

## MX2N PLC user manual

Thank you for choosing Coolmay MX2N series PLC. This manual mainly explains the features, general specifications and wiring methods of MX2N series PLC. Detailed programming information please refer to < Coolmay MX2N PLC Programming Manual >.  
Main features of MX2N series PLC.

- Highly integration. At most 12DI/12DO (digital type can be customized transistor, relay mixed), 4AI (analog input can be customized temperature, current, voltage or mixed) / 2AO (analog output can be customized current, voltage or mixed) 12-bit precision. Analog data can be read and output directly using registers.
- Support multi-channels high-speed counting and high-speed pulse. Normally 6 channels single-phase or 2 channels AB dual phase 10KHz high speed counting. Can be customized 6 channels single phase counting (4 channels 60KHz, 2 channels 10KHz) or 2 channels AB dual phase 60KHz. Normally 4 channels 10KHz high speed pulse; can be customized 2 channels 200KHz and 2 channels 100KHz.
- Support special encryption. Setting 12345678 as password can thoroughly prevent the data from being read. (Attention: Only supports 8-bit password encryption)
- Support for external interrupts and watchdog functions. Digital tube display function is optional, one-way weighing function (accuracy is 24 bits) or a CAN communication port can be customized.
- use DIN rail (35mm wide) and mounting holes for installing.
- Use 5.0mm pitch pluggable terminals for easy wiring;

### Products information:

◆ CX3G - 24 M RT - 8AD 4DA - V - A0 - 1C1 - 1P - 485/232

- Series: MX2N: MX2N series plc
- I/O Points: 24: 12DI/12DO
- Module: M: Main Module
- DO type: R: relay T: transistor RT: relay and transistor mixed
- AI: 0~4 channels are optional
- AO: 0~2 channels are optional
- AI type: G: weighing function NTC: Thermal resistance (10K/50K) [Occupy 2 AD, up to 2 channels] V: 0-10V V5: 0-5V A0: 0-20mA
- AO type: :0-10V V5: 0-5V A0: 0-20mA
- C1 stands for single phase high-speed counting, C2 for AB phase counting, can be customized 6 channels single phase (4 channels 60KHz, 2 channels 10KHz) or 2 channels AB dual phase 60KHz
- P stands for 100KHz high-speed pulse; P2 stands for 200KHz; normally 4 channels 10kHz; can be customized 2 channels 200KHz and 2 channels 100kHz
- COM port: 1 232 port or 1 RS485 port and 1 CAN can be optional

### ◆ Basic specification

Diagram1: basic parameters

| CX3G series standard PLC | Switching Value |    | Analog Points |        | COM Port  |                         | High-speed counting  |   | High-speed pulse   | Size           |                  |
|--------------------------|-----------------|----|---------------|--------|---|-------------------------|--|---|--|----------------|------------------|
|                          | DI              | DO | Max AI        | Max AO | 485/232   | CAN                     | Single phase   | AB phase  | Output   | Dimension (MM) | Cutout size (MM) |
| MX2N-24M                 | 12              | 12 | 4             | 2      | Come with one 232 programming port one 232 or one 485 can be optional | ONE CAN can be optional | Normally single phase 6 10KHz (4 channels 60KHz, 2 channels 10KHz) | Normally AB(Z) 10KHz can be customized 2 channels AB dual phase 60KHz | Normally 4 channels 10KHz, can be customized 2 channels 200KHz and 2 channels 100kHz | 130*90*36      | 122*99           |

MT means transistor output, the max load is 500mA; MR means relay output, the max load is 5A, MRT means both relay and transistor, it is up to customers.

Diagram 2 : electrical parameters

| Electrical Parameters |                        |                    |
|-----------------------|------------------------|--------------------|
| Input Voltage         | DC24V                  |                    |
| Digital Input Index   |                        |                    |
| Isolation Mode        | Photocoupling          |                    |
| Input Impedance       | High-speed input 3.3KΩ | Common input 4.3KΩ |

|                       |  |  |
|-----------------------|--|--|
| Input ON              | Electric current of high-speed input is higher than 4. 5mA   | Electric current of common input is Higher than 3. 5mA |
| Input OFF             | High-speed input and normal input current are less than than 1. 5mA  |  |
| Filter Function       | With filter function, the filter time can be set amon 0-100ms, defaulted as 10ms   |  |
| High - speed Counting | Normally 6 channels single-phase (X0-X5) or 2 channels AB dual phase (X0-X1/X3-X4) 10KHz high speed counting. Can be customized 6 channels single phase counting (4 channels 60KHz, 2 channels 10KHz) or 2 channels AB dual phase 60KHz. |  |
| Vii                   | Passive NPN, Common Isolation, S/Sconnect 24V+   |  |

| Digital and Relay Output Index |   |
|--------------------------------|---|
| Max Current                    | 5A  |
| Load Voltage                   | DC/AC 24V-220V  |
| Circuit Insulation             | Relay Mechanical Insulation   |
| On Respond Time                | About 10ms  |
| Mechanical Life (without load) | 10 million times  |
| Electrical Life ( Rated Load ) | 300 thousand times  |
| Vol                            | Normally open dry contact output, COM port can be connected to positive or negative |

| Transistor Output Index     |   |
|-----------------------------|---|
| Max Current                 | 500mA   |
| Load Voltage                | DC12V~48V   |
| Circuit Insulation          | Optocoupler Insulation  |
| Isolation Voltage           | 1500VAC   |
| ON Respond Time             | High-speed output: 10 μ s, and others 0.5ms                                   |
| High-speed Output Frequency | Y0-Y3 is 10KHz can be customized 4 channels, Y0/Y1 is 200KHz. Y2/Y3 is 100KHz |
| Vol                         | COM connected with negative terminal NPN                                      |

| Analog Input Index |   |
|--------------------|---|
| Input Signal       | NTC10K/NTC50K/0-10V/0-5V/0-20mA/customizations. |
| Respond Time       | 22 scanning cycle                               |
| AI Quantity        | 0-4 channels                                    |
| Accuracy           | 12bits, ±full range                             |

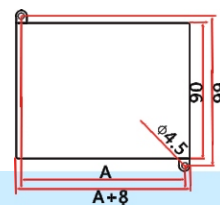
| Analog Output Index |  |
|---------------------|--|
| Output Signal       | 0-5V/0-10V/0-20mA/others can be customized |
| AO Quantity         | 0-2 channels                               |
| Accuracy            | 12bits                                     |

| Interface        |  |
|------------------|--|
| Programming Port | Come with 1 232 programming port                   |
| COM port         | 1 232 port or 1 485 port and 1 CAN can be optional |

| Environment           |   |
|-----------------------|---|
| Operating Temperature | 0°C~50°C  |
| Relative Humidity     | 5%~95%RH  |
| Storage Temperature   | -20°C~70°C  |
| Vibrational Frequency | 10-57Hz, amplitude 0.035mm, 57Hz-150Hz, 4.9m/s <sup>2</sup> (10 times each on X, Y, Z, total 80 minutes each) |

### Mechanical Design Reference

#### ◆ Installation Size:



Cutout size: A\*99mm  
Dimension: (A+8)\*90mm

MX2N-24M A:122mm

Diagram 1 Installation dimension drawing

### Electrical design reference

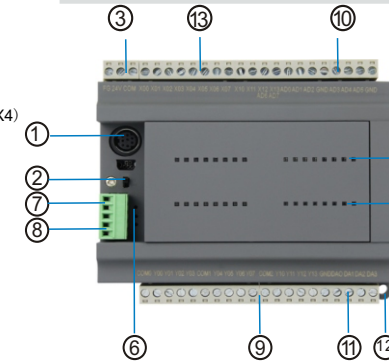


Diagram 2 Product structure

#### ◆ Hardware Interface

0V 24V S/S X00-X13 GND Ad0 Ad1 Ad2 Ad3 GND Da0 Da1  
COM0 Y00 Y01 COM1 Y02 Y03 COM2 Y04-Y07 COM3 Y10-Y13 E+ S- S+  
**MX2N-24MT/MR/MRT-4AD2DA**

Diagram 3 Hardware Interface Drawing

#### MX2N Series PLC PIN definition

| Pin NO . | Signal | Description   |
|----------|--------|---------------|
| 4        | RXD    | Receive Data  |
| 5        | TXD    | Transmit Data |
| 8        | GND    | Ground        |

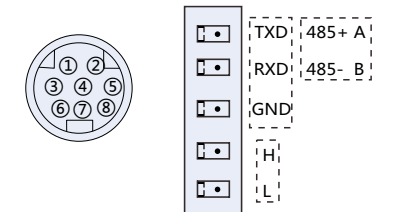


Diagram 5 com port optional

**Terminals wiring standard:** 22-14AWG wire. This series terminals are all pluggable terminals. Special model interface mark please refer to product silk screen

Communication interface definition: refers to [diagram1: basic parameters]

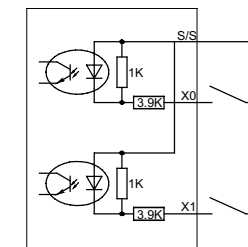
#### COM port definition:

RS232 (PLC programming port); support Mitsubishi programming port protocol, which can be used for downloading PLC software and can be communicated with device that supports Mitsubishi programming protocol.

RS232/RS485 optional: Supports Mitsubishi programming port protocol, RS protocol and Modbus RTU [Modbus RTU protocol The protocol communication parameters are set in D8120, and the station number is set in D8121, which can be used as a master or slave.] Supports RS, FROM, TO instruction

CAN communication port (not coexisting with optional weighing module): only for internal CAN networking communication [communication baud rate is set in D8153, host/slave number is set in D8150, maximum support 32 slaves, Master and slave share up to 32 registers]

The PLC input (X) is an externally powered DC24V sink type (passive NPN) with the input signal isolated from the power supply. When using, connect S/S to 24V positive external power supply.



#### PLC Digital Input Wiring:

Port short circuit: S/S of PLC input terminal is connected to 24V, X terminal is connected to power supply 0V, that is, input signal;

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

Three-wire system (photoelectric sensor or encoder): The PLC switch is connected to the 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 requirements are NPN type

#### PLC Digital Output Wiring:

Transistor: The output is NPN, COM is connected to the negative pole, and Y is connected to the positive pole of the power supply after the load.  
Relay: dry contact output, COM can be connected to positive or negative

Diagram 6

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

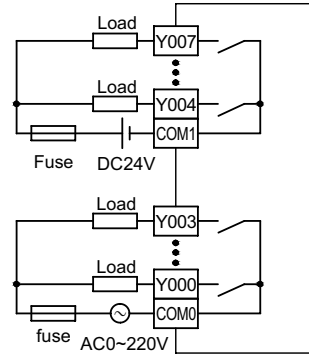


Diagram 7 Relay output equivalent circuit

The equivalent circuit of the PLC output part of the transistor output type is shown in Figure 8. Also known from the figure, the output terminals are several groups, each group is electrically isolated, and different groups of output contacts can be connected to different power circuits; the transistor output stage can only be used for DC 24V load circuits. Output wiring is NPN, COM common cathode.

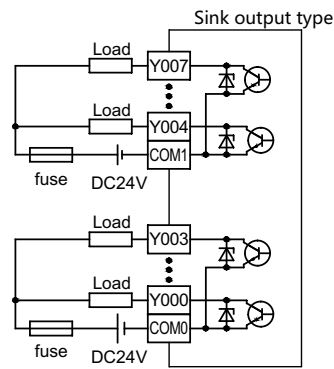


Diagram 8 Transistor output equivalent circuit

For the inductive load connected to the AC circuit, the external circuit should consider the RC transient voltage absorption circuit; corresponding to the inductive load of the DC loop, consider adding a freewheeling diode, as shown in diagram 9.

Stepping or servo motor wiring as shown in Figure 10, 3G series PLC default Y0-Y7 is pulse point, direction can be customized

Note: 5V drive must be connected to a 2KΩ resistor on DC24V

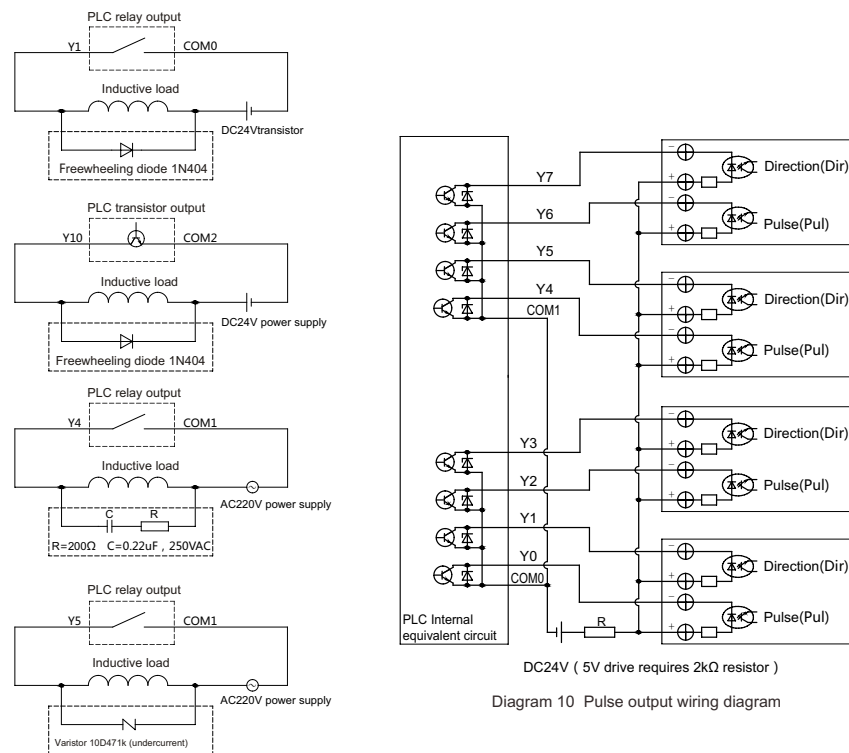


Diagram 9 Inductive load absorption circuit schematic

⊗ Note: All internal circuits in the illustrations are for reference only.

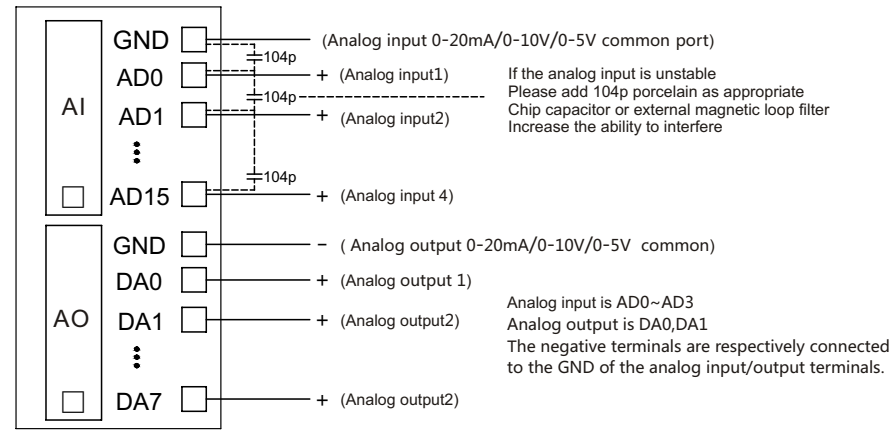


Diagram 11 PLC analog wiring



**PLC analog wiring**

Two-wire system: the positive pole of the power supply is connected to the positive pole of the transmitter; the negative pole of the transmitter is connected to the AD side; the negative pole of power supply is connected to GND, which normally it is a wiring way of 4-20mA/0-20mA transmitter  
 Three-wire system: the positive pole of the power supply is connected to the positive pole of the transmitter, the negative pole of the power supply and the negative pole of the signal output are the same terminal and the transmitter signal output is connected to the AD terminal;  
 Four-wire system: the positive and negative poles of the power supply are respectively connected to the positive and negative poles of the power supply of the transmitter, and the positive and negative poles of the transmitter signal output are respectively connected to the AD and GND terminals;

The analog line of temperature is connected to the AD terminal and the GND terminal respectively. The GND common terminal of the analog input and output can be shared.

**PLC anti-interference processing**

1. Strong and weak currents should be separated and wired, and not common ground; when there is strong electric interference, magnetic rings should be added on the power supply side; and properly and effectively grounded according to the type of the chassis.
2. When the analog quantity is disturbed, 104 ceramic capacitors can be added for filtering, and a correct and effective grounding can be performed.

**Programming Reference**

◆ Devices Distribution and Statement of Power-down Save

|                       |   | MX2N-24M  |  |                                    |
|-----------------------|---|---|--|------------------------------------|
| Digital output X      |   | X00~X13 12 points   |  |                                    |
| Digital output Y      |   | X00~X13 12 points   |  |                                    |
| Auxiliary relay M     |   | [M0~M199]500 point general/[M500~M1535]1036 point holding / [M8000~M8511] 512point special  |  |                                    |
| State S               |   | [S0~S9] 10point general / [S10~S999] 990point holding   |  |                                    |
| Timer T               |   | [T0~T199] 200point 100ms general [T200~T24] 46point 1μs general [T246~T249] 4point 1ms grand total keep state/[T250~T255] 6point 100ms grand total keep state                     |  |                                    |
| Counter C             |   | 16bit up counter      32bit up and down counter      High-speed counter   |  |                                    |
|                       |   | [C0~C15] 16point General [C16~C199] 184point Holding [C200~C219] 20point General [C220~C234] 15points holding      [C21, C31, C51] single phase dual counting 9 points keep state |  |                                    |
| Data Register D, V, Z |   | [D0~D127] 128point general      [D128~D7999] 7872point Holding      [D8000~D8511] 512point special  |  |                                    |
| Nested Pointer        |   | [N0~N7] 8point master control/[P0~P127]128points Jump, Subroutine with branch pointer/[10XX~15XX]6 points Indexing  |  |                                    |
| Constant              | K | 16bit -32,768~32,767  |  | 32bit -2,147,483,648~2,147,483,647 |
|                       | H | 16 bits 0-FFFFH   |  | 32 bits 0-FFFFFFFFH                |

**Analog input register(AD means analog input)**

The analog input can be up to 4 channels, and the precision is 12 bits [optional thermistor NTC (10K/50K); occupy 2 AD, up to two channels].

| No. | AD register | Analog sampling filter times |
|-----|-------------|------------------------------|
| AD0 | D8030       | Fixed to 22 PLC scan cycles  |
| AD1 | D8031       |                              |
| AD2 | D8032       |                              |
| AD3 | D8033       |                              |

**Load cell read register**

| Start flag | Read register (32 bit) | Weighing filter register |
|------------|------------------------|--------------------------|
| M8112      | D8112<br>D8113         | D8114                    |

Note : Analog input range and corresponding values of registers, etc. <Coolmay MX2N series PLC programming manual>

**Analog output register(DA means analog output)**

| No. | DA register | Setting range | Output voltage/current range |
|-----|-------------|---------------|------------------------------|
| DA0 | D8096       | 0-4095        | 0-10V/0-5V/0-20mA            |
| DA1 | D8097       | 0-4095        |                              |

The MX2N PLC's device power-off maintenance is permanently maintained, that is, all the devices in the holding area are not lost after the module is powered off.  
 The real-time clock uses a rechargeable battery to ensure that the clock is the current time. All power-off hold functions must ensure DC 24V. The voltage after the source is loaded is 23V or more, and the PLC power-on time is longer than 2 minutes, otherwise the power-off function will be abnormal.

Programming software: compatible with Mitsubishi programming software GX8. 52 and WORKS2  
 Detailed materials please refer to <MX2N PLC programming user manual >  
 <MX2N PLC user manual> <Mitsubishi FX programming manual>  
 <Coolmay HMI user manual >

TIPS

## MX2N PLC User Manual

— Before using this product, please read the relevant manual  
Carefully use the product under the environmental conditions specified in the manual.

1. In case of damaging the product, please confirm power supply range first (the regular power supply only limited to 24V DC, we suggest you to use the power supply which output voltage is 18W or higher than 18W), and wiring correctly, then electrify it.
2. Before installing the product, please tighten the screw and clamp guide to avoid falling.
3. Please do not wiring or plug cable when the power is on, otherwise it may cause electric shock or circuit damage. Disconnect the power switch immediately when the product smells or sounds abnormal. Do not drop metal shavings and wire tips into the control vent holes during screwing hole and wiring, which may cause product malfunctions and faults.
4. Please do not tie the power cord and communication cable together or let them too close, you should keep them for more than 10cm distance. The strong and weak electricity should be separated and properly grounded. If the interference is serious the communication and high frequency signal input and output cables should be the shielded cables to improve anti-jamming performance. The grounding terminal FG on this unit must be properly grounded, which can improve the anti-interference ability.
5. The digital input is an externally powered DC24V leakage type (passive NPN) with the input signal isolated from the power supply. When using, connect S/S to 24V positive external power supply.
6. The COM of the binary input / output (transistor) is common to the cathode.
7. Do not disassemble the product or modify the wiring optionally. Otherwise it may cause fault, malfunction, loss, or fire.
8. Please make sure to turn off the all power when you install or dismantle the product, otherwise it may cause malfunction or fault.

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