

M3S series PLC user manual

Thank you for purchasing M3S series PLC. This manual mainly describes the product features, general specifications and wiring methods of this series of PLCs. For detailed program-ming, please refer to "M3S Series Programming Manual". More specifications can be customized in batches

M3S series PLC has the following features:

- Highly integrated. The maximum switching value is 24 inputs and 16 outputs, and the switching value output can be transistor / hybrid output.
- It is equipped with two PLC programming ports: type-C port (faster download and reading speed) and RS232 (8-hole mouse head female seat); Conventional 2 RS485, or 1 RS232 + 1 RS485 communication port can be customized.
- Support multi-channel high-speed counting and high-speed pulse. High speed counting conventional 2-way single-phase 60KHZ + 4-way 10kHz or 1-way AB (z) phase 30kHz + 1 channel AB (z) phase 5KHz; High speed pulse is 100kHz for each channel of Y0 ~ Y1 and 10kHz for each channel of Y2 ~ Y3, with independent acceleration and deceleration.
- The total number of high-speed counting + high-speed pulses shall not exceed 300kHz.
- It can be specially encrypted, and the password is set to 12345678 to completely prohibit reading the program. [Note: only 8-bit password encryption is supported]
- Screw type terminal blocks with fixed spacing of 5.0mm are adopted for convenient wiring; It can be installed with DIN rail (35mm wide) and fixing hole.
- Super powerful. Compatible with fx3s series PLC, with fast operation speed.

Product information

◆ Naming rules M3S - 24 - MRT - 1C1 - 1P - 485/485

- Company product series M3S: M3S series PLC
- Digital input and output (DI/DO): 24: 16 DI 10 DO 40: 24 DI 16 DO
- Module classification M: general controller main module
- Digital value output type R: relay output type; T: Transistor output type; RT: transistor relay hybrid output
- C1 represents single-phase high-speed count, C2 represents AB phase count, and C3 represents ABZ phase count; Conventional 2-way single-phase 60KHZ + 4-way 10kHz or 1-way AB (z) phase 30kHz + 1-way AB (z) phase 5KHz;
- P0 represents high-speed pulse 10kHz; P1 represents high-speed pulse 100kHz; Conventional Y0 ~ Y1 each 100kHz, Y2 ~ Y3 each 10kHz;
- The total number of high-speed counting + high-speed pulses shall not exceed 300kHz.
- See [table 1: basic parameters] for optional communication port

Basic parameters

Table 1: basic parameters

M3S series standard PLC	I/O		Communication port	High speed counting			High speed pulse	Dimensions	
	DI	DO		single-phase	AB phase	ABZ phase		Dimensions (mm)	CutoutSize (mm)
M3S-24M	14	10	Default 2 RS485; Or can be customized as one RS485 and one RS232.	Conventional single phase 2 channels 60KHz	Conventional AB phase 1 channel 30KHz	Conventional ABZ phase 1 channel 30KHz	Conventional 4 channels; Y0-Y1 is 100KHz, Y2-Y3 is 10KHz;	93*88*75	74*80
M3S-40M	24	16		+4 channels 10KHz;	+1 channel 5KHz;	+1 channel 5KHz;	High-speed counting+ high speed pulse can't Exceed 300KHz	143*88*75	124*80

MT is transistor output: Y0 / Y1 of 24m is fixed as transistor; MR is relay output; MRT is a mixed output, which is optional according to customer requirements.

Table 2: Electrical parameters

Electrical parameters		
Input voltage	AC 220V	
Digital input indexes		
Isolation mode:	Photoelectric coupling	
Input impedance	High speed input terminal 3.4K Ω	Common input terminal: 4.3K Ω

(Continue to above table)

Input ON	Input current of high-speed input terminal is greater than 5.8ma/24v	Input current of common input terminal is greater than 9.9ma/24v
Input OFF	The input current of the high-speed input terminal is less than 4.5mA/19V	The input current of ordinary input terminal is less than 4mA/17V
Filter function	With filtering function, the filtering time can be set in the range of 0-60ms, the default is 10ms	
High count function	Conventional 2-way single-phase 60KHz+4-way 10KHz or 1-way AB(Z) phase 30KHz+1-way AB(Z) phase 5KHz	
Input level	Passive NPN, common terminal isolated, S/S connected to 24V+	
Digital relay output index		
Max current	2A/point, 4A/4point COM, 5A/8point COM, 5A/12point COM	
loop supply voltage	DC/AC24V~220V	
Circuit insulation	Relay Mechanical Insulation	
On Response time	about 10ms	
Mechanical life (no load)	10 million times	
Electrical life (rated load)	300,000 times	
Output level	Normally open dry contact output, COM can be connected to positive or negative	
Digital transistor (MOS) output index		
Maximum allowable current	Y0-Y1 of 24M is fixed to MT, 0.1A/point; MT: 0.5A/point, 0.8A/4 points COM, 1.6A/8 points COM;	
loop supply voltage	DC24V	
Circuit insulation	Optocoupler insulation	
Isolation Voltage (Power - External Terminals)	1500VAC	
On Response time	High-speed output: 10μs other 0.5ms	
High-speed output frequency	Conventional 4 channels, Y0-Y1 is 100KHz, Y2-Y3 is 10KHz High-speed counting + high-speed pulse total can not exceed 300KHz	
Output level	Low level NPN, COM connected to negative	
External interface		
Programming port	Comes with two programming ports: Type-C port (faster download speed) and RS232 (8-hole mouse head female socket)	
Communication port	Refer to [Table 1: Basic Parameters]	
Environment condition		
Working temperature	0°C~50°C	
Relative humidity	5%~95%RH	
Storage temperature	-20°C~70°C	
Vibration frequency	10-57Hz, amplitude 0.035mm; 57Hz-150Hz, acceleration 4.9m/s ² (10 times each in X, Y, and Z directions, totaling 80 minutes each)	

Mechanical Design Reference

◆ Installation and Dimensions

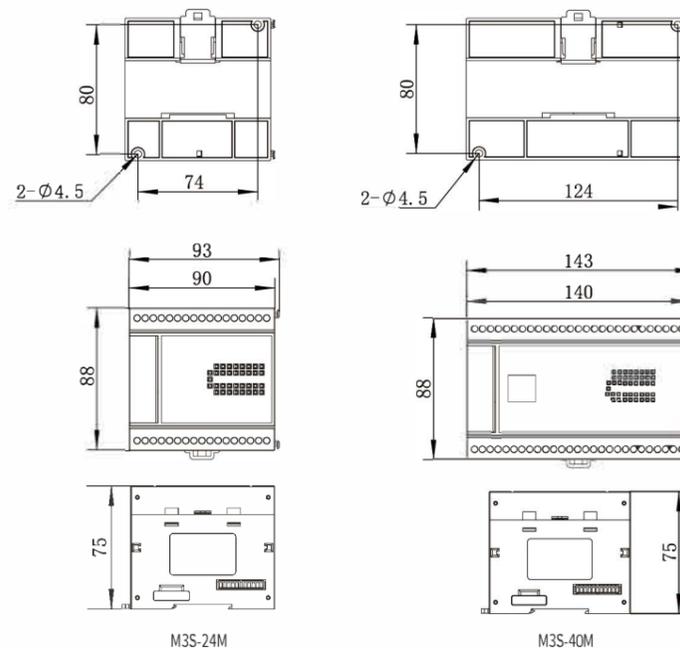


Figure 1 Installation dimension drawing

Electrical Design Reference

◆ Product structure

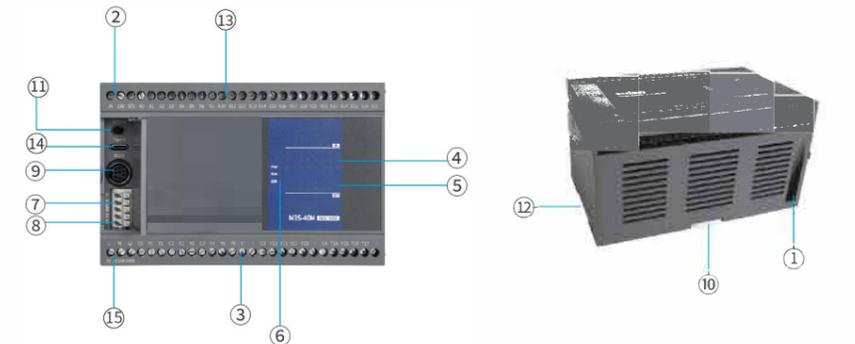


Figure 2 Product structure

- Mounting holes
- DC24V power output terminal block
- Digital output terminal block
- Digital input display LED
- Digital output display LED
- PWR: Indicates power-on status
RUN: Lights up when the PLC is running
ERR: The indicator light will be on when the program is wrong
- RS485/RS232
- RS485
- PLC programming port RS232
- Buckle fixed
- RUN/STOP PLC operation switch
- DIN rail (35mm wide) mounting slot
- Digital input terminal block
- PLC Type-C programming port
- AC220V power input terminal block

◆ Hardware interface

0V 24V S/S X00~X07 X10~X15
L N FG C0 Y00 Y01 C1 Y02 Y03 C2 Y04 Y05 C3 Y6 Y7 Y10 Y11
M3S-24MT/MRT

0V 24V S/S X00~X07 X10~X17 X20~X27
L N FG C0 Y00 Y01 C1 Y02 Y03 C2 Y04~Y07 • C3 Y10~Y13 • C4 Y14~Y17 •
M3S-40MT/MRT

Figure 3 Hardware interface diagram



Figure 4 PLC programming port

M3S series PLC pin definition

Pin number	Signal	Describe
4	RXD	wiring
5	TXD	send
8	GND	ground wire

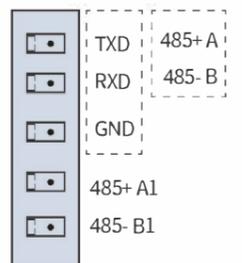


Figure 5 Optional communication port

Terminal wiring specification: 22-14AWG wire. The digital input and output terminals of this series of models are screw-type terminals, and the optional communication port adopts spring-type terminals.

Communication interface definition:

Comes with two programming ports: Type-C port (faster download speed) and RS232 (8-hole mouse head female socket). Default 2 RS485, or can be customized as 1 RS485, 1 RS232.

Communication port description:

- Serial port 1: RS232 (PLC programming port): supports Mitsubishi programming port protocol, which can be used to download PLC programs or communicate with devices that support Mitsubishi programming port protocol
- Serial port 2: RS485 (AB port) / optional RS232: support Mitsubishi programming port protocol, RS protocol and Modbus RTU/ASCII protocol
* Support RS, WR3A, RD3A, ADPRW instructions
- Serial port 3: RS485 (A1, B1 port): support Mitsubishi programming port protocol, RS2 protocol and Modbus RTU/ASCII protocol
* Support RS2, WR3A, RD3A, ADPRW instructions

Note: For detailed settings, please refer to "Coolmay M3S Series PLC Programming Manual"

Equivalent Circuit

◆ Digital input wiring

PLC input (X) is an external power supply DC24V sink type (passive NPN), the input signal is isolated from the power supply. When using, connect S/S to the 24V positive of the power supply. Among them, 24V and 0V on the terminal have internal power supply, which can be directly used for X point input.

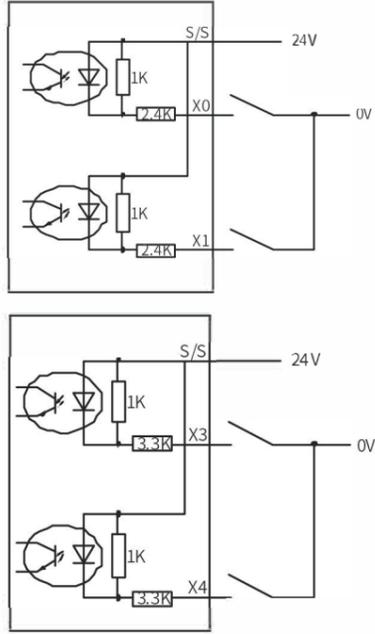


Figure 6 Input wiring diagram (the upper picture is the high-speed contact, the lower picture is the ordinary contact)

PLC digital input wiring:

Port short connection: The S/S of the PLC input terminal is connected to 24V, and the X terminal is connected to the power supply 0V, that is, there is a signal input;

Two-wire system (magnetic control switch): PLC digital input is connected to the two-wire magnetic control switch, the positive pole of the magnetic control switch is connected to the X terminal, and the negative pole is connected to 0V;

Three-wire system (photoelectric sensor or encoder): PLC switch is connected to a three-wire photoelectric sensor or encoder, the power supply of the sensor or encoder is connected to the positive pole of the power supply, and the signal line is connected to the X terminal; the encoder and photoelectric sensor are required to be NPN type (PNP requires Special custom).

PLC digital output wiring:

Transistor: Y0/Y1 of 24MT is fixed as pulse output port, the conventional wiring load is only 0.1A, and the wiring method is DC24V passive NPN output;

Other conventional outputs are NPN, COM is connected to the negative pole, and Y is connected to the positive pole of the power supply after passing through the load.

Relay: dry contact output, COM can be connected to positive or negative.

◆ Digital output wiring

Figure 7 shows the equivalent circuit diagram of the relay output module. There are several groups of output terminals, and each group is electrically isolated. The output contacts of different groups are connected to different power circuits.

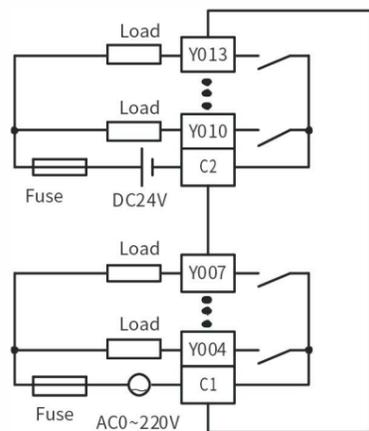


Figure 7 Relay output equivalent circuit

The equivalent circuit of the PLC output part of the transistor output type is shown in Figure 8. Also known from the figure, there are several groups of output terminals, and each group is electrically isolated. The output of different groups can be connected to different power circuits when they are electrocuted; the transistor output can only be used for DC24V load circuit. The output wiring mode is NPN, COM common cathode.

Among them, Y0-Y1 of 24M is fixed as the pulse output port, the conventional wiring load is only 0.1A, and the wiring method is DC24V passive NPN output.

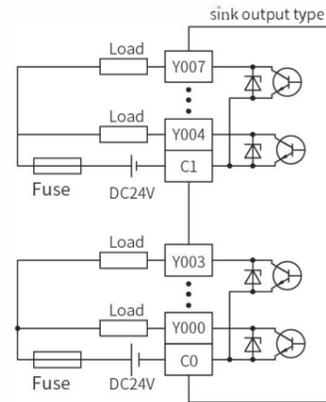


Figure 8 Transistor output equivalent circuit

For the inductive load connected to the AC circuit, the external circuit should consider the RC instantaneous voltage absorption circuit; for the load of the DC circuit, consider adding a freewheeling diode, as shown in Figure 9.

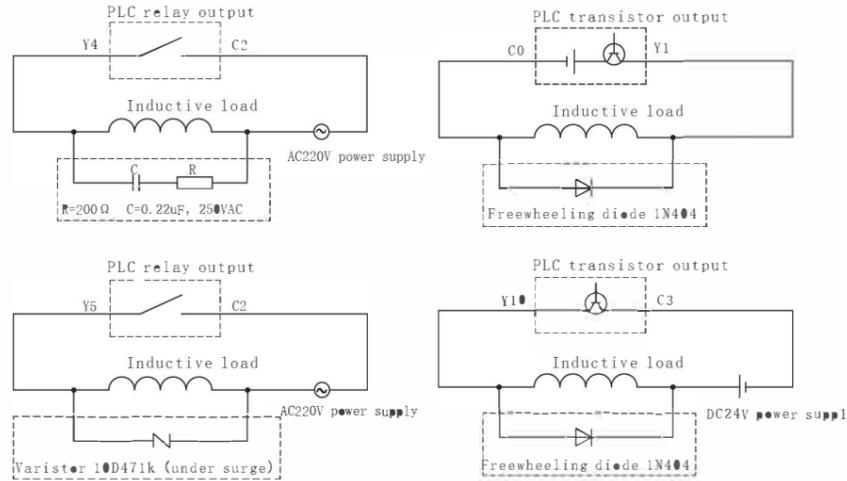
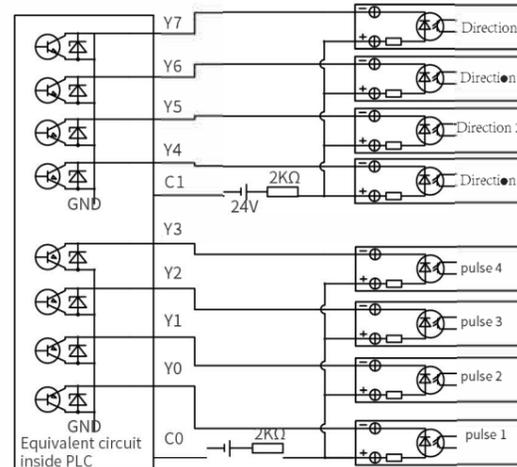


Figure 9 Schematic diagram of inductive load absorption circuit

The wiring of the stepper or servo motor is shown in Figure 10. The M3S series transistor output PLC defaults to Y0-Y3 as the pulse point, and the direction can be customized. As shown in Figure 10. Note: 5V drive must be connected with a 2KΩ resistor in series with DC24V.



The 5V driver must be connected in series with a 2KΩ resistor, and the 24V driver does not need a series resistor

Figure 10 Pulse output wiring diagram

※Note: All internal circuits shown in the figures are for reference only

Programming Reference

◆ Description of device assignment and power-down retention

Max digital point	M3S-24M	M3S-40M
Digital input X	X00-X15 14 Points	X00-X27 24Points
Digital output Y	Y00-Y11 10 Points	Y00-Y17 16Points
Auxiliary relay M	[M0-M383] 384Points for general use / [M384-M511] 128Points for hold use / [M512-M1535] 6144Points for general use [M8000-M8511] 512 Points for special use	
State S	[S0-S9] 10Points for initial state / [S10-S127] 118 Points for holding / [S128-S255] 128Points for general use	
Timer T	[T0-T31] 32Points 100ms for general use / [T32-T62] 31Points 100ms, M8028 =ON becomes 10ms [T128-T131] 4Points 1ms accumulation for keeping use / [T132-T137] 6Points 100ms accumulation for keeping use	
Counter C	16bit up counter [C0-C15] 16 points for general use/[C16-C31] 16Points for holding 32-bit up-down counter [C200-C234] 35Points for general use High-speed counter [C235-C245 single-phase single count] [C246-C250 single-phase double count][C251-C255 double-phase double count]	
Data register D	[D0-D127] [D256-D2999] 2872 points for general use [D128-D255] [D1000-D3999]3128Points for keeping use/[D8000-D8511]512 points for special use	
Data register VZ	[V0-V7] [Z0-Z7] 16 points for index	
Pointer JUMP and CALL for branches	[P0-P255] 256 Points / [P0~P1280] 1281Points	
Nested	[N0-N7] 8 point for master control	
Interrupt	[I000~I500] 66 points for input interruption/[I600~I800] 3 points for timer interrupt	
Constant	K	16 bit -32,768-32,767
	H	16bit 0-FFFFH
		32bit -2,147,483,648-2,147,483,647
		32bit 0-FFFFFFFFH

The soft components of M3S PLC are kept permanently after power off, that is, all the soft components in the holding area will not be lost after the module is powered off, and the real-time clock adopts non-rechargeable batteries, which is convenient for users to replace. All power-off holding functions must ensure that the voltage of the DC24V power supply with load is above 23v, and the power on time of the PC is more than 2 minutes, otherwise the power-off function will be abnormal.

The programming software is compatible with Mitsubishi PLC programming software GX Developer8.86Q and GX Works2. For details, please refer to "Coolmay M3S Series PLC Programming Manual" "M3S Series Programmable Logic Controller (PLC) User Manual" "Coolmay Full Series PLC Instruction Programming Manual"

Tips

M3S Series Programmable Logic Controller (PLC) User Manual

—Before using this product, please read the relevant manuals carefully and use this product under the environmental conditions specified in the instruction manual.

1. Please confirm the power supply voltage range of this product (conventional product power supply AC220V!) and correct wiring before turning on the power to avoid damage.
2. When installing this product, be sure to tighten the screws or clamp the guide rail to avoid falling off.
3. Avoid wiring, plugging and unplugging cables in a live state, otherwise it will easily cause electric shock or circuit damage; when the product emits peculiar smell or abnormal sound, please turn off the power switch immediately; when processing screw holes and wiring, do not let metal chips and The end of the wire falls into the ventilation hole of the controller, which may cause product malfunction and malfunction.
4. Do not bundle the power cord and the communication cable together or get too close, and keep a distance of more than 10cm; strong and weak currents need to be separated and properly grounded; Input and output cables should be shielded to improve anti-interference performance. The ground terminal FG on the machine must be properly grounded, which can improve the anti-interference ability.
5. The digital input is an external power supply DC24V sink type (passive NPN), the input signal is isolated from the power supply, and the S/S needs to be connected to the 24V positive of the external power supply when using.
6. The COM of the output common terminal of the digital transistor is a common cathode.
7. Please do not disassemble the product or modify the wiring at will. Failure to do so may cause malfunction, malfunction, loss, or fire.
8. When installing and disassembling the product, please be sure to cut off all power, otherwise it will cause equipment malfunction and failure.