



CP series Blade type module

User manual

(Version: V1.5)

Shenzhen yulian technology co., LTD

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Catalogue

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Introduction

Thank you for using our CP series blade Module.

Before using this product, be sure to read this manual carefully to understand the necessary safety information, precautions, and operation methods.

The wrong operation can lead to extremely serious consequences.

statement

The design and manufacture of this product does not have the ability to protect personal safety from the threat of mechanical systems. Users are requested to consider safety protection measures during the design and manufacture of mechanical systems to prevent accidents caused by improper operation or abnormal products.

Due to product improvements, the contents of the manual are subject to change without notice.

Our company will not be responsible for any modification of the product by the user.

When reading, please note the following marks in the manual:



Remind you to pay attention to the main points in the text.



Indicates that improper operations may result in personal injury or equipment damage.

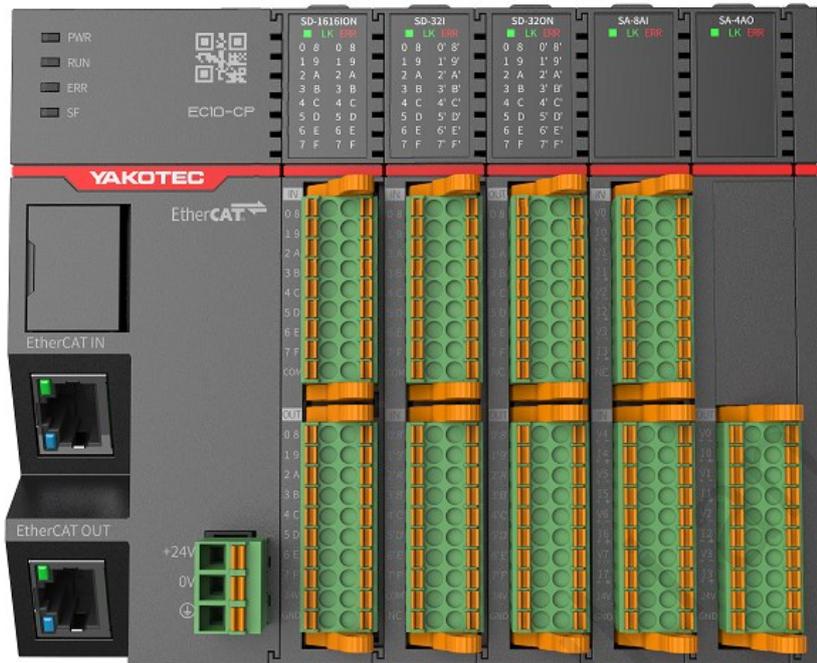
I. Product overview

CP series blade Module adopt a new generation of distributed I/O system, which consists of a coupler module and an extended I/O module. The coupler module is responsible for fieldbus communication, and realizes the communication connection with the master station controller or the host computer software. The expansion I/O module is responsible for connecting to the input/output sensors in the field.

The coupler can select the corresponding bus module according to the communication interface of the controller system, and can support mainstream industrial communication protocols, including EtherCAT, PROFINET, EtherNet/IP, Modbus-TCP, etc. The extended I/O module is mainly divided into four categories, digital module, analog module, temperature module, special module and so on.

CP series blade module has the advantages of high adaptation, fast response, large density, novel structure, etc. The coupler module and the extended I/O module can be freely combined according to the field demand, and the CP series blade module can achieve lower cost requirements when there are more points.

1.1 Product Configuration



Configuration mode:

CP series module products by the combination of coupler and digital, analog, temperature and other I/O module configuration; With a blade structure, the module can be removed or installed from the front simply by opening the buckle; The module adopts detachable terminal design, which greatly optimizes the wiring change process.

Configure the application:

Based on the access capability, number of sites, I/O points, and function types of the master station, various types of I/O Module are configured. Various expansion Module are complete, applicable to different application requirements, and high-density node Module are configured to optimize system configuration and simplify onsite wiring.

Configuration rules:

Module from left to right are coupler Module, various I/O Module, and end caps.

1.2 Product Selection

Product list

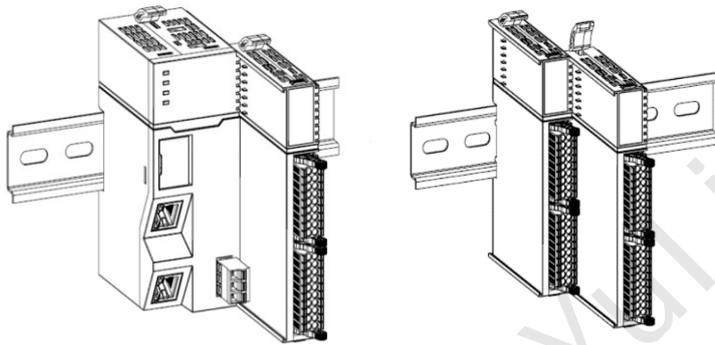
序号	型号	名称描述	备注
1	EC10-CP	EtherCAT Coupler module	
2	PN10-CP	PROFINET Coupler module	
3	MT10-CP	Modbus TCP Coupler module	
4	EIP10-CP	EtherNet IP Coupler module	In development
5	SD-32I	32 digital input module (input NPN/PNP compatible)	
6	SD-32ON	32 digital output module (output NPN)	
7	SD-32OP	32 digital output module (output PNP)	
8	SD-16I	16 digital digital input module (input NPN/PNP compatible)	
9	SD-16ON	16 digital output module (output NPN)	
10	SD-16OP	16 digital output module (output PNP)	
11	SD-16I6ION	16&16 digital input/Output hybrid module (input compatible, output NPN)	
12	SD-16I6IOP	16&16 digital input/Output hybrid module (input compatible, output PNP)	
13	SA-8I	8 analog input module (voltage and current compatible)	
14	SA-4I	4 analog input module (voltage and current compatible)	
15	SA-4O	4 analog output module (voltage and current compatible)	
16	ST-4I	4 temperature input module (compatible with thermal resistance and thermocouple)	
17	SD-8OR	8 relay output module	
18	SD-2HC	2 channel counting Module	
19	SC-2S	2 serial port Module	

1.3 Installation and Removal

1.3.1 Installation Methods

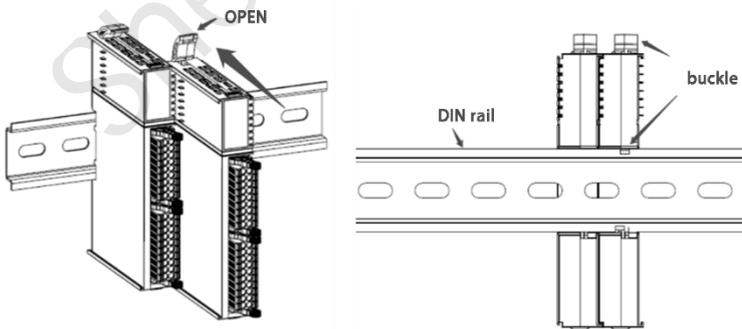
■ Intermodule installation

The assembly between Module is mounted by sliding rails at both ends, as shown in the figure.



■ The module is mounted on the guide rail

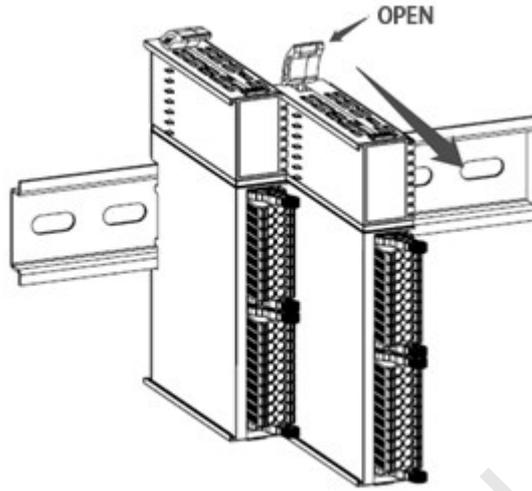
DIN rail mounting method. When installing the module, open the self-locking latch on the top of the module, align the module with the DIN rail, press the module in the direction indicated by the arrow, and manually close the rail lock after the module is installed in place.



Note: It is necessary to install the tail cover on the last I/O module to prevent the metal PIN from being exposed, and install a rail clamp on the head and tail of the module assembly to prevent the module assembly from sliding left and right.

1.3.2 Disassembling Methods

Press to open the top rail latch and pull the module away from the DIN rail.



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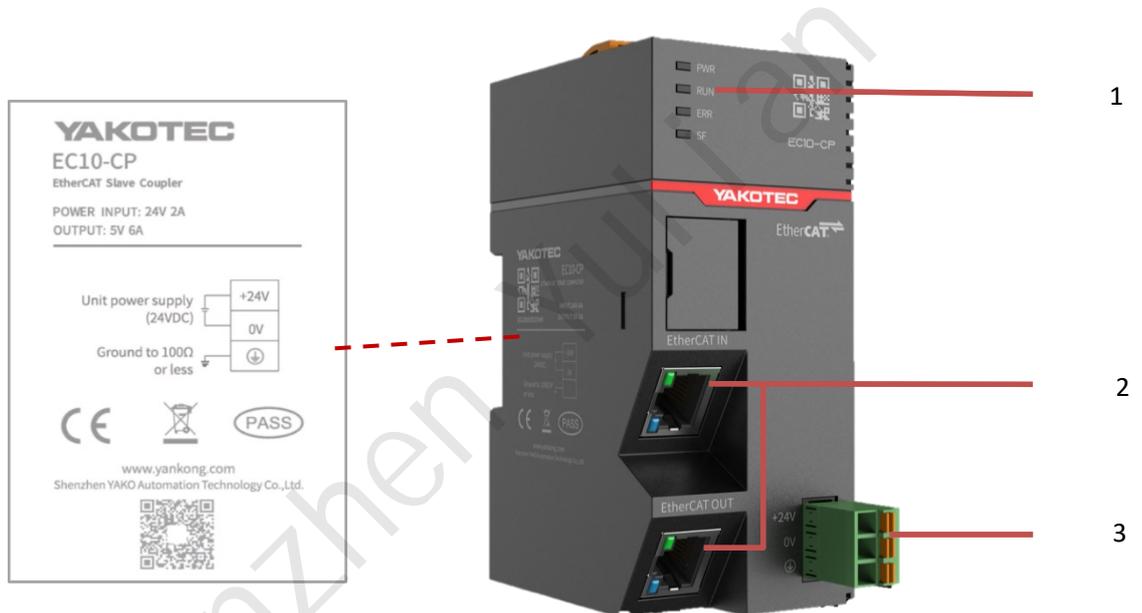
II. Module introduction

2.1 Coupler module

2.1.1 EC10-CP (EtherCAT coupler module)

■ Module overview

EtherCAT Coupler Module (EC10-CP), this model supports standard EtherCAT protocol access and can support 32 extended I/O Module.



NO.	name	Description			
1	Status light	PWR	Power indicator	Green	Light up when the power is on
		RUN	Run indicator	Off	module is in INIT state
				flashing(green)	module is in the Pre-Operational state
				Singleflash (green)	module is in the Safe-Operational state
				ON(green)	module is in Operational state
		ERR	Communication error indicator	Off	EtherCAT communication is normal
				Flashing(red)	A communication error occurred on EtherCAT next level
		SF	Fault indicator	Off	Equipment normal
				ON(red))	The configuration extension module has an error
		2	EtherCAT interface	IN: EtherCAT input	
OUT: EtherCAT output for connecting back-end EtherCAT slaves					
3	24V power supply	For power supply input			

■ Technical Specification

● Power supply specification

Item	Specification
Rated input voltage of the terminal	24V DC(20.4V DC~ 28.8V DC)
Rated current of terminal input power	2A (typical value at 24V)
Rated voltage of bus output power supply	5V DC(4.75V DC~5.25V DC)
Rated current of bus output power supply	6A (typical value at 5V)
Power supply protection	Overcurrent protection, anti-reverse protection, surge absorption

● Software specification

Item	Specification
Addressing mode	Support set addressing and sequential addressing
Enter the number of Pdos	The maximum is 2048 bits
Output the number of Pdos	The maximum is 2048 bits

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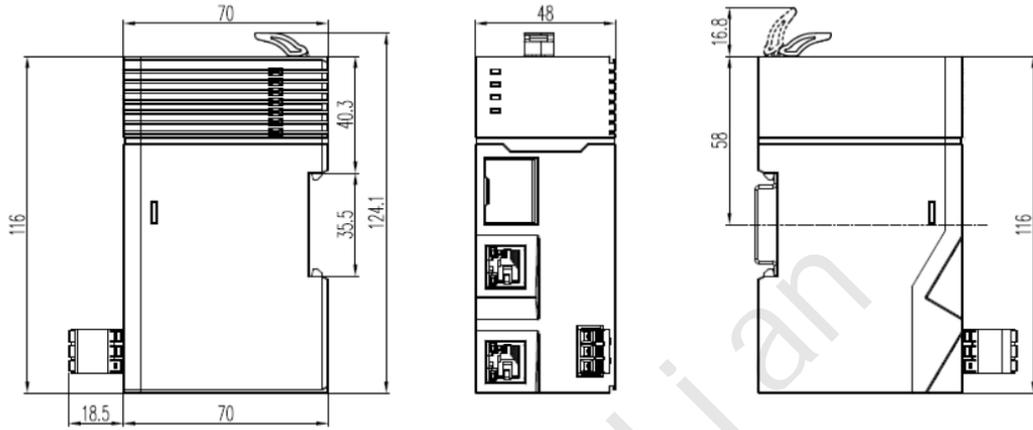
● Environmental specification

Item	Specification
Ambient operating temperature	-20°C~55°C
Ambient working humidity	The relative humidity is less than 95%RH No condensation
atmosphere	Ensure no corrosive gases
Ambient storage temperature	-20°C~60°C(relative humidity less than 90%RH no condensation)
Altitude	Below 2000 m (80kPa)
Pollution level	Level 2
Immunity to interference	Power cable 2Kv(IEC 61000-4-4)
Overvoltage class	II
EMC anti-interference level	Zone B, IEC61131-2
Vibration resistance	IEC 60068-2-6 5Hz~8.4Hz, amplitude 3.5mm, 8.4Hz~ 150Hz, acceleration 9.8m/s ² , X, Y, Z direction 100 minutes each (10 times, 10 minutes each, 100 minutes in total)
Impact resistance	IEC 60068-2-27, 9.8m/s ² , 11ms, X/Y/Z, 3 times each in 3 axes and 6 directions

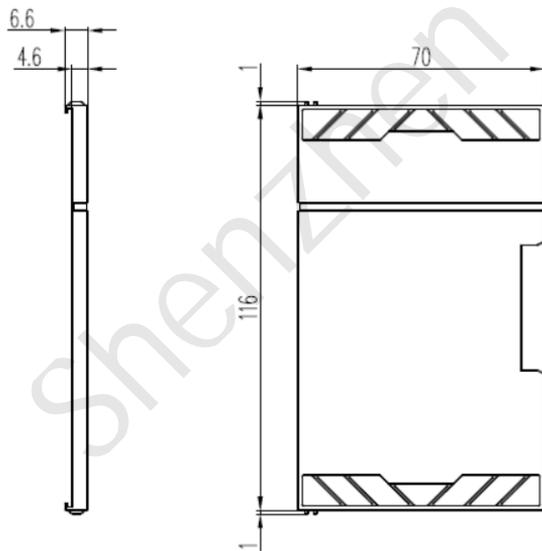
■ Installation wiring

● Module size

The main size information of the module is shown in the following figure, Unit in (mm):

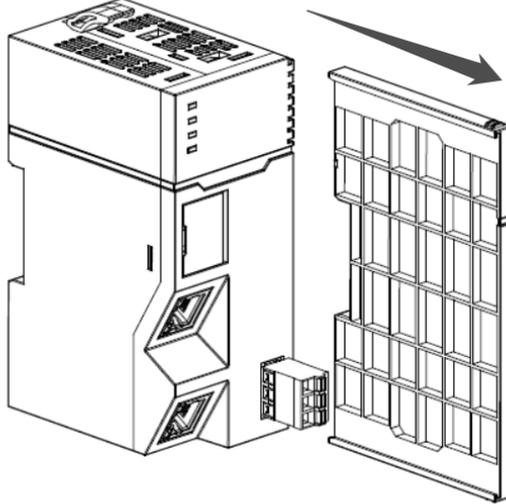


The size information of the tail cover is shown in the following figure, Unit in (mm):

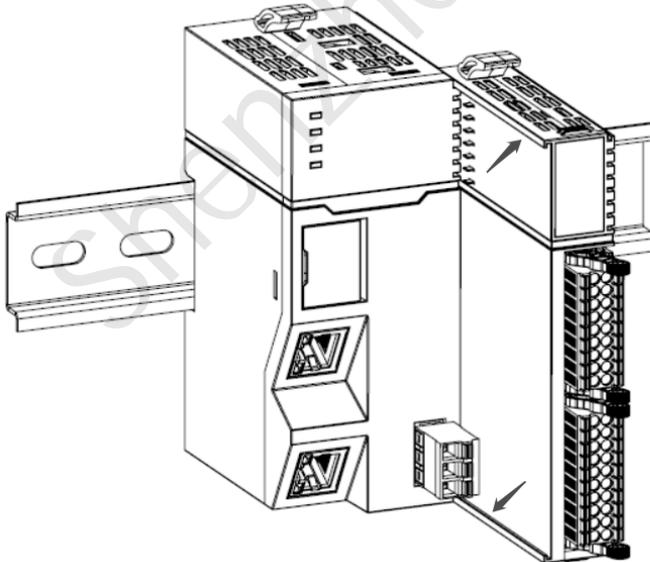


● Installation method

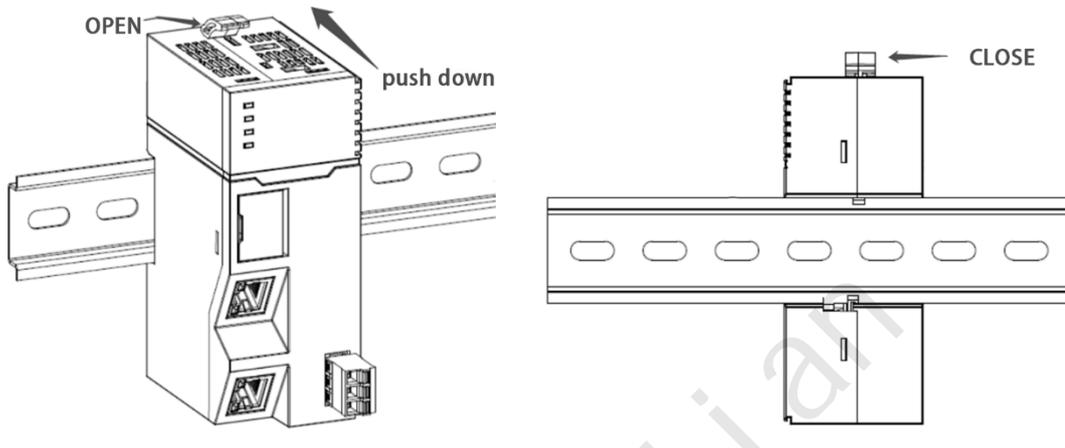
Intermodule assembly: Before installing the module, remove the tail cover in the direction indicated before proceeding to the next step. As shown in the following picture.



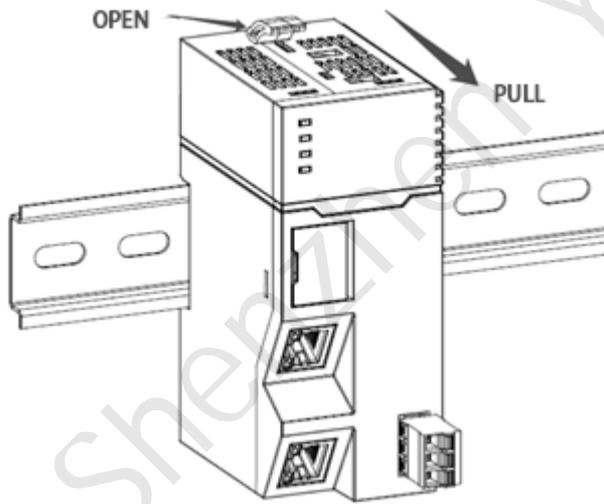
Inter-module assembly is mounted by sliding through the top and bottom rails of the module, as shown in the figure below.



Module installation: DIN rail installation method. To install the module, open the self-locking latch, align the module with the DIN rail, press the module in the direction indicated by the arrow, and then close the self-locking latch after the module is installed in place. As shown in the following picture.



Remove: Press to open the top rail latch, then pull the module away from the DIN rail.



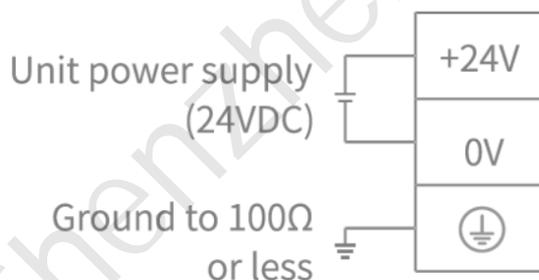
● Electrical connection

Communication related wiring:

Module communication adopts shielded layer network cable for network data transmission, without short circuit, dislocation and bad contact phenomenon; The length of the cable between devices cannot exceed 100m. If the cable length exceeds 100m, the signal will be attenuated and normal communication will be affected. The following network cables are recommended:

Item	Specification
Cable type	Elastic crossover cable, S-FTP, Category 5 cable
Satisfied criteria	EIA/TIA568A, EN50173, ISO/IEC11801 EIA/TI Abulletin TSB, EIA/TIA SB40-A&TSB36
Traverse section	AWG26
Conductor type	Twisted pair
Line pair	4

User terminal wiring:



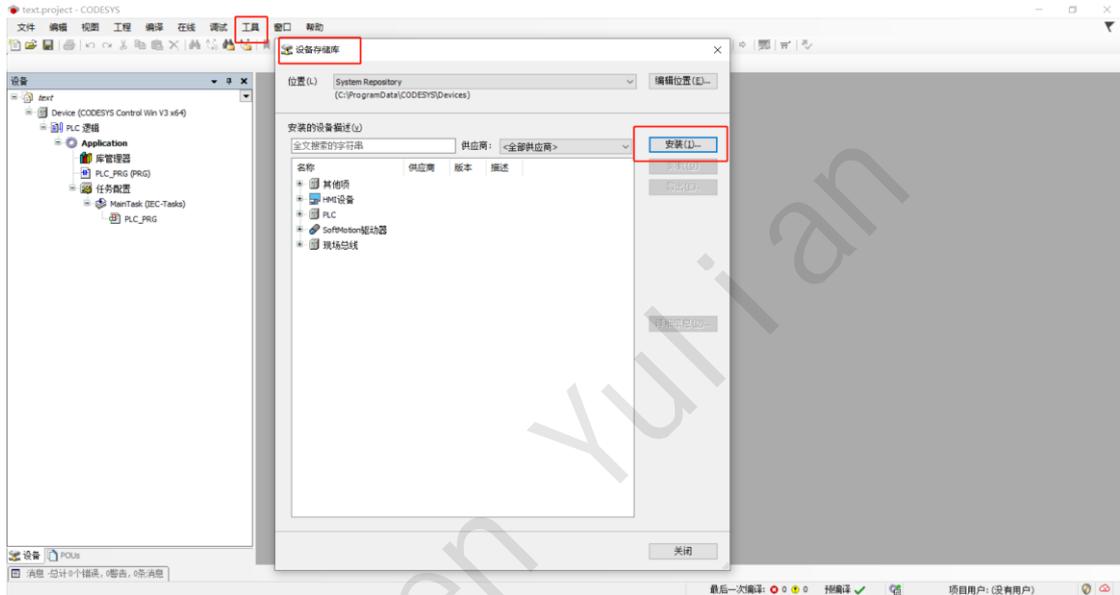
	Terminal indication	Instructions
Power terminal	+24V	24V power supply positive
	0V	24V power supply negative
	PE	Ground wire

■ Use

● Application under CODESYS software environment

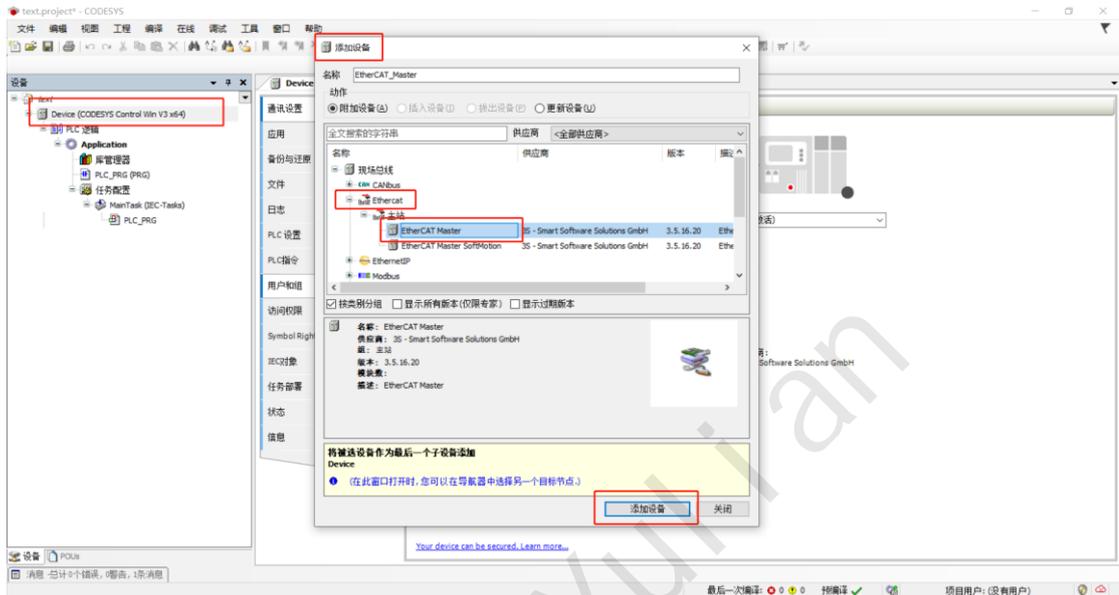
① Configure the ESI file

Open the CODESYS project, enter the menu: Tools → Device Repository, click Install, and select the corresponding coupler ESI configuration file (.xml format).



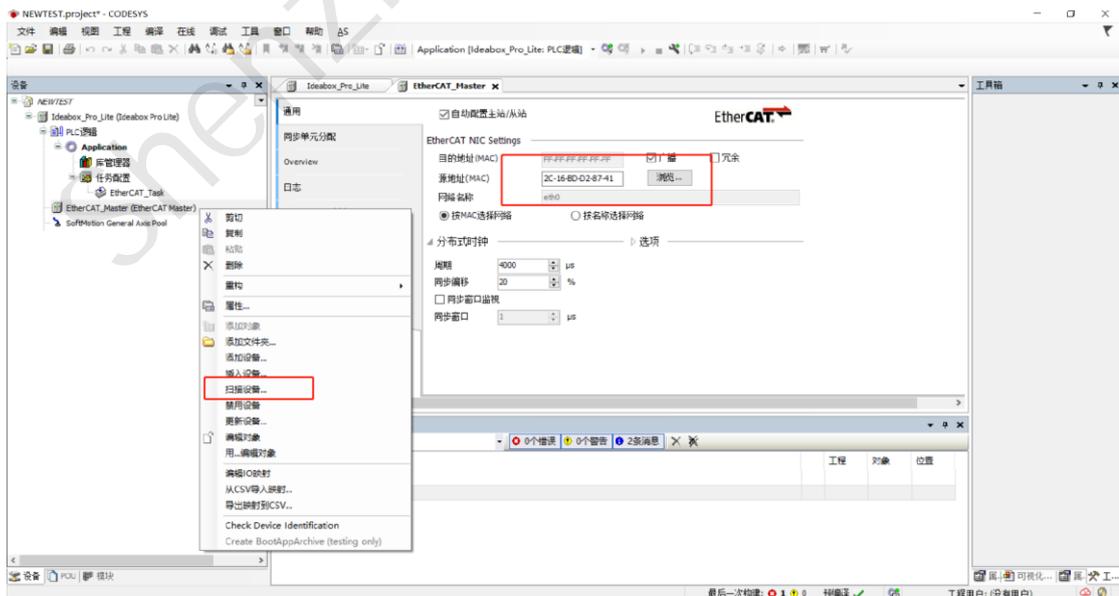
② Add master

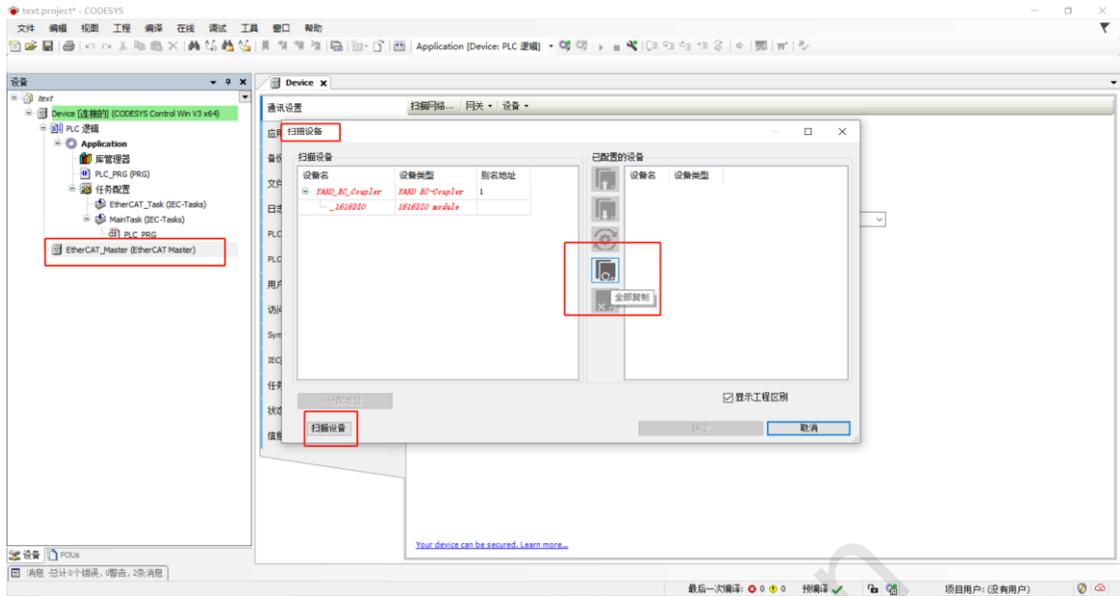
After ESI file configuration is complete, add EtherCAT Master: right-click DEVICE → Add device → Fieldbus → EtherCAT → Master → EtherCAT Master, and click Add Device.



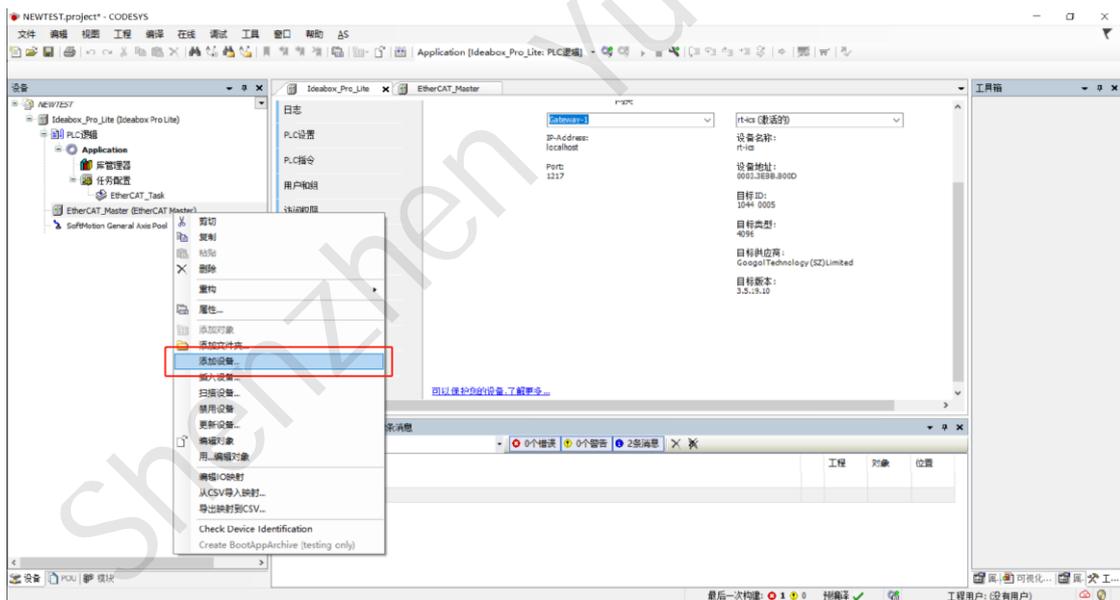
③ After the master station is added, configure the Ethernet MAC source address.

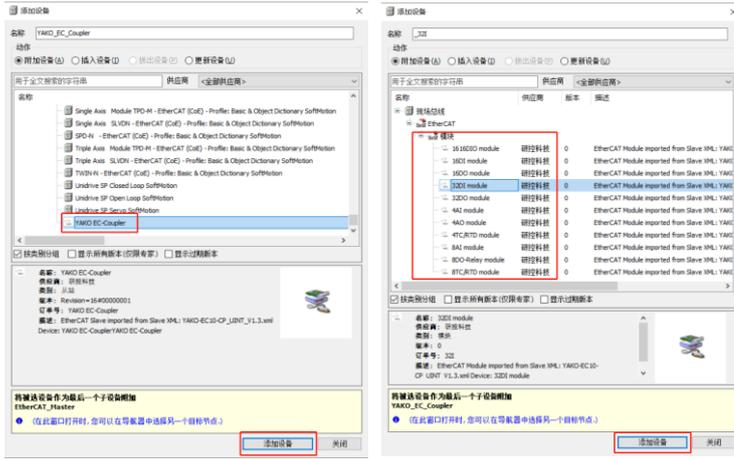
Ensure the normal connection of CODESYS, right-click the main station to automatically scan the device;





You can also add devices manually using "Add Devices", but be careful to keep it consistent with the actual configuration:

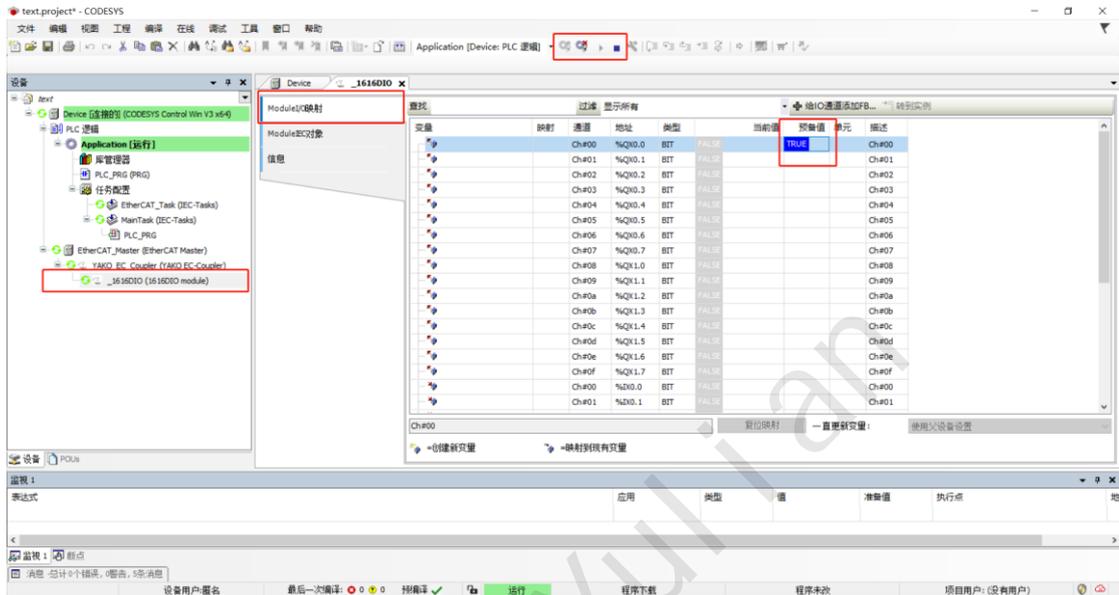




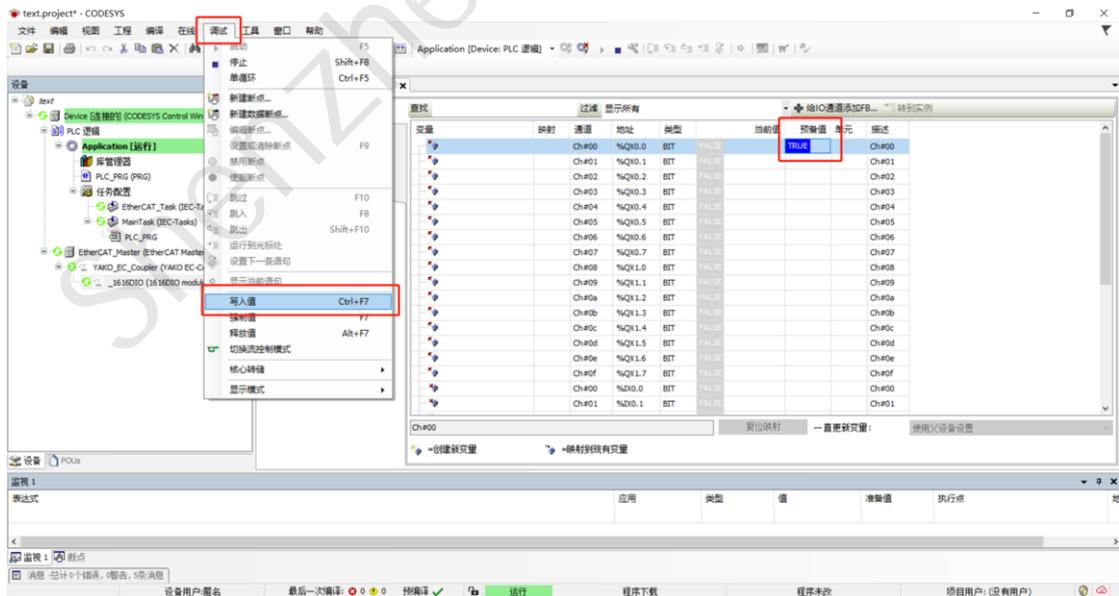
④ IO debugging

After the scan is completed, log in to the device, click Start, and run the program status;

Enter the slave module Mould/I/O mapping and write the reserve value;



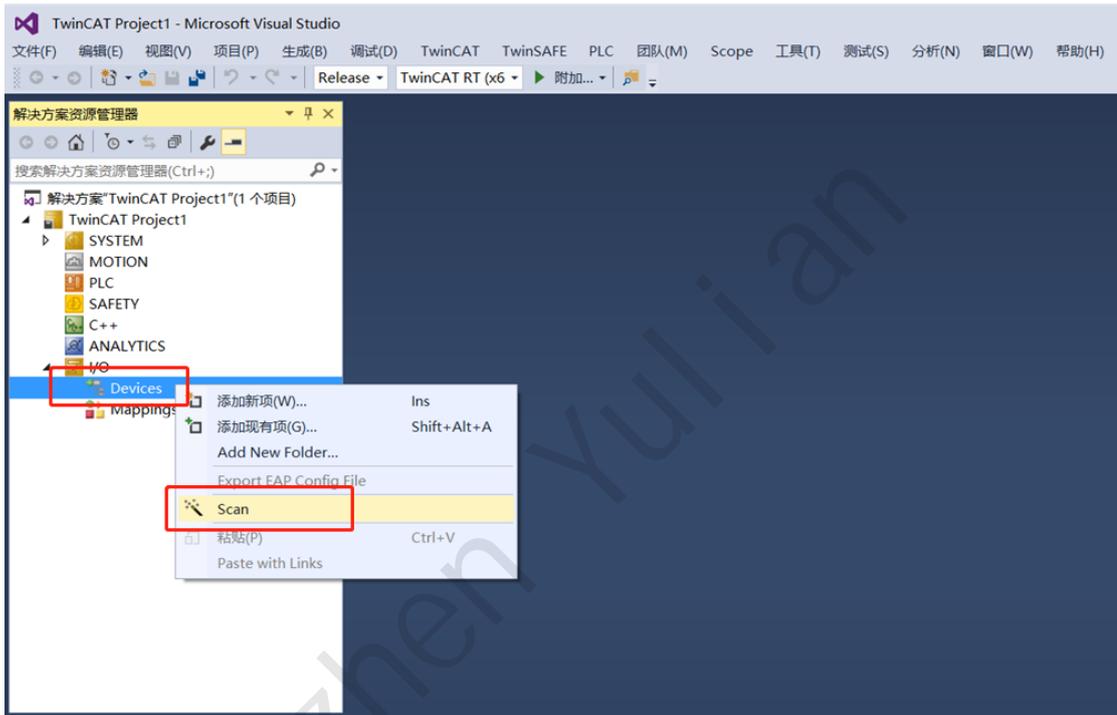
Click Debug to write the prepared value to the slave station; Observe the indicator of the corresponding channel of the slave station. If the indicator is on, the control is normal.



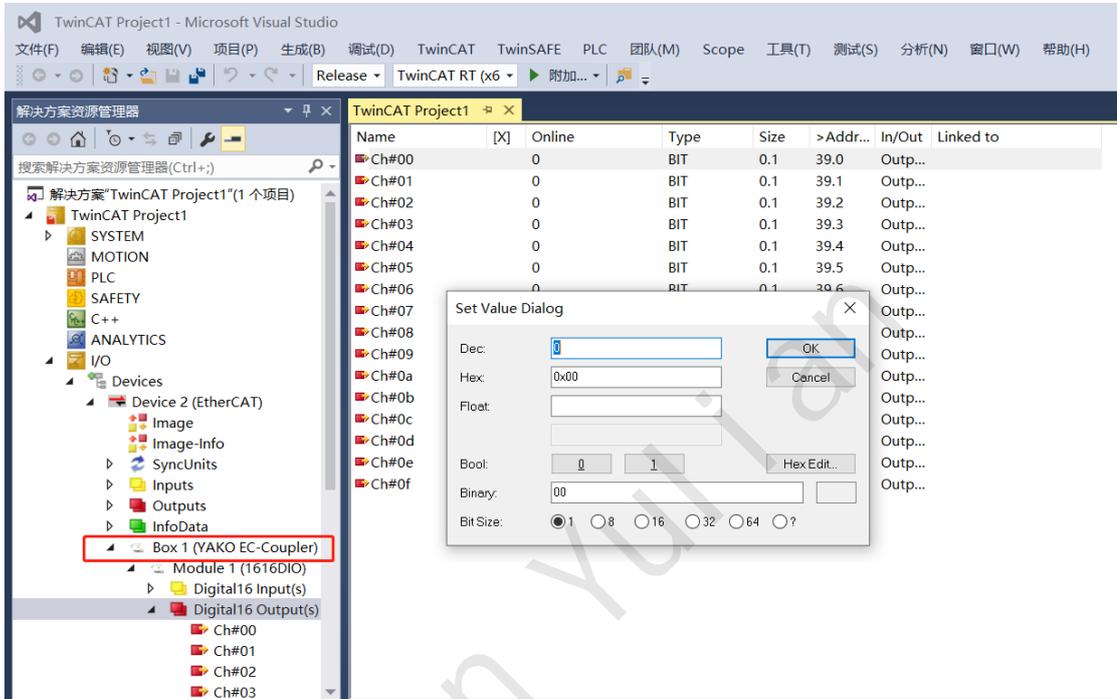
● Application under TwinCAT software environment

① Place the EtherCAT coupler ESI configuration file in the TwinCAT installation directory, "C:\TwinCAT\3.1\Config\Io\EtherCAT";

② After making sure that the coupler is connected properly, click the automatic scanning device in TwinCAT;



③After scanning, open BOX1→Module1→ (Input/output) in sequence, click to enter (Input/output), select the channel you want to control, right-click Onlinewrite, write the value online, and click "OK" to control the channel output. Observe that the indicator of the corresponding channel is on, indicating that the control is normal.



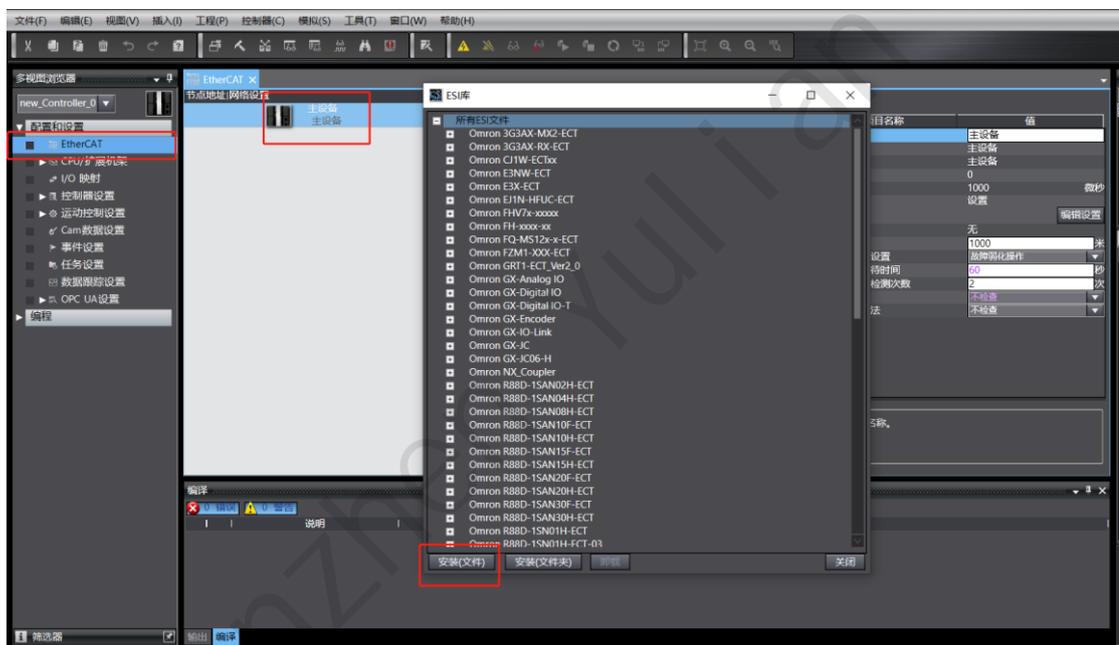
● Application under Sysmac Studio software environment

① Configure the ESI file

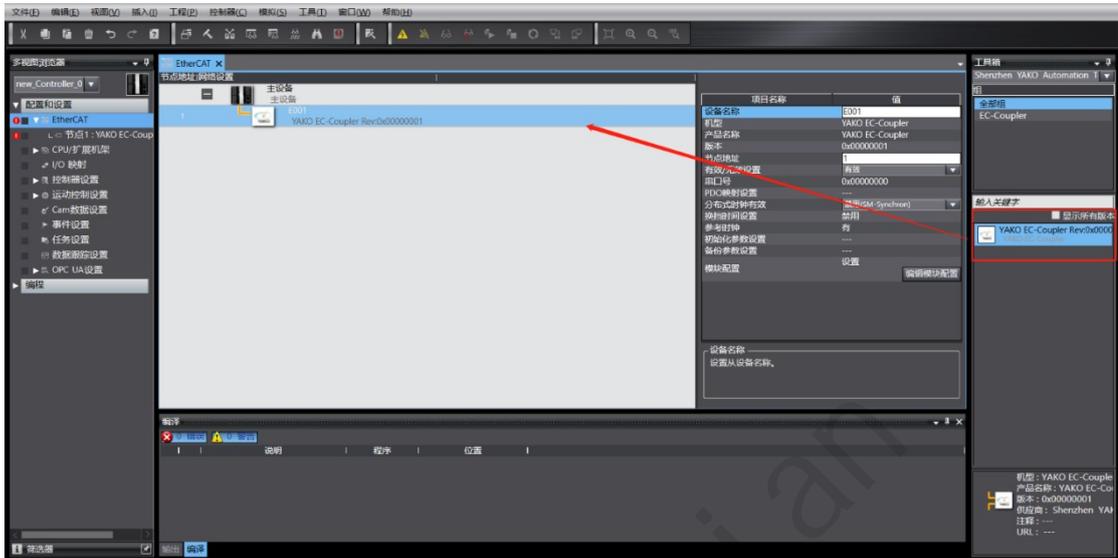
Open SysmacStudio project and connect Omron PLC to ensure normal communication connection;

Open in sequence: Configuration and Settings → EtherCAT. After entering, right-click the main device to display ESI library;

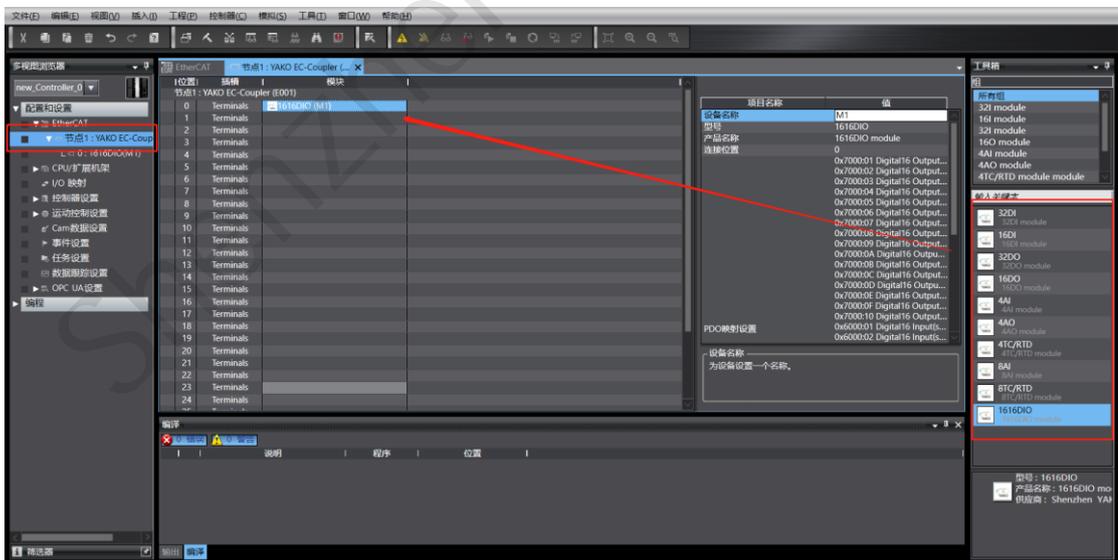
Install the coupler ESI configuration file (.xml format) in the ESI library.



- ② After the ESI file is configured, locate the coupler module to be added in the right toolbox, double-click or drag it to the main module to add it.

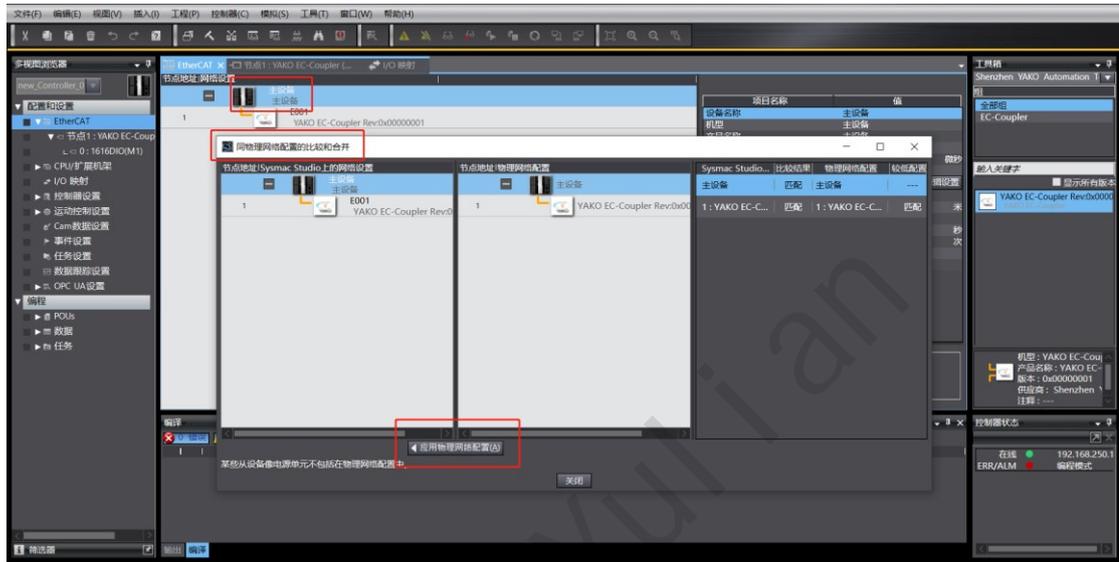


- ③ After the coupler configuration is completed, enter the node and configure the slave station; Drag the required slave module to the corresponding coupler slot in turn;



⑥ Apply physical network configuration

After the node address is written, restart the PLC and coupler; PLC online, right-click EtherCAT master device, select "Compare and merge with physical network configuration", confirm the scan device is correct, apply PLC physical network configuration;



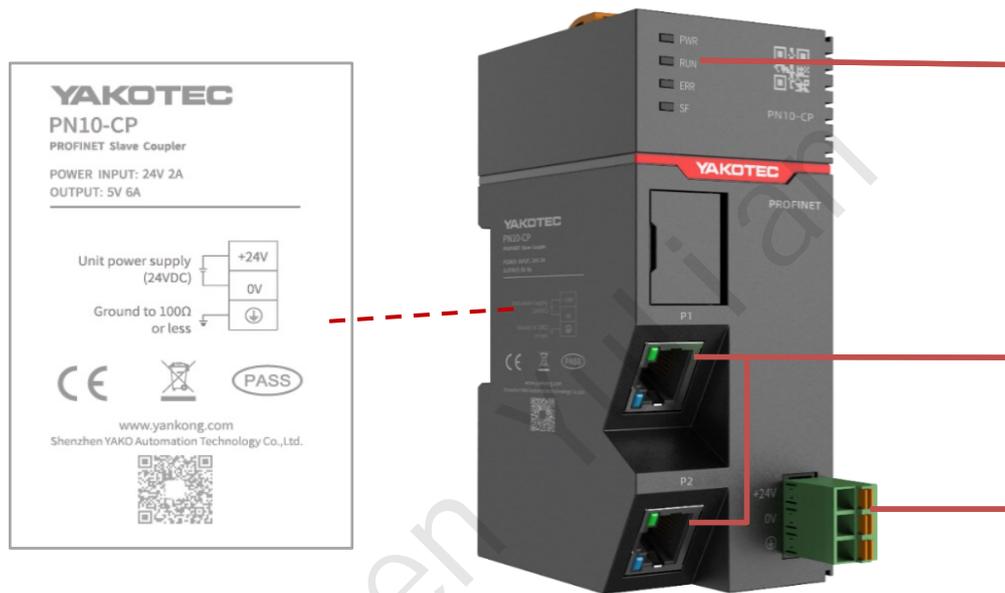
⑦ Configuration complete

After this step, the module configuration is complete. Download or synchronize the configured program to the PLC controller, run the program, observe the state of the corresponding mapping value of the variable control in the program, and the indicator state of the corresponding channel of the module, which is consistent with the program, indicating that the control is normal.

2.1.2 PN10-CP (PROFINET coupler module)

■ Module overview

PROFINET Coupler module (PN10-CP), this model supports PRIFINET communication protocol access, ADAPTS to PROFINET master devices such as S7-1500 and S7-1200, and can support 32 extended I/O Module.



Serial number	Interface name	Function definition			
1	Status light	PWR	Power indicator light	green	Light up when the power is on
		RUN	Running light	destroy	The PN module is in INIT state
				Flicker (green)	The PN module is in the Pre-Operational state
				Single flash (green)	The PN module is in the Safe-Operational state
				Bright (green)	The PN module is in Operational state
		ERR	Communication fault light	destroy	PRIFINET communication is normal
				Bright (red)	The communication is faulty or the expansion module synchronization is incorrect
		SF	Module fault indicator	destroy	Equipment normal
Bright (red)	The local bus is faulty or the expansion module is faulty				
2	PROFINET interface	P1: indicates PROFINET interface 1			
		P2: PROFINET interface 2			
3	24V power supply	Module power input terminal			

■ Technical Specification

● Power supply specification

Item	Specification
Rated input voltage of the terminal	24V DC(20.4V DC~ 28.8V DC)
Rated current of terminal input power	2A (typical value at 24V)
Rated voltage of bus output power supply	5V DC(4.75V DC~5.25V DC)
Rated current of bus output power supply	6A (typical value at 5V)
Power supply protection	Overcurrent protection, anti-reverse protection, surge absorption

● **Software specification**

Item	Specification
Communication mode	RT mode
Minimum communication cycle	1ms
I&M Data	I&M0 ~ I&M3
Expansion capability	Supports 32 Module
PROFINET Indicates the number of interfaces	two
PROFINET Switch functions	Support networking function
Open IE support	TCP/IP is supported
Alarm/diagnostic/status information	Supported, local support error codes uploaded to the PLC
Physical layer	100BASE-TX
Communication rate	10 Mbit/s (Standard Ethernet), 100 Mbit/s (PROFINET)
Communication mode	Full duplex
Topological structure	Support line, star, tree, etc
Transmission medium	Category 5 and above
Transmission distance	The distance between the two nodes is less than 100 meters
Priority start	support
Port disable	support
This configuration is not required when replacing a device	Support (same type of PN module)
The ontology is restored to factory Settings	support
The module is restored to factory Settings	nonsupport
Ontology firmware upgrade	support

● **Environmental specification**

Item	Specification
Ambient operating temperature	-20°C~55°C
Ambient working humidity atmosphere	The relative humidity is less than 95%RH No condensation Ensure no corrosive gases
Ambient storage temperature	-20°C~60°C(relative humidity less than 90%RH no condensation)
Altitude	Below 2000 m (80kPa)
Pollution level	Level 2
Immunity to interference	Power cable 2Kv(IEC 61000-4-4)
Overvoltage class	II
EMC anti-interference level	Zone B, IEC61131-2
Vibration resistance	IEC 60068-2-6 5Hz~8.4Hz, amplitude 3.5mm, 8.4Hz~ 150Hz, acceleration 9.8m/s ² , X, Y, Z direction 100 minutes each (10 times, 10 minutes each, 100 minutes in total)
Impact resistance	IEC 60068-2-27, 9.8m/s ² , 11ms, X/Y/Z, 3 times each in 3 axes and 6 directions

■ **Installation wiring**

on page 12

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■ Use

● Applications under TIA Portal software environment

① Preparatory work

Hardware environment:

One computer, pre-installed TIA Portal V14 software

Siemens PLC 1

PROFINET special shielded cable

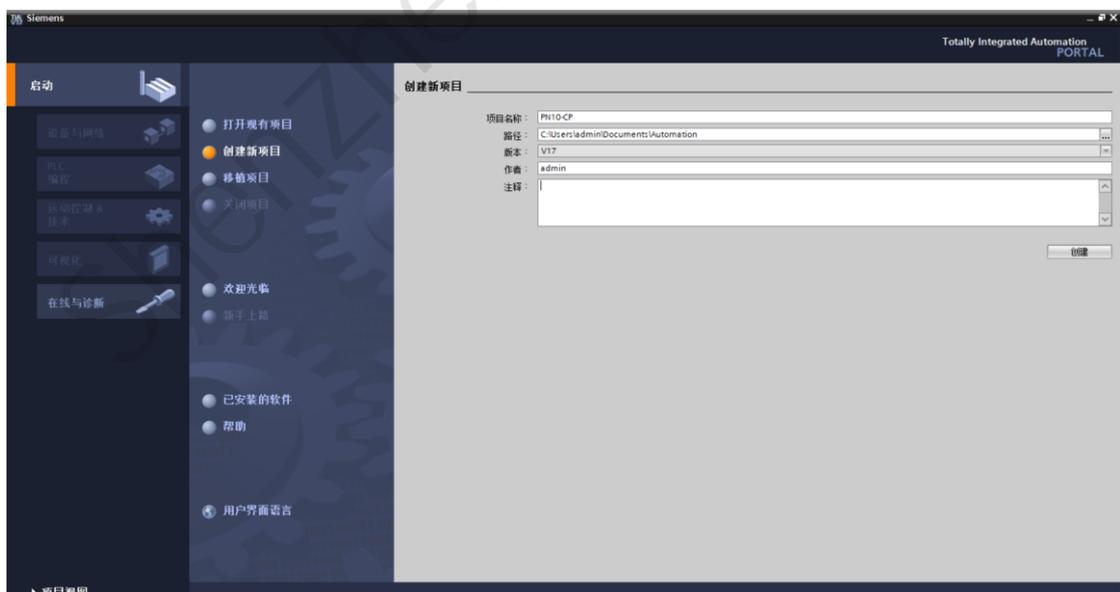
One switching power supply

Module: Digital quantities SD-32I, SD-32O, SD-1616ION

② New construction

1. Open the TIA Portal V14 software.

2. Click Create New Project.

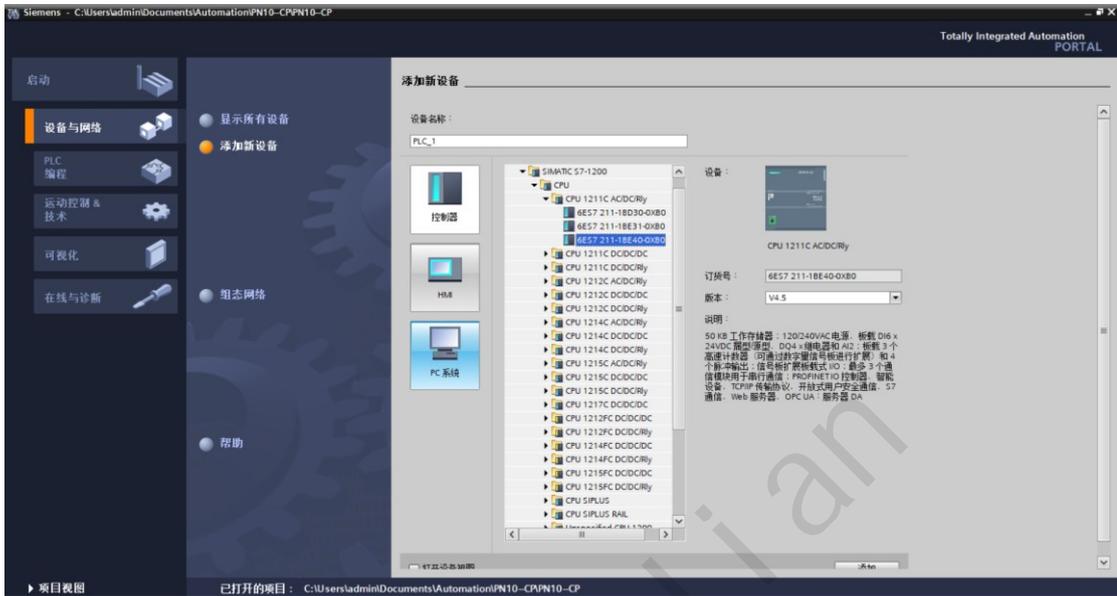


③ Configuration configuration

1. Click Configure Device.



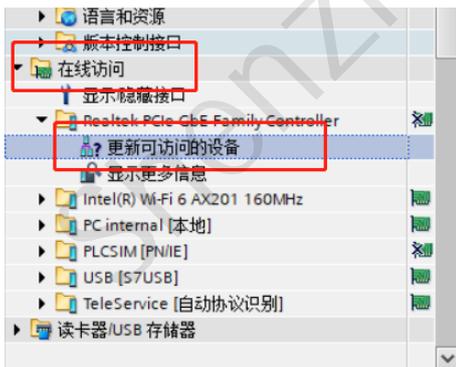
2. Click Add New Device, select the current PLC model, and click Add, as shown in the following figure.



3. After adding the project, click in the lower left corner to enter the project view.

④ Scan connection device

Click Online Access -> Update Accessible Devices in the navigation tree on the left, as shown in the following figure



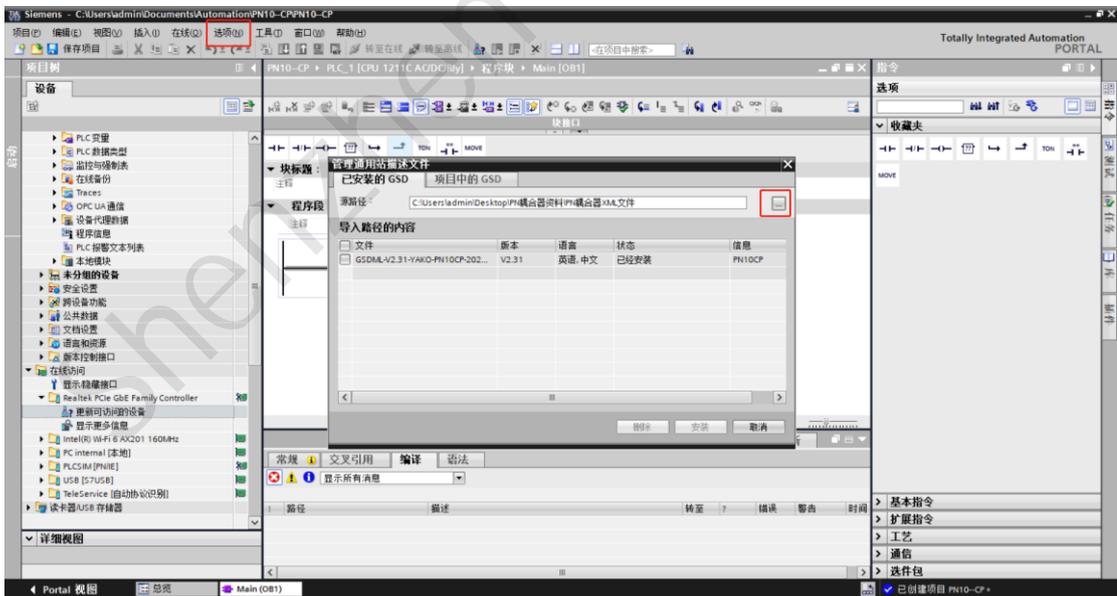
When the update is complete, the connected slave devices are displayed, such as the following figure.



The IP address of the computer must be in the same network segment as that of the PLC. If not, repeat the preceding steps after changing the IP address of the computer.

⑤ Configure the GSD file

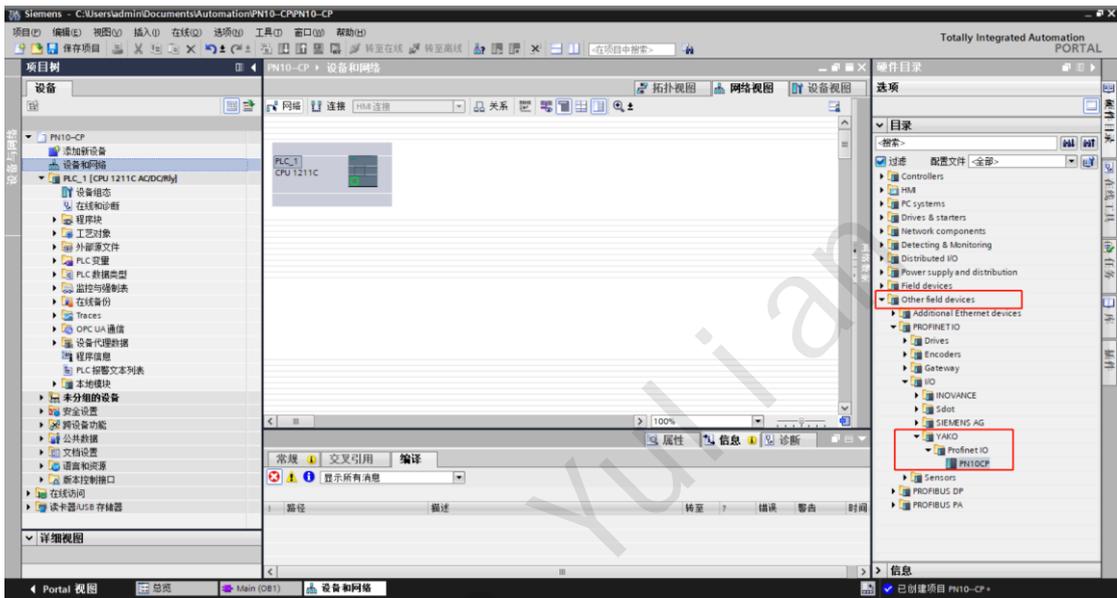
1. On the menu bar, choose Options -> Manage Common Site Description File (GSDML)(D).
2. Click Source Path to select the file.



Check whether the status of the GSD file to be added is Not installed. If yes, click Cancel to skip the installation step.

⑥ Add a slave device

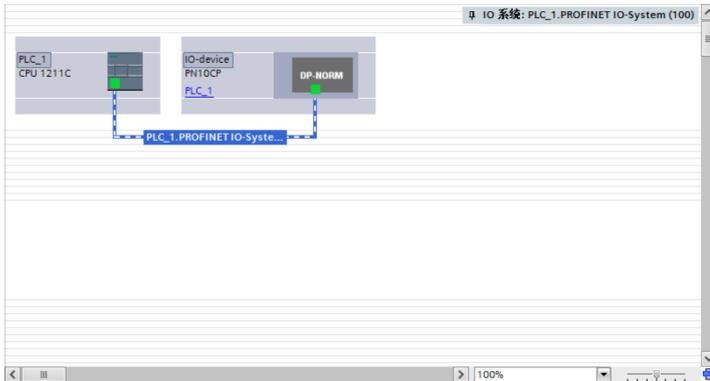
1. Double-click "Devices and Networks" in the left navigation bar.
2. Click Hardware Directory on the right. The following directories are displayed.
3. Choose Other Field Devices > PROFINET IO > I/O > YAKO > Profinet IO > PN10-CP.



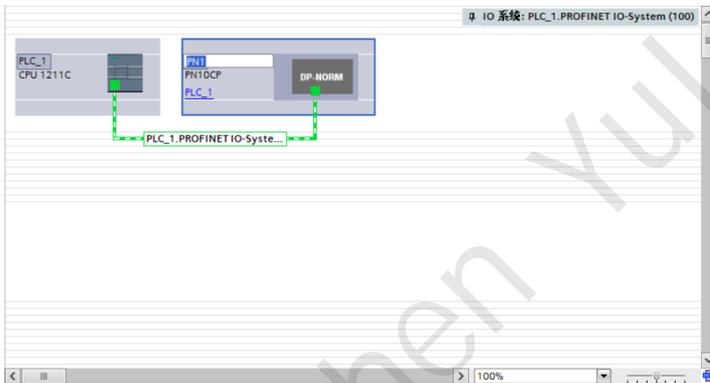
4. Drag or double-click PN10-CP to Network View, as shown in the following figure.



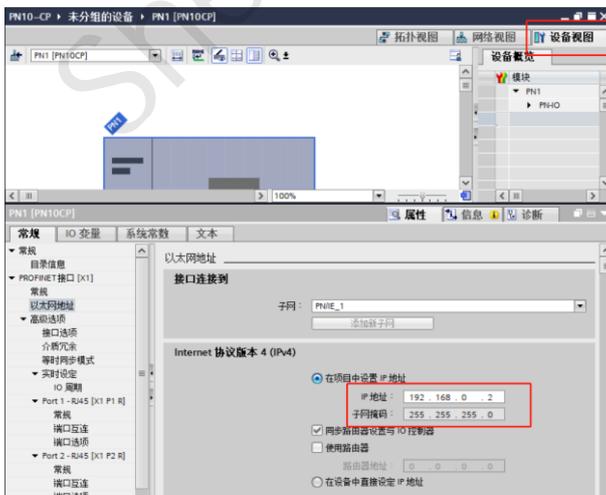
5. Click UnAssigned (blue font) on the slave device, and select PLC_1.PROFINET Interface _1, as shown in the following figure.



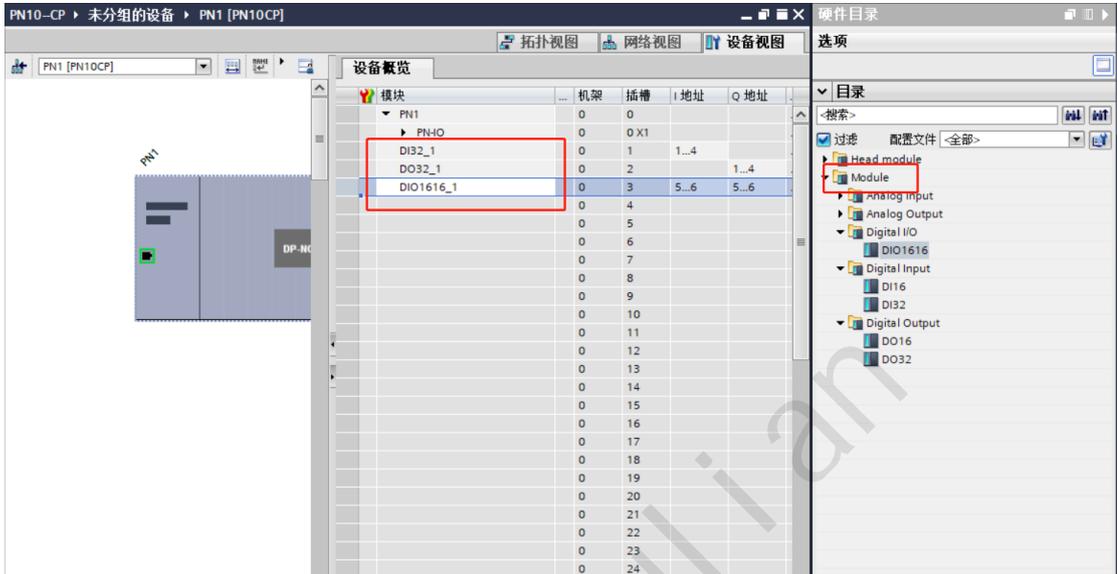
6. Click the device name to rename the device, as shown in the following figure



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

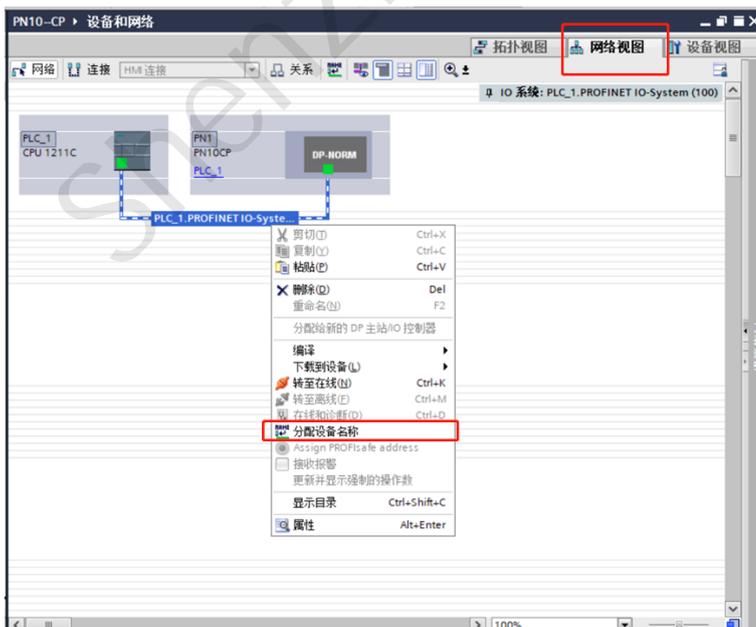


8. In the Module directory on the right, add I/O Module one by one based on the actual topology. (The sequence must be consistent with the actual topology; otherwise, communication fails.)

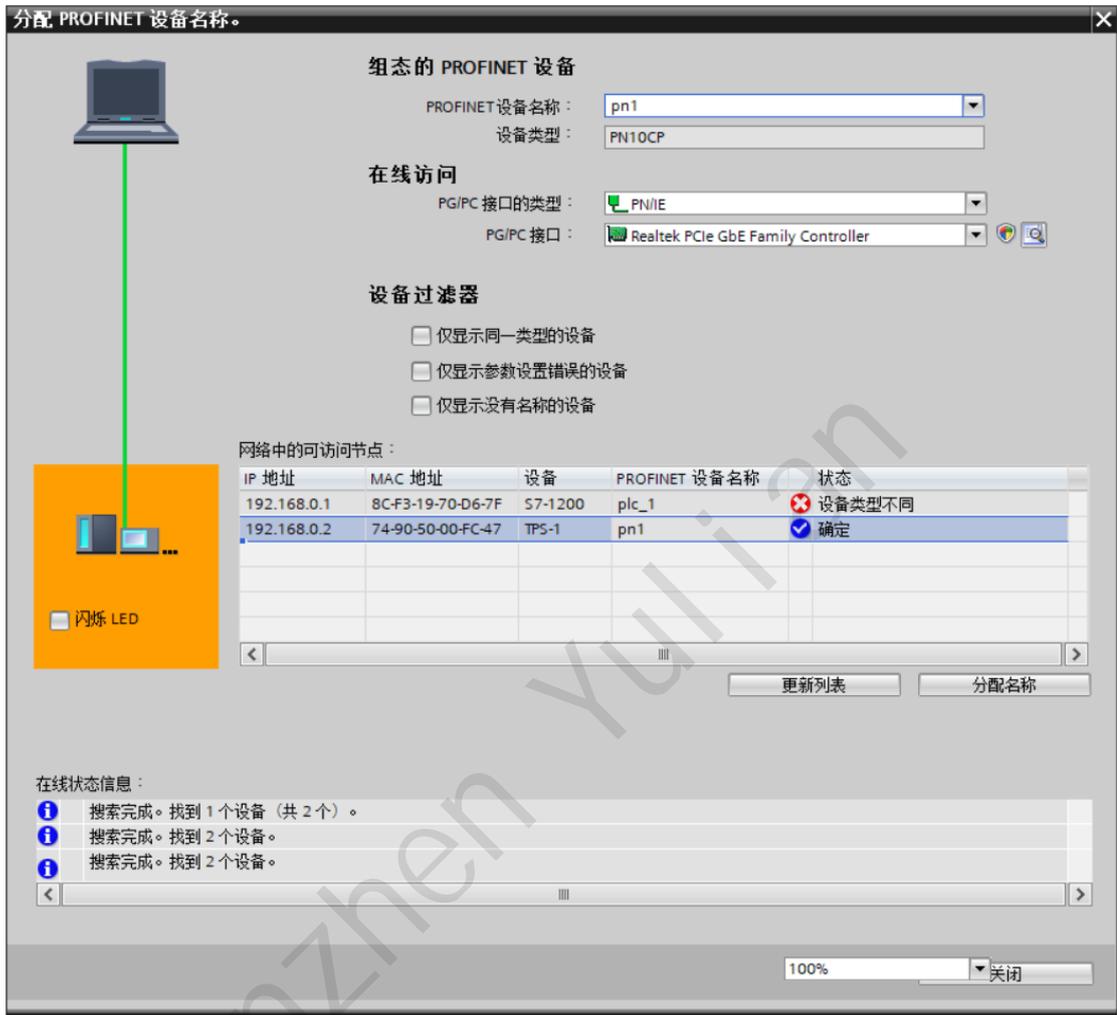


Up to 32 Module can be added, and I/O addresses are assigned to the system or can be changed.

9. Switch to "Network View", right-click the connection cable between PLC and PN10, and select "Assign Device Name".



10. The Assign PROFINET Device Name window is displayed, as shown in the following figure.



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

PROFINET Device name: Set the name in Assign IP Address and Device Name to the slave station.

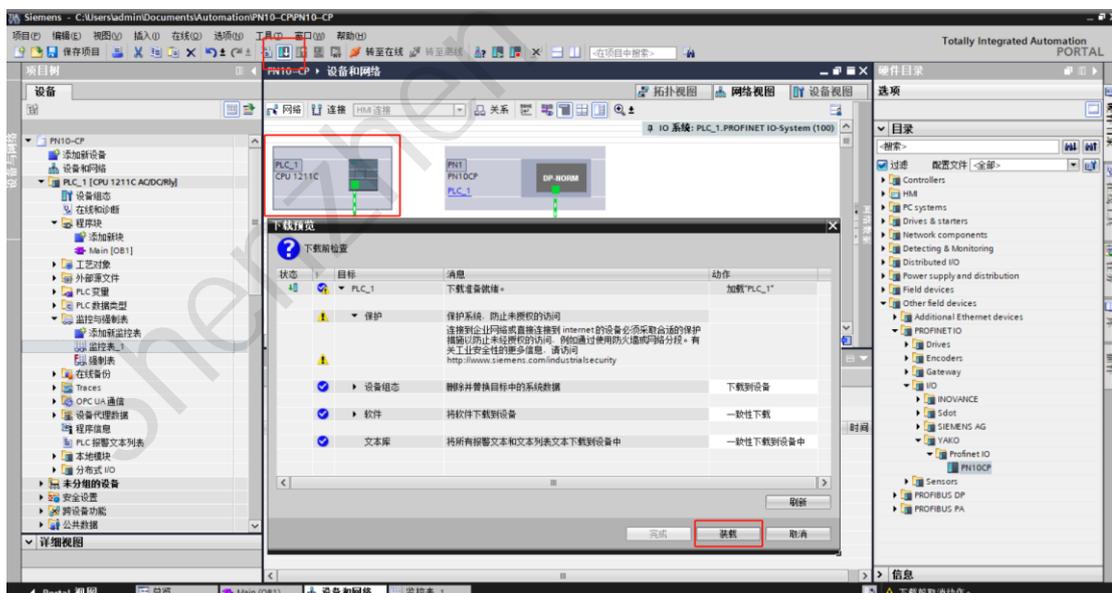
PG/PC Interface type: PN/IE.

PG/PC interface: The actual network adapter used.

11. Select secondary devices, click Update List, and click Assign Name.

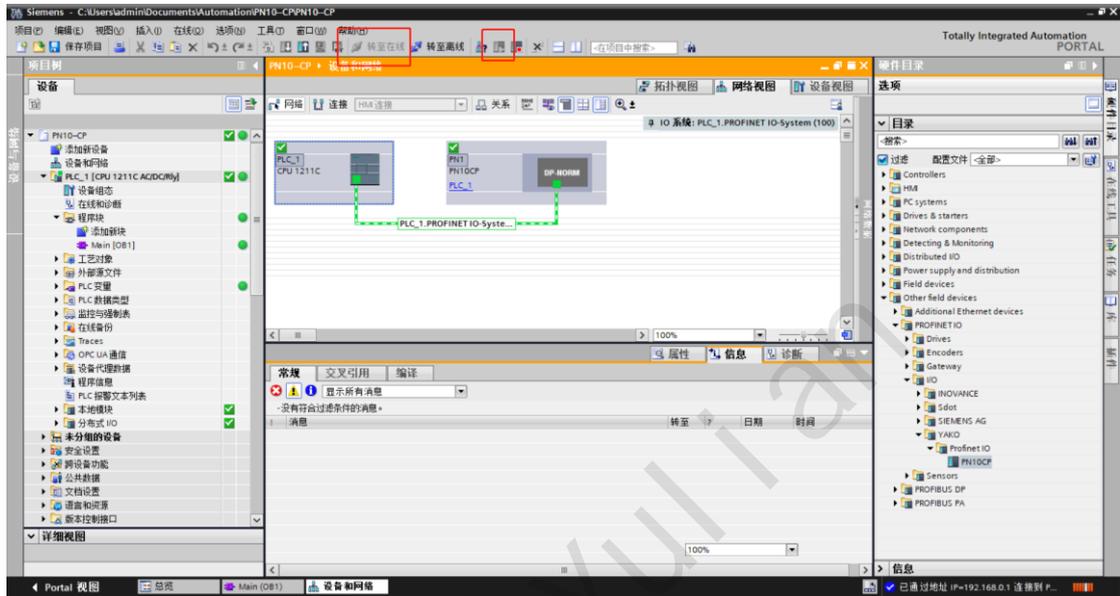
⑦ Download the configuration structure

1. In Network View, select the PLC.
2. Click the Download button on the menu bar.
3. The Extended Download to Device page is displayed.
4. Click Start Search.
5. Click Download.
6. Select Continue in Asynchronous mode.
7. Select Stop All.
8. Click Load.
9. Click Finish.
10. Power on the device again.



⑧ Communication connection

1. Click the button.
2. Click Go Online. The connection is successful, as shown in the following figure.



⑨ Check device indicator light

PN10-CP: The PWR indicator is steady green, the RUN indicator is steady green, and other indicators are off.

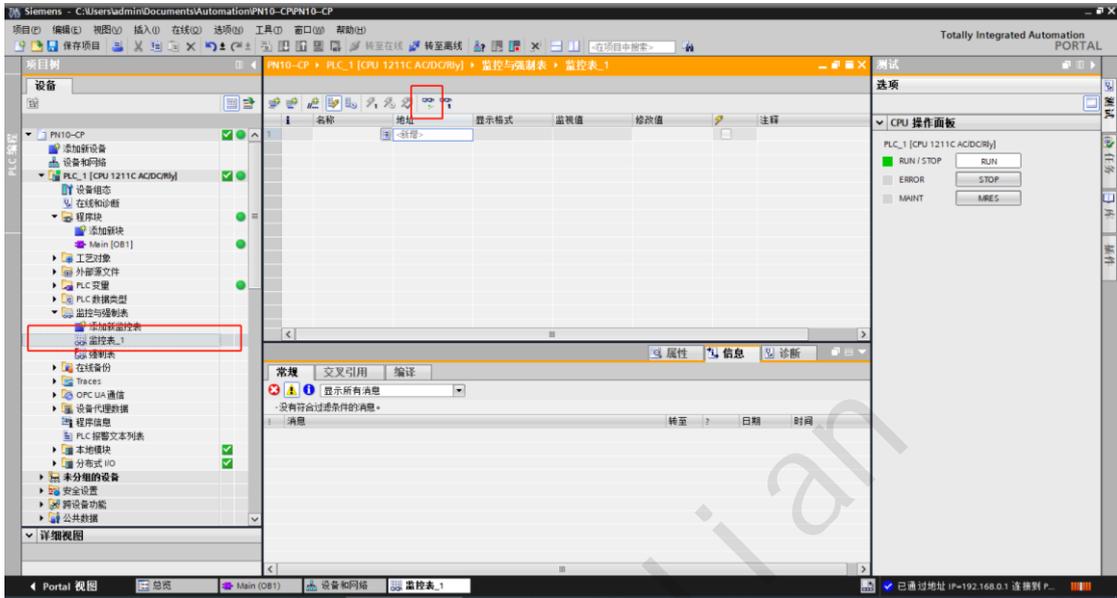
I/O module: The indicator is steady green, and the LK indicator is steady green.

⑩ Test

1. Expand the project navigation on the left and choose "Monitor and Force Table", as shown in the following figure.

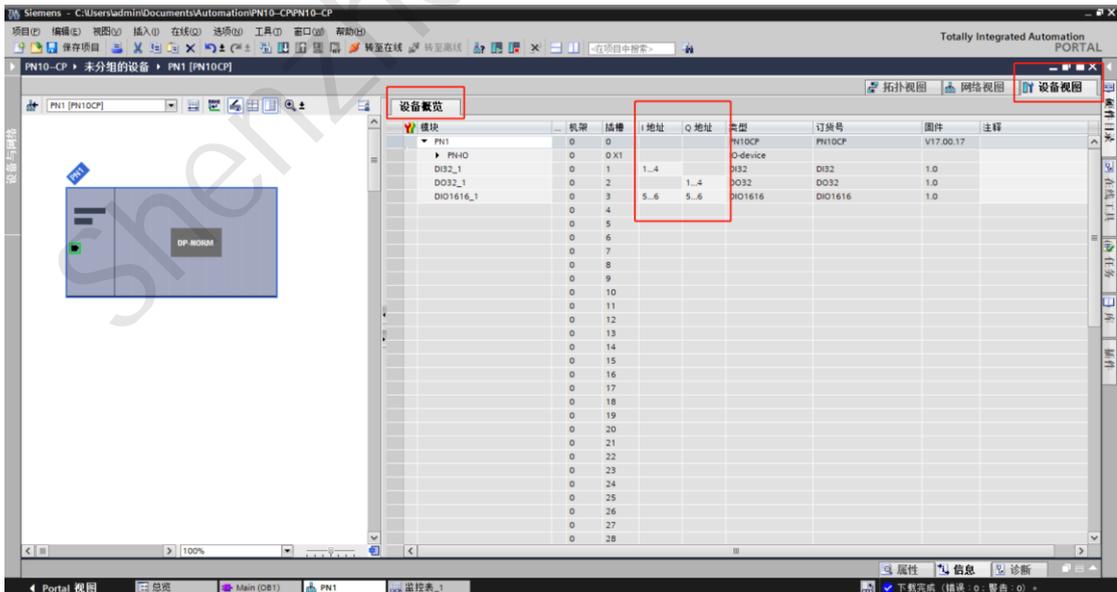


2. Double-click Add New Monitoring Table. The system adds a monitoring table, as shown in the following figure.



3. Click  the button.

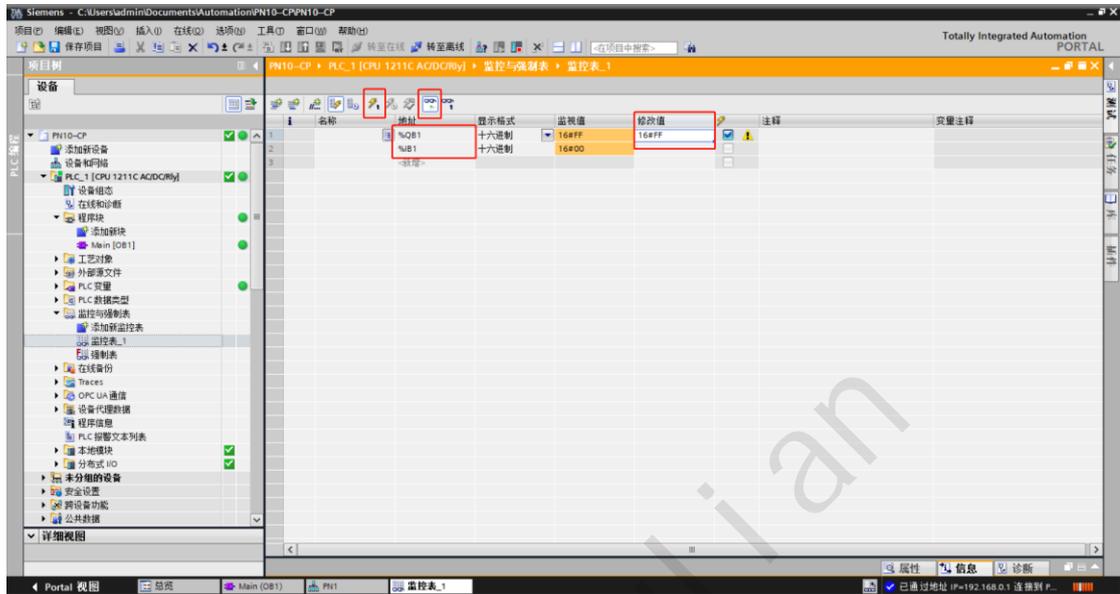
4. Open "Device Overview" to view the channel Q address (the channel address of the output signal) or I address (the channel address of the input signal)



5. Enter QB1 in the address cell of the monitoring table, as shown in the following figure.

6. Press Enter. The following information is displayed:

7. Enter a value in the Modify Value cell, click Write, and view the channel indicator.
8. Enter IB+ I Address in the address box to monitor the input module.



Attachment: Slave station equipment parameter Settings

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

- Setting Output Empty Hold

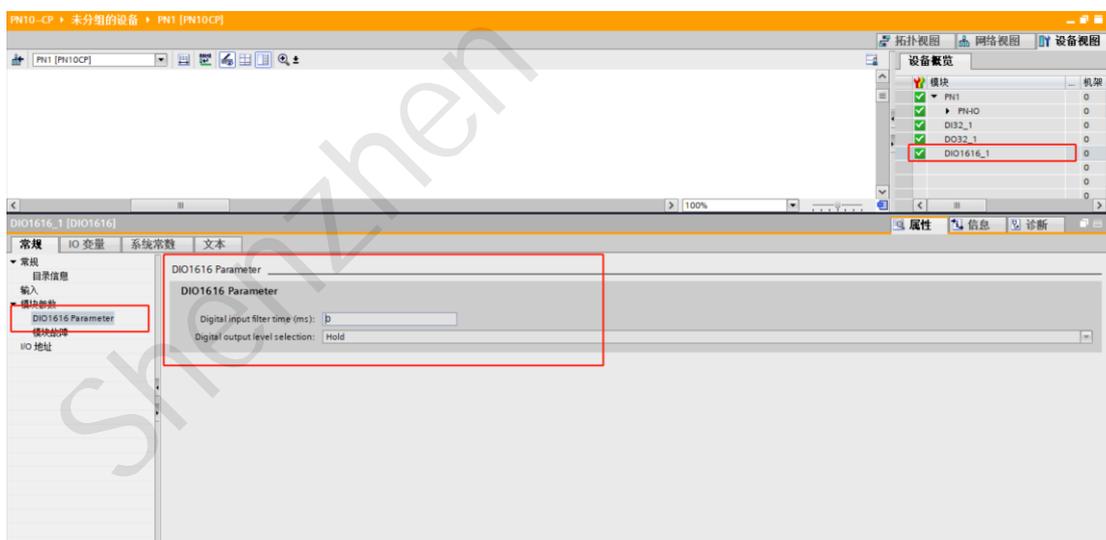
1. Open Device View.

2. Select the output module and click Module Parameters, as shown in the following figure.

Hold: Hold output. When the network communication is interrupted, the module output channel is kept output.

High: full output. When the network communication is disconnected, the module output channel is full output.

Low: Clears the output. When the network communication is disconnected, the output channel of the module clears the output.

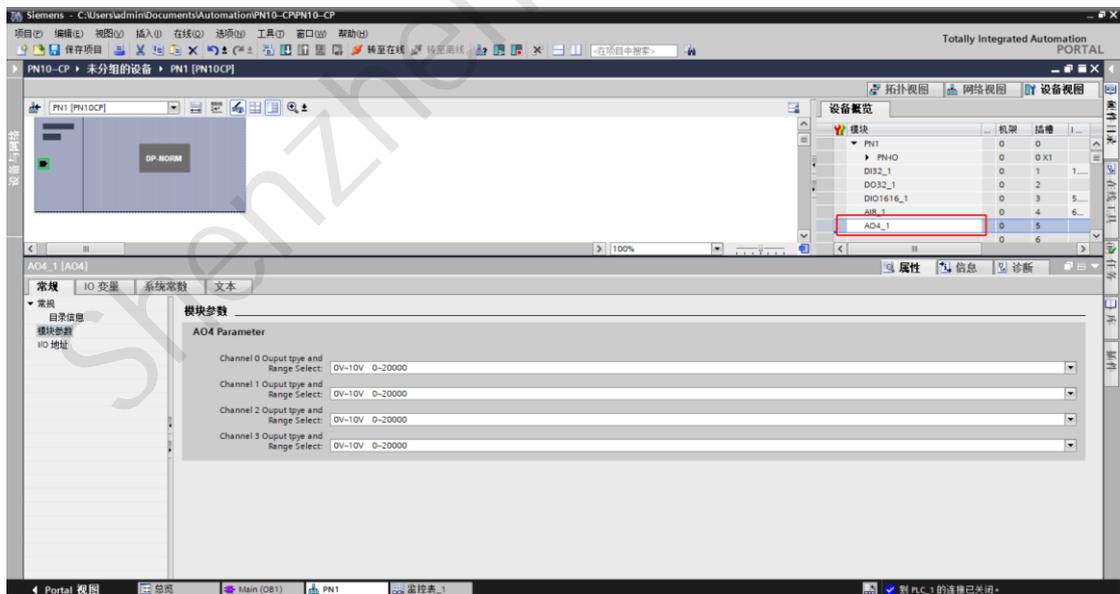
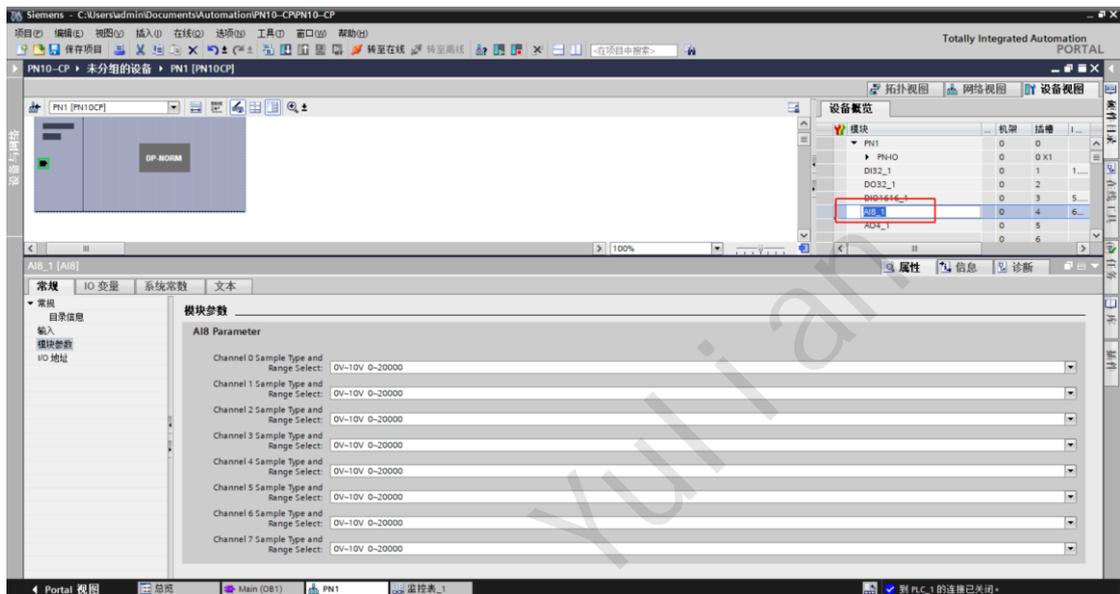


After the configuration is complete, power it on again.

● Set the analog range

1. Open Device View.

2. Select the analog module, click Module Parameters, and set the analog range, as shown in the following figure. The default measurement range is 0 to 10V-0 to 20000.

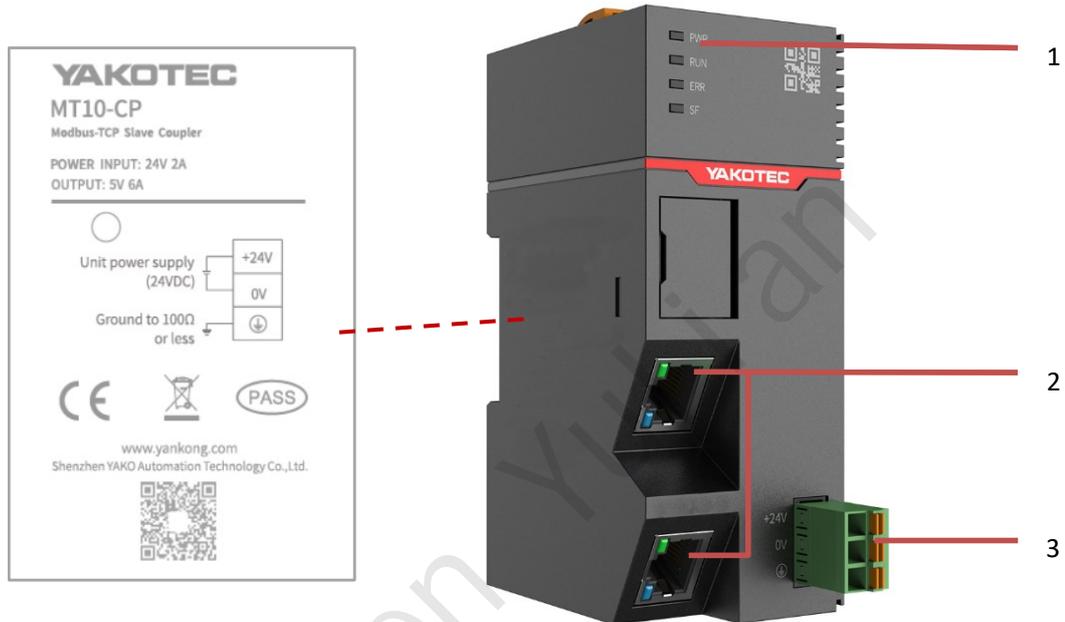


After the configuration is complete, power it on again.

2.1.3 MT10-CP (Modbus-TCP coupler module)

■ Module overview

Modbus-TCP Coupler module (MT10-CP), this model supports Modbus-TCP communication protocol access and can support 32 extended I/O Module.



Serial number	Interface name	Function definition			
		Indicator	Light state	Meaning	Description
1	Status light	PWR	Power indicator light	green	Light up when the power is on
		RUN	Running light	destroy	The MT module is not running. Procedure
				Bright (green)	The MT module is running. Procedure
		ERR	Communication fault light	destroy	The Moubus-TCP communication is normal
				Bright (red)	Communication failure error
		SF	Module fault indicator	destroy	Equipment normal
Bright (red)	The local bus is faulty				
2	Moubus-TCP interface	Port LAN1: indicates Moubus-TCP interface 1			
		Port LAN2: indicates Moubus-TCP interface 2			
3	24V power supply	Module power input terminal			

■ Technical Specification

● Power supply specification

Item	Specification
Rated input voltage of the terminal	24V DC(20.4V DC~ 28.8V DC)
Rated current of terminal input power	2A (typical value at 24V)
Rated voltage of bus output power supply	5V DC(4.75V DC~5.25V DC)
Rated current of bus output power supply	6A (typical value at 5V)
Power supply protection	Overcurrent protection, anti-reverse protection, surge absorption

● Software specification

Item	Specification
Network protocol	Modbus-TCP
Number of client connections	5
Function code	01/02/03/04/05/06/15/16/23
Network interface	2 RJ45
Connection rate	10/100Mbps , adaptive, full duplex
Maximum bus length	100m
IP address setting	Dip switch or Modbus Poll configuration software

● Environmental specification

Item	Specification
Ambient operating temperature	-20°C~55°C
Ambient working humidity	The relative humidity is less than 95%RH No condensation
atmosphere	Ensure no corrosive gases
Ambient storage temperature	-20°C~60°C(relative humidity less than 90%RH no condensation)
Altitude	Below 2000 m (80kPa)
Pollution level	Level 2
Vibration resistance	IEC 60068-2-6 5Hz~8.4Hz, amplitude 3.5mm, 8.4Hz~ 150Hz, acceleration 9.8m/s ² , X, Y, Z direction 100 minutes each (10 times, 10 minutes each, 100 minutes in total)
Impact resistance	IEC 60068-2-27 9.8m/s ² , 11ms, X/Y/Z, 3 times each in 3 axes and 6 directions

■ **Installation wiring**

on page 12

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■ Use

● IP Settings and changes

Two select switches are installed on the front panel of the coupler, which can be used to specify the module IP address. The address setting method is as follows:

Rotary switch	Address value	IP address setting method
H	Hexadecimal high	Before delivery, the rotary switch is set to 00, and the default IP address is 192.168.1.100. The first 3 bytes can be configured by software or the default 192.168.1.XXX;
L	Hexadecimal low	The last byte of the IP address is set by adding the high digit of the hexadecimal H dip switch to the hexadecimal L dip switch. Calculation method: Set value = (H*16+L)

● Module function code corresponding table

MT coupler module supports a total of 9 function codes, functions and meanings are shown in the following table:

Function code	meaning	Type of operation
01	Read Coils	Bit operation
02	Read Discrete Inputs	Bit operation
03	Read Holding Registers	Word operation
04	Read Input Registers	Word operation
05	Write Single Coil	Bit operation
06	Write Single Register	Word operation
15	Write Multiple Coils	Bit operation
16	Write Multiple Registers	Word operation
23	Read/Write Multiple Registers	Word operation

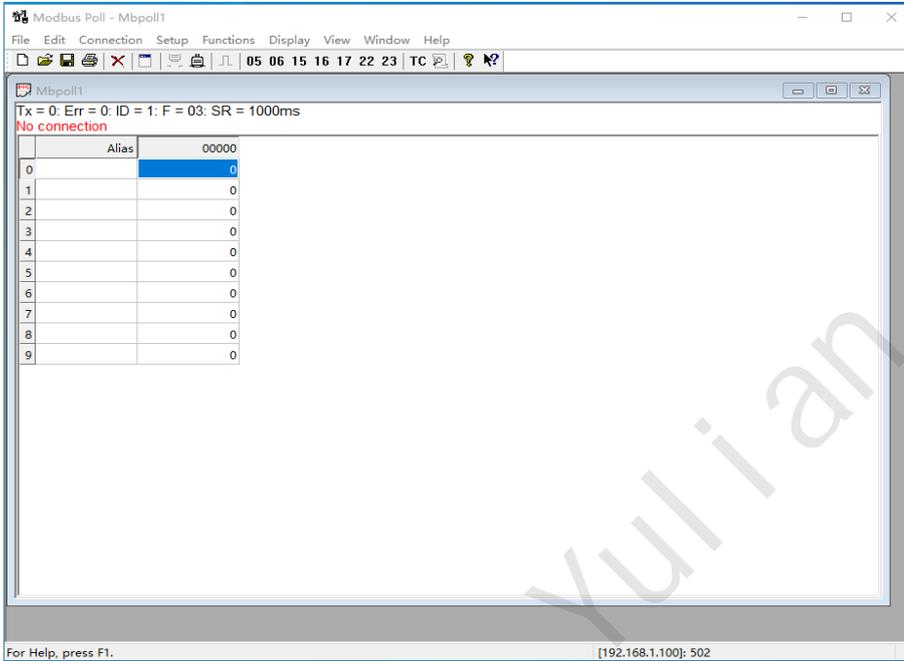
The following table lists the function code, offset start address, and address range corresponding to different I/O Module:

I/O module address mapping table					
DI(input bit)	DO(output bit)	AI(input word)	AO(output word)	DI(input word)	DO(output word)
Function code: 01/02	Function code: 05/15	Function code: 03/04	Function code: 06/16	Function code: 03	Function code: 16
Offset start address: 0X00	Offset start address: 0X00	Offset start address: 0X00	Offset start address: 0X00	Offset start address: 0X5000	Offset start address: 0X3000
Bit address range: 0~1023	Bit address range: 0~1023	Bit address range: 0~511	Bit address range: 0~511	Bit address range: 0X5000~0X507F	Bit address range: 0X3000~0X307F
Data length range: 1~1024	Data length range: 1~1024	Data length range: 1~512	Data length range: 1~512	Data length range: 1~128	Data length range: 1~128
Offset address + length ≤ 1024	Offset address + length ≤ 1024	Offset address + length ≤ 512	Offset address + length ≤ 512	Offset address + length ≤ 20608	Offset address + length ≤ 12416

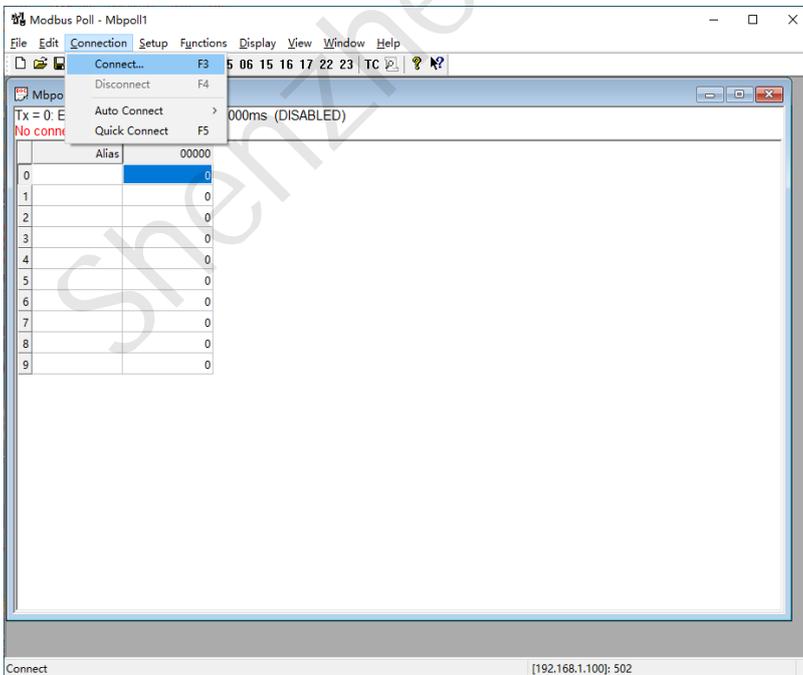
● Application under Modbus Poll software environment

① Connect

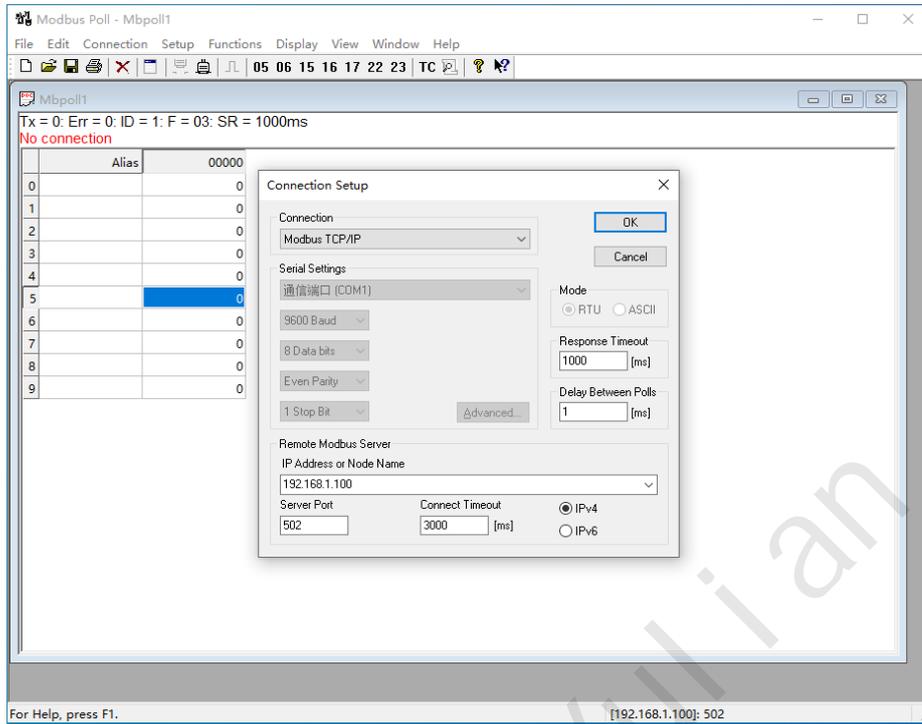
1 Open the home screen



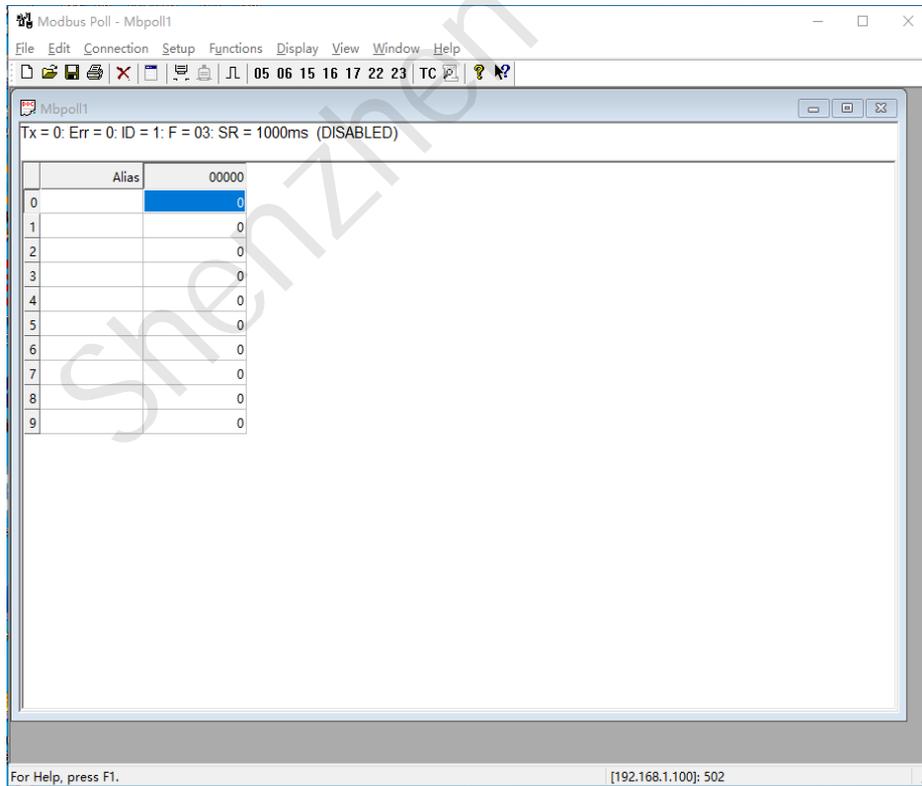
2 Go to Network configuration and click connection on the connection menu



3 Network configuration, set the IP address, and click OK



4 After the connection is successful, the red alarm disappears



② Modular control

Module control is mainly divided into two steps, first to find the IO mapping of the module being operated, and then to control through read and write commands.

The command table and mapping table are shown as follows:

Command table:

Function code	meaning	Type of operation
01	Read Coils	Bit operation
02	Read Discrete Inputs	Bit operation
03	Read Holding Registers	Word operation
04	Read Input Registers	Word operation
05	Write Single Coil	Bit operation
06	Write Single Register	Word operation
15	Write Multiple Coils	Bit operation
16	Write Multiple Registers	Word operation
23	Read/Write Multiple Registers	Word operation

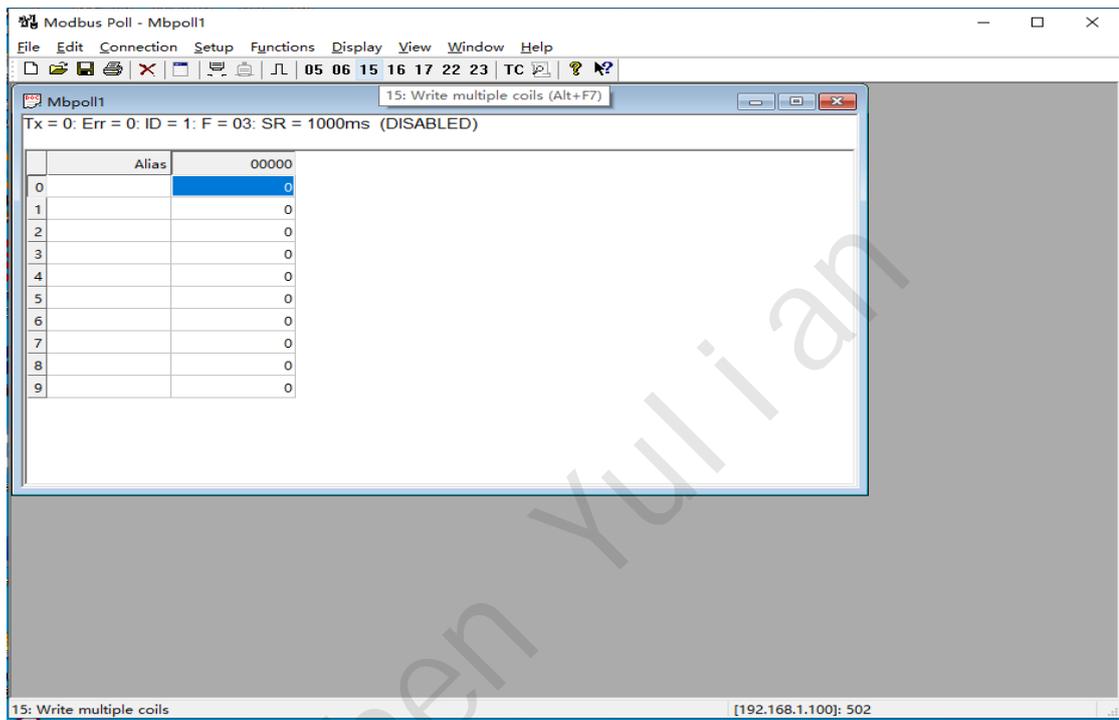
Mapping table:

I/O module address mapping table					
DI(input bit)	DO(output bit)	AI(input word)	AO(output word)	DI(input word)	DO(output word)
Function code: 01/02	Function code: 05/15	Function code: 03/04	Function code: 06/16	Function code: 03	Function code: 16
Offset start address: 0X00	Offset start address: 0X00	Offset start address: 0X00	Offset start address: 0X00	Offset start address: 0X5000	Offset start address: 0X3000
Bit address range: 0~1023	Bit address range: 0~1023	Bit address range: 0~511	Bit address range: 0~511	Bit address range: 0X5000~0X507F	Bit address range: 0X3000~0X307F
Data length range: 1~1024	Data length range: 1~1024	Data length range: 1~512	Data length range: 1~512	Data length range: 1~128	Data length range: 1~128
Offset address + length <= 1024	Offset address + length <= 1024	Offset address + length <= 512	Offset address + length <= 512	Offset address + length <= 20608	Offset address + length <= 12416

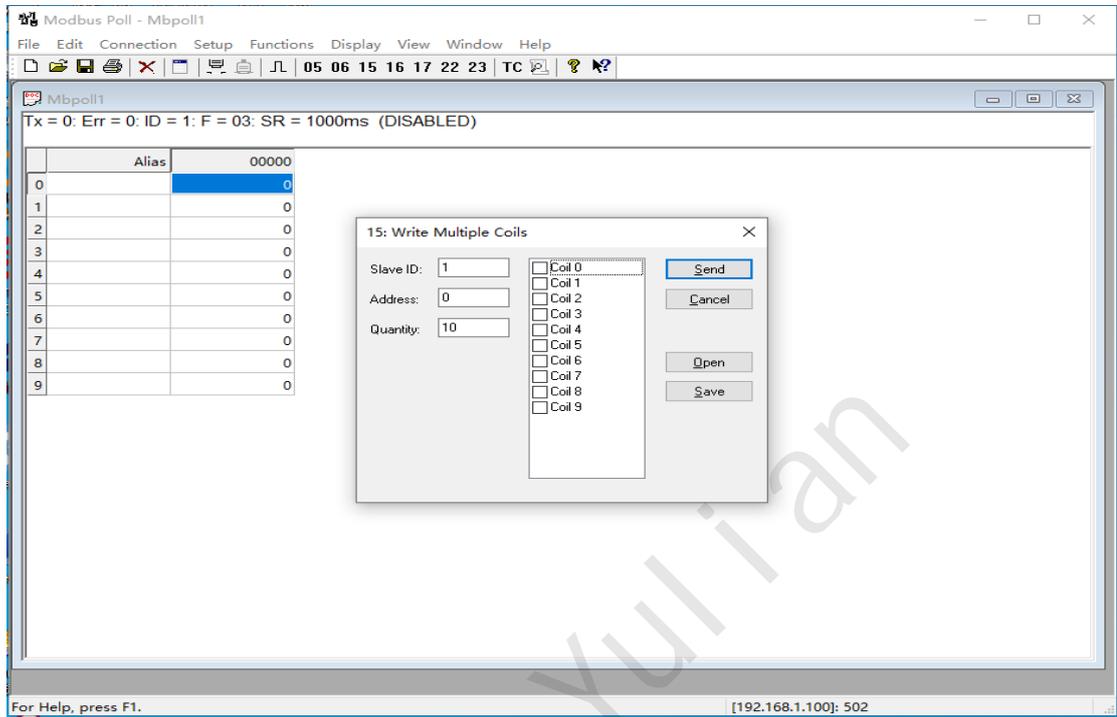
Example 1: DO output and read back the value of DI output.

write operation: According to the IO mapping table, the command codes for DO write operation are 05 and 15. Here, we use the 15 command to set multiple coil outputs.

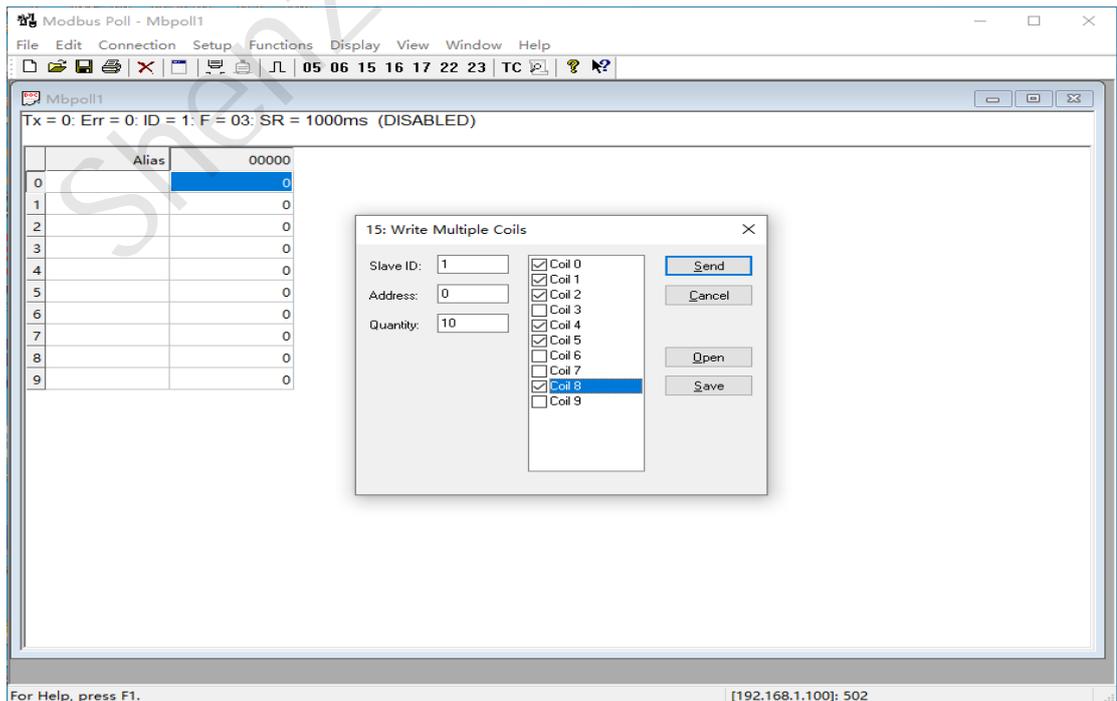
Click the 15 command code in the menu bar



Enter the operation menu, fill in the IO mapping address, then fill in the number of coils, and finally set the IO output.

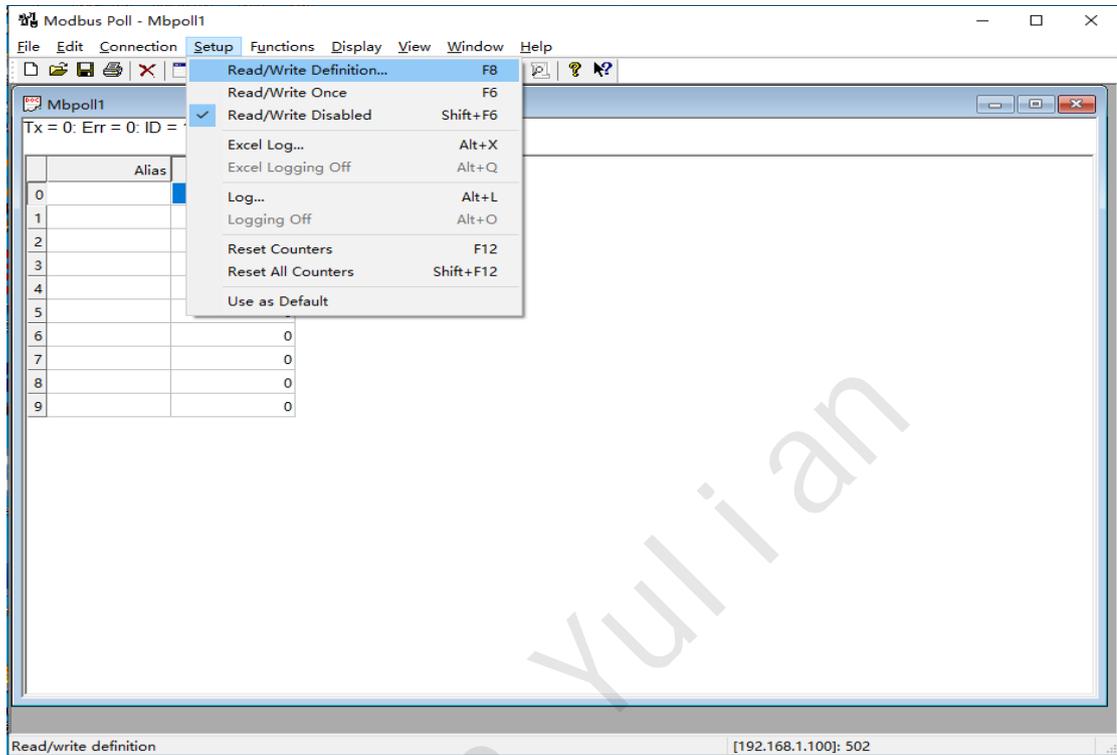


Address: The initial address of the DO mapping is 00 by default. The address is 00. Number of coils: Number of accessed IO /IO output: Click the check box on the right and set IO output to Send.

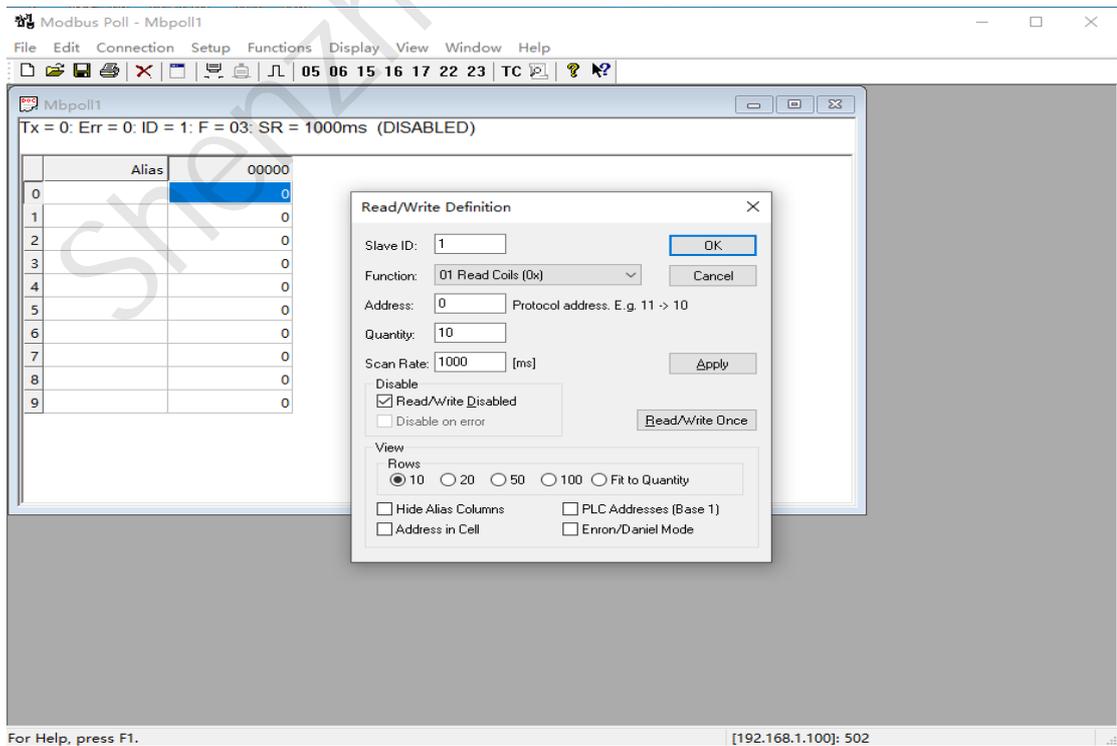


Read Actions

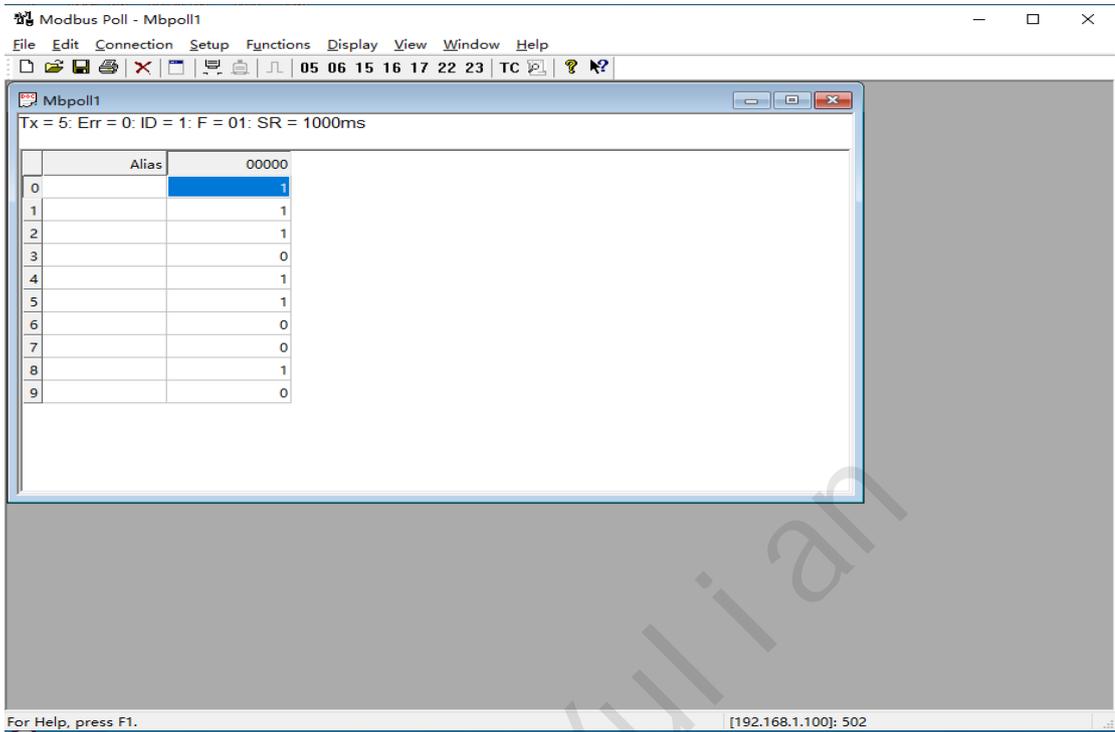
Click the Read/Write Definition option under Setup in the menu bar.



Read setting: DI data, and the read start address is 00.



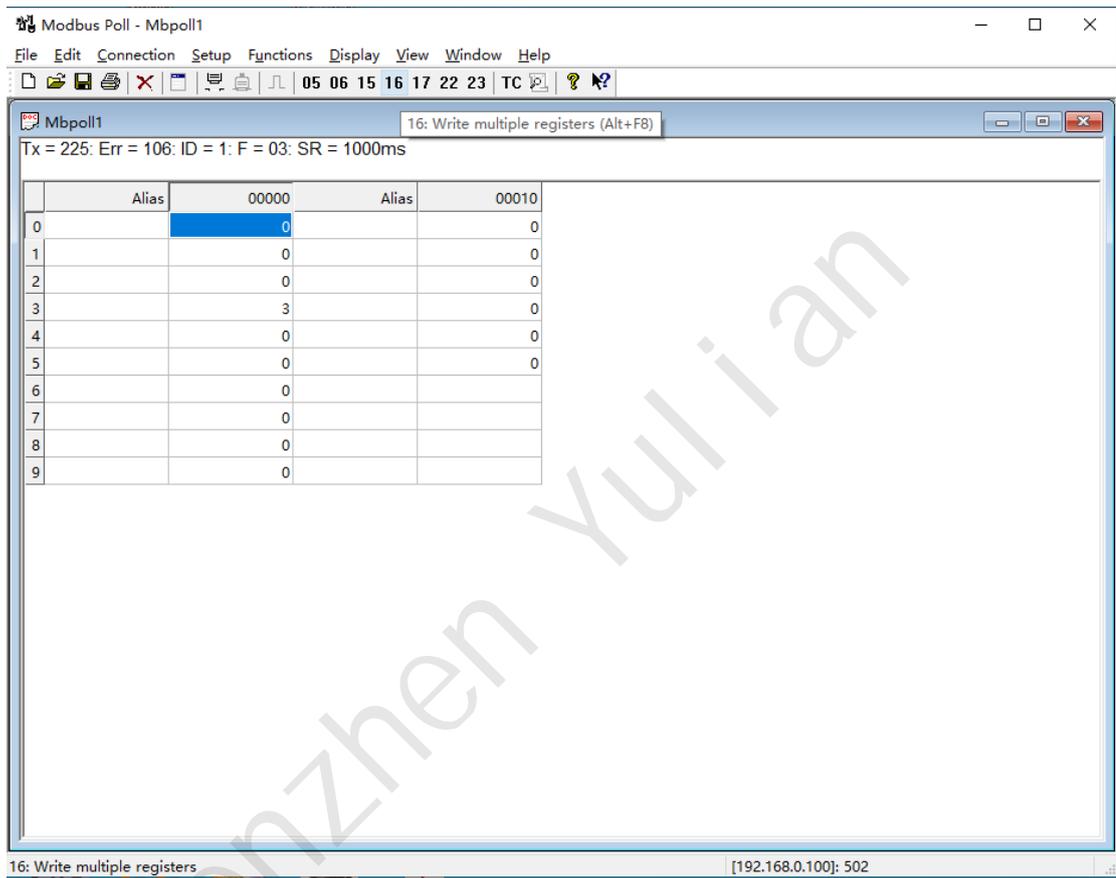
After the Settings are complete, the monitoring data is read periodically by default.



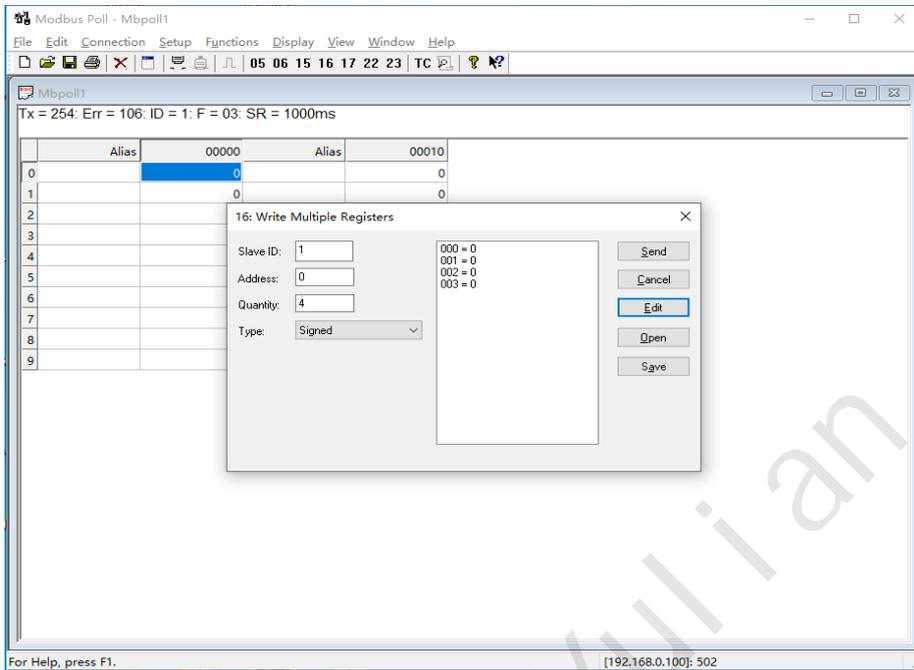
Case 2: AO output, and read back the numerical write operation of AI output.

according to the IO mapping table, the command code of AO write operation is 06 and 16, here we use the 16 command to set multiple register output.

Click the 16 command code in the menu bar.



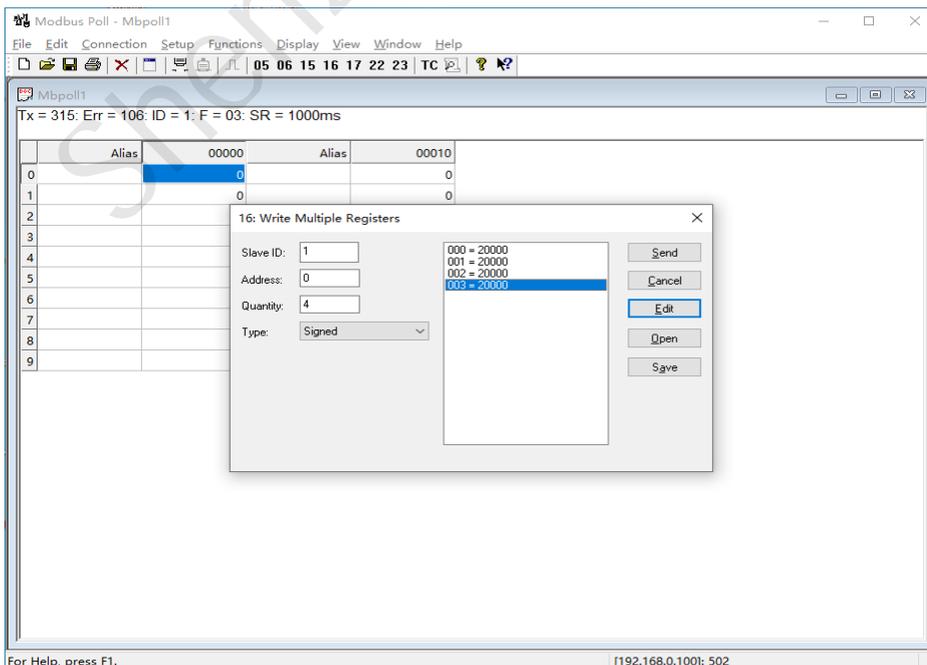
After entering the operation menu, fill in the IO mapping address, then fill in the number of registers, and finally set the register output.



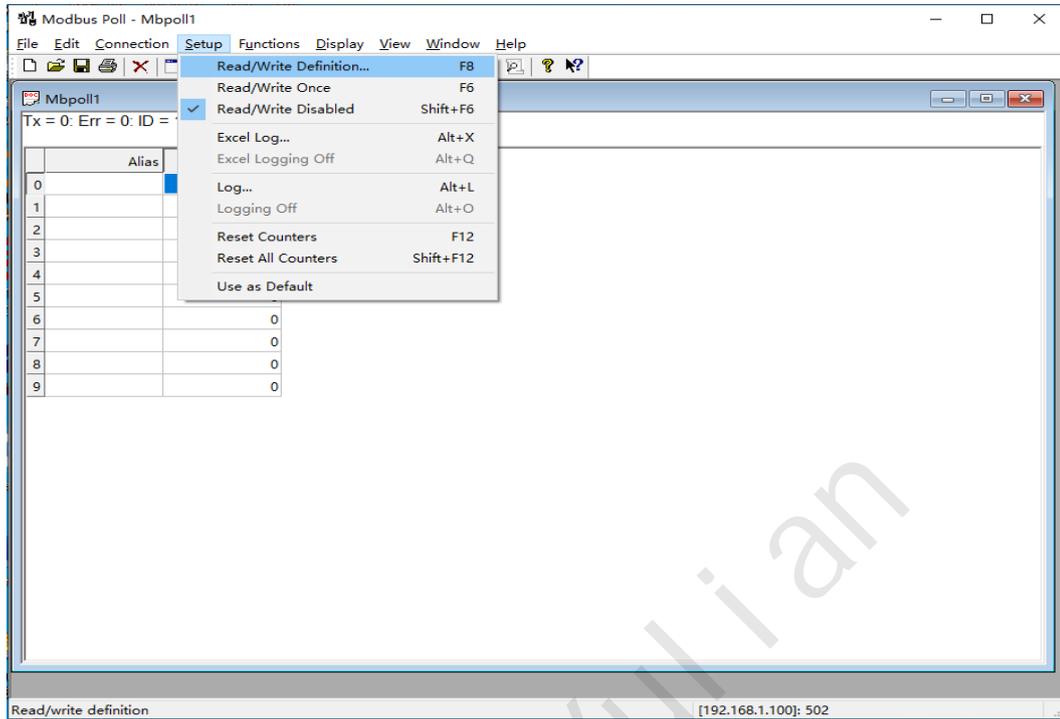
Address: The initial address of the AO mapping is 00 by default, and 00 is used here.

Quantity: Number of accessed registers /AO Output: Double-click the address value on the right to write the set value.

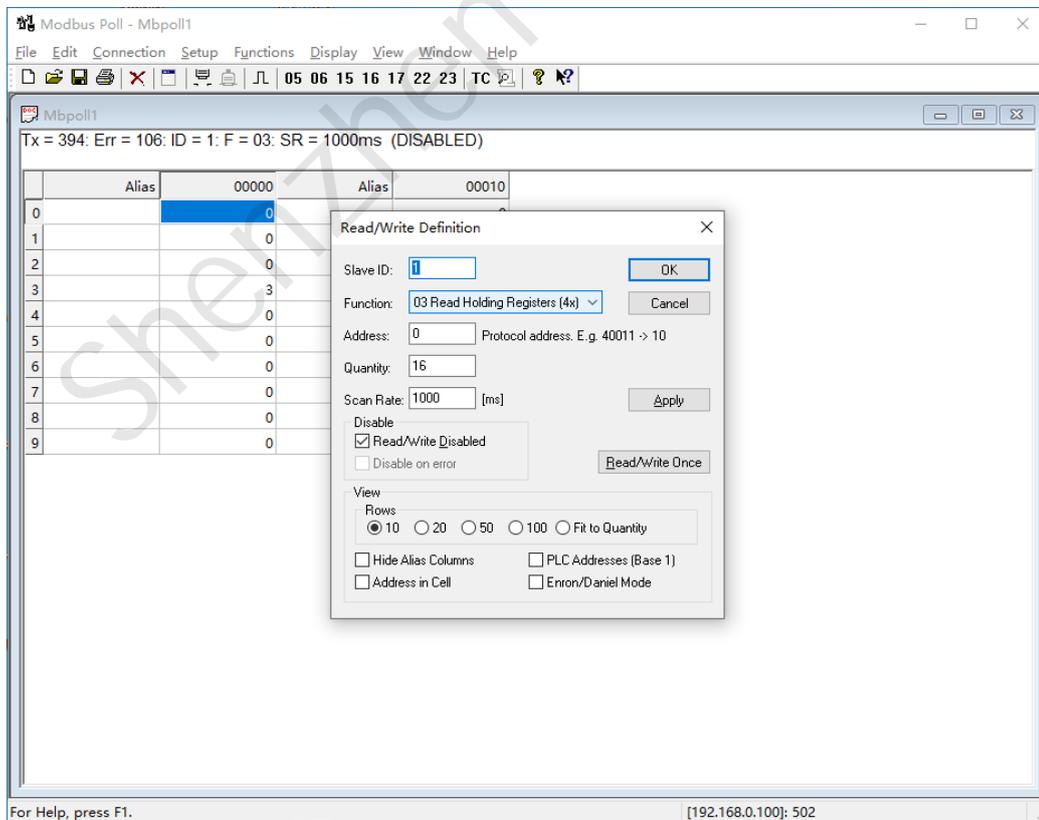
Once the AO output is set, click send.



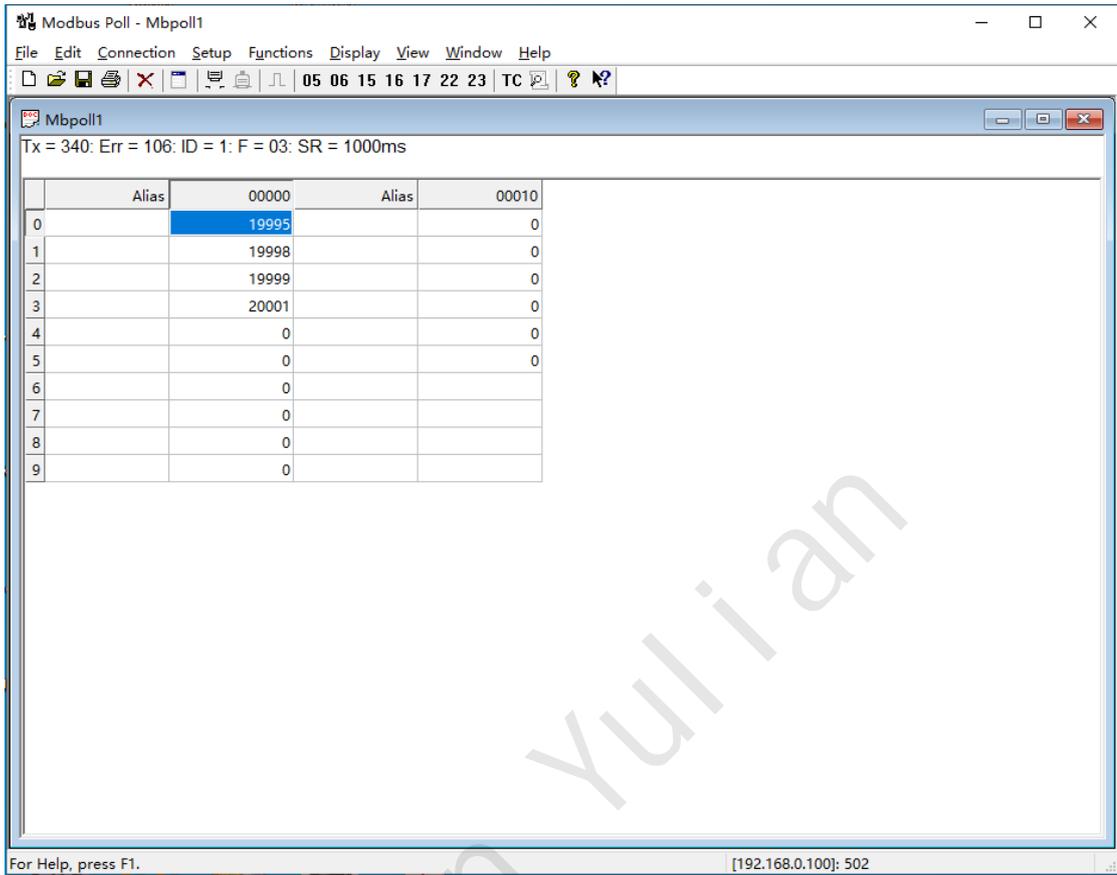
Read action: Click the Read/Write Definition option under Setup in the menu bar.



Read setting: AI data, the read start address is 00.



After the Settings are complete, the monitoring data is read periodically by default.



2.1.4 EIP10-CP (EtherNet/IP coupler module)

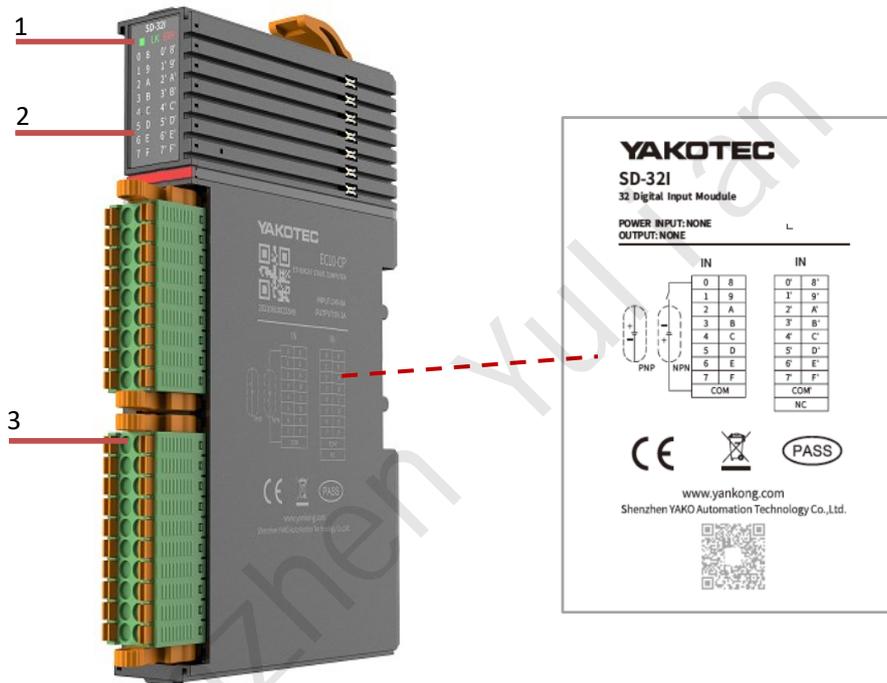
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2.2 Slave module

2.2.1 SD-32I (32 digital input module)

■ Module overview

The SD-32I is an I/O digital input module. The module has 32 digital channels, supports source and drain input, and is used with the CP series coupler module.



Serial number	name	Function definition			
1	Status light	■	Power on/running indicator	green	The module turns on when it is powered on
		LK	Communication connection indicator with the upper level	green	On when connecting to the upper-layer module. Off: indicates that the communication is abnormal
		ERR	State machine error indicator	red	Lit when the connection to the subordinate module is incorrect
2	IO signal lamp	Corresponding to each input or output signal indication, signal effective indicator light			
3	User terminal	For details, see Section Installing Cables			

■ Technical Specification

● Power supply specification

Item	Specification
Bus input power rated voltage	5V DC(4.75V DC~ 5.25V DC)
Rated current of bus input power supply	180mA (typical at 5V)
Rated input voltage of the terminal	24V DC(20.4V DC ~ 28.8V DC)
Rated current of terminal input power	130mA (typical at 24V)
Rated output voltage of the terminal	/
Rated current of the terminal output power supply	/
Module hot swap function	nonsupport

● Input Specification

Item	Specification
Input type	Digital input
Input mode	Source/drain type
Input channel	32
Input voltage level	24V DC \pm 10%(21.6V DC-26.4V DC)
Input current	3mA(typical value at 24V)
ON voltage	>15V DC
OFF voltage	<5V DC
Hardware response time ON/OFF	100us/100us
Software filtering time	support
Input impedance reference value	Reference value 9.1k-9.5k
Isolation or not	support
Input action display	When the input is in drive state, the input indicator lights up (software controlled)

● Software specification

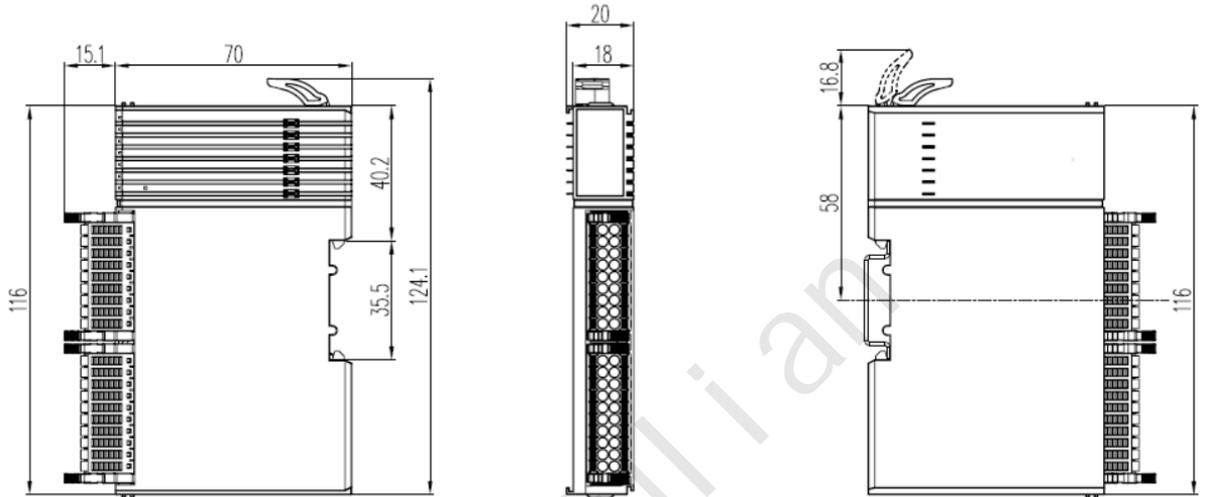
Item	Specification
Software input filtering time	No filter (factory Settings), setting range: 1ms-255ms, sharing one filter parameter
IO mapping	Supports bitwise access

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■ Installation wiring

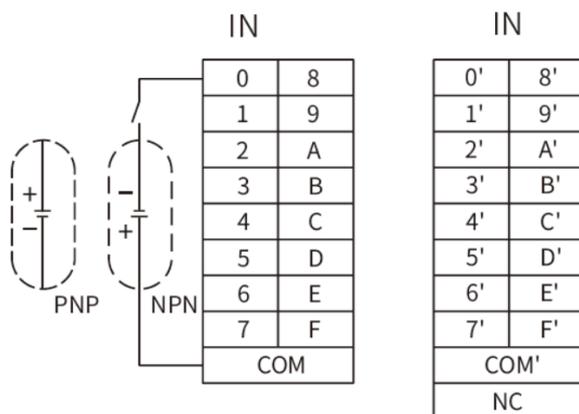
● Module size

The installation dimensions are shown in the following figure, in mm:



Note: For the installation method, see "Product Overview → 1.3 Installation and Disassembly".

● Terminal Wiring



18PIN terminal					
Terminal number	Terminal indication	Instructions	Terminal number	Terminal indication	Instructions
1	0	0 byte Input bit 0	10	8	1 byte input bit 0
2	1	0 byte Input bit 1	11	9	1 byte input bit 1
3	2	0 byte Input bit 2	12	A	1 byte input bit 2
4	3	0 byte Input bit 3	13	B	1 byte input bit 3
5	4	0 byte Input bit 4	14	C	1 byte input bit 4
6	5	0 byte Input bit 5	15	D	1 byte input bit 5
7	6	0 byte Input bit 6	16	E	1 byte input bit 6
8	7	0 byte Input bit 7	17	F	1 byte input bit 7
9	COM	0&1 bytes input public end	18	COM	0&1 bytes input public end
20 PIN terminal					
Terminal number	Terminal indication	Instructions	Terminal number	Terminal indication	Instructions
1	0'	2 byte Input bit 0	11	8'	3 byte Input bit 0
2	1'	2 byte Input bit 1	12	9'	3 byte Input bit 1
3	2'	2 byte Input bit 2	13	A'	3 byte Input bit 2
4	3'	2 byte Input bit 3	14	B'	3 byte Input bit 3
5	4'	2 byte Input bit 4	15	C'	3 byte Input bit 4
6	5'	2 byte Input bit 5	16	D'	3 byte Input bit 5
7	6'	2 byte Input bit 6	17	E'	3 byte Input bit 6
8	7'	2 byte Input bit 7	18	F'	3 byte Input bit 7
9	COM'	2&3 bytes input public end	19	COM'	2&3 bytes input public end
10	NC	empty	20	NC	empty

Note:

When COM port is connected to the positive terminal of 24V power supply, the input low level is effective (NPN input); When the GND ground is connected, the input level is high (PNP input).

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■ Use

● Parameter definition

The reference value of the data object dictionary index is set

index	16#9000+n (n indicates the module number)				
subindex	name	Data type	Access mode	Mapping capability	Default value
16#00	Index	USINT	RO	NO	/
16#01	32DI_Configuration	UDINT	RW	NO	16#0000 0000

Configuration value:

position	Instructions
Bit0-7	16# 000000 __ : Input filtering coefficient =1ms * value
Bit8-15	Output Troubleshooting 16#0000 0000 (0) : Clear after the communication is interrupted 16#0000 0100 (256) : Set after the communication is interrupted 16#0000 0200 (512) : Retain the current value after the communication is interrupted Other: Retain

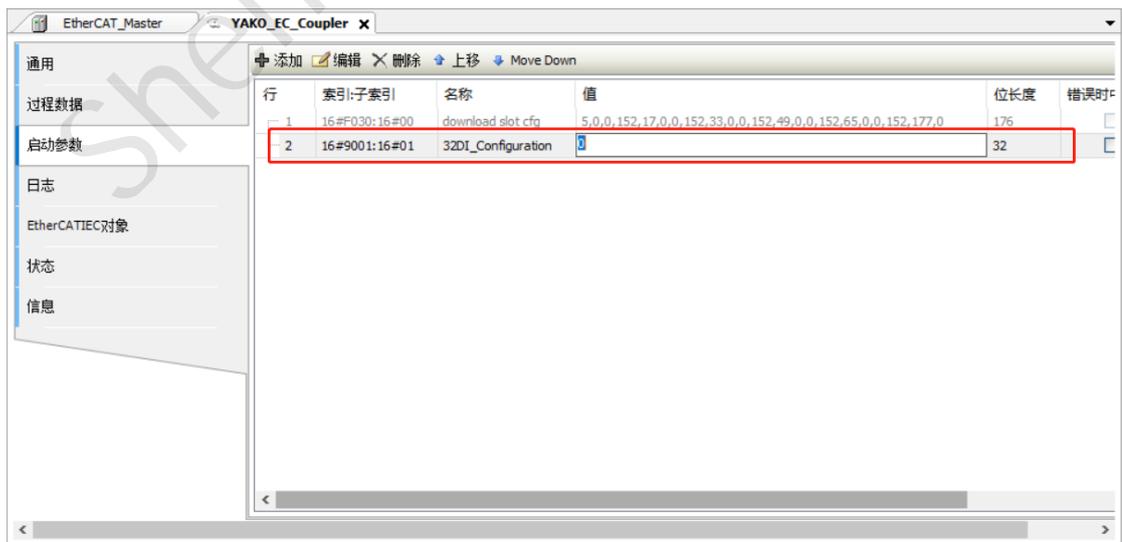
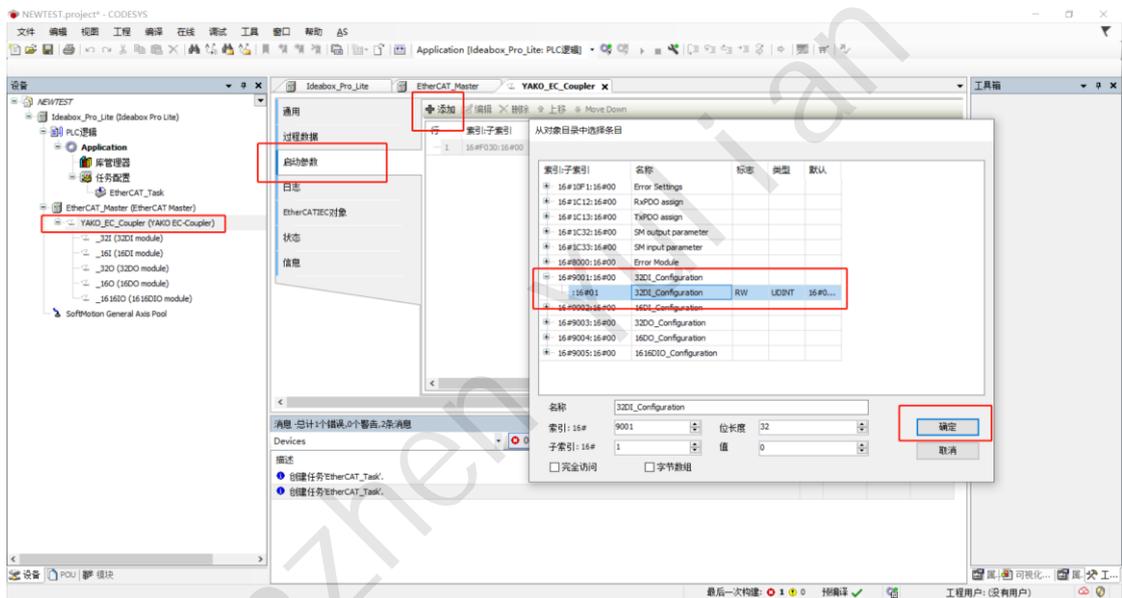
● Programming example

This example uses the CODESYS master control and EtherCAT Coupler module (EC10-CP) as the demonstration environment.

Refer to 2.1.1 → Use → Application in CODESYS Software Environment for the coupler configuration.

The steps for configuring SD-32I module parameters are as follows:

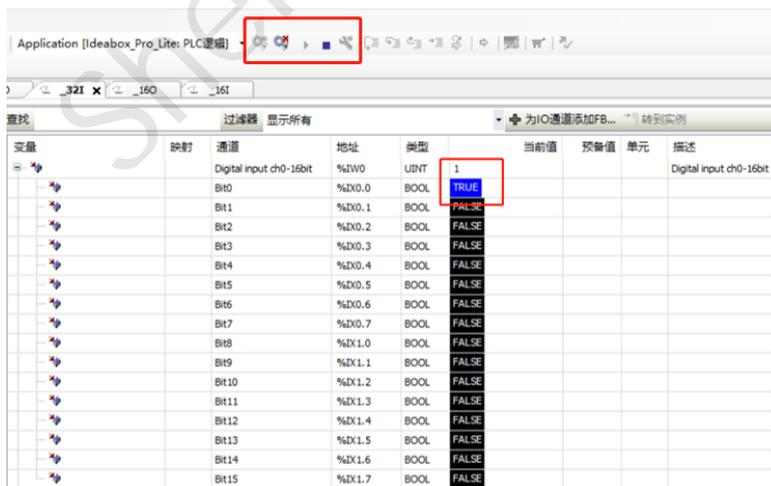
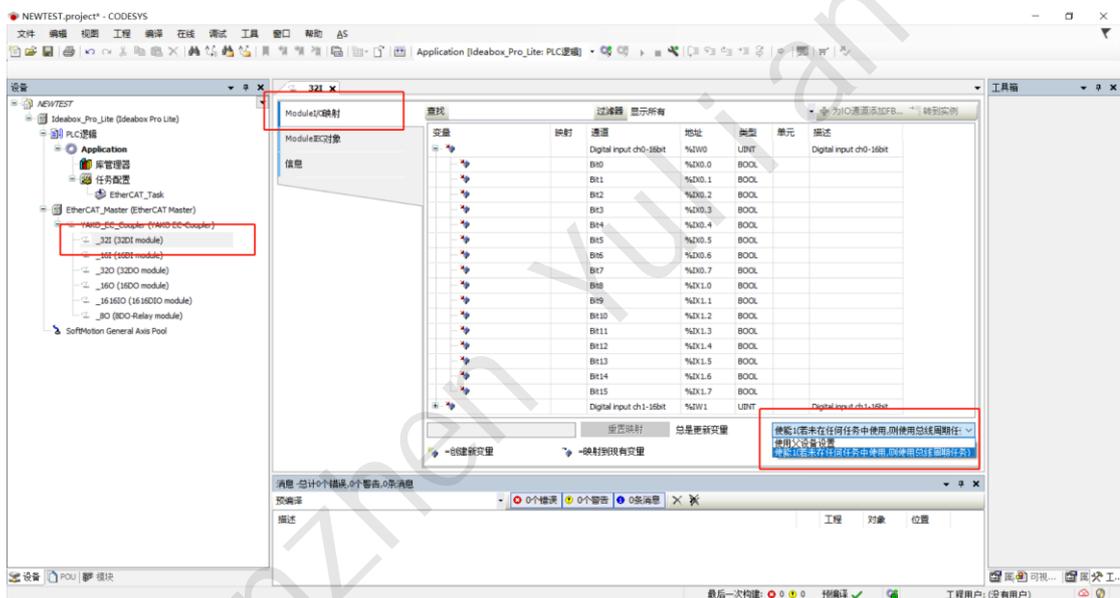
Click YAKO EC-Coupler → Startup parameters → Add → 32DI_Configuration



DI_Configuration indicates the input filtering parameter: Filtering time (ms) =1ms x Configuration value.

After module parameters are configured, click to go to Module → module/O Mapping → Change device Settings to Enable 1 → Log in to the device → Download and start the program;

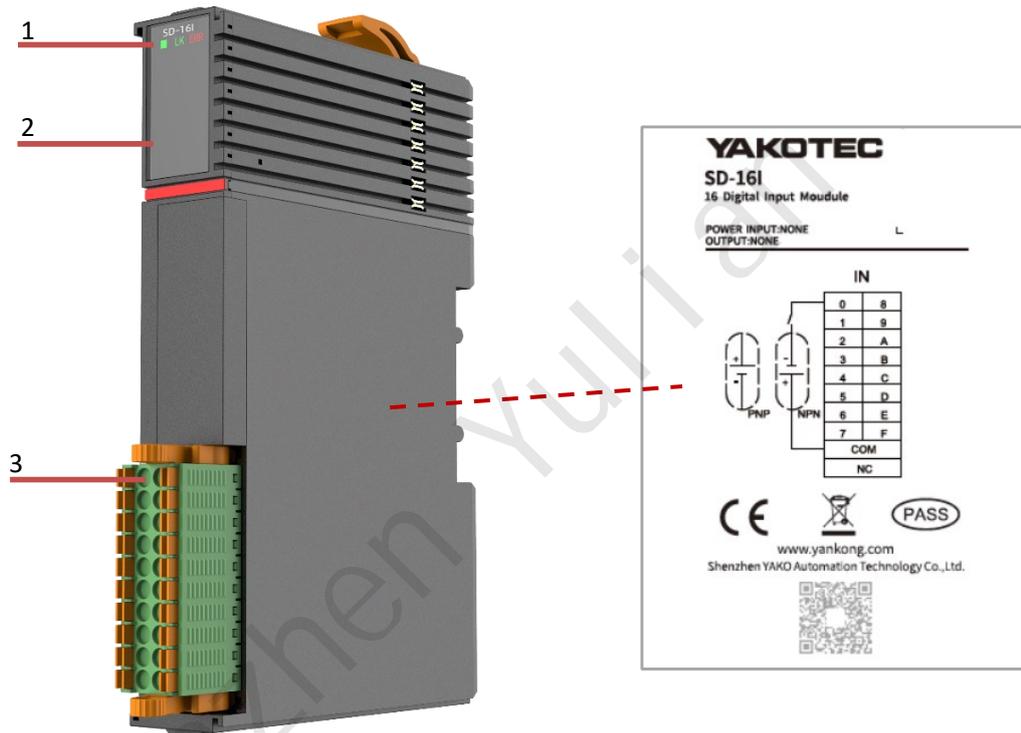
Example: SD-32I module: The default parameter is 0, and the external access input signal is displayed. Observe the indicator of the channel corresponding to the slave station. When the indicator is on, and the current value of the module changes to TURE, it indicates that the module is normal.



2.2.2 SD-16I (16 digital input module)

■ Module overview

The SD-16I is an I/O digital input module. The module has 16 digital channels, supports source type and drain type input, and is used with CP series coupler module.



Serial number	name	Function definition			
1	Status light	■	Power on/running indicator	Green	The module turns on when it is powered on
		LK	Communication connection indicator with the upper level	Green	On when connecting to the upper-layer module. Off: indicates that the communication is abnormal
		ERR	State machine error indicator	Red	Lit when the connection to the subordinate module is incorrect
2	IO signal lamp	Corresponding to each input or output signal indication, signal effective indicator light			
3	User terminal	For details, see section 123 Installing Cables			

■ Technical Specification

● Power supply specification

Item	Specification
Bus input power rated voltage	5V DC(4.75V DC~ 5.25V DC)
Rated current of bus input power supply	180mA (typical at 5V)
Rated input voltage of the terminal	24V DC(20.4V DC ~ 28.8V DC)
Rated current of terminal input power	130mA (typical at 24V)
Rated output voltage of the terminal	/
Rated current of the terminal output power supply	/
Module hot swap function	nonsupport

● Input Specification

Item	Specification
Input type	Digital input
Input mode	Source/drain type
Input channel	16
Input voltage level	24V DC \pm 10%(21.6V DC-26.4V DC)
Input current	3mA(typical value at 24V)
ON voltage	>15V DC
OFF voltage	<5V DC
Hardware response time ON/OFF	100us/100us
Software filtering time	support
Input impedance reference value	Reference value 9.1k-9.5k
Isolation or not	support
Input action display	When the input is in drive state, the input indicator lights up (software controlled)

● Software specification

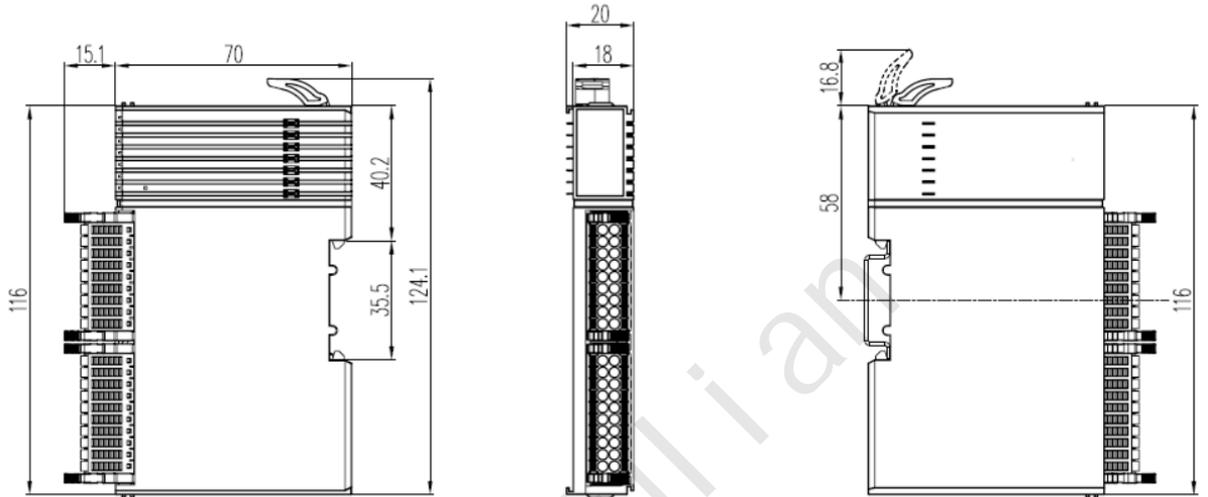
Item	Specification
Software input filtering time	No filter (factory Settings), setting range: 1ms-255ms, sharing one filter parameter
IO mapping	Supports bitwise access

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■ Installation wiring

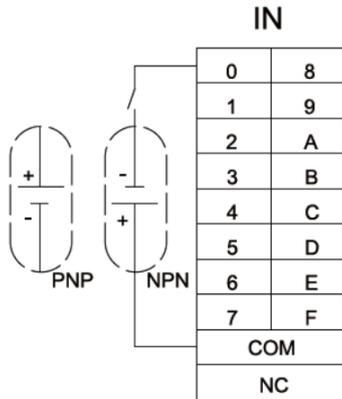
● Module size

The installation dimensions are shown in the following figure, in mm:



Note: For the installation method, see "Product Overview → 1.3 Installation and Disassembly".

● Terminal Wiring



18 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1			10		
2			11		
3			12		
4			13		
5			14		
6			15		
7			16		
8			17		
9			18		
20 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1	0	0 byte Input bit 0	11	8	1 byte input bit 0
2	1	0 byte Input bit 1	12	9	1 byte input bit 1
3	2	0 byte Input bit 2	13	A	1 byte input bit 2
4	3	0 byte Input bit 3	14	B	1 byte input bit 3
5	4	0 byte Input bit 4	15	C	1 byte input bit 4
6	5	0 byte Input bit 5	16	D	1 byte input bit 5
7	6	0 byte Input bit 6	17	E	1 byte input bit 6
8	7	0 byte Input bit 7	18	F	1 byte input bit 7
9	COM	0&1 bytes input public end	19	COM	0&1 bytes input public end
10	NC	empty	20	NC	empty

Note: When the COM port is connected to the positive pole of a 24V power supply, the low level input is effective (NPN input); When connected to GND ground, the high level input is effective (PNP input).

Shenzhen Yulian

■ Use

● Parameter definition

The reference value of the data object dictionary index is set :

index	16#9000+n (n indicates the module number)				
subindex	name	Data type	Access mode	Mapping capability	Default value
16#00	Index	USINT	RO	NO	/
16#01	16DI_Configuration	UDINT	RW	NO	16#0000 0000

Configuration value:

位	说明
Bit0-7	16# 000000 __ : Input filtering coefficient =1ms * value
Bit8-15	Output Troubleshooting 16#0000 0000 (0) : Clear after the communication is interrupted 16#0000 0100 (256) : Set after the communication is interrupted 16#0000 0200 (512) : Retain the current value after the communication is interrupted Other: Retain

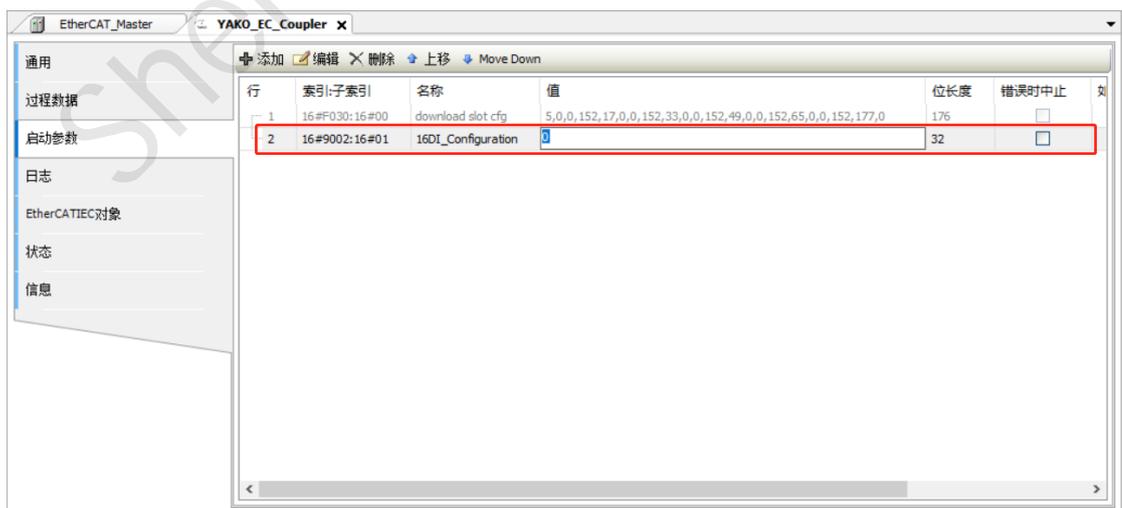
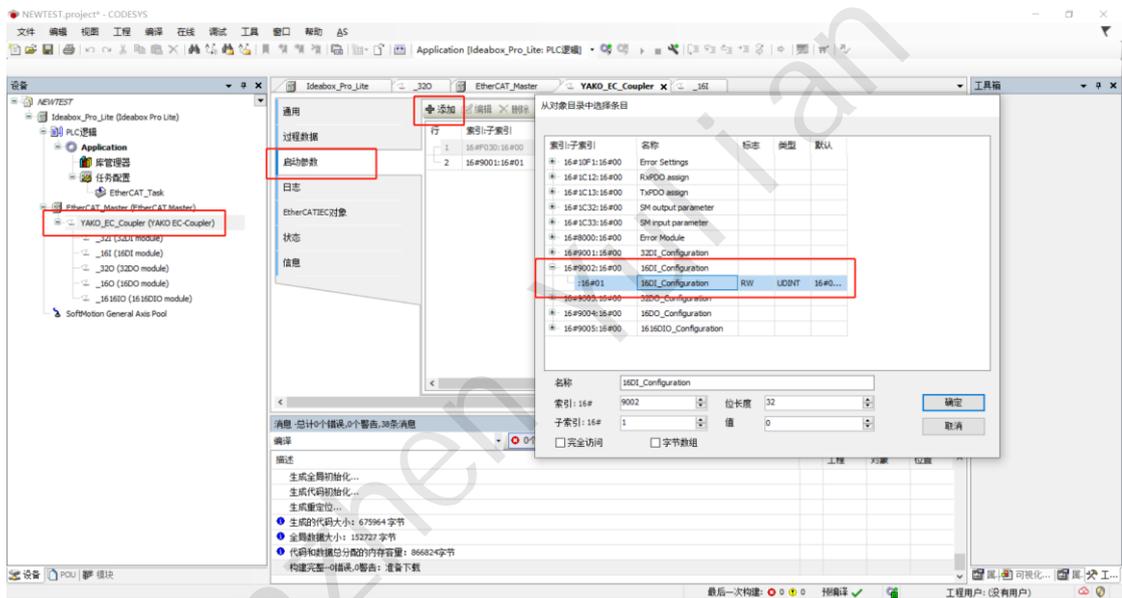
● Programming example

This example uses the CODESYS master control and EtherCAT Coupler module (EC10-CP) as the demonstration environment.

Refer to 2.1.1 → Use → Application in CODESYS Software Environment for the coupler configuration.

The steps for configuring SD-16I module parameters are as follows:

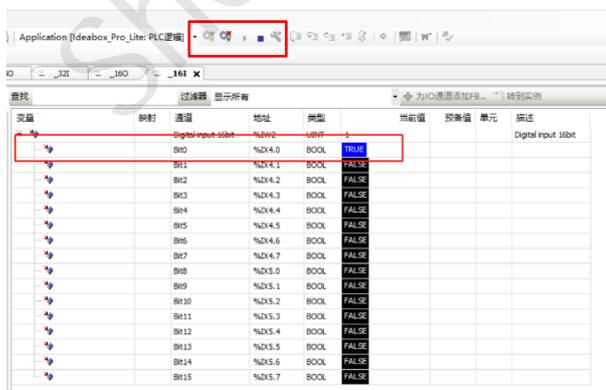
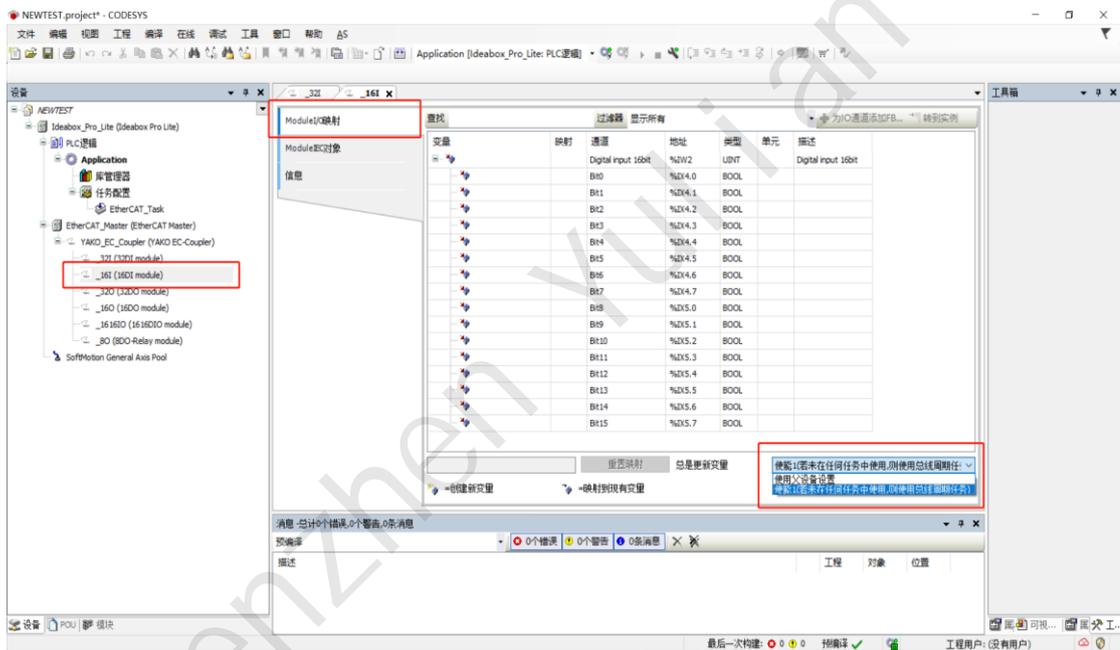
Click YAKO EC-Coupler → Startup parameters → Add → 16DI_Configuration



DI_Configuration indicates the input filtering parameter: Filtering time (ms) =1ms x Configuration value.

After module parameters are configured, click to go to Module → module/I/O Mapping → Change device Settings to Enable 1 → Log in to the device → Download and start the program;

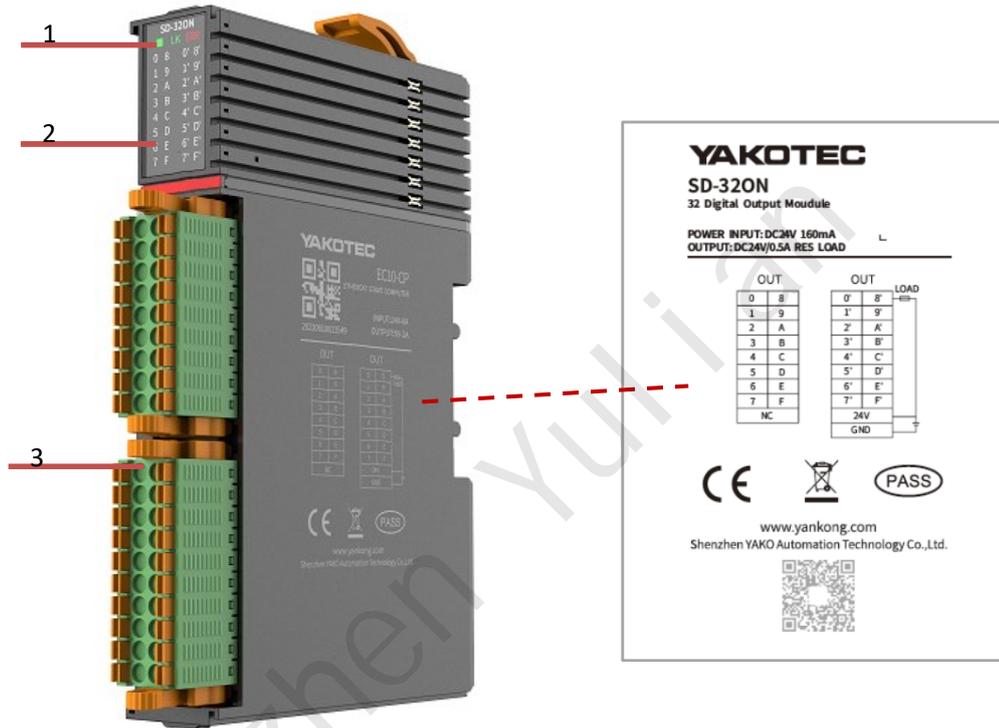
Example: SD-16I module: The default parameter is 0, and the external access input signal is displayed. Observe the indicator of the channel corresponding to the slave station. When the indicator is on, the current value of the module changes to TURE, indicating that the module is normal.



2.2.3 SD-32ON (32 digital output module -NPN)

■ Module overview

The SD-32ON is an I/O digital output module. The module has 32 digital channels, supports leaky output and is used with the CP series coupler module.



Serial number	name	Function definition			
1	Status light	■	Power on/running indicator	green	The module turns on when it is powered on
		LK	LK and upper-level communication connection indicator	green	On when connecting to the upper-layer module. Off: indicates that the communication is abnormal
		ERR	State machine error indicator	red	Lit when the connection to the subordinate module is incorrect
2	IO signal lamp	Corresponding to each input or output signal indication, signal effective indicator light			
3	User terminal	For details, see Section Installing Cables			

■ Technical Specification

● Power supply specification

Item	Specification
Bus input power rated voltage	5V DC(4.75V DC~ 5.25V DC)
Rated current of bus input power supply	200mA (typical at 5V)
Rated input voltage of the terminal	24V DC(20.4V DC ~ 28.8V DC)
Rated current of terminal input power	24mA (typical at 24V)
Rated output voltage of the terminal	/
Rated current of the terminal output power supply	/
Module hot swap function	nonsupport

● Output Specification

Item	Specification
Output type	Digital output, transistor low side output
Output mode	Drain type
Output channel	32
Output voltage level	24V DC \pm 10%(21.6V DC-26.4V DC)
Output load(Resistive load)	0.5A/point
Output load (inductive load)	7.2W/point
Output load(Lamp load)	5W/point
Hardware response time ON/OFF	100us/300us
Leakage current at OFF	10uA
Switching frequency	Resistance load 100Hz, inductor load 0.5Hz, lamp load 10Hz
Isolation or not	yes
Output action display	When the output is in drive state, the output indicator lights up (software control)
Protection function	Short circuit protection, over current protection

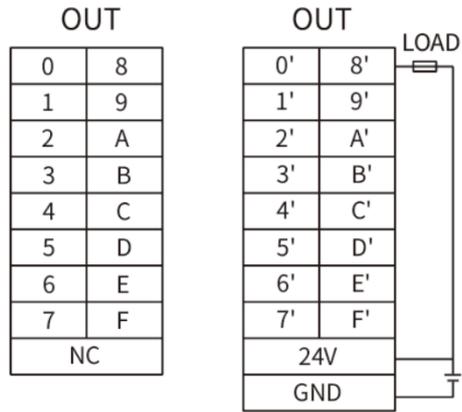
● Software specification

Item	Specification
Fault shutdown output status mode	Clear, set, and keep the current value
IO mapping	Supports bitwise access

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■ Installation wiring

● Terminal Wiring



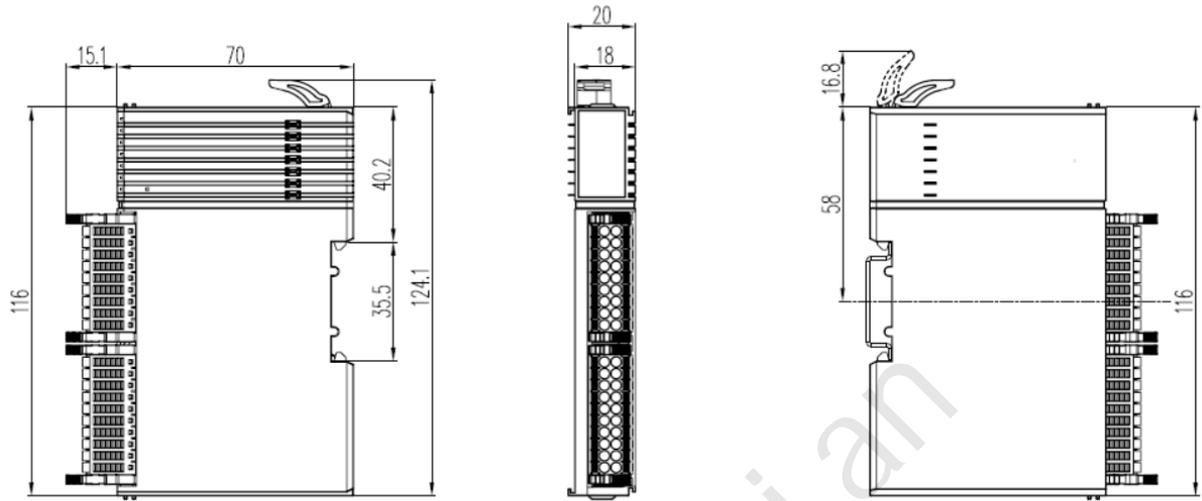
Shenzhen Yulian

18 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1	0	0 byte output bit 0	10	8	1 byte output bit 0
2	1	0 byte output bit 1	11	9	1 byte output bit 1
3	2	0 byte output bit 2	12	A	1 byte output bit 2
4	3	0 byte output bit 3	13	B	1 byte output bit 3
5	4	0 byte output bit 4	14	C	1 byte output bit 4
6	5	0 byte output bit 5	15	D	1 byte output bit 5
7	6	0 byte output bit 6	16	E	1 byte output bit 6
8	7	0 byte output bit 7	17	F	1 byte output bit 7
9	NC	Empty	18	NC	empty
20 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1	0'	2 byte output bit 0	11	8'	3 byte output bit 0
2	1'	2 byte output bit 1	12	9'	3 byte output bit 1
3	2'	2 byte output bit 2	13	A'	3 byte output bit 2
4	3'	2 byte output bit 3	14	B'	3 byte output bit 3
5	4'	2 byte output bit 4	15	C'	3 byte output bit 4
6	5'	2 byte output bit 5	16	D'	3 byte output bit 5
7	6'	2 byte output bit 6	17	E'	3 byte output bit 6
8	7'	2 byte output bit 7	18	F'	3 byte output bit 7
9	24V	Output 24V power supply positive	19	24V	Output 24V power supply positive
10	GND	Output 24V power supply negative	20	GND	Output 24V power supply negative

Note: The output module ends with letter N, and the default output is valid at a low level (NPN output).

● Module size

The installation dimensions are shown in the following figure, in mm:



Note: For the installation method, see "Product Overview → 1.3 Installation and Disassembly".

■ Use

● Parameter definition

Configure data object dictionary index reference values:

index	16#9000+n (n indicates the module number)				
subindex	name	Data type	Access mode	Mapping capability	Default value
16#00	Index	USINT	RO	NO	/
16#01	32DO_Configuration	UDINT	RW	NO	16#0000 0000

Configuration value:

position	Instructions
Bit0-7	16# 000000 __ : Input filtering coefficient =1ms * value
Bit8-15	Output Troubleshooting 16#0000 0000 (0) : Clear after the communication is interrupted 16#0000 0100 (256) : Set after the communication is interrupted 16#0000 0200 (512) : Retain the current value after the communication is interrupted Other: Retain

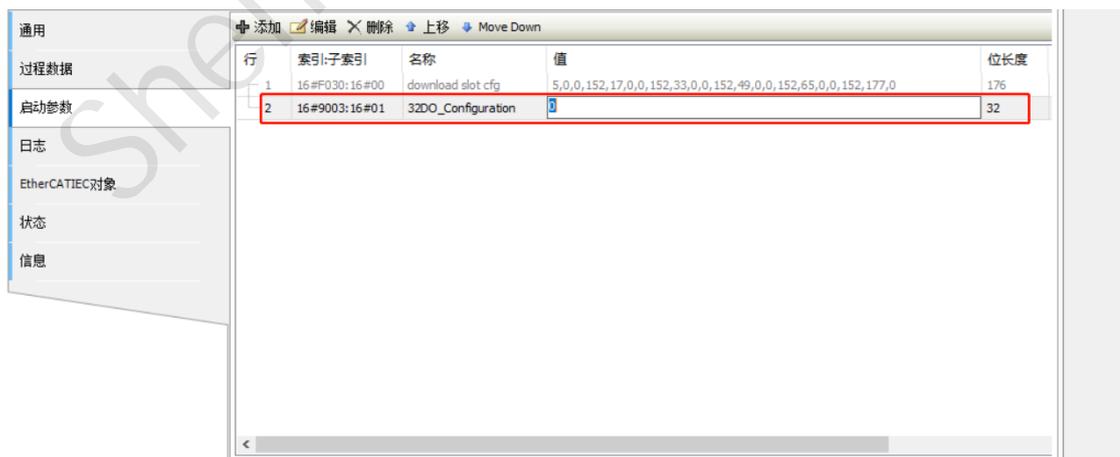
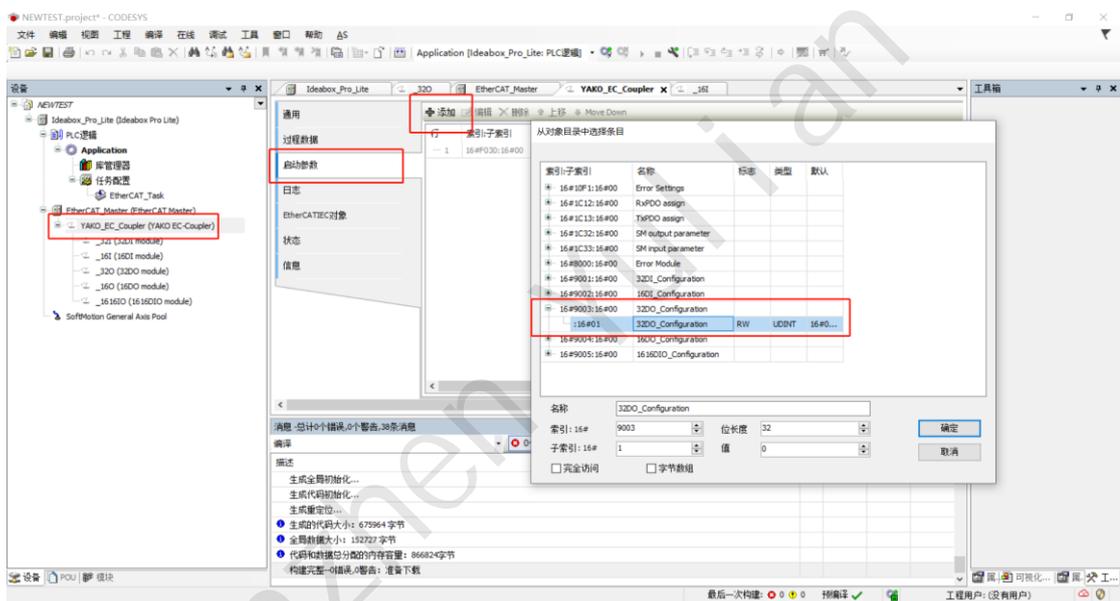
● Programming example

This example uses the CODESYS master control and EtherCAT Coupler module (EC10-CP) as the demonstration environment.

Refer to 2.1.1 → Use → Application in CODESYS Software Environment for the coupler configuration.

The steps for configuring SD-32ON module parameters are as follows:

Click YAKO EC-Coupler → Startup parameters → Add → 32DO_Configuration



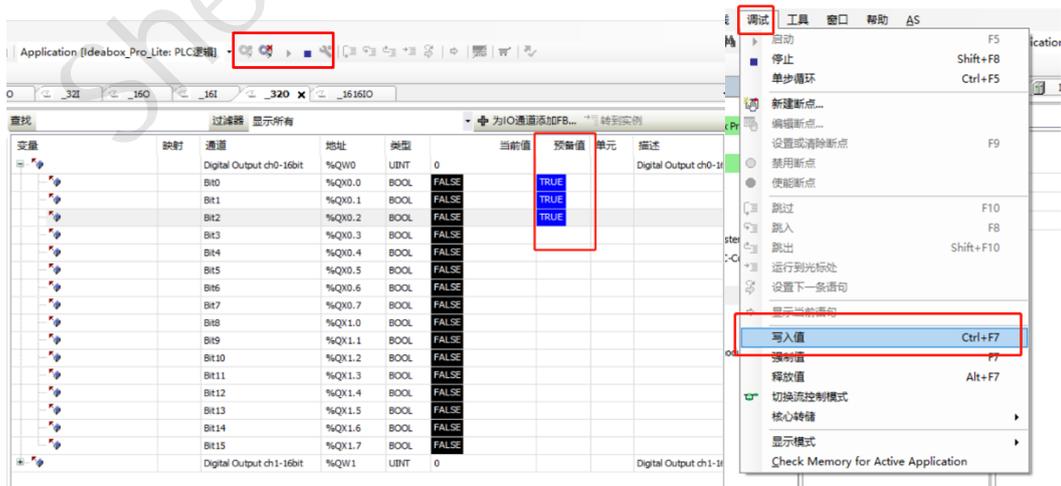
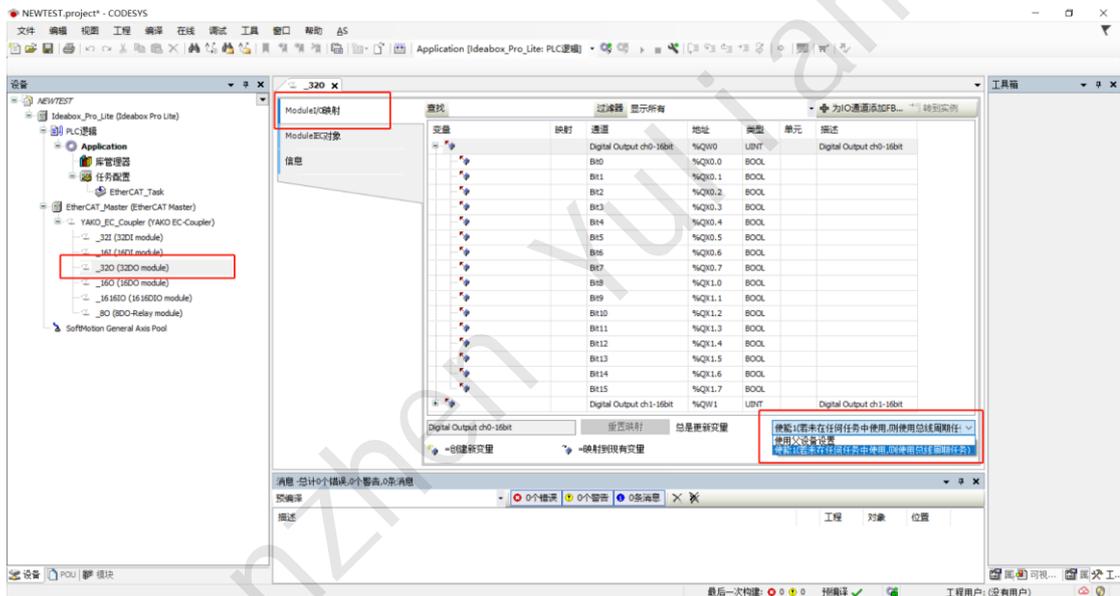
The DO_Configuration value indicates the fault shutdown output state mode.

Three modes are supported: DO_Configuration value: =0 (reset) /=256 (set) /=512 (keep the current value).

After module parameters are configured, click to go to Module → module/I/O Mapping → Change device Settings to Enable 1 → Log in to the device → Download and start the program;

Example: SD-32ON module: The default configuration parameter is 0, the channel preparation value is written to TRUE, debugging → write value;

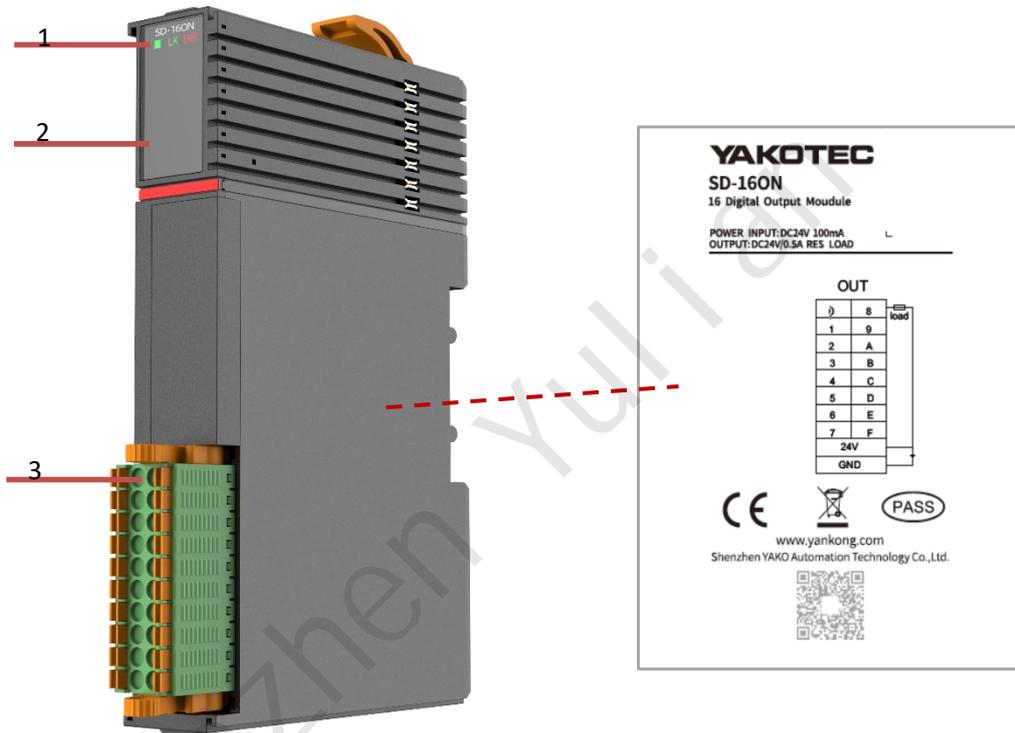
Write the reserve value to the slave station and observe the indicator of the corresponding channel of the slave station. If the indicator is on, the module is normal.



2.2.4 SD-16ON (16 digital output module -NPN)

■ Module overview

The SD-16ON is an I/O digital output module. The module has 16 digital channels, supports leakage output, and is used with the CP series coupler module.



Serial number	name	Function definition			
1	Status light	■	Power on/running indicator	green	The module turns on when it is powered on
		LK	LK and upper-level communication connection indicator	green	On when connecting to the upper-layer module. Off: indicates that the communication is abnormal
		ERR	State machine error indicator	red	Lit when the connection to the subordinate module is incorrect
2	IO signal lamp	Corresponding to each input or output signal indication, signal effective indicator light			
3	User terminal	For details, see Section Installing Cables			

■ Technical Specification

● Power supply specification

Item	Specification
Bus input power rated voltage	5V DC(4.75V DC~ 5.25V DC)
Rated current of bus input power supply	200mA (typical at 5V)
Rated input voltage of the terminal	24V DC(20.4V DC ~ 28.8V DC)
Rated current of terminal input power	24mA (typical at 24V)
Rated output voltage of the terminal	/
Rated current of the terminal output power supply	/
Module hot swap function	nonsupport

● Output Specification

Item	Specification
Output type	Digital output, transistor low side output
Output mode	Drain type
Output channel	16
Output voltage level	24V DC \pm 10%(21.6V DC-26.4V DC)
Output load(Resistive load)	0.5A/point
Output load (inductive load)	7.2W/point
Output load(Lamp load)	5W/point
Hardware response time ON/OFF	100us/300us
Leakage current at OFF	10uA
Switching frequency	Resistance load 100Hz, inductor load 0.5Hz, lamp load 10Hz
Isolation or not	yes
Output action display	When the output is in drive state, the output indicator lights up (software control)
Protection function	Short circuit protection, over current protection

● Software specification

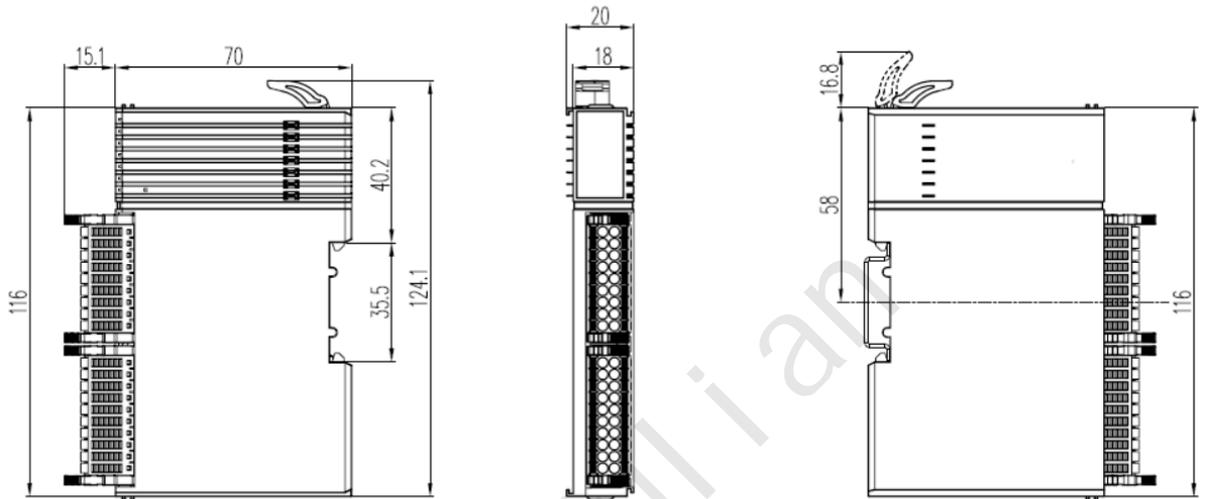
Item	Specification
Fault shutdown output status mode	Clear, set, and keep the current value
IO mapping	Supports bitwise access

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■ Installation wiring

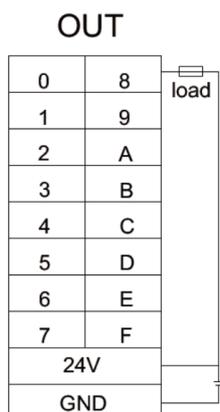
● Module size

The installation dimensions are shown in the following figure, in mm:



Note: For the installation method, see "Product Overview → 1.3 Installation and Disassembly".

● Terminal Wiring



18PIN 端子					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1			10		
2			11		
3			12		
4			13		
5			14		
6			15		
7			16		
8			17		
9			18		
20PIN 端子					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1	0	0 byte output bit 0	11	8	1 byte output bit 0
2	1	0 byte output bit 1	12	9	1 byte output bit 1
3	2	0 byte output bit 2	13	A	1 byte output bit 2
4	3	0 byte output bit 3	14	B	1 byte output bit 3
5	4	0 byte output bit 4	15	C	1 byte output bit 4
6	5	0 byte output bit 5	16	D	1 byte output bit 5
7	6	0 byte output bit 6	17	E	1 byte output bit 6
8	7	0 byte output bit 7	18	F	1 byte output bit 7
9	24V	Output 24V power supply positive	19	24V	Output 24V power supply positive
10	GND	Output 24V power supply negative	20	GND	Output 24V power supply negative

Note: The output module ends with letter N, and the default output is valid at a low level (NPN output).

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■ Use

● Parameter definition

The reference value of the data object dictionary index is set:

index	16#9000+n (n indicates the module number)				
subindex	name	Data type	Access mode	Mapping capability	Default value
16#00	Index	USINT	RO	NO	/
16#01	16DO_Configuration	UDINT	RW	NO	16#0000 0000

Configuration value:

position	Instructions
Bit0-7	16# 000000 __ : Input filtering coefficient =1ms * value
Bit8-15	Output Troubleshooting 16#0000 0000 (0) : Clear after the communication is interrupted 16#0000 0100 (256) : Set after the communication is interrupted 16#0000 0200 (512) : Retain the current value after the communication is interrupted Other: Retain

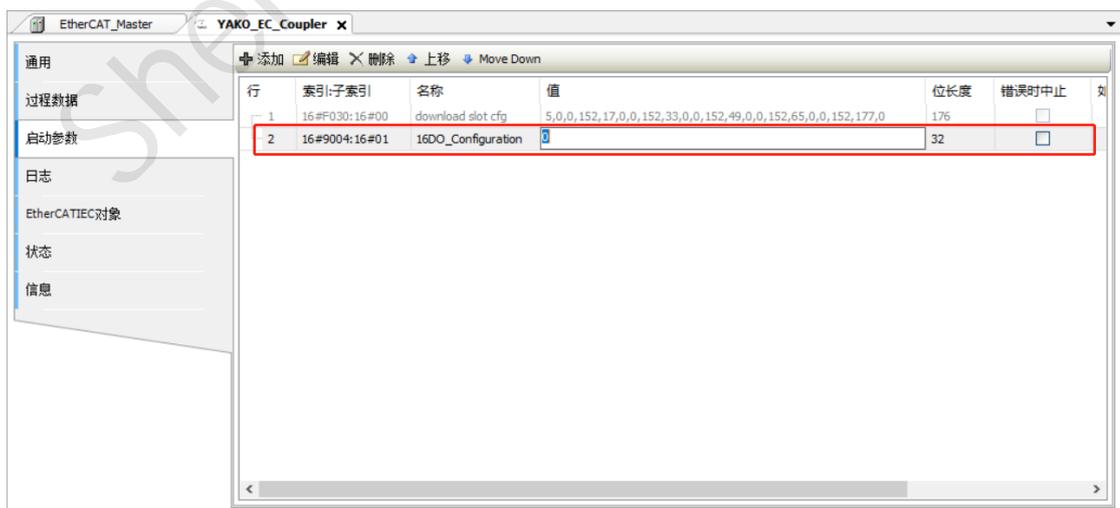
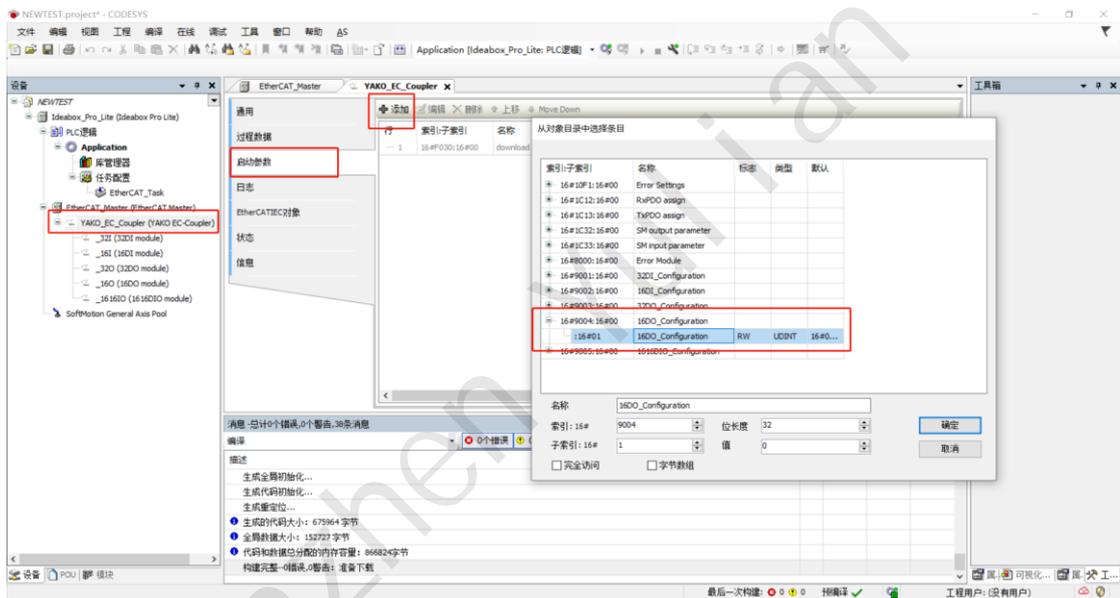
● Programming example

This example uses the CODESYS master control and EtherCAT Coupler module (EC10-CP) as the demonstration environment.

Refer to 2.1.1 → Use → Application in CODESYS Software Environment for the coupler configuration.

The steps for configuring SD-16ON module parameters are as follows:

Click YAKO EC-Coupler → Startup parameters → Add → 16DO_Configuration



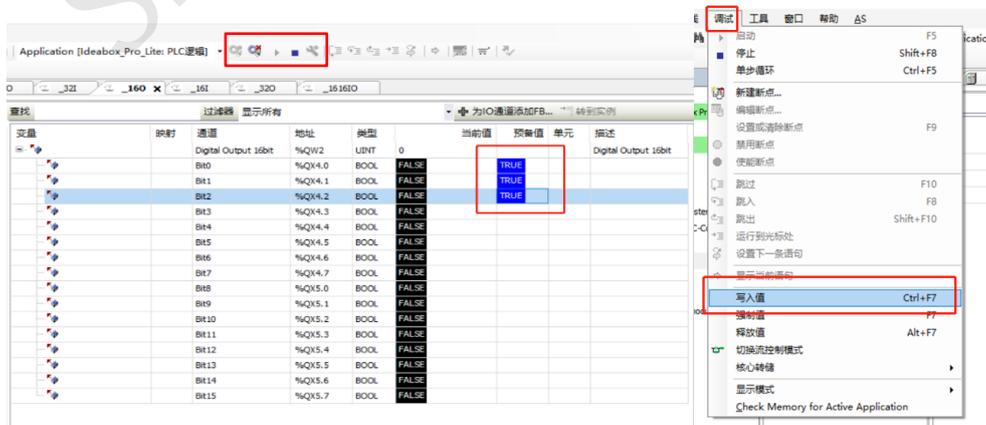
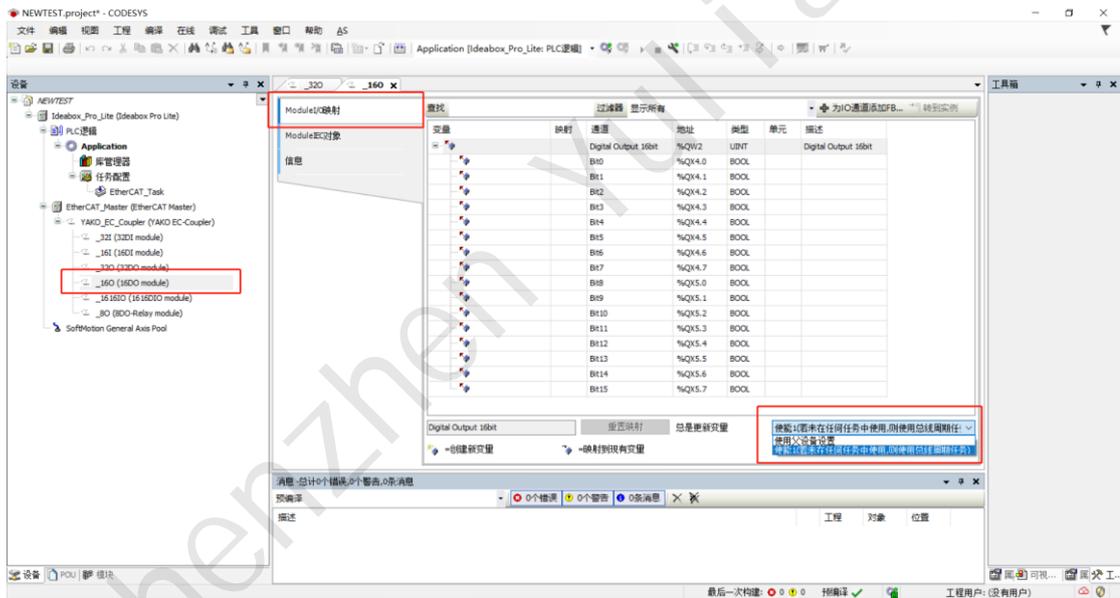
The DO_Configuration value indicates the fault shutdown output state mode. Three modes are supported:

DO_Configuration value: =0 (reset) /=256 (set) /=512 (keep the current value).

After module parameters are configured, click to go to Module → module/O Mapping → Change device Settings to Enable 1 → Log in to the device → Download and start the program;

Example: SD-16ON module: The default configuration parameter is 0, the channel preparation value is written to TRUE, debugging → write value;

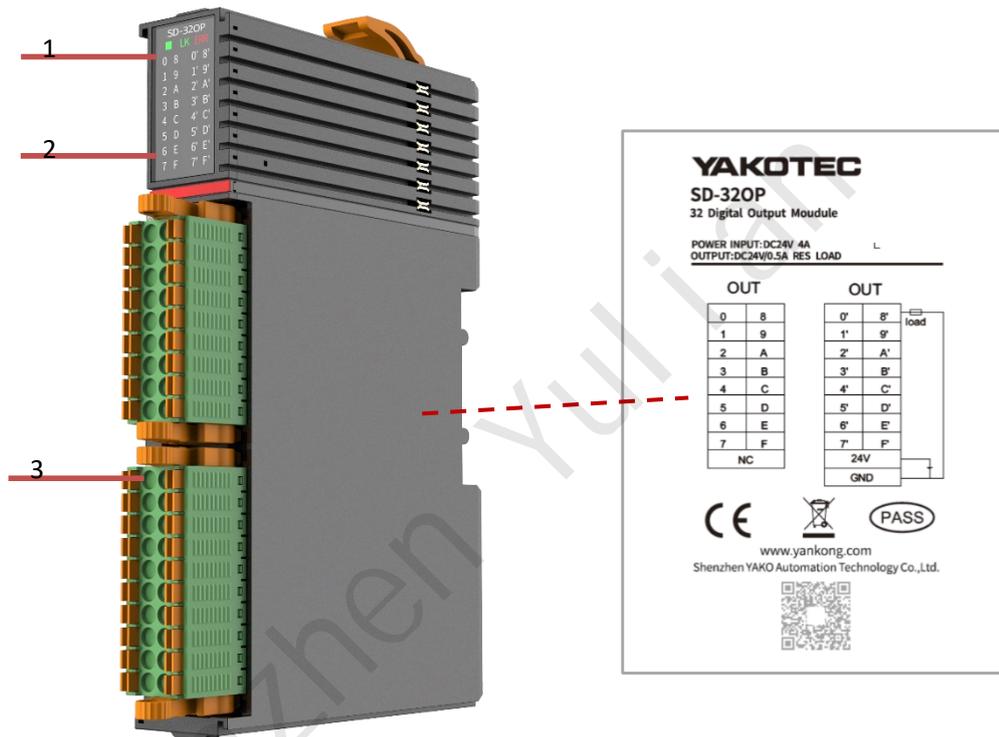
Write the reserve value to the slave station and observe the indicator of the corresponding channel of the slave station. If the indicator is on, the module is normal.



2.2.5 SD-32OP (32 digital output module -PNP)

■ Module overview

The SD-32OP is an I/O digital output module. The module has 32 digital channels, supports source-type output and is used with the CP series coupler module.



Serial number	name	Function definition			
1	Status light	■	Power on/running indicator	green	The module turns on when it is powered on
		LK	LK and upper-level communication connection indicator	green	On when connecting to the upper-layer module. Off: indicates that the communication is abnormal
		ERR	State machine error indicator	red	Lit when the connection to the subordinate module is incorrect
2	IO signal lamp	Corresponding to each input or output signal indication, signal effective indicator light			
3	User terminal	For details, see Section Installing Cables			

■ Technical Specification**● Power supply specification**

Item	Specification
Bus input power rated voltage	5V DC(4.75V DC~ 5.25V DC)
Rated current of bus input power supply	200mA (typical at 5V)
Rated input voltage of the terminal	24V DC(20.4V DC ~ 28.8V DC)
Rated current of terminal input power	4A (typical at 24V)
Rated output voltage of the terminal	/
Rated current of the terminal output power supply	/
Module hot swap function	nonsupport

● Output Specification

Item	Specification
Output type	Digital output, transistor low side output
Output mode	Source type
Output channel	32
Output voltage level	24V DC \pm 10%(21.6V DC-26.4V DC)
Output load(Resistive load)	0.5A/point
Output load (inductive load)	7.2W/point
Output load(Lamp load)	5W/point
Hardware response time ON/OFF	100us/300us
Leakage current at OFF	10uA
Switching frequency	Resistance load 100Hz, inductor load 0.5Hz, lamp load 10Hz
Isolation or not	yes
Output action display	When the output is in drive state, the output indicator lights up (software control)
Protection function	Short circuit protection, over current protection

● Software specification

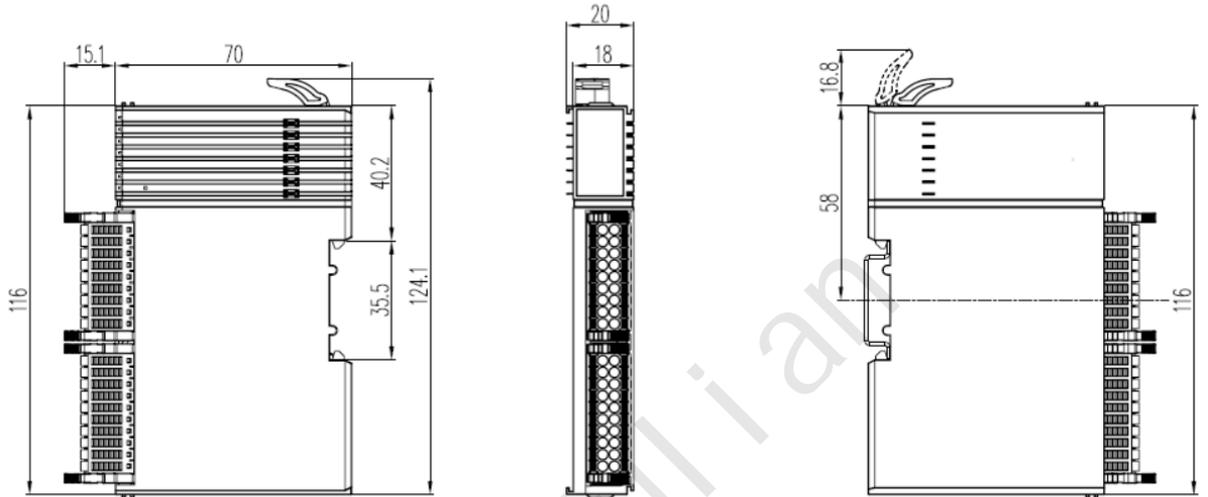
Item	Specification
Fault shutdown output status mode	Clear, set, and keep the current value
IO mapping	Supports bitwise access

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■ Installation wiring

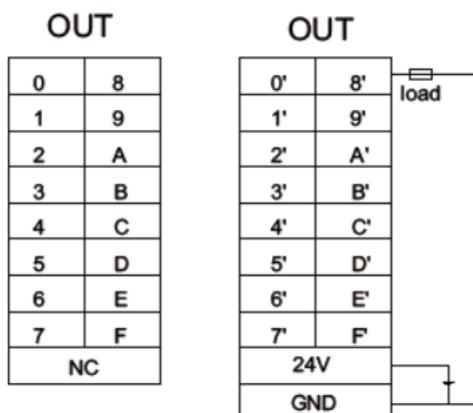
● Module size

The installation dimensions are shown in the following figure, in mm:



Note: For the installation method, see "Product Overview → 1.3 Installation and Disassembly".

● Terminal Wiring



18 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1	0	0 byte output bit 0	10	8	1 byte output bit 0
2	1	0 byte output bit 1	11	9	1 byte output bit 1
3	2	0 byte output bit 2	12	A	1 byte output bit 2
4	3	0 byte output bit 3	13	B	1 byte output bit 3
5	4	0 byte output bit 4	14	C	1 byte output bit 4
6	5	0 byte output bit 5	15	D	1 byte output bit 5
7	6	0 byte output bit 6	16	E	1 byte output bit 6
8	7	0 byte output bit 7	17	F	1 byte output bit 7
9	NC	Empty	18	NC	empty
20 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1	0'	2 byte output bit 0	11	8'	3 byte output bit 0
2	1'	2 byte output bit 1	12	9'	3 byte output bit 1
3	2'	2 byte output bit 2	13	A'	3 byte output bit 2
4	3'	2 byte output bit 3	14	B'	3 byte output bit 3
5	4'	2 byte output bit 4	15	C'	3 byte output bit 4
6	5'	2 byte output bit 5	16	D'	3 byte output bit 5
7	6'	2 byte output bit 6	17	E'	3 byte output bit 6
8	7'	2 byte output bit 7	18	F'	3 byte output bit 7
9	24V	Output 24V power supply positive	19	24V	Output 24V power supply positive
10	GND	Output 24V power supply negative	20	GND	Output 24V power supply negative

Note: The output module ends with letter P, and the default output is high (PNP output).

Shenzhen Yulian

■ Use

● Parameter definition

Configure data object dictionary index reference values:

index	16#9000+n (n indicates the module number)				
subindex	name	Data type	Access mode	Mapping capability	Default value
16#00	Index	USINT	RO	NO	/
16#01	32DO_Configuration	UDINT	RW	NO	16#0000 0000

Configuration value:

position	Instructions
Bit0-7	16# 000000 __ : Input filtering coefficient =1ms * value
Bit8-15	Output Troubleshooting 16#0000 0000 (0) : Clear after the communication is interrupted 16#0000 0100 (256) : Set after the communication is interrupted 16#0000 0200 (512) : Retain the current value after the communication is interrupted Other: Retain

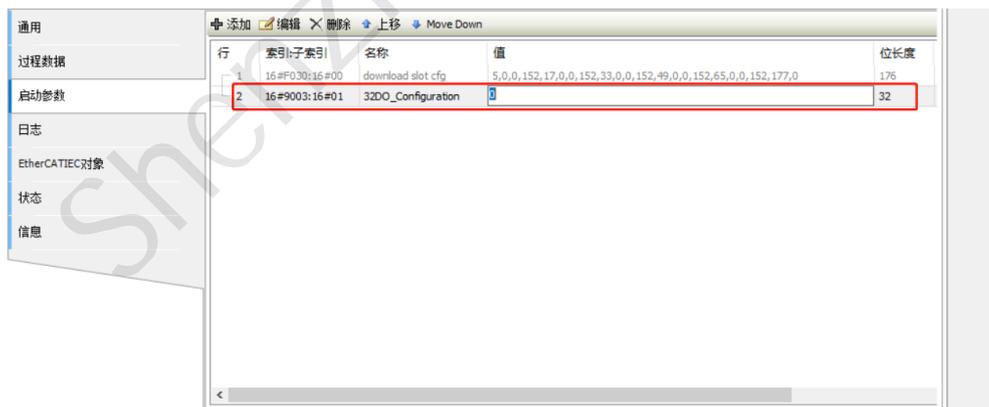
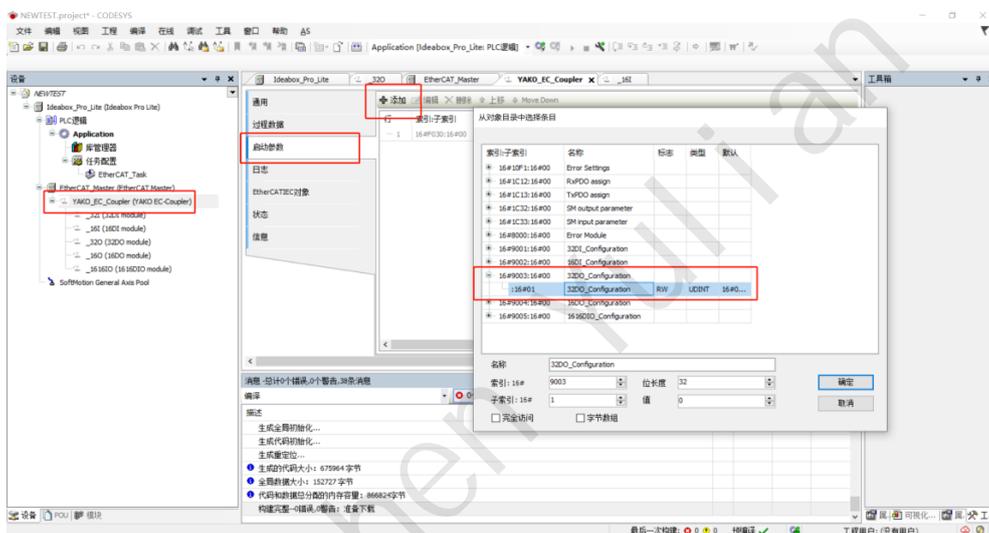
● Programming example

This example uses the CODESYS master control and EtherCAT Coupler module (EC10-CP) as the demonstration environment.

Refer to 2.1.1 → Use → Application in CODESYS Software Environment for the coupler configuration.

The steps for configuring SD-32OP module parameters are as follows:

Click YAKO EC-Coupler → Startup parameters → Add → 32DO_Configuration

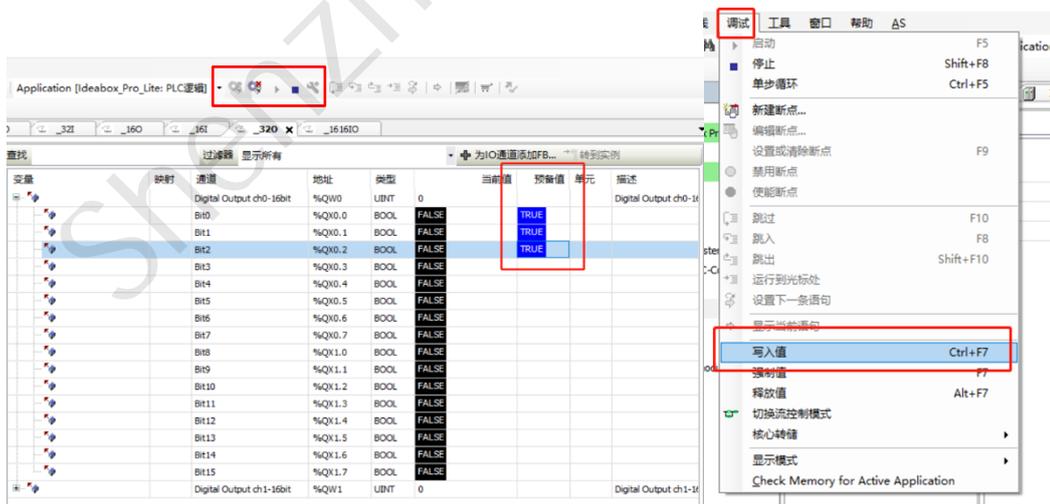
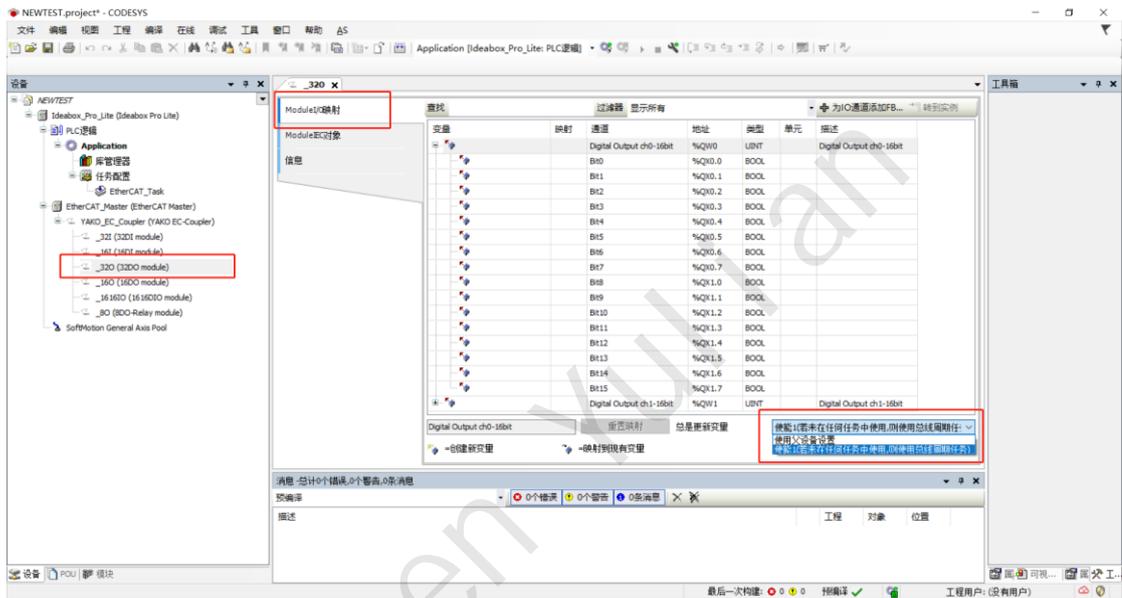


The DO_Configuration value indicates the fault shutdown output state mode. Three modes are supported:

DO_Configuration value: =0 (reset) /=256 (set) /=512 (keep the current value).

After module parameters are configured, click to go to Module → module/O Mapping → Change device Settings to Enable 1 → Log in to the device → Download and start the program;

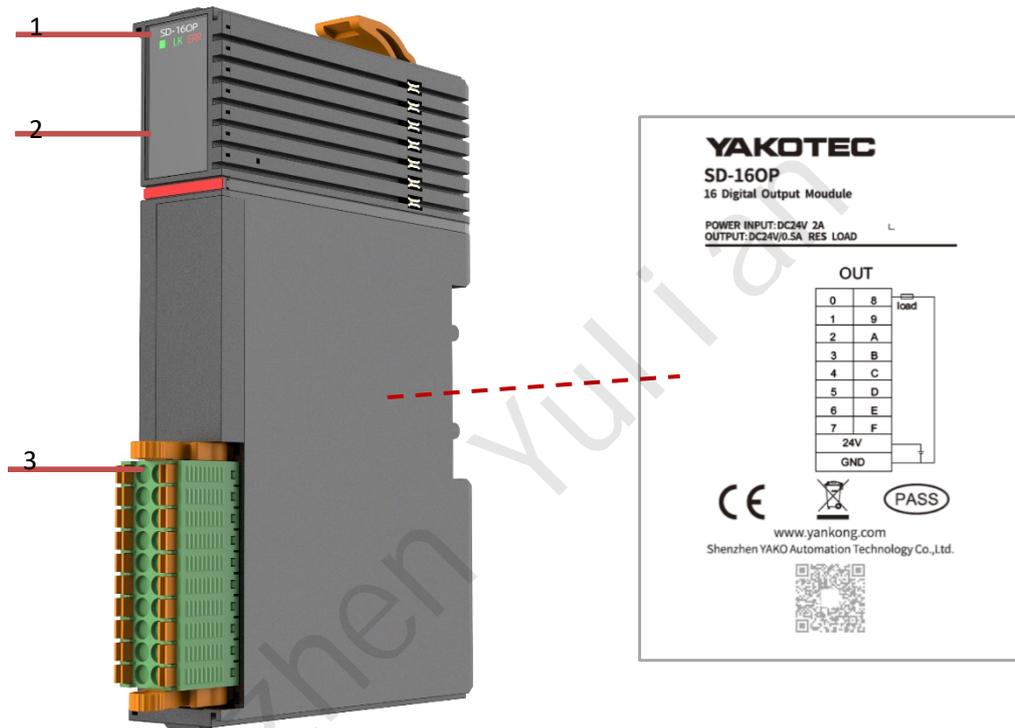
Example: SD-32OP module: The default configuration parameter is 0, the channel preparation value is written to TRUE, debugging → write value; Write the reserve value to the slave station and observe the indicator of the corresponding channel of the slave station. If the indicator is on, the module is normal.



2.2.6 SD-16OP (16I digital output module -PNP)

■ Module overview

The SD-16OP is an I/O digital output module. The module has 16 digital channels, supports source output, and is used with the CP series coupler module.



Serial number	name	Function definition			
1	Status light	■	Power on/running indicator	green	The module turns on when it is powered on
		LK	LK and upper-level communication connection indicator	green	On when connecting to the upper-layer module. Off: indicates that the communication is abnormal
		ERR	State machine error indicator	red	Lit when the connection to the subordinate module is incorrect
2	IO signal lamp	Corresponding to each input or output signal indication, signal effective indicator light			
3	User terminal	For details, see Section Installing Cables			

■ Technical Specification

● Power supply specification

Item	Specification
Bus input power rated voltage	5V DC(4.75V DC~ 5.25V DC)
Rated current of bus input power supply	200mA (typical at 5V)
Rated input voltage of the terminal	24V DC(20.4V DC ~ 28.8V DC)
Rated current of terminal input power	4A (typical at 24V)
Rated output voltage of the terminal	/
Rated current of the terminal output power supply	/
Module hot swap function	nonsupport

● Output Specification

Item	Specification
Output type	Digital output, transistor low side output
Output mode	Source type
Output channel	16
Output voltage level	24V DC \pm 10%(21.6V DC-26.4V DC)
Output load(Resistive load)	0.5A/point
Output load (inductive load)	7.2W/point
Output load(Lamp load)	5W/point
Hardware response time ON/OFF	100us/300us
Leakage current at OFF	10uA
Switching frequency	Resistance load 100Hz, inductor load 0.5Hz, lamp load 10Hz
Isolation or not	yes
Output action display	When the output is in drive state, the output indicator lights up (software control)
Protection function	Short circuit protection, over current protection

● Software specification

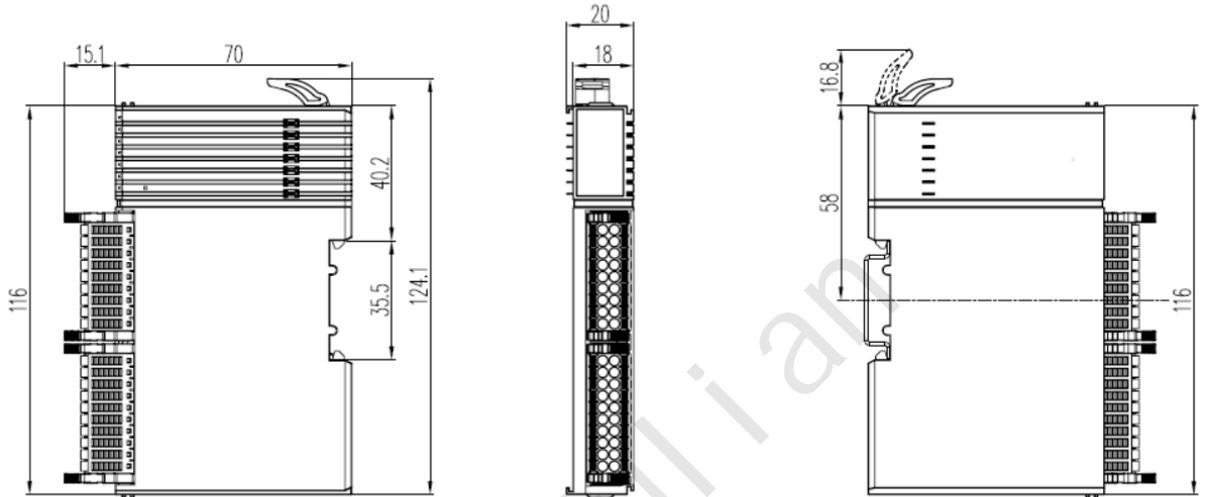
Item	Specification
Fault shutdown output status mode	Clear, set, and keep the current value
IO mapping	Supports bitwise access

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■ Installation wiring

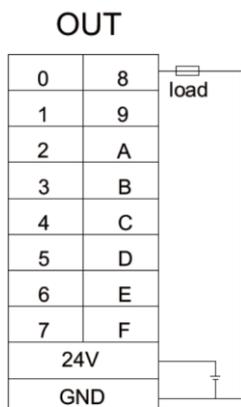
● Module size

The installation dimensions are shown in the following figure, in mm:



Note: For the installation method, see "Product Overview → 1.3 Installation and Disassembly".

● Terminal Wiring



18 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1			10		
2			11		
3			12		
4			13		
5			14		
6			15		
7			16		
8			17		
9			18		
20 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1	0	0 byte output bit 0	11	8	1 byte output bit 0
2	1	0 byte output bit 1	12	9	1 byte output bit 1
3	2	0 byte output bit 2	13	A	1 byte output bit 2
4	3	0 byte output bit 3	14	B	1 byte output bit 3
5	4	0 byte output bit 4	15	C	1 byte output bit 4
6	5	0 byte output bit 5	16	D	1 byte output bit 5
7	6	0 byte output bit 6	17	E	1 byte output bit 6
8	7	0 byte output bit 7	18	F	1 byte output bit 7
9	24V	Output 24V power supply positive	19	24V	Output 24V power supply positive
10	GND	Output 24V power supply negative	20	GND	Output 24V power supply negative

Note: The output module ends with letter P, and the default output is high (PNP output).

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■ Use

● Parameter definition

The reference value of the data object dictionary index is set:

index	16#9000+n (n indicates the module number)				
subindex	name	Data type	Access mode	Mapping capability	Default value
16#00	Index	USINT	RO	NO	/
16#01	16DO_Configuration	UDINT	RW	NO	16#0000 0000

Configuration 值:

position	Instructions
Bit0-7	16# 000000 __ : Input filtering coefficient =1ms * value
Bit8-15	Output Troubleshooting 16#0000 0000 (0) : Clear after the communication is interrupted 16#0000 0100 (256) : Set after the communication is interrupted 16#0000 0200 (512) : Retain the current value after the communication is interrupted Other: Retain

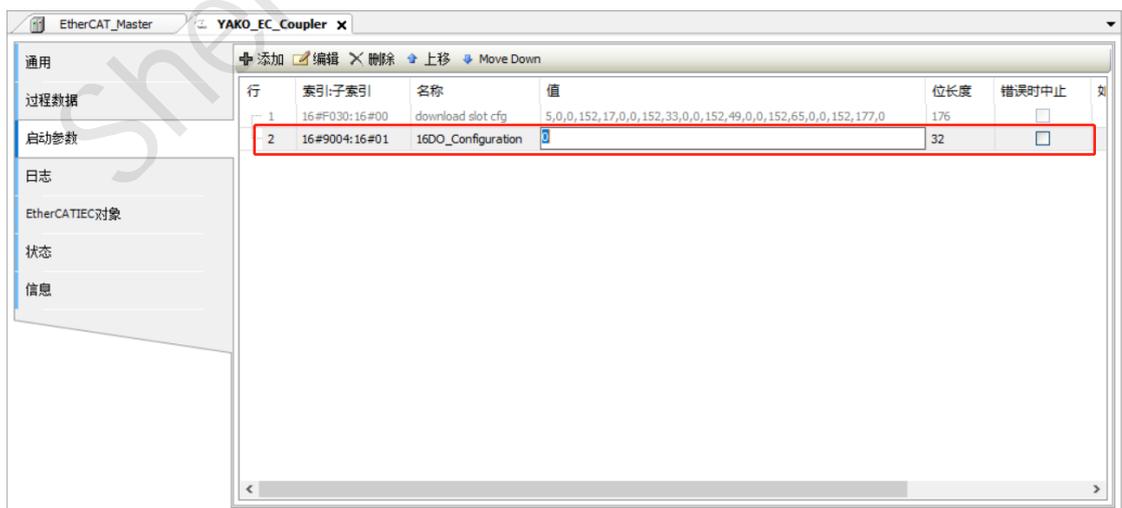
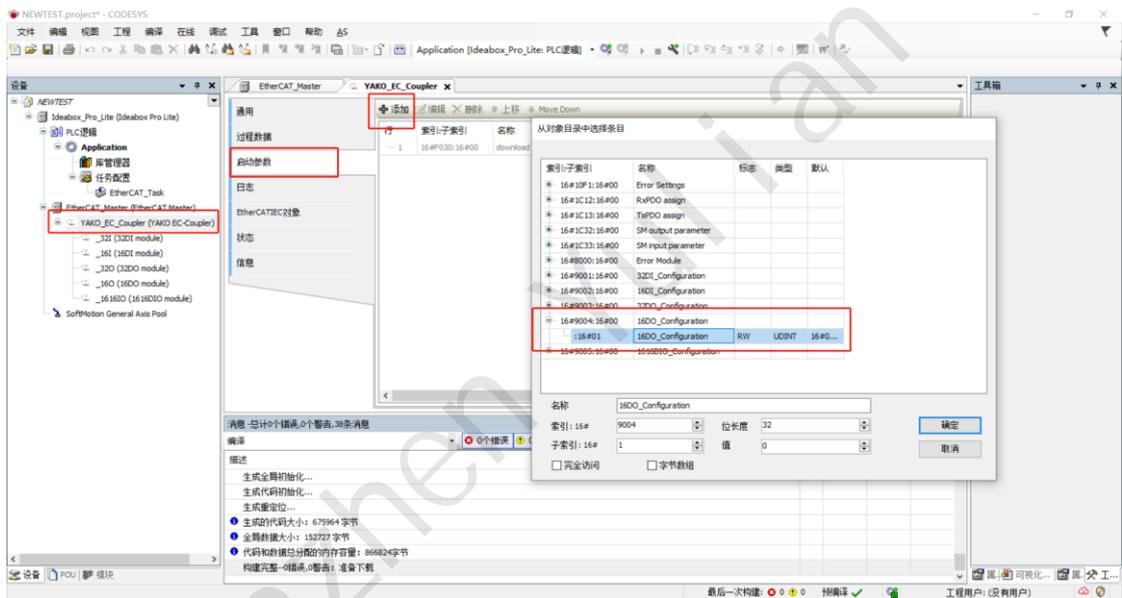
● Programming example

This example uses the CODESYS master control and EtherCAT Coupler module (EC10-CP) as the demonstration environment.

Refer to 2.1.1 → Use → Application in CODESYS Software Environment for the coupler configuration.

The steps for configuring SD-16OP module parameters are as follows:

Click YAKO EC-Coupler → Startup parameters → Add → 16DO_Configuration



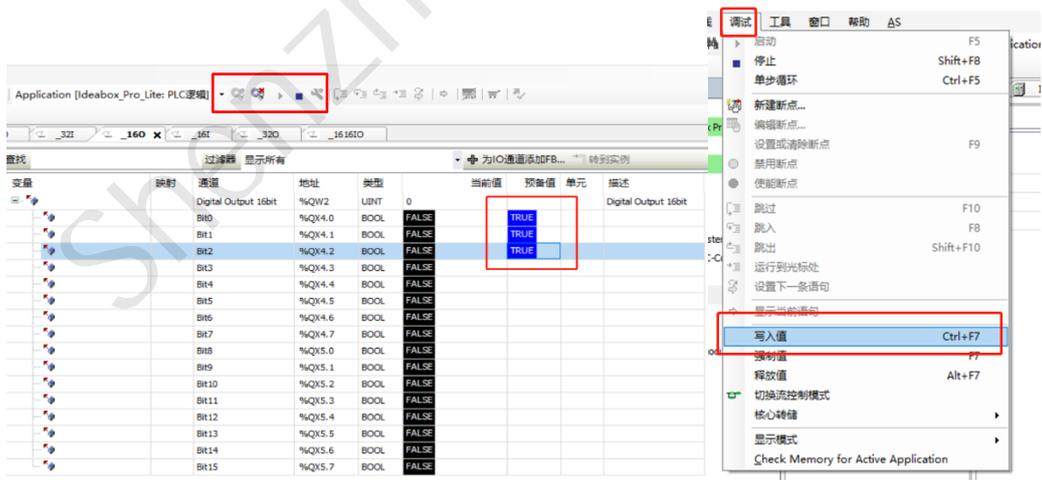
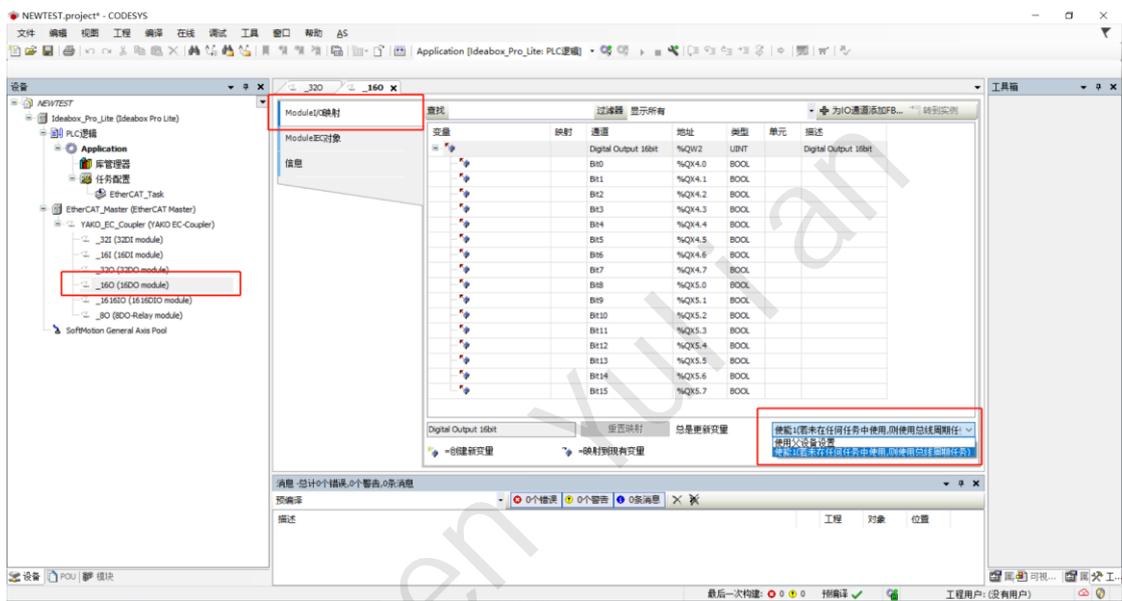
The DO_Configuration value indicates the fault shutdown output state mode. Three modes are supported:

DO_Configuration value: =0 (reset) /=256 (set) /=512 (keep the current value).

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After module parameters are configured, click to go to Module → module/O Mapping → Change device Settings to Enable 1 → Log in to the device → Download and start the program;

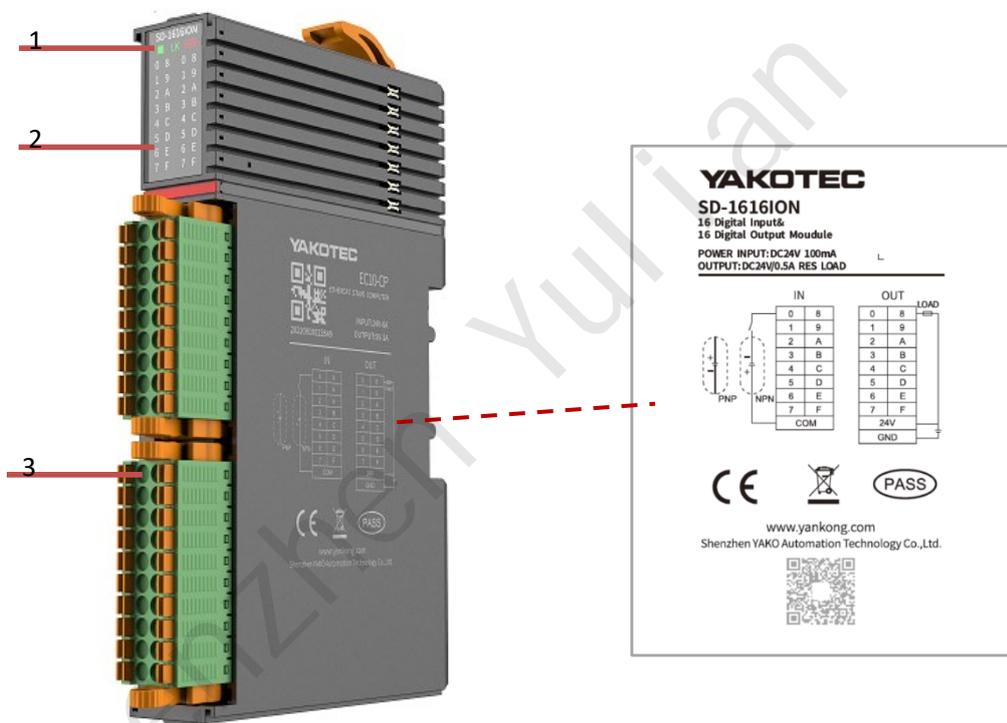
Example: SD-16OP module: The default configuration parameter is 0, the channel preparation value is written to TRUE, debugging → write value; Write the reserve value to the slave station and observe the indicator of the corresponding channel of the slave station. If the indicator is on, the module is normal.



2.2.7 SD-1616ION (16&16 digital input/output hybrid module - NPN)

■ Module overview

The SD-1616ION is an I/O digital transistor hybrid module. The module has 32 digital channels, including 16 inputs and 16 outputs, support source and drain digital input, drain output, with CP series coupler module use.



Serial number	name	Function definition			
1	Status light	■	Power on/running indicator	green	The module turns on when it is powered on
		LK	LK and upper-level communication connection indicator	green	On when connecting to the upper-layer module. Off: indicates that the communication is abnormal
		ERR	State machine error indicator	red	Lit when the connection to the subordinate module is incorrect
2	IO signal lamp	Corresponding to each input or output signal indication, signal effective indicator light			
3	User terminal	For details, see Section Installing Cables			

■ Technical Specification

● Power supply specification

Item	Specification
Bus input power rated voltage	5V DC(4.75V DC~ 5.25V DC)
Rated current of bus input power supply	180mA (typical at 5V)
Rated input voltage of the terminal	24V DC(20.4V DC ~ 28.8V DC)
Rated current of terminal input power	22mA (typical at 24V)
Rated output voltage of the terminal	/
Rated current of the terminal output power supply	/
Module hot swap function	nonsupport

● Input Specification

Item	Specification
Input type	Digital input
Input mode	Source/drain type
Input channel	16
Input voltage level	24V DC \pm 10%(21.6V DC-26.4V DC)
Input current	4mA(typical value at 24V)
ON voltage	>15V DC
OFF voltage	<5V DC
Hardware response time ON/OFF	100us/100us
Software filtering time	support
Input impedance reference value	Reference value 1.7k - 5.1k
Isolation or not	support
Input action display	When the input is in drive state, the input indicator lights up (software controlled)

● Output Specification

Item	Specification
Output type	Digital output, transistor low side output
Output mode	Drain type
Output channel	16
Output voltage level	24V DC \pm 10%(21.6V DC-26.4V DC)
Output load(Resistive load)	0.5A/point
Output load (inductive load)	7.2W/point
Output load(Lamp load)	5W/point
Hardware response time ON/OFF	100us/300us
Leakage current at OFF	10uA
Switching frequency	Resistance load 100Hz, inductor load 0.5Hz, lamp load 10Hz
Isolation or not	yes
Output action display	When the output is in drive state, the output indicator lights up (software control)
Protection function	Short circuit protection, over current protection

● Software specification

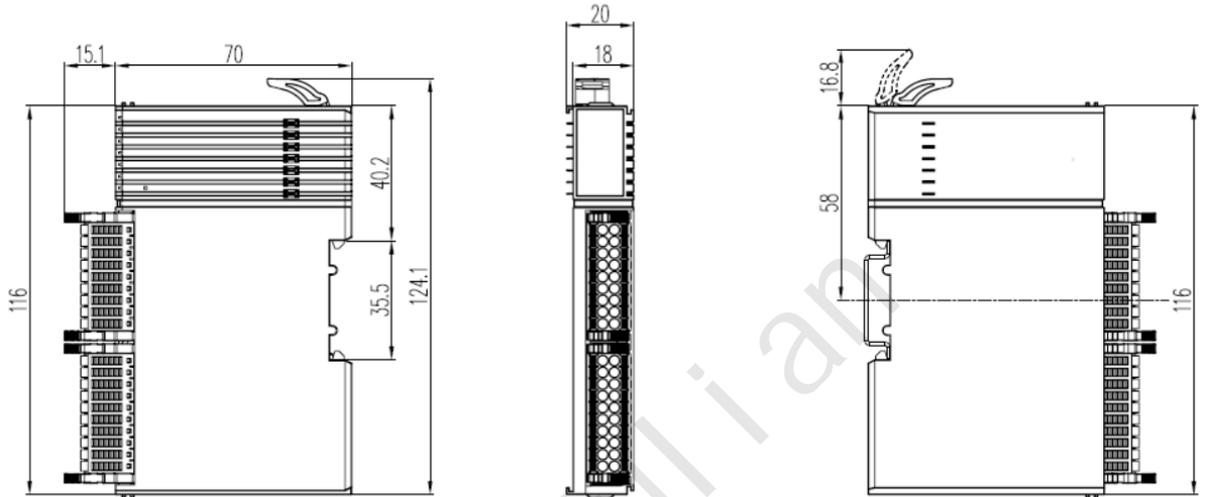
Item	Specification
Software input filtering time	No filter (factory Settings), setting range: 1ms-255ms, sharing one filter parameter
Fault shutdown output status mode	Clear, set, and keep the current value
IO mapping	Supports bitwise access

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■ Installation wiring

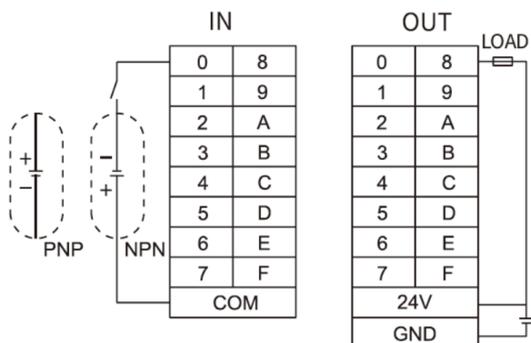
● Module size

The installation dimensions are shown in the following figure, in mm:



Note: For the installation method, see "Product Overview → 1.3 Installation and Disassembly".

● Terminal Wiring



18 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1	0	0 byte Input bit 0	10	8	1 byte Input bit 0
2	1	0 byte Input bit 1	11	9	1 byte Input bit 1
3	2	0 byte Input bit 2	12	A	1 byte Input bit 2
4	3	0 byte Input bit 3	13	B	1 byte Input bit 3
5	4	0 byte Input bit 4	14	C	1 byte Input bit 4
6	5	0 byte Input bit 5	15	D	1 byte Input bit 5
7	6	0 byte Input bit 6	16	E	1 byte Input bit 6
8	7	0 byte Input bit 7	17	F	1 byte Input bit 7
9	COM	0&1 bytes input public end	18	COM	0&1 bytes input public end
20 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1	0	0 byte output bit 0	11	8	1 byte output bit 0
2	1	0 byte output bit 1	12	9	1 byte output bit 1
3	2	0 byte output bit 2	13	A	1 byte output bit 2
4	3	0 byte output bit 3	14	B	1 byte output bit 3
5	4	0 byte output bit 4	15	C	1 byte output bit 4
6	5	0 byte output bit 5	16	D	1 byte output bit 5
7	6	0 byte output bit 6	17	E	1 byte output bit 6
8	7	0 byte output bit 7	18	F	1 byte output bit 7
9	24V	Output 24V power supply positive	19	24V	Output 24V power supply positive
10	GND	Output 24V power supply negative	20	GND	Output 24V power supply negative

Note: When COM port is connected to the positive terminal of 24V power supply, the input low level is effective (NPN input); When the GND ground is connected, the input level is high (PNP input). Output module ends with letter N, default output low effective (NPN output).

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■ Use

● Parameter definition

The reference value of the data object dictionary index is set:

index	16#9000+n (n is the module number)				
subindex	name	Data type	Access mode	Mapping capability	Default value
16#00	Index	USINT	RO	NO	/
16#01	1616DIO_Configuration	UDINT	RW	NO	16#0000 0000

Configuration value:

position	Instructions
Bit0-7	16#0000 00_ _: Input filtering coefficient =1ms * value
Bit8-15	Output Troubleshooting 16#0000 0000 (0) : Clear after the communication is interrupted 16#0000 0100 (256) : Set after the communication is interrupted 16#0000 0200 (512) : Retain the current value after the communication is interrupted Other: Retain

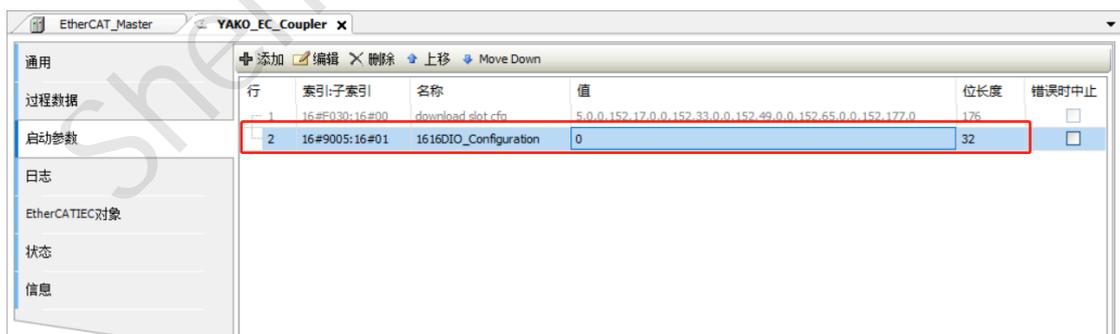
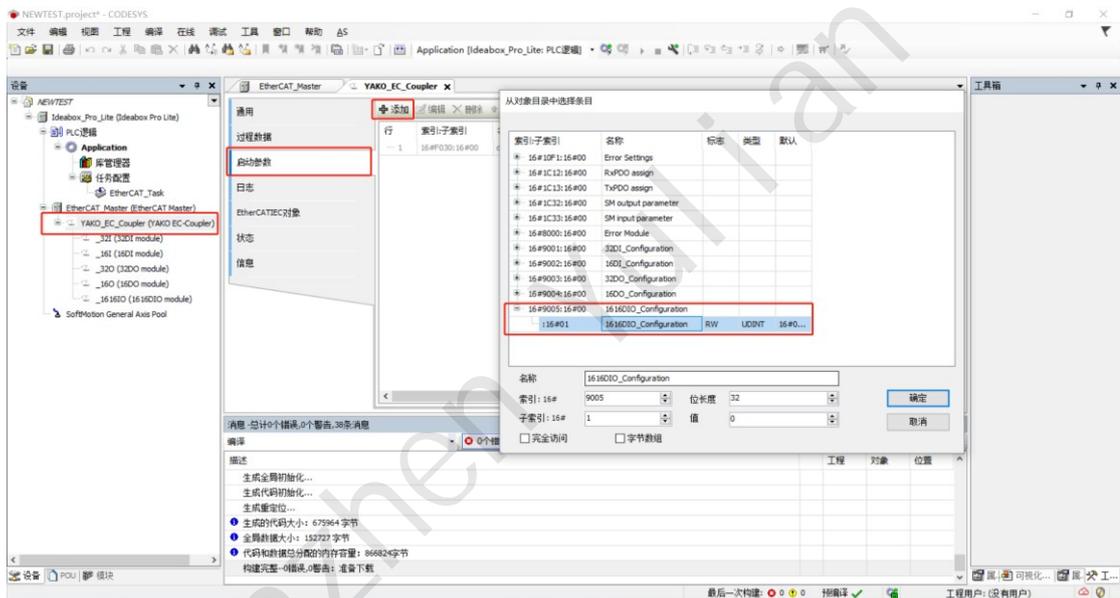
● Programming example

This example uses the CODESYS master control and EtherCAT Coupler module (EC10-CP) as the demonstration environment.

Refer to 2.1.1 → Use → Application in CODESYS Software Environment for the coupler configuration.

The steps for configuring SD-1616ION module parameters are as follows:

Click YAKO EC-Coupler → Startup parameters → Add → 1616DIO_Configuration



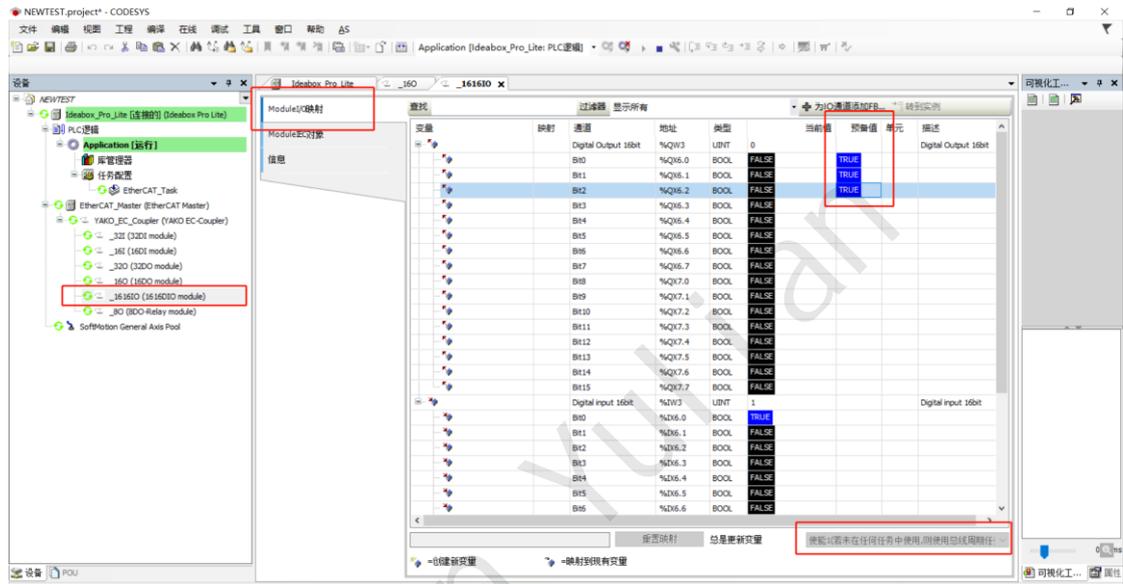
Configuration value = : Input filter parameter + output state mode;

Input filtering parameters: filtering time (ms) = 1ms * Configuration value;

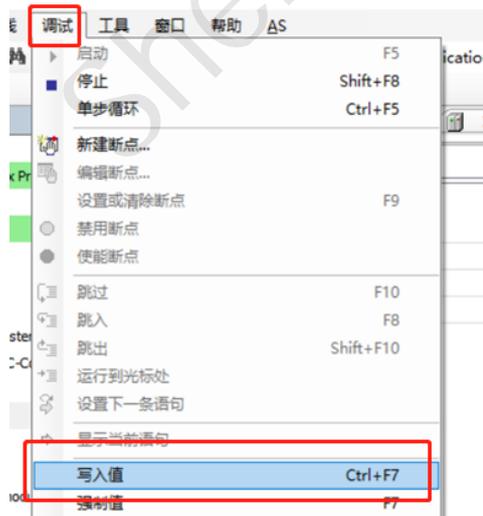
Output status mode: =0 (reset) /=256 (set) /=512 (keep the current value).

After module parameters are configured, click to go to Module → module/O Mapping → Change device Settings to Enable 1 → Log in to the device → Download and start the program;

Example: SD-1616ION module: The default configuration parameter is 0, the external access input signal, observe the indicator of the corresponding channel of the slave station, the indicator is on, and the current value of the module changes to TURE, indicating that the module is normal.



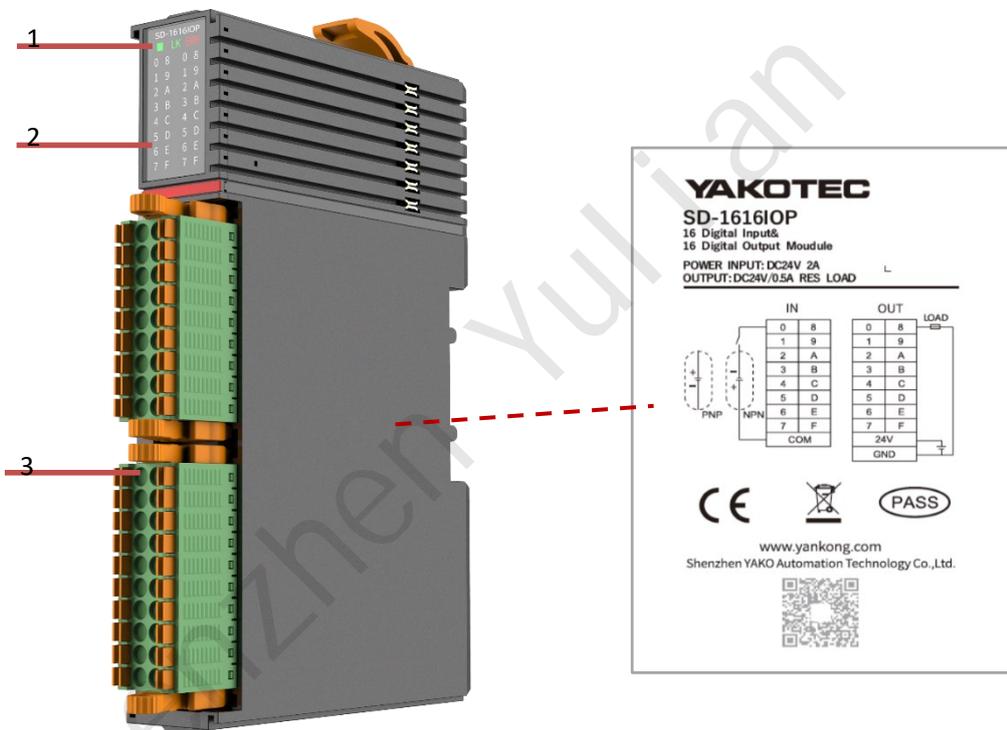
Write the channel preparation value to TRUE, debug → write the value; Write the reserve value to the slave station and observe the indicator of the corresponding channel of the slave station. If the indicator is on, the module is normal.



2.2.8 SD-1616IOP (16&16 digital input/output hybrid module - PNP)

■ Module overview

The SD-1616IOP is an I/O digital transistor hybrid module. The module has 32 digital channels, including 16 inputs and 16 outputs, support source and drain type digital input, source type output, with CP series coupler module.



Serial number	name	Function definition			
1	Status light	■	Power on/running indicator	green	The module turns on when it is powered on
		LK	LK and upper-level communication connection indicator	green	On when connecting to the upper-layer module. Off: indicates that the communication is abnormal
		ERR	State machine error indicator	red	Lit when the connection to the subordinate module is incorrect
2	IO signal lamp	Corresponding to each input or output signal indication, signal effective indicator light			
3	User terminal	For details, see Section Installing Cables			

■ Technical Specification

● Power supply specification

Item	Specification
Bus input power rated voltage	5V DC(4.75V DC~ 5.25V DC)
Rated current of bus input power supply	150mA (typical at 5V)
Rated input voltage of the terminal	24V DC(20.4V DC ~ 28.8V DC)
Rated current of terminal input power	2A (typical at 24V)
Rated output voltage of the terminal	/
Rated current of the terminal output power supply	/
Module hot swap function	nonsupport

● Input Specification

Item	Specification
Input type	Digital input
Input mode	Source/drain type
Input channel	16
Input voltage level	24V DC \pm 10%(21.6V DC-26.4V DC)
Input current	4mA(typical value at 24V)
ON voltage	>15V DC
OFF voltage	<5V DC
Hardware response time ON/OFF	100us/100us
Software filtering time	support
Input impedance reference value	Reference value 4.7k-5.3k
Isolation or not	support
Input action display	When the input is in drive state, the input indicator lights up (software controlled)

● Output Specification

Item	Specification
Output type	Digital output, transistor low side output
Output mode	Source type
Output channel	16
Output voltage level	24V DC \pm 10%(21.6V DC-26.4V DC)
Output load(Resistive load)	0.5A/point
Output load (inductive load)	7.2W/point
Output load(Lamp load)	5W/point
Hardware response time ON/OFF	100us/300us
Leakage current at OFF	10uA
Switching frequency	Resistance load 100Hz, inductor load 0.5Hz, lamp load 10Hz
Isolation or not	yes
Output action display	When the output is in drive state, the output indicator lights up (software control)
Protection function	Short circuit protection, over current protection

● Software specification

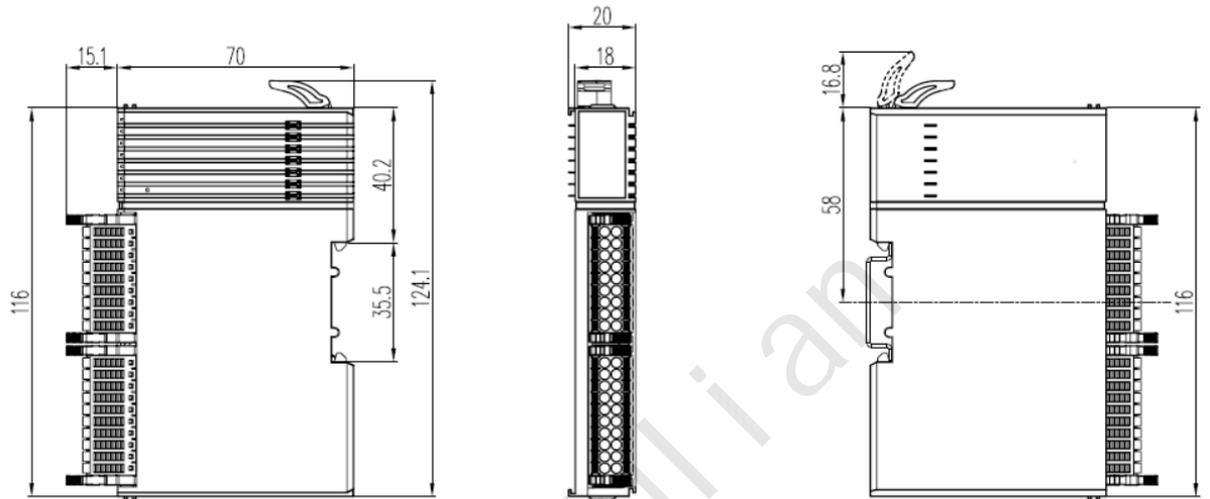
Item	Specification
Software input filtering time	No filter (factory Settings), setting range: 1ms-255ms, sharing one filter parameter
Fault shutdown output status mode	Clear, set, and keep the current value
IO mapping	Supports bitwise access

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■ Installation wiring

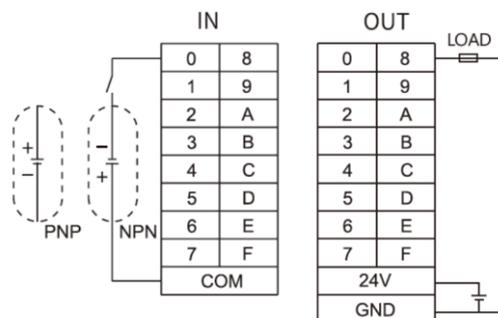
● Module size

The installation dimensions are shown in the following figure, in mm:



Note: For the installation method, see "Product Overview → 1.3 Installation and Disassembly".

● Terminal Wiring



18 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1	0	0 byte Input bit 0	10	8	1 byte Input bit 0
2	1	0 byte Input bit 1	11	9	1 byte Input bit 1
3	2	0 byte Input bit 2	12	A	1 byte Input bit 2
4	3	0 byte Input bit 3	13	B	1 byte Input bit 3
5	4	0 byte Input bit 4	14	C	1 byte Input bit 4
6	5	0 byte Input bit 5	15	D	1 byte Input bit 5
7	6	0 byte Input bit 6	16	E	1 byte Input bit 6
8	7	0 byte Input bit 7	17	F	1 byte Input bit 7
9	COM	0&1 bytes input public end	18	COM	0&1 bytes input public end
20 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1	0	0 byte output bit 0	11	8	1 byte output bit 0
2	1	0 byte output bit 1	12	9	1 byte output bit 1
3	2	0 byte output bit 2	13	A	1 byte output bit 2
4	3	0 byte output bit 3	14	B	1 byte output bit 3
5	4	0 byte output bit 4	15	C	1 byte output bit 4
6	5	0 byte output bit 5	16	D	1 byte output bit 5
7	6	0 byte output bit 6	17	E	1 byte output bit 6
8	7	0 byte output bit 7	18	F	1 byte output bit 7
9	24V	Output 24V power supply positive	19	24V	Output 24V power supply positive
10	GND	Output 24V power supply negative	20	GND	Output 24V power supply negative

Note: When COM port is connected to the positive terminal of 24V power supply, the input low level is effective (NPN input); When the GND ground is connected, the input level is high (PNP input).

The output module ends with the P letter, and the default output is active at a low level (PNP output).

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■ Use

● Parameter definition

The reference value of the data object dictionary index is set:

index	16#9000+n (n is the module number)				
subindex	name	Data type	Access mode	Mapping capability	Default value
16#00	Index	USINT	RO	NO	/
16#01	1616DIO_Configuration	UDINT	RW	NO	16#0000 0000

Configuration value:

position	Instructions
Bit0-7	16# 000000 __ : Input filtering coefficient =1ms * value
Bit8-15	Output Troubleshooting 16#0000 0000 (0) : Clear after the communication is interrupted 16#0000 0100 (256) : Set after the communication is interrupted 16#0000 0200 (512) : Retain the current value after the communication is interrupted Other: Retain

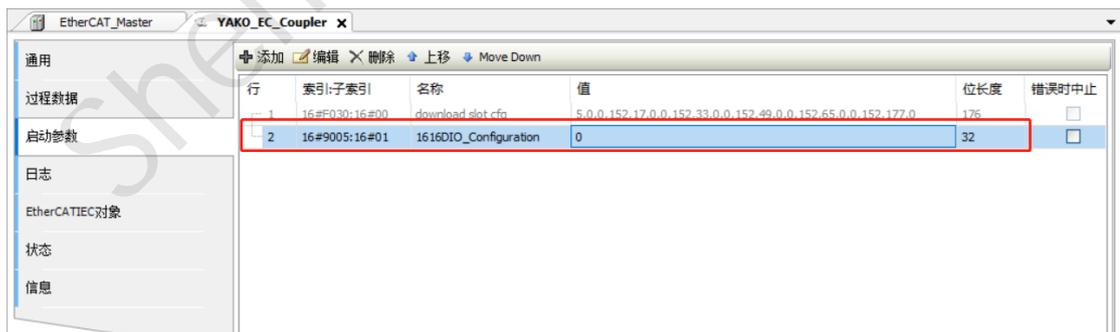
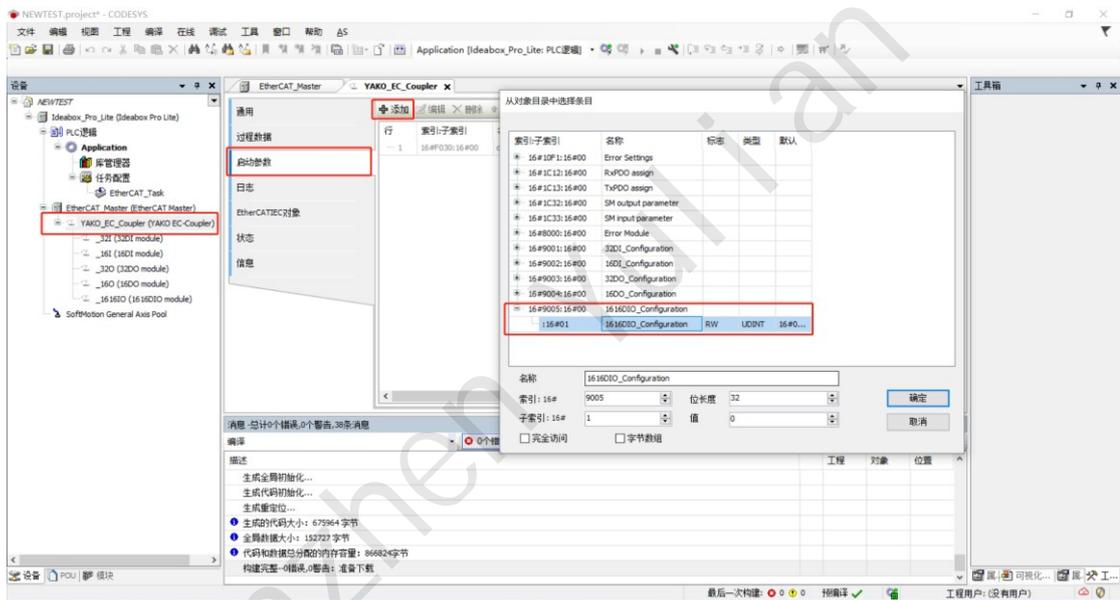
● Programming example

This example uses the CODESYS master control and EtherCAT Coupler module (EC10-CP) as the demonstration environment.

Refer to 2.1.1 → Use → Application in CODESYS Software Environment for the coupler configuration.

The steps to configure parameters for the SD-1616IOP module are as follows:

Click YAKO EC-Coupler → Startup parameters → Add → 1616DIO_Configuration



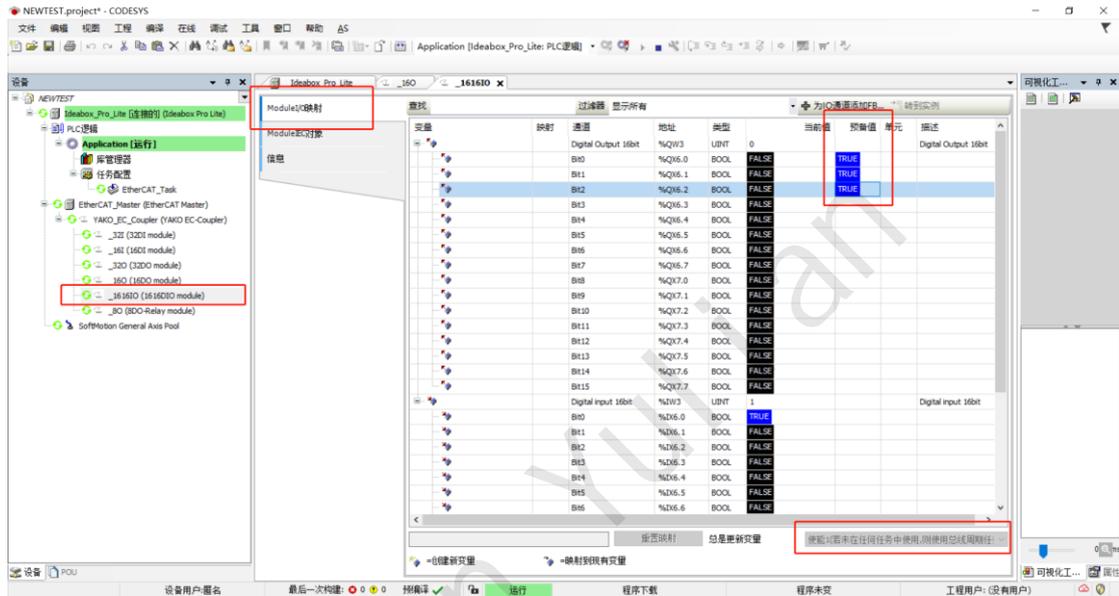
Configuration value = : Input filter parameter + output state mode;

Input filtering parameters: filtering time (ms) = 1ms * Configuration value;

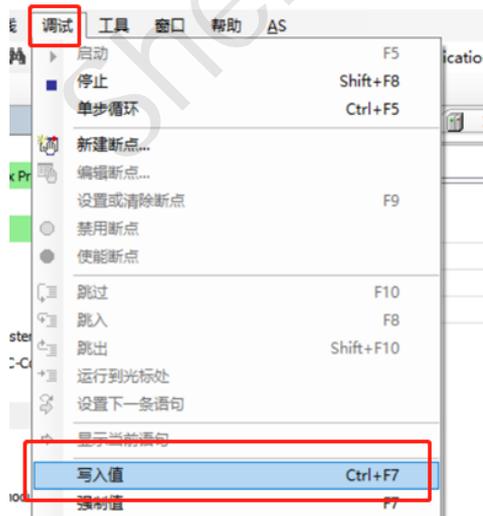
DO_Configuration value: =0 (clear) /=256 (set) /=512 (keep the current value).

After module parameters are configured, click to go to Module → module/O Mapping → Change device Settings to Enable 1 → Log in to the device → Download and start the program;

Example: SD-1616IOP module: The default parameter is 0, the external access input signal, observe the indicator of the corresponding channel of the slave station, the indicator is on, and the current value of the module changes to TURE, indicating that the module is normal.



Write the channel preparation value to TRUE, debug → write the value; Write the reserve value to the slave station and observe the indicator of the corresponding channel of the slave station. If the indicator is on, the module is normal.



2.2.9 SA-8I (8 analog input module)

■ Module overview

The SA-8I is an analog input module. The module has 8 channels of analog inputs, supports voltage and current input modes, and is used with the CP series coupler module.



Serial number	name	Function definition			
1	Status light	■	Power on/running indicator	green	The module turns on when it is powered on
		LK	LK and upper-level communication connection indicator	green	On when connecting to the upper-layer module. Off: indicates that the communication is abnormal
		ERR	State machine error indicator	red	Lit when the connection to the subordinate module is incorrect
2	User terminal	For details, see Section Installing Cables			

■ Technical Specification

● Power supply specification

Item	Specification
Bus input power rated voltage	5V DC(4.75V DC~ 5.25V DC)
Rated current of bus input power supply	180mA (typical at 5V)
Rated input voltage of the terminal	24V DC(20.4V DC ~ 28.8V DC)
Rated current of terminal input power	80mA (typical at 24V)
Rated output voltage of the terminal	/
Rated current of the terminal output power supply	/
Module hot swap function	nonsupport

● Input Specification

Item	Specification
Input type	Analog input
Input mode	Voltage/current
Input channel	8
Resolution	16bit
Conversion time	125us/channle
Voltage input range	0-10V, $\pm 10V$, 0-5V, $\pm 5V$, 1-5V
Voltage input impedance	1M Ω
Voltage input accuracy (25 $^{\circ}C$)	$\pm 0.1\%$ (gamut)
Voltage input accuracy (full temperature range)	$\pm 0.2\%$ (gamut)
Voltage input limit	$\pm 15V$
Voltage input diagnosis	Disconnection detection is not supported
Current input range	0-20mA, 4-20mA
Current sampling impedance	250 Ω
Current input accuracy (25 $^{\circ}C$)	$\pm 0.1\%$ (gamut)
Current input accuracy (full temperature range)	$\pm 0.2\%$ (gamut)
Current input limit instantaneous	$\pm 30mA$, average $\pm 24mA$
Isolation or not	The interface channels are not isolated, the power supply is isolated from the interface, and the interface is isolated from the bus
Input action display	/
Input derating	/

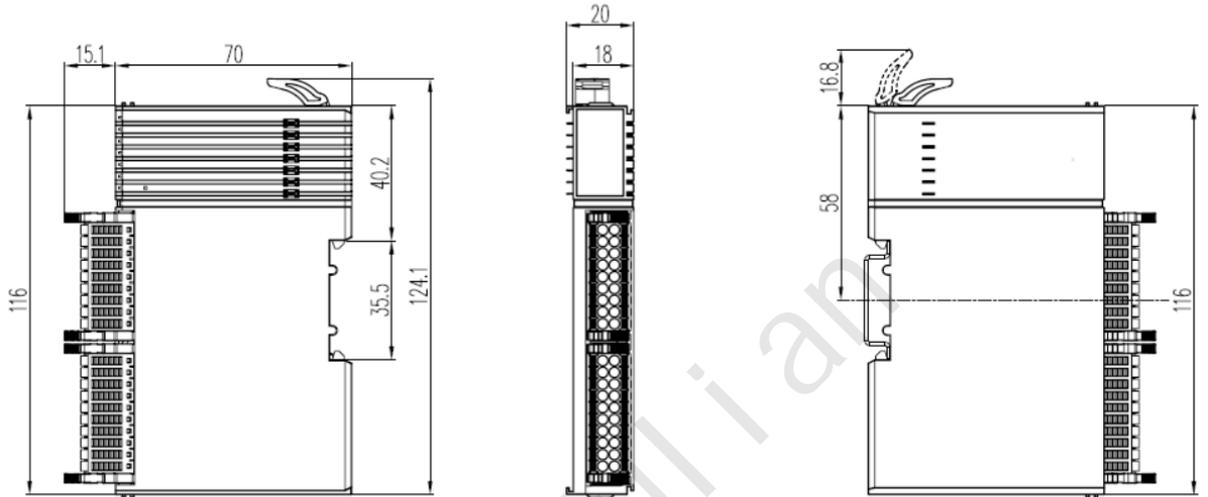
● Software specification

Item	Specification
The independent channel is enabled	support
Configure the diagnostic reporting function	support
Transition mode configuration	0-10V, $\pm 10V$, 0-5V, $\pm 5V$, 1-5V, 0-20mA, 4-20mA
Convert the number range configuration	-20000 ~ 20000
Sampling time	8 channle 1000us
Sample refresh	Asynchronously refresh according to the sampling time, and do not require synchronous refresh according to the bus cycle

■ Installation wiring

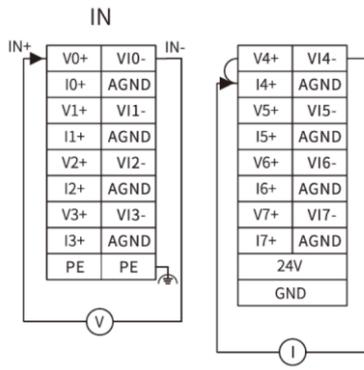
● Module size

The installation dimensions are shown in the following figure, in mm:



Note: For the installation method, see "Product Overview → 1.3 Installation and Disassembly".

● Terminal Wiring



Shenzhen Yulian

18 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1	V0+	Analog channel 0 voltage positive	10	VI0-	Analog channel 0 negative terminal
2	I0+	Analog channel 0 current positive	11	AGND	simulatively
3	V1+	Analog channel 1 voltage positive	12	VI1-	Analog channel 1 negative terminal
4	I1+	Analog channel 1 current positive	13	AGND	Simulatively
5	V2+	Analog channel 2 voltage positive	14	VI2-	Analog channel 2 negative terminal
6	I2+	Analog channel 2 current positive	15	AGND	Simulatively
7	V3+	Analog channel 3 voltage positive	16	VI3-	Analog channel 3 negative terminal
8	I3+	Analog channel 3 current positive	17	AGND	simulatively
9	PE	Ground wire	18	PE	Ground wire
20 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1	V4+	Analog channel 4 voltage positive	11	VI4-	Analog channel 4 negative terminal
2	I4+	Analog channel 4 current positive	12	AGND	Simulatively
3	V5+	Analog channel 5 voltage positive	13	VI5-	Analog channel 5 negative terminal
4	I5+	Analog channel 5 current positive	14	AGND	Simulatively
5	V6+	Analog channel 6 voltage positive	15	VI6-	Analog channel 6 negative terminal
6	I6+	Analog channel 6 current positive	16	AGND	Simulatively
7	V7+	Analog channel 7 voltage positive	17	VI7-	Analog channel 7 negative terminal
8	I7+	Analog channel 7 current positive	18	AGND	simulatively
9	24V	Output 24V power supply positive	19	24V	Output 24V power supply positive
10 157	GND	Output 24V power supply negative	20	GND	Output 24V power supply negative

Note: Analog module is compatible with voltage and current mode, voltage input wiring is voltage positive and channel negative; The current input cable needs to short-circuit the positive voltage terminal and the positive current terminal and connect the correct current input terminal.

Shenzhen Yulian

■ Use

● Parameter definition

The reference value of the data object dictionary index is set

index	16#9000+n (n indicates the module number)				
subindex	name	Data type	Access mode	Mapping capability	Default value
16#00	Index	USINT	RO	NO	/
16#01	8AI_Configuration	UDINT	RW	NO	16#0000 0000

Configuration value:

position	Instructions
Bit0-3 (16#0000 000_)	Channel 1 conversion mode 0: 0V~10V 5: 0mA~20mA 1: -10V~10V 6: 4mA~20mA 2: 0V~5V 3: -5V~5V 4: 1V~5V
Bit4-7 (16#0000 00_0)	channle2
Bit8-11 (16#0000 0_00)	Channle3
Bit12-15 (16#0000 _000)	Channle4
Bit16-19 (16#000_ 0000)	channle5
Bit20-23 (16#00_0 0000)	channle6
Bit24-27 (16#0_00 0000)	channle7
Bit28-31 (16#_000 0000)	channle8

Analog quantity to digital quantity comparison table:

mode	type	Rated range	Corresponding digit quantity
0	Analog voltage	0V~10V	0~20000
1	Analog voltage	-10V~10V	-20000~20000
2	Analog voltage	0V~5V	0~20000
3	Analog voltage	-5V~5V	-20000~20000
4	Analog voltage	1V~5V	0~20000
5	Analog current	0mA~20mA	0~20000
6	Analog current	4mA~20mA	0~20000

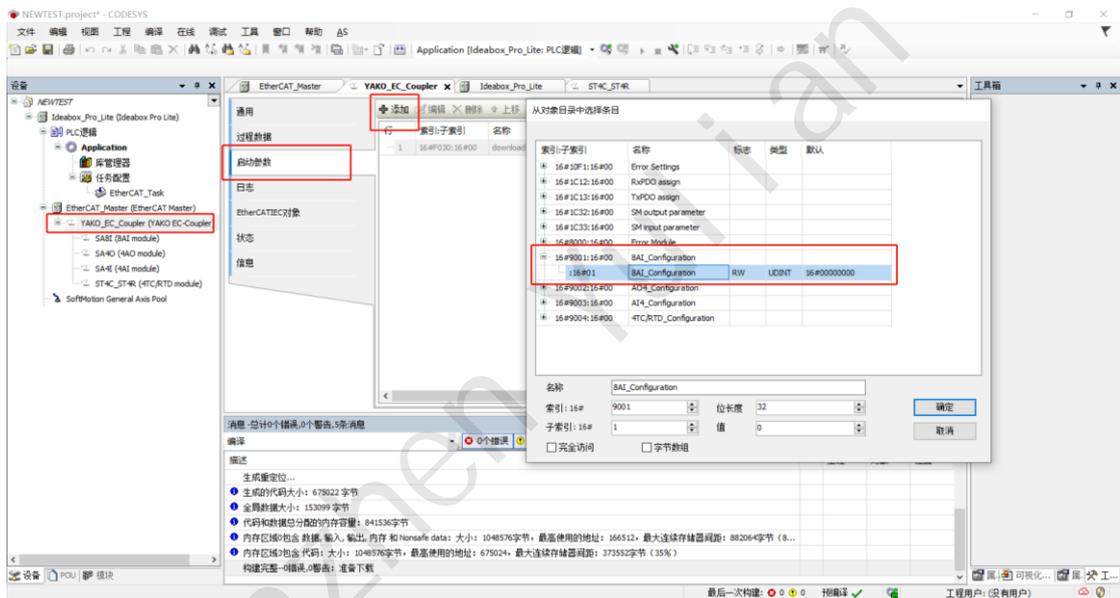
● Programming example

This example uses the CODESYS master control and EtherCAT Coupler module (EC10-CP) as the demonstration environment.

Refer to 2.1.1 → Use → Application in CODESYS Software Environment for the coupler configuration.

The steps for configuring SA-8I module parameters are as follows:

Click YAKO EC-Coupler → Startup parameters → Add → 8AI_Configuration



行	索引/子索引	名称	值	位长度	错误时中止	如果#
1	16#F030:16#00	download slot cfg	4,0,0,152,129,0,0,152,97,0,0,152,81,0,0,152,113,0	144	<input type="checkbox"/>	
2	16#9001:16#01	8AI_Configuration	0	32	<input type="checkbox"/>	

The AI_Configuration value is set in analog input mode. Seven modes are supported:

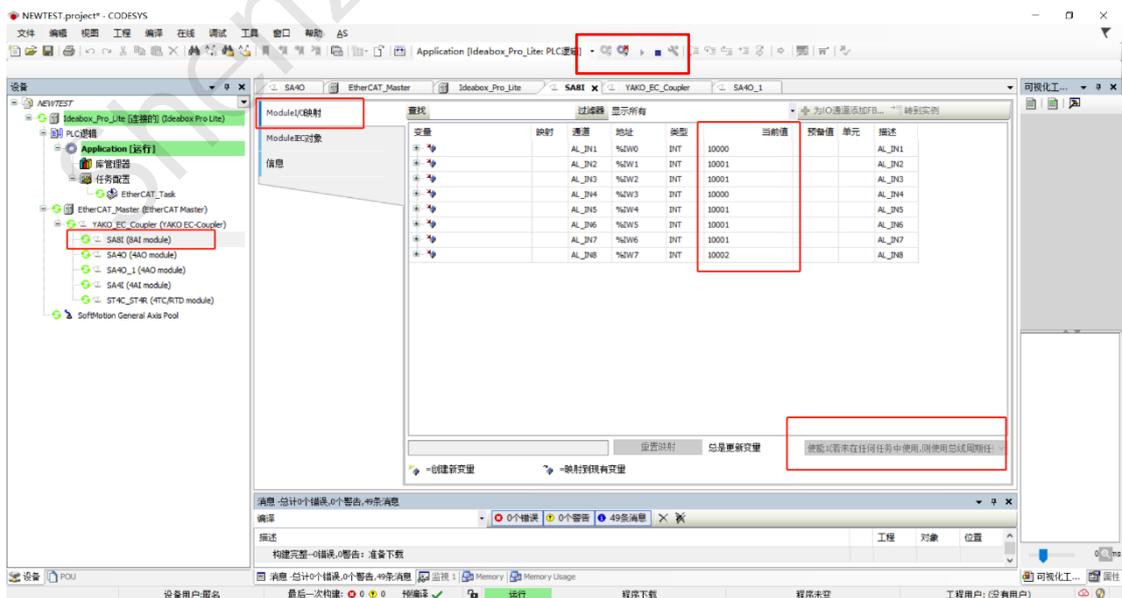
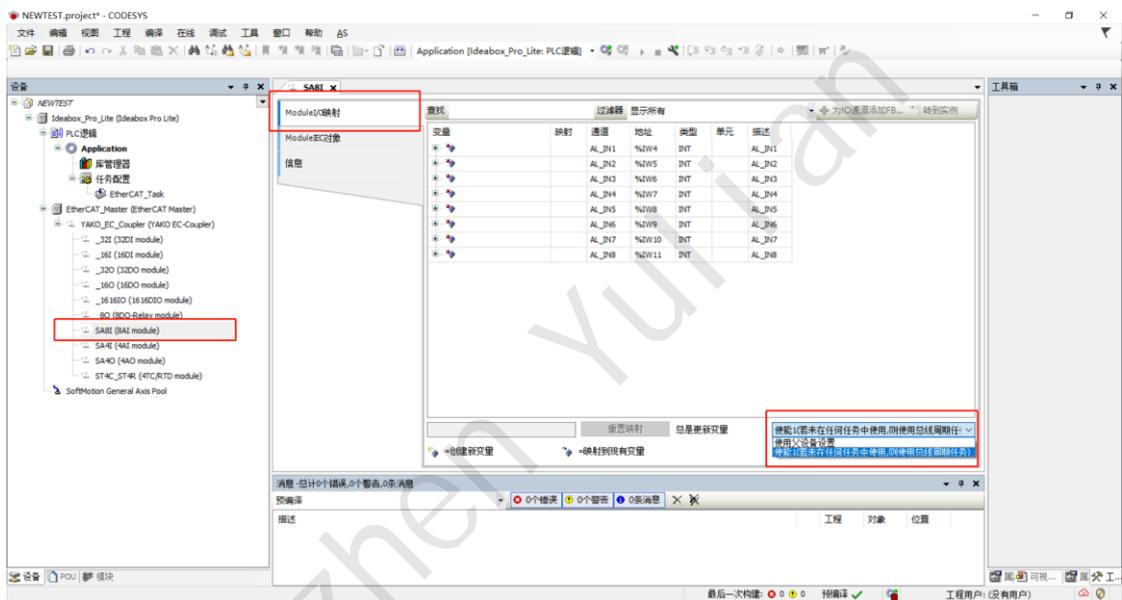
AI_Configuration value (channel 0 is used as an example) :

=0 (0V~10V) /=1 (-10V~10V) /=2 (0V~5V) /=3 (-5V~5V) /=4 (1V~5V) /= 5 (0mA~20mA) /=6 (4mA~20mA)

After module parameters are configured, click to go to Module → module/O Mapping → Change device Settings to Enable 1 → Log in to the device → Download and start the program;

Example: SA-8I module: The default configuration parameter is 0 (0V-10V), and the external cable channels 1-8 supply 5V voltage.

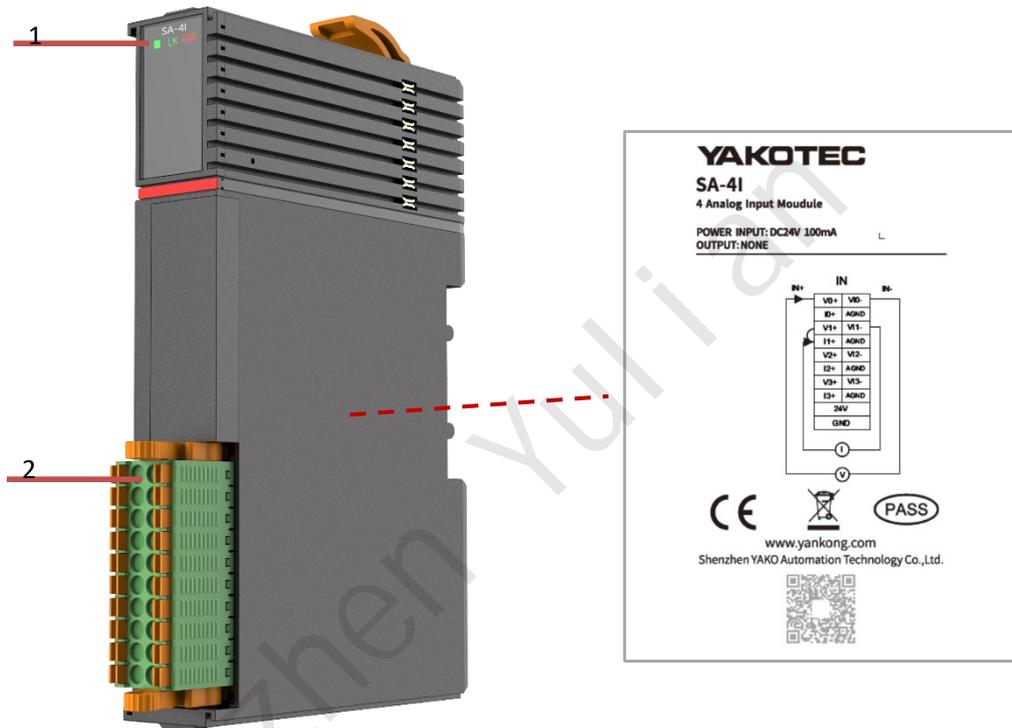
According to the analog quantity to digital quantity comparison table, 5V corresponds to the digital quantity is 10000, and the monitoring channel value is 10000, indicating that the module is normal.



2.2.10 SA-4I (4 analog input module)

■ Module overview

SA-4I is an analog input module. The module has 4 channels of analog inputs, supports voltage and current input modes, and is used with the CP series coupler module.



Serial number	name	Function definition			
1	Status light	■	Power on/running indicator	green	The module turns on when it is powered on
		LK	LK and upper-level communication connection indicator	green	On when connecting to the upper-layer module. Off: indicates that the communication is abnormal
		ERR	State machine error indicator	red	Lit when the connection to the subordinate module is incorrect
2	User terminal	For details, see Section Installing Cables			

■ Technical Specification

● Power supply specification

Item	Specification
Bus input power rated voltage	5V DC(4.75V DC~ 5.25V DC)
Rated current of bus input power supply	180mA (typical at 5V)
Rated input voltage of the terminal	24V DC(20.4V DC ~ 28.8V DC)
Rated current of terminal input power	80mA (typical at 24V)
Rated output voltage of the terminal	/
Rated current of the terminal output power supply	/
Module hot swap function	nonsupport

● Input Specification

Item	Specification
Input type	Analog input
Input mode	Voltage/current
Input channel	4
Resolution	16bit
Conversion time	125us/channle
Voltage input range	0-10V, $\pm 10V$, 0-5V, $\pm 5V$, 1-5V
Voltage input impedance	1M Ω
Voltage input accuracy (25 $^{\circ}C$)	$\pm 0.1\%$ (gamut)
Voltage input accuracy (full temperature range)	$\pm 0.2\%$ (gamut)
Voltage input limit	$\pm 15V$
Voltage input diagnosis	Disconnection detection is not supported
Current input range	0-20mA, 4-20mA
Current sampling impedance	250 Ω
Current input accuracy (25 $^{\circ}C$)	$\pm 0.1\%$ (gamut)
Current input accuracy (full temperature range)	$\pm 0.2\%$ (gamut)
Current input limit instantaneous	$\pm 30mA$, average $\pm 24mA$
Isolation or not	The interface channels are not isolated, the power supply is isolated from the interface, and the interface is isolated from the bus
Input action display	/
Input derating	/

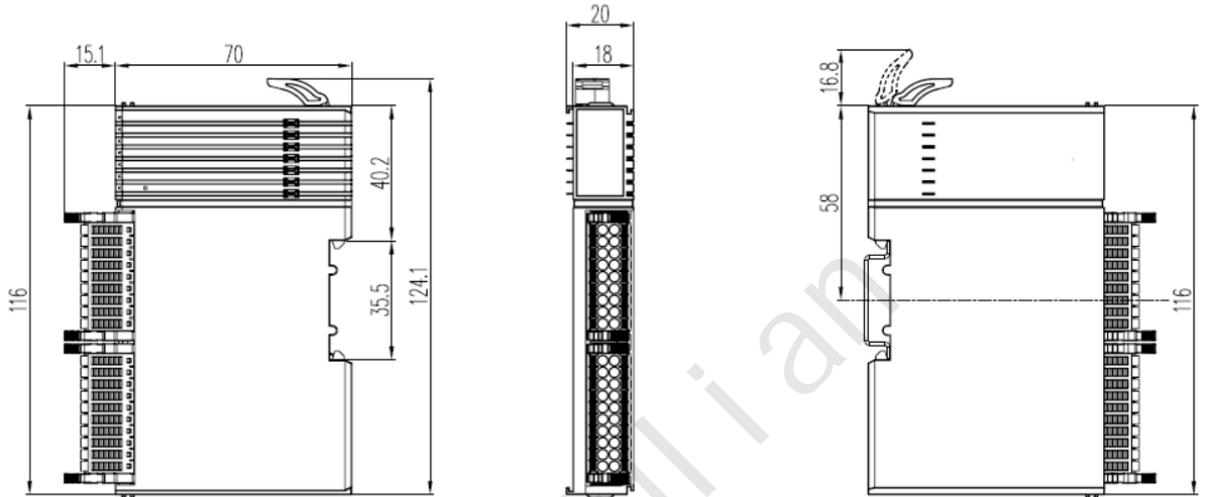
● Software specification

Item	Specification
The independent channel is enabled	support
Configure the diagnostic reporting function	support
Transition mode configuration	0-10V, $\pm 10V$, 0-5V, $\pm 5V$, 1-5V, 0-20mA, 4-20mA
Convert the number range configuration	-20000 ~ 20000
Sampling time	8 channle 1000us
Sample refresh	Asynchronously refresh according to the sampling time, and do not require synchronous refresh according to the bus cycle

■ Installation wiring

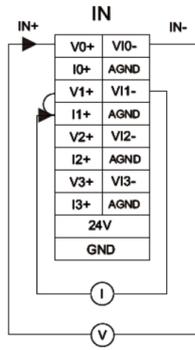
● Module size

The installation dimensions are shown in the following figure, in mm:



Note: For the installation method, see "Product Overview → 1.3 Installation and Disassembly".

● Terminal Wiring



Shenzhen Yulian

18 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1			10		
2			11		
3			12		
4			13		
5			14		
6			15		
7			16		
8			17		
9			18		
20 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1	V4+	Analog channel 0 voltage positive	11	VI4-	Analog channel 0 negative terminal
2	I4+	Analog channel 0 current positive	12	AGND	Simulatively
3	V5+	Analog channel 1 voltage positive	13	VI5-	Analog channel 1 negative terminal
4	I5+	Analog channel 1 current positive	14	AGND	Simulatively
5	V6+	Analog channel 2 voltage positive	15	VI6-	Analog channel 2 negative terminal
6	I6+	Analog channel 2 current positive	16	AGND	Simulatively
7	V7+	Analog channel 3 voltage positive	17	VI7-	Analog channel 3 negative terminal
8	I7+	Analog channel 3 current positive	18	AGND	simulatively
9	24V	Output 24V power supply positive	19	24V	Output 24V power supply positive
10	GND	Output 24V power supply negative	20	GND	Output 24V power supply negative

Note: Analog module is compatible with voltage and current mode, voltage input wiring is voltage positive and channel negative; The current input cable needs to short-circuit the positive voltage terminal and the positive current terminal and connect the correct current input terminal.

■ Use

● Parameter definition

The reference value of the data object dictionary index is set

Index	16#9000+n (n indicates the module number)				
Subindex	Name	Data type	Access mode	Mapping capability	Default value
16#00	Index	USINT	RO	NO	/
16#01	4AI_Configuration	UDINT	RW	NO	16#0000 0000

Configuration value:

position	Instructions
Bit0-3 (16#0000 000_)	Channel 1 conversion mode 0: 0V~10V 5: 0mA~20mA 1: -10V~10V 6: 4mA~20mA 2: 0V~5V 3: -5V~5V 4: 1V~5V
Bit4-7 (16#0000 00_0)	channle2
Bit8-11 (16#0000 0_00)	Channle3
Bit12-15 (16#0000 _000)	Channle4

Analog quantity to digital quantity comparison table:

Mode	Type	Rated range	Corresponding digit quantity
0	Analog voltage	0V~10V	0~20000
1	Analog voltage	-10V~10V	-20000~20000
2	Analog voltage	0V~5V	0~20000
3	Analog voltage	-5V~5V	-20000~20000
4	Analog voltage	1V~5V	0~20000
5	Analog current	0mA~20mA	0~20000
6	Analog current	4mA~20mA	0~20000

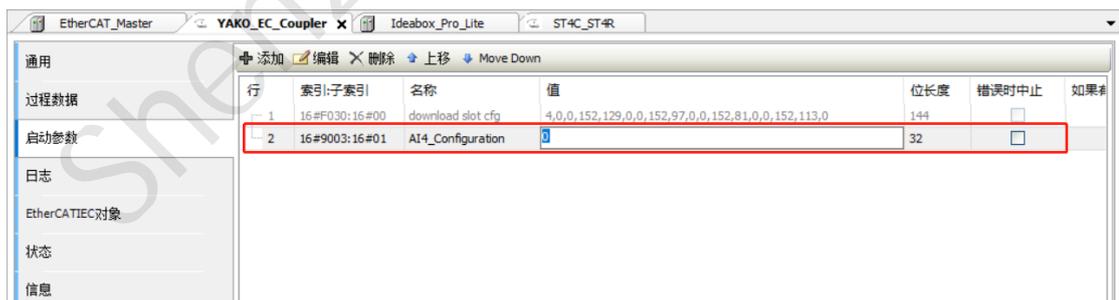
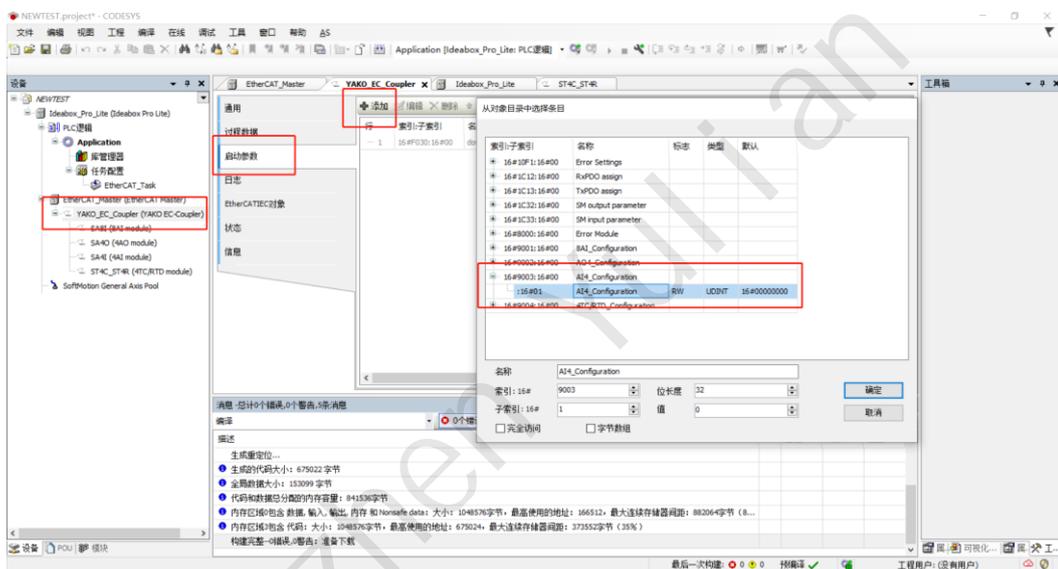
● Programming example

This example uses the CODESYS master control and EtherCAT Coupler module (EC10-CP) as the demonstration environment.

Refer to 2.1.1 → Use → Application in CODESYS Software Environment for the coupler configuration.

The steps for configuring SA-8I module parameters are as follows:

Click YAKO EC-Coupler → Startup parameters → Add → 4AI_Configuration



The AI_Configuration value is set in analog input mode. Seven modes are supported:

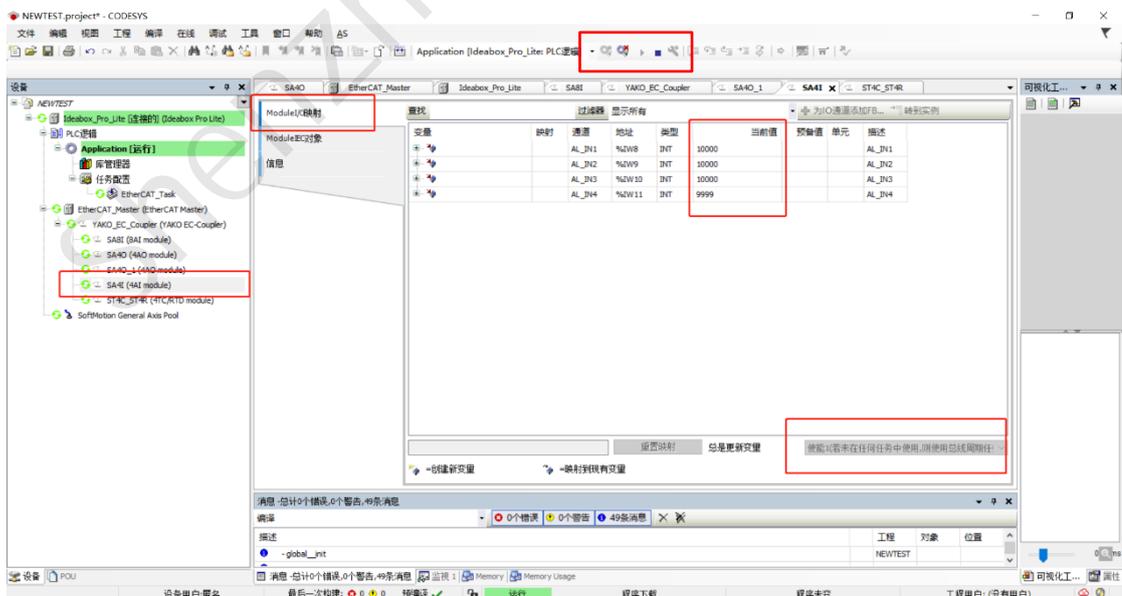
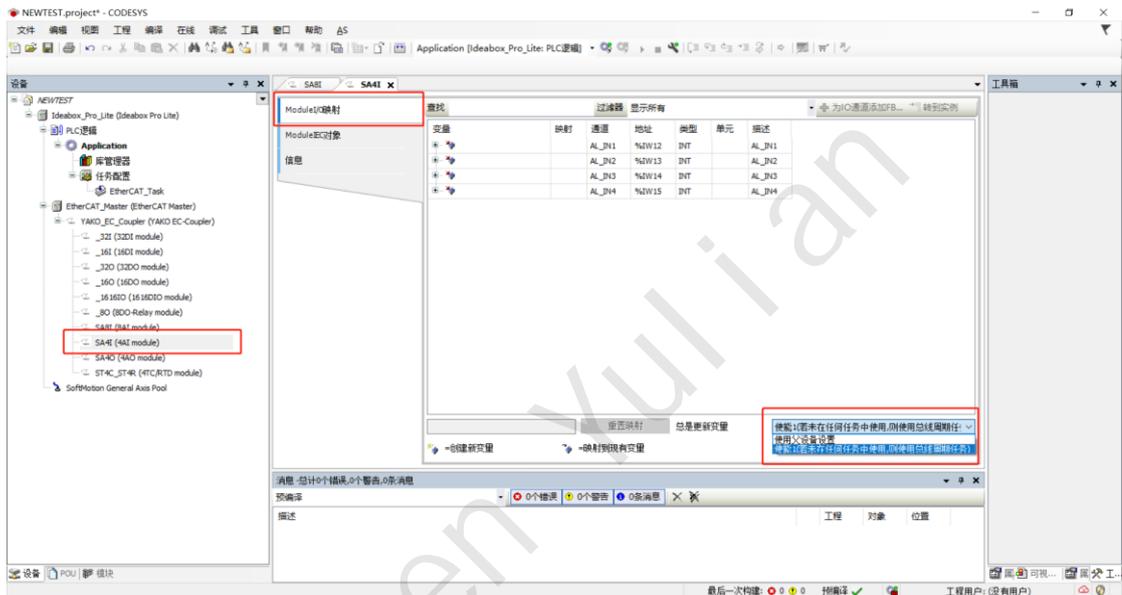
AI_Configuration value (channel 0 is used as an example) :

$$=0(0V\sim10V)/=1(-10V\sim10V)/=2(0V\sim5V)/=3(-5V\sim5V)/=4(1V\sim5V)/$$

$$=5(0mA\sim20mA)/=6(4mA\sim20mA)$$

After module parameters are configured, click to go to Module → module/I/O Mapping → Change device Settings to Enable 1 → Log in to the device → Download and start the program;

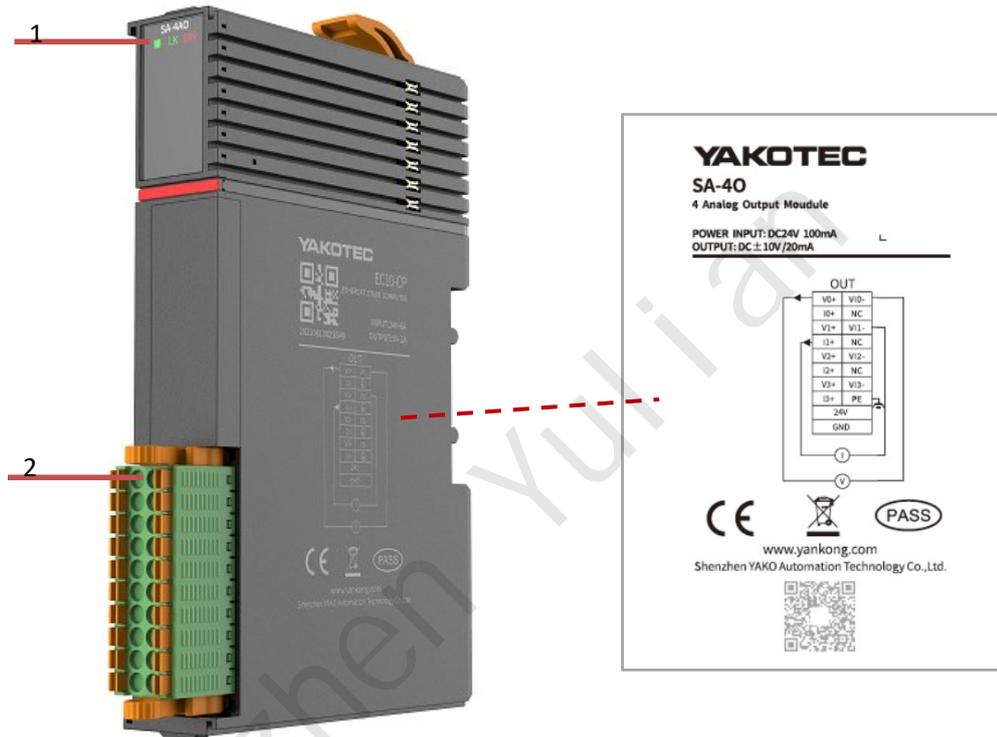
Example: SA-4I module: The default configuration parameter is 0 (0V-10V), and the external cable channels 1-4 supply 5V voltage. According to the analog quantity to digital quantity comparison table, 5V corresponds to the digital quantity is 10000, and the monitoring channel value is 10000, indicating that the module is normal



2.2.11 SA-40 (4 analog output module)

■ Module overview

SA-40 is an analog output module. The module has 4 channels of analog output, supports voltage and current output modes, and is used with CP series coupler module.



Serial number	name	Function definition			
1	Status light	■	Power on/running indicator	green	The module turns on when it is powered on
		LK	LK and upper-level communication connection indicator	green	On when connecting to the upper-layer module. Off: indicates that the communication is abnormal
		ERR	State machine error indicator	red	Lit when the connection to the subordinate module is incorrect
2	User terminal	For details, see Section Installing Cables			

■ Technical Specification

● Power supply specification

Item	Specification
Bus input power rated voltage	5V DC(4.75V DC~ 5.25V DC)
Rated current of bus input power supply	180mA (typical at 5V)
Rated input voltage of the terminal	24V DC(20.4V DC ~ 28.8V DC)
Rated current of terminal input power	80mA (typical at 24V)
Rated output voltage of the terminal	/
Rated current of the terminal output power supply	/
Module hot swap function	nonsupport

● Output Specification

Item	Specification
Output type	Analog output
Output mode	Voltage/current
Output channel	4
Resolution	16bit
Conversion time	125us/channle
Voltage output range	0-10V, $\pm 10V$, 0-5V, $\pm 5V$, 1-5V
Voltage output impedance	1k Ω
Voltage output accuracy (25 $^{\circ}$ C)	$\pm 0.1\%$ (gamut)
Voltage output accuracy (full temperature range)	$\pm 0.5\%$ (gamut)
Current output range	0-20mA, 4-20mA
Current output load	0-600 Ω
Current input accuracy (25 $^{\circ}$ C)	$\pm 0.1\%$ (gamut)
Current input accuracy (full temperature range)	$\pm 0.5\%$ (gamut)
Isolation or not	The interface channels are not isolated, the power supply is isolated from the interface, and the interface is isolated from the bus

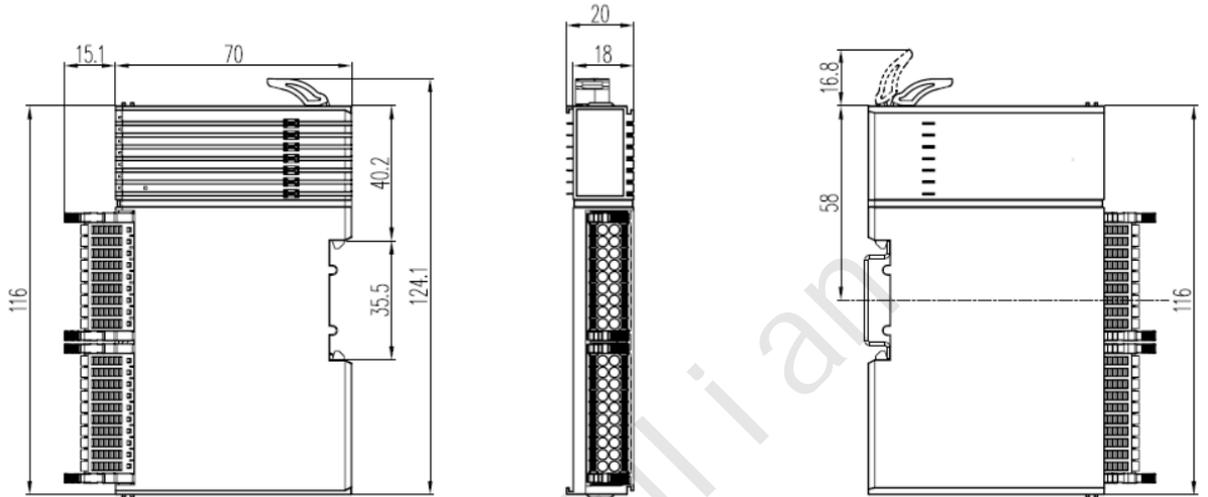
● Software specification

Item	Specification
The independent channel is enabled	support
Transition mode configuration	0-10V, $\pm 10V$, 0-5V, $\pm 5V$, 1-5V, 0-20mA, 4-20mA
Output status configuration after shutdown	Zero clearing
Convert the number range configuration	-20000 ~ 20000
Sampling time	4 channle 500us
Sample refresh	Asynchronously refresh according to the sampling time, and do not require synchronous refresh according to the bus cycle

■ Installation wiring

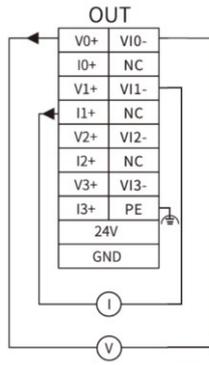
● Module size

The installation dimensions are shown in the following figure, in mm:



Note: For the installation method, see "Product Overview → 1.3 Installation and Disassembly".

● Terminal Wiring



Shenzhen Yulian

18 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1			10		
2			11		
3			12		
4			13		
5			14		
6			15		
7			16		
8			17		
9			18		
20 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1	V0+	Analog channel 0 voltage positive	11	VI0-	Analog channel 0 negative terminal
2	I0+	Analog channel 0 current positive	12	NC	empty
3	V1+	Analog channel 1 voltage positive	13	VI2-	Analog channel 1 negative terminal
4	I1+	Analog channel 1 current positive	14	NC	empty
5	V2+	Analog channel 2 voltage positive	15	VI3-	Analog channel 2 negative terminal
6	I2+	Analog channel 2 current positive	16	NC	empty
7	V3+	Analog channel 3 voltage positive	17	VI4-	Analog channel 3 negative terminal
8	I3+	Analog channel 3 current positive	18	PE	Ground wire
9	24V	Output 24V power supply positive	19	24V	Output 24V power supply positive
10	GND	Output 24V power supply negative	20	GND	Output 24V power supply negative

Note: The analog module is compatible with voltage and current modes, and the voltage output is connected to the positive voltage terminal and the negative channel terminal; The current output is connected to the positive current terminal and the negative channel terminal.

■ Use

● Parameter definition

The reference value of the data object dictionary index is set

Index	16#9000+n (n is the module number)				
Subindex	Name	Data type	Access mode	Mapping capability	Default value
16#00	Index	USINT	RO	NO	/
16#01	4AO_Configuration	UDINT	RW	NO	16#0000 0000

Configuration value:

position	Instructions
Bit0-3 (16#0000 000_)	Channel 1 conversion mode 0: 0V~10V 5: 0mA~20mA 1: -10V~10V 6: 4mA~20mA 2: 0V~5V 3: -5V~5V 4: 1V~5V
Bit4-7 (16#0000 00_0)	channle2
Bit8-11 (16#0000 0_00)	Channle3
Bit12-15 (16#0000 _000)	Channle4

Digital quantity to analog quantity comparison table:

mode	type	Rated range	Corresponding digit quantity
0	Analog voltage	0V~10V	0~20000
1	Analog voltage	-10V~10V	-20000~20000
2	Analog voltage	0V~5V	0~20000
3	Analog voltage	-5V~5V	-20000~20000
4	Analog voltage	1V~5V	0~20000
5	Analog current	0mA~20mA	0~20000
6	Analog current	4mA~20mA	0~20000

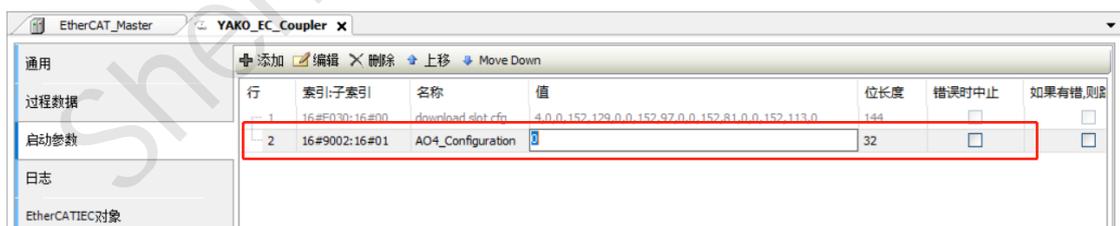
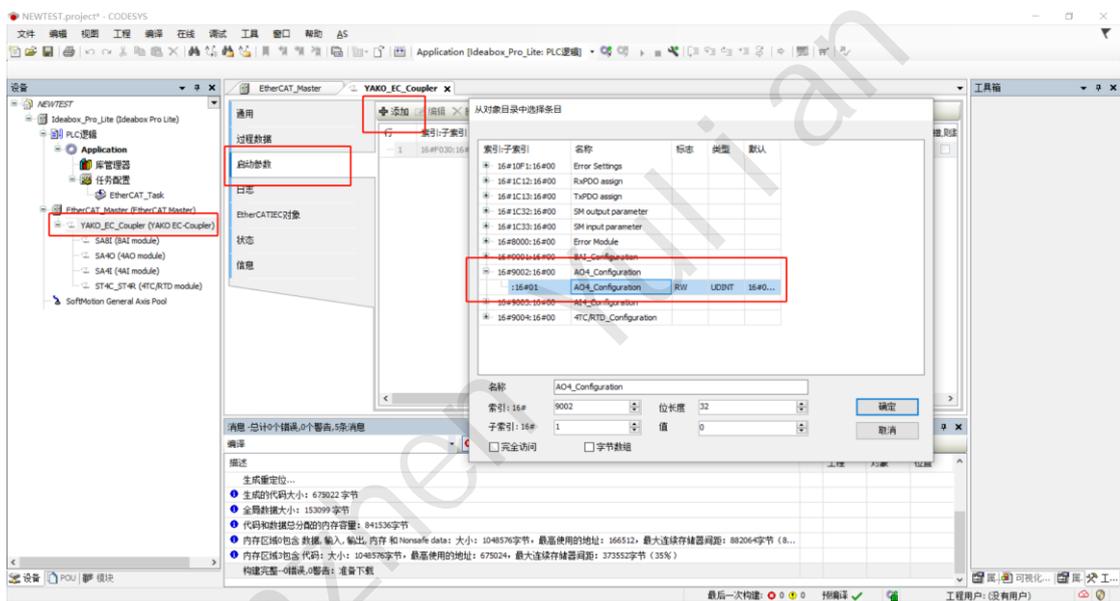
● Programming example

This example uses the CODESYS master control and EtherCAT Coupler module (EC10-CP) as the demonstration environment.

Refer to 2.1.1 → Use → Application in CODESYS Software Environment for the coupler configuration.

The steps for configuring SA-4O module parameters are as follows:

Click YAKO EC-Coupler → Startup parameters → Add → 4AO_Configuration



The AO_Configuration value is the analog input mode configuration, and seven modes are supported:

AO_Configuration value (channel 0 is used as an example) :

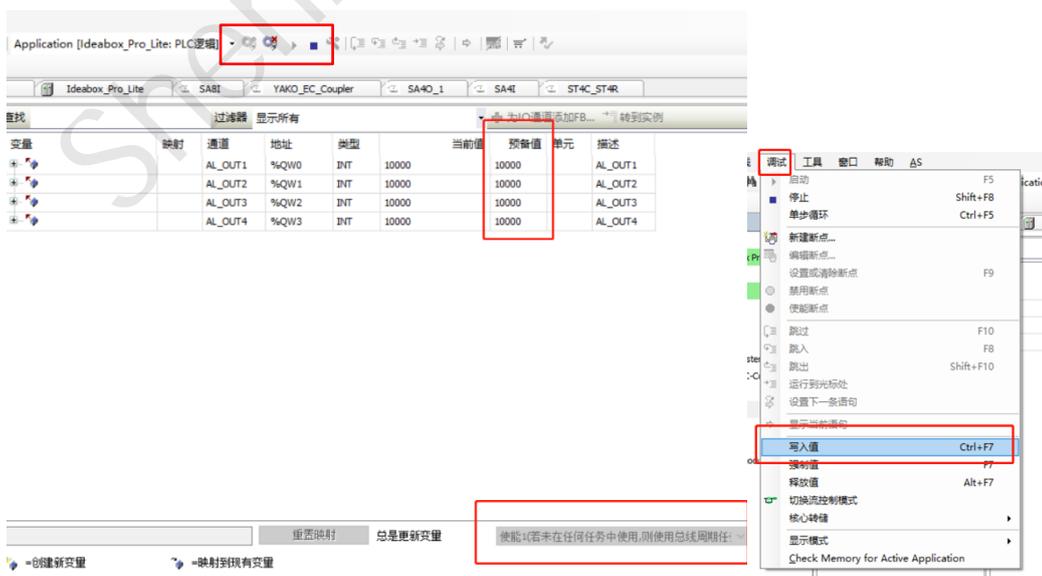
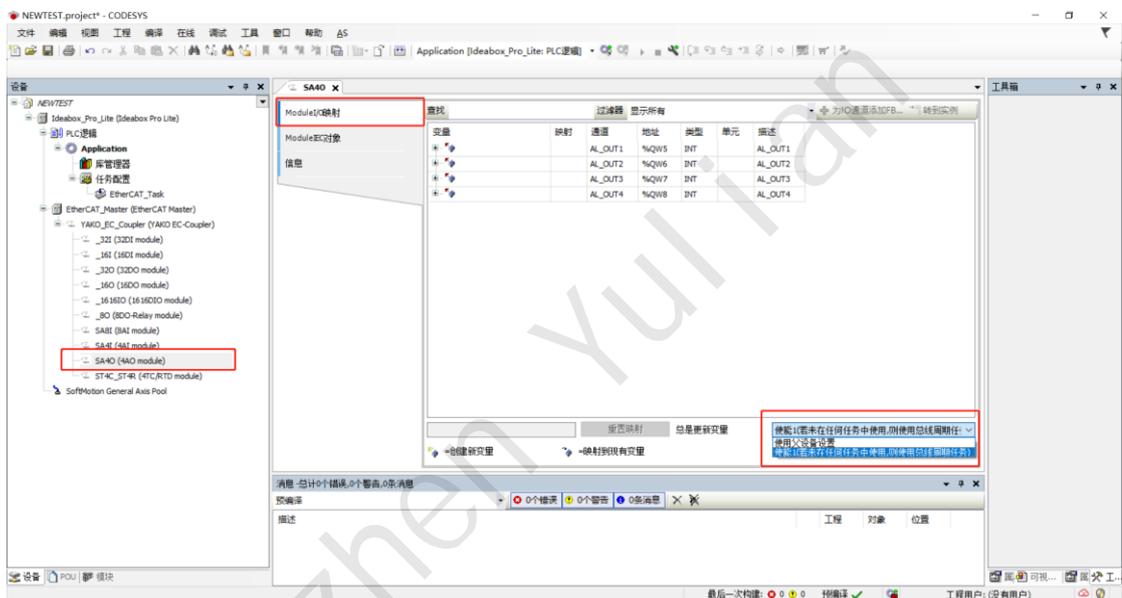
$$=0(0V\sim10V)/=1(-10V\sim10V)/=2(0V\sim5V)/=3(-5V\sim5V)/=4(1V\sim5V)/$$

$$=5(0mA\sim20mA)/=6(4mA\sim20mA)$$

After module parameters are configured, click to go to Module → module/O Mapping → Change device Settings to Enable 1 → Log in to the device → Download and start the program;

Example: SA-40 module: The default configuration parameter is 0 (0V-10V), the channel preparation value is written to 10000, debugging → write value;

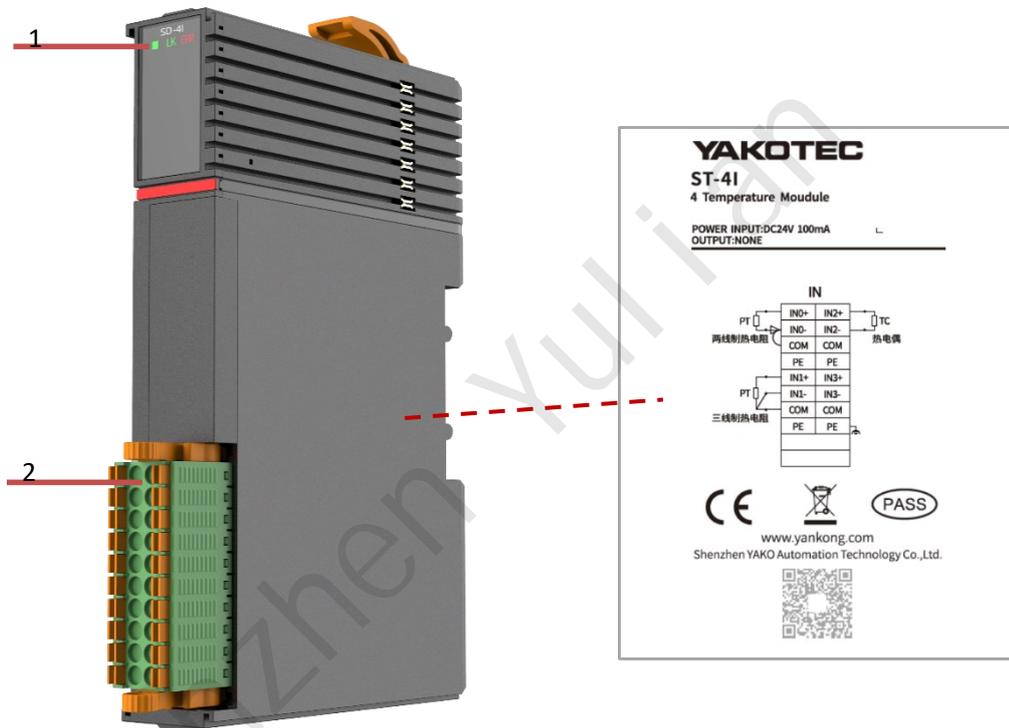
According to the analog quantity to digital quantity comparison table, the analog voltage corresponding to the digital quantity is 5V, and the module is normal when the output voltage of the external channel is 5V.



2.2.12 ST-4I (4 temperature input module)

■ Module overview

ST-4I is a temperature input module. The module has 4 channels of temperature input, supports thermal resistance, thermocouple and other types of sensors, and is used with CP series coupler module.



Serial number	name	Function definition			
1	Status light	■	Power on/running indicator	green	The module turns on when it is powered on
		LK	LK and upper-level communication connection indicator	green	On when connecting to the upper-layer module. Off: indicates that the communication is abnormal
		ERR	State machine error indicator	red	Lit when the connection to the subordinate module is incorrect
2	User terminal	For details, see Section Installing Cables			

■ Technical Specification

● Power supply specification

Item	Specification
Bus input power rated voltage	5V DC(4.75V DC~ 5.25V DC)
Rated current of bus input power supply	85mA (typical at 5V)
Rated input voltage of the terminal	24V DC(20.4V DC ~ 28.8V DC)
Rated current of terminal input power	100mA (typical at 24V)
Rated output voltage of the terminal	/
Rated current of the terminal output power supply	/
Module hot swap function	nonsupport

● Input Specification

Item	Specification
Input channel	4 channle
Digital resolution	16bit
Display sensitivity	0.5℃
Input terminal	4 thermal resistance input/thermocouple input
Sensor type	Thermal resistance: Pt100, Pt200, Pt500, Pt1000, thermocouple: K,J,T,E,N,S,R,B
Connection mode	Thermal resistance: two wire/three wire, thermocouple: two wire
Accuracy (room temperature 25℃)	Full scale ($\pm 0.5\%$), (0mV ~ 1000mV full scale)
Accuracy (ambient temperature -20℃ ~ 55℃)	Full scale ($\pm 1\%$), (0mV ~ 1000mV full scale)
Sampling period	250ms, 500ms, 1000ms/4 channels (configurable by software)
Filtering time	0s to 100s (Software configurable, default 1s)
Isolation mode	The I/O terminals are isolated from the power supply, and channels are isolated from each other

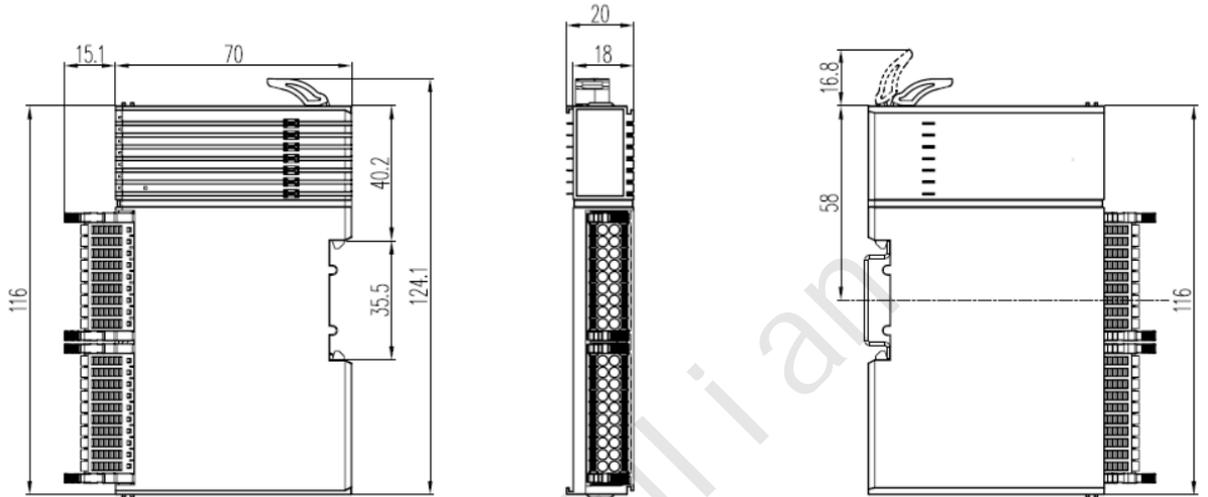
● **Software specification**

Item	Specification
Configure the diagnostic reporting function	support
Configures the diagnostic detection function	Supports over limit and broken line detection
The overlimit detection function is enabled	support
Independent channel configuration	support
The temperature offset function was enabled	support
Temperature setting range	204.8 to +204.7 Temperature unit
Sampling period	250ms, 500ms, 1000ms/4 channle
Display mode	Degree Celsius(°C)
Sensitivity	0.5°C, 0.5°F
Sample refresh	Asynchronously refresh according to the sampling time, and do not require synchronous refresh according to the bus cycle
Stop mode	Continue to refresh according to the sampling time
Broken or overrun	The output is based on the maximum value and is not refreshed
Channel diagnosis	Upper limit alarm, lower limit alarm, line disconnection alarm, overflow error
Software diagnosis	Not supported yet
Configuration diagnosis	Configuration error identification or channel parameters are incorrectly configured

■ Installation wiring

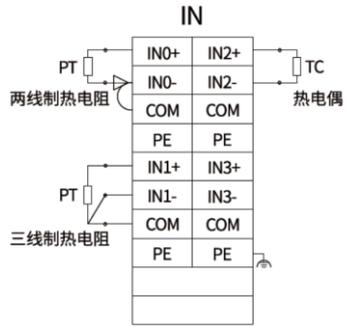
● Module size

The installation dimensions are shown in the following figure, in mm:



Note: For the installation method, see "Product Overview → 1.3 Installation and Disassembly".

● Terminal Wiring



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18 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1			10		
2			11		
3			12		
4			13		
5			14		
6			15		
7			16		
8			17		
9			18		
20 PIN terminal					
Terminal number	Terminal number	Terminal number	Terminal number	Terminal number	Terminal number
1	IN0+	Temperature channel 0 Input positive terminal	11	IN2+	Temperature channel 2 Input the positive terminal
2	IN0-	Temperature channel 0 Input negative terminal	12	IN2-	Temperature channel 2 input negative terminal
3	COM	Temperature channel 0 COM reference source	13	COM	Temperature channel 2 COM reference source
4	PE	Ground wire	14	PE	Ground wire
5	IN1+	Temperature channel 1 Input the positive terminal	15	IN3+	Temperature channel 3 Input the positive terminal
6	IN1-	Temperature channel 1 input negative terminal	16	IN3-	Temperature channel 3 Input negative terminal
7	COM	Temperature channel 1 COM reference source	17	COM	Temperature channel 3 COM reference source
8	PE	Ground wire	18	PE	Ground wire
9			19		
10			20		

Note: The temperature quantity module is compatible with thermal resistance and thermocouple types. The two-wire heating resistance connection requires a short-channel input negative electrode and a COM reference source. PE is recommended to be connected to the cable shielding layer.

■ Use

● Parameter definition

The reference value of the data object dictionary index is set:

Index	16#9000+n (n is the module number)				
Subindex	Name	Data type	Access mode	Mapping capability	Default value
16#00	8DORelay_Configuration	USINT	RO	NO	/
16#01	Sensor Type	UDINT	RW	NO	(K 型)
16#02	Channel Enable	UINT	RW	NO	/

Sensor Type value:

value	Instructions
0	K
1	J
2	T
3	E
4	N
5	S
6	R
7	B
8	PT100
9	PT200
A	PT500
B	PT1000

Note: Channel digital display value: =10* actual sensor temperature value;

The Offset value of the channel is the offset.

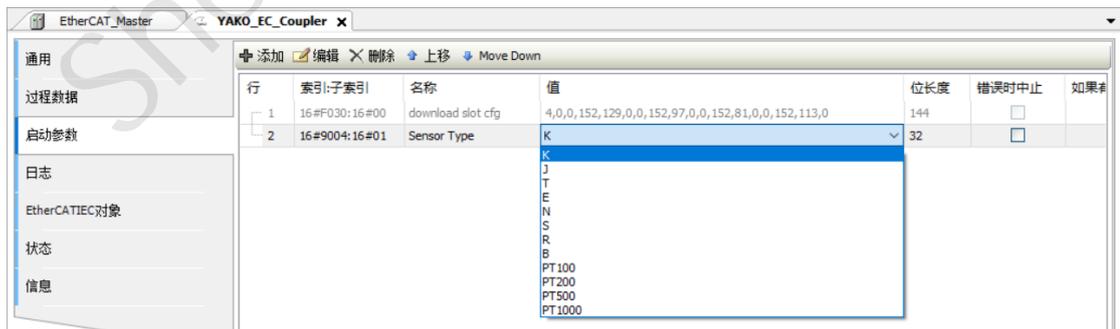
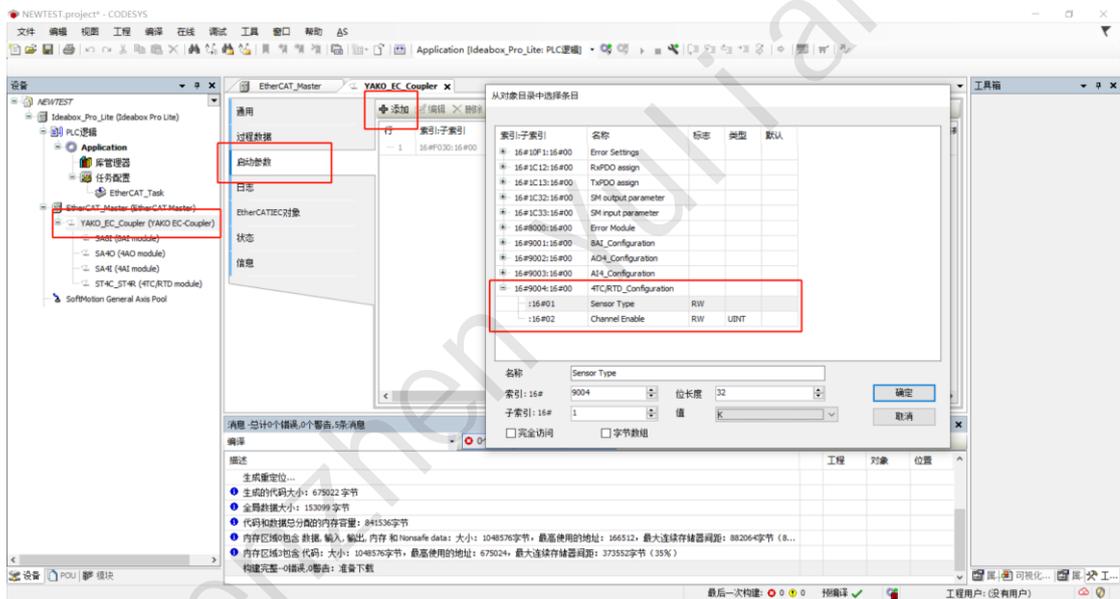
● Programming example

This example uses the CODESYS master control and EtherCAT Coupler module (EC10-CP) as the demonstration environment.

Refer to 2.1.1 → Use → Application in CODESYS Software Environment for the coupler configuration. The steps for configuring

ST-4I module parameters are as follows:

Click YAKO EC-Coupler → Startup parameters → Add → 4TC/RTD_Configuration → Sensor Type



Configuration → Sensor Typ Indicates the sensor type.

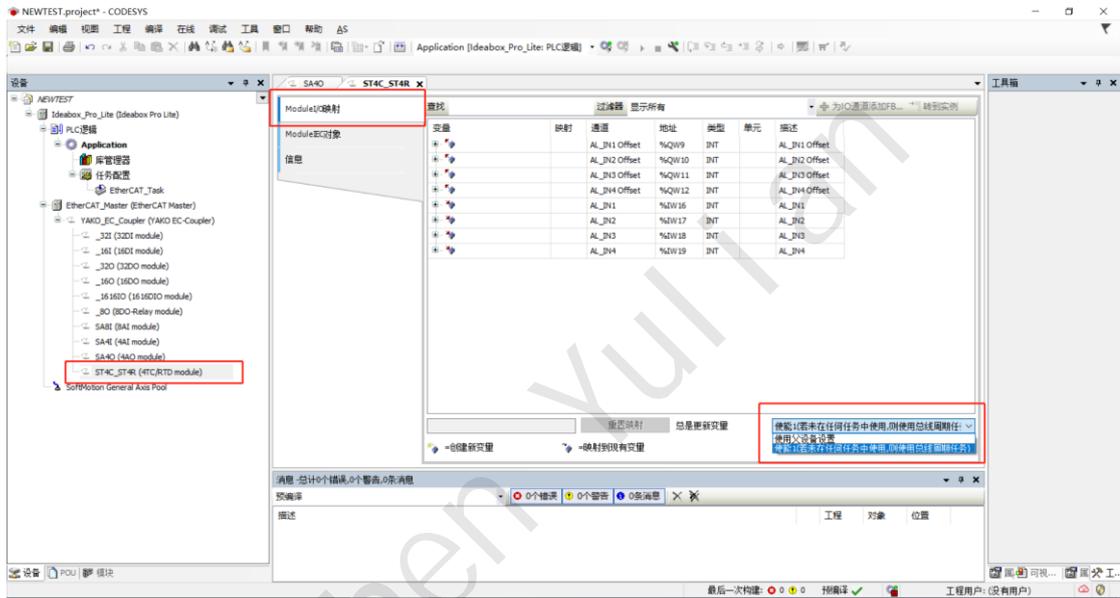
Thermocouple and thermoresistor types are supported: K,J,T,E,N,S,R,B;

Thermal resistance support type: Pt100, Pt200, Pt500, Pt1000.

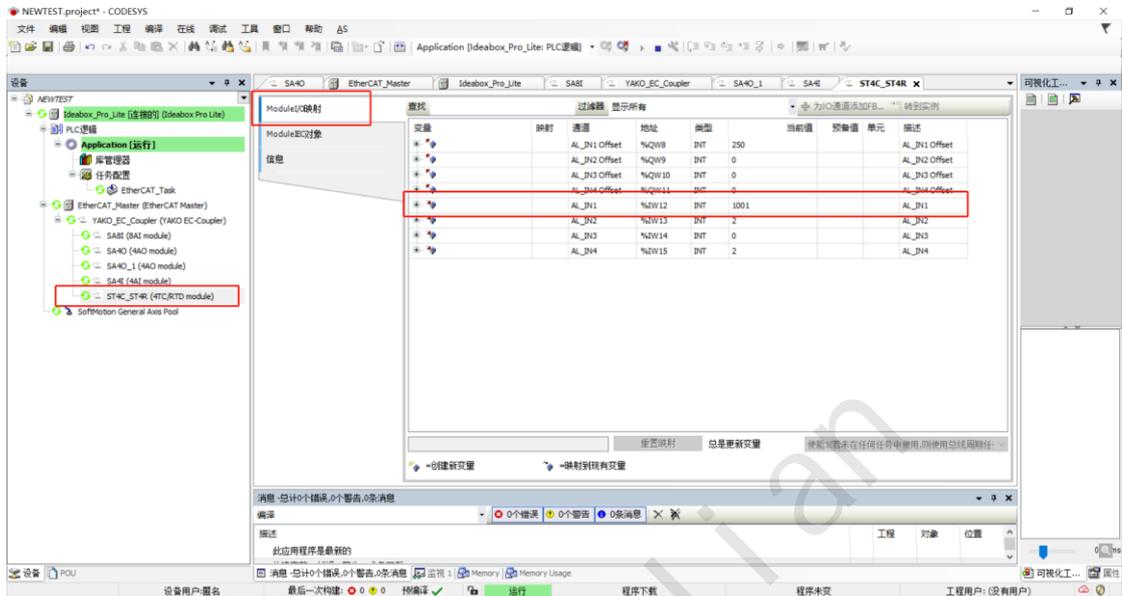
After module parameters are configured, click to go to Module → module/O Mapping → Change device Settings to Enable 1 → Log in to the device → Download and start the program;

Case: ST-4I module: Default configuration parameters K thermocouple, external wiring channel 1 access K thermocouple sensor;

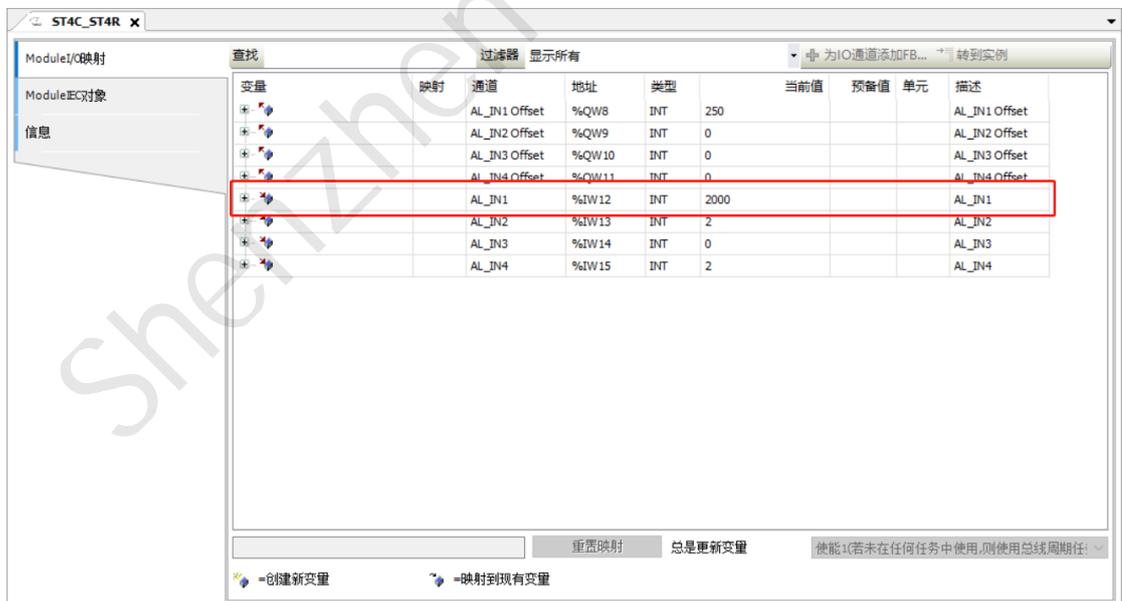
If the value of the monitoring channel is displayed (10 x the actual temperature), the module is normal.



The actual temperature value of the K-type sensor is 100°C, and the actual reading is as shown in the figure below:



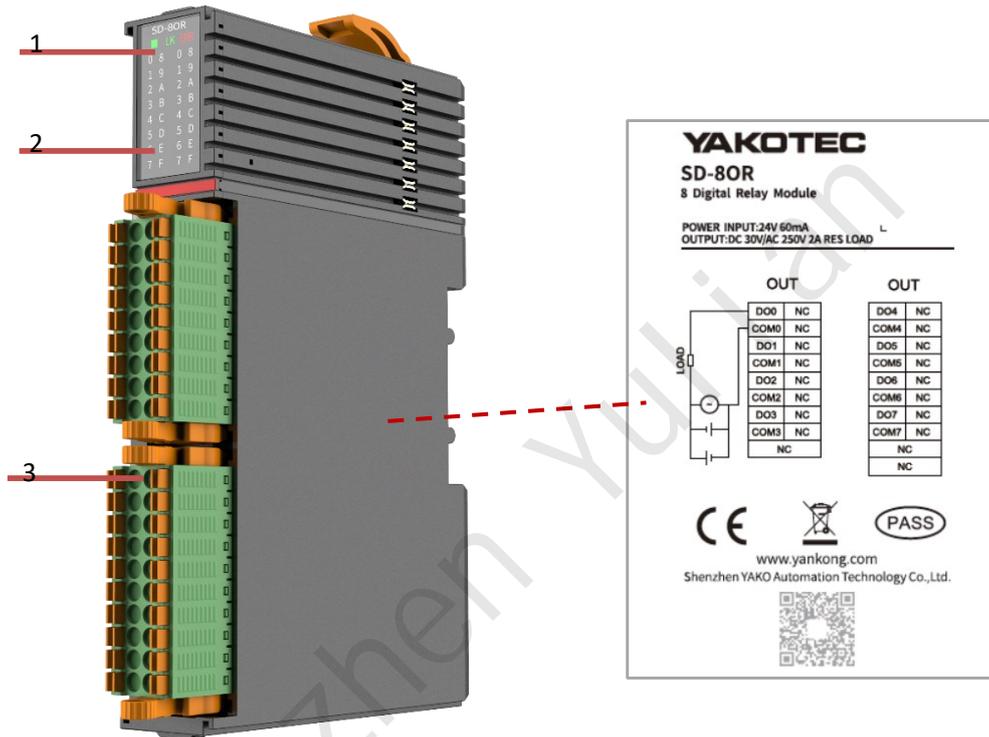
The actual temperature of the K-type sensor is 200°C, and the actual reading is as shown in the figure below :



2.2.13 SD-8OR (8 relay output module)

■ Module overview

SD-8OR is a relay output module. The module has an 8-channel relay output and is used with the CP series coupler module.



Serial number	name	Function definition			
1	Status light	■	Power on/running indicator	green	The module turns on when it is powered on
		LK	LK and upper-level communication connection indicator	green	On when connecting to the upper-layer module. Off: indicates that the communication is abnormal
		ERR	State machine error indicator	red	Lit when the connection to the subordinate module is incorrect
2	IO signal lamp	Corresponding to each input or output signal indication, signal effective indicator light			
3	User terminal	For details, see Section Installing Cables			

■ Technical Specification

● Power supply specification

Item	Specification
Bus input power rated voltage	5V DC(4.75V DC~ 5.25V DC)
Rated current of bus input power supply	85mA (typical at 5V)
Rated input voltage of the terminal	24V DC(20.4V DC ~ 28.8V DC)
Rated current of terminal input power	100mA (typical at 24V)
Rated output voltage of the terminal	/
Rated current of the terminal output power supply	/
Module hot swap function	nonsupport

● **Output Specification**

Item	规格
Output type	Digital output, relay output
Output mode	Dry contact
Output channel	8
Output voltage level	250V AC/30V DC
Output load(Resistive load)	2A/channel, 8A/module
Output load (inductive load)	1A/channel , 4A/module
Output load(Lamp load)	30W/channel , 120W/module
Hardware response time ON/OFF	15ms
Minimum load	5V DC, 5mA
Minimum number of operable switches	1×10^5
Isolation or not	support
Output action display	When the output is in drive state, the output indicator lights up (software control)

● Software specification

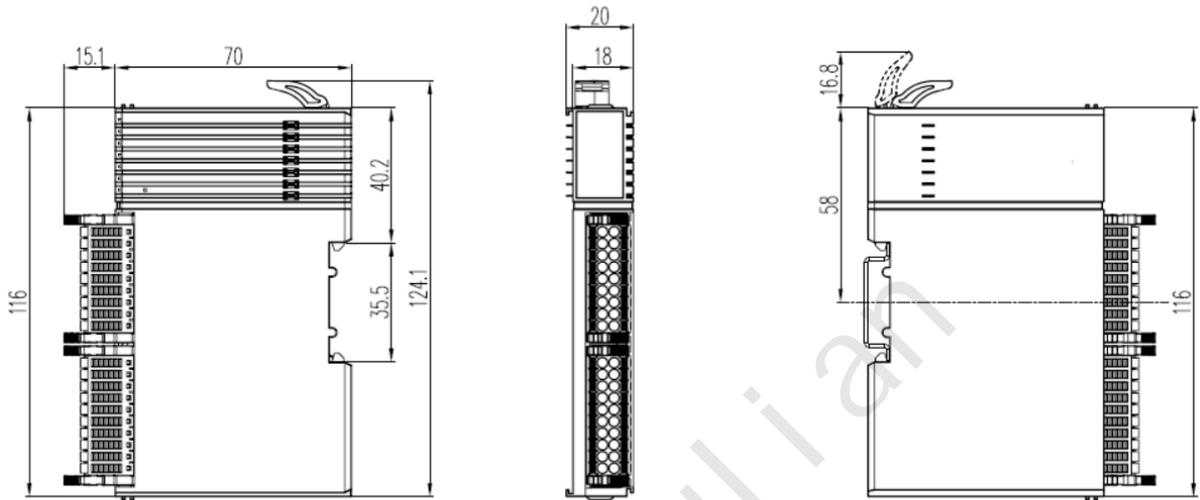
Item	Specification
Fault shutdown output status mode	Clear, set, and keep the current value
IO mapping	Supports bitwise access

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■ Installation wiring

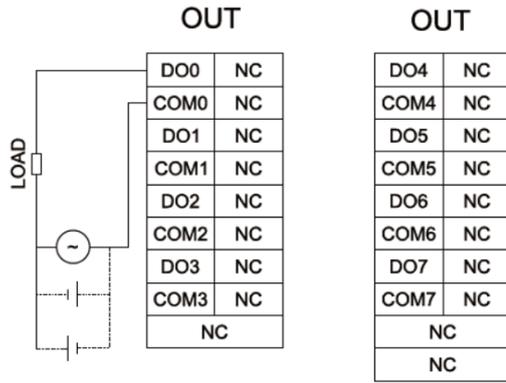
● Module size

The installation dimensions are shown in the following figure, in mm:



Note: For the installation method, see "Product Overview → 1.3 Installation and Disassembly".

● Terminal Wiring



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OUT							
Terminal number	Terminal indication	Terminal identification	Instructions	Terminal number	Terminal indication	Terminal identification	Instructions
1	0	DO0	Relay output channel 0	10	/	NC	empty
2	C0	COM0	Relay output channel 0 COM terminal	11	/	NC	empty
3	1	DO1	Relay output channel 1	12	/	NC	empty
4	C1	COM1	Relay output channel 1 COM terminal	13	/	NC	empty
5	2	DO2	Relay output channel 2	14	/	NC	empty
6	C2	COM2	Relay output channel 2 COM terminal	15	/	NC	empty
7	3	DO3	Relay output channel 3	16	/	NC	empty
8	C3	COM3	Relay output channel 3 COM terminal	17	/	NC	empty
9	NC	NC	空	18	/	NC	empty
OUT							
Terminal number	Terminal indication	Terminal identification	Instructions	Terminal number	Terminal indication	Terminal identification	Instructions
1	4	DO4	Relay output channel 4	11	/	NC	empty
2	C4	COM4	Relay output channel 4 COM terminal	12	/	NC	empty
3	5	DO5	Relay output channel 5	13	/	NC	empty
4	C5	COM5	Relay output channel 5 COM terminal	14	/	NC	empty
5	6	DO6	Relay output channel 6	15	/	NC	empty
6	C6	COM6	Relay output channel 6 COM terminal	16	/	NC	empty
7	7	DO7	Relay output channel 7	17	/	NC	empty
8	C7	COM7	Relay output channel 7 COM terminal	18	/	NC	empty
9	NC	NC	empty	19	/	NC	empty
10	NC	NC	empty	20	/	NC	empty

■ Use

● Parameter definition

Configure data object dictionary index reference values:

index	16#9000+n (n is the module number)				
subindex	name	Data type	Access mode	Mapping capability	Default value
16#00	Index	USINT	RO	NO	/
16#01	8DORelay _Configuration	UDINT	RW	NO	16#0000 0000

Configuration value:

position	Instructions
Bit0-7	16# 000000 __ : Input filtering coefficient =1ms * value
Bit8-15	Output Troubleshooting 16#0000 0000 (0) : Clear after the communication is interrupted 16#0000 0100 (256) : Set after the communication is interrupted 16#0000 0200 (512) : Retain the current value after the communication is interrupted Other: Retain

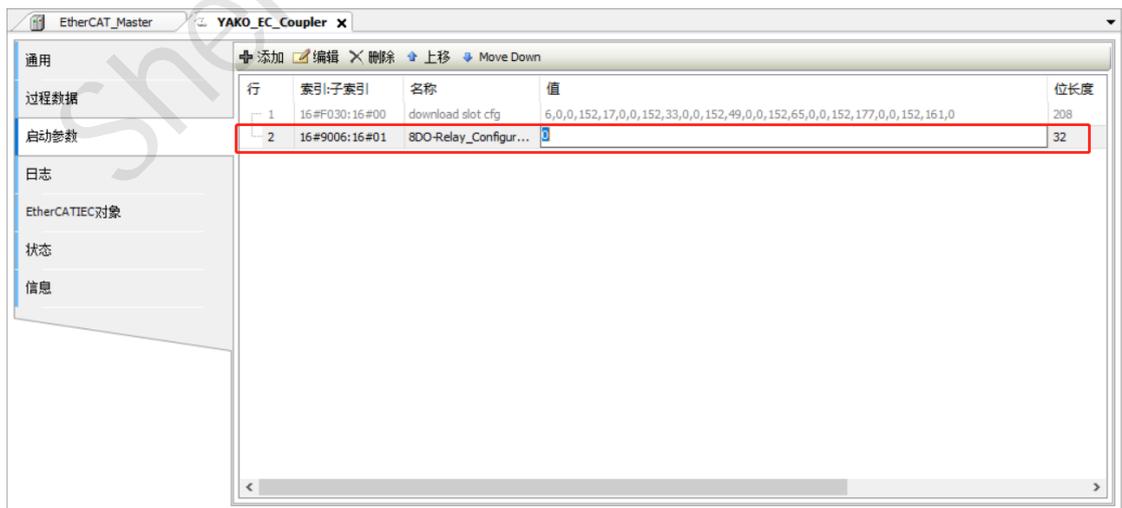
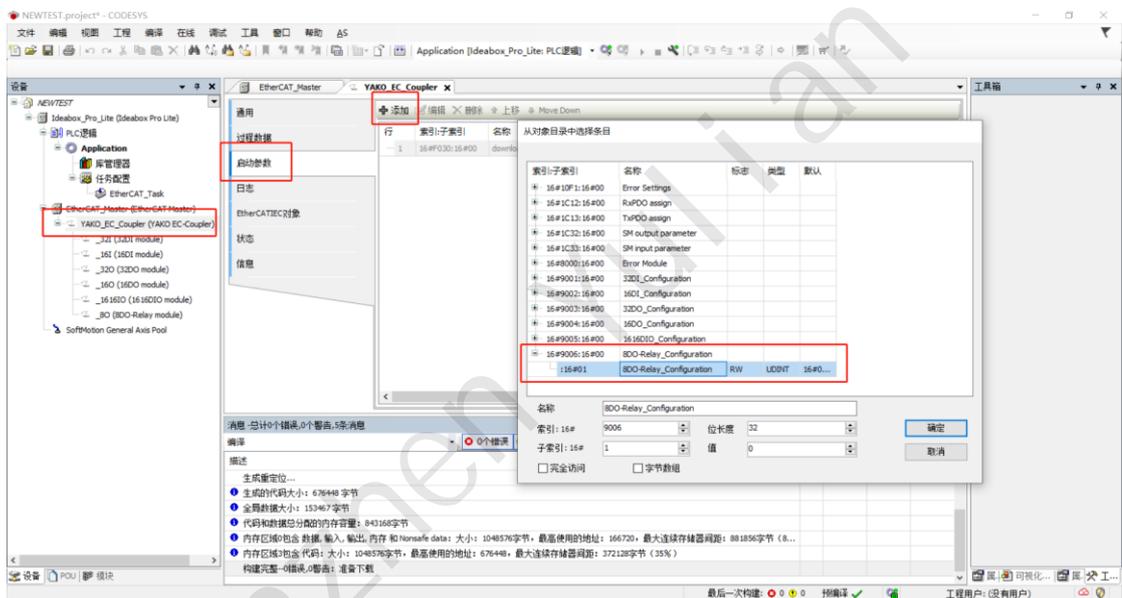
● Programming example

This example uses the CODESYS master control and EtherCAT Coupler module (EC10-CP) as the demonstration environment.

Refer to 2.1.1 → Use → Application in CODESYS Software Environment for the coupler configuration.

The steps for configuring SD-8OR module parameters are as follows:

Click YAKO EC-Coupler → Startup parameters → Add → 8DO-Relay_Configuration

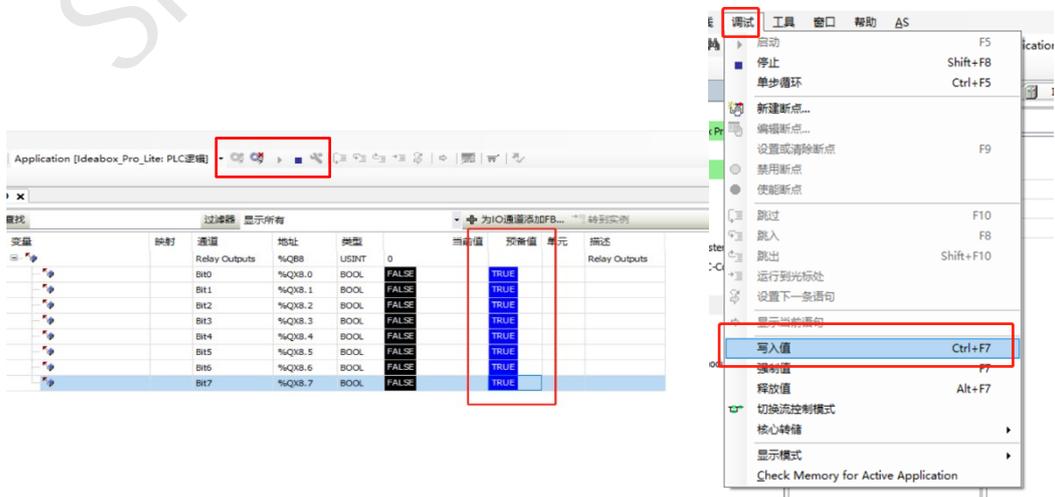
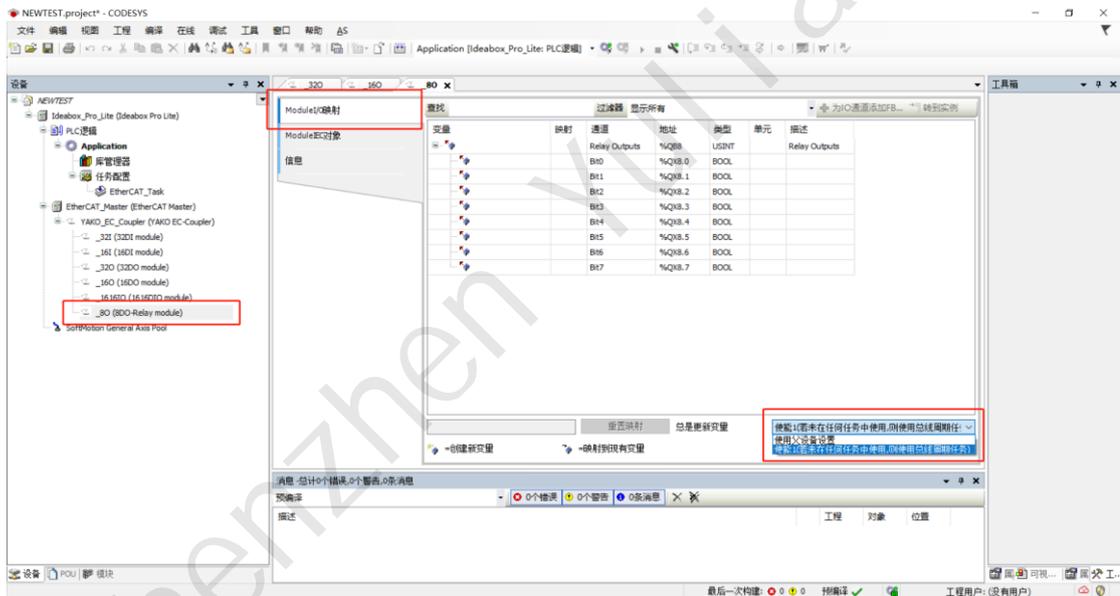


The DO_Configuration value indicates the fault shutdown output state mode.

Three modes are supported: DO_Configuration value: =0 (reset) /=256 (set) /=512 (keep the current value).

After module parameters are configured, click to go to Module → module/O Mapping → Change device Settings to Enable 1 → Log in to the device → Download and start the program;

Example: SD-8OR module: The default configuration parameter is 0, the reserve value of channel 1-8 is written to TRUE, debugging → write value; Write the reserve value to the slave station and observe the indicator of the corresponding channel of the slave station. If the indicator is on, the module is normal.



2.2.13 SD-2HC (2 channel counting module)

■ Module overview

SD-2HC is a high-speed counter module. The module has 2 channels of single-ended (or differential) pulse input, each channel can count AB phase 1 frequency doubled, AB phase 2 frequency doubled, AB phase 4 frequency doubled, pulse plus direction and other formats of pulses. Each module contains 4 high-speed inputs (latch function), 4 ordinary inputs, 4 high-speed outputs (comparison output), and 2 ordinary outputs, which are used with the CP series coupler module.

Serial number	name	Function definition			
1	Status light	■	Power on/running indicator	green	The module turns on when it is powered on
		LK	LK and upper-level communication connection indicator	green	On when connecting to the upper-layer module. Off: indicates that the communication is abnormal
		ERR	State machine error indicator	red	Lit when the connection to the subordinate module is incorrect
2	IO signal lamp	Corresponding to each input or output signal indication, signal effective indicator light			
3	User terminal	For details, see Section Installing Cables			

■ Technical Specification

● Power supply specification

Item	Specification
Bus input power rated voltage	5V DC(4.75V DC~ 5.25V DC)
Rated current of bus input power supply	85mA (typical at 5V)
Rated input voltage of the terminal	24V DC(20.4V DC ~ 28.8V DC)
Rated current of terminal input power	250mA (typical at 24V)
Rated output voltage of the terminal	/
Rated current of the terminal output power supply	/
Module hot swap function	nonsupport

● Input Specification

Item	Specification
Signal type	High-speed input signal (single-ended input)
Input channel	2 channel ABZ
Rated input voltage (single-ended)	24VDC(+20%~-15%)
Rated input current (single-ended)	7.3mA(Typical value)(DC24V)
ON current (single ended)	Above 5mA
OFF current (single-ended)	Less than 1.5mA
Input resistance (single-ended)	3.3K Ω
Maximum input Specification	

Item	Specification
Signal type	High-speed input signal (differential input)
Input channel	2 channel ABZ
Differential input Specification standard	EIA standard RS-422-A differential wire drive level
Maximum input Specification	

Item	Specification
Signal type	Ordinary input signal
Input channel	8 channel
Rated input voltage	24VDC(+20%~-15%)
Rated input current	5.6mA(Typical value)(DC24V)
ON current	3.5mA or above
OFF current	Less than 1.5mA
Input resistance (single-ended)	4.3K Ω

● **Output Specification**

Item	Specification
Signal type	High speed output signal (compare output)
Output mode	Drain type
Output channel	4channel
Rated load current	0.5A/点
ON response time	1us
OFF Response time	1us
Output frequency	200K HZ

Item	Specification
Signal type	Ordinary output signal
Output mode	Drain type
Output channel	2 channle
Rated load current	0.5A / point
ON Response time	0.5ms
OFF Response time	0.5ms

● Software specification

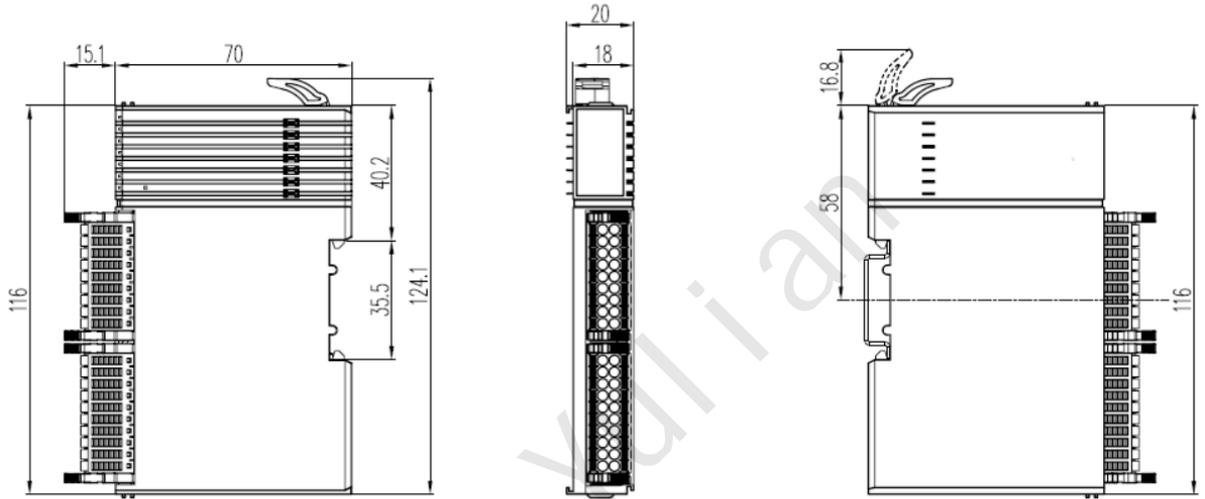
Item	Specification
Counter mode	AB phase 4 frequency, AB phase 2 frequency, AB phase 1 frequency, pulse plus direction
Latch mode	Single latch, continuous latch
Comparator mode	Ordinary output, greater than the comparison value, less than the comparison value, equal to the comparison value, equal to the comparison value in the queue, linear equal to the comparison value

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■ Installation wiring

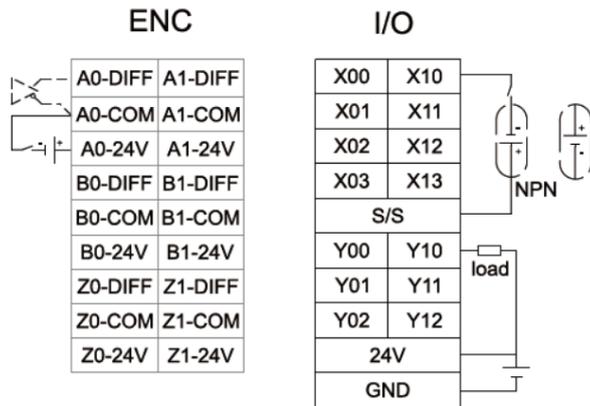
● Module size

The installation dimensions are shown in the following figure, in mm:



Note: For the installation method, see "Product Overview → 1.3 Installation and Disassembly".

● Terminal Wiring



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ENC							
Terminal number	Terminal indication	Terminal identification	Instructions	Terminal number	Terminal indication	Terminal identification	Instructions
1	A	A0-DIFF	Channel 0-A phase differential input positive end	10		A1-DIFF	Channel 1-A phase differential input positive end
2		A0-COM	Channel 0- Input public end	11		A1-COM	Channel 1- Input ground terminal
3		A0-24V	Channel 0- Single-end input positive end	12		A1-24V	Channel 1- Single-end input positive end
4	B	B0-DIFF	Channel 0-B phase differential input positive end	13	B'	B1-DIFF	Channel 1-B phase differential input positive end
5		B0-COM	Channel 0- Input public end	14		B1-COM	Channel 1- Input ground terminal
6		B0-24V	Channel 0- Single-end input positive end	15		B1-24V	Channel 1- Single-end input positive end
7	Z	Z0-DIFF	Channel 0-Z phase differential input positive end	16	Z'	Z1-DIFF	Channel 1-Z phase differential input positive end
8		Z0-COM	Channel 0- Input public end	17		Z1-COM	Channel 1- Input ground terminal
9		Z0-24V	Channel 0- Single-end input positive end	18		Z1-24V	Channel 1- Single-end input positive end
I/O							
Terminal number	Terminal indication	Terminal identification	Instructions	Terminal number	Terminal indication	Terminal identification	Instructions
1	0	X00	Channel 0- Input signal 0 (latch)	11	0'	X10	Channel 1- Input signal 0 (latch)
2	1	X01	Channel 0- Input signal 1 (latch)	12	1'	X11	Channel 1- Input signal 1 (latch)
3	2	X02	Channel 0- Input signal 2	13	2'	X12	Channel 1- Input signal 2
4	3	X03	Channel 0- Input signal 3	14	3'	X13	Channel 1- Input signal 3
5	S/S	S/S	Input signal public end	15	S/S	S/S	Input signal public end
6	0	Y00	Channel 0- Output signal 0 (compare)	16	0'	Y10	Channel 1- Output signal 0 (compare)
7	1	Y01	Channel 0- Output signal 1 (Compare)	17	1'	Y11	Channel 1- Output Signal 1 (Compare)
8	2	Y02	Channel 0- Output signal 2	18	2'	Y12	Channel 1- Output signal 2
9	24V	24V	24V power supply positive	19	24V	24V	24V power supply positive
10	GND	GND	24V power supply negative	20	GND	GND	24V power supply negative

■ Use

● Parameter definition

Process Data (PDI) :

address (16bit)	Register name	Instructions	Data type	Stats	Length
0/1	Encode Value0	Encoder 0 counts the value	UDINT	RO	4Byte
2/3	Encode Value1	Encoder 1 counts the value	UDINT	RO	4Byte
4/5	Encode Speed0	Encoder 0 input rate	UDINT	RO	4Byte
6/7	Encode Speed1	Encoder 1 input rate	UDINT	RO	4Byte
8/9	Latch ValidFlag0	Encoder 0 latch flag bit	UDINT	RO	4Byte
10/11	Latch ValidFlag1	Encoder 1 latch flag bit	UDINT	RO	4Byte
12/13	Latch Value0	Encoder 0 latch value	UDINT	RO	4Byte
14/15	Latch Value1	Encoder 1 latch value	UDINT	RO	4Byte
16/17	COMP Value0	Encoder 0 comparison value	UDINT	RO	4Byte
18/19	COMP Value1	Encoder 1 comparison value	UDINT	RO	4Byte
20	COMP AllCount0	Encoder 0 number of comparisons	INT	RO	2Byte
21	COMP AllCount1	Encoder 1 number of comparisons	INT	RO	2Byte
22	COMP Increment0	Encoder 0 Remaining number of comparisons	INT	RO	2Byte
23	COMP Increment1	Encoder 1 Remaining number of comparisons	INT	RO	2Byte
24	Digital Input	Numeric input value	BOOL	RO	2Byte
25	Module ErrCode	Error code	BOOL	RO	2Byte

Parameter description:

name	Description	definition
Encode Value	Encoder count	Captures and saves the current encoder meter value
Encode Speed	Encoder input rate	Displays the current encoder input frequency
Latch ValidFlag	Encoder latch flag bit	Encoder latch flag: 0 invalid, 1 valid
Latch Value	Encoder latch value	Capture and save encoder latch count values
COMP Value	Encoder comparison value	Displays comparison values for the current encoder Settings
COMP AllCount	Encoder comparison number	Displays the number of comparisons for the current encoder Settings
COMP Increment	Number of comparisons left in the encoder	Displays the remaining number of comparisons for the current encoder Settings
Digital Input	Numeric input value	Input signal of the corresponding channel: 0 no signal, 1 signal
Module ErrCode	Error code	Bit0: encoder 0 configuration Settings are incorrect Bit1: encoder 1 configuration Settings are incorrect Bit2: comparator 0 is enabled in pulse mode and the width is 0 bit3: comparator 1 is enabled in pulse mode and the width is 0

Process Data (PDO) :

address(16bit)	Register name	Instructions	Data type	Stats	Length
0	ENC Control	Encoder count function configures registers	INT	RW	2Byte
1/2	ENC SetValue0	Encoder 0 Initial value setting	UDINT	RW	4Byte
3/4	ENC SetValue1	Encoder 1 Initial value setting	UDINT	RW	4Byte
5	Latch Control	Encoder latch function configuration register	INT	RW	2Byte
6	COMP Control	Encoder compare function configuration register	INT	RW	2Byte
7/8	COMP Stream0	Encoder 0 comparison value setting	UDINT	RW	4Byte
9/10	COMP Stream1	Encoder 1 Compare value Settings	UDINT	RW	4Byte
11/12	COMP Count0	Encoder 0 Set the number of comparisons	UDINT	RW	4Byte
13/14	COMP Count1	Encoder 1 Compare the number of Settings	UDINT	RW	4Byte
15/16	COMP PulseWide0	Encoder 0 compares the output pulse width	UDINT	RW	4Byte
17/18	COMP PulseWide1	Encoder 1 Compares the output pulse width	UDINT	RW	4Byte
19/20	COMP IncrementIn0	Encoder 0 compares output increment values	UDINT	RW	4Byte
21/22	COMP IncrementIn1	Encoder 1 compares output increment values	UDINT	RW	4Byte
23	Digital Output	Digital quantity output value	BOOL	RW	2Byte

Parameter description:

name	Description	address	definition
ENC Control	Encoder latch function configuration register	Bit0	Encoder 0 count enable: 0 is invalid, 1 is valid
		Bit1	Encoder 1 Count Enable: 0 invalid, 1 valid
		Bit2	Encoder 0 value clear to zero: 0 is invalid, 1 is valid
		Bit3	Encoder 1 value clear to zero: 0 is invalid, 1 is valid
		Bit4	Encoder 0AB interchange: 0 is invalid, 1 is valid
		Bit5	Encoder 1AB interchange: 0 is invalid, 1 is valid
		Bit6	Encoder 0Z phase clear zero: 0 is invalid, 1 is valid
		Bit7	Encoder 1Z phase clear zero: 0 is invalid, 1 is valid
		Bit8	Encoder 0 initialization is complete: 0 is invalid, 1 is valid
		Bit9	Encoder 1 initialization is complete: 0 is invalid, 1 is valid
		Bit10	
		Bit11	
		Bit12	
		Bit13	
Bit14			
Bit15			
ENC SetValue0	Encoder initial value setting	/	Set the initial value. After starting the count, the count starts from the initial value. Note: ENCControl sets the initial value to take effect

name	Description	address	definition
Latch Control	Encoder latch function configuration register	Bit0	Encoder 0 latch enable: 0 is invalid, 1 is valid
		Bit1	Encoder 1 latch enable: 0 invalid, 1 valid
		Bit2	Encoder 0 latch clear: 0 is invalid, 1 is valid
		Bit3	Encoder 1 latch clear zero: 0 is invalid, 1 is valid
		Bit4-15	reserve
COMP Control	Encoder compare function configuration register	Bit0	Encoder 0 comparison Enable: 0 is invalid, 1 is valid
		Bit1	Encoder 1 Comparison Enable: 0 invalid, 1 valid
		Bit2	Encoder 0 clear comparison number: 0 invalid, 1 valid
		Bit3	Encoder 1 Clear comparison number: 0 invalid, 1 valid
		Bit4	Encoder 0 sets the comparison value: 0→1→0 for a single data addition
		Bit5	Encoder 1 Set the comparison value: 0→1→0 for a single data addition
		Bit6-15	reserve
COMP Stream	Encoder comparison value setting	/	Set the encoder comparison value
COMP Count	Encoder comparison times set	/	Set the number of encoder comparisons
COMP PulseWide	The encoder compares the output pulse width	/	Encoder compares output signal output time width, default value 0, actual value = set value *10ns
COMP IncrementIn	Encoder compares output increment values	/	Set the encoder comparison increment value
Digital Output	Digital quantity output value	/	Corresponding channel input signal: 0 is invalid, 1 is valid

Configuration parameter(SDO):

address(16bit)	Register name	Instructions	Data type	Stats	Length
0/1	ENC Mode0	Encoder 0 count mode	UDINT	RW	4Byte
2/3	ENC Mode1	Encoder 1 count mode	UDINT	RW	4Byte
4/5	ENC UpperLimit0	Encoder 0 count threshold setting	UDINT	RW	4Byte
6/7	ENC UpperLimit1	Encoder 1 Count threshold setting	UDINT	RW	4Byte
8/9	ENC FiltGrafe0	Encoder 0 counts filter	UDINT	RW	4Byte
10/11	ENC FiltGrafe1	Encoder 1 counts filter	UDINT	RW	4Byte
12/13	Latch Souerce0	Encoder 0 latch input channel selection	UDINT	RW	4Byte
14/15	Latch Souerce1	Encoder 1 Latch input channel selection	UDINT	RW	4Byte
16/17	COMP Mode0	Encoder 0 comparison mode selection	UDINT	RW	4Byte
18/19	COMP Mode1	Encoder 1 Compare mode selection	UDINT	RW	4Byte
20/21	COMP OutputChannelSel0	Encoder 0 compares output channel selection	UDINT	RW	4Byte
22/23	COMP OutputChannelSel1	Encoder 1 Compares output channel selection	UDINT	RW	4Byte

Parameter description:

name	Description	address
ENC Mode	Encoder count mode	Encoder count mode: 0:4 frequency multiplier mode; 1:2 frequency doubling mode; 2:1 frequency doubling mode; 3: pulse + direction;
ENC UpperLimit	Encoder count threshold	Threshold value: -2147483648~+21474836487
ENC FiltGrafe	Encoder counts filter level	Lv.0: 0.32us Lv.1: 0.32us*2 Lv.2: 0.32us*4 ... Lv.7: 0.32us*128=40.96us
Latch Souerce	Encoder latch input channel selection	Select encoder latch input channel
COMP Mode	Encoder comparison mode selection	mode: 0: disable; 1: Equal to; 2: Greater than; 3: Less than; 4: Equal in queue; 5: Linear equal;
COMP OutputChannelSel	Encoder compares output channel selection	Select the encoder to compare output channels

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