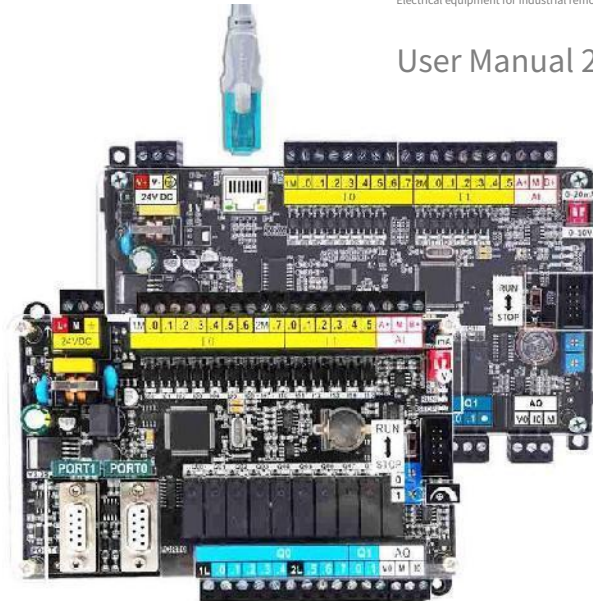


GONGBEI Economy 200

Electrical equipment for industrial remote control operation in the electronics industry

User Manual 20250301



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1. Product Selection

CPU Module	Digital quantity	Analog quantity	485mouth	network port	Power consumption	Extend	size(mm)
GPU221-R-ETH	6DI 4DOrelay	2AI 1AO	1	1	6W	support	95×106×35
GPU221-T-ETH	6DI 4DOtransistor	2AI 1AO	1	1	6W	support	95×106×35
MPU222-R	8DI 6DOrelay	2AI 1AO	1	—	6W	Not supported	95×106×35
MPU222-T	8DI 6DOtransistor	2AI 1AO	1	—	6W	Not supported	95×106×35
GPU222-R	8DI 6DOrelay	2AI 1AO	1	—	6W	support	95×106×35
GPU223-R	10DI 10DOrelay	2AI 2AO	2	—	8W	support	125×106×35
GPU224XP-R	14DI 10DOrelay	2AI 1AO	2	—	10W	support	150×106×35
GPU224XP-T	14DI 10DOtransistor	2AI 1AO	2	—	10W	support	150×106×35
GPU224XP-R-ETH	14DI 10DOrelay	2AI 1AO	2	1	12W	support	180×116×35
GPU224XP-T-ETH	14DI 10DOtransistor	2AI 1AO	2	1	12W	support	180×116×35
GPU226-R	24DI 16DOrelay	-	2	—	16W	support	180×116×35
GPU226-T	24DI 16DOtransistor	-	2	—	16W	support	180×116×35
GPU226-R-ETH	24DI 16DOrelay	-	2	1	18W	support	180×116×35
GPU226-T-ETH	24DI 16DOtransistor	-	2	1	18W	support	180×116×35
GPU228-R	16DI 14DOrelay	4AI 2AO	3	—	16W	support	180×116×35
GPU228-T	16DI 14DOtransistor	4AI 2AO	3	—	16W	support	180×116×35

Digital input/output module	describe	powered by	size(mm)	Power consumption	
GM221-I16	16Digital input16×24 VDC	24VDC	95×108×35	2W	
GM222-RQ16	Digital quantity	24VDC	95×108×35	3W	
GM223-I8RQ8	24VDC 8lose	24VDC	95×108×35	3W	
GM223-I16TQ16	24VDC 16	24VDC	150×108×35	6W	
Analog module		powered by	size(mm)	Power consumption	
GM231-AI8	mold	24VDC	95×108×35	2W	
GM232-AQ4	mold	24VDC	95×108×35	4W	
GM235-AI4AQ2	Analog quantity	24VDC	95×108×35	2W	
GM235-AI8AQ4	Analog quantity8enter4Output	24VDC	150×108×35	3W	
Temperature module	describe	powered by	size(mm)	Power consumption	Whether to isolate
GM231-P4	4roadP100enter	24VDC	95×108×35	3W	isolation
GM231-P8	8roadP100enter	24VDC	95×108×35	5W	isolation
GM231-N8	8roadNTCenter	24VDC	95×108×35	5W	non-isolation
GM235- P8AQ4	8roadPT100enter4Analog output	24VDC	150×108×35	8W	isolation

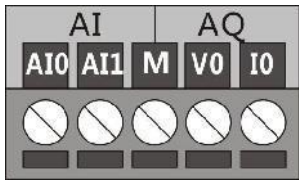
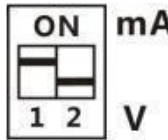
GM235- N8AQ4	8roadNTCenter4Analog output	24VDC	150×108×35	8W	non-isolation
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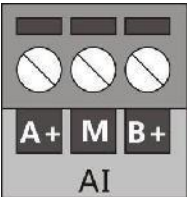
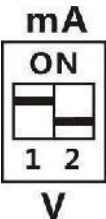
2.Host usage

2.1Overview

- Perfect compatibility: Fully compatible with S7 programming software and instruction set.
- Bidirectional Input: The digital input ports utilize internal bidirectional optocouplers, supporting NPN or PNP inputs. High Accuracy: Analog inputs employ high-precision AD converters and rail-to-rail operational amplifiers, enabling low-voltage identification. Comprehensive Communication Ports: PPI communication interface, supporting 187.5k baud rate. Models with the -ETH suffix include one Ethernet port for downloading and monitoring programs via Ethernet.
- Rich Protocol Support: Supports PPI, Modbus, Freeport, and USS protocols. Comprehensive Clock Features: Built-in clock battery, dual-circuit power supply design, supports over 2 years of standby use for a perpetual calendar. Reliable Encryption: Encryption is uncrackable, fully protecting your program.
- Power-off retention: Utilizes FLASH technology, requiring no battery and permanently storing data. Comprehensive protection: Reverse polarity protection for the power supply; electrostatic discharge protection for the communication port; short-circuit protection for analog signals. PID support: Supports PID commands, allowing users to easily implement multi-channel PID control. Independent power supply: The power board is robustly constructed with sufficient power to power multiple expansions and sensors. Strong anti-interference capability: Has undergone rigorous industrial field testing and environmental testing.
- High-speed pulse output: Transistor model supports 30K high-speed pulse output. Expansion support: Supports up to 7 external expansion modules.

2.2The host has built-in analog signal usage

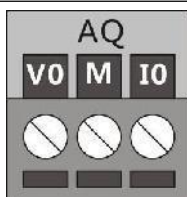
GPU221Analog interface	Terminal Definition		DIP switch settings
	AI:simulation Input	AI0:aisle1,registerAIW0	
		AI1:aisle2,registerAIW2	
	AO:simulation Output	V0:aisle1Voltage output, registerAQW0Output range0-10V	
		I0:aisle1Current output, registerAQW0Output range0-20mA	
	M	MAnalog input/output common terminal	
Note: Analog input supports voltage or current input, selectable via the DIP switch on the right. 1correspond AI0Corresponding channel AIW0Registers, DIP switches2correspondAI1Corresponding channelAIW2register,ON The analog output channel : Current input; OFF: Voltage input. outputs both voltage and current simultaneously, both of which are affected by...AQW0control.			

MPU222,GPU222Analog input interface	Terminal Definition	DIP switch settings
	A+:AIW0aisle, 0-10V or 0-20mA enter;	
	MAnalog input common terminal;	
	B+:AIW2aisle, 0-10V or 0-20mA enter;	

Note: Analog input supports voltage or current input, selectable via the DIP switch on the right. 1 correspond A+ Channel, dialer 2 correspond B+ aisle, ON Current input OFF Voltage input, as shown in the figure above.

MPU222, GPU222 Analog output interface

Terminal Definition



V0: AQW0 aisle, 0-10V Output;

M: Analog output common terminal;

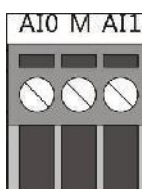
B+: AQW0 aisle, 0-20mA Output;

Note: Analog output channels output both voltage and current simultaneously, both of which are affected by...AQW0 control.

GPU223 Analog input terminals

Terminal Definition

DIP switch settings



AI0 (AIW0): 0-10V/ 0-20mA

M: Input public terminal.

AI1 (AIW2): 0-10V/ 0-20mA

0-20mA



0-10V

Note: Analog inputs support voltage or current, selectable via the red DIP switch in the upper right corner. Each DIP switch channel corresponds to one analog input; the leftmost DIP switch channel corresponds to...AIW0, ON Set to current input. OFF Set to voltage input.

GPU223 Analog output terminals

Terminal Definition



IO: Analog current (0-20mA) aisle 0 (AQW0) Output terminal.

M: Common terminal for analog output.

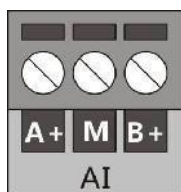
I1: Analog current (0-20mA) aisle 1 (AQW2) Output terminal.

Note: GPU223 Analog output only supports current output.

GPU224 Analog input interface

Terminal Definition

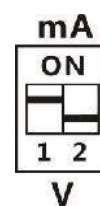
DIP switch settings



A+: AIW0 aisle, 0-10V or 0-20mA enter;

M: Analog input common terminal;

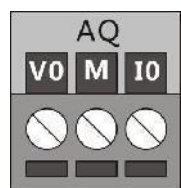
B+: AIW2 aisle, 0-10V or 0-20mA enter;



Note: Analog input supports voltage or current input, selectable via the DIP switch on the right. 1 correspond A+ Channel, dialer 2 correspond B+ aisle, ON Current input OFF Voltage input, as shown in the figure above.

GPU224 Analog output interface

Terminal Definition

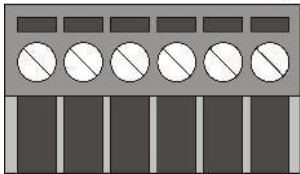
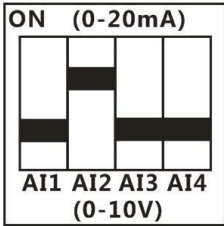


V0: AQW0 aisle, 0-10V Output;

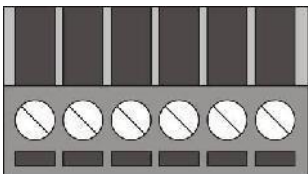
M: Analog output common terminal;

IO: AQW0 aisle, 0-20mA Output;

Note: Analog output channels output both voltage and current simultaneously, both of which are affected by...AQW0control.

GPU228Analog input terminals	Product Description:	DIP switch settings
	AI0 (AIW0):0-10V/ 0-20mA	
	M: Input public terminal.	
	AI1 (AIW2):0-10V/ 0-20mA	
	AI2 (AIW4):0-10V/ 0-20mA	
	M: Input public terminal.	
	AI3 (AIW6):0-10V/ 0-20mA	

Note: Analog inputs support voltage or current, selectable via the red DIP switch in the upper right corner. Each DIP switch channel corresponds to one analog input; the leftmost DIP switch channel corresponds to...AIW0,ONSet to current input.OFFSet to voltage input.

GPU228Analog output terminals	Function Description:
	VI0Analog voltage (0-10V)aisle0(AQW0)Output terminal.
	IOAnalog current (0-20mAaisle0(AQW0)Output terminal.
	M: Common terminal for analog output.
	VI1Analog voltage (0-10V)aisle1(AQW2)Output terminal.
	I1Analog current (0-20mAaisle1(AQW2)Output terminal.
	M: Common terminal for analog output.

Note: There are two analog output channels in total.0The analog voltage and current are output simultaneously, and are only affected by...AQW0control.

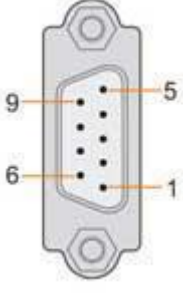
2.3Host technical parameters

storage	Program area	16K
	Data area	10K
IO	Digital I/O mapping area	256 (128DI/128DO)
	Simulated I/O mapping area	64 (32AI/32AO)
	Maximum expansion module	7 (MPU222 does not support expansion)
	High-speed pulse input	GPU221: Single-phase 2 x 30K, Dual-phase 2 x 30K
		MPU222, GPU222, GPU223: Single-phase 3 x 30K, Dual-phase 3 x 30K
		GPU224, GPU226, GPU228: Single-phase 4 x 30K, Dual-phase 4 x 30K
internal	High-speed pulse output	2 x 100K (transistor models only)
	Total number of timers	256
	Total number of counters	256
	Analog Potentiometer	2 x 8-bit
	Real-time clock	Supported, built-in battery
	Real-time clock valid	1 year
	Boolean instruction efficiency	0.28uS
	Floating-point instruction efficiency	0.75uS
485	Support Protocol	PPI protocol, Modbus RTU protocol, freeport protocol
	Maximum number of stations	32
power supply	Input voltage	DC24V 20.4-28.8VDC

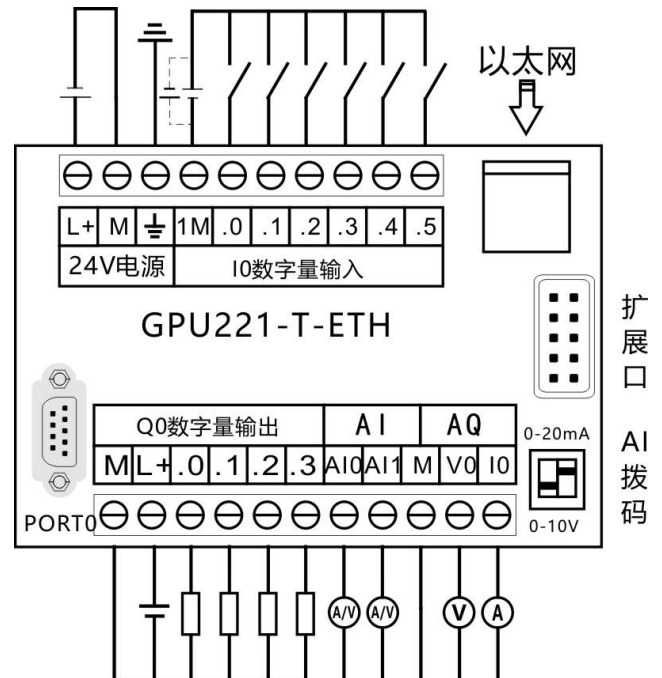
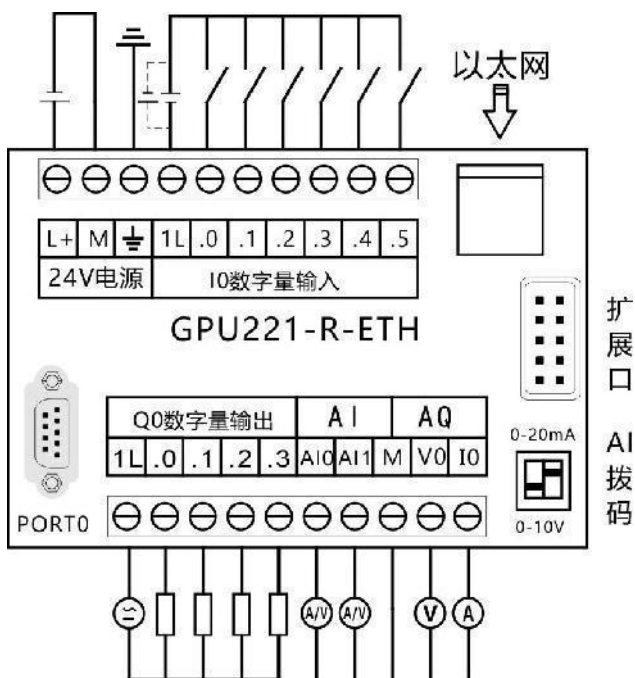
characteristic	isolation	No quarantine
number Volume Special sex	Input type	PNP/NPN bidirectional
	Rated voltage	24VDC, 4mA
	Maximum continuous allowable voltage	30VDC
	Surge voltage	35VDC, 0.5s
	Logic 1 voltage range	15V-30VDC
	Logic 0 voltage range	0-5VDC
	Isolation (of the scene and the logic)	isolation
	Opto-isolation	500VDC, 1 minute
	Maximum cable length	500 meters (standard input)
number Volume Special sex	Output type	- T suffix: Transistor source type 0.8A (can output 24V+ and disconnect 24V+) - R suffix: 5A (resistive) relay
	Common terminal rated current	6A
	Connecting the resistor (contact)	- R suffix: 0.2Ω typical value (0.6Ω maximum value)
	Opto-isolation (from site to isolation)	isolation
simulation Volume Special sex	Input method	Single-ended input
	Analog input characteristics	0~10V / 0~20mA
	Input impedance	Voltage type 30KΩ, Current type 120Ω
	Data format	0~32000
	resolution	12-bit including sign bit
	error	Worst case scenario: 0°C to 55°C ±2.5% of full scale Typical, 25°C ±1.0% of full scale Repeatability ±0.05% of full scale
	Conversion time	200ms
simulation Volume Special sex	Output voltage range	0~10V
	Output current range	0~20mA
	Data format	0~32000
	error	Worst case scenario: 0°C to 55°C ±3% of full scale typical, 25°C ±2.5% of full scale Repeatability ±1% of full scale
	Conversion time	50μs
	Load capacity	0~10V > 5KΩ
		0~20mA <500Ω

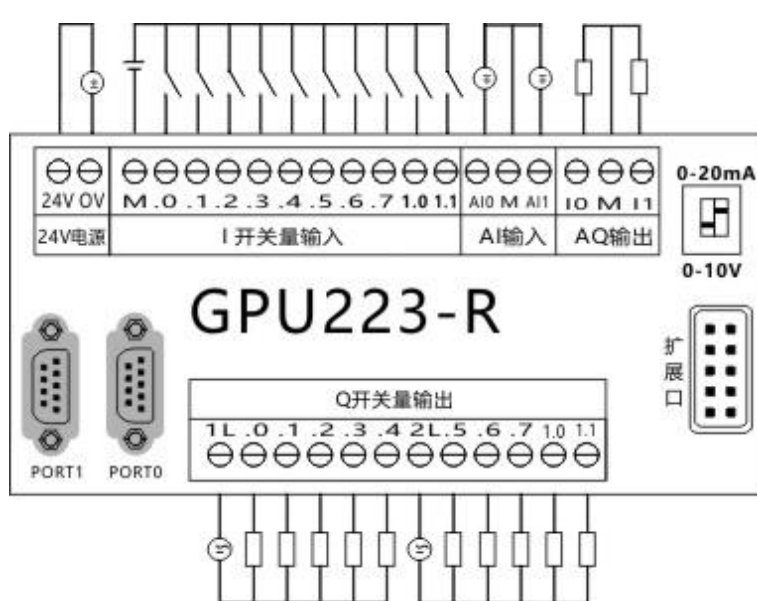
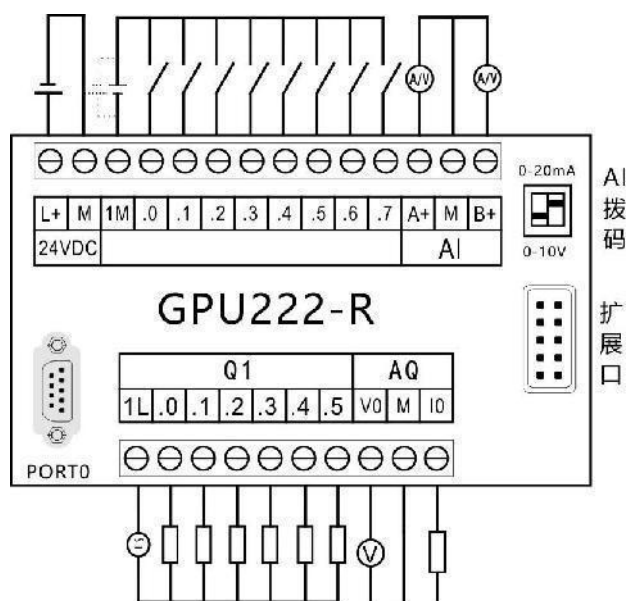
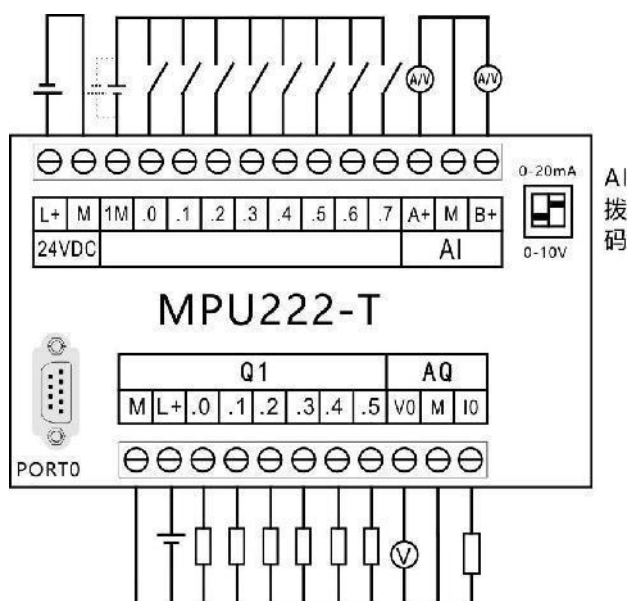
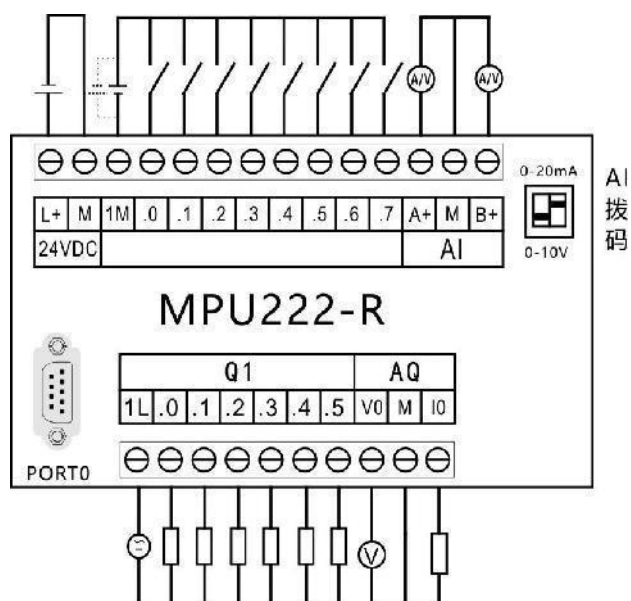
2.4 485Communication interface

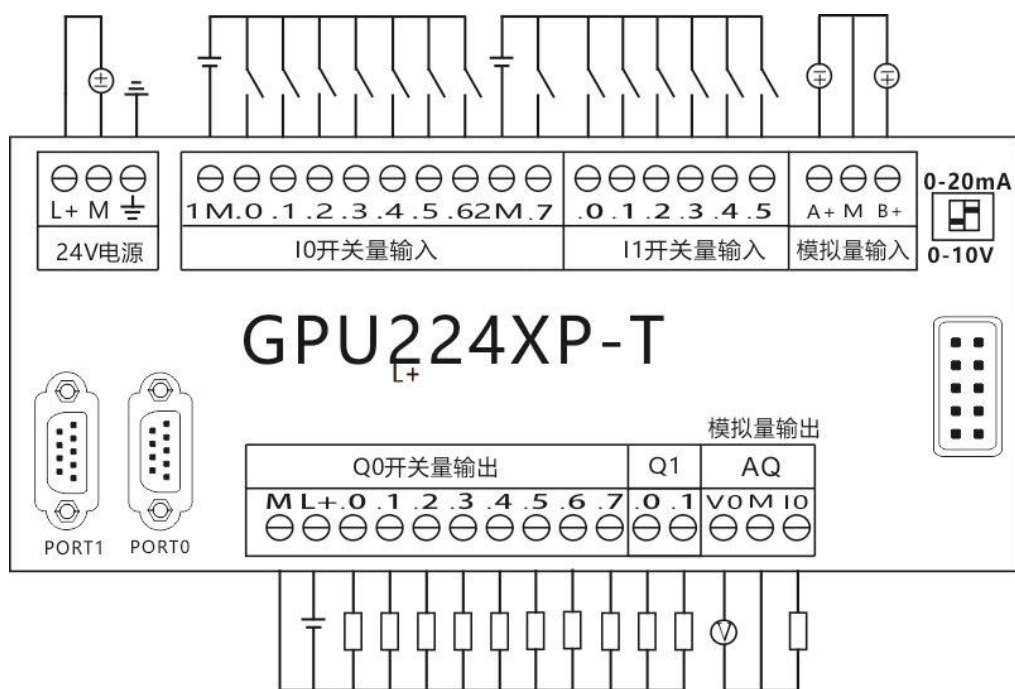
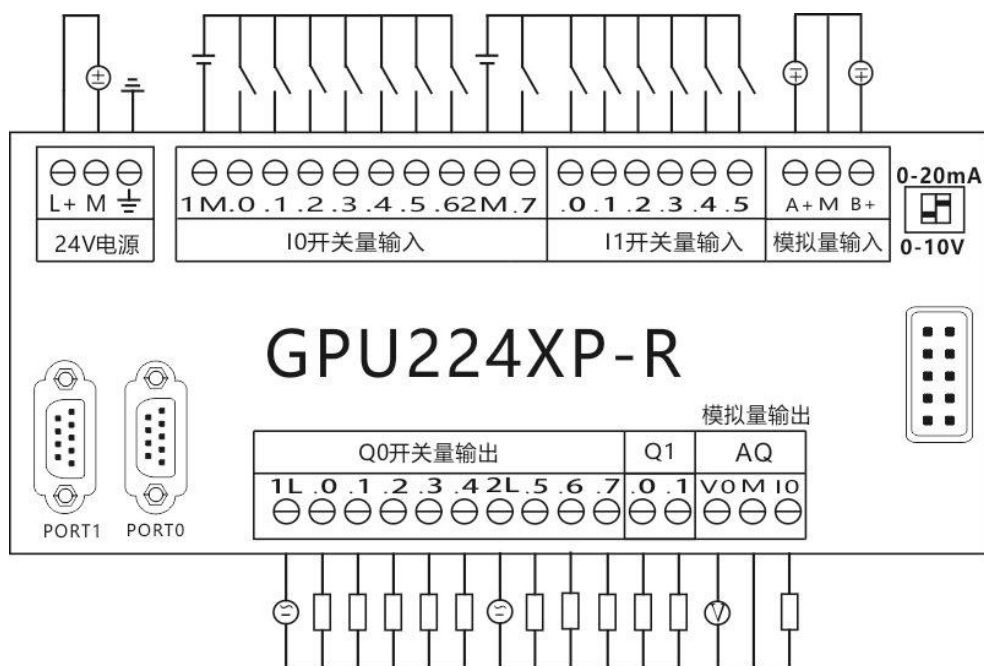
GPU221, MPU222, and GPU222 only support PORT0; GPU223, GPU224, and GPU226 support PORT0 and 1; GPU228 supports PORT0, 1, and 2. The interface definitions are as follows:

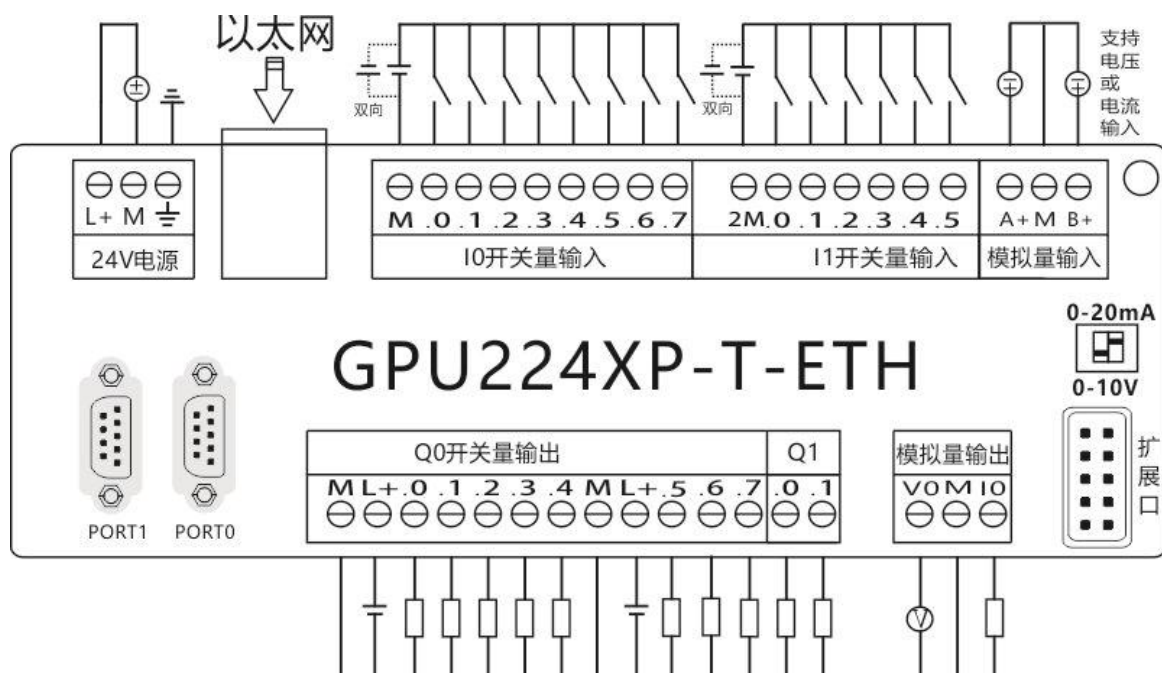
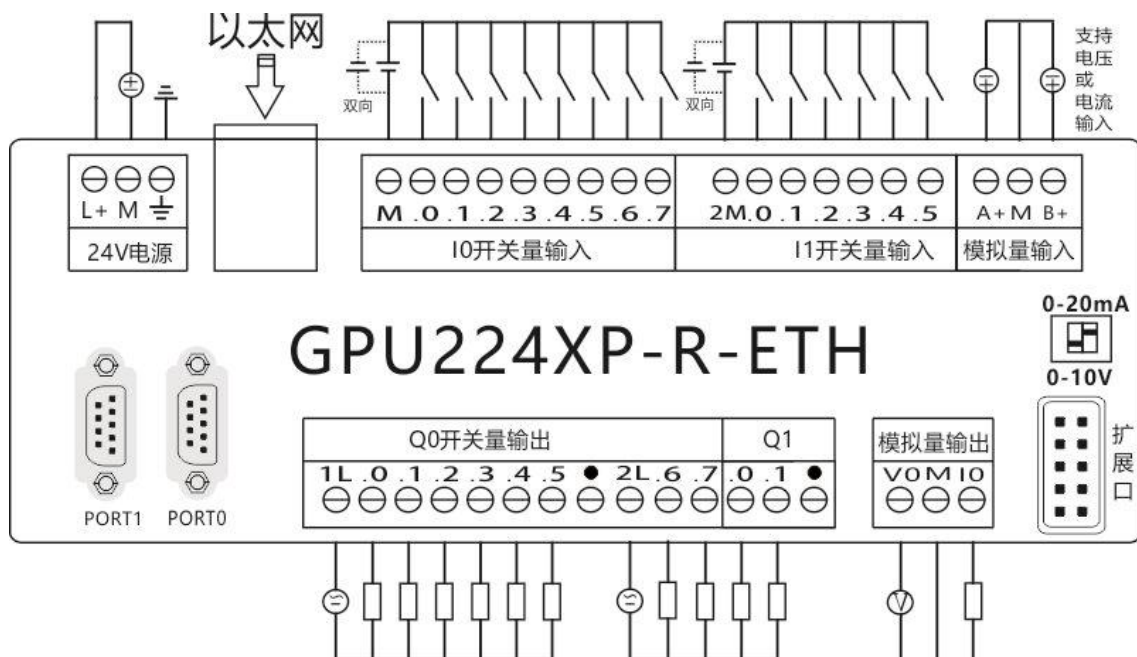
connector	Pin number	PORT0	PORT1	PORT2
	1	chassis grounding	chassis grounding	Note: Only GPU228 support. Port 2 is a terminal. Wiring configuration, on the casing Labeled as B-, A+, in RS485 Standard definition, and Siemens definition The opposite meaning.
	2	+24Vland	+24Vland	
	3	RS485SignalA	RS485SignalA	
	4	Send applicationRTS	Send applicationRTS	
	5	+5Vland	+5Vland	
	6	+5V	+5V	
	7	+24V	+24V	
	8	RS485SignalB	RS485SignalB	
	9	NC	NC	
	shell	chassis grounding	chassis grounding	

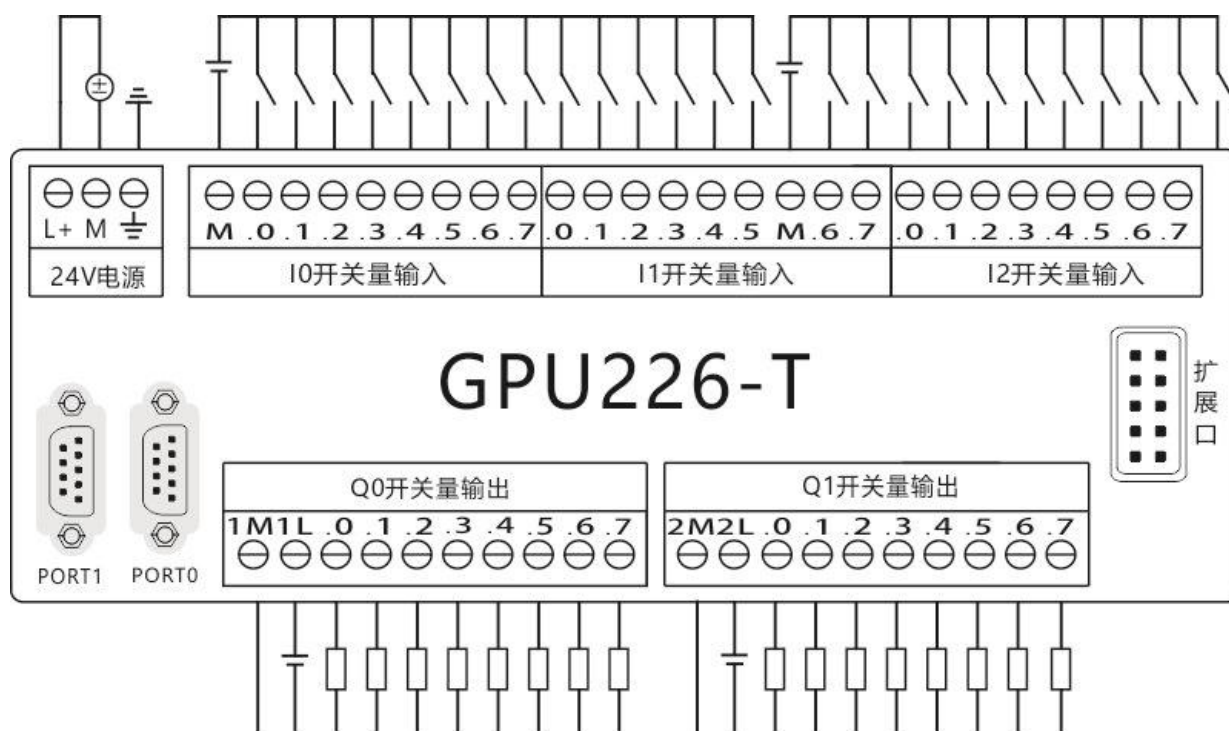
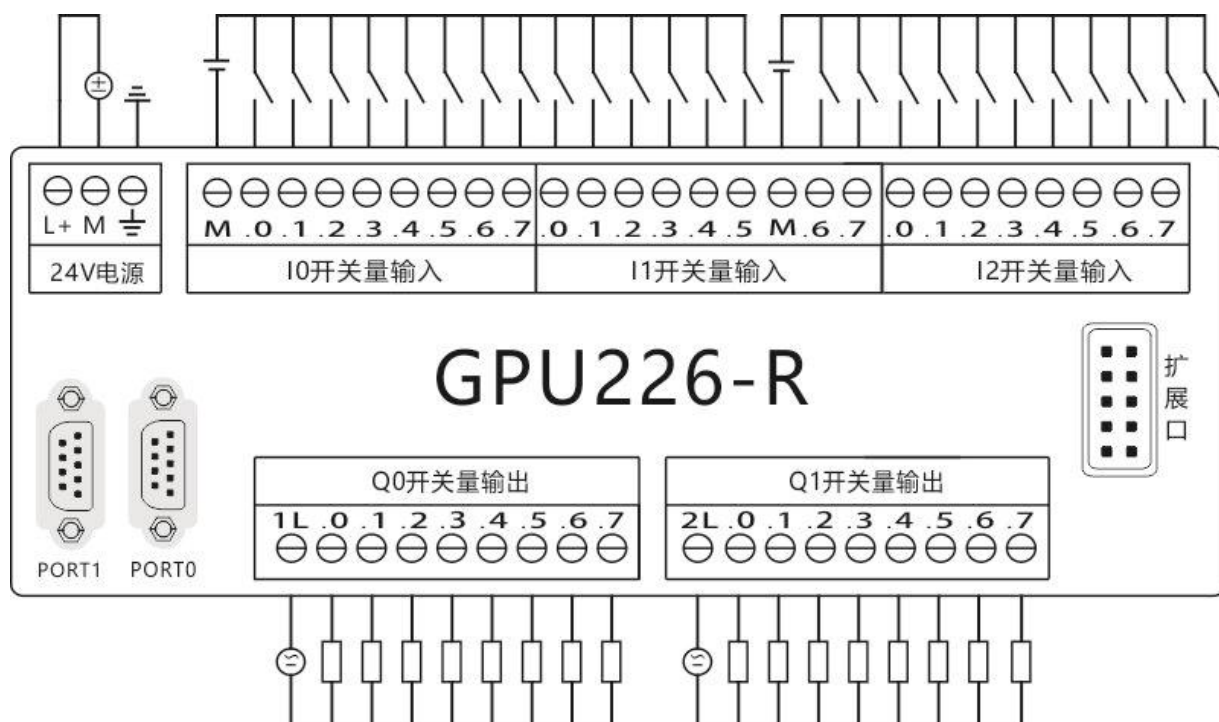
2.5Main unit wiring diagram

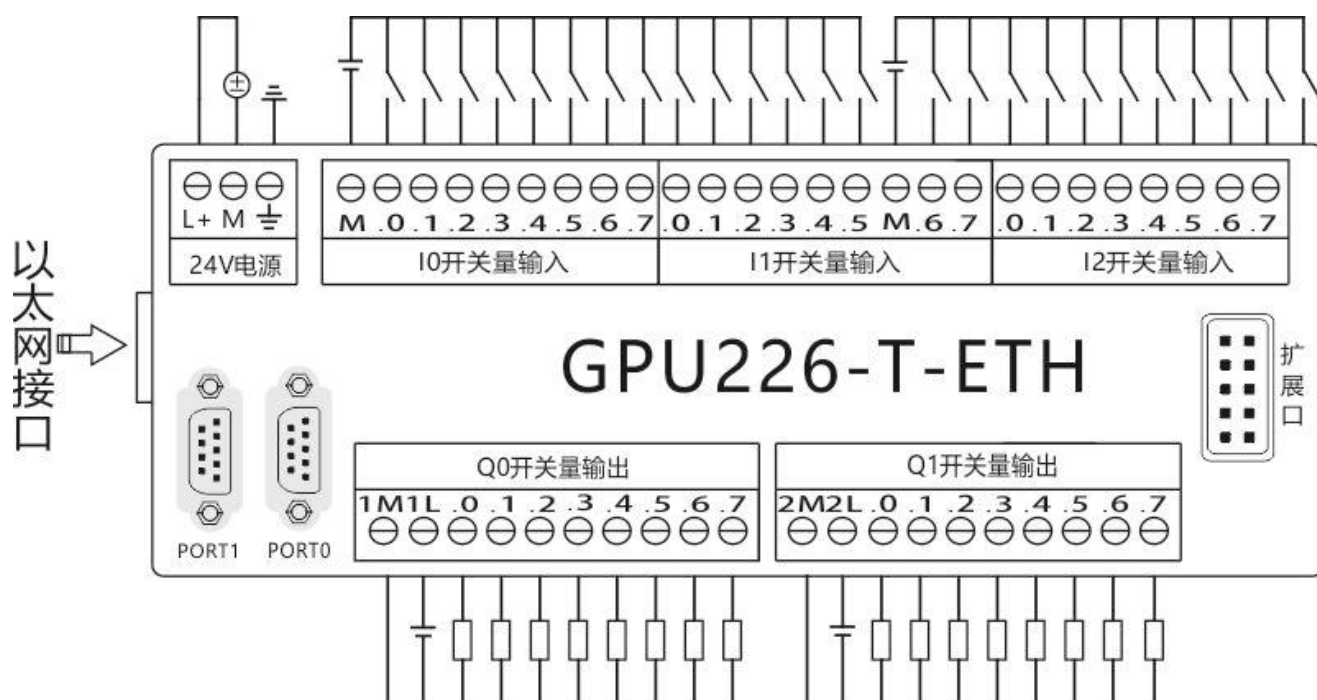
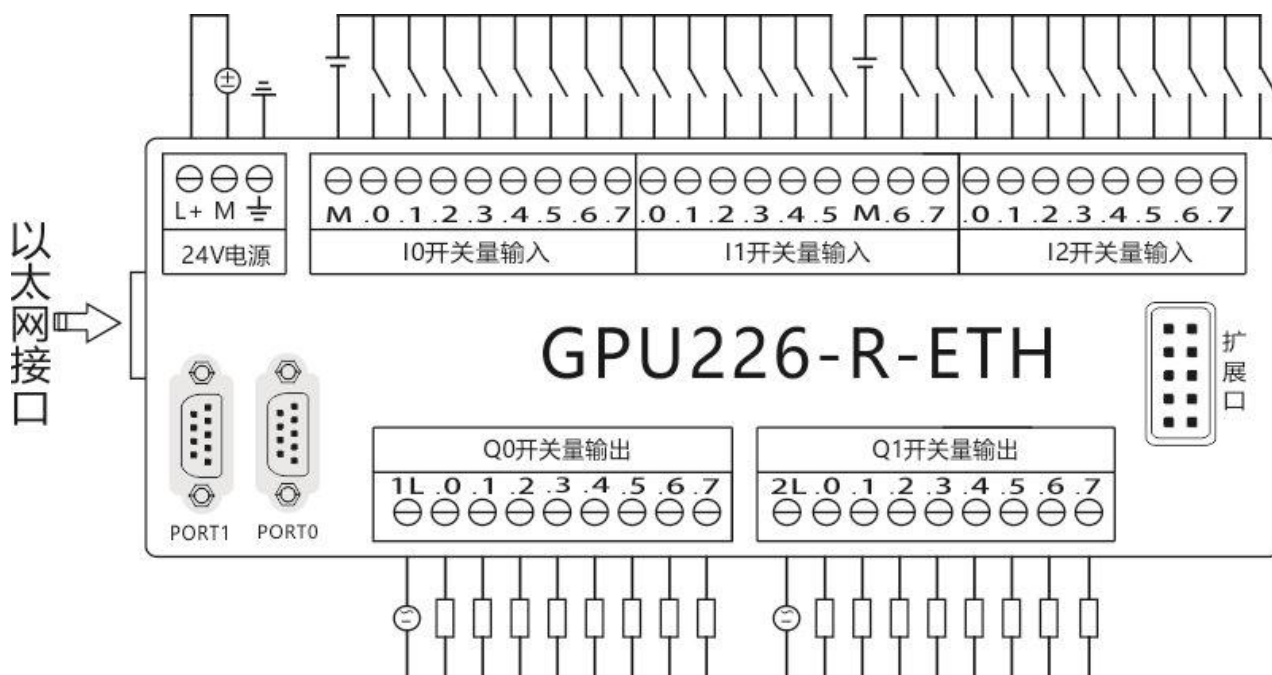


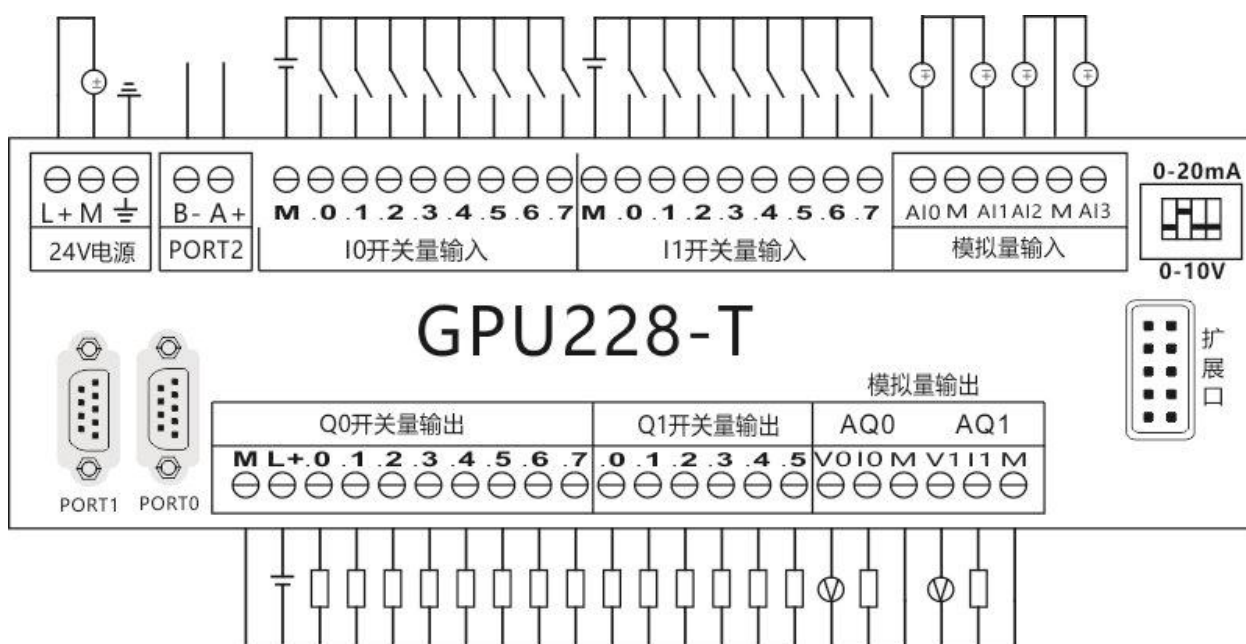
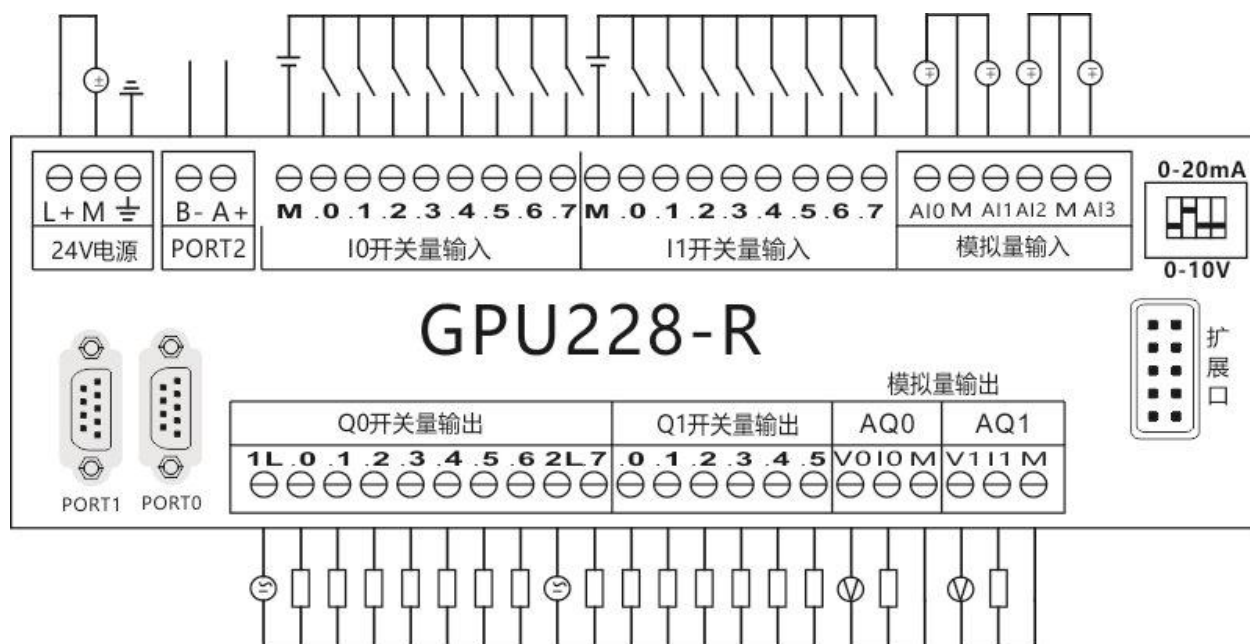




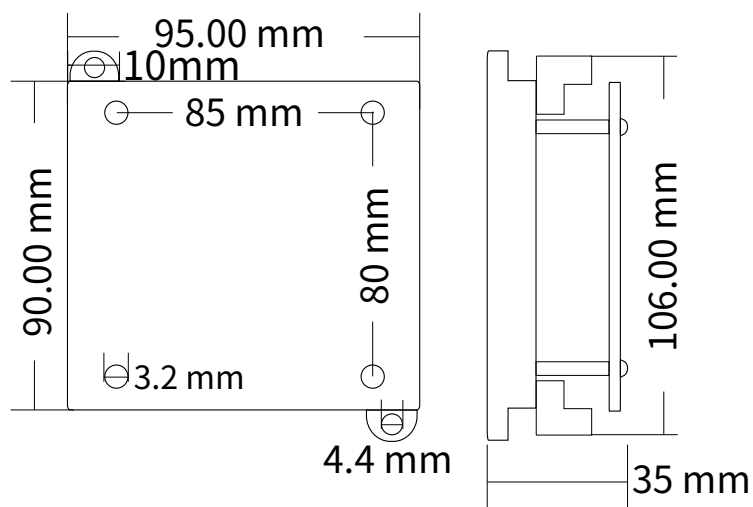




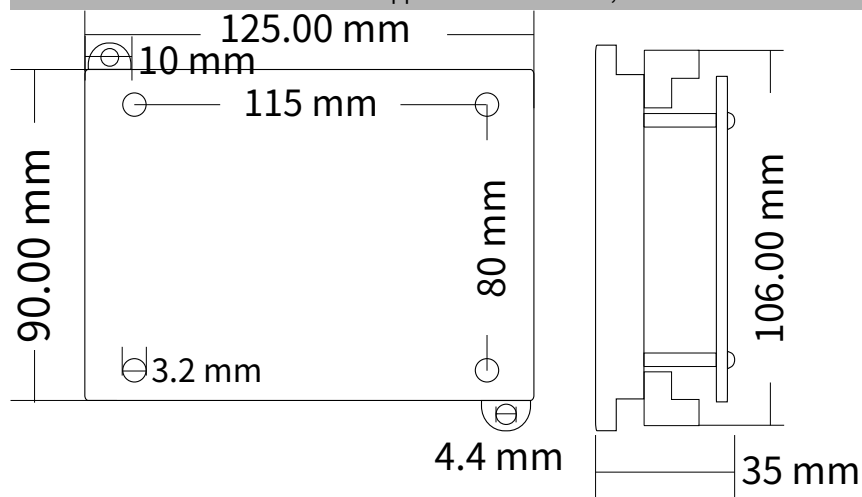




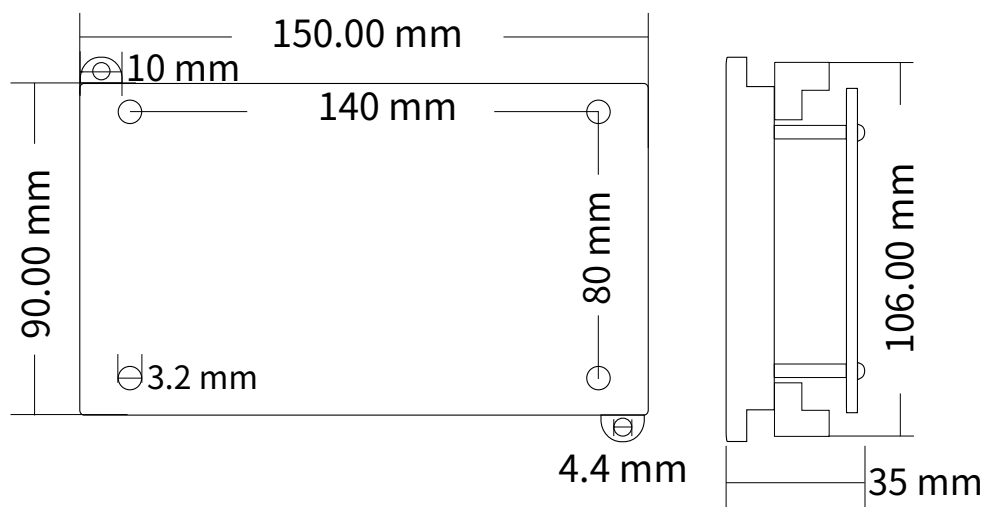
2.6Main unit dimensions and installation



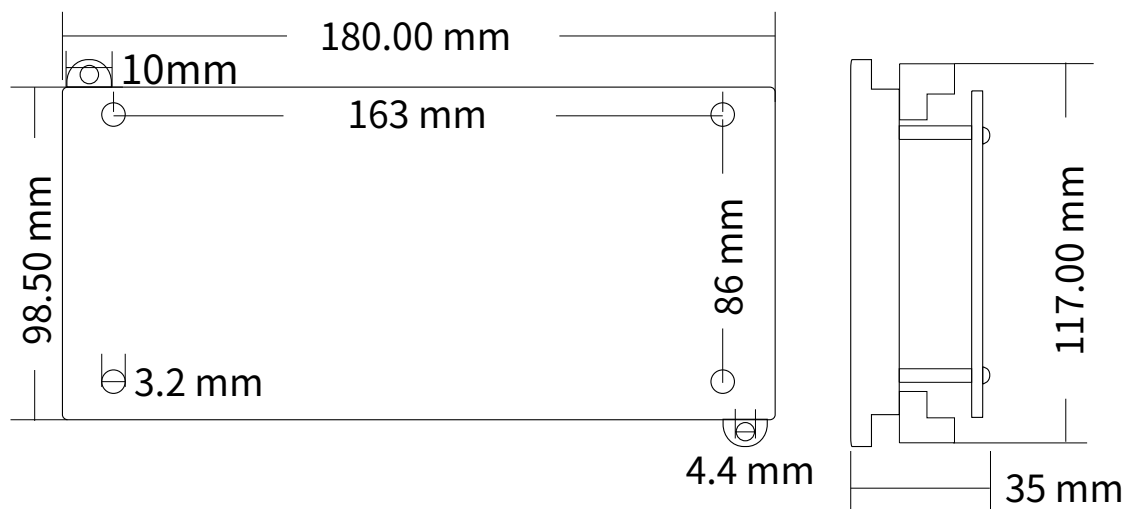
ApplicableGPU221-ETH,MPU222model



ApplicableGPU223model



ApplicableGPU224XPmodel



Applicable GPU224XP-ETH, GPU226, GPU226-ETH, GPU228 model

Note: There is a clip on the back of the black base for mounting on a rail.

2.7 PLC Common Hosting Issues

2.7.1 Programming software and PLC Communication is

unavailable. A: ① Turn on the operation switch STOP Use it again.

② Check if other computer software that occupies the communication port is open at the same time, such as configuration software or multiple programming software.

③ Communication settings for the programming software: Different programming cables require different settings. Programming cables generally come in two types: one requires driver installation and is displayed in Device Manager.COM Another type is a driverless cable, which appears in Device Manager.USB For device setup instructions, please refer to the programming cable manual. If not, you can also refer to the programming cable manual on our website; the basic operations are the same.

④ It may be due to a compatibility issue with the programming software.200The programming software is a relatively old programmable software. 64BitwindowThe system is prone to various problems. Frequently, it may fail to load drivers or display the error message "The specified access point could not be found." On our website...200 PLCThe downloaded materials contained "【工贝电子】".64"Apply the OS compatibility patch" and follow the instructions. When using the software, try right-clicking and selecting "Run as administrator." If that doesn't work, install...smartsoftware,smartThe software comes with its own driver; after installation,200The software might fix it. If that doesn't work, try reinstalling the operating system or installing a virtual machine.

3 Ethernet Port Usage Instructions

PLCs with the "-ETH" suffix have one Ethernet interface, essentially integrating a CP243 Ethernet module. However, no configuration settings are required; simply set the IP address and it's ready to use, making it simpler and more reliable than the CP243 module. It offers excellent Ethernet performance, supporting two protocols: S.7 Ethernet and Modbus TCP. It connects via a single network cable.

This enables program uploading, downloading, and monitoring, with ultra-fast download speeds, eliminating the need for programming cables. It can also communicate with configuration panels and connect directly to WinCC. If multiple PLC mainframes are connected to a single switch, they can communicate with each other.

3.1 PLCofIPAddress modification and viewing

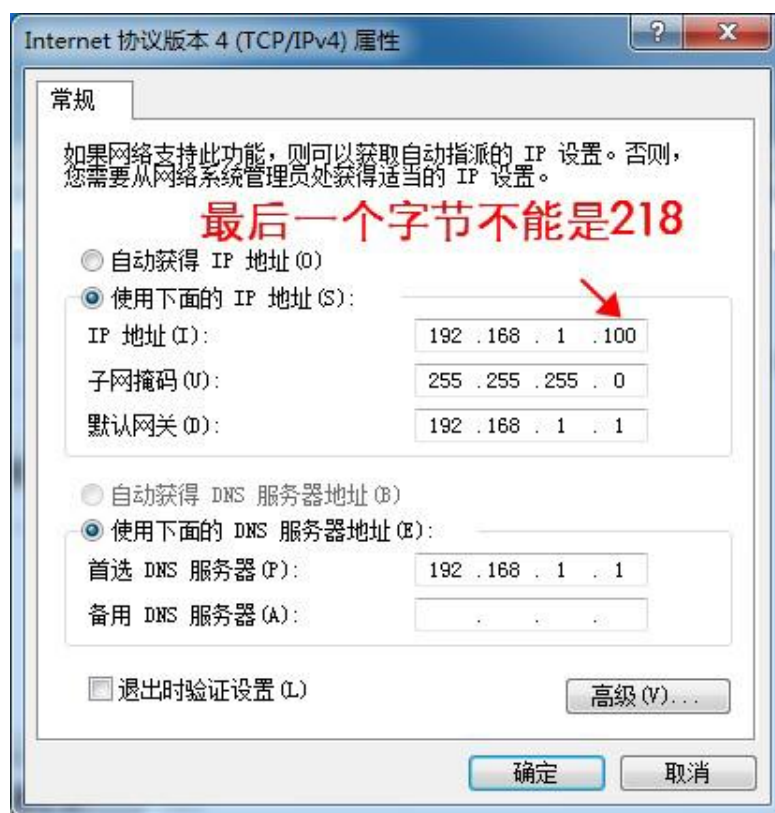
3.1.1Beginner's Guide - Computer Settings

Connect the PLC using a network cable. The machine uses the factory default IP address. 192.168.1.218 The PLC can be directly connected to a computer.

It can also be connected to a router or switch, and PLC access can be achieved through router settings.

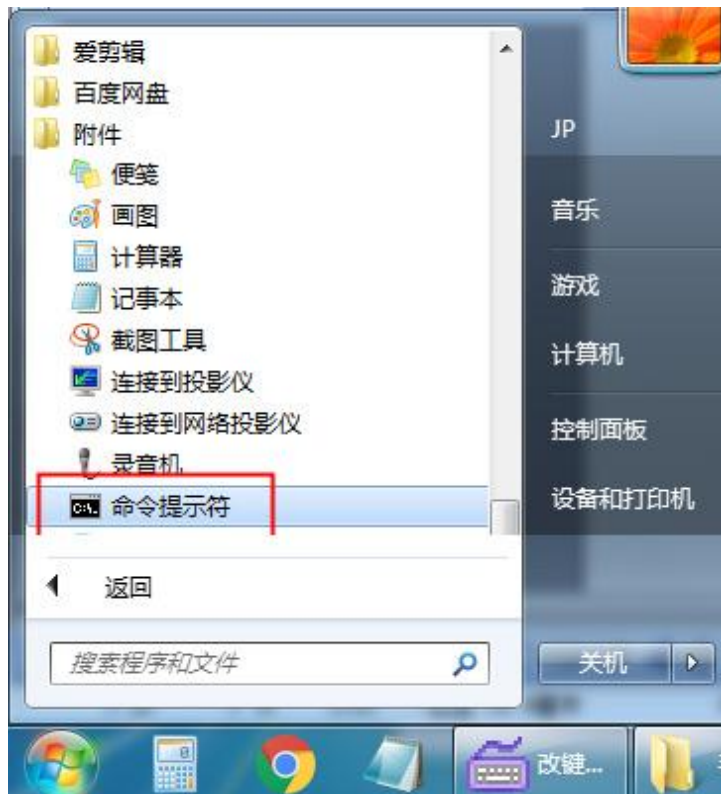
For a computer to access a PLC, both the computer and the PLC must be on the same local area network (LAN) segment, and a wired network card must be configured (note that...).

(This is a wireless network card) The IP address is within the 192.168.1.XXX network segment. Please fill in all the information as shown in the image below.



(Search on Baidu for instructions on setting IP addresses)

Fill in the computer! After setting the address, test the computer and...PLC Check if the physical connection is normal by opening "Command Prompt" on your computer.



entering 192.168.1.218Press Enter. See the image below for an explanation.PLCexist1msThe data was returned within a short time, indicating that the physical connection was normal.PLCYou can continue with the following steps. If it fails, check your computer settings until...pingOnly after it is connected can the following applications be carried out.

```
C:\Users\MrJ>ping 192.168.1.218

正在 Ping 192.168.1.218 具有 32 字节的数据:
来自 192.168.1.218 的回复: 字节=32 时间<1ms TTL=128
来自 192.168.1.218 的回复: 字节=32 时间<1ms TTL=128
来自 192.168.1.218 的回复: 字节=32 时间<1ms TTL=128
来自 192.168.1.218 的回复: 字节=32 时间<1ms TTL=128

192.168.1.218 的 Ping 统计信息:
    数据包: 已发送 = 4, 已接收 = 4, 丢失 = 0 (0% 丢失),
    往返行程的估计时间<以毫秒为单位>:
        最短 = 0ms, 最长 = 0ms, 平均 = 0ms
```

3.1.2View and modify via web pagePLCofIPAddress

Use a browser ([Internet Explorer is recommended](#)).Enter the URL, <http://192.168.1.218>. Note: This is not allowed.

Please enter https.



Click "Parameter Settings"

IP地址	192.168.001.218
网关地址	192.168.001.001
子网掩码	255.255.255.000
MAC地址	00.01.02.03.04.05

Config

Click "After making the changes" ConfigConfirm with the button.

Note: Gateway address and IP The addresses must be on the same network segment and must be modified simultaneously. Setting them to different network segments may cause issues.

Unable to reconnect to PLC .

3.1.3View via programming cableIPaddress

The IP address of the SMB395~398 device can be viewed in the registers via the PPI programming cable. See the diagram below.

7-Micro/MIN - 项目1 - [状态表]			
F(E) 编辑(E) 查看(V) PLC(P) 调试(D) 工具(T) 窗口(W) 帮助(H)			
· 3 · · 4 · · 5 · · 6 · · 7 · · 8 · · 9 · · 10 · · 11 · · 12 · · 13 ·			
	地址	格式	当前值
1	SMB395	无符号	192
2	SMB396	无符号	168
3	SMB397	无符号	1
4	SMB398	无符号	218

3.2Download and monitor the program via Ethernet

3.2.1Download steps:



Taking connecting the PLC to the computer via network cable as an example, click in the view window. Choose according to your computer's network card.

(The image below shows the network card of the demo machine. Users need to select the correct network card for their own computer. The name of your computer's network card is in "Settings".)

Check in the "Driver Manager". If the network card is not listed in the driver list, this is a software compatibility issue. It is recommended to install a 64-bit system.

Download the system patch (from the official website of Gongbei) and click "Diagnosis" to perform a test.



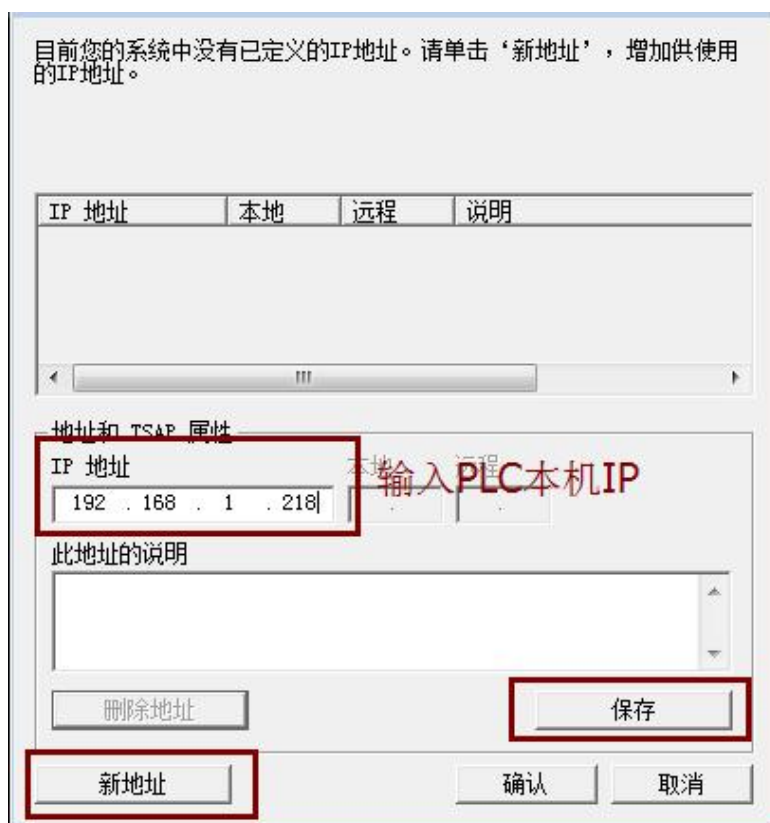
OK, this means the SR protocol test was successful, but it doesn't necessarily mean the PLC connection was successful, because even without a PLC connection,

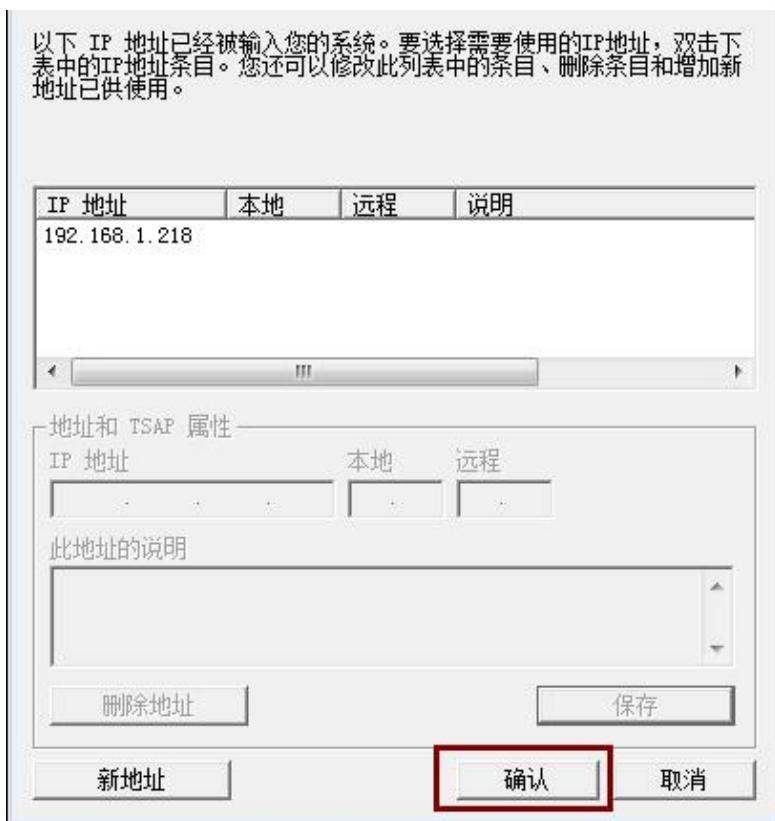
If the SR protocol is working correctly, the test will pass successfully; if it fails, please refer to the section "SR Protocol Diagnosis and Troubleshooting".



"Method". Click on the viewing interface.

Button,





Click OK, double-click to refresh the list, and the host column will be recognized. PLC The model number indicates a successful connection.



Finally, be sure to click on the device that appears in the search results, and then click "Confirm".

The remaining steps are as follows. The same applies to cable downloads and monitoring.

3.3 S.7 Ethernet Protocol - Configuration Communication Examples

The Gongbei PLC's Ethernet port supports both S.7 Ethernet and Modbus TCP protocols. Communication is via the S.7 Ethernet protocol.

The advantage is that no programming is required on the PLC side; the disadvantage is that the S.7 Ethernet protocol only supports server mode (and touch screens, computer groups).

In terms of software communication, PLCs typically use a server-based model, so the S.7 Ethernet protocol is suitable for most industrial scenarios.

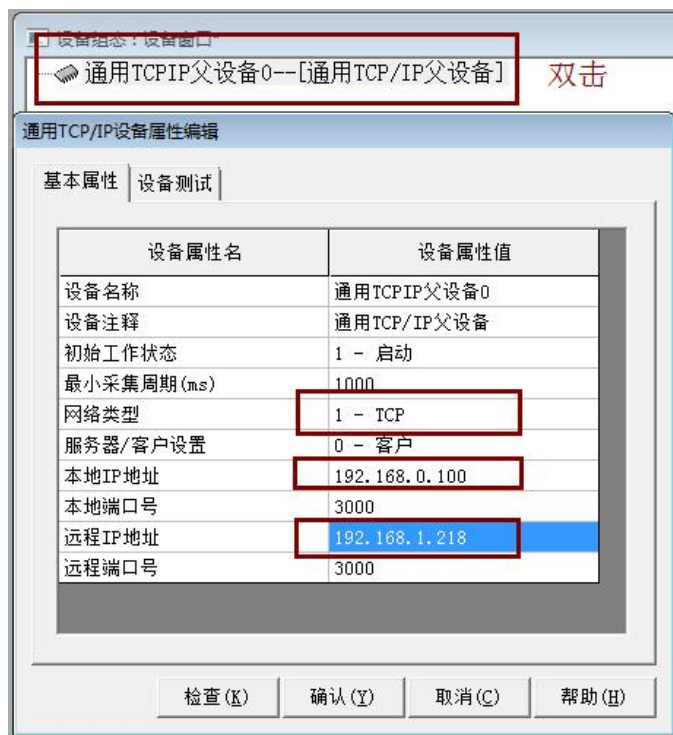
The following example uses communication with the MCGS configuration screen.

3.3.1 Add parent device

In the Devices window, double-click "Generic TCP/IP Parent Device".



And set the parameters as shown in the figure below;



3.3.2 Add device

Any driver that supports the S.7 Ethernet protocol will work; the Smart driver is recommended. See the image below for completion.



3.3.3 Double-click the device to start configuration

设备属性名		设备属性值
[内部属性]		设置设备内部属性
采集优化	1-优化	
设备名称	设备0	
设备注释	西门子 Smart200	
初始工作状态	1 - 启动	
最小采集周期(ms)	100	
TCP/IP通讯延时	200	
重建TCP/IP连接等待时间[s]	10	
机架号[Rack]	0	
槽号[Slot]	2	
快速采集次数	0	
本地IP地址	192.168.1.100	
本地端口号	3000	
远端IP地址	192.168.1.218	
远端端口号	102	

索引	连接变量	通道名称	通道地址
0001	I0_0	只读I000.0	
0002	I0_1	只读I000.1	
0003	I0_2	只读I000.2	
0004	I0_3	只读I000.3	
0005	I0_4	只读I000.4	
0006	I0_5	只读I000.5	
0007	I0_6	只读I000.6	
0008	I0_7	只读I000.7	
0009	I1_0	只读I001.0	
0010	I1_1	只读I001.1	
0011	I1_2	只读I001.2	
0012	I1_3	只读I001.3	
0013	I1_4	只读I001.4	
0014	I1_5	只读I001.5	
0015	I1_6	只读I001.6	
0016	I1_7	只读I001.7	
0017	I2_0	只读I002.0	
0018	I2_1	只读I002.1	
0019	I2_2	只读I002.2	
0020	I2_3	只读I002.3	
0021	I2_4	只读I002.4	
0022	I2_5	只读I002.5	
0023	I2_6	只读I002.6	
0024	I2_7	只读I002.7	
0025	Q0_0	读写Q000.0	

Enter the IP address of your local machine (computer or touchscreen);

Enter the remote (PLC) IP address;

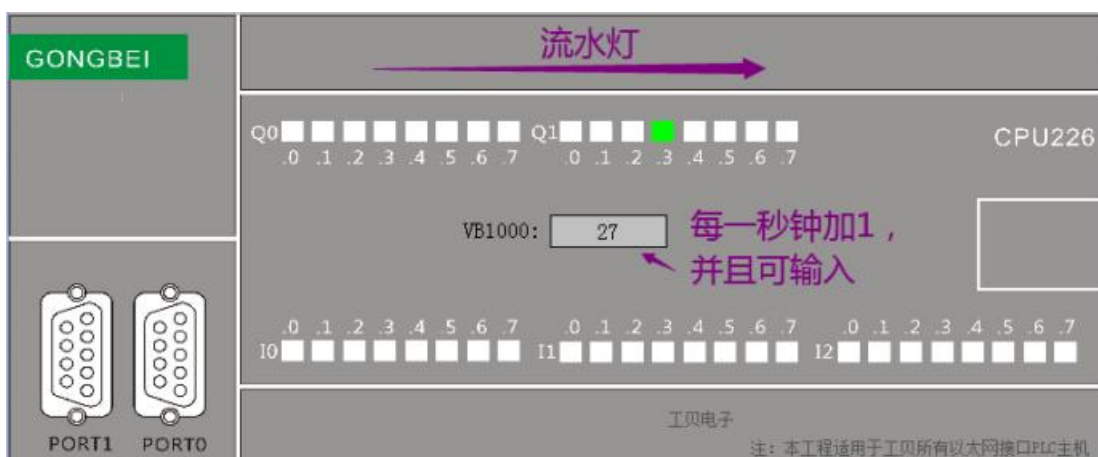
Enter the remote port number. The PLC's port number in server mode using the S7 Ethernet protocol can only be 102.

Finally, by mapping the variables to the screen, direct communication can be achieved.

Download and extract the "[Ethernet] GB PLC Ethernet Test Routine" from the Gongbei official website. Run the PLC routine "GB PLC"

Ethernet Smart200 Ethernet Module Device Test Routines.mwp and MCGS Routines GB PLC Ethernet

The following is the display on the MCGS end of the "Smart200 Ethernet Module Device Test Routine.MCE".



3.4 MODBUS TCPProtocol - Installation Library and Address Table

The Gongbei PLC has an Ethernet port that supports Modbus TCP server mode and client mode.

3.4.1 Install MODBUS TCP Instruction library

When you open the S.7 programming software, the Modbus TCP library is not available in the library, as shown in the image below.



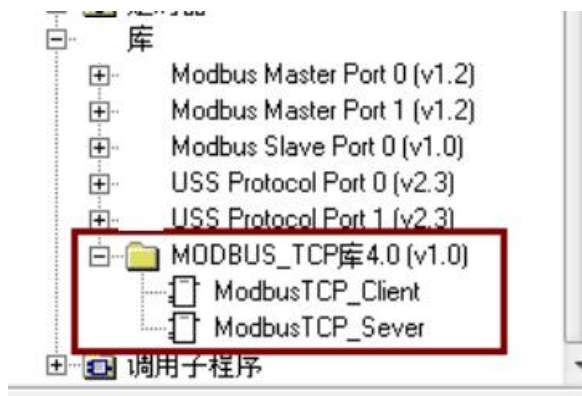
Download the latest Modbus TCP library "[Ethernet] Modbus TCP Installation Library 4.0.mwl" from the Gongbei Electronics website.

Double-click. Then click "Yes".



This library file cannot be deleted after installation, otherwise the library will be lost. Therefore, it is recommended to copy it to a fixed location.

After restarting, the MODBUS_TCP library will be installed, as shown in the image below.



3.4.2 MODBUS Address Mapping Table

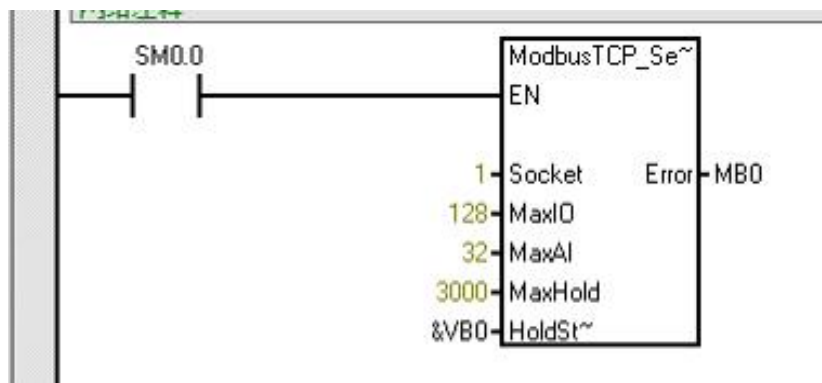
Modbus address	Mapping to PLC address	Function code	describe
0000 to 00128	Q0.0 to Q15.7	Read coil: Function code 1; Write a single coil: Function code 5 Write multiple coils: Function code 15	Read/Write Digital Output Register
1000 to 10128	I0.0 to I15.7	Read input status bit: Function code 2	Read digital input register
30001 to 30128	AIW0 to AIW62	Read input register: Function code 4;	Read analog input register

4000 to 4XXXX	VW (HoldStart) to VW[HoldStart +2 * (XXXX-1)]	Read holding register: Function code 3; Write to a single register: Function code 6; Write to multiple registers: Function code 16;	Hold register, corresponding to V region, HoldStart Fill in the program instructions. For example: If HoldStart is assigned the value &VB1000 in the instruction, then... Address 40001 corresponds to VW1000. Address 40002 corresponds to VW1002. Address 40003 corresponds to VW1004. Address 40004 corresponds to VW1006.
---------------	---	--	--

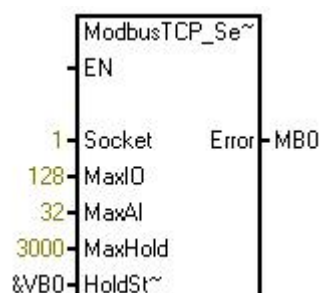
3.5 PLCDoModbus TCPThe server and the computer (touchscreen) act as the client.

Using a PLC as the server and a touchscreen as the client is the most common connection method, and it's also the simplest for PLC programming.

This method only requires writing one command. The Modbus TCP server uses port 502.



3.5.1 PLC Server-Side Instructions (ModbusTCP_Server)



parameter	type	definition
EN	Bool	Enable
Socket	Byte	Interface numbers 1, 2, 3, 4, 5; note that these are interface numbers, not the number of interfaces. A maximum of 5 interface numbers are supported, indicating that a specific interface number is open. The server and client interface numbers can be different. If you want two clients to access the service simultaneously, you need to open two interface numbers, meaning you need to write two separate programs, with only the sockets differing.
Error	Byte	Error code

MaxIO	Word	Maximum I/Q bits: The maximum number of I/O points involved in communication. The I/O map area is 128/128, with a default value of 128.
MaxAI	Word	Maximum AI word count, the maximum number of AI channels participating in communication, can be 16 or 32.
MaxHold	Word	The largest holding register area contains the V memory word (VW) used for communication.
Holdstart	Dword	In Modbus TCP, zone 40000 corresponds to the starting address of the PLC's holding register area, specified by &VBx (indirect addressing mode).

3.5.2 Setting up the client on a computer (touchscreen)

Taking MCGS as an example, select the general TCP/IP parent device and choose the Modicon ModbusTCP device:

通用TCP/IP设备属性编辑

基本属性 | 设备测试

设备属性名	设备属性值
设备名称	通用TCPIP父设备0
设备注释	通用TCP/IP父设备
初始工作状态	1 - 启动
最小采集周期(ms)	100
网络类型	1 - TCP
服务器/客户设置	0 - 客户
本地IP地址	192.168.1.100
本地端口号	3000
远程IP地址	192.168.1.218
远程端口号	502

端口必须502 Modbus TCP规定

检查(K) 确认(Y) 取消(C) 帮助(H)

The Modicon ModbusTCP device is configured as follows:

设备属性编辑窗口

通用TCPIP父设备0--[通用TCP/IP父设备]
设备1--[莫迪康ModbusTCP]

驱动构件信息:
驱动版本信息: 3.043000
驱动模块信息: 新驱动模块
驱动文件路径: D:\MCGSE\Program\drivers\通用设备\modbus
驱动预留信息: 0.000000
通道处理拷贝信息: 无

设备属性名	设备属性值
[内部属性]	设置设备内部属性
采集优化	1-优化
设备名称	设备1
设备注释	莫迪康ModbusTCP
初始工作状态	1 - 启动
最小采集周期(ms)	100
设备地址	1
通讯等待时间	500
快速采集次数	0
16位整数解码顺序	0 - 12
32位整数解码顺序	0 - 1234
32位浮点数解码顺序	0 - 1234
分块采集方式	0 - 按最大长度分块
4区16位写功能码选择	0 - 0x06

索引	连接变量	通道名称	通道处理
0000		通讯状态	
0001	I0_0	只读10001	
0002	I0_1	只读10002	
0003	I0_2	只读10003	
0004	I0_3	只读10004	
0005	I0_4	只读10005	
0006	I0_5	只读10006	
0007	I0_6	只读10007	
0008	I0_7	只读10008	
0009	I1_0	只读10009	
0010	I1_1	只读10010	
0011	I1_2	只读10011	
0012	I1_3	只读10012	
0013	I1_4	只读10013	
0014	I1_5	只读10014	
0015	I1_6	只读10015	
0016	I1_7	只读10016	
0017	I2_0	只读10017	
0018	I2_1	只读10018	
0019	I2_2	只读10019	
0020	I2_3	只读10020	
0021	I2_4	只读10021	
0022	I2_5	只读10022	
0023	I2_6	只读10023	
0024	I2_7	只读10024	

增加设备通道
删除设备通道
删除全部通道
快速连接变量
删除连接变量
删除全部连接
通道处理设置
通道处理删除
通道处理复制
通道处理粘贴
通道处理全删
启动设备调试
停止设备调试
设备信息导出
设备信息导入
打开设备帮助
设备组态检查

Finally, configure the screen, connect the variables, and connect with a network cable to enable communication.

We have created a sample program for using MCGS as a client PLC and a server for your reference. You can download it from the official website.

GB PLC Ethernet MODBUS-TCP Touchscreen Client Test Example.MCE

GB PLC Ethernet MODBUS TCP PLC Server-Side Test Program.mwp

Download the two programs separately. The PLC's scrolling LED display is mapped to the MCGS terminal, as shown in the image below.



Note: MCGS's connection policy is that if the connection is lost, it will reconnect after a period of time. Therefore, if MCGS is clicked on the computer...

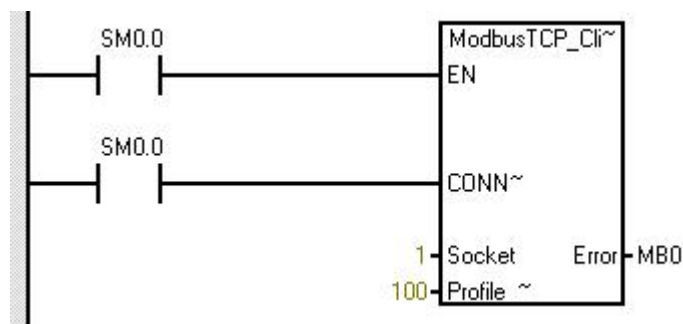
If you stop and then click "Run," it will take about 2 minutes to reconnect. If you download MCGS to the touchscreen, according to my tests...

It will reconnect in approximately 20 seconds. If you are using the ModScan testing tool on your computer to connect to the PLC, will it reconnect after disconnection?

You will need to wait; the connection will reconnect immediately. So, if the MCGS indicator on your computer isn't running, just wait a while.

3.6 PLCDoModbus TCPThe client uses a computer (touchscreen) as the server.

This type of use is mainly employed in...PLCConnection supportModbus TCPIn sensor applications of the protocol. Client commands (ModbusTCP_ClientSet in the ladder diagram:



parameter	Parameter type	Data types	definition
EN	INPUT	Bool	Enable
CONNECT	INPUT	Bool	0: Disconnect 1: Establish and maintain the connection.
Socket	INPUT	Byte	Interface numbers 1, 2, 3, 4, 5; note that these are interface numbers, not the number of interfaces. A maximum of 5 interface numbers are supported, indicating which interface number is being used. The server and client interface numbers can be different. If you want to access multiple servers, you can open only one socket, but the access will be slower. Opening two sockets will allow parallel access, which is much faster.
Profile_Table	INPUT	Word	The starting address of the communication envelope table. Represented by byte offsets starting from V0 (example). For example, VB99 corresponds to the value 99.
Error	INPUT	Byte	Error code

Add data to the data block according to access requirements:

查看

数据块

工具

用户定义1

VB100 4
VB101 192
VB102 168
VB103 1
VB104 205
VB105 16#FF
VB106 3
VW107 40001
VW109 4
VW111 1000
VW113 1300
VB115 0
VB121 192
VB122 168
VB123 1
VB124 205
VB125 16#FF
VB126 16
VW127 41000
VW129 4
VW131 1600
VW133 1900
VB135 0
VB141 192
VB142 168
VB143 1
VB144 210
VB145 16#FF
VB146 16
VW147 41200
VW149 4
VW151 2200
VW153 2500
VB155 0
VB161 192
VB162 168
VB163 1

本socket要访问的段数

对方IP地址

从站地址, Modbus TCP默认FF

3是功能码,
4001是数据地址,
4是数据个数

1000是V区发送数据的起始地址,
1300是V区接收数据的起始地址,
0是本段的状态字

VB116-VB120保留

第二段

第三段

VB136-VB140保留

The data transmission configuration format is as follows:

Send starting address	example		example
Offset address			

VBn	4	The number of segments accessed by this socket	4
VBn+1	First paragraph	The highest byte of the other party's IP address	192
VBn+2		The second byte of the other party's IP address	168
VBn+3		The third byte of the other party's IP address	1
VBn+4		The last byte of the other party's IP address	205
VBn+5		Slave ID (Slave Address)	16#FF
VBn+6		Function code	3
VWn+7		The data address to be read/written from the slave station	40001
VWn+9		Number of data read and written	4
VWn+11		V - Starting address for sending data from memory area	1000
VWn+13		V. Starting address for receiving data in the storage area	1300
VBn+15		Status bytes of this segment	
VBn+16 VBn+20		This section is reserved for future use.	
VBn+21	Second paragraph	The highest byte of the other party's IP address	192
VBn+22		The second byte of the other party's IP address	168
VBn+23		The third byte of the other party's IP address	1
VBn+24		The last byte of the other party's IP address	205
VBn+25		Slave ID (Slave Address)	16#FF
VBn+26		Function code	16
VWn+27		The data address to be read/written from the slave station	41000
VWn+29		Number of data read and written	4
VWn+31		V - Starting address for sending data from memory area	1600
VWn+33		V. Starting address for receiving data in the storage area	1900
VBn+35		Status bytes of this segment	
VBn+36 VBn+40		This section is reserved for future use.	
continuous		continuous	

The format of the received data is as follows::

answer	Receive starting address Offset address	describe	
The correct one should answer	VBn	Number of received data	
	VBn+1	Slave ID (Slave Address)	
	VBn+2	Function code	
	VBn+3	Number of data reads	
	VBn+4	Data area	
Error	VBn	Number of received data	
	VBn+1	Slave ID (Slave Address)	

	VBn+2	Function code + 0x80	Function code highest position 1
	VBn+3	Error code: 0 No error The value of Count is 0. 2. Invalid data address 4 Communication port is busy 6. Function code error	

In the example above, Only enabled Socket1 Communication port part1access192.168.1.205, part2access192.168.1.205, part3access192.168.1.210, part4access192.168.1.213, Accessing different devices via the same communication port IP Address, this will reduce communication efficiency.. Recommend the same socket Access only the same IP Address, to access another IP For the address, open another one. socket Configure it.

3.7 PLC Common Ethernet Port Issues

3.7.1 Ping It doesn't work.

A: This indicates a failed physical layer connection. ① Check if the network cable is loose. ② Check the computer IP Whether or not PLC of IP They are on the same network segment. ③ Computer gateway address, subnet mask, DNS ④ Try turning off your computer's wireless network adapter. ⑤ Connect your computer to... PLC Try connecting directly with an Ethernet cable, without the intermediate router.

3.7.2 Ping The connection is established, but the webpage cannot be opened.

A: ① Change IE Try your browser. ② The URL does not allow the use of... https, need to use http ③ Try a different computer.

3.7.3 S7 Software settings PC/PG The network card driver cannot be found in the interface.

A: Download from the website 64 Apply the bit patch and try running it.

3.7.4 Two CPU 226-ETH When devices are connected to the same switch, one of them will always experience lag.

answer: PLC After leaving the factory MAC The addresses are all the same; check... MAC If the addresses are not the same, you can modify one of them.

3.7.5 Two PLC It can't communicate when connected directly with a network cable, but it can communicate when both are plugged into a switch. A: Try

using a crossover network cable.

4. Extension module usage

4.1 Overview

GB Budget-friendly hosting supports a maximum of 7 One expansion module, supporting up to [number] digital inputs and outputs. 128 Points, analog inputs and outputs can support up to [number] points. 32 point.

How to view the starting address of digital and analog quantities:

exist S7 Select "Software menu bar" PLC Then select "Information," and an information table will pop up. The information table will display... PLC The information is as follows: the first line represents the host module, and each subsequent line represents an expansion module. The starting addresses of digital and analog signals are based on this table.

模块	类型	输入	起始地址	输出	起始地址	状态
PLC	数字量和模拟量	16	I0.0	16	Q0.0	无错误
0	模拟量	4	AIW4	2	AQW4	无错误
1	数字量	0	I2.0	8	Q2.0	无错误
2						不存在
3						不存在
4						不存在
5						不存在
6						不存在

In the picture above PLC The first one in the system is CPU224XP The host module, as its type indicates, has both digital and analog input channels. Digital inputs are from...I0.0 Start occupying 16 Bit, digital output from Q0.0 Start occupying 16 The number of analog signals used is not displayed, but it can be inferred from the second piece of information.

The second one is EM235 Analog expansion module, analog input from AIW4 Channel starts, occupied 4 One byte. Analog output channel from AQW4 Start occupying 2 One byte. From this, we can infer the analog input channel of the first host computer from...AIW0 Start occupying 4 One byte. Analog output channel from AQW0 Start occupying 4 One byte.

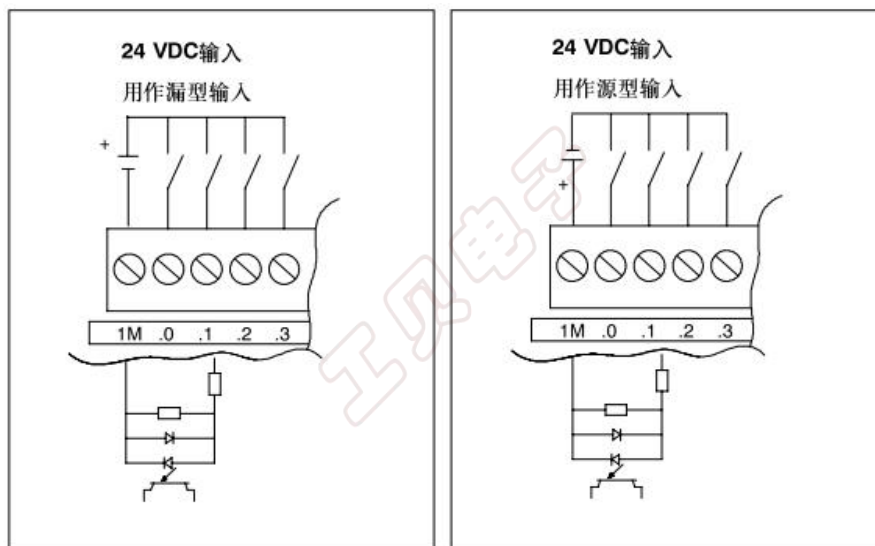
The third one is EM222-Q8 Digital expansion module, digital input from I2.0 Start occupying 8 One byte means there is no digital input. Digital output starts from...Q2.0 Start occupying 8 Bit.

Note: If the address table is incorrect, the entire system will lose power. 30s Then, simply restart.

4.2 Expansion Module Technical Specifications

4.2.1 Digital input/output module technical parameters

Digital Input Specifications	24VDC Center
Input type	Sink/Source
Input rated voltage	24VDC, 4mA
Maximum continuous voltage	30VDC
Surge voltage	35VDC, 0.5s
logic1	15 to 30VDC
logic0	0 to 5VDC
Input delay (maximum)	4.5ms
Maximum allowable leakage current of a two-wire proximity switch sensor	1mA
Isolation (optical isolation) from the field to the logic	500VAC, 1 minute

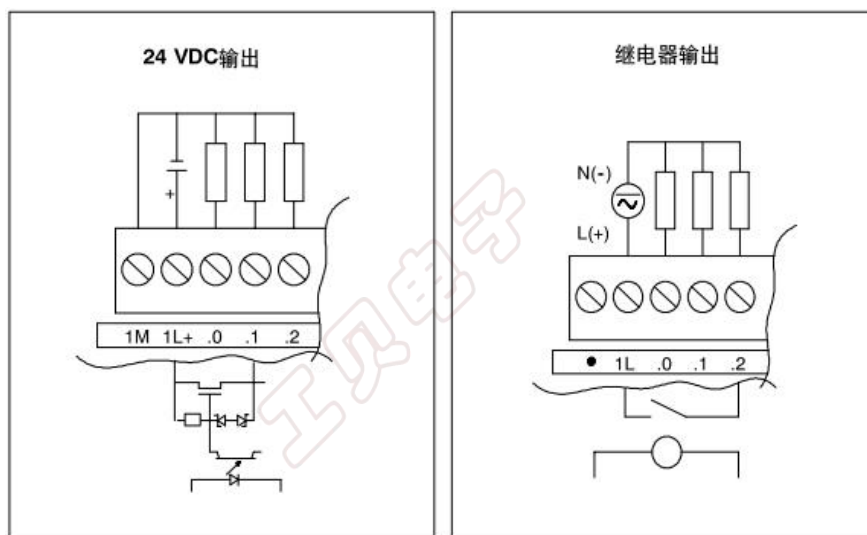


Digital expansion module input internal structure diagram

hint: It uses a bidirectional optocoupler internally, which can realize either sink or source connection.

Digital output specifications	24VDC Output	Relay output
-------------------------------	--------------	--------------

Output type	transistor(PNP)	dry contacts
Output rated voltage	24VDC	24VDCor250VAC
Output voltage range	20.4to28.8VDC	5to30VDCor5to250VAC
Surge current (maximum)	8A,100m	5A, 4s@10%Duty cycle
logic1(Minimum)	20VDC	—
logic0(maximum)	0.1VDC 10K	—
Rated current per point (maximum)	Source type 0.8A (	5AResistive; 0.5A DCSensitivity
Maximum current at common terminal	10A	10A
Leakage current (maximum)	10 μ A	—
Lighting load (maximum)	5W	30WDC 200WAC
On-resistance (maximum)	0.3 Ω	0.2 Ω
Isolation (optical-isolation)	From scene to logic:500VAC, 1minute	Coil to contact:1500VAC,1minute
Disconnect to Connect / Connect to Disconnect	200 μ s	10ms
Enable maximum delay		
Switching frequency (maximum)	1Hz	
Mechanical life	—	10,000,000(No load)
Contact life	—	100,000 ((Rated load)



Digital expansion module output structure diagram

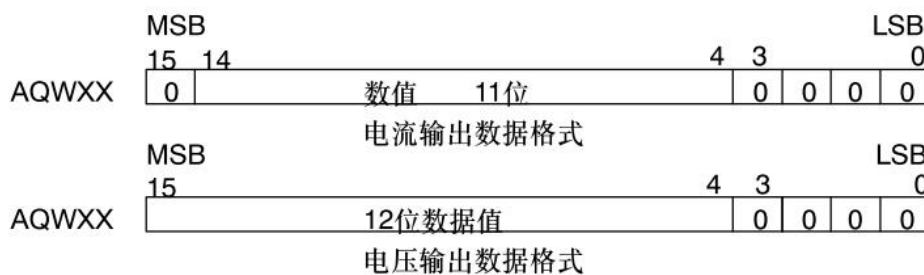
4.2.2 Analog Module Technical Parameters

Analog input channel specifications	parameter	Analog Channel Output Specifications	parameter
Data word format: Unipolar, full scale	0to32000	Signal range: Voltage output	$\pm 10V$

		Current output	0~20mA
Input impedance: voltage Current	>2MΩ 150Ω	resolution	12Bit
Maximum input voltage	3	Format: Voltage Current	- 32000to32000 0to32000
Maximum input current	3	Voltage output Current output	± full scale1% ± full scale1%
resolution	1	Time: Voltage Output Current output	100μs 2
Accuracy: Voltage Input Current input	± ± full scale0.5%	Drive: Voltage output Current output	5 5
Input type	Non-difference	Isolation (of the scene and the logic)	none
Input range: Voltage/Current	0-10V / 0-20mA	—	
Isolation (of the scene and the logic)	none	—	

Data format:**hint:**

The number of bits in the analog input is 12 Left-aligned. ADC Each change in count value 1, In the data word, it is in 8 for unit change change.

**hint:**

The number of bits in the analog output is 12 Left-aligned. The output voltage and output current are simultaneously affected by one

Positive number 1 Representing negative numbers

24VDC Power indicator light:

Light on: Power supply is normal, connection to host is normal.

Extinguished: Power supply error or connection problem with host.

hint:

Expansion module powered separately 24V, No

The light is not on.

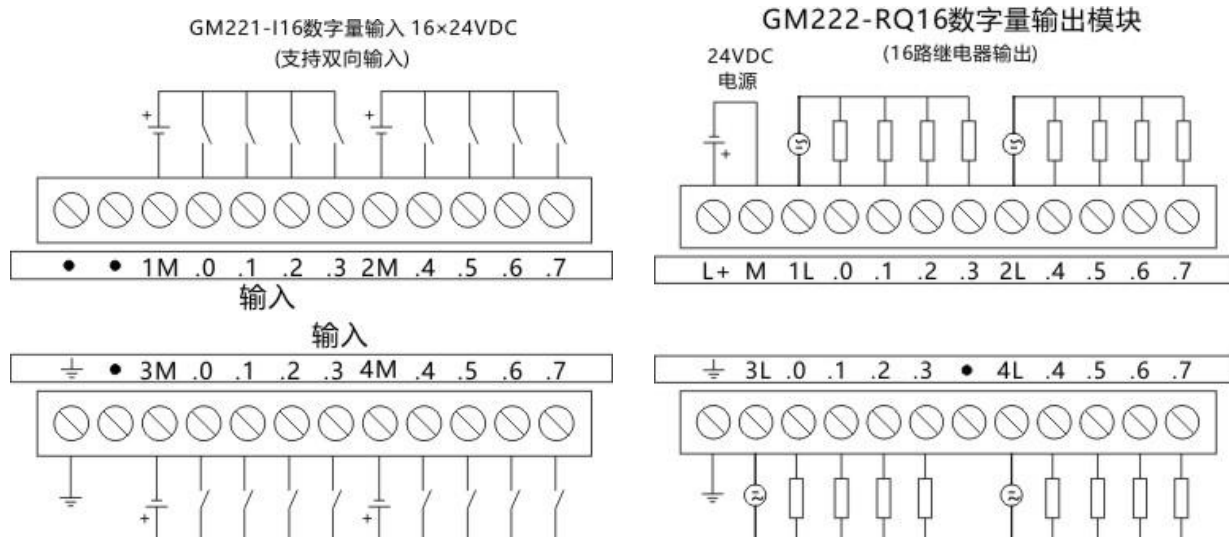
4.2.3 Temperature module technical parameters

PT100 Temperature sensor input channel specifications	parameter
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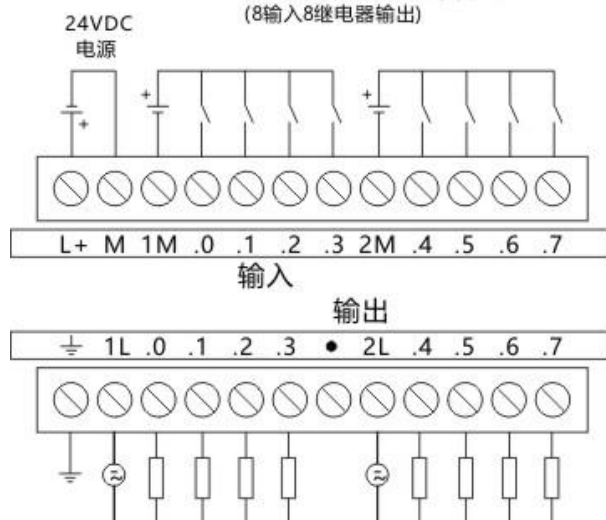
Sensor wire length:	longest30rice
Data word format:	- 2000to6000 (-200.0°C to600.0°C)
Exceeding the upper temperature limit:	+ 32767
Sensor disconnection value:	- 32767
Resolution:	0.1°C
Accuracy:	0.1°C
Input type	difference
Isolation (of the scene and the logic)	isolation

NTCTemperature sensor channel input	parameter
Sensor type:	10KΩ
Sensor wire length:	
Data word format:	0 (-50.0°C to150.0°C)
Exceeding the upper temperature limit:	
Sensor disconnection value:	
Resolution:	12Bit
Accuracy:	±full scale0.5%
Input type:	Non-difference
Isolation (site and logic):	none
Power supply:	24V 0.2A
size:	95×108×35mm

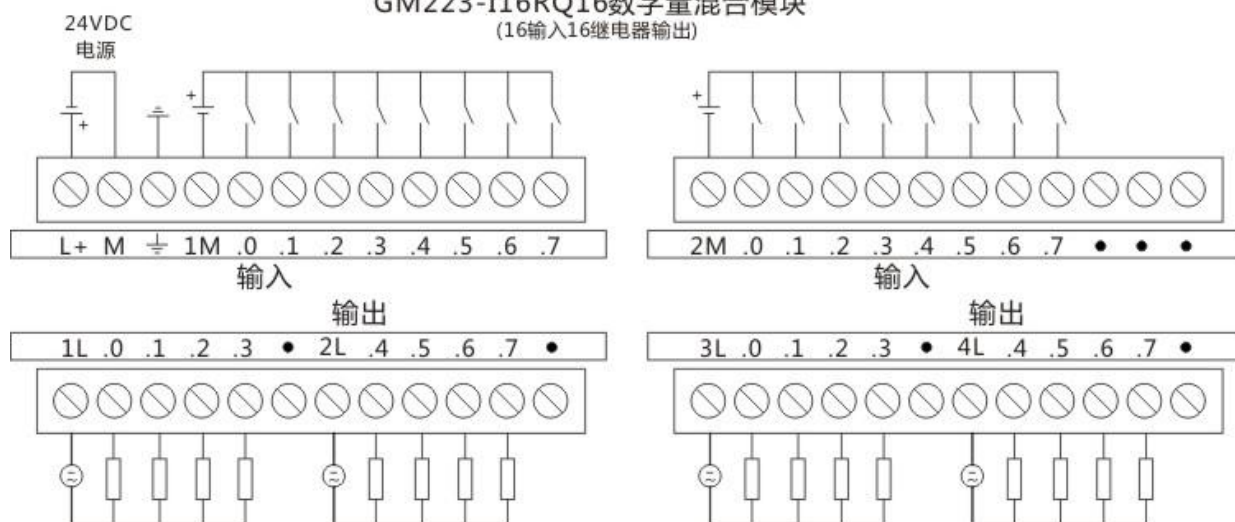
4.3Expansion module wiring diagram



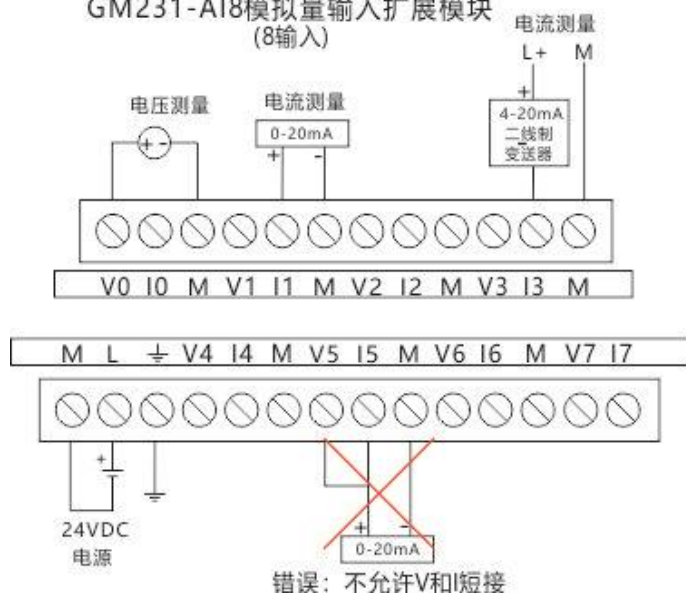
GM223-I8RQ8数字量混合模块 (8输入8继电器输出)



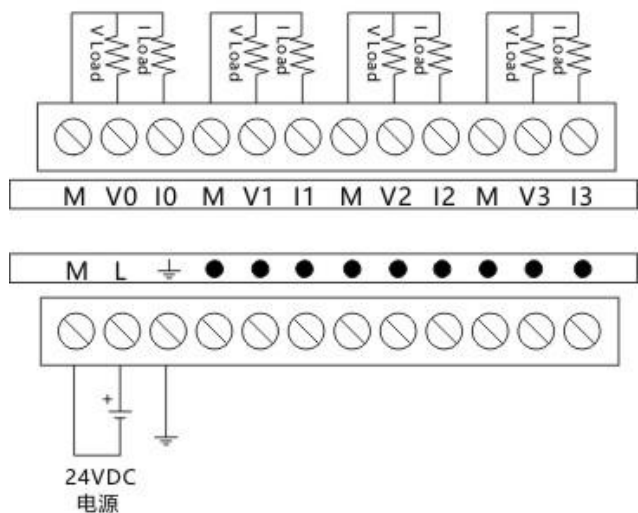
GM223-I16RQ16数字量混合模块 (16输入16继电器输出)



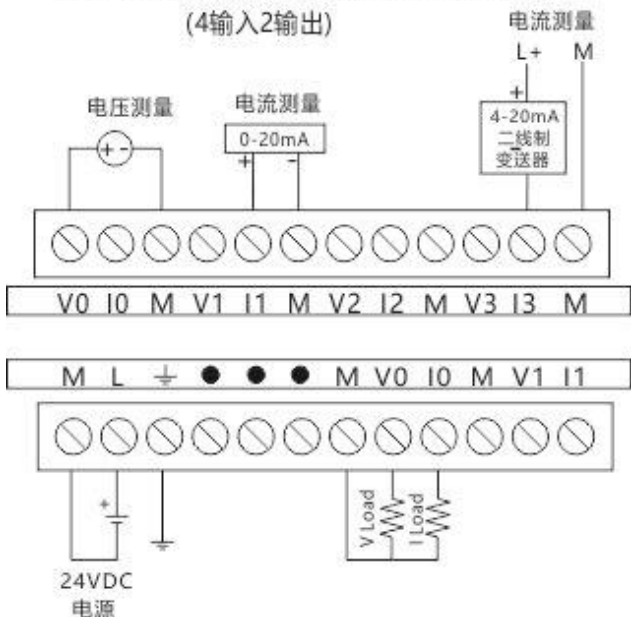
GM231-AI8模拟量输入扩展模块 (8输入)



GM232-AQ4模拟量输出扩展模块

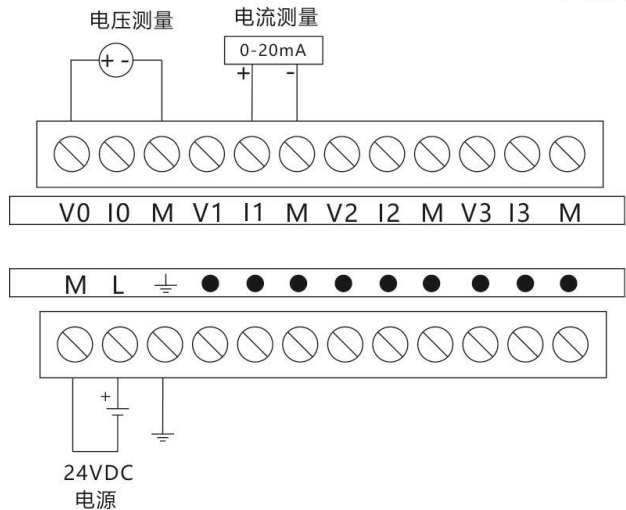


GM235-AI4AQ2模拟量混合扩展模块
(4输入2输出)

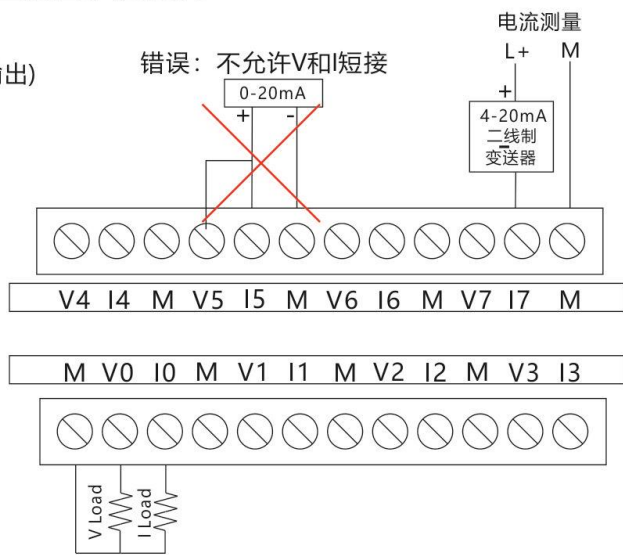


GM235-AI8AQ4模拟量混合扩展模块

(8输入4输出)

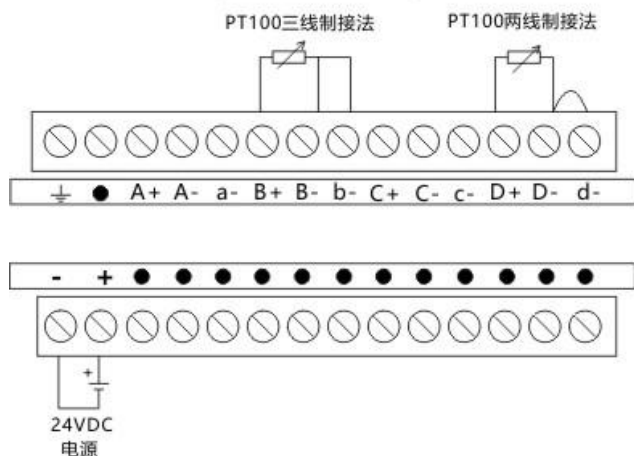


错误：不允许V和I短接



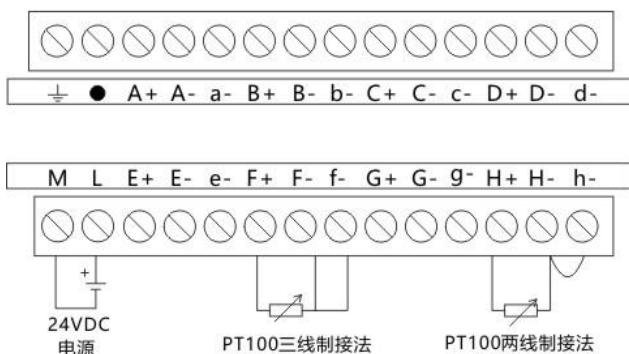
GM231-P4温度测量扩展模块

(4×PT100温度测量)



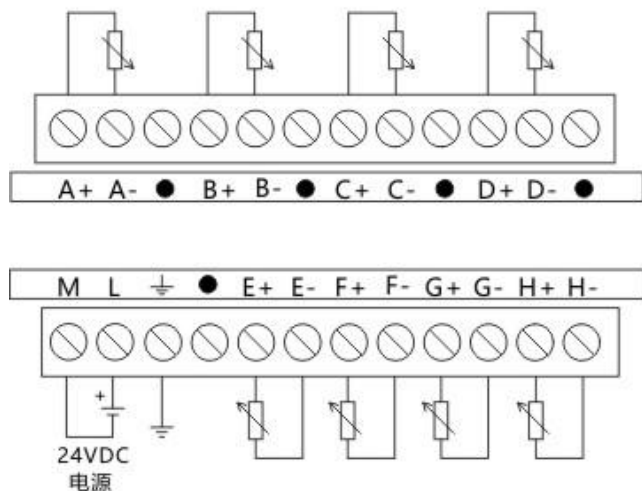
GM231-P8温度测量扩展模块

(8×PT100温度测量)



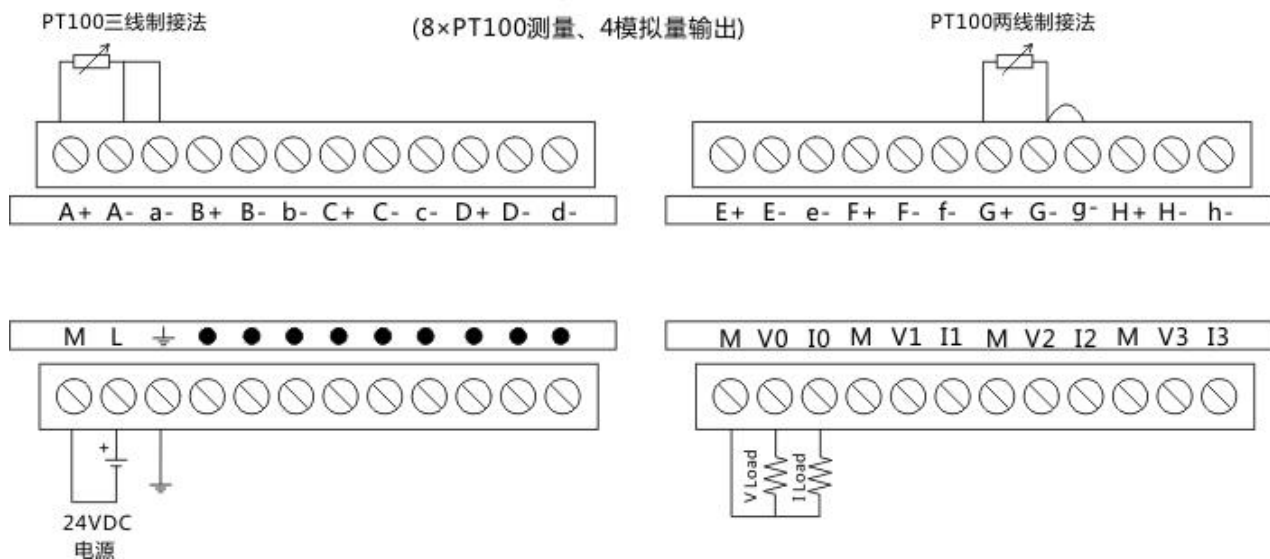
GM231-N8温度测量扩展模块

(8×NTC温度测量, 10K, 3950)

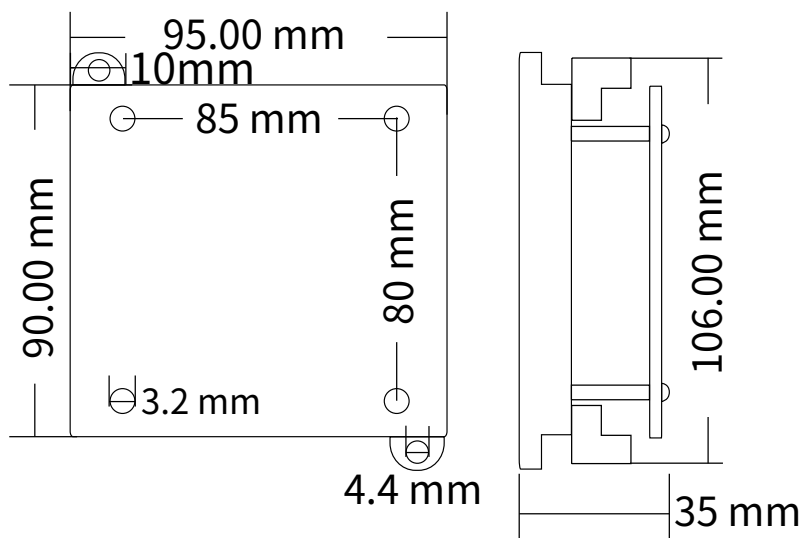


GM235-P8AQ4温度测量扩展模块

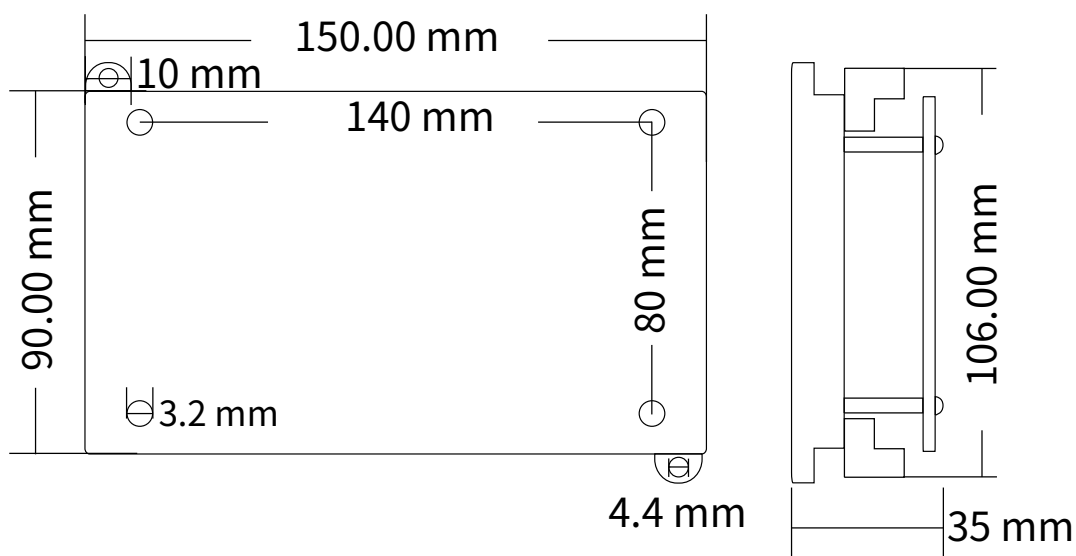
(8×PT100测量、4模拟量输出)



4.4Expansion module dimensions and installation

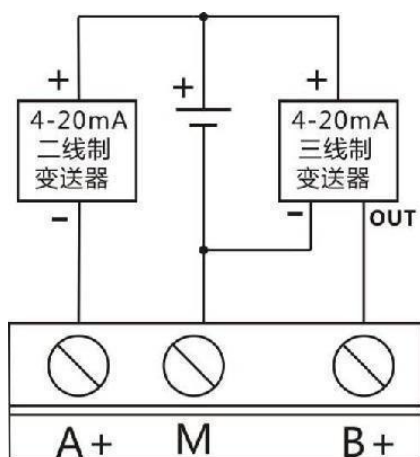


Note: Applicable to GM221-I16, GM222-RQ16, GM223-I8RQ8, GM231-AI8, GM232-AQ4, GM235-AI4AQ2 GM231-P4, GM231-P8, GM231-N8



Note: Applicable to GM223-I16RQ16, GM235-AI8AQ4, GM235-P8AQ4, GM235-N8AQ4

8. Transmitter wiring diagram



Note: Before connecting a current signal, the analog input should be set to current input mode using the red DIP switch.

9. Transistor output internal diagram

