

EX3U-80 series all-in-one user manual

Thank you for purchasing the EX3U-80 series all-in-one machine. This manual mainly explains the product characteristics, general specifications, and wiring methods of this series of touch screen PLC all-in-one machines. For detailed PLC programming, please refer to the "EX3U- 80 Series All-in-One Programming Manual"; For the touch screen section, please refer to "TK80 Series Touchscreen User Manual".

The EX3U-80 series touch screen PLC all-in-one machine has the following characteristics:

1. Adopting military grade 32-bit CPU+ASIC dual processors, it supports online monitoring and downloading, and the fastest execution speed of basic instructions is 0.24us.
2. Highly integrated. The switch quantity has a maximum of 30 inputs and 28 outputs, and the switch output can be selected as transistor/relay/mixed output, and the analog quantity has a maximum of 12 inputs and 8 outputs.
3. The PLC program capacity is up to 30K steps, 12K holding registers, and can support programming languages: instructions, ladder diagram (LD), step ladder diagram (SFC).
4. Supports multiple interrupts, input interrupts, timer interrupts, communication interrupts, high-speed counter interrupts and high-speed pulse output interrupts.
5. It supports CAN bus and can control servo motion and controller communication that supports CANBUS (CANOPEN protocol).
6. Special encryption is available. The touch screen and PLC can be encrypted separately, and the PLC password can be set to 12345678 to completely prohibit the reading of the program.

Product information

◆ Naming rules

EX3U-80	43H	- 24	M	RT	- 4AD	2DA	- 485/232P
①	●	●	●	●	●	●	●

1. Product series EX3U: Motion control type touch screen PLC all-in-one machine
2. HMI type 43: 4.3 inches 50: 5 inches 70: 7 inches 100: 10 inches
3. Input/output points 24: 12DI12DO 44: 24DI20DO 58: 30DI28DO
4. Module classification M: General controller main module
5. Switch output type R: Relay output type; T: Transistor (MOS) output type; RT: Mixed output
6. The maximum number of analog input points is 12
7. The maximum number of analog output points is 8
8. Analog input type E: Type E thermocouple (K/T/S/J types optional, supports negative temperatures) PT: PT100 PT1000. PT1000 NTC: Thermistors (10K/50K/100K) V: 0-10V V5: 0-5V V5_: -5V~5V V_: -10V~10V A: 0-20mA A4: 4-20mA or 4-channel static weighing module and other special specifications
- * 4.3/5-inch modular optional: ① 4K ● 4PT ③ 4NTC10K (50K, 100K optional) ④ 4V ⑤ 4A0 ⑥ 2PT+2V ⑦ 2K+2V ● 2V+2A0 ⑧ 2K+2A0 ⑩ 2PT+2A0
9. Analog output type V: 0-10V V5: 0-5V V5_: -5V~5V V_: -10V~10V A: 0-20mA A4: 4-20mA [Negative voltage output is available only for 7-inch and 10-inch models; one negative voltage output channel occupies two DA channels]
10. For communication ports, please refer to Table 1: Basic Parameters

◆ Table 1: Basic Parameters

Common models and specifications	Digital (Optional)		Analog (Optional)		COM.Port(Optional)		High-speed counting		High-speed pulse
	DI	DO	AD	DA	HMI	PLC	Single-phase	AB phase	Output
EX3U-8043H-24M EX3U-8043H-30MT	Maximum 12DI 12DO (MT: When the 2-input/4-output module is optionally installed, the maximum is 14 inputs and 18 outputs)		PCB boards after December 2025: Maximum 5AD2DA, A04 can be selected as NTC10K, other types cannot be selected (When the 2-input 4-output I/O module is selected, only 2-channel DA is available)		① 4.3-inch and 5-inch models come with 1 RS232; ● 7-inch and 10-inch models come with 1 RS232 or 1 optional RS485;	① Comes with 1 RS232 and 1 RS485; Optional 1 RS485 (Changed from the default RS232) ② WiFi optional for 7-inch/10-inch models (occupies the screen USB download port)	Conventional single-phase 6-channel 100KHz	Conventional AB phase 2-channel 100KHz	MT output: Conventional 8-channel Y0-Y5 are 200KHz, Y6-Y7 are 100KHz
EX3U-8050H-24M EX3U-8050H-30MT									
EX3U-8070H-44M EX3U-8070H-58M							Maximum 24DI 20DO (When the 6-input/18-output module is optionally installed, the maximum is 30 inputs and 28 outputs)	Maximum 12AD8DA; When the 6-input/output module is optionally installed, the maximum is 5 inputs and 4 outputs (when the thermocouple is optionally installed, AD4 is the cold junction)	
EX3U-8100H-44M EX3U-8100H-58M									
● 4.3-inch and 5-inch: MT is a transistor output, with a maximum load of 0.5A; ● 7-inch and 10-inch: MT is a transistor output (Y20-Y23 are fixed as MT; when the 6-input 8-output module is selected, Y24-Y33 are fixed as MT), with a maximum load of 500mA, MR is a relay output with a maximum load of 2A, MRT is a mixed output (only available for 7-inch and 10-inch models, with a maximum of 8 transistor Y0-Y7 channels), optional according to customer requirements Limitations: When Y1 is used for high-speed pulses, X6 and X7 cannot be used for high-speed counting, but can be used as regular input points; X6 and X7 high-speed counting cannot be used simultaneously, only one of them can be used.									

◆ Table 2: Electrical Parameters

Electrical parameters		
Input voltage	DC24V	
Digital input indicators		
Isolation method	Photoelectric coupling	
Input impedance	High speed input terminal 2.4K Ω	Normal input terminal 4.7KΩ
Input-ON	The input current at the high-speed input terminal is greater than 5.8mA/24V	The input current of the ordinary input terminal is greater than 9.9mA/24V
Input-OFF	The input current at the high-speed input end is less than 4.5mA/19V	The input current of the ordinary input terminal is less than 4mA/17V
Filtering function	With filtering function, the filtering time can be set within the range of 0-60ms, with a default of 10ms	
High speed counting function	Conventional single-phase 8-channel and AB phase 3-channel 100KHz (4.3/5 inch: single-phase 6-channel and AB phase 2-channel 100KHz)	
Input voltage level	Passive NPN or PNP, common terminal isolation	

(Continued from the table above)

Digital relay output indicators	
Maximum output current	Resistive load: 2A/point, 8A/COM; Inductive load: 1A/point, 4A/COM; Lamp load: 30W/point, 120W/COM
Circuit power supply voltage	DC/AC24V~220V
Circuit insulation	Relay mechanical insulation
On response time	About 10ms
Mechanical lifespan (no load)	10 million times
Electrical lifespan (rated load)	100000 times
Output level	Constant open dry contact output, COM can be connected to positive or negative
Digital transistor (MOS transistor) output indicators	
Maximum output current	Resistive load: 0.5A/point, 4A/COM; Inductive load: 12W/24V DC; Lamp load: 1.5W/24V DC
Circuit power supply voltage	DC24V
Circuit insulation	Optocoupler insulation
Isolation voltage (power supply-external terminal)	1500VAC
On response time	High-speed output: 10us; other: 0.5ms
High speed output frequency	MT output: Conventional 8-channel Y0-Y5 are 200kHz, Y6-Y7 are 100kHz
Output level	Low level NPN, COM connected to negative
Analog input indicators	
Input signal	0-10V/-5.5V/-10-10V/0-20mA/4-20mA/E, K, S, T, J type (including negative temperature) thermocouples/PT100/PT1000/NTC10K (50K/100K)/4-channel static weighing module or other customized signals
Response time	1 scanning cycle
Analog input points	4.3/5 inches: up to 5 channels; 7/10 inches: up to 12 channels
Accuracy	12 bits
Analog output indicators	
Output signal	0-10V/0-5V/0-20mA/4-20mA/-5-5V/-10-10V or other customized signals
Analog output points	4.3/5 inches: up to 2 channels; 7/10 inches: up to 8 channels
Accuracy	12 bits
External Interface	
COM.Port	Refer to "Table 1: Basic Parameters"
Ambient condition	
Operation temperature	-20°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/s² (10 times in each of the X, Y, and Z directions, totaling 80 minutes each)

Mechanical Design Reference

◆ Installation size

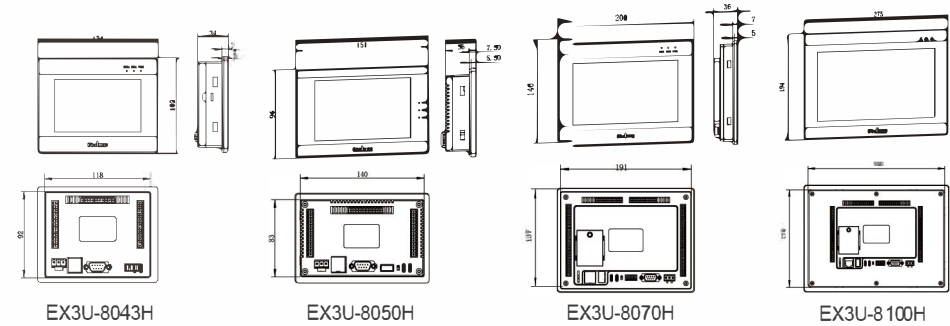


Figure 1 Installation dimension diagram

◆ Table 3: Dimensional Table (Customizable for bulk customers)

Model	MAX digital	MAX analog	Installation (cutout) size		External dimensions W*H*D (mm)
			A (mm)	B (mm)	
EX3U-8043H	14DI16DO	5AD2DA	120	94	134*102*34
EX3U-8050H	14DI16DO	5AD2DA	142	84	151*96*36
EX3U-8070H	30DI28DO	12AD8DA	193	139	200*146*36
EX3U-8100H	30DI28DO	12AD8DA	262	180	275*194*36

Electrical Design Reference

◆ Product structure

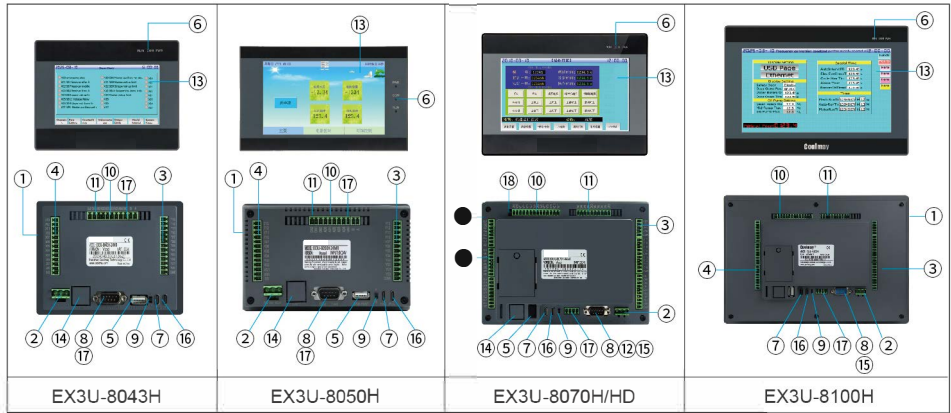


Figure 2 Product structure

- ① Four installation buckle holes on the side

② Terminal block for power supply FG: Chassis protection grounding 0V: 24V negative 24V: 24V positive

③ Switching output terminal block

④ Switching input terminal block

⑤ USB port

⑥ PWR: Power indicator light RUN: PLC running indicator light COM: PLC and touch screen flashing during communication
- ⑦ Touch screen programming port

⑧ PLC programming port RS232/RS485 0V: 24V negative 24V: 24V positive

⑨ PLC operation switch RUN/STOP

⑩ Analog input [Note: A B is RS485]

⑪ Analog output

⑫ Touch screen RS232/RS485/PLC-CAN
- ⑬ LCD screen

⑭ Network interface (HMI and PLC cannot coexist)

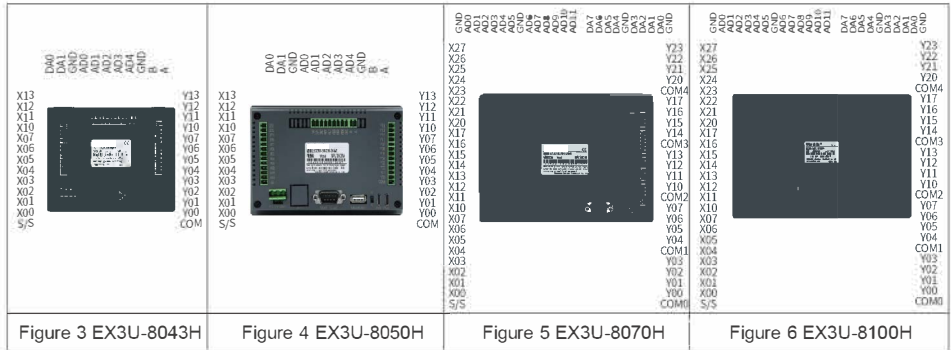
⑮ Optional WIFI

⑯ PLC USB programming port

⑰ PLC/touch screen RS485

⑱ Optional WIFI switch

◆ Hardware interface



Terminal wiring specification: 22-14AWG wire. The terminals of this series of models are all pluggable terminals. Please refer to the product silk screen for the identification of special model interfaces.

◆ Table 4: Pin Definition

EX3U series all-in-one machine has a built-in RS232 on the touch screen and one RS232 + one RS485(A, B) on the PLC. The specific pin configurations are shown in the table below:



Figure 7 COM1/COM2

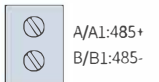


Figure 8 PLC485 port

EX3U-8043H/8050H COM port description			EX3U-8070H/HD/8100H COM port description						
COM DB9 port	Definition	Illustrate		COM DB9 port	PLC optional and default 232, screen optional 485 cannot coexist	PLC Optional	PLC Default	PLC Default	HMI
1	485+	PLC-RS485-Optional (Serial port 3, multiplexed with PLC-RS232)		PIN#	PLC-Serial port 3	PLC-CAN	PLC-232 Serial port 3	PLC-Serial port 2	Screen-232 (default), cannot coexist with screen option 485
6	485-			2			RXD		
2	Receive(RXD)	Default PLC-RS232 (Serial port 3)		3			TXD		
3	Send (TXD)			5			GND	GND	
5	Ground wire(GND)			4				TXD	
4	Send (TXD)		Default HMI-RS232	7					RXD
7	Receive(RXD)			8		H			
8	NC			9		L			
9	NC			Terminal A B				PLC-485-1	
Terminal B	485-	PLC-RS485-Default (Serial port 2)		Terminal A1 B1	PLC485-2				Screen-485
Terminal A	485+								

Except for 4.3 inches, network ports can be optionally installed (screen and PLC cannot coexist); 7-inch and 10-inch can be optionally equipped with CAN ports (2.0A/B), and WIFI can be optionally installed (occupying the screen download port)

※ Note: For detailed communication procedures, please refer to the "EX3U-80 Series All-in-One Programming Manual"

Equivalent circuit

◆ Digital input wiring circuit

The input of the EX3U series all-in-one machine is a biphasic optocoupler, and the input signal is isolated from the power supply, with passive input; Users can choose NPN or PNP connection method. However, it should be noted that since the common terminals of the input points are all connected, a product can only have one wiring method and cannot be mixed.

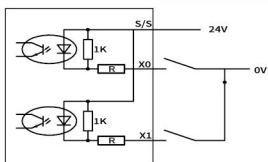


Figure 8 Input (NPN) wiring diagram

PLC digital NPN input wiring:

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

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

Three wire system (photoelectric sensor or encoder): The PLC switch is connected to the photoelectric sensor or encoder of the three wire system. 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; Encoders and photoelectric sensors require NPN type.

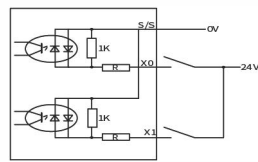


Figure 9 Input (PNP) wiring diagram

PLC digital PNP input wiring:

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

Two wire system (magnetic control switch): PLC switch input is connected to a two-wire magnetic control switch, with the negative pole of the magnetic control switch connected to the X terminal and the positive pole connected to 24V;

Three wire system (photoelectric sensor or encoder): The PLC switch is connected to the photoelectric sensor or encoder of the three wire system. 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; Encoders and photoelectric sensors require PNP type.

◆ Digital output wiring circuit

Figure 10 shows the equivalent circuit diagram of the relay output module, with several groups of output terminals that are electrically isolated from each other. The output contacts of different groups are connected to different power circuits.

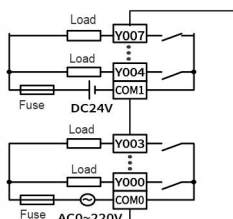


Figure 10 Equivalent circuit of relay output

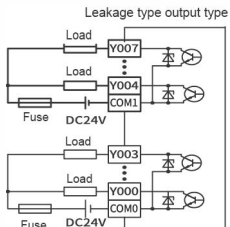


Figure 11 Equivalent circuit of transistor output

The equivalent circuit of the output part of the transistor output type PLC is shown in Figure 11. As can also be seen from the figure, the output terminals are divided into several groups, and each group is electrically isolated. The output contacts of different groups can be connected to different power circuits; The transistor output can only be used for DC 24V load circuits. The output wiring method is NPN, COM common cathode.

For inductive loads connected to AC circuits, external circuits should consider RC instantaneous voltage absorption circuits; For the inductive load of the corresponding DC circuit, consideration should be given to adding a freewheeling diode, as shown in Figure 12. The wiring of the stepper or servo motor is shown in Figure 13. The PLC defaults to Y0-Y7 as pulse points, and the direction can be customized; Note: A 2KΩ resistor must be connected in series with DC24V for 5V drive.

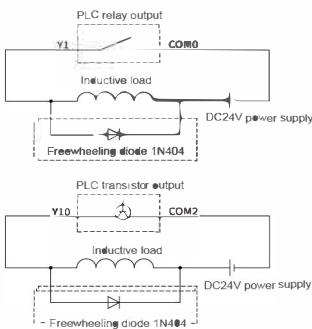


Figure 12 Schematic diagram of inductive load absorption circuit

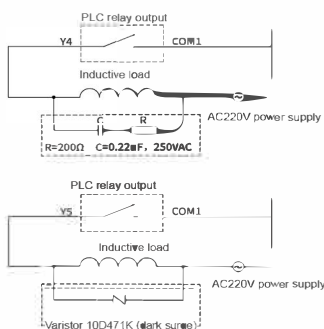


Figure 13 Pulse output wiring diagram

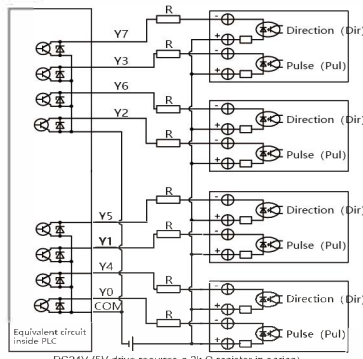


Figure 14 Analog input wiring diagram

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

◆ PLC analog wiring

4.3/5-inch analog inputs are AD0~AD3, outputs are DA0~DA1; 7/10-inch analog inputs are AD0~AD11, outputs are DA0~DA7. The negative terminals are connected to GND of the analog input/output terminals respectively. Input types can be selected from EKSTJ type heat exchanger (including negative temperature)/PT100/PT1000/NTC10K/NTC50K/NTC100K/0~10V/0~5V/5~5V/10~10V/0~20mA/4~20mA or 4-channel weighing module; 4.3/5 inch modular options: ① 4K ② 4PT ③ 4NTC10K (50K, 100K optional) ④ 4V ⑤ 4A0 ⑥ 2PT+2V ⑦ 2K+2V ⑧ 2V+2A0 ⑨ 2K+2A0 ⑩ 2PT+2A0

Output type options include 0~10V/0~5V/5~5V/10~10V/0~20mA/4~20mA [Negative voltage is supported only for 7-inch and 10-inch models]

1. Use isolated cables for analog input/output signal lines and isolate them from other power lines.

2. If connecting a 7-inch/10-inch device to a current signal, be sure to short-circuit the Vn and In (n=0~3) terminals.

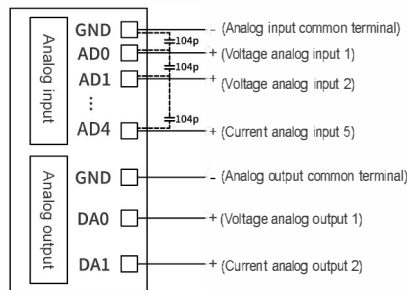


Figure 15 4.3-inch/5-inch PLC analog wiring diagram

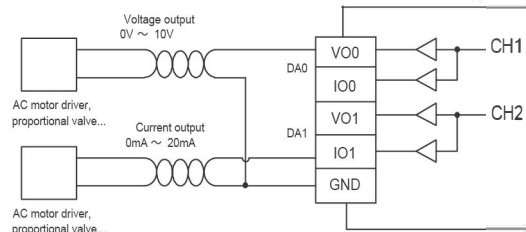


Figure 16 7-inch/10-inch PLC analog output wiring diagram

PLC anti-interference processing

1. Strong and weak electricity should be wired separately and cannot be grounded together; When there is strong electrical interference, add a magnetic ring at the power supply end; And carry out correct and effective grounding treatment according to the type of casing.

2. When the analog signal is disturbed, a 104 ceramic capacitor can be added for filtering and correctly and effectively grounded.

※ Note: For more detailed information, please refer to the "PLC anti-interference processing method" on the official website of Coolmay.

Programming reference

◆ Software component allocation and power-off maintenance instructions

Maximum digital points	EX3U-8043H/8050H-30MT	EX3U-8070H-58M	EX3U-8100H-58M
Digital input X	X00~X13 12points	X00~X27 24points	X00~X27 24points
Digital output Y	Y00~Y13 12points	Y00~Y23 20points	Y00~Y23 20points
Auxiliary relay M	[M0~M499] 500 points for general use / [M500~M1023] 524 points for maintenance / [M1024~M7679] 6656 points for general use / [M8000~M8511] 512 points for special use		
State S	[S0~S9] 10 points for initial state / [S10~S499] 490 points for general use / [S500~S899] 400 points for maintenance / [S900~S999] 100 points for maintenance / [S1000~S4095] 3096 points for maintenance		
Timer T	[T0~T199] 200 o'clock 100ms for general use / [T200~T245] 46 o'clock 10ms for maintenance [T246~T249] 4 o'clock 1ms cumulative type / [T250~T255] 6 o'clock 100ms cumulative type [T256~T511] 256 o'clock 1ms for general use ※ The 10ms timer will be affected by the scanning cycle. If the scanning cycle is 12ms, the timer will execute once every 12ms.		
Counter C	16-bit up counter [C0~C99] 100 points for general use [C100~C199] 100 points for maintenance	32-bit up/down counter [C200~C219] 20 points for general use [C220~C234] 15 points for maintenance	high-speed counter [C235~C245 single-phase single counting] [C246~C250 single-phase dual counting] [C251~C255 dual-phase dual-counting]
Data register D	[D0~D199] 200 points for general use / [D200~D511] 312 points for maintenance / [D512~D7999] 7488 points for maintenance / [D8000~D8511] 512 points for special use		
Data register V,Z	[V0~V7] [Z0~Z7] 16 points for addressing purposes		
Extended register (16-bit)	[R0~R22999] 23000 points, supports power failure retention (when using CANopen or ECAT function, registers R1000~R1999 are occupied) [R23000~R23999] 1000 points, for internal system use / [R24000~R32767] 8768 points, supports power outage retention		
Pointer JUMP, CALL for branches	[P0~P4095] 4096 points		
Nesting	[N0~N7] 8 points for main control		
Interruption	[I000~I500] Used for 6-point input interruption / [I600~I800] Used for 3-point timer interruption / [I1000~I6000] Used for 6-point counter interruption		
Constant	K	16-bit -32,768~32,767	32-bit -2,147,483,648~2,147,483,647
	H	16-bit 0~FFFFH	32-bit 0~FFFFFFFFH

◆ Analog input register (AD stands for analog input) with an accuracy of 12 bits supports direct reading of registers:

D [8030]~D [8041] are the input values corresponding to the analog quantities [AD0~AD11], channel switch D8114;

NO.	Register reading value	NO.	Register reading value
AD0	D8030	AD6	D8036
AD1	D8031	AD7	D8037
AD2	D8032	AD8	D8038
AD3	D8033	AD9	D8039
AD4 (cold junction)	D8034	AD10	D8040
AD5	D8035	AD11	D8041

◆ Sampling of analog input

D8073 is the number of sampling periods: range 0-7, default=7; After modification, restart to take effect. If D8073=1, then one PLC scanning cycle samples once and changes the value in the analog input once. R23960 starts with the zero-point correction value, which defaults to 0 (i.e., magnitude correction); R23980 starts with the negative temperature gain, which defaults to 10000 (currently only negative temperature gain is available); R23600-R23615 are the number of filter cycles: range 0-32767, default = 10. The 16 registers starting with R23620 are the corresponding values for 0~10V or 0~20mA, real-time sampled values.

◆ Analog output register (DA represents analog output, with an accuracy of 12 bits); Supports direct register assignment operation

No.	Register address	Range of set values	No.	Register address	Range of set values
DA0	D8050	0~4000	DA4	D8054	0~4000
DA1	D8051	0~4000	DA5	D8055	0~4000
DA2	D8052	0~4000	DA6	D8056	0~4000
DA3	D8053	0~4000	DA7	D8057	0~4000

The soft components of the touch screen PLC all-in-one machine are permanently held when the module is powered off, that is, all soft components in the holding area are not lost after the module is powered off; All power-off hold functions must ensure that the voltage of the DC24V power supply with load is above 23V, and the power on time of the PLC is greater than 2 minutes, otherwise abnormal power off functions may occur.

Programming software: PLC: Coolmay Vtool Pro Programming Software HMI: Vtool Touchscreen Programming Software For detailed information, please refer to the "Coolmay EX3U-80 Series All-in-One Programming Manual" and "Coolmay TK80 Series Touchscreen User Manual"

TIPS

EX3U-80 series all-in-one user manual

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

1. Please confirm the power supply voltage range of this product (conventional product power supply is limited to DC 24V! It is recommended that the output power of the power supply be 18W or above) and correct wiring before powering on to avoid damage.
2. When installing this product, please be sure to tighten the screws or clamp the guide rail to avoid detachment.
3. Avoid wiring and plugging cable plugs when they are live, as this can easily cause electric shock or circuit damage; When the product emits an odor or abnormal sound, please immediately disconnect the power switch; When machining screw holes and wiring, do not let metal shavings and wire ends fall into the ventilation holes of the controller, as this may cause product failure and misoperation.
4. Do not tie the power cord and communication cable together or place them too close. Keep a distance of at least 10cm; Strong and weak electricity need to be separated and properly and effectively grounded; In situations with severe interference, shielded cables should be used for communication and high-frequency signal input and output to improve anti-interference performance. The grounding terminal FG on this machine must be correctly grounded to improve its anti-interference ability.
5. The digital input is externally powered by DC 24V and supports passive NPN or PNP. The input signal is isolated from the power supply. During operation, please note that only one wiring method is supported, and mixed wiring is not allowed.
6. The COM of the switch output (transistor) defaults to a common cathode.
7. Please do not disassemble the product or modify the wiring at will. Otherwise, it may cause malfunctions, misoperations, losses, and fires.
8. When installing and disassembling the product, please be sure to cut off all power sources, otherwise it will cause equipment malfunction and failure.

Product Warranty Statement

Dear customer:

Sincerely thank you for choosing this product. As our user, you will receive our company's high-quality service of "free repair service and lifelong technical support for product quality problems caused by non-human damage or disassembly within two years from the date of purchase (one and a half years for LCD screen and touchpad).

During the warranty period, if there is a hardware malfunction caused by the product itself, our company will provide customers with free replacement or repair services. Please do not disassemble and repair the product yourself. Our products are labeled with anti-disassembly labels, and only our company and authorized professionals can repair our products. Any unauthorized disassembly and repair of the product by other personnel is equivalent to automatically waiving the warranty services provided by our company.

Situations not covered by the free warranty service:

- Damage caused by human factors (external impact or collision, improper use, etc.)
- The product has been disassembled, modified, or repaired without authorization
- Damage caused by external factors such as lightning strikes, water ingress into the power supply, and falls
- Damage caused by incorrect installation or use by the user
- The device has exceeded the warranty service period

If you need to repair, please fill in the following items:

Product Name: _____ Customer Name: _____
Product model: _____ contact number: _____
Product serial number: _____ Purchase date: _____
Problem remarks: _____

QR code

V 2026/03

The model specifications and information related to the product in this manual are subject to change without prior notice.