MELSEC iQ-R Series
iQ Platform-compatible PAC

Bridging the next generation of automation
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.
iQ Platform for maximum return on investment

Minimize TCO, Seamless integration, Maximize productivity, Transparent communications: these are common items that highlight the benefits of the iQ Platform and e-F@ctory. The iQ Platform minimizes TCO at all phases of the automation life cycle by improving development times, enhancing productivity, reducing maintenance costs, and making information more easily accessible across the plant. Together with e-F@ctory, offering various best-in-class solutions through its e-F@ctory alliance program, the capabilities of the manufacturing enterprise is enhanced even further realizing the next level for future intelligent manufacturing plants.

Further reduce TCO while securing your manufacturing assets

**Automation Controller**
- Improve productivity and product quality
- 1. High-speed system bus realizing improved system performance
- 2. On-screen multi-touch control enabling smooth GOT (HMI) operations

**Integrated Network**
- Best-in-class integrated network optimizing production capabilities
- 1. CC-Link IE supporting 1 Gbps high-speed communication
- 2. Seamless connectivity within all levels of manufacturing with SLMP

**Centralized Engineering**
- Integrated engineering environment with system level features
- 1. Automatic generation of system configuration
- 2. Share parameters across multiple engineering software via MELSOFT Navigator
- 3. Changes to system labels are reflected between PAC and HMI
Revolutionary, next-generation controllers building a new era in automation

MELSEC iQ-R series

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

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

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

*TCO: Total cost of ownership

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**Process**

High availability process control in a scalable automation solution

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

**Safety**

System design flexibility with integrated safety control

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

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**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

**Maintenance**

Reduce maintenance costs and downtime utilizing easier maintenance features

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

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**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

**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
Security
Robust security that can be relied on
• Protect intellectual property
• Unauthorized access protection across distributed control network

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

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

Intelligence
Extensive data handling from shop floor to business process systems
• Direct data collection and analysis
• C/C++ based programming
• Collect factory data in real-time
• Expand features using third party partner applications
High-available process control in a scalable automation solution

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

**Extensive visualization and data acquisition**

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

PID control

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

Extension base unit

- Supports Q Series modules (RQ extension base)

Process control system

Process CPU

- Register up to 480 tags (execute up to 300 PID loops)
- Fast process program execution cycle (50 ms)

CPU-embedded ECC memory

- Reliability improved by detection/correction of data corruption (within 1 bit)

Multi-level redundancy ensuring continuous control

High availability

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

One package process control software

Integrated engineering

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

Integrated safety control offering a total system solution

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

Compliant with international safety standards

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

Generic and safety control in one CPU

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

Extensive data handling from shop floor to business process systems

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

C/C++ based programming

Flexibility

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

High-speed production data collection

Data logging

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

Direct access to IT system database servers

Information connection

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

Improve productivity through advanced performance/functionality

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

Multiple CPUs
High-speed data communication
High-speed system bus (approx. 40x faster)
Inter-module sync
High-speed modular synchronization

New high-speed system bus realizes improved production cycle

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

Multi-CPU system realizes very accurate motion control

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

*1: Compared to MELSEC-Q Series.
*2: Compared to Q173DSCPU/Q172DSCPU.
Inter-modular synchronization realizes increased processing accuracy

More flexible control over performance
Realizing high processing accuracy could not be any simpler when utilizing the inter-modular synchronization feature, which enables precise data synchronization between controller CPUs and various interface modules via the high-speed system bus (backplane). In addition, network level synchronization (both CC-Link IE Field and SSCNET III/H) is now possible, realizing deterministic performance by ensuring synchronization between nodes without being influenced by varying network transmission delays.

New controller performance architecture further reduces H/W costs

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

Realize high-speed system performance
Approx. 8x faster than QCPU*3

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

Built-in database eliminates the need for a PC-based database server
Recipe data and production results data, previously managed using a database server, can now be managed via the database in the programmable controller. Use of dedicated commands for the built-in database makes it easy to search, add and update data on the fly. Furthermore, the import/export correlation with spreadsheet software is made easier. Directly access CPU internal database data from a computer equipped with Microsoft® Access® or Excel® is also supported.

Data management realized with built-in database
• Recipe
• Production data
• Easy to switch between recipes
• Realize product batch control
• Access database from computer

Data management

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

*3: Based on a typical application example, the system benchmark test measures the CPU scan time, taking into consideration the network refresh time and monitoring processing time with external devices as compared to Universal model QCPU (QnUDEHCPU).
*4: Average number of instructions such as for basic instructions and data processing executed in 1μs (the larger the value, the faster the processing speed).
Reducing development costs through intuitive engineering

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

Intuitive engineering software covering the product development cycle

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

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

- **Conforms to IEC 61131-3**
  - GX Works3 realizes structured programming such as ladder and ST, making project standardization across multiple users even easier.

Simple point and click programming architecture

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<tr>
<th>System design</th>
<th>Programming</th>
<th>Debug/maintenance</th>
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<tr>
<td><strong>Straightforward graphic based system configuration design</strong></td>
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<tr>
<td>• Simply drag and drop from the module list to easily create system configuration</td>
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<tr>
<td>• Directly setup parameters for each module</td>
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<td>• Automatically reflect changes in the layout to the module parameters</td>
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<td><strong>MELSOFT library enables efficient programming through “Module Label/FB”</strong></td>
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<tr>
<td>• Assign convenient label names to internal devices, rather than manually entering a device name every time</td>
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<tr>
<td>• Simply drag &amp; drop module FBs from the MELSOFT Library directly into the ladder program, making programming even easier</td>
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<td><strong>Extensive version control features</strong></td>
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<tr>
<td>• Flexibly register program change (historical) save points</td>
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<tr>
<td>• Easily visualize and confirm program changes</td>
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Simple motion setting tool
- Easily configure the simple motion module with this convenient integrated tool.

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

Navigation window
- Easily access project components Organize program file list.

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

Module list
- Simply drag & drop modules directly into the module configuration.
GX Works3

One Software, Many Possibilities

Reduce engineering time by 60%*1

Global realization by multi-language support

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

Module label/FB

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

*1 Based on new project test benchmarks between GX Works2 and GX Works3.
Reduce maintenance costs and downtime utilizing easier maintenance features

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

**Preventive maintenance**

- **CPU module**
  - Visualize manufacturing data in real-time
  - Monitor live manufacturing process data across the plant
  - Very easy setup using the dedicated GX LogViewer monitoring tool
  - Real-time monitor

- **Output module**
  - Prevent system downtime with relay monitoring
  - Monitors relay switching amount
  - Check relay condition from GOT (HMI)
  - Plan module maintenance prior to malfunction of relay

- **MES interface module**
  - Direct access to enterprise level
  - Registers device values directly into database
  - Visible shop floor data enables actions before event occurs

**Corrective maintenance**

- **CPU module**
  - Memory dump enables confirmation of operation problems
  - Saves block of device data when error occurs
  - Root cause analysis by confirming data on device monitor screen and offline via program editing window
  - Memory dump results (Program editor)
The MELSEC iQ-R Series is a unique control system equipped with innumerable functions. It works to ensure that the “down-time” of the system is kept to a minimum, which improves productivity and helps to maintain the efficiency of the overall plant.

**Corrective maintenance**

**CPU module**

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

**Corrective maintenance**

**GX Works3**

**Multi-language software improves global support**
- Comment/label names can be registered in multiple languages
- Easy to switch between languages
- No need for multiple programs to satisfy regional requirements

**Corrective maintenance**

**GX Works3**

**Quickly find network errors**
- Visualize error location from network system image
- Easy network error corrective measures

**Corrective maintenance**

**GX Works3**

**Simple troubleshooting, even for novice users**
- Start diagnostics screen on GX Works3 just by connecting via USB
- Display detailed error information and corrective procedures

**Corrective maintenance**

**GX Works3**

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

**Switch between device comment languages**

Japanese  English

**CC-Link IE Field diagnosis window**

**Automatically start diagnostics**

**USB**

Mitsubishi Electric PAC MELSEC iQ-R
“Maintenance” Movie
Quality

Reliable and trusted
MELSEC product quality

The MELSEC iQ-R Series is based on two fundamental aspects of quality.
“Quality of product”
“Quality for application”

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

Robust design ideal for harsh industrial environments

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

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

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

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

*1: Please contact your local Mitsubishi Electric office or representative for further details.
Conforms to main international quality standards

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

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**Improve and maintain actual manufacturing quality**

**Maintains product quality during manufacturing**

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

**Realizes traceability through data logging**

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

Seamless network reduces system costs

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

Cost-saving integrated network CPU module

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

Integrate motion control into one network

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

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

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

Supporting Ethernet protocol stack realizing highly-flexible system

CC-Link IE Field Network Basic protocol is software-based (not requiring ASIC), operating on standard Ethernet protocol stack, which can be used together with TCP/IP communications. This allows CC-Link IE Field Network Basic compatible products and Ethernet compatible products to be connected on the same Ethernet communications line, enabling a highly-flexible and low cost system. MELSEC programmable controller CPUs with an embedded Ethernet port can be used as a master station, eliminating the need for an additional network module.
Security

Robust security that can be relied on

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

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

Powerful security features protecting intellectual property

Security key authentication protecting project data

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

Prevent unauthorized access across the network

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

Extensive compatibility with existing products

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

Variety of compatible modules

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

\(^2\): For further details, please refer to the "MELSEC iQ-R Module Configuration Manual".

Possible to divert external device wiring

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

Current programs can be fully utilized

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

\(^1\): For detailed information about converting to GX Works3 programs, please refer to the "GX Works3 Operating Manual".

Utilize existing MELSEC-Q Series assets
### Lineup

#### Power supply (P.23)
- **R61P**: AC input (inc. 24 V DC output)
- **R62P**: AC input (large capacity)
- **R64P**: DC input (Redundant)
- **R63RP**: DC input (Redundant)

#### Base (P.23)
- **Main base**
  - **R35B**: 5-slot
  - **R38B**: 8-slot
  - **R310RB**: 10-slot (Redundant)
  - **R312B**: 12-slot
- **Extended temperature range main base**
  - **R310B-HT**: 10-slot
  - **R38RB-HT**: 8-slot (Redundant)
- **Extension base**
  - **R65B**: 5-slot
  - **R68B**: 8-slot
  - **R610RB**: 10-slot (Redundant)
  - **R612B**: 12-slot
- **Extended temperature range extension base**
  - **R610B-HT**: 10-slot
  - **R68RB-HT**: 8-slot (Redundant)
- **RQ extension base (MELSEC-Q Series)**
  - **RQ65B**: 5-slot
  - **RQ68B**: 8-slot
  - **RQ612B**: 12-slot
- **Extension cable**
  - **RC06B**: 0.6 m
  - **RC12B**: 1.2 m
  - **RC30B**: 3 m
  - **RC50B**: 5 m
  - **RC100B**: 10 m

#### CPU (P.26)
- **Programmable controller CPU**
  - **R04(EN)CPU**: 40K steps
  - **R08(EN)CPU**: 80K steps
  - **R16(EN)CPU**: 160K steps
  - **R32(EN)CPU**: 320K steps
  - **R120(EN)CPU**: 1,200K steps
  - **R200CPU**: 2,000K steps
- **Motion CPU**
  - **R16MTCPU**: 16-axis
  - **R32MTCPU**: 32-axis
  - **R64MTCPU**: 64-axis
- **Safety CPU**
  - **R08SFCPU-SET**: 80K steps
  - **R16SFCPU-SET**: 160K steps
  - **R32SFCPU-SET**: 320K steps
  - **R120SFCPU-SET**: 1,200K steps
- **Process CPU**
  - **R08PCPU**: 80K steps
  - **R16PCPU**: 160K steps
  - **R32PCPU**: 320K steps
  - **R120PCPU**: 1,200K steps
- **Redundant function module**
  - **R6RFM**: Redundant function
- **C Controller**
  - **R12CCPU-V**: Memory capacity 256 MB

#### I/O (P.43)
- **AC input**
  - **RX28**: 8-point
  - **RX10**: 16-point
- **DC input**
  - **RX40C7**: 16-point
  - **RX41C4**: 32-point
  - **RX42C4**: 64-point
- **DC high-speed input**
  - **RX40PC6H**: Positive common, 16-point
  - **RX40NC6H**: Negative common, 16-point
  - **RX41CHS**: Positive/negative common, 32-point
  - **RX61CHS**: Positive/negative common, 32-point
- **DC (with diagnostic functions) input**
  - **RX40NC6B**: 16-point
- **Relay output**
  - **RY18R2A**: 8-point
  - **RY10R2**: 16-point
- **Triac output**
  - **RY20S6**: 16-point
- **Transistor (sink) output**
  - **RY40NT5P**: 16-point
  - **RY41NT2P**: 32-point
  - **RY42NT2P**: 64-point
- **High-speed transistor (sink) output**
  - **RY41NT2H**: 32-point
- **Transistor (source) output**
  - **RY40PT5P**: 16-point
  - **RY41PT1P**: 32-point
  - **RY42PT1P**: 64-point
- **High-speed transistor (source) output**
  - **RY41PT2H**: 32-point
- **Transistor (with diagnostic functions) output**
  - **RY40PT5B**: 16-point
- **I/O combined module**
  - **RH42C4NT2P**: 32-point/32-point

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**Additional notes:**
- **RC100B**
- **RC50B**
- **RC30B**
- **RC12B**
- **RQ612B**
- **R68RB-HT**
- **R612B**
- **R310B-HT**
- **R38RB-HT**
- **RQ68B**
- **RQ612B**
- **R38B**
- **R310RB**
- **R312B**
- **R65B**
- **R68B**
- **R610RB**
- **R612B**
- **RQ65B**
- **RQ68B**
- **RQ612B**
- **RC50B**
- **RC100B**

---

**I/O ports:**
- **AC input**
- **DC input**
- **DC high-speed input**
- **DC (with diagnostic functions) input**
- **Relay output**
- **Triac output**
- **Transistor (sink) output**
- **Transistor (source) output**
- **I/O combined module**
### Analog

**P.48**

**Analog input**
- R60AD4 ........ 4-channel (voltage or current)
- R60ADV8 .......... 8-channel (voltage)
- R60ADI8 .......... 8-channel (current)

**High-speed analog input**
- R60ADH4 ........ 4-channel (voltage or current)

**Analog input (channel isolated)**
- R60AD8-G ........ 8-channel (voltage or current)
- R60AD16-G .... 16-channel (voltage or current)

**Temperature input**
- R60TD8-G ......... 8-channel (thermocouple)
- R60RD8-G .......... 8-channel (RTD)

**Temperature control**
- R60TCTR2TT2 ....... 2-channel multi-input, 2-channel thermocouple input
- R60TCTR4 ......... 4-channel RTD input
- R60TCTR2TT2BW .... 2-channel multi-input, 2-channel thermocouple input
- R60TCTR4BW ........ 4-channel RTD input

**Analog output**
- R60DA4 ........ 4-channel (voltage or current)
- R60DAV8 .......... 8-channel (voltage)
- R60DAI8 .......... 8-channel (current)

**High-speed analog output**
- R60DAH4 ........ 4-channel (voltage or current)

**Analog output (channel isolated)**
- R60DA8-G ........ 8-channel (voltage or current)
- R60DA16-G .... 16-channel (voltage or current)

### Motion, Positioning, Flexible high-speed I/O, High-speed counter

**P.57**

**Simple motion**
- (Compatible with CC-Link IE Field network)
- RD77GF4 ........ 4-axis
- RD77GF8 .......... 8-axis
- RD77GF16 .......... 16-axis
- RD77GF32 ........ 32-axis

**Positioning**
- Transistor output
  - RD75P2 ........ 2-axis
  - RD75P4 .......... 4-axis
- Differential driver output
  - RD75D2 ........ 2-axis
  - RD75D4 .......... 4-axis

**Flexible high-speed I/O**
- RD40PD01 ....... IP:12-point, O/P:14-point

**High-speed counter**
- DC input/Transistor (sink) output
  - RD62P2 .......... 2-channel
- DC input/Transistor (source) output
  - RD62P2E ......... 2-channel
- Differential input/Transistor (sink) output
  - RD62D2 .......... 2-channel

### Network

**P.64**

**Ethernet**
- RJ1EN71 .......... 1 G/100 M/10 Mbps

**Multiple network type**
- (Ethernet/CC-Link IE)

**CC-Link IE Control network**
- RJ71GP21-SX ........ Control/Normal station optical cable

**CC-Link IE Field network**
- RJ71GF11-T2 .......... Master/Local station
- RJ72GF16-T2 .......... Remote station

**CC-Link**
- RJ61BT11 .......... Master/Local station

**AnyWireASLINK**
- RJ51AW12AL .......... Master station

**BACnet®**
- RD81OPC96 ........ Embedded OPC UA server

**Serial communication**
- RJ71C24 .......... RS-232, RS-422/485
- RJ71C24-R2 ........ RS-232 x2ch
- RJ71C24-R4 ........ RS-422/485 x2ch

**Advanced information modules**

**P.72**

**MES Interface**
- RD81MES96 .......... Database connection

**OPC UA server**
- RD81OPC96 .......... Embedded OPC UA server

**High-speed data logger**
- RD81DL96 .......... Data collection

**C Intelligent function module**
- RD55UP06-V .......... C/C++ program execution
Flexible, interchangeable system architecture

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.

Multiple CPU modules
- Programmable controller CPU
- CC-Link IE embedded CPU
- Motion CPU
- Safety CPU
- Process CPU
- C Controller

*1: Multi-CPU is not supported.
*2: Product package includes a safety CPU and safety function module.

Max. 7 extension bases

Max. 4 CPU modules

Base units
- Main base unit
- Extended temperature range main base unit
- Extension base unit
- Extended temperature range 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).

Power supply module
- Power supply module

I/O & Intelligent function modules
- Input module
- Output module
- I/O combined module
- Analog input module
- Temperature input module
- Temperature control module
- Analog output module
- Simple motion module
- Positioning module
- Flexible high-speed I/O control module
- High-speed counter module
- Ethernet interface module
- CC-Link IE Control Network module
- CC-Link IE Field Network master/local module
- CC-Link IE Field Network remote head module
- CC-Link system master/local module
- AnyWireASLINK master module
- BACnet module
- Serial communication module
- MES interface module
- OPC UA server module
- High-speed data logger module
- C intelligent function module
Integrated safety control

The MELSEC iQ-R Series safety control system consists of a safety CPU that is compliant with international safety standards, ISO 13849-1 PL e and IEC 61508 SIL 3, and can execute both safety and general logic in the same CPU. The CPU module can be installed on a standard base unit and when paired with the safety function module enables control of safety I/O, realizing easy integration into an existing or new control system. Safety I/O such as an emergency stop switch or light curtain is controlled via CC-Link IE Field network, which is connected to the safety remote I/O module.

CPU
- Safety remote I/O
  - Safety CPU
  - Safety remote I/O module
  - Enabling switch
  - Emergency stop switch
  - Indicator light
  - Door switch

Highly scalable redundant control

The MELSEC iQ-R Series redundant control system is based on a dual-system architecture where all modules on a primary (control) system are duplicated onto a secondary (standby) system with a tracking cable connecting the systems together. Both systems are equipped with a process CPU module and redundant function module, with the former being able to execute standard logic and process control. Remote I/Os are controlled via the CC-Link IE Field network, and dedicated base units for supporting redundant power-supply modules are available in either standard or extended temperature models.

CPU, redundant function module
- Process CPU
- Redundant function module

Power supply modules, base units*
- Redundant power supply module
  - Redundant power supply main base unit
  - Extended temperature range redundant power supply main base unit
- Redundant power supply extension base unit
  - Extended temperature range redundant power supply extension base unit

* Only these base units support redundant power supply modules. Can utilize standard MELSEC iQ-R Series modules.
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.

Power supply module

Main base unit (Standard, Extended temperature range)

Extension base unit (Standard, Extended temperature range)

RQ extension base unit

Extension cable

*1: Enables standard MELSEC iQ-R Series modules to support extended operating ambient temperature of 0 to 60°C.
*2: Overall cable distance 20 m. 13.2 m with the RQ extension base.
The MELSEC iQ-R Series includes a wide range of programmable automation controllers capable of catering to diversified automation control needs, redesigned around the new MELSEC iQ-R high-speed system bus to ensure high performance and intelligent processing power. The lineup includes a high-performance, general-purpose controller (with an embedded CC-Link IE network model available) capable of variable memory capacities and a high-precision motion controller with variable controllable axes. In addition, application-specific CPUs are available; the Safety CPU (supporting functional safety standards), Process CPU (supporting high-speed PID control and hot-swap of I/O modules and when paired with a redundant function module realizes a high available control system), and the C Controller CPU, which provides C language programming ideal for converting from personal computer or micro-controller based systems.

### Improved performance

Controller performance has been improved, resulting in increased processing power and the ability to handle larger amounts of data. The multi-CPU architecture has been further improved, enabling faster data exchange across the backplane. The core instruction processing speed has also been improved tenfold, helping to reduce the production cycle time. High-speed and large process control systems can be realized, supporting up to 500 loops.

### Finely balanced control

Balancing of various different control needs can be done effectively utilizing the multi-CPU feature of the MELSEC iQ-R Series. Up to 192 servo axes can be controlled by incorporating three separate motion CPUs on the base unit, with a spare CPU slot required for controlling the general aspects of the system.

---

*1: Based on a typical application example, the system benchmark test measures the CPU scan time taking into consideration the network refresh time and processing time using external devices, (compared to universal model OCPU, QnUDEHCPU).

*2: Average number of instructions, such as basic instructions and data processing, executed in 1 μs (the larger the value, the faster the processing speed).
At the core of the MELSEC iQ-R Series is a programmable controller CPU. This CPU is the heart of the control system and includes various features for different applications. The most common CPU is the programmable controller CPU, into which various features are embedded, enabling it to perform a wide range of control tasks. The different CPUs are highly scalable with five types available, based on program capacity needs (40K to 1200K steps). In addition, a CC-Link IE embedded CPU is available, further reducing hardware costs as a separate network module is not required.

**Built-in hardware features**

Programmable controller CPUs are equipped with a built-in USB port (high-speed Ver. 2.0 Mini-B) and an Ethernet port (up to 100 Mbps) as standard, enabling connection to a general LAN network*1 or MELSOFT software. Two memory options are included as well, an external SRAM cassette that enables device/label memory to be increased and doubling up as a hardware security key, and an SD memory card which can be used for logging data, troubleshooting device values or as a memory database for recipe storage.

*1: General LAN connection supported by the Ethernet port only.
Flexible, large-capacity data storage

The MELSEC iQ-R Series programmable controller CPU is designed to allow an external SRAM cassette to be installed directly into the CPU module. This option makes it possible to increase internal device memory to an impressive 5786K words, expanding device/label memory even further. An SD memory card can be used at the same time, expanding data logging memory and the capacity of the internal database, which is ideal for large-scale systems. In general, management of programmable controller internal data is quite flexible, making programming even easier by allowing various data area allocations to be changed within the CPU memory and SRAM cassette.

Data management utilizing internal database (DB)

The CPU includes an internal database that can be installed into the SD memory card. This feature allows, for example, a selection of database commands that can add/delete/change records to be utilized for simple recipe functions. It is also much easier to import/export Unicode files for use in spreadsheets. Accessing the CPU internal database data from a computer equipped with Microsoft® Access® or Excel® is also supported. The CPU internal database is especially useful for the food and beverage industry where multiple product variations are produced using the same machine process.
High-speed, event driven programs

Further improvements to CPU performance have resulted in the interval time between event driven programs (interrupt programs) reduced to 50 us. This has been realized by having multiple event driven programs able to be nested within other event driven programs and being triggered from already executing programs. This kind of performance is available with a standard input module and programmable controller CPU, without requiring a dedicated interrupt type input module, which helps to further reduce hardware costs while realizing a high-precision control system.

CPU program management data

Operation and system historical events are automatically recorded in the CPU module, allowing quick root cause analysis of system errors or management of program changes. Actual changes to the program, parameters and system errors are viewable using GX Works3 or can be exported as a CSV file for use by other third-party software.
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

### Domestic development dept.

- Data sent via email
- Quicker root cause analysis

Visual representation of data when error occurs

Easily collect manufacturing data

Utilizing the installed SD memory card or a direct live connection to the CPU module, logging data can be easily realized just by simply registering the parameters. Logged data can be utilized in a number of ways, such as using third-party spreadsheet software or as a real-time feed of data for analyzing various manufacturing processes. The real-time feature enables live feeds showing data has they happen in addition to historical trending. Logged historical trend files support the Unicode text file format, which is especially useful for Asian based applications as most languages in the region require Unicode compatibility for information to be legible.

Real-time monitoring
- Monitoring data
- Direct connection to the programmable controller via Ethernet or USB

Logging
- Logging files
- Displays logging file data saved in the SD memory card
## Programmable controller CPU module specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>R04(EN)CPU</th>
<th>R08(EN)CPU</th>
<th>R16(EN)CPU</th>
<th>R32(EN)CPU</th>
<th>R120(EN)CPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control method</td>
<td>Stored program cyclic operation</td>
<td>Stored program cyclic operation</td>
<td>Stored program cyclic operation</td>
<td>Stored program cyclic operation</td>
<td>Stored program cyclic operation</td>
</tr>
<tr>
<td>I/O control mode</td>
<td>Refresh mode (Direct access I/O is available by specifying direct access I/O (DX, DY).)</td>
<td>Refresh mode (Direct access I/O is available by specifying direct access I/O (DX, DY).)</td>
<td>Refresh mode (Direct access I/O is available by specifying direct access I/O (DX, DY).)</td>
<td>Refresh mode (Direct access I/O is available by specifying direct access I/O (DX, DY).)</td>
<td>Refresh mode (Direct access I/O is available by specifying direct access I/O (DX, DY).)</td>
</tr>
<tr>
<td>Programming language</td>
<td>Ladder diagram (LD), structured text (ST), function block diagram (FBD), sequential function chart (SFC)</td>
<td>Ladder diagram (LD), structured text (ST), function block diagram (FBD), sequential function chart (SFC)</td>
<td>Ladder diagram (LD), structured text (ST), function block diagram (FBD), sequential function chart (SFC)</td>
<td>Ladder diagram (LD), structured text (ST), function block diagram (FBD), sequential function chart (SFC)</td>
<td>Ladder diagram (LD), structured text (ST), function block diagram (FBD), sequential function chart (SFC)</td>
</tr>
<tr>
<td>Extended programming language</td>
<td>Function block (FB), label programming (system/local/global)</td>
<td>Function block (FB), label programming (system/local/global)</td>
<td>Function block (FB), label programming (system/local/global)</td>
<td>Function block (FB), label programming (system/local/global)</td>
<td>Function block (FB), label programming (system/local/global)</td>
</tr>
<tr>
<td>Program execution type</td>
<td>Initial, scan, fixed scan, interrupt, standby type</td>
<td>Initial, scan, fixed scan, interrupt, standby type</td>
<td>Initial, scan, fixed scan, interrupt, standby type</td>
<td>Initial, scan, fixed scan, interrupt, standby type</td>
<td>Initial, scan, fixed scan, interrupt, standby type</td>
</tr>
<tr>
<td>Number of I/O points [X/Y] (point)</td>
<td>4096</td>
<td>4096</td>
<td>4096</td>
<td>4096</td>
<td>4096</td>
</tr>
<tr>
<td>Constant scan (ms)</td>
<td>0.2...2000</td>
<td>0.2...2000</td>
<td>0.2...2000</td>
<td>0.2...2000</td>
<td>0.2...2000</td>
</tr>
<tr>
<td>Function for keeping regular scan time</td>
<td>(Setting available in 0.1 ms increments)</td>
<td>(Setting available in 0.1 ms increments)</td>
<td>(Setting available in 0.1 ms increments)</td>
<td>(Setting available in 0.1 ms increments)</td>
<td>(Setting available in 0.1 ms increments)</td>
</tr>
<tr>
<td>Memory capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program capacity (step)</td>
<td>40K</td>
<td>80K</td>
<td>160K</td>
<td>320K</td>
<td>1200K</td>
</tr>
<tr>
<td>Program memory (byte)</td>
<td>160K</td>
<td>320K</td>
<td>640K</td>
<td>1280K</td>
<td>4800K</td>
</tr>
<tr>
<td>Device/label memory**(1) (byte)</td>
<td>400K</td>
<td>1188K</td>
<td>1720K</td>
<td>2316K</td>
<td>3380K</td>
</tr>
<tr>
<td>Data memory (byte)</td>
<td>2M</td>
<td>5M</td>
<td>10M</td>
<td>20M</td>
<td>40M</td>
</tr>
<tr>
<td>Instruction processing time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD instruction (ns)</td>
<td>0.98</td>
<td>0.98</td>
<td>0.98</td>
<td>0.98</td>
<td>0.98</td>
</tr>
<tr>
<td>MOV instruction (ns)</td>
<td>1.96</td>
<td>1.96</td>
<td>1.96</td>
<td>1.96</td>
<td>1.96</td>
</tr>
<tr>
<td>E + instruction (floating-point addition) (ns)</td>
<td>9.8</td>
<td>9.8</td>
<td>9.8</td>
<td>9.8</td>
<td>9.8</td>
</tr>
<tr>
<td>Structured text IF instruction**(1) (ns)</td>
<td>1.96</td>
<td>1.96</td>
<td>1.96</td>
<td>1.96</td>
<td>1.96</td>
</tr>
<tr>
<td>Structured text FOR instruction**(1) (ns)</td>
<td>1.96</td>
<td>1.96</td>
<td>1.96</td>
<td>1.96</td>
<td>1.96</td>
</tr>
<tr>
<td>PC MIX value**(1) (instructions/µs)</td>
<td>419</td>
<td>419</td>
<td>419</td>
<td>419</td>
<td>419</td>
</tr>
<tr>
<td>Interface connection port</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB 2.0 High Speed (miniB)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Ethernet (100 BASE-TX/10 BASE-T)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td>CC-Link IE connection port</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethernet (1000BASE-T/100BASE-TX/10BASE-T)</td>
<td>●*4</td>
<td>●*4</td>
<td>●*4</td>
<td>●*4</td>
<td>●*4</td>
</tr>
<tr>
<td>Memory interface</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD memory card</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Extended SRAM cassette</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Function</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple interrupt</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Standard PID control</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Internal database</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Memory dump</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td>Data logging</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Real-time monitor</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Security</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Inter-modular synchronization</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>SLMP communication</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

---

*1: An extended SRAM cassette expands the device/label memory area.
*2: The IF or FOR sentence of the structured text consists of several instructions, which may increase the processing time period.
*3: Average number of instructions such as for basic instructions and data processing executed in 1 µs. The larger the value, the faster the processing speed.
*4: Available with RJ71ENCPU. For details about network specifications, refer to the RJ71EN CPU performance specifications on page 65.
*5: The following networks are supported, Ethernet, CC-Link IE Control (twisted pair cable), and CC-Link IE Field (two simultaneous Ethernet networks and combined CC-Link IE Field and CC-Link IE Control networks are not supported).

### SD memory card specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>NZ1MEM-2GBSD</th>
<th>NZ1MEM-4GBSD</th>
<th>NZ1MEM-8GBSD</th>
<th>NZ1MEM-16GBSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>SD memory card</td>
<td>SDHC memory card</td>
<td>SDHC memory card</td>
<td>SDHC memory card</td>
</tr>
<tr>
<td>Capacity (byte)</td>
<td>2G</td>
<td>4G</td>
<td>8G</td>
<td>16G</td>
</tr>
</tbody>
</table>

### Extended SRAM cassette specifications

| Item | NZ2MC-1MBS | NZ2MC-2MBS | NZ2MC-4MBS | NZ2MC-8MBS(E)|| NZ2MC-16MBS** |
|------|-------------|-------------|-------------|-----------------|
| Capacity (byte) | 1M | 2M | 4M | 8M | 16M |

---

*6: NZ2MC-8MBSE is only supported by safety CPU and process CPU.
*7: Safety CPU is not supported.
The motion CPU module is a dedicated high-precision control CPU module, designed solely for applications that require advanced motion control such as positioning control, synchronous control, and speed-torque control at a very high accuracy. The motion CPU is incorporated into the multiple CPU architecture of the MELSEC iQ-R Series complimenting the programmable controller CPU.

High-speed data communication between CPUs

High-speed communication is realized between the two CPUs via a large bandwidth data buffer memory exchange. There are two types of buffer memory for data exchange: one that provides cyclic exchange at a cycle time as fast as 0.222 ms; and one for direct data exchange of event-driven buffer memory, which is useful for large data bandwidth requirements. High-speed communications are very useful when there is a need to instantaneously transfer a large amount of information such as cam data, thereby simplifying programming even further.

*1: As compared to current Mitsubishi Electric products.
Various different applications easily realized

Tension control can be maintained constantly enabling the unwinding of various rolled sheets, for example, with line synchronization realized via speed and advanced synchronous control.

The combination of a machine vision system and high-speed motion control enables highly accurate positional alignment.

Synchronization between different print heads has been achieved by speed and advanced synchronous control.

Multiple machine processes by SFC programming

The motion CPU module is programmed using the SFC (Sequential Function Chart) type language which enables programming in clearly identifiable steps. This is extremely useful where multiple machine processes have to be performed simultaneously.

### Motion SFC Program

#### Reduced display

<table>
<thead>
<tr>
<th>F10</th>
<th>Data calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>F20</td>
<td>Work ready</td>
</tr>
<tr>
<td>G200</td>
<td>Start accept OFF confirmation</td>
</tr>
<tr>
<td>K100</td>
<td>Operation start</td>
</tr>
<tr>
<td>G300</td>
<td>Start accept OFF confirmation</td>
</tr>
</tbody>
</table>

- Operation control step: Arithmetic operations and I/O control, etc., are carried out.
- Transition (condition wait): The transition conditions are judged.
- Motion control step: Servomotor positioning control and speed control are carried out.

#### Enlarged display

| G200 | Work ready completion sensor ON? |
| K100 | Real |

### Motion CPU module specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>R16MTCPU</th>
<th>R32MTCPU</th>
<th>R64MTCPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of control axes</td>
<td>16 axes</td>
<td>32 axes (16 axes x 2 lines)</td>
<td>64 axes (32 axes x 2 lines)</td>
</tr>
<tr>
<td>Operation cycle (ms)</td>
<td>0.222, 0.444, 0.888, 1.777, 3.555, 7.111</td>
<td>0.222, 0.444, 0.888, 1.777, 3.555, 7.111</td>
<td>0.222, 0.444, 0.888, 1.777, 3.555, 7.111</td>
</tr>
<tr>
<td>Programming language</td>
<td>Motion SFC, dedicated instruction</td>
<td>Motion SFC, dedicated instruction</td>
<td>Motion SFC, dedicated instruction</td>
</tr>
<tr>
<td>Servo program capacity (step)</td>
<td>32K</td>
<td>32K</td>
<td>32K</td>
</tr>
<tr>
<td>Number of positioning points (point)</td>
<td>6400</td>
<td>6400</td>
<td>6400</td>
</tr>
<tr>
<td>Servo amplifier network</td>
<td>SSCNET II.H (1 line)</td>
<td>SSCNET II.H (2 lines)</td>
<td>SSCNET II.H (2 lines)</td>
</tr>
<tr>
<td>Max. distance between stations (m)</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Linear interpolation (axis)</td>
<td>2, 3, 4</td>
<td>2, 3, 4</td>
<td>2, 3, 4</td>
</tr>
<tr>
<td>Circular interpolation (axis)</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Helical interpolation (axis)</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>PTP (Point To Point) control</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Speed-position switching control</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Continuous path control</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Position follow-up control</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Advanced synchronous control</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Speed-torque control</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Acceleration/deceleration control</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Trapezoidal acceleration/deceleration</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>S-curve acceleration/deceleration</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Advanced S-curve acceleration/deceleration</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Interface</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>PERIPHERAL 1/F</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>SO memory card</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Function</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Absolute positioning system*1</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Mark detection function</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Security function</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Digital oscilloscope function</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Driver communication function</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

*1: A battery needs to be installed in the servo amplifier for home position backup.
The process CPU module is part of the application-specific range in the MELSEC iQ-R Series and has four CPUs available with memory sizes from 80K to 1200K steps. It is designed specifically for medium- to large-scale process control systems requiring high-speed performance coupled with the handling of large PID loops. When paired with a redundant function module, a highly reliable (redundant) control system can be realized with a tracking data capacity of up to 1 M words between the control and standby systems supported.

**DCS style features in a cost-efficient automation control system**

The specialized CPU inherits its high performance from the MELSEC iQ-R Series when used together with the centralized programming suite GX Works3 and iQ Works. The process control system incorporates a dedicated process instruction set (such as two-degree-of-freedom PID, sample PI, and auto-tuning), realizing algorithmic PID and highly reliable features such as being able to interchange (hot-swap) I/O modules while the system is still online and large-scale process control with a maximum of 500 loops, closely bringing it in line with DCS capabilities without the financial burden.
Redundant system remote location and high-speed switching

Optical-fiber tracking cables enable the standby system to be installed in a remote location up to 550 m from the control (primary) system. The tracking cables are immune to noise interference and support fast data transfer rates. System switching speed has also been improved to speeds of 10 ms or less, enabling high-speed switching of the control system to standby system further improving reliability.

Improve reliability with reduced single-point failure

A multi-level redundant system can be realized by installing dual control systems consisting of the control (primary) and standby CPUs combined with a dual cable topology for the network cabling of the CC-Link IE Field networks, and dual remote stations minimizing the risk of single-point failure. The Ethernet module is equipped with two communications ports, enabling continuous information level communications with SCADA software even if an error occurs with one of the ports. Only one module is required per control and standby system, reducing overall hardware cost. Online replacement of modules (hot-swapping) is possible without stopping the operating control system.
Efficient engineering through extensive compatibility between software

An efficient and highly-scalable engineering environment can be realized by the extensive compatibility between GX Works3 together with SCADA software (MC Works64), monitoring software GT SoftGOT and GT Works3 [GOT (HMI)].

Highly scalable process control visualization

Process tag labels (variables) can be shared between GX Works3, Mitsubishi SCADA MC Works64, GT SoftGOT and GOT (HMI), realizing an efficient engineering environment that makes screen creation easier. In addition, a scalable SCADA control system can be realized combining these products.

Integrated engineering software realizing easy programming and maintenance

GX Works3 is a centralized programming environment supporting various programming, debug and maintenance features, thereby enabling efficient engineering. Multiple programming languages can be used within the same GX Works3 project, including function block diagram (process control programming), ladder, structured text and sequential function chart.

System configuration

<table>
<thead>
<tr>
<th>CPU</th>
<th>I/O</th>
<th>Analog</th>
<th>Motion, Positioning, Flexible high-speed I/O</th>
<th>High-speed counter</th>
<th>Network</th>
<th>Advanced information</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Advanced information</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Process CPU module specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>R08PCPU</th>
<th>R16PCPU</th>
<th>R32PCPU</th>
<th>R120PCPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control method</td>
<td>Stored program cyclic operation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I/O control mode</td>
<td>Refresh mode (Direct access I/O is available by specifying direct access I/O (DX, DY).)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Programming language</td>
<td>Ladder diagram (LD), structured text (ST), function block diagram (FBD), sequential function chart (SFC)**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extended programming language</td>
<td>Function block (FB), label programming (system/local/global)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program execution type</td>
<td>Initial, scan, fixed scan, interrupt, standby type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of I/O points [X/Y][point]</td>
<td>4096</td>
<td>4096</td>
<td>4096</td>
<td>4096</td>
</tr>
<tr>
<td>Constant scan (ms)</td>
<td>0.2...2000 (Setting available in 0.1 ms increments)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program capacity (step)</td>
<td>80K</td>
<td>160K</td>
<td>320K</td>
<td>1200K</td>
</tr>
<tr>
<td>Program memory (byte)</td>
<td>320K</td>
<td>640K</td>
<td>1280K</td>
<td>4800K</td>
</tr>
<tr>
<td>Device/label memory (ECC type)**</td>
<td>1188K</td>
<td>1720K</td>
<td>2316K</td>
<td>3380K</td>
</tr>
<tr>
<td>Data memory (byte)</td>
<td>5M</td>
<td>10M</td>
<td>20M</td>
<td>40M</td>
</tr>
<tr>
<td>Instruction processing time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD instruction (ns)</td>
<td>0.98</td>
<td>0.98</td>
<td>0.98</td>
<td>0.98</td>
</tr>
<tr>
<td>MOV instruction (ns)</td>
<td>1.96</td>
<td>1.96</td>
<td>1.96</td>
<td>1.96</td>
</tr>
<tr>
<td>E + instruction (floating-point addition) (ns)</td>
<td>9.8</td>
<td>9.8</td>
<td>9.8</td>
<td>9.8</td>
</tr>
<tr>
<td>Structured text IF instruction** (ns)</td>
<td>1.96</td>
<td>1.96</td>
<td>1.96</td>
<td>1.96</td>
</tr>
<tr>
<td>Structured text FOR instruction** (ns)</td>
<td>1.96</td>
<td>1.96</td>
<td>1.96</td>
<td>1.96</td>
</tr>
<tr>
<td>PC MIX value** (instructions/μs)</td>
<td>419</td>
<td>419</td>
<td>419</td>
<td>419</td>
</tr>
<tr>
<td>USB2.0 High Speed (miniB)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Ethernet (100BASE-TX/10BASE-T)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Memory interface**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD memory card</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Extended SRAM cassette</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Function**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple interrupt</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Standard PID control</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Process control</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Database</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td>Data logging</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Security function</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Inter-modular synchronization**</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>SLMP communication</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Online module change</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

*1: SFC programming language is not supported when the Process CPU is used in redundant mode (future support).
*2: An extended SRAM cassette expands the device/label memory area. (NZ2MC-8MBSE expands the device/label memory area conforming to ECC type memory.)
*3: The IF or FOR sentence of the structured text consists of several instructions, which may increase the processing time period.
*4: Average number of instructions such as for basic instructions and data processing executed in 1 μs. The larger the value, the faster the processing speed.
*5: For more information please refer to the SD memory card and SRAM cassette specifications on page 31.
*6: Memory dump and real-time monitor are not supported.
*7: Inter-modular synchronization is not supported when used in redundant mode.

### Redundant function module specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>R6RFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication cable</td>
<td>Multi-mode optical cable</td>
</tr>
<tr>
<td>Max. distance (m)</td>
<td>550 (when the core outer diameter is 50 μm)</td>
</tr>
<tr>
<td>Tracking cable data capacity (word)</td>
<td>1M</td>
</tr>
</tbody>
</table>
The safety CPU module enables control of both generic and safety programs in the same module and is easily programmed utilizing the intuitive features of GX Works3. Compliant with internationally recognized safety standards, the safety CPU enables safety devices such as safety light curtains, emergency switches, and door switches to be connected via the CC-Link IE Field network without requiring a separate dedicated network line. The safety CPU is easily programmed using GX Works3, and utilizes its intuitive features.

**Generic and safety control in one CPU**

The safety CPU can be installed directly on the MELSEC iQ-R Series base rack, and is easily integrated into an existing or new control system. Safety devices are connectable using the CC-Link IE Field network with safety communication integrated into the network protocol over a widely-available industrial Ethernet topology. The safety CPU is compliant with ISO 13849-1 PL e and IEC 61508 SIL 3 and is certified by TÜV Rheinland®.
Common engineering platform

In GX Works3, operation and safety programs are included in the same project folder, eliminating the need to manage multiple project folders. Various useful features of GX Works3 are also available for safety programs similar to other control programs.

Faster response times and handling of larger programs

Utilizing the high-performance capabilities of the MELSEC iQ-R Series and CC-Link IE Field network, productivity is enhanced as response times are even faster. Additionally, safety control program capacity has been increased by up to three times, to 40K steps, enabling the control of more complex programs.

Safety CPU performance specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>R08SFCPU-SET*1</th>
<th>R16SFCPU-SET*1</th>
<th>R32SFCPU-SET*1</th>
<th>R120SFCPU-SET*1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety integrity level (SIL)</td>
<td>SIL 3 (IEC 61508)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance level (PL)</td>
<td>PL e (EN/ISO 13849-1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control method</td>
<td>Stored program cyclic operation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I/O control mode</td>
<td>Refresh mode (Direct access I/O) is available by specifying direct access I/O (DX, DY).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Programming language</td>
<td>Ladder diagram (LD), structured text (ST)*2, function block diagram (FBD)*2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extended programming language</td>
<td>Function block (FB), label programming (local/global)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program execution type</td>
<td>Initial*, scan**, fixed scan, interrupt**, standby type**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program capacity (step)</td>
<td>80K (40K for safety programs)</td>
<td>160K (40K for safety programs)</td>
<td>320K (40K for safety programs)</td>
<td>1200K (40K for safety programs)</td>
</tr>
<tr>
<td>Program memory (byte)</td>
<td>320K</td>
<td>640K</td>
<td>1280K</td>
<td>4800K</td>
</tr>
<tr>
<td>Device/label memory*3/(byte)</td>
<td>1178K</td>
<td>1710K</td>
<td>2306K</td>
<td>3370K</td>
</tr>
<tr>
<td>Data memory (byte)</td>
<td>8M</td>
<td>16M</td>
<td>20M</td>
<td>40M</td>
</tr>
<tr>
<td>SLMP communication</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

1: Product package includes a safety CPU (R SFCPU) and safety function module (R6SFM).
2: Only for executing generic control programs.
3: An extended SRAM cassette expands the device/label memory area.
C Controller Module

R12CCPU-V
Memory capacity 256 MB

The C Controller module is part of the application-specific range in the MELSEC iQ-R Series. The multi-core ARM®-based controller pre-installed with VxWorks® Version 6.9, realizes the simultaneous execution of programs, thereby providing a robust and deterministic alternative to computer based systems. Utilizing a fan-less hardware design, the C Controller is ideal for clean fab-based applications where dust circulation can be detrimental to the production environment. The C Controller utilizes the high-performance, flexible, and robust features of the MELSEC iQ-R Series to provide an industrial-grade automation control system.

**Easy setup using three simple tools**

Setup of the C Controller couldn’t be simpler as the CPU is shipped with a pre-installed real-time OS with various drivers embedded. This eliminates the need to setup and install a separate OS and develop drivers, which can substantially add to the cost of implementation. The C Controller allows C language programming by using CW Workbench programming software, easy configuration using MELSOFT CW Configurator, and VxWorks® emulation using CW-Sim.
Programming without considering MPU

C Controller dedicated functions (CCPU functions) and MELSEC communication functions (MD functions) realize easy access to the C Controller, I/O, intelligent function, network, and programmable controller/motion CPU modules. Applications involving programmable controllers can be easily created using these functions.

Parameter setup/diagnosis/monitoring with CW Configurator

CW Configurator enables parameter setup, module diagnosis and monitoring of various MELSEC iQ-R/Q Series intelligent, network and I/O modules*1 modules including the C Controller module. Using CW Configurator is as easy as using the MELSEC iQ-R engineering software GX Works3, which shares similar interfaces.

*1: For supported modules, please refer to the relevant manual of that module.
Application development in simple steps

Developing applications with the MELSEC C Controller is easy as no additional driver development is required, whilst providing a full-scale embedded development environment at a relatively low cost. CW Workbench is used as the main programming software in C/C++ with a VxWorks® emulator, CW-Sim/CW-Sim standalone, which allows debugging without requiring any hardware.

No need to generate OS or drivers. This program does it all.

Engineering tool for C Controller
CW Workbench

C Controller module specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>R12CCPU-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware</td>
<td></td>
</tr>
<tr>
<td>Endian format</td>
<td>Little endian</td>
</tr>
<tr>
<td>MPU</td>
<td>ARM® Cortex-A9 Dual Core</td>
</tr>
<tr>
<td>Working RAM</td>
<td>256 MB</td>
</tr>
<tr>
<td>ROM</td>
<td>16 MB</td>
</tr>
<tr>
<td>Backup RAM</td>
<td>4 MB</td>
</tr>
<tr>
<td>Software</td>
<td></td>
</tr>
<tr>
<td>OS</td>
<td>VxWorks® Version 6.9</td>
</tr>
<tr>
<td>Programming language</td>
<td>C language (C/C++)</td>
</tr>
<tr>
<td>Programming development environment</td>
<td>CW Workbench/Wind River Workbench3.3</td>
</tr>
<tr>
<td>C Controller module setting/monitoring tool</td>
<td>CW Configurator (SW1DND-RCCPU)</td>
</tr>
<tr>
<td>Communication interface</td>
<td></td>
</tr>
<tr>
<td>USB</td>
<td></td>
</tr>
<tr>
<td>Ethernet</td>
<td>2CH (1000BASE-T/10BASE-TX/10BASE-T)</td>
</tr>
<tr>
<td></td>
<td>1CH (9600...115200 bps)</td>
</tr>
<tr>
<td>RS-232</td>
<td></td>
</tr>
<tr>
<td>SD memory card slot</td>
<td></td>
</tr>
</tbody>
</table>
Digital I/O modules are the senses of the automation system and provide an interface of various processes to the controller. Devices such as switches, indicator lamps, and sensors can be easily connected to the control system. The high-density terminal connections (up to 64 points) results in space-saving designs within the control cabinet further reducing installation costs. In addition, input interrupt functions and output relay health diagnosis are additional features embedded in this intelligent, yet small, compact module.

**Focus points**
- **Input/output combined**
- **Input**
  - 16 points
  - 32 points
  - 64 points
  - Serial no. on the module front surface
- **Output**
  - Rating information
  - Easy-to-use aesthetic design
  - Cable tie hook

- Input/output rating is printed at the front, reducing incorrect wiring
- Easy-to-use cable tie hook for tidy wiring*1
- Existing 16-point terminal blocks are reusable; eliminating rewiring
- Simple confirmation by product serial no. printed on the front
- Alternating toggle switch used to display between 32-point LED signals*2
- Terminal signals are clearly labeled and color-coded*1
- Up to 32 LED signals clearly visible

**Clear and easily legible**

White and red labels clearly differentiate the input and output modules from each other, further improving safety awareness. The LED signal displays also labeled with clearly visible and easy to read I/O signal numbers printed on the cover. The wiring terminals of the 16-point modules are labeled with signal names, further reducing the possibility of wiring mistakes. Up to 32 LED signals can be displayed at one time, and a toggle switch enables alternation between the first- and second-half signal displays for the high-density 64-point modules. The input and output ratings are also clearly printed on the front and the serial number is at the bottom, making it easy to confirm product model and version.

**Simple wiring and high-density I/O**

I/O modules are available in a wide range of densities (16-, 32- and 64-points) depending on the I/O requirements and minimum use of space in the control cabinet. A module with a 40-pin connector is available for high-density I/O wiring. The terminal block and spring clamp terminal block are interchangeable with MELSEC-Q Series I/O terminals and can save on the cost of upgrading from existing control systems.
Digital input modules like the 24 V direct-current (DC) power supply are among the most used input signals in the control industry. The robust design of the various modules in this diversified lineup makes them ideal for industrial use.

**Multiple features integrated**

A single MELSEC iQ-R input module can handle input response devices as fast as 0.1 ms, interrupt input devices and can be wired using either positive or negative (sink or source) common terminals. Since multiple modules are no longer required, a substantial reduction in overall footprint of up to 20% and a reduction in total system costs of up to 60% can be realized.

<table>
<thead>
<tr>
<th>Module</th>
<th>Points</th>
<th>Type</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>RX28</td>
<td>8</td>
<td>AC</td>
<td>8 points, 100 to 240 V AC (50/60 Hz)</td>
</tr>
<tr>
<td>RX10</td>
<td>16</td>
<td>AC</td>
<td>16 points, 100 to 120 V AC (50/60 Hz)</td>
</tr>
<tr>
<td>RX40C7</td>
<td>16</td>
<td>DC</td>
<td>24 V DC, 70 mA</td>
</tr>
<tr>
<td>RX41C4</td>
<td>32</td>
<td>DC</td>
<td>24 V DC, 4.0 mA</td>
</tr>
<tr>
<td>RX42C4</td>
<td>64</td>
<td>DC</td>
<td>24 V DC, 4.0 mA</td>
</tr>
<tr>
<td>RX40PC6H</td>
<td>16</td>
<td>DC high-speed</td>
<td>24 V DC, 6.0 mA, Positive common type</td>
</tr>
<tr>
<td>RX40NC6H</td>
<td>16</td>
<td>DC high-speed (with diagnostic functions)</td>
<td>24 V DC, 6.0 mA, Negative common type</td>
</tr>
<tr>
<td>RX41C6HS</td>
<td>32</td>
<td>DC high-speed</td>
<td>24 V DC, 6.0 mA, Both sink and source wiring</td>
</tr>
<tr>
<td>RX61C6HS</td>
<td>32</td>
<td>DC high-speed</td>
<td>5 V DC, 6.0 mA, Both sink and source wiring</td>
</tr>
</tbody>
</table>

The RX42C4 module can be configured to use both sink and source wiring. All features integrated into one module! Occupied I/O slots reduced to 20%*. Hardware costs reduced by 60%**.

* The RX42C4 module can be configured to use both sink and source wiring (between the left and right sides of 32 point terminal).

** Based on a comparison with the MELSEC-Q Series
Reduce downtime with disconnection detection

Similar to analog modules, the MELSEC iQ-R Series input module (with diagnostic functions) includes input disconnection detection which enables detection of inputs directly on the I/O module. When an error occurs, the control system can quickly highlight the fault via a monitoring system or on GX Works3 programming software, reducing system downtime and loss of production.

Input module specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>AC input</th>
<th>DC input</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RX28</td>
<td>RX10C</td>
</tr>
<tr>
<td>Number of input points</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Rated input voltage, frequency</td>
<td>100...240 V AC, 50/60 Hz</td>
<td>100...120 V AC, 50/60 Hz</td>
</tr>
<tr>
<td>Rated input current (mA)</td>
<td>16.4 (200 V AC, 60 Hz)</td>
<td>13.7 (200 V AC, 50 Hz)</td>
</tr>
<tr>
<td>Response time</td>
<td>≤ 20 ms</td>
<td>≤ 20 ms</td>
</tr>
<tr>
<td>Common terminal arrangement (points/common)</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Interrupt function</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>External interface*1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-point screw terminal block</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>40-pin connector</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>DC high-speed input</th>
<th>DC input (with diagnostic functions)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RX40PC6H</td>
<td>RX40NC6H</td>
</tr>
<tr>
<td>Number of input points</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Rated input voltage, frequency</td>
<td>24 V DC</td>
<td>24 V DC</td>
</tr>
<tr>
<td>Rated input current (mA)</td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Response time</td>
<td>5 μs...70 ms</td>
<td>5 μs...70 ms</td>
</tr>
<tr>
<td>Common terminal arrangement (points/common)</td>
<td>8 (positive common)</td>
<td>8 (negative common)</td>
</tr>
<tr>
<td>Interrupt function</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Diagnostic function*2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Disconnection detection</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>External interface*1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>18-point screw terminal block</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>40-pin connector</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*1: For more information about external interface (for applicable options, please refer to the relevant product manual), please refer to the options list on page 94.

*2: For more information about diagnostic functions, please refer to the relevant product manual.
### Output Modules

**Relay output**

- **RY18R2A**
  - NEW
  - 8 points
  - 24 V DC, 240 V AC

- **RY10R2**
  - 16 points
  - 24 V DC, 240 V AC

**Triac output**

- **RY20S6**
  - NEW
  - 16 points
  - 100 to 240 V AC

**Transistor (sink) output**

- **RY40NT5P**
  - 16 points
  - 12 to 24 V DC, 0.5 A

- **RY41NT2P**
  - 32 points
  - 12 to 24 V DC, 0.2 A

- **RY42NT2P**
  - 64 points
  - 12 to 24 V DC, 0.2 A

**Transistor (source) output**

- **RY40PT5P**
  - 16 points
  - 12 to 24 V DC, 0.5 A

- **RY41PT1P**
  - 32 points
  - 12 to 24 V DC, 0.1 A

- **RY42PT1P**
  - 64 points
  - 12 to 24 V DC, 0.1 A

**High-speed transistor (sink) output**

- **RY41NT2H**
  - 32 points
  - 5 to 24 V DC, 0.2 A

**High-speed transistor (source) output**

- **RY41PT2H**
  - 32 points
  - 5 to 24 V DC, 0.2 A

**Transistor-with diagnostic functions (source) output**

- **RY40PT5B**
  - 16 points
  - 24 V DC, 0.5 A

---

A variety of digital output modules are available including relay, transistor sink (wired as positive common) and transistor source (wired as negative common). Load voltages include 240 V AC and 12 V to 24 V DC, with various current ratings.

### Relay health diagnostics for preventive maintenance

Output modules (relay output and transistor-with diagnostic functions modules) keep track of how many times they’re turned on and off. Utilizing this data, such as from embedded relay contacts in the relay output module or from relays connected externally to the transistor output module (with diagnostic functions), preventive maintenance can be carried out based on the known service of the relay.

### Output module specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Relay output</th>
<th>Triac output</th>
<th>Transistor (sink) output</th>
<th>Transistor (source) output</th>
<th>High-speed transistor (sink) output</th>
<th>High-speed transistor (source) output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RY18R2A</td>
<td>RY10R2</td>
<td>RY20S6</td>
<td>RY40NT5P</td>
<td>RY41NT2P</td>
<td>RY42NT2P</td>
</tr>
<tr>
<td>Number of input points (point)</td>
<td>8</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>32</td>
<td>64</td>
</tr>
<tr>
<td>Rated switching voltage, current</td>
<td>24 V DC/2 A</td>
<td>24 V DC/2 A</td>
<td>240 V AC/2 A</td>
<td>240 V AC/2 A</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Rated load voltage (V DC)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>12...24</td>
<td>12...24</td>
</tr>
<tr>
<td>Max. load current (A/point)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.5</td>
<td>0.2</td>
</tr>
<tr>
<td>Response time</td>
<td>≤ 12 ms</td>
<td>≤ 12 ms</td>
<td>≤ 1 ms + 0.5 cycle</td>
<td>≤ 1 ms</td>
<td>≤ 1 ms</td>
<td>≤ 1 ms</td>
</tr>
<tr>
<td>Common terminal arrangement (points/common)</td>
<td>-</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Protection function</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>18-point screw terminal block</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>40-pin connector</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Network</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

---

1: For more information about external interface (for applicable options, please refer to the relevant product manual), please refer to the options list on page 94.

2: For more information about diagnostic functions, please refer to the relevant product manual.
In addition to dedicated digital input and output modules, if only a few I/O points are required, a combined I/O module is available. This is an excellent alternative for cost-sensitive applications.

### I/O combined module specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>RH42C4NT2P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DC input</strong></td>
<td></td>
</tr>
<tr>
<td>Number of input points (point)</td>
<td>32</td>
</tr>
<tr>
<td>Rated input voltage (V DC)</td>
<td>24</td>
</tr>
<tr>
<td>Rated input current (mA)</td>
<td>4.0 TYP</td>
</tr>
<tr>
<td>Response time (ms)</td>
<td>0.1...70</td>
</tr>
<tr>
<td>Common terminal arrangement</td>
<td></td>
</tr>
<tr>
<td>(points/common)</td>
<td>32</td>
</tr>
<tr>
<td>Interrupt function</td>
<td>●</td>
</tr>
<tr>
<td><strong>Transistor (sink) output</strong></td>
<td></td>
</tr>
<tr>
<td>Number of output points (point)</td>
<td>32</td>
</tr>
<tr>
<td>Rated load voltage (V DC)</td>
<td>12...24</td>
</tr>
<tr>
<td>Max. load current (A/point)</td>
<td>0.2</td>
</tr>
<tr>
<td>Response time (ms)</td>
<td>≤ 1</td>
</tr>
<tr>
<td>Common terminal arrangement</td>
<td></td>
</tr>
<tr>
<td>(points/common)</td>
<td>32</td>
</tr>
<tr>
<td>Protection function (overload, overheat)</td>
<td>●</td>
</tr>
<tr>
<td>External interface*</td>
<td>● (2x)</td>
</tr>
</tbody>
</table>

*1: For more information about external interface (for applicable options, please refer to the relevant product manual), refer to the options list on page 94.
Similar to the digital I/O modules, analog modules are the main interface between the control process and the MELSEC iQ-R Series automation system. The main differences are that they have been designed to interface with sensors that process varying voltage and current signals instead of digital binary signals, and convert those signals into binary data that the control system can use. The MELSEC iQ-R Series range of analog modules includes features such as high-speed sampling (5 μs/4CH) coupled with 16 bit high-resolution (1/32,000) digital output signals, simultaneous multi-channel conversion (no. of channels increased with inter-modular synchronization), galvanic channel isolation and disconnection detection, thereby enabling highly precise and stable analog signal processing.

Save on downtime cost with ‘channel disconnection detection’

Channel input or output error threshold values are easily settable within GX Works3 ensuring the detection of disconnected channel(s), reducing downtime and saving on maintenance costs.

High signal integrity using galvanic isolation

The “-G” suffix modules include internal galvanic channel isolation that can improve noise interference capabilities without requiring an additional signal converter as well as protecting the internal module components from a short circuit.

![Image showing analog signal processing](image_url)
High-frequency noise filtering

The analog modules include a first-order delay filter that eliminates high-frequency noise interference and improves the accuracy of input analog signals. This feature can be easily setup using the module's dedicated parameters, thereby improving the processing time as an additional setup program (ladder) is not required.

Enhanced alarm and warning features

Preventive maintenance procedures are simplified with the enhanced alarm and warning capabilities. Regardless of the program scan time, when an event such as the change rate of an analog signal exceeding the preset limit occurs, corrective interrupt procedures can be triggered or an alarm generated to notify responsible personnel or initiate proper countermeasures.
Data logging faster than scan time

Analog modules are equipped with a data logging feature that’s useful when a large amount of data (up to 10k points) is required within a specified period of time. Coupled with the high-speed analog-to-digital conversion time, event-driven triggers enable continuous logging even after an event occurrence and fast data logging sampling that is asynchronous to the control scan time. Data logging can be used in applications such as a motor inspection line, where motor performance can be logged at high speed and certain values such as voltage, current, torque and rotational speed analyzed through comparisons with different test patterns.

Scaling and shifting digital values without any programs

Scaling and shifting can be easily setup from only using the parameters. There is no need for additional programming, thereby realizing reductions in engineering costs and overall program size.
### Analog input module specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>R60AD4</th>
<th>R60ADV8</th>
<th>R60ADI8</th>
<th>R60AD8-G</th>
<th>R60AD16-G</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of analog input points (ch)</strong></td>
<td>4</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature 25 ±5°C</td>
<td>±0.1%</td>
<td>±0.1%</td>
<td>±0.1%</td>
<td>±0.1%</td>
<td>±0.1%</td>
</tr>
<tr>
<td>Ambient temperature 0...55°C</td>
<td>±0.3%</td>
<td>±0.3%</td>
<td>±0.3%</td>
<td>±0.3%</td>
<td>±0.3%</td>
</tr>
<tr>
<td><strong>Common</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conversion speed (µs)</td>
<td>80</td>
<td>80</td>
<td>80 µs</td>
<td>10 ms</td>
<td>10 ms</td>
</tr>
<tr>
<td>Channel isolation</td>
<td>-</td>
<td>-</td>
<td>Transformer isolation</td>
<td>Transformer isolation</td>
<td></td>
</tr>
<tr>
<td>Absolute max. input</td>
<td>±15 V, 30 mA</td>
<td>±15 V</td>
<td>30 mA</td>
<td>±15 V, 30 mA</td>
<td>±15 V, 30 mA</td>
</tr>
<tr>
<td><strong>Voltage input</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog input voltage (V DC)</td>
<td>–10...10</td>
<td>–10...10</td>
<td>-</td>
<td>–10...10</td>
<td>–10...10</td>
</tr>
<tr>
<td>Digital output value</td>
<td>–32000...32000</td>
<td>–32000...32000</td>
<td>-</td>
<td>–32000...32000</td>
<td>–32000...32000</td>
</tr>
<tr>
<td><strong>Current input</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog input current (mA DC)</td>
<td>0...20</td>
<td>-</td>
<td>0...20</td>
<td>0...20</td>
<td>0...20</td>
</tr>
<tr>
<td>Digital output value</td>
<td>0...32000</td>
<td>-</td>
<td>0...32000</td>
<td>0...32000</td>
<td>0...32000</td>
</tr>
<tr>
<td><strong>External interface</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-point screw terminal block</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>● (2x)</td>
</tr>
<tr>
<td>40-pin connector</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

*1: For more information about external interface (for applicable options, please refer to the relevant product manual), refer to the options list on page 94.

### High-speed analog input module specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>R60ADH4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of analog input points (ch)</strong></td>
<td>4</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature 25 ±5°C</td>
<td>±0.1%</td>
</tr>
<tr>
<td>Ambient temperature 0...55°C</td>
<td>±0.2%</td>
</tr>
<tr>
<td><strong>Operation mode (sampling cycle)</strong></td>
<td>Normal mode (low speed: 20 µs/CH)</td>
</tr>
<tr>
<td>Absolute max. input</td>
<td>±15 V, 30 mA</td>
</tr>
<tr>
<td><strong>Voltage input</strong></td>
<td></td>
</tr>
<tr>
<td>Analog input voltage (V DC)</td>
<td>–10...10</td>
</tr>
<tr>
<td>Digital output value</td>
<td>–32000...32000</td>
</tr>
<tr>
<td><strong>Current input</strong></td>
<td></td>
</tr>
<tr>
<td>Analog input current (mA DC)</td>
<td>0...20</td>
</tr>
<tr>
<td>Digital output value</td>
<td>0...32000</td>
</tr>
<tr>
<td><strong>External interface</strong></td>
<td></td>
</tr>
<tr>
<td>18-point screw terminal block</td>
<td>●</td>
</tr>
<tr>
<td>40-pin connector</td>
<td>●</td>
</tr>
</tbody>
</table>

### Temperature input module specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>R60TD8-G</th>
<th>R60RD8-G</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of analog input points (ch)</strong></td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Cold junction temperature compensation accuracy</strong></td>
<td>±1.0°C</td>
<td>-</td>
</tr>
<tr>
<td><strong>Usable thermocouple</strong></td>
<td>B, R, S, K, E, J, T, N</td>
<td>-</td>
</tr>
<tr>
<td><strong>Usable RTD</strong></td>
<td>Pt100, JPt100, Ni100, Pt50</td>
<td>-</td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>B, R, S: 0.3°C</td>
<td>K, E, J, T: 0.1°C</td>
</tr>
<tr>
<td><strong>Conversion speed (µs)</strong></td>
<td>30 ms</td>
<td>10 ms</td>
</tr>
<tr>
<td><strong>Channel isolation</strong></td>
<td>Transformer isolation</td>
<td>Transformer isolation</td>
</tr>
<tr>
<td><strong>Wire break detection</strong></td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td><strong>Measured temperature value (16-bit signed binary data)</strong></td>
<td>~2700...18200</td>
<td>~2000...8500</td>
</tr>
<tr>
<td><strong>Scaling value (16-bit signed binary data)</strong></td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td><strong>External interface</strong></td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>40-pin connector</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

*1: For more information about external interface (for applicable options, please refer to the relevant product manual), refer to the options list on page 94.
Faster, smoother predefined wave signal output

The analog output module enables pre-registration of waveforms easily using MELSOFT GX Works3, realizing a smoother continuous output that closely matches the precision required for the application, such as torque control for a press or injection molding machine. Registering the waveform in the module is simple and easy, and does not require a dedicated analog output program, such as for continuous line control, further reducing programming time.

Pressure control of injection molding

Mold  
Heater  
Screw  
Heating cylinder  
Hopper

Shift operation and scaling without programs

Shift operation and scaling can be used without creating programs; they can be simply set on parameters. This simple setting minimizes program development cost as well as the program size.

Analog Output Modules

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>R60DA4</td>
<td>4-channel (voltage or current)</td>
</tr>
<tr>
<td>R60DAV8</td>
<td>8-channel (voltage)</td>
</tr>
<tr>
<td>R60DAI8</td>
<td>8-channel (current)</td>
</tr>
<tr>
<td>R60DA8-G</td>
<td>8-channel (voltage or current), channel isolated</td>
</tr>
<tr>
<td>R60DA16-G</td>
<td>16-channel (voltage or current), channel isolated</td>
</tr>
<tr>
<td>R60DAH4</td>
<td>NEW 4-channel (voltage or current)</td>
</tr>
</tbody>
</table>

MELSEC iQ-R Series analog output modules reliably deliver accurate analog values to points where high-resolution digital inputs are required. A variety of modules (voltage, current, or mixed) are available to cover a wide range of application requirements, such as high-speed drive control or variable-speed control of the pressure applied to materials being fed into some kind of forming mechanism.
### Analog output module specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>R60DA4</th>
<th>R60DAV8</th>
<th>R60DAI8</th>
<th>R60DA8-G</th>
<th>R60DA16-G</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of analog output points (ch)</strong></td>
<td>4</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature 25 ±5°C</td>
<td>±0.1%</td>
<td>±0.1%</td>
<td>±0.1%</td>
<td>±0.1%</td>
<td>±0.1%</td>
</tr>
<tr>
<td>Ambient temperature 0...55°C</td>
<td>±0.3%</td>
<td>±0.3%</td>
<td>±0.3%</td>
<td>±0.1%</td>
<td>±0.1%</td>
</tr>
<tr>
<td>Temperature coefficient</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Common</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conversion speed (µs)</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>1 ms</td>
<td>1 ms</td>
</tr>
<tr>
<td>Channel isolation</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Transformer isolation</td>
<td>Transformer isolation</td>
</tr>
<tr>
<td>Output short-circuit protection</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>External supply power (V DC)</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Voltage output</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital input value</td>
<td>–32000...32000</td>
<td>–32000...32000</td>
<td>-</td>
<td>–32000...32000</td>
<td>–32000...32000</td>
</tr>
<tr>
<td>Analog output voltage (V DC)</td>
<td>–10...10</td>
<td>–10...10</td>
<td>-</td>
<td>–12...12</td>
<td>–12...12</td>
</tr>
<tr>
<td><strong>Current output</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital input current (mA DC)</td>
<td>0...20</td>
<td>-</td>
<td>0...20</td>
<td>0...20</td>
<td>0...20</td>
</tr>
<tr>
<td>Analog output current (mA DC)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td><strong>External interface</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-point screw terminal block</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>40-pin connector</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>● (2x)</td>
<td>-</td>
</tr>
</tbody>
</table>

#### High-speed analog output module specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>R60DAH4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of channels</strong></td>
<td>4</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature 25 ±5°C</td>
<td>±0.1%</td>
</tr>
<tr>
<td>Ambient temperature 0...55°C</td>
<td>±0.3%</td>
</tr>
<tr>
<td><strong>Voltage output</strong></td>
<td></td>
</tr>
<tr>
<td>Digital input value</td>
<td>–32000...32000</td>
</tr>
<tr>
<td>Analog output voltage (V DC)</td>
<td>–10...10</td>
</tr>
<tr>
<td>Current output</td>
<td></td>
</tr>
<tr>
<td>Digital input value</td>
<td>0...32000</td>
</tr>
<tr>
<td>Analog output current (mA DC)</td>
<td>0...20</td>
</tr>
<tr>
<td><strong>External interface</strong></td>
<td></td>
</tr>
<tr>
<td>18-point screw terminal block</td>
<td>●</td>
</tr>
</tbody>
</table>

*1: For more information about external interface (for applicable options, please refer to the relevant product manual), please refer to the options list on page 94.
MELSEC iQ-R Series temperature control modules are ideal for applications requiring highly stable and responsive temperature control. The series comes with thermocouple and RTD input module types and are available with or without heater disconnection detection.

**Controlled heating minimizes distortion in heating profile**

Temperature fluctuations are attenuated at high speed through the external disturbance suppression function. This enables the preset temperature value to be maintained, ensuring a uniform heating profile not influenced by heating variations in the work. Due to its high-speed response capabilities, this function can be used in applications such as packaging machine sealing, injection molding, and for wafer plates in semiconductor manufacturing machines.
Coordination between multiple temperature control modules

Temperature control modules are equipped with features that enable coordination of up to 64 modules in one control system. The features that support this are as follows:

- Inter-module simultaneous temperature rise
- Inter-module peak current suppression

■ Inter-module simultaneous temperature rise
Temperature uniformity is realized by aligning the timing of multiple loops when reaching the set value, thereby bringing the temperature profile closer, ensuring a reduction in energy used controlled over multiple zones.

■ Inter-module peak current suppression
Peak current is reduced by spreading out the control output timing of transistors, thereby ensuring an energy-efficient power consumption cycle. High and low power usage periods are grouped together, realizing a lower peak current overall with up to five groups possible.
Temperature trace realizing real-time temperature waveform monitoring

Setting parameters has been simplified when using the temperature trace feature of GX Works3. This simple-to-use feature enables tracing of various temperature values in real-time, helping to visualize the control performance while adjusting the parameters. Temperature values can also be exported as a CSV file.

Temperature waveform monitored in real-time

Adjust parameters against temperature waveform

Temperature data can be saved as a CSV file

Temperature control module performance specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>R60TCTR2T1T2</th>
<th>R60TCTR4</th>
<th>R60TCTR2T2T2BW</th>
<th>R60TCTR4BW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of analog input channels (ch)</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Usable RTD</td>
<td>Pt100, JPt100</td>
<td>Pt100, JPt100</td>
<td>Pt100, JPt100</td>
<td>Pt100, JPt100</td>
</tr>
<tr>
<td>Sampling cycle (4 ch, ms)</td>
<td>250/500</td>
<td>250/500</td>
<td>250/500</td>
<td>250/500</td>
</tr>
<tr>
<td>Control output cycle (s)</td>
<td>0.5...100.0</td>
<td>0.5...100.0</td>
<td>0.5...100.0</td>
<td>0.5...100.0</td>
</tr>
<tr>
<td>Input impedance (MΩ)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Input filter (s)</td>
<td>0...100 s</td>
<td>0...100 s</td>
<td>0...100 s</td>
<td>0...100 s</td>
</tr>
<tr>
<td>Sensor correction value setting</td>
<td>(full scale of input range) to full scale of input range</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation at a sensor input disconnection</td>
<td>Upscale processing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heater disconnection detection</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Indication accuracy*1:</td>
<td>±0.3%</td>
<td>±0.3%</td>
<td>±0.3%</td>
<td>±0.3%</td>
</tr>
<tr>
<td>Ambient temperature 25±5°C</td>
<td>±0.7%</td>
<td>±0.7%</td>
<td>±0.7%</td>
<td>±0.7%</td>
</tr>
<tr>
<td>Ambient temperature 0...55°C</td>
<td>±0.3%</td>
<td>±0.3%</td>
<td>±0.3%</td>
<td>±0.3%</td>
</tr>
<tr>
<td>PID constants setting</td>
<td>Setting by auto tuning is available.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportional band (P)</td>
<td>• When the input range is °C or °F: 0 (0.0)...full scale of input range (depending on the decimal point position)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integral time (I)</td>
<td>0...3600 s (Set 0 for P control and PD control.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Derivative time (D)</td>
<td>0...3600 s (Set 0 for P control and PI control.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transistor output</td>
<td>ON/OFF pulse</td>
<td>ON/OFF pulse</td>
<td>ON/OFF pulse</td>
<td>ON/OFF pulse</td>
</tr>
<tr>
<td>Rated load voltage (V DC)</td>
<td>10...30</td>
<td>10...30</td>
<td>10...30</td>
<td>10...30</td>
</tr>
<tr>
<td>Maximum load current (A)</td>
<td>0.1 point, 0.4 common</td>
<td>0.1 point, 0.4 common</td>
<td>0.1 point, 0.4 common</td>
<td>0.1 point, 0.4 common</td>
</tr>
<tr>
<td>Maximum inrush current (A)</td>
<td>0.4 A, 10 ms</td>
<td>0.4 A, 10 ms</td>
<td>0.4 A, 10 ms</td>
<td>0.4 A, 10 ms</td>
</tr>
</tbody>
</table>

External interface*2:

1-point screw terminal block | (2x) | (2x) |

*1: The accuracy is calculated in the following method. For details, please refer to the manual. (Only when it is not affected by noise.)

Accuracy (°C) = (full-scale) × (indication accuracy) + cold junction temperature compensation accuracy

*2: For more information about external interface (for applicable options, please refer to the relevant product manual), refer to the options list on page 94.
Focus points

- Wide range of modules for best-fit motion control needs
- Motion control programming simplified
- Software-based gear, shaft, transmission, and cam control
- 3-axis helical interpolation for large-diameter thread milling
- Normal, fast or multi-axis startup
- High-accuracy pulse measurement

MELSEC iQ-R Series simple motion, positioning, and high-speed counter modules are a distinct set of high-accuracy and fast control response intelligent modules that are ideal for applications requiring high-speed and precision.

Simple motion module

Simple motion modules are easy to setup similar to positional modules and offer high-precision motion controller performance. This is an easy-to-use module specifically designed for highly precise motion control applications, available with connection to either high-speed servo control network (SSCNET Ⅲ/H) or CC-Link IE Field network depending on the model.

Positioning module

Capable of high-speed transmission (5M pulses/s*1), the positioning module can control up to four axes. This versatile module supports connection to a wide range of motion devices, such as pulse-train input servo amplifiers or stepping motor with a transistor (open collector), or differential driver input interface.

High-speed counter module

Capable of measurements at up to 8M pulses/s*2, the high-speed counter module is an ideal low-cost position control solution that provides precise positional tracking when used in combination with an incremental encoder.

*1: Differential driver output

*2: Differential input
Simple Motion Modules

Compatible with CC-Link IE Field network

<table>
<thead>
<tr>
<th>Model</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD77GF4</td>
<td>Up to 4-axis control</td>
</tr>
<tr>
<td>RD77GF8</td>
<td>Up to 8-axis control</td>
</tr>
<tr>
<td>RD77GF16</td>
<td>Up to 16-axis control</td>
</tr>
<tr>
<td>RD77GF32</td>
<td>Up to 32-axis control</td>
</tr>
</tbody>
</table>

Compatible with SSCNET III/H

<table>
<thead>
<tr>
<th>Model</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD77MS2</td>
<td>Up to 2-axis control</td>
</tr>
<tr>
<td>RD77MS4</td>
<td>Up to 4-axis control</td>
</tr>
<tr>
<td>RD77MS8</td>
<td>Up to 8-axis control</td>
</tr>
<tr>
<td>RD77MS16</td>
<td>Up to 16-axis control</td>
</tr>
</tbody>
</table>

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. The module line-up includes 2-, 4-, 8-, 16-, and 32-axis models, 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 operated (start/stop) for each axis, allowing synchronous and positional control axes within the same program.

■ Synchronous control
All axes are synchronized using a synchronous encoder or servo input axes. Up to 32 control axes can be synchronized when using the synchronous encoder, such as that used for packaging 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 dimensions, 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.

Speed-torque control (press-fit control)

The motor can be switched to torque control (press-fit mode) without stopping it during positioning. The current position is controlled during the speed/torque control. Therefore the positioning can be done smoothly even after switching back to position control.

Simple motion module specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>RD77GF4</th>
<th>RD77GF8</th>
<th>RD77GF16</th>
<th>RD77GF32</th>
<th>RD77MS2</th>
<th>RD77MS4</th>
<th>RD77MS8</th>
<th>RD77MS16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of control axes (axis)</td>
<td>4</td>
<td>8</td>
<td>16</td>
<td>32</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Operation cycle (ms)</td>
<td>0.5, 1.0, 2.0, 4.0</td>
<td>0.5, 1.0, 2.0, 4.0</td>
<td>0.5, 1.0, 2.0, 4.0</td>
<td>0.5, 1.0, 2.0, 4.0</td>
<td>0.444, 0.888, 1.777, 3.555</td>
<td>0.444, 0.888, 1.777, 3.555</td>
<td>0.444, 0.888, 1.777, 3.555</td>
<td>0.444, 0.888, 1.777, 3.555</td>
</tr>
<tr>
<td>Control unit</td>
<td>mm, inch, degree, pulse</td>
<td>mm, inch, degree, pulse</td>
<td>mm, inch, degree, pulse</td>
<td>mm, inch, degree, pulse</td>
<td>mm, inch, degree, pulse</td>
<td>mm, inch, degree, pulse</td>
<td>mm, inch, degree, pulse</td>
<td>mm, inch, degree, pulse</td>
</tr>
<tr>
<td>Positioning data (data/axis)</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>Servo amplifier</td>
<td>MR-J4-GF</td>
<td>MR-J4-GF</td>
<td>MR-J4-GF</td>
<td>MR-J4-GF</td>
<td>MR-J4-B</td>
<td>MR-J4-B</td>
<td>MR-J4-B</td>
<td>MR-J4-B</td>
</tr>
<tr>
<td>Max. distance between stations (m)</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Servo amplifier connection system</td>
<td>CC-Link IE Field</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SSCNET II-H</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Control interface*1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>40-pin connector</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Interpolation function</td>
<td>Linear interpolation (axis)</td>
<td>2, 3, 4</td>
<td>2, 3, 4</td>
<td>2, 3, 4</td>
<td>2, 3, 4</td>
<td>2</td>
<td>2, 3, 4</td>
<td>2, 3, 4</td>
</tr>
<tr>
<td>Circular interpolation (axis)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Control system</td>
<td>PTP (Point To Point) control</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Trajectory control (linear, arc)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Speed control</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Speed-position switching control</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Speed-torque control</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Pressure control</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Advanced synchronous control</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Acceleration/deceleration</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Trapezoidal acceleration/deceleration</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>S-curve acceleration/deceleration</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Function</td>
<td>Absolute positioning system*2</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

*1: For more information about external interface (for applicable options, please refer to the relevant product manual), refer to the options list on page 94.
*2: A battery needs to be installed in the servo amplifier for home position backup.
Positioning Modules

Transistor output
200k pulse/s

RD75P2
Up to 2-axis (linear/circular interpolation)

RD75P4
Up to 4-axis (linear/circular/helical interpolation)

Differential driver output
5M pulse/s

RD75D2
Up to 2-axis (linear/circular interpolation)

RD75D4
Up to 4-axis (linear/circular/helical interpolation)

The MELSEC iQ-R Series offers a choice of two positioning modules, transistor output or differential drive output, depending on the connected amplifier. The modules are capable of transmission speeds up to 5M pulses/s, and the differential driver output module supports wiring up to a distance of 10 m. It can be used in positional control or speed control, and features include linear, circular, and helical interpolation, which is a complex control required for deep-thread milling applications.

Various positional control
Various different positional control is performed by the module, from manual control, advanced control, to zero return control where it is required for the process position to return to its starting point. Automated sealing and gluing applicators tend to require extensive positional control as the interpolation may require a profile consisting of linear and circular paths that need to be followed accurately, such as in the automotive industry when glues are applied to the sealing portions of the doors.

Multiple startup options
Positioning modules are capable of multiple different position-start options such as normal startup where the starting trigger command is activated from the command pulse; fast-start, where an event-driven trigger is asynchronous to the execution program data analysis; and multi-axis startup, where multiple axes can be executed simultaneously from an output pulse. In addition, block-start is where multiple sequential positioning data are executed by a single start trigger, which is used in control that follows the same repetitive path.

4 path profiles (P1...P4) being drawn in sequence.
Realize helical interpolation

For applications that require the boring of deep, large holes, usually multiple interpolation control of three axes (X, Y and Z) or more must be taken into consideration. In such cases, the actual milling is done in a circle, with the X and Y axes synchronized to achieve the pre-set size. The depth of the hole is simultaneously controlled along the Z axis, ensuring minimal deviation in the cutting bit position. This type of positioning is usually quite difficult as the interpolation of the three axes can introduce some deviation when not utilizing a full-scale numerical control system.

Positioning module specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Transistor output</th>
<th>Differential driver output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RD7SP2</td>
<td>RD7SP4</td>
</tr>
<tr>
<td>Number of control axes (axis)</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Control unit</td>
<td>mm, inch, degree, pulse</td>
<td>mm, inch, degree, pulse</td>
</tr>
<tr>
<td>Positioning data (data/axis)</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>Module backup function</td>
<td>Positioning data, and block start data can be saved on flash ROM (battery-less backup)</td>
<td></td>
</tr>
<tr>
<td>Starting time (1 axis linear control) (ms)</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Max. output pulse (pulse/s)</td>
<td>200,000</td>
<td>200,000</td>
</tr>
<tr>
<td>Max. connection distance between servos (m)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Interpolation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear interpolation (axis)</td>
<td>2</td>
<td>2, 3, 4</td>
</tr>
<tr>
<td>Circular interpolation (axis)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Helical interpolation (axis)</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Control system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTP (Point To Point) control</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Path control (linear, arc, helical)</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Speed control</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Speed-position switching control</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Position-speed switching control</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Acceleration/deceleration process</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Trapezoidal acceleration/deceleration</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>S-curve acceleration/deceleration</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Fast-start function</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positioning start signal (µs)</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>External command signal (µs)</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>40-pin connector</td>
<td>●</td>
<td>● (2x)</td>
</tr>
</tbody>
</table>

*1: For more information about external interface (for applicable options, please refer to the relevant product manual), refer to the option lists on page 94.
The flexible high-speed I/O control module includes features such as the ability to program control logic and microsecond-fast asynchronous I/O response times to the programmable controller CPU and control bus, realizing stable machine performance minimizing processing speed fluctuation. Equipped with a field programmable gate array (FPGA), easy hardware logic design using the dedicated tool reduces development cost.

**High-speed, stable I/O response**

The flexible high-speed I/O control module provides highly accurate control of I/O timing owing to the asynchronous execution of internal control logic to the CPU and control bus. Variation in processing time is reduced to nanoseconds, thereby enabling sensors such as proximity lasers to trigger vision cameras accurately, which is required in product testing equipment in order to capture products moving at high-speed. Trigger input timing is adjustable to a minimum of 25 ns resolution.

**FPGA logic design enables more freedom in customization**

Equipped with a FPGA, control logic can be programmed easily using GX Works3. This low-cost alternative to HDL programming, logic synthesis and timing analysis reduces the design process, which is a common feature of general FPGA logic design.

### Flexible high-speed I/O control module specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>RD40PD01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of input points (point)</td>
<td>12 (5/24 V DC/differential)</td>
</tr>
<tr>
<td>Number of output points (point)</td>
<td>8 (5...24 V DC, 0.1 A/point)</td>
</tr>
<tr>
<td>Number of interrupts</td>
<td>8</td>
</tr>
<tr>
<td>Input response time</td>
<td>≤ 1 μs</td>
</tr>
<tr>
<td>Output response time</td>
<td>≤ 1 μs</td>
</tr>
<tr>
<td>Max. pulse input speed (pulse/s)</td>
<td>200 k (200 kHz)</td>
</tr>
<tr>
<td>Max. pulse output speed (pulse/s)</td>
<td>8 M (2 MHz)</td>
</tr>
<tr>
<td>Main functions executable using main block combinations</td>
<td>Pulse count, coincidence detection, cam switch, highly-accurate pulse output, PWM output, ratio setting, pulse measurement, electrical interface conversion</td>
</tr>
<tr>
<td>Main hardware logic processing time</td>
<td>Logic operation: Min. 875 ns, coincidence output: Min. 1375 ns, cam switch: Min. 262.5 ns</td>
</tr>
<tr>
<td>40-pin connector</td>
<td>(2x)</td>
</tr>
</tbody>
</table>

*1: For more information about external interface (for applicable options, please refer to the relevant product manual), refer to the option lists on page 94.
High-Speed Counter Modules

<table>
<thead>
<tr>
<th></th>
<th>RD62P2</th>
<th>RD62P2E</th>
<th>RD62D2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of channels</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Count input signal</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>1-phase input (1 multiple/2 multiples)</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>2-phase input (1 multiple/2 multiples/4 multiples)</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>CW/CCW input</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Signal level ((\phi_A, \phi_B))</td>
<td>2...5 mA at 5/12/24 V DC</td>
<td>2...5 mA at 5/12/24 V DC</td>
<td>EIA Standard RS-422-A Differential line driver level</td>
</tr>
<tr>
<td>Counting speed (pulse/s)</td>
<td>10k...200k</td>
<td>10k...200k</td>
<td>10k...8M</td>
</tr>
<tr>
<td>Counting range (32-bit signed binary)</td>
<td>-2147483648...2147483648</td>
<td>-2147483648...2147483647</td>
<td>-2147483648...2147483647</td>
</tr>
<tr>
<td>External input</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Preset, function start</td>
<td>7...10 mA at 5/12/24 V DC</td>
<td>7...10 mA at 5/12/24 V DC</td>
<td>7...10 mA at 5/12/24 V DC</td>
</tr>
<tr>
<td>Digital filter (ms)</td>
<td>0, 0.1, 1, 10</td>
<td>0, 0.1, 1, 10</td>
<td>0, 0.1, 1, 10</td>
</tr>
<tr>
<td>Resolution* (ns)</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Number of points per channel</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>External output</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Coincidence output (2 points/channel)</td>
<td>Transistor (sink type) output, 12/24 V DC, 0.5 A/poin</td>
<td>Transistor (source type) output, 12/24 V DC, 0.1 A/poin</td>
<td>Transistor (sink type) output, 12/24 V DC, 0.5 A/poin</td>
</tr>
<tr>
<td>PWM output</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Output frequency range (kHz)</td>
<td>0...200</td>
<td>0...200</td>
<td>0...200</td>
</tr>
<tr>
<td>Duty ratio</td>
<td>Multiples of 0.1 µs</td>
<td>Multiples of 0.1 µs</td>
<td>Multiples of 0.1 µs</td>
</tr>
<tr>
<td>Number of output points per channel</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Setting change during operation</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>External interface*</td>
<td>40-pin connector</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

*1: Pulse measurement can be performed in the range of 2000 to 2147483647 (0.2 ms to approx. 214 s).
*2: For more information about external interface (for applicable options, please refer to the relevant product manual), refer to the option lists on page 94.

The MELSEC iQ-R Series counter modules are capable of 200k pulse/s for the DC input type, and 8M pulse/s for differential input. When used with a high-accuracy incremental encoder, positional tracking can also be realized. It also features a PWM output, which is ideal for applications requiring a measurement of pulse cycles.

Pulse measurement

The pulse measurement feature enables measuring of the pulse cycle, which is ideal for various applications such as in the food and beverage industry where proximity sensors are used to control flask position on the conveyor, or the renewable energy industry where the wind vane angle is controlled on a wind turbine.

High-speed PWM output

The PWM output frequency can support up to 200 kHz with a minimum 100 ns pulse width (proportion to ‘on’ time) during the required duty cycle. The set values can be changed during operation without having to stop the system, such as in industrial-scale fan control.
The network and interface modules of the MELSEC iQ-R Series ensure a vast selection of interconnectivity possibilities with various protocols and network topologies providing the best-fit solution for various applications. At the core of the Series is the CC-Link IE network family which is a high-speed 1 Gbps control level and field level Ethernet topology industrial open network.

**Seamless message protocol (SLMP*) network communications**

With SLMP, it is possible to seamlessly access production management systems, programmable controllers and other devices using the same method, eliminating concerns about network hierarchies and boundaries. Tasks such as machine monitoring, data collection and maintenance can be performed from virtually anywhere on the network. Used together with the Ethernet module, SLMP-ready Ethernet devices such as a machine vision sensor or RFID controller can be interfaced to the CC-Link IE Field Network without further adding another network.

---

*1: SLMP (Seamless Message Protocol) is a client/server protocol that enables communications between Ethernet-ready and CC-Link IE compatible devices.
The MELSEC iQ-R Series Ethernet module is equipped with two ports that can be used as either a generic Ethernet, CC-Link IE Field or Control Network module. The module design incorporates an easy-to-read display and a dot-matrix LED providing a quick way to assess network conditions using the module.

**Dual gigabit Ethernet ports**

The number of connectable ports on the Ethernet module has been doubled and the number of connections per channel increased. By increasing the number of ports the module can be used effectively as a gateway, simultaneously connecting a generic Ethernet network to one port and using the second port for the CC-Link IE Field or Control network. Additionally, the number of connections per channel has been increased from 64 to 128, doubling the bandwidth for even more connectable devices.

<table>
<thead>
<tr>
<th>Ethernet interface module specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Item</strong></td>
</tr>
<tr>
<td>Transmission specifications</td>
</tr>
<tr>
<td>Data transmission speed</td>
</tr>
<tr>
<td>Interface</td>
</tr>
<tr>
<td>Max. frame size (byte)</td>
</tr>
<tr>
<td>IP version</td>
</tr>
<tr>
<td>Sending/receiving data storage memory</td>
</tr>
<tr>
<td>Number of simultaneous open connections</td>
</tr>
<tr>
<td>Fixed buffer</td>
</tr>
<tr>
<td>Socket communications</td>
</tr>
<tr>
<td>* 5K words x 112 (when only P1/P2 is used)</td>
</tr>
<tr>
<td>Random access buffer</td>
</tr>
<tr>
<td>CC-Link IE Field/Control cable specifications</td>
</tr>
</tbody>
</table>

**1:** The specifications differ for the Q Series compatible Ethernet mode.

The CC-Link IE Field and CC-Link IE Control networks cannot be used together.
CC-Link IE Control
Network Module
RJ71GP21-SX
1 Gbps optical cable, control/normal station

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

Continuous communications even when cable or stations are faulty

Utilizing a high-speed, noise resistant fiber-optic topology, the CC-Link IE Control Network supports a loop-back function that guarantees continuous communications even when a cable is disconnected or a station falls into a fault status. The dual-loop topology of the cable ensures that the data will find another route along the network without affecting overall network communications.

Extensive real-time network monitoring

The network status can be easily monitored directly from GX Works3 software enabling intuitive troubleshooting of network errors or viewing the operation of the network while in communications. This makes it possible to see the actual fault occurring in the network, thereby helping to reduce the overall downtime. In addition, error messages related to the faulty network module station can be viewed for further network diagnosis. All stations within the network can be monitored regardless of which station the software is connected to.

CC-Link IE Control Network module specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>RJ71GP21-SX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication speed</td>
<td>1 Gbps</td>
</tr>
<tr>
<td>Transmission path</td>
<td>Duplex loop</td>
</tr>
<tr>
<td>Communication cable</td>
<td>Optical fiber cable which satisfies 1000 BASE-SX standard: Multi-mode optical fiber (GI)</td>
</tr>
<tr>
<td>Max. station-to-station distance (m)</td>
<td>550 (when the core outer diameter is 50 µm)</td>
</tr>
<tr>
<td></td>
<td>275 (when the core outer diameter is 62.5 µm)</td>
</tr>
<tr>
<td>Overall cable distance (m)</td>
<td>66,000 (when 120 stations are connected and the core outer diameter is 50 µm)</td>
</tr>
<tr>
<td></td>
<td>33,000 (when 120 stations are connected and the core outer diameter is 62.5 µm)</td>
</tr>
<tr>
<td>Max. number of connectable stations</td>
<td>120 (control station: 1, normal station: 119)</td>
</tr>
<tr>
<td>Max. number of link points per network</td>
<td>32K points (32768 points, 4K bytes)</td>
</tr>
<tr>
<td>Link relay (LLR)</td>
<td>128K points (131072 points, 256K bytes)</td>
</tr>
<tr>
<td>Link register (LW)</td>
<td>8K points (8192 points, 1K bytes)</td>
</tr>
</tbody>
</table>
**Multiple topology variations**

- **Star topology**
  Devices are connected via a switching hub allowing local stations to be added easily.

- **Line topology**
  Continuous connection of devices along the Ethernet line.

- **Ring topology**
  Connection is done in a continuous loop, which guarantees communications by isolating the faulty network station.

**Synchronized network communications**

The control cycle of local stations on the network can be synchronized with the master station.

**CC-Link IE Field Network module specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>RJ71GF11-T2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission speed</td>
<td>1 Gbps</td>
</tr>
<tr>
<td>Network topology</td>
<td>Line topology, star topology (both types can be on the same line), and ring topology</td>
</tr>
<tr>
<td>Communication cable</td>
<td>Ethernet cable (Category 5e or higher, double shielded/STP)</td>
</tr>
<tr>
<td>Max. station-to-station distance (m)</td>
<td>100</td>
</tr>
<tr>
<td>Overall cable distance (m)</td>
<td>Line topology: 12,000 (when 121 stations are connected)</td>
</tr>
<tr>
<td></td>
<td>Star topology: Depends on the system configuration</td>
</tr>
<tr>
<td></td>
<td>Ring topology: 12,100 (when 121 stations are connected)</td>
</tr>
<tr>
<td>Max. number of connectable stations</td>
<td>121 (master station: 1, slave station: 120)</td>
</tr>
<tr>
<td>Max. number of I/O points per network</td>
<td></td>
</tr>
<tr>
<td>Remote input (RX), remote output (RY)</td>
<td>16K points (16384 points, 2K bytes)</td>
</tr>
<tr>
<td>Remote register (RWw, RWr)</td>
<td>8K points (8192 points, 16K bytes)</td>
</tr>
</tbody>
</table>
The CC-Link IE Field head module can control the I/O and intelligent function modules directly when installed on the same base unit, and can operate as a network remote station. Installing two remote head modules improves network reliability by having redundant network lines, and supports online module replacement (hot-swap) when a module needs to be changed while the system is still in operation.

**Remote station with redundant head modules and network**

Network system reliability can be improved by installing redundant head modules and redundant network cables; even if an error occurs in one of the head modules, the network standby module can take over without disrupting network communications and initiates the control system to switch to the standby system. In addition, if one of the head modules is replaced, the settings and parameters are automatically transferred to the standby module and re-initialized.

---

**CC-Link IE Field Network remote head module specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>RJ72GF15-T2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission speed</td>
<td>1 Gbps</td>
</tr>
<tr>
<td>Network topology</td>
<td>Line topology, star topology (both types can be on the same line), and ring topology</td>
</tr>
<tr>
<td>Communication cable</td>
<td>Ethernet cable (Category 5e or higher, double shielded/STP)</td>
</tr>
<tr>
<td>Max. station-to-station distance (m)</td>
<td>Line topology: 12,000 (when 121 stations are connected)</td>
</tr>
<tr>
<td></td>
<td>Star topology: Depends on the system configuration</td>
</tr>
<tr>
<td></td>
<td>Ring topology: 12,100 (when 121 stations are connected)</td>
</tr>
<tr>
<td>Max. number of connectable stations</td>
<td>121 (master station: 1, slave station: 120)</td>
</tr>
<tr>
<td>Max. number of RX points per network</td>
<td>16K points (16384 points, 2K bytes)</td>
</tr>
<tr>
<td>Remote output (RY)</td>
<td>8K points (8192 points, 16K bytes)</td>
</tr>
</tbody>
</table>
AnyWireASLINK is a sensor-level network that realizes a smaller installation space and reduces wiring owing to its easy wiring topology. The ability to monitor the network system from a centralized location reduces commissioning time and improves productivity.

Preventive maintenance by monitoring of sensor status

Using the AnyWireASLINK system, parameter settings of each sensor and actual measurement values can be monitored on the control system with changes reflected easily to sensors on the network.

Various devices connected with less wiring

Overall wiring of various sensors can be reduced using the AnyWireASLINK connection system.

- ASLINKER (2-wire general-purpose I/O device)
- ASLINKTERMINAL (general-purpose I/O terminal for 4/8/16 points)
- ASLINKSENSOR (sensor directly connected to AnyWireASLINK)
- ASLINKAMP (sensor amplifier connecting a general-purpose sensor head)

AnyWireASLINK master module specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>RJ51AW12AL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. number of I/O points</td>
<td>512 points (256 input points/256 output points)</td>
</tr>
<tr>
<td>Max. number of connectable modules</td>
<td>128 (varies according to each slave module's current consumption)</td>
</tr>
<tr>
<td>Overall cable distance** (m)</td>
<td>200**</td>
</tr>
<tr>
<td>Topology</td>
<td>Bus (multi-drop, T-branch, tree branch)</td>
</tr>
<tr>
<td>Communication clock (kHz)</td>
<td>270</td>
</tr>
<tr>
<td>Max. communication cable supply current** (A)</td>
<td>2 (when using 1.25 mm² cable)</td>
</tr>
</tbody>
</table>

*1: The allowable value varies depending on the transmission cable supply current, total distance, or transmission cable (DP, DN) wire diameter. For details, please refer to the user's manual.

*2: With the slave module having an integrated transmission cable (DP, DN) and module, the length of the transmission cable (DP, DN) is included in the overall length.
BACnet® is a data communications protocol for building automation and control networks. It is utilized extensively in the building automation industry to allow the products of different manufacturers to communicate using a common protocol. The MELSEC iQ-R Series BACnet module supports the control of various automated building systems such as lighting control, HVAC and building security management. It realizes lower hardware costs, and improves the communications and maintenance between these different control systems.

**Ideal for large-scale building automation**

The MELSEC iQ-R Series BACnet module enables up to 4000 I/O object instances to be registered. It can monitor up to 10,000 points (RDMONB function), realizing large-scale automated building control systems capable of simultaneously managing many different devices such as sensors and drive equipment. It can be used in two modes, either controlling automated building devices as a BACnet® controller or managing/monitoring multiple controllers as a workstation.

**Improve maintenance with backup of property values**

Maintenance can be improved by enabling the backup of property values when power is lost to the control system. The MELSEC iQ-R Series BACnet module is equipped with MRAM memory for saving property values during power failures. By ensuring that data values are saved immediately before a power failure, recovery time and system maintenance are minimal. Property values are stored permanently, ensuring that values are not cleared automatically and realizing a reduction in downtime, which reduces maintenance costs.

**BACnet module specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>RJ71BAC96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission specifications</td>
<td></td>
</tr>
<tr>
<td>Transmission rate (bps)</td>
<td>100M/10M</td>
</tr>
<tr>
<td>Communication mode</td>
<td>Full-duplex/half-duplex</td>
</tr>
<tr>
<td>Transmission method</td>
<td>Base band</td>
</tr>
<tr>
<td>Maximum segment length (m)</td>
<td>100 (distance between switching hub and node)</td>
</tr>
<tr>
<td>IP version</td>
<td>IPv6/IPv4</td>
</tr>
<tr>
<td>Input/output objects*2</td>
<td></td>
</tr>
<tr>
<td>Input/output objects</td>
<td>4000 Instance</td>
</tr>
<tr>
<td>CA objects</td>
<td>300 Instance</td>
</tr>
<tr>
<td>SC objects</td>
<td>100 Instance</td>
</tr>
<tr>
<td>TL objects</td>
<td>200 Instance</td>
</tr>
<tr>
<td>NC objects</td>
<td>50 Instance</td>
</tr>
<tr>
<td>BDABR</td>
<td>2176 points in total</td>
</tr>
<tr>
<td>BDABW</td>
<td></td>
</tr>
<tr>
<td>RDMONB</td>
<td>10000 points in total</td>
</tr>
</tbody>
</table>


2. For details on the input/output objects, please refer to the “MELSEC iQ-R BACnet Module User’s Manual (Application)”. 
CC-Link is a high-speed and highly reliable deterministic I/O control network that realizes reduced wiring while offering multi-vendor compatible products.

Multiple connectivity of field devices
CC-Link incorporates many different field devices that can be configured into a wire-saving communications network. Using the remote device net mode, it is possible to connect up to 64 remote devices, such as analog I/O modules.

<table>
<thead>
<tr>
<th>Item</th>
<th>RJ61BT11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission speed (bps)</td>
<td>156k/625k/2.5M/5M/10M</td>
</tr>
<tr>
<td>Network topology</td>
<td>Bus (RS-485)</td>
</tr>
<tr>
<td>Communication cable</td>
<td>Ver 1.0 compatible CC-Link dedicated cable</td>
</tr>
<tr>
<td>Overall distance (m)</td>
<td>100 (10 Mbps)...1200 (156 kbps)</td>
</tr>
<tr>
<td>Max. number of connected modules</td>
<td>65 stations (master station: 1, slave station: 64)</td>
</tr>
<tr>
<td>Max. number of link points per system (CC-Link Ver.2)</td>
<td>8192 points</td>
</tr>
<tr>
<td>Remote I/O (RX, RY)</td>
<td>2048 points</td>
</tr>
<tr>
<td>Remote register (RWw, RWr)</td>
<td></td>
</tr>
</tbody>
</table>

Serial Communication Modules
RJ71C24
Max. 230.4 kbps, RS-232 (1 channel), RS-422/485 (1 channel)

RJ71C24-R2
Max. 230.4 kbps, RS-232 (2 channels)

RJ71C24-R4
Max. 230.4 kbps, RS-422/485 (2 channels)

The serial communication module enables serial devices with up to 230.4 kbps transmission speeds to be connected per channel. Communications protocols such as MODBUS® are supported via the pre-defined protocol feature.
e-F@ctory is a solution from Mitsubishi Electric helping to optimize production systems through its direct connectivity between an IT system and the shop floor reducing cost over the entire product life cycle. Production data management, analysis and planning utilizing IoT* can be realized, improving productivity through preventive maintenance, operations management, traceability, and energy management. The MELSEC iQ-R Series includes a range of products that fulfill these various needs as part of the "Intelligence" lineup of interconnected e-F@ctory advanced information products.

* Internet of Things

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

C/C++ based programming
Provides a robust and cost-efficient alternative from computer-based analytical and testing systems, enabling custom applications to be executed directly on the control system. In addition, various communications protocols can be installed directly.

High-speed data logging simplifies troubleshooting
Managing production line data, accurate identification of failures and keeping daily/monthly records can be realized at a low cost.

Note: For information about the C Controller, please refer to page 40
Along with ever-changing manufacturing trends, improving machine productivity and maintaining manufacturing quality through meticulous traceability have become a fundamental part of manufacturing. MES Interface modules address these requirements by providing direct database connectivity for IT systems and facilitating automatic SQL* text generation using intuitive configuration setup software. Modules allow production data from the shop floor to be inserted into database records directly; for example, providing real-time production status that enables quicker response to production-related problems.

System configuration costs reduced by 65%*

MES Interface modules enable direct connectivity between IT database servers and programmable controllers on the shop floor, eliminating the need for gateway computers or specified programs. Being much more reliable than computers, the MES Interface saves on maintenance costs typical of computers.

* Assumption based on a typical control architecture.

**Database connection**

- **Item**: Database connection
- **Supported database**: Oracle® Database, Microsoft® SQL Server, Microsoft® Access
- **SQL text**: SELECT, INSERT, UPDATE, DELETE, Multi-SELECT, STORED PROCEDURE
- **Database communication action field**: 65,536
- **Accessible CPU module**: iQ-R Series (Direct, Remote), Q Series (Remote), L Series (Remote)
- **Data sampling interval**
  - **High speed data sampling (ms)**: Sequence scan time synchronization, 1...900
  - **General data sampling (s)**: 0.1...0.9, 1...3600
- **DB record read/write**: Reads/writes data in the database of the host information system
- **Device memory read/write**: Reads/writes device memory data of the CPU module
- **Trigger condition monitoring**: Monitors values of the time or device tag components etc., and starts jobs when a trigger condition changes from false to true (the condition is satisfied)
- **Data operation and processing**: Performs four arithmetic operations, obtains remainder, performs character string operation, etc.
- **Program execution**: Executes a program on the server through a MES Interface module
- **DB buffering**: Buffers the data sent to the database, and resend it after recovery, when the data cannot be linked due to the disconnection of the network between MES Interface module and the database or failure of the database etc.

*3: For details, please refer to the relevant manual.
OPC UA Server Module

The MELSEC iQ-R Series OPC UA server module integrates the OPC UA server directly into the equipment control system as a robust alternative to a computer-based configuration. OPC Unified Architecture (OPC-UA) is a platform-independent communications standard developed by the OPC foundation that offers reliable and secure data communications between the manufacturing-level and IT-level systems.

**Embedded OPC UA server improves system reliability and reduces cost**

The OPC UA server module can be installed directly on the MELSEC iQ-R Series base unit realizing an embedded OPC UA server within the machine. This improves reliability by eliminating the requirement for a computer-based server, which can be vulnerable to high security risks such as computer viruses. Less hardware maintenance is required, reducing overall system cost as industrial control systems have a longer product service life compared to computers. Efficient tag data management provided utilizing data structure format and storage of tag names within the equipment. Implementation of an IT system is improved such as with SCADA simply by selecting the stored tag.

**Robust security with protection against unauthorized data access**

OPC UA security function such as certificate, encrypt and signature can be set based on system requirements. Security is enhanced by having two Ethernet ports, enabling separation of the IT and shop floor networks.

**OPC UA server module software specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>RD81OPC96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic operating specifications</td>
<td></td>
</tr>
<tr>
<td>Connection method</td>
<td>Ethernet IPv4</td>
</tr>
<tr>
<td>Simultaneously connected configuration software</td>
<td>1</td>
</tr>
<tr>
<td>Device memory input/output specifications</td>
<td></td>
</tr>
<tr>
<td>Max. number of tags</td>
<td>10000</td>
</tr>
<tr>
<td>Access device</td>
<td>Max. number 8</td>
</tr>
<tr>
<td>Type</td>
<td>RCPU, QCPU (Q mode), LCPU</td>
</tr>
<tr>
<td>Data collection period</td>
<td>Max. number of definitions 8</td>
</tr>
<tr>
<td>Setting cycle</td>
<td>200 ms...24 h</td>
</tr>
<tr>
<td>Max. number of conversion definitions</td>
<td>256</td>
</tr>
<tr>
<td>Connectable Ethernet port</td>
<td>CH1</td>
</tr>
</tbody>
</table>

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (http://www.openssl.org).
High-speed Data Logger Module
RD81DL96

Data collection

The production process data acquisition feature of this high-speed data logger module contributes to improving production quality and efficiency, thereby realizing optimal production processes. The module enables logging of various data such as Unicode, CSV, and BIN text formats, which can be utilized for spreadsheet reporting owing to the automatic report generation feature: BIN text format data can be ported directly to Microsoft® Windows® Excel®. Logging files can also be automatically sent to a FTP server or directly into a Microsoft® Windows® share folder.

Data logging synchronized with control system scan time

Acquired data can be synchronized with the control system scan time and achieve sampling rates up to 0.5 ms, realizing a higher resolution that enables changes in control data to be captured.

Easier root cause analysis

Event-driven data can be acquired right before and after the trigger occurrence, improving the recovery time of the control system.

Utilize data for various analysis and maintenance processes

Various data, such as the frequency and duration of a specific operation that has been satisfied, can be utilized for preventative maintenance and machine operation/trend analysis.

High-speed Data Logger Module RD81DL96

<table>
<thead>
<tr>
<th>Item</th>
<th>RD81DL96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessible CPU modules</td>
<td>iQ-R Series (Direct, Remote), Q Series (Remote), L Series (Remote)</td>
</tr>
<tr>
<td>Data sampling interval</td>
<td></td>
</tr>
<tr>
<td>High-speed data sampling (ms)</td>
<td>• Sequence scan time synchronization</td>
</tr>
<tr>
<td></td>
<td>• 0.5...0.9, 1...32767 (for trigger logging)</td>
</tr>
<tr>
<td></td>
<td>• 0.5...0.9, 1...32767 (for continuous logging)</td>
</tr>
<tr>
<td>General data sampling (s)</td>
<td>• Time interval specification (specify hour/minute/second)</td>
</tr>
<tr>
<td>Amount of sampled data</td>
<td></td>
</tr>
<tr>
<td>High-speed data sampling</td>
<td>• Overall amount of data: 32768 (per setting: 1024)</td>
</tr>
<tr>
<td></td>
<td>• Overall number of device points: 32768 (per setting: 4096)</td>
</tr>
<tr>
<td>General data sampling</td>
<td>• Overall amount of data: 65536 (per setting: 1024)</td>
</tr>
<tr>
<td></td>
<td>• Overall amount of data: 262144 (per setting: 4096)</td>
</tr>
<tr>
<td>Function</td>
<td></td>
</tr>
<tr>
<td>Data logging</td>
<td>Logs CPU module device values at specified data sampling intervals.</td>
</tr>
<tr>
<td>Event logging</td>
<td>Monitors sampled device values from the CPU module, and logs events that occur.</td>
</tr>
<tr>
<td>Report</td>
<td>Outputs the data sampled by the high speed data logger module as an Excel® file.</td>
</tr>
<tr>
<td>Recipe</td>
<td>Executes the following operations using recipe files stored in the SD memory card:</td>
</tr>
<tr>
<td></td>
<td>• Transfer device values written on the recipe files to devices in the CPU module.</td>
</tr>
<tr>
<td></td>
<td>• Transfer device values in the CPU module to the recipe files.</td>
</tr>
</tbody>
</table>
C Intelligent Function Module
RD55UP06-V
C/C++ program execution

The C Intelligent function module is available with a multi-core ARM®-based controller pre-installed with VxWorks® Version 6.9, which realizes simultaneous execution of programs, thereby providing a robust and deterministic alternative to computer-based systems. Utilizing a fan-less hardware design, the C Intelligent function module is ideal for clean fab-based environments, where dust circulation can be detrimental to the production environment, and can be used for applications such as in-line production quality testing or as a gateway for various industry-specific communications protocols.

Realize complex arithmetic equations in C/C++

The C Intelligent Function module enables the execution of C/C++ programs when paired with a standard MELSEC iQ-R Series Programmable Controller CPU, emulating the same features as a standalone C Controller. Representing complex arithmetic and string equations in C/C++ programs is much easier than implementing in ladder form, thereby reducing overall development time and program size. Additionally, Intellectual property is simplified as the result of separating it from the ladder program.

Application development in simple steps

CW Workbench**1 is used as the main programming software in C/C++ with a VxWorks® emulator, CW-Sim/ CW-Sim standalone, which allows debugging without requiring any hardware.

*C**: For more information, please refer to page 42.

C intelligent function module specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>RD55UP06-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware</td>
<td></td>
</tr>
<tr>
<td>Endian format</td>
<td>Little endian</td>
</tr>
<tr>
<td>MPU</td>
<td>ARM® Cortex-A9 Dual Core</td>
</tr>
<tr>
<td>Working RAM</td>
<td>128 MB</td>
</tr>
<tr>
<td>ROM</td>
<td>12 MB</td>
</tr>
<tr>
<td>OS</td>
<td>VxWorks® Version 6.9</td>
</tr>
<tr>
<td>Software</td>
<td></td>
</tr>
<tr>
<td>Programming language</td>
<td>C/C++</td>
</tr>
<tr>
<td>Programming development environment</td>
<td>CW Workbench/Wind River Workbench3.3</td>
</tr>
<tr>
<td>Setting/monitoring tool</td>
<td>GX Works3 (SW1DND-GXW3-E)**2</td>
</tr>
<tr>
<td>Communication interface</td>
<td></td>
</tr>
<tr>
<td>Ethernet (1000BASE-T/100BASE-TX/10BASE-T)</td>
<td>1CH</td>
</tr>
<tr>
<td>SD memory card slot</td>
<td></td>
</tr>
</tbody>
</table>

**2**: Setting and monitoring of the module is integrated within the GX Works3 engineering software.
FA Integrated 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.

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

GX Works3 is the latest generation of programming and maintenance software offered by Mitsubishi Electric specifically designed for the MELSEC iQ-R Series control system. It includes many new features such as graphic-based system configuration, integrated motion control setup, multiple language support, providing an intuitive engineering environment solution.

HMI/GOT screen design software
MELSOFT GT Works3

This graphic operation terminal (GOT) screen creation software is designed with three main features—simplicity, graphics design and operation ease—that help to create graphic screens in fewer steps.

Motion controller engineering software
MELSOFT MT Works2

This motion control design and maintenance software includes intuitive graphic-based programming together with a digital oscilloscope simulator.

Robot engineering software
MELSOFT RT ToolBox2 mini

This robot setup software 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

This software 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.
Total system centralized configuration

The correlation between the system configuration feature of MELSOFT Navigator and GX Works3, MT Works2 has been further improved. The system design console works in a bidirectional method, enabling the system configuration to be shared across all three software including network level integration without having to re-design the configuration from within the product level programming software(s).

Effective parameter registration

Registration of module parameters within the system has been further enhanced with parameters being shared bidirectionally between MELSOFT Navigator and GX Works3, MT Works2. Upward registration of parameters to MELSOFT Navigator is also possible as changes are reflected from within the system configuration.

Unified system label database

The unified label database allows centralized management of global labels across both GX Works3 and GT Works3. The dynamic labeling structure enables system label sharing, which ensures that labels can be used without being conscious of the device associated with that label. The structure is also responsive to system configuration changes without having to modify the labels within the product programming tools.
GX Works3 consists of various different components that help to simplify project creation and maintenance tasks. A system design console that enables projects to be created at the system overview stage has been added. Additionally, the main programming languages are supported and their labels (variables) are shared, further simplifying programming. Various debug and maintenance features are also included.

Project lifecycle engineering

Various features have been consolidated into an integrated engineering environment that enables easier project creation throughout the engineering process, ensuring consistency through every step.

- System-wide design
  - Easy system configuration with parts library
  - Direct module parameter registration
  - Integrated simple motion module setup

- Multiple programming languages
  - Conforms to IEC 61131-3
  - Supports main programming languages
  - Consistency between different programming tabs

- Simple to debug
  - Various online monitoring
  - Hardware simulator (emulator)
  - Data logging

- Straightforward maintenance
  - System monitoring
  - Module and network diagnostics
  - Multi-language commenting
Most projects start from system design, so having a software application that caters to this initial stage is important. GX Works3 incorporates a system design feature that enables system components to be assembled directly in the programming software. It includes a parts library consisting of MELSEC iQ-R Series modules that can be used to simplify system creation.

Register module parameters on the fly

Another useful feature is the ability to register parameters automatically. Simply double-click on the desired module and the corresponding parameters will be registered in the project. A window with an easy-to-use parameter settings screen opens, enabling module parameters to be modified as needed.
Integrated motion setup tool

GX Works3 is equipped with a special motion setup tool that makes it easy to change simple motion module settings such as module parameters, positioning data and servo parameters. Also, debugging is simplified using the fine-tuning cam data generation feature.

**Project window**
- Easy to use navigation pane

**Servo amplifier information**
- Quickly visualize type of servo amplifier and motor model

**Servo amplifier setup**
- Select the servo amplifier and operation mode for each axis.

**Assistant window**
- Selective tools further simplifying setup

**Basic parameters**

**Synchronous parameters**

**Cam data**
- Fine-tune cam curve data
Central parts library

GX Works3 comes with an updated object library pre-installed in the software consisting of a module library with current modules at time of software release although this can be added to as newer modules become available. A variety of other objects are available such as third-party partner function blocks. The library can be fully shared across multiple projects.

Reduce repetitive program tasks

Global and local variables (labels) are supported providing an easy way to share device names across multiple projects, other MELSOFT software and third party SCADA. The variables can be registered into either the current program, function block as a local variable or within the project as a global variable to share across multiple programs within the same project. Variables specific to a particular module are also available, and can be used immediately, further reducing engineering time and cost.
Main programming languages supported

The main IEC languages are supported by GX Works3. Various different programming languages can be used within the same project simultaneously and can be viewed easily via the menu tab. The variables and devices used in each program can be shared across multiple platforms, with user defined function blocks supported.
Easy version management

Being able to visually see and manage different versions of the same project can help to reduce debugging processes. Even with a number of engineers are working on the same project, changes made are easily recognized directly from the program or as an automatically generated verification results list. This feature is available for locally stored projects on the computer, and between the program stored in the programmable controller CPU.

Hardware simulation

GX Works3 features an integrated simulator which helps to visualize the operation of the program during the debugging process. Motion control CPU hardware can be simulated as well.

Offline debugging without a control CPU required
Software

Maintenance

Simplified troubleshooting reduces downtime even further

GX Works3 incorporates various maintenance features helping to reduce downtime and keep productivity high. Various levels of maintenance are possible, from system-wide monitoring of errors and module status to monitoring at the network level; for example, detailed operations that show where programs or parameters have been changed in the CPU and the monitoring of system events, which also includes a useful historical function that can be exported as a CSV file.

Multi-language menu, ideal for global support

The menu system can be switched between various languages, enabling different locations to work on the same project with the same programming software version. In addition, device comments within the project can be switched between various languages without having to create multiple copies of the same project to support the comments in different languages.
Extensive global support coverage providing expert help whenever needed

Global FA centers

China
1. Shanghai FA Center
MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. Shanghai FA Center
Mitsubishi Electric Automation Center, No.1386 Hongkong Road, Shanghai, China
Tel: +86-21-2322-3030 / Fax: +86-21-2322-3000

2. Beijing FA Center
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Tel: +86-10-6518-8830 / Fax: +86-10-6518-2938

3. Guangzhou FA Center
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5. Thailand
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7. Taiwan
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9. Indonesia
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12. Americas
MITSUBISHI ELECTRIC AUTOMATION, INC.
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Tel: +1-847-478-2469 / Fax: +1-847-478-2253

13. Brazil
MITSUBISHI ELECTRIC DO BRASIL COMÉRCIO E SERVIÇOS LTDA.
Avenida Adelino Cardana, 293, 21 andar, Barueri SP, Brazil
Tel: +55-11-4689-3000 / Fax: +55-11-4689-3016

14. Turkey
MITSUBISHI ELECTRIC TURKEY A.Ş.
Ümraniye, Ümraniye - İstanbul 34760, Turkey
Tel: +90-216-526-3990 / Fax: +90-216-526-3995
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.

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
• Included with GX Works3 engineering software
• Also available in tablet version
• 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 FA e-Manual (tablet version)

The e-Manual application is available on iOS and Android™ tablets. e-Manual files are provided as in-app downloads.

Supported versions

<table>
<thead>
<tr>
<th>OS</th>
<th>OS version</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>iOS</td>
<td>iOS 8.1 or later</td>
<td>Apple iPad 2, iPad (3rd generation), iPad (4th generation), iPad Air, iPad Air 2, iPad mini, iPad mini 2, iPad mini 3</td>
</tr>
<tr>
<td>Android™</td>
<td>Android™ 4.3/4.4/5.0</td>
<td>ASUS Nexus7™ (2013)*1</td>
</tr>
</tbody>
</table>

*1: When using a tablet not listed above, 7-inch (resolution of 1920x1200 dots (WUXGA)) or better is recommended.
CC-Link Partner Association (CLPA) - Actively promoting worldwide adoption of CC-Link networks

Proactively supporting CC-Link, from promotion to specification development

The CC-Link Partner Association (CLPA) was established to promote the worldwide adoption of the CC-Link open-field network. By conducting promotional activities such as organizing trade shows and seminars, conducting conformance tests, and providing catalogs, brochures and website information, CLPA activities are successfully increasing the number of CC-Link partner manufacturers and CC-Link-compatible products. As such, CLPA is playing a major role in the globalization of CC-Link.

Visit the CLPA website for the latest CC-Link information.
URL: www.cc-link.org

Global influence of CC-Link continues to spread

CC-Link is supported globally by CLPA. With offices throughout the world, support for partner companies can be found locally. Each regional CLPA office undertakes various support and promotional activities to further the influence of CC-Link/CC-Link IE in that part of the world. For companies looking to increase their presence in their local area, CLPA is well placed to assist these efforts through offices in all major regions.

Visit the CLPA website for the latest CC-Link information.
URL: www.cc-link.org

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E-mail: info@cc-link.org
Each regional CLPA office undertakes various support and promotional activities to further the influence of CC-Link/CC-Link IE in promoting worldwide adoption of CC-Link networks. The CC-Link Partner Association (CLPA) was established to promote the worldwide adoption of the CC-Link open-field network. By proactively supporting CC-Link, from promotion to specification development, the global influence of CC-Link continues to spread. Visit the CLPA website for the latest CC-Link information.

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating ambient temperature</td>
<td>0...55°C (when a base unit other than an extended temperature range base unit is used)</td>
</tr>
<tr>
<td>Storage ambient temperature</td>
<td>0...25°C</td>
</tr>
<tr>
<td>Operating ambient humidity</td>
<td>5...99% RH, non-condensing</td>
</tr>
<tr>
<td>Storage ambient humidity</td>
<td>5...99% RH, non-condensing</td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>Compliant with JIS B 3502 and IEC 61131-2</td>
</tr>
<tr>
<td>Frequency</td>
<td>Under intermittent vibration</td>
</tr>
<tr>
<td>Constant acceleration</td>
<td>5...8.4 Hz</td>
</tr>
<tr>
<td>Half amplitude</td>
<td>3.5 mm</td>
</tr>
<tr>
<td>Sweep count</td>
<td>10 times each in X, Y, Z directions</td>
</tr>
<tr>
<td>Shock resistance</td>
<td>Compliant with JIS B 3502 and IEC 61131-2 (147 m/s², 3 times each in directions X, Y, Z)</td>
</tr>
</tbody>
</table>

**General specifications**

**Software operating environment**

<table>
<thead>
<tr>
<th>Item</th>
<th>MELSOFT GX Work3s, CW Configurator</th>
<th>MELSOFT MX MESInterface-R**, MX OPC UA Module Configurator-R</th>
<th>CW Workbench, CW-Sim, CW-Sim Standalone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal computer</td>
<td>Windows® supported personal computer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU</td>
<td>Intel® Core™ 2 Duo Processor 2 GHz or more</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Available hard disk capacity</td>
<td>5 GB</td>
<td>512 MB</td>
<td></td>
</tr>
<tr>
<td>Display resolution</td>
<td>1024 x 768 pixels or higher</td>
<td>4 GB or more</td>
<td></td>
</tr>
<tr>
<td>Required memory</td>
<td>2 GB or more recommended</td>
<td>2 GB or more recommended</td>
<td></td>
</tr>
<tr>
<td>64-bit edition</td>
<td>2 GB or more recommended</td>
<td>2 GB or more recommended</td>
<td></td>
</tr>
<tr>
<td>32-bit edition</td>
<td>2 GB or more recommended</td>
<td>1 GB or more recommended</td>
<td></td>
</tr>
<tr>
<td>OS (English version)</td>
<td>Windows® 7 Ultimate Operating System</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Windows® 7 Home Premium Operating System</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Windows® 7 Professional Operating System</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Windows® 7 Ultimate Operating System</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Windows® 10 Home Operating System</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Windows® 10 Pro Operating System</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Windows® 10 Enterprise Operating System</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Windows® 8.1 Operating System</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Windows® 8.1 Pro Operating System</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Windows® 8.1 Enterprise Operating System</td>
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<td></td>
<td>Windows® 8 Operating System</td>
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<tr>
<td></td>
<td>Windows® 8 Pro Operating System</td>
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<tr>
<td></td>
<td>Windows® 8 Enterprise Operating System</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Windows® 7 Starter Operating System</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Windows® 7 Home Premium Operating System</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Windows® 7 Professional Operating System</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Windows® 7 Ultimate Operating System</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Windows® 8 and 8.1 Operating System</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Windows® 8 and 8.1 Enterprise Operating System</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Windows® 7 and 8 Operating System</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Windows® 7 and 8 Pro Operating System</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Windows® 7 and 8 Enterprise Operating System</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software operating environment**</td>
<td>For information about software operating environment, refer to PX Developer Version 1 Operating Manual (Monitor Tool).</td>
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</table>

**Programmable controller CPU modules**

<table>
<thead>
<tr>
<th>Item</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>R08CPU</td>
</tr>
<tr>
<td>CPU</td>
<td>R16CPU</td>
</tr>
<tr>
<td>CPU</td>
<td>R32CPU</td>
</tr>
<tr>
<td>CPU</td>
<td>R120CPU</td>
</tr>
</tbody>
</table>

**Process CPU**

<table>
<thead>
<tr>
<th>Item</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
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<tr>
<td>CPU</td>
<td>R16CPU</td>
</tr>
<tr>
<td>CPU</td>
<td>R32CPU</td>
</tr>
<tr>
<td>CPU</td>
<td>R120CPU</td>
</tr>
</tbody>
</table>

**Safety CPU**

<table>
<thead>
<tr>
<th>Item</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>R08CPU</td>
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<tr>
<td>CPU</td>
<td>R16CPU</td>
</tr>
<tr>
<td>CPU</td>
<td>R32CPU</td>
</tr>
<tr>
<td>CPU</td>
<td>R120CPU</td>
</tr>
</tbody>
</table>

**MES Interface**

<table>
<thead>
<tr>
<th>Item</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>R081ME096</td>
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</tbody>
</table>

**MELSOFT GX Work3s-supported CPU modules**

**MELSOFT MX Configurator-supported CPU modules**

<table>
<thead>
<tr>
<th>Item</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>R08CPU</td>
</tr>
<tr>
<td>CPU</td>
<td>R16CPU</td>
</tr>
<tr>
<td>CPU</td>
<td>R32CPU</td>
</tr>
<tr>
<td>CPU</td>
<td>R120CPU</td>
</tr>
</tbody>
</table>

**PX Developer monitor tool-supported CPU modules**

<table>
<thead>
<tr>
<th>Item</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>R08CPU</td>
</tr>
<tr>
<td>CPU</td>
<td>R16CPU</td>
</tr>
<tr>
<td>CPU</td>
<td>R32CPU</td>
</tr>
<tr>
<td>CPU</td>
<td>R120CPU</td>
</tr>
</tbody>
</table>

**MX OPC UA Module Configurator-supported CPU modules**

<table>
<thead>
<tr>
<th>Item</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPC UA server</td>
<td>R081PC096</td>
</tr>
</tbody>
</table>
### Product List

Please check product compatibility and restrictions in the related manual(s) before purchasing.

#### CPU modules

<table>
<thead>
<tr>
<th>Type</th>
<th>Model</th>
<th>Outline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programmable controller CPU</td>
<td>R04CPU</td>
<td>Program capacity, 40K steps; basic operation processing speed (LD instruction), 0.98 ns</td>
</tr>
<tr>
<td></td>
<td>R06CPU</td>
<td>Program capacity, 80K steps; basic operation processing speed (LD instruction), 0.98 ns</td>
</tr>
<tr>
<td></td>
<td>R16CPU</td>
<td>Program capacity, 160K steps; basic operation processing speed (LD instruction), 0.98 ns</td>
</tr>
<tr>
<td></td>
<td>R32CPU</td>
<td>Program capacity, 320K steps; basic operation processing speed (LD instruction), 0.98 ns</td>
</tr>
<tr>
<td></td>
<td>R120CPU</td>
<td>Program capacity, 1200K steps; basic operation processing speed (LD instruction), 0.98 ns</td>
</tr>
<tr>
<td></td>
<td>Q6DIN2</td>
<td>CC-Link IE embedded; program capacity, 40K steps; basic operation processing speed (LD instruction), 0.98 ns</td>
</tr>
<tr>
<td></td>
<td>R08ENCPU</td>
<td>CC-Link IE embedded; program capacity, 80K steps; basic operation processing speed (LD instruction), 0.98 ns</td>
</tr>
<tr>
<td></td>
<td>R16ENCPU</td>
<td>CC-Link IE embedded; program capacity, 160K steps; basic operation processing speed (LD instruction), 0.98 ns</td>
</tr>
<tr>
<td></td>
<td>R32ENCPU</td>
<td>CC-Link IE embedded; program capacity, 320K steps; basic operation processing speed (LD instruction), 0.98 ns</td>
</tr>
<tr>
<td></td>
<td>R120ENCPU</td>
<td>CC-Link IE embedded; program capacity, 1200K steps; basic operation processing speed (LD instruction), 0.98 ns</td>
</tr>
<tr>
<td>Motion CPU</td>
<td>R16MTCPU</td>
<td>Up to 16-axis control; operation cycle, ≤0.222 ms; SSCNET II-H connectivity</td>
</tr>
<tr>
<td></td>
<td>R32MTCPU</td>
<td>Up to 64-axis control; operation cycle, ≤0.222 ms; SSCNET II-H connectivity</td>
</tr>
<tr>
<td></td>
<td>R64MTCPU</td>
<td>Up to 128-axis control; operation cycle, ≤0.222 ms; SSCNET II-H connectivity</td>
</tr>
<tr>
<td>Safety CPU</td>
<td>R08SFCPU-SET</td>
<td>Program capacity, 80K steps (40K steps for safety programs); basic operation processing speed (LD instruction), 0.98 ns</td>
</tr>
<tr>
<td></td>
<td>R16SFCPU-SET</td>
<td>Program capacity, 160K steps (40K steps for safety programs); basic operation processing speed (LD instruction), 0.98 ns</td>
</tr>
<tr>
<td></td>
<td>R32SFCPU-SET</td>
<td>Program capacity, 320K steps (40K steps for safety programs); basic operation processing speed (LD instruction), 0.98 ns</td>
</tr>
<tr>
<td></td>
<td>R120SFCPU-SET</td>
<td>Program capacity, 1200K steps (40K steps for safety programs); basic operation processing speed (LD instruction), 0.98 ns</td>
</tr>
<tr>
<td>Process CPU</td>
<td>R08PCPU</td>
<td>Program capacity, 80K steps; basic operation processing speed (LD instruction), 0.98 ns</td>
</tr>
<tr>
<td></td>
<td>R16PCPU</td>
<td>Program capacity, 160K steps; basic operation processing speed (LD instruction), 0.98 ns</td>
</tr>
<tr>
<td></td>
<td>R32PCPU</td>
<td>Program capacity, 320K steps; basic operation processing speed (LD instruction), 0.98 ns</td>
</tr>
<tr>
<td></td>
<td>R120PCPU</td>
<td>Program capacity, 1200K steps; basic operation processing speed (LD instruction), 0.98 ns</td>
</tr>
<tr>
<td>Redundant function module</td>
<td>R6RFM</td>
<td>By combining with a process CPU a redundant control system can be realized.</td>
</tr>
<tr>
<td>C Controller</td>
<td>R12CCPU-V</td>
<td>Endian format, little endian; OS, VxWorks® Version 6.9</td>
</tr>
<tr>
<td>SD memory card**</td>
<td>NZ1MEM-2GBSD</td>
<td>SD memory card, 2GB bytes</td>
</tr>
<tr>
<td></td>
<td>NZ1MEM-4GBSD</td>
<td>SDHC memory card, 4GB bytes</td>
</tr>
<tr>
<td></td>
<td>NZ1MEM-8GBSD</td>
<td>SDHC memory card, 8GB bytes</td>
</tr>
<tr>
<td></td>
<td>NZ1MEM-16GBSD</td>
<td>SDHC memory card, 16GB bytes</td>
</tr>
<tr>
<td>Extended SRAM cassette</td>
<td>NZ2MC-1MBES</td>
<td>1MB bytes</td>
</tr>
<tr>
<td></td>
<td>NZ2MC-2MBES</td>
<td>2MB bytes</td>
</tr>
<tr>
<td></td>
<td>NZ2MC-4MBES</td>
<td>4MB bytes</td>
</tr>
<tr>
<td></td>
<td>NZ2MC-8MBES**</td>
<td>8MB bytes</td>
</tr>
<tr>
<td></td>
<td>NZ2MC-16MBES</td>
<td>16MB bytes</td>
</tr>
<tr>
<td>Battery</td>
<td>Q6BAT</td>
<td>Replacement battery</td>
</tr>
<tr>
<td></td>
<td>Q7BAT</td>
<td>Replacement large-capacity battery</td>
</tr>
<tr>
<td></td>
<td>Q7BAT-SET</td>
<td>Large-capacity battery with holder for mounting CPU</td>
</tr>
</tbody>
</table>

*1: Mitsubishi Electric shall not guarantee the operation of any third party products.
*2: ECC type for safety CPU and process CPU modules.

#### Base unit

<table>
<thead>
<tr>
<th>Type</th>
<th>Model</th>
<th>Outline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main base</td>
<td>R35B</td>
<td>5 slots, for MELSEC IQ-R Series modules</td>
</tr>
<tr>
<td></td>
<td>R38B</td>
<td>8 slots, for MELSEC IQ-R Series modules</td>
</tr>
<tr>
<td></td>
<td>R312B</td>
<td>12 slots, for MELSEC IQ-R Series modules</td>
</tr>
<tr>
<td>Redundant power supply main base</td>
<td>R310RB</td>
<td>10 slots, for MELSEC IQ-R Series modules</td>
</tr>
<tr>
<td>Extended temperature range main base</td>
<td>R310B-HT</td>
<td>10 slots, for MELSEC IQ-R Series modules</td>
</tr>
<tr>
<td>Extended temperature range redundant power supply main base</td>
<td>R38RB-HT</td>
<td>8 slots, for MELSEC IQ-R Series modules</td>
</tr>
<tr>
<td>Extension base</td>
<td>R65B</td>
<td>5 slots, for MELSEC IQ-R Series modules</td>
</tr>
<tr>
<td></td>
<td>R68B</td>
<td>8 slots, for MELSEC IQ-R Series modules</td>
</tr>
<tr>
<td></td>
<td>R612B</td>
<td>12 slots, for MELSEC IQ-R Series modules</td>
</tr>
<tr>
<td>Redundant power supply extension base</td>
<td>R610RB</td>
<td>10 slots, for MELSEC IQ-R Series modules</td>
</tr>
<tr>
<td>Extended temperature range extension base</td>
<td>R610B-HT</td>
<td>10 slots, for MELSEC IQ-R Series modules</td>
</tr>
<tr>
<td>Extended temperature range redundant power supply extension base</td>
<td>R68RB-HT</td>
<td>8 slots, for MELSEC IQ-R Series modules</td>
</tr>
<tr>
<td>RQ extension base</td>
<td>RQ65B</td>
<td>5 slots, for MELSEC-Q Series modules</td>
</tr>
<tr>
<td></td>
<td>RQ68B</td>
<td>8 slots, for MELSEC-Q Series modules</td>
</tr>
<tr>
<td></td>
<td>RQ612B</td>
<td>12 slots, for MELSEC-Q Series modules</td>
</tr>
<tr>
<td>Extension cable</td>
<td>RC06B</td>
<td>0.6 m cable for extension and RQ extension base units</td>
</tr>
<tr>
<td></td>
<td>RC12B</td>
<td>1.2 m cable for extension and RQ extension base units</td>
</tr>
<tr>
<td></td>
<td>RC30B</td>
<td>3 m cable for extension and RQ extension base units</td>
</tr>
<tr>
<td></td>
<td>RC50B</td>
<td>5 m cable for extension and RQ extension base units</td>
</tr>
<tr>
<td></td>
<td>RC100B</td>
<td>10 m cable for extension and RQ extension base units</td>
</tr>
<tr>
<td>DIN rail mounting adapter</td>
<td>R6IDIN1</td>
<td>For main and extension base units</td>
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<tr>
<td></td>
<td>Q6IDIN1</td>
<td>For RQ68B/RQ612B</td>
</tr>
<tr>
<td></td>
<td>R6IDIN1A</td>
<td>For RQ extension base units (with vibration-proofing bracket sets)</td>
</tr>
<tr>
<td>Blank cover</td>
<td>RG60</td>
<td>For I/O slots of main and extension base units</td>
</tr>
<tr>
<td></td>
<td>QG60</td>
<td>For I/O slots of RQ extension base units</td>
</tr>
</tbody>
</table>
### Power supply module

<table>
<thead>
<tr>
<th>Type</th>
<th>Model</th>
<th>Outline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R61P</td>
<td>AC power supply; input, 100...240 V AC; output, 5 V DC/6.5 A</td>
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</tr>
<tr>
<td>R62P</td>
<td>AC power supply; input, 100...240 V AC; output, 5 V DC/3.5 A, 24 V DC/6.6 A</td>
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</tr>
<tr>
<td>R64P</td>
<td>AC power supply; input, 100...240 V AC; output, 5 V DC/9 A</td>
<td></td>
</tr>
<tr>
<td>R63P</td>
<td>DC power supply; input, 24 V DC; output, 5 V DC/8.5 A</td>
<td></td>
</tr>
<tr>
<td>R63RP</td>
<td>DC power supply; input, 24 V DC; output, 5 V DC/8.5 A, Redundant power supply function support</td>
<td></td>
</tr>
<tr>
<td>R64RP</td>
<td>AC power supply; input, 100 to 240 V AC; output, 5 V DC/9 A, Redundant power supply function support</td>
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### I/O modules

<table>
<thead>
<tr>
<th>Type</th>
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<tbody>
<tr>
<td>I/O modules</td>
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</tr>
<tr>
<td>Input</td>
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<td></td>
</tr>
<tr>
<td>RX28</td>
<td>AC input, 8 points; 100...240 V AC (50/60 Hz)</td>
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</tr>
<tr>
<td>RX10</td>
<td>AC input, 16 points; 100...120 V AC (50/60 Hz)</td>
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</tr>
<tr>
<td>RX40C7</td>
<td>DC input, 16 points; 24 V DC, 73 mA</td>
<td></td>
</tr>
<tr>
<td>RX41C4</td>
<td>DC input, 32 points; 24 V DC, 4.0 mA</td>
<td></td>
</tr>
<tr>
<td>RX42C4</td>
<td>DC input, 64 points; 24 V DC, 4.0 mA</td>
<td></td>
</tr>
<tr>
<td>RX40PCH</td>
<td>Positive common type DC input, 16 points; 24 V DC, 6.0 mA, minimum response time 5 μs</td>
<td></td>
</tr>
<tr>
<td>RX40NCCH</td>
<td>Negative common type DC input, 16 points; 24 V DC, 6.0 mA, minimum response time 5 μs</td>
<td></td>
</tr>
<tr>
<td>RX41CH</td>
<td>Positive/negative common type DC input, 32 points; 24 V DC, 6.0 mA, minimum response time 1 μs</td>
<td></td>
</tr>
<tr>
<td>RX61CH</td>
<td>Positive/negative common type DC input, 32 points; 5 V DC, 6.0 mA, minimum response time 1 μs</td>
<td></td>
</tr>
<tr>
<td>RX40NCB</td>
<td>Negative common type DC input, 16 points; 24 V DC, 6.0 mA</td>
<td></td>
</tr>
</tbody>
</table>

| High-speed input |       |                                                                         |
| RX40PC6H     | Positive common type DC input, 16 points; 24 V DC, 6.0 mA, minimum response time 5 μs |
| RX40NC6H    | Negative common type DC input, 16 points; 24 V DC, 6.0 mA, minimum response time 5 μs |
| RX41C6HS    | Positive/negative common type DC input, 32 points; 24 V DC, 6.0 mA, minimum response time 1 μs |
| RX61CH55    | Positive/negative common type DC input, 32 points; 5 V DC, 6.0 mA, minimum response time 1 μs |

| Input (with diagnostic functions) |       |                                                                         |
| RY18R2A     | Relay output, 8 points; 24 V DC/D2 A, 240 V AC/D2 A                    |
| RY10R2      | Relay output, 16 points; 24 V DC/D2 A, 240 V AC/D2 A                   |
| RY20S6      | Transistor (sink) output, 16 points; 24 V DC, 6.0 mA                   |
| RY40NT5P    | Transistor (sink) output, 16 points; 24 V DC, 6.0 mA                   |
| RY41NT2P    | Transistor (sink) output, 32 points; 24 V DC, 6.0 mA                   |
| RY42NT2P    | Transistor (sink) output, 64 points; 24 V DC, 6.0 mA                   |
| RY40PT5P    | Transistor (source) output, 16 points; 24 V DC, 6.0 mA                 |
| RY41PT1P    | Transistor (source) output, 32 points; 24 V DC, 6.0 mA                 |
| RY42PT1P    | Transistor (source) output, 64 points; 24 V DC, 6.0 mA                 |

| High-speed output |       |                                                                         |
| RY41NT2H     | Transistor (sink) output, 32 points; 24 V DC, 6.0 mA, minimum response time 2 μs |
| RY41PT2H     | Transistor (source) output, 32 points; 24 V DC, 6.0 mA, minimum response time 2 μs |

| Output (with diagnostic functions) |       |                                                                         |
| RY40PT5B     | Transistor (source) output, 16 points; 24 V DC, 6.0 mA                 |

| I/O combined |       |                                                                         |
| RH42C4NT2P   | DC input, 32 points; 24 V DC, 4.0 mA                                    |
| (Transistor sink) output, 32 points; 24 V DC, 0.2 A, minimum response time 2 μs |

### Analog modules

<table>
<thead>
<tr>
<th>Type</th>
<th>Model</th>
<th>Outline</th>
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<tbody>
<tr>
<td>Analog input</td>
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<tr>
<td>R60AD4</td>
<td>4 channels for voltage/current inputs</td>
<td></td>
</tr>
<tr>
<td>R60AD4H4</td>
<td>4 channels for voltage/current inputs</td>
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</tr>
<tr>
<td>R60AD8V</td>
<td>8 channels for voltage inputs</td>
<td></td>
</tr>
<tr>
<td>R60ADIB</td>
<td>8 channels for current inputs</td>
<td></td>
</tr>
<tr>
<td>R60AD8-G</td>
<td>8 channels for voltage/current input, channel isolated</td>
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</tr>
<tr>
<td>R60AD8IB-G</td>
<td>16 channels for voltage/current input, channel isolated</td>
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<tr>
<td>Temperature input</td>
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<tr>
<td>R60TDB-G</td>
<td>RTD (Pt100, JPt100, Ni100, Pt50), 8 channels for input, channel isolated, 10 ms/CH</td>
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<tr>
<td>Temperature control</td>
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<tr>
<td>R60TCTR17TT2BW</td>
<td>Thermocouple (B, R, S, K, E, J, T, Ni), 8 channels for input, channel isolated, 30 ms/CH</td>
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<tr>
<td>R60TCTR4BW</td>
<td>RTD (Pt100, JPt100), 4 channels for input, heater disconnection detection</td>
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</tbody>
</table>

| Analog output |       |                                                                         |
| R60DA4      | 4 channels for voltage/current outputs                                    |
| R60DA4H4    | 4 channels for voltage/current outputs                                    |
| R60DAV8     | 8 channels for voltage outputs                                             |
| R60DA8-G    | 8 channels for voltage/current output, channel isolated                   |
| R60DA8-B    | 16 channels for voltage/current output, channel isolated                  |
Motion/Positioning/Flexible high-speed I/O/High-speed counter modules

<table>
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<tr>
<th>Type</th>
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<tbody>
<tr>
<td>Simple motion</td>
<td>RD77GF4</td>
<td>4 axes, linear/circular interpolation, advanced synchronous control, CC-Link IE Field network compatible</td>
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<td>RD77GF8</td>
<td>8 axes, linear/circular interpolation, advanced synchronous control, CC-Link IE Field network compatible</td>
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<td>RD77GF16</td>
<td>16 axes, linear/circular interpolation, advanced synchronous control, CC-Link IE Field network compatible</td>
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<td>RD77GF32</td>
<td>32 axes, linear/circular interpolation, advanced synchronous control, CC-Link IE Field network compatible</td>
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<tr>
<td>Positioning</td>
<td>RD77MS2</td>
<td>2 axes, linear/circular interpolation, advanced synchronous control, SSCNET II/H compatible</td>
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<td>RD77MS4</td>
<td>4 axes, linear/circular interpolation, advanced synchronous control, SSCNET II/H compatible</td>
</tr>
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<td>RD77MS8</td>
<td>8 axes, linear/circular interpolation, advanced synchronous control, SSCNET II/H compatible</td>
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<tr>
<td></td>
<td>RD77MS16</td>
<td>16 axes, linear/circular interpolation, advanced synchronous control, SSCNET II/H compatible</td>
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<tr>
<td>Flexible high-speed I/O</td>
<td>RD75P2</td>
<td>Transistor output, 2 axes; max. output, 200k pulse/s; linear/circular interpolation</td>
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<td>RD75P4</td>
<td>Transistor output, 4 axes; max. output, 200k pulse/s; linear/circular interpolation</td>
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<td>RD75D4</td>
<td>Differential driver output, 4 axes; max. output, 5M pulse/s; linear/circular interpolation</td>
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<tr>
<td>High-speed counter</td>
<td>RD62P2</td>
<td>5/12/24 V DC input, 2 channels; max. counting speed, 200k pulse/s; external output, transistor (sink type)</td>
</tr>
<tr>
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<td>RD62P2E</td>
<td>5/12/24 V DC input, 2 channels; max. counting speed, 200k pulse/s; external output, transistor (sink type)</td>
</tr>
<tr>
<td></td>
<td>RD62D2</td>
<td>Differential input, 2 channels; max. counting speed, 8M pulse/s; external output, transistor (sink type)</td>
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Network modules

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<th>Type</th>
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<tr>
<td>Ethernet (built-in CC-Link IE)</td>
<td>RJ71EN71</td>
<td>1 Gbps/100 Mbps/10 Mbps, 2 ports</td>
</tr>
<tr>
<td>CC-Link IE Control</td>
<td>RJ71GP21-SX</td>
<td>Multi-network connectivity (Ethernet/CC-Link IE)</td>
</tr>
<tr>
<td>CC-Link IE Field</td>
<td>RJ71GF11-T2</td>
<td>1 Gbps, master/local station</td>
</tr>
<tr>
<td>CC-Link IE Network remote head</td>
<td>RJ72GF15-T2</td>
<td>1 Gbps, remote station</td>
</tr>
<tr>
<td>CC-Link</td>
<td>RJ681BT11</td>
<td>Max. 10 Mbps, master/local station, CC-Link Ver 2.1 supported</td>
</tr>
<tr>
<td>AnyWireASLINK</td>
<td>RJ51AW12AL</td>
<td>DigitalLinkSensor AnyWireASLINK system compatible, master station</td>
</tr>
<tr>
<td>BACnet®</td>
<td>RJ71BAC96</td>
<td>BACnet® system compatible, controller/workstation</td>
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<tr>
<td>Serial communication</td>
<td>RJ71C24</td>
<td>Max. 230.4 kbps; RS-232, 1 channel; RS-422/486, 1 channel</td>
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<td>RJ71C24-R2</td>
<td>Max. 230.4 kbps; RS-232, 2 channels</td>
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<td></td>
<td>RJ71C24-R4</td>
<td>Max. 230.4 kbps; RS-422/486, 2 channels</td>
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</table>

Advanced information modules

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<tr>
<th>Type</th>
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<th>Outline</th>
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<tbody>
<tr>
<td>MELSOFT Interface</td>
<td>RD81ME598</td>
<td>Database connection (MEX Interface-R is required)</td>
</tr>
<tr>
<td>OPC UA server</td>
<td>RD51OPC96</td>
<td>Embedded OPC UA server (OPC UA Module Configurator-R is required)</td>
</tr>
<tr>
<td>High-speed data logger</td>
<td>RD81DL50</td>
<td>Data collection (High-speed data logger module tool “SW1DNN-RDLUTL-E” is required)*2</td>
</tr>
<tr>
<td>C intelligent function module</td>
<td>RD55UP06-V</td>
<td>C/C++ program execution (Setting and monitoring tool is integrated within GX Works3)</td>
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</table>

Software

<table>
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<tr>
<th>Type</th>
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<th>Outline</th>
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<tbody>
<tr>
<td>MELSOFT IQ Works</td>
<td>SV2DND-QWK-E</td>
<td>FA engineering software®/C/C++ program execution (Setting and monitoring tool is integrated within GX Works3)</td>
</tr>
<tr>
<td></td>
<td>(DVD-ROM edition)</td>
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</tbody>
</table>

*1: General specifications and product guarantee conditions for co-branded products may vary from those of general MELSEC products. For more information, please refer to the relevant product manuals or contact your local Mitsubishi Electric sales office/representative.

*2: For information on how to obtain the software, please contact your local Mitsubishi Electric sales office or representative.

*3: For detailed information about supported modules, refer to the manuals of the relevant software package.

*4: The MELSOFT GX Works4 menu is switchable between Japanese, English, and simplified Chinese.

*5: Includes both programming tool and monitor tool for process control.
<table>
<thead>
<tr>
<th>Type</th>
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<th>Outline</th>
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<tbody>
<tr>
<td>Connector</td>
<td>A6CON1</td>
<td>32-point connector soldering type (40-pin connector)</td>
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<tr>
<td></td>
<td>A6CON2</td>
<td>32-point connector crimp-contact type (40-pin connector)</td>
</tr>
<tr>
<td></td>
<td>A6CON3</td>
<td>32-point connector pressure-displacement (flat cable) type (40-pin connector)</td>
</tr>
<tr>
<td></td>
<td>A6CON4</td>
<td>32-point connector soldering type (40-pin connector, cable connectable in bidirectional)</td>
</tr>
<tr>
<td>Spring clamp terminal block</td>
<td>Q6TE-18SN</td>
<td>For 16-point I/O modules, 0.3…1.5 mm² (22…16 AWG)</td>
</tr>
<tr>
<td>Connector/terminal block conversion module</td>
<td>A6TBXY36</td>
<td>For positive common input modules and sink output modules (standard type)</td>
</tr>
<tr>
<td></td>
<td>A6TBXY54</td>
<td>For positive common input modules and sink output modules (2-wire type)</td>
</tr>
<tr>
<td></td>
<td>A6TBX70</td>
<td>For positive common input modules (3-wire type)</td>
</tr>
<tr>
<td>Connector/terminal block conversion module cable</td>
<td>AC05TB</td>
<td>For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 0.5 m</td>
</tr>
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<td>AC10TB</td>
<td>For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 1 m</td>
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<td>AC20TB</td>
<td>For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 2 m</td>
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<td>AC30TB</td>
<td>For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 3 m</td>
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<td>AC50TB</td>
<td>For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 5 m</td>
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<td>AC80TB</td>
<td>For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 8 m*</td>
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<td>AC100TB</td>
<td>For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 10 m*</td>
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<tr>
<td>Relay terminal module</td>
<td>A6TE2-16SRN</td>
<td>For 40-pin connector 24 V DC transistor output modules (sink type)</td>
</tr>
<tr>
<td>Relay terminal module cable</td>
<td>AC06TE</td>
<td>For A6TE2-16SRN, 0.6 m</td>
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<td>AC10TE</td>
<td>For A6TE2-16SRN, 1 m</td>
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<tr>
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<td>AC30TE</td>
<td>For A6TE2-16SRN, 3 m</td>
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<td>AC60TE</td>
<td>For A6TE2-16SRN, 5 m</td>
</tr>
<tr>
<td></td>
<td>AC100TE</td>
<td>For A6TE2-16SRN, 10 m</td>
</tr>
</tbody>
</table>

*Common current 0.5 A or lower
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<td></td>
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<td>+61-2-9684-7245</td>
</tr>
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Specifications are subject to change without notice.