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SX seriesRemote Expansion Module Hardware Manual

让人类共享智能社会
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Revised resume

The manual number is located under the cover.

Manual type	issue date	Manual number	Revised content description
SX Series Remote Expansion Module Hardware Manual	V1.0	first edition	

forwardWord

First of all, thank you for purchasing SC series programmable logic controllers and expansion modules developed and produced by Sunstar technology!

Before using this product, you should read this manual and the related manuals introduced in this manual carefully, and operate correctly with full attention to safety.

Kind of manual

- SCThe types of series manuals are as follows. Please refer to the corresponding manual according to the application.
- Manuals are available from our homepage http://www.step-sigriner.com.cndownload.

Manuals used by SC series

NO.	Manual name	content
1.	SC Series Controller Software Operation Manual	Software installation, configuration, debugging, coding, etc.

2.	SC Series Controller Software Programming Manual	Motion control programming, common programming libraries, instructions, etc.
3.	SC20Controller Hardware Manual	SC20Related hardware interface, wiring and maintenance
4.	SC30 Controller Hardware Manual	SC30 related hardware interface, wiring and maintenance
5.	SC series controller visual interface operation instructions	Visual interface related operations and programming
6.	SX Series Remote Expansion Module Hardware Manual	SX series expansion module related hardware interface, wiring and maintenance

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content

1 before use

1.1 Safety Precautions

The following instructions must be followed in order to prevent hazards to persons or damage to property.

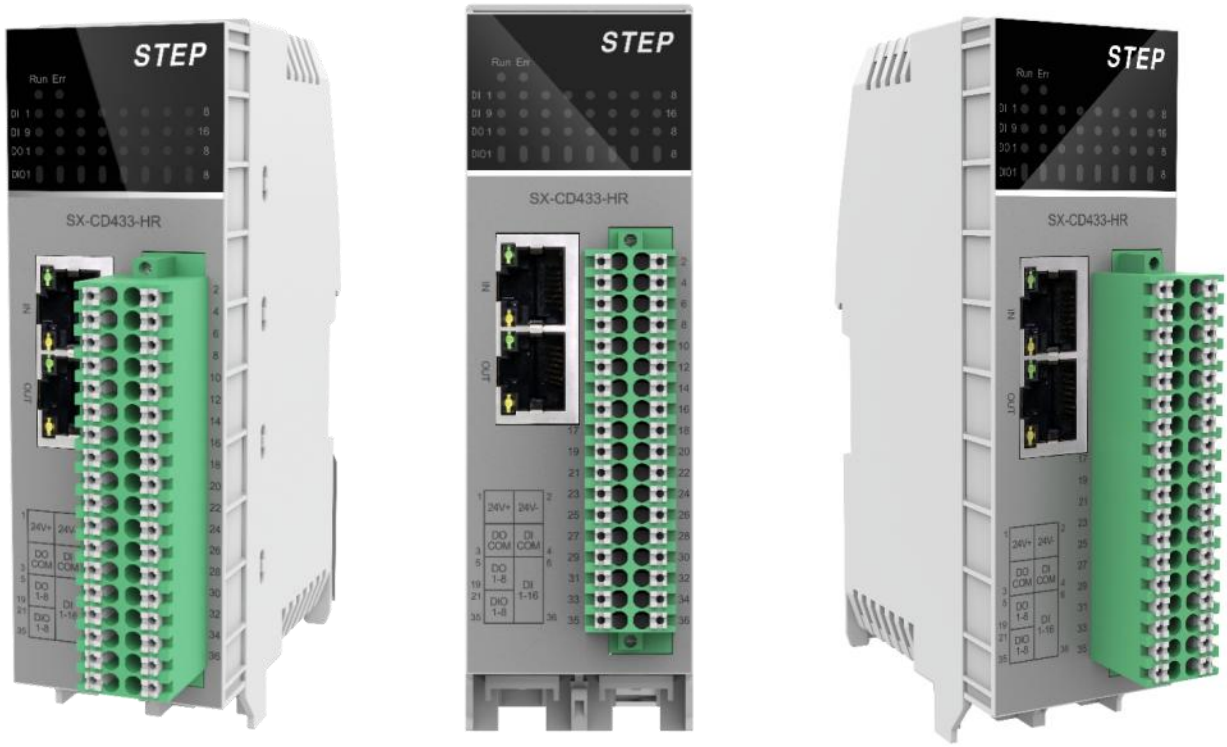
- Categorize and explain the degree of harm and damage caused by the wrong method of use.

⚠警告	"Matters that could result in death or serious injury".
⚠注意	"Matters that may cause minor injury or property damage".
⃠	unenforceable matter.
❗	things that must be done.
⚠警告	
❗	●Please take safety measures outside this product, so that the safety of the entire system can be guaranteed when this product fails or an abnormal situation occurs due to external reasons.
⃠	●Do not use in an environment with flammable gas. Otherwise it may cause an explosion.
⃠	●Do not throw this product into fire. Otherwise, the battery and electronic components may be ruptured.
⚠注意	
❗	●In order to prevent abnormal heat and smoke, the parameters used should have a certain margin relative to the guaranteed characteristics and performance parameters of this product.
⃠	●Do not dismantle or remodel. Otherwise, it may cause abnormal heat and smoke.
⃠	●Do not touch the terminals while the power is on. Otherwise, electric shock may result.
❗	●Install an emergency stop circuit and an interlock circuit in the external circuit.
❗	●Please connect the wires and connectors correctly. Poor contact between the wire and the connector can cause abnormal heat and smoke.
⃠	●Do not perform work (connection, disassembly, etc.) while the power is on. Otherwise, electric shock may result.
❗	●If it is not used in accordance with the method specified by our company, the protection

function of the unit may be damaged.
●This product was developed and manufactured for use in an industrial environment.

2 summary

2.1 SX Series Remote Expansion Module Overview

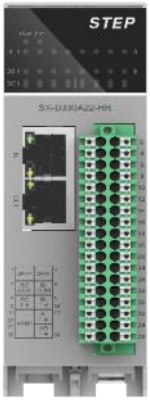


SX series remote expansion module renderings

SX series remote expansion modules can be SC seriesMotion controller provides remote expansion, SC series controllerIt is a medium-sized controller with modular structure design.

- SC seriescontrollerIt supports the remote expansion of the rack through various industrial fieldbuses such as EtherCAT and CANopen. Supports digital input/output modules, analog input/output modules. The analog input/output module adopts a 12-bit resolution conversion chip,Guaranteed highprecisiondata collection
- The remote adopts a linear topology,Easy to expand.
- Via EtherCAT bus, supportUp to 64 axessport control

2.2 Introduction to Remote Expansion Modules

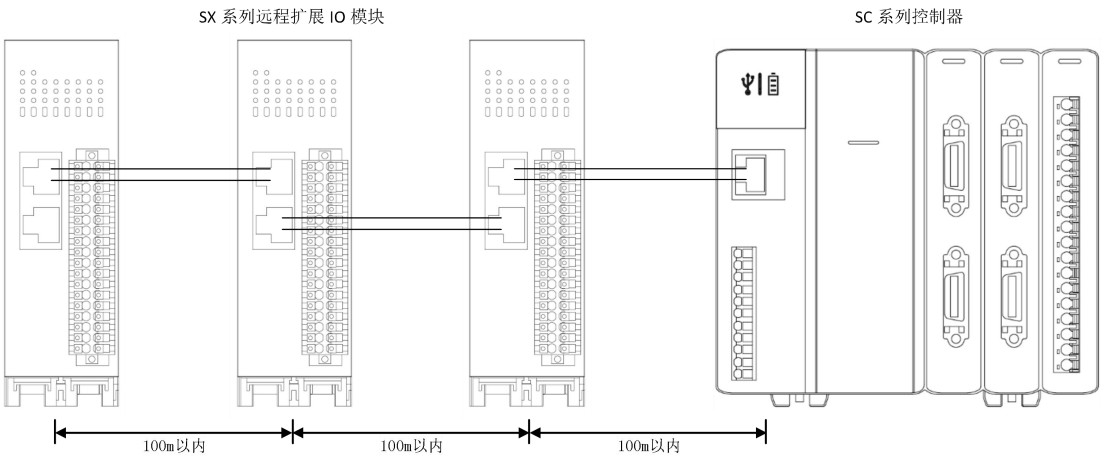
model	line drawing	unit	describe
SX-CD433-HR		EtherCAT extended remote digital input and output module	24V 8-way bidirectional configurable 16 DI, 8 DO MOS tube output type
SX-D330A22-HR		EtherCAT extended remote input and output hybrid module	24V 8-way DI, 8-way DO 4-way AI, 4-way AO

2.3 Module silkscreen instructions

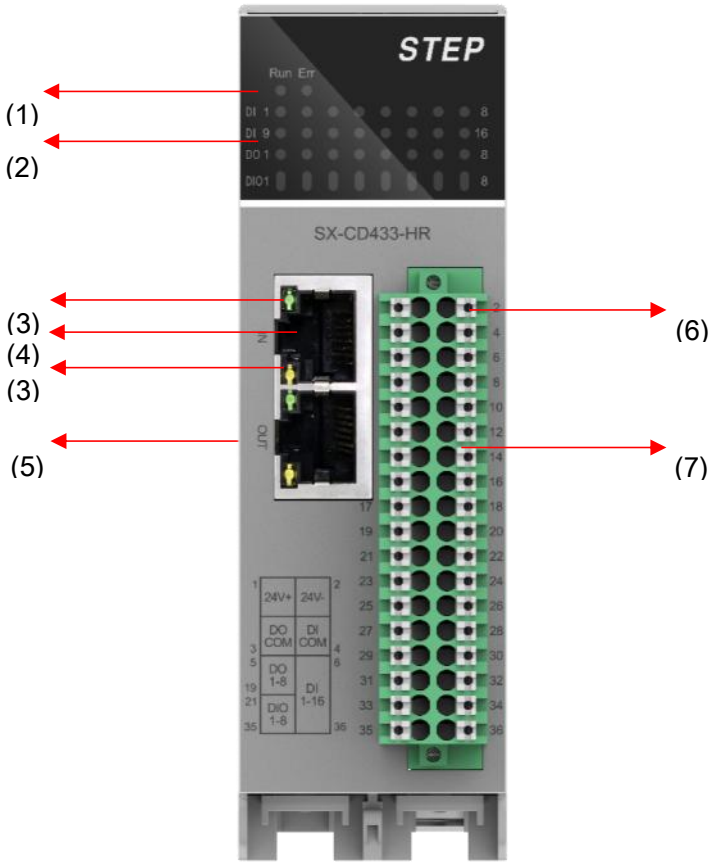
module name	Corresponding silk screen
Remote expansion digital input and output module	SX-CD433-HR
Remote expansion of mixed analog-digital input and output modules	SX-D330A22-HR

2.4 System Configuration

The maximum number of SC series controllers that can be configured via Ether CAT and how to configure them can be found in "SC series controller manual".



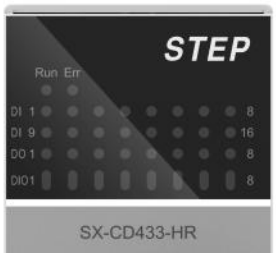
3 List of names and functions



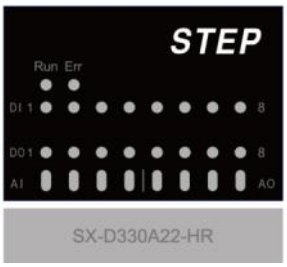
No.	name	Features
1	Operating status indicator	Monitor the operating status of the module
2	IO status indicator	Monitor IO connection status
3	Ethernet port status indicator	It is the status indicator of the LAN port see"Status Display LED Names and Functions"
4	LAN interface IN	Ether CAT input interface
5	LAN interface OUT	Ether CAT output interface
6	Power input interface	24V power input interface see"Interface definition and wiring"

7	IO port	Connect input and output devices see"Interface definition and wiring"

3.1.1 Status Display LED Names and Functions

Remote expansion digital input and output module	led	color	state	describe
	Run	red	extinguish	Module is not powered
			Always bright	The module is powered normally
	Err	——	——	undefined
	DI 1—16	red	extinguish	Other states are off.
			flicker	When 1 valid value is input, it flashes once.
	DO 1-8	green	extinguish	Other states are off.
			flicker	When 1 valid value is output, it flashes once.
	DIO 1-8	When configured as DI,red	extinguish	Other states are off.
			flicker	When 1 valid value is input, it flashes once.
		When configured as	extinguish	Other states are off.
			flicker	When 1 valid value is output,

		DO,green		it flashes once.

Remote expansion of mixed analog-digital input and output modules	led	color	state	describe
	Run	red	extinguish	Module is not powered
			Always bright	The module is powered normally
	Err	——	——	undefined
	DI 1-8	red	extinguish	Other states are off.
			flicker	When 1 valid value is input, it flashes once.
	DO 1-8	green	extinguish	Other states are off.
			flicker	When 1 valid value is output, it flashes once.
	AI, AO	——	——	undefined

4 Specification

4.1 Application Environment Specifications

project	Specification
Rated voltage	24V DC
Voltage allowable range	20.4V DC~28.8V DC
Use ambient temperature	-5°C~+55°C
save ambient temperature	-20°C~+80°C
Use ambient humidity	10%RH~90%RH non-condensing
Save ambient humidity	10%RH~95%RH non-condensing
use altitude	0-2km (no limit)
	>2km (ambient temperature decreases by 0.5° C every 100m)
Protection class	IP20
pollution level	IE33
Atmospheric pressure	86Kpa~106Kpa
Use environment	There should be no corrosive gases. There should be no heavy dust.
EMC immunity level	Execute EN61000-6-X
weight	<0.5kg

4.2 Specifications of Remote Expansion Modules

4.2.1 Remote Expansion Digital I/O Module Specifications

project		Specification
Two-way configurable	number of channels	8
	Insulation method	Digital Isolator Insulation
	public end	Share a common terminal with fixed DI/DO, NPN/PNP method is the same as
input specification	input channel	16
	Insulation method	Digital Isolator Insulation
	Input voltage	DC24V
	Input Current	7mA
	Voltage ON/Current ON	10V
	OFF voltage/OFF current	0V
	ON/OFF time	0.05ms/0.10ms
	input filter time	100us
	public end	16 points + configuration point / 1 common terminal
output specification	output channel	8
	Insulation method	digital isolation insulation
	output form	PNP type
	Input voltage	DC24V

	Maximum load current	500mA per channel
	Maximum surge current	1000mA per channel
	ON/OFF response time	0.5ms/0.10ms
	I/O power supply method	Source output, panel terminal input
	I/O power terminal current capacity	Single channel 500mA; the whole machine maximum 5A
	Power consumption	2W
	public end	8 points + configuration point / 1 common terminal
isolation method		Bugela between channels of the same type, isolation between different types
Protective function		Overvoltage, overcurrent, surge, anti-reverse, low voltage
voltage		DC24±20%
Power supply mode		external input
I/O connection method		Push-in connector
I/O refresh method		Synchronous I/O refresh or free-running refresh optional

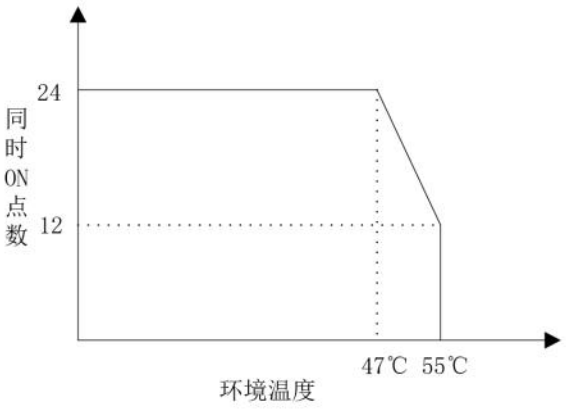
■ Power derating

In order to ensure the reliability of the module application, it is necessary to derate the number of channels used in different temperature environments (especially high temperature environments) to ensure that the module

Application reliability and security.

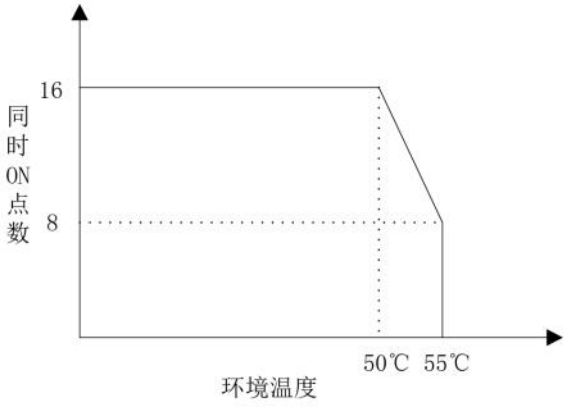
Remote expansion digital input and output module

Input limit on the number of simultaneous ON points (maximum number of points 24)



Remote expansion digital input and output module

Restriction on the number of simultaneous output ON points (maximum number of points 16)



4.2.2 *Remote expansion mixed analog-digital input and output module specifications*

project		Specification
Digital Input Specifications	input channel	16
	Insulation method	Digital Isolator Insulation
	Input voltage	DC24V
	Input Current	7mA

	Voltage ON/Current ON	10V
	OFF voltage/OFF current	0V
	ON/OFF time	0.05ms/0.10ms
	input filter time	100us
	public end	16 points + configuration point / 1 common terminal
Digital output specifications	output channel	8
	Insulation method	digital isolation insulation
	output form	PNP type
	Input voltage	DC24V
	Maximum load current	500mA per channel
	Maximum surge current	1000mA per channel
	ON/OFF response time	0.5ms, 0.10ms
	I/O power supply method	Source output, panel terminal input
	I/O power terminal current capacity	Single channel 500mA; the whole machine maximum 5A
	Power consumption	2W
Analog Input Specifications	number of channels	4
	input range	0-10V
	Absolute Maximum Ratings	15V
	input resistance	100K
	Overall accuracy	12bit

	Conversion time	5us/pass
Analog output specifications	number of channels	4
	output range	0-10V
	allowable load resistance	5kΩ or more
	output impedance	100Ω
	Overall accuracy	12bit
	Conversion time	200us/pass
isolation method		Bugela between channels of the same type, isolation between different types
Protective function		Overvoltage, overcurrent, surge, anti-reverse, low voltage
voltage voltage		DC24±20%
Power supply mode		external input
I/O connection method		Push-in connector
I/O refresh method		Synchronous I/O refresh or free-running refresh optional

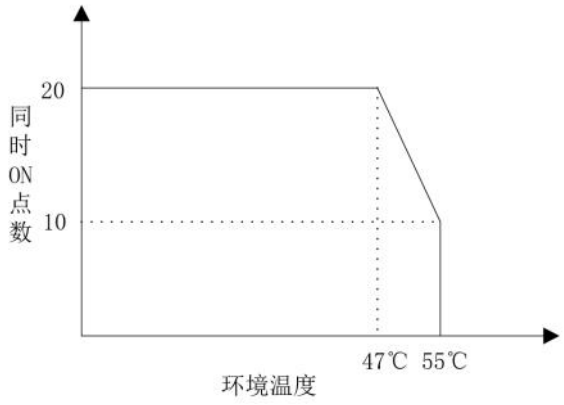
■ Power derating

In order to ensure the reliability of the module application, it is necessary to derate the number of channels used in different temperature environments (especially high temperature environments) to ensure that the module

Application reliability and security.

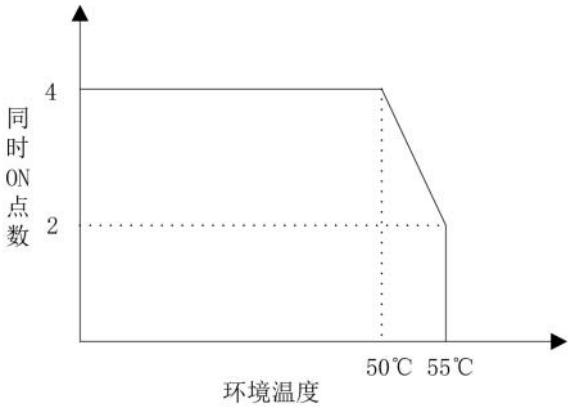
Remote expansion of mixed analog-digital input and output modules

Input limit on the number of simultaneous ON points (maximum number of points 20)



Remote expansion of mixed analog-digital input and output modules

Restriction on the number of simultaneous output ON points (maximum number of points 4)



4.3 LAN Port Specifications

project	Specification
port definition	EtherCAT IN/OUT
Communication Interface	Industrial Ethernet
communication speed	100Mbps/10Mbps Auto-negotiation
physical layer	100BASE-TX
Transmission distance	100m (The maximum size is 100m. In some use environments, anti-interference measures such as installing ferrite cores need to be taken. In addition, it is recommended to set up the hub near the control panel and use it within 10m)

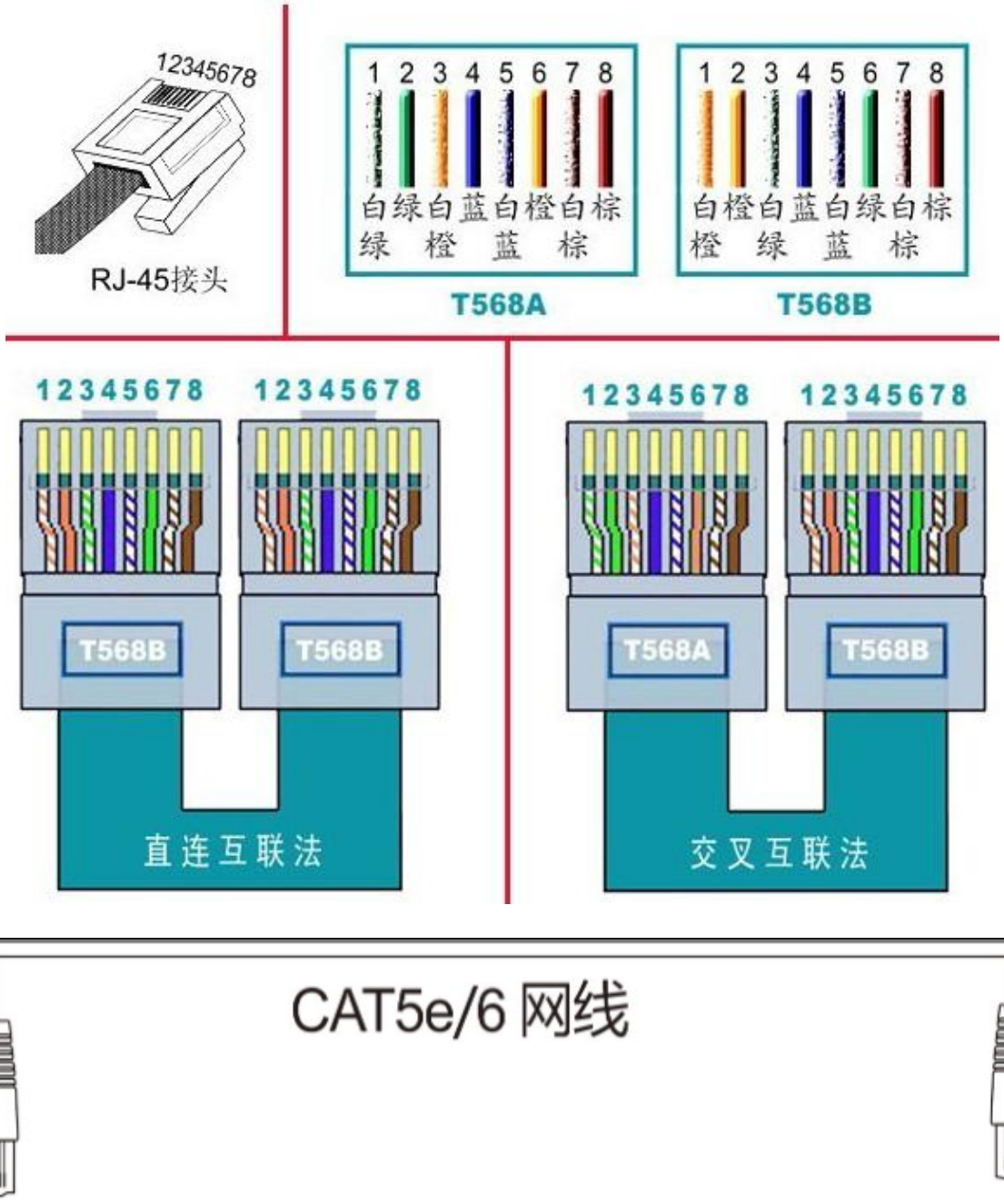
Communication Cable		Twisted pair cable (shielded: STP): Category 5e or higher
letter of agreement		TCP/IP
Number of slave connections		Depends on the main controller
Topology		Linear topology
way of communication		Full duplex/half duplex mode
TCP/IP protocol		Compliant with TCP/IP (IPV4)
LED display	LINK	Lights up when a connection is established between devices on the Ethernet
	ACT	Blinks when various types of communications such as command, response, etc. are being performed with the connected device

5 Wiring wiring

5.1 EtherCAT wiring requirements

5.1.1 network cable production

controller withEtherCATEthernetcableSupport auto-negotiation, AB crystal head directly connected or crossed. The remote IO modules are directly interconnected.



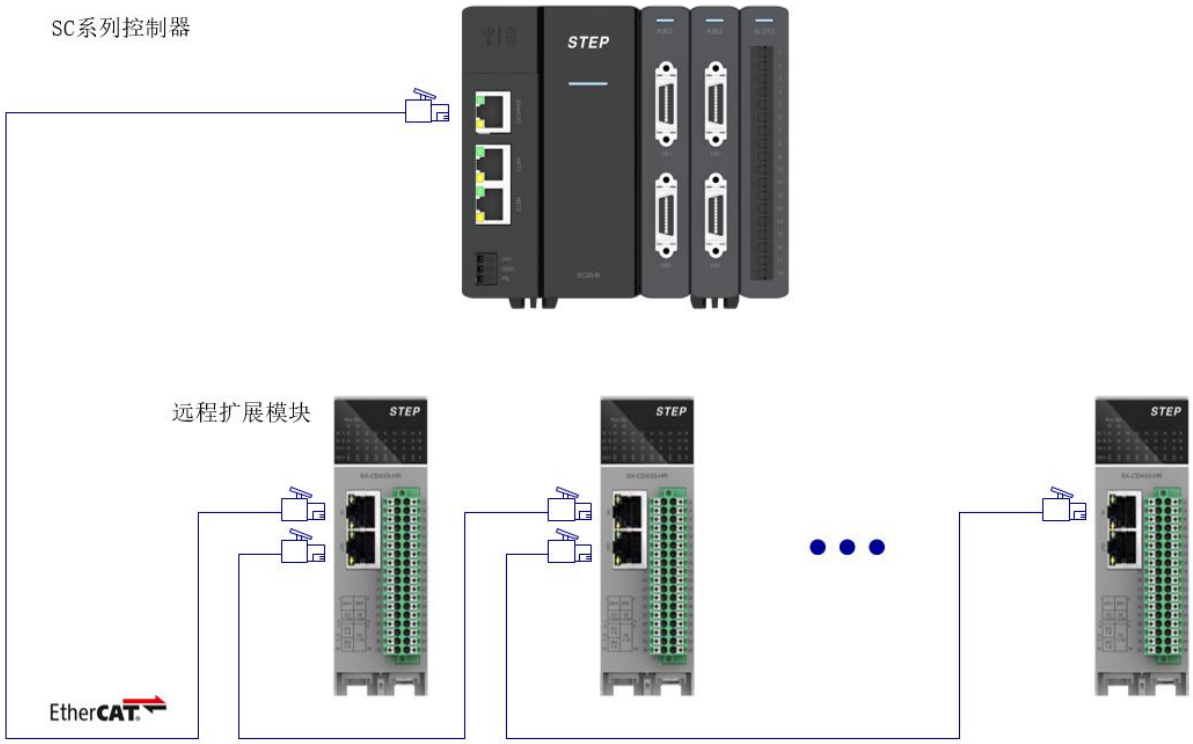
(computer side) (SC30 side)

■ Cable Requirements

project	Specification

cable type	Super 5 categories. The SC controller and the remote modules are adaptive; the remote modules are directly connected and interconnected.
fulfill the standard	ISO/IEC11801, EIA/TIA 568B
wire type	twisted pair

■ **Internet connection**



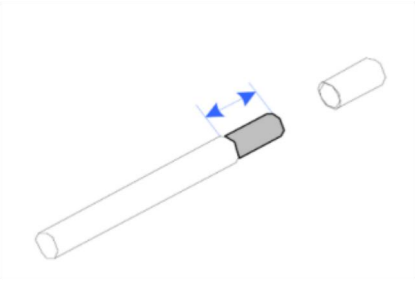
The number of configurations depends on the master controller.

5.2 Module terminal signal cable production

5.2.1 cable production

Except the LAN port adopts RJ45 (8P8C) plug, other I/O terminal wiring adopts PUSH IN in-line wiring, no need to customize the cluster socket.

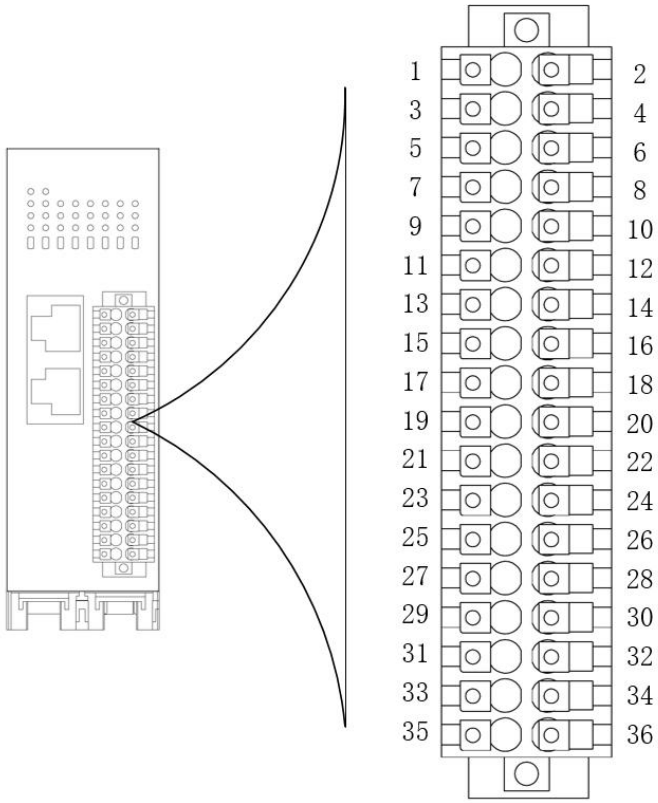
■ **Connection cable diameter specification**

project	Reference data
Power wiring ()mm^2	0.5-1.5
I/O module()mm^2	0.2-1.5
In-line cable stripping length ()mm	8-9  Stripping Diagram

5.3 Interface definition and wiring

5.3.1 Remote expansion digital input and output module

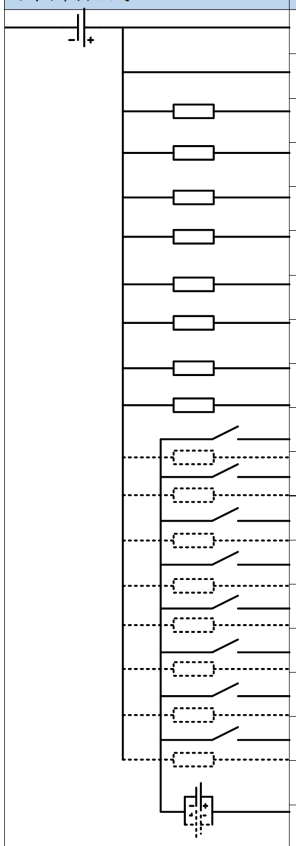
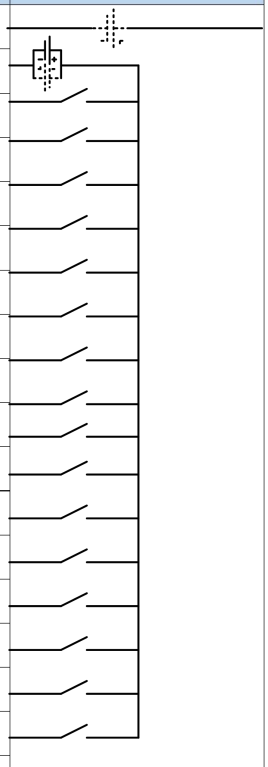
Schematic diagram of terminal arrangement



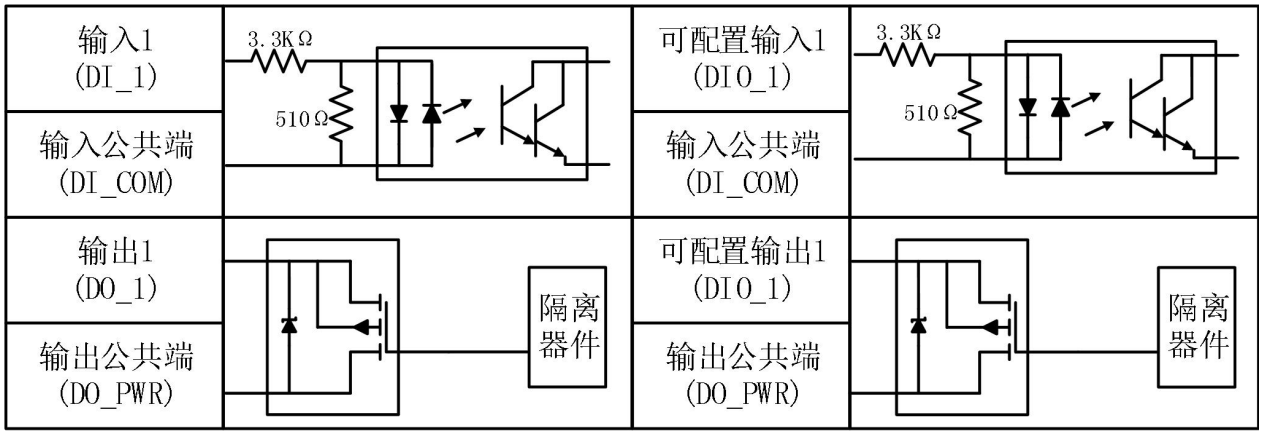
Features	name	No.	No.	name	Features
24V power supply	24V	1	2	24V_GND	24V power ground
DO public	DO_PWR	3	4	DI_COM	DI common
8 DO outputs MOS tube output, 500mA	D0_1	5	6	DI_1	16 DI inputs Optocoupler input, configurable NPN/PNP
	D0_2	7	8	DI_2	
	D0_3	9	10	DI_3	
	D0_4	11	12	DI_4	
	D0_5	13	14	DI_5	
	D0_6	15	16	DI_6	
	D0_7	17	18	DI_7	
	D0_8	19	20	DI_8	
8 DI/DO configurable	DI0_1	twenty	twenty	DI_9	

input/output		one	two		
Optocoupler input, MOS tube output, 500mA, configurable NPN/PNP, DI/DO	DI0_2	twenty three	twenty four	DI_10	
	DI0_3	25	26	DI_11	
	DI0_4	27	28	DI_12	
	DI0_5	29	30	DI_13	
	DI0_6	31	32	DI_14	
	DI0_7	33	34	DI_15	
	DI0_8	35	36	DI_16	
Note: The 8-way configurable DI/DO needs to share a common terminal with 16DI or 8DO, and the NPN/PNP method is the same.					

■ External wiring

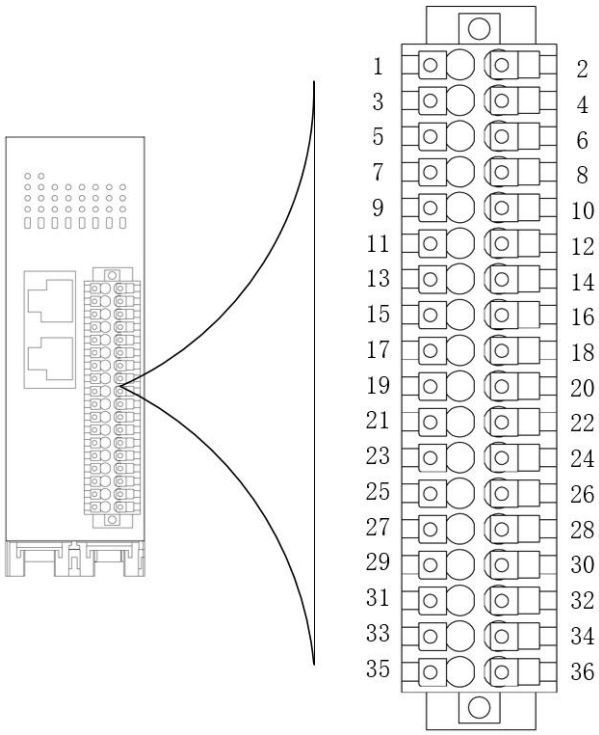
外部配线	名称	No.	No.	名称	外部配线
	24V	1	2	24V_GND	
	DO_PWR	3	4	DI_COM	
	DO_1	5	6	DI_1	
	DO_2	7	8	DI_2	
	DO_3	9	10	DI_3	
	DO_4	11	12	DI_4	
	DO_5	13	14	DI_5	
	DO_6	15	16	DI_6	
	DO_7	17	18	DI_7	
	DO_8	19	20	DI_8	
	DIO_1	21	22	DI_9	
	DIO_2	23	24	DI_10	
	DIO_3	25	26	DI_11	
	DIO_4	27	28	DI_12	
	DIO_5	29	30	DI_13	
	DIO_6	31	32	DI_14	
	DIO_7	33	34	DI_15	
	DIO_8	35	36	DI_16	
	DI_COM				

■ Internal Equivalent Circuit Diagram



5.3.2 *Remote expansion of mixed analog-digital input and output modules*

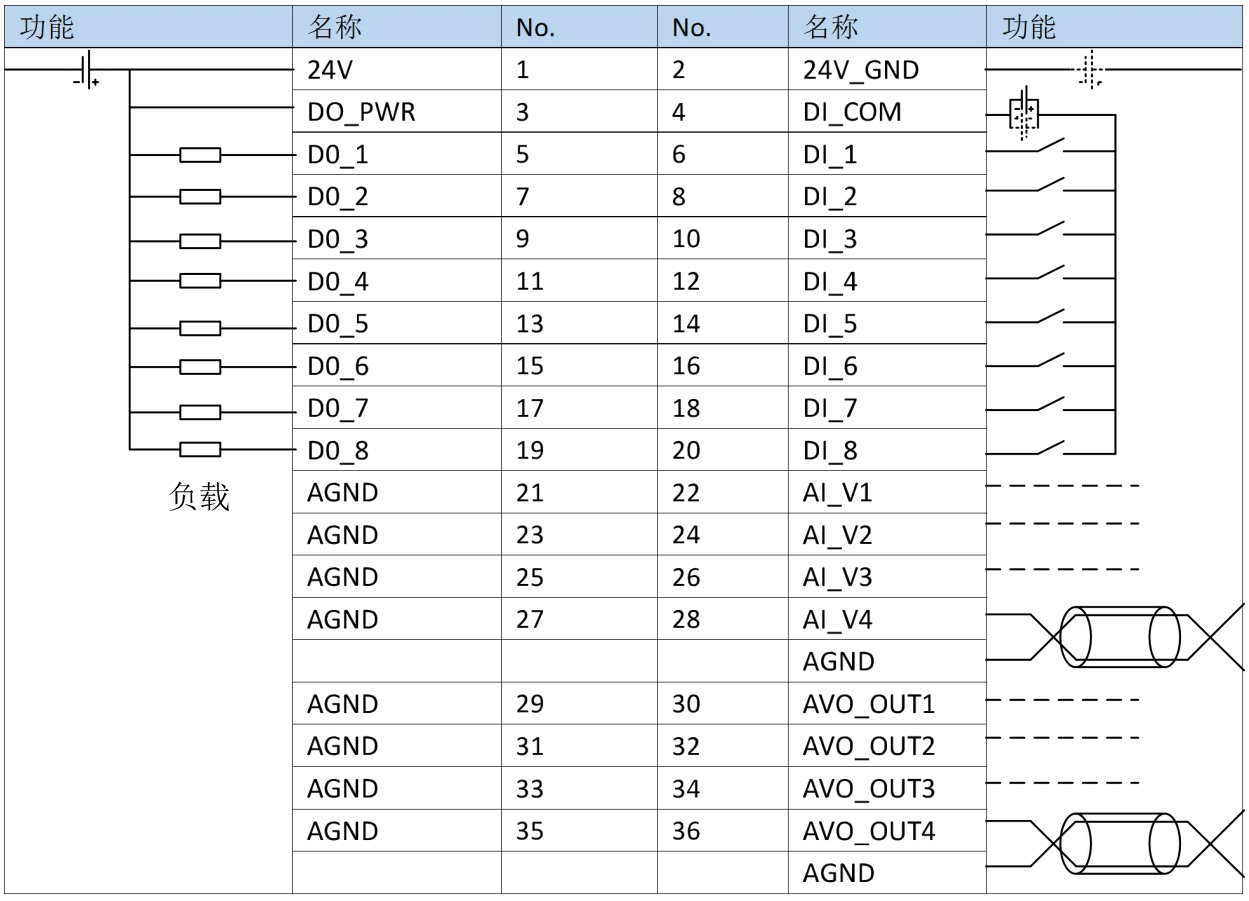
Schematic diagram of terminal arrangement



Features	name	No.	No.	name	Features
24V power supply	24V	1	2	24V_GND	24V power ground
DO public	DO_PWR	3	4	DI_COM	DI common
8 DO outputs MOS tube output, 500mA	D0_1	5	6	DI_1	8 DI inputs Optocoupler input, configurable NPN/PNP
	D0_2	7	8	DI_2	
	D0_3	9	10	DI_3	
	D0_4	11	12	DI_4	
	D0_5	13	14	DI_5	
	D0_6	15	16	DI_6	
	D0_7	17	18	DI_7	
	D0_8	19	20	DI_8	
AI/AO public terminal	AGND	twenty one	twenty two	AI_V1	4-way 12-bit AI; Current 0-20mA;

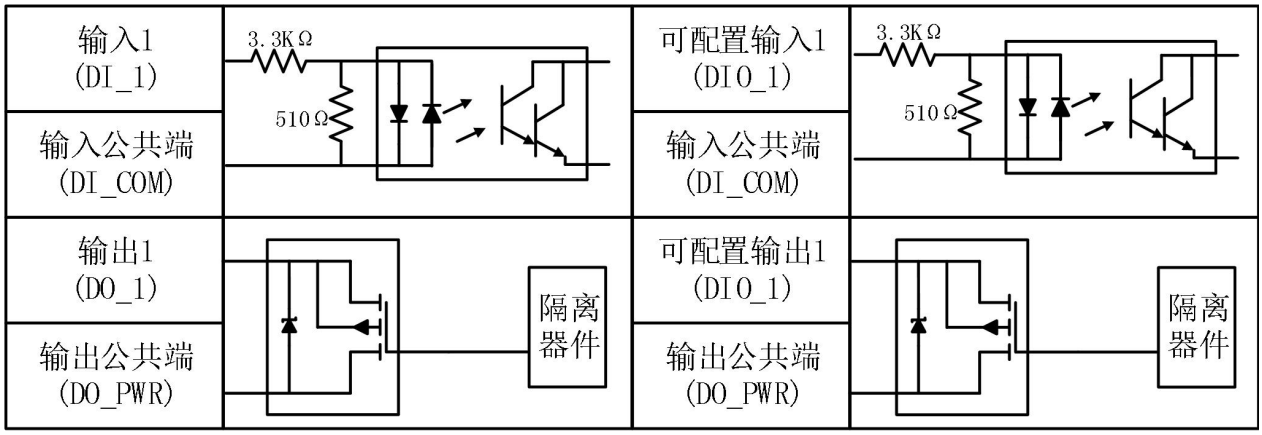
	AGND	twenty three	twenty four	AI_V2	Voltage 0-10V;
	AGND	25	26	AI_V3	
	AGND	27	28	AI_V4	
	AGND	29	30	AVO_OUT1	4-way 12-bit AO;
	AGND	31	32	AVO_OUT2	Current 0-20mA;
	AGND	33	34	AVO_OUT3	4-20mA;
	AGND	35	36	AVO_OUT4	Voltage 0-10V, ±10V;

■ External wiring

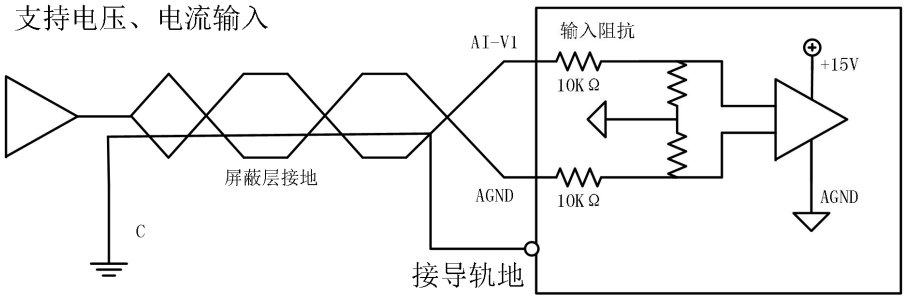


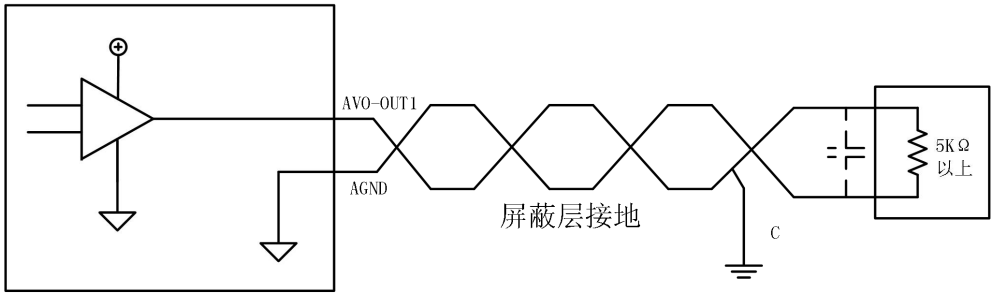
功能	名称	No.	No.	名称	功能
	24V	1	2	24V_GND	
	DO_PWR	3	4	DI_COM	
	D0_1	5	6	DI_1	
	D0_2	7	8	DI_2	
	D0_3	9	10	DI_3	
	D0_4	11	12	DI_4	
	D0_5	13	14	DI_5	
	D0_6	15	16	DI_6	
	D0_7	17	18	DI_7	
	D0_8	19	20	DI_8	
	AGND	21	22	AI_V1	
	AGND	23	24	AI_V2	
	AGND	25	26	AI_V3	
	AGND	27	28	AI_V4	
				AGND	
	AGND	29	30	AVO_OUT1	
	AGND	31	32	AVO_OUT2	
	AGND	33	34	AVO_OUT3	
	AGND	35	36	AVO_OUT4	
				AGND	

■ DI/DO internal equivalent circuit diagram



■ **AI/AO internal equivalent circuit diagram (support voltage and current input)**





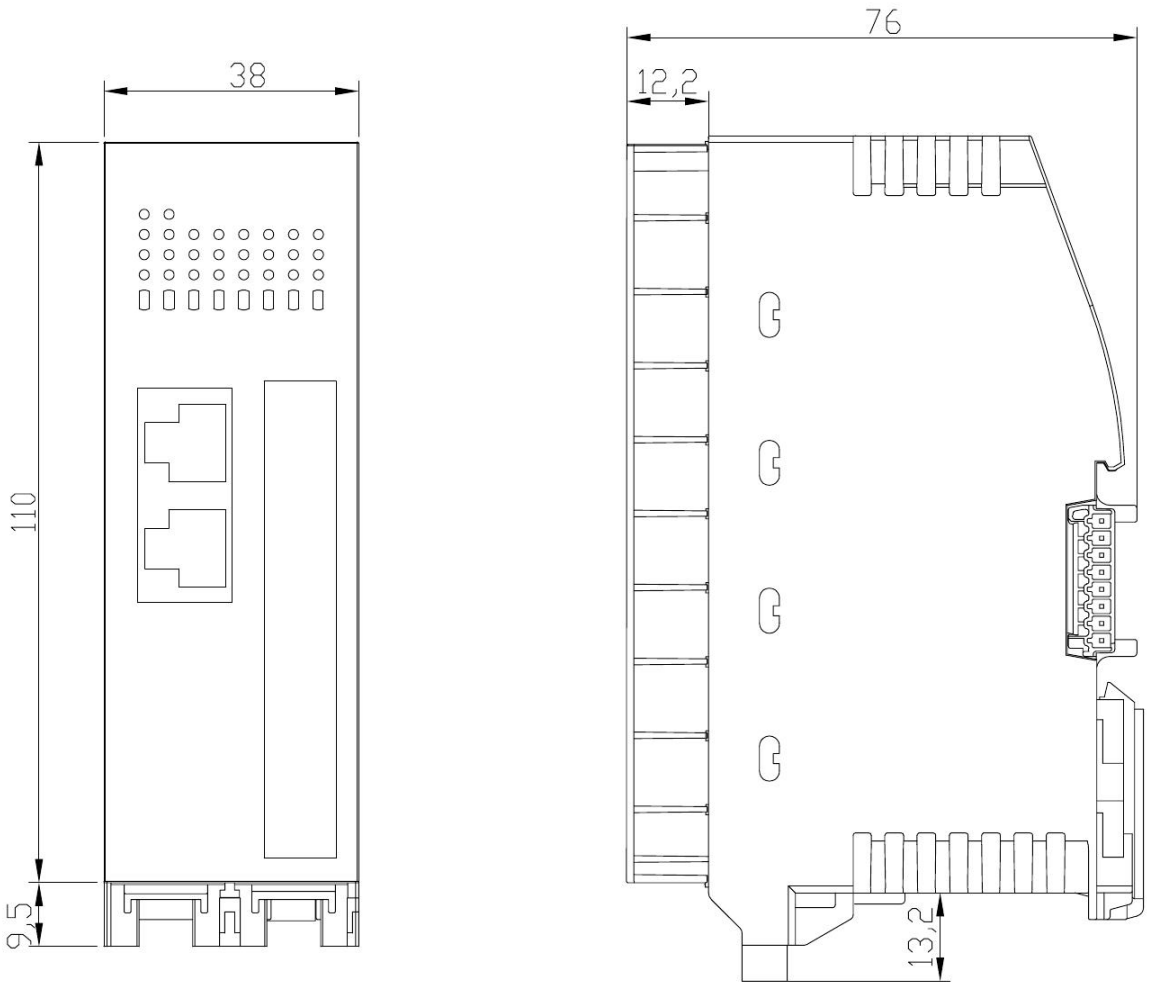
6 troubleshooting

6.1 EtherCAT Communication Slave Module Troubleshooting

Please refer to the corresponding host controller hardware manual "troubleshooting"

7 Appendix 1 Dimensions

The external dimension drawing of SC series remote expansion module is shown below.



(unit: mm)

8 Appendix 2 Upgrade/Warranty Notes

■ **Parts and System Upgrades**

Please contact after sales.

8.1 Warranty

■ Warranty time

The product quality warranty period is 1 year after purchase or within 1 year and 6 months from the company's production month.

■ Warranty

During the warranty period, if a malfunction occurs due to our company, our company will replace or repair the faulty part of the purchased machine. In addition, the above-mentioned responsibilities of our company are limited to the replacement and repair of the purchased equipment, and our company is not responsible for any damage to your company or a third party caused by the failure of the purchased equipment.

In addition to the matters stated in the "Warranty Period", our company will not be held responsible for any of the following situations in which the equipment is not in good condition and causes damage to your company or a third party.

1. When the machine is not assembled or used in accordance with the instructions or precautions described in this specification book

2. When the machine does not match the product assembled in the machine

3. When the items that depend on your company cannot be dealt with in this specification sheet

4. Others, when the machine is in poor condition not caused by our company

■ Notes on use

- Precautions when exporting this product and the machine on which it is installed
- When the end user or end use of this product is related to military or weapons, it shall be stipulated in the "Japan Foreign Exchange and Foreign Trade Control Law".

subject of export regulations. Therefore, when exporting such products, please conduct a sufficient examination and go through the necessary export procedures.

- This product is produced for general industrial products, etc., and is not designed and produced for use in machines and systems related to human life.
- Setting, wiring, operation, maintenance and spot check, etc., should be carried out by experts with knowledge of product use.
- Install safety devices when it is predicted that a serious accident or loss of equipment may occur due to a malfunction of this product.
- This product is designed for general industrial products, etc. Do not use it for nuclear power control, aerospace equipment, transportation facilities, medical equipment, safety devices, etc., equipment related to human safety, and special environments.
- Since the wiring conditions (grounding method, cable length, signal line shielding conditions) may affect the noise immunity performance, please confirm the noise immunity of the machine by yourself.
- Depending on the contents of the malfunction of this product, there may be smoke as much as a cigarette. When using it in a clean room, etc., please consider.
- Overloading the product will cause the goods to fall, please handle according to the label.
- Volatile oils, thinners, alcohol, acidic and alkaline detergents may cause discoloration or damage to the outer packaging, so please do not use it.
- Please dispose of it as industrial waste.

- The user should confirm the suitability of the laws and regulations of the finished machine, as well as the matching of the structure, size, life, and characteristics of the installed machine and parts.
- Please note that normal operation of the product cannot be guaranteed when used beyond the specifications of this product.
- Due to product performance improvement and other reasons, the contents of this manual (model, software version, etc.) may be changed without prior notice.

After-sales service

Repair and maintenance

1. For repair and maintenance, please contact the product agent first;

2. If the product has been installed in the equipment, please contact the equipment manufacturer first.

Technical Services

Customer technical consultation

Tel: (86) 13917890469 (Zhong Gong)

Consultation time: Monday to Sunday 9:00--17:30 (except specific holidays)

After-sales technical and maintenance consultation (repair of faulty parts, purchase of repair parts and optional accessories)

After-sales support: 400-168-2718

Purchase Inquiry: 13925286547Manager Zhou

Consultation time: Monday to Sunday 9:00--17:30 (except specific holidays)

Internet technical information