Coolmay®
Automation Expert

L02 Series Programmable Logic Controller (PLC)

Customize your automation control system

Version 2022.05

www.coolmayplc.com

Factory


Office

BRAND STORY

The predecessor of Coolmay Technology is Coolmay apparel, which initially started with the production of lace machines. This kind of device is low value but it is difficult for users to make after-sales budgets. In addition, they lacked professional maintenance technology, which made after-sales maintenance difficult. If any problem, they had to come to the manufacturer for help, which caused cost increasing for both parties. How great it would be if after-sales problems could be solved without door-to-door service!

Coolmay decided to develop one controller to solve this problem, and created the first HMI/PLC all-in-one in China in 2006. The all-in-one integrates the functions of PLC and HMI, including the highly integration of logic control, analog input and output, high speed counting, high speed pulse, communication, etc.. It supports arc interpolation and linear Interpolation. This device made after-sales maintenance very simple and greatly reduced the maintenance cost of the entire equipment. Users do not need to have professional technology but just simply replace the all-in-one if any problem.

Soon after entering the market, the actual effects of the product emerged. After using the all-in-one machine, the after-sales problem that a certain textile equipment manufacturer could not solve for many years was solved instantly, which reduced 90% after-sale cost.

This made Coolmay dertermine to engage in the all-in-one industry more firm. It is this force that drives Coolmay to embark on a new path of automation control concept.

Simple operation. Flexible. Cost-effective

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

It is powerful positioning control function, and 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 compact, 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.

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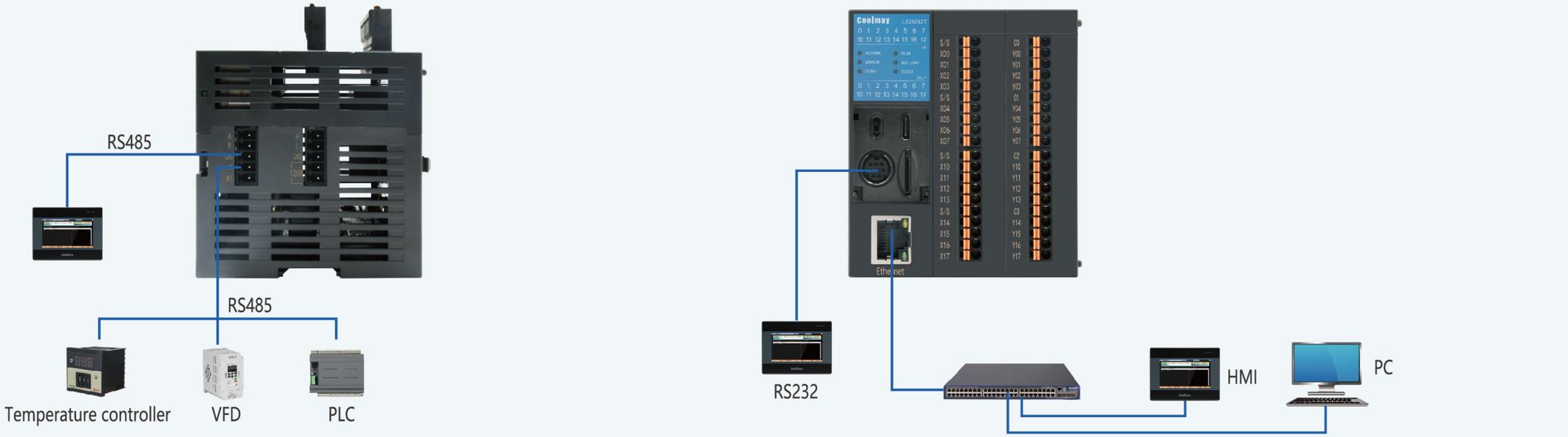
Contents

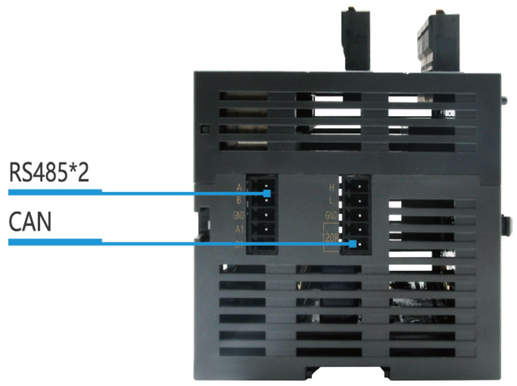
L02 series host motion control system

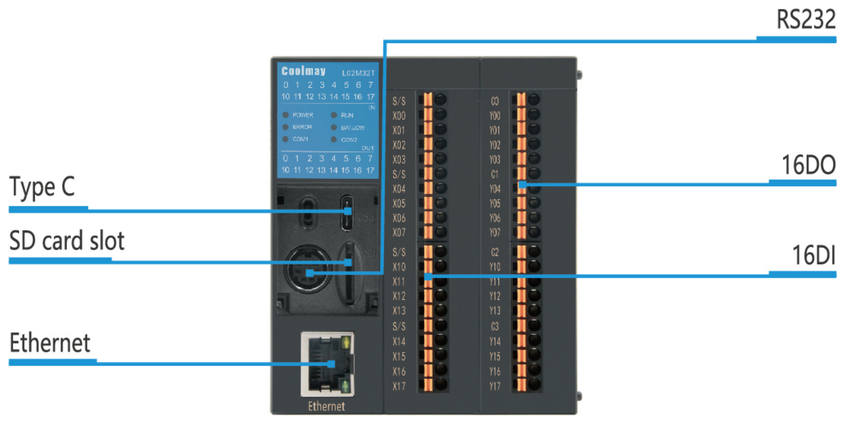
- Supports up to 8 axis servo control, 6 groups of high-speed counter inputs
- Support digital, analog and temperature module expansion (max 31 units)
- Provide high-speed computing speed: the fastest execution speed of basic instructions can reach 0.35μs
- Provide multiple motion control commands such as position, speed, positioning and interpolation
- Built-in maximum 16DI/16DO, 1x RS232, 2x RS485, 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 registerd, 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
- Maximum expansion module: 31 units

Basic instruction: 0.35μs

Application instruction: 0.642μs

Execution efficiency optimization

L02 series cycle scanning method

Program cycle scan mode

I/O update

L02 series update

Automatic address allocation, expansion module plug and play

Data is stored permanently, no battery required

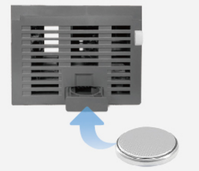
Use permanent preservation, write to Flash instantly after power off

Power-off retention area, permanently maintained

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

Perpetual calendar timing function, applied CR1620 batteries

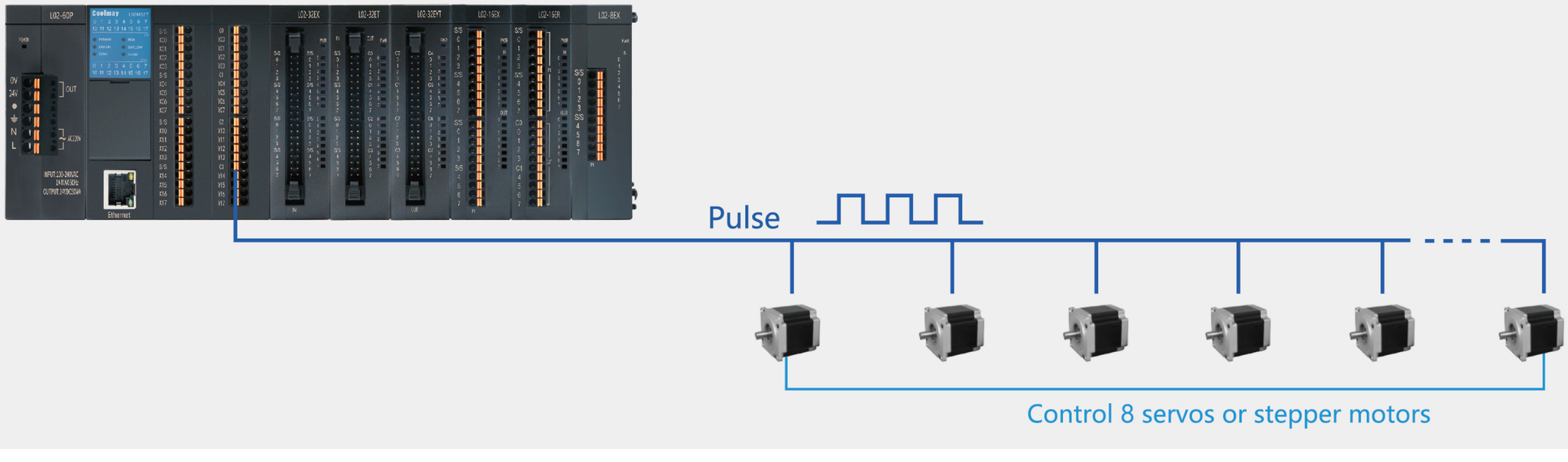
Drawer type, can be installed by anyone



Battery CR1620

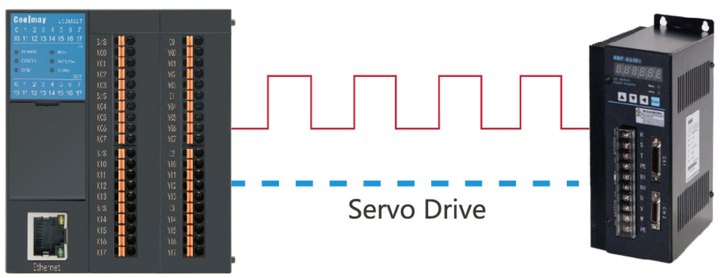
When PLC is powered off	
Perpetual calendar	Time keeping

Powerful axis control - positioning control solution



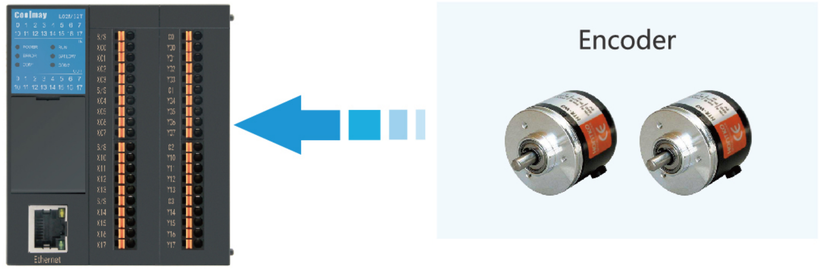
Positioning control, high-speed pulse

- L02M32T/ L02M24T transistor CPU: 8-axis (4-axis 200KHz + 4-axis 50KHz)
- 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 channels of 60 KHz
- Up to 6 external input interrupts



Easy installation

Design for easy installation

Space saving, most suitable for installation in mechanical equipment

Applied press-type terminal wiring

- No screwdriver required for installation, convenient and fast

Save installation time
Complete wiring in 1 second

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.

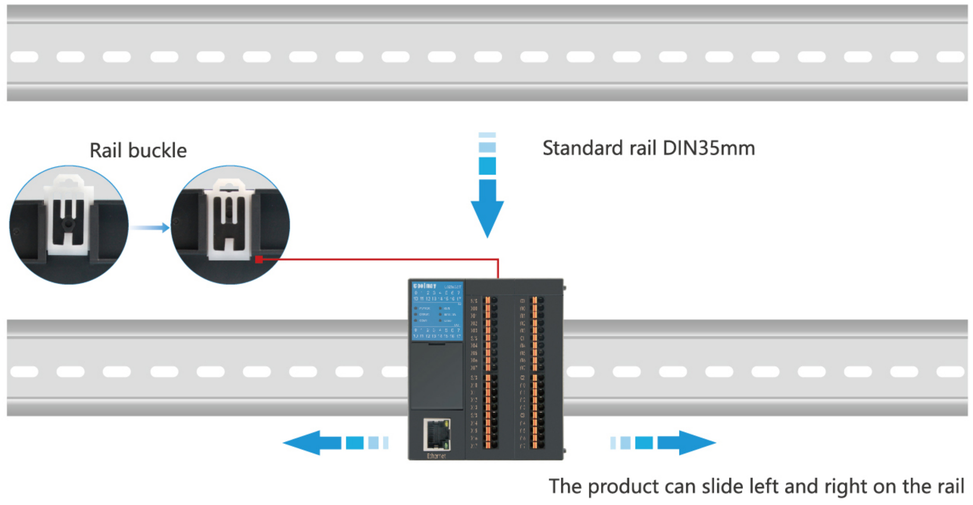
Align the modules

Push the module in

Press the buckle

Rail mounting

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.

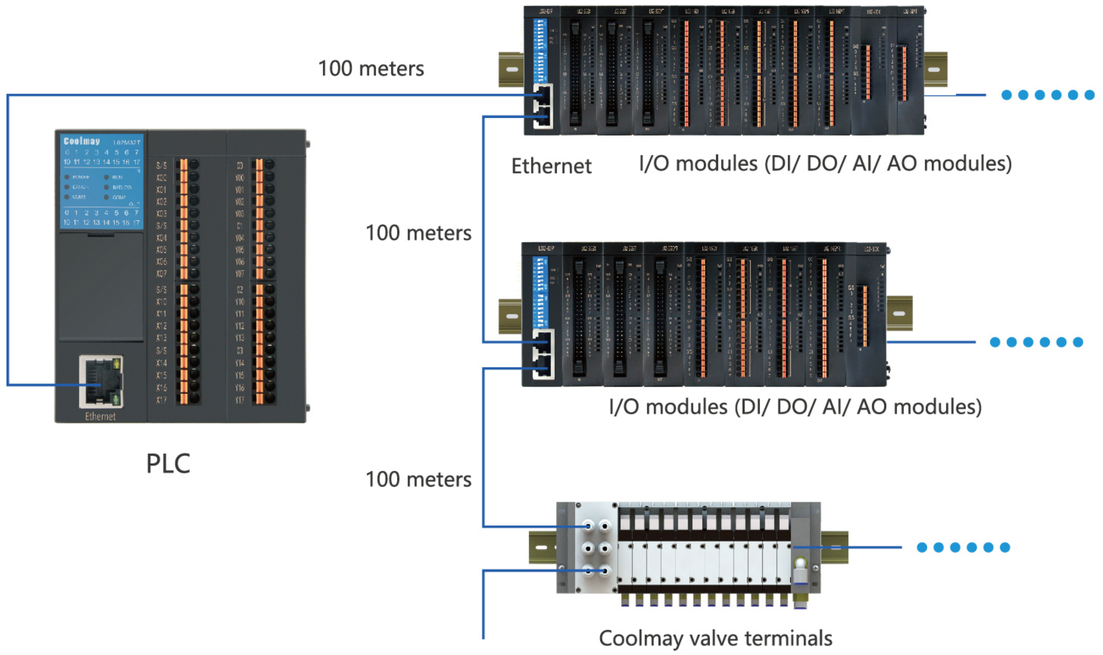


Put into the rail card slot, press the rail buckle, the installation is completed.

Industrial network solution I

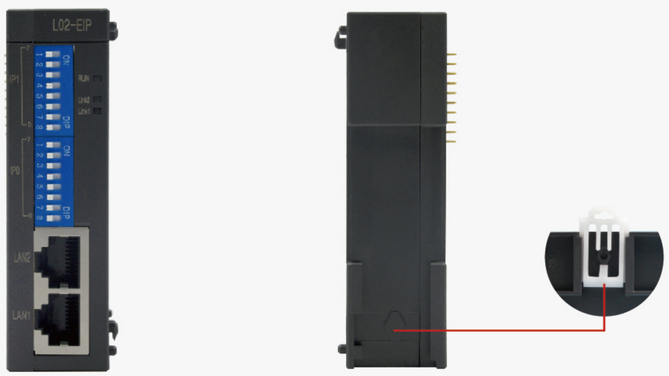
Ethernet/IP solution

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 adding a switch.



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
- Applied standard DIN35 rail installation, fixed with buckles



Fixed with buckles

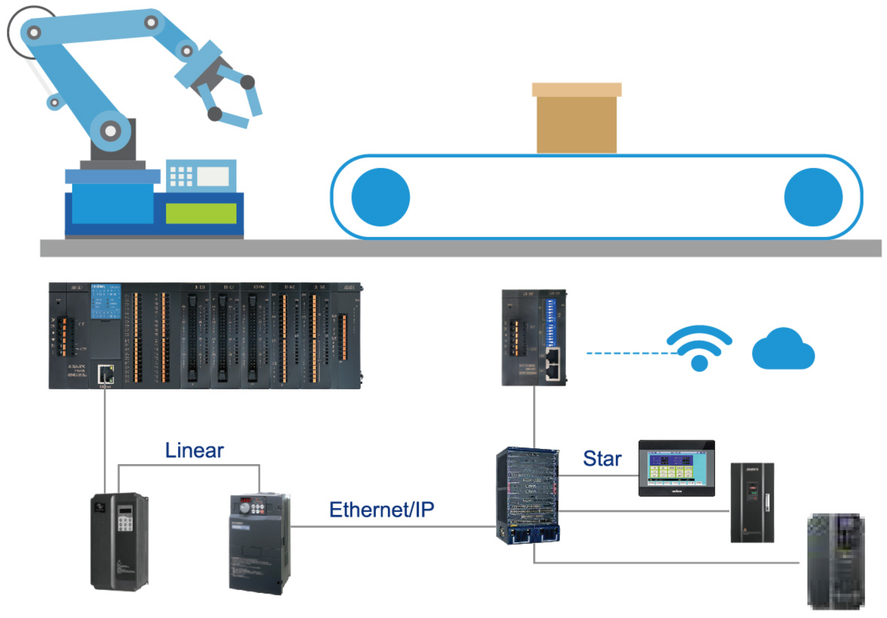
Technical specifications

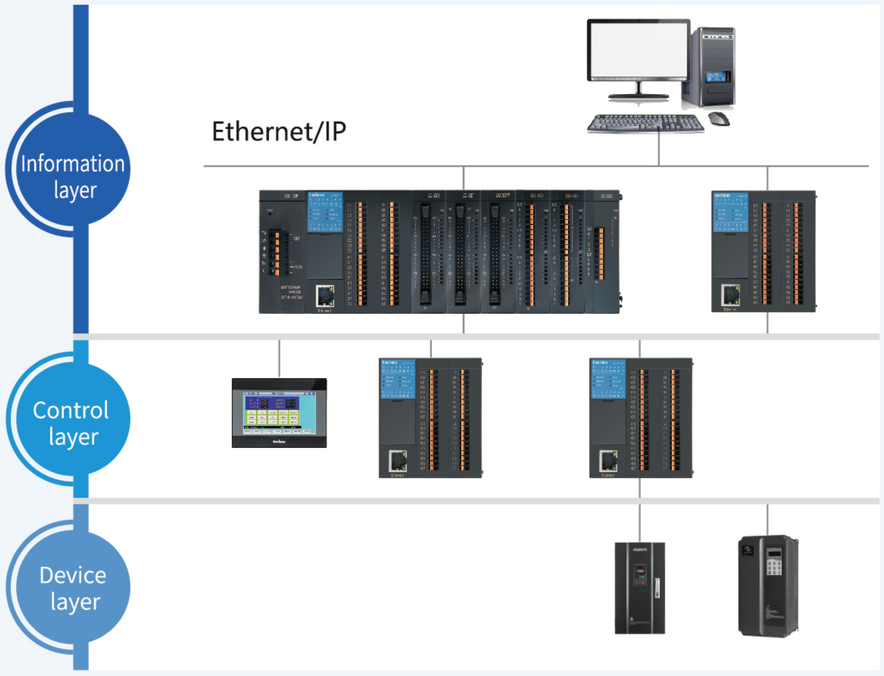
Communication bus		
Bus protocol	Ethernet/IP	
Connection method	RJ45	
Communication rate	100Mb/s	
Communication distance	100m（Station distance）	
Status, alarm, diagnosis		
Power status display	Green RUN LED light	
Network port indication (Flashes when there is data exchange)	Green LINK1 light corresponds to LAN1	Green LINK2 light corresponds to LAN2

Industrial network solution Ⅱ

Flexible network system creation

- 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





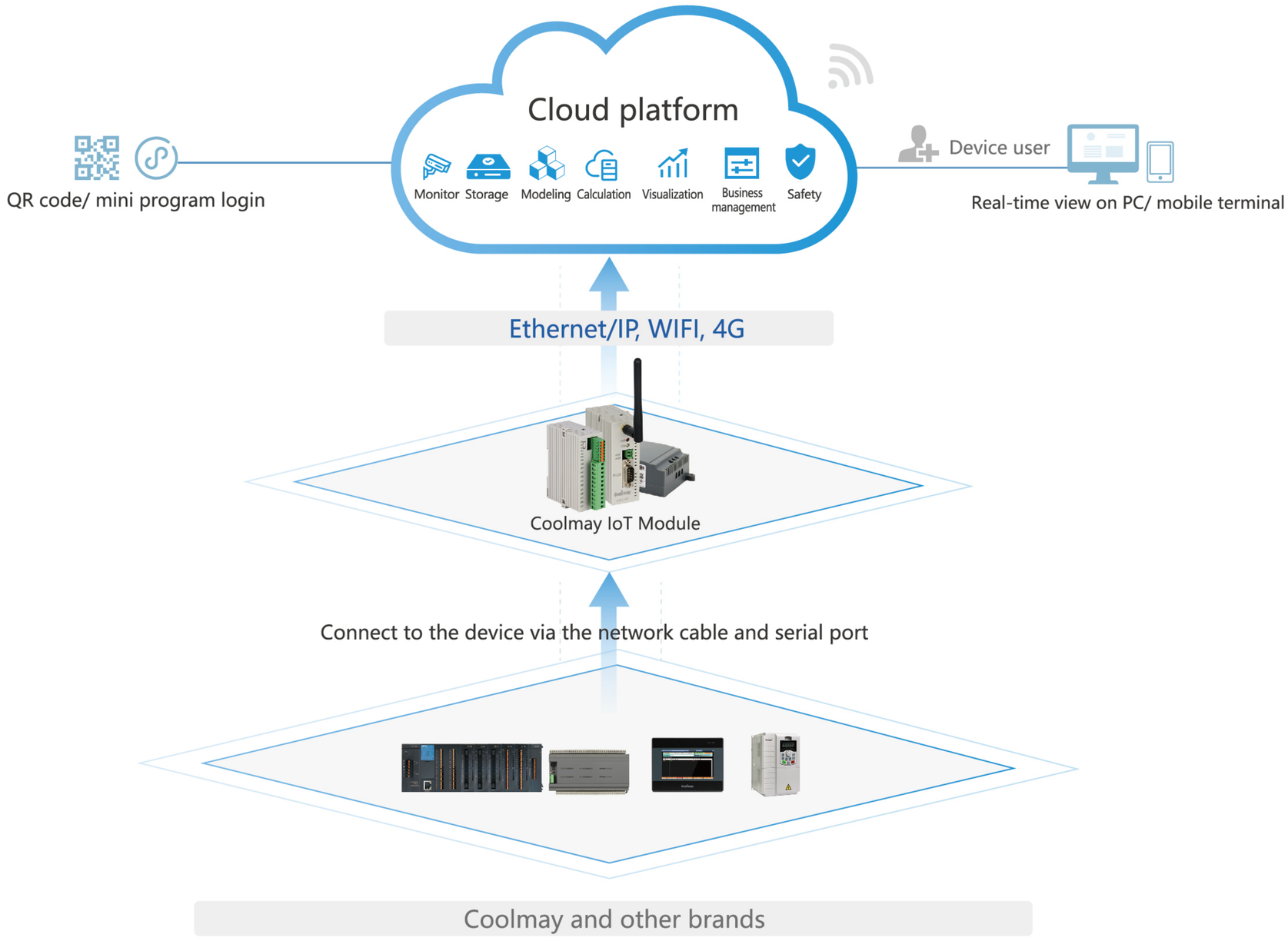
One cable, one network

- Coolmay 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

Cloud platform

Coolmay cloud platform

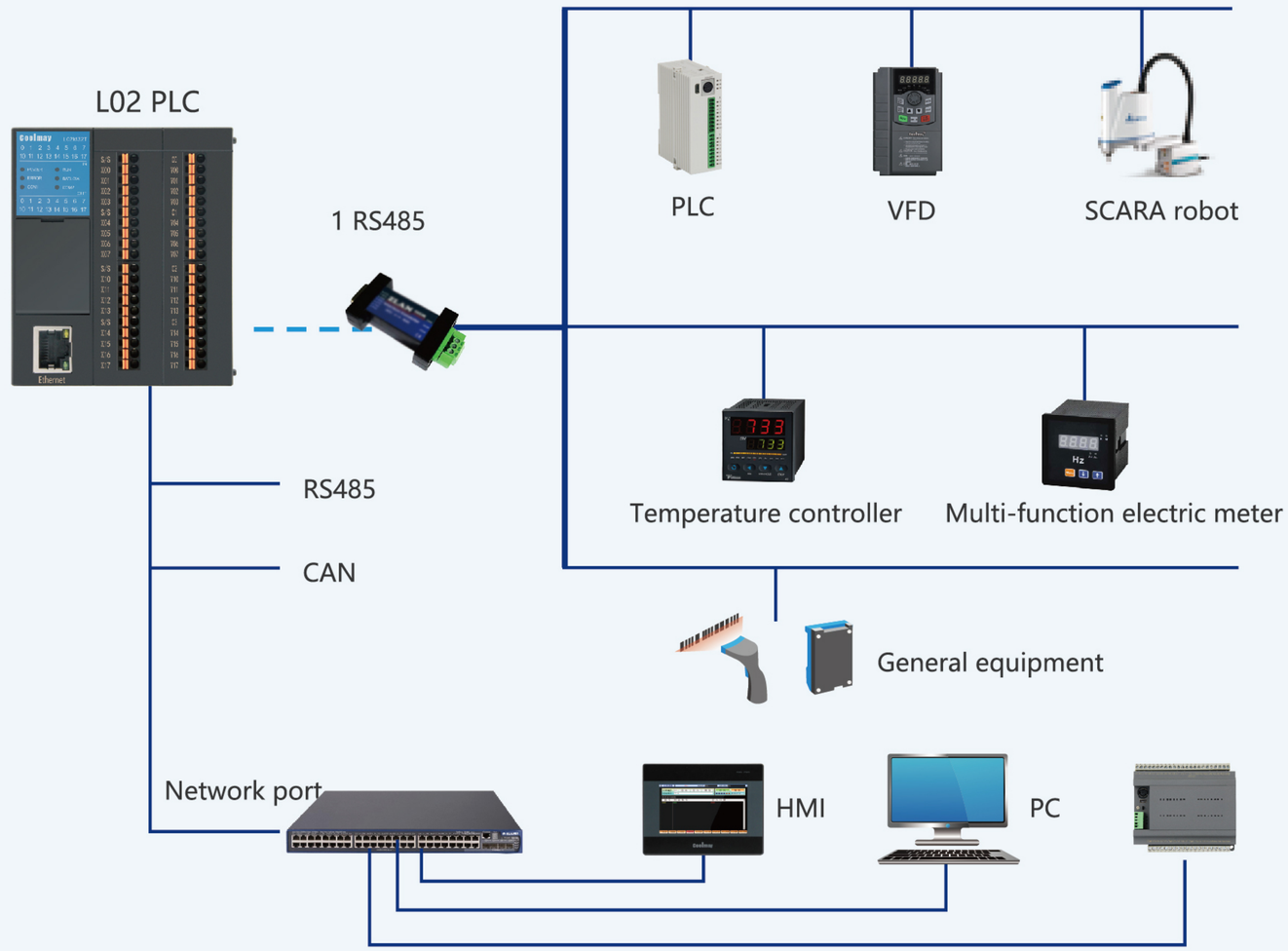
The platform is an IoT system that can complete terminal device data collection, real-time control, alarm push, group management, configuration design, video monitor and other functions in one stop.



Serial communication solution

L02 series host

- Two RS485 ports. 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 human machine interface and VFD.
- One CAN port，supports CAN2.0A, CAN2.0B, Modbus networking and Freeport protocols, which can easily realize multi-channel interconnection.
- One high-speed Ethernet interface, supports Mitsubishi programming port protocol, Modbus TCP/UDP protocol, Ethernet/IP protocol.

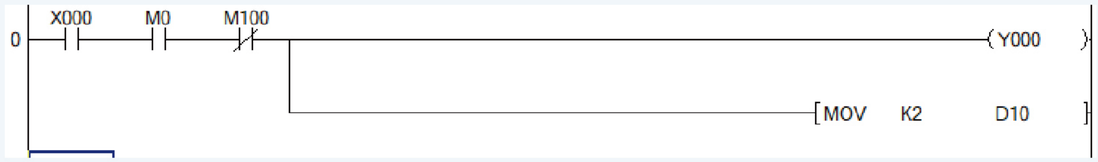


Multiple programming languages

Various programming languages can be used together in one project

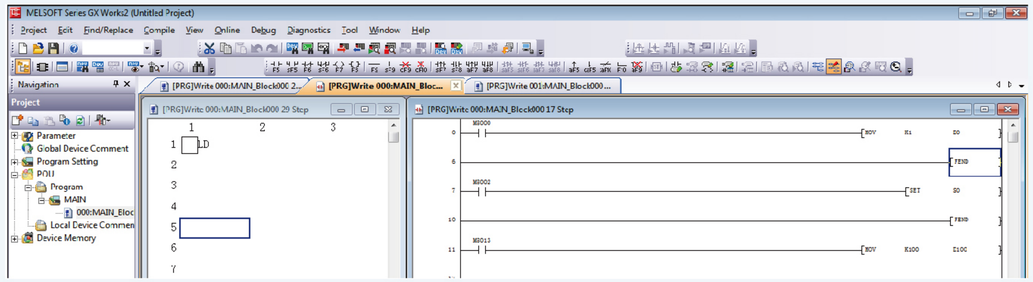
Ladder diagram (LD)

Used the most extensive ladder diagram, and an easy-to-use editing interface is provided to help users quickly to create program.



Sequential function chart(SFC)

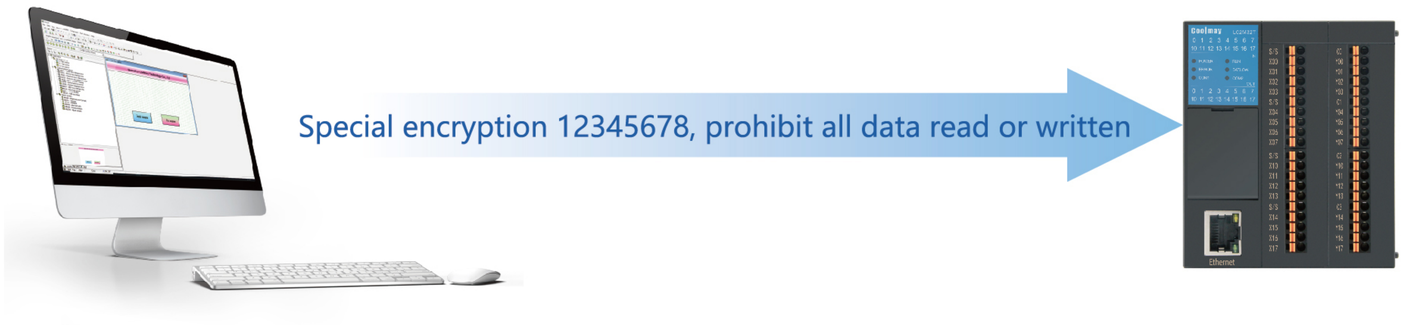
Express the actions of each stage in a flow chart, intuitive and easy to under-stand, suitable for applications that emphasize staged process control



Multiple safety protection functions.Ensure the confidentiality of user program data

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

- The host is protected by 8-letter password
- Limited times for input errors
- Protection function that prohibits uploading



Naming rules

Host module

L02M32R/ L02M32T

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

L02M24R/ L02M24T

L02	M	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

Voltage and current analog module

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

L02	4	AD
Series	Analog channel	Type
	4 channels	AD: analog input DA: analog output AD/DA: analog input/ output

Temperature and weighing module

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

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

Power supply module

L02-60P

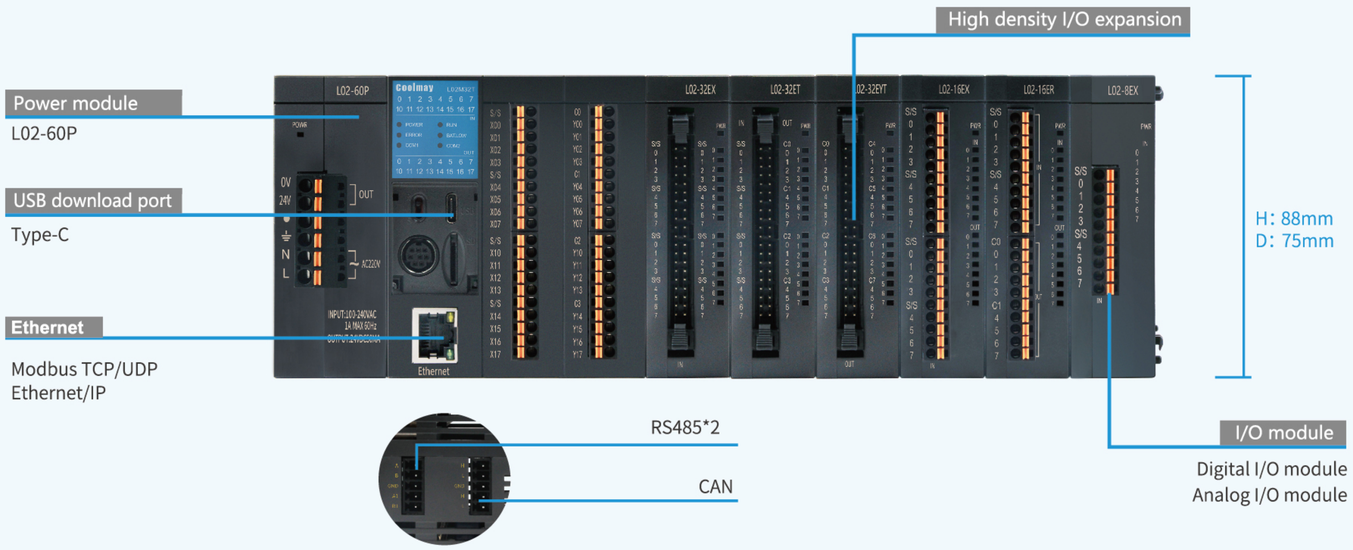
L02	60P	
Series	Category	Function
	Power module	100-240VAC input/ 24VDC output

Ethernet/IP module

L02-EIP

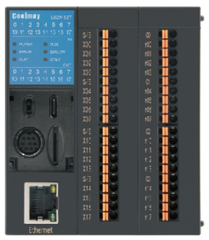
L02	EIP	
Series	Category	Function
	Ethernet/IP module	RJ45*2, support Ethernet/ IP protocol

Product models and specifications

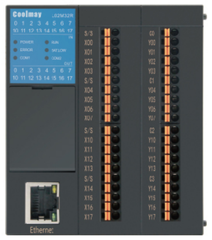


CPU Host

L02M32T



L02M32R



L02M24T

L02M24R

L02 series host standard specifications			
Program capacity 32Ksteps	Basic command speed 0.35μs	Input and output I/O: Maximum 512 Expansion module: 31 units	
Type-C/RS-232/RS-485*2/ CAN/Ethernet	Micro SD Card	Ethernet/IP, Modbus, CAN, Remote I/O(*1)	
Model	**Built-in I/O**	**High-speed output**	**High-speed input**
L02M32T	16DI/16DO	4-axis 200 KHz + 4-axis 50 KHz Pulse output	6 channels 60KHz High-speed counter
L02M32R	16DI/16DO	—	6 channels 60KHz High-speed counter
L02M24T	12DI/12DO 4AD/4DA	4-axis 200 KHz + 4-axis 50 KHz Pulse output	6 channels 60KHz High-speed counter
L02M24R	12DI/12DO 4AD/4DA	—	6 channels 60KHz High-speed counter

Power supply module L02-60P	
	Input 100-240VAC
	Output 24VDC,0.5A

Product specification

Model		L02M32T	L02M32R	L02M24T	L02M24R
programming language		Ladder diagram(LD)	Instruction list	Sequential function chart(SFC)	
Command processing speed	Basic instruction (LD)	0.35μs			
	Application instruction	0.642μs			
Program capacity		32k steps			
Storage capacity	Date (D)	[D0~D127] 128 points General /[D128~D7999] 7872 points Retentive /[D8000~D8511] 512 points Special			
	Expansion (R)	[R0~R22999] 23000points. Support power-off retention / [R23000~R23999] 1000points, internal use			
Expansion model		Max limit of 31 units: max 12 analog input /output respectively			
Max I/O		FX3U mode: 512 points | FX3G mode: 256 points (the sum of input and output points)			
CPU Digital I/O		16DI / 16DO		12DI / 12DO	
CPU analog I/O		-		4AD/4DA	
I/O	X	FX3U mode: 256 points (X0~X377) | FX3G mode: 128 points (XO~X177)			
	Y	FX3U mode: 256 points (YO~Y377) | FX3G mode: 128 points (YO~Y177)			
Bit device	M	[M0~M383] 384 points, general /[M384~M1535] 1152 points, retentive /[M1536~M7679] 6144points, general			
		[M8000~M8511] 512 points, special			
	S	[S0-S9] 10points, initial state/ [S10~S999] 990 points, retentive/ [S1000~S4095] 3096 points, general			
Timer T		[T0~T199] 200 points, 100ms, general /[T250~T255] 6 points, 100ms, retentive			
		[T246~T249] 4 points 1ms cumulative, retentive /[T256~T319] 64 points 1ms, general			
		[T200~T245] 46points 10ms, general ※The 10ms timer is affected by the scan period. If the scan period is 12ms, the timer becomes 12ms and executes once.			
16-bit counter C		[C0~C15] 16 points, general			
		[C16~C199] 184 points, retentive			
32-bit counter C		[C200~C219] 20 points, general [C220~C234] 15 points, retentive			
		[C235~C245 Single phase single counting] [C246~C250 Single phase double counting] [C251~C255 Two-phase double counting			
High-speed pulse		4-axis 200KHz + 4-axis 50KHz			
High-speed counter		6 channels 60KHz			
DO type		L02M32T/ L02M24T: transistor output, load max 500mA, low level NPN, COM connected to negative L02M32R/ L02M24R: Relay output, load max 2A, normally open dry contact, COM can be connected to positive or negative			
Default COM		Type-C, RS232, 2x RS485, Ethernet, CAN			
Protocol		Mitsubishi programming port Modbus RTU, Modbus TCP, Modbus UDP, freeport protocol, CAN, Ethernet/IP, Mitsubishi BD board			

Product specification

Model		L02M32T	L02M32R	L02M24T	L02M24R
Data backup function. No need battery storage	Program	Flash ROM			
	Retentive area	MRAM, unlimted write-in times			
Calendar(RTC)		Commercially available batteries CR1620 (optional)			
Self-diagnosis		CPU abnormalities, internal memory problems, etc.			
Rated input voltage	Host	24 VDC (±10%)			
	Expansion module				

Electrical and environmental specifications

Item		Specification
Internal current consumption	Host	150 mA
	Expansion module	Relay output <150 mA, other modules < 80 mA
Operating temperature		0 ~ 50 ºC
Storage temperature		-20 ~ 70 ºC
Operating humidity		5 ~ 95%，no condensation
Storage humidity		5 ~ 95%，no condensation
Vibration resistant		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 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



8 points	16 points	32 points
Quick wiring terminal block	Quick wiring terminal block	High density horn block terminal block
L02-8EX	L02-16EX	L02-32EX

Rated input voltage 5 ~ 24 VDC

Reaction time 1 ms

Filter function 1 ~ 20 ms

Digital input/output module



16 points	16 points	32 points
Quick wiring terminal block 8 points input 8 points transistor output	Quick wiring terminal block 8 points input 8 points transistor output	High density horn block terminal block 16 points input 16 points transistor output
L02-16ET	L02-16ER	L02-32ET

Reaction time

1 ms (Transistor)

10 ms (Relay)

Digital output module





8 points	8 points	16 points	16 points	32 points
Quick wiring terminal block Transistor output	Quick wiring terminal block Relay output	Quick wiring terminal block Transistor output	Quick wiring terminal block Relay output	High density horn block terminal block Transistor output
L02-8EYT	L02-8EYR	L02-16EYT	L02-16EYR	L02-32EYT

L02 series AIO module

Analog input module

4 points
Analog input
L02-4AD

Analog output module

4 points
Analog output
L02-4DA

Analog input/ output module

4/2 points
Analog input/ output
L02-4AD2DA

Temperature analog module



4 points	4 points	4 points
Temperature transducer / PT100/ PT1000	Temperature transducer/ thermocouple	Temperature transducer/ thermistor
L02-4RTD	L02-4TC	L02-4NTC

Weighing module

2 points
Weighing module
L02-2LC

Basic function	
50/60Hz filter	High-speed dynamic weighing
Dual channel independent sampling	High resolution 32 bit
2 sets of channels	4-wire Load Cell

Power module

Power module
L02-60P

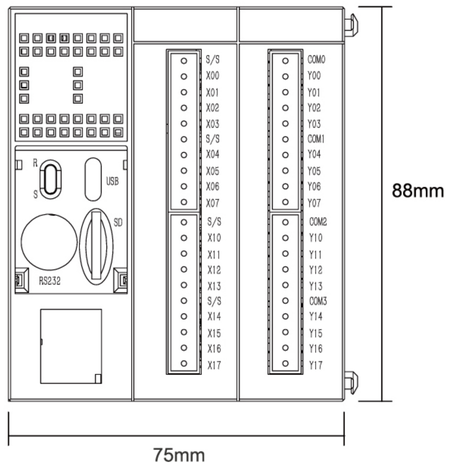
Ethernet/IP module

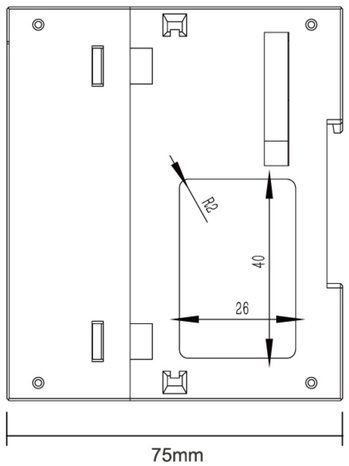
Ethernet/IP module
L02-EIP

Dimension

Host modules

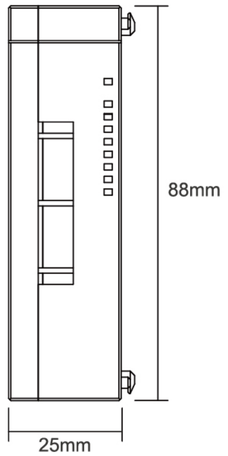
L02M32T, L02M32R, L02M24T, L02M24R

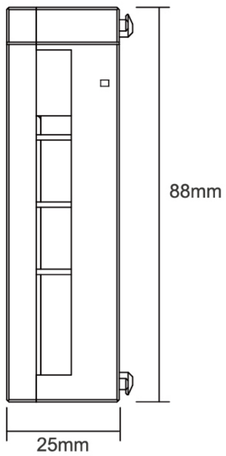




AI/AO module

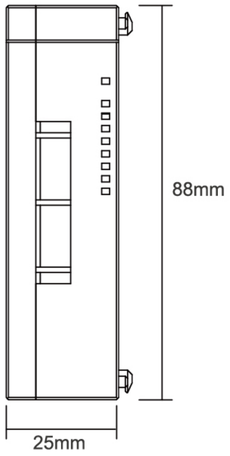
L02-4AD, L02-4DA, L02-4AD2DA
L02-4RTD, L02-4TC, L02-4NTC, L02-2LC

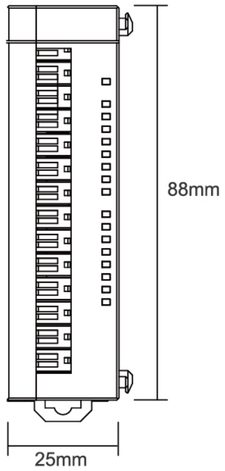




DI/ DO module

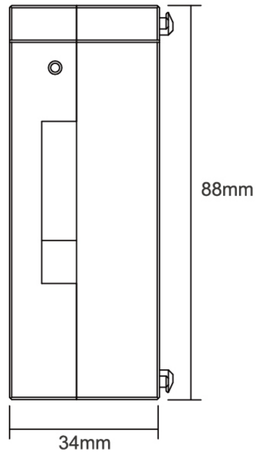
L02-8EX, L02-16EX, L02-32EX
L02-16ET, L02-16ER, L02-32ET
L02-8EYT, L02-8EYR, L02-16EYT, L02-16EYR, L02-32EYT





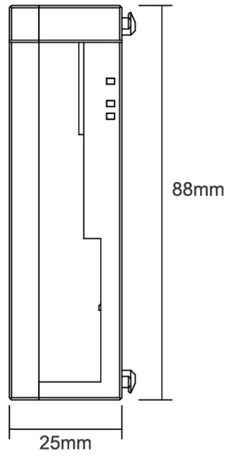
Power supply module

L02-60P



Ethernet/IP module

L02-EIP



Order guide

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
CPU Module	L02M32T	32K steps	512 points/ 31 units	16DI/16DO	Transistor	-	6 channels 60KHz	L02M32T and L02M24T 4-axis 200KHz + 4-axis 50KHz (Y4 ~ Y7 pulse total transmission does not exceed 200KHz)	Type C RS232 2x RS485 Ethernet CAN Free	Micro SD max32G	Press
	L02M32R				Relay	-					
	L02M24T			12DI/12DO 4AI/4AO	Transistor	2V2A					Press
	L02M24R				Relay						

DI/DO 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

AI/AO module

L02 series	Model	Type	Analog input	Analog output	Resolution	Analog type (optional)	Terminal block
Analog input module	L02-4AD	AD	4	0	0.15mV 0.3mV 0.6uA 0.5uA	0~5V 0~10V 0~20mA 4~20mA	Press
Analog output module	L02-4DA	DA	0	4	0.15mV 0.3mV 0.6uA 0.5uA	0~5V 0~10V 0~20mA 4~20mA	Press
Analog input/ output module	L02-4AD2DA	AD	4	0	0.15mV 0.3mV 0.6uA 0.5uA	0~5V 0~10V 0~20mA 4~20mA	Press
		DA	0	2	0.15mV 0.3mV 0.6uA 0.5uA	0~5V 0~10V 0~20mA 4~20mA	Press
Temperature analog module	L02-4RTD	AD	4	0	0.1℃	PT100 PT1000	Press
	L02-4TC	AD	4	0	0.1℃	Type J/K/S/T/E thermocouple	Press
	L02-4NTC	AD	4	0	0.1℃	NTC 10K/ 50K/ 100K	Press
Weighing module	L02-2LC	AD	2	0	24bit	-	Press

Power module

Name	Model	Input	Output	Safety standard
Power module	L02-60P	100-240VAC 1A MAX60Hz	24VDC 0.5A	CE

Ethernet/IP module

Name	Model	Specification
Ethernet/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

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