MITSUBISHI ELECTRIC

Changes for the Better

for a greener tomorrow

MELSEC iQ-R Series
iQ Platform-compatible PAC

reddot design award winner 2016

DESIGN AWARD 2015

GOOD DESIGN AWARD 2014

e-F@ctory

Bridging the next generation of automation

MELSEC iQ-R series

evolutionary

GLOBAL IMPACT OF MITSUBISHI ELECTRIC

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

Changes for the Better

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

Mitsubishi Electric is involved in many areas including the following

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

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

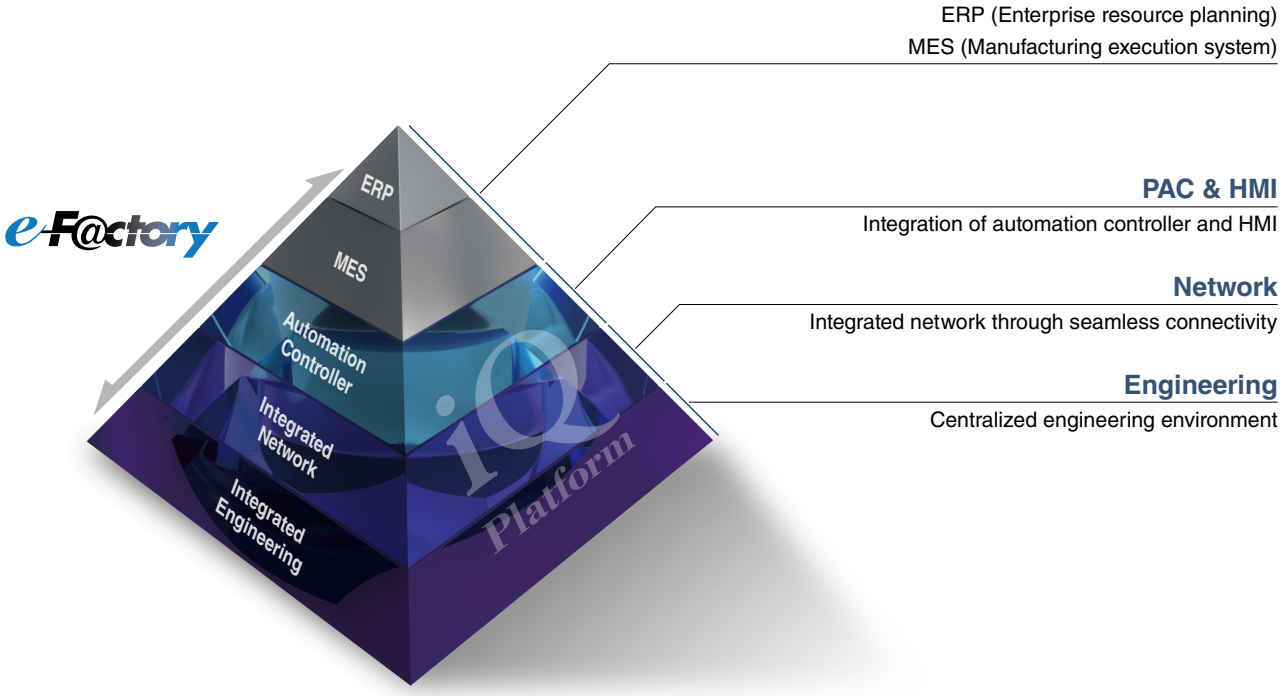
Home Appliance
Dependable consumer products like air conditioners and home entertainment systems.

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

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

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

Process

High availability process control in a scalable automation solution

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

Safety

System design flexibility with integrated safety control

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

Productivity

Improve productivity through advanced performance/ functionality

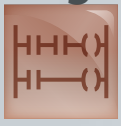
- New high-speed system bus realizing shorter production cycle
- Super-high-accuracy motion control utilizing advanced multiple CPU features
- Inter-modular synchronization resulting in increased processing accuracy

Maintenance

Reduce maintenance costs and downtime utilizing easier maintenance features

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

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

Mitsubishi Electric PAC MELSEC iQ-R "Promotion" Movie

Intelligence

Extensive data handling from shop floor to business process systems

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

Connectivity

Seamless network reduces system costs

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

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

Security

Robust security that can be relied on

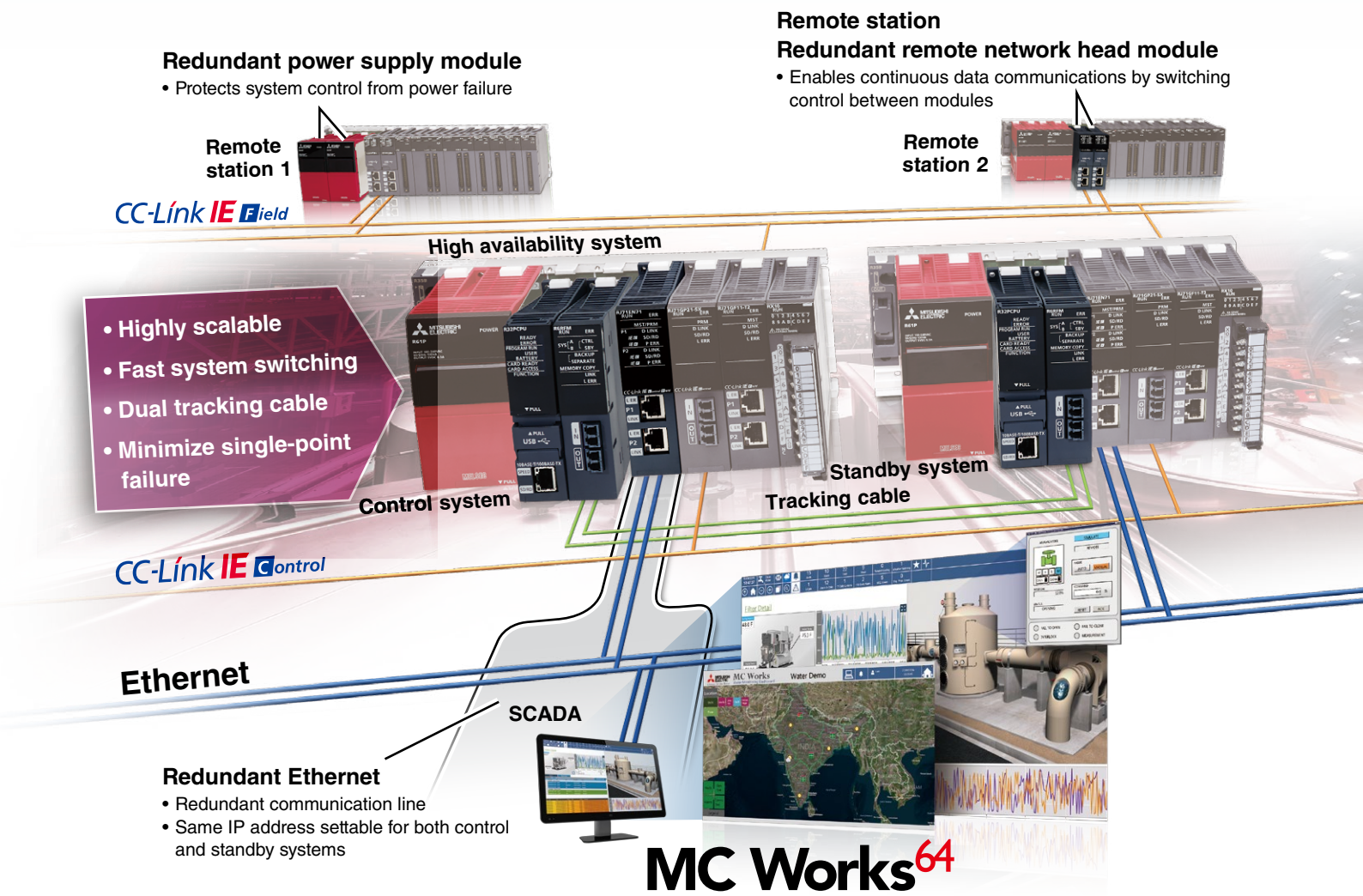
- Protect intellectual property
- Unauthorized access protection across distributed control network

Mitsubishi Electric PAC MELSEC iQ-R
"Process" Movie

Process

High-available process control in a scalable automation solution

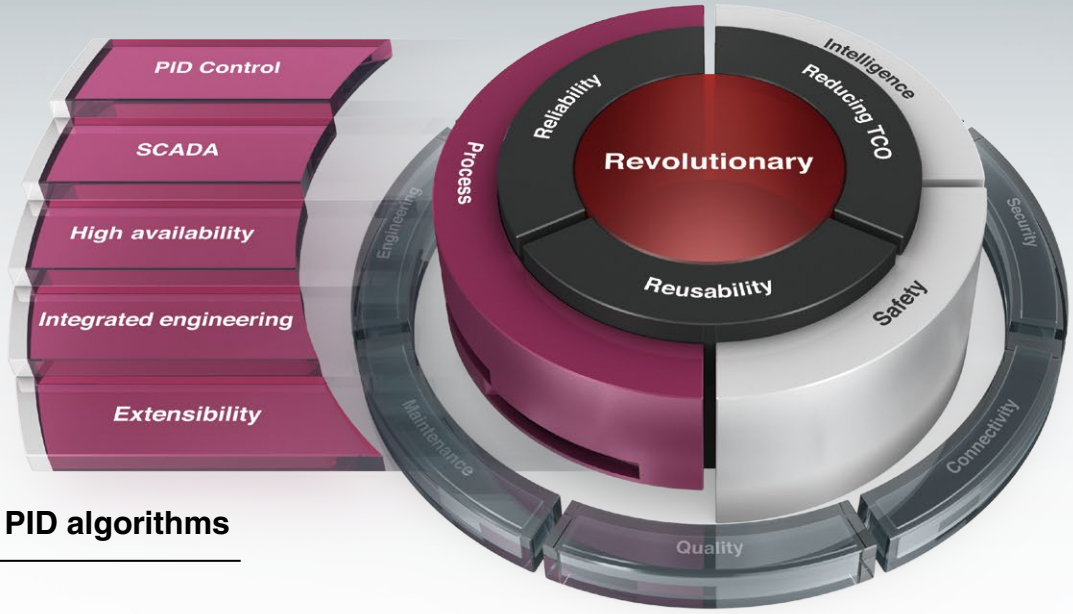
MELSEC iQ-R Series process CPU modules are designed to cover wide-ranging process control applications, from small- to large-scale. All models provide high-speed performance coupled with the ability to handle large PID loops utilizing embedded PID control algorithms; integrating both general and process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



Extensive visualization and data acquisition

SCADA

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

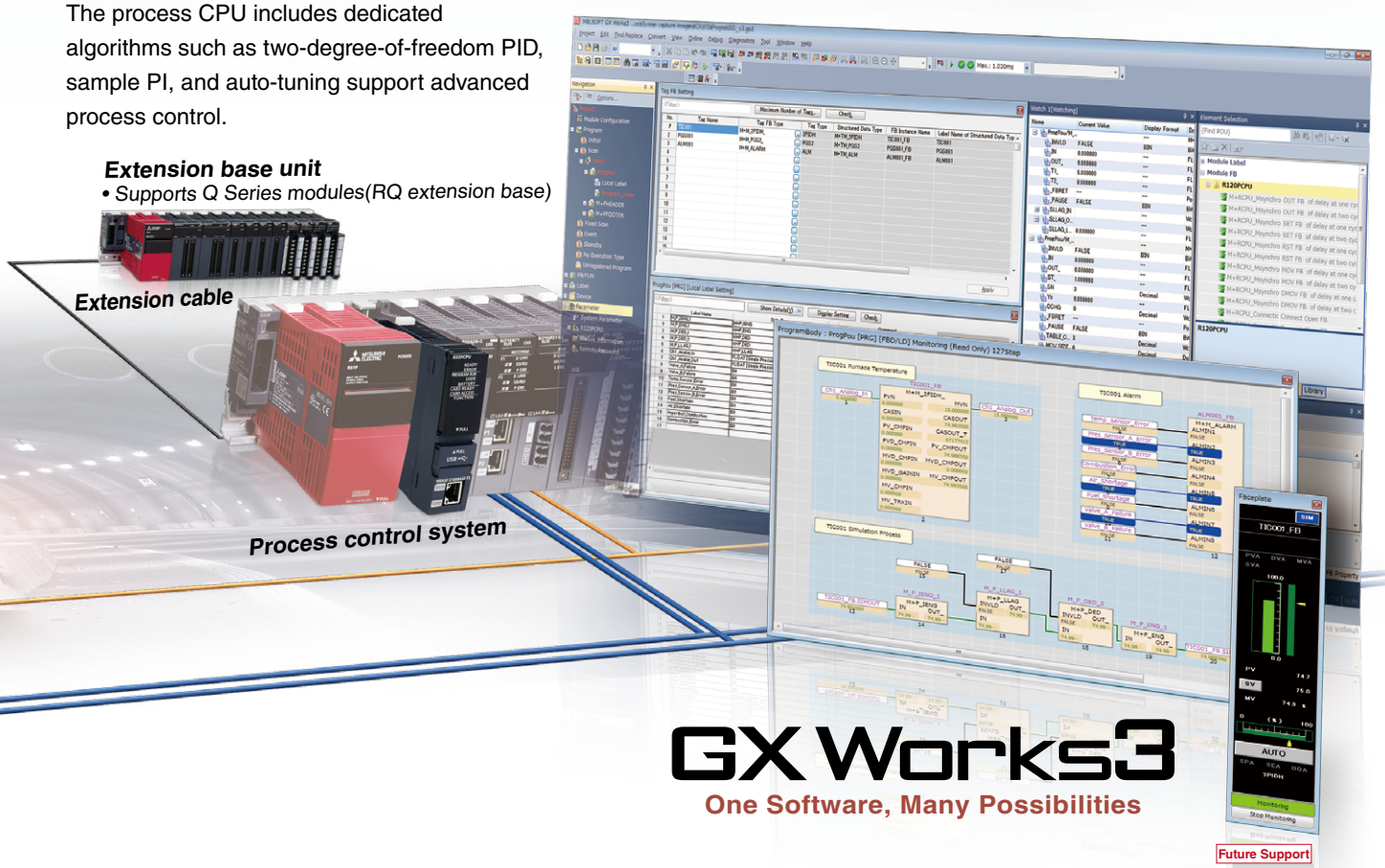


Embedded PID algorithms

PID control

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

Extension base unit
• Supports Q Series modules(RQ extension base)



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.

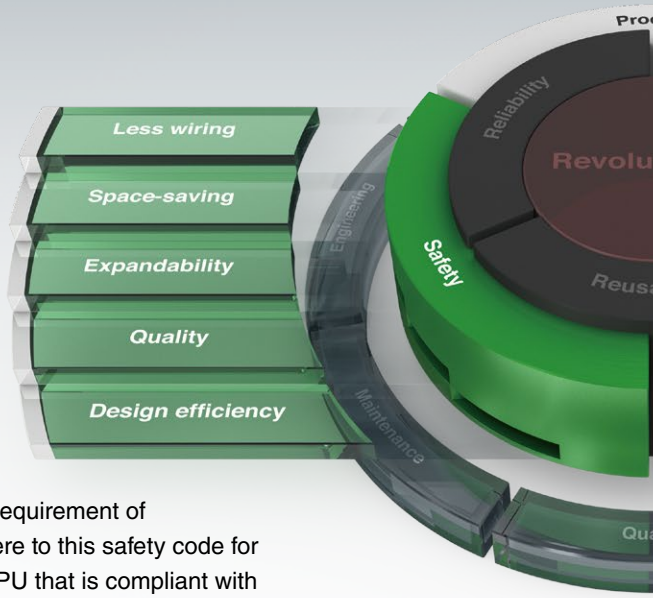
One package process control software

Integrated engineering

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

*1. MC Works64 redundant Ethernet connection will be supported in the future.
*2. Process features such as process tag and faceplate will be supported in the future.

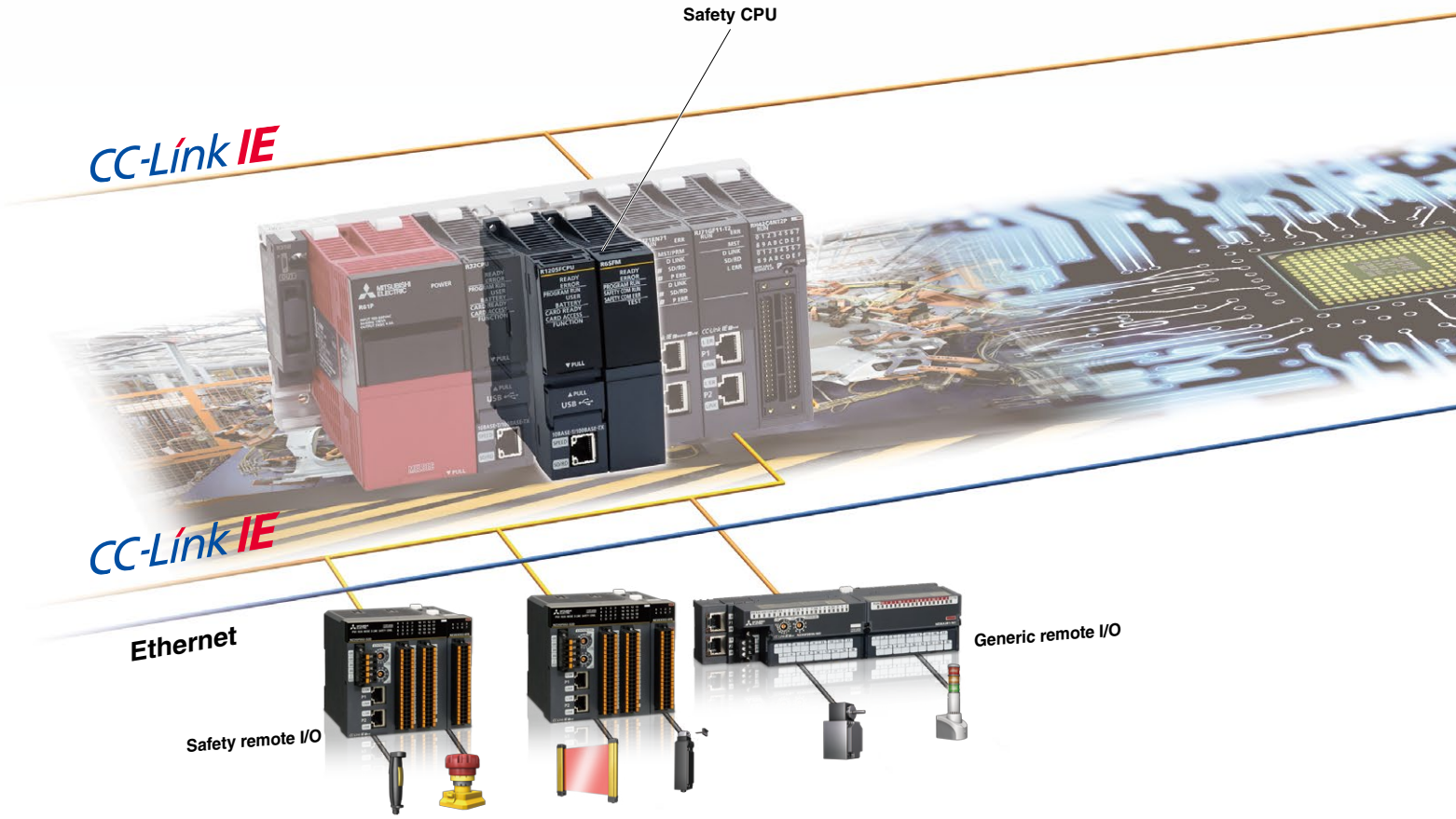
Mitsubishi Electric PAC MELSEC iQ-R
"Safety" Movie



Safety

Integrated safety control offering a total system solution

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



Compliant with international safety standards

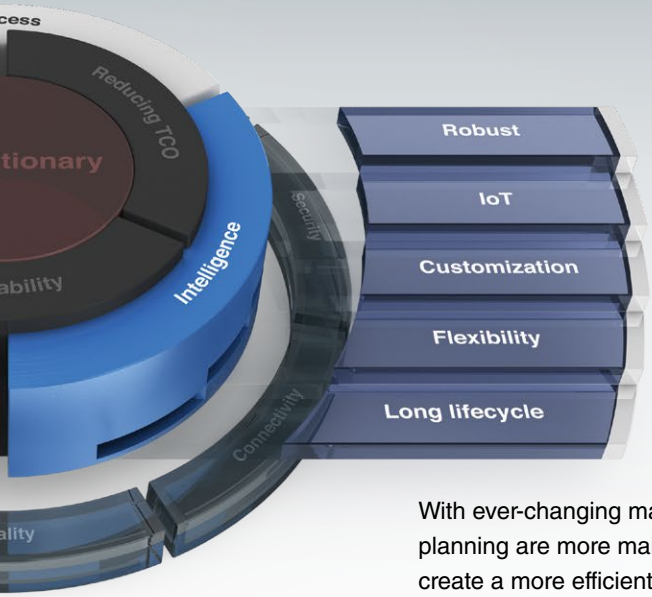
Quality

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

Generic and safety control in one CPU

Space-saving

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

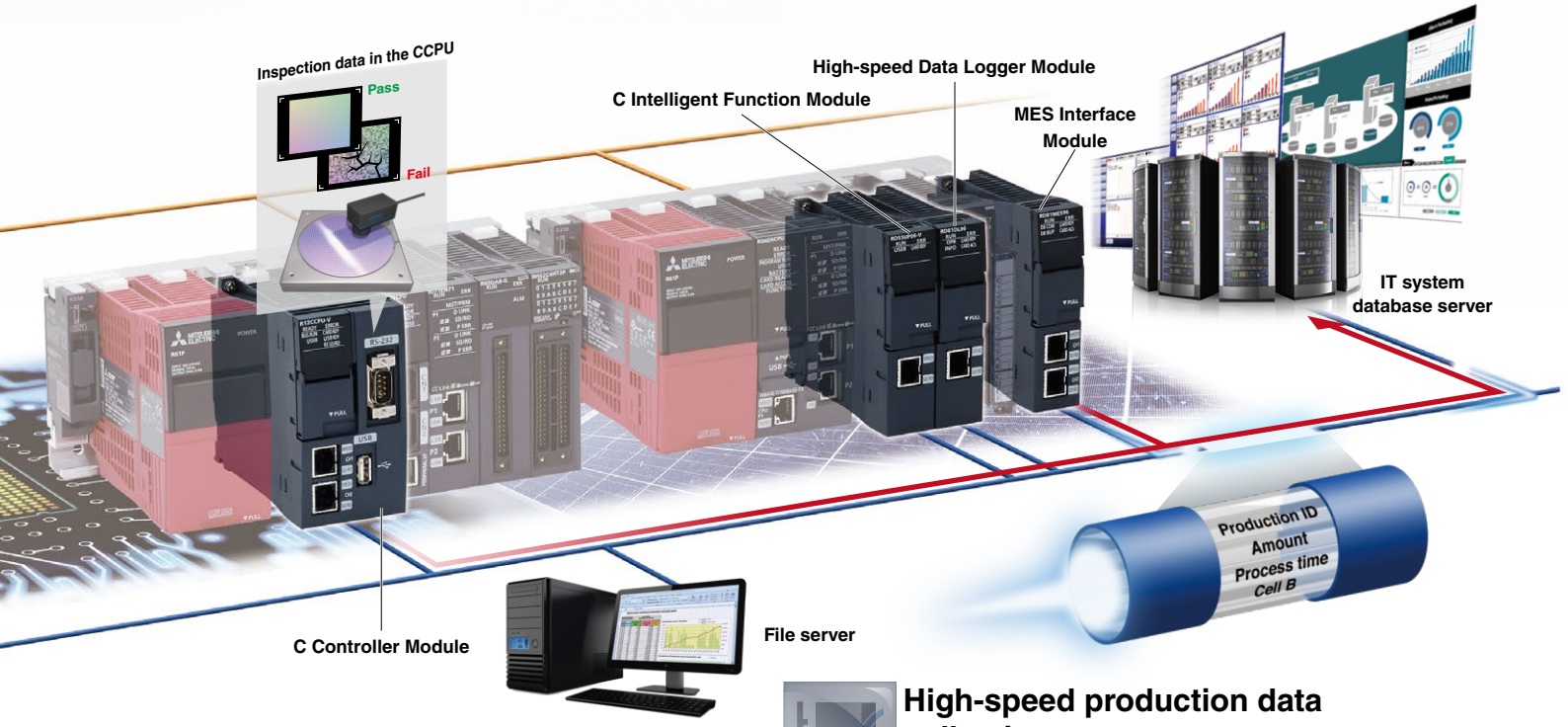


Mitsubishi Electric PAC MELSEC iQ-R "Intelligence" Movie

Intelligence

Extensive data handling from shop floor to business process systems

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



C/C++ based programming

Flexibility

Based on the ARM® dual-core Cortex A9 processor, the real-time OS VxWorks® C Controller CPU is ideal for high-end analytical requirements where raw data has to be processed, such as for in-line manufacturing quality testing. The C Intelligent Function Module, based on the same processor, is a versatile programmable module that can be used for installing 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

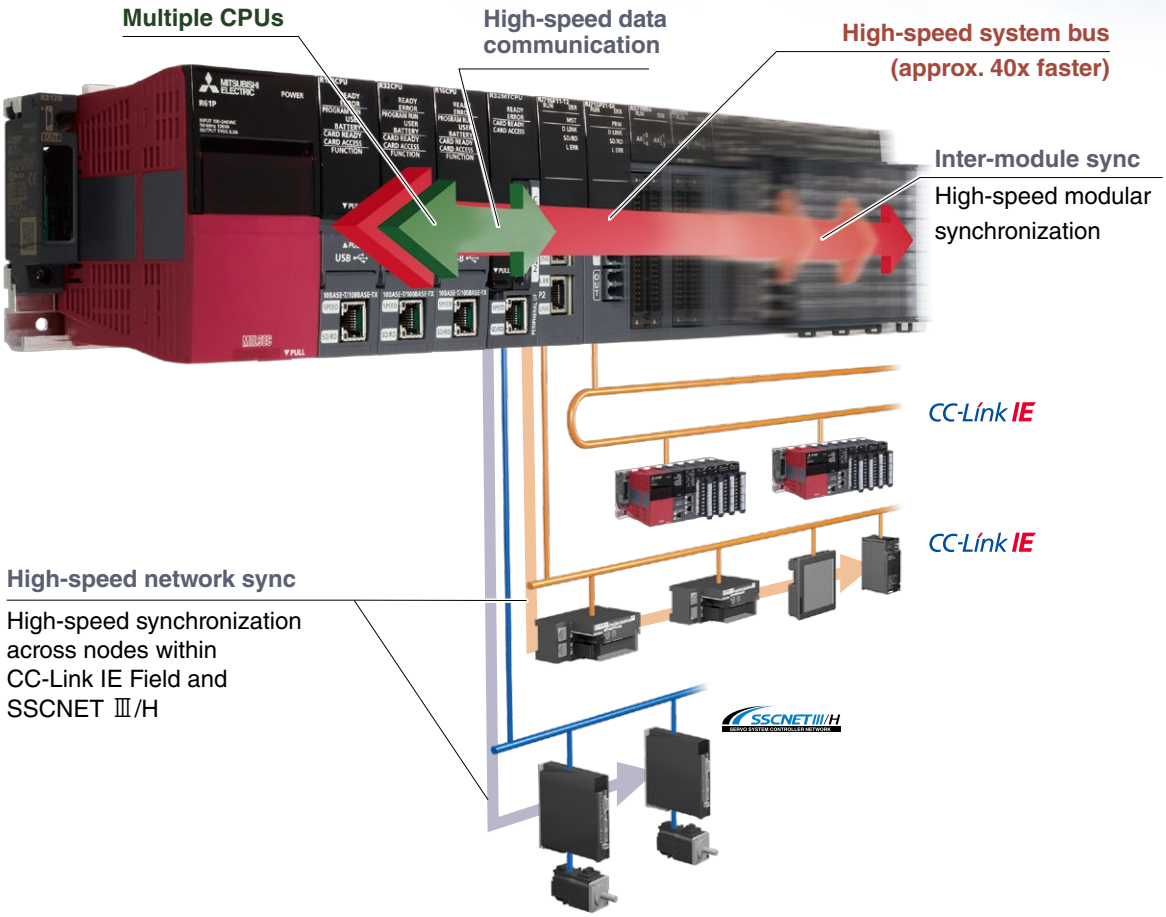
Information connection

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.



New high-speed system bus realizes improved production cycle

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

High-speed system bus
40x faster*1

Multi-CPU system realizes very accurate motion control

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

Synchronized data exchange with motion CPU
4x faster*2

*1: Compared to MELSEC-Q Series.
*2: Compared to Q173DSCPU/Q172DSCPU.

Mitsubishi Electric PAC MELSEC iQ-R "Productivity" Movie

Inter-modular synchronization realizes increased processing accuracy

More flexible control over performance

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

New controller performance architecture further reduces H/W costs

High-speed processing of structured programs

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

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

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

Realize high-speed system performance

Approx. 8x faster than QCPU*3

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

Data management realized with built-in database

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

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

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

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

Engineering

Reducing development costs through intuitive engineering

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

Intuitive engineering software covering the product development cycle

Graphic-based configuration realizing easier programming

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

Integrated motion-control system configuration

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

Conforms to IEC 61131-3

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

Simple point and click programming architecture

System design | Programming | Debug/maintenance

Straightforward graphic based system configuration design

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

System design | **Programming** | Debug/maintenance

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

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

System design | Programming | **Debug/maintenance**

Extensive version control features

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

Simple motion setting tool

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

Tab view multiple editors

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

Navigation window

Easily access project components
Organize program file list.

Module configuration

Easily parameterize each module directly from the configuration editor.

Module list

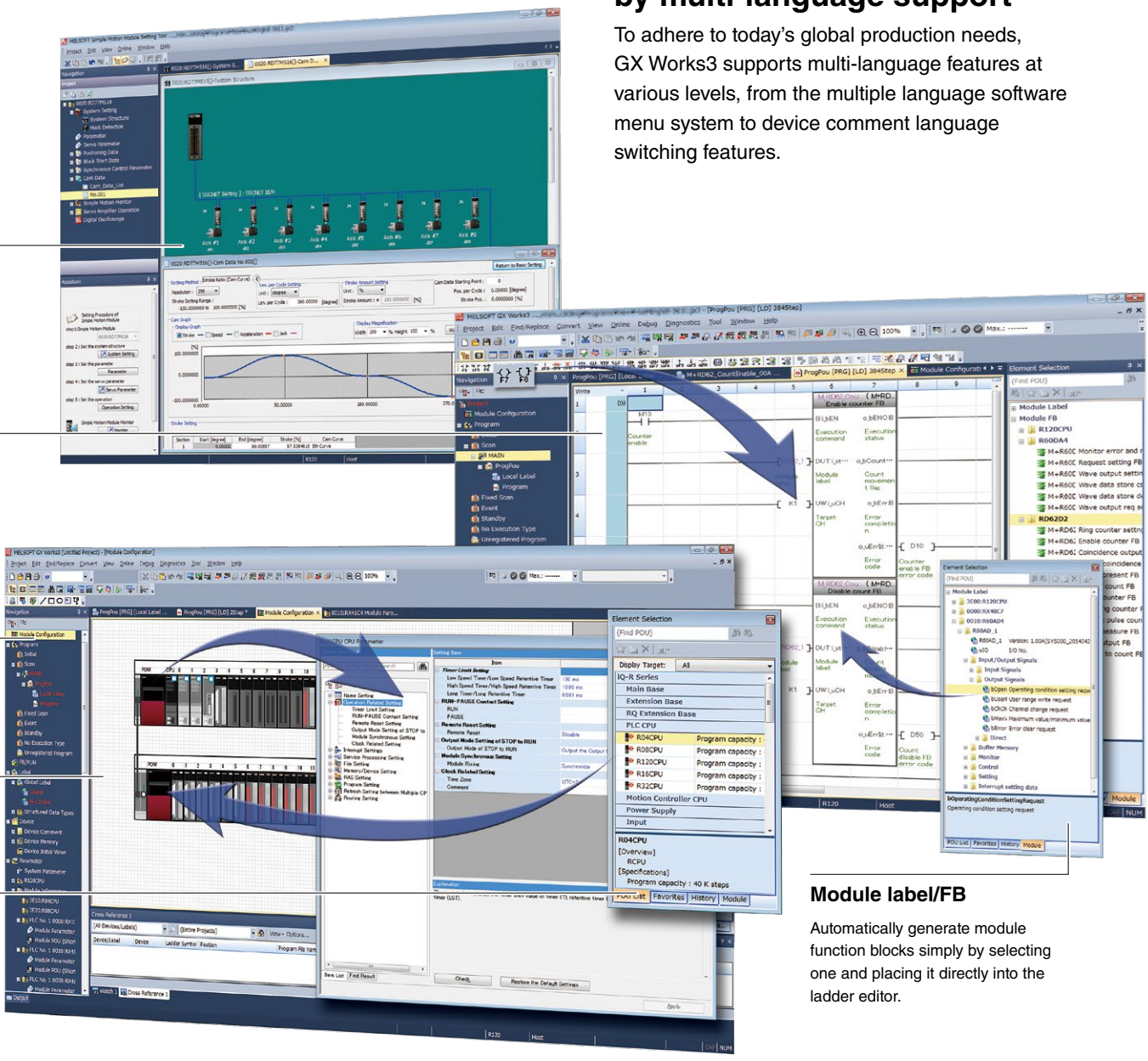
Simply drag & drop modules directly into the module configuration.

Mitsubishi Electric PAC MELSEC iQ-R
"Engineering" Movie

GX Works3

One Software, Many Possibilities

Reduce engineering time by 60%*1



Global realization by multi-language support

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

Module label/FB

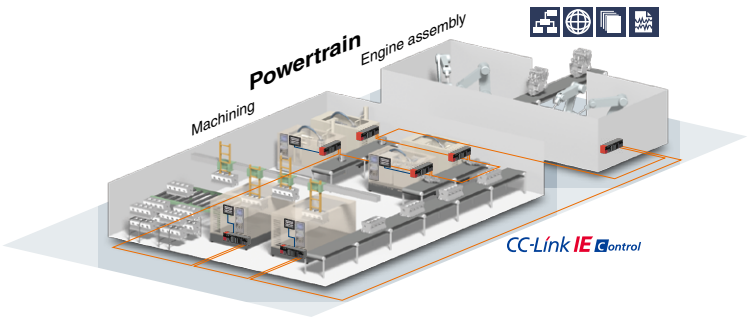
Automatically generate module function blocks simply by selecting one and placing it directly into the ladder editor.

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

Maintenance

Reduce maintenance costs and downtime utilizing easier maintenance features

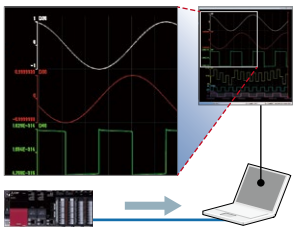
A manufacturing plant is seldom stopped or taken offline and continuously produces the desired product or component. However, the control system occasionally requires maintenance; for example, at the time of a faulty product or system upgrade for manufacturing a new or updated component. At that time,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



Preventive maintenance CPU module

Visualize manufacturing data in real-time

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

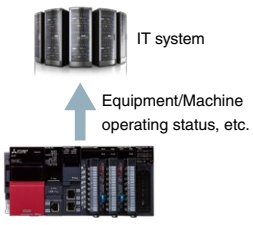


Real-time monitor

Preventive maintenance MES interface module

Direct access to enterprise level

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



Preventive maintenance Output module

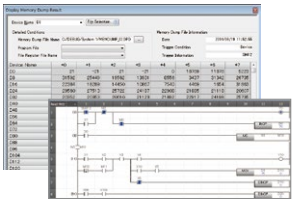
Prevent system downtime with relay monitoring

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

Corrective maintenance CPU module

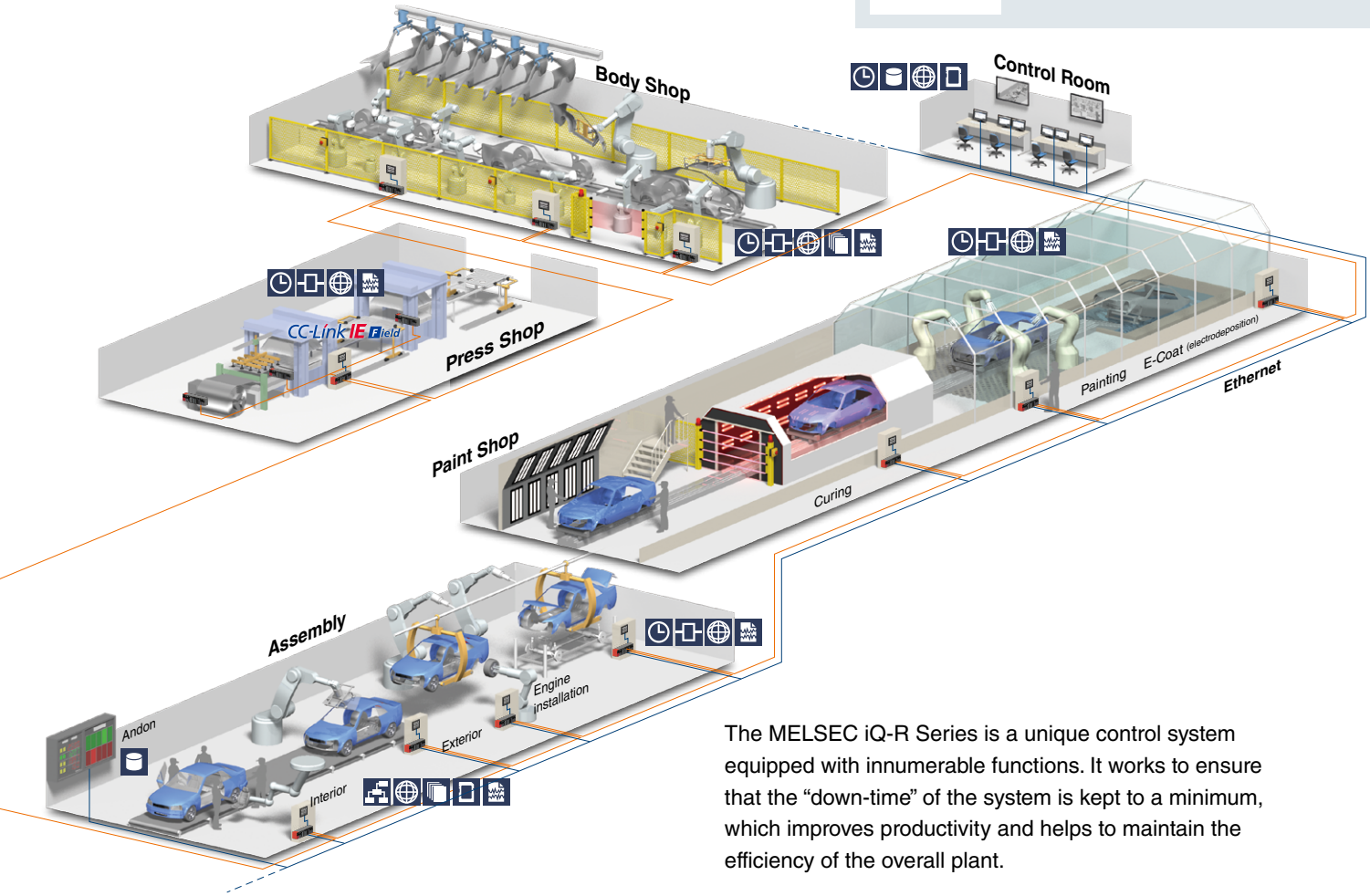
Memory dump enables confirmation of operation problems

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



Memory dump results (Program editor)

Mitsubishi Electric PAC MELSEC iQ-R "Maintenance" Movie

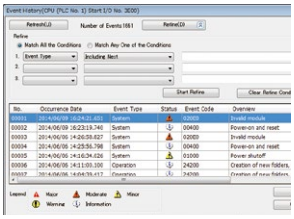


The MELSEC iQ-R Series is a unique control system equipped with innumerable functions. It works to ensure that the “down-time” of the system is kept to a minimum, which improves productivity and helps to maintain the efficiency of the overall plant.

Corrective maintenance CPU module

Efficient diagnostics with extensive event logging

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

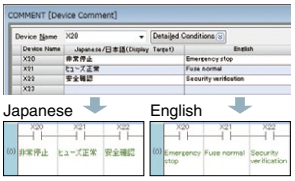


Event log list

Corrective maintenance GX Works3

Multi-language software improves global support

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

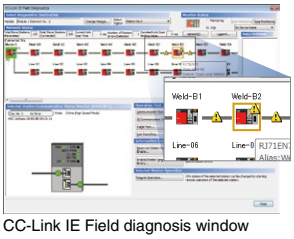


Switch between device comment languages

Corrective maintenance GX Works3

Quickly find network errors

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



CC-Link IE Field diagnosis window

Corrective maintenance GX Works3

Simple troubleshooting, even for novice users

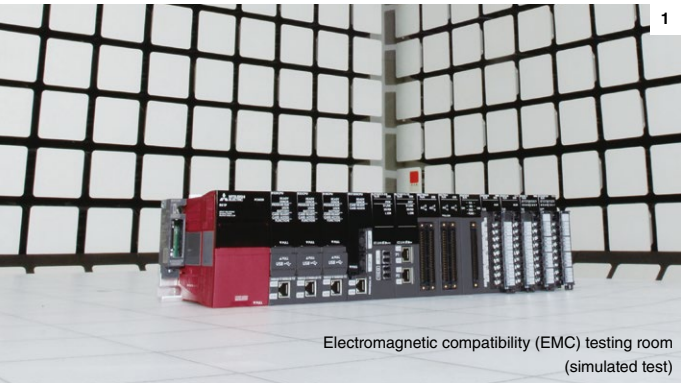
- Start diagnostics screen on GX Works3 just by connecting via USB
- Display detailed error information and corrective procedures

Automatically start diagnostics

Quality

Reliable and trusted MELSEC product quality

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



1 Electromagnetic compatibility (EMC) testing room (simulated test)

2

3

4

5

Robust design ideal for harsh industrial environments

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

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

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

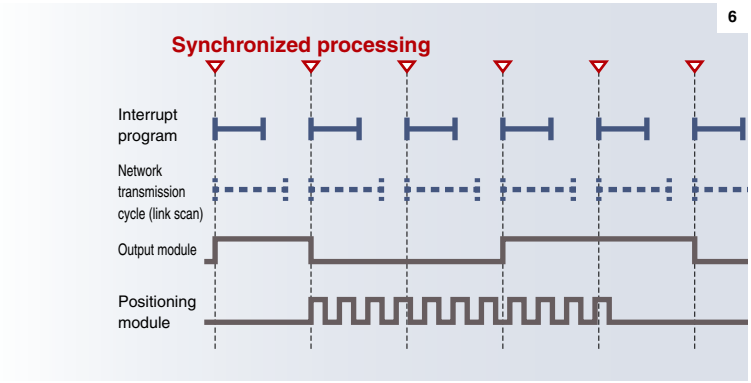
*1: Please contact your local Mitsubishi Electric office or representative for further details.

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

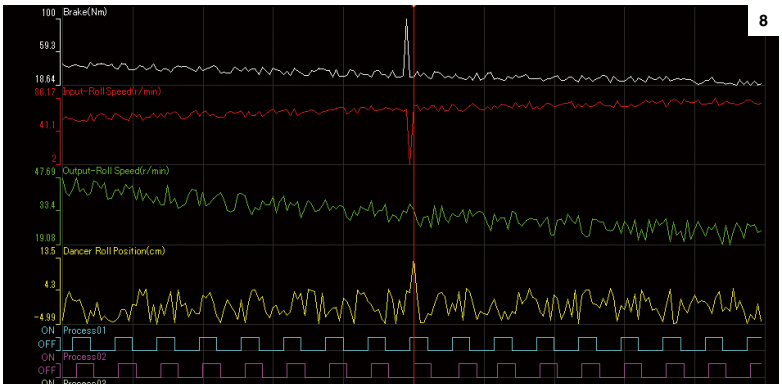
Mitsubishi Electric PAC MELSEC iQ-R "Quality" Movie

Conforms to main international quality standards

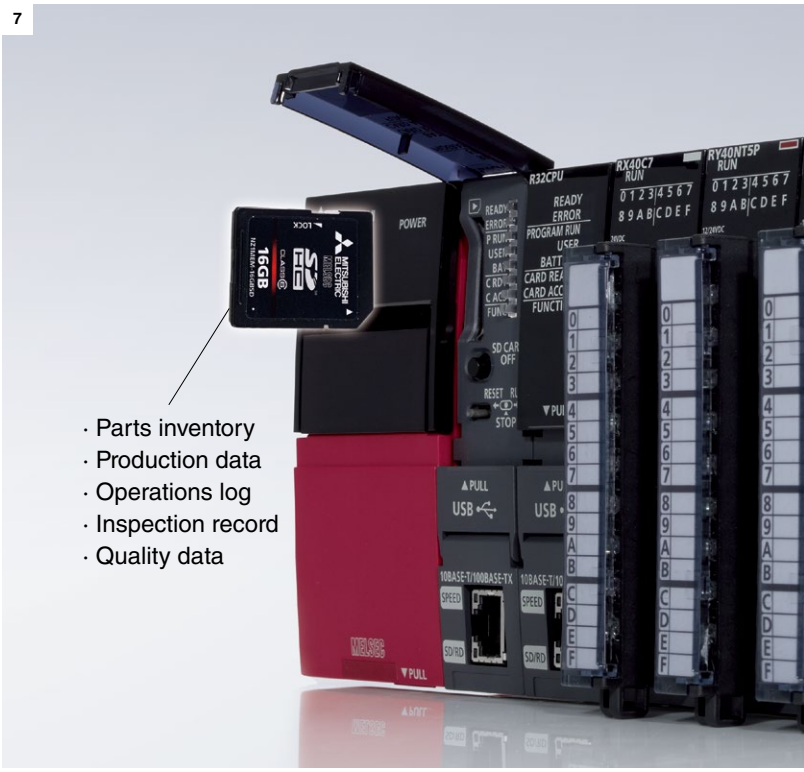
The MELSEC iQ-R Series conforms to most of the main international standards that realizes applications requiring multiple global locations.



6



8



7

Improve and maintain actual manufacturing quality

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

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 3/H high-speed motion control network further enhance the factory-wide connectivity solution.

CC-Link IE embedded CPU

CC-Link IE Field Network compatible Simple Motion module

Cost-saving integrated network CPU module

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

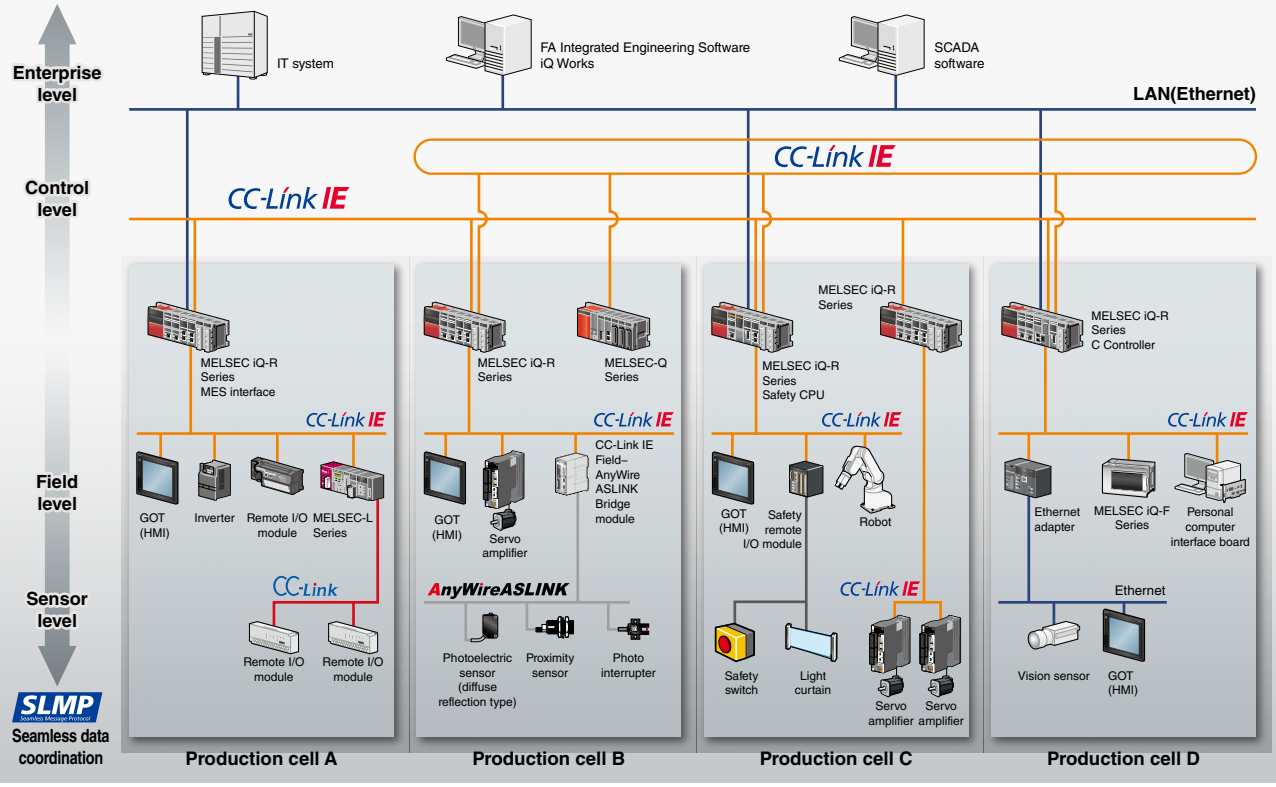
System hardware costs
Reduced 50% *2

Integrate motion control into one network

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

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

Mitsubishi Electric PAC MELSEC iQ-R
"Connectivity" Movie



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

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

CC-Link IE Control (twisted-pair cable)

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

Connect to two different types of networks with the same module

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

Security

Robust security that can be relied on

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

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

Mitsubishi Electric PAC MELSEC iQ-R "Security" Movie

Powerful security features protecting intellectual property

Security key authentication protecting project data

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

Prevent unauthorized access across the network

Device with registered IP address (access permitted)

Device without registered IP address (access denied)

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

Compatibility

Extensive compatibility with existing products

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

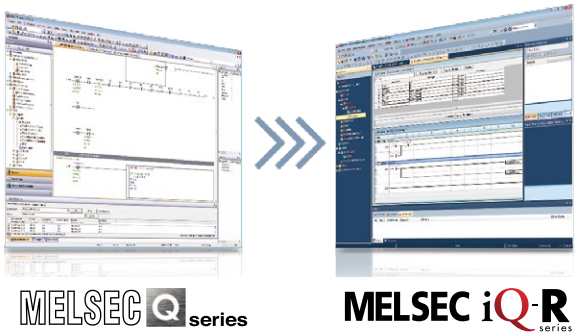
Mitsubishi Electric PAC MELSEC iQ-R "Compatibility" Movie

Utilize existing MELSEC-Q Series assets

Current programs can be fully utilized

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

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



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.

Lineup

Power supply P.23

- R61P ..... AC input
- R62P ..... AC input (inc. 24 V DC output)
- R64P ..... AC input (large capacity)
- R64RP NEW ..... AC input (Redundant)
- R63P ..... DC input

Base P.23

Main base

- R35B 5-slot
- R38B 8-slot
- R310RB NEW ..... 10-slot (Redundant)
- R312B 12-slot

Extended temperature range main base

- R310B-HT 10-slot
- R38RB-HT NEW ..... 8-slot (Redundant)

Extension base

- R65B 5-slot
- R68B 8-slot
- R610RB NEW ..... 10-slot (Redundant)
- R612B 12-slot

Extended temperature range extension base

- R610B-HT 10-slot
- R68RB-HT NEW ..... 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

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 ..... 1200K steps

R□ENCPU is equipped with CC-Link IE Control/CC-Link IE Field network ports.

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 ..... 1200K steps

Process CPU

- R08PCPU ..... 80K steps
- R16PCPU ..... 160K steps
- R32PCPU ..... 320K steps
- R120PCPU ..... 1200K steps

Redundant function module

- R6RFM NEW ..... Redundant function

C Controller

- R12CCPU-V ..... Memory capacity 256 MB

I/O P.43

AC input

- 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
- RX41C6HS ... Positive/negative common, 32-point
- RX61C6HS ... Positive/negative common, 32-point

DC (with diagnostic functions) input

- RX40NC6B ..... 16-point NEW

Relay output

- RY10R2 ..... 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

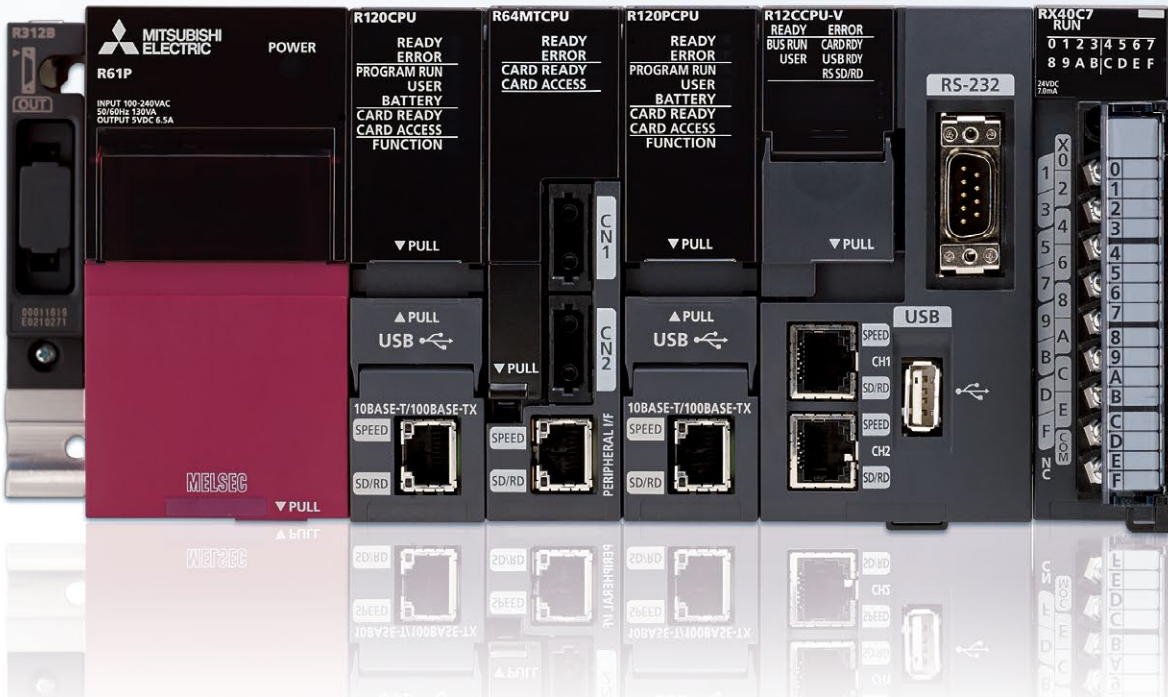
Transistor (with diagnostic functions) output

- RY40PT5B NEW 16-point

I/O combined module

DC Input, transistor (sink) output

- RH42C4NT2P 32-point/32-point



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

R60TCTRT2TT2 ..... 2-channel multi-input, 2-channel thermocouple input
R60TCRT4 ..... 4-channel RTD input
R60TCTRT2TT2BW ...2-channel multi-input, 2-channel thermocouple input
R60TCRT4BW ..... 4-channel RTD input

Analog output

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

Analog output (channel isolated)

R60DA8-G ..... 8-channel (voltage or current)
R60DA16-G .. 16-channel (voltage or current)

Motion, Positioning, High-speed counter P.56

Simple motion

(Compatible with CC-Link IE Field network)

RD77GF4 ..... 4-axis
RD77GF8 ..... 8-axis
RD77GF16 ..... 16-axis

(Compatible with SSCNET Ⅲ/H)

RD77MS2 ..... 2-axis
RD77MS4 ..... 4-axis
RD77MS8 ..... 8-axis
RD77MS16 ..... 16-axis

Positioning

Transistor output

RD75P2 ..... 2-axis
RD75P4 ..... 4-axis

Differential driver output

RD75D2 ..... 2-axis
RD75D4 ..... 4-axis

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.62

Ethernet

RJ71EN71 ..... 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
RJ72GF15-T2 NEW ..... Remote station

CC-Link

RJ61BT11 ..... Master/Local station CC-Link Ver.2

AnyWireASLINK

RJ51AW12AL NEW ..... Master station

Serial communication

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

Advanced information modules P.69

MES Interface

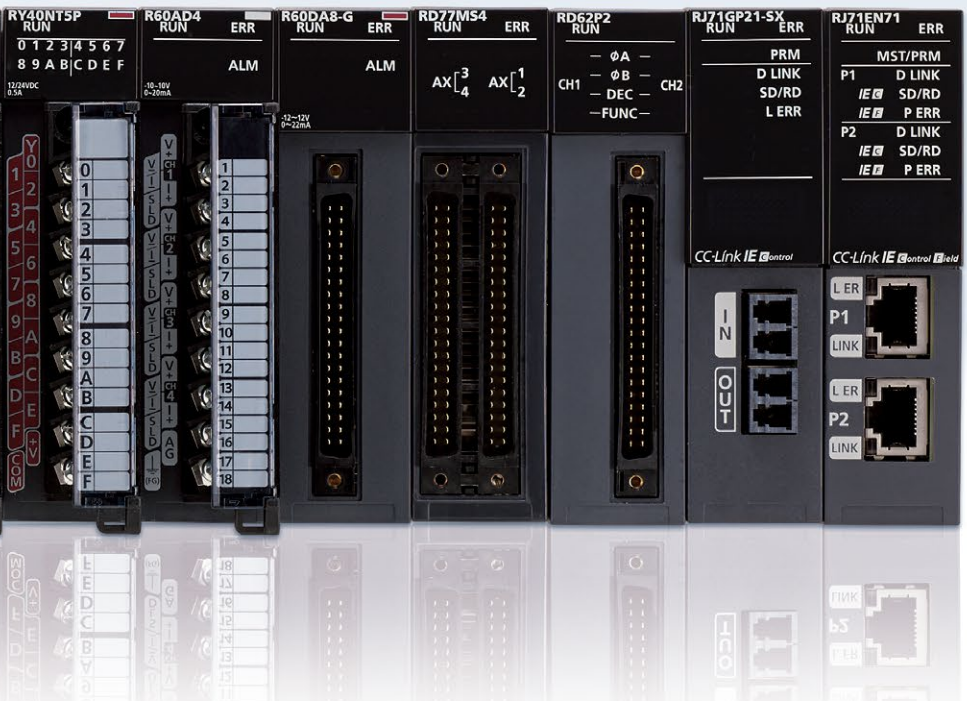
RD81MES96 ..... Database connection

High-speed data logger

RD81DL96 ..... Data collection

C Intelligent function module

RD55UP06-V ..... C/C++ program execution



Flexible, interchangeable system architecture

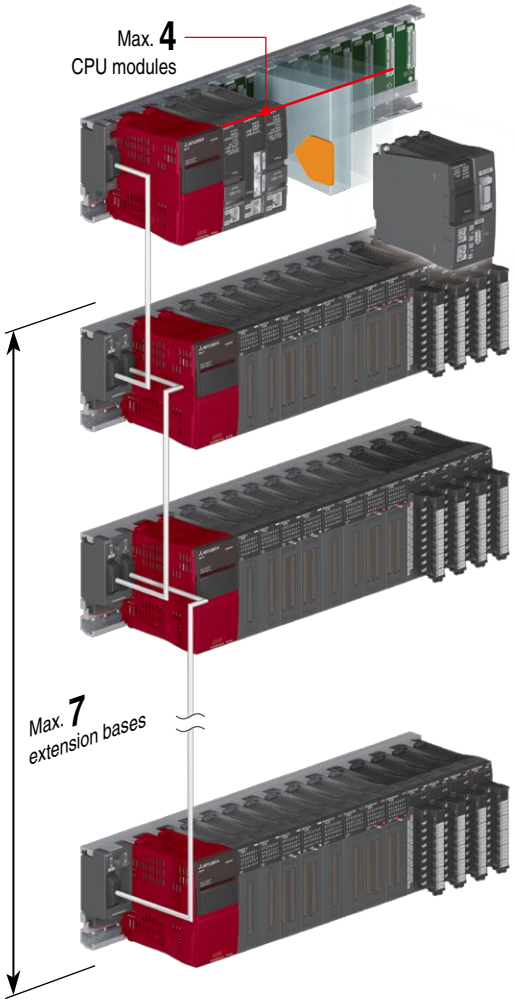
The MELSEC iQ-R Series is a modular control system equipped with various modules such as CPUs, power supply, digital I/O, analog I/O and base unit and intelligent function modules, each having its own responsibility in the system. The core of the system is a base unit that interconnects all of the modules 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

Install up to four CPU modules together

- Programmable controller CPU
- CC-Link IE embedded CPU*1
- Motion CPU
- Safety CPU*2
- Process CPU
- C Controller

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



Base units

- Main base unit
- Extended temperature range main base unit NEW

- Extension base unit
- Extended temperature range extension base unit NEW

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

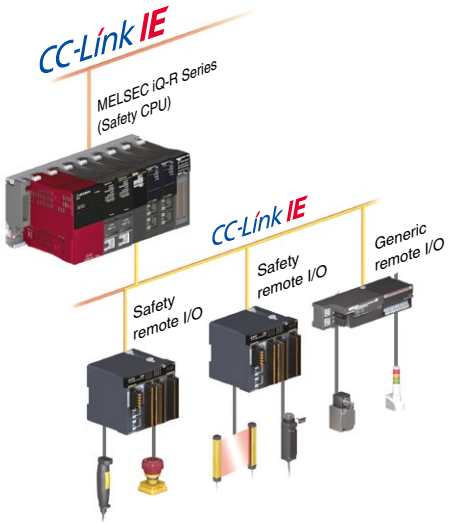
- Input module
- Output module
- I/O combined module
- Analog input module
- Temperature input module
- Temperature control module
- Analog output module
- Simple motion module
- Positioning module
- High-speed counter module
- Ethernet interface module
- CC-Link IE Control Network module
- CC-Link IE Field Network master/local module
- CC-Link IE Field Network remote head module NEW
- CC-Link system master/local module
- AnyWireASLINK master module NEW
- Serial communication module
- MES interface 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.

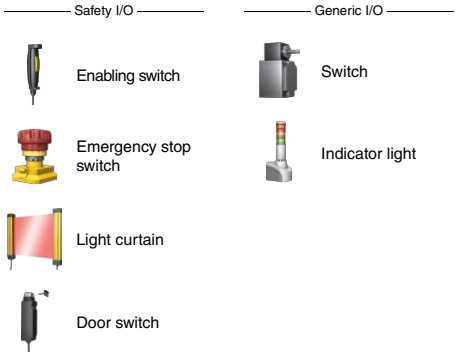
CPU

• Safety CPU



Safety remote I/O

• Safety remote I/O module

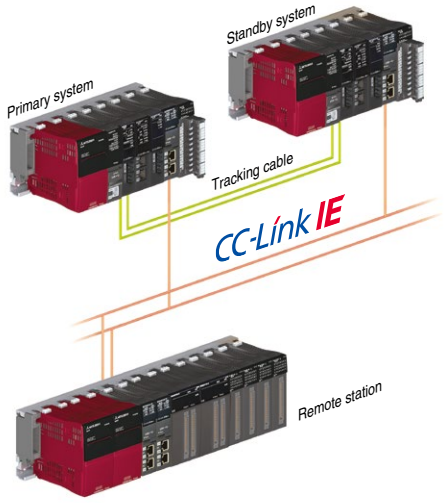


Highly scalable redundant control

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

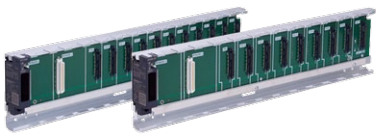
• Process CPU
• Redundant function module NEW



Power supply modules, base units*

• Redundant power supply module NEW

• Redundant power supply main base unit NEW
• Extended temperature range redundant power supply main base unit NEW

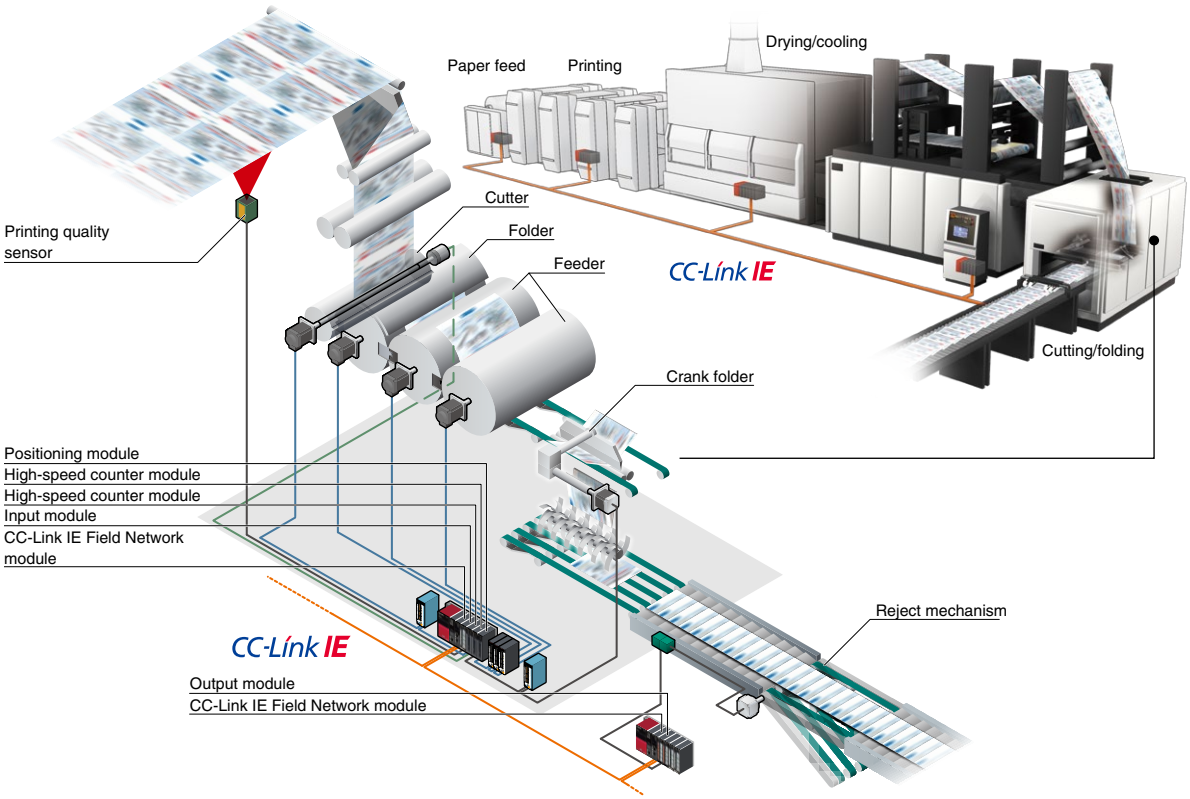


• Redundant power supply extension base unit NEW
• Extended temperature range redundant power supply extension base unit NEW

* 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

Item	R61P	R62P	R64P	R64RP	R63P
Input power supply voltage	100...240 V AC (85...264 V AC)	100...240 V AC (85...264 V AC)	100...240 V AC (85...264 V AC)	100...240 V AC (85...264 V AC)	24 V DC (15.6...31.2 A DC)
Input frequency	50/60 Hz ±5%	50/60 Hz ±5%	50/60 Hz ±5%	50/60 Hz ±5%	-
Max. input apparent power (VA)	130	120	160	160	-
Max. input power (W)	-	-	-	-	50
Rated output current (5 V DC)	6.5 A	3.5	9	9	6.5 A
Rated output current (24 V DC)	-	0.6	-	-	-
Redundant power supply	-	-	-	●	-

Main base unit (Standard, Extended temperature range)

Item	Main base unit (Standard)				Extended temp. range main base unit	
	R35B	R38B	R310RB	R312B	R310B-HT	R38RB-HT
Number of I/O modules installed	5	8	10	12	10	8
DIN rail mounting adapter type	R6DIN1	R6DIN1	R6DIN1	R6DIN1	R6DIN1	R6DIN1
External dimensions (H x W x D, mm)	101 x 245 x 32.5	101 x 328 x 32.5	101 x 439 x 32.5	101 x 439 x 32.5	101 x 439 x 32.5	101 x 439 x 32.5

Extension base unit (Standard, Extended temperature range)

Item	Extension base unit (Standard)				Extended temp. range extension base unit	
	R65B	R68B	R610RB	R612B	R610B-HT	R68RB-HT
Number of I/O modules installed	5	8	10	12	10	8
Applicable module	MELSEC iQ-R Series module					
DIN rail mounting adapter type	R6DIN1	R6DIN1	R6DIN1	R6DIN1	R6DIN1	R6DIN1
External dimensions (H x W x D, mm)	101 x 245 x 32.5	101 x 328 x 32.5	101 x 439 x 32.5	101 x 439 x 32.5	101 x 439 x 32.5	101 x 439 x 32.5

RQ extension base unit

Item	RQ extension base unit		
	RQ65B	RQ68B	RQ612B
Number of I/O modules installed	5	8	12
Applicable module	MELSEC-Q Series module		
DIN rail mounting adapter type	Q6DIN2	Q6DIN1	Q6DIN1
External dimensions (H x W x D, mm)	98 x 245 x 44.1	98 x 328 x 44.1	98 x 439 x 44.1

Extension cable

Item	RC06B	RC12B	RC30B	RC50B
Cable length*1 (m)	0.6	1.2	3.0	5.0

*1: Overall cable distance 20 m. 13.2 m with the RQ extension base.

CPU

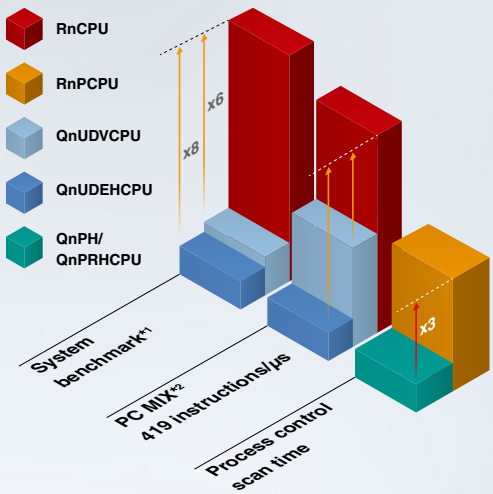
The MELSEC iQ-R Series includes a wide range of programmable automation controllers capable of catering to diversified automation control needs, redesigned around the new MELSEC iQ-R high-speed system bus to ensure high performance and intelligent processing power. The lineup includes a high-performance, 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.

Focus points

- Program capacity of up to 1200K steps
- Improved multi-CPU controller architecture
- Embedded gigabit network ports CPU
- Internal DB for simple batch recipe control
- Security embedded in hardware SRAM cassette
- Various motion control possible (position, speed, torque, advanced sync, etc.)
- International standard (ISO 13849-1 PL e, IEC 61508 SIL 3) safety CPU
- High-speed PID control, module replacement while online (hot-swap), supports highly reliable redundant system process CPU
- C/C++ programming ideal for PC/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 QCPU, 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).

Programmable Controller CPU Modules

R04CPU
Program capacity 40K steps

R04ENCPU
Program capacity 40K steps, CC-Link IE embedded

R08CPU
Program capacity 80K steps

R08ENCPU
Program capacity 80K steps, CC-Link IE embedded

R16CPU
Program capacity 160K steps

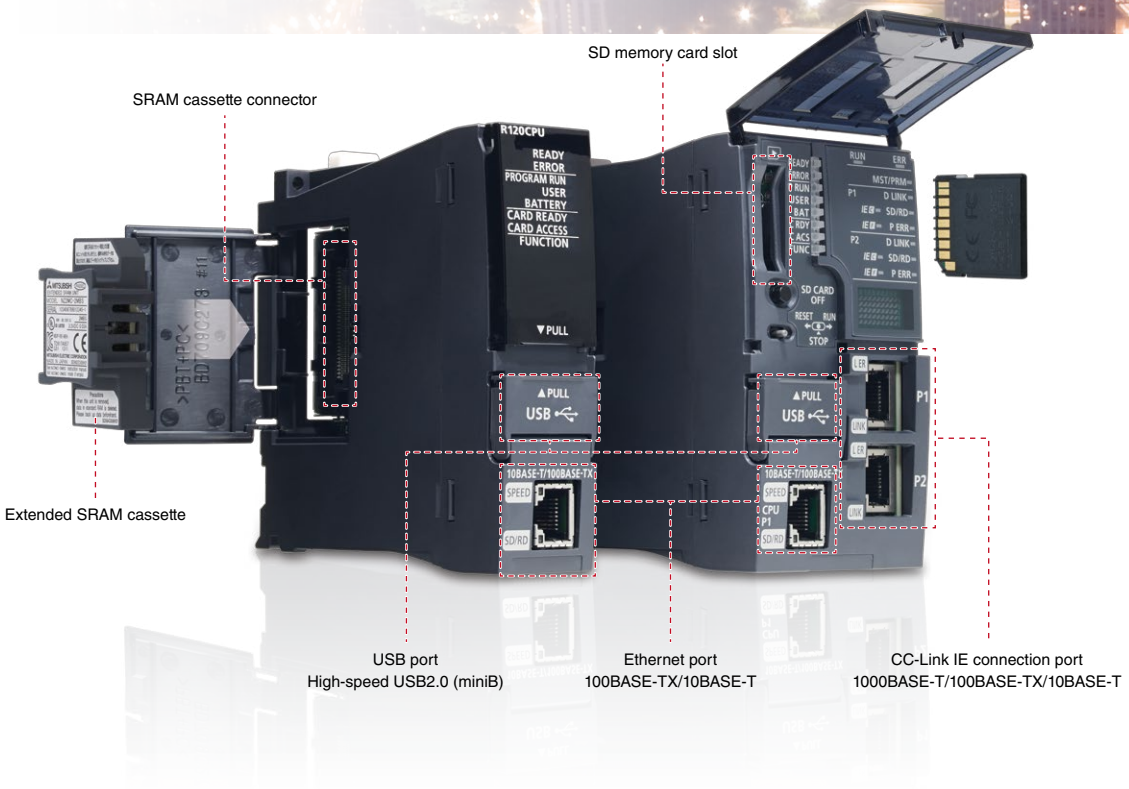
R16ENCPU
Program capacity 160K steps, CC-Link IE embedded

R32CPU
Program capacity 320K steps

R32ENCPU
Program capacity 320K steps, CC-Link IE embedded

R120CPU
Program capacity 1200K steps

R120ENCPU
Program capacity 1200K steps, CC-Link IE embedded



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.

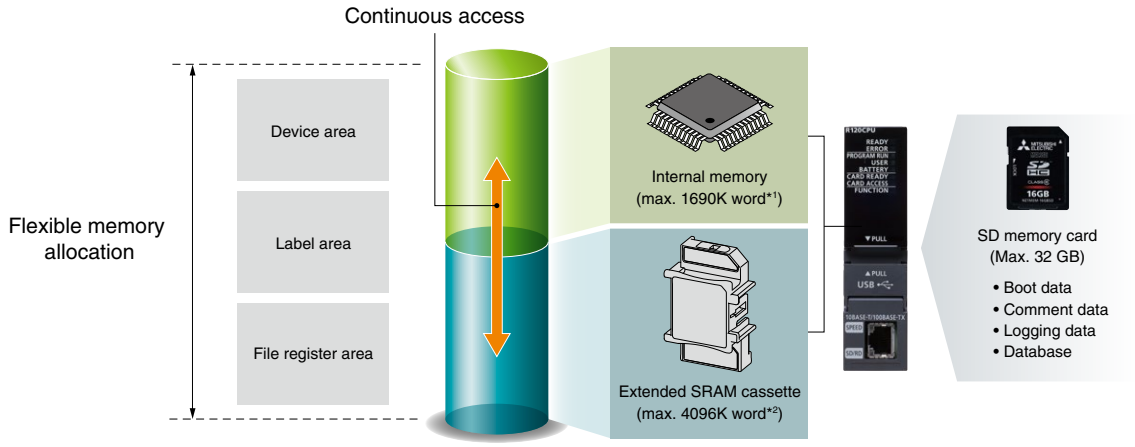
Built-in hardware features

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

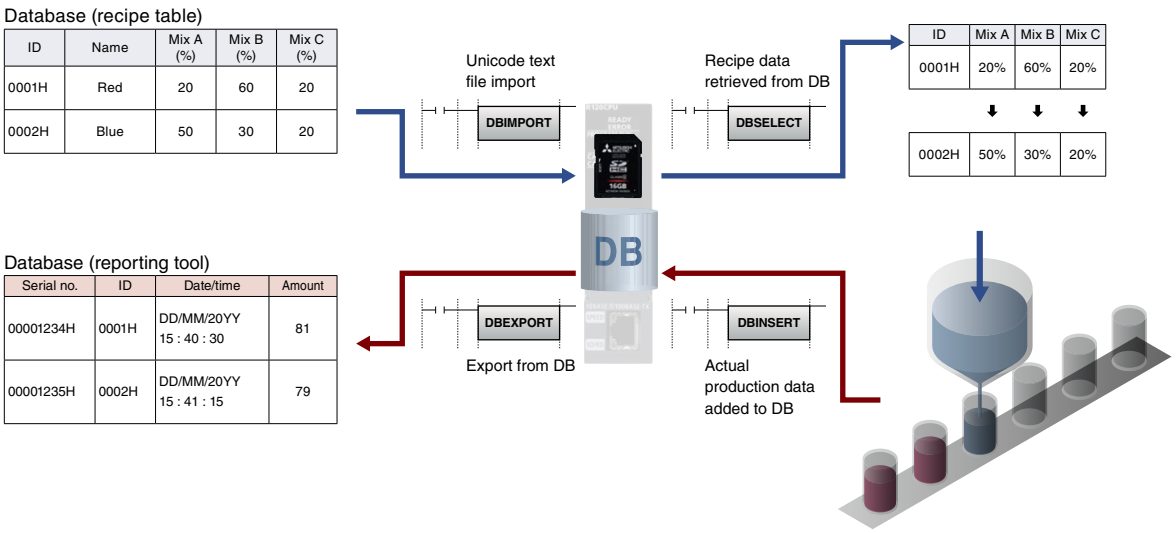
The MELSEC iQ-R Series programmable controller CPU is designed to allow an external SRAM cassette to be installed directly into the CPU module. This option makes it possible to increase internal device memory to an impressive 5786K words, expanding device/label memory even further. An SD memory card 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.



*1: Based on R120CPU.
*2: Based on NZ2MC-8MBS (8 MB).

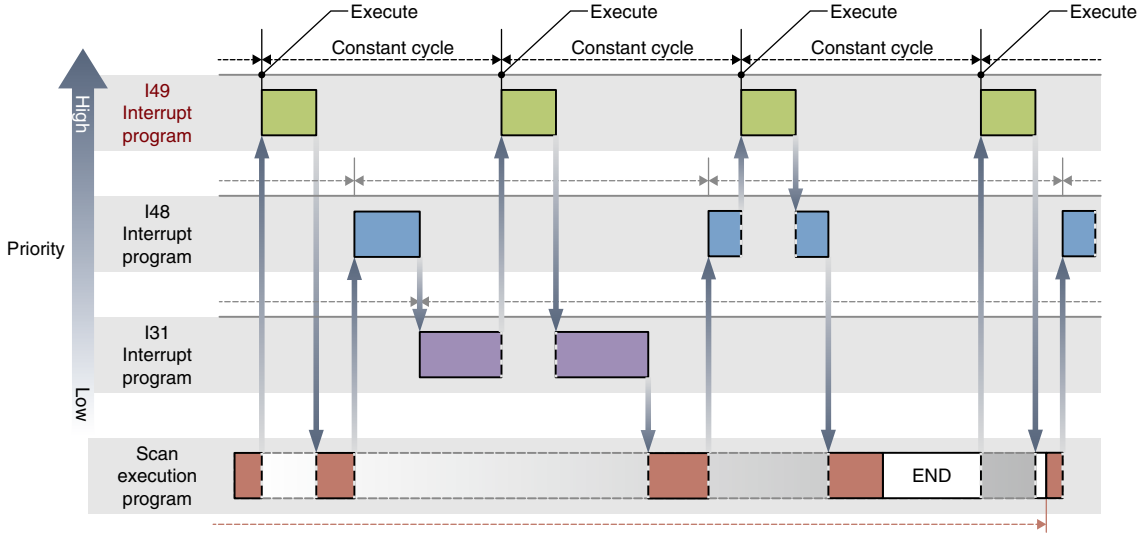
Data management utilizing internal database (DB)

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. This is a very useful feature, especially for the food and beverage industry where multiple product variations are produced using the same machine process.

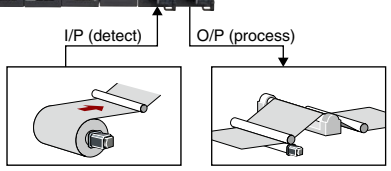


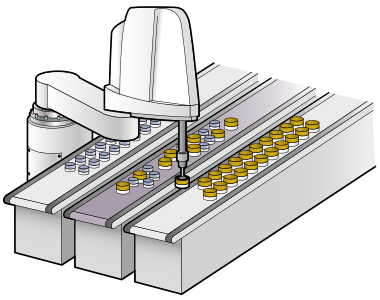
High-speed, event driven programs

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.



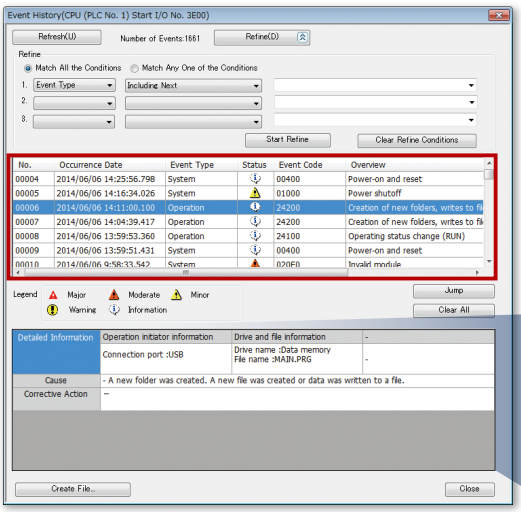
I/P module + ABS encoder accurately detect variable high-speed I/P signals.



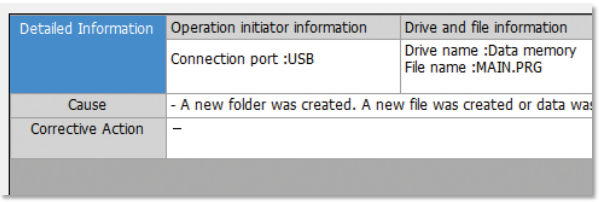


CPU program management data

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.



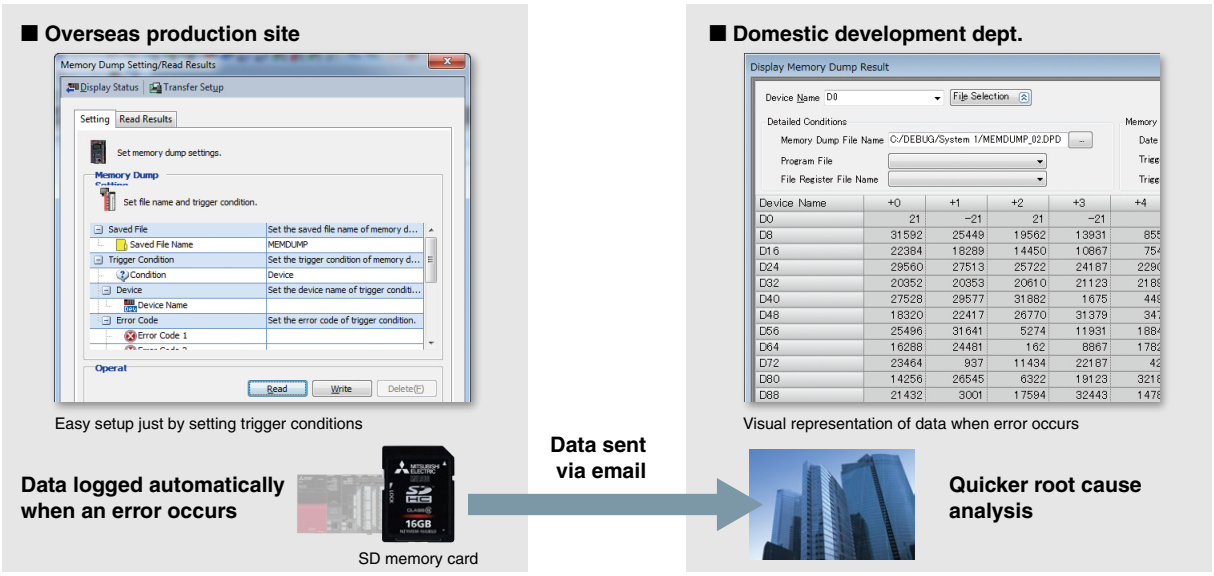
View operations and system events with corresponding event/error codes, data can be sorted according to various attributes.



Corresponding explanatory text

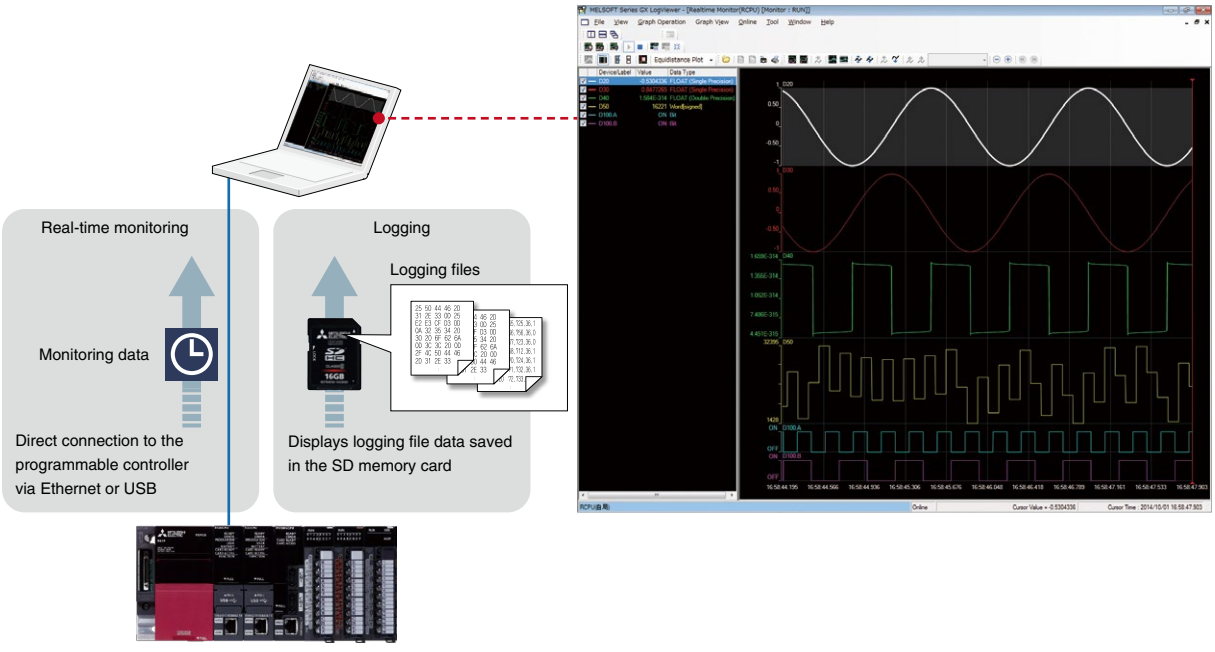
Intuitive root cause analysis

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.



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.



Programmable controller CPU module specifications

Item	R04(EN)CPU	R08(EN)CPU	R16(EN)CPU	R32(EN)CPU	R120(EN)CPU
Control method	Stored program cyclic operation				
I/O control mode	Refresh mode (Direct access I/O is available by specifying direct access I/O (DX, DY).)				
Programming language	Ladder diagram (LD), structured text (ST), function block diagram (FBD), sequential function chart (SFC)				
Extended programming language	Function block (FB), label programming (system/local/global)				
Program execution type	Initial, scan, fixed scan, interrupt, standby type				
Number of I/O points [X/Y] (point)	4096	4096	4096	4096	4096
Constant scan (ms) (Function for keeping regular scan time)	0.2...2000 (Setting available in 0.1 ms increments)				
Memory capacity					
Program capacity (step)	40K	80K	160K	320K	1200K
Program memory (byte)	160K	320K	640K	1280K	4800K
Device/label memory*1 (byte)	400K	1188K	1720K	2316K	3380K
Data memory (byte)	2M	5M	10M	20M	40M
Instruction processing time					
LD instruction (ns)	0.98	0.98	0.98	0.98	0.98
MOV instruction (ns)	1.96	1.96	1.96	1.96	1.96
E + instruction (floating-point addition) (ns)	9.8	9.8	9.8	9.8	9.8
Structured text IF instruction*2 (ns)	1.96	1.96	1.96	1.96	1.96
Structured text FOR instruction*2 (ns)	1.96	1.96	1.96	1.96	1.96
PC MIX value*3 (instructions/μs)	419	419	419	419	419
Interface connection port					
USB 2.0 High Speed (miniB)	●	●	●	●	●
Ethernet (100 BASE-TX/10 BASE-T)	●	●	●	●	●
CC-Link IE connection port					
Ethernet (1000BASE-T/100BASE-TX/10BASE-T)	●*4*5	●*4*5	●*4*5	●*4*5	●*4*5
Memory interface					
SD memory card	●	●	●	●	●
Extended SRAM cassette	●	●	●	●	●
Function					
Multiple interrupt	●	●	●	●	●
Standard PID control	●	●	●	●	●
Internal database	●	●	●	●	●
Memory dump	●	●	●	●	●
Data logging	●	●	●	●	●
Real-time monitor	●	●	●	●	●
Security	●	●	●	●	●
Inter-modular synchronization	●	●	●	●	●
SLMP communication	●	●	●	●	●

*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 R□ENCPU. For details about network specifications, refer to the RJ71EN71 performance specifications on page 63.
*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

Item	NZ1MEM-2GBSD	NZ1MEM-4GBSD	NZ1MEM-8GBSD	NZ1MEM-16GBSD
Type	SD memory card	SDHC memory card	SDHC memory card	SDHC memory card
Capacity (byte)	2G	4G	8G	16G

Extended SRAM cassette specifications

Item	NZ2MC-1MBS	NZ2MC-2MBS	NZ2MC-4MBS	NZ2MC-8MBS(E)*6	NZ2MC-16MBS*7
Capacity (byte)	1M	2M	4M	8M	16M

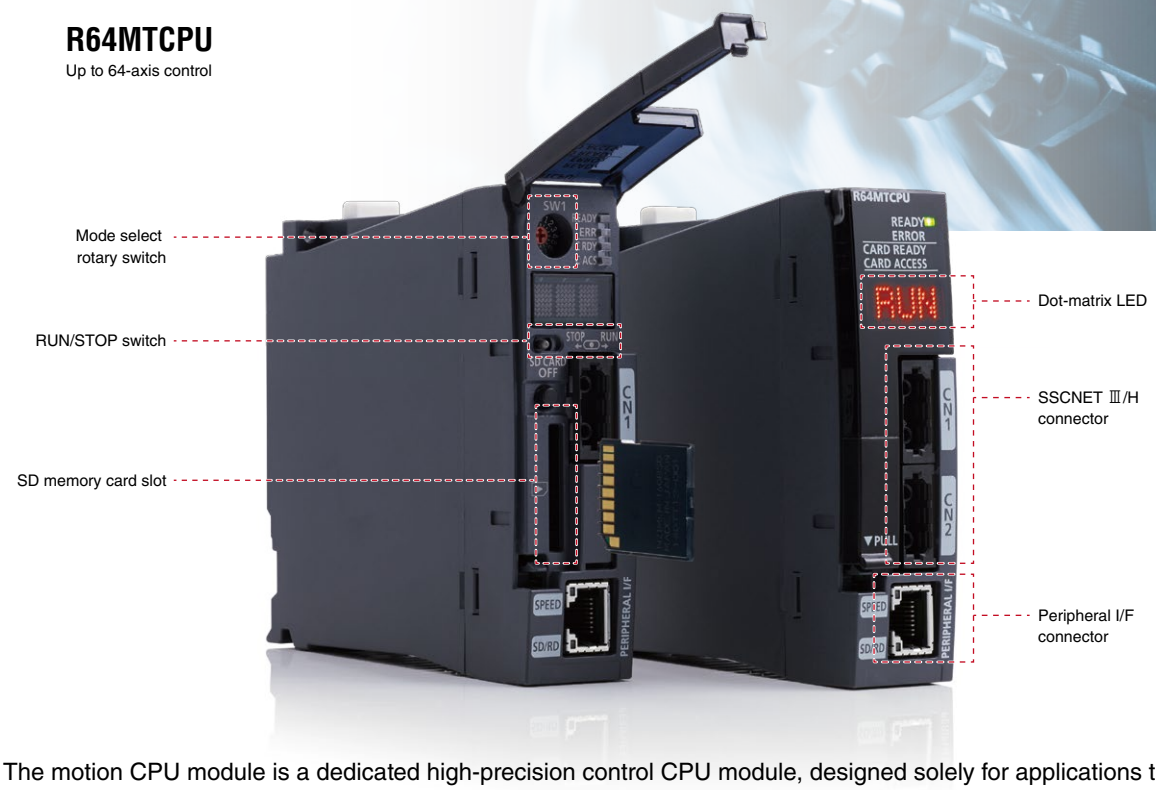
*6: NZ2MC-8MBSE is only supported by safety CPU and process CPU.
*7: Safety CPU is not supported.

Motion CPU Modules

R16MTCPU
Up to 16-axis control

R32MTCPU
Up to 32-axis control

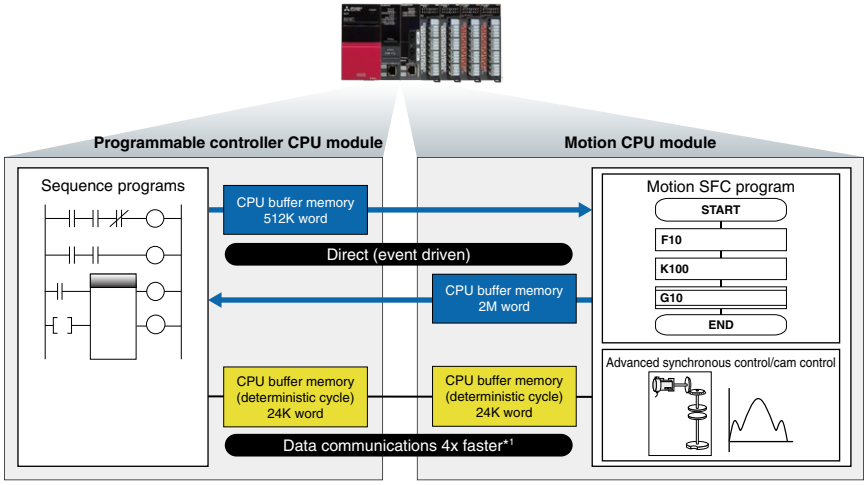
R64MTCPU
Up to 64-axis control



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

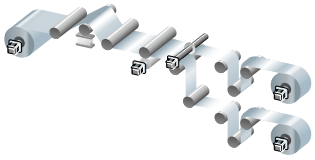
High-speed communication is realized between the two CPUs via a large bandwidth data buffer memory exchange. There are two types of buffer memory for data exchange: one that provides cyclic exchange at a cycle time as fast as 0.222 ms; and one for direct data exchange of event-driven buffer memory, which 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.

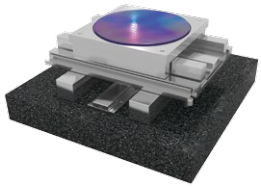
Various different applications easily realized

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.



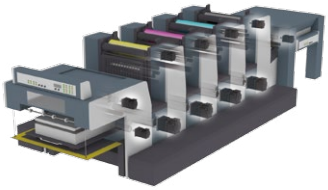
Converting equipment

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



Positional alignment

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

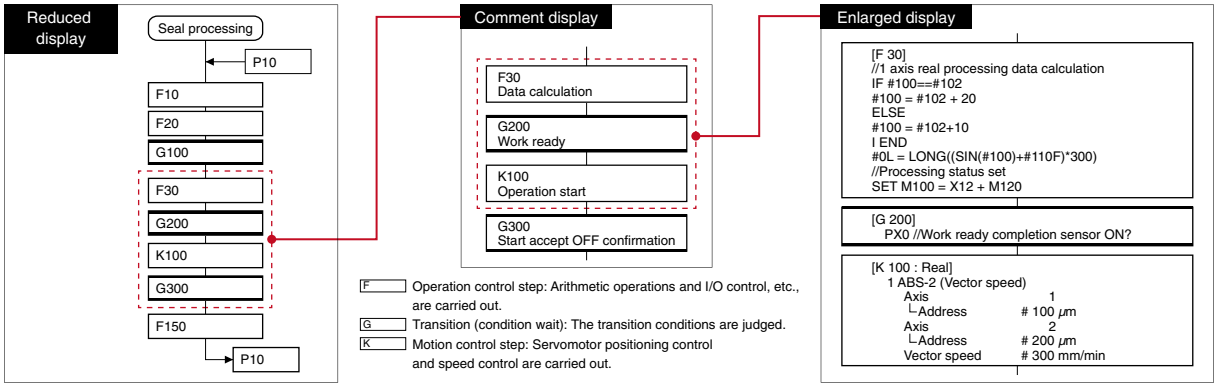


Offset printing

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.

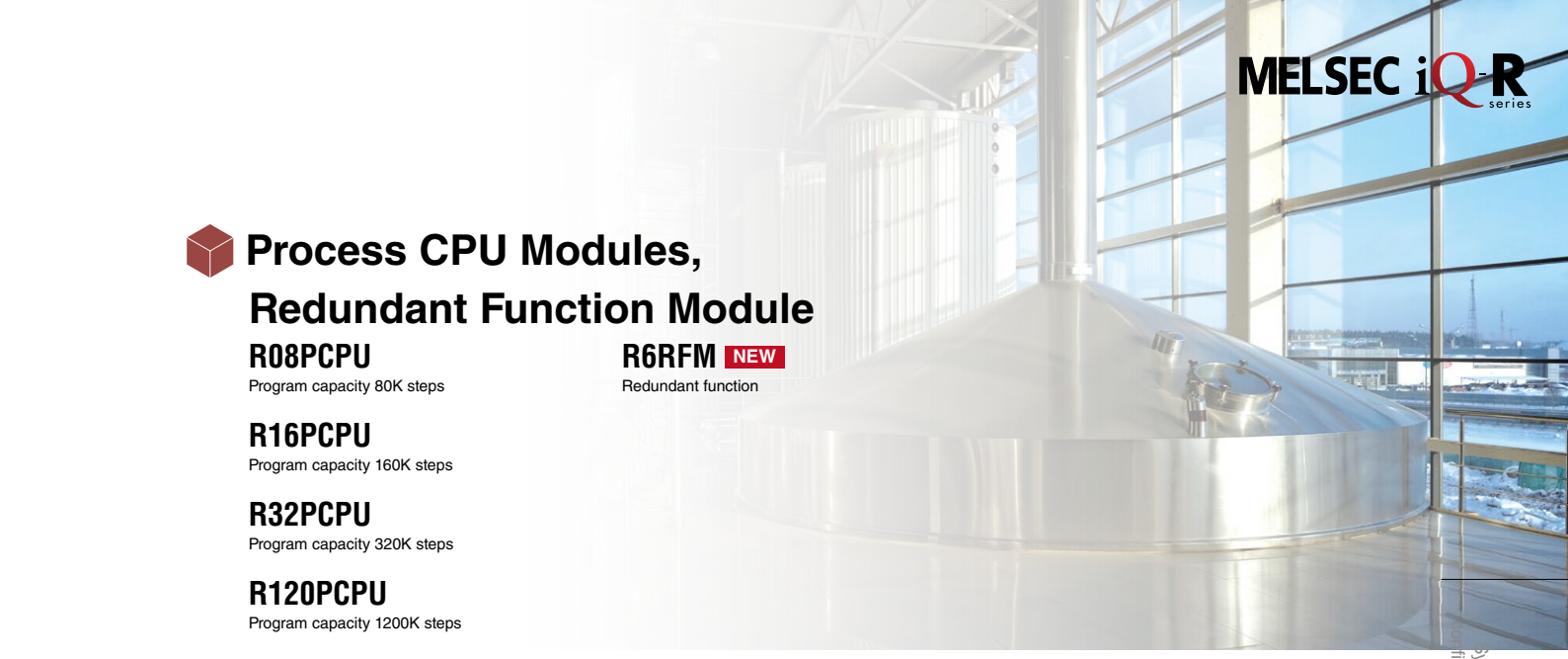
■ Motion SFC Program



Motion CPU module specifications

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

*1: A battery needs to be installed in the servo amplifier for home position backup.



Process CPU Modules, Redundant Function Module

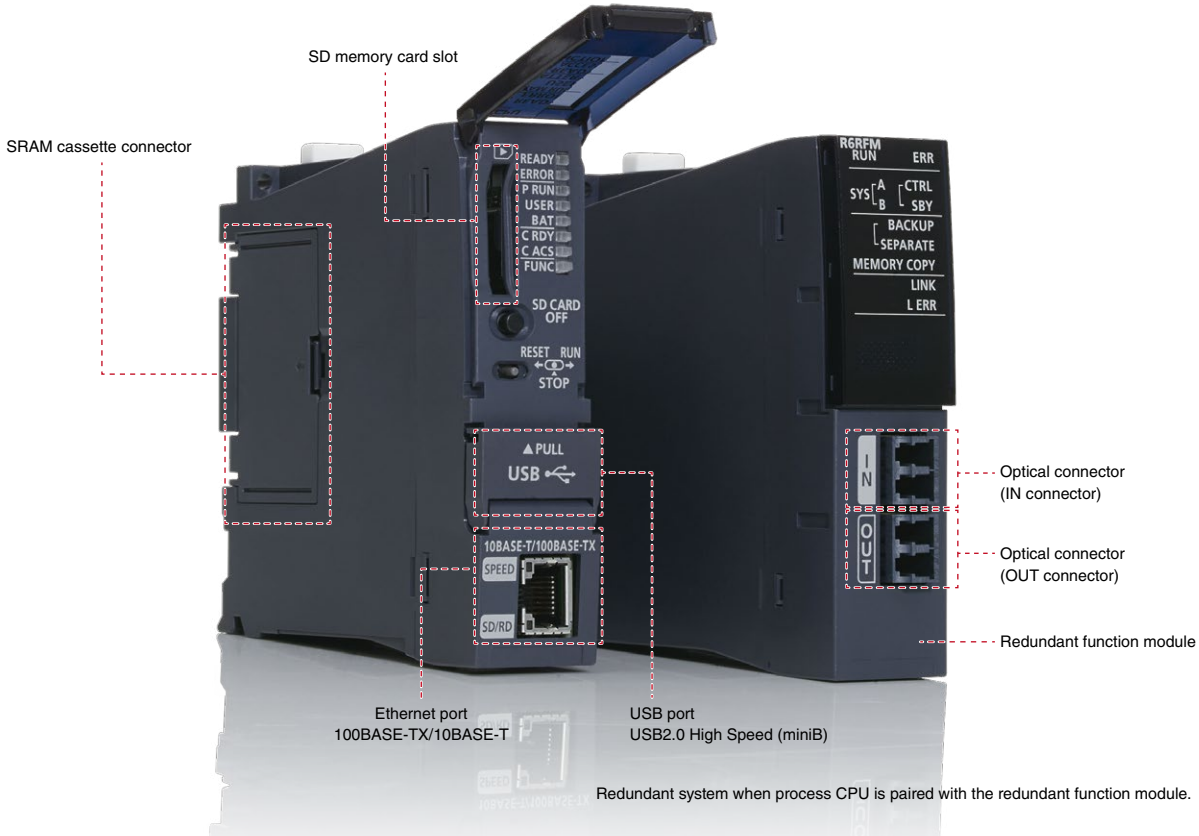
R08PCPU
Program capacity 80K steps

R16PCPU
Program capacity 160K steps

R32PCPU
Program capacity 320K steps

R120PCPU
Program capacity 1200K steps

R6RFM NEW
Redundant function



Redundant system when process CPU is paired with the redundant function module.

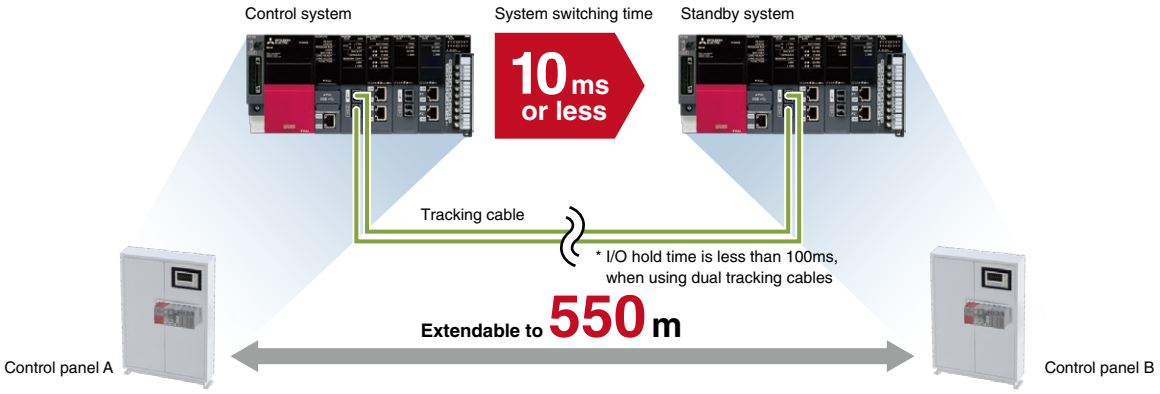
The process CPU module is part of the application-specific range in the MELSEC iQ-R Series and has four CPUs available with memory sizes from 80K to 1200K steps. It is designed specifically for medium- to large-scale process control systems requiring high-speed performance coupled with the handling of 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.

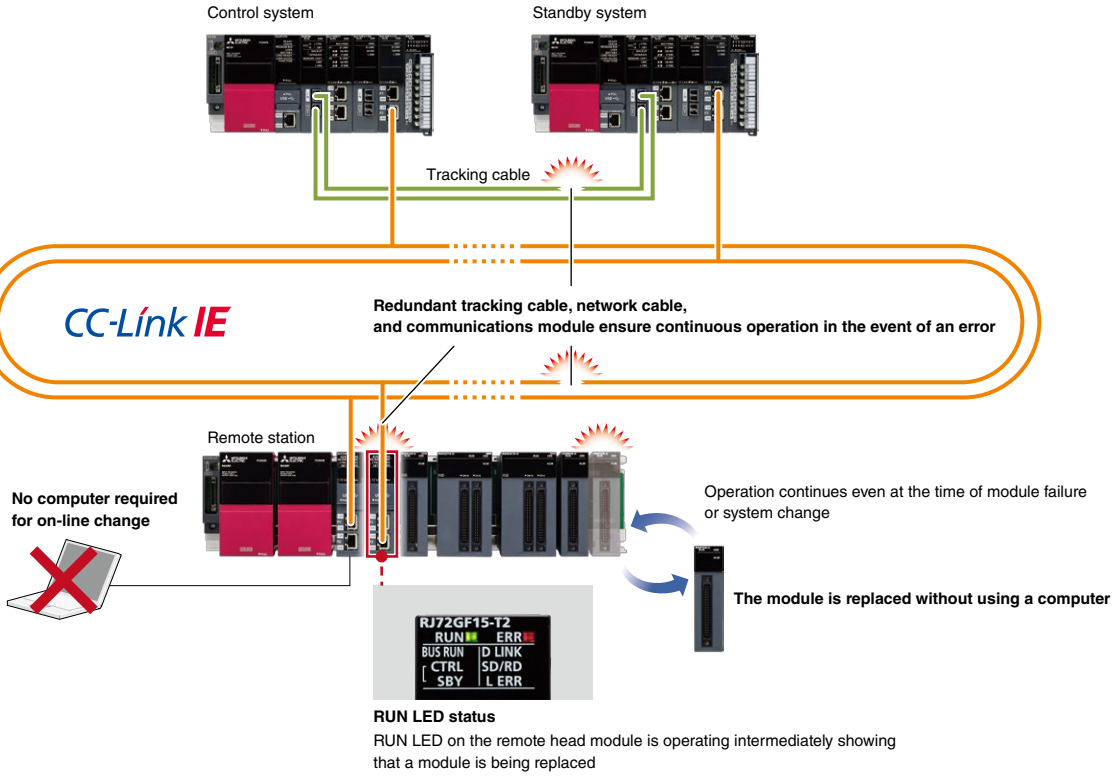
Redundant system remote location and high-speed switching

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 singe-point failure. It is also possible to replace modules (hot-swapping) without stopping the operating control system.

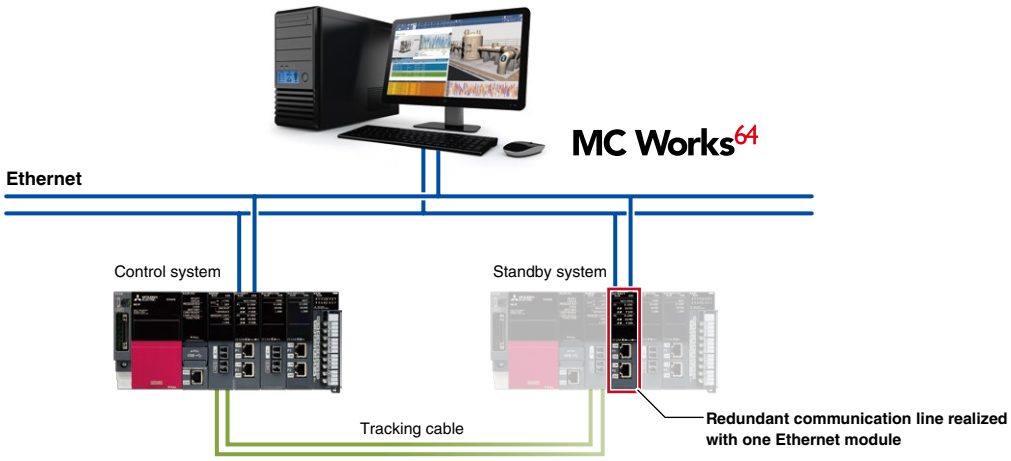


RUN LED status

RUN LED on the remote head module is operating intermediately showing that a module is being replaced

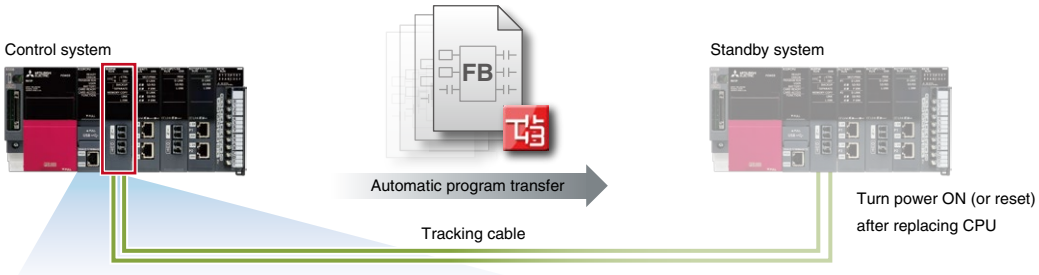
Mitsubishi MC Works64 visualization and redundant Ethernet improving information level reliability

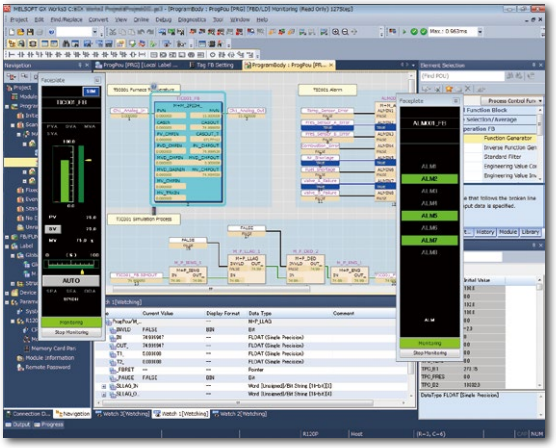
Mitsubishi SCADA MC Works64 in combination with MELSEC iQ-R Series redundant system realizes highly reliable visualization and control system. The Ethernet module includes two communications ports which enable information level communications with MC Works 64 without switching the system even if an error occurs with one of the ports, in addition to reducing system hardware costs as only one module is required per control and standby system.



GX Works3* easy programming and automatic memory copy

GX Works3 is the main programming and maintenance software of the MELSEC iQ-R process control system. This integrated software application is equipped with many functions that contribute to reducing engineering time and simplifying commissioning. When installed as a redundant system, the same project can be transferred to the standby system automatically during CPU module replacement without having to upload the project to the new CPU again.





GX Works3
One Software, Many Possibilities

■ **GX Works3 (process + ladder logic control)**

- Process tag labels (variables) are shared across process and other control programs.
- Simple program structure enables easy upload and download to the process CPU.

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

Process CPU module specifications

Item	R08PCPU	R16PCPU	R32PCPU	R120PCPU
Control method	Stored program cyclic operation			
I/O control mode	Refresh mode (Direct access I/O is available by specifying direct access I/O (DX, DY).)			
Programming language	Ladder diagram (LD), structured text (ST), function block diagram (FBD), sequential function chart (SFC)*1			
Extended programming language	Function block (FB), label programming (system/local/global)			
Program execution type	Initial, scan, fixed scan, interrupt, standby type			
Number of I/O points [X/Y](point)	4096	4096	4096	4096
Constant scan (ms) (Function for keeping regular scan time)	0.2...2000 (Setting available in 0.1 ms increments)			
Memory capacity				
Program capacity (step)	80K	160K	320K	1200K
Program memory (byte)	320K	640K	1280K	4800K
Device/label memory (ECC type)*2 (byte)	1188K	1720K	2316K	3380K
Data memory (byte)	5M	10M	20M	40M
Instruction processing time				
LD instruction (ns)	0.98	0.98	0.98	0.98
MOV instruction (ns)	1.96	1.96	1.96	1.96
E + instruction (floating-point addition) (ns)	9.8	9.8	9.8	9.8
Structured text IF instruction*3 (ns)	1.96	1.96	1.96	1.96
Structured text FOR instruction*3 (ns)	1.96	1.96	1.96	1.96
PC MIX value*4 (instructions/μs)	419	419	419	419
Interface connection port				
USB2.0 High Speed (miniB)	●	●	●	●
Ethernet (100BASE-TX/10BASE-T)	●	●	●	●
Memory interface*5				
SD memory card	●	●	●	●
Extended SRAM cassette	●	●	●	●
Function*6				
Multiple interrupt	●	●	●	●
Standard PID control	●	●	●	●
Process control	●	●	●	●
Database	●	●	●	●
Data logging	●	●	●	●
Security function	●	●	●	●
Inter-modular synchronization*7	●	●	●	●
SLMP communication	●	●	●	●
Online module change	●	●	●	●

*1: SFC programming language is not supported when used in redundant mode.
*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

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

Safety CPU

R08SFCPU-SET
Program capacity 80K steps

R16SFCPU-SET
Program capacity 160K steps

R32SFCPU-SET
Program capacity 320K steps

R120SFCPU-SET
Program capacity 1200K steps

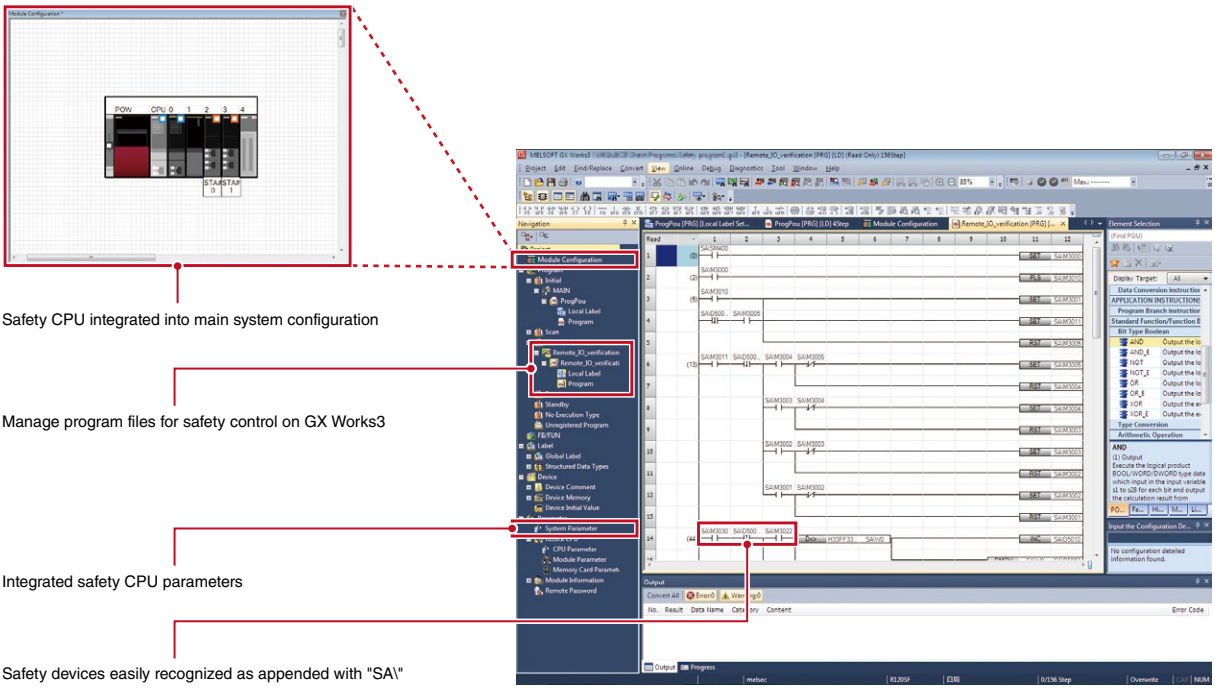
The safety CPU module enables control of both generic and safety programs in the same module and is easily programmed utilizing the intuitive features of GX Works3. Compliant with internationally recognized safety standards, the safety CPU enables safety devices such as safety light curtains, emergency 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

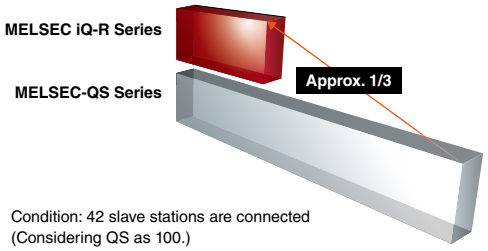
In GX Works3, operation and safety programs are included in the same project folder, eliminating the need to manage multiple project folders. Various useful features of GX Works3 are also available for safety programs similar to other control programs.



Faster response times and handling of larger programs

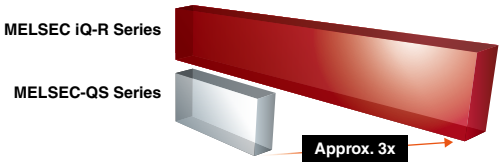
Utilizing the high-performance capabilities of the MELSEC iQ-R Series and CC-Link IE Field network, productivity is enhanced as response times are even faster. Additionally, safety control program capacity has been increased by up to three times, to 40K steps, enabling the control of more complex programs.

■ Safety control response time



Condition: 42 slave stations are connected
(Considering QS as 100.)

■ Safety program size



Safety CPU performance specifications

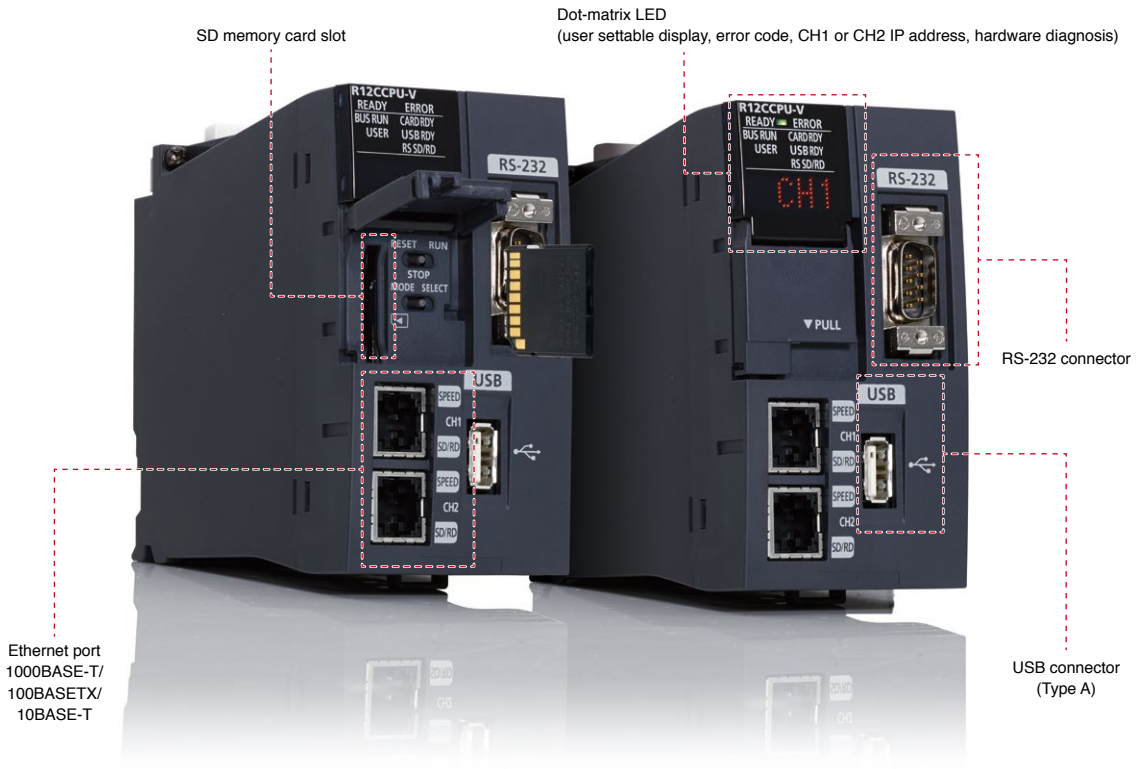
Item	R08SFCPU-SET*1	R16SFCPU-SET*1	R32SFCPU-SET*1	R120SFCPU-SET*1
Safety integrity level (SIL)	SIL 3 (IEC 61508)			
Performance level (PL)	PL e (EN/ISO 13849-1)			
Control method	Stored program cyclic operation			
I/O control mode	Refresh mode (Direct access I/O is available by specifying direct access I/O (DX, DY).)			
Programming language	Ladder diagram (LD), structured text (ST)*2, function block diagram (FBD)*2			
Extended programming language	Function block (FB), label programming (local/global)			
Program execution type	Initial*2, scan*2, fixed scan, interrupt*2, standby type*2			
Memory capacity				
Program capacity (step)	80K (40K for safety programs)	160K (40K for safety programs)	320K (40K for safety programs)	1200K (40K for safety programs)
Program memory (byte)	320K	640K	1280K	4800K
Device/label memory*3 (byte)	1178K	1710K	2306K	3370K
Data memory (byte)	5M	10M	20M	40M
SLMP communication	●	●	●	●

*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.

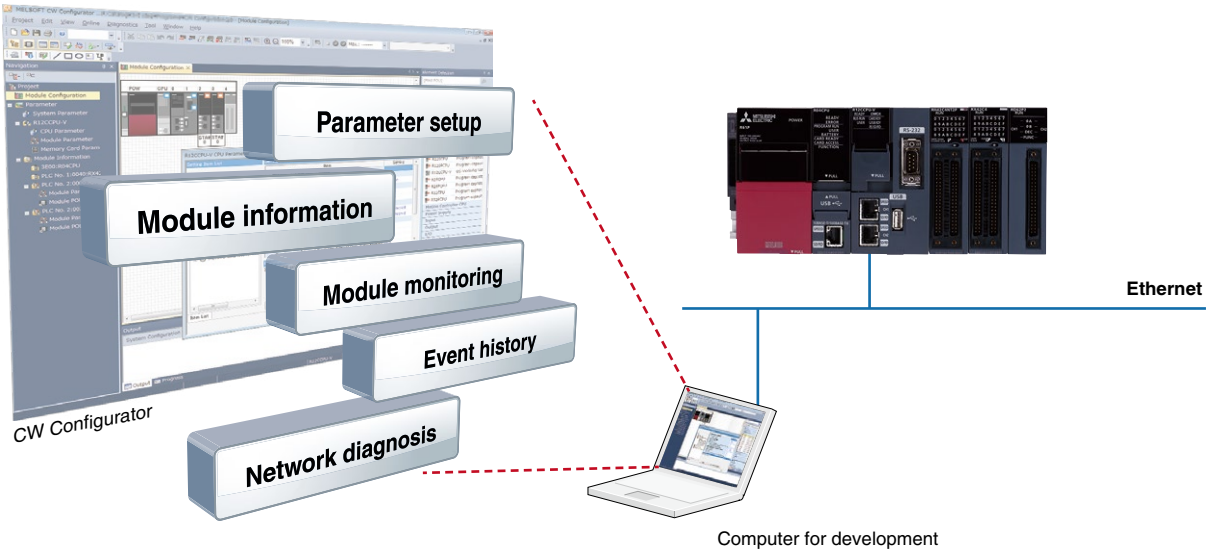
Programming without considering MPU

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.

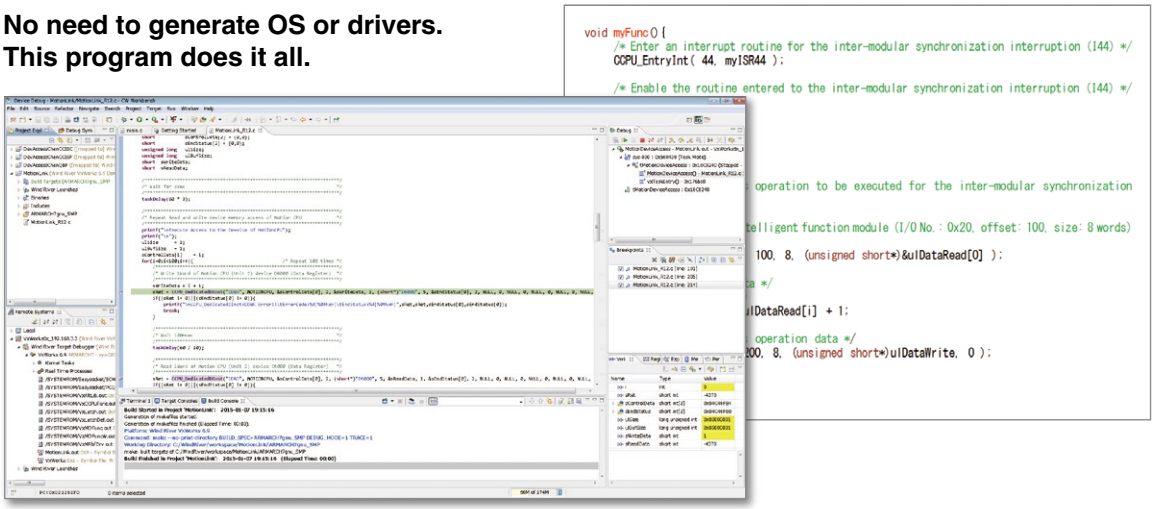
*1: For supported modules, please refer to the relevant manual of that module.



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.

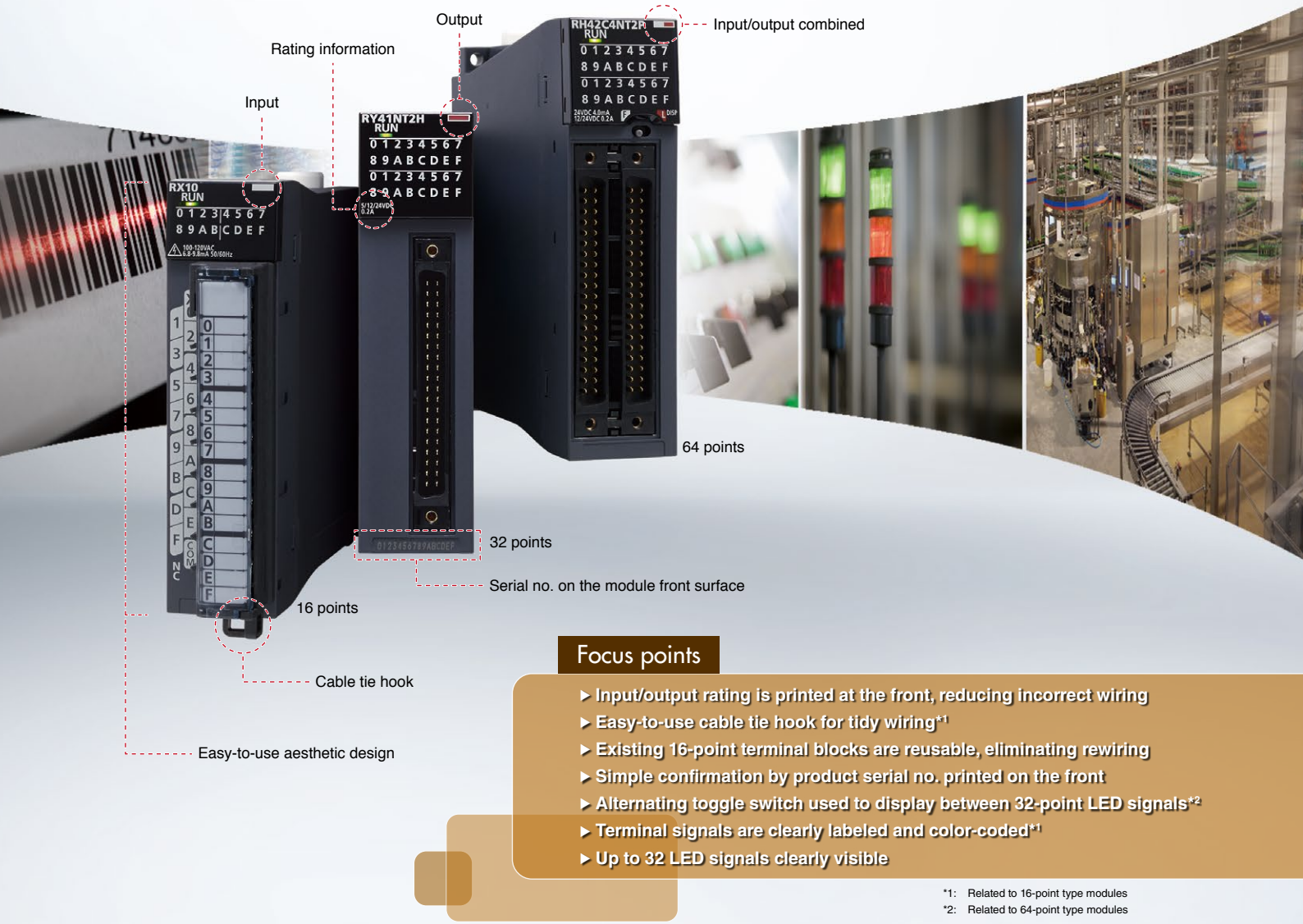


Engineering tool for C Controller
CW Workbench

C Controller module specifications

Item	R12CCPU-V
Hardware	
Endian format	Little endian
MPU	ARM® Cortex-A9 Dual Core
Working RAM	256 MB
ROM	12 MB
Backup RAM	4 MB
Software	
OS	VxWorks® Version 6.9
Programming language	C language (C/C++)
Programming development environment	CW Workbench/Wind River Workbench3.3
C Controller module setting/monitoring tool	CW Configurator (SW1DND-RCCPU)
Communication interface	
USB	●
Ethernet	2CH (1000BASE-T/100BASE-TX/10BASE-T)
RS-232	1CH (9600...115200 bps)
SD memory card slot	●

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 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

*1: Related to 16-point type modules
*2: Related to 64-point type modules

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.

Input Modules

AC input

RX10
16 points
100 to 120 V AC (50/60 Hz)

DC input

RX40C7
16 points
24 V DC, 7.0 mA

RX41C4
32 points
24 V DC, 4.0 mA

RX42C4
64 points
24 V DC, 4.0 mA

DC high-speed input

RX40PC6H
16 points 24 V DC, 6.0 mA
positive common type

RX40NC6H
16 points 24 V DC, 6.0 mA
negative common type

RX41C6HS NEW
32 points 24 V DC, 6.0 mA
Positive/negative common shared

RX61C6HS NEW
32 points 5 V DC, 6.0 mA
Positive/negative common shared

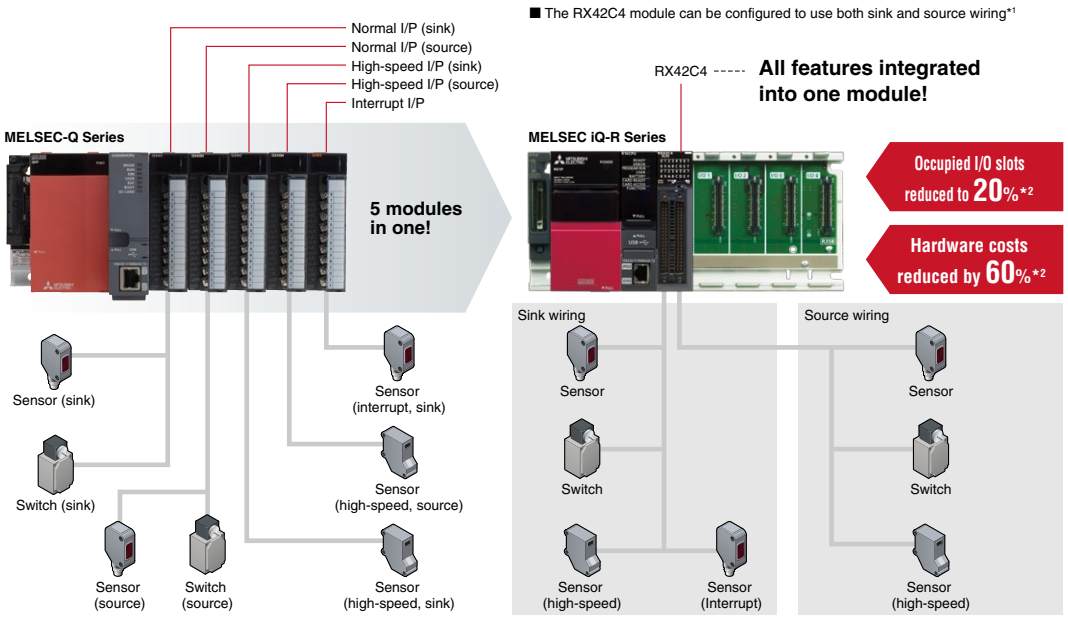
DC input (with diagnostic functions)

RX40NC6B NEW
16 points 24 V DC, 6.0 mA
Negative common type

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.



*1: The RX42C4 module can be configured to use both sink and source wiring (between the left and right sides of 32 point terminal).
*2: Based on a comparison with the MELSEC-Q Series

Reduce downtime with disconnection detection

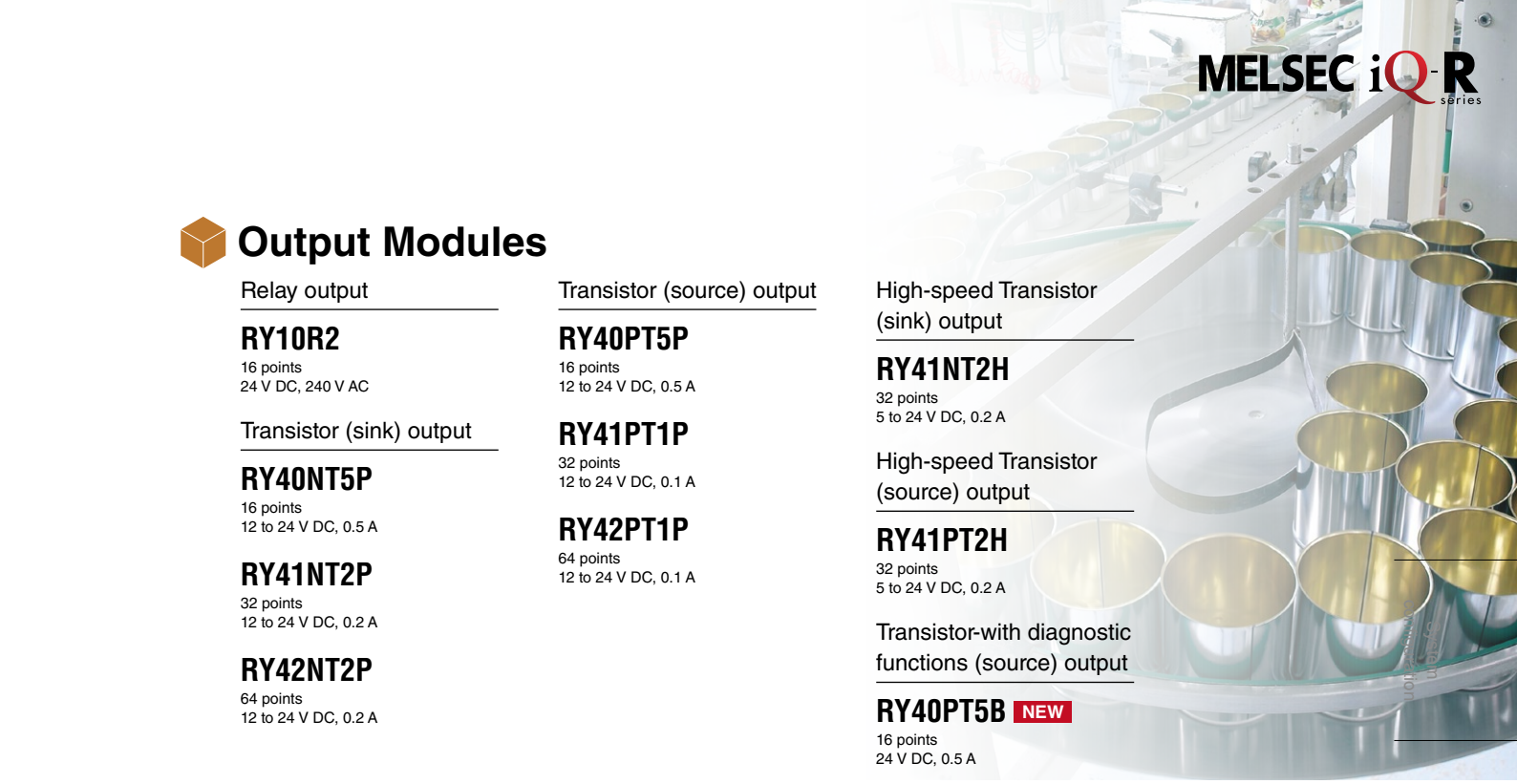
Similar to analog modules, the MELSEC iQ-R Series input module (with diagnostic functions) includes input disconnection detection which enables detection of inputs directly on the I/O module. When an error occurs, the control system can quickly highlight the fault via a monitoring system or on GX Works3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

Input module specifications

Item	AC input	DC input		
	RX10	RX40C7	RX41C4	RX42C4
Number of input points	16	16	32	64
Rated input voltage, frequency	100...120 V AC, 50/60 Hz	24 V DC	24 V DC	24 V DC
Rated input current (mA)	8.2 (100 V AC, 60 Hz) 6.8 (100 V AC, 50 Hz)	7.0 TYP.	4.0 TYP.	4.0 TYP.
Response time	≤ 20 ms	0.1...70 ms	0.1...70 ms	0.1...70 ms
Common terminal arrangement (points/common)	16	16	32	32
Interrupt function	●	●	●	●
External interface*1				
18-point screw terminal block	●	●	-	-
40-pin connector	-	-	●	● (2x)

Item	DC high-speed input				DC input (with diagnostic functions)
	RX40PC6H	RX40NC6H	RX41C6HS	RX61C6HS	RX40NC6B
Number of input points	16	16	32	32	16
Rated input voltage, frequency	24 V DC	24 V DC	24 V DC	5 V DC	24 V DC
Rated input current (mA)	6.0	6.0	6.0	6.0	6.0
Response time	5 µs...70 ms	5 µs...70 ms	1 µs...70 ms	1 µs...70 ms	1 ms...70 ms
Common terminal arrangement (points/common)	8 (positive common)	8 (negative common)	32 (positive/negative common)	32 (positive/negative common)	16 (negative common)
Interrupt function	●	●	●	●	●
Diagnostic function*2					
Disconnection detection	-	-	-	-	●
External interface*1					
18-point screw terminal block	●	●	-	-	●
40-pin connector	-	-	●	●	-

*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 90.
*2: For more information about diagnostic functions, please refer to the relevant product manual.



Output Modules

Relay output

RY10R2
16 points
24 V DC, 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 NEW
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

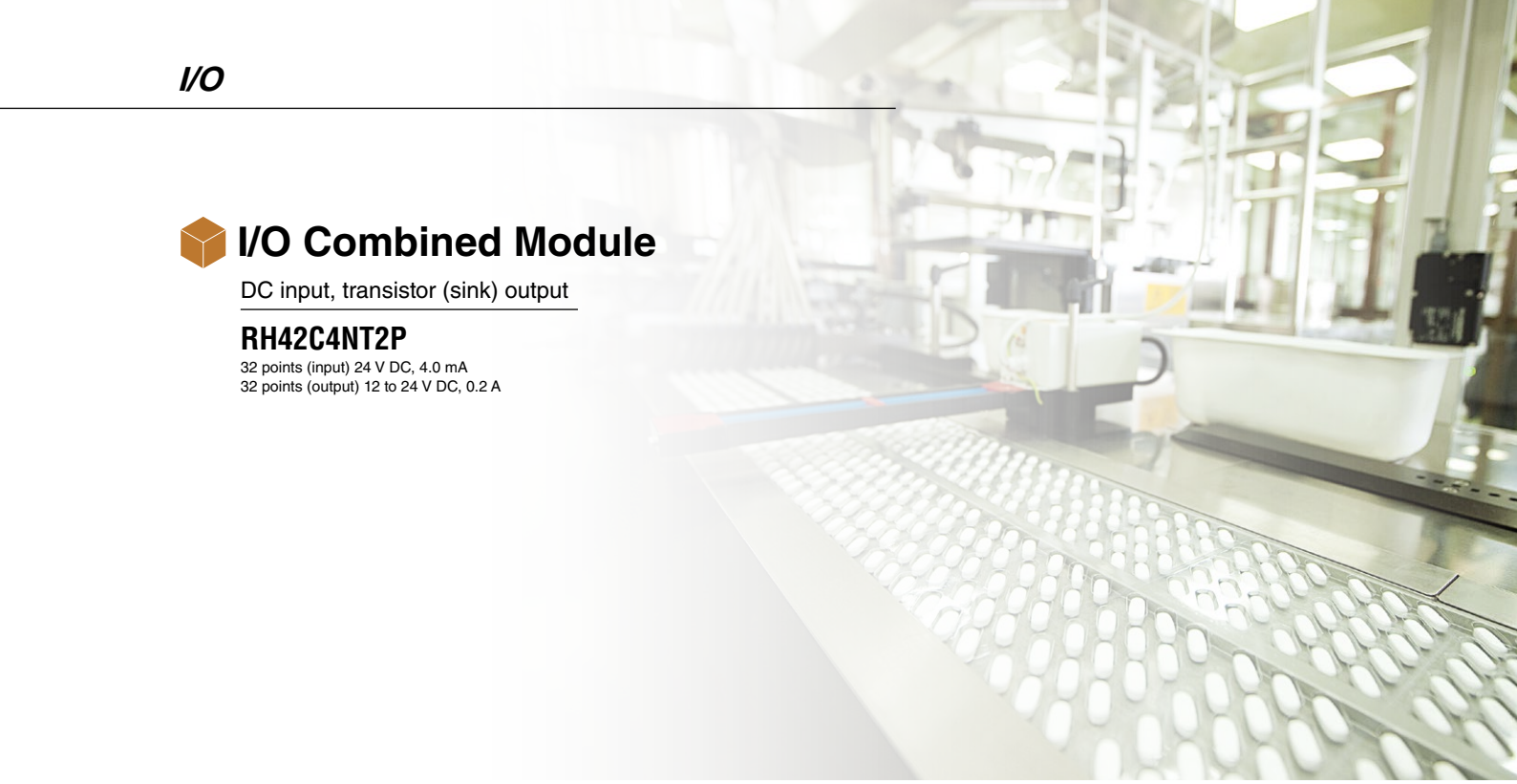
Output modules (relay output and transistor-with diagnostic functions modules) keep track of how many times they're turned on and off. Utilizing this data, such as from embedded relay contacts in the relay output module or from relays connected externally to the transistor output module (with diagnostic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

Output module specifications

Item	Relay output	Transistor (sink) output			
	RY10R2	RY40NT5P	RY41NT2P	RY42NT2P	RY41NT2H
Number of input points (point)	16	16	32	64	32
Rated switching voltage, current	24 V DC/2 A 240 V AC/2 A	-	-	-	-
Rated load voltage (V DC)	-	12...24	12...24	12...24	5...24
Max. load current (A/point)	-	0.5	0.2	0.2	0.2
Response time	≤ 12 ms	≤ 1 ms	≤ 1 ms	≤ 1 ms	≤ 2 µs
Common terminal arrangement (points/common)	16	16	32	32	32
Protection function (overload, overheat)	-	●	●	●	-
External interface*1					
18-point screw terminal block	●	●	-	-	-
40-pin connector	-	-	●	● (2x)	●

Item	Transistor (source) output				Transistor-with diagnostic functions (source) output
	RY40PT5P	RY41PT1P	RY42PT1P	RY41PT2H	RY40PT5B
Number of input points (point)	16	32	64	32	16
Rated load voltage (V DC)	12...24	12...24	12...24	5...24	24
Max. load current (A/point)	0.5	0.1	0.1	0.2	0.5
Response time	≤ 1 ms	≤ 1 ms	≤ 1 ms	≤ 2 µs	≤ 1.5 ms
Common terminal arrangement (points/common)	16	32	32	32	16
Protection function (overload, overheat)	●	●	●	-	●
Diagnostic function*2					
Output disconnection detection	-	-	-	-	●
Output short-circuit detection	-	-	-	-	●
External interface*1					
18-point screw terminal block	●	-	-	-	●
40-pin connector	-	●	● (2x)	●	-

*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 90.
*2: For more information about diagnostic functions, please refer to the relevant product manual.



I/O Combined Module

DC input, transistor (sink) output

RH42C4NT2P

32 points (input) 24 V DC, 4.0 mA
32 points (output) 12 to 24 V DC, 0.2 A

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.

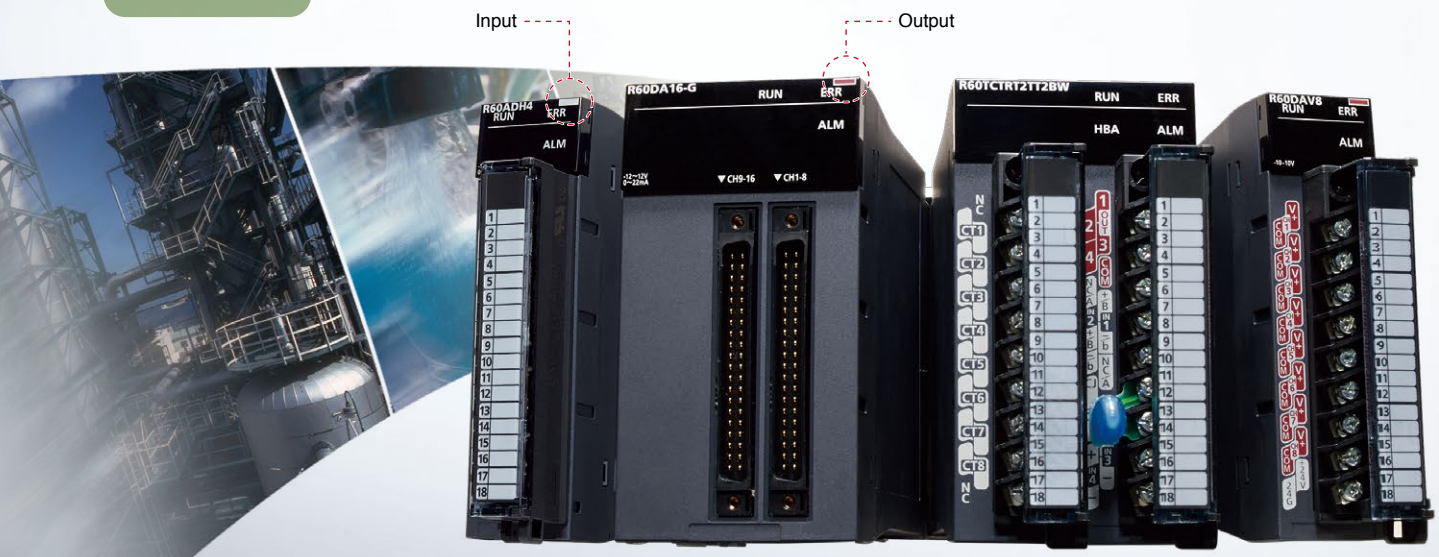
I/O combined module specifications

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

*1: For more information about external interface (for applicable options, please refer to the relevant product manual), refer to the options list on page 90.

Focus points

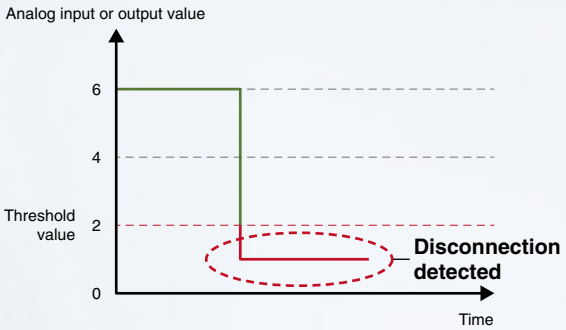
- 5 µs high-speed sampling, 16-bit high resolution (1/32,000)
- Scaling and shifting operations using parameter settings
- Ideal for high-speed precision inspection applications
- Filtering of high-frequency noise
- Event driven performance asynchronous from main scan
- Generate or import pre-defined wave data
- Galvanic channel isolation
- Synchronization of multiple channels



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.

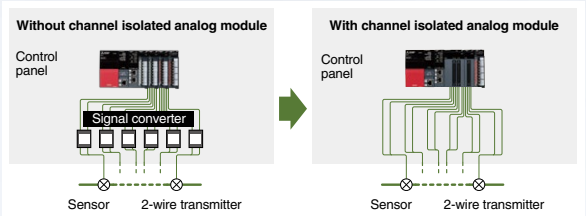
Save on downtime cost with 'channel disconnection detection'

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.

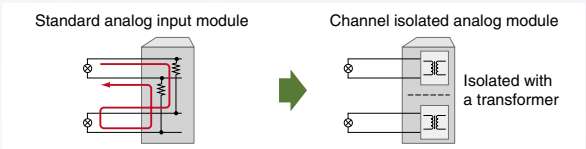


High signal integrity using galvanic isolation

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.



Electric disturbances such as current and noise can be isolated.



Analog Input Modules

R60AD4
4-channel (voltage or current)

R60ADV8
8-channel (voltage)

R60ADI8
8-channel (current)

R60AD8-G
8-channel (voltage or current), channel isolated

R60AD16-G
16-channel (voltage or current), channel isolated

R60TD8-G
8-channel, temperature input (thermocouple) channel isolated

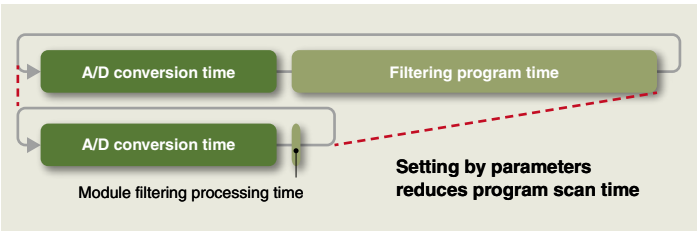
R60RD8-G
8-channel, temperature input (RTD) channel isolated

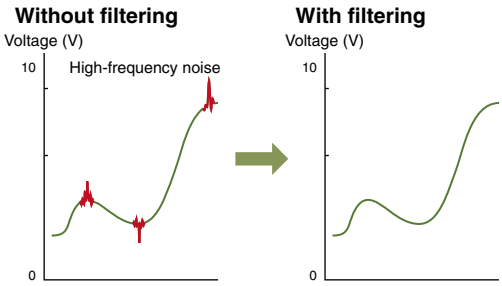
R60ADH4 NEW
4-channel (voltage or current)

MELSEC iQ-R Series analog modules are ideal as the interface between external analog signals and the control system. Various modules are available to cover a wide range of requirements, such as galvanic isolation, thermocouple sensors, resistance temperature detectors (RTD), current, voltage and mixed channel applications.

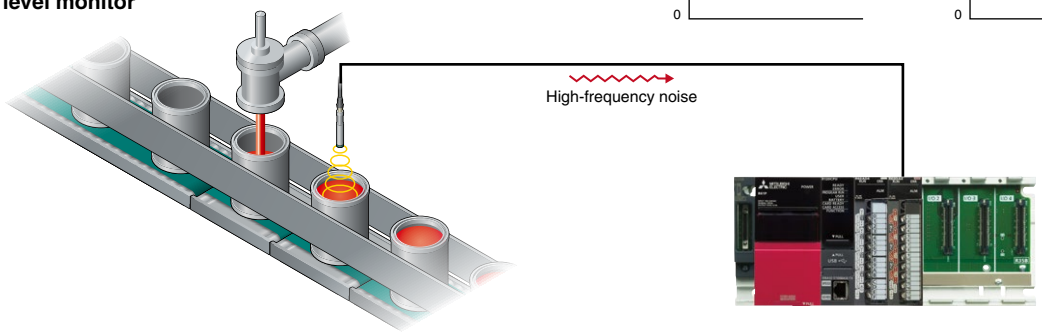
High-frequency noise filtering

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.



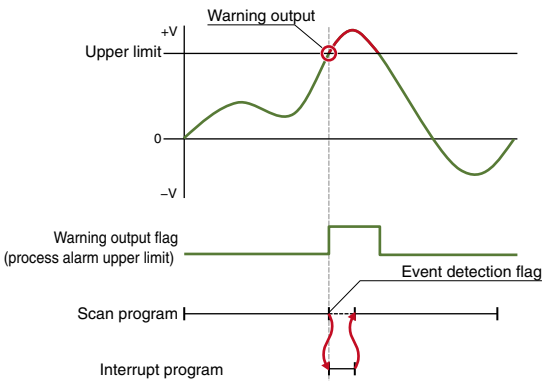


In-line level monitor



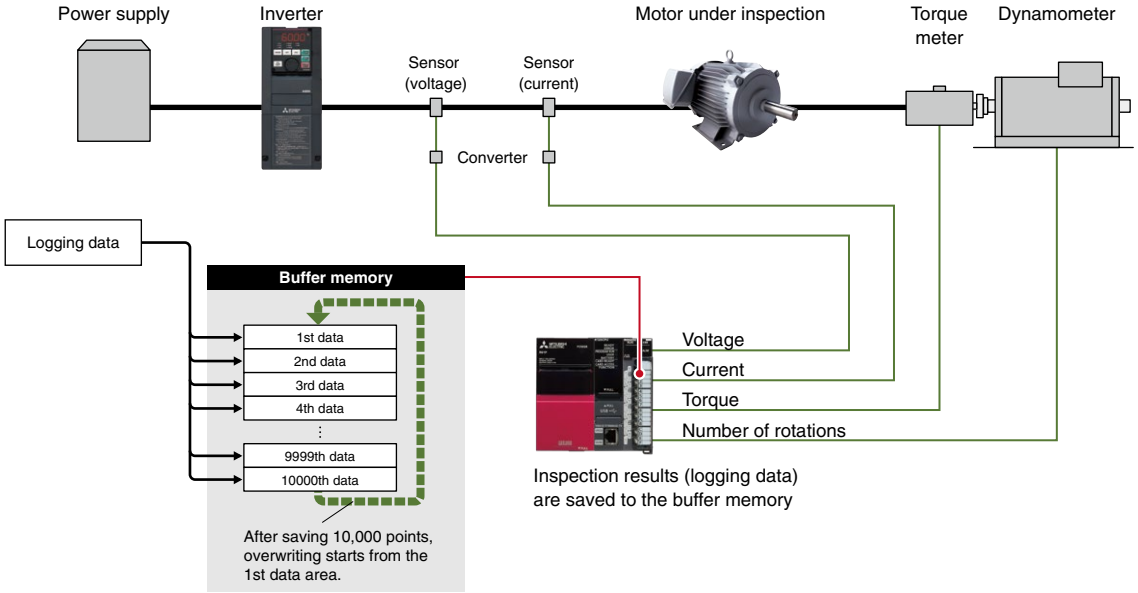
Enhanced alarm and warning features

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.



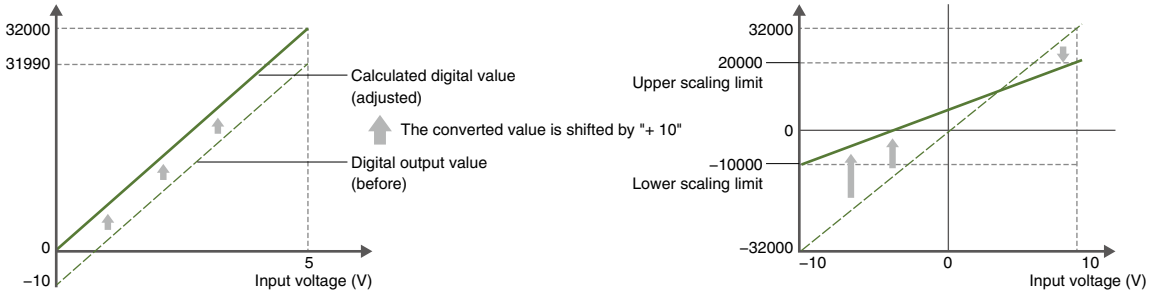
Data logging faster than scan time

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.



Upper and lower limits of scaling can range from −32000 to 32000.

Analog input module specifications

Item	R60AD4	R60ADV8	R60ADI8	R60AD8-G	R60AD16-G
Number of analog input points (ch)	4	8	8	8	16
Accuracy					
Ambient temperature 25 ±5˚C	±0.1%	±0.1%	±0.1%	±0.1%	±0.1%
Ambient temperature 0...55˚C	±0.3%	±0.3%	±0.3%	-	-
Temperature coefficient	-	-	-	±35 ppm/°C	±35 ppm/°C
Common					
Conversion speed (ch)	80 μs	80 μs	80 μs	10 ms	10 ms
Channel isolation	-	-	-	Transformer isolation	Transformer isolation
Absolute max. input	±15 V, 30 mA	±15 V	30 mA	±15 V, 30 mA	±15 V, 30 mA
Voltage input					
Analog input voltage (V DC)	–10...10	–10...10	-	–10...10	–10...10
Digital output value	–32000...32000	–32000...32000	-	–32000...32000	–32000...32000
Current input					
Analog input current (mA DC)	0...20	-	0...20	0...20	0...20
Digital output value	0...32000	-	0...32000	0...32000	0...32000
External interface*1					
18-point screw terminal block	●	●	●	-	-
40-pin connector	-	-	-	●	● (2x)

High-speed analog input module specifications

Item	R60ADH4
Number of analog input points (ch)	4
Accuracy	
Ambient temperature 25 ±5˚C	±0.1%
Ambient temperature 0...55˚C	±0.2%
Input specifications	
Operation mode (sampling cycle)	Normal mode (medium speed: 10 μs/CH) Normal mode (low speed: 20 μs/CH) Simultaneous conversion mode (5 μs/4CH)
Absolute max. input	±15 V, 30 mA
Voltage input	
Analog input voltage (V DC)	–10...10
Digital output value	–32000...32000
Current input	
Analog input current (mA DC)	0...20
Digital output value	0...32000
External interface*1	
18-point screw terminal block	●

Temperature input module specifications

Item	R60TD8-G	R60RD8-G
Number of analog input points (ch)	8	8
Cold junction temperature compensation accuracy	±1.0°C	-
Usable thermocouple	B, R, S, K, E, J, T, N	-
Usable RTD	-	Pt100, JPt100, Ni100, Pt50
Resolution	B, R, S, N: 0.3°C K, E, J, T: 0.1°C	0.1°C
Conversion speed (ch)	30 ms	10 ms
Channel isolation	Transformer isolation	Transformer isolation
Wire break detection	●	●
Output		
Measured temperature value (16-bit signed binary data)	–2700...18200	–2000...8500
Scaling value (16-bit signed binary data)	●	●
External interface*1		
40-pin connector	●	●

*1: For more information about external interface (for applicable options, please refer to the relevant product manual), refer to the options list on page 90.

Analog Output Modules

R60DA4
4-channel (voltage or current)

R60DAV8
8-channel (voltage)

R60DAI8
8-channel (current)

R60DA8-G
8-channel (voltage or current), channel isolated

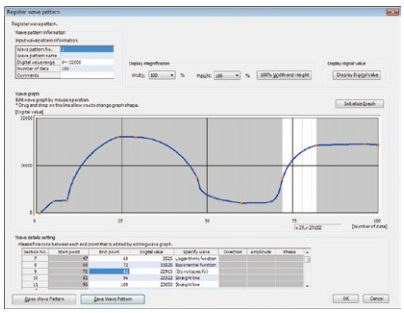
R60DA16-G
16-channel (voltage or current), channel isolated

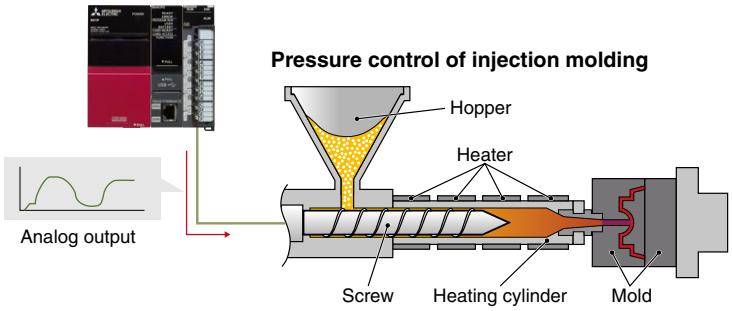
MELSEC iQ-R Series analog output modules reliably deliver accurate analog values to points where high-resolution digital inputs are required. A variety of modules (voltage, current, or mixed) are available to cover a wide range of application requirements, such as high-speed drive control or variable-speed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

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.

GX Works3 wave output data setup





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 module specifications

Item	R60DA4	R60DAV8	R60DAI8	R60DA8-G	R60DA16-G
Number of analog output points (ch)	4	8	8	8	16
Accuracy					
Ambient temperature 25 ±5°C	±0.1%	±0.1%	±0.1%	±0.1%	±0.1%
Ambient temperature 0...55°C	±0.3%	±0.3%	±0.3%	-	-
Temperature coefficient	-	-	-	±50 ppm/°C	±50 ppm/°C
Conversion speed (ch)	80 μs	80 μs	80 μs	1 ms	1 ms
Channel isolation	-	-	-	Transformer isolation	Transformer isolation
Output short-circuit protection	●	●	●	●	●
External supply power (V DC)	24	24	24	-	-
Voltage output					
Digital input value	–32000...32000	–32000...32000	-	–32000...32000	–32000...32000
Analog output voltage (V DC)	–10...10	–10...10	-	–12...12	–12...12
Current output					
Digital input value	0...32000	-	0...32000	0...32000	0...32000
Analog output current (mA DC)	0...20	-	0...20	0...20	0...20
External interface*1					
18-point screw terminal block	●	●	●	-	-
40-pin connector	-	-	-	●	● (2x)

*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 90.

Temperature Control Modules

R60TCTRT2TT2
2-channel (multiple input) + 2-channel (thermocouple input)

R60TCRT4
4-channel (RTD input)

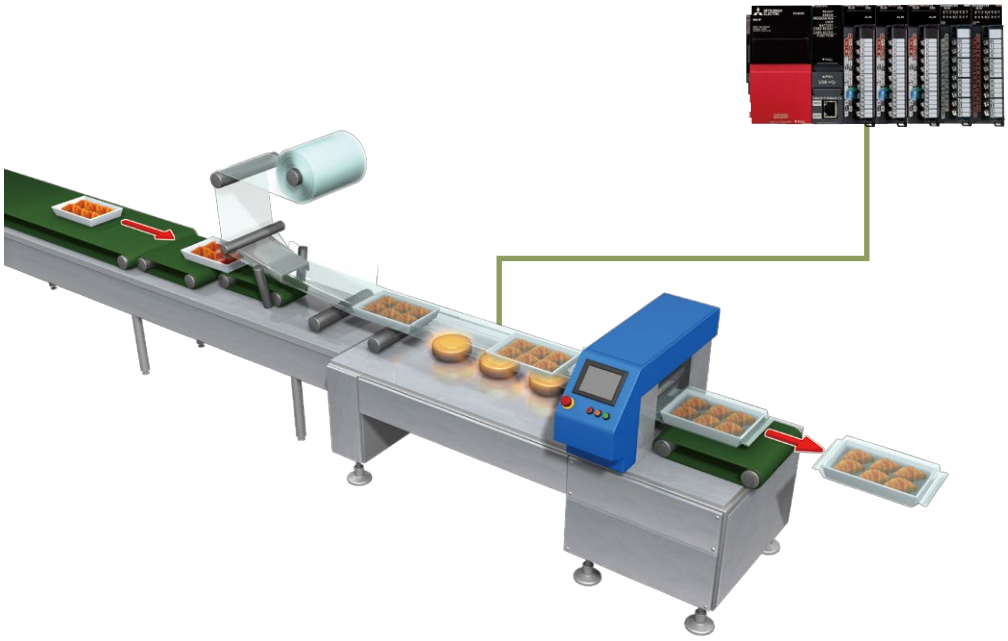
R60TCTRT2TT2BW
2-channel (multiple input) + 2-channel (thermocouple input)
With heater disconnection detection

R60TCRT4BW
4-channel (RTD input)
With heater disconnection detection

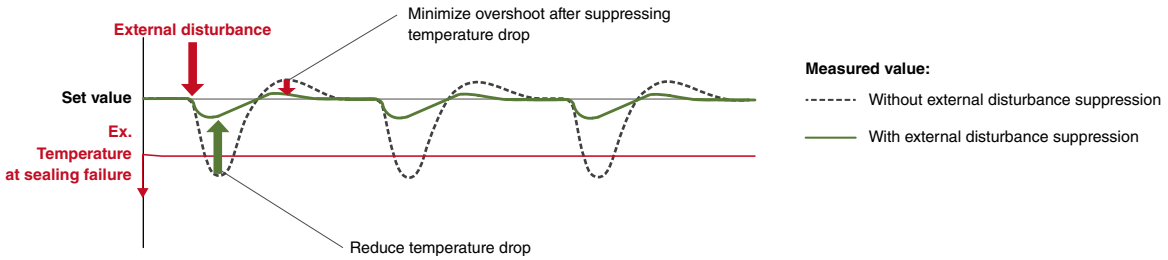
MELSEC iQ-R Series temperature control modules are ideal for applications requiring highly stable and responsive temperature control. The series comes with thermocouple and RTD input module types and are available with or without heater disconnection detection.

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.



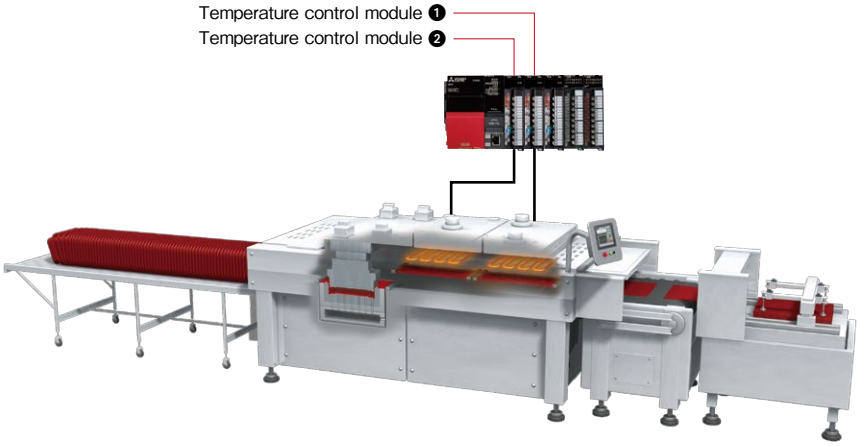
■ External disturbance suppression



Coordination between multiple temperature control modules

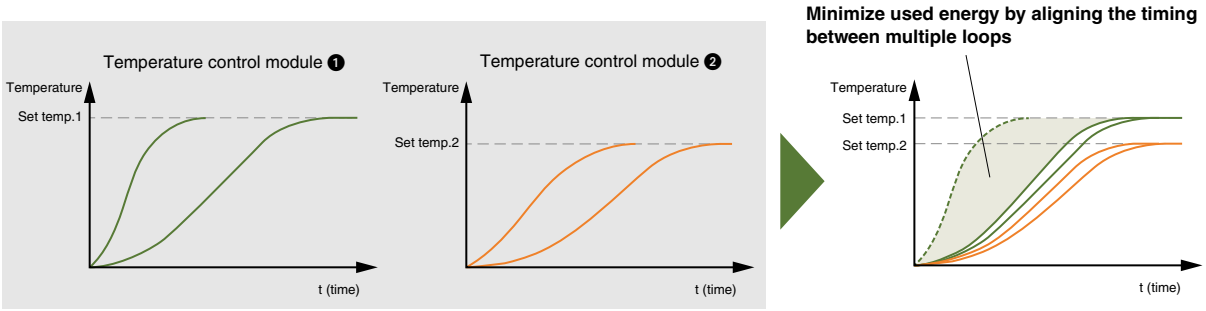
Temperature control modules are equipped with features that enable coordination of up to 64 modules in one control system. The features that support this are as follows:

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



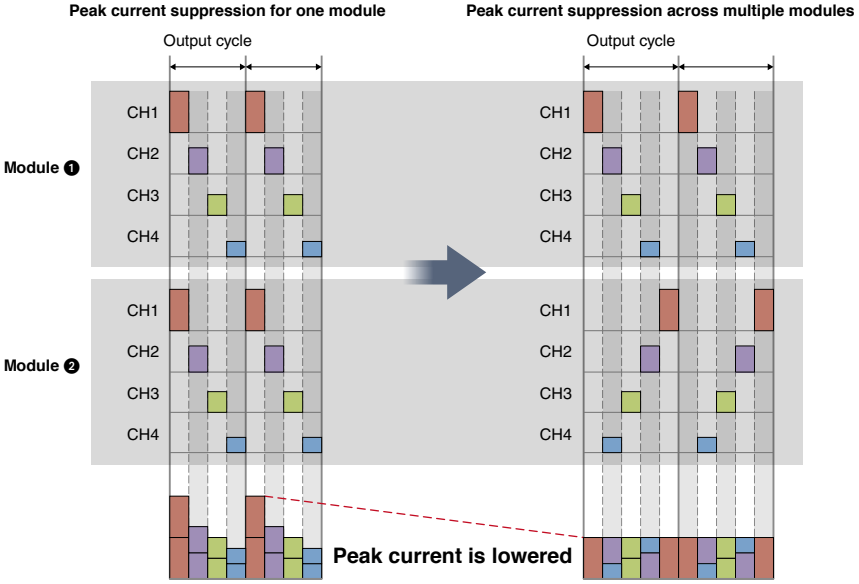
■ Inter-module simultaneous temperature rise

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.



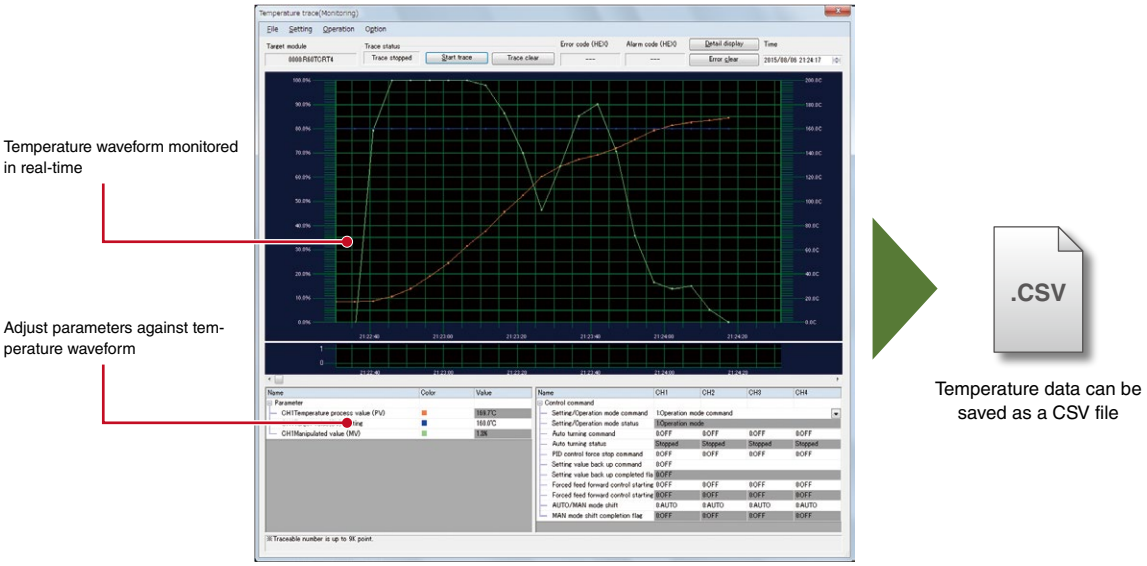
■ Inter-module peak current suppression

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 trace window

Temperature control module performance specifications

Item	R60TCTRT2TT2	R60TCRT4	R60TCTRT2TT2BW	R60TCRT4BW
Number of analog input channels (ch)	4	4	4	4
Usable thermocouple	B, R, S, K, E, J, T, N, U, L, PLⅡ, W5Re/W26Re	-	B, R, S, K, E, J, T, N, U, L, PLⅡ, W5Re/W26Re	-
Usable RTD	Pt100, JPt100	Pt100, JPt100	Pt100, JPt100	Pt100, JPt100
Sampling cycle (4 ch, ms)	250/500	250/500	250/500	250/500
Control output cycle (s)	0.5...100.0	0.5...100.0	0.5...100.0	0.5...100.0
Input impedance (MΩ)	1	1	1	1
Input filter (0: Input filter OFF)	0...100 s	0...100 s	0...100 s	0...100 s
Sensor correction value setting	(-(full scale of input range)) to full scale of input range			
Operation at a sensor input disconnection	Upscale processing			
Temperature control method	PID ON/OFF pulse or two-position control			
Heater disconnection detection	-	-	●	●
Indication accuracy*1				
Ambient temperature 25±5°C	≤ ±0.3%	≤ ±0.3%	≤ ±0.3%	≤ ±0.3%
Ambient temperature 0...55°C	≤ ±0.7%	≤ ±0.7%	≤ ±0.7%	≤ ±0.7%
PID constants range				
PID constants setting	Setting by auto tuning is available.			
Proportional band (P)	• When the input range unit is °C or °F: 0 (0.0)...full scale of input range (depending on the decimal point position) • When the input range is another analog input unit: 0.0...1000.0%			
Integral time (I)	0...3600 s (Set 0 for P control and PD control.)			
Derivative time (D)	0...3600 s (Set 0 for P control and PI control.)			
Transistor output				
Output signal	ON/OFF pulse	ON/OFF pulse	ON/OFF pulse	ON/OFF pulse
Rated load voltage (V DC)	10...30	10...30	10...30	10...30
Maximum load current (A)	0.1/point, 0.4/common	0.1/point, 0.4/common	0.1/point, 0.4/common	0.1/point, 0.4/common
Maximum inrush current	0.4 A, 10 ms	0.4 A, 10 ms	0.4 A, 10 ms	0.4 A, 10 ms
External interface*2				
18-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 90.

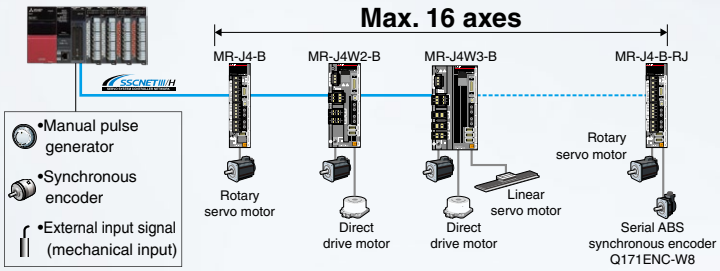
Focus points

- ▶ 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.

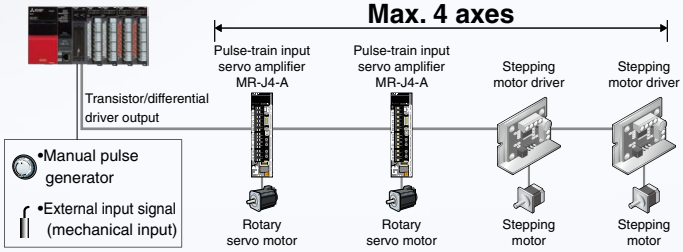


- Positioning control
  (sealant-glue applicator, etc.)
- Synchronous control/electronic cam control
  (Pick and place, packaging machine, etc.)
- Speed-torque control
  (Press machine, injection molding, etc.)
- Speed/position control switching
  (semiconductor wafer production, etc.)

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.

*1: Differential driver output

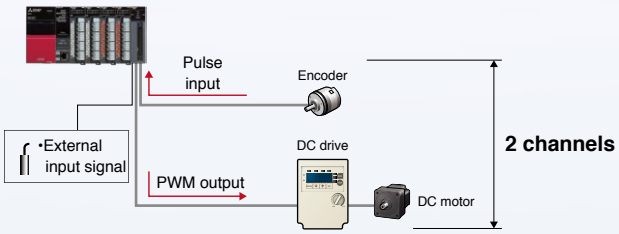


- Positional control
  (sealant-glue applicator, etc.)
- Speed control
  (Conveyor control, paper roller feed-in, etc.)
- Linear, circular, helical interpolation
  (High-speed milling, etc.)

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.

*2: Differential input



- Pulse measurement by an encoder
  (conveyor control, etc.)
- PWM (pulse-width modulation) system drive control

Simple Motion Modules

Compatible with
CC-Link IE Field network

RD77GF4
Up to 4-axis control

RD77GF8
Up to 8-axis control

RD77GF16
Up to 16-axis control

Compatible with
SSCNET Ⅲ/H

RD77MS2
Up to 2-axis control

RD77MS4
Up to 4-axis control

RD77MS8
Up to 8-axis control

RD77MS16
Up to 16-axis control

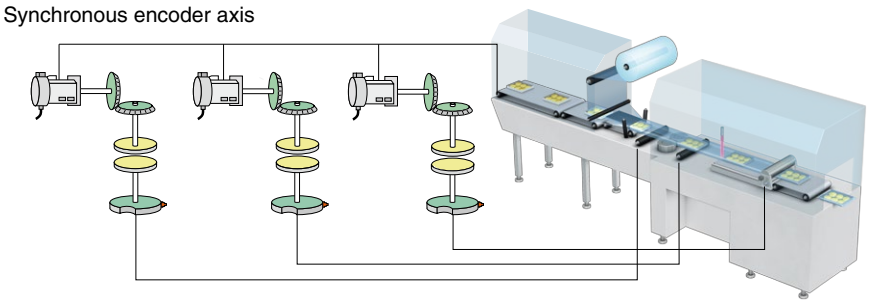
Similar to positioning modules, simple motion modules are capable of a wide range of high-precision control such as positional control, advanced synchronous control, cam control, and speed-torque control. The module line-up includes 2-, 4-, 8-, and 16-axis models, with setup being done easily by parameters 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.

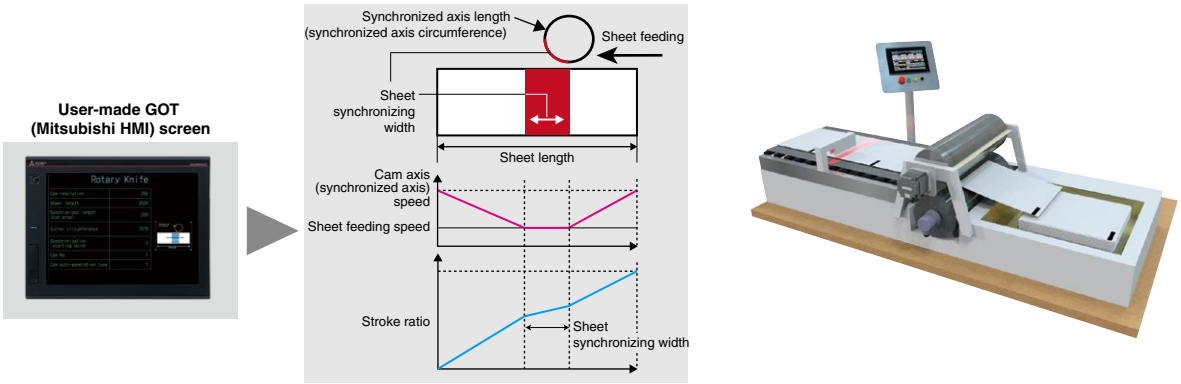
■ Synchronous control

All axes are synchronized using a synchronous encoder or servo input axes. Up to 16 control axes can be synchronized when using the synchronous encoder, such as that used for packaging machines, for example.



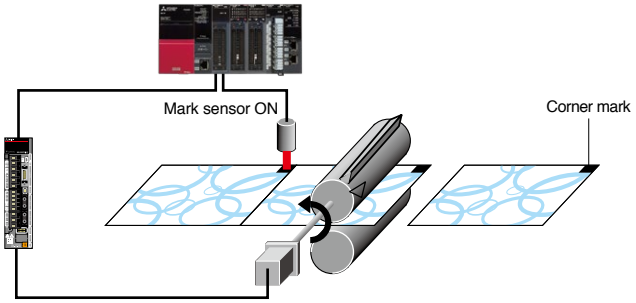
■ Cam auto-generation

Cam data for a rotary cutter can be generated automatically simply by registering the sheet length, synchronization width, rotary cutter axis dimensions, etc.



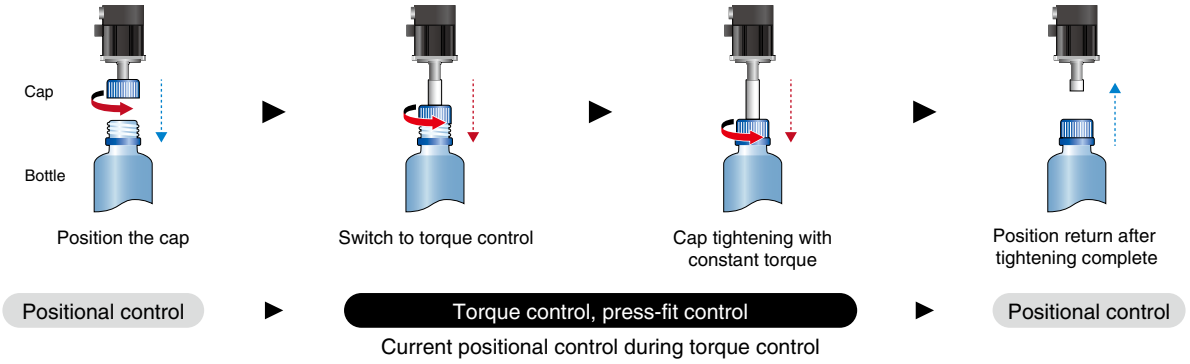
Mark detection

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)

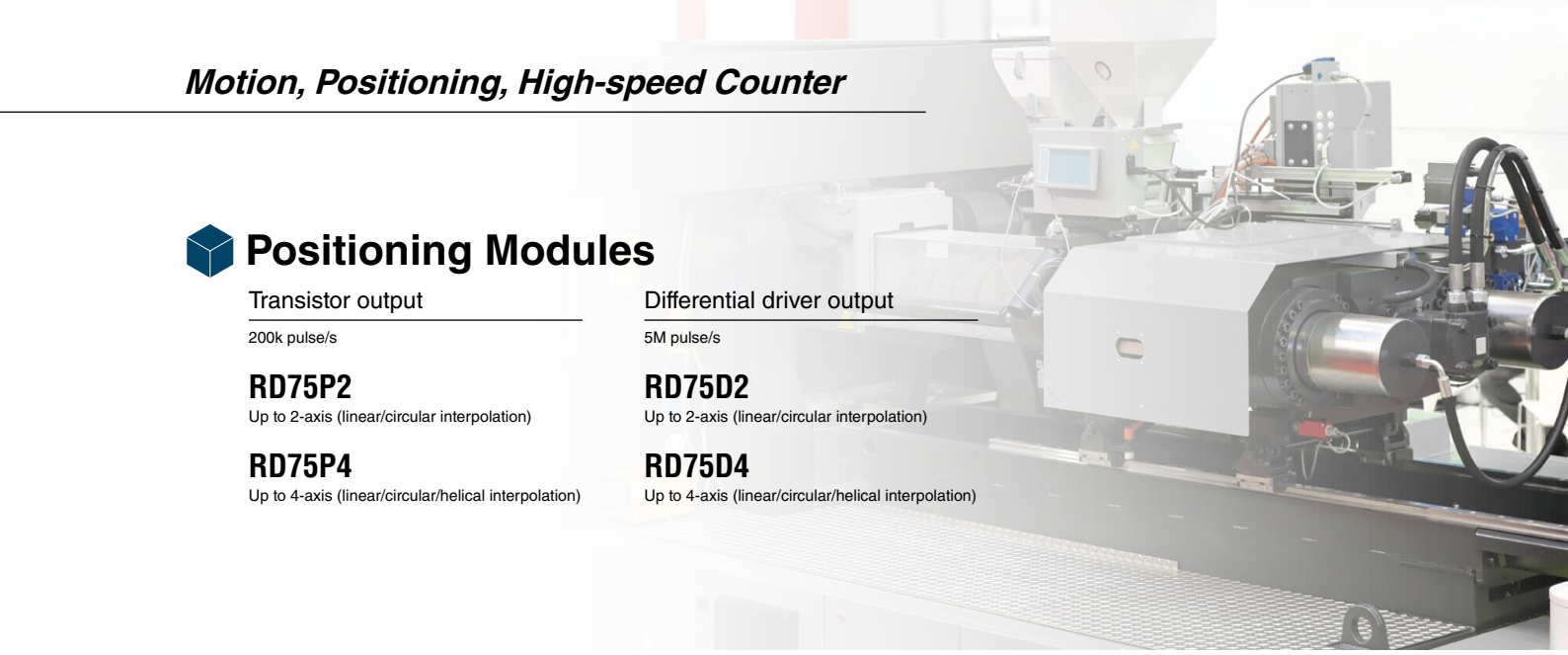
The motor can be switched to torque control (press-fit mode) without stopping it during positioning. The current position is controlled during the speed/torque control. Therefore the positioning can be done smoothly even after switching back to position control.



Simple motion module specifications

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

*1: For more information about external interface (for applicable options, please refer to the relevant product manual), refer to the options list on page 90.
*2: A battery needs to be installed in the servo amplifier for home position backup.



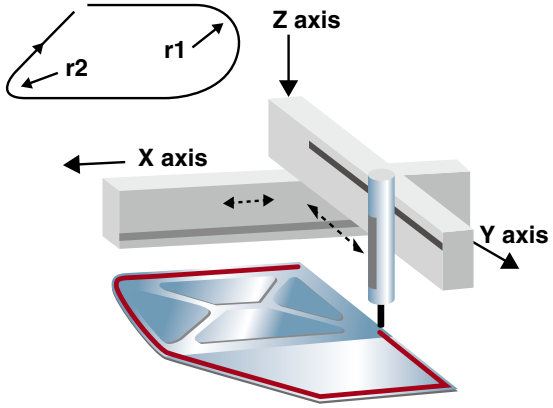
Positioning Modules

Transistor output	Differential driver output
200k pulse/s	5M pulse/s
RD75P2 Up to 2-axis (linear/circular interpolation)	**RD75D2** Up to 2-axis (linear/circular interpolation)
RD75P4 Up to 4-axis (linear/circular/helical 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.

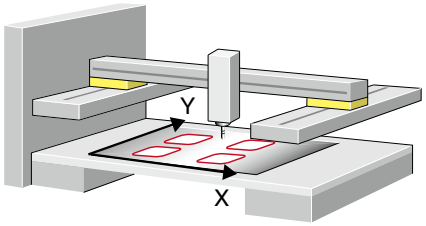
Various positional control

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.

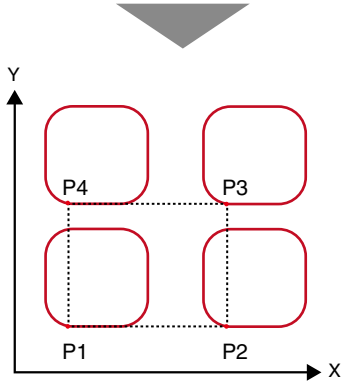


Multiple startup options

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.

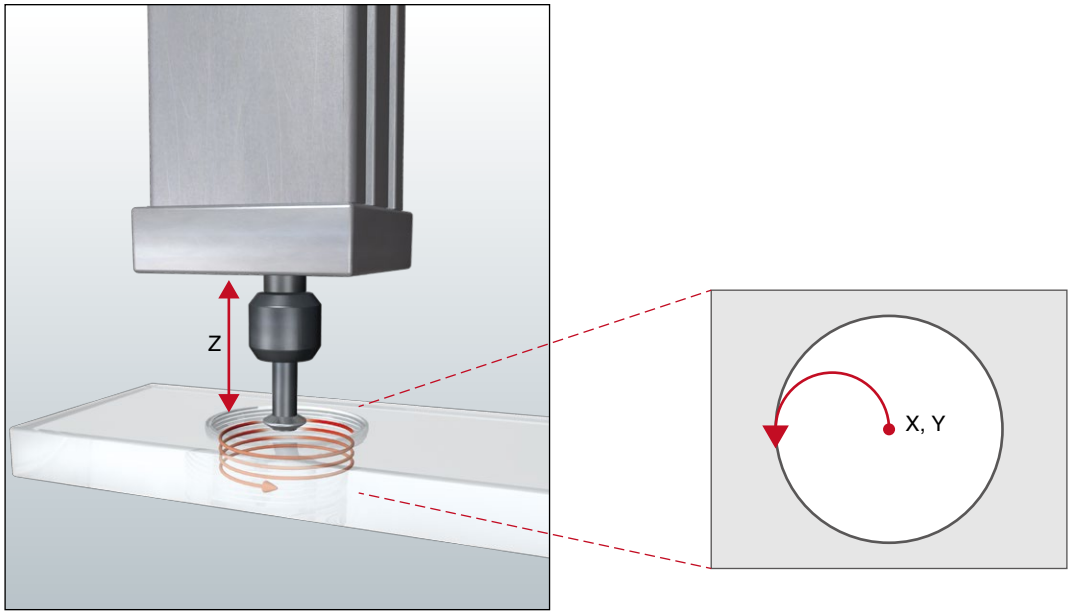


4 path profiles (P1...P4) being drawn in sequence.



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

Item	Transistor output		Differential driver output	
	RD75P2	RD75P4	RD75D2	RD75D4
Number of control axes (axis)	2	4	2	4
Control unit	mm, inch, degree, pulse	mm, inch, degree, pulse	mm, inch, degree, pulse	mm, inch, degree, pulse
Positioning data (data/axis)	600	600	600	600
Module backup function	Positioning data, and block start data can be saved on flash ROM (battery-less backup)			
Starting time (1 axis linear control) (ms)	0.3	0.3	0.3	0.3
Max. output pulse (pulse/s)	200,000	200,000	5,000,000	5,000,000
Max. connection distance between servos (m)	2	2	10	10
Interpolation				
Linear interpolation (axis)	2	2, 3, 4	2	2, 3, 4
Circular interpolation (axis)	2	2	2	2
Helical interpolation (axis)	-	3	-	3
Control system				
PTP (Point To Point) control	●	●	●	●
Path control (linear, arc, helical)	●	●	●	●
Speed control	●	●	●	●
Speed-position switching control	●	●	●	●
Position-speed switching control	●	●	●	●
Acceleration/deceleration process				
Trapezoidal acceleration/deceleration	●	●	●	●
S-curve acceleration/deceleration	●	●	●	●
Fast-start function				
Positioning start signal (μs)	8	8	8	8
External command signal (μs)	20	20	20	20
External interface*1				
40-pin connector	●	● (2x)	● (2x)	● (2x)

*1: For more information about external interface (for applicable options, please refer to the relevant product manual), refer to the option lists on page 90.

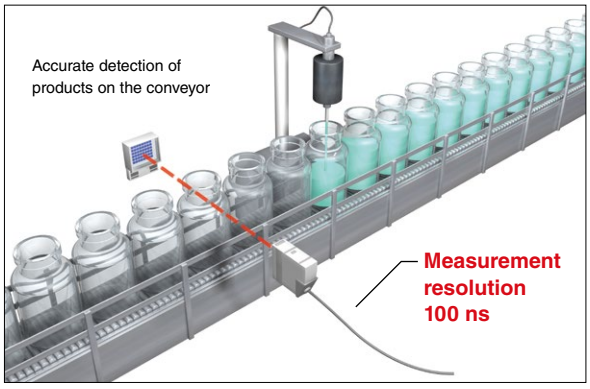
High-Speed Counter Modules

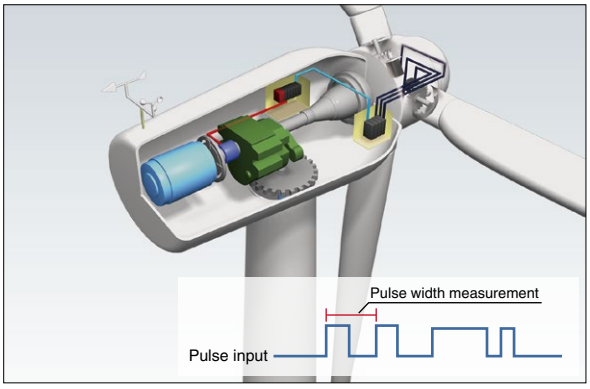
DC input, transistor (sink) output	DC input, transistor (source) output	Differential input, transistor (sink) output
RD62P2	**RD62P2E**	**RD62D2**
2-channel	2-channel	2-channel

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.

High-speed counter module specifications

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

*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 90.

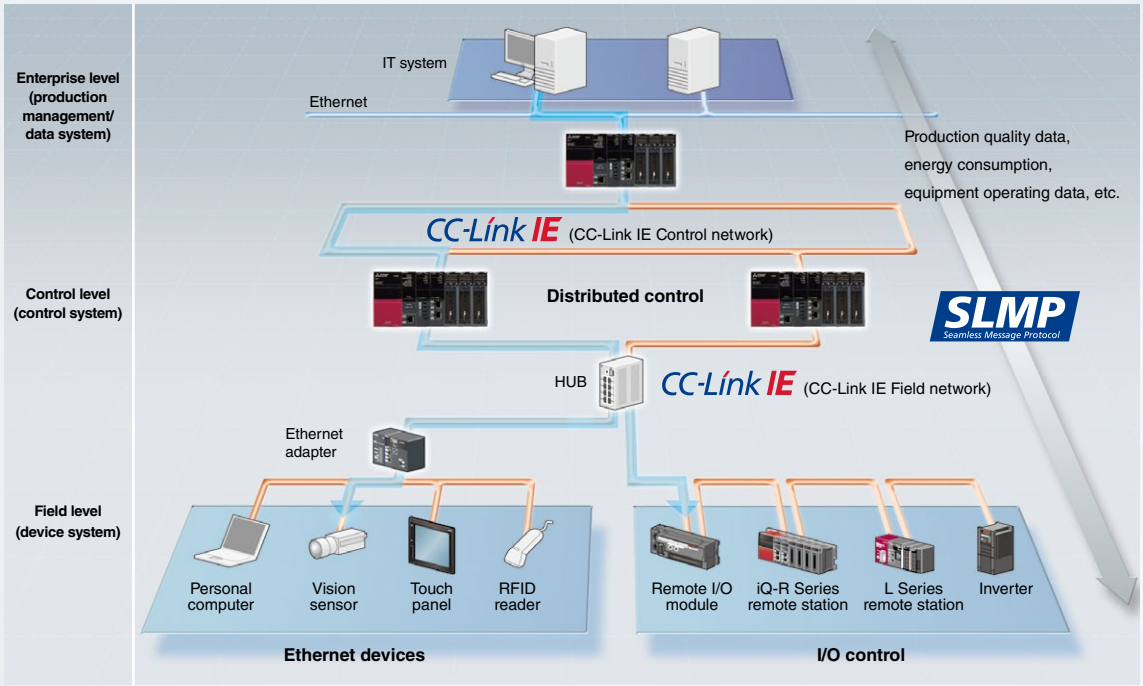
Focus points

- Various network-specific modules available
- 1 Gbps high-speed, large bandwidth of 128K word for CC-Link IE
- Connect to two separate networks using a single module
- Seamless networking (SLMP)
- Loop-back function ensures continuous communications
- Auto-return when faulty station is replaced
- Supports standard interfaces such as RS-232 and RS-422/485

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*1) 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.



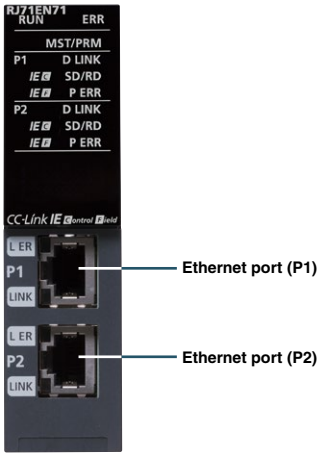
*1: SLMP (Seamless Message Protocol): Is a client/server protocol that enables communications between Ethernet-ready and CC-Link IE compatible devices.

Ethernet Interface Module

RJ71EN71

1 Gbps, 100/10 Mbps multiple network type

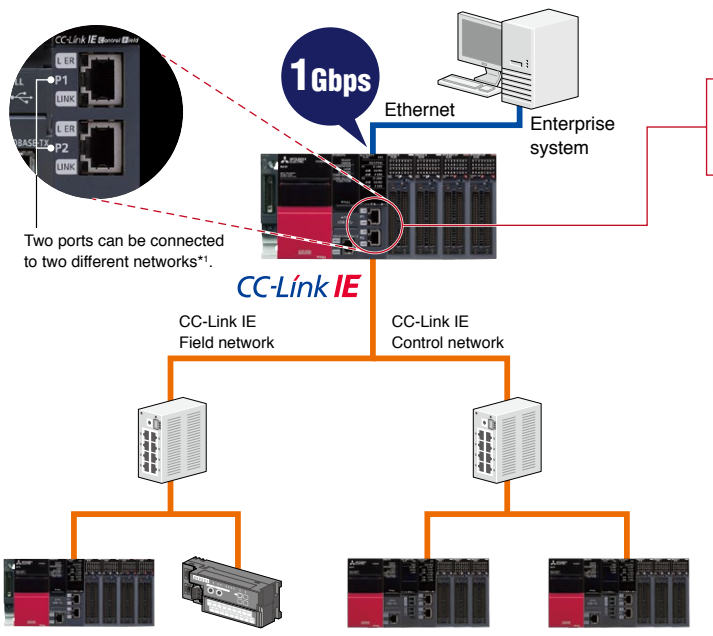
CC-Link IE

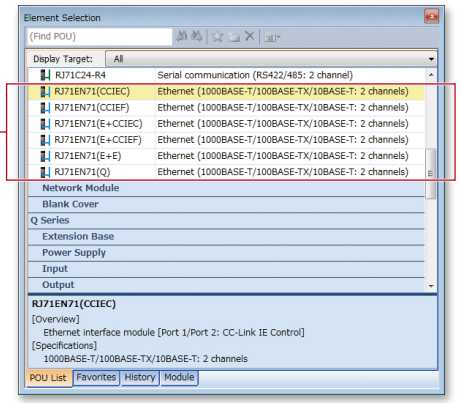


The MELSEC iQ-R Series Ethernet module is equipped with two ports that can be used as either a generic Ethernet, CC-Link IE Field or Control Network module. The module design incorporates an easy-to-read display and a dot-matrix LED providing a quick way to assess network conditions using the module.

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.





Select network combination from within GX Works3.

■ Network combination*1

P1	C	F	E	E	E
P2	C	F	C	F	E

C : CC-Link IE Control Network

F : CC-Link IE Field Network

E : Ethernet

*1: The CC-Link IE Field and CC-Link IE Control networks cannot be used together.

Ethernet interface module specifications

Item	RJ71EN71*2
Transmission specifications	
Data transmission speed	1 Gbps/100 Mbps/10 Mbps
Interface	RJ45 connector (Auto MDI/MDI-X)
Max. frame size (byte)	1518/9022 (when jumbo frames are used)
IP version	Compatible with IPv4
Sending/receiving data storage memory	
Number of simultaneous open connections	128
Fixed buffer	5K words x 16
Socket communications	• 5K words x 48 (when only P1 is used) • 5K words x 112 (when only P1/P2 is used)
Random access buffer	6K words x 1
CC-Link IE Field/Control cable specifications	
Communication cable	Ethernet cable (Category 5e or higher, double shielded/STP)

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

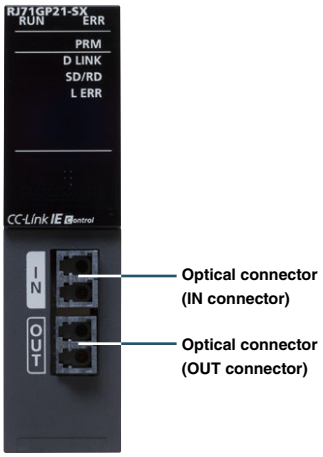
CC-Link IE Control Network Module

RJ71GP21-SX

1 Gbps optical cable, control/normal station

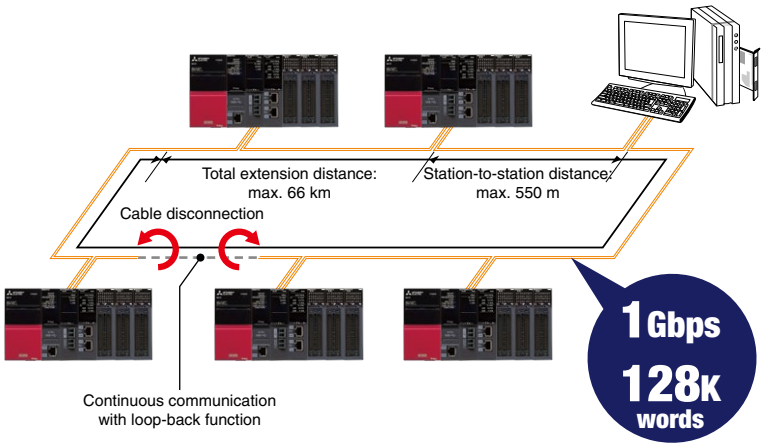
CC-Link IE Control

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.



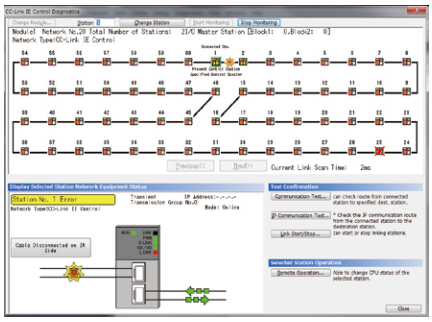
Continuous communications even when cable or stations are faulty

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 too.



CC-Link IE Control monitoring window

CC-Link IE Control Network module specifications

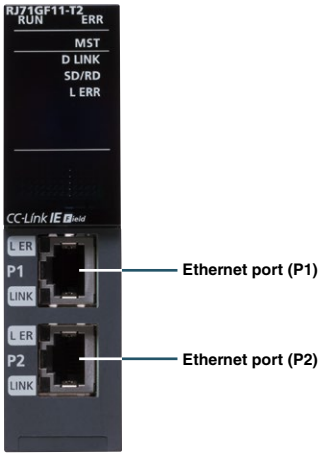
Item	RJ71GP21-SX
Communication speed	1 Gbps
Transmission path	Duplex loop
Communication cable	Optical fiber cable which satisfies 1000 BASE-SX standard: Multi-mode optical fiber (GI)
Max. station-to-station distance (m)	550 (when the core outer diameter is 50 μm) 275 (when the core outer diameter is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

CC-Link IE Field Network Module

RJ71GF11-T2

1 Gbps, master/local station

CC-Link IE Field



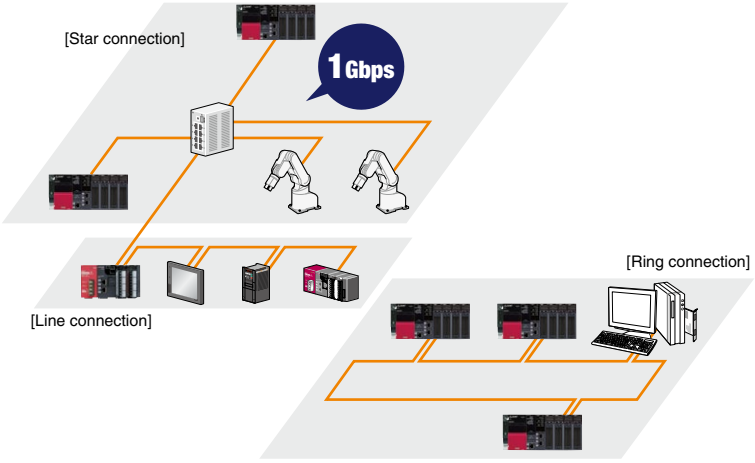
CC-Link IE Field is a versatile gigabit Ethernet-based network integrating controller, I/O control, safety control, and motion control in a flexible wiring topology supporting star, ring, and line configurations.

Multiple topology variations

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

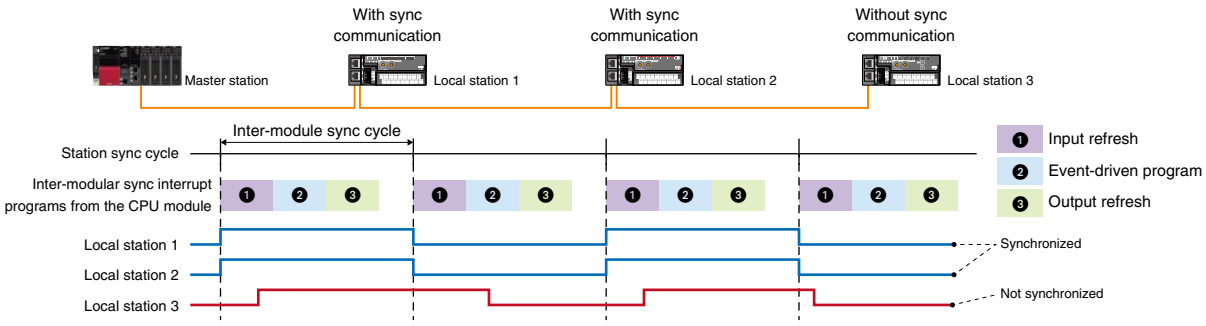
■ Line topology
Continuous connection of devices along the Ethernet line.

■ 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

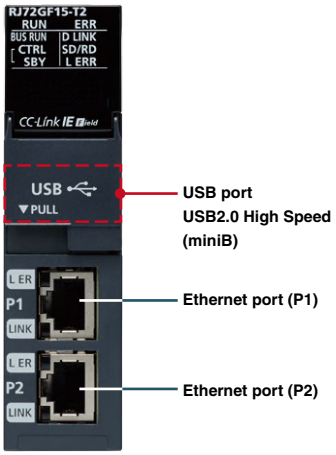
Item	RJ71GF11-T2
Transmission speed	1 Gbps
Network topology	Line topology, star topology (both types can be on the same line), and ring topology
Communication cable	Ethernet cable (Category 5e or higher, double shielded/STP)
Max. station-to-station distance (m)	100
Overall cable distance (m)	Line topology: 12,000 (when 121 stations are connected) Star topology: Depends on the system configuration Ring topology: 12,100 (when 121 stations are connected)
Max. number of connectable stations	121 (master station: 1, slave station: 120)
Max. number of link points per network	
Remote input (RX), remote output (RY)	16K points (16384 points, 2K bytes)
Remote register (RWw, RWr)	8K points (8192 points, 16K bytes)

CC-Link IE Field Network Remote Head Module

RJ72GF15-T2 NEW

1 Gbps, remote station

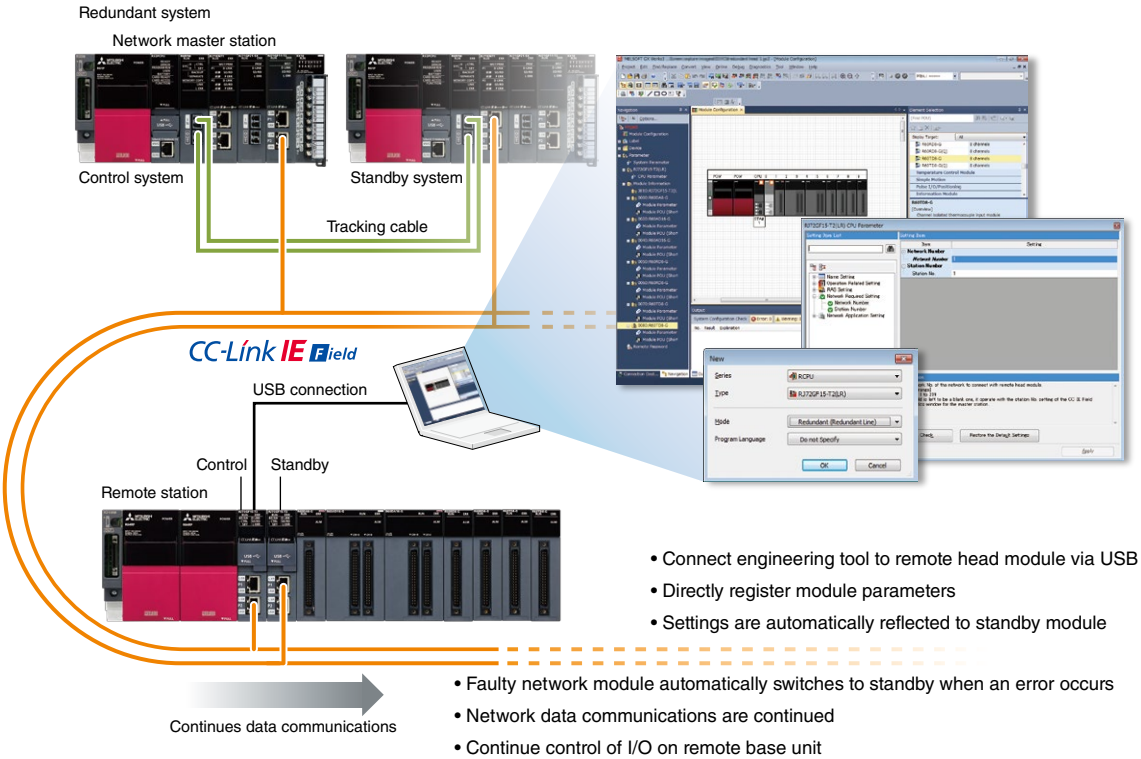
CC-Link IE Field



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.



- Connect engineering tool to remote head module via USB
- Directly register module parameters
- Settings are automatically reflected to standby module
- Faulty network module automatically switches to standby when an error occurs
- Network data communications are continued
- Continue control of I/O on remote base unit

CC-Link IE Field Network remote head module specifications

Item	RJ72GF15-T2
Transmission speed	1 Gbps
Network topology	Line topology, star topology (both types can be on the same line), and ring topology
Communication cable	Ethernet cable (Category 5e or higher, double shielded/STP)
Max. station-to-station distance (m)	100
Overall cable distance (m)	Line topology: 12,000 (when 121 stations are connected) Star topology: Depends on the system configuration Ring topology: 12,100 (when 121 stations are connected)
Max. number of connectable stations	121 (master station: 1, slave station: 120)
Max. number of link points per network	
Remote input (RX), remote output (RY)	16K points (16384 points, 2K bytes)
Remote register (RWw, RWr)	8K points (8192 points, 16K bytes)

AnyWireASLINK Master Module

RJ51AW12AL NEW

DigitalLinkSensor AnyWireASLINK system compatible

AnyWireASLINK

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.

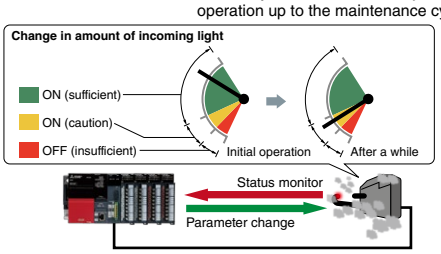
Preventive maintenance by monitoring of sensor status

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.

■ AnyWireASLINK

Prevent intermittent stops

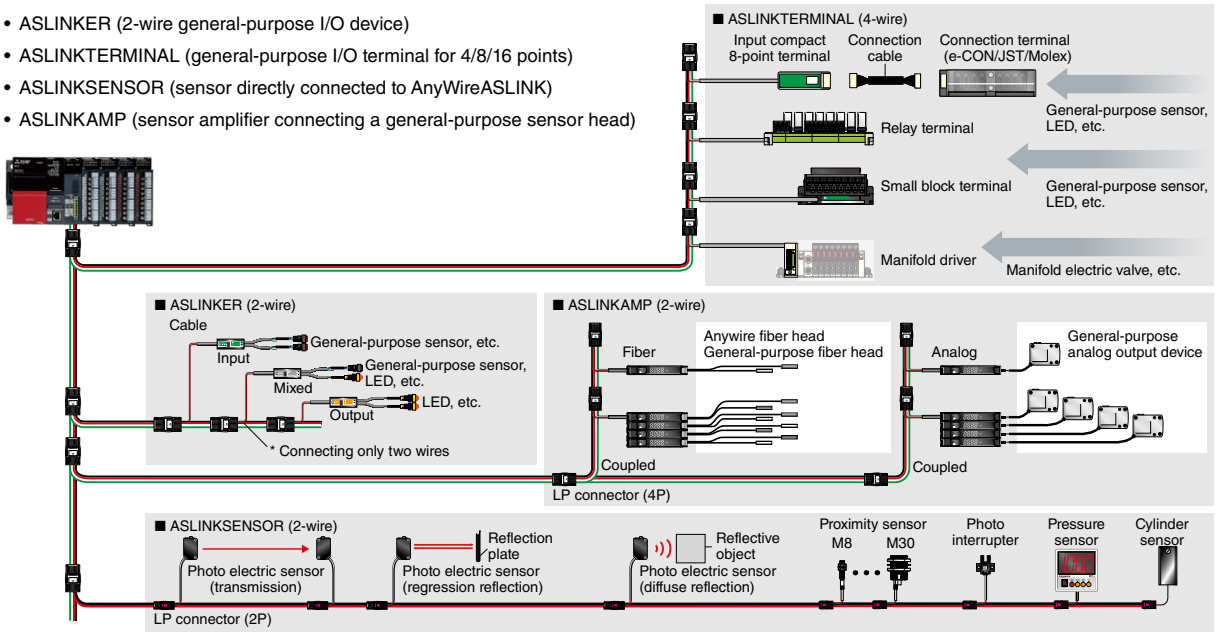
- Analyze the amount of incoming light
- Sensitivity threshold can be adjusted to keep operation up to the maintenance cycle



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

Item	RJ51AW12AL
Max. number of I/O points	512 points (256 input points/256 output points)
Max. number of connectable modules	128 (varies according to each slave module's current consumption)
Overall cable distance*1 (m)	200 m*2
Topology	Bus (multi-drop, T-branch, tree branch)
Communication clock	27.0 kHz
Max. communication cable supply current*1 (A)	2 (when using 1.25 mm^2 cable) 1 (when using 0.75 mm^2 cable)

*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.

CC-Link System Module

RJ61BT11

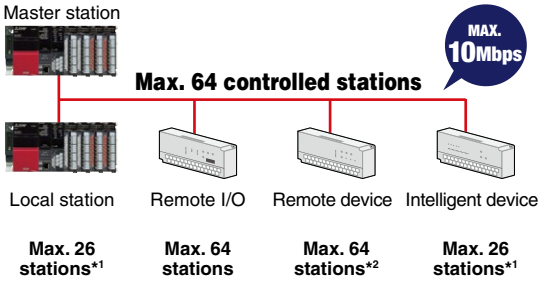
Max. 10 Mbps, master/local station (CC-Link Ver.2)

CC-Link V2

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.



Item	RJ61BT11
Transmission speed (bps)	156k/625k/2.5M/5M/10M
Network topology	Bus (RS-485)
Communication cable	Ver.1.10-compatible CC-Link dedicated cable
Overall distance (m)	100 (10 Mbps)...1200 (156 kbps)
Max. number of connected modules	65 stations (master station: 1, slave station: 64)
Max. number of link points per system (CC-Link Ver.2)	
Remote I/O (RX, RY)	8192 points
Remote register (RWw, RWr)	2048 points

Serial Communication Modules

RJ71C24

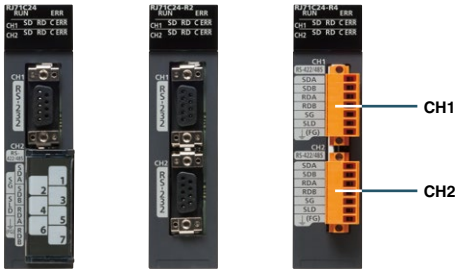
Max. 230.4 kbps, RS-232 (1 channel), RS-422/485 (1 channel)

RJ71C24-R2

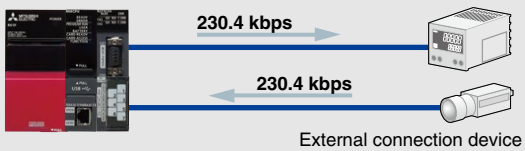
Max. 230.4 kbps, RS-232 (2 channels)

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.



Item	RJ71C24	RJ71C24-R2	RJ71C24-R4
Transmission speed (bps)	1.2k/2.4k/4.8k/9.6k/14.4k/19.2k/28.8k/38.4k/57.6k/115.2k/230.4k		
Interface			
CH1	RS-232	RS-232	RS-422/485
CH2	RS-422/485	RS-232	RS-422/485
Overall transmission distance			
RS-232 (m)	15	15	-
RS-422/485 (m)	1,200	-	1,200

Advanced information modules

- Direct access to IT system database
- C/C++ based programming
- Installation of various communications protocols
- High-speed collection of shop floor data in real-time
- Utilize third-party partner applications

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

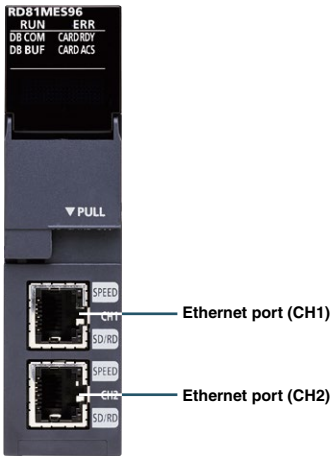
Managing production line data, accurate identification of failures and keeping daily/monthly records can be realized at a low cost.

Note: For information about the C Controller, please refer to page 40

MES Interface module

RD81MES96

Database connection



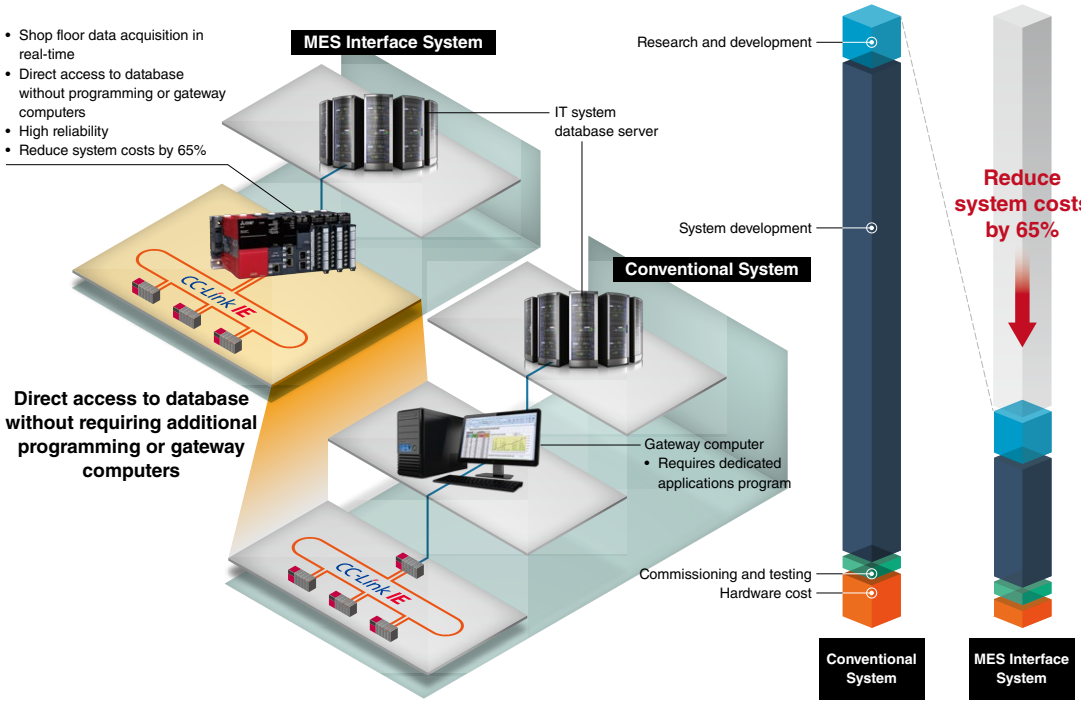
Along with ever-changing manufacturing trends, improving machine productivity and maintaining manufacturing quality through meticulous traceability have become a fundamental part of manufacturing. MES Interface modules address these requirements by providing direct database connectivity for IT systems and facilitating automatic SQL*1 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.

*1: Structured Query Language is a programming language designed for managing data in a relational database.

System configuration costs reduced by 65%*2

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.

*2: Assumption based on a typical control architecture.



MES Interface module specifications

Item	RD81MES96
Database connection	
Supported database*3	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*3	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
Function	
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.

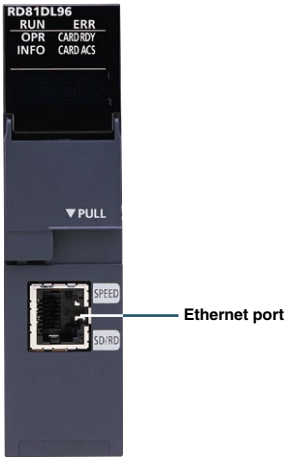
*3: For details, please refer to the relevant manual.

High-speed Data Logger Module

RD81DL96

Data collection

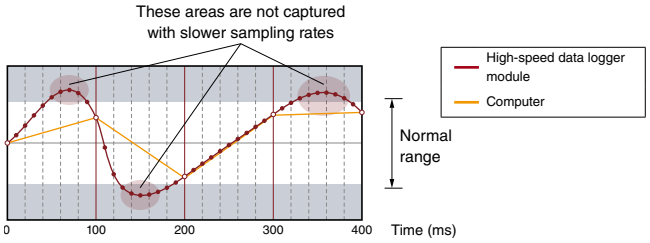
The production process data acquisition feature of this high-speed data logger module contributes to improving production quality and efficiency, thereby realizing optimal production processes. The module enables logging of various data such as Unicode, CSV, and BIN text formats, which can be utilized 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

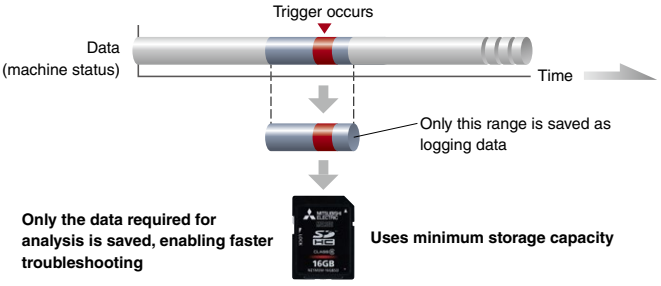
Acquired data can be synchronized with the control system scan time and achieve sampling rates up to 0.5 ms, realizing a higher resolution that enables changes in control data to be captured.

High-speed data sampling function: 0.5 ms (max.)



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 specifications

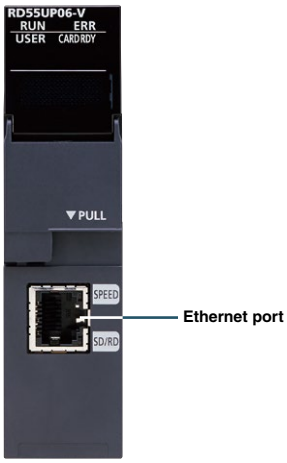
Item	RD81DL96
Accessible CPU modules	iQ-R Series (Direct, Remote), Q Series (Remote), L Series (Remote)
Data sampling interval	
High-speed data sampling (ms)	• Sequence scan time synchronization • 0.5...0.9, 1...32767 (for trigger logging) • 2...32767 (for continuous logging)
General data sampling (s)	• 0.1...0.9, 1...32767 • Time interval specification (specify hour/minute/second)
Amount of sampled data	
High-speed data sampling	• Overall amount of data: 32768 (per setting: 1024) • Overall number of device points: 32768 (per setting: 4096)
General data sampling	• Overall amount of data: 65536 (per setting: 1024) • Overall amount of data: 262144 (per setting: 4096)
Function	
Data logging	Logs CPU module device values at specified data sampling intervals.
Event logging	Monitors sampled device values from the CPU module, and logs events that occur.
Report	Outputs the data sampled by the high speed data logger module as an Excel® file.
Recipe	Executes the following operations using recipe files stored in the SD memory card: • Transfer device values written on the recipe files to devices in the CPU module. • Transfer device values in the CPU module to the recipe files.

C Intelligent Function Module

RD55UP06-V

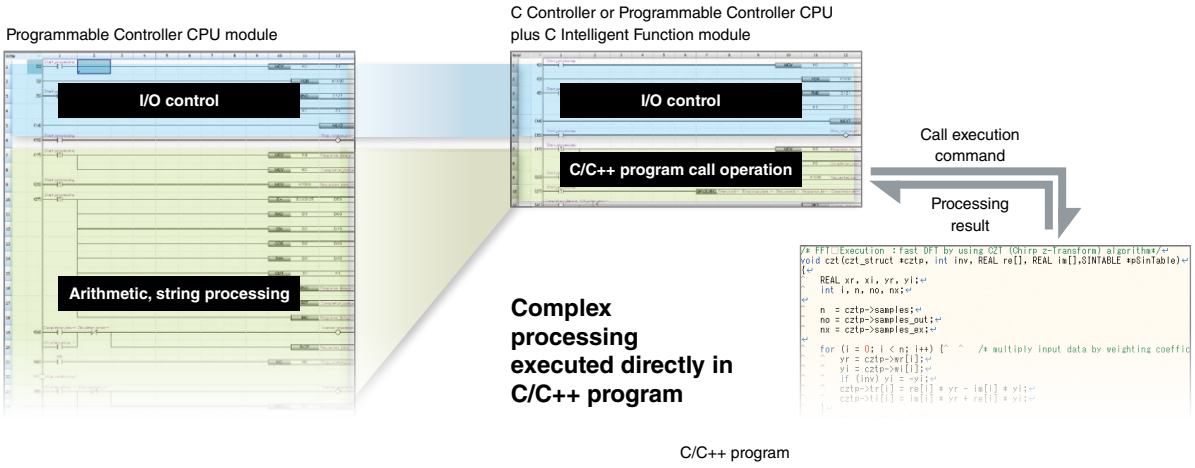
C/C++ program execution

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.

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

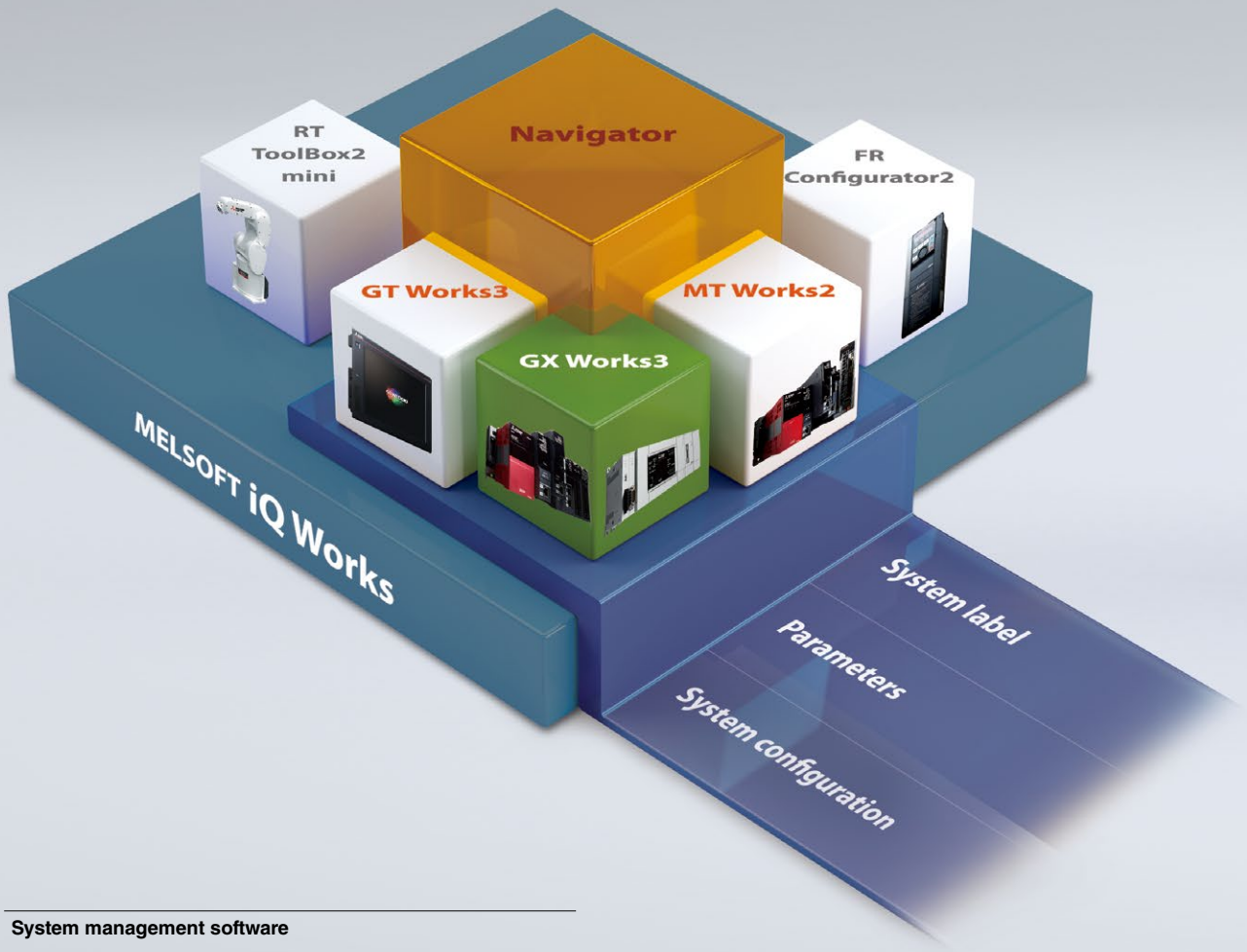
C intelligent function module specifications

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

*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.

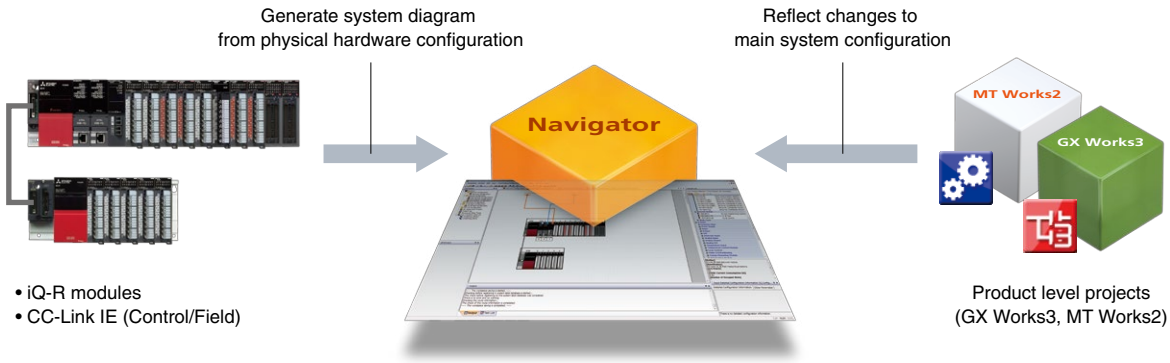
Inverter setup software

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.

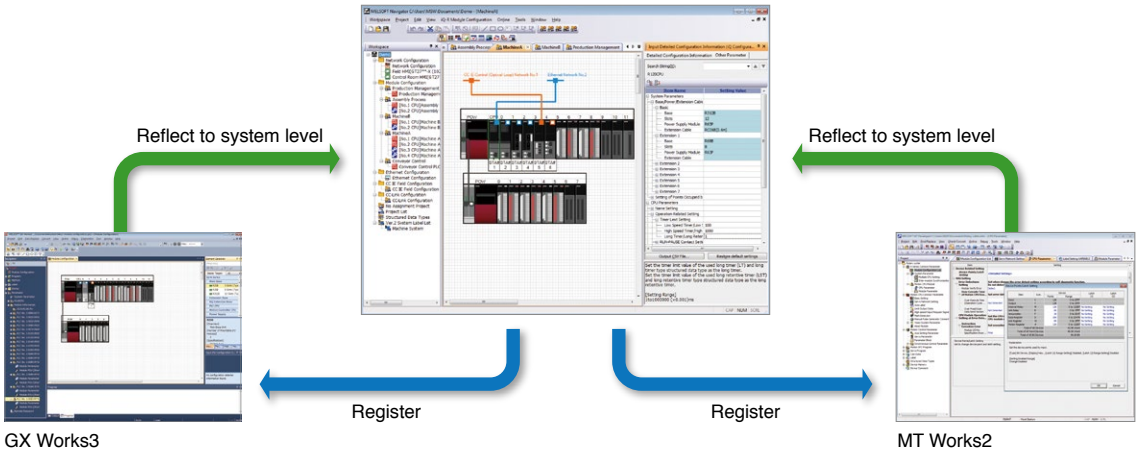
Total system centralized configuration

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).



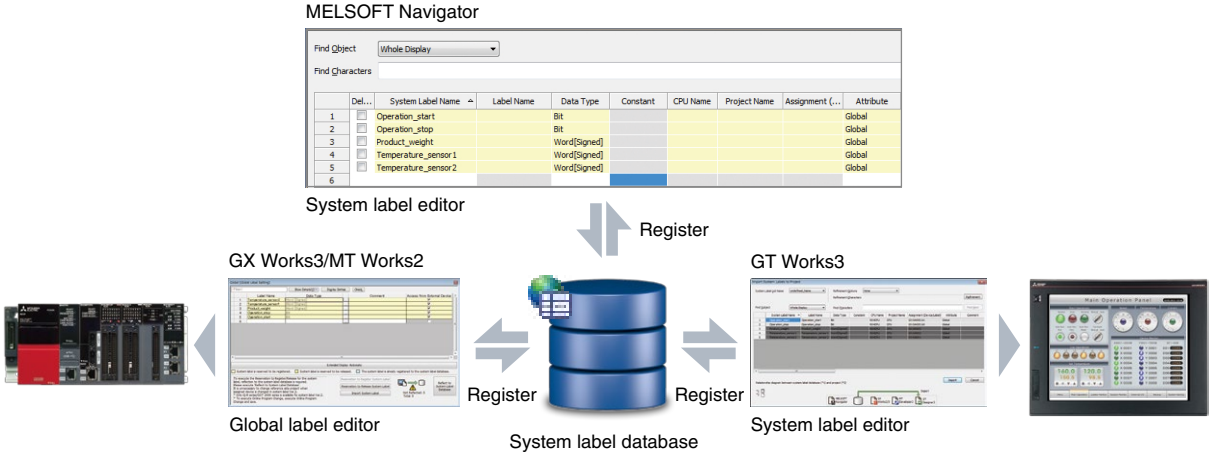
Effective parameter registration

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.

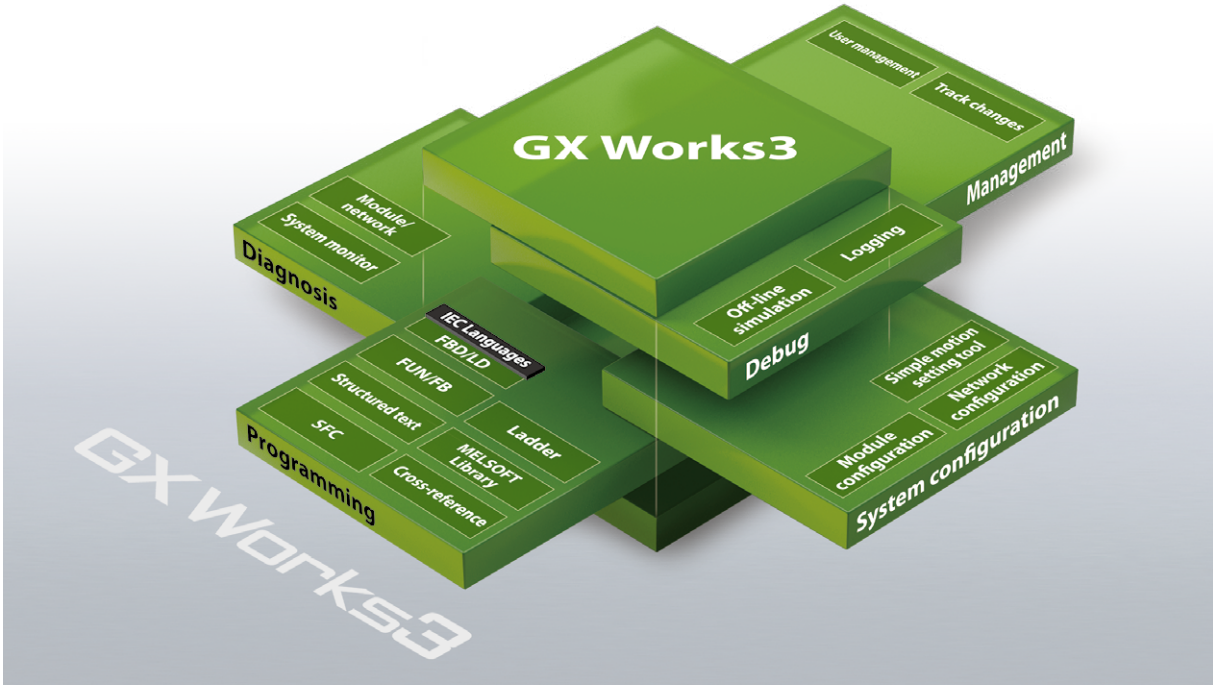


GX Works3

One Software, Many Possibilities

Mitsubishi Electric
MELSOFT GX Works3
Promotion Movie

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

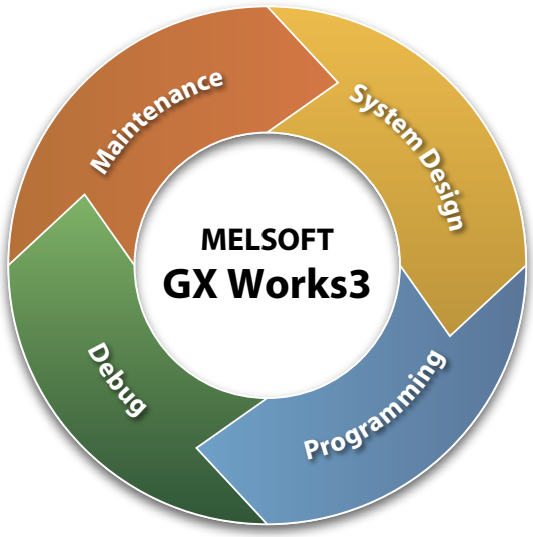
Various features have been consolidated into an integrated engineering environment that enables easier project creation throughout the engineering process, ensuring consistency through every step.

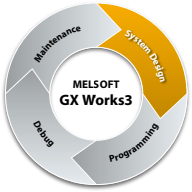
■ System-wide design
- Easy system configuration with parts library
- Direct module parameter registration
- Integrated simple motion module setup

■ 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

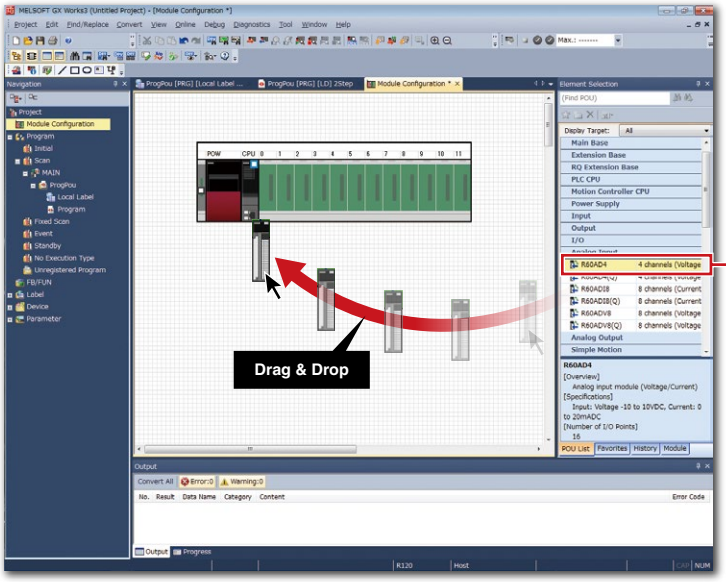




System Design

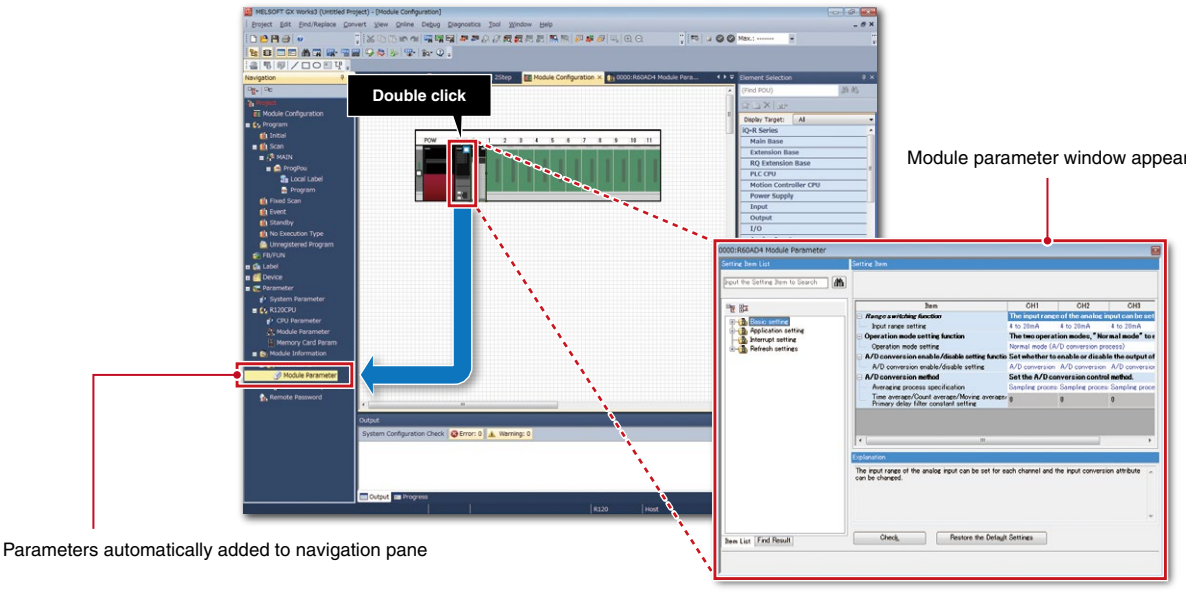
System design with a convenient parts library

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.



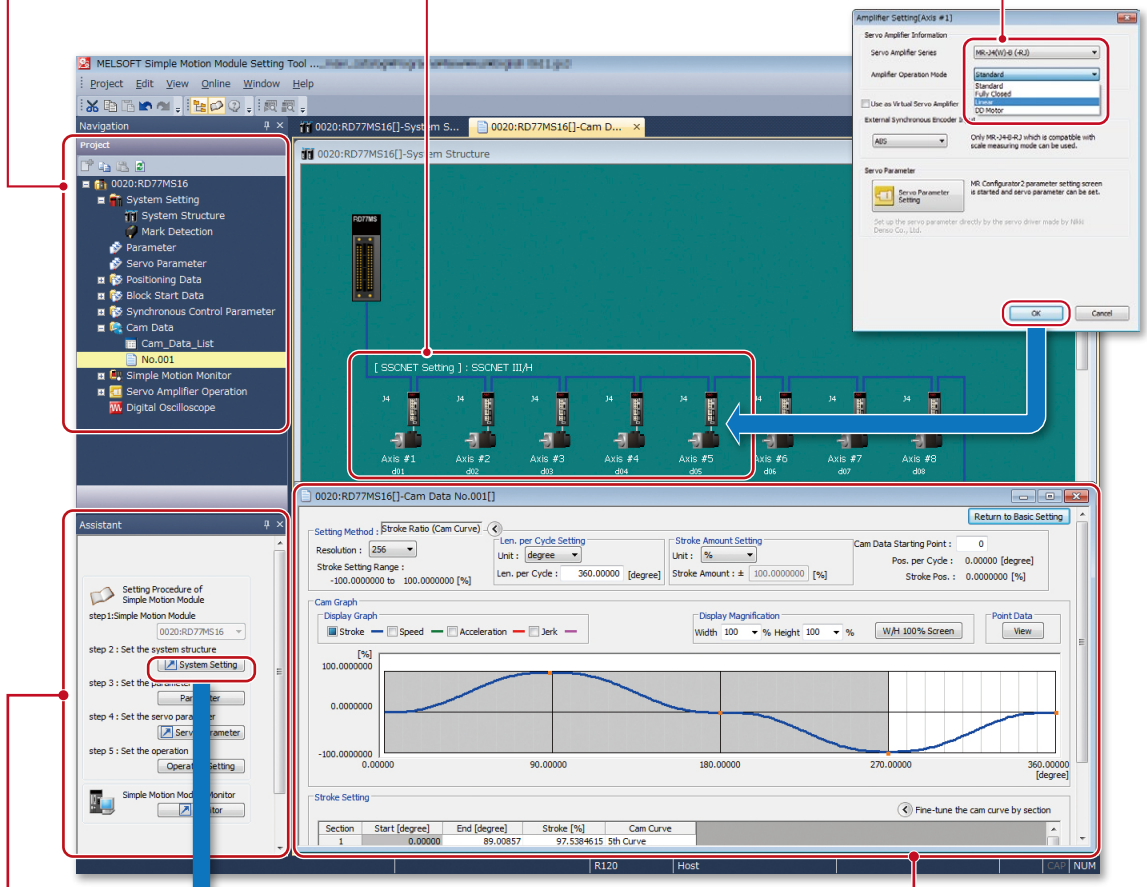
Integrated motion setup tool

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

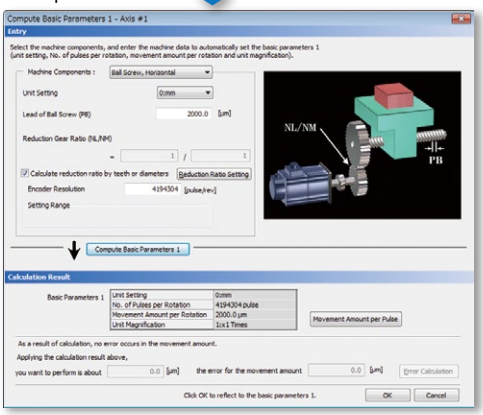
Servo amplifier setup
Select the servo amplifier and operation mode for each axis.



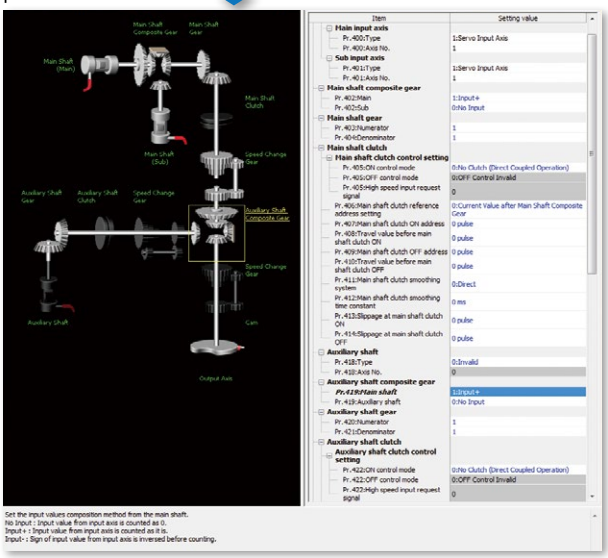
Assistant window
Selective tools further simplifying setup

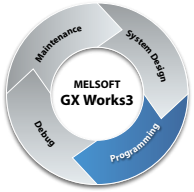
Cam data
Fine-tune cam curve data

Basic parameters



Synchronous parameters

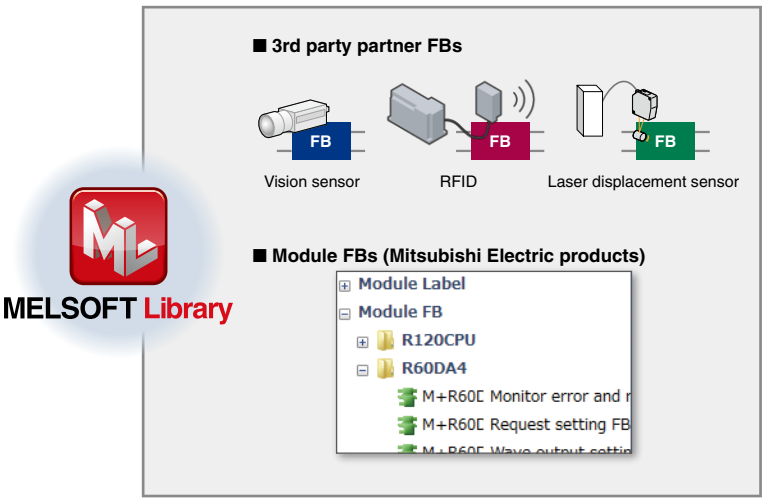


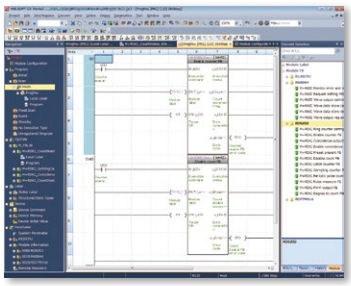


Programming

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.

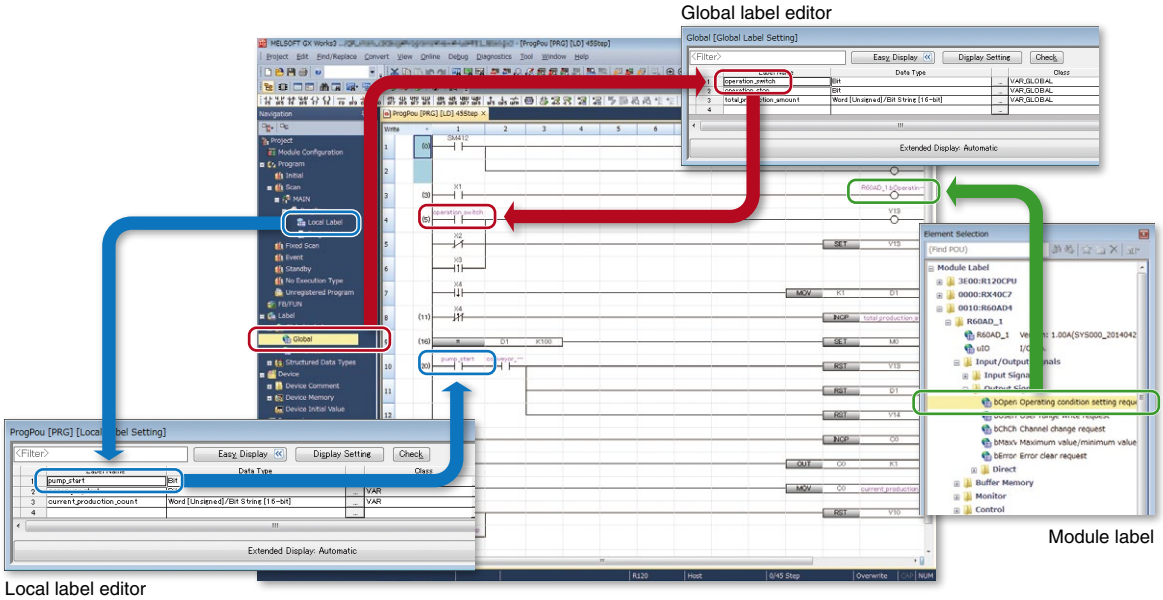




Just "select" to create a program

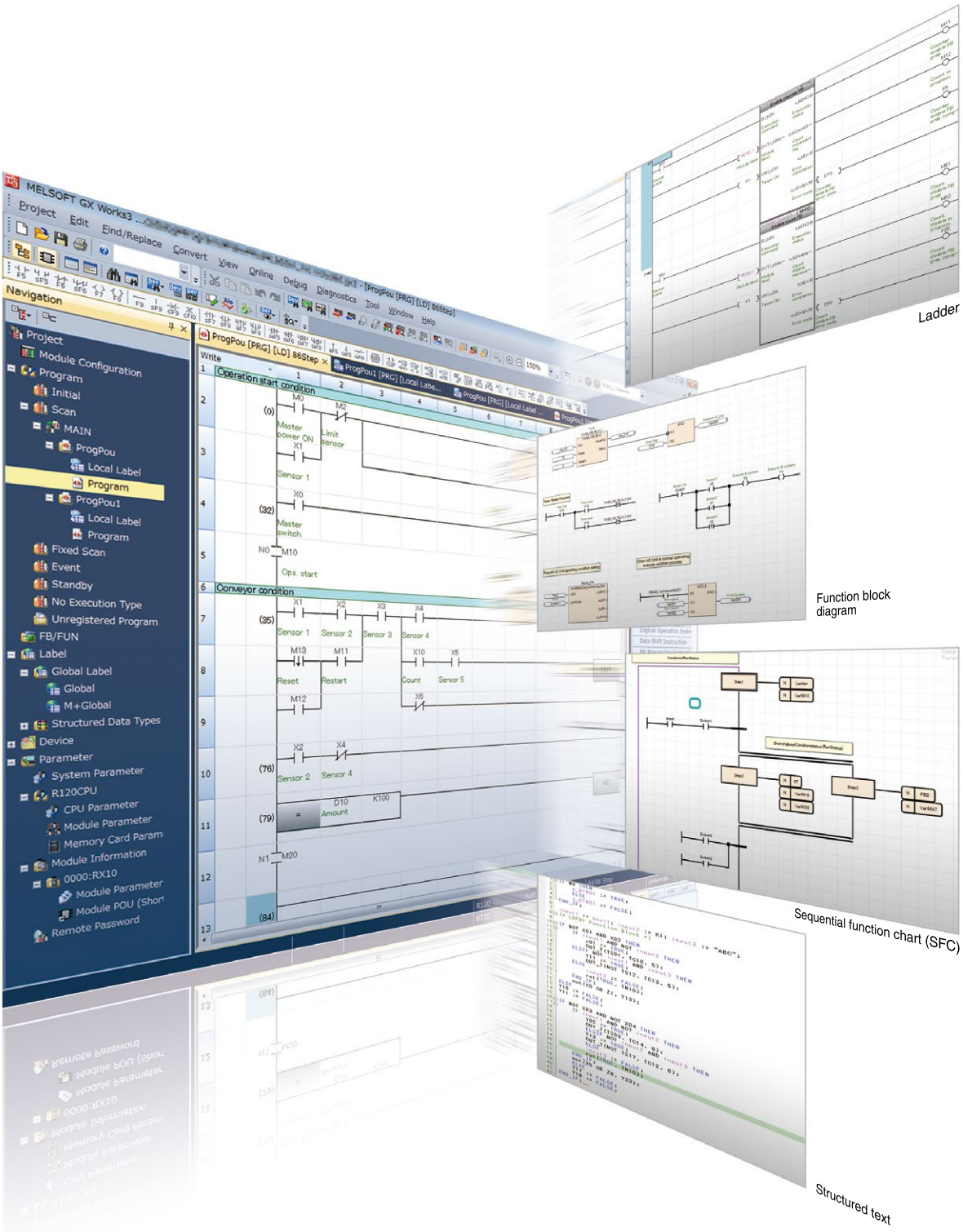
Reduce repetitive program tasks

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.

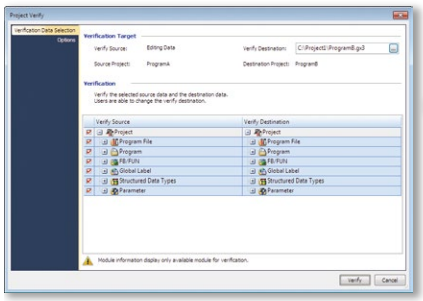


Debug

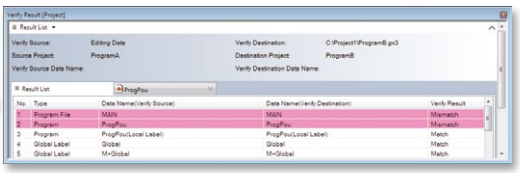
Easy version management

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.

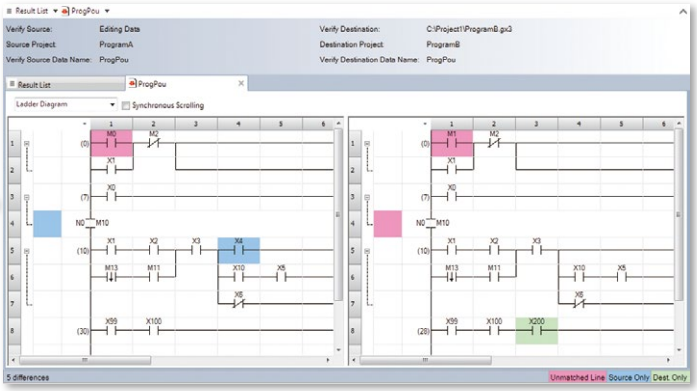
Online data operation



Verification results



Graphical representation of differences

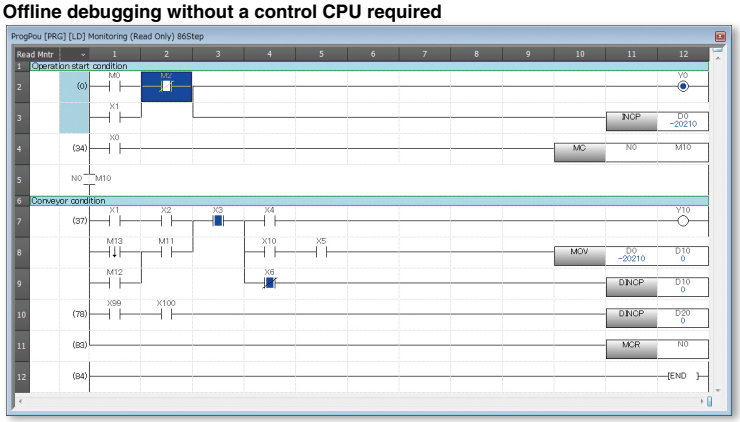


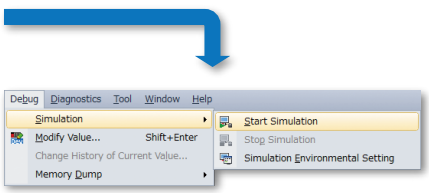
: Unmatched Line : Source Only : Dest. Only

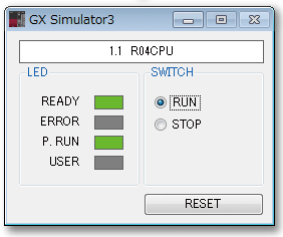
Hardware simulation

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







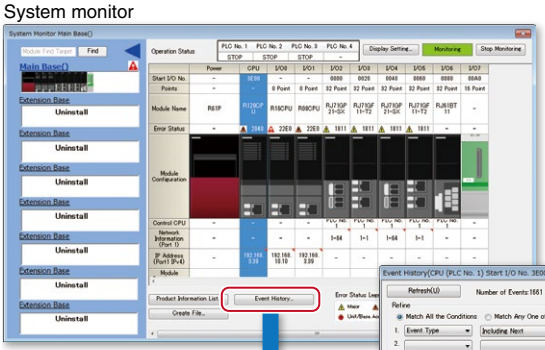
Directly debugging on the computer

Maintenance

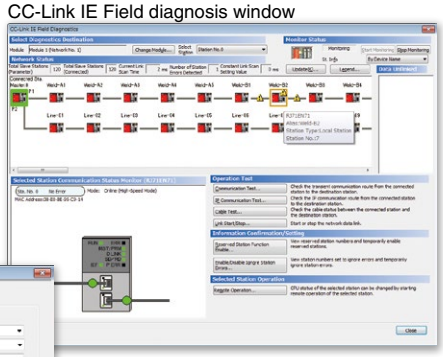
Simplified troubleshooting reduces downtime even further

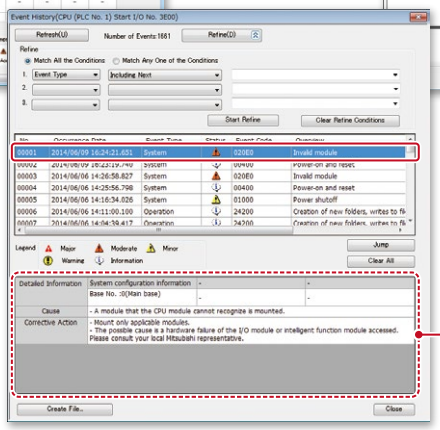
GX Works3 incorporates various maintenance features helping to reduce downtime and keep productivity high. Various levels of maintenance are possible, from system-wide monitoring of errors and module status to monitoring at the network level; for example, detailed operations that show where programs 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.

System monitor



CC-Link IE Field diagnosis window



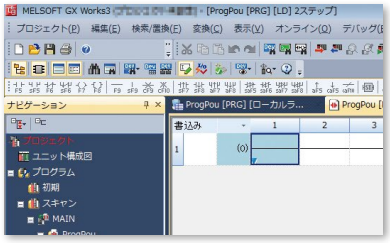


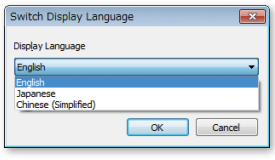
Detailed information including the cause and respective countermeasures are shown here

Event history

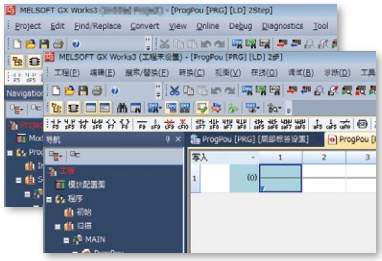
Multi-language menu, ideal for global support

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.

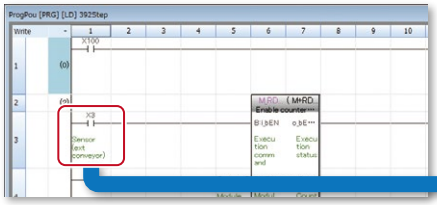


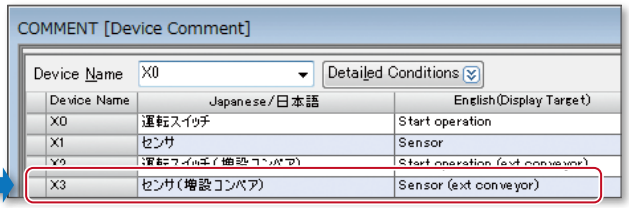


Menu language switch



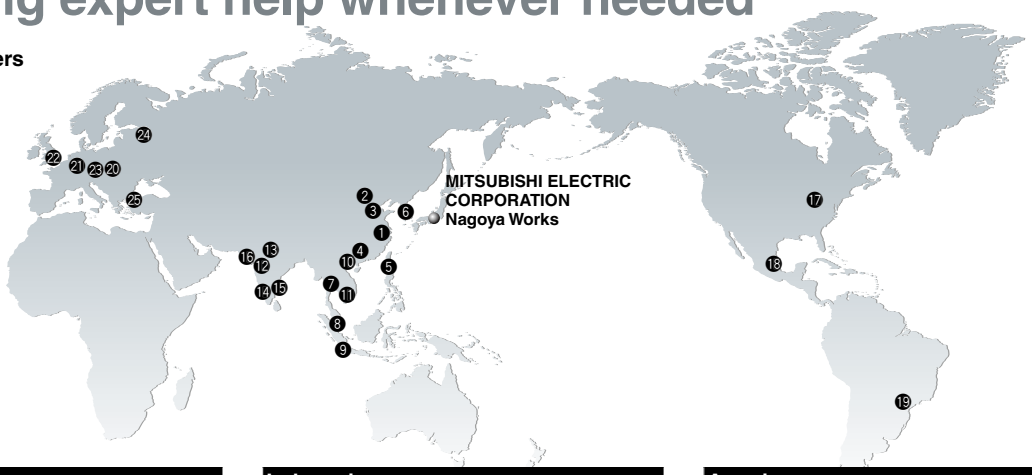
Language version of comments being switched





Extensive global support coverage providing expert help whenever needed

■ Global FA centers



China

❶ Shanghai FA Center
MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. Shanghai FA Center

Mitsubishi Electric Automation Center, No.1386 Hongqiao Road, Shanghai, China
Tel: +86-21-2322-3030 / Fax: +86-21-2322-3000

❷ Beijing FA Center
MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. Beijin FA Center

Unit 901, Office Tower 1, Henderson Centre, 18 Jianguomennei Avenue, Dongcheng District, Beijing, China
Tel: +86-10-6518-8830 / Fax: +86-10-6518-2938

❸ Tianjin FA Center
MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. Tianjin FA Center

Room 2003 City Tower, No.35, Youyi Road, Hexi District, Tianjin, China
Tel: +86-22-2813-1015 / Fax: +86-22-2813-1017

❹ Guangzhou FA Center
MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. Guangzhou FA Center

Room 1609, North Tower, The Hub Center, No.1068, Xingang East Road, Haizhu District, Guangzhou, China
Tel: +86-20-8923-6730 / Fax: +86-20-8923-6715

Taiwan

❺ Taichung FA Center
MITSUBISHI ELECTRIC TAIWAN CO.,LTD.

No.8-1, Industrial 16th Road, Taichung Industrial Park, Taichung City 40768 Taiwan
Tel: +886-4-2359-0688 / Fax: +886-4-2359-0689

Korea

❻ Korea FA Center
MITSUBISHI ELECTRIC AUTOMATION KOREA CO., LTD.

7F~9F, Gangseo Hangang Xi-tower A, 401, Yangcheon-ro, Gangseo-Gu, Seoul 07528, Korea
Tel: +82-2-3660-9632 / Fax: +82-2-3664-0475

Thailand

❼ Thailand FA Center
MITSUBISHI ELECTRIC FACTORY AUTOMATION (THAILAND) CO., LTD.

12th Floor, SV.City Building, Office Tower 1, No. 896/19 and 20 Rama 3 Road, Kwaeng Bangpongpang, Knet Yannawa, Bangkok 10120, Thailand
Tel: +66-2682-6522~31 / Fax: +66-2682-6020

ASEAN

❽ ASEAN FA Center
MITSUBISHI ELECTRIC ASIA PTE. LTD.

307 Alexandra Road, Mitsubishi Electric Building, Singapore 159943
Tel: +65-6470-2480 / Fax: +65-6476-7439

Indonesia

❾ Indonesia FA Center
PT. MITSUBISHI ELECTRIC INDONESIA Cikarang Office

Jl. Kenari Raya Blok G2-07A Delta Silicon 5, Lippo Cikarang - Bekasi 17550, Indonesia
Tel: +62-21-2961-7797 / Fax: +62-21-2961-7794

Vietnam

❿ Hanoi FA Center
MITSUBISHI ELECTRIC VIETNAM COMPANY LIMITED Hanoi Branch Office

6th Floor, Detech Tower, 8 Ton That Thuyet Street, My Dinh2 Ward, Nam Tu Liem District, Hanoi, Vietnam
Tel: +84-4-3937-8075 / Fax: +84-4-3937-8076

⓫ Ho Chi Minh FA Center
MITSUBISHI ELECTRIC VIETNAM COMPANY LIMITED

Unit 01-04, 10th Floor, Vincom Center, 72 Le Thanh Ton Street, District 1, Ho Chi Minh City, Vietnam
Tel: +84-8-3910-5945 / Fax: +84-8-3910-5947

India

⓬ India Pune FA Center
MITSUBISHI ELECTRIC INDIA PVT. LTD. Pune Branch

Emerald House, EL-3, J Block, M.I.D.C., Bhosari, Pune - 411026, Maharashtra, India
Tel: +91-20-2710-2000 / Fax: +91-20-2710-2100

⓭ India Gurgaon FA Center
MITSUBISHI ELECTRIC INDIA PVT. LTD. Gurgaon Head Office

2nd Floor, Tower A & B, Cyber Greens, DLF Cyber City, DLF Phase-Ⅲ, Gurgaon-122002, Haryana, India
Tel: +91-124-463-0300 / Fax: +91-124-463-0399

⓮ India Bangalore FA Center
MITSUBISHI ELECTRIC INDIA PVT. LTD. Bangalore Branch

Prestige Emerald, 6th Floor, Municipal No.2, Madras Bank Road, Bangalore - 560001, Karnataka, India
Tel: +91-80-4020-1600 / Fax: +91-80-4020-1699

⓯ India Chennai FA Center
MITSUBISHI ELECTRIC INDIA PVT. LTD. Chennai Branch

Citilights Corporate Centre No. 1, Vivekananda Road, Srinivasa Nagar, Chetpet, Chennai - 600031, Tamil Nadu, India
Tel: +91-4445548772 / Fax: +91-4445548773

⓰ India Ahmedabad FA Center
MITSUBISHI ELECTRIC INDIA PVT. LTD. Ahmedabad Branch

B/4, 3rd Floor, SAFAL Profitaire, Corporate Road, Prahaladnagar, Satellite, Ahmedabad - 380015, Gujarat, India
Tel: +91-7965120063

America

⓱ North America FA Center
MITSUBISHI ELECTRIC AUTOMATION, INC.

500 Corporate Woods Parkway, Vernon Hills, IL 60061, U.S.A.
Tel: +1-847-478-2469 / Fax: +1-847-478-2253

Mexico

⓲ Mexico FA Center
MITSUBISHI ELECTRIC AUTOMATION, INC. Mexico Branch

Mariano Escobedo #69, Col.Zona Industrial, Tlalnepantla Edo. Mexico, C.P.54030
Tel: +52-55-3067-7511

Brazil

⓳ Brazil FA Center
MITSUBISHI ELECTRIC DO BRASIL COMÉRCIO E SERVIÇOS LTDA.

Avenida Adelino Cardana, 293, 21 andar, Bethaville, Barueri SP, Brazil
Tel: +55-11-4689-3000 / Fax: +55-11-4689-3016

Europe

⓴ Europe FA Center
MITSUBISHI ELECTRIC EUROPE B.V. Polish Branch

ul. Krakowska 50, 32-083 Balice, Poland
Tel: +48-12-347-65-81 / Fax: +48-12-630-47-01

㉑ Germany FA Center
MITSUBISHI ELECTRIC EUROPE B.V. German Branch

Mitsubishi-Electric-Platz 1, 40882 Ratingen, Germany
Tel: +49-2102-486-0 / Fax: +49-2102-486-1120

㉒ UK FA Center
MITSUBISHI ELECTRIC EUROPE B.V. UK Branch

Travellers Lane, Hatfield, Hertfordshire, AL10 8XB, U.K.
Tel: +44-1707-27-8780 / Fax: +44-1707-27-8695

㉓ Czech Republic FA Center
MITSUBISHI ELECTRIC EUROPE B.V. Czech Branch

Avenir Business Park, Radlicka 751/113e, 158 00 Praha 5, Czech Republic
Tel: +420-251-551-470 / Fax: +420-251-551-471

㉔ Russia FA Center
MITSUBISHI ELECTRIC (RUSSIA) LLC ST. Petersburg Branch

Piskarevsky pr. 2, bld 2, lit "Sch", BC "Benua", office 720; 195027, St. Petersburg, Russia
Tel: +7-812-633-3497 / Fax: +7-812-633-3499

㉕ Turkey FA Center
MITSUBISHI ELECTRIC TURKEY A.Ş Ümraniye Branch

Serifali Mahallesi Nutuk Sokak No:5, TR-34775 Umraniye / Istanbul, Turkey
Tel: +90-216-526-3990 / Fax: +90-216-526-3995

Factory Automation Global website

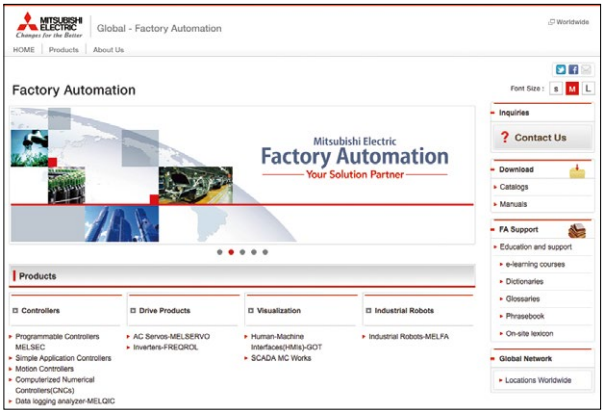
Mitsubishi Electric Factory Automation provides a mix of services to support its customers worldwide. A consolidated global website is the main portal, offering a selection of support tools and a window to its local Mitsubishi Electric sales and support network.

■ 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.

Innovative next-generation, e-Manual

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

■ Key features include

- One-stop database containing all required manuals, with local file cache
- 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.

iOS
Version 8.1 or later
Download on the App Store

Android™
Version 4.3/4.4/5.0
ANDROID APP ON Google play

■ Supported versions

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

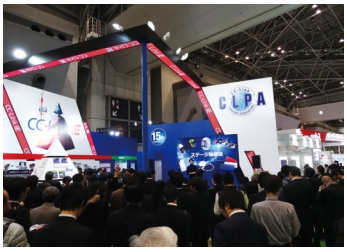
*1: When using a tablet not listed above, 7-inch (resolution of 1920×1200 dots (WUXGA)) or better is recommended.

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.

Seminar



Trade show

Conformance testing lab

Visit the CLPA website for the latest CC-Link information.

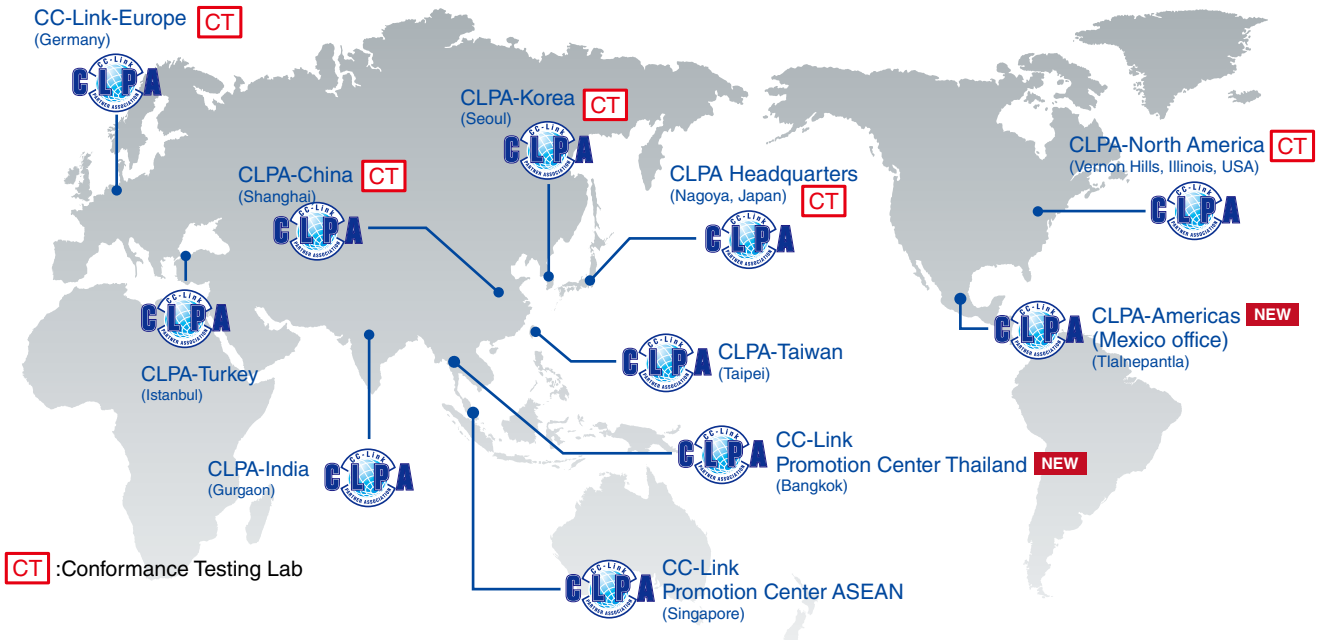
URL:www.cc-link.org

6F Ozone Front Bldg. 3-15-58 Ozone
Kita-ku, Nagoya 462-0825, JAPAN
TEL: +81-52-919-1588 FAX: +81-52-916-8655
E-mail:info@cc-link.org

CC-Link
Partner Association

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.



■ General specifications

Item	Specification					
Operating ambient temperature	0...55°C					
Storage ambient temperature	–25...75°C					
Operating ambient humidity	5...95% RH, non-condensing					
Storage ambient humidity	5...95% RH, non-condensing					
Vibration resistance	Compliant with JIS B 3502 and IEC 61131-2	-	Frequency	Constant acceleration	Half amplitude	Sweep count
		Under intermittent vibration	5...8.4 Hz	-	3.5 mm	10 times each in X, Y, Z directions
			8.4...150 Hz	9.8 m/s²	-	
		Under continuous vibration	5...8.4 Hz	-	1.75 mm	-
			8.4...150 Hz	4.9 m/s²	-	
Shock resistance	Compliant with JIS B 3502 and IEC 61131-2 (147 m/s², 3 times each in directions X, Y, Z)					
Operating atmosphere	No corrosive gases*4, no flammable gases, no excessive conductive dust					
Operating altitude*1	0...2000 m*5					
Installation location	Inside a control panel					
Overvoltage category*2	≤ Ⅱ					
Pollution degree*3	≤ 2					
Equipment class	Class 2*6					

*1: Do not use or store the programmable controller under pressure higher than the atmospheric pressure of altitude 0 m. Doing so may cause malfunction.
When using the programmable controller under pressure, please consult your local Mitsubishi Electric representative.
*2: This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises.
Category Ⅱ applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for up to the rated voltage of 300 V is 2500 V.
*3: This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used.
Pollution level 2 is when only non-conductive pollution occurs. A temporary conductivity caused by condensing must be expected occasionally.
*4: The special coated product, which meets the regulation (JIS C 60721-3-3/IEC 60721-3-3 3C2) related to corrosive gas, is available for the use in a corrosive gas environment.
For more details on the special coated product, please consult your local Mitsubishi Electric representative.
*5: When used at an altitude higher than 2000 m, the upper limits of the permissible voltage and the operating ambient temperature become lower. Please consult your local Mitsubishi Electric representative.
*6: Class 1 when the RQ extension base unit is used.

■ Software operating environment

Item	MELSOFT GX Works3, CW Configurator	CW Workbench, CW-Sim, CW-Sim Standalone
Personal computer	Windows® supported personal computer	
CPU	Intel® Core™ 2 Duo Processor 2 GHz or more	
Available hard disk capacity	5 GB	4 GB or more
Display resolution	1024 x 768 pixels or higher	
Required memory		
64-bit edition	2 GB or more recommended	2 GB or more
32-bit edition	1 GB or more recommended	1 GB or more (2 GB or more recommended)
OS (English version)		
Microsoft® Windows® 8.1 Operating System	●	●*7
Microsoft® Windows® 8.1 Pro Operating System	●	●*7
Microsoft® Windows® 8.1 Enterprise Operating System	●	●*7
Microsoft® Windows® 8 Operating System	●	●*7
Microsoft® Windows® 8 Pro Operating System	●	●*7
Microsoft® Windows® 8 Enterprise Operating System	●	●*7
Microsoft® Windows® 7 Starter Operating System	●	-
Microsoft® Windows® 7 Home Premium Operating System	●	-
Microsoft® Windows® 7 Professional Operating System	●	●*8
Microsoft® Windows® 7 Ultimate Operating System	●	●*8
Microsoft® Windows® 7 Enterprise Operating System	●	●*8
Microsoft® Windows Vista® Home Basic Operating System	●*9	-
Microsoft® Windows Vista® Home Premium Operating System	●*9	-
Microsoft® Windows Vista® Business Operating System	●*9	-
Microsoft® Windows Vista® Ultimate Operating System	●*9	-
Microsoft® Windows Vista® Enterprise Operating System	●*9	-
Microsoft® Windows® XP Professional Operating System SP3	●*9	●*9
Microsoft® Windows® XP Home Edition Operating System SP3	●*9	-

*7: Windows Touch is not supported.
*8: Windows® XP Mode is not supported.
*9: The 64-bit edition is not supported.

■ MELSOFT GX Works3-supported CPU modules

Item	Model	
Programmable controller CPU	R04(EN)CPU	R32(EN)CPU
	R08(EN)CPU	R120(EN)CPU
	R16(EN)CPU	
Safety CPU	R08SFCPU	R32SFCPU
	R16SFCPU	R120SFCPU
Process CPU	R08PCPU	R32PCPU
	R16PCPU	R120PCPU

■ CW Workbench, CW-Sim, CW-Sim Standalone, MELSOFT CW Configurator-supported CPU modules

Item	Model
C Controller	R12CCPU-V

Product List

■ CPU modules

Type	Model	Outline
Programmable controller CPU	R04CPU	Program capacity, 40K steps; basic operation processing speed (LD instruction), 0.98 ns
	R08CPU	Program capacity, 80K steps; basic operation processing speed (LD instruction), 0.98 ns
	R16CPU	Program capacity, 160K steps; basic operation processing speed (LD instruction), 0.98 ns
	R32CPU	Program capacity, 320K steps; basic operation processing speed (LD instruction), 0.98 ns
	R120CPU	Program capacity, 1200K steps; basic operation processing speed (LD instruction), 0.98 ns
	R04ENCPU	CC-Link IE embedded; program capacity, 40K steps; basic operation processing speed (LD instruction), 0.98 ns
	R08ENCPU	CC-Link IE embedded; program capacity, 80K steps; basic operation processing speed (LD instruction), 0.98 ns
	R16ENCPU	CC-Link IE embedded; program capacity, 160K steps; basic operation processing speed (LD instruction), 0.98 ns
	R32ENCPU	CC-Link IE embedded; program capacity, 320K steps; basic operation processing speed (LD instruction), 0.98 ns
	R120ENCPU	CC-Link IE embedded; program capacity, 1200K steps; basic operation processing speed (LD instruction), 0.98 ns
Motion CPU	R16MTCPU	Up to 16-axis control; operation cycle, ≤0.222 ms; SSCNET Ⅲ/H connectivity
	R32MTCPU	Up to 32-axis control; operation cycle, ≤0.222 ms; SSCNET Ⅲ/H connectivity
	R64MTCPU	Up to 64-axis control; operation cycle, ≤0.222 ms; SSCNET Ⅲ/H connectivity
Safety CPU	R08SFCPU-SET	Program capacity, 80K steps (40K steps for safety programs); basic operation processing speed (LD instruction), 0.98 ns
	R16SFCPU-SET	Program capacity, 160K steps (40K steps for safety programs); basic operation processing speed (LD instruction), 0.98 ns
	R32SFCPU-SET	Program capacity, 320K steps (40K steps for safety programs); basic operation processing speed (LD instruction), 0.98 ns
	R120SFCPU-SET	Program capacity, 1200K steps (40K steps for safety programs); basic operation processing speed (LD instruction), 0.98 ns
Process CPU	R08PCPU	Program capacity, 80K steps; basic operation processing speed (LD instruction), 0.98 ns
	R16PCPU	Program capacity, 160K steps; basic operation processing speed (LD instruction), 0.98 ns
	R32PCPU	Program capacity, 320K steps; basic operation processing speed (LD instruction), 0.98 ns
	R120PCPU	Program capacity, 1200K steps; basic operation processing speed (LD instruction), 0.98 ns
Redundant function module	R6RFM NEW	By combining with a process CPU a redundant control system can be realized.
C Controller	R12CCPU-V	Endian format, little endian; OS, VxWorks® Version 6.9
SD memory card*1	NZ1MEM-2GBSD	SD memory card, 2G bytes
	NZ1MEM-4GBSD	SDHC memory card, 4G bytes
	NZ1MEM-8GBSD	SDHC memory card, 8G bytes
	NZ1MEM-16GBSD	SDHC memory card, 16G bytes
Extended SRAM cassette	NZ2MC-1MBS	1M bytes
	NZ2MC-2MBS	2M bytes
	NZ2MC-4MBS	4M bytes
	NZ2MC-8MBS	8M bytes
	NZ2MC-8MBSE*2	8M bytes
	NZ2MC-16MBS	16M bytes
Battery	Q6BAT	Replacement battery
	Q7BAT	Replacement large-capacity battery
	Q7BAT-SET	Large-capacity battery with holder for mounting CPU

*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

Type	Model	Outline
Main base	R35B	5 slots, for MELSEC iQ-R Series modules
	R38B	8 slots, for MELSEC iQ-R Series modules
	R312B	12 slots, for MELSEC iQ-R Series modules
Redundant power supply main base	R310RB NEW	10 slots, for MELSEC iQ-R Series modules
Extended temperature range main base	R310B-HT	10 slots, for MELSEC iQ-R Series modules
Extended temperature range redundant power supply main base	R38RB-HT NEW	8 slots, for MELSEC iQ-R Series modules
Extension base	R65B	5 slots, for MELSEC iQ-R Series modules
	R68B	8 slots, for MELSEC iQ-R Series modules
	R612B	12 slots, for MELSEC iQ-R Series modules
Redundant power supply extension base	R610RB NEW	10 slots, for MELSEC iQ-R Series modules
Extended temperature range extension base	R610B-HT	10 slots, for MELSEC iQ-R Series modules
Extended temperature range redundant power supply extension base	R68RB-HT NEW	8 slots, for MELSEC iQ-R Series modules
RQ extension base	RQ65B	5 slots, for MELSEC-Q Series modules
	RQ68B	8 slots, for MELSEC-Q Series modules
	RQ612B	12 slots, for MELSEC-Q Series modules
Extension cable	RC06B	0.6 m cable for extension and RQ extension base units
	RC12B	1.2 m cable for extension and RQ extension base units
	RC30B	3 m cable for extension and RQ extension base units
	RC50B	5 m cable for extension and RQ extension base units
DIN rail mounting adapter	R6DIN1	For main and extension base units
	Q6DIN1	For RQ68B/RQ612B
	Q6DIN2	For RQ65B
	Q6DIN1A	For RQ extension base units (with vibration-proofing bracket sets)
Blank cover	RG60	For I/O slots of main and extension base units
	QG60	For I/O slots of RQ extension base units

■ Power supply module

Type	Model	Outline
Power supply	R61P	AC power supply; input, 100 to 240 V AC; output, 5 V DC/6.5 A
	R62P	AC power supply; input, 100 to 240 V AC; output, 5 V DC/3.5 A, 24 V DC/0.6 A
	R64P	AC power supply; input, 100 to 240 V AC; output, 5 V DC/9 A
	R63P	DC power supply; input, 24 V DC; output, 5 V DC/6.5 A
	R64RP NEW	AC power supply; input, 100 to 240 V AC; output, 5 V DC/9 A, Redundant power supply function support

■ I/O modules

Type	Model	Outline
Input	RX10	AC input, 16 points; 100...120 V AC (50/60 Hz)
	RX40C7	DC input, 16 points; 24 V DC, 7.0 mA
	RX41C4	DC input, 32 points; 24 V DC, 4.0 mA
	RX42C4	DC input, 64 points; 24 V DC, 4.0 mA
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 NEW	Positive/negative common type DC input, 32 points; 24 V DC, 6.0 mA; minimum response time 1 µs
	RX61C6HS NEW	Positive/negative common type DC input, 32 points; 5 V DC, 6.0 mA; minimum response time 1 µs
Input (with diagnostic functions)	RX40NC6B NEW	Negative common type DC input, 16 points; 24 V DC, 6.0 mA
Output	RY10R2	Relay output, 16 points; 24 V DC/2 A, 240 V AC/2 A
	RY40NT5P	Transistor (sink) output, 16 points; 12 to 24 V DC, 0.5 A
	RY41NT2P	Transistor (sink) output, 32 points; 12 to 24 V DC, 0.2 A
	RY42NT2P	Transistor (sink) output, 64 points; 12 to 24 V DC, 0.2 A
	RY40PT5P	Transistor (source) output, 16 points; 12 to 24 V DC, 0.5 A
	RY41PT1P	Transistor (source) output, 32 points; 12 to 24 V DC, 0.1 A
	RY42PT1P	Transistor (source) output, 64 points; 12 to 24 V DC, 0.1 A
High-speed output	RY41NT2H	Transistor (sink) output, 32 points; 5 to 24 V DC, 0.2 A; minimum response time 2 µs
	RY41PT2H	Transistor (source) output, 32 points; 5 to 24 V DC, 0.2 A; minimum response time 2 µs
Output (with diagnostic functions)	RY40PT5B NEW	Transistor (source) output, 16 points; 24 V DC, 0.5 A
I/O combined	RH42C4NT2P	DC input, 32 points; 24 V DC, 4.0 mA Transistor (sink) output, 32 points; 12 to 24 V DC, 0.2 A

■ Analog modules

Type	Model	Outline
Analog input	R60AD4	4 channels for voltage/current inputs -10...10 V DC, -32000...32000; 0...20 mA DC, 0...32000; 80 µs/CH
	R60ADH4	4 channels for voltage/current inputs -10...10 V DC, -32000...32000; 0...20 mA DC, 0...32000; 5 µs/4CH
	R60ADV8	8 channels for voltage inputs -10...10 V DC, -32000...32000; 80 µs/CH
	R60ADI8	8 channels for current inputs 0...20 mA DC/0...32000; 80 µs/CH
	R60AD8-G	8 channels for voltage/current input, channel isolated -10...10 V DC/-32000...32000, 0...20 mA DC/0...32000, 10 ms/CH
	R60AD16-G	16 channels for voltage/current input, channel isolated -10...10 V DC/-32000...32000, 0...20 mA DC/0...32000, 10 ms/CH
Temperature input	R60TD8-G	Thermocouple (B, R, S, K, E, J, T, N), 8 channels for input, channel isolated, 30 ms/CH
	R60RD8-G	RTD (Pt100, JPt100, Ni100, Pt50), 8 channels for input, channel isolated, 10 ms/CH
Temperature control	R60TCTRT2TT2	Thermocouple (B, R, S, K, E, J, T, N, U, L, PL Ⅱ, W5Re/W26Re), 4 channels for input (2 channels can also be used for RTD input)
	R60TCRT4	RTD (Pt100, JPt100), 4 channels for input
	R60TCTRT2TT2BW	Thermocouple (B, R, S, K, E, J, T, N, U, L, PL Ⅱ, W5Re/W26Re), 4 channels for input (2 channels can also be used for RTD input), heater disconnection detection
	R60TCRT4BW	RTD (Pt100, JPt100), 4 channels for input, heater disconnection detection
Analog output	R60DA4	4 channels for voltage/current outputs -32000...32000, -10...10 V DC; 0...32000, 0...20 mA DC; 80 µs/CH
	R60DAV8	8 channels for voltage outputs -32000...32000, -10...10 V DC; 80 µs/CH
	R60DAI8	8 channels for current outputs 0...32000, 0...20 mA DC; 80 µs/CH
	R60DA8-G	8 channels for voltage/current output, channel isolated -32000...32000/-12...12 V DC, 0...32000/0...20 mA DC, 1 ms/CH
	R60DA16-G	16 channels for voltage/current output, channel isolated -32000...32000/-12...12 V DC, 0...32000/0...20 mA DC, 1 ms/CH

■ Motion/Positioning/High-speed counter modules

Type	Model	Outline
Simple motion	RD77GF4	4 axes, linear/circular interpolation, advanced synchronous control, CC-Link IE Field network compatible
	RD77GF8	8 axes, linear/circular interpolation, advanced synchronous control, CC-Link IE Field network compatible
	RD77GF16	16 axes, linear/circular interpolation, advanced synchronous control, CC-Link IE Field network compatible
	RD77MS2	2 axes, linear/circular interpolation, advanced synchronous control, SSCNETⅢ/H compatible
	RD77MS4	4 axes, linear/circular interpolation, advanced synchronous control, SSCNETⅢ/H compatible
	RD77MS8	8 axes, linear/circular interpolation, advanced synchronous control, SSCNETⅢ/H compatible
	RD77MS16	16 axes, linear/circular interpolation, advanced synchronous control, SSCNETⅢ/H compatible
Positioning	RD75P2	Transistor output, 2 axes; max. output, 200k pulse/s; linear/circular interpolation
	RD75P4	Transistor output, 4 axes; max. output, 200k pulse/s; linear/circular/helical interpolation
	RD75D2	Differential driver output, 2 axes; max. output, 5M pulse/s; linear/circular interpolation
	RD75D4	Differential driver output, 4 axes; max. output, 5M pulse/s; linear/circular/helical interpolation
High-speed counter	RD62P2	5/12/24 V DC input, 2 channels; counting speed, max. 200k pulse/s; external output, transistor (sink type)
	RD62P2E	5/12/24 V DC input, 2 channels; counting speed, max. 200k pulse/s; external output, transistor (source type)
	RD62D2	Differential input, 2 channels; max. counting speed, 8M pulse/s; external output, transistor (sink type)

■ Network modules

Type	Model	Outline
Ethernet (built-in CC-Link IE)	RJ71EN71	1 Gbps/100 Mbps/10 Mbps, 2 ports Multi-network connectivity (Ethernet/CC-Link IE)
CC-Link IE Control	RJ71GP21-SX	1 Gbps, fiber-optic cable, control/normal station
CC-Link IE Field	RJ71GF11-T2	1 Gbps, master/local station
CC-Link IE Field Network remote head	RJ72GF15-T2 NEW	1 Gbps, remote station
CC-Link	RJ61BT11	Max. 10 Mbps, master/local station, CC-Link Ver.2 supported
AnyWireASLINK	RJ51AW12AL NEW	DigitalLinkSensor AnyWireASLINK system compatible, master station
Serial communication	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

■ Advanced information modules

Type	Model	Outline
MES Interface	RD81MES96	Database connection (MX MESInterface-R is required)
High-speed data logger	RD81DL96	Data collection (High-speed data logger module tool "SW1DNN-RDLUTL-E"is required)*1
C intelligent function module	RD55UP06-V	C/C++ program execution (Setting and monitoring tool is integrated within GX Works3)

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

■ Software

Type	Model	Outline
MELSOFT iQ Works	SW2DND-IQWK-E (DVD-ROM edition)	FA engineering software*2 • System Management Software: MELSOFT Navigator • Controller Programming Software: MELSOFT GX Works3*3, GX Works2, GX Developer • Motion Programming Software: MELSOFT MT Works2 • HMI Programming Software: MELSOFT GT Works3 • Robot Programing Software: MELSOFT RT ToolBox2 mini • Inverter Setup Software: MELSOFT FR Configurator2 • C Controller setting and monitoring tool: MELSOFT CW Configurator • MITSUBISHI ELECTRIC FA Library
MELSOFT GX Works3	SW1DND-GXW3-E (DVD-ROM edition)	• Controller Programming Software: MELSOFT GX Works3*3, GX Works2, GX Developer • MITSUBISHI ELECTRIC FA Library

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

*3: The MELSOFT GX Works3 menu is switchable between Japanese, English, and simplified Chinese. (Traditional Chinese and Korean will be supported soon.)

Type	Model	Outline
CW Workbench	SW1DND-CWWR-E	Engineering tool for C Controller module
	SW1DND-CWWR-EZ	Additional license for R12CCPU-V, RD55UP06-V
	SW1DND-CWWR-EVZ	Update license for R12CCPU-V, RD55UP06-V
CW-Sim	SW1DND-CWSIMR-EZ	VxWorks® simulation environment for CW Workbench, additional license
CW-Sim Standalone	SW1DNC-CWSIMSAR-E	VxWorks® simulation environment for CW Workbench, standalone type
MELSOFT CW Configurator	SW1DND-RCCPU-E	Setting and monitoring tool for C Controller
MX MESInterface-R	SW1DND-RMESIF-E	MES Interface function configuration tool

■ Option

Type	Model	Outline
Connector	A6CON1	32-point connector soldering type (40-pin connector)
	A6CON2	32-point connector crimp-contact type (40-pin connector)
	A6CON3	32-point connector pressure-displacement (flat cable) type (40-pin connector)
	A6CON4	32-point connector soldering type (40-pin connector, cable connectable in bidirectional)
Spring clamp terminal block	Q6TE-18SN	For 16-point I/O modules, 0.3…1.5 mm² (22…16 AWG)
Connector/terminal block conversion module	A6TBXY36	For positive common input modules and sink output modules (standard type)
	A6TBXY54	For positive common input modules and sink output modules (2-wire type)
	A6TBX70	For positive common input modules (3-wire type)
Connector/terminal block conversion module cable	AC05TB	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 0.5 m
	AC10TB	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 1 m
	AC20TB	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 2 m
	AC30TB	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 3 m
	AC50TB	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 5 m
	AC80TB	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 8 m*
	AC100TB	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 10 m*
Relay terminal module	A6TE2-16SRN	For 40-pin connector 24 V DC transistor output modules (sink type)
Relay terminal module cable	AC06TE	For A6TE2-16SRN, 0.6 m
	AC10TE	For A6TE2-16SRN, 1 m
	AC30TE	For A6TE2-16SRN, 3 m
	AC50TE	For A6TE2-16SRN, 5 m
	AC100TE	For A6TE2-16SRN, 10 m

* Common current 0.5 A or lower

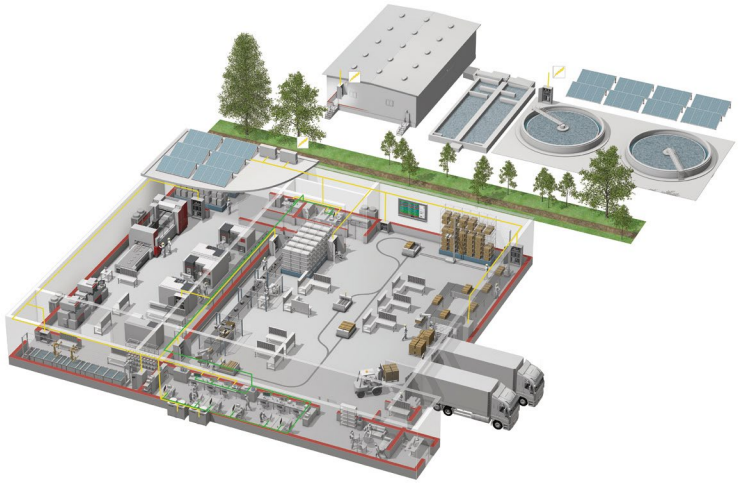
Precautions before use

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

⚠ For safe use

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

YOUR SOLUTION PARTNER



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

A NAME TO TRUST

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

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

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

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

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

Low voltage: MCCB, MCB, ACB

Medium voltage: VCB, VCC

Power monitoring, energy management

Compact and Modular Controllers

Inverters, Servos and Motors

Visualisation: HMIs

Numerical Control (NC)

Robots: SCARA, Articulated arm

Processing machines: EDM, Lasers, IDS

Transformers, Air conditioning, Photovoltaic systems

* Not all products are available in all countries.

Country/Region	Sales office	Tel/Fax
USA	MITSUBISHI ELECTRIC AUTOMATION, INC. 500 Corporate Woods Parkway, Vernon Hills, IL 60061, U.S.A.	Tel : +1-847-478-2100 Fax : +1-847-478-2253
Mexico	MITSUBISHI ELECTRIC AUTOMATION, INC. Mexico Branch Mariano Escobedo #69, Col. Zona Industrial, Tlalnepantla Edo. Mexico, C.P.54030	Tel : +52-55-3067-7500
Brazil	MITSUBISHI ELECTRIC DO BRASIL COMÉRCIO E SERVIÇOS LTDA. Avenida Adelino Cardana, 293, 21 andar, Bethaville, Barueri SP, Brazil	Tel : +55-11-4689-3000 Fax : +55-11-4689-3016
Germany	MITSUBISHI ELECTRIC EUROPE B.V. German Branch Mitsubishi-Electric-Platz 1, 40882 Ratingen, Germany	Tel : +49-2102-486-0 Fax : +49-2102-486-1120
UK	MITSUBISHI ELECTRIC EUROPE B.V. UK Branch Travellers Lane, Hatfield, Hertfordshire, AL10 8XB, U.K.	Tel : +44-1707-28-8780 Fax : +44-1707-27-8695
Ireland	MITSUBISHI ELECTRIC EUROPE B.V. Irish Branch Westgate Business Park, Ballymount, Dublin 24, Ireland	Tel : +353-1-4198800 Fax : +353-1-4198890
Italy	MITSUBISHI ELECTRIC EUROPE B.V. Italian Branch Centro Direzionale Colleoni-Palazzo Sirio Viale Colleoni 7, 20864 Agrate Brianza(Milano) Italy	Tel : +39-039-60531 Fax : +39-039-6053-312
Spain	MITSUBISHI ELECTRIC EUROPE, B.V. Spanish Branch Carretera de Rubí, 76-80-Apdo. 420, 08190 Sant Cugat del Vallés (Barcelona), Spain	Tel : +34-935-65-3131 Fax : +34-935-89-1579
France	MITSUBISHI ELECTRIC EUROPE B.V. French Branch 25, Boulevard des Bouvets, 92741 Nanterre Cedex, France	Tel : +33-1-55-68-55-68 Fax : +33-1-55-68-57-57
Czech Republic	MITSUBISHI ELECTRIC EUROPE B.V. Czech Branch Avenir Business Park, Radlicka 751/113e, 158 00 Praha5, Czech Republic	Tel : +420-251-551-470 Fax : +420-251-551-471
Poland	MITSUBISHI ELECTRIC EUROPE B.V. Polish Branch ul. Krakowska 50, 32-083 Balice, Poland	Tel : +48-12-347-65-00 Fax : +48-12-630-47-01
Sweden	MITSUBISHI ELECTRIC EUROPE B.V. (Scandinavia) Fjelievägen 8, SE-22736 Lund, Sweden	Tel : +46-8-625-10-00 Fax : +46-46-39-70-18
Russia	MITSUBISHI ELECTRIC (RUSSIA) LLC St. Petersburg Branch Piskarevsky pr. 2, bld 2, lit "Sch", BC "Benua", office 720; 195027 St. Petersburg, Russia	Tel : +7-812-633-3497 Fax : +7-812-633-3499
Turkey	MITSUBISHI ELECTRIC TURKEY A.Ş Ümraniye Branch Serifali Mahallesi Nutuk Sokak No:5, TR-34775 Umraniye/Istanbul, Turkey	Tel : +90-216-526-3990 Fax : +90-216-526-3995
UAE	MITSUBISHI ELECTRIC EUROPE B.V. Dubai Branch Dubai Silicon Oasis, P.O.BOX 341241, Dubai, U.A.E.	Tel : +971-4-3724716 Fax : +971-4-3724721
South Africa	ADROIT TECHNOLOGIES 20 Waterford Office Park, 189 Witkoppen Road, Fourways, South Africa	Tel : +27-11-658-8100 Fax : +27-11-658-8101
China	MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. No.1386 Hongqiao Road, Mitsubishi Electric Automation Center, Shanghai, China	Tel : +86-21-2322-3030 Fax : +86-21-2322-3000
Taiwan	SETSUYO ENTERPRISE CO., LTD. 6F, No.105, Wugong 3rd Road, Wugu District, New Taipei City 24889, Taiwan	Tel : +886-2-2299-2499 Fax : +886-2-2299-2509
Korea	MITSUBISHI ELECTRIC AUTOMATION KOREA CO., LTD. 7F-9F, Gangseo Hangang Xi-tower A, 401, Yangcheon-ro, Gangseo-Gu, Seoul 07528, Korea	Tel : +82-2-3660-9530 Fax : +82-2-3664-8372
Singapore	MITSUBISHI ELECTRIC ASIA PTE. LTD. 307, Alexandra Road, Mitsubishi Electric Building, Singapore 159943	Tel : +65-6473-2308 Fax : +65-6476-7439
Thailand	MITSUBISHI ELECTRIC FACTORY AUTOMATION (THAILAND) CO., LTD. 12th Floor, SV.City Building, Office Tower 1, No. 896/19 and 20 Rama 3 Road, Kwaeng Bangpongpang, Khet Yannawa, Bangkok 10120, Thailand	Tel : +66-2682-6522 Fax : +66-2682-6020
Vietnam	MITSUBISHI ELECTRIC VIETNAM COMPANY LIMITED Hanoi Branch 6th Floor, Detech Tower, 8 Ton That Thuyet Street, My Dinh 2 Ward, Nam Tu Liem District, Hanoi, Vietnam	Tel : +84-4-3937-8075 Fax : +84-4-3937-8076
Indonesia	PT. MITSUBISHI ELECTRIC INDONESIA Gedung Jaya 11th Floor, JL. MH. Thamrin No.12, Jakarta Pusat 10340, Indonesia	Tel : +62-21-3192-6461 Fax : +62-21-3192-3942
India	MITSUBISHI ELECTRIC INDIA PVT. LTD. Pune Branch Emerald House, EL-3, J Block, M.I.D.C., Bhosari, Pune-411026, Maharashtra, India	Tel : +91-20-2710-2000 Fax : +91-20-2710-2100
Australia	MITSUBISHI ELECTRIC AUSTRALIA PTY. LTD. 348 Victoria Road, P.O. Box 11, Rydalmere, N.S.W 2116, Australia	Tel : +61-2-9684-7777 Fax : +61-2-9684-7245

Mitsubishi Electric Corporation Nagoya Works is a factory certified for ISO 14001 (standards for environmental management systems) and ISO 9001 (standards for quality assurance management systems).

EC97J1113 051 008

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE: TOKYO BLDG., 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN

www.MitsubishiElectric.com

L(NA)08298ENG-F 1606〈IP〉

New publication, effective Jun. 2016.