



for a greener tomorrow



**MITSUBISHI  
ELECTRIC**

*Changes for the Better*

FACTORY AUTOMATION

# Open Gigabit Enabled Motion Performance

**e-Factory**

Fully integrated, highest productivity  
open motion systems



## CC-Link IE

Ethernet-based integrated network

MITSUBISHI SERVO AMPLIFIERS & MOTORS

# MELSERVO SYSTEM

# 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.

# OVERVIEW

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### Extensive visualization with advanced data connectivity

Big Data analytics requires deterministic data collection, which can be realized by incorporating two key features: SLMP\*1 that enables seamless connectivity between devices in the IT layer and on the shop floor; and a high-speed, large-capacity 1 Gbps communications network that enables the handling of large-data, such as production, quality and control data between different production processes.

\*1. Seamless Message Protocol

\*2. MELSEC iQ-R Series is supported by GX Works3. MELSEC-Q Series and MELSEC-L Series are supported by GX Works2.

### General, motion and safety control integrated into one network

CC-Link IE incorporates generic distributed control, synchronous motion control, and safety control enabling safety communications across multiple safety devices, all on the same network. The topology is quite versatile, based on twisted-pair cables, which enables flexibility in system configuration while helping to keep installation cost low.

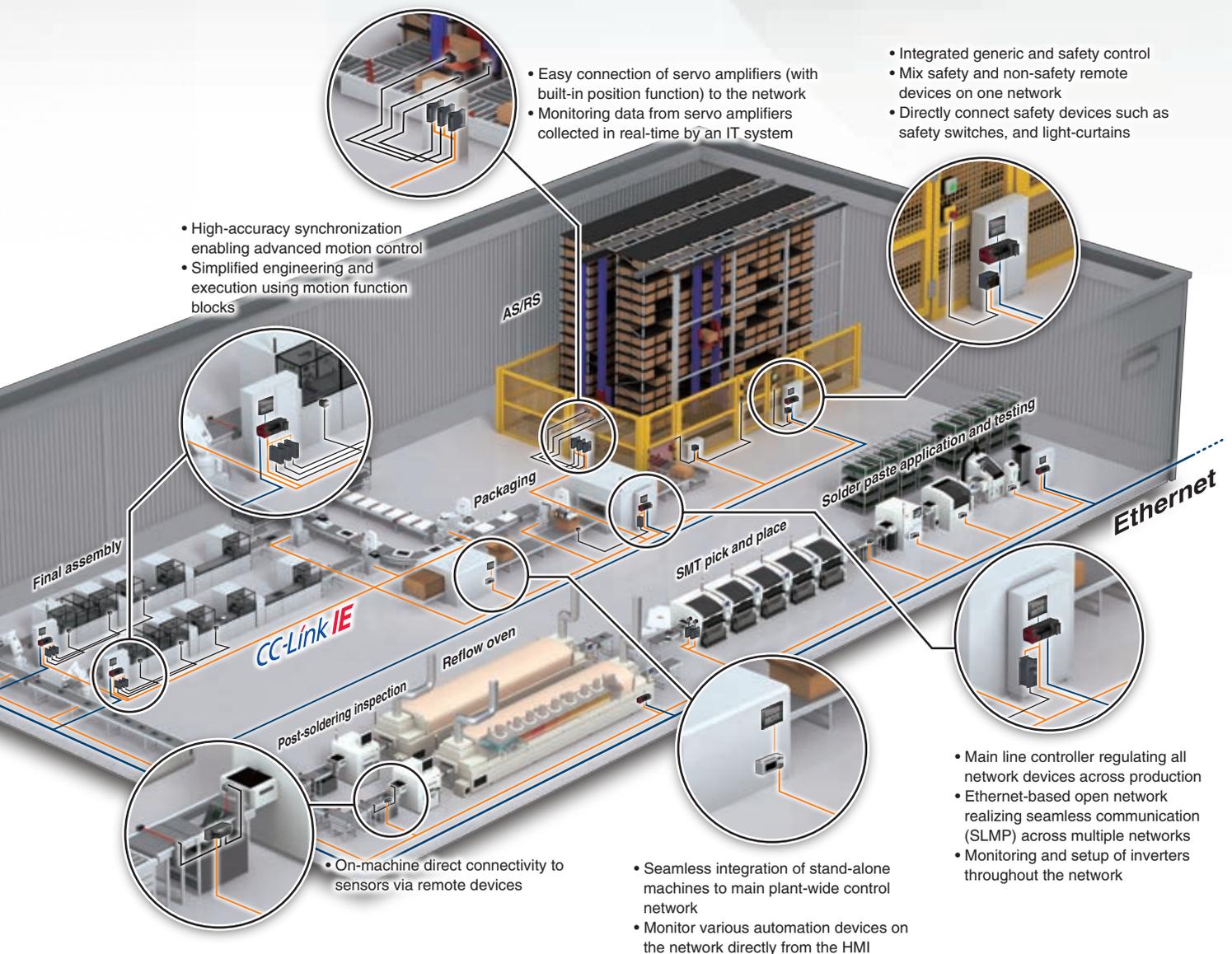
### Comprehensive diagnosis realizing higher reliability

Disruptions to the control system are kept to a minimum via comprehensive diagnostics functions, high communications integrity owing to the noise-resistant characteristics of the optical cable, and communication re-routing capabilities made possible as the result of using a ring topology. Also, network errors can be rectified quickly by visualizing the network system image using the engineering software\*2, and remotely from a GOT (HMI) directly on the machine or production line.

# Seamless connectivity within all levels of automation

The backbone of e-F@ctory, leveraging connectivity between the shop floor and IT

10010100110



# CONNEX





# T FLEXIB

Fully integrated, highest productivity open



# LY

motion systems

Seamless integration of Mitsubishi Electric's servo system into CC-Link IE Field brings vast possibilities to the world of Industrial Automation.

- Reduced wiring and high levels of improved noise-immunity drastically improve ease of use.
- Mitsubishi Electric CC-Link IE and partner products are designed with simple connectivity in mind.
- Access easily from anywhere is possible for maximum flexibility to perform engineering tasks from programming to diagnosis.



# IA Components

## Full system integration on a single open gigabit network

Most machines incorporate a wide variety of automation components - I/O, motion, HMIs and others; all must be integrated into a single system. CC-Link IE offers the unique chance to build a single open system from a variety of vendors, all operating at unmatched gigabit speeds. Mitsubishi Electric's servo systems fit seamlessly into these systems, providing a new level of machine design possibilities. This leads to simplified configurations, reduced wiring, and significantly improved diagnostic efficiency.

# All-in-One Network

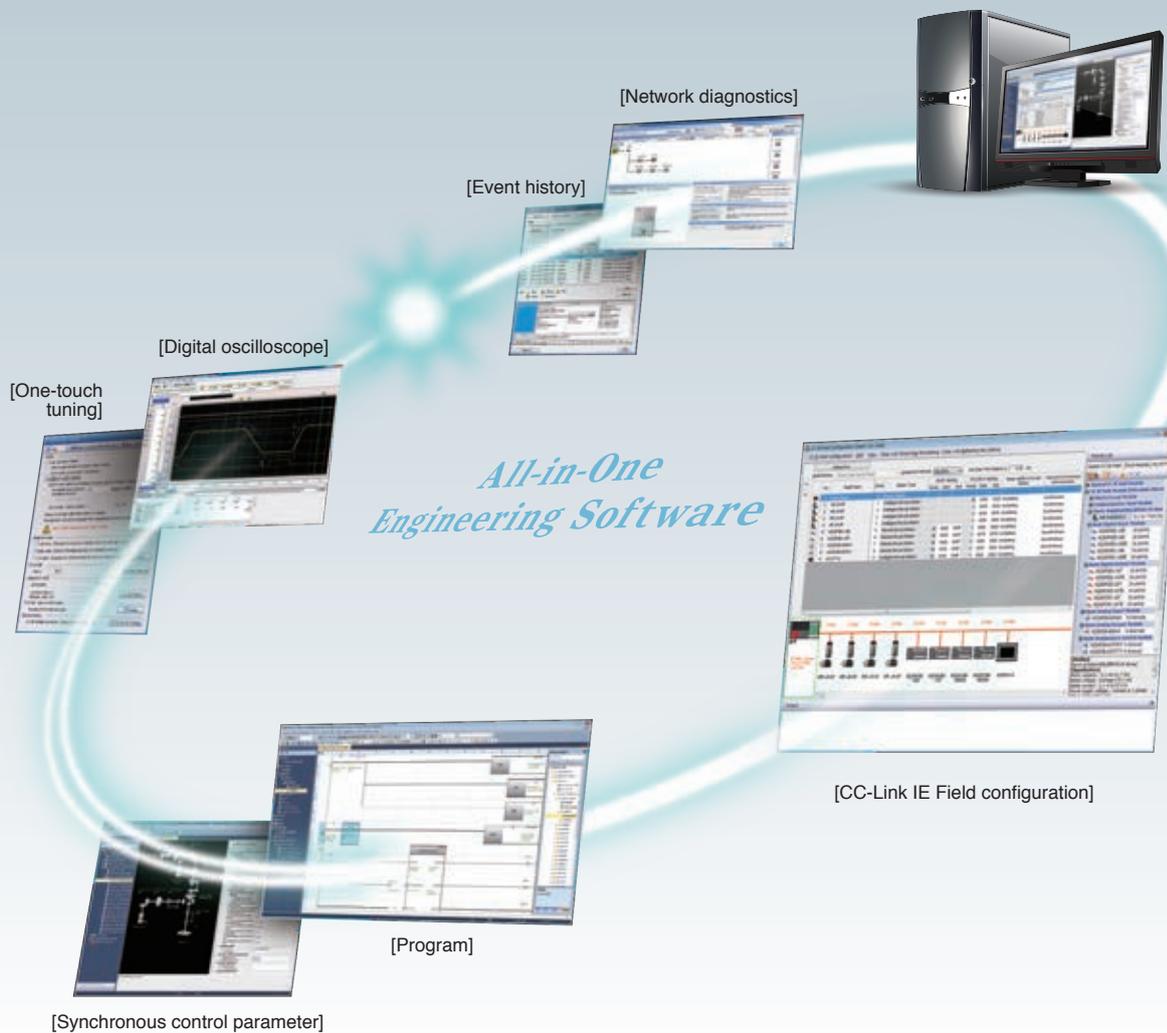


## CC-Link IE Field Network - Integration of IA components on ONE single network

CC-Link IE Field Network is a single network which combines the versatility of Ethernet and highly accurate synchronous operation for Motion control. With the single network, various field devices, such as servo amplifiers, I/O modules, and high-speed counter modules, are connected flexibly.

CC-Link IE Field Network enables a further upgrade of your machine with the flexible servo system configuration.

# All-in-One Engineering Software



1

Concept

## Covering all aspects of the product development cycle - From easy settings to diagnosis with ONE engineering software

To meet customer needs, such as easy programming, easy startup, and easy maintenance, we offer the All-in-One engineering software as an easy manipulation tool with various new functions and technology.

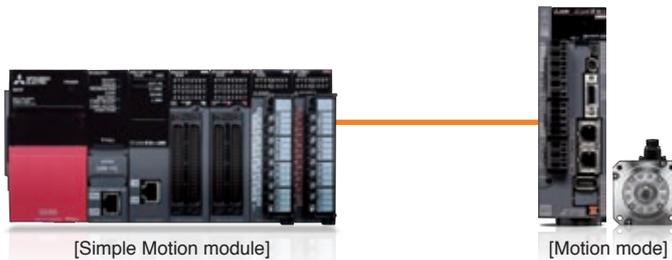
Various tasks, such as Simple Motion parameter settings, servo adjustment, and debugging as well as creating a sequence program, such as a function block (FB), are performed only with this All-in-One engineering software.

# Flexible Servo System Configuration with CC-Link IE Field Network

## Synchronous control up to $\mu\text{sec}$ precision, suitable for high-accuracy positioning



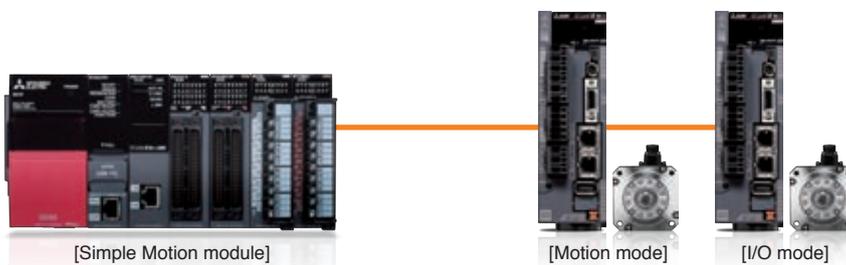
This system configuration is suited for a wide range of high-accuracy motion control, such as multi-axis interpolation, synchronous, and speed-torque control.



## A high flexibility enabling versatile control with Motion and I/O modes



This system configuration allows a single axis for positioning to be flexibly added to a machine which requires a wide range of high-accuracy motion control, such as multi-axis interpolation, synchronous, and speed-torque control.



## Covering a wide range of applications for positioning control



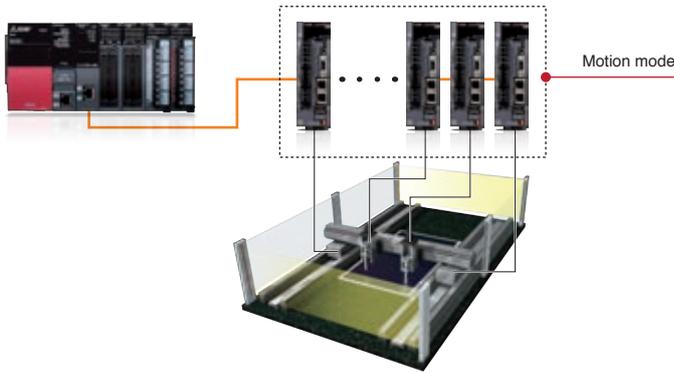
This system configuration allows a single axis for positioning to be flexibly connected to a master station, such as a CC-Link IE embedded CPU without the Simple Motion module.



**Motion mode:** This mode enables advanced motion control, such as positioning for multi-axis interpolation, synchronous, and speed-torque control in combination with the Simple Motion module.

**I/O mode:** This mode easily drives a belt conveyor, a rotary table, a ball screw mechanism, etc., by using the built-in positioning function in a servo amplifier.

### Application example using Motion mode



#### ■ Motion mode

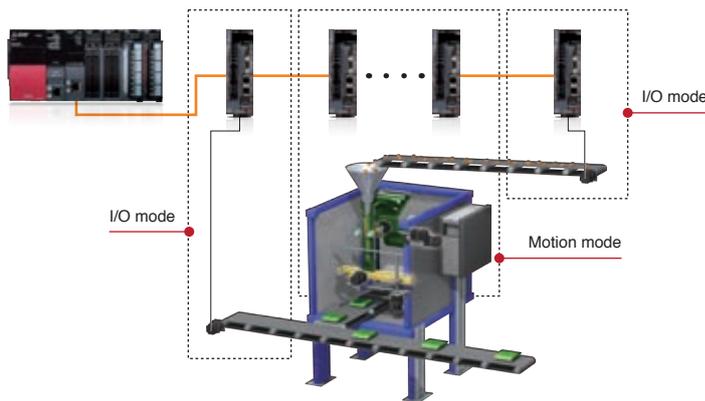
##### Application examples

Dispensing machines for FPD, Packaging machines, Pressing machines, X-Y tables, and Converting machines

##### Main functions

- Tandem control of a gantry application
- 2-axis continuous trajectory control
- Advanced synchronous control

### Application example using Motion and I/O modes



#### ■ Motion mode

##### Application examples

Packaging machines, Filling machines, Material handling machines, and Converting machines

##### Main functions

- Advanced synchronous control
- Cam control
- Cam auto-generation
- Mark detection function

#### ■ I/O mode

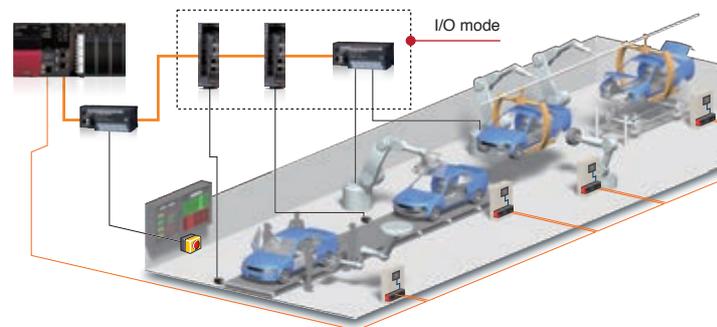
##### Application examples

Material handling axes and Belt conveyor axes

##### Main functions

- Positioning control

### Application example using I/O mode



#### ■ I/O mode

##### Application examples

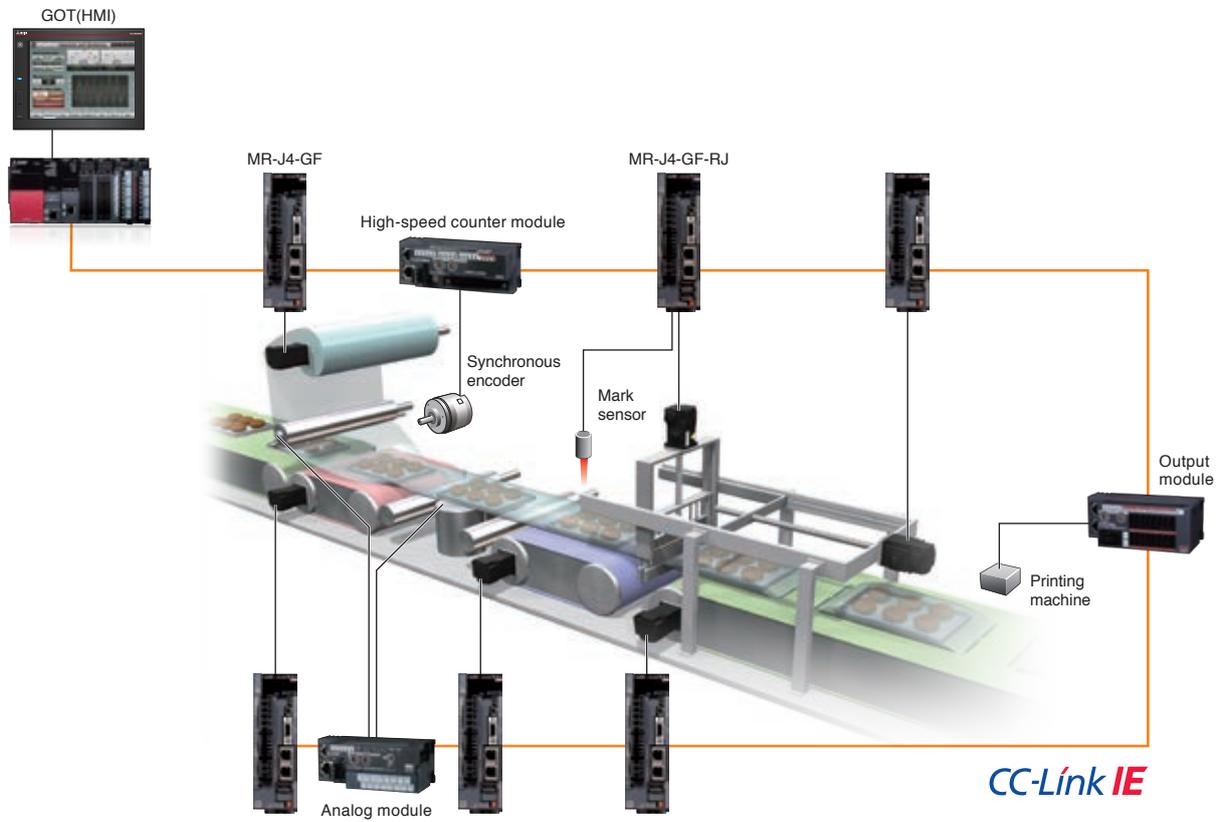
Material handling axes and Belt conveyor axes

##### Main functions

- Positioning control

# Synchronization of Inputs and Outputs with Servo Control

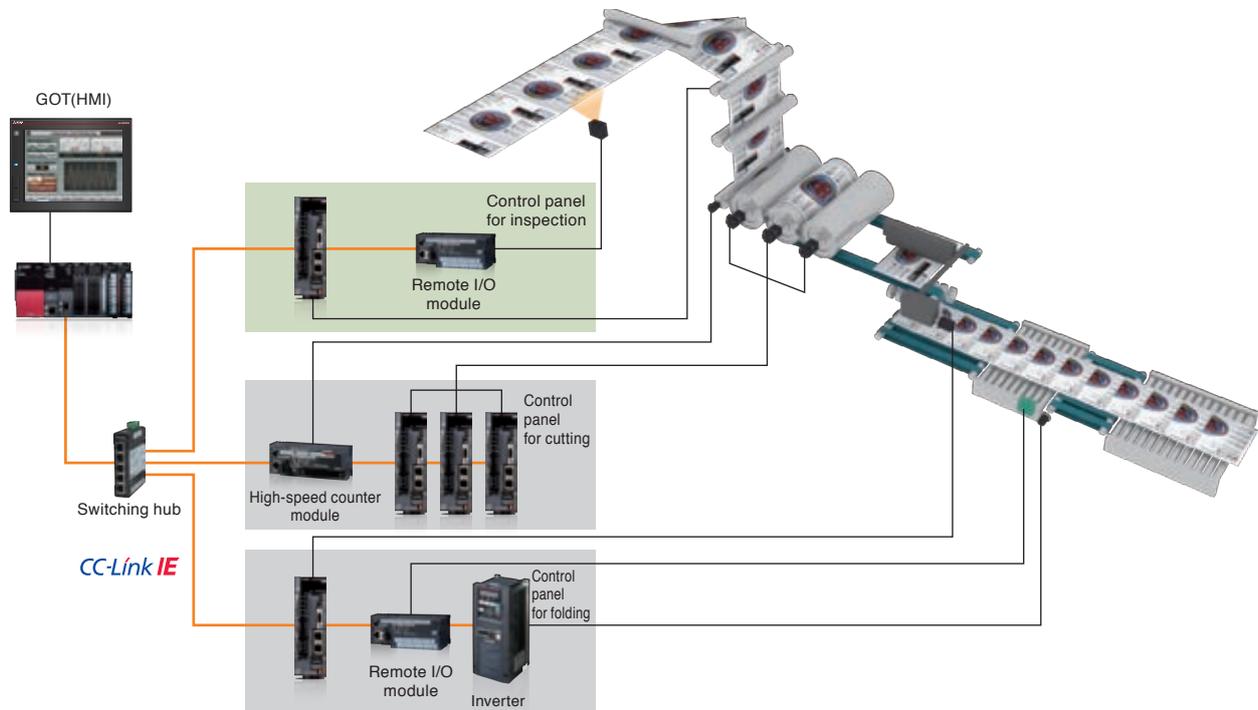
1  
Concept



[An example of inputs and outputs synchronized with the command communication cycle of a servo amplifier]

Various data, such as synchronous encoder values, sheet tension values, and text data, are inputted and outputted in accordance with the servo command communication cycle, enabling a wide range of Motion control applications.

# Flexible network topology



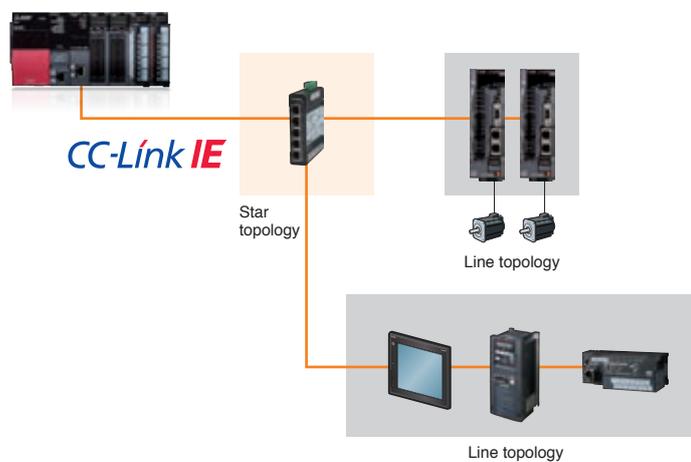
Star, line, and star/line mixed topologies are available for a network configuration by using a switching hub. An easy topology created only by a cable being connected to a free port of the switching hub allows field devices to be added to the system more flexibly.

## Star topology

Each module is connected via the switching hub, allowing field devices to be added easily.

## Line topology

Continuous connection of modules along the Ethernet line.



# A wide range of product series and capacities for various system applications

MELSERVO-J4 series is the newest member to the MELSERVO family, backed by Mitsubishi Electric's leadership in all-digital technology.

With the Ethernet-based "CC-Link IE Field Network", safety, and energy-efficient design of the new MELSERVO-J4 series - man, machine, and environment can at last work together in perfect harmony.

1  
Concept



**From rotary to linear and direct drive motors, a wide range of servo motors is available.**

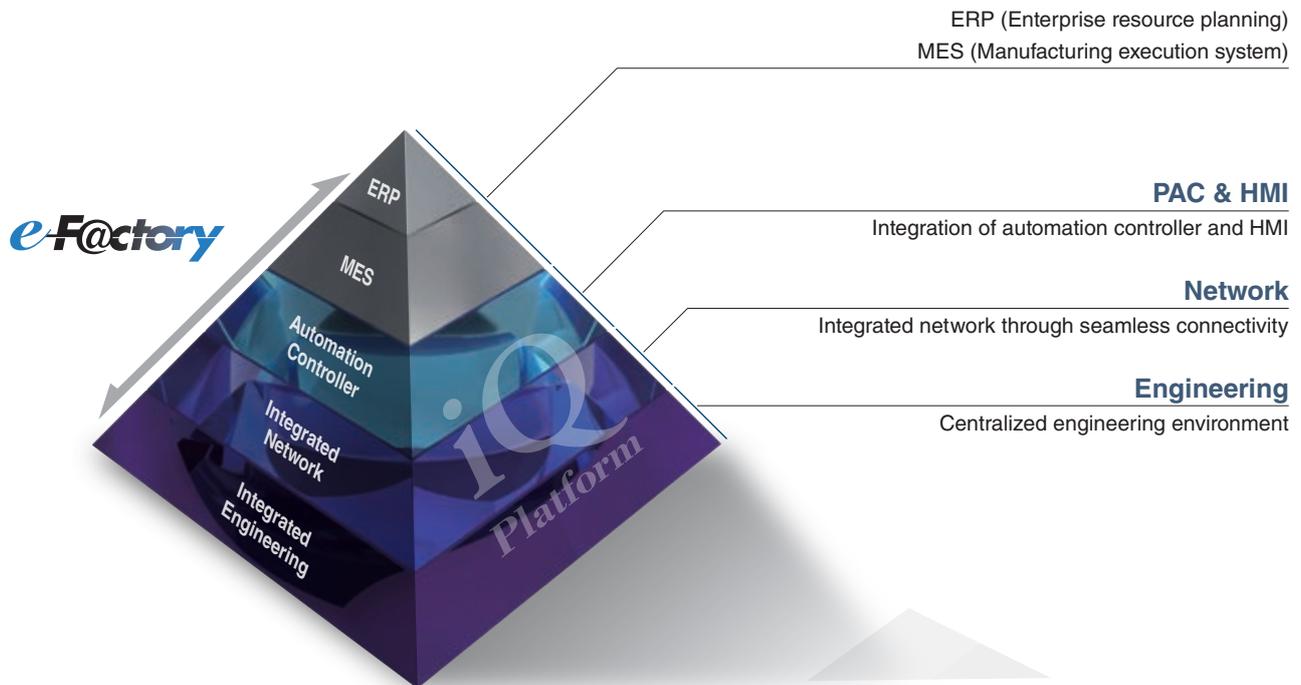
Rotary servo motors are available in capacities from 50 W to 25 kW.

Linear servo motors and direct drive motors satisfy new needs in driving control by providing high rigidity, performance, and flexibility in system configurations unique to direct drive. These motors also offer easy maintenance and cleanliness.



# 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

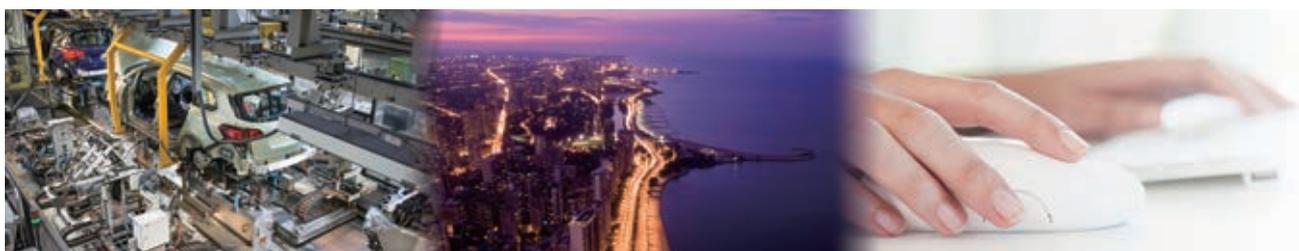
Best-in-class integrated network optimizing production capabilities

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



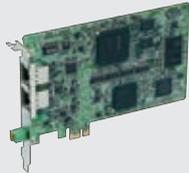
# Mitsubishi Electric Servo System

As the leading supplier of automation products and solutions worldwide, Mitsubishi Electric, known for its high quality and diverse range of component products including servo system controllers, servo amplifiers, and servo motors, network, and engineering software, boasts a whole range of solutions specific to your needs.

<p><b>SOLUTION</b></p>	 <p>e-F@ctory is the Mitsubishi Electric solution for improving the performance of any manufacturing enterprise by enhancing productivity, and reducing the maintenance and operation costs together with seamless information flow throughout the plant.</p>						
<p><b>HUMAN MACHINE I/F CONTROLLER</b></p>	<table border="1"> <tr> <td data-bbox="614 586 837 616"> <p><b>Graphic Operation Terminal</b></p> </td> <td data-bbox="997 586 1220 616"> <p><b>Personal computer</b></p> </td> </tr> <tr> <td data-bbox="662 649 798 750">  </td> <td data-bbox="1037 638 1197 761">  </td> </tr> </table>	<p><b>Graphic Operation Terminal</b></p>	<p><b>Personal computer</b></p>				
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<p><b>SOFTWARE</b></p>	<table border="1"> <tr> <td data-bbox="614 851 901 929"> <p>Programmable Controller Engineering Software <b>MELSOFT GX Works3</b> <b>MELSOFT GX Works2</b></p> </td> <td data-bbox="925 851 1220 929"> <p>Software Development Kit <b>MELSOFT EM Software Development Kit</b></p> </td> </tr> <tr> <td colspan="2" data-bbox="614 952 1220 1030"> <p>Servo Setup Software <b>MELSOFT MR Configurator2</b></p> </td> </tr> <tr> <td colspan="2" data-bbox="614 1041 1220 1120"> <p><b>Capacity Selection Software</b></p> </td> </tr> </table>	<p>Programmable Controller Engineering Software <b>MELSOFT GX Works3</b> <b>MELSOFT GX Works2</b></p>	<p>Software Development Kit <b>MELSOFT EM Software Development Kit</b></p>	<p>Servo Setup Software <b>MELSOFT MR Configurator2</b></p>		<p><b>Capacity Selection Software</b></p>	
<p>Programmable Controller Engineering Software <b>MELSOFT GX Works3</b> <b>MELSOFT GX Works2</b></p>	<p>Software Development Kit <b>MELSOFT EM Software Development Kit</b></p>						
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<p><b>Capacity Selection Software</b></p>							
<p><b>NETWORK</b></p>							
<p><b>SERVO AMPLIFIER LOW-VOLTAGE SWITCHGEAR</b></p>							
<p><b>SERVO MOTOR</b></p>	<p><b>Rotary servo motor</b></p> <table border="1"> <tr> <td data-bbox="678 1713 805 1859">  <p>Small capacity, low inertia <b>HG-KR series</b> Capacity: 50 to 750 W</p> </td> <td data-bbox="933 1713 1077 1859">  <p>Small capacity, ultra-low inertia <b>HG-MR series</b> Capacity: 50 to 750 W</p> </td> <td data-bbox="1220 1702 1348 1859">  <p>Medium capacity, medium inertia <b>HG-SR series</b> Capacity: 0.5 to 7 kW</p> </td> </tr> <tr> <td data-bbox="678 1881 837 2049">  <p>Medium/large capacity, low inertia <b>HG-JR series</b> Capacity: 0.5 to 25 kW</p> </td> <td data-bbox="933 1881 1077 2049">  <p>Medium capacity, ultra-low inertia <b>HG-RR series</b> Capacity: 1 to 5 kW</p> </td> <td data-bbox="1220 1870 1348 2049">  <p>Medium capacity, flat type <b>HG-UR series</b> Capacity: 0.75 to 5 kW</p> </td> </tr> </table>	 <p>Small capacity, low inertia <b>HG-KR series</b> Capacity: 50 to 750 W</p>	 <p>Small capacity, ultra-low inertia <b>HG-MR series</b> Capacity: 50 to 750 W</p>	 <p>Medium capacity, medium inertia <b>HG-SR series</b> Capacity: 0.5 to 7 kW</p>	 <p>Medium/large capacity, low inertia <b>HG-JR series</b> Capacity: 0.5 to 25 kW</p>	 <p>Medium capacity, ultra-low inertia <b>HG-RR series</b> Capacity: 1 to 5 kW</p>	 <p>Medium capacity, flat type <b>HG-UR series</b> Capacity: 0.75 to 5 kW</p>
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Mitsubishi Electric's integrated FA platform for achieving lateral integration of controllers & HMI, engineering environments and networks at production sites.

<b>Programmable controller</b> <b>MELSEC iQ-R</b> series CPU module RnCPU 		CC-Link IE embedded CPU module RnENCPU 	<b>Programmable controller</b> <b>MELSEC Q</b> series 	
<b>Simple Motion module</b>  RD77GF4 RD77GF8 RD77GF16 RD77GF32	<b>Master/local module</b>  RJ71EN71 RJ71GF11-T2	<b>Simple Motion module</b>  QD77GF4 QD77GF8 QD77GF16	<b>Master/local module</b>  QJ71GF11-T2	<b>Personal Computer Embedded Type Simple Motion Board</b>  MR-EM340GF

CC-Link IE Field

CC-Link IE Field Network

<b>Servo amplifier</b>  MITSUBISHI SERVO AMPLIFIERS & MOTORS <b>MELSERVO-J4</b> MR-J4-GF MR-J4-GF-RJ	<b>Molded-case circuit breaker</b>  WS-V	<b>Magnetic contactor</b>  MS-T
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**Linear servo motor**

 Core type <b>LM-H3 series</b> Rating: 70 to 960 N	 Core type (natural/liquid cooling) <b>LM-F series</b> Rating: 300 to 3000 N (natural cooling) Rating: 600 to 6000 N (liquid cooling)
 Core type with magnetic attraction counter-force <b>LM-K2 series</b> Rating: 120 to 2400 N	 Coreless type <b>LM-U2 series</b> Rating: 50 to 800 N

**Direct drive motor**

Compatible in the future

 Low-profile flange type <b>TM-RG2M series</b> Low-profile table type <b>TM-RU2M series</b> Rating: 2.2 to 9 N·m	 High rigidity <b>TM-RFM series</b> Rating: 2 to 240 N·m
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## CC-Link IE Field Network Compatible Servo Amplifier

# MR-J4-GF

# MR-J4-GF-RJ

CC-Link IE Field Network compatible servo amplifier executes positioning of one or multiple axes, synchronous control, and speed-torque control by being connected to the various master modules compatible with CC-Link IE Field Network, including the Simple Motion module, and CC-Link IE embedded CPU module, etc.

## CC-Link IE Field Network Compatible Servo Amplifier

### Features

Two types of modes are available according to your needs:

- Motion mode for a wide range of motion control such as positioning of multiple axes, synchronous control, etc.
- I/O mode for positioning of one axis

●: Supported

Connectable module with MR-J4-GF	MR-J4-GF/MR-J4-GF-RJ	
	Motion mode	I/O mode
Simple Motion module	●	●
Simple Motion board	●	●
CC-Link IE embedded CPU module	—	●
Master/local module	—	●

### Wide Range of Capacities and Series

The servo amplifiers support motors from rotary servo motors to linear servo motors and direct drive motors, and greatly enhance system performance.

### Diagnosis

Reading information of the servo amplifier from the PLC CPU via a network helps the preventive maintenance such as the machine diagnosis.

### Product Lines

○: Available in the future ●: Supported

Model	Power supply	Fully closed loop control (Note-2)	Servo motor			Capacity range [kW]
			Rotary	Linear (Note-3)	Direct drive	
MR-J4-GF MR-J4-GF-RJ (Note-1)	1-phase 100 VAC	○	○	○	○	0.1 kW ■ 0.4 kW (Available in the future)
	3-phase 200 VAC	●	●	●	●	0.1 kW ■ 22 kW
	3-phase 400 VAC	●	●	●	—	0.6 kW ■ 22 kW

(Note-1): MR-J4-GF-RJ is compatible with two-wire type and four-wire type serial linear encoders, and pulse train interface (A/B/Z-phase differential output type) linear encoders. MR-J4-GF-RJ is compatible with DC power supply input. (200 V only)

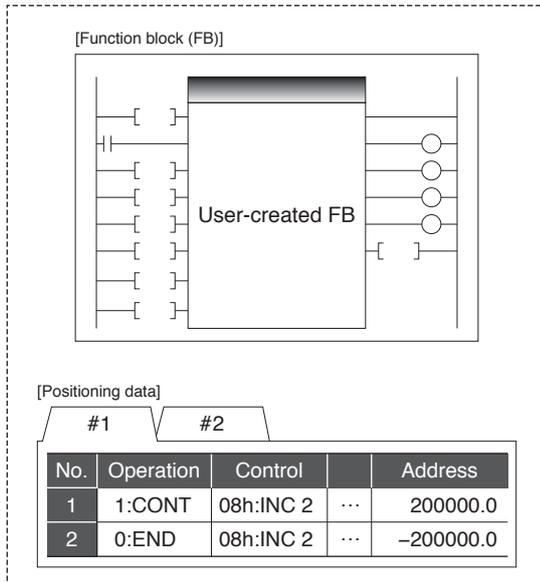
(Note-2): MR-J4-GF is compatible only with two-wire type serial linear encoders. For four-wire type serial linear encoders and pulse train interface (A/B/Z-phase differential output type) linear encoders, use MR-J4-GF-RJ.

(Note-3): MR-J4-GF is compatible only with two-wire type and four-wire type serial linear encoders. For pulse train interface (A/B/Z-phase differential output type) linear encoders, use MR-J4-GF-RJ.

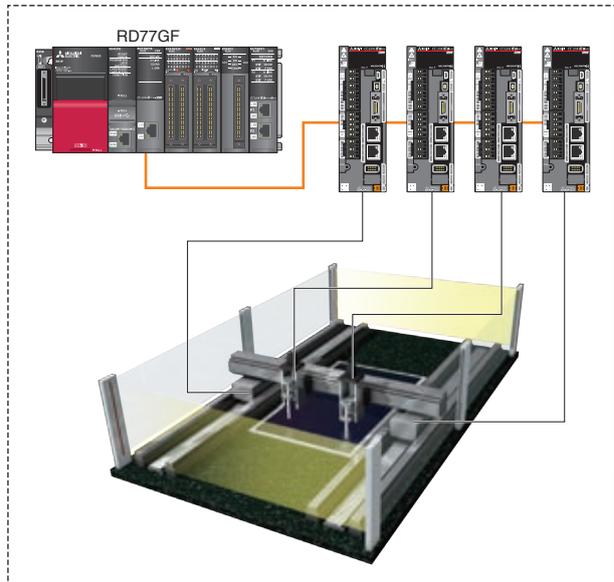
## Control Mode

### Motion mode

Combined with the Simple Motion module or the Simple Motion board, the servo amplifier can perform advanced motion control including multiple-axis positioning, synchronous control, and speed-torque control.



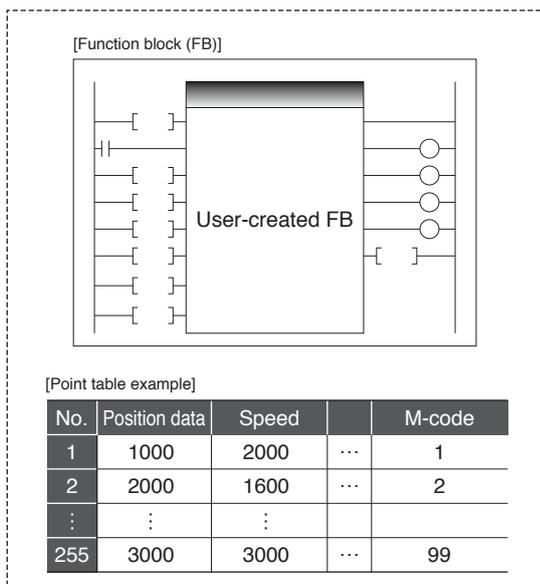
Positioning operation is executed easily from a function block (FB).



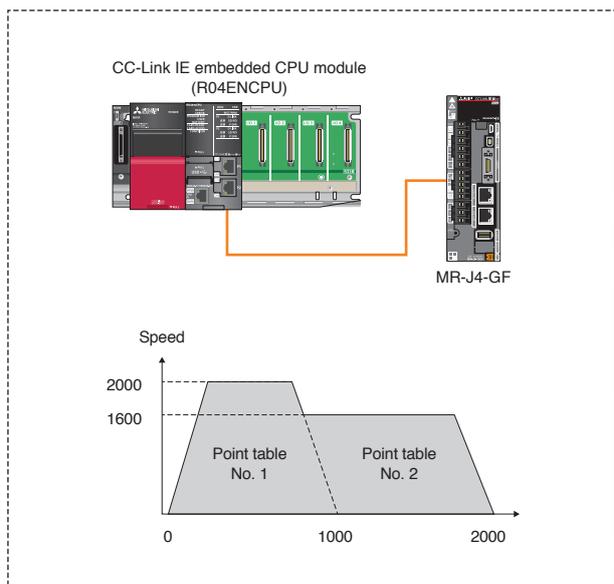
The motion mode enables motion control including tandem control, 2-axis (X-Y) continuous trajectory control, and synchronous control for gantry applications.

### I/O mode

Combined with the CC-Link IE embedded CPU or a master/local module, the servo amplifier can drive belt conveyors, rotary tables, ball screws, etc. Positioning operation is carried out easily in the same way as I/O operation because the built-in positioning function of the servo amplifier is used.



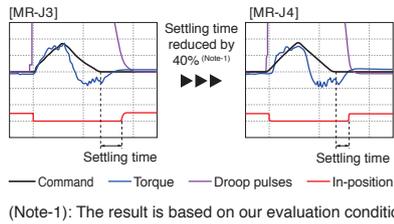
Setting position data (target position), servo motor speed, and acceleration/deceleration time constants in point table is as easy as setting a parameter.



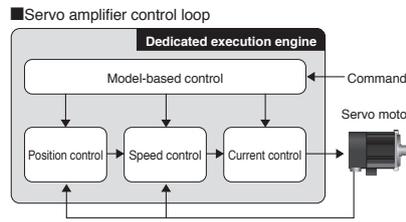
Positioning operation will be executed after the point table No. is selected and started from the sequence program.

## Industry-leading Level of Servo Amplifier Basic Performance

[Settling time comparison]



[Dedicated execution engine]



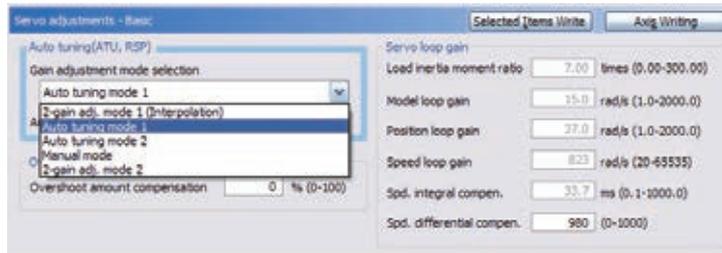
Speed frequency response of 2.5 kHz is achieved by applying our original high-speed servo control architecture evolved from the conventional two-degrees-of-freedom model adaptive control to the dedicated execution engine. Together with a high-resolution absolute position encoder of 4,194,304 pulses/rev, fast and accurate operation is enabled. The performance of the high-end machines is utilized to the fullest.

## Servo Gain Adjustment

The following two functions are available for adjusting servo gain: auto tuning that eliminates a manual servo adjustment and one-touch tuning function that enables an advanced servo gain adjustment.

### Auto tuning

Servo gain is automatically adjusted to an optimum value for a machine in real time when the servo amplifier is operated in auto tuning mode.

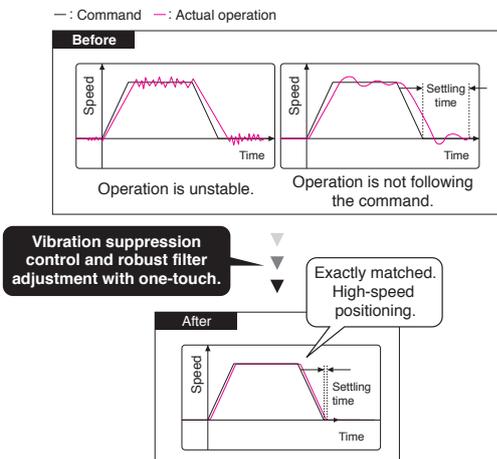


### One-touch tuning function

Just turn on the one-touch tuning function to complete servo gain adjustment automatically, including machine resonance suppression filter, advanced vibration suppression control II (Note-1), and robust filter for maximizing your machine performance.

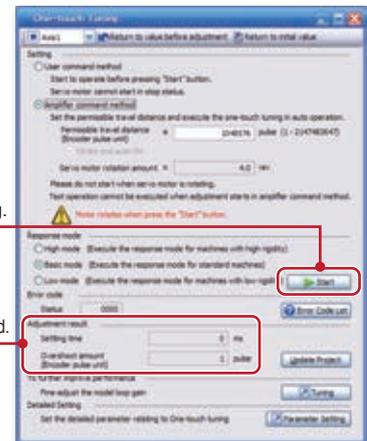
This function also sets responsiveness automatically, while the real-time auto tuning requires manual setting.

(Note-1): The advanced vibration suppression control II automatically adjusts one frequency.



Start tuning just by clicking.

Adjustment results are displayed.



## Functional Safety

### ■ Achieving Category 4 PL e, SIL 3

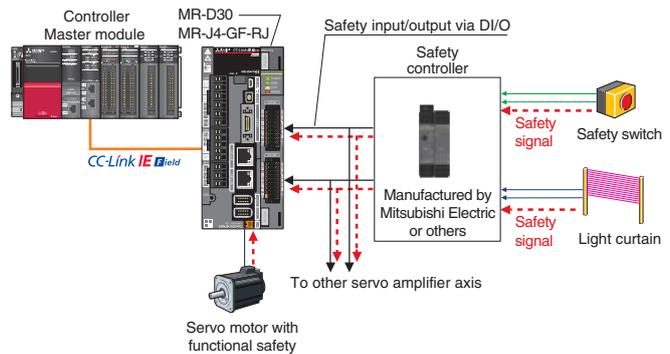
#### ■ By wiring to MR-D30 functional safety unit <sup>(Note-1)</sup>

Safety level is Category 4 PL e, SIL 3 when the safety signals are inputted directly to MR-D30 functional safety unit.

The safety observation function is operated on the MR-D30 by parameter setting, and therefore expansion of the safety observation function is possible independent of controllers.

IEC/EN 61800-5-2:2007 function	Safety level
STO (Safe torque off)	Category 4 PL e, SIL 3
SS1 (Safe stop 1)	
SS2 (Safe stop 2) <sup>(Note 2)</sup>	
SOS (Safe operating stop) <sup>(Note 2)</sup>	
SLS (Safely-limited speed) <sup>(Note 3)</sup>	
SSM (Safe speed monitor) <sup>(Note 3)</sup>	

- (Note-1): Requires modules which support the functional safety. Refer to relevant manuals or catalogs for details.
- (Note-2): Requires the use of a servo motor with functional safety.
- (Note-3): Safety level is Category 3 PL d, SIL 2 when the servo motor with functional safety is not used.

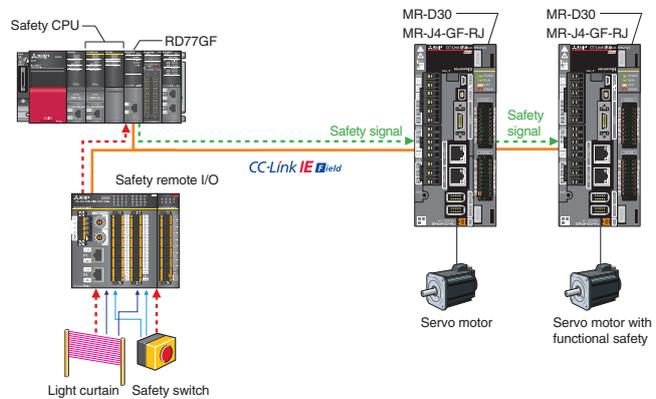


#### ■ By CC-Link IE Field Network <sup>(Note-1)</sup>

Safety signals are monitored by a combination of the safety CPU and RD77GF Simple Motion module. The safety CPU checks the safety signals received via the safety remote I/O module and outputs the safety signals (STO, etc.) to the servo amplifiers. Since the safety signals are outputted through CC-Link IE Field Network, wiring of the safety signals to each functional safety unit are not necessary.

IEC/EN 61800-5-2:2007 function	Safety level
STO (Safe torque off)	Category 4 PL e, SIL 3
SS1 (Safe stop 1)	
SS2 (Safe stop 2) <sup>(Note-2)</sup>	
SOS (Safe operating stop) <sup>(Note-2)</sup>	
SLS (Safely-limited speed) <sup>(Note-3)</sup>	
SSM (Safe speed monitor) <sup>(Note-3)</sup>	

- (Note-1): Requires modules which support the functional safety. Refer to relevant manuals or catalogs for details.
- (Note-2): Requires the use of a servo motor with functional safety.
- (Note-3): Safety level is Category 3 PL d, SIL 2 when the servo motor with functional safety is not used.



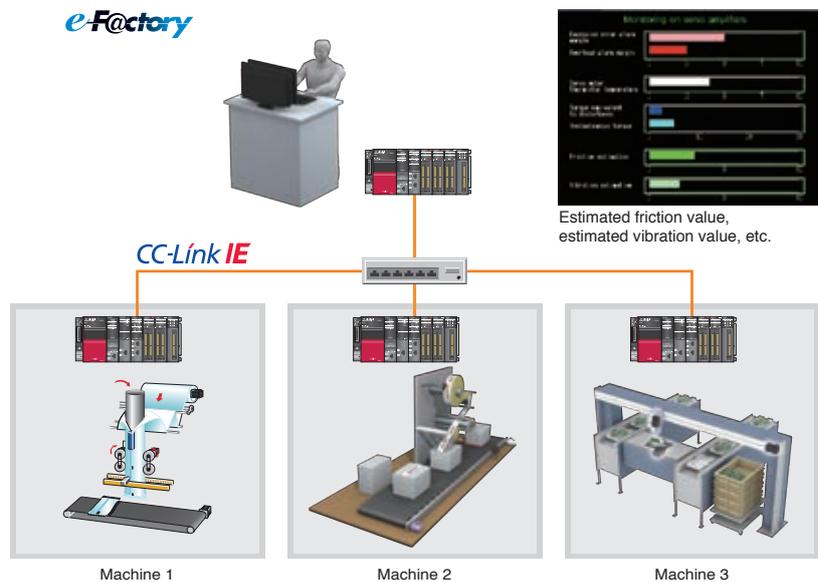
## Direct Access to Host System

Data of servo amplifiers and servo motors for each machine can be collected via CC-Link IE Field Network.

The status of the entire product line can be visualized by batch management of the collected data.

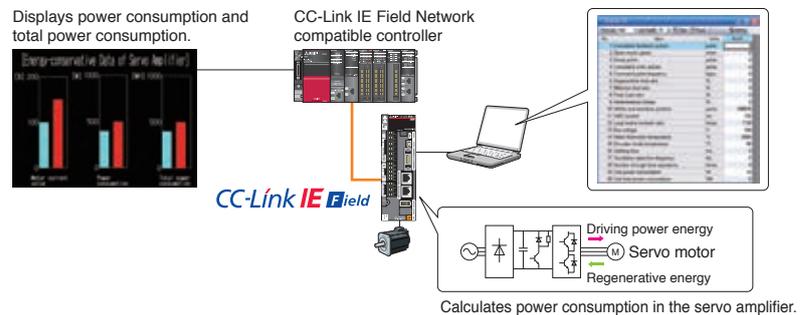
A CC-Link IE Field Network servo system supports to build IoT<sup>(Note-1)</sup> for your machine.

(Note-1): IoT (Internet of Things)



## Power Monitoring Function

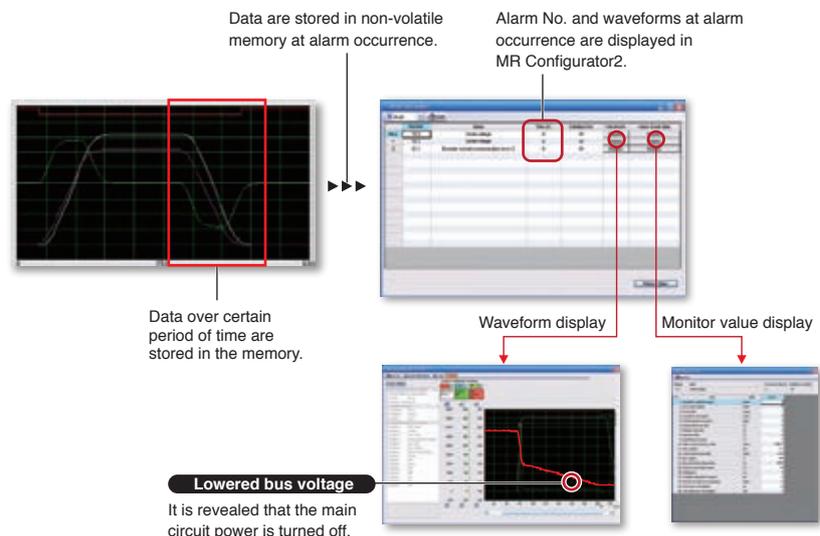
Driving/regenerative power is calculated from the data such as speed and current in the servo amplifier, and MR Configurator2 monitors the operation data including power consumption. The data are transmitted to a servo system controller, and the power consumption is analyzed and displayed.



## Large Capacity Drive Recorder

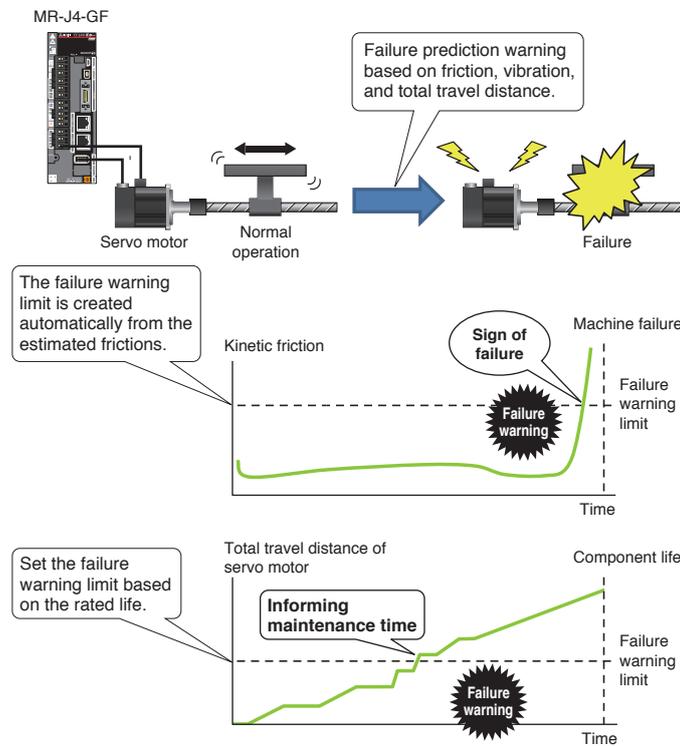
Servo data such as motor current and position command before and after the alarm occurrence are stored in non-volatile memory of the servo amplifier.

Reading the servo data on MR Configurator2 helps you analyze the cause of the alarm.



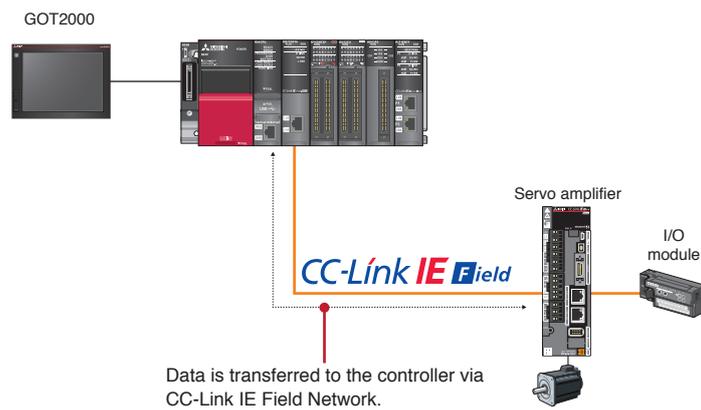
## Failure Prediction Function

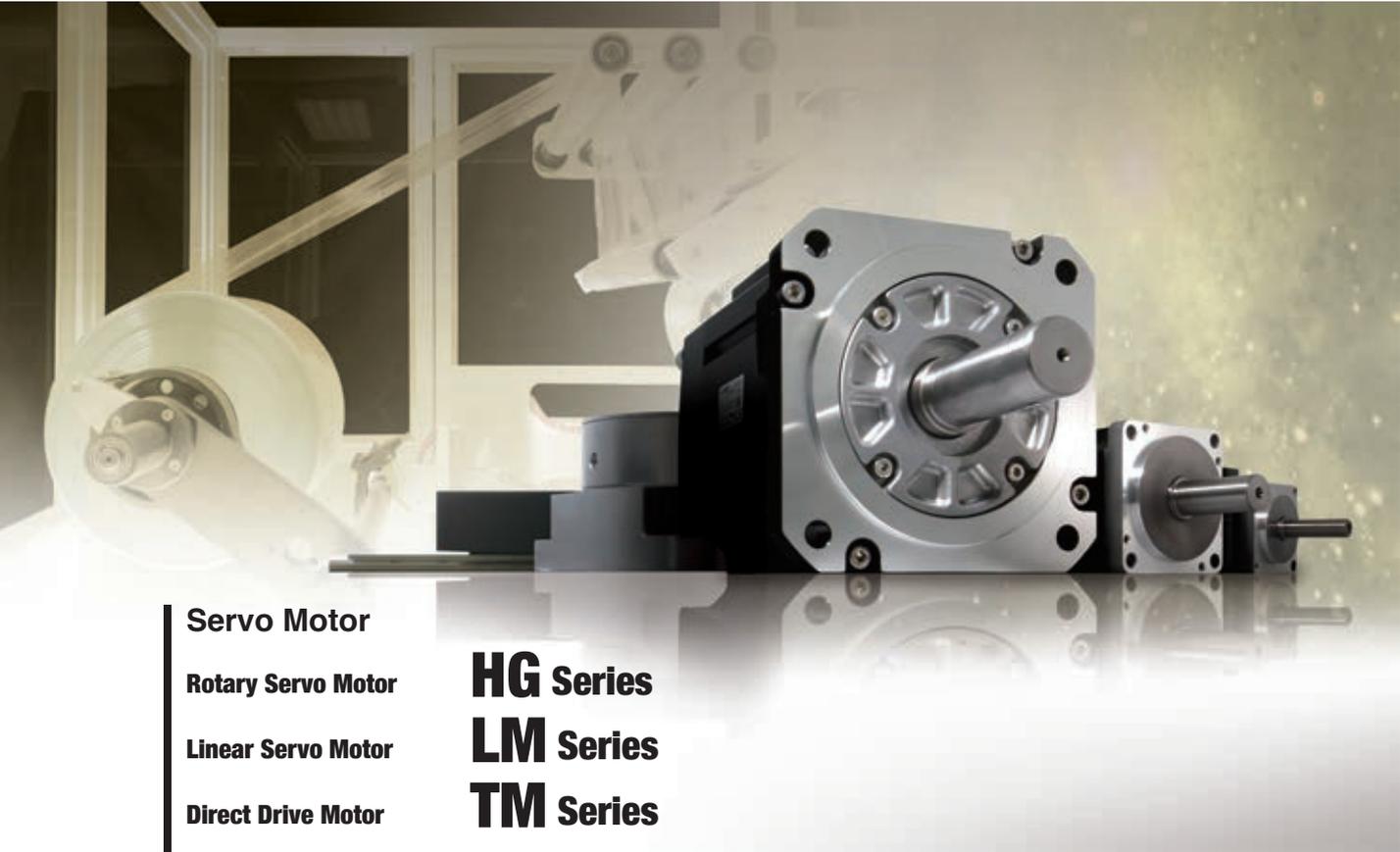
MR-J4-GF detects aging-related changes in a machine performance based on the frictions and vibrations monitored by the machine diagnosis function, and informs the maintenance time with a warning. MR-J4-GF also stores the total travel distance of the servo motor and informs the maintenance time with a warning when the total travel distance exceeds the warning limit set by you. When the limit is set to the rated life of a ball screw or bearing, preventive maintenance can be executed according to the actual machine operation.



## Backup/Restoration

Parameters of servo amplifiers and I/O modules which are connected to CC-Link IE Field Network are backed up and restored by GOT2000. Therefore, the efficiency of replacement and maintenance of the modules is improved.





**Servo Motor**

**Rotary Servo Motor**

**Linear Servo Motor**

**Direct Drive Motor**

**HG Series**

**LM Series**

**TM Series**

## Rotary Servo Motor HG Series

High-speed, high-torque servo motors for fast, precise machine operation

### High-resolution Absolute Position Encoder

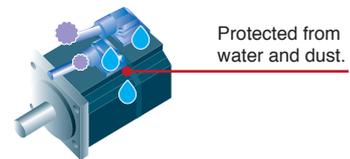
Servo motors are equipped with a high-resolution absolute position encoder of 4,194,304 pulses/rev (22-bit) as standard, increasing positioning accuracy.

### Improved Environmental Resistance

HG-KR/HG-MR/HG-RR/HG-UR and HG-SR/HG-JR are rated IP65 and IP67 <sup>(Note-1)</sup>, respectively. <sup>(Note-2)</sup>

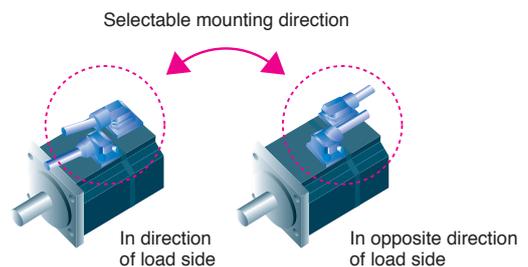
<sup>(Note-1)</sup>: HG-JR1000 r/min series 15 kW or larger, and HG-JR1500 r/min series 22 kW or larger are rated IP44.

<sup>(Note-2)</sup>: The shaft-through portion is excluded.



### Cable Leading Direction

Cables for power, encoder, and electromagnetic brake are capable of connecting either in direction or in opposite direction of the load side, depending on the cable selection. (HG-KR, HG-MR series)



Product lines

Series	Rated speed [r/min]	Maximum speed [r/min]	Capacity range [kW]				IP rating <sup>(Note-1)</sup>
HG-KR	3000	6000	0.05 kW	0.75 kW			IP65
HG-MR	3000	6000	0.05 kW	0.75 kW			IP65
HG-SR	1000	1500		0.5 kW	4.2 kW		IP67
	2000	3000		0.5 kW	7 kW		IP67
HG-JR	3000	6000/5000		0.5 kW	9 kW		IP67
	1500	3000/2500			7 kW	22 kW	IP67/IP44
	1000	2000/1500			6 kW	25 kW	IP67/IP44
HG-RR	3000	4500		1 kW	5 kW		IP65
HG-UR	2000	3000/2500		0.75 kW	5 kW		IP65

(Note-1): The shaft-through portion is excluded.

▶ HG-KR/HG-MR



HG-KR: Small capacity, low inertia. Perfect for general-purpose industrial machines.  
 HG-MR: Small capacity, ultra-low inertia. Perfect for high-throughput operations.

Capacity: 50 W to 750 W Rated speed: 3000 r/min Maximum speed: 6000 r/min

[Application example]

- Inserters, mounters and bonders ●PCB drilling machines
- In-circuit testers and label printers ●Knitting and embroidery machines
- Compact robots and robot hand sections

▶ HG-SR



Medium capacity, medium inertia. Suitable for machines having large load inertia.

Capacity: 0.5 kW to 7 kW Rated speed: 1000 r/min and 2000 r/min

[Application example]

- Material handling systems ●Dedicated machines ●Robots
- Loaders and unloaders ●Winders and tension units ●Turrets ●X-Y tables

▶ HG-JR



Medium to large capacity, low inertia. Perfect for high-throughput positioning or high acceleration/deceleration operations.

Capacity: 0.5 kW to 25 kW Rated speed: 1000 r/min, 1500 r/min, and 3000 r/min

[Application example]

- Food packaging machines ●Printers ●Injection molding machines ●Press machines

▶ HG-RR



Medium capacity, ultra-low inertia. Perfect for high-throughput operation.

Capacity: 1 kW to 5 kW Rated speed: 3000 r/min

[Application example]

- Roll feeders ●Loaders and unloaders
- Ultra high-throughput material handling systems

▶ HG-UR



Medium capacity, flat type. Perfect for applications with limited mounting space.

Capacity: 0.75 kW to 5 kW Rated speed: 2000 r/min

[Application example]

- Robots ●Conveyors ●Winders and tension machines
- Food processing machines

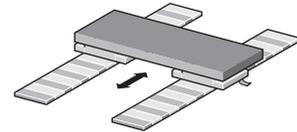
## Linear Servo Motor

Servo motors for high-speed, high-accuracy, linear drive systems

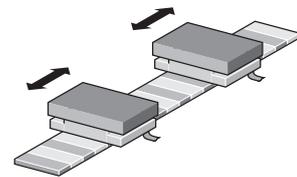
### Basic Performance

- Supporting maximum speed of 3 m/s (LM-H3 series)
- Supporting maximum thrust of 150 N to 18000 N  
Small size and high thrust are achieved by the increased winding density and the optimized core and magnet geometries as a result of electromagnetic field analysis.
- Available in four types: core, liquid-cooling core, magnetic attraction counter-force core, and coreless types
- Supporting A/B/Z-phase differential output type linear encoders (MR-J4-GF-RJ)
- Configuring a high-performance system including high-accuracy tandem synchronous control with a combination of the servo amplifiers and the CC-Link IE Field Network compatible servo system controller

Tandem configuration



Multi-head configuration



### Product lines

Series	Maximum speed [m/s]	Magnetic attraction force [N]	Thrust [N]		IP rating	
			Continuous thrust [N]	Maximum thrust [N]		
LM-H3	3	630 to 8800	70 N 175 N	960 N 2400 N	IP00	
LM-F	2	4500 to 45000	(Natural cooling)	300 N 1800 N	3000 N 18000 N	IP00
			(Liquid cooling)	600 N 1800 N	6000 N 18000 N	
LM-K2	2	0	120 N 300 N	2400 N 6000 N	IP00	
LM-U2	2	0	50 N 150 N	800 N 3200 N	IP00	

▲ Thrust

Core type (natural/liquid cooling)  
**LM-F** series



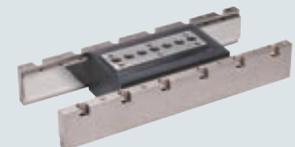
Coreless type  
**LM-U2** series



Core type  
**LM-H3** series



Core type with magnetic attraction counter-force  
**LM-K2** series



► Positioning-oriented

◀ Feed speed-oriented

## Direct Drive Motor

Compact and robust direct drive motors for high-accuracy applications

### Basic Performance

- High performance with the latest technologies  
Our latest magnetic design and winding technologies enable high torque density. In addition, extremely smooth rotation is achieved by the minimized torque ripple.
- Compact and low-profile design  
Due to high level of structural design technology, compact and low-profile design is achieved. This design enables a small mounting space and a low center of gravity.
- High-resolution absolute position encoder  
The direct drive motor is equipped with a high-resolution absolute position encoder (1,000,000 to 4,000,000 pulses/rev) as standard, increasing positioning accuracy.
- Hollow shaft diameter range:  $\varnothing 20$  mm to 104 mm  
The motor is equipped with a large hollow shaft resulting from using bearing and encoder with large diameter. It allows cables and air tubing to pass through.

### Product lines

Series	Rated speed [r/min]	Maximum speed [r/min]	Motor outer diameter [mm]	Rated torque [N·m]	Maximum torque [N·m]	IP rating (Note-1)
Compatible in the future TM-RG2M TM-RU2M	300	600	130	2.2 N·m	8.8 N·m	IP40
	300	600	180	4.5 N·m	13.5 N·m	IP40
	300	600	230	9 N·m	27 N·m	IP40
TM-RFM	200	500	130	2 N·m	6 N·m	IP42
	200	500	180	6 N·m	18 N·m	IP42
	200	500	230	12 N·m	36 N·m	IP42
	100	200	330	40 N·m	120 N·m	IP42

(Note-1): Connectors and a gap along the rotor (output shaft) are excluded.



Product lines

■ Servo amplifier

● : Supported ○ : Available in the future — : Not supported

Servo amplifier (*4)	Number of control axes	Power supply specifications	Rated output [kW] (*1)	Control mode					Compatible servo motor series												
				Position	Speed	Torque	Positioning function	Fully closed loop control (*2)	HG-KR	HG-MR	HG-SR	HG-JR	HG-AK	HG+RR	HG+UR	LM-H3	LM-F	LM-K2	LM-U2	TM-RG2M/TM-RU2M	TM-RFM
<b>CC-Link IE Field Network</b> 	1 axis	1-phase 100 VAC	0.1, 0.2, 0.4	○	○	○	○	○	○	○	○	—	—	—	—	○	—	○	○	○	○
		3-phase 200 VAC	0.1, 0.2, 0.4, 0.6, 0.75, 1, 2, 3.5, 5, 7, 11, 15, 22	●	●	●	●	●	●	●	●	●	—	●	●	●	●	●	○	●	●
		3-phase 400 VAC	0.6, 1, 2, 3.5, 5, 7, 11, 15, 22	●	●	●	●	●	—	—	●	●	—	—	—	—	●	—	—	—	—

\*1. The listed are the rated output of the servo amplifier. For the compatible servo motor capacities, refer to "MELSERVO-J4 catalog (L(NA)03058)."  
 \*2. MR-J4-GF is compatible with two-wire type serial linear encoders. For four-wire type serial linear encoders and pulse train interface (A/B/Z-phase differential output type) linear encoders, use MR-J4-GF-RJ.  
 \*3. MR-J4-GF is compatible with two-wire type and four-wire type serial linear encoders. For pulse train interface (A/B/Z-phase differential output type) linear encoders, use MR-J4-GF-RJ.  
 \*4. The functions listed are supported by the servo amplifiers with the latest software version. (As of December 2017) Refer to relevant servo amplifier instruction manuals for the supporting software versions.

■ Linear servo motor

Linear servo motor series	Maximum speed [m/s]	Continuous thrust [N] (*1)	Maximum thrust [N] (*1)	Cooling method	Features	Application examples
<b>LM-H3 series</b> 	3.0	70, 120, 240, 360, 480, 720, 960	175, 300, 600, 900, 1200, 1800, 2400	Natural cooling	Suitable for space-saving. Compact size and high thrust. Maximum speed: 3 m/s.	<ul style="list-style-type: none"> <li>•Mounters</li> <li>•Wafer cleaning systems</li> <li>•LCD assembly machines</li> <li>•Material handlings</li> </ul>
<b>LM-F series</b> 	2.0	300, 600, 900, 1200, 1800, 2400, <span style="border: 1px solid black; padding: 1px;">3000</span>	1800, 3600, 5400, 7200, 10800, 14400, <span style="border: 1px solid black; padding: 1px;">18000</span>	Natural cooling	Compact size. The integrated liquid-cooling system doubles the continuous thrust.	<ul style="list-style-type: none"> <li>•Press feeders</li> <li>•NC machine tools</li> <li>•Material handlings</li> </ul>
		600, 1200, 1800, 2400, 3600, 4800, <span style="border: 1px solid black; padding: 1px;">6000</span>	1800, 3600, 5400, 7200, 10800, 14400, <span style="border: 1px solid black; padding: 1px;">18000</span>	Liquid cooling		
<b>LM-K2 series</b> 	2.0	120, 240, 360, 720, 1200, 1440, 2400	300, 600, 900, 1800, 3000, 3600, 6000	Natural cooling	High thrust density. Magnetic attraction counter-force structure enables longer life of the linear guides and lower audible noise.	<ul style="list-style-type: none"> <li>•Mounters</li> <li>•Wafer cleaning systems</li> <li>•LCD assembly machines</li> </ul>
<b>LM-U2 series</b> 	2.0	50, 75, 100, 150, 225, 400, 600, 800	150, 225, 300, 450, 675, 1600, 2400, 3200	Natural cooling	No cogging and small speed fluctuation. No magnetic attraction force structure extends life of the linear guides.	<ul style="list-style-type: none"> <li>•Screen printing systems</li> <li>•Scanning exposure systems</li> <li>•Inspection systems</li> <li>•Material handlings</li> </ul>

\*1.    : For 400 V.

■ Direct drive motor

Direct drive motor series	Motor outer diameter [mm]	Hollow shaft diameter [mm]	Rated speed [r/min]	Maximum speed [r/min]	Rated torque [N·m]	Maximum torque [N·m]	IP rating (*1)	Features	Application examples
<b>Low-profile</b>  <span style="border: 1px solid red; padding: 1px;">Compatible in the future</span>	<b>TM-RG2M series</b> <b>TM-RU2M series</b>	ø130	300	600	2.2	8.8	IP40	<ul style="list-style-type: none"> <li>•Suitable for low-speed and high-torque operations.</li> <li>•Smooth operation with less audible noise.</li> <li>•The motor's low profile design contributes to compact construction and a low center of gravity for enhanced machine stability.</li> <li>•Clean room compatible.</li> </ul>	<ul style="list-style-type: none"> <li>•Semiconductor manufacturing devices</li> <li>•Liquid crystal manufacturing devices</li> <li>•Machine tools</li> </ul>
		ø180	300	600	4.5	13.5	IP40		
		ø230	300	600	9	27	IP40		
<b>High-rigidity</b> 	<b>TM-RFM series</b>	ø130	200	500	2, 4, 6	6, 12, 18	IP42	<ul style="list-style-type: none"> <li>•Suitable for low-speed and high-torque operations.</li> <li>•Smooth operation with less audible noise.</li> <li>•The motor's low profile design contributes to compact construction and a low center of gravity for enhanced machine stability.</li> <li>•Clean room compatible.</li> </ul>	<ul style="list-style-type: none"> <li>•Semiconductor manufacturing devices</li> <li>•Liquid crystal manufacturing devices</li> <li>•Machine tools</li> </ul>
		ø180	200	500	6, 12, 18	18, 36, 54	IP42		
		ø230	200	500	12, 48, 72	36, 144, 216	IP42		
		ø330	100	200	40, 120, 240	120, 360, 720	IP42		

\*1. Connectors and a gap along the rotor (output shaft) are excluded.

## Rotary servo motor

●: Available    —: Not available

Rotary servo motor series	Rated speed (maximum speed) [r/min]	Rated output [kW] (*1)	Servo motor type (*2)			IP rating (*3)	Features	Application examples	
			With electro-magnetic brake (B)	With reducer (G1)	With reducer (G5, G7)				
Small capacity	<b>HG-KR series</b> 	3000 (6000)	0.05, 0.1, 0.2, 0.4, 0.75	●	●	●	IP65	Low inertia Perfect for general industrial machines.	•Belt drives •Robots •Mounters •Food processing machines •Semiconductor manufacturing equipment
	<b>HG-MR series</b> 	3000 (6000)	0.05, 0.1, 0.2, 0.4, 0.75	●	—	—	IP65	Ultra-low inertia Well suited for high-throughput operations.	•Inserters •Mounters
Medium capacity	<b>HG-SR series</b> 	1000 (1500)	0.5, 0.85, 1.2, 2.0, 3.0, 4.2	●	—	—	IP67	Medium inertia This series is available with two rated speeds.	•Material handling systems •Robots
		2000 (3000)	0.5, 1.0, 1.5, 2.0, 3.5, 5.0, 7.0 0.5, 1.0, 1.5, 2.0, 3.5, 5.0, 7.0	●	●	●	IP67		
Medium/large capacity	<b>HG-JR series</b> 	3000 (6000: 0.5 to 5 kW, 5000: 7, 9 kW)	0.5, 0.75, 1.0, 1.5, 2.0, 3.5, 5.0, 7.0, 9.0 0.5, 0.75, 1.0, 1.5, 2.0, 3.5, 5.0, 7.0, 9.0	●	—	—	IP67	Low inertia Well suited for high-throughput and high-acceleration/ deceleration operations.	•Food packaging machines •Printing machines
		1500 (3000: 7 to 15 kW, 2500: 22 kW)	7.0, 11, 15, 22 7.0, 11, 15, 22	● (*5)	—	—	IP67/ IP44 (*4)		•Injection molding machines •Press machines
		1000 (2000: 6 to 12 kW, 1500: 15 to 25 kW)	6.0, 8.0, 12, 15, 20, 25 6.0, 8.0, 12, 15, 20, 25	● (*5)	—	—	IP67/ IP44 (*4)		
Medium capacity	<b>HG-RR series</b> 	3000 (4500)	1.0, 1.5, 2.0, 3.5, 5.0	●	—	—	IP65	Ultra-low inertia Well suited for high-throughput operations.	•Ultra-high-throughput material handling systems
Medium capacity, flat type	<b>HG-UR series</b> 	2000 (3000: 0.75 to 2 kW, 2500: 3.5, 5 kW)	0.75, 1.5, 2.0, 3.5, 5.0	●	—	—	IP65	Flat type The flat design makes this unit well suited for situations where the installation space is limited.	•Robots •Food processing machines

\*1.   : For 400 V.

\*2. G1 for general industrial machines. G5 and G7 for high precision applications.

\*3. The shaft-through portion is excluded. Refer to "MELSERVO-J4 catalog (L(NA)03058)" for the shaft-through portion.

For geared servo motor, IP rating of the reducer portion is equivalent to IP44.

\*4. For HG-JR1500 r/min series, 15 kW or smaller is rated IP67, and 22 kW is rated IP44. For HG-JR 1000 r/min series, 12 kW or smaller is rated IP67, and 15 kW or larger is rated IP44.

\*5. The servo motor with electromagnetic brake is not available for HG-JR 1500 r/min series 22 kW, and 1000 r/min series 15 kW or larger.



## CC-Link IE Field Network Compatible Simple Motion Module

# RD77GF4/RD77GF8/RD77GF16/RD77GF32 QD77GF4/QD77GF8/QD77GF16

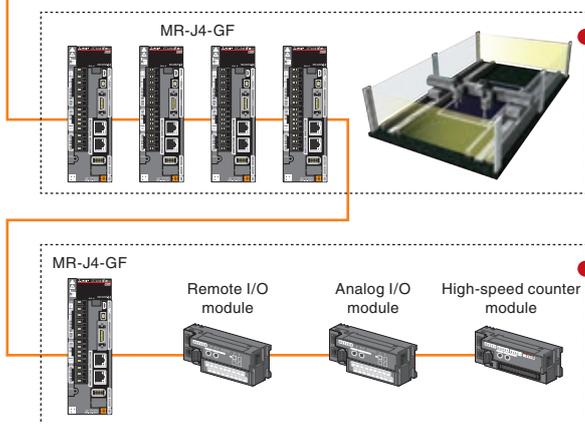
The Simple Motion module enables various motion control, such as positioning including interpolation and trajectory control, synchronous, cam, and speed-torque control.

Advanced motion control is easily performed with parameter settings and a sequence program, such as a function block (FB).

The 4, 8, 16 and 32-axis models are available to best suit your control needs.

## Servo System Configuration

The CC-Link IE Field Network compatible Simple Motion module, not only performs Motion control, but can also function as a CC-Link IE Field Network master station. Up to 120 stations including servo amplifiers are connectable.



### Motion mode

This mode enables advanced Motion control, such as positioning for multi-axis interpolation, synchronous, and speed-torque control in combination with the Simple Motion module.

**Maximum number of control axes: 32 axes**

### I/O mode

With CC-Link IE Field Network, various field devices, such as servo amplifiers, I/O modules, and high-speed counter modules, can be connected flexibly.

**Maximum number of control stations: 120 stations**

RD77GF: Including the number of motion mode compatible servo amplifiers  
QD77GF: 16 motion mode compatible servo amplifiers + 104 I/O devices

## CC-Link IE Field Network Master Station



The CC-Link IE Field Network Simple Motion module covers the functionality that a CC-Link IE Field Network master/local module provides<sup>(Note-1)</sup>. The Simple Motion module can function as a master module, and is also equipped with link devices equivalent to a master/local module. This leads to reduced cost on system because it includes functions of both Simple Motion module and a master module.

(Note-1): Excludes the function of a sub-master station.

### Maximum link points per network

Item	RD77GF	QD77GF	Master module
Remote input (RX)/Remote output (RY)	16k points each (16384 points, 2k byte)	8k points each (8192 points, 1k byte)	16k points each (16384 points, 2k byte)
Remote register (RWw, RWr)	8k points each (8192 points, 16k byte)	1k points each (1024 points, 2k byte)	8k points each (8192 points, 16k byte)

## Diagnosis and Parameter Settings for CC-Link IE Field Network

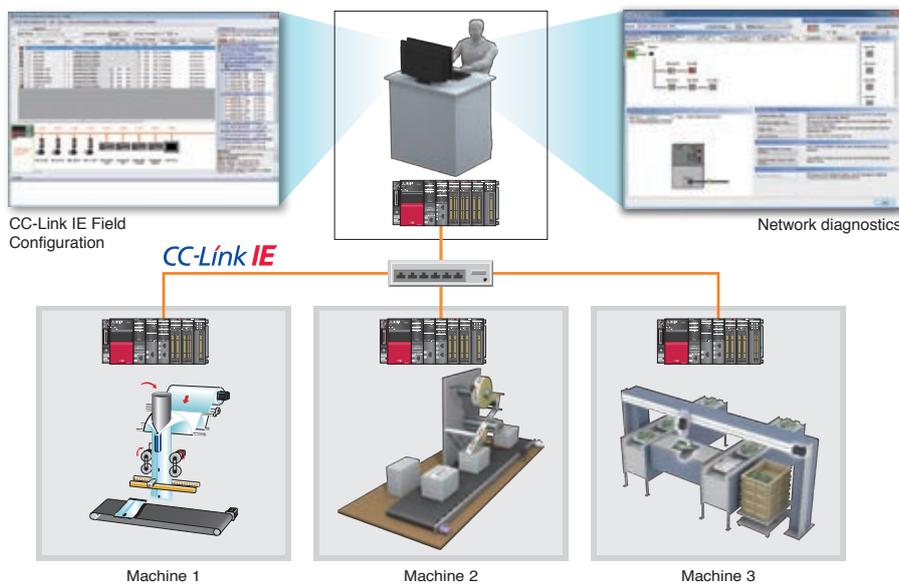
Setting parameters and collecting information of field devices are possible from any-network connected point including a computer or shop floor device.

### Easy parameter settings

Selecting each field device on the screen of CC-Link IE Field configuration via drag & drop enables easy parameter settings.

### Easy diagnosis of network

Engineering software enables users to identify network errors at a glance. The users can instantly identify the cause of trouble when it occurs thus downtime will be shortened.



## Programming

Control, such as positioning control, is easily executed by a sequence program, such as a function block (FB) being started.

### ■ PLCopen® Motion Control FB

Simple Motion modules and servo amplifiers with built-in positioning are used to execute Motion control. Each device uses specific programming, thus the time and cost involved in understanding how each device works is a burden.

PLCopen® Motion Control FB is a standardized interface, which provides the following benefits:

- Reduced workload for programming, saving time and reducing costs.
- People other than the program designer can understand the programming, leading to reduced maintenance time.



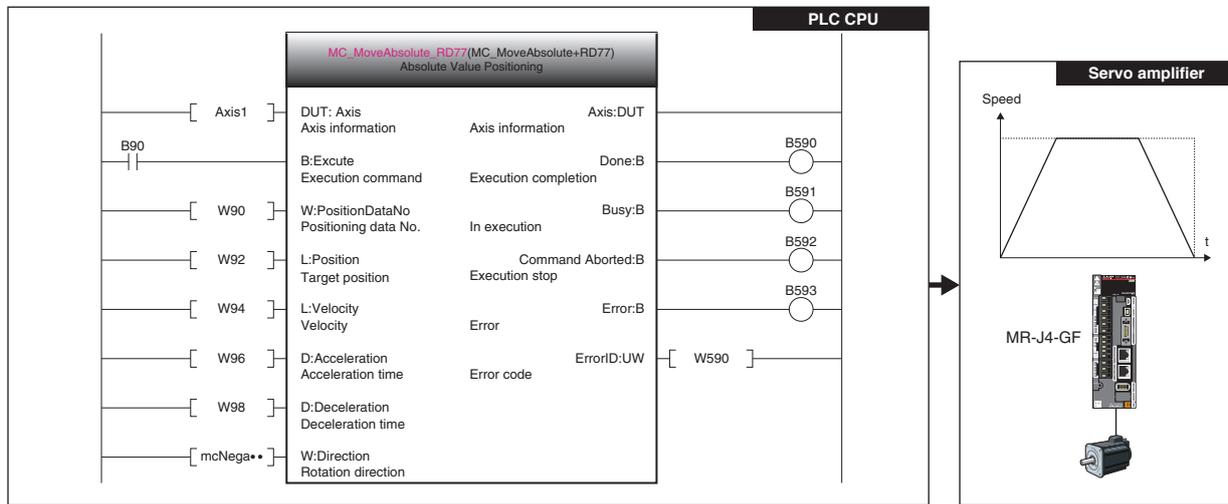
### Conforms to IEC 61131-3

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

The sequence program using FBs is created with the same interface regardless of whether the motion mode or the I/O mode is used.

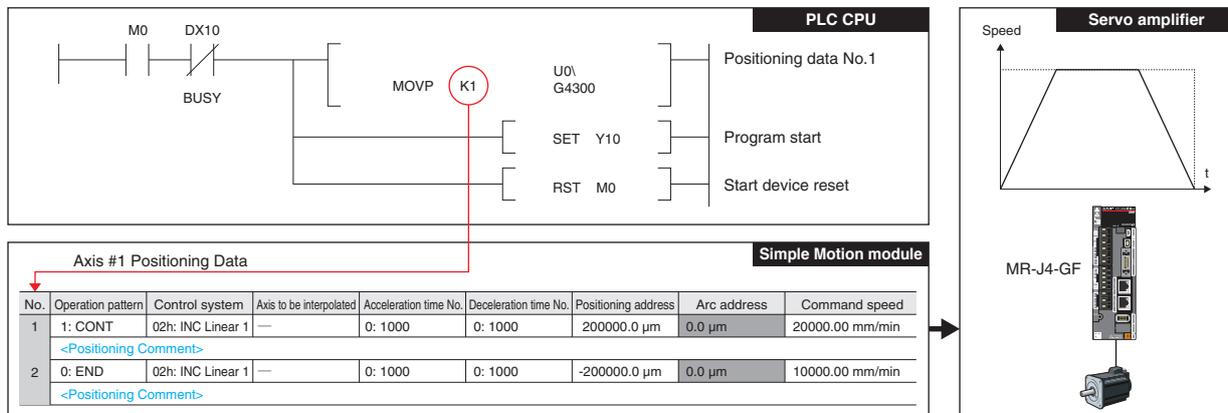
5

Simple Motion Modules



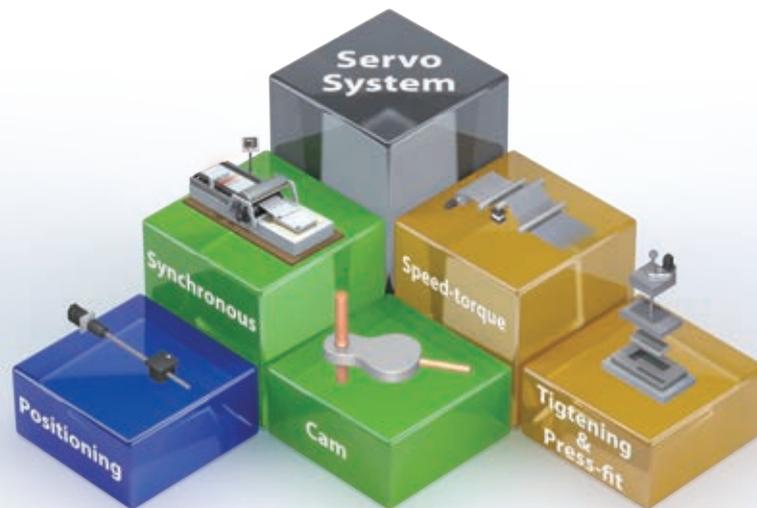
### ■ Sequence Program

The operation starts from the designated positioning data No. in the sequence program.



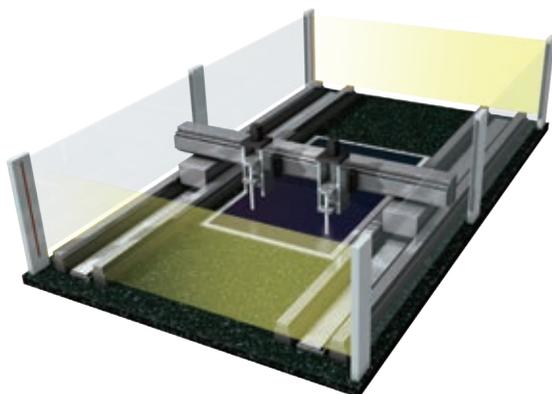
## Extensive Motion control

A wide range of control, such as positioning, speed-torque, cam, and synchronous control, is applicable to various machines, such as X-Y tables, packaging machines, and converting machines. Selecting the best suitable control methods and functions for your machine achieves an optimal solution.



### ■ Positioning control (Interpolation Function and Trajectory Control)

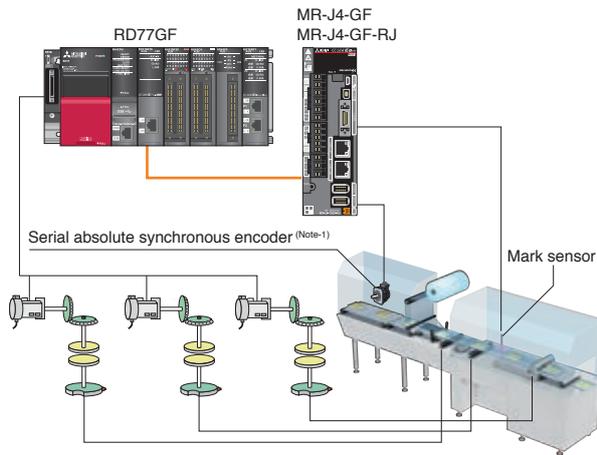
Positioning control is easily performed with a Motion profile table in the sequence program.



- To respond to various application needs, the Simple Motion module offers various control methods, such as linear interpolation, 2-axis circular interpolation, fixed-pitch feed, and continuous trajectory control.
- Automatic operation can be executed easily by setting positioning addresses, speeds, and other setting items in a sequence program.
- Powerful sub-functions, such as M-code output, skip, speed change, and target position change functions, are available.

# Simple Motion Modules

## Advanced Synchronous Control



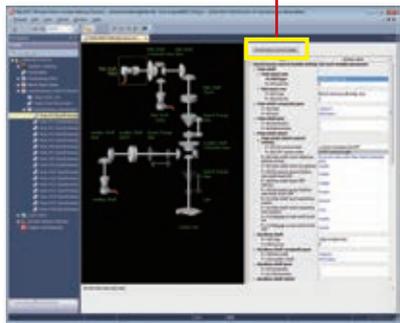
The advanced synchronous control is software-based synchronous control as an alternative to mechanical control, such as gear, shaft, clutch, speed change gear, and cam. In addition, cam control becomes even easier with cam auto-generation function.

The synchronous control can be simply started/ended for each axis, allowing the synchronous control axis and positioning control axis to be used within the same program.

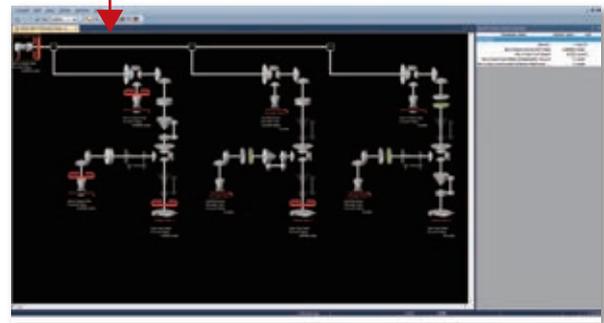
(Note-1): MR-J4-GF-RJ is required when the serial absolute synchronous encoder is used.

### Module configuration of synchronous control

The whole module configuration of the advanced synchronous control is displayed in one screen, and monitoring of the target modules is also viewed, which enables more efficient debugging.



Synchronous control parameters



Module configuration

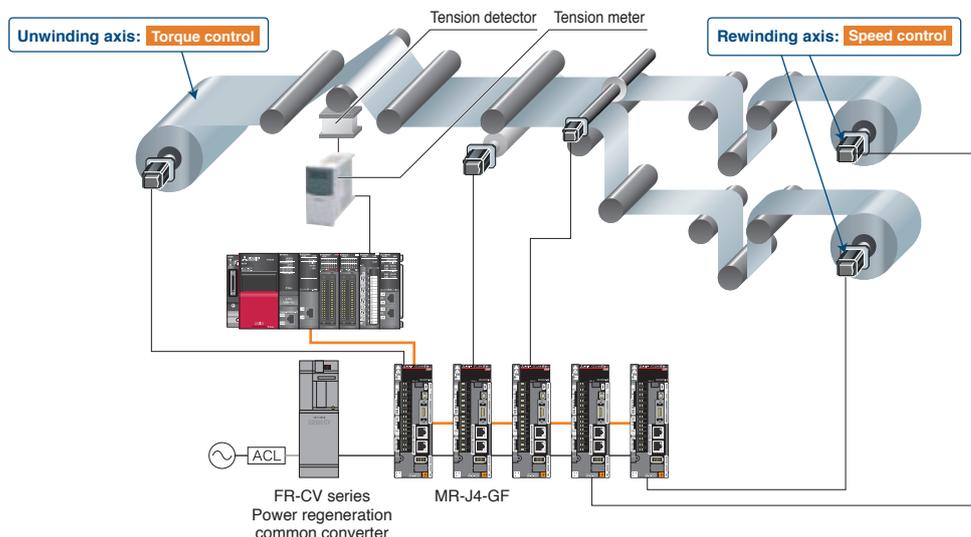
- Synchronous control is easily performed only with parameter settings.

- All the output axes that are connected to the main shaft main input axes modules are displayed in the monitoring screen.
- Monitoring of each module and parameter settings are possible.

## Speed-torque Control

The Simple Motion module can be used for tension control, such as unwinding or rewinding.

Positioning using absolute position coordinates can be smoothly performed even after switching back to position control because the current position is controlled during the speed-torque control.



## Various Functions

### JOG operation

While the JOG start signal is ON, the workpiece moves in the designated direction.

JOG operation can be executed without completing home position return.

### Motion profile table operation

The operation is executed by the motion profile table method, in which position data and feed speed are set. Once the start signal is turned ON, the set commands are executed sequentially from the start point to the end point.

### Stroke limit functions

This function is used to establish the physical movable range for a machine. The hardware stroke limit function and the software stroke limit function are available.

### Absolute position system

This function restores the absolute position of the designated axis. Once the home position return is executed at the start of system, it is unnecessary to perform the home position return again when the power is turned ON next time.

### Step function

This function temporarily stops the operation to confirm the positioning operation during debugging, etc.  
The operation is stopped at each of "automatic deceleration" or "positioning data".

### M-code output function

This function issues commands for sub works corresponding to the M-code No. 0 to 65535 that is set for each positioning data. The commands are used for clamp or drill stop, tool change, etc.

### External input signal setting function

This function allows you to set the input type, the input terminal, and the input filter for each external input signal (the upper/lower limit signal, the proximity dog signal, and the stop signal).

### Phase compensation

In synchronous control with a synchronous encoder, the phase compensation function is used to compensate the delay time caused by a communication delay in the synchronous encoder data, etc.

### Home position return methods

Various types of home position return methods, the retry function and the shift function are available to establish a home position used as the machine reference point. Select any of these home position return methods that suits your machine type.

### Stop operation functions

Forced stop, axis stop, and forced stop for servo amplifiers are available. Utilize these stop operation functions based on your application.

### Unlimited length feed

Unlimited length feed is performed by disabling the stroke limit function. This function is used for a rotary table, a belt conveyor, etc.

### Amplifier-less operation

This function executes the positioning control by the Simple Motion module without connecting to servo amplifiers, thus enabling debugging of a user program and simulation of positioning operation on a personal computer.

### Skip function

This function stops the positioning being executed when the skip signal is inputted, and executes the next positioning. It is used for measurement with a sensor.

### Execution data backup function

This function stores the "setting data", currently being executed, into the flash ROM/internal memory without a battery. The command for this function is executed on MELSOFT GX Works3 or a sequence program.

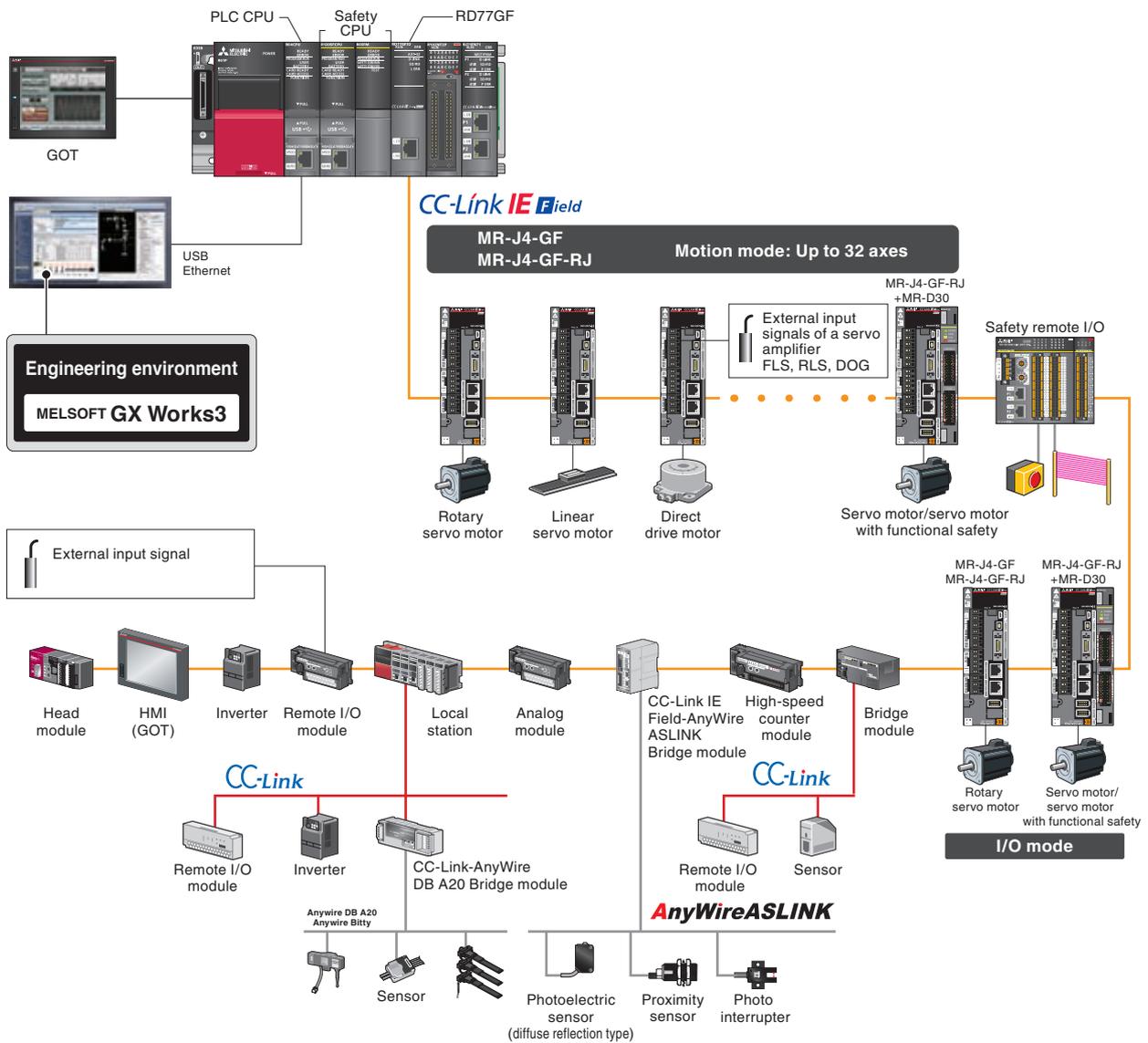
### External I/O signal logic switching function

This function switches I/O signal logic according to devices connected to the Simple Motion module, etc.

**CC-Link IE Field**  
**MELSEC iQ-R**  
series

CC-Link IE Field Network  
MELSEC iQ-R series Simple Motion module

**RD77GF4/RD77GF8/RD77GF16/RD77GF32**

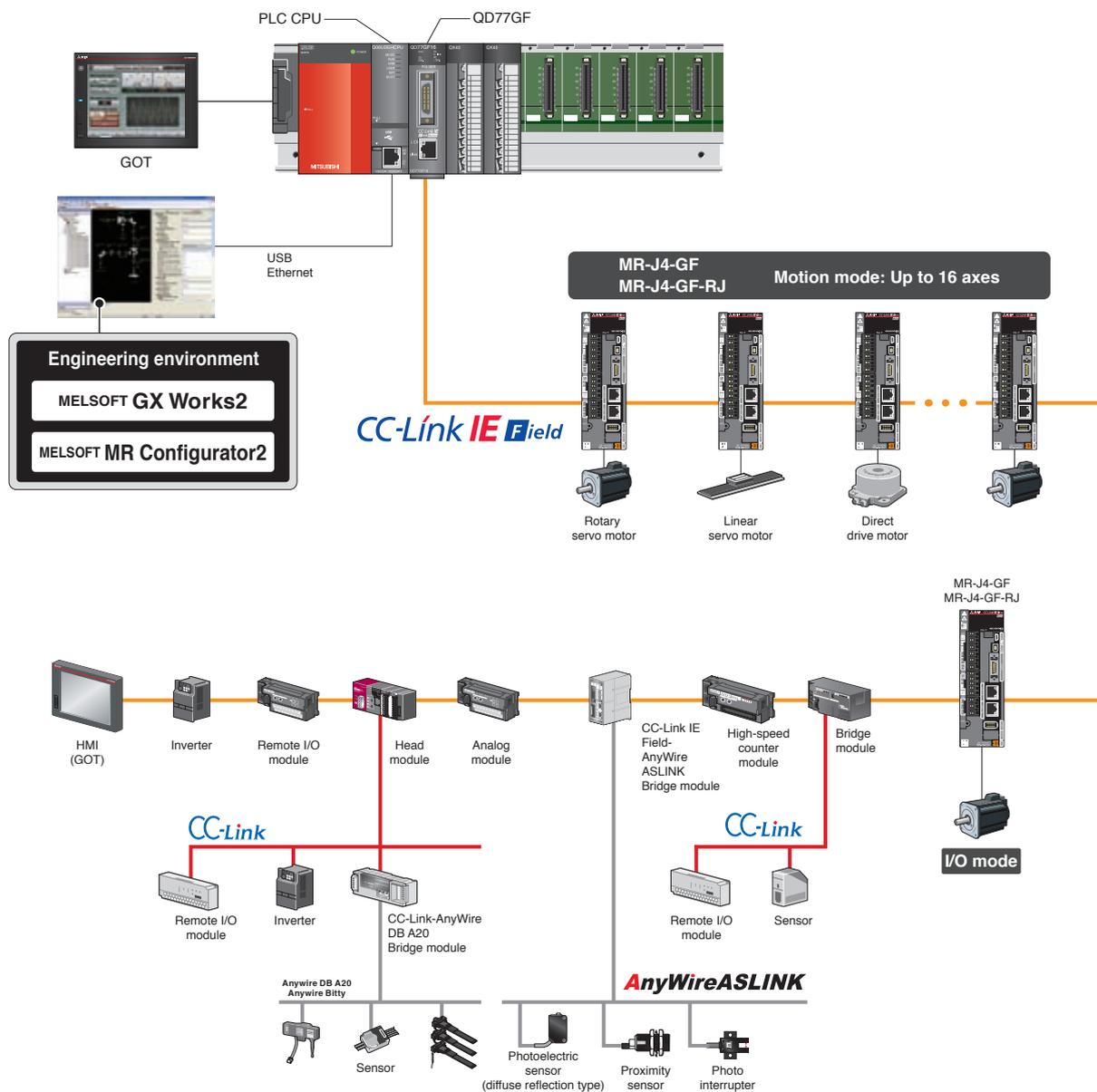


Slave station: Up to 120 stations (Including the number of motion mode compatible servo amplifiers)  
(Note): A switching hub is required for star topology.

CC-Link IE Field  
MELSEC Q series

CC-Link IE Field Network  
MELSEC-Q series Simple Motion module

**QD77GF4/QD77GF8/QD77GF16**



Slave station: Up to 120 stations (16 motion mode compatible servo amplifiers + 104 I/O devices)

(Note): A switching hub is required for star topology.

# Simple Motion Modules

## Module specifications

### Simple Motion module RD77GF4/RD77GF8/RD77GF16/RD77GF32

Item	Specifications			
	RD77GF4	RD77GF8	RD77GF16	RD77GF32
Maximum number of control axes (Virtual servo amplifier axis included)	4 axes	8 axes	16 axes	32 axes
Servo amplifier connection system	CC-Link IE Field Network			
Maximum distance between stations [m(ft.)]	100(328.08)			
Peripheral I/F	Via CPU module (USB, Ethernet)			
Manual pulse generator operation function	Possible to connect 1 module (via link device)			
Synchronous encoder operation	4 modules	8 modules	16 modules	32 modules
	A total of link devices, interfaces via CPU, and interfaces via servo amplifier			
Number of I/O occupying points	32 points (I/O allocation: Intelligent function module, 32 points)			64 points (I/O allocation: intelligent function module, 64 points)
Number of module occupied slots	1			
5VDC internal current consumption [A]	1.1			
Mass [kg]	0.23			
Exterior dimensions [mm(inch)]	106.0(4.17) (H) × 27.8(1.09) (W) × 110.0(4.33) (D)			

### Applicable CPU

PLC CPU	R04CPU, R08CPU, R16CPU, R32CPU, R120CPU, R04ENCPU, R08ENCPU, R16ENCPU, R32ENCPU, R120ENCPU R08PCPU, R16PCPU, R32PCPU, R120PCPU R08SFPCU-SET, R16SFPCU-SET, R32SFPCU-SET, R120SFPCU-SET
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Refer to "MELSEC iQ-R Module Configuration Manual" for details.

### Simple Motion module QD77GF4/QD77GF8/QD77GF16

Item	Specifications		
	QD77GF4	QD77GF8	QD77GF16
Maximum number of control axes (Virtual servo amplifier axis included)	4 axes	8 axes	16 axes
Servo amplifier connection system	CC-Link IE Field Network		
Maximum distance between stations [m(ft.)]	100(328.08)		
Peripheral I/F	Via CPU module (USB, RS-232, Ethernet)		
Manual pulse generator operation function	Possible to connect 1 module		
External command signal	Number of input points	4 points	
	Input method	Positive common/Negative common shared (Photocoupler isolation)	
	Rated input voltage/current	24 VDC/ Approx. 5 mA	
	Operating voltage range	21.6 to 26.4 VDC (24 VDC ±10%, ripple ratio 5% or less)	
	ON voltage/current	17.5 VDC or more/3.5 mA or more	
	OFF voltage/current	5 VDC or less/0.9 mA or less	
	Input resistance	Approx. 5.6 kΩ	
	Response time	1 ms or less (OFF→ON, ON→OFF)	
Recommended wire size	AWG24 (0.2 mm <sup>2</sup> )		
Forced stop input signal (EMI)	Number of input points	1 point	
	Input method	Positive common/Negative common shared (Photocoupler isolation)	
	Rated input voltage/current	24 VDC/Approx. 2.4 mA	
	Operating voltage range	20.4 to 26.4 VDC (24 VDC +10%/-15%, ripple ratio 5% or less)	
	ON voltage/current	17.5 VDC or more/2 mA or more	
	OFF voltage/current	1.8 VDC or less/0.18 mA or less	
	Input resistance	Approx. 10 kΩ	
Response time	1 ms or less (OFF→ON, ON→OFF)		
Recommended wire size	AWG24 (0.2 mm <sup>2</sup> )		
Manual pulse generator/Incremental synchronous encoder signal	Signal input form	Phase A/Phase B (magnification by 4/magnification by 2/magnification by 1), PULSE/SIGN	
	Input frequency	1 Mpps (After magnification by 4, up to 4 Mpps) (Differential output type) 200 kpps (After magnification by 4, up to 800 kpps) (Voltage-output/Open-collector type)	
	Cable length	Up to 30 m (98.43ft.) (Differential output type) Up to 10 m (32.81ft.) (Voltage-output/Open-collector type)	
Number of occupied I/O points	32 points (I/O allocation: Intelligent function module, 32 points)		
Number of module occupied slots	1		
5 VDC internal current consumption [A]	0.8		
Mass [kg]	0.26		
Exterior dimensions [mm(inch)]	98.0(3.86) (H) × 27.4(1.08) (W) × 115(4.53) (D)		

### Applicable CPU

Universal model QCPU (Upper five digit of Serial No. is "12012" or later)	Q00UJCPU, Q00UCPU, Q01UCPU, Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q10UDHCPU, Q13UDHCPU, Q20UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q10UDEHCPU, Q13UDEHCPU, Q20UDEHCPU, Q26UDEHCPU, Q50UDEHCPU, Q100UDEHCPU
High-speed universal model QCPU	Q03UDVCPU, Q04UDVCPU, Q06UDVCPU, Q13UDVCPU, Q26UDVCPU

■ Performance specifications of CC-Link IE Field Network

Item		MELSEC IQ-R series				MELSEC-Q series			
		RD77GF4	RD77GF8	RD77GF16	RD77GF32	QD77GF4	QD77GF8	QD77GF16	
Maximum link points per network	RX	16k points (16384 points, 2k bytes)				8k points (8192 points, 1k byte)			
	RY	16k points (16384 points, 2k bytes)				8k points (8192 points, 1k byte)			
	RWr	8k points (8192 points, 16k bytes)				1k points (1024 points, 2k bytes)			
	RWw	8k points (8192 points, 16k bytes)				1k points (1024 points, 2k bytes)			
Maximum link points per station	Master station	RX	16k points (16384 points, 2k bytes)				8k points (8192 points, 1k byte)		
		RY	16k points (16384 points, 2k bytes)				8k points (8192 points, 1k byte)		
		RWr	8k points (8192 points, 16k bytes)				1k points (1024 points, 2k bytes)		
		RWw	8k points (8192 points, 16k bytes)				1k points (1024 points, 2k bytes)		
	Local station	RX	2k points (2048 points, 256 bytes)				—		
		RY	2k points (2048 points, 256 bytes)				—		
		RWr	1k points (1024 points, 2k bytes)				—		
		RWw	1k points (1024 points, 2k bytes)				—		
	Intelligent device station	RX	2k points (2048 points, 256 bytes)				2k points (2048 points, 256 bytes)		
		RY	2k points (2048 points, 256 bytes)				2k points (2048 points, 256 bytes)		
		RWr	1k points (1024 points, 2048 bytes)				1k points (1024 points, 2048 bytes)		
		RWw	1k points (1024 points, 2048 bytes)				1k points (1024 points, 2048 bytes)		
	Remote device station	RX	128 points, 16 bytes				128 points, 16 bytes		
		RY	128 points, 16 bytes				128 points, 16 bytes		
		RWr	64 points, 128 bytes				64 points, 128 bytes		
		RWw	64 points, 128 bytes				64 points, 128 bytes		
Ethernet	Communication speed	1 Gbps							
	Connection cable	1000BASE-T Ethernet cable <sup>(Note-1)</sup> (Category 5e or higher), (Double shielded/STP) Straight cable							
	Maximum distance between stations [m(ft.)]	100(328.08) (conforms to ANSI/TIA/EIA-568-(Category 5e))							
	Topology	Line type, star type, line/star mixed type							
Overall cable distance	Line type [m(ft.)]	12000(39370.08) (When 1 master station and 120 slave stations are connected)							
	Star type <sup>(Note-2)</sup>	Depends on system configuration							
Maximum stations per network	121 stations (1 master station, 120 slave stations)				121 stations (1 master station, 120 slave stations) (4, 8, or 16 servo amplifiers + 104 I/O devices)				
Maximum number of networks	239								

(Note-1): Use the cables recommended by CC-Link Partner Association for CC-Link IE Field Network.

CC-Link IE Controller Network cables are not compatible with CC-Link IE Field Network.

(Note-2): A switching hub is required for star type topology.

Ethernet Cable Specifications

Item		Description
Ethernet cable		Category 5e or higher, (double shielded/STP) straight cable
	Standard	The cable must meet the following standards: <ul style="list-style-type: none"> <li>• IEEE802.3 (1000BASE-T)</li> <li>• ANSI/TIA/EIA-568-B (Category 5e)</li> </ul>
	Connector	RJ-45 connector with shield

■ Products on the Market

Ethernet Cable

Item	Specifications
Ethernet cable	For indoor SC-E5EW-S_M _: cable length (100 m max., unit of 1 m)
	For moving part, indoor SC-E5EW-S_M-MV _: cable length (45 m max., unit of 1 m)
	For indoor/outdoor SC-E5EW-S_M-L _: cable length (100 m max., unit of 1 m)

For details, contact Mitsubishi Electric System & Service Co., Ltd.  
 [Sales office] FA PRODUCT DIVISION mail: osb.webmaster@melsc.jp

Manual pulse generator

Mitsubishi Electric has confirmed the operation of the following manual pulse generator. Contact the manufacturer for details.

Product	Model	Description	Manufacturer
Manual pulse generator	UFO-M2-0025-2Z1-B00E	Number of pulses per revolution: 25 pulse/rev (100 pulse/rev after magnification by 4), Permitted speed: 200 r/min (Normal rotation)	Nemicon Corporation



■ Synchronous control specifications

Item	Number of settable axes						
	MELSEC iQ-R series				MELSEC-Q series		
	RD77GF4	RD77GF8	RD77GF16	RD77GF32	QD77GF4	QD77GF8	QD77GF16
Servo input axis	4 axes/module	8 axes/module	16 axes/module	32 axes/module	4 axes/module	8 axes/module	16 axes/module
Synchronous encoder input axis	4 axes/module	8 axes/module	16 axes/module	32 axes/module	4 axes/module		
Composite main shaft gear	1 module/output axis						
Main shaft main input axis	1 module/output axis						
Main shaft sub input axis	1 module/output axis						
Main shaft gear	1 module/output axis						
Main shaft clutch	1 module/output axis						
Auxiliary shaft	1 module/output axis						
Auxiliary shaft gear	1 module/output axis						
Auxiliary shaft clutch	1 module/output axis						
Auxiliary shaft composite gear	1 module/output axis						
Speed change gear	1 module/output axis						
Output axis (Cam axis)	4 axes/module	8 axes/module	16 axes/module	32 axes/module	4 axes/module	8 axes/module	16 axes/module

■ Cam control

Item			Specifications								
			MELSEC iQ-R series				MELSEC-Q series				
			RD77GF4	RD77GF8	RD77GF16	RD77GF32	QD77GF4	QD77GF8	QD77GF16		
Memory capacity	Cam storage area	Up to 3 MB									
	Cam working area	Up to 16 MB				1024k bytes					
Number of registration		Up to 1024				Up to 256					
Comment			Up to 32 characters for each cam data								
Cam data	Stroke ratio data type	Maximum number of cam registration	RD77GF								
			Cam resolution	256	512	1024	2048	4096	8192	16384	32768
		Number of cam registration	1024	1024	1024	1024	1024	512	256	128	
		QD77GF									
	Cam resolution	256	512	1024	2048	4096	8192	16384	32768		
	Number of cam registration	256	128	64	32	16	8	4	2		
Coordinate data type	Maximum number of cam registration	RD77GF									
		Number of coordinates	128	256	512	1024	2048	4096	8192	16384	32768
	Number of cam registration	1024	1024	1024	1024	1024	512	256	128	64	32
	QD77GF										
Number of coordinates	128	256	512	1024	2048	4096	8192	16384			
Number of cam registration	256	128	64	32	16	8	4	2			
Coordinate data		Input value: 0 to 2147483647, Output value: -2147483648 to 2147483647									
Cam auto-generation	Cam for rotary cutter	Available				Available					
	Easy stroke ratio cam	Available				—					
	Advanced stroke ratio cam	Available				—					

■ Compatibility with servo amplifier

Item	MELSEC iQ-R series				MELSEC-Q series		
	RD77GF4	RD77GF8	RD77GF16	RD77GF32	QD77GF4	QD77GF8	QD77GF16
MR-J4-GF(-RJ)	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible (Note-1)

(Note-1): Only QD77GF16 with the first 5 digits of serial No. on and after 17102 is compatible with MR-J4-GF(-RJ).

■ Component

Part	Model	Description	Standards	
Simple Motion modules	MELSEC iQ-R series	RD77GF4	Up to 4 axes	CE, UL, KC, EAC
		RD77GF8	Up to 8 axes	CE, UL, KC, EAC
		RD77GF16	Up to 16 axes	CE, UL, KC, EAC
		RD77GF32	Up to 32 axes	CE, UL, KC, EAC
	MELSEC-Q series	QD77GF4	Up to 4 axes	CE, UL, KC, EAC
		QD77GF8	Up to 8 axes	CE, UL, KC, EAC
		QD77GF16	Up to 16 axes	CE, UL, KC, EAC
Internal I/F connector set (Note-1)	LD77MHIICON	Incremental synchronous encoder/Mark detection signal interface connector set	—	

(Note-1): Use this connector set for QD77GF.

# Simple Motion Board



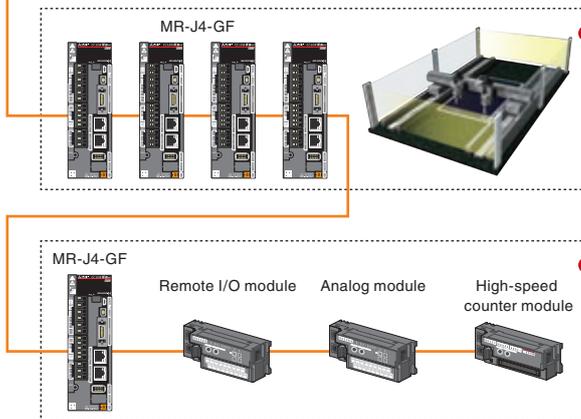
CC-Link IE Field Network Compatible  
Simple Motion Board

## MR-EM340GF

Numerous motion control functions, such as positioning, synchronous control, and speed-torque control are performed by the Simple Motion board being embedded in a PC which supports PCI Express®.

### Servo System Configuration

The Simple Motion board, not only performs Motion control, but can also function as a CC-Link IE Field Network master station. Up to 120 stations including servo amplifiers are connectable.



**Motion mode:**

This mode enables advanced motion control functions, such as positioning for multi-axis interpolation, synchronous control, and speed-torque control in combination with the Simple Motion board.

**Maximum number of control axes: 16 axes**

**I/O mode:**

With CC-Link IE Field Network, various field devices, such as servo amplifiers, I/O modules, and high-speed counter modules, can be connected flexibly.

**Maximum number of control stations: 120 stations**  
(including the number of servo amplifiers for motion mode)

## Software Development Kit MELSOFT EM Software Development Kit

MELSOFT EM Software Development Kit is a development software package, supporting the engineering process from system design and programming to debug and maintenance for the Simple Motion board.

(Note): Contact your local sales office for the latest version of Software Development Kit.



### MELSOFT EM Configurator

Every step in the engineering process from system design and programming to debug and maintenance, is supported by this software.



### MELSOFT MR Configurator2

Primarily, tuning, monitoring, and diagnosis are easily performed with this software by being connected to a servo amplifier.



### API library

The API library is an add-on library which uses functions (method) and labels (member) of controller and axis classes, and enables easy programming with Visual C++®.



### PCI Express® device driver

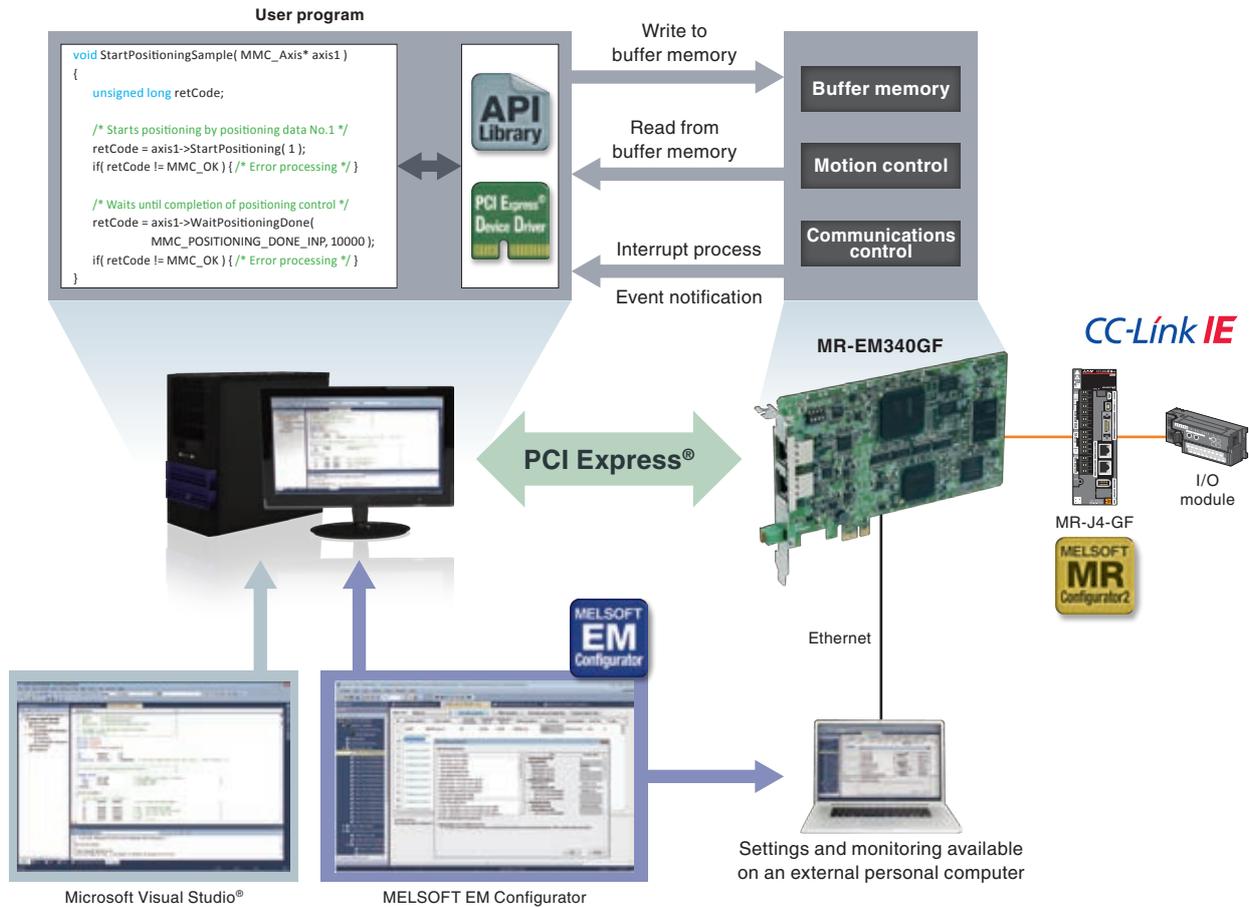
The PCI Express® device driver is software for a user program to gain access to the Simple Motion board via PCI Express®.

## Development and Debugging Environments

A user program is created by adding the API library (for motion control) to a project of Microsoft Visual Studio®.

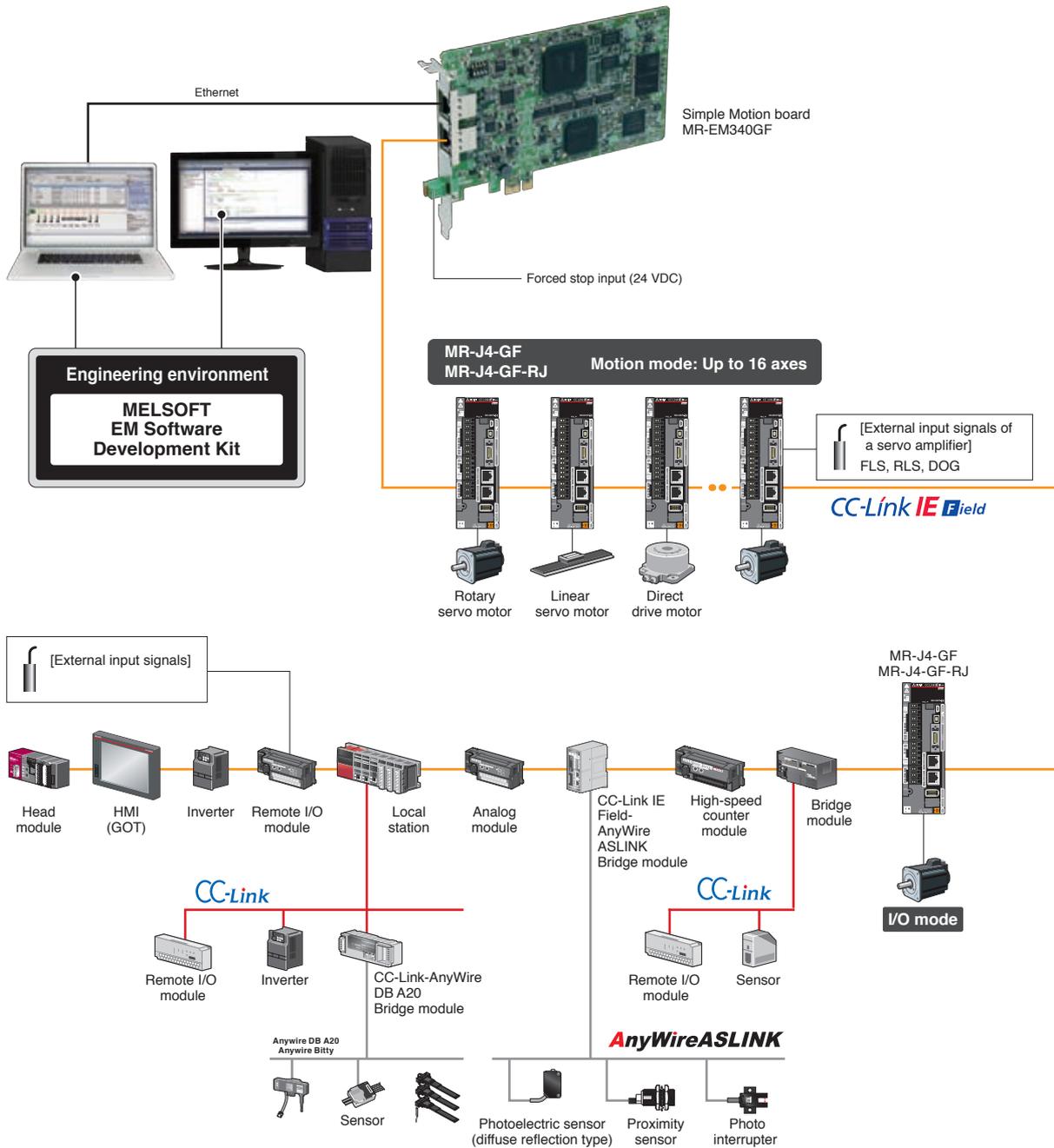
INtime and RTX (real-time operating system) are supported.

(Note): Contact your local Mitsubishi Electric office for more details.



(Note): OS and the development environment are not included.

## System configuration



Slave station: Up to 120 stations (including the number of motion mode compatible servo amplifiers)

(Note): A switching hub is required for star topology.

## Control specifications

Item		Specification	
		MR-EM340GF	
Maximum number of control axes (virtual servo amplifier axis included)		16 axes	
Operation cycle (operation cycle settings)		0.5 ms, 1.0 ms, 2.0 ms, 4.0 ms	
Interpolation function		Linear interpolation (up to 4 axes), Circular interpolation (2 axes), Helical interpolation (3 axes)	
Control modes		Positioning, Trajectory control (linear, arc, and helical), Speed control, Speed-torque control	
Acceleration/deceleration process		Trapezoidal acceleration/deceleration, S-curve acceleration/deceleration	
Compensation function		Backlash compensation, Electronic gear, Near pass function	
Synchronous control		Synchronous encoder input, Cam, Phase compensation, Cam auto-generation	
Control unit		mm, inch, degree, pulse	
Number of positioning data		600 data/axis	
Backup		Parameters, positioning data, and block start data can be saved on flash ROM (battery-less backup)	
Home position return	Home position return method		Driver home position return method
	Fast home position return control		Provided
	Sub-function		Provided (the sub-function of a servo amplifier)
Positioning control	Linear control		Linear interpolation control (up to 4 axes) <sup>(Note-1)</sup> (vector speed, reference axis speed)
	Fixed-pitch feed		Fixed-pitch feed control
	2-axis circular interpolation		Auxiliary point-specified circular interpolation, Central point-specified circular interpolation
	Speed control		Speed control
	Speed-position switching		INC mode, ABS mode
	Position-speed switching		INC mode
	Current value change		Positioning data, Start No. for a current value changing
	NOP instruction		Provided
	JUMP instruction		Conditional JUMP, Unconditional JUMP
	LOOP, LEND		Provided
High-level positioning		Block start, Condition start, Wait start, Simultaneous start, Repeated start	
Manual control	JOG operation		Provided
	Inching operation		Provided
	Manual pulse generator		Possible to connect 1 module (incremental), Unit magnification (1 to 10000 times) Via link device
Expansion control	Speed-torque control		Speed control without positioning loops, Torque control
	Direct control		Provided
Absolute position system		Made compatible by setting a battery to a servo amplifier	
Synchronous encoder interface		16CH	
	Via buffer memory		Provided (incremental)
	Link device		Provided (incremental)
	Via servo amplifier		16CH
Functions that limit control	Speed limit		Speed limit value, JOG speed limit value
	Torque limit		Torque limit value same setting, torque limit value individual setting
	Forced stop	Internal interface	Provided
		Buffer memory	Provided
		Link device	Provided
	Software stroke limit		Movable range check with current feed value, movable range check with machine feed value
Hardware stroke limit		Provided	
Functions that change control details	Speed change		Provided
	Override		0 to 300 [%]
	Acceleration/deceleration time change		Provided
	Torque change		Provided
	Target position change		Target position address and speed are changeable
Other functions	M-code output		WITH mode/AFTER mode
	Step function		Deceleration unit step, Data No. unit step
	Skip function		Via buffer memory, Via external command signal
	Teaching function		Provided
Parameter initialization function		Provided	
External input signal setting function	Via buffer memory		Provided
	Link device		Provided
	Via servo amplifier		Provided
Amplifier-less operation function (virtual servo amplifier function)		Provided	
Mark detection function			Continuous Detection mode, Specified Number of Detections mode, Ring Buffer mode
	Mark detection signal		Up to 16 points <sup>(Note-3)</sup>
		Mark detection setting	
		16 settings	
Digital oscilloscope function <sup>(Note-2)</sup>	Bit data		16CH
	Word data		16CH

(Note-1): 4-axis linear interpolation control is enabled only at the reference axis speed.

(Note-2): 8CH word data and 8CH bit data are displayed in real time.

(Note-3): The Mitsubishi Electric remote input module is required.

# Simple Motion Board

## Simple Motion board specifications

Item		Specification
		MR-EM340GF
Servo amplifier connection system		CC-Link IE Field Network
Maximum distance between stations [m(ft.)]		100 (328.08)
Peripheral I/F		Ethernet (100BASE)
Forced stop input signal (EM)	Number of input points	1 point
	Input method	Positive Common/ Negative Common Shared Type (Photocoupler isolation)
	Rated input voltage/current	24 VDC/approx. 2.4 mA
	Operating voltage range	20.4 to 26.4 VDC (24 VDC +10 %/-15 %, ripple ratio 5 % or less)
	ON voltage/current	17.5 VDC or more/2.0 mA or more
	OFF voltage/current	1.8 VDC or less/0.18 mA or less
	Input resistance	Approx. 10 kΩ
	Response time	1 ms or less (OFF to ON, ON to OFF)
Recommended wire size [mm <sup>2</sup> ]		0.08 to 0.5 (AWG 20 to AWG 28)
Number of Simple Motion boards for one computer		4
Bus specification		PCI Express® 2.0 × 1
	Size [mm(inch)]	Short sized version (167.65(6.60) × 111.15(4.38))
Power supply voltage		12 VDC/3.3 VDC
Current consumption [A]	12 VDC	0.4
	3.3 VDC	0.6
Mass [kg]		0.13

## Operation environment for MELSOFT EM Development Kit

Item		Description
Personal computer	Personal computer	Microsoft® Windows® supported personal computer
	OS	Microsoft® Windows® 10 (Pro, Enterprise) English version (64-bit/32-bit) Microsoft® Windows® 8.1 (Pro, Enterprise) English version (64-bit/32-bit) Microsoft® Windows® 7 (Professional, Ultimate, Enterprise) English version (64-bit/32-bit) [Service Pack 1]
	CPU	Desktop: Intel® Celeron® Processor 2.8 GHz or more recommended Laptop: Intel® Pentium® M Processor 1.7 GHz or more recommended
	Required memory	1 GB or more recommended (For 32-bit edition) 2 GB or more recommended (For 64-bit edition)
Available hard disk space		When installing the test tool: 3 GB or more of available hard disk space required When operating the test tool: 512 MB or more of available hard disk space required
Disk drive		DVD-ROM supported disk drive
Monitor		Resolution 1024 × 768 pixels or higher
Communications interface		PCI Express® BUS Ethernet port

## Development environment

Item	Description
OS for user program operation	The same operation environment as MELSOFT EM Software Development Kit
Software development environment	Microsoft® Visual C++® 2015/2013/2012/2010
API library	Class library (Only compiled into C++)

**Performance specifications of CC-Link IE Field Network**

Item		Specification		
		MR-EM340GF		
Maximum link points per network	RX	16k points (16384 points, 2 kbytes)		
	RY	16k points (16384 points, 2 kbytes)		
	RWr	8k points (8192 points, 16 kbytes)		
	RWw	8k points (8192 points, 16 kbytes)		
Maximum link points per station	Master station	RX	16k points (16384 points, 2 kbytes)	
		RY	16k points (16384 points, 2 kbytes)	
		RWr	8k points (8192 points, 16 kbytes)	
		RWw	8k points (8192 points, 16 kbytes)	
	Local station	RX	2k points (2048 points, 256 bytes)	
		RY	2k points (2048 points, 256 bytes)	
		RWr	256 points, 512 bytes	
		RWw	256 points, 512 bytes	
	Intelligent device station	RX	2k points (2048 points, 256 bytes)	
		RY	2k points (2048 points, 256 bytes)	
		RWr	256 points, 512 bytes	
		RWw	256 points, 512 bytes	
Remote device station	RX	128 points, 16 bytes		
	RY	128 points, 16 bytes		
	RWr	64 points, 128 bytes		
	RWw	64 points, 128 bytes		
Ethernet	Communication speed		1 Gbps	
	Connection cable		1000BASE-T Ethernet cable <sup>(Note-1)</sup> ; category 5e or higher (double shielded/STP) straight cable	
	Maximum distance between stations [m(ft.)]		100(328.08) (conforms to ANSI/TIA/EIA-568-B (category 5e))	
	Topology		Line type, star type, line/star mixed type	
Overall cable distance	Line type [m(ft.)]		12000(39370.08) (When 1 master station and 120 slave stations are connected)	
	Star type <sup>(Note-2)</sup>		Depends on system configuration	
Maximum connectable stations per network		121 stations (1 master station, 120 slave stations)		
Maximum number of networks		239		

(Note-1): Use the cables recommended by CC-Link Partner Association for CC-Link IE Field Network.

CC-Link IE Controller Network cables are not compatible with CC-Link IE Field Network.

(Note-2): A switching hub is required for star topology.

**Ethernet Cable Specifications**

Item		Specification
Ethernet cable	Category 5e or higher (double shielded/STP) straight cable	
	Standard	The cable must meet the following standards: <ul style="list-style-type: none"> <li>• IEEE802.3 (1000BASE-T)</li> <li>• ANSI/TIA/EIA-568-B (category 5e)</li> </ul>
	Connector	RJ-45 connector with shield

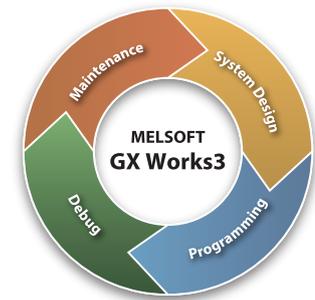
For details, contact Mitsubishi Electric System & Service Co., Ltd.  
 [Sales office] FA PRODUCT DIVISION mail: osb.webmaster@melsc.jp

**Products on the Market**

**Ethernet Cable**

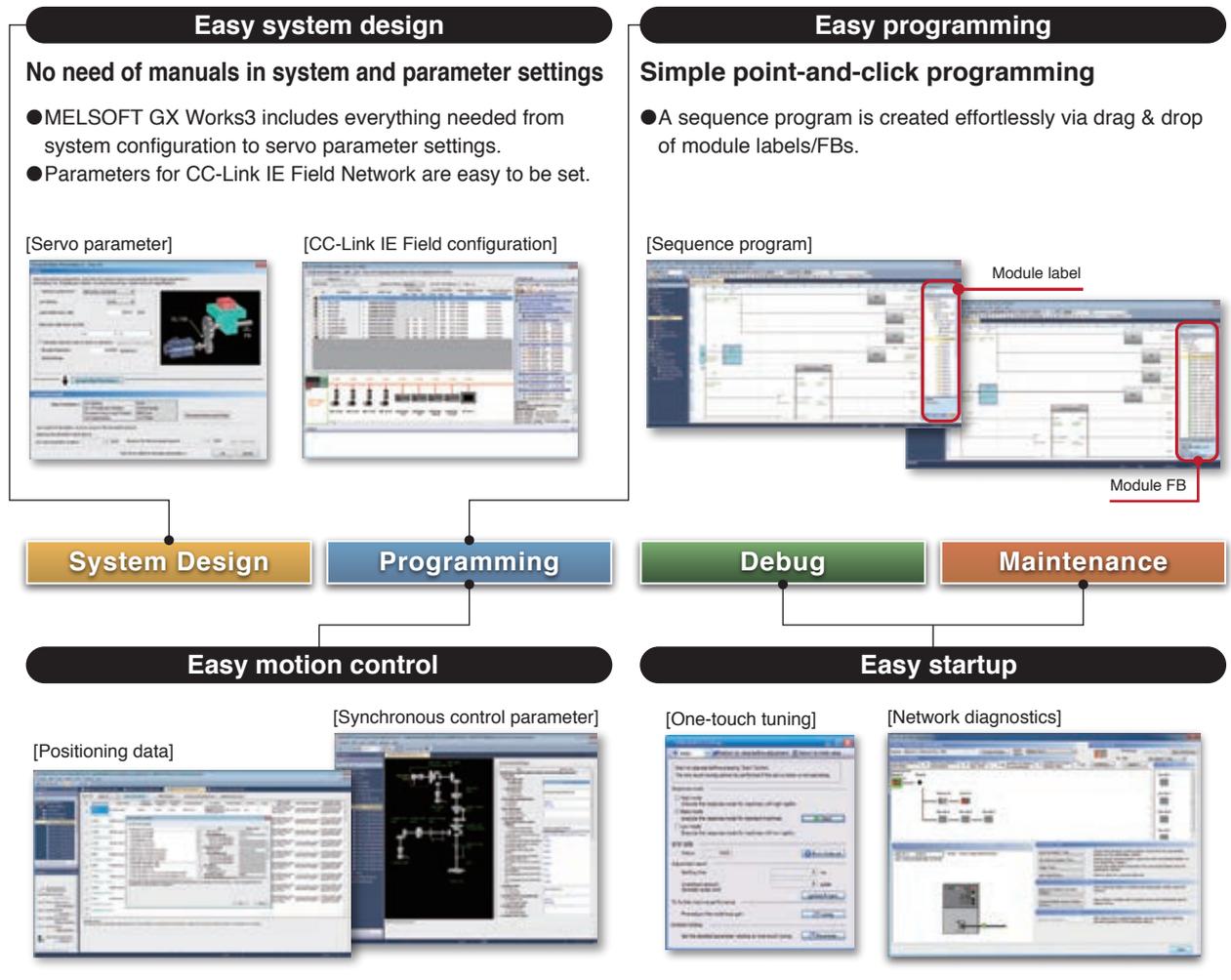
Item	Model	Specification	Note
Ethernet cable	For indoor	SC-E5EW-S_M	Double shielded cable (category 5e)
	For indoor and moving part	SC-E5EW-S_M-MV	
	For indoor/outdoor	SC-E5EW-S_M-L	





**All-in-One Engineering Software**

This all-in-one software covers all aspects of the product development cycle - from system design, programming, to debugging and maintenance - maximizing efficiency while minimizing your effort.



**Increased usability in synchronous/positioning control settings**

- An array of sub functions helps you create positioning data.
- Synchronous control is performed easily just by parameter settings.
- Creation of a rough cam waveform on a graph via drag & drop, or direct numerical value input to the graph enables easy creation of cam data.

**Increased efficiency in debugging and maintenance**

- Servo adjustment is automatically completed using the One-touch tuning function.
- Debugging of a program without an actual machine is possible by simulation.
- The network errors are displayed by Network diagnostics.

## ■ Operating environment

### MELSOFT GX Works3

Item	Description
OS	Microsoft® Windows® 10 (Home, Pro, Enterprise, Education) (64bit/32bit) Microsoft® Windows® 8.1 (64bit/32bit), Microsoft® Windows® 8.1 (Enterprise, Pro) (64bit/32bit) Microsoft® Windows® 8 (64bit/32bit), Microsoft® Windows® 8 (Enterprise, Pro) (64bit/32bit) Microsoft® Windows® 7 (Enterprise, Ultimate, Professional, Home Premium, Starter) (64bit/32bit) Microsoft® Windows Vista® (Enterprise, Ultimate, Business, Home Premium, Home Basic) (32bit) Microsoft® Windows® XP (Professional SP3, Home SP3) (32bit)
CPU	Intel® Core™2 Duo Processor 2 GHz or more recommended
Required memory	64-bit OS: 2GB or more recommended 32-bit OS: 1GB or more recommended
Available hard disk capacity	For installation: 17GB or more free hard disk capacity For operation: 512MB or more free virtual memory capacity
Optical drive	DVD-ROM supported disk drive
Monitor	Resolution 1024 x 768 pixels or higher

(Note): Refer to Installation Instructions for precautions and restrictions regarding the operating environment.

### MELSOFT GX Works2

Item	Description
OS	Microsoft® Windows® 10 (Home, Pro, Enterprise, Education) (64bit/32bit) Microsoft® Windows® 8.1 (64bit/32bit), Microsoft® Windows® 8.1 (Enterprise, Pro) (64bit/32bit) Microsoft® Windows® 8 (64bit/32bit), Microsoft® Windows® 8 (Enterprise, Pro) (64bit/32bit) Microsoft® Windows® 7 (Enterprise, Ultimate, Professional, Home Premium, Starter) (64bit/32bit) Microsoft® Windows Vista® (Enterprise, Ultimate, Business, Home Premium, Home Basic) (32bit) Microsoft® Windows® XP (Professional SP3, Home SP3) (32bit)
CPU	Intel® Core™2 Duo Processor 2GHz or more recommended
Required memory	64-bit OS: 2GB or more recommended 32-bit OS: 1GB or more recommended
Available hard disk capacity	For installation: 2.5GB or more free hard disk capacity For operation: 512MB or more free virtual memory capacity
Optical drive	DVD-ROM supported disk drive
Monitor	Resolution 1024 x 768 pixels or higher

(Note): Refer to Installation Instructions for precautions and restrictions regarding the operating environment.

## ■ Engineering software list

Product	Model	Description	
MELSOFT GX Works3	SW1DND-GXW3-E	<ul style="list-style-type: none"> <li>Programmable Controller Engineering Software [MELSOFT GX Works3, GX Works2, GX Developer]</li> <li>MITSUBISHI ELECTRIC FA Library</li> </ul>	DVD-ROM
MELSOFT GX Works2	SW1DND-GXW2-E	<ul style="list-style-type: none"> <li>Programmable Controller Engineering Software [MELSOFT GX Works2, GX Developer]</li> </ul>	DVD-ROM
MELSOFT iQ Works	SW2DND-IQWK-E	<ul style="list-style-type: none"> <li>FA Engineering Software <sup>(Note-1)</sup></li> <li>System Management Software [MELSOFT Navigator]</li> <li>Programmable Controller Engineering Software [MELSOFT GX Works3, GX Works2, GX Developer]</li> <li>Motion Controller Engineering Software [MELSOFT MT Works2]</li> <li>Screen Design Software [MELSOFT GT Works3]</li> <li>Robot Total Engineering Support Software [MELSOFT RT ToolBox2 mini]</li> <li>Inverter Setup Software [MELSOFT FR Configurator2]</li> </ul>	DVD-ROM

(Note-1): Refer to each product manual for software needed for the model.





**Realize cyclic communication with software implementation only**

## CC-Link IE Field Network Basic

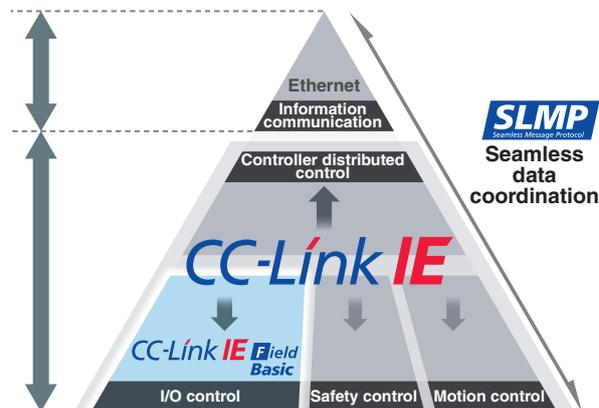
With recent trends of IoT\*<sup>1</sup>, network connection of devices and equipment for small-scale systems are becoming more mainstream. CC-Link IE Field Network Basic realizes easier network integration, as its cyclic communications stack is software-based, without requiring a dedicated ASIC helping to reduce implementation costs for device partners. Mitsubishi Electric is launching CC-Link IE Field Network Basic compatible products to further leverage networking on the production floor.

## Plant-wide seamless communication

Utilizing standard Ethernet technology, TCP/IP protocol stack for communications (such as HTTP, FTP) is supported. Based on SLMP\*<sup>2</sup>, data flows transparently between the sensor level and the enterprise level across multiple industry-standard automation networks. Seamless communication can be easily realized with CC-Link IE Field Network Basic, further improving performance of the manufacturing enterprise.

## Positioning within CC-Link IE Network

The Ethernet-based open network CC-Link IE is a high-speed and large-capacity network integrating distributed control, I/O control, safety control, and motion control. CC-Link IE Field Network Basic, which is a part of CC-Link IE Network, realizes easier network connection of Ethernet devices. Transparent communications are achieved by utilizing SLMP\*<sup>2</sup> that enables seamless connectivity within all levels of manufacturing.



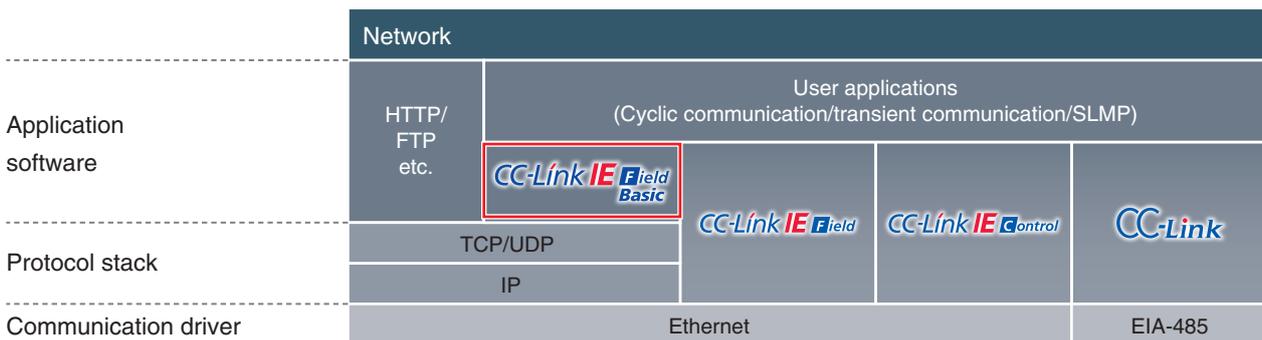
\*1. Internet of Things  
\*2. Seamless Message Protocol

## Combining with TCP/IP communications

- Configure more flexible system
- Setup/monitor from enterprise level computer or tablet computer

### Highly flexible system can be configured combining with TCP/IP communications

The network operates on the standard Ethernet protocol stack, which can be used together with TCP/IP communications. This feature allows CC-Link IE Field Network Basic compatible products and Ethernet compatible products to be connected on the same Ethernet communications line, enabling a highly-flexible and low cost system. By enabling cyclic communication control on standard Ethernet, parameter setting and status monitoring can be done with peripheral devices (such as an enterprise level or tablet computer) connected via TCP/IP communications.



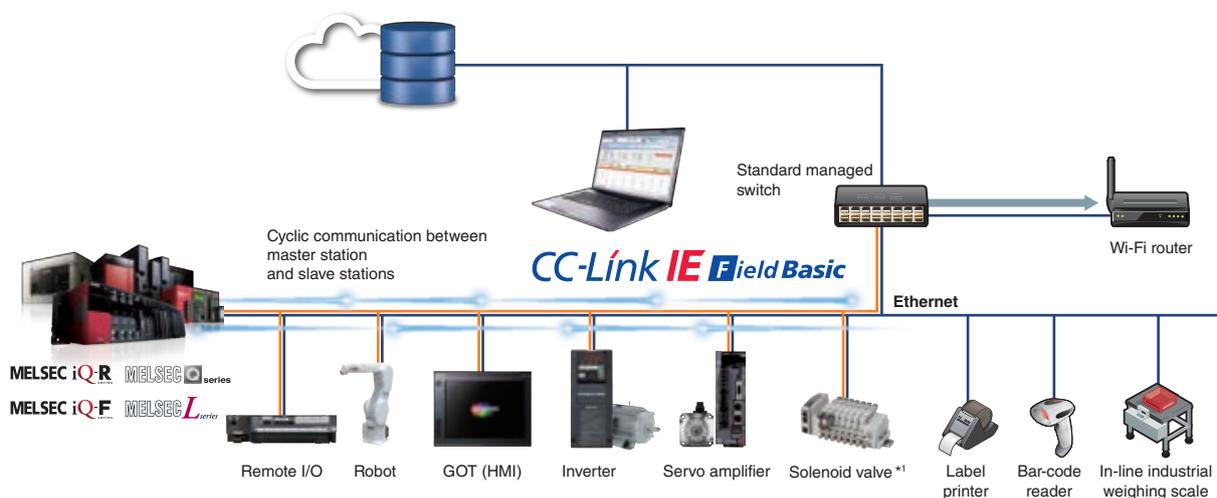
\* SLMP: Seamless Message Protocol

## Wider range of connectable products

- Connect third-party partner products on the same network

### A wider range of CC-Link IE Field Network Basic-supported devices\*

CC-Link IE Field Network Basic realizes cyclic communication with software implementation only. System can be easily configured using a standard managed switch and cables at a lower cost. Supported-products can be easily developed and a wider range of CC-Link IE Field Network Basic-supported devices can be readily available.



\*1. For further details regarding this product, please directly contact 'CKD Corporation', details can be found on their website at <http://www.ckd.co.jp/english/glbinfo/global/>  
 Note: Some images are for illustrative purposes only.

CC-Link IE Field Network Basic compatible  
servo amplifier

**MR-JE-C** NEW

Servo motor

**HG-KN**

**HG-SN**

CC-Link IE Field Network compatible servo amplifier  
(CC-Link IE Field Network Basic supported)

**MR-J4-GF**



CC-Link IE Field Network Basic realizes easier network integration, as its cyclic communications stack is software-based, without requiring a dedicated ASIC. The servo amplifiers connect to a personal computer and a controller via Ethernet without any network dedicated module, realizing a simple system.

## Supporting CC-Link IE Field Network Basic NEW

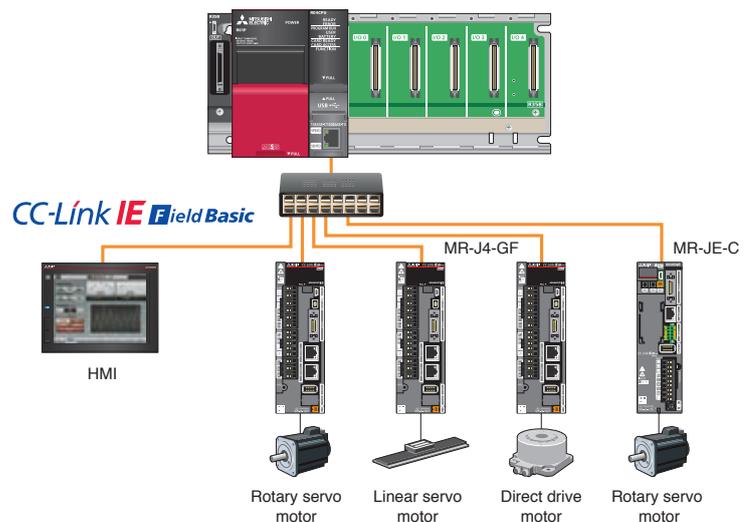
### Configuration

Mitsubishi Electric offers two models of servo amplifiers which support CC-Link IE Field Network Basic:

MR-J4-GF <sup>(Note-1)</sup> and MR-JE-C. They can be configured together in the same system.

Additionally, MR-J4-GF supports a broad range of servo motors from rotary servo motors, linear servo motors, to direct drive motors, allowing you to flexibly configure a system that meets your application needs.

(Note-1): MR-J4-GF with software version of A4 or later supports CC-Link IE Field Network Basic.

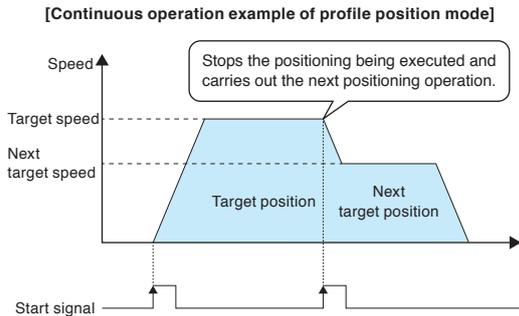


## Features

### MR-JE-C

MR-JE-C servo amplifier supports CiA 402 drive profile. A positioning system is easily configured without a Positioning module.

- Drive methods supported by CiA 402 drive profile
  - Profile position mode: pp
  - Profile velocity mode: pv
  - Profile torque mode: tq
  - Homing mode: hm



### MR-J4-GF

MR-J4-GF(-RJ) allows positioning operation with point table method or indexer method.

- Point table method
 

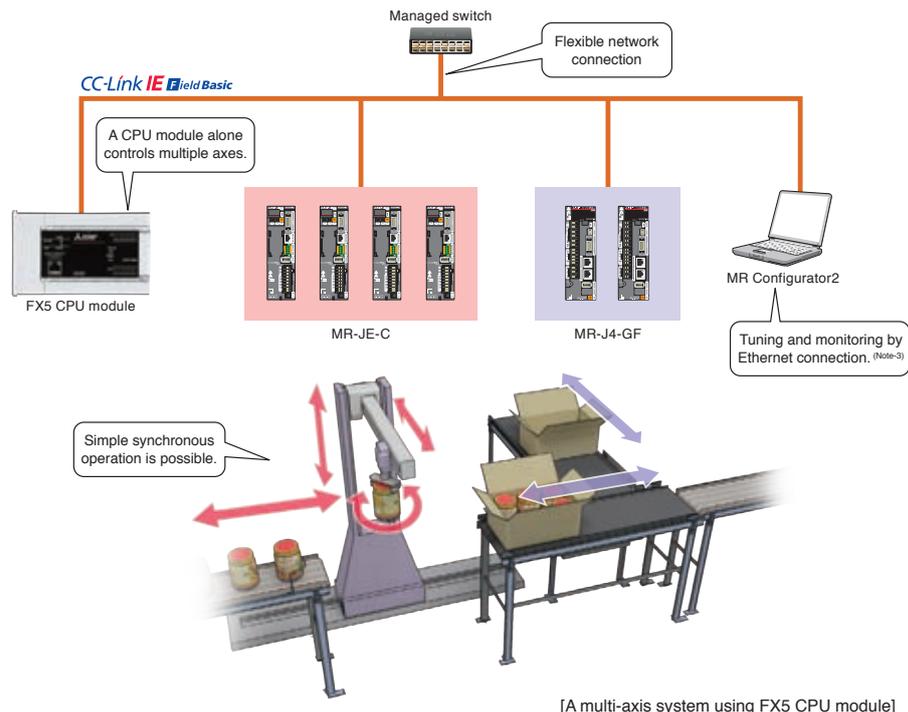
With the point table method, just set the point table No. and turn on the start signal, and then the positioning operation will be started. A continuous operation of the next point table is also possible without stopping.
- Indexer method
 

In the indexer method, the travel amount is automatically calculated based on the number of stations set in the parameter.

Point table No.	Position data	Servo motor speed	Acceleration time constant	Deceleration time constant	Dwell	Sub function
1	1000	2000	200	200	0	1
2	2000	1600	100	100	0	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮
255	3000	3000	100	100	0	2

### Multi-axis system

- Flexible network connection is configured easily using a managed switch. (Network topology: Star topology, Maximum station-to-station distance: 100 m <sup>(Note-1)</sup>)
- A CC-Link IE Field Network Basic embedded CPU <sup>(Note-2)</sup> alone controls multiple axes.
- Simple synchronous operations including horizontal, vertical, and rotational movements are possible with a start signal to all axes via cyclic transmission.
- Tuning, monitoring, diagnosing, reading/writing parameters, and test operations are enabled with a personal computer (MR Configurator2) connected via Ethernet. <sup>(Note-3)</sup>



(Note-1): For the maximum station-to-station distance, contact manufacturers of the managed switch to be used.

(Note-2): Refer to "Ethernet-based Open Network CC-Link IE Product Catalog" (L(NA)08111E) for CPU modules supporting CC-Link IE Field Network Basic.

(Note-3): Requires MR Configurator2 which supports CC-Link IE Field Network Basic. **Compatible in the future**

Refer to relevant manuals or catalogs for details.

# HG Series Rotary Servo Motor for MR-JE-C

## Features

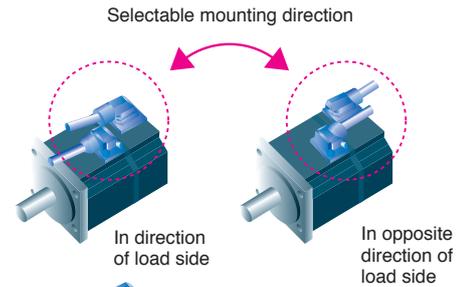
- High-resolution encoder

Servo motors are equipped with a high-resolution encoder of 131072 pulses/rev (17-bit) as standard, achieving high-accuracy positioning and smooth rotation.



- Flexible cable leading direction

Cables for power, encoder, and electromagnetic brake are capable of connecting either in direction or in opposite direction of the load side, depending on the cable selection. (HG-KN series)



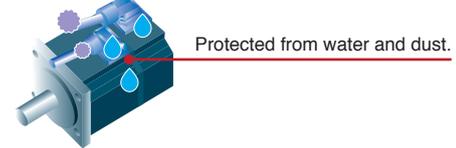
- Improved environmental resistance

Ingress protection <sup>(Note)</sup> of servo motors:

HG-KN: IP65

HG-SN: IP67

(Note): The shaft-through portion is excluded.



## Lineup

### ▶ HG-KN series



Small capacity, low inertia. Perfect for general industrial machines.

Capacity: 100 to 750 W

Rated speed: 3000 r/min Maximum speed: 5000(6000) r/min <sup>(Note-1)</sup>

Rated torque: 0.32 to 2.4 N·m

(Note-1): The value in the parenthesis is applicable according to the parameter setting of the servo amplifier. Refer to "MR-JE-\_C Servo Amplifier Instruction Manual" for details.

#### Application examples

- Inserters, mounters and bonders
- PCB drilling machines
- In-circuit testers and label printers
- Knitting and embroidery machines
- Compact robots and robot hand sections

### ▶ HG-SN series



Medium capacity, medium inertia. Applicable to machines with high inertia.

Capacity: 0.5 to 3 kW

Rated speed: 2000 r/min Maximum speed: 2500 r/min <sup>(Note-2)</sup>, 3000 r/min

Rated torque: 2.39 to 14.3 N·m

(Note-2): The maximum speed of HG-SN302(B)J is 2500 r/min.

#### Application examples

- Material handling systems
- Dedicated machines
- Robots
- Loaders and unloaders
- Winders and tension units
- Turrets
- X-Y tables

## Combinations of MR-JE-C servo amplifier and servo motors

Servo amplifier	Servo motor	
	HG-KN series	HG-SN series
MR-JE-10C	HG-KN13(B)J	–
MR-JE-20C	HG-KN23(B)J	–
MR-JE-40C	HG-KN43(B)J	–
MR-JE-70C	HG-KN73(B)J	HG-SN52(B)J
MR-JE-100C	–	HG-SN102(B)J
MR-JE-200C	–	HG-SN152(B)J, HG-SN202(B)J
MR-JE-300C	–	HG-SN302(B)J

### ● Servo amplifier specifications

●: Supported ○: Available in the future

Model	Power supply specifications <sup>(Note-1)</sup>	Rated output [kW] <sup>(Note-1)</sup>	Command interface	Control mode			
			CC-Link IE Field Network Basic	Profile position mode	Profile velocity mode	Profile torque mode	Positioning function
MR-JE-C	3-phase 200 VAC 1-phase 200 VAC	0.1, 0.2, 0.4, 0.75, 1, 2, 3	●	●	●	●	○

(Note-1): Servo amplifiers with rated output of 3 kW support only 3-phase power supply.

### ● Servo motor specifications

●: Supported

Series	Rated speed [r/min]	Maximum speed [r/min]	Rated output [kW]	With electromagnetic brake (B)	Oil seal (J)	IP rating <sup>(Note-3)</sup>
HG-KN series	3000	5000(6000) <sup>(Note-1)</sup>	0.1, 0.2, 0.4, 0.75	●	●	IP65
HG-SN series	2000	3000/2500 <sup>(Note-2)</sup>	0.5, 1, 1.5, 2, 3	●	●	IP67

(Note-1): The value in the parenthesis is applicable according to the parameter setting of the servo amplifier. Refer to "MR-JE-\_C Servo Amplifier Instruction Manual" for details.

(Note-2): The maximum speed of HG-SN302(B)J is 2500 r/min.

(Note-3): The shaft-through portion is excluded.

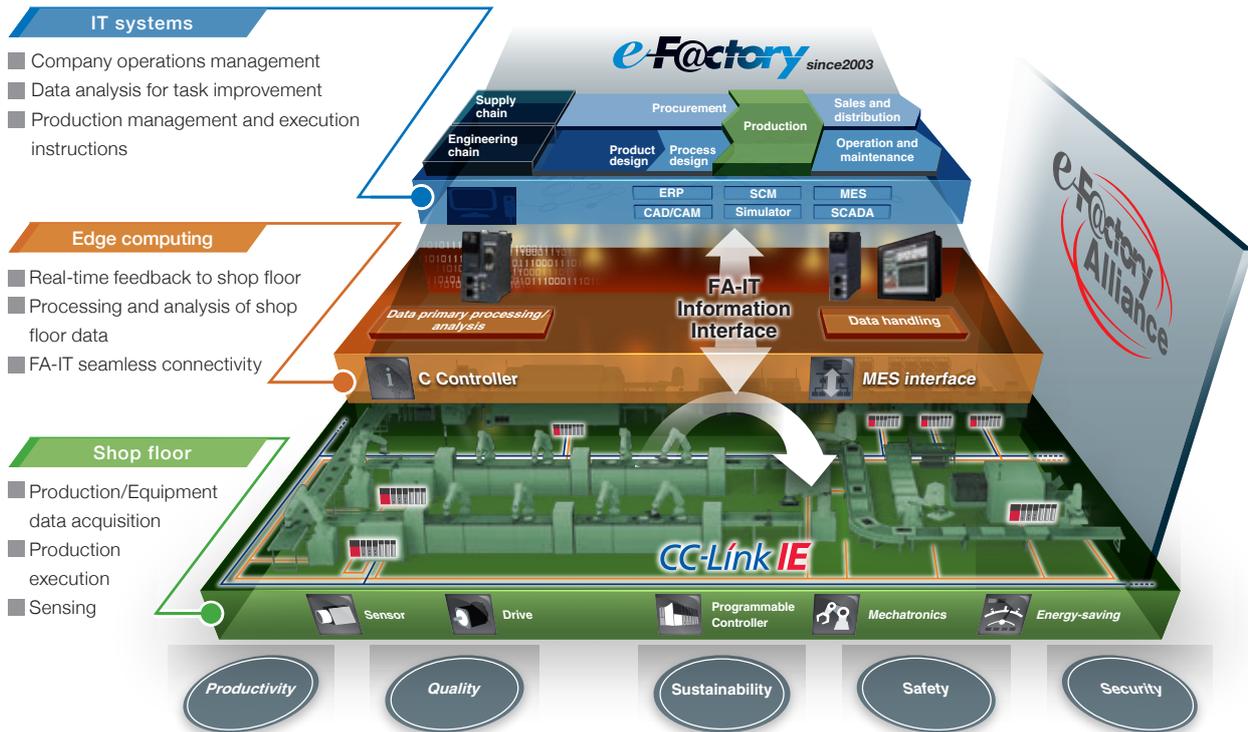
## Combinations of MR-J4-GF servo amplifier and servo motors

Refer to "Product lines" in page 29 in this catalog.

# e-F@ctory creates “Smart Factories” through IoT-based Big Data utilization

e-F@ctory optimizes manufacturing overall by connecting all devices and equipment involved in development, manufacturing, logistics, etc., and then analyzing and utilizing the vast amount of data collected.

By taking full advantage of Mitsubishi Electric’s technological capability that achieved development of FA devices, along with our connectivity technology which makes it possible to connect FA with IT, we will create next-generation manufacturing encompassing elements such as mass customization, preventive maintenance and traceability.



**Powerful Alliances with Over 450 Partner Companies\***

## e-F@ctory Alliance

In order to propose optimal solutions to our customers, e-F@ctory works in collaboration with many partner manufacturers. Through powerful alliances between Mitsubishi Electric, who boasts a broad-ranging product appeal in the FA domain, and partners that participate in the FA partnership program (e-F@ctory Alliance) promoted by Mitsubishi Electric, we will achieve new business creation and new monozukuri never before imaginable.

\*As of October 2017



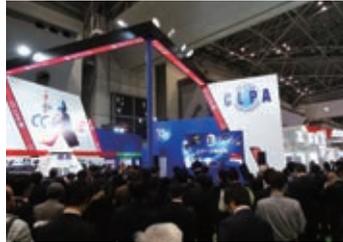
# CC-Link Partner Association (CLPA) - Actively promoting worldwide adoption of CC-Link networks

## 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](http://www.cc-link.org)

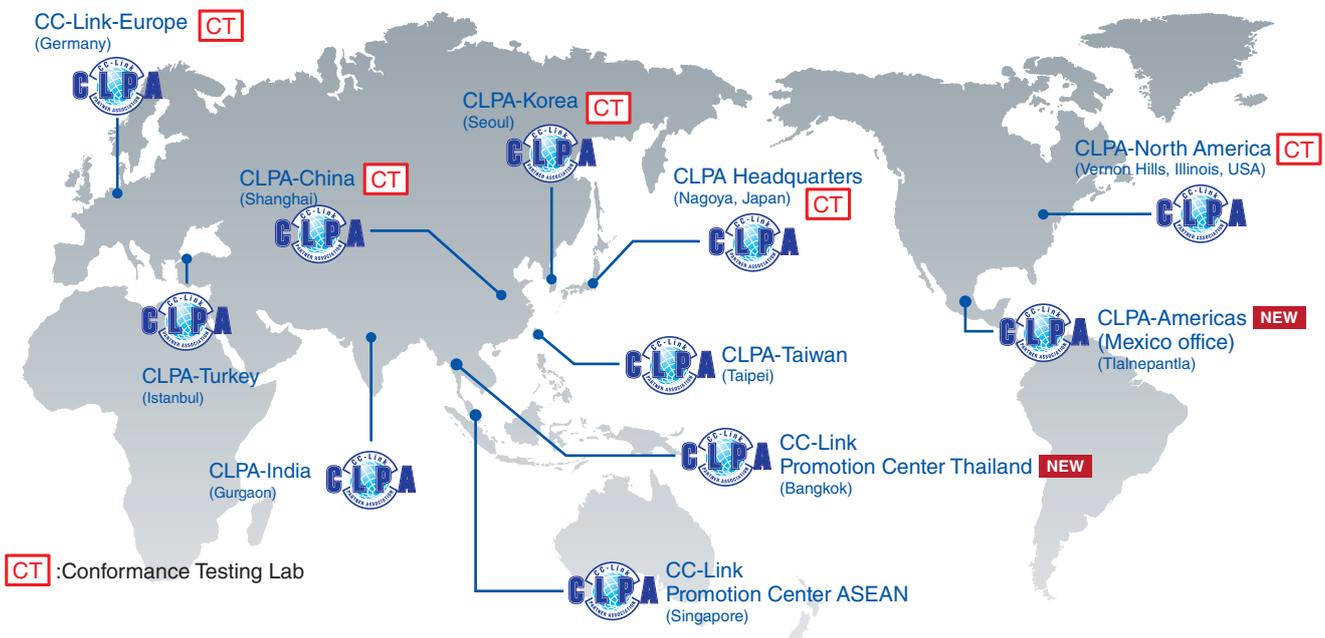


6F Ozone Front Bldg. 3-15-58 Ozone  
Kita-ku, Nagoya 462-0825, JAPAN  
TEL: +81-52-919-1588 FAX: +81-52-916-8655  
E-mail: [info@cc-link.org](mailto:info@cc-link.org)

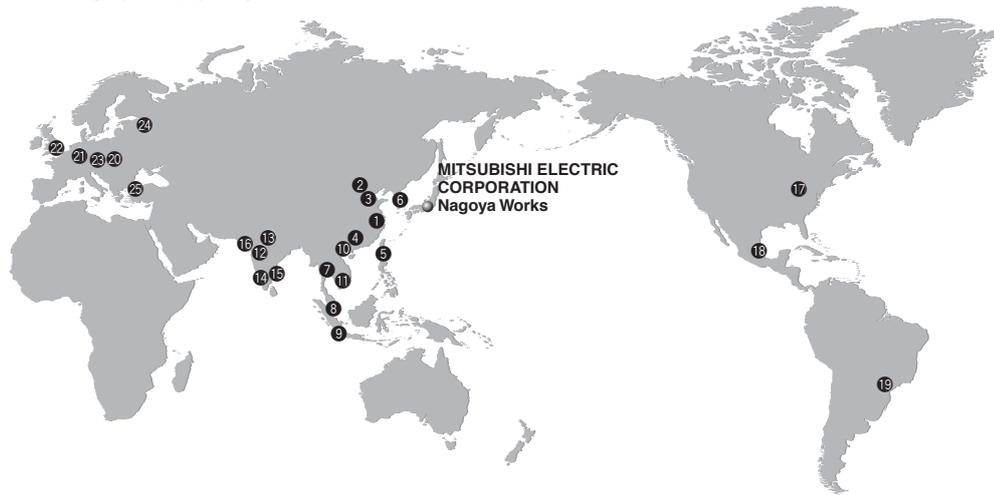


## Global influence of CC-Link continues to spread

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



# Global FA centers



## China

### 1 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

### 2 Beijing FA Center Mitsubishi Electric Automation (China) Ltd. Beijing FA Center

5/F, ONE INDIGO, 20 Jiuxianqiao Road Chaoyang District, Beijing, China  
Tel: +86-10-6518-8830

### 3 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

### 4 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

## Taiwan

### 5 Taipei FA Center SETSUYO ENTERPRISE CO., LTD.

3F, No.105, Wugong 3rd Road, Wugu District, New Taipei City 24889, Taiwan  
Tel: +886-2-2299-9917

## Korea

### 6 Korea FA Center Mitsubishi Electric Automation Korea Co., Ltd.

8F, Gangseo Hangang Xi-tower A, 401, Yangcheon-ro, Gangseo-Gu, Seoul 07528, Korea  
Tel: +82-2-3660-9630

## Thailand

### 7 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 Bangpongpan, Knet Yannawa, Bangkok 10120, Thailand  
Tel: +66-2682-6522 to 31

## ASEAN

### 8 ASEAN FA Center Mitsubishi Electric Asia Pte. Ltd.

307 Alexandra Road, Mitsubishi Electric Building, Singapore 159943  
Tel: +65-6470-2475

## Indonesia

### 9 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

## Vietnam

### 10 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

### 11 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

## India

### 12 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

### 13 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

### 14 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

### 15 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

### 16 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

## Americas

### 17 North America FA Center Mitsubishi Electric Automation, Inc.

500 Corporate Woods Parkway, Vernon Hills, IL 60061, U.S.A.  
Tel: +1-847-478-2100

### 18 Mexico City 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

### 19 Brazil FA Center Mitsubishi Electric do Brasil Comercio e Servicos Ltda.

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

## Europe

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### 22 UK FA Center Mitsubishi Electric Europe B.V. UK Branch

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### 25 Turkey FA Center Mitsubishi Electric Turkey A.S. Umraniye Branch

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



## General-purpose AC servo

### 1. Warranty period and coverage

We will repair any failure or defect hereinafter referred to as "failure" in our FA equipment hereinafter referred to as the "Product" arisen during warranty period at no charge due to causes for which we are responsible through the distributor from which you purchased the Product or our service provider. However, we will charge the actual cost of dispatching our engineer for an on-site repair work on request by customer in Japan or overseas countries. We are not responsible for any on-site readjustment and/or trial run that may be required after a defective unit is repaired or replaced.

#### [Term]

The term of warranty for Product is twelve (12) months after your purchase or delivery of the Product to a place designated by you or eighteen (18) months from the date of manufacture whichever comes first ("Warranty Period"). Warranty period for repaired Product cannot exceed beyond the original warranty period before any repair work.

#### [Limitations]

- (1) You are requested to conduct an initial failure diagnosis by yourself, as a general rule.  
It can also be carried out by us or our service company upon your request and the actual cost will be charged.  
However, it will not be charged if we are responsible for the cause of the failure.
- (2) This limited warranty applies only when the condition, method, environment, etc. of use are in compliance with the terms and conditions and instructions that are set forth in the instruction manual and user manual for the Product and the caution label affixed to the Product.
- (3) Even during the term of warranty, the repair cost will be charged on you in the following cases;
  - (i) a failure caused by your improper storing or handling, carelessness or negligence, etc., and a failure caused by your hardware or software problem
  - (ii) a failure caused by any alteration, etc. to the Product made on your side without our approval
  - (iii) a failure which may be regarded as avoidable, if your equipment in which the Product is incorporated is equipped with a safety device required by applicable laws and has any function or structure considered to be indispensable according to a common sense in the industry
  - (iv) a failure which may be regarded as avoidable if consumable parts designated in the instruction manual, etc. are duly maintained and replaced
  - (v) any replacement of consumable parts (battery, fan, smoothing capacitor, etc.)
  - (vi) a failure caused by external factors such as inevitable accidents, including without limitation fire and abnormal fluctuation of voltage, and acts of God, including without limitation earthquake, lightning and natural disasters
  - (vii) a failure generated by an unforeseeable cause with a scientific technology that was not available at the time of the shipment of the Product from our company
  - (viii) any other failures which we are not responsible for or which you acknowledge we are not responsible for

### 2. Term of warranty after the stop of production

- (1) We may accept the repair at charge for another seven (7) years after the production of the product is discontinued. The announcement of the stop of production for each model can be seen in our Sales and Service, etc.
- (2) Please note that the Product (including its spare parts) cannot be ordered after its stop of production.

### 3. Service in overseas countries

Our regional FA Center in overseas countries will accept the repair work of the Product. However, the terms and conditions of the repair work may differ depending on each FA Center. Please ask your local FA Center for details.

### 4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

- (1) Damages caused by any cause found not to be the responsibility of Mitsubishi.
- (2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
- (3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
- (4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

### 5. Change of Product specifications

Specifications listed in our catalogs, manuals or technical documents may be changed without notice.

### 6. Application and use of the Product

- (1) For the use of our General-Purpose AC Servo, its applications should be those that may not result in a serious damage even if any failure or malfunction occurs in General-Purpose AC Servo, and a backup or fail-safe function should operate on an external system to General-Purpose AC Servo when any failure or malfunction occurs.
- (2) Our General-Purpose AC Servo is designed and manufactured as a general purpose product for use at general industries. Therefore, applications substantially influential on the public interest for such as atomic power plants and other power plants of electric power companies, and also which require a special quality assurance system, including applications for railway companies and government or public offices are not recommended, and we assume no responsibility for any failure caused by these applications when used.  
In addition, applications which may be substantially influential to human lives or properties for such as airlines, medical treatments, railway service, incineration and fuel systems, man-operated material handling equipment, entertainment machines, safety machines, etc. are not recommended, and we assume no responsibility for any failure caused by these applications when used.  
We will review the acceptability of the abovementioned applications, if you agree not to require a specific quality for a specific application. Please contact us for consultation.

## Simple Motion module/Simple Motion board

### 1. Warranty period and coverage

We will repair any failure or defect (hereinafter referred to as "failure") in our FA equipment (hereinafter referred to as the "Product") arisen during warranty period at no charge due to causes for which we are responsible through the distributor from which you purchased the Product or our service provider. However, we will charge the actual cost of dispatching our engineer for an on-site repair work on request by customer in Japan or overseas countries. We are not responsible for any on-site readjustment and/or trial run that may be required after a defective unit is repaired or replaced.

#### [Term]

The term of warranty for Product is thirty six (36) months after your purchase or delivery of the Product to a place designated by you or forty two (42) months from the date of manufacture whichever comes first ("Warranty Period"). Warranty period for repaired Product cannot exceed beyond the original warranty period before any repair work.

#### [Limitations]

- (1) You are requested to conduct an initial failure diagnosis by yourself, as a general rule.  
It can also be carried out by us or our service company upon your request and the actual cost will be charged.  
However, it will not be charged if we are responsible for the cause of the failure.
- (2) This limited warranty applies only when the condition, method, environment, etc. of use are in compliance with the terms and conditions and instructions that are set forth in the instruction manual and user manual for the Product and the caution label affixed to the Product.
- (3) Even during the term of warranty, the repair cost will be charged on you in the following cases;
  - (i) a failure caused by your improper storing or handling, carelessness or negligence, etc., and a failure caused by your hardware or software problem
  - (ii) a failure caused by any alteration, etc. to the Product made on your side without our approval
  - (iii) a failure which may be regarded as avoidable, if your equipment in which the Product is incorporated is equipped with a safety device required by applicable laws and has any function or structure considered to be indispensable according to a common sense in the industry
  - (iv) a failure which may be regarded as avoidable if consumable parts designated in the instruction manual, etc. are duly maintained and replaced
  - (v) any replacement of consumable parts (battery, fan, etc.)
  - (vi) a failure caused by external factors such as inevitable accidents, including without limitation fire and abnormal fluctuation of voltage, and acts of God, including without limitation earthquake, lightning and natural disasters
  - (vii) a failure generated by an unforeseeable cause with a scientific technology that was not available at the time of the shipment of the Product from our company
  - (viii) any other failures which we are not responsible for or which you acknowledge we are not responsible for

### 2. Term of warranty after the stop of production

- (1) We may accept the repair at charge for another seven (7) years after the production of the product is discontinued. The announcement of the stop of production for each model can be seen in our Sales and Service, etc.
- (2) Please note that the Product (including its spare parts) cannot be ordered after its stop of production.

### 3. Service in overseas countries

Our regional FA Center in overseas countries will accept the repair work of the Product. However, the terms and conditions of the repair work may differ depending on each FA Center. Please ask your local FA Center for details.

### 4. Exclusion of loss in opportunity and secondary loss from warranty liability

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- (1) Damages caused by any cause found not to be the responsibility of Mitsubishi.
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- (3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
- (4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

### 5. Change of Product specifications

Specifications listed in our catalogs, manuals or technical documents may be changed without notice.

### 6. Application and use of the Product

- (1) For the use of our Simple Motion module/Simple Motion board, its applications should be those that may not result in a serious damage even if any failure or malfunction occurs in Simple Motion module/Simple Motion board, and a backup or fail-safe function should operate on an external system to Simple Motion module/Simple Motion board when any failure or malfunction occurs.
- (2) Our Simple Motion module/Simple Motion board are designed and manufactured as general purpose product for use at general industries.  
Therefore, applications substantially influential on the public interest for such as atomic power plants and other power plants of electric power companies, and also which require a special quality assurance system, including applications for railway companies and government or public offices are not recommended, and we assume no responsibility for any failure caused by these applications when used.  
In addition, applications which may be substantially influential to human lives or properties for such as airlines, medical treatments, railway service, incineration and fuel systems, man-operated material handling equipment, entertainment machines, safety machines, etc. are not recommended, and we assume no responsibility for any failure caused by these applications when used.  
We will review the acceptability of the abovementioned applications, if you agree not to require a specific quality for a specific application. Please contact us for consultation.

## Conformity with Global Standards and Regulations

Mitsubishi Electric servo system conforms to global standards.

(Note-1): Our servo system products are not subject to China Compulsory Certification (CCC).

(Note-2): Refer to relevant manuals and "EMC Installation Guidelines" when your system needs to meet the EMC directive.

(Note-3): Refer to "MELSERVO-J4 Series Catalog" for details of MR-J4 series conformity with global standards and regulations.

(Note-4): For corresponding standards and models, contact your local sales office.

Complies with EN, UL, CSA (c-UL) standards,  
and Korea Radio Wave Law (KC).



## Conformity with Restriction of Hazardous Substances Directive (RoHS)

The human and environment-friendly Mitsubishi Electric servo system is compliant with RoHS Directive.

< About RoHS directive >

RoHS Directive requires member nations to guarantee that new electrical and electronic equipment sold in the market after July 1, 2006 do not contain lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants. <G> mark indicating RoHS Directive compliance is printed on the package.

(Note-1): Refer to relevant manuals and "EMC Installation Guidelines" when your system needs to meet the EMC directive.

(Note-2): Our optional cables and connectors comply with "Measures for Administration of the Pollution Control of Electronic Information Products" (Chinese RoHS).

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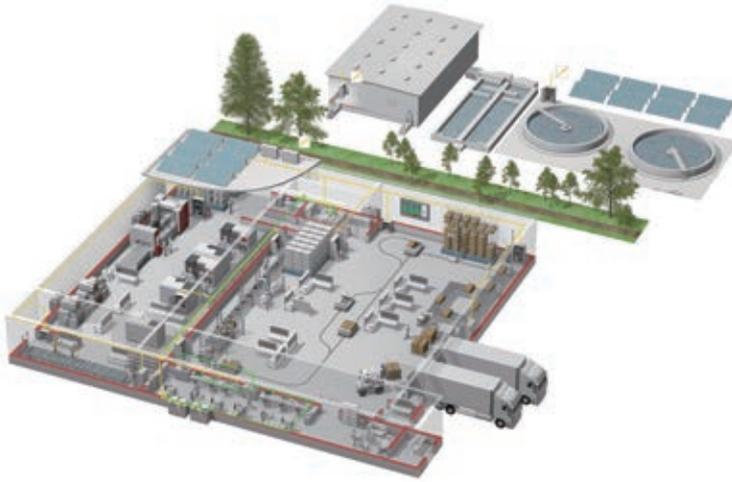
### Precautions before use

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

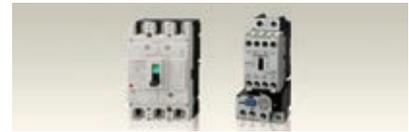
Since its beginnings in 1870, some 45 companies use the Mitsubishi name, covering a spectrum of finance, commerce and industry.

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



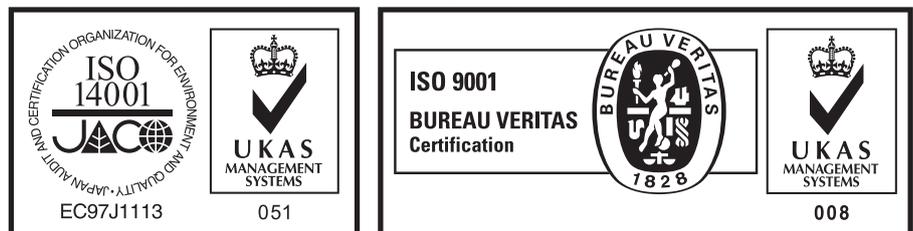
Transformers, Air conditioning, Photovoltaic systems

\* Not all products are available in all countries.

# Ethernet-based Open Network CC-Link IE Compatible Servo System

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



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