SC30 motion controller

Hardware Manual

让人类共享智能社会
的便利和幸福

Revised resume

issue date	Manual number	Revised content description	Remark
2021-06	V1.0	first edition	

foreword

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	Motion control programming, common

	Manual	programming libraries, instructions, etc.
3.	SC20 Controller Hardware Manual	SC20 related 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

Notes on Copyright and Trademarks

content

第一章 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.

1.2. Product Naming Rules

SC series naming rules

SC 30 - A6 H 2

1-2 3-4 5 6 7 8 9

SC	
1-2	系列号

30	
3-4	20：小型 30：中大型 40：高性能工控机 31：中型集成显示 32：中型工控机 41：高性能集成显示

-	
5	分隔符

A	
6	A:为子系列代号 B：为子系列代号

6	
7	3：8轴* 4：16轴 5：32轴 6：64轴 7：128轴

H	特殊规格
8	L：无内置高速IO板，低速IO板 H：内置高速IO板（支持脉冲轴，编码器脉冲计数）

2	特殊规格
9	6：6个高速（脉冲轴+ABZ编码器）模块 4：4个高速（脉冲轴+ABZ编码器）模块 1个通用IO模块 3：2个高速（脉冲轴+ABZ编码器）模块 1个通用IO模块，1个模拟量IO模块

*: As a reference for computing power and axis capacity. The number of axes will vary slightly depending on the software implementation.

第二章 summary

2.1.Basic system configuration

2.1.1.SC30 System Overview

Version 2 SC30_B with different optional modules and renderings of local expansion boards

SC30 series motion controller is a medium-sized controller with modular structure design.

- **Strong scalability**

- Each controller supports local expansion of 32 expansion modules. The local expansion module carries out module expansion through the internal bus protocol, and supports digital input/output modules and analog input/output modules. The analog input/output module adopts a 12-bit resolution conversion chip to ensure high-precision data acquisition
- PassRemote expansion of racks is possible through various industrial fieldbuses such as Ether CAT and CAN Open
- Three Ethernet connection ports are supported, one of which is EtherCAT compatible.

- **Powerful Control Function**

- Supports 64-axis motion control via Ether CAT bus
- With single-axis acceleration and deceleration control function, electronic gear function, electronic

cam function, CNC, robot and other motion control functions

- The single-axis basic positioning function can also be realized through high-speed IO, and the maximum frequency can reach 4 Mbps.

2.1.2.Unit module type

■ Controller body

type	subunit	Features	Product screen printing
Controller body	SC30 Controller	64-axis motion controller Transistor NPN output type	SC30_B
	Local optional axis-controlled high-speed counter module (optional)	For 2ch motor pulse control	P2E2
	Local optional ordinary digital input and output module (optional)	24V 12 DI, 4 DO	X12Y4
	Communication module	1 channel CAN, 1 channel RS232, 2-way RS485 communication interface	SLT30

■ Local Expansion Unit Module

type	unit	Features	Product screen printing
digital module	Local expansion of ordinary digital output	24V	Y16

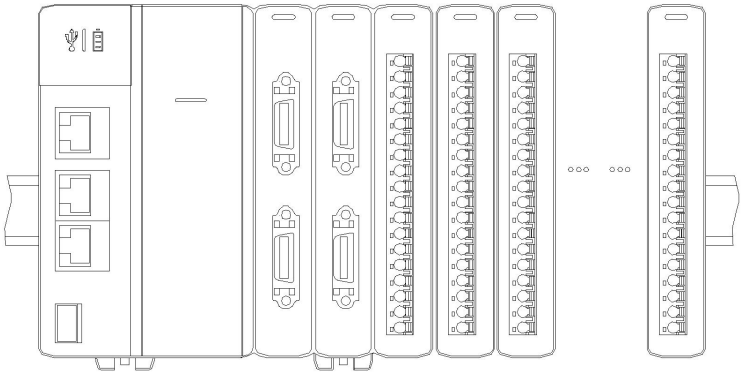
	modules	16 way DO Transistor NPN type	
	Local expansion of ordinary digital input modules	24V 16 way DI	X16
analog module	Local expansion of ordinary analog input and output modules	24V 8-way AI, 4-way AO Transistor NPN output type	AX4Y2

■ Remote Expansion Unit Module

type	unit	Features	Product screen printing
digital module	Ether CAT extended remote digital input and output module	24V 8-way bidirectional configurable 16 DI, 8 DO MOS tube output type	SX-CD433-HR
Hybrid module	Ether CAT extended remote input and output hybrid module	24V 8-way DI, 8-way DO 4-way AI, 4-way AO	SX-D330A22-HR

2.1.3.Limitation on the number of expansion units

Can be installed up to the right side of the SC30 controller32station to expand the ordinary unit.



2.2. Programming Tools

2.2.1. Software usage environment and applicable cables

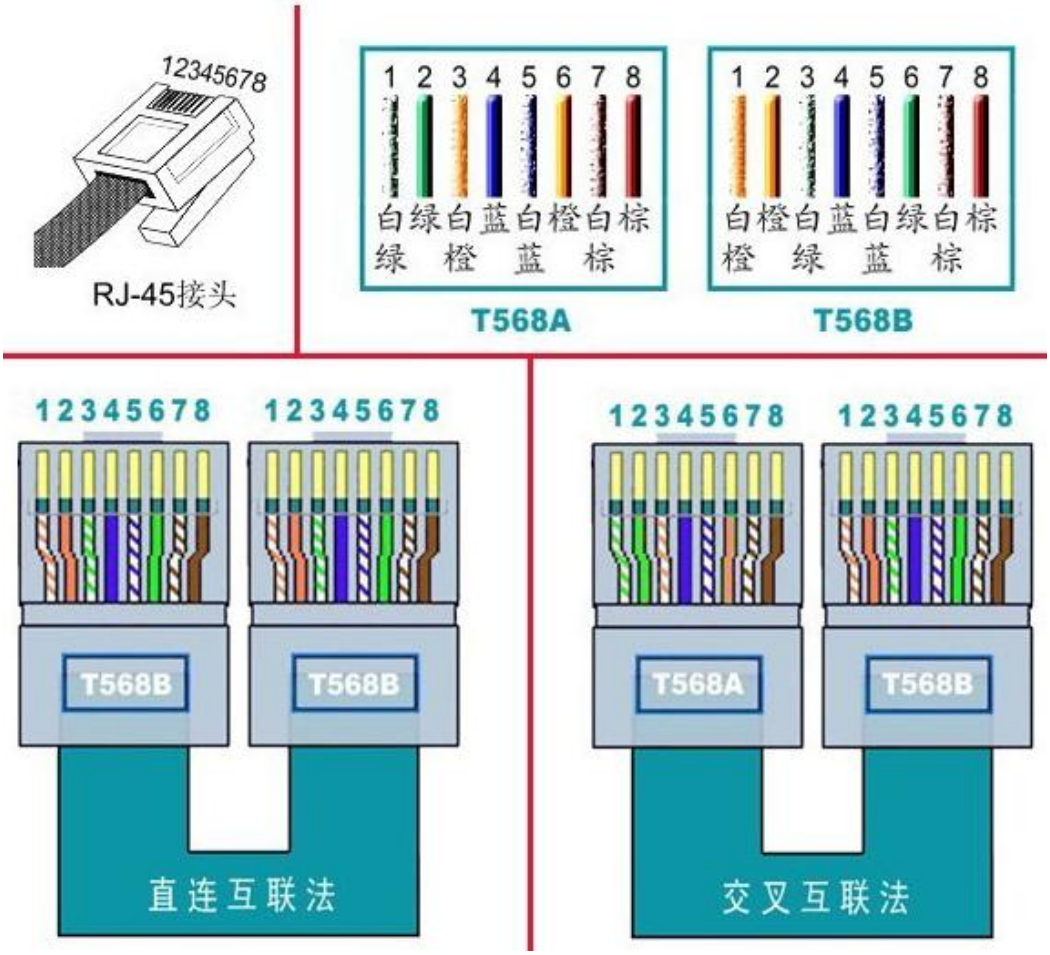
For programming software and software operating environment, see "SC series controller software manual".

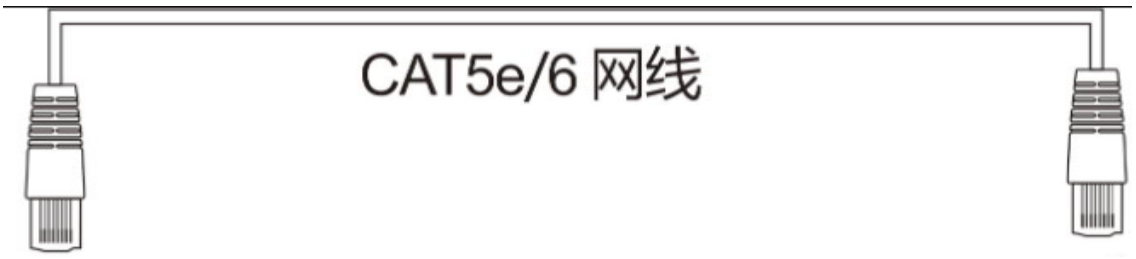
computer connection cable

- Please use a commercially available Ethernet 100Base-TX cable.

Kind of cable	length
Ethernet 100Base-TX	up to 50m

- controller withPC sideEthernetcablesupport auto-negotiation,ABCrystal head directly connected or crossed.

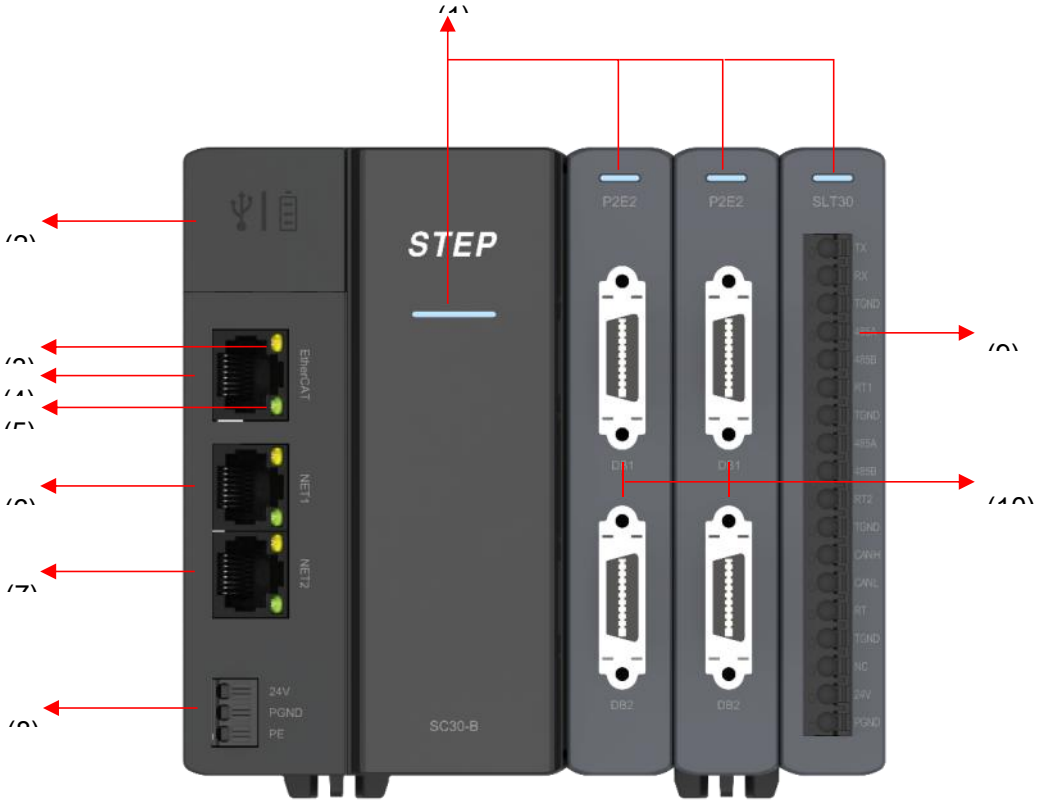




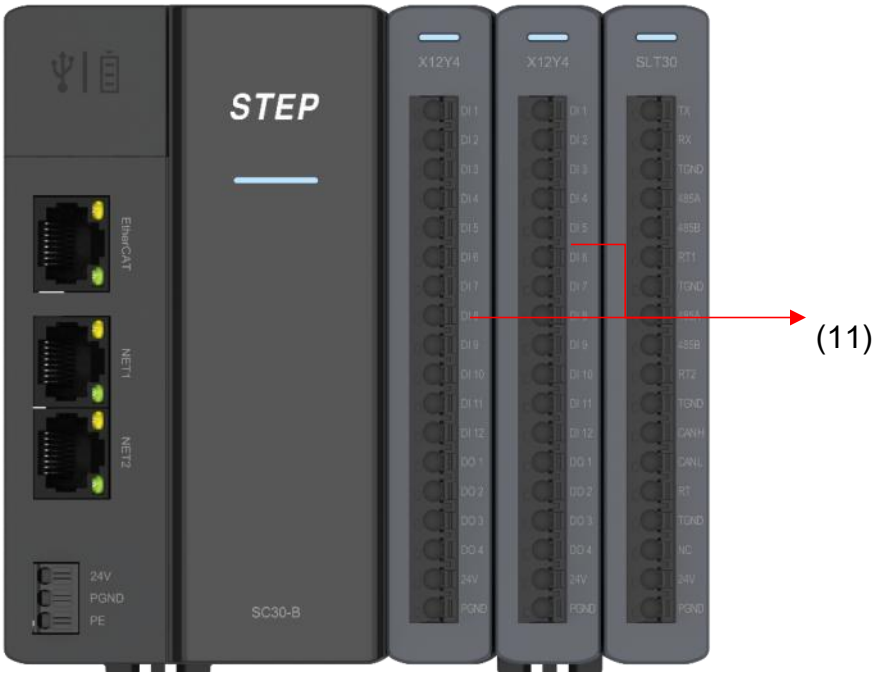
(computer side) (SC30 side)

第三章 Components of the system and port definitions

3.1. Name and function of each part of SC30 controller



3.1.1. List of names and functions



No.	name	Features
1	LED status indicator	is the unit status indicator See "Status Display LED Names and Functions"
2	flip cover	Inside contains: USB-A socket, button battery box, reset button
3	EtherCAT, Ethernet Status Indicator	Is the LAN port status indicator See "Status Display LED Names and Functions"
4	LAN port 1 EtherCAT network port	Is the connector for EtherCAT connection. STEP.Eth0.IP default address 192.168.1.11
5	EtherCAT, Ethernet Status Indicator	It is the status indicator of the LAN port See "Status Display LED Names and Functions"
6	LAN port 2 NET1 network port	Is the connector for the Ethernet connection. STEP.Eth1.IP default address 192.168.0.11
7	LAN port 3 NET2 network port	Is the connector for the Ethernet connection. STEP.Eth2.IP default address 192.168.39.220
8	Power input interface	is the controller power supply access See "Power Interface Definition"
9	Communication board interface	1 RS232, 1 CAN, 2 RS485 See "Communication board interface definition"
10	local optional Axis control high-speed counter module interface	Can be divided into 2 2ch axis control motor interfaces (Can form a 4ch motor pulse control interface) See "Local optional axis control board interface definition"

11	local optional Common input and output module interface	24V 12ch digital input 4ch digital output See "Local optional common input and output board definition"

3.1.2.Power Interface Definition

No.	name	Features
1	24V	Power input 24V
2	GND	power input ground
3	PE	the earth

3.1.3.Status Display LED Names and Functions

No.	name	LED color	Features
1	Module status LED display	LED tri-color light red, blue, yellow	Display the status of the current module See "Self-diagnostic function"
2	EtherCAT, Ethernet communication status indicator	Green, yellow.	When the connection is normal: the green indicator is always on. When data is sent and received: the green light and the yellow light flash at the same time. In case of failure: the orange light is always on

3.1.4.Communication board interface definition

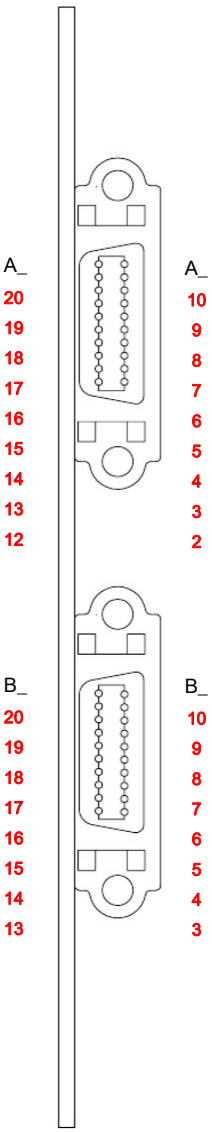
No.	name	Features	Port mapping in software
1	TX	RS232 send	COM1
2	RX	RS232 reception	
3	TGND	communication reference	
4	485A	RS485 communication 1+	COM2
5	485B	RS485 communication 1-	
6	RT1	485Terminating resistor	
7	TGND	communication reference	
8	485A	RS485 communication2+	COM3
9	485B	RS485 communication 2-	
10	RT2	485Terminating resistor	
11	TGND	communication reference	
12	CANH	CAN+	CAN0
13	CANL	CAN-	
14	RT	CANTerminating resistor	
15	TGND	communication reference	
16	NC	empty pin	
17	24V	Power input 24V	
18	PGND	Power reference ground	

3.1.5.Local optional common input and output board interface definition

No.	name	Features
1	DI1	digital input
2	DI2	digital input
3	DI3	digital input
4	DI4	digital input
5	DI5	digital input
6	DI6	digital input
7	DI7	digital input
8	DI8	digital input
9	DI9	digital input
10	DI10	digital input
11	DI11	digital input
12	DI12	digital input
13	DO1	digital output
14	DO2	digital output

15	DO3	digital output
16	DO4	digital output
17	24V	Supplemental power input
18	PGND	Supplementary power ground

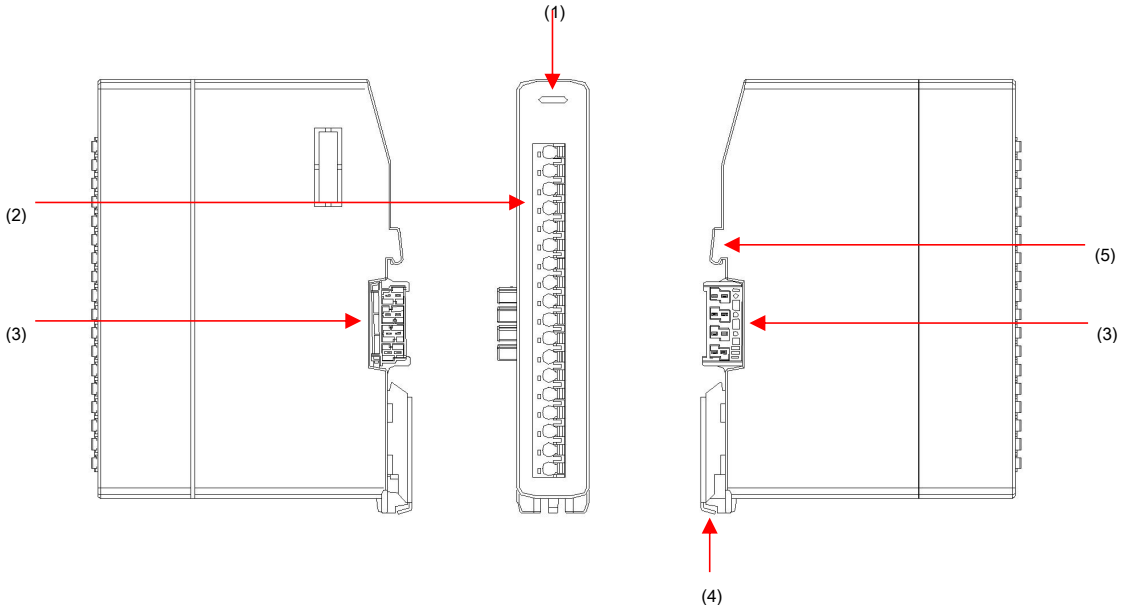
3.1.6.Local optional axis control board high-speed counter module interface definition

Optional axis control high-speed counter board terminal arrangement diagram	NO.		name	use
	A_	B_		
	1	1	ECA1+	Encoder A
	2	2	ECA1-	Encoder A
	3	3	ECB1+	Encoder B
	4	4	ECB1-	Encoder B
	5	5	ECZ1+	Encoder Z
	6	6	ECZ1-	Encoder Z
	7	7	OPC	reservedHigh-speed DI+
	8	8	PULS	Reserve high-speed DI-
	9	9	SRV_COIN	Servo positioning completedDI
	10	10	ALARM	Servo alarm DI
	11	11	+5V_ENC	Encoder power
	12	12	EGND	Encoder reference ground
	13	13	DR+	command direction
	14	14	DR-	command direction

	15	15	PU+	command pulse
	16	16	PU-	command pulse
	17	17	24V	Power Output
	18	18	GND_24V	reference place
	19	19	SRV_ON	Enable Servo DO
	20	20	CLEAR	Clear Servo Alarm DO

3.2.expansion unit

3.2.1.Names and Functions of Parts of the SC30 Local Expansion Unit



No.	name	Features
1	Status display LED	Use LEDs to display module connection status
2	I/O connector	Connect input and output devices See "Local Expansion Digital I/O Board Interface Definition"
3	Power input interface	Provides stable power with bottom bus connection
4	DIN hook	A hook for fixing the main body to a DIN rail.
5	DIN rail mounting section	It is the part that is mounted on the DIN rail.

3.2.2.Local Expansion I/O Board Interface Definition

■ **Local expansion digital input board interface definition**

No.	name	Features
1	DI1	digital input
2	DI2	digital input
3	DI3	digital input
4	DI4	digital input
5	DI5	digital input
6	DI6	digital input
7	DI7	digital input
8	DI8	digital input
9	DI9	digital input
10	DI10	digital input
11	DI11	digital input
12	DI12	digital input
13	DI13	digital input
14	DI14	digital input
15	DI15	digital input
16	DI16	digital input
17	COM+	public
18	NC	empty pin

■ **Local expansion digital output board interface definition**

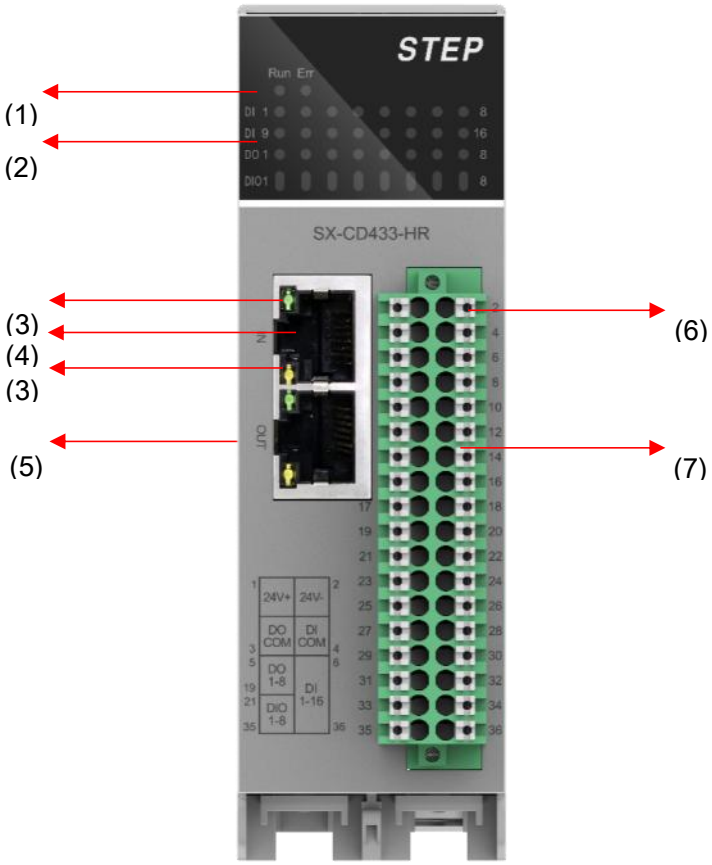
No.	name	Features
1	DO1	digital output
2	DO2	digital output
3	DO3	digital output
4	DO4	digital output
5	DO5	digital output
6	DO6	digital output
7	DO7	digital output
8	DO8	digital output
9	DO9	digital output
10	DO10	digital output
11	DO11	digital output
12	DO12	digital output
13	DO13	digital output
14	DO14	digital output
15	DO15	digital output
16	DO16	digital output
17	24V	IO supplementary power supply
18	PGND	IO reference ground

■ Definition of local extension analog input and output board interface

No.	name	Features
1	AI1+	Positive analog input

2	AI1-	Analog input negative
3	AI2+	Positive analog input
4	AI2-	Analog input negative
5	AI3+	Positive analog input
6	AI3-	Analog input negative
7	AI4+	Positive analog input
8	AI4-	Analog input negative
9	AGND	Analogously
10	AO1+	Positive analog output
11	AO1-	Analog output negative
12	AO2+	Positive analog output
13	AO2-	Analog output negative
14	AGND	Analogously
15	NC	empty pin
16	NC	empty pin
17	24V	IO supplementary power supply
18	PGND	IO reference ground

3.2.3.Part Names and Functions of Remote Expansion Units



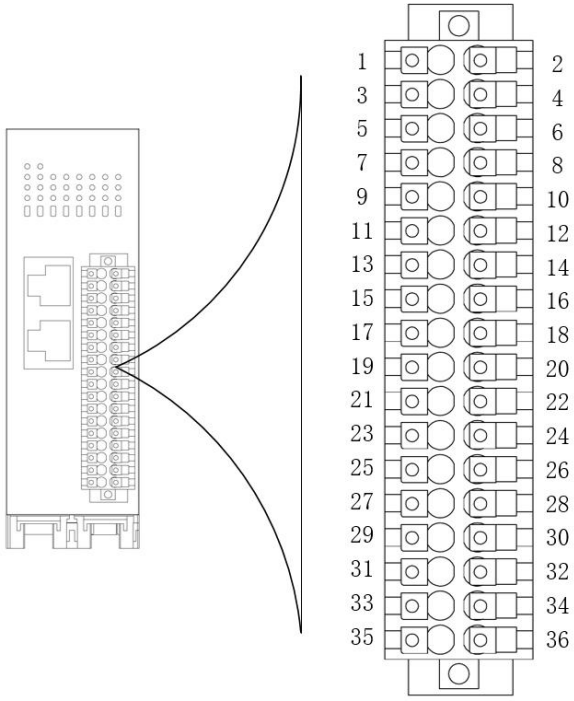
No.	name	Features
1	Operating status indicator	Monitor the operating status of the module
2	IO status indicator	Monitor IO connection status
3	Ethernet port status indicator	It is the status indicator of the LAN port see"Status Display LED Names and Functions"
4	LAN interface IN	Ether CAT input interface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

7	IO port	Connect input and output devices see"Remote Expansion I/O Board Interface Definition"

3.2.4.Remote Expansion I/O Board Interface Definition

■ Remote expansion digital input and output module

Schematic diagram of terminal arrangement

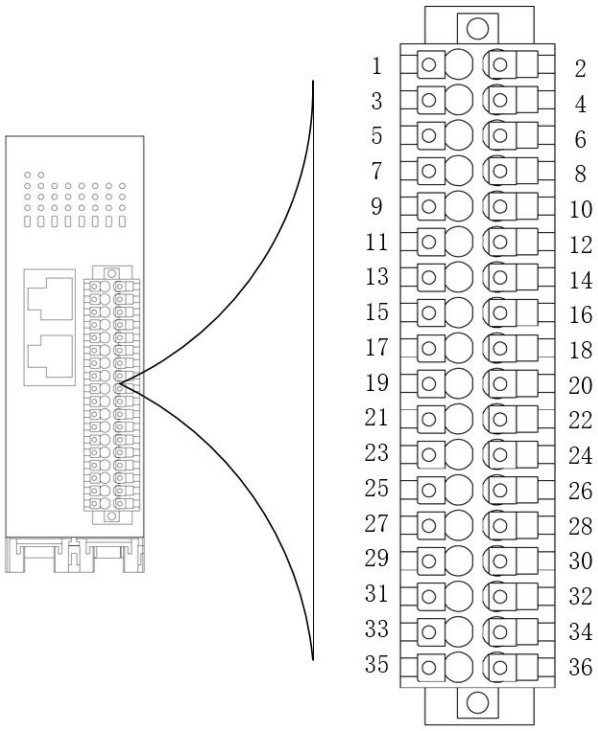


Features	name	No.	No.	name	Features
24V power supply	24V	1	2	24V_GND	24V power ground
DO public	DO_PWR	3	4	DI_COM	DI common
8 DO outputs MOS tube output, 500mA	D0_1	5	6	DI_1	16 DI inputs Optocoupler input, configurable NPN/PNP
	D0_2	7	8	DI_2	
	D0_3	9	10	DI_3	
	D0_4	11	12	DI_4	
	D0_5	13	14	DI_5	
	D0_6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

	D0_8	19	20	DI_8	
8 DI/DO configurable input/output Optocoupler input, MOS tube output, 500mA, configurable NPN/PNP, DI/DO	DI0_1	twenty one	twenty two	DI_9	
	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.					

■ 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;

3.2.5.Module silkscreen instructions

module name	Corresponding silk screen
local communication module	SLOT3
Local optional common input and output modules	X12Y4
Local optional axis control high-speed counting module	P2E2
Local expansion digital input module	X16
Local expansion digital output module	Y16
Local expansion of analog input and output modules	AX4Y2
Remote expansion digital input and output module	SX-CD433-HR
Remote expansion of mixed analog-digital input	SX-D330A22-HR

and output modules	

第四章 Install

4.1.Installation of SC30 series

4.1.1.Installation environment and installation space

■ Installation Environment

When installing, please use it within the range of general specifications.

- Ambient temperature: -5°C~+55°C
- Ambient humidity: 10%RH~90%RH (at 25°C, there should be no condensation)
- Protection class: IP20
- Pollution level: IE33
- Use altitude: below 2000m above sea level
- EMC immunity level: implement EN 61000-6-X standard
- Installation position: Use in the environment where the protection structure is IP54 or higher in the control cabinet (made of metal with sufficient strength).

Do not use in the following environments.

- Places exposed to direct sunlight
- Places where condensation may occur due to rapid temperature changes
- In the environment with corrosive gas and flammable gas
- Places with a lot of dust, iron powder and salt
- Places and environments where organic solvents such as gasoline, thinner, and alcohol, or strong alkaline substances such as ammonia and sodium hydroxide may adhere
- Places that may be directly exposed to vibration or shock, and places that are directly splashed by

water droplets

- In the vicinity of high-voltage power lines, high-voltage equipment, power lines, power equipment or equipment with transmitting devices such as amateur radio, and equipment generating large switching inrush currents (at least 100mm away)

■ operate

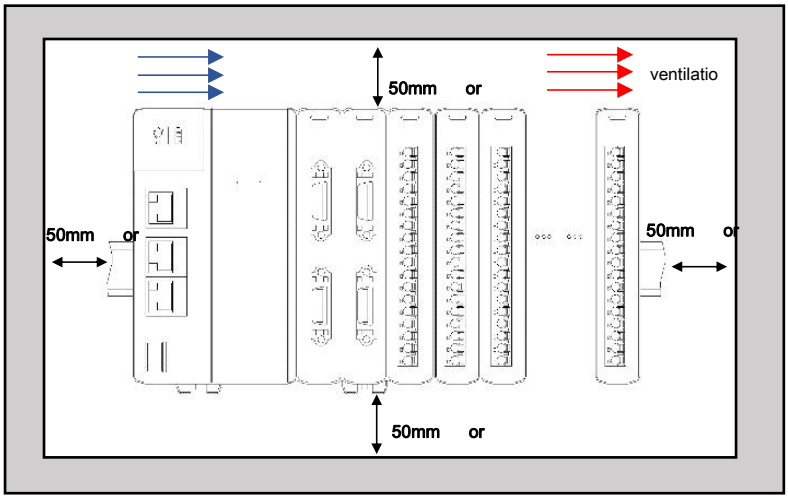
- To avoid electrostatic damage, do not directly touch the pins of connectors.
- Please discharge the static electricity carried by the human body before operating.
- The connector on the side of the unit can only be connected to our company's SC30 series.
- Use copper wire with a temperature rating of 80°C or higher.

■ Considerations for Heat Dissipation

- For the consideration of heat dissipation, please install it in the direction shown in the figure below.
- Do not install it vertically, horizontally or upside down, otherwise it will cause insufficient heat dissipation and cause abnormal internal heating.
- Do not install it directly above equipment that generates a large amount of heat, such as heaters, transformers, and large-capacity resistors.

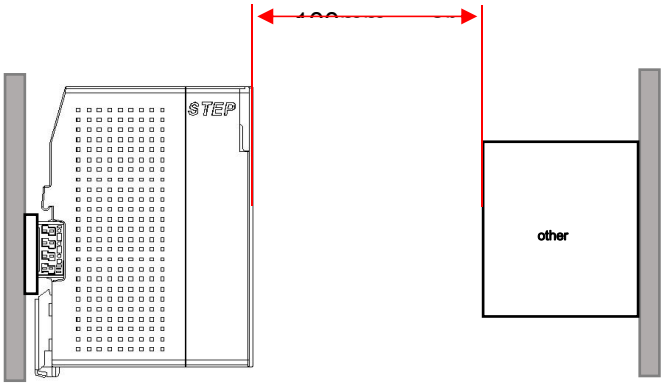
■ installation space

- In order to ensure the ventilation space, please keep a distance of more than 50mm from other equipment and wiring ducts at the top, bottom, left and right sides during installation.

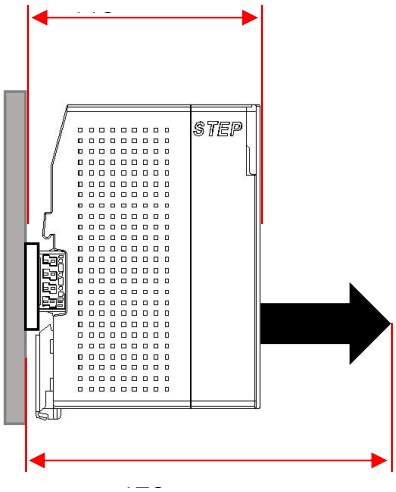


- Do not install it directly above equipment that generates a large amount of heat, such as heaters, transformers, and large-capacity resistors.

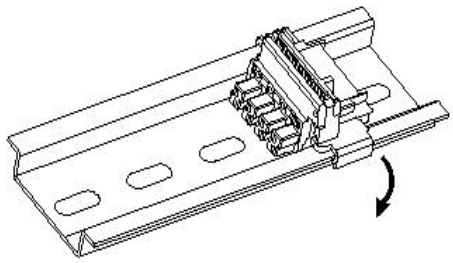
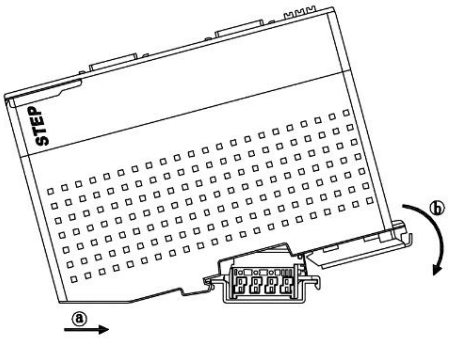
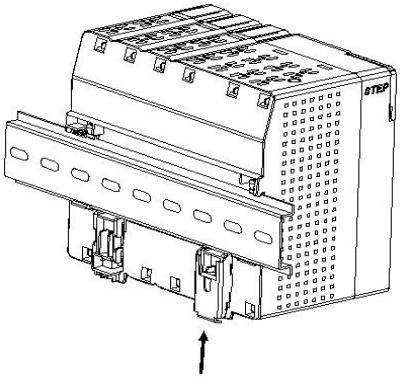
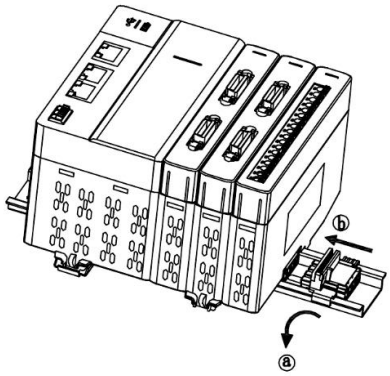
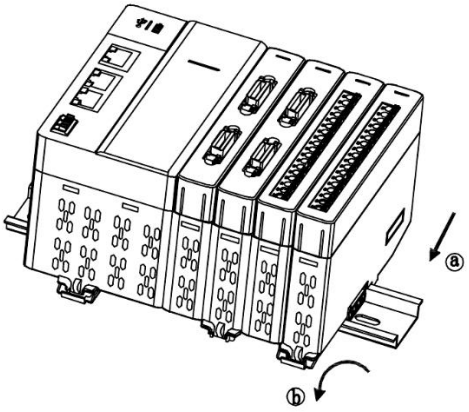
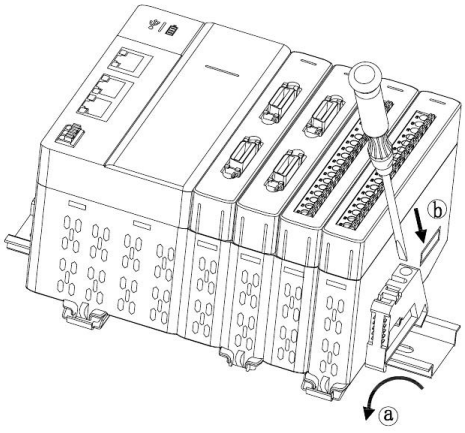
- To avoid the influence of radiated noise, please separate the surface of each unit from the power line or electromagnetic switch by a distance of 100mm or more during installation. Especially when installed on the back of the control cabinet door, ensure a certain distance from other equipment.



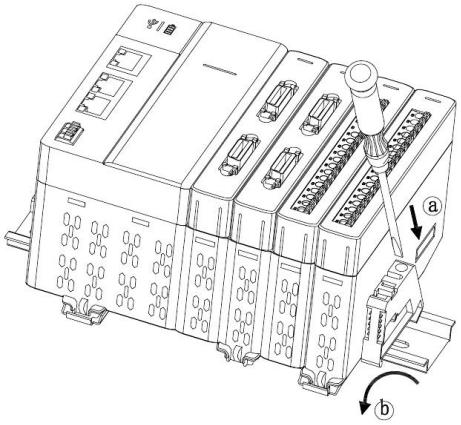
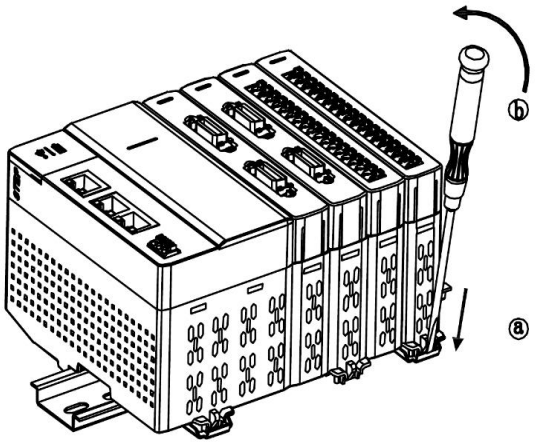
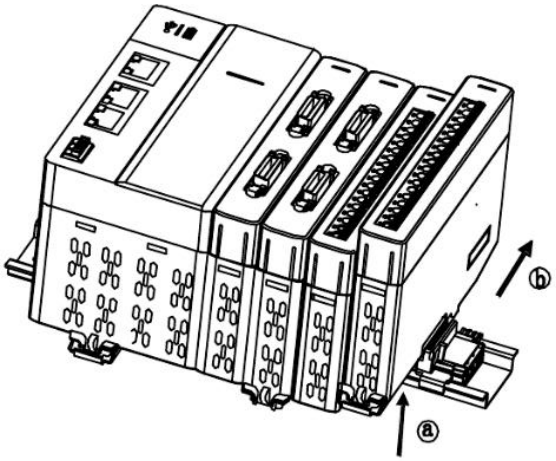
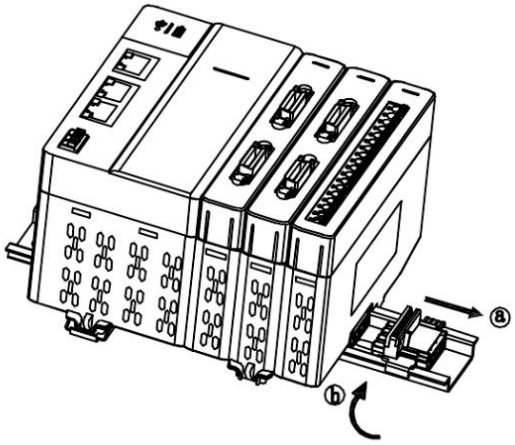
- To connect the tool software cable, make sure to leave a space of 170mm or more on the mounting surface of the SC30 series.

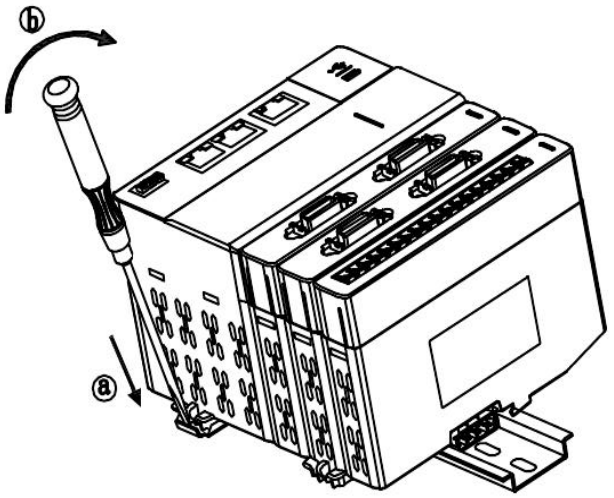
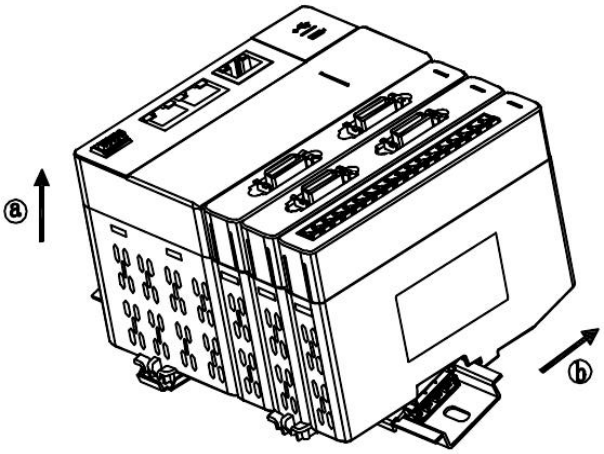
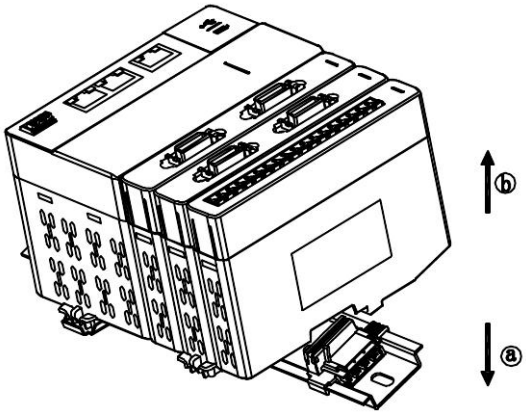

STEP

4.1.2.Unit installation steps

1. Mount the bus connector on the rail.	2. Slide the upper end of the unit installation into the DIN rail and apply force to the rail side (a in the figure), and then insert the lower end of the unit installation into the DIN rail (b in the figure).
	
3. After hearing the "click" sound, the metal lock is snapped into the DIN rail, and the installation is complete.	4. Press down the bus connector and install it on the guide rail (a in the figure), then slide it to the side of SC30, and insert the male connector into the female connector (b in the figure).
	
5. Slide the upper end of the expansion I/O into the DIN rail (a in the figure), and then insert the lower end into the DIN rail (b in the figure).	6. Snap the guide rail fastener into the guide rail (a in the figure), and tighten it with a screwdriver (b in the figure), and the installation is complete.
	

4.1.3.Disassembly of the unit

1. Use a screwdriver to unscrew the guide rail fastener (a in the figure), and then take it out from the rail (b in the figure).	1. Use a screwdriver to hold down the latch (a in the figure), then pry the screwdriver toward the expansion unit to open the metal latch at the bottom of the expansion unit (b in the figure).
	
2. First lift the lock side (a in the figure), and then push it out to the other side (b in the figure), you can successfully take out the expansion I/O unit	3. Pull out the bus connector and separate the male and female from the plug (a in the figure); flip the lower end of the unit upwards to separate it from the track (b in the figure).
	
4. Use a screwdriver to hold down the latch (a in the figure), then pry the screwdriver towards the SC30 controller to open the metal latch at the bottom of the unit (b in the figure).	5. Pull the locking side of the unit upwards (a in the figure), and then push it forward (b in the figure).

<table>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>6. The unit and DIN rail are separated, and the disassembly is completed (a and b in the figure).</td><td></td></tr>
<tr><td> 
</td><td></td></tr>
</table>

第五章 wiring

5.1.Wiring Recommendations

5.1.1.Ground the shielded cable

Cables for high-speed I/O, analog I/O, fieldbus, and communication signals must use shielded cables. Ground as close to the module as possible, so that the grounded cable will not be affected by the electromagnetic induction of the cable before grounding. For the shielded part of the shielded cable that is exposed after stripping part of the outer skin, try to make it grounded with the conductive backplane in a large area to ensure good contact.

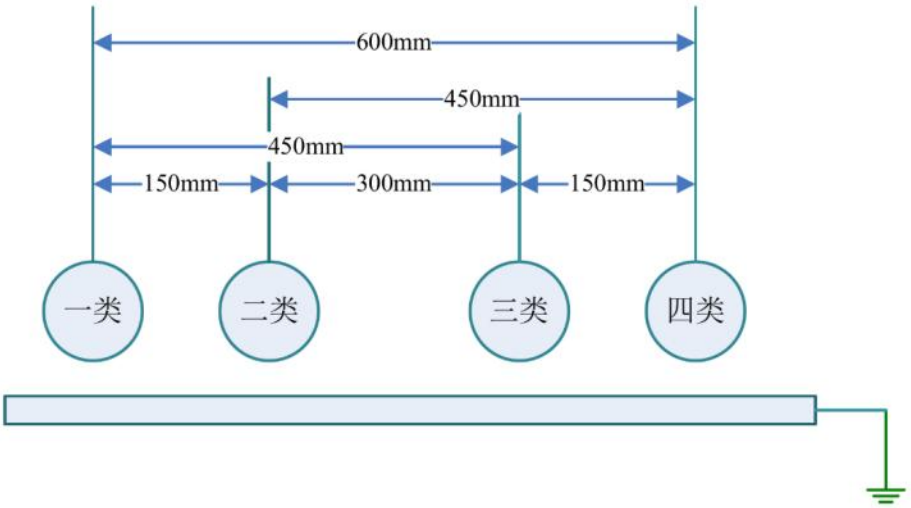
For welding the shielded part of the shielded cable to the PVC wire, the method of grounding the front end will increase the high frequency resistance and weaken the shielding effect. It should be noted and avoided as much as possible.

The analog signal is only grounded at one end near the module side, and the shielded wire of high-speed I/O, fieldbus, and communication signal cables needs to be grounded at both ends.

5.1.2.Wiring Requirements

Low-voltage cables (<1KV) are generally divided into four types. Only cables of the same type can be put together to form a cable bundle. Different types of cables should be separated when wiring, and generally cannot overlap. When crossing is unavoidable, they should be crossed at right angles. . A certain distance is required between different types of cables. For cables with a wire length less than 30m, the minimum allowable distance is shown in the figure below. When the length of the parallel wiring of the cable increases, the spacing should be appropriately increased. In addition to maintaining the spacing, multiple shielding plates can also be installed between different types of cables to achieve shielding. To

reduce cross-interference, all cables should be routed as close as possible to the (earthed) structural member connected to the cabinet ground. For example, mounting panels for cabinets or rack parts.



Schematic diagram of wiring requirements for various types of cables

【Note】One class: Ethernet, EtherCAT;

Class II: low-speed digital communication signals (RS232, RS485, CAN, etc.) and digital I/O signals

Three types: low-voltage AC power distribution line (such as PLC 220V AC power line) or DC power line (such as switching power supply output DC 24 power line)

Category 4: Input and output cables, welding machine cables, power converter power cables

5.2.Wiring of the power supply

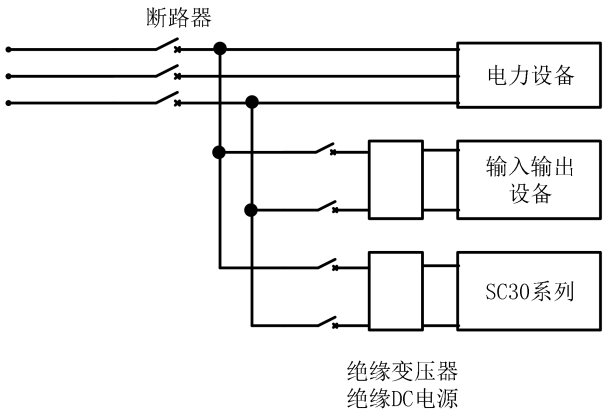
5.2.1.General Considerations

■ Choice of power supply

- Please use a power supply with low noise as much as possible.
- Although there is sufficient noise margin for noise superimposed on the power supply line, it is recommended to further reduce noise by using an isolation transformer/isolated power supply.

■ Separation of power system

The wiring on the unit, input and output equipment, and power equipment should be separated from the system.

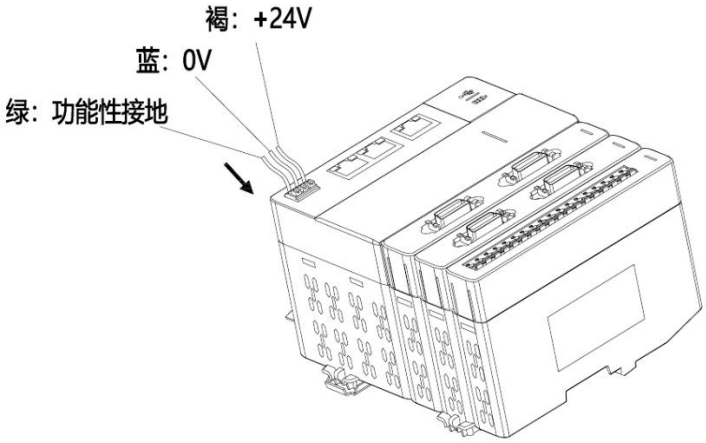


■ Power sequence

- Please consider the power supply sequence, and cut off the power supply of the controller before cutting off the power supply for I/O.
- If the power for input and output is turned off before turning off the power of the controller, the SC30 controller may detect the change of input level and cause unexpected sequence actions.

5.2.2.SC30 Controller Power Supply

■ Wiring of the power supply

unit	Wiring diagram
SC30 Controller	

■ About the choice of power supply

- To protect the circuit from the influence of abnormal voltage from the power supply line, use an isolated power supply with a built-in protection circuit in the power supply. (Reinforced insulation or double insulation power supply)
- Among the regulators built in the unit, a non-isolated type is used.
- Please select a power supply whose capacity exceeds the unit to be connected. Also, choose a power supply above 24W, even at the minimum configuration.

■ voltage

- Make sure that the voltage of the power supply to be connected is within the allowable range.

Rated input voltage	allowable voltage range	Rated output capacity
24V DC	20.4V-28.8V DC	Above 24W

■ power cable

- It is recommended to customize the color and label of the power supply cable.

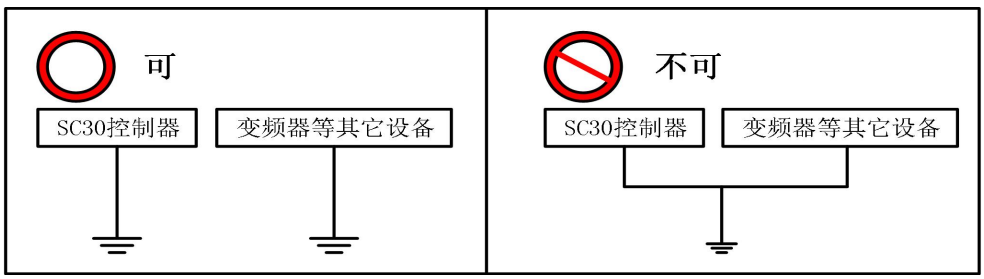
Brown: 24V DC, Blue: 0V, Green: Functional ground

- To reduce the influence of noise, twist the power cable (twist processing).

5.2.3.ground

■ Use dedicated ground

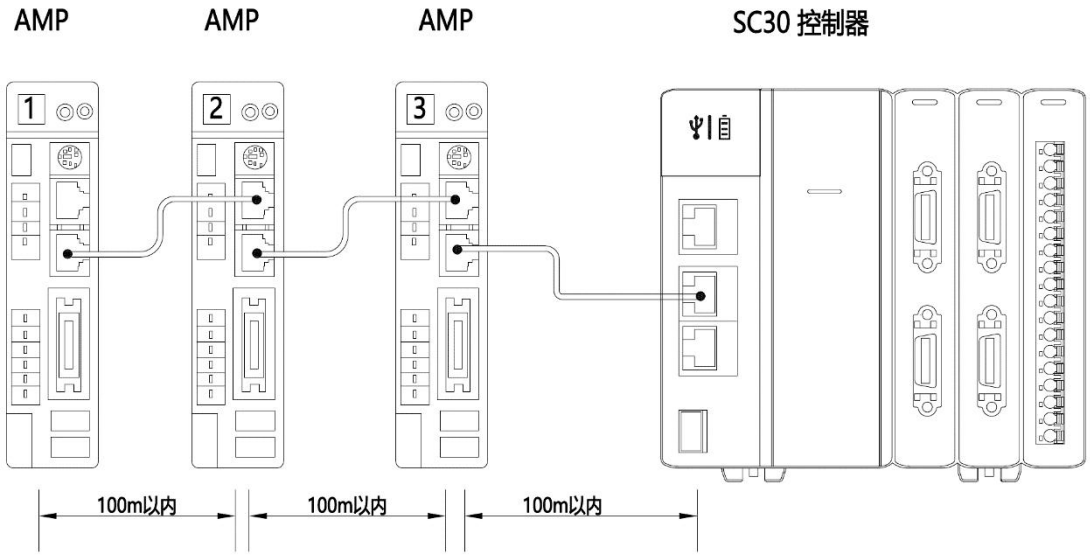
- Please use Class D (Class 3) grounding with a grounding resistance of 100Ω or less.
- The grounding point should be as close as possible to the SC30 controller to shorten the distance of the grounding wire.
- When the ground is shared with other equipment, the opposite effect may occur, so a dedicated ground must be used.



5.3.network wiring

For network wiring, use a Category 5e shielded LAN cable. To prevent it from falling off, firmly connect the connector on the cable side to the network connector (RJ45 connector) of the unit main unit.

The length between each node should be within 100m, and the total length of the communication loop should be within 200m.



- The LAN port connected to the ethernet of SC30 controller is connected with the communication input port of the servo drive, the communication output LAN port of the drive is connected with the next servo drive, and so on. The communication connection adopts the chain connection.

5.4.General Wiring Specifications for I/O Modules

5.4.1.General Considerations for Input and Output

■ Location of wiring

For input wiring and output wiring, and these wiring and power wiring should be as far away as possible. Do not route or bundle them in the same conduit. The input and output wiring, power line and high-voltage line should be at least 100mm away.

■ Choice of wires

When wiring the input line and output line, please select the diameter of the wire according to the current capacity.

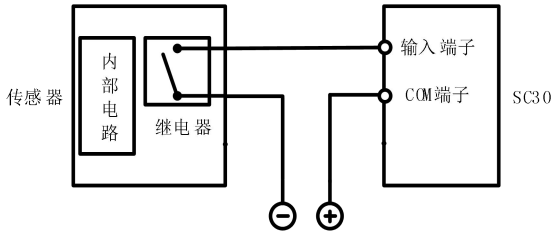
■ power supply

Please turn off the power of SC30 before wiring. The connection between the SC30 controller and the expansion unit should also be performed with the power off. Connecting while the power is on may cause malfunction or malfunction.

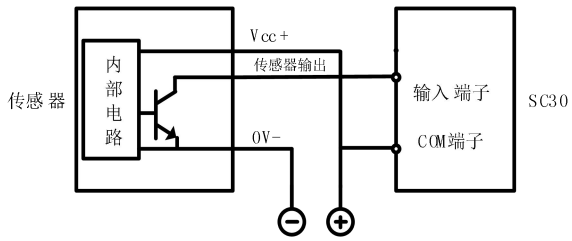
5.4.2.Input side wiring

■ Connections with photoelectric sensors and proximity sensors

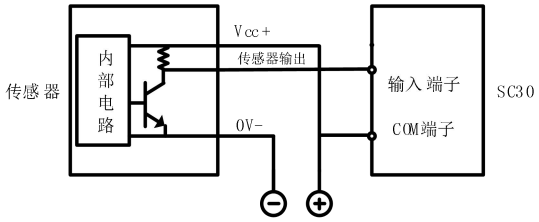
Relay output type



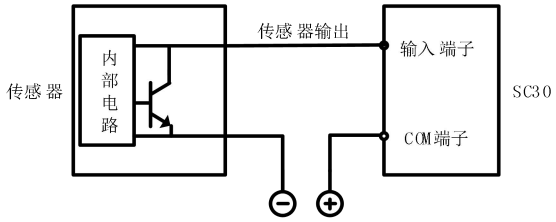
NPN open collector output type



Voltage output type



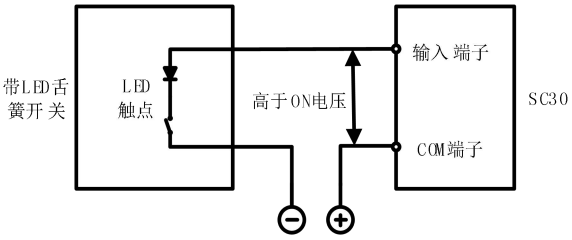
Two-wire output type



■ Precautions when using reed switches with LED

When LEDs are connected in series with input contacts (such as reed switches with LEDs, etc.), please apply a voltage greater than ON to the input terminals of SC30

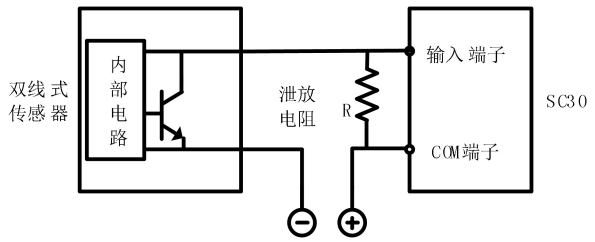
voltage voltage. Be especially careful when connecting multiple switches in series.



■ Precautions when using a two-wire sensor

When using a two-wire photoelectric sensor or proximity sensor, if the leakage current prevents the input to the SC30 from being cut off

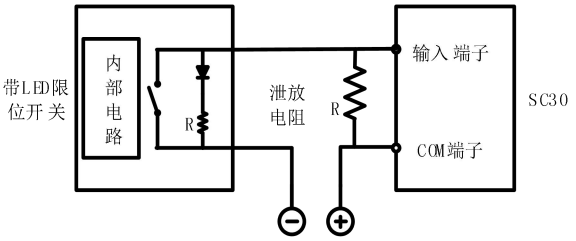
current, connect the bleeder resistor as shown below.



■ Precautions when using limit switches with LED

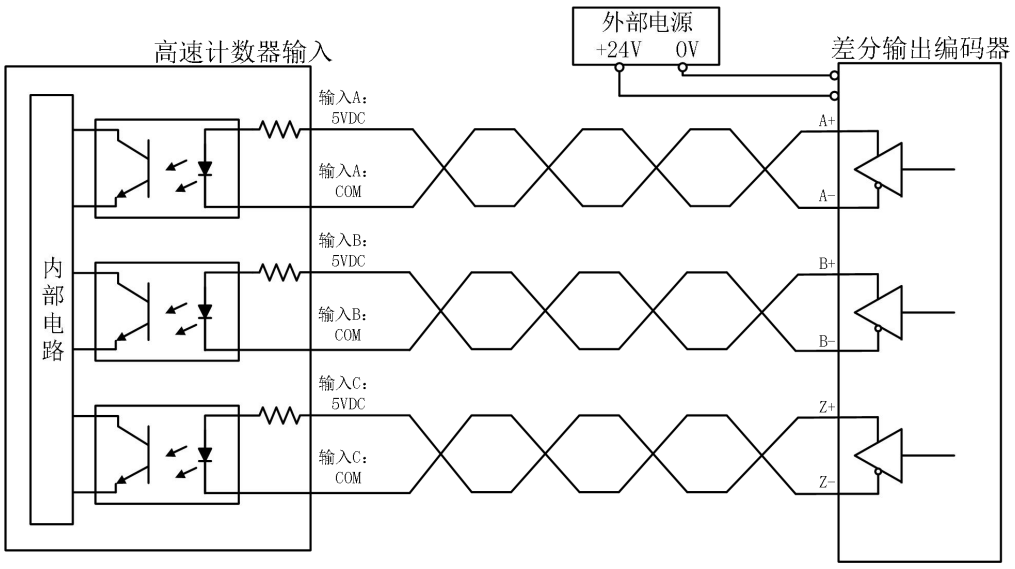
When using the limit switch with LED, if the input current to SC30 cannot be cut off due to the influence of leakage current, please press

Connect the bleeder resistor as shown below.

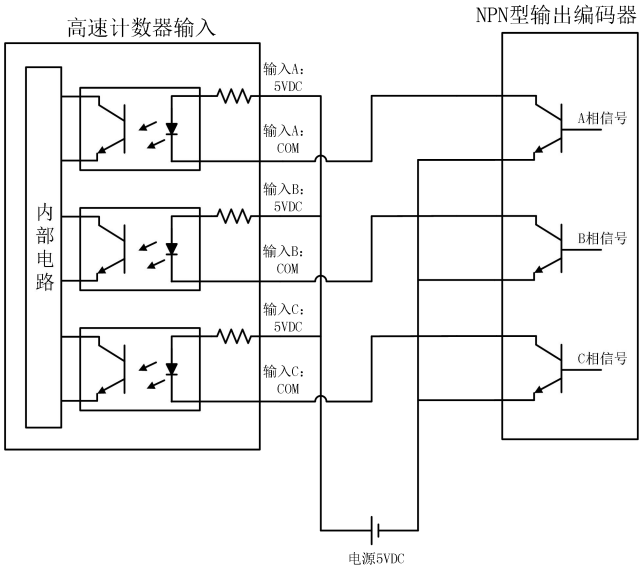


5.4.3.Axis-controlled high-speed counter input wiring

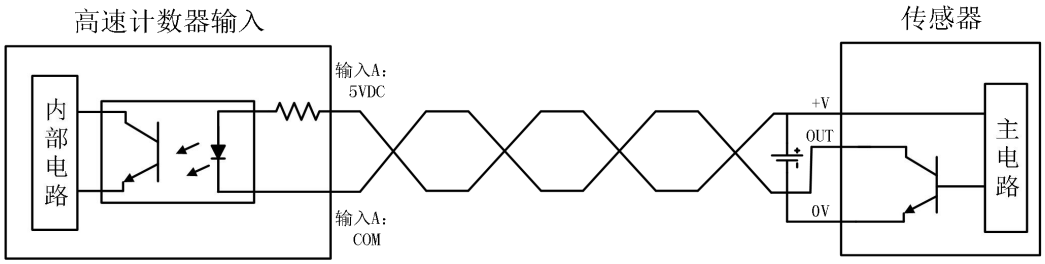
■ Case of Line Drivers with Differential Encoder Inputs



■ For NPN encoder input transistor/open collector type



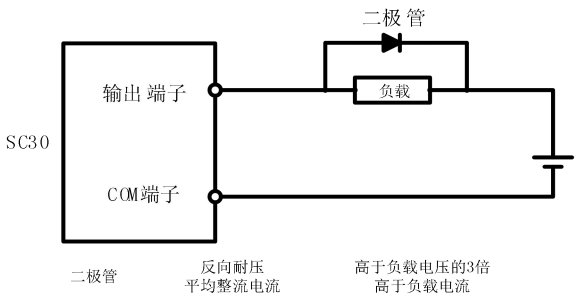
■ In the case of sensor input



5.4.4.Wiring on the output side

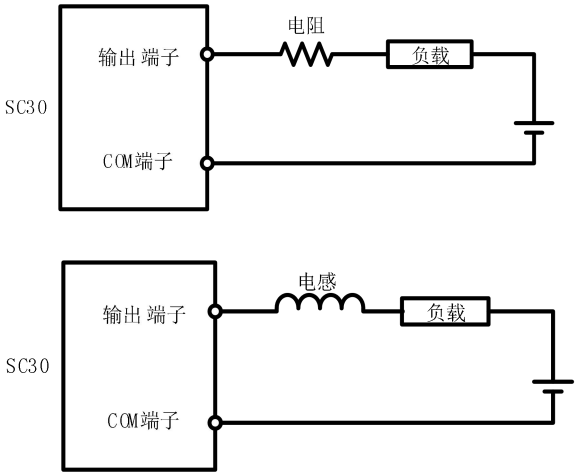
■ Protection circuit for inductive loads

For inductive loads, install a protection circuit in parallel with the load.



■ Precautions when using capacitive loads

When connecting a load with a large inrush current, in order to minimize its influence, please set up the following protection circuit.

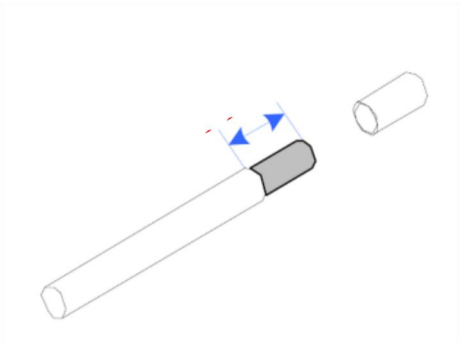


5.5.Module terminal signal arrangement and cable production

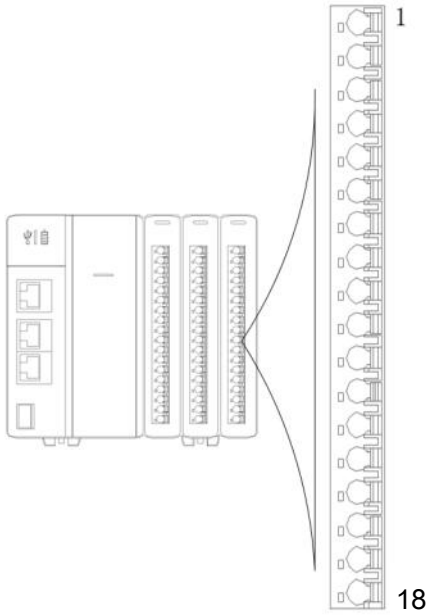
5.5.1.cable production

Except the axis-controlled high-speed counter board adopts DB20 connector (need to be customized) and the LAN port adopts RJ45 (8P8C) plug, other I/O terminal wiring adopts straight-in connector, and no customized connection plug is required.

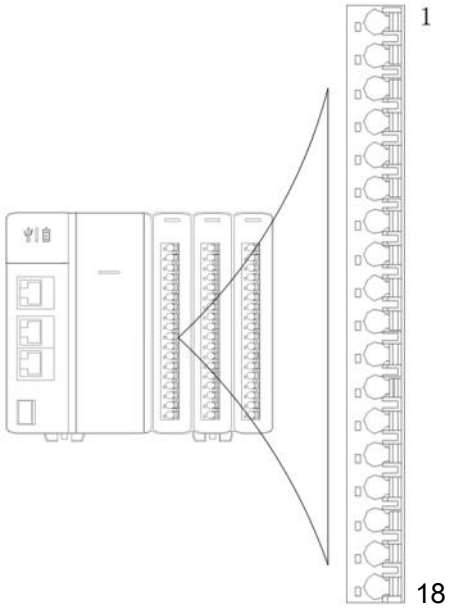
■ Connection cable diameter specification

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

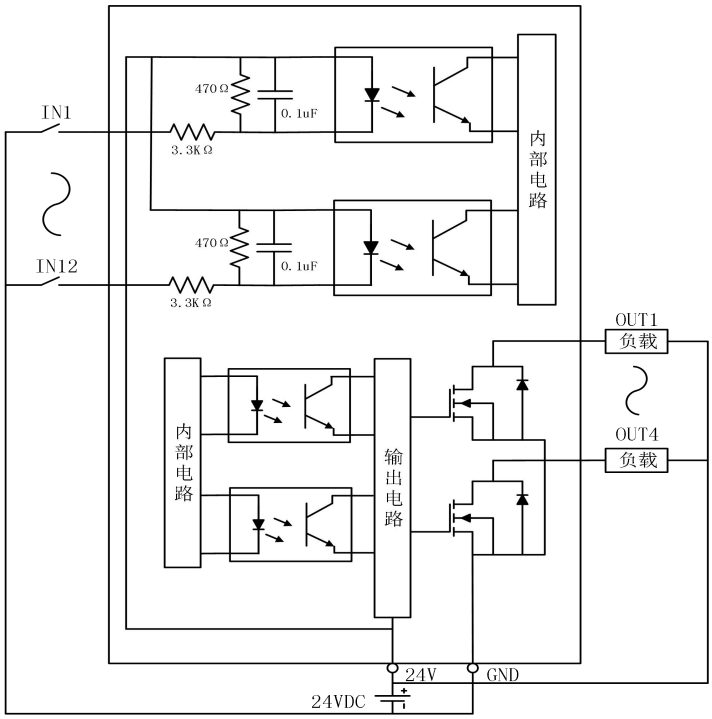
5.5.2.Communication board terminal signal arrangement and definition

Schematic diagram of terminal arrangement	No.	name	Features
	1	TX	RS232 send
	2	RX	RS232 reception
	3	TGND	communication reference
	4	485A	RS485 communication 1+
	5	485B	RS485 communication 1-
	6	RT1	485Terminating resistor
	7	TGND	communication reference
	8	485A	RS485 communication2+
	9	485B	RS485 communication 2-
	10	RT2	485Terminating resistor
	11	TGND	communication reference
	12	CANH	CAN+
	13	CANL	CAN-
	14	RT	CANTerminating resistor
	15	TGND	communication reference
	16	NC	empty pin
	17	24V	Power input 24V
	18	PGND	Power reference ground

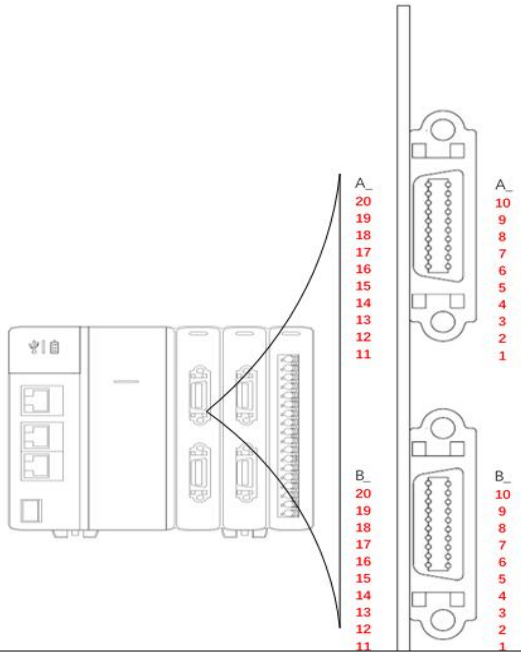
5.5.3.Local optional common input and output board terminal signal arrangement and definition

Schematic diagram of terminal arrangement	No.	name	Features	Remark
	1	DI1	digital input	Sink input, active low
	2	DI2	digital input	Sink input, active low
	3	DI3	digital input	Sink input, active low
	4	DI4	digital input	Sink input, active low
	5	DI5	digital input	Sink input, active low
	6	DI6	digital input	Sink input, active low
	7	DI7	digital input	Sink input, active low
	8	DI8	digital input	Sink input, active low
	9	DI9	digital input	Sink input, active low
	10	DI10	digital input	Sink input, active low
	11	DI11	digital input	Sink input, active low
	12	DI12	digital input	Sink input, active low
	13	DO1	digital output	Sink output, active low
	14	DO2	digital output	Sink output, active low
	15	DO3	digital output	Sink output, active low
	16	DO4	digital output	Sink output, active low
	17	24V	Supplemental power input	——
	18	PGND	Supplementary power ground	——

■ Internal Equivalent Circuit Diagram and External Wiring



5.5.4.Local optional axis control high-speed counter board terminal signal arrangement and definition

Schematic diagram of terminal arrangement	NO.		name	use
	A_	B_		
	1	1	ECA1+	Encoder A
	2	2	ECA1-	Encoder A
	3	3	ECB1+	Encoder B
	4	4	ECB1-	Encoder B
	5	5	ECZ1+	Encoder Z
	6	6	ECZ1-	Encoder Z
	7	7	OPC	reservedHigh-speed DI+
	8	8	PULS	Reserve high-speed DI-
	9	9	SRV_COIN	Servo positioning completedDI
	10	10	ALARM	Servo alarm DI
	11	11	+5V_ENC	Encoder power
	12	12	EGND	Encoder reference ground
	13	13	DR+	command direction

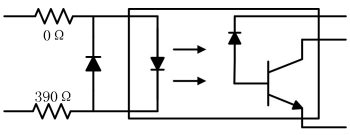
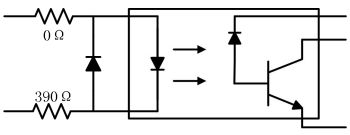
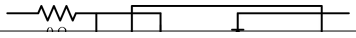
	14	14	DR-	command direction
	15	15	PU+	command pulse
	16	16	PU-	command pulse
	17	17	24V	Power Output
	18	18	GND_24V	reference place
	19	19	SRV_ON	Enable Servo DO
	20	20	CLEAR	Clear Servo Alarm DO

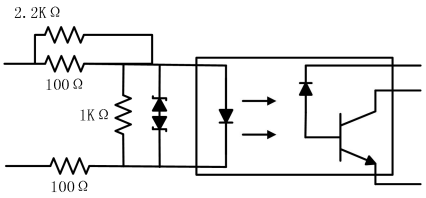
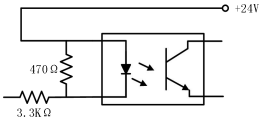
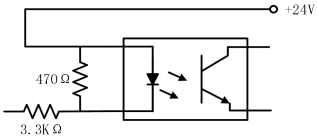
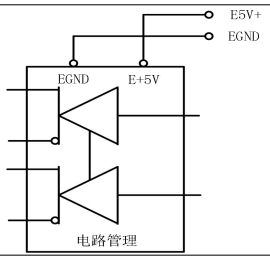
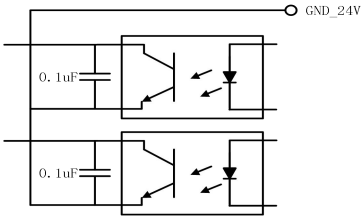
The axis-controlled high-speed counter module uses DB20 plugs, and the pins of the plugs should be customized according to the "local optional axis-controlled high-speed counter board terminal signal arrangement and definition".

Description of DB20 Connector

project	model
DB20 male 	SM-SCSI-20P

■ Internal Equivalent Circuit Diagram

No.A_	No.B_	Signal name	internal circuit
1	1	ECA1+ Encoder A	
2	2	ECA1- Encoder A	
3	3	ECB1+ Encoder B	
4	4	ECB1- Encoder B	
5	5	ECZ1+	

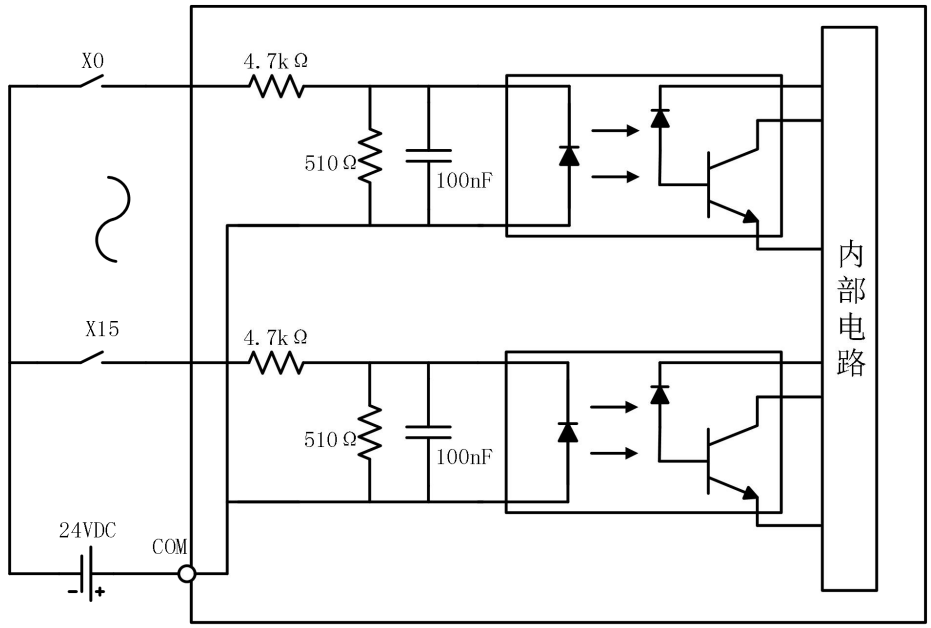
		Encoder Z	
6	6	ECZ1- Encoder Z	
7	7	OPC1 High-speed DI+	
8	8	PULS1 High-speed DI-	
9	9	SRV1_COIN low speed DI-	
10	10	ALARM_1 low speed DI-	
11	11	E5V+ encoder power supply	
12	12	EGND encoder reference ground	
13	13	DR1+ command direction	
14	14	DR1 - command direction	
15	15	PU1+command pulse	
16	16	PU1-command pulse	
17	17	+24VPower Output	
18	18	GND_24Vreference place	
19	19	SRV1_ON low speed DO	
20	20	CLEAR_1 low speed DO	

5.5.5.Local expansion digital input board terminal signal arrangement and definition

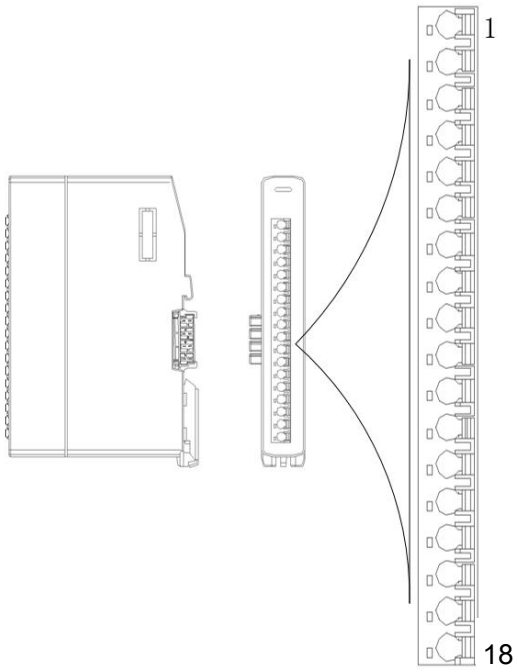
Schematic diagram of terminal arrangement	No.	name	Features	Remark
	1	DI1	digital input	Sink input, active low

	2	DI2	digital input	Sink input, active low
	3	DI3	digital input	Sink input, active low
	4	DI4	digital input	Sink input, active low
	5	DI5	digital input	Sink input, active low
	6	DI6	digital input	Sink input, active low
	7	DI7	digital input	Sink input, active low
	8	DI8	digital input	Sink input, active low
	9	DI9	digital input	Sink input, active low
	10	DI10	digital input	Sink input, active low
	11	DI11	digital input	Sink input, active low
	12	DI12	digital input	Sink input, active low
	13	DI13	digital input	Sink input, active low
	14	DI14	digital input	Sink input, active low
	15	DI15	digital input	Sink input, active low
	16	DI16	digital input	Sink input, active low
	17	COM+	public	——
	18	NC	empty pin	——

■ Internal Equivalent Circuit Diagram and External Wiring

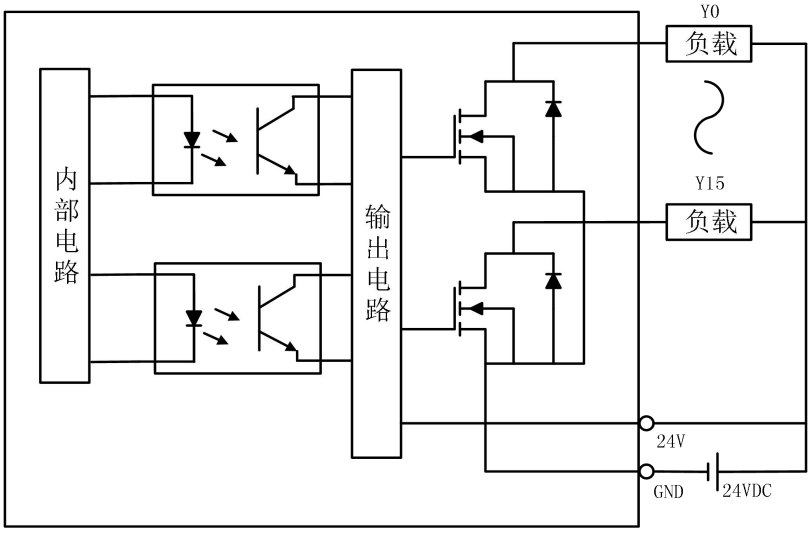

X0
4. 7k Ω
510 Ω
100nF
X15
4. 7k Ω
510 Ω
100nF
24VDC
COM
内部电路

5.5.6.Local extension digital output terminal signal arrangement and definition

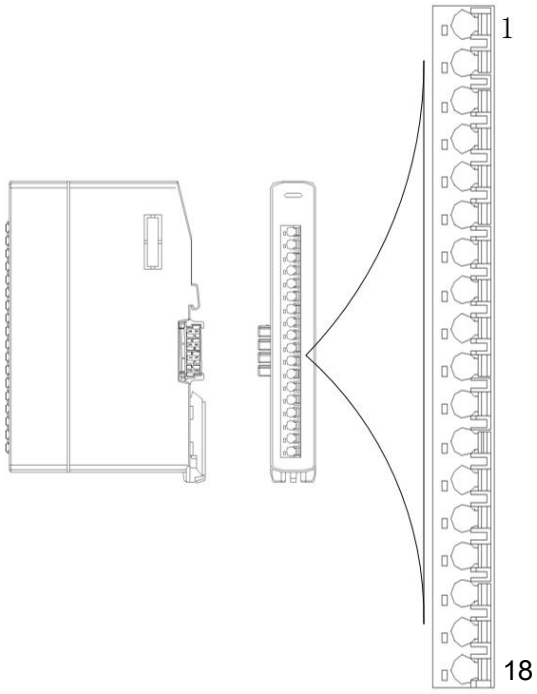
Schematic diagram of terminal arrangement	No.	name	Features	Remark
	1	DO1	digital output	Sink output, active low
	2	DO2	digital output	Sink output, active low
	3	DO3	digital output	Sink output, active low
	4	DO4	digital output	Sink output, active low
	5	DO5	digital output	Sink output, active low
	6	DO6	digital output	Sink output, active low
	7	DO7	digital output	Sink output, active low
	8	DO8	digital output	Sink output, active low
	9	DO9	digital output	Sink output, active low
	10	DO10	digital	Sink output, active low

			output	
	11	DO11	digital output	Sink output, active low
	12	DO12	digital output	Sink output, active low
	13	DO13	digital output	Sink output, active low
	14	DO14	digital output	Sink output, active low
	15	DO15	digital output	Sink output, active low
	16	DO16	digital output	Sink output, active low
	17	24V	IO supplementary power supply	
	18	PGND	IO reference ground	

■ **Internal Equivalent Circuit Diagram and External Wiring**

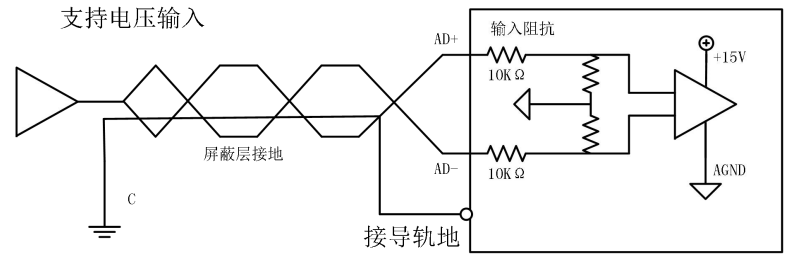

Y0
负载
Y15
负载
内部电路
输出电路
24V
GND
24VDC

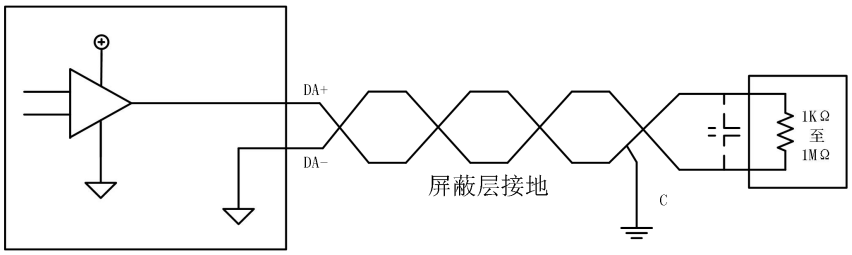
5.5.7.Local expansion analog input and output board terminal signal arrangement and definition

Schematic diagram of terminal arrangement	No.	name	Features
	1	AI1+	Positive analog input
	2	AI1-	Analog input negative
	3	AI2+	Positive analog input
	4	AI2-	Analog input negative
	5	AI3+	Positive analog input
	6	AI3-	Analog input negative
	7	AI4+	Positive analog input
	8	AI4-	Analog input negative
	9	AGND	Analogously
	10	AO1+	Positive analog output
	11	AO1-	Analog output negative
	12	AO2+	Positive analog output
	13	AO2-	Analog output negative
	14	AGND	Analogously

	15	NC	empty pin
	16	NC	empty pin
	17	24V	IO supplementary power supply
	18	PGND	IO reference ground
Note: This analog module is powered by 24VDC through Pin17 and Pin18, providing part of the power supply! ! !			

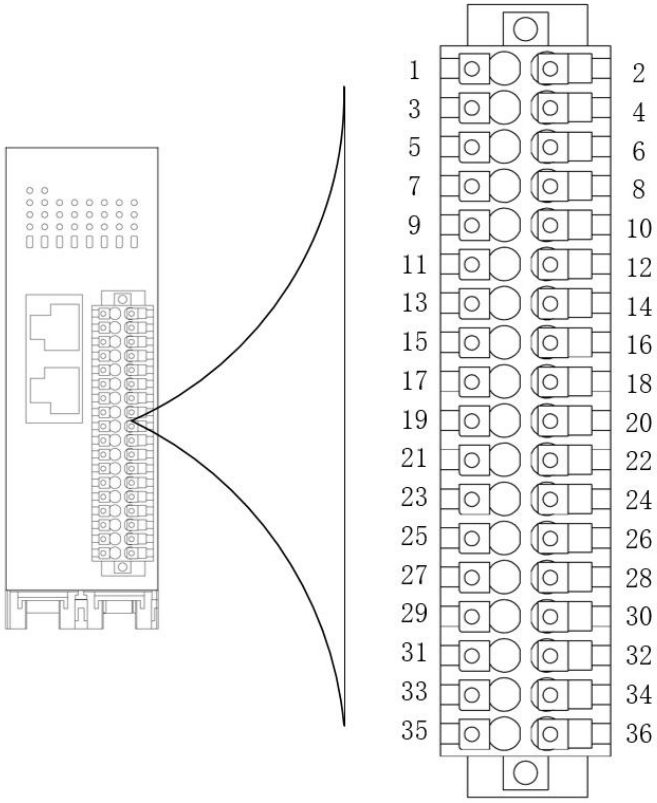
■ AI/AO internal equivalent circuit diagram and external wiring (only support voltage input)





5.5.8.Remote expansion digital input and output board terminal signal arrangement and definition

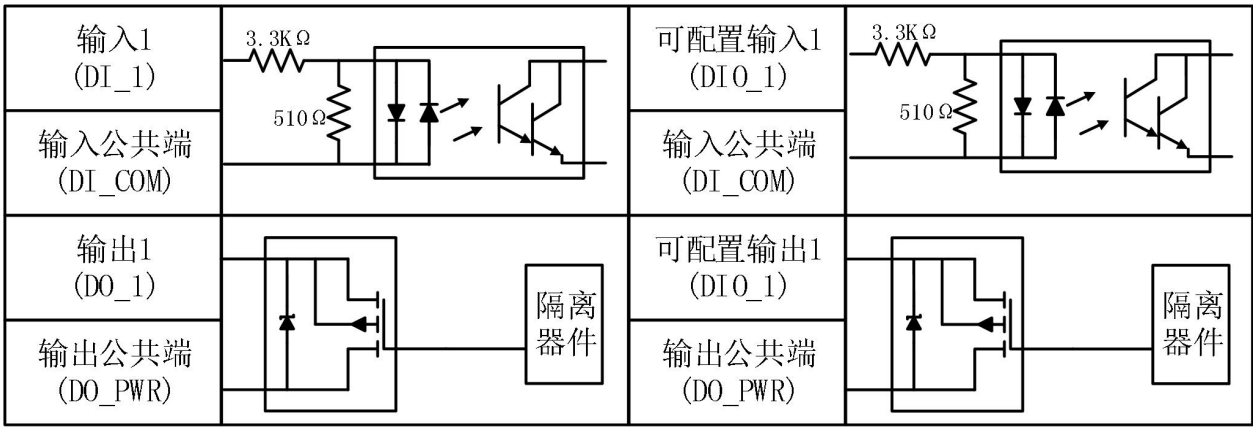
Schematic diagram of terminal arrangement



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	DO_1	5	6	DI_1	16 DI inputs; optocoupler input; Configurable NPN/PNP
	DO_2	7	8	DI_2	
	DO_3	9	10	DI_3	
	DO_4	11	12	DI_4	
	DO_5	13	14	DI_5	

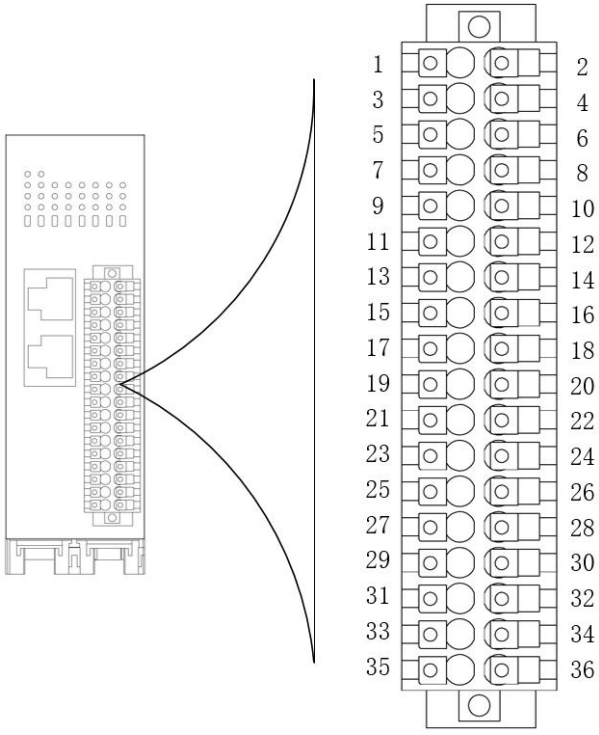
	DO_6	15	16	DI_6	
	DO_7	17	18	DI_7	
	DO_8	19	20	DI_8	
8 DI/DO Configurable input/output; optocoupler input; MOS tube output; 500mA; Configurable NPN/PNP; DI/DO	DIO_1	twenty one	twenty two	DI_9	
	DIO_2	twenty three	twenty four	DI_10	
	DIO_3	25	26	DI_11	
	DIO_4	27	28	DI_12	
	DIO_5	29	30	DI_13	
	DIO_6	31	32	DI_14	
	DIO_7	33	34	DI_15	
	DIO_8	35	36	DI_16	
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.					

■ Internal Equivalent Circuit Diagram



5.5.9.Terminal signal arrangement and definition of remote expansion mixed analog-digital input and output board

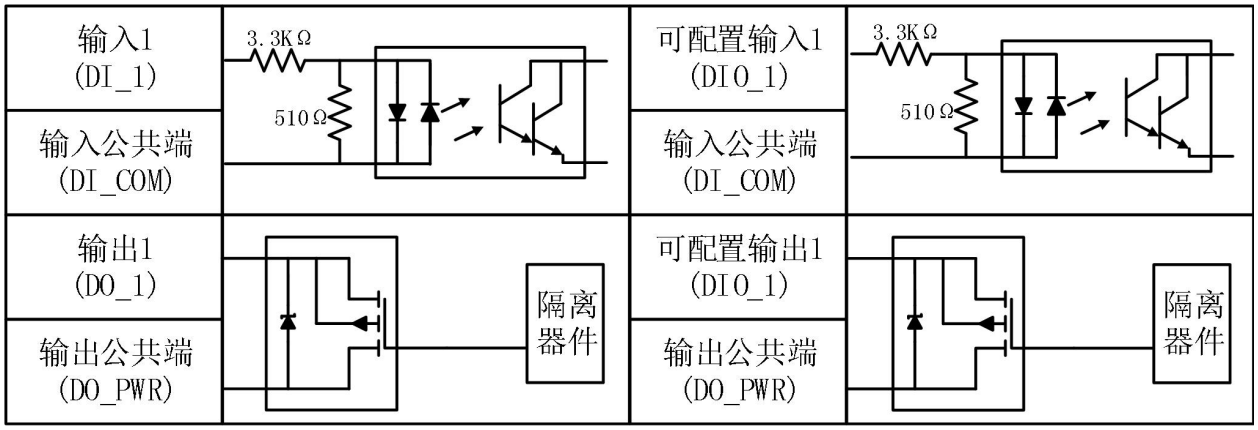
Schematic diagram of terminal arrangement



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;	DO_1	5	6	DI_1	8-way DI input;
MOS tube output;	DO_2	7	8	DI_2	optocoupler input;
500mA	DO_3	9	10	DI_3	Configurable NPN/PNP
	DO_4	11	12	DI_4	
	DO_5	13	14	DI_5	
	DO_6	15	16	DI_6	

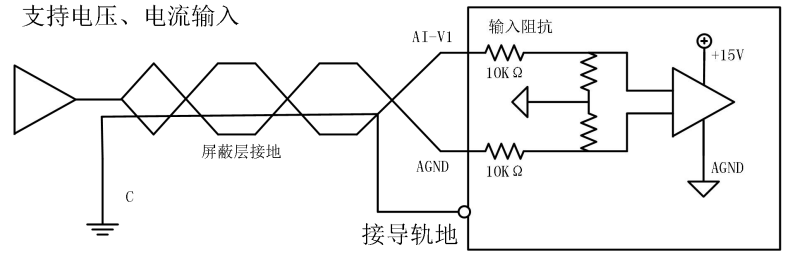
	DO_7	17	18	DI_7	
	DO_8	19	20	DI_8	
AI/AO public terminal	AGND	twenty one	twenty two	AI_1	4-way 12-bit AI; Current 0-20mA; Voltage 0-10V;
	AGND	twenty three	twenty four	AI_2	
	AGND	25	26	AI_3	
	AGND	27	28	AI_4	
	AGND	29	30	AO_1	4-way 12-bit AO; Current 0-20mA; 4-20mA; Voltage 0-10V; ±10V;
	AGND	31	32	AO_2	
	AGND	33	34	AO_3	
	AGND	35	36	AO_4	

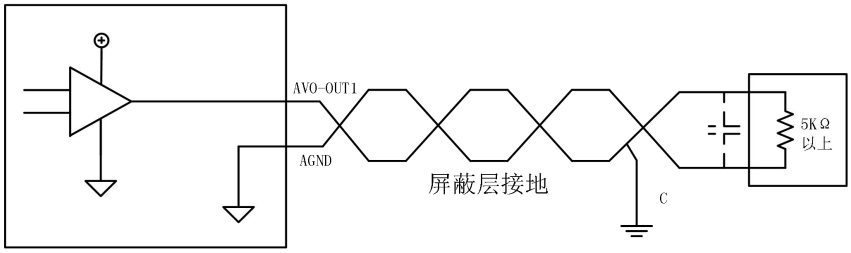
■ DI/DO internal equivalent circuit diagram



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

支持电压、电流输入


AI-V1
输入阻抗
10K Ω
+15V
屏蔽层接地
AGND
10K Ω
AGND
C
接导轨地


AVO-OUT1
AGND
屏蔽层接地
C
5K Ω
以上

5.6.safety measures

5.6.1.safety measures

■ System Design Considerations

- In a system using SC30, malfunction may occur due to the following reasons.

• Deviation of start and stop times of SC30 power supply, input and output equipment, and power equipment.

• Variation in response time caused by momentary power failure.

• Abnormality of SC30 main unit, external power supply, and other devices.

Please take safety measures in order to prevent an abnormality or accident of the entire system caused by such a malfunction.

■ Interlock Circuit Settings

- When controlling the reverse motion of the motor such as forward rotation and reverse rotation, please set up an interlock circuit outside the SC30.

■ Emergency stop circuit settings

- Install the circuit outside the SC30 to cut off the power supply of the output device in an emergency.

■ Power sequence

- After the input and output equipment and power equipment are started, start SC30.

- When stopping SC30, if you do not know the relationship between the program and the equipment, please stop the operation of SC30 first, and then stop the input and output equipment and power equipment.

- Due to the power-off hold circuit, power on again after 30s after power off can ensure the system

hardware reset.

■ ground

- When installing SC30 near equipment where high voltage is generated due to the switching action of the inverter, avoid common grounding, and use a dedicated grounding with a grounding resistance of 100 Ω or less (Class D grounding/Class 3 grounding).

5.6.2.Instantaneous power failure

■ Operation during momentary power failure

- If the momentary power failure time is less than 10ms, SC30 will continue to operate. If it exceeds 10ms, the operation will change depending on conditions such as the combination of units and the power supply voltage. The same action as a power reset may occur.

第六章 Confirm the wiring

6.1.Recommendations for safety circuits

This equipment requires the construction of the necessary safety circuits

E.g:

1. Motor forward and reverse interlock circuit is required when driven by servo

2. And the over-limit switch circuit of the motor

3. Emergency cut off the power circuit of the output device

6.2.Items to check when wiring

(1) Confirm the connection of each device

Please confirm that each device is connected as designed.

(2) Confirmation of external safety circuit settings

Please confirm that the wiring and installation of the safety circuit overrun switch based on the external circuit is properly installed.

(3) Confirm the power-on sequence setting

Please confirm that the procedure for turning on the power is set to "Power ON operation".

(4) Confirm that the LED status of the SC30 controller is normal

Please observe the LED status of the SC30 controller after power-on and refer to the LED status display instructions. Judge whether the operation is normal, if there is any abnormality, please refer to the fault diagnosis for wiring fault troubleshooting.

6.3.Power ON/OFF operation

6.3.1.Power ON operation

Turn on power to other load devices.

Power on the SC30 controller.

6.3.2.OFF operation

Make sure that the load device has stopped working, and then turn off the power of the SC30 controller.

Turn off the power to the load device.

第七章 Check items before operation

7.1.Confirm that the power is ON and the network is established

■ **Follow the steps below to turn on the power.**

Turn on the power to the I/O devices connected to the SC30 controller.

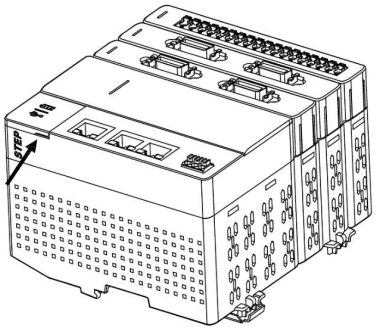
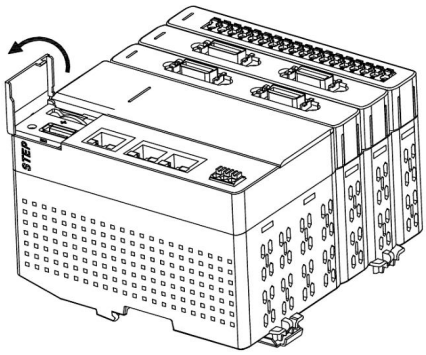
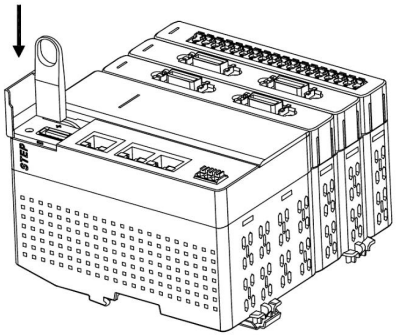
Turn on the power of the servo drive.

Power on the SC30 controller.

After turning on the power, please confirm that the operating status display LED of the SC30 controller is in the normal running state.

第八章 About U disk operation

8.1.U disk insertion method

1. Press the side of the battery cover with your hand.	2. Flip the battery cover upwards.	3. Insert the U disk into the corresponding interface.
		

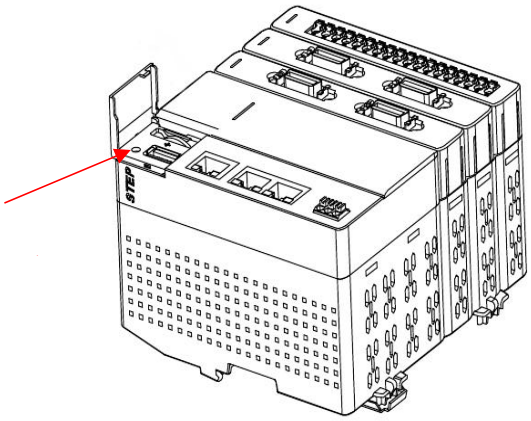
8.2.U copy file operation

Please refer to the software manual.

第九章 About system reset

9.1.Reset the device through the reset button of the SC30 host

■ The position of the reset button on SC30



■ Reset button function

project	Reset button long press operation time	result
at startup	Press and hold until the display lights up and release	delete codesys project
	Press and hold until the display is on, then continue for more than 3s	Enter the U disk to update the system firmware
running	2s	stop the current program

第十章 troubleshooting

10.1. system status

LED lights	main module status	deal with
Always bright blue	normal	
Always bright red	Program exception	Please check the system log
red blue green	undefined	

LED lights	slave module	deal with
Always bright blue	works fine	
Always bright red	working abnormally	Please check the status of the software
flashing blue	in communication	

The OLED screen can provide two lines of display information. Users can display customized information through the library.

OLED screen	state
boot display	STEP.Eth1.IP default address 192.168.39.220
	STEP.Eth2.IP default address 192.168.0.11
IDLE	The system is ready, the user program is not running
RUN	User program is running
STOP	user program stop

10.2. exception handling method

Conventional processing method:

1. In the left view, double-click the node in question, and under the online status, check the status. Analyze the operation according to the error prompt.

2. Open the system Log log and check the error message.

3. If you still can't solve it, please contact the after-sales service.

Phenomenon	possible processing
Can't log in to the controller	Confirm that the PC and the controller are in the same network segment, and the IP addresses are not duplicated; restart the gateway; Turn off the emulation mode of the controller; If the user has an illegal program, press and hold the reset button when the machine is turned on.
The main panel shows IDLE, no program is running	download user programs; User illegal program, download after modification
The main module LED light is always on red	View the system log and analyze the reason
Slave module LED light is solid red	Please check the software status analysis reason
During system startup, it stops at the startup screen	Firmware upgrade failed, or key files were manually deleted. Please contact after sales.

- Contact after-sales, please provide the basic software version number and hardware model, which can be viewed in the log

第十一章 Maintenance and Inspection

11.1. an examination

To ensure optimum use, perform daily or periodic inspections.

■ Check item

Check item	Check the content	Judgment standard
installation status	Mounting, Looseness on DIN Rail, Unit Looseness, Shaking	should be installed properly.
Connection Status	loose connector	There should be no looseness in the connector part.
surroundings	Ambient temperature, cabinet temperature Ambient humidity, humidity inside the cabinet	-5°C~+55°C 10%RH~90%RH There should be no dust and corrosive gas.

第十二章 Specifications and Dimensions

12.1. 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

12.2. Performance Specifications

project		Specification Description
processor frequency		1GHz dual core (default) or quad core
RAM capacity		1G
FLASH capacity		8G
Power down data size		128k
Power-down protection program mode		Flash keeps
Power-off hold power-on waiting time		35s
power input		DC22V-28V maximum 1A
instruction cycle		1ns
Module composition	Maximum number of points	16000
	Maximum number of local bus modules	32
	Maximum number of remote EtherCAT nodes supported	>128
sport control	Maximum number of axes	64 axes
	Maximum number of pulse axes	4
	1ms with number of axes	32
	Number of linkage interpolation axes	32
	Ether Cat axis control minimum cycle	200us
	CNC+PLCOpen (electronic cam, axis group, etc.)	support

Support interface	RS232/RS485/CAN/USB
Industrial bus	EtherCAT/Modbus/CAN Open
Edge Computing/IoT	support
develop software	STEP Automation Studio (codsys)

■ List of current consumption

unit type		current consumption	Current increasing part
SC30 controller stand-alone	——	0.5A	——
When connecting an expansion board	Local expansion digital input board	——	0.1A
	Local expansion digital output board	——	0.1A
	Local expansion analog I/O board	——	0.1A

12.3. Specifications of SC30 Controller

12.3.1. High-speed input specification of SC30 controller

project	Specification	
	Input A, B, Z signals	
	24V DC	5V DC
Insulation method	optocoupler isolation	
Rated input voltage	24V DC	5V DC
Use voltage range	20.4V DC~28.8V DC	3.5V DC~5.5V DC
input resistance	4.7kΩ	510Ω
Minimum ON voltage /minimum ON current	10V DC /4mA	3V DC /4mA
Maximum OFF voltage /max OFF current	2V DC /2mA	1V DC / 0.5mA
public end	Independent public terminal of each point	
Fastest supported frequency	4Mbps	

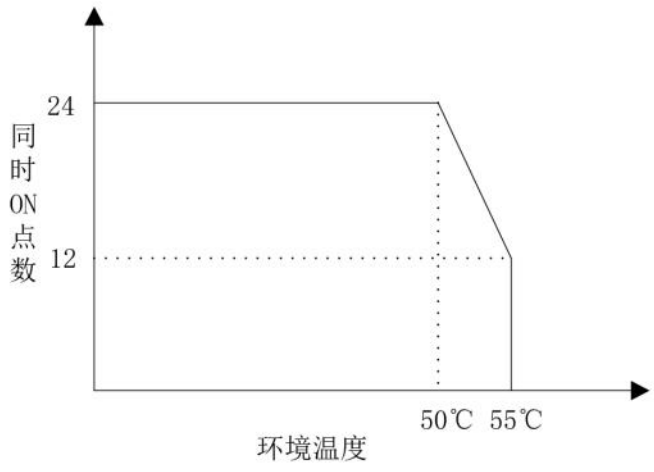
12.3.2. High-speed (pulse) output specifications of SC30 controller

project	Specification
Control loop voltage	5VDC
Rated load current	0.1A/point
Maximum voltage drop at ON	0.2V
Leakage current at OFF	0.1mA or less
Output frequency	4Mbps
public end	4 points/1 common

12.3.3. Input Specifications of SC30 Controller

project	Specification
Insulation method	optocoupler insulation
Rated input voltage	24V DC
Rated input current	Less than 6mA (24DC)
input resistance	4.7kΩ
OFF voltage /OFF current	2.4V /1mA
ON/OFF response time	>0.01ms (less than 10k)
I/O refresh method	Synchronous I/O refresh or free-running refresh optional
public end	12 points/1 common
I/O connection method	Push-in connector

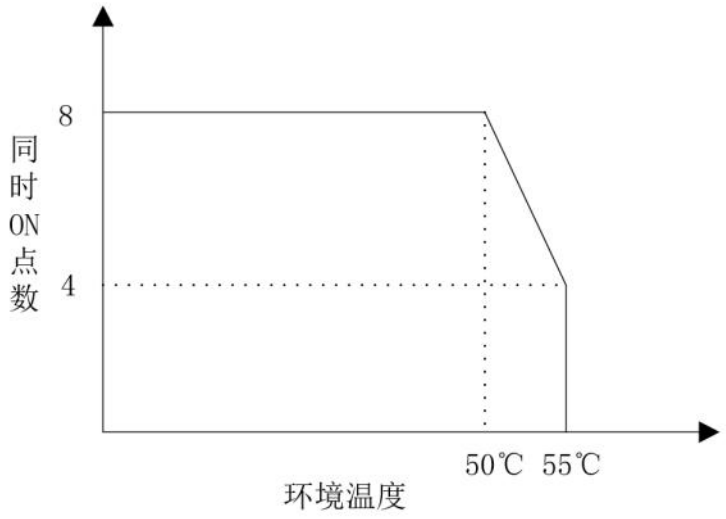
■ **Limitation of the number of simultaneous ON points of controller input (maximum number of points 24)**



12.3.4. Output Specifications of SC30 Controller

project	Specification
Insulation method	optocoupler isolation
output form	NPN output type
Working load voltage range	20.4V DC~28.8V DC
Maximum load current	0.5A
Maximum surge current	1A
I/O refresh method	Synchronous I/O refresh or free-running refresh optional
Maximum voltage drop at ON	Below 1V
ON/OFF response time	>0.01ms (less than 10k)
circuit protection	overcurrent, overvoltage, short circuit
public end	4 points/1 common
I/O connection method	Push-in connector

■ **Limitation on the number of simultaneous ON points of controller output (maximum number of points 8)**

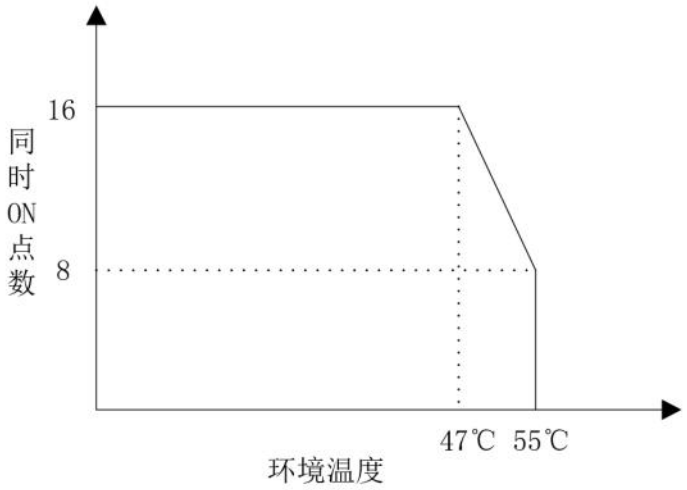

8
同时ON点数
4
50℃ 55℃
环境温度

12.4. Specifications of Local Expansion Modules

12.4.1. Specifications of Local Expansion Digital Input Board

project	Specification
Insulation method	optocoupler insulation
Rated input voltage	24V DC
Rated input current	Less than 6mA (24DC)
input resistance	4.7kΩ
OFF voltage /OFF current	2.4V /1mA
ON/OFF response time	>0.01ms (less than 10k)
I/O refresh method	Synchronous I/O refresh or free-running refresh optional
Power supply mode	bottom bus
Protective function	overcurrent, overvoltage, short circuit
public end	16 points/1 common terminal
Power supply mode	bottom bus
I/O connection method	Push-in connector

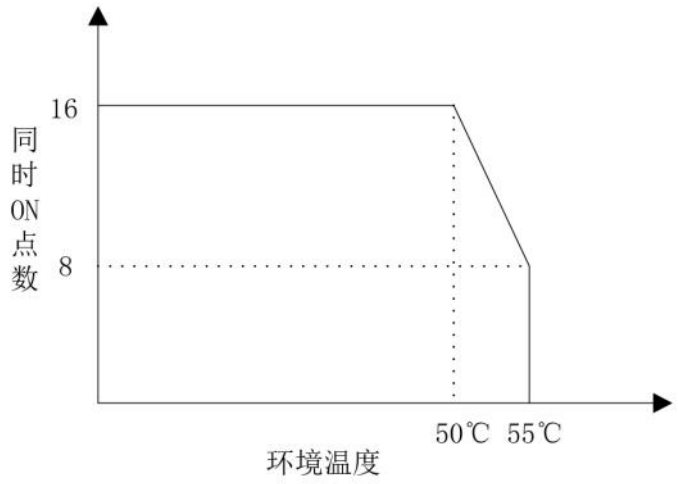
■ **Restriction on the number of simultaneous ON points of the input of the local expansion digital input board (maximum number of points 16)**


16
同时ON点数
8
47℃ 55℃
环境温度

12.4.2. Specifications of Local Expansion Digital Output Units

project	Specification
Insulation method	optocoupler isolation
output form	NPN output type
Working load voltage range	20.4V DC~28.8V DC
Maximum load current	0.5A
Maximum surge current	1A
I/O refresh method	Synchronous I/O refresh or free-running refresh optional
Maximum voltage drop at ON	Below 1V
ON/OFF response time	>0.01ms (less than 10k)
circuit protection	overcurrent, overvoltage, short circuit
public end	16 points/1 common terminal

■ **Limitation of the number of simultaneous ON points of the local extended digital output (maximum number of points 16)**

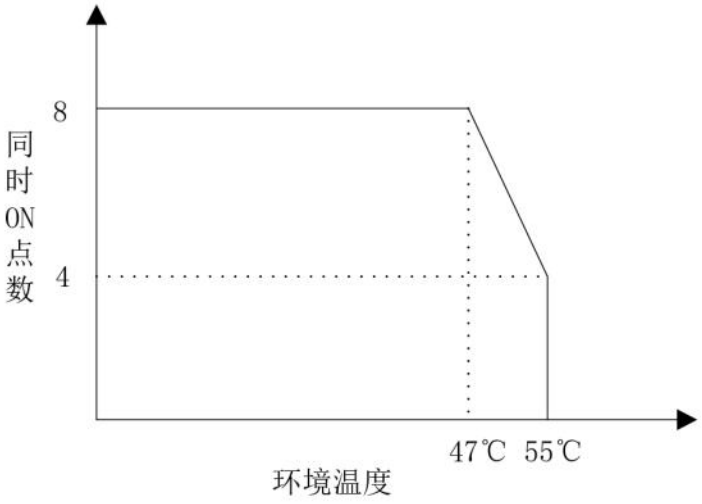


12.4.3. Specifications of Local Extended Analog Hybrid Units

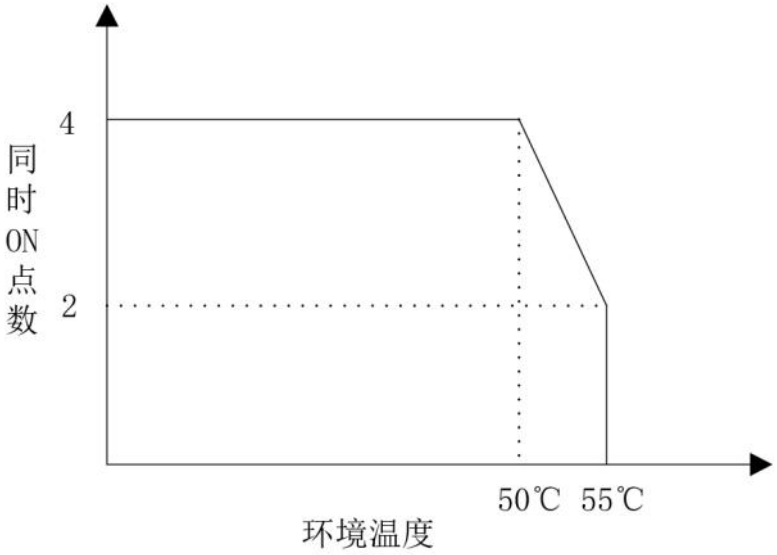
project		Specification
input specification	input channel	8
	voltage	0-10V
	Internal 5V power consumption	0.1A
	Voltage input impedance	10k
	Voltage input range	0-10V
	Resolution	12 bits
	sampling time	40us/channel
	precision	0.005V
	limit voltage	+15V
	Maximum common-mode voltage between channels	15V
	isolation method	Between I/O terminals and power supply: capacitive separation Between channels: non-isolated
output specification	output channel	4
	voltage	24V DC (20.4V~28.8V DC)
	Internal 5V power consumption	0.1A

	Voltage output load	1kΩ~1MΩ
	Voltage output range	0-10V
	precision	0.005V
	Resolution	12 bits
	Conversion time	40us/channel
	isolation method	Between I/O terminals and power supply: capacitive separation Between channels: non-isolated
	Output short circuit protection	none
Power supply mode		5V control power bottom bus, 24V terminal power supply
I/O connection method		Push-in connector

■ **Restriction on the number of simultaneous ON points of the input of the local expansion analog hybrid unit (maximum number of points 8)**



■ **Restriction on the number of simultaneous ON points of the input of the local expansion analog hybrid unit (maximum number of points 4)**


4
同时ON点数
2
50℃ 55℃
环境温度

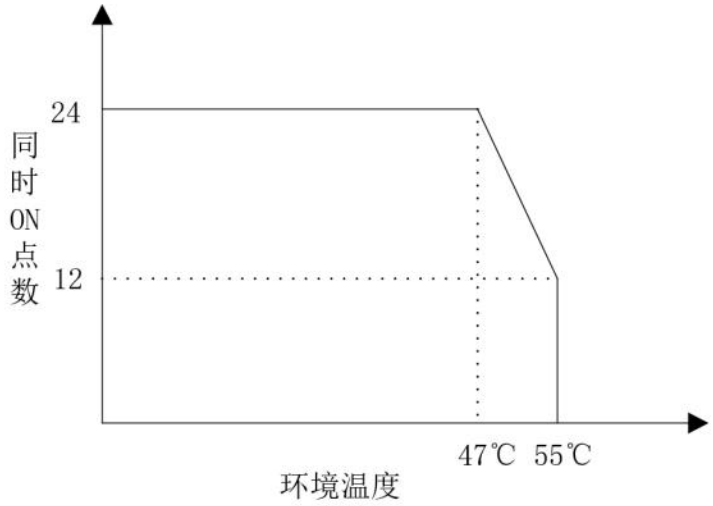
12.5. Specifications of Remote Expansion Modules

12.5.1. Remote expansion digital input and output module

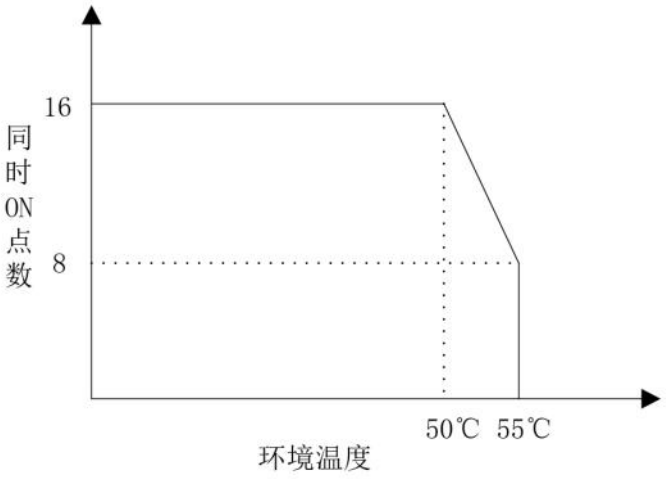
project		Specification
Two-way configurable	number of channels	8
	Insulation method	Digital Isolator Insulation
	public end	Share a common terminal with fixed DI/DO, NPN/PNP method is the same as
input specification	input channel	16
	Insulation method	Digital Isolator Insulation
	Input voltage	DC24V
	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

■ **Restriction on the number of simultaneous input ON points of the remote expansion digital I/O module (maximum number of points 24)**



■ **Restriction on the number of simultaneous output ON points of the remote expansion digital I/O module (maximum number of points 16)**



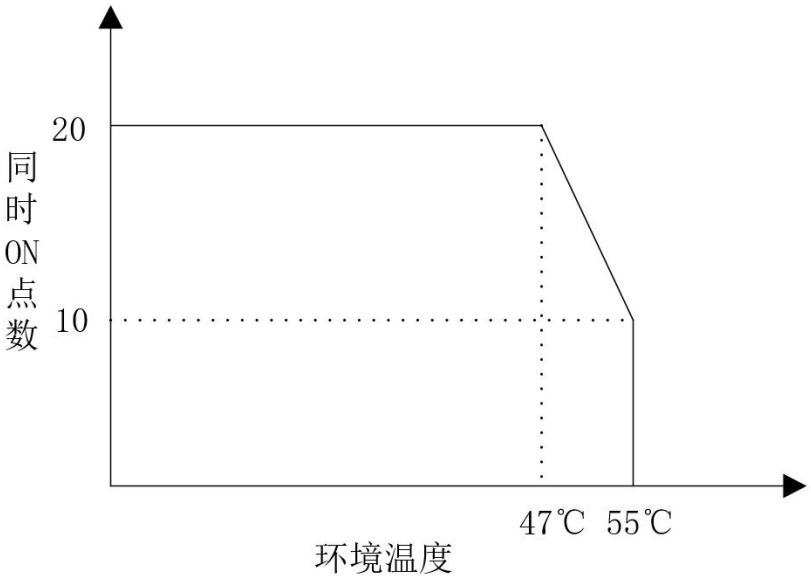
12.5.2. Remote expansion of mixed analog-digital input and output modules

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	Single channel 500mA; the whole machine

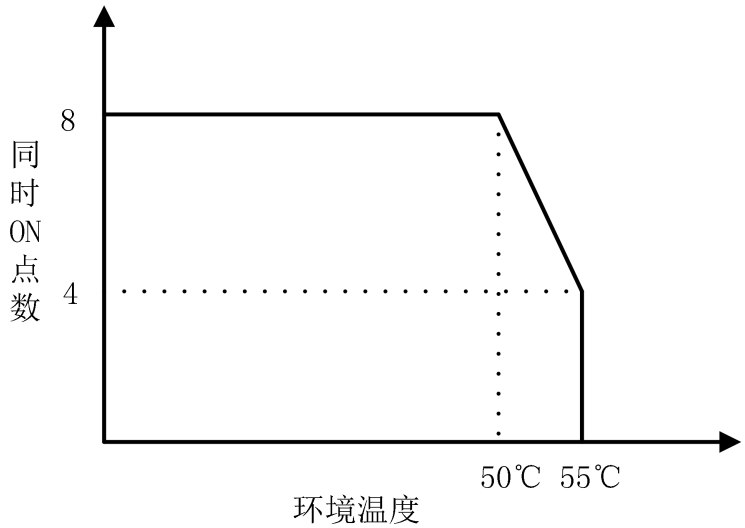
	current capacity	maximum 5A
	Power consumption	2W
Analog Input Specifications	number of channels	4
	input range	0-10V
	Absolute Maximum Ratings	15V
	input resistance	100K
	Overall accuracy	12bit
	Conversion time	5us/pass
Analog output specifications	number of channels	4
	output range	0-10V
	allowable 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

■ **Restriction on the number of simultaneous input ON points of the remote expansion mixed analog-digital I/O module (maximum number of points 20)**



■ **Restriction on the number of simultaneous ON points of the output of the remote expansion mixed analog-digital I/O module (maximum number of points 4)**



12.6. Integrated Communication Module Specifications

12.6.1. USB port specifications

project	Specification
standard	USB2.0 Fullspeed
connector shape	Type-A USB

12.6.2. COM port specifications

■ RS-232 Port Specifications

project	Specification
CH number	1
physical layer	RS-232
Transmission distance	up to 15m
Communication type	1:1 communication
way of communication	half duplex
transmission line	Multi-core shielded wire
transfer speed	9600/19200/38400/57600/115200bps
Connector method	Push-in connector

■ RS485 Port Specifications

project	Specification
CH number	2
physical layer	RS-485

Transmission distance	1000m (19.2kbps)/100m (115.2kbps)
Communication type	1:1 communication
way of communication	half duplex
transmission line	Multi-core shielded wire
transfer speed	The maximum transfer rate is 115.2kbps
Connection method	Push-in connector

■ CAN port basic specifications

project	Specification
CH number	1
physical layer	CAN
Transmission distance	up to 15m
Communication type	1:n communication
way of communication	half duplex
transmission line	Multi-core shielded twisted pair
transfer speed	10K/20K/50K/125K/250K/500K/800K/1Mbps
Connection method	Push-in connector

12.6.3. LAN Port Specifications

project	Specification		
port definition	2 way ethernet		1 way ethercat
default address	STEP.Eth1.IP Default address 192.168.39.220	STEP.Eth2.IP Default address 192.168.0.11	
Communication Interface	Ethernet		
communication speed	100Mbps/10Mbps Auto-negotiation		100Mbps
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		————	64
Topology		Linear topology	
way of communication		Full duplex/half duplex mode	
TCP/IP protocol		Compliant with TCP/IP (IPV4)	
Features		Change, maintain network settings (IP, Subnet, Gateway) Same/different network settings can be set between Ethernet ports No routing between Ethernet ports	
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	

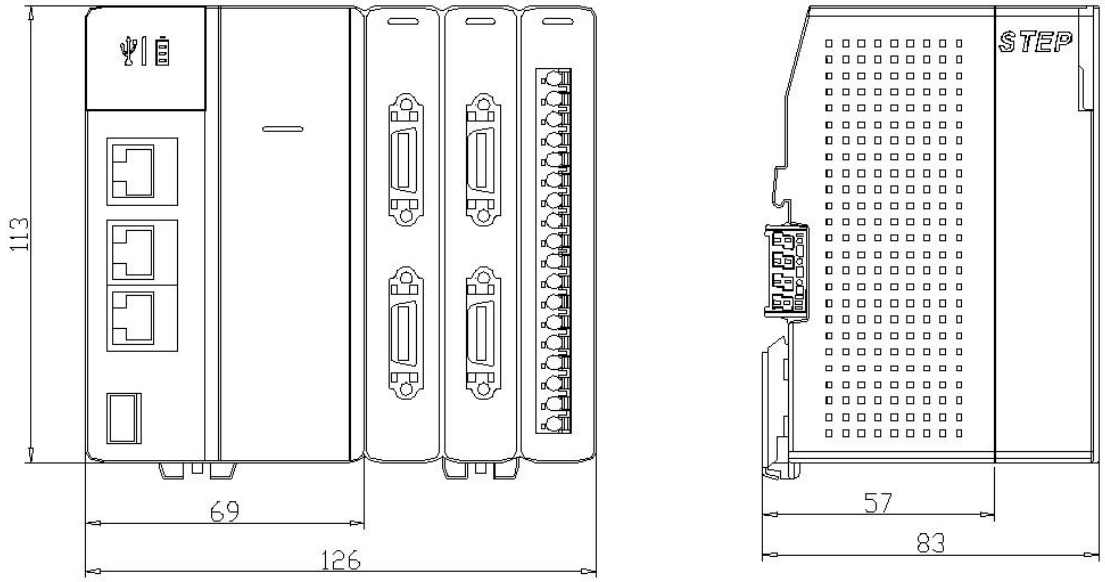
12.7. Other specifications

12.7.1. U Disk Specifications

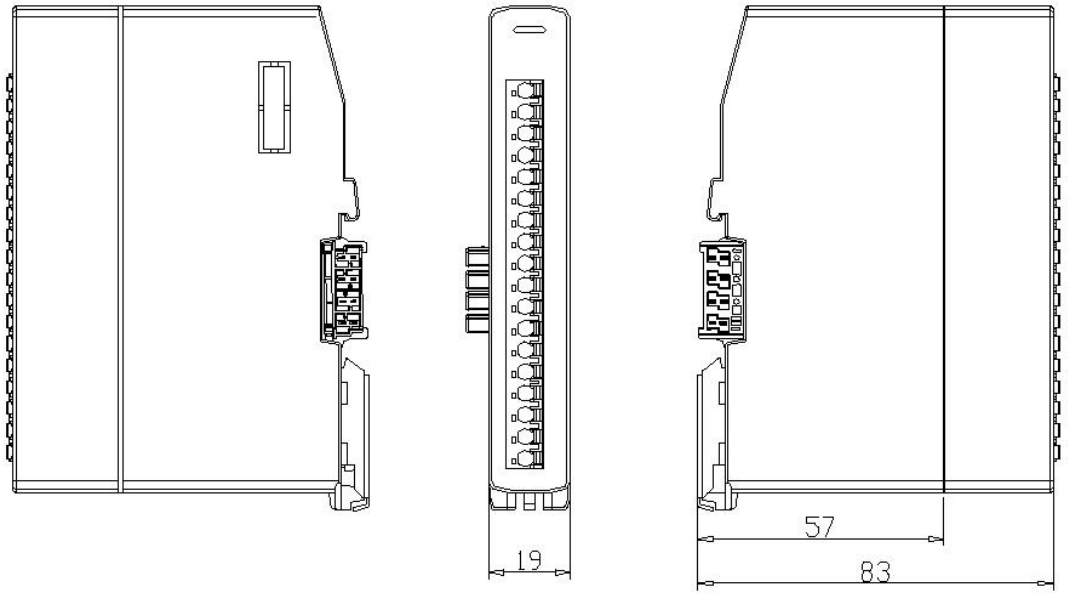
project		Specification
U disk	Maximum capacity supported	unlimited
	Supported Standards	USB2.0
	motion detection	none

12.8. Dimensions

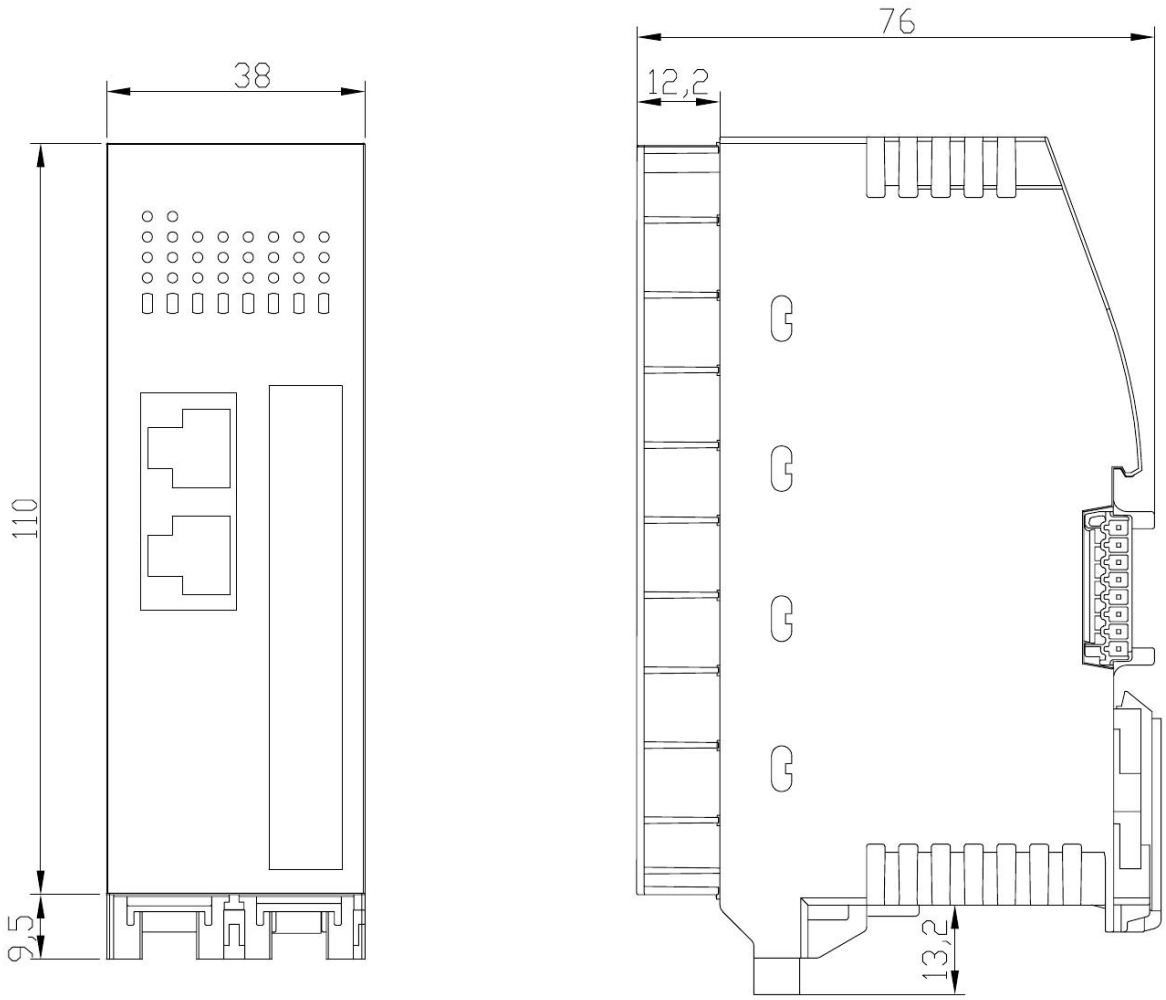
12.8.1. Dimensions of SC30 Controller



12.8.2. Dimensions of SC30 Local Expansion Module



12.8.3. Dimensions of SC30 Remote Expansion Module



第十三章 Appendix 1 Upgrade/Warranty Notes

13.1. 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 the fault 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 will 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 the improvement of product performance, etc., the contents of this manual (model, software version, etc.) may be changed without prior noticecondition.

13.2. 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.

13.3. 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 consultation: 13925286547 Manager Zhou

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

- Internet technical information