FATEK

M Series

Programmable Controller

NEXT Level *SOLUTION*

FATEK

fatek.com

FATEK AUTOMATION CORPORATION

M-CV2-01-2025

「Hard PLC」 Technology

Industry Leading

0.0008 us

FASTER

Nanosecond-level processing

Instant boot-up

Ultra-low latency

STABLE

「HARD PLC」 structure

Continuous high-efficiency

EFFICIENT

Low-heat, durable design

Dual-CPU System

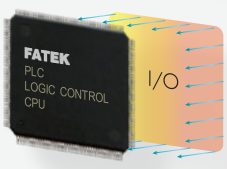
- Motion control
- PLC control

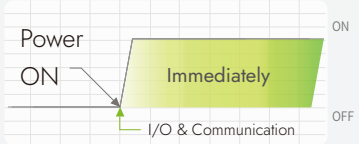
Ultimate Performance and Efficiency - Hard PLC

Dedicated high-performance hardware design for logic operations, ensuring consistent system efficiency over time.

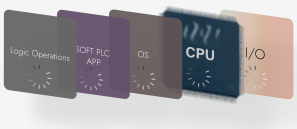
Low power consumption and high stability system architecture without fans and heat sink.Without complicated and huge OS, PLC can immediately operate with no delay when power-on.

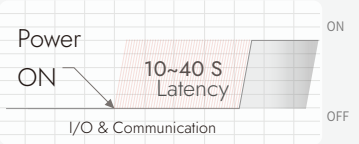
FATEK Hard PLC





Soft PLC





Advanced Motion Control

Supports EtherCAT and **PULSE** modes

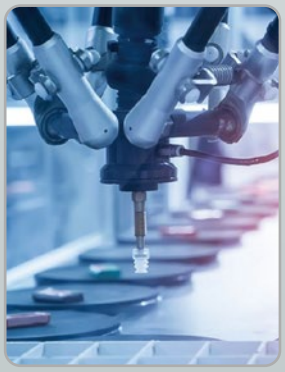
Achieve up to **24** axes motion control with EtherCAT and pulse

With advanced motion features, redefining speed and precision
Elevate machine performance to a whole new level

- E-CAM
- Flying Shear & Rotary Knife
- 3D Circular & Helical Interpolation
- SAPC*
- ICF & ICA*

Industry Applications

3C Manufacturing

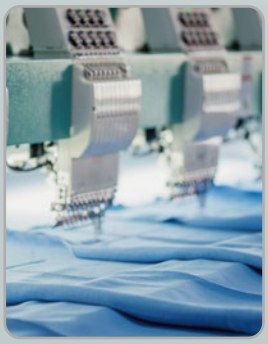


Food Processing

Spray Coating

Packaging & Box Stapling

Textile Industry



M series combines advanced technology,
flexible configuration,and exceptional computing and motion control capabilities.
With high stability and outstanding performance, it is widely used in 3C manufacturing, food processing,
coating technology, packaging and box stapling, textiles, and many other industries.
Through highly efficient solutions, it drives industrial upgrades and delivers a *NEXT* Level *SOLUTION* to reach new heights!

* SAPC (single axis positioning control) , ICF (interrupt constant feed) , ICA(interrupt constant angle)

Industry Leading

HARD PLC Technology

0.0008 us

Ultimate Performance

Super Low Latency

Ultimate speed leading ahead of the industry

Innovatively developed high-performance processor and high-performance algorithm. Achieves ultimate up to 0.8ns for the command processing speed.Pushes the control performance to the unimaginable "ns" realm.

BASIC LD
0.0008 µs (0.8 ns)

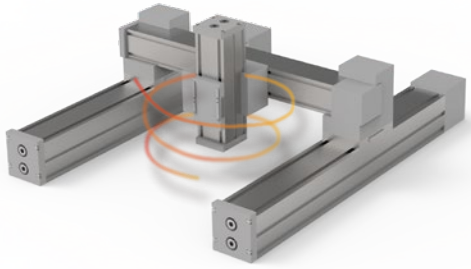
MOV	Multiplication	Floating Point Addition
7.5 ns	38 ns	35 ns

Ultra low interrupt response time

With a 3µs industry-leading interrupt response time, ensures precise execution for control demands requiring fast reactions and ultra-low latency,completely unaffected by program complexity or PLC scan cycle time.

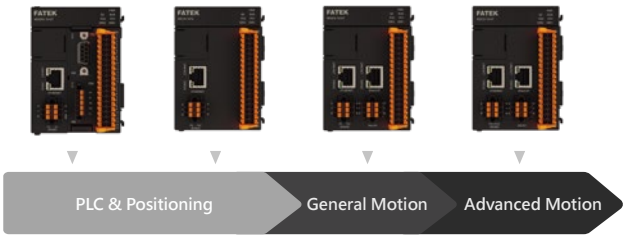
Ultra high precision motion control performance

Independent processing of motion control related tasks with the dedicated motion control CPU. Execute the complicated or massive amount of motion control commands in real-time and accurate manner without affecting the scan time.



Versatile models for diverse scenarios

MQ, MA, MS, and ME: four versatile models
From PLC control to advanced multi-axis motion control.
From small I/O points to comprehensive factory-wide control solutions with tens of thousands of points*
Delivering versatile and flexible solutions tailored to your needs.

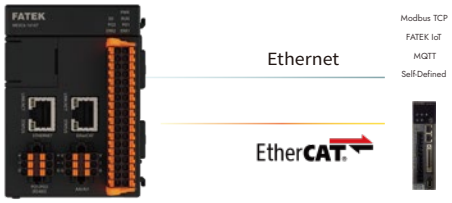


*Requires use with FATEK IO Coupler

World-class high-capacity and efficient control center

Dual Ethernet communication interface

Ethernet supports Modbus TCP, MQTT and self-defined protocol. Exchange the data with the peripheral devices, systems and platforms easily. And EtherCAT could seamlessly connect with other brands* of EtherCAT servos. Advanced motion control can be achieved by the built-in motion control function without the need of expansion module.

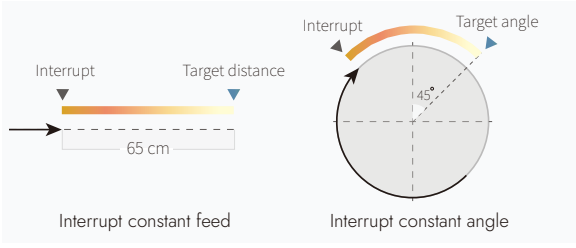


IoT control hub

Support FATEK IoT solution without the need of fixed IP and IoT gateway. Easily achieve the applications such as remote monitoring, project maintenance and alarm notification. And also supports the MQTT Protocol for interfacing with the third-party cloud platform

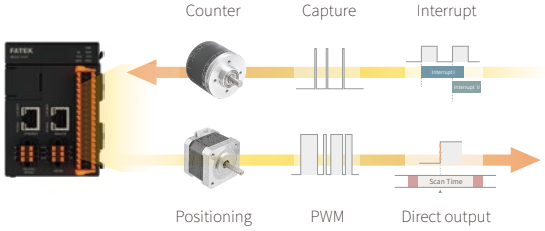
High-speed pulse output and positioning control

Built-in up to 8 axes and up to 200KHz high-speed pulse output which can perform positioning control. And supports advanced functions such as interrupt constant feed and interrupt constant angle. Application such as edge grinding, edge banding and feeding can be easily realized.



High-density integrated I/O

Built-in 16 sets of digital input and output points respectively. With up to 200KHz high-speed counter and pulse output. Support interrupt and capture input to ensure commands and signal capture are not affected by scan time when control immediacy is extremely required.



2-channel RS-485 communication ports

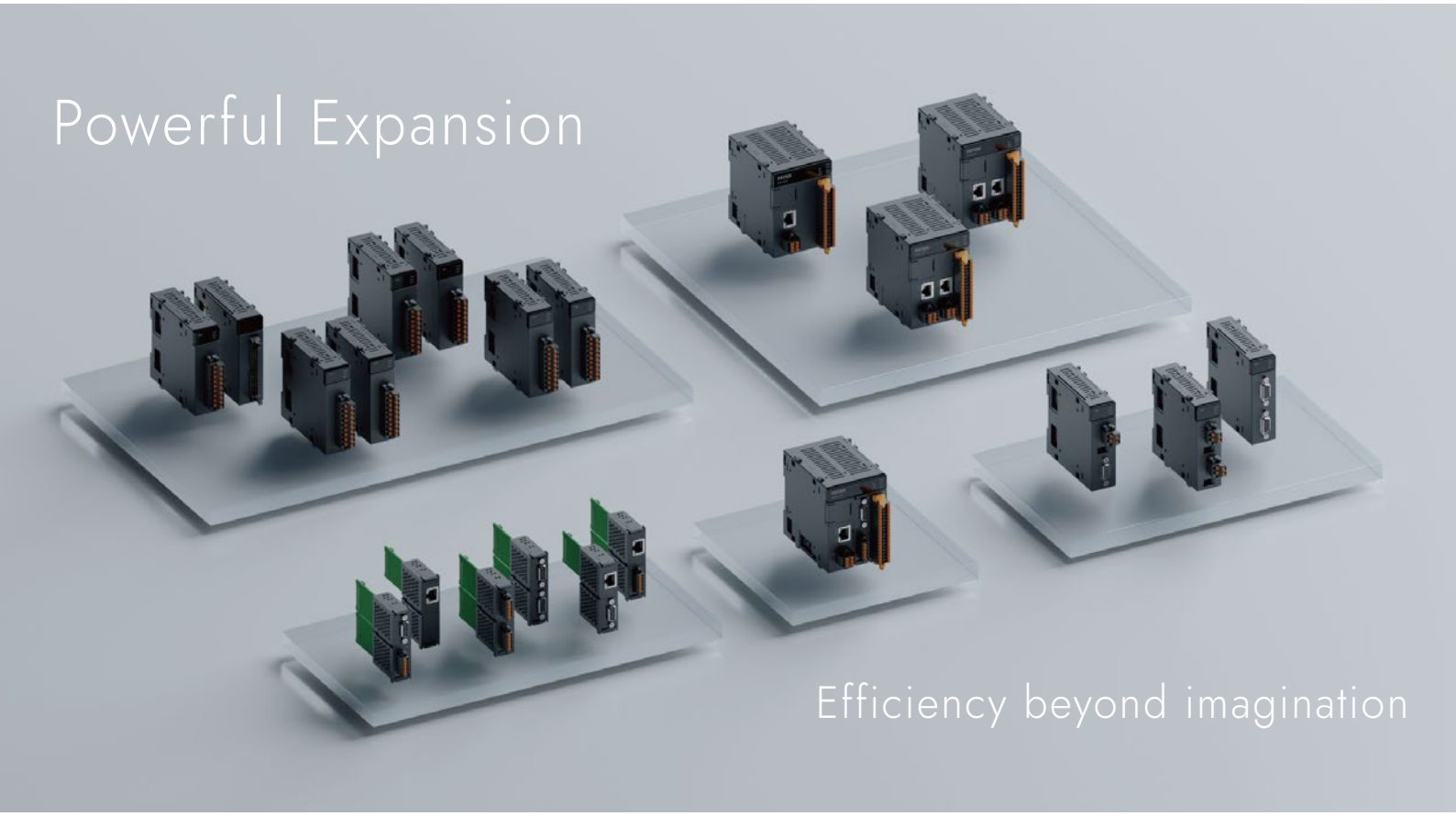
Built-in 2-channel RS-485 communication ports and support Modbus Client/Slave.

2-channel analog input interface

Built-in 2-channel 12-bit analog input interface.

* For supported driver brands, please refer to the list on FATEK website

Powerful Expansion



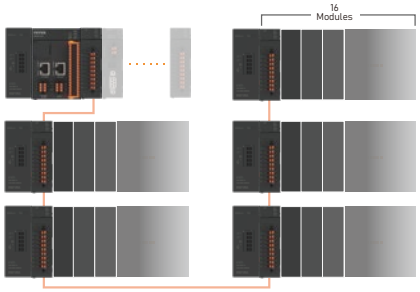
Efficiency beyond imagination

Industry Leading

Powerful control over scale and extensibility

- Supporting up to 16 communication ports

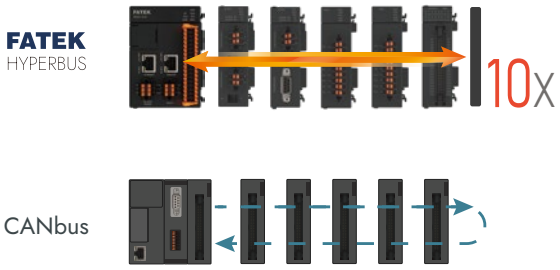
Control scale run up to 2048 DIO and 256 AIO.
Can be expanded to include 16 communication ports and up to 64 various expansion modules.
FHB transmission technology can transfer data without delay when monitoring large number of IO points from modules.



Extend with **MRGH** & **MRGT** IO Bus Extension Module

FHB FATEK Hyper-bus data transmission technique

It solves the problem of increasing bus communication response time with more installed modules.Achieve an astonishing communication efficiency that is 10 times faster than the CAN bus. Moreover, the bus connector is designed with a dedicated vibration damping joint, and now data transmission is not only fast, but also more stable and reliable.

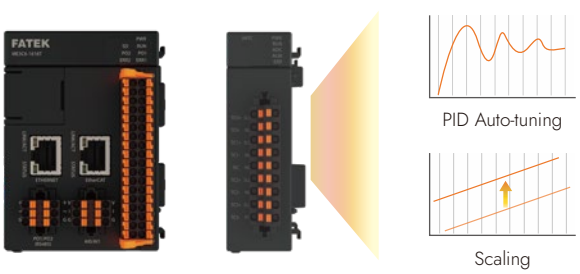


Comprehensive expansion modules

Provide various modules from I/O,communication, numerical monitoring to IoT*. In addition to being applicable to various machines and systems, it can also be used as a control and integration hub for cross-system integration.

Distributed computing on modules

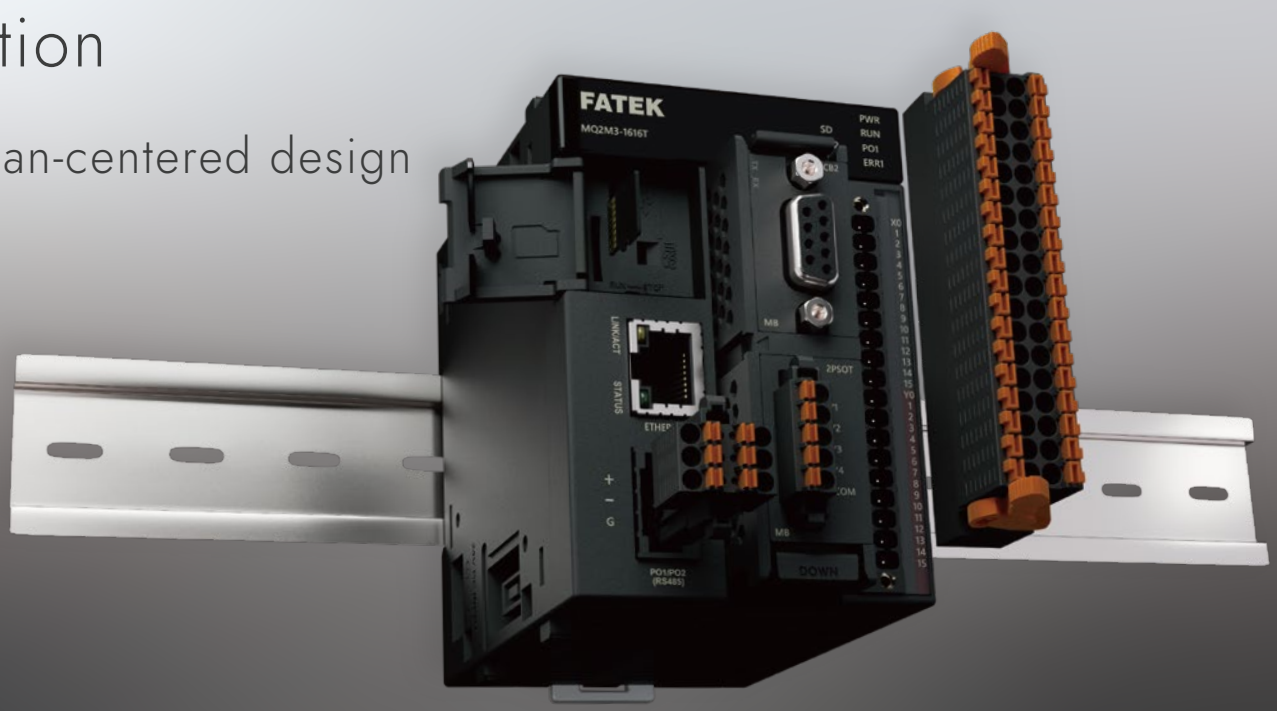
Each extension module has an independent MCU that can perform complex real-time computing tasks.Communication analysis, auto-tuning and various post-processing can be executed directly on the module. Improve system efficiency and significantly reduce CPU loading with a distributed architecture.



* Will be supported in the future

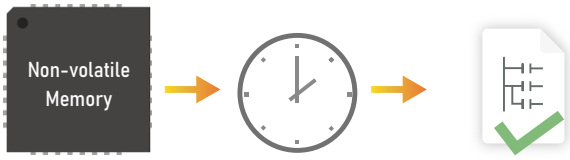
Intuition

Human-centered design



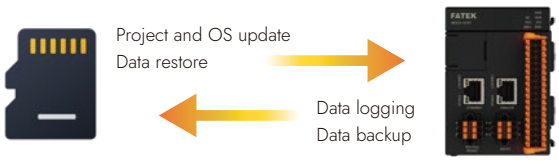
Battery-free program memory

Program and data memory using non-volatile memory.
No battery required to maintain internal data storage.
Never need to worry about data loss or damage caused by battery out of power anymore.



Micro-SD* card expansion slot

Logged data can be directly stored in the Micro-SD card, and also project and OS update, data backup and restore can be performed through the Micro-SD card.It allows the user to complete data logging, project loading and system maintenance without a computer.

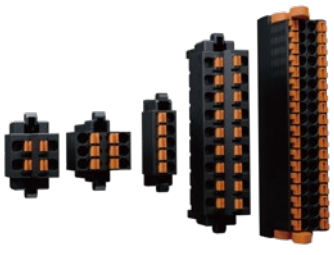


Dedicated floating connector

The local bus connector design with dedicated vibrate-absorbing joints can absorb the vibration effects caused by the machine and the environment.Improve durability and avoid data loss caused by poor contact.Especially suitable for machinery and transportation industries.

Convenient wiring and quick dismantling

Quick wiring without tools using Push-in terminals.
And can ensure contacts tightly connected to avoid poor contact.



RUN/STOP switch

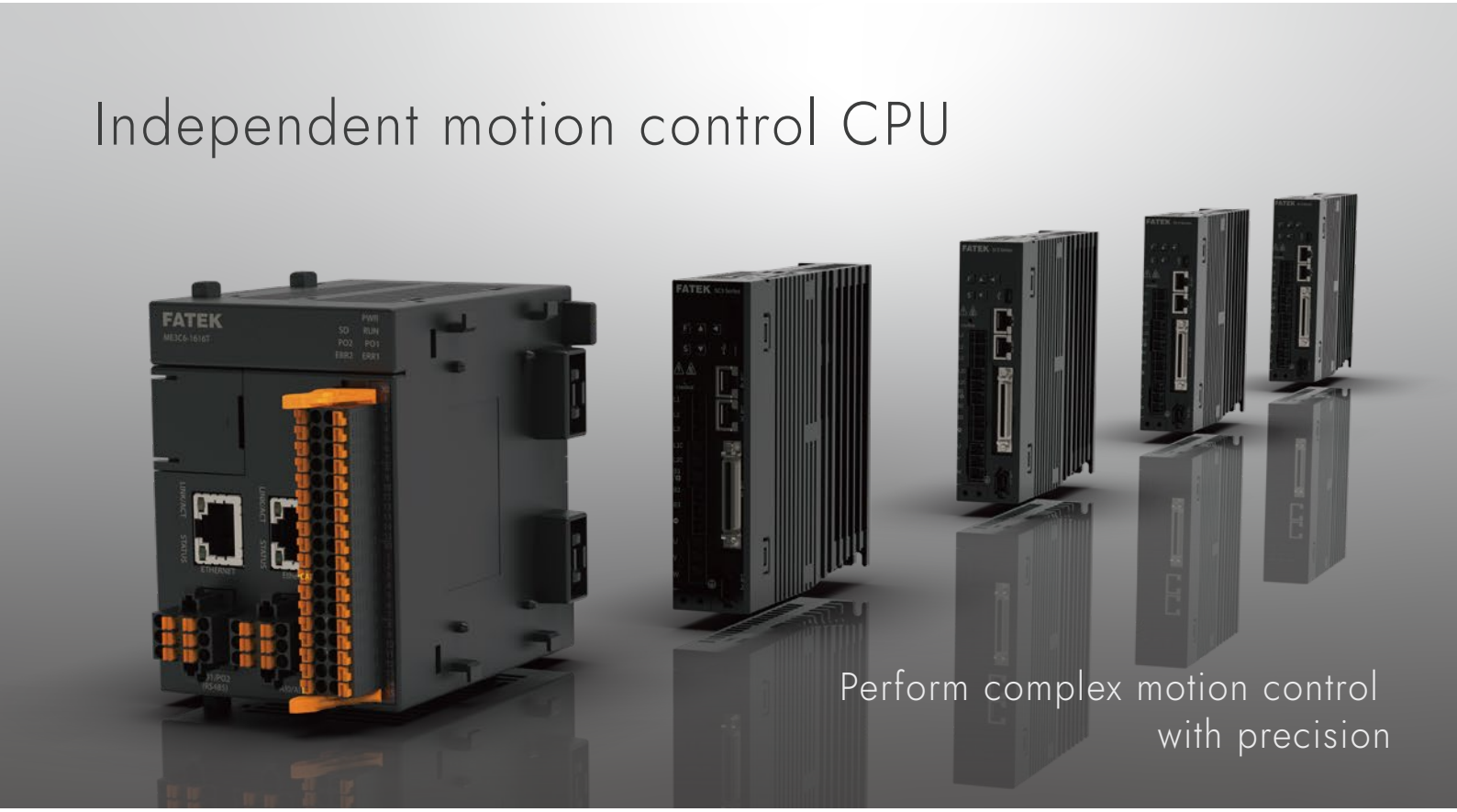
The physical switch can change-over the state of PLC without a computer. Significantly improve the convenience of tuning and debugging

Type-C interface

Adopt USB Type-C as the standard programming interface.
Project upload/download and online monitoring/editing simply with the use of common USB Type-C cable.

* Only support MFM06 - dedicated Micro-SD card

Independent motion control CPU

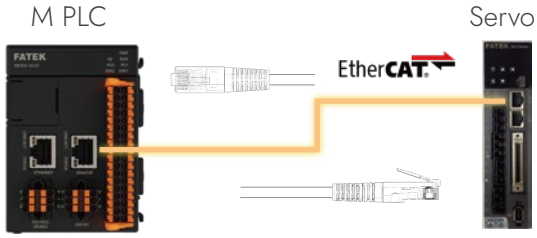


Independent motion control CPU

Motion control operates independently of the PLC logic program. Even if the execution of complex high-speed and high-precision motion control requirements will not be affected by the program scan time or other interrupt tasks.It can ensure the best control accuracy and stability

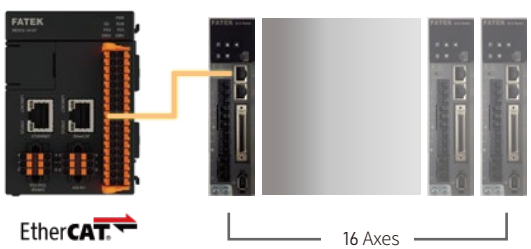
EtherCAT integrates with flexibility and ease

EtherCAT fieldbus can be seamlessly connected with other brands* of EtherCAT servos,and provide reliable and highly efficient control method while exhibiting faster transmission speed.
Wiring simply done by using standard RJ-45 cables.
Improve assembly efficiency while reducing the maintenance cost.



16-axis synchronous motion control

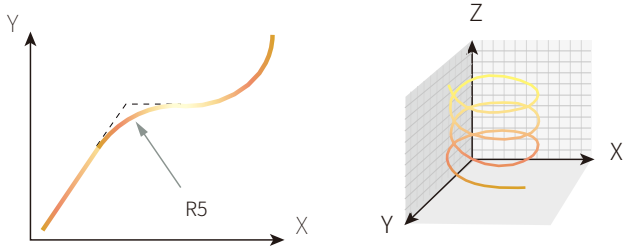
Control up to 16-axis servo driver simultaneously without the need of expanding any motion control module or linking several CPUs.Perform high-precision multi-axis time-synchronized cooperative control.Each axis can be used to carry out the advanced motion-sync control.



Quickly import ESI files to connect to other brands of EtherCAT servo drives, and support virtual axis function

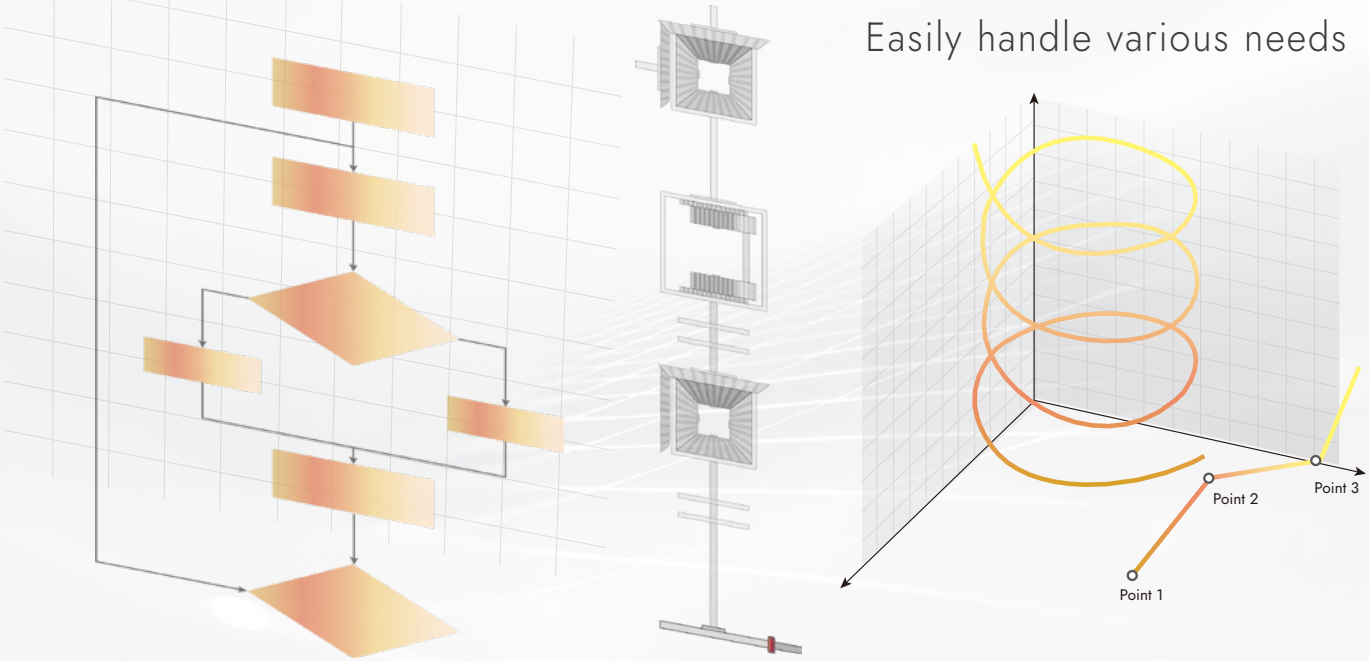
Advanced interpolation function

Built-in linear, circular and helical interpolation functions, and support drawing out continuous point arc between two motion points. The two motion trajectories can be connected with each other by auxiliary circles which smoother transitions and reduced mechanical vibration.



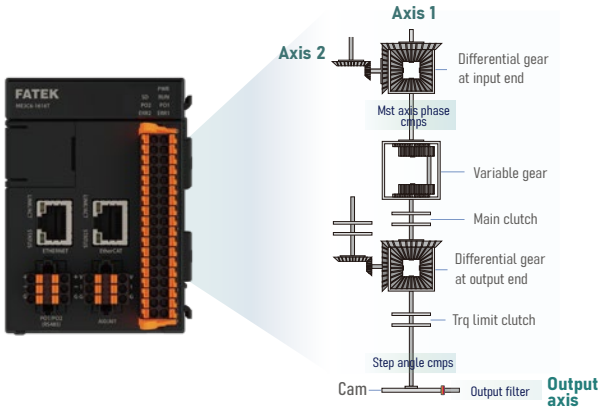
* For supported driver brands, please refer to the list on FATEK website

Powerful motion control functions



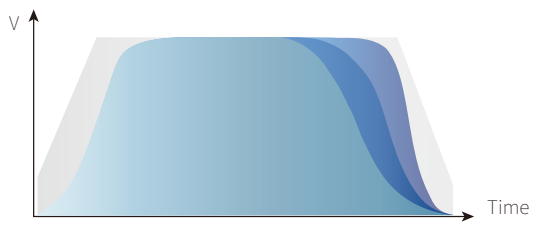
Motion-sync control

Synchronous axis control can be completed with PLC, without the need for mechanical structures such as transmission gears, clutches and shafts.Provides the flexibility to adjust synchronization parameters in a timely manner in addition to reducing mechanical parts and maintenance costs.



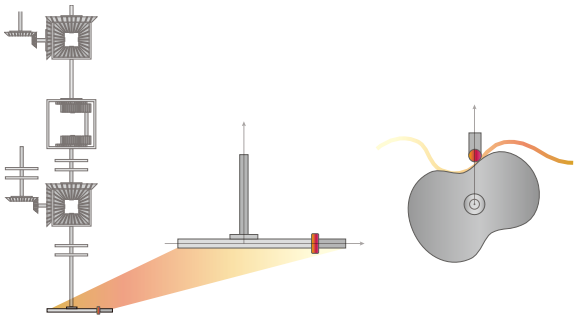
Stabilized and smooth control

Support S-curve acceleration/deceleration in various motion control modes.On the premise of not reducing the acceleration and deceleration to maintain the existing operating efficiency, it can reduce the jitter caused by the rapid change of speed and make the operation smoother.



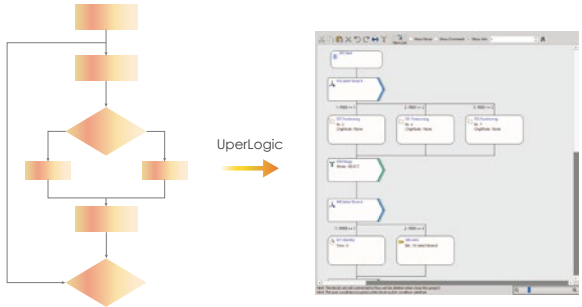
Electronic cam

Support electronic cam function on the output axis of motion-sync control.Executes fly shear/rotary knife action without physical cam mechanism.Easily meet complex machine application requirements such as packaging and cutting



Easy and intuitive motion control

Plan the motion control tasks with the highly visualized Motion Flow. Complex motion control processes and requirements can be easily implemented through an intuitive graphical process-Motion flow , that requires no programming at all.

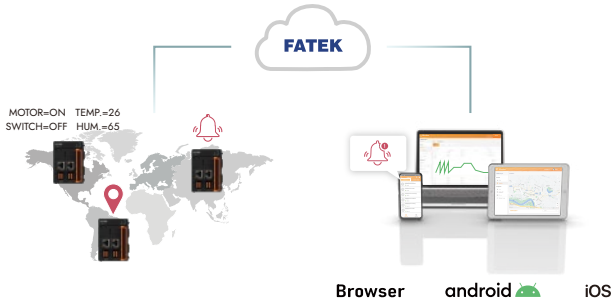


Monitor and control remote devices

anytime and anywhere

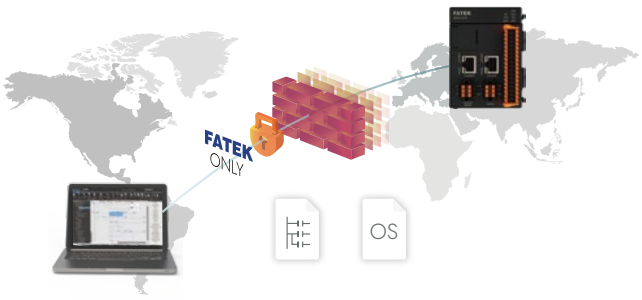
iMonitor - remote data monitoring

Easily monitor and control the data of the scattered devices remotely through mobile phones and computers.
Alarm notifications can inform the administrator when detecting abnormal operations.Pinpoint the device address instantly through the GPS information.



iAccess - remote project maintenance with module*

No need for fixed IP and complex firewall settings, as long as the PLC is connected to the Internet, you can easily and quickly perform remote project and firmware maintenance, and you can use UperLogic to achieve real-time online monitoring and project editing. Devices are now within arm's length, no matter how far away they are.

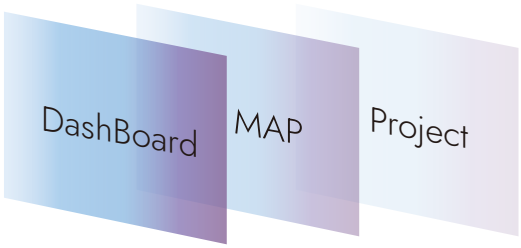


Connect mainstream cloud platforms with MQTT

Built-in MQTT communication protocol which is commonly used in IoT standard.Provide a convenient setting interface, which can easily connect to mainstream cloud platforms without any programming. The user will be allowed to expand wider realm and aspect applications without limitation.

FATEK IoT Solution

Easily monitor, control and maintain scattered devices anytime, anywhere.Intuitive user-friendly operation interface and web content management system.Ready-to-use without the need of additional IoT platform development.Support cross-platform to ensure running on various devices.

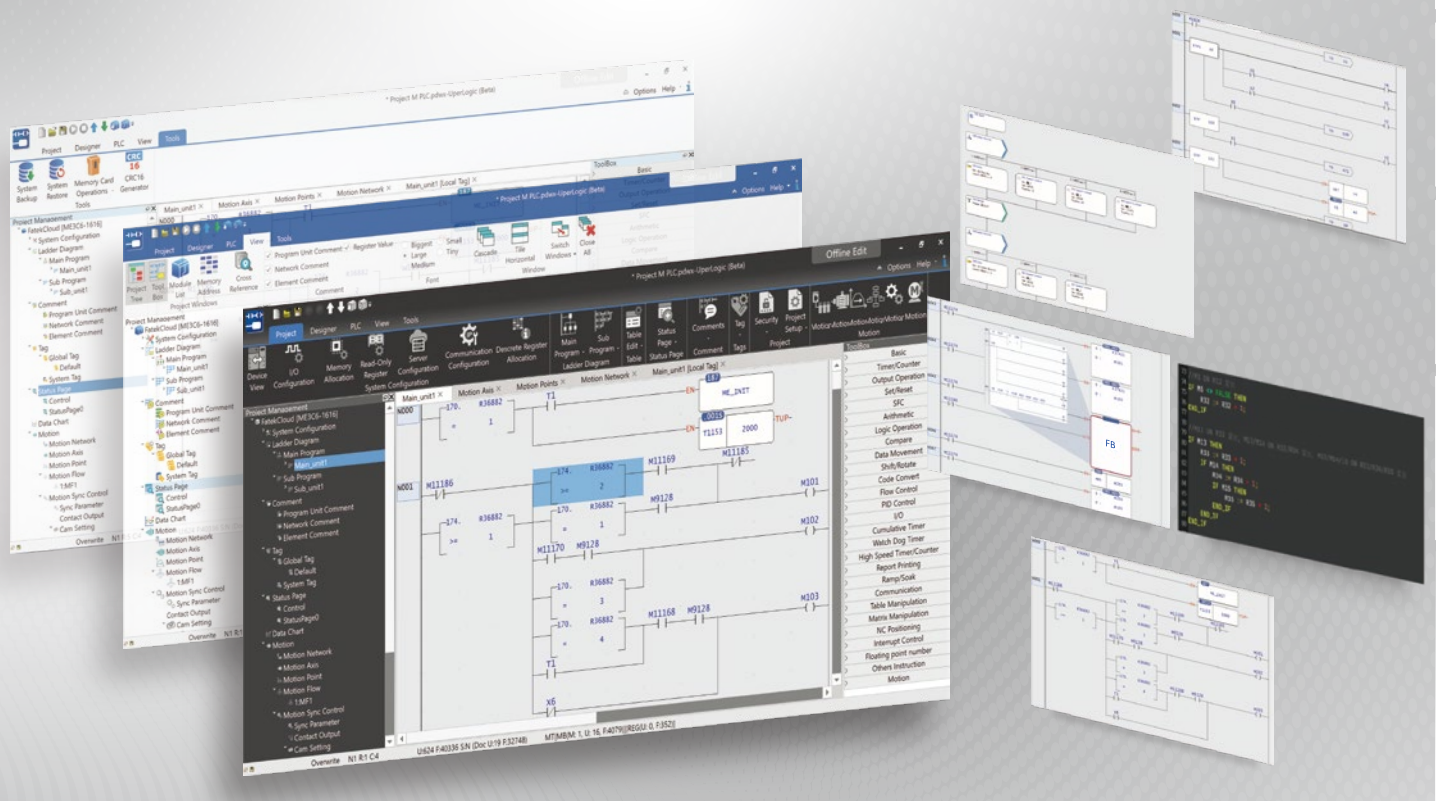


* Will be supported in the future

M SERIES Programming Software

UperLogic

Powerful and approachable



Support LD / ST / FB / SFC

IEC 61131-3 like programming language

DEVICE VIEW

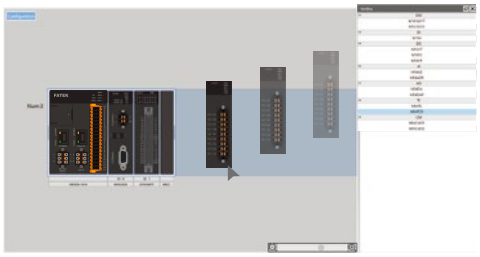
device information at a glance

Automatic system composition scanning

Once connected to the PLC, it will automatically scan the system composition. There is no more need to go to the field or open the control cabinet to check the configuration, and no need to manually enter the module model name to get complete information.

Drag and Drop

Simply drag and drop to plan the system composition. Automatically prompts whether the location and quantity of the modules are in compliance with the specifications, and help quickly carry out configuration planning without the need of manuals.

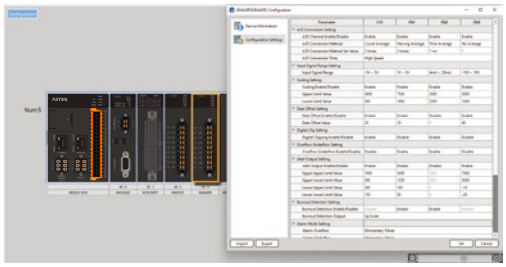


Online real-time monitoring

Click the module icon on the device view to open the real-time monitoring page, and it will also list out the register data and status code of the module. Clearly get the module information without reading the manual and looking up to the register table.

Module parameter setting

Set and calibrate the module by clicking on the module icon on device view, and support advanced settings such as alarm, upper and lower limits, and offsets. Quick setup without the need of hardware jumpers or registers and ladder settings.



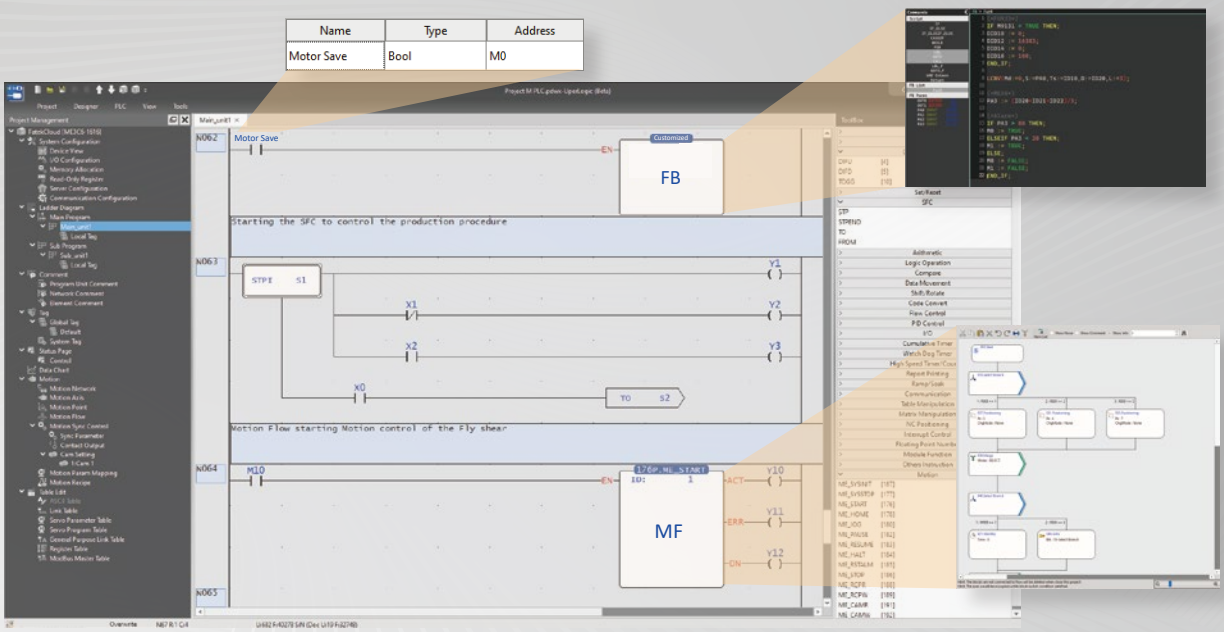
Module dimensions and information

Display data information and dimensions of individual modules and the entire configuration.Conveniently provide the information you need when planning machines and systems.

Automatic power consumption

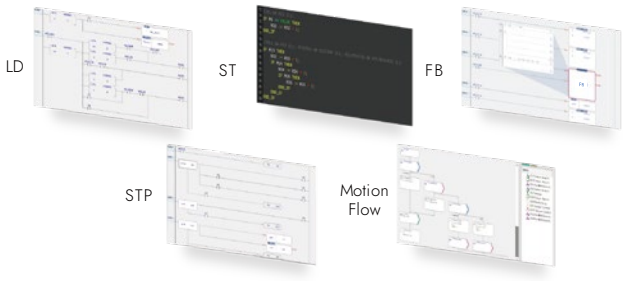
The power consumption of the module is displayed below the module icon on device view, and the total system power margin is automatically calculated to ensure sufficient power supply.

Comprehensive and powerful features



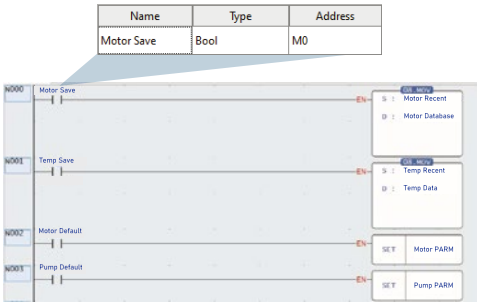
Multi-language editing

Support LD / ST / FB/ STP / MotionFlow editing languages. Multiple languages can be mixed and matched in the same project.The most suitable language could be selected for project development according to different applications.



PLC TAG

Directly define the object, function and register address by name, no longer have to worry about not being able to identify the purpose represented by the register address for each item.Easily manage and import/export tag settings through the tag database.

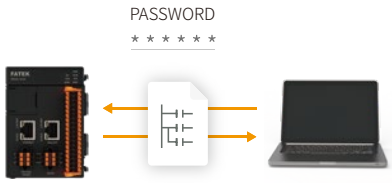


Intellectual property protection

Projects and Data Protection

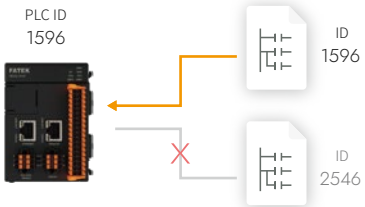
Project, data and settings can be protected by password

Download and project verifying



Project upload/download permissions can also be protected by password

Project and PLC binding



Project can be run if only when Project ID and PLC ID match

Modbus mapping table

When used as a slave, it can automatically correspond the external Modbus address to the internal register. The communication between the third-party device and the PLC can be easily completed without programming.

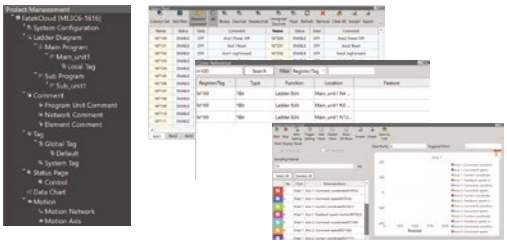
Self-defined protocol

Provide convenient and intuitive self-defined protocol setting table.Even non-mainstream devices and sensors can be easily connected.

Intuitive and convenient operation experience

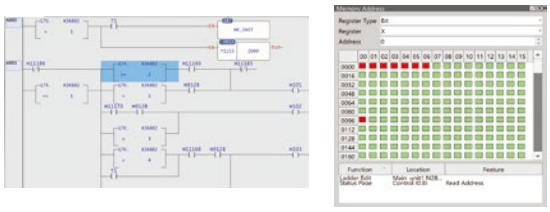
Tree View and multi-window editing

Tree structure project management window.
Project and parameter settings can be clearly and simply managed hierarchically and systematically.
Flexible multi-window interface easy for multitasking.



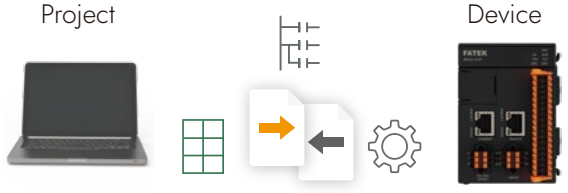
Memory Map

Clearly indicate the PLC internal memory usage.
By clicking on the used resources, it can guide you to the related component or function.Significantly improve resource planning efficiency and accessibility.



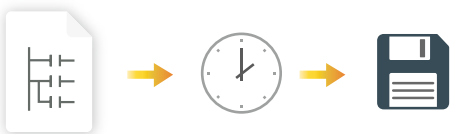
Project comparison

After onlining, it will automatically compare the project consistency between the computer and the PLC, and list the comparison results of PLC, Motion and modules respectively.
Based on the comparison result, you may select the specific item for executing upload or download.



Project automatic backup

A specific time interval can be set for project backup during project development.The project will be saved automatically if the user shuts down the software without saving.Automatic backup ensures that the results are properly retained in the event of any PC errors during programming.



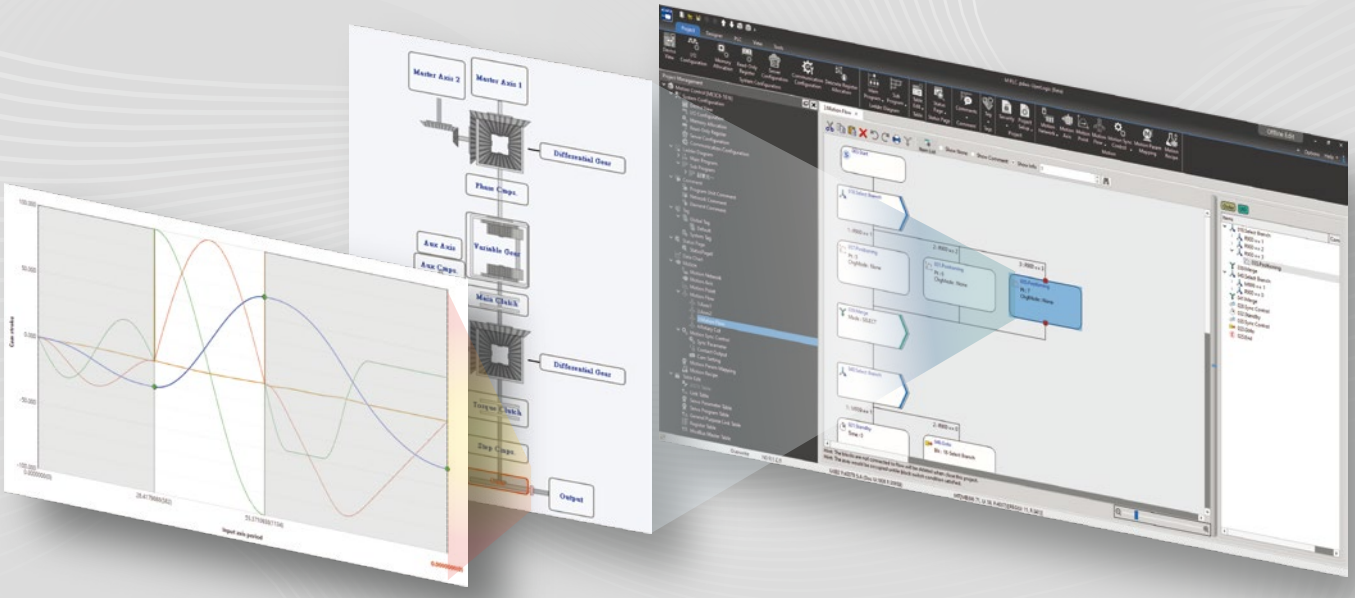
Network device scanning

Easily scan devices in LAN through a single click.
Eliminate the intricate process of confirming IP information device by device.

Hotkey input

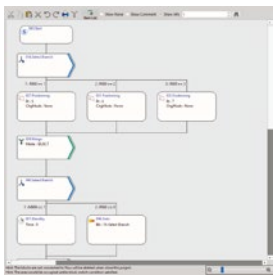
Support keyboard hotkey command input.
Skip the tedious steps of clicking the window to enter the function item by item with the mouse.

A simple motion planning approach



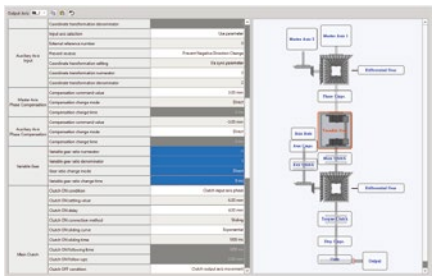
Motion Flow

Intuitively plan motion control processes graphically without the need of complex programming.Even complicated motion action can be concisely defined through intuitive motion block.
Motion flow is highly visualized, it allows the user to comprehend the control process and the command simply by viewing.



Sync parameter

Directly click on the icon of the synchronous axis mechanism to adjust the detailed parameters of the clutch and gear,etc.It allows the user to change the interaction between input and output axes quickly and flexibly.

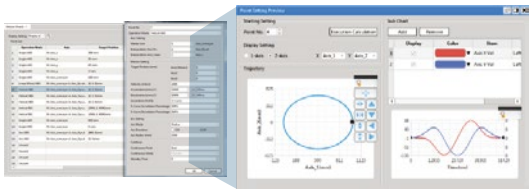


Electronic cam

Intuitive adjustment of cam stroke and phase by chart dragging.
Built-in up to 22 cam profiles for quick and easy cam shape creation.
Cam configuration can be achieved without complicated parameter calculation and setting.

Trajectory simulation

Simulate the motion settings in the motion point table and draw the values and trajectories.Display multiple values at once, such as position, velocity, and acceleration.Quickly verify the correctness of parameters without running the machine.



Contact output

Cam phase and PLC output can be linked.
The required on or off value of the output can be triggered at a specific cam stroke interval.

Motion Network

Simply connect other brands EtherCAT servo drivers* by importing ESI files.
And also support virtual axis planning.

* For supported driver brands, please refer to the list on FATEK website

Line Up

ME

Advanced Motion

Expansion Module | Advanced | Local I/O | High-Speed

General	Motion and Positioning Control			Communication	IO & Expansion
Basic LD 0.8 nS	PLC + Motion Dual CPU	EtherCAT **Motion** 16 Axes	Pulse 8 Axes	Ethernet	32 DIO
Total Program Memory 3 MB	E-Cam 16 Axes	Flying shear Rotary knife	Motion Sync	EtherCAT	2 AI
DIO 2048	Helical & 3D Circular interpolation	Circular interpolation	Linear interpolation	RS 485	SD slot
AIO 256	SAPC Single axis positioning control	ICF Interrupt constant feed	ICA Interrupt constant angle	IoT & MQTT	Type C

* The above table lists the highest-level specifications of the series. Please refer to the specification table for each single model.

MS General Motion

Advanced | Local I/O | High-Speed

General	Motion and Positioning Control			Communication	IO & Expansion
Basic LD 0.8 nS	PLC + Motion Dual CPU	EtherCAT **Motion** 16 Axes	Pulse 8 Axes	Ethernet	32 DIO
Total Program Memory 3 MB	E-Cam 3 Axes	Flying Saw Rotary cut	Motion Sync	EtherCAT	2 AI
DIO 2048	Helical & 3D Circular interpolation	Circular interpolation	Linear interpolation	RS 485	SD slot
AIO 256	SAPC Single axis positioning control	ICF Interrupt constant feed	ICA Interrupt constant angle	IoT & MQTT	Type C

MA ADVANCED

Advanced | Local I/O | High-Speed

General	Motion and Positioning Control			Communication	IO & Expansion
Basic LD 0.8 nS	PLC + Motion Dual CPU	EtherCAT **SAPC** 16 Axes	Pulse 8 Axes	Ethernet or*2	32 DIO
Total Program Memory 80 KB	E-Cam	Flying Saw Rotary cut	Motion Sync	EtherCAT	2 AI
DIO 2048	Helical & 3D Circular interpolation	Circular interpolation	Linear interpolation	RS 485	SD slot
AIO 256	SAPC Single axis positioning control	ICF Interrupt constant feed	ICA Interrupt constant angle	IoT & MQTT	Type C

MQ COMPACT

Local I/O | Plug-in

General	Motion and Positioning Control			Communication	IO & Expansion
Basic LD 0.8 nS	PLC + Motion Dual CPU	EtherCAT **SAPC** 16 Axes	Pulse 4 Axes*1	Ethernet or*2	32 DIO
Total Program Memory 80 KB	E-Cam	Flying Saw Rotary cut	Motion Sync	EtherCAT	2 AI
DIO 512	Helical & 3D Circular interpolation	Circular interpolation	Linear interpolation	RS 485	SD slot
AIO 128	SAPC Single axis positioning control	ICF Interrupt constant feed	ICA Interrupt constant angle	IoT & MQTT	Type C

Power Supply

MPA024-24

Input : 100~240VAC (50/60Hz)
Output : 24VDC 1A
(External+Internal)
Power : 24W

MPA048-24

Input : 100~240VAC (50/60Hz)
Output : 24VDC 2A
(External+Internal)
Power : 48W

The above table lists the highest-level specifications of the series. Please refer to the specification table for each single model.
*1: MQ CPU built-in 4 axes pulse position control and can expand up to 8 axes with plug-in expansion module.
*2: MQ and MA models Eth/EC port can switch between using Ethernet and EtherCAT.

Local I/O & High-speed expansion

Digital

Local I/O expansion

Digital Input

M16X

Input : 16 points
24VDC Input
Push-in terminal blocks

Digital Output

M16YT/J/R

Output : 16 points
T: SINK(NPN) J: SOURCE (PNP) R:RELAY
Push-in terminal blocks

Digital Input & Output

M1616XYT/J

Input : 16 points Output : 16 points
24VDC Input
T: SINK(NPN) J: SOURCE (PNP)
40 pins box header connector

Analog

Local I/O expansion

Analog Input

M04AD

Input : 4 points Voltage/ Current
Resolution : 1/16383
Precision : ±0.1%
Push-in terminal blocks

High Resolution Analog Input

M04ADR

Input : 4 points Voltage/ Current
Resolution : 1/160000
Precision: ±0.1%
Push-in terminal blocks

Analog Output

M04DA

Output : 4 points Voltage/ Current
Resolution : 1/16383
Precision : ±0.2%
Push-in terminal blocks

High Resolution Analog Output

M04DAR

Output : 4 points Voltage/ Current
Resolution : 1/54000
Precision : ±0.05%
Push-in terminal blocks

Analog Input & Output

M0202AH

Input : 2 points Voltage/ Current
Resolution : 1/16383
Precision : ±0.1%
Push-in terminal blocks

Output : 2 points Voltage/ Current
Resolution : 1/16383
Precision : ±0.2%

Temperature

Local I/O expansion

Temperature Input

M04TC

Input : 4 points
Thermocouple : K,J,E,T,R,B,N,S,mV
Resolution : 0.1°C
Precision : ±0.5%
Push-in terminal blocks

High Precision Temperature Input

M04TCR

Input : 4 points
Thermocouple : K,J,E,T,R,B,N,S,mV
Resolution : 0.1°C
Precision : ±0.2%
Push-in terminal blocks

Temperature Input

M04RTD

Input : 4 points
RTD : Pt100/Pt1000: (-200~850°C)
JPt100/JPt1000:(-200~600°C)
Pt100/1000 - DIN EN 60751
JPt100/1000 - JIS C 1609-1981
Resolution : 0.1°C Precision : ±0.1%
Push-in terminal blocks

Mixed Temperature Input

M0202TH

Input : 2 points
Thermocouple : K,J,E,T,R,B,N,S,mV
Resolution : 0.1°C
Precision : ±0.5%
Push-in terminal blocks

Input : 2 points
RTD : Pt100/Pt1000: (-200~850°C)
JPt100/JPt1000:(-200~600°C)
Pt100/1000 - DIN EN 60751
JPt100/1000 - JIS C 1609-1981
Resolution : 0.1°C
Precision : ±0.1%

Load cell

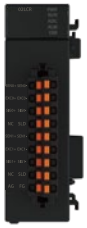
Local I/O expansion

Load cell input

M02LC

Input : 2 points
Resolution : 24 bits
Precision : ±0.5%
Push-in terminal blocks

High Precision Load cell Input



M02LCR

Input : 2 points
Resolution : 24 bits
Precision : ±0.01%
Push-in terminal blocks

Communication

High-Speed expansion*

Communication Expansion

MHCM25

1 port RS485 + 1 port RS232
Speed and interface:
RS485 - Max. 230400 bps
Push-in terminal blocks
RS232 - Max. 115200 bps
D-Sub 9-Pin

MHCM22

2 ports RS232
Speed and interface:
RS232 - Max. 115200 bps
D-Sub 9-Pin

MHCM55

2 ports RS485
Speed and interface:
RS485 - Max. 230400 bps
Push-in terminal blocks

IO Bus Extension

Repeater

MRPWE-AC

Input : 100~240VAC (50/60Hz)
Output : 24VDC 2A
(External+Internal)
Power : 48W
Maximum expansion number of modules per unit: 16 modules with maximum of 3 modules added per CPU, achieving up to 64 local I/O expansion modules

Head/Tail Branch

MRGH/MRGT

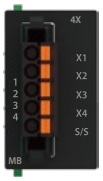
Expansion per row:
16 local I/O expansion modules
Maximum expansion up to
6 rows (6 sections)
Total of 64 expansion modules
Expansion Distance:
Single section of 2 meters,
total length 10 meters

* Support up to 6 high-speed modules, and need to be installed in the first 6 expansion positions on the right side of the CPU (placed between the CPU and local I/O modules)
MQ CPU does not support High-speed modules

Plug-in expansion

Digital Plug-In expansion*

Digital Input



MB-4X

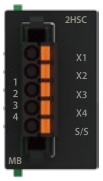
Input : 4 points
24VDC Input
Push-in terminal blocks

Digital Output

MB-4YT/J

Output : 4 points
T: SINK(NPN) J: SOURCE (PNP)
Push-in terminal blocks

High speed-Digital Input



MB-2HSC

Input : 4 points
HSC: 200KHz High speed counter
24VDC Input
Push-in terminal blocks

High speed-Digital Output

MB-2PSOT/J

Output : 4 points
HSPO: 200KHz High speed pulse output
T: SINK(NPN) J: SOURCE (PNP)
Push-in terminal blocks

Analog Plug-In expansion*

Analog Input

MB-2ADL

COMING SOON

Analog Output

MB-2DAL

COMING SOON

Communication Plug-In expansion*

RS232

MB-CB2

1 ports RS232
Speed and interface:
RS232 - Max. 115200 bps
D-Sub 9-Pin

RS485

MB-CB5

1 ports RS485
Speed and interface:
RS485 - Max. 230400 bps
Push-in terminal blocks

RTC Plug-In expansion*

MB-RTC

Accurately keep time regardless of whether the PLC is powered on or off.
It provides seven types of time data:
week, year, month, day, hour, minute, and second

* Plug-in expansion module is only supported by MQ series CPU and can maximum expand up to 2.

Performance specifications

ME

Advanced Motion

MS

General Motion

MA

Advanced

MQ

Compact

General Specifications

Item	ME □□□ -1616 ◇ / MS □□□ -1616 ◇	MA □□□ -1616 ◇ /MQ □□□ -1616 ◇
Power consumption	DC24V±20%，0.2A	DC24V±20%，0.15A
Grounding	Class D grounding	
Environmental temperature	0 ～ 55°C	
Storage temperature	-25 ～ 70°C	
Environmental humidity	5 ～ 95%RH(non-condensing, RH-2)	
Working atmosphere	Free from excessive conductive dust and corrosive gas	
Altitude	≤ 2000m	
Vibration resistance	5 to 8.4Hz Half-amplitude: 3.5mm	
	8.4 to 150 Hz Constant acceleration: 19.6m/s2 (2G)	
	3 directions of X, Y, Z: 10times (IEC61131-2 compliants)	
Shock resistance	10G, three times for each direction of 3 axes	
Noise resistance	1500 Vp-p, pulse width 1μS	
Withstand voltage	1500VAC, 1 minute,	
Pollution resistance	Degree II	
Certifications	CE、UL*	

◇: T — Transistor SINK (NPN) output; J — Transistor SOURCE (PNP) output (expected to be supported in 2025)
*Please note when placing an order.

Input Specifications

Digital Input

Item		Specification
Input points		16 points (8 points/1 common point)
Input type		24VDC single-end input
Maximum input frequency		200KHz
Input signal voltage		24VDC±10%
Threshold	ON current	＞ 4mA
	OFF current	＜ 2mA
Maximum input current		6mA(@DC24V)
Input indication		Displayed by LED: light when “ON”, dark when “OFF”
Isolation method		optical isolation,500VAC,1 minute
SINK/SOURCE wiring		Via variation of internal common terminal S/S and external common wiring
Noise filtering time		DHF(0 ~ 15ms) ＋ AHF(0.47μs) DHF: Digital Hardware Filtering; AHF: Analog Hardware Filtering
External connection		2X18 pins Push-in terminal blocks

Analog Input

Item		Specification		
Input point		2ch		
Analog Input characteristics and resolution	Voltage	Analog input range	Value	Resolution
		0~10V	0~4096	2.44mV
	Current	Analog input range	Value	Resolution
		0~20mA	0~4096	4.88uA
Conversion precision	Voltage	±1% (25° C±5°C)		
	Current	±1% (25° C±5°C)		
Conversion speed		Conversion once for each scan		
Input resistance		Voltage：76KΩ Current：165Ω		
Hardware maximum input		Voltage：0 ~ 15V Current：0 ~ 30mA		
External connection		2X3 pins Push-in terminal blocks		

Output Specifications

Digital Output

Item		MQ/MA/MS/ME Series
output points		16
output mode		Single-end transistor output
Maximum output frequency		200KHz
Working voltage		5 ～ 30VDC
Maximum load current Resistive		0.1A
Maximum voltage drop(@Maximum load)		0.6V
Leakage current		＜ 0.1 mA/30VDC
Maximum output delay time	ON → OFF	2us
Maximum output delay time	OFF → ON	2us
Output status indication		Displayed by LED: Light when “ON”, dark when “OFF”
Isolation method		Optical isolation, 500VAC, 1 minute
SINK/SOURCE output type		Choose SINK/SOURCE by models and non-exchangeable
External connection		2X18 pin Push-in terminal blocks

Power Supply Module

Item	MPA024-24	MPA048-24
Input voltage	100~240 VAC	
Frequency	50/60Hz	
Maximum input current	1A max.	
Inrush current (cold start)	22A/115VAC (44A/230VAC)	
Rated output current (External+Internal)	1A	2A
Rated output power (External+Internal)	24W	48W
External output voltage	24 VDC	
Output voltage range	24 VDC+-1%	
Output ripple+noise	< 1%	
Hold-up time	>15ms/ 115VAC , >60ms/ 220VAC	
Overcurrent protection	101%~133% Foldback overload protection,automatically recover when overload is removed	
Overvoltage protection	34~36 VDC / Latching overvoltage protection, re-power on to recover	
Conversion efficiency	86%/110VAC, 87%/220VAC	
Withstand voltage	3,000 VAC (Primary-secondary), 1,500 VAC (Primary-PE), 500 VAC(Secondary-PE)	
Insulation resistance	>100M Ohms/500VDC	
Fuse	2A	
Environmental temperature	0°C ~55°C	
Environmental humidity	20%~90% (Non-condensing)	

IO Bus Extension

Repeater

Item	MRPWE-AC
Input voltage	100~240 VAC
Frequency	50/60Hz
Maximum input current	1A max.
Inrush current (cold start)	22A/115VAC (44A/230VAC)
Rated output current (External+Internal)	2A
Rated output power (External+Internal)	48W
External output voltage	24 VDC
Output voltage range	24 VDC+-1%
Output ripple+noise	< 1%
Hold-up time	>15ms/ 115VAC , >60ms/ 220VAC
Overcurrent protection	101%~133% Foldback overload protection automatically recover when overload is removed
Overvoltage protection	34~36 VDC / Latching overvoltage protection, re-power on to recover
Conversion efficiency	86%/110VAC, 87%/220VAC
Withstand voltage	3,000 VAC (Primary-secondary), 1,500 VAC (Primary-PE), 500 VAC(Secondary-PE)
Insulation resistance	>100M Ohms/500VDC
Fuse	2A
Environmental temperature	0°C ~55°C
Environmental humidity	20% ～ 90%(non-condensing)
Maximum expansion of modules	One repeater module can expand to 16 local I/O expansion modules, with maximum of 3 repeaters added per CPU, achieving up to 64 local I/O expansion modules. (Including the original 16 local I/O expansion modules directly supported by the CPU)
Installation location	Can only be installed between local I/O modules, cannot be installed between CPU and high-speed modules.
Notes	Cannot be expanded to the second row, must be connected to the main section (basic section)

Head Branch

Tail Branch

Item	MRGH	MRGT
Number of expansion	With 1 MRGH and 1 MRGT, you can expand up to 16 local I/O expansion modules, with a maximum of 6 rows (6 sections), totaling 64 local I/O expansion modules.	
Maximum Expansion Distance	Single section of 2 meters, total length 10 meters (Used with MFB20M-120 cable)	
Installation Location	It can only be installed to the right of the power module, not in the main section, and must be placed in the expansion section (from the second row onward). There is only one port on the front, so it cannot be directly daisy-chained to the next row's MRGH. To connect to the next row, an additional MRGT module is required.	It can only be placed in the RACK (entire section) at the end of a row, specifically to the left of the end module(MRE). For each additional expansion section (next row), an MRGH module must be added.
Power expansion	The left side must be connected to a power module or supplied with 24V from an external power source to provide power for the expansion modules in this section.	It does not include power expansion, and a power module cannot be connected to the left side to expand internal power.
Notes	Requires the use of MFB20M-120 dedicated connection cable and includes one MRE end module.	Requires the use of MFB20M-120 dedicated connection cable

Performance specifications

Specification			ME3C6	ME2C5	ME2C4	ME2C3	MS3C6	MS2C5	MS2C4	MS2C3	MS1C2	MS1C1
Programming language			LD / ST / FB / STP / MotionFlow									
Instruction execution speed		LD Instruction	0.0008 uS/ LD (0.8nS/LD)									
		MOV Instruction	0.0075 uS/ LD (7.5nS / MOV)									
Maximum I/O		DIO	2048	2048	1024	1024	2048	2048	1024	512	512	512
		AIO	256	256	128	128	256	256	128	128	128	128
Maximum number of Modules		Local I/O + High-speed	64 units (with the use of I/O Bus Extension module)									
		High-speed	6 units (need to be installed between CPU and general module)									
		Advanced	●	●	●	●	●	●	●	●	●	●
		Plug-in	–	–	–	–	–	–	–	–	–	–
Program Memory		PLC	80KB	80KB	80KB	80KB	80KB	80KB	80KB	80KB	80KB	80KB
		Motion	3 MB	1.5 MB	1.1 MB	742 KB	3 MB	1.5 MB	1.1 MB	742 KB	556 KB	370 KB
Memory card *5 Dedicated Industrial Grade Micro-SD Card		Project Backup and Restore	Supports rapid project loading via memory card									
		Register Data Backup and Restore	●	●	●	●	●	●	●	●	●	●
Built-in digital input and output			Input 16 points 、 Output 16 points									
Built-in analog input			2ch 12bits									
Built-in analog output			Optional selection(PWMDA x 1)									
Communication Interface	ETHERNET	Interface	1 Port 10/100 Base-T									
		Modbus / User-Defined	Master/Slave									
	EtherCAT		1 Port									
	RS-485		2 ports，Support Master/Slave，Communication speed 4.8K ～ 921.6Kbps									
	Maximum serial ports		14 (2 Built-in + 12 Expansion)									
	USB		1 port，USB Type C (USB 2.0)									
IoT expansion *4			MQTT ， FATEK iMonitor / iAccess									
Motion Control	Number of control axes		24 axes	22 axes	18 axes	13 axes	24 axes	22 axes	18 axes	13 axes	12 axes	7 axes
	Pulse	Axes	8 axes	8 axes	8 axes	8 axes	8 axes	8 axes	8 axes	8 axes	8 axes	4 axes
		Output frequency	200KHz	200KHz	200KHz	200KHz	200KHz	200KHz	200KHz	200KHz	200KHz	200KHz
		Pulse output mode	3 Modes (U/D 、P/R 、A/B)									
		Linear Interpolation	●	●	●	●	●	●	●	●	●	●
		Circular Interpolation	●	●	●	●	●	●	●	–	–	–
		ICF/ICA*2	●	●	●	●	●	●	●	●	●	●
	EtherCAT	Number of axis (A+B+C)	16	14	10	5	16	14	10	5	4	3
		Real/Virtual axes(A)	16	12	8	4	16	12	8	4	3	2
		Additional Virtual axes (B)	0	2	2	1	0	2	2	1	1	1
		Additional SAPC*1 axes on EN/EC port (C)	–	–	–	–	–	–	–	–	–	–
		Linear Interpolation	●	●	●	●	●	●	●	●	●	●
		Circular Interpolation	●	●	●	●	●	●	●	●	●	●
		ICF/ICA*2	●	●	●	●	●	●	●	●	●	●
		3D circular/Helical Interpolation	●	●	●	●	–	–	–	–	–	–
		E-cam (Fly-saw/Rotary-cut)	16	12	8	4	3	3	2	2	–	–
High-speed counter 200KHz *3			16 points (8 channel)				16 points (8 channel)					8 points (4 channel)
High-speed Pulse output			16 points（8 axes）				16 points（8 axes）					8 points (4 axes)
High-speed timer 0.1mS			1 (16-bit) , 4 (32-bit)				1 (16-bit) , 4 (32-bit)					
Built-in RTC			sec,min,hour,day,month,year,week									
Data retentive		Program and Data	Non-volatile memory (no battery required)									
		Calendar	Battery									

◇：T — Transistor SINK(NPN) output； J — Transistor SOURCE (PNP) output (planned support in 2025)

*1 : SAPC (single axis positioning control) . Eth/EC ports on MA/MQ models can be switched to support Ethernet/EtherCAT.

*2 : ICF (interrupt constant feed) , ICA(interrupt constant angle)

*3 : ME/MS models, half of the available channels are reserved for Motion control

*4 : CPU built-in support for MQTT and iMonitor functions, while iAccess will be supported through advanced expansion (planned support in 2025). iMonitor and iAccess services must be activated using a license key

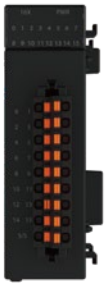
*5 : Only supports the MFM06 dedicated SD memory card (planned for support in 2025)

Specification			MA1I4	MA1N3	MQ2M6	MQ2M3
Programming language			LD / ST / FB / STP			
Instruction execution speed		LD Instruction	0.0008 uS/ LD (0.8nS/LD)			
		MOV Instruction	0.0075 uS/ LD (7.5nS / MOV)			
Maximum I/O		DIO	2048	1024	512	512
		AIO	256	128	128	128
Maximum number of Modules		Local I/O + High-speed	64 units (with the use of I/O Bus Extension module)			
		High-speed	6 units (need to be installed between CPU and general module)		–	
		Advanced	●	●	–	
		Plug-in	–	–	2 Sets	
Program Memory		PLC	80KB	80KB	80KB	80KB
		Motion	–	–	–	–
Memory card *5 Dedicated Industrial Grade Micro-SD Card		Project Backup and Restore	Support project and OS update with memory card			
		Register Data Backup and Restore	●	●	●	●
Built-in digital input and output			Input 16 points 、 Output 16 points			
Built-in analog input			–	–	–	–
Built-in analog output			Optional selection(PWMDA x 1)			
Communication Interface	ETHERNET	Interface	1 Port 10/100 Base-T			
		Modbus / User-Defined	Master/Slave			
	EtherCAT		1 Port (Eth/EC port shared with Ethernet)			–
	RS-485		2 ports，Support Master/Slave，Communication speed 4.8K ～ 921.6Kbps			
	Maximum serial ports		14 (2 Built-in + 12 Expansion)		4 (2 Built-in + 2 Plug-in)	
	USB		1 port，USB Type C (USB 2.0)			
IoT expansion *4			MQTT ， FATEK iMonitor / iAccess			
Motion Control	Number of control axes		24 axes	12 axes	20 axes	4 axes
	Pulse	Axes	8 axes	4 axes	4 axes Can expand up to 8 axes	4 axes Can expand up to 8 axes
		Output frequency	200KHz	200KHz	200KHz	200KHz
		Pulse output mode	3 Modes (U/D、P/R、A/B)			
		Linear Interpolation	●	●	●	●
		Circular Interpolation	●	–	●	–
		ICF/ICA*2	●	●	●	●
	EtherCAT	Number of axis (A+B+C)	16	8	16	–
		Real/Virtual axes(A)	–	–	–	–
		Additional Virtual axes (B)	–	–	–	–
		Additional SAPC *1 axes on EN/EC port (C)	16	8	16	–
		Linear Interpolation	–	–	–	–
		Circular Interpolation	–	–	–	–
		ICF/ICA*2	–	–	–	–
		3D circular/Helical Interpolation	–	–	–	–
		E-cam (Fly-saw/Rotary-cut)	–	–	–	–
High-speed counter 200KHz *3			8 points (4 channel)		8 points (4 channel) Can expand up to 8 channel	
High-speed Pulse output			16 points（8 axes）	8 points（4 axes）	8 points（4 axes） Can expand up to 8 axes	
High-speed timer 0.1mS			1 (16-bit) , 4 (32-bit)			
Built-in RTC			sec,min,hour,day,month,year,week		– (Can Expandable through by MB-RTC)	
Data retentive		Program and Data	Non-volatile memory (no battery required)			
		Calendar	Battery			

Digital Module

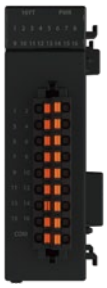
Local I/O

Digital Input



Item		M16X
Input points		16
Input type		24VDC single-end input
Maximum input frequency		Medium to Low speed 1kHz
Input signal voltage		24VDC±10%
Threshold current	ON	＞ 4mA
	OFF	＜ 1.5mA
Maximum input current		7.6mA
Input resistance		5.6 kΩ
Isolation type		Optical isolation, 500VAC, 1 minute
SINK/SOURCE wiring		Via variation of internal common terminal S/S and external common wiring
Noise filtering time		DHF(0 ~ 70ms) + AHF(0.47ms)
External connection		18 pins Push-in terminal blocks

Digital Output



Item		M16YT/J	M16YR
Output points		16	16
Output type		T: Transistor SINK(NPN) J: Transistor SOURCE(PNP)	Wiring of relay single-end output
Maximumoutput frequency		Medium to Low speed 1kHz	ON/OFF
Working voltage		5~30VDC	<250VAC,30VDC
Maximum load current	Resistive	0.5A	2A/Single，8A/ Common
	Inductive	0.5A	80VA(AC)/24VA(DC)
Maximum voltage drop/ conducting resistance		2.2V	0.06V(first time)
Minimum load		—	2mA/DC
Leakage current		＜ 0.1mA/30VDC	—
Maximum output delay time	ON > OFF	＜ 10μS	10ms
Maximum output delay time	OFF > ON	＜ 40μS	10ms
Isolation type		Optical isolation, 500VAC, 1 min	Electromagnetic isolation, 500VAC, 1 min
SINK / SOURCE Wiring		Selected based on the model cannot be changed	Polarity-free components, configurable as either SINK or SOURCE output
External connection		18 pins Push-in terminal blocks	

Digital Input & Output

Item			M1616XYT/J
Input	Input points		16
	Input type		24VDC single-end input
	Maximum input frequency		Medium to Low speed 1kHz
	Input signal voltage		24VDC±10%
	Threshold current	ON	＞ 4mA
		OFF	＜ 1.5mA
	Maximum input current		7.6mA
	Input resistance		5.6 kΩ
	Common method		16 points / 4 common (S/S)
Output	Output points		16
	Output type		Transistor NPN(T)/PNP(J)
	Maximum output frequency		Medium to Low speed 1kHz
	Working voltage		5~30VDC
	Maximum voltage drop/ conducting resistance		2.2V
	Leakage current		＜ 0.1mA/30VDC
	Maximum output delay time	ON > OFF	＜ 10μS
	Maximum output delay timet	OFF > ON	＜ 40μS
	Common method		16 points / 4 common(COM)
External connection			40 pins box header connector

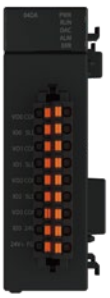
Analog Module

Local I/O

Analog Input

Item		M04AD			M04ADR		
Input points		4			4		
Analog Input characteristics and resolution	Voltage	Input range	Value	Resolution	Input range	Value	Resolution
		-10~+10V	-8192~8191	1.2mV	-10~+10V	-80000~80000	0.125mV
		-5~+5V	-8192~8191	0.6mV	-5~+5V	-80000~80000	0.0625mV
		0~10V	0~16383	0.6mV	0~10V	0~80000	0.125mV
		0~5V	0~16383	0.3mV	0~5V	0~80000	0.0625mV
		1~5V	0~16383	0.24mV	1~5V	0~80000	0.05mV
	Current	Input range	Value	Resolution	Input range	Value	Resolution
		-20mA~+20mA	-8192~8191	2.4uA	-20mA~+20mA	-80000~80000	0.25uA
		0~20mA	0~16383	1.2uA	0~20mA	0~80000	0.25uA
		4~20mA	0~16383	0.97uA	4~20mA	0~80000	0.2uA
Conversion precision	Voltage	±0.1% (25° C±5°C) ±0.2% (0 ～ 55°C)			±0.1% (25° C±5°C) ±0.2% (0 ～ 55°C)		
	Current	±0.2% (25° C±5°C) ±0.4% (0 ～ 55°C)			±0.1% (25° C±5°C) ±0.2% (0 ～ 55°C)		
Conversion speed		High speed : 300us/Ch Medium speed : 500us/Ch Low speed : 1ms/Ch 50Hz filtering : 80ms/Ch 60Hz filtering: 68ms/Ch			High speed : 1.5ms/Ch. Medium speed : 4ms/Ch. Low speed : 15ms/Ch. 50Hz filtering : 80ms/Ch. 60Hz filtering : 68ms/Ch.		
Input resistance		Voltage：1MΩ Current：250Ω					
Hardware maximum input		Voltage：－ 15V ～+ 15V Current：-30mA~+30mA					
Isolation method		Between analog input terminals and CPU : Isolation (Transformer(power) and optical coupler(signal)) No isolation between each channel					
External connection		18 pins Push-in terminal blocks			18 pins Push-in terminal blocks		

Analog Output



Item		M04DA			M04DAR		
Output points		4			4		
Analog Output characteristics and resolution	Voltage	Output range	Value	Resolution	Output range	Value	Resolution
		-10~+10V	-8192~8191	1.2mV	-10~+10V	-27000~27000	0.37mV
		-5~+5V	-8192~8191	0.6mV	-5~+5V	-27000~27000	0.185mV
		0~10V	0~16383	0.6mV	0~10V	0~27000	0.37mV
		0~5V	0~16383	0.3mV	0~5V	0~27000	0.185mV
		1~5V	0~16383	0.2mV	1~5V	0~27000	0.148mV
	Current	Output range	Value	Resolution	Output range	Value	Resolution
		0~20mA	0~16383	1.22μA	0~20mA	0~27000	0.74μA
		4~20mA	0~16383	0.97μA	4~20mA	0~27000	0.592μA
Conversion precision	Voltage	±0.2% (25°C ±5°C) ±0.5% (0~55°C)			±0.05% (25°C ±5°C) ±0.3% (0~55°C)		
	Current	±0.2% (25°C ±5°C) ±0.5% (0~55°C)			±0.05% (25°C ±5°C) ±0.3% (0~55°C)		
Conversion speed		1ms/ch			0.5ms/ch		
Minimum load resistance		Voltage：1kΩ			Voltage：1kΩ		
Maximum load resistance		Current：500Ω			Current：500Ω		
Hardware maximum input	Voltage	-10.2~+10.2V -5.1~+5.1V -0.2~10.2V -0.1~5.1V 0.9~5.1V			-10.2~+10.2V -5.1~+5.1V -0.2~10.2V -0.1~5.1V 0.9~5.1V		
	Current	0~20.2mA 4~20.2mA			0~20.2mA 4~20.2mA		
Isolation method		Between analog output terminals and CPU : Isolation (Transformer(power) and optical coupler(signal)) No isolation between each channel					
External connection		18 pins Push-in terminal blocks					

Analog Module

Local I/O

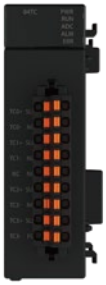
Analog Input & Output

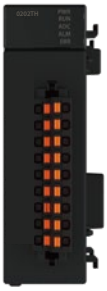
Item		M0202AH					
Input/Output points		2 input			2 output		
Analog characteristics and resolution	Voltage	Input range	Value	Resolution	Output range	Value	Resolution
		-10~+10V	-8192~8191	1.2mV	-10~+10V	-8192~8191	1.2mV
		-5~+5V	-8192~8191	0.6mV	-5~+5V	-8192~8191	0.6mV
		0~10V	0~16383	0.6mV	0~10V	0~16383	0.6mV
		0~5V	0~16383	0.3mV	0~5V	0~16383	0.3mV
		1~5V	0~16383	0.2mV	1~5V	0~16383	0.2mV
	Current	Input range	Value	Resolution	Output range	Value	Resolution
		-20mA~+20mA	-8192~8191	2.4uA	0~20mA	0~16383	1.22μA
		0~20mA	0~16383	1.2uA			
		4~20mA	0~16383	0.97uA	4~20mA	0~16383	0.97μA
Conversion precision	Voltage	±0.1% (25° C±5°C) ±0.2% (0 ～ 55°C)			±0.2% (25°C ±5°C) ±0.5% (0~55°C)		
	Current	±0.2% (25° C±5°C) ±0.4% (0 ～ 55°C)			±0.2% (25°C ±5°C) ±0.5% (0~55°C)		
Conversion speed		High speed : 300us/Ch Medium speed : 500us/Ch Low speed : 1ms/Ch 50Hz filtering : 80ms/Ch 60Hz filtering: 68ms/Ch			1ms/ch		
Isolation method		Between analog input/output terminals and CPU : Isolation (Transformer(power) and optical coupler(signal)) No isolation between each channel					
External connection		18 pins Push-in terminal blocks					

Temperature Module

Local I/O

Temperature input



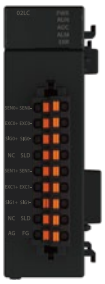


Item	M04TC	M04TCR	M04RTD	M0202TH	
Input points	4 TC	4 TC	4RTD	2 RTD	2 TC
Sensor	Thermocouple K,J,E,T,R,B,N,S,mV		Pt100/Pt1000: (-200~850°C) JPt1000/JPt1000:(-200~600°C) Pt100(1000) - DIN EN60751 JPt100(1000) - JIS 1609-1981		Thermocouple K,J,E,T,R,B,N,S,mV
Resolution	0.1°C	0.1°C	0.1°C	0.1°C	0.1°C
Conversion precision	±0.5% (25° C±5°C) ±1% (0 ～ 55°C)	±0.2% (25° C±5°C) ±0.4% (0 ～ 55°C)	±0.1% (25° C±5°C) ±0.5% (0 ～ 55°C)		±0.5% (25° C±5°C) ±1% (0 ～ 55°C)
Sampling period	High speed : 200ms/ch General : 400ms/ch	High speed : 100ms/ch General : 200ms/ch	100ms/ch		High speed : 200ms/ch General : 400ms/ch
PID Control period	Adjustable computation interval: 0.1 to 30 seconds (TS), plus an additional scan cycle.				
Control Method	PID control、ON/OFF contol				
Calibration Method	PID auto-tuning mode				
Isolation method	Between analog input terminals and CPU : Isolation (Digital Isolator) Analog input channels: Insulated (Optocoupler isolation)				
External connection	18 Pin Push-in terminal blocks				

Load cell Module

Local I/O

Load cell input



Item	M02LC	M02LCR
Input points	2	2
A/D Converter Utilized	24 bits	24 bits
Conversion precision	±0.5% (25° C±5°C) ±1% (0 ～ 55°C)	±0.01% (25° C±5°C) ±0.4% (0 ～ 55°C)
Sampling period	High speed: 2 ms/ch (for single-point use) General :10ms/ch	General :10ms/ch
Level of sensitivity	±1.0mV/V、±2.0mV/V、±3.0mV/V、±4.0mV/V	
Zero drift	0.2uV/°C	
Gain drift	±10ppm/°C	
Excitation Voltage	5VDC±5%, Output current :60mA max. 6 wires	
Isolation method	Between analog input terminals and CPU : Isolation (Transformer(power) and optical coupler(signal)) No isolation between each channel	
External connection	18 pins Push-in terminal blocks	

Communication Module

High-Speed*

Serial

Item	MHCM25	MHCM22	MHCM55
Communication standard	1 port RS485 1 port RS232	2 port RS232	2 port RS485
Connection interface	RS485: 2X2 pins Push-in terminal blocks RS232 : D-Sub 9-Pin	RS232 : D-Sub 9-Pin	2X2 pins Push-in terminal blocks
Maximum number of connections	RS485: 32 slave RS232: 1 slave	RS232: 1 slave	RS485: 32 slave
Transmission speed	RS485: Maximum 230400 RS232: Maximum 115200	RS232: Maximum 115200	RS485: Maximum 230400
Transmission distance	RS485: 1200M RS232: 15M	RS232: 15M	RS485: 1200M
Isolation method	Transformer(power) isolation		

*Supports up to 6 high-speed modules, which must be installed in the first 6 expansion slots to the right of the CPU (between the CPU and local I/O expansion). MQ series CPUs do not support high-speed expansion

Digital Plug-in

Plug-in*

Digital Input

Item		MB-4X	MB-2HSC
Input points		4	4
HSC		–	○
Channel		–	2
Input type		24VDC single-end input	
Maximum input frequency		0.47mS	High speed 200kHz
Input signal voltage		24VDC±10%	
Threshold current	ON	＞4mA	
	OFF	＜1.5mA	＜2mA
Maximum input current		7.6mA(DC24V)	6mA(DC24V)
Input resistance		5.6 kΩ	3.3 kΩ
Isolation type		Optical isolation, 500VAC, 1 minute	
SINK/SOURCE wiring		Via variation of internal common terminal S/S and external common wiring	
Noise filtering time		DHF(0 ~ 70ms) + AHF(0.47ms)	DHF(0 ~ 15ms) + AHF(0.47us)
External connection		5 pins Push-in terminal blocks	

Digital Output

Item		MB-4YT/J	MB-2PSOT/J
Output points		4	4
HSPO		–	○
Channel		–	2
Output type		T :Transistor SINK(NPN) J: Transistor SOURCE(PNP)	
Maximum output frequency		–	High speed 200kHz
Working voltage		5~30VDC	
Maximum load current	Resistive	0.1A	
	Inductive	0.1A	
Maximum voltage drop/ conducting resistance		2.2V	0.6V
Minimum load		—	—
Leakage current		＜0.1mA/30VDC	
Maximum output delay time	ON > OFF	15μS	＜2μS
Maximum output delay time	OFF > ON	30μS	＜2μS
Isolation type		Optical isolation, 500VAC, 1 minute	
External connection		5 pins Push-in terminal blocks	

Analog Plug-in

COMING SOON

* Plug-in expansion is only supported by MQ series CPUs, expanding up to 2 Plug-ins

Communication Plug-in

Plug-in*

Serial

Item	MB-CB2	MB-CB5
Communication standard	1 port RS232	1 port RS485
Connection interface	D-Sub 9-Pin	5 pin Push-in terminal blocks
Maximum number of connections	1 slave	32 slave
Transmission speed	Maximum 115200	Maximum 230400
Transmission distance	15M	1200M

RTC Plug-in

Plug-in*

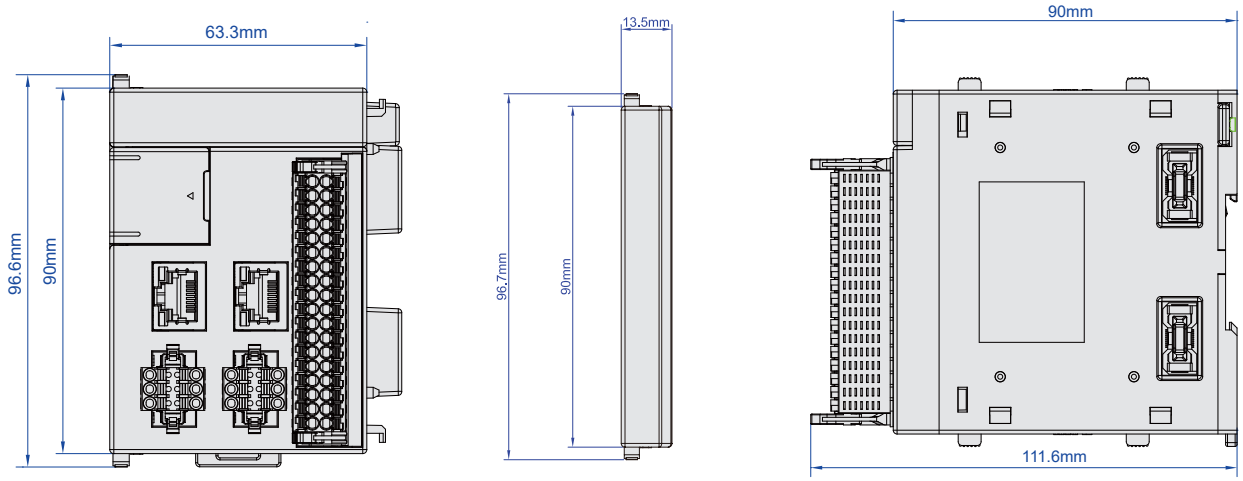
Item	MB-RTC
Function	This module can accurately keep time regardless of whether the PLC is powered on or off. It provides seven types of time data: week, year, month, day, hour, minute, and second
Battery	CR2450 non-rechargeable battery
Battery life	10 years Depending on usage environment and temperature

* Plug-in expansion is only supported by MQ series CPUs, expanding up to 2 Plug-ins

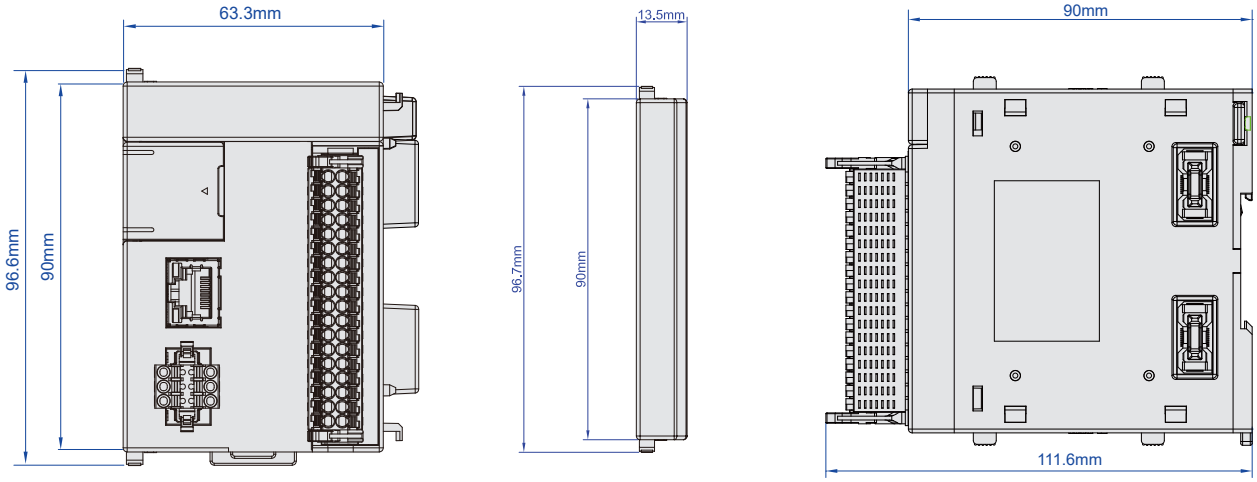
Dimensions

CPU

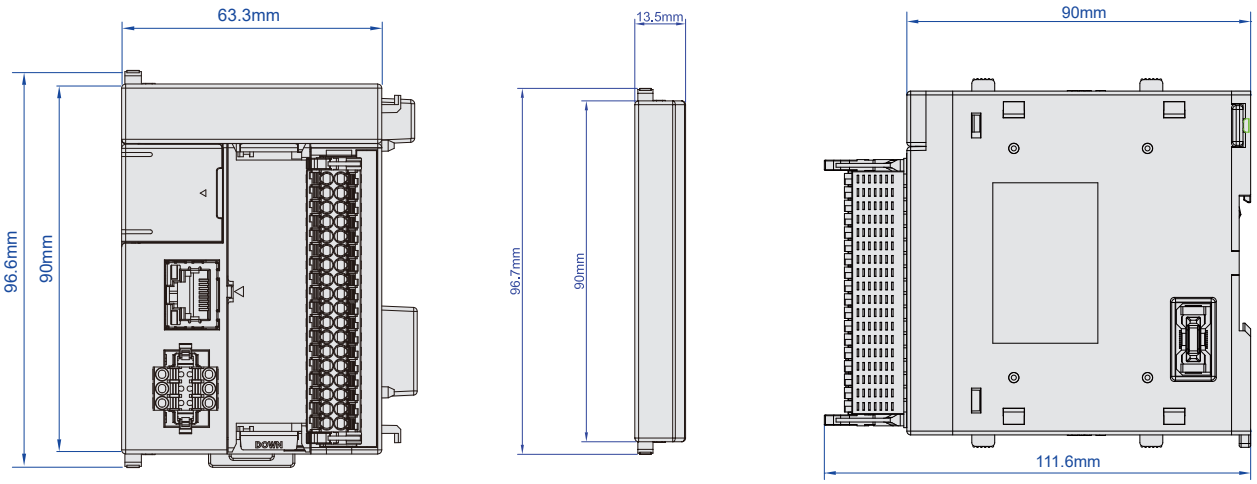
ME / MS



MA

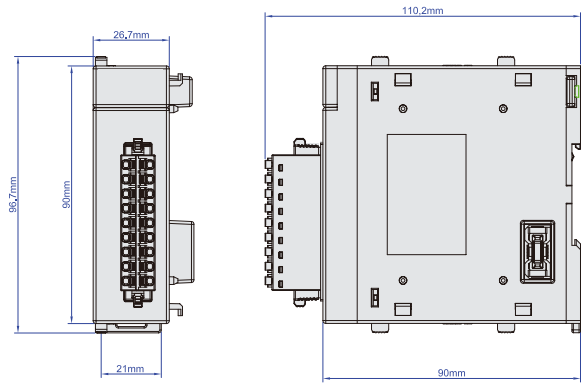


MQ

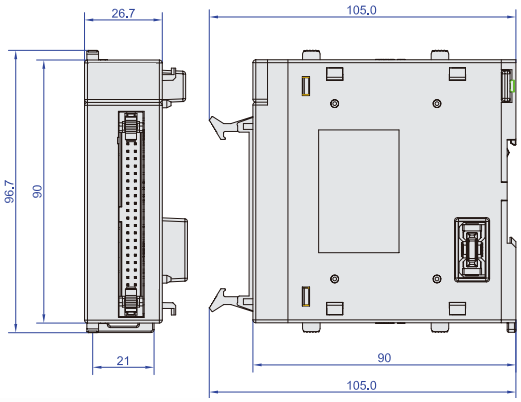


Digital Module

M16X / M16Y T/J/R

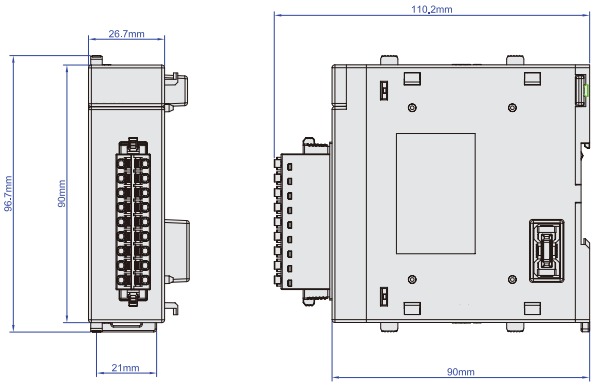


M1616XY T/J



Analog / Temperature / Load cell Module

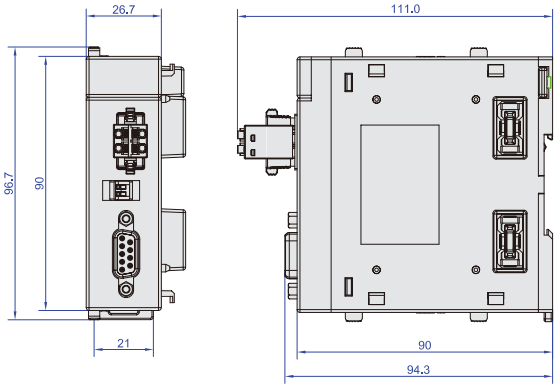
M04AD R / M04DA R / M0202AH / M04TC R / M04RTD /M0202TH / M02LC R



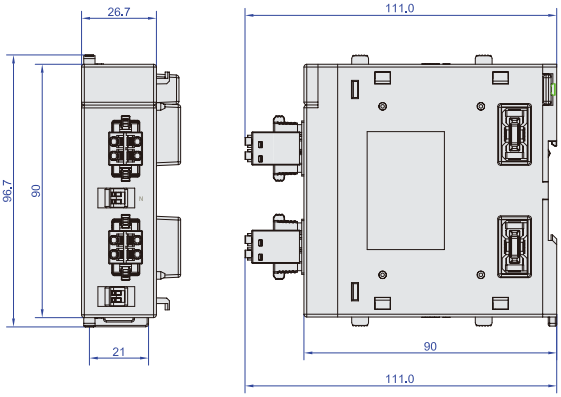
Communication Module

High-Speed*

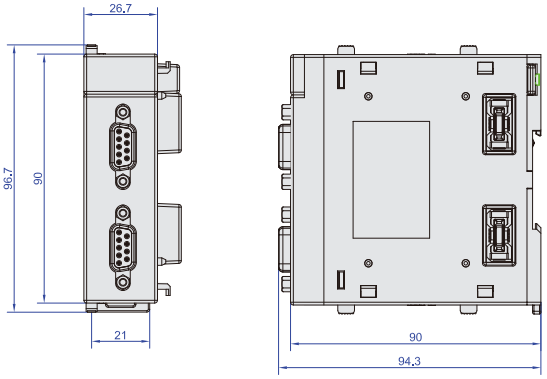
MHCM25



MHCM55



MHCM22

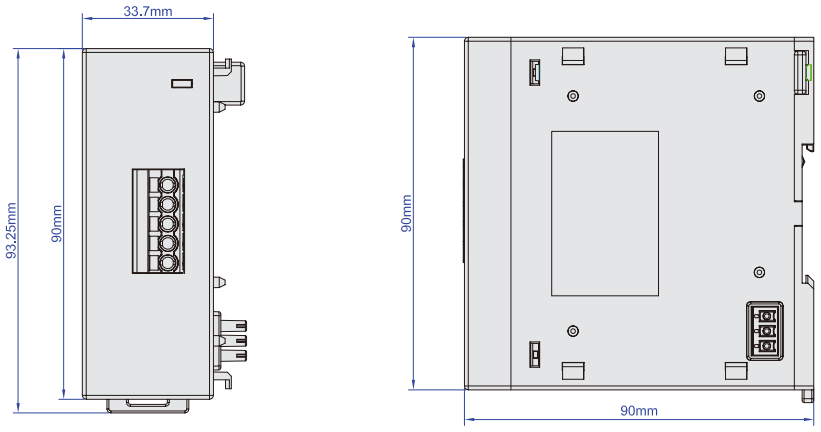


*Supports up to 6 high-speed modules, which must be installed in the first 6 expansion slots to the right of the CPU (between the CPU and local I/O expansion). MQ series CPUs do not support high-speed expansion

Dimensions

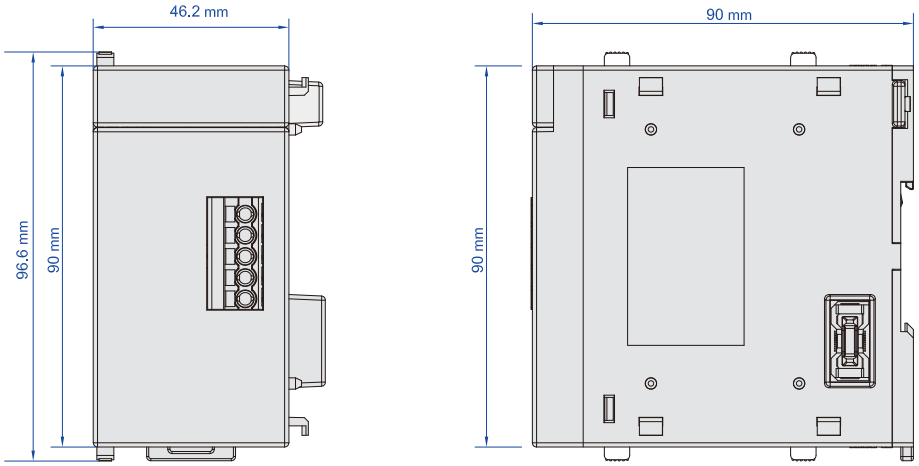
Power Supply Module

MPA024/48-24

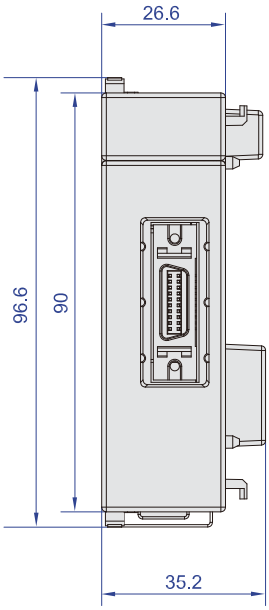


IO Bus Extension

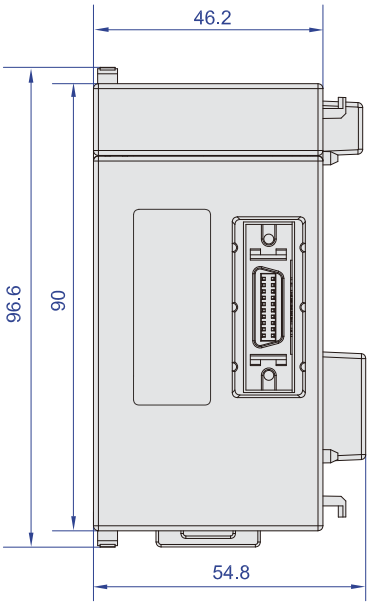
MRPWE-AC



MRGT



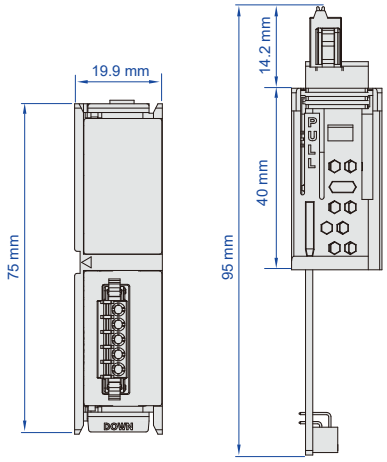
MRGH



Digital Plug-in Module

Plug-in*

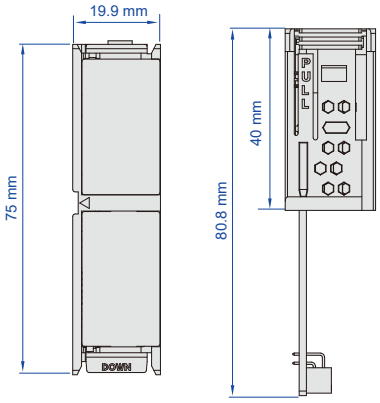
MB-4X
MB-2HSC
MB-4YT/J
MB-2PSOT/J



RTC Plug-in Module

Plug-in*

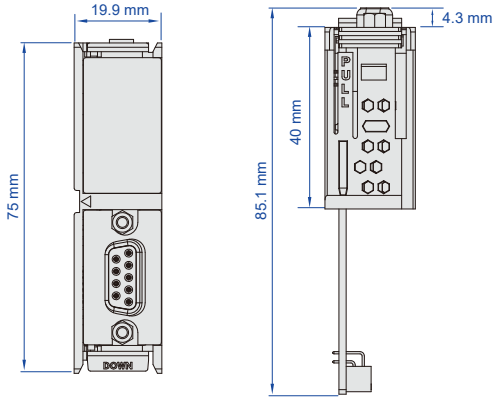
MB-RTC



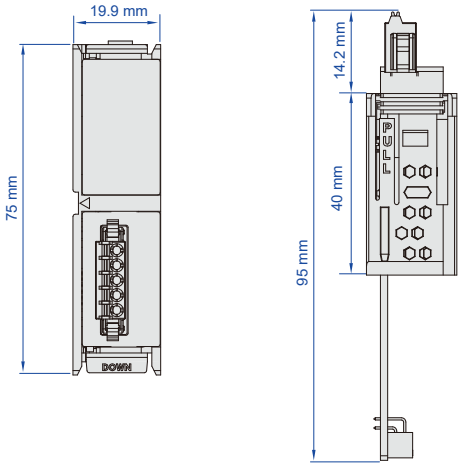
Communication Plug-in Module

Plug-in*

MB-CB2



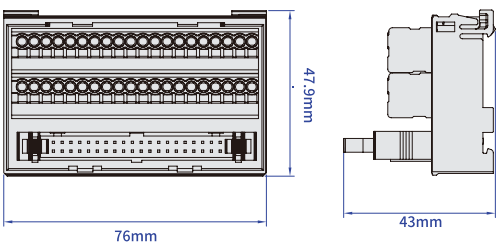
MB-CB5



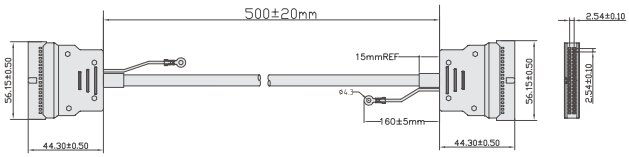
* Plug-in expansion is only supported by MQ series CPUs, expanding up to 2 Plug-ins

Peripheral and Accessory

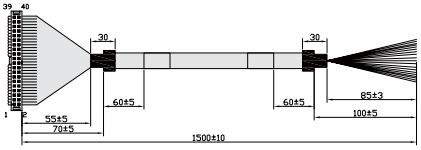
MFT40T



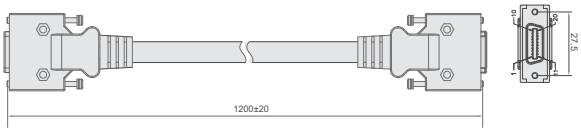
MFW40I-50



MFW40N-150



MFB20M-120



Model List

Category		Model	Maximum I/O Points		Total Program Memory		Built-in Ethernet Communication	HSC	HSPO	Total Axes	Pulse	EtherCAT		
			DIO	AIO	PLC	Motion					Number of axis	Number of axis	3D circular/ helical interpolation	E-CAM
Compact CPU	**EtherCAT Motion Control** : SAPC(Single axis positioning control) **Pulse Positioning Control** : SAPC、Linear/Circular Interpolation*5 ICF/ICA*2 **Built-in I/O**: Input 16 / Output 16、Optional analog output function (PWMDA) **Communication Ports**: Ethernet or EtherCAT(Eth/EC)、2 ports RS485 USB Type-C、FHB expansion bus、Micro-SD slot *6、Run/Stop switch **Supports local I/O and Plug-in expansion modules**	MQ2M3-1616 ◇	512	128	80 KB	–	Master/Slave	8 Points*3 (4ch)	8 Points*3 (4 axes)	4 axes	4 axes*3	–	–	–
		MQ2M6-1616 ◇	512	128	80 KB	–	Master/Slave	8 Points*3 (4ch)	8 Points*3 (4 axes)	20 axes	4 axes*3	16 axes (SAPC*1)	–	–
Advanced CPU	**EtherCAT Motion Control** : SAPC(Single axis positioning control) **Pulse Positioning Control** : SAPC、Linear/Circular Interpolation、ICF/ICA*2 **Built-in I/O**: Input 16 / Output 16、Optional analog output function (PWMDA) **Communication Ports**: Ethernet or EtherCAT(Eth/EC)、2 ports RS485 USB Type-C 、FHB expansion bus、Micro-SD slot *6、Run/Stop switch **Supports local I/O, high-speed, and advanced expansion modules**	MA1N3-1616 ◇	1024	128	80 KB	–	Master/Slave	8 Points (4ch)	8 Points (4 axes)	12 axes	4 axes	8 axes (SAPC*1)	–	–
		MA1I4-1616 ◇	2048	256	80 KB	–	Master/Slave	8 Points (4ch)	16 Points (8 axes)	24 axes	8 axes	16 axes (SAPC*1)	–	–
General Motion CPU	**EtherCAT Motion Control** : SAPC(Single axis positioning control) Linear/Circular Interpolation、E-CAM*5、ICF/ICA*2 **Pulse Positioning Control** : SAPC、Linear/Circular Interpolation *5、ICF/ICA*2 **Built-in I/O:** Input 16 / Output 16、12-bit 2ch analog input Optional analog output function (PWMDA) **Communication Ports:** EtherCAT、Ethernet、2 ports RS485、USB Type-C 、FHB expansion bus、Micro-SD slot *6、Run/Stop switch **Supports local I/O, high-speed, and advanced expansion modules**	MS1C1-1616 ◇	512	128	80 KB	370 KB	Master/Slave	8 Points*3 (4ch)	8 Points (4 axes)	7 axes	4 axes	2 Real/Virtual + 1 Virtual	–	–
		MS1C2-1616 ◇	512	128	80 KB	556 KB	Master/Slave	16 Points*3 (8ch)	16 Points (8 axes)	12 axes	8 axes	3 Real/Virtual + 1 Virtual	–	–
		MS2C3-1616 ◇	512	128	80 KB	742 KB	Master/Slave	16 Points*3 (8ch)	16 Points (8 axes)	13 axes	8 axes	4 Real/Virtual + 1 Virtual	–	2 axes
		MS2C4-1616 ◇	1024	128	80 KB	1.1 MB	Master/Slave	16 Points*3 (8ch)	16 Points (8 axes)	18 axes	8 axes	8 Real/Virtual + 2 Virtual	–	2 axes
		MS2C5-1616 ◇	2048	256	80 KB	1.5 MB	Master/Slave	16 Points*3 (8ch)	16 Points (8 axes)	22 axes	8 axes	12 Real/Virtual + 2 Virtual	–	3 axes
		MS3C6-1616 ◇	2048	256	80 KB	3 MB	Master/Slave	16 Points*3 (8ch)	16 Points (8 axes)	24 axes	8 axes	16 Real/Virtual	–	3 axes
Advanced Motion CPU	**EtherCAT Motion Control** : SAPC(Single axis positioning control) Linear/Circular/3D Circular/Helical interpolation、E-CAM、ICF/ICA*2 **Pulse Positioning Control** : SAPC、Linear/Circular Interpolation、ICF/ICA*2 **Built-in I/O:** Input 16 / Output 16、12-bit 2ch analog input Optional analog output function (PWMDA) **Communication Ports:** EtherCAT、Ethernet、2 ports RS485、USB Type-C 、FHB expansion bus、Micro-SD slot *6、Run/Stop switch **Supports local I/O, high-speed, and advanced expansion modules**	ME2C3-1616 ◇	1024	128	80 KB	742 KB	Master/Slave	16 Points*3 (8ch)	16 Points (8 axes)	13 axes	8 axes	4 Real/Virtual + 1 Virtual	●	4 axes
		ME2C4-1616 ◇	1024	128	80 KB	1.1 MB	Master/Slave	16 Points*3 (8ch)	16 Points (8 axes)	18 axes	8 axes	8 Real/Virtual + 2 Virtual	●	8 axes
		ME2C5-1616 ◇	2048	256	80 KB	1.5 MB	Master/Slave	16 Points*3 (8ch)	16 Points (8 axes)	22 axes	8 axes	12 Real/Virtual + 2 Virtual	●	12 axes
		ME3C6-1616 ◇	2048	256	80 KB	3 MB	Master/Slave	16 Points*3 (8ch)	16 Points (8 axes)	24 axes	8 axes	16 Real/Virtual	●	16 axes

◇： T — Transistor SINK(NPN) output； J — Transistor SOURCE (PNP) output(expected support in 2025)

* 1 : SAPC (Single Axis Positioning Control),Eth/EC ports on MA/MQ models can be switched to support Ethernet/EtherCAT.

* 2 : ICF (interrupt constant feed), ICA(interrupt constant angle)

* 3 : MQ can be expanded up to 16 points(8 axes/8 channels) through Plug-in extension. In the ME/MS models, half of the quantity is reserved for Motion use.

* 4 : Built-in CPU support for MQTT and iMonitor;
iAccess will be supported through expansion modules (expected in 2025) / iMonitor and iAccess services require activation via key

* 5 : Specific models supported；MQ2M3-1616◇,MA1N3-1616◇, MS1C1-1616 ◇,MS1C2-1616 ◇,MS1C3-1616 ◇ do not support Circular Interpolation。
MS1C1-1616◇and MS1C2-1616◇ do not support E-CAM。

* 6 : SD card function expected support in 2025)

Category		Model	Specifications
Local I/O Expansion	Digital I/O Module	M16X	16 points 24 VDC digital input，Push-in terminal blocks
		M16YT	16 points transistor SINK(NPN) output ，Push-in terminal blocks
		M16YJ	16 points transistor SOURCE(PNP) output ，Push-in terminal blocks
		M16YR	16 points relay output ，Push-in terminal blocks
		M1616XYT	16 points 24 VDC digital input，16 points transistor SINK(NPN) output，40 pins header connector
		M1616XYJ	16 points 24 VDC digital input，16 points transistor SOURCE(PNP) output，40 pins header connector
	Analog I/O Module	M04ADR	4 channels，Voltage and current input，Resolution:1/160000
		M04AD	4 channels，Voltage and current input，Resolution:1/16383
		M04DAR	4 channels，Voltage and current output，Resolution:1/54000
		M04DA	4 channels，Voltage and current output，Resolution:1/16383
		M0202AH	2 channels voltage and current input + 2 channels voltage and current output ，Resolution:1/16383
	Temperature Input Module	M04TCR	4 channels，Thermocouple temperature input (K, J, T, E, R, B, N, S, mV)，Precision: ±0.2%（25° C±5° C)
		M04TC	4 channels，Thermocouple temperature input (K, J, T, E, R, B, N, S, mV)，Precision: ±0.5%（25° C±5° C)
		M04RTD	4 channels RTD(Pt100/Pt1000, JPt100/JPt1000)，Precision: ±0.1%（25° C±5° C)
		M0202TH	2 channels RTD + 2 channels thermocouple，Precision: RTD:±0.1%，TC:±0.5%（25° C±5° C)
	Load Cell Module	M02LCR	2 channels load cell input module，A/D Converter Utilized: 24 bits，Precision: ±0.01%（25° C±5° C)
		M02LC	2 channels load cell input module，A/D Converter Utilized: 24 bits， Precision: ±0.5%（25° C±5° C)
High-speed*3	Communication Module	MHCM25	1 port RS232 + 1 port RS485 high speed*1 serial communication
		MHCM22	2 port RS232 high speed*1 serial communication
		MHCM55	2 ports RS485 high speed*1 serial communication
I/O Bus Extension	Repeater Module	MRPWE-AC	Including the original 16 local I/O expansion modules directly supported by the CPU with maximum of 3 repeaters added per CPU, achieving up to 64 local I/O expansion modules. Input: 100~240VAC (50/60Hz)，Output: 24VDC 2A(Internal and external)，48W
	I/O Bus Extension Module (Head)	MRGH	The head module must be used with the MRGT (tail). Each row can expand up to 16 Local I/O expansion modules, with a maximum of 6 rows (6 sections, racks), for a total of 64 Local I/O expansion modules.
	I/O Bus Extension Module (Tail)	MRGT	The tail module must be used with the MRGH (head). Each row can expand up to 16 Local I/O expansion modules, with a maximum of 6 rows (6 sections, racks), for a total of 64 Local I/O expansion modules.
Power Expansion Module	Power Supply Module	MPA024-24	Input: 100~240VAC (50/60Hz)，Output: 24VDC 1A(Internal and external)，24W
		MPA048-24	Input: 100~240VAC (50/60Hz)，Output: 24VDC 2A(Internal and external)，48W
Plug-in*3 Expansion Module	Digital I/O Plug-in	MB-4X	4 points 24 VDC digital input，Push-in terminal blocks
		MB-2HSC	24 VDC digital input，2 channels 200KHz HSC，Push-in terminal blocks
		MB-4YT	4 points transistor SINK(NPN) output ，Push-in terminal blocks
		MB-4YJ	4 points transistor SOURCE(PNP) output，Push-in terminal blocks
		MB-2PSOT	transistor SINK(NPN) output ，2 channels 200KHz HSPO，Push-in terminal blocks
		MB-2PSOJ	transistor SOURCE(PNP) output ，2 channels 200KHz HSPO，Push-in terminal blocks
	Analog I/O Plug-in	MB-2ADL	COMING SOON
		MB-2DAL	COMING SOON
	Communication Plug-in	MB-CB2	1 port RS232 Communication
		MB-CB5	1 port RS485 Communication
	RTC Plug-in	MB-RTC	RTC Clock Extension
Peripheral and Accessory	Coupler Unit	MC0EN	Remote I/O Coupler (Modbus TCP and Ethernet/IP)
	Dedicated Memory Card	MFM06	Industrial grade Micro-SD card，Data-log area: 6GB*2
	End module	MRE	End module must be connected to the right side of the CPU module or the end of the entire row(rack) (Included within the CPU and I/O bus extension module)
	Terminal block	MFT40T	40 pins interface module，Connection method: PID(for engineering testing purpose, not necessary)
	High density DI/DO connection cable	MFW40I-50	High density modules connector 40pin socket, Vertical cable exit, shielded 28AWG I/O cable length 50cm Usually used with MFT40T
		MFW40N-150	High density modules connector 40pin socket (discrete wire at one end) , Horizontal cable exit, shielded 28AWG I/O cable length 150cm
		MFW40NS-300	High density modules connector 40pin socket (discrete wire at one end) , Vertical cable exit, 22AWG I/O cable length 300cm
	I/O Bus extension module connection cable	MFB20M-120	Connection between I/O Bus extension modules MRGT and MRGH with a 20-pin MDR connector,cable length 120 cm

*1 ME/MS/MA CPUs support high-speed expansion modules, while MQ CPUs and IO Couplers do not.

A single CPU can support up to 6 high-speed expansion modules, which must be installed in the first 6 expansion slots on the right side of the CPU (between the CPU and local I/O expansion).

*2 The M series PLC only supports the MFM06 dedicated memory card

*3 MQ CPUs support Plug-in expansion modules, while ME/MS/MA CPUs do not.