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L02 Series Programmable Logic Controller (PLC)

Customize Your Automation Control System

Simple operation, Flexible, Cost-effective

Coolmay L02 series PLC is a high-function general-purpose controller specially designed for automation equipment. L02 series modules can be expanded up to 31 units.

Powerful positioning control function, can support up to 8 axis high-speed pulse control at the same time, suitable for various automation equipment, such as electronic manufacturing, labeling, food packaging, textile equipment and other industry equipment.

The L02 series host has a built-in communication network and communicates with the Ethernet/IP industrial network to realize high-speed data transmission.

Dial switch to set up IP, quickly build a network environment, built-in multiple sets of industry-specific functional modules, convenient for customer applications, and can set multiple password protection to improve system security.

The snap-in buckle design allows the module to be replaced "straight up/down" for easy installation. The appearance is simple and neat, the dark gray case is anti-fouling and anti-dirty, suitable for harsh industrial environments, and has the characteristics of recyclability, low pollution, and lead-free. It complies with international environmental protection regulations and the concept of resource reuse.



Catalog

Dimension Order guide

L02 series host motion control system	02
Integrated host design	
High efficiency computing power	03
CPU performance is greatly improved Execution efficiency optimization I/O update Data is stored permanently, no battery required	
Powerful axis control	04
Positioning control, high-speed pulse High-speed counter	
Easy installation	05
Industrial network solutions	06
Cloud platform	08
Serial communication solution	09
Multiple programming languages	10
Naming principle	11
Naming principle	
Product model and specification	13
Specification	

- reach 0.35µs



L02 series host motion control system

- L02 series CPU supports up to 8 axis servo control, 6 groups of high-speed counter inputs • Support digital, analog and temperature module expansion (max 31 units)
- Provide high-speed computing speed: the fastest execution speed of basic instructions can
- Provide multiple motion control commands such as position, speed, positioning and interpolation
- Built-in maximum 16DI/16DO, RS-232/RS-485*2, Ethernet and CAN interfaces



Integrated host design

L02 host motion controller has built-in multiple I/O and communication interfaces, which can meet the market demand for compactness, high performance and high value





High efficiency computing power

- Super function. Compatible with FX3G/FX3U/FX3S series PLC, fast running speed.
- 32k program capacity, 32k retentive register, support positioning, interruption, linear arc interpolation, PID auto-tuning
- Special encryption, prohibit reading data



CPU performance is greatly improved

High-speed computing

- Maximum I/O:512 points
- Program capacity: 32k steps
- Data storage: 32k words

03

Maximum expansion module: 31 units





Execution efficiency optimization

I/O update

L02 series update

Perpetual calendar timing function,

use general commercially available

Automatic address allocation,

expansion module plug and play

L02 series cycle scanning method

Program cycle scan mode

Data is stored permanently, no battery required

Use permanent preservation, write to Flash instantly after power off

Power-off retention area, permanently maintained



When PLC is powered off PLC program area Permanently maintained Power-off retention area Permanently maintained

Drawer type, can be installed by customers



Install commercially available

CR1620 batteries



Powerful axis control - positioning control solution



Positioning control, high-speed pulse

- L02M32T/L02M24T CPU: 8-axis(4-axis 200KHz+4-axis 100KHz)
- Support positioning, can quickly complete the support positioning function, up to 8 axes
- Specify Y0, Y1 for continuous interpolation; support Z axis (under development)
- The control of each axis is commanded, the PLC program is highly readable, and the maintenance is convenient

High-speed counter

- Real-time high-precision monitoring: 6 groups of 60 KHz
- Up to 6 external input interrupts





Easy installation

Design, easy to install

Space saving, most suitable for installation in mechanical equipment





No screwdriver required for installation

- Adopt press-type terminal wiring
- Screwdriver-free installation, convenient and fast installation





adding a switch.

Easy installation

Open the white buckle, align the expansion interface and push the module directly in, press the white buckle at both ends to complete the installation





Arrange the modules neatly







Rail installation method

The CPU module and the expansion modules can be directly installed on the standard rail DIN35mm without a backplane; press the rail buckle to directly lock the product on the rail



The product can slide left and right on the rail

Put into the rail card slot, press the rail buckle, the installation is complete

Industrial network solution I

Ethernet/IP solution

The communication bus protocol adopts the standard Ethernet/IP communication bus, which can easily realize barrier-free connection with Ethernet/IP PLC or industrial computer. The communication interface mode is 2 RJ45 Fast Ethernet interfaces, and the internal port switching function has been implemented, so multiple slave stations can be easily cascaded without



The module communication interface supports the Ethernet/IP bus protocol, conforms to the IEC61158 standard and GB/T25105 standard, and can realize the seamless connection of mainstream Ethernet/IP master stations

Integrated dual-port switching function, convenient to achieve linear topology Use dial switch to set the IP address, 192.168.IP1.IP0, simple and convenient Adopt standard rail installation, fix with buckle





Technical specifications

Communication bus			
Bus protocol Ethernet/IP		net/IP	
Connection method	RJ	45	
Communication rate 100Mb/s		1b/s	
Communication distance 100m (Station distance)		n distance)	
Status, alarm, diagnosis			
Power status display Green RUN LED			
Network port indication Green LINK1 light Green LINK1 correspondent (Flashes when there is data exchange) correspondent to LAN1 correspondent to LAN1		Green LINK2 light corresponds to LAN2	

Industrial network solution II

Flexible network system construction

- Support star-shaped, linear network topology, can quickly expand and manage production lines
- Compatible with IT network, no need to cut the network or maintain by professional IT technicians



Cloud platform



One cable, one network

- Coolmay's Ethernet/IP solution connects devices through network cables, simplifying wire material preparation and inventory.
- Replace the traditional three-tier industrial network architecture and seamlessly connect with 100 Mb/s high-speed network.

Coolmay cloud service platform

The platform is an IoT system that can complete terminal device data collection, real-time control, alarm push, group management, configuration design, video monitor and other functions in one stop.



Serial communication solution

L02 series host

- Provide 2 RS-485, support Mitsubishi programming port protocol, Modbus networking protocol, Freeport protocol, Mitsubishi BD board protocol and N:N protocol, easily realize the interconnection between PLCs and the communication with external equipment such as man-machine interface and inverter.
- 1 CAN port, supports CAN2.0A, CAN2.0B, Modbus networking and Freeport protocols, which can easily realize multi-channel interconnection.
- 1 high-speed Ethernet interface, supports Mitsubishi programming port protocol, Modbus TCP/UDP protocol, Ethernet/IP protocol.





Multiple programming languages

Various programming languages can be used together in the project

Ladder diagram(LD)

The most extensive ladder diagram is used, and an easy-to-use editing interface is provided to help users quickly create programs



Sequential function chart(SFC)

Express the actions of each stage in a flow chart, intuitive and easy to understand, suitable for applications that emphasize staged process control

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Multiple safety protection functions Ensure the confidentiality of user program data

Safety - provide a variety of program protection functions, combined with the best application of security and performance

- The host is protected by 8 characters password
- The number of input errors is limited
- Protection function that prohibits uploading



Naming principle

Host module

L02M32R/L02M32T

L02	М	32	R, T
Series	General Controller Main Module	I/O points	Output type
		16DI 16DO	R: Relay output T: Transistor output

L02M24R/L02M24T

L02	М	24	R, T
Series	General Controller Main Module	I/O points	Output type
		12DI 12DO+4AD 4DA	R: Relay output T: Transistor output

Digital input module

L02-8EX/L02-16EX/L02-32EX

L02	8	EX
Series	I/O input points	Category/Input module
	8: 8 points 16:16 points 32: 32 points	

Digital output module

L02-8EYR/L02-8EYT/L02-16EYR /L02-16EYT/L02-32EYT

L02	8	EY	R, T
Series	I/O output points	Category/Output module	Output type
	8: 8 points 16:16 points 32: 32 points		R: Relay output T: Transistor output

Digital input/output module L02-16ER/L02-16ET/L02-32ET

L02	16	E	R, T
Series	I/O points	Category/Input and output model	Output type
	16: 8DI 8DO 32: 16DI 16DO		R: Relay output T: Transistor output

Se

L02	4	RTD
Series	Analog channel	Туре
	4 channels	RTD: PT100/PT1000 TC: Thermocouple NTC: NTC10K/50K/100K LC: Weighing

L02-60P

Sei

Ethernet/IP module L02-EIP

Ser

Voltage and current analog module

L02-4AD/L02-4DA/L02-4AD2DA

02	4	AD
ries	Analog channel	Туре
	4 channels	AD: analog input DA: analog output xADxDA: analog input/output

Temperature and weighing module

L02-4RTD/L02-4TC/L02-4NTC/L02-2LC

Power module

)2	60P	
ries	Category	Function
	Power module	100-240VAC input /24VDC output

2	EIP	
ies	Category	Function
	Ethernet/IP module	RJ45*2, support Ethernet/IP protocol

Product model and specification



CPU host











L02 series host standard specifications					
Program capacity	Basic command	Input and e	output I/O: Maximum 512		
32k steps	speed 0.35µs	Expans	ion module: 31 units		
Type-C/RS-232/RS-485*2/	Micro	Ethernet/IF	P, Modbus,		
CAN/Ethernet	SD Card	CAN, Rem	note I/O ^(*1)		
Model	Built-in I/O	High-speed output	High-speed input		
L02M32T	16DI/16DO	4-axis 200 KHz+4-axis 100 KHz Pulse output	6 channels 60KHz High-speed counter		
L02M32R	16DI/16DO	4-axis 200 KHz+4-axis 100 KHz Pulse output	6 channels 60KHz High-speed counter		
L02M24T	12DI/12DO	4-axis 200 KHz+4-axis 100 KHz	6 channels 60KHz		
	4AI/4AO	Pulse output	High-speed counter		
L02M24R	12DI/12DO	4-axis 200 KHz+4-axis 100 KHz	6 channels 60KHz		
	4AI/4AO	Pulse output	High-speed counter		



programi

Command processing speed

Prograr Storage capacity

Expans

CPU D

CPU ar

I/O

Bit device

16-bit c

32-bit c

High-s High-spe

D

Defa



Product specification

del	L02M32T	L02M32R	L02M24T	L02M24R			
ning language	Ladder diagram(LD)	Instructio	on list Seq	uential function chart(SFC			
Basic instruction (LD)		0.3	35µs				
pplication instruction		0.6	642µs				
capacity		32k	steps				
Date (D)	[D0~D127] 128points Genera	l/[D128~D7999] 787	2points Retentive/[D8000~D8511] 512points Specia			
Expansion (R)	[R0~R2	2999] 23000points S [R23000~R23999] 1	Support power-down L000points Internal u:	retention / se			
on model	Max limit of 31	units: max 12 a	analog input/ou	Itput respectively			
x I/O	FX3U mode: 512 points; I	FX3G mode: 256	points (the sum o	of input and output points			
gital I/O	16DI / 16D	00		12DI / 12DO			
alog I/O	-			4AD/4DA			
Х		256 poir	nts(X0 ~ X377)				
Y		256 poii	nts(Y0 ~ Y377)				
M	[M0~M383] 384points General / [M384~M1535] 1152points Retentive / [M1536~M7679] 6144points General						
IVI	[M8000~M8511] 512points Special						
S	[S0-S9] 10points Initial state	/ [S10~S999] 990po	ints Retentive/ [S10	00~S4095] 3096points Genera			
	[T0~T199] 200po	ints 100ms General	/[[T250~T255] 6p	oints 100ms Retentive			
ier T	[T246~T249] 4points	1ms cumulative Re	etentive / [T256~T3]	19] 64points 1ms General			
	[T200~T245] 46points 1	0ms General ** The the ti	e 10ms timer is affected by the mer becomes 12ms and execu	scan period. If the scan period is 12ms, tes once.			
untar C		[C0~C15] 16p	oints General				
Junter C		[C16~C199] 184	points Retentive				
ounter C	[C200~C219] 20p	oints General	[C220~C234]	15points Retentive			
	[C235~C245 Single ph	ase single counting C251~C255 Two-p] [C246~C250 Single phase double count	e phase double counting] ing			
eed pulse		4-axis 200KH	z+4-axis 100KH	Z			
ed counter		6 char	nnels 60KHz				
type	L02M32T/L02M24T: Transistor L02M32R/L02 C0	output, load maximu 2M24R:Relay outpu DM can be connected	m 500mA, low level N t, load maximum 2A, l to positive or negativ	PN, COM connected to negative dry contact, re			
ılt COM	Туре	-C, RS-232, RS-4	485*2, Ethernet	, CAN			
tocol	Mitsubishi programı freeport prot	ning port Modl ocol, CAN, Ethe	ous RTU, Modbi ernet/IP, Mitsub	us TCP, Modbus UDP, vishi BD board			

Product specification

Model		L02M32T	L02M32R	L02M24T	L02M24R		
Data backup	Program						
battery storage	Retentive area		MRAM has n	o write limit			
Calend	ar(RTC)	Commercially available batteries CR1620 (optional)					
Self-dia	gnosis	CPU abnormalities, internal memory problems, etc.					
Rated input	Host	24 V(DC) + 100(4)					
voltage	Expansion module		24 VDC(±10%)				

Electrical and environmental specifications

Item		Specification		
Internal current	Host	150 mA		
consumption	Expansion module	Relay output <150 mA, other modules <80 mA		
Operating te	mperature	0 ~ 50 °C		
Storage tem	nperature	-20 ~ 70 °C		
Operating I	numidity	5~95%,no condensation		
Storage h	umidity	5 ~ 95%, no condensation		
Vibration r	esistant	Comply with international standards, IEC61131-2, IEC60068-2-6 (TESTFc), Sinusoidal 5-8.4 Hz 3.5 mm displacement, 8.4-150 Hz 1 G acceleration		
Shock p	proof	Comply with international standard specification IEC61131-2IEC60068-2-27 (TESTEa) half sine 15 g peak, 11 ms duration		
working environment		No corrosive gas exists		
Installation	location	Inside the control box		
Pollution level		2		

L02 series DIO module

Digital input module



Rated input voltage 5~24VDC

Reaction time

1 ms

Filter function

1~20 ms

Reaction time

1ms (Transistor)

10ms (Relay)

Digital input/output module



L02-16ET L02-16ER L02-32ET



L02 series AIO module Analog input module Analog output module Analog input/output module

Analog input Analog output Analog input/ output L02-4AD L02-4DA L02-4AD2DA Weighing module Temperature analog module

Dual channel Rated 4 points 4 points 4 points 2 points independent weight sampling 0.4% Temperature transducer Temperature transducer/ Temperature transducer/ Weighing module /PT100/PT1000 2 sets of 4-wire Thermocouple Thermistor channels Load Cell L02-2LC L02-4RTD L02-4TC L02-4NTC

4 points

4/2 points

Basic function

50/60Hz High-speed filter dynamic

weighing

filter

Power module



4 points

Power module

L02-60P

Ethernet/IP module



Dimension

Host module



DIO module



L02M32T,L02M32R,L02M24T,L02M24R





- L02-8EX,L02-16EX,L02-32EX L02-16ET.L02-16ER.L02-32ET
- L02-8EYT,L02-8EYR,L02-16EYT,L02-16EYR,L02-32EYT



Power module Ethernet/IP module

L02-60P L02-EIP



Make automation control easier 16

88m

L02-4AD,L02-4DA,L02-4AD2DA L02-4RTD,L02-4TC,L02-4NTC,L02-2LC

A/O module

CPU module

Name	Model	Program capacity	Max I/O points/ expansion module	I/O	DO Type	AIO Type	High-speed counter	High-speed pulse	Default COM	Memory card	Terminal block
	L02M32T			16DI/16DO	Transistor	-	- 6 channels 60KHz 2V2A	4-axis 200KHz+4-axis 100KHz (Y4∼Y7 pulse total transmis- sion does not exceed 200KHz)	Type-C RS-232 RS-485*2 Ethernet CAN Free		Pross
CPU Module	L02M32R	32K stops	512 points/31 sets		Relay	-				Micro SD max32G	11035
er o module	L02M24T	52N 3tep3	512 points/51 sets	12DI/12DO	12DI/12DO Transistor	2\/2∆					Pross
	L02M24R			4AI/4AO	Relay						11035

DIO module

Input module

L02 series	Model	Digital input	Digital output	DO type	Input signal	Terminal block
	L02-8EX	8	NULL	NULL	5~24V	Press
	L02-16EX	16	NULL	NULL	5~24V	Press
	L02-32EX	32	NULL	NULL	5~24V	horn block terminal

Input/output module

L02 series	Model	Digital input	Digital output	DO type	Input signal	Terminal block
	L02-16ET	8	8	Transistor	5~24V	Press
	L02-16ER	8	8	Relay	5~24V	Press
	L02-32ET	16	16	Transistor	5~24V	horn block terminal

Output module

L02 series	Model	Digital input	Digital output	DO type	Input signal	Terminal block
	L02-8EYT	-	8	Transistor	NULL	Press
	L02-8EYR	-	8	Relay	NULL	Press
	L02-16EYT	-	16	Transistor	NULL	Press
	L02-16EYR	-	16	Relay	NULL	Press
	L02-32EYT	-	32	Transistor	NULL	horn block terminal

AIO module

Analogi modu

Analog οι modu

Analog ir output m

Temperat analog mo

Weighing m

Power module

Power r

Ethernet/IP module

Ethernet



ries	Model	Туре	Analog input	Analog output	Resolution	Analog type (optional)	Terminal block
input ule	L02-4AD	AD	4	0	0.15mV 0.15mV 0.3mV 0.3mV 0.6uA 0.5uA 0.6uA	0~5V -5~5V 0~10V -10~10V 0~20mA 4~20mA -20~20mA	Press
output ule	L02-4DA	DA	0	4	0.15mV 0.3mV 0.6uA 0.5uA	0~5V 0~10V 0~20mA 4~20mA	Press
nput/	L02-4AD2DA	AD	4	0	0.15mV 0.15mV 0.3mV 0.3mV 0.6uA 0.5uA 0.6uA	0~5V -5~5V 0~10V -10~10V 0~20mA 4~20mA -20~20mA	Press
loaule		DA	0	2	0.15mV 0.3mV 0.6uA 0.5uA	0~5V 0~10V 0~20mA 4~20mA	Press
ature	L02-4RTD	AD	4	0	0.1°C	PT100 PT1000	Press
odule	L02-4TC	AD	4	0	0.1°C	Type J/K/S/T/E thermocouple	Press
	L02-4NTC	AD	4	0	0.1°C	NTC 10K/50K/100K	Press
nodule	L02-2LC	AD	2	0	24bit	-	Press

ime	Model	Input	Output	Safety standard
nodule	L02-60P	100-240VAC 1A MAX60Hz	24VDC 0.5A	CE/UL

ime	Model	Specification
/IP module	L02-EIP	
		The communication interface is 2 RJ45 100M Ethernet interfaces, the port has built-in switch function, which can easily realize the cascading of multiple slave stations and supports the Ethernet/IP protocol



L02 Series Programmable Logic Controller (PLC) User Manual

Thank you for purchasing Coolmay L02 series PLC. This manual mainly describes the product characteristics, general specifications and wiring methods of this series of PLC. For detailed programming, please refer to "Coolmay L02 Series PLC Programming Manual" and ""Coolmay PLC Instruction Programming Manuel".

L02 series PLC has the following characteristics:

- 1. Strong scalability, 31 modules can be expanded, and the maximum I/O can reach 512 points (Need to expand the module in case of power off).
- 2. It can be specially encrypted, and the password is set to 12345678 to completely prohibit reading the program.
- 3. Powerful positioning control function, which can simultaneously support 8-axis high-speed pulse function.

6. Digital input

7. Digital output

10. RS-485

8. L02 power interface 1

9. DC24V power interface 2

4. High-efficiency computing capability, basic instruction execution speed can reach 0.35µs.

Product structure







Figure 1 Product structure

11. CAN 12. Battery slot 13. Expansion interface 14. Digital input indicator 15. Digital output indicator



C0 Y00 Y01 Y02 Y03

C1 Y04 Y05 Y06 Y07

S/S X00 X01 X02 X03 S/S X04 X05 X06 X07

S/S X10 X11 X12 X13 C2 Y10 Y11 Y12 Y13

GNG AD0 AD1 AD2 AD3 GNG DA0 DA1 DA2 DA3

16. POWER: Power indicator RUN: PLC running flashes ERROR: The indicator flashes when the program is wrong (it always lights when the CPU is wrong) BAT.LOW: When the battery is low, it will always be on COM1/COM2: flashing during RS-485 communication



1. PLC dial switch

3. RS-232

5. Ethernet

4. SD card slot

2. Type-c download port



Note: S/S is the common terminal of digital input; Cx is the common terminal of digital output; GND is the common terminal of analog input/analog output

C0 Y00 Y01 Y02 Y03

C1 Y04 Y05 Y06 Y07

C2 Y10 Y11 Y12 Y13

C3 Y14 Y15 Y16 Y17

RS-232 programming port pin definition

Pin number	Signal	Description
4	RXD	Accept
5	TXD	Send
8	GND	Ground





Figure 4 RS-232 programming port

Communication port description

- \blacklozenge Serial port 1: RS-232 (PLC programming port): supports Mitsubishi programming port protocol, which can be used to download PLC programs or communicate with devices that support Mitsubishi.
- Serial port 2: RS-485 (A B): Support Mitsubishi programming port protocol, Mitsubishi BD protocol, RS protocol and Modbus RTU protocol. % Support RS, RS2, WR3A, RD3A, ADPRW instructions.
- Serial port 3: RS-485 (A1 B1): supports Mitsubishi programming port protocol, RS2 protocol and Modbus RTU protocol. upport RS2, WR3A, RD3A, ADPRW instructions
- CAN (H L) communication port: supports RS2 protocol and Modbus RTU protocol(The communication wiring needs to be connected to the upper HL; short-circuit the lower HL, CAN has a terminal resistance of 120Ω; otherwise, there is no terminal resistance.) %Support RS2, WR3A, RD3A, ADPRW instructions.
- Ethernet: Support Mitsubishi programming port protocol, Modbus TCP/UDP protocol, Ethernet/IP protocol.

Host Module size

L02M32T、L02M32R、L02M24T、L02M24R



Figure 3 L02M24T/L02M24R

Figure 6 Host module size

Installation

Snap-in installation

Push back into the buckle between the groups, directly push the module in, and when you hear a "click", the module is installed





Equivalent Circuit

points are all connected, so a module or a host can only have one wiring method, not mixing.

PLC input (X) is external power supply DC24V sink type (passive NPN), the input signal is isolated from the power supply. When using, you need to connect S/S to the 24V positive of the external power supply

PLC digital NPN input wiring:



Port short connection: The S/S of the PLC input terminal is connected to 24V, and the X terminal is connected to the power supply 0V, that is, the input has a signal Two-wire system (magnetic control switch): PLC digital input is connected to a wo-wire magnetic control switch, the positive pole of the magnetic control switch is connected to the X terminal, and the negative pole is connected to 0V; Three-wire system (photoelectric sensor or encoder): PLC switch is connected to a three-wire photoelectric sensor or encoder, the power supply of the sensor or encoder is connected to the positive electrode of the power supply, and the signal line is connected to the X terminal; the encoder and photoelectric sensor must be of NPN type

Figure 9 Input wiring diagram

Figure 11 shows the equivalent circuit diagram of the relay output module. The output terminals are in several groups, and each group is electrically isolated. The output contacts of different groups are connected to different power circuits.

The equivalent circuit of the transistor output type PLC output part is shown in Figure 12. It can also be seen from the figure that the output terminals are in 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. Output wiring mode NPN, COM common cathode.



Figure 11 Relay output equivalent circuit

The wiring of stepper or servo motor is shown in Figure 13. The L02 series PLC defaults Y0-Y7 as pulse points, and the direction can be customized.

Note: 5V drive must be connected with a 2KΩ resistor in DC24V



DC24V (5V drive must be connected with 2kΩ resistance)

Figure 13 Pulse output wiring diagram



Rail installation method

The CPU module and the expansion modules can be directly installed on the standard rail DIN35mm without a backplane; press the rail buckle to directly lock the product on the rail



Figure 8 Rail installation

The input of L02 series is dual-phase optocoupler, users can choose NPN or PNP connection when using. Note, however, because the common ends of the input

PLC input (X) is an external power supply DC24V source type (passive PNP), and the input signal is isolated from the power supply. When using, you need to connect S/S to the 0V of the external power supply



PLC digital PNP input wiring: Port short connection: The S/S of the PLC input terminal is connected to 0V, and the X terminal is connected to the power supply 24V, that is, the input has a signal: Two-wire system (magnetic control switch): PLC digital input is connected to a ' two-wire magnetic control switch, the positive pole of the magnetic control switch is connected to the X terminal, and the negative pole is connected to 24V; Three-wire system (photoelectric sensor or encoder): PLC switch is connected to a three-wire photoelectric sensor or encoder, the power supply of the sensor or encoder is connected to the positive power supply, and the signal line is connected to the X terminal; the encoder and photoelectric sensor are required to be of PNP type.

Figure 10 Input wiring diagram



Figure 12 Transistor output equivalent circuit

The L02M24T/L02M24R host comes with 4 analog inputs and 4 analog outputs; the fixed type of analog input/output is 2 0-10V and 2 0-20mA (4-20mA). The wiring is shown in Figure 14.



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 terminal, and the negative pole of the power supply is connected to the GND terminal. Generally, it is the connection method of 0-20mA/4-20mA 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 positive and negative poles of the signal output of the transmitter are respectively connected to the AD terminal and the GND terminal

Four-wire system: the positive and negative poles of the power supply are connected to the positive and negative poles of the transmitter respectively, and the positive and negative poles of the transmitter signal output are respectively connected to the AD and GND terminals;

Coolmay L02 Series PLC Programming Manual

(PLC part: Difference comparing with FX3G)

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V22.21



Catalog

1. Overview	1
1.1. Coolmay L02 PLC has the following advantages:	1
1.2. Coolmay L02 System Architecture	4
1.3. Host operation	5
1.4. L02 series host and modules description	7
1.5. L02 series host and module power reference table	
1.6. Precautions for L02 series host programming	9
2. Device Number	11
2.1. Device number table	11
3. Special relay and register	13
3.1. Special relay number and content	13
3.2. Special register number and content	17
4. Function Instructions	
4.1. List of basic logic instructions	20
4.2. Applied instructions [Sequence is according to instruct v	/ariety】21
5. Application of analog	
5.1 Analog input	28
5.1.1. L02M24 Host analog input type	
5.1.2. L02M24 Host analog input read	
5.1.3. Expansion analog module input type	
5.1.4. Expansion analog module input read	29
5.1.5. Host Analog input sampling	31
5.1.6. Analog input program example	31
5.2. Analog output	
5.2.1. L02M24 Host analog output setting	33
5.2.2. Expand analog module output setting	33
5.2.3. Host analog output program example	34
5.3. PID Instruction	34

5.3.1. Outline	34
5.3.2. PID instruction format and parameter description	34
5.3.3. Function and action description	35
5.3.4. Notice	37
5.3.5. Example	37
6. Application of high speed counter	39
6.1. Assignment table of built-in high speed counter	39
6.2. Related device	40
7. Application of high speed pulse	41
7.1. high speed pulse output	41
7.2. Circular interpolation	42
7.2.1. Normal interpolation function	42
7.2.2. Continuous interpolation function	44
7.3. Pulse width modulation PWM	47
7.4. Handwheel pulse function	50
8. Coolmay L02 series PLC communication manual	53
8.1. MODBUS instruction explanation and communication	
address	53
8.1.1. Function and operation description of read/write data	
	53
8.1.2. ADPRW instruction function and operation description	54
8.1.3. Word device communication address number	50
8.1.5 ADPRW instruction function parameters	50
0.1.0. ADI TW Instruction function parameters	57
8.2. Serial port 1: RS232 (PLC programming port)	57
8.3. Serial port 2: RS485 (A B)/RS232	57
8.3.1. Mitsubishi programming port	59
8.3.2. Mitsubishi BD Protocol	60
8.3.3. Freeport protocol functions and examples	61
8.3.4. Modbus RTU protocol	62
8.3.5. Modbus RTU function ADPRW instruction	65
8.3.6. Modbus ASCII protocol	67
8.4. Serial port 3: RS485 (A1 B1)	68
8.4.1. Mitsubishi programming port protocol	71

8.4.2. Freeport protocol function	71
8.4.3. Modbus RTU function RD3A/WR3A instruction	72
8.4.4. Modbus RTU Function ADPRW instruction	75
8.4.5. Modbus ASCII function	76
8.5. CAN Communication port	77
8.5.1. Freeport protocol function	80
8.5.2. Modbus RTU function RD3A/WR3A instruction	81
8.5.3. Modbus RTU function ADPRW instruction	83
8.6. Network communication	84
8.6.1. MITSUBISHI MC protocol	87
8.6.2. Modbus TCP Function	92
8.6.3. Etherenet/IP function	94
8.7. Network N:N communication	104
8.7.1. Related device content	104
8.7.2. Program settings and instructions	106
9. Coolmay L02 series PLC hardware identification and address	
allocation	108
9.1. Hardware identification of digital input and output modules	108
9.2. Address allocation of digital input and output modules	109
9.3. Hardware identification of analog input and output modules	110
9.4. Address reading of analog input and output modules	111
Appendix Version Change Record	112

1. Overview

1.1. Coolmay L02 PLC has the following advantages:

L02 series CPU module is a high-end application controller.L02 series CPU has built-in up to 8 axis (pulse type) positioning outputs,up to 6 groups of high-speed counter inputs, and diverse network communication options, providing users with powerful network functions. By setting program to establish various network device links. With the built-in memory card function of the L02 series CPU module, system settings can be quickly backed up or restored.

This manual describes the basic operating functions of the L02 system, allowing users to quickly get started with the L02 system.

1) Function Feature:

◆Adopting Military level 32 bit CPU, compatible to with Mitsubishi FX3G/FX3U/FX3S series PLC,run faster and more adapted to industrial environment of high electromagnetic interference.

◆ The high-speed pulse output of the host L02M32T/L02M24T is generally 8 channels. Each channel of Y0~Y3 can reach 100KHz, and each channel of Y4~Y7 can reach 50KHz.

High-speed counting is generally single-phase 6-channel 60KHz or AB
 (Z) phase 2-channel 30KHz + AB-phase 1-channel 5KHz.

Special encryption, prevent illegal reading thoroughly. 8-bit encryption, 12345678 as password can thoroughly prevent reading of ladder logic program.

2) Supporting more I/O

◆L02 series plc can support at most 512 i/o or 31 pieces modules (regardless of type) or 12 analog i/o modules.

The extended I/O address does not require programming, is automatically

assigned, and the module is easy to use by plugging and playing.

Digital input and output expansion, the expansion address starts from X20, Y20.

◆L02 series can be matched with L02-EIP module to establish remote I/O communication.

Remarks: 256 points (X0~X177, Y0~Y177) in FX3G mode. 512 points (X0~X377, Y0~Y377) in FX3U mode.

3) Diversified I/O module option

◆L02 series CPU modules support the following types of I/O modules:

digital I/O modules, analog I/O modules, temperature and weighing modules,

and Ethernet/IP modules.

Module Type	I/O	Model
	Input	L02-8EX,L02-16EX,L02-32EX
Digital I/O	Output	L02-8EYT,L02-8EYR,L02-16EYT,L02-
		16EYR,L02-32EYT
modules	Mixed	L02-16ET,L02-16ER,L02-32ET
	Input/Output	
	Input	L02-4AD
Analog I/O	Output	L02-4DA
modules	Mixed	L02-4AD2DA
	Input/Output	
Temperature and Weighing modules		L02-4RTD,L02-4TC,L02-4NTC,L02-2TC
Ethernet/IP modules		L02-EIP

4) Larger program capacity and data memory block

◆L02 series CPU module, the program capacity can reach 32k steps.

Built-in 8K registers (128 points for usual, 7872 points for power failure

retention), and 24k file registers (support power failure retention).

- 5) Support Mitsubishi programming software
 - ◆L02 series CPU module, the programming software is compatible with
- GX Developer8.86/GX Works2.

◆ Support online editing mode, allowing users to update the program without affecting the system operation while the system is running.

Supported programming languages: Ladder Diagram (LD) and Sequential Function Chart (SFC).

Note: Structured programming and tags are not supported.

6) Multifunctional communication interface

◆L02 series host PLC has two default programming ports, 1 Type-C programming port, the download speed is faster; 1 RS232, which the interface terminal is an 8-hole mouse head female socket.

Note: When using FX3U mode, the download program only supports RS232 download.

Provide 2 RS485, support Mitsubishi programming port protocol/modbus RTU protocol/free port protocol/Mitsubishi BD board protocol, easily realize PLC interconnection and communication with external equipment such as HMI and vfd inverters.

◆1 CAN, support CAN2.0A, CAN2.0B, modbus networking and free port protocol, can easily realize multi-channel interconnection.

◆1 high-speed Ethernet interface, supporting Mitsubishi programming port protocol, modbus TCP/UDP protocol, Ethernet/IP protocol.

7) Memory card storage interface

◆The memory card interface provides the following functions:

System backup: user programs, CPU parameters, I/O configuration settings, device settings

System response: user program, CPU parameters, I/O configuration settings, device settings

Parameter storage: device content value

Record storage: system error record, system status record

8) Installation and I/O module replacement method

The host PLC supports perpetual calendar timing function, using CR1620 battery, drawer type which can be installed by itself.

Easy to install. It can be installed on DIN rail (35mm width).

◆When the power is off, all L02 series modules support buckle installation and replacement modules.

Flexible use, more specifications and batches can be customized according to customer requirements.

1.2. Coolmay L02 System Architecture

L02 series PLC is Coolmay small and medium-sized programmable control system. In addition to the improvement of execution speed and storage capacity, it also provides a more flexible system expansion architecture in order to meet users' higher-end application requirements. Under such a system architecture, users will not have to split the system into multiple host systems for control due to excessive system points or excessive distance between devices. In this way, the integrity of the system can be preserved, and Allow users to be more efficient in the project development process.

Minimum architecture requirements for L02 series:

To build an L02 system, at least one host module and one power supply module must be included so that the system can be planned and operated.

Power Supply Module+L02 Host (L02-60P+L02M32T) ; The power module can also directly use an external DC24V switching power supply. Maximum architecture requirements for L02 series:

To build an L02 system, its maximum limit is the following three limit conditions. If any one of the limit conditions is exceeded, the host will send out an alarm message.

Limit 1: The number of expansion modules is up to 31. (Excluding power supply, host and remote module)

Limit 2:The maximum total number of digital points is 512 points. (Including built-in points of the host)

Limit 3:No more than 12 analog input/output module respectively. (That is 50 points, excluding the host Al/O points)

1.3. Host operation

The host is the core component of the entire L02 series. In addition to executing the user's logic program, it is also responsible for all I/O data receiving and sending, and data communication processing. The relationship between the L02 system established by the host and related modules and the actual external devices can be simply expressed as follows:



Above is a simple expression of the operation of the host, which simplifies the process of initialization, diagnosis, communication and other system aspects, and the process of external interruption, time interruption and other



program aspects. If you are interested in a deeper understanding, please

refer to the complete description.

The content of the manual, the complete host operation process is listed below for reference.

On power ⊥

System startup initialization:

- Non-power failure retention memory initialization
- User program inspection
- CPU module parameter check
- I/O table parameter check
- Comparison between CPU memory I/O table and actual device I/O
- Download I/O settings to I/O modules
- If you install a memory card, check whether the system copy option is set to perform system copy

Diagnostic treatment:

- Check Memory card and other settings
 - Check Module communication
 - Check System parameter

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I/O input data update:

- Update digital I/O module input data
- Update analog I/O module input data
- Update other module input data

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Program execution:

- Execute user program
- Execute interrupt program

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I/O output data update:

- Update digital I/O module output data
- Update analog I/O module output data
- Update other module output data

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Communication service:

- External communication processing of host communication port
- External communication processing of other I/O modules
- Internal communication processing between host and I/O module

1.4. L02 series host and modules description

Sort	Model	Description				
PSU Module	L02-60P	Input: 100-240VAC, 50/60Hz AC power input. Output (for L02 series internal use): 24VDC/1.5A, 36W Output (for external use): 24VDC/0.5A, 12W				
	L02M32T	CPU module, transistor (NPN) output, built-in Ethernet, RS-485*2, RS232, Type-C download port, Micro SD card interface, CAN communication port and 32-point IO (16DI+16DO), support up to 512-point I/O, program capacity 32k steps, using push-type terminals				
	L02M32R	CPU module, relay output, built-in Ethernet, RS-485*2, RS232, Type-C download port, Micro SD card interface, CAN communication port and 32-point IO (16DI+16DO), support up to 512-point I/O, program Capacity 32k steps, using push-type terminals				
L02 CPU Module	L02M24T	CPU module, transistor (NPN) output, built-in Ethernet, RS-485*2, RS232, Type-C download port, Micro SD card interface, CAN communication port; 24 points IO (12DI+12DO) and 8 points AI (4AD+ 4DA), support up to 512 points I/O, program capacity 32k steps, using push- type terminals				
	L02M24R	CPU module, relay output, built-in Ethernet, RS-485*2, RS232, Type-C download port, Micro SD card interface, CAN communication port; 24 points IO (12DI+12DO) and 8 points AI (4AD+4DA), support up to 512 points I/O, program capacity 32k steps, using push-type terminals				
	L02-8EX	DC24V, 6mA, 8 points input, push-type terminal				
Digital input Module L02-16EX		DC24V, 6mA, 16 points input, push-type terminal				
	L02-32EX	DC24V, 6mA, 32 points input, horn block terminal				
	L02-8EYT	30VDC, 2A/point; 2A/4point COM, 8 points transistor output, push-type terminal				
	L02-8EYR	Below AC220V / Below DC30V, 2A/point, 4A/4point COM, 8 points relay output, push-type terminal				
Digital output Module	L02-16EYT	30VDC, 2A/point; 2A/4point COM, 16 points transister output, push-type terminal				
	L02-16EYR	Below AC220V / Below DC30V, 2A/point, 4A/4poin COM, 16 points relay output, push-type terminal				
	L02-32EYT	30VDC, 2A/point; 2A/4point COM, 32 points transistor output, horn block terminal				
Digital input Output mixed	L02-16ET	DC24V, 6mA, 8 points input; 30VDC, 2A/point; 2A/4point COM, 8 points transistor output, push-type terminal				
Module	L02-16ER	DC24V, 6mA, 8 points input;				

Sort	Model	Description		
		Below AC220V / Below DC30V, 2A/point, 4A/4point COM, 8 points relay output, push-type terminal		
	L02-32ET	DC24V, 6mA, 16 points input; 30VDC, 2A/point; 2A/4point COM, 16 points transistor output, horn block terminal		
Analog input Module	L02-4AD	channel analog signal input 16-bit resolution 0~10V, 0~5V, 0~20mA, -20~20mA		
Analog output Module	L02-4DA	4-channel analog signal output 16-bit resolution 0~5V, 0~10V, 0~20mA		
Analog input Output mixed Module	L02- 4AD2DA	4-channel analog signal input 16-bit resolution 0~10V, 0~5V, 4~20mA, 0~20mA 2-channel analog signal output 16-bit resolution 0~5V, 0~10V, 0~20mA		
	L02-4RTD	4-channel 2-wire or 3-wire RTD temperature sensing Sensor type: Pt100/Pt1000 Resolution: 0.1°C/0.1°F (16 bit converter)		
Temperature Module	L02-4TC	4-channel thermocouple temperature sensing Sensor type: J, K, S, T, E Resolution: 0.1℃/0.1°F (16 bit converter)		
	L02-4NTC	4-channel thermistor temperature sensing Sensor type: NTC10K/50K/100K Resolution: 0.1℃/0.1°F (16 bit converter)		
Weighing/Loa d cell Module	L02-2LC	2-channel 4-wire load cell Characteristic values: 1, 2, 4, 6, 20, 40, 80 mV/V Accuracy error value: one ten thousandth (1/10000) ADC resolution: 24 bits		
Ethernet/IP Module	L02-EIP	Built-in two Ethernet interfaces, support switch function Support Ethernet/IP protocol, remotely expand I/O available.		

1.5. L02 series host and module power reference table

Product model	Voltage (V)	Current (mA)	Maximum power loss (W)
LO2M32R	DC24	250	4
LO2M32T	DC24	120	2
LO2M24R	DC24	230	4
LO2M24T	DC24	110	2
LO2-8EX	DC24	25	0.75
L02-16EX	DC24	28	1.5
L02-32EX	DC24	30	0.4
L02-16ET	DC24	60	0.95
L02-32ET	DC24	90	1.55

L02-16ER	DC24	95	1.6
LO2-8EYR	DC24	120	2.1
LO2-8EYT	DC24	45	0.75
LO2-16EYR	DC24	135	2.25
LO2-16EYT	DC24	65	1.08
LO2-32EYT	DC24	90	1.5
LO2-4AD	DC24	30	0.5
LO2-4DA	DC24	85	1.4
LO2-4AD2DA	DC24	110	1.95
L02-4RTD	DC24	30	0.5
L02-4TC	DC24	30	0.5
L02-4NTC	DC24	35	0.5
L02-2LC	DC24	65	1.08
LO2-EIP	DC24	150	2.1
L02-60P	AC220	40	7

1.6. Precautions for L02 series host programming

The PLC is compatible with GX Developer8.86Q/GX Works2 and the following version programming software. Use other versions of the software, there may be incompatibilities.

A prompt error occurred during PLC program download: the com port cannot be specified. GX Developer 8.86 software: online-change the com port in the transfer setting; GX Works2: all targets-change the com port in all connected targets. If there is a communication abnormality or cable abnormality, it can be eliminated by cutting off the power, checking the cable, checking whether the power supply is normal, or changing the computer.

Select in the GX Developer 8.86 version as shown in the figure:

Lo serres	OK
7XCBI	Cancel
С Туре	
FX3G	<u>•</u>
rogram type	Label setting
🖲 Ladder	C Do not use lab
C SFC T MELSAF-L	C lise label
CST	FF and structures)
- Device memory data which	is the same as program data's n
Device memory data which Setup project name Setup project name Drive/Path E:\MELSEC\GPPW	is the same as program data's n
Device memory data which Setup project name Setup project name Drive/Path E.\MELSEC\GPPW Project	is the same as program data's n Browse,

Select in the GX Works2 software version as shown in the figure: (Note:

the use of labels is prohibited)

	New Project		×
Project Type:			ОК
Simple Project		<u>.</u>	Cancel
	Use Label		Cancel
PLC Series:			
FXCPU		•	
PLC Type:			
FX3G/FX3GC	_	•	
Language:			
Ladder		-	



2. Device Number

2.1. Device number table

Name	Contents			
I/O relay	•			
Input relay	X000~X377	256 points	It is octal number	
Output relay	Y000~Y377	256 points	Total 512 I/O	
Auxiliary relay				
General	M0~M383	384 points		
EEPROM hold	M384~M1535	1152 points		
General	M1536~M7679	6144 points		
Special	M8000~M8511	512 points		
Status				
Initial state (EEPROM hold)	S0~S9	10 points		
EEPROM hold	S10~S999	990 points		
General	S1000~S4095	3096 points		
Timer (ON delay timer)				
100ms	T0~T199	200 points	0.1~3,276.7s	
10ms×1	T200~T245	46 points	0.01~327.67s	
1ms accumulative (EEPROM hold)	T246~T249	4 points	0.001~32.767s	
100ms accumulative (EEPROM hold)	T250~T255	6 points	0.1~3,276.7s	
1ms	T256~T319	64 points	0.001~32.767s	
Counter	-			
General up counter (16bit)	C0~C15	16 points	0~32,767 counter	
EEPROM hold up counter (16 bit)	C16~C199	184 points	$0 \sim 32,767$ counter	
General bi-direction (32 bit)	C200~C219	20 points	-2,147,483,648~ +2,147,483,647 counter	
EEPROM hold bi-direction (32 bit)	C220~C234	15 points	-2,147,483,648~ +2,147,483,647 counter	
High-speed counter				
Single-phase single counter input Bi-direction (32 bit) (EEPROM hold)	C235~C245	-2,147,483,648~+2,147,483,647 Counter Software counter Single phase: at most 6 channel, 60kHz Double phase: 1 times frequency:at most 2-		
Single-phase double counter input Bi-direction (32 bit) (EEPROM hold)	C246~C250			
Double –phase double counter input Bi-direction (32 bit)(EEPROM hold)	C251~C255	 channels, Max frequency 30KHz; M8198 is 4 times frequency sign of C251/C252. 4 times frequency:at most 2 channels, 24kHz,M8199 is 4 times frequency sign of C253/C255. 		

Name	Contents				
Data register(32 bit wh	en using in pair)				
General(16bit)	D0~D127	128 points			
EEPROM hold (16 bit)	D128~D7999	7872 points			
Special (16 bit)	D8000~D8511	512 points			
Index (16 bit)	V0~V7,Z0~ Z7	16 points			
Extended register exter	nded file register				
		23000points Su	pport power failure		
Extended register(16	R0~R22999	retention			
bit)	R23000~ R23999	1000points for system internal			
Pointer					
JUMP,CALL branch	P0~P1280	1281 points	CJ instruction, CALL instruction		
Input interrupt	I0==~I5==	6 points			
Timer interrupt	I600~I800	3 points			
Counter interrupt	I010~I060	6 points			
Nest					
Main control	N0~N7	8points	MC instruct		
Constant					
Desimal (V)	16 bit	-32,768~+32,7	67		
Decimai (K)	32 bit	-2,147,483,648	~+2,147,483,647		
II	16 bit	0000~FFFF			
Hexadecimal (H)	32 bit	00000000~FFI	FFFFF		
Real number(E)	32 bit	00000000∼FFFFFFF -1.0×2128~-1.0×2-126,0,1.0×2-126~ 1.0×2128 Can be in the form of a decimal point and index			

%1: The 10ms timer will be affected by the scan cycle. If the scan period

is 12ms, the timer becomes 12ms and is executed once.

3. Special relay and register

3.1. Special relay number and content

Num	Content	Remarks	Num	Content	Remarks
M8000	In RUN,Normally closed		M8224	C224 Increase/decrease counting action	
M8001	In RUN,Normally open		M8225	C225 Increase/decrease counting action	
M8002	After RUN, Output a scan cycle ON		M8226	C226 Increase/decrease counting action	
M8003	After RUN, Output a scan cycle OFF		M8227	C227 Increase/decrease counting action	
M8011	Oscillating in 10ms cycle		M8228	Handwheel function enablement	
M8012	Oscillating in 100ms cycle		M8229	C229 Increase/decrease counting action	ON:decrease action
M8013	Oscillating in 1s cycle		M8230	C230 Increase/decrease counting action	action
M8014	Oscillating in 1min cycle		M8231	C231 Increase/decrease counting action	
M8020	Zero flag		M8232	C232 Increase/decrease counting action	
M8021	Borrowing flag		M8233	C233 Increase/decrease counting action	
M8022	Carry flag		M8234	C234 Increase/decrease counting action	
M8024	Specify BMOV direction		M8235	C235 Increase/decrease counting action	
M8028	During instruction execution,allow interrupt		M8236	C236 Increase/decrease counting action	
M8029	Instruction execution end flag		M8237	C237 Increase/decrease counting action	
M8031	Non-retentive memory is cleared		M8238	C238 Increase/decrease counting action	
M8032	Retentive memory is cleared		M8239	C239 Increase/decrease counting action	ON:decrease
M8033	Memory retention stop		M8240	C240 Increase/decrease counting action	action OFF:increase
M8034	Prohibit all output		M8241	C241 Increase/decrease counting action	action
M8035	Forced RUN mode		M8242	C242 Increase/decrease counting action	
M8036	Force RUN command		M8243	C243 Increase/decrease counting action	
M8037	Force STOP command		M8244	C244 Increase/decrease counting action	
M8045	Prohibit reset of all outputs		M8245	C245 Increase/decrease counting action	
M8046	STL state action		M8246	C246 Increase/decrease counting	ON:decrease

Num	Content	Remarks	Num	Content	Remarks
				action	action
M8047	STL temporary control is effective		M8247	C247 Increase/decrease counting action	OFF:increase action
M8048	Signal alarm action		M8248	C248 Increase/decrease counting action	
M8049	Signal alarm is effective		M8249	C249 Increase/decrease counting action	
M8050	Input interrupt (I00 is prohibited)		M8250	C250 Increase/decrease counting action	
M8051	Input interrupt (I10 is prohibited)		M8251	C251 Increase/decrease counting action	
M8052	Input interrupt (I20 is prohibited)		M8252	C252 Increase/decrease counting action	
M8053	Input interrupt (I30 is prohibited)		M8253	C253 Increase/decrease counting action	
M8054	Input interrupt (I40 is prohibited)		M8254	C254 Increase/decrease counting action	
M8055	Input interrupt (I50 is prohibited)		M8255	C255 Increase/decrease counting action	
M8056	Timer interrupt (I6 is prohibited)		M8340	1st pulse operation temporary control	
M8057	Timer interrupt (I7 is prohibited)		M8341	Y000 clear signal output function is valid	
M8058	Timer interrupt (I8 is prohibited)		M8342	Y000 specify the origin return direction	
M8059	Counter interrupt is prohibited		M8343	Y000 forward limit	
M8060	I/O Constitute error		M8344	Y000 reverse limit	
M8061	PLC hardware error		M8345	Y000 near-point DOG signal logic inversion	
M8062	Serial communication error 0		M8346	Y000 zero signal logic inversion	
M8063	Serial communication error 1		M8347	Y000 interrupt signal logic inversion	
M8064	Parameter error		M8348	Y000 positioning command driver	
M8065	Grammatical error		M8349	1st pulse stop	
M8066	Loop error		M8350	2nd pulse operation temporary control	
M8067	Operation error		M8351	Y001 clear signal output function is valid	
M8068	Operation error latch		M8352	Y001 specify the origin return direction	
M8069	I/O bus detection		M8353	Y001 forward limit	
M8075	Sample tracking preparation start command		M8354	Y001 reverse limit	
M8076	Sample tracking execution start command		M8355	Y001 near-point DOG signal logic inversion	
M8077	Sampling and tracking execution temporary control		M8356	Y001 zero signal logic inversion	
M8078	Sample tracking execution end		M8357	Y001 interrupt signal logic	



Num	Content	Remarks	Num	Content	Remarks
	temporary control			inversion	
M8079	Sampling tracking system area		M8358	Y001 positioning command driver	
M8120	Can't use		M8359	2nd pulse stop	
M8121	RS/RS2 command sends standby		M8360	3rd pulse operation temporary control	
M8122	RS/RS2 command to send request		M8361	Y002 clear signal output function is valid	
M8123	RS/RS2 command reception end	Serial Port	M8362	Y002 specify the origin return direction	
M8124	RS/RS2 command data in reception	2 refer to	M8363	Y002 forward limit	
M8125	MODBUS and Mitsubishi function enablement	chapter 8.2	M8364	Y002 reverse limit	
M8128	RD3A/WR3A Receive correct		M8365	Y002 near-point DOG signal logic inversion	
M8129	RD3A/WR3A communication timeout		M8366	Y002 zero signal logic inversion	
M8151	5th pulse operation temporary control		M8367	Y002 interrupt signal logic inversion	
M8152	6th pulse operation temporary control		M8368	Y002 positioning command driver	
M8153	7th pulse operation temporary control		M8369	3rd pulse stop	
M8154	8th pulse operation temporary control		M8370	4th pulse operation temporary control	
M8160	XCH's SWAP function		M8371	Y003 clear signal output function is valid	
M8161	8-bit processing mode		M8372	Y003 specify the origin return direction	
M8170	Input X000 pulse capture		M8373	Y003 forward limit	
M8171	Input X001 pulse capture		M8374	Y003 forward limit	
M8172	Input X002 pulse capture		M8375	Y003 near-point DOG signal logic inversion	
M8173	Input X003 pulse capture		M8376	Y003 zero signal logic inversion	
M8174	Input X004 pulse capture		M8377	Y003 interrupt signal logic inversion	
M8175	Input X005 pulse capture		M8378	Y003 positioning command driver	
M8176	Input X006 pulse capture		M8379	4th pulse stop	
M8177	Input X007 pulse capture		M8396	C254 function corresponds to input phase	
M8192	Programming port protocol and other protocol enablement	Serial port3	M8401	RS2 command sends standby	
M8196	Programming port protocol and other protocol enablement	Serial port2	M8402	RS2 command to send request	
M8198	4 times frequency of C251/C252		M8403	RS2 command reception end	
M8199	4 times frequency of C253/C255		M8404	RS2 command data in reception	Refer to chapter 6.1

Coolmay L02 Series PLC Programming Manual

Num	Content	Remarks	Num	Content	Remarks
M8200	C200 Increase/decrease counting action		M8405	RS2 command data setting ready	
M8201	C201 Increase/decrease		M8408	RD3A/WR3A Receive Completed	
M8202	C202 Increase/decrease counting action	-	M8409	RD3A/WR3A communication timeout	
M8203	C203 Increase/decrease counting action		M8421	RS2 command sends standby	Serial port 3 Refer to chapter
M8204	C204 Increase/decrease counting action		M8422	RS2 command to send request	8.5
M8205	C205 Increase/decrease counting action		M8423	RS2 command reception end	
M8206	C206 Increase/decrease counting action		M8424	RS2 command data in reception	-
M8207	C207 Increase/decrease counting action		M8425	RS2 command data send completed	
M8208	C208 Increase/decrease counting action		M8426	RS command master-slave and multi-machine mode	
M8209	C209 Increase/decrease counting action		M8427	CAN data standard frame and extended frame	
M8210	C210 Increase/decrease counting action		M8428	CAN communication MODBUS response correct	CAN
M8211	C211 Increase/decrease counting action	ON:decrea se action	M8429	Communication timeout	communication Refer to chapter
M8212	C212 Increase/decrease counting action	OFF:incre ase action	M8432	Interpolation mode	8.5
M8213	C213 Increase/decrease counting action		M8433	Interpolation mode	
M8214	C214 Increase/decrease counting action		M8434	Interpolation relative/absolute coordinate	
M8215	C215 Increase/decrease counting action		M8435	Interpolation counterclockwise	
M8216	C216 Increase/decrease counting action		M8450	5th pulse stop	
M8217	C217 Increase/decrease counting action		M8451	6th pulse stop	
M8218	C218 Increase/decrease counting action		M8452	7th pulse stop	
M8219	C219 Increase/decrease counting action		M8453	8th pulse stop	
M8220	C220 Increase/decrease counting action				
M8221	C221 Increase/decrease counting action				
M8222	C222 Increase/decrease counting action	1			
M8223	C223 Increase/decrease counting action				



3.2. Special register number and content

Num	Content	Remarks	Num	Content	Remarks
D8000	Watchdog timer		D8186	Z3 Register contents	
D8001	PLC type and system version	Main version number	D8187	V3 Register contents	
D8002	PLC memory capacity	22K steps; 44K steps; 88K steps; When 16K steps and above, D8002=8,D8102 is corresponded to 16,32,64	D8188	Z4 Register contents	
D8003	Memory type	10H:Programmabl e controller built- in memory	D8189	V4 Register contents	
D8010	Scan current value		D8190	Z5 Register contents	
D8011	Scan time minimum		D8191	V5 Register contents	
D8012	Scan time maximum		D8192	Z6 Register contents	
D8013	Second		D8193	V6 Register contents	
D8014	Minute		D8194	Z7 Register contents	
D8015	Hour		D8195	V7 Register contents	
D8016	Date		D8268	Customize the frequency of	
D8017	Month		D8269	PWM0~3	Value range:840~
D8018	Year		D8278	Customize the frequency of	16800000
D8019	Week		D8279	PWM4~7	
D8020	Input filter adjustment		D8340	1st nosition nulse amount	Low
D8030	AD0 analog input value		D8341		High
D8031	AD1 analog input value		D8342	Y0 deviation speed Initial value:0	
D8032	AD2 analog input value		D8343	1st pulse maximum speed	Low
D8033	AD3 analog input value		D8344	ist puise maximum speed	High
D8050	DA0 analog output value		D8345	Y0 crawling speed Initial value: 1000	
D8051	DA1 analog output value		D8346	Y0 Origin return speed	Low
D8052	DA2 analog output value		D8347	Initial value:50000	High
D8053	DA3 analog output value		D8348	1st pulse acceleration time	
D8054	Module digital input bytes		D8349	1st pulse deceleration time	
D8055	Module analog input words		D8350	and position pulse amount	Low
D8056	Module digital output bytes		D8351	2nd position pulse amount	High
D8057	Module analog output words		D8352	Y1 deviation speed Initial value:0	
D8058	When DA is current, Bit setting	Refer to chapter 5.2	D8353	2nd pulse maximum speed	Low
D8059	Constant scan time		D8354	Y1 crawling speed	High
D8074	X0 Rising edge ring counter	Low	D8355	Initial value: 1000	
D8075	value [1/6µs unit]	High	D8356	Y1 Origin return speed	Low



Coolmay L02 Series PLC Programming Manual

Num	Content	Remarks	Num	Content	Remarks
				Initial value:50000	
D8076	X0 falling edge ring counter value	Low	D8357		High
D8077	[1/6µs unit]	High	D8358	2nd pulse acceleration time	
D8078	X0 pulse width / pulse period	Low	D8359	2nd pulse deceleration time	
D8079	[10µs unit]	High	D8360	3rd position pulse amount	Low
D8080	X1 Rising edge ring counter	Low	D8361		High
D8081	[1/6µs unit]	High	D8362	Y2 deviation speed Initial value:0	
D8082	X1 falling edge ring counter	Low	D8363	3rd pulse maximum speed	Low
D8083	value [1/6µs unit]	High	D8364	Y2 crawling speed	High
D8084	X1 pulse width / pulse period	Low	D8365	initial value. 1000	
D8085	[10µs unit]	High	D8366	V2 Origin raturn speed	Low
D8086	X3 Rising edge ring counter value	Low	D8367	Initial value:50000	High
D8087	[1/6µs unit]	High	D8368	3rd pulse acceleration time	
D8088	X3 falling edge ring counter	Low	D8369	3rd pulse deceleration time	
D8089	value [1/6µs unit]	High	D8370	4th position pulse amount	Low
D8090	X3 pulse width / pulse period	Low	D8371		High
D8091	[10µs unit]	High	D8372	Y3 deviation speed Initial value:0	
D8092	X4 Rising edge ring counter	Low	D8373	441	Low
D8093	[1/6µs unit]	High	D8374	4th pulse maximum speed	High
D8094	X4 falling edge ring counter value	Low	D8375	Y3 crawling speed Initial value:1000	
D8095	[1/6µs unit]	High	D8376	Y3 Origin return speed	Low
D8096	X4 pulse width / pulse period	Low	D8377	Initial value:50000	High
D8097	[10µs unit]	High	D8378	4th pulse acceleration time	
D8101	PLC type and system version		D8379	4th pulse deceleration time	
D8102	PLC memory capacity	1616K Steps	D8395	ADPRW command serial port	refer to chapter 8.6
D8108	modules		D8397	function	refer to chapter 8.2
D8109	Y number where the output refresh error occurred		D8398	0~2147483647(1ms) Ring	
D8120	Modbus RTU protocol Communication parameters		D8399	count for incremental actions	
D8121	Master/Slave station number		D8400	Modbus RTU protocol Communication parameters	Serial Port 3, refer to chapter 8.3
D8122	RS command to receive points		D8401	Communication mode	-
D8123	monitoring RS command to	Serial Port 2, refer	D8406		
00125	send data remaining points	to chapter 8.2	20100	overtime timeNumber of	
D8124	RS header <initial stx="" value:=""></initial>	-	D8409	interval period	
D8125	RS trailer <initial value:<br="">ETX></initial>		D8410	RS2 header 1, 2 <initial value:<br="">STX></initial>	
D8126	Serial port 2 interval period		D8411	RS2 header 3, 4	



Coolmay L02 Series PLC Programming Manual

Num	Content	Remarks	Num	Content	Remarks
	number		D8412	RS2 trailer 1, 2 <initial value:<br="">ETX></initial>	
D8127	Specify the number of data requested by the lower computer communication		D8413	RS2 trailer 3, 4	
D8128	Specify the starting number of the communication request of the lower computer	Serial Port 2, refer to chapter 8.2	D8414	Master / slave station number	
D8129	Set timeout		D8415	RS2 receives the summation calculation result	
D8140		Low	D8416	RS2 sends summation	
D8141	5th position pulse amount	High	D8420	Communication parameters	CAN communication Refer to chapter 8.6
D8142	(the position mules are sunt	Low	D8421	Communication mode	
D8143	our position pulse amount	High	D8426	Number of interval period	
D8144		Low	D8429	overtime time	
D8145	7th position pulse amount	High	D8430	RS2 header 1, 2 <initial value:<br="">STX></initial>	
D8146		Low	D8431	RS2 header 3, 4	
D8147	5th -8th pulse max speed	High	D8432	RS2 trailer 1, 2 <initial value:<br="">ETX></initial>	
D8148	5th-8th pulse acceleration and deceleration time		D8433	RS2 trailer 3, 4	
D8160	Oth position pulse amount	Low	D8434	RS2 receives the summation receive data	
D8161	sui position puise amount	High	D8435	RS2 receives the summation calculation result	
D8169	Restrict access status		D8436	RS2 sends summation	
D8182	Z1 Register contents				
D8183	V1 Register contents				
D8184	Z2 Register contents				
D8185	V2 Register contents				

Specific functions please refer to "Coolmay PLC Instructions Programming

Manual V20.81"



4. Function Instructions

4.1. List of basic logic instructions

Mnemonic	Name	Features	Available devices
LD	Take	Normally open contact logic operation starts	X,Y,M,S,D□.b,T,C
LDI	Negate	Normally closed contact logic operation starts	X,Y,M,S,D□.b,T,C
LDP	Take the rising edge of the pulse	Start of operation to detect rising edge	X,Y,M,S,D□.b,T,C
LDF	Take the falling edge of the pulse	Start of operation to detect falling edge	X,Y,M,S,D□.b,T,C
AND	Versus	Series of normally open contacts	X,Y,M,S,D□.b,T,C
ANI	With reverse	Series of normally closed contacts	X,Y,M,S,D□.b,T,C
ANDP	With pulse rising edge	Detect rising edge series connection	X,Y,M,S,D□.b,T,C
OR	Or pulse rising edge	Normally open contacts in parallel	X,Y,M,S,D□.b,T,C
ORI	Or reverse	Normally closed contacts in parallel	X,Y,M,S,D□.b,T,C
ORP	Or pulse rising edge	Parallel connection detecting rising edge	X,Y,M,S,D□.b,T,C
ORF	Or pulse falling edge	Parallel connection to detect falling edge	X,Y,M,S,D□.b,T,C
ANB	Block with	Series connection of circuit blocks	-
ORB	Block or	Parallel connection of circuit blocks	-
MPS	Push stack	Push onto the stack	-
MRD	Read stack	Read stack	-
MPP	Unstack	Pop the stack	-
INV	Negate	Inversion of operation result	-
MEP	M.E.P	Conduction on rising edge	-
MEF	MEF	Conduction on falling edge	-
OUT	Output	Coil drive	Y,M,S,D□.b,T,C
SET	Position	Movement retention	Y,M,S,D□.b
RST	Reset	Clear action keeps, register cleared	Y,M,S,D□.b,T,C, D,R,V,Z
PLS	Pulse	Differential output on rising edge	Y,M
PLF	Falling edge pulse	Differential output on falling edge	Y,M
МС	Master	Connection circle command for common series point	Y,M
MCR	Master reset	Instruction to eliminate common series point	-
NOP	No operation	No action	-
END	End	End of the program and I/O and return to the beginning	-

4.2. Applied instructions **[**Sequence is according to instruct

variety

(Contrast with MITSUBISHI)

Applied instruction can be divided into the following 18 kinds.

1	Data move instructions
2	Data conversion instructions
3	Comparison instructions
4	Arithmetic operation instructions
5	Logical operation instructions
6	Special function instructions
7	Rotate instructions
8	Data operation instructions
9	Data operation instructions
10	Character string operation instructions
11	Program flow control instructions
12	I/O refresh instructions
13	Real time clock control instructions
14	Pulse output/positioning control instructions
15	Serial communication
16	Special block/unit control instructions
17	Extension register/extension file register control instructions
18	Other handy instruct

1. Data move instructions

Mnemonic	FNC No.	Function	Support
MOV	12	Move	*
SMOV	13	Shift Move	*
CML	14	Compliment	*
BMOV	15	Block Move	*
FMOV	16	Fill Move	*
PRUN	81	Parallel Run (Octal Mode)	*
ХСН	17	Exchange	*
SWAP	147	Byte Swap	*
EMOV	112	Floating Point Move	*
HCMOV	189	High Speed Counter Move	*

2. Data conversion instructions

Mnemonic	FNC No.	Function	Support
BCD	18	Conversion to Binary Coded Decimal	*
BIN	19	Conversion to Binary	*
GRY	170	Decimal to Gray Code Conversion	*
Coolmay L02 Series PLC Programming Manual

GBIN	171	Gray Code to Decimal Conversion	*
FLT	49	Conversion to Floating Point	*
INT	129	Floating Point to Integer Conversion	*
EBCD	118	Floating Point to Scientific Notation Conversion	*
EBIN	119	Scientific Notation to Floating Point Conversion	*
RAD	136	Floating Point Degree to Radian Conversion	*
DEG	137	Floating Point Radian to degree Conversion	*

3. Comparison instructions

Mnemonic	FNC No.	Function	Support
LD=	224	Contact compare LD (S1)=(S2)	*
LD>	225	Contact compare LD (S1)>(S2)	*
LD<	226	Contact compare LD (S1)<(S2)	*
LD<>	228	Contact compare LD $(S1)\neq(S2)$	*
LD<=	229	Contact compare LD $(S1) \leq (S2)$	*
LD>=	230	Contact compare LD $(S1) \ge (S2)$	*
AND=	232	Contact compare AND (S1)=(S2)	*
AND>	233	Contact compare AND (S1)>(S2)	*
AND<	234	Contact compare AND (S1)<(S2)	*
AND<>	236	Contact compare AND $(S1)\neq(S2)$	*
AND<=	237	Contact compare AND $(S1) \leq (S2)$	*
AND>=	238	Contact compare AND $(S1) \ge (S2)$	*
OR=	240	Contact compare OR (S1)=(S2)	*
OR>	241	Contact compare OR (S1)>(S2)	*
OR<	242	Contact compare OR (S1)<(S2)	*
OR<>	244	Contact compare OR $(S1)\neq(S2)$	*
OR<=	245	Contact compare OR $(S1) \leq (S2)$	*
OR>=	246	Contact compare OR $(S1) \ge (S2)$	*
СМР	10	Compare	*
ZCP	11	Zone Compare	*
ECMP	110	Floating Point Compare	*
EZCP	111	Floating Point Zone Compare	*
HSCS	53	High speed counter set	*
HSCR	54	High speed counter reset	*
HSZ	55	High Speed Counter Zone Compare	*
HSCT	280	High speed counter table compare	*
BKCMP=	194	Block compare (S1)=(S2)	*
BKCMP>	195	Block compare (S1)>(S2)	*
BKCMP<	196	Block compare (S1)<(S2)	*
BKCMP<>	197	Block compare (S1)≠(S2)	*
BKCMP<=	198	Block compare $(S1) \leq (S2)$	*
BKCMP>=	199	Block compare $(S1) \ge (S2)$	*

Mnemonic	FNC No.	Function	Support
ADD	20	Addition	*
SUB	21	Subtraction	*
MUL	22	Multiplication	*
DIV	23	Division	*
EADD	120	Floating Point Addition	*
ESUB	121	Floating Point Subtraction	*
EMUL	122	Floating Point Multiplication	*
EDIV	123	Floating Point Division	*
BK+	192	Block Data Addition	*
BK-	193	Block Data Subtraction	*
INC	24	Increase	*
DEC	25	Decrement	*

4. Arithmetic operation instructions

5. Logical operation instructions

Mnemonic	FNC No.	Function	Support
WAND	26	Word AND	*
WOR	27	Word OR	*
WXOR	28	Word Exclusive OR	*

Mnemonic	FNC No.	Function	Support
SQR	48	Square Root	*
ESQR	127	Floating Point Square Root	*
EXP	124	Floating Point Exponent	*
LOGE	125	Floating Point Natural Logarithm	*
LOG10	126	Floating Point Common Logarithm	*
SIN	130	Floating Point Sine	*
COS	131	Floating Point Cosine	*
TAN	132	Floating Point Tangent	*
ASIN	133	Floating Point Arc Sine	*
ACOS	134	Floating Point Arc Cosine	*
ATAN	135	Floating Point Arc Tangent	*
RND	184	Random Number Generation	*

6. Special function instructions

7. Rotate instructions

Mnemonic	FNC No.	Function	Support
ROR	30	Rotation Right	*
ROL	31	Rotation Left	*
RCR	32	Rotation right With Carry	*
RCL	33	Rotation Left with Carry	*

8. Shift instructions

Mnemonic	FNC No.	Function	Support
SFTR	34	Bit Shift Right	*
SFTL	35	Bit Shift Left	*
SFR	213	Bit Shift Right with Carry	*
SFL	214	Bit Shift Left with Carry	*
WSFR	36	Word Shift Right	*
WSFL	37	Word Shift left	*
SFWR	38	Shift Write [FIFO/FILO Control]	*
SFRD	39	Shift Read [FIFO Control]	*
POP	212	Shift Last Data Read [FILO Control]	*

9. Data operation instructions

Mnemonic	FNC No.	Function	Support
ZRST	40	Zone Reset	*
DECO	41	Decode	*
ENCO	42	Encode	*
MEAN	45	Mean	*
WSUM	140	Sum of Word Data	*
SUM	43	Sum of Active Bits	*
BON	44	Check Specified Bit Status	*
NEG	29	Negation	*
ENEG	128	Floating Point Negation	*
WTOB	141	WORD to BYTE	*
BTOW	142	BYTE to WORD	*
UNI	143	4-bit Linking of Word Data	*
DIS	144	4-bit Grouping of Word Data	*
CCD	84	Check Code	*
CRC	188	Cyclic Redundancy Check	*
LIMIT	256	Limit Control	*
BAND	257	Dead Band Control	*
ZONE	258	Zone control	*
SCL	259	Scaling (Coordinate by Point Data)	*
SCL2	269	Scaling 2 (Coordinate by X/Y Data)	*
SORT	69	Sort Tabulated Data	*
SORT2	149	Sort Tabulated Data 2	*
SER	61	Search a Data Stack	*
FDEL	210	Deleting Data from Tables	*
FINS	211	Inserting Data to Tables	*

10. String processing instruction

Mnemonic	FNC No.	Function	Support
ESTR	116	Floating Point to Character String Conversion	*
EVAL	117	Character String to Floating Point Conversion	*

Coolmay L02 Series PLC Programming Manual

STR	200	BIN to Character String Conversion	*
VAL	201	Character String to BIN Conversion	*
DABIN	260	Decimal ASCII to BIN Conversion	*
BINDA	261	BIN to Decimal ASCII Conversion	*
ASCI	82	Hexadecimal to ASCII Conversion	*
HEX	83	ASCII to Hexadecimal Conversion	*
\$MOV	209	Character String Transfer	*
\$+	202	Link Character Strings	*
LEN	203	Character String Length Detection	*
RIGH	204	Extracting Character String Data From the Right	*
LEFT	205	Extracting Character String Data from the Left	*
MIDR	206	Random Selection of Character Strings	*
MIDW	207	Random Replacement of Character Strings	*
INSTR	208	Character string search	*
COMRD	182	Read Device Comment Data	*

11. Program flow control instructions

Mnemonic	FNC No.	Function	Support
CJ	00	Conditional Jump	*
CALL	01	Call Subroutine	*
SRET	02	Subroutine Return	*
IRET	03	Interrupt Return	*
EI	04	Enable Interrupt	*
DI	05	Disable Interrupt	*
FEND	06	Main Routine Program End	*
FOR	08	Start a FOR/NEXT Loop	*
NEXT	09	End a FOR/NEXT Loop	*

12. I/O refresh instructions

Mnemonic	FNC No.	Function	Support
REF	50	Refresh	*
REFF	51	Refresh and Filter Adjust	*

13. Real time clock control instructions

Mnemonic	FNC No.	Function	Support
ТСМР	160	RTC Data Compare	*
TZCP	161	RTC Data Zone Compare	*
TADD	162	RTC Data Addition	*
TSUB	163	RTC Data Subtraction	*
TRD	166	Read RTC data	*
TWR	167	Set RTC data	*
HTOS	164	Hour to Second Conversion	*
STOH	165	Second to Hour Conversion	*

Mnemonic	FNC No.	Function	Support
ABS	155	Absolute Current Value Read	*
DSZR	150	DOG Search Zero Return	*
ZRN	156	Zero Return	*
TBL	152	Batch Data Positioning Mode	*
DVIT	151	Interrupt Positioning	*
DRVI	158	Drive to Increment	*
DRVA	159	Drive to Absolute	*
PLSV	157	Variable Speed Pulse Output	*
PLSY	57	Pulse Y Output	*
PLSR	59	Acceleration/Deceleration Setup	*

14. Pulse output/positioning control instruction

15. Serial communication instructions

Mnemonic	FNC No.	Function	Support
RS	80	Serial Communication	*
R(S2)	87	Serial Communication 2	*
IVCK	270	Inverter Status Check	
IVDR	271	Inverter Drive	
IVRD	272	Inverter Parameter Read	
IVWR	273	Inverter Parameter Write	
IVBWR	274	Inverter Parameter Block Write	
IVMC	275	Inverter multiple command	
ADPRW	276	MODBUS read and write	*

16. Special block/unit control instructions

Mnemonic	FNC No.	Function	Support
FROM	78	Read From a Special Function Block	*
ТО	79	Write To a Special Function Block	*
RD3A	176	Read form Dedicated Analog Block	*
WR3A	177	Write to Dedicated Analog Block	*
RBFM	278	Divided BFM Read	
WBFM	279	Divided BFM Write	

17. Extension register/extension file register control instructions

Mnemonic	FNC No.	Function	Support
LOADR	290	Load From ER	
SAVER	291	Save to ER	
RWER	294	Rewrite to ER	
INITR	292	Initialize R and ER	
INITER	295	Initialize ER	
LOGR	293	Logging R and ER	

Mnemonic	FNC No.	Function	Support
WDT	07	Watchdog Timer Refresh	*
ALT	66	Alternate State	*
ANS	46	Timed Annunciator Set	*
ANR	47	Annunciator Reset	*
HOUR	169	Hour Meter	*
RAMP	67	Ramp Variable Value	*
SPD	56	Speed Detection	*
PWM	58	Pulse Width Modulation	*
DUTY	186	Timing Pulse Generation	*
PID	88	PID Control Loop	*
ZPUSH	102	Batch Store of Index Register	*
ZPOP	103	Batch POP of Index Register	*
TTMR	64	Teaching timer	*
STMR	65	Special timer	*
ABSD	62	Absolute Drum Sequencer 🔶 🛨	
INCD	63	Incremental Drum Sequencer 🔶 🖈	
ROTC	68	Rotary Table Control	
IST	60	Initial state 🗶 🖈	
MTR	52	Input Matrix	*
TKY	70	Ten Key Input	*
HKY	71	Hexadecimal Input	*
DSW	72	Digital switch (thumbwheel input)	*
SEGD	73	Seven Segment Decoder 🛛 🖈	
SEGL	74	Seven Segment With Latch	
ARWS	75	Arrow Switch	*
ASC	76	ASCII code data input 🔶	
PR	77	Print (ASCII Code)	
VRRD	85	Volume Read 🔶	
VRSC	86	Volume Scale	*

18. Other handy instructions



5. Application of analog

When using, Please notice the difference between Host L02M24 and Expansion analog module.

5.1. Analog input

L02 series PLC input accuracy is 12bit, and expansion analog module input accuracy is 16bit. When using, you can directly read the register value corresponding to each analog.

5.1.1. L02M24 Host analog input type

L02M24T/L02M24R has default 4 analog input and 4 analog output; Analog input type:2*0-10V, 2*0-20mA(4-20mA).

Input signal	Range	Register value	Resolution	Accuracy (Total Measuring range)
Voltage	0-10V	$0{\sim}4000$	2.5mV	1%
Current Type1	0~20mA	$0{\sim}4000$	5uA	1%
Current Type2	4~20mA	0~4000	4uA	1%

The type of host analog input needs to be set, refer to following table:

Register no	Read value	Туре
R23940~R23943	0	0~10V(or 0~20mA)
R23940~R23943	1	4~20mA

5.1.2. L02M24 Host analog input read

L02M24T/L02M24R has default 4 analog input and 4 analog output;Analog input type:2*0-10V, 2*0-20mA(4-20mA).

Support FROM instruction or register directly read. Such as: FROM K0 K0

D400 K2 read out 16 analog input, 0-10V.

Registers read values are shown in the following table:

No	AD Register
AD0 (Voltage 1)	D8030
AD1 (Voltage 2)	D8031

AD2 (Current 1)	D8032
AD3 (Current 2)	D8033

When 4-20mA type, Registers read less than 3.8mA, the value is 32760,

that is break value.

R23960 starts with a zero correction value and default is 0 (Namely, size correction).

R23980 starts with a negative temperature magnification, and the default is 10000.

The 4 registers starting from R23620 are 0~10V or 0~20mA corresponding values, that is, real-time sampled values.

Input signal	Range	Register value	Resolution	Accuracy (Total Measuring range)	Remark
K-type thermocouple	-230∼ 1370℃	-2300~13700	0.1 °C	1%	
T-type thermocouple	-230∼400°C	-2300~4000	0.1°C	1%	Thermocouple
S-type thermocouple	-40∼1690°C	-400~16900	0.1 °C	1%	type requires non-grounded
J-type thermocouple	-90∼950℃	-900~9500	0.1°C	1%	wiring
E-type thermocouple	-110∼730℃	-1100~7300	0.1 °C	1%	
PT100/PT1000	-200∼498°C	-2000~4984	0.1 °C	1%	
NTC10K (B value:3435)	-48∼110℃	-480~1100	0.1 °C	1%	
Voltage	0-10V/0-5V	0~32000	0.3mV/0.15mV	1%	
Current Type1	0~20mA	0~32000	0.6uA	1%	
Current Type2	4~20mA	0~32000	0.5uA	1%	

5.1.3. Expansion analog module input type

5.1.4. Expansion analog module input read

If the host analog does not meet your project requirements, you can also directly connect the analog expansion module (maximum 12 units can be



expanded), such as L02-4AD/L02-4AD2DA, etc.

Among them, D8055 is the number of analog input words; the address is directly assigned, and the read value of the register expanded is shown in the following table:

NO	Register Value
AD0	R23700
AD1	R23701
AD2	R23702
AD3	R23703
AD48	R23748
AD49	R23749

The type of analog input needs to be set, refer to following table:

Register NO.	Read value	Туре	Mark
R23500~R23549	0	0~10V(or 0~20mA); NTC (3435); K type thermocouple; PT100\PT1000	PT cannot be switched; others can be switched to the same type of analog.
R23500~R23549	1	4~20mA;	
R23500~R23549	3	10K NTC (3950)	
R23500~R23549	5	E-type thermocouple	
R23500~R23549	7	T-type thermocouple	Little difference on thermocouple type, it can still be
R23500~R23549	9	S-type thermocouple	modified to other thermocouple types after reading the value
R23500~R23549	11	J-type thermocouple	setting

Remarks: The environmental temperature measuring probe of the temperature analog module is designed on the terminal block of the module, and the value of the corresponding register is the temperature value, which can be directly read and used. If there is a small deviation between the value of the corresponding register and the actual temperature, you can transfer the value of the corresponding register in the program, and then add or subtract to make it close to the actual temperature. If the value of the corresponding

register deviates greatly from the actual temperature, you need to send the module back to the manufacturer for recalibration.

5.1.5. Host Analog input sampling

Filtering cycles=(R23600~R23603)* PLC scanning time, if R23600=1,

sample one time each scan circle and change the 1st analog value for one

time. The larger R23600~R23603 value is, the result is more stable.

R23600~R23603 is filtering cycles, default is 100 (Range 2~20000);

D8073 is smoothing filter coefficients of all analog input, range: 0~999

5.1.6. Analog input program example

5.1.6.1 Host analog input example

Below is an example of the L02 host 1 channel temperature analog AD0 acquisition. The program reads the values as follows:



Connect the signal end of the voltage sensor to the AD0 input end of the PLC, and connect the other end to the GND of the analog input port. When the PLC is running, the value of the data register D8030 corresponding to AD0 will be transferred to D0, the value of D0 will be put into D10 after the division operation, the result D10 is the actual voltage input value. In the ladder diagram, you can also directly divide the value of D8030.

Note: When the input is 0-10V analog, the actual analog value = register reading / 400;

When the input is 0-20mA analog, the actual analog value = register



reading / 200;

When the input is 4-20 mA analog, the actual analog value = register reading / 250 + 4.

5.1.6.2 Module analog input example

The following example is an example of the first channel temperature analog quantity extended AD0 acquisition of L02, the program read value is as follows:



Connect the signal wire of the temperature sensor to the input terminal of the analog module. When the PLC is running, the value of the data register R23700 corresponding to AD0 will be transferred to D100, the value of D100 will be put into D102 after floating-point calculation, and then floating-point division will be performed on D102, the result of the operation will be put into D20, the result D20 is the actual temperature value. In the ladder diagram, you can also directly divide the value of R23700.

Note:

When the input is 0-10V analog, the actual analog value = register reading / 3200;

When the input is temperature, the actual temperature value = register reading/10;

When the input is 0-20mA analog, the actual analog value = register reading / 1600;

When the input is 4-20 mA analog, the actual analog value = register



reading / 2000 + 4.

5.2. Analog output

5.2.1. L02M24 Host analog output setting

L02M24T/L02M24R has default 4analog input and 4analog output;Analog output type:2*0-10V, 2*0-20mA(4-20mA), analog output setting range is 0-4000, accuracy is 12bit.

Support TO instruction or register assignment operation directly.

Adopts TO K0 K0 D500 K4, 4 channels 0~10V or 0~20mA analog output.

Register assignment operation directly: D8050~D8053.

When the analog output is current, the bit of D8058 needs to be set: when default D8058.0~D8058.7=0, it means 0~20mA; when D8058.0~D8058.7=1, it means 4~20mA.

NO	DA register	Range	Output type
DA0 (Votalge 1)	D8050	0-4000	When D8058 0~D8058 7=0
DA1 (Votalge 2)	D8051	0-4000	Indicates 0~20mA;
DA2 (Current 1)	D8052	0-4000	When D8058.0~D8058.7=1
DA3 (Current 2)	D8053	0-4000	Indicates 4~20mA.

5.2.2. Expand analog module output setting

If the host analog does not meet your project requirements, you can also directly connect the analog expansion module (maximum 12 units can be expanded), such as L02-4DA/L02-4AD2DA, etc,Optional type can be 0-10V,0-20mA (4-20mA). Analog output setting range is 0-32000, accuracy is 16bit.

Register assignment operation directly: R23750~R23799.

Among them, D8057 is the number of analog input words; the address is directly assigned, and the read value of the register expanded is shown in the following table:



NO	DA register	Range	Output type
DA0	R23750	0-32000	
DA1	R23751	0-32000	
			When R23550~R23599=1 Indicates 4~20mA
DA48	R23798	0-32000	
DA49	R23799	0-32000	

5.2.3. Host analog output program example

As below, it shows the host 0-10V voltage analog output.



At this point, use a multimeter to check the voltage of the DA0 terminal, that is, the multimeter's red pen is connected to the DA0 terminal, and the black pen is connected to the GND terminal. The multimeter is displaying 5V voltage value.

5.3. PID Instruction

5.3.1. Outline

This command is used to perform PID control that changes the output value according to the amount of change in the input.

5.3.2. PID instruction format and parameter description

Instruction format:



Parameter Description:

Operand	Content	Data Type	Word software
Туре	Content		component



S1.	Save data register number of the target value (SV)	BIN16 bit	D,R
S2.	Save data register number of the measured value (PV)	BIN16 bit	D,R
S3.	Save the data register number of the parameter	BIN16 bit	D,R
D.	Save data register number of the output register (MV)	BIN16 bit	D,R

5.3.3. Function and action description

16-bit operation (PID): After setting the target value S1., the measured value S2., and the parameters S3~S3+6 in the execution program, the operation result (MV) is saved to the output value D. every sampling time S3.



Setting item

Setti	ng item	Content	Occupied points
S1.	Target value(SV)	Set target value (SV) PID instruction does not change the setting contents	1 point
S2.	Measured value(PV)	The input value of the PID operation	1 point
S3.	Parameter	 Auto-tuning: step response method a) ACT setting: when bit1,bit2,bit5 are all not "0",occupy 25points Soft Component starting from the Initial Soft Component specified in S3. b) ACT setting: when bit1,bit2,bit5 are all "0",occupy 20points Soft Component starting from the Initial Soft Component specified in S3. 	25 points 20 points
DD.	Output value (MV)	Auto-tuning: step response method Set the step output value on the user side before the instruction is driven. During the auto-tuning process, the MV output cannot be changed on the side of the PID instruction.	1 point

Parameter list S3.~S3.+28

Coolmay L02 Series PLC Programming Manual

	Setting i	tem	Setting content	Remark
S3.	Sampling	time(Ts)	1~32767(ms)	Value shorter than the calculation period can't be run
		bit0	0: positive action; 1: reverse action.	Action direction (ACT)
		bit1	0: No input change alarm; 1: Input change amount alarm is valid.	
		bit2	0: No output change alarm; 1: Output change amount alarm is valid.	Do not turn ON bit2 and bit5 at the same time
		bit3	Can't use	
S3.+1	ACT	bit4	0: Auto-tuning doesn't work; 1: Perform auto-tuning.	
		bit5	0: No output value upper and lower limit setting; 1: The output value upper and lower limits are valid.	Do not turn ON bit2 and bit5 at the same time
		bit6	0: Step response method.	Auto-tuning mode
		bit7~bit15	Can't use	
S3.+2	Input filte	r constant (α)	0~99(%)	0 means no input filtering
S3.+3	Proportion	nal gain ()	1~32767(%)	
S3.+4	Integratio	n time()	0~32767(*100ms)	0 means as ∞ processing (no points)
S3.+5	Differenti	al gain ()	0~100(%)	0 means no derivative gain
S3.+6	Derivative	e time ()	0~32767(*10ms)	0 means no differential processing
S3.+7 S3.+19	PID opera	tion internal proce	ssing occupied, please do not change the da	ta.
S3.+20*1	Input char (increase sid	nge amount e) alarm set value	0~32767	(ACT): Valid when S3.+1 bit1=1
S3.+21*1	Input char (decrease sid	nge amount le) alarm set value	0~32767	(ACT): Valid when S3.+1 bit1=1
\$3.+22*1	Output ch (increase sid	ange amount le) alarm set value	0~32767	(ACT): Valid when S3.+1 bit2=1, bit5=0
	Output up	per limit set value	-32768~32767	(ACT): Valid when S3.+1 bit2=0, bit5=1
S2 + 22*1	Output ch (decrease sid	ange amount le) alarm set value	0~32767	(ACT): Valid when S3.+1 bit2=1, bit5=0
55.+25*1	Output lo	wer limit set value	-32768~32767	(ACT): Valid when S3.+1 bit2=0, bit5=1
		bit0	0: The input change amount (increase side) does not overflow; 1: Input change amount (increase side) overflow.	(ACT): Valid when S3.+1 bit1=1 or bit2=1
S3.+24*1	Alarm output	bit1	0: The input change amount (reduction side) does not overflow; 1: Input change amount (reduction side) overflow.	
		bit2	0: The output change amount (increase side) does not overflow; 1: Output change amount (increase side) overflow.	



	0: The output change amount (reduction	
1:42	side) does not overflow;	
DILS	1: Output change amount (reduction	
	side) overflow.	

*1: When S3+1 action setting (ACT) bit1=1, bit2=1 or bit5=1, S3+20~24 is occupied.

5.3.4. Notice

When using multiple instructions: It can be executed multiple times at the same time (the number of loops is not limited), but note that the S3 and D devices used in the operation cannot be repeated.

Occupied points of parameter S3. : Step response method

1) ACT setting: when bit1,bit2,bit5 are all not "0",occupy 25points Soft Component starting from the Initial Soft Component specified in S3.

2) ACT setting: when bit1,bit2,bit5 are all "0",occupy 20points Soft Component starting from the Initial Soft Component specified in S3.

Step response mode: The self-tuning mode in the PID instruction has only a step response mode, and the step value is S0+22, which is the upper limit value.

When specifying the soft component in the power failure holding

area: If D. is specified in the program to hold the data register in the power failure, needs to clear the specified register at the time of program start-up.

Action flag:

bit 0=0 of S3+1 is positive action, bit0=0 is reverse action;

When heating, is reverse action.

5.3.5. Example

Coolmay L02 Series PLC Programming Manual

M8000	[MOV	K500	P22600	1
M8000		10000	1120000	1
	[MOV	D8030	D200	}
M500 M8002	[Nov	¥1	DETA	1
	D510 means : Set the parameter starting position,in	dicating the	sampling t	ime
	[MOV	H31	D511	1
	D511means : Pa	arameter set	action set	ting
	[MOV	K80	D512	}
	D512 means : Paramet	er set input	filter const	ant
	[MOV	K500	D513	}
	D513 means : Param	eter set (pro	portional g	jain
	[MOV	K534	D514	}
	D514 means : Para	meter set in	itegration ti	me
	[MOV	K496	D515	}
	D515 means : Para	ameter set :d	lifferential g	ain
	[MOV	K124	D516	}
	D516 means : Para	ameter set :c	lifferential t	ime
	[MOV	K4000	D532	}
	Set the outp	ut upper lim	it setting va	lue
	[MOV	КО	D533	}
M8000	Set the outp	out lower lim	it setting va	lue
	[MOV	D511	K2M130	}
M134				
-1/		SET	M500	}
M134		RST	M500	1
M121		r,		1
	PID D500 D200 D500:Target value SV	D510 D510:Param	D502 eter start vi	alue
M121	D200:Measure value P	/ D50	2:output va	lue
-11	LPWM D502	K4000	Y000	ł

6. Application of high speed counter

6.1. Assignment table of built-in high speed counter

For L02 series PLC, high speed counter is default as single phase 6 channels 60KHz, or AB(Z) phase 2 channels 30KHz+AB phase 1 channel 5KHz; Among them,AB phase double counter input is default as 1 times frequency.

Counter type	NO		Input assignment						
	NU	X000	X001	X002	X003	X004	X005	X006	X007
	C235	U/D							
	C236		U/D						
	C237			U/D					
Single above	C238				U/D				
Single phase	C239					U/D			
single counter	C240						U/D		
input	C241	U/D	R						
	C242			U/D	R				
	C243					U/D	R		
	C244	U/D	R					S	
	C245			U/D	R				S
	C246	U	D						
Single phase	C247	U	D	R					
double counter	C248				U	D	R		
input	C249	U	D	R				S	
	C250				U	D	R		S
	C251	А	В						
AB phase	C252	А	В	R					
double counter	C253				А	В	R		
input	C254							А	В
•	C255				А	В	R		S

U: up counter	D: down counter
A: A phase input	B:B phase input
R: External reset input	S: External start input

Single phase: at most 6 channels, max frequency is 60KHz;

AB phase:

1 times frequency: at most 2-3 channels, Max frequency is 30KHz;

4 times frequency: at most 2 channels, Max frequency is 24KHz;

6.2. Related device

Туре	Counter	Designated device	Up	Down counting
	C235	M8235	counting	ON
	C236	M8236		
	C237	M8237		
	C238	M8238		
	C239	M8239		
Single phase single	C240	M8240	OFF	
counter input	C241	M8241		
	C242	M8242		
	C243	M8243		
	C244	M8244		
	C245	M8245		

1. For switching up/down counting of Single phase single counter

2. For monitoring the up/down counting direction of Single phase

Туре	Counter	Designated	Up	Down
	numper	uevice	counting	counting
	C246	M8246		
Single phase double counter input AB phase double counter input	C247	M8247		
	C248	M8248		ON
	C249	M8249		
	C250	M8250	OFF	
	C251	M8251	OFF	
	C252	M8252		
	C253	M8253		
	C254	M8254		
	C255	M8255		

double counter and AB phase double counter

3. For High-speed counter function switching

Device name	Name	Content
M8198	Function switching	1 times/4 times switching device for C251/C252
M8199	device	1 times/4 times switching device for C253/C255

7. Application of high speed pulse

7.1. high speed pulse output

Coolmay L02 series plc default has 8 channels high speed pulse, Y0-Y3 each 100KHz, Y4-Y7 each 50KHz, variable speed supported, the initial/final speed of start/stop is 0, diagram as below: (take accelerate and decelerate time D8148 as an example).



Acceleration/deceleration time T calculation=

(target speed-current speed)*acceleration / deceleration time ÷maximum speed.

For example, target speed = 50000, current speed = 20000, acceleration time 100 (ms), maximum speed = 100,000, T = 30 ms.

L02 plc: 8 channels of pulse, the last 4 channels of acceleration and

deceleration = D8148, the maximum speed is D8146, D8147.

PLSY, ZRN, PLSV, DRVI, DRVA, DVIT, DSZR, only Y0-Y3 supports DVIT

(interrupt positioning), DSZR (origin return with DOG search) instructions.

Pulse point Function Description	YO	Y1	¥2	¥3	Y4	Y5	¥6	¥7
Pulse operation	M8340	M8350	M8360	M8370	M8151	M8152	M8153	M8154
Position pulse (32bit)	D8340 D8341	D8350 D8351	D8360 D8361	D8370 D8371	D8140 D8141	D8142 D8143	D8144 D8145	D8160 D8161
Accelerate / decelerate time	D8348 D8349	D8358 D8359	D8368 D8369	D8378 D8379	D8148	D8148	D8148	D8148
Pulse stop bit	M8349	M8359	M8369	M8379	M8450	M8451	M8452	M8453
Maximum speed	D8343 D8344	D8353 D8354	D8363 D8364	D8373 D8374	D8146 D8147	D8146 D8147	D8146 D8147	D8146 D8147



The original FX3G pulse program can be used directly.

All the instruction support 8 channels pulse, except DVIT,DSZR which only support first 4 channels.

7.2. Circular interpolation

7.2.1. Normal interpolation function

The special flags when setting the interpolation route are as shown in the

following table:

Interpolation mode	M8433	M8432
Line Interpolation	0	1
Center interpolation	1	0
Radius interpolation	1	1

The direction and coordinates of the center and radius interpolation are as

shown in the following tab	e:
----------------------------	----

Clockwise	M8435 = 0
Anticlockwise	M8435 = 1
Relative coordinate	M8434 = 0
Absolute coordinate	M8434 = 1

D8340 shows the current address of X axis, D8350 shows the current

address of Y axis.

In CoolMay L02 PLC, interpolation motion still adopts DPLSR for pulse

output.

instruction i	input		200 2000 - 20040		
	DPLSR	s.	S. +2	S. +4	D.
	1.0				

Description of the Operand:

S. represents the pulse frequency, that is, the speed of the interpolation motion.

S.+2 represents the X-axis target address.

S.+4 represents the Y-axis target address.

D. specify the Y number with pulse output (Currently only supports Y0,

the corresponding direction is Y4; Y1 is another axis, the corresponding direction is Y5).

In center interpolation mode:

S.+6 represents the center X coordinate address.

S.+8 represents the center Y coordinate address.

In radius interpolation mode:

S.+6 represents the radius length.

When it is positive, the path is a small circle; when it is a negative value,

the path is a large circle.

For example: DPLSR D100 D102 D104 Y000

In the linear interpolation: D100 is speed, D102 is the X-axis target address, and D104 is the Y-axis target address.Y0 and Y1 respectively pulse the X-axis and Y-axis.



In the Center interpolation: D100 is speed, D102 is the X-axis target address, D104 is the Y-axis target address, and D106 is the center X address. D108 is the center Y address. Y0 and Y1 respectively pulse the X-axis and Yaxis.



Center Interpolation Diagram

Note 1: The current address of X and Y must be on the same circle as the destination address.

Note 2: When the current address coincides with the target address, it indicates that the motion track is a full circle.

In the radius interpolation: D100 is speed, D102 is the X-axis target address, D104 is the Y-axis target address, and D106 is the radius length. Y0 and Y1 respectively pulse the X-axis and Y-axis. (The legend clockwise, i.e. M8435 = 0)



7.2.2. Continuous interpolation function

M8436 is the flag for the normal interpolation mode and continuous interpolation mode.

M8436=0: regular interpolation mode;

M8436=1: continuous interpolation mode;

In CoolMay L02 series PLC, continuous interpolation motion uses DPLSR for pulse output.



Operand Description:All use 32-bit registers.

S1. indicates the pulse frequency, that is, the speed of the interpolation motion.

S2. indicates the X-axis target address.

S2.+2 indicates the Y-axis target address.

In the center mode:

S2.+4 and S2.+6 indicates the Center coordinates.

In radius mode:

S2.+4 indicates the radius length, and S2.+6 ignores and unused.

S2.+4 positive value: the path is a small circle; S2.+4 negative value:

the path is a big circle.

S2.+8 is the control register.

D.: Specify the Y number with pulse output (only Y0 supported, the

corresponding direction is Y4; Y1 is another axis, the corresponding direction is Y5).

In continuous interpolation mode, M8432~M8435 are determined by the 5th parameter (ie S.+8).

The function description of each bit of the 32-bit register S2.+8 is as follows:

32bit position	b31~b28	b27~b24	b23~b20	b19~b16	b15~b12	b11~b8	b7~b4	b3~b0
Function	Conti	nuous inte	erpolation	Position	Interpolatio	Interpolatio		
i unerion		stop	Flag posi	ition		mode	n direction	n mode

When S2.+8 is used, it is in hexadecimal. The bit values of each group are

as below:

b3~b0	=1: linear mode interpolation=2: center mode interpolation=3: radius mode interpolation
b7~b4	=0: clockwise rotation=1: counterclockwise rotation= any other value: linear mode
b11~b8	=1: relative position=2: absolute position
b31~b12	=00000: continuous interpolation execution =AAAAA: continuous interpolation stop

PS: When using linear mode interpolation, b7~b4 is ignored and can be set to any value from 2~F.

S1. and S2. may be set discontinuous. For example, S1.=D100,

S2.=D120.

S2. Must be consecutive with the next four 32-bit registers. For example,

it must be set to D102, D104, D106, D108, D110.

For example: draw a line and two arcs, as shown:



Program as below :



8002					
11-1		-[DWOA	K0 D8340 is i	D8340	x
			coordinat	e position	-
		DMOV	KO	D8350	
			D8350 is t	he current	Y
		TDMOW	K200	D100	
-		_[D100 4	D100 sets	the pulse	
			frequency	or speed	
	 	-[DMOV	K500	D102	
			straight	line X targe	t
		-[DMOV	K1000	D104	
			the first	straight line	DN 1
		-DMOV	H251	D110	
		D11	0 first-stage	linear differ	en
		com	pensation co	ntrol metho	bd
		-[DWOA	K1000	D112	
			setting of t	he first arc	Ee
		Thurst			
		-{nwox	K1500	DII4	
			D114 Set t	he Y-axis tai	rge
		TOHOU	V1000	DILG	
		-[Dino 4	116 Set the	X conselinat	e
		t	he center of	the first arc	
	-	-TDMOV	K1000	D118	
		1	0118 Set the	Y coordinat	te
			of the center	of the first	a
		-[DMOV	H202	D120	
		D12	0 The first se	gment arc	20
		inte	rpolation con	ittor mode	20
		-[DWOA	K500	0122	
			D122 Set th	e X-axis targ	let
		TDMON	K1000	D124	inc.
		-[Duto 4	D124 Set th	e Y-axis tar	ge
			position of	the second a	ard
		TDMOV	K500	D126	
		-Lever	D126 sets t	he length of	f
			the second	arc radius	
	-DMOV	HOAAAA	A203	D130	
2002		D13 inte	0 The secon rpolation co	d segment a ntrol mode	arc 20
			ISET	M8436	
			-lear	10100	
#10					
17 A	and the second second	Contraction of the second second		and a state of the	

7.3. Pulse width modulation PWM

1. Summary: This instruction is used to specify pulse output with pulse period and ON time.

2. PWM instruction format and parameter description.

Instruction format:

input PWM S1. S2. D.	Instruction input	FNC 58 PWM	S1.	S2.	D.
----------------------	----------------------	---------------	-----	-----	----

Parameter description:

Operand type	Content	Type of data		Character device	Ranges
S1.	Pulse width (ms) data or word device number for storing data	BIN16 bit	KnX、 T、C、	KnY、KnM、KnS、 D、R、V、Z、K、H	0~32767 ms
S2.	Cycle (ms) data or word device number for storing data	BIN16 bit	KnX、 T、C、	KnY、KnM、KnS、 D、R、V、Z、K、H	1~32767 ms
D.	Output pulse device (Y) number	BIN16 bit	Y0-Y7		Y0-Y7

3. Description of functions and actions

16-bit operation (PID): output pulses with an ON pulse width of [S1.ms] in units of cycle [S2.ms].



Pay attention to the points

The values of pulse width S1. and period S2. should be set as S1. \leq S2.

When the command input is OFF, the output from D. is also OFF.

Do not operate the setting switch of the pulse output mode during pulse

sending.

4. Sample program



In this example, the data range of D10 is changed from 0 to 50, and the average output of Y0 is 0 to 100%. If the data of D10 is greater than 50, an error will occur.

Example of smooth loop:





R >> P

 $t = R(K\Omega)^* C(\mu F) = 470ms >>T0$

The time constant τ of the filter is a very large value compared to the pulse period T0.

The fluctuation value Δe in the average output current e is approximately

$$\frac{\Delta e}{e} \leq \frac{T0}{\tau}$$

5. Special instructions

Conventional PWM

1) Support a total of 8 channels Y0-Y7 (please select transistor MT output);

2)There is no limit to the pulse width and pulse period, both in milliseconds (ms).

Special customized PWM -- as Analog output

The following parameters are required for model selection:

1) the output voltage of the required PWM;

2) the output frequency of the required PWM;

3) Confirm the numbers of customized PWM, up to 4 PWMs. (depending on analog outputs that customer make).

4) Whether the customized PWM coexists with other analog. (If the product is separately equipped with analog, the analog output terminals DA0~DA3 are a group, and DA4~DA7 are a group. When L02 customizes the PWM, the



output frequency can only be installed in a group with other analogs when the output frequency is only 21KHz.).

Special customized PWM -- Output frequency setting

When special customize PWM,don't need to use the PWM instruction. You only need to set the special register and then turn on the hardware.

The special registers used for each analog, check below table:

Analog output address	DAO	DA1	DA2	DA3
Duty cycle setting	D8050	D8051	D8052	D8053
Frequency (32 bits)	D8268	D8268	D8268	D8268

D8050 to D8053: the corresponding duty cycle, the value range is $0\sim4000$, each 1 is 0.025%, and the total corresponds to $0\sim100\%$;

D8268 : the value range is 1~100000Hz (32 bits);

D8050 to D8053 \leq D8268

When D8268 is powered on, the default setting is 21000Hz, and the power

is not maintained. Program assignment is required when using.

7.4. Handwheel pulse function

The handwheel pulse generator is commonly known as electronic handwheel and handwheel. It is mainly used for the setting of the teaching CNC machine work origin in CNC machine tools, manual stepping fine adjustment, and interruption insertion during processing. Widely used in CNC engraving and milling machines, CNC milling machines, CNC lathes, machining centers, CNC wire cutting machine tools, CNC EDM machine tools, printing equipment, textile machinery and other fields.

Coolmay L02 series PLC supports the function of handwheel (only supports servo motors, not stepper motors). With the cooperation of L02 PLC, the handwheel is used to control the rotation of the motor, which can realize



the rotation of the handwheel by one pulse and the motor also rotates

correspondingly number of pulses.

Special sign:

M8228: Turn ON to enable the handwheel function (the original C228

function is temporarily not used)

Instruction format and parameter description when using handwheel.



Parameter Description:

Operand type	Content	type of data	Character device
S1.	Set the numerator of the input to output ratio	BIN16 set	K、D
S2.	Set the denominator of the input to output ratio	BIN16 set	K, D
D.	Output pulse device (Y) number	BIN16 set	pulse: Y0-Y5 Corresponding direction: Y10-Y15

PS: When setting S1. and S2., S1. must be an integer multiple of S2. If it is 1:1, it means that the hand wheel rotates one pulse and the motor rotates one pulse; if it is an integer multiple of n, it means that the hand wheel rotates one pulse and the motor rotates n pulses.

The wiring of the handwheel is shown in the figure below:







The function program of the hand wheel is shown in the figure below:

Ga. 1	Handwheel flag bit
M8000	(M8228
445	Handwheel and pulse output setting 1:1
	PLSY KI KI Y000

This program is 1:1 pulse output, that is, how many pulses will Y0 output when the handwheel rotates how many pulse.

8. Coolmay L02 series PLC communication manual

The L02 series PLC is equipped with a programming port (RS232), two RS485, a CAN port, and a network port to meet the needs of users to connect several types of equipment.

8.1. MODBUS instruction explanation and communication

address

When PLC is used as the host, it supports ADPRW instruction, RD3A instruction and WR3A instruction. This section explains these three commands.

8.1.1. Function and operation description of read/write data command



The RD3A instruction corresponds to the No. 03 function of Modbus.

m1 represents the station number of the read slave device, ranging from 1-247;

m2 represents the first address number of the read data in the slave device;

D. Represents the number of registers to be read, the range is 1-125 (the

range is 1-45 in Modbus ASCII, and the range is 1-90 in CAN

communication), and the read data are stored in the host D.+1, D. +2.

D.-1 Address value must be set (=0: serial port 2; =1: serial port 3; =2: CAN; =3: network MODBUS)



Write data WR3A:

The WR3A instruction corresponds to the No. 06 and No. 10 functions of

Modbus.

m1 represents the station number of the slave device to be written, ranging from 1-247.

m2 represents the first address number of the written register in the slave device;

S. indicates the number of registers to be written, the range is 1-123 (the range is 1-45 in Modbus ASCII, and the range is 1-90 in CAN communication). The data to be written is sequentially stored in the host S.+1, S.+2.

When S=1, WR3A instruction corresponds to Modbus function 06;

When S=2-123, WR3A instruction corresponds to Modbus No. 10 function;

S.-1 address value must be set (=0: serial port 2; =1: serial port 3; =2: CAN; =3: network MODBUS)

RD3A and WR3A only support the following functions of MODBUS RTU:

No. 03 function: read the holding register, and obtain the current binary value range 1-125 in one or more holding registers.

No. 06 function: Load the specific binary value into a holding register (write register), the range is 1.

No. 10 function: preset multiple registers, load specific binary values into a series of continuous holding registers (write multiple registers), the range is 1-123.

8.1.2. ADPRW instruction function and operation description

The ADPRW instruction supports the following functions of MODBUS RTU:

No. 01 function: read the coil status, get the current status (ON/OFF) of a group of logic coils, the range is 1-512

No. 02 function: read the input status, get the current status (ON/OFF) of a group of switch inputs, the range is 1-512

No. 03 function: read the holding register, obtain the current binary value in one or more holding registers, the range is 1-125

No. 04 function: Get the current binary value in one or more input registers, the range is 1-125

No. 05 function: force a single coil, force a logic coil on-off state (write position), range 1

No. 06 function: load the specific binary value into a holding register (write register), the range is 1

OF function: force setting of multiple coils, force setting of on-off of a series of continuous logic coils (write multiple digits), range 1-1968

No. 10 function: preset multiple registers, load specific binary values into a series of continuous holding registers (write multiple registers), range 1-125



```
ADPRW:
```

S. indicates the station number of the slave device to be read and written, ranging from 1-247;

S1. Represents the function code (that is, the 01-06, 15, 16 functions written above);

S2. The function parameter corresponding to each function code (for example, the operand represents the start address of MODBUS when the function is 01);

S3. The function parameter corresponding to each function code (for example, the operand indicates the number of access points in the 01 function, and the parameter is fixed to 0 in the 05 function);

D. Represents the starting position of the data storage device.



MODBUS device			
Input register (read only)	Holding register (read/write)	L02 device	
-	0x0000~0x1F3F	D0~D7999	
-	0x1F40~0x213F	D8000~D8511	
-	0x2140~0x7EFF	R0~R23999	
-	0x7F00~0xA13F	Unused address	
-	0xA140~0xA27F	TN0~TN319	
-	0xA280~0xA33F	Unused address	
-	0xA340~0xA407	CN0~CN199	
-	0xA408~0xA477	CN200~CN255	
-	0xA478~0xA657	M0~M7679	
-	0xA658~0xA677	M8000~M8511	
-	0xA678~0xA777	S0~S4095	
-	0xA778~0xA78B	TS0~TS319	
-	0xA78C~0xA797	Unused address	
-	0xA798~0xA7A7	CS0~CS255	
-	0xA7A8~0xA7AF	Y0~Y177	
0xA7B0~0xA7B7	-	Unused address	
0xA7B8~0xA7BF	-	X0~X177	
An error occurs when accessing an unused address $CN200 \sim 255$ are 32-bit counters			

8.1.3. Word device communication address number

8.1.4. Bit device communication address number

MODBUS device			
Input (read only)	Coil (read/write)	L02 device	
-	0x0000~0x1DFF	M0~M7679	
-	0x1E00~0x1FFF	M8000~M8511	
-	0x2000~0x2FFF	S0~S4095	
-	0x3000~0x313F	TS0~TS319	
-	0x3140~0x31FF	Unused address	
-	0x3200~0x32FF	CS0~CS255	
-	0x3300~0x337F	Y0~Y177	
0x3380~0x33FF	-	Unused address	
0x3400~0x347F	-	X0~X177	
An error occurs when accessing an unused address			

Operand	S 1	S2.	S3.	D.
Functions	Function code	MODBUS address/sub function code	Access points/sub function data	Data storage device start
Coil readout	1H	MODBUS address: 0000H~FFFFH	Access points: 1~2000	Read target device D.R.M.Y.S
Input readout	2Н	MODBUS address: 0000H~FFFFH	Access points: 1~2000	Read target device D.R.M.Y.S
Holding register read	3Н	MODBUS address: 0000H~FFFFH	Access points: 1~125	Read target device D.R
Input register read	4H	MODBUS address: 0000H~FFFFH	Access points: 1~125	Read target device D.R
Single coil write	5H	MODBUS address: 0000H~FFFFH	0(fixed)	Write target device D.R.X.Y.M.S 0=bit OFF/1=bit ON
Single register write	6Н	MODBUS address: 0000H~FFFFH	0(fixed)	Write target device D.R
Batch coil write	FH	MODBUS address: 0000H~FFFFH	Access points: 1~1968	Write target device D.R.X.Y.M.S
Batch register write	10H	MODBUS address: 0000H~FFFFH	Access points: 1~123	Write target device D.R

8.1.5. ADPRW instruction function parameters

8.2. Serial port 1: RS232 (PLC programming port)

Support Mitsubishi programming port protocol; can be used to download PLC programs or communicate with devices that support Mitsubishi programming port protocol.

8.3. Serial port 2: RS485 (A B)/RS232

Support Mitsubishi programming port protocol, Mitsubishi BD board protocol, free port protocol and MODBUS RTU protocol;

The special relays and special registers involved in this serial port are as follows:

Function Description	Serial port 2 (A/B)	Serial port 3 (A/B)	CAN(H/L)	Remarks
Mitsubishi programming port protocol	M8196=0	M8192=0	-	Power failure does not keep
Freeport protocol function	M8196=1 M8125=0	M8192=1	-	
RS/RS2 send flag	M8122=1	M8402=1	M8422=1	Automatically reset at the
				end of sending
--	--------------------	---------	-------------------------	--
RS/RS2 sending complete flag	-	-	M8425	Need to reset manually
RS/RS2 receiving end flag	M8123	M8403	M8423	Need to reset manually
RS/RS2 receiving process flag	M8124	M8404	M8424	Data is being received
RS/RS2 instruction 8- bit/16-bit distinguishing flag	M8161	M8161	M8161	
Master-slave flag when RS2 command CAN	-	-	M8426	M8426=0 master-slave mode, M8426=1 multi- machine mode
RS2 instruction last operand setting	-	1	2	
MODBUS function	M8196=1 M8125=1	M8192=1	-	
RD3A/WR3A receive correct flag	M8128	M8408	M8428	Automatic reset
RD3A/WR3A communication timeout flag	M8129	M8409	M8429	Automatic reset
ADPRW instruction completion flag	M8029	M8029	M8029	Instruction execution end flag
Communication parameters	D8120	D8400	D8420	
Communication mode	-	D8401	D8421	
Master and slave station number	D8121	D8414	D8434 D8440 D8442	D8434: CAN slave station number D8440\D8442 multi- machine mode ID number
RD3A/WR3A timeout time	D8129	D8409	D8429	The unit is milliseconds, see explanation for detailed settings
RD3A/WR3A interval cycles	D8126	D8406	D8426	
RD3A/WR3A last operand -1	0	1	2	
Set during ADPRW instruction	D8397=0	D8397=1	D8397=2	
CAN data frame	-	-	M8427	

M8196: The activation flag of using programming port protocol and other protocol.

M8125: The activation flag of using MODBUS and the original Mitsubishi function.

M8122: RS command sending flag (this bit needs to be set 1 when using

the RS instruction,), reset automatically.

M8123: RS command receiving end flag, need to be reset manually.

M8124: RS command data is being received.

M8161: 8-bit/16-bit mode distinguishing flag of RS instruction.

M8128: RD3A/WR3A receives the correct flag and needs to be reset manually.

M8129: RD3A/WR3A communication timeout flag (when communication timeout, the flag bit is ON).

M8029: Communication complete flag (communication complete flag when using ADPRW instruction, manual reset is required).

D8120: Save the communication parameters of Modbus RTU/ASCII protocol. For details, see the setting introduction in the table.

D8121: Save the station number of the master or slave. (This value must be set to the maximum K255 when doing the host)

D8129: RD3A and WR3A timeout time(The unit is milliseconds. It is recommended to set: when the communication rate is set to be greater than or equal to 9600, D8129 is set to 10~20; when the communication rate is set to be less than 9600, D8129 is set to 20~50).

D8126: Number of interval cycles. Default=10 (times).

D8397: When using the serial port 2 for ADPRW instruction, D8397 must be set to 0.

Support RS, WR3A, RD3A, ADPRW instructions. Can be set in the parameter zone, corresponding to serial port 2. The parameter zone settings are only valid for this channel. It is invalid for serial port 3.

8.3.1. Mitsubishi programming port

When used as Mitsubishi programming port protocol: set M8196=0.

8.3.2. Mitsubishi BD Protocol

When used as the Mitsubishi BD protocol function: set M8196=1, M8125=0; D8120 is set as the communication parameter, and D8121 is set as the slave station number. For example, set D8120=H6086, D8121=H1 (communication parameter is 9600/7/E/1, slave station number is 1).

D8120 parameter setting

b1	b1	b1	b1	b1	b1	b	b	b	b	b	b	b	b	b	b
5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	0

b0	Data length 0: 7 bits 1: 8 bits						
b1	Parity (b2,b1)						
b2	00: None; 01: Odd; 11: Even						
	Stop bit						
b3	0:1 bit						
	1: 2 bits						
b4	Baud rate (b7,b6,b5,b4)						
b5	(0100):600bps (0101):1200bps (0110):2400bps						
b6	(0111):4800bps (1000):9600bps (1001):19200bps						
b7	(1010):38400bps (1011):57600bps (1101):115200bps						
b8							
b9	Set ()						
b10	5010						
b11							
b12	Set 0						
b13	Set 1						
b14	Set 1						
b15	Set 0						



Example of PLC as slave program:



HMI can communicate with PLC by setting BD protocol master station.

8.3.3. Freeport protocol functions and examples

When used as Mitsubishi Freeport protocol function: set M8196=1,

M8125=0; the difference between Mitsubishi protocol 1 and protocol 4 is that

there are end characters 0A 0D (stored in D8124 and D8125 respectively)

For Mitsubishi Freeport Protocol, RS instruction is supported, the D8120

only needs to set the value of the lower 8 bits.

b7	b6	b5	b4	b3	b2	b1	b0
----	----	----	----	----	----	----	----

b0	Data length 0: 7 bits 1: 8 bits				
b1	Parity (b2,b1)				
b2	00: None; 01: Odd; 11: Even				
	Stop bit				
b3	0:1 bit				
	1: 2 bits				
b4	Baud rate (b7,b6,b5,b4)				
b5	(0100):600bps (0101):1200bps (0110):2400bps				
b6	(0111):4800bps (1000):9600bps (1001):19200bps				
b7	(1010):38400bps (1011):57600bps (1101):115200bps				



Program example:



The data obtained by using the serial port tool to monitor the serial port 2 is: [2019:11:01:10:49:16] [Receive] 31 32 33

8.3.4. Modbus RTU protocol

When used as Modbus RTU protocol: set M8196=1, M8125=1; D8120 is set as communication parameter, D8121 is set as slave station number. For example, set D8120=HE081, D8121=H1 (communication parameter is 9600/8/n/1, slave station number is 1).

D8120 parameter setting:

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
-----	-----	-----	-----	-----	-----	----	----	----	----	----	----	----	----	----	----

b0	Data length 0: 7 bits 1: 8 bits
b1 b2	Parity (b2, b1) 00: None; 01: Odd; 11: Even
b3	Stop bit 0:1 bit 1: 2 bits

b4 b5 b6 b7	Baud rate (b7,b6,b5,b4) (0100):600bps (0101):1200bps (0110):2400bps (0111):4800bps (1000):9600bps (1001):19200bps (1010):38400bps (1011):57600bps (1101):115200bps
b8	
b9	Set 0
b10	Set 0
b11	
b12	RTU/ASCII mode setting 0:RTU 1:ASCII
b13	Set 1
b14	Set 1
b15	Set 1

RD3A program example (refer to chapter 8.1.1 for instruction

introduction):

Slave program:



Host program:

M8002	OV HOROSI	D8120 1
	Set D8120 con parameter val	nmunication
H	OV KO	D299 }
	Setting D299=0 serial port 2 in th	means using his program
ŀ	OV K10 Set D300 to th read registers	D300]
-	OV K255	D8121 7
	121 master and slave s nber, the master must	tation be set to 255
-	OV K10	D8129 7
	Communication t when setting RD	imeout time 3A
Ì	OV K20 Set the m interval c	D8126] umber of RD3/ cycles
f	Set M819 serial port	M8196 } 6 to 1 to use t 2 flag
L	SET	M8125 }
M7	Setting M81 using MODB	25 to 1 means
	K100	D300]
	Set D300 to of read regis	the number sters

Program explanation:

D300 saves the number of registers read, here it means reading 10 data.

When using serial port 2, D.-1, here D299 must be set to 0.

The program means to read a total of 10 data from registers D100-D109 in the PLC whose slave station is 1, and save them in the registers D301-D310 of the master station PLC.

WR3A program example (refer to <u>chapter 8.1.1</u> for instruction

introduction):

Host program:

Coolmay L02 Series PLC Programming Manual

Coolmay®

M8002	
	[MOV HUE081 D8120]
	set D8120 communication
	Setting D299=0 means using
	serial port 2 in this program
-	
	Set D300 to the number of read registers
-	
	Set the data to be written
	to the slove by DSD1
	Set MR106 to 1 to uso
	serial port 2 flag
	ISET M8125 1
	Setting M8125 to 1 means
	using MODBUS RTU function
-	[MOV K255 D8121]
	D8121 master and slave station number, need to be set to 255 for master
-	TMOV K10 D8129 7
	Communication time when setting RD3A
87	Set the number of RD3A interval cycles
	TWR3A K1 K100 D300 T
10	Set D300 to the number of read registers

Slave program:

11-	Тиол	HOE081	D8120	3
	- mov	Set D8120 of parameter v K1	ommunicatio alue D8121	n.
		Set the number	to 1 M8196	
		Set Mi serial	196 to 1 to i port 2 flag M8125	ise
		Setting I means u	08125 to 1 sine MODBU	JS

Program explanation:

The program means to write 1 data of register D301 in the master station PLC to the slave station as 1 PLC, and save it in the slave station PLC register D100.

8.3.5. Modbus RTU function ADPRW instruction

03 function code holding register output program example(refer to chapter

8.1.2 for instruction introduction)

Host program:



Slave program:



Use the serial port tool to monitor the serial port 2 to get the following data:

[2017:11:01:17:48:54][receive]01 03 00 00 00 06 C5 C8

[2017:11:01:17:48:54][receive]01 03 0C 00 0C 00 17 00 22 00 38 00 4E 00 63 C4 29

8.3.6. Modbus ASCII protocol

When used as Modbus ASCII protocol: The specific parameter settings are the same as 8.3.3, only the 12th bit setting of D8120 is different. For specific settings, refer to the introduction of D8120 parameter settings in chapter 8.3.3.

Note: In modbus ASCII protocol, ADPRW command is not supported.

Program example:

Host program:







Slave program:

M8002				1
	LWOA	HOF081	D8120	7
	D81	20 communic	ation parame	eter,
	Volt	K1	D8121	1
		Set th	e slave stati er to 1	on
		[SET Set N	M8196 8196 to 1 to	Huse
		Serial	port 2 flag M8125	H
N8000		Setting D8 using MOD	125 to 1 mea BUS function	n
-11	[wox	K35	D100	3
	[иол	K36	D101	3
		K37	D102	3

The data display status of the host D300~D303 before and after program

Device	+FEDC	+B A 9 8	+7654 +321	0
D300	0000	0000	0000 001	1 3
D301	0000	0000	0000 000	0 0
D302	0000	0000	0000 000	0 0
D303	0000	0000	0000 000	0 0
		Monitor	the data of D300-D	301 before the host M7 is turned on
Device	+FEDC	+B A 9 8	+7654 +321	0
D300	0000	0000	0000 001	1 3
D301	0000	0000	0010 001	1 35
D302	0000	0000	0010 010	0 36
D303	0000	0000	0010 010	1 Data of D300-D303 after 37
D304	0000	0000	0000 000	0 M7 is turned on 0

execution is shown in the figure below.

8.4. Serial port 3: RS485 (A1 B1)

Support Mitsubishi programming port protocol, RS2 protocol and MODBUS

RTU protocol

The special relays and special registers involved in this serial port are as

follows:

Function Description	Serial 2(A/B)	Serial 3(A1/B1)	CAN(H/L)	Remarks
Mitsubishi programming port	M8196=0	M8192=0	-	Power failure does not keep
Freeport protocol function	M8196=1 M8125=0	M8192=1	-	
RS/RS2 sending flag	M8122=1	M8402=1	M8422=1	Automatically reset at the end



				of sending
RS/RS2 sending complete flag	-	-	M8425	Need to reset manually
RS/RS2 receiving end flag	M8123	M8403	M8423	Need to reset manually
RS/RS2 receiving process flag	M8124	M8404	M8424	Data is being received
RS/RS2 instruction 8-bit/16-bit distinguishing flag	M8161	M8161	M8161	
Master-slave flag when RS2 command CAN	-	-	M8426	M8426=0 master-slave mode M8426=1 multi-machine mode
RS2 instruction last operand setting	-	1	2	
MODBUS RTU function	M8196=1 M8125=1	M8192=1	-	
RD3A/WR3A receive correct sign	M8128	M8408	M8428	Automatic reset
RD3A/WR3A communication timeout flag	M8129	M8409	M8429	Automatic reset
ADPRW instruction completion flag	M8029	M8029	M8029	Instruction execution end flag
Communication parameters	D8120	D8400	D8420	
Communication mode	-	D8401	D8421	
Master and slave station number	D8121	D8414	D8434 D8440 D8442	D8434: CAN slave station number D8440\D8442 multi-machine mode ID number
RD3A/WR3A timeout time	D8129	D8409	D8429	The unit is milliseconds, see explanation for detailed settings
RD3A/WR3A interval cycles	D8126	D8406	D8426	
RD3A/WR3A last operand -1	0	1	2	
Set during ADPRW instruction	D8397=0	D8397=1	D8397=2	
CAN data frame	-	-	M8427	

M8192: Use the programming port protocol and the enable flag of other

protocols.

M8402: Send flag (used in RS2 command).

M8403: Communication end flag (communication end flag when using RS2

instruction, needs to be reset manually).

M8404: Data receiving.

M8408: Communication completion flag (valid when using RD3A and

WR3A for MODBUS communication, manual reset is required).

M8409: Communication timeout.

M8029: Communication completion flag (communication completion flag when using ADPRW instruction, manual reset is required).

M8161: 8-bit/16-bit mode distinction flag for RS/RS2 instructions

D8400: Save the communication parameters of Modbus RTU protocol, see the setting introduction in the table for details.

D8401: Save the communication mode of serial port 3.

D8401=H0 means RS2 free communication mode.

For Modbus RTU: D8401=H11 means the PLC is the slave station;

D8401=H1 means the PLC is the master station.

For Modbus ASCII: D8401=H111 indicates that the PLC is a slave

station; D8401=H101 indicates that the PLC is a master station.

D8406: The number of interval cycles. Default=12 (times).

D8409: Timeout time. (The unit is milliseconds, and it is recommended to

set: when the communication rate setting is greater than or equal to 9600,

D8409 is set to $10\sim20$; when the communication rate setting is less than 9600, D8409 is set to $20\sim50$).

D8414: Save the station number of the master or slave. (This value must be set to the maximum K255 when doing the host)

D8397: When using ADPRW instruction, use serial port 3, and D8397 must be set to 1.

Support RS2, WR3A, RD3A, ADPRW instructions. Can be set in the parameter area, corresponding to serial port 3. The parameter area setting is only valid for this channel. It is invalid for serial port 2.

b0	Data length 0: 7 bits 1: 8 bits
b1 b2	Parity (b2, b1) 00: None 01: Odd odd 11: Even

D8400 communication parameter format setting:



b3	Stop bit 0:1 bit 1: 2 bits
b4 b5 b6 b7	Baud rate (b7,b6,b5,b4) 0100:600bps 0101:1200bps 0110:2400bps 0111:4800bps 1000:9600bps 1001:19200bps 1010:38400bps 1011:57600bps 1100:Not use
b8~b15	Not available, set to 0

D8401 communication parameter format setting:

	Select protocol
b0	0: Other communication protocol
	1: MODBUS protocol
b1~b3	Not available, set to 0
	Master/slave setting
b4	0: MODBUS master
	1: MODBUS slave
b5~b7	Not available, set to 0
b8	RTU/ASCII mode setting 0: RTU 1: ASCII
b9~b15	Not available, set to 0

8.4.1. Mitsubishi programming port protocol

When used as Mitsubishi programming port protocol: set M8192=0.

8.4.2. Freeport protocol function

When used as Mitsubishi Freeport protocol function: set M8192=1,

M8402=1;

Program example:



11					SET	M8192	1
					M8192	set 1 serial p	port
				[NOV	flag H81	D8400	}
				THOY	parameters H0	D8401	1
MS				L	D8401 setting own communi	0 means RS cation mode	52 J
Î				-[nov	H31	D100	B
-			_	-[nov	H32	D101	3
				mov	Н33	D102	3
					[SET	M8402	3
					M8402 set 1	to send fla	B
	TRS2	D100	K3	D110	K6	K1	7

The data obtained by using the serial port tool to monitor the serial port 3 is: [2017:11:01:11:49:16][receive]31 32 32

RS2 command last parameter =1: Serial port 3;

=2: CAN.

8.4.3. Modbus RTU function RD3A/WR3A instruction

When used as Modbus RTU protocol: set M8192=1; set D8400 as the communication parameter, and set D8414 as the master and slave station number.

For example, set D8400=H81, D8414=K1 (communication parameter is 9600/8/n/1, slave station number is 1).

RD3A program example (refer to <u>chapter 8.1.1</u> for instruction introduction):

Host program:

M8002					
		-[won	H81	D8400	}
		-[MOV	parameters H1	D8401	1
		-[woa	D8401 is 1 the master K255 D8414 need	finger PLC as station D8414 s to be set to	1
-		-[woa	255 for the K10 D8409 ti	master statio D8409 meout time	۳]
-		-[WOA	K20 Set the	D8406 number of Ri	D3Å
		-[MOV	K1 etting D299=1	D299	} am
		-[WOA	K10 K10 Set D300 of read re	rial port 3 D300 to the numb gisters	er }
м7			Set M819 serial por	M8192 2 to 1 to use t 3 flag	}
-11	[RD 3A	K1 Set D3 registe	K100 00 to the num ers	D300 iber of read	}

Slave program:

₩8002 	NOV H81 D8400 D8400 set communication parameters	}
		}
	NOV K1 D8414 D8414 set slave station number FSFT M8192	3
-	Set M8192 to 1 to use serial port 3 flag	1

Use the serial port tool to monitor the serial port 3 data, and get the following results:

[2017:11:01:09:00:11][receive]01 03 00 64 00 0A 84 12 [2017:11:01:09:00:11][receive]01 03 14 00 42 00 4D 00 58 00 58 00 63 00 37 00 2C 00 21 00 16 00 0B 9F C7

WR3A program example (refer to <u>chapter 8.1.1</u> for instruction introduction):





Host program:

M8002					
-16-7		-[WOA	H81 D8400 set o	D8400	ion
		-fwor	parameters HI D8401 is	D8401	1
		—[wov	the mast K255 D8414 nee	D8414 D8414 ds to be set	to
		-[woa	255 for the K10	D8409	}
(—[woa	K20 Set th	D8406 e number of	RDB
		-[wow	K1	D399	J
-		-[MOV	ans using se K8 Set t	rial port 3 D400 he number o	of]
			Set M81 serial po	M8192 92 to 1 to us rt 3 flag	se }
	[WR3A	K1	K100	D400	3
			Set th regist	e number of ers read	

Slave program:

[MOV H81 D8400] D8400 set communication
[MOV H11 D8401] D8401 set PLC as slave
[MOV K1 D8414] D8414 set slave station number
 [SET M8192] Set M8192 to 1 to use serial port 3 flag

Use the serial port tool to monitor the serial port 3 data, and get the following results:

[2017:11:01:09:25:20][receive]01 10 00 64 00 08 10 00 0B 00 16 00 21 00 2C 00 37 00 42 00 4D 00 58 D1 6C

[2017:11:01:09:25:20][receive]01 10 00 64 00 08 10 00 0B 00 16 00 21 00 2C 00 37 00 42 00 4D 00 58 D1 6C

8.4.4. Modbus RTU Function ADPRW instruction

04 Input register readout demo program (detail of instruction

introduction please refer to chapter 8.1.2).

Master program

-1				MOA	H81	D8400	1
				set D8	400 com	parameter	15
			_		H1	D8401	}
	D8401 co	mmuni	ation m	ode is 1 r	neans ma	aster statio	on
		_	_		SET	18192]
		Se	et M819	2 to 1 me	ans use s	serial port	3
				VOM-	K1	D8397	1
	D8397 must be set to 1 whe	- ustan	anital man				
M9	T10	n using	senai po	rt 5 with	ADPRW	instruction	n
₩9 	T10	H1	H4	K0	K6	D100	n]
₩9 —↓	T10 T10 T10 T10 T10 T10	H1	H4	KO	K6	D100 K30 (T10	n])

Slave program

M8002			11111	
	[WOA.	H81	D8400	3
	set communication p	arameter	s of D840	0
-	[MOA	H11	D8401	3
	D8401 communication mode is 11 n	efers to s	lave statio	m
-	[Mov-	K1	D8397	3
	D8397 must be set to 1 when using serial port 3 wit	h ADPRV	V instructio	on
-	[MOA	K1	D8414	3
	Set D8414	4 as the s	lave static 18192	m
M8002	Set M8192 to 1 me	ans use s	erial port	3
	[жол	K21	DO	3
-	[wov	K32	D1	3
H	-[Mov	K43	D2	3
-	[Mov	K65	D3	3
-	- [MoA	K87	D4	3

Use the serial port tool to monitor data of serial port 3, and get the following results:

[2017:11:01:17:38:34][receive]01 04 00 00 00 06 70 08

[2017:11:01:17:38:34][receive]01 04 0C 00 15 00 20 00 2B 00 41 00 57 00 00 5F A7

8.4.5. Modbus ASCII function

When used as Modbus ASCII protocol: the specific parameter setting is the same as 8.4.3, only the 8th bit setting of D8401 is different, the introduction of specific setting D8401 parameter setting.

Note: In modbus ASCII protocol, ADPRW command is not supported. Demo program:

Master program:





Slave program:



The data display status of slave D100~D109 before and after program execution is shown in the figure below.

+FEDC	+B A 9 8	+7654	+3210		- 1	-
0000	0000	0000	0000		0	
0000	0000	0000	0000		0	_
0000	0000	0000	0000	D100-D109 data	0	
0000	0000	0000	0000		0	
0000	0000	0000	0000	before M7 is turned	0	
0000	0000	0000	0000	PERSONAL PROPERTY.	0	
0000	0000	0000	0000	on	0	
0000	0000	0000	0000	on	0	
0000	0000	0000	0000		0	
0000	0000	0000	0000		0	
0000	0000	0000	0000		0	
+FEDC	+5 A 9 8	+7654	+3210			4
0000	0000	0000	1011		11	
0000	0000	0000	1011		11	1
0000	0000	0000	1011		11	
0000	0000	0000	101*		11	
0000	0000	0000	16 1	Data from D00-D109	11	
0000	0000	0000	1011	all second second second	11	
0000	0000	0000	1011	is written after M7 is	11	
0000	0000	0000	1011		11	
0000	0000	0000	1011	turned on	11	
0000	0000	0000	1011		11	
0000	0000	0000	0000		0	
	+F ± D C 0 0 0 0 0 0 0 0	+F IDC +B A 98 00000 0000 00000 0000 00000 0000 00000 0000 00000 0000 00000 0000 00000 0000 00000 0000 00000 0000 00000 00000 00000	+F E D C +B A 98 +7 6 5 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 <t< td=""><td>+F IDC +B A 9 8 +7 6 5 4 +3 2 1 0 00000 0000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 10111 00000 00000 00000 00000 00000 10111 00000 10111 00000 00000 00000 10111 00000 10111 00000 00000 00000 10111 00000 10111</td><td>+F EDC +B A 98 +7 654 +3 210 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 1011 0000-DD109 00000 00000 1011 0000-DD109 0000-DD109 00000 00000 1011 is written after M7 is 00000 00000 1011 is written after M7 is 00000 00000<td>+F # DC +B & 98 +7 & 65 & 4 +3 & 2 & 1 & 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</td></td></t<>	+F IDC +B A 9 8 +7 6 5 4 +3 2 1 0 00000 0000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 10111 00000 00000 00000 00000 00000 10111 00000 10111 00000 00000 00000 10111 00000 10111 00000 00000 00000 10111 00000 10111	+F EDC +B A 98 +7 654 +3 210 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 1011 0000-DD109 00000 00000 1011 0000-DD109 0000-DD109 00000 00000 1011 is written after M7 is 00000 00000 1011 is written after M7 is 00000 00000 <td>+F # DC +B & 98 +7 & 65 & 4 +3 & 2 & 1 & 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</td>	+F # DC +B & 98 +7 & 65 & 4 +3 & 2 & 1 & 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

8.5. CAN Communication port

Support RS2 protocol and MODBUS RTU protocol. Note: After the CAN port setting is completed, the PLC must be disconnected (at least 15 seconds).



The special relays and special registers involved are as follows.

Function Description	Serial port 2(A/B)	Serial port 3(A1/B1)	CAN(H/L)	Remarks
Programming port	M8196=0	M8192=0	-	Non power retentive
RS/RS2 function	M8196=1 M8125=0	M8192=1	-	
RS/RS2 Send flag	M8122=1	M8402=1	M8422=1	Automatically reset at the end of sending
RS/RS2 Send complete flag	-	-	M8425	Need to reset manually
RS/RS2 Receive end flag	M8123	M8403	M8423	Need to reset manually
RS/RS2 Receiving process flag	M8124	M8404	M8424	Data is being received
RS/RS2 instruction 8-bit/16- bit distinguishing flag	M8161	M8161	M8161	
Master-slave flag when RS2 command CAN	-	-	M8426	M8426=0 master-slave mode, M8426=1 multi-machine mode
RS2 instruction last operand setting	-	1	2	
MODBUS function	M8196=1 M8125=1	M8192=1	-	
RD3A/WR3A receive correct flag	M8128	M8408	M8428	Automatic reset
RD3A/WR3A communication timeout flag	M8129	M8409	M8429	Automatic reset
ADPRW instruction completion flag	M8029	M8029	M8029	Instruction execution end flag
Communication parameters	D8120	D8400	D8420	
Communication mode	-	D8401	D8421	
Master and slave station number	D8121	D8414	D8434 D8440 D8442	D8434: Slave station number when CAN master-slave D8440\D8442 multi-machine mode ID number
RD3A/WR3A overtime time	D8129	D8409	D8429	The unit is milliseconds, see explanation for detailed settings
RD3A/WR3A Number of intervals	D8126	D8406	D8426	
RD3A/WR3A Last operand - 1	0	1	2	
ADPRW Set at command	D8397=0	D8397=1	D8397=2	
CAN Data Frame	-	-	M8427	

M8422:Send data, reset automatically at the end of sending

M8423:The data is received;

M8424:Data is being received;

M8425:After sending, it needs to be reset manually;

M8426: Multi-machine mode and master-slave mode switchingM8426=1: CAN is a multi-machine mode, there is no distinction between master and slave, and can transmit up to 8 bytes of data.

M8426=0: In CAN master-slave mode, there must be one master on the bus, which is similar in function to MODBUS.

M8427: =0 means set to CAN2.0B extended frame, =1 means set to

CAN2.0A standard frame.

M8428: It turns ON when the MODBUS communication response is

correct, and it needs to be reset manually.

M8429: Communication timed out.

D8420: Communication parameters.

The 0th~9th bits of D8420 are CAN baud rate, 1K~1023K. The default is 500.

Supported baud rate: 5 10 15 20 25 40 50 62 80 100 125 200 250

400 500 666 800 1000

D8421: Communication protocol and description of master and slave stations;

For RS2 instruction: D8421=H10 should be set, which means free agreement.

For RD3A, WR3A, and ADPRW : D8421=H1 means master station, D8421=H11 means slave station.

D8397: When using CAN in ADPRW instruction, D8397 must be set to 2.

D8426: Number of interval cycles, default=12 (times);

D8429: Timeout time, (unit: milliseconds, recommended setting: when the communication rate setting is greater than or equal to 9600, D8429 is set to 10~20; when the communication rate setting is less than 9600, D8429 is set to 20~50; when using RD3A and WR3A, the master station timeout time is set to about 6 longer than the slave station timeout time).

D8434: Slave station number

D8440: Save the ID number of the machine (slave station number).

D8442: When multi-channel interconnection, save the slave station ID

number (which slave station sent the data read, the ID of the slave station).

D8421 Communication parameter format setting

b0	Choose agreement 0:Other communication protocols 1:MODBUS protocal						
b1~b3	Not available, set to 0						
b4	Master/slave settings 0:MODBUS master station 1:MODBUS slave station						
b5~b7	Not available, set to 0						
b8	RTU/ASCII Mode setting 0:RTU 1:ASCII						
b9~b15	Not available, set to 0						

8.5.1. Freeport protocol function

When the RS2 command is used, multiple channels can be interconnected, and the communication PLC can be distinguished by ID number. D8440 saves the ID number of the machine, D8442 saves the ID number of the PLC where the data read in; the ID number uses a 32-bit register, but the setting can only use 29 bits, that is, the upper 3 bits have no effect. When the RS2 command is used, up to 8 lengths of data can be sent.

Program example:

M8002								
					[noa	K2	D8440 Local ID	1
						[SET	M8426	7
					M842	6=1, multi-	-machine mo	de
					—[wov	K250 Commun	D8420 mication rat	te
M8002 		-			—[mov	H10	D8421	
						Commun	ication mod	8
Send completed	1,10ms					[SET	M8422 Set send]
M8425							M8422	1-1
Send completed							M8425	-
						Se	end complete	ed
мвооо —				[BWOA	D8013	D600	K6	
M8000						Seria al	ed	
		RS2	D600	K8	D800	K8	K2	1
			Send a	rea	Receive	area		
m8424 → P= receiving	D8442 K1 ID Received	1		—[виол	0800 Receive	D1000 area	K8	-
{D=	D8442 K2) . 		[BWOA	D800 Receive	D1010	K8	1.1

RS2 command last parameter=1: Serial port 3;

=2: CAN.

8.5.2. Modbus RTU function RD3A/WR3A instruction

RD3A program example (refer to <u>chapter 8.1.1</u>)

Master program:

Coolmay L02 Series PLC Programming Manual

			RST	M8426	7
M8002	M8426	=0 means	using mast	er-slave mod	de
-11		MOV	K250	D8420	7
	B420=250 means to	set the co	mmunicatio	n rate to 25	OK
-		MOV	H1	D8421	1
	1	88421=1	means mast	er station mo	ode
		MOV	K16	D8429	7
M8002	D8429 is the communication timeou	t time, the t	ime setting ne	eds to be set	-
	more 6 than the slave station		K2	D299	1
8002 -		L			1
			K16	D300	}
10000	Cat the purphs	r of data	to be read f	rom the class	-
MSUUU	Set the humbe	er of data	to be read i	tom the slave	
	RD3A	KI	K501	D300	1

Slave program

M8002										
-+	1						MOV	K1	D8434	}
				C	08434=1 m	eans that t	he station	number of	the slave is M8426	1
M8002						M8426=	0 means	using maste	r-slave mod	le
	1						MOV	K250	D8420	7
1.1					D8420=	250 means	to set the	e communic	ation rate to	2
	-				250K	_	_[MOV	H11	D8421	}
							D842	1=11 mean	s slave mod	e
L							-{MOV	K300	D500	}
M8013 		_						[DEC	D500	}
[= 	K200	D500]			_	-[MOV	K300	D500	}
						[FMOV	D500	D501	K16	}

Monitoring the master station program, the master station D301-D316 has a total of 16 data at the speed of subtracting 1 per second and changing between 300-200.

WR3A program example (refers to <u>chapter 8.1.1</u> for instruction introduction):

Master program:

			RST	M8426	1
MS002	M8426	=0 means us	sing maste	r-slave mo	de
$\neg \vdash$		MOV	K250	D8420	}
	D8420=250 means to	o set the com	munication H1	rate to 250 D8421	к 7
	D8429 is the communication timeou	D8421=1 mea	K16 k16	station mo D8429 eeds to be	de 6
M8002	numbers larger than the slave station	[MOV	K2	D299	}
		MOV	K16	D300	7
	Set the nu	mber of data [MOV	to be writt K200	en to the sli D0	ave
M8013			[INC	DO	}
= M8000	K400 D0]	[MOV	K200	DO	}
	[FM] The 16 data at the beginning of the	0V D0 e above settin	D301 g master s	K16 tation D301	}
M8000	change between 200-400	3A K1	K100	D300	1

Slave program:



Monitoring the program of the slave station, a total of 16 data from the stations D100-D115 can be changed between 200-400 at the speed of adding 1 per second.

8.5.3. Modbus RTU function ADPRW instruction

01 Input register readout program example (refer to <u>chapter 8.1.2</u> for instruction introduction)

Master Program

M8002					RST	M8426	}
M8002					Master	-slave mod	е
				_[MOA	K250	D8420	3
					Commu	nication rate	e
-			_	MON	H1	D8421	1
					Commun	ication mod	e
				MOM	K16	D8429	7
10000						overtime	-
				TNOV	K2	D8397	1
W000				Set to	use CAN c	ommunicati	ion
	[ADPRW	H1	Ht	HO	K4	DO	3

Slave program



It means to communicate with the CAN port of the slave PLC through the CAN port of this PLC, and read the 4-bit M0~M3 of the slave PLC to D0 of the master PLC.

8.6. Network communication

Support Mitsubishi MC protocol, modbus TCP/UDP protocol and EtherNet/IP protocol.

The network is automatically detected after power-on. When there is a network chip, M8193=1, the network is ready.

The involved special relays, special registers, and registers used by the IP address are as follows:



Function Description	Network usage	remarks
Network preparation	M8193	
Connection communication flag	M8395	 =1: Communication is normal =0: The connection communication is abnormal; Change from normal to abnormal, automatically reconnect once
Write network address	M8197	
MODBUS timeout	M8062	
IP address conflict	M8063	
Obtain the current IP address automatically	M8324	26238 and above versions use
EtherNet/IP and MODBUS master, the number of slaves	D8325	1≤D8325≥4
EtherNet/IP and MODBUS switch sign	D8395	
Set during ADPRW instruction	D8397=3	
Router address	R23800 R23801	
Mask address	R23802 R23803	
MAC address	R23804~R23806	
Local IP address	R23807 R23808	
Destination IP address	R23830 R23831(Server 1) R23840 R23841(Server 2) R23850 R23851(Server 3) R23860 R23861(Server 4)	
port	R23812	Default 502
RD3A/WR3A instruction cycle times	R23813	
MODBUS timeout	R23814	
Number of packets sent	R23815	
Number of received packets	R23816	
overtime time	R23824	Default 200ms

M8193: =1 Indicates that there is a network chip, and the network is ready

M8197: =1 Write the network address and reset automatically.

M8062: =1 Indicates MODBUS timeout, MODBUS_TCP is used.

M8063: =1 Indicates an IP address conflict.

D8325: The number of slave stations, the number of connections must be set when acting as the master, $1 \le D8325 \ge 4$, the default is D8325=0.

D8395: EtherNet/IP and MODBUS_TCP switch;

D8395=0: EtherNet/IP master station (with 4 slave stations at most)

D8395=1: MODBUS_UDP Slaves

D8395=2: MODBUS_UDP Masters

D8395=3: MODBUS_TCP Slaves (Server)

D8395=4: MODBUS_TCP Masters (Client, with up to 4 slaves)

D8395=5: EtherNet/IP Slaves (Server)

Note: In the local area network, MODBUS TCP or Ethernet/IP communication can be used, and Mitsubishi programming software can be used to program through the network port.

D8397: When using MODBUS_TCP for ADPRW instruction, D8397 needs to be set to 3.

R23800 and 23801 are router addresses. The default is 192.168.1.1. That is, R23800=0XC0A8, R23801=0X0101.

R23802 and 23803 are the mask addresses, and the default is 0 .0. 0 .0. That is, R23802=0, R23803=0.

R23804~23806 are MAC addresses, which are generated by the system and are basically not repeated. Can also be set. Note: The MAC address on the same network cannot be repeated, otherwise it will cause abnormal communication.

R23807 and R23808 are the IP addresses of this machine. The default is 192.168. 1.250, that is, R23807=0XC0A8, R23808=0X01FA.

R23830, R23831/R23840, R23841/R23850, R23851/R23860, R23861 are MODBUS target IP.

R23812 port default 502

R23813 default=100 (number of cycles), which is the interval time between WR3A and RD3A sequence execution.

R23814 default = 20 (200ms), it is the MODBUS timeout time setting, only

retry twice, each time = (R23814*5)ms.

R23815 is the number of MODBUS sent packets

R23816 is the number of MODBUS received packets.

8.6.1. MITSUBISHI MC protocol

Note: a. MC protocol and cloud configuration background can coexist, even when MC protocol is used, it can also be connected with Coolamy Cloud background.

b. When the MC protocol is used, the default port is 5556.

c. When the communication is unsuccessful, check whether the IP of the

PLC and HMI is correct (ensure the same network segment), whether the IP of the HMI remote access is correct, whether the HMI protocol is selected correctly, and whether the network cable is connected correctly.

1. Set the IP address of the PLC

a. Automatic acquisition: M8324 is set when M8002 is powered on

I	M8002		-	
0	-1)	[SET	M8324]

b. Manual settings:

Method 1:

Write directly to the IP register

Router address: R23800 R23801; default 192.168.1.1. That is,

R23800=0XC0A8, R23801=0X0101.

Subnet mask: R23802 R23803; default 0 .0. 0 .0. That is, R23802=0, R23803=0.

IP address: R23807 R23808; the default is 192.168.1.250, that is, R23807=0XC0A8, R23808=0X01FA.

02	* <route (10.31.0.1)="" gateway=""> [DMOV H10A1F R23800]</route>
	* <mask(255.255.0.0)> [DMOV H0FFFF R23802]</mask(255.255.0.0)>
	* <ip (10.31.1.206)=""></ip>

Method 2:

Use cloud parameter setting software (Cloudset.exe) to set



即地址设定	云参数
IP地址:	服务器地址:
子网撞码:	PLC编号:
路由器地址:	用户名:
MAC地址:	密码:
	连接服务器状态: 未知 刷新
	· 获取当前云设定
1:设置好IP. 子网掩码, 路由器	备注:上传云时,需要在程序中置位18326

- 2. Diagram of network connection
 - a. Without switching equipment

_	LAN	_	 _	_	_
	CX30	5 PLC			
	1				Ì
	T	- C			



b. Through the switching equipment





- 3. HMI settings (different manufacturers have different HMI settings)
 - a. Weilun HMI protocol settings:

Name :	Mitsubishi FX3U (Etherne			
	OHMI Device			
Location :	Local 🗸 S	ettings		
* Select Local for a	device connected to this H	MI, or Remote	for a device connected	l through another HM
Device type :	M	itsubishi FX	30 (Ethernet)	
	Device ID : 105, V. 1. 10, M	ITSUBISHI_FX	3U_ETHERNET.e30	
I/F:	Ethernet	~	Open Device Co	onnection Guide
* Support off-line si	mulation on HMI (use LB-12	2358).		
* Support off-line si	10.31.1.223, Port=5556	2358).		Settings
* Support off-line si IP :	i0.31.1.223, Port=5556	2358). am Protocol)		Settings
* Support off-line si IP :	mulation on HMI (use LB-12 10.31.1.223, Port=5556 Use UDP (User Datagra	2358). am Protocol)		Settings
* Support off-line si	ilo.31.1.223, Port=5556	am Protocol)		Settings
* Support off-line si IP :	mulation on HMI (use LB-12 10.31.1.223, Port=5556 Use UDP (User Datagra	am Protocol)		Settings
* Support off-line si IP : Interv	mulation on HMI (use LB-12 10.31.1.223, Port=5556 Use UDP (User Datagra	am Protocol)		Settings
* Support off-line si IP : Interv Max. rea	nulation on HMI (use LB-12 10.31.1.223, Port=5556 Use UDP (User Datagra val of block pack (words) : d-command size (words) :	2358). am Protocol)		Settings

The settings in the above figure indicate that the HMI accesses the PLC whose IP is 10.31.1.223, and the port is 5556.

8.6.2. Modbus TCP Function

The master station supports WR3A RD3A instructions, WR3A D300 D400

D500, RD3A D300 D400 D500, and requires D499=3

When D499=0, it is serial port 2 MODBUS.

When D499=1, it is serial port 3 MODBUS.

When D499=2, it is CAN_MODBUS.

When D499=3, it is network MODBUS.

Slave station response function code, does not support five kinds of 0X7

0X8 0XB 0XC 0X11, others are supported

RD3A program example (refer to <u>chapter 8.1.1</u> for instruction

introduction):

Master Program:

Coolmay L02 Series PLC Programming Manual

	M8002	* <mov hocoa<="" th=""><th>8 R23800, R2380</th><th>00, R23</th><th>801 is the r</th><th>outer addre</th><th>ss)</th></mov>	8 R23800, R2380	00, R23	801 is the r	outer addre	ss)
0	$\neg \vdash$			-[MOV	HOCOA8	R23800	
				EMOV	H1	R23801	
	- 7						
		* <mov ho<="" td=""><td>FFFF R23802; R2</td><td>.3802, Fuov</td><td>R23803 is th</td><td>e subnet ma</td><td>sk</td></mov>	FFFF R23802; R2	.3802, Fuov	R23803 is th	e subnet ma	sk
	1			-Twon	HOFFFF	R23802	0
	1			-[mov	HOFFOO	R23803	
		* <mov hocoas="" r2<="" td=""><td>3807; R23807, R</td><td>23808</td><td>is the IP of</td><td>this machi</td><td>ne</td></mov>	3807; R23807, R	23808	is the IP of	this machi	ne
				-[mov	HOCOA8	R23807	
	4			-[mov	H1A	R23808	
			* <mov k<="" td=""><td>(800 R2</td><td>3813; modbus</td><td>polling ti</td><td>me</td></mov>	(800 R2	3813; modbus	polling ti	me
				-[mov	K800	R23813	
			* <set m<="" td=""><td>8197;</td><td>write networl</td><td>s informati</td><td>on)</td></set>	8197;	write networl	s informati	on)
				-	[SET	M8197	ļ
		* <mov d8395;d8395="4" k4="" td="" ⊅<=""><td>means this mach</td><td>ine is</td><td>a TCP commu</td><td>nication ho</td><td>st.</td></mov>	means this mach	ine is	a TCP commu	nication ho	st.
	1	S		-[mov	K4	D8395	
		* <mov d8<="" k1="" td=""><td>325; D8325=1 is</td><td>the n</td><td>umber of com</td><td>nected slav</td><td>es)</td></mov>	325; D8325=1 is	the n	umber of com	nected slav	es)
	- 6			-[MOV	K1	D8325	
		* <mov d19="</td" d19;="" k3=""><td>3 means RD3A is</td><td>used</td><td>for network</td><td>communicati</td><td>on</td></mov>	3 means RD3A is	used	for network	communicati	on
				-[mov	КЗ	D19	
	2			-[mov	K8	D20	
	10000	* <iiov hocoa8="" r2383<="" td=""><td>0: R23830, R238</td><td>31 are</td><td>the target 1</td><td>IP of slave</td><td>1)</td></iiov>	0: R23830, R238	31 are	the target 1	IP of slave	1)
58 -				-[mov	HOCOA8	R23830	-
				-[mov	H19	R23831	
		[RD3A	K1	ко	D20		
			WAND DOOR		5		
77 -	₩8000 		*/MO# 1230	-[MOA	R23815	D315	167
			* <mov d<="" r23816="" td=""><td>1317, n</td><td>umber of rece</td><td>eived packe</td><td>ts</td></mov>	1317, n	umber of rece	eived packe	ts
				-[mov	R23816	D317	-
88 -						END	
							-

Slave program:


	M8002	* <mov 1<="" hocoa8="" r23800,="" r23800;="" th=""><th>R23801</th><th>is the router</th><th>IP addres:</th></mov>	R23801	is the router	IP addres:
0 -			-[MOA	HOCOA8	R23800
			-[mov	H1	R23801
		* <mov hoffff="" r23802;="" r23<="" td=""><td>3802, I</td><td>23803 is the</td><td>subnet masl</td></mov>	3802, I	23803 is the	subnet masl
			-[mov	HOFFFF	R23802
	1		-[mov	HOFFOO	R23803
		* <mov hocoa8="" r23807,="" r23807;="" r3<="" td=""><td>23808 i</td><td>is the IP of t</td><td>his machine</td></mov>	23808 i	is the IP of t	his machine
			-[mov	HOCOA8	R23807
			-[mov	HODB	R23808
				[SET	M8197
		* <mov d8395="3</td" d8395;="" k3=""><td>is the</td><td>e TCP communic</td><td>ation slave</td></mov>	is the	e TCP communic	ation slave
			-[mov	K3	D8395
8 -				10	-[END
					-

8.6.3. Etherenet/IP function

8.6.2.1 Communication with L02-EIP

When the L02 series host computer and L02-EIP module use the Ethernet/IP protocol to communicate, the L02-EIP module is used as the slave station, and the DIP switch needs to be used to set the slave station IP address on the L02-EIP. And if the analog input expansion module is connected to the L02-EIP, you need to set the analog input type of each channel of LO2-EIP. For detailed setting method, please refer to "Coolmay L02-EIP Module User Manual"

8.6.2.2 L02 PLC as Ethernet/IP master station

The following special registers need to be set when the L02 master is the master.

D8325: The number of EtherNet/IP slave stations. Currently, it supports a maximum of 4 slave stations.

D8395: EtherNet/IP and MODBUS switch flag, default D8395=0;

R23824: The timeout period is 200ms by default.

R23820-R23823 are EIP connection status:

=1 means connecting

=0 not connected

=2 successfully connected

=345 is the EIP handshake process

=5 the handshake is successful

R23834, R23844, R23854, R23864 set the number of bytes input by switch;

R23835, R23845, R23855, R23865 set the number of analog input words;

R23836, R23846, R23856, R23866 set the switch to measure the number

of bytes;

R23837, R23847, R23857, R23867 set the number of analog output words;

The number of digital bytes must be set to an even number. For example, if the number of digital input bytes in the slave is 3, then the number of digital bytes in the master must be set to 4, otherwise the data will be messy. After setting, set M8197 once to start communication.

1. PLC as Ethernet/IP master station

The host will automatically map the data of the slave to the corresponding internal address, and the mapping relationship is as follows:

		Number	200 host	Number	50 host		200 host	Number	50 host	
Number		of	correspo	of	correspo	digital	correspo	of	correspo	Connect
of slaves	Slave IP	digital	nding	analog	nding	output	nding	analog	nding	ion
D8325		input	addresse	input	addresse	bytes	addresse	output	addresse	Status
		bytes	S	words	S		S	words	s	
Slave 1	R23830 R23831	R23834	M5000- M5199	R23835	R23100- R23149	R23836	M6000- M6199	R23837	R23300- R23349	R23820
Slave 2	R23840 R23841	R23844	M5200- M5399	R23845	R23150- R23199	R23846	M6200- M6399	R23847	R23350- R23399	R23821



Coolmay L02 Series PLC Programming Manual

Slave 3	R23850 R23851	R23854	M5400- M5599	R23855	R23200- R23249	R23856	M6400- M6599	R23857	R23400- R23449	R23822
Slave 4	R23860 R23861	R23864	M5600- M5799	R23865	R23250- R23299	R23866	M6600- M6799	R23867	R23450- R23499	R23823

Slave input allocation (D2000-D2199) 200 bytes Slave output allocation (D1000-D1199) 200 bytes

The first slave address allocation:

- Digital input: 24 bytes (M5000-M5191)
 Slave station address allocation: D2000-D2023
- 2) Analog input: 50 words (100 bytes) (R23100-R23149)Slave station address allocation: D2024-D2123
- Digital output: 24 bytes (M6000-M6191)
 Slave station address allocation: D1000-D1023
- 2) Analog output: 50 words (100 bytes) (R23300-R23349)Slave station address allocation: D1024-D1123

The second slave address allocation:

- Digital input: 24 bytes (M5200-M5391)
 Slave station address allocation: D2000-D2023
- 2) Analog input: 50 words (100 bytes) (R23150-R23199) Slave station address allocation: D2024-D2123
- Digital output: 24 bytes (M6200-M6391)
 Slave station address allocation: D1000-D1023

2) Analog output: 50 words (100 bytes) (R23350-R23399) Slave station address allocation: D1024-D1123

The third slave address allocation:

- Digital input: 24 bytes (M5400-M5591)
 Slave station address allocation: D2000-D2023
- 2) Analog input: 50 words (100 bytes) (R23200-R23249)

Slave station address allocation: D2024-D2123

- Digital output: 24 bytes (M6400-M6591)
 Slave station address allocation: D1000-D1023
- 2) Analog output: 50 words (100 bytes) (R23400-R23449) Slave station address allocation: D1024-D1123

The fourth slave address allocation:

- Digital input: 24 bytes (M5600-M5791)
 Slave station address allocation: D2000-D2023
- 2) Analog input: 50 words (100 bytes) (R23250-R23299) Slave station address allocation: D2024-D2123
- Digital output: 24 bytes (M6600-M6791)
 Slave station address allocation: D1000-D1023
- 2) Analog output: 50 words (100 bytes) (R23450-R23499)Slave station address allocation: D1024-D1123

2. Ethernet/IP Host program example:

Coolmay L02 Series PLC Programming Manual

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	10000	* <192.168.1.	1	
0		[MOV]	HOCOAS	R23800
		L	ocal rout	ing address 1
			H101	R23801
		L	cal rout	ing address 2
		* <255, 255, 25	5.0	
			HOFFFF	R23802
		Local	subnet m	ask address 1
			HOFFOO	R23803
		Local	subnet m	ask address 2
		* ⊀192, 168, 1,	175	
		Гиоу	HOCOAS	R23807
			Local	IP address 1
		Гиоу	HIAF	R23808
			Local	IP address 2
			\$800	R23813
				Polling time
		* < D8395=0; Eth	erNet/IP	主站
		[MOV]	02	D8395
		Communicat	ion proto	col selection
			<u>۲</u> 1	D8325
		-24	Number c	of EIP modules
- 1	W 8002	* <192.168.1.	31	
46 -		[mov]	HOCOAS	R23830
		IP address 1 o	f the fir	rst EIP module
			HIIF	R23831
		IP address 2 c	f the fir	rst EIP module
-		* <number bytes="" digital="" input="" of="" of<="" td=""><td>the firs</td><td>st EIP module></td></number>	the firs	st EIP module>
			<u>{</u> 2	R23834
		* <number bytes="" digital="" of="" of<="" output="" td=""><td>the first</td><td>st EIP module)</td></number>	the first	st EIP module)
		โพกง เ	(2	R23836

			Mov	К4	R23835	1
		* <number analog<="" of="" th=""><th>s output byte</th><th>s of the first</th><th>EIP module</th><th>e></th></number>	s output byte	s of the first	EIP module	e>
			Ewon	K4	R23837	1
77	₩8002			[SET	M8197	-
2 byte	s of remo	e input are respectively in M5000-M5015		Write network	informatio	'n
2 byte digita	s of remc l quantit	e output are in M6000-M6015 respectively .es of the remote 2 channel analog input are in R23100-R23101 respectively				
remote	2 channe M8000	. analog output given registers are in R23300-R23301 respectively				
80	-11-		Ewon	K4M5000	D100	3
				D102	K4M6000	3
		LBMOV	R23100	D110	K4	1
			[wov	K2000	R23300	3
				K4000	R23301	7
			*/WOX 2000	15 D215, cond	data nackoj	
108	M8000			P22215	D215	1
100	11		LWOV 222216	D217 receive	data nacka	+ \
			Funder R23810	DOIT, TECETVE	DO17	-
			LWOA	W29010	0317	-



8.6.2.3 L02 PLC as Ethernet/IP slave

When the L02 host PLC is used as a slave station for Ethernet/IP

protocol communication, it needs to be set as follows:

M8197: =1 to write the network address and automatically reset.

D8395: EtherNet/IP slave (server)

Transfer the data that needs to be read or written in the program to a

fixed corresponding register interval, the relationship is as follows:

	Input register fixed	Output register fixed
	correspondence	correspondence
	(the lower eight bits are valid)	(the lower eight bits are valid)
slave	D2000-D2199	D1000-D1199

The Ethernet/IP host only needs to configure the corresponding input and output connection address, and it will automatically map the data of the slave to the configured connection address.

Example of L02 PLC as Ethernet/IP slave station program:



0		M8002		*<19	92.168.1.3
Implementation Imple	0		VOM]	HOCOA8	R23807
*(write network parameters			[M OV	H11F	R23808
Averter hervork parameter [SET M8197 *<=5 is Ethernet/IP slave stat [Nov N5 D8395 18 1002 The input register is fixed and corresponding, the lower eight bits are valid 24 10 (Nov N2000 D2000 [Nov N2000 D2000 [Nov N2000 D2000 [Nov N2000 D200 [Nov N2000 D200 [Nov N2000 D200 [Nov N2000 D200 [Nov N2000 D20 [Nov N2000 N2000 [Nov N200				a santuraula	
18 1000 <			*/WII/	ferr	parameter:
#<5 is Ethernet/IP slave stat				Lon	m0197
Image: Macro of the second s			*<=5 is Ether	met/IP sl	ave statio
18 18 [ZKST D1000 D1089 The input register is fixed and corresponding, the lower eight bits are valid 24 [MOV EZX000 D2000 24 [MOV EZX000 D2000 Analog input, the lower eight bits of D2002-D2005 are valid [MOV EZX010 D2001 Analog input, the lower eight bits of D2002-D2005 are valid [MOV D8030 D20 Analog input, the lower eight bits of D2002-D2005 are valid [MOV D8031 D21 Analog input, the lower eight bits of D2002-D2005 are valid [MOV D8031 D21 Analog input, the lower eight bits of D2002-D2005 are valid [MOV D8031 D21 Analog input, the lower eight bits of D2002-D2005 are valid [MOV D8031 D21 Analog input, the lower eight bits of D2002-D2005 are valid [MOV D1000 E27000 54 [MOV D1000-D1001, the lower eight bits are valid [MOV D1001 E27010 54 [MS000 [MS000 [MOV D1001 E27010 65 [MS000 [MOV D100 E7000 E7000 65 [MS000<				KS	D8395
The input register is fixed and corresponding, the lower eight bits are valid 24	18	₩8002 	[ZRST	D1000	D1099
24 18000 100V K2X000 D2000 Analog input, the lower eight bits of D2002-D2005 are valid 100V K2X010 D2001 Analog input, the lower eight bits of D2002-D2005 are valid 100V D8030 D20 Analog input, the lower eight bits of D2002-D2005 are valid 100V D8031 D21 Analog input, the lower eight bits of D2002-D2005 are valid 100V D8031 D21 46 10000 1000-D1001, the lower eight bits are valid 100V D1000 K27000 54 1000 1000 1000 K27000 1000 K27000 73 1000 1000 100 100 100 100 100 73 1000 1000 1000 1000 1000 1000 1000 73 1000 1000 1000 1000 1000 1000 1000	The in	out register is fixed and corresponding, t	he lower eight bits are valid		
Analog input, the lower eight bits of D2002-D2005 are valid MOV EZX010. D2001 Analog input, the lower eight bits of D2002-D2005 are valid MEOOD [MOV D8031 D21 Analog input, the lower eight bits of D2002-D2005 are valid MEOOD [WTOB D20 D2002 K4 Digital output D1000-D1001, the lower eight bits are valid MEOOD [MOV D1000 EX2000 MEOOD [MOV D1001 EX2000 The lower eight bits of analog output are valid Combine D1002-D1005 bytes into D100 D101 MEOOD [NOV D100 K2000 MEOOD [NOV D100 K200 MEOOD [NOV D100 K200 MEOD [NOV D100 K200 MEOD [NOV D1	24	M8000	Гион	K2X000	12000
Image:			Enc.	12x000	02000
Analog input, the lower eight bits of D2002-D2005 are valid 35			[моv	K2X010	D2001
35 M8000 Down Description Mov Description Description <thdescription< th=""> Description</thdescription<>	Analog	input, the lower eight bits of D2002-D200	5 are valid		
Analog input, the lower eight bits of D2002-D2005 are valid 46 46 M8000 54 The lower eight bits of analog output are valid Combine D1002-D1005 bytes into D100 D101 65 M8000 73 M8000 73 (MOV D100 D100 D101 D100 D101 (MOV D100 D100 D100 D101 D100 D100 D100 D10	35	M8000		18030	1120
Image:		-11	Last		
Analog input, the lower eight bits of D2002-D2005 are valid 46			Гмоу	D8031	D21
46 M8000 [WT08 D20 X4 Digital output D1000-D1001, the lower eight bits are valid [MOV D1000 K27000 54 [MOV D1000 K27000 [MOV D1001 K27000 54 [MOV D1001 K27000 [MOV D1001 K27010 [MOV D1002 D100 K4 [MOV D100 D8050 [MOV D100 D8050 [MOV D101 D8051	Analog	input, the lower eight bits of D2002-D200	5 are valid		
Digital output D1000-D1001, the lower eight bits are valid 54	46	₩8000	[WTOB D20	D2002	K4
54	Digita	output D1000-D1001 the lower eight hits	are valid		
Control CMOV D1001 M27010 The lower eight bits of analog output are valid Combine D1002-D1005 bytes into D100 D101 Entrol M2000 65	54	M8000	Гион	D1000	K20000
Image: Moving and Sector 1 Image: Moving and Sector 1 <th< td=""><td>01</td><td></td><td>Enc.</td><td>DIOOD</td><td>121000</td></th<>	01		Enc.	DIOOD	121000
The lower eight bits of analog output are valid Combine D1002-D1005 bytes into D100 D101 65 [BTOW D1002 D100 K4 73 [MOV D100 D8050 [MOV D101 D8051			Смоч	D1001	K2Y010
Combine D1002-D1005 bytes into D100 D101	The low	ver eight bits of analog output are valid			
65 [BTOW D1002 D100 K4 73 [M0V D100 D8050 [M0V D101 D8051	Combine	2 D1002-D1005 bytes into D100 D101			
73	65		[BTOW D1002	D100	К4
/3	70	8000			
[MOV D101 D8051	13			1100	19020
			[mov	D101	D8051
					-

8.6.2.4 L02 series Ethernet/IP protocol use structure diagram

1. The L02 host is the master station of the Ethernet/IP protocol, and L02-

EIP is the slave station of the Ethernet/IP protocol, passing through the router.



2. The L02 host is the master station of the Ethernet/IP protocol, and the L02-EIP is the slave station of the Ethernet/IP protocol, without going through the router.



3. The L02 host is the master station of the Ethernet/IP protocol, and the L02 host is the slave station of the Ethernet/IP protocol.



4. The L02 host is the master station of the Ethernet/IP protocol, and the L02 host and the L02-EIP module are mixed as the slave station of the Ethernet/IP protocol

Coolmay L02 Series PLC Programming Manual



8.7. Network N:N communication

8.7.1. Related device content

Device	Name	Content	Set value
M8038	Parameter	Set the flag bit for communication parameters. It can also be used as a flag bit for confirming	
10050	setting	whether there is an N:N network program. Do not turn ON in the sequence program.	
D8176	Setting of the corresponding station number	N:N network setting when using the station number. The master station is set to 0, and the slave station is set to 1-15. [Initial value: 0]	0~15
D8177	Total number of slaves setting	Set the total number of slave stations. No setting is required in the programmable controller of the slave station. [Initial value: 7]	1~15

1. N:N Device for network setting



Coolmay L02 Series PLC Programming Manual

D8178	Refresh Range setting	Select the mode of the number of device points to communicate with each other. No setting is required in the programmable controller of the slave station. [Initial value: 0]	0~2
D8394	Serial channel selection	=2: Serial port2=3: Serial port3=4: CAN	2~4

2. Components for judging N:N network errors

M8184~M8190, M8496~M8503: Data transmission sequence error flag of the slave.

When each slave station has a data transmission sequence error, the

corresponding flag bit is ON.

Station No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Relay	M8184	M8185	M8186	M8187	M8188	M8189	M8190	M8496	M8497	M8498	M8499	M8500	M8501	M8502	M8503

3. Link device

It is a device used to send and receive information between each programmable controller. Depending on the station number set in the corresponding station number setting and the mode set in the refresh range setting, the device numbers and points used are also different.

Station No.	Station 0	Station 1	Station 2	Station 3	Station 4	Station 5	Station 6	Station 7
Word device (4 points each)	D0~D3	D10~D13	D20~D23	D30~D33	D40~D43	D50~D53	D60~D63	D70~D73
Station No.	Station 8	Station 9	Station 10	Station 11	Station 12	Station 13	Station 14	Station 15
Bit device (4 points each)	D80~D83	D90~D93	D100~ D103	D110~ D113	D120~ D123	D130~ D133	D140~ D143	D150~ D153

1) In mode 0 (D8178=0):

2) In mode 1 (D8178=1)

Station No.	Station 0	Station 1	Station 2	Station 3	Station 4	Station 5	Station 6	Station 7
Word device (32 points each)	M1000~ M1031	M1064~ M1095	M1128~ M1159	M1192~ M1223	M1256~ M1287	M1320~ M1351	M1384~ M1415	M1448~ M1479
Bit device	D0, D2	D10~	D20~	D30~	D40~	D50~	D60~	D70~
(4 points each)	D0~D3	D13	D23	D33	D43	D53	D63	D73
Station No.	Station 8	Station 9	Station 10	Station 11	Station 12	Station 13	Station 14	Station 15
Bit devices (32 points each)	M1512~ M1543	M1576~ M1607	M1640~ M1671	M1704~ M1735	M1768~ M1799	M1832~ M1863	M1896~ M1927	M1960~ M1991
Word device	D80~	D90~	D100~	D110~	D120~	D130~	D140~	D150~
(4 points each)	D83	D93	D103	D113	D123	D133	D143	D153

3) In mode 2 (D8178=2):

Station No.	Station 0	Station 1	Station 2	Station 3	Station 4	Station 5	Station 6	Station 7
Bit devices (64 points each)	M1000~ M1063	M1064~ M1127	M1128~ M1191	M1192~ M1255	M1256~ M1319	M1320~ M1383	M1384~ M1447	M1448~ M1511
Word device (8 points each)	D0~D7	D10~ D17	D20~ D27	D30~ D37	D40~ D47	D50~ D57	D60~ D67	D70~ D77
Station No.	Station 8	Station 9	Station 10	Station 11	Station 12	Station 13	Station 14	Station 15
Bit devices (64 points each)	M1512~ M1575	M1576~ M1639	M1640~ M1703	M1704~ M1767	M1768~ M1831	M1832~ M1895	M1896~ M1959	M1960~ M2023
Word device (8 points each)	D80~ D87	D90~ D97	D100~ D107	D110~ D117	D120~ D127	D130~ D137	D140~ D147	D150~ D157

8.7.2. Program settings and instructions

The program settings are as follows. The timeout waiting register D8129/D8409/D8429 is recommended to be set to 12 or more. You only need to set the corresponding special register to realize the data sharing of the corresponding interval register and auxiliary relay. There is no need to write read and write instructions. Channel M8184~M8190 and the last 8 channels M8496~M8503, you can view the status of each slave, if there is no connection, it will be turned ON

1. Serial port 2



Master program:



Slave program:

V18002	* <serial d8<="" port="" selection,="" th=""><th>394=2 is serial port</th></serial>	394=2 is serial port
	[моv к	2 D8394
v18038	* <	lave station numb
-11	[моv к	5 D8176
		5 001

2. Serial port 3

Such as serial port 2, only need the master and slave program to set D8394=3

3. CAN port

Master program:





Slave program:



9. Coolmay L02 series PLC hardware identification

and address allocation

The L02 series PLC host can expand digital and analog according to customer needs. This chapter introduces the hardware identification and address allocation of the extension module by the host.

9.1. Hardware identification of digital input and output

modules

When the host detects the digital module, it will display the number of bytes of digital input and output in the corresponding designated register. The number of digital inputs and outputs is calculated in bytes, and every 8 inputs or 8 outputs counts as one byte.

If the extension module is correctly connected to the host, but the host does not detect the module (that is, the data in the register does not match the actual number of extension modules), please re-plug the host and the extension module.

Register	Function description
D8054	Number of digital input bytes
D8056	Number of digital output bytes



For example, the product is L02M24R + L02-16EX + L02-16ER, which expands 24 digital inputs and 8 digital outputs. Monitor the data of D8054 and D8056 as shown in the figure below.

Softcomponent	+FEDC	+B A 9 8	+7654	+3 2 1 0	
D8054	0000	0000	0000	0011	3
D8055	0000	0000	0000	0000	0
D8056	0000	0000	0000	0001	1
D8057	0000	0000	0000	0000	0

9.2. Address allocation of digital input and output modules

When the host detects the expansion of the digital input and output, it will automatically sort from X20 or Y20 from left to right.

Take the host L02M24R, digital input modules L02-8EX and L02-16EX, and digital output modules L02-16EYR and L02-8EYT as examples. When the expansion module sequence is different, the address allocation is also different.

Sort one, the address of each expansion module is shown in the figure below.



Sort two, the address of each expansion module is shown in the figure below.



9.3. Hardware identification of analog input and output modules

When expanding the analog module, you need to set the type of each analog in the R23500~R23549 register of the host. For the correspondence between values and types, please refer to chapter 5.1.4.

The type is set correctly. When the host detects the analog module, it will display the number of analog input and output words (ie the number of channels) in the corresponding designated register.

If the extension module is correctly connected to the host, but the host does not detect the module (that is, the data in the register does not match the actual number of extension modules), please re-plug the host and the extension module.

Register	Function description
D8055	Number of analog input words
D8057	Number of analog output words

For example, the product is L02M24R + L02-4TC + L02-4DA+L02-4AD2DA, which is to extend 8 analog input and 6 analog output. You need to set the



value of R23500-R23507 in the R register of the host first (Note that the

default is 0) as shown in the following table.

Monitor the data of D8055 and D8057 as shown in the figure below.

Softcomponent	+FEDC	+B A 9 8	+7654	+3 2 1 0	
D8054	0000	0000	0000	0000	0
D8055	0000	0000	0000	1000	8
D8056	0000	0000	0000	0000	0
D8057	0000	0000	0000	0110	6

9.4. Address reading of analog input and output modules

Refer to Chapter 5.1.4 for analog input reading.

Refer to Chapter 5.2.2 for analog output reading.



Appendix Version Change Record

Date	Changed version	Change content
Aug. 2021	V21.81	 1.4 L02 series host and modules descriptionmodified the description of power module 7.3 Pulse width modulation PWM5. Special instructions, changed the output frequency
Dec.2021	V21.121	 3.1 Special Relays and Registers-Change Interpolation Flag Relay
Feb.2022	V22.21	 AB(Z) phase 2 channels 60KHz + AB phase 1 channel 10KHz changed to AB(Z) phase 2 channels 30KHz + AB phase 1 channel 5KHz The high-speed pulse is modified to 4 channels of 100KHz+4 channels of 50KHz 8.3.2 Mitsubishi BD Protocol Added 8.6 Modification of some parameters 8.6.1 MC protocol Added

Coolmay® Automation Expert

L02 Series AIO Module User Manual

Thank you for purchasing Coolmay L02 series AIO modules. This manual mainly describes the product characteristics, general specifications and wiring methods of the module. For detailed usage, please refer to "Coolmay L02 Series PLC Programming Manual".

L02 series AIO modules have the following characteristics:

1. Used with Coolmay L02 series CPU, the address is automatically assigned.

2. Standard DIN rail (35mm wide) and snap-in buckle installation, convenient installation and removal.

3. Using push-type terminals, convenient wiring.

Product Structure







3. Expansion interface

4 point

Temperature sensor,

Thermocouple

L02-4TC



4. Standard DIN rail installation

Figure 1 Product structure

Temperature analog module

1. PWR: power indicator

2. Analog input and output terminal block

Hardware Port



4/2 point Analog input/output Current and voltage

L02-4AD2DA

Analog input/

output module

A/O Module size

L02-4AD、L02-4DA、L02-4AD2DA L02-4RTD、L02-4TC、L02-2LC



4 point

Temperature sensor,

PT100/PT1000

L02-4RTD

Figure 2 AIO module

Figure 3 Dimensions of AIO module

Installation Notes

Snap-in buckle installation method

Open the white buckle, align the expansion interface and push the module directly in, press the white buckle at both ends to complete the installation



Press the buckle

Figure 4 Snap-in buckle installation

Analog Wiring

The L02 series analog modules have the following wiring methods. Please do not wire the empty terminals. Current and voltage

1. Please use insulated wires for analog input/output signals and separate them from other power cables. 2. If the current signal is connected, the Vn and In (n=1~4) terminals must be short-circuited.





Figure 6 Analog wiring diagram

Weighing module











Rail installation method

The CPU module and each expansion module can be directly installed on the standard rail DIN35mm without a backplane; the product can be directly locked on the rail by pressing the rail buckle....



Put the module into the rail card slot, press the rail buckle to complete the installation.

Figure 5 Rail installation

RTD

1. Use insulated twisted-pair wires to reduce interference. Be careful to keep them away from other power cables or wires that may cause noise.

2. When using 2-wire temperature sensor, please short-circuit TAn and TBn (n=1~4).

Note: The length of the three-wire type wire must be equal, the single wire length is less than 200m and the single wire resistance is less than 200hm.



TC

Use J, K, S, T, E type thermocouple temperature sensor connection wires or insulated twisted-pair wires, and separate them from other power cables or wires that may cause noise.



NTC

When using thermistor, pay attention to the B value of the sensor, NTC 50K/100K (B value defaults to 3950), NTC10K (B value defaults to 3435);

The B value can be switched in the program, please refer to the programming manual for details.



Weighing module L02-2LC

