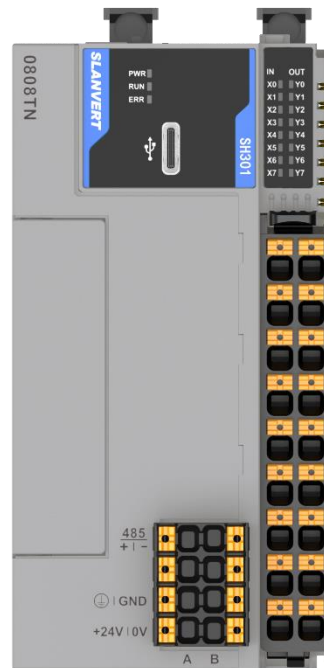# SH300 Series PLC User Manual

Hope Senlan Science And Technology Holding Corp., Ltd

Preface

Profile

This product is a new generation of bus-controlled PLC products independently developed by SLANVERT. It can realize process encapsulation and reuse through FB/FC functions, realize multi-level network communication through RS485, Ethernet, and CAN, and support expansion of 16 modules. It can also expand RS485/DI/DO/AD/DA/RTC clock and other functions through expansion cards.

This manual introduces the installation and wiring of the product, including product information, mechanical installation, electrical installation, etc.

Version Change History

Revision Date	Release version	Changes
2024/10/21	V1.0	First edition

Warranty Statement

Under normal use, if the product fails or is damaged, SLANVERT provides warranty service within the warranty period (please refer to the order form for the product warranty period). After the warranty period, a repair fee will be charged. During the warranty period, if the product is damaged due to the following circumstances, a repair fee will be charged.

● Failure to operate this product according this manual.
● Product damages caused by fire, flood and abnormal voltage.
● Product damages caused by abnormal applications.
● Product damages caused by exceeding the specified scope of use of products.
● Secondary product damages caused by force majeure (natural disasters, earthquakes and lightning strikes).

The relevant service fee shall be calculated by the unified standard of the manufacturer. If there is a contract, terms in it will be of the highest priority. Please refer to "Product Warranty Card" for details.

Safety precautions

Security Statement

● This chapter explains the safety precautions that need to be paid attention to for the correct use of this product. Before using this product, please read the instruction manual and correctly understand the relevant information of the safety precautions. Failure to comply with the matters stipulated in the safety precautions may result in death, serious injury, or equipment damage.

● The "Danger", "Warning" and "Note" items in the manual do not represent all the safety items

that should be followed, but only serve as a supplement to all safety precautions.

● This product should be used in an environment that meets the design specifications. Otherwise, it may cause malfunctions. Functional abnormalities or component damage caused by failure to comply with relevant regulations are not within the scope of product quality assurance.

● SLANVERT will not assume any legal responsibility for personal safety accidents, property losses, etc. caused by failure to comply with the contents of this manual or illegal operation of the product.

Security Level Definition

⚠

Indicates that failure to follow the instructions could result in death or serious bodily injury.

⚠

Indicates that failure to follow the instructions could result in death or serious injury.

⚠

Indicates that failure to follow the instructions may result in minor personal injury or equipment damage.

Safety precautions

● In the illustrations of the product in this manual, in order to show the details of the product, the product is sometimes shown without the outer cover or safety cover. When using this product, please be sure to install the outer cover or cover as required and operate it according to the regulations in the instruction manual.

● The product illustrations in this manual are for example only and may differ slightly from the products you ordered. Please refer to the actual products you ordered.

Unpack & Acceptance
⚠ Warning
● When unpacking, please do not install them if any damages, rust or clues of use on the products and accessories.
● When unpacking, please do not install them if any clues of water ingress are found inside the product, or there are missing or damaged parts.
● Please check the packing list carefully. please do not install them if they don't match the packing list.
⚠ Note
● Before unpacking, please check whether the outer packaging of the equipment is in good condition, whether it is damaged, soaked, damp or deformed.
● Please open the package from outside to inside. Do not pound on it!
● When unpacking, please check the surface of equipment and accessories for damage, corrosion, bruise, etc.
After unpacking, please carefully check quantity and names of the products against the list and check if any files or manuals are missing.
Storage & Transportation

 Note

- When handling products, please lift them lightly, and pay attention to the objects under your feet at any time to prevent tripping or falling, otherwise it may cause personal injuries or product damages.
- When handling products with bare hands, please hold on to the product housing to avoid falling, otherwise it may cause personal injuries.
- Please strictly follow the required storage and transportation requirements for storage and transportation, otherwise it may cause product damages.
- Avoid storage and transportation under water splashing and rain, direct sunlight, strong electric field, strong magnetic field and strong vibration.
- Avoid storing products for more than 3 months. And please carry out stricter protection and necessary inspections if it is longer than 3 months.
- Please pack the products carefully before transporting them by vehicles. Sealed boxes must be used for long-distance transportation.

Do not transport this product together with equipment or articles that may affect or damage this product.

Installation

 Danger

Only professionals with relevant training in electrical equipment and electrical knowledge can carry out operation on this product. Please keep non-professional personnels away from this product.

 Warning

- Please read the product manual and safety precautions carefully before installation!
- Please do not install this product in places with strong electric field or strong electromagnetic wave interference.
- Before carrying out installation, ensure that the installation position is sufficient to support the weight of the equipment.
- Do not wear loose clothes or accessories when installing, otherwise you may get an electric shock.
- When installing the product in a closed environment (such as cabinet or case), please use a cooling device (such as fan or air conditioner), otherwise it may cause product overheat or fire.
- Do not refit this product.
- When this product is installed in the cabinet or terminal equipment, the cabinet or terminal equipment needs to provide corresponding protective devices such as fire-proof casing, electricity-proof casing and mechanical protective devices, and the protection level should meet the relevant IEC standards and local laws and regulations.
- When it is necessary to install strong electromagnetic interference equipment such as transformers, please install shielding devices to avoid misoperation of this product.

Please install the product on flame retardant objects such as metal. Keep flammable materials away from the product, otherwise it may cause fire.

> ⚠ Note

- During installation, please cover the top of the product with cloth or paper to prevent metal chips, oil, water and other foreign bodies from entering the product during drilling, otherwise it may cause product failure. After the operation, please remove the covering to avoid blocking the ventilation hole and impair the heat dissipation, otherwise it may cause abnormal heating of the product.

Resonance may occur when regulate the speed of the motor which is running at a constant speed. Please install anti-vibration rubber under the motor base or use vibration suppression function to reduce vibration effectively.

Wiring

> ⚠ Danger

- It is forbidden to carry out equipment installation, wiring, maintenance, inspection or component replacement by non-professional personals.
- Please cut off the power supply of all equipment before wiring. There is residual voltage in the internal capacitor of the equipment after the power supply is cut off. Please wait at least for the time specified on the warning label on the product before wiring and other operations. Measure the DC voltage of the main circuit and make sure it is below the safe voltage, otherwise there is risk of electric shock.
- Please cut off the power to carry out wiring, remove the product cover or touch the circuit board, otherwise it may cause electric shock.

Please confirm that the equipment and products are well grounded, otherwise it may cause electric shock. Separate grounding or single-point grounding should be adopted, and public grounding is not acceptable.

> ⚠ Warning

- It is forbidden to connect the input power supply to the output end of equipment or products, otherwise it may cause equipment damages or even fire.
- When the driving equipment is connected with the motor, please confirm that the phase sequence of the product and the motor terminal is accurate and consistent, otherwise the motor will run in reverse.
- The cables used in wiring must meet the requirements in diameter and shielding, and the shielding layer of cables needs be grounded at one end.

Confirm that all cables are wired correctly and no screws, gaskets or bare cables are left inside the product after wiring, otherwise it may cause electric shock or product damages.

> ⚠ Note

- Please follow the procedures specified in the Electrostatic Preventive Measures (ESD), and wear electrostatic bracelets for wiring and other operations to avoid damaging the internal circuits.

When wiring the control loop, please use twisted pair shielding cables and connect the shielding layer to the grounding terminal of the product, otherwise it will cause abnormal operation.

Power

⚠ Danger
- Before power-on, please confirm that the product is installed in good condition, the wiring is firm, and the motor device is allowed to restart.   - Before power-on, please confirm that the power supply meets the requirements to avoid product damages or fire.   It is forbidden to open the product cabinet door or product protective cover plate to touch any terminal of the product, or disassemble any device or parts of the product when power is on, otherwise it may cause electric shock.

⚠ Warning
- After wiring and parameter setting, please run the motor to see if it can run normally, otherwise it may cause personal injuries or equipment damage.   - Before power-on, please confirm that the rated voltage of the product is consistent with the power supply voltage. If the power supply or voltage is incorrect, it may cause fire.   Before power-on, please confirm that there are no people around the products, motors and other machines, otherwise it may cause casualties.

Operation

⚠ Danger
It is forbidden to run the products by non-professional personals, otherwise it may cause casualties.   It is forbidden to touch any terminal of equipment and disassemble any devices or parts of the product when it is in operation, otherwise it may cause electric shock.

⚠ Warning
Do not touch the equipment housing, fan or resistor to test the temperature, otherwise it may cause burns.   During operation, please prevent other items or metal objects falling into the equipment, otherwise it may cause fire or product damages.

Maintenance

⚠ Danger
- It is forbidden to carry out equipment installation, wiring, maintenance, inspection or component replacement by non-professional personals.   - It is forbidden to maintain the equipment when power is on, otherwise it may cause electric shock.   - After cutting off the power of all equipment, please wait for at least the time specified on the warning label on the product before performing equipment maintenance and other operations.   When using a PM motor, even if the power supply of the product is turned off, the induced voltage will be generated on the motor terminal during the rotation of the motor. Do not touch the motor terminal, otherwise it may cause electric shock.

⚠ Warning
Please carry out daily and regular inspection and maintenance of equipment and products according to requirements, and keep the records carefully.

| Repair |
|---|
| ⚠ Danger |
| ● It is forbidden to carry out equipment installation, wiring, maintenance, inspection or component replacement by non-professional personals.
● It is strictly forbidden to carry out equipment maintenance under the condition of power on, otherwise it may cause electric shock.
After cutting off the power of all equipment, please wait for at least the time specified on the warning label on the product before carrying out equipment inspection, maintenance and other operations. |
| ⚠ Warning |
| ● Please report the equipment for repair according to the product warranty agreement.
● When the fuse is blown, the circuit breaker trips or the leakage circuit breaker (ELCB) trips, please wait at least the time specified on the warning label on the product before switching on the power supply or other operations, otherwise it may cause casualties and equipment damages.
● In face of equipment failure or damage, troubleshoot and repair must be carried out by professional personals according to the maintenance manual, and make maintenance records.
● Please follow the manual for replacing worn parts.
● Do not continue to use the damaged machine, otherwise it may cause casualties or greater damage to the product.
After replacing the equipment, please re-check the wiring and parameter setting. |
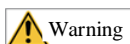
Disposal
⚠ Warning
● Please process the equipment and products according to relevant national regulations and standards, otherwise it may cause casualties or property loss. Scrapped equipment and products should be treated and recycled according to industrial waste treatment standards to avoid environmental pollution.

1 Product Information

1.1 Model and nameplate description

SH311-0808TN
① ②③ ④   ⑤ ⑥ ⑦

Description:

①   SH: Thin-film programmable controller

②   Series number (1 = economical type; 3 = high performance type; 5 = bus control type)

③   Number of Ethernet channels: (1 Ethernet channel in this example)

④   Controllable pulse number: (1 = 8 pulses;)

⑤   Input point: 8 input points in this example

⑥   Output point: 8 output points in this example

⑦   Output type (TN: NPN transistor output; TP: PNP transistor output)

1.2 Component Description
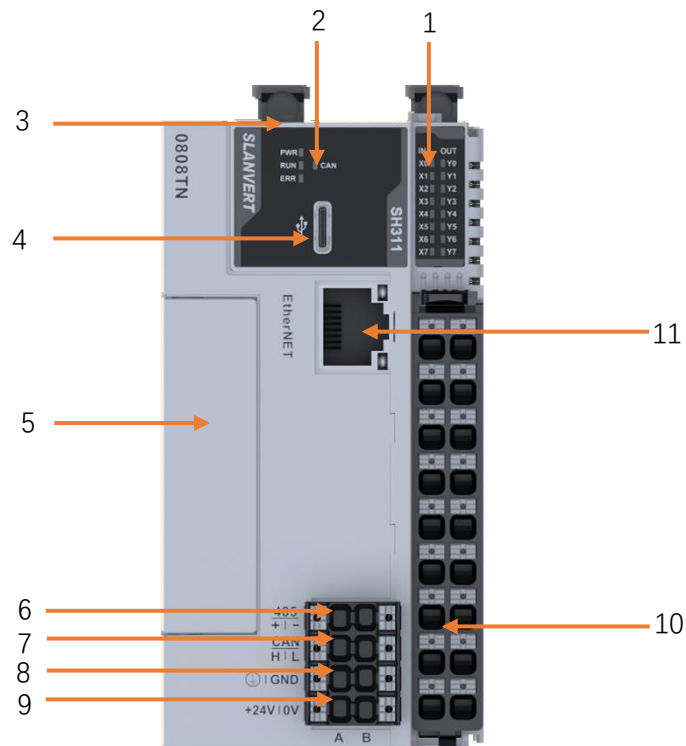
No.	Port Type	Interface ID	definition	Indicator Color	Description
1	IO indicator	IN/OUT	IO Display Status	Green	ON: Input or output is valid OFF: Input or output is invalid
2	Operation status indicator	PWR	Normal power supply	Green	ON: Power supply is normal OFF: Power supply is abnormal
		RUN	Normal operation	Green	ON: User program is running OFF: User program is stopped
		ERR	Runtime Error	Red	OFF: No serious errors Flash: A serious error has occurred

					ON: indicates the link is established successfully Flash: communication is in progress Off: Indicates that the link is not established
		CAN	CAN Status	Green	
3	Dip switch	RUN/STOP	Control host to run/ stop	/	/
4	Type-C interface	⭗⮒	Communicate with PC	/	/
5	Expansion card slots	/	Expansion card slot, with For functional expansion	/	/
6	RS485	485 +	485 communication signal +	/	/
		485-	485 communication signal -	/	/
7	CAN	CANH	CAN communication signal+	/	/
		CANL	CAN communication signal-	/	/
8	Grounding	PE	Power Ground	/	/
		GND	Signal Ground	/	/
9	power supply	24V +	Power+	/	/
		24V -	power supply-	/	/
10	IO Terminals	/	8 inputs/8 outputs/I O power supply	/	See section 3.1 for details
11	Ethernet port	Ethernet	Ethernet communication RJ45 interface	Yellow	● ON: indicates the link is established successfully ● Flash: Indicates communication is in progress

1.3 Product Specifications

1.3.1 Basic Specifications

Item		Specification
Key item	Program capacity	200K Bytes
	Data capacity	128K Bytes user soft element, about 84K Bytes power-off retention 1M Bytes of custom variables, and 128K Bytes are saved after power failure
	E-CAM, circular/linear interpolation	Support
	Local extension	16 local expansion modules , 1 left expansion card
Program	Programming Platform	Auto Studio
	Programming language	Programming languages (LD, FBD, ST, SFC)
	Ethernet	Support ModbusTCP master/slave: as master, supports 16 slaves; as slave, supports 4 masters
		TCP free protocol, supports 4 connections
	RS485	Supported channels: up to 3 channels (main unit supports 1 channel, expansion card can support 2 channels)
		Hardware interface: 2× 4 PIN terminal (shared with power supply)
		Isolation method: Isolation
		With or without terminal resistance: With terminal resistance, it can be a master or slave
		Number of slave stations: Supports up to 31 Modbus - RTU slave stations
		Communication baud rate: 1.2kbps~115.2kbps
		Short circuit protection: support
		Support serial port free protocol
	CAN	Support CANopen master station: through the expansion card, it can support 1 CANopen master station and up to 30 slave stations
	USB	Not supported
High speed I/ O	Pulse input	8-way 200K high-speed input
	Pulse output	8-channel 200K high-speed output
User program upgrade	Ether net	Program download
	TF card	Subsequent upgrades

Firmware Upgrade	TF card	Support firmware upgrade
Size and weight	Dimensions (L x W x H) (mm)	100 x 53 x 80
	Weight	-

1.3.2 Power Specifications

Item	Specification
Terminal input power rated voltage	24V DC±10% (21.6V DC ~ 26.4V DC)
Terminal input power rated current	1.6 A (max at 24V DC)
Bus output power rated voltage	5V DC (4.75V DC ~ 5.25V DC)
Bus output power rated current	2A (max at 5V)
24V input power protection	Support short circuit protection and reverse connection protection
Module hot swap function	Not supported

1.3.3 Input Specifications

Item		Specification
Input Type		Digital input
Number of input channels		8 channels
Input method		NPN Sink input
Input voltage level		24V DC±10% (21.6V DC ~ 26.4V DC)
High-speed input (X0 ~ X7)	Input is ON, input current	> 1mA
	Input is OFF, input current	< 0.15 mA
	Hardware response time	5 µs
	Maximum input frequency	200 kHz
	Input Impedance	16 K
ON Voltage		>18 V
OFF voltage		< 4V
Software filter time		0 ~ 60ms continuously adjustable, the minimum adjustable unit is 1µs
Isolation Mode		Integrated chip isolation method
Public mode		8 points/common (DC24V+)

1.3.4 Output Specifications

Item		Specification
Output Type		Transistor NPN output
Number of output channels		8 channels
Output voltage level		24V DC±10% (21.6V DC ~ 26.4V DC)
High-speed output (X0 ~ X7)	Output Load	0.5A/point, 2A/8 points
	Hardware response time	5us
	Maximum output frequency	200 KHz
	Load current requirement	≥11 mA full frequency
OFF leakage current		0.5mA or less, rated voltage 24V
Maximum residual voltage when ON		0.5 V DC or less
Isolation method		Digital Isolators
Public terminal mode		8 points/common (DC24V-)
Output action display		When the output is in the driving state, the output indicator light is on (software control)
External inductive load protection		When connecting an external inductive load, the user needs to connect a freewheeling diode

When the output frequency is greater than or equal to 100KHz , an external 1K pull-up resistor is required to connect to 24V.

2 Mechanical Installation

2.1 Installation Environment Requirements

When installing a programmable controller on a rail, install it with full consideration of operability, maintainability, and environmental resistance.

Item	Specification
Usage Environment	No corrosive, flammable gas, conductive dust (dust) is not serious
altitude	≤ 2000m(80kPa)
Pollution degree	Level 2
Interference immunity	Power line 2kV (IEC 61000-4-4)
Overvoltage category	Level I
EMC immunity level	Zone B, IEC61131-2
Vibration resistance	IEC 60068-2-6 5Hz ~ 8.4Hz, 3.5mm, 8.4Hz ~ 150Hz, 1g, X/Y/Z three-axis, 10 cycles/axis
Impact resistance	IEC 60068-2-27 150m/s2, 11ms, ±X/Y/Z six directions, 3 times/direction, 18 times in total
Overcurrent protection device	1.5 A fuse
Storage temperature and humidity range	● Storage temperature: -40 ℃ ～ + 70 ℃ ● Relative humidity: < 90%RH, no condensation
Transport temperature and humidity range	● Storage temperature: -40 ℃ ～ + 70 ℃ ● Relative humidity: < 90%RH, no condensation
Working temperature and humidity range	● Working temperature: -20 ℃ ～ +55 ℃ (horizontally installed), 20 ℃ ～ +45 ℃ (non-horizontally installed) ● Relative humidity: < 95%RH, no condensation
Installation Locations and Restrictions	Installation position: Can be installed in 4 directions, please refer to " 2.2 Installation position requirements" for details

2.2 Installation location requirements

This product can be installed in four positions (i.e., installation directions): horizontal, vertical, on top of the cabinet, and on the bottom of the cabinet. It is recommended to install it in the horizontal direction. Different installation positions have different requirements for operating temperature and its limit. For details, please refer to " 2.1 Installation Environment Requirements".

■ Optimal installation location

The best installation position for this product is horizontal installation. The heat dissipation is designed to be through natural convection. To ensure normal ventilation and heat dissipation and reserve sufficient wiring space, the minimum gap must be retained around this product, as shown in the figure below.

⚠️
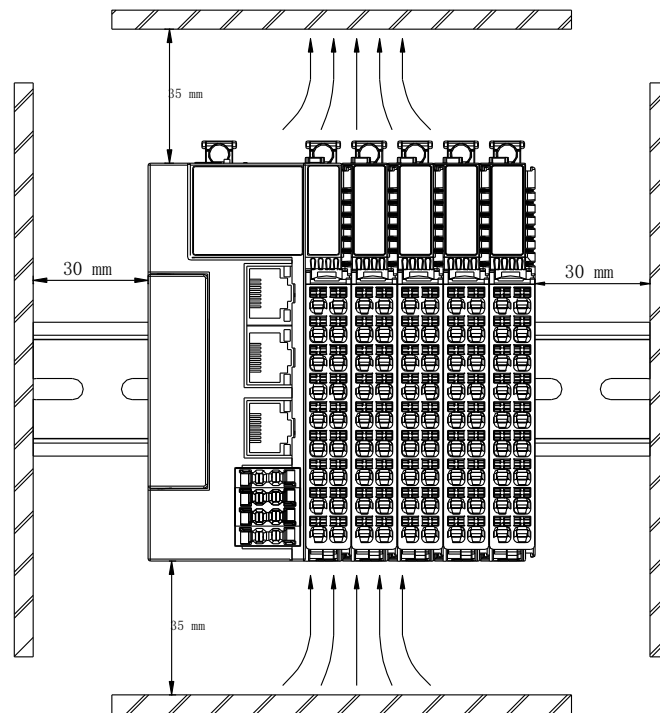
If there is high-temperature heat source equipment (heater, transformer, large resistor, etc.) around this product, keep a gap of at least 100mm between it and the high-temperature heat source equipment .

■ Other installation locations

The peripheral clearance requirements for other installation positions are the same as the requirements for the above optimal installation position. Other installation positions are shown in the figure below.

Up

Down

⚠
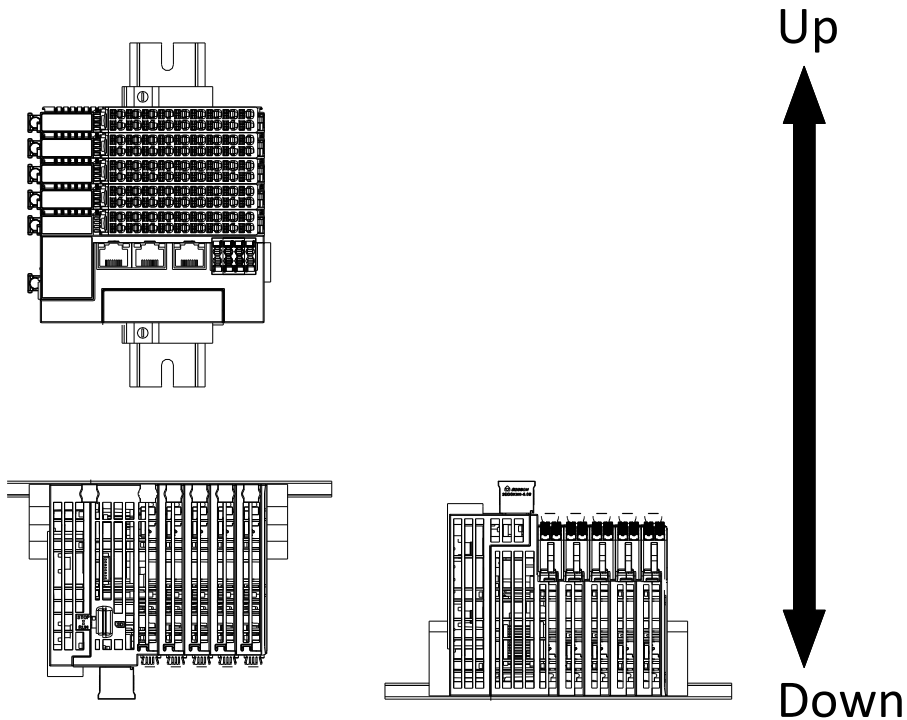
two requirements for vertical installation :

● PLC must be installed below all IO modules.

● When wiring, please use a wire trough to hold the cables to prevent the weight of the cables from being applied to the lower rail clamps . The lower rail clamps may slide down under the weight of the cables, which may cause the product to not be fixed on the DIN rail, resulting in malfunction.

2.3 Installation Notes

● Before installing or removing the host and module, make sure the host and module are powered off.

⚠

Do not hot- swap modules. Hot-swap modules may cause the host to restart, user data to be lost or damaged, etc.

● Do not drop or impact the housing or terminals of the host or module to avoid damage to the host or module.

2.4 Installation dimensions

The installation dimension information is shown in the figure below, the unit is millimeter (mm).
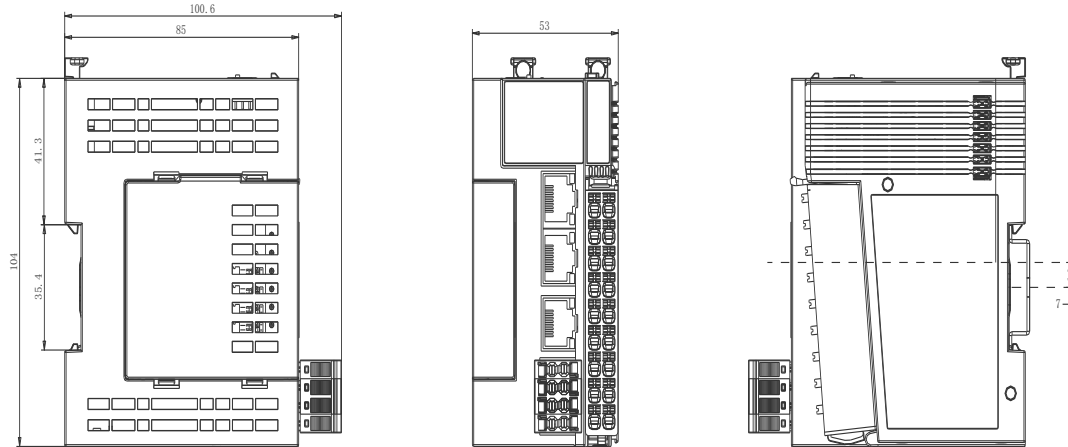
2.5 Installation Method

The host is installed using a DIN rail. The DIN rail must comply with the IEC 60715 standard (35 mm wide and 1 mm thick). The dimensions are shown in the figure below, in millimeters (mm).

_____

⚠️
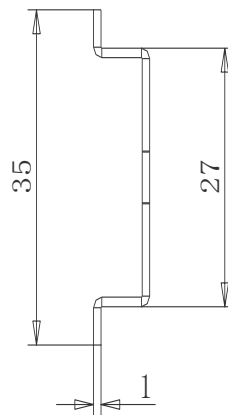
When this product is installed on a DIN rail other than the one recommended above (especially when the thickness of the DIN rail is not 1.0 mm), the DIN rail lock will fail and the product will not be installed in place, causing the product to malfunction.

■ Main module installation

1. When installing, align the host with the DIN rail and press the module in the direction indicated by the arrow. After installation, there will be an obvious snap-in sound, as shown in the figure below.

导轨锁扣

DIN导轨
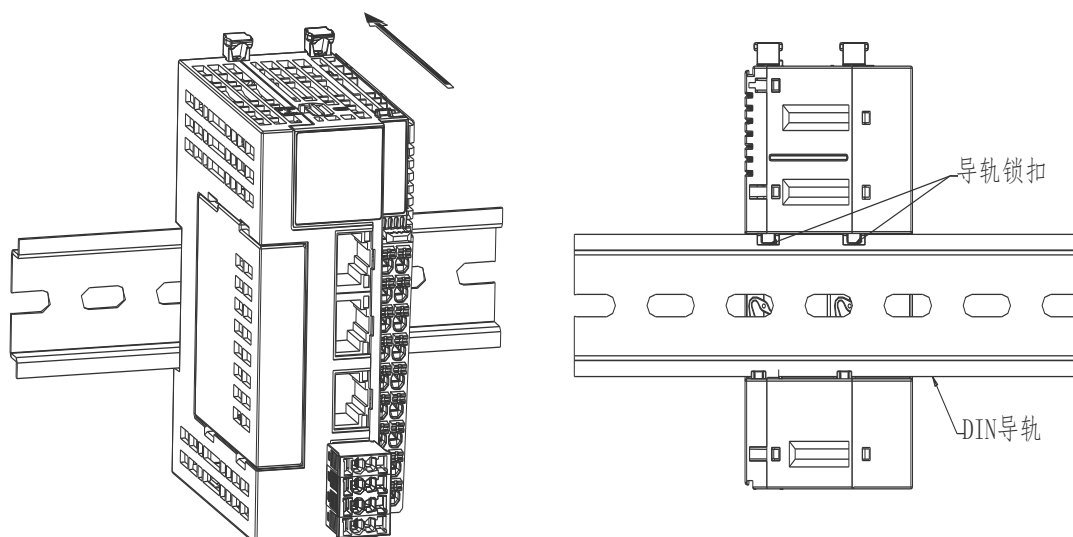
2. Confirm that the DIN rail lock of the host is in the locked state. The locked and unlocked states of the rail lock are shown in the figure below.
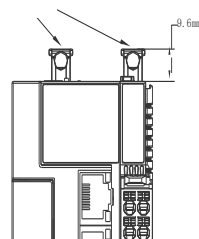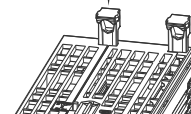
Rail lock   Rail lock

5.5mm   9.6mm
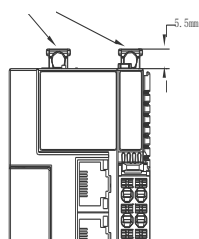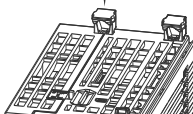
locked   unlock

● If the DIN rail lock is at the bottom, it is locked.

● If the DIN rail lock is at the top, it is unlocked.

When it is in the unlocked state, press down the DIN rail lock to change it to the locked state.

_____

When the host is not installed on the guide rail, please keep the guide rail lock in the locked state. If it is unlocked for a long time, the lock will become ineffective.

■ Host and module installation

The assembly between the host and the module is performed by sliding the top and bottom rails of the module, as shown in the figure below.

Rail between module
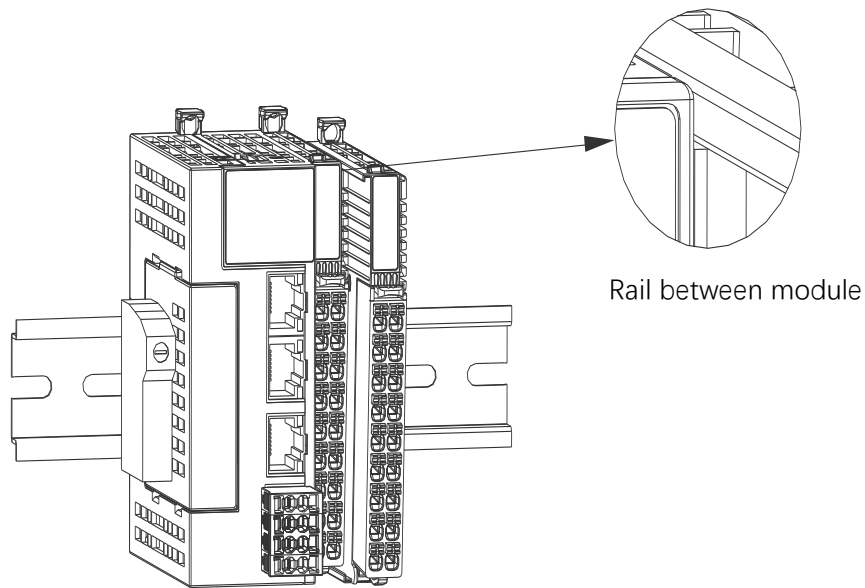
Install a DIN rail clip at each end of the main unit or module. When installing the rail clip , hook the bottom of the rail clip to the bottom of the rail and then rotate the rail clip so that the upper end of the rail clip hooks the upper end of the rail, and finally tighten the screws to lock the rail clip, as shown in the figure below.
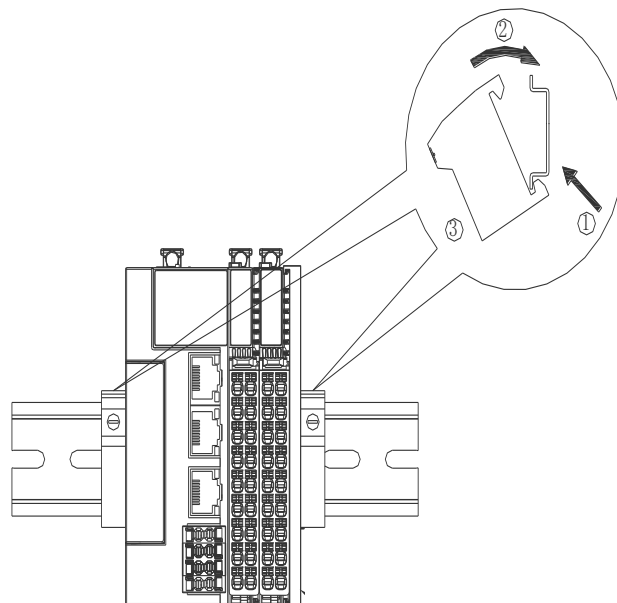
■ Disassembly

Use a flat-blade screwdriver or similar tool to pry the rail lock upwards and pull the module forward to remove it, pressing down on the top of the lock when finished.

Screw driver

Rail lock
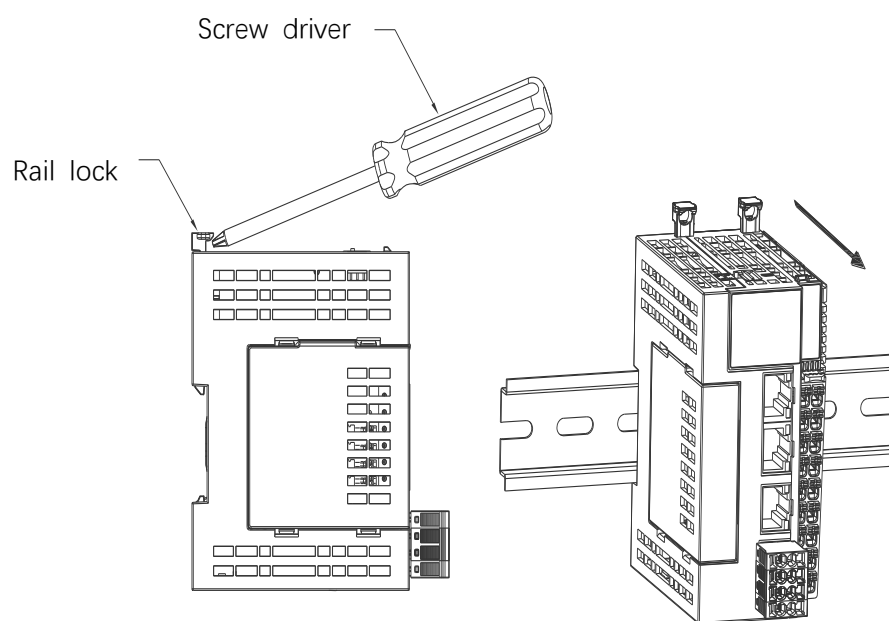
3 Electrical installation

3.1 Terminal Arrangement

| Left signal	Left terminal	Right terminal	Right signal
X0 Input	A1	B1	Y0 output
X 1 Input	A2	B 2	Y 1 output
X 2 input	A3	B 3	Y 2 output
X 3 input	A4	B 4	Y 3 output
X 4 input	A 5	B 5	Y 4 output
X 5 input	A6	B 6	Y 5 output
X 6 input	A7	B 7	Y 6 output
X 7 input	A8	B 8	Y 7 output
2 4V	A 9	B 9	0V

● The total extension distance of the high-speed IO interface extension cable should be within 3m.

● When wiring, avoid bundling them together with power lines (high voltage, high current) and other cables that transmit strong interference signals. The wires should be routed separately and avoid parallel routing.

3.2 Input terminal wiring
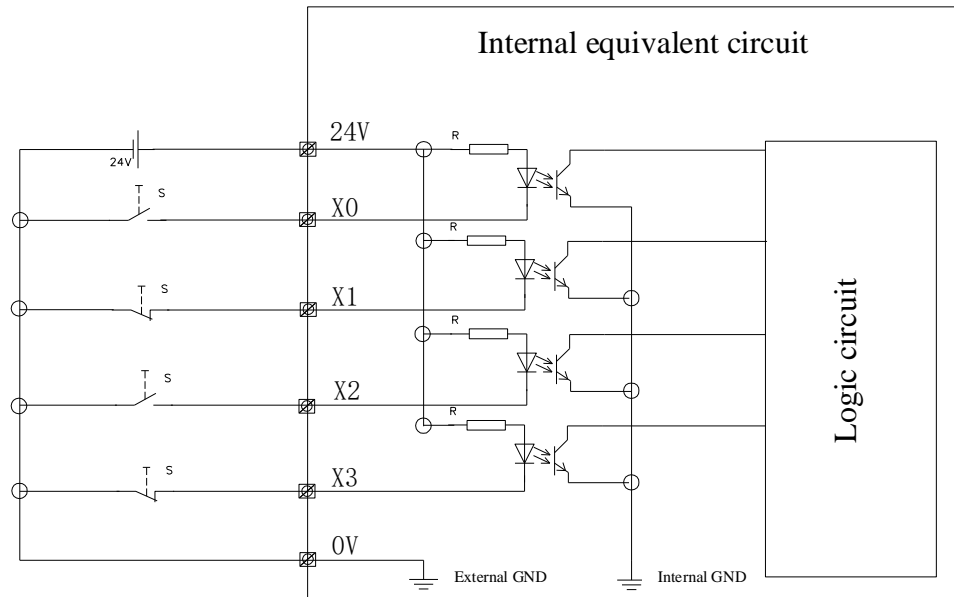
3.3 Output terminal wiring
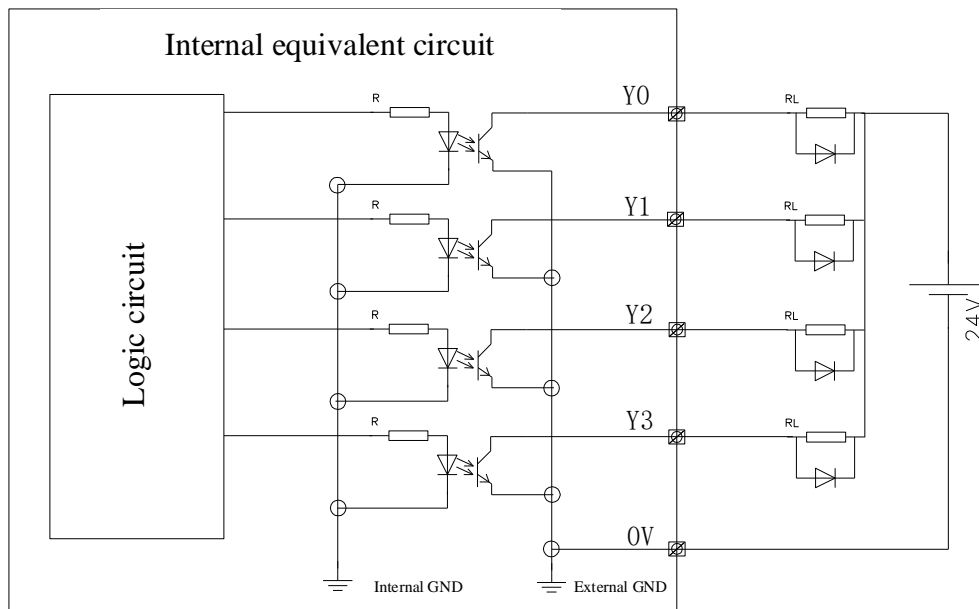
illustrate

When connecting an inductive load, an external freewheeling diode is required. The diode can be 1N4001 or a diode with similar parameters.

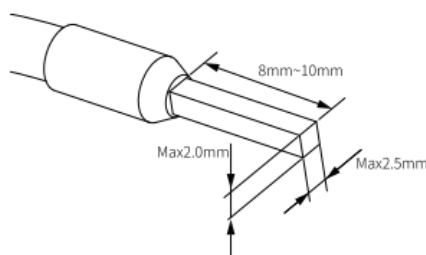# 4 Communication Connection

4.1 Communication Network

EtherCAT, Ethernet, CAN RS485

4.2 Cable Selection

The wire lug diameters in the following table are for reference only and can be reasonably calculated and adjusted based on actual use.

	Applicable wire diameter	
	National standard/mm2	American Standard/AWG
Tube wire	0.3	twenty two
	0.5	2 0
	0.75	1 8
	1.0	1 8
	1.5	1 6

If other tubular lugs are used, please crimp them onto the stranded wires. The shape and size requirements are as shown in the figure below.

4.3 Cable Connection

The CAN communication terminal, RS485 communication port and power port share a terminal block. The interface distribution is shown in the figure below.
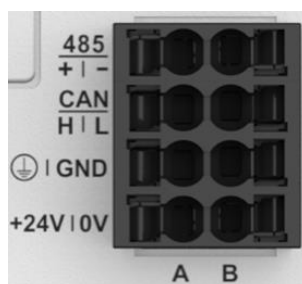
Terminal Definition

Signal Description	Left	Right	Signal Description
RS485 positive	485+	485-	RS485 negative
CAN positive	CAN-H	CAN-L	CAN negative
PE	⏚	GND	Communication ground
DC 24V power supply positive	+24V	0V	DC24V power negative

● Wiring

Please refer to "4.2 Cable Selection" to select a tubular cable and insert it into the communication port.
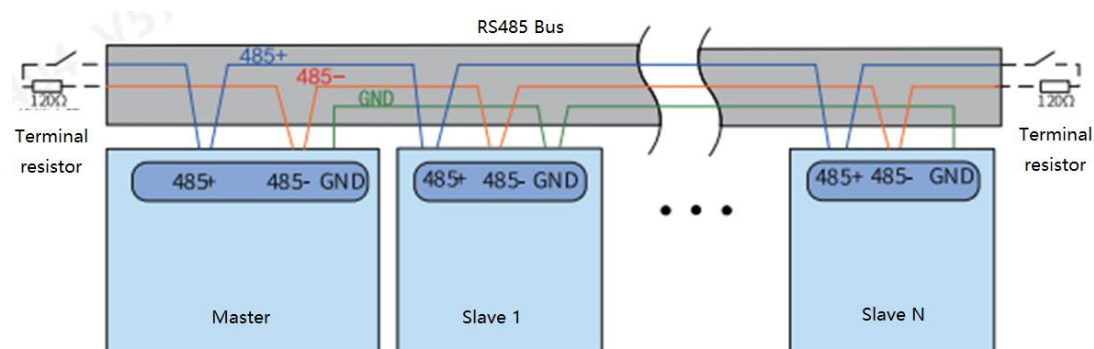
■ Ethernet communication

To improve the reliability of equipment communication, the Ethernet cable is required to use Category 5 shielded twisted pair cable with iron shell injection molding cable.

● Connection: Hold the RJ45 connector with the cable and insert it into the Ethernet port (RJ45 interface) until a "click" sound is heard.

● Disassembly: Press the tail of the crystal head and pull out the connector and the product horizontally.

4.4 RS485 Communication Description

It is recommended to use shielded twisted pair for RS485 bus connection. 485+ and 485- are connected by twisted pair. 120Ω terminal matching resistors are connected at both ends of the bus to prevent signal reflection. The reference ground of 485 signals of all nodes is connected together. A maximum of 31 nodes can be connected, and the distance between each node branch line should be less than 3m.

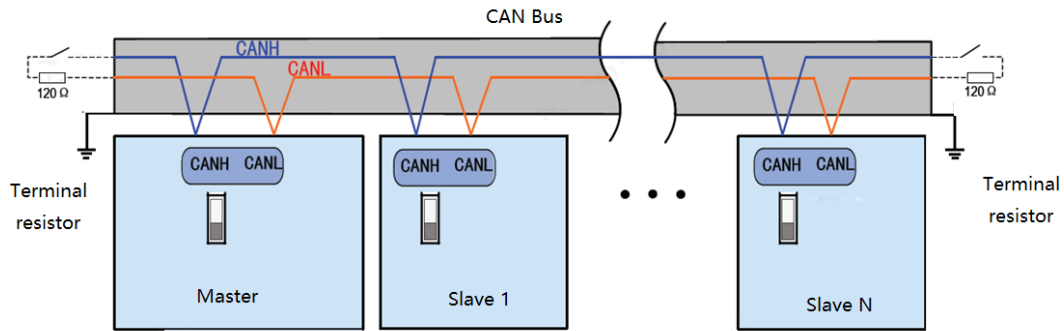The RS485 bus connection topology is shown in the figure below.

When fixing cables, do not bundle them together with AC power cables, high-voltage cables, etc. to avoid interference with communication signals.

4.5 CAN communication

The CAN bus connection topology is shown below. It is recommended to use shielded twisted pair cables for CAN bus connection.

Connect two 120Ω terminal matching resistors to prevent signal reflection. The shielding layer is generally reliably grounded at a single point.

It is recommended to use shielded twisted pair cables for CAN bus connection. Two 120Ω terminal matching resistors are connected at both ends of the bus to prevent signal reflection. The shielding layer is generally reliably grounded at a single point. When fixing the cables, do not bundle them together with AC power cables, high-voltage cables, etc. to avoid interference with communication signals.

4.6 Terminal resistance instructions

The CAN and RS485 terminal resistor DIP switch is located on the left side of the VH controller. The left extension cover needs to be opened. The DIP switch is located in the position shown in the figure below.

DIP for active terminal resistor of CAN/RS845
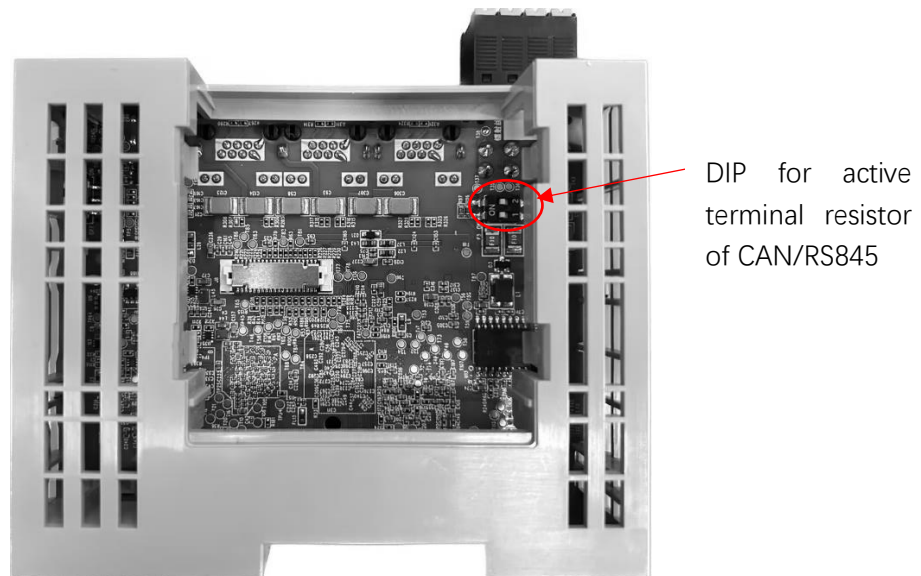
terminal resistance and DIP channel is shown in the table below.

Dial	Resistance	Remark
1 channel	120 Ω	RS485 terminal resistor
2 channels	120 Ω	CAN terminal resistor

5. Operation and Maintenance

5.1 Operation and shutdown

After the program is written into the PLC, please follow the steps below to perform power on/off operation.

After writing a program in the PLC STOP state, when the system needs to be run:

1. Set the system to RUN state.

2. Make sure the RUN indicator is always on and is yellow-green.

3. When you need to stop running, set the system to STOP state, or you can stop it through the background operation of the host computer.

5.2 SD card user program burning

This feature will be upgraded later

5.3 SD card firmware upgrade

1. Load the firmware upgrade SD card (maximum capacity 32GB, file format FAT32) onto the TF expansion card and install it into this product.

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The TF expansion card needs to be installed when the product is powered off.

2. Re-energize the product.

on this product flash quickly, it means that the firmware is being upgraded; if the RUN indicator flashes slowly and the ERR indicator is off, it means that the firmware upgrade is successful; if the RUN indicator is off and the ERR indicator flashes slowly, it means that the firmware upgrade has failed.

3. After the firmware upgrade is complete, power off the product and remove the SD card.

4. Re-energize the product.

Appendix: Expansion Card Options

type	model	Specification
Left expansion module	SH-RS485	2-channel RS485
	SH-4DI	4-channel DI
	SH-4DO - TN	4-channel leakage DO
	SH-2AD1DA-I	2-channel AI, 1-channel AO, current mode.
	SH-2AD1DA-V	2-channel AI, 1-channel AO, voltage mode.
	SH-RTC	Real-time clock
	SH-RS485-RTC	Left extension 2-way RS485 + with RTC
	SH-4DI-RTC	4-channel digital input + with RTC
	SH-4DO-TN-RTC	4-channel digital output + RTC
	SH-2AD1DA-I-RTC	2-channel analog input, 1-channel analog output current type + with RTC
	SH-2AD1DA-V-RTC	2-channel analog input, 1-channel analog output voltage type + with RTC
Right expansion module	SH-1600END	16- channel digital input module
	SH-0800END	8- channel digital input module
	SH-0016ETN	16 -channel digital transistor NPN output module
	SH-0016ETP	16 -channel digital transistor PNP output module
	SH-0808ETN	8 -channel digital input module, 8 -channel digital transistor NPN output module
	SH-0808ETP	8 -channel digital input module, 8 -channel digital transistor PNP output module
	SH-0008ETN	8 -channel digital transistor NPN output module
	SH-0008ETP	8 -channel digital transistor PNP output module
	SH-4AD	4-channel analog input module
	SH-4DA	4-channel analog output module
	SH-4PT	4-channel input thermal resistor temperature detection module
	SH-4TC	4-channel input thermocouple temperature detection module