

Programmable Text Monitor User Manual

Thank you for choosing Coolmay programmable text monitor. This manual mainly explains the features, general specifications and wiring methods of programmable text monitor. Detailed programming for PLC please refers to < COOLMAY PLC Programming Manual> and text refers to <EX2N-A Software User Manual> .

Main features of programmable text monitor :

- Highly intergrated. At most 24AI/20AO , 12DI/8DO. For EX2N-30A, only one Rs485 can be added; for EX2N-40A/50A, 2 Rs485 ports or 1 Rs232 and 1 Rs485 can be added.
- 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 up to 4 or 520-200KHz.
- Support special encryption for both HMI and PLC. Setting 12345678 as password of PLC can thoroughly prevent data from being read.
- 3.81MM pluggable terminals being adopted for easy wiring.
- Mitsubishi programming software for PLC, 30A, 40A, 50A for text seperately

Product Information

◆ **Naming Rule** EX2N - 40A - 24 MRT - 4AD - 2DA - V - A0 - 1C1 - 1P - 485/232

- Series EX2N
- Text 30A:3.0" 40A:4.0" 50A:5.0"
- I/O 10:5I/5O 16:8I/8O 24:12I/12O
- Module M:Main module of universal controller
- DO type: R: relay T: transistor RT: both relay and transistor
- DI 4 channels for 30A, 12 channels for 40A/50A
- DO 2 channels for 30A, 8 channels for 40A/50A
- AI EK: Ek thermocouple PT:PT100 SR: S-type thermocouple
A4:4-20mA A0:0-20mA JR: J-type thermocouple
V:0-10V NTC: thermistor (10k/50k/100k)
- AO V:0-10V A0:0-20mA V5:0-5V
- C1stands for single phase 100k high-speed counting, C2 for 100KHz AB phase counting C3 for 100KHz ABZ counting, C30 for 10Khz ABZ counting, at most 6 single phase 10Khz or 3 AB(Z) phase 10-100KHz can be custom-made. If 6 single phase 10KHz be made, the model should be 6C10.
- P stand for 100KHz, P2 for 200KHz, 5P0 for 5 channel 20k. At most 4 100-200KHz can be customized for 30A, and 5 100-200KHz for 40A/50A
- Optional COM port For EX2N-30A, only 1 Rs485 port can be added; for EX2N-40A/50A, 2 Rs485 ports or 1 Rs232 and 1RS485 can be added.

Basic Specifications

diagram 1: Basic parameters

Programmable Text Monitor Models	Switching Value		Analog (optional)		COM Port	High-speed counting (optional)			High-speed pulse(optional)							
	DI	DO	AI	AO	PLC	Single Phase	AB Phase	ABZ Phase	Output							
EX2N-30A/40A/50A-10M	5	5	At most 4 channels can be added for 30A, 12 for 40A/ 50A At most 2 channels for 30A, 8 channels for 40A/50A Only one RS485 port can be added in 30A; 2 RS485 or 1 RS232 and 1 RS485 can be added in 40A/50A			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 3ABZ can be added (1 10-100K, 2 5-10K)	Normally 2-4 20K pulse output, at most 4 20-200K can be added in30A and 5 20-200K can be added in 40A/50A							
EX2N-30A/40A/50A-16M	8	8														
EX2N-30A/40A/50A-20M	12	8														
EX2N-30A/40A/50A-24M	12	12														
EX2N-40A/50A-30M	16	14														
EX2N-40A/50A-32M	16	16														
EX2N-40A/50A-36M	20	16														
EX2N-40A/50A-38M	20	18														
EX2N-40A/50A-40M	20	20														
EX2N-40A/50A-40M-S	24	16														
EX2N-40A/50A-44M	24	20														
MT means transistor output, the max load is 500mA; MR means relay output, the max load is5A; MRT means both relay and transistor, it is up to customers																
Note: only MT for 30A																

Diagram 2: electrical parameters

Electrical Parameters		
Input Voltage	DC 24V	
Analog 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	
Filter Function	With filter function, the filter time can be set among 0-100ms, defaulted as 10mA	
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	AC220V, DC24V	
Circuit Insulation	Relay Mechanical Insulation	
ON Respond Time	About 10ms	
Mechanical Life (without load)	10 million times	
Electrical Life (Rated Load)	300k times	
Output Common Port	COM connected with negative terminal	
Transistor Output Index		
Max Current	500mA	
Voltage of power supply	DC24V	
Circuit Insulation	Optocoupler Insulation	
Isolation voltage (external terminal)	1500VAC	
ON Respond Time	High-speed Output : 10μs, others 0.5ms	
High-speed Output Frequency	Y0/Y1/Y6/Y7 Normally 20Khz, at most 4-5 100-200KHZ Y10 can be added while 5 channels is customized	
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 scan cycle	
AI Quantity	0-12 channels	
Accuracy	12bit, ±1% (full scale)	
Analog Output Index		
Output Signal	0-10V/0-20mA/0-5V	
AO Quantity	0-8 channels	
Accurary	10 bit	
Interface		
COM Port	1 Rs232 programming port, Only one Rs485 port can be added in 30A; 2 Rs485 or 1 Rs232 and 1 Rs485 can be added in 40A/50A	
Environment		
Working 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

◆ Installation Dimensions

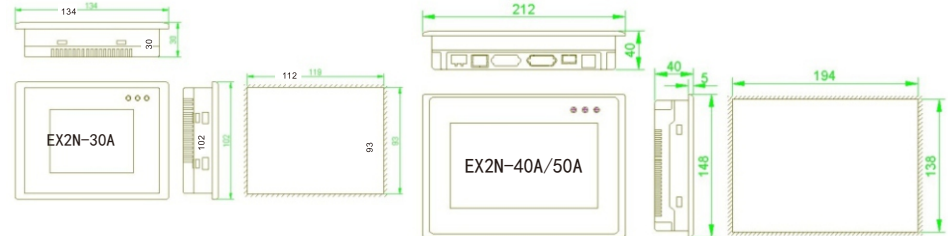


Diagram 1: Dimension Drawing

Diagram 3: Cutout Size

Model	Max Points	Installation dimensions		Overall Size W*H*D(mm)
		A (mm)	B (mm)	
EX2N-30A	24 points	119	93	134*102*30
EX2N-40A	44 points	194	138	212*148*40
EX2N-50A	44 points	194	138	212*148*40

Electrical design reference

◆ Product Structure

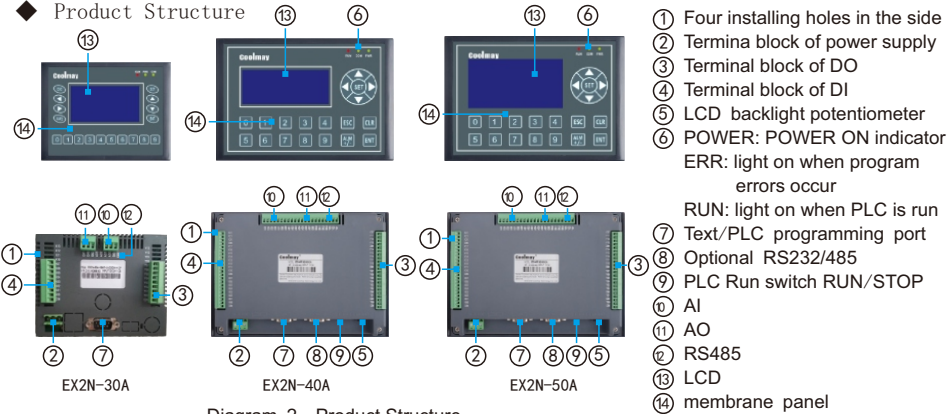
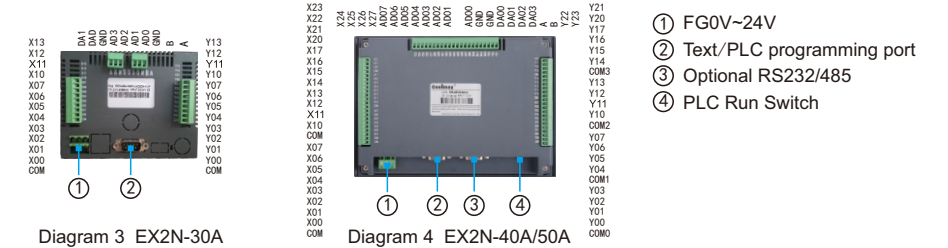


Diagram 2: Product Structure

◆ Hardware interface



Terminal wiring specification: 22-14AWG wire.

Pluggable terminals adopted.

Communication interface definition:

RS232 is the programming port, terminal blocks are DB9 male. As for 30A, only one RS232 can be added. As for 40A/50A, two Rs485 or one Rs232 and one Rs485 can be added.



Diagram 5 COM1/COM2

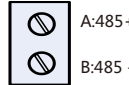


Diagram 6 Rs485 of PLC

EX2N-40A/50A COM2 Pin definition			EX2N-40A/50A COM1 Pin definition		
Pin Number	Signal	Description	Pin Number	Signal	Description
Optional RS232 of PLC			Text/PLC programming port		
2	RXD	Receive	2	RXD	Receive
3	TXD	Transmit	3	TXD	Transmit
5	GND	Ground	5	GND	Ground
Optional Rs485 of PLC (D8120)			Optional RS485 of PLC (D8160)		
1	A	485+	1	A	485+
6	B	485-	6	B	485-

Equivalent Circuit

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

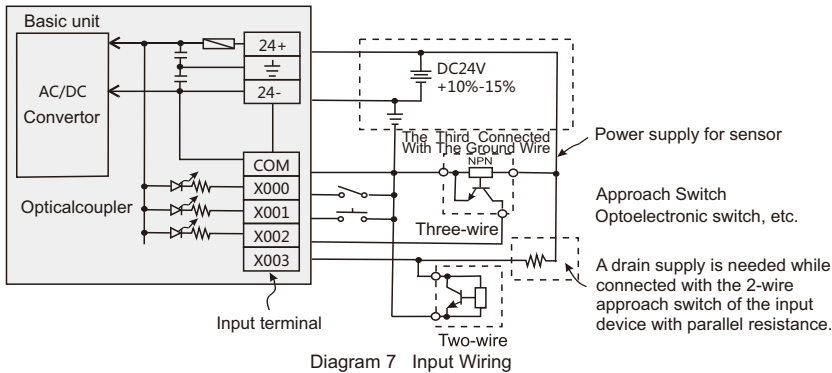


Diagram 7 Input Wiring

Diagram 8 is an equivalent circuit diagram of relay output module. There are several group of input terminals, each group is electrical isolation and the output electric shock of different groups should be connected with different power circuit.

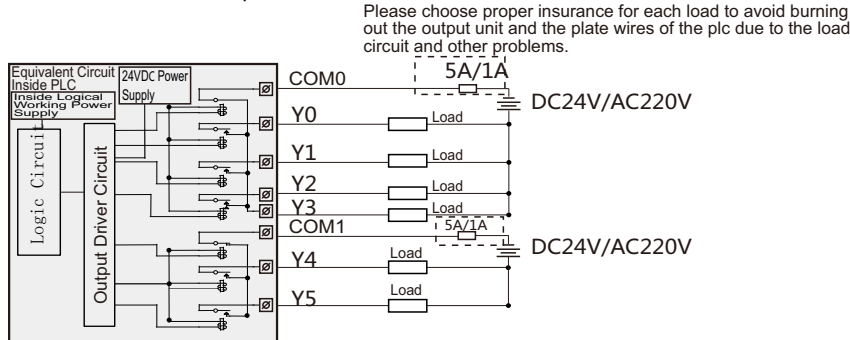


Diagram 8 Equivalent Circuit of Relay Output

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.

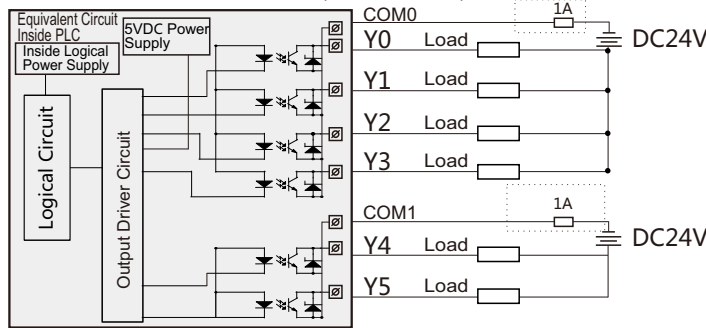


Diagram 9 Equivalent Circuit of Transistor Output

Diagram 9 is 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 transistor output 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 10.

Wiring diagram of stepping motor or serve motor is shown as diagram 11. DC24Vof 5V Driver must be used together with a 2 KΩ resistance.

4 pulses are Y0 Y1 Y6 Y7, customized pulses are Y0 Y1 Y6 Y7 Y10.

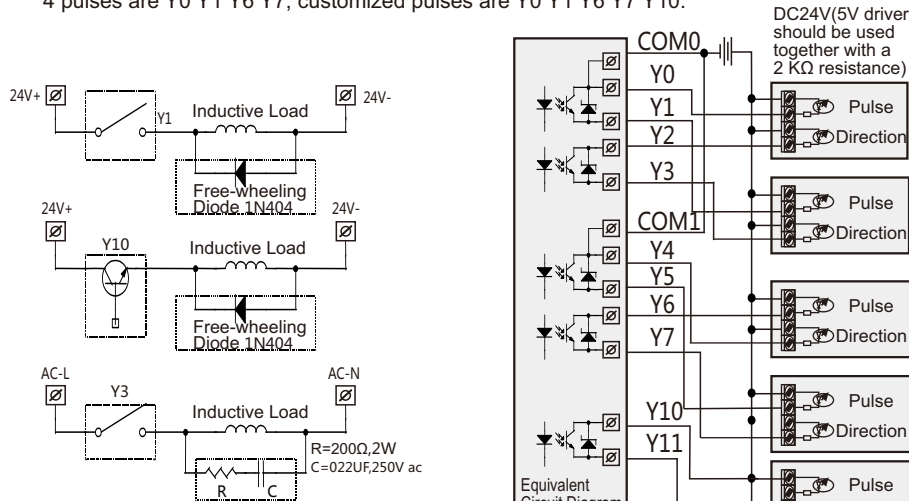


Diagram 10 Inductive Load Absorbing Circuit

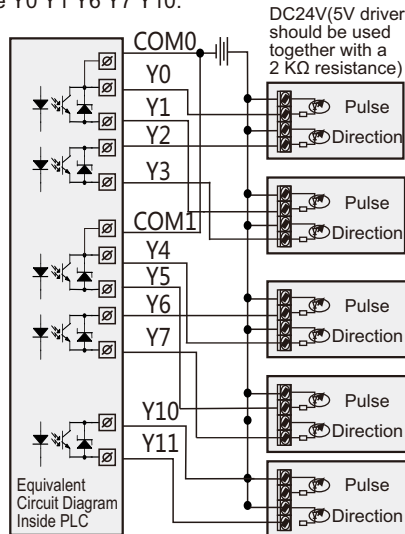


Diagram 11 Pulse wiring

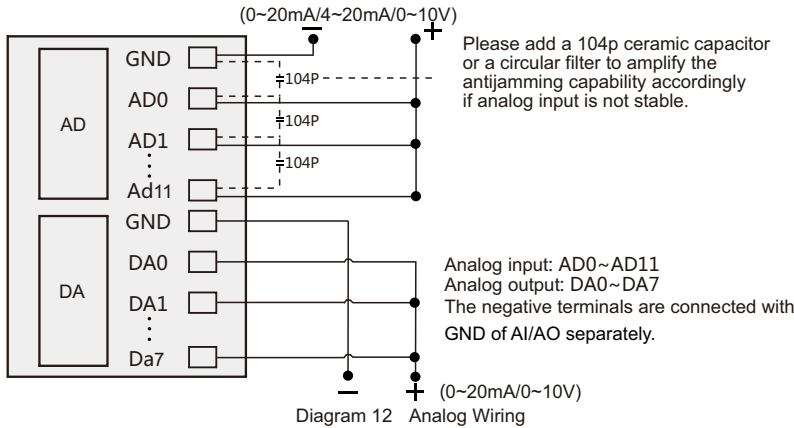


Diagram 12 Analog Wiring

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 transmitte 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 chassis
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

	EX2N-30A-24M	EX2N-40A-44M	EX2N-50A-44M
Input X	X00~X13 12 points	X00~X27 24 points	X00~X27 24 points
Output Y	Y00~Y13 12 points	Y00~Y23 20 points	Y00~Y23 20 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 accumulation Holding
Counter C	16bit Up Counter C0~C99 100 points General	32bit Up Counter C100~C199 100 points Holding	High-speed Counter C200~C234 35 points Holding
Data Register D,V,Z	D0~D199 200 points General	D200~D999 800 points Holding	D8000~D8255 256 points Special
Nested Pointer	N0~N7 8 points Master	P0~P127 128 points Please use branch pointer while jumping to a subprogram.	V0~V7 Z0~Z7 16 points Index
Constant	K 16 bit -32,768~32,767 H 16 bit 0~FFFFH	32 bit -2,147,483,648~2,147,483,647	32 bit 0~FFFFFFFFH

◆ Analog Register

Analog input (AD):
EX2N-30A-MT-4AD2DA

AD	Register Value	Magnification Correction (units: milli)	Size Correction	Circle Setting of Analog Sampling
AD0-AD3	D8030-D8033	D8040-D8043	D8070-D8073	D8050-D8053
Cold End	D8034	D8044	D8039	

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

◆ EX2N-40A/50A-MT/MR/MRT-12AD8DA

AD	Register Value	Magnification Correction (units: milli)	Size Correction	Cycle Setting of Analog Sampling
AD0-AD1	D8030-D8041	D8200-D8211	D8220-D231	D8050-D8061
Cold End	D8042	D8212	D8232	

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

Analog output (DA):
EX2N-30A-MT-4AD2DA

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

EX2N-40A/50A-MT/MR/MRT-12AD8DA

DA	Register Value	Set Value	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	M8084 be driven ON

* The defaulted data of the circle setting of analog sampling is 32, the mix can be setted as 1

The power-down save of programmable text monitor's devices is permanent retention. Namely, all the devices of the holding section won't lose while the module is power off. Chargable 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 ensure 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

PLC : Compatible with MITSUBISHI GX8.52 and WORKS 2

Text : 《COOLMAY_30A software》 《COOLMAY_40Asoftware》 《COOLMAY_50A software》

Detailed information please refer to:

《COOLMAY PLC Programming Manual》 《EX2N-A Programmable Text Monitor User manual》

《EX2N-A Software User Manual》 《MITSUBISHI FX 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 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 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 malfuncion or fault.

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