MITSUBISHI ELECTRIC

Changes for the Better

MELSEC iQ-R Series
iQ Platform-compatible PAC

reddot design award winner 2016

DESIGN AWARD 2015

e-F@ctory

Bridging the next generation of automation

Concise

MELSEC iQ-R series

GLOBAL IMPACT OF MITSUBISHI ELECTRIC

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

Changes for the Better

"Changes for the Better" represents the Mitsubishi Electric Group's attitude to "always strive to achieve something better", as we continue to change and grow. Each one of us shares a strong will and passion to continuously aim for change, reinforcing our commitment to creating "an even better tomorrow".

Our advances in AI and IoT are adding new value to society in diverse areas from automation to information systems. The creation of game-changing solutions is helping to transform the world, which is why we are honored to be recognized in the 2019 "Forbes Digital 100" as one of world's most influential digital corporations.

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.

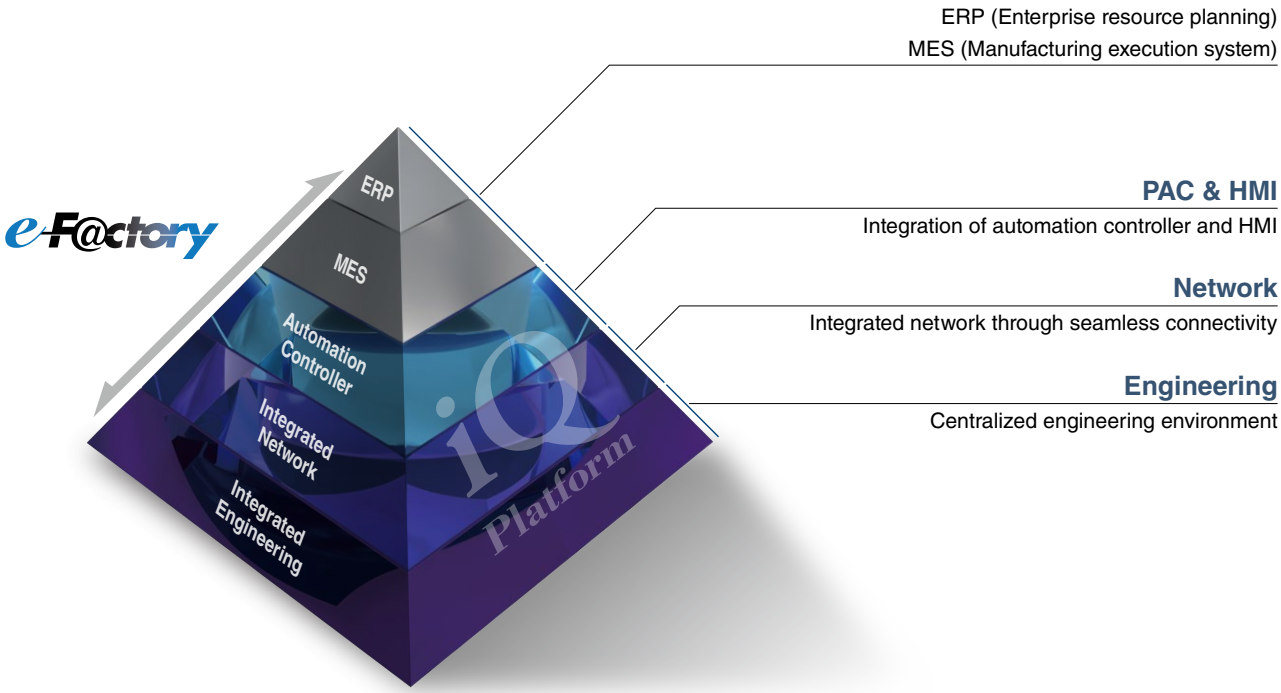
Information and Communication Systems
Commercial and consumer-centric equipment, products and systems.

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

FA Integrated Platform
"iQ Platform" Movie

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*1

To succeed in highly competitive markets, it's important to build automation systems that ensure high productivity and consistent product quality. The MELSEC iQ-R Series has been developed from the ground up based on common problems faced by customers and rationalizing them into seven key areas: Productivity, Engineering, Maintenance, Quality, Connectivity, Security and Compatibility. Mitsubishi Electric is taking a three-point approach to solving these problems: **Reducing TCO*1**, increasing **Reliability** and **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.

*1. 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-module 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

Open integrated networking across the manufacturing enterprise

- High-speed/high-accuracy motion control reduces operating cycle time
- Flexible IIoT*2 system configuration
- Improve system usability using intuitive engineering software

*2. IIoT: Industrial Internet of Things

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 FA Global website
MELSEC iQ-R Series concept

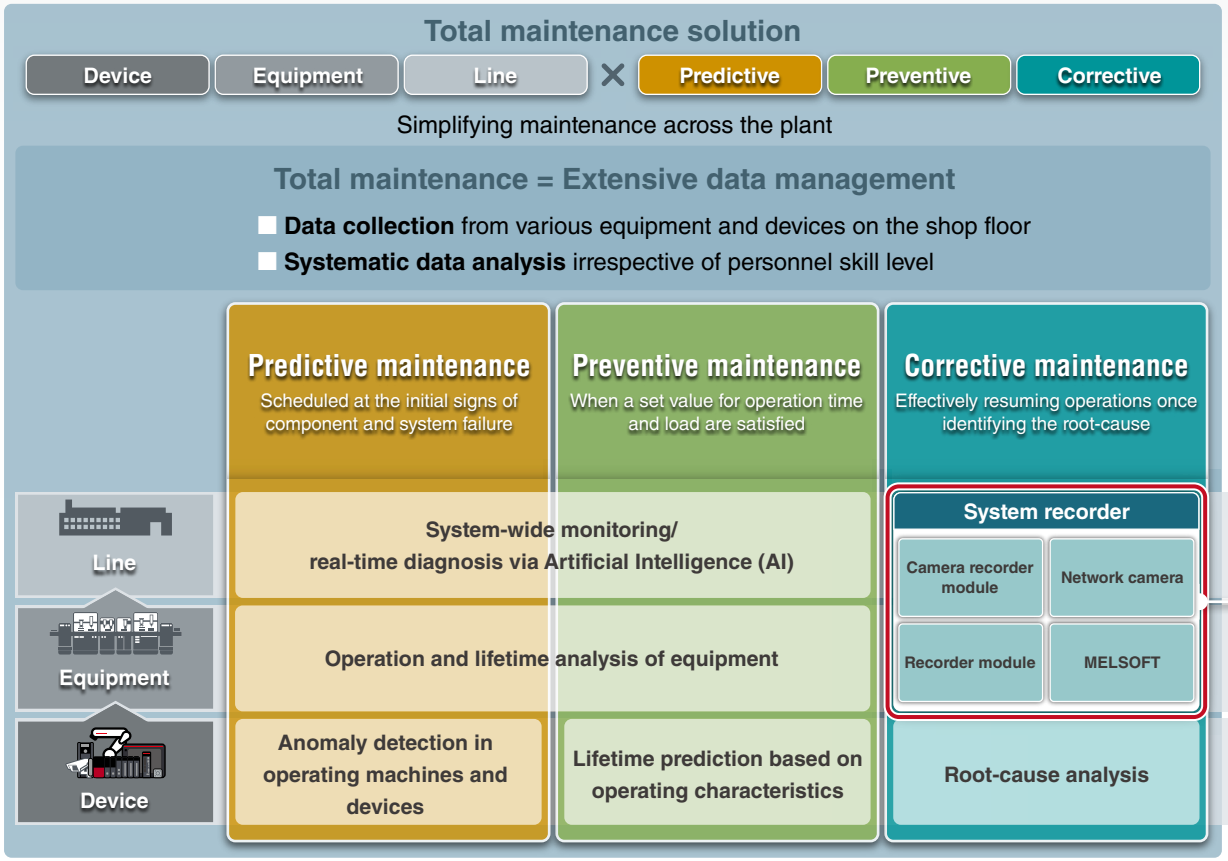
MELSEC iQ-R Search

www.MitsubishiElectric.com/fa/products/cnt/plcr/pmerit/concept/index.html

The viewable page may vary depending on web browser and/or device (smartphone or tablet) used.

Mitsubishi Electric's solution for improving productivity through easier data management

Ensuring continuous production is a key factor in manufacturing from **device**, to **equipment** and across **multiple lines**. This can be achieved in various ways by recording and sampling production and machine operating data and utilizing this data within various stages of maintenance; from ❶**predictive maintenance** to detect signs of error, periodical ❷**preventive maintenance**, and ❸**corrective maintenance** for prompt troubleshooting at the time of failure. Having an enhanced maintenance solution is Mitsubishi Electric's goal of empowering the customer to reduce downtime and to ensure a manufacturing plants efficiency is running at optimum resulting in reduced operating and maintenance cost.



System-wide recording

Data recording and video feed

Device/label collection ..... h i
Event history recording ..... h i
Network camera image recording ..... h j k l
Automatic saving to file server ..... j l

Drives status recording

Servo system recording ..... a f i

GOT (HMI) operation recording

Recording of log and alarm data ..... g

Simplified analysis

Data analysis with video feed

Offline monitoring ..... a b d e h
Log marker ..... a b c

Comprehensive device relationship mapping

Data flow analysis ..... b

System recorder

The system recorder is a corrective maintenance solution that ensures effective resumption of operations reducing downtime through its extensive system-wide data recording and simplified analysis software features.

System-wide recording and simplified analysis

System-wide recording

■ Extensive recording ensures simpler cause analysis

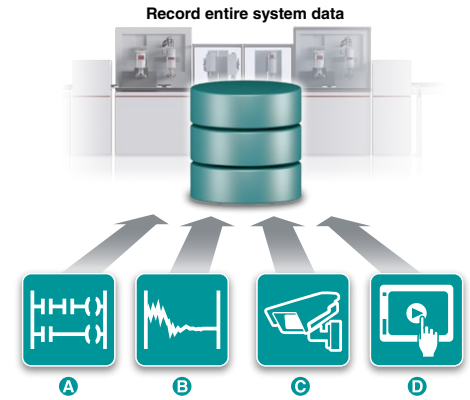
Error cause identification is made simpler by the extensive recording of various equipment and device data together with a real-time video feed reducing the need for multiple retesting due to insufficient data.

■ System-wide

Irregularities between various equipment including control and drive systems together with operations are all linked.

■ Automatic system-wide recording

Recording of errors that can occur outside standard operating shifts.



Ⓐ Programmable controller CPU (entire bit/word data)
Ⓑ Servo status (command position, actual position, speed, torque)
Ⓒ Network camera video feed
Ⓓ Display and operation log of GOT (HMI)

Simplified analysis

■ Extensive data shown in the same timeline

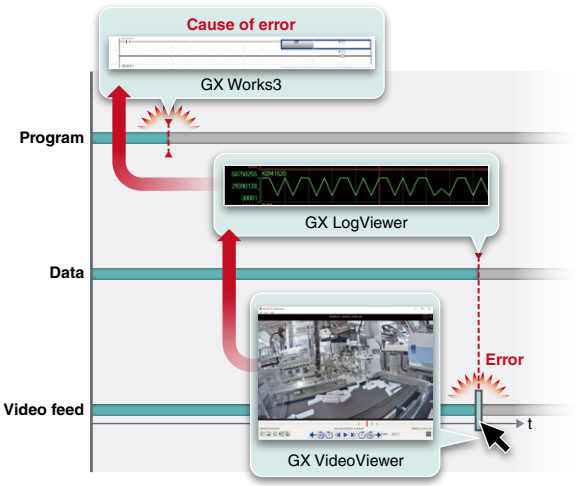
Waveform, data, program, operations log and video feeds are shown in sequence ready for analysis.

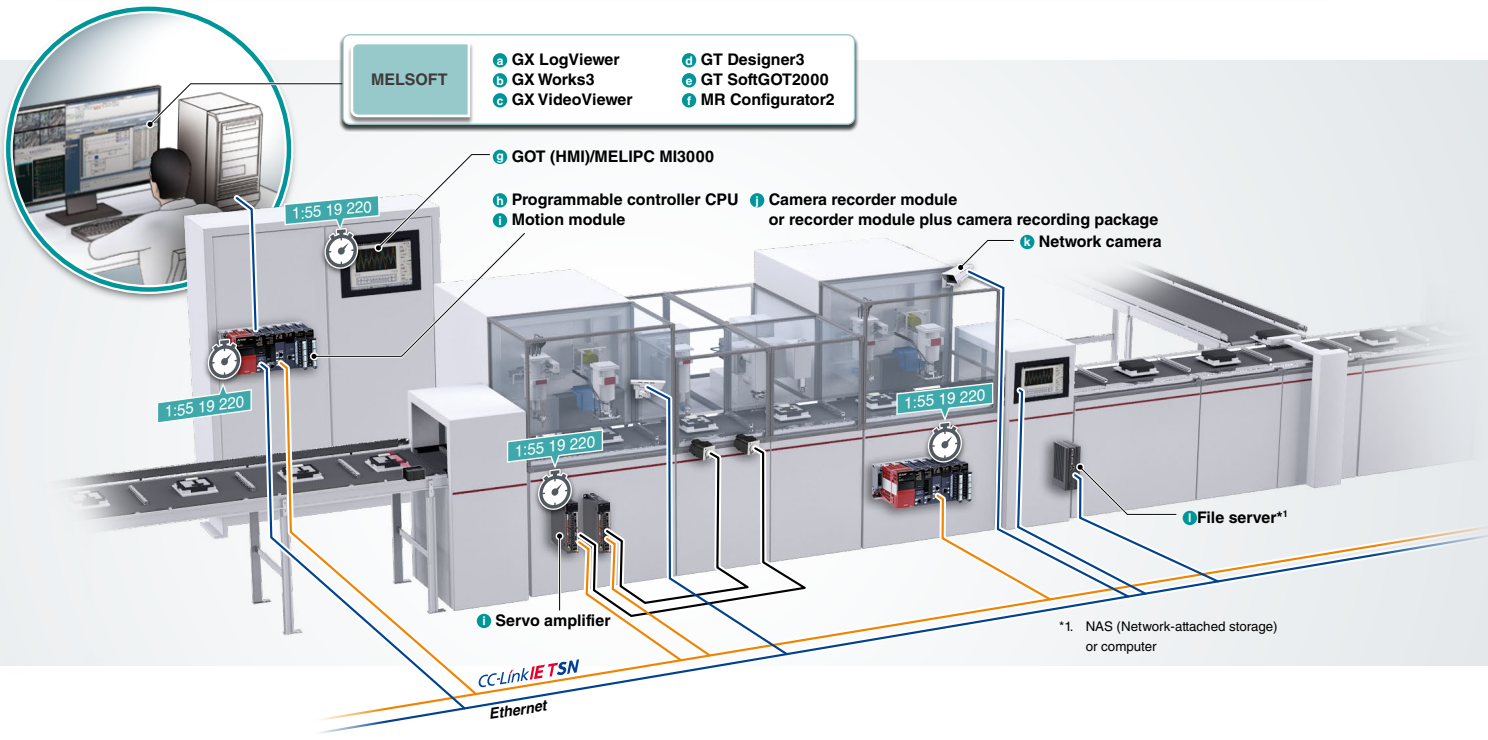
■ Easier cause identification

Data flow analysis makes understanding the root-cause of failures easier by showing the relationship between failed and normal devices.

■ Structured program ensures easier troubleshooting

Supports structured programs and device labels enabling easier resolution of problems.





*1. NAS (Network-attached storage) or computer

Mitsubishi Electric PAC MELSEC iQ-R
"Process" Movie

Process

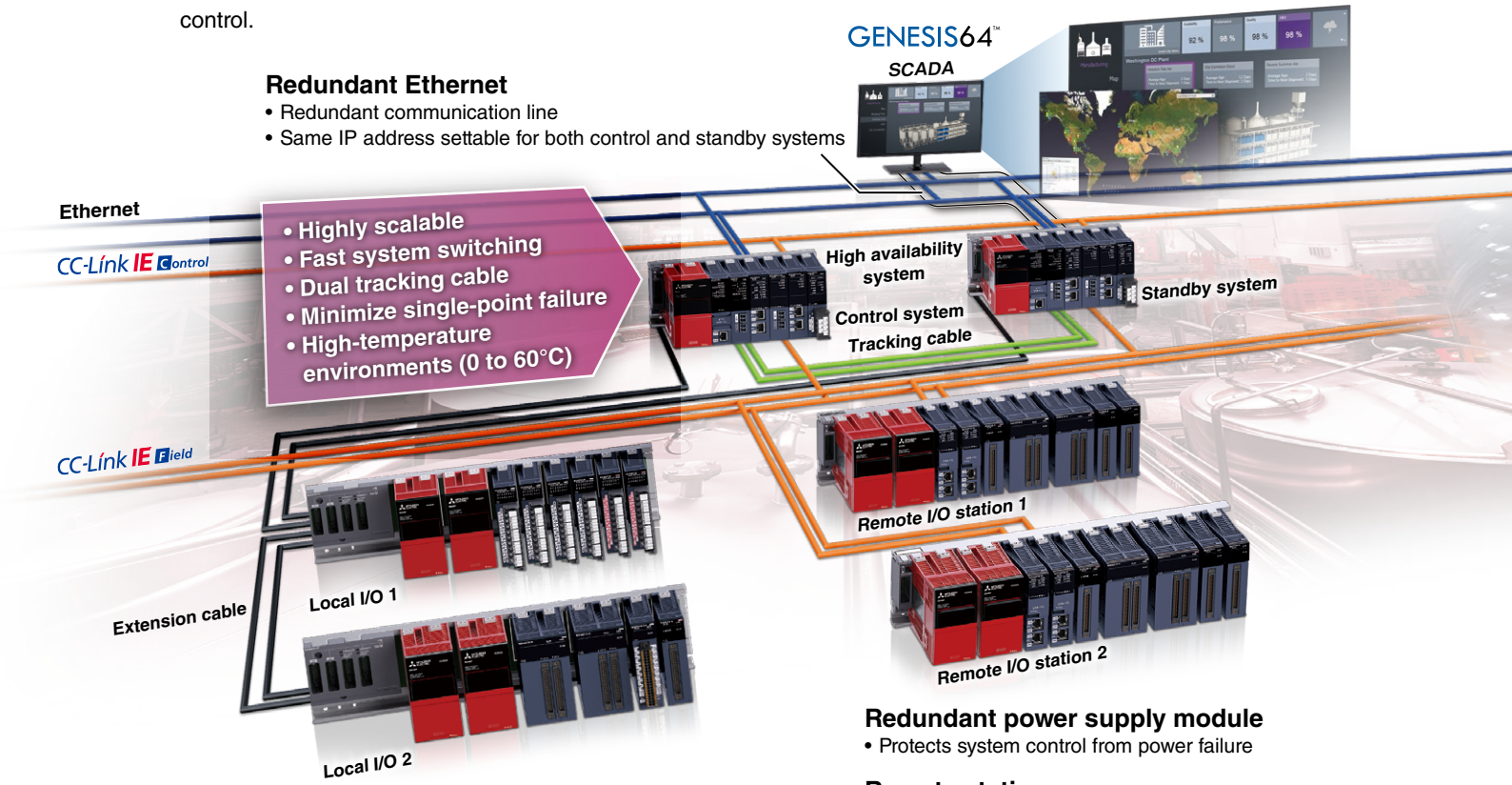
High-available process control in a scalable automation solution

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.

System monitoring control and data utilization

Extensive visualization

SCADA Software GENESIS64™, GOT2000, and GT SoftGOT2000 provide extensive visualization with their 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.



Redundant power supply module
- Protects system control from power failure

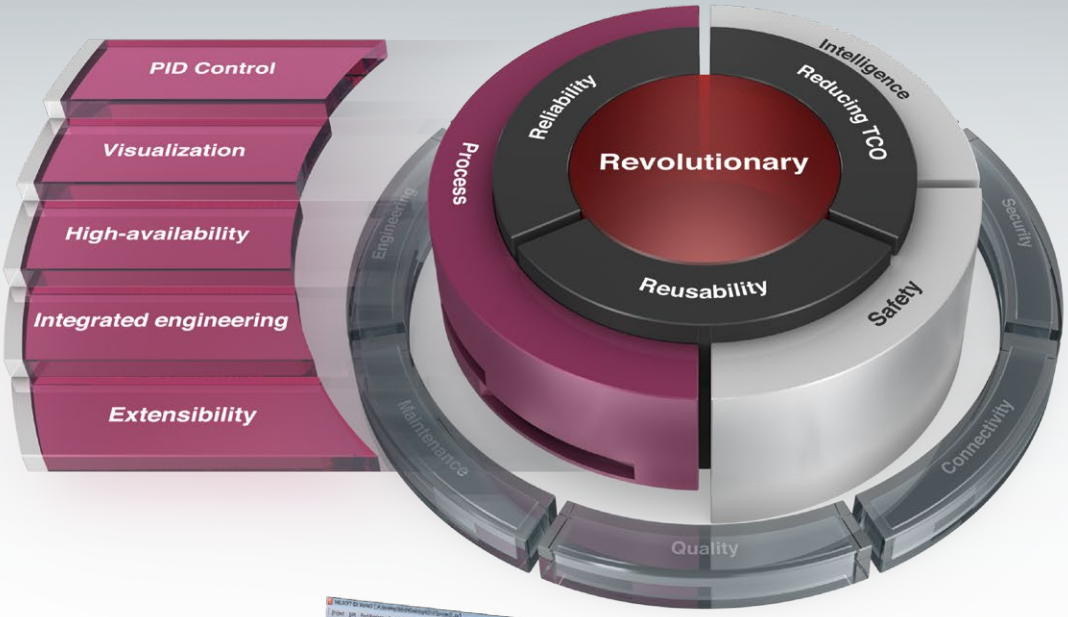
Redundant extension base unit
- Connects directly to the redundant control system base unit
- Reduced single point of failure when either power supply or extension cabling fails

Remote station
Redundant remote network head module
- Enables continuous data communications by switching control between modules

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, network, and extension cable levels, thereby avoiding system downtime and ensuring continuous control and operation of critical systems.



Embedded PID algorithms

PID control

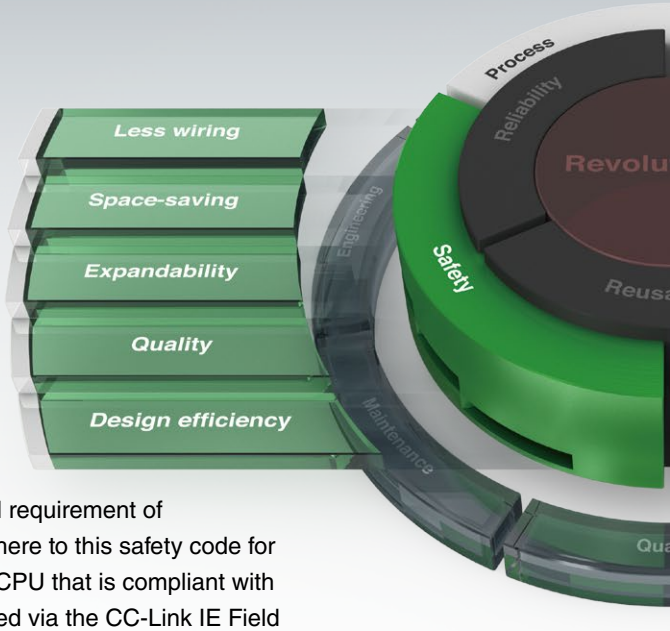
The process CPU includes dedicated algorithms such as two-degree-of-freedom PID, sample PI, and auto-tuning support advanced process control.

One package process control software

Integrated engineering

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

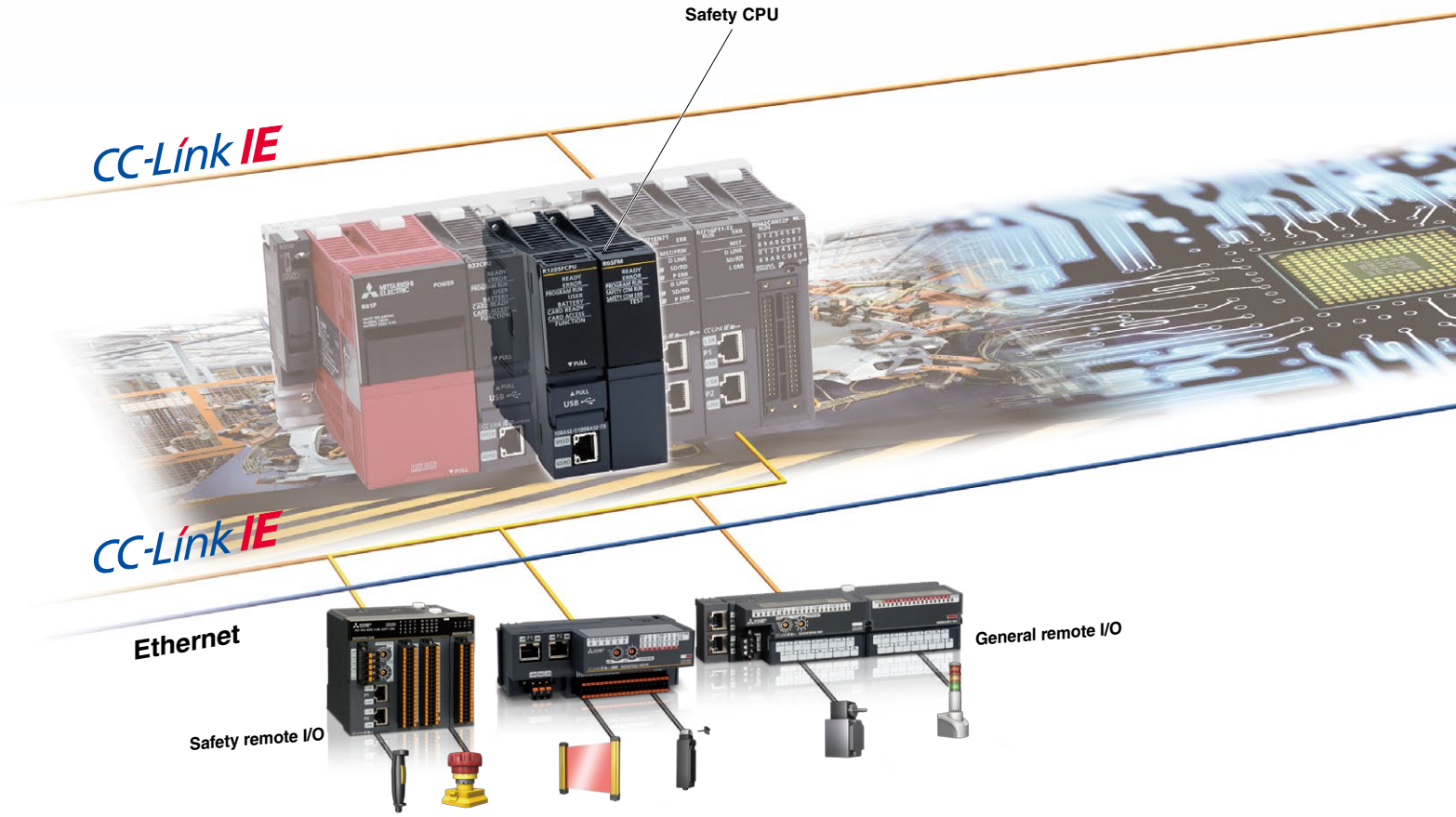
Mitsubishi Electric PAC MELSEC iQ-R
"Safety" Movie



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

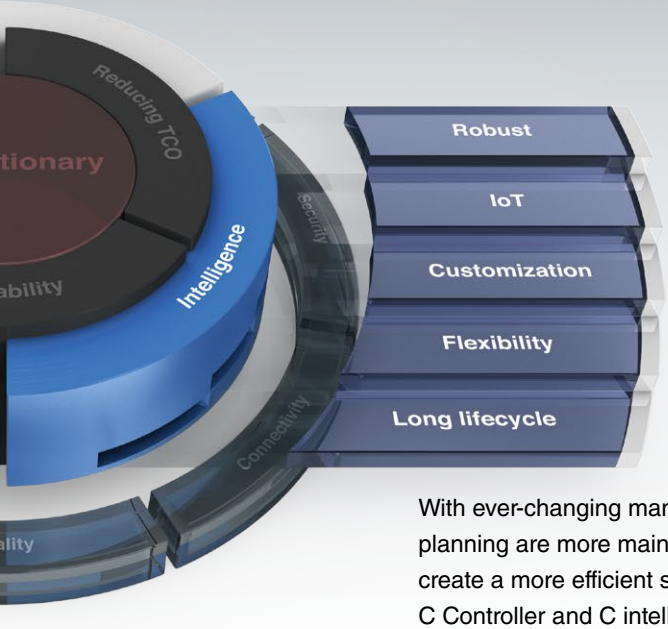
Quality

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

General and safety control in one CPU

Space-saving

Safety CPU can be installed directly on the MELSEC iQ-R base rack realizing easy integration into an existing or new control system. Also, compact remote I/Os are available ideal for systems with limited space.

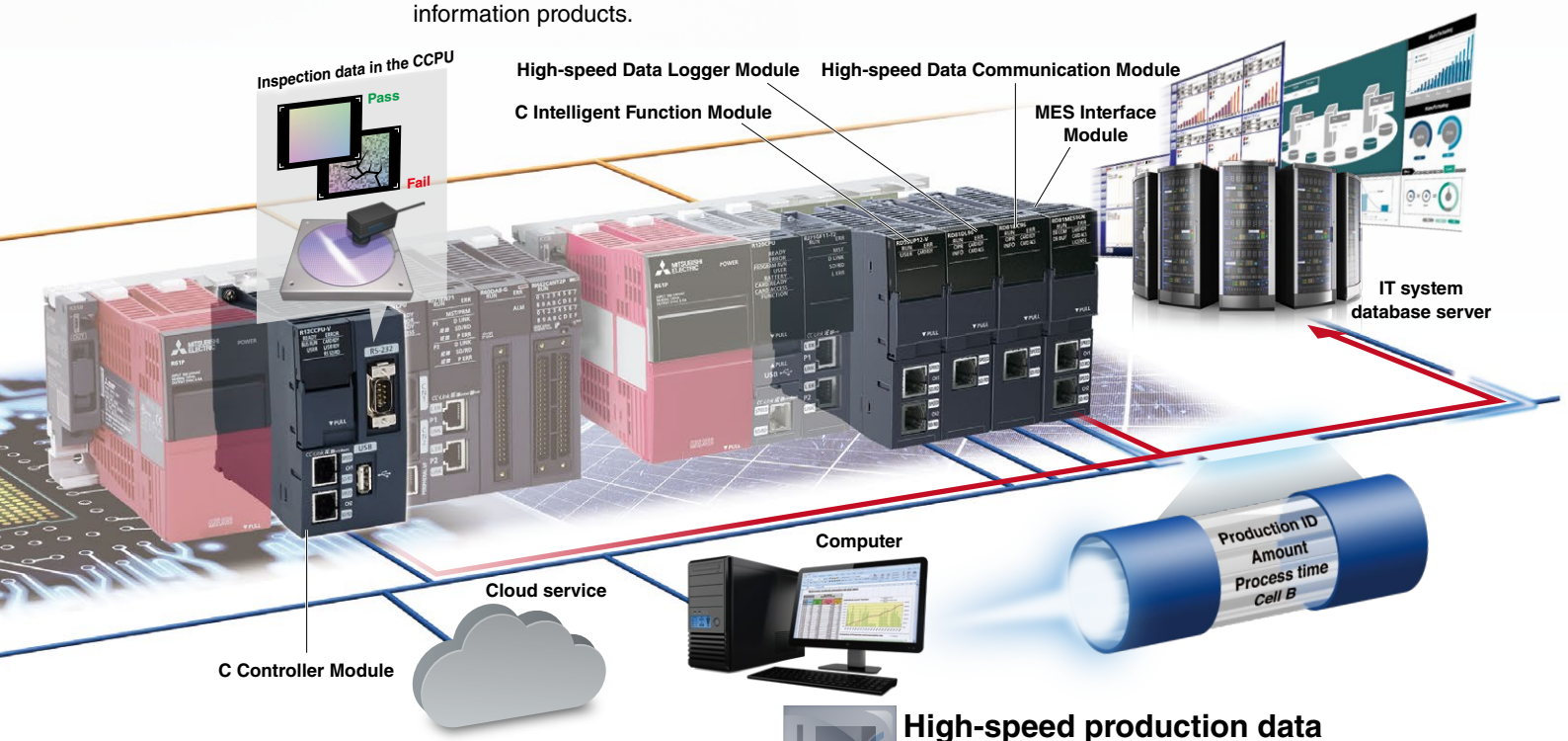


Mitsubishi Electric PAC MELSEC iQ-R "Intelligence" Movie

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, high-speed data logger, and high-speed data communication modules as part of the “Intelligence” lineup of interconnected advanced information products.



C/C++ based programming

Flexibility

Based on the Arm® Cortex®-A9 dual-core 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 collection

The high-speed data logger and high-speed data communication modules enable data collection and conversion for easier processing on a computer. Less program development time realizes quick implementation.

Connectivity with database servers and cloud services

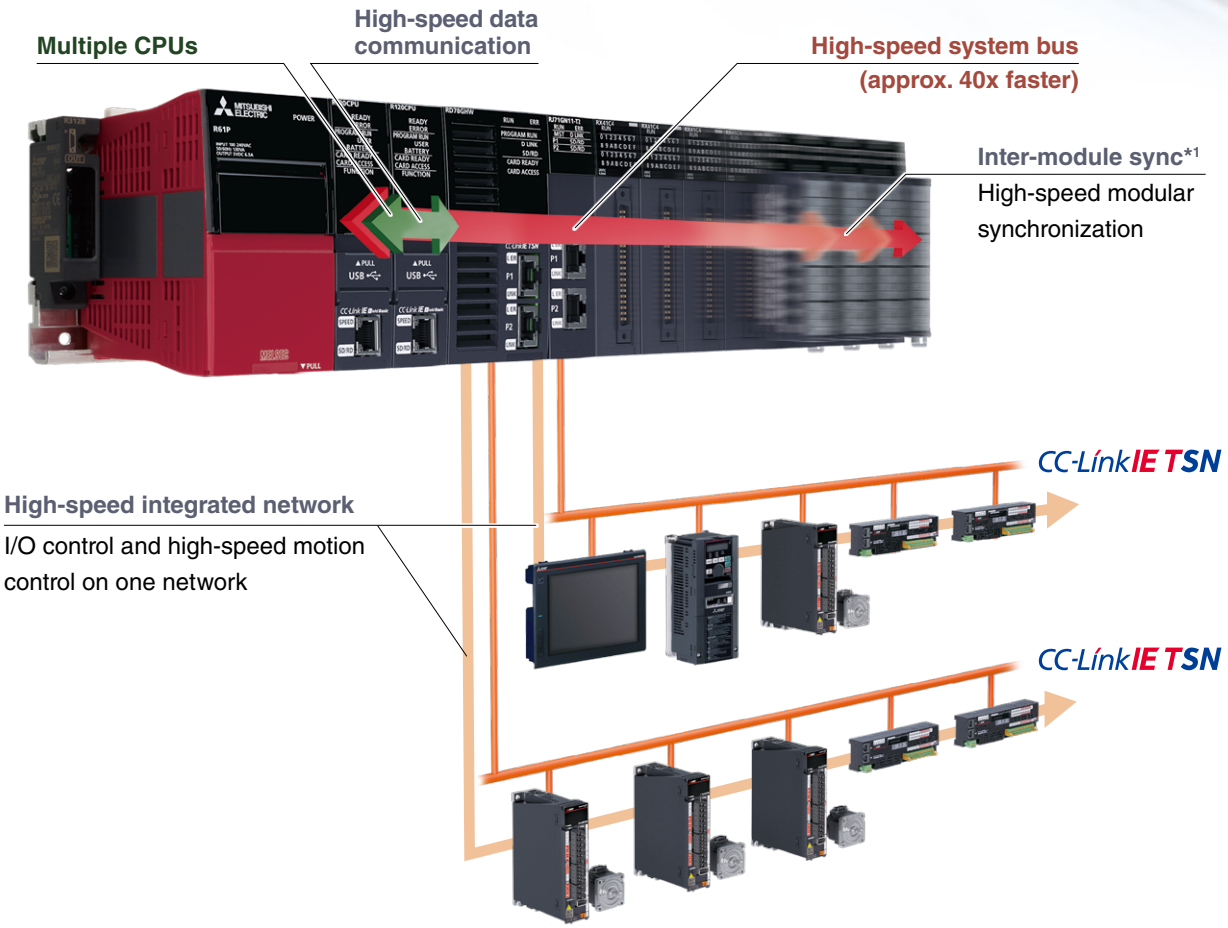
Information connection

The MES interface module realizes direct access to the IT system with easy setting. Overall system cost is reduced as gateway computers are not required. The C intelligent function module supports Debian GNU/Linux, realizing third-party cloud services connection. Predictive and remote maintenance of machines are easily realized.

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*2

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*3

*1. Inter-module synchronization for the CC-Link IE TSN compatible motion module will be supported in the future.
*2. Compared to MELSEC-Q Series.
*3. Compared to Q173DSCPU/Q172DSCPU.

Mitsubishi Electric PAC MELSEC iQ-R "Productivity" Movie

Inter-module synchronization realizes increased processing accuracy

More flexible control over performance

Realizing high processing accuracy could not be any simpler when utilizing the Inter-module 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. Directly access CPU internal database data from a computer equipped with Microsoft® Access® or Excel® is also supported.

Realize high-speed system performance

Approx. 8x faster than QCPU*4

- 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
- Access database from computer

LD instruction speed	PC MIX*5 (instructions/μs)	Fixed-cycle interrupt program	ST instruction (IF text, bit condition)	Program capacity
0.98 ns	419	50 μs	8 ns	1200K steps

*4. 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).

*5. 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.

Complies with 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

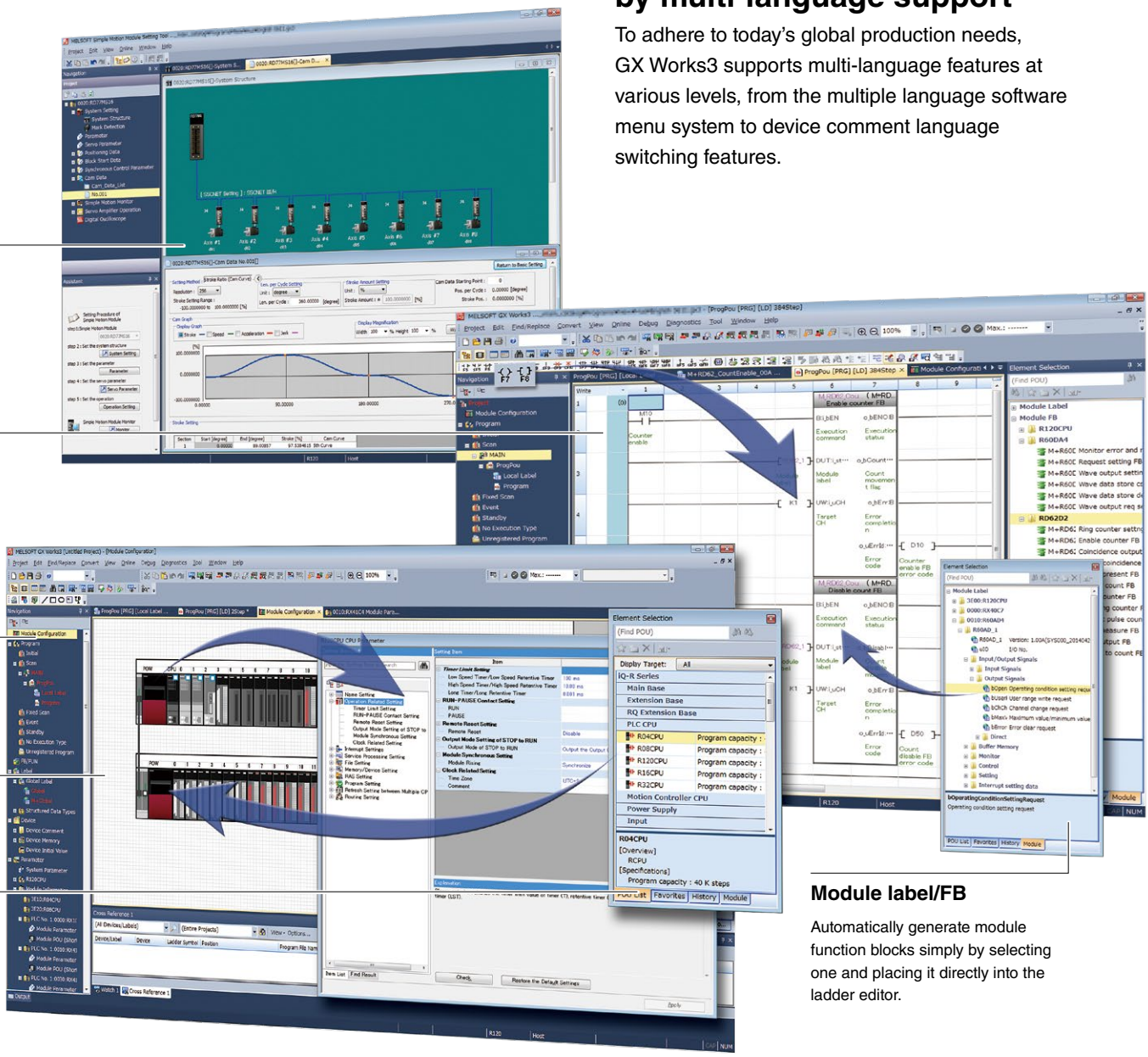
Simply drag & drop modules directly into the module configuration.

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

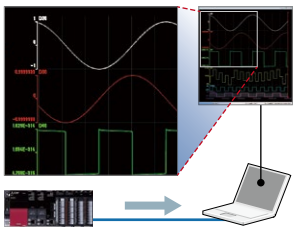
Reduce maintenance costs and downtime utilizing easier maintenance features

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

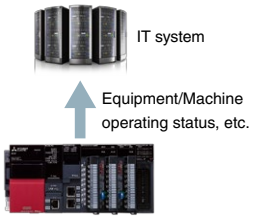


Real-time monitor

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

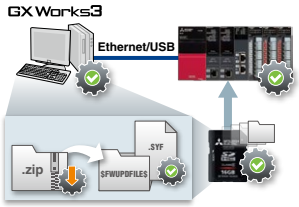
Prevent system downtime with relay monitoring

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

Corrective maintenance CPU module, GX Works3

Module firmware update ensuring latest functional version module

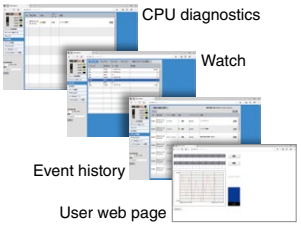
- Utilize new functions and features immediately
- Update multiple modules using GX Works 3 in one go
- Direct updating using a SD memory card



Corrective maintenance CPU module

Web server enables monitoring of module status on a web browser

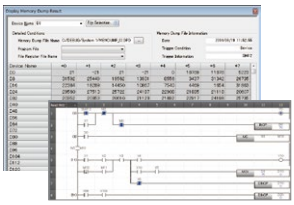
- Monitor various module status data:
  - CPU diagnostics
  - Device block monitor/ watch
  - Event history
- Supports custom made web pages



Corrective maintenance CPU module

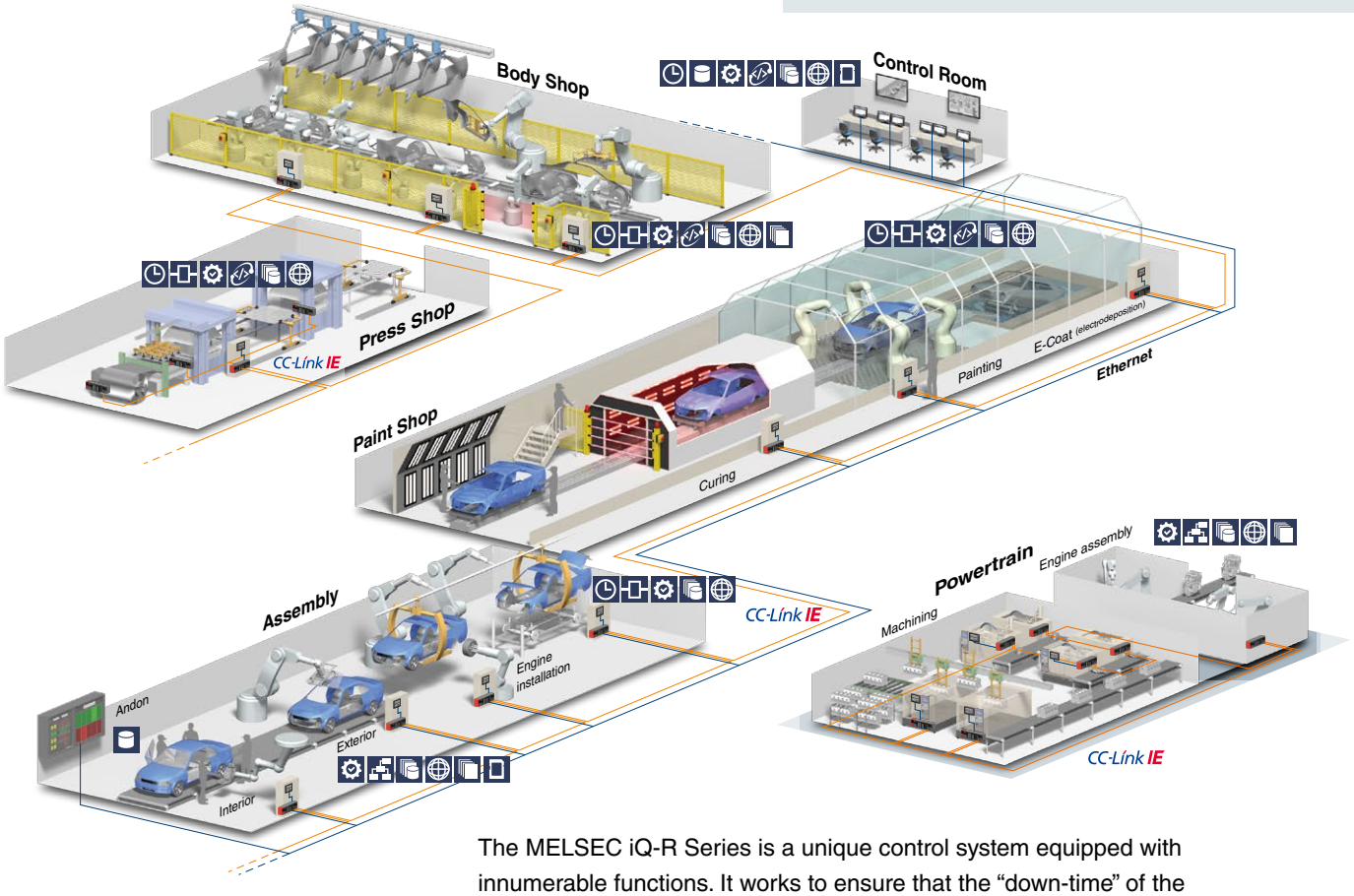
Memory dump enables confirmation of operation problems

- 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 System recorder (CPU, camera recorder, recorder modules)

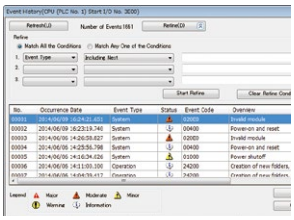
System-wide recording and simplified analysis

- Extensive recording of control data and status of equipment/devices
- Reproduction of processes contributing to prompt troubleshooting of equipment

Corrective maintenance CPU module

Efficient diagnostics with extensive event logging

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

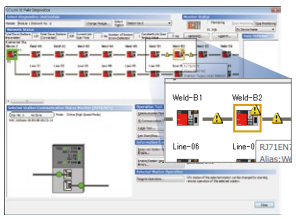


Event log list

Corrective maintenance GX Works3

Quickly find network errors

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

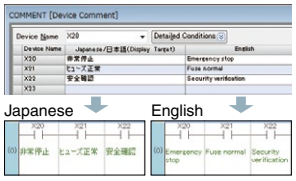


CC-Link IE Field diagnosis window

Corrective maintenance GX Works3

Multi-language software improves global support

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



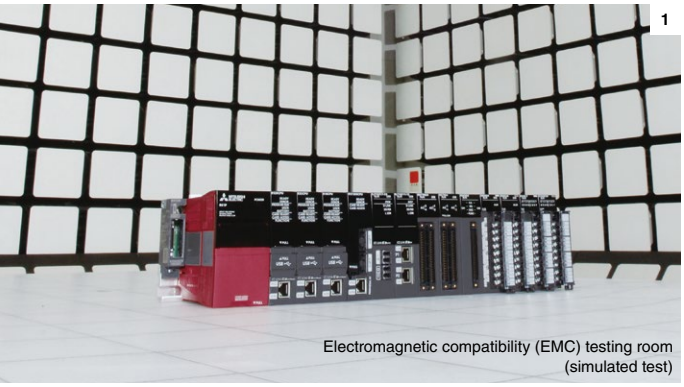
Switch between device comment languages

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 the regulation related to corrosive gas

For protection against aggressive atmosphere and gases, products with a conformal coating (IEC 60721-3-3: 1994 3C2) are available on request*1

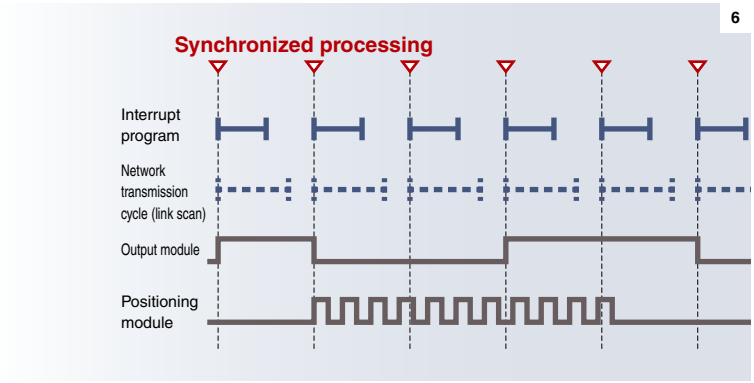
*1. Please contact your local Mitsubishi Electric sales office or representative for further details.

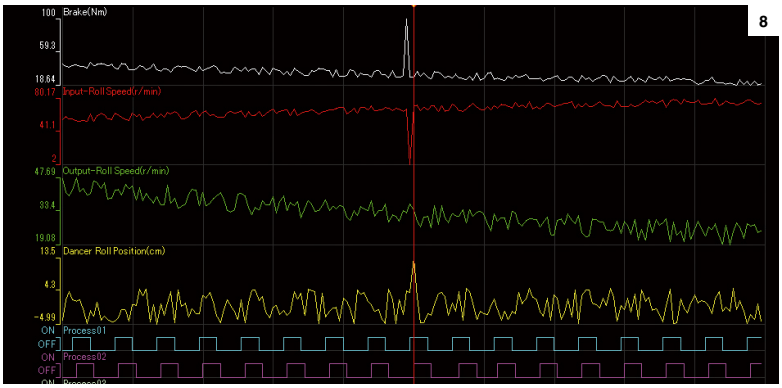
1. Conforms to stringent quality evaluations and tests that are based on robust industrial environments including EMC, LSI, temperature, vibration and HALT tests.
2. High manufacturing quality control through QR code based quality management system.
3. The front face has a wide and open design with an easy-to-use front cover.
4. High quality is ensured by conducting reliability testing on all modules during manufacturing.
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. 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.

Improve and maintain actual manufacturing quality

Maintains product quality during manufacturing

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

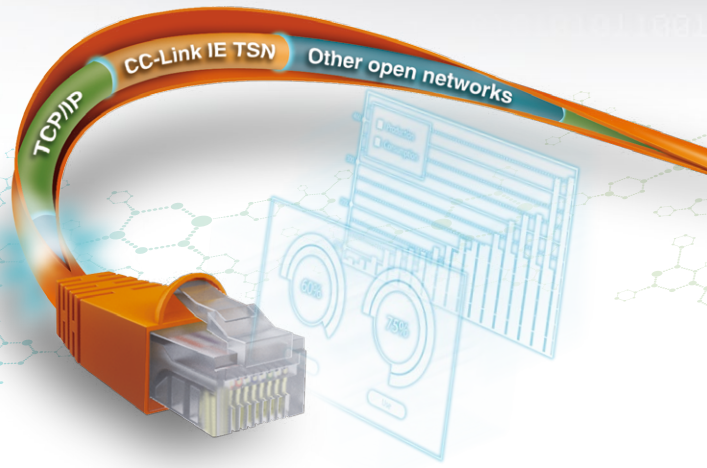
Realizes traceability through data logging

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

Connectivity

Open integrated networking across the manufacturing enterprise

The MELSEC iQ-R Series is part of a family of products all interconnected across various levels of automation. Utilizing TSN technology and an advanced communication protocol, CC-Link IE TSN enables seamless communication between the shop floor and IT systems. Real-time collected production data can be processed on either edge devices or IT systems, improving the productivity of the entire manufacturing plant.



CC-Link IE TSN

CC-Link IE TSN module

CC-Link IE TSN-compatible motion module

Network module maximizes CC-Link IE TSN functionality

The network module enables mixing of real-time control and TCP/IP communications. Automatic detection of network devices and parameter distribution realizes easy network configuration.

Synchronization accuracy	Link points
±1 µs	2x

Supports various motion control functions maximizing on network performance

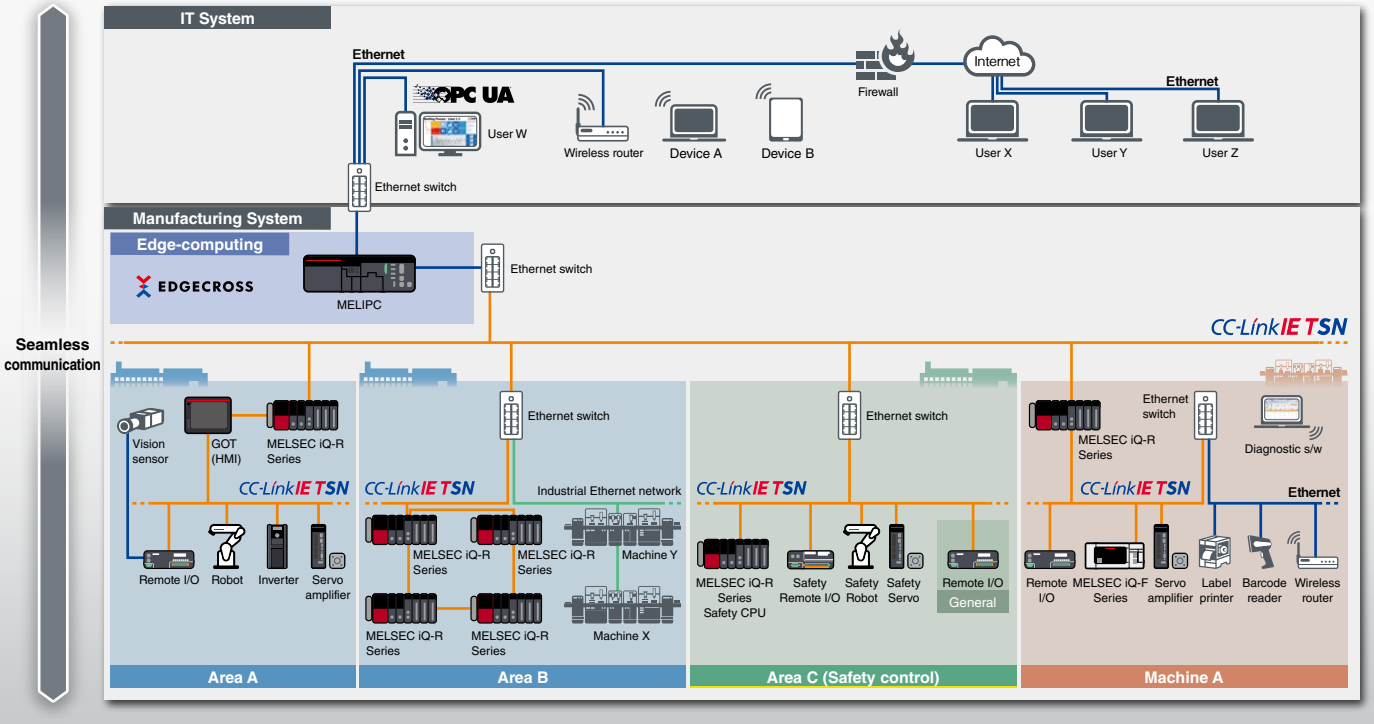
Select motion modules based on the equipment size and application. Supports connection of I/O modules as well as servo amplifiers.

Min. communication cycle	High-speed processing	Max. number of synchronized axes
31.25 µs *1*2	16x	256*1

*1. Minimum operation cycle and maximum number of control axes for the RD78GH.
*2. This value is achieved when fast operation mode of the motion module (RD78GH) is used. For details, please refer to the MELSEC iQ-R Motion Module User's Manual (Application) (IB-0300411ENG).

CC-Link IE TSN "IIoT system" movie

CC-Link IE TSN "Integrated motion" movie



Flexible IIoT system configuration

CC-Link IE TSN utilizes TSN technology together with its support of TCP/IP communications enables mixing of information communication (non real-time) with Ethernet communication devices. This allows TCP/IP communication devices to be used without affecting real-time deterministic communications, thereby giving greater flexibility when connecting machines and equipment.

Reduce startup, engineering and maintenance costs

Through its support of SNMP*3, general Ethernet diagnostics software can be used to identify the network-related errors of CC-Link IE TSN and Ethernet devices more easily. The internal clocks of devices can be synchronized to within the microsecond, making it possible to log historical events in sequence and easily identify the cause of an error.

*3. SNMP: Simple network management protocol

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.

Extended SRAM cassette with registered security key

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.

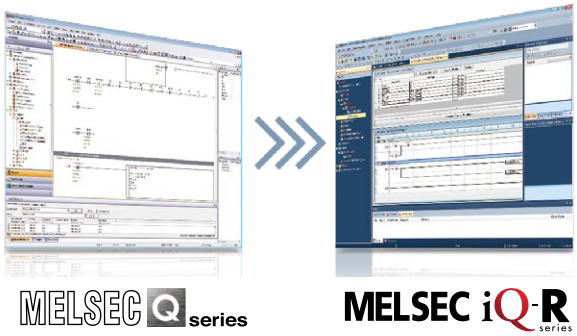
Mitsubishi Electric PAC MELSEC iQ-R "Compatibility" Movie

Utilize existing MELSEC-Q Series assets

Current programs can be fully utilized

A simple 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

- R61P ..... AC input
- R62P ..... AC input (inc. 24 V DC output)
- R64P ..... AC input (large capacity)
- R63P ..... DC input
- R63RP ..... DC input (Redundant)
- R64RP ..... AC input (Redundant)

Base

Main base
- R33B 3-slot
- R35B 5-slot
- R38B 8-slot
- R312B 12-slot
- R310RB ..... 10-slot (Redundant)

Extended temperature range main base
- R310B-HT 10-slot
- R38RB-HT ..... 8-slot (Redundant)

Extension base
- R65B 5-slot
- R68B 8-slot
- R612B 12-slot
- R610RB ..... 10-slot (Redundant)
- R68WRB ..... 8-slot (Redundant)

Extended temperature range extension base
- R610B-HT 10-slot
- R68RB-HT ..... 8-slot (Redundant)
- R66WRB-HT ..... 6-slot (Redundant)

RQ extension base (MELSEC-Q Series)
- RQ65B 5-slot
- RQ68B 8-slot
- RQ612B 12-slot

Extension cable
- RC06B ..... 0.6 m
- RC12B ..... 1.2 m
- RC30B ..... 3 m
- RC50B ..... 5 m
- RC100B ..... 10 m

CPU

Programmable controller CPU
- R00CPU ..... 10K steps
- R01CPU ..... 15K steps
- R02CPU ..... 20K steps
- 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

SIL2 process CPU
- R08PSFCPU-SET ..... 80K steps
- R16PSFCPU-SET ..... 160K steps
- R32PSFCPU-SET ..... 320K steps
- R120PSFCPU-SET ..... 1200K steps

Redundant function module
- R6RFM ..... Redundant function

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

I/O

AC input
- RX28 ..... 8-point
- RX10-TS 16-point
- RX10 ..... 16-point

DC input
- RX40C7-TS 16-point
- RX40C7 ..... 16-point
- RX41C4-TS 32-point
- RX41C4 ..... 32-point
- RX42C4 ..... 64-point
- RX70C4 ..... 16-point
- RX71C4 ..... 32-point
- RX72C4 ..... 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

Relay output
- RY18R2A 8-point
- RY10R2-TS 16-point
- RY10R2 ..... 16-point

Triac output
- RY20S6 ..... 16-point

Transistor (sink) output
- RY40NT5P-TS 16-point
- RY40NT5P 16-point
- RY41NT2P-TS 32-point
- RY41NT2P 32-point
- RY42NT2P 64-point

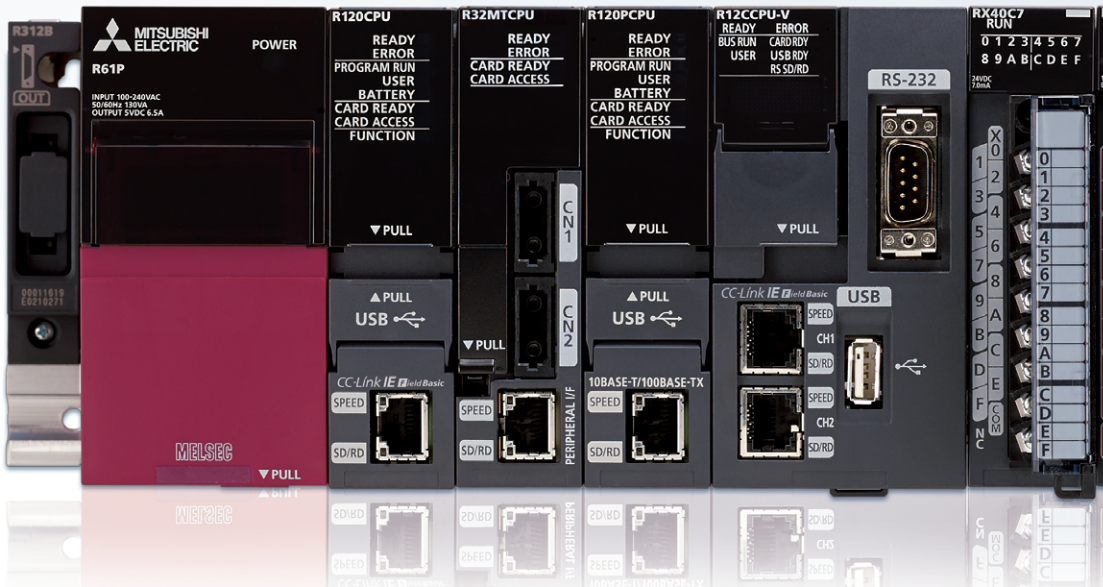
High-speed transistor (sink) output
- RY41NT2H 32-point

Transistor (source) output
- RY40PT5P-TS 16-point
- RY40PT5P 16-point
- RY41PT1P-TS 32-point
- RY41PT1P 32-point
- RY42PT1P 64-point

High-speed transistor (source) output
- RY41PT2H 32-point

Transistor (with diagnostic functions) output
- RY40PT5B 16-point

I/O combined module
DC input, transistor (sink) output
- RH42C4NT2P 32-point/32-point



Analog

Analog input
- R60AD4 ..... 4-channel (voltage or current)
- R60ADV8 ..... 8-channel (voltage)
- R60ADI8 ..... 8-channel (current)
- R60ADI8-HA ..... 8-channel (current) HART® communication
- R60AD6-DG ..... 6-channel (channel isolated)

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 (channel isolated)
- R60TD8-G ..... 8-channel (thermocouple)
- R60RD8-G ..... 8-channel (RTD)

Temperature control
- R60TCTRT2TT2-TS ..... 2-channel multi-input
- R60TCTRT2TT2 ..... 2-channel multi-input, 2-channel thermocouple input
- R60TCRT4-TS ..... 4-channel RTD 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)

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

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

SIL2 analog control output
- RY40PT5B-AS 16-point

Motion, Positioning, High-speed Counter, Channel isolated pulse input

Motion
(Compatible with CC-Link IE TSN)
- RD78G4 ..... 4-axis
- RD78G8 ..... 8-axis
- RD78G16 ..... 16-axis
- RD78G32 ..... 32-axis
- RD78G64 ..... 64-axis
- RD78GHV 128-axis
- RD78GHW 256-axis

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

Channel isolated pulse input
- RD60P8-G 8-channel

Network

CC-Link IE TSN
- RJ71GN11-T2 ..... Master/Local station

Ethernet
- RJ71EN71 ..... 1 G/100 M/10 Mbps Multiple network type (Ethernet/CC-Link IE)

CC-Link IE Control network
- RJ71GP21(S)-SX*1 ..... Control/Normal station optical cable

*1. RJ71GP21S-SX includes an external power supply input

CC-Link IE Field network
- RJ71GF11-T2 ..... Master/Local station
- RJ72GF15-T2 ..... Remote station

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

AnyWireASLINK
- RJ51AW12AL ..... Master station

BACnet®
- RJ71BAC96 ..... Controller/Workstation

CANopen®
- RJ71CN91 ..... NMT master/NMT slave

PROFINET®
- RJ71PN92 ..... IO Controller
- RJ71PN93 ..... IO Device

EtherNet/IP™
- RJ71EIP91 ..... Scanner

PROFIBUS®-DP
- RJ71PB91V ..... DP master/slave

DeviceNet®
- RJ71DN91 ..... Master/slave

MELSECNET/H network
- RJ71LP21-25 ..... Control/Normal station optical cable

GP-IB interface
- RJ71GB91 ..... Controller/device

Serial communication
- RJ71C24 ..... RS-232, RS-422/485
- RJ71C24-R2 ..... RS-232 (2-channel)
- RJ71C24-R4 ..... RS-422/485 (2-channel)

Advanced information modules

MES Interface
- RD81MES96N ..... Database connection

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

Camera recorder module
- RD81RC96-CA ..... Device/label collection, camera image

Recorder module
- RD81RC96 ..... Device/label collection

High-speed data communication module
- RD81DC96 ..... Data collection

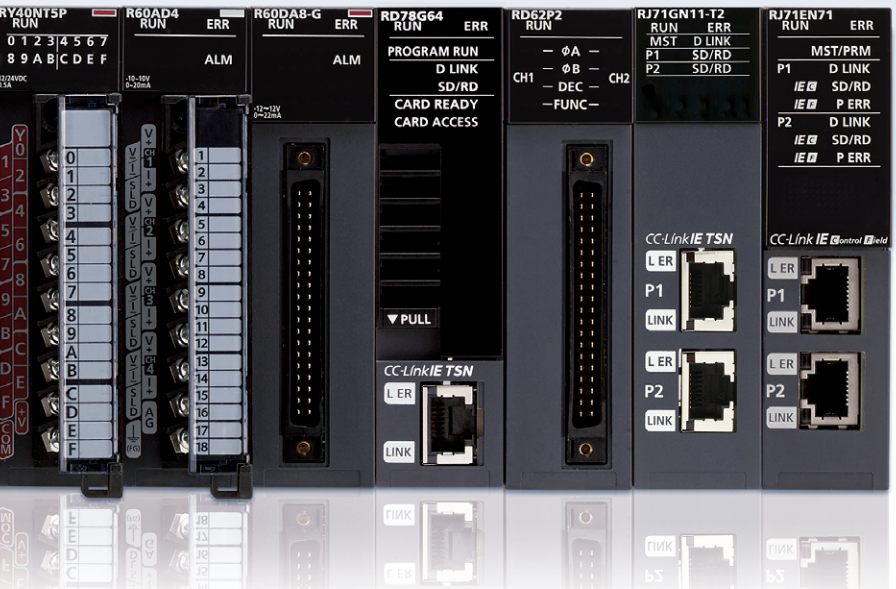
High-speed data logger
- RD81DL96 ..... Data collection

C intelligent function module
- RD55UP06-V ..... RAM: 128 MB
- RD55UP12-V ..... RAM: 1 GB

Technology

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

Energy measuring
- RE81WH ..... Energy measurement



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