

CX3G PLC user manual

Thank you for choosing Coolmay CX3G series PLC. This manual mainly explains the features, general specifications and wiring methods of CX3G series. Detailed programming information please refer to <Coolmay CX3G PLC Programming Manual>.

Main features of CX3G series PLC.

- Highly integration. At most 40DI/40DO (digital type can be customized transistor, relay mixed), 16AI (analog input can be customized temperature, current, voltage or mixed) / 8AO (analog output can be customized current, voltage or mixed).
- Comes with 2 PLC programming ports: Mini typeB usb port (speed of reading and downloading is more faster) and RS 232 (8-hole mouse head female seat), normally have 2 RS 485 ports, both RS 232 and CAN are optional.
- Support multi-channels high-speed counting and high-speed pulse. High-speed counting normally single-phase 6 60KHz or AB(Z) phase 2 60KHz+ 1 10-100KHz. High-speed pulse normally Y0-Y3 each channel 100KHz, Y4-Y7 each channel 10KHz, acceleration and deceleration individually. The total amount of HSC and HSP output can not exceed 485KHz.
- Support special encryption. Setting 12345678 as password can thoroughly prevent the data from being read.
- 32K steps of program capacity, 32K power-failed holding registers which support interrupting, linear arc interpolation and PID auto-tuning.
- Use 5.0mm pitch pluggable terminals for easy wiring; use DIN rail (35mm wide) and mounting holes for installing.
- DCX3G series is the same with CX3N, but without the body case.
- Super function. Compatible with FX3G/FX2U/FX3S series PLC, operation speed more fast.

Products information:

◆ CX3G - 48 M RT - 8AD 4DA - V - A0 - 1C1 - 1P - 485/232

- Series: CX3G: CX3G series plc
- I/O Points: 16 : 8DI/8DO 24 : 12DI/12DO 32 : 16DI/16DO 34 : 18DI/16DO 48 : 24DI/24DO 64 : 32DI/32DO 68 : 32DI/36DO 80 : 40DI/40DO
- Module: M: Main Module
- DO type: R: relay T: transistor RT: relay and transistor mixed
- AI: 0~16 channels are optional
- AO: 0~8 channels are optional
- AI type: EK Thermocouple(can be customized T, S, J type)
PT: PT100 NTC:Thermal resistance (10K/50K/100K)
A0:0-20mA A4: 4-20mA V:0-10V V5:0-5V
- AO type: V:0-10V V5:0-5V A0:0-20mA
- C1 stands for single phase high-speed counting, C2 for AB phase counting, C3 for ABZ counting. Normally single-phase 6 60KHz or AB (Z) phase 2 60KHz+ 1 10KHz.
- P stands for high-speed pulse; normally 8 channels, Y0-Y3 is 100KHz, Y4-Y7 is 10KHz. High-speed counting + high-speed pulse total output can not exceed 480KHz.
- COM port: 2 RS485 port are default, 34M / 64M / 80M can be customized 1 485 port and 1 232 port, CAN is optional; 16M / 24M / 32M / 48M can be customized as 1 485, 1 232 or 1 485, 1 CAN 1 232, 1 CAN.

◆ 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		Single phase	AB phase	ABZ phase		Output	Dimension (MM)	Cutout size (MM)			
CX3G-16M	8	8	0	0	2 RS485 port are default can be customized 1 485, 1 232 Or 1 485, 1 CAN Or 1 232, 1 CAN	Normally single phase 6 60KHz or AB(Z) 2 60KHz+1 10KHz	Normally single phase 6 60KHz or AB(Z) 2 60KHz+1 10KHz	Normally single phase 6 60KHz or AB(Z) 2 60KHz+1 10KHz	Normally 8 channels Y0-Y3 100KHz, Y4-Y7 10KHz. High-speed counting + high-speed pulse total output can not exceed 480KHz.	85	90	36	77	99	
CX3G-22M	10	12	8	4						125	90	36	117	99	
CX3G-24M	12	12	6	4						195	90	36	187	99	
CX3G-30M	16	14	2	2						2 485 are default Can be customized 1 485, 1 232 CAN is optional	285	90	36	277	99
CX3G-32M	16	16	2	0											
CX3G-48M	24	24	8	4											
CX3G-34M	18	16	12	8											
CX3G-64M	32	32	16	8											
CX3G-80M	40	40	4	4											

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.
CX3G-24M if it be customized 8 analog input, the maximum digital input is 10
CX3G-32M if it be customized 2 AI2AO, the maximum digital points are 16DI 14DO

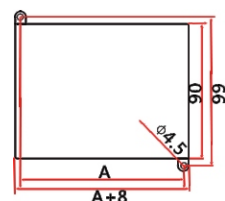
Diagram 2 : electrical parameters

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

Input ON	Electric current of high-speed input is higher than 5.8mA/24V	Electric current of common input is Higher than 9.9mA/24V
Input OFF	Electric current of high-speed input is higher than 4.5mA/19V	Electric current of common input is Higher than 4mA/17V
Filter Function	With filter function, the filter time can be set amon 0-60ms, defaulted as 10ms	
High - speed Counting	Normally single phase 6 channels 60KHz or AB(Z) phase 2 channels 60KHz+1 channel 10KHz.	
Vil	Passive NPN, Common Isolation, S/S	
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	COM connected with negative terminal NPN	
Transistor Output Index		
Max Current	500mA	
Load Voltage	DC24V	
Circuit Insulation	Optocoupler Insulation	
Isolation Voltage	1500VAC	
ON Respond Time	High-speed output: 10 μ s, and others 0.5ms	
High-speed Output Frequency	8 channels: Y0-Y3 is 100KHz, Y4-Y is 10KHz. High-speed counting and pulse can't over 480KHz.	
Vol	COM connected with negative terminal NPN	
Analog Input Index		
Input Signal	PT100/PT1000/thermocouple/NTC/0-10V/0-5V/0-20mA/4-20mA/ customizations.	
Respond Time	One scanning cycle	
AI Quantity	0-16 channels	
Accuracy	12bits	
Analog Output Index		
Output Signal	0-5V/0-10V/0-20mA/4-20mA	
AO Quantity	0-8 channels	
Accurary	12bits	
Interface		
Programming Port		
COM port	2 RS485 port are default, 34M/64M/80M can be customized 1 485 port and 1 232 port, CAN is optional; 16M/24M/32M/48M can be customized as 1 485, 1 232 or 1 485, 1 CAN or 1 232, 1 CAN.	
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 ² (10 times each on X, Y, Z, total 80 minutes each)	

Mechanical Design Reference

◆ Installation Size:



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

CX3G-16M A:77mm
CX3G-32/30/24/22M A:117mm
CX3G-48/34M A:187mm
CX3G-64/80M A:277mm

Diagram 1 Installation dimension drawing

Electrical design reference

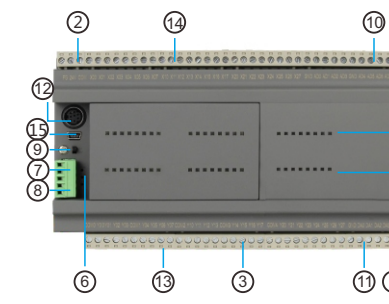


Diagram 2 Product structure

- Mounting hole
 - Terminal block for input signal of power supply
 - Terminal block of digital output
 - LED of Digital Input
 - LED of Digital Output
 - PWR: Power-up State RUN:The light is On when the PLC is run ERR: The indicator will flash when the program is wrong
 - RS485/RS232/CAN
 - RS485
 - RUN/STOP PLC operational switch
 - Analog input
 - analog output
 - RS232
 - DIN-Rail Slot (35mm)
 - Terminal block of digital input
 - PLC USB programming port
- Note: CAN port location reference hardware interface diagram; other models are marked with this tag

◆ Hardware Interface

0V 24V S/S X00~X07

COM0 Y00~Y03 COM1 Y04~Y07

CX3G-16MT/MR/MRT

0V 24V S/S X00~X7 X10 X11 { AD6 AD7 AD0~AD2 GND AD3~ AD5 (Apply to CX3G-22MT/MR/MRT-8AD4DA)
X12 X13 AD0~AD2 GND AD3~ AD5 (Apply to CX3G-24MT/MR/MRT-6AD4DA)

COM0 Y00~Y03 COM1 Y04~Y07 COM2 Y10~Y13 GND DA0~DA3

CX3G-22MT/MR/MRT-8AD4DA, CX3G-24MT/MR/MRT-6AD4DA

0V 24V S/S X00~X17 GND0 AD0 GND0 AD1

COM0 Y00~Y03 COM1 Y04~Y07 COM2 Y10~Y13 COM3 Y14 Y15 {Y16 Y17 (Apply to CX3G-32MT/MR/MRT-2AD)
DA0 DA1 (Apply to CX3G-30MT/MR/MRT-2AD2DA)

CX3G-32MT/MR/MRT-2AD, CX3G-30MT/MR/MRT-2AD2DA

0V 24V S/S X00~X07 X10~X17 X20~X27 GND0 AD0~AD3 GND0 AD4~AD7

COM0 Y00~Y03 COM1 Y04~Y07 COM2 Y10~Y13 COM3 Y14~Y17 COM4 Y20~Y27 GND DA0~DA3

CX3G-48MT/MR/MRT-8AD4DA

0V 24V S/S X00~X07 X10~X17 X20~X27 X30~X37 GND0 AD0~AD3 GND0 AD4~AD7 GND0 AD8~AD11 GND0 AD12~AD15

COM0 Y00~Y03 COM1 Y04~Y07 COM2 Y10~Y13 COM3 Y14~Y17 COM4 Y20~Y27 COM5 Y30~Y37 GND CAN-H CAN-L GND DA0 DA1 GND DA2 DA3 GND DA4~DA7

CX3G-64MT/MR/MRT-16AD8DA

0V 24V S/S X00~X07 X10~X17 X20~X27 COM X30~X37 COM X40~X47 GND0 CAN-H CAN-L GND0 AD0 GND0 AD1 GND0 AD2 AD3

COM0 Y00~Y03 COM1 Y04~Y07 COM2 Y10~Y13 COM3 Y14~Y17 COM4 Y20~Y27 COM5 Y30~Y37 COM6 Y40~Y47 GND DA0~DA3

CX3G-80MT/MR/MRT-4AD4DA

Diagram 3 Hardware Interface Drawing

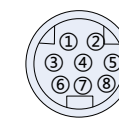


Diagram 4 PLC programming

3G PLC PIN definition

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

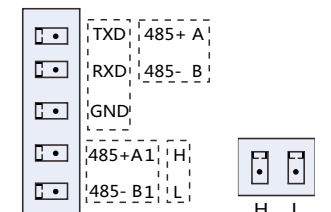


Diagram 5 com port optional

Terminals wiring standard: 22-14AWG wire. This series terminals are all pluggable terminals.

COM port definition:

Come with 2 programming ports: Mini B type usb port (more faster for downloading) and RS232 (8holes mouse head). 2 RS485 port are default, 34M/64M/80M can be customized 1 485 port and 1 232 port, CAN is optional, 16M/24M/32M/48M can be customized as 1 485, 1 232 or 1 485, 1 CAN or 1 232, 1 CAN

COM port explanation:

Interface:
Serial 1: 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.
Serial 2: RS485 (AB port)/RS232: support Mitsubishi programming port protocol, Mitsubishi BD board protocol, RS protocol and MODBUS protocol

The involved special relays are M8196, M8125, M8122, M8123, M8128, M8029;

The involved special registers are D8120, D8121, D8124, D8125, D8126

Supports RS2, WR3A, DR3A, ADPRW instructions

Serial 3: RS485 (A1 B1): supports Mitsubishi programming port protocol,

The involved special relays are M8192, M8402, M8403, M8408, M8029;

The involved special registers are D8400, D8401, D8414, D8126

Supports RS2, WR3A, DR3A, ADPRW instructions

CAN com port: supports RS2 and MODBUS protocol

The involved special relays are M8426, M8422, M8424, M8425

The involved special registers are D8420, D8421, D8126

Supports RS2, WR3A, DR3A, ADPRW instructions

Attention: Detail refers to <Coolmay CX3G&FX3GC programming user manual>

Equivalent Circuit

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.

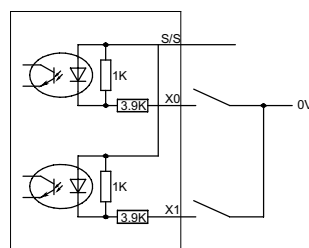


Diagram 6 Input wiring diagram

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.

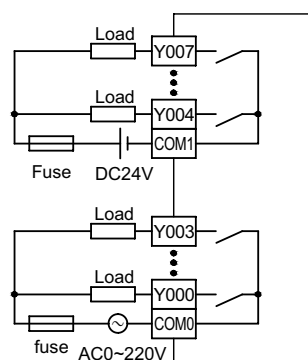


Diagram 7 Relay output equivalent circuit

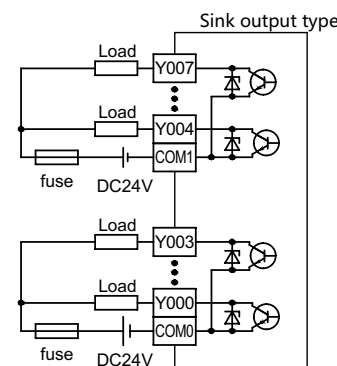


Diagram 8 Transistor output equivalent circuit

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.

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

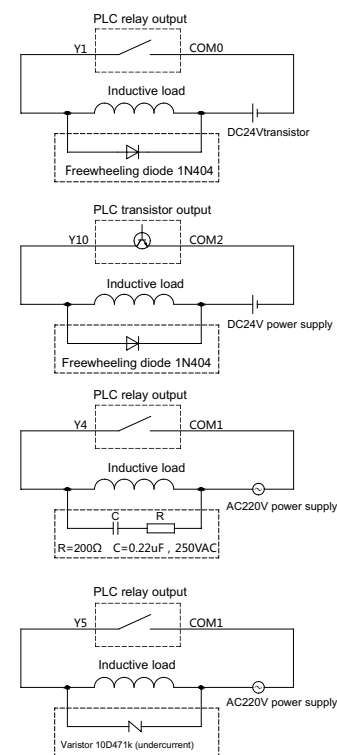


Diagram 9 Inductive load absorption circuit schematic

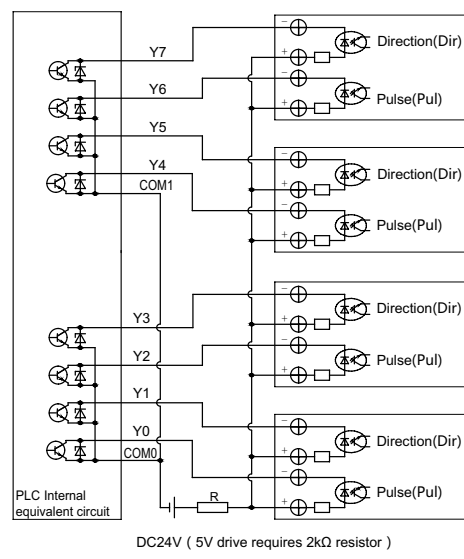


Diagram 10 Pulse output wiring diagram

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

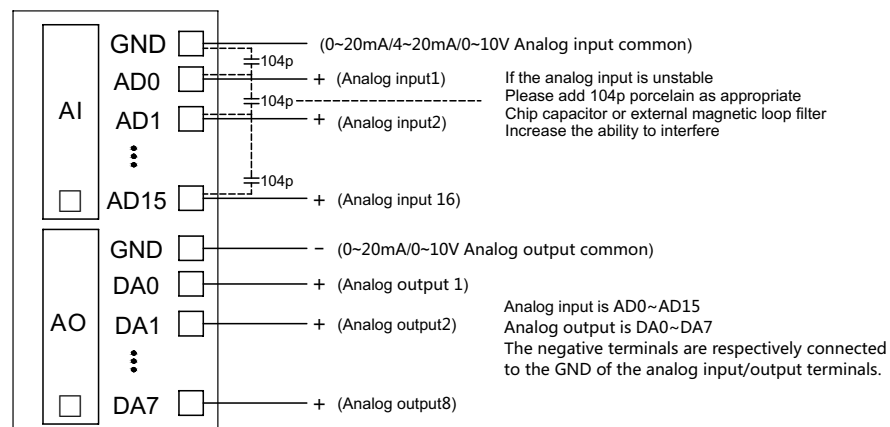


Diagram 11 PLC analog wiring

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; 4-20MA/0-20MA transmitter wiring method; 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. If it is a three-wire Pt100, it needs to be connected in two lines. The GND common terminal of the analog input and output can be shared.

PLC anti-interference processing

- 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.
- 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

	CX3G-16M	CX3G-22M	CX3G-24M	CX3G-30M	CX3G-32M	CX3G-34M	CX3G-48M	CX3G-64M	CX3G-80M
Digital input X	X00~X07 8 point	X00~X11 10 point X00~X13 12 point	X00~X13 12 point	X0~X17 16 point	X00~X17 16 point	X00~X21 18 point	X00~X27 24 point	X00~X37 32 point	X00~X47 40 point
Digital output Y	Y00~Y07 8 point	Y00~Y13 12 point Y00~Y11 10 point	Y00~Y13 12 point	Y0~Y15 16 point	Y00~Y17 16 point	Y00~Y17 16 point	Y00~Y27 24 point	Y00~Y37 32 point	Y00~Y47 40 point
Auxiliary Relay M	[M0~M383]384point [M1536~M7679]6144point general	[M384~M1535] 1152point Holding	[M8000~M8511] 512point Specially						
State S	[S0~S9] 10point Initial state/	[S10~S999] 990point holding/	[S1000~S4095] 3096point general						
Timer T	[T0~T199] 200point 100ms general/	[T200~T245] 46point 10ms general/	[T246~T249] 4point 1ms grand total keep state/	[T250~T255] 6point 100ms grand total keep state/	[T256~T319] 64point 1ms general				
Counter C		16bit	32bit	High-speed counting					
Data Register D,V,Z	[D0~D127] 128point general	[D128~D7999] 7872point Holding	[D8000~D8511] 512point special	[R0~R23999] 24000point holding	[V0~V7] [Z0~Z7] 16point Indexing				
Nested Pointer	[N0~N7] 8point		[P0~P127] 128point (26232and higher version)	JUMP, CALL Branch					
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, precision is 12 bit); supports FROM instructions or register direct assignment operation

E.g : FROM K0 K0 D400 K16 reads 16 channel analog input 0-10V. Register directly according to the type of analog input, refer to the following address

The following address applies to software version 26210

◆ K type thermocouple(1~4 channel)AD0~AD3 address is R23680~R23683, the 5th is ambient temperature, address is R23684, (6~16 channel)AD4~AD15 address is R23685~R23695.

◆ PT100(1~16 channel)AD0~AD15 address is R23640~R23655.

◆ NTC10K(1~16 channel)AD0~AD15 address is R23660~R23675.

◆ 0~10V/0-5V or 0~20mA(1~16 channel)AD0~AD15 address is D8030~D8045.

◆ 4~20mA(1~16 channel)AD0~AD15 address is R23620~R23635.

The following address applies to software version 26220

◆ K type thermocouples(1~4 channel)AD0~AD3 address is R23680~R23683, the 5th way is ambient temperature, address is R23684, (6~16 channel)AD4~AD15 address is R23685~R23695.

◆ K type thermocouple negative temperature(1~4 channel)AD0~AD3 address is R23720~R23723, the 5th channel is ambient temperature, address is R2372, (6~16 channel)AD4~AD15 address is R23725~R23735.

◆ T type thermocouple(1~4 channel)AD0~AD3 address is R23700~R23703, the fifth channel is ambient temperature, address is R23704, (6~16 channel)AD4~AD15 address is R23705~R23715.

◆ T type thermocouple negative temperature(1~4 channel)AD0~AD3 address is R23740~R23743, the fifth channel is Ambient temperature, address is R23744, (6~16 channel)AD4~AD15 address is R23745~R23755'

◆ PT100(1~16 channel)AD0~AD15 address is R23640~R23655.

◆ NTC10K(1~16 channels)AD0~AD15 address is R23660~R23675.

◆ 0~10V/0-5V or 0~20mA(1~16 channels)AD0~AD15 address is D8030~D8045.

◆ 4~20mA(1~16channels)AD0~AD15 address is R23620~R23635.

※ 0~10V/0-5V or 0~20mA in D8030~D8045, the analog register occupies D8039, so the constant scan time function is not supported defaultly.

The following address applies to software version 26230

Registers read directly: D[8030]~D[8045] are the output values set for the corresponding type. When thermocouple type, D8034 is the ambient temperature.

The constant scan time was changed to D8059 and started by M8039 (version 26232 and higher version has this function).

◆ Thermistor NTC(1~4 channels)AD0~AD3 address is R23660~R23663, The fifth road is the ambient temperature, address is R23664, (6~16 channels)AD4~AD15 address is R23665~R23675.

◆ 0~10V or 0~20mA(1~16 channels)AD0~AD15 address is R23620~R23635

※ The temperature type is one digit after the decimal point. That is register value is 182=actual value 18.2 degrees.

※ Analog input sampling

D8073 is the smoothing filter coefficient for all analog inputs. Setting range: 0~999

Number of filter cycles = (R23600~R23615)* The scan time of the PLC. The default value is 0. If R23600=1 one PLC scan cycle is sampled once and the value in the first analog input is changed once., The bigger the value of R23600~R23615 is set, the more stable the result is.

D8073 is the smoothing filter coefficient for all analog inputs. The setting range is 0~999

◆ Analog output register(DA means analog output, precision is 12 bit); supports TO instructions or register direct assignment operation

Adopts TO K0 K0 D500 K8 instructions, there are 8 channels of analog 0~10V or 0~20mA; register direct assignment operation D8050~D8057.

Serial Number	Register address	Setting range	Output type
DA0	D8030	0-4000	When D8058.0~D8058.7=0 Type is 0~20mA;
DA1	D8031	0-4000	
DA2	D8032	0-4000	
DA3	D8033	0-4000	
DA4	D8034	0-4000	When D8058.0~D8058.7=1 Type is 4~20mA.
DA5	D8035	0-4000	
DA6	D8036	0-4000	
DA7	D8037	0-4000	

The CX3G 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 GX8.86 and WORKS2

Detailed materials please refer to <Coolmay PLC programming user manual >

<CX3G PLC user manual> <FX3GX PLC user manual>

TIPS

CX3G PLC User Manual

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

- 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.
- Before installing the product, please tighten the screw and clamp guide to avoid falling.
- 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.
- 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.
- 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.
- The COM of the binary input / output (transistor) is common to the cathode.
- Do not disassemble the product or modify the wiring optionally. Otherwise it may cause fault, malfunction, loss, or fire.
- 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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