



for a greener tomorrow



**mitsubishi
electric**

Changes for the Better

FACTORY AUTOMATION

FA PRODUCT CATALOG

2017-18

A series of approximately ten overlapping diagonal lines in various colors (blue, orange, red, green, purple, teal, pink, dark green, light blue, and dark red) extend from the left edge towards the right, creating a sense of motion and depth.



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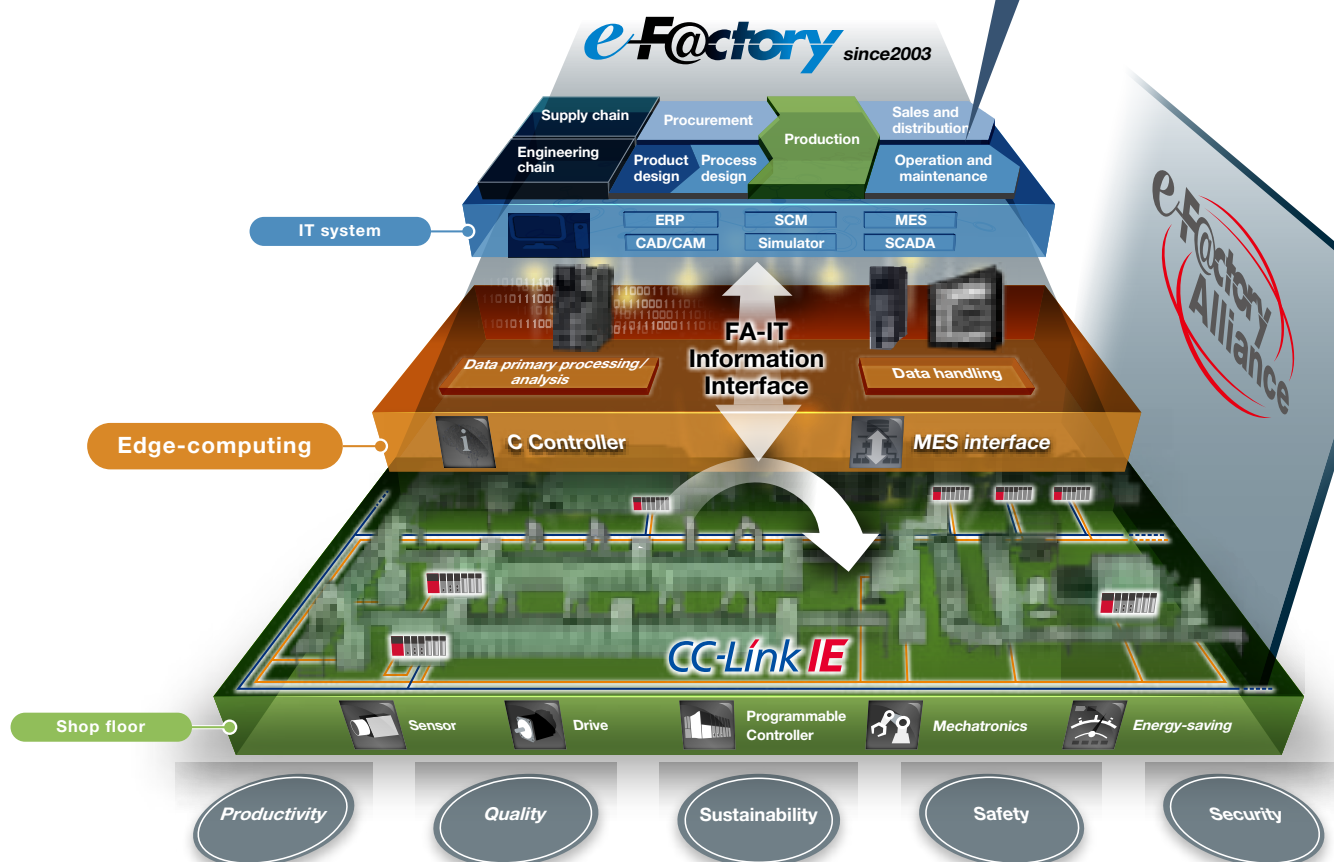
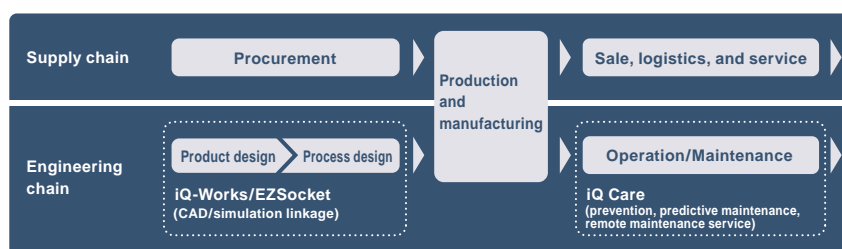
This solution solves customers' issues and concerns by enabling visualization and analysis that lead to improvements and increase availability at production sites.

*1 Visualize, analyze, and improve

Utilizing our FA and IT technologies and collaborating with e-F@ctory Alliance partners, we reduce the total cost across the entire supply chain and engineering chain, and support the improvement initiatives and one-step-ahead manufacturing of our customers.



FA integrated solutions
reduce total cost



Overall production information is captured in addition to energy information, enabling the realization of efficient production and energy use (energy savings).

To realize **e-F@ctory**[®]

iQ Platform iQ Platform

e-F@ctory is a FA integrated solution based on the concept of reducing total cost across the board, from development and production to maintenance. It supports the future of manufacturing by optimizing factory operations utilizing advanced technologies and information. The foundation of e-F@ctory is the FA integrated platform, iQ Platform. iQ Platform integrates and links the controllers and HMI that control production systems, engineering environments and networks. It contributes to cost reductions throughout all phases of manufacturing, from design to launch, operation, and maintenance. Mitsubishi Electric optimizes its customers' systems with leading technologies and solutions that will continue to support the future of manufacturing.

Controllers and HMI Improves productivity and product quality

- ①Significantly improves total system performance through the high-speed performance of MELSEC Series system buses
- ②Equipped with dedicated FB and label memory necessary for program standardization
- ③Equipped with a robust integrated security function

Engineering environment Achieves efficient development, operation, and maintenance

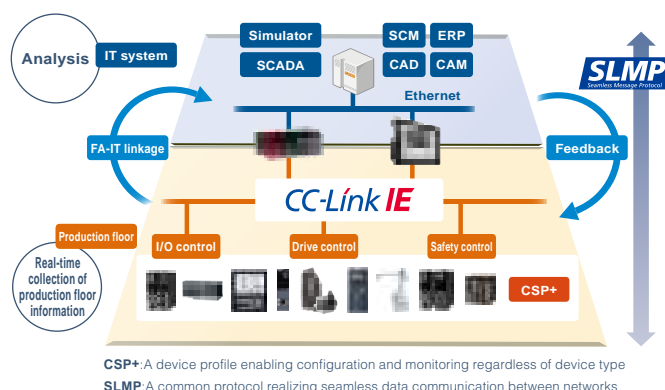
- ①Detect and generate large-scale network configuration diagrams from the actual machine
- ②Mutual parameter reflection between MELSOFT Navigator and individual engineering software programs
- ③Automatically follows changes to system label devices commonly owned by each controller and HMI

Networks Reduce loss with high accuracy and production speed

- ①Utilizing CC-Link IE, 1 Gbps high-speed communication retrieval with no loss
- ②Seamless communication between each device using SLMP

CC-Link IE CC-Link IE

Integration of all functions required in control applications such as a high-speed, large-volume, enhanced diagnosis function, and the unification of general I/O control/motion functions and a safety communication function. Also achieves improved productivity, quality and energy savings through the utilization of IT, real-time collection of data from the production floor-necessary for reducing TCO-as well as seamless integration with IT systems. By linking each component with CC-Link IE, the customer's overall system is optimized, and TCO can be reduced across all phases, from development to production and maintenance.



Delivering networks made in Japan to the world -CC-Link Partner Association

CC-Link is an open field network made in Japan. The CC-Link Partner Association (CLPA) is expanding its global activities to promote CC-Link. These activities, including exhibitions in and outside Japan, are coming to fruition. CC-Link is now certified as a standard by the ISO and the IEC, international standardization management organizations. CC-Link is growing to become a genuine world-standard network. Moreover, supporting the need to optimize entire systems, the CLPA has introduced CC-Link IE, an integrated network based on the Ethernet that enables the expansion of seamless communications from upstream information systems to production sites. As one of the board companies of the CLPA, Mitsubishi Electric is cooperating with CLPA partners in and outside Japan to actively promote CC-Link.

Mitsubishi Electric Nagoya Works realizes significant improvement in productivity, quality, energy-efficiency, safety, and security through the introduction of e-F@ctory.

Mitsubishi Electric's Nagoya Works has some e-F@ctory model factories within the premises of the Works, enabling the actual effects of improving productivity and equipment operating ratio to be examined. Please see for yourself how e-F@ctory is being used Mitsubishi Electric factories.



Example of operation management/energy conservation/work support system introduction: Nagoya Works, E4 Building: Programmable controller manufacturing factory

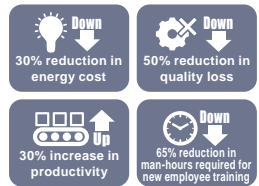
Aim of introduction

- Stabilization of operating ratio by reducing the installation of incorrect parts
- Reduction of time taken for failure analysis
- Alleviation of burden on experienced operators who provide guidance
- Safety countermeasures for operators who perform loading/unloading work

Examples of introduction

- Introduction of a surface-mounting operation management system utilizing C-language controllers
- Introduction of a work instruction system based on HMI screens
- Introduction of an energy conservation system for AC/lighting using programmable controllers
- Introduction of a vertical conveyance system using safety programmable controllers

Results of introduction



Example of quality control on assembly line: Nagoya Works, W3 Building: Servo motor manufacturing factory

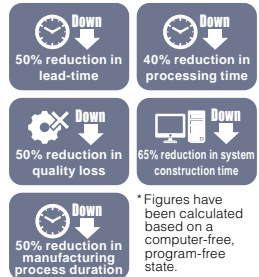
Aim of introduction

- Response to varying demand and high-mix, variable production
- Improvement of equipment operating ratio and quality

Examples of introduction

- Direct collection of information inside equipment from the MES interface (programmable controller)
- Strengthen information management through direct connection of equipment with the manufacturing execution system (MES) and conducting various improvement activities

Results of introduction



Example of productivity improvement through AI robot introduction: Nagoya Works, Kani Factory: Magnetic Motor Starters manufacturing factory

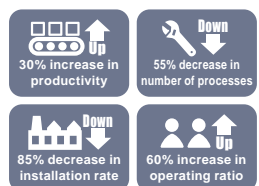
Aim of introduction

- Improve operating ratio of lines with a high number of processes
- Support high-mix, low-volume, high-cycle production
- Reduce equipment installation area

Examples of introduction

- Introduction of a robot production system that fuses people and machines
- Uniform management of quality and equipment information by utilizing e-F@ctory
- Collection and management (traceability) of product data (barcodes) and quality (inspection) data for each machine
- Utilization of robot intelligent technologies (assembly/inspection using force sensors)

Results of introduction



Example of productivity improvement of shaft processing line through introduction of e-F@ctory: Nagoya Works, Shinshiro factory: 3-phase motor manufacturing factory

Aim of introduction

- Improve line balance by reducing grinding time of bottleneck processes

Examples of introduction

- Manage production information through introduction of e-F@ctory
Automatic work instructions to the processing lines based on information from the upper production management server
Expand unmanned operation through planned set-up changeover and improve productivity
- A grinder-free system utilizing a C-language controller
Automatically calculating the offset value of the lathe from the automatically calculated outer-diameter dimensions and achieving stable finishing on the lathe
Significant reduction of cycle time through the abolishment of the shaft rotor grinding process

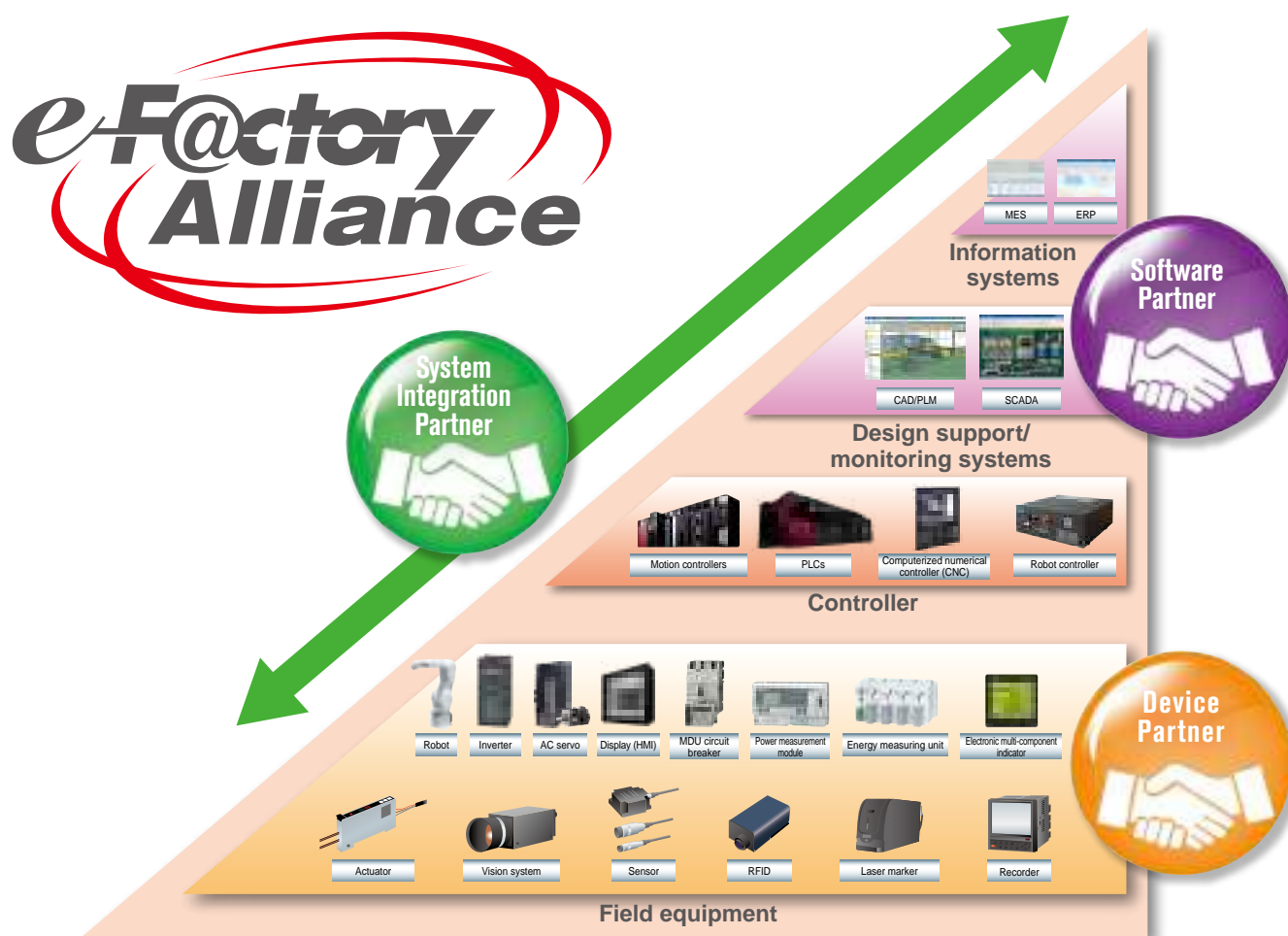
Results of introduction



FA Integrated Solution
e-F@ctory

Firmly linking partner companies, e-F@ctory Alliance offers solutions for diversified needs.

The e-F@ctory Alliance is a FA manufacturer partnering program that strongly links the connection compatibility of Mitsubishi Electric FA equipment utilizing excellent software and machinery offered by partners, thereby enabling systems to be built by systems integration partners and the proposal of optimal solutions to customers.



Create entire production systems.
Realize advanced systems integration.

Combining Mitsubishi Electric FA equipment and other products, systems integrators propose systems solutions for everything from shop floors to information systems.



Develop applications software that further enhance connection compatibility of Mitsubishi Electric FA equipment.

Utilizing information-sharing products and technologies such as Mitsubishi Electric's EZSocket and SLMP, vendors develop and propose excellent application software and drivers that ensure the connection compatibility of Mitsubishi Electric FA equipment.



Propose Mitsubishi Electric FA equipment and other machinery with superior compatibility.
Realize improved systems construction and maintenance.

Manufacturers proposing peripheral equipment that is easy to connect with Mitsubishi Electric FA equipment and is easier to use.

Production line	Energy-saving	Instrument
Traceability	Production management	Preventive maintenance
Safety	Quality control	Renewal

etc

MES	SCADA	SCM
CAD/PLM	ERP	MRP
Data logger	FA simulator	APS

etc

Sensor	Actuator	Communication cable
Visualization system	RFID	Analyzer
Laser marker	Recorder	Relay terminal block

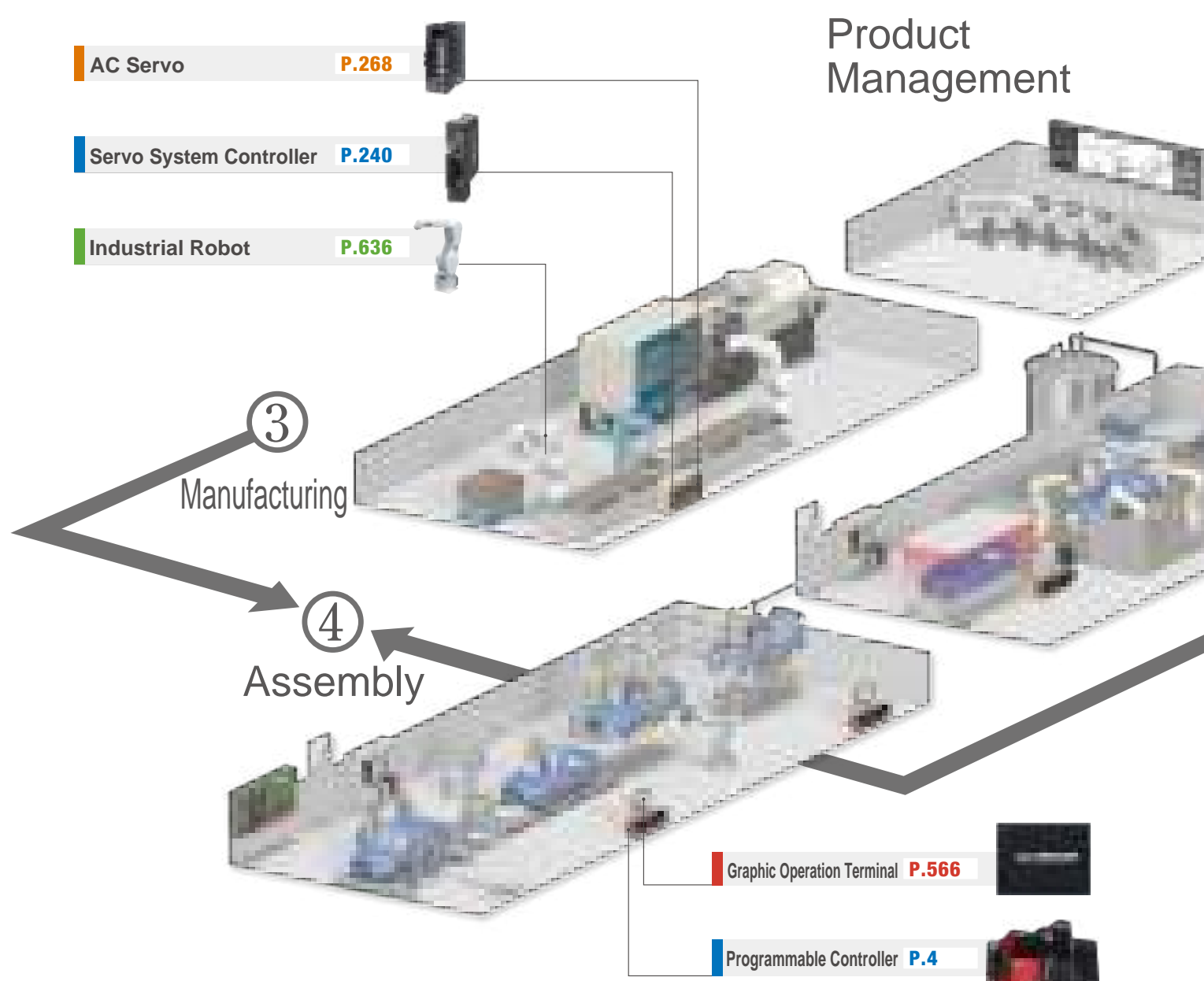
etc

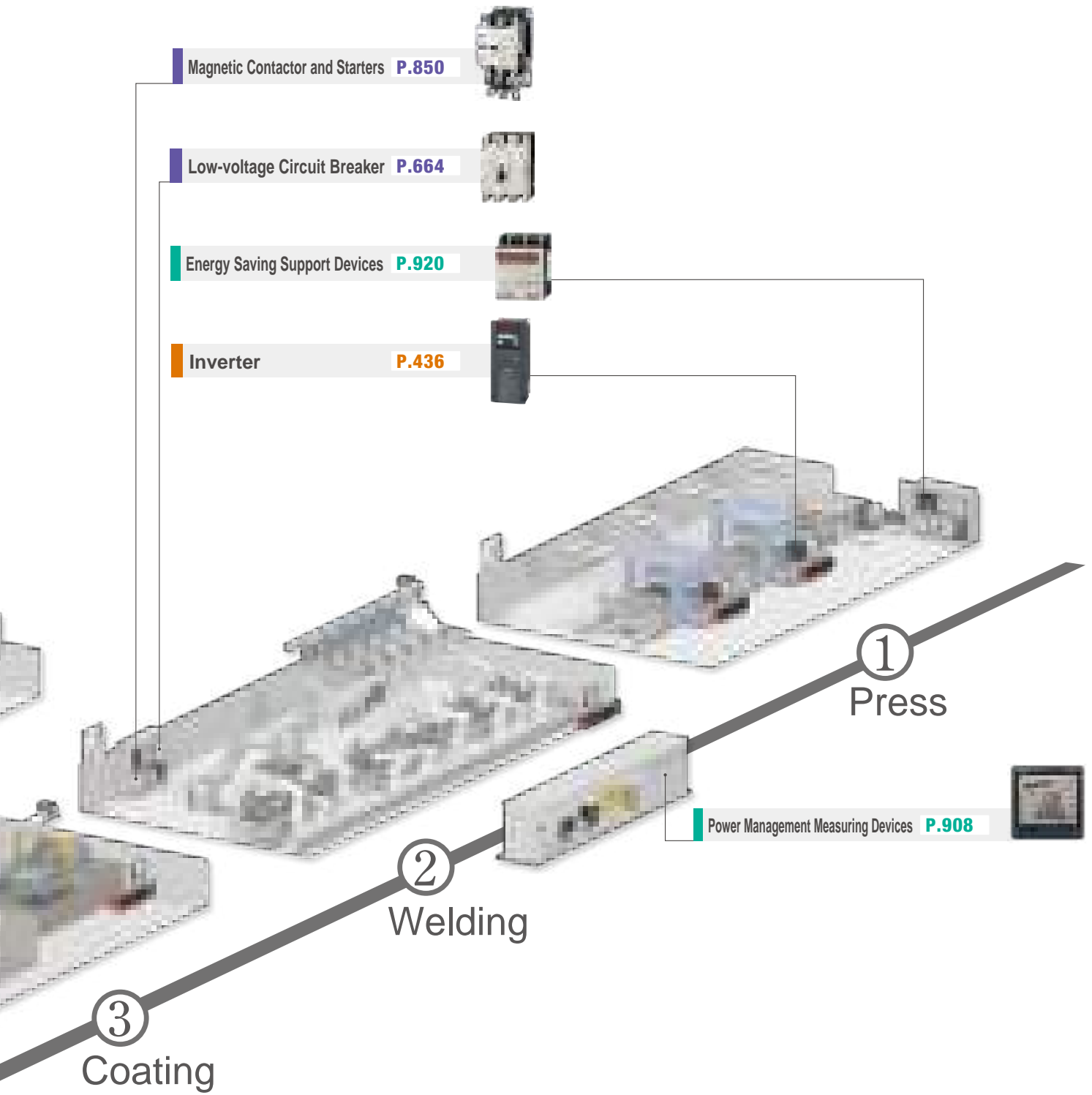
Example of Product Application

Various production sites' various locations are supported by the our optimized FA device.

With expanding our product line-up, we always continue to challenge product development to respond to customer needs.

Responding to customer needs by cutting edge technology... That is our mission as an FA total supplier.





**3-year
warranty**

Product warranty extended to 3 years



[Applicable models] Programmable Controller /Indicator

Programmable Controller MELSEC Series



- iQ-R Series
- Q Series
- L Series
- iQ-F Series
- F Series

Human Machine Interface



- GOT2000 Series
- GOT1000 Series

*Our product warranty is valid for 3 years after the date of customer purchase or the date of delivery to your designated location (within 42 months of manufacturing and with up to a six month circulation period after shipping from our manufacturer).

Additionally, the coverage of this warranty will be determined by our company internal regulations.

FA Products Mobile Showroom

The latest product for our customers



The Mobile Showroom is equipped with our latest line-up of Mitsubishi FA products, and is available across the entire country to introduce our products to customers.

Even without our customers coming to meet us or securing a meeting room, we can quickly hold an exhibition in a single corner of a customer's parking lot. By all means, if you are interested, please let us know.

We are available anywhere throughout the country.



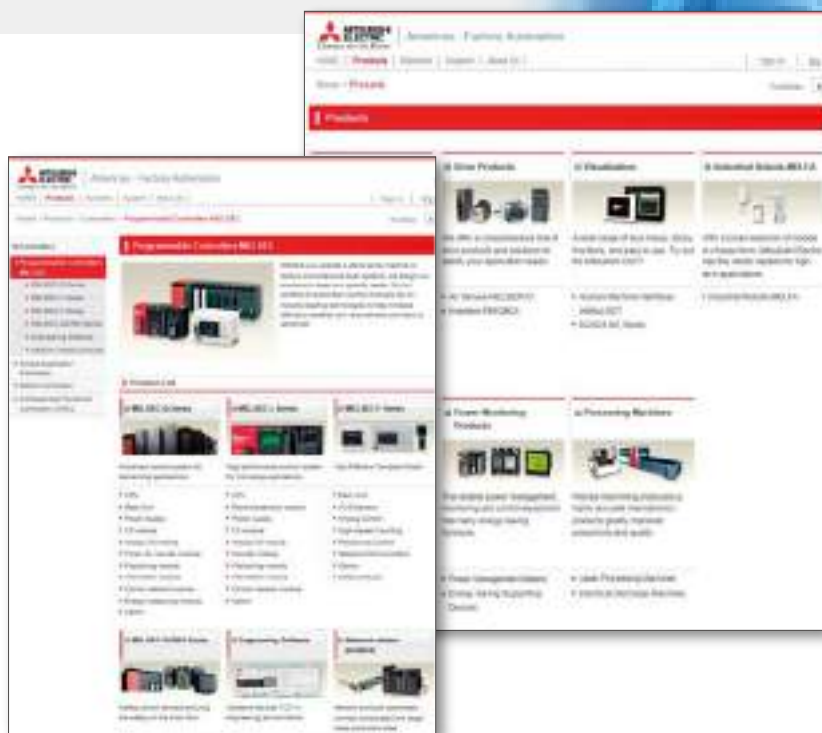
Mobile Showroom for Robot products



WEB

Easier to see, easier to use,
and easier to understand!

In addition to our Mitsubishi electrical products we provide a variety of useful information regarding partner company's products and services, and now each of our services is even easier to use.



Download

Refine conditions for a significant
power-up in search functions

Our downloadable catalogs and manuals, etc. are made even easier to use with the refining and search functions. Additionally, you can quickly download even large amounts of data.



Global business support

In addition to support sites and Japanese language contacts in all over the world, phrase books, glossaries, etc are available in every language.



Global

Throughout the world, Mitsubishi Electric FA Information can be easily accessed.

From the “Worldwide” link on the upper right of the page, you can easily access the global FA site.

On the global page, in addition to products that can be purchased globally, you can also check-out various regional services, such as regional product information and international language catalogs and manuals. By all means, please make use of these services when expanding your business overseas.



FA e-Learning

Learn at your own pace whenever and wherever.

In the office, out of the office, and in your own home — You can attend the Mitsubishi FA Equipment Usage e-Learning sessions for free from anywhere.

■ e-Learning tools

e-Learning is available with many language.

Languages: English, Chinese, Korean, Thai, Indonesian, Vietnamese, Malay, Portuguese (South American), Spanish (Central and South American), Turkish, Hindi.

<http://www.MitsubishiElectric.co.jp/fa/glosup/e-learning/index.html>

e-Learning



1

**All courses
are free of
charge**

2

**Learning at your
own pace,
whenever and
wherever.**

- You can learn whenever & wherever.
- You can repeat lessons as needed.
- You can quickly and easily check your learning progress.

3

**Effective
multi-media
learning**

- You can understand deeply with animations and videos.
- You can operate programming software with simulator.



● Access directly from the following URL.

<http://www.mitsubishielectric.com/fa/assist/e-learning/index.html>

CONTROLLERS

Programmable Controllers MELSEC

Servo System Controller

Adaptable to a wide range of operations,
from miniaturized machines to
large-scale infrastructure monitoring

MELSEC

Programmable Controllers MELSEC

MELSEC Series; Innovating technology

The MELSEC Series continued to respond to the demands of
production sites and made refinements.

Our highly reliable and extensive lineup offers new possibilities
to advanced production sites.

Product details

P.4



Servo System Controller

Capable of high-speed, high-accuracy drive control of various industrial machines.

Our lineup of motion controllers and simple motion units allow you to make the best choice for your control needs.

Product details **P.240**

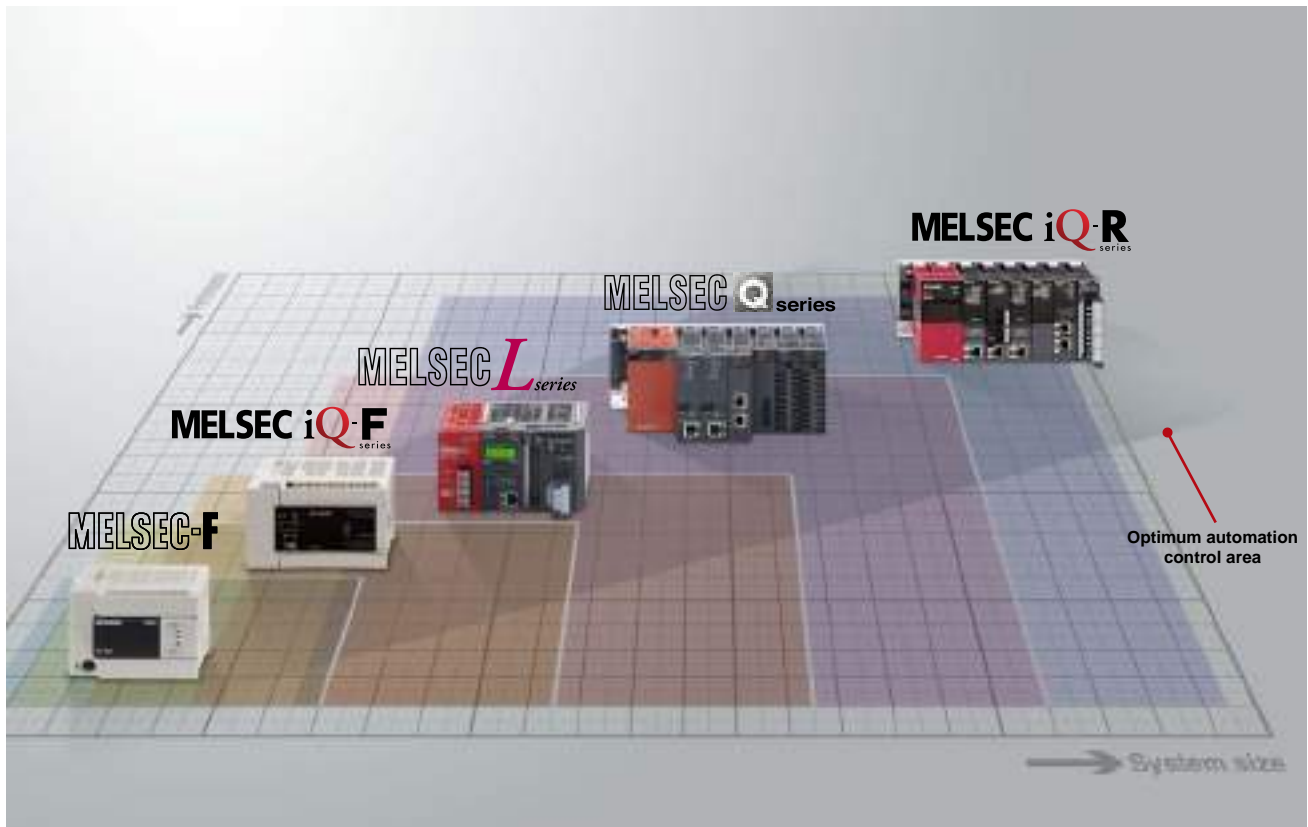


Programmable Controllers

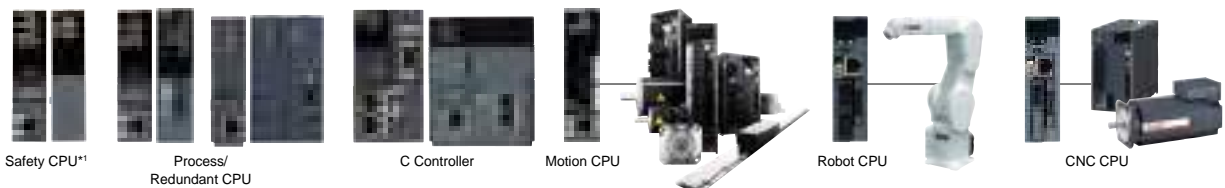
MELSEC Series; Innovating technology

The MELSEC Series continued to respond to the demands of production sites and made refinements.

Our highly reliable and extensive lineup offers new possibilities to advanced production sites.



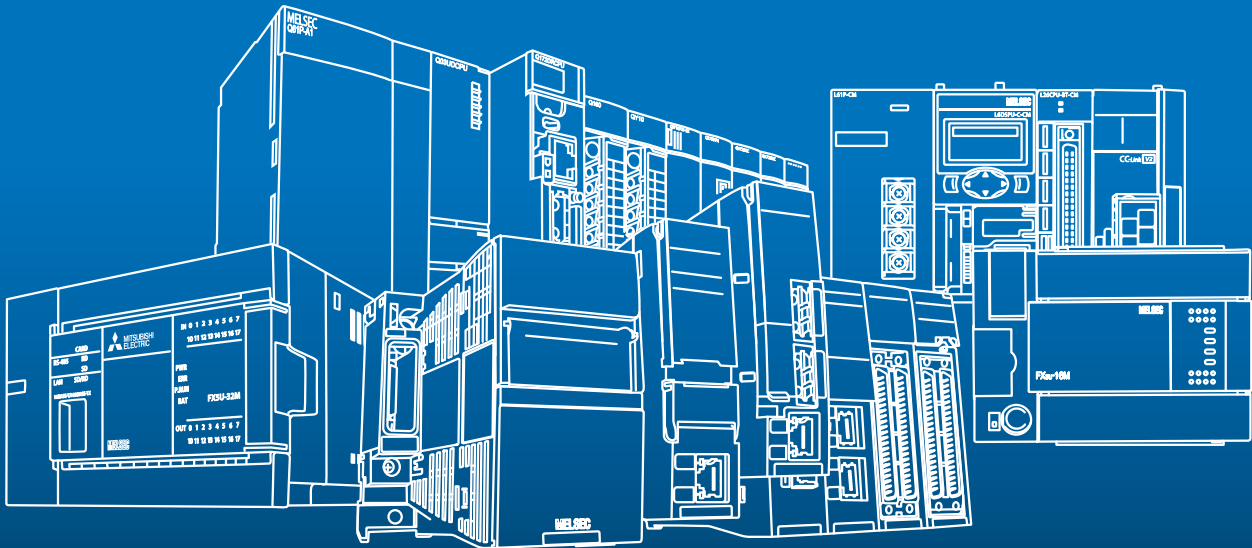
Application-specific CPUs



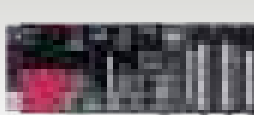
iQ Platform

These best-in-class CPUs, integrated into the iQ Platform, are designed for specific needs across various different industry areas.

*1: R□SFCPU-SET includes both a safety CPU and safety function module



Medium- to large-scale control



P.10
MELSEC
iQ-R Series

A next-generation programmable automation controller (PAC), the MELSEC iQ-R Series incorporates a revolutionary high-speed system bus that improves productivity through advanced performance and functionality.



P.88
MELSEC-Q
Series

The first to incorporate the multiple CPU architecture, the MELSEC-Q Series wide-range of CPUs enables control of multiple operations, improving the performance and scalability of the overall production system.

Small- to medium-scale control



P.118
MELSEC-L
Series

The MELSEC-L Series is a baseless highly scalable controller ideal for applications having limited space. With various I/O functionality embedded into the CPU head, exceptional cost versus performance is achieved in a compact body.

Small-scale and stand-alone



P.48
MELSEC
iQ-F Series

Designed to provide outstanding performance and superior drive control, the MELSEC iQ-F Series is a high-performance compact-class controller with a rich assortment of integrated functions.



P.134
MELSEC-F
Series

Incorporating abundant features with a flexible system configuration, the MELSEC-F Series has a power supply, CPU and I/Os into a single compact body. Furthermore, a diverse range of options are available to further expand its capabilities.

Safety control



MELSEC-WS
Series **P.150**



MELSEC-QS
Series

"MELSEC Safety", the Total Safety Solution delivers safety control while securing compatibility with the MELSEC programmable controllers. Our extensive lineup offers safety equipment best suited to your system configuration.

Network related products



Supports seamless network construction from office to production sites, based on the platform of a consistent design approach. Built to deliver seamless collaboration from lower field system to higher information system to realize an optimized network according to purpose and use.

Engineering software



Lineup of engineering software for comprehensive support of programmable controller design and maintenance work. By sharing system design such as system configuration and programming among the overall system, it makes possible to enhance the efficiency of system design and programming.

iQ Sensor Solution



iQSS (iQ Sensor Solution) simplifies sensor setting and maintenance process. Linkage among sensors, indicators, and engineering environment is strengthened further to reduce TCO (Total Cost of Ownership) of individual customers.

MELSEC Designed with automation in mind

Mitsubishi Electric offers a wide range of controllers capable of satisfying the diversified application needs in various industries. The high-speed, high-accuracy controllers in the MELSEC series covers them all, providing highly flexible cost-effective solutions.

iQ-R : MELSEC iQ-R Series	Q : MELSEC-Q Series	L : MELSEC-L Series	iQ-F : MELSEC iQ-F Series	F : MELSEC-F Series
S : Safety	P : Process/Redundant system	C : C Controller	M : Servo system controller	R : Robot controller
N : CNC CPU				

Automotive

iQ-R **Q** **S** **M** **R** **N**



Improve productivity and realize flexibility in different automotive assembly lines with high-accuracy motion control, including linear/circular interpolation and electric cam profile.

Automated warehouse

iQ-R **Q** **iQ-F** **F** **C** **M** **R**



Realize advanced logistics coordination and eliminate errors in repetitive processes. Servo-based high-speed material handling and highly accurate positioning improving productivity and reduce energy consumption.

Food and beverage, CPG

iQ-R **Q** **L** **iQ-F** **F** **P** **M**



Realize improvements in various packaging applications such as high-speed filling, which requires a highly accurate, continuous feed rate and precision.

Semiconductor

iQ-R **Q** **S** **C** **M**



Reduce maintenance costs using the high-durability MELSEC Series. Having the compact, robust design desired for semiconductor manufacturing, MELSEC products solve the small footprint, high-performance requirements.

Pick-and-place

iQ-R **M**



Achieve highly precise, fast and accurate placement of components in various sizes and shapes such as that required by SMT pick-and-place equipment, further improving productivity.

Flat panel display (FPD)

iQ-R **Q** **S** **C** **M** **R**



Improve the large data bandwidth and high performance requirements common in FPD manufacturing processes using MELSEC's integrated control platform. The integrated controller and network solution offer increased flexibility and enhanced performance.

Chemical

iQ-R Q P



Improve control of processes involving chemical manufacturing using highly scalable solutions that integrate process control and factory automation.

Inspection machines

iQ-R C



Easily integrate Inspection machine control into automated systems, thereby reducing maintenance and overall operational costs.

Renewable energy

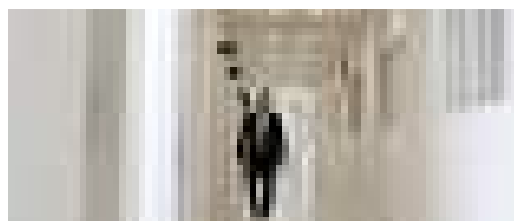
iQ-R P C



Easily integrate renewable energy plant management utilizing plant-wide data acquisition and extensive real-time control, thereby reducing overall investment and maintenance costs.

Building automation

iQ-R Q L iQ-F F C



Increase security and ensure effective use of energy management capabilities by supporting various building automation protocols, resulting in a reduced carbon footprint.

Printing and packaging machinery

iQ-R Q C M



We provide system solutions enabling high-precision synchronization of roll-up and roll-out operations as part of the printing and packaging process. This allows flexible realization of high-speed, high-grade converting applications.

Injection molding

iQ-R Q iQ-F F M



Achieve reductions in machine operation costs and improve productivity by integrating MELSEC controllers that utilize an easy-to-use control platform combined with highly accurate motion control.

Machine tool

iQ-R Q L iQ-F F N



Improve productivity, operating efficiency and overall equipment effectiveness using the scalable control of MELSEC products, supporting tasks such as drilling, grinding, and milling.




General automation

iQ-R Q L iQ-F F C



Alternative automation applications such as automatic car washes and automated hydroponic farming require a high-level of automation similar to industrial solutions.

Controller lineup

Series	Modular type	Modular type	Baseless type
			
	MELSEC iQ-R	MELSEC-Q	MELSEC-L
	PAC (Programmable automation controller)	Programmable controller CPU	Programmable controller CPU
Lineup	<ul style="list-style-type: none">• Programmable controller CPU: 5 models• CC-Link IE embedded CPU: 5 models• Safety CPU: 4 models• Process CPU*1: 4 models• C Controller: 1 model• Motion CPU: 3 models	<ul style="list-style-type: none">• Programmable controller CPU (Universal model): 25 models• Process CPU: 4 models• Redundant CPU: 2 models• C Controller: 4 models• Motion controller: 2 models• Robot controller: 1 model• CNC CPU: 1 model	<ul style="list-style-type: none">• Programmable controller CPU• Sink type: 5 models• Source type: 5 models
Control method	Stored program cyclic operation	Stored program cyclic operation	Stored program cyclic operation
I/O control mode	Refresh mode	Refresh mode	Refresh mode
Programming language	<ul style="list-style-type: none">• Ladder diagram• Structured text (ST)• Sequential function chart (SFC)*2• Function block diagram (FBD/LD)• Function block (FB)• C/C++*4	<ul style="list-style-type: none">• Ladder diagram• Structured text (ST)• Instruction list• MELSAP3 (SFC), MELSAP-L• Function block diagram (FBD)• Function block (FB)• C/C++*4	<ul style="list-style-type: none">• Ladder diagram• Structured text (ST)• Instruction list• MELSAP3 (SFC), MELSAP-L• Function block (FB)
Safety standard conformance level	<ul style="list-style-type: none">• ISO 13849-1 PL e• IEC 61508 SIL 3*18	—	—
Engineering environment	MELSOFT GX Works3 MELSOFT MT Works2 CW Workbench	MELSOFT GX Works2 MELSOFT PX Developer CW Workbench MELSOFT MT Works2	MELSOFT GX Works2
Program size (K step)	1200	1000	260
Number of I/O points [X/Y] (point)	4096	4096	4096
Device/label memory/ standard RAM (K byte)	3380	1792	768
Data memory/ standard ROM (byte)	40M	16M	2M
Processing speed			
LD instruction (ns)	0.98	1.9	9.5
MOV instruction (ns)	1.96	3.9	19
Floating point addition (μs)	0.01	0.014	0.057
Memory interface			
Extended SRAM cassette	●	●*3	—
SD memory card	●	●*3	●*5
SRAM card, FLASH card, ATA card	—	●*5	—
External interface			
USB	●	●	●
Ethernet (1000BASE-T*7/ 100BASE-TX/10BASE-T)	●	●*8	●*6
RS-232	—	●*9	●*10
RS-422/485	—	—	—
Display unit	—	—	●
CC-Link IE connection port			
Ethernet (1000BASE-T/100BASE-TX/10BASE-T)	●*12	—	—
Network connectivity (adapter/module)			
Ethernet (1000BASE-T*13/100BASE-TX/10BASE-T)	●	●	●
CC-Link IE Control	●	●	—
CC-Link IE Field	●	●*15	●
CC-Link	●	●	●
CC-Link Safety	—	—	—
CC-Link/LT	—	●	●
SSCNET III/H	●	●	●
AnyWire	●	●	●
BACnet™	●	●	●
MODBUS®/TCP	●	●	●
MODBUS®	●	●	●
General specifications/conformed standards			
Operating ambient temperature	0...55°C (60°C*17)	0...55°C	0...55°C
International safety standards (ISO 13849 1 PL e, IEC 61508 SIL 3)	●*18	—	—
Standard on corrosive atmosphere (JIS C 60721-3-3/ IEC 60721-3-3 3C2)	●*19	—	—
CE: Council Directive of the European Communities	●	●	●
UL: Underwriters Laboratories Listing	●	●	●
LR: Lloyd's Register of Shipping approval	●	●	—
DNV: Norwegian Maritime approval	●	●	—
RINA: Italian Maritime approval	●	●	—
NK: ClassNK approval	●	●	—
ABS: American Bureau of Shipping approval	●	●	—
BV: Bureau Veritas approval	●	●	—
GL: Germanischer Lloyd approval	●	●	—
Key features/functions	<ul style="list-style-type: none">• Line manufacturing• Distributed control• Large-scale I/O control• Security• Inter-modular sync• Built-in database• Integrated network• Multiple CPU <ul style="list-style-type: none">• Process control• High-reliability control• C programming• Data logging• IT gateway• Advanced motion• Safety• Real-time monitor	<ul style="list-style-type: none">• Line manufacturing• Distributed control• Large-scale I/O control• Integrated network• Multiple CPU• Process control• High-reliability control <ul style="list-style-type: none">• C programming• Data logging• IT gateway• Advanced motion	<ul style="list-style-type: none">• Machine control• Distributed control• Small-scale I/O control• Large-scale I/O control• Space/cost saving• Integrated network• Extensive built-in functions <ul style="list-style-type: none">• Data logging• Motion control• Real-time monitor

*1: Supports redundant system when paired with R6RFM

*2: SFC is not supported in redundant mode and by safety CPU

*3: Q□UDVCPU only.

*4: When using CW Workbench

*5: Does not support QnUDVCPU and certain models

*6: Does not support L02SCPU-(P)

*7: Supports the user Ethernet port of Q24DHCCPU-V/VG/LS and Q26DHCCPU-LS only

*8: Supports Q□UDE(H)CPU and Q□UDVCPU only

*9: Does not support Q□UDE(H)CPU and Q□UDVCPU

*10: Supports L02SCPU-(P) only

*11: Supports FX3G only

*12: R□ENCPU only.

*13: Supports the MELSEC iQ-R Series only

*14: Supported by expansion board

*15: Does not support Q ₁ Q(P)(H)CPU and Q ₁ PRHCPU	*19: For protection against aggressive atmosphere and gases, products with a conformal coating (JIS C 60721-3-3/IEC 60721-3-3 Class 3C2) are available on request
*16: Supports SSCNET III	*20: Operating ambient temperature from -20°C is supported by products produced from June 2016 (serial number "166" or later). For details, on supported products, please refer to the relevant product manual.
*17: Only supported when used together with extended temperature range main/extension base units	*21: Supports WSO-CPU3 only
*18: R ₁ SFCPU-SET only.	

MELSEC iQ-R Series

Revolutionary, next-generation controllers building a new era in automation

As the core for next-generation automation environment,
realizing an automation controller with added value while reducing TCO*

*TCO: Total cost of ownership

MELSEC iQ-R Series

MELSEC iQ-F Series

MELSEC-Q Series

MELSEC-L Series

MELSEC-F Series

MELSEC-QS/WS Series

Network Related Products

Engineering and Programming Software

iQ Sensor Solution

Product List

CPU Module

Designed to control programmable controller systems. Lineup of CPUs to address various control demands.



Base Unit

Enable to mount power supply module, CPU module, I/O module. Our lineup of base units are designed to meet your system needs.



Power Supply Module

Supplies power to CPU module, I/O module and other modules.



I/O Module

Connects input and output devices.
Wide lineup of I/O modules for various system configurations.



Analog I/O Module

Inputs and outputs data in analog form and built for process control needs as well. Lineup of analog modules for high-speed, high-precision control.



Simple Motion Module/ Positioning Module

Delivers high-speed, high-precision positioning control. Lineup of positioning modules to suit various uses.



High-Speed Counter Module

Compatible with high resolution devices. High-speed counter module for high-speed, high-precision control.



Information Coordination Module

Enables information communication with upper management system. Lineup of modules designed for production efficiency through sampling and management of various production information.



Network Module

Control system network interface module. Delivers seamless integration of individual FA hierarchies through wide network.





To succeed in highly competitive markets, it's important to build automation systems that ensure high productivity and consistent product quality. The MELSEC iQ-R Series has been developed from the ground up based on common problems faced by customers and rationalizing them into seven key areas: Productivity, Engineering, Maintenance, Quality, Connectivity, Security and Compatibility. Mitsubishi Electric is taking a three-point approach to solving these problems: **Reducing TCO***, increasing **Reliability** and **Reusability** of existing assets.

As a bridge to the next generation in automation, the MELSEC iQ-R Series is a driving force behind **revolutionary** progress in the future of manufacturing.





Mitsubishi Electric PAC MELSEC iQ-R
"Promotion" Movie

Process



**High availability process control
in a scalable automation solution**

- Extensive visualization and data acquisition
- High availability across multiple levels
- Integrated process control software simplifies engineering

Safety



**System design flexibility with
integrated safety control**

- Integrated generic and safety control
- Consolidated network topology
- Complies with international safety standards

Productivity



**Improve productivity through
advanced performance/functionality**

- New high-speed system bus realizing shorter production cycle
- Super-high-accuracy motion control utilizing advanced multiple CPU features
- Inter-modular synchronization resulting in increased processing accuracy

Engineering



**Reducing development costs
through intuitive engineering**

- Intuitive engineering environment covering the product development cycle
- Simple point-and-click programming architecture
- Understanding globalization by multiple language support

Maintenance



**Reduce maintenance costs and downtime
utilizing easier maintenance features**

- Visualize entire plant data in real-time
- Extensive preventative maintenance functions embedded into modules

Quality



**Reliable and trusted
MELSEC product quality**

- Robust design ideal for harsh industrial environments
- Improve and maintain actual manufacturing quality
- Conforms to main international standards

Intelligence



**Extensive data handling from shop
floor to business process systems**

- Direct data collection and analysis
- C/C++ based programming
- Collect factory data in real-time
- Expand features using third party partner applications

Connectivity



**Seamless network
reduces system costs**

- Seamless connectivity within all levels of manufacturing
- High-speed and large data bandwidth ideal for large-scale control systems
- Easy connection of third-party components utilizing device library

Security



**Robust security that can
be relied on**

- Protect intellectual property
- Unauthorized access protection across distributed control network

Compatibility

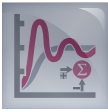


**Extensive compatibility
with existing products**

- Utilize existing assets while taking advantage of cutting-edge technology
- Compatible with most existing MELSEC-Q Series I/O



Mitsubishi Electric PAC MELSEC iQ-R
"Process" Movie



Process

High-available process control in a scalable automation solution

MELSEC iQ-R Series process CPU modules are designed to cover wide-ranging process control applications, from small- to large-scale. All models provide high-speed performance coupled with the ability to handle large PID loops utilizing embedded PID control algorithms; integrating both general and process control into one module. When paired with a redundant function module, a redundant control system ideal for applications that require highly reliable control can be easily realized at a low cost.

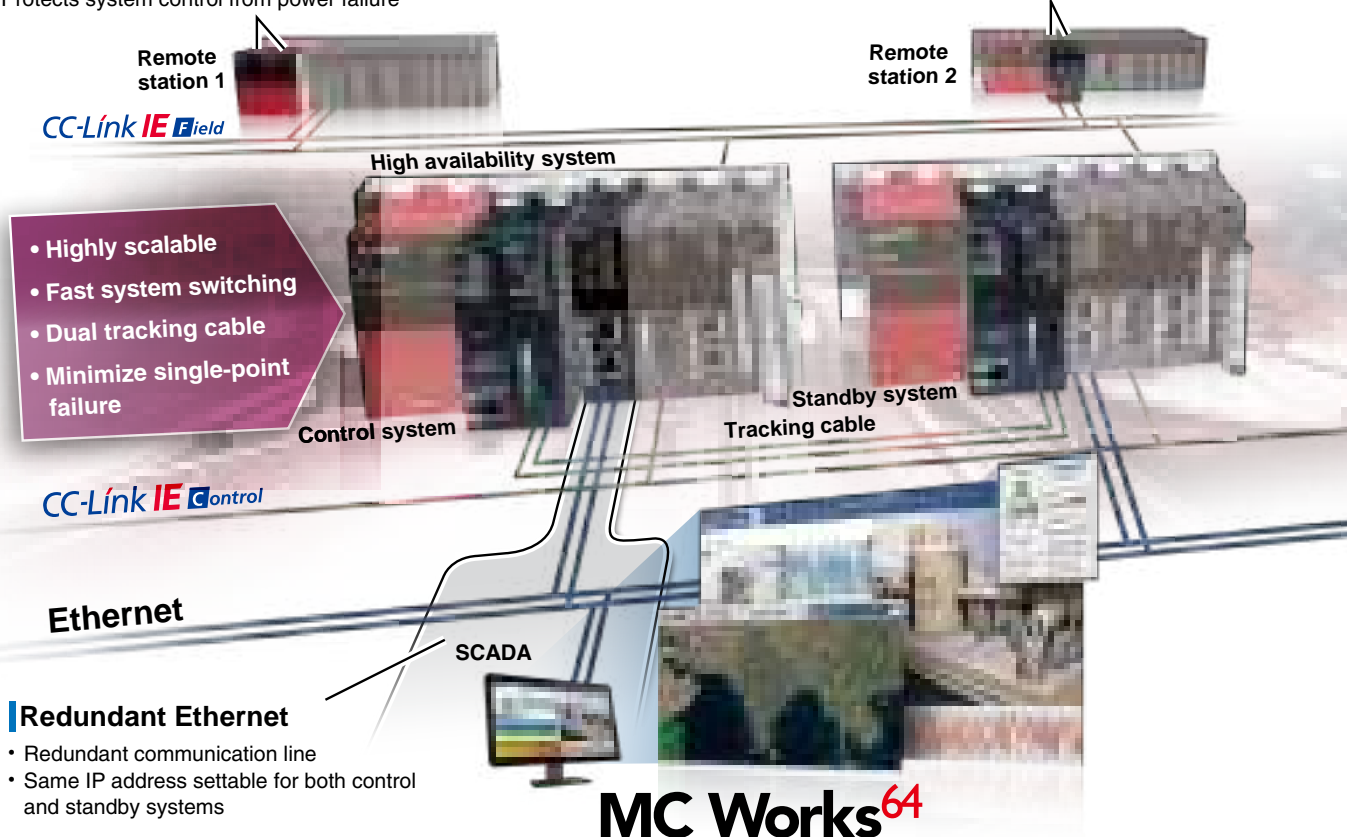
Redundant power supply module

- Protects system control from power failure

Remote station

Redundant remote network head module

- Enables continuous data communications by switching control between modules



Redundant Ethernet

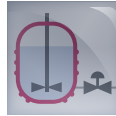
- Redundant communication line
- Same IP address settable for both control and standby systems



Extensive visualization and data acquisition

SCADA

Mitsubishi SCADA MC Works⁶⁴*1 is a next generation supervisory control and data acquisition (SCADA) software providing extensive visualization with its enhanced interconnectivity with the MELSEC iQ-R Series. Advanced features such as energy management, scheduling, alarm and event management, trending, reporting, historian, and Geo-SCADA monitoring realize intuitive factory-wide control.



Embedded PID algorithms

PID control

The process CPU includes dedicated algorithms such as two-degree-of-freedom PID, sample PI, and auto-tuning support advanced process control.



Multi-level redundancy ensuring continuous control

High availability

Highly reliable control systems can be easily realized minimizing the possibility of single-point failure at the visualization (SCADA), control, and network levels, thereby avoiding system downtime and ensuring continuous control and operation of critical systems.

*1. MC Works64 redundant Ethernet connection will be supported in the future.

*2. Process features such as process tag and faceplate will be supported in the future.



One package process control software

Integrated engineering

GX Works3^{*2}, the standard integrated engineering software for the MELSEC iQ-R Series, makes programming redundant process control systems relatively easy. The program editor uses function block diagram (FBD) language for process control and simplifies system configuration with its intuitive features such as process tag label (variables) sharing, simple program structure, and easy project upload/download to the process CPU.



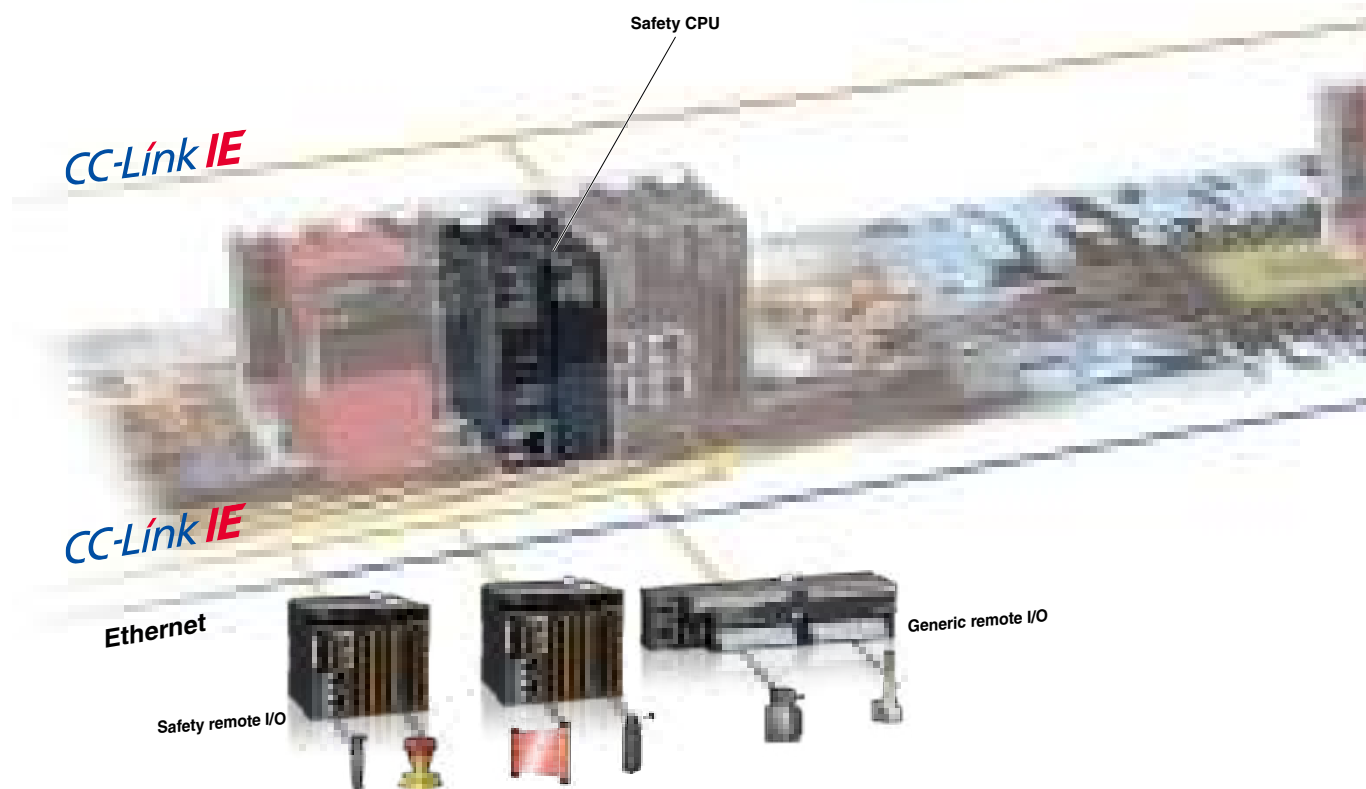
Mitsubishi Electric PAC MELSEC iQ-R
"Safety" Movie



Safety

Integrated safety control offering a total system solution

Ensuring the safety of personnel on the factory floor is a fundamental requirement of manufacturing plants and requires stringent safety regulations. To adhere to this safety code for control systems, the MELSEC iQ-R Series is equipped with a safety CPU that is compliant with international safety standards, enabling safety devices to be connected via the CC-Link IE Field network. The entire system can be programmed using GX Works3 programming software as standard.



Compliant with international safety standards
Quality

The Safety CPU is compliant with ISO 13849-1 PL e and IEC 61508 SIL 3 and is certified by TÜV Rheinland®.



Generic and safety control in one CPU
Space-saving

Can be installed directly on the MELSEC iQ-R base rack, and is easily integrated into an existing or new control system.

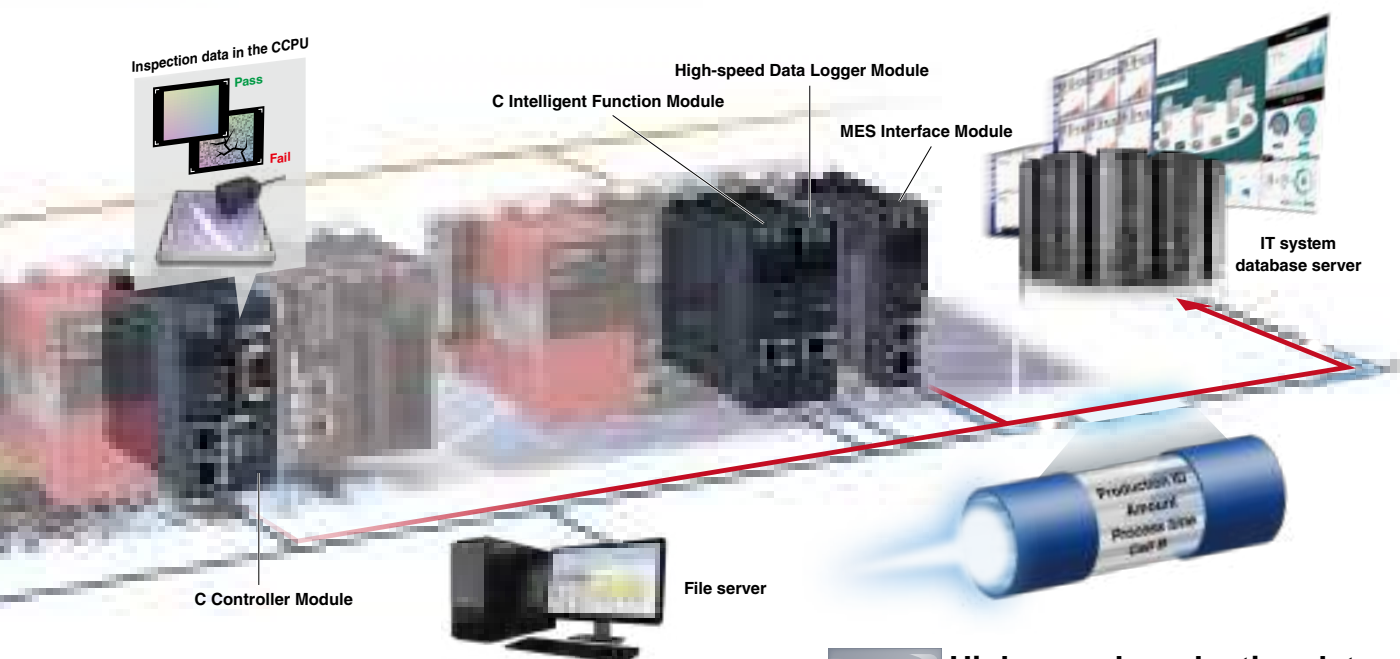



Mitsubishi Electric PAC MELSEC iQ-R
"Intelligence" Movie


Intelligence

Extensive data handling from shop floor to business process systems

With ever-changing manufacturing trends, production data management, analysis, and planning are more mainstream helping to realize leaner operations, improve yield, and create a more efficient supply chain. The MELSEC iQ-R Series includes the MES Interface, C Controller and C Intelligent function, and High-speed data logger modules as part of the "Intelligence" lineup of interconnected advanced information products.



C/C++ based programming

Flexibility

Based on the ARM® dual-core Cortex A9 processor, the real-time OS VxWorks® C Controller CPU is ideal for high-end analytical requirements where raw data has to be processed, such as for in-line manufacturing quality testing. The C Intelligent Function Module, based on the same processor, is a versatile programmable module that can be used for installing industryspecific communications protocols; for example, plant-wide monitoring of wind power generation farms, building automation and industrial open fieldbus networks.



High-speed production data collection

Data logging

Enables high-speed data logging that can be synchronized with the controller scan time, as an alternative to a dedicated logging client computer. Includes features such as triggering and reporting that improve troubleshooting of the manufacturing process.



Direct access to IT system database servers

Information connection

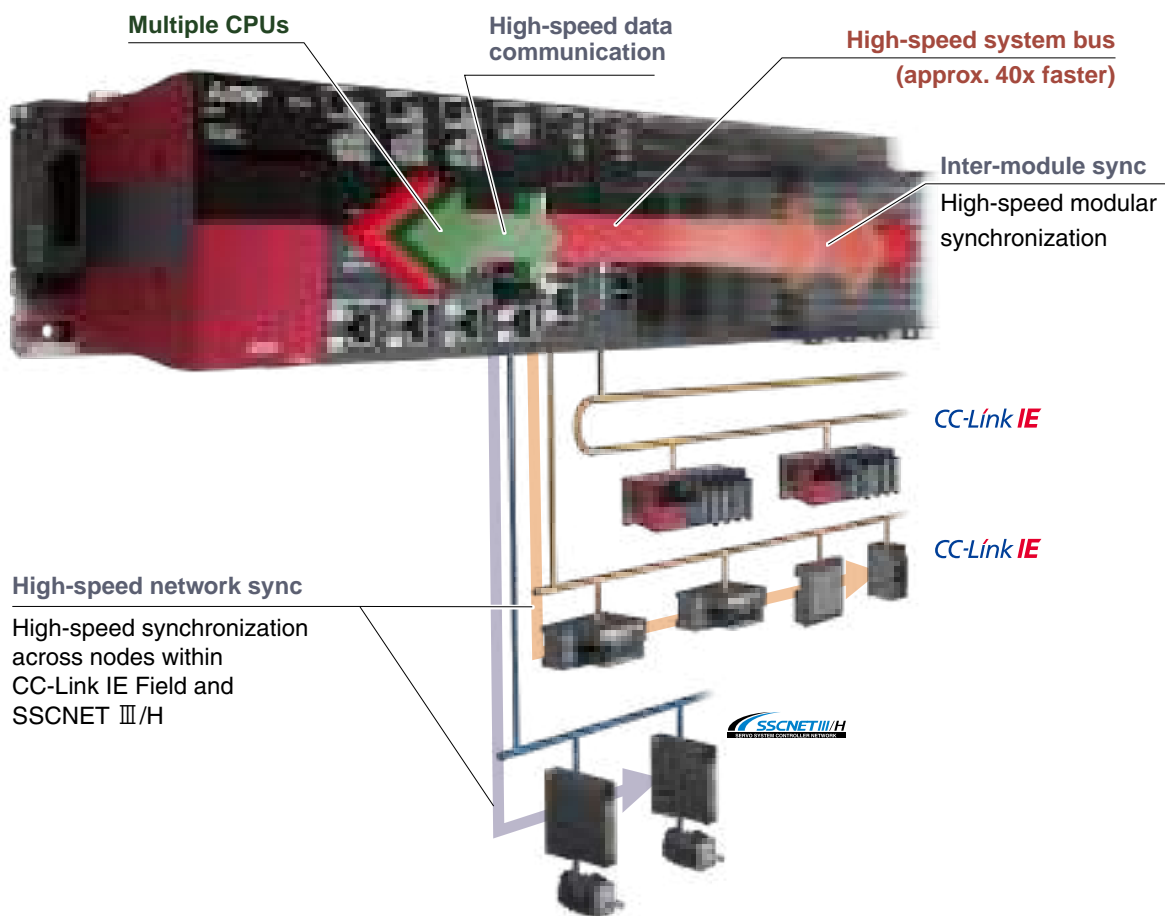
Improve production management and recipe data handling via real-time direct access to IT system database servers such as Oracle® and Microsoft® (SQL Server®, Access®). Overall system cost is also reduced as additional programming, which can increase engineering time, and gateway computers are no longer required.



Productivity

Improve productivity through advanced performance/functionality

Integrating high-performance capabilities based on the high-end iQ-R system bus, high-speed network, and an advanced motion control system; applications requiring these characteristics can be easily realized using the MELSEC iQ-R Series as the core of the automation system.



New high-speed system bus realizes improved production cycle

The newly developed high-speed system bus is 40-times faster compared to existing models, realizing very fast and large-capacity data processing between modules (network, I/O, multi-CPU, etc.), enabling the optimum utilization of MELSEC iQ-R Series performance and functionality.

High-speed system bus

40x faster*

Multi-CPU system realizes very accurate motion control

By supporting synchronized data communications between the programmable controller CPU and motion CPU via the high-speed system bus, performance is improved by up to four times compared to existing models, easily realizing super-high motion control accuracy.

Synchronized data exchange with motion CPU

4x faster*

*1: Compared to MELSEC-Q Series.

*2: Compared to Q173DSCPU/Q172DSCPU.


Mitsubishi Electric PAC MELSEC iQ-R
"Productivity" Movie

Inter-modular synchronization realizes increased processing accuracy

More flexible control over performance

Realizing high processing accuracy could not be any simpler when utilizing the inter-modular synchronization feature, which enables precise data synchronization between controller CPUs and various interface modules via the high-speed system bus

(backplane). In addition, network level synchronization (both CC-Link IE Field and SSCNET III/H) is now possible, realizing deterministic performance by ensuring synchronization between nodes without being influenced by varying network transmission delays.

New controller performance architecture further reduces H/W costs

High-speed processing of structured programs

The processing performance of the controller CPU has been substantially enhanced thanks to the newly designed CPU engine. The memory consumption for program and internal devices used in function block (FB) and structured text (ST) programs have been improved. This results in one CPU being able to do the job that used to require several CPUs in order to achieve the expected performance level and memory capacity.

Built-in database eliminates the need for a PC-based database server

Recipe data and production results data, previously managed using a database server, can now be managed via the database in the programmable controller. Use of dedicated commands for the built-in database makes it easy to search, add and update data on the fly. Furthermore, the import/export correlation with spreadsheet software is made easier.

Realize high-speed system performance

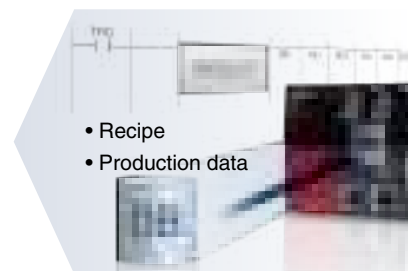
Approx. **8x** faster than QCPU*3



- Realizes high-speed control performance
- Inherits MELSEC-Q Series functions
- Large-capacity memory ideal for large-scale control



Data management realized with built-in database

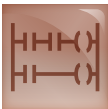


- Recipe
- Production data
- Easy to switch between recipes
- Realize product batch control
- Efficiently switch between systems

LD instruction speed	PC MIX**4 (instructions/μs)	Fixed-cycle interrupt program	ST instruction (IF text, bit condition)	Program capacity
0.98 ns	419	50 μs	8 ns	1200K steps

*3: Based on a typical application example, the system benchmark test measures the CPU scan time, taking into consideration the network refresh time and monitoring processing time with external devices as compared to Universal model QCPU (QnUDEHCPU).

*4: Average number of instructions such as for basic instructions and data processing executed in 1μs (the larger the value, the faster the processing speed).



Engineering

Reducing development costs through intuitive engineering

The engineering software is sometimes considered a fundamental part of the control system in addition to the hardware components. The core of the system, it includes various steps of the product life cycle, from the design stage all the way to commissioning and maintenance of the control system. Today, intuitive, easy-to-use software suites are expected as a standard for modern manufacturing needs. GX Works3 is the latest generation of programming and maintenance software offered by Mitsubishi Electric specifically designed for the MELSEC iQ-R Series control system. It includes many new features and technologies to ensure a trouble-free engineering environment solution.

Intuitive engineering software covering the product development cycle

Graphic-based configuration realizing easier programming

Various intuitive features such as graphic-based system configuration and an extensive module library (module label/FB) provided as standard.

Integrated motion-control system configuration

From setting simple motion module parameters and positioning data setup to servo amplifier configuration, everything is packaged into an easy-to-use engineering environment.

Conforms to IEC 61131-3

GX Works3 realizes structured programming such as ladder and ST, making project standardization across multiple users even easier.

Simple point and click programming architecture

System design / Programming / Debug/maintenance

Straightforward graphic based system configuration design

- Simply drag and drop from the module list to easily create system configuration
- Directly setup parameters for each module
- Automatically reflect changes in the layout to the module parameters

System design / Programming / Debug/maintenance

MELSOFT library enables efficient programming through “Module Label/FB”

- Assign convenient label names to internal devices, rather than manually entering a device name every time
- Simply drag & drop module FBs from the MELSOFT Library directly into the ladder program, making programming even easier

System design / Programming / Debug/maintenance

Extensive version control features

- Flexibly register program change (historical) save points
- Easily visualize and confirm program changes

Simple motion setting tool

Easily configure the simple motion module with this convenient integrated tool.

Tab view multiple editors

Conveniently work on multiple editors without having to switch between software screens.

Navigation window

Easily access project components
Organize program file list.

Module configuration

Easily parameterize each module directly from the configuration editor.

Module list

Simply drag & drop modules directly into the module configuration.



Mitsubishi Electric PAC MELSEC iQ-R
"Engineering" Movie

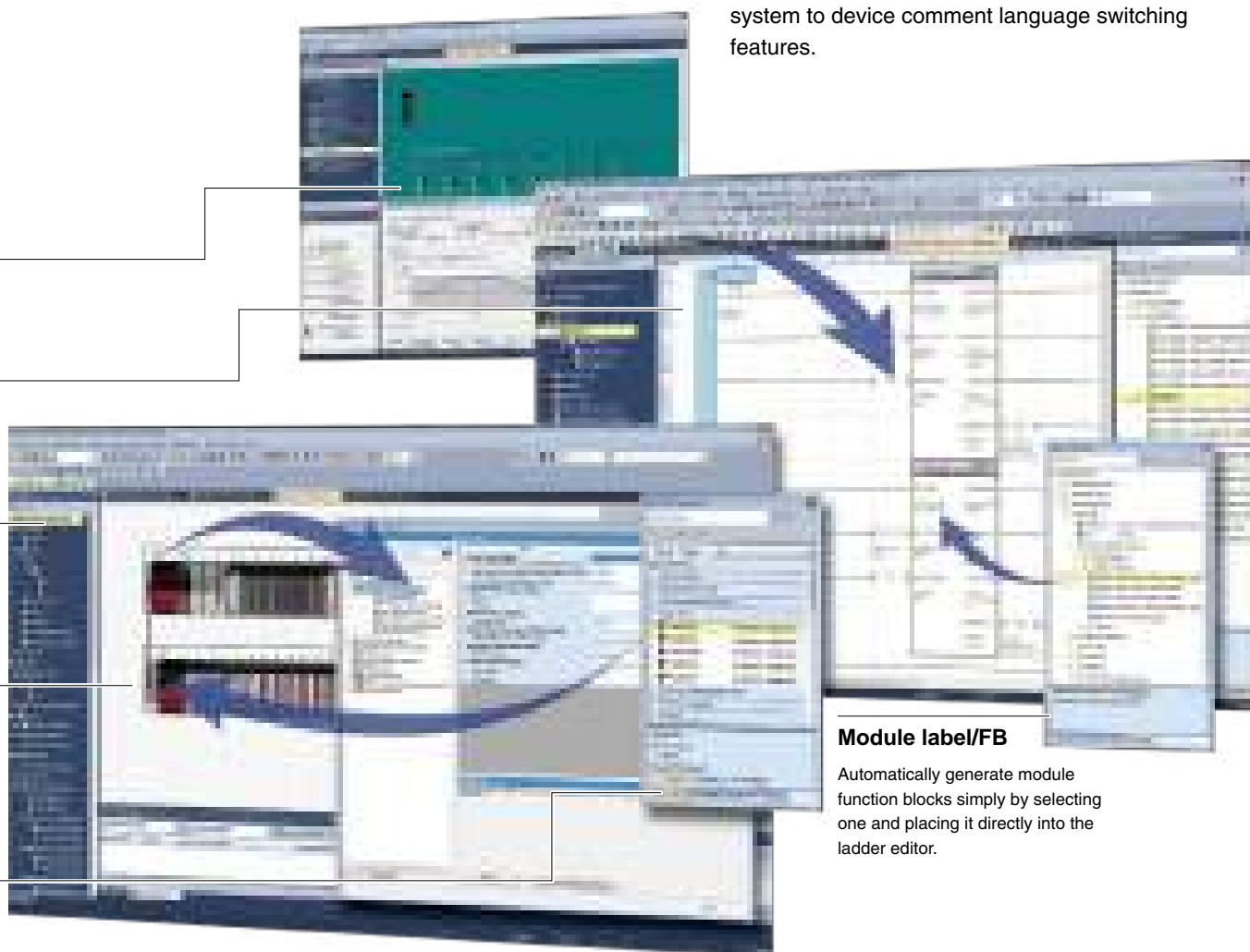
GX Works3

One Software, Many Possibilities

Reduce engineering time by 60%*1

Global realization by multi-language support

To adhere to today's global production needs, GX Works3 supports multi-language features at various levels, from the multiple language software menu system to device comment language switching features.



Module label/FB

Automatically generate module function blocks simply by selecting one and placing it directly into the ladder editor.

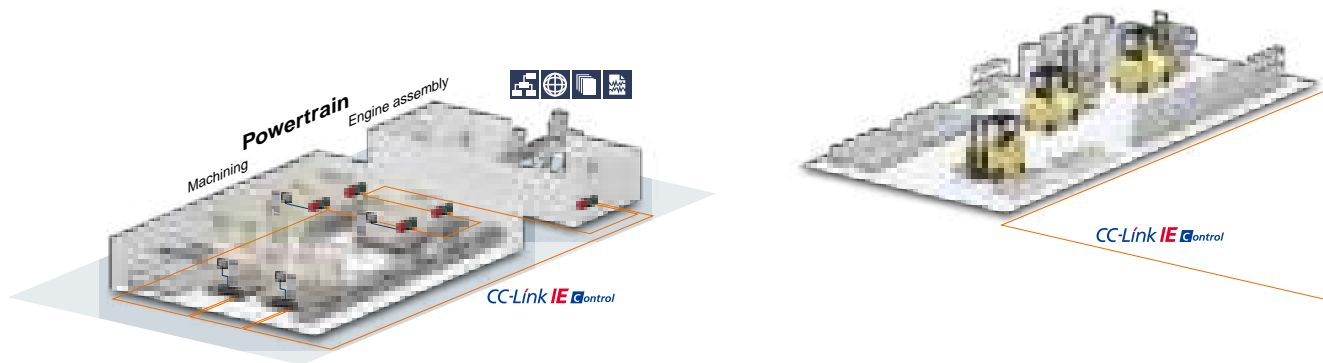
*1 Based on new project test benchmarks between GX Works2 and GX Works3.



Maintenance

Reduce maintenance costs and downtime utilizing easier maintenance features

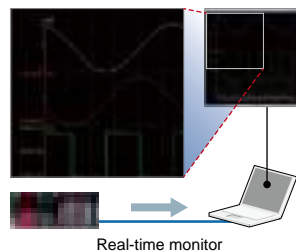
A manufacturing plant is seldom stopped or taken offline and continuously produces the desired product or component. However, the control system occasionally requires maintenance; for example, at the time of a faulty product or system upgrade for manufacturing a new or updated component. At that time, thanks to the extensive maintenance functions embedded in the hardware and software, the user can trust the control system to handle transition into/out of the maintenance period for both preventive and post maintenance.



Preventive maintenance CPU module

Visualize manufacturing data in real-time

- Monitor live manufacturing process data across the plant
- Very easy setup using the dedicated GX LogViewer monitoring tool

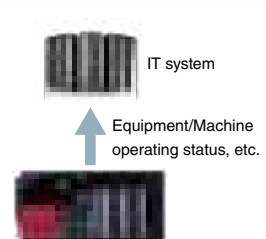


Real-time monitor

Preventive maintenance MES interface module

Direct access to enterprise level

- Registers device values directly into database
- Visible shop floor data enables actions before event occurs



Preventive maintenance Output module

Prevent system downtime with relay monitoring

- Monitors relay switching amount
- Check relay condition from GOT (HMI)
- Plan module maintenance prior to malfunction of relay



Corrective maintenance CPU module

Memory dump enables confirmation of operation problems

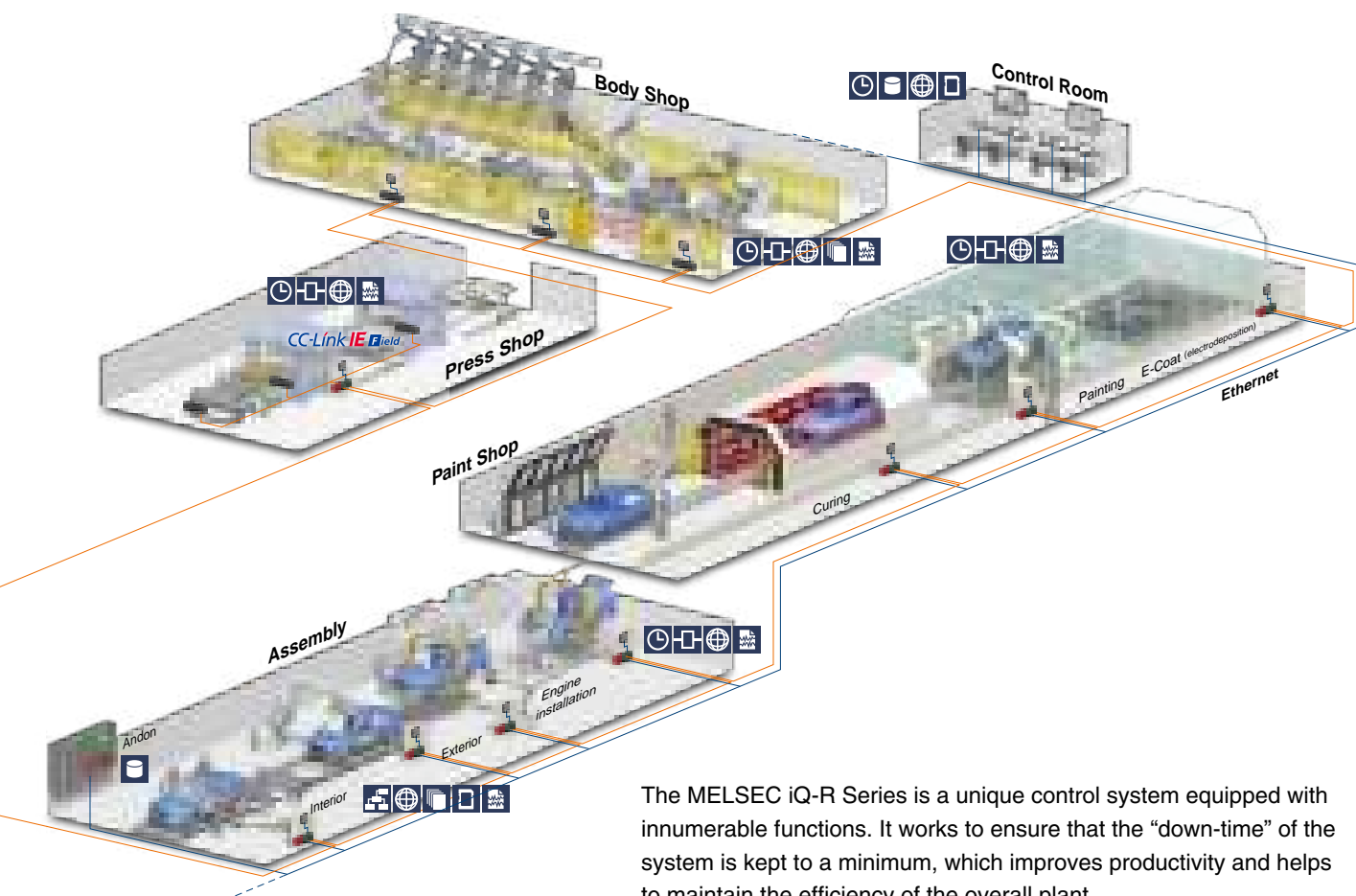
- Saves block of device data when error occurs
- Root cause analysis by confirming data on device monitor screen and offline via program editing window



Memory dump results (Program editor)



Mitsubishi Electric PAC MELSEC iQ-R
"Maintenance" Movie



The MELSEC iQ-R Series is a unique control system equipped with innumerable functions. It works to ensure that the “down-time” of the system is kept to a minimum, which improves productivity and helps to maintain the efficiency of the overall plant.

Corrective maintenance CPU module

Efficient diagnostics with extensive event logging

- Logging of program change events, errors and when the power is turned off
- Event logging displayed in list form
- Quickly detect problems due to operating mistakes by multiple users



Event log list

Corrective maintenance GX Works3

Quickly find network errors

- Visualize error location from network system image
- Easy network error corrective measures

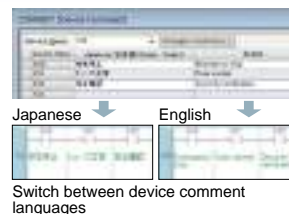


CC-Link IE Field diagnosis window

Corrective maintenance GX Works3

Multi-language software improves global support

- Comment/label names can be registered in multiple languages
- Easy to switch between languages
- No need for multiple programs to satisfy regional requirements



Switch between device comment languages

Corrective maintenance GX Works3

Simple troubleshooting, even for novice users

- Start diagnostics screen on GX Works3 just by connecting via USB
- Display detailed error information and corrective procedures



Automatically start diagnostics



Quality

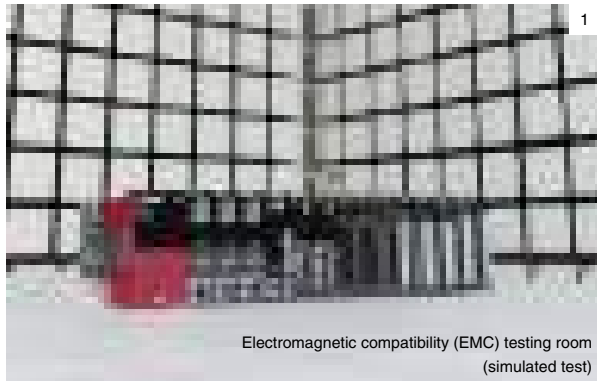
Reliable and trusted MELSEC product quality

The MELSEC iQ-R Series is based on two fundamental aspects of quality.

“Quality of product”

“Quality for application”

These two characteristics are part of the main principle behind the MELSEC iQ-R Series. This new control system includes various features designed-in to provide a solution that not only improves the overall manufacturing productivity, but also maintains a high level of industrial quality that is ideal for the harsh and rugged environments that it is subjected to on a daily basis.



Robust design ideal for harsh industrial environments

Synonymous with the Mitsubishi Electric name, the MELSEC iQ-R Series is designed with high quality and reliability, which is a prerequisite for industrial applications. In addition, the overall aesthetics and usability enable easier maintenance that customers routinely expect.

Classification according to IEC 60721-3-3 Class 3C2

For protection against aggressive atmosphere and gases, products with a conformal coating (IEC 60721-3-3 Class 3C2) are available on request^{*1}

^{*1}: Please contact your local Mitsubishi Electric office or representative for further details.

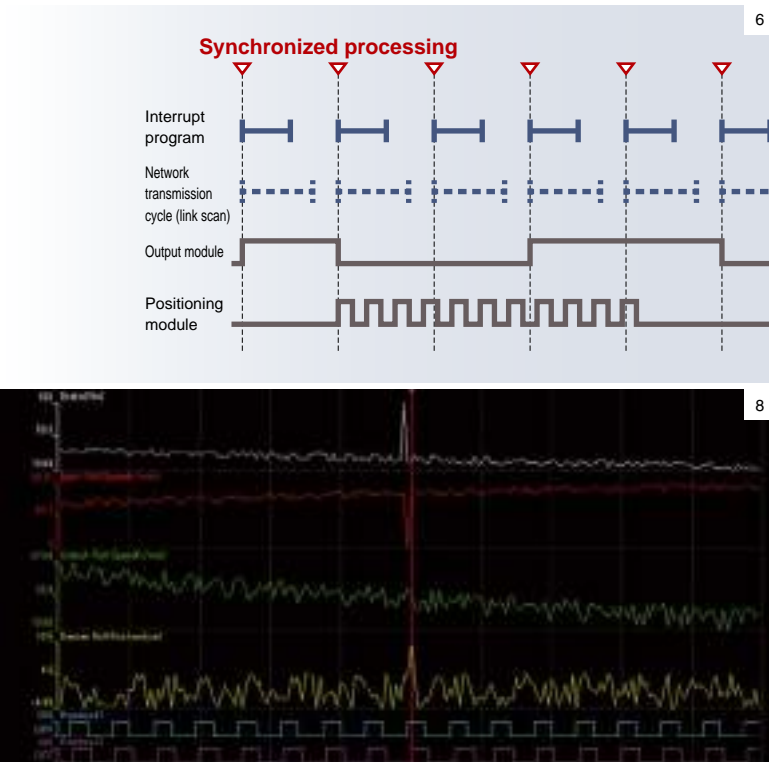
1. Conforms to stringent quality evaluations and tests that are based on robust industrial environments including EMC, LSI, temperature, vibration and HALT tests.
2. High manufacturing quality control through QR code based quality management system.
3. The front face has a wide and open design with an easy-to-use front cover.
4. High-quality CPU module manufacturing with in-line high-low temperature testing.
5. The base rack design includes a dedicated earth rail to prevent noise interference in low power supply conditions and a robust structure that enables easy installation without extensive damage to bus connectors.



Mitsubishi Electric PAC MELSEC iQ-R
"Quality" Movie

Conforms to main international quality standards

The MELSEC iQ-R Series conforms to most of the main international standards that realizes applications requiring multiple global locations.



Improve and maintain actual manufacturing quality

Maintains product quality during manufacturing

With inter-module synchronization, it is now possible to precisely synchronize interrupt programs with the network communications cycle (link scan). Any variations in data transmission response time (network transmission delay time) between the controller and other devices on the network are eliminated, realizing high integrity between manufacturing processes that are dependent on each other, ensuring high performance and processing.

Realizes traceability through data logging

Simple settings enable the collection of production data needed for traceability. Furthermore, collected data can be analyzed easily using a dedicated viewer. Analyzing various data on production processes provides an indicator for quality improvements and manufacturing cost reductions, thereby supporting optimization of the production system.

6. Graph showing the signal synchronization between several modules.
7. Data required for traceability is collected on the SD memory card.
8. Collected data is analyzed using a dedicated viewer.



Connectivity

Seamless network reduces system costs

The MELSEC iQ-R Series is part of a family of products all interconnected across various levels of automation. Based on the seamless message protocol (SLMP^{*1}), data flows transparently between the sensor level and the management level across multiple industry-standard automation networks. CC-Link IE, Asia's No. 1 industrial network, realizes fast gigabit data transmission speeds, further optimizing the manufacturing cycle. In addition, the SSCNET III/H high-speed motion control network further enhance the factory-wide connectivity solution.



Cost-saving integrated network CPU module

The MELSEC iQ-R Series includes a lineup of CPUs with embedded industrial network connection ports (CC-Link IE and Ethernet). System costs can be further reduced by approximately 50% using the embedded network CPU module, which realizes the same features as a generic network interface module.

System hardware costs
Reduced 50%^{*2}

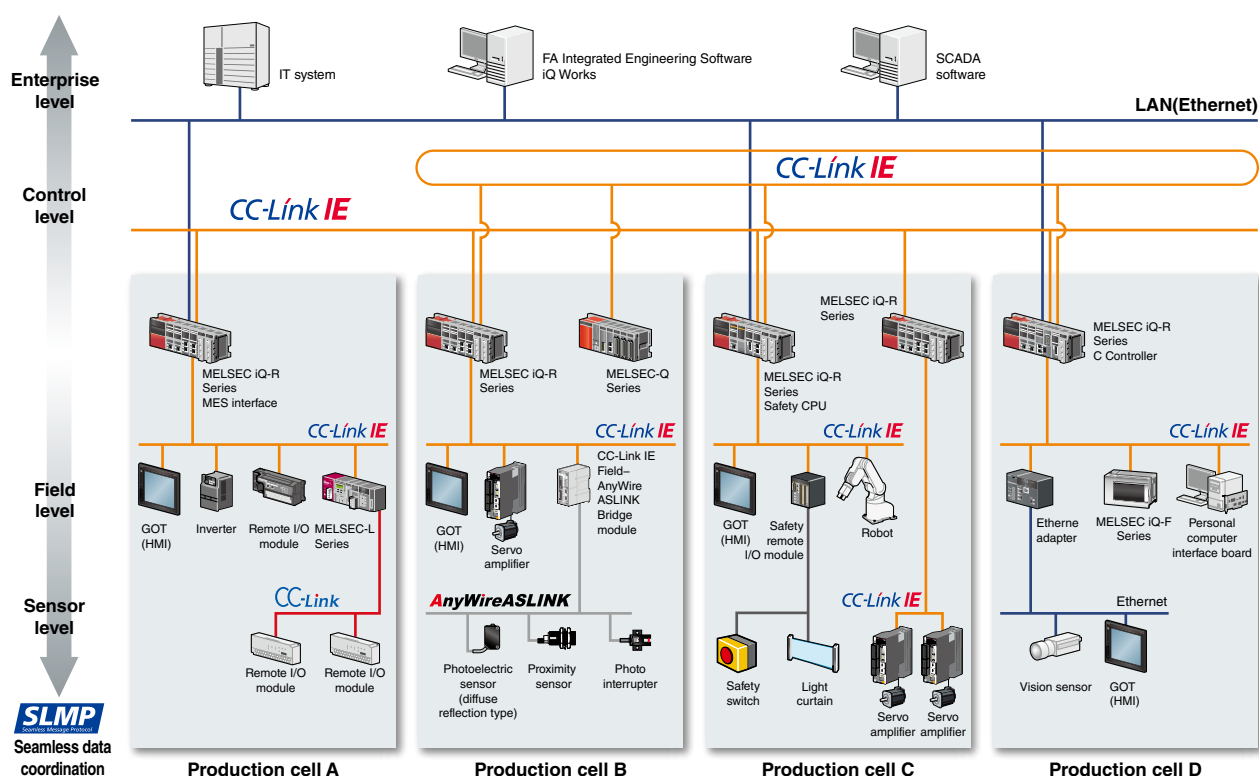
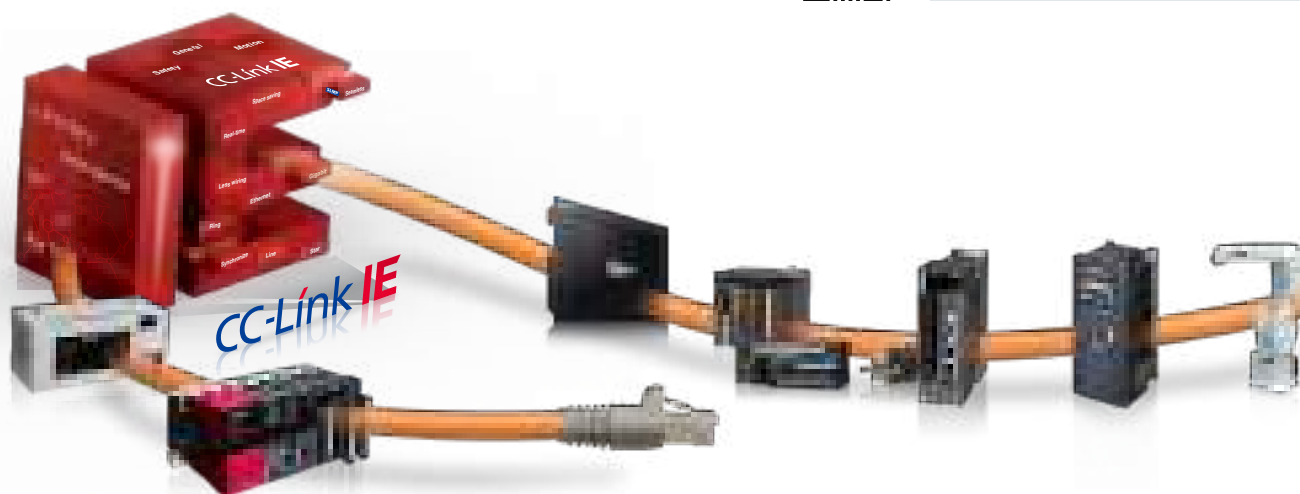
Integrate motion control into one network

The CC-Link IE Field Network compatible Simple Motion module can be used as a master station^{*3} on the network. System configuration cost can be reduced as only one module is required for both Motion control and network connectivity.

^{*1}: Seamless Message Protocol (SLMP): A simple client-server common protocol that enables communication between Ethernet products and CC-Link IE-compatible machines.
^{*2}: Cost comparison of using the MELSEC iQ-R Series R04CPU + RJ71EN71 modules.
^{*3}: The sub-master and safety communication functions are not supported.



Mitsubishi Electric PAC MELSEC iQ-R
"Connectivity" Movie



High-speed and large bandwidth ideal for large-scale control systems

The Ethernet-based open network CC-Link IE is an industry-leading 1 Gbps high-speed, large-capacity network. The division of 1 Gbps broadband into uses for distributed control and field data communications secures the reliability of control communications and realizes real-time data collection, which can be difficult with standard Ethernet.

CC-Link IE Control (twisted-pair cable)

Utilizing a system architecture that has no constraints and enables one to choose freely such as star/line/ring topologies, adding and removing equipment is easier. Moreover, compatibility with standard twisted-pair cabling means that wiring costs can be reduced.

Connect to two different types of networks with the same module

Ethernet and CC-Link IE network communications can be realized with the same network module. Since multiple network types can use one module, equipment costs can be further reduced.



Security

Robust security that can be relied on

As technology becomes more complex and the distribution of manufacturing systems more global, the protection of intellectual property is even more significant. When shipping a finished product overseas, the last thing an OEM needs to consider is unauthorized copying or changing of the original project data. In addition to this, unauthorized access to the control system can have very serious implications to the control system and the end user, which can compromise the overall safety of the plant.

The MELSEC iQ-R Series has a number of embedded features that help to maintain these requirements, such as hardware and software keys to protect intellectual property, and multi-level user access password hierarchy to protect the project at the design stage.



Mitsubishi Electric PAC MELSEC iQ-R "Security" Movie

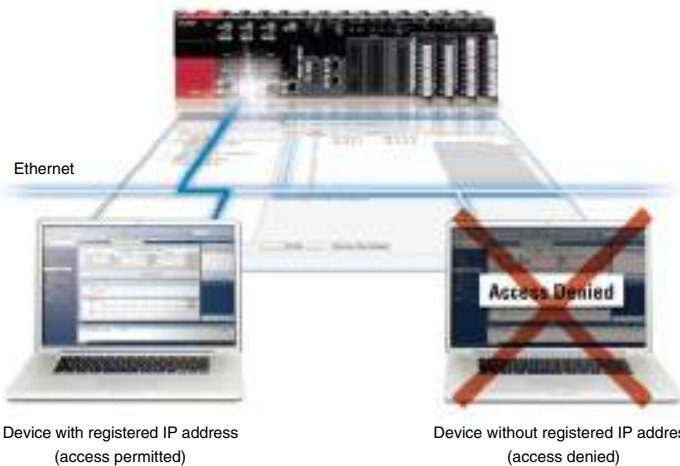
Powerful security features protecting intellectual property

Security key authentication protecting project data

The security key authentication prevents programs from being opened on personal computers where the security key has not been registered. Furthermore, because programs cannot be executed by CPU modules where the security key has not been registered, the integrity of customer technologies and other intellectual property is not compromised. The security key can also be registered on an extended SRAM cassette. Therefore, when replacing the CPU module, there is no need to re-register the security key, making replacement very simple.



Prevent unauthorized access across the network



The IP filter can be used to register the IP addresses of devices permitted to access the CPU module. As a result, access from non-registered devices can be blocked, thereby lowering the risk of program hacking and unauthorized access by a third party. Another feature is a remote password function for password-based security. Passwords of up to 32 characters can be set to prevent unauthorized access to the CPU module via networks such as Ethernet.



Compatibility

Extensive compatibility with existing products

Whenever introducing a new system or technology into an existing manufacturing plant or control system, utilization of existing assets as much as feasibly possible is a mandatory requirement with today's manufacturing needs. The MELSEC iQ-R Series addresses these subtle but substantial needs with various system hardware support and engineering project compatibility to achieve an easy path to higher technology and improved performance capabilities.



Mitsubishi Electric PAC MELSEC iQ-R
"Compatibility" Movie

Utilize existing MELSEC-Q Series assets

Current programs can be fully utilized

A simply conversion process*1 is all it takes to enable the use of MELSEC-Q Series programs with the MELSEC iQ-R Series. Customers can effectively use the program assets they have accumulated, thereby reducing the overall engineering time.

*1: For detailed information about converting to GX Works3 programs, please refer to the "GX Works3 Operating Manual".



Possible to divert external device wiring

The MELSEC iQ-R Series I/O module, analog module, and counter module pin layouts and connectors are the same as those of the MELSEC-Q Series. Accordingly, existing external device wiring (connectors, terminal blocks) can be diverted without changes and wiring costs can be reduced.

Variety of compatible modules

By utilizing the dedicated extension base, most MELSEC-Q Series modules*2 can be re-used. This makes it possible to introduce the high-performance MELSEC iQ-R Series while controlling the cost of supplementary equipment.

*2: For further details, please refer to the "MELSEC iQ-R Module Configuration Manual".



CPU

Programmable Controller CPU Module

Select the most suitable CPU based on the size of your program, CC-Link IE built-in functions and other requirements.



Model	LD instruction speed	Program capacity	Number of I/O points [X/Y]	Interface connection port	Compatible memory card	Others	
R04CPU	0.98 ns	40K steps	4096 points	USB Ethernet	SD Extended SRAM	DB MEM DUMP SYNCHRO	DATA LOG RT MON MULTI CPU
R08CPU	0.98 ns	80K steps	4096 points	USB Ethernet	SD Extended SRAM	DB MEM DUMP SYNCHRO	DATA LOG RT MON MULTI CPU
R16CPU	0.98 ns	160K steps	4096 points	USB Ethernet	SD Extended SRAM	DB MEM DUMP SYNCHRO	DATA LOG RT MON MULTI CPU
R32CPU	0.98 ns	320K steps	4096 points	USB Ethernet	SD Extended SRAM	DB MEM DUMP SYNCHRO	DATA LOG RT MON MULTI CPU
R120CPU	0.98 ns	1200K steps	4096 points	USB Ethernet	SD Extended SRAM	DB MEM DUMP SYNCHRO	DATA LOG RT MON MULTI CPU
R04ENCPU	0.98 ns	40K steps	4096 points	USB Ethernet	SD Extended SRAM	DB MEM DUMP SYNCHRO	DATA LOG RT MON CC-Link IE
R08ENCPU	0.98 ns	80K steps	4096 points	USB Ethernet	SD Extended SRAM	DB MEM DUMP SYNCHRO	DATA LOG RT MON CC-Link IE
R16ENCPU	0.98 ns	160K steps	4096 points	USB Ethernet	SD Extended SRAM	DB MEM DUMP SYNCHRO	DATA LOG RT MON CC-Link IE
R32ENCPU	0.98 ns	320K steps	4096 points	USB Ethernet	SD Extended SRAM	DB MEM DUMP SYNCHRO	DATA LOG RT MON CC-Link IE
R120ENCPU	0.98 ns	1200K steps	4096 points	USB Ethernet	SD Extended SRAM	DB MEM DUMP SYNCHRO	DATA LOG RT MON CC-Link IE

SD SD memory card Extended SRAM Extended SRAM cassette DB Data base function DATA LOG Data logging function MEM DUMP Memory dump function
RT MON Real-time monitor function SYNCHRO Inter-module synchronization function MULTI CPU Multi-CPU system functions
CC-Link IE CC-Link IE Field Network function (For more information, please refer to the CC-Link IE Field Network master/local module.)

Process CPU Module

The process CPU module is capable of both loop control and sequence control on a single module, and is suitable for process control systems in which PID loop control is primarily required. Four CPUs are available with memory sizes from 80K to 1200K steps to suit specific control requirements (number of loop control).



Model	LD instruction speed	Program capacity	Number of I/O points [X/Y]	Interface connection port	Compatible memory card	Others
R08PCPU	0.98 ns	80K steps	4096 points	USB Ethernet	SD Extended SRAM	DATA LOG MULTI CPU *1 OC SYNCHRO *1 PROCESS
R16PCPU	0.98 ns	160K steps	4096 points	USB Ethernet	SD Extended SRAM	DATA LOG MULTI CPU *1 OC SYNCHRO *1 PROCESS
R32PCPU	0.98 ns	320K steps	4096 points	USB Ethernet	SD Extended SRAM	DATA LOG MULTI CPU *1 OC SYNCHRO *1 PROCESS
R120PCPU	0.98 ns	1200K steps	4096 points	USB Ethernet	SD Extended SRAM	DATA LOG MULTI CPU *1 OC SYNCHRO *1 PROCESS

SD SD memory card Extended SRAM Extended SRAM cassette DATA LOG Data logging function SYNCHRO Inter-module synchronization function MULTI CPU Multi-CPU system function
PROCESS Process control function OC Online module change

*1: Inter-module synchronization is not supported when used in redundant mode.

Redundant Function Module

A redundant system can be configured by combining this module with the process CPU. Various redundancy compatible network modules (Ethernet, CC-Link IE) can cover customer requirements, greatly improving reliability.



Model	Communication cable	Max. distance	Tracking cable data capacity
R6RFM	Multi-mode optical cable	550 m (when the core outer diameter is 50 μm)	1M word

Programmable ControllersMELSEC iQ-R Series

Safety CPU

The safety CPU module enables control of both generic and safety programs in the same module and is easily programmed utilizing the intuitive features of GX Works3. Compliant with internationally recognized safety standards, the safety CPU enables safety devices such as safety light curtains, emergency switches, and door switches to be connected via the CC-Link IE Field Network without requiring a separate dedicated network line. Safety CPUs are certified as being compliant with ISO 13849-1 PL e and IEC 61508 SIL 3 by TÜV Rheinland®, the world-leading third party testing institution. As such, they can be trusted for use in safety control applications.



Model	LD instruction speed	Program capacity	Number of I/O points [X/Y]	Interface connection port	Compatible memory card	Others
R08SFCPU-SET*1	0.98 ns	80K steps (40K steps for safety programs)	4096 points	USB Ethernet	SD Extended SRAM	DATA LOG MULTI CPU SAFETY
R16SFCPU-SET*1	0.98 ns	160K steps (40K steps for safety programs)	4096 points	USB Ethernet	SD Extended SRAM	DATA LOG MULTI CPU SAFETY
R32SFCPU-SET*1	0.98 ns	320K steps (40K steps for safety programs)	4096 points	USB Ethernet	SD Extended SRAM	DATA LOG MULTI CPU SAFETY
R120SFCPU-SET*1	0.98 ns	1200K steps (40K steps for safety programs)	4096 points	USB Ethernet	SD Extended SRAM	DATA LOG MULTI CPU SAFETY

SD SD memory card Extended SRAM Extended SRAM cassette DATA LOG Data logging function MULTI CPU Multi-CPU system function SAFETY Safety function

*1: Product package includes a safety CPU(R□SFCPU) and safety function module (R6SFM).

C Controller Module

The multi-core ARM®-based controller pre-installed with VxWorks® Version 6.9, realizes the simultaneous execution of programs.



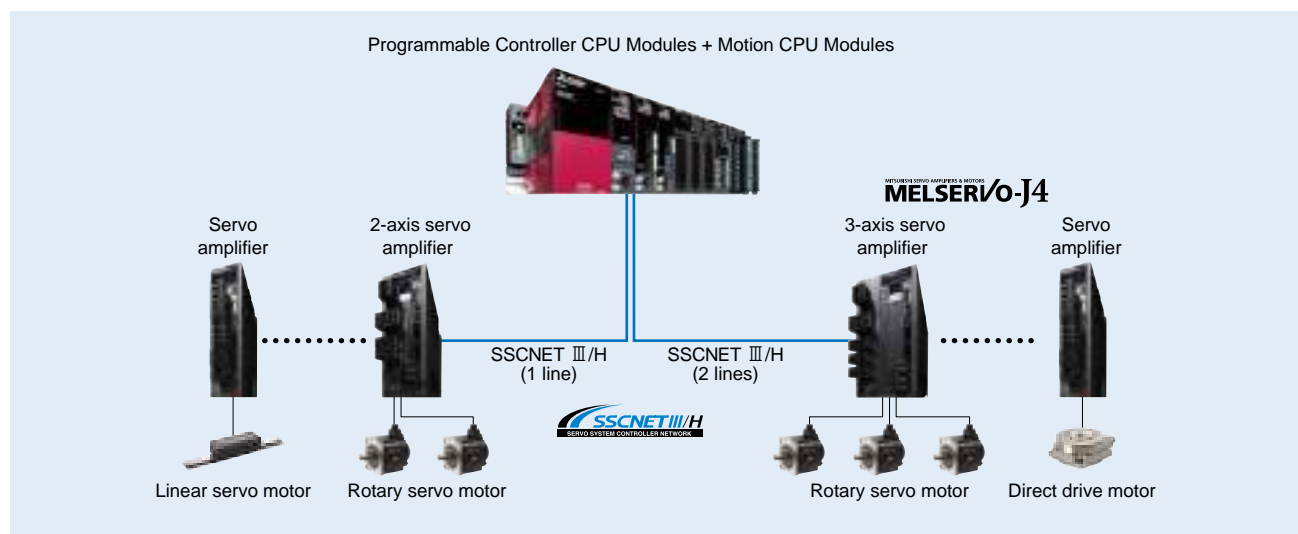
Model	OS	Endian format	Number of I/O points [X/Y]	Communication interface	Compatible memory card
R12CCPU-V	VxWorks® Version 6.9	Little endian	4096 points	USB RS-232 Ethernet	SD

SD SD memory card

Motion CPU Module

Our motion controllers are designed for high-speed control, capable of delivering a maximum of 64 axes per single CPU, or up to 192 axes using 3 CPUs by a multi-CPU system. Compact and small footprint, the new-generation motion controllers are packed with the latest features that deserves.

Model	Number of control axes	Servo amplifier network	
R16MTCPU	16 axes	SSCNET III/H	1 line
R32MTCPU	32 axes	SSCNET III/H	2 lines
R64MTCPU	64 axes	SSCNET III/H	2 lines



Programmable ControllersMELSEC iQ-R Series

Base Unit

Product modules of the MELSEC iQ-R Series can be mounted. Select the most suitable base unit for your configuration system.

Type	Model	Number of module installed	Power supply module
Main base unit	R35B	CPU + 5 slots	Mounting required
	R38B	CPU + 8 slots	Mounting required
	R312B	CPU + 12 slots	Mounting required
Redundant power supply main base	R310RB	CPU + 10 slots	2 redundant modules
Extended temperature range main base	R310B-HT	CPU + 10 slots	Mounting required
Extended temperature range redundant power supply main base	R38RB-HT	CPU + 8 slots	2 redundant modules
Extension base unit	R65B	5 slots	Mounting required
	R68B	8 slots	Mounting required
	R612B	12 slots	Mounting required
Redundant power supply extension base	R610RB	10 slots	2 redundant modules
Extended temperature range extension base	R610B-HT	10 slots	Mounting required
Extended temperature range redundant power supply extension base	R68RB-HT	8 slots	2 redundant modules
RQ extension base unit*1	RQ65B	5 slots	Mounting required*2
	RQ68B	8 slots	Mounting required*2
	RQ612B	12 slots	Mounting required*2

2 redundant modules 2 redundant power supply modules required

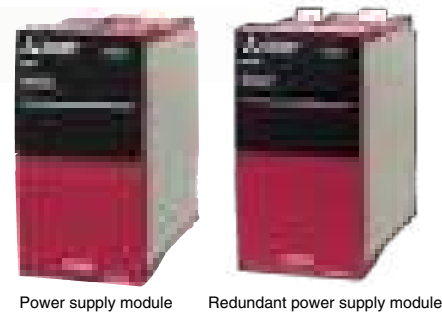
*1: For mounting the MELSEC-Q Series modules.

*2: Mount the power supply module of the MELSEC-Q Series.



Power Supply Module

Power supply modules for the MELSEC iQ-R Series.



Type	Model	Input voltage	Output voltage	Output current
Power supply	R61P	100...240 V AC	5 V DC	6.5 A
	R62P	100...240 V AC	5/24 V DC	3 A/0.6 A
	R63P	24 V DC	5 V DC	6.5 A
	R64P	100...240V AC	5 V DC	9 A
Redundant power supply module	R64RP	100...240V AC	5 V DC	9 A

I/O Module

Input Module

Our lineup of input modules covers various control situations. Select the appropriate model according to voltage, input format, input points, wiring method, etc.



Type	Model	Number of input points	Rated input voltage	Rated input current	Common terminal arrangement	Response time	External interface
AC input	RX10	16 points	100...120 V AC	8.2 mA (100 V AC, 60Hz) 6.8 mA (100 V AC, 50Hz)	16 points/common	20 ms	Screw terminal block
DC input (positive common)	RX40PC6H	16 points	24 V DC	6.0 mA	8 points/common	5 μs...70 ms	Screw terminal block
DC input (positive/negative shared common)	RX40C7	16 points	24 V DC	7.0 mA	16 points/common	0.2...70 ms	Screw terminal block
	RX41C4	32 points	24 V DC	4.0 mA	32 points/common	0.2...70 ms	40-pin connector
	RX42C4	64 points	24 V DC	4.0 mA	32 points/common	0.2...70 ms	40-pin connector (2x)
	RX41C6HS	32 points	24 V DC	6.0 mA	32 points/common	1 μs...70 ms	40-pin connector
	RX61C6HS	32 points	5 V DC	6.0 mA	32 points/common	1 μs...70 ms	40-pin connector
DC input (negative common)	RX40NC6H	16 points	24 V DC	6.0 mA	8 points/common	5 μs...70 ms	Screw terminal block
DC (with diagnostic functions) input (negative common)*1	RX40NC6B	16 points	24 V DC	6.0 mA	16 points/common	1...70 ms	Screw terminal block

*1: For more information about diagnostic functions, please refer to the relevant product manual.

Output Module

Select the appropriate module according to application such as transistor output or relay and number of outputs.



Type	Model	Number of output points	Rated load voltage	Max. load current (Rated switching current)	Common terminal arrangement	Response time	External interface
Relay output	RY10R2	16 points	24 V DC/240 V AC	2 A/points 8 A/common	16 points/common	12 ms	Screw terminal block
Transistor (sink) output	RY40NT5P	16 points	12...24 V DC	0.5 A/points 5 A/common	16 points/common	1 ms	Screw terminal block
	RY41NT2P	32 points	12...24 V DC	0.2 A/points 2 A/common	32 points/common	1 ms	40-pin connector
	RY42NT2P	64 points	12...24 V DC	0.2 A/points 2 A/common	32 points/common	1 ms	40-pin connector (2x)
	RY41NT2H	32 points	5...24 V DC	0.2 A/points 2 A/common	32 points/common	2 μs	40-pin connector
	RY40PT5P	16 points	12...24 V DC	0.5 A/points 5 A/common	16 points/common	1 ms	Screw terminal block
Transistor (source) output	RY41PT1P	32 points	12...24 V DC	0.1 A/points 2 A/common	32 points/common	1 ms	40-pin connector
	RY42PT1P	64 points	12...24 V DC	0.1 A/points 2 A/common	32 points/common	1 ms	40-pin connector (2x)
	RY41PT2H	32 points	5...24 V DC	0.2 A/points 2 A/common	32 points/common	2 μs	40-pin connector
	RY40PT5B	16 points	24 V DC	0.5 A/points 5 A/common	16 points/common	1.5 ms	Screw terminal block

*1: For more information about diagnostic functions, please refer to the relevant product manual.

I/O Combined Module

The combined module is capable of both input and output controls by a single module.



Type	Model	Number of I/O points	Rated input voltage/ Rated load voltage	Rated input current	Max. load current	Common terminal arrangement	Response time	External interface
DC input/Transistor output	RH42C4NT2P	Input 32 points	24 V DC	4.0 mA	—	32 points/common	0.2...70 ms	40-pin connector (2x)
		Output 32 points	12...24 V DC	—	0.2 A/points 2 A/common	32 points/common	1 ms	

Analog Module

Analog Input/Analog Output

Our wide range of analog modules incorporates a variety of functions for supporting site control situations.

The lineup also includes modules that support channel isolated, which is ideal for process control.



Type	Model	Number of channels	Input/Output	Resolution	Conversion speed (Sampling cycle)	External interface	Others
Voltage input	R60ADV8	8 ch	-10...10 V DC	-32000...32000	80 μs/ch	Screw terminal block	–
Current input	R60ADI8	8 ch	0...20 mA DC	0...32000	80 μs/ch	Screw terminal block	–
Voltage, current input	R60AD4	4 ch	-10...10 V DC 0...20 mA DC	-32000...32000 0...32000	80 μs/ch	Screw terminal block	–
	R60ADH4	4 ch	-10...10 V DC 0...20 mA DC	-32000...32000 0...32000	10 μs/ch 20 μs/ch 5 μs/4 ch	Screw terminal block	–
	R60AD8-G	8 ch	-10...10 V DC 0...20 mA DC	-32000...32000 0...32000	10 ms/ch	40-pin connector	Channel isolated
	R60AD16-G	16 ch	-10...10 V DC 0...20 mA DC	-32000...32000 0...32000	10 ms/ch	40-pin connector (2x)	Channel isolated
Voltage output	R60DAV8	8 ch	-10...10 V DC	-32000...32000	80 μs/ch	Screw terminal block	–
Current output	R60DAI8	8 ch	0...20 mA DC	0...32000	80 μs/ch	Screw terminal block	–
Voltage, current output	R60DA4	4 ch	-10...10 V DC 0...20 mA DC	-32000...32000 0...32000	80 μs/ch	Screw terminal block	–
	R60DA8-G	8 ch	-12...12 V DC 0...20 mA DC	-32000...32000 0...32000	1 ms/ch	40-pin connector	Channel isolated
	R60DA16-G	16 ch	-12...12 V DC 0...20 mA DC	-32000...32000 0...32000	1 ms/ch	40-pin connector (2x)	Channel isolated

Temperature Input Module, Temperature Control Module

Available are a lineup of temperature input modules compatible with various temperature sensors and a lineup of temperature controllers that ensure standard control, heating-cooling control and optimum temperature control by detecting heater disconnection.



Temperature input module Temperature control module

Type	Model	Number of channels	Input/Output	Resolution	Conversion speed (Sampling cycle)	External interface	Others
Temperature input	Thermocouple	R60TD8-G	8 ch	Thermocouple (B,R,S,K,E,J,T,N)	30 ms/ch	40-pin connector	Channel isolated Disconnection detected
	RTD	R60RD8-G	8 ch	Platinum RTD (Pt100,JPt100,Pt50) Nickel RTD (Ni100)	10 ms/ch	40-pin connector	Channel isolated Disconnection detected
Temperature control	Thermocouple/ RTD	R60TCRT2TT2	4 ch	Thermocouple (B,R,S,K,E,J,T,N,U,L,PL II, W5Re/W26Re) Platinum RTD *1 (Pt100,JPt100)	250 ms / 4 ch 500 ms / 4 ch	Screw terminal block	Channel isolated Standard control heating and cooling control
		R60TCRT2TT2BW	4 ch	Thermocouple (B,R,S,K,E,J,T,N,U,L,PL II, W5Re/W26Re) Platinum RTD *1 (Pt100,JPt100)	250 ms / 4 ch 500 ms / 4 ch	Screw terminal block (2x)	Channel isolated Standard control heating and cooling control Heater disconnection detection
	RTD	R60TCRT4	4 ch	Platinum RTD (Pt100,JPt100)	250 ms / 4 ch 500 ms / 4 ch	Screw terminal block	Channel isolated Standard control heating and cooling control
		R60TCRT4BW	4 ch	Platinum RTD (Pt100,JPt100)	250 ms / 4 ch 500 ms / 4 ch	Screw terminal block (2x)	Channel isolated Standard control heating and cooling control Heater disconnection detection

*1: Only for executing 4 ch in 2 ch (ch1 and ch2)

Motion, Positioning

Simple Motion Module

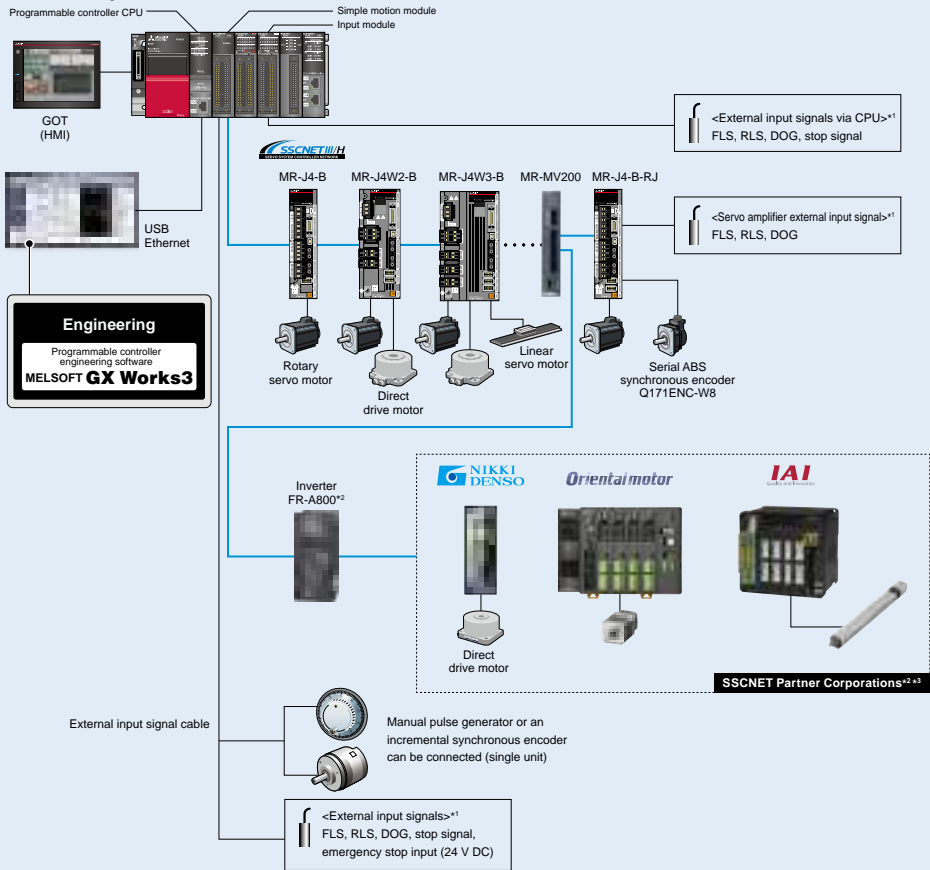
Various controls can be made similar to positioning modules. The sequence program handles highly-advanced and wide range of motion controls, including the synchronous control, cam control, speed and torque (pressing control) and others. Synchronous encoder, mark detection function, and other necessary features are equipped as standard.



Servo amplifier network	Model	Maximum number of control axes	Control unit	Operation cycle	Positioning data
CC-Link IE Field Network	RD77GF4	4 axes	mm degree	0.5 ms 2.0 ms	600
	RD77GF8	8 axes	mm degree	0.5 ms 2.0 ms	600
	RD77GF16	16 axes	mm degree	0.5 ms 2.0 ms	600
SSCNET III/H	RD77MS2	2 axes	mm degree	0.444 ms 1.777 ms	600
	RD77MS4	4 axes	mm degree	0.444 ms 1.777 ms	600
	RD77MS8	8 axes	mm degree	0.444 ms 1.777 ms	600
	RD77MS16	16 axes	mm degree	0.444 ms 1.777 ms	600

600 600 data/axis

System configuration example:



RD77MS16: Up to 16 axes/RD77MS8: Up to 8 axes/RD77MS4: Up to 4 axes/RD77MS2: Up to 2 axes

*1: Destination of the external input signals (FLS, RLS, DOG, stop signal) can be changed with parameters.
*2: Use versions of partner products and inverter FR-A800 that are compatible with simple motion modules.
(Refer to the "MELSEC iQ-R Simple Motion Module User's Manual (Application).")
*3: For details about partner products, refer to the servo system partner product catalog.

Positioning Module



High-speed, high-precision positioning modules support various positioning controls, including 2 - 4-axis linear interpolation, 2-axis circular interpolation, 3-axis helical interpolation, and trajectory control.

Type	Model	Maximum number of control axes	Control unit		Positioning data	Max. output pulse	External interface
Open collector output	RD75P2	2 axes	mm degree	inch pulse	600	200 kpps	40-pin connector
	RD75P4	4 axes	mm degree	inch pulse	600	200 kpps	40-pin connector (2x)
Differential output	RD75D2	2 axes	mm degree	inch pulse	600	5 Mpps	40-pin connector (2x)
	RD75D4	4 axes	mm degree	inch pulse	600	5 Mpps	40-pin connector (2x)
600	600 data/axis						

600 600 data/axis

High-speed Counter Module



Positioning and other controls are available by combining with external encoders. The maximum counting speed can be switched for counting, from a high-speed pulse to a gentle rise/fall low-frequency pulse.

Model	Number of channels	Counting speed switch	Count input signal	External input	Coincidence output	External interface
RD62P2	2 ch	200 kpps 100 kpps 10 kpps	5 V DC 12 V DC 24 V DC	5 V DC 12 V DC 24 V DC	Transistor (sink) 12/24 V DC, 0.5 A/point 2 A/common	40-pin connector
RD62P2E	2 ch	200 kpps 100 kpps 10 kpps	5 V DC 12 V DC 24 V DC	5 V DC 12 V DC 24 V DC	Transistor (source) 12/24 V DC, 0.1 A/point 0.4 A/common	40-pin connector
RD62D2	2 ch	8 Mpps 4 Mpps 2 Mpps 1 Mpps 500 kpps 200 kpps 100 kpps 10 kpps	Differential line driver	5 V DC 12 V DC 24 V DC	Transistor (sink) 12/24 V DC, 0.5 A/point 2 A/common	40-pin connector

Advanced Information Module

MES Interface Module

Realize improved production management and reduce overall system costs through real-time direct access to IT system database servers without requiring additional programming and gateway computers.



Model	Number of database connections	Connectable database	Max. No. of job settings	Data sampling interval	Amount of sampled data	Function
RD81MES96	16 server	Oracle® 11g, Oracle® 12c, Microsoft® SQL Server® 2008 R2, Microsoft® SQL Server® 2012, Microsoft® SQL Server® 2014, Microsoft® Access® 2010, Microsoft® Access® 2013, MySQL®, PostgreSQL	Max. 64	General data sampling 0.1...0.9 s, 1...3600 s High speed data sampling 1...900 ms, 1...60 s, per scan	Max. 65536	<div>DB record read/write function</div> <div>Device memory read/write function</div> <div>Trigger condition monitoring function</div> <div>Data operation and processing function</div> <div>Program execution function</div> <div>DB buffering function</div> <div>Trigger buffering function</div> <div>Variable I/O function</div> <div>Job execution monitoring function</div> <div>One-shot execution function</div>

High-speed Data Logger Module

High-speed data logger module enables logging of various data without using a computer. High-speed accurate data logging is easily realized at a low cost. The sophisticated data collection rules can be easily created using wizard-like High-speed Data Logger Module Configuration Tool. Logged data are viewable using the logging data display and analysis tool, GX LogViewer, and can be used for data analysis.



Model	Data sampling interval	Amount of sampled data	Save file format	Function
RD81DL96	General data sampling Time specification:0.1...32767 s Time interval specification (specify hour/minute/second)	General data sampling Overall amount of data: 65536 (per setting: 1024) Overall number of device points: 262144 (per setting: 4096)	<div>TXT file</div> <div>CSV file</div> <div>EXCEL format</div> <div>BIN file</div>	<div>High-speed data sampling function</div> <div>FTP server function</div> <div>File transfer function</div> <div>Recipe function</div> <div>Email function</div>
	High-speed data sampling Sequence scan time synchronization Time specification:0.5...32767 s (for trigger logging)/2...32767 ms (for continuous logging)	High-speed data sampling Overall amount of data: 32768 (per setting: 1024) Overall number of device points: 32768 (per setting: 4096)		<div>Trigger logging function</div> <div>Event-logging function</div> <div>Auto logging function</div>

C Intelligent Function Module

The C Intelligent function module is available with a multi-core ARM®-based controller pre-installed with VxWorks® Version 6.9, which realizes simultaneous execution of programs, thereby providing a robust and deterministic alternative to computer-based systems.



Model	OS	Endian format	Communication interface	Compatible memory card
RD55UP06-V	VxWorks® Version 6.9	Little endian	<div>Ethernet</div>	<div>SD</div>

SD

 SD memory card

Network Module

Ethernet Interface Module

The Ethernet interface module offers the best choice for the system and other devices. The engineering tool setting enables to use the Ethernet port (P1 and P2) in Ethernet and CC-Link IE networks.



Model	Ethernet standard	Number of channels	Transmission speed	Others
RJ71EN71	1000BASE-T 100BASE-TX 10BASE-T	2 ch	1 Gbps 100 Mbps 10 Mbps	MELSOFT connection SLMP communication Communication protocol CC-Link IE Field
RnENCPU*1	1000BASE-T 100BASE-TX 10BASE-T	2 ch	1 Gbps 100 Mbps 10 Mbps	MELSOFT connection SLMP communication Communication protocol CC-Link IE Field

[Communication protocol](#) Predefined Protocol support function

[CC-Link IE Field](#) CC-Link IE function (For more information, please refer to the CC-Link IE Control Network module, CC-Link IE Field Network master/local module.)

CC-Link IE Control Network Module

The CC-Link IE Control Network control/normal stations are designed for a large-scale controller-distributed control and to link with individual field networks.

This high-reliability distributed control network can handle very large data communications (128K word) over a high-speed (1 Gbps) dual-loop optical cable topology.

CC-Link IE



Model	Connection cable	Communication speed	Transmission path	Overall cable distance	Max. number of link points per network
RJ71GP21-SX	Optical fiber cable (multi-mode optical fiber)	1 Gbps	Duplex loop	66000 m (When 120 stations are connected)	120 stations
RJ71EN71*1	Ethernet cable that meets 1000 BASE-T standard: Category 5e or higher, straight cable (double shielded, STP)	1 Gbps	Line topology Star topology Ring topology Coexistence of line topology and star topology is possible.	Line topology: 11,900 m (When 120 stations are connected) Star topology: Depends on the system configuration Ring topology: 12,000 m (When 120 stations are connected)	120 stations
RnENCPU*1*2	Ethernet cable that meets 1000 BASE-T standard: Category 5e or higher, straight cable (double shielded, STP)	1 Gbps	Line topology Star topology Ring topology Coexistence of line topology and star topology is possible.	Line topology: 11,900m (When 120 stations are connected) Star topology: Depends on the system configuration Ring topology: 12,000m (When 120 stations are connected)	120 stations

*1: When using the CC-Link IE Field Network device.

CC-Link IE Field Network Master/Local Module

The CC-Link IE Field Network master/local station for an all-round field network system that integrates the controller distributed control, I/O control, safety control, and motion control. Its high-speed (1Gbps) and enhanced communication responsiveness brings significant reduction of tact time.

CC-Link IE



Model	Connection cable	Communication speed	Transmission path	Overall cable distance	Compatible station	Max. number of link points per network
RJ71GF11-T2	Ethernet cable that meets 1000 BASE-T standard: Category 5e or higher, straight cable (double shielded, STP)	1 Gbps	<div>Line topology</div> <div>Star topology</div> <div>Ring topology</div> Coexistence of line topology and star topology is possible.	Line topology: 12,000 m (master station: 1, slave station: 120) Star topology: Depends on the system configuration Ring topology: 12,100 m (master station: 1, slave station: 120)	<div>Master station</div> <div>Local station</div> (including safety station)	<div>121 stations</div> (master station: 1, slave station: 120)
RJ71EN71*1	Ethernet cable that meets 1000 BASE-T standard: Category 5e or higher, straight cable (double shielded, STP)	1 Gbps	<div>Line topology</div> <div>Star topology</div> <div>Ring topology</div> Coexistence of line topology and star topology is possible.	Line topology: 12,000 m (master station: 1, slave station: 120) Star topology: Depends on the system configuration Ring topology: 12,100 m (master station: 1, slave station: 120)	<div>Master station</div> <div>Local station</div> (except for safety station)	<div>121 stations</div> (master station: 1, slave station: 120)
RnENCPU**2	Ethernet cable that meets 1000 BASE-T standard: Category 5e or higher, straight cable (double shielded, STP)	1 Gbps	<div>Line topology</div> <div>Star topology</div> <div>Ring topology</div> Coexistence of line topology and star topology is possible.	Line topology: 12,000 m (master station: 1, slave station: 120) Star topology: Depends on the system configuration Ring topology: 12,100 m (master station: 1, slave station: 120)	<div>Master station</div> <div>Local station</div> (except for safety station)	<div>121 stations</div> (master station: 1, slave station: 120)

*1: When using the CC-Link IE Field Network device.

CC-Link IE Field Network Remote Head Module

The CC-Link IE Field head module can control the I/O and intelligent function modules directly when installed on the same base unit, and can operate as a network remote station. Network system reliability can be improved by installing redundant head modules and redundant network cables.

CC-Link IE



Model	Connection cable	Communication speed	Transmission path	Overall cable distance	Compatible station	Max. number of link points per network
RJ22GF15-T2	Ethernet cable (Category 5e or higher, double shielded, STP)	1 Gbps	<div>Line topology</div> <div>Star topology</div> <div>Ring topology</div> Coexistence of line topology and star topology is possible.	Line topology: 12,000 m (master station: 1, slave station: 120) Star topology: Depends on the system configuration Ring topology: 12,100 m (master station: 1, slave station: 120)	<div>Remote station</div>	<div>121 stations</div> (master station: 1, slave station: 120)

CC-Link System Master/Local Module

Field network module which delivers outstanding cost-performance of I/O control, and can be used as either a CC-Link Ver.1 or Ver.2 compatible master/local station.

CC-Link



Model	Connection cable	Communication speed	Transmission path	Overall cable distance	Compatible station	Max. number of link points per network
RJ61BT11	Ver.1.10-compatible CC-Link dedicated cable	156 kbps	Bus (RS-485)	1200 m	Ver.2 Master station	<div>65 stations</div> (master station: 1, slave station: 64)
		625 kbps		900 m	Ver.2 Local station	
		2.5 Mbps		400 m	Ver.1 Master station	
		5 Mbps		160 m	Ver.1 Local station	
		10 Mbps		100 m		

AnyWireASLINK Master Module **DB**

AnyWireASLINK is a sensor-level network that realizes a smaller installation space and reduces wiring owing to its easy wiring topology. This master module allows miniature sensors to be freely arranged on the network and can control 512 I/O points maximum.

AnyWireASLINK

DB Co-developed with other companies



Model	Connection cable	Transmission path	Overall cable distance	Max. number of link points per network
RJ51AW12AL	Universal 2-wire/4-wire cable, universal cable, dedicated flat cable	Bus (multi-drop, T-branch, tree branch)	200 m	128 stations (varies according to each slave module's current consumption)

Serial Communication Module

This module communicates with various external devices (PC, GOT(HMI), bar code reader, measuring equipment, etc.) for data sampling/change, monitoring/management, and measurement data sampling of the programmable controller.



Model	Transmission interface	Number of channels	Transmission speed	Overall transmission distance (Overall cable distance)	Others
RJ71C24	RS-232 RS-422/485	2 ch CH1:RS-232 CH2:RS-422/485	1200 bps 2400 bps 4800 bps 9600 bps 14400 bps 19200 bps 28800 bps 38400 bps 57600 bps 115200 bps 230400 bps	RS-232: Max. 15 m RS-422/485: Max. 1200 m	MELSOFT connection MC protocol communication Communication protocol
RJ71C24-R2	RS-232	2 ch	1200 bps 2400 bps 4800 bps 9600 bps 14400 bps 19200 bps 28800 bps 38400 bps 57600 bps 115200 bps 230400 bps	Max. 15 m	MELSOFT connection MC protocol communication Communication protocol
RJ71C24-R4	RS-422/485	2 ch	1200 bps 2400 bps 4800 bps 9600 bps 14400 bps 19200 bps 28800 bps 38400 bps 57600 bps 115200 bps 230400 bps	Max. 1200 m	MELSOFT connection MC protocol communication Communication protocol

Communication protocol Predefined Protocol support function

MELSEC-iQ-R
Series

MELSEC-iQ-F
Series

MELSEC-Q
Series

MELSEC-L
Series

MELSEC-F
Series

MELSEC-QS/MS
Series

Network Related
Products

Engineering and
Programming
Software

iQ Sensor
Solution

Product List

Programmable Controller CPU Module Specifications

■ Programmable controller CPU modules, Process CPU: Hardware specifications

Item		R04CPU R04ENCPU	R08CPU R08ENCPU R08PCPU	R16CPU R16ENCPU R16PCPU	R32CPU R32ENCPU R32PCPU	R120CPU R120ENCPU R120PCPU
Control method		Stored program cyclic operation				
I/O control mode		Refresh mode (Direct access I/O is available by specifying direct access I/O (DX, DY).)				
Instruction processing time	LD instruction	0.98 ns				
	MOV instruction	1.96 ns				
Instruction processing time (ST language)	IF statement	1.96 ns				
	CASE statement	1.96 ns				
	FOR statement	1.96 ns				
Memory size	Program size	40K steps (160K bytes)	80K steps (320K bytes)	160K steps (640K bytes)	320K steps (1280K bytes)	1200K steps (4800K bytes)
	Program memory	160K bytes	320K bytes	640K bytes	1280K bytes	4800K bytes
	SD memory card	SD memory card capacity level (SD/SDHC memory cards up to 32GB)				
	Device/label memory*1	400K bytes	1188K bytes	1720K bytes	2316K bytes	3380K bytes
	Data memory	2M bytes	5M bytes	10M bytes	20M bytes	40M bytes
	CPU buffer memory	1072K bytes (536K word) (includes periodic communication area (24K word))				
	Refresh memory	2048K bytes*2				
Maximum number of files for storage	Program memory (P: Number of program files, FB: Number of FB files)	188 files (P: 124 files, FB: 64 files (up to 64 can be stored to 1 file))	380 files (P: 252 files, FB: 128 files (up to 64 can be stored to 1 file))			
	Device/label memory	324 files (regardless of the extended SRAM cassette use)*3				
	Data memory*4	256 files	512 files			
	SD memory card*4	• NZ1MEM-2GBSD: 256 files • NZ1MEM-4GBSD, NZ1MEM-8GBSD, NZ1MEM-16GBSD: 32767 files				
Maximum number of folders	Data memory*4	256 files	512 files			
	SD memory card*4	• NZ1MEM-2GBSD: 256 files • NZ1MEM-4GBSD, NZ1MEM-8GBSD, NZ1MEM-16GBSD: 32767 files*4				
USB port		USB2.0 High Speed (miniB) x1				
Ethernet port		10BASE-T/100BASE-TXx1				
CC-Link IE communication port		Ethernet (1000BASE-T/100BASE-TX/10BASE-T)*5*6				

*1: Total capacity for the device area, label area, latch label area, the local device area, and the file storage area. Capacity of each area can be changed from the parameter setting. Extended SRAM cassette can be mounted to increase the device/label memory capacity.
*2: Total capacity of the device and the unit label areas.
*3: Number including system files.
*4: This is the total number (including system files and system folder) that can be created in the root folder when the file name and folder name are 13 characters (including extension) or less. When creating in a sub folder, up to 32767 files can be created. Note, however, that the number decreases when a file and folder having a name longer than 13 characters (including extension) are created.
*5: Available with R□ENCPU.
*6: The following networks are supported, Ethernet, CC-Link IE Control (twisted pair cable), and CC-Link IE Field (two simultaneous Ethernet networks and combined CC-Link IE Field and CC-Link IE Control networks are not supported).

■ Programmable controller CPU modules, Process CPU: Programming specifications

Item			R04CPU R04ENCPU	R08CPU R08ENCPU R08PCPU	R16CPU R16ENCPU R16PCPU	R32CPU R32ENCPU R32PCPU	R120CPU R120ENCPU R120PCPU	
Program language			• Ladder Diagram (LD) • Sequential Function Chart (SFC)*1*2 • Structured Text (ST) • Function Block Diagram (FBD/LD)					
Programming extensions			Function block (FB), label programming (system/local/global)					
Program operation	Execution type	Initial execution type, scan execution type, periodic execution type, event execution type, wait type						
	Interrupt type	Internal timer interrupt (I28...I31), high-speed internal timer interrupt 1 (I49), high-speed internal timer interrupt 2 (I48), interrupt from the unit, synchronous interrupt between units (I44)*2, synchronous interrupt between multi-CPU's (I45)*2*3						
Number of program execution			124 programs	252 programs				
Number of FB files			64 programs	128 programs				
Tact performance	Constant scanning	0.1...2000 ms (setting can be made in 0.1 ms increments)						
	Periodic interrupt	0.5...1000 ms (setting can be made in 0.5 ms increments)						
	High-speed internal timer interrupt	0.05...1000 ms (setting can be made in 0.05 ms increments)						
	Synchronous interrupt between units*2	0.1...10.00 ms (setting can be made in 0.05 ms increments)						
	Synchronous interrupt between multi-CPU's*2*3	0.1...10.00 ms (setting can be made in 0.05 ms increments)						
Timer performance	Low-speed timer	1...1000 ms (default is 100 ms)						
	High-speed timer	0.01...100 ms (default is 10 ms)						
	Long timer	0.001...1000 ms (default is 0.001 ms)						
Input/output points			4096 points					
User device points	Input (X)	12288 points (fixed)						
	Output (Y)	12288 points (fixed)						
	Internal relay (M)	12288 points (changeable with use of a parameter)*4						
	Latching relay (L)	8192 points (changeable with use of a parameter)*4						
	Link relay (B)	8192 points (changeable with use of a parameter)*4						
	Link special relay (SB)	2048 points (changeable with use of a parameter)*4						
	Annunciator (F)	2048 points (changeable with use of a parameter)*4						
	Edge relay (V)	2048 points (changeable with use of a parameter)*4						
	Step relay (S)*1*2*5	0 points (changeable with use of a parameter)*4						
	Timer system	Timer (T)	1024 points (changeable with use of a parameter)*4					
		Long timer (LT)	1024 points (changeable with use of a parameter)*4					
	Integrating timer system	Integrating timer (ST)	0 points (changeable with use of a parameter)*4					
		Long integrating timer (LST)	0 points (changeable with use of a parameter)*4					
	Counter system	Counter (C)	512 points (changeable with use of a parameter)*4					
		Long counter (LC)	512 points (changeable with use of a parameter)*4					
		Data register (D)	18432 points (changeable with use of a parameter)*4					
		Link register (W)	8192 points (changeable with use of a parameter)*4					
		Link special register (SW)	2048 points (changeable with use of a parameter)*4					
	System device points	Special relay (SM)	4096 points (fixed)					
Special register (SD)		4096 points (fixed)						
Function input (FX)		16 points (fixed)						
Function output (FY)		16 points (fixed)						
Function register (FD)		5 points × 4 words (fixed)						
File register points	File register (R/ZR)	0 points (changeable with use of a parameter)*4						
Index register points	Index register (Z)	20 points (Maximum 24 points changeable with use of a parameter)						
	Long index register (LZ)	2 points (Maximum 12 points changeable with use of a parameter)						
Pointer points	Pointer (P) (Global/local)	8192 points (Maximum 16384 points changeable with use of a parameter)					8192 points (Maximum 32768 points changeable with use of a parameter)	
	Interrupt pointer (I)	1024 points (fixed)						
Link direct device points	Link input (J□¥X□)	Maximum 16384 points*6						
	Link output (J□¥Y□)	Maximum 16384 points*6						
	Link relay (J□¥B□)	Maximum 32768 points*6						
	Link register (J□¥W□)	Maximum 131072 points*6						
	Link special relay (J□¥SB□)	Maximum 512 points*6						
	Link special register (J□¥SW□)	Maximum 512 points*6						
Unit access device points	Intelligent function unit device (U□¥G□)	Maximum 268435456 points*6						
	Buffer memory (U3E□¥G□)	Maximum 524288 points*6						
CPU buffer memory access device points	Buffer memory periodic communication area (U3E□¥HG□)*2	Maximum 12288 points*7						
Refresh data register points	Refresh data register (RD)	524288 points (Maximum 1048576 points)						
Nesting points	Nesting (N)	15 points						

*1: When using on the RnCPU or process CPU, check the version of the CPU module and engineering tool.

*2: Cannot be used on a process CPU (redundancy mode).

*3: Cannot be used on the RnENCPU.

*4: Changeable from the parameter setting and within the capacity scope of the CPU built-in memory and the extended SRAM cassette.

*5: Used in the SFC program. For details on the SFC program, refer to the manual.

*6: Indicate the maximum value that CPU can handle, and the actual points differ among units.

*7: The maximum value differs according to parameter setting (multi-CPU setting).

■ Safety CPU: Hardware specifications

Item		R08SFCPU	R16SFCPU	R32SFCPU	R120SFCPU
Control method		Stored program cyclic operation			
I/O control mode		Refresh mode (Direct access I/O is available by specifying direct access I/O (DX, DY).)			
Instruction processing time	LD instruction SA#X0	0.98 ns			
	MOV instruction SA#D0 SA#D1	1.96 ns			
Memory size	Program size	80K steps (320K bytes) (40K steps for safety programs (160K bytes))	160K steps (640K bytes) (40K steps for safety programs (160K bytes))	320K steps (1280K bytes) (40K steps for safety programs (160K bytes))	1200K steps (4800K bytes) (40K steps for safety programs (160K bytes))
	Program memory	320K bytes (160K bytes for safety programs)	640K bytes (160K bytes for safety programs)	1280K bytes (160K bytes for safety programs)	4800K bytes (160K bytes for safety programs)
	Device/label memory*1	1178K bytes	1710K bytes	2306K bytes	3370K bytes
	Data memory	5M bytes	10M bytes	20M bytes	40M bytes
	CPU buffer memory	1024K bytes (512K word) (includes built-in function information area size 4M bytes (2K word))			
	Refresh memory	2048K bytes*2			
Maximum number of files for storage	Program memory (P: Number of program files, FB: Number of FB files)	380 files (including those for the safety program) (P: 252 files, FB: 128 files (up to 64 can be stored to 1 file))			
	Program memory (P: Number of safety program files, FB: Number of safety FB files)	48 files (P: 32 files, FB: 16 files (up to 64 can be stored to 1 file))			
	Device/label memory	323 files (regardless of the extended SRAM cassette use)*3			
	Data memory	512 files*4			
	SD memory card	• NZ1MEM-2GBSD: 256 files*4 • NZ1MEM-4GBSD, NZ1MEM-8GBSD, NZ1MEM-16GBSD: 32767 files*4			
Maximum number of folders	Data memory	512 files*4			
	SD memory card	• NZ1MEM-2GBSD: 256 files*4 • NZ1MEM-4GBSD, NZ1MEM-8GBSD, NZ1MEM-16GBSD: 32767 files*4			
USB port		USB2.0 High Speed (miniB) ×1			
Ethernet port		100BASE-TX/10BASE-T×1			

*1: The size of device area, label area, latch label area, and file storage are can be changed by parameter settings. Device/label memory size can be increased by mounting the extended SRAM cassette.
*2: This is the total size of device area and unit label area.
*3: Number including system files.
*4: This is the total number (including system files and system folder) that can be created in the root folder when the file name and folder name are 13 characters (including extension) or less. When creating in a sub folder, up to 32767 files can be created. Note, however, that the number decreases when a file and folder having a name longer than 13 characters (including extension) are created.

Safety CPU: Programming specifications

Item			R08SFCPU	R16SFCPU	R32SFCPU	R120SFCPU
Program language			• Ladder Diagram (LD) • Structured Text (ST)*1 • Function Block Diagram (FBD/LD)*1			
Programming extensions			Function block (FB), label programming (system/local/global)			
Program operation	Execution type	General program	Initial execution type, scan execution type, periodic execution type, event execution type, wait type			
	Interrupt type	Safety program	periodic execution type			
Number of program execution	General program	General program	Internal timer interrupt (I28...I31), interrupt from the unit			
	Safety program	Safety program	252 programs (including those for safety program)			
Number of FB files	FB file	FB file	32 programs			
	Safety FB file	Safety FB file	128 programs (up to 64 can be stored to 1 file) (including those for safety FB files)			
Tact performance	Constant scanning	Constant scanning	16 programs (up to 64 can be stored to 1 file)			
	Periodic interrupt	Periodic interrupt	0.2...2000 ms (setting can be made in 0.1 ms increments)			
Timer performance	Low-speed timer	Low-speed timer	0.5...1000 ms (setting can be made in 0.5 ms increments)			
	High-speed timer	High-speed timer	1...1000 ms (default is 100 ms)			
Input/output points	Long timer*1	Long timer*1	0.01...100 ms (default is 10ms)			
	Long timer*1	Long timer*1	0.001...1000 ms (default is 0.001 ms)			
User device points	Input (X)*1		4096 points			
	Output (Y)*1		12288 points (fixed)			
	Internal relay (M)*1		12288 points (fixed)			
	Latching relay (L)*1		12288 points (changeable with use of a parameter)*2			
	Link relay (B)*1		8192 points (changeable with use of a parameter)*2			
	Link special relay (SB)*1		8192 points (changeable with use of a parameter)*2			
	Annunciator (F)*1		2048 points (changeable with use of a parameter)*2			
	Edge relay (V)*1		2048 points (changeable with use of a parameter)*2			
	Timer system	Timer (T)*1	2048 points (changeable with use of a parameter)*2			
		Long timer (LT)*1	1024 points (changeable with use of a parameter)*2			
	Integrating timer system	Integrating timer (ST)*1	1024 points (changeable with use of a parameter)*2			
		Long integrating timer (LST)*1	0 points (changeable with use of a parameter)*2			
	Counter system	Counter (C)*1	0 points (changeable with use of a parameter)*2			
		Long counter (LC)*1	512 points (changeable with use of a parameter)*2			
	Data register (D)*1		512 points (changeable with use of a parameter)*2			
	Link register (W)*1		18432 points (changeable with use of a parameter)*2			
	Link special register (SW)*1		8192 points (changeable with use of a parameter)*2			
	Safety input (SA*Y)*3		2048 points (changeable with use of a parameter)*2			
	Safety output (SA*Y)*3		8192 points (either 8192 or 12288 points can be selected with use of a parameter)*4			
	Safety internal relay (SA*Y)*3		8192 points (either 8192 or 12288 points can be selected with use of a parameter)*4			
Number of safety user device points	Safety link relay (SA*Y)*3		6144 points (changeable with use of a parameter)*2			
	Safety timer (SA*Y)*3		4096 points (changeable with use of a parameter)*2			
	Safety integrating timer (SA*Y)*3		512 points (changeable with use of a parameter)*2			
	Safety counter (SA*Y)*3		0 points (changeable with use of a parameter)*2			
	Safety data register (SA*Y)*3		512 points (changeable with use of a parameter)*2			
	Safety link register (SA*Y)*3		512 points (changeable with use of a parameter)*2			
	Safety integrating timer (SA*Y)*3		12288 points (changeable with use of a parameter)*2			
	Safety counter (SA*Y)*3		4096 points (changeable with use of a parameter)*2			
System device points	Special relay (SM)*1		4096 points (fixed)			
	Special register (SD)*1		4096 points (fixed)			
	Function input (FX)*1		16 points (fixed)			
	Function output (FY)*1		16 points (fixed)			
	Function register (FD)*1		5 points × 4 words (fixed)			
Safety system device points	Safety special relay (SA*SM)*3		4096 points (fixed)			
	Safety special register (SA*SD)*3		4096 points (fixed)			
File register points	File register (R/ZR)*1		0 points (changeable with use of a parameter)*2			
Index register points	Index register (Z)*1		20 points (Maximum 24 points changeable with use of a parameter)			
	Long index register (LZ)*1		2 points (Maximum 12 points changeable with use of a parameter)			
Pointer points	Pointer (P)*1 (Global/local)		8192 points (Maximum 16384 points changeable with use of a parameter)			16384 points (Maximum 32768 points changeable with use of a parameter)
	Interrupt pointer (I)*1		1024 points (fixed)			
Link direct device points	Link input (J□*X□)*1		Maximum 16384 points*5			
	Link output (J□*Y□)*1		Maximum 16384 points*5			
	Link relay (J□*B□)*1		Maximum 32768 points*5			
	Link register (J□*W□)*1		Maximum 131072 points*5			
	Link special relay (J□*SB□)*1		Maximum 512 points*5			
Unit access device points	Link special register (J□*SW□)*1		Maximum 512 points*5			
	Intelligent function unit device (U□*G□)*1		Maximum 268435456 points*5			
CPU buffer memory access device points	Buffer memory (U3E□*G□)*1		Maximum 268435456 points*5			
Refresh data register points	Refresh data register (RD)*1		524288 points (Maximum 1048576)			
Nesting points	Nesting (N)		15 points			

*1: Cannot be used in safety programs.

*2: For details about the permissible range, refer to the manual.

*3: Cannot be used in general programs.

*4: When 12288 points is selected, check the version of the CPU module and engineering tool.

*5: Indicate the maximum value that CPU can handle, and the actual points differ among units.

MELSEC iQ-F Series

Designed on the concepts of outstanding performance, superior drive control and user centric programming, Mitsubishi's MELSEC-F Series has been reborn as the MELSEC iQ-F Series.

From stand alone use to networked system applications, MELSEC iQ-F Series brings your business to the next level of industry.

MELSEC iQ-F
SERIES



The next level of industry

Further extending the range of applications through improved fundamental performance, cooperation with drive devices and improved programming environment.



Conveyance



Food & Beverage



Packaging



Air-conditioning

New micro PLC designed on the concepts of ...

Outstanding Performance

- High-speed system bus
- Extensive built-in functions
- Enhanced security functions
- Battery-less

Superior Drive Control

- Easy built-in positioning (4-axis 200 kpps)
- Simple interpolation functions
- 4-axis synchronous control with simple motion module (dedicated positioning software not needed)

Intuitive Programming Environment

- Easy programming by drag and drop
- Reduced development time with module FB
- Parameterized setup for a variety of functions



GX Works3



iQ Platform

Taking the iQ Platform to the next level.

iQ platform minimizes TCO* by providing innovative solutions for :

Building a stable production system with enhanced productivity

Reducing the time from system development to startup for shorter product cycles

Efficiently managing and servicing the system to reduce down time and maintain productivity

Ensuring product quality by swiftly processing large volumes of control data and production data and establishing traceability

*TCO: Total Cost of Ownership

PLC & HMI

1. High-speed bus performance greatly enhances the total system performance with the high-speed system bus performance (150x conventional speed*1)
2. Standardize programs with pre-defined module function blocks and module labels
3. Uniform and powerful security functions

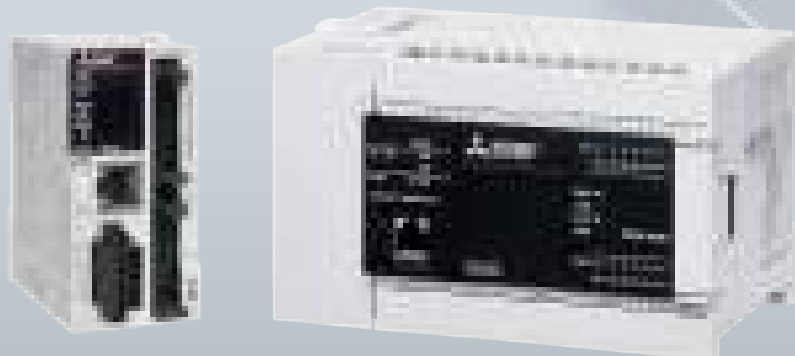
Network

1. Achieve loss-less retrieval with CC-Link IE Field 1 Gbps high-speed communication (link refresh performance 40x conventional levels*1)
2. Seamless connectivity with each device using SLMP*

*SLMP: SeamLess Message Protocol

Engineering Environment

1. The intuitive programming environment of GX Works3 reduces development cost.
2. Module configuration drawings can be generated through direct reading from actual hardware.
3. Share parameters across multiple engineering software via MELSOFT Navigator.



*1: Comparison with FX3U

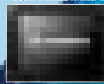
eFactory

iQ Platform

MELSEC iQ-R



GOT2000



PLC & HMI

MELSEC iQ-F



Network

Engineering
Environment



Controller

MELSEC iQ-R
Series

MELSEC iQ-F
Series

MELSEC-Q
Series

MELSEC-L
Series

MELSEC-F
Series

MELSEC-QS/MS
Series

Network Related
Products

Engineering and
Programming
Software

iQ Sensor
Solution

Product List

Advanced Built-in Functions

CPU Performance

MELSEC iQ-F is powered by a high speed CPU that can execute the LD instruction in 34 ns.

Furthermore, MELSEC iQ-F can execute structured programs, execute multiple programs and handle ST language and function blocks.

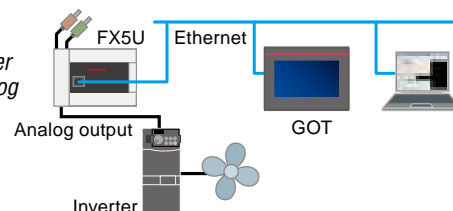
Program capacity 64 k Step	Instruction execution speed (LD, MOV instruction) 34 ns
PC MIX value 14.6 instructions/μs	Fixed Cycle Interrupt Program Min. 1 ms

Built-in Analog Input/Output (with alarm output) FX5U

FX5U is equipped with 12-bit 2ch analog input and 1ch analog output. With parameter setup, no programming is required.

Value shifting, scaling and alarm output can also be set easily with parameters.

» Example of inverter control using analog output

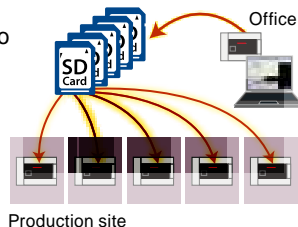


Built-in SD Memory Card Slot

A built-in SD memory card slot is convenient for updating the program and mass production of equipment. Data can be logged in SD memory card

(future support), making it easy to analyze the system status and production state, etc.

» Example of mass-production of equipment using SD memory card



RUN/STOP/RESET Switch

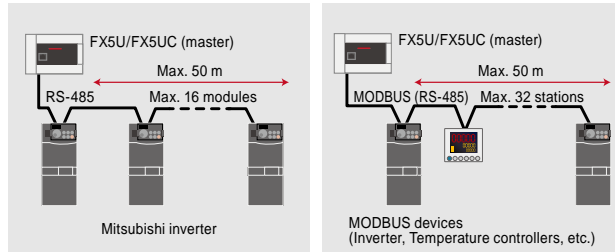
RUN/STOP/RESET switch is built in.

PLC can be rebooted without turning off the main power for efficient debugging.

Built-in RS-485 Port (with MODBUS® function)

Connect to serial devices up to 50 m away with built-in RS-485 port. Control for up to 16 Mitsubishi inverters is possible with dedicated inverter communication instructions. MODBUS is also supported and can connect up to 32 MODBUS devices such as PLCs, sensors and temperature controllers.

» Inverter Communication » MODBUS Communication



FX5U

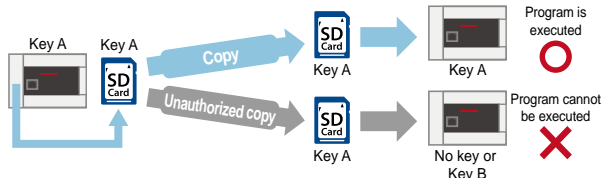
Space saving

FX5UC

Security

MELSEC iQ-F has advanced security functions (file password, remote password, security key) to prevent data theft and illegal operations by unauthorized persons.

» Example of security key function



High-speed System Bus Communication

High-speed system bus communication at 1.5 K words/ms (approximately 150 times faster compared with FX3U), together with high speed CPU, allows MELSEC iQ-F to output maximum performance even when heavy data communication intelligent function modules are used.



CC-Link IE Field

High-speed System Bus Communication
(Approx. 150-times faster) Comparison with FX3U

Battery-less and Maintenance-free

MELSEC iQ-F series holds programs and devices in nonvolatile memory such as flash ROM, and does not require a battery.

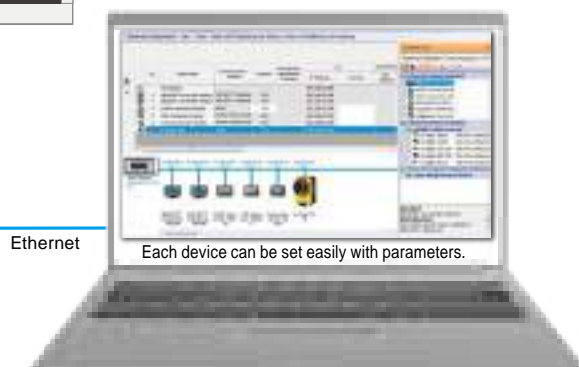
*: It is possible to increase the capacity of held devices by using an optional battery.

Built-in Ethernet Port

The Ethernet communication port can handle communication of up to 8 connections on the network, and can support multiple connections with personal computer and other devices. In addition, the Ethernet communication port can handle seamless SLMP communication with the upper-level device.



The CPU module and engineering tool (GX Works3) can be directly connected with a single Ethernet cable.

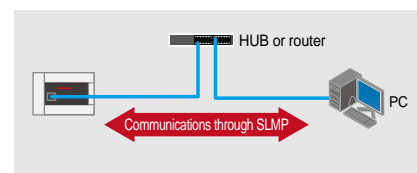


Ethernet

Each device can be set easily with parameters.

» SLMP Communication

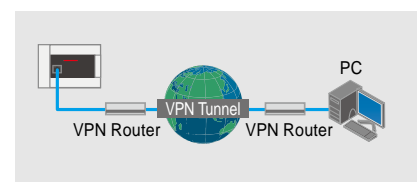
PC and other devices can read/write to the CPU module via the open protocol SLMP*.



*: SeamLess Message Protocol

» Remote Maintenance

Program read/write can be made by GX Works3 connected via VPN.



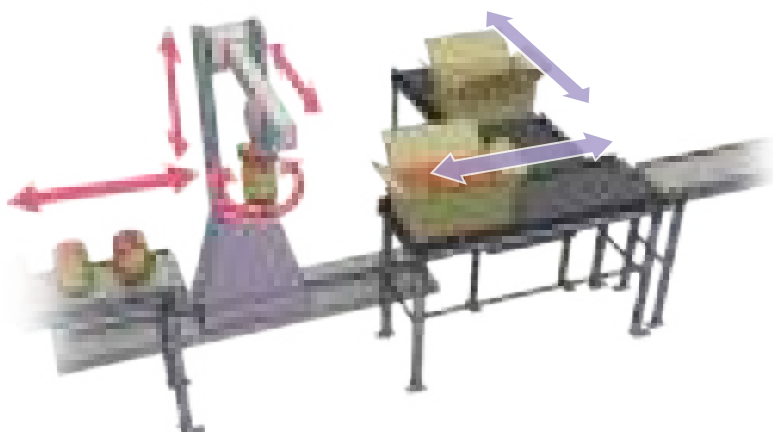
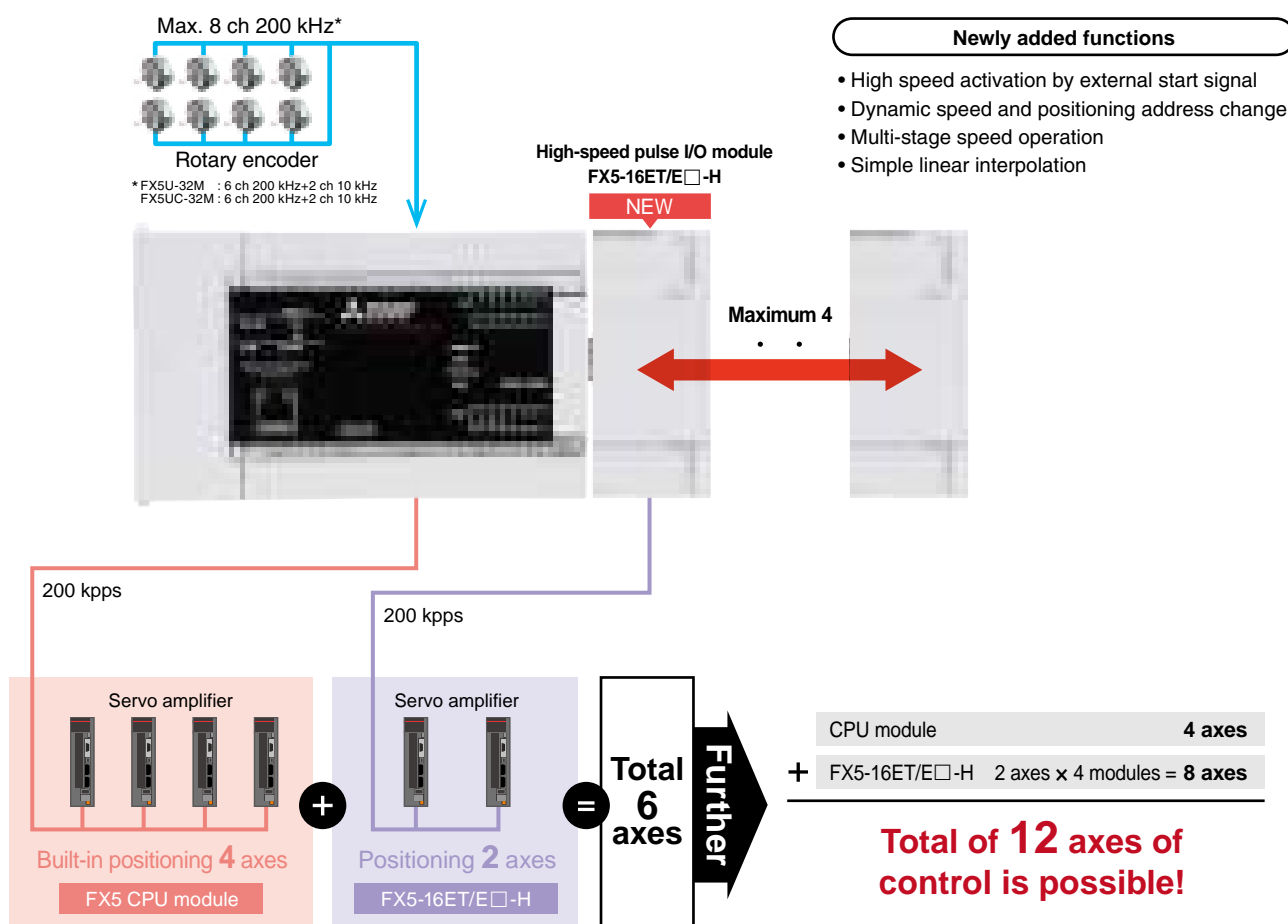
Advanced Positioning Function

Built-in Positioning (200 kpps, 4 axes built in) + Positioning 2 axes (200 kpps, 2 axes)

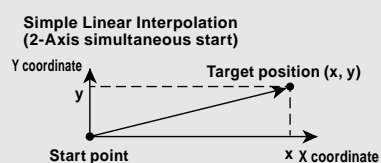
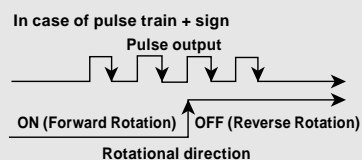
Positioning capable of 20 μ s high-speed start

FX5U/FX5UC is equipped with built-in positioning functions that can utilize 8 ch high speed counter function and 4 axes pulse output.

In addition to the existing interrupt stop operation and variable speed operation, new functions have been added and made even easier to use. Furthermore, up to four high-speed pulse I/O modules can be connected for affordable multi-axis control.



[Example of carton packing system]

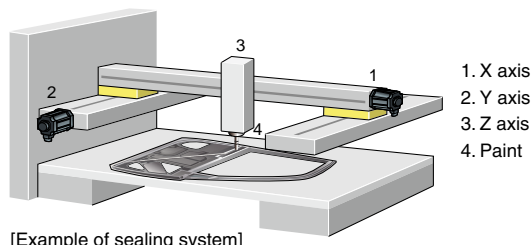


Simple Motion Module <4-axis control module>

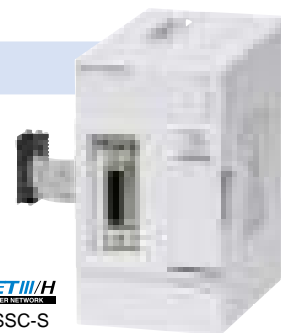
Positioning control with SSCNETIII/H

FX5-40SSC-S is equipped with a 4-axis positioning function compatible with SSCNETIII/H.

By combining linear interpolation, 2-axis circular interpolation and continuous trajectory control in the program set with a table, a smooth trajectory can be easily drawn.



[Example of sealing system]



Main functions

- Linear interpolation
- Circular interpolation
- Continuous trajectory control
- S-curve acceleration/deceleration

Application examples

- Sealing system
- Palletizer
- Grinding system

Advanced Motion Control

Making simple motion with compactly packed extra functions

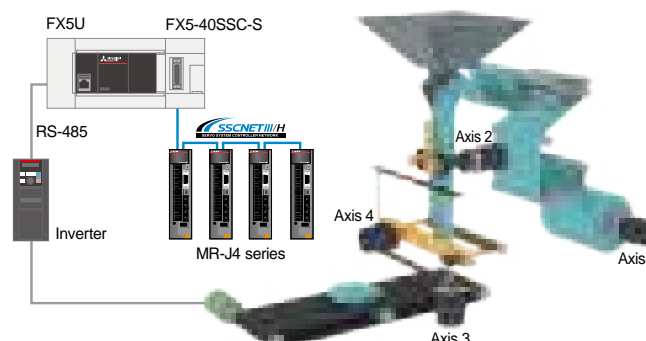
By starting with parameter settings and the sequence program, the simple motion modules can realize a variety of motion control including positioning control, advanced synchronous control, cam control and speed-torque control.

Synchronous control

In addition to synchronous control that replaces physical machine mechanisms such as gears, shaft, transmission and cam with software, functions such as cam control, clutch and cam auto-generation are easily realized. Since synchronous control can be started and stopped for each axis, programs can contain both synchronous control axes and positioning control axes.

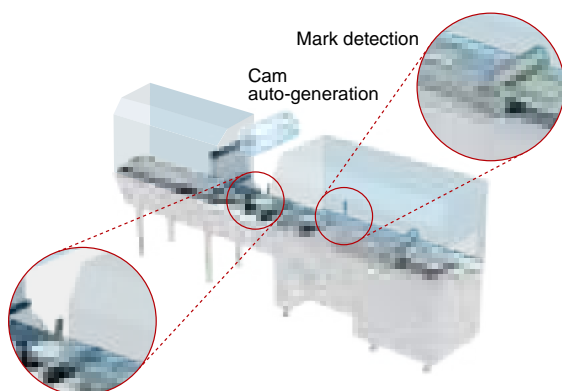
Up to four axes can be synchronized to the synchronous encoder axis, enabling use with a variety of systems.

- Use synchronous control and cam control to build a system perfect for your equipment.
- Register up to 64 types of cam patterns to respond to any type of packaging needs.
- Perform continuous operation without stopping the workpiece operation.



Mark detection function

The cutter axis deviation can be compensated by detecting a mark on the workpiece so the workpiece can be cut at a constant position.

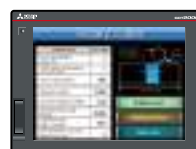


[Example of rotary cutter control with mark detection and cam data]

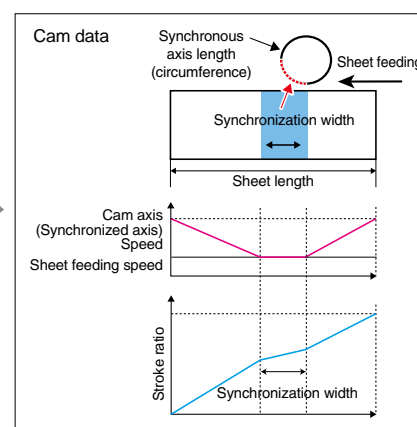
Cam data auto-generation

Easily program and automatically generate difficult cam data for rotary cutters just by inputting the sheet length, synchronization width, and cam resolution, etc.

User-created GOT screen



Parameter settings, including items like sheet length, etc.



Advanced MELSEC iQ-F Series

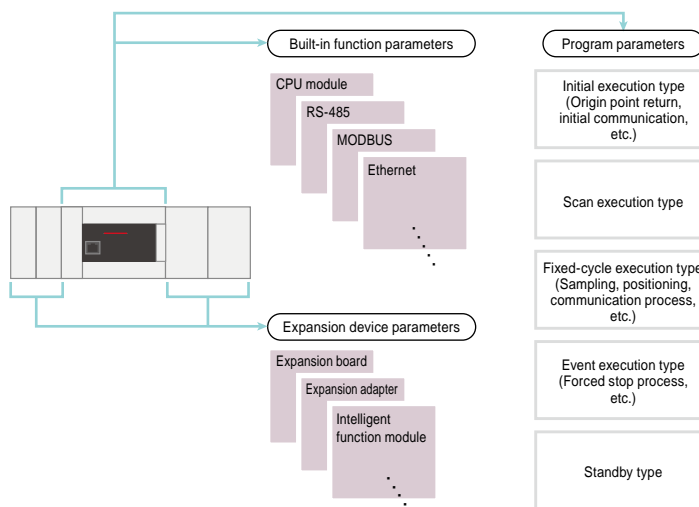
Simple and convenient parameter settings

With MELSEC iQ-F, various device settings that conventionally had to be programmed can be input in table format.

Easily set the built-in functions as well as expansion devices just by inputting values into the parameters. The program's execution trigger can also be set with the parameters.

[Functions set with parameters]

- Settings for CPU parameters, Ethernet port, RS-485 communication port, input response time, expansion board, memory card, security, etc.
- Settings for expansion adapters and intelligent function module and program parameters



Memory area for each application

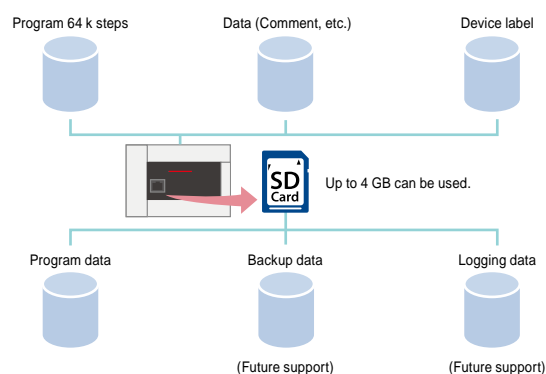
The CPU module has 64 k steps of program memory capacity, but the MELSEC iQ-F has a memory data area for each application, so all 64 k steps can be used as the program area.

Comments and statements can be written freely without affecting the program area.

[Maximum number of characters]

Comment: 1024 characters Statement: 5000 characters

MELSEC iQ-F Series stores the program and devices in non-volatile memory such as Flash ROM, so no battery is required.



Flexible internal devices

A variety of devices including new latch relays and link relays, and expanded timers and counters are available.

The number of device points can be reassigned and used in the internal memory.

● Providing the convenience of special devices

In addition to the conventional special devices, up to 12000 points of convenient system devices compatible with upper level devices are added.

New upper level compatible system devices

- SM/SD0 to 4099

Compatible with MELSEC iQ-R



Conventional convenient devices

- Conventional M8000 or later devices
→ Has changed to SM8000 or later devices
 - Conventional D8000 or later devices
→ Has changed to SD8000 or later devices
- (When migrating an FX3U/FX3UC program created using GX Works2 to MELSEC iQ-F Series, the devices are automatically converted.)

● Freely customize the latch range setting

The latch range can be set for each device, so the latch clear range can be selected during the clearing operation.

Item	Symbol	Points	Device	Range	Latch (1)	Latch (2)
Appl.	X	1024	0 to 1023			
Output	Y	1024	0 to 1023			
Internal Relay	M	7000	0 to 7000	Setting	No Setting	
Link Relay	B	200	0 to 199	No Setting	No Setting	
Special Link Relay	SL	200	0 to 199	No Setting	No Setting	
Relay	R	100	0 to 99	No Setting	No Setting	
Step Relay	S	8000	0 to 4095	Setting	No Setting	
Timer	T	112	0 to 111	No Setting	No Setting	
Retention Timer	ST	10	0 to 9	Setting	No Setting	
Counter	C	200	0 to 199	Setting	No Setting	
Link Counter	LC	10	0 to 9	Setting	No Setting	
Data Register	D	8000	0 to 7999	Setting	No Setting	
Latch Relay	L	7000	0 to 7000			
Free Capacity				12,000 Word		11,000 Word
Total Device				11,100 Word		9,900 Word
Total Word Device				10,200 Word		9,100 Word
Total Bit Device				16,700 Bit		25,100 Bit

● Handy timer and counter settings

The timer and counter properties are determined by data type and how instruction is written, so programs can be created regardless of the device number.

Timers:

- OUT T0.....100 ms timer
- OUTH T0.....10 ms timer
- OUTHS T0.....1 ms timer
- OUT ST0.....Retentive timer

Counters:

- OUT C0.....16 bit counter
- OUT LC0.....32 bit counter

Software

Dramatically more dedicated instructions

A great number of dedicated instructions have been added since the FX3.

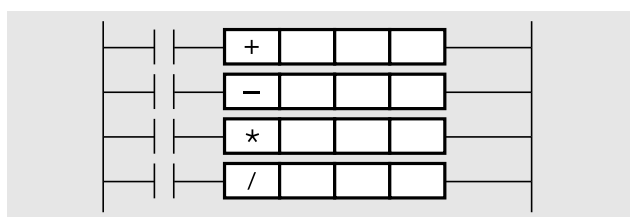
[FX3] 510 types → [FX5] 1014 types

The newly added instructions include convenient ones that are interchangeable with the MELSEC iQ-R and dedicated instructions for built-in functions. (Only FX3U and FX3UC programs can be imported)



Intuitive and easy-to-understand arithmetic operations

Symbols can be input in the arithmetic operations making it easy and intuitive to describe programs.



High-performance built-in high-speed counter function

Input and measure three modes by setting the parameters.

- Normal mode
- Pulse density measurement mode
- Rotation speed measurement mode

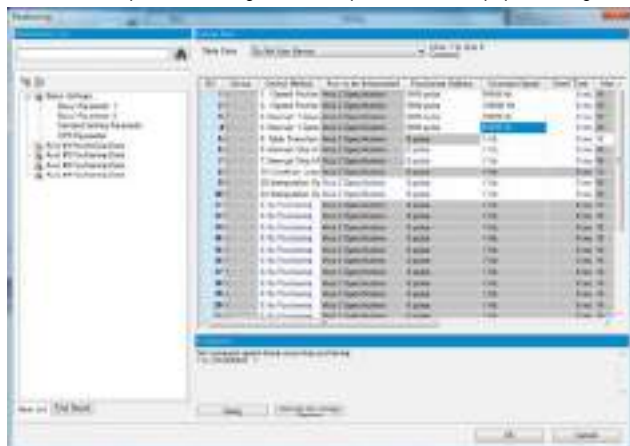


Up to 32 tables can be set for the high-speed comparison table and up to 128 tables for the multi-point output high-speed comparison table. The DHCMOV instruction can be used to read the latest values from the special registers.

Reinforced built-in positioning function

Positioning can be easily performed with table operation instructions. Even advanced positioning like simple linear interpolation is possible with the multi-table operation (DRVTBL) instruction and multi-axis table operation (DRVMUL) instruction.

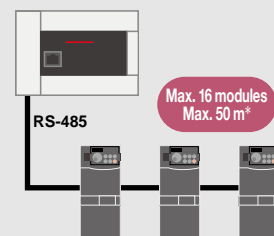
Diverse table operation settings for multi-speed and interrupt positioning, etc.



Inverter communication command function

The built-in Mitsubishi inverter protocol makes it possible to use inverter communication instructions to control a Mitsubishi inverter connected with RS-485 communication.

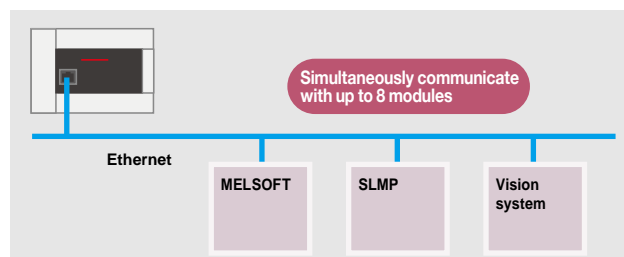
- IVCK : Operation monitor
- IVDR : Operation control
- IVRD : Parameter read
- IVWR : Parameter write
- IVBWR : Parameter batch write
- IVMC : Multiple command (2 types of settings and 2 types of read)



*: For built-in RS-485 and RS-485 expansion boards

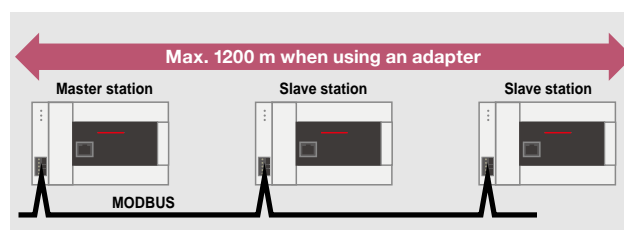
Built-in Ethernet function

Communication is set with parameters easily. Functions include the diagnosis function from GX Works3, SLMP function, socket communication function and IP address change function, and unauthorized access from an external source can be prevented with remote password.



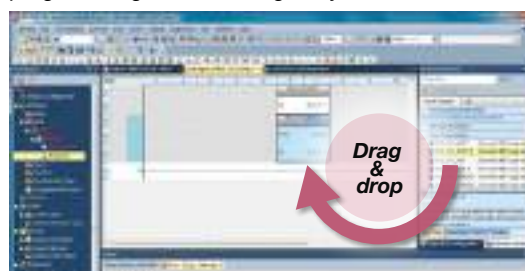
MODBUS function

The MODBUS function can be used with parameter settings and ADPRW (MODBUS master communication instruction [data read/write.]) Communicate with devices up to 1200 m away using the RS-485 communication adapter.



Standard function/function block function

110 types of basic standard function and function blocks are provided. These can be used as parts by dragging and dropping, so when used together with dedicated instructions, programming time can be greatly reduced.



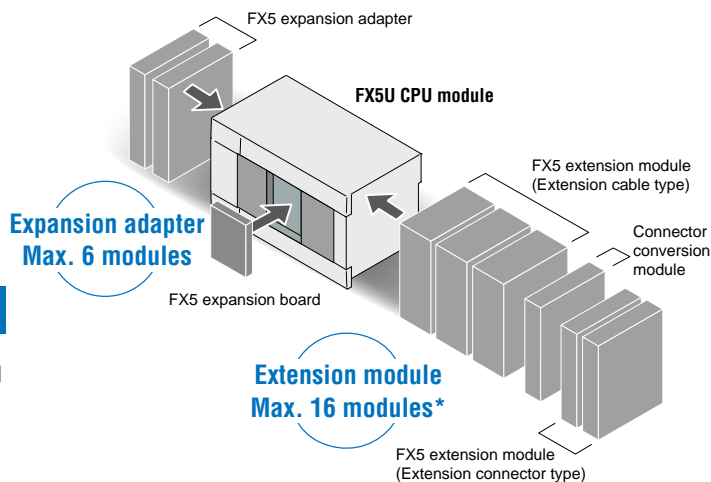
System Configuration

FX5U

Flagship model equipped with advanced built-in functions and diverse expandability

Simplifying use with renewed extension modules!

FX5U is equipped with analog functions, communication and high-speed I/O, and can easily be expanded with expansion boards and adapters. The high-speed system bus communication brings out the maximum performance of extension devices equipped with intelligent functions.



*: Up to 12 modules can be directly connected to CPU module. Up to 16 modules can be connected by connecting a powered I/O module or an extension power supply module. Extension power supply modules and connector conversion modules are not included in the number of connected modules.

FX5 expansion adapters



Max.
2
modules

For Communication

FX5-232ADP For RS-232C communication
FX5-485ADP For RS-485 communication



Max.
4
modules

Analog

FX5-4AD-ADP For analog input
FX5-4DA-ADP For analog output

FX5 expansion boards



Max.
1
module

For Communication

FX5-232-BD For RS-232C communication
FX5-485-BD For RS-485 communication
FX5-422-BD-GOT For RS-422 communication (For GOT connection)

Peripheral device

HMI

GOT2000, GOT1000

FX5U CPU module



FX5U-32MR/ES
FX5U-32MT/ES
FX5U-32MT/ESS
NEW FX5U-32MR/DS
NEW FX5U-32MT/DS
NEW FX5U-32MT/DSS

AC	D2	R
AC	D2	T1
AC	D2	T2
DC	D2	R
DC	D2	T1
DC	D2	T2

Input: 16 points/Output: 16 points



FX5U-64MR/ES
FX5U-64MT/ES
FX5U-64MT/ESS

AC	D2	R
AC	D2	T1
AC	D2	T2
DC	D2	R
DC	D2	T1
DC	D2	T2

Available soon FX5U-64MR/DS

Available soon FX5U-64MT/DS

Available soon FX5U-64MT/DSS

Input: 32 points/Output: 32 points



FX5U-80MR/ES
FX5U-80MT/ES
FX5U-80MT/ESS

AC	D2	R
AC	D2	T1
AC	D2	T2
DC	D2	R
DC	D2	T1
DC	D2	T2

Available soon FX5U-80MR/DS

Available soon FX5U-80MT/DS

Available soon FX5U-80MT/DSS

Input: 40 points/Output: 40 points

Option

Terminal module

FX-16E-TB FX-16E-TB/UL
FX-32E-TB FX-32E-TB/UL
FX-16EYR-TB FX-16EYR-ES-TB/UL
FX-16EYS-TB FX-16EYS-ES-TB/UL
FX-16EYT-TB FX-16EYT-ES-TB/UL
FX-16EYT-ESS-TB/UL

I/O cable

● General-purpose I/O cable
FX-16E-500CAB-S (5 m, 20-pin)
● For terminal modules
FX-16E-□CAB (Both end, 20-pin)
□: 150 (1.5 m)/300 (3 m)/500 (5 m)
● For terminal modules
FX-16E-□CAB-R (20-pin)
□: 150 (1.5 m)/300 (3 m)/500 (5 m)

Battery

FX3U-32BL

SD memory card

NZ1MEM-2GBSD (2 GB)
NZ1MEM-4GBSD (4 GB)

Engineering tool

GX Works3

Power supply cable

● Power supply cable
FX2NC-100BPCB (1 m)
● Power crossover cable
FX2NC-10BPCB1 (0.1 m)

Extended extension cable



● Extended extension cable
NEW FX5-30EC*2
NEW FX5-65EC*2
● Connector conversion adapter
NEW FX5-CNV-BC

AC AC power supply
DC DC power supply
D2 DC input (sink/source)
T1 Transistor output (sink)
T2 Transistor output (source)
R Relay output

Connector connection Cable connection

Generic Specifications

Item		Generic Specifications
Power supply	Rated voltage	AC power supply type: 100 to 240 V AC, 50/60 Hz DC power supply type: 24 V DC
	Power consumption*1	AC power supply type: 30 W (32M), 40 W (64M), 45 W (80M) DC power supply type: 30 W
	Rush current	AC power supply type: 32M: max. 25 A for 5 ms or less/100 V AC, max. 50 A for 5 ms or less/200 V AC 64M/80M: max. 30 A for 5 ms or less/100 V AC, max. 60 A for 5 ms or less/200 V AC DC power supply type: max. 50 A for 0.5 ms or less/24 V DC
	5 V DC internal power supply capacity	AC power supply type: 900 mA (32M), 1100 mA (64M/80M) DC power supply type: 900 mA (775 mA)*2
	24 V DC service power supply capacity	AC power supply type: 400 mA [300 mA*3] (32M), 600 mA [300 mA*3] (64M/80M) When an external power supply is used for the input circuit of the CPU module: 480 mA [380 mA*3] (32M), 740mA [440 mA*3] (64M), 770 mA [470 mA*3] (80M)
	24 V DC internal power supply capacity	DC power supply type: 480 mA (360 mA)*2
Input/output	Input specifications	5.3 mA/24 V DC (X020 and later: 4.0 mA/24 V DC)
	Output specifications	Relay output type: 2 A/1 point, 8 A or less/4 points common, 8 A or less/8 points common, 30 V DC or less, 240 V AC or less (250 V AC or less in case of noncompliance with CE, UL/cUL Standards) Transistor output type: 0.5 A/1 point, 0.8 A or less/4 points common, 1.6 A or less/8 points common, 5 to 30 V DC
	Input/output extension	Extension devices for FX5 can be connected: when adding an extension connector type, the connector conversion module (FX5-CNV-IF) is required.
Built-in communication port		Ethernet (100BASE-TX/10BASE-T), RS-485 1 ch each
Built-in memory card slot		1 slot for SD memory card
Built-in analog input/output		Input 2 ch, output 1 ch







*1: The values show the state where the service power of 24 V DC is consumed to the maximum level in case that its configuration has the max. no. of connections provided to CPU module. (Including the current in the input circuit)



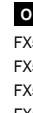

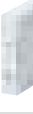



*2: The values in the parentheses () indicate the power supply capacity to be resulted when the power supply voltage falls in the range from 16.8 to 19.2 V DC.

*3: The values in the brackets [] will result when the ambient temperature is less than 0°C during operations.

Please choose the I/O type of CPU module or I/O module suited for your equipment.
Refer to the page below for the details of I/O type of each product.

FX5 extension module

I/O module			Intelligent function module	Extension power supply module
Powered I/O module  Powered I/O module FX5-32ER/ES FX5-32ET/ES FX5-32ET/ESS NEW FX5-32ER/DS NEW FX5-32ET/DS NEW FX5-32ET/DSS	I/O module  Input module FX5-8EX/ES FX5-16EX/ES High-speed pulse input/output module NEW FX5-16ET/ES-H NEW FX5-16ET/ESS-H	 Output modules FX5-8EYR/ES FX5-8EYT/ES FX5-8EYT/ESS FX5-16EYR/ES FX5-16EYT/ES FX5-16EYT/ESS	 Simple motion FX5-40SSC-S  CC-Link IE Field Network NEW FX5-CCLIEF	 Extension power supply module FX5-1PSU-5V*3

FX5 extension module (Extension cable type)	FX5 extension module (Extension connector type)	Bus conversion module	FX3 extension module																										
Connector conversion module  Connector conversion module NEW FX5-CNV-IF	I/O module  Input module FX5-C16EX/D FX5-C16EX/DS FX5-C32EX/D FX5-C32EX/DS  Output module FX5-C16EYT/D FX5-C16EYT/DS FX5-C32EYT/D FX5-C32EYT/DS  Input/output module FX5-C32ET/D FX5-C32ET/DSS Extension power supply module  FX5-C1PS-5V*1*4	 Bus conversion module FX5-CNV-BUSC  Bus conversion module FX5-CNV-BUS	Intelligent function module <table border="1"> <tr><th colspan="2">Analog</th></tr> <tr><td>FX3U-4AD</td><td>For input</td></tr> <tr><td>FX3U-4DA</td><td>For output</td></tr> <tr><th colspan="2">Temperature control</th></tr> <tr><td>FX3U-4LC</td><td>Temperature control</td></tr> <tr><th colspan="2">Positioning</th></tr> <tr><td>FX3U-1PG</td><td>For pulse output</td></tr> <tr><th colspan="2">High speed counter</th></tr> <tr><td>FX3U-2HC</td><td>For high-speed input</td></tr> <tr><th colspan="2">Communication/Network</th></tr> <tr><td>FX3U-64CCL</td><td>CC-Link slave</td></tr> <tr><td>FX3U-16CCL-M</td><td>CC-Link master</td></tr> <tr><td>FX3U-128ASL-M</td><td>AnyWireASLINK master</td></tr> </table> For the module requiring parameter in FX3 extension module, parameter settings by program are necessary. When connecting the FX3 extension module, the bus speed for FX3 applies for access. Extension power supply module  FX3U-1PSU-5V*1	Analog		FX3U-4AD	For input	FX3U-4DA	For output	Temperature control		FX3U-4LC	Temperature control	Positioning		FX3U-1PG	For pulse output	High speed counter		FX3U-2HC	For high-speed input	Communication/Network		FX3U-64CCL	CC-Link slave	FX3U-16CCL-M	CC-Link master	FX3U-128ASL-M	AnyWireASLINK master
Analog																													
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FX3U-64CCL	CC-Link slave																												
FX3U-16CCL-M	CC-Link master																												
FX3U-128ASL-M	AnyWireASLINK master																												

*1: When adding the extension module, it is necessary to connect it to the front stage of extension module in case of a shortage of internal power supply in CPU module.

*2: Attach when connecting an extension cable type module to a distant location or when making two-tier connections. The connector conversion adapter (FX5-CNV-BC) is required when connected with an input/output module (extension cable type), high-speed pulse input/output module, or an intelligent function module. When using also the bus conversion module in the same system, connect the FX5 extension power supply module or the powered I/O module right after the extended extension cable.

*3: Can be connected only to the AC power type system.

*4: Can be connected only to the DC power type system.

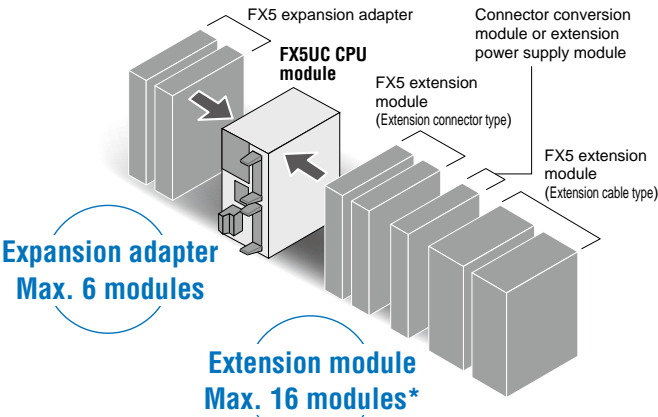
System Configuration

FX5UC

Compact body packed with diverse functions.


Simplifying use with renewed extension modules!

The extension module compatible with FX5UC is compact and easy-to-use, and helps to downsize your system. Easily connect to the FX5 and FX3 extension modules with the variety of conversion modules available.




*: Up to 12 modules can be directly connected to the CPU module. Up to 16 modules can be connected by connecting a powered I/O module or an extension power supply module. Extension power supply modules and connector conversion modules are not included in the number of connected modules.

FX5 expansion adapter



Max.
2
modules


For Communication
FX5-232ADP For RS-232C communication
FX5-485ADP For RS-485 communication




Max.
4
modules

Analog
FX5-4AD-ADP For analog input
FX5-4DA-ADP For analog output


FX5UC CPU module



FX5UC-32MT/D
FX5UC-32MT/DSS
Input: 16 points/Output: 16 points

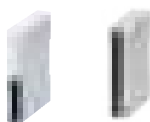


FX5UC-64MT/D
FX5UC-64MT/DSS
Input: 32 points/Output: 32 points



FX5UC-96MT/D
FX5UC-96MT/DSS
Input: 48 points/Output: 48 points

FX5 extension module (extension connector type)

I/O module


Input module
FX5-C16EX/D
FX5-C16EX/DS
FX5-C32EX/D
FX5-C32EX/DS

Output module
FX5-C16EYT/D
FX5-C16EYT/DS
FX5-C32EYT/D
FX5-C32EYT/DS

I/O module
FX5-C32ET/D
FX5-C32ET/DS

Peripheral device

HMI
GOT2000, GOT1000

DC DC power supply

D1 DC input (sink)

D2 DC input (sink/source)





T1 Transistor output (sink)

T2 Transistor output (source)

Connector connection

Cable connection

Option

Battery	I/O cable	Terminal module	Power supply cable	Extended extension cable
FX3U-32BL SD memory card NZ1MEM-2GBSD (2 GB) NZ1MEM-4GBSD (4 GB) Engineering tool GX Works3	 ●General-purpose I/O cable FX-16E-500CAB-S (5 m, 20-pin) ●For terminal modules FX-16E-□CAB (Both end, 20-pin) □: 150 (1.5 m)/300 (3 m)/500 (5 m) ●For terminal modules FX-16E-□CAB-R (20-pin) □: 150 (1.5 m)/300 (3 m)/500 (5 m)	 FX-16E-TB FX-16E-TB/UL FX-32E-TB FX-32E-TB/UL FX-16EYR-TB FX-16EYR-ES-TB/UL FX-16EYS-TB FX-16EYS-ES-TB/UL FX-16EYT-TB FX-16EYT-ES-TB/UL FX-16EYT-ESS-TB/UL	●CPU module power supply cable FX2NC-100MPCB (1 m) (attached to CPU module) ●Power supply cable FX2NC-100BPCB (1 m) (attached to FX5UC-□MT/D) ●Power supply crossover cable FX2NC-10BPCB1 (0.1 m) (attached to FX5-C□EX/D, FX5-C32ET/D)	 ●Extended extension cable NEW FX5-30EC*3 NEW FX5-65EC*3  ●Connector conversion adapter NEW FX5-CNV-BC

Generic Specifications


Item		Generic Specifications
Power supply	Rated supply voltage	24 V DC
	Power consumption*1	5 W (32M), 8 W (64M), 11 W (96M)
	Rush current	32M: Max. 35 A 0.5 ms or less/24 V DC 64M/96M: Max. 40 A 0.5 ms or less/24 V DC
	5 V DC power supply capacity	720 mA
	24 V DC power supply capacity	500 mA
Input/output	Input specifications	5.3 mA/24 V DC (X020 and later: 4.0 mA/24 V DC)
	Output specifications	Transistor output type: Y000 to Y003 0.3 A/1 point, Y004 and later 0.1 A/1 point, 0.8 A/8 points common*2 5 to 30 V DC
	Input/output extension	Extension device for FX5 can be connected (extension power supply module (FX5-C1PS-5V) or connector conversion module (FX5-CNV-IFC) is required when connecting an extension cable type)
Built-in communication port		Ethernet (100BASE-TX/10BASE-T), RS-485 1 ch each
Built-in memory card slot		1 slot for SD memory card

*1: The values show the state where the power of 24 V DC is consumed to the maximum level in case that its configuration has the max. no. of connections provided to CPU module. (Including the current in an input circuit)

*2: 1.6 A or less when two common terminals are connected to the external part.


Please choose the I/O type of CPU module or I/O module suited for your equipment.
Refer to the page below for the details of I/O type of each product.

FX5 extension module (extension connector type)



Extension power supply module
FX5-C1PS-5V*1 *2

or




Connector conversion module
FX5-CNV-IFC

FX5 extension module (extension cable type)


I/O module

Powered I/O module




Powered I/O module
NEW FX5-32ER/DS
NEW FX5-32ET/DS
NEW FX5-32ET/DSS

Input/output module




Input module
FX5-8EX/ES
FX5-16EX/ES




Output module
FX5-8EYR/ES
FX5-8EYT/ES
FX5-8EYT/ESS
FX5-16EYR/ES
FX5-16EYT/ES
FX5-16EYT/ESS

High-speed pulse input/output module
NEW FX5-16ET/ES-H
NEW FX5-16ET/ESS-H

Intelligent function module




Simple motion
FX5-40SSC-S




Network
NEW FX5-CCLIF

Bus conversion module



Bus conversion module
FX5-CNV-BUS



Bus conversion module
FX5-CNV-BUSC

FX3 extension module

Intelligent function module

Analog

FX3U-4AD For input
FX3U-4DA For output

Positioning

FX3U-1PG For pulse output

Communication/Network

FX3U-64CCL CC-Link slave
FX3U-16CCL-M CC-Link master
FX3U-128ASL-M AnyWireASLINK master

Temperature control

FX3U-4LC Temperature control

High speed counter

FX3U-2HC For high-speed input

For the module requiring parameter in FX3 extension module, parameter settings by program are necessary.
When connecting the FX3 extension module, the bus speed for FX3 applies for access.

*1: When adding the extension module, it is necessary to connect it to the front stage of extension module in case of a shortage of internal power supply in CPU module.

*2: Next-stage extension connector of an extension power supply module can be used only for either connector connection or cable connection. In case of connector connection, an extension connector type module can be connected.

*3: Attach when connecting an extension cable type module to a distant location or when making two-tier connections. The connector conversion adapter (FX5-CNV-BC) is required when connected with an input/output module (extension cable type) or an intelligent function module. When using also the bus conversion module in the same system, connect the powered I/O module right after the extended extension cable.

Selecting the FX5U Model

Product Configuration

FX5U

- Control scale: 32 to 256 points
(CPU module: 32/64/80 points)
- Control points up to 512 input/output points,
including remote I/O*

*: For CC-Link and AnyWireASLINK



For details about the connection positions, refer to the manual.

Type	Details	Connection details, model selection
1 CPU module	PLC with built-in CPU, power supply, input/output and program memory.	Various extension devices can be connected.
2 4 I/O module (extension cable type)	Product for extending I/O of extension cable type. Some products are powered.	Input/output can be extended to up to 256 points. Up to 16 extension modules can be connected. (Extension power supply modules and connector conversion modules are not included in the number of connected modules.) Up to 4 high-speed pulse I/O modules can be connected. For details, refer to "Rules for System Configuration" on p. 66.
3 FX5 Extension power supply module	Module for extending power supply if CPU module's internal power supply is insufficient. Extension cable is enclosed.	Power can be supplied to I/O module, intelligent function module, and bus conversion module. Up to 2 modules can be connected.
5 FX5 intelligent function module	Module with functions other than input/output.	Up to 16 extension modules including the I/O module can be connected (Extension power supply modules and connector conversion modules are not included in the number of connected modules.)
6 Connector conversion module	Module for connecting FX5 Series (extension connector type) extension module.	An extension module (extension connector type) for FX5 can be connected.
7 I/O module (extension connector type)	Product for adding extension connector type inputs/outputs.	The maximum number of points for input/output extension is 256. Up to 16 extension modules can be connected. (Extension power supply modules and connector conversion modules are not included in the number of connected modules.) Using this type of I/O module requires the connector conversion module.
8 Bus conversion module	Conversion module for connecting FX3 Series extension module.	FX3 extension module can be connected only to the right side of the bus conversion module. When using FX5-CNV-BUSC, a connector conversion module is required.
9 FX5 Expansion board	Board connected to front of CPU module to expand functions.	Up to 1 module can be connected to the front of the CPU module. (Expansion adapter can also be used.)
10 FX5 Expansion adapter	Adapter connected to left side of CPU module to expand functions.	Up to 6 modules can be connected to the left side of the CPU module.
11 FX3 Extension power supply module	Module for extending power supply if CPU module's internal power supply is insufficient. Extension cable is enclosed.	Up to 2 modules can be connected. The bus conversion module is required for use.
12 FX3 intelligent function module	Module with functions other than input/output.	When using the FX3 extension power supply module, up to 8 modules* can be used. When not using the FX3 extension power supply module, up to 6 modules* can be used. The bus conversion module is required for use.

*: Excluding some models

1 -1) CPU module (AC power supply, DC input type)

Model	Function	Number of occupied input/output points	Power supply capacity		I/O type	No. of input points	No. of output points
			5 V DC power supply	24 V DC service power supply			
FX5U-32MR/ES	CPU module (24 V DC service power built-in)	32 points	900 mA	400 mA (480 mA ^{*1}) [300 mA (380 mA ^{*1})] ^{*2}	DC input (sink/source)/relay output	16 points	16 points
FX5U-32MT/ES					DC input (sink/source)/transistor (sink)		
FX5U-32MT/ESS					DC input (sink/source)/transistor (source)		
FX5U-64MR/ES		64 points	1100 mA	600 mA (740 mA ^{*1}) [300 mA (440 mA ^{*1})] ^{*2}	DC input (sink/source)/relay output	32 points	32 points
FX5U-64MT/ES					DC input (sink/source)/transistor (sink)		
FX5U-64MT/ESS					DC input (sink/source)/transistor (source)		
FX5U-80MR/ES		80 points	1100 mA	600 mA (770 mA ^{*1}) [300 mA (470 mA ^{*1})] ^{*2}	DC input (sink/source)/relay output	40 points	40 points
FX5U-80MT/ES					DC input (sink/source)/transistor (sink)		
FX5U-80MT/ESS					DC input (sink/source)/transistor (source)		

*1: Power supply capacity when an external power supply is used for input circuits

*2: Value inside [] indicates the power supply capacity when the CPU module is used at the operating ambient temperature of less than 0°C.

1 -2) CPU module (DC power supply/DC input type)

Model	Function	Number of occupied input/output points	Power supply capacity		I/O type	No. of input points	No. of output points
			5 V DC power supply	24 V DC power supply			
FX5U-32MR/DS	CPU module	32 points	900 mA [775 mA]*	480 mA [360 mA]*	DC input (sink/source)/relay output	16 points	16 points
FX5U-32MT/DS					DC input (sink/source)/transistor output (sink)		
FX5U-32MT/DSS					DC input (sink/source)/transistor output (source)		

*: Value inside [] indicates the power supply capacity when the supply voltage is 16.8 to 19.2 V DC.

2 -1) I/O module (AC power supply/DC input type) (extension cable type)

Model	Function	Number of occupied input/output points	Power supply capacity		I/O type	No. of input points	No. of output points
			5 V DC power supply	24 V DC service power supply			
FX5-32ER/ES*1	I/O module (24 V DC service power built-in)	32 points	965 mA	250 mA (310 mA*2)	DC input (sink/source)/relay output	16 points	16 points
FX5-32ET/ES*1					DC input (sink/source)/transistor (sink)		
FX5-32ET/ESS*1					DC input (sink/source)/transistor (source)		

*1: Can be connected only to the AC power type system

*2: Power supply capacity when an external power supply is used for input circuits

2 -2) I/O module (DC power supply/DC input type) (extension cable type)

Model	Function	Number of occupied input/output points	Power supply capacity		I/O type	No. of input points	No. of output points
			5 V DC power supply	24 V DC power supply			
FX5-32ER/DS*	I/O module	32 points	965 mA	310 mA	DC input (sink/source)/relay output	16 points	16 points
FX5-32ET/DS*					DC input (sink/source)/transistor output (sink)		
FX5-32ET/DSS*					DC input (sink/source)/transistor output (source)		

*: Can be connected only to the DC power type system

3 FX5 Extension power supply module

Model	Function	Number of occupied input/output points	Power supply capacity	
			5 V DC power supply	24 V DC power supply
FX5-1PSU-5V*1	Extension power supply	—	1200 mA*3	300 mA*3
FX5-C1PS-5V*2	Extension power supply	—	1200 mA*3	625 mA*3

*1: Can be connected only to the AC power type system

*2: Can be connected only to the DC power type system

*3: Derating occurs when the ambient temperature exceeds 40°C. For details, refer to manuals of each product.

4 I/O module (extension cable type)

Model	I/O type	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-8EX/ES	DC input (sink/source)	8 points	75 mA	50 mA* ²	—
FX5-16EX/ES	DC input (sink/source)	16 points	100 mA	85 mA* ²	
FX5-8EYR/ES	Relay output	8 points	75 mA	75 mA	
FX5-8EYT/ES	Transistor output (sink)				
FX5-8EYT/ESS	Transistor output (source)				
FX5-16EYR/ES	Relay output	16 points	100 mA	125 mA	
FX5-16EYT/ES	Transistor output (sink)				
FX5-16EYT/ESS	Transistor output (source)				
FX5-16ET/ES-H* ¹	DC input (sink/source)/transistor output (sink)	16 points	100 mA	125 mA (85 mA)* ³	
FX5-16ET/ESS-H* ¹	DC input (sink/source)/transistor output (source)				

*1: Compatible with FX5U CPU modules from Ver. 1.030 (Serial number: 165**** (May 2016))

*2: Adopt "0 mA" in the current consumption calculation for the system configuration when an external power supply is used for input circuits.

*3: Current consumption when an external power supply is used for input circuits (not including the input circuit current)

5 FX5 intelligent function module

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-40SSC-S	Simple motion 4-axis control (SSCNETIII/H compatible)	8 points	—	—	250 mA
FX5-CCLIEF*	CC-Link IE field network intelligent device station	8 points	10 mA	—	230 mA

*: Compatible with FX5U CPU modules from Ver. 1.030 (Serial number: 165**** (May 2016))

6 Connector conversion module

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-CNV-IF	Connector conversion (FX5 (Extension cable type) →FX5 (Extension connector type))	—	—	—	—

7 I/O module (extension connector type)

Model	I/O type	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-C16EX/D	DC input (sink)	16 points	100 mA	—	65 mA*
FX5-C32EX/D		32 points	120 mA		130 mA*
FX5-C16EX/DS	DC input (sink/source)	16 points	100 mA		65 mA*
FX5-C32EX/DS		32 points	120 mA		130 mA*
FX5-C16EYT/D	Transistor output (sink)	16 points	100 mA	100 mA	—
FX5-C32EYT/D		32 points	120 mA	200 mA	
FX5-C16EYT/DSS	Transistor output (source)	16 points	100 mA	100 mA	
FX5-C32EYT/DSS		32 points	120 mA	200 mA	
FX5-C32ET/D	DC input (sink)/transistor output (sink)	32 points	120 mA	100 mA	65 mA*
FX5-C32ET/DSS	DC input (sink/source)/transistor output (source)	(16 input points, 16 output points)			

*: Current consumption when a service power supply is used for the input circuit.

8 Bus conversion module

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-CNV-BUSC	Bus conversion FX5 (extension connector type) →FX3 extension	8 points	150 mA	—	—
FX5-CNV-BUS	Bus conversion FX5 (extension cable type) →FX3 extension				

9 FX5 Expansion board

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-232-BD	RS-232C communication	—	20 mA	—	—
FX5-485-BD	RS-485 communication				
FX5-422-BD-GOT	RS-422 communication (for GOT connection)		20 mA*		

*: The current consumption will increase when the 5 V type GOT is connected.

10 FX5 Expansion adapter

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-232ADP	RS-232C communication	—	30 mA	30 mA	—
FX5-485ADP	RS-485 communication		20 mA		
FX5-4AD-ADP	4 ch voltage input/current input		10 mA	20 mA	
FX5-4DA-ADP	4 ch voltage output/current output			—	160 mA

11 FX3 Extension power supply module

Model	Function	Number of occupied input/output points	Power supply capacity		
			5 V DC power supply	24 V DC power supply	24 V DC external power supply
FX3U-1PSU-5V	Extension power supply	—	1000 mA*	300 mA*	—

*: Derating occurs when the ambient temperature exceeds 40°C. For details, refer to manuals of each product.

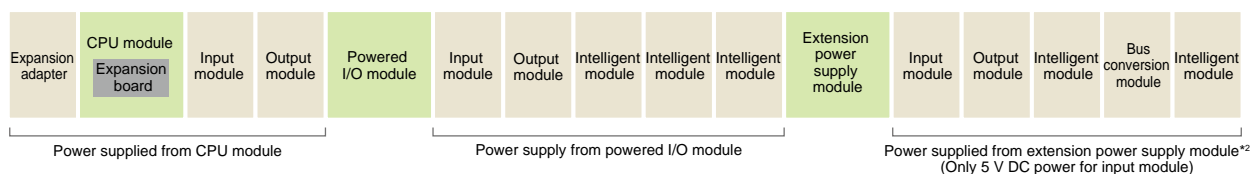
12 FX3 intelligent function module

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX3U-4AD	4 ch voltage input/current input	8 points	110 mA	—	90 mA
FX3U-4DA	4 ch voltage output/current output		120 mA		160 mA
FX3U-4LC	4-loop temperature control (resistance thermometer/thermocouple/low voltage)		160 mA		50 mA
FX3U-1PG	Pulse output for 1-axis control		150 mA		40 mA
FX3U-2HC	2 ch high-speed counter		245 mA		—
FX3U-16CCL-M	CC-Link master	*	—	—	240 mA
FX3U-64CCL	CC-Link intelligent device station	8 points	—		220 mA
FX3U-128ASL-M	AnyWireASLINK master	*	130 mA		—

*: Varies according to settings.

Calculation of current consumed by extension modules (For the AC power supply type)*1

The power required for the expansion adapter, expansion board and extension module is supplied from the CPU module or extension power supply module. Use the following calculations to confirm whether the required power can be supplied. (All calculations must be satisfied.)



■ Power supply from CPU module [5 V DC power supply]

$$\begin{array}{|c|c|c|c|} \hline \text{5 V DC power supply capacity (CPU module)} & \text{Total current consumption (Total no. of extension devices to be connected)} & = \text{Calculation results} & \geq 0 \text{ mA} \\ \hline \end{array}$$

[24 V DC power supply]

$$\begin{array}{|c|c|c|c|} \hline \text{24 V DC service power supply capacity (CPU module)} & \text{Total current consumption (Total no. of extension devices to be connected)} & = \text{Calculation results} & \geq 0 \text{ mA}^{*3} \\ \hline \end{array}$$

■ Power supply from powered I/O module [5 V DC power supply]

$$\begin{array}{|c|c|c|c|} \hline \text{5 V DC power supply capacity (Powered I/O module)} & \text{Total current consumption (Total no. of extension devices to be connected)} & = \text{Calculation results} & \geq 0 \text{ mA} \\ \hline \end{array}$$

[24 V DC power supply]

$$\begin{array}{|c|c|c|c|} \hline \text{24 V DC service power supply capacity (Powered I/O module)} & \text{Total current consumption (Total no. of extension devices to be connected)} & = \text{Calculation results} & \geq 0 \text{ mA}^{*3} \\ \hline \end{array}$$

■ Power supply from extension power supply module (When using FX3 extension power supply module, another calculation is required. Refer to manuals for more details.) [5 V DC power supply]

$$\begin{array}{|c|c|c|c|} \hline \text{5 V DC power supply capacity (Extension power supply module)} & \text{Total current consumption (Total no. of extension devices to be connected)} & = \text{Calculation results} & \geq 0 \text{ mA} \\ \hline \end{array}$$

[24 V DC power supply]

$$\begin{array}{|c|c|c|c|} \hline \text{24 V DC power supply capacity (Extension power supply module)} & \text{Total current consumption (Total no. of extension devices to be connected)} & = \text{Calculation results} & \geq 0 \text{ mA} \\ \hline \end{array}$$

<Cautions>

If the calculation results are negative, the power capacity is exceeded so review the system configuration.

*1: For calculation for the DC power supply type, refer to the manual.

*2: When connecting an input module to the back stage (right side) of the extension power supply module, power will be supplied from the CPU module or a powered I/O module. 5V DC power is supplied from an extension power supply module.

*3: The 24 V DC service power calculation results value (when positive) indicates the 24 V DC service power supply's remaining capacity, and can be used as an external load power.

Refer to the next section for the details of some products since the number of connected modules may be limited.

MELSEC-iQ-R
Series

MELSEC-iQ-F
Series

MELSEC-Q
Series

MELSEC-L
Series

MELSEC-F
Series

MELSEC-QSWS
Series

Network Related
Products

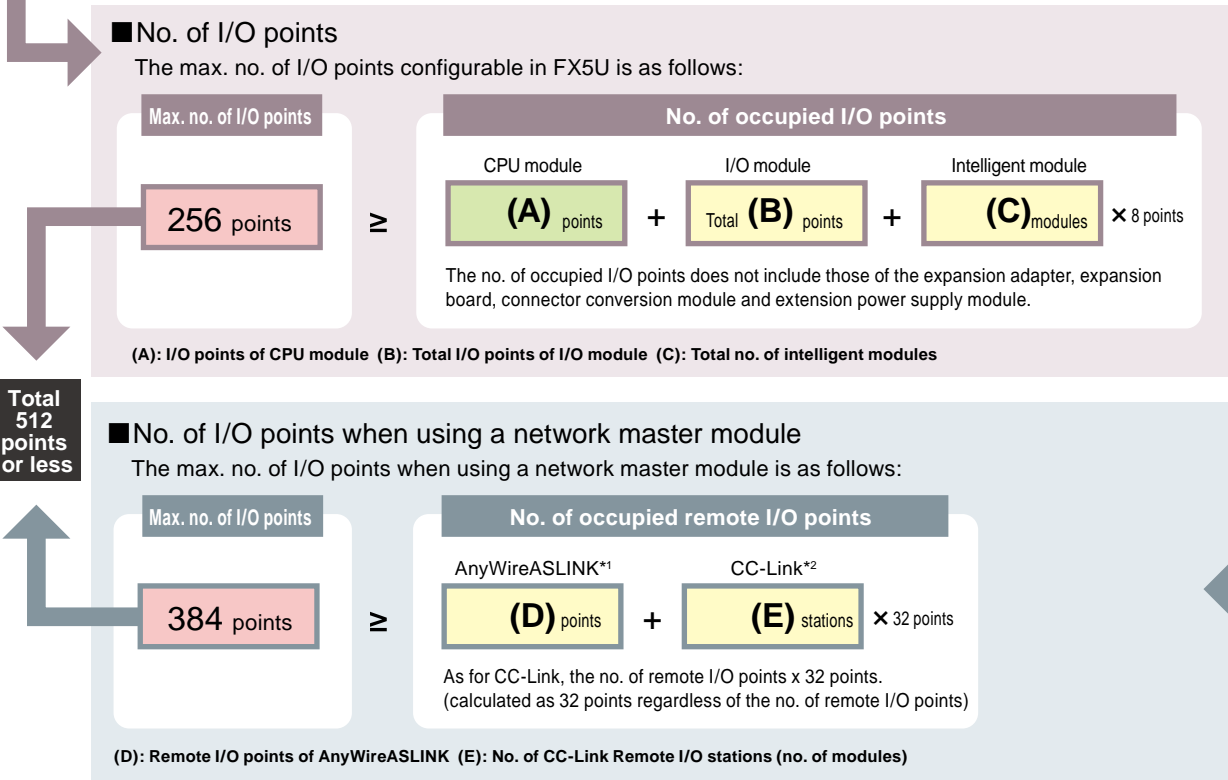
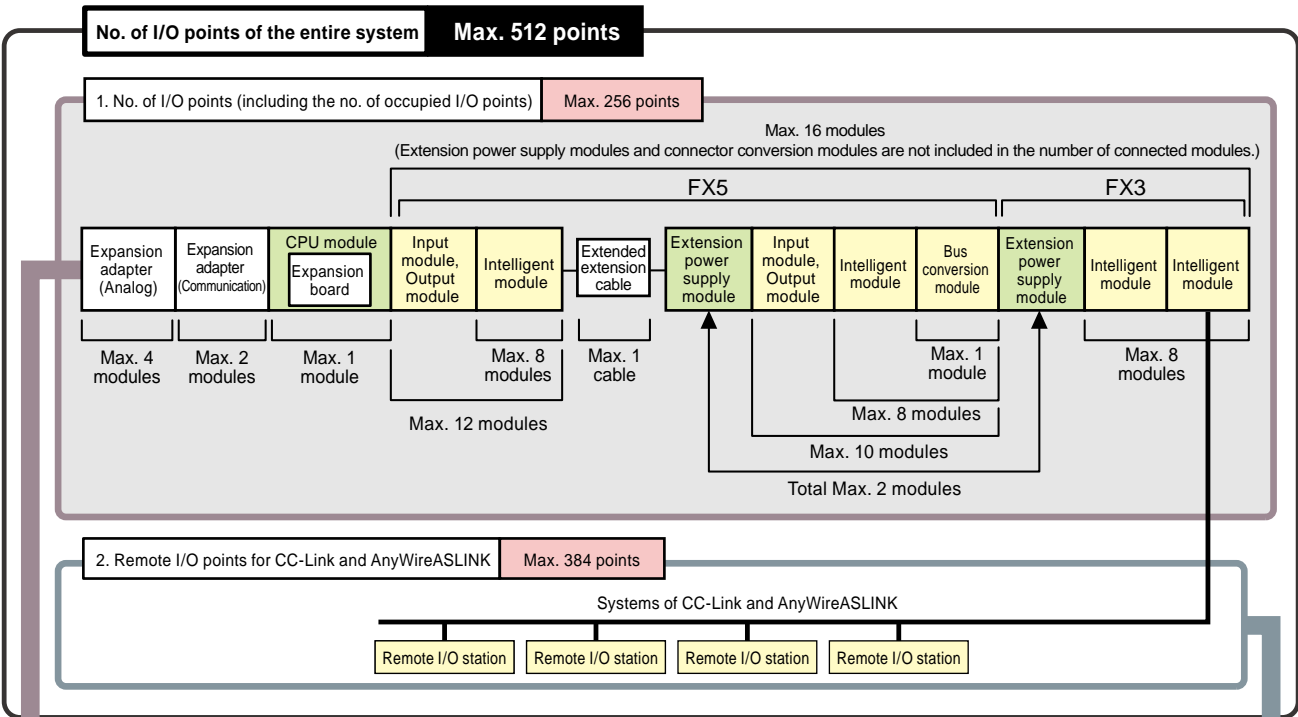
Engineering and
Programming
Software

iQ Sensor
Solution

Product List

Rules for System Configuration

The total number of I/O points and remote I/O points for the CPU module and extension devices controllable in FX5U CPU module is 512 points or less.



Limitation on power supply type when connecting

It is not possible to install both the AC type and the DC type in one system.

The power supply type is limited for extension modules connectable to the following CPU modules. For details, refer to the manual of each product.

Type/model/power supply type	Connectable extension module	
	Type	Model/power supply type
FX5U CPU module FX5U-□M□/E□ (AC power supply type)	Powered I/O module	FX5-32E□/E□ (AC power supply type)
	Extension power supply module	FX5-1PSU-5V (AC power supply type)
FX5U CPU module FX5U-□M□/D□ (DC power supply type)	Powered I/O module	FX5-32E□/D□ (DC power supply type)
	Extension power supply module	FX5-C1PS-5V (DC power supply type)

Limitation on number of modules when extending

The number of connectable modules is limited for the following products. For details, refer to manuals of each product.

Type	Model/type	Setting method/precautions
I/O module (Extension cable type)	FX5-16ET/ES-H	Up to 4 modules can be connected for the entire system.
	FX5-16ET/ESS-H	
FX5 intelligent function module	FX5-CCLIEF	Only 1 module can be connected in the whole system.
FX3 intelligent function module	FX3U-4AD	■When using FX3U-1PSU-5V: Up to 8 modules can be connected per system. ■When not using FX3U-1PSU-5V: Up to 6 modules can be connected per system.
	FX3U-4DA	
	FX3U-1PG	
	FX3U-4LC	
	FX3U-128ASL-M	Up to 1 module of each model type can be connected in the whole system.
	FX3U-16CCL-M	
	FX3U-64CCL	
	FX3U-2HC	Up to 2 modules can be connected for the entire system. When not using the FX3U-1PSU-5V, connect immediately after the bus conversion module.

*Refer to the manual for details on each model.

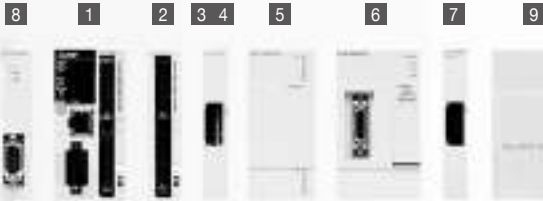
Selecting the FX5UC Model

Product Configuration

FX5UC

- Control scale: 32 to 256 points
(CPU module: 32/64/96 points)
- Control points up to 512 input/output points, including remote I/O*

*: For CC-Link and AnyWireASLINK



For details about the connection positions, refer to the manual.

Type	Details	Connection details, model selection
1 CPU module	PLC with built-in CPU, power supply, input/output and program memory.	Various extension devices can be connected.
2 I/O module (extension connector type)	Product for extension I/O of extension connector type.	Input/output can be extended to up to 256 points. Up to 16 extension modules can be connected. (Extension power supply modules and connector conversion modules are not included in the number of connected modules.) For details, refer to "Rules for System Configuration" on p. 71.
3 FX5 Extension power supply module	Module for extension power supply if CPU module's internal power supply is insufficient. Connector conversion function is also provided.	Power can be supplied to I/O module, intelligent function module, and bus conversion module. Up to 2 modules can be connected.
4 Connector conversion module	Module for connecting FX5 Series (extension cable type) extension module.	Extension devices (extension cable type) for FX5 can be connected.
5 I/O module (extension cable type)	Product for extending I/O of extension cable type.	Input/output can be extended to up to 256 points. Up to 16 extension modules can be connected. (Connector conversion modules are not included in the number of connected modules.) Up to 4 high-speed pulse I/O modules can be connected. Using this type of I/O module requires the connector conversion module.
6 FX5 intelligent function module	Module with functions other than input/output.	Up to 16 extension modules including I/O modules can be connected. (Connector conversion modules are not included in the number of connected modules.) Using this type of module requires the connector conversion module.
7 Bus conversion module	Conversion module for connecting FX3 extension module.	FX3 Series extension modules can be connected only to the right side of the bus conversion module. Using the FX5-CNV-BUS requires the connector conversion module or extension power supply module.
8 FX5 Expansion adapter	Adapter connected to left side of CPU module to expand functions.	Up to 6 modules can be connected to the left side of the CPU module.
9 FX3 intelligent function module	Module with functions other than input/output.	Up to 6 modules* can be connected to the right side of the bus conversion module. The bus conversion module is required for use.

*: Excluding some models

1 CPU module

Model	Function	Number of occupied input/output points	Power supply capacity		I/O type	No. of input points	No. of output points
			5 V DC power supply	24 V DC power supply			
FX5UC-32MT/D	CPU module	32 points	720 mA	500 mA	DC input (sink)/transistor (sink)	16 points	16 points
FX5UC-32MT/DSS					DC input (sink/source)/transistor (source)		
FX5UC-64MT/D		64 points			DC input (sink)/transistor (sink)	32 points	32 points
FX5UC-64MT/DSS					DC input (sink/source)/transistor (source)		
FX5UC-96MT/D		96 points			DC input (sink)/transistor (sink)	48 points	48 points
FX5UC-96MT/DSS					DC input (sink/source)/transistor (source)		

2 I/O module (extension connector type)

Model	I/O type	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-C16EX/D	DC input (sink)	16 points	100 mA	—	65 mA*
FX5-C32EX/D		32 points	120 mA		130 mA*
FX5-C16EX/DS	DC input (sink/source)	16 points	100 mA		65 mA*
FX5-C32EX/DS		32 points	120 mA		130 mA*
FX5-C16EYT/D	Transistor output (sink)	16 points	100 mA	100 mA	—
FX5-C32EYT/D		32 points	120 mA	200 mA	
FX5-C16EYT/DSS	Transistor output (source)	16 points	100 mA	100 mA	
FX5-C32EYT/DSS		32 points	120 mA	200 mA	
FX5-C32ET/D	DC input (sink)/transistor output (sink)	32 points (16 input points, 16 output points)	120 mA	100 mA	65 mA*
FX5-C32ET/DSS	DC input (sink/source)/transistor output (source)				

*: Adopt "0 mA" in the current consumption calculation for the system configuration when an external power supply is used for input circuits.

3 FX5 Extension power supply module

Model	Function	Number of occupied input/output points	Power supply capacity	
			5 V DC power supply	24 V DC power supply
FX5-C1PS-5V	Extension power supply	—	1200 mA*	625 mA*

*: Derating occurs when the ambient temperature exceeds 40°C. For details, refer to the manual.

4 Connector conversion module

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-CNV-IFC	Connector conversion (FX5 (Extension connector type) →FX5 (Extension cable type))	—	—	—	—

5 -1) I/O module (DC power supply/DC input type) (extension cable type)

Model	Function	Number of occupied input/output points	Power supply capacity		I/O type	No. of input points	No. of output points
			5 V DC power supply	24 V DC power supply			
FX5-32ER/DS	Input/output module	32 points	965 mA	310 mA	DC input (sink/source)/relay output	16 points	16 points
FX5-32ET/DS					DC input (sink/source)/transistor output (sink)		
FX5-32ET/DSS					DC input (sink/source)/transistor output (source)		

5 -2) I/O module (extension cable type)

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-8EX/ES	DC input (sink/source)	8 points	75 mA	50 mA* ¹	—
FX5-16EX/ES	DC input (sink/source)	16 points	100 mA	85 mA* ¹	
FX5-8EYR/ES	Relay output	8 points	75 mA	75 mA	
FX5-8EYT/ES	Transistor output (sink)				
FX5-8EYT/ESS	Transistor output (source)				
FX5-16EYR/ES	Relay output	16 points	100 mA	125 mA	
FX5-16EYT/ES	Transistor output (sink)				
FX5-16EYT/ESS	Transistor output (source)				
FX5-16ET/ES-H* ²	DC input (sink/source)/transistor output (sink)	16 points	100 mA	125 mA (85 mA)* ³	
FX5-16ET/ESS-H* ²	DC input (sink/source)/transistor output (source)				

*1: Adopt "0 mA" in the current consumption calculation for the system configuration when an external power supply is used for input circuits.

*2: Compatible with FX5UC CPU modules from Ver. 1.030 (Serial number: 165**** (May 2016)).

*3: Current consumption when an external power supply is used for input circuits (not including the input circuit current)

6 FX5 intelligent function module

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-40SSC-S	Simple motion 4-axis control (SSCNETIII/H compatible)	8 points	—	—	250 mA
FX5-CCLIEF*	CC-Link IE field network intelligent device station	8 points	10 mA	—	230 mA

*: Compatible with FX5UC CPU modules from Ver. 1.030 (Serial number: 165**** (May 2016))

7 Bus conversion module

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-CNV-BUSC	Bus conversion FX5 (extension connector type) →FX3 extension	8 points	150 mA	—	—
FX5-CNV-BUS	Bus conversion FX5 (extension cable type) →FX3 extension				

8 FX5 Expansion adapter

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-232ADP	RS-232C communication	—	30 mA	30 mA	—
FX5-485ADP	RS-485 communication		20 mA		
FX5-4AD-ADP	4 ch voltage input/current input		10 mA	20 mA	160 mA
FX5-4DA-ADP	4 ch voltage output/current output			—	

9 FX3 intelligent function module

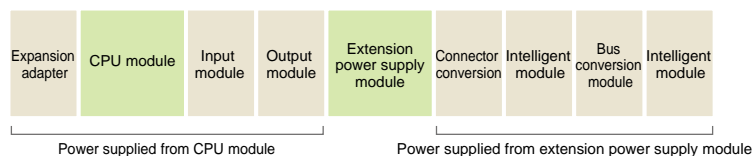
Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX3U-4AD	4 ch voltage input/current input	8 points	110 mA	—	90 mA
FX3U-4DA	4 ch voltage output/current output		120 mA		160 mA
FX3U-4LC	4-loop temperature control (resistance thermometer/thermocouple/low voltage)		160 mA		50 mA
FX3U-1PG	Pulse output for 1-axis control		150 mA		40 mA
FX3U-2HC	2 ch high-speed counter		245 mA		—
FX3U-16CCCL-M	CC-Link master	*	—		240 mA
FX3U-64CCCL	CC-Link intelligent device station	8 points			220 mA
FX3U-128ASL-M	AnyWireASLINK master	*			—

*: Varies according to settings.

Calculation of current consumed by extension modules

The power required for the expansion adapter and extension module is supplied from the CPU module.

Use the following calculations to confirm whether the required power can be supplied. (All calculations must be satisfied.)



■ Power supply from CPU module

[5 V DC power supply]

$$\begin{array}{|c|c|c|c|c|} \hline \text{5 V DC power supply capacity} & \text{Total current consumption} & = & \text{Calculation results} & \geq 0 \text{ mA} \\ \text{(CPU module)} & \text{(Total no. of extension devices to be connected)} & & & \\ \hline \end{array}$$

[24 V DC power supply]

$$\begin{array}{|c|c|c|c|c|} \hline \text{24 V DC power supply capacity} & \text{Total current consumption} & = & \text{Calculation results} & \geq 0 \text{ mA} \\ \text{(CPU module)} & \text{(Total no. of extension devices to be connected)} & & & \\ \hline \end{array}$$

■ Power supply from extension power supply module

[5 V DC power supply]

$$\begin{array}{|c|c|c|c|c|} \hline \text{5 V DC power supply capacity} & \text{Total current consumption} & = & \text{Calculation results} & \geq 0 \text{ mA} \\ \text{(Extension power supply module)} & \text{(Total no. of extension devices to be connected)} & & & \\ \hline \end{array}$$

[24 V DC power supply]

$$\begin{array}{|c|c|c|c|c|} \hline \text{24 V DC power supply capacity} & \text{Total current consumption} & = & \text{Calculation results} & \geq 0 \text{ mA} \\ \text{(Extension power supply module)} & \text{(Total no. of extension devices to be connected)} & & & \\ \hline \end{array}$$

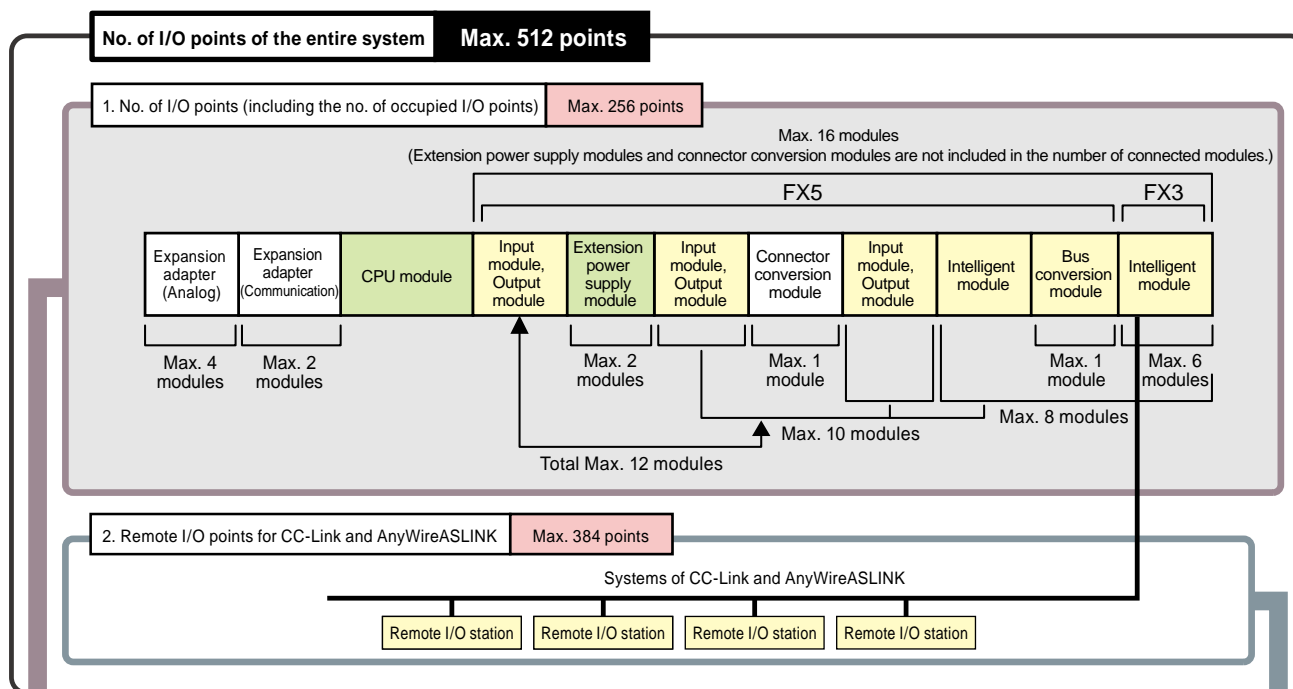
<Cautions>

If the calculation results are negative, the power capacity is exceeded so review the system configuration.

Refer to the next section for the details of some products since the number of connected modules may be limited.

Rules for System Configuration

The total number of I/O points and remote I/O points for the CPU module and extension devices controllable in FX5UC CPU module is 512 points or less.



No. of I/O points

The max. no. of I/O points configurable in FX5UC is as follows:

Max. no. of I/O points

256 points

≥

No. of occupied I/O points

CPU module

I/O module

Intelligent module

(A) points

+

Total (B) points

+

(C) modules

× 8 points

The number of occupied I/O points does not include those of the expansion adapter, connector conversion module, extension power supply module.

(A): I/O points of CPU module (B): Total I/O points of I/O module (C): Total no. of intelligent modules

No. of I/O points when using a network master module

The max. no. of I/O points when using a network master module is as follows:

Max. no. of I/O points

384 points

≥

No. of occupied remote I/O points

AnyWireASLINK*1

CC-Link*2

(D) points

+

(E) stations

× 32 points

As for CC-Link, the no. of remote I/O points x 32 points.
(calculated as 32 points regardless of the no. of remote I/O points)

(D): Remote I/O points of AnyWireASLINK (E): No. of CC-Link Remote I/O stations (no. of modules)

*1: Please recognize the no. of I/O points set by the rotary switch of AnyWireASLINK master as the no. of remote I/O points.

*2: When simultaneously using CC-Link master and AnyWireASLINK master, please connect AnyWireASLINK master to the front stage (left side). FX5UC CPU occupies the max. 256 points of remote I/O points including the no. of those not occupied since CC-Link master parameters are set by PLC program. Therefore, when connecting CC-Link master to the front stage (left side), the no. of remote I/O points of AnyWireASLINK master may be less than 128. Refer to the "FX3U-128ASL-M and FX3U-16CCL-M user's manual" for simultaneous use.

Total
512
points
or less

Limitation on power supply type when connecting

It is not possible to install both the AC type and the DC type in one system.
The power supply type is limited for extension modules connectable to the following CPU modules. For details, refer to the manual of each product.

Type/model/power supply type	Connectable extension module	
	Type	Model/power supply type
FX5U CPU module FX5U-□M□/D□ (DC power supply type)	Powered I/O module	FX5-32E□/D□ (DC power supply type)
	Extension power supply module	FX5-C1PS-5V (DC power supply type)

Limitation on number of modules when extending

The number of connectable modules is limited for the following products. For details, refer to manuals of each product.

Type	Model/type	Setting method/precautions
I/O module (Extension cable type)	FX5-16ET/ES-H	Up to 4 modules can be connected for the entire system.
	FX5-16ET/ESS-H	
FX5 intelligent function module	FX5-CCLIEF	Only 1 module can be connected in the whole system.
FX3 intelligent function module	FX3U-4AD	Up to 6 modules can be connected for the entire system.
	FX3U-4DA	
	FX3U-1PG	
	FX3U-4LC	
	FX3U-128ASL-M	Up to 1 module of each model type can be connected in the whole system.
	FX3U-16CCL-M	
	FX3U-64CCL	Up to 2 modules can be connected for the entire system. Connect immediately after the bus conversion module.
	FX3U-2HC	

*Refer to the manual for details on each model.

MELSEC iQ-R
Series

MELSEC iQ-F
Series

MELSEC-Q
Series

MELSEC-L
Series

MELSEC-F
Series

MELSEC-QS/WS
Series

Network Related
Products

Engineering and
Programming
Software

iQ Sensor
Solution

Product List

Product Specifications

General, power supply, input/output specifications

General specifications

Item	Specifications							
	FX5U				FX5UC			
Operating ambient temperature*1	-20 to 55°C (-4 to 131°F), non-freezing*2 *3							
Storage ambient temperature	-25 to 75°C (-13 to 167°F), non-freezing							
Operating ambient humidity	5 to 95%RH, non-condensation*4							
Storage ambient humidity	5 to 95%RH, non-condensation							
Vibration resistance*5 *6	Frequency	Acceleration	Half amplitude	Sweep count	Frequency	Acceleration	Half amplitude	Sweep count
	Installed on DIN rail	5 to 8.4 Hz	—	1.75 mm	10 times each in X, Y, Z directions (80 min in each direction)	5 to 8.4 Hz	—	1.75 mm
		8.4 to 150 Hz	4.9 m/s²	—		8.4 to 150 Hz	4.9 m/s²	—
	Direct installing	5 to 8.4 Hz	—	3.5 mm		—		
8.4 to 150 Hz		9.8 m/s²	—					
Shock resistance*5	147 m/s², Action time: 11 ms, 3 times by half-sine pulse in each direction X, Y, and Z							
Noise durability	By noise simulator at noise voltage of 1000 Vp-p, noise width of 1 ms and period of 30 to 100 Hz							
Grounding	Class D grounding (grounding resistance: 100 Ω or less) <Common grounding with a heavy electrical system is not allowed.>*7							
Working atmosphere	Free from corrosive or flammable gas and excessive conductive dust							
Operating altitude*8	0 to 2000 m							
Installation location	Inside a control panel							
Overvoltage category*8	II or less							
Pollution degree*10	2 or less							
Equipment class	Class 2							

*1: The simultaneous ON ratio of available PLC inputs or outputs changes with respect to the ambient temperature. For details, refer to manuals of each product.

*2: 0 to 55°C for products manufactured before June 2016. For intelligent function modules, refer to the manual of each product.

The following products cannot be used when the ambient temperature is less than 0°C:
FX5-40SSC-S, FX5-CNV-BUS, FX5-CNV-BUSC, battery (FX3U-32BL), SD memory cards (NZ1MEM-2GBSD, NZ1MEM-4GBSD, L1MEM-2GBSD and L1MEM-4GBSD), FX3 extension modules, terminal modules and I/O cables (FX-16E-500CAB-S, FX-16E-□CAB and FX-16E-□CAB-R)

*3: The specifications are different in the use at less than 0°C. For details, refer to the manual of each product.

*4: When used in a low-temperature environment, use in an environment with no sudden temperature changes. If there are sudden temperature changes because of opening/closing of the control panel or other reasons, condensation may occur, which may cause a fire, fault, or malfunction. Furthermore, use an air conditioner in dehumidifier mode to prevent condensation.

*5: The criterion is shown in IEC61131-2.

*6: When the system has equipment which specification values are lower than above mentioned vibration resistance specification values, the vibration resistance specification of the whole system is corresponding to the lower specification.

*7: For grounding, refer to manuals of each product.

*8: The PLC cannot be used at a pressure higher than the atmospheric pressure to avoid damage.

*9: This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises. Category II applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for up to the rated voltage of 300 V is 2500 V.

*10: This index indicates the degree to which conductive material is generated in the environment in which the equipment is used. Pollution level 2 is when only non-conductive pollution occurs. Temporary conductivity caused by condensation must be expected occasionally.

Power supply specifications

FX5U CPU module, AC power supply type

Item	Specifications		
	FX5U-32M□/E□	FX5U-64M□/E□	FX5U-80M□/E□
Rated voltage	100 to 240 V AC		
Allowable supply voltage range	85 to 264 V AC		
Voltage fluctuation range	—		
Frequency rating	50/60 Hz		
Allowable instantaneous power failure time	Operation can be continued upon occurrence of instantaneous power failure for 10 ms or less. If the supply voltage is 200 V AC system, change in the range from 10 to 100 ms can be made by the user program.		
Power fuse	250 V 3.15 A Time-lag Fuse	250 V 5 A Time-lag Fuse	
In-rush current	25 A Max. 5 ms or less/100 V AC 50 A Max. 5 ms or less/200 V AC	30 A Max. 5 ms or less/100 V AC 60 A Max. 5 ms or less/100 V AC	
Power consumption*1	30 W	40 W	45 W
5 V DC internal power supply capacity*3	900 mA	1100 mA	1100 mA
24 V DC service power supply*2	Supply capacity when service power supply is used for input circuit of the CPU module*4	400 mA (300 mA)	600 mA (300 mA)
	Supply capacity when external power supply is used for input circuit of the CPU module*4	480 mA (380 mA)	770 mA (470 mA)

*1: The values show the state where the service power of 24 V DC is consumed to the maximum level in case that its configuration has the max. no. of connections provided to CPU module. (Including the current in an input circuit)

*2: When I/O modules are connected, they consume current from the 24 V DC service power supply, resulting in decrease of usable current. For details about the service power supply, refer to the manual.

*3: The values designate power supply capacity for an intelligent function module, expansion adapter, and expansion board.

*4: The values in the parentheses () will result when the ambient temperature is less than 0°C during operations.

FX5U CPU module, DC power supply type

Item	Specifications
	FX5U-32M□/D□
Rated voltage	24 V DC
Allowable supply voltage range	16.8 to 28.8 V DC
Allowable instantaneous power failure time	Operation can be continued upon occurrence of instantaneous power failure for 5 ms or less.
Power fuse	250 V 3.15 A Time-lag Fuse
In-rush current	50 A Max. 0.5 ms or less/24 V DC
Power consumption*1	30 W
5 V DC internal power supply capacity*2 *3	900 mA (775 mA)
24 V DC internal power supply capacity*2	480 mA (360 mA)

*1: The values show the state where power is consumed to the maximum level in case that the configuration has the max. no. of connections provided to CPU module.
*2: The values in the parentheses () indicate the power supply capacity to be resulted when the power supply voltage falls in the range from 16.8 to 19.2 V DC.
*3: The values designate power supply capacity for an intelligent function module, expansion adapter, and expansion board.

FX5UC CPU module

Item	Specifications		
	FX5UC-32MT/□	FX5UC-64MT/□	FX5UC-96MT/□
Rated voltage	24 V DC		
Allowable supply voltage range	+20%, -15%		
Allowable instantaneous power failure time	Operation can be continued upon occurrence of instantaneous power failure for 5 ms or less.		
Power fuse	125 V 3.15 A Time-lag Fuse		
In-rush current	35 A Max. 0.5 ms or less/24 V DC	40 A Max. 0.5 ms or less/24 V DC	
Power consumption*	5 W/24 V DC (30 W/24 V DC +20%, -15%)	8 W/24 V DC (33 W/24 V DC +20%, -15%)	11 W/24 V DC (36 W/24 V DC +20%, -15%)
5 V DC internal power supply capacity	720 mA		
24 V DC internal power supply capacity	500 mA		

*: The value results when the CPU module is used alone.
The values in the parentheses () result when the maximum no. of connections have been made to the CPU module. (External DC 24 V power supplies of extension modules are not included.)

FX5-4AD-ADP

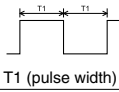
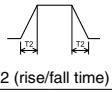
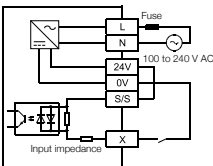
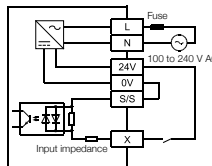
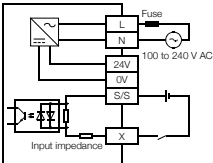
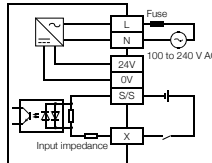
Item	Specifications
Internal power feed (A/D conversion circuit)	24 V DC 20 mA Power is internally fed from the 24 V DC power supply of the CPU module.
Internal power feed (interface)	5 V DC 10 mA Power is internally fed from the 5 V DC power supply of the CPU module.

FX5-4DA-ADP

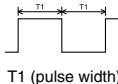

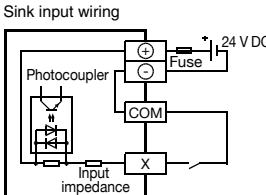
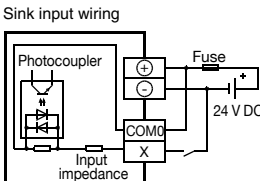
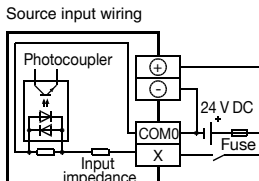
Item	Specifications
External power feed (D/A conversion circuit)	24 V DC +20%/-15% 160 mA Power is externally fed from the power supply connector of the adapter.
Internal power feed (interface)	5 V DC 10 mA Power is internally fed from the 5 V DC power supply of the CPU module.

Input specifications

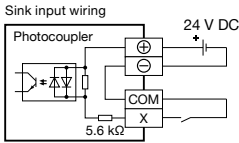
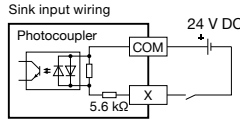
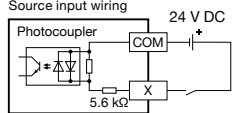
FX5U CPU module

Item		Specifications		
		FX5U-32M□	FX5U-64M□	FX5U-80M□
No. of input points		16 points	32 points	40 points
Connection type		Removable terminal block (M3 screws)		
Input type		Sink/source		
Input signal voltage		24 V DC +20%, -15%		
Input signal current	X000 to X017	5.3 mA/24 V DC		
	X020 and subsequent	4.0 mA/24 V DC		
Input impedance	X000 to X017	4.3 kΩ		
	X020 and subsequent	5.6 kΩ		
ON input sensitive current	X000 to X017	3.5 mA or more		
	X020 and subsequent	3.0 mA or more		
OFF input sensitivity current		1.5 mA or less		
Input response frequency	X000 to X005	200 kHz	—	
	X000 to X007	—	200 kHz	
	X006 to X017	10 kHz	—	
	X010 to X017	—	10 kHz	
Pulse waveform	Waveform			
		T1 (pulse width)		T2 (rise/fall time)
	X000 to X005	T1: 2.5 μs or more, T2: 1.25 μs or less		—
	X000 to X007	—		T1: 2.5 μs or more, T2: 1.25 μs or less
	X006 to X017	T1: 50 μs or more, T2: 25 μs or less		—
X010 to X017	—		T1: 50 μs or more, T2: 25 μs or less	
Input response time (H/W filter delay)	X000 to X005	ON: 2.5 μs or less, OFF: 2.5 μs or less		—
	X000 to X007	—		ON: 2.5 μs or less, OFF: 2.5 μs or less
	X006 to X017	ON: 30 μs or less, OFF: 50 μs or less		—
	X010 to X017	—		ON: 30 μs or less, OFF: 50 μs or less
	X020 and subsequent	—		ON: 50 μs or less, OFF: 150 μs or less
Input response time (Digital filter setting value)		None, 10 μs, 50 μs, 0.1 ms, 0.2 ms, 0.4 ms, 0.6 ms, 1 ms, 5 ms, 10 ms (initial values), 20 ms, 70 ms When using this product in an environment with much noise, set the digital filter.		
Input signal format		No-voltage contact input Sink: NPN open collector transistor Source: PNP open collector transistor		
Input circuit isolation		Photo-coupler isolation		
Input operation display		LED is lit when input is on		
Input circuit configuration	AC power supply type	- When using service power supply		
		<div>Sink input wiring</div>  <div>Source input wiring</div> 		
	DC power supply type	- When using external power supply		
		<div>Sink input wiring</div>  <div>Source input wiring</div> 		

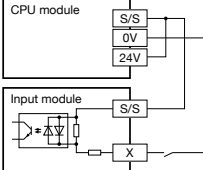
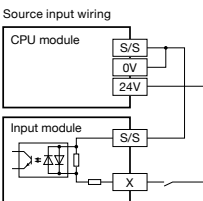
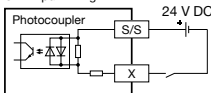
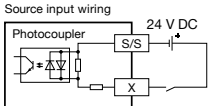
FX5UC CPU module

Item		Specifications		
		FX5UC-32MT/□	FX5UC-64MT/□	FX5UC-96MT/□
No. of input points		16 points	32 points	48 points
Connection type		Connector		
Input type		FX5UC-□MT/D: Sink FX5UC-□MT/DSS: Sink/source		
Input signal voltage		24 V DC +20%, -15%		
Input signal current	X000 to X017	5.3 mA/24 V DC		
	X020 and subsequent	4.0 mA/24 V DC		
Input impedance	X000 to X017	4.3 kΩ		
	X020 and subsequent	5.6 kΩ		
ON input sensitivity current	X000 to X017	3.5 mA or more		
	X020 and subsequent	3.0 mA or more		
OFF input sensitivity current		1.5 mA or less		
Input response frequency	X000 to X005	200 kHz	—	
	X000 to X007	—	200 kHz	
	X006 to X017	10 kHz	—	
	X010 to X017	—	10 kHz	
Pulse waveform	Waveform			
		T1 (pulse width)		T2 (rise/fall time)
	X000 to X005	T1: 2.5 μs or more, T2: 1.25 μs or less		—
	X000 to X007	—		T1: 2.5 μs or more, T2: 1.25 μs or less
	X006 to X017	T1: 50 μs or more, T2: 25 μs or less		—
X010 to X017	—		T1: 50 μs or more, T2: 25 μs or less	
Input response time (H/W filter delay)	X000 to X005	ON: 2.5 μs or less, OFF: 2.5 μs or less		—
	X000 to X007	—		ON: 2.5 μs or less, OFF: 2.5 μs or less
	X006 to X017	ON: 30 μs or less, OFF: 50 μs or less		—
	X010 to X017	—		ON: 30 μs or less, OFF: 50 μs or less
	X020 and subsequent	—		ON: 50 μs or less, OFF: 150 μs or less
Input response time (Digital filter setting value)		None, 10 μs, 50 μs, 0.1 ms, 0.2 ms, 0.4 ms, 0.6 ms, 1 ms, 5 ms, 10 ms (initial values), 20 ms, 70 ms When using this product in an environment with much noise, set the digital filter.		
Input signal format		FX5UC-□MT/D No-voltage contact input NPN open collector transistor		
		FX5UC-□MT/DSS No-voltage contact input Sink: NPN open collector transistor Source: PNP open collector transistor		
Input circuit isolation		Photo-coupler isolation		
Input operation display		LED is lit when input is on (DISP switch: IN)		
Input circuit configuration		FX5UC-□MT/D		
				
Input circuit configuration		FX5UC-□MT/DSS		
		<div><div>Sink input wiring</div><div>Source input wiring</div></div>		

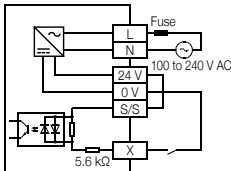
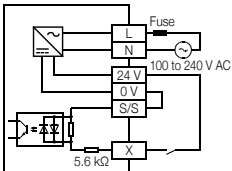
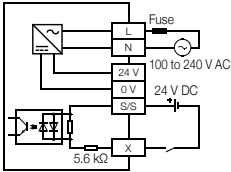
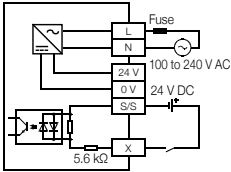
Extension module (extension connector type), input, input/output module

Item	Specifications					
	FX5-C16EX/D	FX5-C32EX/D	FX5-C32ET/D	FX5-C16EX/DS	FX5-C32EX/DS	FX5-C32ET/DSS
Connection type	Connector					
Input type	Sink			Sink/source		
Input signal voltage	24 V DC +20%, -15%					
Input signal current	4.0 mA/24 V DC					
Input impedance	5.6 kΩ					
Input sensitivity current	ON	3.0 mA or more				
	OFF	1.5 mA or less				
Input response time	ON: 50 μs or less OFF: 150 μs or less					
Input signal format	No-voltage contact input Sink: NPN open collector transistor			No-voltage contact input Sink: NPN open collector transistor Source: PNP open collector transistor		
Input circuit isolation	Photo-coupler isolation					
Input operation display	LED is lit when input is on.	LED is lit when input is on. (F/L of DISP switch is used to change between lower and higher numbers.)	LED is lit when input is on. (DISP switch: IN)	LED is lit when input is on.	LED is lit when input is on. (F/L of DISP switch is used to change between lower and higher numbers.)	LED is lit when input is on. (DISP switch: IN)
Input circuit configuration						
						

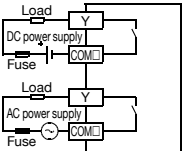
Extension module (extension cable type), input, input/output module

Item	Specifications			
	FX5-8EX/ES	FX5-16EX/ES	FX5-16ET/ES-H	FX5-16ET/ESS-H
Connection type	Terminal block (M3 screws)			
Input type	Sink/source			
Input signal voltage	24 V DC +20%, -15%			
Input signal current	4.0 mA/24 V DC		5.3 mA/24 V DC	
Input impedance	5.6 kΩ		4.3 kΩ	
Input sensitivity current	ON	3.0 mA or more		3.5 mA or more
	OFF	1.5 mA or less		
Input response time	ON: 50 μs or less OFF: 150 μs or less		X0 to 5 ON: 2.5 μs or less OFF: 2.5 μs or less X6, 7 ON: 30 μs or less OFF: 50 μs or less	
Input signal format	No-voltage contact input Sink: NPN open collector transistor Source: PNP open collector transistor			
Input circuit isolation	Photo-coupler isolation			
Input operation display	LED is lit when input is on.			
Input circuit configuration	When using service power supply		When using external power supply	
	<p>Sink input wiring</p>  <p>Source input wiring</p> 		<p>Sink input wiring</p>  <p>Source input wiring</p> 	

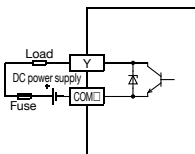
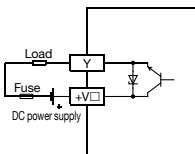
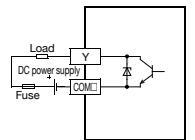
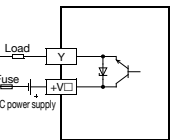
Extension module powered input/output module

Item		Specifications					
		FX5-32ER/ES	FX5-32ET/ES	FX5-32ET/ESS	FX5-32ER/DS	FX5-32ET/DS	FX5-32ET/DSS
Connection type		Terminal block (M3 screws)					
Input type		Sink/source					
Input signal voltage		24 V DC +20%, -15%					
Input signal current		4.0 mA/24 V DC					
Input impedance		5.6 kΩ					
Input sensitivity current	ON	3.0 mA or more					
	OFF	1.5 mA or less					
Input response time		ON: 50 μs or less OFF: 150 μs or less					
Input signal format		No-voltage contact input Sink: NPN open collector transistor Source: PNP open collector transistor					
Input circuit isolation		Photo-coupler isolation					
Input operation display		LED is lit when input is on.					
Input circuit configuration		When using service power supply					<div><div><p>Sink input wiring</p></div><div><p>Source input wiring</p></div></div>
		When using external power supply					
		<div><div><p>Sink input wiring</p></div><div><p>Source input wiring</p></div></div>					

Output specifications
Relay output (FX5U CPU module)

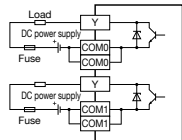
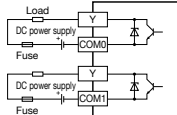
Item		Specifications		
		FX5U-32MR/□	FX5U-64MR/□	FX5U-80MR/□
No. of output points		16 points	32 points	40 points
Connection type		Removable terminal block (M3 screws)		
Output type		Relay		
External power supply		30 V DC or less 240 V AC or less ("250 V AC or less" if not a CE, UL, cUL compliant item)		
Max. load		2 A/point The total load current per common terminal should be the following value. · 4 output points/common terminal: 8 A or less · 8 output points/common terminal: 8 A or less		
Min. load		5 V DC, 2 mA (reference values)		
Open circuit leakage current		—		
Response time	OFF→ON	Approx. 10 ms		
	ON→OFF	Approx. 10 ms		
Isolation of circuit		Mechanical isolation		
Indication of output operation		LED is lit when output is on		
Output circuit configuration		<div></div> <p>A number is entered in the □ of [COM□].</p>		

Transistor output (FX5U/FX5UC CPU module)

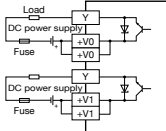
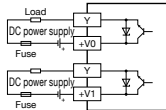
Item		Specifications					
		FX5U-32MT/□	FX5U-64MT/□	FX5U-80MT/□	FX5UC-32MT/□	FX5UC-64MT/□	FX5UC-96MT/□
No. of output points		16 points	32 points	40 points	16 points	32 points	48 points
Connection type		Removable terminal block (M3 screws)			Connector		
Output type		Transistor/sink output (FX5U-□MT/ES, FX5U-32MT/DS) Transistor/source output (FX5U-□MT/ESS, FX5U-32MT/DSS)			Transistor/sink output (FX5UC-□MT/D) Transistor/source output (FX5UC-□MT/DSS)		
External power supply		5 to 30 V DC					
Max. load		0.5 A/point The total load current per common terminal should be the following value. · 4 output points/common terminal: 0.8 A or less · 8 output points/common terminal: 1.6 A or less			Y000 to Y003: 0.3 A/1 point Y004 and subsequent: 0.1 A/1 point The total load current per common terminal should be the following value. · 8 output points/common terminal: 0.8 A or less*		
Open circuit leakage current		0.1 mA or less/30 V DC					
Voltage drop when ON	Y000 to Y003	1.0 V or less					
	Y004 and subsequent	1.5 V or less					
Response time	Y000 to Y003	2.5 μs or less/10 mA or more (5 to 24 V DC)					
	Y004 and subsequent	0.2 ms or less/200 mA or more (24 V DC)			0.2 ms or less/100 mA (24 V DC)		
Isolation of circuit		Photo-coupler isolation			Photo-coupler isolation		
Indication of output operation		LED is lit when output is on			LED is lit when output is on (DISP switch set to OUT)		
Output circuit configuration		<div><div>Sink output wiring</div></div> <div><div>Source output wiring</div></div>			<div><div>Sink output wiring</div></div> <div><div>Source output wiring</div></div>		
		A number is entered in the □ of [COM□]. A number is entered in the □ of [+V□].					
		A number is entered in the □ of [COM□]. A number is entered in the □ of [+V□].					

*: 1.6 A or less when two common terminals are connected outside.

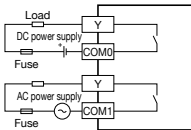
Transistor output (sink output, extension module)

Item		Specifications							
		FX5-C16EYT/D	FX5-C32EYT/D	FX5-C32ET/D	FX5-8EYT/ES	FX5-16EYT/ES	FX5-32ET/ES	FX5-32ET/DS	FX5-16ET/ES-H
Connection type		Connector			Terminal block (M3 screws)				
Output type		Transistor output/sink output							
External power supply		5 to 30 V DC							
Max. load		0.1 A/1 point The total load current per common terminal should be the following value. - 4 output points/common terminal: 0.8 A or less - 8 output points/common terminal: 0.8 A or less			0.5 A/1 point The total load current per common terminal should be the following value. - 4 output points/common terminal: 0.8 A or less - 8 output points/common terminal: 1.6 A or less				
Open circuit leakage current		0.1 mA/30 V DC							
Voltage drop when ON		1.5 V or less							
Response time	OFF→ON	0.2 ms or less/100 mA (at 24 V DC)			0.2 ms or less/200 mA (at 24 V DC)			Y0, Y1, Y4, Y5: 2.5 μs or less/10 mA (at 5 to 24 V DC) Y2, Y3, Y6, Y7: 0.2 ms or less / 200 mA (at 24 V DC)	
	ON→OFF	0.2 ms or less/100 mA (at 24 V DC)			0.2 ms or less/200 mA (at 24 V DC)			Y0, Y1, Y4, Y5: 2.5 μs or less/10 mA (at 5 to 24 V DC) Y2, Y3, Y6, Y7: 0.2 ms or less / 200 mA (at 24 V DC)	
Isolation of circuit		Photo-coupler isolation							
Isolation of output operation		LED is lit when output is on.	LED is lit when output is on. (F/L of DISP switch is used to change between lower and higher numbers.)	LED is lit when output is on. (DISP switch set to OUT)	LED is lit when output is on.				
Output circuit configuration									

Transistor output (source output, extension module)

Item		Specifications							
		FX5-C16EYT/DSS	FX5-C32EYT/DSS	FX5-C32ET/DSS	FX5-8EYT/ESS	FX5-16EYT/ESS	FX5-32ET/ESS	FX5-32ET/DSS	FX5-16ET/ESS-H
Connection type		Connector			Terminal block (M3 screws)				
Output type		Transistor/source output							
External power supply		5 to 30 V DC							
Max. load		0.1 A/1 point The total load current per common terminal should be the following value. · 8 output points/common terminal: 0.8 A or less			0.5 A/1 point The total load current per common terminal should be the following value. · 4 output points/common terminal: 0.8 A or less · 8 output points/common terminal: 1.6 A or less				
Open circuit leakage current		0.1 mA/30 V DC							
Voltage drop when ON		1.5 V or less							
Response time	OFF→ON	0.2 ms or less/100 mA (at 24 V DC)			0.2 ms or less/200 mA (at 24 V DC)			Y0, Y1, Y4, Y5: 2.5 μs or less/10 mA (at 5 to 24 V DC) Y2, Y3, Y6, Y7: 0.2 ms or less / 200 mA (at 24 V DC)	
	ON→OFF	0.2 ms or less/100 mA (at 24 V DC)			0.2 ms or less/200 mA (at 24 V DC)			Y0, Y1, Y4, Y5: 2.5 μs or less/10 mA (at 5 to 24 V DC) Y2, Y3, Y6, Y7: 0.2 ms or less / 200 mA (at 24 V DC)	
Isolation of circuit		Photo-coupler isolation							
Indication of output operation		LED is lit when output is on.	LED is lit when output is on. (F/L of DISP switch is used to change between lower and higher numbers.)	LED is lit when output is on. (DISP switch set to OUT)	LED is lit when output is on.				
Output circuit configuration									

Relay output (extension module)

Item		Specifications			
		FX5-8EYR/ES	FX5-16EYR/ES	FX5-32ER/ES	FX5-32ER/DS
Connection type		Terminal block (M3 screws)			
Output type		Relay			
External power supply		30 V DC or less 240 V AC or less ("250 V AC or less" if not a CE, UL, cUL compliant item)			
Max. load		2 A/1 point The total load current per common terminal should be the following value. · 4 output points/common terminal: 8 A or less · 8 output points/common terminal: 8 A or less			
Min. load		5 V DC, 2 mA (reference values)			
Response time	OFF→ON	Approx. 10 ms			
	ON→OFF	Approx. 10 ms			
Isolation of circuit		Mechanical isolation			
Indication of output operation					

Built-in analog input

Item	Specifications	
	FX5U CPU module	
Analog input points	2 points (2 channels)	
Analog input	Voltage	0 to 10 V DC (input resistance 115.7 kΩ)
Digital output	Unsigned 12-bit binary	
Input characteristics, maximum resolution	Digital output value	0 to 4000
	Maximum resolution	2.5 mV
Precision (Accuracy in respect to full-scale digital output value)	Ambient temperature 25 ±5°C (77±41°F)	Within ±0.5% (±20 digit*2)
	Ambient temperature 0 to 55°C (32±131°F)	Within ±1.0% (±40 digit*2)
	Ambient temperature -20 to 0°C (32±131°F)*1	Within ±1.5% (±60 digit*2)
Conversion speed	30 μs/channels (data refreshed every operation cycle)	
Absolute maximum input	-0.5 V, +15 V	
Isolation	No isolation from the CPU module internal circuit, no isolation between the input terminals (channels)	
Number of occupied input/output points	0 points (No concern with the maximum no. of input/output points of the CPU module)	
Terminal block used	European-type terminal block	

*1: Products manufactured earlier than June 2016 do not support this specification.

*2: The term "digit" refers to "digital value".

Built-in analog output

Item	Specifications	
	FX5U CPU module	
Analog output points	1 point (1 channel)	
Digital input	Unsigned 12-bit binary	
Analog output	Voltage	0 to 10 V DC (external load resistance 2 kΩ to 1 MΩ)
	Digital input value	0 to 4000
Output characteristics, maximum resolution	Maximum resolution	2.5 mV
	Ambient temperature 25 ±5°C (77±41°F)	Within ±0.5% (±20 digit*2)
Accuracy (Accuracy in respect to full-scale analog output value)	Ambient temperature 0 to 55°C (32±131°F)	Within ±1.0% (±40 digit*2)
	Ambient temperature -20 to 0°C (32±131°F)*1	Within ±1.5% (±60 digit*2)
Conversion speed	30 μs (data refreshed every operation cycle)	
Isolation	No isolation from the CPU module internal circuit	
Number of occupied input/output points	0 points (No concern with the maximum no. of input/output points of the CPU module)	
Terminal block used	European-type terminal block	

*1: Products manufactured earlier than June 2016 do not support this specification.

*2: The term "digit" refers to "digital value".

Built-in RS-485 communication

Item	Specifications	
	FX5U / FX5UC CPU module	
Transmission standards	Conforms to RS-485/RS-422 specifications	
Data transmission speed	Max. 115.2 kbps	
Communication method	Full-duplex (FDX) / Half-duplex (HDX)	
Maximum transmission distance	50 m	
Protocol type	MELSOFT connection	
	MELSEC Communication protocol (3C/4C frames)	
	Non-protocol communication	
	MODBUS RTU communication	
	Inverter communication	
	N:N network	
Isolation of circuit	Predefined protocol support	
	Not isolated	
Terminal resistors	Built-in (OPEN/110 Ω/330 Ω)	
Terminal block used	European-type terminal block	

Built-in Ethernet communication

Item	Specifications	
	FX5U / FX5UC CPU module	
Data transmission speed	100/10 Mbps	
Communication method	Full-duplex (FDX) / Half-duplex (HDX)**	
Interface	RJ45 connector	
Transmission method	Base band	
Maximum segment length (The distance between hub and node)	100 m	
Cascade connection	100BASE-TX	Cascade connection max. 2 stages*3
	10BASE-T	Cascade connection max. 4 stages*3
Protocol type	MELSOFT connection	
	SLMP (3E frame)	
	Socket communication	
	Predefined protocol support	
Number of connections	Total of 8 for MELSOFT connection, SLMP, socket communication and predefined protocol support (Up to 8 external devices can access one CPU module at the same time.)	
Hub**	Hubs with 100BASE-TX or 10BASE-T ports** are available.	
IP address	Initial value: 192.168.3.250	
Isolation of circuit	Pulse transformer isolation	
Cable used**2	For 100BASE-TX connection	Ethernet standard-compatible cable, category 5 or higher (STP cable)
	For 10BASE-T connection	Ethernet standard-compatible cable, category 3 or higher (STP cable)

*1: IEEE802.3x flow control is not supported.

*2: Straight cables can be used. When connecting a CPU module with GOTs directly through Ethernet cables, crossover cables (category 5e or less) can also be used.

*3: No. of connectable stages when using a repeater hub. For the no. of connectable stages when a switching hub is in use, check with the manufacturer of the switching hub.

*4: The ports must comply with the IEEE802.3 100BASE-TX or IEEE802.3 10BASE-T standards.

Built-in positioning function

Item	Specifications	
	FX5U / FX5UC CPU module	
Number of control axes	4 axes* (Simple linear interpolation by 2-axis simultaneous start)	
Maximum frequency	2147483647 (200 kpps in pulses)	
Positioning program	Sequence program, Table operation	
Pulse output instruction	PLSY and DPLSY instructions	
Positioning instruction	DSZR, DDSZR, DVIT, DDVIT, TBL, DRVTBL, DRVMUL, DABS, PLSV, DPLSV, DRVI, DDRVI, DRVA, and DDRVA instructions	

*: The number of control axes is 2 when the pulse output mode is CW/CCW mode.

Built-in high speed counter function

Item	Specifications	
	FX5U / FX5UC CPU module	
Types of high-speed counters	Input specifications	Maximum frequency
	1 phase, 1 input counter (S/W)	200 kHz
	1 phase, 1 input counter (H/W)	200 kHz
	1 phase, 2 input counter	200 kHz
	2 phase, 2 input counter [1 edge count]	200 kHz
	2 phase, 2 input counter [2 edge count]	100 kHz
	2 phase, 2 input counter [4 edge count]	50 kHz
Input allocation	Parameter setup*	
High-speed counter instruction	[High-speed processing instruction]	
	- Setting 32-bit data comparison (DHSCS)	
	- Resetting 32-bit data comparison (DHSCR)	
	- Comparison of 32-bit data band (DHSZ)	
	- Start/stop of the 16-bit data high-speed I/O function (HIOEN)	
	- Start/stop of the 32-bit data high-speed I/O function (DHIOEN)	
	[High-speed transfer instruction of current value]	
	- High-speed current value transfer of 16-bit data (HCMOV)	
	- High-speed current value transfer of 32-bit data (DHCMOV)	

*: For details, refer to manuals of each product.

Extension Device Specifications

I/O Modules

Powered input/output modules

Model	Total No. of points	No. of input/output points & Input/output type		Connection type
		Input	Output	
FX5-32ER/ES	32 points	16 points	24 V DC (Sink/source)	16 points
FX5-32ET/ES				
FX5-32ET/ESS				
FX5-32ER/DS				
FX5-32ET/DS				
FX5-32ET/DSS				
				Terminal block
				Relay
				Transistor (Sink)
				Transistor (Source)
				Relay
				Transistor (Sink)
				Transistor (Source)

Input module

Model	Total No. of points	No. of input/output points & Input/output type		Connection type
		Input	Output	
FX5-8EX/ES	8 points	8 points	24 V DC (Sink/source)	Terminal block
FX5-16EX/ES	16 points	16 points	24 V DC (Sink)	
FX5-C16EX/D			24 V DC (Sink)	
FX5-C16EX/DS			24 V DC (Sink/source)	Connector
FX5-C32EX/D	32 points	32 points	24 V DC (Sink)	
FX5-C32EX/DS			24 V DC (Sink/source)	

Output module

Model	Total No. of points	No. of input/output points & Input/output type		Connection type	
		Input	Output		
FX5-8EYR/ES	8 points		8 points	Relay	Terminal block
FX5-8EYT/ES			Transistor (Sink)		
FX5-8EYT/ESS			Transistor (Source)		
FX5-16EYR/ES	16 points	-	16 points	Relay	
FX5-16EYT/ES			Transistor (Sink)		
FX5-16EYT/ESS			Transistor (Source)		
FX5-C16EYT/D			Transistor (Sink)		
FX5-C16EYT/DSS			Transistor (Source)		
FX5-C32EYT/D	32 points		32 points	Transistor (Sink)	Connector
FX5-C32EYT/DSS			Transistor (Source)		

I/O module

Model	Total No. of points	No. of input/output points & Input/output type		Connection type
		Input	Output	
FX5-C32ET/D	32 points	16 points	24 V DC (Sink)	Connector
FX5-C32ET/DSS		16 points	24 V DC (Sink/source)	

High-speed pulse input/output module

Model	Total No. of points	No. of input/output points & Input/output type		Connection type
		Input	Output	
FX5-16ET/ES-H*	16 points	8 points	24 V DC (Sink/source)	8 points
FX5-16ET/ESS-H*				
				Terminal block
				Transistor (Sink)
				Transistor (Source)

*: Compatible with FX5U/FX5UC CPU modules from Ver. 1.030 (Serial number: 165**** (May 2016))

Expansion adapter

FX5-232ADP

Item	Specifications
Transmission standard/Maximum transmission distance/Isolation	Conforming to RS-232C/15 m/Photo-coupler isolation (Between communication line and CPU module)
External device connection method	9-pin D-sub, male
Communication method	Half-duplex bidirectional/Full-duplex bidirectional
Baud rate	300/600/1200/2400/4800/9600/19200/38400/57600/115200 (bps)*
Compatible CPU module	FX5U, FX5UC
Number of occupied input/output points	0 point (no points occupied)
Control power (supplied from CPU module)	5 V DC, 30 mA / 24 V DC, 30 mA

*: The communication method and baud rate vary depending on the type of communication.

FX5-485ADP

Item	Specifications
Transmission standard/Maximum transmission distance/Isolation	Conforming to RS-485, RS-422/1200 m/Photo-coupler isolation (Between communication line and CPU module)
External device connection method	European terminal block
Communication method	Half-duplex bidirectional/Full-duplex bidirectional
Baud rate	300/600/1200/2400/4800/9600/19200/38400/57600/115200 (bps)*
Terminal resistor	Built-in (OPEN/110 Ω/330 Ω)
Compatible CPU module	FX5U, FX5UC
Number of occupied input/output points	0 point (no points occupied)
Control power (supplied from CPU module)	5 V DC, 20 mA / 24 V DC, 30 mA

*: The communication method and baud rate vary depending on the type of communication.

FX5-4AD-ADP

Item	Specifications			
Analog input points	4 points (4 channels)			
Analog input voltage	-10 to +10 V DC (input resistance 1 MΩ)			
Analog input current	-20 to +20 mA DC (input resistance 250 Ω)			
Digital output value	14-bit binary value			
Input characteristics, resolution ^{*1}	Analog input range		Digital output value	
	Voltage	0 to 10 V	0 to 16000	625 μV
		0 to 5 V	0 to 16000	312.5 μV
		1 to 5 V	0 to 12800	312.5 μV
		-10 to +10V	-8000 to +8000	1250 μV
	Current	0 to 20 mA	0 to 16000	1.25 μA
		4 to 20 mA	0 to 12800	1.25 μA
		-20 to +20 mA	-8000 to +8000	2.5 μA
Accuracy (Accuracy in respect to full-scale digital output value)	Ambient temperature 25±5°C: within ±0.1% (±16 digit) Ambient temperature 0 to 55°C: within ±0.2% (±32 digit) Ambient temperature -20 to 0°C*: within ±0.3% (±48 digit)			
Absolute maximum input	Voltage: ±15 V, Current: ±30 mA			
Isolation	Between input terminal and PLC: Photo-coupler isolation Between input channels: No isolation			
Compatible CPU module	FX5U,FX5UC			
Number of occupied input/output points	0 point (no points occupied)			

*1: For the input conversion characteristic, refer to manuals of each product.
*2: Products manufactured earlier than June 2016 do not support this specification.

FX5-4DA-ADP

Item	Specifications			
Analog output points	4 points (4 channels)			
Analog output voltage	-10 to +10 V DC (external load resistance value 1 kΩ to 1 MΩ)			
Analog output current	0 to 20 mA DC (external load resistance value 0 to 500 Ω)			
Digital input	14-bit binary value			
Output characteristics, resolution*1	Analog output range	Digital value	Resolution	
	Voltage	0 to 10 V	0 to 16000	625 μV
		0 to 5 V	0 to 16000	312.5 μV
		1 to 5 V	0 to 16000	250 μV
		-10 to +10V	-8000 to +8000	1250 μV
	Current	0 to 20 mA	0 to 16000	1.25 μA
		4 to 20 mA	0 to 16000	1 μA
Accuracy (Accuracy in respect to full-scale analog output value)	Ambient temperature 25±5°C: within ±0.1% (Voltage ±20 mV, Current ±20 μA) Ambient temperature -20 to 55°C*: within ±0.2% (Voltage ±40 mV, Current ±40 μA)			
Isolation	Between output terminal and PLC: Photo-coupler isolation Between output channels: No isolation			
Compatible CPU module	FX5U, FX5UC			
Number of occupied input/output points	0 point (no points occupied)			

*1: For details on the output conversion characteristic, refer to manuals of each product.
*2: The ambient temperature specification is 0 to 55°C for products manufactured earlier than June 2016.

Expansion board

Item	Specifications		
	FX5-232-BD	FX5-485-BD	FX5-422-BD-GOT
Transmission standards	Conforming to RS-232C	Conforming to RS-485, RS-422	Conforming to RS-422
Maximum transmission distance	15 m	50 m	According to the specification of the GOT
External device connection method	9-pin D-sub, male	European-type terminal block	8-pin MINI-DIN, female
Isolation	Not isolation (Between communication line and CPU module)	Not isolation (Between communication line and CPU module)	Not isolation (Between communication line and CPU module)
Communication method	Half-duplex bidirectional/Full-duplex bidirectional*	Half-duplex bidirectional/Full-duplex bidirectional*	Half-duplex bidirectional
Baud rate	300/600/1200/2400/4800/9600/19200/38400/57600/115200 (bps)*	300/600/1200/2400/4800/9600/19200/38400/57600/115200 (bps)*	9600/19200/38400/57600/115200 (bps)
Terminal resistor	—	Built-in (OPEN/110 Ω/330 Ω)	—
Compatible CPU module	FX5U	FX5U	FX5U
Number of occupied input/output points	0 point (no points occupied)	0 point (no points occupied)	0 point (no points occupied)

*: The communication method and baud rate vary depending on the type of communication.

MELSEC iQ-R Series

MELSEC iQ-F Series

MELSEC-Q Series

MELSEC-L Series

MELSEC-F Series

MELSEC-QSWS Series

Network Related Products

Engineering and Programming Software

iQ Sensor Solution

Product List

Extension power supply module

FX5-1PSU-5V

Item		Specifications
Rated supply voltage		100 to 240 V AC
Allowable range of supply voltage		85 to 264 V AC
Frequency rating		50/60 Hz
Allowable instantaneous power failure time		Operation can be continued upon occurrence of instantaneous power failure for 10 ms or less.
Power fuse		250 V, 3.15 A time-lag fuse
In-rush current		25 A Max. 5 ms or less/ 100 V AC 50 A Max. 5 ms or less/ 200 V AC
Power consumption		20 W Max.
Output current* (For power supply to rear stage)	24 V DC	300 mA (Maximum output current depends on the ambient temperature.)
	5 V DC	1200 mA (Maximum output current depends on the ambient temperature.)
Compatible CPU module		FX5U (AC power supply type)
Number of occupied input/output points		0 points (no points occupied)

*: For details on the current conversion characteristic, refer to manuals of each product.

FX5-C1PS-5V

Item		Specifications
Supply voltage		24 V DC
Voltage fluctuation range		+20%, -15%
Allowable time of momentary power failure		Operation can be continued upon occurrence of instantaneous power failure for 5 ms or less.
Power fuse		125 V, 3.15 A time-lag fuse
In-rush current		35 A Max. 0.5 ms or less/24 V DC
Power consumption		30 W Max.
Output current* (For power supply to rear stage)	24 V DC	625 mA (Maximum output current depends on the ambient temperature.)
	5 V DC	1200 mA (Maximum output current depends on the ambient temperature.)
Compatible CPU module		FX5U (DC power supply type) FX5UC
Number of occupied input/output points		0 points (no points occupied)

*: For details on the current conversion characteristic, refer to manuals of each product.

Bus conversion module

FX5-CNV-BUS (FX5 (extension cable type)→FX3 extension)

Item		Specifications
Compatible CPU module		FX5U, FX5UC
Number of occupied input/output points		8 points (Either input or output is available for counting)
Control power (supplied from PLC)		5 V DC 150 mA

FX5-CNV-BUSC (FX5 (extension connector type)→FX3 extension)

Item		Specifications
Compatible CPU module		FX5U, FX5UC
Number of occupied input/output points		8 points (Either input or output is available for counting)
Control power (supplied from PLC)		5 V DC 150 mA

Connector conversion module

FX5-CNV-IF (FX5 (extension cable type)→FX5 (extension connector type) extension)

Item		Specifications
Compatible CPU module		FX5U
Number of occupied input/output points		0 points (no points occupied)
Control power (supplied from PLC)		0 mA (no power consumed)

FX5-CNV-IFC (FX5 (extension connector type)→FX5 (extension cable type) extension)

Item		Specifications
Compatible CPU module		FX5U
Number of occupied input/output points		0 points (no points occupied)
Control power (supplied from PLC)		0 mA (no power consumed)

Intelligent function module

FX5-CCLIEF

Item		Specifications
Station type		Intelligent device station
Station number		1 to 120 (sets by parameter or program)
Communication speed		1 Gbps
Network topology		Line topology, star topology (coexistence of line topology and star topology is also possible), and ring topology
Maximum station-to-station distance		Max. 100 m (Conforming to ANSI/TIA/EIA-568-B (Category 5e))
Cascade connection		Max. 20 stages
Communication method		Token passing
Maximum number of link points*1	RX	384 points, 48 bytes
	RY	384 points, 48 bytes
	RWr	1024 points, 2048 bytes*2
	RWw	1024 points, 2048 bytes*2
Compatible CPU module		FX5U, FX5UC from Ver. 1.030 (Serial number: 165**** (May 2016))
Number of occupied input/output points		8 points (Either input or output is available for counting)
Control power (supplied from PLC)		5 V DC 10 mA
Control power (supplied from outside)		24 V DC 230 mA

*1: The maximum number of link points that a master station can assign to one FX5-CCLIEF module.

*2: 256 points (512 bytes) when the mode of the master station is online (High-Speed Mode).

Simple Motion Module

FX5-40SSC-S

Control specification

Item		Specifications
Number of control axes (Virtual servo amplifier axis included)		Max. 4 axes
Operation cycle (Operation cycle settings)		1.777 ms
Interpolation function		Linear interpolation (Up to 4 axes)
Control system		PTP (Point To Point) control, Trajectory control (both linear and arc), Speed control, Speed-position switching control, Position-speed switching control, Speed-torque control
Acceleration/deceleration process		Trapezoidal acceleration/deceleration, S-curve acceleration/ deceleration
Compensation function		Backlash compensation, Electronic gear, Near pass function
Synchronous control		Synchronous encoder input, Cam, Phase compensation, Cam auto-generation
Control unit		mm, inch, degree, pulse
Number of positioning data		600 data (positioning data No. 1 to 600)/axis (Can be set with MELSOFT GX Works3 or a sequence program.)
Backup		Parameters, positioning data, and block start data can be saved on flash ROM (battery-less backup)
Home position return	Home position return method	Proximity dog method, Count method 1, Count method 2, Data set method, Scale home position signal detection method
	Fast home position return control	Provided
	Auxiliary functions	Home position return retry, Home position shift
Positioning control	Linear control	Linear interpolation control (Up to 4 axes)*1 (Vector speed, Reference axis speed)
	Fixed-pitch feed control	Fixed-pitch feed control (Up to 4 axes)
	2-axis circular interpolation	Auxiliary point-specified circular interpolation, Central point-specified circular interpolation
	Speed control	Speed control (Up to 4 axes)
	Speed-position switching control	INC mode, ABS mode
	Position-speed switching control	INC mode
	Current value change	Positioning data, Start No. for a current value changing
	NOP instruction	Provided
	JUMP instruction	Unconditional JUMP, Conditional JUMP
	LOOP, LEND	Provided
	High-level positioning control	Block start, Condition start, Wait start, Simultaneous start, Repeated start
	JOG operation	Provided
	Inching operation	Provided
Manual control	Manual pulse generator	Possible to connect 1 module (Incremental), Unit magnification (1 to 10000 times)
	Expansion control	Speed-torque control
Absolute position system		Made compatible by setting a battery to servo amplifier
Synchronous encoder interface		Up to 4 channels (Total of the internal interface, via PLC CPU interface, and servo amplifier interface)
Functions that limit control	Internal interface	1 ch (Incremental)
	Speed limit function	Speed limit value, JOG speed limit value
	Torque limit function	Torque limit value same setting, torque limit value individual setting
	Forced stop	Valid/Invalid setting
	Software stroke limit function	Movable range check with current feed value, movable range check with machine feed value
	Hardware stroke limit function	Provided
Functions that change control details	Speed change function	Provided
	Override function	1 to 300 [%]
	Acceleration/deceleration time change function	Provided
	Torque change function	Provided
Other functions	Target position change function	Target position address and speed are changeable
	M-code output function	WITH mode/AFTER mode
	Step function	Deceleration unit step, Data No. unit step
	Skip function	Via PLC CPU, Via external command signal
	Teaching function	Provided
Parameter initialization function		Provided
External input signal setting function		Via CPU
Amplifier-less operation function		Provided
Mark detection function		Continuous Detection mode, Specified Number of Detections mode, Ring Buffer mode
	Mark detection signal	Up to 4 points
	Mark detection setting	4 settings
Optional data monitor function		4 points/axis
Driver communication function		Provided
SSCNET connect/disconnect function		Provided
Digital oscilloscope function*2	Bit data	16 ch
	Word data	16 ch

*1: 4-axis linear interpolation control is enabled only at the reference axis speed.

*2: 8 ch word data and 8 ch bit data can be displayed in real time.

Module specification

Item		Specifications
Servo amplifier connection method		SSCNETIII/H
Maximum overall cable distance [m]		400
Maximum distance between stations [m]		100
Peripheral I/F		Via CPU module (Ethernet)
Manual pulse generator operation function		Possible to connect 1 module
Synchronous encoder operation function		Possible to connect 4 modules (Total of the internal interface, via PLC CPU interface, and servo amplifier interface)
Input signals (DI)	No. of input points	4 points
	Input method	Positive common/Negative common shared (Photocoupler isolation)
	Rated input voltage/current	24 V DC/Approx. 5 mA
	Operating voltage range	19.2 to 26.4 V DC (24 V DC +10%/-20%, ripple ratio 5% or less)
	ON voltage/current	17.5 V DC or more/3.5 mA or more
	OFF voltage/current	7 V DC or less/1.0 mA or less
	Input resistance	Approx. 6.8 kΩ
	Response time	1 ms or less (OFF→ON, ON→OFF)
Forced stop input signal (EMI)	Recommended wire size	AWG24 (0.2 mm ²)
	No. of input points	1 point
	Input method	Positive common/Negative common shared (Photocoupler isolation)
	Rated input voltage/current	24 V DC/Approx. 5 mA
	Operating voltage range	19.2 to 26.4 V DC (24 V DC +10%/-20%, ripple ratio 5% or less)
	ON voltage/current	17.5 V DC or more/3.5 mA or more
	OFF voltage/current	7 V DC or less/1.0 mA or less
	Input resistance	Approx. 6.8 kΩ
Manual pulse generator/incremental synchronous encoder signal	Response time	4 ms or less (OFF→ON, ON→OFF)
	Recommended wire size	AWG24 (0.2 mm ²)
	Signal input form	Phase A/Phase B (magnification by 4/ magnification by 2/magnification by 1), PULSE/SIGN
	Differential output type (26LS31 or equivalent)	Input pulse frequency
		Max. 1 Mpulse/s (After magnification by 4, up to 4 Mpulse/s)
		Pulse width
		1 μs or more
		Leading edge/trailing edge time
		0.25 μs or less
	Voltage/output/ Opencollector type (5 V DC)	Phase difference
		0.25 μs or more
		Rated input voltage
		5.5 V DC or less
		High/Low-voltage
		2.0 to 5.25 V DC/0 to 0.8 V DC
		Differential voltage
		±0.2 V
Compatible CPU module	Cable length	Up to 30 m
	Input pulse frequency	Max. 200 kpulse/s (After magnification by 4, up to 800 kpulse/s)
	Pulse width	5 μs or more
	Leading edge/trailing edge time	1.2 μs or less
	Phase difference	1.2 μs or more
	Rated input voltage	5.5 V DC or less
	High/Low-voltage	3.0 to 5.25 V DC/2 mA or less, 0 to 1.0 V DC/5 mA or more
	Cable length	Up to 10 m
Number of occupied input/output points		8 points (Either input or output is available for counting)
24 V DC internal current consumption		0.25 A

Standards

List of Compatible Products

Model	CE		UL cUL	KC	Ship approvals							
	EMC	LVD			ABS	DNV	LR	GL	BV	RINA	NK	KR
◆ FX5U CPU modules												
FX5U-32MR/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-32MT/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-32MT/ESS	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-64MR/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-64MT/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-64MT/ESS	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-80MR/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-80MT/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-80MT/ESS	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-32MR/DS	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-32MT/DS	○	□	○	○	—	—	—	—	—	—	—	—
FX5U-32MT/DSS	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5UC CPU modules												
FX5UC-32MT/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5UC-32MT/DSS	○	□	○	○	—	—	—	—	—	—	—	—
FX5UC-64MT/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5UC-64MT/DSS	○	□	○	○	—	—	—	—	—	—	—	—
FX5UC-96MT/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5UC-96MT/DSS	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5 I/O modules (extension cable type)												
FX5-8EX/ES	○	□	○	○	—	—	—	—	—	—	—	—
FX5-16EX/ES	○	□	○	○	—	—	—	—	—	—	—	—
FX5-8EYR/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5-8EYT/ES	○	□	○	○	—	—	—	—	—	—	—	—
FX5-8EYT/ESS	○	□	○	○	—	—	—	—	—	—	—	—
FX5-16EYR/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5-16EYT/ES	○	□	○	○	—	—	—	—	—	—	—	—
FX5-16EYT/ESS	○	□	○	○	—	—	—	—	—	—	—	—
FX5-16ET/ES-H	○	□	○	○	—	—	—	—	—	—	—	—
FX5-16ET/ESS-H	○	□	○	○	—	—	—	—	—	—	—	—
FX5-32ER/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5-32ET/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5-32ET/ESS	○	○	○	○	—	—	—	—	—	—	—	—
FX5-32ER/DS	○	○	○	○	—	—	—	—	—	—	—	—
FX5-32ET/DS	○	□	○	○	—	—	—	—	—	—	—	—
FX5-32ET/DSS	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5 I/O module (extension connector type)												
FX5-C16EX/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C16EX/DS	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C32EX/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C32EX/DS	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C16EYT/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C16EYT/DSS	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C32EYT/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C32EYT/DSS	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C32ET/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C32ET/DSS	○	□	○	○	—	—	—	—	—	—	—	—

Model	CE		UL cUL	KC	Ship approvals							
	EMC	LVD			ABS	DNV	LR	GL	BV	RINA	NK	KR
◆ FX5 intelligent function module												
FX5-40SSC-S	○	□	○	○	—	—	—	—	—	—	—	—
FX5-CCLIEF	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5 extension power supply module												
FX5-1PSU-5V	○	○	○	○	—	—	—	—	—	—	—	—
FX5-C1PS-5V	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5 bus conversion module												
FX5-CNV-BUS	○	□	○	○	—	—	—	—	—	—	—	—
FX5-CNV-BUSC	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5 connector conversion module												
FX5-CNV-IF	○	□	○	○	—	—	—	—	—	—	—	—
FX5-CNV-IFC	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5 expansion adapter												
FX5-4AD-ADP	○	□	○	○	—	—	—	—	—	—	—	—
FX5-4DA-ADP	○	□	○*1	○	—	—	—	—	—	—	—	—
FX5-232ADP	○	□	○	○	—	—	—	—	—	—	—	—
FX5-485ADP	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5U expansion board												
FX5-232-BD	○	□	—	○	—	—	—	—	—	—	—	—
FX5-485-BD	○	□	—	○	—	—	—	—	—	—	—	—
FX5-422-BD-GOT	○	□	—	○	—	—	—	—	—	—	—	—
◆ Terminal module												
FX-16E-TB	—	—	○	□	—	—	—	—	—	—	—	—
FX-32E-TB	—	—	○	□	—	—	—	—	—	—	—	—
FX-16EYR-TB	—	—	○	□	—	—	—	—	—	—	—	—
FX-16EYS-TB	—	—	—	—	—	—	—	—	—	—	—	—
FX-16EYT-TB	—	—	○	□	—	—	—	—	—	—	—	—
FX-16E-TB/UL	—	—	○	□	—	—	—	—	—	—	—	—
FX-32E-TB/UL	—	—	○	□	—	—	—	—	—	—	—	—
FX-16EYR-ES-TB/UL	—	—	○	□	—	—	—	—	—	—	—	—
FX-16EYS-ES-TB/UL	—	—	○	□	—	—	—	—	—	—	—	—
FX-16EYT-ES-TB/UL	—	—	○	□	—	—	—	—	—	—	—	—
FX-16EYT-ESS-TB/UL	—	—	○	□	—	—	—	—	—	—	—	—
◆ Extended extension cable												
FX5-30EC	○	□	○	○	—	—	—	—	—	—	—	—
FX5-65EC	○	□	○	○	—	—	—	—	—	—	—	—
◆ Connector conversion adapter												
FX5-CNV-BC	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX3 intelligent function module												
FX3U-4AD	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-4DA	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-4LC	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-1PG	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-2HC	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-16CCL-M	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-64CCL	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-128ASL-M	○*2	□	○	—	—	—	—	—	—	—	—	—
◆ FX3 extension power supply module												
FX3U-1PSU-5V	○	○	○	○	—	—	—	—	—	—	—	—

○: Compliant with standards or self-declaration □: No need to comply

^{*1}: Supported by manufacturing serial number 1660001 and later

^{*2}: Zone A

■EN Standards: Compliance with EC Directives/CE marking

EC Directives were issued by the European Council of Ministers to unify standards in the EU Community, and to ensure smooth distribution of products for which safety is ensured. Approximately 20 types of EC Directives for product safety have been issued.

Attachment of a CE mark (CE marking) is mandatory on specific products before they may be distributed in the EU.

The EMC Directive (Electromagnetic Compatibility Directive) and LVD Directive (Low Voltage Directive) apply to the programmable controller, which is labeled as an electrical part of a machine product under the EC Directives.

1) EMC Directive

The EMC Directive is a directive that requires products to have "Capacity to prevent output of obstructive noise that adversely affects external devices: Emission damage" and "Capacity to not malfunction due to obstructive noise from external source: Immunity".

2) LVD Directive (Low Voltage Directive)

The LVD Directive is enforced to distribute safe products that will not harm or damage people, objects or assets, etc. With the programmable controller, this means a product that does not pose a risk of electric shock, fire or injury, etc.



■UL/cUL Standards

UL is the United State's main private safety testing and certification agency for ensuring public safety.

UL sets the safety standards for a variety of fields. Strict reviews and testing are performed following the standards set forth by UL. Only products which pass these tests are allowed to carry the UL Mark.

As opposed to the EN Standards, the UL Standards do not have a legally binding effect. However, they are broadly used as the U.S. safety standards, and are an essential condition for selling products into the U.S.

UL is recognized as a certifying and testing agency by the Canadian Standards Association (CSA). Products evaluated and certified by UL in accordance with Canadian standards are permitted to carry the cUL Mark.



■"ISO 9001" international standard for quality-assurance system

Mitsubishi Electric Corporation Nagoya Works has acquired "ISO 9001" international standard for quality-assurance system for the development/ manufacture on the whole from order reception to shipment of all series of micro sequencer.

Of the ISO 9000 series by which the International Organization for Standardization (ISO) defines the standards of quality-assurance systems, "ISO 9001" assumes a wide range of quality-assurance systems related to development, manufacture, materials, quality and sales. The MELSEC iQ-F Series is manufactured under the control system based on an internationally recognized quality-assurance system.

It is also used as a registration site of "ISO 14001" environmental management system.

MEMO

Controller

MELSEC-**IQ-R**
Series

MELSEC-**IQ-F**
Series

MELSEC-**Q**
Series

MELSEC-**L**
Series

MELSEC-**F**
Series

MELSEC-**Q5WS**
Series

Network Related
Products

Engineering and
Programming
Software

IQ Sensor
Solution

Product List

MELSEC-Q Series

Improved Productivity. All-round models for all kinds of use.

The "MELSEC-Q Series" Programmable Controller with nano-order basic instruction processing at high-speed can significantly enhance the performance of devices and machines.

Its fast-speed, high-precision, and high-volume data processing and machine control are ideal for ever-advancing production and manufacturing facilities.

MELSEC IQ-R Series

MELSEC IQ-F Series

MELSEC-Q Series

MELSEC-L Series

MELSEC-F Series

MELSEC-QS/WS Series

Network Related Products

Engineering and Programming Software

IQ Sensor Solution

Product List

CPU Module

Designed to control programmable controller systems. Lineup of CPUs to address various control demands.



Base Unit

Enable to mount power supply module, CPU module, I/O module. Our lineup of base units are designed to meet your system needs.



Power Supply Module

Supplies power to CPU module, I/O module and other modules.



I/O Module

Connects input and output devices.
Wide lineup of I/O modules for various system configurations.



Analog I/O Module

Inputs and outputs data in analog form and built for process control needs as well. Lineup of analog modules for high-speed, high-precision control.



Simple Motion Module/ Positioning Module

Delivers high-speed, high-precision positioning control. Lineup of positioning modules to suit various uses.



High-speed Counter/ Pulse Input Module

Compatible with high resolution devices. Pulse-input and high-speed counter modules for high-speed, high-precision control.



Energy Measuring Module

Measures and monitors various energy information.



Information Collaborative Module

Enables information communication with upper management system. Lineup of modules designed for production efficiency through sampling and management of various production information.



Network Module

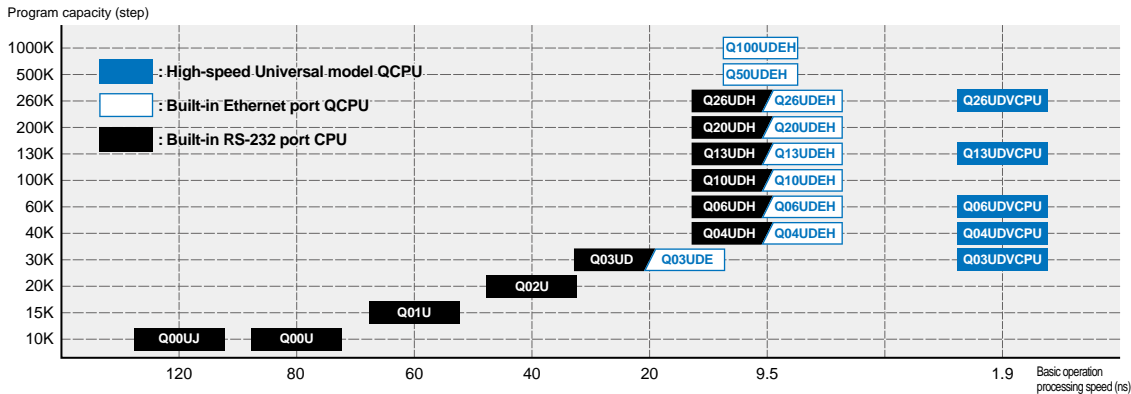
Control system network interface module. Delivers seamless integration of individual FA hierarchies through wide network.



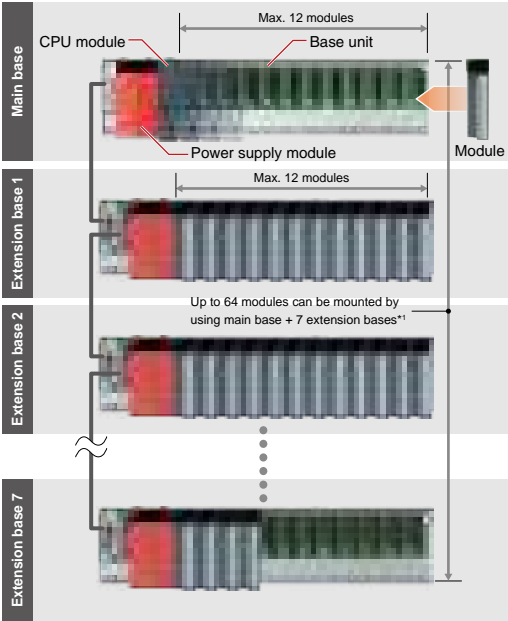


Performance on a different level brought to you with the programmable controller

Current production requirements are calling for an increase in productivity and carrying out production processes even faster due to an increase in production information such as production results and traceability. The MELSEC-Q Series programmable controller “Universal model QnU” is a leader for these market needs. High-speed basic instruction processing on a micro scale dramatically increases your system and machine performance.



System configuration example



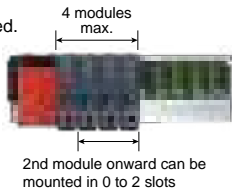
*1: Maximum number of mounting varies with CPU configuration.

CPU module

Up to 4 CPU modules can be mounted.

- Programmable controller CPU
- Robot controller
- CNC CPU
- Motion CPU
- C Controller CPU

iQ Platform



Base unit*2



- Main base unit (3, 5, 8, 12)
- Multiple CPU high speed main base unit (5, 8, 12)
- Slim type main base unit (2, 3, 5)
- Redundant power main base unit (8)
- Extension base (2, 3, 5, 8, 12)
- Redundant power extension base (8)
- Redundant type extension base (5)

Options

- Battery
- Extended SRAM cassette
- SD/SDHC memory card
- Memory card (SRAM, FLASH, ATA)

Power supply module



- Power supply
- Power supply with life detection
- Slim type power supply
- Redundant power supply

I/O module/Intelligent function module

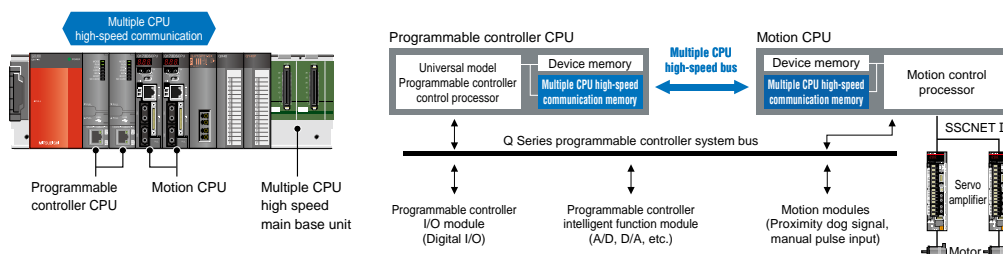


- I/O module
- Interrupt module
- Relay terminal module
- Analog I/O module
- Load cell input module
- CT input module
- Temperature input module
- Temperature control module
- Loop control module
- Simple motion module
- Positioning module
- High-speed counter module
- Channel isolated pulse input module
- Energy measuring module
- Isolation monitoring module
- MES interface module
- High-speed data logger module
- Intelligent communication module
- Network module

High-speed, high-accuracy machine control

To achieve high-speed synchronized control between multiple CPUs, a dedicated bus is used, independent of control operation. (0.88 ms operation cycle)^{*1}

This multiple CPU high-speed communication is synchronized with motion control to maximize efficiency. Additionally, the performance of the latest motion control CPU is twice as fast as the previous model, ensuring high-speed, high-accuracy machine control.



*1: Not supported by Q00UJ, Q00U, Q01U, Q02U.

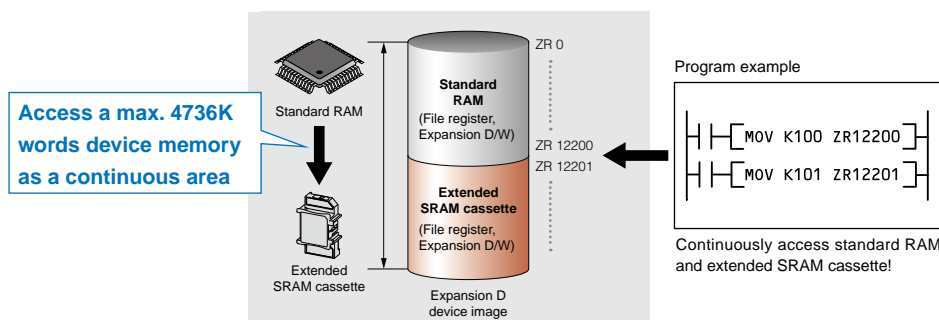
Large data volume at high-speed

Conventionally, continuous access to the standard RAM and SRAM card's file register area could not be achieved which had to be reflected in the user program.

When an 8 MB extended SRAM cassette^{*2} is installed in the High-speed Universal model QCPU, the standard RAM can be as one continuous file register with up to 4736K words capacity, simplifying the user program.

Even if the device memory is insufficient, the file register area can be expanded easily by installing the extended SRAM cassette.

High-speed Universal model QCPU



*2: Only supported by Q03UDV, Q04UDV, Q06UDV, Q13UDV, Q26UDV.

Easy logging without a program^{*3}

Save collected data in CSV format on a SD memory card just by completing easy settings with the dedicated setting tool wizard. Various reference materials including daily reports, form creation and general reports can be created easily within the saved CSV file. This data can be used for a wide variety of applications requiring traceability, production data, etc.



Logging data display and analysis tool
GX LogViewer



GOT(HMI) log viewer function

*3: Only supported by Q03UDV, Q04UDV, Q06UDV, Q13UDV, Q26UDV.

CPU Module

User-friendly programmable controllers based on requirement of production sites; Mitsubishi Electric takes this approach in its manufacturing process. The MELSEC-Q Series offers programmable controller, process, redundant, C language, motion, robot and CNC CPUs to cover various different control requirements.

Programmable Controller CPU

Our full lineup delivers CPU modules suitable to your particular use.

Type	Model	Basic operation processing speed (LD instruction)	Program memory capacity	No. of I/O points [X/Y]	Peripheral connection ports	Compatible memory card	Others
High-speed Universal model QCPU	Q03UDVCPU	1.9 ns	30K steps	4096 points	USB Ethernet	SD Extended SRAM	DATA LOG Communication protocol
	Q04UDVCPU	1.9 ns	40K steps	4096 points	USB Ethernet	SD Extended SRAM	DATA LOG Communication protocol
	Q06UDVCPU	1.9 ns	60K steps	4096 points	USB Ethernet	SD Extended SRAM	DATA LOG Communication protocol
	Q13UDVCPU	1.9 ns	130K steps	4096 points	USB Ethernet	SD Extended SRAM	DATA LOG Communication protocol
	Q26UDVCPU	1.9 ns	260K steps	4096 points	USB Ethernet	SD Extended SRAM	DATA LOG Communication protocol
Universal model QCPU	Q00UJCPU	120 ns	10K steps	256 points	USB RS-232	—	Integrated power supply and base
	Q00UCPU	80 ns	10K steps	1024 points	USB RS-232	—	—
	Q01UCPU	60 ns	15K steps	1024 points	USB RS-232	—	—
	Q02UCPU	40 ns	20K steps	2048 points	USB RS-232	SRAM FLASH ATA	—
	Q03UDCPU	20 ns	30K steps	4096 points	USB RS-232	SRAM FLASH ATA	—
	Q04UDHCPU	9.5 ns	40K steps	4096 points	USB RS-232	SRAM FLASH ATA	—
	Q06UDHCPU	9.5 ns	60K steps	4096 points	USB RS-232	SRAM FLASH ATA	—
	Q10UDHCPU	9.5 ns	100K steps	4096 points	USB RS-232	SRAM FLASH ATA	—
	Q13UDHCPU	9.5 ns	130K steps	4096 points	USB RS-232	SRAM FLASH ATA	—
	Q20UDHCPU	9.5 ns	200K steps	4096 points	USB RS-232	SRAM FLASH ATA	—
	Q26UDHCPU	9.5 ns	260K steps	4096 points	USB RS-232	SRAM FLASH ATA	—
	Q03UDECPU	20 ns	30K steps	4096 points	USB Ethernet	SRAM FLASH ATA	—
	Q04UDEHCPU	9.5 ns	40K steps	4096 points	USB Ethernet	SRAM FLASH ATA	—
	Q06UDEHCPU	9.5 ns	60K steps	4096 points	USB Ethernet	SRAM FLASH ATA	—
	Q10UDEHCPU	9.5 ns	100K steps	4096 points	USB Ethernet	SRAM FLASH ATA	—
	Q13UDEHCPU	9.5 ns	130K steps	4096 points	USB Ethernet	SRAM FLASH ATA	—
	Q20UDEHCPU	9.5 ns	200K steps	4096 points	USB Ethernet	SRAM FLASH ATA	—
	Q26UDEHCPU	9.5 ns	260K steps	4096 points	USB Ethernet	SRAM FLASH ATA	—
	Q50UDEHCPU	9.5 ns	500K steps	4096 points	USB Ethernet	SRAM FLASH ATA	—
	Q100UDEHCPU	9.5 ns	1000K steps	4096 points	USB Ethernet	SRAM FLASH ATA	—

SD

SD memory card

Extended SRAM

Extended SRAM cassette

SRAM

SRAM card

FLASH

Flash card

ATA

ATA card

DATA LOG

Data logging function

Communication protocol

Predefined protocol support function

Integrated power supply and base

5-slot base, with 100 to 240 V AC input/5 V DC/3 A output power supply