

GB Economical Smart PLC

User Manual 250319



1. Product selection.....	1
2.Expandable modules.....	2
3.Host comes with analog quantity.....	3
4.Host indicator light status.....	4
5.Technical Parameters.....	5
6.485Communication interface definition.....	7
7.Analog input channel wiring diagram.....	8
8.Internal schematic diagram of transistor output.....	8
9.Wiring Diagram.....	9
10.Dimensions and installation.....	20

1. Product selection

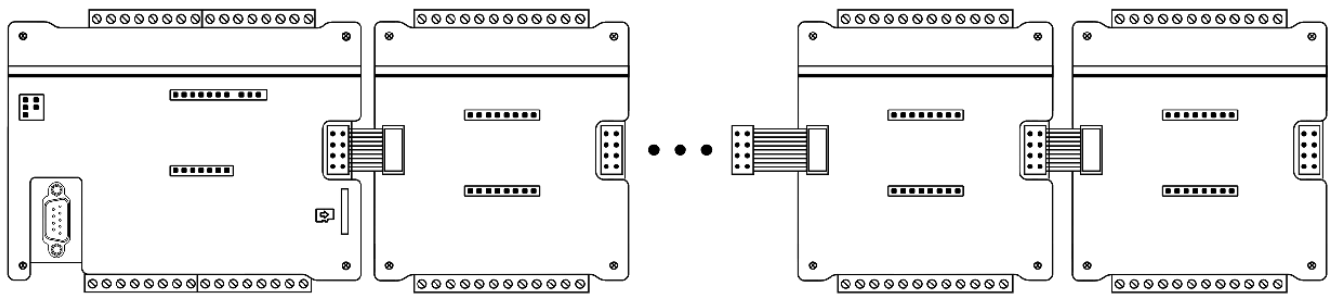
Host model	Digital quantity	Analog	485 mouths	Network port	Extension modules	Signal board	SD card	Configuration selection	size
GR10XP	6 input 4 relay output	2 in 1 out	1 way	1 way	support	Not supported	support	SR20	95×108×35
GT10XP	6-input 4-output transistor	2 in 1 out						ST20	
GR14XP	8 input 6 relay output	2 in 1 out						SR20	
GT14XP	8 input 6 transistor output	2 in 1 out						ST20	
GR20	12 input 8 relay output	-						SR20	125×108×35
GT20	12 input 8 transistor output	-						ST20	
GR20XP	12 input 8 relay output	2 in 1 out						SR20	
GT20XP	12 input 8 transistor output	2 in 1 out						ST20	
GR24XP	14 in 10 out transistor	2 in 1 out	2-way	1 way	support	Not supported	support	SR30	150×108×35
GT24XP	14 in 10 out transistor	2 in 1 out						ST30	
GR30	18 in 12 relay out	-						SR30	
GT30	18 input 12 transistor output	-						ST30	
GR30XP	18 in 12 relay out	4 in 2 out						SR30	180×116×35
GT30XP	18 input 12 transistor output	4 in 2 out						ST30	
GR40	24 input 16 relay output	-						SR40	
GT40	24 input 16 transistor output	-						ST40	

Digital expansion module	describe	Configuration selection	size
GM DE08-8DI	8 digital inputs	EM DE08	75x108x35
GM DE16-16DI	16 digital inputs	EM DE16	95x108x35
GM DR08-8DQ	8 Relay outputs	EM DR08	75x108x35
GM QR16-16DQ	16 Relay outputs	EM QR16	95x108x35
GM DR16-8DI8DR	8 digital inputs 8 relay outputs	EM DR16	95x108x35
GM DR32-16DI16DR	16 digital inputs 16 relay outputs	EM DR32	150x108x35
Analog expansion module	describe	Configuration selection	size

GM AE04-4AI	4 inputs (supports voltage or current)	EM AE04	75x108x35
GM AE08-8AI	8 inputs (supports voltage or current)	EM AE08	95x108x35
GM AQ04-4AQ	4 outputs (supports voltage or current)	EM AQ04	75x108x35
GM AQ08-8AQ	8 outputs (supports voltage or current)	EM AQ04	150x108x35
GM AM06-4AI2AQ	4 inputs 2 outputs (supports voltage or current)	EM AM06	95x108x35
GM AM12-8AI4AQ	8 inputs 4 outputs (supports voltage or current)	EM AM06	150x108x35
GM AM16-8AI8AQ	8 inputs and 8 outputs (supports voltage or current)	EM AM06	150x108x35
Temperature acquisition expansion module	describe	Configuration selection	
GM AN04-4NTC	Temperature acquisition 4-channel NTC (10K, 3950)	EM AR04	75x108x35
GM AN08-8NTC	Temperature acquisition 8-channel NTC (10K, 3950)	EM AR04	95x108x35
GM AR04-4PT100	Temperature collection 4 PT100	EM AR04	75x108x35
GM AR08-8PT100	Temperature collection 8 PT100	EM AR04	95x108x35

2.Expandable modules

GB Smart economical host can be connected to GB Smart economical expansion modules, and can be expanded to 16 at most.



工贝经济型SMART主机

经济型模块1

经济型模块15

经济型模块16

2.1 For the first 6 expansion modules, you can directly configure them in the system block of the S7 software. When selecting the model, just treat the GM in the industrial model as EM, and the starting address is allocated according to the configuration list. For models not in the configuration list, select the corresponding one below.

GM AM04 directly selects EM AM03; GM AM08 directly selects EM AM06; GM AM12 directly selects EM AM06; GM AM16 directly selects EM AM06; GM AQ08 directly selects EM AQ04; GM AR08 directly selects EM AR04; GM AN04 directly selects EM AR04; GM AN08 directly selects EM AR04; GM AT04 directly selects EM AT04;

2.2 The expansion modules No. 7-16 do not need to be configured in the software, and the addresses are automatically mapped into the CPU

host: The starting address of the digital input starts from I700.0;

The digital output address starts from Q700.0;

The analog input address starts from IW800;

The analog output address starts from QW800;

All addresses are compactly arranged. You can also scan the QR code below for quick search.



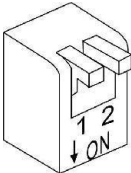
Special registers							
IW630	Reserve	ID640	Module 2 Model	ID660	Module 7 Model	ID680	Module 12 Model
IW632	Diagnostic alarm codes	ID644	Module 3 Model	ID664	Module 8 Model	ID684	Module 13 Model
IB634	Diagnostic alarm device ID	ID648	Module 4 Model	ID668	Module 9 Model	ID688	Module 14 Model
IB635	Disconnection error device ID	ID652	Module 5 Model	ID672	Module 10 Model	ID692	Module 15 Model
ID636	Module 1 Model	ID656	Module 6 Model	ID676	Module 11 Model	ID696	Module 16 Model

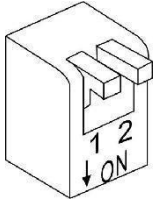
3. The host comes with analog

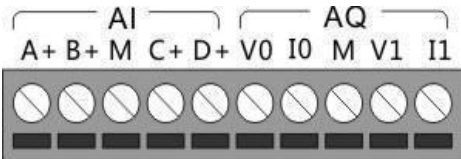
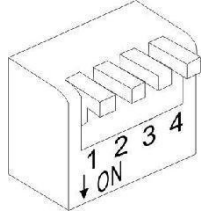
The host model with the suffix "XP" indicates that the host has its own analog channel. The analog input start register address starts from AIW0. For example, the GR30XP host has 4 analog inputs, and the start addresses are AIW0, AIW2, AIW4, and AIW6. No configuration is required and they can be used directly. The register data range is 0~27648, corresponding to 0~10V or 0~20mA.

The analog output start register address starts from AQW0. For example, if the GR30XP host has 2 analog outputs, the start address is AQW0 and AQW2. The register data range is 0~27648, corresponding to output 0~10V and 0~20mA. The maximum upper limit of the register value is 28200, corresponding to 20.4mA and 10.2V.

Analog filter coefficient: The analog quantity of the host can set the filter coefficient. For analog quantities with fast response, such as instantaneous pressure changes, the filter coefficient can be reduced. For those that require stable acquisition and strong anti-interference, such as temperature measurement, the filter coefficient can be increased. The filter coefficient is saved in special registers SMB1850~SMB1853. The value range is 0~3. 0 corresponds to the minimum filtering, and 3 corresponds to the longest filtering time. The default value after restart is 2. Each register corresponds to a channel. For example: For the third analog input of GR30XP, different filtering degrees can be achieved by assigning SMB1852 to 0~3. Note: The register is not saved when the power is off, and the value needs to be assigned every time the power is on.

GR/T10XP analog terminal	Terminal Definition		Dial setting
AI AQ A+ B+ M V0 I0	AI	A+: Analog input channel 1.	 Analog input dial, one The digit dial corresponds to a The next one is the current input. Switch up to voltage input enter.
		B+: Analog input channel 2.	
	AQ	M: Analog input common terminal.	
		V0: Analog output 0-10V output.	
		I0: Analog output 0-20mA output.	
Note: Analog input corresponds to AIW0 and AIW2. Analog output corresponds to AQW0, voltage and current are the same The output is controlled by a register.			

GR/T20XP, GR/T24XP analog terminals	Terminal Definition		Dial setting
AI AQ A+ M B+ V0 I0 M	AI	A+: Analog input channel 1.	 Analog input dial, one-digit dial The code corresponds to a channel, and the following are Current input, switch up to electric Pressure input.
		M: Analog input common terminal.	
		B+: Analog input channel 2.	
	AQ	V0: Analog output 0-10V output.	
		I0: Analog output 0-20mA output.	
		M: Analog output common terminal.	
Note: Analog input corresponds to AIW0 and AIW2. Analog output corresponds to AQW0, voltage and Stream simultaneous output is controlled by a register.			

GR/T30XP analog terminal	Terminal Definition		Dial setting
	AI	A+: Analog input channel 1.	
		B+: Analog input channel 2.	
		M: Analog input common terminal.	
		C+: Analog input channel 3.	
	AQ	D+: Analog input channel 4.	Analog input dial switch, One dial corresponds to one Channel, down is current Input, switch up to Voltage input.
		V0: Analog output 1 channel voltage output.	
		I0: Analog output 1 channel current output.	
		M: Analog input and output common terminal.	
		V1: Analog output 2 channel voltage output.	
		I1: Analog output 2 channel current output.	
		Note: Analog input corresponds to AIW0 and AIW2. Analog output corresponds to AQW0, voltage and current at the same time The output is controlled by a register.	

4.Host indicator status

Classification	Logo	color	meaning
PLC Running status Indicator Lights	RUN	green	Steady on: Running
	STOP	yellow	On: Stop; Flashing: There is a forced point
	ERROR	red	Steady on: Fault
Network port status Indicator Lights	LINK	green	Steady on: Connection established successfully
	Rx/Tx	yellow	Flashing: data is being sent or received

Indicator status	Common status analysis
STOP Yellow light is always on	① If the program does not run after downloading, click the RUN button in the S7 software;

	② If it does not run after power on, check the system block, start, and select RUN; ③ If the yellow light is on during operation, open the information table to check fatal and non-fatal errors ; ④ If the S7 software does not run when you click the RUN button, check the system blocks, enable missing hardware, and allow hardware configuration errors, and try again after checking them.
STOP Yellow light flashing	① If there are mandatory points, click Debug in the menu bar and click Cancel All Mandatory Points; ② The SD card is not removed
Three indicator lights flashing	① The power supply voltage is lower than 18V, check the power supply. ② Click the "Flashing Indicator Light" button on the communication interface

5. Technical Parameters

model	GT/R10XP	GT/R14XP	GT/R20	GT/R20XP	GT/R24XP	GT/R30	GT/R30XP	GT/R40
Software Configuration	ST/R20	ST/R20	ST/R20	ST/R20	ST/R30	ST/R30	ST/R30	ST/R40
Supply voltage	Power supply range 20~28VDC							
Power consumption	9W/10W	10W/11W	10W/12W	12W/14W	13W/15W	14W/16W	15W/18W	18W/23W
Program Space	12KB				18KB			24KB
Data Space	12KB				16KB			20KB
Power-off retention	Maximum 12KB							
Process Mapping	256-bit input (I)/256-bit output (Q)							
Analog mapping	56 characters AI/56 characters AQ							
Dimensions in mm	95×108×35		125×108×35		150×108×35		180×116×35	
IO digital quantity								
Onboard digital quantity	6 in 4 out	8 in 6 out	12 in 8 out		14 in 10 out	18 in 12 out		24 in 16 out
Input Type	Sink/source bipolar; Rated voltage 24VDC, 4mA; Maximum continuous allowable voltage 30VDC							
Logic Input	Logic 1 minimum 16V. Logic 0 maximum 5V							
Output Type	Transistor (T): source type (can output 24V+ and disconnect 24V+, cannot output 0V); Relay (R): dry contact.							
Output Current	The maximum resistive load of the transistor is 0.5A (16W), and the inductive load is 0.2A (5W); the maximum resistive load of the relay is 2A, and the inductive load is 0.5A;							
Mechanical life	Transistor type has no life limit; relay type has 100,000 opening and closing times							
Pulse output	Transistor type only, 100KHz; GT10XP/GT14XP: 2 channels when using PWM, 1 channel when using PTO. GT20/GT20XP: 2 channels. GT24XP/GT30/GT30XP/GT40: 3 channels.							
High-speed counting	Single phase: 4 channels 30K	Single phase: 5 channels 30K	Single phase: 6 channels 30KHz					
	A/B phase2-way 30K	A/B phase: 3 channels 30K	A/B phase: 4 channels 30KHz					
Interface and functionality								
Network port specification	1 channel 10M/100M adaptive							
Network port protocol	S7 Ethernet protocol; Modbus TCP protocol; TCP Freeport protocol;							
Number of network port connections	A maximum of 6 connections are supported, and all protocol connections share these 6 connections.							
485 interface	1 way				2-way: The second way needs to be configured with SB CM01 before use			
Extension modules	Normally 6, maximum 16. Note: It does not support original modules, only supports Gongbei economical Smart expansion modules.							
Signal board	Not supported							
Memory Card	microSDHC card (sold separately)							
Real-time clock	Built-in, replaceable, button battery, not rechargeable, the battery power is not consumed when the device is powered on; the failed clock is restored to 2000.01.01; the validity period when not powered is 1 year.							
encryption	It supports 4 levels of encryption. Because the password storage location is different from the original one, it cannot be cracked using the original cracking method, which is safer.							

The host has built-in analog quantity (Note: only the model with suffix XP has built-in analog quantity)					
Host	GT/R10XP	GT/R14XP	GT/R20XP	GT/R24XP	GT/R30XP
Analog input channel	2 inputs				4 inputs
Analog input mode	Non-differential				
Analog input signal	0~10V or 0~20mA				
Analog input data format	0~27648				
Analog input impedance	Voltage: 30K, Current: 150Ω,				
Analog input resolution	12 bits				
Analog input error	Maximum: ±1% of full scale				
Analog input conversion time	100ms				
Analog output channels	1 way				2-way
Analog output signal	0~10V and 0~20mA				
Analog output data format	0~27648, the maximum value can be assigned is 28200 corresponding to 20.4mA and 10.2V				
Analog output load capacity	Voltage: >5KΩ, Current: <500Ω,				

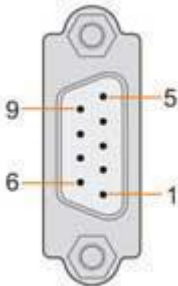
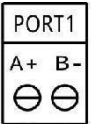
Digital Module	GM DE08	GM DE16	GM DR08	GM QR16	GM DR16	GM DR32
Number of channels	8 in	16 in	8 Relay output	16 Relay output	8 input 8 relay output	16 input 16 relay output
Digital input type	Sink type or source type (supports bidirectional input, common terminal can be positive or negative)					
Digital input voltage	Logic 1 minimum voltage: 18VDC at 2.5mA Logic 0 maximum voltage: 5VDC at 1mA					
Digital input isolation	Internal optical isolation					
Maximum output current	Relay: resistive load 5A; inductive load 0.5A; capacitive load 0.5A; Transistor: 0.5A;					
Digital output isolation	Internal optical isolation					
L+,M Rated voltage	24VDC (30VDC max)					
Power consumption	2W	3W	4W	6W	5W	10W
Dimensions (mm)	75x108x35	95x108x35	75x108x35	95x108x35	95x108x35	150×108×35

Analog Modules	GM AE04	GM AE08	GM AQ04	GM AQ08	GM AM06	GM AM12	GM AM16
Number of input channels	4-way	8-way	-	-	4-way	8-way	8-way
Output channels	-	-	4-way	8-way	2-way	4-way	8-way
Input range	0-10V or 0-20mA						
Input precision	0.3% of full scale						
Output range	0-10V and 0-20mA						
Output resolution	Voltage: 11 bits + sign Current: 11 bits						
Output Impedance	Voltage: ≥1000Ω Current: ≤500Ω						
Full scale range	0 to 27,648 for 0-10V and 0-20mA						
isolation	none						
Power consumption	3W	3W	3W	5W	4W	6W	7W

Dimensions (mm)	75x90x35	95x108x35	75x90x35	150x108x35	95x108x35	150×108×35
aisle Indicator Lights	Long off: 0V or 0mA (disconnection or no signal indication) Long on: normal signal, the corresponding register collection value is greater than 100 and less than 28400 Flashing: signal>10V or signal>20mA (over-range alarm)					
DIGI Indicator Lights	On: The module's 24V power supply is normal, and the communication with the host is normal. Flashing: The field side power supply is abnormal, that is, the 24V power supply of the expansion module is abnormal. Off: The bus power supply is abnormal or the communication is abnormal.					

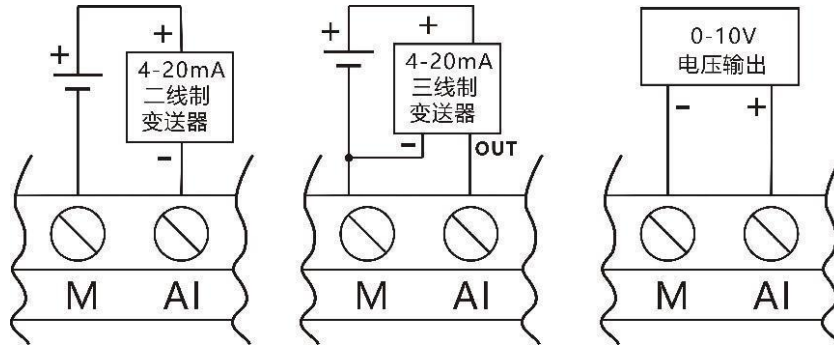
Temperature acquisition module	GM AR04	GM AR08	GM AN04	GM AN08	GM AT04
Number of channels	4-way	8-way	4-way	8-way	4-way
Sensor Type	2, 3, 4-wire PT100		NTC(10K,3950)		K-type thermocouple
Temperature measurement range	- 200.0℃~600.0℃		- 50.0℃~150.0℃		- 270.0℃~1372.0℃
Corresponding reading range	- 2000~6000 (Magnify 10 times)		- 500~1500 (Magnify 10 times)		- 2700~13720 (Magnify 10 times)
Open circuit, short circuit reading	+32000 or -32000		+32000 or -32000		+32000 or -32000
Resolution	0.1℃		0.1℃		0.1℃
Accuracy	0.1% of full scale		0.5% of full scale		0.1% of full scale
Isolation	isolation		none		isolation
Channel indicator light	Steady on: The temperature is within the normal measurement range. Changmie: Don’ t answer. Flashing: Open circuit (M+ I+ wired, I- not wired) Or short circuit (M+ I+ I- connected together)		Steady on: The temperature is normal. Changmie: Don’ t answer. Flashing: short circuit.		Steady on: The temperature is normal. Off: The temperature exceeds the limit. Flashing: No connection or disconnected.
DIGI Indicator Lights	On: The module's 24V power supply is normal, and the communication with the host is normal. Flashing: The field side power supply is abnormal, that is, the 24V power supply of the expansion module is abnormal. Off: The bus power supply is abnormal or the communication is abnormal.				
Power consumption	3W	4W	3W	4W	3W
Dimensions (mm)	75x90x35	95x90x35	75x90x35	95x108x35	75x90x35

6.485Communication interface definition

PORT0interface		PORT1interface	
	1: Chassis grounding		PORT1Only Holding part type No., only supports 485Function. When needed System block configuration SB CM01make Use, as shown on the right
	2:+24Vland		
	3:RS485SignalA	485通讯	
	4: Send applicationRTS		
	5:+5Vland		
	6:+5V		
	7:+24V	A+:RS485 SignalA	
	8:RS485SignalB		
9:NC(Missed)	B:-RS485 SignalB		
Shell: Ground			
			

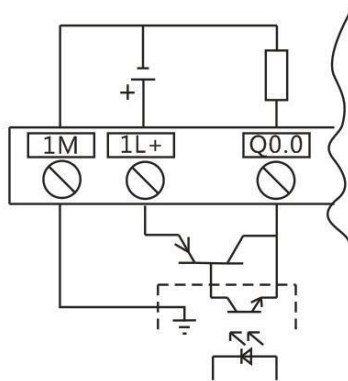
Note: A and B in the 485 interface definition in the table are defined according to the 485 standard. If you check the Xizi manual, it is just the opposite. This is because the Xizi definition is opposite to the standard 485 definition, but the internal circuit design is consistent with Xizi. Considering that most customers connect this interface to non-Xizi 485 devices, it is marked according to the standard 485 interface. If the user connects to Xizi 485 devices, just swap the line sequence.

7. Analog input channel wiring diagram

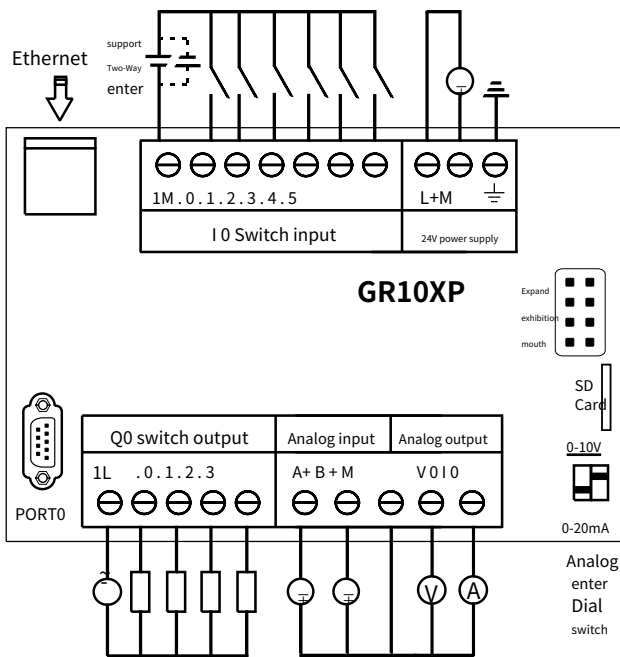


Note: In the figure above, AI indicates the analog input channel of the host, expansion module or signal board. Whether it is a voltage input channel or a current input channel varies from product to product. Some products require configuration selection in the system block, some are switched by DIP switches, and some are distinguished by wiring terminals. For details, please refer to the corresponding chapters.

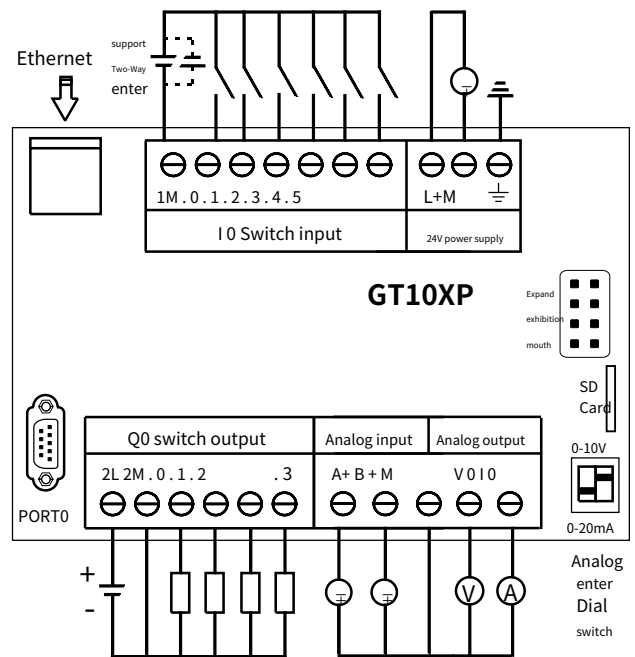
8. Internal schematic diagram of transistor output



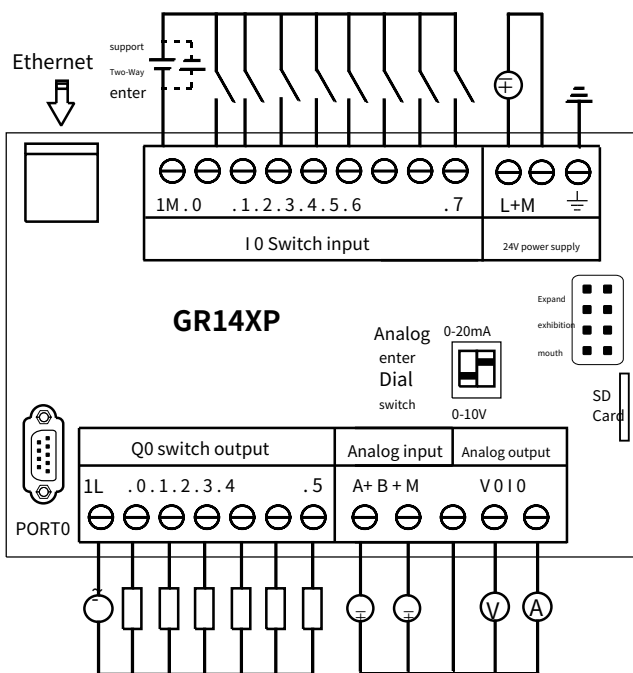
9. Wiring Diagram



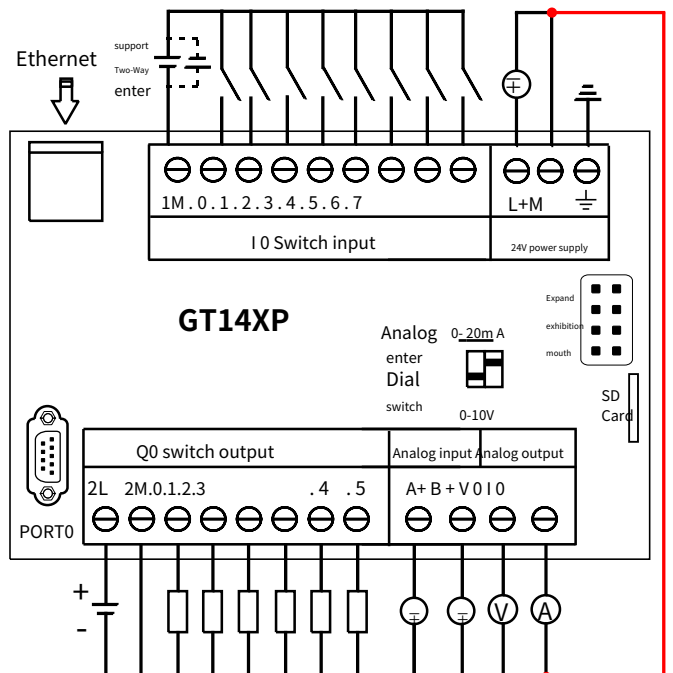
GR10XP (Relay Type) Wiring Diagram



GT10XP (transistor type) wiring diagram



GR14XP (relay type) wiring diagram



GT14XP (transistor type) wiring diagram

mold

Simulation

quantity

lose

enter

lose

out

male

common

end

make

use

right

superior

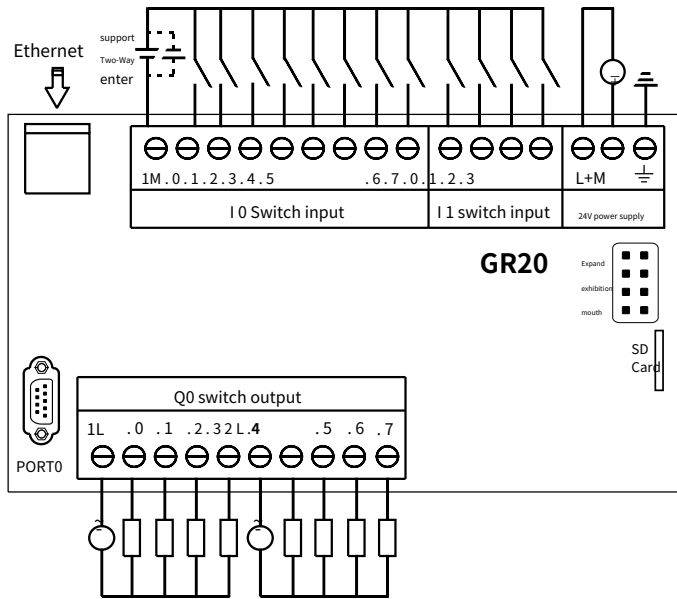
horn

electricity

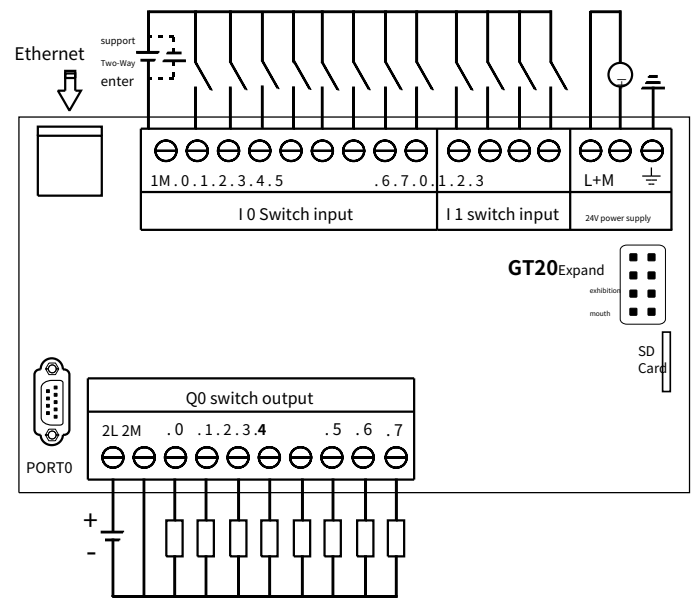
source

burden

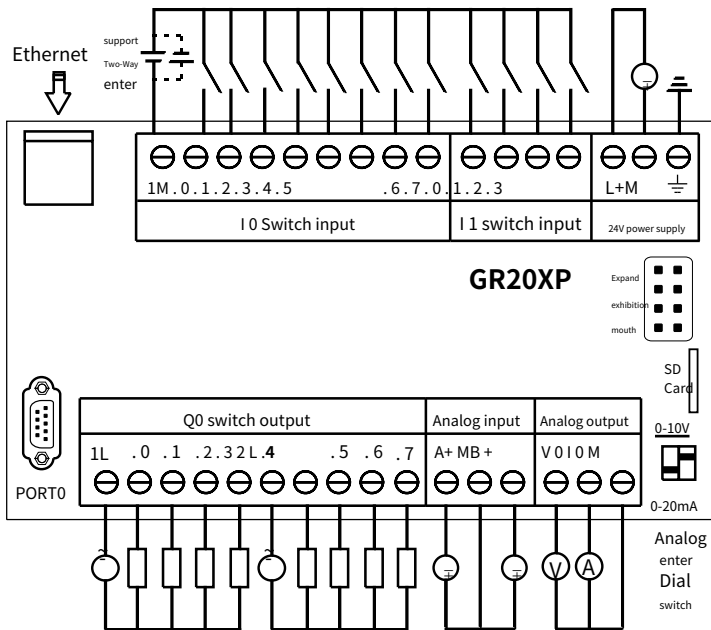
pole



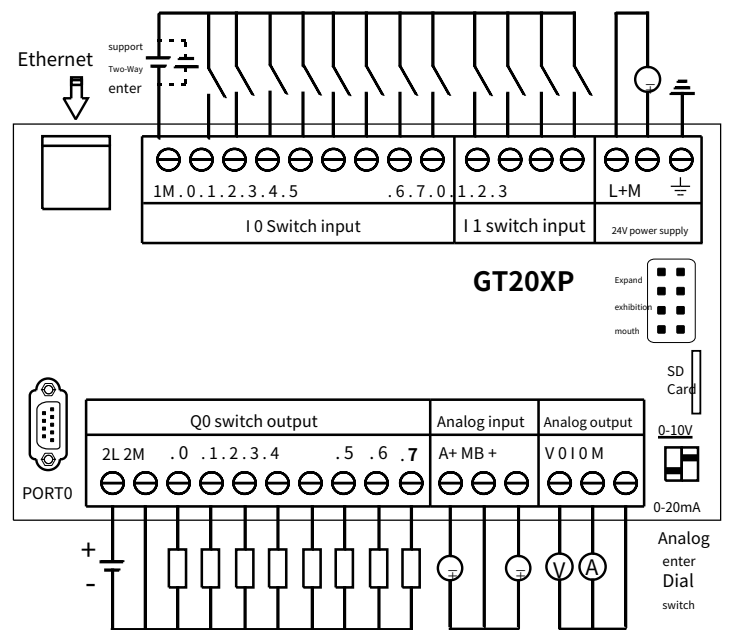
GR20 (relay type) wiring diagram



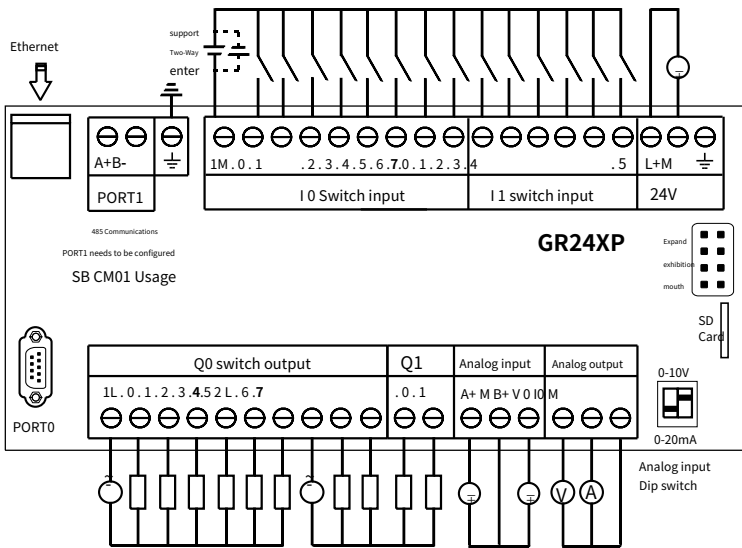
GT20 (transistor type) wiring diagram



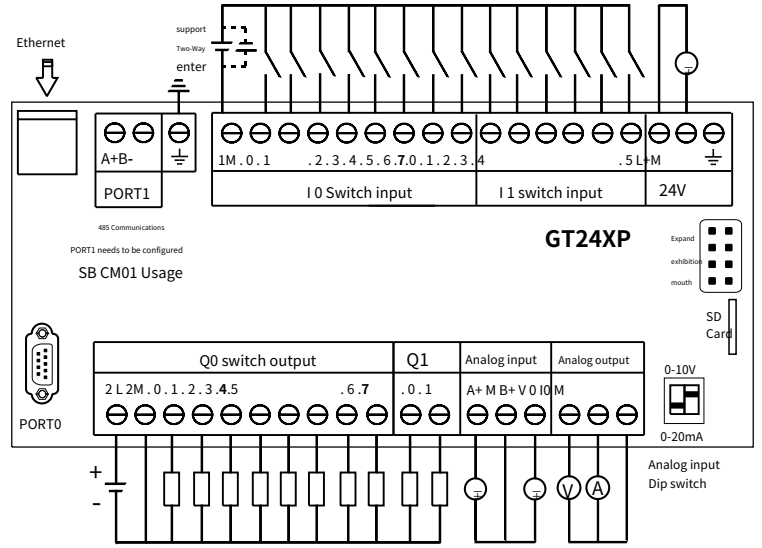
GR20XP (relay type) wiring diagram



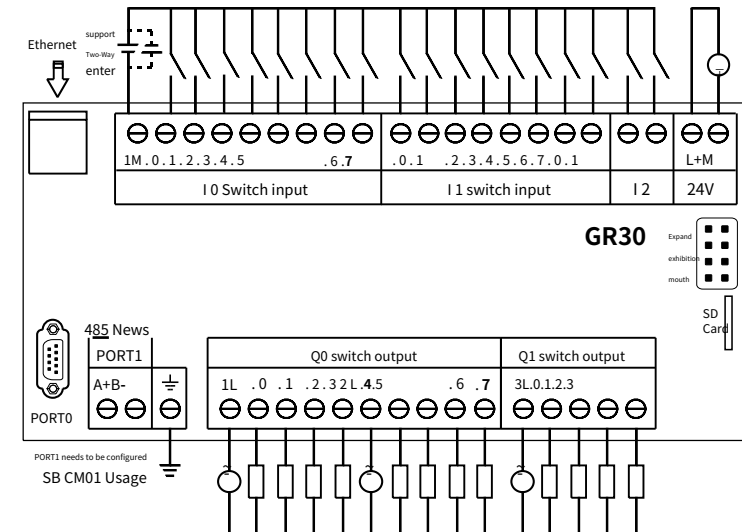
GT20XP (transistor type) wiring diagram



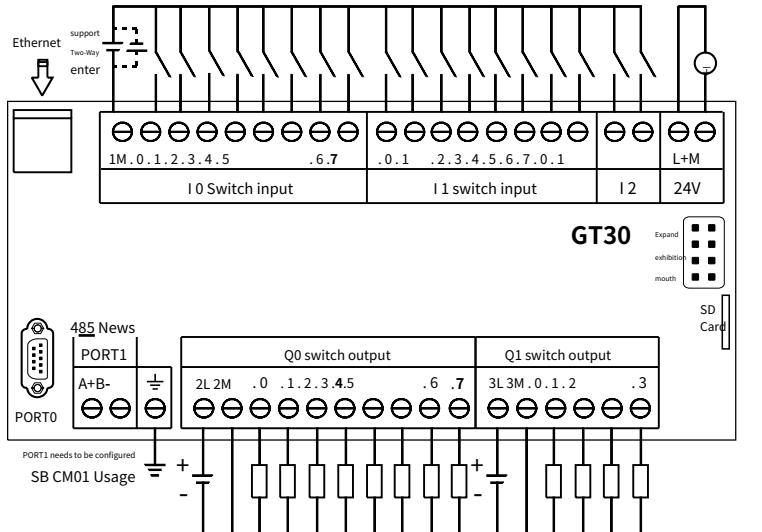
GR24XP (relay type) wiring diagram



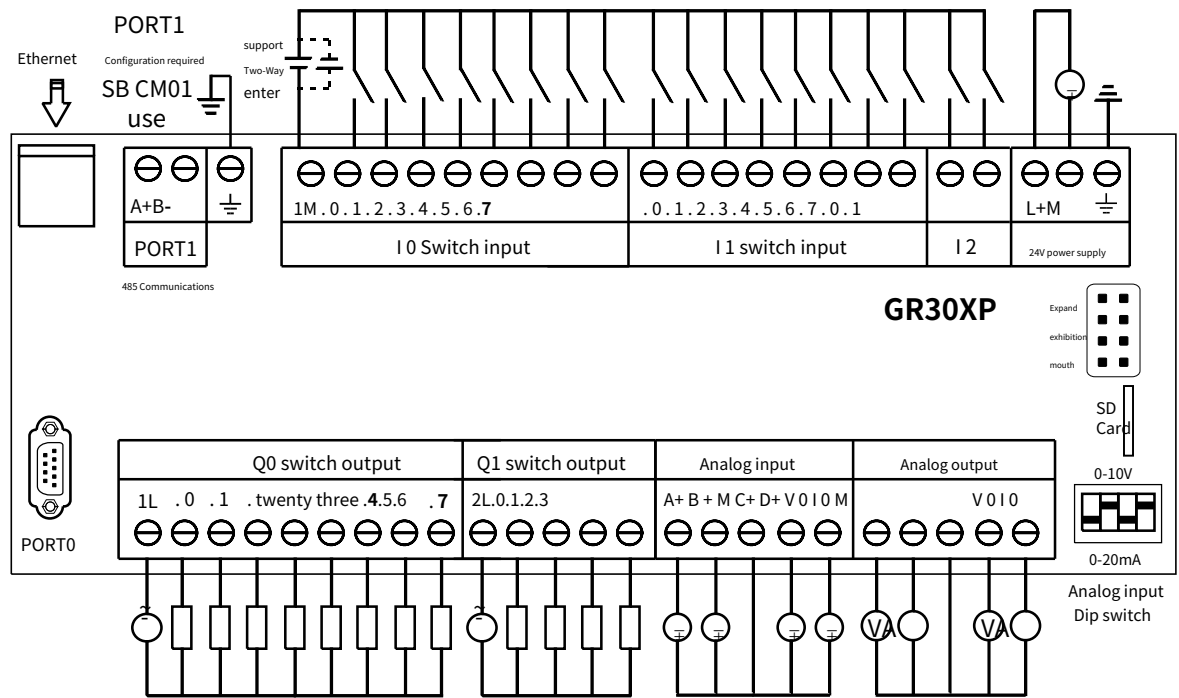
GT24XP (transistor type) wiring diagram



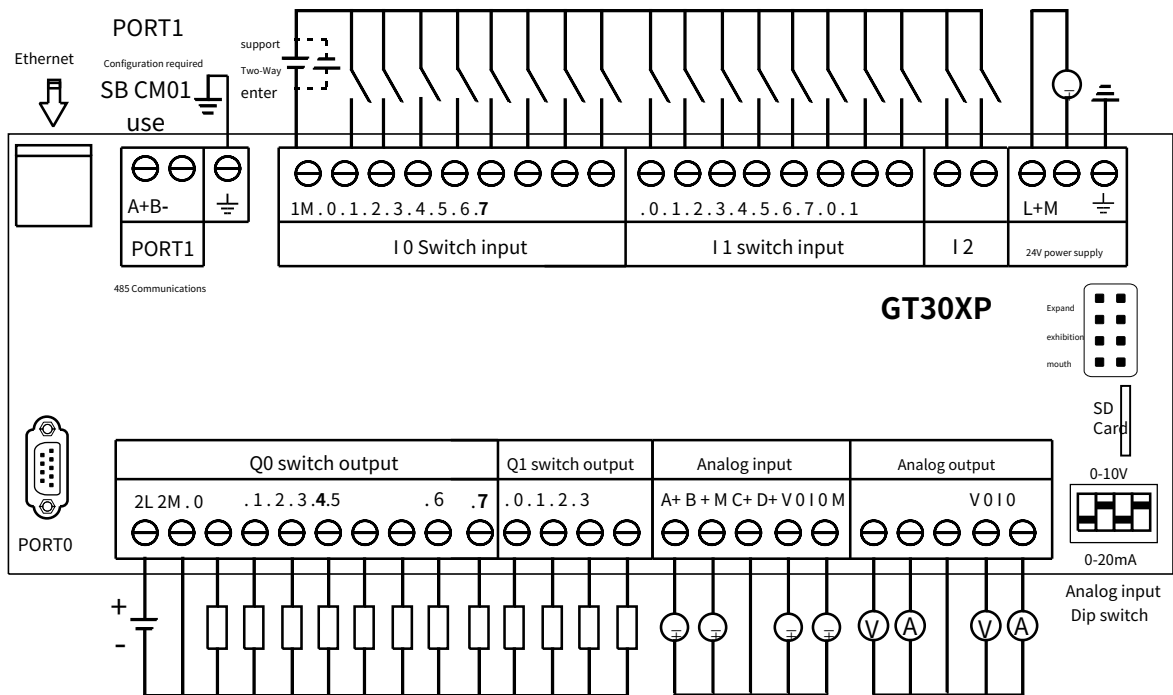
GR30 (relay type) wiring diagram



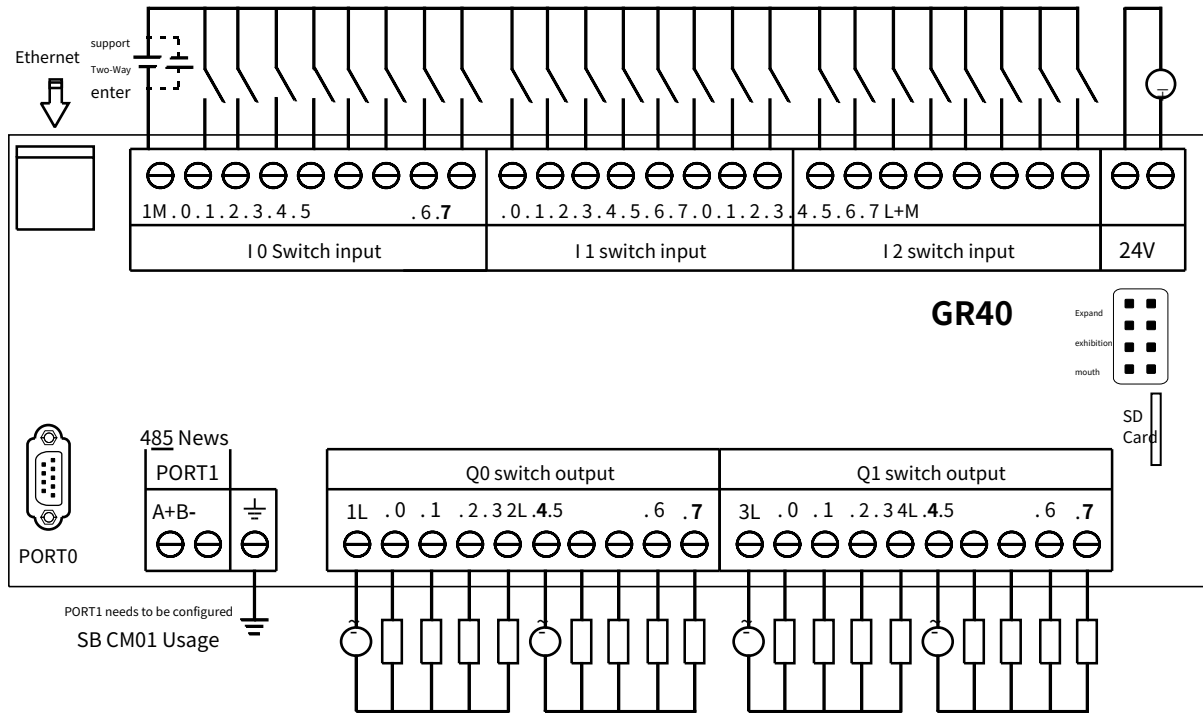
GT30 (transistor type) wiring diagram



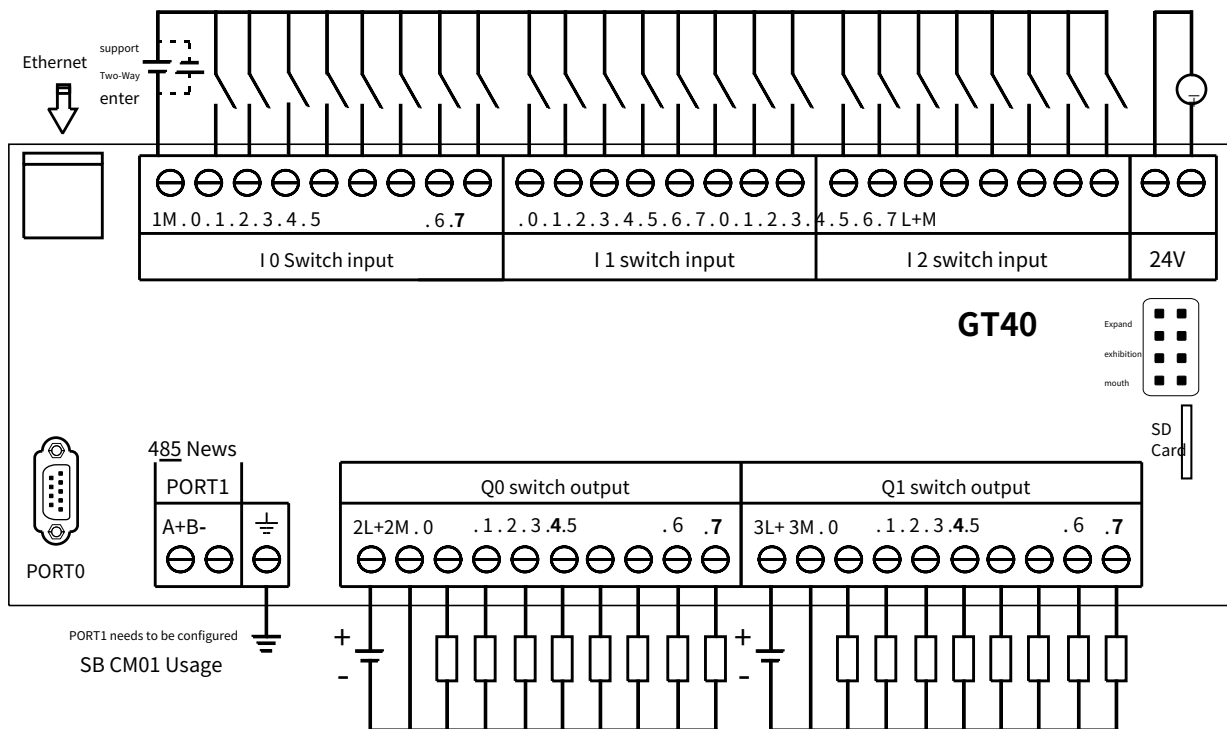
GR30XP (relay type) wiring diagram



GT30XP (transistor type) wiring diagram

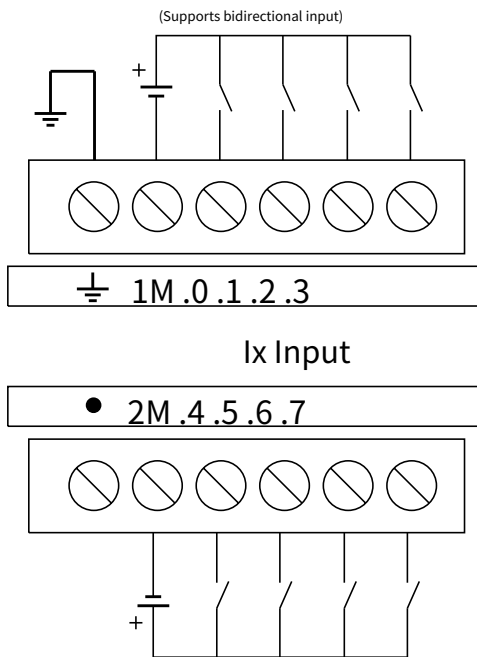


GR40 (relay type) wiring diagram

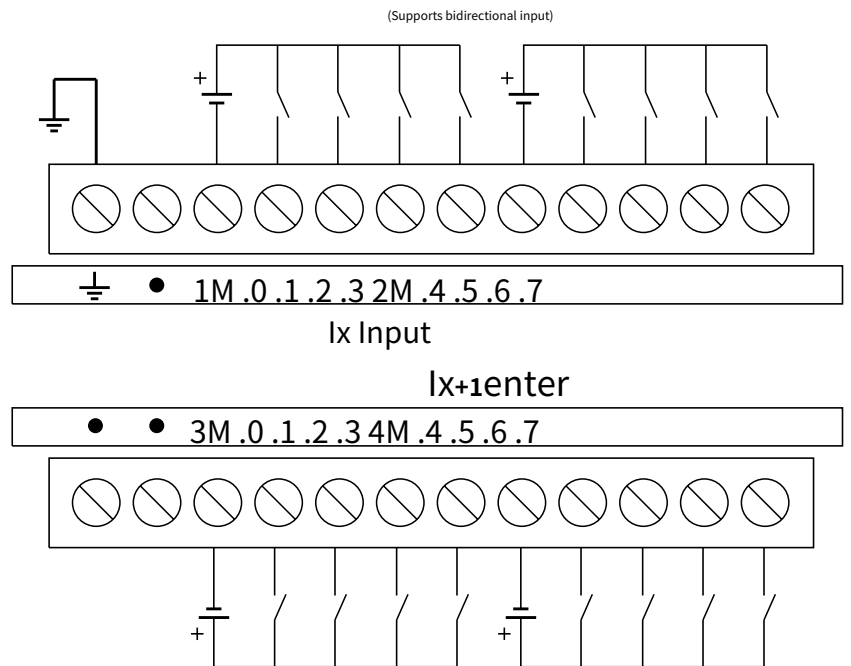


GT40 (transistor type) wiring diagram

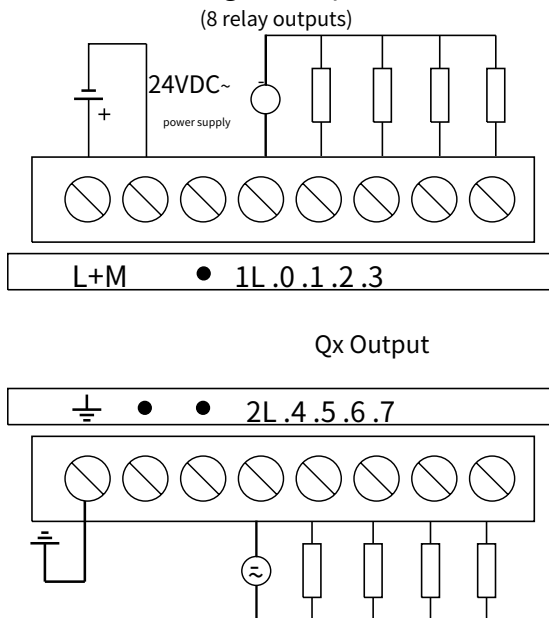
GM DE08 digital input 8×24VDC



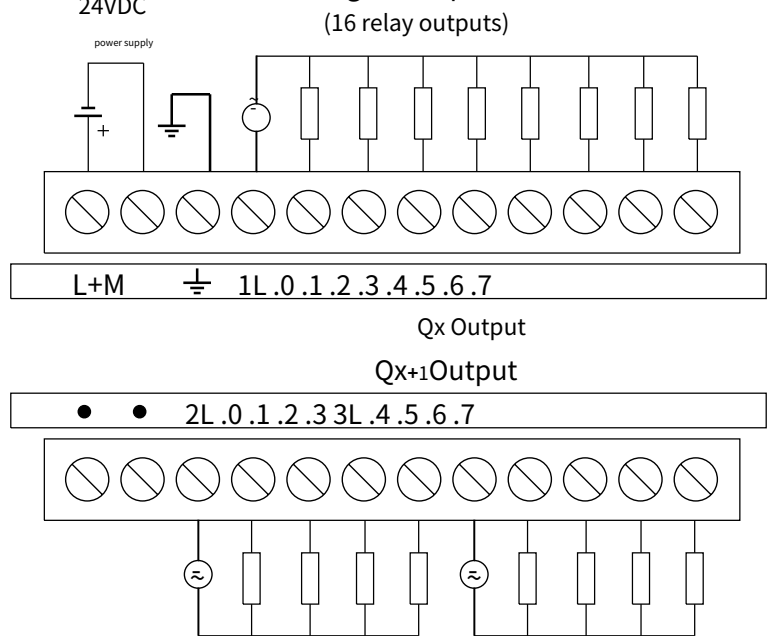
GM DE16 digital input 16×24VDC

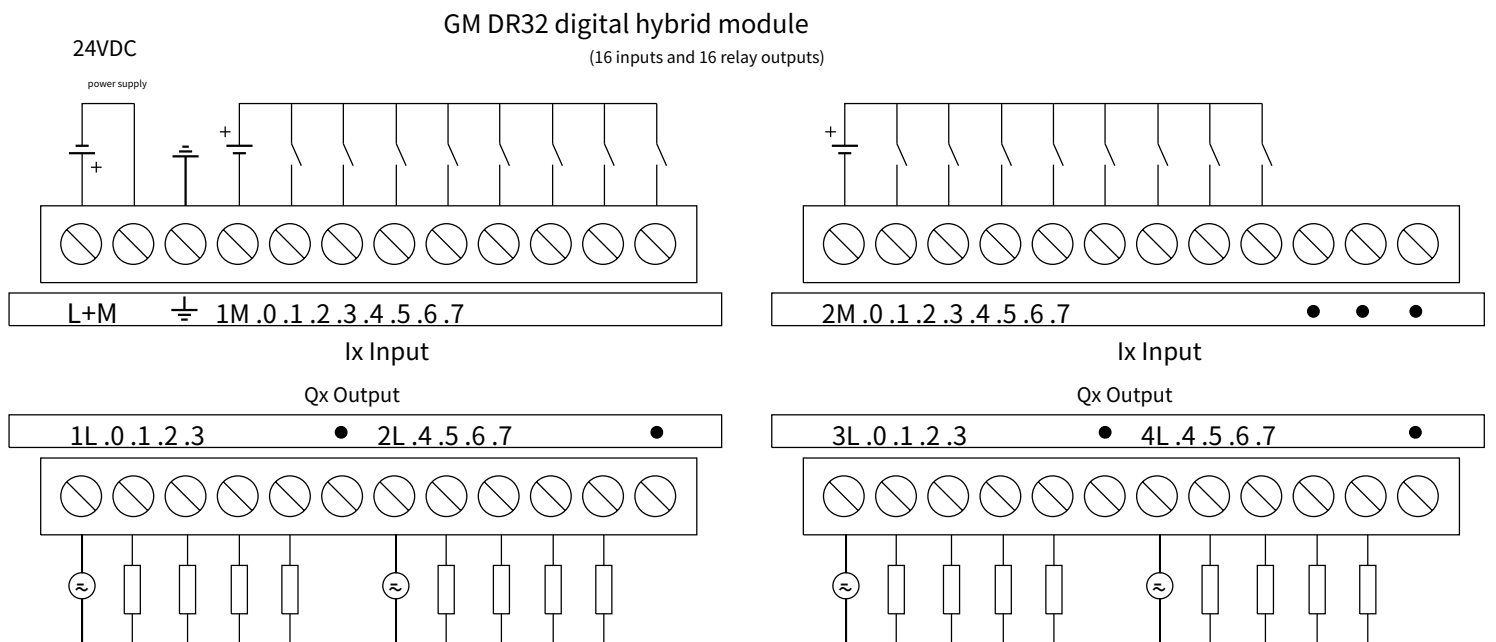
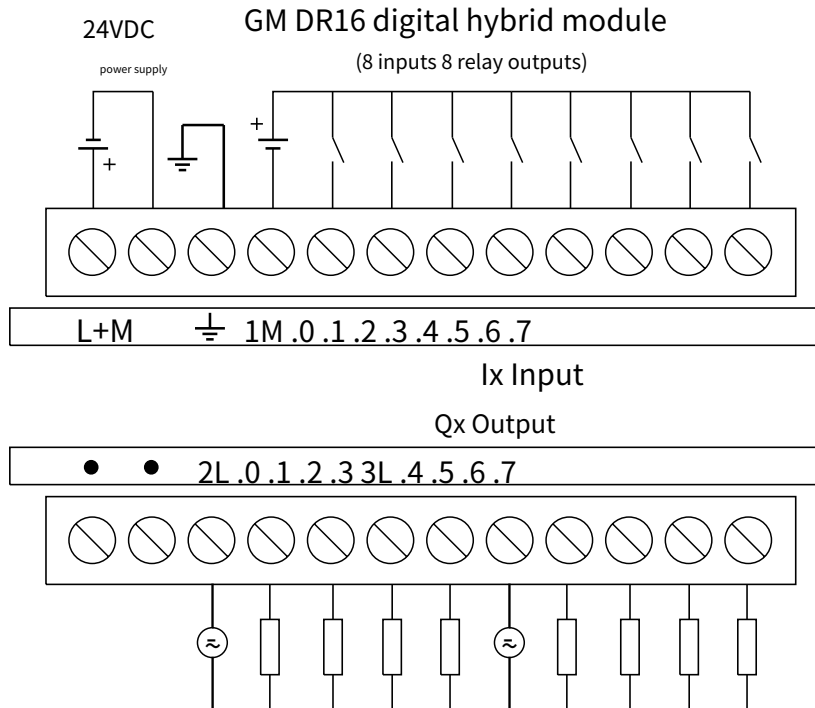


GM DR08 digital output module

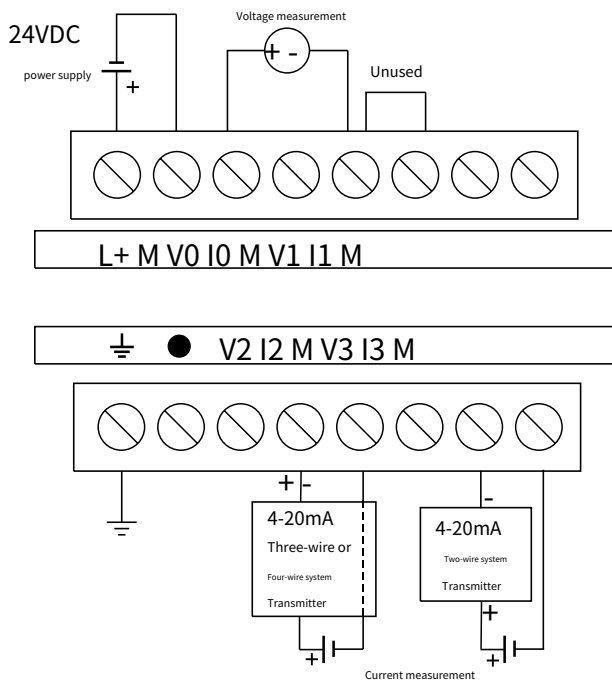


GM QR16 digital output module

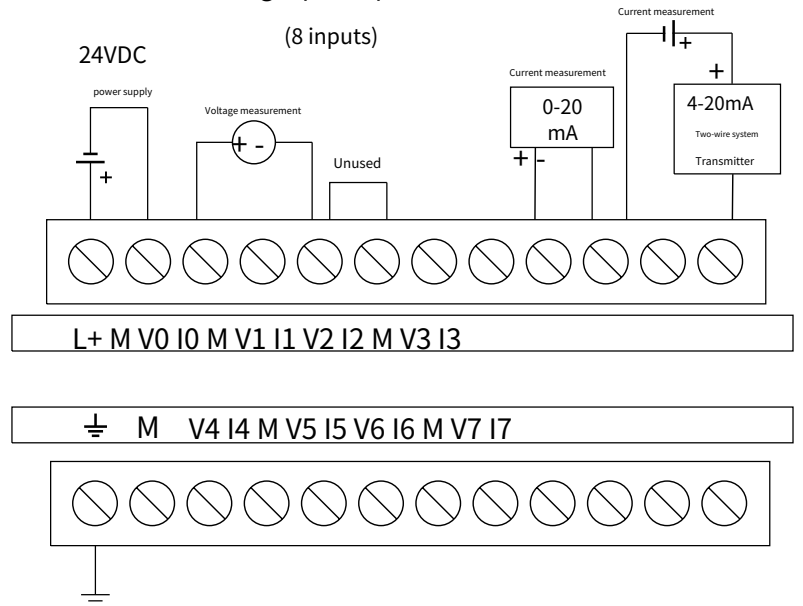




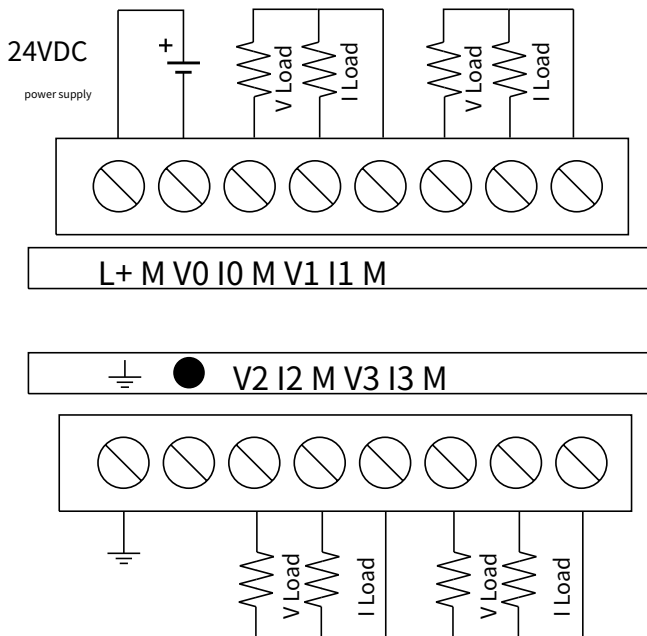
GM AE04 analog input expansion module

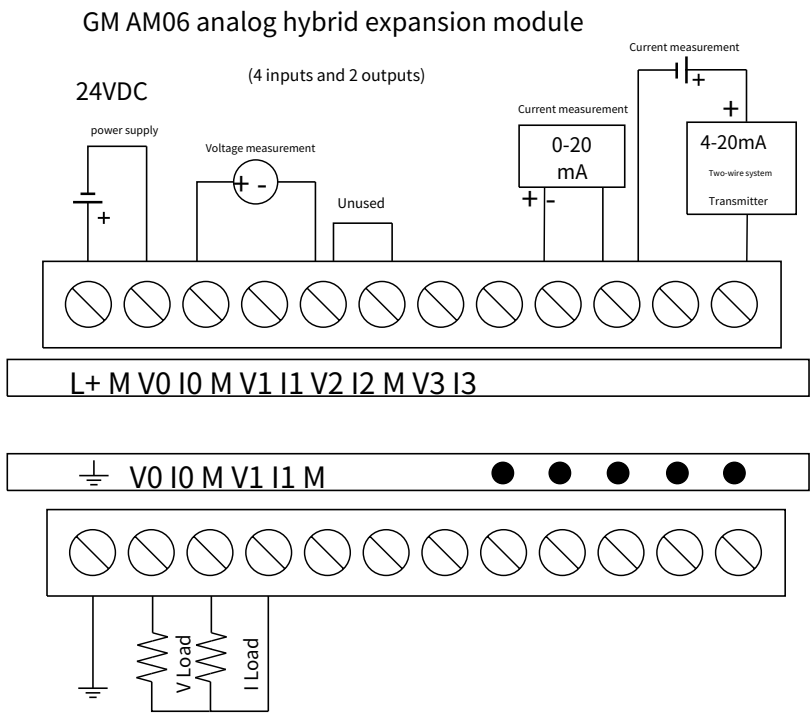
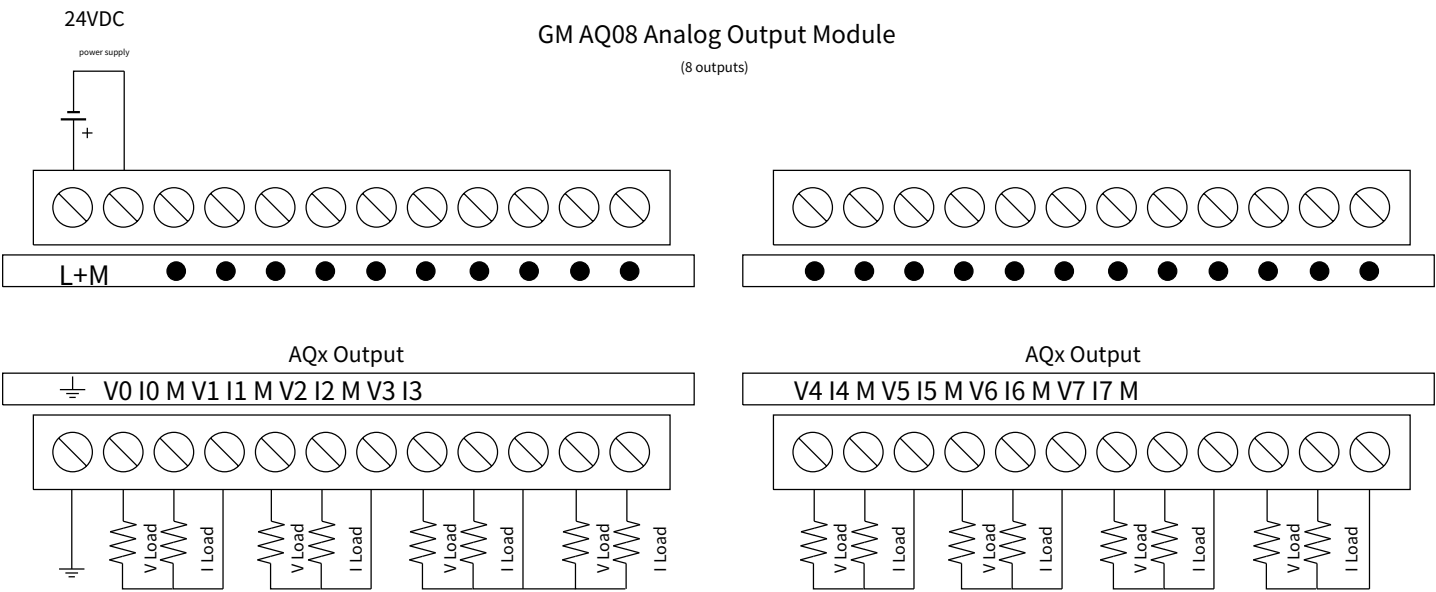


GM AE08 analog input expansion module



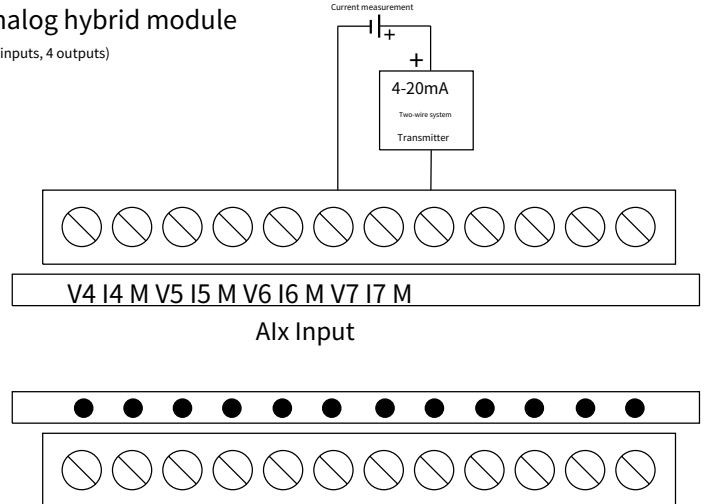
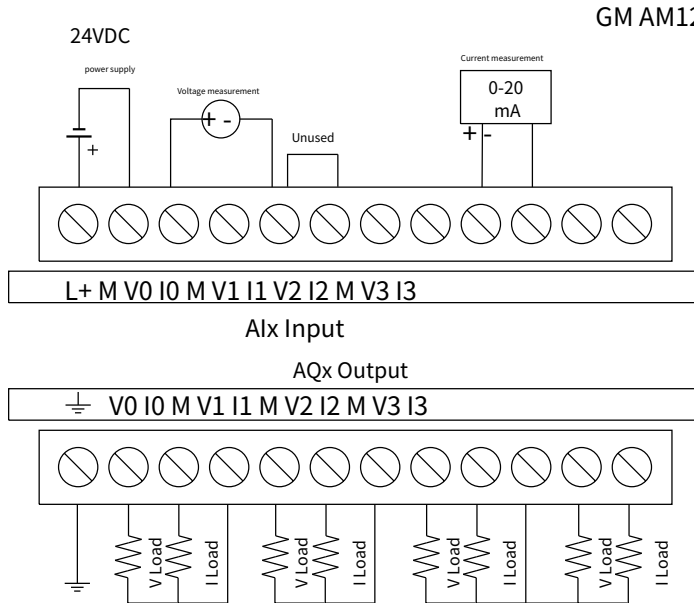
GM AQ04 analog output expansion module





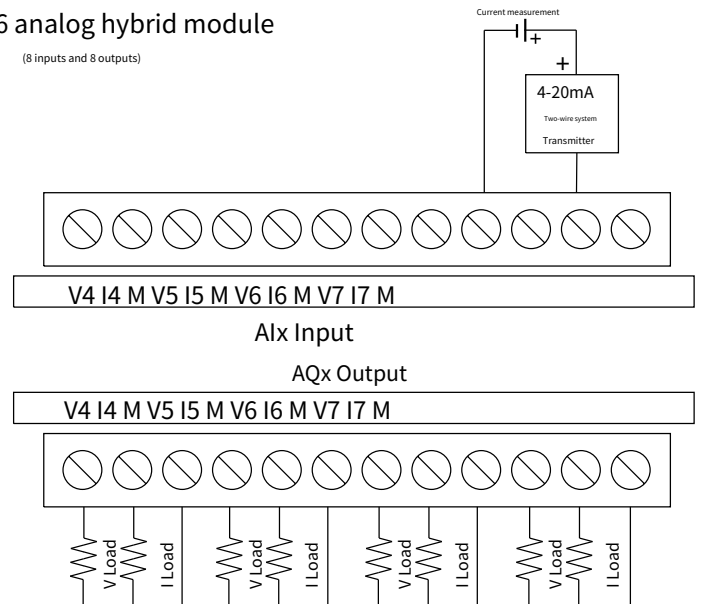
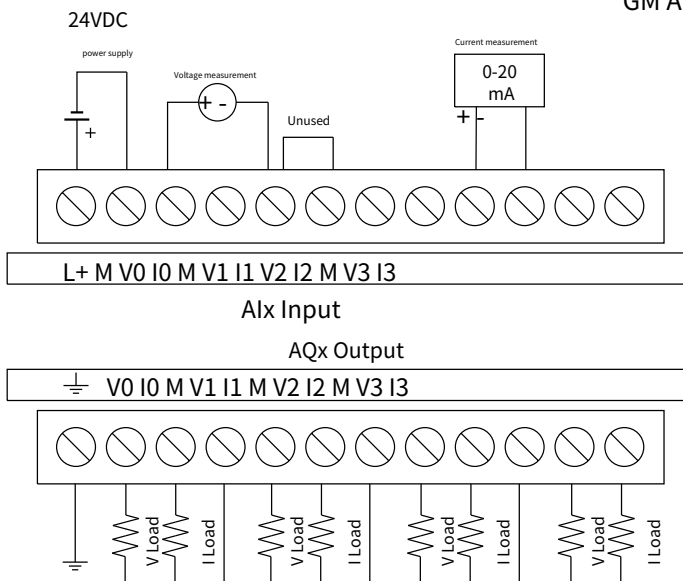
GM AM12 analog hybrid module

(8 inputs, 4 outputs)

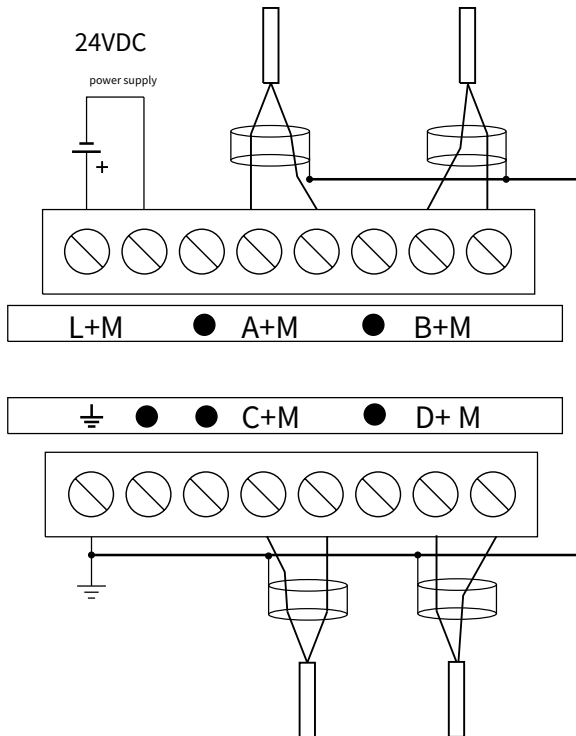


GM AM16 analog hybrid module

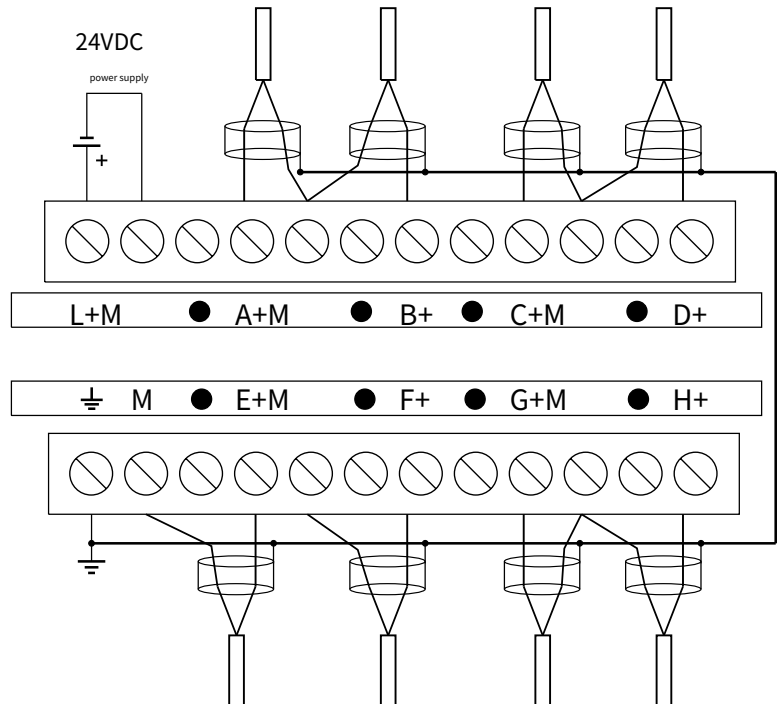
(8 inputs and 8 outputs)



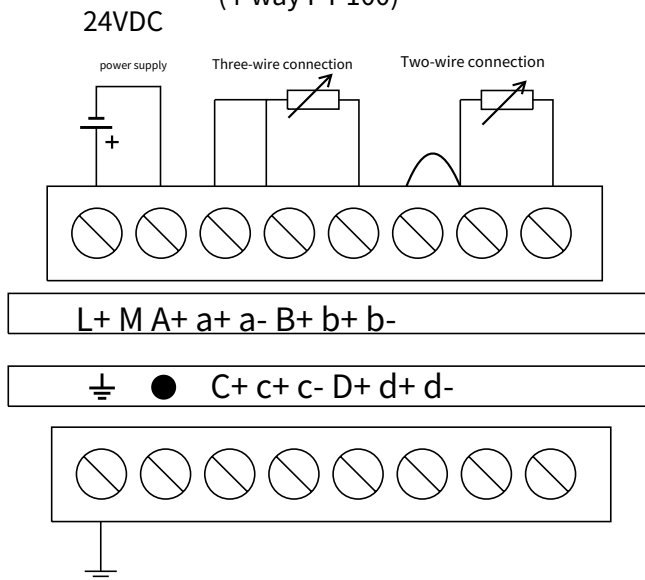
GM AN04 Temperature Expansion Module
(4-channel NTC 10K 3950)



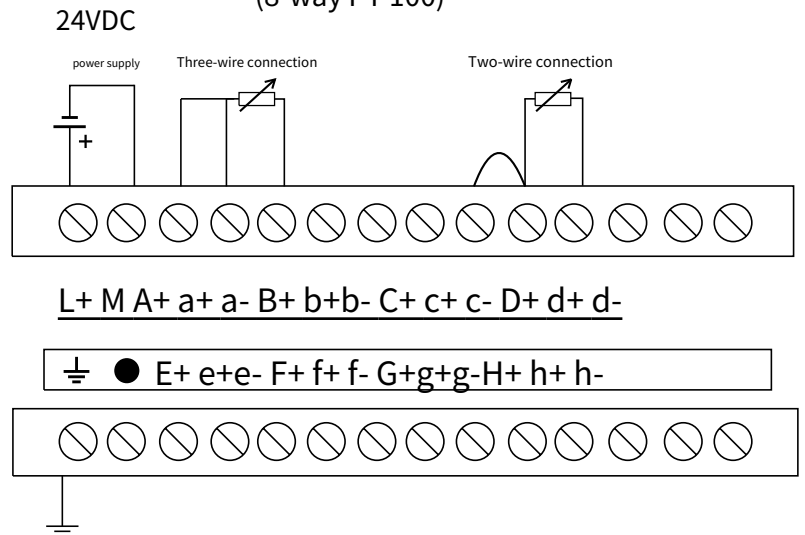
GM AN08 Temperature Expansion Module
(8-channel NTC 10K 3950)



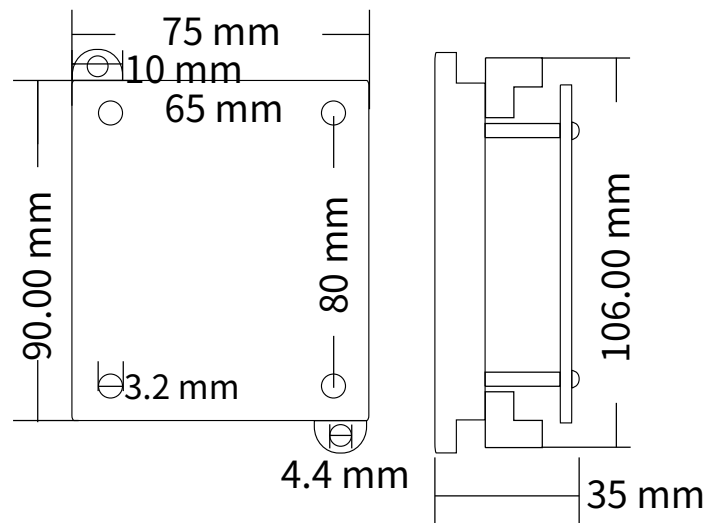
GM AR04 Temperature Extension Module
(4-way PT 100)



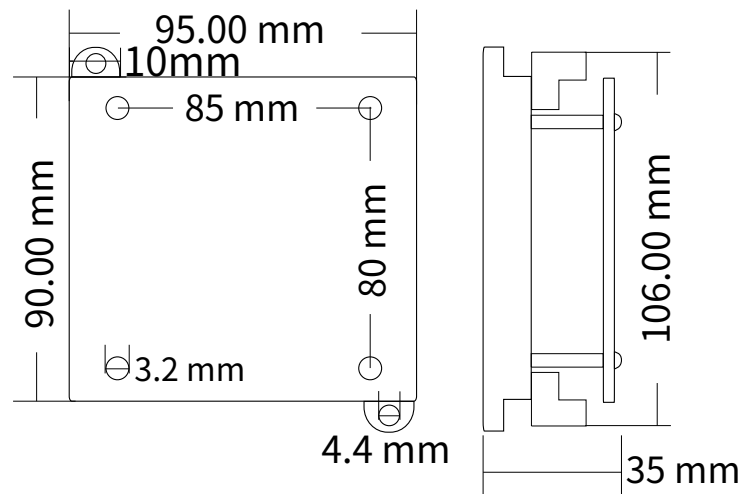
GM AR08 Temperature Extension Module
(8-way PT 100)



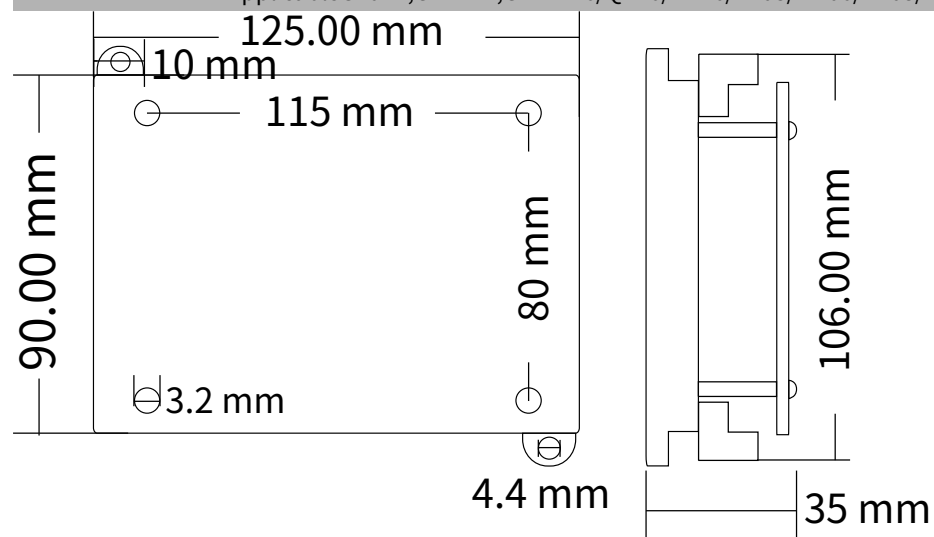
10. Dimensions and installation



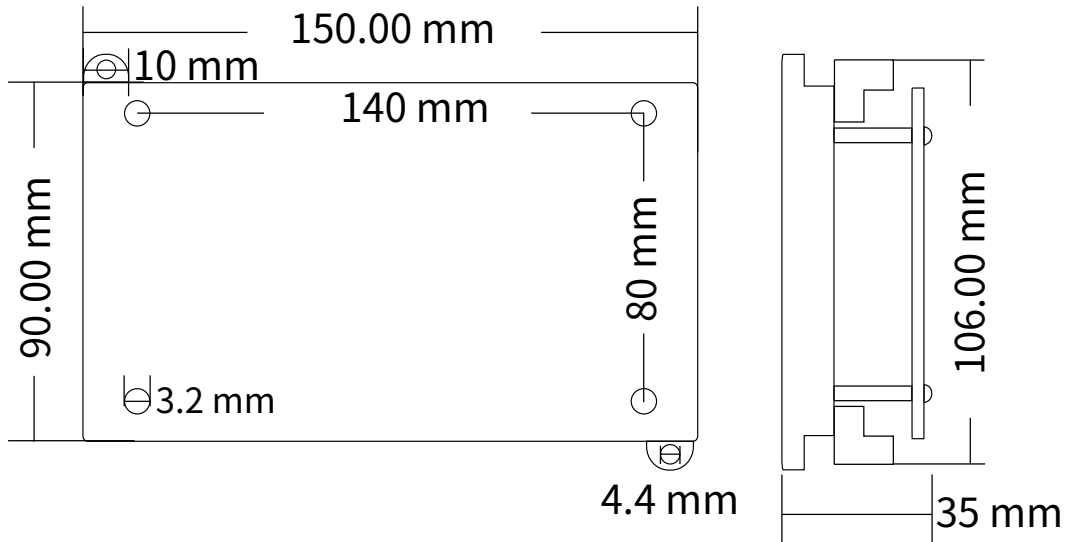
Applicable GM DE08/DR08/AE04/AQ04/AR04/AN04/AT04 model



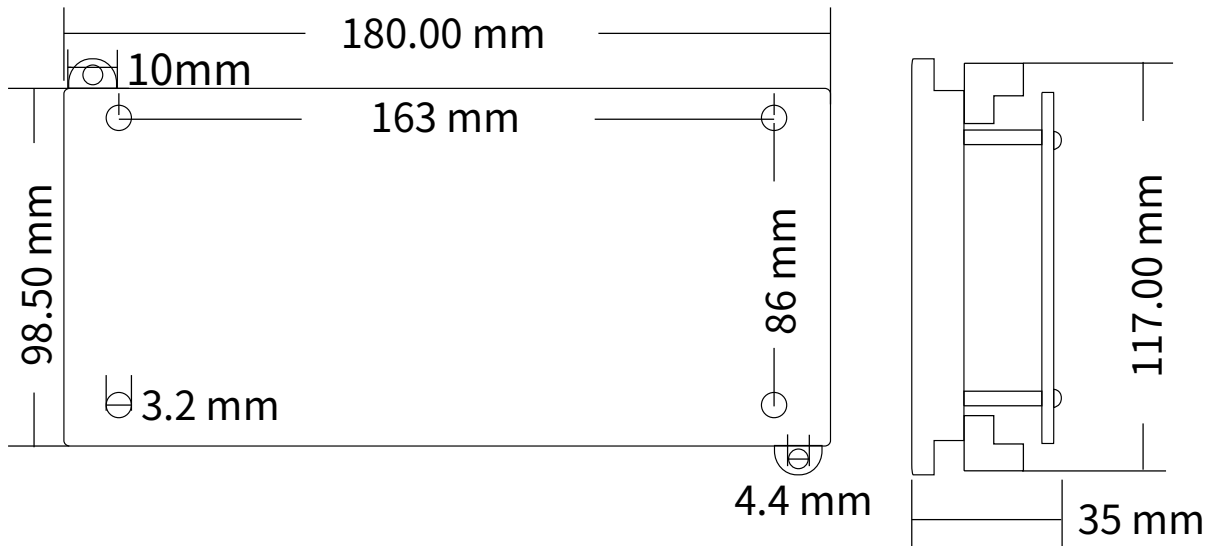
Applicable G10XP, GR14XP, GM DE16/QR16/DR16/AE08/AM06/AR08/AN08 model



Applicable GR/T20, GR/T20XP model



Applicable GR/T24XP, GR/T30, GM DR32/AQ08/AM12/AM16 model



Applicable GR/T30XP, GR/T40 model

Note: There is a buckle on the back of the black bottom shell, which can be hung on the rail