SH100 Series PLC User Manual

Hope Senlan Science And Technology Holding Corp., Ltd

Preface

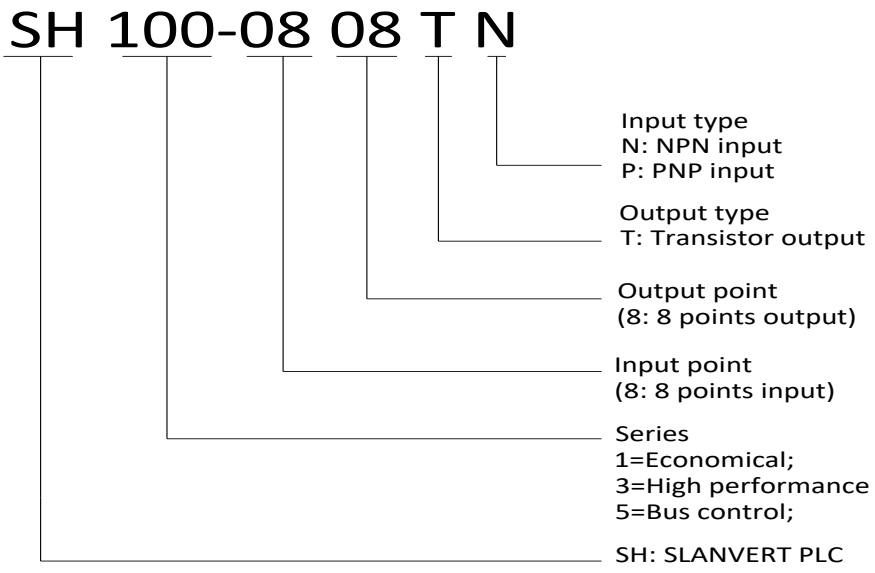
This manual is used as a quick guide for the design, installation, connection and maintenance of the SLANVERT SH100 series PLC, which is convenient for users to check the required information on site. The manual mainly briefly describes the hardware specifications, characteristics and usage methods of the SH100 series PLC, related optional accessories and common problems, etc., for easy reference.

Menu

Chapter 1 Product Introduction

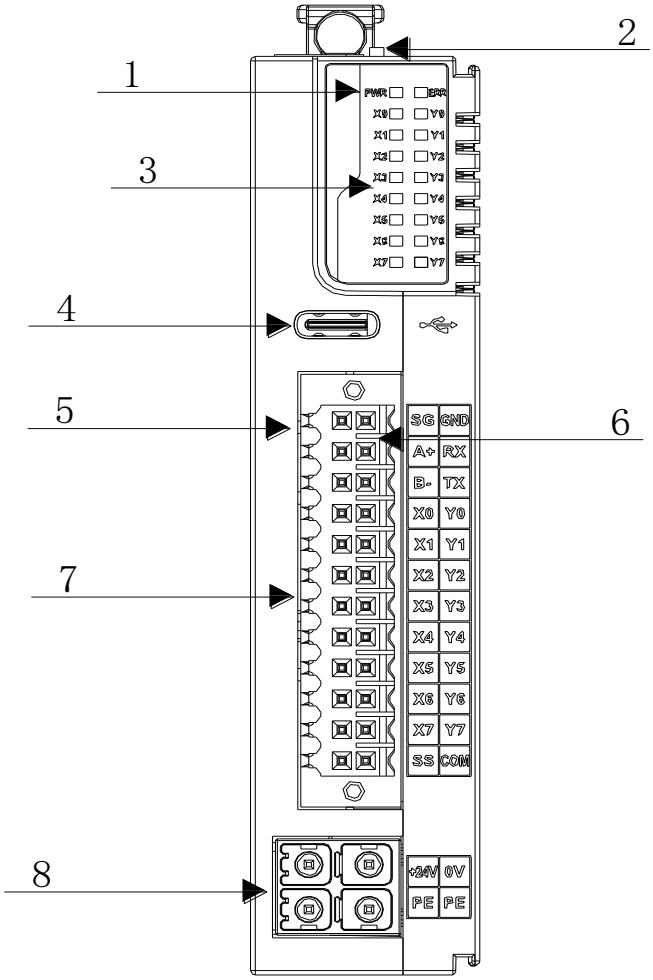
1.1 Model Description

The product model description is shown in the figure below:



1.2 Appearance and structure

SH100 series main module is shown in the figure below (taking SH100-0808TN as an example).



No.	Type	Mark	Definition	Description
1	Operation status indicator	PWR	Running normally	ON: Normal power supply Flash: Indicates it is running Off: No power supply or power supply abnormality
		ERR	Operation error	OFF: No serious errors Flash: A serious error has occurred
2	Dip switch	RUN/STOP	Control run/stop	-
3	IO indicator	X/Y	IO status display	Steady on: indicates input or output is valid Off: Indicates that the input or output is invalid

4	Type-C connector		Communicate with PC	-
5	RS485	A+/B-	485 communication signal	isolation
6	RS 232	TX/RX	232 communication signal	Non-isolated
7	I/O Ports	X /Y	8 inputs, 8 outputs	X0~X7, Y0~Y7
8	Power interface	24V/0V/PE	DC24V power supply	-

1 RS-232 level, 1 RS-485 level, USB interface is Type -C interface, mode selection switch has two positions: ON and OFF, one RS -485 terminal resistor, resistance is 120Ω. 8 points DC24V input, 8 points transistor output (three of which are 100KHz high-speed pulse), DC24V power supply.

1.3 Terminal Introduction

Port Type	Interface ID	Definition
RS485	A +	485 communication signal+
	B -	485 communication signal -
	SG	485 communication location
RS232	TX	RS232 send signal
	RX	RS232 receiving signal
	G	RS232 communication ground
IO Terminals	X0~X7	Input Point
	S S	Input point common
	Y0~Y7	Output Point
	COM	Output point common
Power interface	+24V	DC 24V power supply positive
	0V	DC 24V power negative
	⏚	PE

1. 4 Power supply specifications

- DC power supply specifications:

Item	Specification
Terminal input power rated voltage	24VDC±10% (21.6VDC～26.4VDC)
Terminal input power rated current	0.2 A (max at 24V)
24V input power protection	Support short circuit protection, support reverse connection protection

Chapter 2 Switching Input and Output Characteristics

2.1 Input characteristics and signal specifications

The input characteristics and signal specifications are shown in the following table.

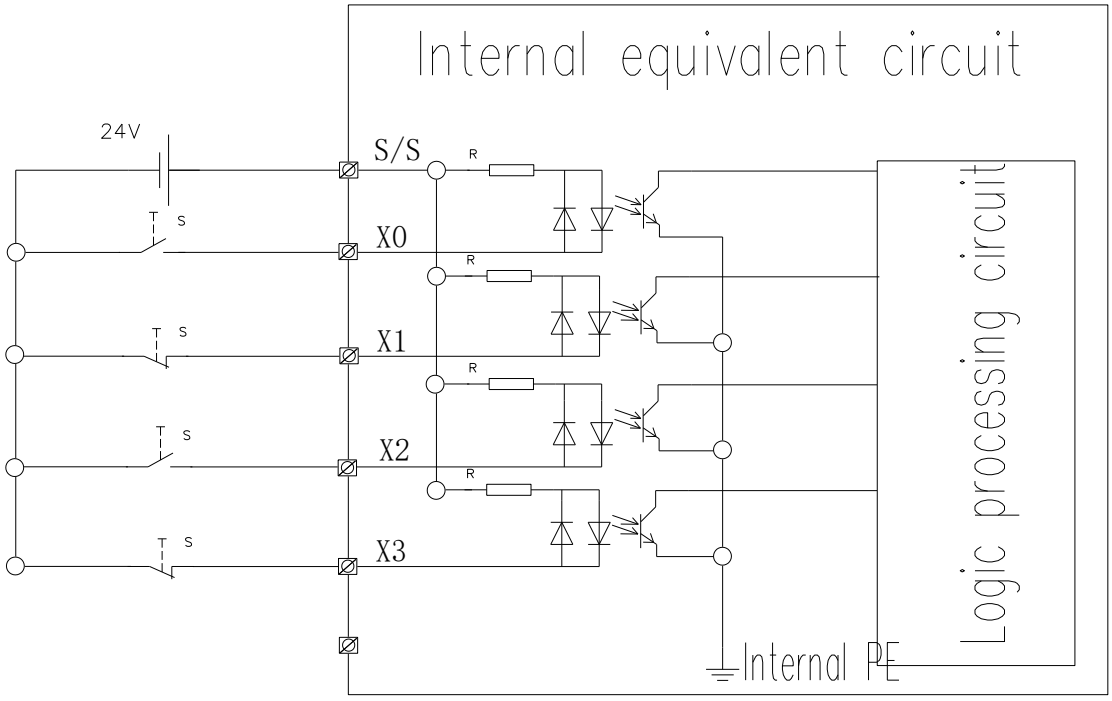
project		Input
Signal input method		Source/sink mode, users can select through the "S/S" terminal
Electrical	Detection voltage	24V DC
	Input Current	4mA (typical at 24V)
	Input Impedance	Reference value 5.3k ~5.6k
	Input ON	＞15 VDC
	Input OFF	＜5 VDC
Filter function	Digital filtering	X0~X7 have digital filtering function, and the filtering time can be programmed by the user between 0 ms~ 60 ms
	Hardware filtering	The remaining ports except X0~X7 are hardware filtered, and the filtering time is about 10ms
High-speed function		X0~X7 can realize high-speed counting, interruption, pulse capture and other functions X0 and X1 ports count at a maximum frequency of 50kHz X2～X7 port counting maximum frequency up to 10kHz The total input frequency must be less than 60kHz
Common terminal		There is only one common terminal, S/S

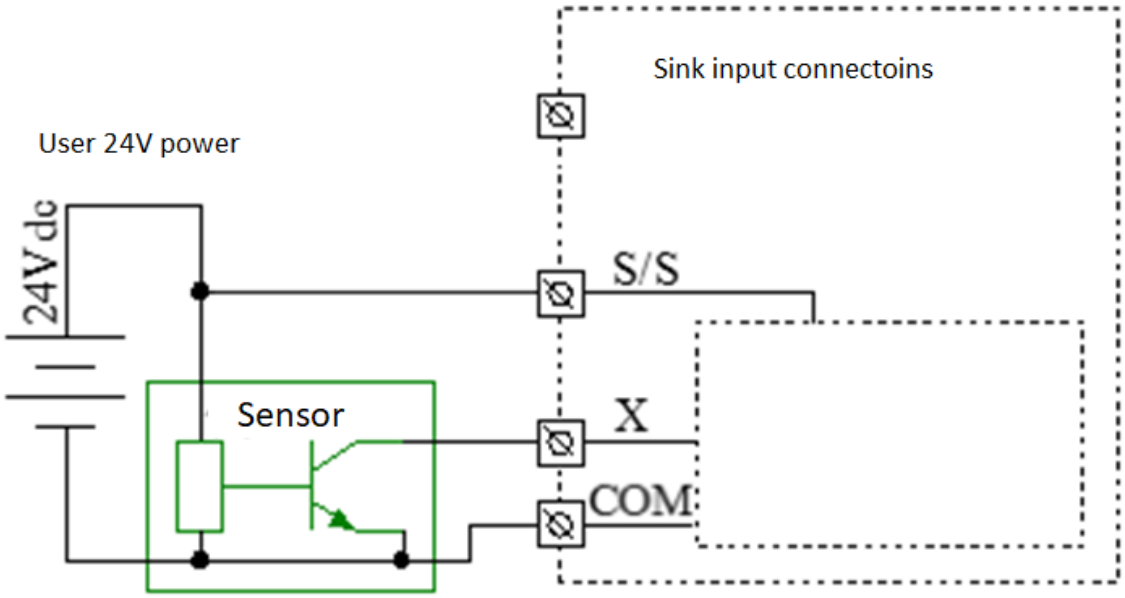
The counter input port has a corresponding maximum frequency limit. When the input frequency exceeds this limit, it may cause inaccurate counting or the system may not operate normally. Please arrange the input port reasonably and select a suitable external sensor.

PLC provides a port "S/S" to select the input mode of the signal, which can be set to source input mode or sink input mode. Connect "S/S" to "+24V", that is, set to sink input mode, and you can connect an NPN sensor.

Input Connection Example

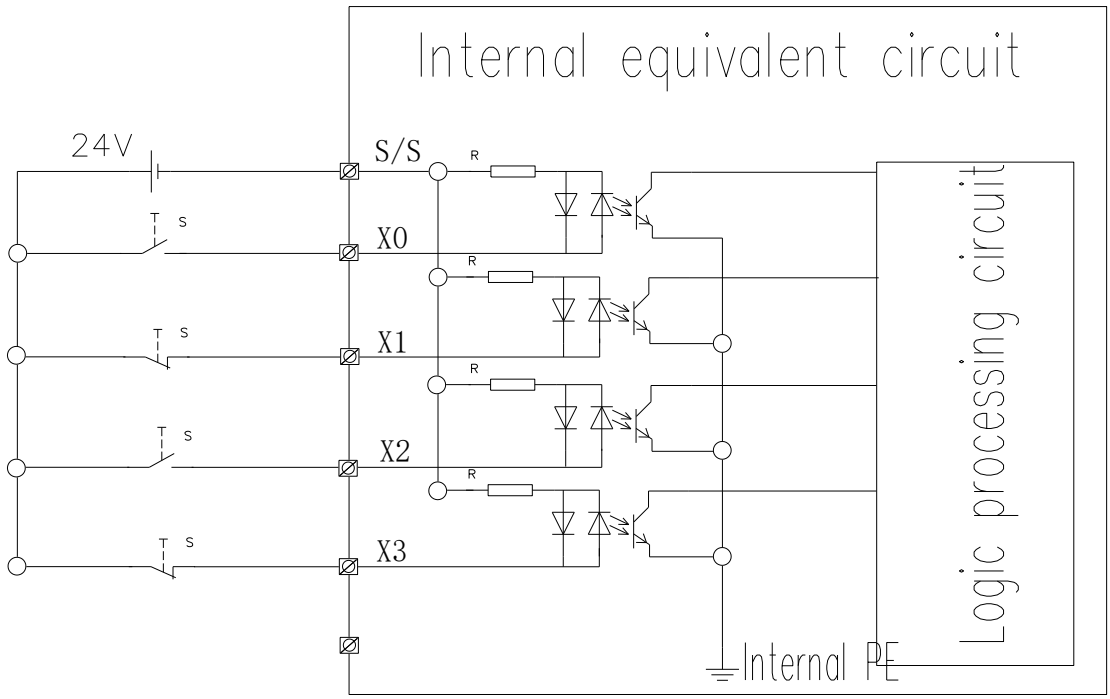
- Sink input terminal circuit diagram

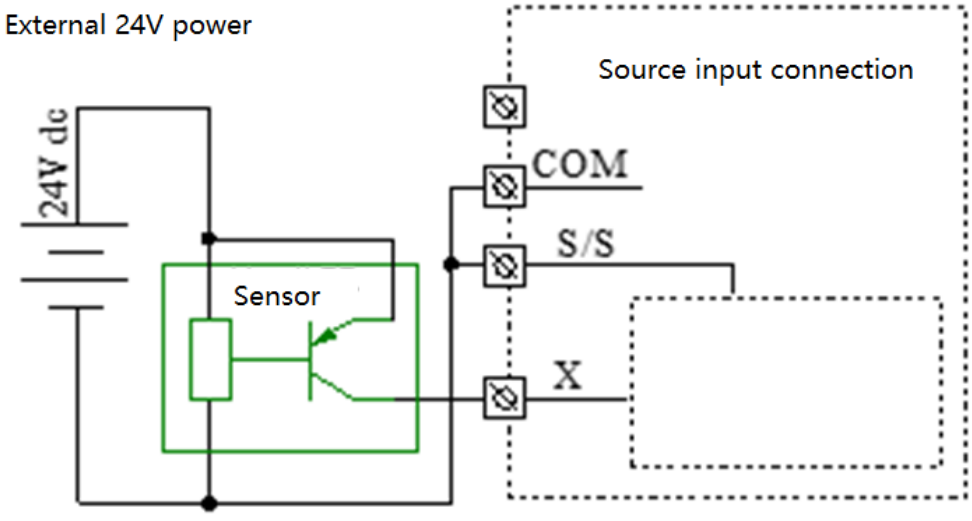




External 24V Power with sink input

- Source input terminal circuit diagram





External 24V Power with source input

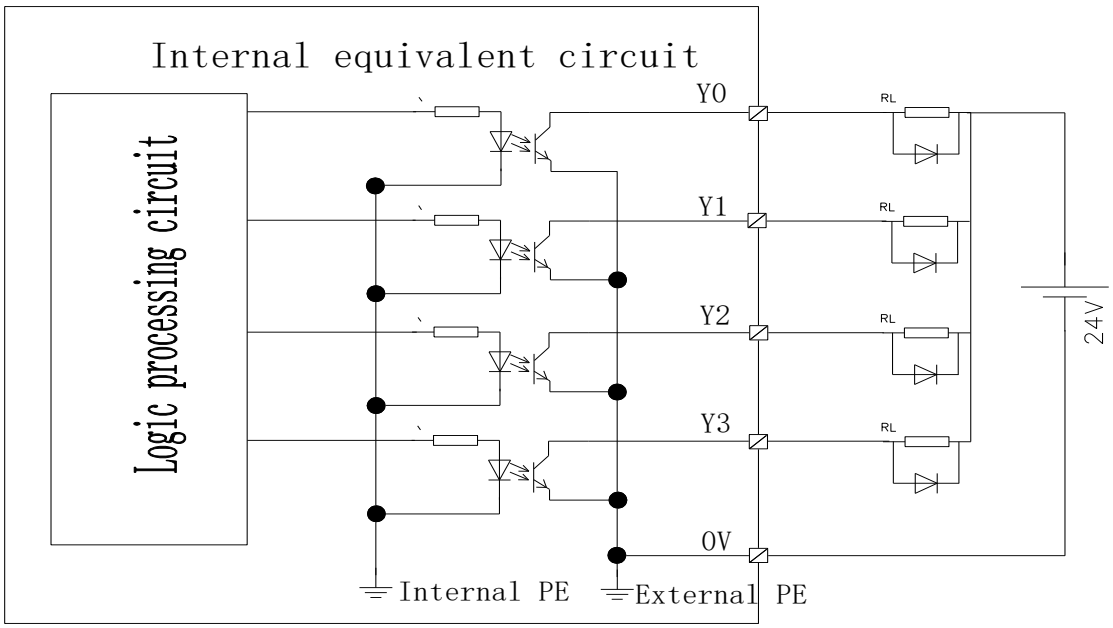
2.2 Output characteristics and signal specifications

The output electrical specifications are shown in the following table.

Item	Transistor Type
Output method	The output state is "ON" when it is connected; the output state is "OFF" when it is disconnected
Voltage characteristics	24V DC , with polarity requirements
Current requirements	Use in accordance with output electrical specifications
Features	Small driving current, high frequency and long life
Applications	Applications that require high frequency and long life, such as controlling servo amplifiers and frequently operated electromagnets

Item		Specification
High-speed output (Y0～Y2)	Output load (resistance	0.5A/point, 2A/8 points
	Output load (inductive load)	7.2W/point, 24W/8 points
	Output load (lamp load)	5W/point, 18W/8 points
	Load current requirement	When the output is greater than 10kHz, the load current
	Maximum output frequency	Resistive load 100kHz, inductive load 0.5Hz, lamp load 10Hz
Normal output (Y4～Y7)	Output load (resistance	0.5A/point, 1A/ common end
	Output load (inductive load)	6W/24VDC (total)
	Output load (lamp load)	1W/24VDC (total)
	Load current requirement	≥5mA
	Maximum output frequency	Resistive load 100Hz, inductive load 0.5Hz, lamp load 10Hz
PWM output (Y0~Y2)		Maximum frequency 100kHz
Leakage current when OFF		30 μA or less, rated voltage 24V
Maximum residual voltage when ON		0.5VDC or less
Isolation method		Optocoupler Isolation
Public terminal mode		8 points/common terminal (polarity of output power -)
Short circuit protection		Each channel supports short circuit protection and recovery
External inductive load protection		When connecting an external inductive load, the user needs to connect a freewheeling diode
Output action display		When the output is in driving state, the indicator light is on.

Output Connection Example



Chapter 3 Communication Port

The SH 100 series PLC main module provides two serial asynchronous communication ports, namely COM0 and COM1 , supporting baud rates: 115200, 57600, 38400, 19200, 9600, 4800, 2400, 1200bps.

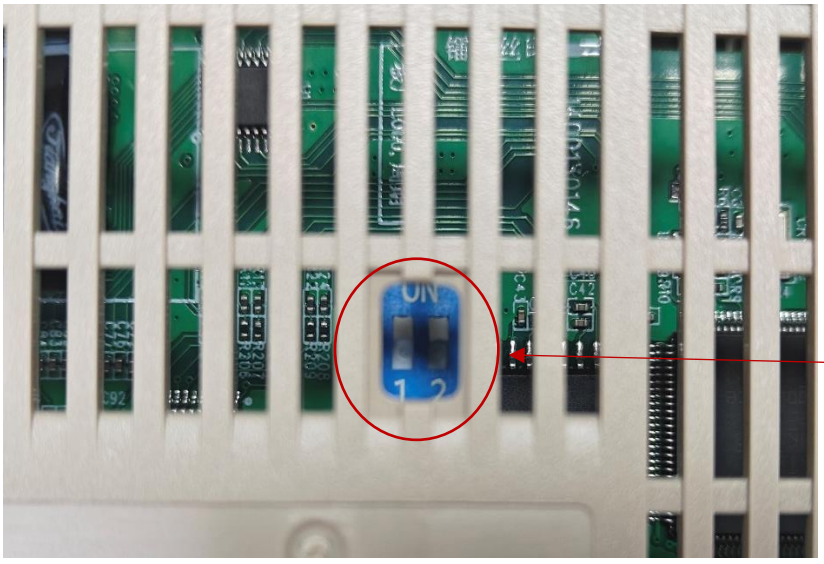
Signal Description	Left terminal	Right terminal	Signal Description
RS485 differential positive	A+	TX	RS232 send signal
RS485 differential pair	B-	RX	RS232 receiving signal
RS485 communication	SG	GND	RS232 communication ground

RS485 Communication Specifications

project	illustrate
Supported	Support 1 channel
Hardware Interface	2×12PIN terminals (shared with DIDO)
Isolation method	Capacitive Isolation
With or without	With 120Ω terminal resistance, it can be used as a master or slave
Number of slave	Supports up to 31 slave stations (the distance between each slave station branch
Short circuit	Support 24V mis-insertion protection

RS232 Communication Specifications

project	illustrate
Supported	Support 1 channel
Hardware Interface	2×12PIN terminals (shared with DIDO)
Isolation method	No isolation



RS485 dip switch
120Ω

COM1 is suitable for connecting with production equipment with communication functions, such as inverters, using MODBUS protocol or RS485 port free protocol to control multiple devices in a network. Its port is a screw-fixed terminal, and the communication signal cable can be made by the user. It is recommended to use twisted shielded pair as the connection cable of the communication port.

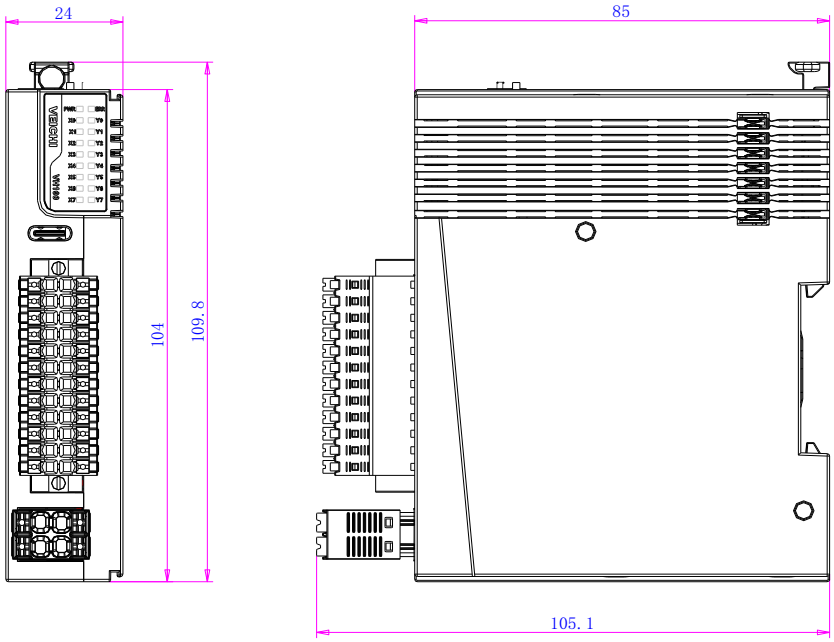
USB is a Type - C interface that supports program download, online firmware update and monitoring functions.

Chapter 4. Installation

This PLC is designed for installation environment II standard, pollution degree 2 applications.

4.1 Dimensions

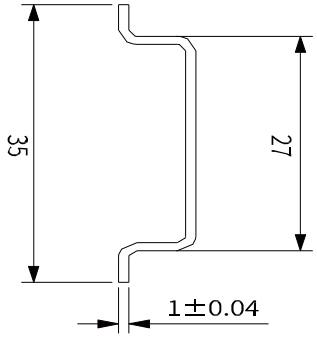
At least 10 mm of space should be reserved above the product to ensure the movement of the lock.



4.2 Installation method

4.2.1 DIN slot installation

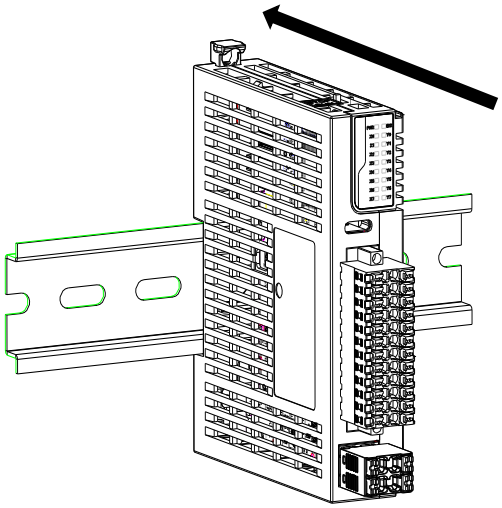
The host is installed with DIN rail, which must comply with IEC 60715 standard (35mm wide, 1mm thick), the size information is shown in the figure below, the unit is millimeter (mm).

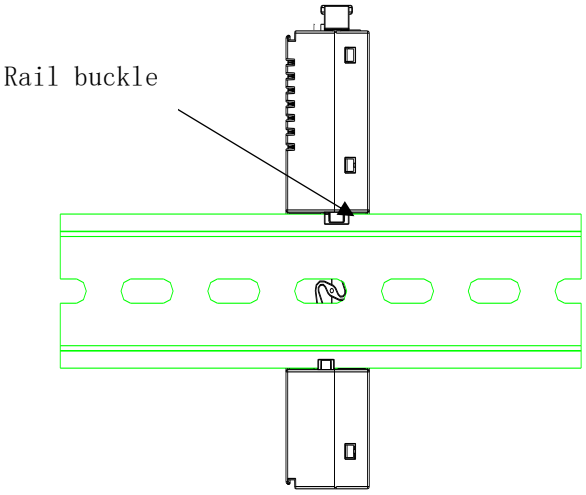


When this product is installed on a DIN rail other than the one recommended above (especially when the thickness of the DIN rail is not 1.0 mm), the DIN rail lock will fail and the product will not be installed in place, causing the product to malfunction.

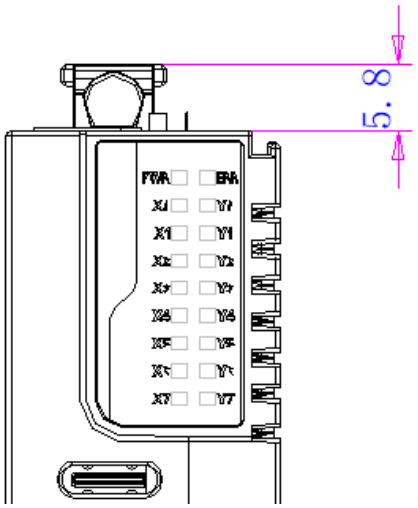
4.2.2 Host Installation

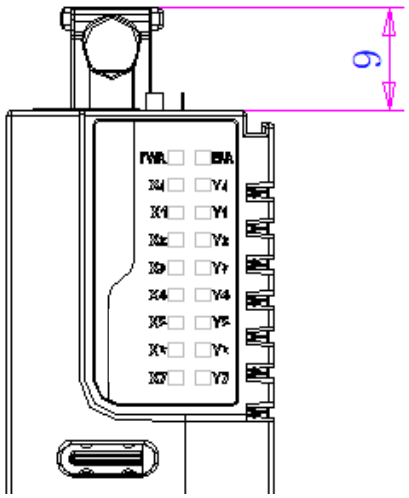
1. During installation, align the host with the DIN rail and press the module in the direction indicated by the arrow. After installation, there will be an obvious snapping sound, as shown in the figure below.





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.



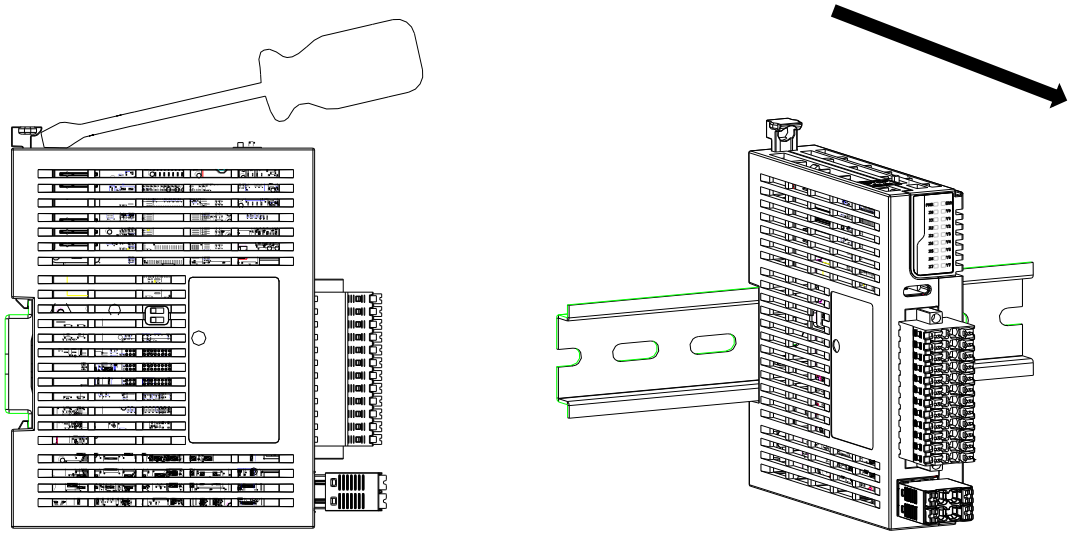


- If the DIN rail lock is at the bottom, it is locked.
- If the DIN rail lock is upward, it is unlocked. If it is unlocked, press the DIN rail lock downward to lock it.

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.

4.2.3 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.

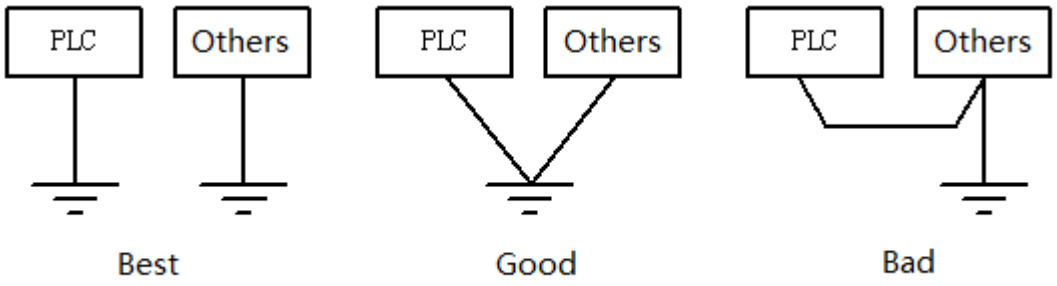


4.3 Cable connections and specifications

Connect the power cord and ground wire . It is recommended that users add a circuit breaker and fuse protection circuit to the PLC power input. The AC power and auxiliary power connection examples are shown in the figure below.

Setting up a reliable grounding wire can enhance equipment safety and improve the electromagnetic interference resistance of the PLC . During installation, the power supply ⏚end of the PLC should be connected to the grounding body. It is recommended to use AWG16~22 type connecting wire and reduce the wire length as much as possible.

It is recommended to set up an independent grounding device and try to avoid common paths with the grounding wires of other devices (especially those with strong interference) during wiring, as shown in the following figure.

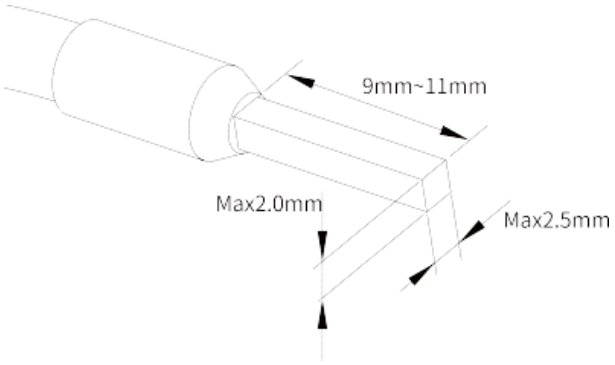


Cable specifications

Power cable: The wire diameters of the wire ears in the following table are for reference only and can be reasonably calculated and adjusted based on actual use.

Name of supporting materials	Adaptive wire diameter	
	National standard / mm^2	American Standard /AWG
Tube type	0.3	22
	0.5	20
	0.75	18
	1.0	18
	1.5	16

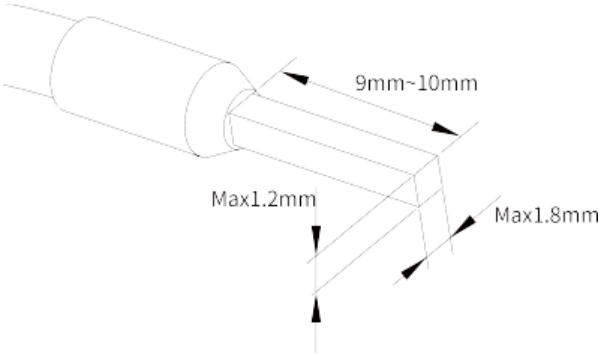
If other tubular lugs are used, please crimp them onto the stranded wires. The shape and size requirements are as shown in the figure below.



Communication line: The wire diameters of the wire ears in the following table are for reference only and can be reasonably calculated and adjusted according to actual use.

Name of supporting materials	Adaptive wire diameter	
	National standard / mm^2	American Standard /AWG
Tube type	0.3	22
	0.5	20

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.



Chapter 5 Power-on Operation and Maintenance

5.1 Power on

After wiring is completed, check the connections item by item to ensure that no foreign objects fall into the casing and that heat dissipation is unobstructed.

1. Power on the PLC power supply, and the PLC PWR light should light up.

2. Start up AutoStudio software on the PC and download the compiled user program to the PLC.

3. After the downloaded program is verified, turn the mode selector switch to the ON position, and the RUN light should be on. If the ERR light is on, it indicates that there is an error in the user program or system. Please follow the instructions in the "SH Series Small Programmable Controller Programming Manual" to eliminate the error until it is correct.

4. Then turn on the power of the PLC external system and debug the system.

5.2 Routine maintenance

During routine maintenance inspections, attention should be paid to the following aspects:

1. Ensure the PLC controller working environment is clean and tidy to prevent foreign matter and dust from falling into the machine;

2. Maintain good ventilation and heat dissipation of the programmable controller;

3. All wiring connections and terminals are firmly fixed and in good condition.

- Transistor output is strictly prohibited from being connected to an AC circuit, such as 220VAC . Please strictly refer to the electrical parameter requirements to design the output circuit, and do not allow overvoltage or overcurrent.
- Frequent operation of relay contacts will seriously affect their service life, so please use them reasonably.
- The relay contacts can only connect loads less than 2A. If a larger load needs to be connected, use an external contactor or intermediate relay.
- When the relay contact current is too small, it cannot be guaranteed to be reliably turned on. It is recommended to design the contact current to be greater than 5mA.

User Notice

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.

Version Updated History

Revision Date	Release version	Changes
2024.08	V 1.0	First edition released