Coolmay®
自动化方案专家

CX2N(-HM) PLC User Manual

Thank you for choosing Coolmay CX2N series. This manual mainly explains the features、general specifications and wiring methods of CX2N series. Detailed programming information please refer to< Coolmay PLC Programming Manual>.

Main features of CX2NC(-HM) series.

1. Highly integration. At most 40DI/40DO, 20AI/8AO can be customized. 1 Rs232 or 1 Rs485, or at most 2 Rs485 can be added.
2. Support high-speed counting and high-speed pulse. High-speed counting can be added to at most 6 single-phase, 3 AB(Z) 10-100KHz. High-speed pulse can be added to 4 or 5 20-200KHz.
3. Support special encryption. Setting 12345678 as password can thoroughly prevent the data from being read.
4. 5.0MM pluggable terminals are adopted for easy wiring.
5. DIN-Rail installation (35 mm) and fixed hole installation.
6. CX2N-HM Series originate from CX2N by adding eight plastic keys and color text display. The text display adopts USB port as the programming port. The programming software and display functions are the same with HM-30B, which can monitor the PLC.
7. DCX2N series is the same with CX2N, but without the body case.

Product Information

◆ **Naming Rule** CX2N ① - 48 ② M ③ RT ④ - 8AD ⑤ - 4DA ⑥ - V ⑦ - A0 ⑧ - 1C1 ⑨ - 1P ⑩ - 485P/232 ⑪

1. Series CX2N:CX2N series PLC CX2N-HM:CX2N-HM series PLC
2. I/O Points 10: 5DI/5DO 24: 12DI/12DO 32: 16DI/16DO 36:20DI/16DO 48: 24DI/24DO 64: 32DI/32DO 68: 32DI/36DO 80:40DI/40DO
3. Module M: Main module
4. DO type R: Relay; T: Transister; RT: Both relay and transistor
5. AI 0~ 20 channels optional
6. AO 0~8 channels optional
7. AI type EK: Thermocouple SR: S-type thermocouple JR: J-type thermocouple PT: Pt100 PT0:PT1000 NTC: Thermistor(10k,50k,100k) V: 0-10V V5: 0-5V A4: 4-20mA A0: 0-20mA
8. AO type V: 0-10V V5: 0-5V A0: 0-20mA
9. C1 stand for singe phase 100k high-speed counting, C2 for 100KHz AB phase counting C3 for 100KHz ABZ counting,C10 for 10K. At most 6 single phase 10Khz （6C10) or 3 AB(Z) phase 10-100KHz can be customized.
10. P for 100KHz high-speed pulse, P2 for 200KHz.P0 for 20KHz. At most 4 100-200KHz can be added.
11. Communication port 1 Rs232, or 1Rs485, or at most 2 Rs485 ports can be added.

◆ **Basic Specifications** diagram 1

CX2N	Switching Value		Analog (optional)		COM Port		High-speed counting			High-speed pulse	Dimension	
	DI	DO	AI	AO	485 Port	232 Port	Single Phase	AB Phase	ABZ Phase	Output	Overall Size (mm)	Cutout Size (mm)
CX2N-10M	5	5	2	2	2 optional	1 Rs232, another Rs232 optional	Normally 2 10K contained, at most 6 channels can be added (4 10-100K and 2 5-10K)	Normally 2 10K contained, at most 3 AB can be added (2 10-100k and 1 5-10K)	At most 3 ABZ counting can be customized (1 10-100k, 2 5-10K)	Normally 4 20K pulse output. For CX2N-10~32M, at most 4 20-200k can be added. For others, at most 5 20-200k can be added.	65*90*36	57*99
CX2N-16M	8	8	0	0								
CX2N-16M	8	8	4	2							85*90*36	77*99
CX2N-22M	12	10	0	0								
CX2N-22M	10	12	8	4							125*90*36	117*99
CX2N-24M	12	12	6	4								
CX2N-30M	16	14	2	2								
CX2N-32M	16	16	2	0							195*90*36	187*99
CX2N-36M	20	16	16	8								
CX2N-48M	24	24	8	4								
CX2N-64M	32	32	8	4							240*90*36	232*99
CX2N-68M	32	36	20	4							285*90*36	277*99
CX2N-80M	40	40	8	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.

Diagram 2: Electrical Parameters

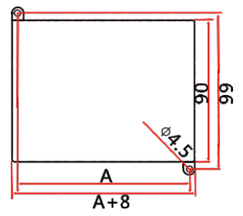
Electrical Parameters		
Input Voltage	DC 24V	
Digital Input Index		
Isolation Mode	Photocoupling	
Input Impedance	High-speed input 3.3KΩ	Common input 4.3Ω
Input ON	Electric current of high-speed input is higher than 4.5mA	Electric current of common input is higher than 3.5mA
Output OFF	Electric current of both is lower than 1.5mA	

(To continue the last table)

Filter Function	With filter function, the filter time can be set among 0-100ms, defaulted as 10ms
High-speed Counting	Normally 2 single counting (X0/X3) or 2 AB phase counting (X0-X1/X3-X4) 10KHz. At most 6 single counting can be customized (4 100KHz、2 10KHz). Or 3 AB phase counting (2 100KHz、1 10KHz) or 3 ABZ counting (1 100KHz 、2 5-10KHz)
Common Port	COM connected with negative pole
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
Output Common Port	COM connected with negative terminal
Transistor Output Index	
Max Current	500mA
Load Voltage	DC24V
Circuit Insulation	Optocoupler Insulation
Isolation Voltage	1500VAC
ON Respond Time	High-speed Output：10μs, others 0.5ms
High-speed Output Frequency	Y0/Y1/Y6/Y7 Normally 20Khz, Y10 can be added while 5 channels be customized, at most 100-200KHZ
Output Common Port	COM connected with negative terminal
Analog Input Index	
Input Signal	Pt100 / PT1000 / Thermocouple / NTC / 0-10V / 0-20mA / 4-20mA, other signals can be customized.
Respond Time	One scanning cycle
AI Quantity	0-20channels
Accuracy	12bit, ±1% (full span)
Analog Output Index	
Output Signal	0-5V/0-10V / 0-20mA,other signals can be customized.
AO Quantity	0-8 channels
Accurary	10 bit
Interface	
COM Port	1 RS232, another 1 RS232, 1 RS485 or 2 RS485 optional
Environment	
Operating Temperature	-20°C~60°C
Relative Humidity	5%~95% RH
Storage Temperature	-20°C~70°C
Vibrational Frequency	10-57Hz, amplitude: 0.035mm; 57Hz-150Hz, accelerated speed: 4.9m/s² (10 times for directions XYZ,80 min. in total)

Mechanical Design Reference

◆ Cutout Size



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

CX2N-16/10M	A: 57 mm
CX2N-24/16M	A: 77 mm
CX2N-32/30/24/22M	A: 117 mm
CX2N-48/36M	A: 187 mm
CX2N-64M	A: 232 mm
CX2N-68/80M	A: 277 mm

Diagram 1 Dimension Drawing

Electrical design reference

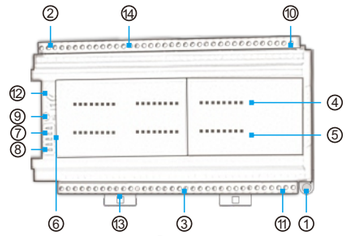


Diagram 2 Product Structure

1. Mounting hole
2. Terminal block for input signal of power supply
3. Terminal block of digital output
4. LED of Digital Input
5. LED of Digital Output
6. PWR: Power-up State
   RUN: The light is On when the PLC is run
   ERR: When there is a program error, the LED indicator will flicker.
7. RS485/RS232
8. RS485
9. RUN/STOP
10. Analog Input
11. Analog Output
12. Rs232
13. DIN-Rail Slot (35mm)
14. Terminal block of digital input
15. PLC USB programming port (CX2N optional) text USB port pro-gramming port (CX2N-HM)

◆ **Hardware Interface**

FG 24V COM X00~X04 { X05 X06 X07 (Apply to CX2N-16MT/MR/MRT) / GNG AD0 Ad1 (Apply to CX2N-10MT/MR/MRT-2AD2DA)
COM Y00 ~Y03 COM1 Y04 { Y05 Y06 Y07 (Apply to CX2N-16MT/MR/MRT) / GNG AD0 AD1 (Apply to CX2N-10MT/MR/MRT-2AD2DA)

CX2N-16MT/MR/MRT、CX2N-10MT/MR/MRT-2AD2DA

FG 24V COM X00~X07 { X10 X11 X12 X13 (Apply to CX2N-22MT/MR/MRT) / AD0 AD1 AD2 AD3 (Apply to CX2N-16MT/MR/MRT-4AD2AD)
{ COM0 Y00 Y01 COM1 Y2~Y5 COM2 Y6~Y11 (Apply to CX2N-22MT/MR/MRT)
{ COM0 Y00~Y03 COM1 Y4~Y7 GND DA0 DA1 (Apply to CX2N-16MT/MR/MRT-4AD2AD)

CX2N-22MT/MR/MRT、CX2N-16MT/MR/MRT-4AD2AD

FG 24V COM X00~X11 { AD0 AD1 AD2 AD3 AD4 GND AD5 AD6 AD7 GND (Apply to CX2N-22MT/MR/MRT-8AD4DA) / X12 X13 AD2 AD3 AD4 GND AD5 AD6 AD7 GND (Apply to CX2N-24MT/MR/MRT-6AD4DA)

COM0 Y00~Y03 COM1 Y04~Y07 COM2 Y10~Y13 GND DA0 DA1 DA2 DA3

CX2N-22MT/MR/MRT-8AD4DA、CX2N-24MT/MR/MRT-6AD4DA

FG 24V COM X00~X17 GND AD0 GND AD1

COM Y00~Y03 COM1 Y04~Y07 COM2 Y10~Y13 COM3 Y14 Y15 { Y16 Y17 (Apply to CX2N-32MT/MR/MRT-2AD) / DA0 DA1 (Apply to CX2N-30MT/MR/MRT-2AD2DA)

CX2N-32MT/MR/MRT-2AD、CX2N-30MT/MR/MRT-2AD2DA

FG 24V COM X00~X17 X20~X23 { X24~X27 GND AD0~AD3 GND AD4~AD7 (Apply to CX2N-48MT/MR/MRT-8AD4DA) / AD0~AD3 GND AD4~AD7 GND AD8~AD11 (Apply to CX2N-36MT/MR/MRT-16AD8DA)

COM0 Y00~Y03 COM1 Y04~Y07 COM2 Y10~Y13 COM3 { Y14~Y17 COM4 Y20~Y27 GND DA0~DA3 (Apply to CX2N-48MT/MR/MRT-8AD4DA) / AD13~AD17 GND DA0~DA3 GND DA4~DA7 (Apply to CX2N-36MT/MR/MRT-16AD8DA)

CX2N-48MT/MR/MRT-8AD4DA、CX2N-36MT/MR/MRT-16AD8DA

FG 24V COM X00~X27 COM X30~X37 GND AD0~AD3 GND AD4~AD7
COM0 Y00~Y03 COM1 Y04~Y07 COM2 Y10~Y13 COM Y14~Y17 COM4 Y20~Y27 COM5 Y30~Y37 GND DA0~DA3

CX2N-64MT/MR/MRT-8AD4DA

FG 24V COM X00~X27 COM X30~X37 GND AD0~AD11 GND AD12~AD15
COM0 Y00~Y03 COM1 Y04~Y07 COM2 Y10~Y13 COM Y14~Y17 COM4 Y20~Y27 COM5 Y30~Y37 COM6 Y40~Y43 AD16~AD19 GND DA0~DA3

CX2N-68MT/MR/MRT-20AD4DA

FG 24V COM X00~X27 COM X30~X37 COM X40~X47 GND AD0~AD3 GND AD4~AD5
COM0 Y00~Y03 COM1 Y04~Y07 COM2 Y10~Y13 COM Y14~Y17 COM4 Y20~Y27 COM5 Y30~Y37 COM6 Y40~Y47 GND DA0~DA3

CX2N-80MT/MR/MRT-8AD4DA

Diagram 3 Hardware Interface Drawing

Diagram 4 PLC Programming Port

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

COM port definition:
The standard COM port is Rs232, interface terminal is 8-holes mouse head, in addition, 1 RS232,1 Rs485 or 2 Rs485 are optional.

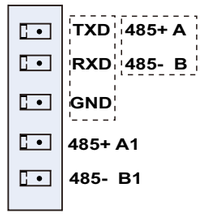


Diagram 5 Optional COM Port

Interface:
1. Rs232 (PLC programming port); support Mitsubishi programming port protocol.
2. Rs485 (AB port)/RS232: suppport Mitsubishi programming port protocol, Mitsubishi serial protocol, Modbus (Modbus RTU/ASCII) parameters are set in D8120, station number is set in D8121, can be used as master or slave.
3. Rs485 (A1 B1 port): support Mitsubishi programming port protocol and Modbus (Modbus RTU/ASCII parameters are set in D8160, station number is set in D8161, normally only be used as slave.

* Two Rs485 ports which support Modbus master station can be special customized.

Pin Definition of Programming Port

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

Equivalent Circuit

There is a power supply (DC24V) inside PLC to test the state of the switch.The end user only need to put in the dry contact. OC output signal is needed if output signals of active crystal sensor should be connected.

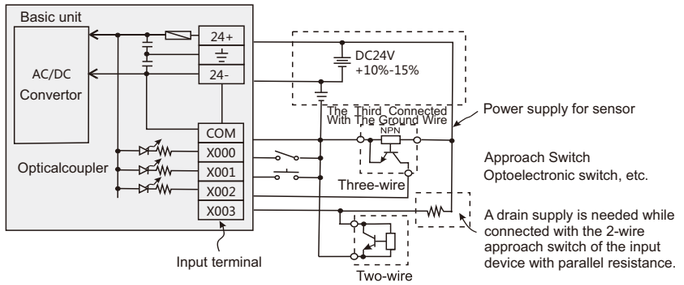


Diagram 6 Input Wiring

Diagram 7 is an equivalent circuit diagram of relay output . There are several groups of input terminals, each group is electrical isolation and the output electric shock of different groups should be connected with different power circuit.

Please choose proper insurance for each load to avoid burning out the output unit and the plate wires of the plc due to the load circuit and other problems.

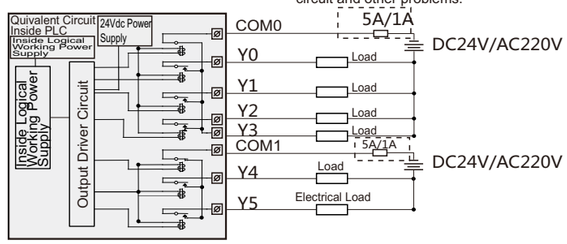


Diagram 7 Equivalent Circuit of Relay Output

Please choose proper insurance for each load to avoid burning out the output unit and the plate wires of the plc due to the load circuit and other problems.

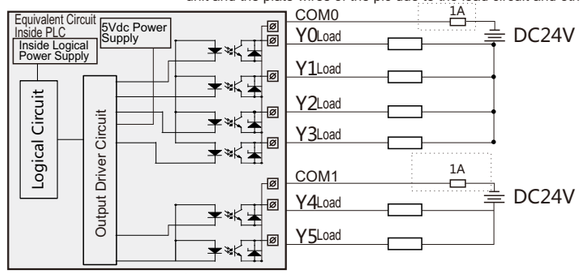


Diagram 8 Equivalent Circuit of Transistor Output

Diagram 8 is an equivalent circuit diagram of transistor output. As the diagram shows, there are several groups of input terminals, each group is electrical isolation and the output electric shock of different group should be connected with different power circuit. The output of transistors can be only used for load circuit with DC24V.

As for inductive load connected with AC circuits, RC instantaneous voltage absorbing circuit should be considered as outside circuit. As for inductive load connected with DC circuits, free-wheeling diode should be added, shown as diagram 9.

Wiring diagram of stepping motor or serve motor is shown as diagram 10. DC24V of 5V Driver must be used together with a 2 KΩ resistance.

4 pulses are Y0 Y1 Y6 Y7, custom made pulses are Y0 Y1 Y6 Y7 Y10.

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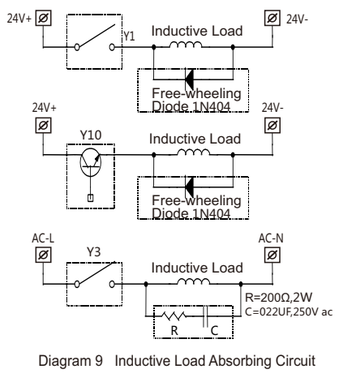

Diagram 9 Inductive Load Absorbing Circuit

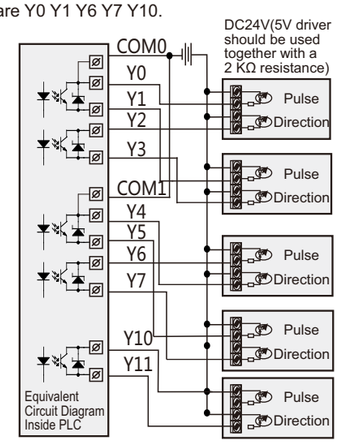

Diagram 10 Pulse wiring

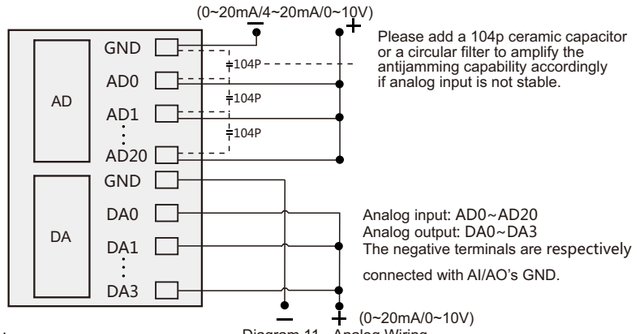

Diagram 11 Analog Wiring

Analog wiring

Two-wire: the power supply's positive pole is connect with the transmitter's positive pole. The transmitter's negative pole is connect with AD, the power supply's negative pole is connect with GND, generally as the wiring of 4-20mA/0-20mA transmitter.

Three-wire: the power supply's positive pole is connect with the transmitter's positive pole. The power supply's negative pole and the signal output cathode are the same terminal. The transmitter output is connect with AD.

Four-wire: the positive and negative poles of the power supply are connect with the transmitter's positive and negative poles separately. The positive and negative poles of transmitter output are connect with AD and GND separately.

When the analog is temperature, two wires should be connect with AD and GND separately.

As for three- wire PT100, it should be merged into two wire.

Anti-interface processing

1. The strong current and the weak current should be wired separately and cannot connect with ground. When there is a strong current, please add a circular on the power port. Besides, proper grounding processing should be conducted according to the chasis
2. When there is a interface, 104 ceramic chip can be added and effective grounding should be conducted.

Programming Reference

◆ Devices Distribution and Statement of Power-down Save

	CX2N-10M	CX2N-16M	CX2N-22M	CX2N-24M	CX2N-30M	CX2N-32M	CX2N-36M	CX2N-48M	CX2N-64M	CX2N-68M	CX2N-80M
Input X	X00~X04 5 points	X00~X07 8 points	X00~X11 10 points	X00~X13 12 points X00~X13 12points	X0~X17 16 points	X00~X17 16 points	X00~X23 20 points	X00~X27 24 points	X00~X37 32 points	X00~X37 32 points	X00~X47 40 points
Output Y	Y00~Y04 5 points	Y00~Y07 8 points	Y00~Y13 12 points	Y00~Y13 12 points Y00~Y13 16 points	Y0~Y15 14 points	Y00~Y17 16 points	Y00~Y17 16 points	Y00~Y27 24 points	Y00~Y37 32 points	Y00~Y43 36 points	Y00~Y47 40 points

Auxiliary Relay M	[M0~M499] 500 points General	[M500~M1535] 1036 points Holding	M8000~M8255 256 points Special	
State S	[S0-S499] 500 points General	[S500-S999] 500 points Holding		
Timer T	T0~T199 200 points 100ms General	T200~T245 46 points 10ms General	[T246~T249] 4 points 1ms accumulatation Holding	[T250~T255] 6 points100ms Actuary Holding
Counter C	16bit Up Counter		32bit Up Counter	High-speed Counter
	C0~C 99 100 points General	[C100~C199] 100 points Holding	[C200~C234] 35 points Holding	[C235~C255] 5 points Holding
Data Register D,V,Z	D0~D199 200 points General	[D200~D999] 800 points Holding	[D8000~D8255] 256 points Special	V0~V7 Z0~Z7 16 points Index
Nested Pointer	N0~N7 8 points Master		P 0~P127 128 points Please use branch pointer while jumping to a subprogram	
Constant K	16 bit -32,768~32,767		32 bit -2,147,483,648~2,147,483,647	
Constant H	16 bit 0~FFFFH		32 bit 0~FFFFFFFFH	

◆ AD Register (AD means analog input)

CX2N-32MT/MR/MRT-2AD

AD	Register Value	Magnification Correction (units: milli)	Size Correction	Cycle Setting of Analog Sampling
AD0-AD1	D8030-D8031	D8040-D8041	D8070-D8071	D8050-D8051
Cold End	D8038	D8048	D8078	

Note: D8038 is the cold end of thermocouple. K-type set D8049=1.

◆ CX2N-10/30MT/MR/MRT-2AD2DA

AD	Register Value	Magnification Correction (units: milli)	Size Correction	Cycle Setting of Analog Sampling
AD0-AD1	D8030-D8031	D8040-D8041	D8070-D8071	D8050-D8051
Cold End	D8038	D8048	D8078	

Note: D8038 is the cold end of thermocouple. K-type set D8049=1.

◆ CX2N-16MT/MR/MRT-4AD2DA

AD	Register Value	Magnification Correction (units: milli)	Size Correction	Cycle Setting of Analog Sampling
AD0-AD3	D8030-D8033	D8040-D8043	D8070-D8073	D8050-D8053
Cold End	D8038	D8048	D8078	

Note: D8038 is the cold end of thermocouple. K-type set D8049=1.

◆ CX2N-24MT/MR/MRT-6AD4DA

AD	Register Value	Magnification Correction (units: milli)	Size Correction	Cycle Setting of Analog Sampling
AD0-AD5	D8030-D8035	D8040-D8045	D8070-D8075	D8050-D8055
Cold End	D8038	D8048	D8078	

Note: D8038 is the cold end of thermocouple. K-type set D8049=1.

◆ CX2N-22/48/64/80MT/MR/MRT-8AD4DA

AD	Register Value	Magnification Correction (units: milli)	Size Correction	Cycle Setting of Analog Sampling
AD0-AD7	D8030-D8037	D8200-D8207	D8220-D8227	D8050-D8057
Cold End	D8038	D8048	D8078	

Note: D8042 is the cold end of thermocouple. K-type set D8213=1.

◆ CX2N-36MT/MR/MRT-16AD8DA、CX2N-68MT/MR/MRT-16AD8DA

AD	Register Value	Magnification Correction (units: milli)	Size Correction	Analog Sampling Cycle Setting
AD0-AD15	D8030-D8045	D8200-D8215	D8220-D8235	D8050-D8069
Cold End	D8049	D8219	D8239	

Note: D8049 is the cold end of thermocouple. K-type set D8240=1.

◆ CX2N-68MT/MR/MRT-20AD4DA

AD	Register Value	Magnification Correction (units: milli)	Size Correction	Cycle Setting of Analog Sampling
AD0-AD19	D8030-D8049	D8200-D8219	D8220-D8239	D8050-D8069
Ad19 is cold end while used only as thermocouple	D8049	D8219	D8239	

Note: D8049 is cold end while used only as thermocouple, the register is D8049, K-type set D8240=1

DA register (DA means analog output)

◆ CX2N-10/30MT/MR/MRT-2AD2DA、CX2N-16MT/MR/MRT-4AD2DA

DA	AI Register	Set Value	Output Voltage /Current	Resolution	Start Contact
DA0-DA1	D8080-D8081	0-1000	0-10V/0-20mA	10mV/0.02mA	M8080 be driven ON

◆ CX2N-24MT/MR/MRT-6AD4DA、CX2N-48/64/80MT/MR/MRT-8AD4DA、CX2N-68MT/MR/MRT-20AD4DA

AD	Register Value	Set Value	Output Current /Voltage	Resolution	Start Contact
DA0-DA3	D8080-D8083	0-1000	0-10V/0-20mA	10mV/0.02mA	M8080 be driven ON

◆ CX2N-36MT/MR/MRT-16AD8DA、CX2N-68MT/MR/MRT-16AD8DA

DA	AI Register	Set Value	Output Voltage /Current	Resolution	Start Contact
DA0-DA3	D8080-D8083	0-1000	0-10V/0-20mA	10mV/0.02mA	M8080 be driven ON
DA4-DA7	D8084-D8087	0-1000	0-10V/0-20mA	10mV/0.02mA	M8080 be driven ON

✱The defaulted data of analog sampling cycle setting is 32, the mix can be set as 1.

The power-down save of CX2N's devices is permanent retention. Namely, all the devices of the holding section won't lose while the module is power off. Chargeable batteries are used for the real-time clock to ensure that the clock is presenting the real time. All the power-down save function should be ensured that the voltage of the power supply (DC24V) should above 23V and the power on time of PLC should above 2mins, or there will be an error with the function of power-down save.

Programming Software: Compatible with MITSUBISHI GX8.52 and WORKS 2
Detailed materials please refer to: <COOLMAY PLC Programming Manual> <CX2N PLC User Manual>
<MITSUBISHI FX Series Programming Manual>

Warm Tips

FX2NC PLC User Manual

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

1. In canse of damaging the product, please confirm power supply range first (the regular power supply only limitied 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 installting 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 damagement. 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 COM of the binary input / output (transistor) is common to the cathode.
6. Do not disassemble the product or modify the wiring optionally . Otherwise it may cause fault, malfunction, loss, or fire.
7. Please make sure to turn off the all power when you install or dismantle the product, otherwise it may cause malfuction or fault.

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