MITSUBISHI ELECTRIC
Changes for the Better

MELSEC Consolidated Catalog

Programmable Controller

MELSEC

designed with automation in mind

GLOBAL IMPACT OF MITSUBISHI ELECTRIC

Through Mitsubishi Electric's vision, "Changes for the Better" are possible for a brighter future.

Changes for the Better

We bring together the best minds to create the best technologies. At Mitsubishi Electric, we understand that technology is the driving force of change in our lives. By bringing greater comfort to daily life, maximizing the efficiency of businesses and keeping things running across society, we integrate technology and innovation to bring changes for the better.

Mitsubishi Electric is involved in many areas including the following

Energy and Electric Systems
A wide range of power and electrical products from generators to large-scale displays.

Electronic Devices
A wide portfolio of cutting-edge semiconductor devices for systems and products.

Home Appliance
Dependable consumer products like air conditioners and home entertainment systems.

Information and Communication Systems
Commercial and consumer-centric equipment, products and systems.

Industrial Automation Systems
Maximizing productivity and efficiency with cutting-edge automation technology.

Committed to ever higher customer satisfaction

Mitsubishi Electric is a global leader in the research, manufacturing and marketing of electrical and electronic equipment used in areas such as communications, consumer electronics, industrial technology, energy and transportation. Within this, the industrial automation business has grown significantly since the first induction motor was manufactured over 90 years ago and has closely followed the automation industry in Japan, Asia, and beyond. Mitsubishi Electric industrial automation boasts a wide-range of product areas such as production control, drives, and mechatronics that are used in various industries. In addition, Mitsubishi Electric offers e&eco-F@ctory and iQ Platform, leveraging its total industrial automation solution portfolio.

Intelligence in everything automated—MELSEC

The MELSEC (Mitsubishi ELectric SEquence Control) brand is well known in the automation industry for robust quality and excellent performance that realizes a reduction in total cost of ownership (TCO). The MELSEC lineup consists of various products, the flagship products being the MELSEC-Q Series and recently introduced MELSEC iQ-R Series. These high-end programmable controllers, mainly used for controlling processes in manufacturing lines and advanced machines are complimented by small- to medium-sized controllers like the MELSEC-L Series, MELSEC-F Series and the new MELSEC iQ-F Series, which are commonly utilized for cell manufacturing and stand-alone applications. Over the years, a main characteristic of the MELSEC Series has been seamless connection, from the sensor level all the way through to Enterprise covering all aspects of manufacturing.

INDEX

Maximizing productivity and reducing costs

e-F@ctory is the Mitsubishi Electric solution for improving the performance of any manufacturing enterprise by enhancing productivity, and reducing the maintenance and operations costs together with seamless information flow throughout the plant.

e-F@ctory helps to reduce the overall TCO* and is achieved in the following four areas:

*TCO: Total Cost of Ownership

Reduce energy costs

Factory Energy Management Systems (FEMS) - e&eco-F@ctory

Modern manufacturing depends much on reducing energy costs as a way to realize an efficient manufacturing enterprise. e-F@ctory supports this by allowing visualization of real-time energy usage, helping to reduce the overall energy consumption.

Integrate FA and IT systems at low cost

Connecting enterprise with the shop floor

e-F@ctory solutions provide direct connectivity from the shop floor to enterprise, such as Manufacturing Execution System (MES) without requiring a gateway computer. This enables leaner operations, improved yield, and efficient management of the supply chain.

Reduce development, production, and maintenance costs

iQ Platform

The iQ Platform minimizes costs at all phases of the automation life cycle by improving development times, enhancing productivity, reducing maintenance costs, and making information more easily accessible. Integration is at the heart of the iQ Platform, with a highly intelligent controller platform as the core, combined with a seamless communication network and an integrated engineering environment.
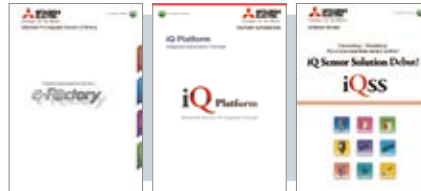
Reduce setup and maintenance costs

iQ Sensor Solution

Easily setup and maintain various types of sensors. Maintenance and design costs can be reduced as compatible iQSS partner sensors can be managed together.

For further details, please refer to the
"Mitsubishi FA Integrated Solution e-F@ctory",
"iQ Platform Integrated Automation Concept", and
"iQ Sensor Solution" catalogs.

L(NA)16012E, L(NA)08340ENG, L(NA)16029ENG

across the entire enterprise

e-F@ctory

IT system

ERP
MES — Production planning, cost control, Stock control, yield control, Process control, quality control ...

FA-IT Information collaborating product group

Information Network
Ethernet

MES interface IT

MES interface

GOT2000 display unit (HMI)

MELQIC data collection analyzer

High-speed data logger
BOX data logger

C Controller

EcoWebServer3 Energy-saving data collection sever

MES interface product group
Controller network
CC-Link IE Control

Information link

Information network
Ethernet

Electricity equipment controller network
B/NET

MELDAS Numeric control unit

MELLASER Laser processing system

DIAX Electrical discharge machine

MELSEC iQ-R Programmable controller

MELSEC-Q Power measurement module

MELSEC-Q Programmable controller

MELSEC-L Programmable controller

MELSEC Safety Safety Programmable controller

MELSEC iQ-R Motion CPU

Servo network
SSCNETIII/H

Production facility

Field network
CC-Link   CC-Link IE Field

Wire-saving network

Safety field network
CC-Link Safety

Geared motor

FR-E700EX/MM-GKR

FR-A800 INVERTER

MELFA Robot

MELSEC-F Programmable controller

MELSEC iQ-F Programmable controller

CC-Link CC-Link IE Field target product

Safety remote I/O

MR-J4

Transformer

MDU breaker

Power measurement module

EcoMonitorPro Energy measurement module

Electronic multi-indicator

INVERTER+ IPM motor

AnyWireASLINK mapping sensor

iQSS Sensor Solution

Energy-saving devices

iQ Platform

Best-in-class solutions across the ecosystem

e-F@ctory Alliance

The e-F@ctory Alliance is an ecosystem offering best-in-class solutions by combining products between Mitsubishi Electric and its various partners. Close collaboration with such partners broaden the choices for the customer and realize the best solution possible.

e-F@ctory Alliance

MELSEC

Comprehensive controller lineup available to meet customers' requirements, from small-scale and stand-alone to medium- and large-scale systems

MELSEC Q series

MELSEC L series

MELSEC iQ-F series
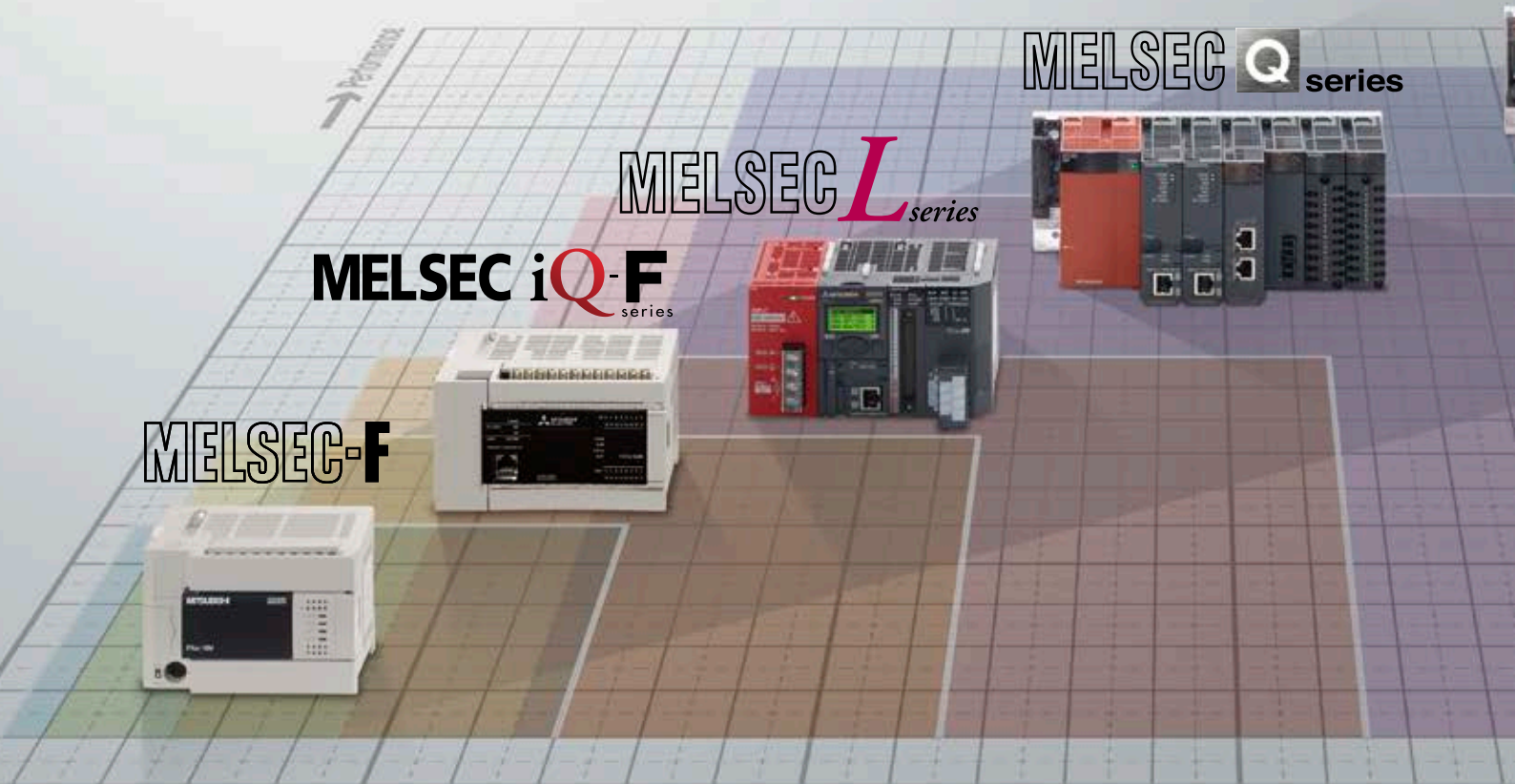
MELSEC-F

Application-specific CPUs

Process/
Redundant CPU

C Controller

Motion CPU

Robot CPU

CNC CPU
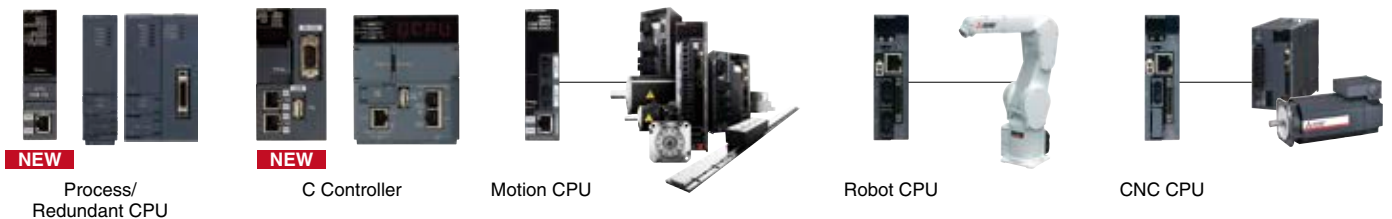
iQ Platform

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

MELSEC iQ-R series

Optimum automation control area

➡ System size

Medium- to large-scale control

▌ 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.

▌ 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

▌ 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

▌ 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.

▌ 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-QS Series   MELSEC-WS Series

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

C : C Controller   **P** : Process/Redundant system   **M** : Servo system controller   **R** : Robot controller   **N** : CNC CPU

S : Safety (MELSEC-QS/ WS Series)

Automotive

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

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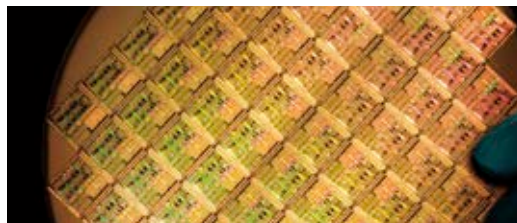
Reduce maintenance costs using the high-durability MELSEC Series. Having the compact, robust design desired for semiconductor manufacturing, MELSEC products solve the small footprint, high-performance requirements.

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** **C** **M** **R** **S**

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.

Renewable energy

`iQ-R` `C` `P`

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

Printing

`iQ-R` `Q` `C` `M`

Realize high-speed, high-quality printing through various solutions offered depending on the printing process involved such as roll paper feed-in, offset printing, binding, and sortation.

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.

Inspection machines

`iQ-R` `C`

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

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.

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.

MELSEC Selection Guide

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	· Programmable controller CPU: 5 models · Motion controller: 2 models · Process CPU: 4 models **NEW** · C Controller: 1 model	· 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	· 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	· Ladder diagram · Structured text (ST) · Sequential function chart (SFC) Coming soon! · Function block diagram (FBD/LD) · Function block (FB) · C/C++*²	· Ladder diagram · Structured text (ST) · Instruction list · MELSAP3 (SFC), MELSAP-L · Function block diagram (FBD) · Function block (FB) · C/C++*²	· Ladder diagram · Structured text (ST) · Instruction list · MELSAP3 (SFC), MELSAP-L · Function block (FB)
Safety standard conformance level	—	—	—
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	●	●*¹	—
SD memory card	●	●*¹	●*⁵
SRAM card, FLASH card, ATA card	—	●*⁴	—
External interface			
USB	●	●	●
Ethernet (1000BASE-T*⁶/ 100BASE-TX/10BASE-T)	●	●*⁷	●*⁵
RS-232	—	●*⁸	●*⁹
RS-422/485	—	—	—
Display unit	—	—	●
Network connectivity (adapter/module)			
Ethernet (1000BASE-T*¹¹/100BASE-TX/10BASE-T)	●	●	●
CC-Link IE Control	●	●	—
CC-Link IE Field	●	●*¹³	●
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℃	0...55℃	0...55℃
Standard on corrosive atmosphere (JIS C 60721-3-3/ IEC 60721-3-3 3C2)	●*¹⁵	—	—
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	· Line manufacturing · Multiple CPU · Distributed control · Process control · Large-scale I/O control · C programming · Security · Data logging · Inter-modular sync · IT gateway · Built-in database · Advanced motion · Integrated network · Real-time monitor	· Line manufacturing · C programming · Distributed control · Data logging · Large-scale I/O control · IT gateway · Integrated network · Advanced motion · Multiple CPU · Process control · High-reliability control	· Machine control · Data logging · Distributed control · Motion control · Small-scale I/O control · Real-time monitor · Large-scale I/O control · Space/cost saving · Integrated network · Extensive built-in functions

*1: Q□UDVCPU only.
*2: When using CW Workbench
*3: Required to use the logging function
*4: Does not support QnUDVCPU and certain models
*5: Does not support L02SCPU(-P)
*6: Supports the user Ethernet port of Q24DHCCPU-V/VG/LS only
*7: Supports Q□UDE(H)CPU and Q□UDVCPU only
*8: Does not support Q□UDE(H)CPU and Q□UDVCPU
*9: Supports L02SCPU(-P) only

|	Compact type **NEW**	Compact type			Modular type	Baseless type
	MELSEC iQ-F	MELSEC-F			MELSEC-QS	MELSEC-WS
	Programmable controller CPU	Programmable controller CPU			Safety programmable controller	Safety controller
	FX5U/FX5UC	FX3S	FX3G/FX3GC	FX3U/FX3UC		
	· FX5U: 9 models · FX5UC: 2 models	· FX3S: 27 models	· FX3G: 24 models · FX3GC: 2 models	· FX3U: 37 models · FX3UC: 12 models	· CPU: 1 models	· CPU: 3 models
	Stored program cyclic operation	Stored program cyclic operation			Stored program cyclic operation	—
	Refresh mode	Refresh mode			Refresh mode	—
	· Ladder diagram · Structured text (ST) · Function block diagram (FBD/LD) · Function block (FB)	· Ladder diagram · Structured text (ST) · SFC for FX Series · Function block (FB)			· Ladder diagram · Function block (FB)	· Function block (FB)
	—	—	—	—	· ISO 13849-1 PL e · IEC 61508 SIL3	· ISO 13849-1 PL e · IEC 61508 SIL3 · IEC 62061 SIL CL3
	MELSOFT GX Works3	MELSOFT GX Works2			MELSOFT GX Developer Ver.8	Setting/monitoring tool (free)
	64	4	32	64	14	—
	256	30	128	256	1024	144
	120	—	—	—	—	—
	5M	—	—	—	128K	—
	34	210	210	65	100	—
	34	520	520	640	350	—
	3.06	11.96	11.96	14.2	—	—
	—	●	●*10	●*3	—	—
	●	—	—	—	—	—
	—	—	—	—	—	—
	—	●	●	●	●	—
	●	—	—	—	—	—
	—	●	●	●	—	●
	●	●	●	●	—	—
	—	●	●*10	●	—	—
	●	●*12	●*12	●	●	●
	—	—	—	—	●	—
	—	—	—	—	●	—
	●	—	●	●	—	●
	—	—	—	—	●	—
	—	—	●	●	—	—
	●	—	—	●*14	—	—
	●	—	●	●	—	—
	—	—	—	—	—	—
	●	—	—	—	—	—
	●	●	●	●	—	—
	0...55℃	0...55℃	0...55℃	0...55℃	0...55℃	−25...55℃
	—	—	—	—	—	—
	●	●	●	●	●	●
	●	●	●	●	●	●
	—	●	●	●	—	—
	—	●	●	●	—	—
	—	●	●	●	—	—
	—	●	●	●	—	—
	—	●	●	●	—	—
	—	●	●	●	—	—
	—	●	●	●	—	—
	· Machine control · Data logging · Distributed control · Motion control · Small-scale I/O control · Space/cost saving · Security · Integrated network · Extensive built-in functions	· Machine control · Small-scale I/O control · Space/cost saving · Motion control			· Line manufacturing · Large-scale I/O control · Safety	· Line manufacturing · Small-scale I/O control · Safety

*10: Supports FX3G only.
*11: Supports the MELSEC iQ-R Series only
*12: Supports with the dedicated adapter

*13: Does not support Q□PHCPU and Q□PRHCPU
*14: Supports SSCNET Ⅲ
*15: 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

MELSEC iQ-R series

Bridging the next generation of automation

iQ Platform

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

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[*1] , increasing Reliability and Reuse 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.

*1: Total Cost of Ownership
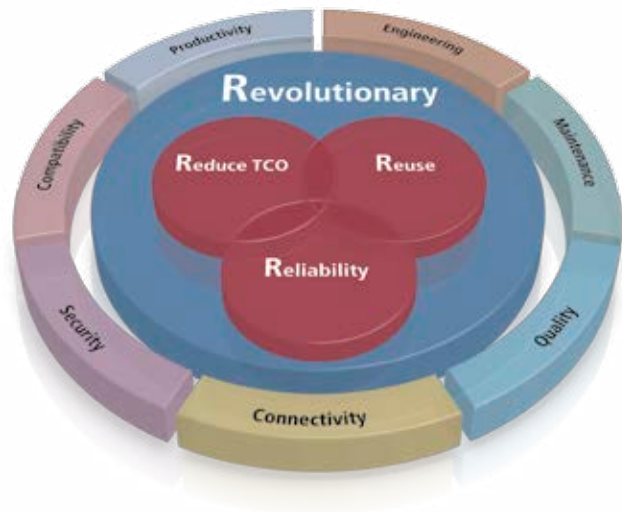
Productivity

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

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

■ Main features/applications

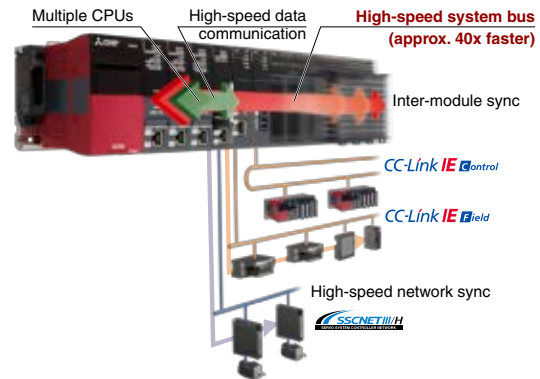| Line manufacturing | Machine control | Distributed control | Small-scale I/O control | Large-scale I/O control | Space/cost saving | Security |
| Inter-modular sync | Built-in database | Integrated network | Multiple CPU | Process control | High-reliability control | Extensive built-in functions |
| C programming | Data logging | IT gateway | Motion control | Advanced motion | Safety | Real-time monitor |

For further details, please refer to the "MELSEC iQ-R Series iQ Platform-compatible PAC" or "MELSEC iQ-R Series iQ Platform-compatible PAC (Concise)" catalog.

L(NA)08298ENG, L(NA)08293ENG

Advanced performance/functions improve productivity

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.

Multiple CPUs High-speed data communication **High-speed system bus (approx. 40x faster)**

Inter-module sync

CC-Link IE Control

CC-Link IE Field

High-speed network sync

SSCNET III/H

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.

• Recipe
• Production data

Powerful security features protecting intellectual property

Functions such as hardware security key identification for protecting programs and an IP filter for preventing unauthorized access to the control system through the network are incorporated to protect customers intellectual property whilst ensuring secure and safe control throughout the plant.

Extended SRAM cassette with registered security key

Intuitive and easy engineering

With GX Works3 graphic based programming cannot be made any easier with various intuitive features such as graphic based system configuration, and an extensive module library provided as standard. In addition to multiple language support realizing a global engineering tool required for current automation needs.

GX Works3

A wide range of modules supporting various different applications

The MELSEC iQ-R Series is a modular control system equipped with various modules such as CPUs, power supply, digital I/O, analog I/O and base unit and intelligent function modules, each having its own responsibility in the system. The core of the system is a base unit that interconnects all of the modules together and enables high-speed communications between each module. From small to large systems, scalability is simple. Up to seven extension bases can be connected and a maximum of 64 modules installed at any one time. An RQ extension base is also available, ensuring compatibility with existing MELSEC-Q Series modules.
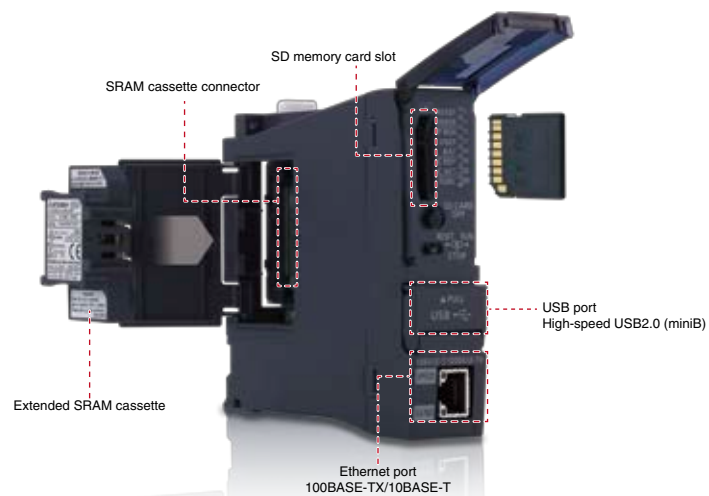
R04CPU
Program capacity 40K steps

R08CPU
Program capacity 80K steps
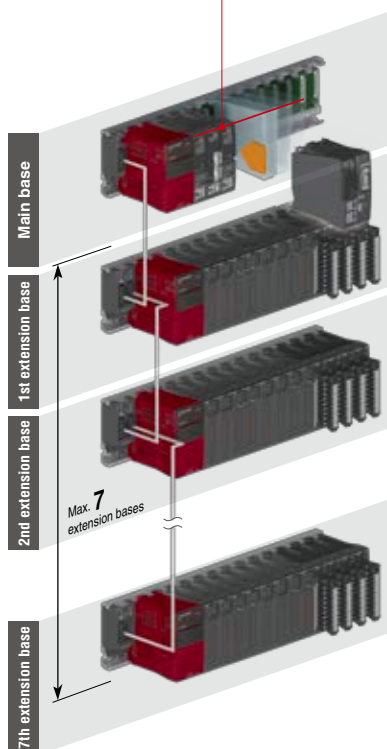
R16CPU
Program capacity 160K steps

R32CPU
Program capacity 320K steps

R120CPU
Program capacity 1200K steps

SRAM cassette connector

SD memory card slot

USB port
High-speed USB2.0 (miniB)

Extended SRAM cassette

Ethernet port
100BASE-TX/10BASE-T

MELSEC iQ-R series

■ System configuration

Main base

1st extension base

2nd extension base

7th extension base

Max. **7** extension bases

■ CPU modules

Install up to four CPU modules together

- Programmable controller CPU module
- Motion CPU module
- Process CPU module
- C Controller module

■ Power supply module

■ I/O & intelligent function modules
- Input module
- Output module
- I/O combined module
- Analog input module
- Analog input module (channel isolated)
- Analog output module
- Analog output module (channel isolated)
- Temperature input module
- Simple motion module
- Positioning module
- High-speed counter module
- Ethernet interface module
- CC-Link IE Control Network module
- CC-Link IE Field Network master/local module
- CC-Link system master/local module
- Serial communication module

■ Base units
- Main base unit
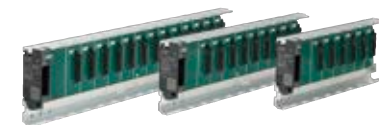
- Extension base unit
 An extension base strictly for I/O and intelligent function modules.

- RQ extension base unit
  An extension base for MELSEC-Q Series modules (further extensions requiring the MELSEC-Q Series extension base version).

Highly accurate synchronization

The MELSEC iQ-R Series system provides highly accurate synchronization between modules on the control system which is realized through inter-modular synchronization. Additionally, use of the CC-Link IE Field Network realizes network-level synchronization, providing node-level synchronization that ensures deterministic data flow void of any influence from data transmission delays. This is ideal for applications such as "cutting and folding" inside an offset printer, which requires synchronization between the printing quality sensor, high-speed rotary cutter, folding roller and conveyor.
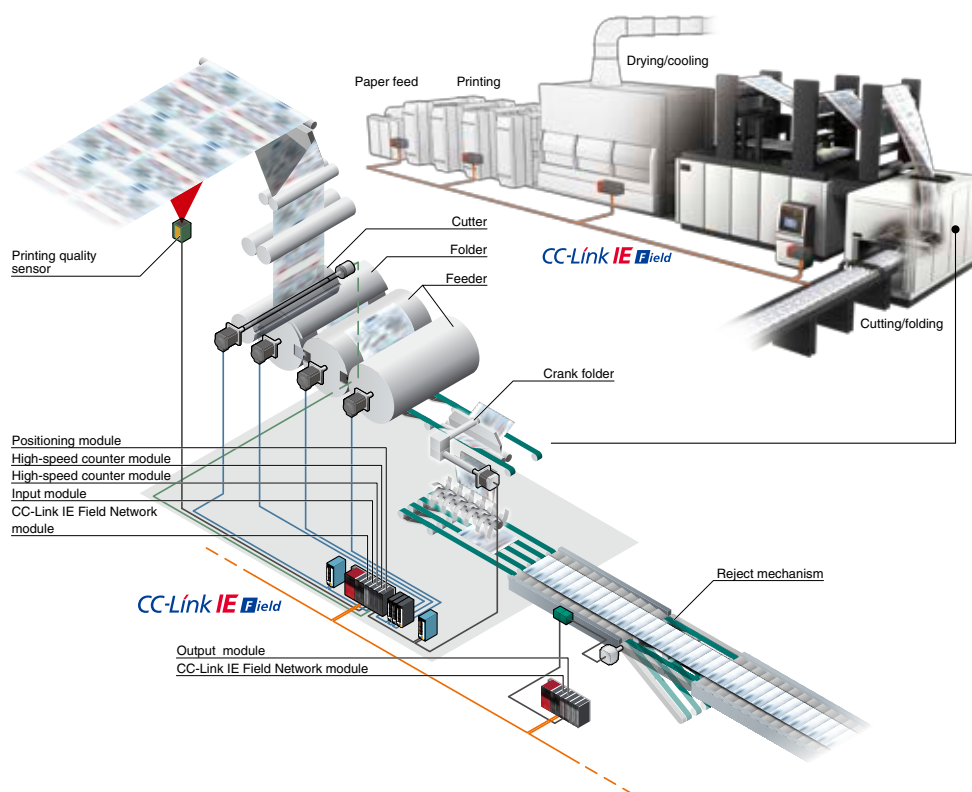

Intuitive root cause analysis

When the SD memory card is installed, device data is saved automatically to the SD memory at the time of system failure. This data is useful for investigating the cause of the failure, enabling various data collected before and during the event to be analyzed. The data can be used in a situation such as when the origin of a machine is different than where the machine was actually being used, and the data can simply be sent by e-mail (for example) as a data file for analysis.

■ Overseas production site

Easy setup just by setting trigger conditions

Data logged automatically when an error occurs
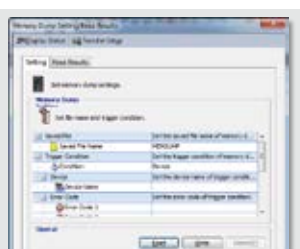
SD memory card

Data sent via email

■ Domestic development dept.

Visual representation of data when error occurs
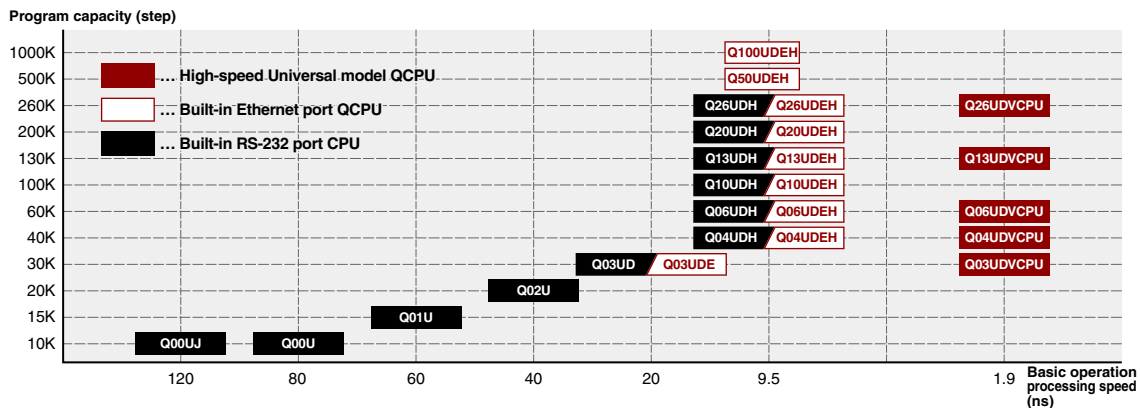
Quicker root cause analysis

MELSEC Q series

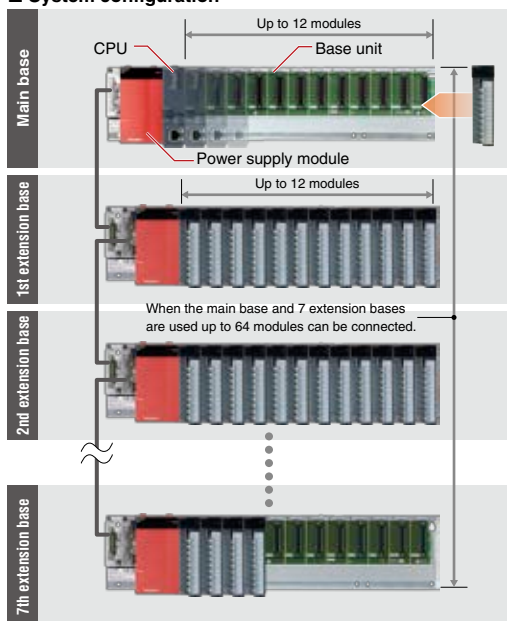## Model flexibility supports versatile applications and improved productivity

iQ Platform

Multi-discipline design offers a broad spectrum of automation controllers

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 ideal for these market needs. High-speed basic instruction processing dramatically increases control system and machine performance. Inheriting the highly robust and easy-to-use design of the Q Series, the MELSEC QnU programmable controller opens up new possibilities in automation.

Program capacity (step)

■ **System configuration**

When the main base and 7 extension bases are used up to 64 modules can be connected.

*1: The maximum number of modules that can be installed depends on the CPU configuration.
*2: Except redundant CPU.
*3: The number within brackets is the number of slots.

■ **CPU modules**

Install up to four CPU modules together*2
• Programmable controller CPU
• Motion controller
• Process CPU
• Redundant CPU
• C Controller
• Robot controller
• CNC CPU

Up to 4 modules
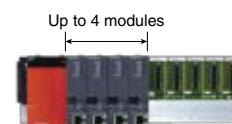
The 2nd and subsequent CPUs can be installed using slots No. 0 to 2

■ **Base units*3**
• Main base (3, 5, 8, 12)
• Multiple CPU high-speed main base (5, 8, 12)
• Slim type main base (2, 3, 5)
• Redundant power main base (8)
• Extension base (2, 3, 5, 8, 12)
• Redundant power extension base (8)
• Redundant type extension base (5)

■ **Power supply modules**
• Power supply
• Power supply with life function
• Slim type power supply
  Redundant power supply module
• Redundant power supply

■ **I/O & intelligent function modules**
• 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
• Web server module
• Intelligent communication module
• Network module
• Digital link sensor module

■ Main features/applications

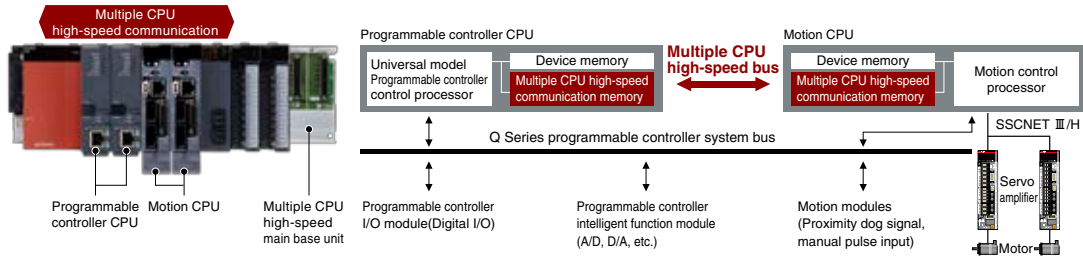| Line manufacturing	Machine control	Distributed control	Small-scale I/O control	Large-scale I/O control	Space/cost saving	Security
Inter-modular sync	Built-in database	Integrated network	Multiple CPU	Process control	High-reliability control	Extensive built-in functions
C programming	Data logging	IT gateway	Motion control	Advanced motion	Safety	Real-time monitor

For further details, please refer to the "Programmable Controllers MELSEC-Q series [QnU]" catalog.

L(NA)08101E

High-speed, high-accuracy machine control

To achieve truly high-speed synchronized control between multiple CPUs, a dedicated bus is used, independent of sequence program operation (0.88 ms operation cycle)*1. This multiple CPU high-speed communication is synchronized with motion control to maximize computational efficiency. Additionally, the performance of the motion control CPU is twice as fast as the previous model, ensuring high-speed, high-accuracy machine control.
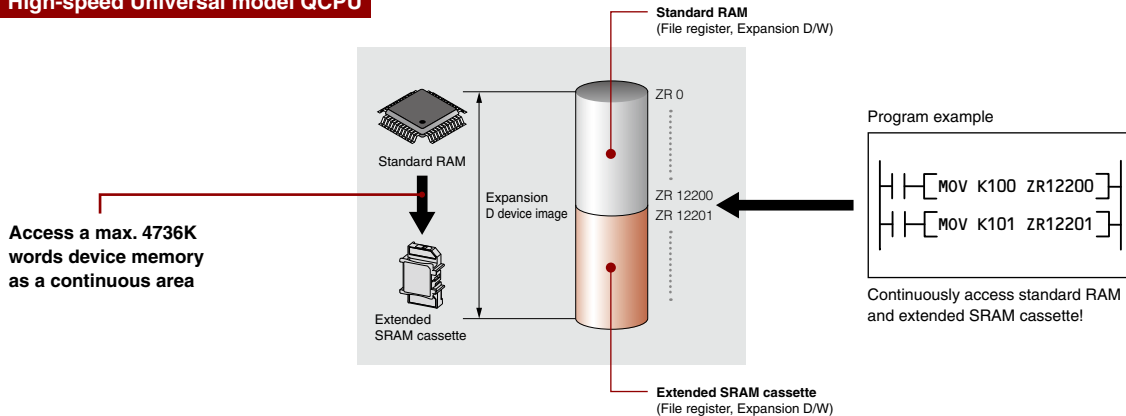

Multiple CPU high-speed communication

Programmable controller CPU

Universal model Programmable controller control processor

Device memory
Multiple CPU high-speed communication memory

Multiple CPU high-speed bus

Motion CPU

Device memory
Multiple CPU high-speed communication memory

Motion control processor

SSCNET III/H

Q Series programmable controller system bus

Programmable controller CPU   Motion CPU   Multiple CPU high-speed main base unit

Programmable controller I/O module(Digital I/O)

Programmable controller intelligent function module (A/D, D/A, etc.)

Motion modules (Proximity dog signal, manual pulse input)

Servo amplifier

Motor

*1: Q00UJ, Q00U, Q01U, and Q02U are not supported.

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

High-speed Universal model QCPU

Standard RAM

Access a max. 4736K words device memory as a continuous area

Extended SRAM cassette

Standard RAM (File register, Expansion D/W)

ZR 0

Expansion D device image

ZR 12200
ZR 12201

Extended SRAM cassette (File register, Expansion D/W)

Program example

```
      ┌─[ MOV K100 ZR12200 ]─
──┤├──┤
      └─[ MOV K101 ZR12201 ]─
```

Continuously access standard RAM and extended SRAM cassette!

*2: Q03UDV, Q04UDV, Q06UDV, Q13UDV and Q26UDV are not supported.

Easy logging without a program*3

Logging can be easily performed using the Wizard setting tool. The data collected can be saved in CSV format on an SD memory card and be displayed on a computer or GOT (HMI). Various reference materials including daily and general reports can be created easily using the saved CSV file. This data can be used for a wide variety of applications requiring traceability, production data, etc.
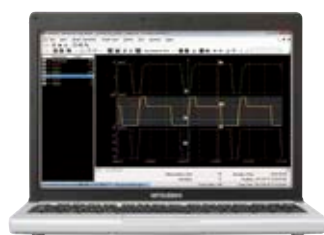
Logging data display and analysis tool GX LogViewer

GOT (HMI) log viewer function

*3: Supports Q03UDV, Q04UDV, Q06UDV, Q13UDV, and Q26UDV.

MELSEC *L series*

Amazingly small footprint and loaded with high-performance features

---

Convenience that fits in the palm of your hand

The L Series is a compact-class controller, part of the MELSEC products renowned for exceptional cost verses performance and strong reliability. It provides the performance, functions, and capabilities required for today's demanding applications in a small package. MELSEC-L Series greatly expands the range of functionality traditionally associated with compact programmable controllers and through user-centric design, pushes the limits of ease of use.

Program capacity (step)

- ...... Sink type
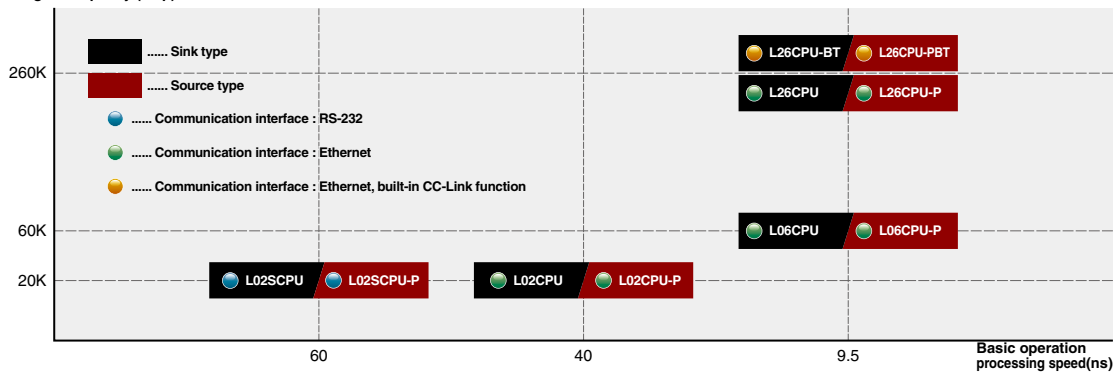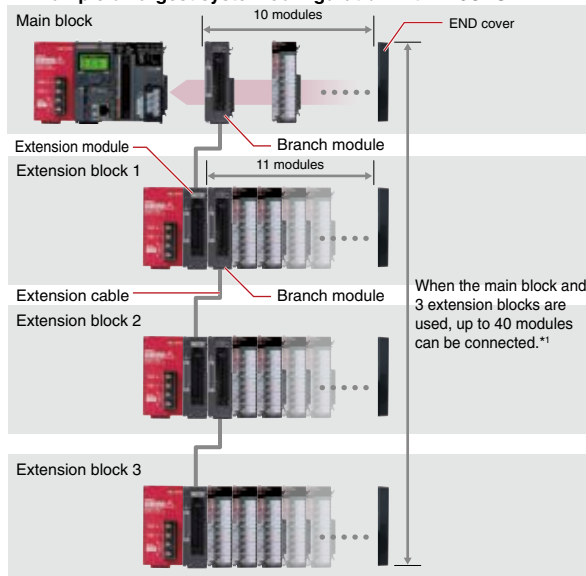- ...... Source type
- ...... Communication interface : RS-232
- ...... Communication interface : Ethernet
- ...... Communication interface : Ethernet, built-in CC-Link function

260K — L26CPU-BT L26CPU-PBT
       L26CPU L26CPU-P

60K — L06CPU L06CPU-P

20K — L02SCPU L02SCPU-P   L02CPU L02CPU-P

60   40   9.5   **Basic operation processing speed(ns)**

■ Example of largest system configuration with L26CPU-BT

Main block — 10 modules — END cover

Extension module — Branch module
Extension block 1 — 11 modules

Extension cable — Branch module
Extension block 2

Extension block 3

When the main block and 3 extension blocks are used, up to 40 modules can be connected.*1

■ CPU module

- Programmable controller CPU (sink type/source type)
  Built-in communication interface
  ▶ RS-232
  ▶ Ethernet
  ▶ Ethernet + CC-Link

■ Option

- Display unit
- RS-232 adapter
- RS-422/485 adapter
- Battery
- SD/SDHC memory card

■ Power supply modules

- Power supply module
- Power supply module (slim type)

■ Branch/extension modules

- Branch module
- Extension module

■ Modules

- I/O module
- Analog module
- Multiple input (voltage/current/ temperature) module
- Temperature control module
- Simple motion module
- Positioning module
- High-speed counter module
- Network module
- Digital link sensor

CPU module	Number of extension blocks	Number of installable modules*2
L02SCPU(-P) L02CPU(-P)	Up to 2	Main block: 10 Extension block: 11
L06CPU(-P) L26CPU(-P) L26CPU-(P)BT	Up to 3	

*1: Total number of I/O, intelligent function, and network modules. Does not include branch module.

*2: Total number of I/O, intelligent function, network, and branch modules. Does not include power supply module, CPU module, display unit, extension module, RS-232 adapter, RS-422/485 adapter and END cover.

■ Main features/applications

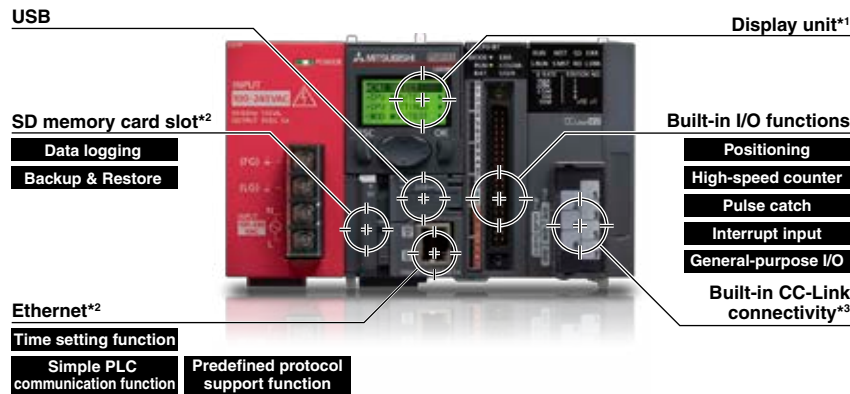| Line manufacturing	Machine control	Distributed control	Small-scale I/O control	Large-scale I/O control	Space/cost saving	Security
Inter-modular sync	Built-in database	Integrated network	Multiple CPU	Process control	High-reliability control	Extensive built-in functions
C programming	Data logging	IT gateway	Motion control	Advanced motion	Safety	Real-time monitor

For further details, please refer to "Programmable Controllers MELSEC-L series" catalog.

L(NA)08159E

Various built-in I/O features and communication interfaces come as standard

In its compact body, a large variety of I/O features are built in as standard. Due to an abundance of advanced functionality, L Series CPUs are flexible enough to meet a wide variety of needs. With a display unit enabling routine operation without a computer, an SD memory card, and easy-to-use programming environment, the L Series dramatically improves system designing and system operation and contributes to improve work efficiency. The display unit[1] shows system statuses and enables setting changes to be made without a program. Even when an error occurs, the error status can be easily checked, assisting troubleshooting on-site.

USB

Display unit[1]

SD memory card slot[2]
Data logging
Backup & Restore

Built-in I/O functions
Positioning
High-speed counter
Pulse catch
Interrupt input
General-purpose I/O

Built-in CC-Link connectivity[3]

Ethernet[2]
Time setting function
Simple PLC communication function
Predefined protocol support function

*1: Option (sold separately). Not compatible with L02SCPU (-P).
*2: Supports L02CPU (-P), L06CPU(-P), L26CPU(-P), L26CPU(-P) BT.
*3: Supports L26CPU (-P) BT.

Gain more flexibility with an integrated system bus structure

L Series modules do not require a base unit. Having an integrated system bus structure, the L Series can be attached directly to a DIN rail by using the minimal required space. Furthermore, adding modules to the system is not restricted by the number of available base unit slots, and costs may be reduced due to the elimination of extension base units.

Improved debugging for system startup and troubleshooting

Device values in the CPU can be monitored in real-time with a detailed setting including interval and timing. Additionally, changes in the device value can be monitored within the GX LogViewer trend graph and are exportable to a computer for further analysis.

Register up to 16[4] word data

Register up to 16 bit data
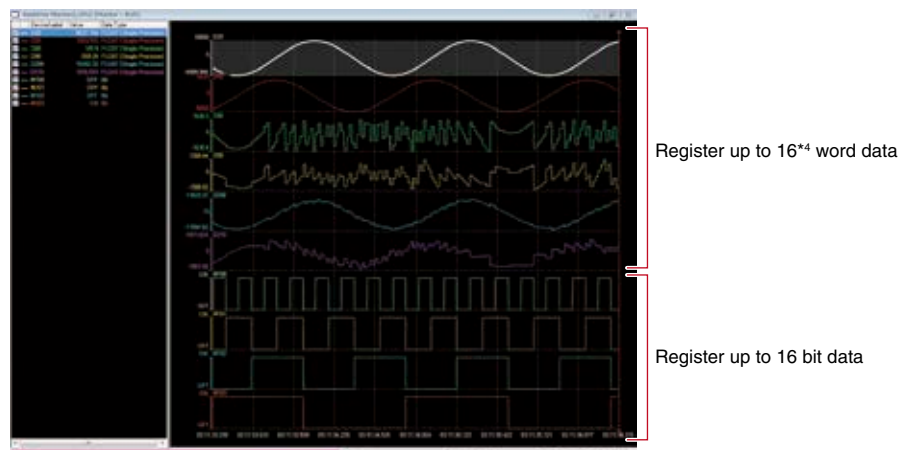
*4: Up to 15 when a bit data is registered

MELSEC iQ-F series

The next level of industry

iQ Platform

New micro PLC designed on the concept of ...

Outstanding Performance

Superior Drive Control

Intuitive Programming Environment

▸ Completely redesigned, high-speed system bus
▸ Extensive built-in functions
▸ Enhanced security functions
▸ No internal battery required

▸ Built-in positioning (4-axis 200 kHz)
▸ Simple linear interpolation
▸ Synchronous control with Simple Motion unit (4-axis) without requiring dedicated positioning software

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

■ System configuration

Number of input/output points on whole system..................... Up to 512 points

1. Number of input/output points (including input/output occupied points) ...... Up to 256 points

Up to 16 modules

FX5U

Expansion adapter (analog)

Expansion adapter (communication)

Input module, output module

Intelligent module

Extension power supply module*1

Input module, output module

Intelligent module

Bus conversion module

Up to 4 modules
Up to 2 modules

Expansion board

Up to 1 module

Up to 8 modules

Up to 12 modules

Up to 1 module

Up to 8 modules

Up to 10 modules

FX3 Series modules are connected via the bus conversion module.

FX3

Extension power supply module*1

Intelligent module

Intelligent module

Up to 8 modules

2. Number of remote input/output points for CC-Link

CC-Link system

Remote I/O station

Remote I/O station

Remote I/O station

Remote I/O station

*1: Up to two extension power supply modules are connectable.

■ Main features/applications

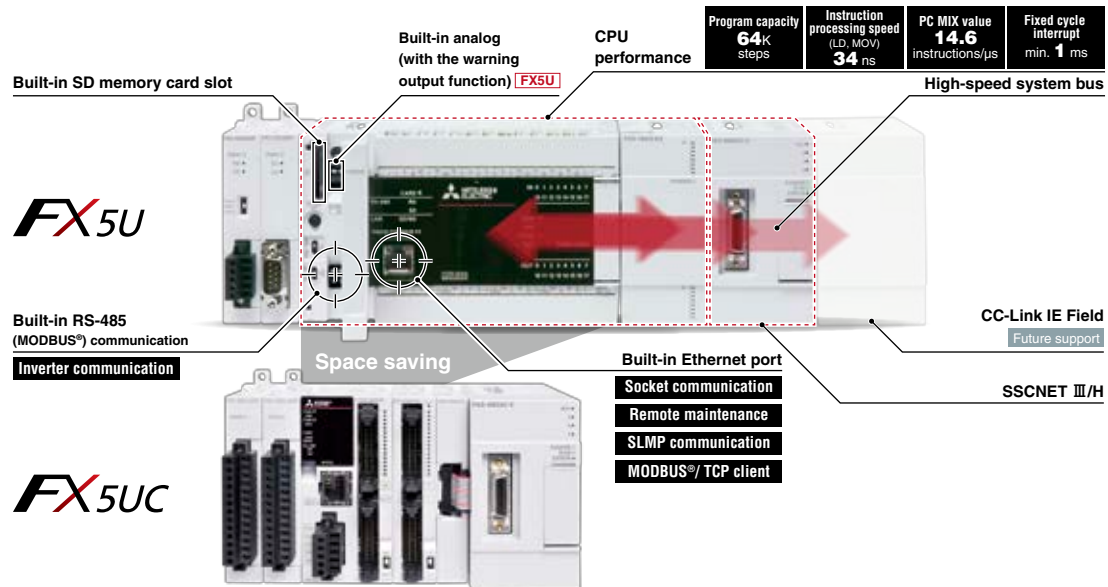| Line manufacturing | Machine control | Distributed control | Small-scale I/O control | Large-scale I/O control | Space/cost saving | Security |
| Inter-modular sync | Built-in database | Integrated network | Multiple CPU | Process control | High-reliability control | Extensive built-in functions |
| C programming | Data logging | IT gateway | Motion control | Advanced motion | Safety | Real-time monitor |

For further details, please refer to the "MELSEC iQ-F Series iQ Platform-compatible PLC" catalog.

HIME-L081

Integrated functions

The high-speed system bus realizes faster communications speed of up to 150 times[1], increasing overall machine performance. The CPU module has many integrated features (Ethernet, RS-485 (MODBUS®RTU supported), analog I/O[2], SD memory card slot, etc.) providing greater flexibility and helping to reduce system costs.

Built-in analog (with the warning output function) FX5U

CPU performance

| Program capacity 64K steps | Instruction processing speed (LD, MOV) 34 ns | PC MIX value 14.6 instructions/μs | Fixed cycle interrupt min. 1 ms |

Built-in SD memory card slot

High-speed system bus

FX5U

Built-in RS-485 (MODBUS®) communication

Inverter communication

Space saving

CC-Link IE Field
Future support

Built-in Ethernet port

Socket communication
Remote maintenance
SLMP communication
MODBUS®/ TCP client

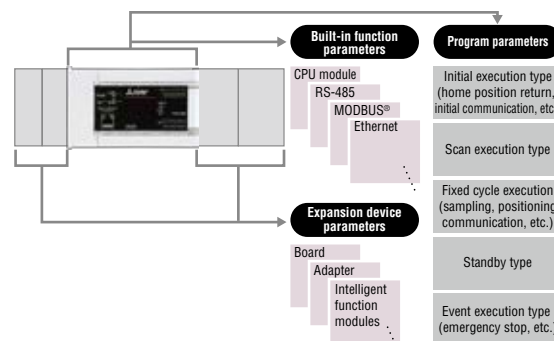SSCNET Ⅲ/H

FX5UC

*1: Compared to FX3U Series.
*2: Not available in FX5UC.

Easy parameter setup

With the MELSEC iQ-F, setting of parameters has been made even easier by the integration of parametrization functionality into GX Works3 engineering software. Setting of parameters for built-in functions, external devices, and program execution trigger are simply done.

Settable parameters
• CPU parameters, Ethernet port, RS-485 communication port, I/O response time, expansion board, memory card, security key functions, etc.
• Expansion adapter, intelligent function module settings

Built-in function parameters
CPU module
RS-485
MODBUS®
Ethernet

Program parameters
Initial execution type (home position return, initial communication, etc.)
Scan execution type
Fixed cycle execution (sampling, positioning communication, etc.)
Standby type
Event execution type (emergency stop, etc.)

Expansion device parameters
Board
Adapter
Intelligent function modules

Standard function/function blocks

Approx. 110 types of standard function and functions blocks are available to utilize in the control program. These functions/function blocks are conveniently located as parts library further helping to reduce overall engineering time.
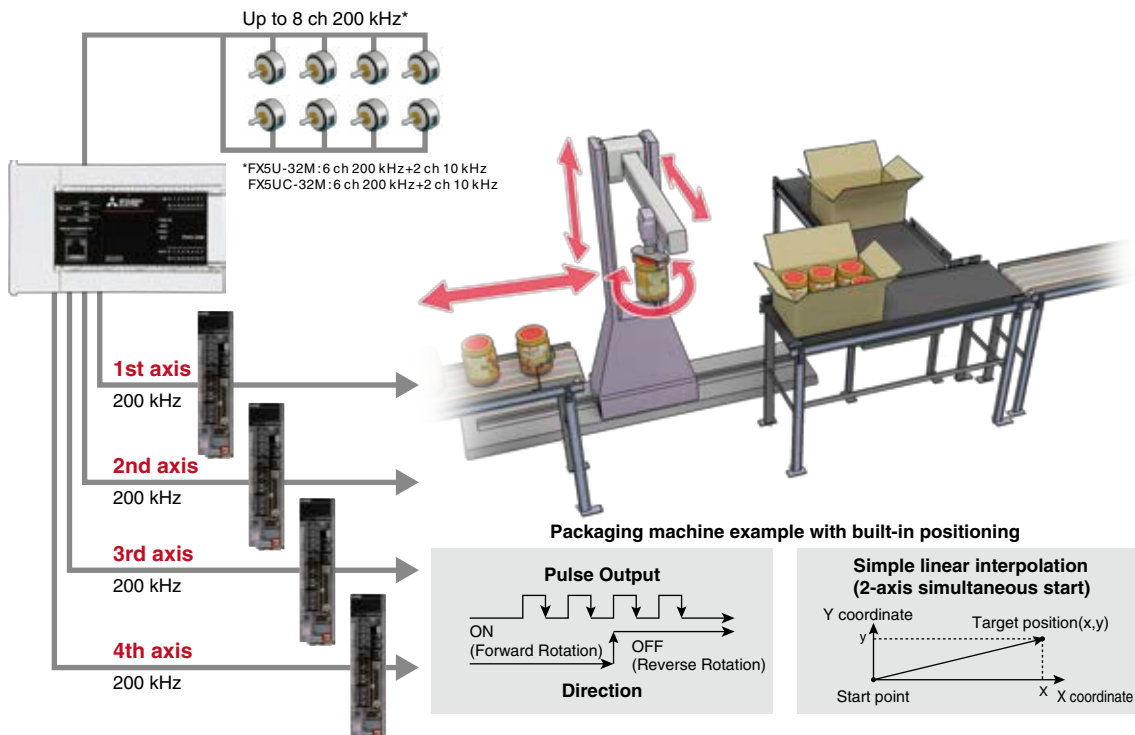
Drag & Drop
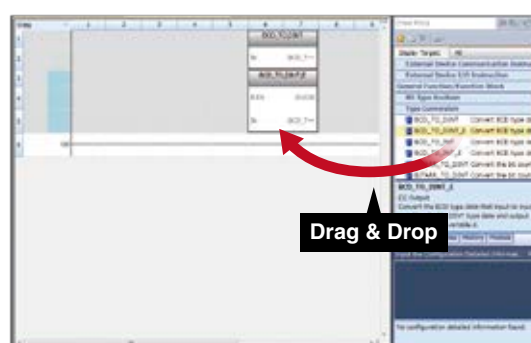
Positioning solution

Built-in positioning (4-axis built-in)

• Positioning that support 20 μs high-speed startup

The built-in high-speed pulse inputs and outputs on the FX5U, with special positioning operations instructions, are designed to satisfy simple independent-axis positioning applications using servo and stepping motors with speed and precision. Positioning operations on different axes can also be started simultaneously.

Up to 8 ch 200 kHz*

*FX5U-32M : 6 ch 200 kHz+2 ch 10 kHz
 FX5UC-32M : 6 ch 200 kHz+2 ch 10 kHz

1st axis
200 kHz

2nd axis
200 kHz

3rd axis
200 kHz

4th axis
200 kHz

Packaging machine example with built-in positioning

Pulse Output

ON
(Forward Rotation)   OFF
                      (Reverse Rotation)
Direction

**Simple linear interpolation
(2-axis simultaneous start)**

Y coordinate   Target position(x,y)
y

Start point   X coordinate
                          x

Simple motion module (4-axis module)

• Positioning control via SSCNET Ⅲ/H

Positioning control is easily executed using a point table. The machine can coat the work piece by using a combination of linear interpolation, 2-axis circular interpolation, and continuous trajectory control.
A smooth trajectory can be traced with the S-curve acceleration/deceleration function.

1. X-axis
2. Y-axis
3. Z-axis
4. Sealant
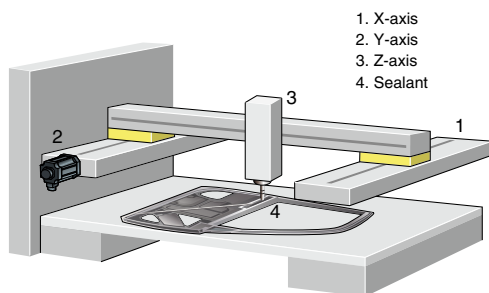
Main functions

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

Application examples

• Sealing
• Vending machine
• Palletizer
• Grinding machine

FX5-40SSC-S

SSCNETⅢ/H
SERVO SYSTEM CONTROLLER NETWORK

Advanced motion control

Making Simple Motion with compactly packed extra functions

Similar to positioning modules, simple motion modules are capable of a wide range of high-precision control such as positional control, advanced synchronous control, cam control, and speed-torque control with setup being done easily by parameters and programming.
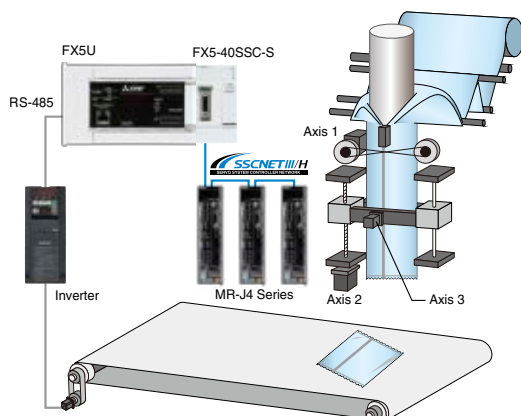

Packing machine example with Simple Motion

- Use synchronous control and cam functionality to make systems that work continuously and maximize output.
- With 64 cam profiles available, the same machine can be used for many different packing styles.
- Continuous operation without stopping the movement of the work piece

Advanced synchronous control

Software-based synchronous control can be used as an alternative to mechanical control, such as gear, shaft, transmission and cam. In addition, cam control is even easier with cam auto-generation. Synchronous control can be simply performed (start/stop) for each axis, allowing synchronous and positional control axes within the same program. Up to 4 control axes can be synchronized when using the synchronous encoder, such as that used for packing machines, for example.

Cam auto-generation

Cam data for a rotary cutter can be generated automatically simply by registering the sheet length, synchronization width, rotary cutter axis dimension, etc.
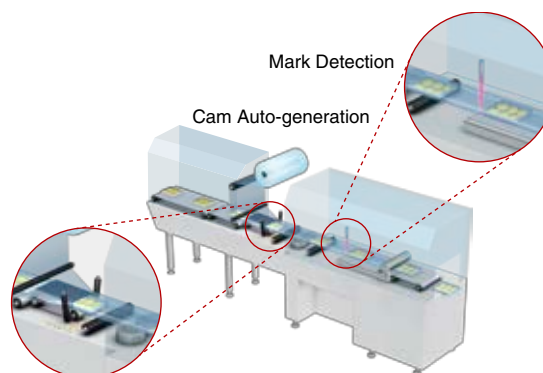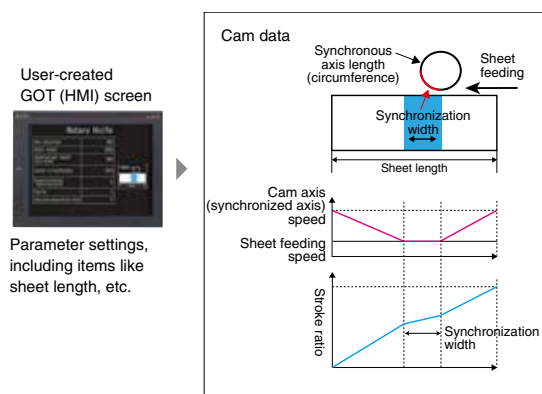
Rotary cutter control example with mark detection and cam data

Mark detection

The actual position of the servo motor can be obtained based on the registration mark printed on the high-speed moving film. Compensation of the cutter axis position, based on the registration marks, keeps the constant cutting position.
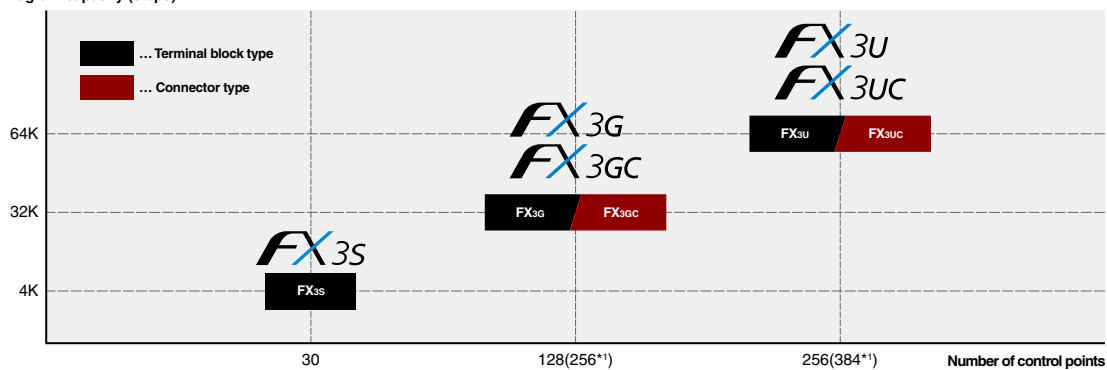
MELSEC-F

All-in-one model with built-in power supply, CPU, and I/O

The third generation of micro programmable controller, the FX3 Series

The FX Series is renowned for its speed, capacity, performance and extensive features. Integrated with many features including analog, communication, Ethernet, and positioning, the FX3 Series realizes high-performance in many different applications.

Program capacity (steps)

- ■ … Terminal block type
- ■ … Connector type

*FX*3U
*FX*3UC

| FX3U | FX3UC |

64K

*FX*3G
*FX*3GC

| FX3G | FX3GC |

32K

*FX*3S

| FX3S |

4K

30   128(256*1)   256(384*1)   **Number of control points**

*1: Number of maximum I/O points including remote I/O.

■ System configuration

Special adapter   Main unit*2   Extension unit

Expansion boards, options

■ Main units
- FX3U/FX3UC
- FX3G/FX3GC
- FX3S

■ Special adapters
- Analog I/O
- Communication
- Data collection
- High-speed I/O

■ Expansion units
- I/O extension block
- Analog I/O block
- Temperature control block
- Temperature sensor input block
- Positioning control block
- Communication/network block
- Extension power supply unit

■ Expansion boards
- Communication
- Analog I/O
- 8-point variable analog potentiometer
- Extended I/O
- Special adapter connection
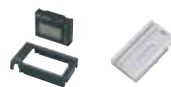
■ Options
- Display module
- Memory cassette
- Battery
- Extension cable
- Conversion adapter

*2: Connectable special adapters, extension units, expansion boards, and other options differ by the models. For details, please refer to the manual of the relevant product.

■ Main features/applications

Line manufacturing	Machine control	Distributed control	Small-scale I/O control	Large-scale I/O control	Space/cost saving	Security
Inter-modular sync	Built-in database	Integrated network	Multiple CPU	Process control	High-reliability control	Extensive built-in functions
C programming	Data logging	IT gateway	Motion control	Advanced motion	Safety	Real-time monitor

For further details, please refer to the "PROGRAMMABLE CONTROLLERS MELSEC-F FX Family Catalog"

HIME-B215

Extensive built-in functions

Including high-speed counter, positioning, high-speed I/O, communication ports, 24 V DC power supply, and other built-in functions, the main control unit can be easily connected with various different external control devices.

GOT (HMI)

Combining with other Mitsubishi Electric factory automation products

In addition to its extensive built-in functions, the FX Series is highly scalable by being connectable to various different devices such as analog, positioning, communication networks, and sensor control through its expansion unit capability.

MELSOFT iQ Works
GX Works2
GT Works3

GOT (HMI)

Ethernet

FX3 Series

Vision system

AnyWireASLINK

CC-Link

MODBUS®

SSCNET

A800/D700 Series inverters

MR-JN/MR-J4 servo amplifiers

Remote I/O

Sensors
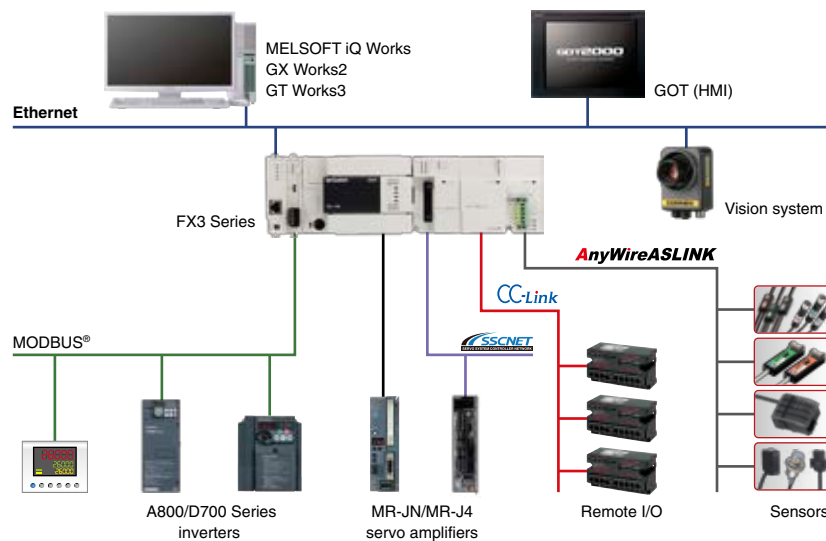
Compatibility

FX Series compatibility
The FX3 Series shares the same size with the FX1S, FX1N/FX1NC, and FX2N/FX2NC Series supporting various different extension blocks

Reusing the existing programs
The dedicated programming tool enables any existing program to be converted, just as simply by changing the PLC type.

MS MELSEC Safety
MITSUBISHI SAFETY FA SOLUTION

Integrating safety control on the shop floor

Mitsubishi Electric's total safety solution

The concept of safety is shifting from human intervention based "zero accidents" to risk assessment based "zero risk". To follow this shift, Mitsubishi Electric has introduced the MELSEC Safety solut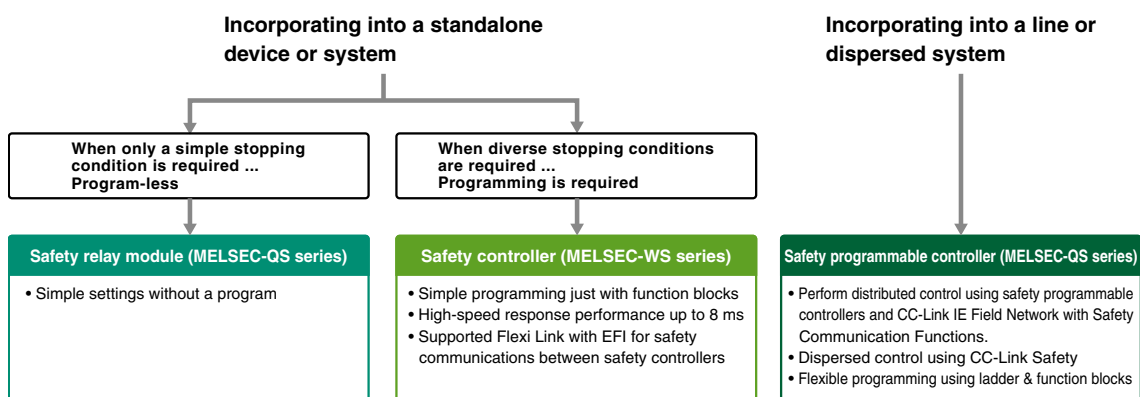ion, which realizes safety control[1] while keeping compatibility with the MELSEC Programmable Controllers. This solution supports the "zero risk" system required today.

[1]: Safety control: Control performed to protect a human being from danger of machines.

Easy to change
Easy to wire

■ **Safety programmable controller**
• LD/FB language support
• More than 100 safety I/O points
• Connectability and expandability with standard programmable controllers

CC-Link Safety
SAFETY FA NETWORK SERIES

CC-Link IE Field

■ **Safety controller**
• Integrated CPU and I/O
• FB language support
• Expansion with extension modules

■ **Safety field network**
• Connect up to 42 safety remote stations
• Use standard stations together with safety remote stations

■ **Safety communication now supported by CC-Link IE Field Network**
• Connect up to 32 safety programmable controllers
• Safety and standard programmable controller can share the same network

■ **Safety relay module**
• Create an internal safety circuit (program not required)
• Expand with module connections

Increased safety system scale, easy changing and easy wiring are required

Scale (number of safety points)

Up to several tens of points

Several tens to several hundreds of points

Incorporating into a standalone device or system

Incorporating into a line or dispersed system

When only a simple stopping condition is required ...
Program-less

When diverse stopping conditions are required ...
Programming is required

Safety relay module (MELSEC-QS series)
• Simple settings without a program

Safety controller (MELSEC-WS series)
• Simple programming just with function blocks
• High-speed response performance up to 8 ms
• Supported Flexi Link with EFI for safety communications between safety controllers

Safety programmable controller (MELSEC-QS series)
• Perform distributed control using safety programmable controllers and CC-Link IE Field Network with Safety Communication Functions.
• Dispersed control using CC-Link Safety
• Flexible programming using ladder & function blocks

■ Main features/applications

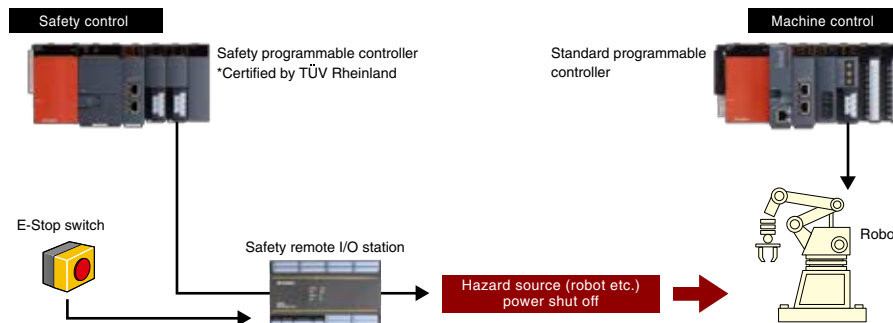| Line manufacturing	Machine control	Distributed control	Small-scale I/O control	Large-scale I/O control	Space/cost saving	Security
Inter-modular sync	Built-in database	Integrated network	Multiple CPU	Process control	High-reliability control	Extensive built-in functions
C programming	Data logging	IT gateway	Motion control	Advanced motion	Safety	Real-time monitor

For further details, please refer to
"Safety Programmable Controller/Safety Controller Safety
Relay Module" catalog.

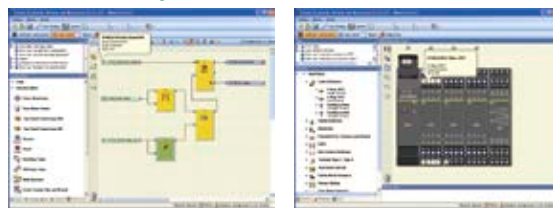L(NA)08192E

MELSEC safety programmable controller

The MELSEC safety programmable controller is an ISO certified safety controller that ensures safety at production sites. Often connected to safety devices, such as emergency stop switches and light curtains, the safety programmable controller disconnects the power supplied to an abnormally operated machine, for example to a robot, which could be a danger to the whole system if left alone. A safety shutoff sequence program can be custom made by the user. The safety programmable controller is different from a general programmable controller in a way that it performs self-diagnosis. When a failure is detected in the self-diagnosis, the safety programmable controller automatically and forcefully turns its safety outputs off. This means that any unsafe status will be never left alone.

Safety control

Safety programmable controller
*Certified by TÜV Rheinland

Machine control

Standard programmable controller

E-Stop switch

Safety remote I/O station

Hazard source (robot etc.) power shut off

Robot

Safety controller

The safety controller is an expandable compact controller suitable for the safety control of small to medium-sized devices and systems. The controller can be expanded to a maximum 144 safety input/output points (single channel) and two network interface units. The dedicated "Setting and Monitor Tool" is equipped with safety sensors, switch connections, and safety-dedicated function blocks, allowing a safety system to be structured easily.
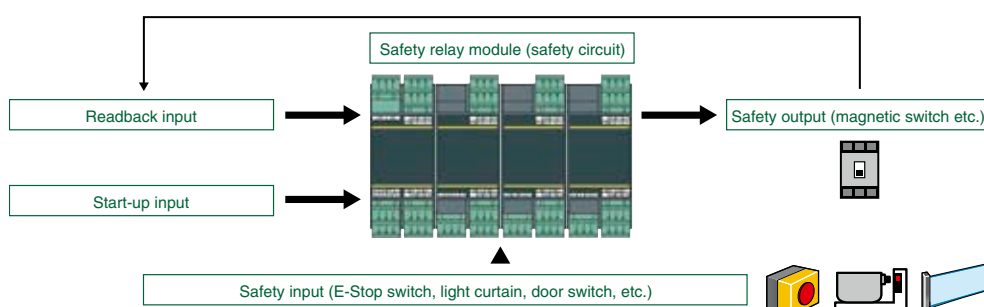
■ Dedicated "Setting and Monitor Tool"

Ethernet

Safety input

Safety plug

E-Stop switch

Enabling switch

Safety controller

Light curtain

RS-232

Magnetic contactor (motor starter)

• CPU module(WS0-CPU1) supports Flexi Link with EFI for safety communications between safety controllers. Safety communications between safety controllers can be easily established at a low cost just by connecting the CPU modules with dedicated cables (Flexi Link cables). Using Flexi Link, safety communication can be conducted between up to four safety controllers.

Safety output

CC-Link
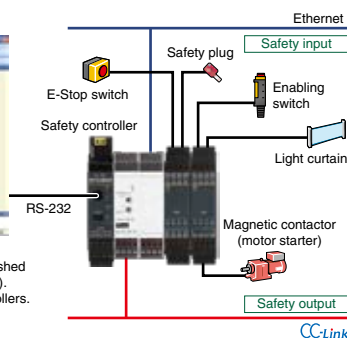
Safety relay module

The safety relay module integrates the emergency stop circuit and the restart circuit with a double safety relay. A basic safety function can be realized with just wiring, eliminating the need for programming and parameter settings. Furthermore, the number of I/O points can be increased by adding extension modules.

Safety relay module (safety circuit)

Readback input

Safety output (magnetic switch etc.)

Start-up input

Safety input (E-Stop switch, light curtain, door switch, etc.)

For further details, please refer to
"MELSEC PROCESS CONTROL/REDUNDANT SYSTEM"
catalog.

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MELSEC
PROCESS CONTROL iQ Platform

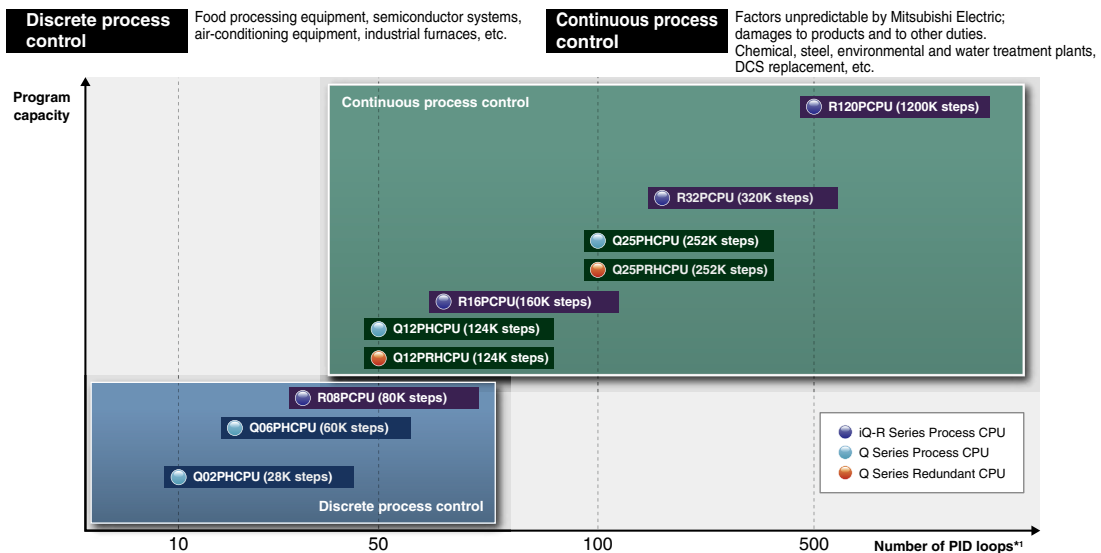### High-speed processing for full-scale monitoring and control
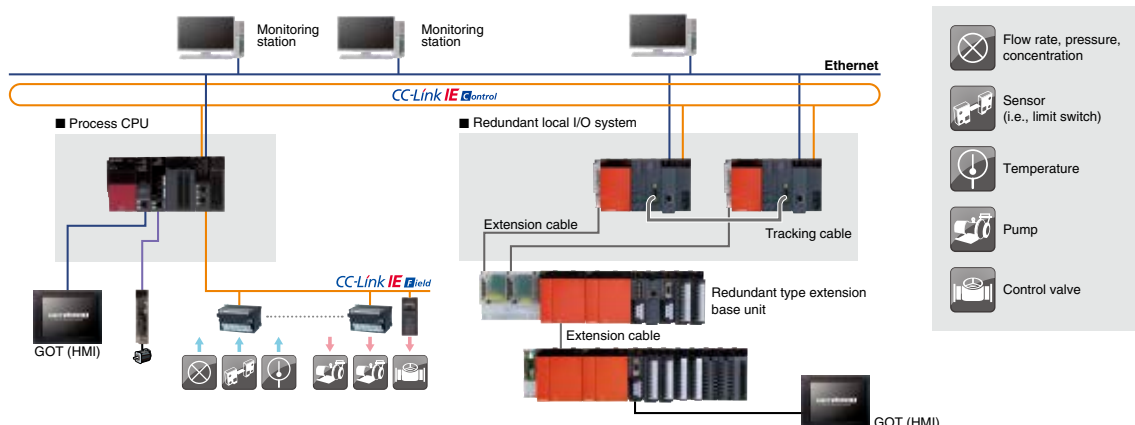
iQ-R Series   **Q Series**

Flexible process control in a cost-efficient automation control solution

The MELSEC process control system consists of a number of specialized controllers specifically designed for use in process automation such as petrochemical refinement and food/beverage production. The CPUs include a specialized set of proportional-integral-derivative (PID) algorithms, and are highly flexible utilizing standard automation control system features rather than highly-specialized distributed control system (DCS) solutions that can be costly to replace and maintain. The system is available in two types, general and high-reliability; the latter of which is in applications such as water treatment and waste incineration.

| Discrete process control | Food processing equipment, semiconductor systems, air-conditioning equipment, industrial furnaces, etc. | Continuous process control | Factors unpredictable by Mitsubishi Electric; damages to products and to other duties. Chemical, steel, environmental and water treatment plants, DCS replacement, etc. |

Program capacity

Continuous process control

● R120PCPU (1200K steps)

● R32PCPU (320K steps)

● Q25PHCPU (252K steps)
● Q25PRHCPU (252K steps)

● R16PCPU(160K steps)
● Q12PHCPU (124K steps)
● Q12PRHCPU (124K steps)

● R08PCPU (80K steps)
● Q06PHCPU (60K steps)
● Q02PHCPU (28K steps)

Discrete process control

● iQ-R Series Process CPU
● Q Series Process CPU
● Q Series Redundant CPU

10   50   100   500   **Number of PID loops[*1]**

*1: The maximum amount of usable PID loops may change depending on the actual program size used. Please refer to the relevant manuals for further details.

The MELSEC process CPU includes dedicated algorithms such as two-degree-of-freedom PID, sample PI, and auto-tuning. In addition, a high-reliability version is available which consists of dual CPU, power supply module, and network modules used together with a specialized high-reliability base unit. With high reliability, bumpless switch-over is achieved when a failure occurs such as in the CPU, network or power supply failure, ensuring continuous control where it is needed.

Monitoring station   Monitoring station

Ethernet

CC-Link IE Control

■ Process CPU   ■ Redundant local I/O system

Extension cable   Tracking cable

CC-Link IE Field

GOT (HMI)

Redundant type extension base unit

Extension cable

GOT (HMI)

Flow rate, pressure, concentration

Sensor (i.e., limit switch)

Temperature

Pump

Control valve

For further details, please refer to "iQ Platform C Controller" catalog.

L(NA)08165E

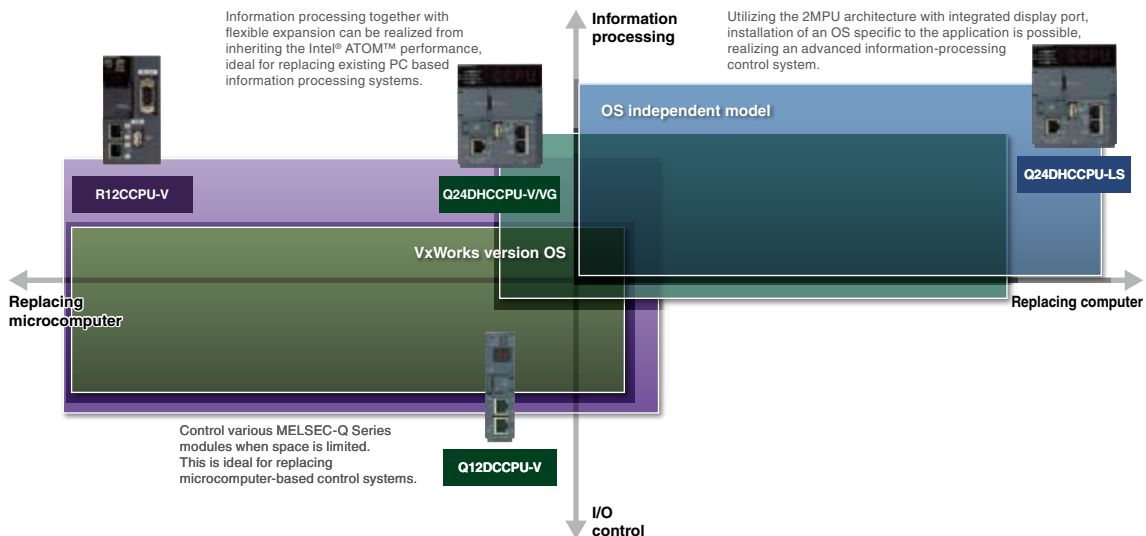# C Controller iQ Platform

Expand on the embedded capabilities of the C Controller
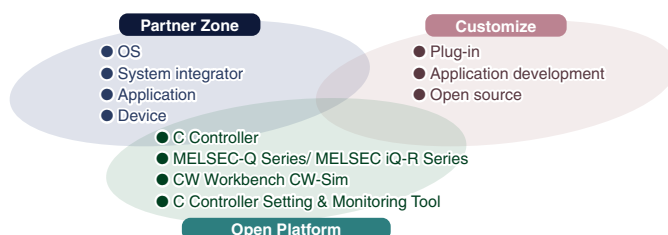
iQ-R Series   **Q Series**

Robust and deterministic alternative to microcomputer/computer based systems

The MELSEC C Controller product range is capable of programming using C language and offers a realistic alternative to mainstream microcomputer/computer based systems. Being part of the MELSEC Series, the C Controller utilizes its robust industrial design and long product life cycle, offering an easy way to realize a cost-efficient solution together with supporting partner products, open source and custom-made applications. This lineup is further enhanced with the new MELSEC iQ-R Series multi-core ARM®-based C Controller.

Information processing together with flexible expansion can be realized from inheriting the Intel® ATOM™ performance, ideal for replacing existing PC based information processing systems.

Information processing

Utilizing the 2MPU architecture with integrated display port, installation of an OS specific to the application is possible, realizing an advanced information-processing control system.

OS independent model

R12CCPU-V

Q24DHCCPU-V/VG

Q24DHCCPU-LS

VxWorks version OS

Replacing microcomputer

Replacing computer

Control various MELSEC-Q Series modules when space is limited. This is ideal for replacing microcomputer-based control systems.
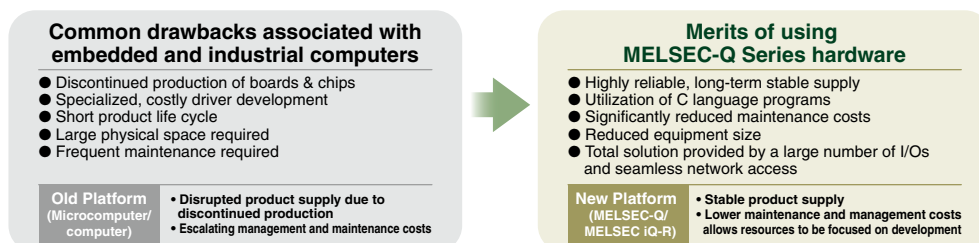
Q12DCCPU-V

I/O control

Generic platform utilizes partner products and open source applications

Highly customizable solution enables the integration of partner products, open source applications, and OS-independent capabilities onto a generic open platform.

Partner Zone
- OS
- System integrator
- Application
- Device

Customize
- Plug-in
- Application development
- Open source

- C Controller
- MELSEC-Q Series/ MELSEC iQ-R Series
- CW Workbench CW-Sim
- C Controller Setting & Monitoring Tool

Open Platform

Reduce common overhead expenses realizing a cost effective solution

The C Controller platform is a solution that realizes computer-level functionality without the burden of high maintenance costs usually associated with computers. In addition, by being based on the MELSEC control system, the C Controller has a robust design that is ideal for industrial environments.

Common drawbacks associated with embedded and industrial computers
- Discontinued production of boards & chips
- Specialized, costly driver development
- Short product life cycle
- Large physical space required
- Frequent maintenance required

Old Platform
(Microcomputer/ computer)
- Disrupted product supply due to discontinued production
- Escalating management and maintenance costs

Merits of using MELSEC-Q Series hardware
- Highly reliable, long-term stable supply
- Utilization of C language programs
- Significantly reduced maintenance costs
- Reduced equipment size
- Total solution provided by a large number of I/Os and seamless network access

New Platform
(MELSEC-Q/ MELSEC iQ-R)
- Stable product supply
- Lower maintenance and management costs allows resources to be focused on development

SERVO SYSTEM CONTROLLER iQ Platform

Total system performance leads to maximum performance

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

Lineup capable of responding to versatile sizes and applications

A full lineup of servo system controllers from Simple Motion modules to Motion Controllers supports all types of system configurations. Simple Motion modules are ideal for simple positioning control, and Motion Controllers are capable of controlling high-speed, multi-axis systems.

● Simple motion module

| MELSEC iQ-R Series | MELSEC-Q Series | MELSEC-L Series | MELSEC iQ-F Series |

- Simple positioning is executed simply by setting sequence programs
- Advanced synchronous control and cam control are available
- Safety system can be configured using the Functional Safety Unit.

● Motion controller

| MELSEC iQ-R Series | MELSEC-Q Series |

- Increases productivity by supporting the iQ Platform
- Advanced synchronous control and cam control are available
- Safety system can be configured using the Functional Safety Unit.
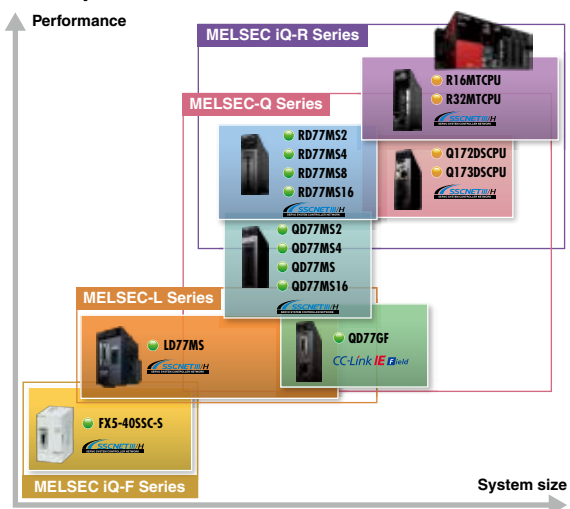
Total system performance leads to maximum performance

Mitsubishi Electric servo system controllers bring a revolutionary change to machine systems, with outstanding features including multiple CPUs connected through iQ Platform, advanced communication between servo amplifiers and motors, and partnerships with third-party companies.

Easy-to-use engineering environment

Programming efficiency is essential for optimal productivity. The MELSEC iQ-R Series optimizes all procedures, from design and debugging to startup.

Works perfectly with PLC CPU

Connected via the high-speed system bus, the programmable controller CPU and motion CPU work together performing machine and motion control, respectively.

High-speed system bus Approx. **40**x faster

Operation cycle Approx. **1.5**x faster 6 axes/0.222 ms

Data exchange cycle with PLC CPU Approx. **4**x faster 0.222 ms

Event task fixed cycle Fastest **0.222** ms (compared to previous model)

Partnership for higher productivity

Equipped with advanced dual engines that are only possible with our cutting-edge iQ platform technology, the MELSEC iQ-R Series is one step ahead of competitors, accelerating equipment evolution by collaborating with partner companies.

SSCNET Partner Association

CC-Link Partner Association

High-performance servo amplifiers

Connecting amplifiers to "SSCNET III/H" optical networks for highly accurate high-speed control when using the MR-J4 dedicated engine and high-resolution encoder.

AC servo MELSERVO-J4 Series

Speed frequency response of servo amplifier **2.5** kHz

SSCNET III/H communication speed **150** Mbps

For further details, please refer to "Mitsubishi Servo System Controllers MELSEC iQ-R Series" and "Mitsubishi Servo System Controllers" catalogs.
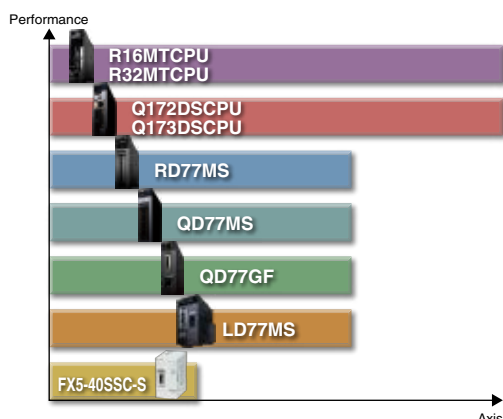
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Extensive motion control

Positioning, speed-torque (press-fit) and advanced synchronous control among other forms of motion control for various equipment, including X-Y table, packaging and press-fitting machines. Ideal features designed to provide optimal solutions for machines and applications.
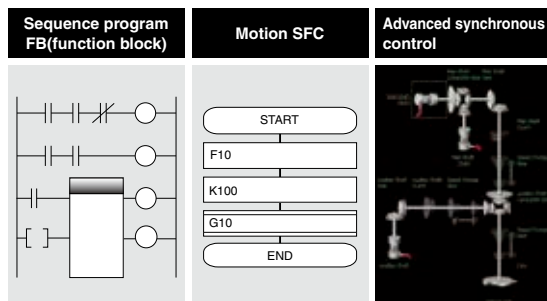
● Performance

An extensive lineup covers different performance, function, and programming needs.

Performance

R16MTCPU
R32MTCPU

Q172DSCPU
Q173DSCPU

RD77MS

QD77MS

QD77GF

LD77MS

FX5-40SSC-S

Axis

● Control

Versatile motion control support different machine operations.

Positioning control

Tightening & press-fit control

Advanced synchronous control

● Programming language

Choose from various programming languages provided to meet user preferences.

Sequence program FB(function block)	Motion SFC	Advanced synchronous control
	START F10 K100 G10 END	
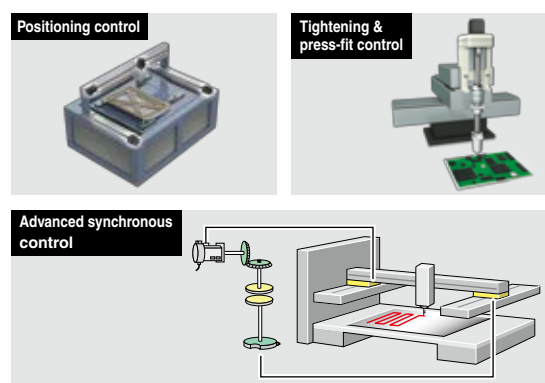
● Functions

Select the functions best suited to match equipment requirements from an extensive list of options.

Cam auto-generation	Mark detection function	Optional data monitor	Absolute position system
Unlimited length feed	Target position change function	Safety observation function	M-code output
Digital oscilloscope function	Master-slave operation	Vision system	

Upgrading different equipment

Wide range of motion control applications adaptable for machines of different types and sizes.

Vertical form, fill & seal

Converting machines

Sealing machines

Inspection and testing

Spinner machines

Alignment systems

Material handling machines

Pressing machines
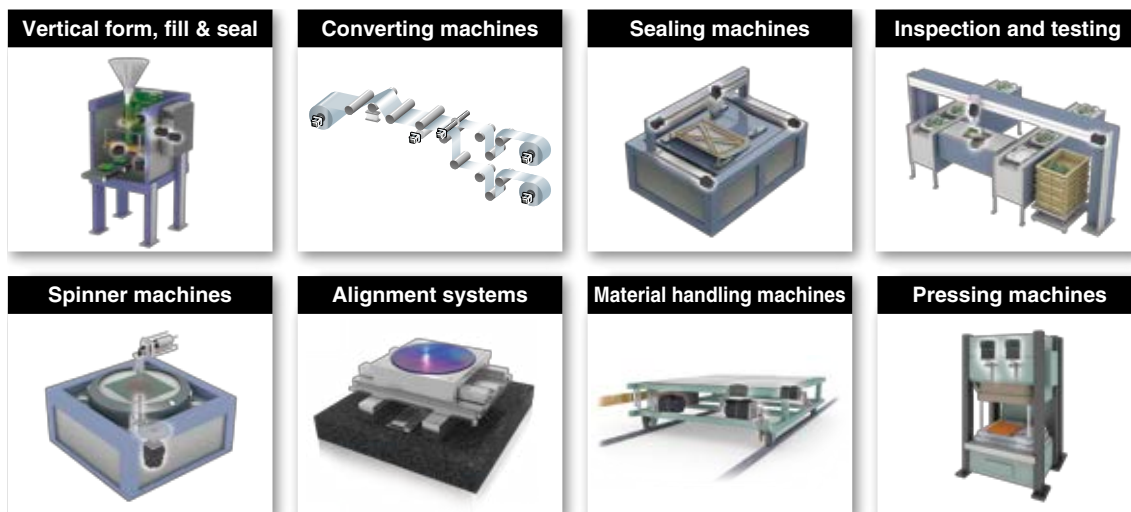
For further details, please refer to
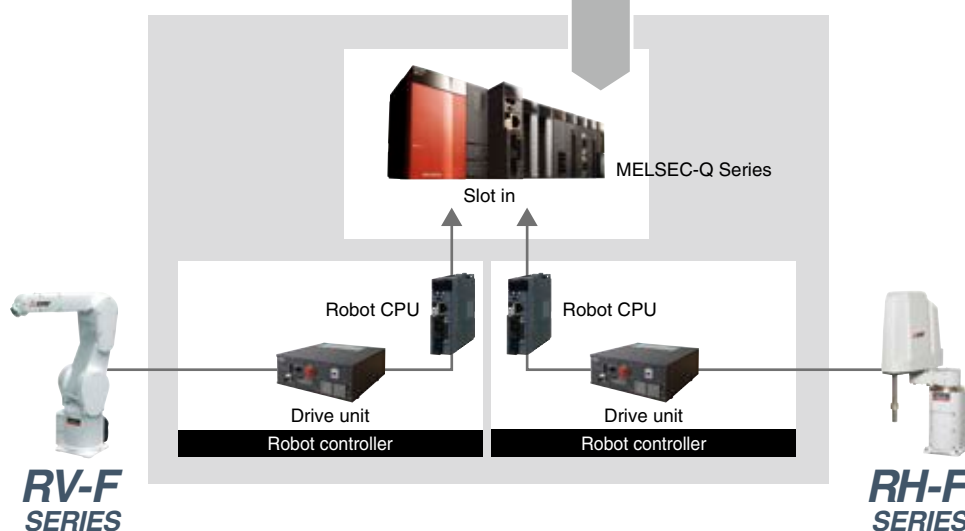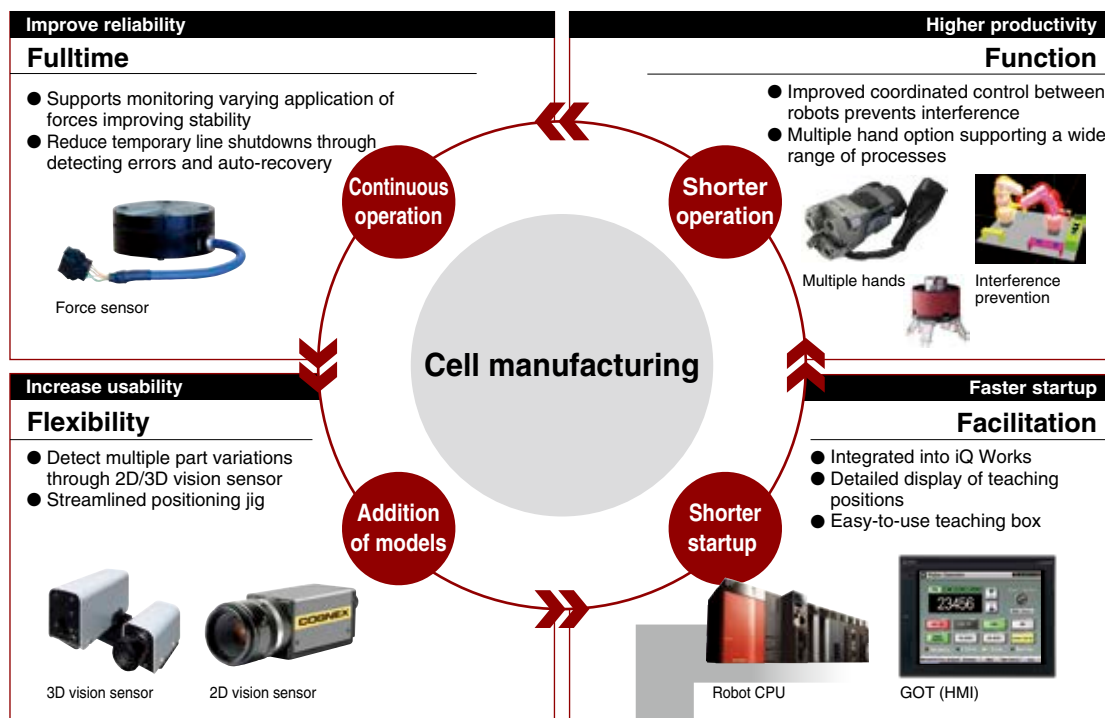"Mitsubishi INDUSTRIAL ROBOT MELFA F Series"
catalog.

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ROBOT CONTROLLER iQ Platform

Opening up multiple communication options through integration to the iQ Platform

Q Series

Leveraging the integration of robots into manufacturing lines

By integrating the use of MELFA robots into the iQ Platform, its possible to leverage communication with the automation controller, motion control and HMI. Utilizing the multi-CPU capabilities and integrated network/engineering environment, optimizing productivity can be achieved regardless of how complex or demanding the application.

Improve reliability
Fulltime
- Supports monitoring varying application of forces improving stability
- Reduce temporary line shutdowns through detecting errors and auto-recovery

Force sensor

Higher productivity
Function
- Improved coordinated control between robots prevents interference
- Multiple hand option supporting a wide range of processes

Multiple hands   Interference prevention

Increase usability
Flexibility
- Detect multiple part variations through 2D/3D vision sensor
- Streamlined positioning jig

3D vision sensor   2D vision sensor

Faster startup
Facilitation
- Integrated into iQ Works
- Detailed display of teaching positions
- Easy-to-use teaching box

Robot CPU   GOT (HMI)

Continuous operation

Shorter operation

Cell manufacturing

Addition of models

Shorter startup

MELSEC-Q Series

Slot in

Robot CPU   Robot CPU

Drive unit   Drive unit

Robot controller   Robot controller

RV-F SERIES

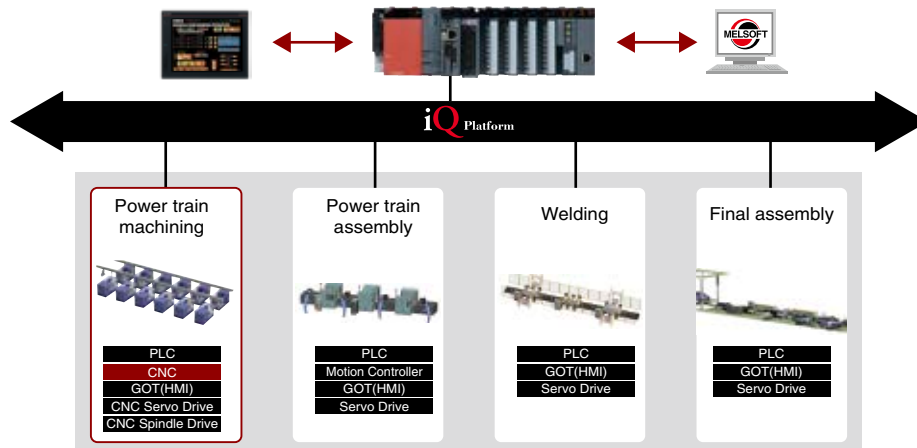*RH-F* SERIES

CNC CPU iQ Platform

Providing maximum reduction in TCO

Q Series

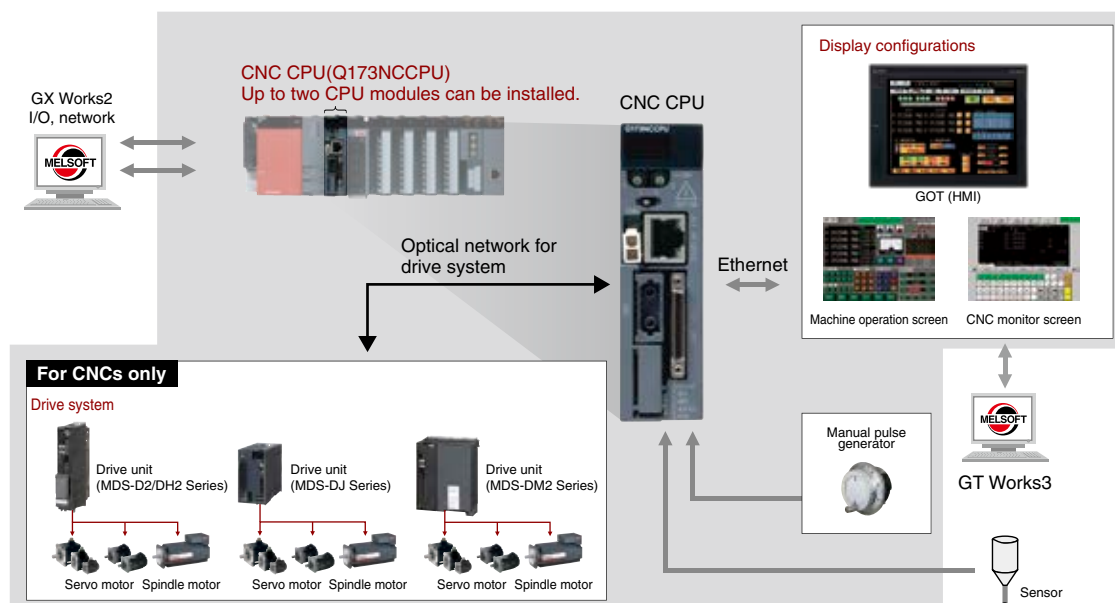## Integrating high-performance CNCs and high-speed programmable controllers

Integrate high-performance CNCs with the iQ Platform and experience substantially enhanced overall control system operation time, improving performance and enhancing productivity. Using standard modules contributes to reducing maintenance costs even further as replacements are generally available.

iQ Platform makes it possible to optimize controller use for various lines.

iQ Platform

Power train machining	Power train assembly	Welding	Final assembly
PLC	PLC	PLC	PLC
CNC	Motion Controller	GOT(HMI)	GOT(HMI)
GOT(HMI)	GOT(HMI)	Servo Drive	Servo Drive
CNC Servo Drive	Servo Drive		
CNC Spindle Drive			

High-speed communication between CNCs and programmable controllers

High-speed CPU processing supported by fast communication bus speeds enable high-speed communication between controllers.

GX Works2
I/O, network

MELSOFT

CNC CPU(Q173NCCPU)
Up to two CPU modules can be installed.

CNC CPU

Display configurations

GOT (HMI)

Machine operation screen   CNC monitor screen

Optical network for drive system

Ethernet

For CNCs only

Drive system

Drive unit (MDS-D2/DH2 Series)	Drive unit (MDS-DJ Series)	Drive unit (MDS-DM2 Series)
Servo motor Spindle motor	Servo motor Spindle motor	Servo motor Spindle motor

Manual pulse generator

MELSOFT

GT Works3

Sensor

Programmable controller engineering software
MELSOFT iQ Works

MELSOFT iQ Works is an integrated software suite consisting of GX Works3, MT Works2, GT Works3, RT ToolBox2 mini and FR Configurator2, which are programming software for each respective product. Integration is further enhanced with MELSOFT Navigator as the central system configuration incorporating an easy-to-use, graphical user interface with additional project-sharing features such as system labels and parameters. The advantages of this powerful integrated software suite are that system design is made much easier with a substantial reduction in repetitious tasks, cutting down on errors while helping to reduce the overall TCO.
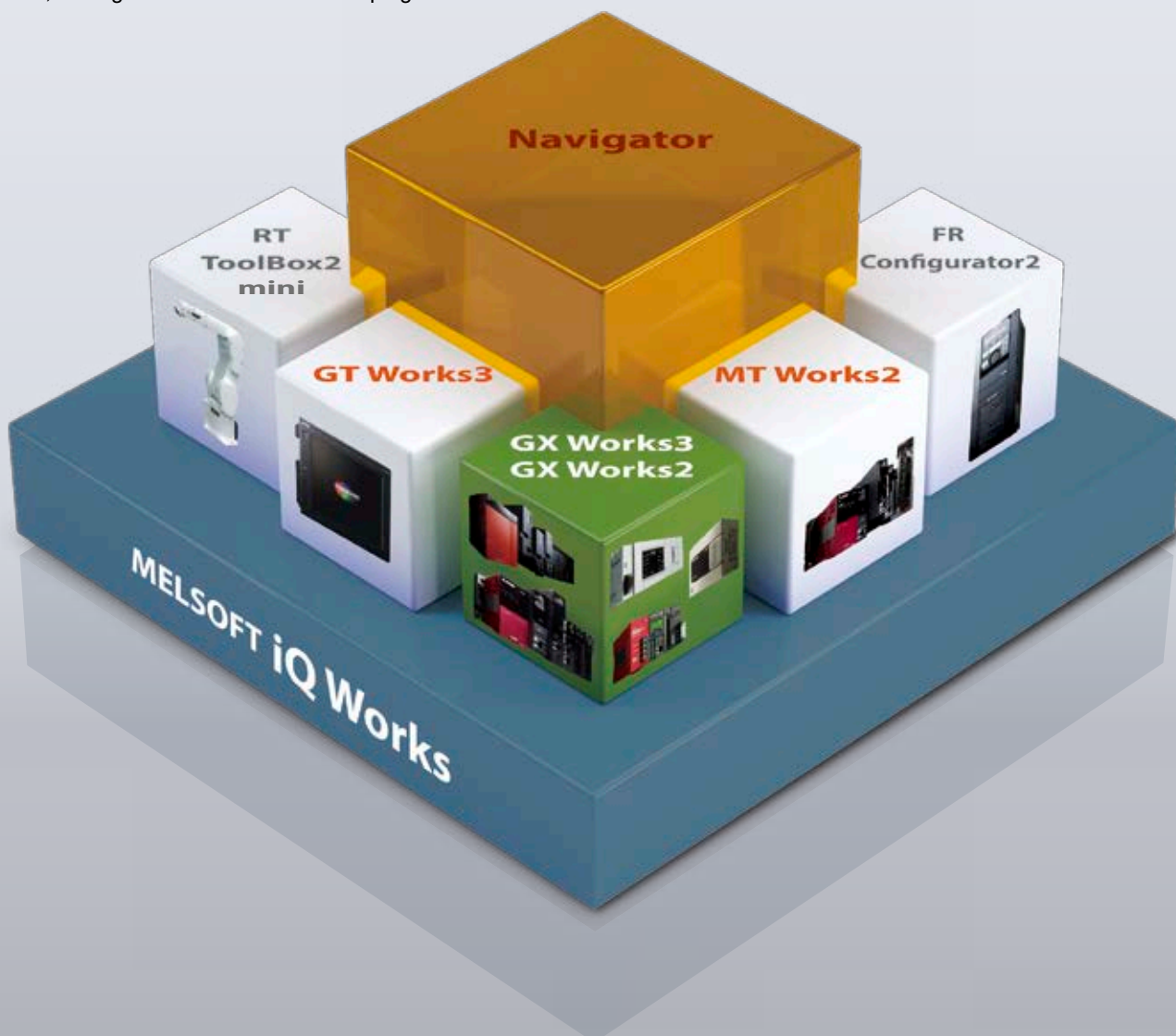
For further details, please refer to "MELSOFT iQ Works" catalog.

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System management software
MELSOFT Navigator

System level graphic-based configuration tool that simplifies the system design by providing a visual representation of the system.
System management features such as system-wide parameterization, labels and block reading of project data are also included.

Programmable controller engineering software
MELSOFT GX Works3

Latest generation of software available for the MELSEC iQ-R and iQ-F Series control systems. Includes a graphic-based system configuration, integrated motion control setup, multiple language support, in addition to extensive diagnosis and troubleshooting functions.
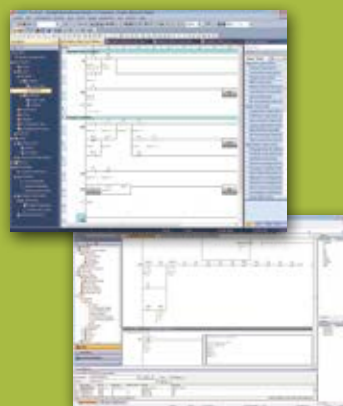
MELSOFT GX Works2

Incorporating backward compatibility of programs created with GX Developer, GX Works2 further improves its functionality resulting in reduced engineering costs.

## HMI/GOT screen design software
MELSOFT GT Works3

The GOT (Graphic Operation Terminal) screen creation software is designed with three main features;
Simplicity, Graphics Design, and Easy-Usability, further helping to create graphic screens in fewer steps.

## Motion controller engineering software
MELSOFT MT Works2

The motion control design and maintenance software includes intuitive graphic based programming together with a digital oscilloscope simulator.
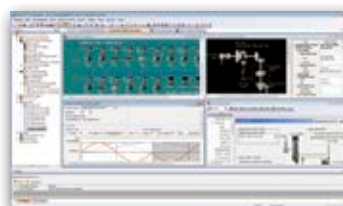
Robot engineering software
# MELSOFT RT ToolBox2 mini

Supports various steps from programming, to commissioning, evaluation, and maintenance. In addition, improved preventative maintenance is realized through the use of an integrated 3D robot simulator.
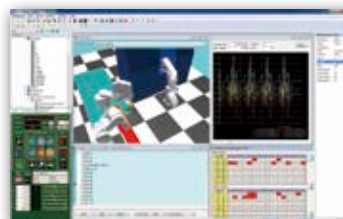
Inverter setup software
MELSOFT FR Configurator2

Simplifies the setup and maintenance of AC inverters. Parameters can be registered easily and distributed to multiple inverters when replacing, and activation of the PLC function all from one setup screen.
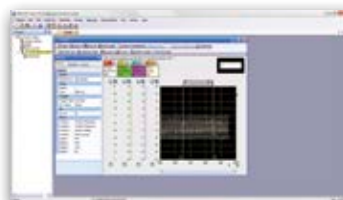
Programmable controller engineering software

GX Works3

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 and MELSEC iQ-F 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

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 to the device comment language switching feature.

Module configuration
Easily parameterize each module directly from the configuration editor.

Module list
Simply drag & drop modules directly into the module configuration.

For further details, please refer to
"Programmable controller engineering software
MELSOFT GX Works3.

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GX Works3

One Software, Many Possibilities

Reduce engineering time by 60%*1
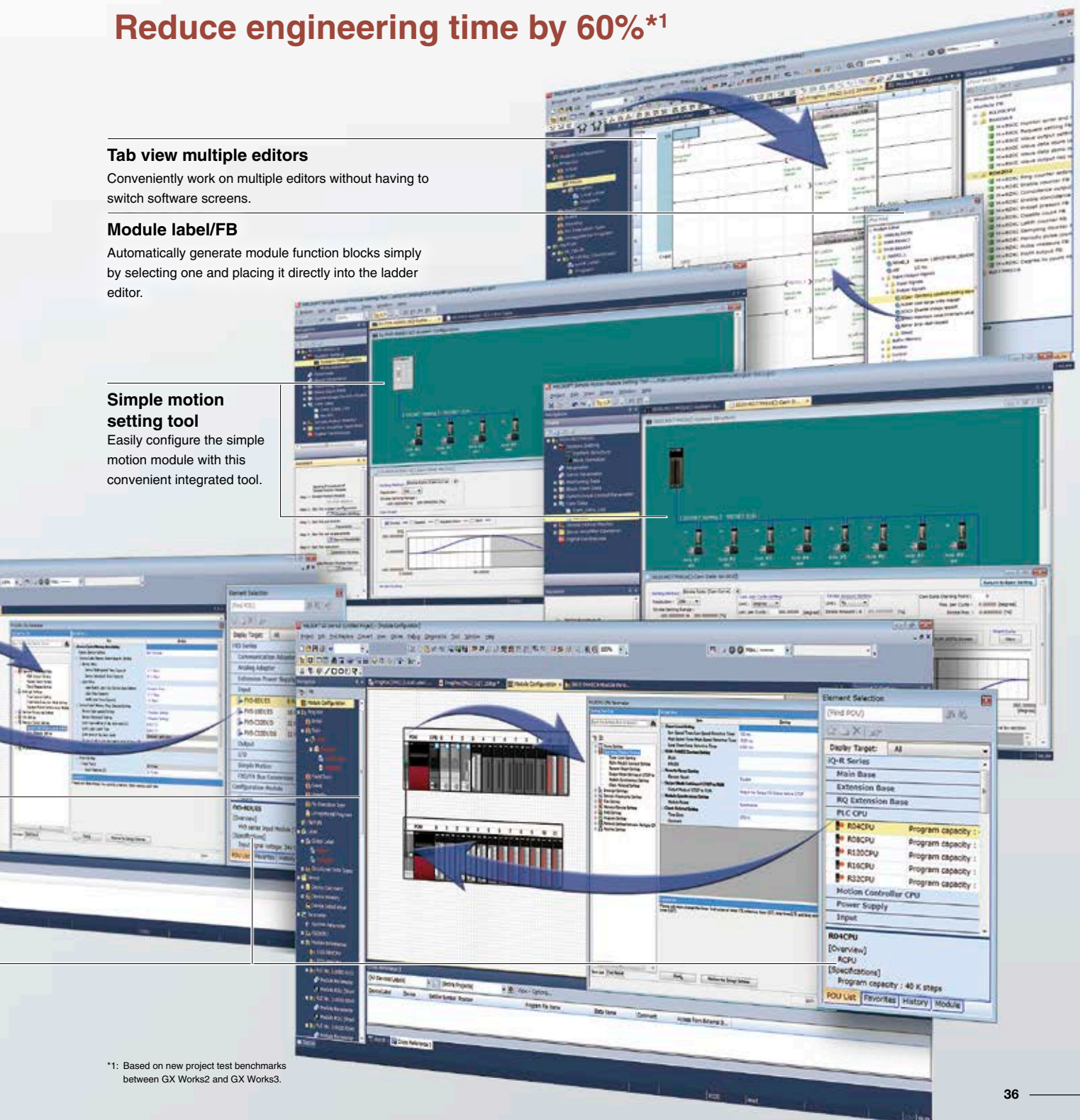
Tab view multiple editors

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

Module label/FB

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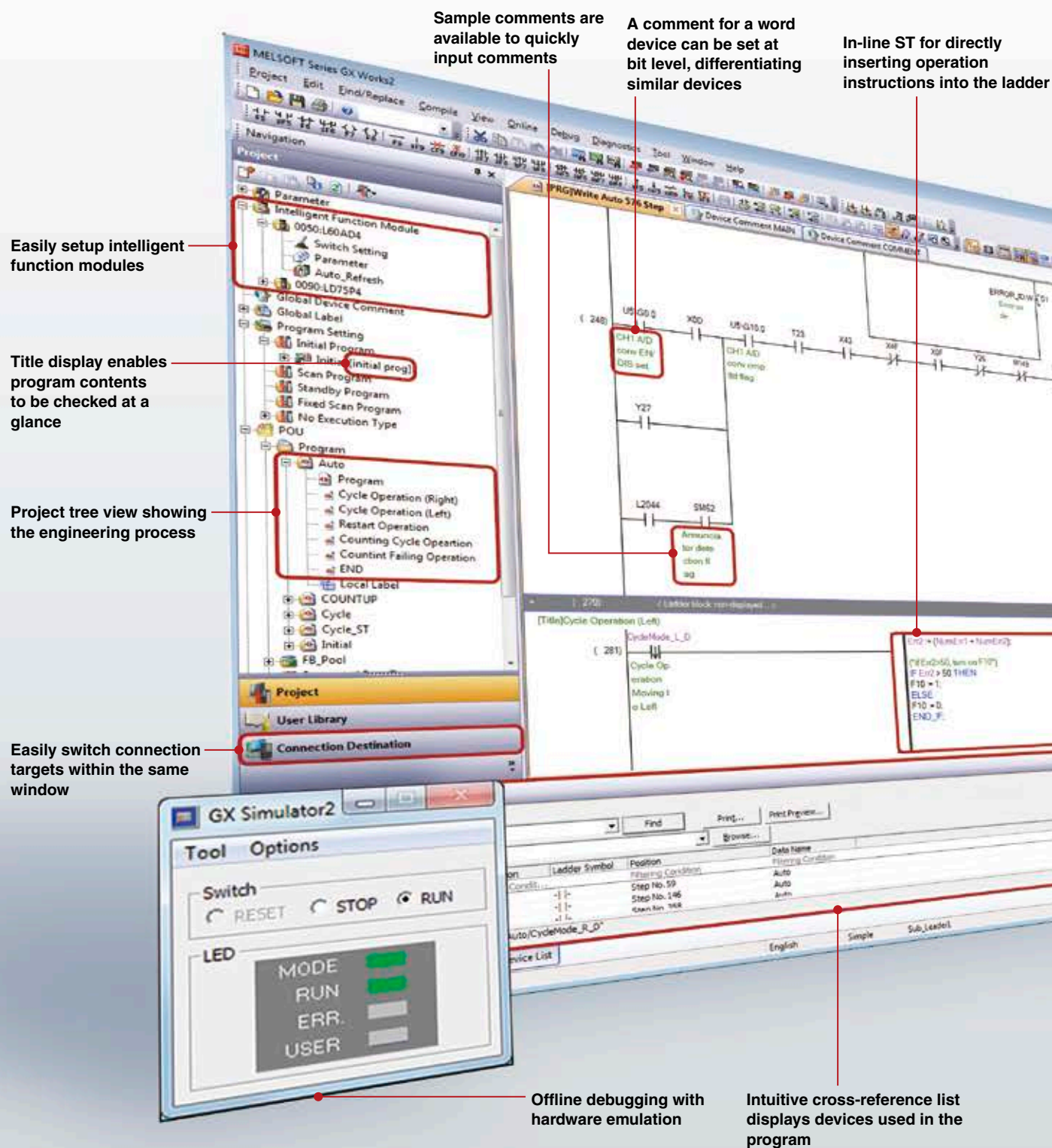
Simple motion setting tool

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

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

Programmable controller engineering software

GX Works2

Sample comments are available to quickly input comments

A comment for a word device can be set at bit level, differentiating similar devices

In-line ST for directly inserting operation instructions into the ladder

Easily setup intelligent function modules

Title display enables program contents to be checked at a glance

Project tree view showing the engineering process

Easily switch connection targets within the same window

Offline debugging with hardware emulation

Intuitive cross-reference list displays devices used in the program

For further details, please refer to
"iQ Platform Compatible
Programmable Controller Engineering Software
MELSOFT GX Works2" catalog.

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Engineering software designed for easy usability

GX Works2 has been designed to realize intuitive programming, maintenance, and debugging through various integrated features.
The software supports IEC 61131-3 programming amongst the compatible programming languages, making it easy to use across
multiple applications. It has an extensive maintenance features set, allowing easy setup of the control system, connected networks, and
various intelligent I/O. GX Works2 is designed with customers in mind including consolidated "all-in-one" packaged programming that
integrates programming, configuration and simulation tools.

Watch window for quick device/label monitoring

Sampling trace enables reduced setup and maintenance

System monitoring provides easier maintenance

Further simplify debugging with device search functionality
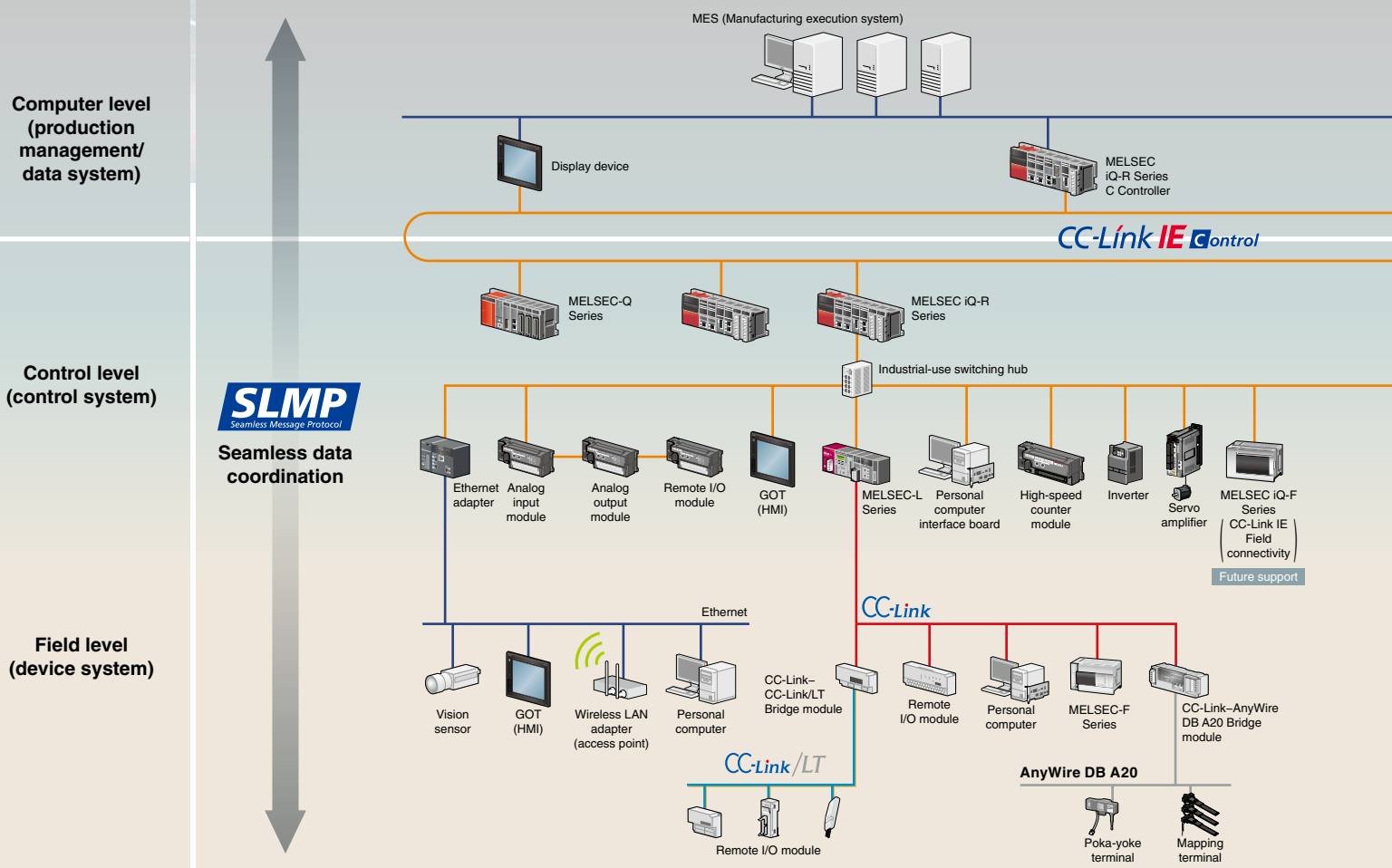
Intuitive project management

The project tree view, which is
situated to the left of the docking
window, enables easy understanding
and management of the entire project.
Various features such as viewing titles
and handling multiple projects enable
a very efficient and cost-effective way
to manage projects, substantially
reducing the overall engineering time.
Project restoration is also easy using
the back-up and restore feature.

Extensive program standardization

Program standardization is simplified
using function blocks (FBs) within
the program. The FBs make it easy
to duplicate programming code that
can be used multiple times in the
project, or for other projects. This
reduces programming time and
realizes more efficient programming.
A function library is also available,
enabling standard FBs to be imported
into projects, which saves on initial
creation time.

Easy maintenance and debugging

Dedicated system monitoring and
PLC diagnostics simplify control
system maintenance and make
error monitoring easy. Various
security features are incorporated
to protect intellectual property, such
as controlling access to projects
involving multi-person development
teams using hierarchal-dependent
access. Debugging using comments
and project simulation is fairly easy,
requiring no hardware.

Computer level (production management/data system)

Control level (control system)

Field level (device system)

MES (Manufacturing execution system)

Display device

MELSEC iQ-R Series C Controller

CC-Link IE Control

MELSEC-Q Series

MELSEC iQ-R Series

Industrial-use switching hub

SLMP Seamless Message Protocol

Seamless data coordination

Ethernet adapter | Analog input module | Analog output module | Remote I/O module | GOT (HMI) | MELSEC-L Series | Personal computer interface board | High-speed counter module | Inverter | Servo amplifier | MELSEC iQ-F Series CC-Link IE Field connectivity

Future support

Ethernet

CC-Link

Vision sensor | GOT (HMI) | Wireless LAN adapter (access point) | Personal computer | CC-Link–CC-Link/LT Bridge module | Remote I/O module | Personal computer | MELSEC-F Series | CC-Link–AnyWire DB A20 Bridge module

CC-Link/LT

Remote I/O module

AnyWire DB A20

Poka-yoke terminal | Mapping terminal

Seamless connectivity within all levels of manufacturing

CC-Link IE Control

CC-Link IE Control is a high-reliability distributed control network designed to handle very large data communications (128 K word) over a high-speed (1 Gbps) dual-loop optical or twisted-pair cable topology.

CC-Link IE Field

CC-Link IE Field is a versatile gigabit Ethernet-based network integrating controller, I/O control, safety control, and motion control in a flexible wiring topology supporting star, ring, and line configurations.

BACnet™

Supporting the communication protocol standard BACnet™ client, this network is mainly used to monitor and control air-conditioning, lighting and fire detection, etc., in building automation applications.

CC-Link   CC-Link Safety   CC-Link/LT

CC-Link is a high-speed and highly reliable deterministic I/O control network that realizes reduced wiring. This open field network is a global standard, originating from Japan and Asia with more than 1,400 partner products.

AnyWire

AnyWire is a sensor level distributed control network that is designed to reduce installation costs by utilizing general-purpose wiring and robot cables.

SSCNET Ⅲ/H
SERVO SYSTEM CONTROLLER NETWORK

SSCNET Ⅲ/H is a dedicated high-speed, high-performance, and highly reliable servo system control network that offers flexible long-distance wiring capabilities based on optical-fiber cable topology.
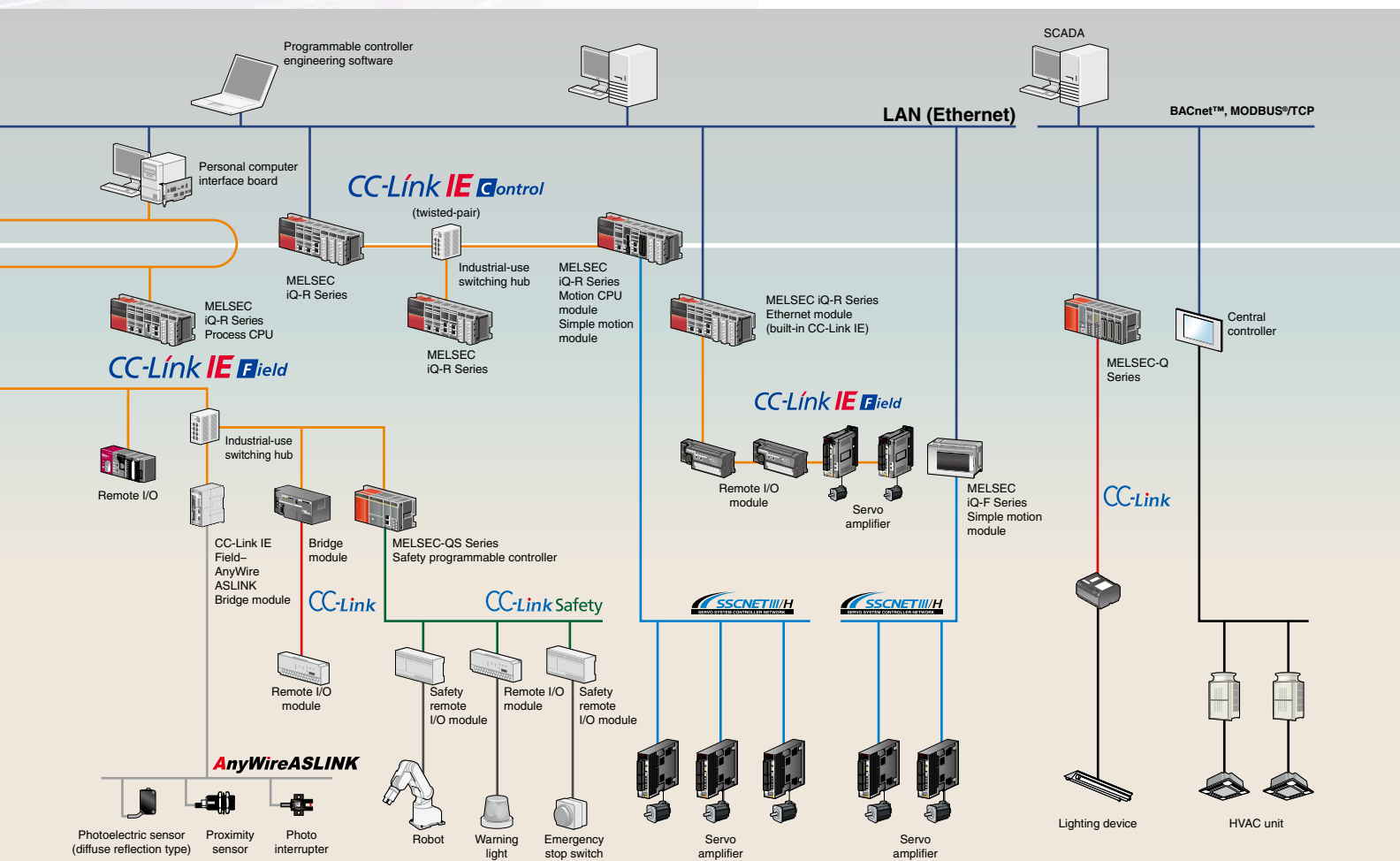
MODBUS®

MELSEC supports the MODBUS® protocol network, realizing easy communication, with various MODBUS® slave devices compatible with Ethernet MODBUS®/TCP or RS-232/422/485 serial communication.
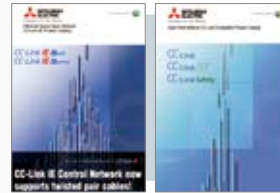
For further details, please refer to "Ethernet-based Open Network CC-Link IE Product" and "Open Field Network CC-Link Compatible Product" catalogs.
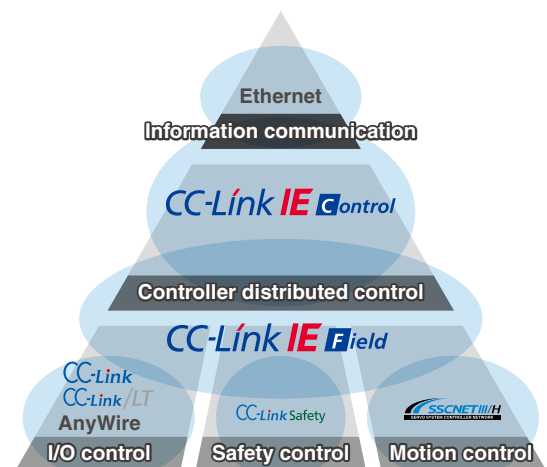
L(NA)08111E, L(NA)08038E

SCADA

LAN (Ethernet)

BACnet™, MODBUS®/TCP

Programmable controller engineering software

Personal computer interface board

CC-Link IE Control (twisted-pair)

MELSEC iQ-R Series

Industrial-use switching hub

MELSEC iQ-R Series Motion CPU module Simple motion module

MELSEC iQ-R Series Ethernet module (built-in CC-Link IE)

Central controller

MELSEC iQ-R Series Process CPU

CC-Link IE Field

MELSEC iQ-R Series

MELSEC-Q Series

Remote I/O

Industrial-use switching hub

CC-Link IE Field–AnyWire ASLINK Bridge module

Bridge module

MELSEC-QS Series Safety programmable controller

CC-Link IE Field

Remote I/O module

Servo amplifier

MELSEC iQ-F Series Simple motion module

CC-Link

CC-Link Safety

Remote I/O module

Safety remote I/O module

Remote I/O module

Safety remote I/O module

AnyWireASLINK

Photoelectric sensor (diffuse reflection type)

Proximity sensor

Photo interrupter

Robot

Warning light

Emergency stop switch

Servo amplifier

Servo amplifier
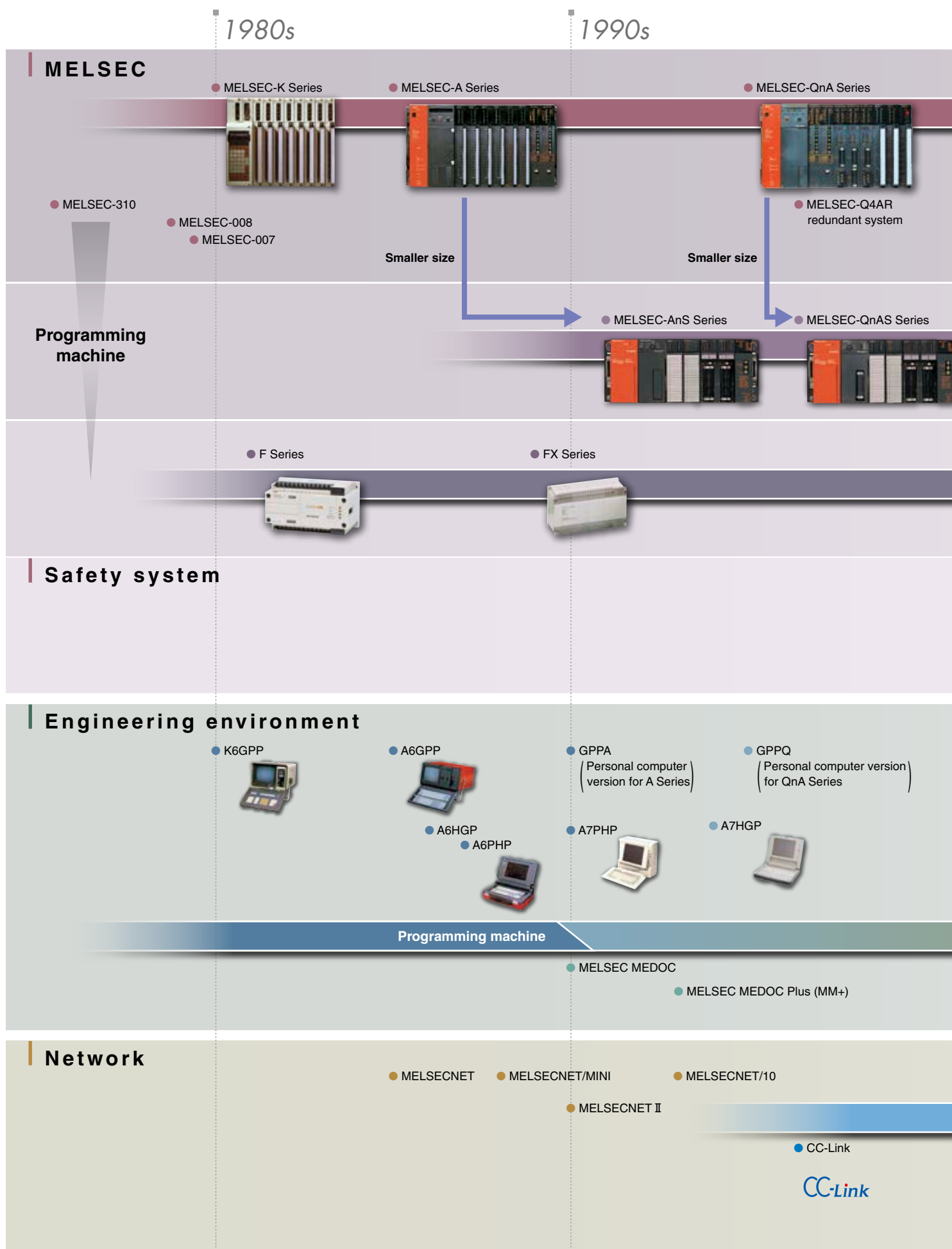
Lighting device

HVAC unit

Reduce system configuration costs

Seamless connectivity is possible between production management systems, programmable controllers and other devices without having to worry about network hierarchies or boundaries. Monitoring and programming can be performed from virtually anywhere on the network, and on Ethernet devices supporting SLMP*1, such as vision sensors and RFID controllers.
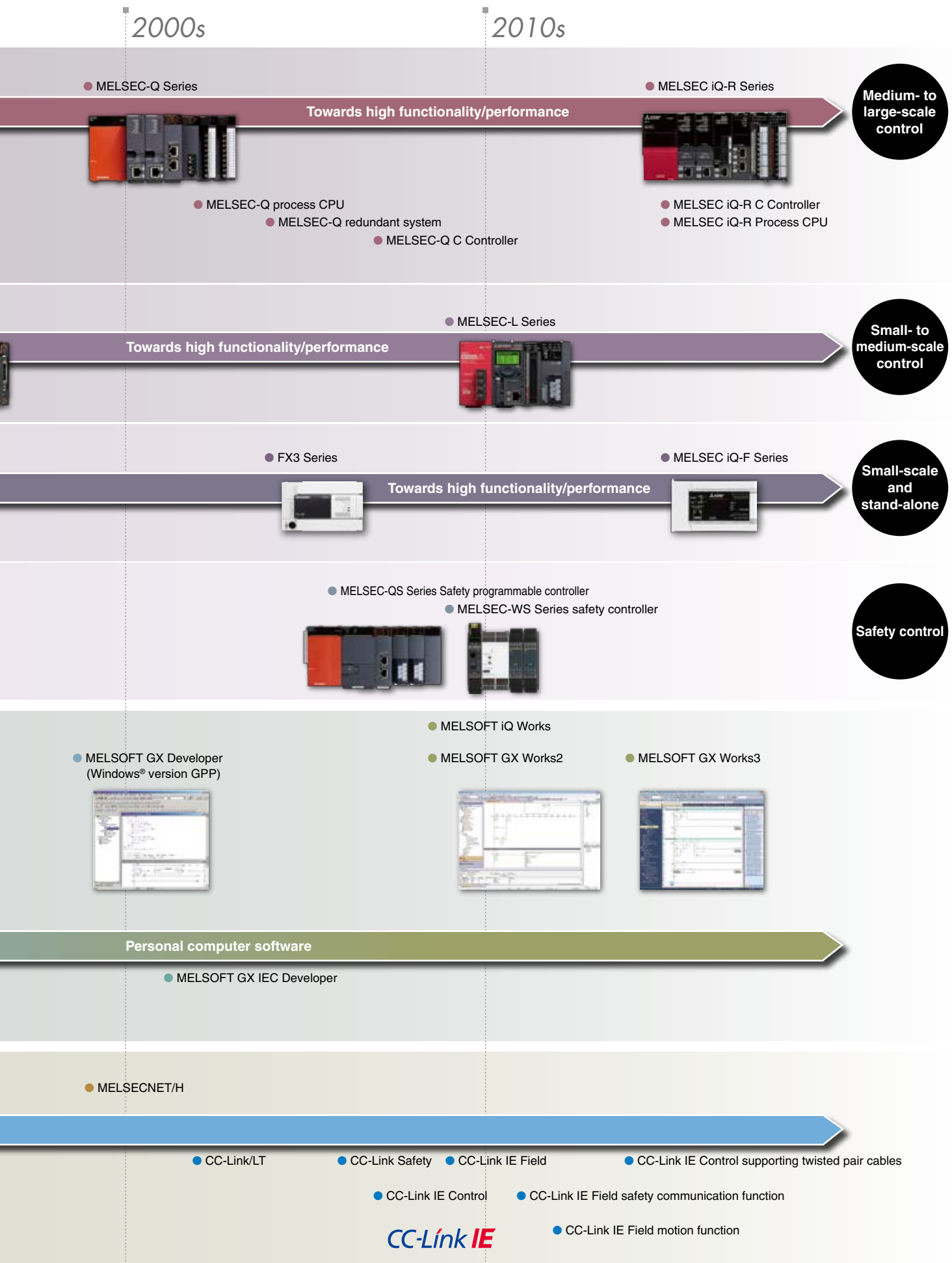
*1: SLMP (Seamless Message Protocol): Is a client/server protocol that enables communications between Ethernet-ready and CC-Link IE compatible devices
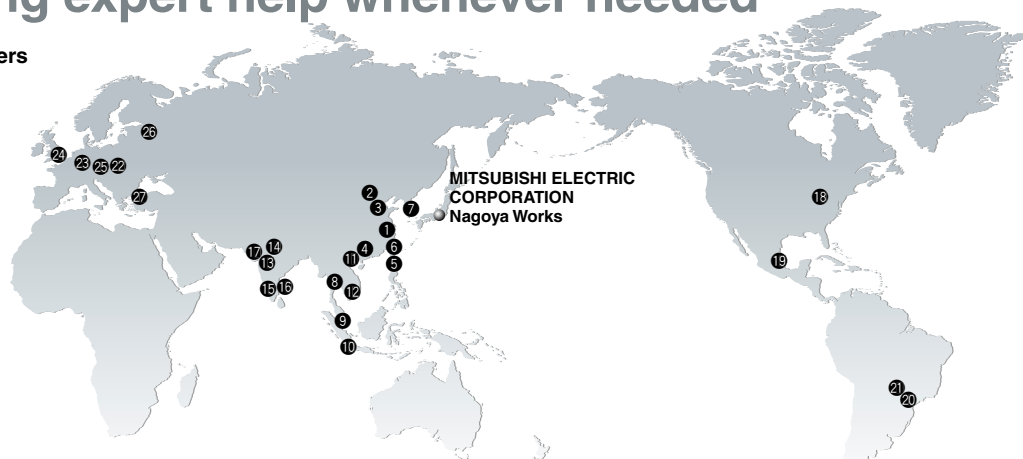
Ethernet — Information communication
CC-Link IE Control — Controller distributed control
CC-Link IE Field
CC-Link, CC-Link/LT, AnyWire — I/O control
CC-Link Safety — Safety control
SSCNETIII/H — Motion control

40

MELSEC History

MELSEC

● MELSEC-K Series   ● MELSEC-A Series   ● MELSEC-QnA Series

● MELSEC-310

● MELSEC-008   ● MELSEC-Q4AR
                                                                  redundant system
● MELSEC-007

Smaller size   **Smaller size**

**Programming
machine**

● MELSEC-AnS Series   ● MELSEC-QnAS Series

● F Series   ● FX Series

Safety system

Engineering environment

● K6GPP   ● A6GPP   ● GPPA   ● GPPQ
                                                      (Personal computer)   (Personal computer version)
                                                      (version for A Series)   (for QnA Series)

                           ● A6HGP   ● A7PHP   ● A7HGP
                             ● A6PHP

Programming machine

● MELSEC MEDOC

● MELSEC MEDOC Plus (MM+)

Network

● MELSECNET   ● MELSECNET/MINI   ● MELSECNET/10

● MELSECNET II

● CC-Link

CC-Link

MELSEC with history and experience.
Satisfying new challenges while utilizing past expertise

2000s   *2010s*

● MELSEC-Q Series

Towards high functionality/performance

● MELSEC iQ-R Series

Medium- to large-scale control

● MELSEC-Q process CPU
    ● MELSEC-Q redundant system
        ● MELSEC-Q C Controller

● MELSEC iQ-R C Controller
● MELSEC iQ-R Process CPU

● MELSEC-L Series

Towards high functionality/performance

Small- to medium-scale control

● FX3 Series

Towards high functionality/performance

● MELSEC iQ-F Series

Small-scale and stand-alone

● MELSEC-QS Series Safety programmable controller
    ● MELSEC-WS Series safety controller

Safety control

● MELSOFT iQ Works

● MELSOFT GX Developer (Windows® version GPP)
● MELSOFT GX Works2
● MELSOFT GX Works3

Personal computer software

● MELSOFT GX IEC Developer

● MELSECNET/H

● CC-Link/LT   ● CC-Link Safety   ● CC-Link IE Field   ● CC-Link IE Control supporting twisted pair cables

    ● CC-Link IE Control   ● CC-Link IE Field safety communication function

    ● CC-Link IE Field motion function

CC-Link IE

Extensive global support coverage providing expert help whenever needed

■ Global FA centers

MITSUBISHI ELECTRIC
CORPORATION
Nagoya Works

China

❶ Shanghai FA Center

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❺ Taichung FA Center

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❻ Taipei FA Center

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❼ Korea FA Center

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❿ Indonesia FA Center

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Vietnam

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⓭ India Pune FA Center

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⓮ India Gurgaon FA Center

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Tel: +52-55-3067-7511

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⓴ Brazil FA Center

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㉓ Germany FA Center

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㉔ UK FA Center

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㉕ Czech Republic FA Center

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㉖ Russia FA Center

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㉗ Turkey FA Center

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## Factory Automation Global website

Mitsubishi Electric Factory Automation provides a mix of services to support its customers worldwide. A consolidated global website is the main portal, offering a selection of support tools and a window to its local Mitsubishi Electric sales and support network.

■ **From here you can find:**

• Overview of available factory automation products
• Library of downloadable literature
• Support tools such as online e-learning courses, terminology dictionary, etc.
• Global sales and service network portal
• Latest news related to Mitsubishi Electric factory automation

Mitsubishi Electric Factory Automation Global website:

www.MitsubishiElectric.com/fa
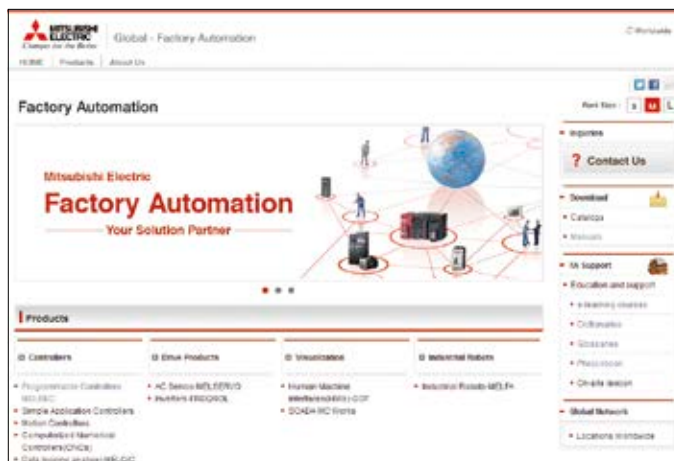
Online e-learning

An extensive library of e-learning courses covering the factory automation product range has been prepared. Courses from beginner to advanced levels of difficulty are available in various languages.

■ **Beginner level**
Designed for newcomers to Mitsubishi Electric Factory Automation products gaining a background of the fundamentals and an overview of various products related to the course.

■ **Basic to Advanced levels**
These courses are designed to provide education at all levels. Various different features are explained with application examples providing an easy and informative resource for in-house company training.

Innovative next-generation, e-manual

The e-manual viewer is a next-generation digital manual offered by Mitsubishi Electric that consolidates all manuals into an easy-to-use package with various useful features integrated into the viewer. The e-manual is modeled around a centralized database allowing multiple manuals to be cross-searched at once, further reducing the time for reading individual product manuals when setting up a control system.
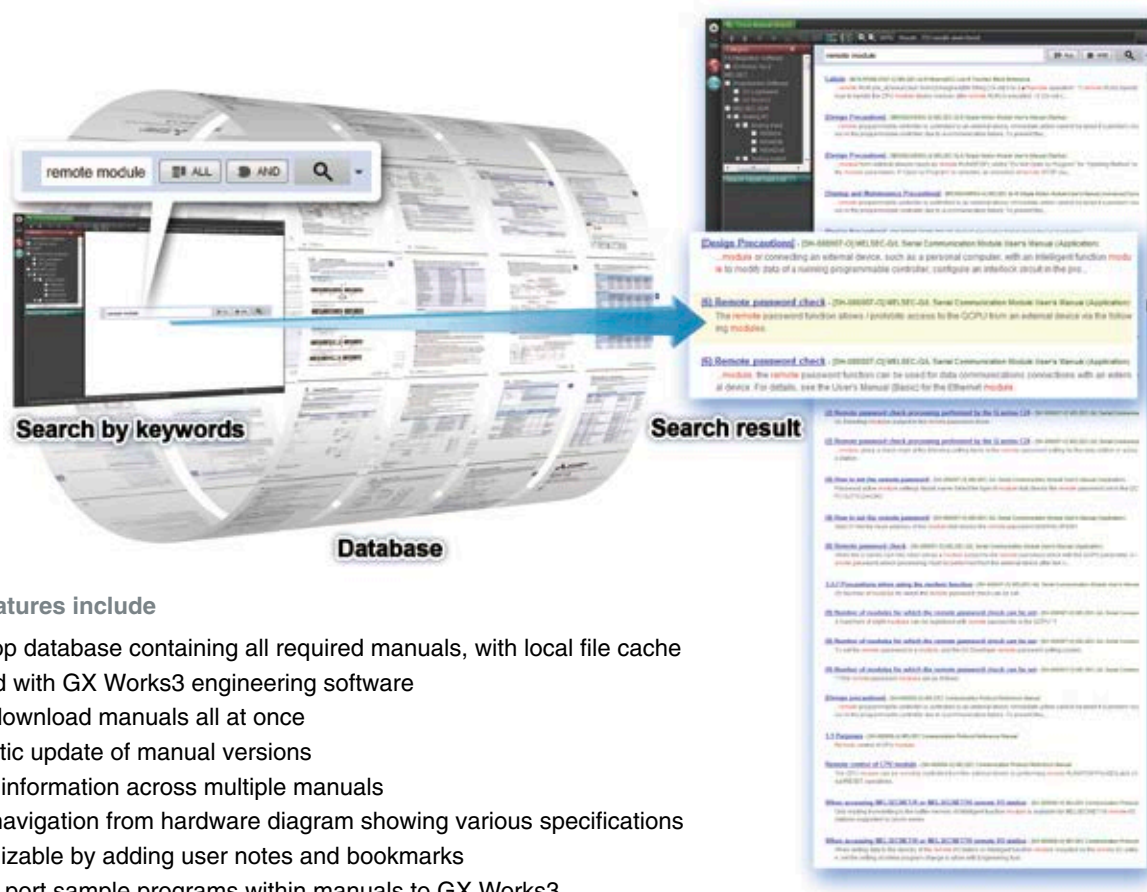
■ **Key features include**

• One-stop database containing all required manuals, with local file cache
• Bundled with GX Works3 engineering software
• Easily download manuals all at once
• Automatic update of manual versions
• Search information across multiple manuals
• Visual navigation from hardware diagram showing various specifications
• Customizable by adding user notes and bookmarks
• Directly port sample programs within manuals to GX Works3

Precautions before use

This publication explains the typical features and functions of the products herein and does not provide restrictions or other information related to usage and module combinations. Before using the products, always read the product user manuals. Mitsubishi Electric will not be held liable for damage caused by factors found not to be the cause of Mitsubishi Electric; opportunity loss or lost profits caused by faults in Mitsubishi Electric products; damage, secondary damage, or accident compensation, whether foreseeable or not, caused by special factors; damage to products other than Mitsubishi Electric products; or any other duties.

⚠ For safe use

To use the products appearing in this publication properly, always read relevant manuals carefully before beginning operation.
The products are manufactured as general-purpose parts for general industries, and are not designed or manufactured to be incorporated in a device or system used for purposes related to human life.
Before using the products for special purposes such as nuclear power, electric power, aerospace, medicine or passenger-carrying vehicles, consult with Mitsubishi Electric.
The products are manufactured under strict quality control. However, when installing the products where major accidents or losses could occur if the products fail, install appropriate backup or fail-safe functions in the system.

YOUR SOLUTION PARTNER
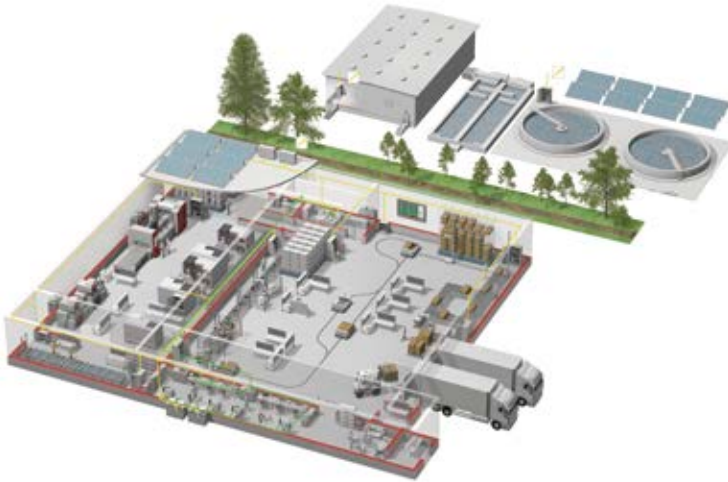
Mitsubishi Electric offers a wide range of automation equipment from PLCs and HMIs to CNC and EDM machines.

A NAME TO TRUST

Since its beginnings in 1870, some 45 companies use the Mitsubishi name, covering a spectrum of finance, commerce and industry.

The Mitsubishi brand name is recognized around the world as a symbol of premium quality.

Mitsubishi Electric Corporation is active in space development, transportation, semi-conductors, energy systems, communications and information processing, audio visual equipment and home electronics, building and energy management and automation systems, and has 237 factories and laboratories worldwide in over 121 countries.

This is why you can rely on Mitsubishi Electric automation solution - because we know first hand about the need for reliable, efficient, easy-to-use automation and control in our own factories.

As one of the world's leading companies with a global turnover of over 4 trillion Yen (over $40 billion), employing over 100,000 people, Mitsubishi Electric has the resource and the commitment to deliver the ultimate in service and support as well as the best products.

Low voltage: MCCB, MCB, ACB

Medium voltage: VCB, VCC

Power monitoring, energy management

Compact and Modular Controllers

Inverters, Servos and Motors

Visualization: HMIs, Software, MES connectivity

Numerical Control (NC)
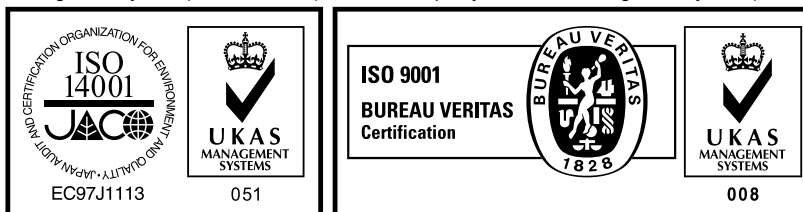

Robots: SCARA, Articulated arm

Processing machines: EDM, Lasers, IDS

Air-conditioning, Photovoltaic, EDS

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USA	MITSUBISHI ELECTRIC AUTOMATION, INC. 500 Corporate Woods Parkway, Vernon Hills, IL 60061, U.S.A.	Tel : +1-847-478-2100 Fax : +1-847-478-2253
Mexico	MITSUBISHI ELECTRIC AUTOMATION, INC. Mexico Branch Mariano Escobedo #69, Col. Zona Industrial, Tlalnepantla Edo, C.P.54030, Mexico	Tel : +52-55-3067-7500
Brazil	MITSUBISHI ELECTRIC DO BRASIL COMÉRCIO E SERVIÇOS LTDA. Rua Jussara, 1750-Bloco B Anexo, Jardim Santa Cecilia, CEP 06465-070, Barueri-SP, Brasil	Tel : +55-11-4689-3000 Fax : +55-11-4689-3016
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Mitsubishi Electric Corporation Nagoya Works is a factory certified for ISO 14001 (standards for environmental management systems) and ISO 9001(standards for quality assurance management systems)

ISO 14001
JACO
CERTIFICATION ORGANIZATION FOR ENVIRONMENT AND QUALITY·JAPAN AUDIT AND CERTIFICATION
UKAS MANAGEMENT SYSTEMS
EC97J1113   051

ISO 9001
BUREAU VERITAS
Certification
BUREAU VERITAS 1828
UKAS MANAGEMENT SYSTEMS
008

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