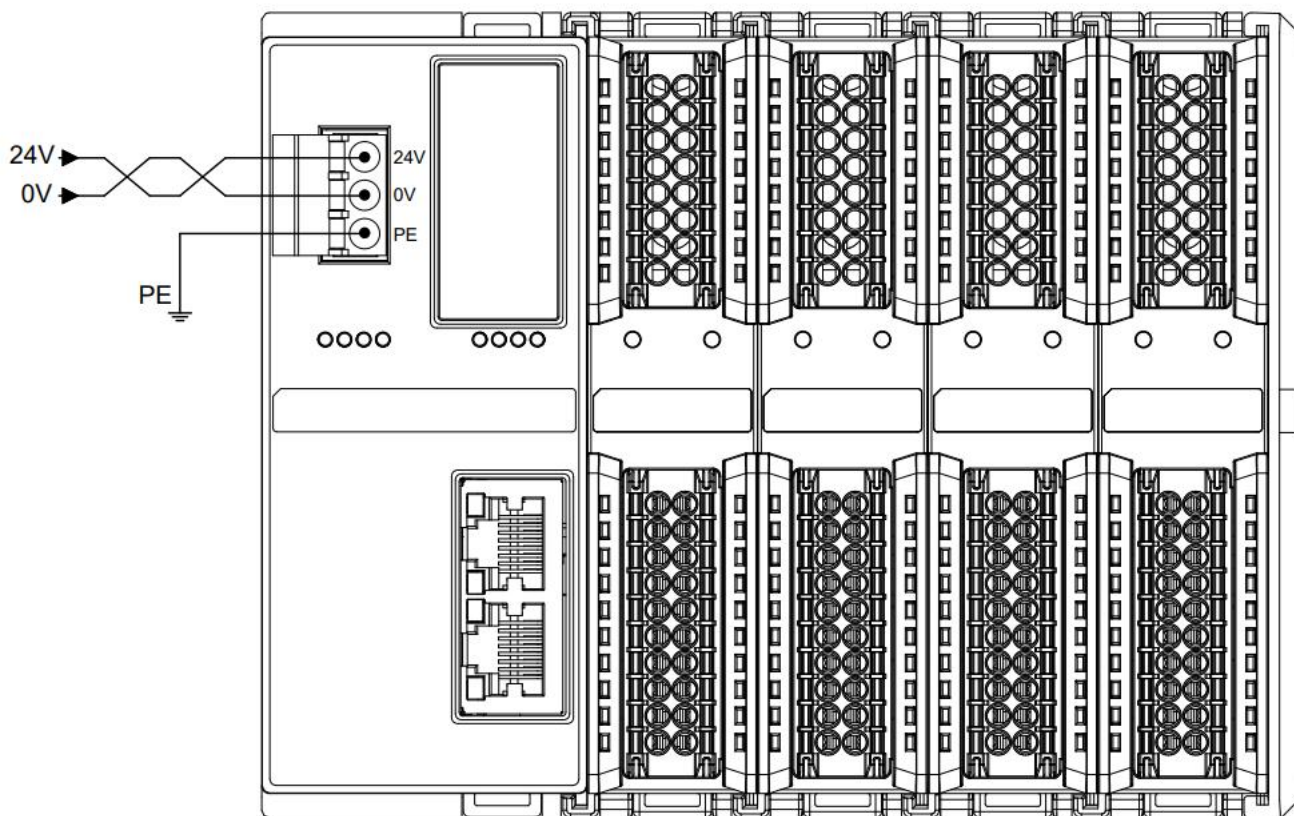
General technical parameters		
Size		106.4 x 43 x 61mm
Weights		155g
Operating environment	Operating temperature	-20°C~+60°C
	Storage temperature	-40°C~+80°C
	Relative humidity	95%, non-condensing
	Altitude	≤2000m
	Vibration resistance	IEC 60068-2-6 Sinusoidal vibration 5Hz~8.4Hz, 3.5mm, 8.4Hz~150Hz, 1g X/Y/Z triaxial, 10 cycles/axial (100min)
	Impact resistance	IEC 60068-2-27 Mechanical shock 150m/s ² , 11ms, ±X/Y/Z six directions 3 times/direction for a total of 18 times

	Protection class	IP20
	Overvoltage category	I
	Pollution degree	Level 2

Electromagnetic compatibility requirements	Electrostatic discharge	Level 3	Contact $\pm 8\text{KV}$ Air $\pm 8\text{KV}$, IEC61000-4-2
	Surge	Level 3	1KV DM 2KV CM, IEC 61000-4-5
	EFT/B	Level 4	Power cable $\pm 4\text{KV}$, IEC61000-4-4
Module Abnormal Self-Recovery		Support	
Accessing PDO through SDO		Support	
Diagnostic		Support	
Warning		Support	
Firmware upgrade		Support	
Short circuit protection		Support (automatic recovery mechanism)	
Reverse connection protection		Support (automatic recovery mechanism)	
Surge protection		Support	
CE certification		EMC EN 61131-2 EN IEC 61000-6-4 EN IEC 61000-6-2	
		LVD EN 61010-1:2010 EN IEC 61010-2-201	
UL certification		UL 61010-1/UL 61010-2-201	
RoHS certification		EU Directive 2011/65/EU Annex II	
REACH certification		EU Directive EC 1907/2006	

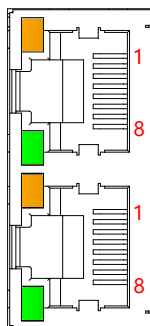
3.1.4 Power supply wiring diagram

Using a 24VDC power module, refer to the wiring method and connect the power supply according to the circuit shown in the following figure, and at the same time ground PE reliably (twisted-pair wire is recommended for the power supply cable).



3.1.5 Bus Wiring

Standard RJ45 network interface with standard crystal connector is used, and the pin assignment is shown in the table below.



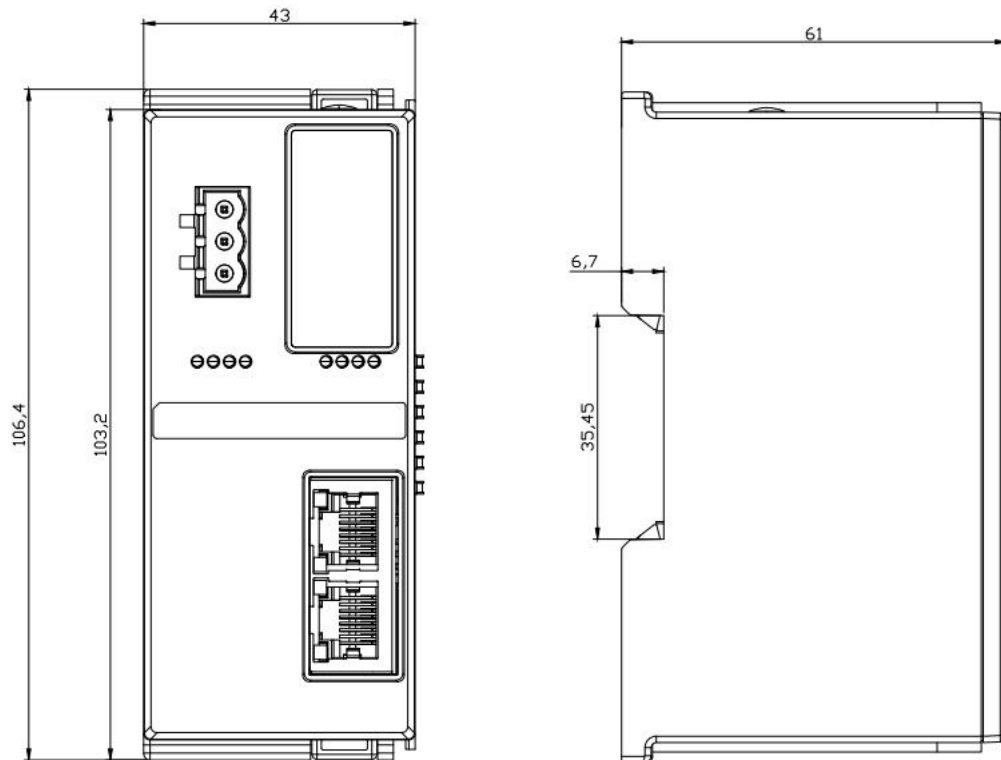
Pin number	Code
1	TD+
2	TD-
3	RD+
4	—
5	—
6	RD-
7	—
8	—

Precautions

- Double shielded (braided mesh + aluminum foil) STP cables of category 5 or higher are recommended as communication cables.
- The length of cables between devices must not exceed 100m.

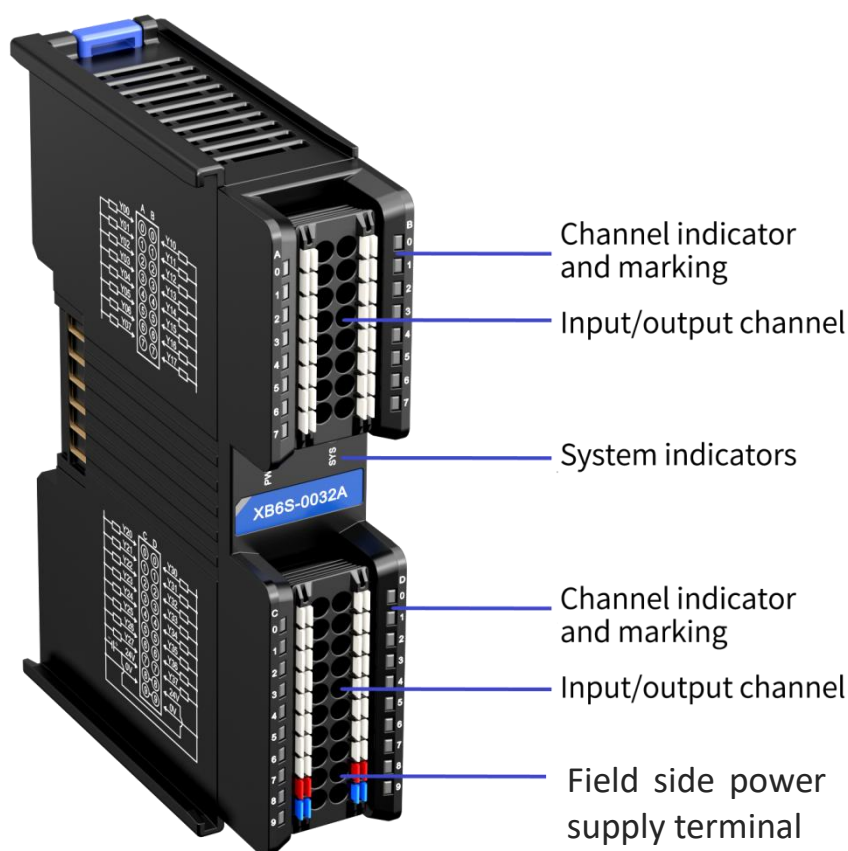
3.1.6 Housing Dimensions

Coupler housing specifications (unit mm)



3.2 Digital I/O Modules

3.2.1 Panel structure



3.2.2 Indicator light function

Digital I/O Module Indicator Definitions				
Markings	Name	Color	Status	Status description
PWR	Power indicator	GREEN	ON	Power supply is normal
			OFF	The product is not powered up or the power supply is abnormal
SYS	Operation status indicator	GREEN	ON	The system is functioning normally
			Flashing 1Hz	No business data interaction, waiting for business data interaction to be established
			Flashing 10Hz	Firmware Upgrade
			OFF	System not working
0~7	Input Channel Indicator	GREEN	ON	Module channels have signal inputs
			OFF	No signal input or abnormal signal input on module channel
0~7	Output Channel Indicator	GREEN	ON	Module channels have signal outputs
			OFF	No signal output or abnormal signal output from module channel

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 Supply Rated Voltage	5VDC (4.5V~5.5V)		
Bus Input Power Supply Rated Current	≤100mA	≤80mA	≤60mA
Input Rated Voltage	24VDC (20.4V~28.8V)		
Input Current Typical Value	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 form Source Input: PNP open-collector input form		
OFF Voltage/OFF Current	-3V~+5V/0.9mA or less		
ON Voltage/ON Current	11V~30V/2.1mA or more		
Response Time	<50us		
Input Filter	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		
Isolated Withstand Voltage	500VAC		
Rated Current Consumption	100mA	80mA	60mA
Power Consumption	0.5W	0.4W	0.3W
Digital Input Type	Type1/Type3		
Channel Indicator Lights	Green LED light		

3.2.3.2 Digital Input/Output Module Parameters

Digital Input		
Product Model	XB6S-1616A	XB6S-1616B
Bus Input Power Supply Voltage Rating	5VDC (4.5V~5.5V)	
Bus Input Power Supply Rated Current	≤130mA	≤100mA
Input Rated Voltage	24VDC (20.4V~28.8V)	
Input Current Typical Value	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 form Source Input: PNP open-collector input form	
OFF Voltage/OFF Current	-3V~+5V/0.9mA or less	
ON Voltage/ON Current	11V~30V/2.1mA or more	
Response Time	<50us	
Input Filter	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	
Isolated 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		
Input 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 loads, pilot duty loads, tungsten loads	
Single Channel Rated Current	Max: 0.5A (see details Attachment 1)	
Leakage Current	<10uA	

Response 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
Isolated Withstand Voltage	500VAC
Channel Indicator Lights	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 Supply Voltage Rating	5VDC (4.5V~5.5V)			
Bus Input Power Supply Current Rating	≤110mA	≤90mA	≤150mA	≤110mA
Field-Side Input Voltage Range	24VDC (20.4V~28.8V)			
Input Signal Points	16	16	32	32
Output Signal Type	NPN	PNP	NPN	PNP
Output Voltage Drop	<1V			
Output Load Type	Resistive loads, pilot duty loads, tungsten loads			
Single Channel Rated Current	Max: 0.5A (see details Attachment 1)			
Leakage Current	<10uA			
Response 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			
Isolated Withstand Voltage	500VAC			
Rated Current Consumption	110mA	90mA	150mA	110mA
Power Consumption	0.55W	0.45W	0.75W	0.55W
Channel Indicator Lights	Green LED light			

Digital Output		
Product Model	XB6S-0008A	XB6S-0008B
Bus Input Power Supply Rated Voltage	5VDC (4.5V~5.5V)	
Bus Input Power Supply Rated Current	≤70mA	≤60mA
Field-Side Input Voltage Range	24VDC (20.4V~28.8V)	
Input Signal Points	8	8
Output Signal Type	NPN	PNP
Output Voltage Drop	<1V	
Output Load Type	Resistive loads, pilot duty loads, tungsten loads	
Single Channel Rated Current	Max: 0.5A (see details Attachment 1)	

Leakage Current	<10uA	
Response 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	
Isolated Withstand Voltage	500VAC	
Rated Current Consumption	70mA	60mA
Power Consumption	0.35W	0.3W
Channel Indicator Lights	Green LED light	

3.2.3.4 Relay Output Module Parameters

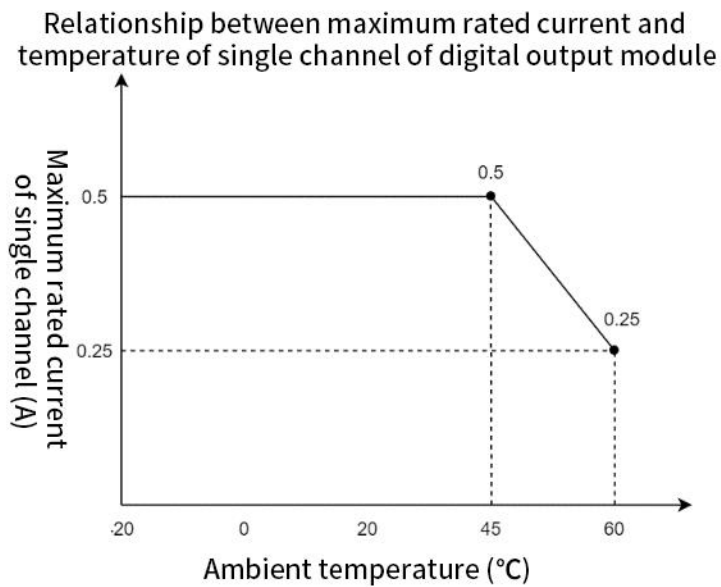
Relay Output	
Product Model	XB6S-0012J/6
Bus Input Power Supply Rated Voltage	5VDC (4.5V~5.5V)
Bus Input Power Supply Rated Current	≤100mA
Field-Side Input Voltage Range	24VDC (20.4V~28.8V)
Number Of Output Signal Points	12
Output Form	Relay
Output Load Type	Resistive loads, pilot duty loads, tungsten loads
Single Channel Rated Voltage	24VDC
Single Channel Rated Current	Max: 2A (see details Attachment 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
Isolated 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 Lights	Green LED light

3.2.3.5 General technical parameters

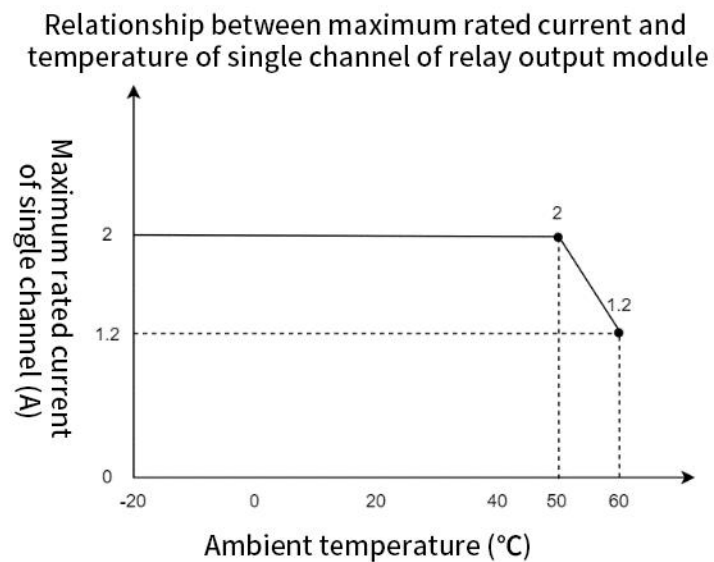
General technical parameters	
Size	106.4 × 25.7 × 72.3mm
Weights	32-channel DIO: 110g
	16-channel DIO: 90g
	8-channel DIO: 90g
	XB6S-0012J/6: 135g
Operating Temperature	-20°C~+60°C
Storage Temperature	-40°C~+80°C

Relative Humidity	95%, no condensation
Altitude	≤2000m
Pollution Degree	Level 2
Protection Class	IP20
Safety Certification	UL certification, CE certification
Green Environmental Certification	RoHS certification, REACH certification

Attachment 1:

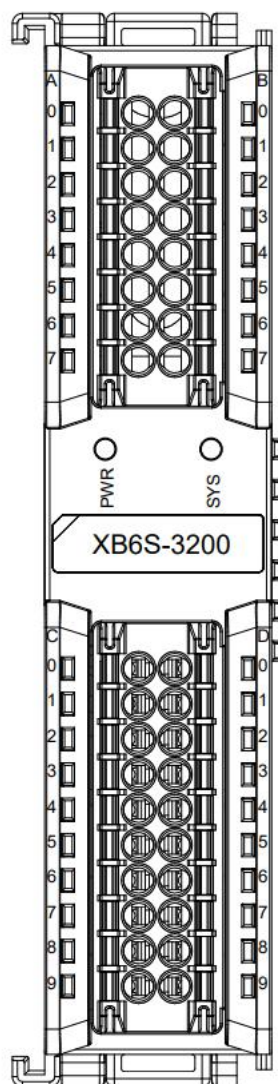
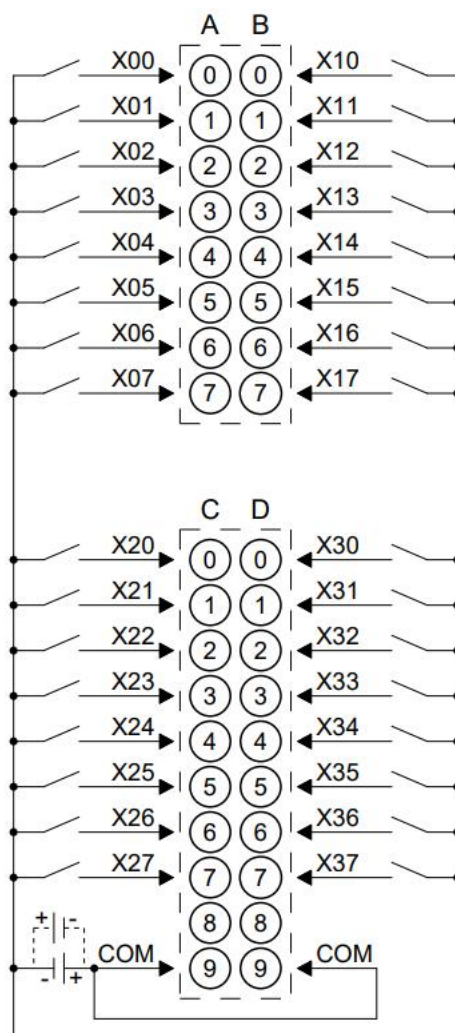


Attachment 2:



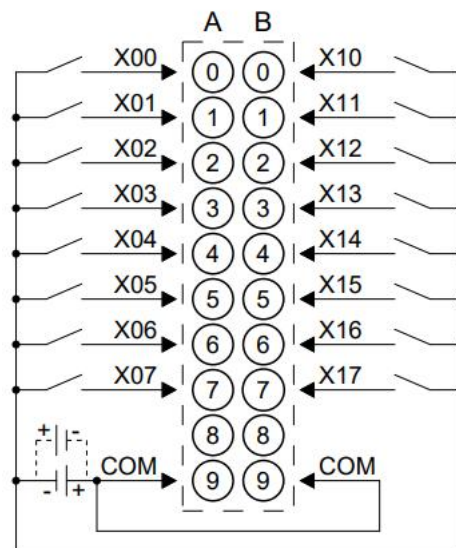
3.2.4 Wiring diagram

3.2.4.1 XB6S-3200

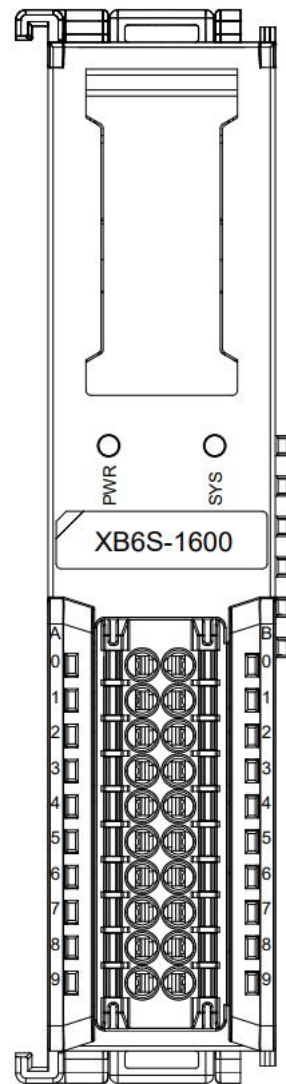


*COM internal conduction; NPN/PNP compatible

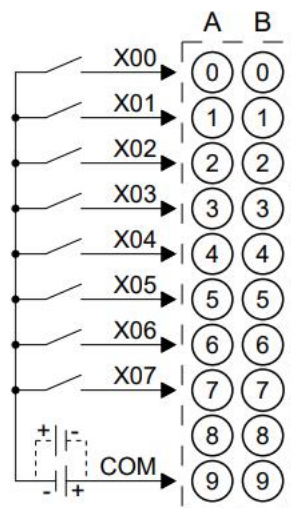
3.2.4.2 XB6S-1600



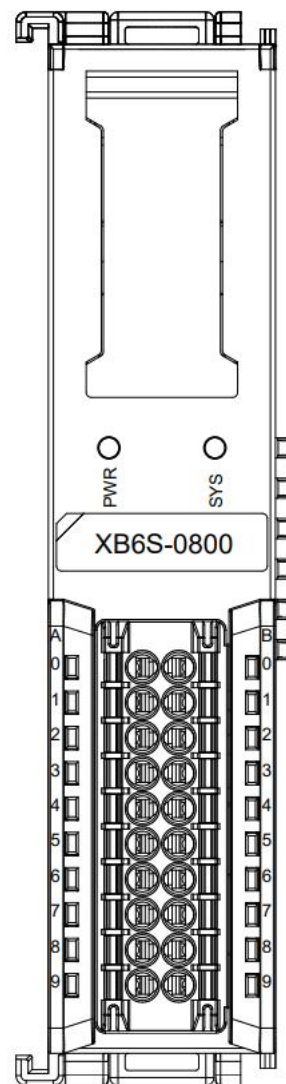
*COM internal conduction; NPN/PNP compatible



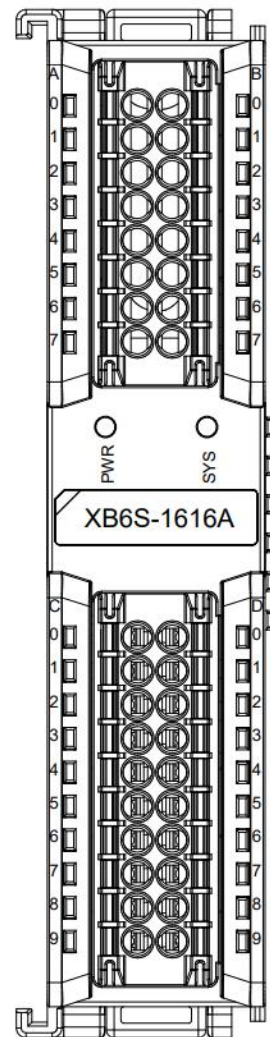
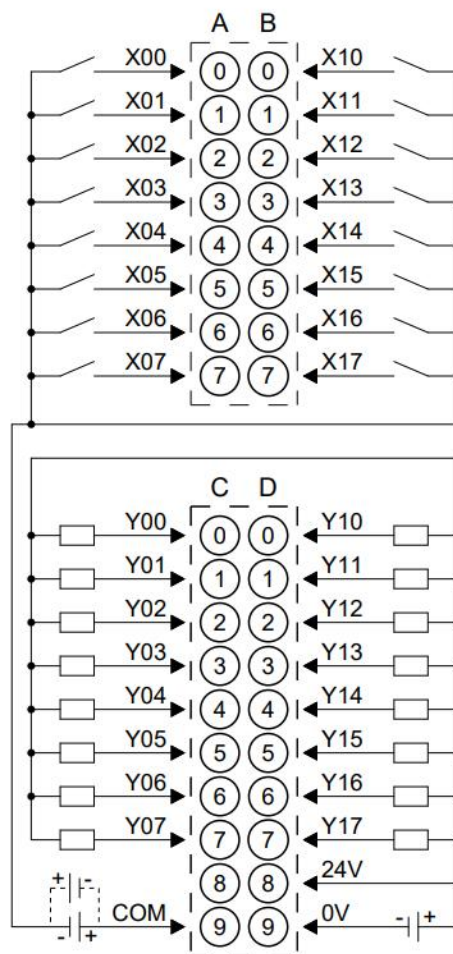
3.2.4.3 XB6S-0800



* NPN/PNP compatible

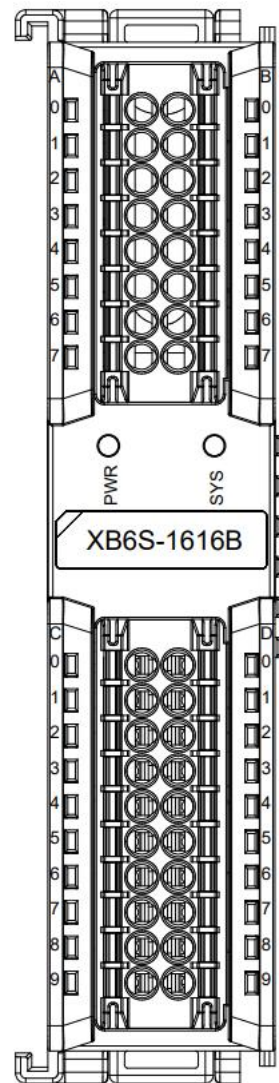
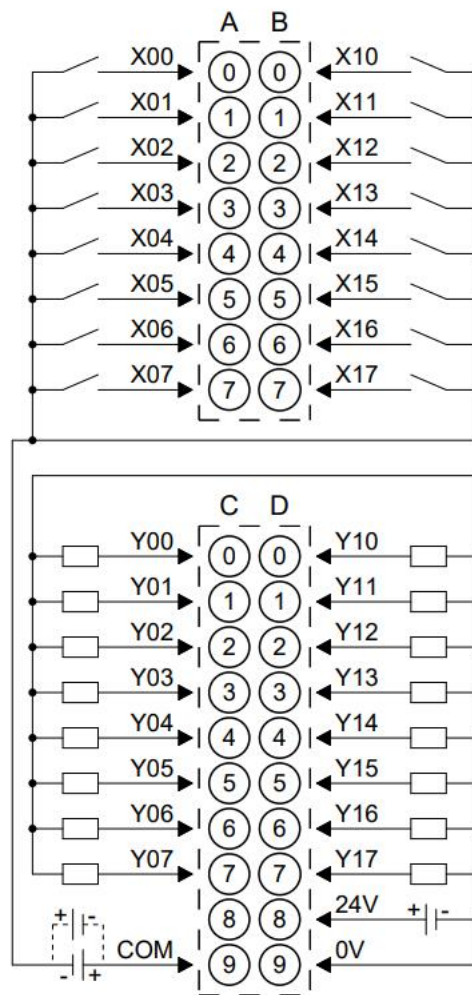


3.2.4.4 XB6S-1616A



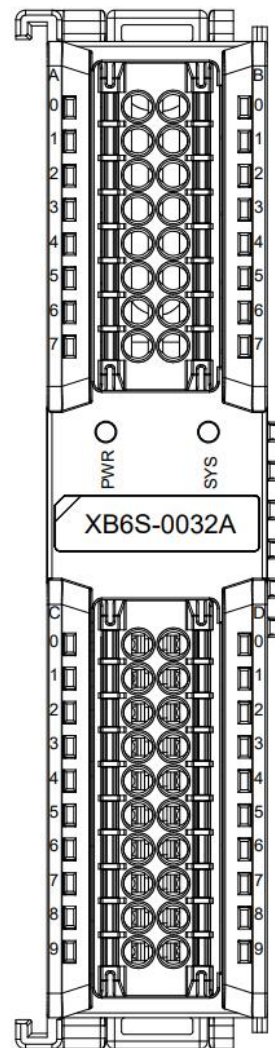
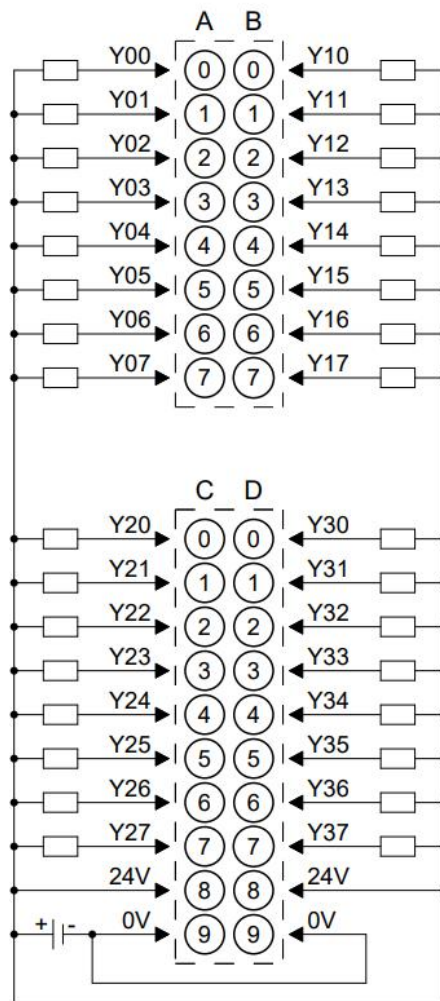
*COM is DI common, DI polarity is NPN/PNP compatible, DO polarity is NPN

3.2.4.5 XB6S-1616B



*COM is DI common, DI polarity is NPN/PNP compatible, DO polarity is PNP

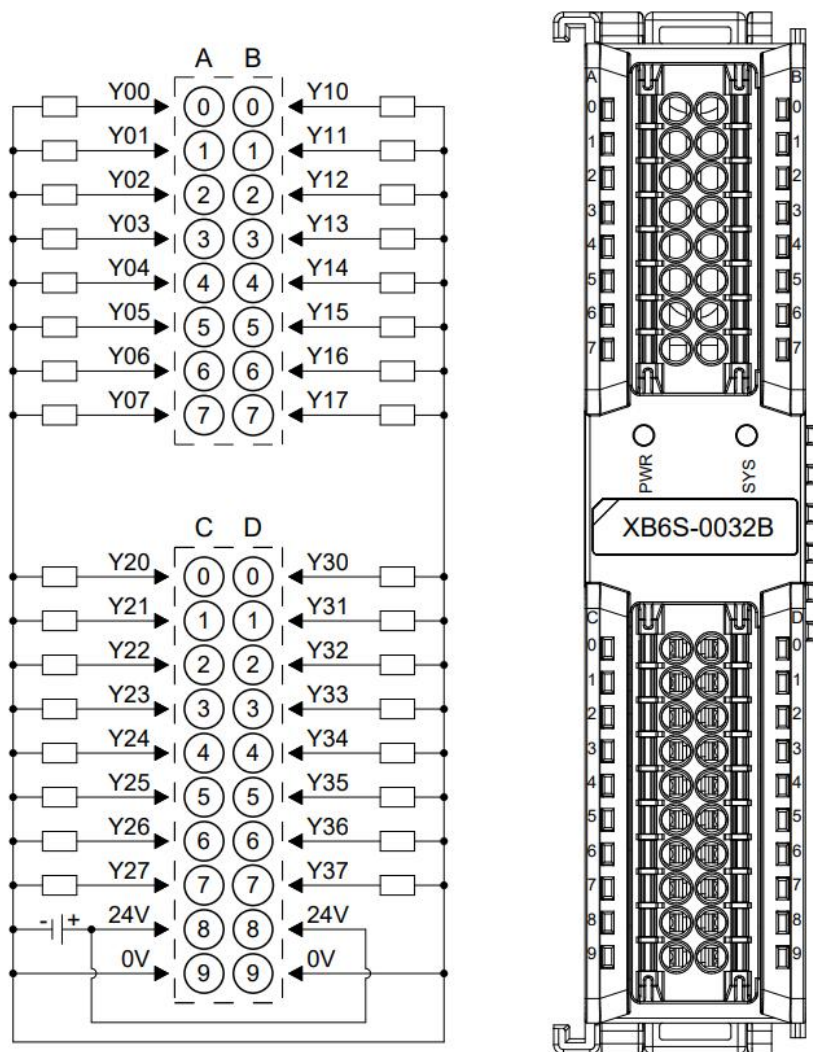
3.2.4.6 XB6S-0032A



*Internal conduction in 24V port; Internal conduction in 0V port

*The load common power supply needs to be the same power supply as the module.

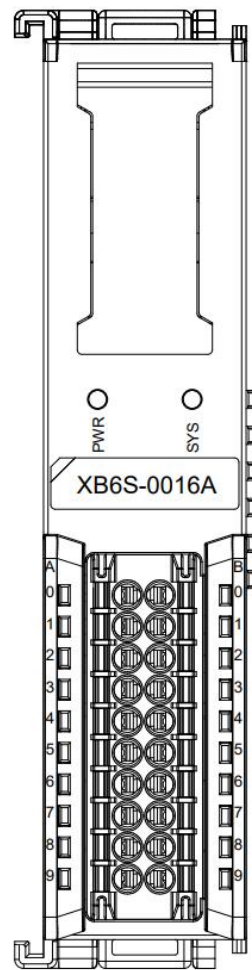
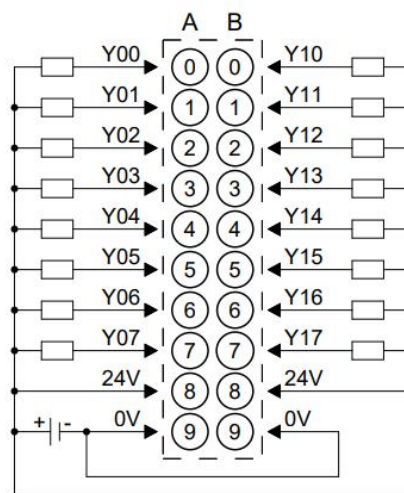
3.2.4.7 XB6S-0032B



*Internal conduction in 24V port; Internal conduction in 0V port

*The load common power supply needs to be the same power supply as the module.

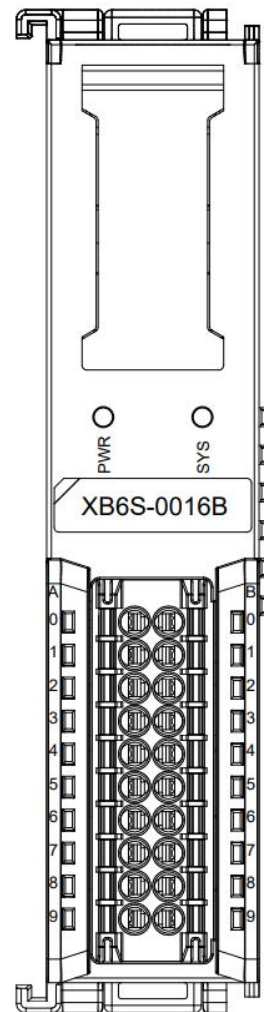
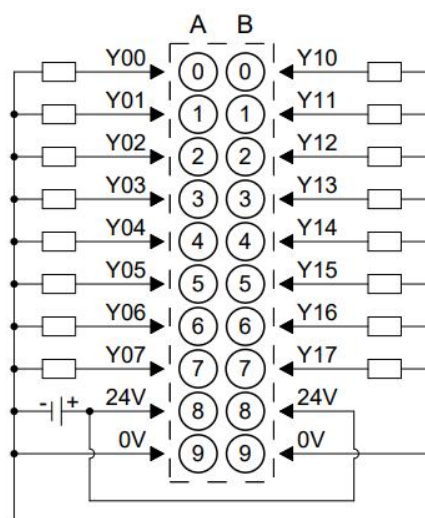
3.2.4.8 XB6S-0016A



*Internal conduction in 24V port; Internal conduction in 0V port

*The load common power supply needs to be the same power supply as the module.

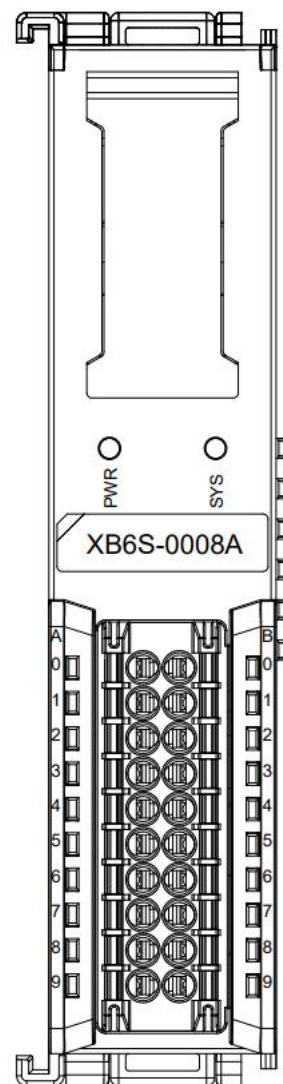
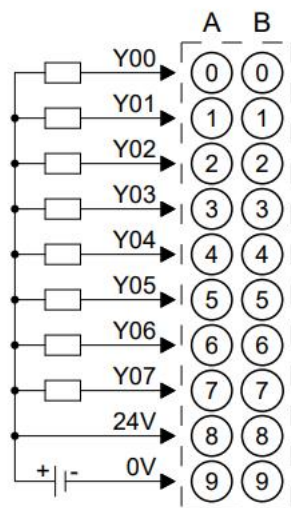
3.2.4.9 XB6S-0016B



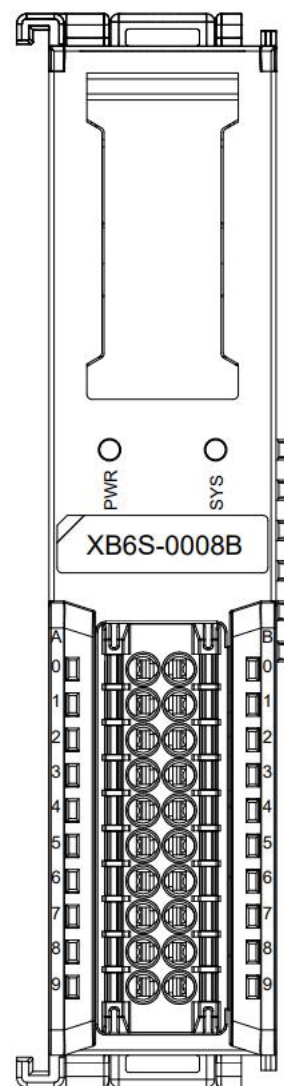
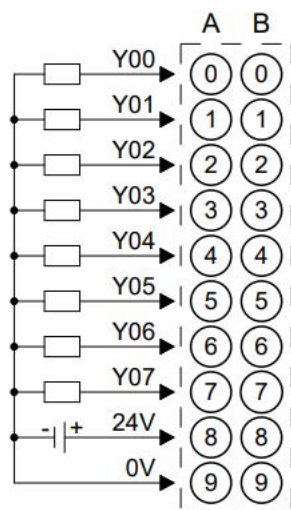
*Internal conduction in 24V port; Internal conduction in 0V port

*The load common power supply needs to be the same power supply as the module.

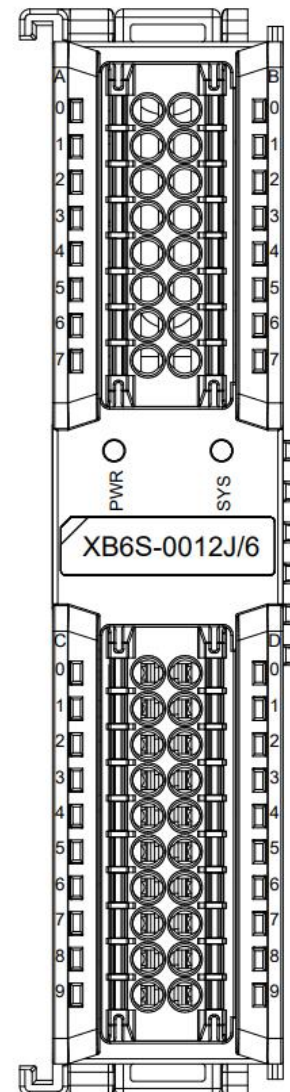
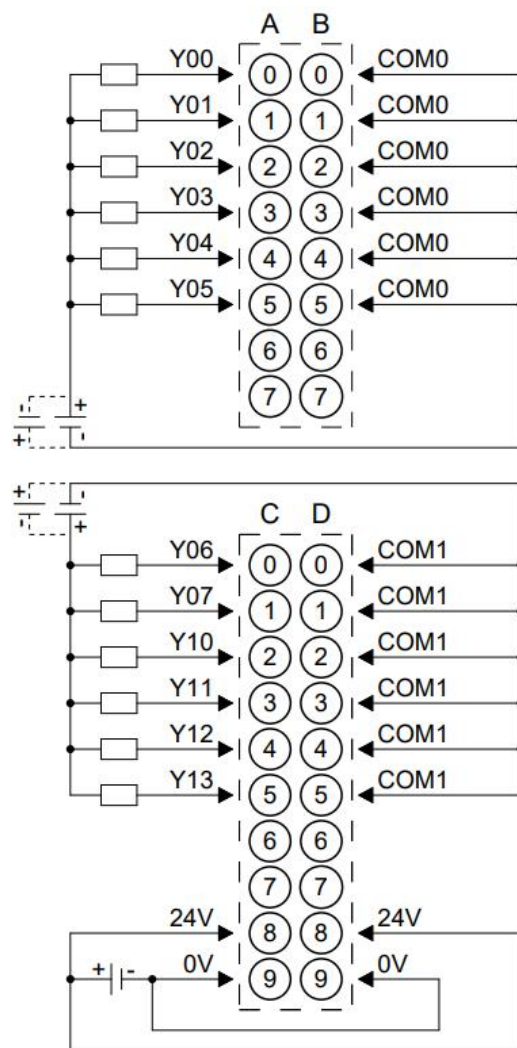
3.2.4.10 XB6S-0008A



3.2.4.11 XB6S-0008B



3.2.4.12 XB6S-0012J/6

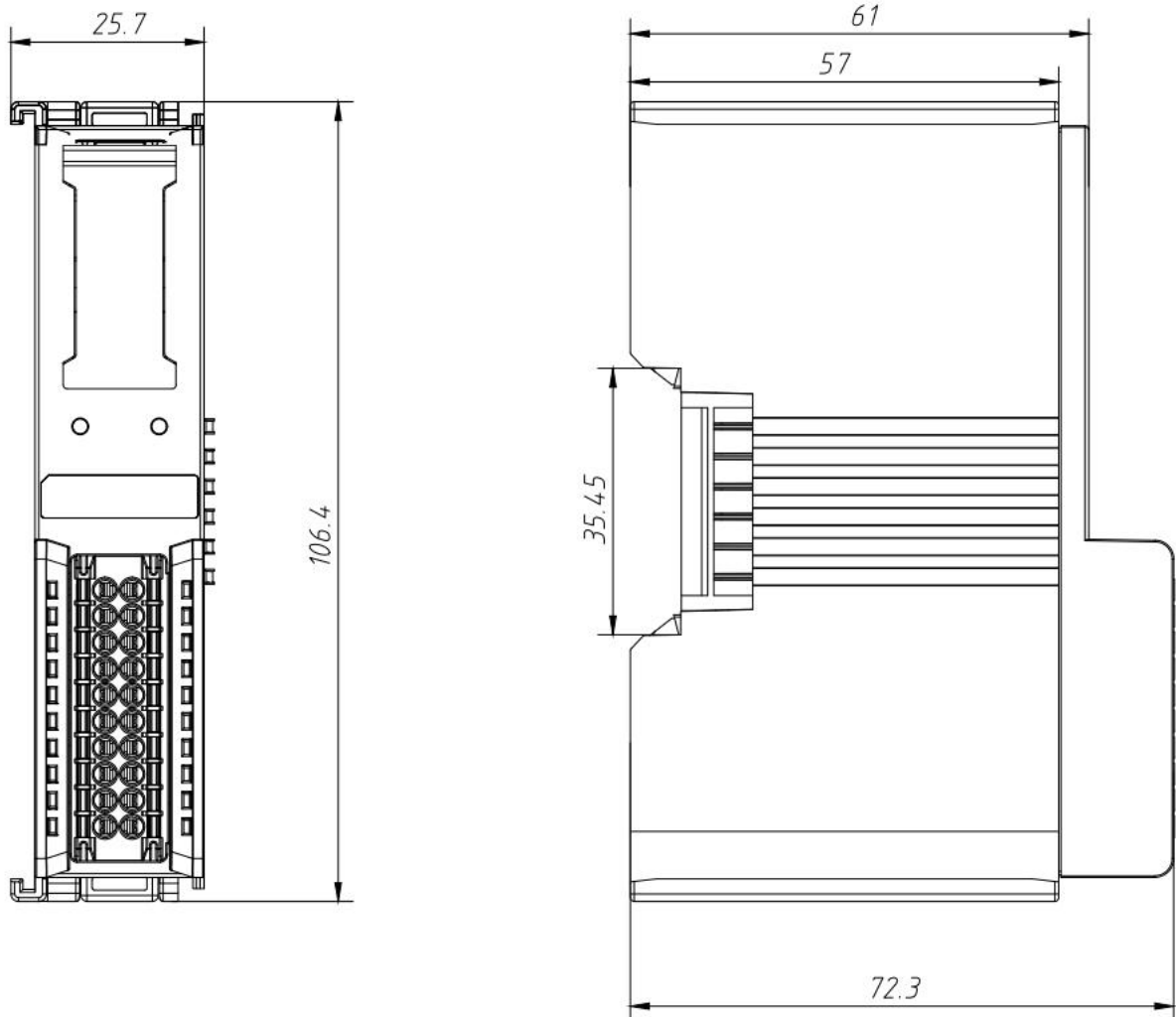


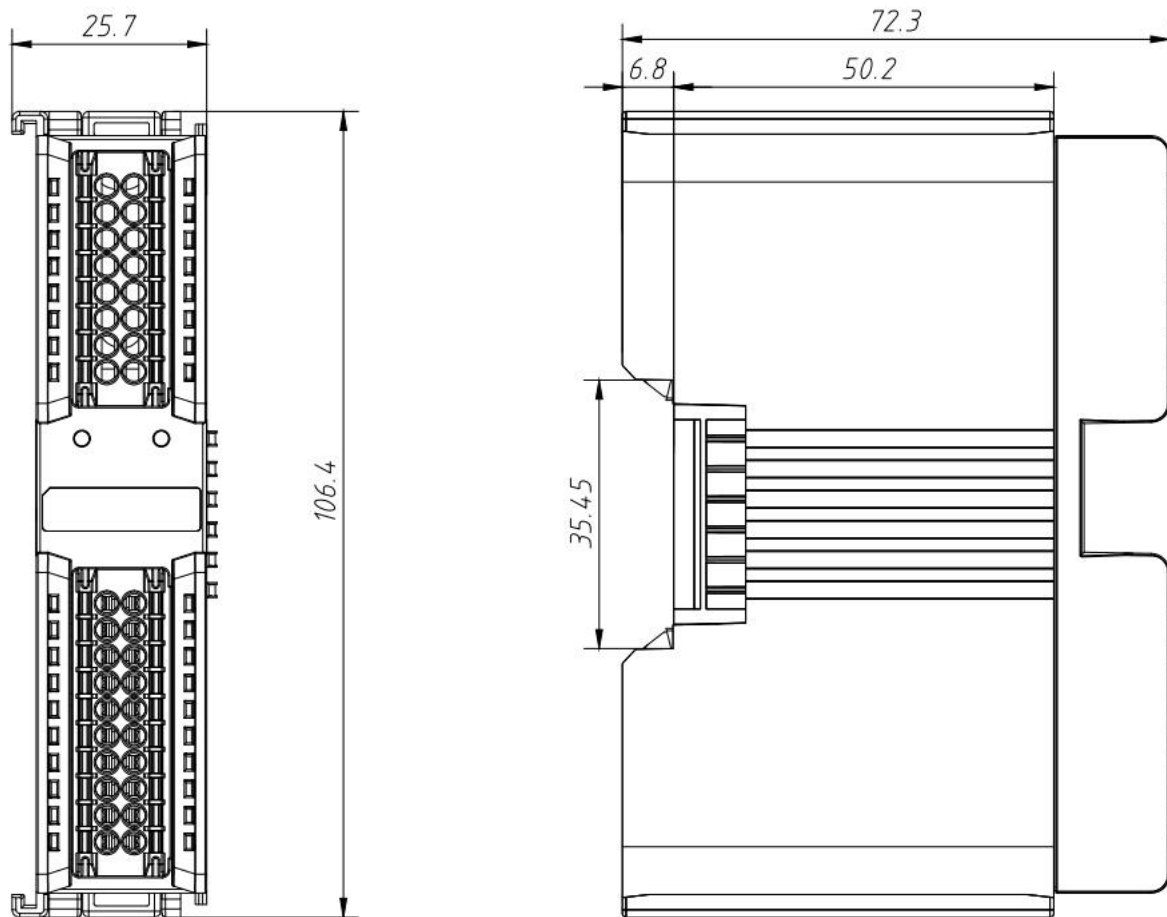
*Internal conduction in 24V port; Internal conduction in 0V port

*COM0 internal conduction; COM1 internal conduction

3.2.5 External Dimensions

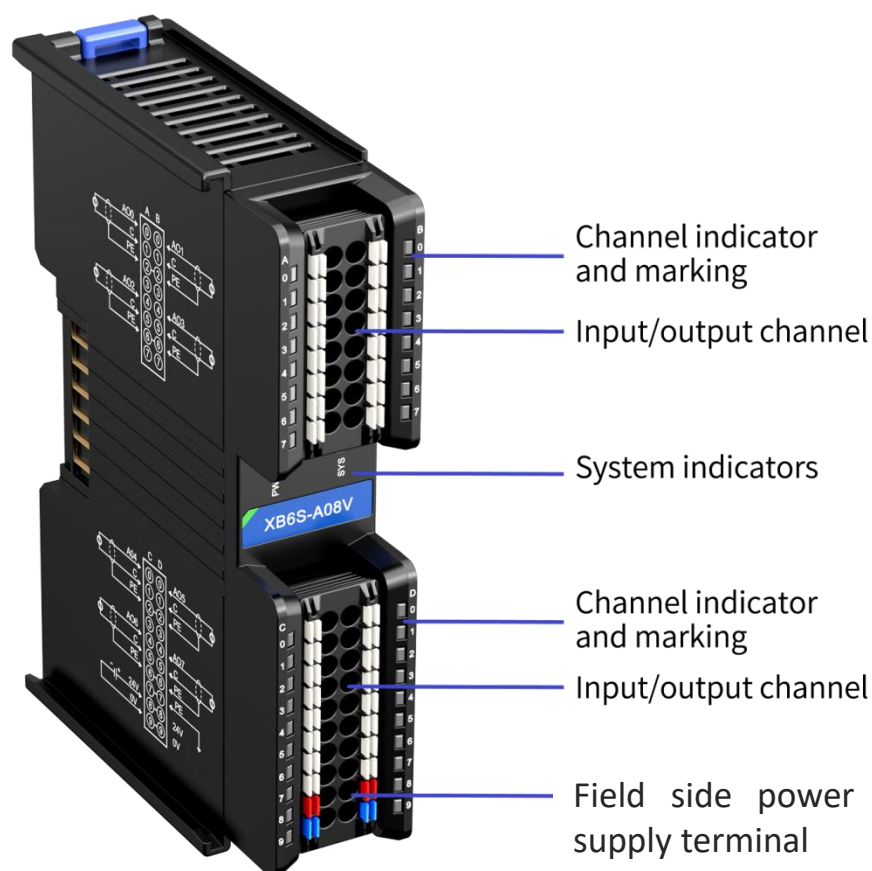
8/16-Channel Digital I/O Module Housing Factor (Unit mm)



32-Channel Digital I/O Module Housing Factor (Unit mm)

3.3 Analog I/O Modules

3.3.1 Panel Structure



3.3.2 Indicator light function

Analog I/O Module Indicator Definitions				
Markings	Name	Color	Status	Status Description
PWR	Power indicator	GREEN	ON	Power supply is normal
			OFF	The product is not powered up or the power supply is abnormal
SYS	Operation status indicator	GREEN	ON	The system is functioning normally
			Flashing 1Hz	No business data interaction, waiting for business data interaction to be established
			Flashing 10Hz	Firmware Upgrade
			OFF	System not working
0~7	Input Channel Indicator	GREEN	ON	Module channels have signal inputs
			OFF	No signal input or abnormal signal input on module channel
0~7	Output Channel Indicator	GREEN	ON	Module channels have signal outputs
			OFF	No signal output or abnormal signal output from module channel

3.3.3 Technical Parameters

3.3.3.1 Analog Input Module Parameters

Analog Input		
Product Model	XB6S-A80VD	XB6S-A80ID
Bus Input Power Supply Rated Voltage	5VDC (4.5V~5.5V)	
Bus Input Power Supply Rated Current	≤210mA	
Input 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 -10V~+10V)	Disable, 4mA~20mA, 0mA~20mA, -20mA~+20mA (Adjustable range, default 0mA~20mA)
Input Signal Type	differential signal	
Channel Response Time	550us / ch 850us / 8ch	
Resolution	16bits	
Sampling Rate (Full Channel)	≤1ksps	
Accuracy	±0.1% at 25°C, ±0.3% over full temperature range	
Input Filter	Support	
Smoothing Level	1~200	
Input Impedance (Voltage Type)	≥1MΩ	-
Input Impedance (Current Type)	-	≤250Ω
Common Mode Voltage Range	12VAC	-
Maximum Permissible Channel Voltage (Voltage Type)	30V	-
Maximum Permissible Channel Current (Current Type)	-	30mA
The System Cannot Be Compromised	When the ±15V power supply is damaged and short-circuited, the system +5V power supply cannot be affected.	
Galvanic Isolation	No isolation between channels, isolation between channels and backplane buses, isolation between channels and supply voltage	
Input Overload Protection	Supports clamp protection	Supports current limit protection
Input Protection	±30V	±30mA
Isolated Withstand	500VDC	

Voltage	
Rated Current Consumption	210mA
Power Consumption	1.05W
Channel Indicator Lights	Green LED light

Analog Input		
Product Model	XB6S-A80V	XB6S-A80I
Bus Input Power Supply Rated Voltage	5VDC (4.5V~5.5V)	
Bus Input Power Supply Rated Current	$\leq 260\text{mA}$	$\leq 110\text{mA}$
Input Points	8	8
Input Type	Voltage Type	Current Type
Input Signal	Disable, -10V~+10V, 0V~10V, -5V~+5V, 0V~5V, 1V~5V (Adjustable range, default -10V~+10V)	Disable, 4mA~20mA, 0mA~20mA (Adjustable range, default 0mA~20mA)
Input Signal Type	Single-ended signal	
Channel Response Time	560us / ch 770us / 8ch	
Resolution	16bits	
Sampling Rate (Full Channel)	$\leq 1\text{ksps}$	
Accuracy	$\pm 0.1\%$ at 25°C, $\pm 0.3\%$ over full temperature range	
Input filter	Support	
Smoothing Level	1~200	
Input Impedance (Voltage Type)	$\geq 400\text{k}\Omega$	-
Input Impedance (Current Type)	-	$\leq 100\Omega$
Maximum Permissible Channel Voltage (Voltage Type)	30V	-
Maximum Permissible Channel Current (Current Type)	-	30mA
The System Cannot Be Compromised	When the $\pm 15\text{V}$ power supply is damaged and short-circuited, the system +5V power supply cannot be affected.	
Galvanic Isolation	No isolation between channels, isolation between channels and backplane buses, isolation between channels and supply voltage	
Input Overload Protection	Supports clamp protection	Supports current limit protection
Input Protection	$\pm 30\text{V}$	$\pm 30\text{mA}$
Isolated Withstand Voltage	500VDC	
Rated Current Consumption	260mA	110mA
Power Consumption	1.35W	0.55W
Channel Indicator Lights	Green LED light	

Analog Input		
Product Model	XB6S-A40VD	XB6S-A40ID
Bus Input Power Supply Rated Voltage	5VDC (4.5V~5.5V)	
Bus Input Power Supply Rated Current	≤150mA	
Input 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 -10V~+10V)	Disable, 4mA~20mA, 0mA~20mA, -20mA~+20mA (Adjustable range, default 0mA~20mA)
Input Signal Type	Differential Signal	
Channel Response Time	300us / ch 600us / 4ch	
Resolution	16bits	
Sampling Rate (Full Channel)	≤1ksps	
Accurate	±0.1% at 25°C, ±0.3% over full temperature range	
Input filter	Support	
Smoothing Level	1~200	
Input Impedance (Voltage Type)	≥1MΩ	-
Input Impedance (Current Type)	-	≤250Ω
Common Mode Voltage Range	12VAC	-
Maximum Permissible Channel Voltage (Voltage Type)	30V	-
Maximum Allowable Channel Current (Current Type)	-	30mA
The System Cannot Be Compromised	When the ±15V power supply is damaged and short-circuited, the system +5V power supply cannot be affected.	
Galvanic Isolation	No isolation between channels, isolation between channels and backplane buses, isolation between channels and supply voltage	
Input Overload Protection	Supports clamp protection	Supports current limit protection
Input Protection	±30V	±30mA
Isolated Withstand Voltage	500VDC	
Rated Current Consumption	150mA	
Power Consumption	0.75W	

Channel Indicator Lights	Green LED light
--------------------------	-----------------

Analog Input		
Product Model	XB6S-A40V	XB6S-A40I
Bus Input Power Supply Rated Voltage	5VDC (4.5V~5.5V)	
Bus Input Power Supply Rated Current	≤180mA	≤100mA
Input 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 -10V~+10V)	Disable, 4mA~20mA, 0mA~20mA (Adjustable range, default 0mA~20mA)
Input Signal Type	Single-ended signal	
Channel Response Time	400us / ch 700us / 4ch	300us / ch 600us / 4ch
Resolution	16bits	
Sampling Rate (Full Channel)	≤1ksps	
Accurate	±0.1% at 25°C, ±0.3% over full temperature range	
Input filter	Support	
Smoothing Level	1~200	
Input Impedance (Voltage Type)	≥400kΩ	-
Input Impedance (Current Type)	-	≤100Ω
Maximum Permissible Channel Voltage (Voltage Type)	30V	-
Maximum Allowable Channel Current (Current Type)	-	30mA
The System Cannot Be Compromised	When the ±15V power supply is damaged and short-circuited, the system +5V power supply cannot be affected.	
Galvanic Isolation	No isolation between channels, isolation between channels and backplane buses, isolation between channels and supply voltage	
Input Overload Protection	Supports clamp protection	Supports current limit protection
Input Protection	±30V	±30mA
Isolated Withstand Voltage	500VDC	
Rated Current Consumption	180mA	100mA
Power Consumption	0.95W	0.5W
Channel Indicator Lights	Green LED light	

3.3.3.2 Analog output module parameters

Analog Output		
Product Model	XB6S-A08V	XB6S-A08I
Bus Input Power Supply Rated Voltage	5VDC (4.5V~5.5V)	
Bus Input Power Supply Rated Current	≤100mA	
Field-Side Input Voltage Range	24VDC (20.4V~28.8V)	
Output Points	8	8
Output Type	Voltage Type	Current Type
Output Signal	Disable, -10V~+10V, 0V~10V, -5V~+5V, 0V~5V, 1V~5V (Adjustable range, default -10V~+10V)	Disable, 4mA~20mA, 0mA~20mA (Adjustable range, default 0mA~20mA)
Channel Response Time	400us / ch 400us / 8ch	
Resolution	16bits	
Accuracy	±0.1% at 25°C, ±0.3% over full temperature range	
Load Impedance (Voltage Type)	≥2kΩ (1kΩ accuracy: ±3‰ at 25°C, ±5‰ at full temperature)	-
Load Impedance (Current Type)	-	≤500Ω
The System Cannot Be Compromised	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 automatic recovery mechanisms)	
Galvanic Isolation	No isolation between channels, isolation between channels and backplane buses, isolation between channels and supply voltage	
Isolated Withstand Voltage	500VDC	
Rated Current Consumption	100mA	
Power Consumption	0.5W	
Clear Hold Optional Function In Non-OP State	Support	
Channel Indicator Lights	Green LED light	

Analog Output		
Product Model	XB6S-A04V	XB6S-A04I
Bus Input Power Supply Rated Voltage	5VDC (4.5V~5.5V)	
Bus Input Power Supply Rated Current	≤80mA	
Field-Side Input Voltage Range	24VDC (20.4V~28.8V)	
Output Points	4	4
Output Type	Voltage Type	Current Type
Output Signal	Disable, -10V~+10V, 0V~10V, -5V~+5V, 0V~5V, 1V~5V (Adjustable range, default -10V~+10V)	Disable, 4mA~20mA, 0mA~20mA (Adjustable range, default 0mA~20mA)
Channel Response Time	200us / ch 200us / 4ch	
Resolution	16bits	
Accuracy	±0.1% at 25°C, ±0.3% over full temperature range	
Load Impedance (Voltage Type)	≥2kΩ (1kΩ accuracy: ±3‰ at 25°C, ±5‰ at full temperature)	-
Load Impedance (Current Type)	-	≤500Ω
The System Cannot Be Compromised	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 automatic recovery mechanisms)	
Galvanic Isolation	No isolation between channels, isolation between channels and backplane buses, isolation between channels and supply voltage	
Isolated Withstand Voltage	500VDC	
Rated Current Consumption	80mA	
Power Consumption	0.4W	
Clear Hold Optional Function In Non-OP State	Support	
Channel Indicator Lights	Green LED light	

3.3.3.3 General technical parameters

General technical parameters	
Size	106.4 x 25.7 x 72.3mm
Weights	8-channel AIO: 125g
	4-channel AIO: 105g
Operating Temperature	-20°C~+60°C

Storage Temperature	-40°C~+80°C
Relative Humidity	95%, no condensation
Altitude	≤2000m
Pollution degree	Level 2
Protection Class	IP20
Safety Certification	UL certification, CE certification
Green 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	Measurement range	Code Value Range	Voltage Input Calculation Formula	Voltage Output Calculation Formula	Code-Value Correspondence Table
0	Disable, indicates that the channel is not enabled				
1 (default)	-10V~+10V	-32768~32767	$D=(65535/20)*U$	$U=(D*20)/65535$	See also 3.3.4.3 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	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 means code value, U means voltage, analog voltage input module range default 1: -10V~+10V (-32768~32767).

3.3.4.2 Voltage Output Range Selection Table

Voltage output range selection and code value range					
Range Selection	Measurement range	Code Value Range	Voltage Input Calculation Formula	Voltage Output Calculation Formula	code-value correspondence table
0	Disable, indicates that the channel is not enabled				
1 (default)	-10V~+10V	-32768~32767	$D=(65535/20)*U$	$U=(D*20)/65535$	See also 3.3.4.4 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	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 means code value, U means voltage, analog voltage output module range default 1: -10V~+10V (-32768~32767).

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 Voltage input module range selection -10V ~ +10V (-32768 ~ 32767) support **up and down overflow** function, that is, when the channel input is greater than 10V voltage, all display the maximum code value 32767; input channel input is less than -10V voltage, all display the minimum code value -32768.

② Voltage input module range selection 0V~10V (0~32767) supports **underflow overshoot, up and down overflow and underflow warning** function. Overshoot means that the input range of the channel exceeds the range and enters into overshoot, and the normal calculated code value is displayed within -0.13V~+10V. Up and down overflow, i.e., when the input voltage of the channel is

greater than 10V, the maximum code value of 32767 is displayed; when the input voltage of the channel is less than -0.13V, the minimum code value of -384 is displayed, and an alarm is issued at the same time.

③ Voltage input module range selection -10V~+10V (-27648~27648) supports **overshoot, up and down overflow and up and down overflow alarm** functions. Overshoot that is, the channel input range exceeds the range into the overshoot, in -10.13V ~ +10.12V within the display of the normal calculation code value. Up and down overflow, i.e., when the channel input is greater than 10.12V, the maximum overshoot code value of 27980 will be displayed and an alarm will be issued at the same time; when the input channel input is less than -10.13V, the minimum overshoot code value of -27980 will be displayed and an alarm will be issued at the same time.

④ Voltage input module range selection 0V~10V (0~27648) supports **overshoot, up and down overflow and up and down overflow alarm** functions. Overshoot that is, the channel input range exceeds the range into the overshoot, in -0.13V ~ +10.12V within the display of the normal calculation code value. Up and down overflow that is, when the channel input is greater than 10.12V voltage, all display overshoot maximum code value 27980, and alarm at the same time; input channel input is less than -0.13V voltage, all display overshoot minimum code value -332, and 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 -5V~+5V (-27648~27648) supports **overshoot, up and down overflow and up and down overflow alarm** functions. Overshoot means that the input range of the channel exceeds the range and enters into overshoot, and the normal calculated code value is displayed within -5.07V~+5.06V. Up and down overflow, i.e., when the channel input is greater than 5.06V, the maximum overshoot code value of 27980 will be displayed and an alarm will be issued

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

② Voltage input module range selection 0V~5V (0~27648) supports **overshoot, up and down overflow and up and down overflow alarm** functions. Overshoot that is, the channel input range exceeds the range into the overshoot, in the -0.07V ~ +5.06V within the display of the normal calculation code value. Up and down overflow that is, when the channel input is greater than 5.06V voltage, all display overshoot maximum code value 27980, and alarm at the same time; input channel input is less than -0.07V voltage, all display overshoot minimum code value -332, and alarm at the same time.

③ Voltage input module range selection 1V~5V (0~27648) supports **overshoot, up and down overflow and up and down overflow alarm** function. Overshoot that is, the channel input range exceeds the range into the overshoot, in the 0.94V ~ 5.06V within the display of the normal calculation code value. Up and down overflow that is, when the channel input is greater than 5.06V voltage, all display overshoot maximum code value 27933, and alarm at the same time; input channel input is less than 0.94V voltage, all display overshoot minimum code value -345, and 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: ① Voltage output module supports **up and down overflow** function. That is, when the range of voltage output module is -10V~+10V or 0V~10V, and the code value setting is larger than the maximum code value corresponding to the range, the channels will output 10V voltage;

When the range of voltage output module is selected from -10V to +10V and the code value is set smaller than the minimum code value corresponding to the range, all channels output -10V;

When the range of the voltage output module is selected from 0V to 10V and the code value is set smaller than the minimum code value corresponding to the range, the channels all 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 = $(55296/10)*\text{voltage}$	Code value = $(27648/5)*\text{voltage}$	Code value = $(27648/4)*\text{voltage} - 6912$
Voltage formula	Voltage = $(\text{code value} * 10)/55296$	Voltage = $(\text{code value} * 5)/27648$	Voltage = $(\text{code value} + 6912)*4/27648$

Note: ① Voltage output module supports **up and down overflow** function. That is to say, when the range of voltage output module selects -5V~+5V/0V~5V/1V~5V, and the code value setting is larger than the maximum code value corresponding to the range, the channels all output 5V voltage;

When the range of the voltage output module is selected from -5V to +5V and the code value is set smaller than the minimum code value corresponding to the range, the channels all output -5V voltage;

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

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

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	Measurement range	Code Value Range	Current input calculation formula	Current Output Calculation Formula	code-value correspondence table
0	Disable, indicates that the channel is not enabled				
1	4mA~20mA	0~65535	$D = (65535/16) * I - 16384$	$I = (D + 16384) * 16 / 65535$	See 3.3.5.3 Current Input Code Value Table
2 (default)	0mA~20mA	0~65535	$D = (65535/20) * I$	$I = (D * 20) / 65535$	
3	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 means code value, I means current, analog current input module range default 2: 0mA~20mA (0~65535).

Range 5: -20mA~+20mA (0~65535) is unique to current input differential signaling modules.

3.3.5.2 Current output range selection table

Current output range selection and code value range					
Range Selection	Measurement range	Code Value Range	Current input calculation formula	Current Output Calculation Formula	code-value correspondence table
0	Disable, indicates that the channel is not enabled				
1	4mA~20mA	0~65535	$D = (65535/16 * I) - 16384$	$I = (D + 16384) * 16 / 65535$	See 3.3.5.4 Current Output Code Value Table
2 (default)	0mA~20mA	0~65535	$D = (65535/20) * I$	$I = (D * 20) / 65535$	
3	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 means code value, I means current, analog current output module range default 2: 0mA~20mA (0~65535).

3.3.5.3 Current input code value table

Range Amps	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 = $65535/16 \times \text{current} - 16384$	Code value = $(65535/20) \times \text{current}$	Code value = $(27648/16) \times \text{current} - 6912$	Code value = $(27648/20) \times \text{current}$	Code value = $(65535/40) \times (\text{current} + 20)$

Note: Range 5: -20mA~+20mA (0~65535) is unique to current input differential signaling modules.

① Current input module range selection 4mA~20mA (0~65535) support **up and down overflow** function, that is, when the channel input is greater than 20mA current, all display the maximum code value 65535; input channel input is less than 4mA current, all display the minimum code value 0.

② Current input module range selection 0mA ~ 20mA (0 ~ 65535) support **up and down overflow** function, that is, the channel input is greater than 20mA current, are displayed in the maximum code value of 65535; input channel input is less than 0mA current, are displayed in the minimum code value 0.

③ Current input module range selection 4mA ~ 20mA (0 ~ 27648) when supporting the **overflow overshoot, up and down overflow and overflow alarm** function. Overflow that is, the channel input range exceeds the range into the overshoot, in the 4mA ~ 20.24mA within the display of the normal calculation code value. Up and down overflow that is, when the channel input is greater than 20.24mA current, all display overshoot maximum code value 28085, and alarm at the same time; input channel input is less than 4mA current, all display overshoot minimum code value 0.

④ Current input module range selection 0mA~20mA (0~27648) supports **overflow overshoot, up and down overflow and overflow alarm** functions. Overflow that is, the channel input range exceeds the range into the overshoot, in the 0mA ~ 20.24mA within the display of the normal calculation code value. Up and down overflow that is, when the channel input is greater than 20.24mA current, all display overshoot maximum code value 27986, and alarm at the same time. When the input channel input is less than 0mA current, all display overshoot minimum code value 0.

⑤ Current input module range selection -20mA ~ +20mA (0 ~ 65535) support **up and down overflow** function, that is, when the channel input is greater than 20mA current, all display the maximum code value 65535; input channel input is less than -20mA current, all display the minimum code value 0.

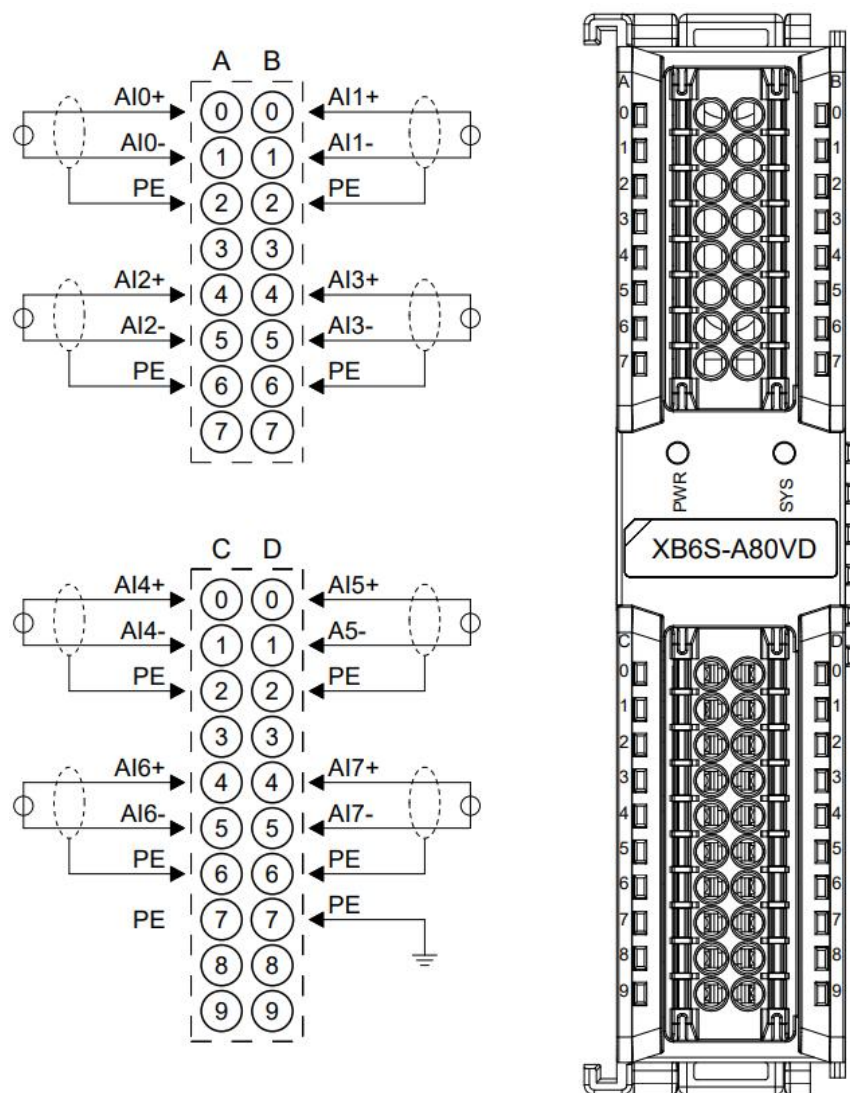
3.3.5.4 Current Output Code Table of Values

Range Amps	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 = $65535/16 \times \text{current} - 16384$	Code value = $(65535/20) \times \text{current}$	Code value = $(27648/16) \times \text{current} - 6912$	Code value = $(27648/20) \times \text{current}$

Note: ①When the current output module selects 4mA~20mA(0~27648) and 0mA~20mA(0~27648), it supports the functions of **overflow**, **overflow** and **underflow**. That is, when the range of current output module selects 4mA~20mA (0~27648) and the code value is set to be greater than 32511, the channels all output 22.81mA current. When the range of current output module is 0mA~20mA (0~27648) and the code value setting is greater than 32511, the channels all output 23.52mA current.

3.3.6 Wiring diagram

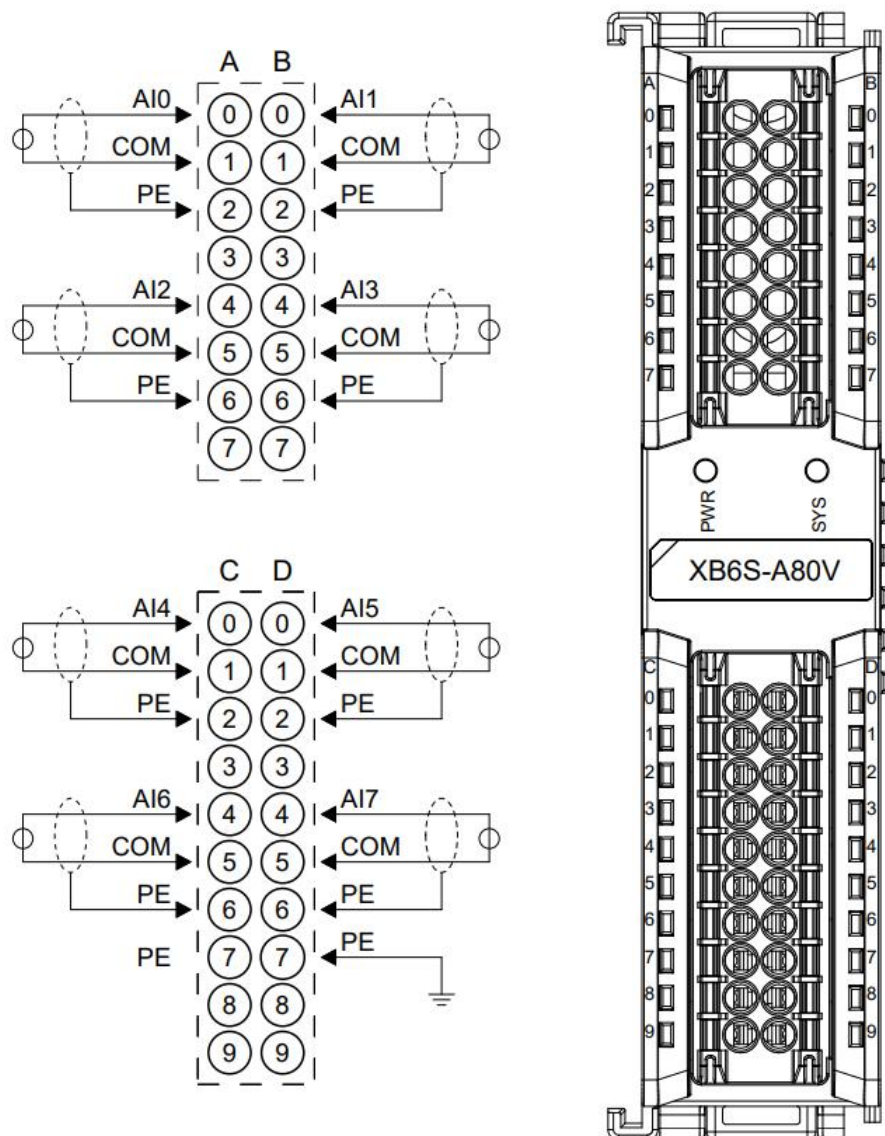
3.3.6.1 XB6S-A80VD



*All PEs internally conductive

* Recommended to use shielded twisted pair cable, connect the shield to the PE port and ground it reliably

3.3.6.2 XB6S-A80V

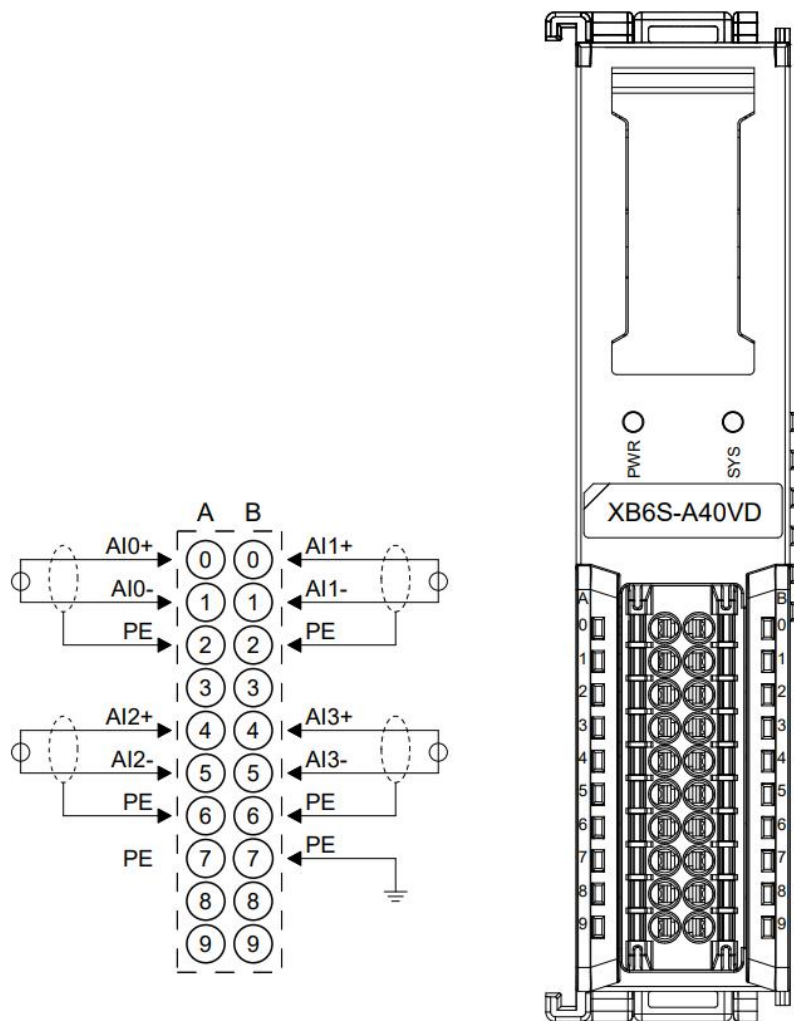


*COM internal conduction, PE internal conduction

* All channel loads need to be homogenous

*Shielded twisted pair cable is recommended for signal cables

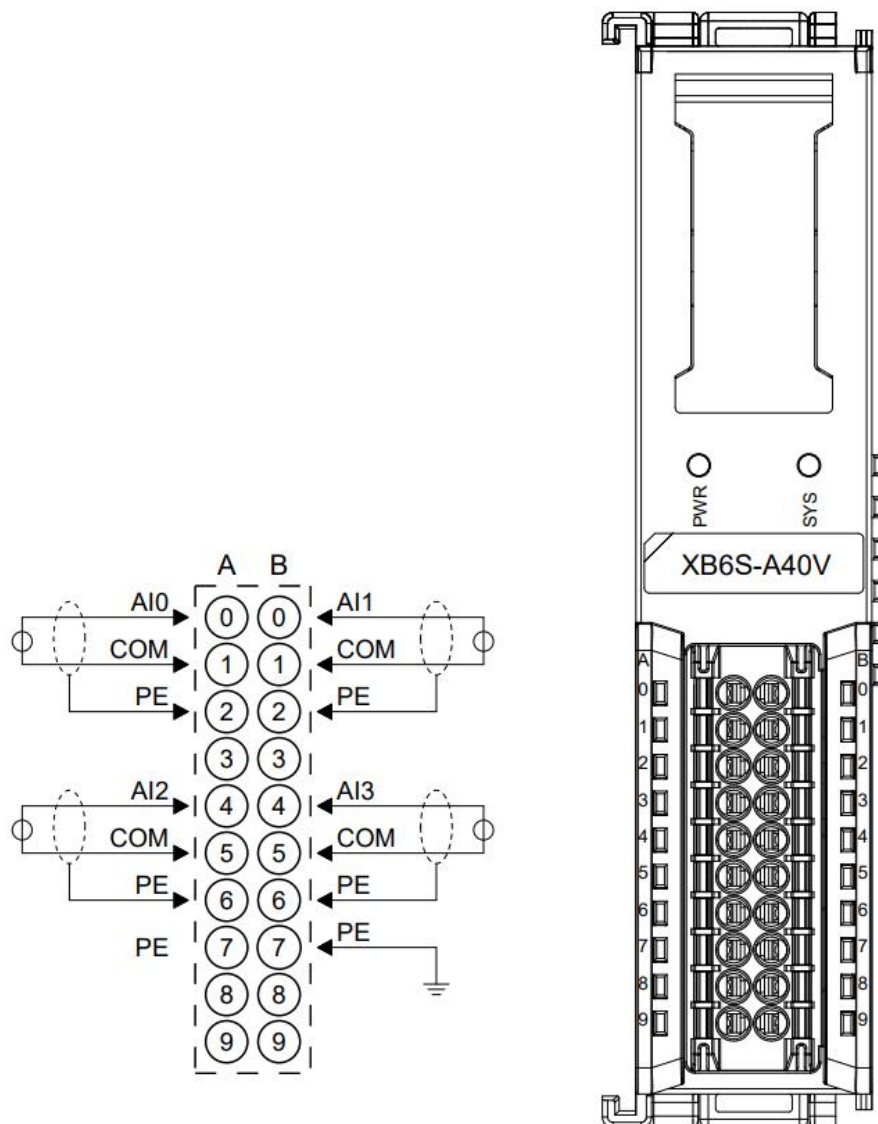
3.3.6.3 XB6S-A40VD



*All PEs internally conductive

* Recommended to use shielded twisted pair cable, connect the shield to the PE port and ground it reliably

3.3.6.4 XB6S-A40V

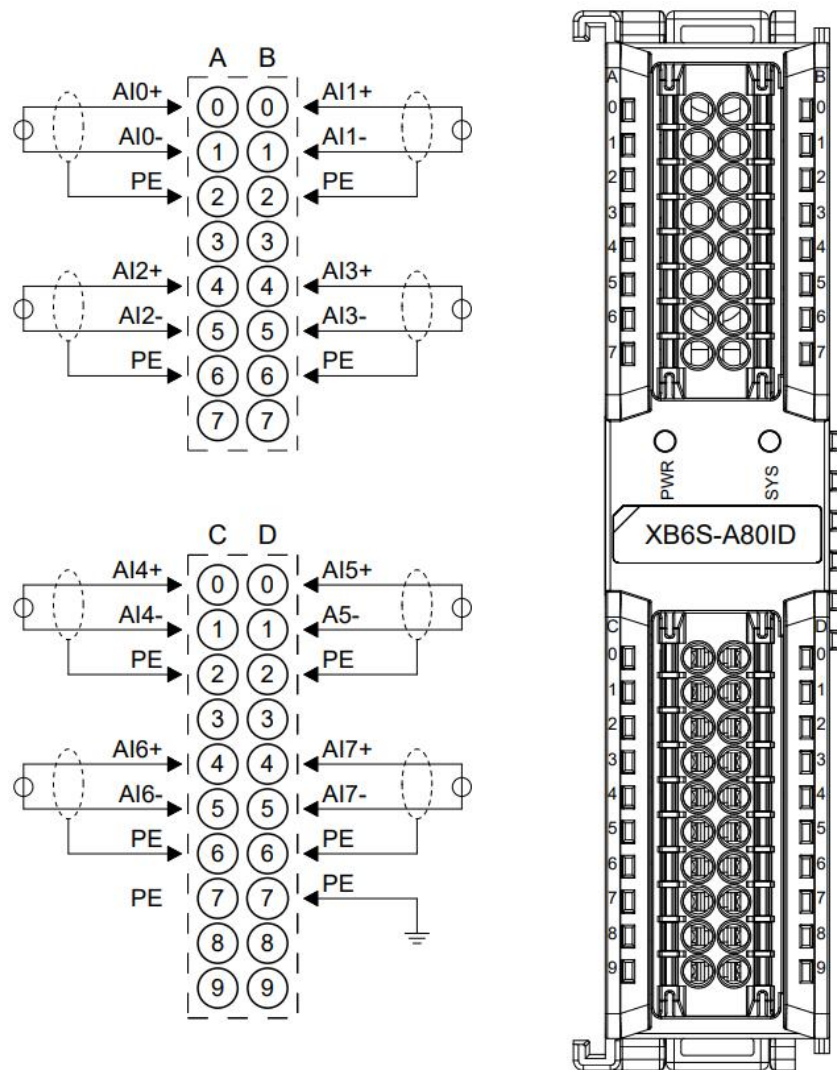


*COM internal conduction, PE internal conduction

* All channel loads need to be homogenous

*Shielded twisted pair cable is recommended for signal cables

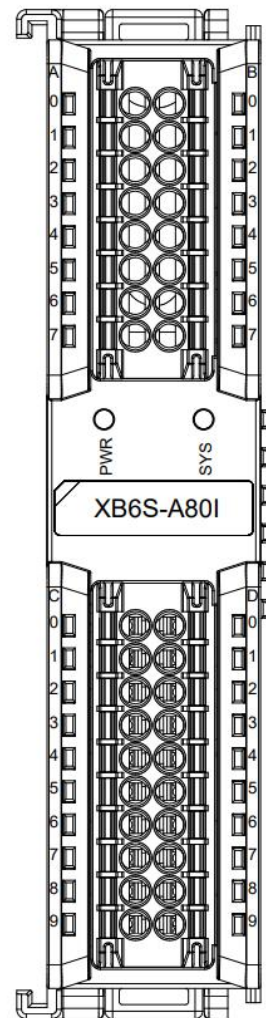
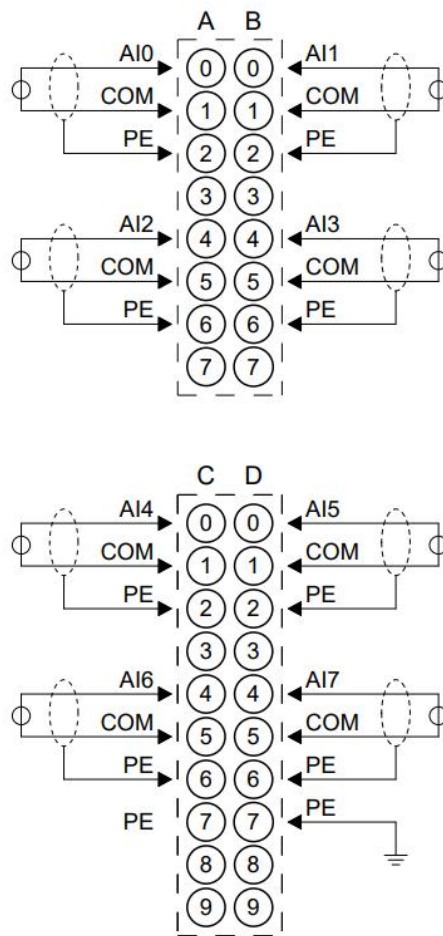
3.3.6.5 XB6S-A80ID



*All PEs internally conductive

* Recommended to use shielded twisted pair cable, connect the shield to the PE port and ground it reliably

3.3.6.6 XB6S-A80I

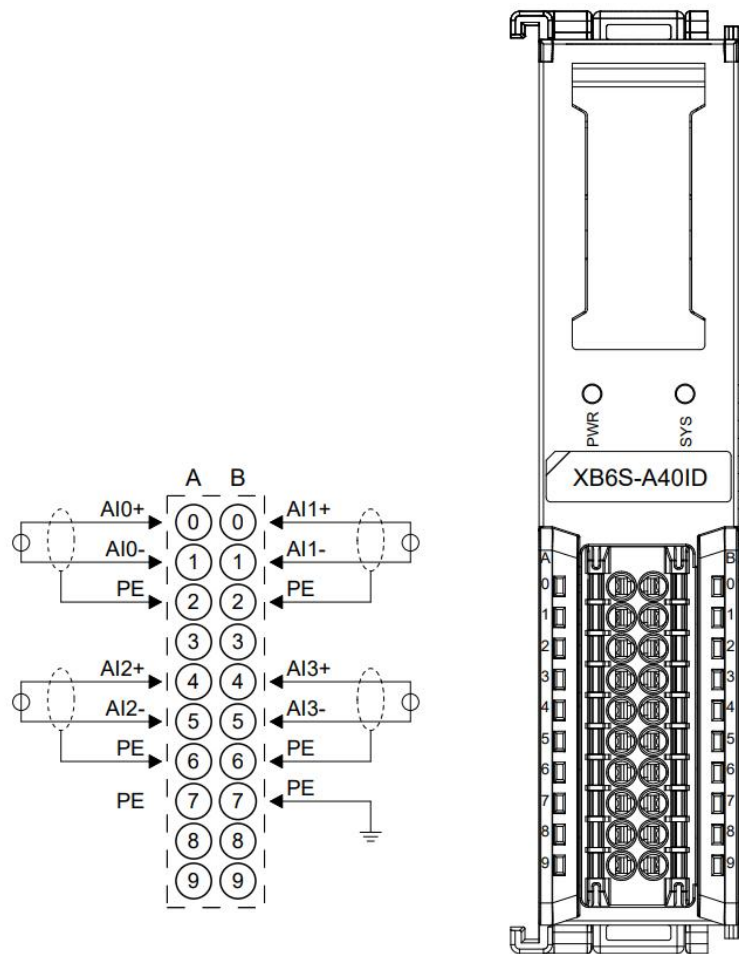


*COM internal conduction, PE internal conduction

* All channel loads need to be homogenous

*Shielded twisted pair cable is recommended for signal cables

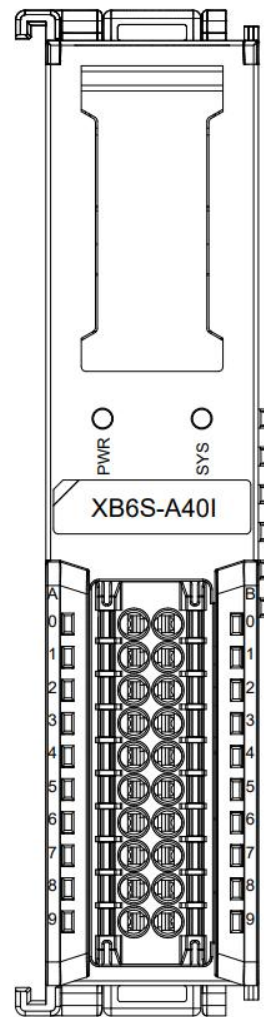
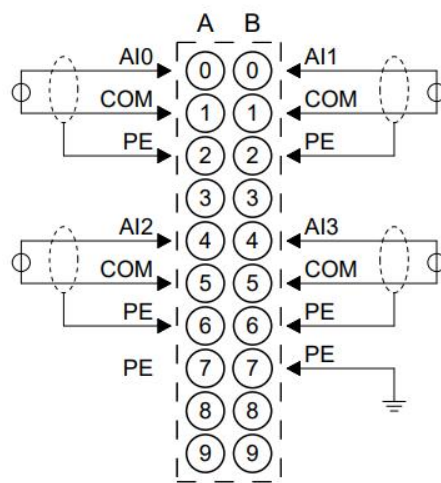
3.3.6.7 XB6S-A40ID



*All PEs internally conductive

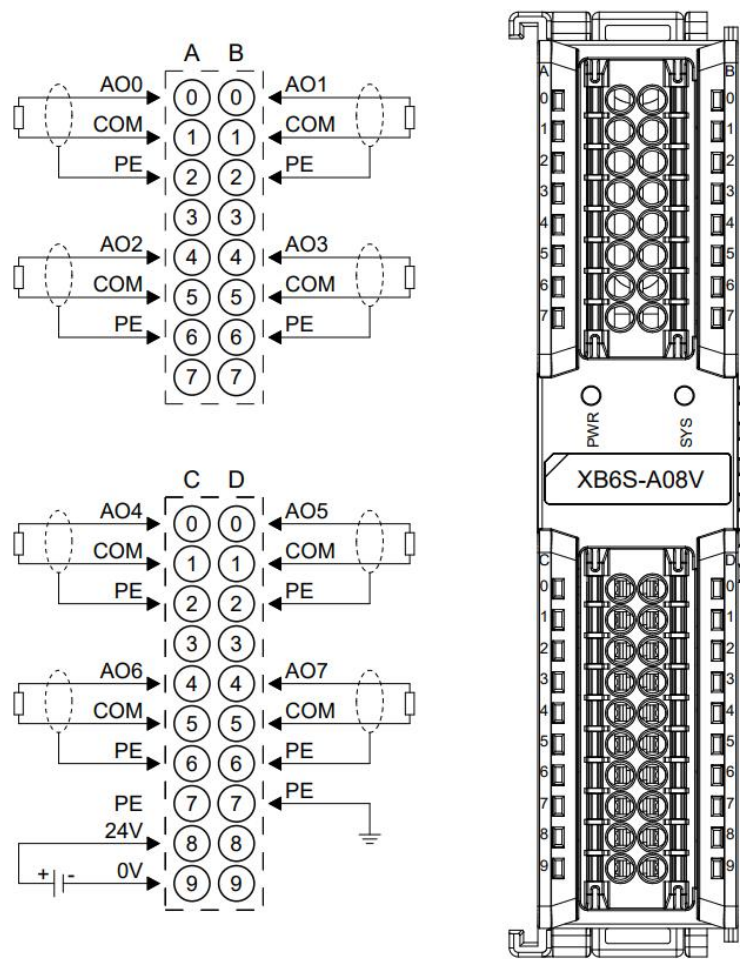
* Recommended to use shielded twisted pair cable, connect the shield to the PE port and ground it reliably

3.3.6.8 XB6S-A40I



- *COM internal conduction, PE internal conduction
- * All channel loads need to be homogenous
- *Shielded twisted pair cable is recommended for signal cables

3.3.6.9 XB6S-A08V

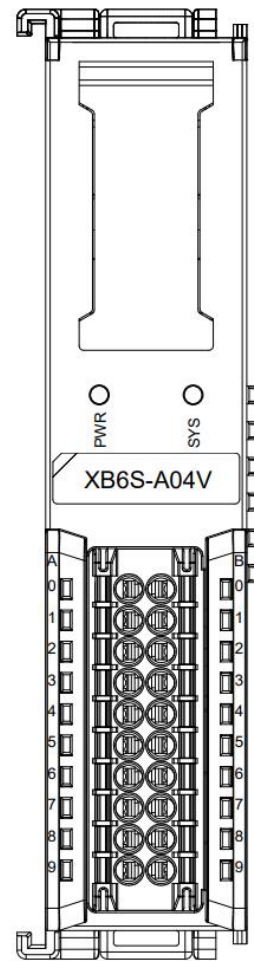
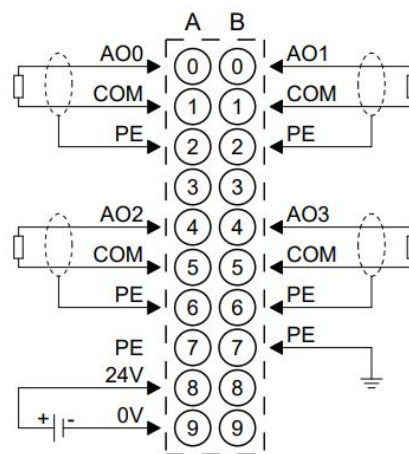


*COM internal conduction, PE internal conduction

* All channel loads need to be homogenous

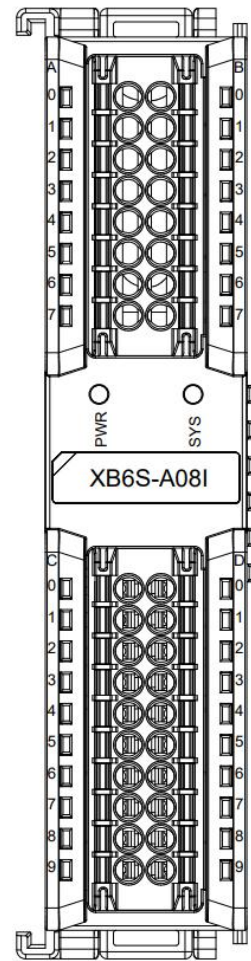
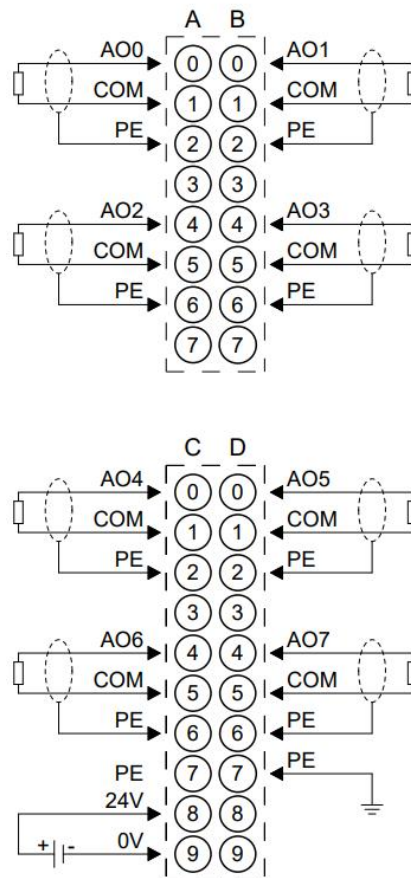
*Shielded twisted pair cable is recommended for signal cables

3.3.6.10 XB6S-A04V



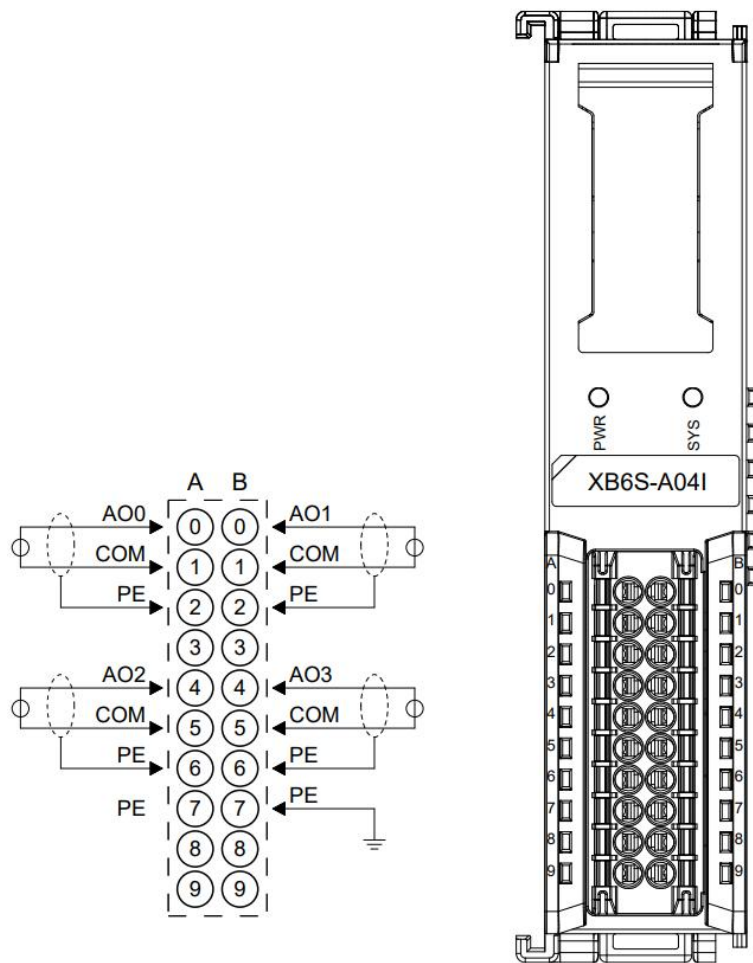
- *COM internal conduction, PE internal conduction
- * All channel loads need to be homogenous
- *Shielded twisted pair cable is recommended for signal cables

3.3.6.11 XB6S-A08I



- *COM internal conduction, PE internal conduction
- * All channel loads need to be homogenous
- *Shielded twisted pair cable is recommended for signal cables

3.3.6.12 XB6S-A04I



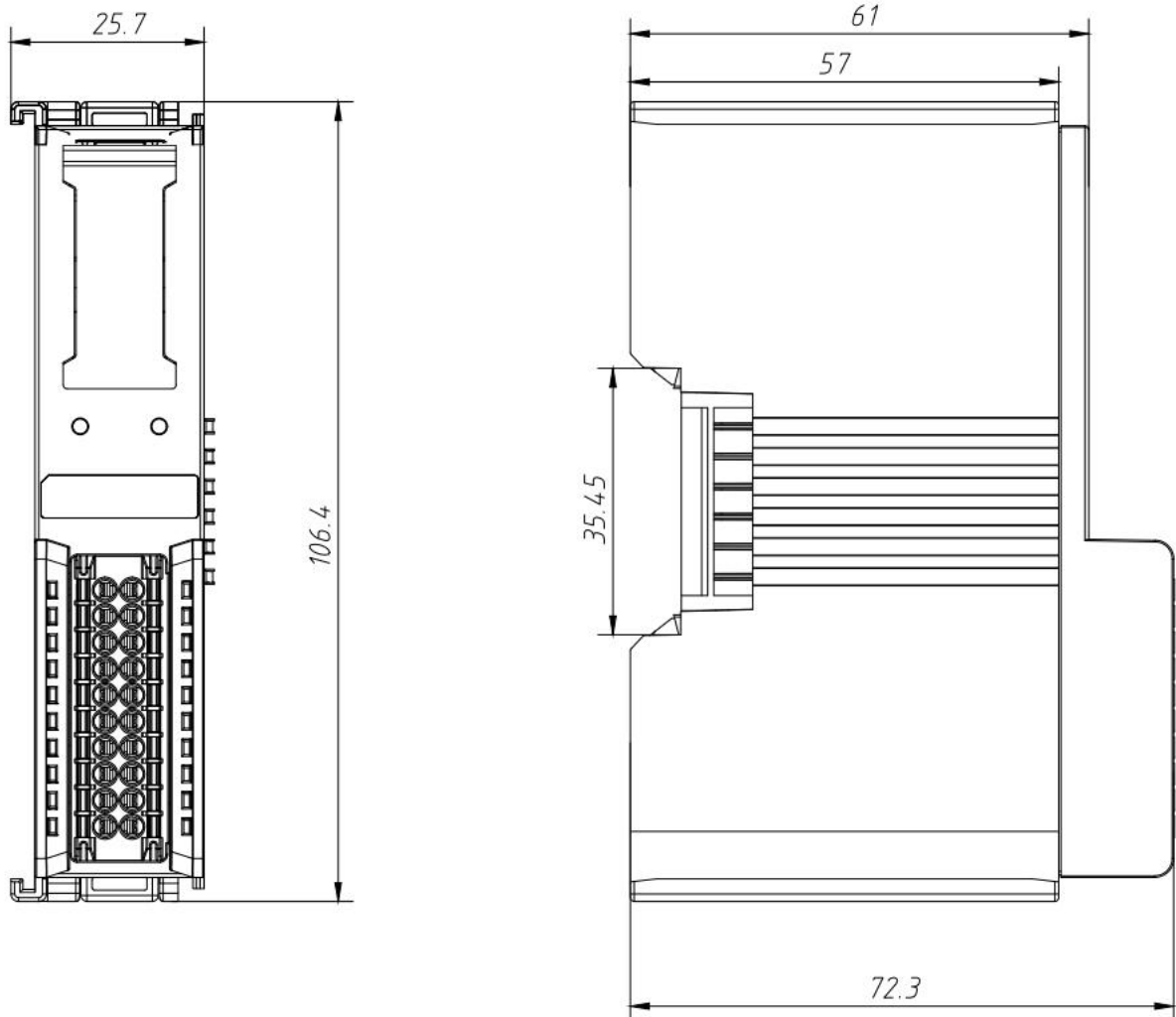
*COM internal conduction, PE internal conduction

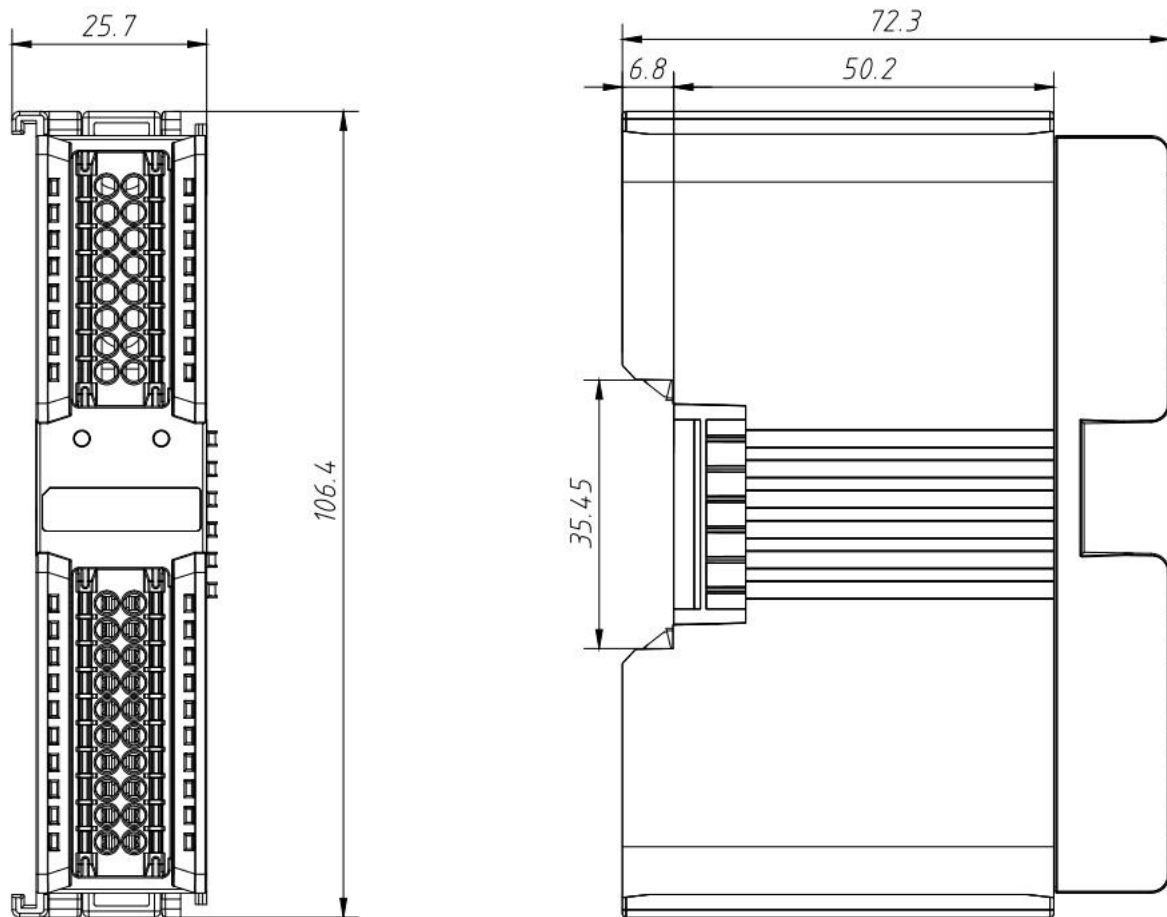
* All channel loads need to be homogenous

*Shielded twisted pair cable is recommended for signal cables

3.3.7 External Dimensions

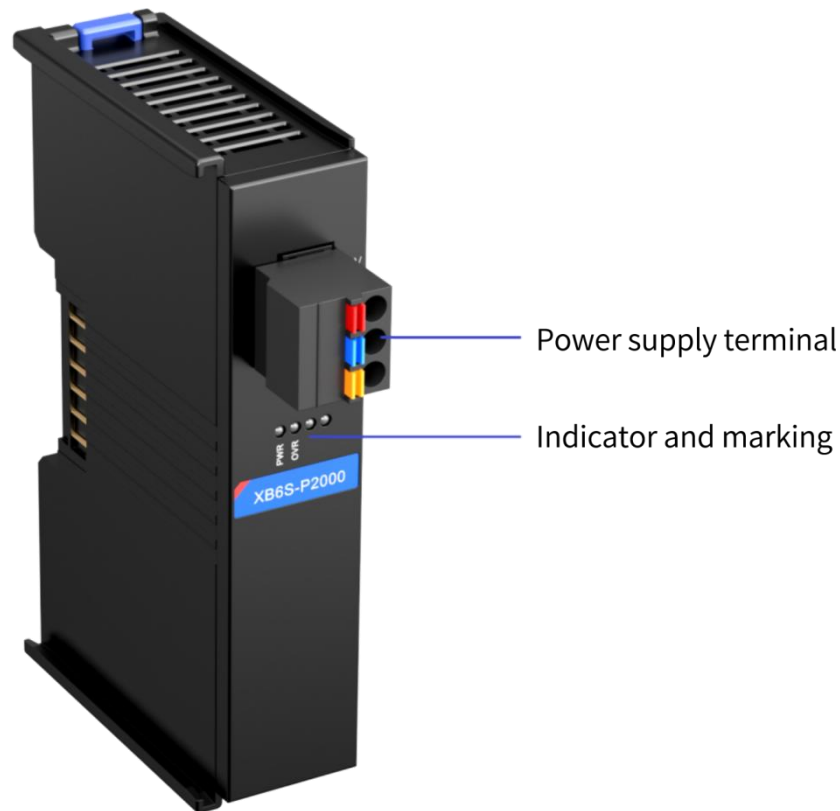
4-Channel Analog I/O Module Housing Factor (Unit mm)



8-Channel Analog I/O Module Housing Factor (Unit mm)

3.4 Extended Power Module

3.4.1 Panel structure



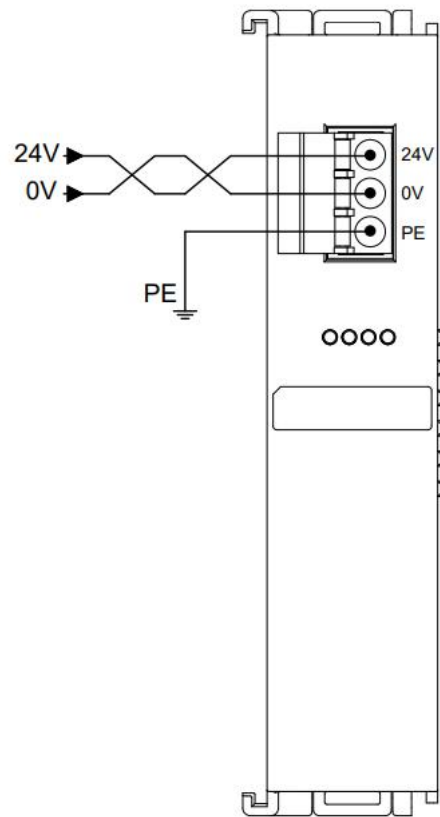
3.4.2 Indicator light function

Extended Power Module Indicator Definitions				
Markings	Name	Color	Status	Status Description
PWR	Power indicator	GREEN	ON	Module power supply is working properly
			OFF	Module not powered or abnormal power supply
OVR	Overload indicator	RED	OFF	Not overloaded
			ON	Load up to 90% ($\pm 5\%$) or more

3.4.3 Technical Parameters

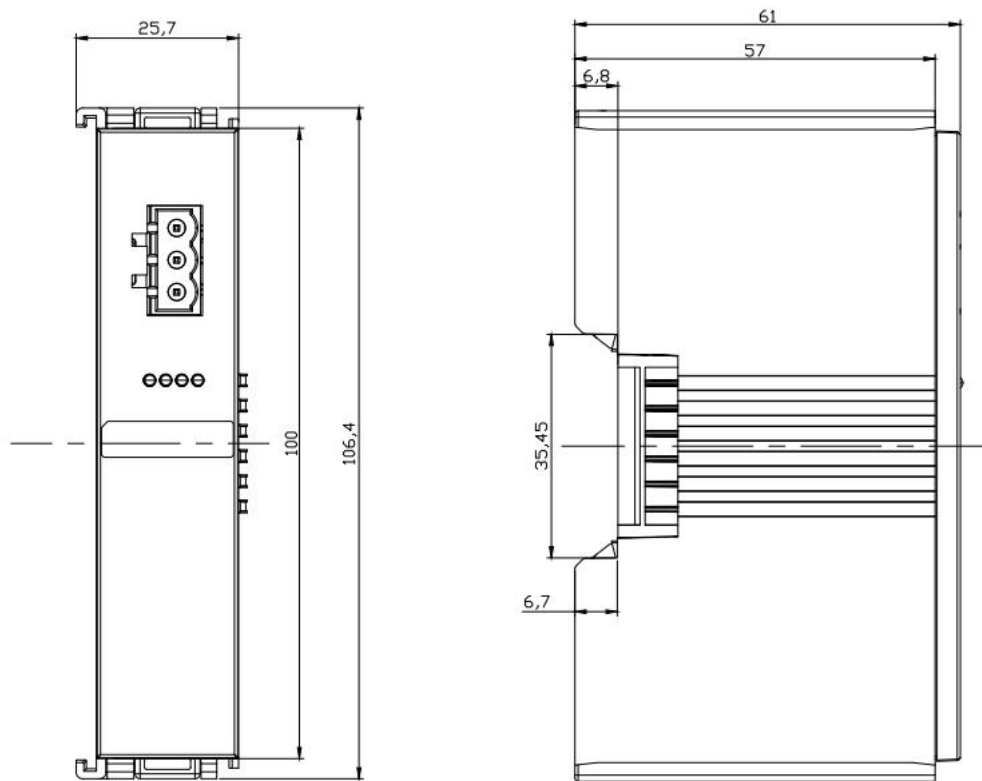
Power supply parameters	
Input Voltage	SELV Input 24VDC (18V~36V)
Input Current	600mA (24VDC)
Output Voltage	5VDC
Output Current	2A
General Technical Parameters	
Size	106.4 x 25.7 x 61mm
Weights	110g
Operating Temperature	-20°C~+60°C
Storage Temperature	-40°C~+80°C
Relative Humidity	95%, non-condensing
Altitude	≤2000m
Pollution Degree	Level 2
Short Circuit Protection	Support (automatic recovery mechanism)
Reverse Connection Protection	Support (automatic recovery mechanism)
Surge Protection	Support
Protection Class	IP20
Safety Certification	UL certification, CE certification
Green Certification	RoHS certification, REACH certification

3.4.4 Wiring diagram



3.4.5 External Dimensions

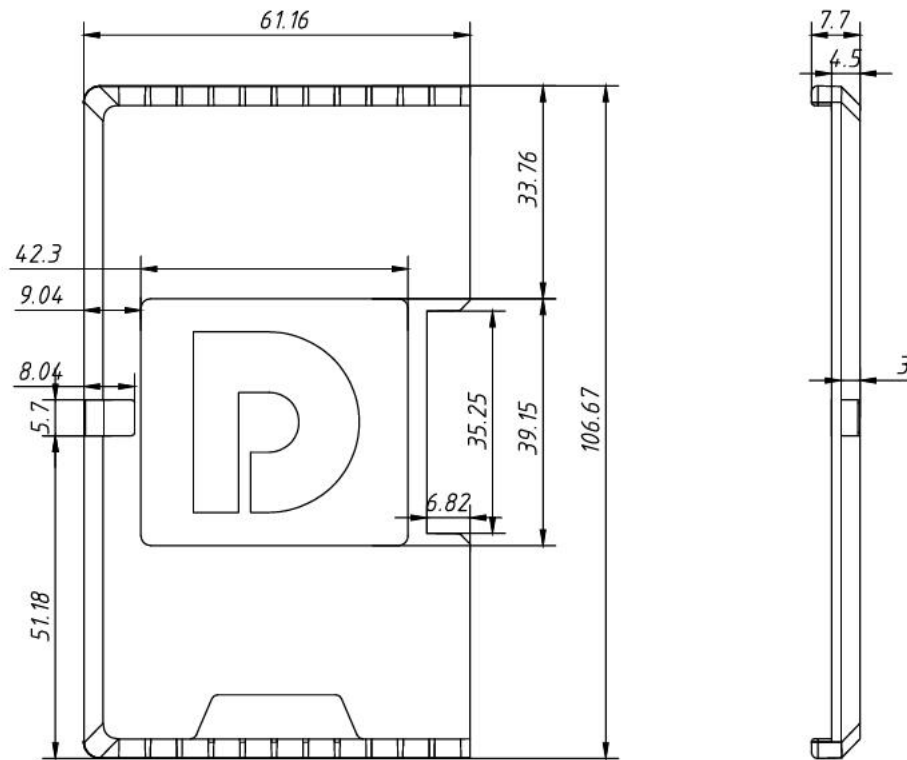
Extended Power Supply Outline Specifications (Unit mm)



3.5 End cap

3.5.1 External Dimensions

End cap profile specification (unit mm)



Note: All are installed with DIN 35 mm standard rail, DIN rail specification 35*7.5*1.0, 35*15*1.0 (unit mm).

4 Installation and uninstall

4.1 Installation Guide

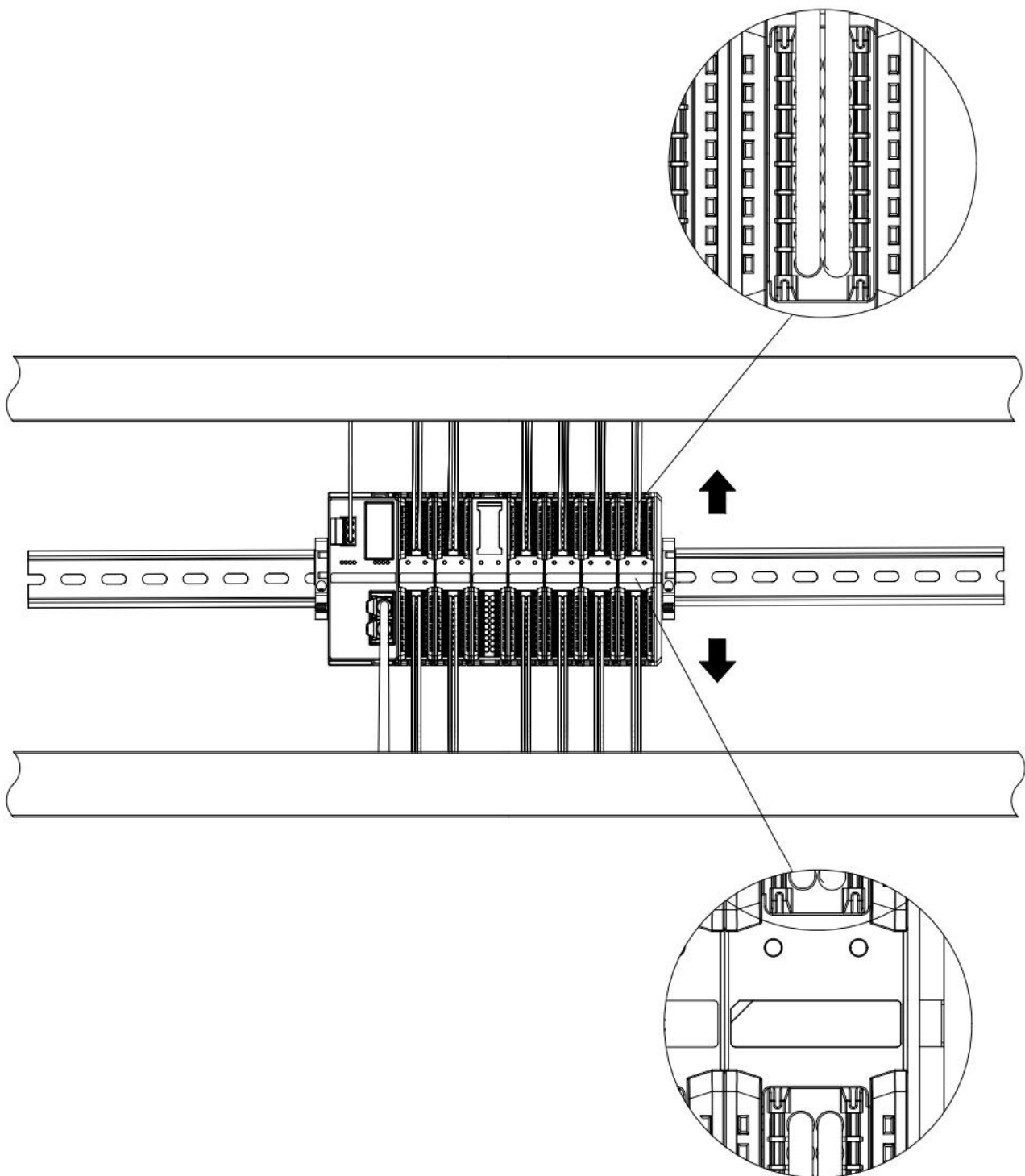
Precautions for installation\uninstall

- The protection class of module is IP20 and the module needs to be installed in the cabinet for indoor use.
- Ensure that the cabinet is well ventilated (e.g., the cabinet is fitted with an exhaust fan).
- Do not install this equipment next to or above equipment that may cause overheating.
- Be sure to install the module vertically on the fixed rails and maintain air circulation around it (at least 50 mm air circulation space above and below the module).
- Once the module is installed, be sure to secure the module by installing rail mounts on both ends.
- Be sure to disconnect the power supply when installing/uninstalling.
- Once the module is installed, it is recommended that wiring and cabling be done in accordance with the top and bottom alignments.

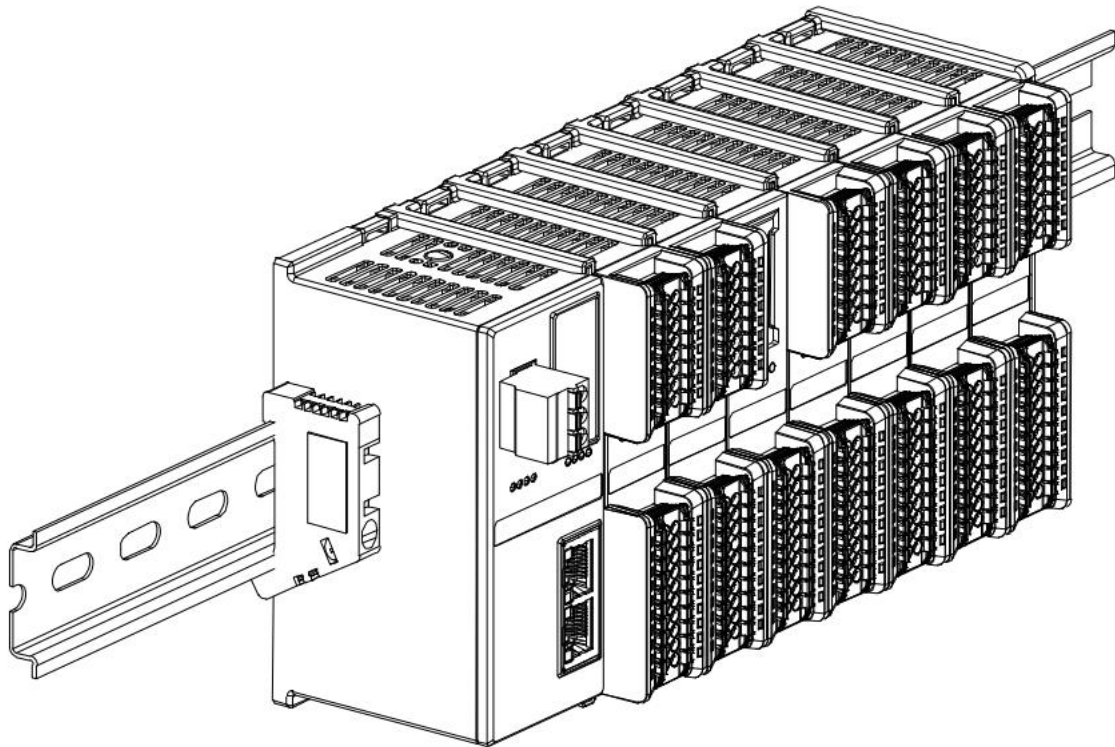


Warnings

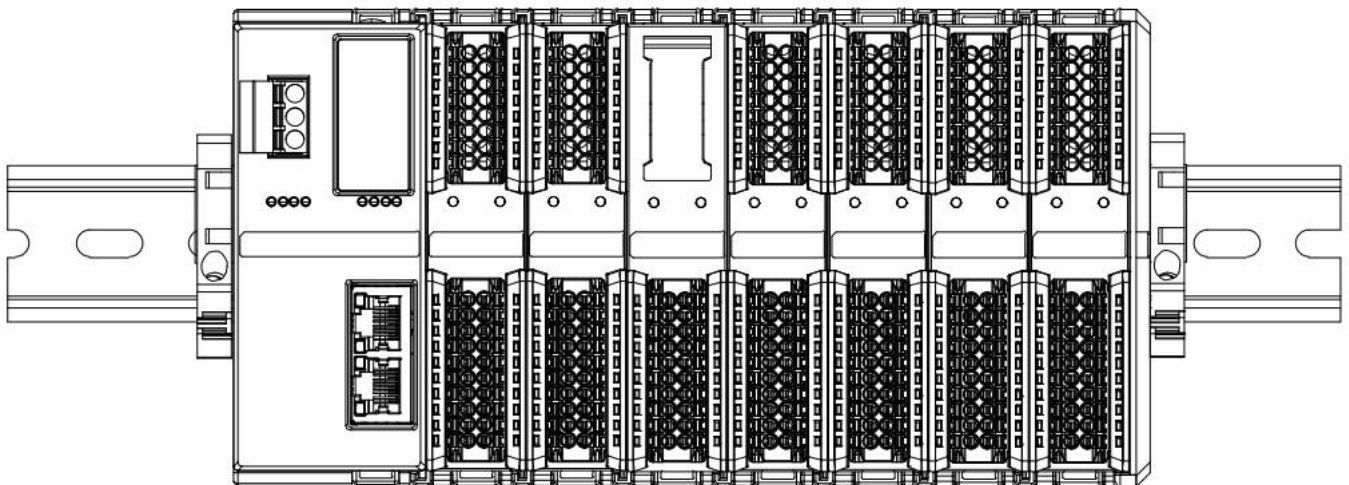
- The protection provided by the device may be jeopardized if it is not used in accordance with the product user manual.
-

Module installation schematic, minimum clearance above and below ($\geq 50\text{mm}$)

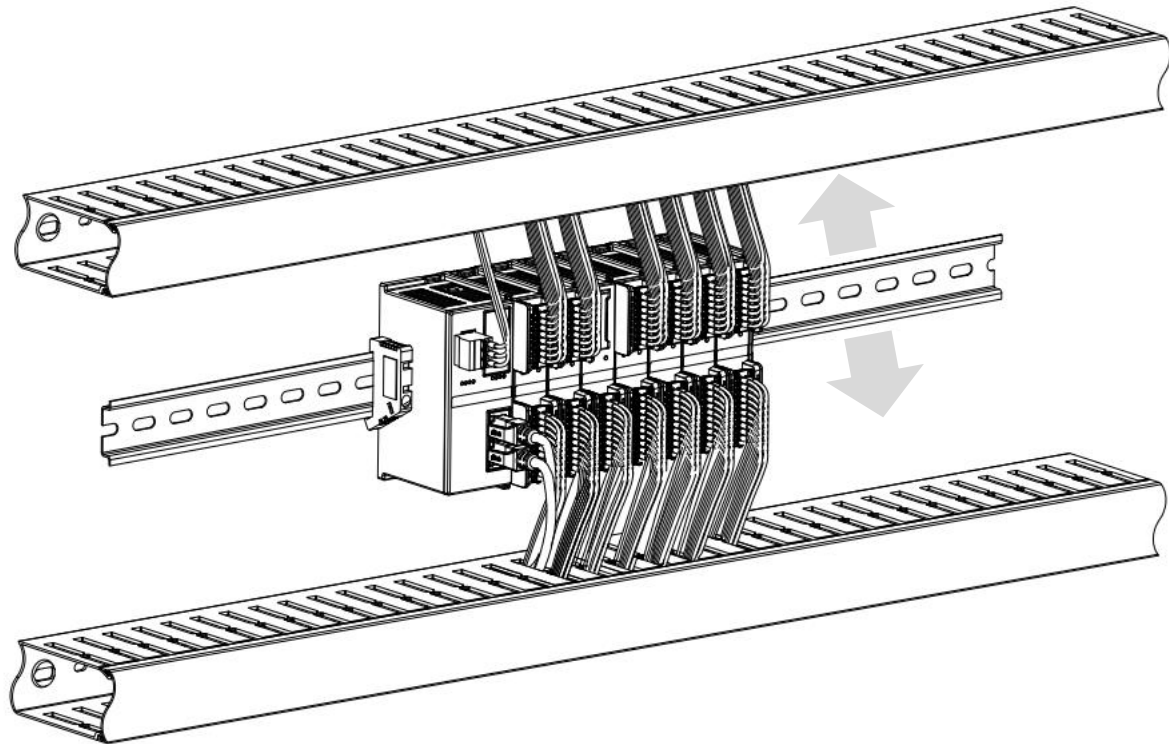
Ensure that the module is installed vertically on the fixed rail



Be sure to install the rail mounts



Schematic diagram of upper and lower wiring of the module



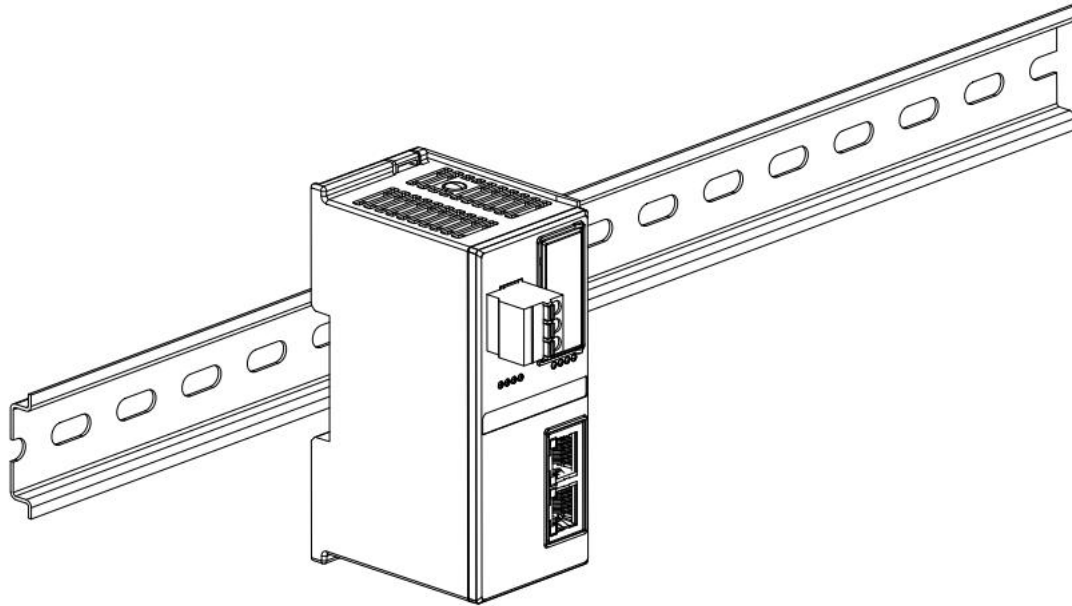
4.2 Installation and uninstall steps

Module Installation and Uninstall	
Module Installation Steps	1. Install the coupler module first on the rail that has been fixed.
	2. Install the required I/O modules or function modules in order to the right of the coupler module.
	3. After installing all the required modules, install the terminal cover to complete the assembly of the module.
	4. Install the rail fixings at both ends of the coupler module and terminal cover to fix the module.
Module uninstall steps	1. Loosen the guide rail fixings at both ends of the module.
	2. Use a one screwdriver to pry off the module snap.
	3. Pull out the uninstalled module.

4.3 Installation and uninstall diagram

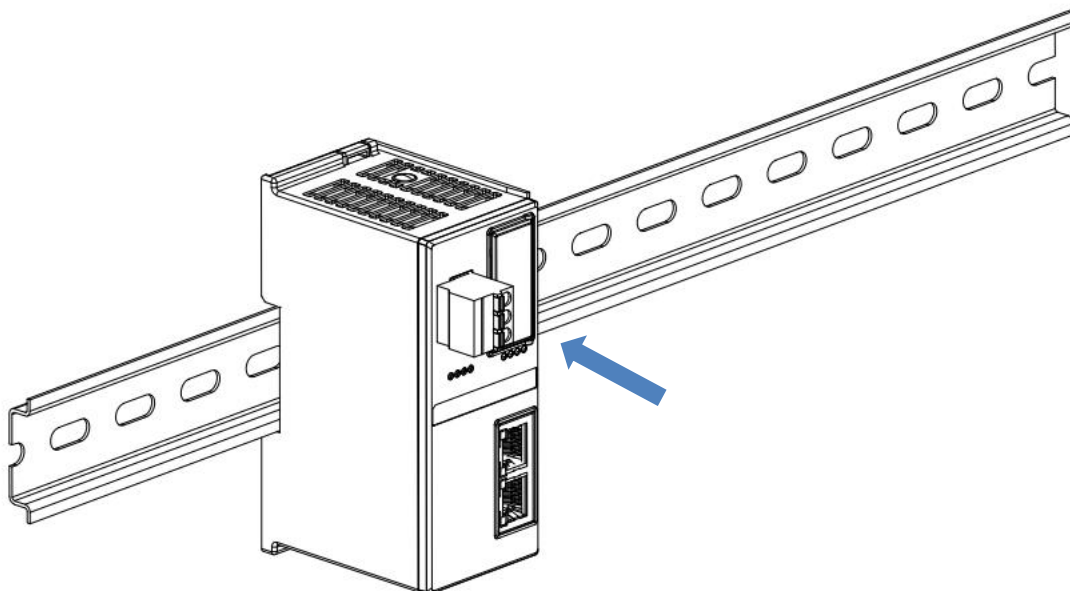
Coupler Module Installation

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



①

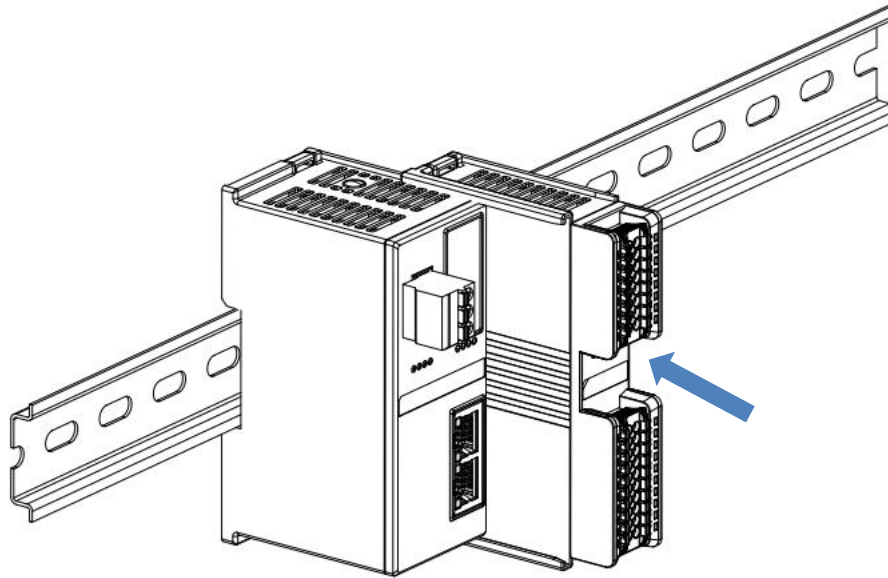
- Press the coupler module in the direction of the guide rail, and when you hear a "click" sound, the module is installed in place, as shown in Figure 2 below.



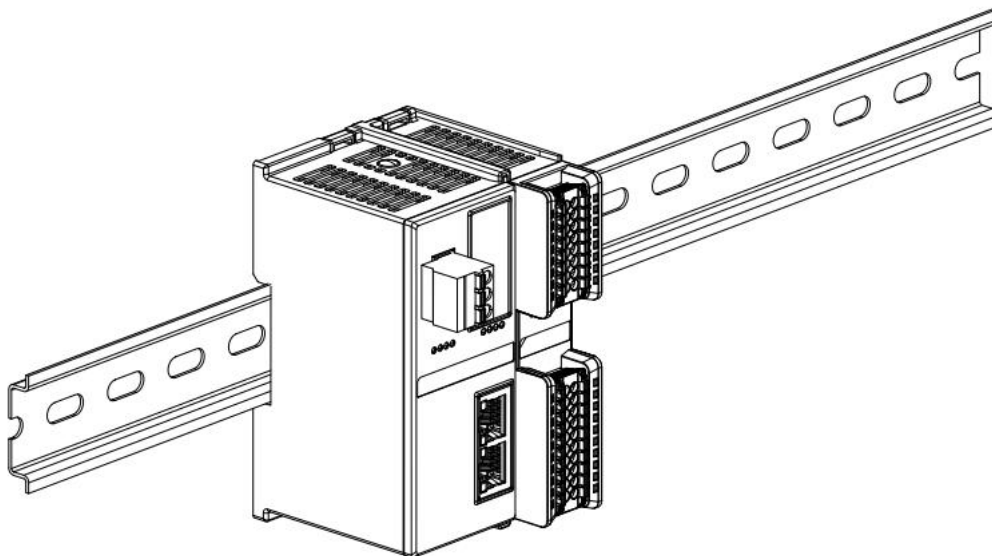
②

I/O Module Installation

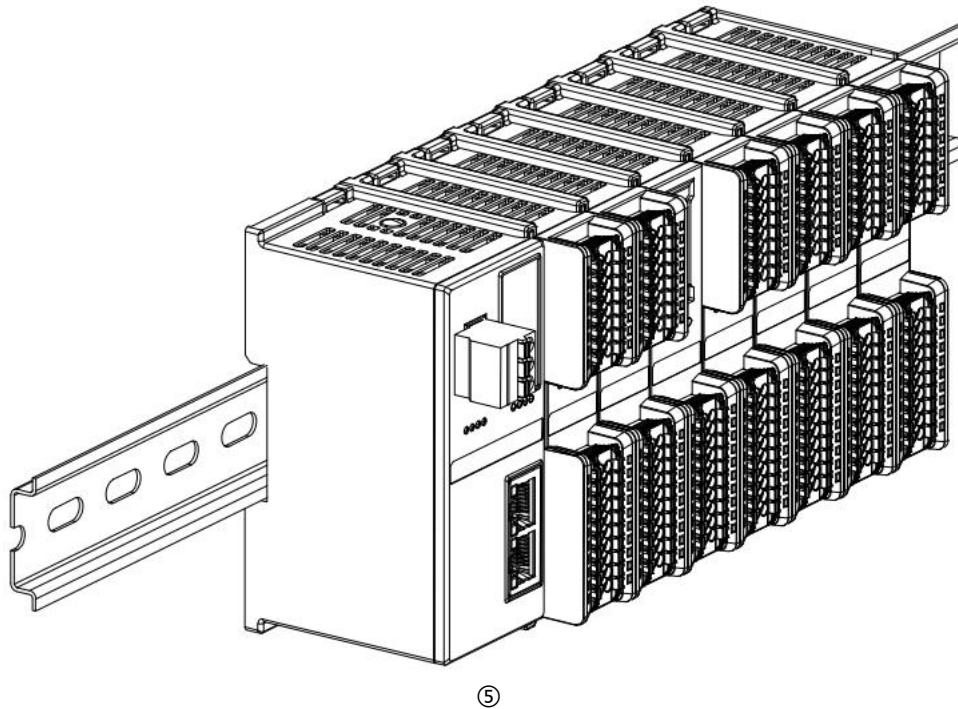
- Install the required I/O modules or function modules one by one according to the above steps of installing coupler modules as shown in Figures ③, ④ and ⑤ below, and push them in, and the modules will be installed in place when you hear the "click" sound.



③

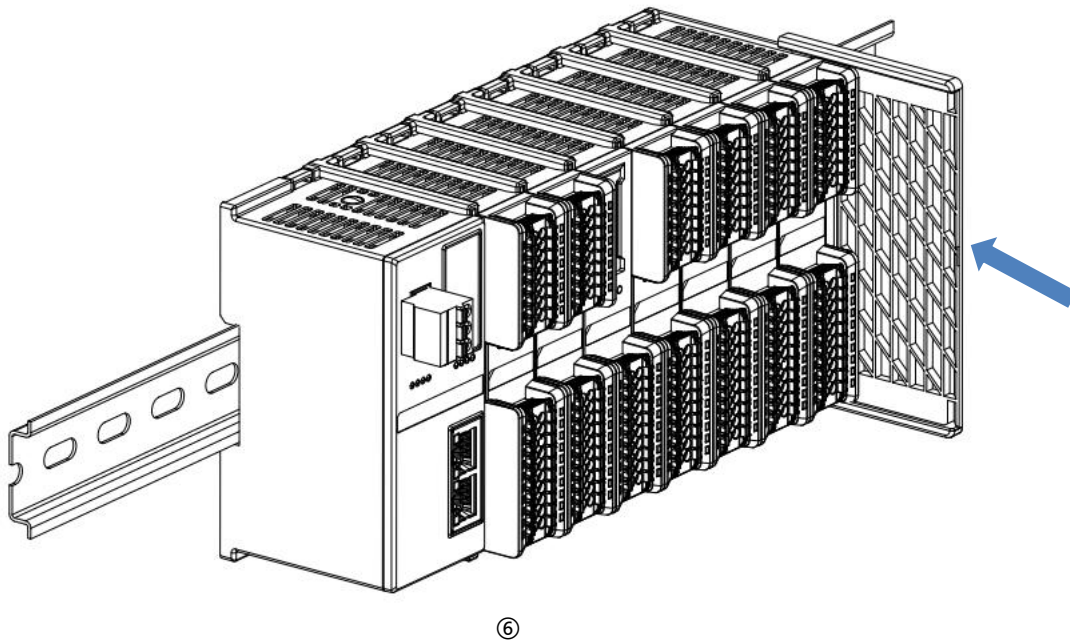


④

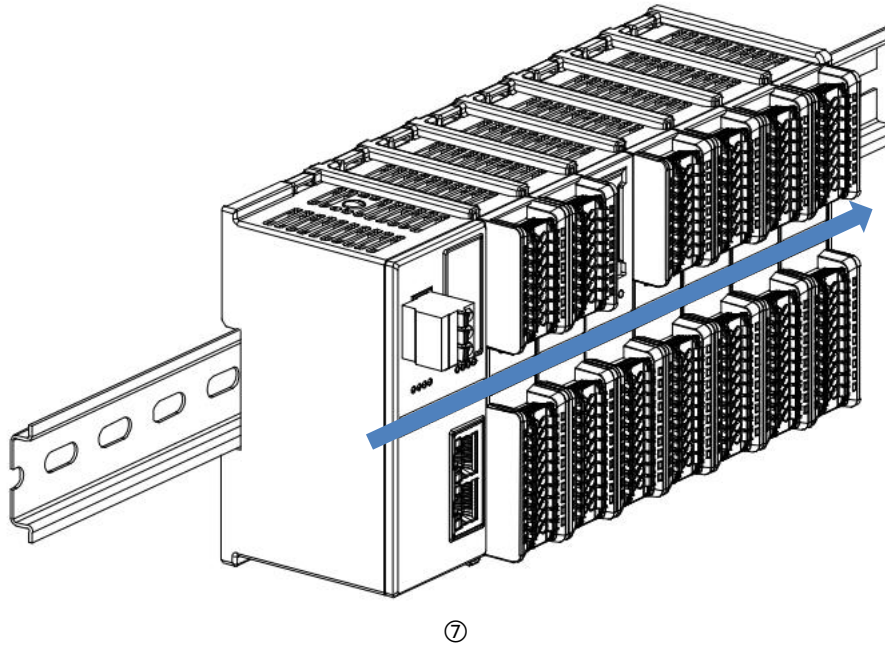


end cap installation

- Install the terminal cover on the right side of the last module, with the grooved side of the terminal cover aligned with the guide rail. Refer to the installation method of the I/O module for the installation method, and push the terminal cover inward into place, as shown in Figure ⑥ below.

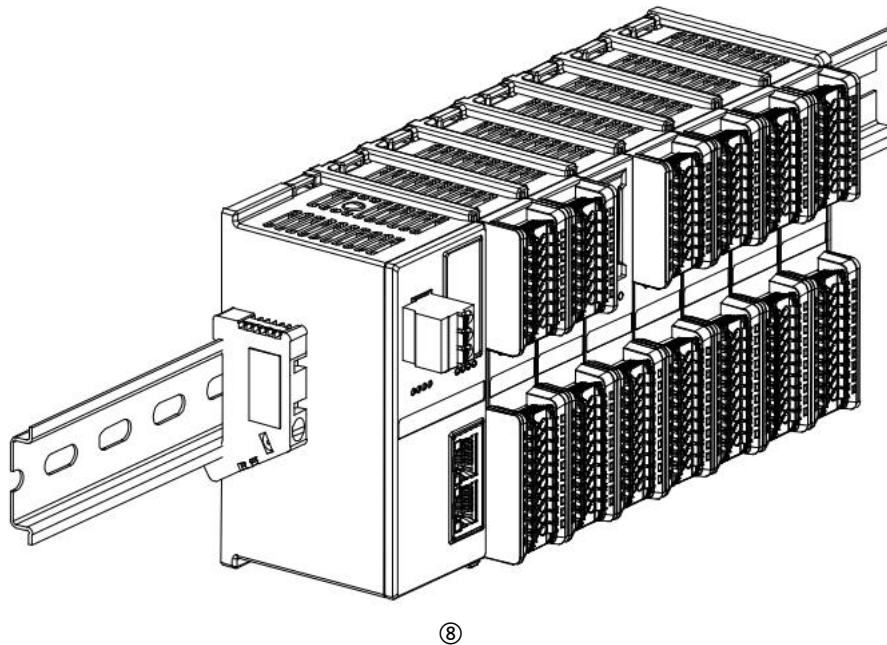


- After the end cap is installed, check whether the entire front of the module is flat to ensure that all modules and end caps are installed in place and the front is flush, as shown in Figure ⑦ below.

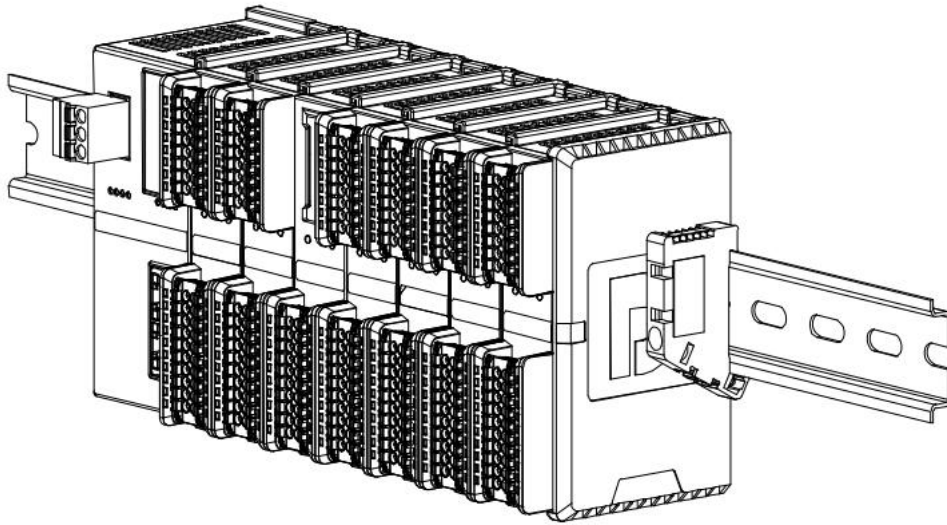


Installation of guide rail fixings

- Install and tighten the rail retainer firmly against the left side face of the coupler as shown in Figure ⑧ below.



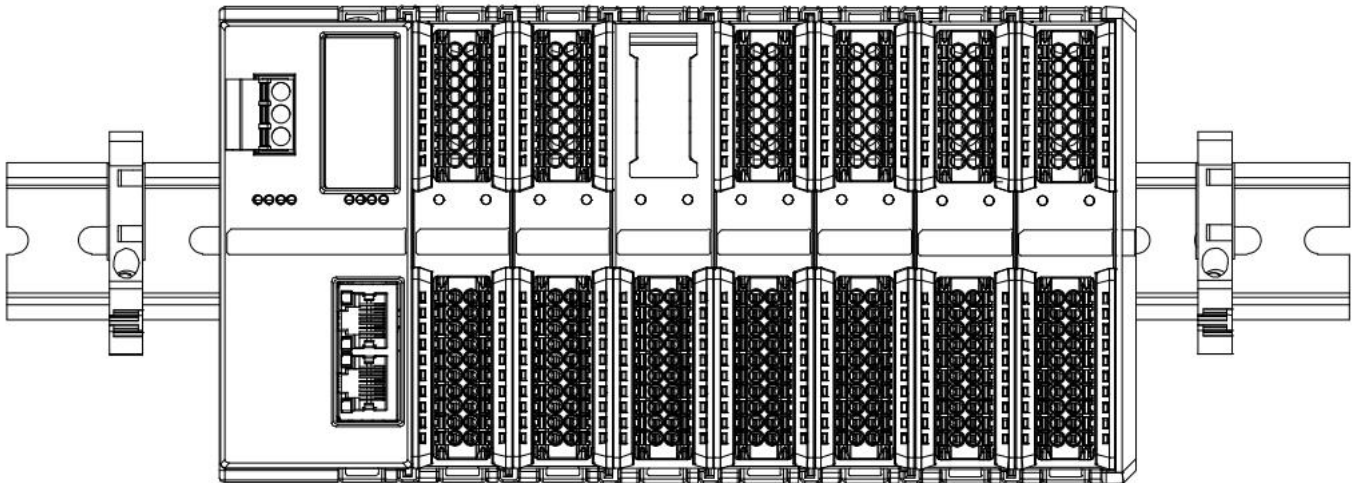
- Install the rail fixing on the right side of the terminal cover, first push the rail fixing firmly in the direction of the coupler to ensure that the module is mounted tightly, and lock the rail fixing with a screwdriver, as shown in Figure ⑨ below.



⑨

Uninstall

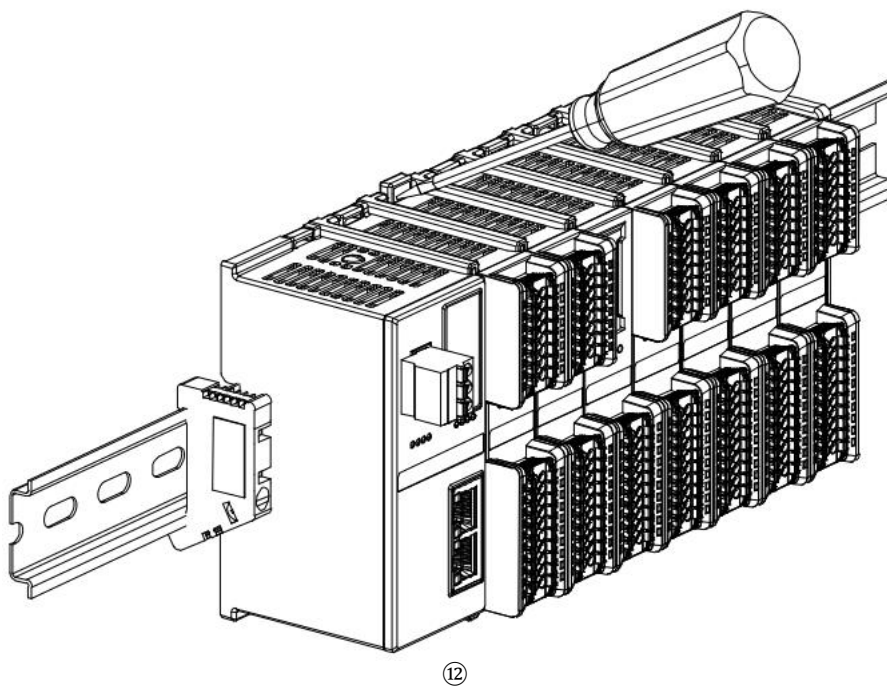
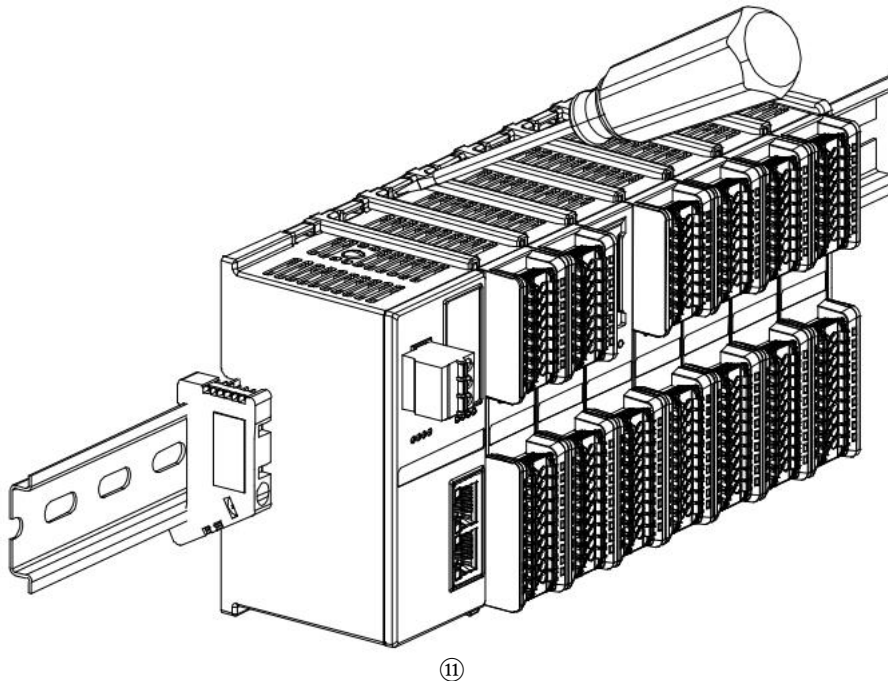
- Loosen the rail retainer at one end of the module with a screwdriver and move it to one side, making sure there is clearance between the module and the rail retainer, as shown in Figure ⑩ below.



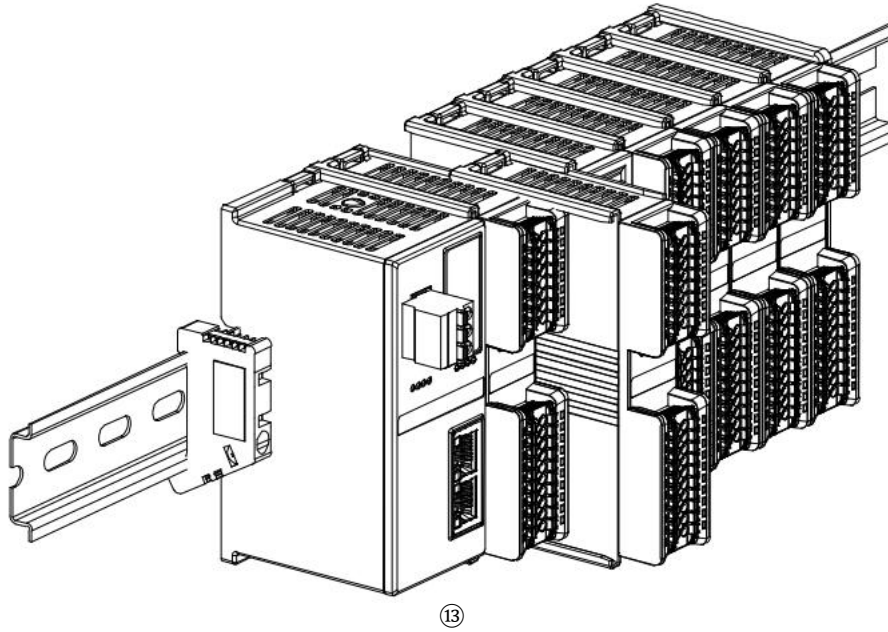
⑩

- Insert a flat head start into the snap of the module to be uninstalled, and apply pressure (hear the rattle) in the direction of the module sideways, as shown in the following figures ⑪ and ⑫.

Note: There is one snap on the top and bottom of each module, follow this method.



- Uninstall the module as shown in figure ⑬ below, following the same procedure as for installing the module.



5 Wiring

5.1 Wiring Terminal

Warnings

Wiring terminal		
Power Supply Terminal	Rated voltage	320V
	Rated current	20A
	Number of poles	3P
	Wire diameter	22~16 AWG 0.3~1.5 mm ²
Signal cable 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 mm ²
Bus Interface	2×RJ45	Category 5+ UTP or STP (STP recommended)

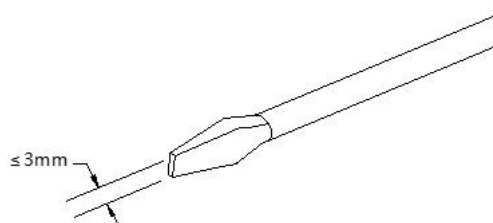
5.2 Wiring instructions and requirements

Power supply wiring precautions

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

Wiring tool requirements

The power supply and signal cable terminals adopt the screwless design, and the installation and removal of the cables can be operated with a single screwdriver



(specification: $\leq 3\text{mm}$).

Stripped wire length requirements

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



Wiring method

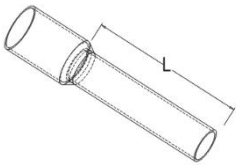
For single stranded hard wires, after stripping the corresponding length of wire, press down the button while inserting the single stranded wire directly into the corresponding end hole.



Multi-stranded flexible wires, after stripping the corresponding length of wire, can be directly connected or supporting the use of the corresponding standard specifications of the cold-pressing end (tube-type insulated terminals, the reference specifications are shown in the table below), press the button down at the same time will be insulated terminal inserted directly into the corresponding end holes.



The specifications for the power supply terminals and signal line terminals are shown in the table below:

Tube Insulation End Specification Sheet		
Specification	Model	Cross-sectional area of conductor (mm ²)
 Tube insulated terminal L with a length of 10 mm	E0310	0.3
	E0510	0.5
	E7510	0.75
	E1010	1.0
	E1510	1.5

 Warnings

- Use only copper wires for wiring conductors.
 - Utilisez uniquement des conducteurs en cuivre.
-

 Warnings

- Cables temperature: 80°C.
 - Température du câble: 80°C.
-

6 Operation

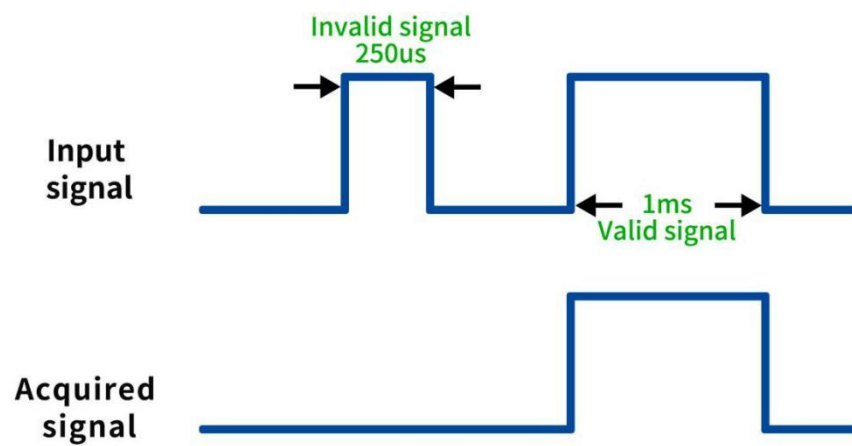
6.1 Parameter description

6.1.1 Digital Input Filter

Digital input filter prevents the program from responding to unexpected rapid changes in the input signal, which can be generated by switch contact jumps or electrical noise. Digital Input Filter supports single module setup, each module can be configured individually, channels cannot be configured individually.

Digital input filter Filter Time is currently configured as 3ms by default, and supports settings ranging from no filter, 0.1ms, 0.2ms, 0.5ms, 1ms, 2ms, 3ms (factory setting), 4ms.... When 3ms is configured, noise within 3ms can be filtered out. 3ms input filter time means that a single signal changes from "0" to "1", or from "1" to "1", or from "1" to "1". The 3ms input filter time means that a single signal from "0" to "1", or from "1" to "0" lasts for 3ms before it can be detected, 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, spurious waves within 1ms can be filtered out. As shown in the figure below, a 250us signal input will be considered 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 acquired.



6.1.2 Digital output signal clear/hold

The Clear/Hold function is intended for modules with output channels. This function configures the output mode of the output channel when the module is in a non-OP state (stopped operation or coupler net disconnected condition). This parameter supports the following output states:

Clear output: When communication is disconnected, the output channel of the module will automatically clear the output, i.e. output 0.

Output RMS: When communication is disconnected, the module output channel always outputs RMS, i.e. output 1.

Hold previous output value: When communication is disconnected, the module output channel holds the previous output value.

The digital clear hold function supports both overall module setting (template mode) and single channel setting (single channel mode). Any channel can be set up using the single channel mode, or it can be set to the template mode, and the single channel mode has higher priority than the template mode. The specific configuration method is shown in the following table, and the default is module overall clear output.

Digital output module clear hold parameter				
Parameter name	Parameter Meaning	parameter value	Parameter Value Meaning	default value
TemplateMode	template mode	1	PresetLow: clear the output, i.e. output 0	1
		2	PresetHigh: output valid value, i.e. output 1	
		3	KeepMode: keep the last output value	
Channel x	Single-channel mode setting	0	TemplateValue: template mode value, i.e. single channel mode is not enabled	0
		1	PresetLow: clear the output, i.e. output 0	
		2	PresetHigh: output valid value, i.e. output 1	
		3	KeepMode: keep the last output value	

6.1.3 Analog range Setting

Range Select is used to set the analog range, which can be configured individually for each channel (see [3.3.4 and 3.3.5 Analog Parameters](#) for Range Selection details)

6.1.4 Analog Input Filter

● Analog input filter function

The analog input filter function, Filter, averages the A/D converted data internally to reduce the effects of fluctuations in the input signal due to noise.

Analog inputs are processed as moving averages with a specified number of A/D conversions.

● Filter Function Configuration

Each channel can be configured individually, configuration range: 1~200, default 10 times.

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

6.1.5 Analog output signal clear/hold

The Clear/Hold function is intended for modules with output channels. This function configures the output mode of the output channel when the module is in a non-OP status (operation stopped or coupler net disconnected condition). This parameter supports the following output states:

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

Hold Outputs: The module output channels keep outputs when communication is disconnected.

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

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

Analog output module clear/hold parameter				
Parameter Name	Parameter Meaning	Parameter Value	Parameter Value Meaning	Default Value
TemplateMode	template mode	0	Clear all-channel clear output	0
		1	Hold full channel hold output	
		2	Preset all-channel output presets	
TemplateValue Chx	Single channel clear/hold configuration	0	TemplateValue template mode value, i.e. single channel mode is not enabled	0
		1	Clear single channel clear output	
		2	Hold single channel hold output	
		3	Preset single channel output preset	
Preset Value Chx	Single-channel presets	Code Value Range	Current/voltage value corresponding to the output code value (Corresponding range code value table)	0

Note: When the overall module setting (template mode) is configured to 2, i.e., when the full channel output preset value is in effect, the preset value is based on the preset code value of channel 0 in the single channel preset value for full channel output.

6.1.6 Analog power-down save

Analog parameters support abnormal power-down communication disconnection, all configuration parameters of the module to save the function, analog modules are default support power-down save.

This manual uses Sysmac Studio as an example to introduce how to configure the parameters of the XB6S-EC2002 coupler + I/O module combination, and the specific steps are detailed in [6.3.1 Parameter Setting](#). After the modification is completed, it is recommended to re-power up the system.

6.2 Fault Code Information

6.2.1 Coupler Generalized Fault Codes

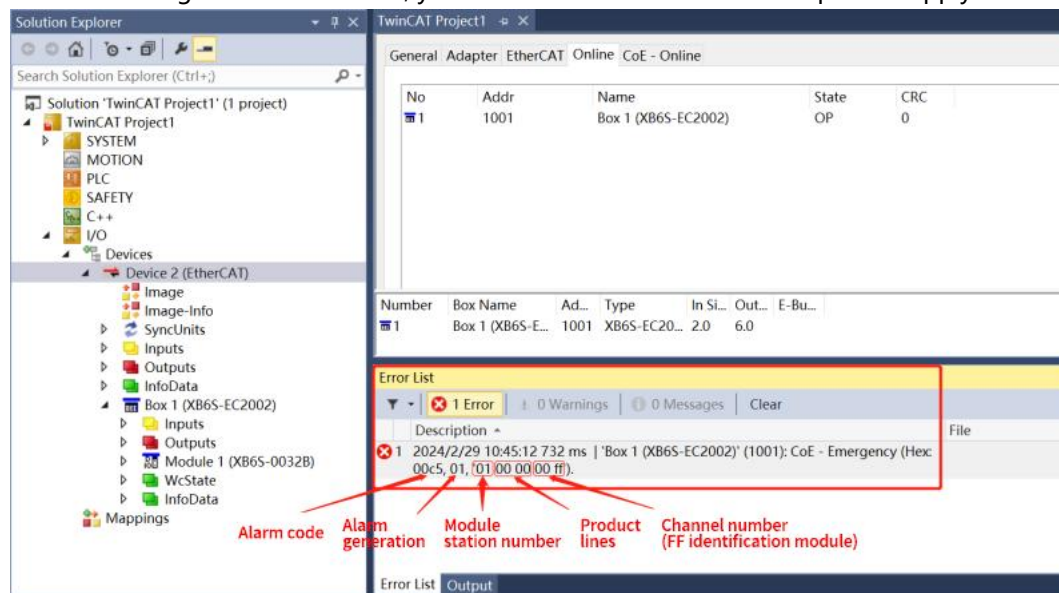
Form	Serial Number	Type Of Error	Error Code	Event Name	Event Code (2#)	Event Code (10#)	Event Code (16#)	Treatment
Generalized errors	2	Online upgrade error	1	Firmware upgrade exception	0000000010000001	129	0x0081	Try to re-upgrade, check for interference in the environment, oversized firmware, etc.
			2	Firmware does not match current module model	0000000010000010	130	0x0082	Check for correct documentation, abnormalities or interference in modules, etc.
	3	Voltage error	5	Load side voltage not connected	0000000011000101	197	0x00C5	Detecting if the field side power supply is wired
	6	Channel error	4	Channel overflow	0000000110000100	388	0x0184	Check whether the input signal of the corresponding channel is out of the measurement range and whether the output signal is out of the configurable range.
	7	Parameter error	0	Parameter setting abnormality	0000000111000000	448	0x01C0	Checking module parameter settings
	63	X-bus communication error	1	X-bus initialization failure	0000111111000001	4033	0x0FC1	Check that the module is connected properly
			2	X-bus token timeout	0000111111000010	4034	0x0FC2	Check the module for abnormalities or interference, etc.
			3	X-bus module	0000111111000011	4035	0x0FC3	Check if the

				running offline				module is online or there is interference, etc.
			4	Parsing data CRC error	0000111111000100	4036	0x0FC4	Check the module for abnormalities or interference, etc.
Analog	1	XB6S-A80TM	0	discontinue	0010000001000000	8256	0x2040	Check whether the corresponding channel wiring is normal
Gateway	0	XB6S-C01SP	0	Generic parameter error	0100000000000000	20480	0x5000	Checking generic parameters for out-of-parameter limits
			1	Communication node parameter error	0100000000000001	20481	0x5001	Check that the communication node format and node settings match the communication mode and control mode.
			2	Process data error	0100000000000010	20482	0x5002	Power down and power up to rescan the module when the parameter configuration is complete and there are no other alarms
			3	Modbus register mapping conflicts	0100000000000011	20483	0x5003	Compare the start address and length settings of each Modbus write command for communication node parameter 1 for range overlap.
			4	Modbus node ID setting error	0100000000000100	20484	0x5004	Check if the slave ID range of communication

								node parameter 2 is 1~247
--	--	--	--	--	--	--	--	------------------------------

6.2.2 Fault Code Viewing

TwinCAT3 software, for example, below “Error” in the Error List window to view the alarm information, as shown in the figure below, the alarm code for Hex: 00c5, that is, the voltage error, the load side voltage is not connected, you can check the field side of the power supply is wired.



The method of viewing event information is shown in the following table:

Structure of event information							
byte0	byte1	byte2	byte3	byte4	byte5	byte6	byte7
Event code		Event status		Module station number	Product lines		Channel number
		Example 0x01: Event Generation 0x00: Event disappears					Example 0xFF: Channel level event 0x00: Channel 0

6.3 EtherCAT Coupler Configuration Application

6.3.1 Application in Sysmac Studio software environment

1、Preparation

- **Hardware environment**

- **Module preparation, this note takes**

XB6S-EC2002+XB6S-1616B+XB6S-A80VD+XB6S-A08I topology as an example

- **One computer with Sysmac Studio software pre-installed**

- **One OMRON PLC**

This description is based on model NJ301-1100 as an example.

- **Shielded cables for EtherCAT**

- **One switching power supply**

- **Device Configuration Files**

Configuration file to get the address: <https://www.solidotech.com/documents/configfile>

- **Hardware configuration and wiring**

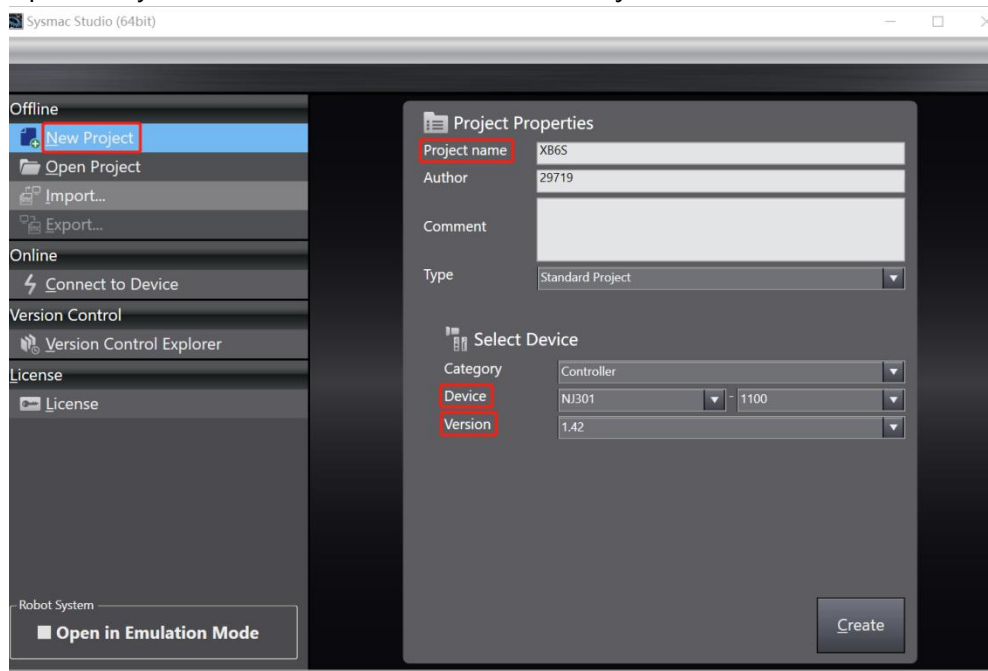
Please follow operation of "[4 Installation and uninstall](#)" and "[5 Wiring](#)"

- **Computer IP requirements**

Set the IP address of the computer and the IP address of the PLC to make sure they are on the same network segment.

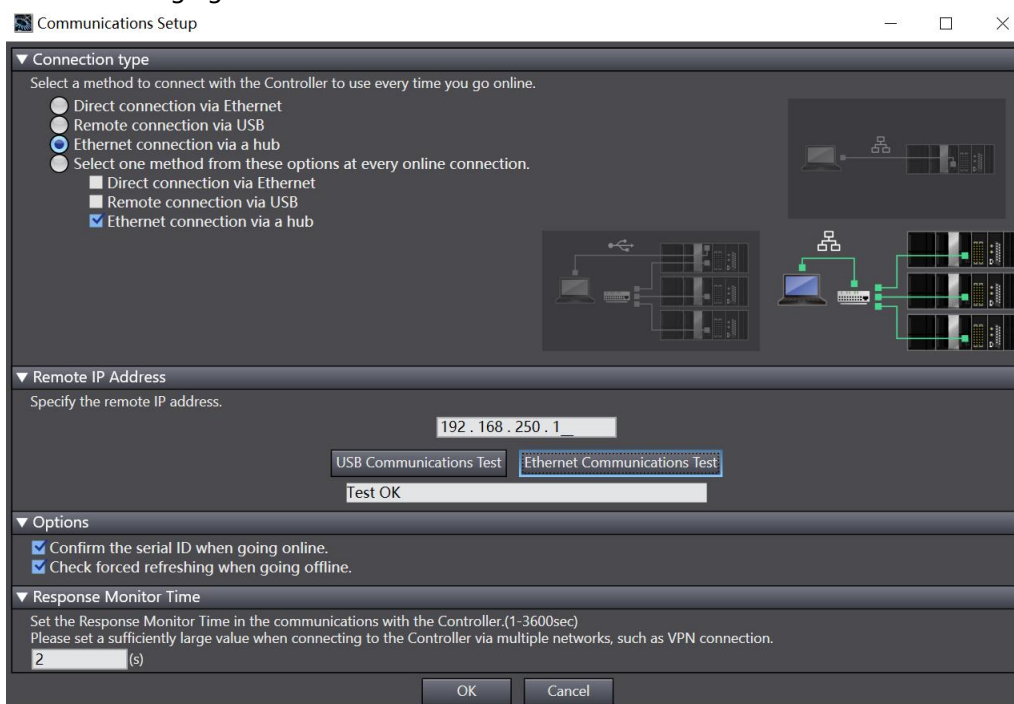
2、New project

- Open the Sysmac Studio software and click "New Project".



- Project name: Customize.
- Device selection: "Device" selects the corresponding PLC model and "Version" selects the corresponding PLC version number.

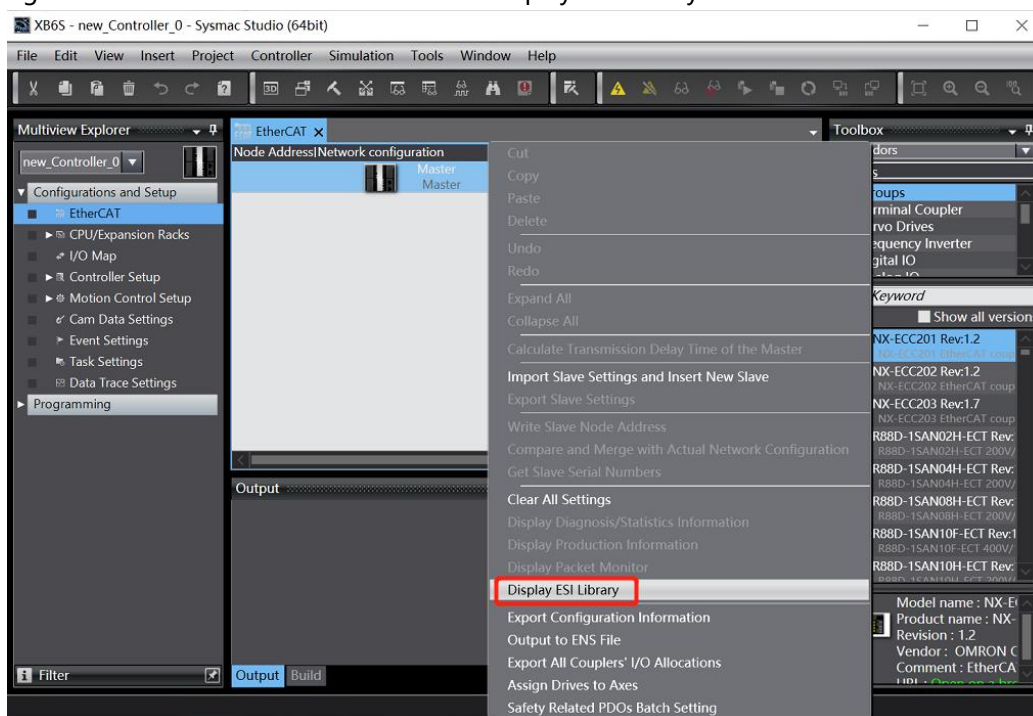
- b. When you have finished entering the project properties, click "Create" .
- c. Click "Controller -> Communication Set up" in the menu bar, select the method to be used every time you connect to the controller when you are online, and enter "Remote IP Address" as shown in the following figure.



- d. Click "Ethernet communication test", the system shows that the test is successful.

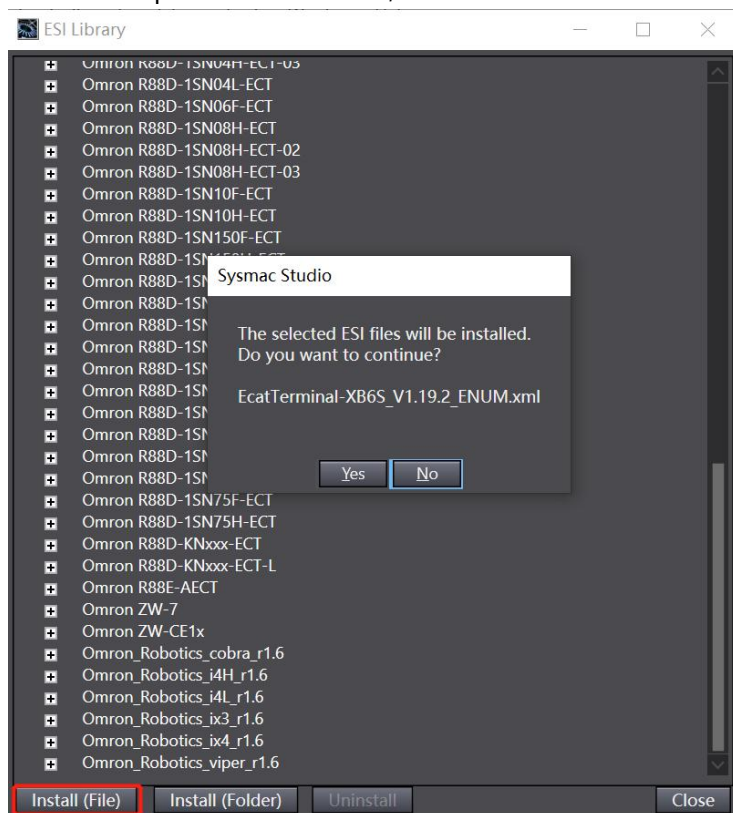
3. Installation of XML files

- a. Expand "Configuration and Setup" in the left navigation tree and double-click on "EtherCAT".
- b. Right-click on "Master Device" and select "Display ESI Library" as shown below.



- c. In the pop-up "ESI Library" window, click "Install (file)", select the module's XML file path, click

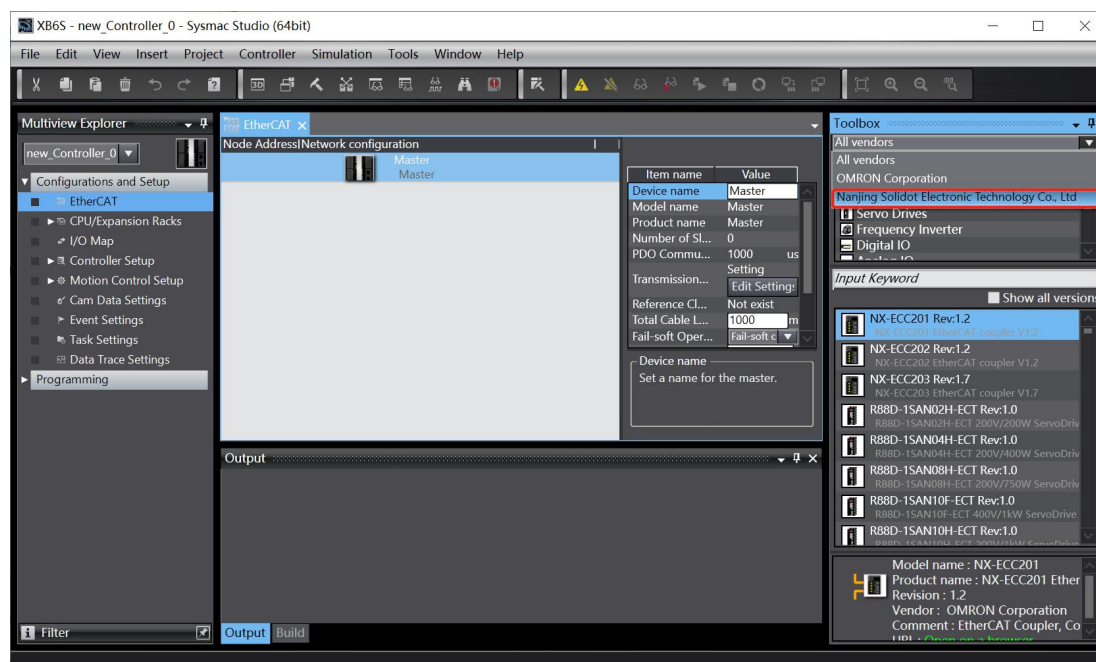
"Yes" to complete the installation, as shown below.



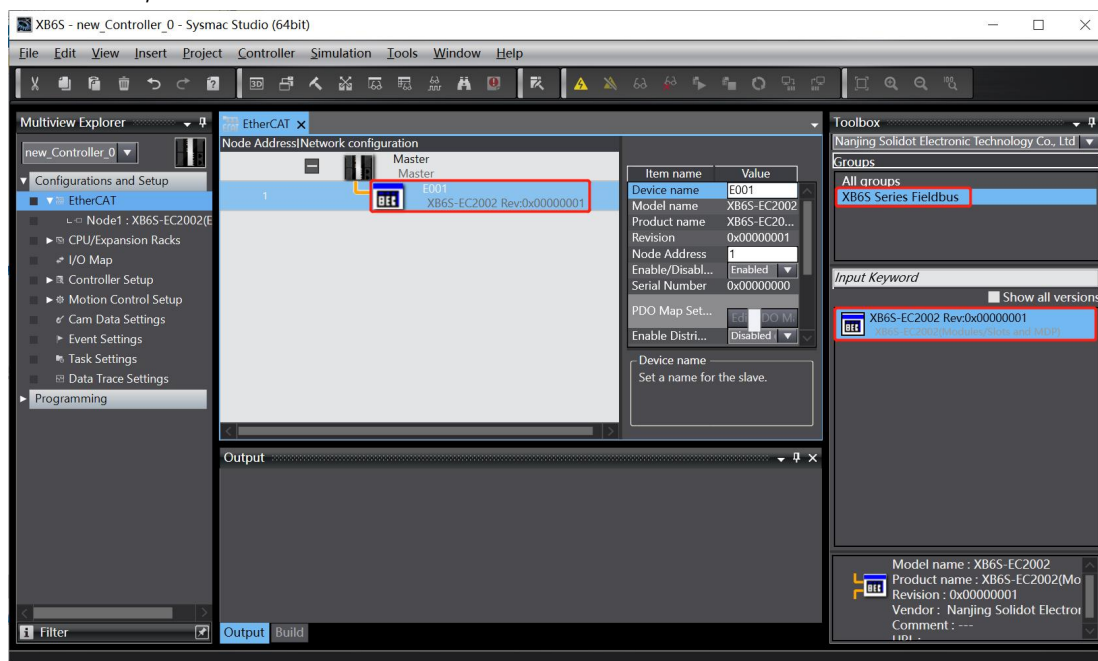
4. Add Device

There are two ways to add devices: online scanning and offline adding, and this note introduces offline adding as an example.

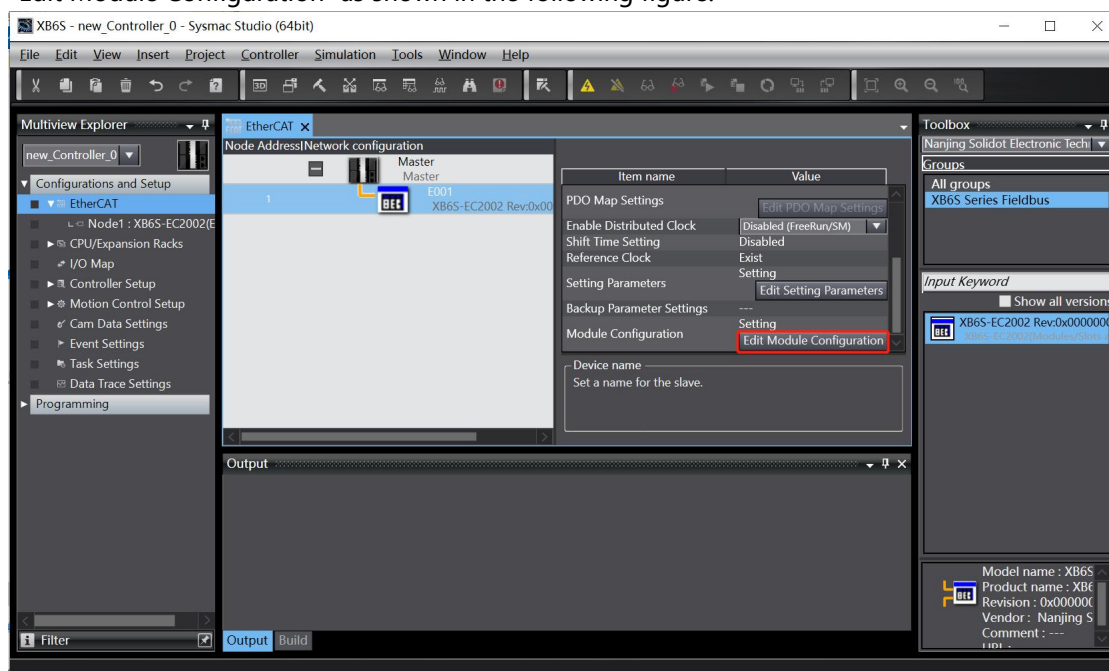
- a. In the right side of the "Toolbox" column, click to expand all suppliers, select "Nanjing Solidot Electronic Technology Co.,Ltd."



- b. Click to select XB6S Series Fieldbus and double-click the XB6S-EC2002 Coupler Module to add a slave device, as shown below.

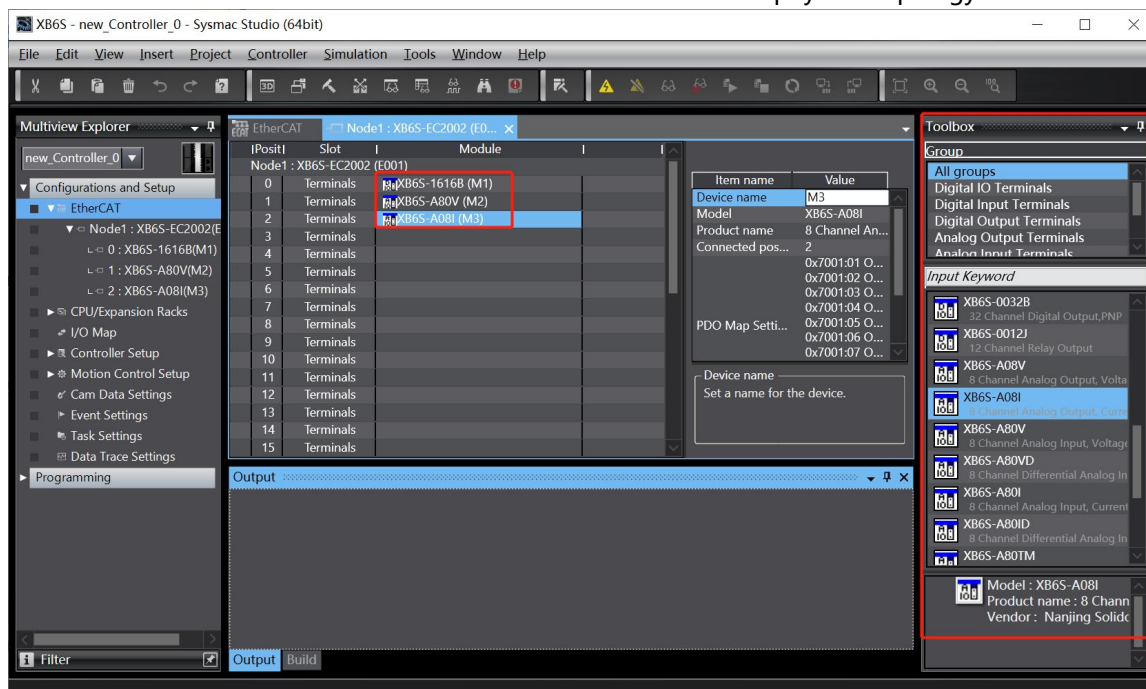


- c. In the EtherCAT main page, select the XB6S-EC2002 coupler module you just added, and choose "Edit Module Configuration" as shown in the following figure.



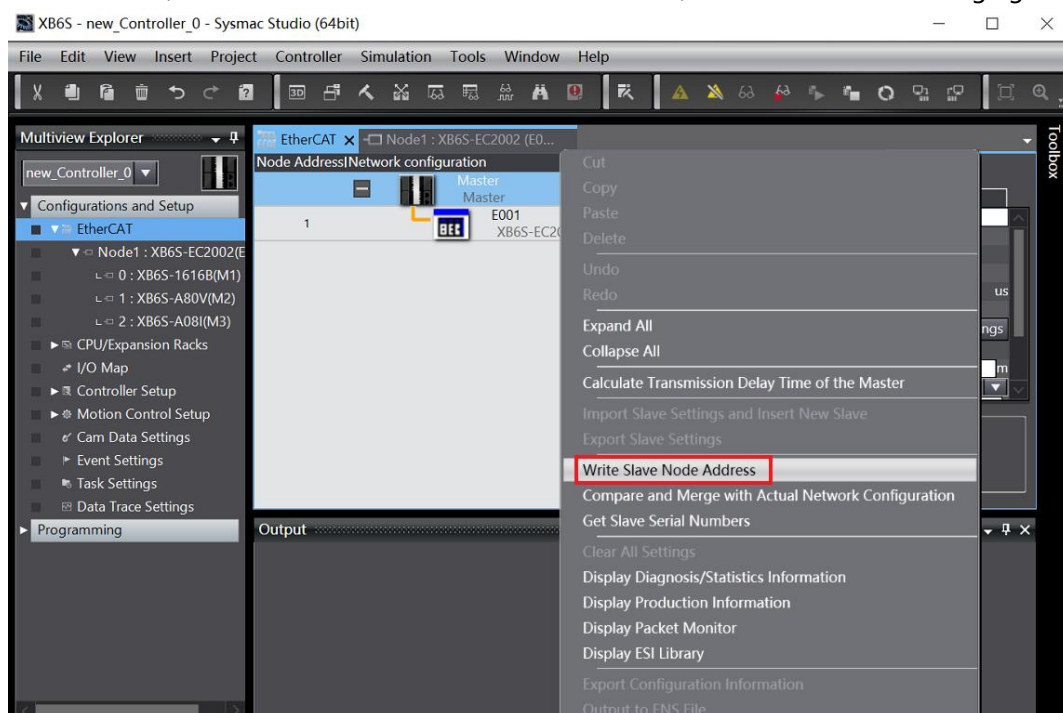
- d. Position the cursor in "Module", click on the module in the right toolbox module list, and add I/O modules one by one in the order of I/O module configuration.

Note: The order and model number must be consistent with the physical topology!



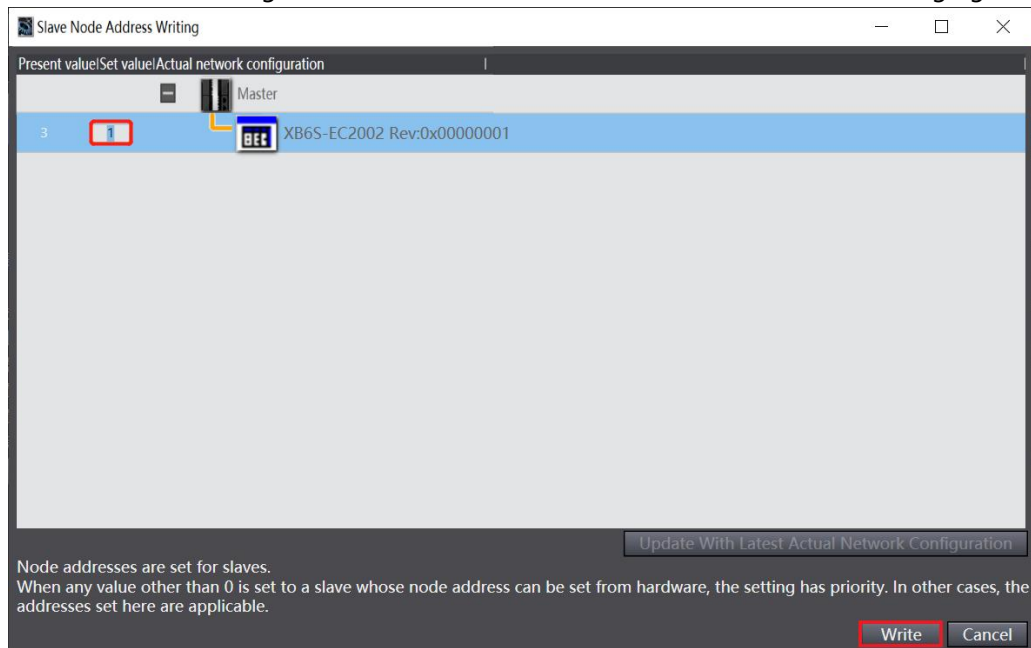
5. Setting the node address

- a. Click "Controller -> Online" in the menu bar to turn the controller to online status. Right-click the master device, click and select "Write Slave Node Address", as shown in the following figure.

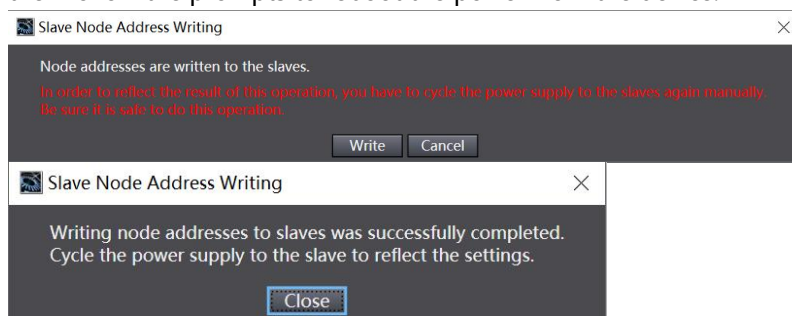


- b. In the Set Node Address window, click the value under Set Value, enter the node address, and

click "Write" to change the slave device node address, as shown in the following figure.

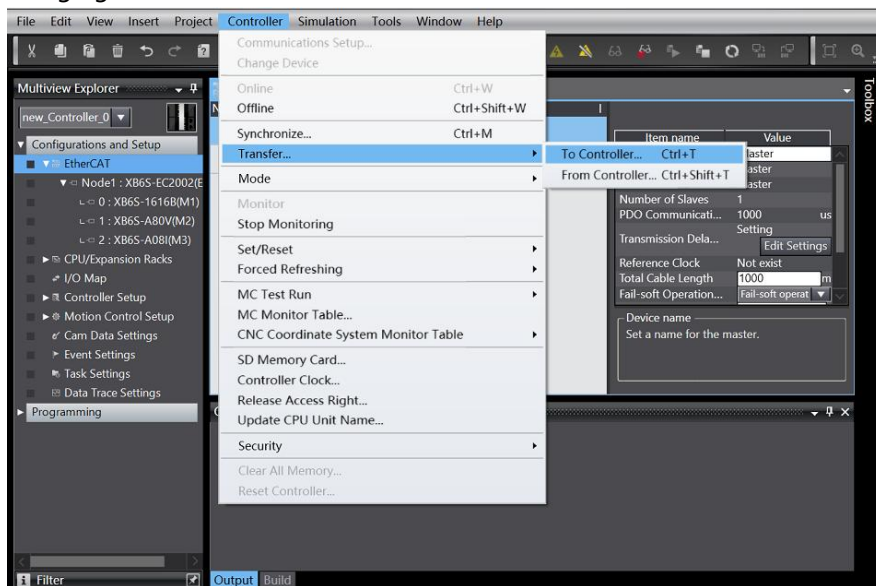


- c. After writing, a re-power prompt will pop up, as shown in the following figure, click "Write", and then follow the prompts to reboot the power from the device.

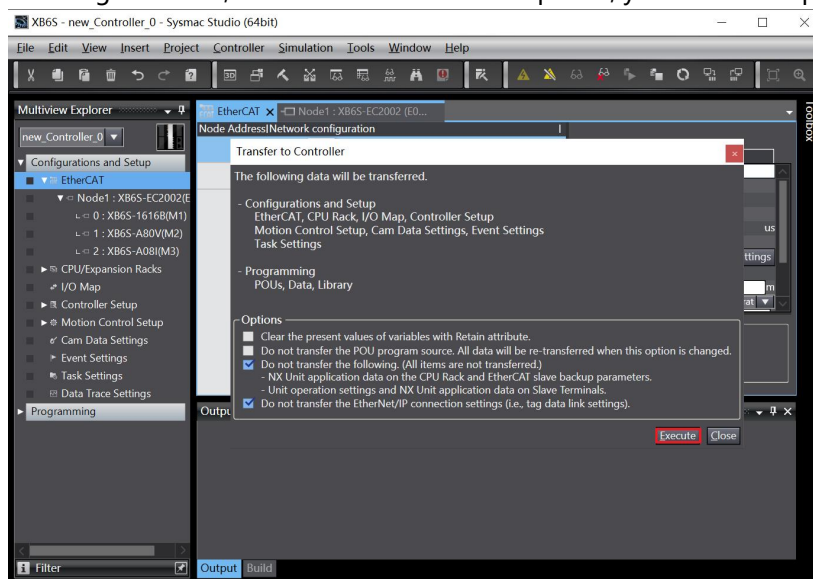


6. Download configuration to PLC

- Click the button "Controller -> Transfer (A) -> To Controller (T)" in the menu bar, as shown in the following figure.

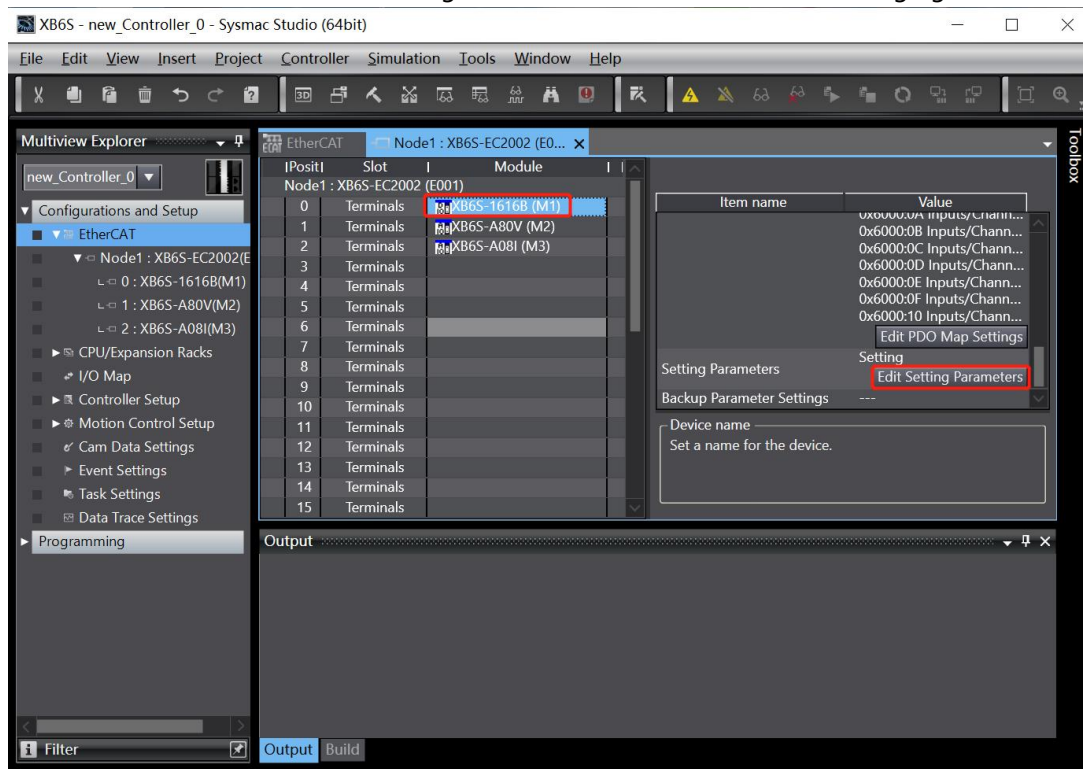


- The configuration will be downloaded to the PLC, the transmission confirmation pop-up window will appear, click "Execute", and then click "Yes/OK" in the subsequent pop-up window, as shown in the figure below, after the download is completed, you need to re-power up.



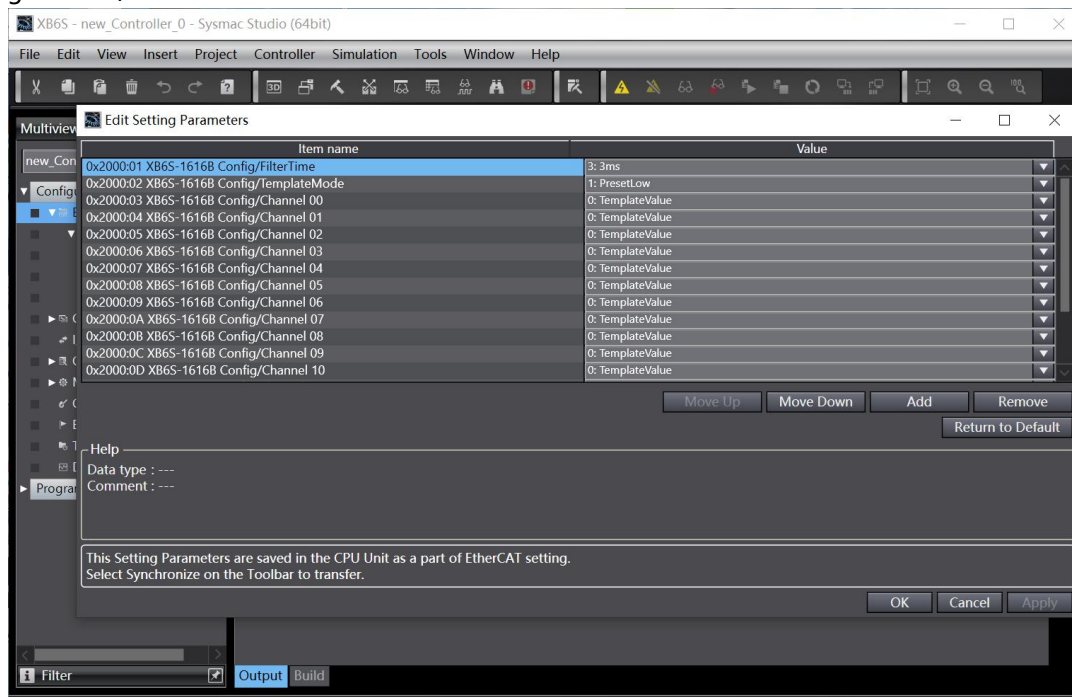
7. Parameter setup

- Switch the configuration to offline Status, edit module configuration page in node 1, select XB6S-1616B module, click "Edit Setting Parameters", as shown in the following figure.

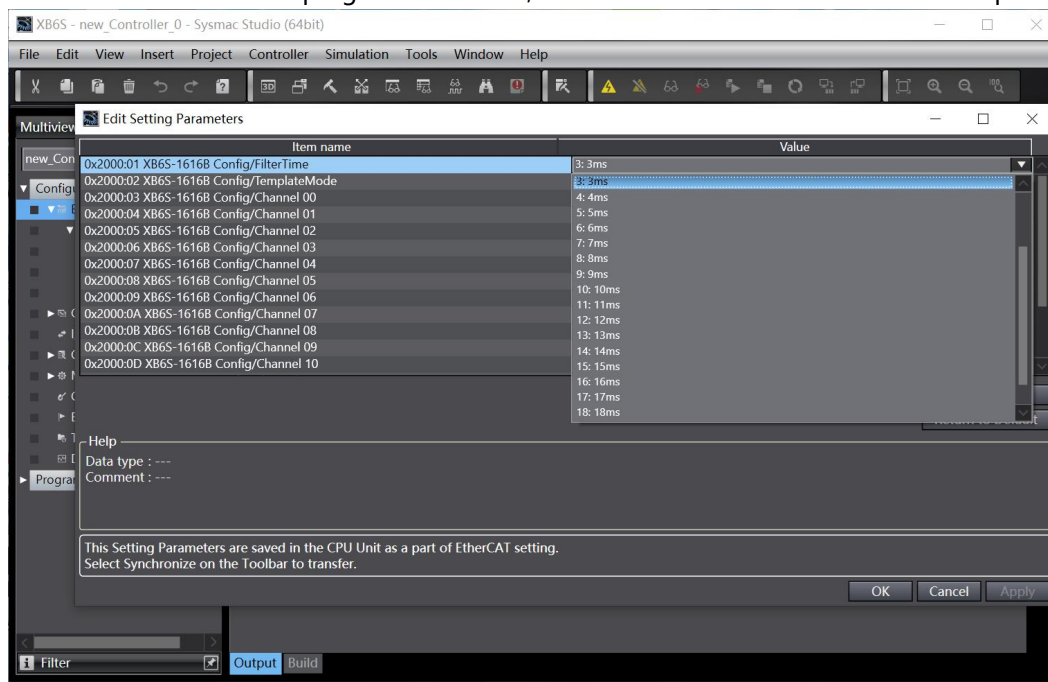


Note: If the PLC firmware version is too low, you need to use EC_CoESDOWrite, EC_CoESDORRead instruction to write and read the SDO address.

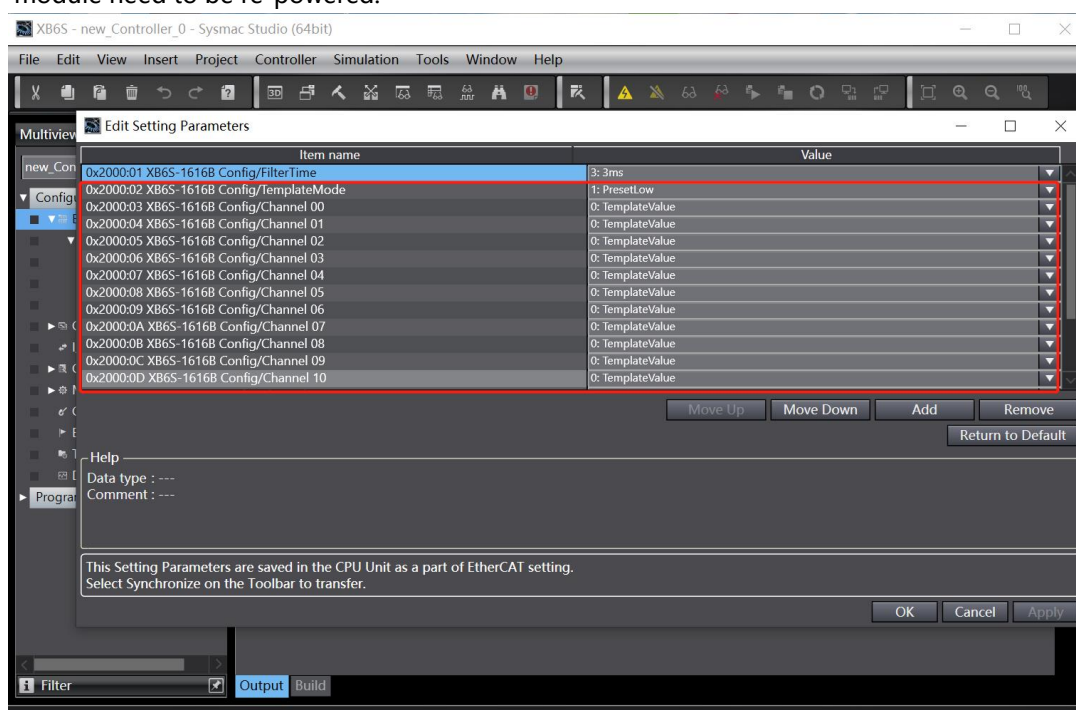
- In the XB6S-1616B parameter setting page, you can configure the digital input filter and output signal clear/hold functions as shown below.



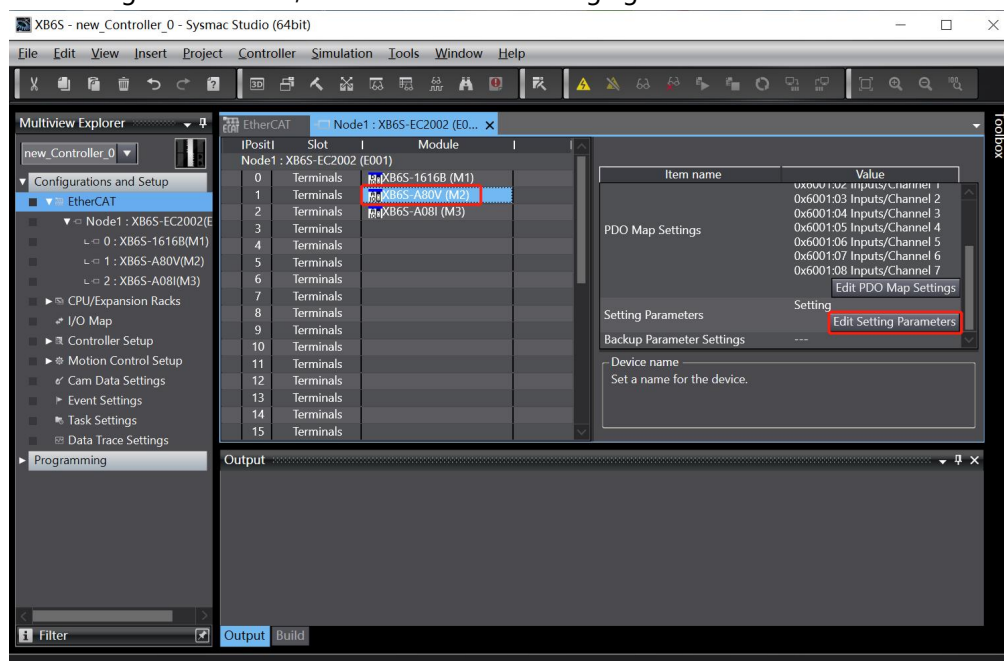
- c. Digital input filter time can be set from 0 to 20ms, after the configuration is complete, click "Apply", click "OK", as shown in the figure below. After all the parameters are configured, you need to re-download the program to the PLC, and the PLC and module need to be re-powered.



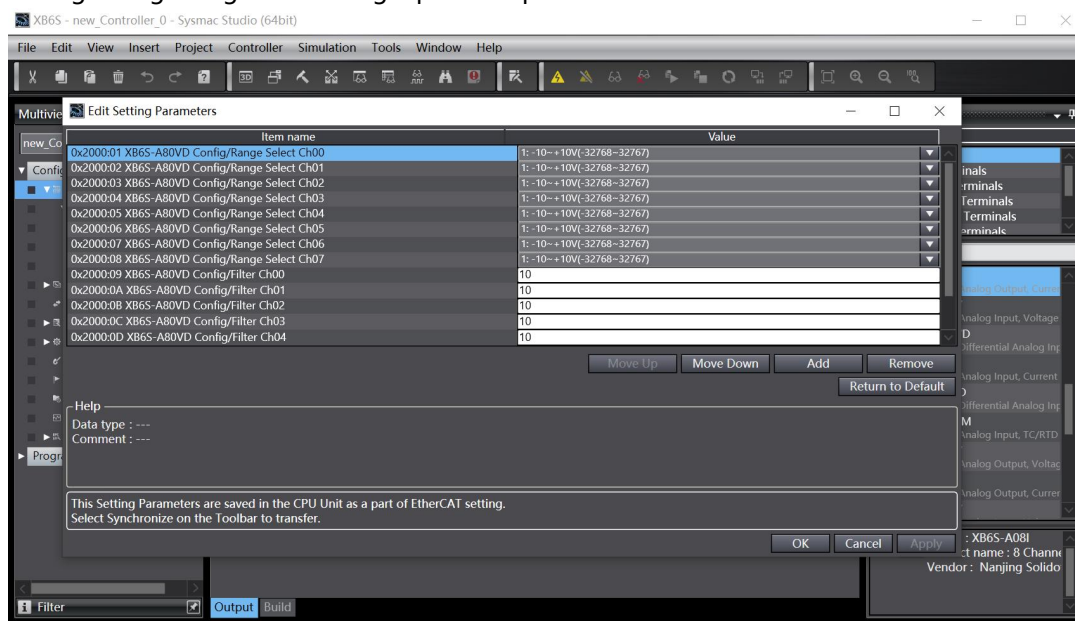
- d. Digital output signal clear/hold function, the default full-channel preset for the output clear mode, the module channel can be configured separately, the corresponding relationship see [6.1.2 Digital Output Signal Clear/Hold](#), after the configuration is complete, click "Apply", click "OK". After configuration, click "Apply" and "OK", as shown in the following figure. After all the parameters are configured, you need to re-download the program to PLC, and the PLC and module need to be re-powered.



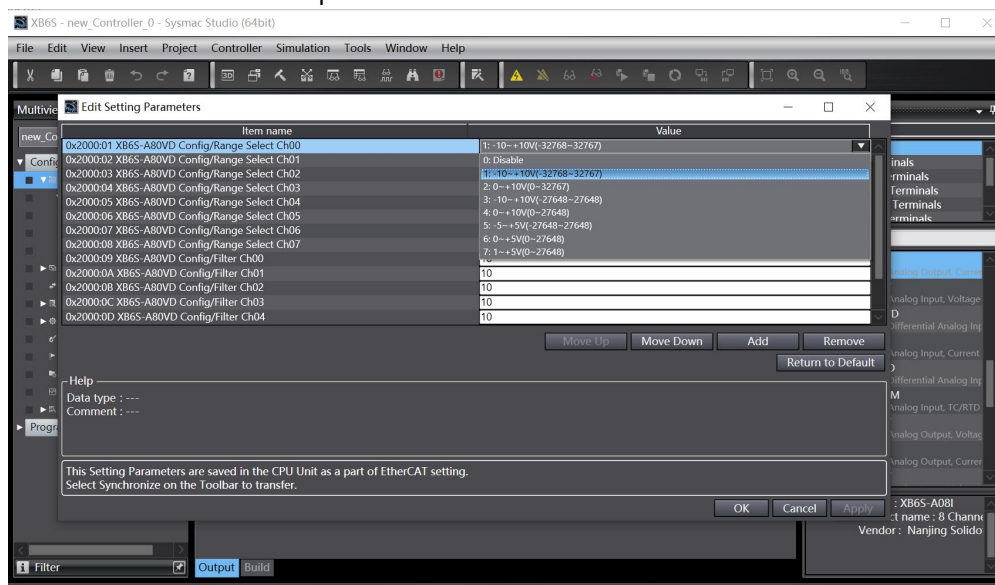
- e. On the Edit Module Configuration page of Node 1, select the XB6S-A80VD module and click “Edit Setting Parameters” , as shown in the following figure.



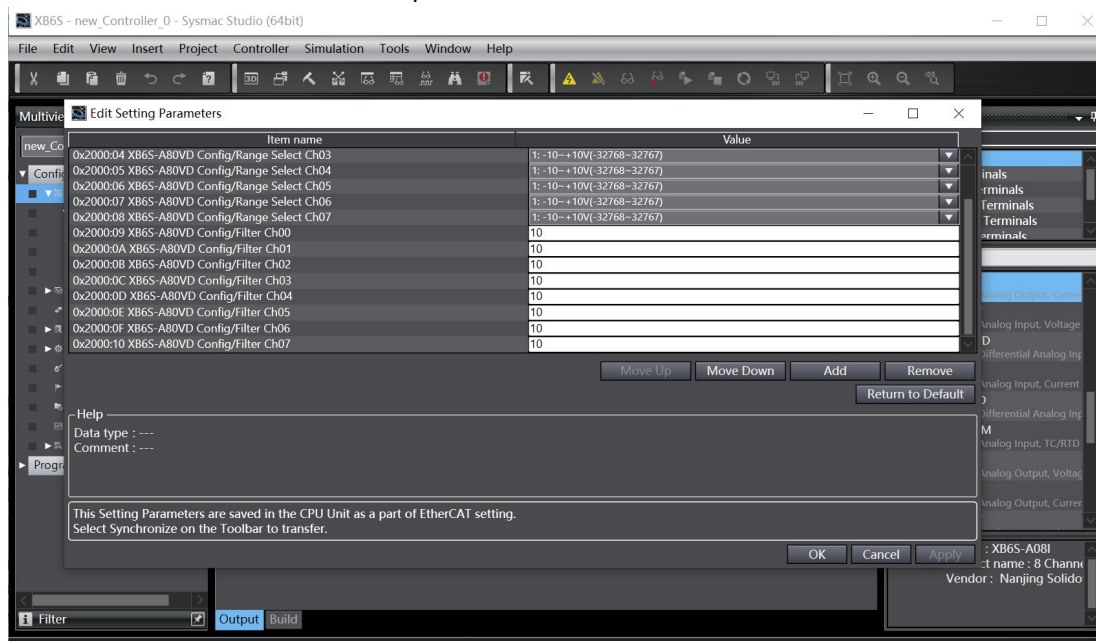
- f. In the XB6S-A80VD Analog Voltage Input Module Parameter Setting page, you can configure the analog voltage range and analog input filter parameters as shown below.



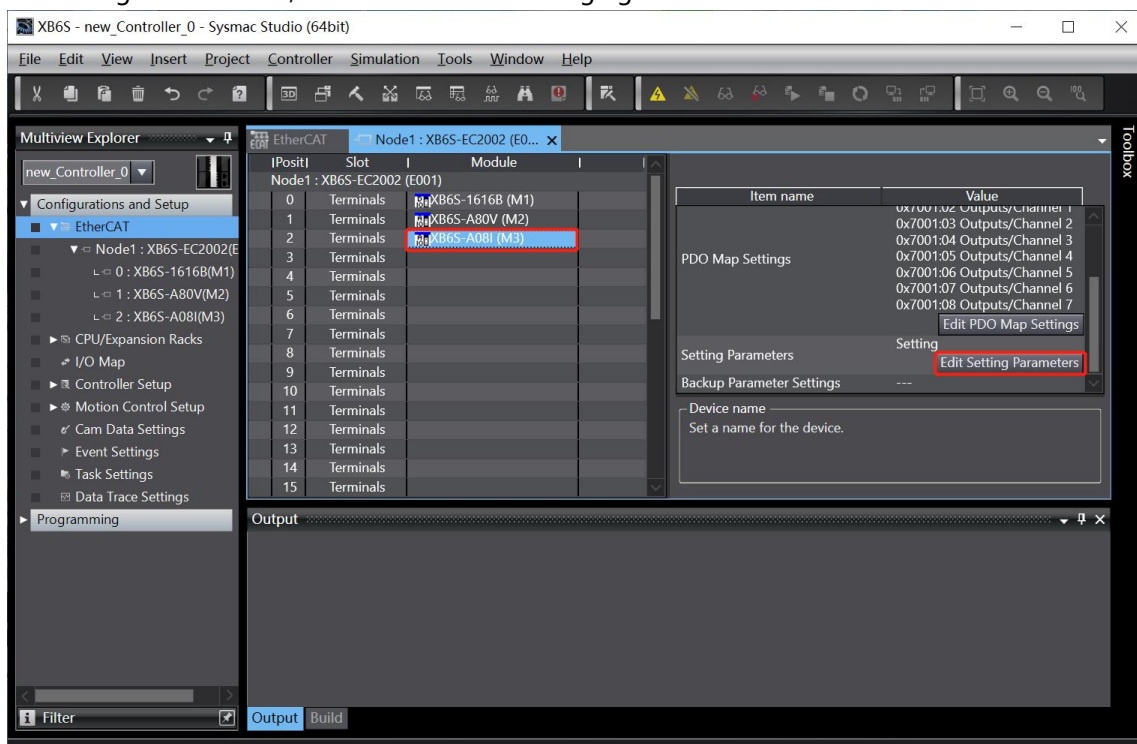
- g. Analog input voltage can be configured as 8 ranges, each channel is configured independently, after the configuration is complete, click "Apply", click "OK", as shown in the figure below. After all the parameters are configured, you need to re-download the program to the PLC, and the PLC and module need to be re-powered.



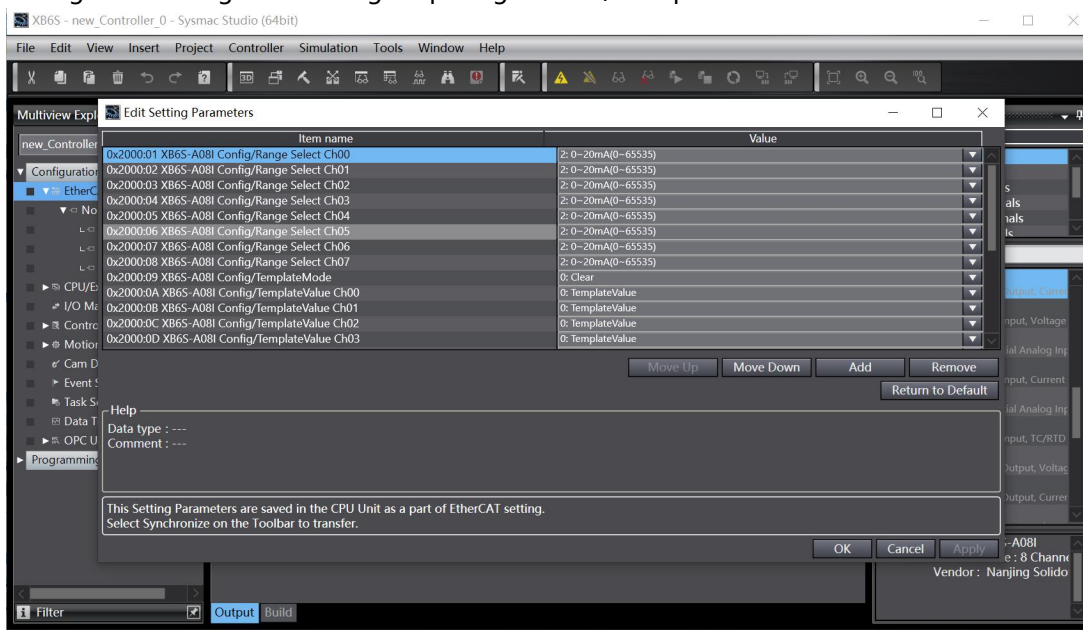
- h. Analog input filter can be configured from 1 to 200, support for single-channel independent configuration, configuration is complete, click "Apply", click "OK", as shown in the figure below. After all the parameters are configured, you need to re-download the program to the PLC, and the PLC and module need to be re-powered.



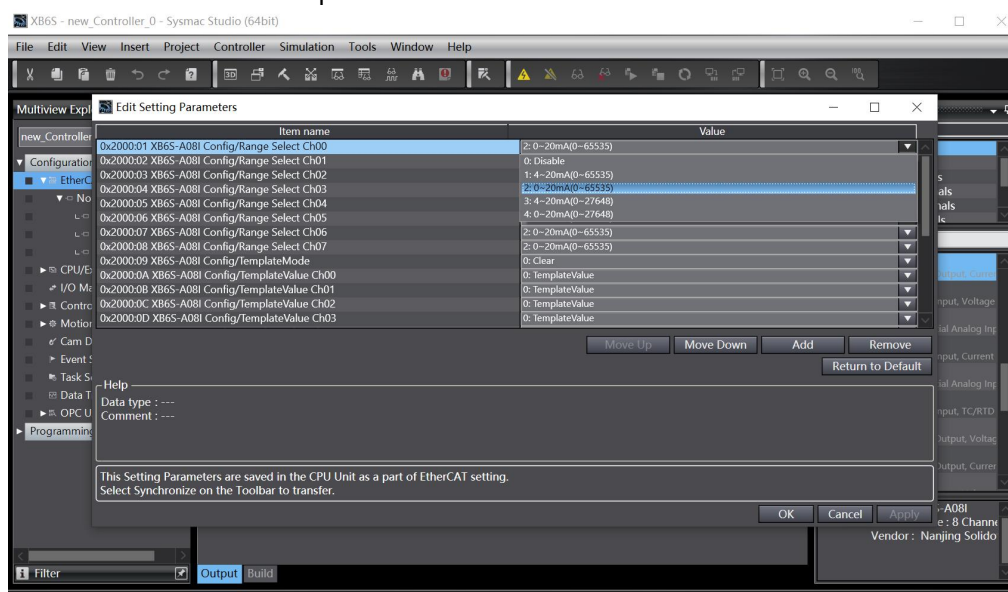
- i. On the Node 1 Edit Module Configuration page, select the XB6S-A08I module and click “Edit Setting Parameters”, as shown in the following figure.



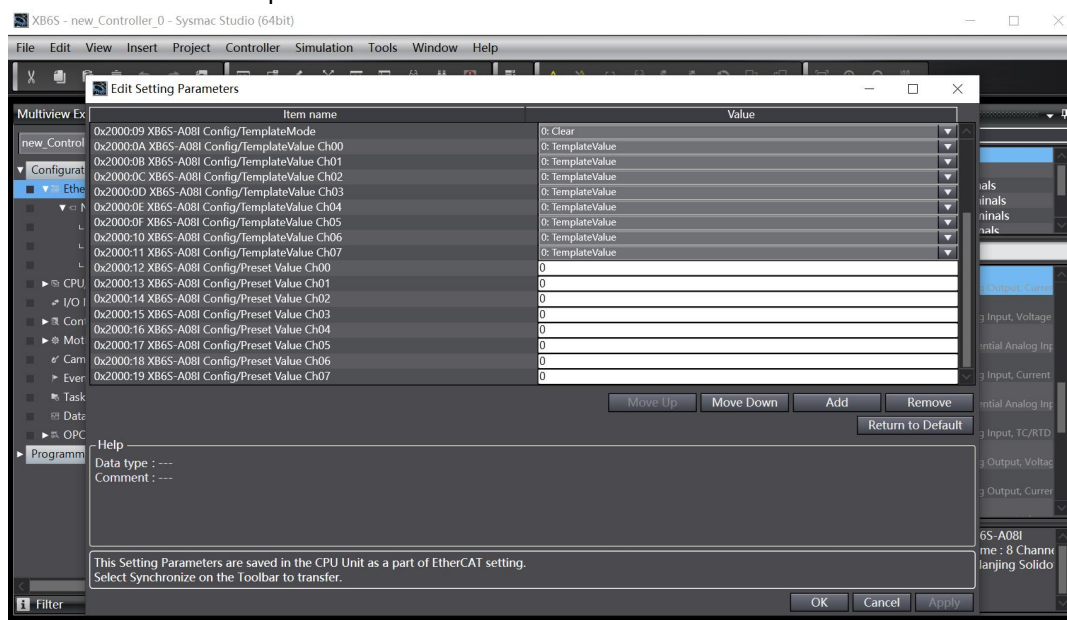
- j. In the XB6S-A08I Analog Current Output Module Parameter Setting page, you can configure the analog current range and analog output signal clear/hold parameters as shown below.



- k. Analog output current can be configured as 5 ranges, each channel is configured independently, after the configuration is complete, click "Apply", click "OK", as shown in the figure below. After all the parameters are configured, you need to re-download the program to the PLC, and the PLC and module need to be re-powered.

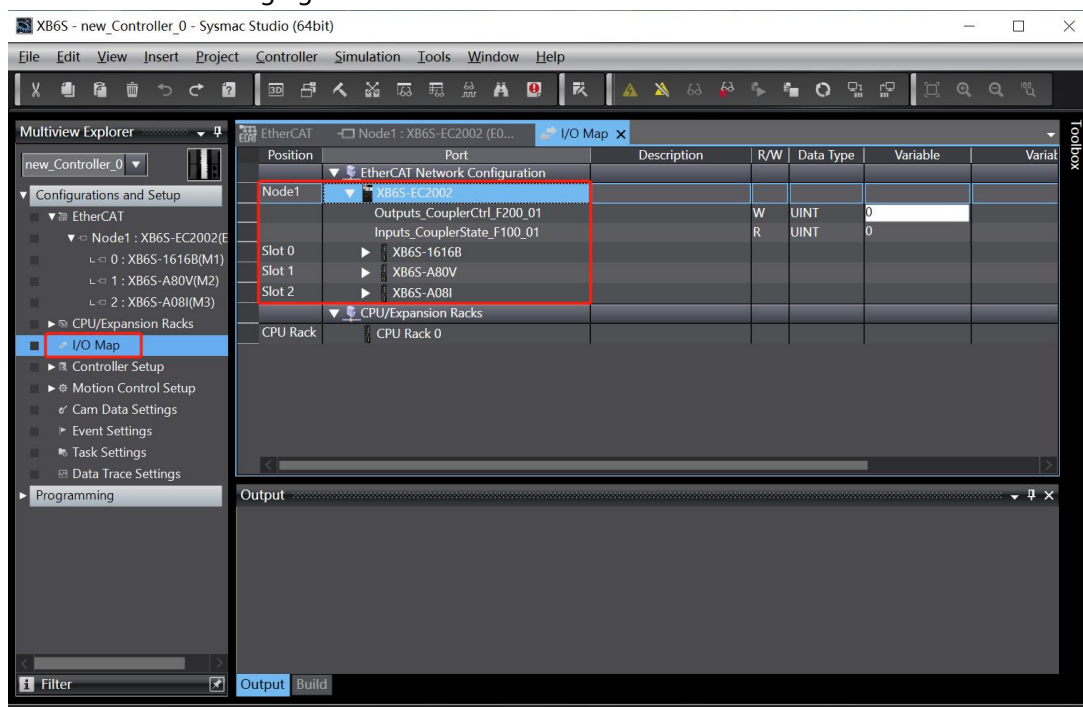


- l. Analog output signal clear/hold function, the default all channels for the output clear mode, module channels can be configured separately, the corresponding relationship see [6.1.5 Analog Output Signal Clear/Hold](#), configuration is complete, click "Apply", click "OK". Click "Apply" and "OK" when the configuration is completed, as shown in the figure below. After all the parameters have been configured, you need to re-download the program to the PLC, and the PLC and module need to be re-powered.

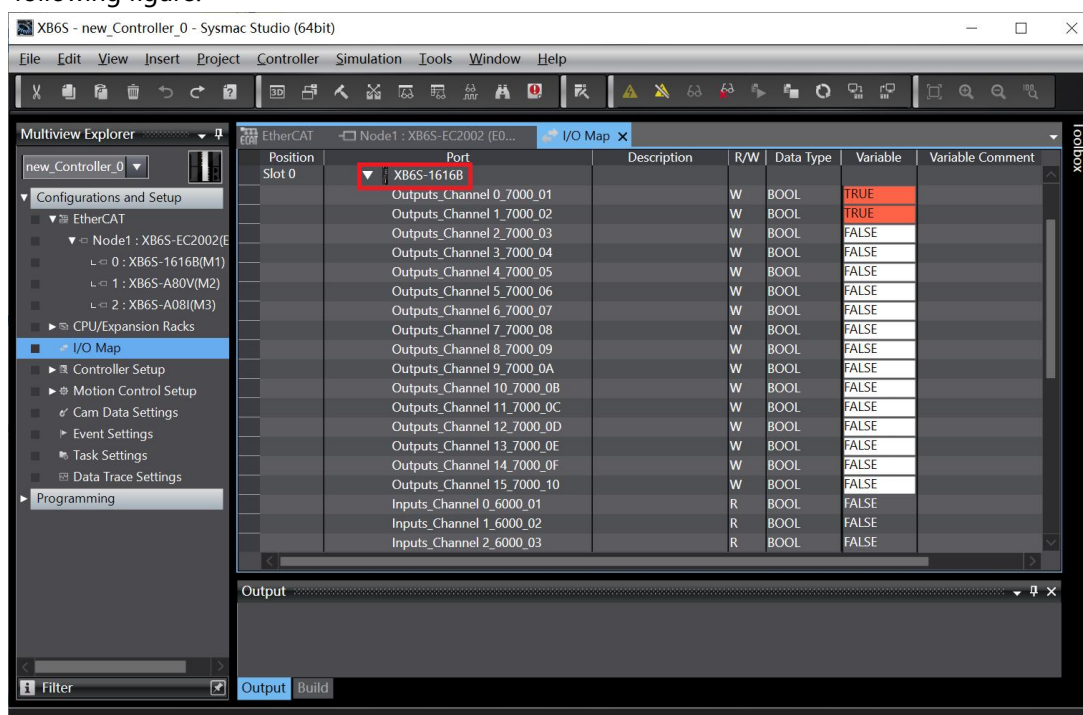


8、I/O Functions

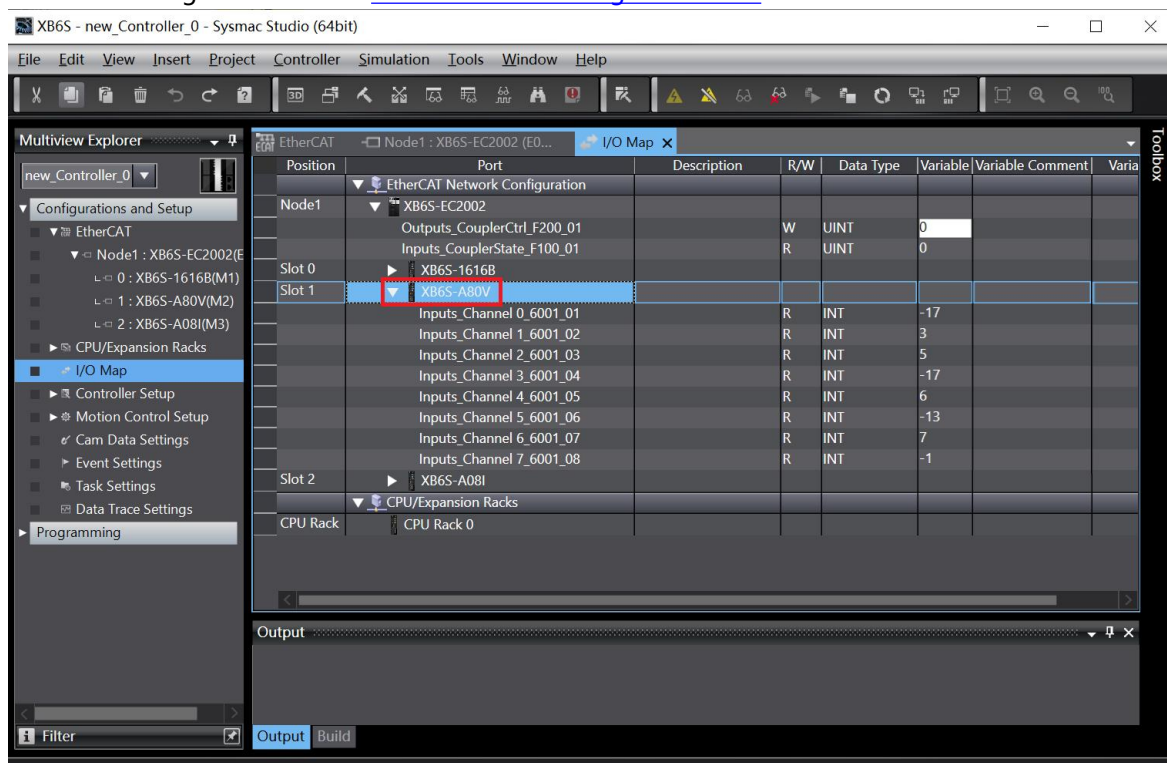
- Double-click "I/O Map" in the left navigation tree to see the mapping table of each module in the topology, so as to monitor the input and output values of each channel of each module, as shown in the following figure.



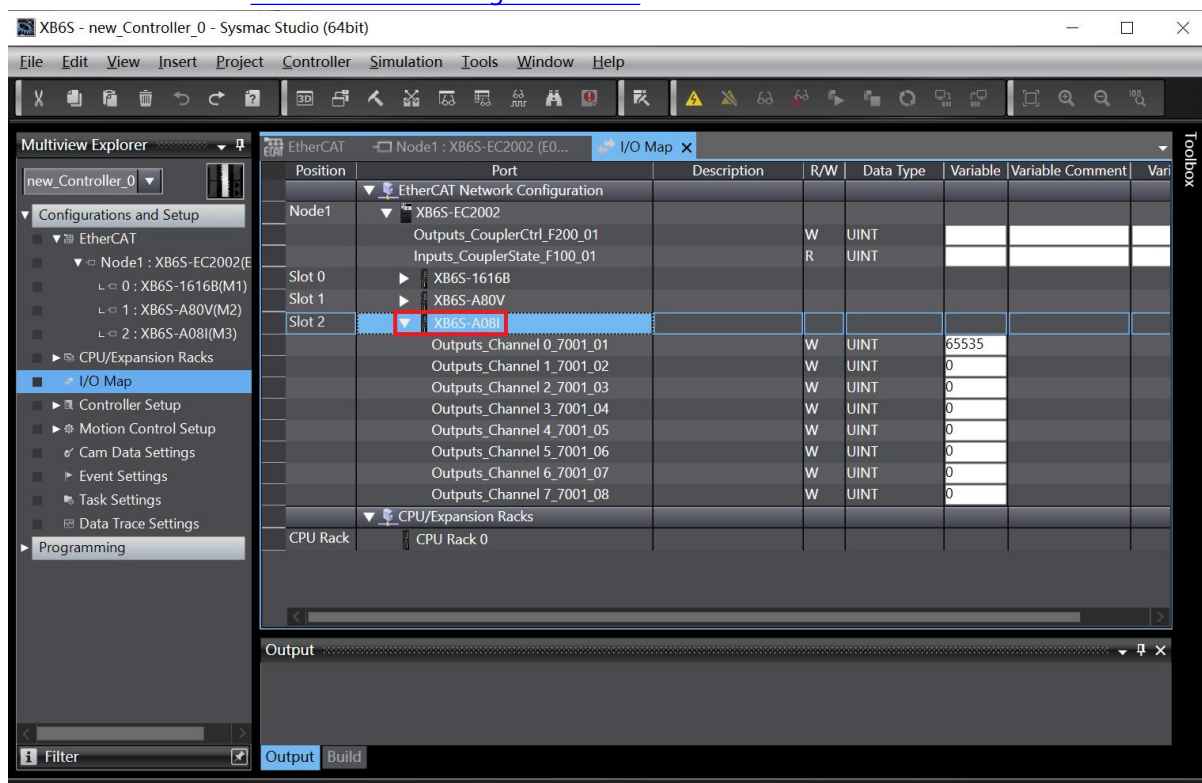
- Expand the mapping table of XB6S-1616B digital module, when the input channel inputs the effective voltage, you can monitor the input value in the mapping table; the output channel can be modified by modifying the value of the channel to force the output control, as shown in the following figure.



- c. Expanding the mapping table of the XB6S-A80VD analog module, you can monitor the input voltage code value of each channel as shown below, and the correspondence between code value and voltage is detailed in [3.3.4 and 3.3.5 Analog Parameters](#).

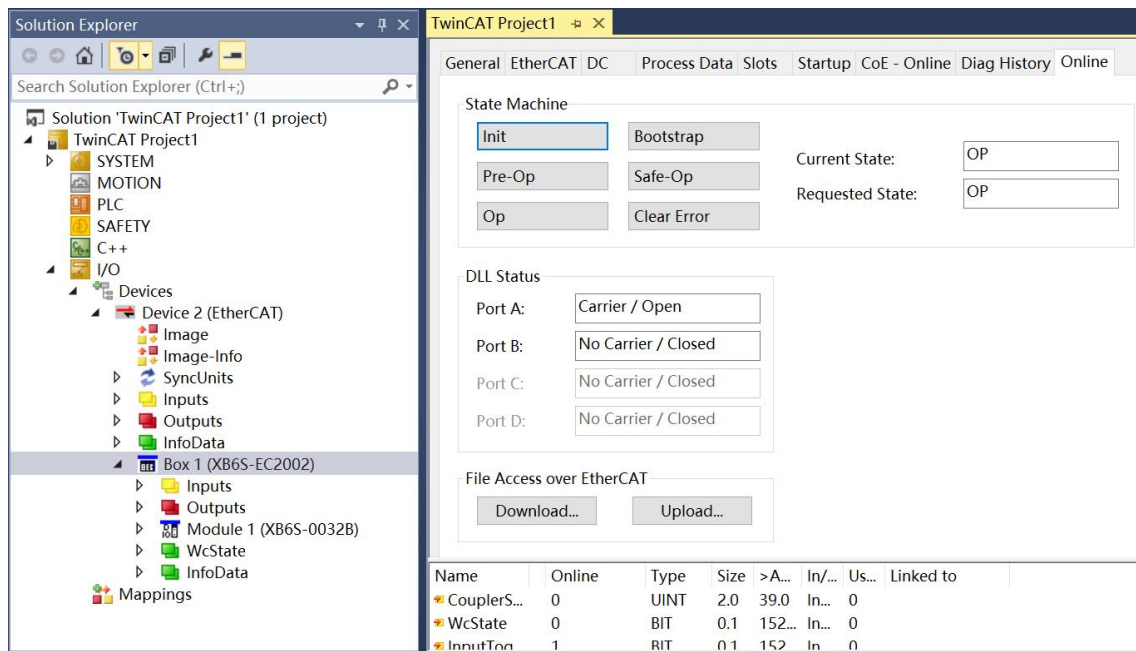


- d. Expand the mapping table of XB6S-A08I analog module, write current code value can be forced to output for each channel, as shown below, the correspondence between code value and current is detailed in [3.3.4 and 3.3.5 Analog Parameters](#).

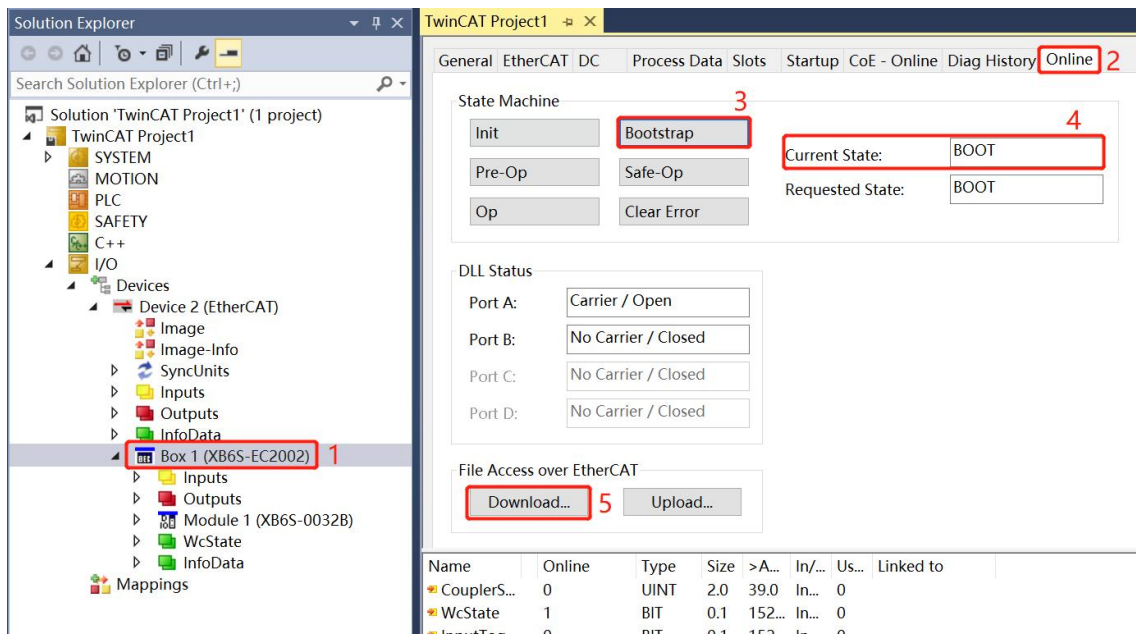


6.4 Firmware Online Upgrade

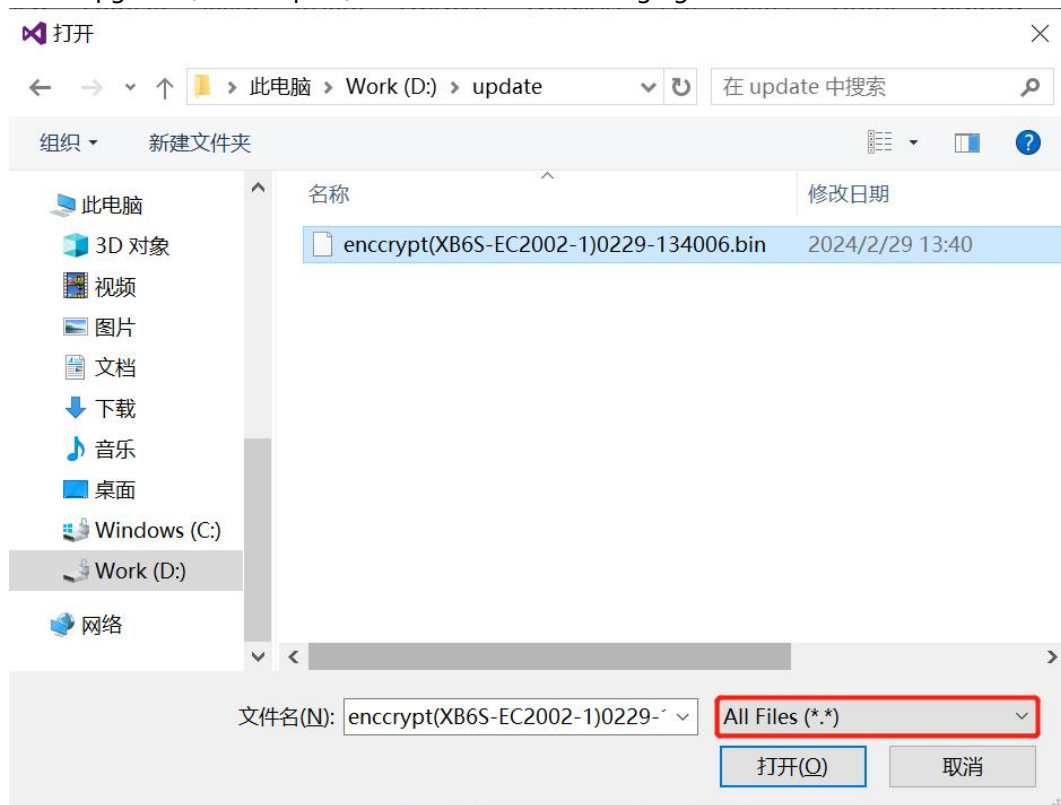
1. Take TwinCAT3 software as an example, the topology is XB6S-EC2002+XB6S-0032B as shown below.



2. Click on the coupler "XB6S-EC2002" in the left navigation tree and click on the "Online" option in the right menu. Click the "Bootstrap" option in State Machine. After the Current State displays "BOOT", click the "Download" option in the File Access over EtherCAT below, as shown in the figure below.

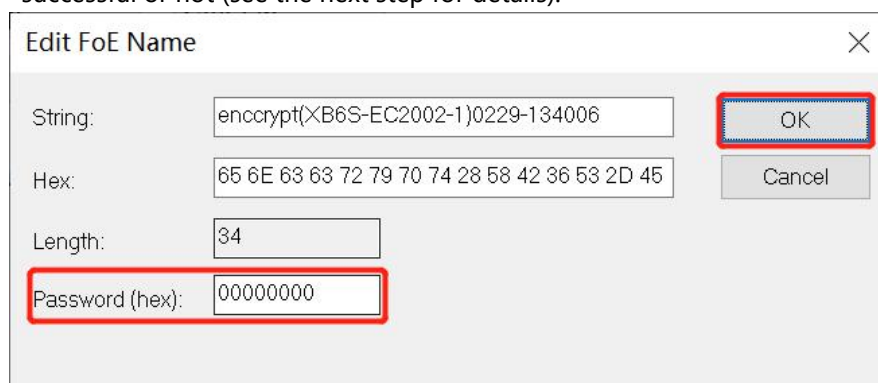


- 3、Open the file window, select the "All Files" option, select the bin file corresponding to the module to be upgraded, click "Open", as shown in the following figure.



- 4、The setting window pops up, enter Password, Password is 0 for upgrading the coupler, click "OK" to upgrade, as shown in the following figure.

Note: To upgrade the corresponding slave module, you need to fill in the corresponding station number in the Password, such as XB6S-0032B upgrade here, fill in 1. After confirming the upgrade, observe the progress bar and the performance of the module to confirm whether the upgrade is successful or not (see the next step for details).



5、 Successful upgrade process for different modules

EtherCAT couplers upgrade online:

- 1) When the progress bar is full, the coupler IOR starts flashing at 10Hz (50ms on 50ms off);
- 2) The IOR changes from 10Hz flashing to 1Hz flashing, indicating a successful upgrade;
- 3) You need to manually switch to OP status after successful online upgrade to re-establish the connection;
- 4) To repeat the upgrade you need to switch the OP Status to BOOT Status again.

IO modules upgrade online:

- 1) When the progress bar is full, the coupler IOR and the SYS of the module being upgraded begin to flash at 10Hz (50ms on 50ms off);
- 2) The SYS of the module being upgraded changes from 10Hz to off, indicating that the upgrade is successful (the upgrade needs to be re-powered to connect normally after completion);
- 3) Can continue to upgrade other modules without powering down.