

LE5105 8 通道数字量输入/6 通道继电器数字量输出 CPU 模块

LE5105 是 LE 系列小型 PLC 的 CPU 模块，可完成系统所需的控制、检测、诊断和 RS485 通讯。具体实现的功能如下：RUN/STOP 开关选择模块的运行/停止模式；实时时钟记录运行时间；RS485 接口提供应用程序的下载通道，支持对外部设备的访问和 PLC 多机互联；自带 8 通道数字量输入，6 通道继电器输出，是一款通用的 CPU 模块。

技术规格

CPU 特性		电源规格		
本机 I/O	8 通道 24VDC 数字量输入/6 通道继电器输出	输入电源	额定电压	100~240VAC
可扩展模块数量（Max.）	10（满足模块功耗的条件下）		允许范围	85~264VAC（50/60Hz）
编程语言	LD/ST/CFC/SFC		电流消耗（Max.）	400mA
程序区存储容量	64K 字节	对外输出电压		24VDC
数据区存储容量	18K 字节	对外输出电流（Max.）	+24VDC（对扩展总线提供）	200mA
掉电保持区容量	2K 字节		+24VDC（对外提供）	200mA
高速计数器（Max.）	单相计数器：2 点，20KHz		+5VDC（对扩展总线提供）	500mA
	双相计数器：1 点，10KHz	掉电保持时间		80ms
脉冲捕获	2 点	输出特性		
快速外部中断	2 点	输出通道数目	6	
基本指令处理时间	0.1μs	输出类型	继电器，干触点	
输入特性		额定电压	24VDC 或 24~230VAC	
输入通道数目	8	允许范围	5~30VDC 或 5~250VAC	
输入类型	漏型/源型	输出电流	2A（阻性负载）	
额定电压	24VDC	公共端输出电流总和	≤10A	
允许范围	0~30VDC	接通状态阻抗	0.2Ω	
逻辑 1 信号	15~30VDC，允许最小电流 3mA	输出开关频率（Max.）	1Hz	
逻辑 0 信号	0~5VDC，允许最大电流 1mA	继电器机械寿命	无负载：达 10,000,000 次以上	
滤波参数	不滤波、5ms、10ms、20ms、50ms、100ms		额定阻性 2A 负载：达 100,000 次以上	
隔离方式	光耦隔离（现场与系统间）	隔离方式	继电器隔离（现场与系统间）	
隔离组	1	隔离组	2	
隔离耐压	500VAC，持续时间 1min，漏电流≤5mA	隔离耐压	2500VAC，持续时间 1min，漏电流≤5mA	
物理特性		通讯特性		
尺寸规格（宽×高×深）	78mm×97mm×90mm	通讯接口	1 个 RS-485	
重量	372g	接口类型	RS-485 圆形接口	
工作温度	0~60℃	通讯速率（bps）	1200、2400、4800、9600、19200、38400、57600、115200	
存储温度	-40~70℃	通讯协议	专有协议、Modbus 主从、自由口协议、多机互联	
相对湿度	5%~95%（无凝结）			

指示灯定义

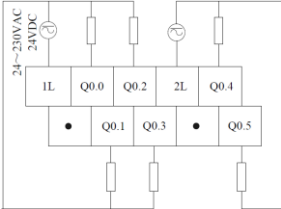
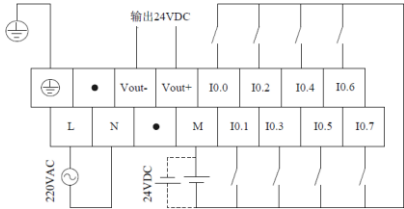
指示灯类型	颜色	状态	含义
电源PWR	绿色	亮	电源工作正常
		灭	电源工作不正常或没有相应的电源加载
通道指示灯Ix.y Qm.n	绿色	亮	本通道 ON 状态
		灭	本通道 OFF 状态
运行指示灯RUN/STOP	绿色	绿亮	PLC 处于 RUN 状态, 用户程序运行
	黄色	黄亮	PLC 处于 STOP 状态, 用户程序停止
故障指示灯ERR	红色	亮	PLC 发生某种或某些可以诊断的故障
		灭	PLC 工作正常

i 说明: ERR 亮的可能性及解决方法:

- (1) 编程软件的系统配置与实际硬件配置不一致;
方法: 重新配置编程软件;
- (2) 与扩展模块通讯故障;
方法: 检查扩展模块连接是否正确;
- (3) 扩展的各个模块发生故障上报;
方法: 更换发生故障的扩展模块。

端子定义与接线

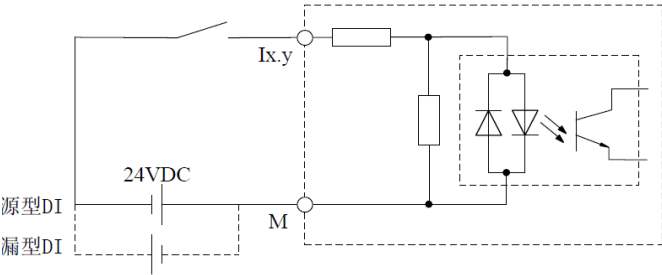
LE5105 模块使用 220VAC 电源, 采用两个双排可插拔端子 (8×2 和 5×2), 上排端子为输入通道 (DI), 下排端子为输出通道 (DO), 接线简单方便, 采用螺丝固定, 是一种典型的现场接线示例。



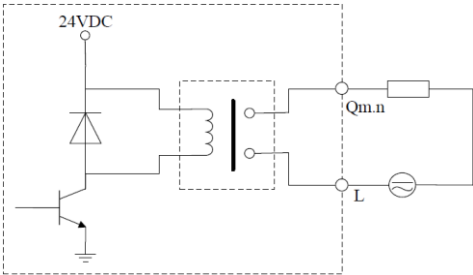
LE5105 端子定义

端子标识	含义	端子标识	含义
⊕	保护地	L	火线
•	无连接	N	零线
Vout-	输出 24VDC 负	•	无连接
Vout+	输出 24VDC 正	M	输入通道外接公共端
I0.0	快速外部中断 1/脉冲捕获 1/单相计数器 1/双相计数器 A 相/普通输入	I0.1	快速外部中断 2/脉冲捕获 2/单相计数器 2/普通输入
I0.2	单相计数器 1 清零端/双相计数器清零端/普通输入	I0.3	单相计数器 2 清零端/普通输入
I0.4	单相计数器 1 方向控制端/双相计数器 B 相/普通输入	I0.5	单相计数器 2 方向控制端/普通输入
I0.6	普通输入端	I0.7	普通输入端
1L	输出公共端 (Q0.0~Q0.3)	•	无连接
Q0.0	普通输出端	Q0.1	普通输出端
Q0.2	普通输出端	Q0.3	普通输出端
2L	输出公共端 (Q0.4、Q0.5)	•	无连接
Q0.4	普通输出端	Q0.5	普通输出端

电气原理图



LE5105 输入通道电气原理图



LE5105 输出通道电气原理图

通讯接口

RS485 通讯接口，通过编程电缆建立与个人计算机（PC）的连接，实现用户程序下载和在线调试并且用于与现场设备进行通讯。通过 LE5105 的 8 芯圆形接口插座（图①处）实现 LE5105 CPU 模块和上位机的连接通信，通过连接器（图②处）实现与扩展模块的连接通信。

8 芯圆形接口插座针脚定义

针号	定义	针号	定义	针号	定义	针号	定义
1	—	3	—	5	RS485 信号正	7	系统地 GND
2	—	4	—	6	RS485 信号负	8	系统地 GND

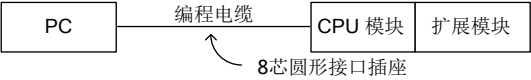
软件配置

由于 PLC 的编程软件和 PLC 模块之间均提供“运行”和“停止”两种状态，故定义硬件与软件相互约束关系。

RUN/STOP 选择开关位置	编程软件状态	模块状态
运行（开关在上档）	RUN	RUN；如果用户在该状态下装用户程序，自动变为 STOP 状态
	STOP	STOP
停止（开关在下档）	RUN/STOP	STOP（用户程序停止，无法运行）

通讯连接

- 下载前，请将 PLC 按图连接；请使用和利时 PLC 编程电缆进行程序下载；
- 在下载之前，确认已经安装 AutoThink V3.1.0 及以上版本软件；
- 下载时，请点击 AutoThink 软件在线菜单中的“下装”选项，按提示进行下载。



注意：

- (1) 在电源线连接好之后，应该把端子盖扣好，以免造成不必要的人身伤害或设备损坏。
- (2) 在安装或者拆卸 PLC 的输入电源时，如果没有切断电源，就有可能导致严重的人身伤害或设备损坏。因此，在安装或拆卸模块前，一定要切断所有电源，并且要随时地注意这一点。
- (3) 在给 PLC 供电之前，请确认已正确连接编程电缆，在模块带电状态下，请勿插拔通讯口，以免损坏设备。
- (4) 如果设备未按照制造商规定的方式使用，设备提供的保护可能会受损。
- (5)  高压危险标识，请勿触碰，严禁带电操作。

故障诊断

系统为每个模块分配相应字节的诊断区，存放每个模块的详细诊断信息。如果模块发生故障，上报诊断，用户需要在 AutoThink 软件中增加变量，输入相对应的地址，根据模块诊断信息来查询对应位的变化，详细信息请参见《AutoThink V3.1 用户手册_工程组态》中第 5 章的数据存储区。

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.

Technical Specifications

CPU Specifications		Power Supply Specifications		
On-board I/O	8 DI / 6 DO	Input	Rated voltage	100~240VAC
I/O expansion module (max.)	10 (total modules power consumption ≤ CPU rating)		Permissible range	85~264VAC (50/60Hz)
Programming language	LD/ST/CFC/SFC		Current consumption (max.)	400mA
Program memory	64K bytes	External output voltage		24VDC
Data memory	18K bytes	External output current (max.)	+24VDC (supply for expansion bus)	200mA
Power-loss retentive memory	2K bytes		+24VDC (supply for peripheral device)	200mA
HSC	2 HSC at 20 KHz for single phase		+5VDC (supply for expansion bus)	500mA
	1 HSC at 10 KHz for A/B phase	Hold up time (loss of power)		80ms
Pulse catch	2	Output 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	0~60℃	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)			

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.
Channel status indicator Ix.y Qm.n	Green	ON	The channel is ON.
		OFF	The channel is OFF.
Operation indicator RUN/STOP	Green/ Yellow	ON green	PLC is in RUN mode and user program is running.
		ON yellow	PLC is in STOP mode and user program is not running.
Failure status indicator ERR	Red	ON	The CPU is in failed mode.
		OFF	PLC is in normal operating mode.

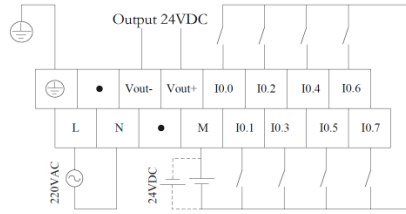


Instructions: possibility and solutions if ERR indicator is on:

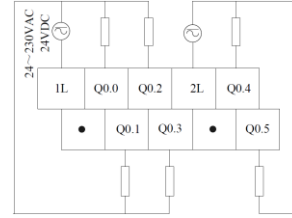
- System configuration of programming software is inconsistent with actual hardware configuration.
Solutions: Check system configuration in programming software.
- Communication with expansion module failed.
Solutions: Check whether expansion module is connected correctly.
- Report faults occurring to each expansion module.
Solutions: Replace faulty expansion module.

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.



LE5105 Upper Terminals Definition and Wring Diagram

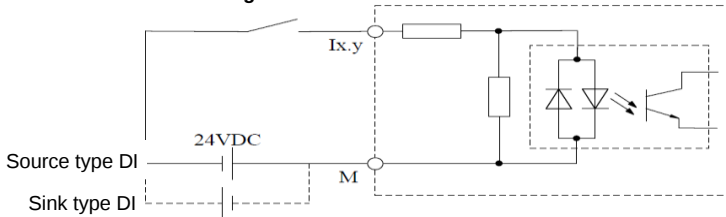


LE5105 Lower Terminals Definition and Wring Diagram

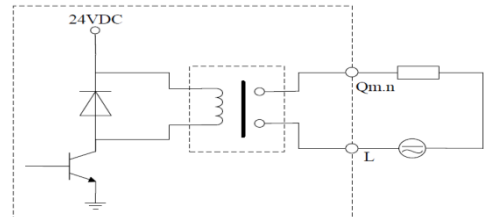
LE5105 Terminal Definition

Terminal Identification	Description	Terminal Identification	Description
	Grounding	L	Fire wire
•	No connection	N	Null line
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 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

Electrical Schematic Diagram



Electrical Schematic Diagram of LE5105 Input



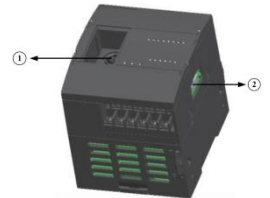
Electrical Schematic Diagram of LE5105 Output

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 LE5105 CPU module and upper computer are achieved through PS/2 of LE5105 (at ① in the figure), junction and communication between LE5105 CPU module and expansion module are achieved through connector (at ② in the figure).

Definition of PS/2

Pin No.	Definition	Pin No.	Definition	Pin No.	Definition	Pin No.	Definition
1	—	3	—	5	RS485+	7	System GND
2	—	4	—	6	RS485-	8	System GND



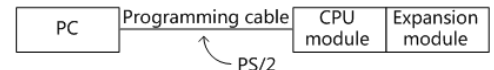
Software Configuration

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

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's program stops, unable to run)

Communication Connection

- Before downloading, please confirm that PLC is connected as per the schematic diagram. Please use HollySys PLC programming cable to download the program.
- 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.



Caution:

- Cover of the terminal should be fastened properly prior to power on of the PLC system 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.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

- Warning symbol for high voltage, please do not touch equipment with the warning symbol, operation in electricity is strictly prohibited.

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.