Programmable Controller

MELSEC Consolidated Catalog

Programmable Controller

MELSEC
designed with automation in mind
GLOBAL IMPACT OF MITSUBISHI ELECTRIC

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.

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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.

Maximizing productivity and reducing costs across the entire enterprise

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.
MELSEC

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

Application-specific CPUs

- Process/Redundant CPU
- C Controller
- Motion CPU
- Robot CPU
- CNC CPU

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

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.
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.

### Automotive

![Automotive Image]

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

![Automated warehouse Image]

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

![Food and beverage, CPG Image]

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

### Semiconductor

![Semiconductor Image]

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

![Pick-and-place Image]

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)

![Flat panel display (FPD) Image]

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

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

Renewable energy

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

Printing

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

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

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

Building automation

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

Injection molding

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

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

<table>
<thead>
<tr>
<th>Series</th>
<th>Modular type</th>
<th>Modular type</th>
<th>Baseless type</th>
</tr>
</thead>
</table>
|              | MELSEC-Q  
(PAC: Programmable automation controller) | MELSEC-Q  
(Prorogrammable controller CPU) | MELSEC-Q  
(Prorogrammable controller CPU) |
|              | MELSEC-L  
(Single/Stand-alone) | MELSEC-L  
(Prorogrammable controller CPU) | MELSEC-L  
(Prorogrammable controller CPU) |
| Lineup       | - Programmable controller CPU: 5 models | - Programmable controller CPU: 5 models | - Programmable controller CPU: 5 models |
|              | - Motion controller: 2 models | - Process CPU: 4 models | - Sink type: 5 models |
|              | - Process CPU: 4 models | - Redundant CPU: 2 models | - Source type: 5 models |
|              | - C Controller: 1 model | - C Controller: 4 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) | - Ladder diagram |
|              | - Sequential function chart (SFC) | - Instruction list | - Structured text (ST) |
|              | - Function block diagram (FB/BLD) | - MELSAP3 (SFC), MELSAP-L | - Instruction list |
|              | - Function block (FR) | - Function block diagram (FBD) | - MELSAP3 (SFC), MELSAP-L |
|              | - C/C++,** | - Function block (FB) | - Function block (FB) |
| Programming language | - Ladder diagram | - Structured text (ST) | - Ladder diagram |
|              | - Sequential function chart (SFC) | - Instruction list | - Structured text (ST) |
|              | - Function block diagram (FB/BLD) | - MELSAP3 (SFC), MELSAP-L | - Instruction list |
|              | - Function block (FR) | - Function block diagram (FBD) | - MELSAP3 (SFC), MELSAP-L |
|              | - C/C++,** | - Function block (FB) | - Function block (FB) |
| Data memory/ standard ROM (byte) | 40M | 16M | 2M |
| Processing speed | 0.98 | 1.9 | 9.5 |
| MOV instruction (ms) | 1.96 | 3.9 | 19 |
| Floating point addition (μs) | 0.01 | 0.014 | 0.057 |
| Memory interface | - Extended SRAM cassette | - SD memory card | - Memory interface |
|              | - SDRAM card, FLASH card, ATA card | - USB | - USB |
| External interface | - Ethernet (100BASE-Tx/100BASE-Tx/10BASE-T) | - RS-232 | - RS-232 |
|              | - RS-422/485 | - Display unit | - Display unit |
| Network connectivity (adapt/adapter/module) | Ethernet (100BASE-Tx/100BASE-Tx/10BASE-T) | - | - |
|              | - CC-Link IE Control | - | - |
|              | - CC-Link IE Field | - | - |
|              | - CC-LINK* | - | - |
|              | - CC-LINK Safety | - | - |
|              | - CC-LINK-T | - | - |
|              | - SsiNet 8H | - | - |
|              | - AnyWire | - | - |
|              | - BACnet* | - | - |
|              | - MODBUS/TCP | - | - |
|              | - MODBUS* | - | - |
| Standard specifications/conformed standards | - Operating ambient temperature 0…55°C | - Operating ambient temperature 0…55°C | - Operating ambient temperature 0…55°C |
| Engineering environment | MELSOFT GX Works2  
MELSOFT MT Works2  
CW Workbench | MELSOFT GX Works2  
MELSOFT MT Works2  
CW Workbench | MELSOFT GX Works2  
MELSOFT MT Works2  
CW Workbench |
| Number of I/O points [KXY] (point) | 4096 | 4096 | 4096 |
| Number of I/O points [KXY] (point) | 3390 | 1792 | 768 |
| Data memory/ standard ROM (byte) | 453 | 16M | 2M |
| Operating ambient temperature | 0...55°C | 0...55°C | 0...55°C |
| Standard on corrosive atmosphere | UV C 40871-3-9/ IEC 60721-3-3/ 3C2 | - | - |
| CE: Council 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 | - | - | - |
| Operating environment | - Line manufacturing | - Multiple CPU | - Machine control |
|              | - Distributed control | - Process control | - Distributed control |
|              | - Large-scale I/O control | - C programming | - Data logging |
|              | - Security | - C programming | - Data logging |
|              | - Inter-molar sync | - Data logging | - Large-scale I/O control |
|              | - Builtin database | - Data logging | - IT gateway |
|              | - Integrated network | - Data logging | - Advanced motion |
|              | - Real-time monitor | - Advanced motion | - Multiple CPU |
|              | - Advanced motion | - Process control | - Multiple CPU |
|              | - Real-time monitor | - High-reliability control | - High-reliability control |
|              | - Advanced motion | - Extended built-in functions | - Extended built-in functions |

*1: MELSEC-Q CPU only
*2: Supports MELSEC-Q CPU only
*3: Required to use the logging function
*4: Does not support QnUDVCPU and certain models
*5: Does not support QnUDVCPU(-P)
*6: Supports the user Ethernet port of Q24DHCCPU-V/VG/LS only
*7: Supports Q-JDE/HCPU and Q-JDE/U CPU only
*8: Does not support Q-JDE/HCPU and Q-JDE/U CPU only
*9: Supports L02SCPU(-P) only
<table>
<thead>
<tr>
<th>Compact type</th>
<th>Compact type</th>
<th>Modular type</th>
<th>Baseless type</th>
</tr>
</thead>
<tbody>
<tr>
<td>MELSEC iQ-F</td>
<td>MELSEC iQ-F</td>
<td>MELSEC-QS</td>
<td>MELSEC-WS</td>
</tr>
<tr>
<td>Programable controller CPU</td>
<td>Programable controller CPU</td>
<td>Safety programable controller</td>
<td>Safety controller</td>
</tr>
<tr>
<td>FX5U/FX5UC</td>
<td>FX5U/FX5UC</td>
<td>- CPU: 1 models</td>
<td>- CPU: 3 models</td>
</tr>
<tr>
<td>- FX5U: 9 models</td>
<td>- FX5U: 27 models</td>
<td>- FX5uc: 24 models</td>
<td>- FX5uc: 12 models</td>
</tr>
<tr>
<td>- FX5UC: 2 models</td>
<td>- FX5uc: 2 models</td>
<td>- FX5uc: 37 models</td>
<td>- CPU: 1 models</td>
</tr>
</tbody>
</table>

### Key Features/Functions

- **BV:** Bureau Veritas approval
- **NK:** ClassNK approval
- **RINA:** Italian Maritime approval
- **DNV:** Norwegian Maritime approval
- **UL:** Underwriters Laboratories Listing

### Standards

- **ISO 13849-1 PL e**
- **IEC 61508 SIL3**
- **IEC 62061 SIL CL3**

### Engineering Environment

- **C Controller:** 1 model
- **Process CPU:** 4 models
- **Motion controller:** 2 models
- **Programmable controller CPU:** 5 models

### Programming Languages

- **C/C++**
- **Function block (FB)**
- **Function block (FBD/LD)**
- **Structured text (ST)**
- **Ladder diagram**

### MELSOFT

- **MELSOFT GX Works3**
- **MELSOFT GX Works2**
- **MELSOFT Developer Ver.B**
- **Setting/monitoring tool (free)**

### Lineup

- **FX5U:** FX5UC, FX5UC, FX5uc, FX5uc
- **FX5UC:** FX5UC, FX5uc, FX5uc, FX5uc
- **FX5uc:** FX5uc, FX5uc, FX5uc, FX5uc
- **FX5uc:** FX5uc, FX5uc, FX5uc, FX5uc

### Machine Control

- **FX3U:** FX3U, FX3U, FX3U, FX3U
- **FX3UC:** FX3UC, FX3UC, FX3UC, FX3UC
- **FX3U:** FX3U, FX3U, FX3U, FX3U
- **FX3UC:** FX3UC, FX3UC, FX3UC, FX3UC

### Safety

- **ISO 13849-1 PL e**
- **IEC 61508 SIL3**
- **IEC 62061 SIL CL3**

### Other Features

- **Real-time monitor**
- **Data logging**
- **IT gateway**
- **Process control**
- **Multiple CPU**
- **Line manufacturing**
- **High-reliability control**
- **Multiple CPU**
- **Integrated network**
- **Large-scale I/O control**
- **Small-scale I/O control**
- **Machine control**
- **Small-scale I/O control**
- **Motion control**
- **Safety**
- **Small-scale I/O control**
- **Safety**

### Notes

- *10:* Supports FX5U only.
- *11:* Supports the MELSEC iQ-R Series only
- *12:* Supports with the dedicated adapter
- *13:* Does not support Q3HMCPU and Q3HPRHCPU
- *14:* Supports SSDNET II
- *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

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* Designed with automation in mind
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
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.

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.

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.

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.
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.

### 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
- Input module
- Output module
- I/O combined module
- Analog input 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

### I/O & intelligent function modules
- Input module
- Output module
- I/O combined module
- Analog input 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

### System configuration
- **CPU modules**
  - 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 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.
- An extension base for MELSEC-Q Series modules (further extensions requiring the MELSEC-Q Series extension base version).
- 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.
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)

<table>
<thead>
<tr>
<th>Capacity (step)</th>
<th>Q00UJ</th>
<th>Q00U</th>
<th>Q01U</th>
<th>Q02U</th>
<th>Q03UD</th>
<th>Q03UDE</th>
<th>Q04UDVCPU</th>
<th>Q06UDVCPU</th>
<th>Q03UDVCPU</th>
<th>Q13UDVCPU</th>
<th>Q26UDVCPU</th>
</tr>
</thead>
<tbody>
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<td>10K</td>
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<td>400K</td>
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<td>450K</td>
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</tr>
</tbody>
</table>

### Basic operation processing speed (ms)

| 40 | 20 | 9.580 | 60 | 120 | 1.9 |

### System configuration

- **Main base**
  - Up to 12 modules
- **2nd extension base**
  - When the main base and 2 extension bases are used up to 64 modules can be connected
- **3rd extension base**
  - The 2nd and subsequent CPUs can be installed using slots No. 0 to 2

### CPU modules

- Programmed controller CPU
- Motion controller
- Process CPU
- Redundant CPU
- C Controller
- Robot controller
- CNC CPU

### Base units

- 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
- Analog I/O module
- Energy measuring module
- Loop control module
- Temperature control module
- Simple motion module
- Positioning module
- High-speed counter module
- Channel isolated pulse input module
- Pulse output module
- Frequency monitoring module
- Network module
- High-speed data transfer module
- Intelligent communication module
- Web server module

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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.
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.

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.

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.
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)

<table>
<thead>
<tr>
<th>Program capacity</th>
<th>260K</th>
<th>60K</th>
<th>20K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sink type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication interface</td>
<td>RS-232</td>
<td>Ethernet</td>
<td>Ethernet, built-in CC-Link function</td>
</tr>
</tbody>
</table>

Basic operation processing speed (ns)

Example of largest system configuration with L26CPU-BT

- Main block: 10 modules
- 2 extension blocks: 11 modules each
- Extension cable: 11 modules
- Branch module

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 (sink 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

<table>
<thead>
<tr>
<th>CPU module</th>
<th>Number of extension blocks</th>
<th>Number of installable modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>L26CPU(-P)</td>
<td>Up to 2</td>
<td>Main block: 10</td>
</tr>
<tr>
<td>L26CPU-P</td>
<td>Up to 3</td>
<td>Extension block: 11</td>
</tr>
</tbody>
</table>

*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.
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.

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.
New micro PLC designed on the concept of ... 

Outstanding Performance

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

Superior Drive Control

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

Intuitive Programming Environment

- 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

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

*1: Up to two extension power supply modules are connectable.
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*, SD memory card slot, etc.) providing greater flexibility and helping to reduce system costs.

Program capacity

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

Socket communication

- Inverter communication
- Remote maintenance
- SLMP communication
- MODBUS®/TCP client

*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

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

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

HIME-I081
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.

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.

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

Application examples
• Sealing
• Vending machine
• Palletizer
• Grinding machine

FX5-40SSC-S
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.

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.

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.
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)

<table>
<thead>
<tr>
<th>Model</th>
<th>Number of control points</th>
<th>Number of I/O points including remote I/O</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX3S</td>
<td>32K</td>
<td>656</td>
</tr>
<tr>
<td>FX3G</td>
<td>64K</td>
<td>1312</td>
</tr>
<tr>
<td>FX3UC</td>
<td>128(256*1)</td>
<td>256</td>
</tr>
<tr>
<td>FX3U</td>
<td>256(384*1)</td>
<td>512</td>
</tr>
</tbody>
</table>

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

**System configuration**

- **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.
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.

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.

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.
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 solution, 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.

<table>
<thead>
<tr>
<th>Safety device</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety controller</td>
<td>Integrated CPU and I/O, FB language support, Expansion with extension modules</td>
</tr>
<tr>
<td>Safety programmable controller</td>
<td>LD/FB language support, More than 100 safety I/O points, Connectability and expandability with standard programmable controllers</td>
</tr>
<tr>
<td>Safety relay module</td>
<td>Create an internal safety circuit (program not required), Expand with module connections</td>
</tr>
</tbody>
</table>

- Easy to change, Easy to wire

- 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

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

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

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

- 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

Incorporating into a line or dispersed system

- 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

- Safety field network
  - Connect up to 42 safety remote stations
  - Use standard stations together with safety remote stations

- Safety communication
  - Connect up to 32 safety programmable controllers
  - Safety and standard programmable controller can share the same network
**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 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.

**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.
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 refining 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.

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.

*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 control system is designed with automation in mind.
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.

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.

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.
Application Specific

SERVO SYSTEM CONTROLLER iQ

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

- 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

- 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.

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.

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

- Operation cycle Approx. 1.5 x faster
- Data exchange cycle with PLC-CPU Approx. 6 axes/0.222 ms
- Event task fixed cycle Fastest 0.222 ms

High-performance servo amplifiers

Connecting amplifiers to "SSCNET #3/H" optical networks for highly accurate high-speed control when using the MR-J4 dedicated engine and high-resolution encoder.

SSCNET Partner Association

AC servo

MELSERVO-J4 Series

Speed frequency response of servo amplifier

2.5 kHz

SSCNET #3/H communication speed

150 Mbps
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.

**Control**

Versatile motion control support different machine operations.

**Programming language**

Choose from various programming languages provided to meet user preferences.

**Functions**

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

**Upgrading different equipment**

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

For further details, please refer to "Mitsubishi Servo System Controllers MELSEC iQ-R Series" and "Mitsubishi Servo System Controllers" catalogs.
Leveraging the integration of robots into manufacturing lines

By integrating the use of MELFA robots into the iQ Platform, it's 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

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

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

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

Opening up multiple communication options through integration to the iQ Platform

ROBOT CONTROLLER iQ

For further details, please refer to "Mitsubishi INDUSTRIAL ROBOT MELFA F Series" catalog.
L(NA)09087ENG
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.

High-speed communication between CNCs and programmable controllers

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

For further details, please refer to “MELSOFT iQ Works” catalog.
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

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.

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.
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.

Reduce engineering time by 60%*1

*1 Based on new project test benchmarks between GX Works2 and GX Works3.
Programmable controller engineering software

- **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**
- **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**
- **Offline debugging with hardware emulation**
- **Intuitive cross-reference list displays devices used in the program**

*Designed with automation in mind.*
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.

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.
**Network**

**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.

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**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.

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

**CC-Link, CC-Link Safety, CC-Link/FT**
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.

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**Computer level (production management/data system)**

**Control level (control system)**

**Field level (device system)**
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
**MELSEC History**

### 1980s
- MELSEC-K Series
- MELSEC-310
- MELSEC-008
- MELSEC-007
- Smaller size

### 1990s
- MELSEC-A Series
- Smaller size
- MELSEC-QnAS Series
- MELSEC-Q4AR redundant system

### Programming machine
- F Series
- FX Series

### Safety system

### Engineering environment
- K6GPP
- A6GPP
- A6HGP
- A6PHP
- GPPA (Personal computer version for A Series)
- A7PHP
- A7HGP
- GPPQ (Personal computer version for QnA Series)
- Programming machine
- MELSEC MEDOC
- MELSEC MEDOC Plus (MM+)

### Network
- MELSECNET
- MELSECNET/10
- MELSECNET MINI
- MELSECNET II
- CC-Link

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**MELSEC with history and experience.**

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

2000s

- MELSEC-Q Series
- Towards high functionality/performance
  - MELSEC-Q process CPU
  - MELSEC-Q redundant system
  - MELSEC-Q C Controller

2010s

- MELSEC iQ-R Series
- Medium- to large-scale control
- MELSEC iQ-R C Controller
- MELSEC iQ-R Process CPU

- MELSEC-L Series
- Small- to medium-scale control
- FX3 Series

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

- MELSOFT iQ Works
- Towards high functionality/performance
- Windows® version GPP

- MELSOFT GX Developer
- MELSOFT GX Works
- MELSOFT GX Works2
- MELSOFT GX Works3

Personal computer software

- 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 Field motion function
Extensive global support coverage providing expert help whenever needed

### Global FA centers

**China**
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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.

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.

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
Mitsubishi Electric offers a wide range of automation equipment from PLCs and HMs 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.
New publication, effective Mar. 2015.
Specifications are subject to change without notice.

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)