SMC300 Series Motion Controller Simple Manual



Shenzhen Sine Electric Co., Ltd. Building 7, Antoshan High-tech Industrial Park, Xinsha Road, Baoan District, Shenzhen www.sinee.cn

Release time: 2025.03 Version: 1.1 Coding: 31050141

/4\

Danger

Precautions

Before use: Thank you for purchasing the SMC300 series motion controller. Please read this manual carefully and use the product after understanding the safety precautions of the product. Equipment manufacturers should send this manual to the end user along with the equipment for subsequent reference

Safety precautions

Safety Definition: In this manual, safety precautions are divided into the following two categories:

Â	Danger: Danger caused by failure to follow the instructions may result in serious injury or even death;
\triangle	Note: Dangers caused by failure to operate as required may result in moderate or minor injuries, and equipment damage;

Safety precautions for installation, startup and maintenance

1.When wiring, all external power supplies used by the system must be disconnected before operation. If not completely disconnected, it may cause electric shock or equipment failure or malfunction; 2. Do not install if water has entered the package, parts are missing or parts are damaged when unpacking!

3. Do not install if the outer packaging logo does not match the actual name!

4. Please install on flame-retardant objects such as metal, away from combustibles, otherwise it may cause a fire The instructions of this manual must be followed and used by professional electrical engineers, otherwise unexpected dangers may occur!

5. Please confirm that the power supply is in a zero energy state before wiring, otherwise there is a risk of electric shock! Please properly ground the motion controller according to the standard, otherwise there is a risk of electric shock!

6. The grounding terminal must be reliably grounded, otherwise there is a risk of electric shock and fire! 7. When the motion controller is running, avoid anything falling into the device, otherwise it will cause damage to the device!

Safety precautions for installation, Notice startup and maintenance

When carrying, lift and place gently, otherwise there is a risk of damaging the equipment

Do not use a damaged motion controller or a motion controller with missing parts, as there is a risk of injury! Please install the motion controller in a place with less vibration and avoid direct sunlight.

. When placing the motion controller in a relatively closed cabinet or space, please pay attention to the installation gap to ensure the hea

pation effect

. Make sure that the wiring meets the EMC requirements and the safety standards of the area. Please refer to the preferred reco or the wire diameter used. Otherwise, an accident may occur!

. When wiring, do not let metal shavings and wire heads fall into the ventilation holes of the controller, which may cause fire, malfunction,

Do not remove the connecting cables inside the motion controller, otherwise it may cause internal damage to the motion controller 8. Please confirm whether the voltage level of the input power supply is consistent with the rated voltage level of the motion controller; and pay attention to check whether there is a short circuit in the peripheral circuit connected to the motion controller, and whether the connected

ines are tight, otherwise it will cause damage to the motion controller! 9. When installing the module, it should be tightly connected to its respective connector and the module connection hook should be firmly ocked. If the module is not installed properly, it may cause malfunction, failure and fall off.

0. Do not bundle the control line and communication cable with the power supply line, etc., or make them too close to each other. They hould be more than 100mm apart from each other, otherwise noise may cause malfunction:

1. For applications with severe interference, please use shielded cables for input or output cables of high-frequency signals to improve the tem's anti-interference ability; 12. For operations such as RUN, STOP, and online modification, you must read the user manual carefully and fully confirm its safety before

orming related operations; 13. Avoid severe vibration or tilting of the equipment during cleaning

Precautions for use

Lightning surge protection: This series of motion controllers are equipped with lightning overcurrent protection devices, which have a certain self-protection ability against induced lightning. For areas where lightning frequently occurs, customers should also install protection on the front end of the controller

Note when scrapping: The electrolytic capacitors on the printed circuit board may explode when burned, and plastic parts will produce toxic gases when burned. Please treat them as industrial waste.

1.Product Information

1.1 Model and nameplate



Serial number	Model	description
1	SMC300-032E	EtherCAT master controller capable of controlling 32 axes
2	SMC300-016E	EtherCAT master controller capable of controlling 16 axes
3	SMC300-012E	EtherCAT master controller capable of controlling 12 axes
4	SMC300-008E	EtherCAT master controller capable of controlling 8 axes
5	SMC300-006E	EtherCAT master controller capable of controlling 6 axes

1.2 External Interface



1.3 Power specifications

-	
Item	Specifications
Input power specifications	$24V \pm 10\%$, $3A$
Undervoltage level	18V
Power-off saving time	1.7s

1.4 Environmental specification

The second s				
Item	Specifications			
Operating temperature	$-10 \sim +55^{\circ}C$			
Storage temperature	-25 ~ 80°C			
Relative humidity	5% ~ 95% (No condensation)			
Altitude	2000m			
Pollution degree	Level 2			
Protection level	IP20			
Cooling method	Natural cooling			
Installation	Rail mounting 35mm			

Serial	type	Interface ID	definition	illustrate
1	Silkscreen	/	Company logo screen printing	/
		PWR	Power Status	
		RUN	Running, Stopping Status	
	Indicator	ERR	Network Error	E bus, C bus error indication
2	Lights	SYS	System Status	Red light always on: system error; Green light flashing: wink; Green light always on: system normal
3	LED Indication	/	16-point input, 12-point output	
4	Dip switch	RUN, STOP	Control system running and stopping	
5	I/O Terminals	/	16-point input, 12-point output	For detailed definition, please refer to 1.6 Terminal Arrangement
6	Right Extension	/	Right expansion module interface	For detailed instructions, please refer to the 《SR30 Right Expansion Module User Manual》
		485+	485Communications+	
7	RS485	485-	485Communications-	
/	interface	GND	485Communication grounding	
8	Power	+24V 0V	DC 24V input	
	interface	PG	PG	
9	Ethernet port 2	EtherCAT	EtherCAT bus communication	
10	0 Ethernet port1 EtherNET		Ethernet communication	Fixed IP: 192.168.1.8
11	USB	Type-C	For firmware upgrade	
12	2 Left extension accessory LBD-A LBD-B Left expansion card		For detailed instructions, please refer to the SL30 Left Expansion Module User Manual.	

1.5 Performance Specifications

Item	Specifications		
Program data capacity	10MB		
Power-off storage capacity	512KB		
	1. Modbus TCP protocol		
Ethernet	2. 10/100M transmission rate		
	3. User program download and debugging (only supports IPv4)		
EtherCAT	Synchronous cycle 4ms/32 axes		
DS485 carial communication	1. Serial port number: COM1		
K3485 serial communication	2. Baud rate: 4800-115200		
Extension method	Left and right local extensions		
Due	IEC 61131-3 programming languages(LD, FBD, IL, ST, SFC,		
Programmatically	CFC)		
USB Type-C interface, firmware upgrade			

1.6 Terminal arrangement

Wiring	Descrip	Name	N	lo.	Name	Descrip	Wiring
	Differential input +	D0+	35	36	D1+	Differential input +	
	Differential input -	D0-	33	34	D1-	Differential input -	\leq
24VDC +	Input common	SS	31	32	SS	Input common	- + 24VDC
	High-speed input	X6	29	30	X16	High-speed input	
∥	Low-speed input	X5	27	28	X15	Low-speed input	
	Low-speed input	X4	25	26	X14	Low-speed input	
	Low-speed input	Х3	23	24	X13	Low-speed input	
	Low-speed input	X2	21	22	X12	Low-speed input	
	Low-speed input	X1	19	20	X11	Low-speed input	
	Low-speed input	X0	17	18	X10	Low-speed input	
	Output common 0	CM0	15	16	CM1	Output common 1	
Load	Low speed output	Y3	13	14	Y13	Low speed output	Load
Load	Low speed output	Y2	11	12	Y12	Low speed output	Load
Load	Low speed output	Y1	9	10	Y11	Low speed output	Load W
Load	Low speed output	YO	7	8	Y10	Low speed output	Load
	Output common 2	CM2	5	6	CM2	Output common 2	
Load	High speed output	Y21	3	4	Y23	High speed output	Load
Load	High speed output	Y20	1	2	Y22	High speed output	Load

2. Electrical Design Description

2.1 Ethernet/EtherCAT network interface

SMC300 has two 10M/100M Ethernet interfaces, Ethernet and EtherCAT. Both use standard Ethernet RJ45 interfaces. The wiring definitions are as follows:

Eth	ernet	EtherCAT			
Signal	Pin Name	Signal name	Pin Name	Function	Terminal pinout
TD+	1	TD+	1	Send Data+	
TD-	2	TD-	2	Send Data-	
RD+	3	RD+	3	Receive Data+	
-	4	-	4	Notwood	
-	5	-	5	Not used	
RD-	6	RD-	6	Receive Data-	
-	7	-	7	Notwood	
-	8	-	8	Not used	
PE	Metal shieldin g layer	PE	Metal shielding layer	Protective grounding	

Both Ethernet communication and EtherCAT communication use shielded twisted-pair cables for network data transmission. Please use cables with the following specifications:

Item	Specifications	
Cable Type	Flexible crossover cable, Category 5e	
Wire Type	Twisted Pair	
Line pair	4	
isolation	Cross skeleton	
Connectors	With shielding layer crystal head	
Cable Material	PVC material, injection molding	
Cable length	No more than 100 meters	

2.2 RS485 communication interface

aisle	Pinout	definition	Function	
	1	485+	RS485 differential positive signal	
COM1	2	485-	RS485 differential pair negative signal	
	3	GND	Power Ground	

2.3 Input Specifications

The basic performance of the input port is shown in the following table:

Item	Normal input	High-speed input	Differential input	
name	X0-X5、X10-X15	X6、X16	D0、D1	
Input method	Sink/Sou	Sink/Source Type		
Electrical parameters	24V± 10%	24V± 10%	5V±10%	
Input Impedance	5.1KΩ	3.3KΩ	200Ω	
Maximum pulse frequency	1K 200K		500K	
Public Mode	16 points and o	one public port	/	

2.3.1 Normal/high-speed input wiring instructions

Normal/high-speed inputs share a common SS terminal. The internal equivalent circuits are the same except for the current limiting resistor. The following description is taken as an example: A.

When the upper device is open collector output:









2.3.2 Differential input wiring instructions

There are two differential input ports, supporting single-phase and AB-phase counting. Take D0 as an



2.4 Output specifications

Item	Normal output	High-speed output
name	Y0-Y3, Y10-Y13	Y20-Y23
Output method	NPN type output	NPN type output
Electrical parameters	DC5-24V	DC24V
Rated load	0.1A/point, 0.5A/common end	0.05A/point
Maximum frequency	1K	200K
Public Mode	One common port for	every 4 points

Take Y0 as an example to explain the wiring method of the back stage:



3. Mechanical design dimensions

3.1 Appearance size



3.2 Connection diagram



4. Installation and Fixing

4.1 Module Installation Process

•

4.1.1 Installation Environment

When installing a programmable controller on a rail, consider operability, maintainability, and environmental resistance. Do not install the module in the following locations.

- Places where the ambient temperature exceeds the range of $-10^{\circ}C \sim 55^{\circ}C$;
- Places where the ambient humidity exceeds the range of 5%~95%RH;
- Places where the temperature changes dramatically and condensation occurs;
- Places with corrosive gases and flammable gases;
- Places with dust, conductive powders such as iron powder, oil mist, salt, and organic solvents;
- Places exposed to direct sunlight;
- Places with strong electric fields and strong magnetic fields;
- Places where the machine body will be directly vibrated and subjected to conductive shock.

4.1.2 Installation space

In order to facilitate ventilation and easy module replacement, the following distances should be kept between the upper and lower parts of the module and the building and components.



4.1.3 Installation Notes Notes when installing the module:

- Before installation, make sure the product is powered off;
- Do not drop or impact the module housing, terminal block, or connector to avoid damaging the module:
- Do not disassemble the module, otherwise the machine may be damaged:
- Do not tighten the machine with excessive torque to avoid damaging the terminals.

4.2 Installation Method

4.2.1 Fix the DIN rail to the mounting surface in the control cabinet

To ensure the strength of the DIN rail, install the DIN rail mounting bolts (user-prepared products) within 30mm from the end of the DIN rail and tighten the bolts within 200mm intervals.



Using M4 screws, secure the DIN rail to the mounting surface as shown below:

4.2.2 Right extension installation method



4.2.3 Left extension installation method

To install the left extension, press the three clips at A, B, and C into place as shown below. To remove the left extension, use a screwdriver to pry the clips from the three clips at A, B, and C in turn to make the left extension pop out.



4.2.4 Install the connected module components onto the guide rail

 Pull the DIN rail mounting clip on the back of the module downward until it is in place (as shown in the following partial figure).



2) As shown in direction ①, hook the buckle on the upper side of the module onto the upper side of the DIN rail, and press the module assembly in direction ② until it is completely embedded in the rail.



3) After locking the module's DIN rail mounting clip, insert it into the DIN rail. Press the clip into place in the direction shown in the figure until the module is locked. In addition, when the DIN rail clip cannot be touched by fingers, use a tool such as a screwdriver. (Note: Do not slide the DIN rail from the end to install it, otherwise it may cause damage to the metal accessories on the back of the module)



4.2.5 How to remove the module assembly from the guide rail

To disassemble the module assembly, use a screwdriver to pull the buckle outward until it is in

place, and then remove the module. (Note: Do not slide the module from the end of the DIN rail for installation and removal, otherwise the metal accessories on the back of the module may be damaged)



5. Wiring

5.1 Tubular cable production Tubular cable production steps:

- Strip the cable insulation layer, expose the copper part of 6mm, and insert the cable into the wire sleeve;
 Insert the conductor part of the cable into the circular hole of the wire ear and crimp it using
-) Insert the conductor part of the cable into the circular hole of the wire ear and crimp it using the wire crimping pliers recommended by the wire ear manufacturer.



5.2 Tubular cable wiring

Insert the tubular terminal into the corresponding slot, use a tool to press down the spring pin of the terminal so that the tubular terminal is fully inserted, and then remove the tool.

