LE Series

Programmable Logic Controller

Hardware Manual

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Hardware Manual

Version 1.5

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Contents

Chapter 1 About This Book

1.1 Document Update

Table 1 Document Update List

Version	Description	Date
V1.0	Update content according to the datasheet manual and apply to document template	July 15.2017
	Modify based on feedback from the field	
V1.1	Update Chapter 3.1.4 Definition of Indicators	January 29.2018
V1.2	Update style in Chapter 11	April 20.2018
V1.3	Add LE5400 module	October 20.2020
V1.0	Add LE5230/LE5231/LE5610/LE5620	Match 09.2021
V1.1	Update Logo	Match 03.2022
V1.2	Add LE5118/LE5119	July 23.2022
V1.3	Update “Technical Specifications” of LE5118/LE5119	October 31.2022
	Add LE5341T	
V1.4	Update LE5341T/LE5341 wiring	November 01.2022
V1.5	Update LE5119 Technical Specifications	March 13.2023

1.2 Purpose

This manual mainly introduces the technical specifications, terminal definition, wiring, configuration settings, fault diagnosis and so on for each module of LE series PLC to help users to use the product properly.

1.3 Target Audience

- Engineers in charge of system engineering implementation.
- Technicians in charge of system maintenance.

- Electricians

1.4 Document Conventions

1.4.1 Menu

The menu commands are described with [], such as [Reset], [Download], [Add Device].

The names of window and dialog are described with bold font, such as **Device Library**, **Library**, **Device Property**.

1.4.2 Important Information

- Danger icon. Indicates a potentially hazardous situation that could result in death or serious injury.

- Electric shock icon. Indicates a potentially hazardous situation that could result in electric shock accident.

- Warning icon, indicating that the operation may lead to the potential threats of failure or damage to software and hardware devices.

- Important icon, identifies important information about the operations or functions which need to be understood.

- Operation icon. Indicates the operation or opening of an object.

SEE ALSO

- Reference icon. Provides additional sources of the information.

1.5 Catalog

HollySys Programmable Logic Controller PLC Instruction Manual

AutoThink V3.1 User Manual_Project Configuration

LE Series Programmable Logic Controller Hardware Manual

1.6 Terminology

Terminology	Description
Profibus –DP	Standard Bus Protocol, used for high-speed data transfer on the field layer.
MODBUS	Modbus is a general bus protocol for communication among controllers or among controllers and other devices.

1.7 Abbreviations

Abbreviations	Full Name
PLC	Programmable Logical Controller
I/O	Input /Output
DC	Direct Current
AC	Alternating Current
GPRS	General Packet Radio Service
TCP	Transmission Control Protocol
Profibus	Process Field Bus
AI	Analog Input
AO	Analog Output

Abbreviations	Full Name
DI	Digital Input
DO	Digital Output

Chapter 2 Overview

LE Series PLC includes various kinds of CPU modules and expansion modules, and works with powerful Auto Think Programming Software which has abundant instruction sets and functions library. LE PLC is appreciated by its stable performance, reliable quality, convenient maintenance and competitive price and has been applied widely in various industries of automation field.

2.1 Overview for Function

LE series programmable logic controller (PLC) is a new generation high-performance micro PLC offered by HollySys. This product fully takes the seamless integration of the system, controller, HMI and software and the requirement for efficient coordination into consideration, and further improve product's portfolio.

- Main features
  - Compact design
  - Simple and reliable installation
  - Various module types
  - Powerful analog processing
  - Abundant instruction sets
  - Special power-loss protection
  - Off-line simulation
  - IEC Standard programming languages
- Application scenarios
  - Punching machinery, printing machinery, textile machinery
  - Construction machinery, packaging machinery, plastics machinery
  - Motion control
  - Environmental control equipment
  - Central air conditioner
  - Elevator control

- Rubber & plastics
- Various types of production lines

■ Product Function

- Integrated 24V power output: It can provide power for external sensors or transmitters, etc.
- AC / DC module: support different power supply and control voltage
- Interrupt input: Allow quickly responds to the process signal.
- Single phase / A/B phase high-speed counters: Support counting up and counting down calculation
- Pulse output: Used to control the servo motors or stepper motors to fulfill positioning tasks
- Real Time Clock: Record the machine running time and display the PLC system time
- Interpolation function: Can achieve linear or circular interpolation function

The LE series PLC has powerful function making it a perfect solution for controlling various applications that either can operate at independent operation or can be connected to network to fulfill complicated control.

2.2 Naming Convention

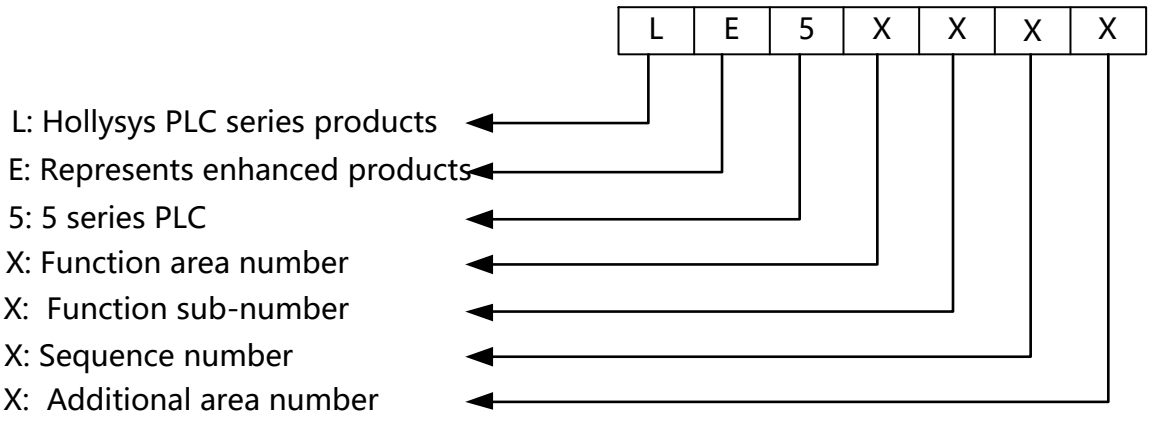


Figure 1 Naming Rules

For example: LE5223: Digital output module

Table 2 PLC Naming Rules for LE Series

Number of function area	Sub-number of function	Serial number	Definition for number of additional area
1 CPU module	00-99 serial number Even: 24VDC power supply, DO is the transistor output Odd: 220VAC power supply, DO is the relay output		E indicates analog input and output L indicates economic type
2 Digital module	1 Input module	0---9 serial number Even: DO is the transistor output Odd: DO is the relay output	
	2 Output module		
3 Analog module	1 Input module	0---9 serial number	
	2 Output module		
	3. Input and output mixed module		
4 Communication module	00-99 serial number		
6 Expansion board	1 Input module	0---9 serial number	
	2 Output module		
	3 Input and output mixed module		
7 Special module	0-99 serial number		

2.3 Model Configuration

2.3.1 CPU Module

CPU module is the core component of a PLC system. CPU modules work with expansion modules to make a complete PLC system via connecting extension bus. CPU module is responsible for carrying out the cycle process for 'reading input → program execution →processing communications requests →self-diagnosis → writing output →reading input…'. At the same time, CPU reads the input data and output data via expansion bus.

1. LE5104

- 24VDC power supply, 24VDC digital input, transistor output
- Integrated 8DI + 6DO total of 14 digital I / O

- Controllers for simple automation control requirements with small amount of I/O application

Figure 2 LE5104 Module Appearance

2. LE5105

- 220VAC power supply, 24VDC digital input, relay output
- Integrated 8DI + 6DO total of 14 digital I / O
- Controllers for simple automation control requirements with small amount of I/O application

Figure 3 LE5105 Module Appearance

3. LE5106

- 24VDC power supply, 24VDC digital input, transistor output
- Integrated 14DI + 10DO total of 24 digital I / O
- Controllers for general automation control requirements with medium amount of I/O application

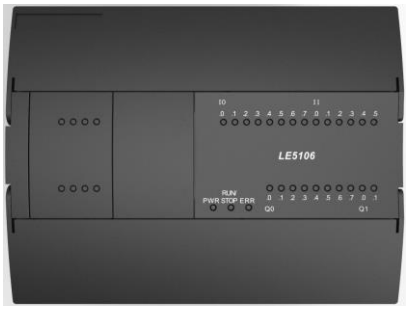


Figure 4　LE5106 Module Appearance

4. LE5107

- 220VAC power supply, 24VDC digital input, relay output
- Integrated 14DI + 10DO total of 24 digital I / O
- Controllers for general automation control requirements with medium amount of I/O application

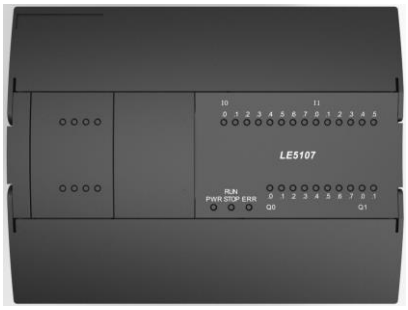


Figure 5　LE5107 Module Appearance

5. LE5107E

- 220VAC power supply, 24VDC digital input, relay output
- Integrated 12DI + 8DO +2AI+2AO total of 20 digital I / O 4 analog I / O
- Controllers for general automation control requirements with medium amount of I/O application

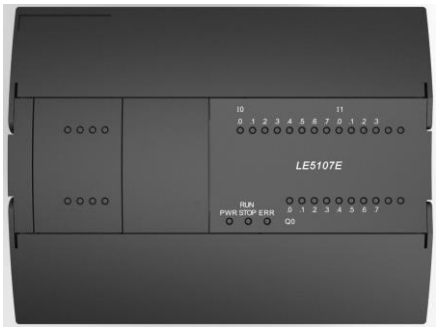


Figure 6 LE5107E Module Appearance

6. LE5107L

- 220VAC power supply, 24VDC digital input, relay output
- Integrated 14DI + 10DO total of 24 digital I / O
- Controllers for general automation control requirements with medium amount of I/O application

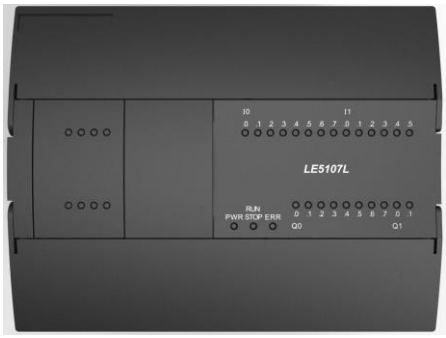


Figure 7 LE5107L Module Appearance

7. LE5108

- 24VDC power supply, 24VDC digital input, transistor output
- Integrated 24DI + 16DO total of 40 digital I / O
- Controllers for complicated automation control requirements with large amount of I/O application

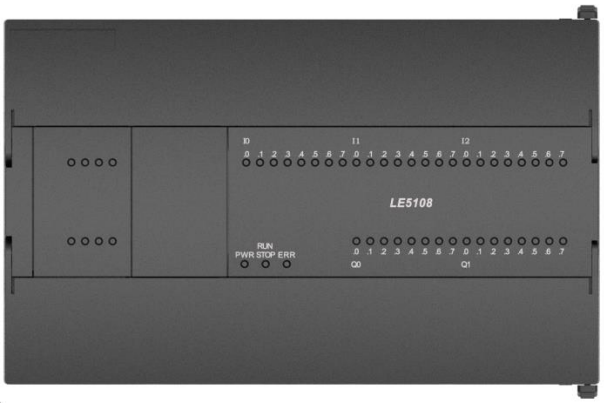


Figure 8 LE5108 Module Appearance

8. LE5109

- 220VAC power supply, 24VDC digital input, relay output
- Integrated 24DI + 16DO total of 40 digital I / O
- Controllers for complicated automation control requirements with large amount of I/O application

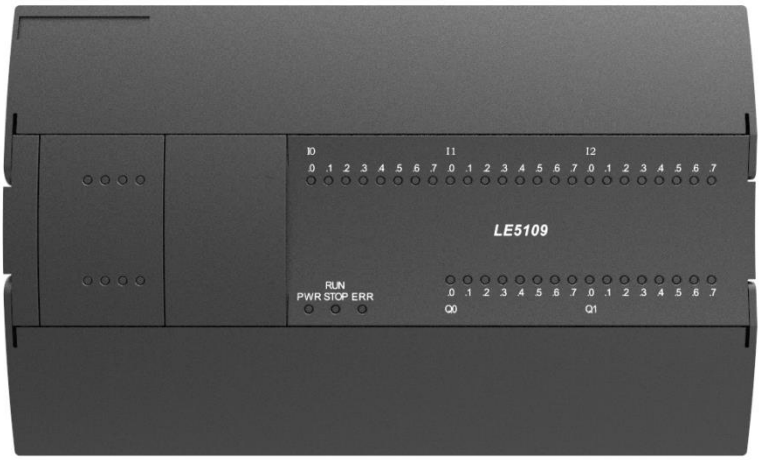


Figure 9 LE5109 Module Appearance

9. LE5109L

- 220VAC power supply, 24VDC digital input, relay output
- Integrated 24DI + 16DO total of 40 digital I / O
- Controllers for complicated automation control requirements with large amount of I/O application

Figure 10 LE5109L Module Appearance

- CPU module with the ability to expand the number of modules must meet the CPU module power consumption conditions, the specific are showed in the Chapter of 2.4 Power Consumption Calculation.

10. LE5118

- 24VDC power supply, 24VDC digital input, transistor output
- Integrated 24DI + 16DO total of 40 digital I / O
- Controllers for complicated automation control requirements with large amount of I/O application

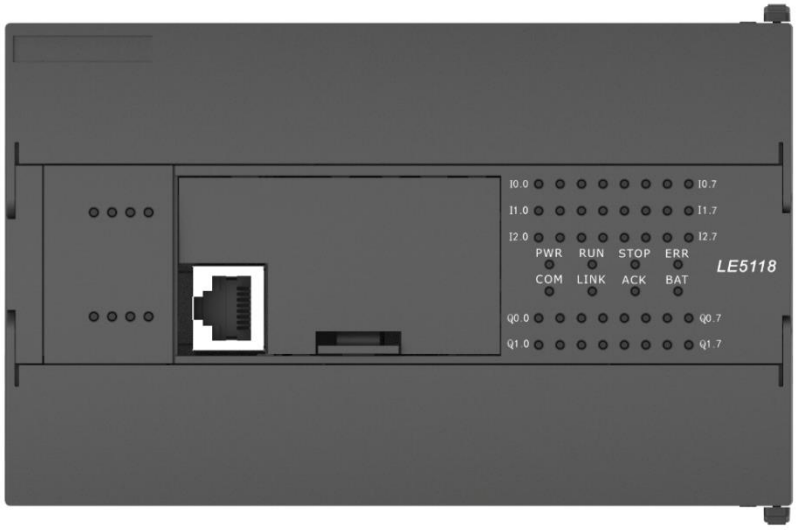


Figure 11 LE5118 Module Appearance

11. LE5119

- 220VAC power supply, 24VDC digital input, relay output

- Integrated 24DI + 16DO total of 40 digital I / O
- Controllers for complicated automation control requirements with large amount of I/O application

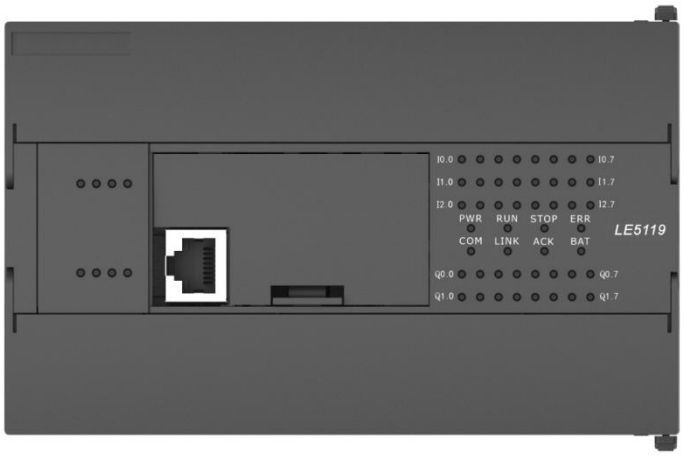


Figure 12 LE5119 Module Appearance

12. LE5128

- 24VDC power supply
- Integrated 16DI + 10DO total of 26 digital IO, 2AI + 4AO total of 6 analog IO
- Can independently control four servo motors or stepper motors for positioning
- Micro controllers specialized in motion control

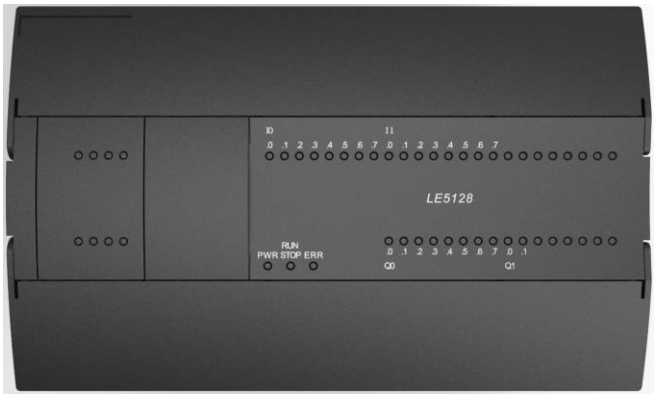


Figure 13 LE5128 Module Appearance

13. LE5708

- 24VDC power supply
- Integrated 24DI + 20DO total of 44 digital IO, 4AI + 8NTC+2AO total of 14 analog IO

- Module with USB memory interface

Controller specialized in air-conditioning

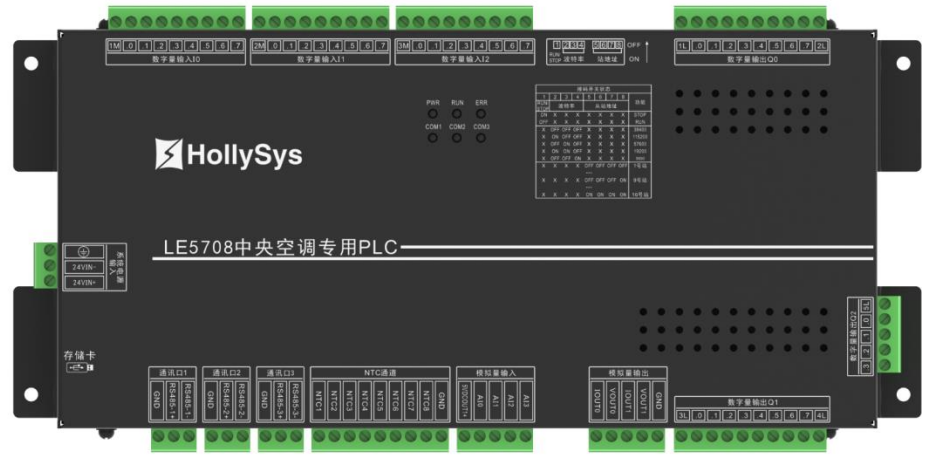


Figure 14 LE5708 Module Appearance

- The ability of CPU module to expand modules must meet the CPU module power consumption, see Chapter 2.4 Power Consumption Calculation for details.

2.3.2 Expansion Module

Apart from the integrated I/O channels, high-speed counting, high-speed output and other special functions in CPU module, in order to achieve control requirements under certain conditions, HollySys also carry a series of expansion modules that further extend the capability of LE PLC from both I/O channels and communication functions aspects. Digital module includes digital input modules and digital output modules.

Analog module includes analog input modules, analog output modules, analog input / output modules, thermocouple input modules, RTD input modules.

LE series PLC also provides a communication expansion module which provides the extremely favorable condition for the improving of function extensions. Communication module includes Profibus-DP slave communication module, Ethernet communication module, GPRS communication module and serial port communication extension module.

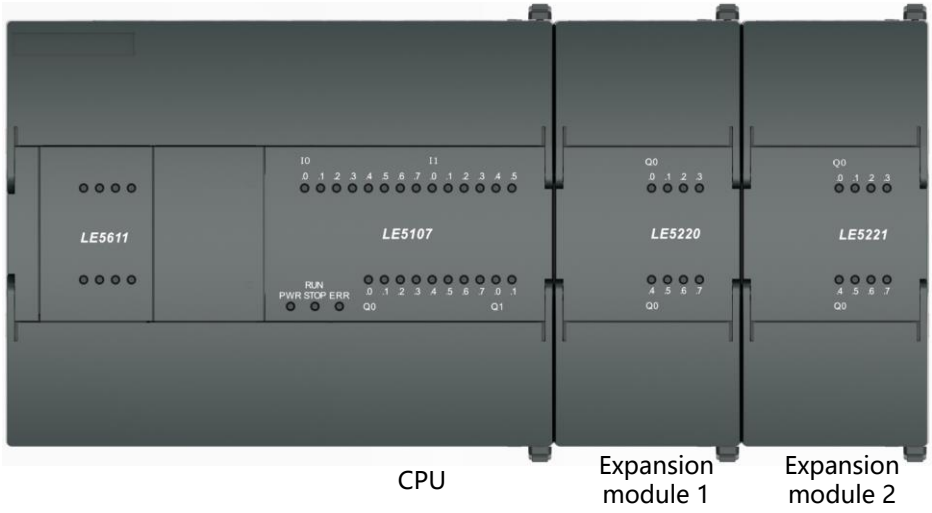


Figure 15 Expansion Module Schematic Diagram

2.3.3 The Maximum IO Configuration

I/O configuration of LE series PLC needs to consider the type of CPU module, the type and amount of expansion module, the size of the I/O data memory, current consumption and other factors.

Table 3 The Maximum I/O Configuration of CPU

Model		Digital (points)	Analog (points)
LE5104	On-board IO	14(8DI+6DO)	0
	The maximum expandable IO	224	72
	The maximum IO	238	72
LE5105	On-board IO	14(8DI+6DO)	0
	The maximum expandable IO	192	68
	The maximum IO	206	68
LE5106 LE5107	On-board IO	24(14DI+10DO)	0
	The maximum expandable IO	480	128
	The maximum IO	508	130
LE5107E	On-board IO	20(12DI+8DO)	4(2AI+2AO)
	The maximum expandable IO	128	22
	The maximum IO	148	26
LE5107L	On-board IO	24(14DI+8DO)	0
	The maximum expandable IO	No less than 80 DI or 42 DO	No less than 24 AI or 12 AO

Model		Digital (points)	Analog (points)
LE5108 LE5109	On-board IO	40(24DI+16DO)	0
	The maximum expandable IO	640	160
	The maximum IO	684	162
LE5109L	On-board IO	40(24DI+16DO)	0
	The maximum expandable IO	No less than 120 DI or 64 DO	No less than 24 AI or 12 AO
LE5118	On-board IO	40(24DI+16DO)	0
	The maximum expandable IO	640	160
LE5119	On-board IO	40(24DI+16DO)	0
	The maximum expandable IO	684	162
LE5128	On-board IO	26(16DI+10DO)	6 (2AI+4AO)
	High-speed IO	6DI+4DO	
	The maximum expandable IO	No less than 213	No less than 48
LE5708	On-board IO	44（24DI+20DO）	14(4AI+8NTC+2AO)

2.4 Power Consumption Calculation

The power supply for expansion modules and terminals are integrated inside the CPU module of LE series PLC, offering power for the CPU module as well as expansion module. All LE series CPU modules provide external 24VDC output which can supply power to sensors or actuators in field.

Table 4 CPU Module Power Supply Specifications

CPU module	System consumption(max.)		Supply for expansion bus		Supply for peripheral device	
	24VDC	220VAC	24VDC	5VDC	24VDC	5VDC
LE5104	800mA	—	250mA	600mA	350mA	—
LE5105	—	400mA	200mA	500mA	200mA	—
LE5106	1300mA	—	500mA	1200mA	300mA	—
LE5107	—	600mA	500mA	1200mA	200mA	—

CPU module	System consumption(max.)		Supply for expansion bus		Supply for peripheral device	
	24VDC	220VAC	24VDC	5VDC	24VDC	5VDC
LE5107E	—	300mA	190mA	550mA	—	—
LE5107L	—	300mA	190mA	550mA	—	—
LE5108	2200mA	—	950mA	2500mA	400mA	—
LE5109	—	1000mA	950mA	2500mA	400mA	—
LE5109L	—	500mA	400mA	1000mA	—	—
LE5118	2200mA	—	950mA	2500mA	400mA	—
LE5119	—	1000mA	950mA	2500mA	400mA	—
LE5128	2200mA	—	950mA	2500mA	400mA	—
LE5708	1200mA	—	—	—	—	10mA

Table 5 Expansion Module Power Consumption Specifications

Expansion module	Required power by expansion bus	
	24 VDC	5 VDC
LE5210	0mA	50mA
LE5211	0mA	65mA
LE5212	0mA	105mA
LE5220	0mA	90mA
LE5221	60mA	50mA
LE5223	120mA	135mA
LE5224	0mA	265mA
LE5310	15mA	95mA
LE5311	0mA	75mA

Expansion module	Required power by expansion bus	
	24 VDC	5 VDC
LE5340	0mA	135mA
LE5341	0mA	80mA
LE5341T	0mA	80mA
LE5342	0mA	130mA
LE5320	0mA	90mA
LE5321	0mA	45mA
LE5330	0mA	35mA
LE5401	0mA	145mA
LE5403	0mA	210mA
LE5404	0mA	30mA

Table 6 Gateway Communication Module Power Specification

Expansion module	Supply for expansion bus	
	24 VDC	5 VDC
LE5405	2100mA	3000mA

In LE PLC system configuration, the number of the expansion modules connected will affect the total demand of the system power. Increasing the number of expansion modules could overload the rated outputting power of CPU module. If this is the scenario, then the number of the expansion modules has to be reduced until it satisfies the rated outputting power of CPU module. Therefore, when choosing CPU module, the number of expansion modules and power consumption of the peripheral devices shall be taken into consideration.

- Calculation examples of power requirement

  The following table provides a calculation example of power demands. The PLC system consists of a CPU module LE5107 and three expansion modules - LE5211, LE5233 and LE5310. The calculation demonstrates that both of the consumption of 24VDC and 5VDC by expansion modules is less than the power providing of LE5107 to its expansion bus. Therefore, CPU module - LE5107 is able to supplies enough power to its expansion modules.

Table 7 Power Consumption Calculation Table

CPU module	Provided power by CPU module	
	24VDC	5VDC
LE5107	500mA	1200mA
Expansion module	Expansion module power consumption	
	24VDC	5VDC
LE5211	0mA	65mA
LE5223	120mA	135mA
LE5310	15mA	95mA
Overall requirements	135mA	295mA
Current balance	500mA -135mA =365mA	1200mA-295mA=905mA

2.5 Electrical Schematic Diagram

1. Electrical schematic diagram of digital input channels

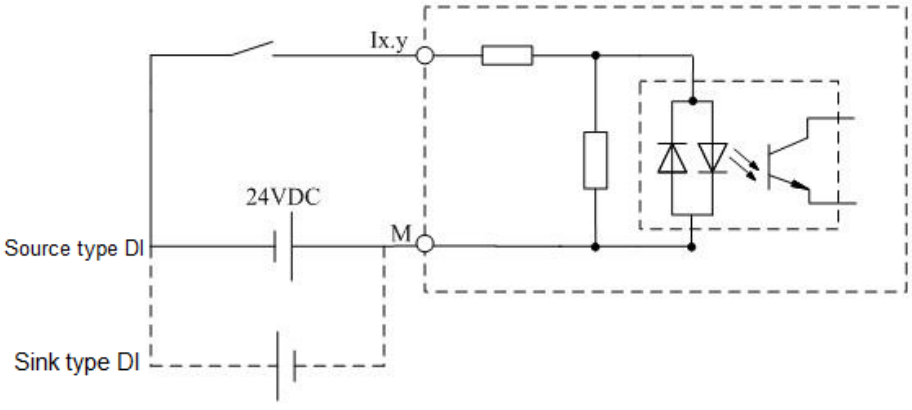


Figure 16 Digital Input Channels

2. Electrical schematic diagram of the ordinary output channels of transistor digital output

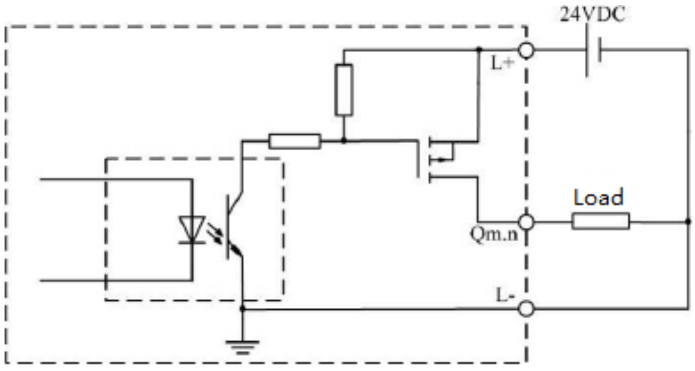


Figure 17 Ordinary Output Channels of Transistor Digital Output

3. Electrical schematic diagram of the high-speed transistor digital output channels

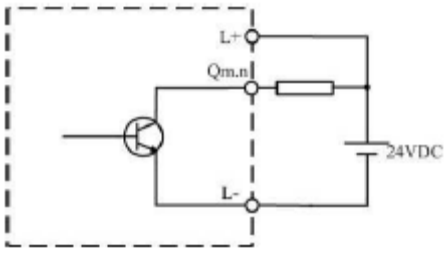


Figure 18 High-speed Transistor Digital Output Channels

4. Electrical schematic diagram of relay digital output channels

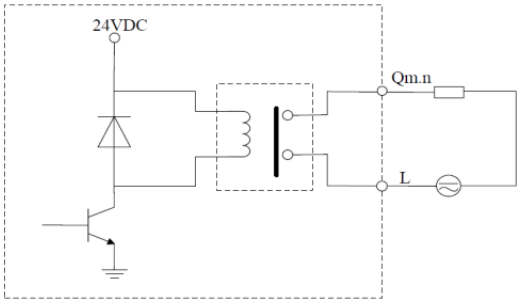


Figure 19 Relay Digital Output Channels

5. Electrical schematic diagram of analog input channels (differential)

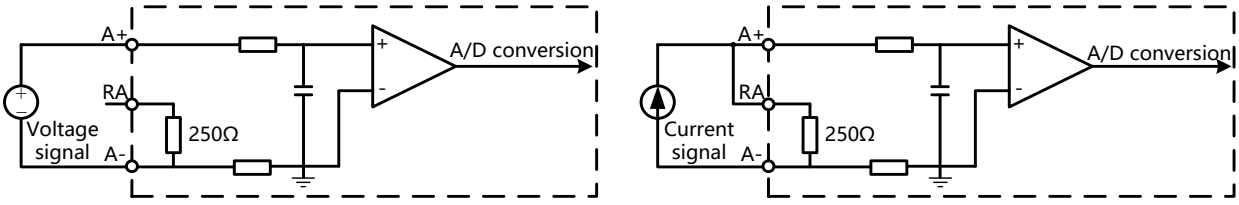


Figure 20 Analog Differential Input Channels

6. Electrical schematic diagram of analog input channels (single-end)

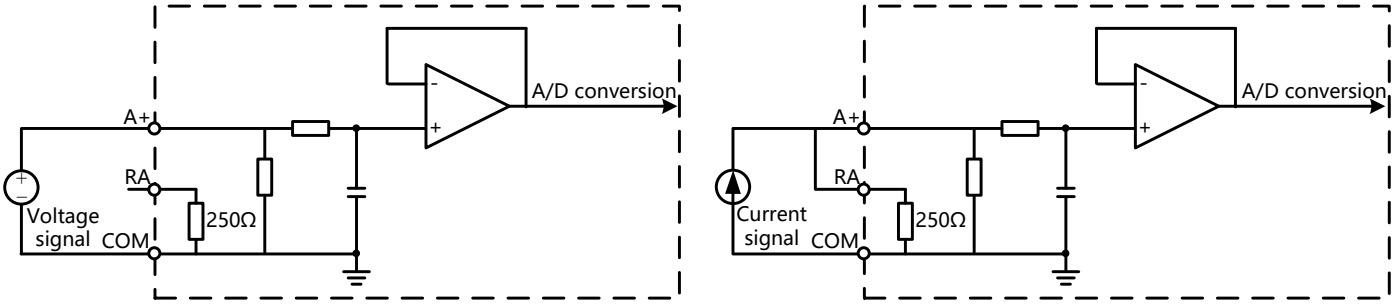


Figure 21 Single-end Analog Input Channels

7. Electrical schematic diagram of analog output channels

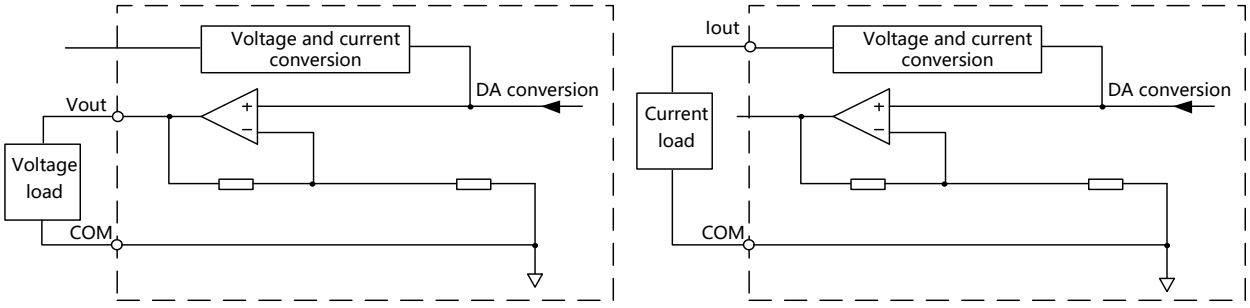


Figure 22 Electrical Schematic Diagram of Analog Output Channels

2.6 Communication Function

In order to meet the modern factory automation system openness requirements, LE series PLC offers serial communication, Profibus-DP fieldbus, and industrial Ethernet and GPRS communication.

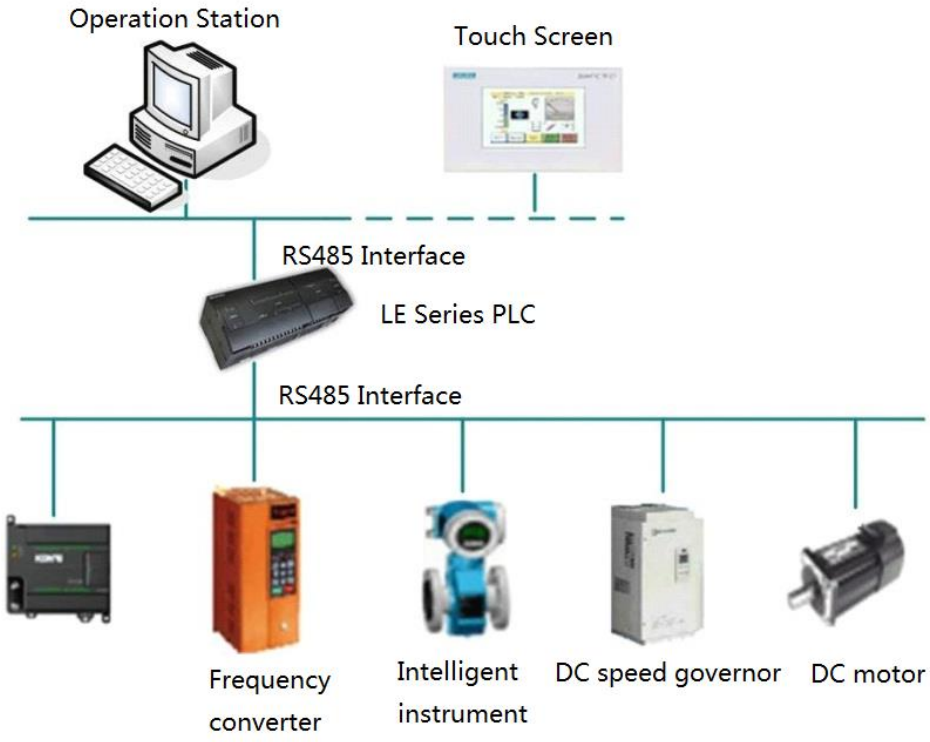


Figure 23 RS485 Communication Mode

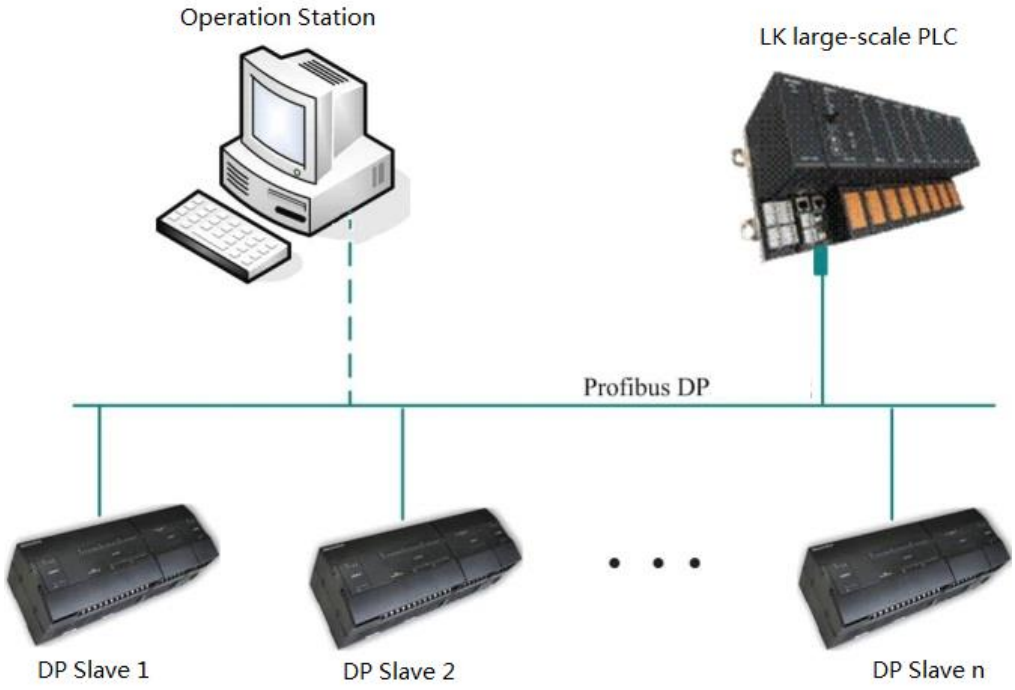


Figure 24 Profibus DP Mode

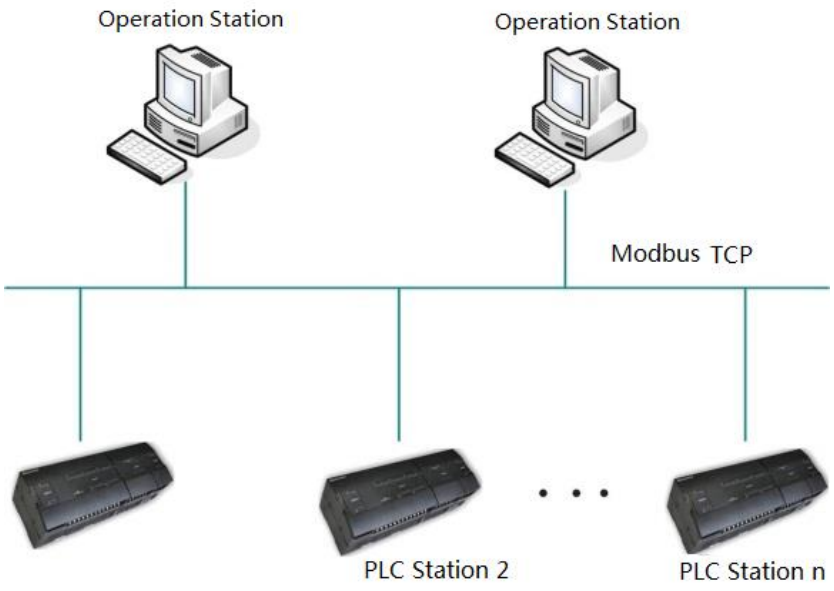


Figure 25 Ethernet Communication Mode

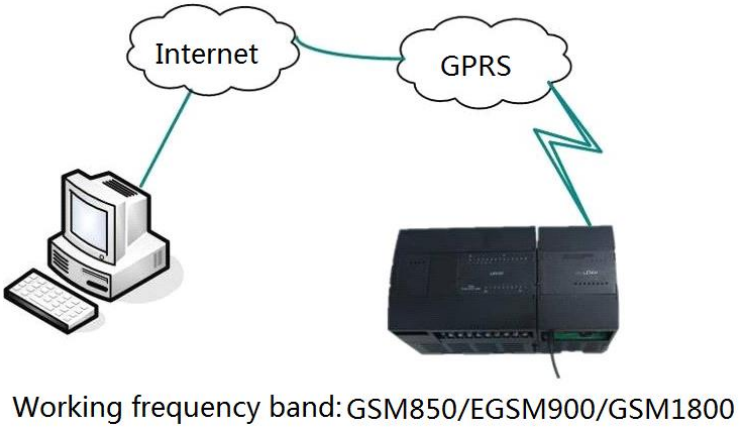


Figure 26 GPRS Communication Mode

2.7 Specifications of General Technology

1. Electromagnetic Compatibility

Electromagnetic Compatibility (EMC) is the ability of an electrical device to operate as intended in an electromagnetic environment and to operate without emitting levels of electromagnetic interference (EMI) that may disturb other electrical devices in the vicinity.

Table 8 Electromagnetic Compatibility Specification

Electromagnetic Compatibility Specification		
Item	Port	Specification
IEC 61000-4-2 Electrostatic Discharge	Chassis	Contact discharge 6kV, Air discharge 8kV
IEC 61000-4-3 Radiated, radio-frequency, electromagnetic field immunity test	Chassis	80MHz~1GHz,10V/m 1GHz~2.7 GHz,3V/m
IEC 61000-4-8 Frequency Magnetic Field Immunity	Chassis	30A/m
IEC 61000-4-4 Electrical Fast Transient Burst	DC systems	No requirements
	AC systems	2kV
	Digital I/O	1kV
	Analog signal and 485 communication port	1kV
IEC 61000-4-5 Surge Immunity	DC systems	No requirements
	AC systems	Common mode 2 kV, differential mode 1kV

Electromagnetic Compatibility Specification		
	Signal port	1kV
IEC 61000-4-6 Conducted disturbances	Power port, signal port	0.15~80MHz, 10V

2. Insulation Withstand Voltage Specifications

Table 9 Insulation Withstand Voltage Specifications

Test of high-voltage insulation	
220V input to earth	3000Vrms, 1min, leakage current <10mA
220V input to 24V/5V output	3000Vrms, 1min, leakage current <10mA
System isolated from the external IO	1000Vrms, 1min, leakage current <10mA

3. Environmental Reliability Specifications

Table 10 Environmental Reliability Specifications

Environmental Reliability Specifications	
Working Temperature	-40℃～＋70℃, 5~95% Relative humidity, non-condensing
IEC 60068-2-14, Test Nb, temperature shock	5～55°C, 3°C/min
IEC 60068-2-27, mechanical shock	15g, duration for 11ms, every axis six times
IEC 60068-2-6, Sinusoidal vibration	5Hz ≤ f ≤ 9Hz, 3.5 mm displacement; 9Hz ≤ f ≤ 150Hz, 1g acceleration
EN 60529, Level of mechanical enclosure	IP20, preventing the high-voltage fingers from touching the device, but not prevent the thing whose diameter is less than 12.5mm or water
Environment conditions-Transport and storage	
IEC 60068-2-2, Test Bb, dry hot IEC 60068-2-1, Test Ab, low temperature	-40℃～＋70℃
IEC 60068-2-30, Test Db, damp and hot	25～55°C, 5~95% relative humidity

Environmental Reliability Specifications	
IEC 60068-2-32, Test Ab, Free fall	1m, five times, transport and package

4. Nominal Voltage

Table 11 Rated Voltage

Rated Voltage	Permissible Range
24VDC	20.4～28.8VDC
220VAC	85～264VAC(50/60Hz)

5. Transportation

The package of this product satisfies the requirement of road and railway transportation. However, in the process of transportation, the environment conditions should meet the requirement that is regulated by the product technology.

6. Storage

The packed products are not suitable for outdoor storage and the relative humidity has to be maintained from 5% to 95% without condensation. The storage of LE PLC should keep away from chemical products that contain harmful gas, inflammable, explosive and mordant. Moreover, these products should be prevented from intense mechanical vibration, impact and the action of high-intensity magnetic field.

The transported barometric pressure should be within the altitude of 0 to 3,000 meters. And the permissible temperature range for storage is from -40 to ＋70°C.

7. Notice for Installation

- Please install the PLC in accordance with the specifications in the manual, the installation shall keep away from below environment:
  - Dust, lampblack, electric conductivity dust, corrosive gas and flammable site.
  - The site exposed to high temperature, moisture condensation, wind and rain.
  - The site with vibration and impact.
  - The electricity shocking and fire will shorten the product lifespan and causing products damage.
- During installation, the metal filing or electric wire should be avoided from probe into the ventilate grille of PLC.
- During installation, the power supply to PLC should remain off state.

- Installation and wiring should be fastened to avoid the loss connection.
- Before PLC powering on, please ensure the terminal covers are attached and closed properly to prevent electricity shock.
- Please turn on the power supply in accordance with the instruction of terminals to avoid mixing up the alternating current power supply (L and N terminals) and direct current power supply (VI- and VI+ terminal) to prevent the damaging of PLC modules.
- Do not connect external power supply to Vout- and Vout+ terminals.
- Please do not share the grounding terminal of the module with high-voltage system.

8. Notice of operation and scrap

- Do not touch the terminals when electricity is energized, otherwise, it will lead to personal electricity shock or unpredictable behaviors of PLC.
- When the product is obsolete, it should be disposed as the industrial waste.

2.8 Fast Application Guide

If you already have experience of using PLC, the following instructions will help you quickly build simple control system based on LE series PLC.

2.8.1 Items Inventory

Please carefully check your product components, and check whether the packaging is complete.

2.8.2 Device Installation

- To select the suitable CPU modules and expansion modules according to actual application.
- To decide the installation mode of the module according to the field situation (rail mounting or screw mounting), and to preliminarily consider the working mode of PLC.
- To develop and formulate a reasonable plan on wiring scheme, and to connect the field sensor or actuator to the PLC module terminals.

2.8.3 Connect the Power Wiring

- Check power supply terminal of PLCs you are using before starting wiring.

- Double check the power wiring before switch on the PLC system power, and ensure that RUN indicator on the CPU module is at on state and PLC system works normally.

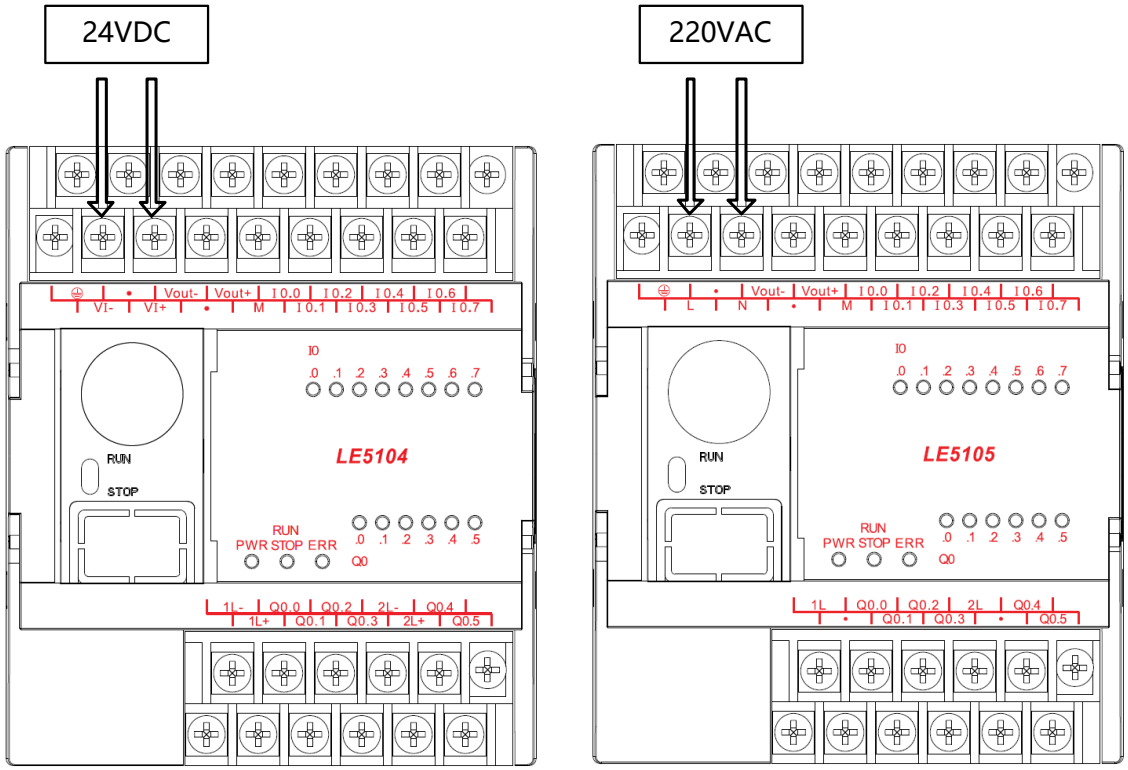


Figure 27 Power Supply Wiring Diagram

Table 12 Power Supply Specifications

Power supply (rated voltage)	Permissible range	Suitable CPU model
24VDC	20.4～28.8VDC	LE5104, LE5106, LE5108, LE5118,LE5128
24VDC	21.6~26.4VDC	LE5708
220VAC	85～264 VAC	LE5105, LE5107, LE5107E, LE5107L, LE5109, LE5109L, LE5119

2.8.4 Establish PC Communication

With the help of programming cable, the CPU module is connected to a computer to establish data transfer channels, and the connection of the programming cable should be secured before powering on the PLC system.

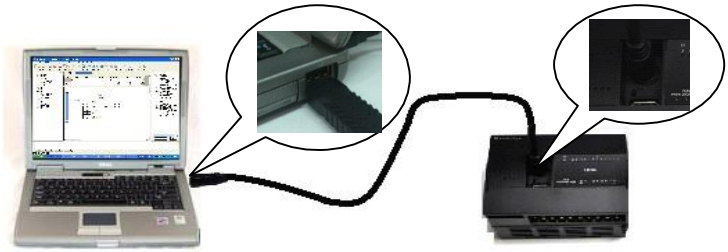


Figure 28 Connecting Programming Cable

The programming cable for LE series PLC is a non-isolated industrial converter. It is an USB to 485 DIN type interface. It can realize the application program downloading and real-time communicating between PLC and its connected PC through AutoThink programming software.

LE5118/LE5119 controller can communicate with AutoThink software through Ethernet port or LE5403 communication module.

- Do not plug and unplug the serial port when CPU power is on.

2.8.5 Programming

Install AutoThink programming software, set relevant parameters to establish communication with the CPU module. Design and develop corresponding program logic to achieve control tasks according to the project requirements.

- Details of programming software, please refer to *AutoThink V3.1 User Manual_Project Configuration*.

2.8.6 Device Running

Upon the completing of the above processes, download the debugged program to the PLC and conduct the testing and commissioning of the field devices, a control system based on LE series PLC can be put into operation.

2.9 Fault Diagnosis

System assign diagnostic zone with corresponding byte to each module and save detailed diagnostic information of each module. When module faults detected the diagnostic information will be reported and saved into the user configurable variables for future query and analysis purposes. Please refer to Data Storage Area in Chapter 5 of *AutoThink V3.1 User Manual_Project Configuration* for more details.

2.10 Module Connection

Module can be connected to each other through 10-pin female socket located at the right of itself and 10-pin male connector located at the left of itself. Latch the upper and lower side-lockers to secure the two modules next to each other.

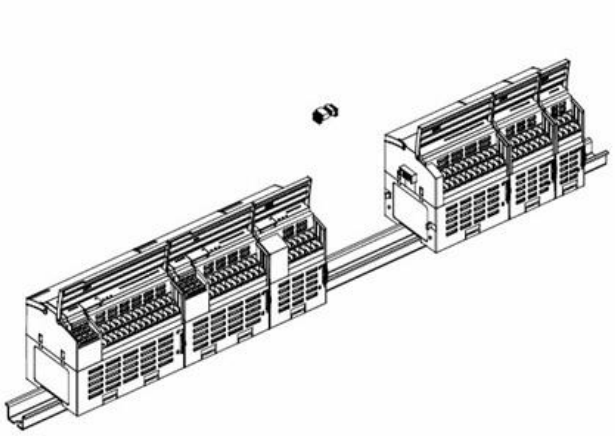


Figure 29 Module Connection

- Before mounting or removing modules and relevant devices, please ensure the power supply shall remain at off state.
- Cover of the terminal should be fastened properly prior to power on of the PLC system to avoid unnecessary personal injury or device damage.

Chapter 3 CPU Module

CPU Module is the control center of the whole PLC system, engaging functions of control, detection, diagnosis and communication that the system needed.

3.1 Overview

3.1.1 Module Structure

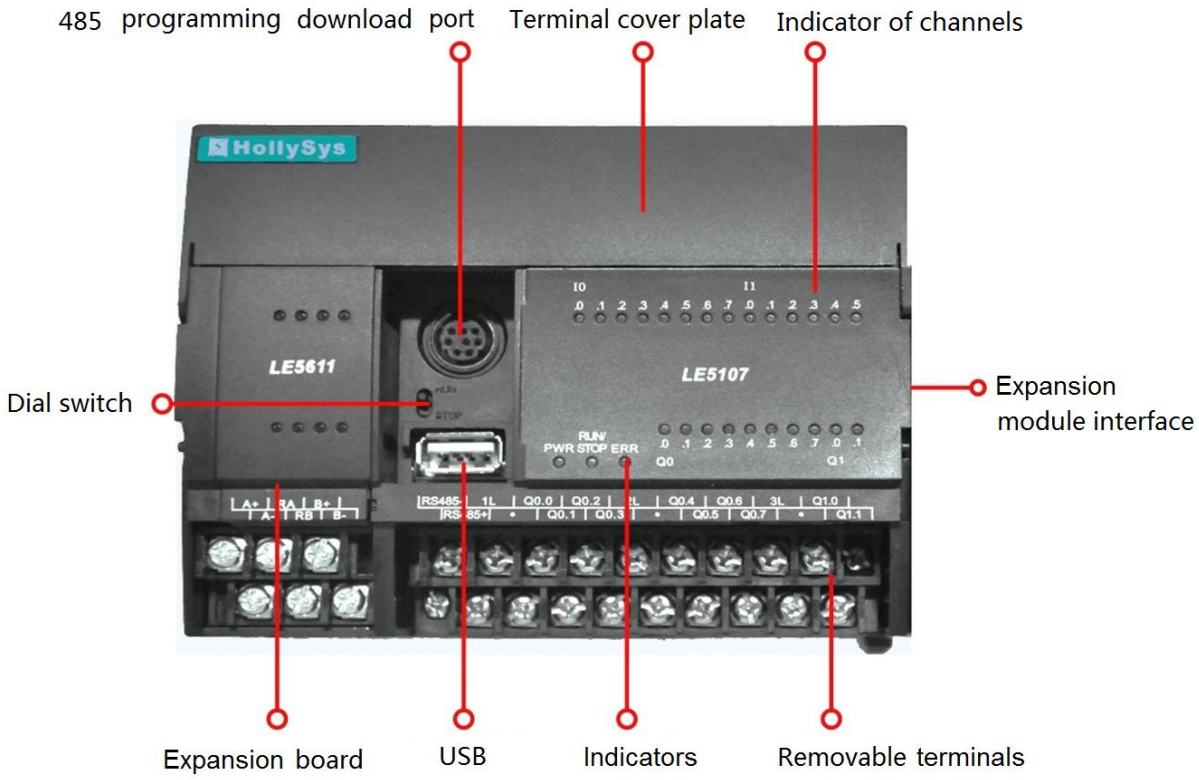


Figure 30 CPU Module Structure

- 485 programming download port: It provides channel for downloading user program, supports visiting to external devices and multi-PLC interconnection (applies to multi-PLC interconnection of 14 points CPU).

- Dial switch: You can choose the run/stop mode of CPU module.
- Expansion module interface: It is used for the communication between CPU module and expansion module.
- USB: Supports uploading user program from USB (applies to 24 points and 40 points CPU module).
- Expansion board: Supports expansion of function board (applies to 24 points and 40 points CPU module). In order to protect the port, protection cover is installed in the module. Coat the cover after wiring to prevent electric shock.

3.1.2 Basic Features

LE series PLC provides various kinds of CPU to meet requirements for different applications. CPU ontology integration has a certain number of I/O points, among which DI is transistor type input which is able to connect source type or sink type input signals; DO type is transistor or relay. According to the specifications of supply power, CPU can be classified as two types: power supplied by 24 VDC and 220VAC. Table 13 shows the major technical specification of various CPU modules.

Table 13 Major Technical Specification of CPU Modules (1)

Basic Specification	**LE5104**	**LE5105**	**LE5106**	**LE5107**	**LE5108**	**LE5109**	**LE5118**	**LE5119**
Supply	24VDC	220VA	24VDC	220VA	24VDC	220VAC	24VDC	220VAC
DI	8×24VDC		14×24VDC		24×24VDC			
DO	6×transistor	6×relay	10×transistor	10×relay	16×transistor	16×relay	16×transistor	16×relay
AI	-							
AO	-							
Number of expansion module (max), see Note ①	10	10	16	16	20	20	20	20
Increment download function	Not supported	Not supported	Supported in LE5106-A05 and above version	Supported in LE5107-D01 and above version	Supported in LE5108-A08 and above version	Supported in LE5109-C02 and above version	Supported	Supported
Program download function	Binary code download mode							

Basic Specification	LE5104	LE5105	LE5106	LE5107	LE5108	LE5109	LE5118	LE5119
Program upload function	Supported							
Memory card function	Not supported		Supported				Not supported	Not supported
TF card function	Not supported		Not supported				Supported	Supported
Program memory	64K bytes		128K bytes		256K bytes			
Input memory	1K bytes				1K bytes			
Output memory	1K bytes				1K bytes			
M memory	4K bytes		8K bytes		16K bytes			
N memory	9K bytes		21K bytes		37K bytes			
S memory	1K bytes						1K bytes	1K bytes
Power-loss retentive	2K bytes		4K bytes		8K bytes			
Number of	Unlimited							
Number of	Unlimited							
PID circuits	Unlimited							
Project encryption	Supported							
Real-time	Supported							
Computing speed	0.1μs (basic instruction)							
Programming language	Ladder diagram(LD), Structured text(ST), Continuous function chart(CFC), Sequence function chart(SFC)							

Table 14 Major Technical Specification of CPU Modules (2)

Basic Specification	LE5107E	LE5107L	LE5109L	LE5128	LE5708
Supply Voltage	220VAC			24VDC	
DI	12×24VDC	14×24VDC	24×24VDC	16×24VDC	24×24VDC

Basic Specification	LE5107E	LE5107L	LE5109L	LE5128	LE5708
DO	8×relay	10×relay	16×relay	10×transistor	20×relay
AI	2×voltage or current	-		2×voltage or current	4×(voltage/current) 8×NTC
AO	2×voltage or current	-		4×voltage or current	2×voltage or current
Number of expansion module (max), see Note ①	4	4	7	20	Not supported
Increment download function	Supported in LE5107E-C04 and above version	Supported in LE5107L-D02 and above version	Supported in LE5109L-D02 and above version	Supported in LE5128-B03 and above version	Not supported
Program download	Binary code download mode				
Program upload	Not supported			Supported	Not supported
Memory card	Supported				
Program memory	128 K bytes			256K bytes	256K bytes
Input memory	128 bytes			1K bytes	512 bytes
Output memory	128 bytes			1K bytes	512 bytes
M memory	3K bytes			16K bytes	16K bytes
N memory	5K bytes			37K bytes	37K bytes
S memory	1K bytes			1K bytes	1K bytes
Power-loss retentive memory	2K bytes			8K bytes	2K bytes

Basic Specification	LE5107E	LE5107L	LE5109L	LE5128	LE5708
Number of timer	Unlimited				
Number of counter	Unlimited				
PID circuits	Not supported			4 (cycle 1-63ms, it is optional for integer times of 1ms)	Not supported
Project encryption	Supported				
Real-time clock	Supported (no power-off protection)			Supported (15 days)	Supported (12 months)
Computing speed	0.1μs (basic instruction)				
Programming language	Ladder diagram(LD), Structured text(ST), Continuous function chart(CFC), Sequence function chart(SFC)				

Note ①: The maximum number of expansion modules should be combined with the power consumption calculation, please refer to Chapter 2.4 Power Consumption Calculation.

3.1.3 Operation Mode

Both programming software and CPU module provide the setting of “Run” and “Stop” status, therefore the software and hardware are constrained each other.

Table 15 RUN/STOP Switch Setting Instructions

RUN/STOP selective Switch Position	Status of Programming Software	Module Status
RUN (switch to upper position)	RUN	RUN: automatically changed into STOP if users download program in this state.
	STOP	STOP
Stop (switch to lower position)	RUN/STOP	STOP (user program stops, unable to run)
STOP→RUN（Switch ）	RUN/STOP	RUN, you can controller run or stop of the controller by programming software

RUN/STOP selective Switch Position	Status of Programming Software	Module Status
RUN→STOP（Switch ）	RUN/STOP	STOP, user's program stops, unable to run by programming software

3.1.4 Definition of Indicators

Table 16 Definition of Indicator

Type	Color	Status		Description	Difference of indicator status	Difference of indicator color
Power supply PWR	Green	ON		Power supply works in normal mode.		
		OFF		Power is abnormal or no power or output 24V overloading		
Channel status indicator Ix.y,Qm.n	Green	ON		The channel is in ON		
		OFF		The channel is in OFF		
Operation status indicator RUN/STOP	Green/ Yellow	ON green		PLC is in RUN mode and user program is running		Operation status indicator color of LE5708 is only green
		Flashing green		User program memory is null or project is invalid	Only LE5109L supported	
				1Hz flashing: Waiting for transferring user program from memory card	Only LE5708 supported	
				4Hz flashing: Transferring user program from memory card		
		OFF green		PLC is in STOP mode and user program is not running	Only LE5708 supported	
		ON yellow		PLC is in STOP mode and user program is not running		
		Flashing yellow(1Hz)		PLC firmware is upgrading	Only LE5107L/LE5107E/LE5108/LE5106/LE5128/LE5109L supported	
		Flashing alter	1Hz	Waiting for transferring user program from memory card	Only the LE5107L/LE5107E/LE5108/LE512	
			4Hz	Transferring user program		

Type	Color	Status	Description	Difference of indicator status	Difference of indicator color
		natel y	from memory card	8/LE5106/LE5107/LE5109L/LE5109 supported	
COM1	Yellow	Flashing	RS485-1 with communication	Only LE5708 supported	
		OFF	No communication		
COM2	Yellow	Flashing	RS485-2 with communication		
		OFF	No communication		
COM3	Yellow	Flashing	RS485-3 with communication		
		OFF	No communication		
Failure status indicator ERR, see Instruction ②	Red	ON	The CPU is in failed mode		
		OFF	PLC is in normal operating mode		
		Flashing (1Hz)	Upgrading firmware failed	Only LE5107L/LE5107E/LE5108/LE5106/LE5128/LE5109L supported	

Instruction ②: Possibility and solutions if ERR indicator is on:

- System configuration of programming software is inconsistent with actual hardware configuration.
- Solutions: check system configuration in programming software and re-configure hardware.
- Communication with expansion module is failed.

  Solutions: check whether the expansion module is connected correctly and check whether state of module is normal in data diagnosis area.
- Report faults occurring to each expansion module.

  Solutions: replace faulty expansion module.
- Project is loaded unsuccessfully through Memory card.

  Solutions: Verify that the engineering and controller platforms in the memory card are consistent.

  Note: indicator of LE5118/LE5119 is different from the above controller indicator, please refer to chapter of corresponding module.

3.1.5 Communication Connection

RS485 communication interface can establish connection to personal computer (PC) through programming cable, realize download of user program and on-line debugging and be applied to communicate with field devices. Junction and communication between CPU module and PC are achieved through PS/2 (at ① in Figure 31), junction and communication between CPU module and expansion module are achieved through connector (at ② in the Figure 31).

Note: LE5118/LE5119 series controller can communicate with AutoThink software through Ethernet port or LE5403 communication module.

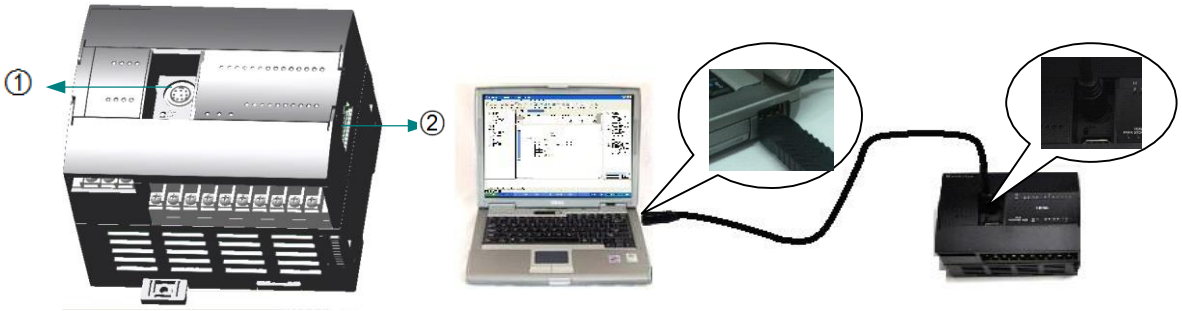


Figure 31 Communication Connection Diagram

- Before downloading, please confirm that PLC is connected as per the schematic diagram.
- Before downloading, please confirm that AutoThink V3.1.0 or above version has been installed.
- To download, please click “Download” option in menu bar of AutoThink software and follow the instructions for downloading.

- Cover of the connector should be fastened properly after power is connected to avoid unnecessary personal injury or device damage;
- When connecting or removing PLC power, severe personal injury or device damage may be caused if power is not isolated. Therefore, before module installation or removal, all power must be turned off and please pay attention to this at any time.
- Before connecting power to PLC, please confirm programming cable is connected properly and please do not remove from or insert into communication port during power on to avoid device damage.
- Please use shielded twisted pair in the high-speed digital input channel.
- You can set the filtering parameter to strengthen the anti-interference ability of the high-speed input channel in the case of interference of high-frequency signal.

3.1.6 485 Downloading Interface

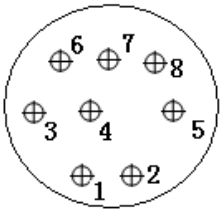


Figure 32 Pins of 485 Downloading Port

Table 17 Definition of Pins

Pin No.	Definition	Pin No.	Definition
1	NC	2	NC
3	NC	4	NC
5	RS485+	6	RS485-
7	GND	8	NC
9	PGND(Shell)		
Note	5, 6 use twisted pair		

3.2 LE5104 8 DI / 6 DO CPU Module

LE5104 is a CPU module of LE Series micro PLC which can complete control, detection, diagnosis, RS485 communication needed for system. Functions specifically achieved as follows: RUN/STOP switch selects running and stopping mode of module. RTC records operation time. RS485 interface provides channel to download application program and supports access to peripheral device and multi-PLC interconnection, equipped with 8 DI and 6 DO and is a general-purpose CPU module.

3.2.1 Technical Specifications

Table 18 Technical Specifications

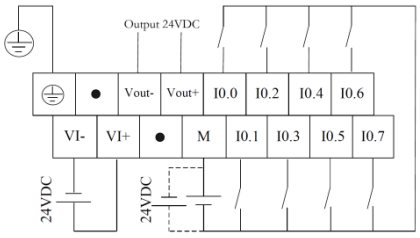
CPU Specifications		Power Supply Specifications		
On-board I/O	8 DI / 6 DO	Input	Rated voltage	24VDC
I/O expansion module (max.)	10 (total module power consumption ≤ CPU rating)		Permissible range	20.4~28.8VDC

CPU Specifications		Power Supply Specifications		
Programming language	LD/ST/CFC/SFC		Current consumption (max.)	800mA@24VDC
Program memory	64K bytes	External output voltage		24VDC
Data memory	18K bytes	External output current (max.)	+24VDC (supply for expansion bus)	250mA
Power-loss retentive memory	2K bytes		+24VDC (supply for peripheral device)	350mA
HSC	2 HSC at 20 KHz for single phase（Ix0.0, Ix0.1）		+5VDC (supply for expansion bus)	600mA
	1 HSC at 10 KHz for A/B phase（Ix0.0, Ix0.1）	Hold up time (loss of power)		10ms
Pulse outputs (max.)	2, 20KHz（Qx0.0, Qx0.1）	Output Specifications		
Pulse catch	2（Ix0.0, Ix0.1）	Number of outputs	6	
Fast external interruption	2（Ix0.0, Ix0.1）	Output type	Transistor	
Basic instruction processing time	0.1μs	Rated voltage	24VDC	
Input Specifications		Permissible range	20.4 to 28.8VDC	
Number of inputs	8	Output current	Max. 500mA for PTO channel; max. 1A for ordinary channel	
Input type	Sink/source	Current per common	1A max. for PTO channel; 4A max. for ordinary channel	
Rated voltage	24VDC	Residual voltage	<0.5V (output logic 1, at 1A current)	
Permissible range	0~30VDC	On state resistance	0.3Ω(typical), 0.6Ω(max.)	
Logic 1 signal	15~30VDC, permissible min. current 3mA	Isolation mode	Optocoupler isolation (field side to system)	
Logic 0 signal	0~5VDC, permissible max. current 1mA	Isolation groups	2	
Filtering parameter	No filtering, 5ms, 10ms, 20ms, 50ms, and 100ms	Isolation withstand voltage	500V AC for 1minute, leakage current <5mA	
Isolation mode	Optocoupler isolation (field side to system)	Physical Specifications		
Isolation groups	1	Dimensions W x H x	78 x 97 x 90	

CPU Specifications		Power Supply Specifications	
		D (mm)	
Isolation withstand voltage	500V AC for 1minute, leakage current <5mA	Weight	315g
Communication Specifications		Operating temperature	-40℃～+70℃
Communication interface	1 RS485	Storage temperature	-40℃～+70℃
Interface type	PS/2	Relative humidity of operating environment	5%~95% (non-condensing)
Baud rates (bps)	1,200, 2,400, 4,800, 9,600, 19,200, 38,400, 57,600, 115,200	Relative humidity of storage environment	5%~95% (non-condensing)
Communication protocol	Proprietary protocol, Modbus master-slave, free port protocol, multi-PLC interconnection		

3.2.2 Terminal Definition and Connection

LE5104 is connected with an external 24VDC power and has two pluggable terminals (8x2 and 5x2), the upper terminal offers digital input channel (DI), the lower terminals offers digital output channel (DO), and connection is easy and convenient and is secured with screw, which is a typical field connection case.



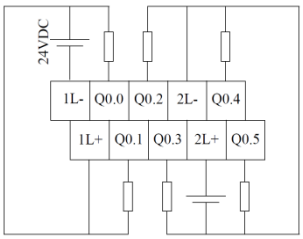
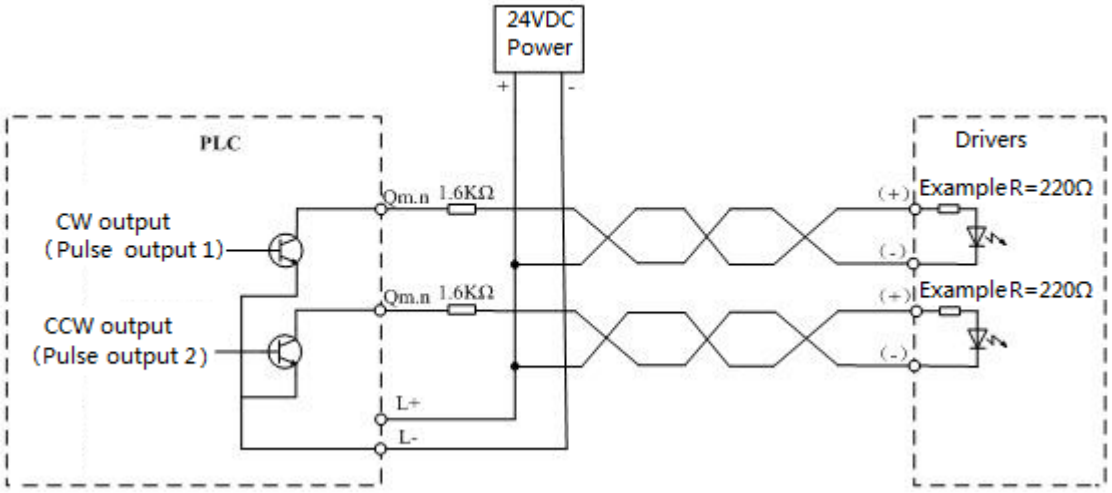


Figure 33 Upper Terminal Definition ***Lower Terminal Definition***

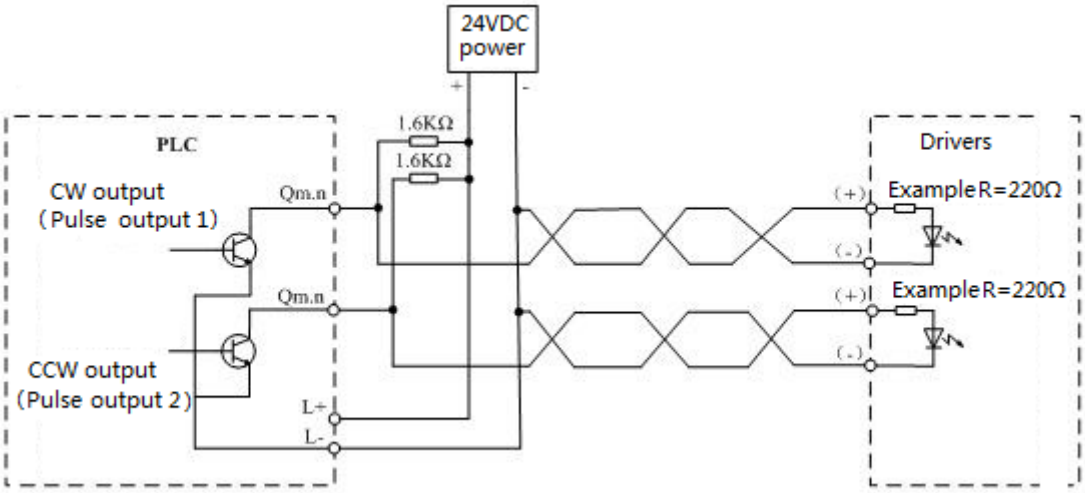
- LE5104 Terminal Definition and Connection Instructions
  - High-speed channel output mode for the open set; ordinary channel output mode for the high-side drive, wiring as shown in Figure 33.
  - M terminal of digital input channel (DI) is common terminal for peripheral DI, users can choose to connect M to positive terminal or negative terminal of 24VDC power to fit sink/source type of DI.

- 1L+, 2L+ and 1L-, 2L- of output channel (DO) respectively are connected to positive terminal and negative terminal of 24VDC load driving power source.
- VI+ and VI- of upper terminal are respectively connected to positive and negative terminals connecting 24VDC power supply to CPU modules.
- Vout+ and Vout- terminals of upper terminal are respectively connected to positive and negative terminal 24VDC connecting power supply to external devices.
- "●" means the channel cannot be connected or connection is not available. "⏚" means grounding.
- The following wiring diagrams include two schematic diagrams of connection of high-speed output terminal and motor, the external resistance in the schematic diagrams is for example only. In actual applications, users must calculate external resistance according to their selected permissible current on input side of driver and internal resistance.

Figure 34 wiring diagrams include two schematic diagrams of connection of high-speed output terminal and motor, the external resistance in the schematic diagrams is for example only. In actual applications, users must calculate external resistance according to their selected permissible current on input side of driver and internal resistance.



(a)



(b)

Figure 34 CW/CCW Mode Wiring Diagram

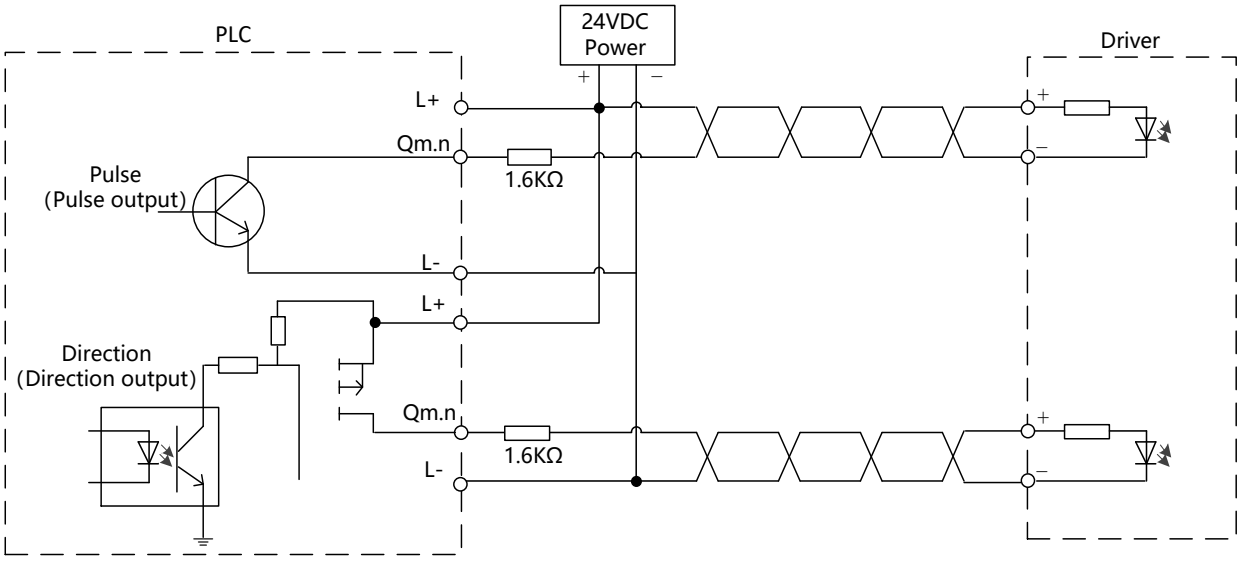


Figure 35 Pulse + Direction Mode Wiring Diagram

Description:

CW / CCW mode:

1: Output axis 1, pulse output (CW) Q0.0, pulse output (CCW) Q0.1

Pulse + direction mode:

1: Output axis 1, pulse output Q0.0, pulse direction Q0.4

2: Output axis 2, pulse output Q0.1, pulse direction Q0.5

Table 19 Terminal Identification

Terminal Identification	Description	Terminal Identification	Description
⏚	Grounding	VI-	Input power supply 24VDC negative
•	No connection	VI+	Input power supply 24VDC positive
Vout-	Output 24VDC negative	•	No connection
Vout+	Output 24VDC positive	M	Common of input
I0.0	Fast external interruption 1/ Pulse catch 1/ single-phase counter 1/ A/B phase counter phase A / Ordinary input	I0.1	Fast external interruption 2/ pulse catch 2/ single-phase counter 2/ Ordinary input
I0.2	Single-phase counter 1 reset / A/B phase counter reset / Ordinary input	I0.3	Single-phase counter 2 reset /Ordinary input
I0.4	Single-phase counter 1 direction control / A/B phase counter phase B/ Ordinary input	I0.5	Single-phase counter 2 direction control / Ordinary input
I0.6	Ordinary input	I0.7	Ordinary input
1L-	Load driving power source 1 negative (Q0.0, Q0.1)	1L+	Load driving power source 1 positive (Q0.0, Q0.1)
Q0.0	High-speed output/Ordinary output	Q0.1	High-speed output/ Ordinary output
Q0.2	Ordinary output	Q0.3	Ordinary output
2L-	Load driving power source 2 negative (Q0.2~Q0.5)	2L+	Load driving power source 2 positive (Q0.2~Q0.5)
Q0.4	Ordinary output	Q0.5	Ordinary output

3.2.3 Electrical Schematic Diagram

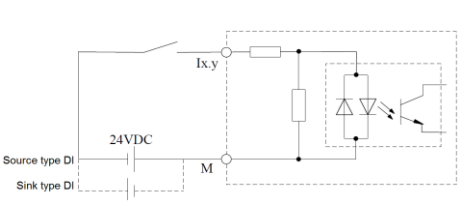
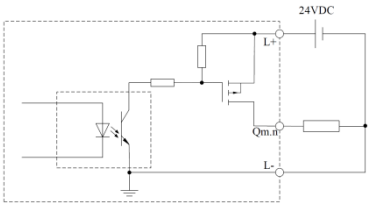
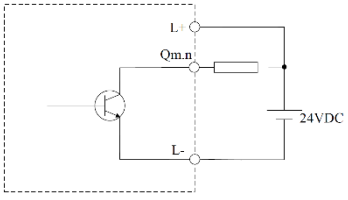


Figure 36 Input



Ordinary Output



High-speed Output

Note: when the output transistor is turned on, the load impedance is required to be greater than 100 Ω for preventing oversize current through the PLC internal.

3.3 LE5105 8 DI/ 6 DO CPU Module

LE5105 is a CPU module of LE Series micro PLC which can complete control, detection, diagnosis and RS485 communication needed for system. Functions specifically achieved as follows: RUN/STOP switch selects running and stopping mode of module. RTC records operation time. RS485 interface provides channel to download application program and supports access to peripheral device and multi-PLC interconnection, equipped with 8 DI and 6 DO and is a general-purpose CPU module.

3.3.1 Technical Specifications

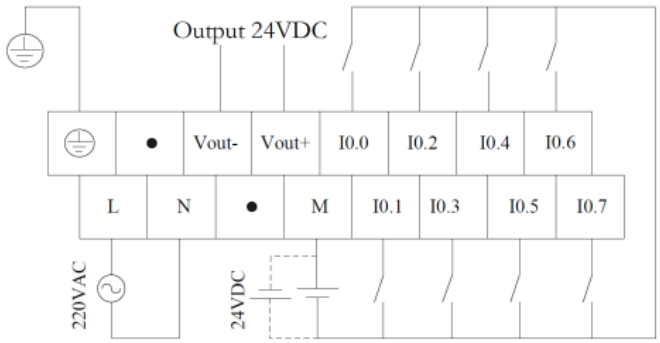
Table 20 Technical Specifications

<table>
<tr><th colspan="2">CPU Specifications</th><th colspan="3">Power Supply Specifications</th></tr>
<tr><td>On-board I/O</td><td>8 DI / 6 DO</td><td rowspan="3">Input</td><td>Rated voltage</td><td>100~240VAC</td></tr>
<tr><td>I/O expansion module (max.)</td><td>10 (total modules power consumption ≤ CPU rating)</td><td>Permissible range</td><td>85~264VAC （50/60Hz）</td></tr>
<tr><td>Programming language</td><td>LD/ST/CFC/SFC</td><td>Current consumption (max.)</td><td>400mA</td></tr>
<tr><td>Program memory</td><td>64K bytes</td><td colspan="2">External output voltage</td><td>24VDC</td></tr>
<tr><td>Data memory</td><td>18K bytes</td><td rowspan="4">External output current (max.)</td><td>+24VDC (supply for expansion bus)</td><td>200mA</td></tr>
<tr><td>Power-loss retentive memory</td><td>2K bytes</td><td>+24VDC (supply for peripheral device)</td><td>200mA</td></tr>
<tr><td rowspan="2">HSC</td><td>2 HSC at 20 KHz for single phase</td><td>+5VDC (supply for expansion bus)</td><td>500mA</td></tr>
<tr><td>1 HSC at 10 KHz for A/B phase</td><td colspan="2">Hold up time (loss of power)</td><td>80ms</td></tr>
<tr><td>Pulse catch</td><td>2</td><td colspan="3">Output Specifications</td></tr>
</table>

CPU Specifications		Power Supply Specifications	
Fast external interruption	2	Number of outputs	6
Basic instruction processing time	0.1μs	Output type	Relay
Input Specifications		Rated voltage	24VDC or 24～230VAC
Number of inputs	8	Permissible range	5～30VDC or 5～250VAC
Input type	Sink/source	Output current	2A (resistance load)
Rated voltage	24VDC	Rated current per com (max.)	＜10A
Permissible range	0～30VDC	On state resistance	0.2Ω(max.)
Logic 1 signal	15~30VDC, permissible min current 3mA	Switching frequency （max.）	1Hz
Logic 0 signal	0~5VDC, permissible max 1mA	Mechanical life of relay	No load: up to 10,000,000 open/close cycles
Filtering parameter	No filtering, 5ms, 10ms, 20ms, 50ms, and 100ms		Rated resistance 2A load: up to 100,000 open/close cycles
Isolation mode	Optocoupler (field side to system)	Isolation mode	Relay (field side to system)
Isolation groups	1	Isolation groups	2
Isolation withstand voltage	500VAC for 1 minute, leakage current <5mA	Isolation withstand voltage	2500VAC for 1 minute, leakage current <5mA
Physical Specifications		Communication Specifications	
Dimensions W x H x D (mm)	78×97×90	Communication interface	1 RS485
Weight	372g	Interface type	PS/2
Operating temperature	-40℃～＋70℃	Baud rates (bps)	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Storage temperature	-40℃～＋70℃	Communication protocol	Proprietary protocol, Modbus master-slave, free port communication protocol, multi-PLC interconnection
Relative humidity	5%~95% (non-condensing)		

3.3.2 Terminal Definition and Connection

LE5105 is connected with an external 220VAC power and has two pluggable terminals (8x2 and 5x2), the upper terminal offers digital input channel (DI), the lower terminal offers digital output channel (DO), and wiring is easy and convenient and is secured with screw, which is a typical field connection case.



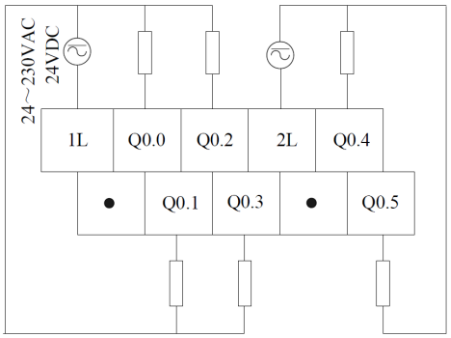


Figure 37 Upper Terminals Definition ***Lower Terminals Definition***

- LE5105 terminal definition and wiring description
  - M terminal of input channel (DI) is as common terminal for peripheral DI, users can chose to connect M to positive terminal or negative terminal of 24VDC power supply to accommodate sink/source type of DI.
  - 1L and 2L in output channel(DO) are as two groups Load power supply terminals, it can be a 24VDC power supply, also can be a 24 ~ 230VAC power supply.
  - L and N of upper terminal are respectively connected to firing line and null line of 220VAC power supply on CPU module;
  - Vout+ and Vout- respectively are positive and negative terminal of the 24 VDC power output form CPU module.
  - "●" means the channel cannot be connected or connection is not available. "⏚" means grounding.

Table 21 Terminal Identification

Terminal Identification	Description	Terminal Identification	Description
⏚	Grounding	L	Fire wire
●	No connection	N	Null line
Vout-	Output 24VDC negative	●	No connection

Terminal Identification	Description	Terminal Identification	Description
Vout+	Output 24VDC positive	M	Common of Input
I0.0	Fast external interruption 1/ Pulse catch 1/ single-phase counter 1/ A/B phase counter phase A / Ordinary input	I0.1	Fast external interruption 2/ pulse catch 2/ single-phase counter 2/ Ordinary input
I0.2	Single-phase counter 1 reset / A/B phase counter reset / Ordinary input	I0.3	Single-phase counter 2 reset /Ordinary input
I0.4	Single-phase counter 1 direction control / A/B counter Phase B/ Ordinary input	I0.5	Single-phase counter 2 direction control / Ordinary input
I0.6	Ordinary input	I0.7	Ordinary input
1L	Common of Output （Q0.0～Q0.3）	●	No connection
Q0.0	Ordinary output	Q0.1	Ordinary output
Q0.2	Ordinary output	Q0.3	Ordinary output
2L	Common of output (Q0.4～Q0.5)	●	No connection
Q0.4	Ordinary output	Q0.5	Ordinary output

3.3.3 Electrical Schematic Diagram

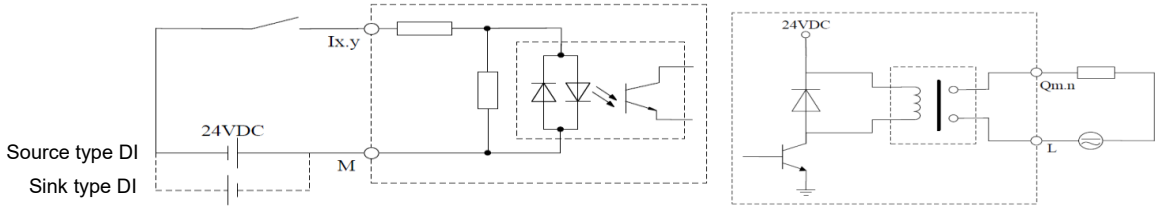


Figure 38 Electrical Schematic Diagram of Input Electrical Schematic Diagram of Output

3.4 LE5106 14 DI / 10 DO CPU Module

LE5106 is a CPU module of LE Series micro PLC which can complete control, detection, diagnosis, RS485 communication needed for system. Functions specifically achieved as follows: RUN/STOP switch selects running and stopping mode of module. RTC records operation time. Equipped with USB memory card interface to facilitate download user program; RS485 interface provides channel to download application program and supports access to peripheral device and PLC multi-machine interconnection; equipped with 14DI, 10DO, is a controller with relatively strong control ability.

3.4.1 Technical Specifications

Table 22 Technical Specifications

CPU Specifications		Power Supply Specifications		
On-board I/O	14 DI / 10 DO	Input	Rated voltage	24VDC
I/O expansion module (max.)	16 (total module power consumption ≤CPU rating)		Permissible range	20.4～28.8VDC
Number of expansion board	1		Current consumption (max.)	1300mA@24VDC
Programming language	LD/ST/CFC/SFC	External output voltage		24VDC
Program memory	128K bytes	External output current (max.)	+24VDC (supply for expansion bus)	500mA
Data memory	36K bytes		+24VDC (supply for peripheral device)	300mA
Power-loss retentive memory	4K bytes		+5VDC (supply for expansion bus)	1200mA
Memory card	Memory card with USB interface	Hold up time (loss of power)		10ms
HSC	4 HSC at 100KHz for single phase（Ix0.0~Ix0.3）	Output Specifications		
	2 HSC at 50KHz for A/B phase（Ix0.0~Ix0.3）	Number of outputs	10	
Pulse output	2, 100KHz（Qx0.0~Qx0.1）	Output type	Transistor	
Pulse catch	4（Ix0.0~Ix0.3）	Rated voltage	24VDC	
Fast external interruption	6（Ix0.0~Ix0.5）	Permissible range	20.4～28.8VDC	
Frequency measurement	4（Ix0.0~Ix0.3）	Output current	Max. 500mA for PTO channel; max. 1A for Ordinary channel	
Basic instruction processing time	0.1μs	Current per common(max)	4A	
Input Specifications		Residual voltage	＜0.5V (output logic 1 at current 1A)	
Number of inputs	14	ON state resistance	0.3Ω (typical), 0.6Ω (max)	
Input type	Sink/source	Isolation mode	Optocoupler (Field side to system)	

CPU Specifications		Power Supply Specifications	
Rated voltage	24VDC	Isolation groups	3
Permissible range	0～30VDC	Isolation withstand voltage	500VAC for 1 minute, leakage current <5mA
Logic 1 signal	15~30VDC, permissible min. current 3mA	Communication Specifications	
Logic 0 signal	0~5VDC, permissible max. current 1mA	Communication interface	2 RS485
Filtering parameter	Ix0.0~Ix0.3: No filtering, 5μs, 10μs, 20μs, 100μs, 200μs, 1ms, 5ms, 10ms, 20ms, 50ms, 100ms	Interface type	PS/2, pluggable terminals
		Baud rates (bps)	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Isolation mode	Optocoupler (Field side to system)		
Isolation groups	1	Communication protocol	Proprietary protocol (only for PS/2), Modbus master-slave, free port communication protocol, multi-PLC interconnection (only for terminal interface)
Isolation withstand voltage	500VAC for 1 minute, leakage current <5mA		
Physical Specifications			
Dimensions W x H x D (mm)	117×97×90	Operating temperature	-40℃～+70℃
Weight	455g	Storage temperature	-40℃～+70℃
Relative humidity	5%~95% (non-condensing)		

3.4.2 Terminal Definition and Connection

LE5106 is connected with an external 24V DC power and has two pluggable terminals (11x2 and 9x2), the upper terminal offers digital input channel (DI), the lower terminal offers digital output channel (DO), and connection is easy and convenient and is secured with screw, which is a typical field connection case.

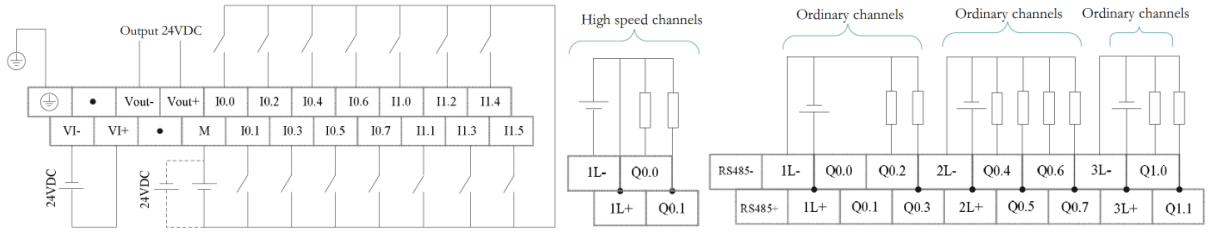


Figure 39 Upper Terminals Definition and LE5106 Lower Terminals Definition

- Wiring description

  High-speed channel output mode for the open set; ordinary channel output mode for the high-side drive, wiring as shown in Figure 39.

Figure 40 wiring diagrams include two schematic diagrams of connection of high-speed output terminal and motor, the external resistance in the schematic diagrams is for example only. In actual applications, users must calculate external resistance according to their selected permissible current on input side of driver and internal resistance.

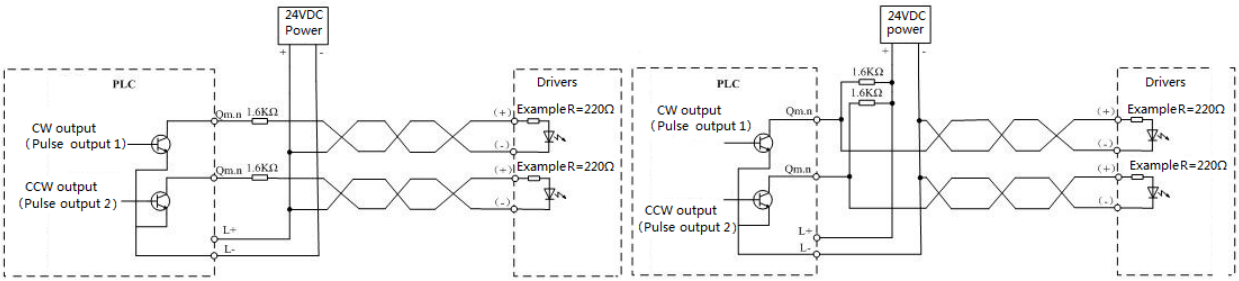


Figure 40 CW/CCW Mode Wiring Diagram

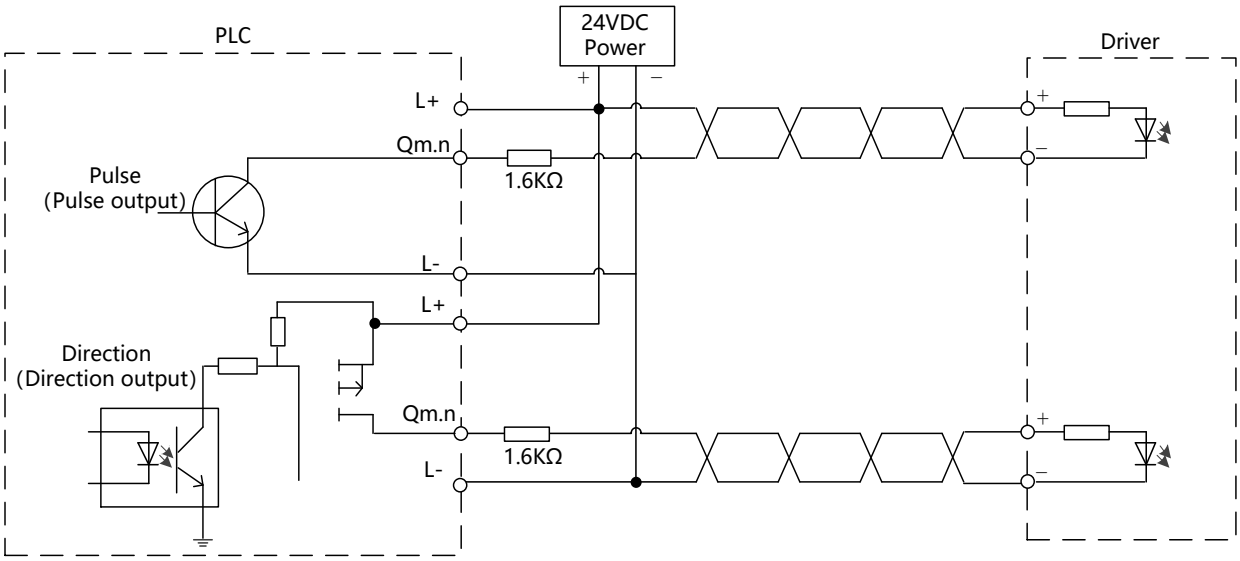


Figure 41 Pulse + Direction Mode Wiring Diagram

Description:

CW / CCW mode:

1: Output axis 1, pulse output (CW) Q0.0, pulse output (CCW) Q0.1

Pulse + direction mode:

1: Output axis 1, pulse output Q0.0, pulse direction Q0.4

2: Output axis 2, pulse output Q0.1, pulse direction Q0.5

Table 23 Terminal Identification

Terminal Identification	Description	Terminal Identification	Description
⏚	Grounding	VI-	Input power supply 24VDC negative
●	No connection	VI+	Input power supply 24VDC positive
Vout-	Output 24VDC negative	●	No connection
Vout+	Output 24VDC positive	M	Common of Input
I0.0	Fast external interruption 1/ pulse catch 1/frequency measurement channel 1/single-phase counter 1/ A/B phase counter 1 phase A/ Ordinary input	I0.1	Fast external interruption 2/pulse catch 2/frequency measurement channel 2/single-phase counter 2/A/B phase counter 1 phase B/ Ordinary input
I0.2	Fast external interruption 3/pulse catch 3/frequency measurement channel 3/single-phase counter	I0.3	Fast external interruption 4/pulse catch 4/ frequency measurement channel4/ single-phase counter 4/ A/B

Terminal Identification	Description	Terminal Identification	Description
	3/A/B phase counter 2 phase A/ Ordinary input		phase counter 2 phase B/ Ordinary input
I0.4	Fast external interruption 5/single-phase counter 1 direction control terminal/ Ordinary input	I0.5	Fast external interruption 6/single-phase counter 2 direction control / Ordinary input
I0.6	Single-phase counter 3 direction control terminal/ Ordinary input	I0.7	Single-phase counter 4 direction control/ Ordinary input
I1.0	Single-phase counter 1 reset /A/B phase counter 1 reset / Ordinary input	I1.1	Single-phase counter 2 reset / Ordinary input
I1.2	Single-phase counter 3 reset /A/B phase counter 2 reset / Ordinary input	I1.3	Single-phase counter 4 reset / Ordinary input
I1.4	Ordinary input	I1.5	Ordinary input
RS485-	RS485 Communication	RS485+	RS485 Communication
1L-	Load driving power supply 1 negative (Q0.0～Q0.3)	1L+	Load driving power supply 1 positive (（Q0.0～Q0.3）
Q0.0	High-speed output / Ordinary output	Q0.1	High-speed output / Ordinary output
Q0.2	Ordinary output	Q0.3	Ordinary output
2L-	Load driving power supply 2 negative （Q0.4～Q0.7）	2L+	Load driving power supply 2 positive (Q0.4～Q0.7)
Q0.4	Ordinary output	Q0.5	Ordinary output
Q0.6	Ordinary output	Q0.7	Ordinary output
3L-	Load driving power supply 3 negative （Q1.0, Q1.1）	3L+	Load driving power supply 3 positive （Q1.0, Q1.1）
Q1.0	Ordinary output	Q1.1	Ordinary output

3.4.3 Electrical Schematic Diagram

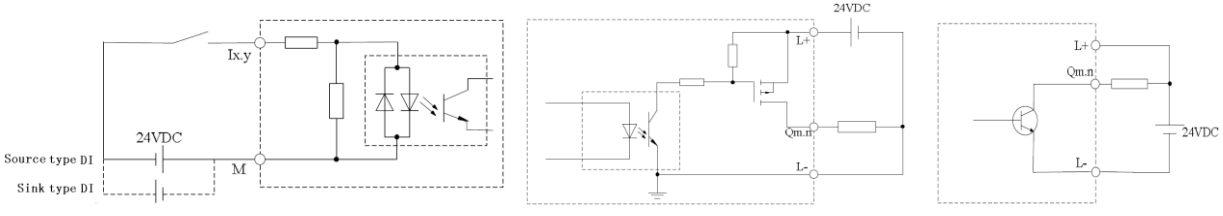


Figure 42 Input Channel Ordinary Output Channel High-speed Output Channel

3.5 LE5107 14DI/ 10 DO CPU Module

LE5107 is a CPU module of LE Series micro PLC which can complete control, detection, diagnosis, RS485 communication needed for system. Functions specifically achieved as follows: RUN/STOP switch selects running and stopping mode of module; RTC records operation time; equipped with USB memory card interface to facilitate download user program; RS485 interface provides channel to download application program and supports access to peripheral device and multi-PLC interconnection; equipped with 14 DI and10 DO and is a general-purpose CPU module.

3.5.1 Technical Specifications

Table 24 Technical Specifications

<table>
<tr><th colspan="2">CPU Characteristics</th><th colspan="3">Power Supply Specification</th></tr>
<tr><td>On-board I/O</td><td>14 DI / 10DO</td><td rowspan="3">Input</td><td>Rated voltage</td><td>100~240VAC</td></tr>
<tr><td>I/O expansion module (max.)</td><td>16 (total modules power consumption ≤ CPU rating)</td><td>Permissible range</td><td>85~264VAC （50/60Hz）</td></tr>
<tr><td>Number of expansion board</td><td>1</td><td>Current consumption (max.)</td><td>600mA</td></tr>
<tr><td>Programming language</td><td>LD/ST/CFC/SFC</td><td colspan="2">External output voltage</td><td>24VDC</td></tr>
<tr><td>Program memory</td><td>128K bytes</td><td rowspan="3">External output current (max.)</td><td>+24VDC (supply for expansion bus)</td><td>500mA</td></tr>
<tr><td>Data memory</td><td>36K bytes</td><td>+24VDC (supply for peripheral device)</td><td>200mA</td></tr>
<tr><td>Power-loss retentive memory</td><td>4K bytes</td><td>+5VDC (supply for expansion bus)</td><td>1200mA</td></tr>
<tr><td>Memory card</td><td>Memory card with USB interface</td><td colspan="2">Hold up time (loss of power)</td><td>80ms</td></tr>
<tr><td rowspan="2">HSC</td><td>4 HSC at 100KHz for single phase</td><td colspan="3">Output Specifications</td></tr>
<tr><td>2 HSC at 50KHz for A/B phase</td><td>Number of outputs</td><td colspan="2">10</td></tr>
</table>

CPU Characteristics		Power Supply Specification	
Pulse catch	4	Output type	Relay
Fast external interruption	6	Rated voltage	24VDC or 24～230VAC
Frequency measurement	4	Permissible range	5～30VDC or 5～250VAC
Basic instruction processing time	0.1μs	Output current	2A (resistance load)
Input Specifications		Rated current per common (max.)	＜10A
Number of inputs	14	On state resistance	0.2Ω (max.)
Input type	Sink/Source	Switching frequency (max.)	1Hz
Rated voltage	24VDC	Mechanical life of relay	No load: up to 10,000,000 open/close cycles
Permissible range	0～30VDC		Rated resistance 2A load: up to 100,000 open/close cycles
Logic 1 signal	15~30VDC, permissible min current 3mA	Isolation mode	Relay (field side to system)
Logic 0 signal	0~5VDC, permissible max 1mA	Isolation groups	3
Filtering parameter	No filtering, 5μs, 10μs, 20μs, 100μs, 200μs, 1ms, 5ms, 10ms, 20ms, 50ms, 100ms	Isolation withstand voltage	2500VAC for 1minute, leakage current <5mA
		Communication Specifications	
Isolation mode	Optocoupler (field side to system)	Communication interface	2 RS485
Isolation groups	1	Interface type	PS/2, pluggable terminals
Isolation withstand voltage	500VAC for 1minute, leakage current <5mA	Baud rates (bps)	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Physical Specifications			

CPU Characteristics		Power Supply Specification	
Dimensions W x H x D (mm)	117×97×90	Communication protocol	Proprietary protocol, Modbus master-slave, free port communication protocol, multi-PLC interconnection(only for terminal connecting)
Weight	567g		
Operating temperature	-40℃～+70℃	Storage temperature	-40℃～+70℃
Relative humidity of operating environment	5%~95% (non-condensing)	Relative humidity of storage environment	5%~95% (non-condensing)

3.5.2 Terminal Definition and Connection

LE5107 is connected with an external 220VAC power and has two pluggable terminals (11x2 and 9x2), the upper terminal offers digital input channel (DI), the lower terminal offers digital output channel (DO), and wiring is easy and convenient and is secured with screw, which is a typical field connection case.

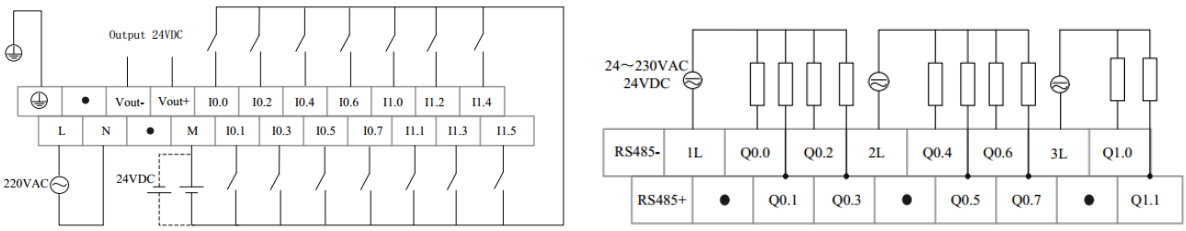


Figure 43 Upper Terminals Definition and Wring Diagram Lower Terminals Definition and Wring Diagram

Table 25 Terminal Identification

Terminal Identification	Description	Terminal Identification	Description
⏚	Grounding	L	Fire wire
●	No connection	N	Null wire
Vout-	Output 24VDC negative	●	No connection
Vout+	Output 24VDC positive	M	Common of Input
I0.0	Fast external interruption 1/ Pulse catch 1/Frequency measurement 1/Single-phase counter 1/ A/B	I0.1	Fast external interruption 2/ Pulse catch 2/Frequency measurement 2/ Single-phase counter 2/ A/B

Terminal Identification	Description	Terminal Identification	Description
	phase counter 1 phase A / Ordinary input		phase counter 1 phase B /Ordinary input
I0.2	Fast external interruption 3/ Pulse catch 3/Frequency measurement 3/ Single-phase counter 3/ A/B phase counter 2 phase A / Ordinary input	I0.3	Fast external interruption 4/ Pulse catch 4/Frequency measurement 4/ Single-phase counter 4/ A/B phase counter 2 phase B /Ordinary input
I0.4	Fast external interruption 5 / Single-phase counter 1 direction control /Ordinary input	I0.5	Fast external interruption 6 / Single-phase counter 2 direction control /Ordinary input
I0.6	Single-phase counter 3 direction control /Ordinary input	I0.7	Single-phase counter 4 direction control / Ordinary input
I1.0	Single-phase counter 1 reset/ A/B phase counter 1 reset/Ordinary input	I1.1	Single-phase counter 2 reset/ Ordinary input
I1.2	Single-phase counter 3 reset/ A/B phase counter 2 reset/Ordinary input	I1.3	Single-phase counter 4 reset/ Ordinary input
I1.4	Ordinary input	I1.5	Ordinary input
RS485-	RS485 communication	RS485+	RS485 communication
1L	Common of Output (Q0.0～Q0.3)	●	No connection
Q0.0	Ordinary output	Q0.1	Ordinary output
Q0.2	Ordinary output	Q0.3	Ordinary output
2L	Common of Output （Q0.4～Q0.7）	●	No connection
Q0.4	Ordinary output	Q0.5	Ordinary output
Q0.6	Ordinary output	Q0.7	Ordinary output
3L	Common of Output (Q1.0～Q1.1)	●	No connection
Q0.0	Ordinary output	Q0.1	Ordinary output

3.5.3 Electrical Schematic Diagram

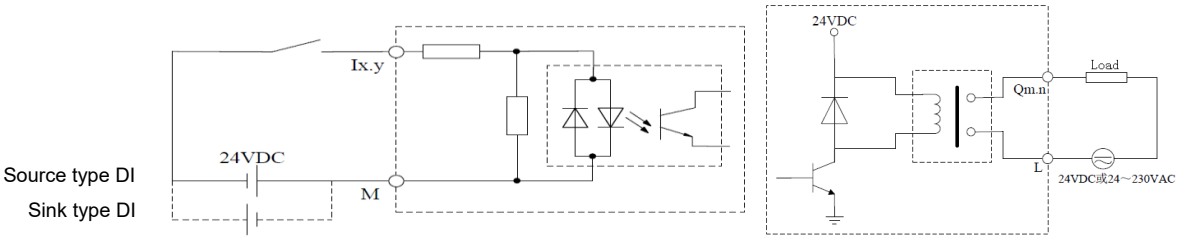


Figure 44 Electrical Schematic Diagram of Input Electrical Schematic Diagram of L Output

3.6 LE5107E 12DI / 8DO, 2AI / 2AO CPU Module

LE5107E is a CPU module of LE Series micro PLC which can complete control, detection, diagnosis, RS485 communication needed for system. Functions specifically achieved as follows: RUN/STOP switch selects running and stopping mode of module; RTC records operation time; equipped with USB memory card interface to facilitate download user program; RS485 interface provides channel to download application program and supports access to peripheral device and multi-PLC interconnection; equipped with 12 DI, 8 DO, 2 AI and 2 AO.

3.6.1 Technical Specifications

Table 26 Technical Specifications

CPU Specifications		Power Supply Specifications		
On-board I/O	12 DI / 8DO/ 2AI/ 2AO	Input	Rated voltage	100~240VAC
I/O expansion module (max.)	4 (total module power consumption ≤ CPU rating)		Permissible range	85-264VAC (50/60Hz)
			Current consumption (max.)	300mA
Number of expansion board	1	External output voltage	Rated voltage	Not supported
Programming language	LD/ST/CFC/SFC		Permissible range	Not supported
Program memory	128K bytes	External output current (max.)	+24VDC (supply for	190mA

			expansion bus)	
Data memory	10496 bytes		+5VDC (supply for expansion bus)	550mA
Power-loss retentive memory	2K bytes	Hold up time (loss of power)		10ms
Memory card	Memory card with USB interface	Communication Specifications		
HSC	2 HSC at 5 KHz for single phase	Communication interface	2 RS485	
	1 HSC at 20 KHz for A/B phase	Interface type	PS/2	
Pulse catch	2	Baud rates (bps)	1,200, 2,400, 4,800, 9,600, 19,200, 38,400, 57,600, 115,200	
Fast external interruption	2			
Frequency measurement	Not supported	Communication protocol	Proprietary protocol, Modbus master-slave, free port protocol, multi-PLC interconnection (only for terminal interface)	
Basic instruction processing time	0.1μs			
Digital Input Specifications		Digital Output Specifications		
Number of inputs	12	Number of outputs	8	
Input type	Sink/source	Output type	Relay	
Rated voltage	24VDC	Rated voltage	24VDC or 24 ~ 230VAC	
Permissible range	0~30VDC	Permissible range	5 ~ 30VDC or 5 ~ 250VAC	
Logic 1 signal	15~30VDC, permissible min. current 4mA	Output current	2A (resistance load)	
Logic 0 signal	0~5VDC, permissible max. current 1mA	Current per common	<8A	
Filtering parameter	No filtering, 5ms, 10ms, 20ms, 50ms, and 100ms	On state resistance	0.2Ω	
		Switching frequency	1Hz	
Isolation mode	Optocoupler isolation (field side to system)	Mechanical life of relay	No load: up to 10,000,000 open/close cycles	
Isolation groups	1		Rated resistance 2A load: up to 100,000	

					open/close cycles
Isolation withstand voltage		500VAC,for 1minute, leakage current <5mA	Isolation mode		Relay isolation (field side to system)
Analog Input Specifications			Isolation groups		2
Number of inputs		2	Isolation withstand voltage		1500VAC for 1 minute, leaking current <5mA
Input type		Single-ended	Analog Output Specifications		
Input range	voltage	0~10V	Number of outputs		2
	current	0~20mA/4~20mA	Output range	voltage	0~10V
Range of corresponding code value		0~65535		current	0~20mA/4~20mA
Input accuracy		1% of full scale	Range of corresponding code value		0~65535
Resolution		10 bits	Output accuracy		1% of full scale
Input impedance	Voltage type	>950kΩ	Resolution		12 bits
	Current type	250Ω	Load impedance	voltage	2000Ω（Min.）
Input voltage/current (max.)		±30V/±32mA		current	600Ω (max.)
Common mode voltage		Signal voltage + common mode voltage <12V	Stable time (95% of new value)	voltage	300us (R) 750us (1uF)
Time for step response of analog input		1.5ms (up to 95%)		current	600us (1mH) 2ms (10mH)
Isolation mode (field side to system)		No	Isolation mode (field side to system)		None
Physical Specifications					
Dimensions W x H x D(mm)		117 x 97 x 90	Weight		575g
Operating temperature		-40℃～+70℃	Storage temperature		-40℃～+70℃
Relative humidity of operating environment		5%~95% (non-condensing)	Relative humidity of storage environment		5%~95% (non-condensing)

3.6.2 Terminal Definition and Connection

LE5107E is connected with an external 220VAC power and has two pluggable terminals (11x2 and 9x2), the upper terminal offers digital input channel (DI, AI), the lower terminals offers digital output channel (DO, AO), and connection is easy and convenient and is secured with screw, which is a typical field connection case.

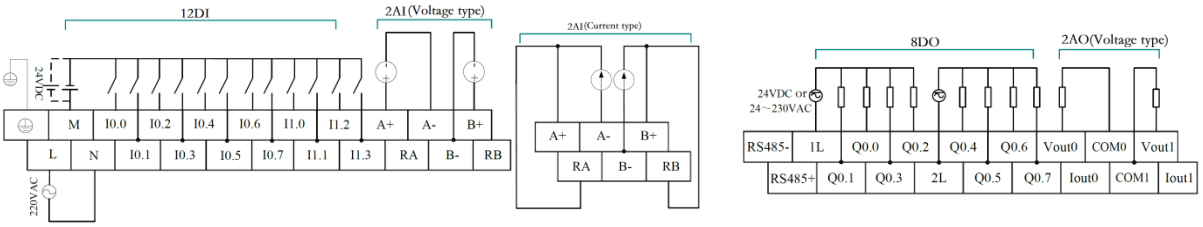


Figure 45 Upper Terminal Definition and Wring Diagram Lower Terminal Definition and Wring Diagram

Table 27 Terminal Identification

Terminal Identification	Description	Terminal Identification	Description	Terminal Identification	Description	Terminal Identification	Description
⏚	Grounding	L	Fire wire	RS485-	RS485 communication negative	RS485+	RS-485 communication positive
M	Common of Input	N	Null wire	1L	Output common (Q0.0~Q0.3)	Q0.1	Ordinary output
I0.0	Fast external interruption 1/Pulse catch 1/Single-phase counter 1/ A/B phase counter 1 phase A/Ordinary input	I0.1	Fast external interruption 2/Pulse catch 2/Single-phase counter 2/Ordinary input	Q0.0	Ordinary output	Q0.3	Ordinary output
I0.2	Single-phase counter 1 reset /A/B	I0.3	Single-phase counter 2 reset	Q0.2	Ordinary output	2L	Output common (Q0.4~Q0.7)

Terminal Identification	Description	Terminal Identification	Description	Terminal Identification	Description	Terminal Identification	Description
	phase counter reset /Ordinary input		/Ordinary input				
I0.4	A/B phase counter phase B / Single-phase counter 1 direction control /Ordinary input	I0.5	Single-phase counter 2 direction control /Ordinary input	Q0.4	Ordinary output	Q0.5	Ordinary output
I0.6	Ordinary input	I0.7	Ordinary input	Q0.6	Ordinary output	Q0.7	Ordinary output
I1.0	Ordinary input	I1.1	Ordinary input	Vout 0	Analog voltage output	Iout0	Analog current output
I1.2	Ordinary input	I1.3	Ordinary input	COM0	Analog output common	COM1	Analog output common
A+	Channel A voltage input	RA	Channel A current input	Vout1	Analog voltage output	Iout1	Analog current output
A-	Analog input common	B-	Analog input common	--	--	--	--
B+	Channel B voltage input	RB	Channel B current input	--	--	--	--

3.6.3 Electrical Schematic Diagram

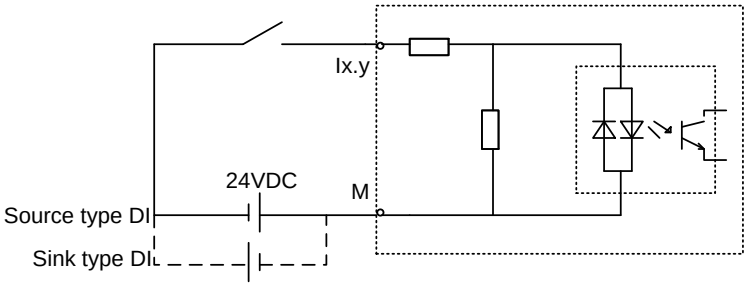


Figure 46 Input Channel (DI)

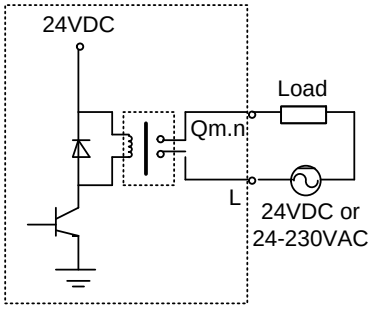


Figure 47 Output Channel (DO)

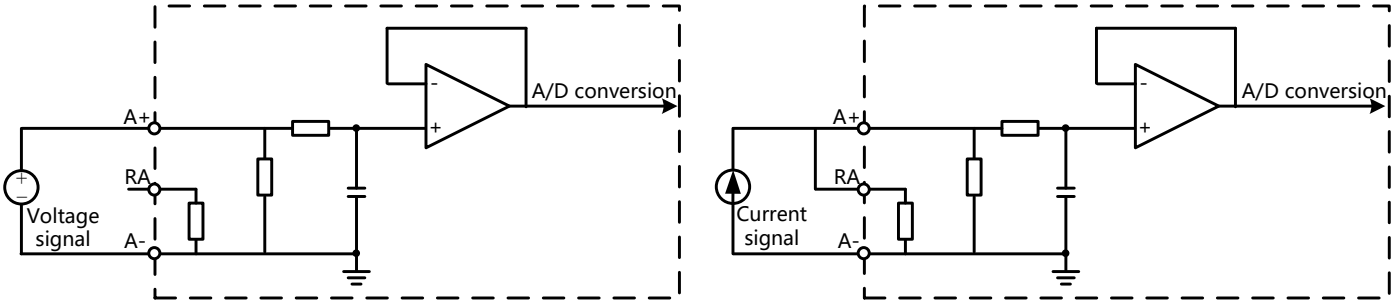


Figure 48 Input Channel (AI)

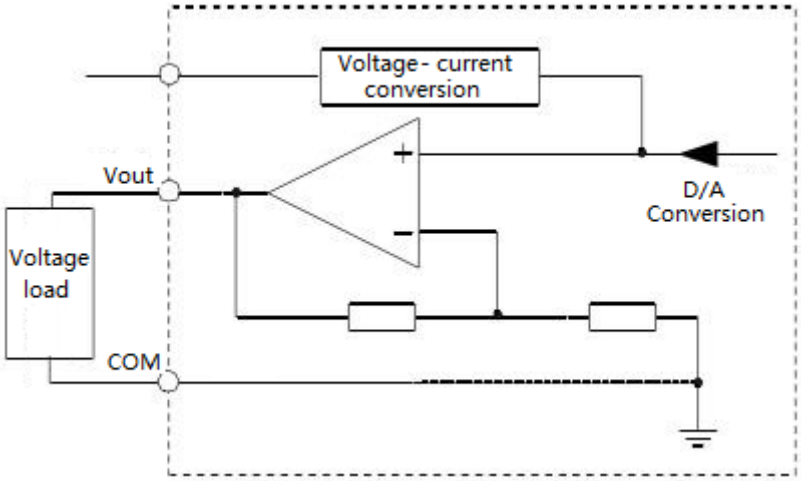


Figure 49 Output Channel (AO)

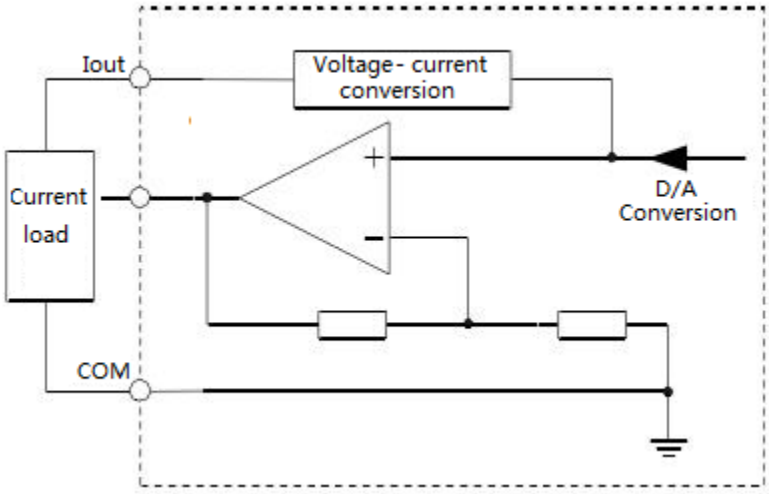


Figure 50 Output Channel (AO)

3.7 LE5107L 14DI/ 10 DO CPU Module

LE5107L is a CPU module of LE Series micro PLC which can complete control, detection, diagnosis, RS485 communication needed for system. Functions specifically achieved as follows: RUN/STOP switch selects running and stopping mode of module; RTC records operation time; equipped with USB memory card interface to facilitate download user program; RS485 interface provides channel to download application program and supports access to peripheral device and multi-PLC interconnection; equipped with 14 DI and10 DO.

3.7.1 Technical Specifications

Table 28 Technical Specifications

CPU Specifications		Power Supply Specifications		
On-board I/O	14 DI / 10 DO	Input	Rated voltage	100~240VAC
			Permissible range	85~264VAC（50/60Hz）
I/O expansion module (max.)	4 (total modules power consumption ⩽ CPU rating)		Current consumption (max.)	300mA
Number of expansion board	1	External output voltage	Rated voltage	Not supported
Programming language	LD/ST/CFC/SFC		Permissible range	Not supported
Program memory	128K bytes	External output current (max.)	+24VDC (supply for expansion bus)	190mA
Data memory	10496 bytes		+5VDC (supply for expansion bus)	550mA
Power-loss retentive memory	2K bytes	Hold up time (loss of power)		10ms
Memory card	Memory card with USB interface	Communication Specifications		
HSC	2 HSC at 5KHz for single phase	Communication interface	2 RS485	
	1 HSC at 20KHz for A/B phase	Interface type	PS/2, pluggable terminals	
Pulse catch	2	Baud rates (bps)	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	
Fast external interruption	2			
Frequency measurement	Not supported	Communication protocol	Proprietary protocol, Modbus master-slave, free port communication protocol, multi-PLC interconnection (only for terminal connecting)	
Basic instruction processing time	0.1μs			
Input Specifications		Output Specifications		
Number of	14	Number of	10	

CPU Specifications		Power Supply Specifications	
inputs		outputs	
Input type	Sink/source	Output type	Relay
Rated voltage	24VDC	Permissible range	5～30VDC or 5～250VAC
Permissible range	0～30VDC	Output current	2A (resistance load)
Logic 1 signal	15~30VDC, permissible min. current 4mA	Rated current per common (max.)	＜8A
Logic 0 signal	0~5VDC, permissible max. current 1mA	ON state resistance	0.2Ω (max.)
Filtering parameter	No filtering, 5ms, 10ms, 20ms, 50ms, 100ms	Switching frequency (max.)	1Hz
		Mechanical life of relay	No load: up to 10,000,000 open/close cycles
Isolation mode	Optocoupler (field side to system)		Rated resistance 2A load: up to 100,000 open/close cycles
Isolation groups	1	Isolation mode	Relay isolation (field side to system)
Isolation withstand voltage	500VAC for 1minute, leakage current <5mA	Isolation groups	2
		Isolation withstand voltage	2500VAC for 1minute, leakage current <5mA
Physical Specifications			
Dimensions W x H x D (mm)	117×97×90	Operating temperature	-40℃～＋70℃
Weight	586g	Storage temperature	-40℃～＋70℃
Relative humidity	5%~95% (non-condensing)		

3.7.2 Terminal Definition and Connection

LE5107L is connected with an external 220VAC power and has two pluggable terminals (11x2 and 9x2), the upper terminal offers digital input channel (DI), the lower terminal offers digital output channel (DO), and wiring is easy and convenient and is secured with screw, which is a typical field connection case.

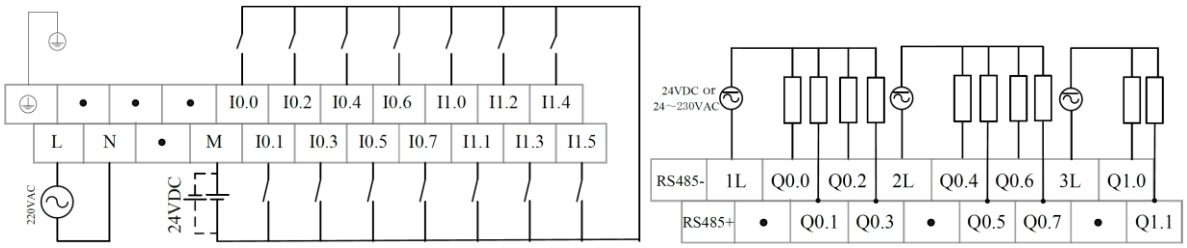


Figure 51 Upper Terminals Definition and Wring Diagram Lower Terminals Definition and Wring Diagram

Table 29 Terminal Identification

Terminal Identification	Description	Terminal Identification	Description
⏚	Grounding	L	Fire wire
●	No connection	N	Null wire
●	No connection	●	No connection
●	No connection	M	Common of Input
I0.0	Fast external interruption 1/ Pulse catch 1/ single-phase counter 1/ A/B phase counter phase A / Ordinary input	I0.1	Fast external interruption 2/ pulse catch 2/ single-phase counter 2/ Ordinary input
I0.2	Single-phase counter 1 reset /A/B phase counter reset /Ordinary input	I0.3	Single-phase counter 2 reset/Ordinary input
I0.4	A/B phase counter Phase B /Single-phase counter 1 direction control /Ordinary input	I0.5	Single-phase counter 2 direction control /Ordinary input
I0.6	Ordinary input	I0.7	Ordinary input
I1.0	Ordinary input	I1.1	Ordinary input
I1.2	Ordinary input	I1.3	Ordinary input
I1.4	Ordinary input	I1.5	Ordinary input
Terminal Identification	Description	Terminal Identification	Description
RS485-	RS485 Communication negative	RS485+	RS485 Communication positive
1L	Common of Output (Q0.0～Q0.3)	●	No connection
Q0.0	Ordinary output	Q0.1	Ordinary output
Q0.2	Ordinary output	Q0.3	Ordinary output
2L	Common of Output	●	No connection

Terminal Identification	Description	Terminal Identification	Description
	（Q0.4～Q0.7）		
Q0.4	Ordinary output	Q0.5	Ordinary output
Q0.6	Ordinary output	Q0.7	Ordinary output
3L	Common of Output (Q1.0～Q1.1)	•	No connection
Q1.0	Ordinary output	Q1.1	Ordinary output

3.7.3 Electrical Schematic Diagram

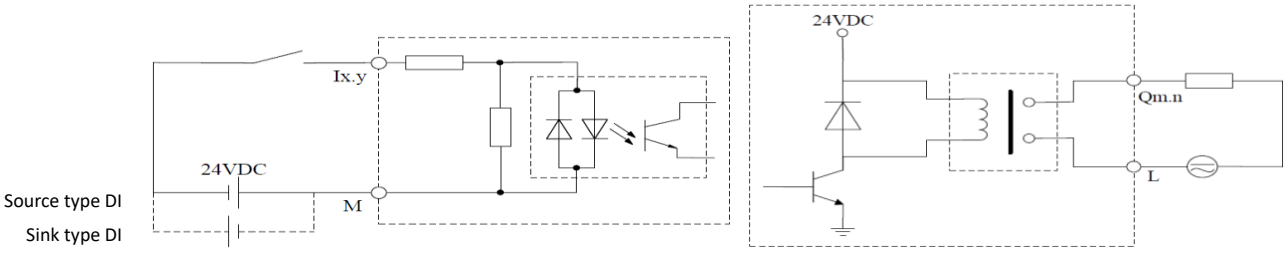


Figure 52 Electrical Schematic Diagram of Input Electrical Schematic Diagram of Output

3.8 LE5108 24 DI/ 16 DO CPU Module

LE5108 is a CPU module of LE Series micro PLC which can complete control, detection, diagnosis, RS485 communication needed for system. Functions specifically achieved as follows: RUN/STOP switch selects running and stopping mode of module; RTC records operation time; equipped with USB memory card interface to facilitate download user program; RS485 interface provides channel to download application program and supports access to peripheral device and multi-PLC interconnection; equipped with 24 DI and16 DO. It is a CPU module with relatively strong control capability.

3.8.1 Technical Specifications

Table 30 Technical Specifications

CPU Specifications		Power Supply Specifications		
On-board I/O	24 DI/ 16 DO	Input	Rated voltage	24VDC

CPU Specifications		Power Supply Specifications		
I/O expansion module (max.)	20 (total module power consumption ≤ CPU rating)		Permissible range	20.4～28.8VDC
Number of expansion board	1		Current consumption (max.)	2200mA@24VDC
Programming	LD/ST/CFC/SFC	External output voltage		24VDC
Program memory	256K bytes	External output current (max.)	+24VDC (supply for expansion bus)	950mA
Data memory	64K bytes		+24VDC(supply for peripheral device)	400mA
Power-loss retentive memory	8K bytes		+5VDC (supply for expansion bus)	2500mA
Memory card	Memory card with USB interface	Hold up time (loss of power)		10ms
HSC	8 HSC at 200KHz for single phase(Ix0.0~Ix0.3, Ix1.4~Ix1.7)	Output Specifications		
	4 HSC at 100KHz for A/B phase(Ix0.0~Ix0.3, Ix1.4~Ix1.7)	Number of outputs	16	
Pulse output (max.)	4, 100KHz(Qx0.0~Qx0.3)	Output type	Transistor	
Pulse catch	8 (Ix0.0~Ix0.3, Ix1.4~Ix1.7)	Rated voltage	24VDC	

CPU Specifications		Power Supply Specifications	
Fast external interruption	6(Ix0.0~Ix0.3, Ix1.4, Ix1.5)	Permissible range	20.4～28.8VDC
Frequency measurement	4(Ix0.0~Ix0.3)	Output current	Max. 500mA for PTO channel; max. 1A for ordinary channel
Basic instruction	0.1μs	Current per common (max.)	2A max. for PTO channel; 4A max. for ordinary channel
Input Specifications		Residual voltage	＜0.5V (output logic 1 at current 1A)
Number of inputs	24	On state resistance	0.3Ω (typical), 0.6Ω (max.)
Input type	Sink/source	Isolation mode	Optocoupler (field side to system)
Rated voltage	24VDC	Isolation	4
Permissible range	0～30VDC	Isolation withstand	500VAC for 1 minute, leakage current <5mA
Logic 1 signal	15~30VDC, permissible min. current 3mA	Communication Specifications	
Logic 0 signal	0~5VDC, permissible max. current 1mA	Communication interface	2 RS485
Filtering parameter	Ix0.0~Ix0.3, Ix1.4~Ix1.7: No filtering, 5μs, 10μs, 20μs,100μs, 200μs, 1ms, 5ms, 10ms, 20ms, 50ms, 100ms, see Note③	Interface type	PS/2, pluggable terminals
		Baud rates (bps)	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Isolation mode	Optocoupler (field side to system)		

CPU Specifications		Power Supply Specifications	
Isolation groups	1	Communication protocol	Proprietary protocol, Modbus master-slave, free port communication protocol, multi-PLC interconnection (only for terminal interface)
Isolation withstand voltage	500VAC for 1 minute, leakage current <5mA		
Physical Specifications			
Dimensions W x H x D	147×97×90	Operating temperature	-40℃～+70℃
Weight	725g	Storage temperature	-40℃～+70℃
Relative humidity	5%~95% (non-condensing)		

Note ③: The filtering of 5μs, 10μs, 20μs, 100μs, 200μs, 1ms are effective for motion control instruction; the filtering of 5ms, 10ms, 20ms, 50ms, 100ms are invalid for motion control instruction.

3.8.2 Terminal Definition and Connection

LE5108 is connected with an external 24VDC power and has two pluggable terminals (16x2 and 13x2), the upper terminal offers digital input channel (DI), the lower terminal offers digital output channel (DO), and connection is easy and convenient and is secured with screw, which is a typical field connection case.

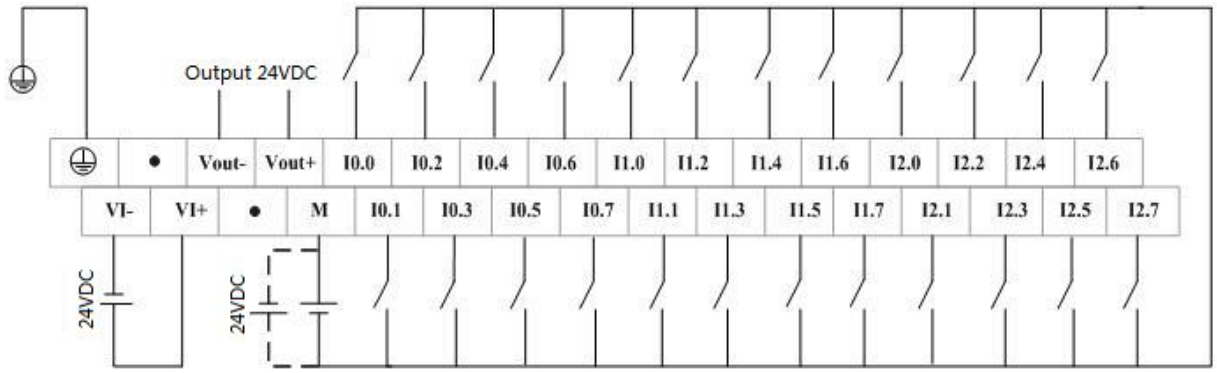


Figure 53 Upper Terminal Definition and Wiring

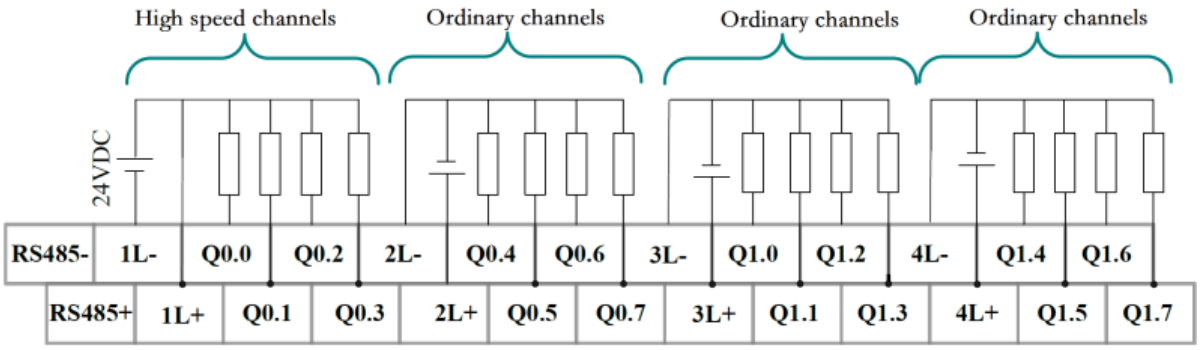


Figure 54 Lower Terminal Definition and Wiring

- Wiring description

  High-speed channel output mode for the open set; ordinary channel output mode for the high-side drive, wiring as shown in Figure 54.

Figure 55 wiring diagrams include two schematic diagrams of connection of high-speed output terminal and motor, the external resistance in the schematic diagrams is for example only. In actual applications, users must calculate external resistance according to their selected permissible current on input side of driver and internal resistance.

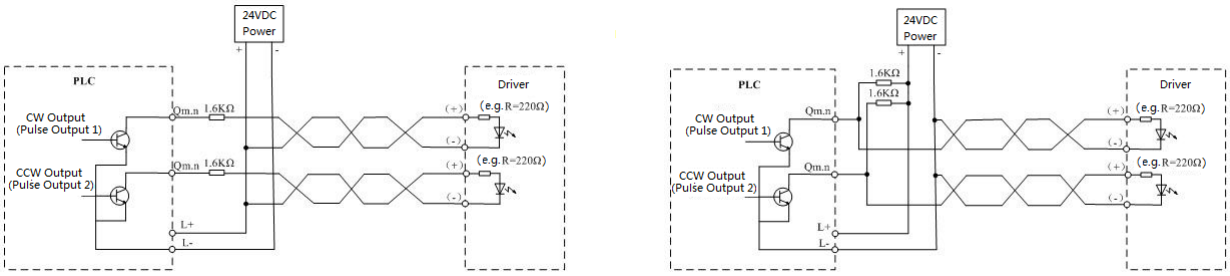


Figure 55 CW/CCW Mode Wiring Diagram

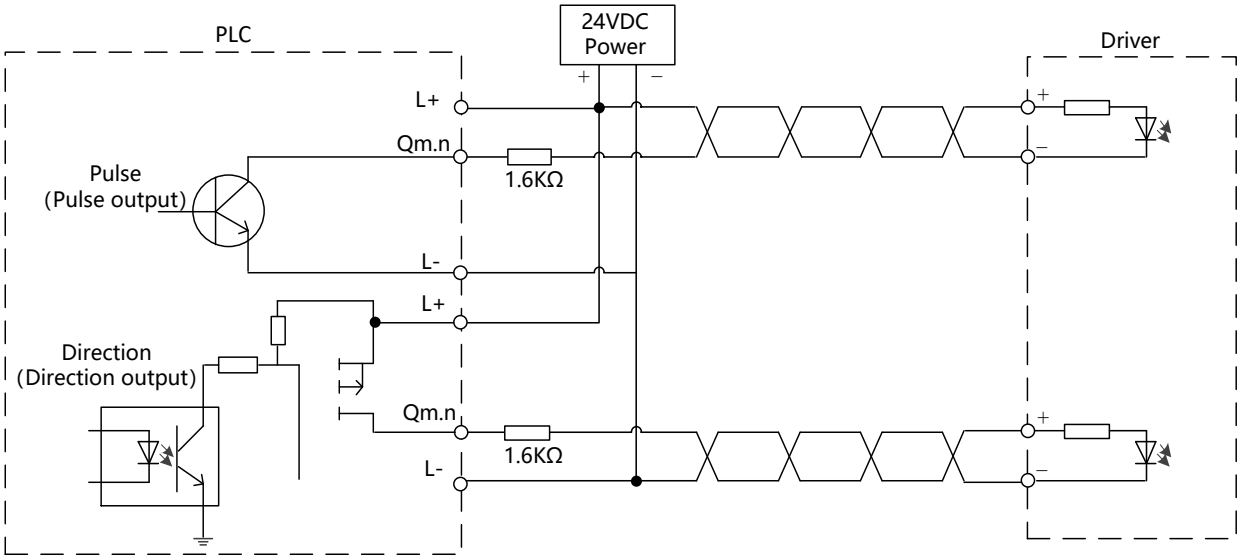


Figure 56 Pulse + Direction Mode Wiring Diagram

Description:

CW / CCW mode:

1: Output axis 1, pulse output (CW) Q0.0, pulse output (CCW) Q0.1

2: Output axis 2, pulse output (CW) Q0.2, pulse output (CCW) Q0.3

Pulse + direction mode:

1: Output axis 1, pulse output Q0.0, pulse direction Q0.4

2: Output axis 2, pulse output Q0.1, pulse direction Q0.5

3: Output axis 3, pulse output Q0.2, pulse direction Q0.6

4: Output axis 4, pulse output Q0.3, pulse direction Q0.7

Table 31 Terminal Identification

Terminal Identification	Description	Terminal Identification	Description
⏚	Grounding	VI-	Input power supply 24VDC negative
●	No connection	VI+	Input power supply 24VDC positive
Vout-	Output 24VDC negative	●	No connection
Vout+	Output 24VDC positive	M	Common of input
I0.0	Fast external interruption 1/ Pulse catch 1/ Frequency measurement channel 1/single-phase counter 1/ A/B phase counter1 phase A / Ordinary input	I0.1	Fast external interruption 2/ Pulse catch 2/ Frequency measurement channel 2/single-phase counter 2/ A/B phase counter1 Phase B/ Ordinary input
I0.2	Fast external interruption 3/ Pulse catch 3/ Frequency measurement channel 3/ single-phase counter 3/ A/B phase counter 2 phase A / Ordinary input	I0.3	Fast external interruption 4/ Pulse catch 4/ Frequency measurement channel 4/ single-phase counter 4/ A/B phase counter 2 phase B / Ordinary input
I0.4	Single-phase counter 1 direction control / Ordinary input	I0.5	Single-phase counter 2 direction control/ Ordinary input
I0.6	Single-phase counter 3 direction control / Ordinary input	I0.7	Single-phase counter 4 direction control/ Ordinary input
I1.0	Single-phase counter 1 reset/ A/B phase counter 1 reset/Ordinary input	I1.1	Single-phase counter 2 reset/ Ordinary input
I1.2	Single-phase counter 3 reset / A/B phase counter 2 reset / Ordinary input	I1.3	Single-phase counter 4 reset/ Ordinary input
I1.4	Fast external interruption 5/ Pulse catch 5/ single-phase counter 5/ A/B phase counter 3 phase A / Ordinary input	I1.5	Fast external interruption 6/ Pulse catch6/ single-phase counter 6/ A/B phase counter 3 phase B / Ordinary input

Terminal Identification	Description	Terminal Identification	Description
I1.6	Pulse catch 7/ single-phase counter 7/ A/B phase counter 4 phase A / Ordinary input	I1.7	Pulse catch8/ single-phase counter 8/ A/B phase counter 4 phase B / Ordinary input
I2.0	Single-phase counter 5 direction control/ Ordinary input	I2.1	Single-phase counter 6 direction control/ Ordinary input
I2.2	Single-phase counter 7 direction control/ Ordinary input	I2.3	Single-phase counter 8 direction control/ Ordinary input
I2.4	Single-phase counter 5 reset/ A/B phase counter 3 reset/ Ordinary input	I2.5	Single-phase counter 6 reset/ Ordinary input
I2.6	Single-phase counter 7 reset/ A/B phase counter 4 reset/ Ordinary input	I2.7	Single-phase counter 8 reset/ Ordinary input
Terminal Identification	Description	Terminal Identification	Description
RS485-	RS485 Communication	RS485+	RS485 Communication
1L-	Load driving power supply 1 negative（Q0.0～Q0.3）	1L+	Load driving power supply 1 positive（Q0.0～Q0.3）
Q0.0	High-speed output / Ordinary output	Q0.1	High-speed output / Ordinary output
Q0.2	High-speed output / Ordinary output	Q0.3	High-speed output / Ordinary output
2L-	Load driving power supply 2 negative（Q0.4～Q0.7）	2L+	Load driving power supply 2 positive（Q0.4～Q0.7）
Q0.4	Ordinary output	Q0.5	Ordinary output
Q0.6	Ordinary output	Q0.7	Ordinary output
3L-	Load driving power supply 3 negative（Q1.0～Q1.3）	3L+	Load driving power supply 3 positive（Q1.0～Q1.3）
Q1.0	Ordinary output	Q1.1	Ordinary output
Q1.2	Ordinary output	Q1.3	Ordinary output

Terminal Identification	Description	Terminal Identification	Description
4L-	Load driving power supply 4 negative（Q1.4～Q1.7）	4L+	Load driving power supply 4 positive（Q1.4～Q1.7）
Q1.4	Ordinary output	Q1.5	Ordinary output
Q1.6	Ordinary output	Q1.7	Ordinary output

3.8.3 Electrical Schematic Diagram

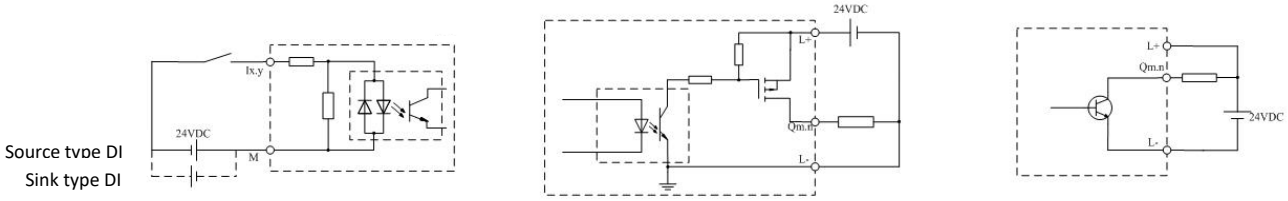


Figure 57 Input Channel Ordinary Output Channel High-speed Output Channel

3.9 LE5109 24DI/ 16 DO CPU Module

LE5109 is a CPU module of LE Series micro PLC which can complete control, detection, diagnosis, RS485 communication needed for system. Functions specifically achieved as follows: RUN/STOP switch selects running and stopping mode of module; RTC records operation time; equipped with USB memory card interface to facilitate download user program; RS485 interface provides channel to download application program and supports access to peripheral device and multi-PLC interconnection; equipped with 24 DI and16 DO. It is a CPU Module with relatively strong control capability.

3.9.1 Technical Specifications

Table 32 Technical Specifications

CPU Specifications		Power Supply Specifications		
On-board I/O	24 DI / 16 DO	Input	Rated voltage	100~240VAC
			Permissible range	85~264VAC（50/60Hz）

CPU Specifications		Power Supply Specifications		
I/O expansion module (max.)	20 (total modules power consumption ≤ CPU rating)		Current consumption (max.)	1000mA
Number of expansion board	1	External output voltage	24VDC	
Programming language	LD/ST/CFC/SFC	External output current (max.)	+24VDC (supply for expansion bus)	950mA
Program memory	256K bytes		+24VDC (supply for peripheral device)	400mA
Data memory	64K bytes		+5VDC (supply for expansion bus)	2500mA
Power-loss retentive memory	8K bytes	Hold up time (loss of power)		80ms
Memory card	Memory card with USB interface	Output Specifications		
HSC	8 HSC at 200KHz for single phase	Number of outputs	16	
	4 HSC at 100KHz for A/B phase	Output type	Relay	
Pulse catch	8	Rated voltage	24VDC or 24～230VAC	
Fast external interruption	6	Permissible range	5～30VDC or 5～250VAC	
Basic instruction processing time	0.1μs	Output current	2A (resistance load)	
Input Specifications		Rated current per common (max.)	＜8A	
Number of inputs	24	ON state resistance	0.2Ω (max.)	
Input type	Sink/source	Switching frequency (max.)	1Hz	
Rated voltage	24VDC	Lifetime mechanical	No load: up to 10,000,000 open/close cycles	
Permissible range	0～30VDC		Rated resistance 2A load: up to 100,000 open/close cycles	
Logic 1 signal	15~30VDC, permissible min. current 3mA	Isolation mode	Relay isolation (field side to system)	

CPU Specifications		Power Supply Specifications	
Logic 0 signal	0~5VDC, permissible max. 1mA	Isolation groups	4
Filtering parameter	No filtering, 5μs, 10μs, 20μs, 100μs, 200μs, 1ms, 5ms, 10ms, 20ms, 50ms, 100ms	Isolation withstand voltage	2500VAC for 1minute, leakage current <5mA
		Communication Specifications	
Isolation mode	Optocoupler (field side to system)	Communication interface	2 RS485
Isolation groups	1	Interface type	PS/2, pluggable terminals
Isolation withstand voltage	500VAC for 1 minute, leakage current <5mA	Baud rates (bps)	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
		Communication protocol	Proprietary protocol, Modbus master-slave, free port communication protocol, multi-PLC interconnection(only for terminal connecting)
Physical Specifications			
Dimensions W x H x D (mm)	147×97×90	Operating temperature	-40℃～+70℃
Weight	875g	Storage temperature	-40℃～+70℃
Relative humidity	5%~95% (non-condensing)		

3.9.2 Terminal Definition and Connection

LE5109 is connected with an external 220V AC power and has two pluggable terminals (16x2 and 13x2), the upper terminal offers digital input channel (DI), the lower terminal offers digital output channel (DO), and connection is easy and convenient and is secured with screw, which is a typical field connection case.

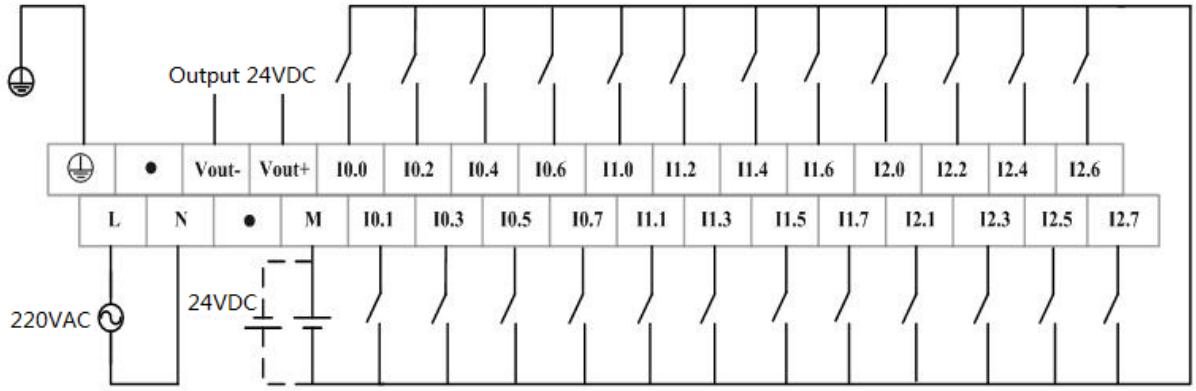


Figure 58 LE5109 Upper Terminals Definition and Wring Diagram

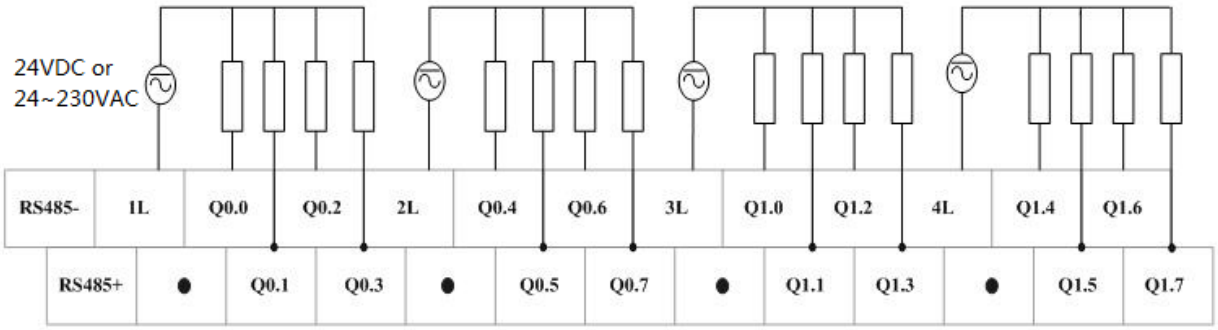


Figure 59 LE5109 Lower Terminals Definition and Wring Diagram

Table 33 Terminal Identification

Terminal Identification	Description	Terminal Identification	Description
⏚	Grounding	L	Fire wire
•	No connection	N	Null wire
Vout-	Output 24VDC negative	•	No connection
Vout+	Output 24VDC positive	M	Common of Input
I0.0	Fast external interruption 1/ Pulse catch 1/frequency measurement 1/single-phase counter 1/ A/B phase counter 1 phase A / Ordinary input	I0.1	Fast external interruption 2/ Pulse catch 2/frequency measurement 2/single-phase counter 2/ A/B phase counter 1 phase B / Ordinary input
I0.2	Fast external interruption 3/ Pulse catch 3/frequency measurement 3/Single-phase counter 3/ A/B phase counter phase A / Ordinary input	I0.3	Fast external interruption 4/ Pulse catch 4/frequency measurement 4/single-phase counter 4/ A/B phase counter 2 phase B / Ordinary input

Terminal Identification	Description	Terminal Identification	Description
I0.4	Single-phase counter 1 direction control /Ordinary input	I0.5	Single-phase counter 2 direction control /Ordinary input
I0.6	Single-phase counter 3 direction control /Ordinary input	I0.7	Single-phase counter 4 direction control /Ordinary input
I1.0	Single-phase counter 1 reset/ A/B phase counter 1 reset/Ordinary input	I1.1	Single-phase counter 2 reset/Ordinary input
I1.2	Single-phase counter 3 reset/ A/B phase counter 2 reset/Ordinary input	I1.3	Single-phase counter 4 reset/Ordinary input
I1.4	Fast external interruption 5/ Pulse catch 5/frequency measurement 5/single-phase counter 5/ A/B phase counter 3 phase A /Ordinary input	I1.5	Fast external interruption 6/ Pulse catch 6/frequency measurement 6/single-phase counter 6/ A/B phase counter 3 phase B /Ordinary input
I1.6	Pulse catch 7/frequency measurement 7/single-phase counter 7/ A/B phase counter 4 phase A /Ordinary input	I1.7	Pulse catch 8/frequency measurement 8/single-phase counter 8/ A/B phase counter 4 phase B/Ordinary input
I2.0	Single-phase counter 5 direction control /Ordinary input	I2.1	Single-phase counter 6 direction control /Ordinary input
I2.2	Single-phase counter 7 direction control /Ordinary input	I2.3	Single-phase counter 8 direction control /Ordinary input
I2.4	Single-phase counter 5 reset/ A/B phase counter 3 reset/Ordinary input	I2.5	Single-phase counter 6 reset /Ordinary input
I2.6	Single-phase counter 7 reset/ A/B phase counter 4 reset/Ordinary input	I2.7	Single-phase counter 8 reset/ /Ordinary input
Terminal Identification	Description	Terminal Identification	Description
RS485-	negative(RS485-)	RS485+	positive (RS485-)
1L	Common of Output (Q0.0～Q0.3)	●	No connection
Q0.0	Ordinary output	Q0.1	Ordinary output
Q0.2	Ordinary output	Q0.3	Ordinary output
2L	Common of Output （Q0.4～Q0.7）	●	No connection
Q0.4	Ordinary output	Q0.5	Ordinary output
Q0.6	Ordinary output	Q0.7	Ordinary output

Terminal Identification	Description	Terminal Identification	Description
3L	Common of Output (Q1.0 ～ Q1.3)	•	No connection
Q1.0	Ordinary output	Q1.1	Ordinary output
Q1.2	Ordinary output	Q1.3	Ordinary output
4L	Common of Output (Q1.4 ～ Q1.7)	•	No connection
Q1.4	Ordinary output	Q1.5	Ordinary output
Q1.6	Ordinary output	Q1.7	Ordinary output

3.9.3 Electrical Schematic Diagram

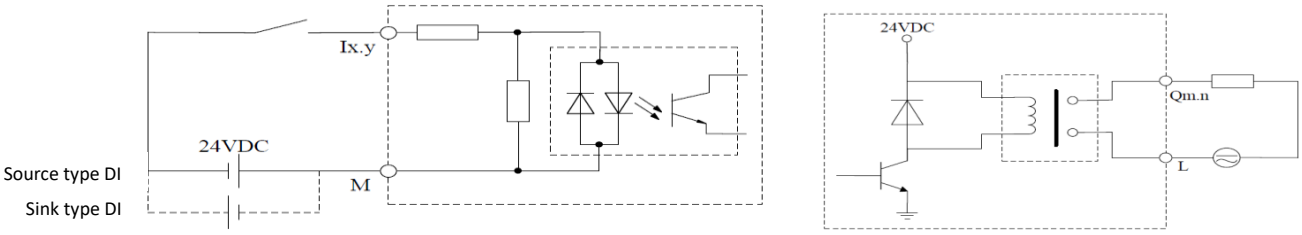


Figure 60 Electrical Schematic Diagram of Input Electrical Schematic Diagram of Output

3.10 LE5109L 24DI/ 16 DO CPU Module

LE5109L is a CPU module of LE Series micro PLC which can complete control, detection, diagnosis, RS485 communication needed for system. Functions specifically achieved as follows: RUN/STOP switch selects running and stopping mode of module; RTC records operation time; equipped with USB memory card interface to facilitate download user program; RS485 interface provides channel to download application program and supports access to peripheral device and multi-PLC interconnection; equipped with 24 DI and16 DO.

3.10.1 Technical Specifications

Table 34 Technical Specifications

CPU Specifications		Power Supply Specifications		
On-board I/O	24 DI / 16 DO	Input	Rated voltage	100~240VAC
			Permissible range	85~264VAC

CPU Specifications		Power Supply Specifications		
				（50/60Hz）
I/O expansion module (max.)	7 (total modules power consumption ≤ CPU rating)		Current consumption (max.)	500mA
Number of expansion board	1	External output voltage	Rated voltage	Not supported
Programming language	LD/ST/CFC/SFC		Permissible range	Not supported
Program memory	128K bytes	External output current (max.)	+24VDC (supply for expansion bus)	400mA
Data memory	10496 bytes		+5VDC (supply for expansion bus)	1000mA
Power-loss retentive memory	2K bytes	Hold up time (loss of power)		10ms
Memory card	Memory card with USB interface	Communication Specifications		
HSC	2 HSC at 5KHz for single phase	Communication interface	2 RS485	
	1 HSC at 20KHz for A/B phase	Interface type	PS/2, pluggable terminals	
Pulse catch	2	Baud rates (bps)	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	
Fast external interruption	2			
Frequency measurement	Not supported	Communication protocol	Proprietary protocol, Modbus master-slave, free port communication protocol,multi-PLC interconnection(only for terminal connecting)	
Basic instruction processing time	0.1μs			
Input Specifications		Output Specifications		
Number of inputs	24	Number of outputs	16	
Input type	Sink/source	Output type	Relay	
Rated voltage	24VDC	Rated voltage	24VDC or 24～230VAC	
Permissible range	0～30VDC	Permissible range	5～30VDC or 5～250VAC	
Logic 1 signal	15~30VDC, permissible min. current 4mA	Output current	2A (resistance load)	
Logic 0 signal	0~5VDC, permissible max. 1mA	Rated current per common (max.)	＜8A	
Filtering parameter	No filtering, 5ms, 10ms, 20ms, 50ms, 100ms	ON state resistance	0.2Ω (max.)	
Isolation mode	Optocoupler (field side	Switching	1Hz	

CPU Specifications		Power Supply Specifications	
	to system)	frequency (max.)	
Isolation groups	1	Lifetime mechanical	No load: up to 10,000,000 open/close cycles
Isolation withstand voltage	500VAC for 1minute, leakage current <5mA		
Physical Specifications			Rated resistance 2A load: up to 100,000 open/close cycles
Dimensions W x H x D (mm)	147×97×90	Isolation mode	Relay isolation (field side to system)
Weight	700g	Isolation groups	4
Operating temperature	-40℃～+70℃		
Storage temperature	-40℃～+70℃	Isolation withstand voltage	1500VAC for 1minute, leakage current <5mA
Relative humidity	5%~95% (non-condensing)		

3.10.2 Terminal Definition and Connection

LE5109L is connected with an external 220 VAC power and has two pluggable terminals (16x2 and 13x2), the upper terminal offers digital input channel (DI), the lower terminal offers digital output channel (DO), and connection is easy and convenient and is secured with screw, which is a typical field connection case.

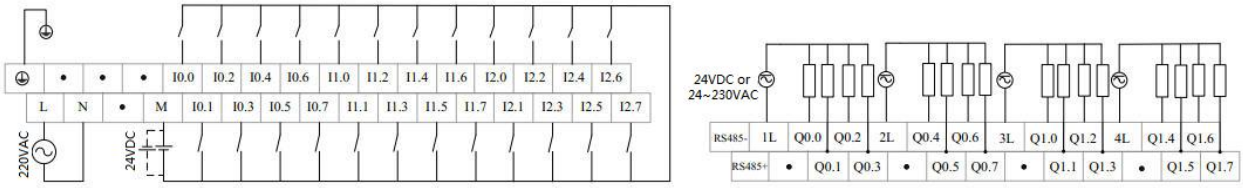


Figure 61 Upper Terminals Definition and Wring Lower Terminals Definition and Wring

Table 35 Terminal Identification

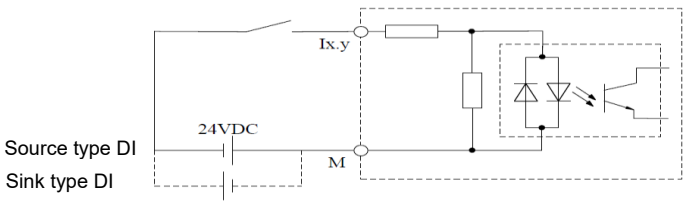
Terminal Identification	Description	Terminal Identification	Description	Terminal Identification	Description	Terminal Identification	Description
⏚	Grounding	L	Fire wire	RS485-	Negative(RS485-)	RS485+	Positive (RS485+)
•	No connection	N	Null line	1L	Common of Output (Q0.0～Q0.3)	•	No connection

Terminal Identification	Description	Terminal Identification	Description	Terminal Identification	Description	Terminal Identification	Description
●	No connection	●	No connection	Q0.0	Ordinary output	Q0.1	Ordinary output
●	No connection	M	Common of Input	Q0.2	Ordinary output	Q0.3	Ordinary output
I0.0	Fast external interruption 1/ Pulse catch 1/single-phase counter 1/ A/B phase counter phase A / Ordinary input	I0.1	Fast external interruption 2/ Pulse catch 2/single-phase counter 2/ Ordinary input	2L	Common of Output （ Q0.4 ～ Q0.7）	●	No connection
I0.2	Single-phase counter 1 reset /A/B phase counter reset /Ordinary input	I0.3	Single-phase counter 2 reset/Ordinary input	Q0.4	Ordinary output	Q0.5	Ordinary output
I0.4	A/B phase counter phase B / Single-phase counter 1 direction control / Ordinary input	I0.5	Single-phase counter 2 direction control / Ordinary input	Q0.6	Ordinary output	Q0.7	Ordinary output
I0.6	Ordinary input	I0.7	Ordinary input	3L	Common of Output (Q1.0～Q1.3)	●	No connection
I1.0	Ordinary input	I1.1	Ordinary input	Q1.0	Ordinary output	Q1.1	Ordinary output

Terminal Identification	Description	Terminal Identification	Description	Terminal Identification	Description	Terminal Identification	Description
I1.2	Ordinary input	I1.3	Ordinary input	Q1.2	Ordinary output	Q1.3	Ordinary output
I1.4	Ordinary input	I1.5	Ordinary input	4L	Common of Output (Q1.4～Q1.7)	•	No connection
I1.6	Ordinary input	I1.7	Ordinary input	Q1.4	Ordinary output	Q1.5	Ordinary output
I2.0	Ordinary input	I2.1	Ordinary input	Q1.6	Ordinary output	Q1.7	Ordinary output
I2.2	Ordinary input	I2.3	Ordinary input	—	—	—	—
I2.4	Ordinary input	I2.5	Ordinary input	—	—	—	—
I2.6	Ordinary input	I2.7	Ordinary input	—	—	—	—

- Only one can be chosen among pulse capture, high-speed counting and quick external interrupt. Please be cautious about filtering parameter of channel when using high-speed counting and quick external interrupt.

3.10.3 Electrical Schematic Diagram



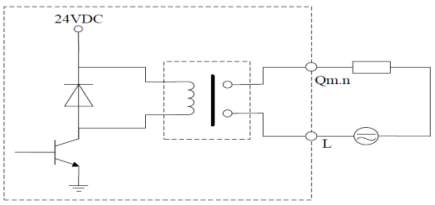


Figure 62 LE5109L Input *LE5109L Output*

3.11 LE5118 24 DI/ 16 DO CPU Module

LE5118 is a CPU module of LE Series micro PLC which can complete control, detection, diagnosis, RS485 and Ethernet communication are supported. Functions specifically achieved as follows: RUN/STOP switch selects running and stopping mode of module; RTC records operation time; equipped with TF card interface to upgrade project of controller; Ethernet interface provides channel

to download application program and RS485 interface supports access to peripheral device and multi-PLC interconnection; equipped with 24 DI and16 DO. It is a CPU module with relatively strong control capability.

3.11.1 Technical Specifications

Table 36 Technical Specifications

<table>
<tr><th colspan="2">CPU Specifications</th><th colspan="3">Power Supply Specifications</th></tr>
<tr><td>On-board I/O</td><td>24 DI/ 16 DO</td><td rowspan="3">Input</td><td>Rated voltage</td><td>24VDC</td></tr>
<tr><td>I/O expansion module (max.)</td><td>20 (total module power consumption ≤ CPU rating)</td><td>Permissible range</td><td>20.4～28.8VDC</td></tr>
<tr><td>Number of expansion board</td><td>1</td><td>Current consumption (max.)</td><td>2200mA@24VDC</td></tr>
<tr><td>Programming language</td><td>LD/ST/CFC/SFC</td><td colspan="2">External output voltage</td><td>24VDC</td></tr>
<tr><td>Program memory</td><td>256K bytes</td><td rowspan="3">External output current (max.)</td><td>+24VDC (supply for expansion bus)</td><td>950mA</td></tr>
<tr><td>Data memory</td><td>64K bytes</td><td>+24VDC(supply for peripheral device)</td><td>400mA</td></tr>
<tr><td>Power-loss retentive memory</td><td>8K bytes (50s after the controller is powered on, the Power-loss retentive function will effective)</td><td>+5VDC (supply for expansion bus)</td><td>2500mA</td></tr>
<tr><td>TF card</td><td>Supported, used to upgrade project of controller</td><td colspan="2">Hold up time (loss of power)</td><td>10ms</td></tr>
</table>

CPU Specifications		Power Supply Specifications	
HSC	8 HSC at 200KHz for single phase (Ix0.0~Ix0.3, Ix1.4~Ix1.7)	Output Specifications	
	4 HSC at 100KHz for A/B phase (Ix0.0~Ix0.3, Ix1.4~Ix1.7)	Number of outputs	16
Pulse output	4, 100KHz (Qx0.0~Qx0.3)	Output type	Transistor
Pulse catch	8 (Ix0.0~Ix0.3, Ix1.4~Ix1.7)	Rated voltage	24VDC
Fast external interruption	6 (Ix0.0~Ix0.3, Ix1.4, Ix1.5)	Permissible range	20.4～28.8VDC
Frequency measurement	4(Ix0.0~Ix0.3)	Output current	Max. 500mA for Q0.0~Q0.7 channel; max. 1A for Q1.0~Q1.7 channel
Basic instruction processing time	0.1μs	Current per common (max.)	2A max. for Q0.0~Q0.7 channel; 4A max. for Q1.0~Q1.7 channel
Input Specifications		Residual voltage	＜0.5V (output logic 1 at current 1A)
Number of inputs	24	On state resistance	0.3Ω (typical), 0.6Ω (max.)
Input type	Sink/source	Isolation mode	Optocoupler (field side to system)
Rated voltage	24VDC	Isolation groups	4

CPU Specifications		Power Supply Specifications	
Permissible range	0～30VDC	Isolation withstand voltage	500VAC for 1 minute, leakage current <5mA
Logic 1 signal	15~30VDC, permissible min. current 3mA	Communication Specifications	
Logic 0 signal	0~5VDC, permissible max. current 1mA	Communication interface (RS485)	
Filtering parameter	Ix0.0~Ix0.3, Ix1.4~Ix1.7: No filtering, 5μs, 10μs, 20μs,100μs, 200μs, 1ms, 5ms, 10ms, 20ms, 50ms, 100ms Ordinary input: No filtering, 5ms, 10ms, 20ms, 50ms, 100ms	Communication interface	1 RS485
Isolation mode	Optocoupler (field side to system)	Interface type	Terminals (Isolation, only for communication)
Isolation groups	1	Baud rates (bps)	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Isolation withstand voltage	500VAC for 1 minute, leakage current <5mA		
Physical Specifications		Communication protocol	Modbus master-slave, free port communication protocol, multi-PLC interconnection
Dimensions W x H x D (mm)	147×97×90	Communication interface (Ethernet)	
Weight	568g	Local communication port	1 Ethernet interface with default IP 192.168.0.250

CPU Specifications		Power Supply Specifications	
Relative humidity	5%~95% (non-condensing)	Interface type	RJ45
Operating temperature	-40℃～＋70℃	Number of visits	The number of simultaneous visits to the master station shall not be more than 5 The number of slave connections shall not be more than 10
Storage temperature	-40℃～＋70℃	Communication rate	10/100Mbps self negotiation
		Communication protocol	ModbusTCP master-slave protocol AT communication protocol (for program uploading and downloading)

3.11.2 Module Structure Diagram

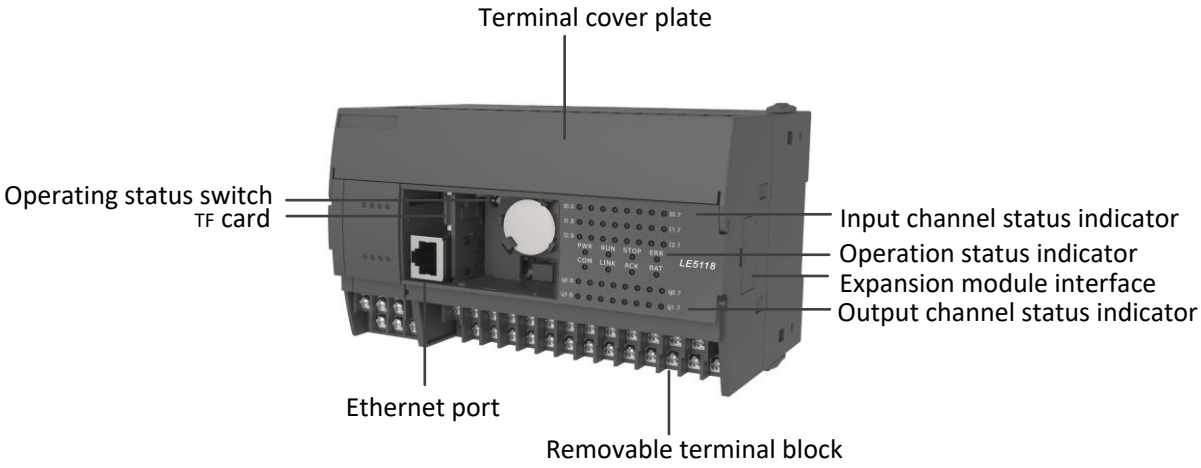


Figure 63 Module Structure

Table 37 Interface Definition

Interface definition	Description
TF card	For controller engineering upgrade
Operating status switch	Select the operation / stop mode of the module, see Chapter 3.1.3 operation mode
Terminal cover plate	Terminal protection cover, one at the top and one at the bottom

Interface definition	Description
	24 input channel status indicators, indicating the working status of the channel
Input channel status indicator	Indicates the operation status and communication status of the module.
Operation status indicator	Used for communication between modules and expansion modules, connecting Le i/o modules.
Expansion module interface	Used for communication between modules and expansion modules, connecting Le i/o modules.
Output channel status indicator	16 input channel status indicators to indicate the working status of the channel
Removable terminal block	2, double row pluggable terminals, upper row 16*2, lower row 13*2
Ethernet port	It is used to connect at programming software, download user programs, support Modbus TCP master-slave protocol

3.11.3 Terminal Definition and Connection

LE5118 is connected with an external 24VDC power and has two pluggable terminals (16x2 and 13x2), the upper terminal offers digital input channel (DI), the lower terminal offers digital output channel (DO), and connection is easy and convenient and is secured with screw, which is a typical field connection case.

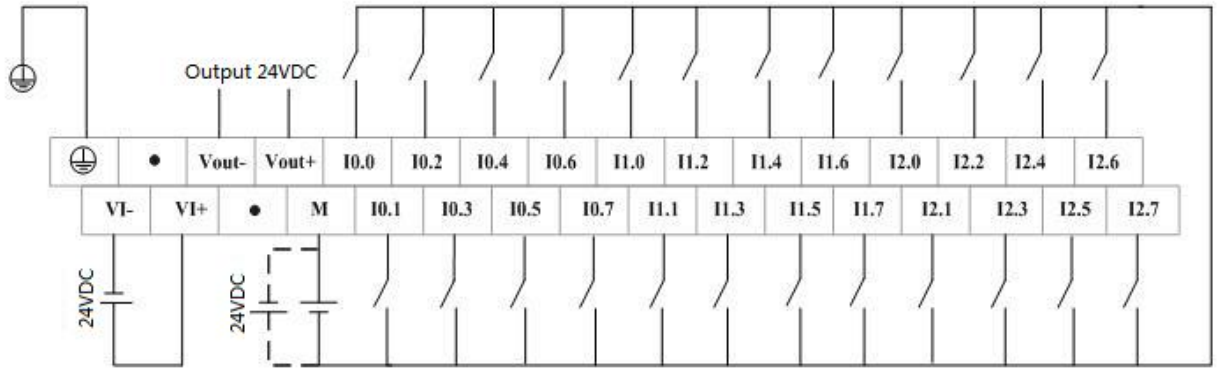


Figure 64 Upper Terminal Definition and Wiring

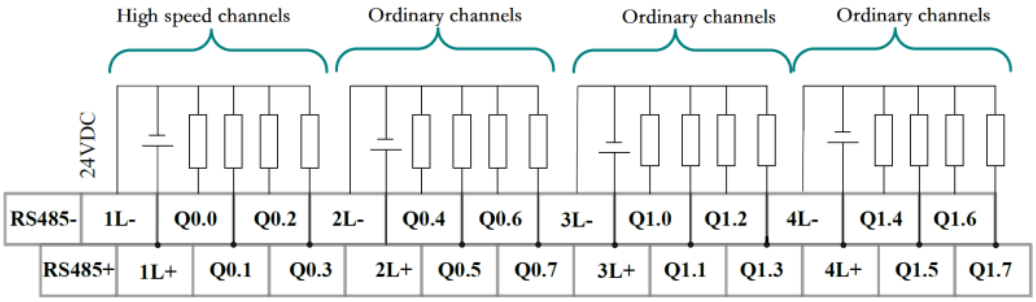
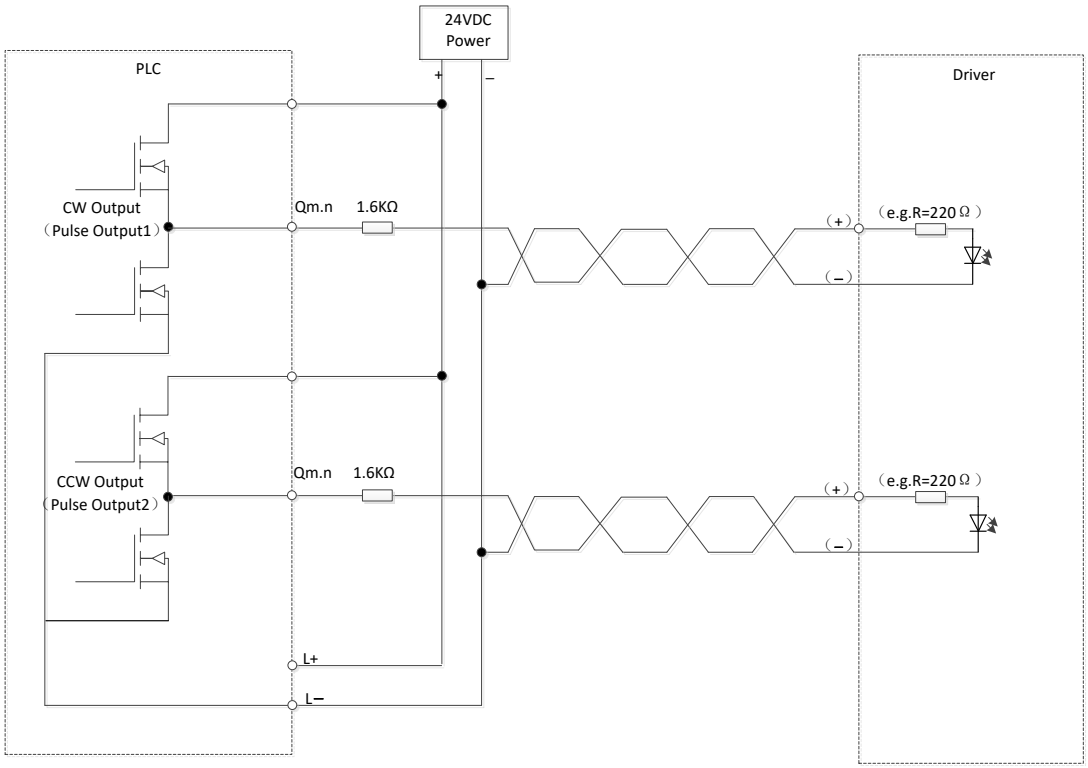


Figure 65 Lower Terminal Definition and Wiring

Wiring description：

- Q0.0~Q0.7 channels output mode for the push-pull; Q1.0~Q1.7 channel output mode for the high-side drive, wiring as shown in Figure 65.
- When Q0.0~Q0.7 outputs capacitive load, channel may be no output, and a power resistor of more than 5 Ω needs to be connected in series.
- Q0.0~Q0.7 has short-circuit protection function inside. If a short circuit occurs in one channel, it will not affect other channels. The circuit needs to be restored to normal, and the on-site test needs to be powered on again.

Figure 66 wiring diagrams include two schematic diagrams of connection of Q0.0~Q0.7 output terminals and motor, the external resistance in the schematic diagrams is for example only. In actual applications, users must calculate external resistance according to their selected permissible current on input side of driver and internal resistance.



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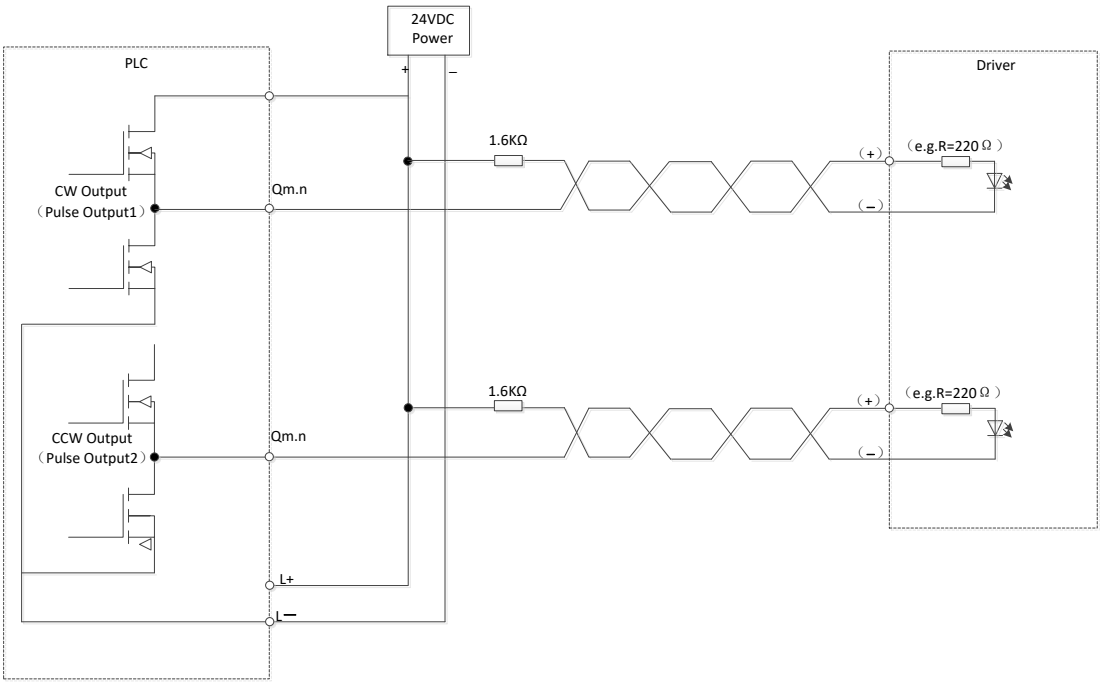

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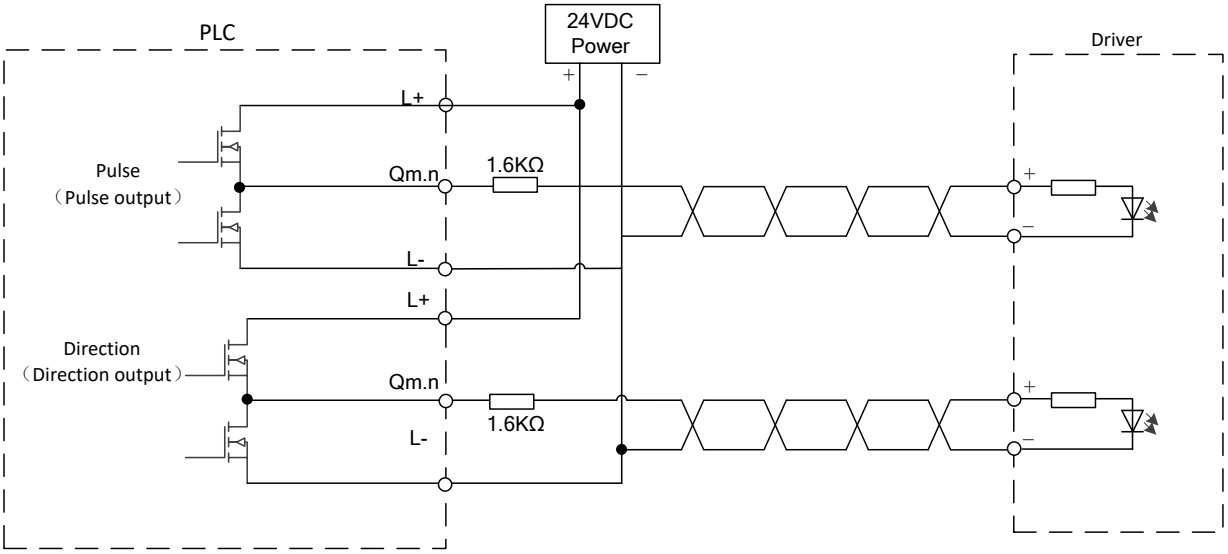
Figure 66　CW/CCW Mode Wiring Diagram



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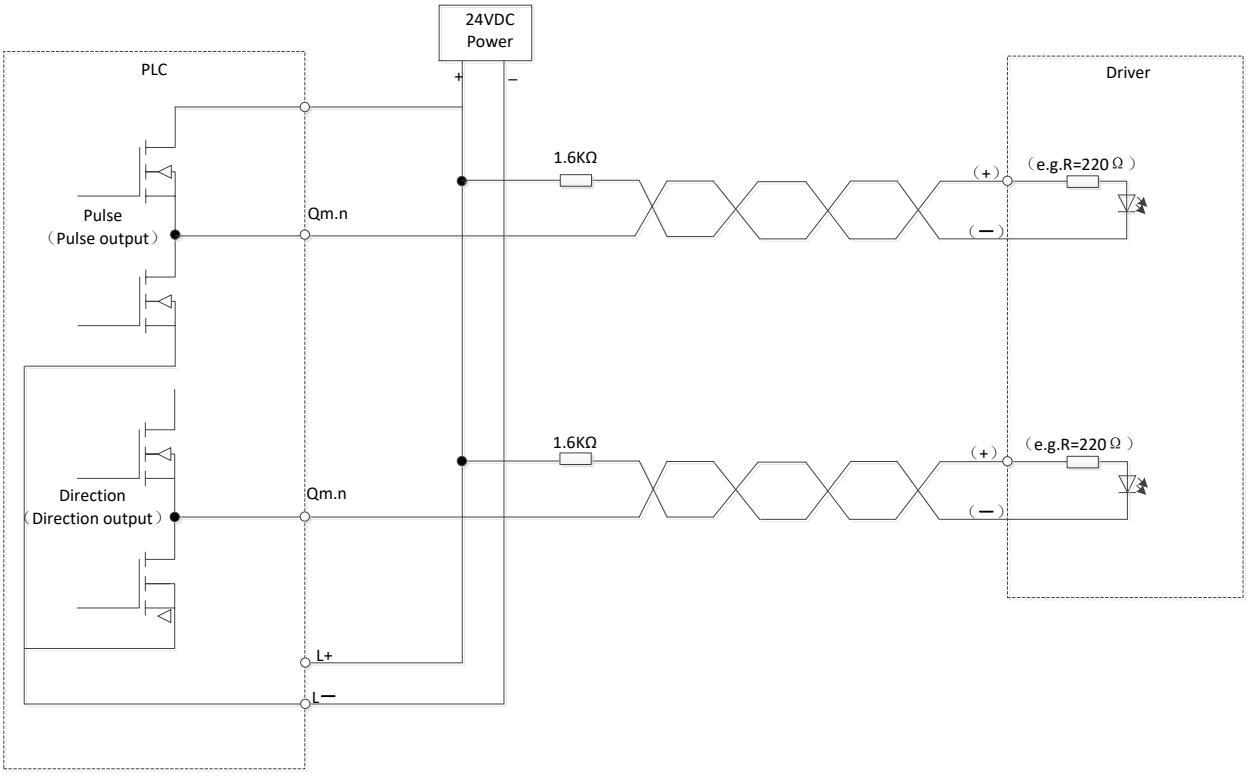


（2）

Figure 67　Pulse + Direction Mode Wiring Diagram

Description:

CW / CCW mode:

1: Output axis 1, pulse output (CW) Q0.0, pulse output (CCW) Q0.1

2: Output axis 2, pulse output (CW) Q0.2, pulse output (CCW) Q0.3

Pulse + direction mode:

1: Output axis 1, pulse output Q0.0, pulse direction Q0.4

2: Output axis 2, pulse output Q0.1, pulse direction Q0.5

3: Output axis 3, pulse output Q0.2, pulse direction Q0.6

4: Output axis 4, pulse output Q0.3, pulse direction Q0.7

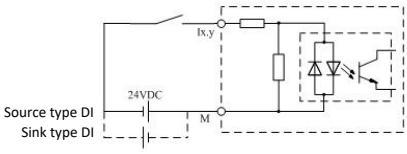
Table 38 Terminal Identification

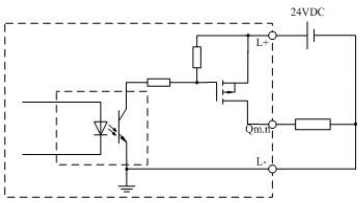
Terminal Identification	Description	Terminal Identification	Description
⏚	Grounding	VI-	Input power supply 24VDC negative
●	No connection	VI+	Input power supply 24VDC positive
Vout-	Output 24VDC negative	●	No connection
Vout+	Output 24VDC positive	M	Common of input
I0.0	Fast external interruption 1/ Pulse catch 1/ Frequency measurement channel 1/single-phase counter 1/ A/B phase counter1 phase A / Ordinary input	I0.1	Fast external interruption 2/ Pulse catch 2/ Frequency measurement channel 2/single-phase counter 2/ A/B phase counter1 Phase B/ Ordinary input
I0.2	Fast external interruption 3/ Pulse catch 3/ Frequency measurement channel 3/ single-phase counter 3/ A/B phase counter 2 phase A / Ordinary input	I0.3	Fast external interruption 4/ Pulse catch 4/ Frequency measurement channel 4/ single-phase counter 4/ A/B phase counter 2 phase B / Ordinary input
I0.4	Single-phase counter 1 direction control / Ordinary input	I0.5	Single-phase counter 2 direction control/ Ordinary input
I0.6	Single-phase counter 3 direction control / Ordinary input	I0.7	Single-phase counter 4 direction control/ Ordinary input
I1.0	Single-phase counter 1 reset/ A/B phase counter 1 reset/Ordinary input	I1.1	Single-phase counter 2 reset/ Ordinary input

Terminal Identification	Description	Terminal Identification	Description
I1.2	Single-phase counter 3 reset / A/B phase counter 2 reset / Ordinary input	I1.3	Single-phase counter 4 reset/ Ordinary input
I1.4	Fast external interruption 5/ Pulse catch 5/ single-phase counter 5/ A/B phase counter 3 phase A / Ordinary input	I1.5	Fast external interruption 6/ Pulse catch6/ single-phase counter 6/ A/B phase counter 3 phase B / Ordinary input
I1.6	Pulse catch 7/ single-phase counter 7/ A/B phase counter 4 phase A / Ordinary input	I1.7	Pulse catch8/ single-phase counter 8/ A/B phase counter 4 phase B / Ordinary input
I2.0	Single-phase counter 5 direction control/ Ordinary input	I2.1	Single-phase counter 6 direction control/ Ordinary input
I2.2	Single-phase counter 7 direction control/ Ordinary input	I2.3	Single-phase counter 8 direction control/ Ordinary input
I2.4	Single-phase counter 5 reset/ A/B phase counter 3 reset/ Ordinary input	I2.5	Single-phase counter 6 reset/ Ordinary input
I2.6	Single-phase counter 7 reset/ A/B phase counter 4 reset/ Ordinary input	I2.7	Single-phase counter 8 reset/ Ordinary input
Terminal Identification	Description	Terminal Identification	Description
RS485-	RS485 Communication	RS485+	RS485 Communication
1L-	Load driving power supply 1 negative（Q0.0～Q0.3）	1L+	Load driving power supply 1 positive（Q0.0～Q0.3）
Q0.0	High-speed output / Ordinary output	Q0.1	High-speed output / Ordinary output
Q0.2	High-speed output / Ordinary output	Q0.3	High-speed output / Ordinary output
2L-	Load driving power supply 2 negative（Q0.4～Q0.7）	2L+	Load driving power supply 2 positive（Q0.4～Q0.7）

Terminal Identification	Description	Terminal Identification	Description
Q0.4	Ordinary output / Pulse direction output	Q0.5	Ordinary output / Pulse direction output
Q0.6	Ordinary output / Pulse direction output	Q0.7	Ordinary output / Pulse direction output
3L-	Load driving power supply 3 negative（Q1.0～Q1.3）	3L+	Load driving power supply 3 positive（Q1.0～Q1.3）
Q1.0	Ordinary output	Q1.1	Ordinary output
Q1.2	Ordinary output	Q1.3	Ordinary output
4L-	Load driving power supply 4 negative（Q1.4～Q1.7）	4L+	Load driving power supply 4 positive（Q1.4～Q1.7）
Q1.4	Ordinary output	Q1.5	Ordinary output
Q1.6	Ordinary output	Q1.7	Ordinary output

3.11.4 Electrical Schematic Diagram





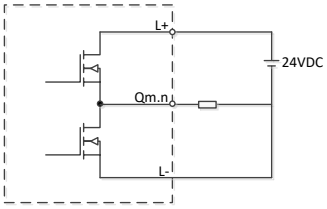


Figure 68 Input Channel ***Q1.0~1.7 Output Channel*** ***Q0.0~0.7 Output Channel***

3.11.5 Definition of Indicators

Indicators monitor the working status of module in real time, including 24 input channel indicators, 8 operation status indicators and 16 output channel indicators.

Table 39 Definition of Indicator

Type	Color	Status	Description
PWR(Power indicator)	Green	ON	System power supply is normal
		OFF	The system is not powered on

Type	Color	Status	Description
RUN(Operation status indicator)	Green	ON	PLC is in operation state, and the user's project is not powered on during operation
		OFF	User project is not running
STOP(Stop status indicator)	Yellow	ON	The PLC is in the stopped state, and the user project stops running
		OFF	PLC in non stop state
ERR(Fault indicator)	Red	ON	Indicates that there is some or some diagnosable fault in the PLC
		OFF	System isnormal
COM(Terminal RS485 communication status indicator)	Green	Flashing	With data communication
		OFF	No data communication
LINK(Ethernet connection indicator)	Green	ON	Ethernet interface successfully connected
		OFF	Ethernet interface failed to connect
ACK(Ethernet communication indicator)	Yellow	ON/Flashing	The Ethernet interface is sending and receiving data Long light (large amount of data) Flashing (small amount of data)
		OFF	Ethernet interface without receiving and sending data
BAT(Battery status indicator)	Green	ON	Low battery voltage (less than 2.3V) or no battery connected
		OFF	Normal battery voltage (more than 2.5V)
Ix.y (DI channel status indicator)	Green	ON	DI input continuity
		OFF	DI input off
Qm.n(DO channel status indicator)	Green	ON	DO output conduction
		OFF	DO output off

3.11.6 Upgrade the Project in Controller

1. Concept

The user project in the controller can be upgraded through the TF card. The controller detects the project file in the TF card during startup to upgrade. If the TF card is inserted after the controller is started, it cannot be upgraded and needs to be powered off and restarted again.

You need to prepare.at engineering documents and HoliSD.cfg configuration file before upgrading. The format of HoliSD.cfg configuration file is shown in the following figure.

File naming requirements:

- .at project file name must match project file names in the HoliSD.cfg configuration file.
- .at project file name length meets no more than 8 digits before and no more than 3 digits after. For example: xxxxxxxx.xxx
- The configuration file must be named as HoliSD.cfg.
- The configuration file format must be created as shown in Figure.

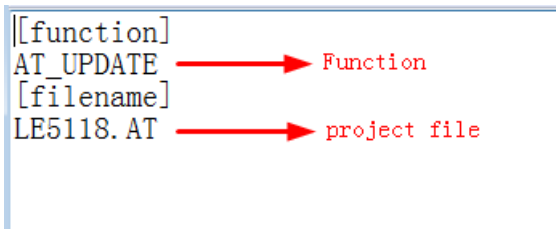


Figure 69 HoliSD.cfg configuration file format

2. Requirements

You need to copy .at engineering documents and HoliSD.cfg configuration file to TF card.

3. Steps

To upgrade the user project of controller, follow the steps below:

Step 1. Insert the TF card into the TF card slot.

Step 2. The controller is powered off and restarted.

After the PWR indicator light is on, the upgrade starts. At this time, the RUN light and STOP light flash alternately. When the RUN light is on, the project upgrade is completed. When the upgrade fails, the STOP light and ERR light are always on at the same time. Please check whether the file meets the naming requirements.

3.12 LE5119 24DI/ 16 DO CPU Module

LE5119 is a CPU module of LE Series micro PLC which can complete control, detection, diagnosis, RS485 and Ethernet communication are supported. Functions specifically achieved as follows: RUN/STOP switch selects running and stopping mode of module; RTC records operation time; equipped with TF card interface to upgrade project of controller; Ethernet interface provides channel to download application program and RS485 interface supports access to peripheral device and multi-PLC interconnection; equipped with 24 DI and16 DO. It is a CPU Module with relatively strong control capability.

3.12.1 Technical Specifications

Table 40 Technical Specifications

CPU Specifications		Power Supply Specifications		
On-board I/O	24 DI / 16 DO	Input	Rated voltage	AC:100~240VAC DC: 110VDC~260VDC
			Permissible range	AC:85~264VAC （50/60Hz） DC: 100VDC~330VDC
I/O expansion module (max.)	20 (total modules power consumption ≤ CPU rating)		Current consumption (max.)	1000mA
Number of expansion board	1	External output voltage	24VDC	
Programming language	LD/ST/CFC/SFC	External output current (max.)	+24VDC (supply for expansion bus)	950mA
Program memory	256K bytes		+24VDC (supply for peripheral device)	400mA
Data memory	64K bytes		+5VDC (supply for expansion bus)	2500mA
Power-loss retentive memory	8K bytes (50s after the controller is powered on, the Power-loss retentive function will effective)	Hold up time (loss of power)		80ms
TF card	Supported, used to upgrade project of controller	Output Specifications		
HSC	8 HSC at 200KHz for single phase	Number of outputs	16	
	4 HSC at 100KHz for A/B phase	Output type	Relay	
Pulse catch	8	Rated voltage	24VDC or 24～230VAC	
Fast external interruption	6	Permissible range	5～30VDC or 5～250VAC	
Basic instruction processing time	0.1μs	Output current	2A (resistance load)	

CPU Specifications		Power Supply Specifications	
Input Specifications		Rated current per common (max.)	＜8A
Number of inputs	24	ON state resistance	0.2Ω (max.)
Input type	Sink/source	Switching frequency (max.)	1Hz
Rated voltage	24VDC	Lifetime mechanical	No load: up to 10,000,000 open/close cycles
Permissible range	0～30VDC		Rated resistance 2A load: up to 100,000 open/close cycles
Logic 1 signal	15~30VDC, permissible min. current 3mA	Isolation mode	Relay isolation (field side to system)
Logic 0 signal	0~5VDC, permissible max. 1mA	Isolation groups	4
Filtering parameter	No filtering, 5μs, 10μs, 20μs, 100μs, 200μs, 1ms, 5ms, 10ms, 20ms, 50ms, 100ms	Isolation withstand voltage	2500VAC for 1minute, leakage current <5mA
		Communication Specifications	
Isolation mode	Optocoupler (field side to system)	Communication interface(RS485)	1 RS485
Isolation groups	1	Interface type	Terminals (Isolation, only for communication)
Isolation withstand voltage	500VAC for 1 minute, leakage current <5mA	Baud rates (bps)	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
		Communication protocol	Proprietary protocol, Modbus master-slave, free port communication protocol, multi-PLC interconnection(only for terminal connecting)
Physical Specifications		Communication interface (Ethernet)	1 Ethernet interface with default IP 192.168.0.250
Dimensions W x H x D (mm)	147×97×90	Interface type	RJ45
Weight	717g	Number of visits	The number of simultaneous visits to the master station shall not be more than 5 The number of slave connections shall not be more than 10
Operating temperature	-40℃～+70℃	Communication rate	10/100Mbps self negotiation
Storage temperature	-40℃～+70℃	Communication protocol	ModbusTCP master-slave protocol AT communication protocol (for program uploading and downloading)
Relative	5%~95% (non-		

CPU Specifications		Power Supply Specifications	
humidity	condensing)		

3.12.2 Module Structure Diagram

The module appearance structure is the same as LE5118. Please refer to Chapter 3.11.2 Module Structure Diagram.

3.12.3 Terminal Definition and Connection

LE5119 is connected with an external 220V AC power and has two pluggable terminals (16x2 and 13x2), the upper terminal offers digital input channel (DI), the lower terminal offers digital output channel (DO), and connection is easy and convenient and is secured with screw, which is a typical field connection case.

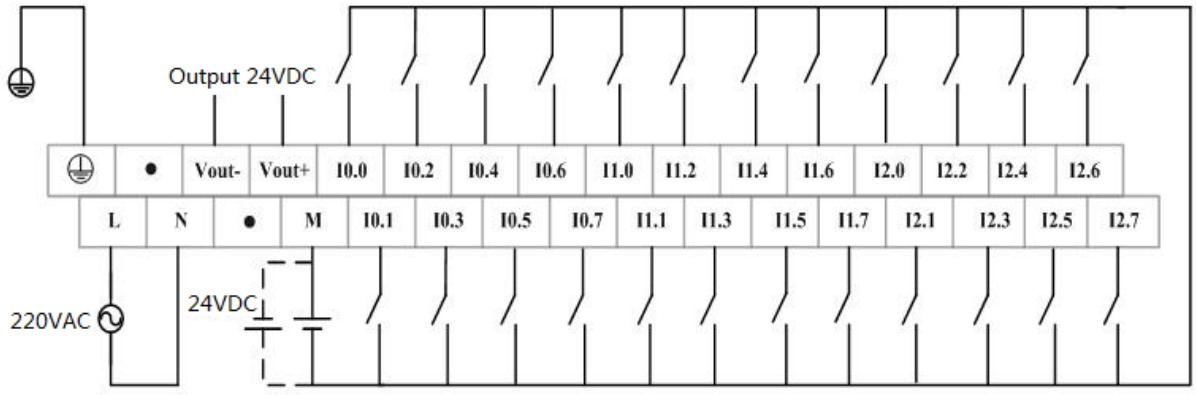


Figure 70 LE5119 Upper Terminals Definition and Wring Diagram

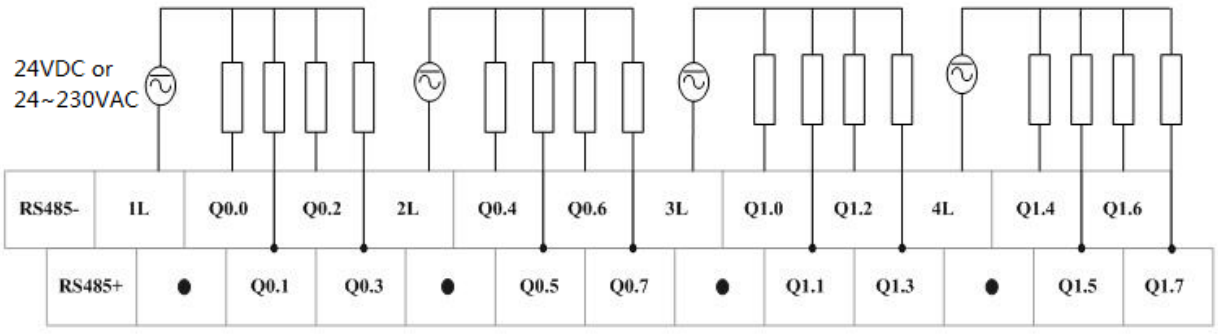


Figure 71 LE5119 Lower Terminals Definition and Wring Diagram

Table 41 Terminal Identification

Terminal Identification	Description	Terminal Identification	Description
⏚	Grounding	L	Fire wire
●	No connection	N	Null wire
Vout-	Output 24VDC negative	●	No connection
Vout+	Output 24VDC positive	M	Common of Input
I0.0	Ordinary input	I0.1	Ordinary input
I0.2	Ordinary input	I0.3	Ordinary input
I0.4	Ordinary input	I0.5	Ordinary input
I0.6	Ordinary input	I0.7	Ordinary input
I1.0	Ordinary input	I1.1	Ordinary input
I1.2	Ordinary input	I1.3	Ordinary input
I1.4	Ordinary input	I1.5	Ordinary input
I1.6	Ordinary input	I1.7	Ordinary input
I2.0	Ordinary input	I2.1	Ordinary input
I2.2	Ordinary input	I2.3	Ordinary input
I2.4	Ordinary input	I2.5	Ordinary input
I2.6	Ordinary input	I2.7	Ordinary input
Terminal Identification	Description	Terminal Identification	Description
RS485-	negative(RS485-)	RS485+	positive (RS485-)
1L	Common of Output (Q0.0～Q0.3)	●	No connection
Q0.0	Ordinary output	Q0.1	Ordinary output
Q0.2	Ordinary output	Q0.3	Ordinary output
2L	Common of Output （Q0.4～	●	No connection

Terminal Identification	Description	Terminal Identification	Description
	Q0.7）		
Q0.4	Ordinary output	Q0.5	Ordinary output
Q0.6	Ordinary output	Q0.7	Ordinary output
3L	Common of Output (Q1.0 ～ Q1.3)	•	No connection
Q1.0	Ordinary output	Q1.1	Ordinary output
Q1.2	Ordinary output	Q1.3	Ordinary output
4L	Common of Output (Q1.4 ～ Q1.7)	•	No connection
Q1.4	Ordinary output	Q1.5	Ordinary output
Q1.6	Ordinary output	Q1.7	Ordinary output

3.12.4 Electrical Schematic Diagram

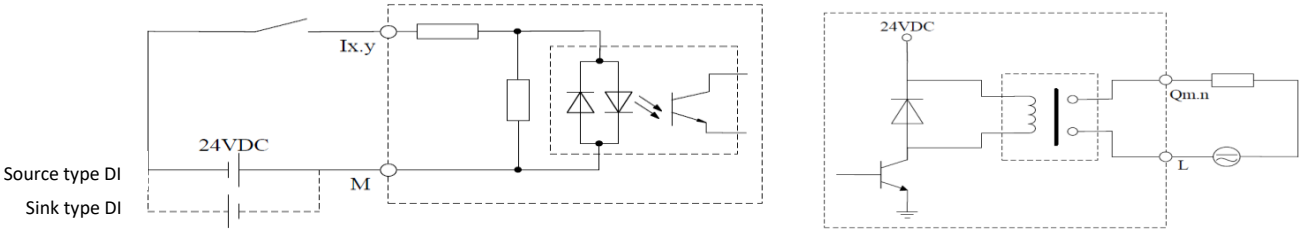


Figure 72 Electrical Schematic Diagram of Input *Electrical Schematic Diagram of Output*

3.12.5 Definition of Indicators

See Chapter 3.11.5 Definition of Indicators.

3.12.6 Upgrade the Project in Controller

See Chapter 3.11.6 Upgrade the Project in Controller.

3.13 LE5128 Special CPU Module for Motion Control

LE5128 is dedicated motion control module in micro PLC in LE series. It has the functions of data latching, rapid locating, automatically arrange-line, electronic gear and periodically fast PID adjustment. It can independently control 4 servo motors or stepper motors to locate with 16 DI, 10 DO, 2 AI and 4 AO.

Note: LE5128 electronic gear does not support reverse synchronization.

3.13.1 Technical Specifications

Table 42 Technical Specifications

<table>
<tr><th colspan="2">CPU Specifications</th><th colspan="3">Power Supply Specifications</th></tr>
<tr><td rowspan="2">On-board I/O</td><td rowspan="2">16 DI/ 10 DO/ 2 AI / 4 AO</td><td rowspan="3">Input</td><td>Rated voltage</td><td>24VDC@2200mA</td></tr>
<tr><td rowspan="2">Permissible range</td><td rowspan="2">20.4～28.8VDC</td></tr>
<tr><td>I/O expansion module (max.)</td><td>5(total module power consumption ≤CPU rating).</td></tr>
<tr><td>Number of expansion board</td><td>1</td><td colspan="2">External output voltage</td><td>24VDC</td></tr>
<tr><td>Programming language</td><td>LD/ST/CFC/SFC</td><td rowspan="3">External output current (max.)</td><td>+24VDC (supply for expansion bus)</td><td>950mA</td></tr>
<tr><td>Program memory</td><td>128K bytes</td><td>+24VDC (supply for peripheral device)</td><td>400mA</td></tr>
<tr><td>Data memory</td><td>64K bytes</td><td>+5VDC (supply for extensive bus)</td><td>2500mA</td></tr>
<tr><td>Power-loss retentive memory</td><td>8K bytes</td><td colspan="2">Hold up time (loss of power)</td><td>10ms</td></tr>
<tr><td>Memory card</td><td>Memory card with USB interface</td><td colspan="3">Communication Specifications</td></tr>
<tr><td rowspan="3">HSC</td><td rowspan="2">4 HSC at 100KHz for single-phase counter (Ix0.0~Ix0.3)</td><td>Communication interface</td><td colspan="2">2 RS485</td></tr>
<tr><td>Interface type</td><td colspan="2">PS/2, pluggable terminals</td></tr>
<tr><td>2 HSC at 400KHz</td><td>Baud rates</td><td colspan="2">1200, 2400, 4800, 9600, 19200, 38400, 57600,</td></tr>
</table>

CPU Specifications		Power Supply Specifications	
	for A/B phase counter (Ix0.0~Ix0.3)	(bps)	115200
Pulse output	4CH, 100KHz(Qx0.0~Qx0.3)		
Pulse catch	4(Ix0.0~Ix0.3)	Communication protocol	Proprietary protocol (only for round port), Modbus master-slave, free port communication protocol, multi-PLC interconnection (only for terminal interface)
Fast external interruption	6(Ix0.0~Ix0.5)		
Frequency measurement	4(10Hz~100KHz), (Ix0.0~Ix0.3)	Digital Output Specifications	
Basic instruction processing time	0.1μs	Number of outputs	10 (4 high-speed Qx0.0~Qx0.3, 6 low-speed Qx0.4~Qx1.1)
Digital Input Specifications		Output type	Transistor
Number of inputs	16	Rated voltage	24VDC
Input type	Sink/source	Permissible range	20.4～28.8VDC
Rated voltage	24VDC	Output current	Max. 0.3A for PTO channel; max. 0.5A for ordinary channel
Permissible range	0～30VDC	Current per common	<3A
Logic 1 signal	15 ～ 30VDC, permissible min. current 3mA	On state resistance	0.3Ω (typical), 0.6Ω (max.)
Logic 0 signal	0 ～ 5VDC, permissible max. current 1mA	Isolation mode	Optocoupler (field side to system)
Filtering parameter	Ix0.0~Ix0.3 No filtering , 5us, 10us, 20us, 100us, 200us, 1ms, 5ms, 10ms, 20ms, 50ms, 100ms	Isolation groups	3
		Isolation withstand voltage	500VAC for 1 minute, leaking current <5mA
Isolation mode	Optocoupler (field side to system)	Analog Output Specifications	
Isolation groups	1	Number of outputs	4
Isolation withstand voltage	500VAC for 1minute, leakage current <5mA		

CPU Specifications		Power Supply Specifications	
Analog Input Specifications		Output range	Channel 1, 2:0～10V
Number of inputs	2		Channel 3, 4:0～10V/0～20mA/4～20mA
Input type	Single-ended	Range of corresponding code value	0～65535
Input range	0 ～ 10V/0 ～ 20mA/4～20mA	Output accuracy	Full scale 0.5%@0~60℃
Range of corresponding code value	0～65535	Resolution	12bits
Input accuracy	Full scale 0.5% @0～60℃	Load impedance	voltage: ≥2000Ω/ current:≤ 600Ω
Resolution	12 bits	Stable time (95% of new value)	Voltage:300us(R),750us(1uF)current:600us(1 mH), 2ms(10mH)
Differential mode rejection ratio	>30dB		
Time for data update	2ms (full-channel)	Isolation mode	Magnetic coupling (field side to system)
Input impedance	voltage type: >950KΩ	Isolation withstand voltage	500VAC for 1 minute, leaking current <5mA
	Current type: 250Ω	Physical Specifications	
Maximum withstand voltage	±30V	Dimensions W x H x D (mm)	147×97×90
Maximum withstand current	±32mA	Weight	571g
Time for step response of analog input	1.5ms (up to 95%)	Operating temperature	-40℃～+70℃
Isolation mode	Magnetic coupling (field side to system)	Storage temperature	-40℃～+70℃
Isolation withstand voltage	500VAC for 1 minute, leaking current <5mA	Relative humidity	5%~95% (non-condensing)

3.13.2 Terminal Definition and Connection

LE5128 is connected with an external 24VDC power and has two pluggable terminals (16×2 and 13×2), the upper terminal offers input channel (DI, AI), the lower terminal offers output channel (DO, AO), and connection is easy and convenient and terminals are secured with screw, which is a typical field connection case.

Table 43 Terminal Identification

Terminal Identification	Description	Terminal Identification	Description
⏚	Grounding	VI-	Input power supply 24VDC negative
●	No connection	VI+	Input power supply 24VDC positive
Vout-	Output 24VDC negative	●	No connection
Vout+	Output 24VDC positive	M	Common of Input
I0.0	Fast external interruption 1/Pulse catch 1/Frequency measurement channel 1/High-speed single-phase counter 1/High-speed A/B phase counter 1 phase A/Ordinary input	I0.1	Fast external interruption 2 /Pulse catch 2 /Frequency measurement channel 2 / High-speed single-phase counter 2/ High-speed A/B phase counter 1 phase B /Ordinary input
I0.2	Fast external interruption 3/Pulse catch 3/Frequency measurement channel 3/High-speed single-phase counter 3/High-speed A/B phase counter 2 phase A /Ordinary input	I0.3	Fast external interruption 4 /Pulse catch 4 /Frequency measurement channel 4 /High-speed single-phase counter 4 /High-speed A/B phase counter 2 phase B /Ordinary input
I0.4	Fast external interruption 5/High-speed single-phase counter 1 direction control/Ordinary input	I0.5	Fast external interruption 6/High-speed single-phase counter 2 direction control /Ordinary input
I0.6	High-speed single-phase counter 3 direction control /Ordinary input	I0.7	High-speed single-phase counter 4 direction control /Ordinary input
I1.0	Ordinary input	I1.1	Ordinary input
I1.2	Ordinary input	I1.3	Ordinary input
I1.4	Ordinary input	I1.5	Ordinary input
I1.6	Ordinary input	I1.7	Ordinary input
A+	A channel voltage input positive	A-	A channel input negative
RA	A channel current input positive	●	No connection

Terminal Identification	Description	Terminal Identification	Description
RB	B channel current input positive	B-	B channel input negative
B+	B channel voltage input positive	●	No connection
Terminal Identification	Description	Terminal Identification	Description
RS485-	RS485 Communication negative	RS485+	RS485 Communication positive
1L-	Load driving power source 1 negative (Q0.0～Q0.3)	1L+	Load driving power source 1 positive (Q0.0～Q0.3)
Q0.0	High-speed output / Ordinary output	Q0.1	High-speed output /Ordinary output
Q0.2	High-speed output /Ordinary output	Q0.3	High-speed output /Ordinary output
2L-	Load driving power source 2 negative (Q0.4-0.7)	2L+	Load driving power source 2 positive (Q0.4-0.7)
Q0.4	Ordinary output	Q0.5	Ordinary output
Q0.6	Ordinary output	Q0.7	Ordinary output
3L-	Load driving power source 3 negative (Q1.0~1.1)	3L+	Load driving power source 3 positive (Q1.0~1.1)
Q1.0	Ordinary output	Q1.1	Ordinary output
COM	Analog output common	●	No connection
Vout0	Analog voltage output	Vout1	Analog voltage output
Vout2	Analog voltage output	Iout2	Analog current output
Vout3	Analog voltage output	Iout3	Analog current output

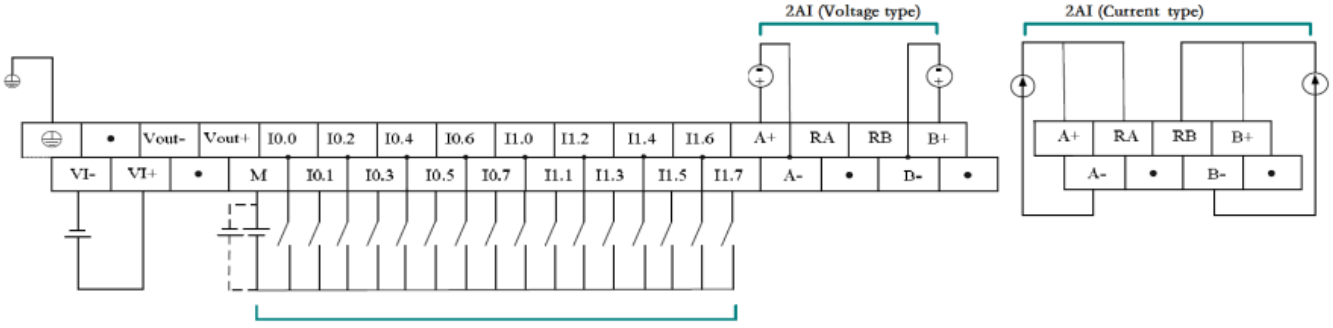


Figure 73　LE5128 Upper Terminals Definition and Wring Diagram

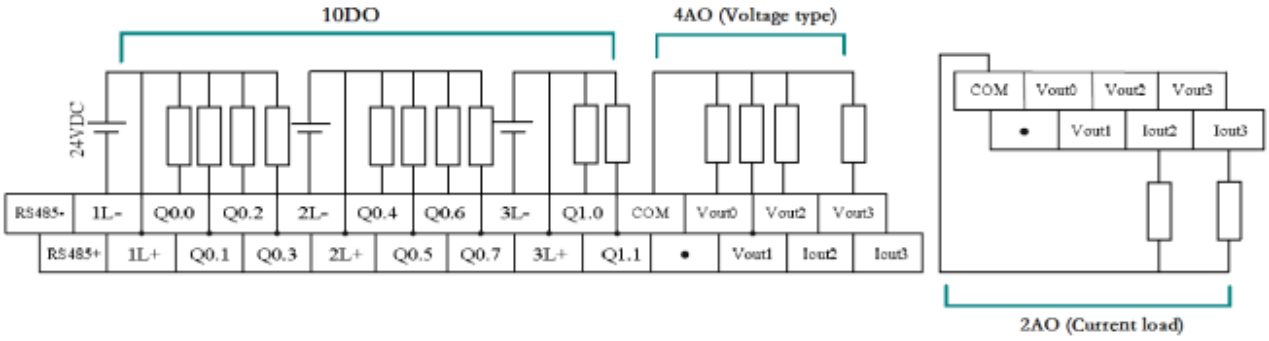


Figure 74 LE5128 Lower Terminals Definition and Wring Diagram

Figure 75 wiring diagrams include two schematic diagrams of connection of high-speed output terminal and motor, the external resistance in the schematic diagrams is for example only. In actual applications, users must calculate external resistance according to their selected permissible current on input side of driver and internal resistance.

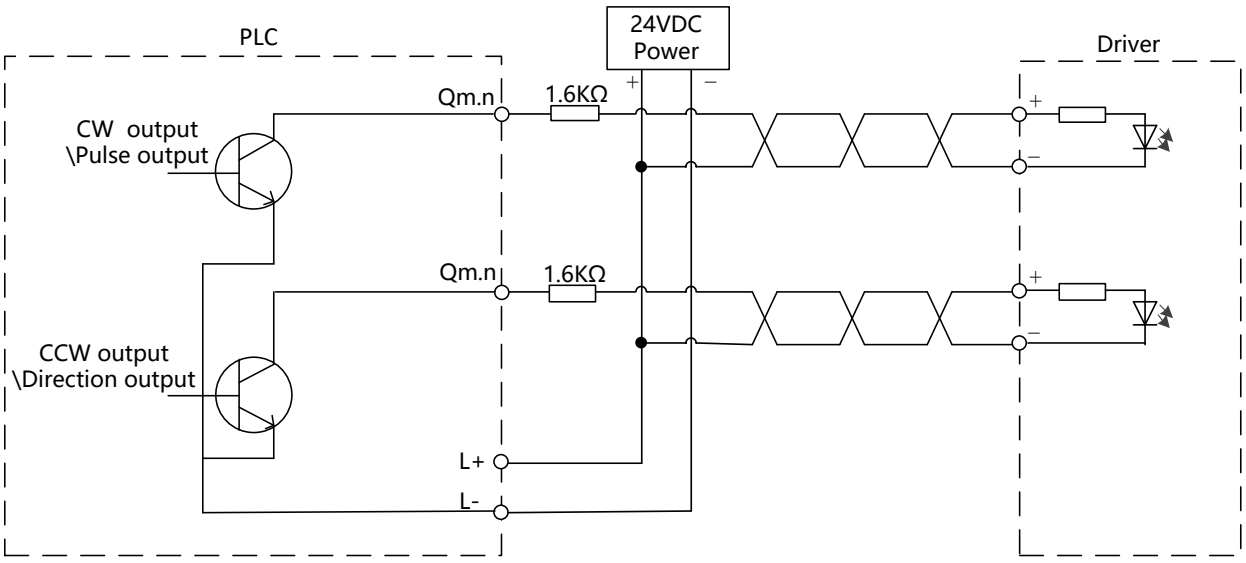


Figure 75 Wiring Diagram of High-speed Output Terminal and Motor

Description:

CW / CCW mode:

1: Output axis 1, pulse output (CW) Q0.0, pulse output (CCW) Q0.1

2: Output axis 2, pulse output (CW) Q0.2, pulse output (CCW) Q0.3

Pulse + direction mode:

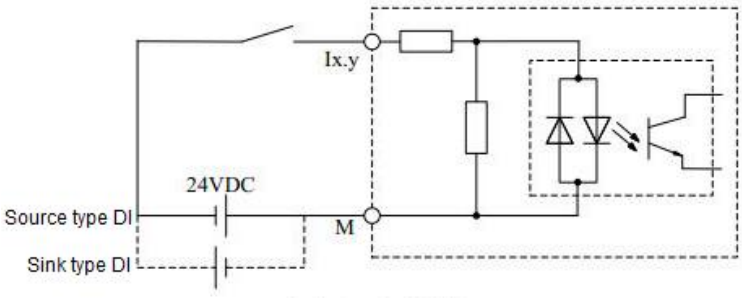
1: Output axis 1, pulse output Q0.0, pulse direction Q0.4

2: Output axis 2, pulse output Q0.1, pulse direction Q0.5

3: Output axis 3, pulse output Q0.2, pulse direction Q0.6

4: Output axis 4, pulse output Q0.3, pulse direction Q0.7

3.13.3 Electrical Schematic Diagram



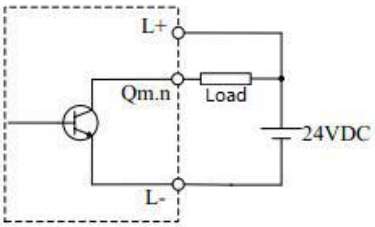
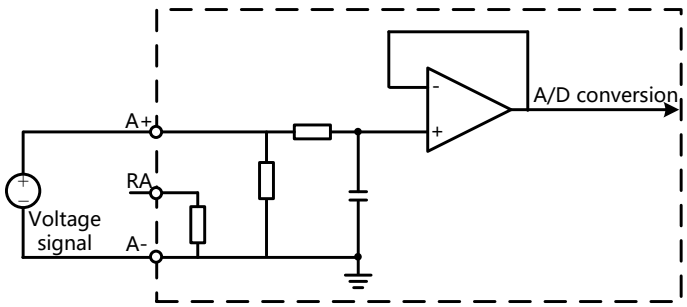


Figure 76 Input Channel (DI) *Output Channel (DO)*



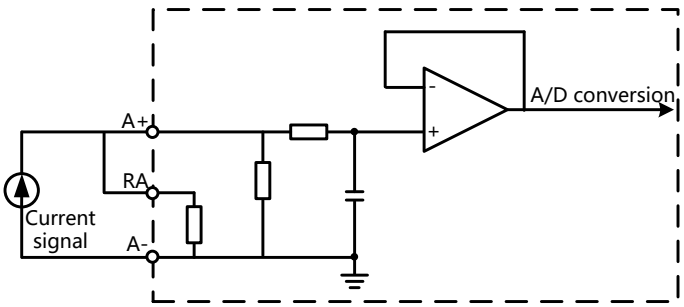
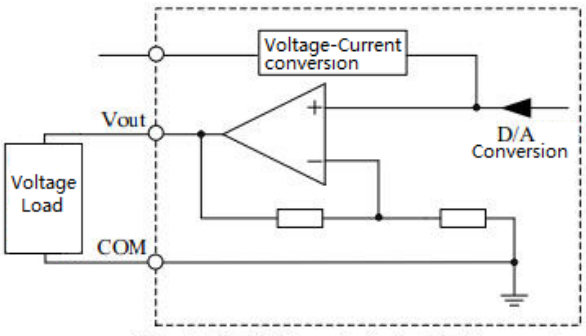


Figure 77 Input Channel (AI)



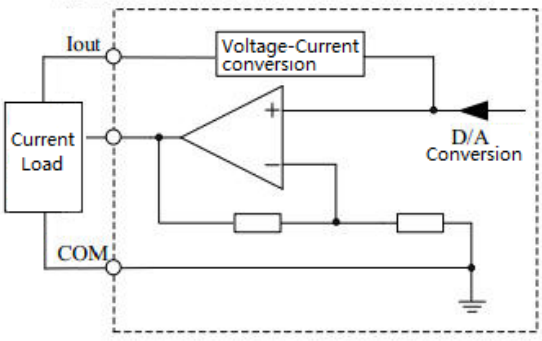


Figure 78 Output Channel (Voltage) *Output Channel (Current)*

3.13.4 Communication Interface

RS485 communication interface can establish connection to personal computer (PC) through programming cable, realize download of user program and on-line debugging and be applied to communication with field devices. Junction and communication between LE5128 CPU module and PC are achieved through PS/2 of LE5128 (as shown in Figure 79 ①), junction and communication between LE5128 CPU module and expansion module are achieved through connector (as shown in Figure 79 ②).

Table 44 Pins Definition of 8 Core Round Interface Socket

Pin No.	Definition	Pin No.	Definition	Pin No.	Definition	Pin No.	Definition
1	-	3	-	5	RS-485 signal positive	7	System GND
2	-	4	-	6	RS-485 signal negative	8	System GND

Figure 79 Communication Interface Identification

3.13.5 Software Configuration

Both programming software and CPU module provide the setting of “Run” and “Stop” status, therefore the software and hardware are constrained each other.

Table 45 RUN/STOP Switch Setting Instructions

RUN/STOP selective switch position	Status of programming software	Module status
Run (Switch to upper position)	RUN	RUN: automatically changed into STOP if users download user program in this status.
	STOP	STOP

RUN/STOP selective switch position	Status of programming software	Module status
Stop (Switch to lower position)	RUN/STOP	STOP(user's program stops, unable to run)

3.14 LE5708 Air Condition Controller Module

LE5708 is air conditioning controller of LE series PLC, which does not support extended LE IO series module. It can complete control, detection, diagnosis, RS485 communication needed for system. Functions specifically achieved as follows: RUN/STOP switch selects running and stopping mode of module; RTC records operation time; equipped with USB memory card interface to facilitate download user program; RS485 interface provides channel to download application program and supports access to peripheral device and multi-PLC interconnection. It meets the user requirements with 24-channel digital inputs (dry contact), 20-channel relay outputs (where the first 16 for the electromagnetic relay output, after 4 for the solid state relay output) and 4-channel analog inputs (through the internal jumper and software configuration to set input signal range for 0 ~ 20mA, 0 ~ 10V or 0 ~ 5V), 8-channel NTC thermistor inputs (can collect -50 ~ 150 ℃ temperature range) and 2-channel analog outputs (output 0 ~ 20mA current signal or 0 ~ 10V voltage signal). It is suitable for follows models of screw compressor: air-cooled heat pump (modular), air-cooled heat pump (non-modular), air-cooled cool-water model (modular), air-cooled cool-water model (non-modular), water source heat pump (modular), water source heat pump (non-modular), water-cooled cool-water model (modular), water-cooled cool-water model (non-modular), water-cooled cool- air model (modular), water-cooled cool- air model (non-modular), which can achieve two screw compressor control.

3.14.1 Technical Specifications

Table 46 Technical Specifications

CPU Specifications				
On-board I/O	Digital input	24	Programming language	LD/ST/CFC/SFC
	Digital output	20	Program memory	256K bytes
	Analog input	4 (voltage / current, partitioned by jumper covering)	Data memory	56K bytes
		8（NTC）	Power-loss retentive memory	2K bytes (1000 bytes addressability)
	Analog output	2 (voltage / current	Basic instruction processing time	0.1μs

CPU Specifications					
		output at the same time, partitioned by different terminals)	Memory card		Memory card with USB interface
Power Source Specifications					
Input power supply	Power source	External 24VDC input	Output power supply (5VDC)	Load capacity	5VDC±5%@10mA (AI external power supply)
	Permissible range	24VDC±10%			
	Power dissipation (max.)	1200mA@24V			
Digital Input Specifications					
Number of inputs		24	Input type		Dry contact
Logic 1 signal		External dry contact close	Power supply query		Built-in
			Logic 0 signal		External dry contact open
Filtering parameter		No filtering, 5 ms, 10 ms（default）, 20 ms, 50 ms, 100 ms	Fault Diagnosis		Not supported
Isolation mode		Optocoupler isolation (field side to system)	Isolation withstand voltage		500VAC for 1 minute, leakage current <5mA
Digital Output Specifications					
Number of outputs		20	Output type	Electromagnetic relay	Q0.0～Q0.7, Q1.0～Q1.7
Output current	Electromagnetic relay*16	5A@30VDC/250VAC (resistive load)		Solid-state relay	Q2.0～Q2.3
	Solid-state relay*4	500mA @250VAC (the relay is in OFF mode, leaking current is 7.5mA@220VAC)	On state resistance (contact impedance)		<0.2Ω （ excluding Q2.0~Q2.3）
Switching frequency （max.）		1Hz	On-off times		No load, up to 10,000,000 open/close cycles
Rated current per common (max.)		<10A			Rated resistance 5A load, up to 100,000 open/close cycles
Warm reset keeping		Supported	Isolation mode		Relay isolation (field side to system)
Isolation withstand voltage		1000VAC for 1 minute, leaking current < 5mA			
Analog Input Specifications					
Number of inputs		4	Input type		Voltage / current (configured by jumper, refer to instruction for details)

CPU Specifications					
Input range	Voltage	0～10V, 0～5V	Range of corresponding code value	Voltage	0～65535
	Current	0～20mA（default）		Current	0～65535
Accuracy		Full scale1%@25℃	ADC resolution		12digits
Time for data update		1s (full-channel)	Filtering parameter		16, 32 (default), 64, 128
Channel withstand voltage / over-current value		±30V (voltage channel) / ±30mA (current channel)	Differential mode rejection ratio		>40dB@50Hz
Input impedance	Current	<300Ω	Alarm diagnosis		Supported
	Voltage	>200KΩ	Temperature drift		±100ppm/℃
Isolation mode		None			
Analog Output Specifications					
Number of outputs		2	Output range	Current	0～20mA(corresponding code value: 0-65535)
Output type		Voltage / current (partitioned by different terminals)		Voltage	0～10V(corresponding code value: 0-65535)
Accuracy		1%F.S@25℃	Driving capability	Voltage	>2000Ω
Temperature drift		±100ppm/℃		Current	≤600Ω
Warm reset keeping		Supported	Isolation mode		None
NTC Temperature Acquisition Specifications					
Number of inputs		8	Input type		Thermistor R: 10K; B: 3976 @25℃
Input range		-50～150℃	Corresponding code valuerange		-500～1500
Temperature resolution	-30～0℃	0.5℃	Accuracy	-30～85℃	±1℃
	0～100℃	0.1℃		85～120℃	±1.6℃
	100～150℃	0.5℃		120～150℃	±2.1℃
Time for data update		1s (full-channel)	Filtering parameter		8, 16, 32（default）
Differential mode rejection ratio		>40dB@50Hz	Temperature drift		±100ppm/℃
Isolation mode		None			
Physical Specifications					
Dimensions L x W x H (mm)		302 x 132.6 x 47 （with lugs）	Installation mode		Screw mounting
Wiring method		Screw fixation			DIN rail mounting

CPU Specifications			
Terminal	Pluggable	Terminal preventing confusion	None
Outgoing method	Parallel with printed board	Range of wire	12～24AWG
Operating temperature	-40℃～＋70℃	Storage temperature	-40℃～＋70°C
Relative humidity	5%~95% (no non-condensing)	Altitude	3000m

3.14.2 Status Code of DIP Switch

Table 47 Status Code of DIP Switch

1	2	3	4	5	6	7	8	Function
RUN/STOP	Baud Rates			Slave Station Address				
ON	X	X	X	X	X	X	X	STOP
OFF	X	X	X	X	X	X	X	RUN
X	OFF	OFF	OFF	X	X	X	X	38400
X	ON	OFF	OFF	X	X	X	X	115200
X	OFF	ON	OFF	X	X	X	X	57600
X	ON	ON	OFF	X	X	X	X	19200
X	OFF	OFF	ON	X	X	X	X	9600
X	X	X	X	OFF	OFF	OFF	OFF	Station 1
				…				
X	X	X	X	OFF	OFF	OFF	ON	Station 9
				…				
X	X	X	X	ON	ON	ON	ON	Station 16

Baud rate and slave address dial setting are valid only for RS485 communication port 2.

3.14.3 Terminal Definition and Connection

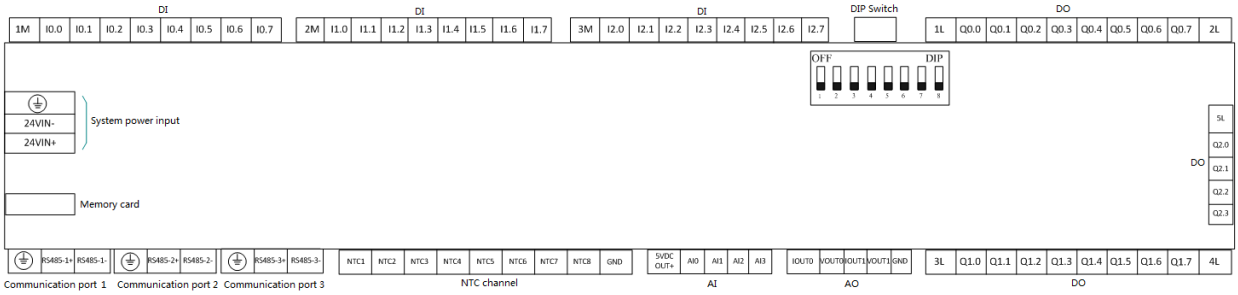


Figure 80 Wiring Method of Input and Output Signal

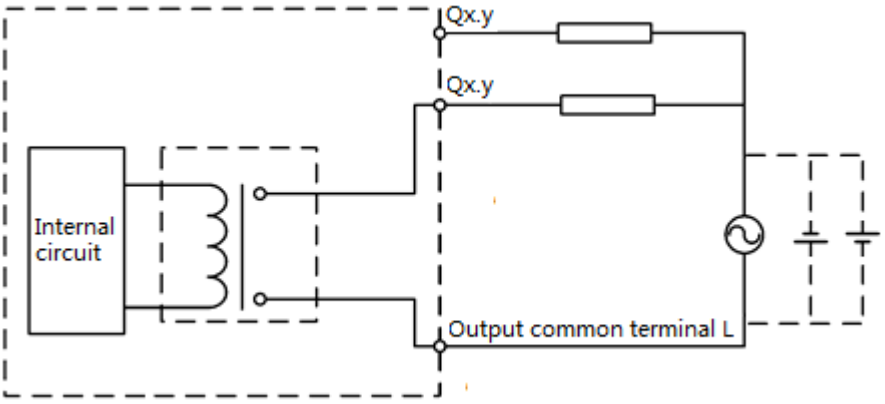


Figure 81 Wiring Method of DO

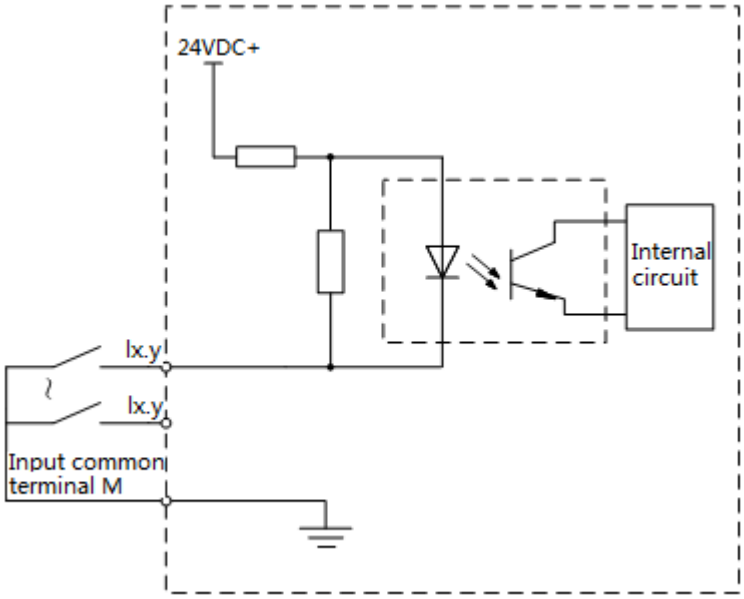


Figure 82 Wiring Method of DI

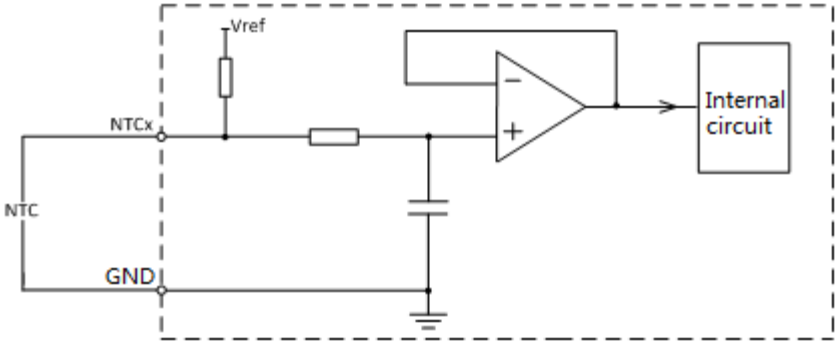


Figure 83 Wiring Method of NTC

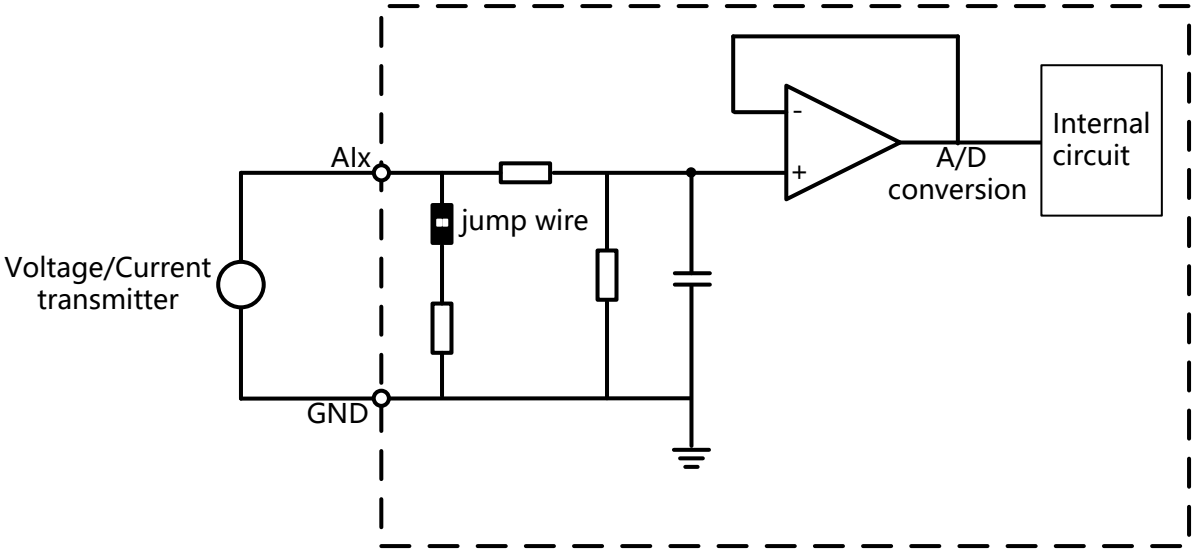


Figure 84 Wiring Method of AI

AI signal: supports 4 AI, 4-channel common. When being used as current signal input, using jumper covering for short-circuit connection of the corresponding channel on J24 connector of template; when being used as voltage signal input, remove jumper covering in corresponding channel.

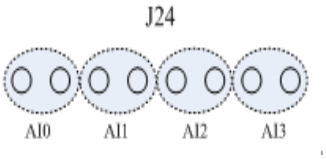


Figure 85 J24 Connector

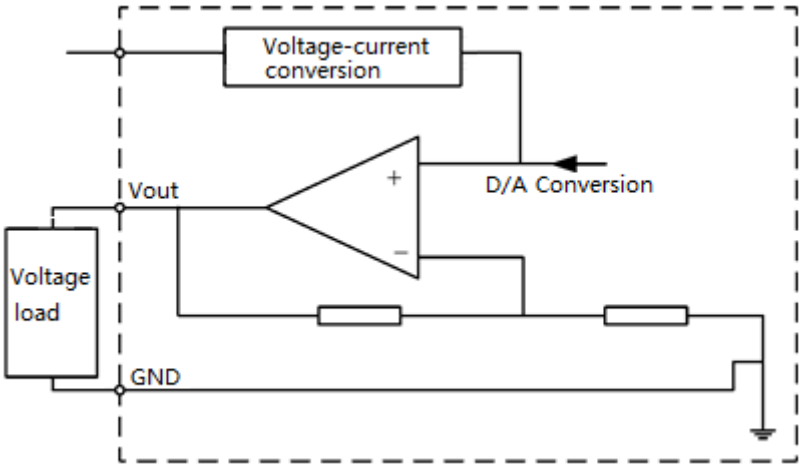


Figure 86 Wiring Method 1 of Analog Output

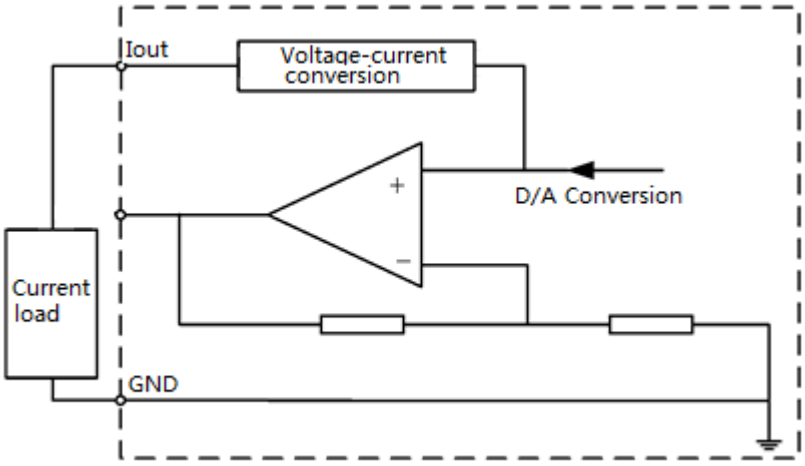


Figure 87 Wiring Method 2 of Analog Output

3.14.4 Communication Signal

LE5708 supports 3 ways RS485 communication, Detail parameters information as shown in Table 48:

Table 48 Parameters Information List

Parameter	Communication port 1	Communication port 2	Communication port 3
Function	Download engineering or HMI communication	Modules cascade	Communication with the third party
Baud rate (bps)	9600, 19200, 38400, 57600, 115200	9600, 19200, 38400, 57600, 115200	9600, 19200, 38400, 57600, 115200
Configuration mode of communication rate	Software configuration	Dial switch 2-4 digit control	Software configuration
Physical layer protocol	1 bit for stopping bit, 8 bits for data bit, no check, odd/even check		
Communication protocol	AT communication, Modbus master-slave, Free port protocol	Modbus master-slave , multi-PLC interconnection, Free port protocol	Modbus master-slave, Free port protocol

Parameter	Communication port 1	Communication port 2	Communication port 3
Connection cable	Twisted-pair cable Shielded		

- Instructions
  - Power Signal: Output of the external power supply as the power (+5VDC) signal of voltage signal transmitter and the load capacity is less than 10mA.
  - DI signal: Support 24 channel digital inputs, a group sharing the public terminal is used by 8 channels, I0.0 - I0.7, I1.0 - I1.7, I2.0 - I2.7.
  - DO signal: Support 20-channel digital outputs. Among them, 16 channel electromagnetic relay outputs, 4 channels use a group sharing the public terminal Q0.0-Q0.3, Q0.4-Q0.7, Q1.0-Q1.3, Q1.4-Q1.7; 4 channel solid-state relay outputs, 4 channels use a group sharing the public terminal Q2.0-Q2.3.
  - NTC signal: Support 8 channel NTC signal inputs, 8 channels sharing the public terminal.
  - Communication signal: See Chapter 3.14.2 Status Code of DIP Switch
  - for specific information of baud rate in RS485 terminal interface 2 and station addresses settings, modification of DIP switch will takes effect via re-power or cold reset.
  - Instructions on communication port: Following configuration is recommended to use during the using process: Communication port 1 is used for AT debugging, communication port 2 is used for multi-machine interconnections and communication port 3 is used to connected with Modbus master equipment (such as touch screen);
  - Instruction on communication delayed response setting: the delayed response settings are recommended as follows: 9600 is 4ms, 19200 is 2ms, 38400, 57600, and 115200 is 1ms.

3.14.5 Fault Diagnosis

- AI fault definition:
  - 0~20mA current signals: over upper limit (>22mA).
  - 0~5V voltage signal: over upper limit (>5.5V).
  - 0~10V voltage signal: over upper limit (>10.2V).
- NTC input fault definition: NTC line broken checking
  - Remain: fault occurs, remain current value.
  - Positive limit: fault occurs, value 1500.

- ☐ Negative limit: fault occurs, value -500.

■ Possibilities of fault indicator ERR is ON

- ☐ Storage card loading failure.
- ☐ Controller reset is abnormal.
- ☐ Hardware parameters configuration is error.

- In the case of strong interference, it is recommended to use the speed limit function block in the project to filter out the transient jump that may occur in the AI and NTC channels.
- If DO load is a contactor, it is recommended that the arc - suppression device supplied by Hollysys is paralleled on both sides of the contactor coil, 9A-32A contactor using 2140600323, 40A-90A contactor using 2140600322.

■ Air Conditioning Module Diagnosis

Fault diagnosis data of air conditioning controller module are as shown in Table 49.

Table 49 Fault Diagnosis Information

Diagnostic Area	Channel	Diagnosis Bit	Channel	Diagnosis
%SB790	Module diagnosis information			
%SB791	AI0	Over upper limit: BIT1	AI1	Over upper limit: BIT5
%SB792	AI2	Over upper limit: BIT1	AI3	Over upper limit: BIT5
%SB793	NTC0	Over lower limit: BIT0	NTC1	Over lower limit: BIT4
		Over upper limit: BIT1		Over upper limit: BIT5
		Break line: BIT2		Break line: BIT6
%SB794	NTC2	Over lower limit: BIT0	NTC3	Over lower limit: BIT4
		Over upper limit: BIT1		Over upper limit: BIT5
		Break line: BIT2		Break line: BIT6
% SB795	NTC4	Over lower limit: BIT0	NTC5	Over lower limit: BIT4
		Over upper limit: BIT1		Over upper limit: BIT5

Diagnostic Area	Channel	Diagnosis Bit	Channel	Diagnosis
		Break line: BIT2		Break line: BIT6
% SB796	NTC6	Over lower limit: BIT0	NTC7	Over lower limit: BIT4
		Over upper limit: BIT1		Over upper limit: BIT5
		Break line: BIT2		Break line: BIT6

Chapter 4 Function Expansion Board

4.1 LE5600 RS232 Communication Expansion Board

LE5600 is the communication function expansion board of LE series PLC, offers 1-channel RS232 communication.

4.1.1 Technical Specifications

Table 50 Technical Specifications

Communication Specifications		**Current Consumption**	
Number of communication port	1	+3.3VDC (supplied by CPU module)	1mA
Connection	Terminals	+5VDC (supplied by CPU module)	90mA
Communication protocol	Modbus RTU master / slave, free port communication protocol	Physical Specifications	
Communication data memory	I/Q/M	Dimensions W x H x D (mm)	29×26×62
Baud rates (bps)	1200, 2400, 4800, 9600, 19200, 38400	Weight	24g
Isolation Specifications		Operating temperature	-40℃～+70℃
Isolation Mode	Optocoupler (field side to system)	Storage temperature	-40℃～+70℃
Isolation withstand voltage	500VAC for 1 minute, leakage current <5mA	Relative humidity	5%~95% (non-condensing)

4.1.2 Terminal Definition and Connection

LE5600 RS232 expansion module adopts a double-row non-pluggable terminal (3x2).

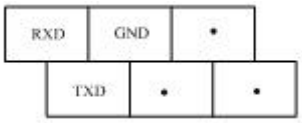


Figure 88 LE5600 RS232 Terminal

Table 51 LE5600 Terminal Definition

Terminal name	RXD	TXD	GND
Definition	RS232_Receive Data	RS232_Transmit Data	Signal ground

4.1.3 Principle Diagram

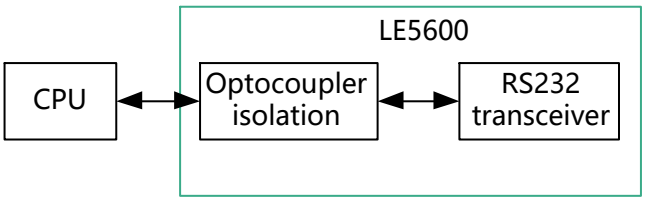


Figure 89 LE5600 Principle Diagram

4.1.4 Expansion Connection

1. Remove the left and bottom terminal block covers from the CPU.

Figure 90 the Removal of Cover

2. Place the expansion board down onto the mounting position on the top of the CPU module, as shown in Figure 91.

Figure 91 the Installation of LE5600 Expansion Board

- LE expansion board can be connected to 24I/O or 40I/O CPU module;
- Do not directly touch circuit during mounting or removing;
- A flat-head screwdriver is needed for dismounting.

4.2 LE5601 RS485 Communication Expansion Board

LE5601 is a communication expansion board of LE series PLC and offers 1-channel RS485 communication.

4.2.1 Technical Specifications

Table 52 Technical Specifications

Communication Function		Current Consumption	
Number of communication port	1	+3.3VDC (supplied by CPU module)	1.5mA
Connection	Terminals	+5VDC (supplied by CPU module)	50mA
Communication protocol	Modbus RTU master / slave, free port communication protocol	Physical Specifications	
Communication data memory	I/Q/M	Dimension W×H×D(mm)	29×26×62

Communication Function		Current Consumption	
Baud rates	1200, 2400, 4800, 9600, 19200, 38400bps	Weight	26g
Isolation Withstand Voltage		Operating temperature	-40℃～+70℃
Isolation mode	Magnetic coupling (field side to system)	Storage temperature	-40℃～+70℃
Isolation withstand voltage	500VAC for 1 minute, leakage current <5mA	Relative humidity	5%~95% (non-condensing)

4.2.2 Terminal Definition and Connection

LE5601 RS485 expansion module adopts a double-row non-pluggable terminal (3x2).

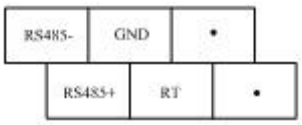


Figure 92 LE5601 RS485 Terminal of Small Extension Board

Table 53 LE5601 Terminal Definition

Upper Terminal	RS485-	GND	•
Description	RS485 communication negative	Signal ground	No connection
Lower Terminal	RS485+	RT	•
Description	RS485 communication positive	Match resistance	No connection

- RT is terminal matching resistance, which should be connected with RS485+ when necessary.

4.2.3 Principle Diagram

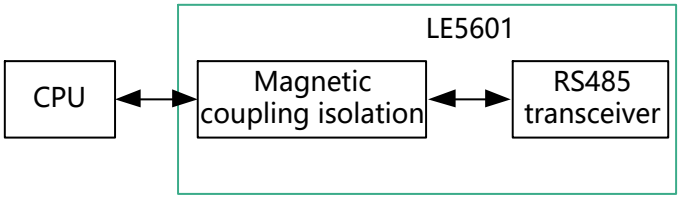


Figure 93 LE5601 Principle Diagram

4.2.4 Expansion Connection

Please refer to Chapter 4.1.4 Expansion Connection.

4.3 LE5610 4 Channel Digital Input Extension Board

LE5610 is the function expansion board of LE series PLC, mainly completing input processing of 4 channels digital signal.

4.3.1 Technical Specifications

Input Features		**Current Consumption**	
The number of input channels	4	3.3V (Provided by CPU module)	5mA
Input type	Source type/ Leakage type	24V (Provided by CPU module)	0mA
Input voltage rating	24VDC	+24 VDC (External driving voltage)	25mA
Allowed rage	0~30 VDC	**Physical characteristics**	
Signal of logic 1	15~30 VDC, Permissible minimum current 3 mA	Dimensions	29 mm (W) x 26 mm (H) x 62 mm (D)
Signal of logic 0	0~5 VDC, Permissible maximum current 1 mA	Weight	25g

Input Features		Current Consumption	
Filter parameters	No filtering, 5ms, 10ms, 20ms, 50ms, 100ms	Working temperature	-40℃～+70℃
Isolation method	Optical coupling isolation (between field and system)	Storage temperature	-40℃～+70℃
Isolation & anti-pressure	500VAC, duration of 1 min, leakage current < 5 mA	Relative humidity	5~95% (no condensation)

4.3.2 Indicator Definition

Indicator Type	Color	Status	Meaning
Channel indicator light	Green	ON	This channel is in ON state
		OFF	This channel is in OFF state

4.3.3 Terminal Definition and Wiring

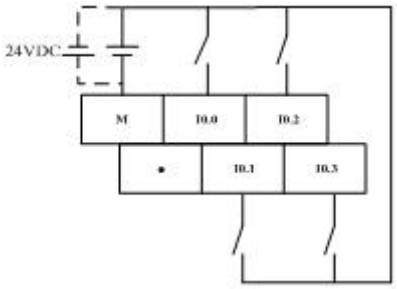


Figure 94 Terminal Wiring

Table 54 Terminal Definition

Name of Terminal	M	I0.0	I0.2
Instructions	Common terminal externally connected of input channel	Input terminal	Input terminal
Name of Terminal	•	I0.1	I0.3

Name of Terminal	M	I0.0	I0.2
Instructions	No connection	Input terminal	Input terminal

4.3.4 Electrical Schematic Diagram

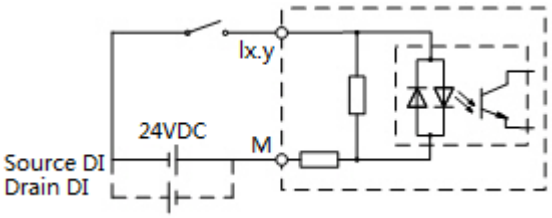


Figure 95 Electrical Schematic Diagram

4.3.5 Expansion Connection

1. Remove the cover plates on the left side of the CPU module and cover plate of lower row.

Figure 96 Removing Cover Plate Schematic

2. Insert extension small plate vertically into the position as shown in Figure 97 to ensure it being well installed.

Figure 97 Connect LE5610 Extension Small Plate

- LE small expansion plate is used by connecting with CPU module of 24 or 40 points.
- Avoid direct contact with the circuit when installing or removing.
- Prepare a screwdriver for removing.

4.4 LE5620 4 Channel Transistor Output Extension Board

LE5620 is the function expansion board of LE series PLC, mainly completing output processing of 4 channels of digital signal.

4.4.1 Technical Specifications

Output characteristic		**Isolation method**	**Optical coupling isolation**
The number of output channels	4	Isolation & anti-pressure	500VAC, duration of 1 min, leakage current<5 mA
Output type	Transistor	Power consumption	
Output voltage	24VDC	3.3V (Provided by CPU module)	23mA
Permissible scope	20.4~28.8VDC	24V (external driving voltage)	Calculated according to actual load
Output current	1A	**Physical characteristics**	

Output characteristic		Isolation method	Optical coupling isolation
On state resistance (Contact resistance)	0.3 Ω (Typical)	Dimensions	29mm (W) x 26mm (H) x 62 mm(D)
	0.6 Ω (Maximum)	Weight	25g
Sum of output current from common terminal	< 3 A	Working temperature	-40℃～+70℃
Minimum load current (per channel)	2mA	Storage temperature	-40℃～+70℃
Transistor conduction voltage drop	< 0.5V (Output logic 1, current 1A)	Relative humidity	5~95% (no condensation)

4.4.2 Indicator Definition

Indicator Type	Color	Status	Meaning
Channel indicator Qm.n	Green	ON	This channel is in ON state
		OFF	This channel is in OFF state

4.4.3 Terminal Definition and Wiring

Table 55 Terminal Definition

Name of terminal	L-	Q0.0	Q0.2
Instructions	Negative terminal of load driving power supply	Output terminal	Output terminal
Name of terminal	**L+**	**Q0.1**	**Q0.3**
Instructions	Positive terminal of load driving power supply	Output terminal	Output terminal

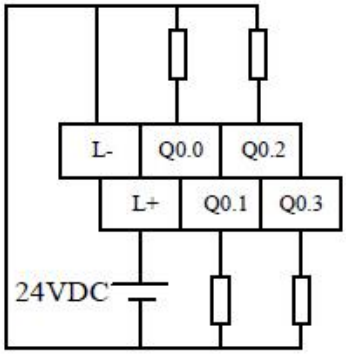


Figure 98 Terminal Wiring

4.4.4 Electrical Schematic Diagram

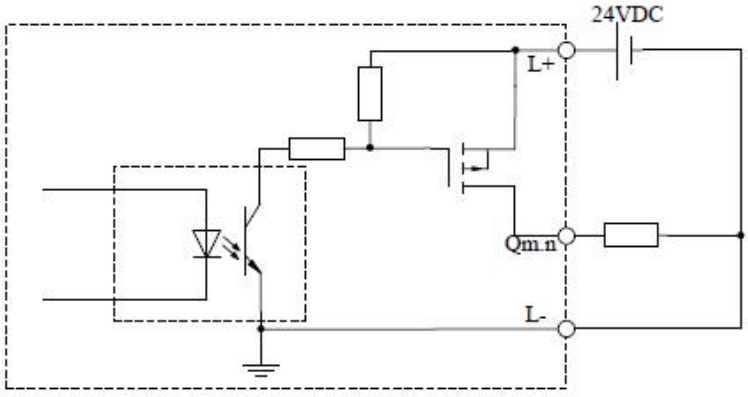


Figure 99 Electrical Schematic Diagram

4.4.5 Expansion Connection

1. Remove the cover plates on the left side of the CPU module and cover plate of lower row.

Figure 100 Removing Cover Plate Schematic

2. Insert extension small plate vertically into the position as shown in Figure 101 to ensure it being well installed.

Figure 101 Connect LE5620 Small Extension Plate

- LE small expansion plate is used by connecting with CPU module of 24 or 40 points.
- Avoid direct contact with the circuit when installing or removing.
- Prepare a screwdriver for removing.

4.5 LE5611 2-Channel AI Expansion Board

LE5611 is an AI expansion board of LE series PLC, which provides acquisition function for two channels AI signal.

4.5.1 Technical Specifications

Table 56 Technical Specifications

Input Specifications				
Number of inputs		2	Input current (max.)	32mA
Input type		single-ended	Time for step response of input	1.5ms (up to 95%)
Input range	Voltage	0~10V	Common mode voltage	Signal voltage + common mode voltage <12V
	Current	0~20mA/4~20mA	Physical Specifications	
Accuracy		1% of full scale	Dimensions W x H x D （mm）	29 x 26 x 62

Input Specifications				
Resolution		10 bits	Weight	22g
Input impedance	Voltage	>1MΩ	Operating temperature	-40℃～+70℃
	Current	250Ω	Storage temperature	-40℃～+70℃
Maximum withstand voltage		15V	Relative humidity	5%~95% (non-condensing)

4.5.2 Signal Type and Scale Range of Input Channel

Table 57 Signal Type and Scale Range of Input Channels

Signal Type	Scale Range	Corresponding Digital Code Value Range	
		Decimal	Hexadecimal
Voltage signal	0~10V	0~65535	0x0000~0xFFFF
Current signal	0~20mA	0~65535	0x0000~0xFFFF
	4~20mA	0~65535	0x0000~0xFFFF

4.5.3 Terminal Definition and Connection

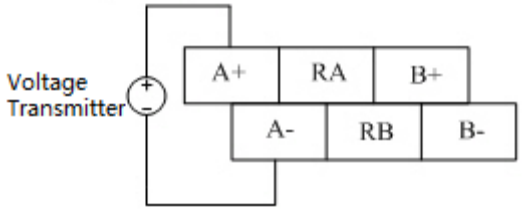


Figure 102 Terminal Definition and Wring Diagram (Voltage Type)

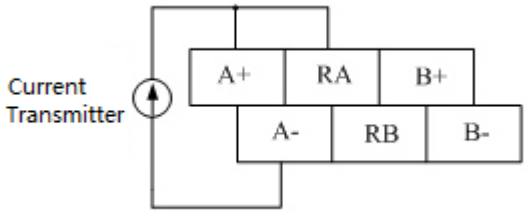


Figure 103 Terminal Definition and Wiring Diagram (Current Type)

- Input channels of LE5611 module can accept either voltage signal or current signal.
- Voltage signal: 'A+' connects to positive pole of voltage transmitter, 'A-' connects to negative pole of voltage transmitter. Channel B follows the same rule.
- Current signal: “RA” and “A+” connects to positive pole of current transmitter after short-circuit connection, “A-” connects to negative pole of current transmitter. Channel B follows the same rule.
- 2-wire wiring and 4-wire wiring are as shown in Figure 104. The transmitter shall be supplied power through external power and also can choose 24VDC output of CPU module according to requirement of power capacity.

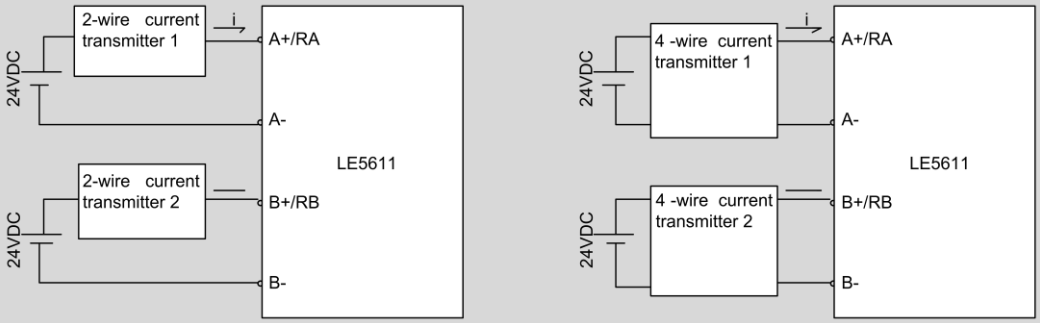


Figure 104 Wiring Diagram with 2-Wire ***Wiring Diagram with 4-Wire***

4.5.4 Electrical Schematic Diagram

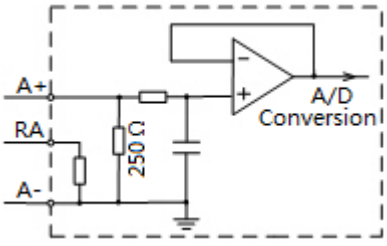


Figure 105 Electrical Schematic Diagram

4.5.5 Expansion Connection

Please refer to Chapter 4.1.4 Expansion Connection.

4.6 LE5621 1 AO Expansion Board

LE5621 is an AO expansion board of LE series PLC and can offer 1-output channel for analog signal.

4.6.1 Technical Specifications

Table 58 Technical Specifications

Output Specifications			Current Consumption	
Number of outputs		1	+3.3VDC (supplied by CPU module)	10mA
Output range	Voltage	0～10V	+5VDC (supplied by CPU module)	15mA
	Current	0～20mA / 4～20mA	+24VDC (external driving voltage)	Calculated by practical load
Accuracy		1% of full scale	Physical Specifications	
Resolution		12 bits	Dimension W x H x D (mm)	29×26×62
Stable time	Voltage	300us（R） 1ms（uF）	Weight	26g
	Current	600us（1mH） 2ms（10mH）	Operating temperature	-40℃～＋70℃
Load impedance	Voltage	≥2000Ω	Storage temperature	-40℃～＋70℃
	Current	≤600Ω	Relative humidity	5%~95% (non-condensing)
Isolation mode		Optocoupler (field side to system)	Isolation withstand voltage	500VAC for 1 minute, leakage current <5mA

4.6.2 Signal Type and Scale Range of Output Channel

Table 59 Signal Type and Scale Range of Output Channel

Signal type	Scale range	Corresponding digital code value range	
		Decimal	Hexadecimal
Voltage signal	0～10V	0～65535	0x0000～0xFFFF
Current signal	0～20mA	0～65535	0x0000～0xFFFF
	4～20mA	0～65535	0x0000～0xFFFF

4.6.3 Terminal Definition and Connection

Table 60 Terminal Definition and Connection

Upper Terminal	Vout	COM	VI-
Description	Analog voltage output	Analog of common	24VDC power supply negative
Lower Terminal	Iout	•	VI+
Description	Analog current output	No connection	24VDC power supply negative

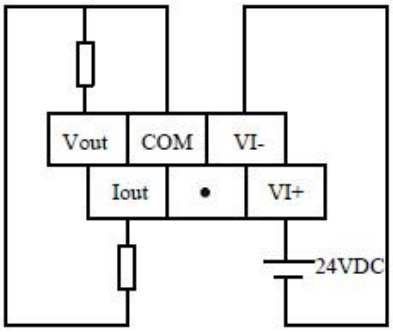


Figure 106 Terminal Wiring

4.6.4 Electrical Schematic Diagram

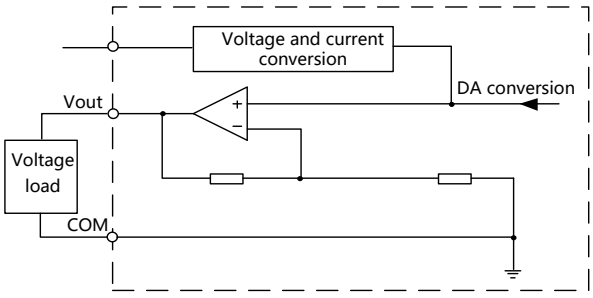
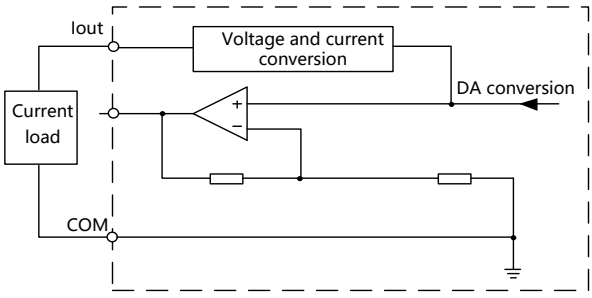


Figure 107 Voltage-Type Load Output



Current-Type Load Output

4.6.5 Expansion Connection

Please refer to Chapter 4.1.4 Expansion Connection.

Chapter 5 DI Module

5.1 LE5210 8-Channel DI Module

LE5210 module is an expansion module of LE series PLC and can offer 8 input channels for digital signal.

5.1.1 Technical Specifications

Table 61 Technical Specifications

Input Specification				
Number of inputs	8	Filtering parameter	No filtering, 5ms, 10ms, 20ms, 50ms, and 100ms	
Input type	Sink/source	Isolation mode	Optocoupler (field side to system)	
Rated voltage	24VDC	Isolation groups	2	
Permissible range	0～30VDC	Isolation withstand voltage	500VAC for 1 minute, leakage current <5mA	
Logic 1 signal	15~30VDC, permissible min. current 3mA	Current consumption	+24VDC (supplied by expansion bus)	0mA
Logic 0 signal	0~5VDC, permissible max. current 1mA		+5VDC (supplied by expansion bus)	50mA
Physical Specification				
Dimensions W x H x D (mm)	47×97×89	Operating temperature	-40℃～+70℃	
Installation mode	DIN rail mounting or screw mounting	Storage temperature	-40℃～+70℃	
Weight	137g	Relative humidity	5%~95% (non-condensing)	

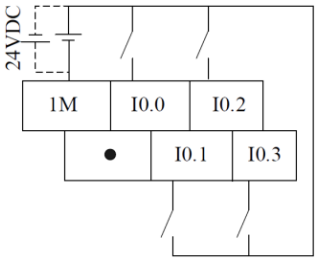
5.1.2 Definition of Indicators

Table 62 Definition of Indicators

Type	Color	Status	Description
Channel indicator Ix.y	Green	ON	The channel is ON.
		OFF	The channel is OFF.

5.1.3 Terminal Definition and Connection

8-channel digital input module LE5210 adopts two double-row pluggable terminals (3 x 2 and 3 x 2) and its definition of terminal and typical field wiring are shown below.



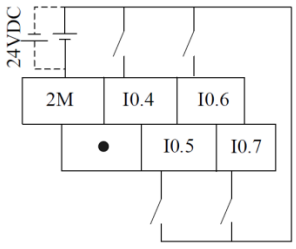


Figure 108 Upper Terminal Definition and Wiring *Lower Terminal Definition and Wiring*

- 1M and 2M terminals of input channel (DI) are common terminal for peripheral DI. users can choose to connect them to positive terminal or negative terminal of 24VDC power to fit sink/source type DI.
- '●' means the channel cannot be connected or connection is not available.

5.2 LE5211 16-Channel DI Module

LE5211 module is an expansion module of LE series PLC and can offer 16 input channels for digital signal.

5.2.1 Technical Specifications

Table 63 Technical Specifications

Input Specifications				
Number of inputs	16	Filtering parameter	No filtering, 5ms, 10ms, 20ms, 50ms, and 100ms	
Input type	Sink/source	Isolation mode	Optocoupler (field side to system)	
Rated voltage	24VDC	Isolation groups	2	
Permissible range	0~30VDC	Isolation withstand voltage	500VAC for 1 minute, leakage current <5mA	
Logic 1 signal	15~30VDC, permissible min. current 3mA	Current consumption	+24VDC (supplied by expansion bus)	0mA
Logic 0 signal	0~5VDC, permissible max. current 1mA		+5VDC (supplied by expansion bus)	65mA
Physical Specifications				
Dimensions W x H x D (mm)	70×97×89	Operating temperature	-40℃～+70℃	
Installation mode	DIN rail mounting or screw mounting	Storage temperature	-40℃～+70℃	
Weight	205g	Relative humidity	5%~95% (non-condensing)	

5.2.2 Definition of Indicators

Please refer to Chapter 5.1.2 Definition of Indicators.

5.2.3 Terminal Definition and Connection

16-channel digital input module LE5211 adopts two double-row pluggable terminals (6 x 2 and 6 x 2) and its definition of terminal and typical field wiring are shown below.

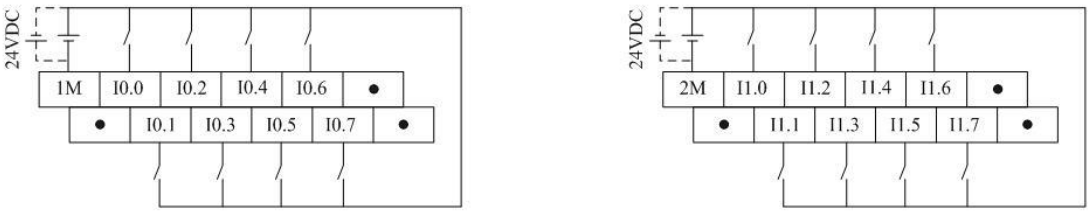


Figure 109 Upper Terminal Definition and Wiring Lower Terminal Definition and Wiring

- 1M and 2M terminals of input channel (DI) are common terminal for peripheral DI, users can choose to connect them to positive terminal or negative terminal of 24VDC power to fit sink/source type DI.
- “●”means the channel cannot be connected or connection is not available.

- Connecting external field power supply to two DI channel of same common terminal will cause close of channel (indicating as right diagram in Figure 109), whereas no damage to module will be caused.

5.3 LE5212 32-Channel DI Module

LE5212 module is an expansion module of LE series PLC and can offer 32 input channels for digital signal.

5.3.1 Technical Specifications

Table 64 Technical Specifications

Input Specifications				
Number of inputs	32	Filtering parameter	No filtering, 5ms, 10ms, 20ms, 50ms, and 100ms	
Input type	Sink/source	Isolation mode	Optocoupler (field side to system)	
Rated voltage	24VDC	Isolation groups	2	
Permissible range	0~30VDC	Isolation withstand voltage	500VAC for 1 minute, leakage current <5mA	
Logic 1 signal	15~30VDC, permissible min. current 3mA	Current consumption	+24VDC(supplied by expansion bus)	0mA
Logic 0 signal	0~5VDC, permissible max. current 1mA		+5VDC(supplied by expansion bus)	105mA
Physical Specifications				
Dimensions W x H x D (mm)	108 x 97x 89	Operating temperature	-40℃～+70℃	
Installation mode	DIN rail mounting or screw mounting	Storage temperature	-40℃～+70℃	

Input Specifications			
Weight	314g	Relative humidity	5%~95% (non- condensing)

5.3.2 Definition of Indicators

Please refer to Chapter 5.1.2 Definition of Indicators.

5.3.3 Terminal Definition and Connection

The 32-channel digital input module LE5212 adopts two double-row pluggable terminals (10 x 2 and 10 x 2) and its definition of terminal and typical field wiring are shown below.

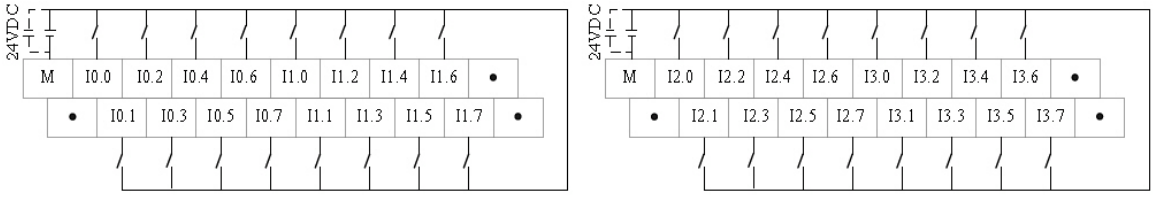


Figure 110 Upper Terminal Definition and Wiring Lower Terminal Definition and Wiring

- 1M and 2M terminals of input channel (DI) are common terminal for peripheral DI, users can choose to connect them to positive terminal or negative terminal of 24VDC power to accommodate sink/source type DI.
- "●" means that channels cannot be connected or physical connection is not available.

Chapter 6 DO Module

6.1 LE5220 8-Channel DO Module

LE5220 module is an expansion module of LE series PLC and can offer 8 output channels for digital signal.

6.1.1 Technical Specifications

Table 65 Technical Specifications

Output Specifications				
Number of outputs	8	On state resistance	0.3Ω (typical), 0.6Ω (max.)	
Output type	Transistor	Isolation mode	Optocoupler (field side to system)	
Rated voltage	24VDC	Isolation groups	2	
Permissible range	20.4~28.8VDC	Isolation withstand voltage	500VAC for 1 minute, leaking current <5mA	
Output current	1A	Current consumption	+24VDC (supplied by expansion bus)	0mA
Current per common	<4A		+24VDC (supplied by peripheral device)	Calculated by practical load
Residual voltage	<0.5V (output logic 1 at 1A current)		+5VDC (supplied by expansion bus)	90mA
Physical Specifications				
Dimensions W x H x D (mm)	47 x 97 x 89	Operating temperature	-40℃～+70℃	
Installation mode	DIN rail mounting or screw mounting	Storage temperature	-40℃～+70℃	
Weight	141g	Relative humidity	5%~95% (non- condensing)	

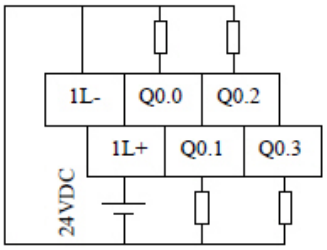
6.1.2 Definition of Indicators

Table 66 Definition of Indicators

Type	Color	Status	Description
Channel indicator Qm.n	Green	ON	The channel is ON.
		OFF	The channel is OFF.

6.1.3 Terminal Definition and Connection

The 8-channel DO module LE5220 adopts two double-row pluggable terminals (3 x 2 and 3 x 2), terminal definition and typical field wiring are shown in Figure 111.



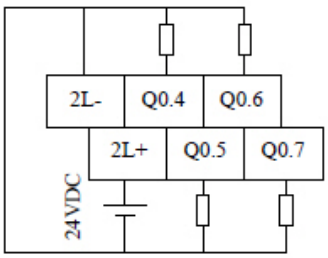


Figure 111 Upper Terminal Definition and Wiring *Lower Terminal Definition and Wiring*

- 1L+, 2L+ and 1L- and 2L- of output channel (DO) are connected respectively with positive terminal and negative terminal of load driving power supply 24VDC.

6.2 LE5221 8 -Channel Relay DO Module

LE5221 module is an expansion module of LE series PLC and can offer 8 output channels for digital signal.

6.2.1 Technical Specifications

Table 67 Technical Specifications

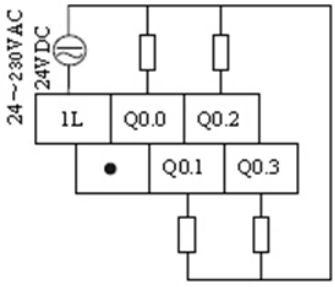
Output Specifications				
Number of outputs	8	Mechanical life of relay	No load: up to 10,000,000 open/close cycles	
Output type	Relay		Rated resistance 2A load: up to 100,000 open/close cycles	
Rated voltage	24VDC or 24 ～ 230VAC	Isolation mode	Relay (field side to system)	
Permissible range	5 ～ 30VDC or 5 ～ 250VAC	Isolation groups	2	
Output current	2A (resistance load)	Isolation withstand voltage	2500VAC for 1 minute, leakage current <5mA	
Current per common	＜10A	Current consumption	+24VDC (supplied by expansion bus)	60mA
On state resistance	0.2Ω		+24VDC (supplied by peripheral device)	Calculated by practical load
Switching frequency （max.）	1Hz		+5VDC (supplied by expansion bus)	50mA
Physical Specifications				
Dimensions W x H x D (mm)	47×97×89	Operating temperature	-40℃～＋70℃	
Mounting mode	DIN rail mounting or screw mounting	Storage temperature	-40℃～＋70℃	
Weight	162g	Relative humidity	5%~95% (non-condensing)	

6.2.2 Definition of Indicators

Please refer to Chapter 6.1.2 Definition of Indicators.

6.2.3 Terminal Definition and Connection

The 8-channel DO module LE5221 adopts two double-row pluggable terminals (3 X 2 and 3 X 2), terminal definition and typical field wiring are shown in Figure 112.



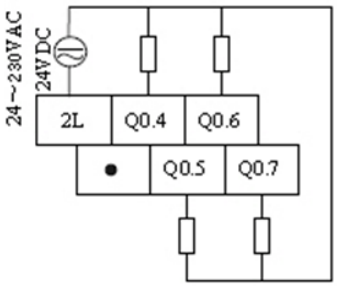


Figure 112 Upper Terminal Definition and Wiring *Lower Terminal Definition and Wiring*

- 1L and 2L are respectively common terminal of load driving power supply for four groups output, which can be supplied via DC and AC.
- "●" means the channel cannot be connected or connection is not available.
- "⏦" means load voltage can be 24VDC or 24～230VAC.

6.3 LE5223 16-Channel Relay DO Module

LE5223 module is an expansion module of LE series PLC and can offer 16 output channels for digital signal.

6.3.1 Technical specifications

Table 68 Technical Specifications

Output Specifications			
Number of outputs	16	Mechanical life of relay	No load: up to 10,000,000 open/close cycles
Output type	Relay		Rated resistance 2A load: up to 100,000 open/close cycles
Rated voltage	24VDC or 24~230VAC	Isolation mode	Relay (field side to system)
Permissible range	5~30VDC or 5~250VAC	Isolation groups	4
Output current	2A (resistance load)	Isolation withstand voltage	2500VAC for 1 minute, leaking current<5mA

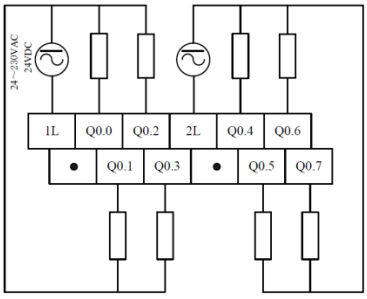
Output Specifications				
Current per common	<10A	Current consumption	+24VDC (supplied by expansion bus)	120mA
On state resistance	0.2Ω		+24VDC (supplied by peripheral device)	Calculated by practical load
Switching frequency (max.)	1Hz		+5VDC (supplied by expansion bus)	135mA
Physical Specifications				
Dimensions W x H x D(mm)	70 x 97 x 89	Operating temperature	-40℃～+70℃	
Mounting mode	DIN rail mounting or screw mounting	Storage temperature	-40℃～+70℃	
Weight	285g	Relative humidity	5%~95% (non-condensing)	

6.3.2 Definition of Indicators

Please refer to Chapter 6.1.2 Definition of Indicators.

6.3.3 Terminal Definition and Connection

The 16-channel DO module LE5223 adopts two double-row pluggable terminals (6 X 2 and 6 X 2), terminal definition and typical field wiring are shown in Figure 113.



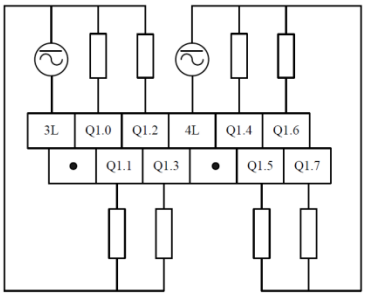


Figure 113 Upper Terminal Definition and Wiring Lower Terminal Definition and Wiring

- 1L, 2L, 3L and 4L are respectively common terminal of load driving power supply for four groups output, which can be supplied via DC and AC.
- "●" means the channel cannot be connected or connection is not available
- "⏦" means load voltage can be 24VDC or 24-230VAC.

6.4 LE5224 32-channel DO Module

LE5224 module is an expansion module of LE series PLC and can offer 32 output channels for digital signal.

6.4.1 Technical Specifications

Table 69 Technical Specifications

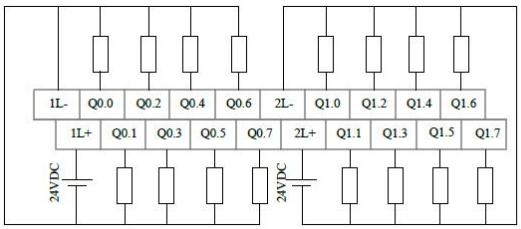
Output Specifications				
Number of outputs	32	On state resistance	0.3Ω (typical), 0.6Ω (max.)	
Output type	Transistor	Isolation mode	Optocoupler (field side to system)	
Rated voltage	24VDC	Isolation groups	4	
Permissible range	20.4～28.8VDC	Isolation withstand	500VAC for 1 minute, leaking current <5mA	
Output current	1A	Current consumption	+24VDC (supplied by expansion bus)	0mA
Current per common	＜8A		+24VDC (supplied by peripheral device)	Calculated by practical
Residual voltage	＜0.5V (output logic 1 at current 1A)		+5VDC (supplied by expansion bus)	265mA
Physical Specifications				
Dimensions W x H x D (mm)	108×97×89	Operating temperature	-40℃～＋70℃	
Mounting mode	DIN rail mounting or screw mounting	Storage temperature	-40℃～＋70℃	
Weight	326g	Relative humidity	5%~95% (non-condensing)	

6.4.2 Definition of Indicators

Please refer to Chapter 6.1.2 Definition of Indicators.

6.4.3 Terminal Definition and Connection

32-channel DO module LE5224 has two double-row pluggable terminals (10 x 2 and 10 x 2), definition of terminal and typical field wiring are shown in Figure 114.



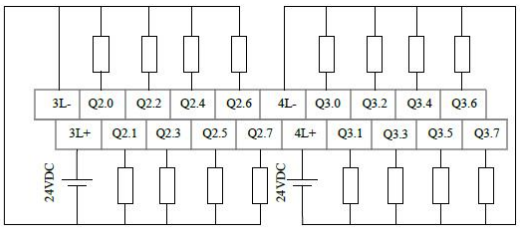


Figure 114 Upper Terminal Definition and Wiring Lower Terminal Definition and Wiring

- 1L+, 2L+, 3L+, 4L+ and 1L-, 2L-, 3L-, 4L- of the output channel (DO) are connected respectively with positive terminal and negative terminal of load driving power 24VDC.

Chapter 7 DI/DO Module

7.1 LE5230 8 Channel Digital Input/8 Channel Digital Output Module

LE5230 module is an extension module of PLC for LE series, which mainly completes the input processing of 8 channels digital signal and the output processing of 8 channels transistor.

7.1.1 Technical Specifications

Input Characteristics		Output Characteristics	
The number of input channel	8	The number of output channel	8
Input type	Leakage type/ Source type	Output type	Transistor
Nominal voltage	24VDC	Nominal voltage	24VDC
Permissible range	0～30VDC	Permissible range	20.4～28.8VDC
Logic 1 signal	15～30VDC, the minimum permissible current is 3mA	Output current	1A
Logic 0 signal	0 ～ 5VDC, the maximum permissible current is 1mA	Sum of output current in public terminal	＜4A
Filtering parameter	none, 5ms, 10ms, 20ms, 50ms, 100ms	Transistor turn-on voltage drop	＜0.5V (output logic 1, current 1A)
		On-state impedance	0.3Ω (Typical), 0.6Ω (Max)
Isolation method	Optical coupling isolation (between field and system)	Isolation method	Optical coupling isolation (between field and system)

Input Characteristics		Output Characteristics		
Isolation group	1	Isolation group	2	
Isolation & anti-pressure	500VAC, lasting for 1min, leak current＜5mA	Isolation & anti-pressure	500VAC, lasting for 1min, leak current ＜5mA	
Physical characteristics		Current consumption	+24VDC (provided by extension bus)	0mA
Size (width* height* depth)	70mm×97mm×89mm		+24VDC(provided by the outside)	Input: 40mA
Weight	215g			Output: calculated according to the actual load
Installation method	Rail or screw installation		+5VDC(provided by extension bus)	108mA
Operating temperature	-40℃～＋70℃	Relative humidity of operating environment	5%～95%(No condensation)	
Storage temperature	-40℃～＋70℃	Relative humidity of storage environment	5%～95%(No condensation)	

7.1.2 Indicator Definition

Indicator Type	Color	Status	Meaning
Channel indicator light Ix.y, Qm.n	Green	ON	This channel is in ON state
		OFF	This channel is in OFF state

7.1.3 Terminal Definition and Wiring

The LE5230 module with 8 channel digital inputs / 8 channel transistor outputs adopts two double-row pluggable terminals (6×2 and 6×2), the definition of connection terminal and typical wiring on field as shown in Figure 115.

Figure 115 Upper Terminal Definition and Wiring Lower Terminal Definition and Wiring

- M terminal of input channel (DI) indicate common terminal of external DI, which can be connected with positive terminal or negative terminal of 24VDC power to match with source-type DI or leakage - type DI.
- 1L+, 2L+ and 1L-, 2L- of output channels respectively is connected to 24VDC positive terminal and negative terminal of load driving power.
- '●' indicates no wiring of this channel or no actual physical connection.

7.1.4 Electrical Schematic Diagram

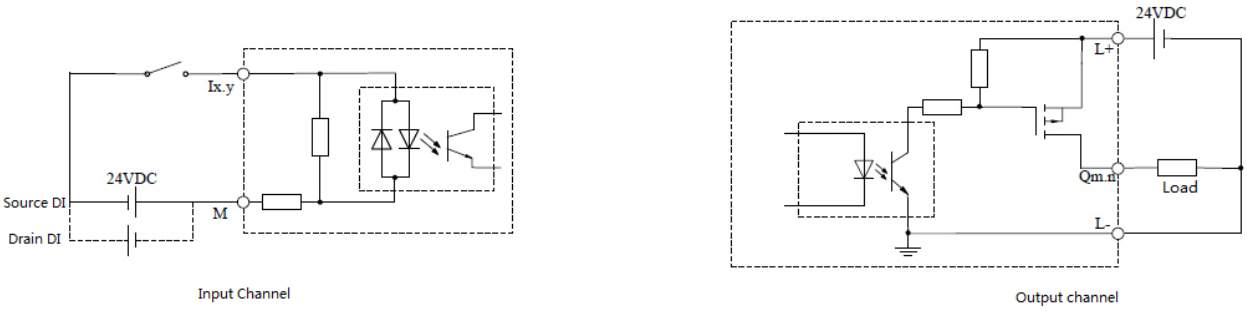


Figure 116 Electrical Schematic Diagram

7.1.5 Expansion Connection

LE5230 can be connected to the 10-pin hole-base of the previous module via a 10-pin socket. The 10-pin hole-base is connected to the 10-pin socket of latter module and then fix with upper and lower side lock.

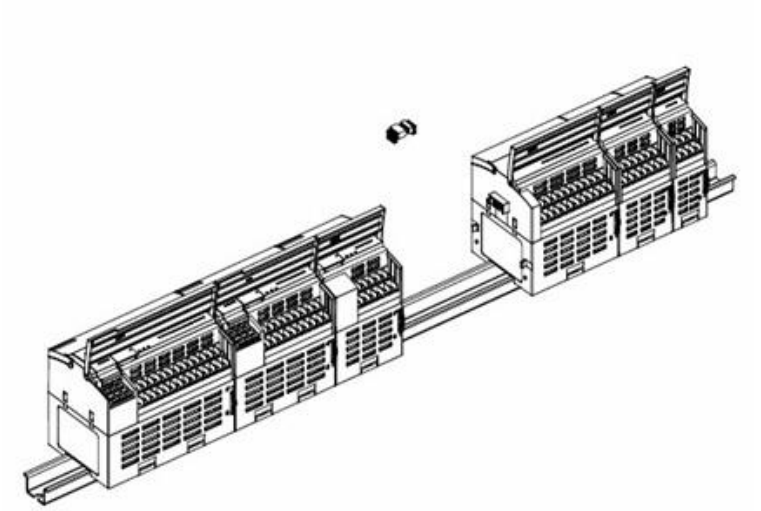


Figure 117 Expansion Connection

- Ensure all powers are switched off before installing or disassembling module and related equipment.
- After the power supply is connected, the terminal cover shall be fitted on closely, so as to avoid unnecessary personal injury and equipment damage.
- Connect with the matched CPU module and extension module of LE series.

7.1.6 Fault Diagnose

System distributes corresponding bytes diagnosis area for each module to store detailed diagnostic information. If there is module fault report, the user needs to add the variables in the AutoThink software, input the corresponding address, and view the changes of corresponding bit according to the module diagnose information, please refer to Data Storage Area in Chapter 5 in *AutoThink V3.1 User Manual_Project Configuration* for the detail information.

7.2 LE5231 8 Channel Digital Input/8 Channel Digital Output Module

LE5231 module is an extension module of PLC for LE series, which mainly completes the input processing of 8 channels digital signal and the output processing of 8 channels relay.

7.2.1 Technical Specifications

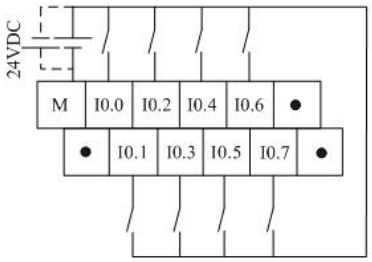
Input Characteristics		**Output Characteristics**	
The number of input channel	8	The number of output channel	8
Input type	Leakage type/ Source type	Output type	Relay
Rated voltage	24VDC	Rated voltage	24VDC or 24～230VAC
Permissible range	0～30VDC	Permissible range	5～30VDC or 5～250VAC
Logic 1 signal	15～30VDC, the minimum permissible current is 3mA	Output current	2A (Resistance load)
Logic 0 signal	0～5VDC, the maximum permissible current is 1mA	Sum of output current in public terminal	＜10A
Filtering parameter	No filtering, 5ms, 10ms, 20ms, 50ms, 100ms	On-state impedance	0.2Ω
Isolation method	Optical coupling isolation (between field and system)	Output on-off frequency (Max)	1Hz
Isolation group	1	Mechanical life of relay	No load: more than 10, 000, 000 times
Isolation & anti-pressure	500VAC, lasting for 1min, leak current＜5mA		Rated resistance 2A load: more than 100, 000 times
Physical characteristics		Isolation method	Relay isolation (between field and system)

Input Characteristics		Output Characteristics	
Size (width* height* depth)	70mm×97mm×89mm	Isolation group	2
Weight	240g	Isolation & anti-pressure	2500VAC, lasting for 1min, leakage current＜5mA
Installation method	Rail installation or screw installation	Current consumption	
Operating temperature	-40℃～＋70℃	+24VDC (provided by extension bus)	60mA
Storage temperature	-40℃～＋70℃	+24VDC (provided by the external)	Input: 40mA
Relative humidity of operating environment	5% ～ 95% (No condensation)		Output: calculated according to the actual load
Relative humidity of storage environment	5% ～ 95% (No condensation)	+5VDC (provided by extension bus)	74mA

7.2.2 Indicator Definition

Indicator Type	Color	Status	Meaning
Channel indicator light Qm.n	Green	ON	This channel is in ON state
		OFF	This channel is in OFF state

7.2.3 Terminal Definition and Wiring



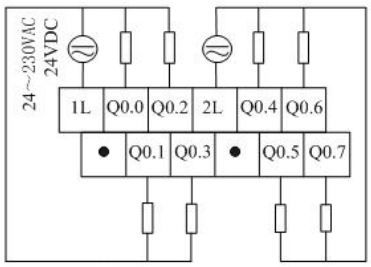
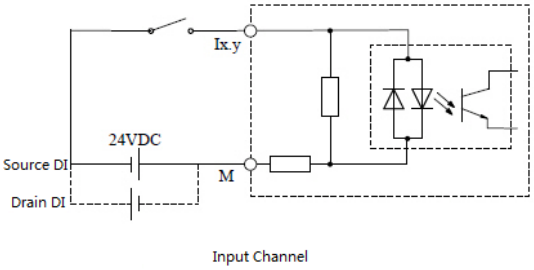


Figure 118 Upper Terminal Definition and Wiring ***Lower Terminal Definition and Wiring***

- M terminal of input channel (DI) indicate common terminal of external DI, which can be connected with positive terminal or negative terminal of 24DC power to match with source-type DI or leakage - type DI.
- 1L and 2L of output channels are power terminals of load driving power, which can be DC supply or AC power supply.
- '●' indicates no wiring of this channel or no actual physical connection.
- indicates the load voltage is 24VDC or 24-230VAC.

7.2.4 Electrical Schematic Diagram



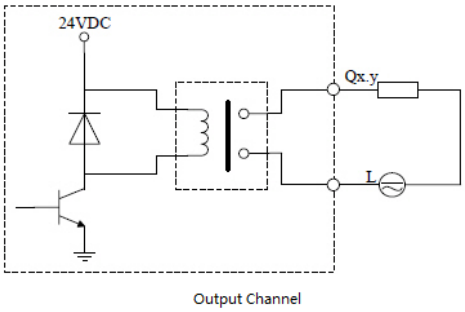


Figure 119 Electrical Schematic Diagram

7.2.5 Expansion Connection

LE5231 can be connected to the 10-pin hole-base of the previous module via a 10-pin socket. The 10-pin hole-base is connected to the 10-pin socket of latter module and then fix with upper and lower side lock.

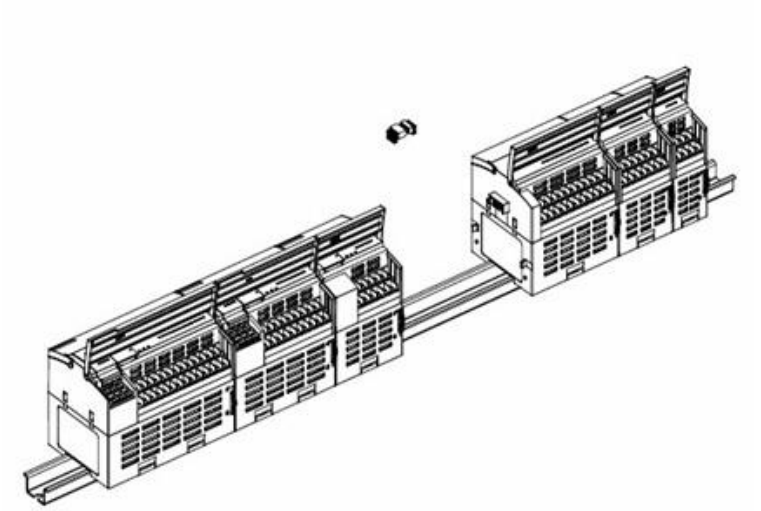


Figure 120 Expansion Connection

- Ensure all powers are switched off before installing or disassembling module and related equipment.
- After the power supply is connected, the terminal cover shall be fitted on closely, so as to avoid unnecessary personal injury and equipment damage.
- Connect with the matched CPU module and extension module of LE series.

7.2.6 Fault Diagnose

System distributes corresponding bytes diagnosis area for each module to store detailed diagnostic information. If there is module fault report, the user needs to add the variables in the AutoThink software, input the corresponding address, and view the changes of corresponding bit according to the module diagnose information, please refer to Data Storage Area in Chapter 5 in *AutoThink V3.1 User Manual_Project Configuration* for the detail information.

Chapter 8 AI Module

8.1 LE5310 4 AI Module

LE5310 is an expansion module of LE series PLC and can offer 4 input channels for analog signal.

8.1.1 Technical Specifications

Table 70 Technical Specifications

Input Specifications			**Current Consumption**	
Number of inputs		4	+24VDC (supplied by expansion bus)	15mA
Input type		Differential / single-ended	+5VDC (supplied by expansion bus)	95mA
Input range	Voltage	0～10V	Isolation Withstand Voltage	
	Current	0 ～ 20 mA /4 ～ 20mA	Isolation mode	Optocoupler (channel side to system)
Input accuracy		0.5% of full scale		No isolation between channels
Resolution		12 bits	Isolation withstand voltage	500VAC for 1 minute, leakage current <5mA
Input impedance	Voltage type	>1MΩ	Physical Specifications	
	Current type	250Ω	Dimensions W x H x D (mm)	70×97×89
Withstand voltage		15V	Weight	213g
Withstand current		32mA	Installation mode	DIN rail mounting or screw mounting
Common mode voltage		Signal voltage + common mode voltage <12V	Operating temperature	-40℃～+70℃
Common mode rejection ratio		>80dB	Storage temperature	-40℃～+70℃

Input Specifications		Current Consumption	
Differential mode rejection ratio	>60dB（50Hz and 60Hz）	Relative humidity	5%~95% (non-condensing)

8.1.2 Definition of Indicators

Table 71 Definition of Indicators

Type	Color	Status	Description
Power supply PWR	Green	ON	Power supply works in normal mode.
		OFF	Power is defective or not supplied.
Failure status indicator ERR	Red	ON	The module is in failed mode.
		OFF	No errors occurred or were detected.

- If ERR indicator in CPU module is ON, the diagnosis information is meaningless.

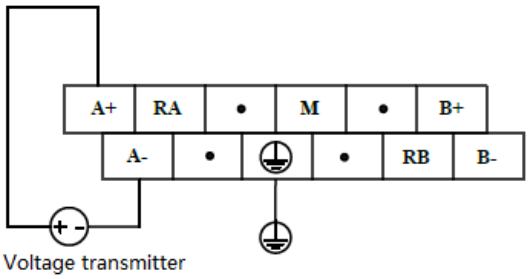
8.1.3 Signal Types and Scale Range of Input Channels

Table 72 Signal Type and Scale Range of Input Channels

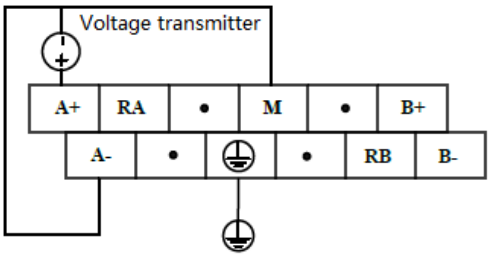
Signal Type	Scale Range	Corresponding Digital Code Value Range	
		Decimal	Hexadecimal
Voltage signal	0～10V	0～65535	0x0000～0xFFFF
Current signal	0～20mA	0～65535	0x0000～0xFFFF
	4～20mA	0～65535	0x0000～0xFFFF

8.1.4 Terminal Definition and Connection

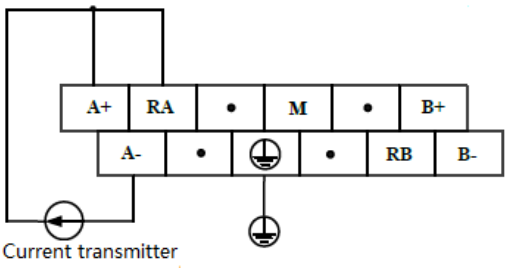
The 4-channel AI module LE5310 adopts two double-row pluggable terminals (6 X 2 and 6 X 2), and its definition of terminal and typical wiring are shown below.



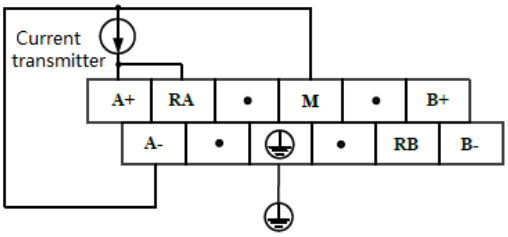
Differential Voltage Type



Single-Ended Voltage Type



Current Type: Mutual Independence of Signal Negative Pole Connection of Signal Negative Pole



Current Type: Short-circuit

Figure 121 Terminal Wiring Diagram

- LE5310 input channels can accept differential or single-ended voltage signal, or current signal. All 4-channel analog input follows the same rule.
- Differential voltage signal: “A+” connects to positive pole of voltage transmitter, “A-” connects to negative pole of voltage transmitter.
- Single-ended voltage signal: “A+” connects to positive pole of voltage transmitter, “A-” and “M” connect to negative pole of voltage transmitter after short-circuit connection.
- Current signal (mutual independence of negative pole): “RA” and “A+” connects to positive pole of current transmitter after short-circuit connection, “A-” connects to negative pole of current transmitter.
- Current signal (short-circuit connection of negative pole): “RA” and “A+” connects to positive pole of current transmitter after short-circuit connection, “A-” and “M” connect to negative pole of current transmitter after short-circuit connection.
- Figure 122 shows wiring mode of 2-wire and 4-wire type current transmitter, using external power supply or CPU module 24VDC output power supply for transmitter.
- '⏚' means grounding, can be connected to cabinet to offer electrostatic discharging channel for internal analog processing circuit.
- '•' means the channel cannot be connected or connection is not available.

- Only select one type for each input channel (voltage type or current type), and cannot use both types at the same time.

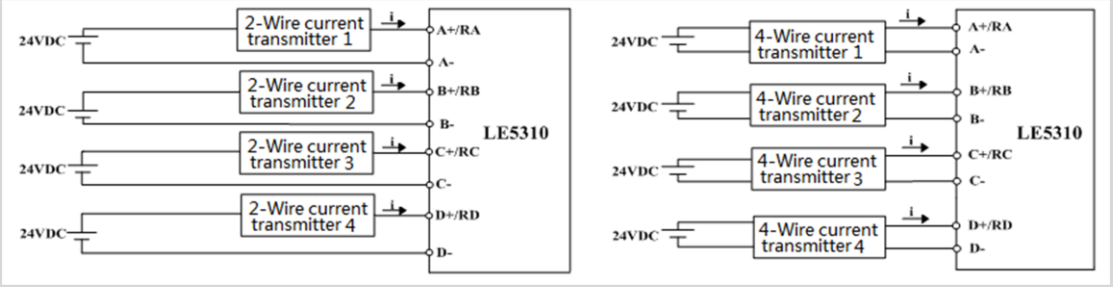
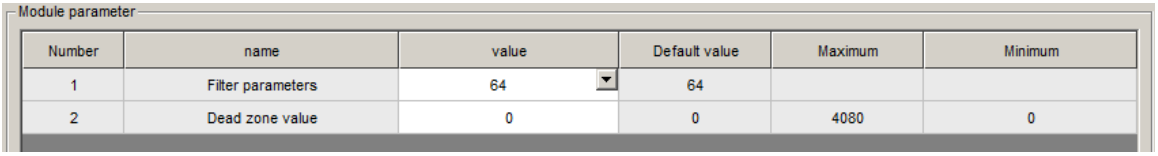


Figure 122 2-wire Type and 4-wire Type Circuit Diagram

8.1.5 Software Configuration

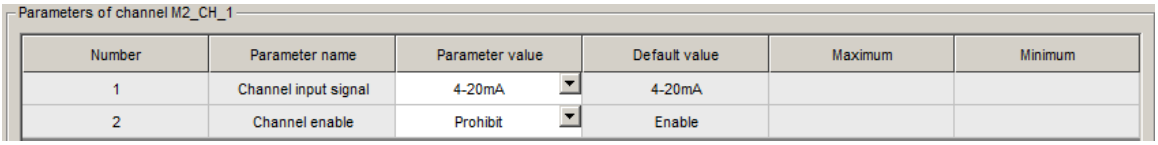
In AT programming software, following parameters will be displayed on hardware configuration window when PLC is configured with LE5310.

1. Module parameter information



- Filter Parameters: Users can select based on actual needs. Maximum filtering parameter value is 256, the minimum value is 2, and the default value is 64. The greater value is, the better filtering effect is.
- Dead zone value: The module does not support dead zone.

2. Channel parameter information



- Channel parameter: Users select type of input signal according to actual conditions (0-10V/0-20mA /4-20mA), and the default value is 4-20mA.
- Channel enable: Users can select based on actual needs. If the channel is used to measure signals, you will select Enable (default value), otherwise Prohibit.

8.2 LE5311 8 AI Module

LE5311 is an expansion module of LE series PLC and can offer 8 input channels for analog signal.

8.2.1 Technical Specifications

Table 73 Technical Specifications

Input Specifications		Current consumption	
Number of inputs	8	+24VDC (supplied by expansion bus)	0mA
Input type	Single-ended	+5VDC (supplied by expansion bus)	75mA

Input Specifications			Current consumption	
Input range	Voltage	0～10V	Isolation Withstand Voltage	
	Current	0～20mA/4～20mA	Isolation mode	Optocoupler (channel side to system)
Input accuracy		0.5% of full scale		No isolation between channels
Resolution		12 bits	Isolation withstand voltage	500VAC for 1 minute, leakage current <5mA
Input impedance	Voltage type	>1MΩ	Physical Specifications	
	Current type	250Ω	Dimensions W x H x D (mm)	70×97×89
Withstand voltage		±30V	Weight	200g
Withstand current		±32mA	Installation mode	DIN rail mounting or screw mounting
Step response time of analog input		1.5ms (up to 95%)	Operating temperature	-40℃～+70℃
Storage temperature		-40℃～+70℃	Relative humidity	5%~95% (non-condensing)

8.2.2 Definition of Indicators

Please refer to Chapter 8.1.2 Definition of Indicators.

8.2.3 Signal Type and Scale Range of Input Channels

Table 74 Signal Type and Scale Range of Input Channels

Signal Type	Scale Range	Corresponding Digital Code Value Range	
		Decimal	Hexadecimal
Voltage signal	0～10V	0～65535	0x0000～0xFFFF
Current signal	0～20mA	0～65535	0x0000～0xFFFF
	4～20mA	0～65535	0x0000～0xFFFF

8.2.4 Terminal Definition and Connection

The 8-channel analog input module LE5311 adopts two double-row pluggable terminals (6 x 2 and 6 x 2) and its definition of terminal and typical wiring are shown below.

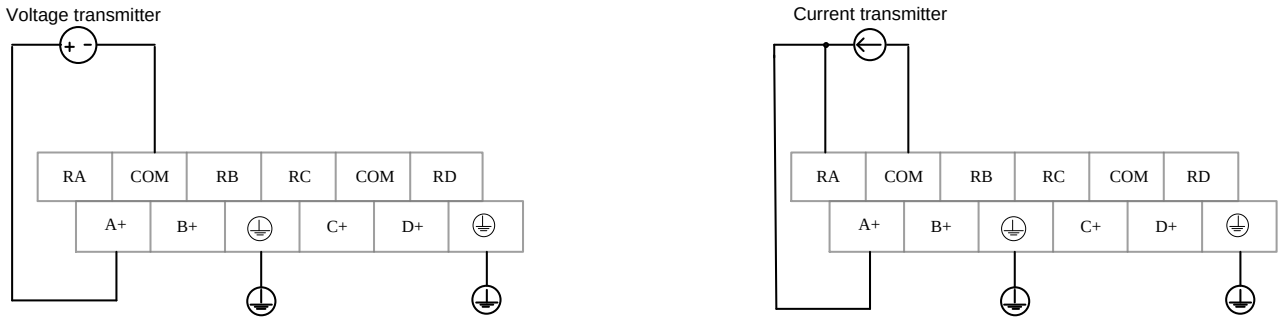


Figure 123 Upper Terminals Definition and Wring (voltage type) Upper Terminals Definition and Wring (current type)

Figure 124 Lower Terminals Definition

- LE5311 input channels can accept voltage signal or current signal.
- Voltage signal: “A+” connects to positive pole of voltage transmitter, “COM” connects to negative pole of voltage transmitter. Other channels follow the same rule.
- Current signal: “RA” and “A+” connects to positive pole of current transmitter after short-circuit connection, “COM” connects to negative pole of current transmitter. Other channels follow the same rule.
- The following figure shows wiring mode of 2-wire and 4-wire type current transmitter, using external power supply or CPU module 24VDC output power supply for transmitter.
- '⏚' means grounding, can be connected to cabinet to offer electrostatic discharging channel for internal analog processing circuit.

- Only select one type for each input channel (voltage type or current type), and cannot use both types at the same time.

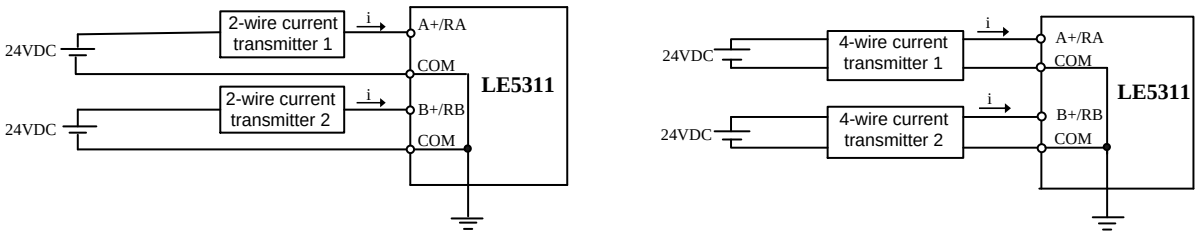


Figure 125 2-wire Type and 4-wire Type Wiring

8.2.5 Software Configuration

In AT programming software, following parameters will be displayed on hardware configuration window when PLC is configured with LE5311.

1. Module parameter information

Module parameter

Number	Name	Value	Default value	Maximum	Minimum
1	Filter parameters	64	64		
2	Dead zone value	0	0	4080	0

- Filter Parameters: Available values: 2, 4, 8, 16, 32, 64 (default value), 128 and 256.
- Dead zone value: Invalid parameter, no needs for setting.

2. Channel parameter information

Number	Parameter name	Parameter value	Default value	Maximum	Minimum
1	Channel input signal	4-20mA	4-20mA		
2	Channel enable	Enable	Enable		

- Channel input signal: Users select type of input signal according to actual conditions: 0-10V / 0-20mA / 4-20mA (default).
- Channel enable: Users can select based on actual needs. If the channel is used to measure signals, you will select Enable (default value), otherwise Prohibit.

8.3 LE5340 4-channel Thermocouple Input Module

LE5340 module is an expansion module of LE series PLC and works as a 4-channel thermocouple input module, it provides connection interface with one temperature measuring component thermocouple for the collection and disposal of thermocouple or millivolt voltage signals from field side.

8.3.1 Technical Specifications

Table 75 Technical Specifications

Input Specifications		Current consumption	
Number of inputs	4	+24VDC (supplied by expansion bus)	0mA
Input type	J, K, T, N, E, R, S, B type floating thermocouple,-80～80mV voltage signal	+5VDC (supplied by for expansion bus)	135mA
		Isolation Withstand Voltage	
Input accuracy	0.1% of full scale (voltage signal, 25℃)	Isolation mode	Magnetic coupling (channel side to system)
Input impedance	≥1MΩ		No isolation between channels
Temperature resolution	0.1℃	Isolation withstand voltage	500VAC for 1 minute, leakage current <5mA
Cold junction compensation	Supported	Physical Specifications	
Cold junction error	±1.5℃	Dimensions W x H x D (mm)	70×97×89
Wire break detection	Supported	Weight	210g
Sample refresh time	450ms (every 4 channels)	Installation mode	DIN rail mounting or screw mounting
Temperature floating	±35ppm/℃	Operating temperature	-40℃～+70℃
Common mode rejection ratio	>100dB	Storage temperature	-40℃～+70℃
Differential mode rejection ratio	>50dB	Relative humidity	5%~95% (non-condensing)
Loop resistance of conductor (max.)	100Ω		

8.3.2 Definition of Indicators

Please refer to Chapter 8.1.2 Definition of Indicators.

8.3.3 Signal Type and Scale Range of Input Channel

Table 76 Signal Type and Scale Range of Input Channel

Input Signal Type	Temperature Range(℃)	Corresponding Digital Code Value Range
S	-50～1768	-500～17680
R	-50～1768	-500～17680
B	250～1820	2500～18200
K	-270～1370	-2700～13700
N	-270～1300	-2700～13000
E	-270～1000	-2700～10000
J	-210～1200	-2100～12000
T	-270～400	-2700～4000
-80～80mV	-	-8000～8000

- Corresponding relationship between input signal and digital code: Digital code=temperature value* 10, Digital code= Millivolt signal * 100.

8.3.4 Terminal Definition and Connection

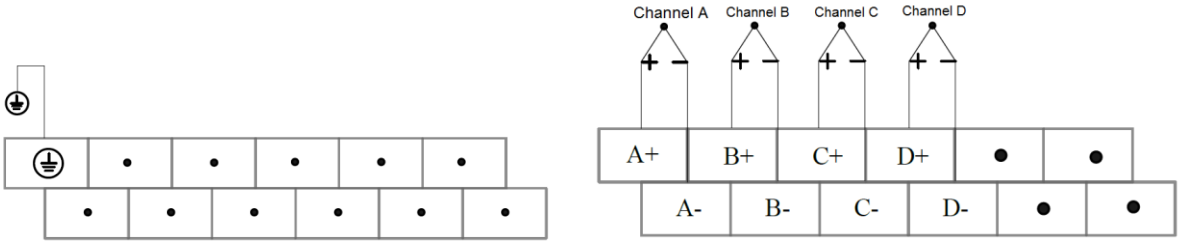


Figure 126 Upper Terminal Definition and Wiring Lower Terminal Definition and Wiring

- Terminal A+ and A- are two terminals of one input channel when being connected to external thermocouple. Connection methods of other channels follow the same rule.

   means grounding.

- • means the channel cannot be connected or connection is not available.

8.3.5 Software Configuration

In AT programming software, following parameters will be displayed on hardware configuration window when PLC is configured with LE5340.

1. Module Parameter Information

Number	Name	Value	Default value	Maximum	Minimum
1	Filter parameters	1	1		
2	Cold junction compensation	Yes	Yes		
3	Disconnection detection	Remain	Remain		

- Filter parameters: Advisable values: 1 (default value), 2, 4, 8, 16 or 32.
- Cold junction compensation: Yes (default), No.
- Disconnection detection:
  - Remain:——maintain current value when wire break error occurs.
  - Positive limit——when wire break error occurs, take the positive limit as 32767.
  - Negative limit——when wire break error occurs, take the negative limit as 32768.

2. Channel parameter information

Number	Parameter name	Parameter value	Default value	Maximum	Minimum
1	Signal type	J	J		
2	Channel enable	Enable	Enable		

- Signal type: Floating thermocouple type——J, K, T, N, E, R, S, B type.

  Millivolt voltage signal——-80～80mV.

- Channel enable: Enable (default) and Prohibit.

8.4 LE5341 4-Channel RTD Input Module

As a 4-channel RTD input module, LE5341 module is an expansion module of LE series PLC, which can provide an interface connecting to RTD temperature measurement element and is used to acquire and process RTD signal.

8.4.1 Technical Specifications

Table 77 Technical Specifications

<table>
<tr><th colspan="2">Input Specifications</th><th colspan="2">Current Consumption</th></tr>
<tr><td>Number of inputs</td><td>4</td><td>+24VDC (supplied by expansion bus)</td><td>0mA</td></tr>
<tr><td>Input type</td><td rowspan="3">Refer to signal type and measuring range of input channel</td><td>+5VDC (supplied by expansion bus)</td><td>80mA</td></tr>
<tr><td>Input range</td><td colspan="2">Isolation Withstand Voltage</td></tr>
<tr><td>Max. deviation of input</td><td rowspan="2">Isolation mode</td><td>Magnetic coupling (field side to system)</td></tr>
<tr><td>Input accuracy</td><td>0.5% of full scale (25℃)</td><td>No isolation between channels</td></tr>
<tr><td>Wiring mode</td><td>Three-wire connection</td><td>Isolation withstand voltage</td><td>500V AC for 1minute, leakage current <5mA</td></tr>
<tr><td>Temperature drift</td><td>±35ppm/℃</td><td colspan="2">Physical Specifications</td></tr>
<tr><td>Sampling refresh time</td><td>540ms (every 4 channels)</td><td>Dimensions W x H x D(mm)</td><td>70 X 97X 89</td></tr>
<tr><td>Differential mode rejection ratio</td><td>>60dB</td><td>Weight</td><td>215g</td></tr>
<tr><td>Common mode rejection ratio</td><td>>100dB</td><td>Mounting mode</td><td>DIN rail mounting or screw mounting</td></tr>
<tr><td>Short-circuit detection</td><td>Supported</td><td>Operating temperature</td><td>-40℃～+70℃</td></tr>
<tr><td>Wire break detection</td><td>Supported</td><td>Storage temperature</td><td>-40℃～+70℃</td></tr>
<tr><td>Wire length</td><td>100m (the longest length away from sensor)</td><td rowspan="2">Relative humidity</td><td rowspan="2">5%~95% (non-condensing)</td></tr>
<tr><td>Wire loop resistance</td><td>20Ω, 2.7Ω(Cu50)</td></tr>
</table>

8.4.2 Definition of Indicators

Type	Color	Status	Description
Power supply PWR	Green	ON	Power supply works in normal mode.
		OFF	Power is defective or not supplied.
Failure status indicator ERR	Red	Flashing	The module is in failed mode. ①.
		OFF	No errors occurred or were detected.

Note①: Flashing of error indicator ERR may be caused by the following three reasons:

(1) A/D conversion chip failure.

(2) Disconnected channels.

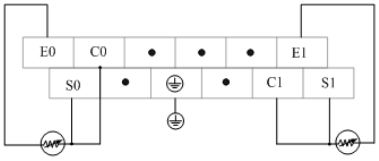
(3) Over-range or under-range input values.

8.4.3 Signal Type and Scale Range of Input Channels

Table 78 Signal Type and Scale Range of Input Channels

RTD Type	0℃ Resistance (Ω)	Resistance Range(Ω)	Temperature Measure Range(℃)	Absolute Error	Engineering Value Calculation Method
Cu:50Ω	50	39.242～82.136	-50～150	±1℃	Displayed resistance: resistance value=digital code value/100 Displayed temperature: temperature=(digital code value-10000)/10
Pt 385-100Ω	100	18.5201～390.481	-200～200	±1℃	
			200～850	±2℃	
Pt 3916-100Ω	100	16.9960～327.744	-200～200	±1℃	
			200～630	±2℃	

8.4.4 Terminal Definition and Connection



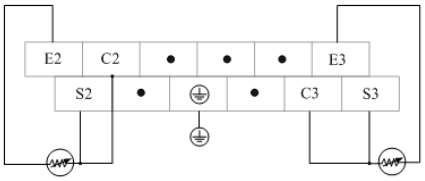


Figure 127 Upper Terminal Definition and Wiring Lower Terminal Definition and Wiring

- Three-wire connection: one end of RTD is connected to “E”, the two wires at another end are connected to “S” and “C” respectively.
- ⏚ means grounding.
- • means the channel cannot be connected or connection is not available.

8.4.5 Software Configuration

In AT programming software, following parameters will be displayed on hardware configuration window when PLC is configured with LE5341.

1. Module Parameter Information

Number	Name	Value	Default value	Maximum	Minimum
1	Filter parameters	64	64		
2	Filter mode	50HZ	50HZ		
3	Dead zone value	0	0	4080	0
4	Short circuit detection	Remain	Remain		
5	Disconnection detection	Remain	Remain		
6	Temperature or resistance output	Resistance_Output	Resistance_Output		

- Filter parameters: Advisable values: 2, 4, 8, 16, 32, 64 (default value), 128 and 256.
- Filter mode: 50Hz (default value), 60Hz.
- Dead area value: invalid parameter, no need to set.
- Short circuit detection (Disconnection detection):
  - Remain (default)-- when short circuit (disconnection) fault occurs, hold the current value.

- ☐ Positive limit-- when short circuit (disconnection) fault occurs, temperature output: take the digital code corresponding to the max. temperature value of the RTD. Resistance output: 65535.
- ☐ Negative limit-- when short circuit (disconnection) fault occurs, temperature output: take the digital code value corresponding to the min. temperature value of the RTD. Resistance output: 0.

■ Temperature or resistance output: Temperature_Output, Resistance_Output (default)

2. Channel Parameter Information

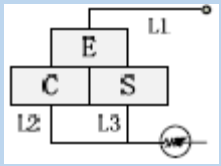
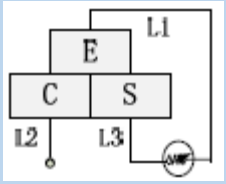
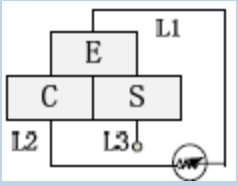
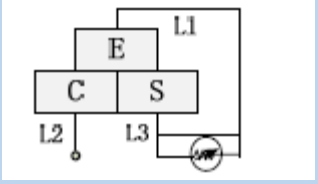
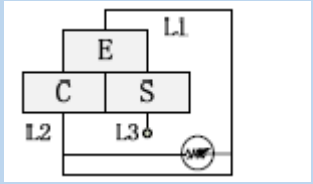
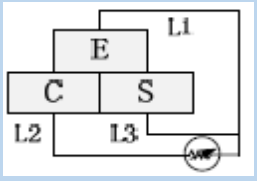
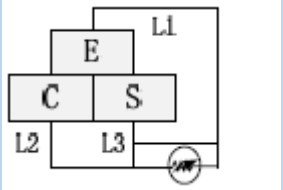
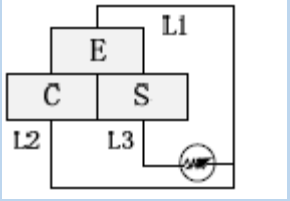
Number	Parameter name	Parameter value	Default value	Maximum	Minimum
1	Signal type	Cu50	Cu50		
2	Channel enable	Enable	Enable		

■ Signal type: Refer to signal type and scale range of input channel.

■ Channel enable: Enable (default) and Prohibit.

Wire break detection and short circuit detection functions can detect the follows faults:

Table 79 Broken Line Detection and Short-circuit Detection

Type	**Wire break detection**	**Wire break detection**	**Wire break detection**	**Wire break detection**
Wiring mode	 Wire break detection in E terminal	 Wire break detection in C terminal	 Wire break detection in S terminal	 Wire break detection in C terminal and ES short circuit
Type	Wire break detection	Wire break detection	Short circuit detection	Short circuit detection
Wiring mode	 Wire break detection in S terminal and EC short circuit	 Error wiring	 Short circuit detection: all three wires short circuit	 Short circuit detection: EC short circuit

8.5 LE5341T 4-Channel RTD Input Module

As a 4-channel RTD input module, LE5341T module is an expansion module of LE series PLC, which can provide an interface connecting to RTD temperature measurement element and is used to acquire and process RTD signal. Supported thermal resistance models include: Pt1000(385), Pt1000(3916). Module is only supported for LE5118/LE5119 controller.

8.5.1 Technical Specifications

Table 80 Technical Specifications

Input Specifications				
Number of inputs	4			
Wiring mode	Three-wire connection			
Resistance measurement accuracy	0.5%FS@25℃ (Pt1000)			
Thermal resistance type	0 ℃ Resistance value（Ω）	Resistance range（Ω）	Measuring range（℃）	Absolute error
Pt 385-1000Ω	1000	185.201~3963.11	-200~870	±1.3℃
Pt 3916-1000Ω	1000	169.960 ～ 3277.44	-200~630	±1.3℃
Temperature drift	±35ppm/℃			
Differential mode rejection ratio	>60dB			
Common mode rejection ratio	>100dB			
Wire length	The maximum distance to the sensor is 100 meters			
Wire loop resistance	20Ω			
Sampling refresh time	690ms(every 4 channels)			
Isolation mode (field side to system)	Magnetic coupling			
Isolation withstand voltage	500VAC,1min@<5mA			
Wire break detection	Supported			

Input Specifications	
Power supply	
Input voltage	5VDC±2%
Power consumption	80mA@5VDC (Backplane bus provides)
Environment condition	
Working temperature	-40℃～+70℃
Storage temperature	-40℃～+70℃
Relative humidity	5%~95% (non-condensing)
Dimensions W x H x D(mm)	70mm×97mm×89mm

8.5.2 Definition of Indicators

Type	Color	Status	Description
Power supply PWR	Green	ON	Power supply works in normal mode.
		OFF	Power is defective or not supplied.
Failure status indicator ERR	Red	Flashing	The module is in failed mode. ①.
		OFF	No errors occurred or were detected.

Note①: Flashing of error indicator ERR may be caused by the following three reasons:

(1) A/D conversion chip failure.

(2) Disconnected channels.

(3) Over-range or under-range input values.

8.5.3 Signal Type and Scale Range of Input Channels

Table 81 Signal Type and Scale Range of Input Channels

RTD Type	0℃ Resistance (Ω)	Resistance Range(Ω)	Temperature Measure Range(℃)	Absolute Error	Engineering Value Calculation Method
Pt385-1000Ω	1000	185.201 ～ 3963.11	-200～870	±1.3℃	Displayed resistance: resistance value=digital code value/10 Displayed temperature: temperature=(digital code value-10000)/10
Pt3916-1000Ω	1000	169.960 ～ 3277.44	-200～630	±1.3℃	

8.5.4 Terminal Definition and Connection

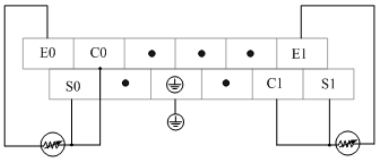
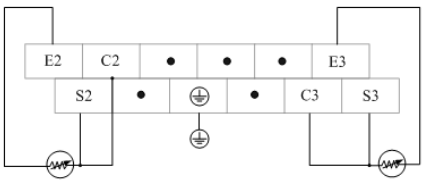


Figure 128 Upper Terminal Definition and Wiring



Lower Terminal Definition and Wiring

- Three-wire connection: one end of RTD is connected to “E”, the two wires at another end are connected to “S” and “C” respectively.
- ⏚ means grounding.
- • means the channel cannot be connected or connection is not available.

8.5.5 Software Configuration

In AT programming software, following parameters will be displayed on hardware configuration window when PLC is configured with LE5341T.

1. Module Parameter Information

Module parameters

Number	Name	Value	Default value	Maximum	Minimum
1	Filter parameters	64	64		
2	Filter mode	50HZ	50HZ		
3	Dead zone value	0	0	4080	0
4	Short circuit detection	Remain	Remain		
5	Disconnection detection	Remain	Remain		
6	Temperature or resistance output	Temperature_Output	Temperature_Output		

- Filter parameters: Advisable values: 2, 4, 8, 16, 32, 64 (default value), 128 and 256.
- Filter mode: 50Hz (default value), 60Hz.
- Dead area value: invalid parameter, no need to set.
- Short circuit detection (Disconnection detection):
  - Remain (default)-- when short circuit (disconnection) fault occurs, hold the current value.
  - Positive limit-- when short circuit (disconnection) fault occurs, temperature output: take the digital code corresponding to the max. temperature value of the RTD. Resistance output: 65535.
  - Negative limit-- when short circuit (disconnection) fault occurs, temperature output: take the digital code value corresponding to the min. temperature value of the RTD. Resistance output: 0.
- Temperature or resistance output: Temperature_Output (default), Resistance_Output

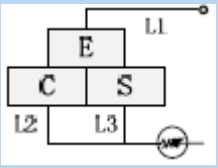
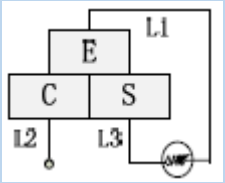
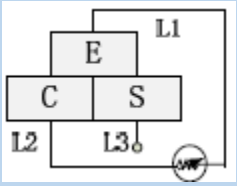
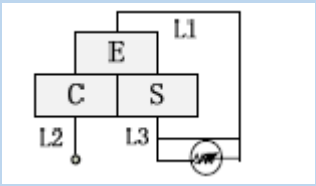
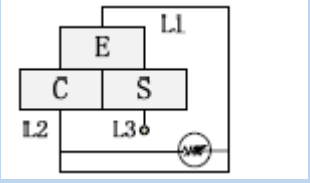
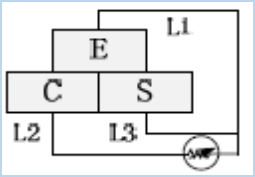
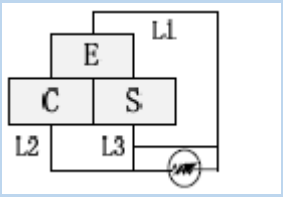
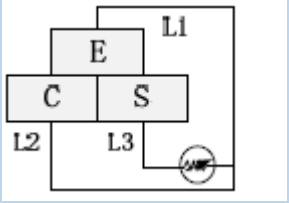
2. Channel Parameter Information

Number	Parameter name	Parameter value	Default value	Maximum	Minimum
1	Signal type	Pt1000(385)	Pt1000(385)		
2	Channel enable	Enable	Enable		

- Signal type: Refer to signal type and scale range of input channel.
- Channel enable: Enable (default) and Prohibit.

Wire break detection and short circuit detection functions can detect the follows faults:

Table 82 Broken Line Detection and Short-circuit Detection

Type	Wire break detection	Wire break detection	Wire break detection	Wire break detection
Wiring mode	 Wire break detection in E terminal	 Wire break detection in C terminal	 Wire break detection in S terminal	 Wire break detection in C terminal and ES short circuit
Type	Wire break detection	Wire break detection	Short circuit detection	Short circuit detection
Wiring mode	 Wire break detection in S terminal and EC short circuit	 Error wiring	 Short circuit detection: all three wires short circuit	 Short circuit detection: EC short circuit

8.6 LE5342 8-Channel Thermistor Input Module

LE5342 is an expansion module of LE series PLC and can offer 8 input channels for thermistor signal.

8.6.1 Technical Specifications

Table 83 Technical Specifications

Input Specifications		Power Supply Specifications	
Number of inputs	8	Power source	Power supply via internal bus
Input type	Thermistor	Input voltage	5VDC±2%
NTC type	R is 10K under 25℃ and B is 3,976	Ripple wave	300mV
Input signal range	-30~130℃（300Ω~177KΩ）	Voltage changing rate	5V/10ms（10uF）

Input Specifications			Power Supply Specifications	
Accuracy	-30～80℃	1℃	Load capacity	400mA@5VDC
	80～105℃	2℃	Current Consumption	
			+24VDC (supplied by expansion bus)	0mA
	105～130℃	5℃	+5VDC (supplied by expansion bus)	130mA
			Isolation Withstand Voltage	
Temperature resolution	-30～0℃	0.5℃	Channel to system	500VAC for 1min, leaking current <5mA
	0～100℃	0.1℃	Channel to channel	No isolation
	100～130℃	0.5℃	Physical Specifications	
Temperature drift	±100ppm/℃		Dimensions W x H x D (mm)	70×97×89
Differential mode rejection ratio	>60dB@50Hz		Installation mode	DIN rail mounting or screw mounting
Sampling refresh time	1s (every 8 channels)		Weight	220g
Wire break detection	Supported		Operating temperature	-40℃～+70℃
Software filtering	Supported, filtering parameter: 1, 2, 4, 8, 16 and 32 can be chosen.		Storage temperature	-40℃～+70℃
Error reported time	Synchronization with data		Relative humidity	5%~95% (non-condensing)

8.6.2 Definition of Indicators

Table 84 Definition of Indicators

Power Supply PWR (Green)	Failure Status Indicator ERR (Red)	Description
ON	OFF	Module is in normal operation.
ON	ON	The module is in failed mode.
OFF	OFF	Power supply failure or module fault.

8.6.3 Signal Type and Scale Range of Input Channels

Table 85 Scale Range

Measure temperature signal range	Corresponding Digital Code Value Range
-30～130℃	-300～1300

- Corresponding relationship between temperature value and digital code value: digital code value= temperature value× 10.

8.6.4 Terminal Definition and Connection

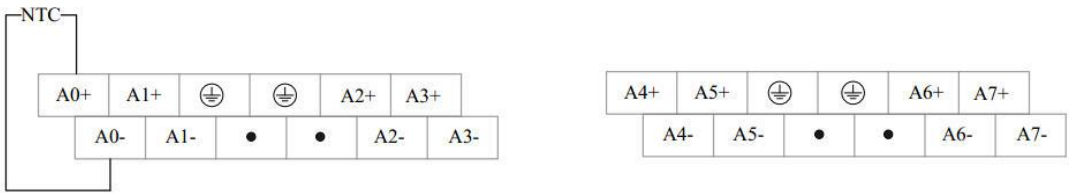


Figure 129 Terminals Schematic

- A0+ and A0- are input terminals of channel 0. Wiring of other channels follows the same rule.
- ● means grounding.
- • means the channel cannot be connected or connection is not available.

8.6.5 Software Configuration

In AT programming software, following parameters will be displayed on hardware configuration window when PLC is configured with LE5342.

1. Module parameter information

Number	Name	Value	Default value	Maximum	Minimum
1	NTC B value	3950	3950	4000	3000
2	NTC filter parameters	1	1		
3	NTC disconnection detection	Remain	Remain		

- NTC B value: Default value 3950.
- NTC filter parameters: Advisable values: 1, 2, 4, 8, 16 and 32.
- NTC disconnection detection:
  - Remain: Hold the last value.
  - Positive limit: value 1300.
  - Negative limit: value -300.

2. Channel parameter information

Number	Parameter name	Parameter value	Default value	Maximum	Minimum
1	Channel enable	Enable	Enable		

- Channel enable: Users can select based on actual needs. If the channel is used to measure signals, you will select Enable (default value), otherwise Prohibit.

Chapter 9 AO Module

9.1 LE5320 2 AO Module

LE5320 module is an expansion module of LE series PLC and can offer 2 output channels for analog signal.

9.1.1 Technical Specifications

Table 86 Technical Specifications

Output Specifications			Current consumption	
Number of outputs		2	+24VDC (supplied by expansion bus)	0mA
Output range	Voltage	0～10V	+24VDC (supplied by peripheral device)	Calculated by practical load
	Current	0～20mA/4～20mA	+5VDC (supplied by expansion bus)	90mA
Output accuracy		0.5% of full scale	Physical Specifications	
Resolution		12 bits	Dimensions W x H x D (mm)	47×97×89
Load impedance	Voltage	2000Ω（min.）	Weight	155g
	Current	600Ω（max.）	Installation mode	DIN rail mounting or screw mounting
Stable time (95% of new value)	Voltage	300us（R） 750us（1uF）	Operating temperature	0~60°C
	Current	600us （ 1mH ） 2ms （10mH）	Storage temperature	-40～70°C
Isolation mode		Optocoupler (field side to system)	Relative humidity	5%~95% (non-condensing)
Isolation withstand voltage		500VAC for 1 minute, leakage current <5mA		

9.1.2 Definition of Indicators

Table 87 Definition of Indicators

Type	Color	Status	Description
Power supply PWR	Green	ON	Power supply works in normal mode.
		OFF	Power is defective or not supplied. ④
Failure status indicator ERR	Red	ON	The module is in failed mode.
		OFF	No errors occurred or were detected.

Note ④: Generally, module components are damaged or module is powered off.

9.1.3 Signal Type and Scale Range of Output Channels

Table 88 Signal Type and Scale Range of Output Channels

Signal Type	Scale Range	Corresponding Digital Code Value Range	
		Decimal	Hexadecimal
Voltage signal	0～10V	0～65535	0x0000~0xFFFF
Current signal	0～20mA	0～65535	0x0000~0xFFFF
	4～20mA	0～65535	0x0000~0xFFFF

9.1.4 Terminal Definition and Connection

2-channel AO module LE5320 adopts two double-row pluggable terminals (3 x 2 and 3 x 2) and its definition of terminal and typical field wiring are shown in Figure 130.

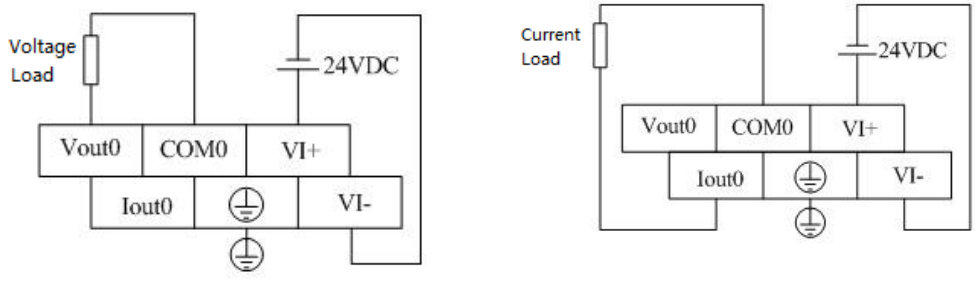


Figure 130 Upper Terminal Definition and Wiring (voltage load) Upper Terminal Definition and Wiring (current load)

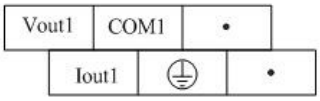


Figure 131 Lower Terminal

- Vout0 and Vout1 are output terminals for external voltage load.
- Iout0 and Iout1 are output terminals for external current load.
- COM0 and COM1 are corresponding common output terminals of voltage type and current type.
- ● means grounding.
- • means the channel cannot be connected or connection is not available.

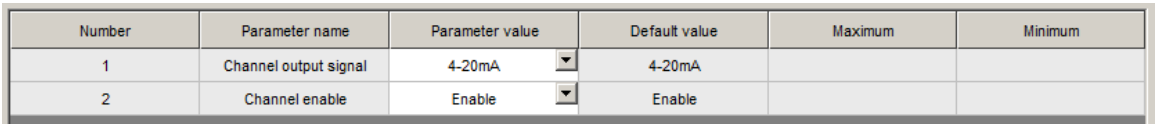
- Only select one type for each Output channel (voltage type or current type), and cannot use both at the same time.

Table 89 Wiring Terminal Instruction

Signs	Description	Signs	Description	Signs	Description
Vout0	Voltage output channel 1 positive	Iout0	Current output channel 1 positive	COM0	Voltage (current) output channel 1 negative
Vout1	Voltage output channel 2 positive	Iout1	Current output channel 2 positive	COM1	Voltage (current) output channel 2 negative
VI+	External supply 24VDC positive	VI-	External supply 24VDC negative	•	No connection

9.1.5 Software Configuration

In AT programming software, following parameters will be displayed on hardware configuration window when PLC is configured with LE5320.



Number	Parameter name	Parameter value	Default value	Maximum	Minimum
1	Channel output signal	4-20mA	4-20mA		
2	Channel enable	Enable	Enable		

- Users select type of output signal according to actual conditions (0～10V/0～20 mA /4～20mA). The default value is 4～20mA.
- Users can select based on actual needs. If the channel is used to measure signals, you will select Enable (default value), otherwise Prohibit.

9.2 LE5321 4 AO Module

LE5321 module is an expansion module of LE series PLC and can offer 4 output channels for analog signal.

9.2.1 Technical Specifications

Table 90 Technical Specifications

Output Characteristics			**Current Consumption**	
Number of outputs		4	+24VDC (supplied by expansion bus)	0mA
Output range	Voltage	0～10V	+24VDC (supplied by peripheral device)	Calculated by practical load
	Current	0～20mA /4～20mA	+5VDC (supplied by expansion bus)	45mA
Output accuracy		0.5% of full scale	Physical Characteristics	
Resolution		12 bits	Dimensions W x H x D (mm)	70×97×89
Load impedance	Voltage	2000Ω（min.）	Weight	215g
	Current	600Ω（max.）	Installation mode	DIN rail mounting or screw mounting
Stable time (95% of the new value)	Voltage	300us（R） 750us（1uF）	Operating temperature	0~60°C
	Current	600us（1mH） 2ms（10mH）	Storage temperature	-40～+70°C
Isolation mode		Optocoupler (field side to	Relative humidity	5%~95% (non-

Output Characteristics		Current Consumption	
	system)		condensing)
Isolation withstand voltage	500VAC for 1 minute, leakage current <5mA		

9.2.2 Definition of Indicators

Please refer to Chapter 9.1.2 Definition of Indicators.

9.2.3 Signal Type and Scale Range of Output Channels

Table 91 Signal Type and Range Capacity of Output Channel

Signal Type	Scale Range	Corresponding Digital Code Value Range	
		Decimal	Hexadecimal
Voltage signal	0～10V	0～65535	0x0000~0xFFFF
Current signal	0～20mA	0～65535	0x0000~0xFFFF
	4～20mA	0～65535	0x0000~0xFFFF

9.2.4 Terminal Definition and Connection

4-channel analog output module LE5321 adopts two double-row pluggable terminals (6 x 2 and 6 x 2) and its definition of terminal and typical field wiring are show below.

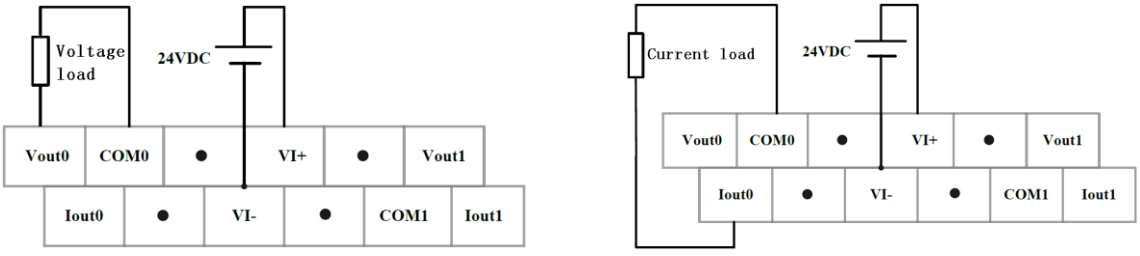


Figure 132 Upper Terminal (Voltage load) Upper Terminal (Current load)

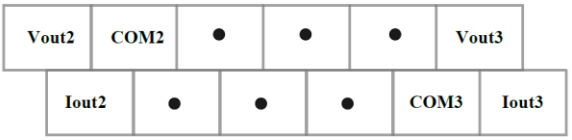


Figure 133 Lower Terminal Definition and Wiring

- Vout0, Vout1, Vout2 and Vout3 are output terminals for external voltage type load.
- Iout0, Iout1, Iout2 and Iout3 are output terminals for external current type load.
- COM0, COM1, COM2 and COM3 are corresponding output common terminals of voltage type and current type.
- ● means grounding.
- • means the channel cannot be connected or connection is not available.

- Only select one type for each Output channel (voltage type or current type), and cannot use both at the same time.

Table 92 Terminal Definition and Instructions

Signs	Description	Signs	Description	Signs	Description
Vout0	Voltage output channel 1 positive	Iout0	Current output channel 1 positive	COM0	Voltage (current) output channel 1 negative
Vout1	Voltage output channel 2 positive	Iout1	Current output channel 2 positive	COM1	Voltage (current) output channel 2 negative
Vout2	Voltage output channel 3 positive	Iout2	Current output channel 3 positive	COM2	Voltage (current) output channel 3 negative
Vout3	Voltage output channel 4 positive	Iout3	Current output channel 4 positive	COM3	Voltage (current) output channel 4 negative
VI+	External supply 24VDC positive	VI-	External supply 24VDC negative	•	No connection

9.2.5 Software Configuration

In AT programming software, following parameters will be displayed on hardware configuration window when PLC is configured with LE5321.

Number	Parameter name	Parameter value	Default value	Maximum	Minimum
1	Channel output signal	4-20mA	4-20mA		
2	Channel enable	Enable	Enable		

- Users select type of output signal according to actual conditions (0-10V/0-20mA /4-20mA). The default value is 4-20mA.
- Users can select based on actual needs. If the channel is used to measure signals, you will select Enable (default value), otherwise Prohibit.

Chapter 10 AI/AO Module

10.1 LE5330 4 AI/ 2 AO Module

LE5330 module is an expansion module of LE series PLC and can offer 4 input channels and 2 output channels for analog signal.

10.1.1 Technical Specifications

Table 93 Technical Specifications

Input Specifications			**Output Specifications**		
Number of inputs		4	Number of outputs		2
Input range	Voltage	0～10V	Output range	Voltage	0～10V
	Current	0～20mA /4～20mA		Current	0～20mA /4～20mA
Input accuracy		0.5% of full scale	Output accuracy		0.5% of full scale
Resolution		12 bits	Resolution		12 bits
Input impedance	Voltage type	>1MΩ	Load impedance	Voltage	2000Ω（min.）
	Current type	250Ω		Current	600Ω（max.）
Input type		Differential / single-ended	Stable time (95% of new value)	Voltage	300us（R）750us（1uF）
Withstand voltage		15V		Current	600us （ 1mH ） 2ms （10mH）
Withstand current		32mA	Isolation mode		Magnetic coupling (field side to system)
Common mode voltage		Signal voltage + common mode voltage <12V	Isolation withstand voltage		500VAC for 1 minute, leakage current <5mA
Common mode rejection ratio		>80dB	Current Consumption		
Differential mode rejection ratio		>60dB （ 50Hz and 60Hz）	+24VDC (supplied by expansion bus)		0mA
Step response time of analog input		1.5ms (up to 95%)	+24VDC±5% (supplied by peripheral device)		34mA

Input Specifications		Output Specifications	
Isolation mode	Magnetic coupling (field side to system)	+5VDC (supplied by expansion bus)	35mA
Isolation withstand voltage	500VAC for 1 minute, leakage current <5mA	Physical Specifications	
Weight	231g	Dimensions W x H x D (mm)	70×97×89
Operating temperature	-40℃～+70℃	Installation mode	DIN rail mounting or screw mounting
Storage temperature	-40℃～+70℃	Relative humidity	5%~95% (non-condensing)

10.1.2 Definition of Indicators

Table 94 Definition of Indicators

Type	Color	Status	Description
Power supply PWR	Green	ON	Power supply works in normal mode.
		OFF	Power is defective or not supplied. ⑤
Failure status indicator ERR	Red	ON	The module is in failed mode. see Note ⑤.
		OFF	No errors occurred or were detected.

Note ⑤: The module can't work in normal mode if ERR is on, a status which might be caused by circuit break of external supplied 24V or other circumstances.

- If ERR indicator in CPU module is ON, the diagnosis information is meaningless.

10.1.3 Signal Type and Scale Range of Input Channel

Table 95 Signal Type and Scale Range of Input Channel

Signal Type	Scale Range	Corresponding Digital Code Value Range	
		Decimal	Hexadecimal
Voltage	0～10V	0～65535	0x0000～0xFFFF
Current	0～20mA	0～65535	0x0000～0xFFFF
	4～20mA	0～65535	0x0000～0xFFFF

10.1.4 Signal Type and Scale Range of Output Channels

Table 96 Signal Type and Scale Range of Output Channels

Signal Type	Scale Range	Corresponding Digital Code Value Range	
		Decimal	Hexadecimal
Voltage Signal	0～10V	0～65535	0x0000～0xFFFF
Current Signal	0～20mA	0～65535	0x0000～0xFFFF
	4～20mA	0～65535	0x0000～0xFFFF

10.1.5 Terminal Definition and Connection

4-channel AI and 2-channel AO module LE5330 adopts two double-row pluggable terminals (6 x 2 and 6 x 2) and its definition of terminal and typical field wiring are shown in Figure 134.

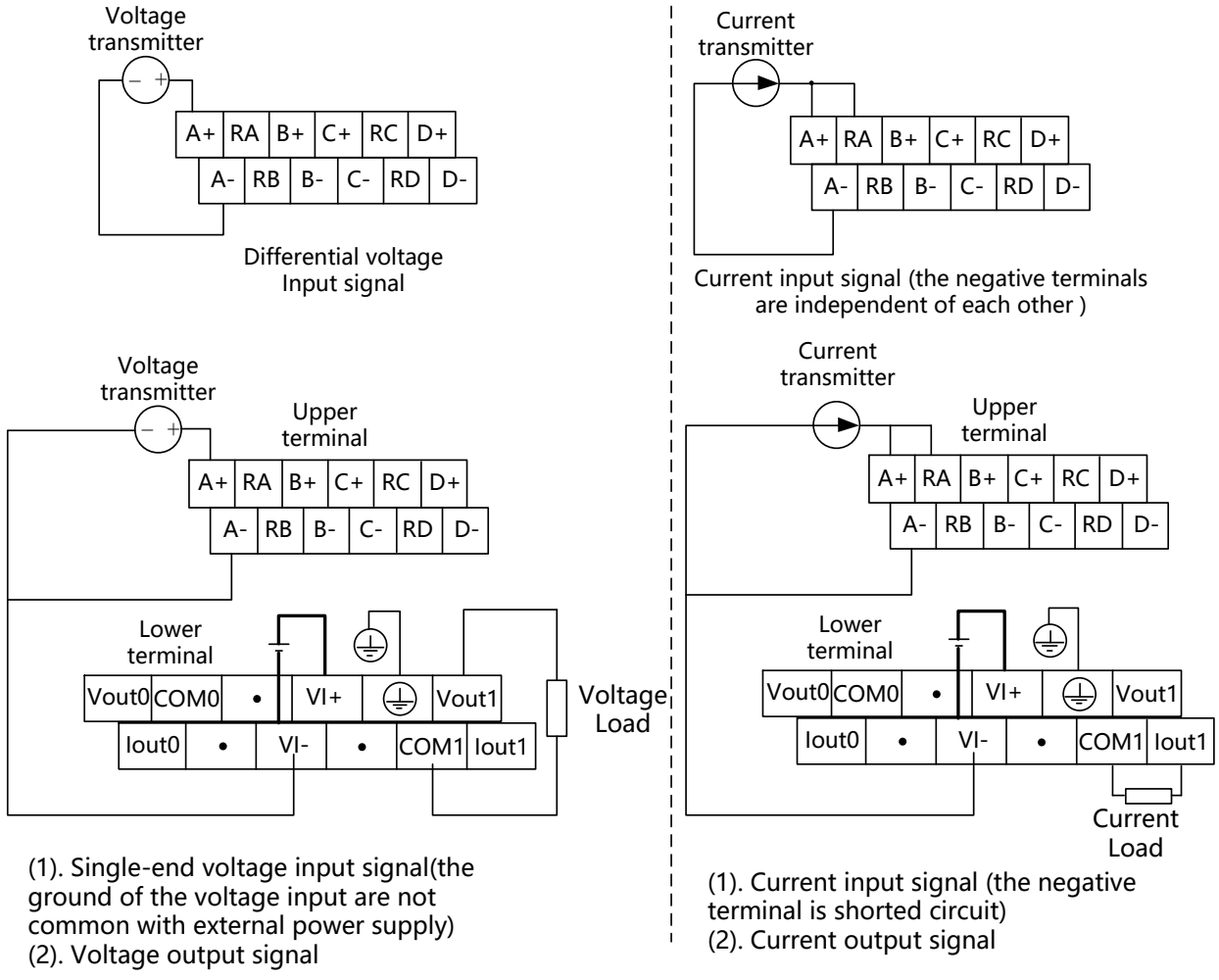


Figure 134 Terminal Definition and Field Wiring

Input channels of LE5330 module can accept differential or single-ended voltage signal, or current signal. All 4-channel analog input follows the same rule.

- Differential voltage signal: “A+” connects to positive pole of voltage transmitter, “A-” connects to negative pole of voltage transmitter.
- Single-end voltage signal:
  - When the input voltage signal of single-ended shares the same grounding with the external power supply, “A+” connects to positive pole of voltage transmitter, “A-” connects to negative pole of voltage transmitter.
  - When the input voltage signal of single-ended does not share the same grounding with the external power supply, “A+” connects to positive pole of voltage transmitter, “A-” and “VI-” connect to negative pole of voltage transmitter after short-circuit connection.
- Current Signal:

- ☐ When negative pole of multiple-circuit current signals are mutual independence, “RA” and “A+” connects to positive pole of current transmitter after short-circuit connection, “A-” connects to negative pole of current transmitter.
- ☐ When negative pole of multiple-circuit current signals are short-circuit connection, “RA” and “A+” connects to positive pole of current transmitter after short-circuit connection, “A-” and “VI-” connect to negative pole of current transmitter after short-circuit connection.

■ External power supply range : 24V±10%

- • ⏚ means grounding, can be connected to cabinet to offer electrostatic discharging channel for internal analog processing circuit.
- • · means the channel cannot be connected or connection is not available.

- Only select one type for each input/output channel (voltage type or current type), and cannot use both types at the same time.

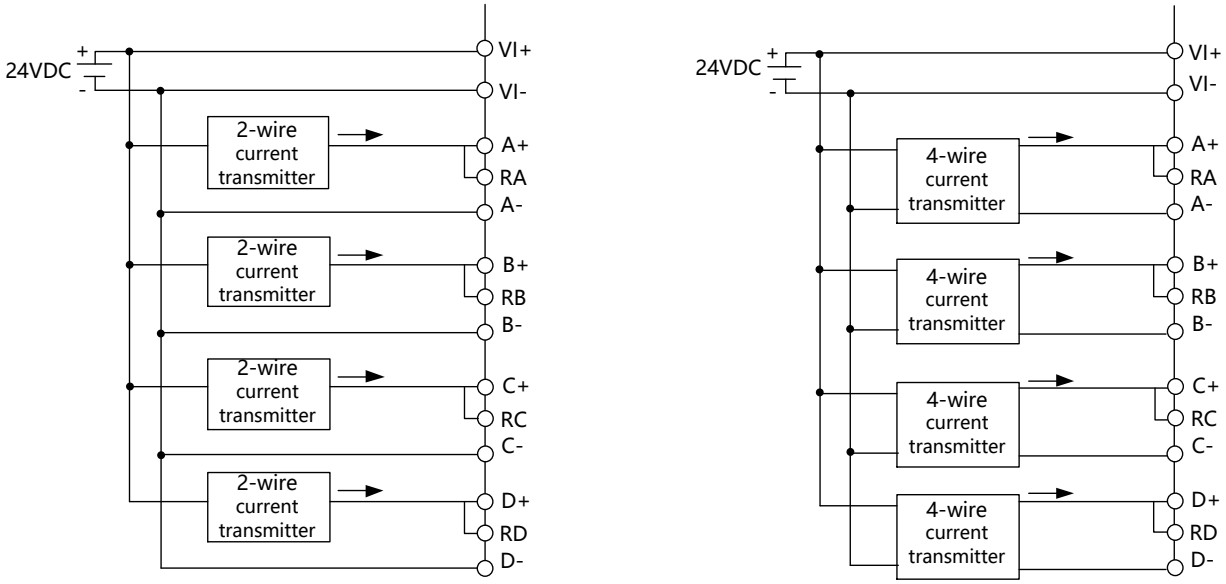


Figure 135 2-wire Type and 4-wire Type Wiring

10.1.6 Electrical Schematic Diagram

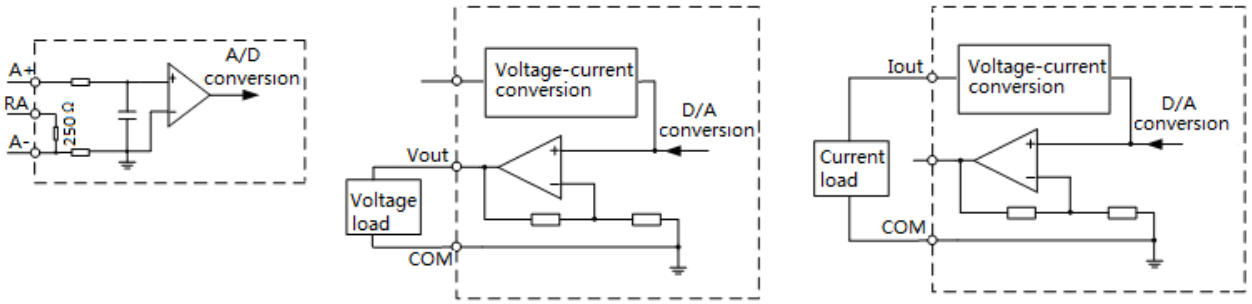


Figure 136 Input Channel Voltage Type Load Output Channel Current Type Load Output Channel

10.1.7 Software Configuration

In AT programming software, following parameters will be displayed on hardware configuration window when PLC is configured with LE5330.

1. Module Parameter Information

Number	Name	Value	Default value	Maximum	Minimum
1	Filter parameters	64	64		
2	Dead zone value	0	0	4080	0

- Module parameter:
  - ☐ Filtering parameter can be selected according to the needs.
  - ☐ Filtering parameter maximum value is 256, minimum value is 2, default value is 64. The greater the filtering parameter, the best the filtering effect.
  - ☐ This module does not support the dead zone function.

2. Channel parameter Information

Number	Parameter name	Parameter value	Default value	Maximum	Minimum
1	Channel input signal	4-20mA	4-20mA		
2	Channel enable	Enable	Enable		

- Channel parameters: Users select type of input signal according to actual conditions (0～10V / 0～20mA / 4～20mA). The default value is 4-20mA.
- Users can select based on actual needs. If the channel is used to measure signals, you will select Enable (default value), otherwise Prohibit.

Chapter 11 Communication Module

11.1 LE5400 Dual-ports (RS485/RS232) Communication Expansion Module

LE5400 is a dual-ports communication expansion module. It provides RS485 / RS232 communication ports, which are used as communication extension interface of controller. The module supports ModbusRTU master station protocol, ModbusRTU slave station protocol and free port communication protocol, you need to configure communication parameters in AutoThink.

11.1.1 Technical Parameters

Table 97 LE5400 Technical Specifications

Communication Specifications		**Power Supply Specifications**	
Number of communication ports	2(RS485/RS232)	Power source	Supplied by backplane
Type of communication interface	Wiring terminal	+24VDC (supplied by expansion bus)	0mA
Communication protocol	Modbus master/slave protocol, Free port protocol	+5VDC (supplied by expansion bus)	210mA
Baud rate (bps)	9600,19200,38400, 57600,115200	Isolation Withstand Voltage	
Communication data memory	I/Q/M	Isolation mode	Field side to system
User data memory	Max.256 bytes	Isolation withstand voltage	500VAC for 1 minute, leaking current <5mA
Physical Specifications		Environmental Conditions	
Dimensions W x H x D(mm)	47 mm×97 mm×89 mm	Operating temperature	-40℃～＋70℃
Weight	142 g	Storage temperature	-40℃～＋70℃
Mounting mode	DIN rail mounting or screw mounting	Operating relative humidity	5%~95%(non-condensing)
Wiring terminal	Pluggable	Storage relative humidity	5%~95%(non-condensing)

11.1.2 Interface Description

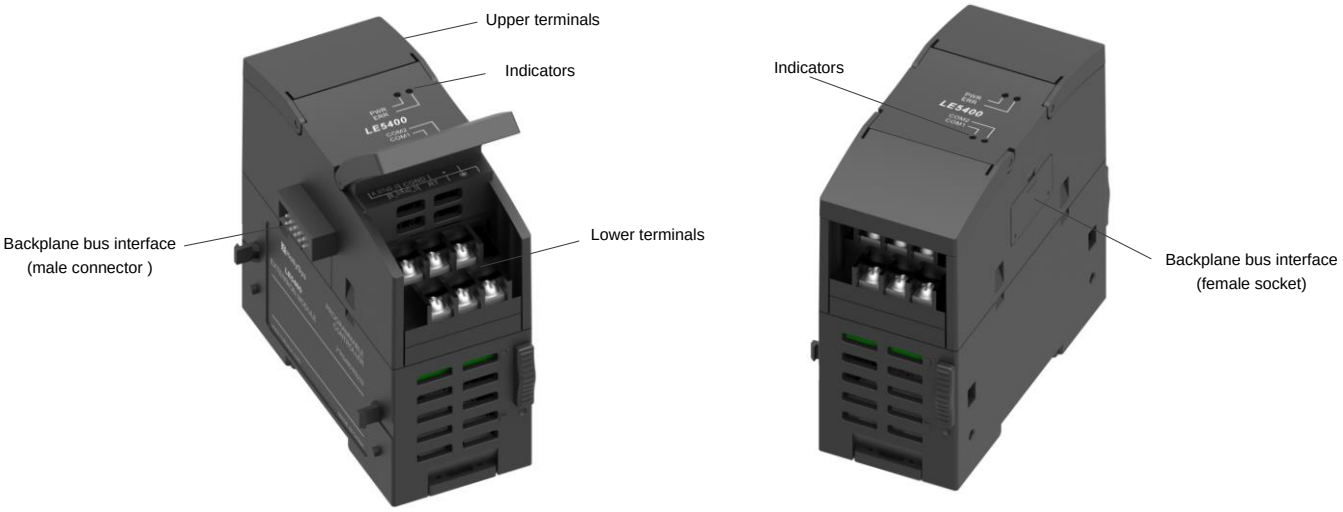


Figure 137 LE5400 Schematic

11.1.2.1 Terminal Wiring

The lower terminal is COM1 and the upper terminal is COM2. When configuring LE5400 in AutoThink, COM1 corresponds to the first COM port, and COM2 corresponds to the second COM port. Here, take COM1 port as an example to describe terminals.

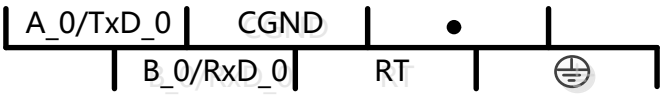


Figure 138 Schematic Diagram of Terminal Interface

Table 98 Terminal List

Terminal	Description
A_0/TxD_0	Positive(RS485+) / Send RS232 signal
B_0/RxD_0	Negative (RS485-) / Receive RS232 signal
CGND	Communication signal grounding
RT	Termination resistance enable terminal. When COM port is connected with RS485 signal, the termination resistance can be connected through short circuit of RT terminal and CGND terminal
•	Reserved terminal, unavailable

Terminal	Description
⏚	Protection grounding

11.1.2.2 Definition of Indicators

Type	Color	Status	Description
PWR(Running status indicator)	Green	ON	The module is working properly
		OFF	Module is abnormal
ERR(Fault indicator)	Red	ON	Abnormal communication or configuration（e.g. configuration error, module offline, memory error）
		OFF	No fault
COM1/COM2(Communication status indicator)	Green	Flashing	Has data communication
		OFF	No data communication

11.1.2.3 Backplane Bus Interface

Interface is used to connect the LE I/O modules. Module can be connected to each other through 10-pin female socket located at the right of itself and 10-pin male connector located at the left of itself. Latch the upper and lower side-lockers to secure the two modules next to each other.

11.1.3 Software Configuration

LE5400 module can be used as master station or slave station of Modbus RTU, and it is default as a slave station. When as a master station, you need to configure function block "MODBUS_MASTER (Modbus RTU Master Communication)". See HollySys Programmable Logic Controller PLC Instruction Manual for details. As a slave station, you need to configure following serial communication parameters and slave address, see following figures.

The LE5400 module also supports free port communication protocol. When communicating through free protocols, you need to configure function block COMM_SEND (Free Protocol Communication Data Transmission) / COMM_RECEIVE (Free Protocol Communication Data Reception). See HollySys Programmable Logic Controller PLC Instruction Manual for details.

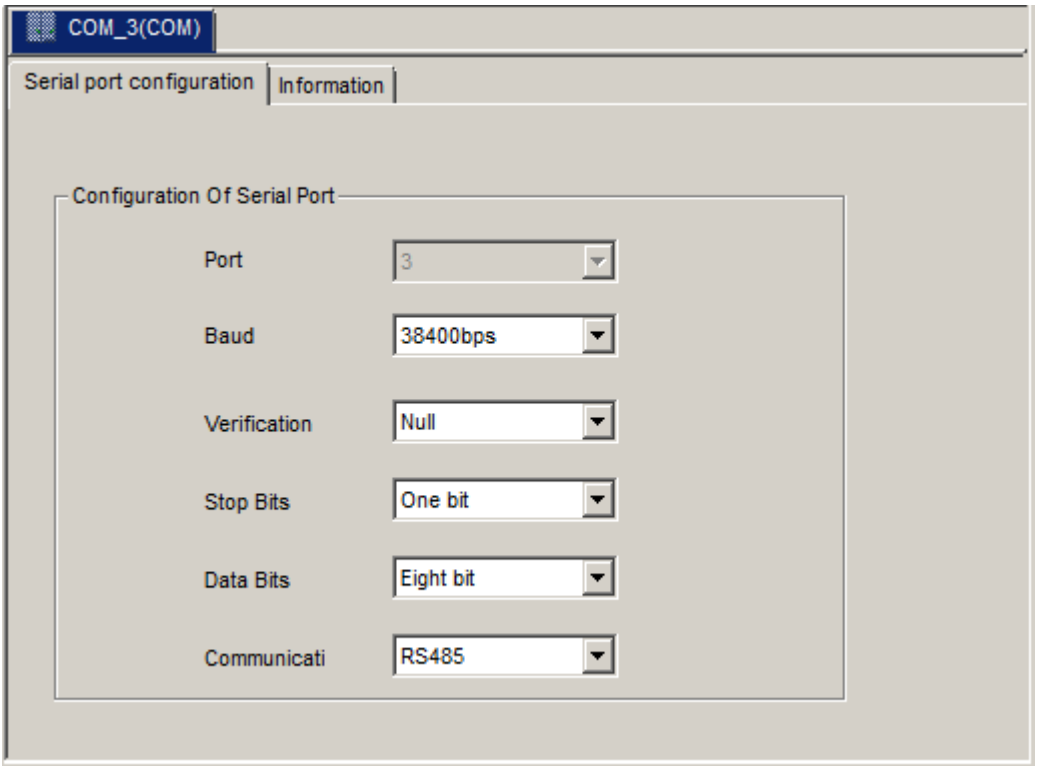


Figure 139 Slave Configuration Parameters

Table 99 Parameters Description

Slave configuration parameters		Description
Serial communication parameters	Port	When the LE5400 module is added, port number is automatically assigned by the software, starting from 3
	Baud	9600, 19200, 38400, 57600, 115200, unit: bps
	Verification	Null, Even check and Odd check
	Stop Bits	One bit/Two bit
	Data Bits	Seven bit /Eight bit (Modbus RTU does not support Seven bit, free port communication does not support Seven bit with null verification)
	Communication	RS485/RS232
Slave address		The slave address should be consistent with the configuration address of the connected slave device

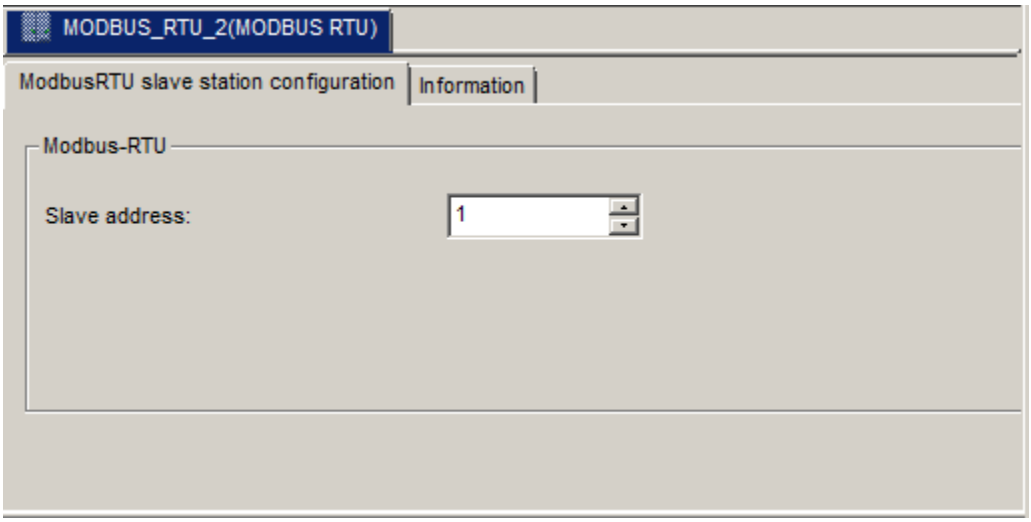


Figure 140 Configure Slave Address

The slave address should be consistent with the configuration address of the connected slave device

11.1.4 Use Instruction

- Only the LE5109 / LE5109L /LE5118/LE5119 controller supports the LE5400 module. Supported firmware version: LE5109-D01 and above version, LE5109L-E01 and above version.
- LE5109 can extend 6 LE5400 modules at most.
- LE5109L can extend 2 LE5400 modules at most.
- LE5118/LE5119 can extend 4 LE5400 modules at most.

11.2 LE5401 Profibus-DP Slave Station Module

- Latest GSD of LE5401 module is stored in the file 'local disk:\AutoThink\DP_GSD'. Please get and use.

LE5401 module is a communication expansion module of LE series PLC. It can connect LE PLC Profitbus DP network and work as a slave station.

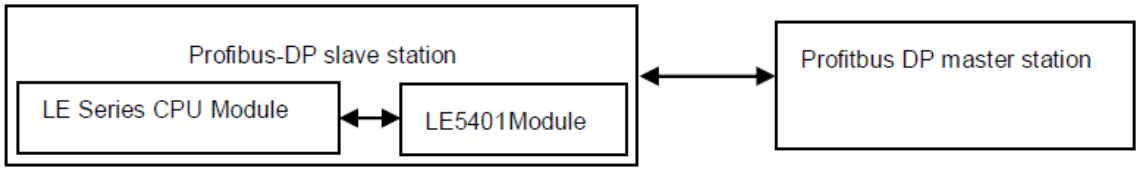


Figure 141 Profibus-DP Network

11.2.1 Technical Specifications

Table 100 Technical Specifications

Communication Specifications		Current Consumption	
Number of communication port	1	+24VDC (supplied by expansion bus)	0mA
Type of communication port	9-pin D female socket/terminal	+5VDC (supplied by expansion bus)	145mA
Size of input and output area	64 bytes each (max.)	Isolation Withstand Voltage	
Profibus-DP baud rate	9.6, 19.2, 45.45, 93.75, 187.5, 500kbps 1.5, 3, 6, 12 Mbps (self-adapting)	Isolation mode	Optical Isolation
		Isolation withstand voltage	500VAC for 1 minute. Leakage current <5mA
Station address	0～125 (set by DIP switch)	Environmental Conditions	
Maximum station number of each section	32	Operating temperature	-40℃～+70℃
Maximum station number of each network	126 (including master station)	Storage temperature	-40℃～+70℃
Physical Specifications		Relative humidity	5%~95% (non-condensing)
Dimensions W x H x D (mm)	70×97×89		
Weight	270g	Installation mode	DIN rail mounting or screw mounting

11.2.2 Definition of Indicators

Table 101 Definition of Indicators

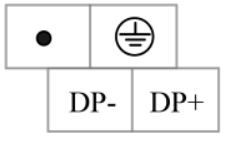
Type	Color	Status	Description
RUN	Green	ON	Module is in normal operation
		Flashing	Communication is under construction
		OFF	No power-on or module damaged
COM	Green	ON	Normal communication
		OFF	No communication
ERR	Red	ON	Communication error
		OFF	Normal communication

11.2.3 Relationship between Communication Rate and Cable Length

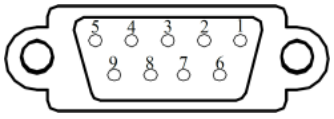
Table 102 Relationship between Communication Rate and Cable Length

Baud rates	Cable length
<93.75kbps	1,200m
187.5kbps	1,000m
500kbps	400m
1～1.5Mbps	200m
3～12Mbps	100m

11.2.4 Terminal Definition and Connection



LE 5401 Terminal



DB9 Female Socket

DIP Switch

Figure 142 Terminal Definition

- LE5401 provides two wiring modes: terminal and DB9 pin type connector. Choosing one wiring mode to connect with DP master station.
- 8-digit DIP switch are used to set up DP slave station address. Status of each DIP switch represents different binary value (ON indicates 0 and OFF indicates 1); decimal value corresponding to 8-digit binary value consisting of 8 DIP switch status is the DP slave station address of LE5401.
- • means the channel cannot be connected or connection is not available.
- • means grounding.

11.2.5 The Corresponding Relationship between DIP Switch State and Station Address

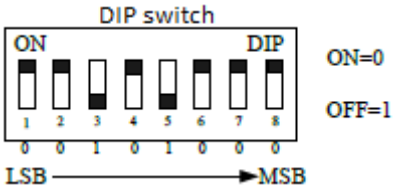


Figure 143 DIP Switch

- Description indicated: station address.
- Binary system: 00010100 Decimal system: 20.

- According to Profibus-DP protocol, the 8th bit is invalid, which must be switched to ON status.

11.2.6 Pin Definition of 9-pin D Type Interface

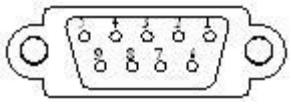


Figure 144 9-pin D Type Interface

Table 103 Definition of DB9 interface

Pin serial number	Signal Definition	Pin serial number	Signal Definition
1	shielding ground	6	+5V
2	—	7	—
3	Communication signal DP+	8	Communication signal DP-
4	—	9	—
5	GND	-	—

11.2.7 Software Configuration

In AT programming software, following parameters will be displayed on hardware configuration window when PLC is configured with LE5401.

Number	Name	Value	Default value	Maximum	Minimum
1	Master station write M zone offset add...	200	200	4095	0
2	Write bytes	2byte	2byte		
3	Master station read M zone offset addr...	200	200	4095	0
4	Read bytes	2byte	2byte		

- Default values of write in address and read address of master station are all %MB200. Communication data is accessible by direct definition of the address as ARRAY variable of %MB200. Users can define data group size according to actual demand (Figure 145 is only for example).

No.	Variable Name	Address	Variable Description	Variable Type	Initial Value	Power Fail Safeguard
0001	p1	%MB200		ARRAY[0..63] OF BYTE		FALSE

Figure 145 Array Definition

- When write in address of master station is the same with read address of master station, data coverage may be caused to write in and read of the same address. Generally, it is suggested to set different values for “offset address in master station write in M zone” and “offset address in master station read M zone”
- Write bytes: Set the byte length of write.
- Read bytes：Set the byte length of read.

11.3 LE5403 Ethernet Communication Module

LE5403 module is an expansion module of LE series PLC. LE series PLC can be connected to the network as a Modbus TCP slave station via LE5403 module.

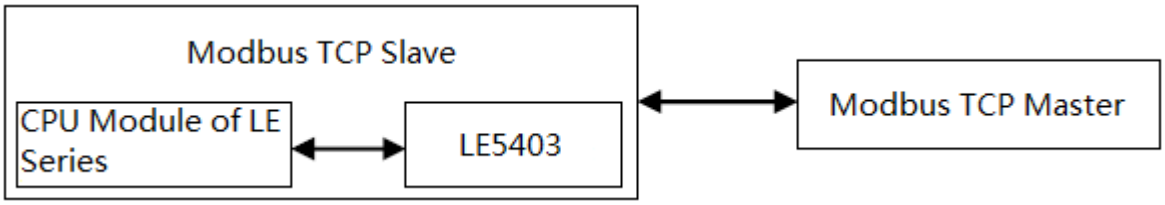


Figure 146 Modbus TCP Network

11.3.1 Technical Specifications

Table 104 Technical Specifications

Communication Specifications		**Power Supply Specifications**	
Number of communication ports	1	Power source	Supplied by backplane
Type of communication interface	RJ45	+24VDC (supplied by expansion bus)	0mA
		+5VDC (supplied by expansion bus)	210mA
Communication protocol	Modbus TCP, AT communication protocol	Isolation Withstand Voltage	
Baud rate	10/100Mbps, self-adaption	Isolation mode	Field side to system
Communication data memory	I/Q/M	Isolation withstand voltage	500VAC for 1 minute, leaking current <5mA

Communication Specifications		Power Supply Specifications	
User data memory	Max.48 bytes for write operation, max. 200 bytes for read operation		
Connection number (Ethernet devices connected at the same time)	3	Environmental Conditions	
Physical Specifications		Operating temperature	-40℃～+70℃
Dimensions W x H x D(mm)	70 x 97 x 89	Storage temperature	-40℃～+70℃
Weight	245g	Relative humidity	5%~95%(non-condensing)
Mounting mode	DIN rail mounting or screw mounting		

- A switch shall be added if length of 10Base T transmission distance exceeds 100m.
- Recommend you use industrial switch, please restart module after the fault has been cleared when a ring network fault occurs during use.

11.3.2 Definition of Indicators

Table 105 Definition of Indicators

Type	Color	Status	Description
PWR	Green	ON	Power supply works in normal mode.
		OFF	Power is defective or not supplied.
LINK	Green	ON	Ethernet connection has been established.
		OFF	Ethernet connection is not established.
RX/TX	Green	Flashing	Data sending or receiving is on-going.
		OFF	No data sending or receiving.
ERR	Red	ON	Communication error or incorrect configuration.
		OFF	No errors occurred or were detected.

11.3.3 Terminal Definition and Connection

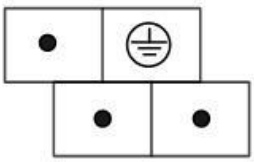


Figure 147 LE5403 Terminal

Figure 148 RJ45 Port

- ▪ means the channel cannot be connected or connection is not available.
- ● means grounding.
- RJ45 port is used to connect Ethernet cable.

11.3.4 Software Configuration

The LE5403 module can be configured as a Modbus TCP slave. In the communication, you need to add the LE5403 module in the Autothink configuration software, and set the LE5403 IP address, subnet mask, gateway and other communication parameters.

For example, in Figure 149, set the IP address of the LE5403 to 172.21.27.20, the subnet mask to 255.255.255.0, and the gateway to 172.21.27.254.

After setting, set the IP address of the master station to the same network segment (or the same VPN) as the LE5403 and set the correct subnet mask and gateway. Then LE controller as the MODBUS TCP slave communicates with the master station (Such as the host computer configuration software, touch screen, etc.).

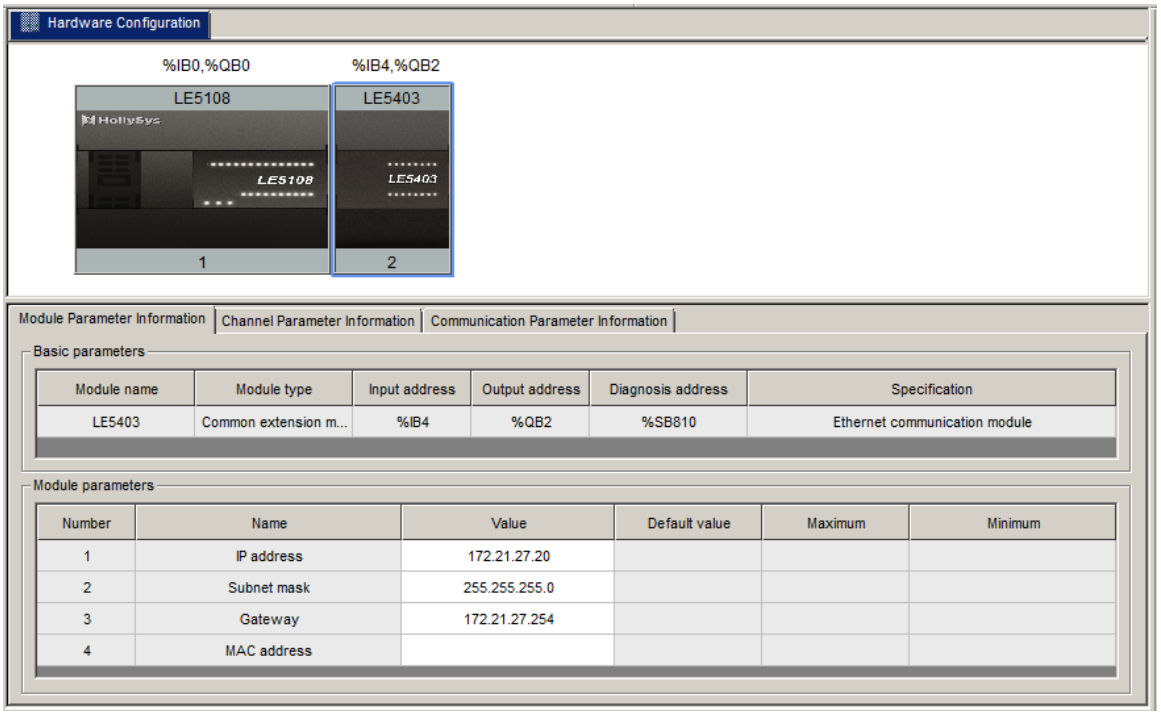


Figure 149 LE5403 Configuration

- IP address and subnet mask shall be configured.
- Gateway shall be configured if both communication sides are not in the same segment.
- There is no need to configure MAC address.

- When the LE5403 is used as a Modbus TCP slave, the master station communication parameter Response timeout is recommended for 1.5s.
- The maximum links are three at the same time. If the links trying to connect are more than three links, the system will disconnect one of the three connected links. At the same time, if the disconnected link attempts to reconnect, the other links will be unstable and cause packet loss.
- The reading analog or digital must not exceed 200Bytes one time. The writing analog or digital must not exceed 48 Bytes one time. At the same time, operation length must not exceed data length of I, Q and M areas in matching CPU.
- If Modbus master does no inquiry frame within ten seconds, LE5403 will close TCP connection initiatively.
- The module does not support high-volume ARP access or is used in a network storm environment.
- It is recommended that the module be configured at the last position of the current configured IO module.

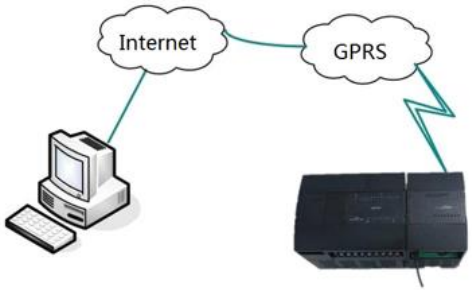
11.3.5 Modbus TCP Functional Description

Table 106 Functional Code Description

Function Code	Name	Function
01	Read on-off output status	Acquire current status of a group of on-off output
02	Read on-off input status	Acquire current status of a group of on-off input
03	Read analog output status	Acquire current status of a group of analog output
04	Read analog input status	Acquire current –status of a group of analog input
05	Force one-way on-off output	Force to set a value for some on-off output
06	Force one-way analog output	Force to set a value for some analog output
15	Force multi-way on-off output	Force to set values for several on-off output
16	Force multi-way analog output	Force to set values for several analog output

11.4 LE5404 GPRS Communication Module

LE5404 is an expansion module of LE series PLC to establish the connection with Internet through GPRS wireless network to exchange remote data.



Operating frequency：GSM850/EGSM900/GSM1800

Figure 150 GPRS Wireless Network

11.4.1 Technical Specifications

Table 107 Technical Specifications

Communication Specification		**Power Supply Specifications**	
Server configuration	IP address and DNS	Power source	Supplied by peripheral device
Type of communication port	Wireless communication		Supplied by expansion bus
Communication pattern	Transparent communication from center to multiple points	Permissible voltage range	7.5 ～ 28.8VDC (supplied by peripheral device)
Communication protocol	Modbus TCP		5VDC (supplied by expansion bus)
Communication data memory	I/Q/M	Current Consumption	
User data memory	50 bytes for write operation and 200 bytes for read operation	+24VDC (supplied by expansion bus)	0 mA
		+24VDC (supplied by peripheral device)	35 mA
		+5VDC (supplied by expansion bus)	30 mA
Physical Specifications		Environment Conditions	

Communication Specification		Power Supply Specifications	
Dimensions W x H x D (mm)	70×97×89	Operating temperature	-40℃～+70℃
Weight	215g	Storage temperature	-40℃～+70℃
Installation mode	DIN rail mounting or screw mounting	Relative humidity	5%~95% (non-condensing)

11.4.2 Definition of Indicators

Table 108 Definition of Indicators

Type	Color	Status	Description
RUN	Green	Flashing slowly	Module is in normal operation
COM	Green	Flashing slowly	GPRS network is normal
LINK	Green	Flashing slowly	Connection of module to server is normal
FLASH	Green	Flashing slowly	Module status indication
RX	Green	Flashing	Receive data package from server
TX	Green	Flashing	Send data package to server

- Slow flash frequency is 0.5Hz.
- Indicator flashing, holding time that LED indicator is ON status for 50ms.
- LED indicators are ON in order FLASH, RUN, COM, LINK after power on.
- COM is ON and LINK is ON: GPRS network is abnormal.
- COM slowly flashes, and LINK is ON: connection of LE5404 module with server is broken.

11.4.3 Terminal Definition and Connection

The input terminals use fence terminal blocks, with a double row terminal (2 * 2), the input terminals are defined as shown in Figure 151.

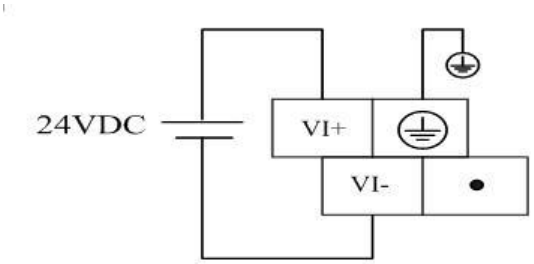


Figure 151 Terminal Wiring

- VI+ and VI- are the terminals of external power supply.
- • means the channel cannot be connected or connection is not available.
- ● means grounding.

11.4.4 Software Configuration

In AT programming software, following parameters will be displayed on hardware configuration window when PLC is configured with LE5404.

Module parameters

Number	Name	Value	Default value	Maximum	Minimum
1	Server IP address				
2	Communication port	0	0	65535	0
3	Device ID				

- Server IP address: Remote monitoring center computer.
- Communication port: Customized setting to avoid using of normal Ethernet communication terminal (e.g. 80).
- Device ID: User need to set up the 11-digital device ID during software configuration and the device ID is compatible cell-phone SIM card. Either Cell-phone number setting or customized setting is allowed.

- During construction engineering, AT related parameters cannot be blank. Ensure the device ID number is 11 digits.

11.5 LE5405 Gateway Communication Module

LE5405 is the gateway module based on Modbus-TCP and offers a channel for the communication between MC series motion controllers and LE series expansion I/O modules.

11.5.1 Technical Specifications

Table 109 LE5405 Technical Specifications

Power Supply Specifications		
Module power supply	Operating voltage	20.4～28.8 VDC
	Rated voltage	24 VDC
	Withstand voltage	19.2～30 VDC
	Consumed power	< 3W (the function of the module itself)
	Anti-reverse connection	Supported, max. 30 VDC
Module output power supply (backplane bus interface)	Load capacity	3 A@5 VDC (to provide via bus interface of extended backplane)
		2.1 A@ (supply voltage -1V) (to provide via bus interface of extended backplane)
Physical interface		
Ethernet	Quantity of communication port	1
	Level standard	IEEE 802.3
	Interface type	Standard RJ45
	Baud rates	10/100 Mbps, self-adapting
	Communication protocol	Modbus-TCP Salve
Physical Specifications		
Installation mode	DIN rail mounting or screw mounting	
Terminal	Pluggable	
Dimensions W×H×D (mm)	78 mm ×97 mm ×90 mm	
Weight	300 g	
Environmental Conditions		
Operating temperature	-40℃～+70℃	
Storage temperature	-40℃～+70℃	

Power Supply Specifications	
Operating humidity	5%~95% (non-condensing)
Working altitude	≤3000 m
Reliability	
Hot swapping (expansion LE I/O)	Not supported
Fault isolation	None
Insulation resistance	The resistance between two isolated terminals: Under general test condition, ≥5MΩ Under heat humid condition, ≥1MΩ

11.5.2 Interface Description

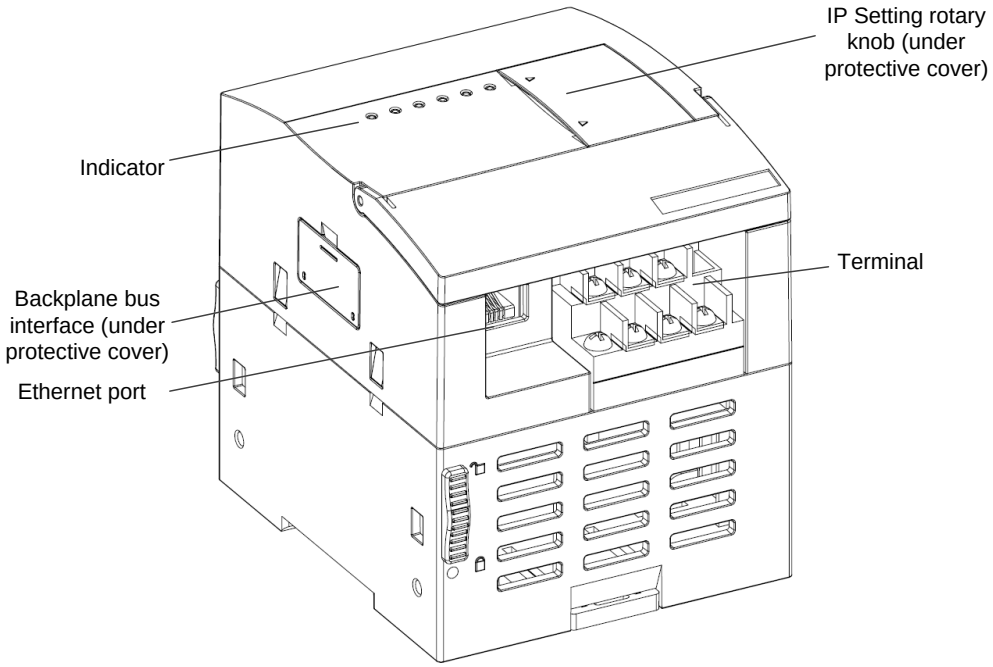


Figure 152 LE5405 Schematic

11.5.2.1 Wiring Terminals

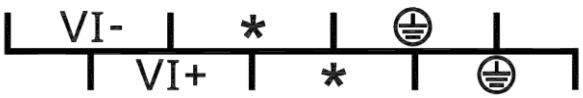


Figure 153 LE5405 Schematic

Table 110 Power Interface List

Terminal	Description
VI+	Positive terminal of power supply input
VI-	Negative terminal of power supply input
⏚	Grounding
⏚	Grounding
*	Unavailable

11.5.2.2 Definition of Indicators

There are 6 indicators in LE5405 module, of which RUN/STOP and IP ADDR are double-color indicators. Description as follows:

Table 111 Definition of Indicators

Type	Color	Status	Description
PWR (Power supply indicator)	Yellow	ON	Power supply works in normal mode.
		OFF	Power is defective or not supplied.
RUN/STOP (Module is under operation/ Stop indicator)	Yellow and green	ON green	Module is operating with load (with configuration files).
		ON yellow	Module is operating without load (without configuration files).
ERR (Abnormal operation indicator)	Red	ON	A certain fault or some faults occurred which can be diagnosed. (such as wrong configuration, module off-line and memory error).
		OFF	No error occurred.
LINK (Ethernet LINK indicator)	Green	ON	Physical layer connection of Ethernet was established.
		OFF	No physical layer connection of Ethernet was established.
ACT (Ethernet data exchange indicator)	Yellow	Flashing	Communication package is under delivery or receiving.
		OFF	No data.
IP ADDR (Ethernet IP address	Yellow and green	OFF	Last byte of IP value is greater than 1 and less than 99.

Type	Color	Status	Description
indicator)		ON green	Last byte of IP value is equal or greater than 100 but less than 199.
		ON yellow	Last byte of IP value is equal or greater than 200 but less than 255.
		Flashing yellow	Invalid IP.
		Flashing green	IP reset.

11.5.2.3 Ethernet Interface

It is used to connect the controller and PC.

11.5.2.4 Backplane Bus Interface

Interface is used to connect the LE I/O module. LE5405 can connect the previous module through the male connector, and connect the next module through the female socket.

11.5.2.5 IP Setting Knob

Open the protection cover, through the X1, X10 knob, you can set a single digit and ten digit in the fourth field of LE5405 IP address.

- X1: single digit, in the range 0 to 9
- X10: ten digit, in the range of 0 to 9

- Default IP is 192.168.0.0(X1 and X10 default value is 0). IP address setting refers to Assistant Tool in Chapter 5 in *AutoThink V3.1 User Manual_Project Configuration.*

11.5.3 Terminal Wiring

When I / O in the MC controller does not meet the field application, it is extended via LE5405 to connect LE series I / O module.

LE5405 is connected with MC series controller via switch and connected with LE expansion I/O module through backplane bus.

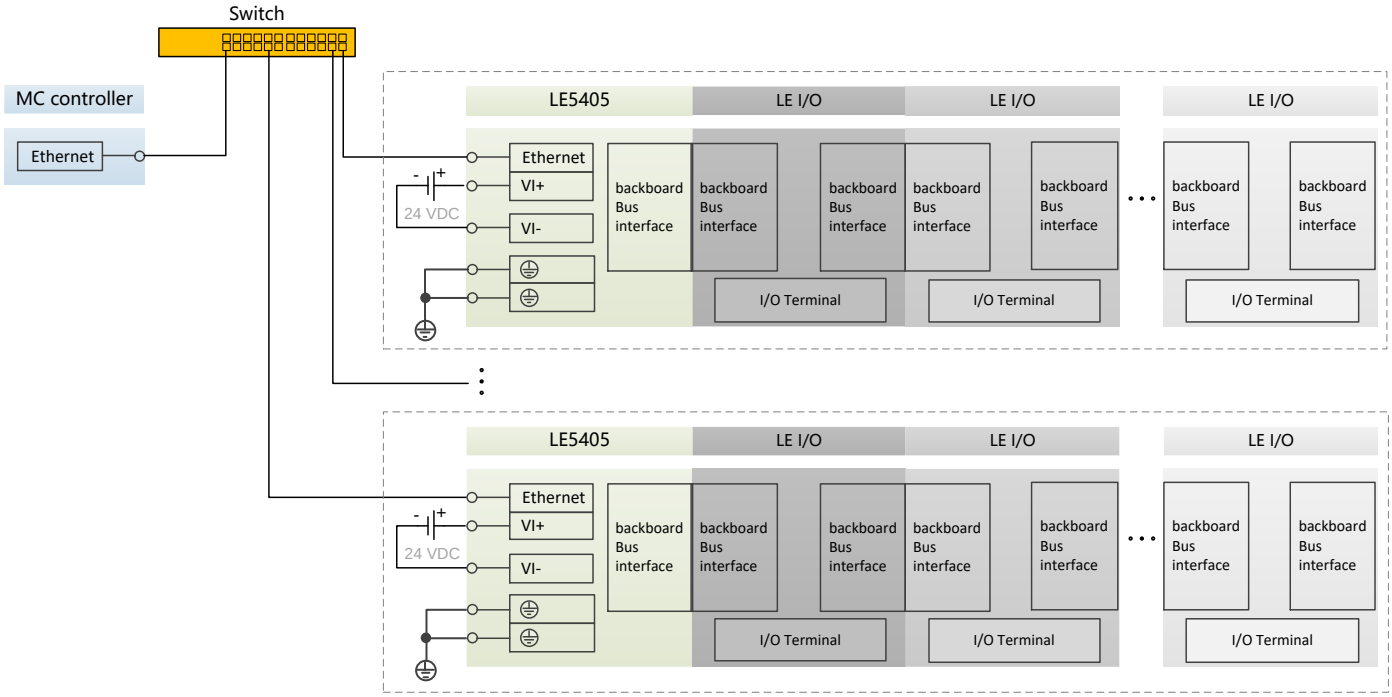


Figure 154 Wiring Schematic

- Ethernet cable: Shielded twisted pair than category 5 with length of ⩽50 m is recommended.
- Ethernet switch: Industrial Ethernet switch of strong anti-jamming capacity is recommended. The switch should be well grounded.
- It is not allowed to plug LE I/O module when module is powered.

11.5.4 Use Instruction

- ☐ Number of LE5405 supported by single MC series controller cannot be more than 10.
- ☐ Maximum number of LE expansion module supported by single LE5405 can't be more than 8.
- ☐ Total I/O points of LE expansion modules through LE5405 can't be more than 200.
- ☐ Follow the above principles, combined with LE5405 backboard bus interface to output LE I / O according to power load capacity configuration requirements.
- ☐ It is not allowed to connect 2 or more MC series controllers to one LE5405.

- After the AT is compiled, if the LE5405 configuration is unsuccessful within 3 minutes, it will not be configured again (need to be recompiled again for configuration).

11.5.5 Power Calculation

Extended LE I / O quantity of MC series motion controller is decided directly by the 5 VDC and 24 VDC output power consumption of LE5405, the specific formula is as follows:

N1 * DI / DO module + N2 * AI module + N3 * AO module (N1, N2, N3 is the number of LE I / O modules of each type)

Chapter 12 Other Modules

12.1 LEA5820 Data Memory Card

LEA5820 is PLC's data memory card of LE series which is used to store the user program and the recipe data. It can be used by socketing the USB-A type plug with CPU module.

12.1.1 Write Memory Card Function

Insert LEA5820 into CPU memory card slot and connect the computer with the LE programming cable.

Operation via menu [Online] – [Write Storage Card] in AutoThink software, then the AT project is written in memory card.

12.1.2 The Function of Controller to Upload Project From Memory Card

CPU module slide switch is in STOP state, please insert LEA5820 into CPU memory card slot and make sure the installation is well. Now, PLC is waiting for uploading program from the memory card. The running indicator is flashing slowly (1Hz).

Setting the CPU module via the STOP-RUN-STOP state, at this moment, PLC is uploading the user's program from the memory card. The running indicator is flashing (4Hz).

After uploading, the state of the running indicator is consistent with the actual state of slide switch.

- After removing memory card, the user's project program can operate normally.

12.1.3 LEA5820 Definition of indicators

Table 112 Definition Of Indicator

Type	Color	Status	Description
Power supply	Green	ON	Power supply works in normal mode
		OFF	Power is defective or not supplied
State indicator	Green	ON or Flashing	Data transmission is normal
		OFF	Memory card is in failed mode

12.2 LEX5810 Programming Cable, 3m

LEX5810 is a programming cable that connects RS485 round interface of PLC to USB port of computers. It can realize application program download and real-time communication between PLC and PC monitoring software.

RS485 round interface definition see Chapter 3.1.6 485 Downloading Interface.

12.2.1 Technical Specifications

Table 113 Technical Specifications

General Characteristics	
Shell	Plastic package
Cable Specifications	
Material	Copper wire
Number of cores	3
Diameter of core	7 strands for every core, diameter of each strand ≥ 0.12mm
Length of cable	3m
Communication Characteristics	
Operating system	Windows 2000, Windows XP, Windows Server 2003, Windows Vista, Windows Server 2008, Windows 7, Windows Server 2008 R2.
USB physical interface protocol	USB2.0

Port on computer side	USB port, hot swapping supported
Physical interface on PLC side	PS/2
Electrical standard on PLC side	Comply with EIA/TIA RS-485 standard; RS485 is half-duplex
Signal on PLC side	A, B, GND, PGND
Communication rate of serial port	38,400bps
Power source	Power from USB port of computers
Isolated or not	No
Support serial data format	8-bit data, odd/even/no parity-bit, 1 stop-bit
Environmental Conditions	
Operating temperature	-40℃～＋70℃
Relative humidity of operating environment	5%~95% (non-condensing)
Storage temperature	-40℃~＋70°C
Relative humidity of storage environment	5%~95% (non-condensing)

12.3 LEX5812 Expansion Cable, 2m

LEX5812 as extension cable of the new generation micro PLC system, that is used to inter-connection and data transmission between LE modules.

Figure 155 Cable Schematic

12.3.1 Technical Specifications

Table 114 Technical Specifications

Cable Specifications	
Material	Copper wire
Number of cores	10
Core diameter	7 shares in each core , diameter of each share≥ 0.12mm
Cable length	2m
Cable Interface Specifications	
Male connector	2.54 DuPont + pin, pin length: 6.0mm
Female socket	2.54 DuPont 2*5P, socket depth: 8.0mm
Pin material	Phosphor bronze
Pluggable times	1000 times
Cable resistance	≤0.5Ω
Insertion force	19.6N
Environment Condition	
Operating temperature	-40℃～＋70℃

Cable Specifications	
Relative humidity of operating environment	5%~95% (non-condensing)
Storage temperature	-40℃~＋70°C
Relative humidity of storage environment	5%~95% (non-condensing)

12.4 LEX5813 RS485 round Interface to Two wires RS485 Communication Cable, 3m

LEX5813 as bus communication cable for RS485 round interface to two wires RS485, that is used to communication between CPU module and the user device.

Figure 156 Cable Schematic

Refer to the Chapter 3.1.6 485 Downloading Interface

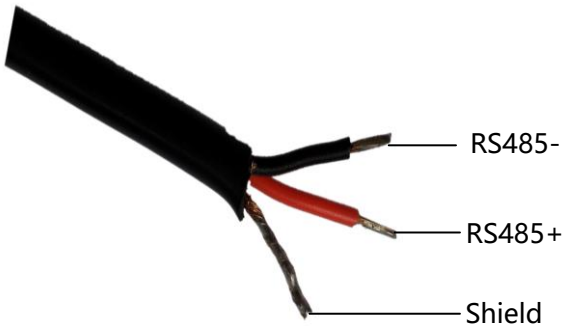


Figure 157 Wire Schematic

12.4.1 Technical Specifications

Table 115 Technical Specifications

Cable Specifications	
Material	Copper wire
Number of cores	3 (Contains shields)
Core diameter	7 shares in each core, diameter of each share≥ 0.12mm
Cable length	3±0.1m
Electrical Specifications	
Rated value	50V, 1.0A
Contact resistance	≤0.03Ω
Baud rates (bps)	≥115200
Withstand voltage	500VAC
Insulation resistance	≥100MΩ(250V)
Cable plug	Mini-DIN8 and three core wires
Shield	The shield must be connected to Mini-DIN8 metal shell
Environment Specifications	
Operating temperature	-40℃～+70℃
Relative humidity of operating environment	5%~95% (non-condensing)
Storage temperature	-40℃~+70°C
Relative humidity of storage environment	5%~95% (non-condensing)

12.5 LEX5817 Communication Cable between LE CPU Module and HT8000, 3m

LEX5817 is connection cable between programming interface of LE PLC module and the HT series touch screen, providing Interconnection and data transmission between the CPU module and the touch screen.

Figure 158 Cable Schematic

Table 116 Definition of Mini-DIN8

Pin No.	Definition	Pin No.	Definition
1	NC	2	NC
3	NC	4	NC
5	RS485+	6	RS485-
7	GND	8	GND
Note	5, 6 use twisted pair		

Table 117 Definition of DB9 Pins

Pin No.	Definition	Pin No.	Definition
1	NC	6	NC
2	NC	7	RS485+

Pin No.	Definition	Pin No.	Definition
3	NC	8	RS485-
4	NC	9	NC
5	NC		

12.5.1 Technical Specifications

Table 118 Technical Specifications

General Specifications	
Shell	Plastic seal
Weight	38g±2g
communication Wire	
Material	Copper wire
Number of cores	2
Core diameter	7 shares in each core, diameter of each share≥ 0.12mm
Cable length	3±0.1m
Electrical Specifications	
Rated value	50V@1.0A
Contact resistance	≤0.03Ω
Baud rates (bps)	≥100K
Withstand voltage	500VAC
Insulation resistance	≥100MΩ(250V)
Cable plug	Mini-DIN8and DB9 female
Shield	The shield must be connected to metal shell of DB9 and Mini-DIN8
Environment Specifications	
Operating temperature	-40℃～+70℃
Relative humidity of operating environment	5%~95% (non-condensing)
Storage temperature	-40℃~+70°C
Relative humidity of storage environment	5%~95% (non-condensing)

Chapter 13 Installation and Removal

13.1 Installation and Removal

13.1.1 Installation Environment

LE series PLC adopts the natural convection heat dissipation mode. A 25mm wide heat dissipation zone must be reserved at the top and bottom of the device to ensure free air flow.

Figure 159 Recommended Heat Dissipation Mode

LE series PLC can be easily installed on a standard DIN rail or a panel. DIN rail clips are provided to secure the device on the DIN rail, as shown in Figure 160. The clips can also be snapped into an extended position to provide a screw mounting position for panel-mounting, as shown in Figure 161.

Figure 160 Panel Installation

Figure 161 DIN Rail Installation

Before you install or remove any electrical device, please ensure that the power supply to that device has been turned off. Meanwhile, make sure that the power supply to any related devices has been turned off as well.

13.1.2 Installation and Removal of CPU module

The CPU module can be installed on a DIN rail or a panel.

- Panel installation

  To install a CPU module on a panel, please follow below steps:

  1： Locate, drill and tap the mounting holes (M3*8) according to the dimensions shown in installation size diagram.

  2： Pull out the DIN rail clips on the module. Make sure that the DIN rail clips are pushed to the extended position.

  3： Use M3 screws to fix the module on the panel.

- DIN rail installation

Figure 162 DIN Rail Clips in a Locked Position

Figure 163　DIN Rail Clips in an Open Position

To install a CPU module onto a DIN rail, please follow below steps:

（a）

（b）

Figure 164　DIN Rail Installation Diagram

1： Install a DIN rail.

2： Hang the CPU module on the DIN rail.

3： Pull out the DIN rail clip at the bottom of the CPU module to make it mounted on the DIN rail.

4： Rotate the module down to the DIN rail.

5： Snap the clip closed.

To remove a CPU module from a DIN rail, follow below steps:

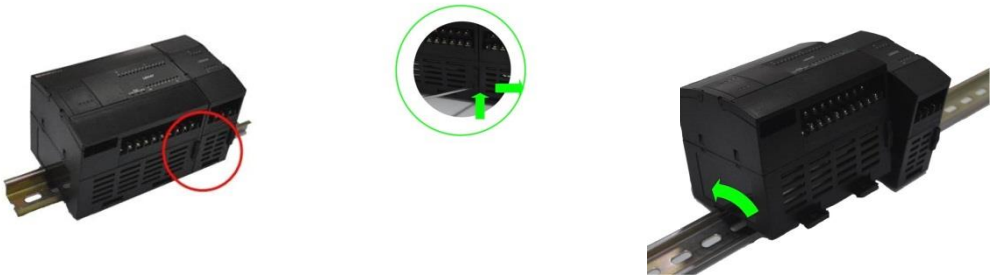


Figure 165　Diagram of Opening the Bottom Side Locker

1： Remove power from the CPU module and any connected I/O modules.

2： Disconnect all the wiring and cabling that is attached to the CPU. The CPU and most expansion modules have removable connectors to make this job easier.

3： Unscrew the mounting screws or snap open the DIN clip.

4： If you have expansion modules connected, slide the CPU module to the left to disengage it from the expansion module connector. Note: unscrewing or unsnapping the DIN clips of the expansion modules can make it easier to disengage the CPU.

5： Remove the CPU.

13.1.3 Installation and Removal of Expansion Modules

Installation and removal steps:

Install expansion modules after installing a CPU module.

Figure 166　Removing a Connector Cover

- Remove the connector cover on the right side of the CPU module.
- Insert a screwdriver into the slot above the cover.
- Gently pry the cover out at its top and remove the cover. Keep the cover for reuse.

Step 1. Installation

Install an expansion module close to a CPU module.

（a）

（b）

Figure 167　Installing an Expansion Module

1： Hang an expansion module on a DIN rail.

2： Pull out the bottom DIN rail clips to allow the expansion module to fit the DIN rail.

3： Turn the expansion module next to the CPU downward to make it in place and push the clips at the bottom to secure the expansion module to the DIN rail.

4： Ensure that the side lockers are in an upward position and push the expansion module to the left until the bus connector meets the connector on the right side of the CPU module.

Set the top/bottom side locker:

1： Place a screwdriver at the top of the top/bottom side locker.

2： Press it downward to make the top/bottom side locker move in a locked position. In this way, the top and bottom side lockers establish a mechanical connection for the expansion module. To install another expansion module next to the expansion module, please repeat the above steps.

Step 2. Removal

Any expansion module can be removed without removing the CPU or when other expansion modules are in original positions. If you want to remove an expansion module, please turn off the power of CPU module and remove the I/O connectors and wiring of the expansion module.

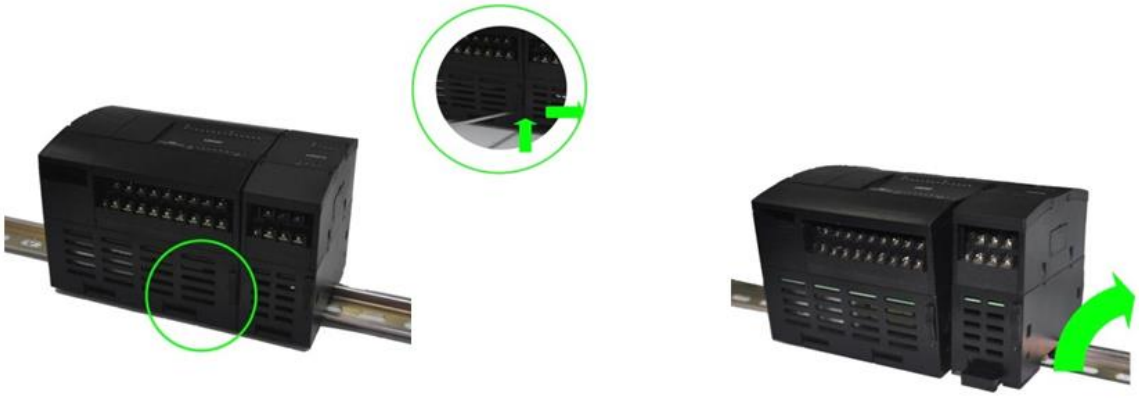


Figure 168 Removing an Expansion Module

- Open the top/bottom side locker.

  1： Place a screwdriver at the bottom of the top/bottom side locker of the CPU module.

  2： Press it upward to make the top/bottom side lock move in an unlocked position.

  3： Slide the module to the right until the bus connector of the module is completely apart from the CPU module. If there is an expansion module on the right side, please repeat this step.

- Remove an expansion module:

  1： Pull out the DIN rail clips at the bottom to loosen the expansion module on the DIN rail.

  2： Turn the expansion module upward to make it go off of the DIN rail. Remove the expansion module from the system.

3： If necessary, please cover the bus connector of the CPU module with a cover to avoid contamination. To remove other modules next to the expansion module, please repeat the above steps.

13.1.4 Installation and Removal of Expansion Boards

Step 1. Installation

To install an expansion board for a CPU module, please turn off the power of the CPU and remove left cover and bottom terminal block cover from the CPU.

Figure 169 Installing an Expansion Board

To install an expansion board, please follow below steps:

1： Place a screwdriver into the slot on the top of the CPU module at the rear of the cover.

2： Gently pry the cover up and remove it from the CPU module.

3： Place the expansion board down into its mounting position on the top of the CPU module.

4： Firmly press the expansion board into the position until it snaps into place.

5： Install the terminal block cover.

Step 2. Removal

To remove an expansion board from a CPU module, please turn off the power of the CPU and remove left cover and bottom terminal block cover from the CPU.

Figure 170 Removing an Expansion Board

To remove the expansion board, follow below steps:

1： Insert a screwdriver into the slot in the upper part of the left side of the CPU.

2： Gently pry the module up to disengage it from the CPU.

3： Remove the module directly from its mounting position in the upper part of the CPU module.

4： Install the covers onto the CPU.

5： Install the terminal block cover.

- If you replace a module with a different module during maintenance, the program will probably run abnormally. The errors in the replacement of an expansion module may lead to serious consequences. Therefore, it’s required to replace a faulty module with a module of the same model and position it correctly.

13.1.5 Removal and Reinstallation of LE Terminal Block Connectors

Both CPU modules and expansion modules provide pluggable terminals easy for maintenance. The preparatory work for the removal of a terminal block connector from the system: turn off the power of the CPU module and open the cover above the terminal.

Figure 171 Removing a Terminal Block

To remove a terminal block, please follow below steps:

1： Remove screws with a screwdriver.

2： Gently pry the top of the terminal away from the CPU.

3： Hold the terminal and remove it from the CPU.

Installation:

To install a terminal block, please follow below steps:

Figure 172 Installing a Terminal Block

1: Turn off the power of the CPU and open the cover of the terminal block.

2: Align the screw cap of the connector with the screw hole on the board.

3: Tighten the screw. Check it carefully to ensure that the terminal has been properly aligned and fully engaged.

- LE expansion board is available only on 24I/O or 40I/OCPU module.
- Avoid direct touch with circuits when installing or removing.
- A flathead screwdriver is needed when removing.

13.2 Wiring Guidelines

13.2.1 Guidelines for Inductive Loads

Use suppressor circuits with inductive loads to limit the voltage rise when a control output is turned off. Suppressor circuits can protect your outputs from premature failures caused by the high voltage transient that occurs when the current flow through an inductive load is interrupted. In addition, suppressor circuits can limit the electrical noise generated when switching inductive loads. Placing an external suppressor circuit and making it electrically across the load and physically located near the load is the most effective way to reduce electrical noise.

The effectiveness of a suppressor circuit depends on the application and must be verified for your particular usage. Ensure that all components are correctly rated.

1. Typical suppressor circuit for DC or relay outputs that switch DC inductive loads
Relays can be used for DC or AC loads and there is no internal protection. The following figure shows a DC-load suppressor circuit. In most applications, the addition of a diode (reverse peak voltage: at least three times the load voltage; average rectified current: 1A) to both ends of a DC inductive load is suitable.

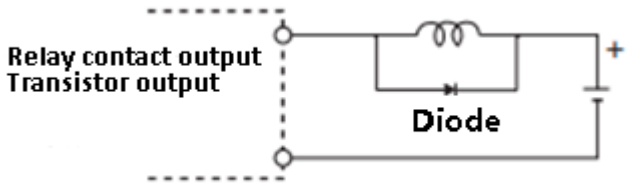


Figure 173 Typical Suppressor Circuit for Switching DC Inductive Loads

2. Typical suppressor circuit for relay outputs that switch AC inductive loads

When a relay is used to switch AC inductive loads, you must place an external resistor/capacitor noise suppression circuit across the AC load. Choose pulse-rated, non-inductive resistors and capacitors recommended for pulse applications (typically metal films). Confirm that the components meet average power, peak power, and peak voltage requirements, e.g. R: 100~200Ω, C: 100nF. The metal oxide varistor (MOV) can also be used to suppress peak voltage. Ensure that the working voltage of the metal oxide varistor (MOV) is at least 20% greater than the nominal line voltage.

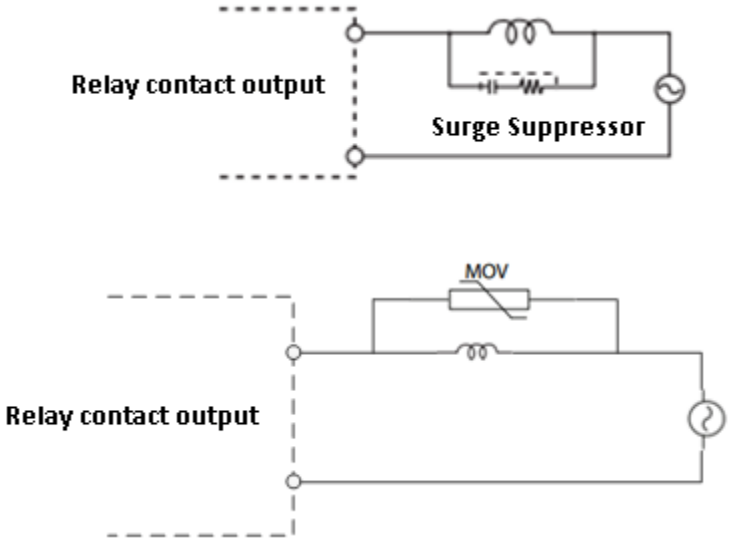
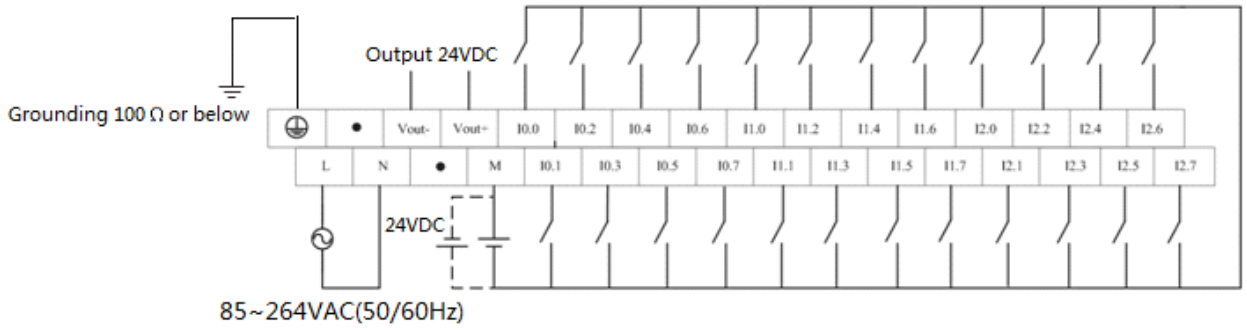


Figure 174 Typical Suppressor Circuit for Switching AC Inductive Loads

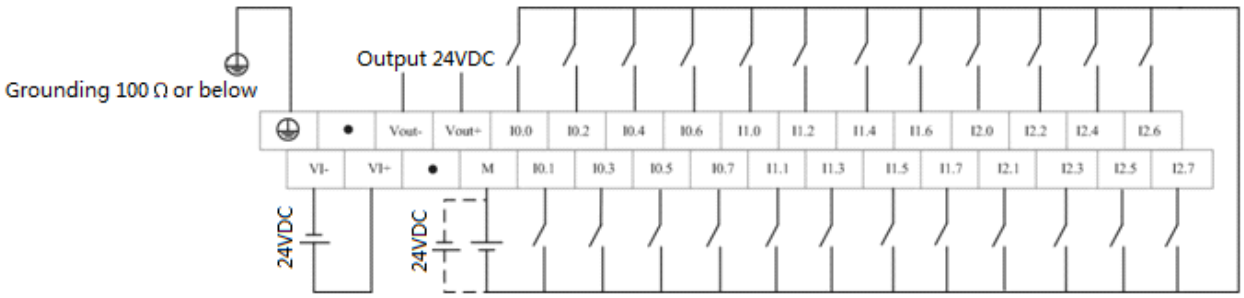
13.2.2 Guidelines for Lamp Loads

Lamp loads are damaging to relay contacts because of the high turn-on surge current. This surge current will nominally be 10 to 15 times the steady state current for a tungsten lamp. A replaceable interposing relay or surge limiter is recommended for lamp loads that will be switched a large number of times during the lifetime of the application.

13.2.3 Grounding



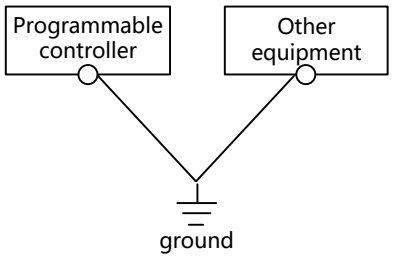
(a)



(b)

Figure 175 Grounding Diagram

- Grounding guidelines
  - ☐ Adopt D-type grounding (with the ground resistance of below 100 Ω).
  - ☐ The best way to ground the application device is to ensure that all of the common and ground connections of LE PLC and related device are grounded to a common point. This point should be connected directly to the ground for your system.



D-type grounding (Grounding resistance: below 100 Ω)

Figure 176 Grounding Diagram

- ⏚ represents the ground. In order to prevent the electric shock, the resistor of the grounding terminal shall adopt special grounding wires with the resistance of 100Ω or below.
- The ground terminal should be as close to PLC controller as possible. All grounding wires should be as short as possible and should adopt large-diameter wires, e.g. 2 mm^2 wires (14AWG).

13.3 Module Size

1. CPU modules

The outline dimensions and mounting dimensions of LE5104 and LE5105 modules are shown in Figure 177 and Figure 178 respectively.

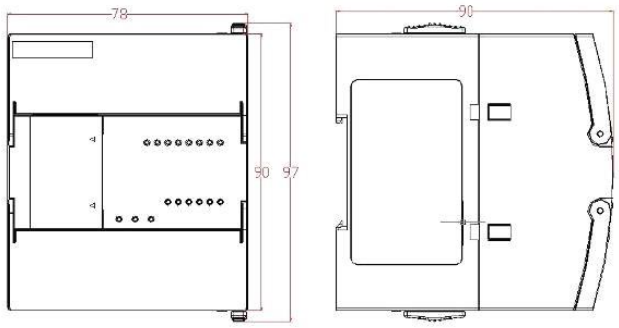


Figure 177 Outline Dimensions

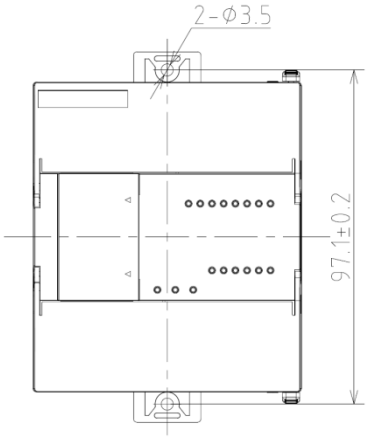


Figure 178 Mounting Dimensions

The outline dimensions and mounting dimensions of LE5106, LE5107, LE5107E and LE5107L modules are shown in Figure 179 and Figure 180 respectively.

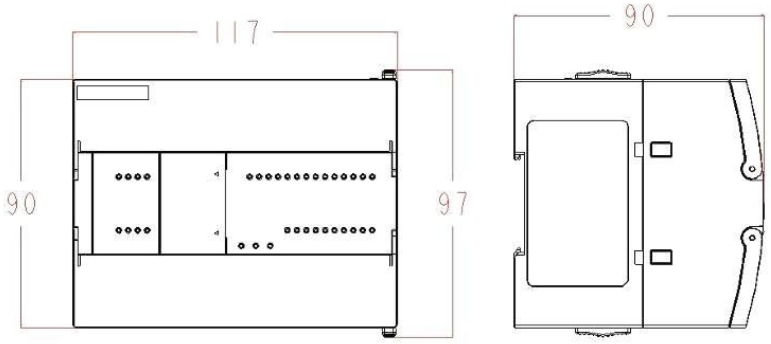


Figure 179 Outline Dimensions

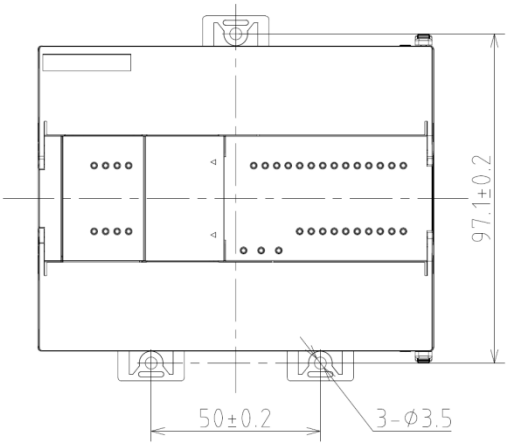


Figure 180 Mounting Dimensions

The outline dimensions and mounting dimensions of LE5128, LE5108, LE5109, LE5109L,LE5118 and LE5119 modules are shown in Figure 181 and Figure 182 respectively.

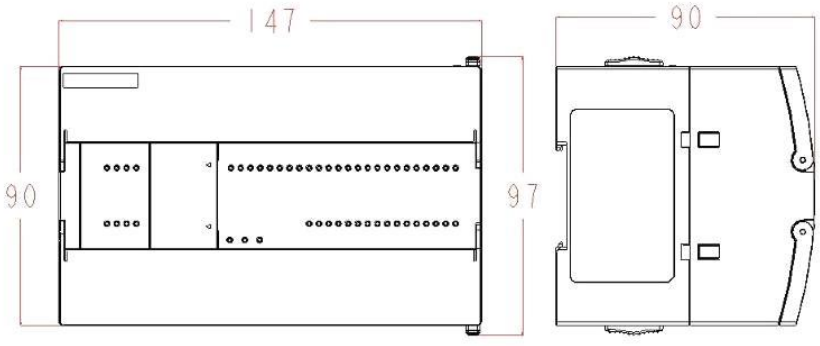


Figure 181 Outline Dimensions

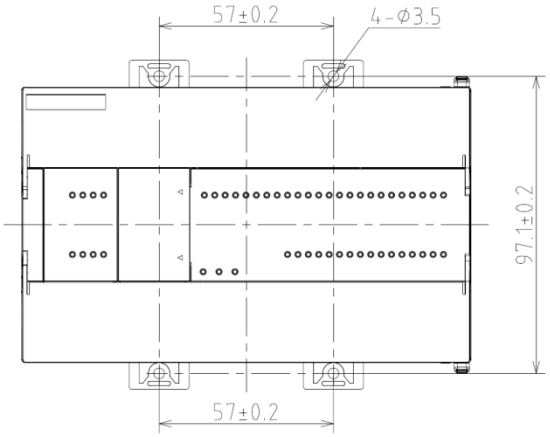


Figure 182 Mounting Dimensions

The outline dimensions and mounting dimensions of LE5708 module are shown in Figure 183 and Figure 184 respectively.

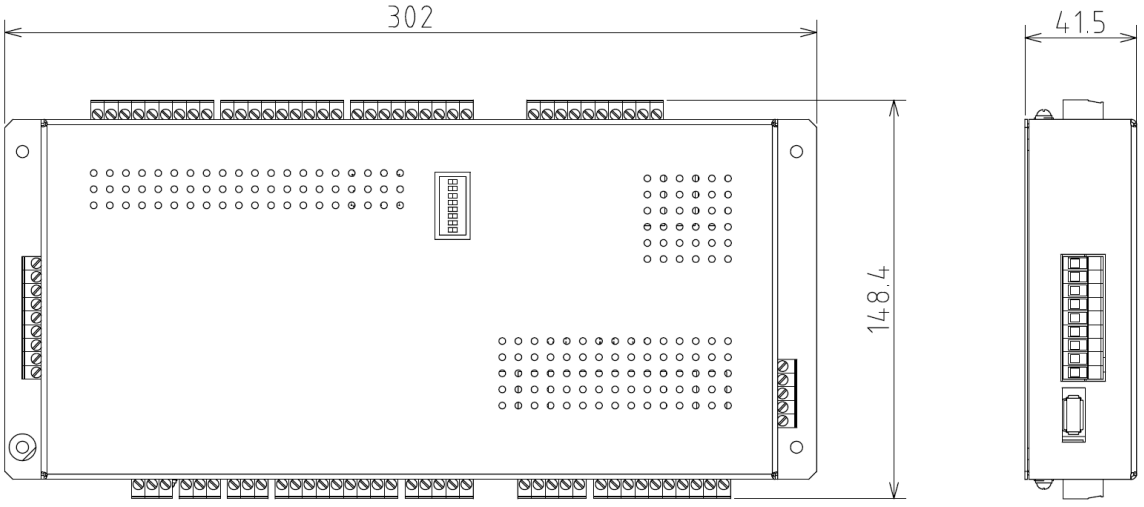


Figure 183 Outline Dimensions

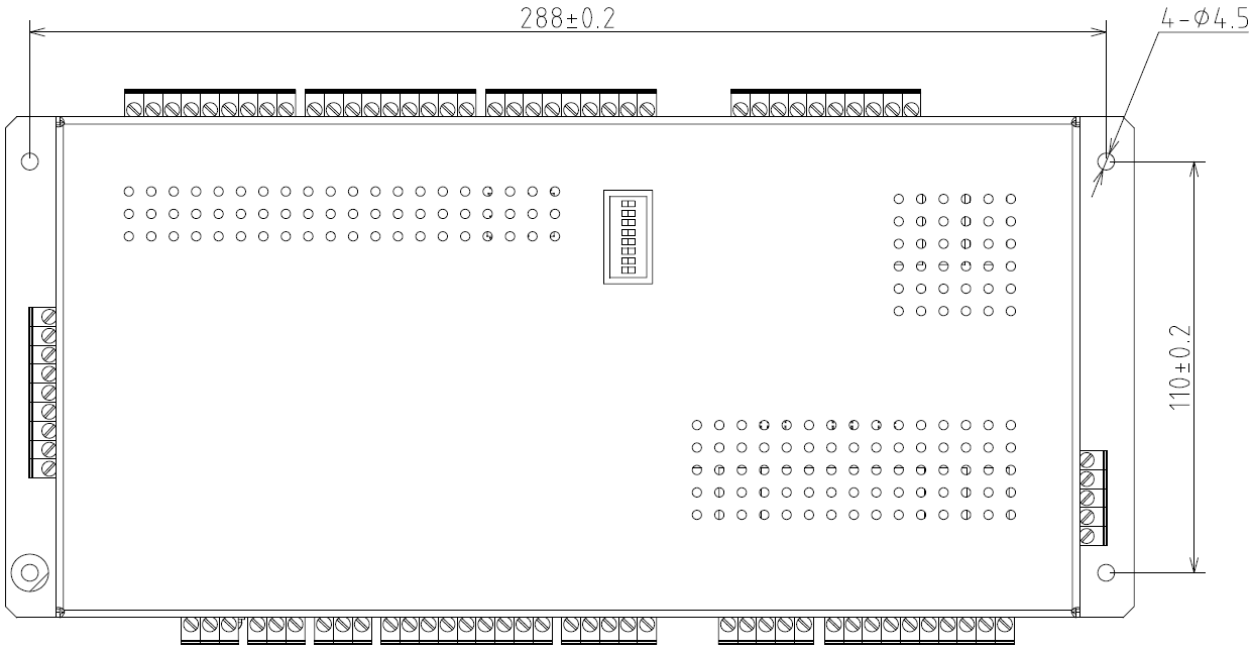


Figure 184 Mounting Dimensions

2. Expansion modules

The outline dimensions and mounting dimensions of 32DI LE5212 and 32DO LE5224 are shown in Figure 185 and Figure 186 respectively.

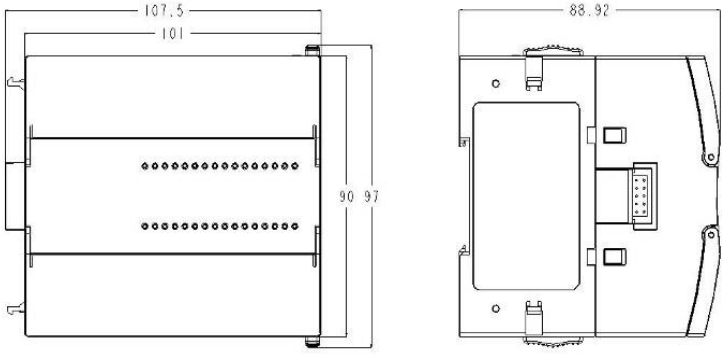


Figure 185 Outline Dimensions

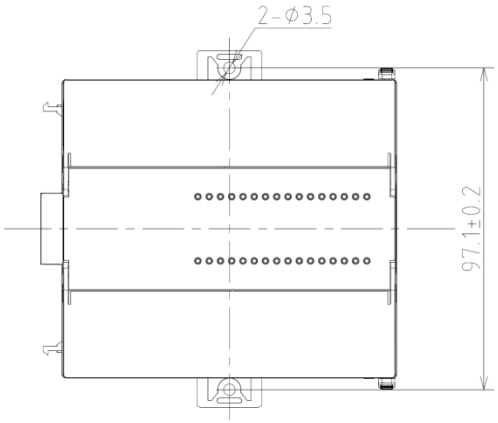


Figure 186 Mounting Dimensions

The outline dimensions and mounting dimensions of LE5211, E5223, LE5310, LE5311, LE5340, LE5341, LE5341T, LE5342, LE5320, LE5321, LE5330, LE5401, LE5403 and LE5404, are shown in Figure 187 and Figure 188 respectively.

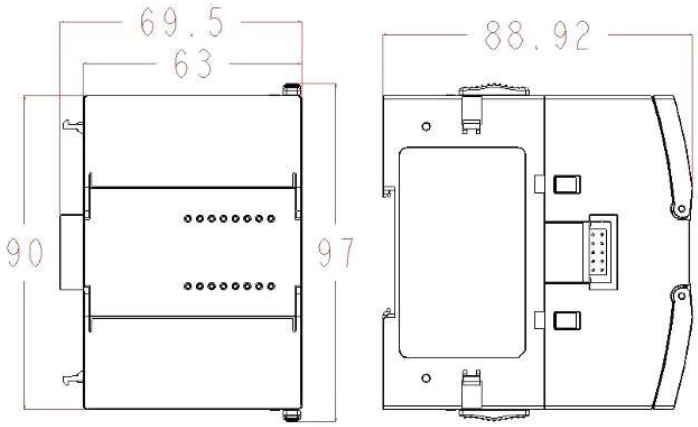


Figure 187 Outline Dimensions

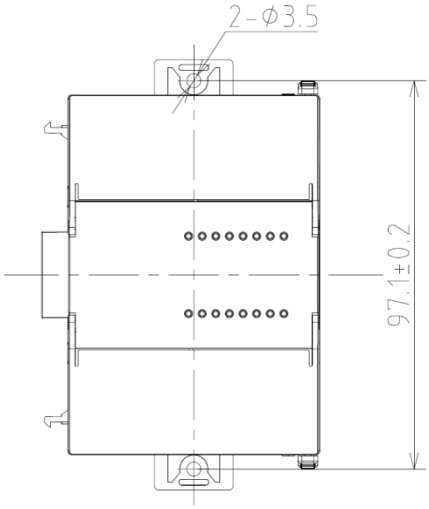


Figure 188 Mounting Dimensions

The outline dimensions and mounting dimensions of LE5400 are shown in Figure 189 and Figure 190 respectively.

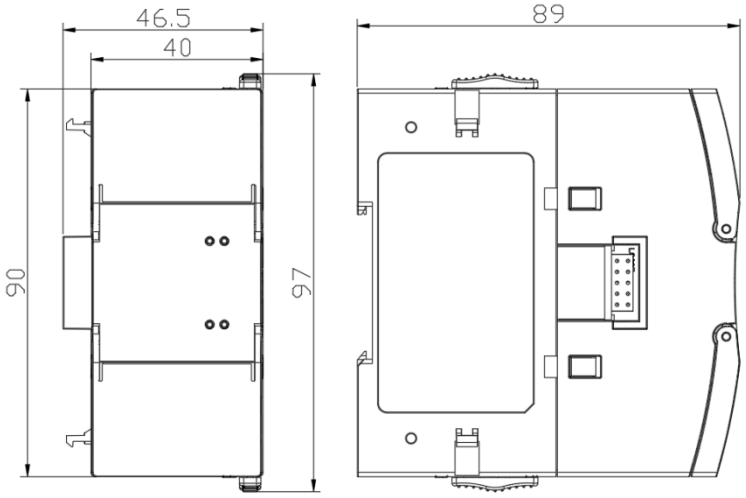


Figure 189 Outline Dimensions

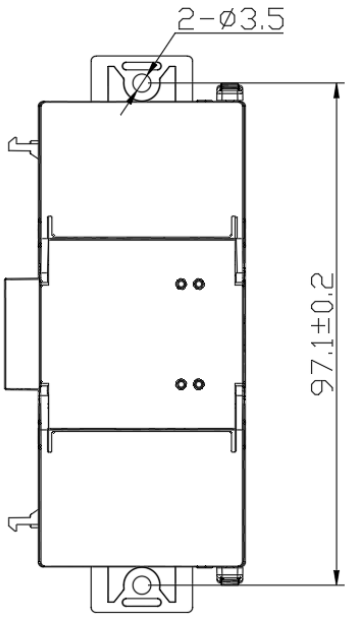


Figure 190 Mounting Dimensions

The outline dimensions and mounting dimensions of LE5405 are shown in Figure 191 and Figure 192 respectively.

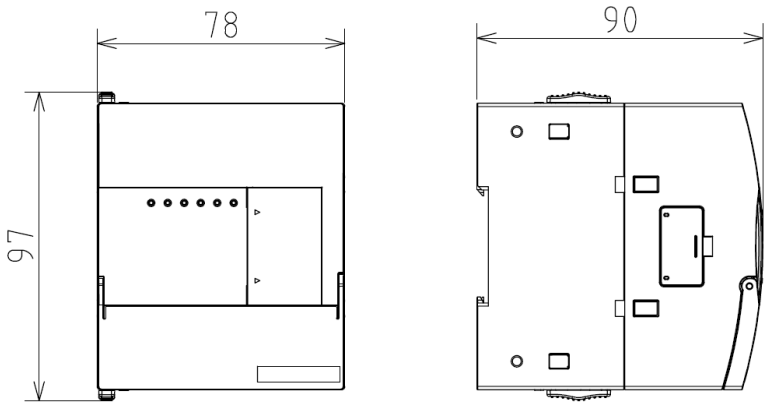


Figure 191 Outline Dimensions

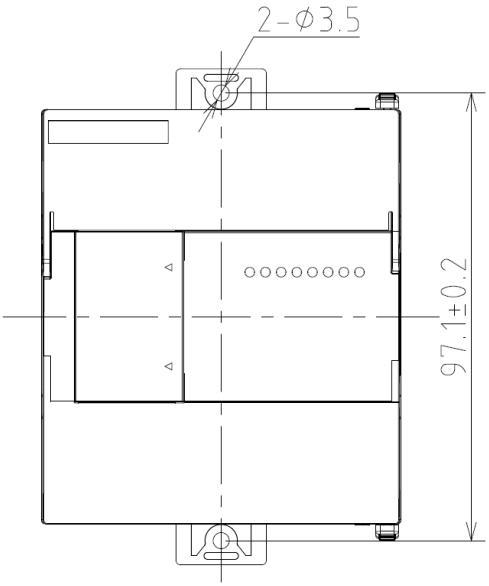


Figure 192 Mounting Dimensions

The outline dimensions and mounting dimensions of LE5210, E5220, LE5221 are shown in Figure 193 and Figure 194 respectively.

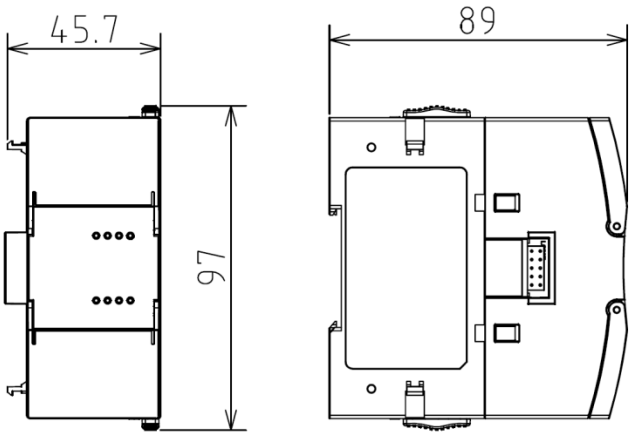


Figure 193 Outline Dimensions

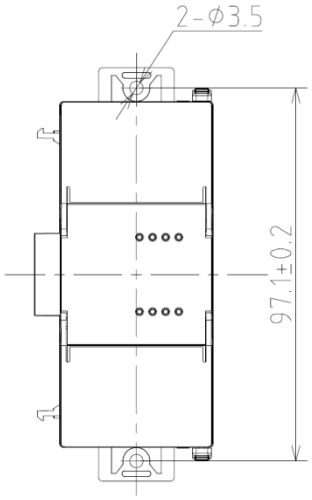


Figure 194 Mounting Dimensions

The outline dimensions of expansion boards LE5600, LE5601, LE5611 and LE5621 are shown in Figure 195.

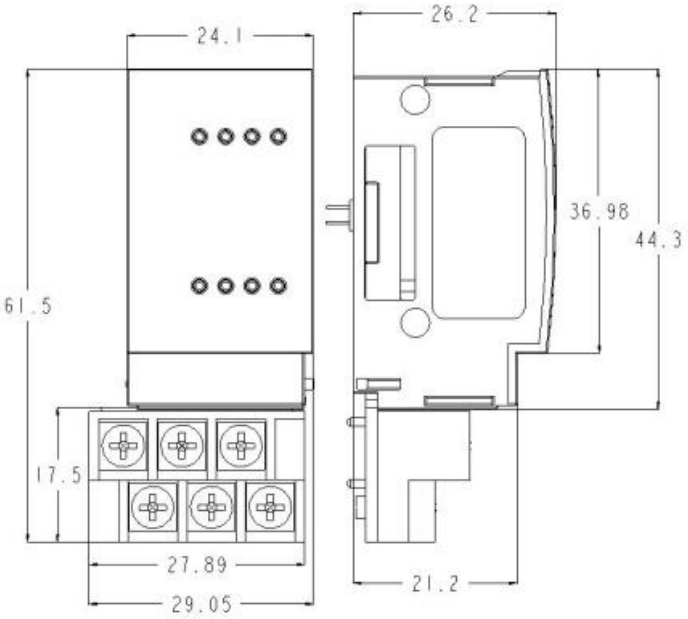


Figure 195 Outline Dimensions

APPENDIX 1 FAQ

No.	Faults	Description for problems	Solutions
1	CPU ERR indicator ON/ red	The system configuration in programming software is not consistent with the actual hardware configuration.	In the programming software, re-configure the PLC hardware according to the actual module model and order.
2	CPU ERR indicator ON/ red	Communication failure with expansion module	Check whether the extension module connection is correct, and check whether the status of each module in the data diagnostic area is normal
3	CPU ERR indicator ON/ red	The expansion modules have some failure reported	Replace the expansion module which has errors.
4	No response of all the indicators when module powered on.	Check and ensure whether the supplied power is up to the rated value.	Use the multimeter to check whether the site connecting to the power is up to 24VDC or 220VAC.
5	CPU ERR indicator ON/ red	Memory card loading fails.	Check project in memory card.

APPENDIX 2 List of LE Series PLC

Module type	Product model	Specification instruction
CPU standard module	LE5104	DC24V power supply, equipped with DI 8 × DC24V, DO 6 × transistor output
	LE5105	AC220V power supply, equipped with DI 8 × DC24V, DO 6 × relay output
	LE5106	DC24V power supply, equipped with DI 14 × DC24V, DO 10 × transistor output
	LE5107	AC220V power supply, equipped with DI 14 × DC24V, DO 10 × relay output
	LE5108	DC24V power supply, equipped with DI 24 × DC24V, DO 16 × transistor output
	LE5109	AC220V power supply, equipped with DI 24 × DC24V, DO 16 × relay output
	LE5118	DC24V power supply, equipped with DI 24 × DC24V, DO 16 × transistor output, Ethernet interface
	LE5119	AC220V power supply, equipped with DI 24 × DC24V, DO 16 × relay output, Ethernet interface
CPU economic module	LE5107E	AC220V power supply, equipped with DI 12 × DC24V, DO 8 × relay output, AI 2 ×10bit (4～20mA/0～20mA/0～10V optional) , AO 2 ×12bit (4～20mA/0～20mA/0～10V optional)
	LE5107L	AC220V power supply, equipped with DI 14× DC24V, DO 10 ×relay output
	LE5109L	AC220V power supply, equipped with DI 24 × DC24V, DO 16 × relay output
CPU motion control module	LE5128	Special CPU module for motion control adopts 16 channel digital inputs, 10 channel digital outputs, 2 channel analog inputs and 4 channel analog outputs.

Module type	Product model	Specification instruction
CPU air conditioner module	LE5708	Air condition controller module adopts 24-channel digital inputs, 20-channel relay outputs and 4-channel analog inputs, 8-channel NTC inputs and 2-channel analog outputs.
Digital I/O module	LE5210	8 channel digital input module, DI 8 × DC24V
	LE5211	16 channel digital input module, DI 16 × DC24V
	LE5212	32 channel digital input module, DI 32 × DC24V
	LE5220	8 channel transistor digital output module, DO 8 ×transistor output
	LE5221	8 channel digital output module, DO 8 ×relay output
	LE5223	16 channel relay digital output module, DO 16 ×relay output
	LE5224	32 channel transistor digital output module,DO32×DC24V transistor output
	LE5230	8 channel digital input/8 channel digital output module, DI 8× DC 24V+ DO 8×DC 24V transistor output
	LE5231	8 channel digital input/8 channel digital output module, DI8×DC24V+ DO8×relay output
Analog I/O module	LE5310	4 channel analog input module (4 ～ 20mA/0 ～ 20mA/0 ～ 10V optional) , differential input, 12 digits
	LE5311	8 channel analog input module (4 ～ 20mA/0 ～ 20mA/0 ～ 10V optional) , single-ended input, 12 digits
	LE5320	2 channel analog output module (4 ～ 20mA/0 ～ 20mA/0 ～ 10V optional) , 12 digits
	LE5321	4 channel analog output module (4 ～ 20mA/0 ～ 20mA/0 ～ 10V optional) , 12 digits
	LE5330	4 channel analog input /2 channel analog output module (4 ～ 20mA/0～20mA/0～10Voptional), 12 digits
	LE5340	4 channel thermocouple input module, -80mV ～ +80mV, B/E/J/K/N/R/S/Type float grounding thermocouple, 24 digits

Module type	Product model	Specification instruction
	LE5341	4 channel RTD input module Cu50, Ni100, Ni120, Ni200, Ni500, Ni1000, Pt100, Pt200, Pt 500, Pt1000, 16 digits
	LE5341T	4 channel RTD input module, support Pt1000（385）、Pt1000（3916）
	LE5342	8 channel thermistor input module
Communication module	LE5400	Dual-ports (RS485/RS232) communication expansion module
	LE5401	Profibus-DP slave station module
	LE5403	Ethernet communication module
	LE5404	GPRS communication module
	LE5405	Gateway communication module
Function expansion module	LE5600	RS232 communication expansion board
	LE5601	RS485 communication expansion board
	LE5610	4 channel digital input extension board, DI 4 × DC24V
	LE5620	4 channel transistor output extension board, DO 4 × transistor output
	LE5611	2 channel analog input expansion board (4～20mA/0～20mA/0～10V optional) , single-ended input, 10 digits
	LE5621	1 channel analog output extension board (4～20mA/0～20mA/0～10V optional) , 12 digits
Communication cable and accessories	LEA5820	Data memory card with USB-A interface, 2M
	LEX5810	Programming cable, 3m
	LEX5812	Expansion cable, 2m
	LEX5813	RS485 round Interface to Two wires RS485 Communication Cable, 3m
	LEX5817	Communication Cable between LE CPU module and HT8000, 3m

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