MITSUBISHI ELECTRIC

Changes for the Better

for a greener tomorrow eco Changes

Mitsubishi Servo System Family Catalog

MITSUBISHI SERVO AMPLIFIERS & MOTORS

MELSERVO SYSTEM

Leading the World with the Industry's Top Class Technology

The most sophisticated drive applications increasingly chosen by the world

MITSUBISHI SERVO AMPLIFIERS & MOTORS

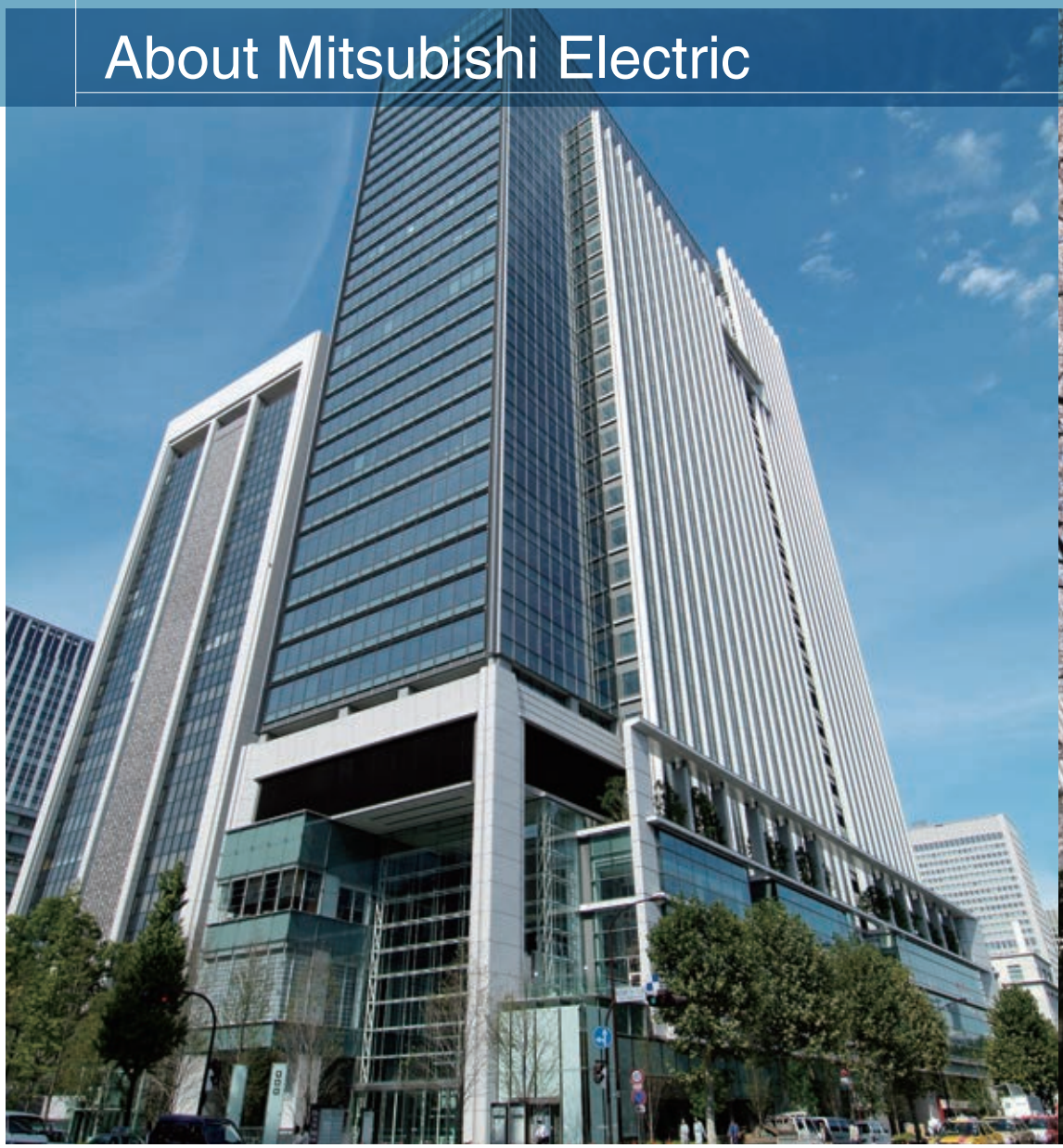
MELSERVO

World-class quality, performance, and system development potential. Achieve these possibilities with Mitsubishi Servo Systems.

World-class quality and performance. Backed by the rock-solid system service capabilities of Mitsubishi Electric as a comprehensive FA supplier, MELSERVO products are playing critical roles in the growing success of manufacturers all over the world.

Providing sophistication to the world. Moving toward sophisticated drive applications. We, Mitsubishi Electric, offer to our customers global sales support and service systems.

About Mitsubishi Electric



Expanding Our Business From Homes to Outer Space

With Our Corporate Statement - "Changes for the Better"

Mitsubishi Electric Corporation was established in 1921 as a manufacturer of transformers, motors, and products like electric fans. Over the years Mitsubishi Electric has expanded its business areas from Japan's first mainline electric locomotives to integrated manufacturing of elevators and escalators, transistorized computers, and Japan's first satellite. Today, Mitsubishi Electric is one of the world's leading electrical and electronic manufacturers, covering everything from household appliances to outer space equipment, and is developing world-class business operations in five areas: (1) Energy and electric systems such as turbine generators, large display devices, and elevators; (2) Industrial mechatronics systems such as programmable controllers, servos, and car multimedia products; (3) Information communication systems such as wireless communication devices, satellites, and network security systems; (4) Electronic devices such as power modules, and high-frequency, optical, and LCD devices; and (5) Home appliances such as LCD televisions, room air conditioners, and refrigerators. Mitsubishi Electric's corporate statement, "Changes for the Better", expresses its commitment to enhancing the quality of society, industry and life, and contributing to an even better tomorrow.

MITSUBISHI ELECTRIC CORPORATION

Business Segment

Home Appliances

Air conditioners and home appliances

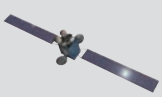
Digital AV

Electronic devices

IPM for photovoltaic (PV) power generation

C-Band, GaN HEMT high-output amplifier for satellite applications

Information Communication Systems

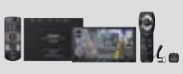


DS2000 standard satellite platforms

Optical broadband access systems

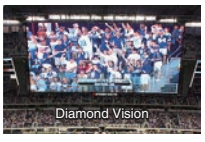
Industrial Mechatronics Systems

AC servos



HDD car navigation systems

Energy and Electric Systems



Diamond Vision

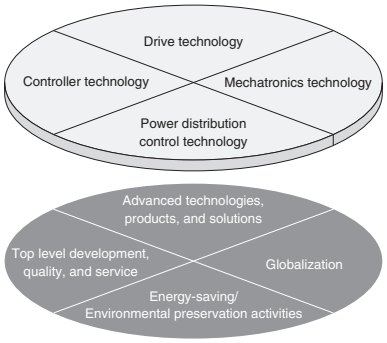
Power plants

Mitsubishi FA Business

Mitsubishi Electric strives to be the best in customer satisfaction by providing total solutions.

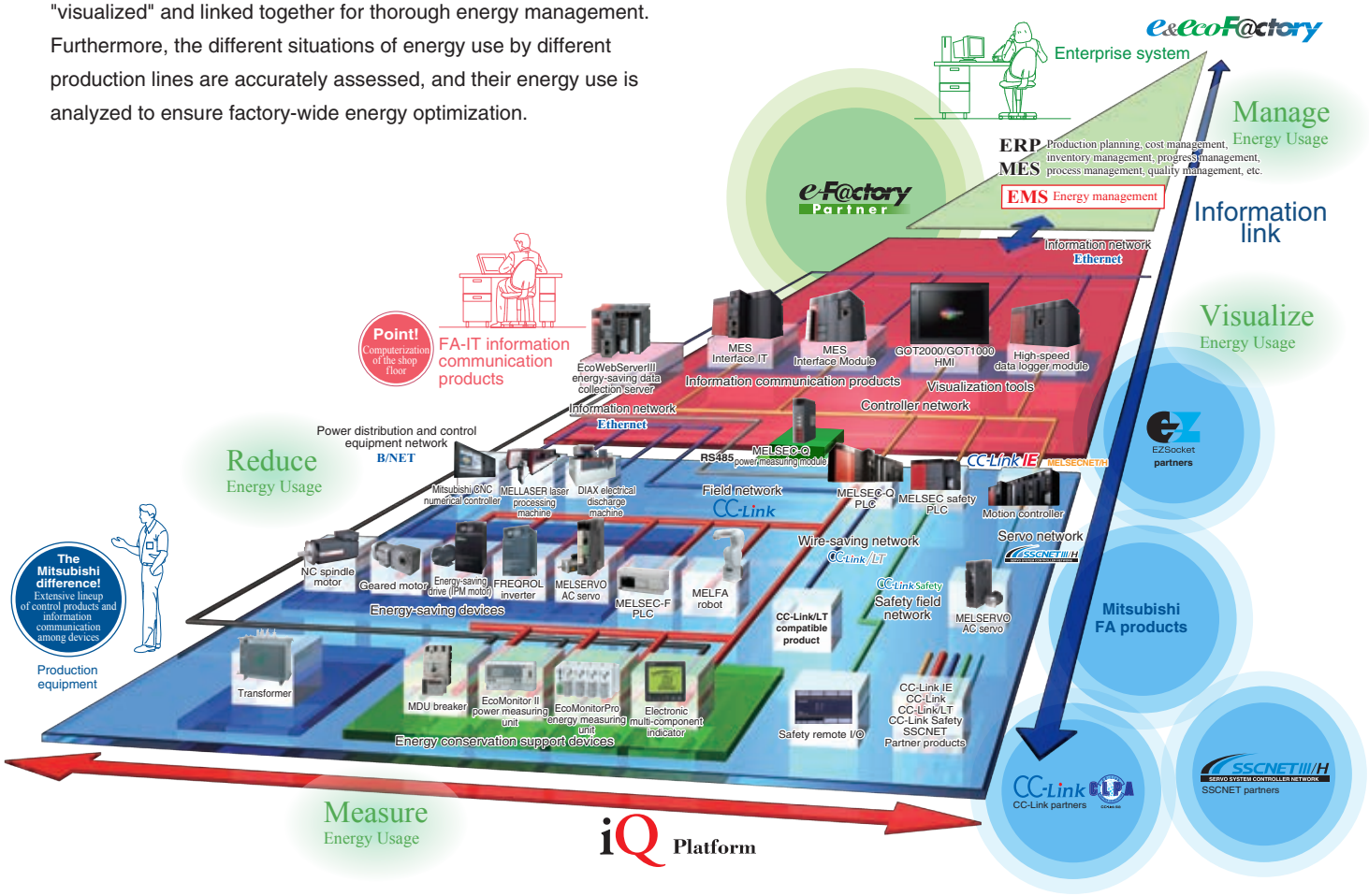
In the 80 years since starting with general-purpose motors, the Factory Automation system Group of Mitsubishi Electric has developed mechatronics products and supported the manufacturing economies of Japan, China, other parts of Asia and the rest of the world. While developing our technologies in factory automation control, drive control, mechatronics, and production control, we have continuously expanded our product lines including controllers, driving devices, mechatronics products, and power distribution control products. Furthermore, we are among the first to offer not only product components but also an innovative manufacturing environment through e&eco-F@ctory and iQ Platform.
As a comprehensive FA supplier, Mitsubishi Electric will continue to offer FA products that meet customer demands throughout the world.

Total FA Solutions



e&eco-F@ctory achieves factory-wide optimization through effective utilization of energy information.

Transforming a factory into an e&eco-F@ctory means optimizing the factory from an energy perspective.
In an e&eco-F@ctory, production and energy information are "visualized" and linked together for thorough energy management.
Furthermore, the different situations of energy use by different production lines are accurately assessed, and their energy use is analyzed to ensure factory-wide energy optimization.



History of Mitsubishi Servo System








			1980	1985	1990	1995	2000	2005
Servo amplifier			●Launch of Mitsubishi's first servo amplifier **MR-A/S0**	●First to introduce a completely digital servo **MR-SA/SB/SC/SD**	●Industry's smallest servo (at the time) **MR-J** ●Most advanced servo (at the time) **MR-H**	**MR-J2**	●Launched the MR-J2-Super Series – the industry's fastest servos (at the time) **MR-J2-Super/J2M**	**MR-J3**
					●Launched super-miniaturized series **MR-C**		**MR-E**	**MR-E Super**
	Industry Needs		●Improvement of productivity ●FMS	●Maintenance-free ●High-speed response ●Low-cost	●Miniaturized ●Low-noise ●Reduced wiring	●Compliant with standards ●Environment resistance ●High-speed and High-performance	●Networking ●Improvement of productivity (Per unit time, per	●Diagnosis
Servo motor	Linear	Core type					●Continuous thrust 250 to 4000 N **LM-N**	**LM-H**
		Coreless type						**LM-T/LM-U**
	Rotary	Medium/large capacity	●0.5 to 22 kW **HA-SAL**		●0.5 to 22 kW **HA-LH**		●5 to 55 kW **HA-LF/LFS**	
		Medium capacity	●0.2 to 7 kW **HA-A**	●0.2 to 7 kW **HA-SA**	●0.5 to 7 kW **HA-SH**	●0.5 to 7 kW **HC-SF/SFS**	●1 to 5 kW **HC-RF/RFS** ●0.1 to 0.75 kW **HC-UF/UFS**	●0.5 to 7 kW **HF-SP** ●0.5 to 2 kW **HF-SE** ●1 to 5 kW **HC-RP** ●0.1 to 0.75 kW **HC-UP**
		Small capacity	●50 to 600 W **HA-S0/SC**		●50 to 600 W **HA-FE/FH**	●50 to 600 W **HA-FF** ●50 to 750 W **HC-KF/KFS**		●50 to 750 W **HF-KP/MP** ●100 to 750 W **HF-KE**
	Direct drive motor							
Servo system controller	Motion controller					●A series **A173UHCPU/A172SHCPUN**	●Q series **Q173/Q172CPUN**	●SSCNET III compatible ●Q series **Q173H/172**
	Simple Motion module Positioning module					●A series **AD75M**	●Q series **QD75M**	●SSCNET III compatible **QD75MH**
Network	Servo system controller network (SSCNET)					●High-speed (5.6 Mbps × 2) ●Centralized parameter management ●ABS standard ●Multi-axis synchronous **SSCNET**		●High-speed **SSCNETⅢ**
	Field network					●10 Mbps **CC-Link**		

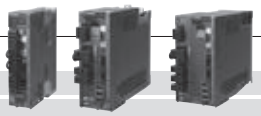
Passing our technologies and experiences from one generation to the next, Mitsubishi Electric continuously strives for cutting-edge technology.

In 1987, Mitsubishi Electric announced MELSERVO-SA, the first completely digital hardware logic product at a time when analog products were at their zenith. Since then, we have pioneered servo technology in Japan. Carrying that heritage forward, we will continuously offer you globally-acknowledged servo systems that completely satisfy your needs.

2010

●2-axis type
MR-J3W

●Speed frequency response of 2.5 kHz
MR-J4/MR-J4W2/MR-J4W3



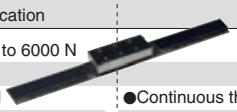
MR-JE

●Launched One-touch servo
MR-JN

functions
unit area) ●Ease of startup ●Widened scope of servo application

●High-performance ●Safety standard ●Energy-saving
●Easy to use ●Vibration suppression ●Mentenance function

●Continuous thrust 600 to 6000 N
LM-F



●Continuous thrust 60 to 960 N
LM-H2

●Continuous thrust 70 to 960 N
LM-H3

●Continuous thrust 120 to 2400 N
LM-K2

●Continuous thrust 50 to 800N
LM-U2

●5 to 55 kW
HA-LP

●0.5 to 15 kW
HF-JP

●0.5 to 22 kW
HG-JR

●0.5 to 7 kW
HG-SR

●0.5 to 2 kW
HF-SN

●1 to 5 kW
HG-RR

●0.1 to 0.75 kW
HG-UR

●50 to 750 W
HG-KR/MR

●100 to 750 W
HF-KN

Rated torque 2 to 240 N·m
TM-RFM

●Single axis
Motion controller
MR-MQ100

●Stand-alone Motion controller
●Built-in PLC
Q170MCPU

●SSCNET III/H compatible
●Built-in PLC
Q170MSCPU

●iQ Platform compatible
Q173D/172DCPU

HCPU

●iQ Platform compatible ●SSCNET III/H compatible
Q173DS/172DSCPU

●SSCNET III compatible
LD77MH

●SSCNET III/H compatible
●L series
LD77MS

●SSCNET III/H compatible
QD77MS

●CC-Link IE Field compatible
QD77GF

●Multi-axis (16 axes)
QD74MH

processing (50 Mbps × 2) ●High-reliability (optical communication)

●High-speed processing (150 Mbps × 2)
SSCNETⅢ/H

●1 Gbps
CC-Link IE Field

Progress ahead of technology and satisfaction.

Servo Application Examples

Industry leading performance MELSERVO supports various system configurations.

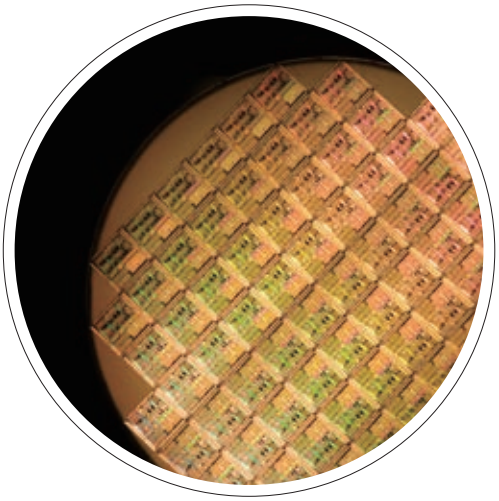
Mitsubishi Electric servo systems have built a track record of outstanding performance across a broad range of fields including liquid crystals and clean conveyors.
Going beyond servo amplifiers and motors, Mitsubishi Electric offers system level solutions that include programmable controllers, Motion controllers, and networks to satisfy a broad scope of needs.

Material handling

Mitsubishi Electric servos support a wide variety of distribution and material handling systems. High-speed material handling and high-accuracy positioning with our servos promote efficiency and labor-savings in your production and handling line.

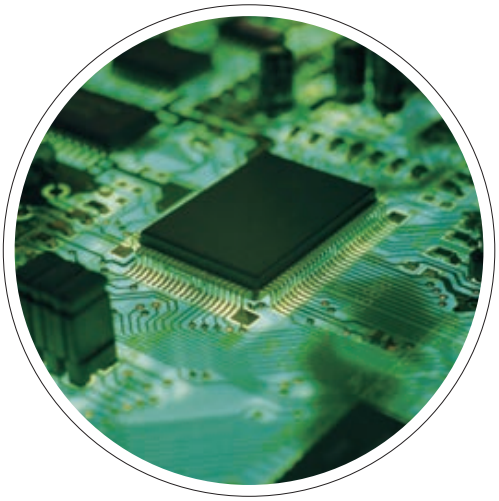
Food processing machines

Mitsubishi Electric servos play important roles in a wide variety of food product manufacturing processes such as shaping, filling, cutting, and packaging of food products made of all kinds of ingredients and in all shapes and sizes.



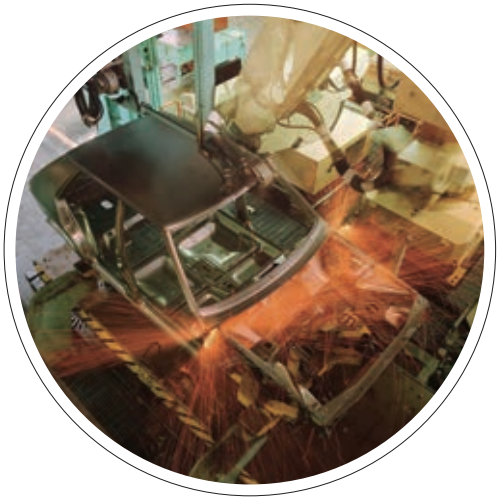
Semiconductor manufacturing Equipment

In today's semiconductor manufacturing process, wafer diameter is getting larger and components smaller. To meet the requirements of higher quality and productivity, Mitsubishi Electric's high-performance servos and high-resolution encoder achieve fast and accurate positioning at stable speeds.



Mounters

Flexible mounting of electronic components with high speed and density is demanded in printed circuit board applications. Mitsubishi Electric offers a high level of servo system solutions for rapid mounting of highly miniaturized components and for flexible mounting of irregular shapes.



Automobile manufacturing lines

Motion control using linear and circular interpolation and electronic cams in various types of processing lines support automobile manufacturing by boosting the productivity and flexibility of the assembly line.

Knitting and embroidery machines

Mitsubishi Electric servos satisfy the textile industry's specific needs of multiobjective production and quality improvement. Our latest technologies enhance the uniformity of quality and production speed.

LCD manufacturing systems

In addition to the high-speed and high-accuracy positioning control, linear servos and a broad array of other actuators play important roles in the manufacturing of constantly evolving flat panel displays.

Printing machines

Mitsubishi Electric provides high-accuracy synchronous system solutions for the paper feeding, printing, cutting, and assembly functions within the printing process. We make high-speed, high-quality printing possible.

Molding machines

Various shapes of works are molded with high precision by motion control using electronic cams and by high-response servos with high-precision encoders.

Machine tools

High-performance servos enable fast and accurate positioning, and support high-speed handling of works. We promote the sophisticated machining capabilities that are a key part of the world's most advanced manufacturing.

Our Total Solution for Your Satisfaction

Mitsubishi Servo System

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

Graphic Operation Terminal

GOT2000/GOT1000 series

PC/AT compatible computer

SOFTWARE

MELSOFT

iQ Platform

- Motion Controller Engineering Software — MELSOFT MT Works2
- Programmable Controller Engineering Software — MELSOFT GX Works2
- Servo Setup Software — MELSOFT MR Configurator2
- Capacity Selection Software

Motion controller

SSCNET III/H compatible Motion controller

Q173DSCPU
Q172DSCPU

SSCNET III/H compatible Stand-alone Motion controller

Q170MSCPU
Q170MSCPU-S1

SSCNET III compatible Single Axis Motion controller

MR-MQ100

Programmable controller

MELSEC-Q series

MELSEC-QS/WS series

MELSEC-L series

MELSEC-F series

Simple Motion module

SSCNET III/H compatible Simple Motion module

QD77MS16
QD77MS4
QD77MS2

SSCNET III/H compatible Simple Motion module

LD77MS16
LD77MS4
LD77MS2

CC Link IE Field Network Simple Motion module

QD77GF16

Positioning module

QD75P4N/QD75D4N
QD75P2N/QD75D2N
QD75P1N/QD75D1N

QD70P8
QD70D8
QD70P4
QD70D4

LD75P4/LD75D4
LD75P2/LD75D2
LD75P1/LD75D1

FX2N-10PG

SSCNET III/H

SSCNET III/H serial bus

CC-Link IE Field

CC-Link IE Field Network

Pulse train input

LOW-VOLTAGE SWITCHGEAR

MR-J4-B/MR-J4W2-B/MR-J4W3-B

SSCNET III/H compatible servo amplifier

MR-J4-B(-RJ)

SSCNET III/H compatible 2-axis servo amplifier

MR-J4W2-B

SSCNET III/H compatible 3-axis servo amplifier

MR-J4W3-B

MR-J4-B-RJ010 +MR-J3-T10

CC-Link IE Field Network servo amplifier with Motion

MR-J4-B-RJ010
+MR-J3-T10

MR-J4-A

General-purpose interface compatible servo amplifier

MR-J4-A(-RJ)

MR-JE-A

General-purpose interface compatible servo amplifier

MR-JE-A

Magnetic contactor

MS-T

Molded-case circuit breaker

WS-V

*1

Rotary servo motor

Small capacity, low inertia
HG-KR series
Capacity: 50 to 750 W

Small capacity, ultra-low inertia
HG-MR series
Capacity: 50 to 750 W

Small capacity, low inertia
HF-KN series
Capacity: 100 to 750 W

Medium capacity, medium inertia
HG-SR series
Capacity: 0.5 to 7 kW

Medium/large capacity, low inertia
HG-JR series
Capacity: 0.5 to 22 kW

Medium capacity, medium inertia
HF-SN series
Capacity: 0.5 to 3.0 kW

Medium capacity, ultra-low inertia
HG-RR series
Capacity: 1 to 5 kW

Medium capacity, flat type
HG-UR series
Capacity: 0.75 to 5 kW

Linear servo motor

Core type
LM-H3 series
Rating: 70 to 960 N

Core type (natural/liquid cooling)
LM-F series
Rating: 300 to 3000 N (natural cooling)
Rating: 600 to 6000 N (liquid cooling)

Core type with magnetic attraction counter-force
LM-K2 series
Rating: 120 to 2400 N

Coreless type
LM-U2 series
Rating: 50 to 800 N

Direct drive motor

TM-RFM series
Rating: 2 to 240 N•m

*1. Not all the combinations of the servo amplifier and the servo motor are available. Refer to "MELSERVO-J4 catalog (L(NA)03058)" and "MELSERVO-JE catalog (L(NA)03086ENG)" for the available combinations.

e-F@ctory

Mitsubishi Electric's integrated FA solution for achieving seamless information collaboration between information systems and control systems, and enabling lateral integration of production sites.

iQ Platform

Mitsubishi Electric's integrated FA platform for achieving lateral integration of controllers & HMI, engineering environments and networks at production sites.

From multi-axis and high-speed systems to simple positioning

Our extensive product lines cover various advanced Motion controllers/Simple Motion modules for SSCNET III/H; a Stand-alone Motion controller in which a power supply module, a PLC, and a Motion controller are integrated; and a Simple Motion module for CC-Link-IE Field Network.

IQ Platform, SSCNET III/H compatible

MELSEC-Q series Motion controller

Q17nDSCPU

The Q173DSCPU/Q172DSCPU Motion controller is a CPU module used with PLC CPU for Motion control. Using a wide variety of positioning programs, the Motion controller achieves various advanced Motion controls such as synchronous control, position follow-up, and tandem operation, in addition to positioning, speed, and torque controls.

◎ The Motion operation cycle of 0.22 ms/4 axes enables shorter operation tact time.
◎ CPU loads are distributed by sharing tasks between the Motion controller and the Programmable controller. Complex servo controls are executed by the Motion controllers, while machine and information control is managed by the Programmable controllers.
◎ The safety observation function, such as speed monitoring, is available as standard.

	Q173DSCPU	Q172DSCPU
Number of control axes	Up to 32 axes	Up to 16 axes
Operation cycle	0.22 ms, 0.44 ms, 0.88 ms, 1.77 ms, 3.55 ms, 7.11 ms	
Servo amplifier	MR-J4-B/MR-J4W2-B/MR-J4W3-B	
Network	SSCNET III/H (2 systems)	SSCNET III/H (1 system)
Extension base unit	Up to 7	

SSCNET III/H compatible

MELSEC-Q series Stand-alone Motion controller

Q170MSCPU

A power supply, a PLC, and a Motion controller are integrated in one module.

◎ Panel and equipment size can be reduced by combining this module with 2-axis/3-axis servo amplifier.
◎ Flexible expansion is achieved for various control purposes, thanks to having the compatibility with MELSEC-Q series modules.
◎ Easy parameter setting enables speedy startup and effortless debugging.
◎ Using program resources efficiently, systems can be expanded with minimum design costs.

	Q170MSCPU-S1	Q170MSCPU
PLC CPU area	Q06UDHCPU or equivalent	Q03UDCPU or equivalent
Number of control axes	Up to 16 axes	
Operation cycle	0.22 ms, 0.44 ms, 0.88 ms, 1.77 ms, 3.55 ms, 7.11ms	
Servo amplifier	MR-J4-B/MR-J4W2-B/MR-J4W3-B	
Network	SSCNET III/H	

SSCNET III/H compatible

MELSEC-Q series Simple Motion module

QD77MS

The QD77MS16/QD77MS4/QD77MS2 Simple Motion module performs positioning control using only sequence programs. This Simple Motion module is simple to use just like Positioning modules but can perform various controls, which are unavailable with Positioning modules, such as synchronous control, cam control, and speed-torque control (tightening & press-fit control). This module is also equipped with all of the functions of the Positioning module (QD75MH).

◎ Projects and sequence programs of the Positioning module (QD75MH) are easily diverted for the use of the Simple Motion module (QD77MS).
◎ A cam profile for rotary cutter is easily created using Cam auto-generation function.

	QD77MS16	QD77MS4	QD77MS2
Number of control axes	Up to 16 axes	Up to 4 axes	Up to 2 axes
Operation cycle	0.88 ms/1.77 ms*1	0.88 ms	
Servo amplifier	MR-J4-B/MR-J4W2-B/MR-J4W3-B		
Network	SSCNET III/H (1 system)		

*1 Default value is 1.77 ms. If necessary, check the operation time and change it to 0.88 ms.

SSCNET III/H compatible

MELSEC-L series Simple Motion module

LD77MS

The Simple Motion module is simple to use just like Positioning modules but can perform various controls, which are unavailable with Positioning modules, such as synchronous, cam, and speed-torque control (tightening & press-fit control).

◎ 16-axis/4-axis/2-axis control

CC-Link IE Field Network compatible

MELSEC-Q series Simple Motion module

QD77GF16

The CC-Link IE Field Network compatible Simple Motion module combines the versatility of Ethernet and highly accurate synchronous operation for Motion control.

◎ 16-axis control

MELSEC-Q series Positioning module

QD75MH

The QD75MH is an SSCNET III compatible Positioning module, available in 4, 2, and 1-axis control models. It is equipped with various positioning functions including circular interpolation and the target position change function, etc.

◎ 4-axis/2-axis/1-axis control

QD70P/QD70D

The QD70P/QD70D are pulse train output compatible modules. These modules enable smooth acceleration/deceleration with frequent speed changes and are suitable for stepping motors.

◎ Each module supports 8-axis/4-axis control

QD75PN/QD75DN

The QD75PN/QD75DN are pulse train output compatible modules, available as the QD75PN for open collector or the QD75DN for differential pulse train output. It is equipped with various positioning functions including circular interpolation and the target position change function, etc.

◎ Each module supports 4-axis/2-axis/1-axis control

MELSEC-L series Positioning module

LD75P/LD75D

The LD75P/LD75D are pulse train output compatible modules, available as the LD75P for open collector or the LD75D for differential pulse train output. It is equipped with various positioning functions including circular interpolation and the target position change function, etc.

◎ Each module supports 4-axis/2-axis/1-axis control

LCPU

The positioning function, equipped as standard, outputs command pulses to a servo amplifier using built-in I/O. I/O points are capable of many functions usually reserved for separate modules, such as the high-speed counter function, general input/output, interrupt input etc. Save on system costs by using the built-in functions rather than relying exclusively on additional modules.

◎ 2-axis control

Single Axis

Motion controller

MR-MQ100

This is a high-functional compact Motion controller with built-in interfaces for incremental synchronous encoder and mark detection signal.

◎ By connecting with an SSCNET III compatible servo amplifier, broad range of motors can be used, including rotary/linear servo motors and direct drive motors.
◎ Synchronous control with standard speed is possible by connecting an incremental synchronous encoder.
◎ Graphic operation terminal (GOT) can be connected via RS-422 communication interface as well as Ethernet interface.
◎ This Motion controller receives and sends input/output signals (Input: 16 points, Output: 16 points) and analog input/output data (A/D: 2 points, D/A: 2 points) from/to MR-J3-D01 extension IO unit, and uses them for control.

MELSEC-F series Positioning module

FX3U(C) series

Equipped with the high standard of high-speed processing and positioning functions, this programmable controller helps achieve a system with high cost effectiveness.

◎ 3-axis control

FX3U-20SSC-H

This SSCNET III compatible positioning block has various functions including real-time monitoring of servo information and achieves reduced wiring by using fiber-optic cables.

◎ 2-axis control

FX2N-10GM/20GM

This Positioning module is used independently or with the FX series programmable controller. The FX2N-20GM model supports 2-axis interpolation control.

◎ 2-axis/1-axis control

FX2N-20GM

FX3U-1PG/FX2N-10PG

This pulse train output block is used with the FX series programmable controller. The FX2N-10PG model is capable of high-speed and high-precision positioning at a maximum of 1 MHz high-speed pulses.

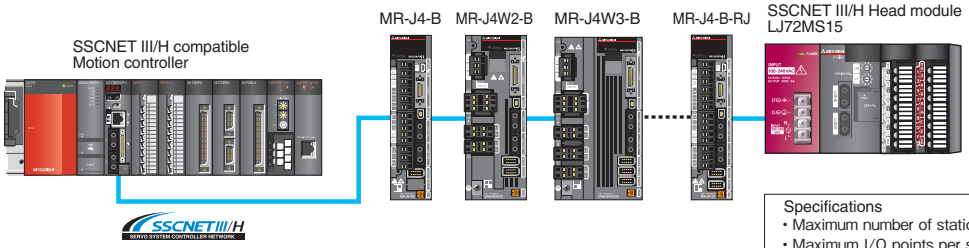
◎ 1-axis control

FX2N-10PG

MELSEC-L series SSCNET III/H Head module

LJ72MS15

The SSCNET III/H head module is used to connect the MELSEC-L series I/O module and intelligent function module to the SSCNET III/H.
Functioning as the Motion controller's remote station, a system can be configured flexibly with the I/O modules and intelligent function modules, the system wiring can be reduced, and space can be saved.
In addition, modules mounted on the SSCNET III/H head module can be used as a Motion controller input/output using cyclic transmission.



Specifications
- Maximum number of stations: 4 stations
- Maximum I/O points per system
  Input points 256 bytes
  Output points 256 bytes
- Maximum I/O points per station
  Input points 64 bytes
  Output points 64 bytes

Connectable to various modules such as I/O, analog, and high-speed counter.

From the industry's top level high-speed, high-accuracy servos to one-touch servos and multi-axis models

In addition to the high-end MELSERVO-J4 series, a variety of models to match various applications is available.
The Mitsubishi servo amplifiers support motors from rotary servo motors to linear servo motors and direct drive motors, and greatly enhance system performance.

MELSERVO-J4 series — Man, machine and environment in perfect harmony

MELSERVO-J4 series is the newest member to the MELSERVO family, backed by Mitsubishi leadership in all-digital technology. With safety, SSCNET III/H high-speed optical communication and energy-efficient design of the new MELSERVO-J4 series - man, machine and environment can at last work together in perfect harmony.

MR-J4-_B(-RJ) (Note 1)

SSCNET III/H compatible servo amplifier

A complete synchronous system with SSCNET III/H can be configured using 0.22 ms cycle high-speed serial communication between the controller and the servo amplifier.

Command interface	SSCNET III/H		
Control mode	Position/Speed/Torque/Fully closed loop		
Power supply	1-phase 100 V AC	3-phase 200 V AC	3-phase 400 V AC
Capacity range	100 W to 400 W*	100 W to 22 kW	600 W to 22 kW
Compatible servo motor	Rotary servo motor, linear servo motor, DD motor		

* 100 V AC 100 W to 400 W will be released in the future.

MR-J4W2-_B

SSCNET III/H compatible 2-axis servo amplifier

The SSCNET III/H compatible 2-axis servo amplifier drives two servo motors, enabling energy-conservative, less-wiring, compact machine at lower cost.

Command interface	SSCNET III/H
Control mode	Position/Speed/Torque/Fully closed loop
Power supply	3-phase 200 V AC
Capacity range	200 W × 2 axes, 400 W × 2 axes, 750 W × 2 axes, 1 kW × 2 axes
Compatible servo motor	Rotary servo motor, linear servo motor, DD motor

MR-J4W3-_B

SSCNET III/H compatible 3-axis servo amplifier

The SSCNET III/H compatible 3-axis servo amplifier drives three servo motors, enabling energy-conservative, less-wiring, compact machine at lower cost.

Command interface	SSCNET III/H
Control mode	Position/Speed/Torque
Power supply	3-phase 200 V AC
Capacity range	200 W × 3 axes, 400 W × 3 axes
Compatible servo motor	Rotary servo motor, linear servo motor, DD motor

MR-J4-_B-RJ010 + MR-J3-T10

CC-Link IE Field Network servo amplifier with Motion

MR-J4-B-RJ010 and MR-J3-T10 used with the Simple Motion module QD77GF are compatible with the Motion function in CC-Link IE Field Network, and synchronous control and interpolation functions are achieved among axes.

Command interface	CC-Link IE Field Network with Motion	
Control mode	Position/Speed*1/Torque*1	
Power supply	3-phase 200 V AC	3-phase 400 V AC
Capacity range	100 W to 22 kW*2	600 W to 22 kW*2
Compatible servo motor	Rotary servo motor	

*1. Speed and torque controls are available in the future.
*2. 200 V AC 11 kW to 22 kW and 400 V AC 600 W to 22 kW will be released in the future.

MR-J4-_A(-RJ) (Note 1)

General-purpose interface compatible servo amplifier

Pulse train and analog input, etc., are provided as a standard for the command interface. The control mode can be switched accordingly for position, speed or torque control.

Command interface	Pulse train/Analog/RS-422 multi-drop		
Control mode	Position/Speed/Torque/Fully closed loop		
Power supply	1-phase 100 V AC	3-phase 200 V AC	3-phase 400 V AC
Capacity range	100 W to 400 W*	100 W to 22 kW	600 W to 22 kW
Compatible servo motor	Rotary servo motor, linear servo motor, DD motor		

* 100 V AC 100 W to 400 W will be released in the future.

Notes: 1. MR-J4-B-RJ and MR-J4-A-RJ are special specification models of MR-J4-B and MR-J4-A.
MR-J4-B-RJ or MR-J4-A-RJ is required when:
・Fully closed loop control is configured with 4-wire type serial linear encoder or A/B/Z-phase differential output type linear encoder,
・Linear servo system is configured with A/B/Z-phase differential output type linear encoder, or
・Scale measurement function is used with 4-wire type serial linear encoder or A/B/Z-phase differential output type linear encoder.

The leading edge in drive control, with unrivaled accuracy and response for next-generation machine performance.

Machine

Industry-leading basic performance

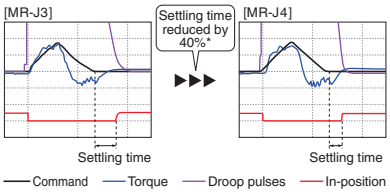
Industry-leading level of servo amplifier basic performance

Industry-leading levels

Our original high-speed servo control architecture is evolved from the conventional two-degrees-of-freedom model adaptive control and applied to the dedicated execution engine. **Speed frequency response is increased to 2.5 kHz, achieving the industry-leading level of speed*.** Compatible servo motors are equipped with **a high-resolution absolute encoder of 4,194,304 pulses/rev (22-bit)**, enabling high-speed and high-accuracy operation. The performance of the high-end machine is utilized to the fullest.

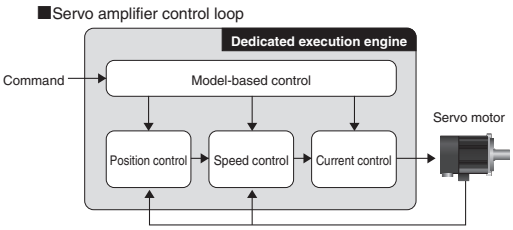
* Based on Mitsubishi Electric research as of September 2013.

[Settling time comparison with the prior model]



* The result is based on our evaluation condition.

[Dedicated execution engine]

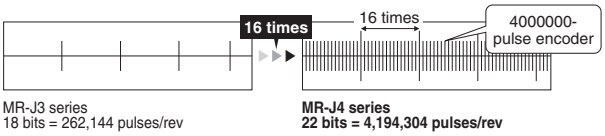


Improving machine performance with high-performance motors

Industry-leading levels

Rotary servo motors achieve high-accuracy positioning and smooth rotation with a high-resolution encoder and improved processing speed.

[Resolution comparison with the prior model]



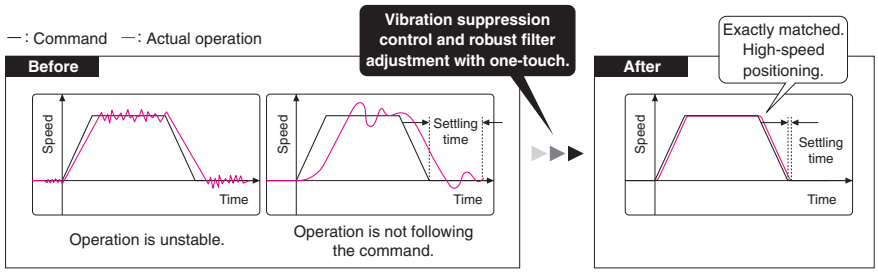
Advanced servo gain adjustment function

Advanced one-touch tuning function

Enhanced functions

Servo gains including machine resonance suppression filter, advanced vibration suppression control II*, and robust filter are adjusted just by turning on the one-touch tuning function. Machine performance is utilized to the fullest using the advanced vibration suppression control function.

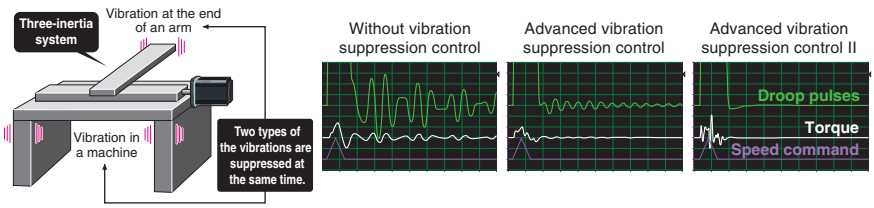
* The advanced vibration suppression control II automatically adjusts one frequency.



Advanced vibration suppression control II

Patent pending
Enhanced functions

Due to vibration suppression algorithm which supports three-inertia system, two types of low frequency vibrations are suppressed at the same time. Adjustment is performed on MR Configurator2. This function is effective in suppressing vibration at the end of an arm and in reducing residual vibration in a machine, enabling a shorter settling time.



The leading edge in safety and convenience, designed to harmonize with the way you work.

Man

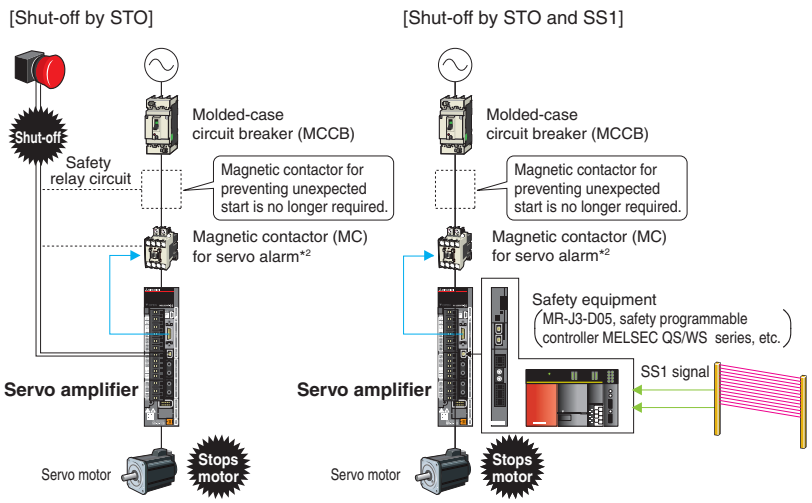
Equipped with the safety observation function

Functions according to IEC/EN 61800-5-2

STO (Safe torque off) and SS1[*1] (Safe stop 1) are integrated as standard, enabling the safety system to be configured easily in the machine. (SIL 2)

- Turning off the control power of servo amplifier is not required, cutting out the time for restart. Additionally, home position return is not required.
- Magnetic contactor for preventing unexpected motor start is not required.[*2]

*1. Safety equipment (MR-J3-D05, safety programmable controller MELSEC QS/WS series, etc.) is required.
*2. STO is the function to turn off the output torque by shutting off the power supply inside the servo amplifier. For MR-J4 series servo amplifier, magnetic contactors are not required to meet the STO requirements. However, install a magnetic contactor to prevent the short circuit of servo amplifier or electric shock.

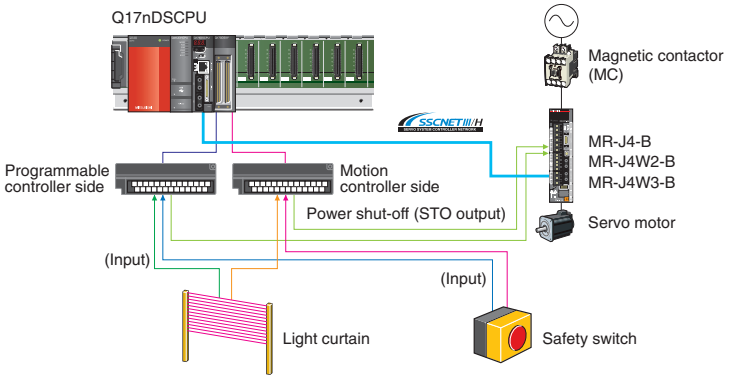


Improving safety level by combining MR-J4 with Motion controller

The safety observation function of Q17nDSCPU is compatible with the following functions defined as "Power drive system function" in IEC/EN 61800-5-2.

IEC/EN 61800-5-2:2007 function
STO (Safe torque off)
SS1 (Safe stop 1)
SS2 (Safe stop 2)
SOS (Safe operating stop)
SLS (Safely-limited speed)
SBC (Safe brake control)
SSM (Safe speed monitor)

[Safety signal comparison function]



Maintenance function to achieve TCO* reduction

* TCO : Total Cost of Ownership

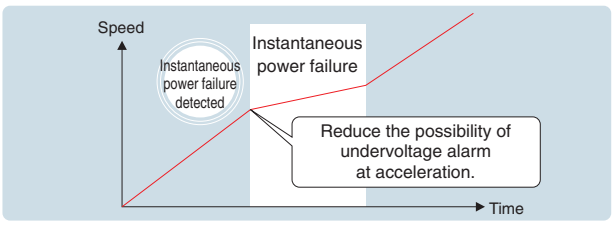
Detect changes in the operating environment and adjust the servo control automatically to reduce losses from the system stop.

Tough drive function

Enhanced functions

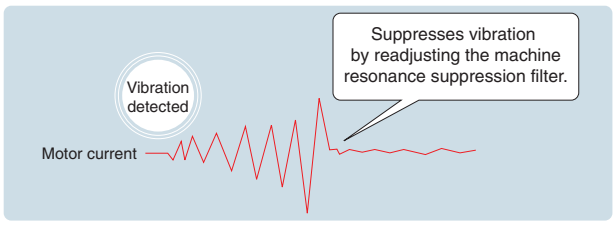
●Instantaneous power failure tough drive

The possibility of undervoltage alarm is reduced when instantaneous power failure is detected in the input power.



●Vibration tough drive

Machine resonance suppression filter is automatically readjusted when a change in machine resonance frequency is detected by the servo amplifier. Losses from the machine stop due to age-related deterioration are reduced.

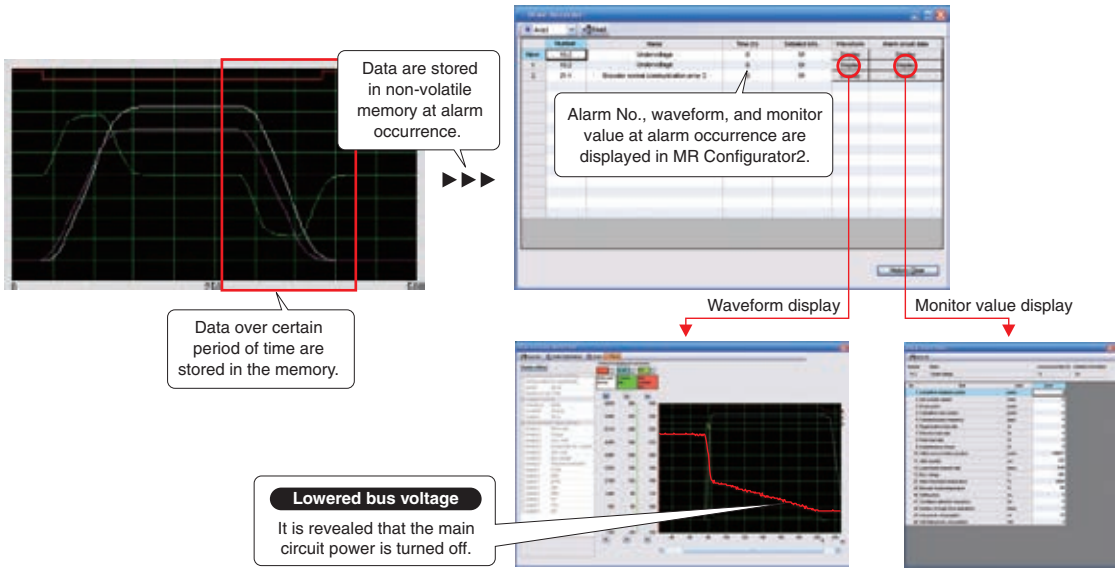


Swiftly and accurately identify the cause when alarms occur.

Large capacity drive recorder

Patent pending | Enhanced functions

- 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.
  The data read on MR Configurator2 during restoration are used for cause analysis.
- Check the waveform ((analog 16 bits × 7 channels + digital 8 channels) × 256 points) of 16 alarms in the alarm history and the monitor value.

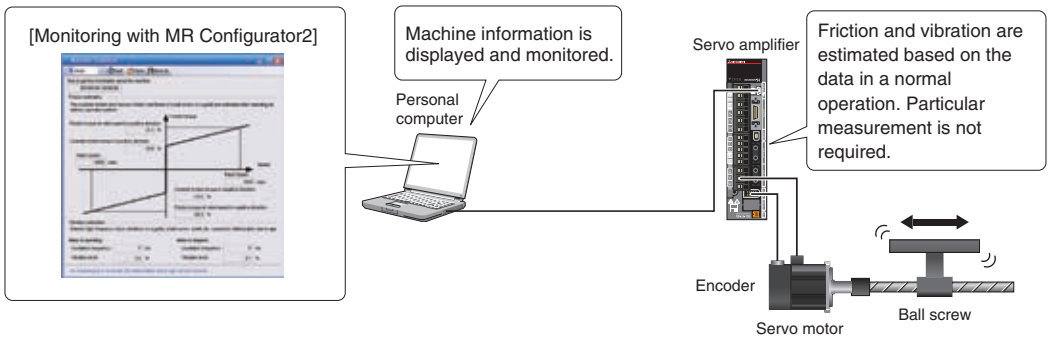


For preventive maintenance in advance

Machine diagnosis function

Patent pending | NEW

This function detects changes of machine parts (ball screw, guide, bearing, belt, etc.) by analyzing machine friction, load moment of inertia, unbalanced torque, and changes in vibration component from the data inside the servo amplifier, supporting timely maintenance of the driving parts.



Servo setup software

MELSOFT MR Configurator2

Tuning, monitor display, diagnosis, reading/writing parameters, and test operations are easily performed on a personal computer.
This start-up support tool achieves a stable machine system, optimum control, and short setup time.

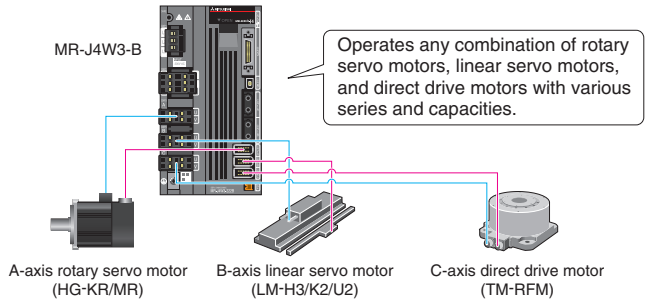
The new MR-J4 series: an evolution in eco-friendly design that's winning acclaim worldwide.

Environment

Multi-axis servo amplifier in harmony with eco-friendly society

2-axis/3-axis types for energy-conservative, miniaturized, and low-cost machine

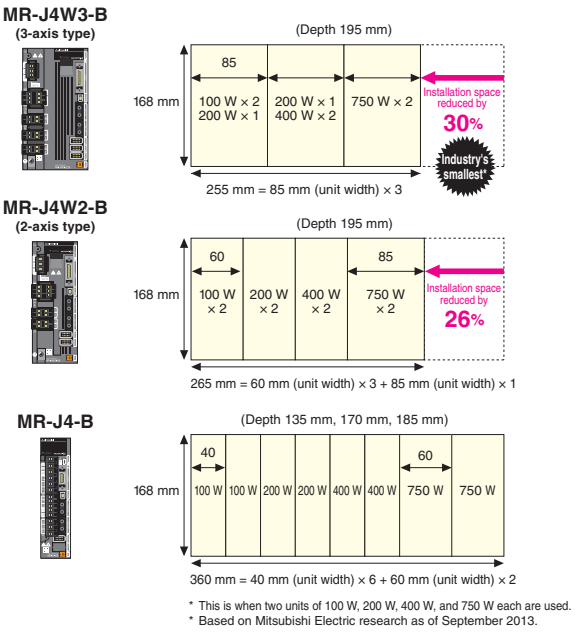
2-axis and 3-axis servo amplifiers are available for operating two and three servo motors, respectively. These servo amplifiers enable energy-conservative, compact machine at lower cost. Different types of servo motors including rotary servo motors, linear servo motors, and direct drive motors are freely combined as long as the servo motors are compatible with the servo amplifier.



Space-saving with industry's smallest* 3-axis type

2-axis servo amplifier MR-J4W2-B requires 26% less installation space than two units of MR-J4-B. 3-axis servo amplifier MR-J4W3-B requires 30% less installation space than three units of MR-J4-B.

[Installation space]

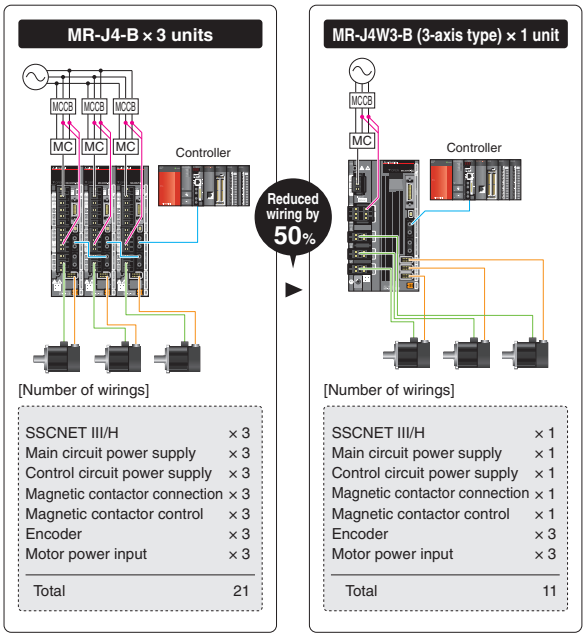


* This is when two units of 100 W, 200 W, 400 W, and 750 W each are used.
* Based on Mitsubishi Electric research as of September 2013.

Reduced wiring by approx. 50% with 3-axis type

In 3-axis servo amplifier MR-J4W3-B, the three axes use the same connections for main and control circuit power, peripheral equipment, control signal wire, etc. Thus, the number of wirings and devices is greatly reduced.

[Comparison of the number of wirings]



[Number of wirings]

SSCNET III/H	× 3
Main circuit power supply	× 3
Control circuit power supply	× 3
Magnetic contactor connection	× 3
Magnetic contactor control	× 3
Encoder	× 3
Motor power input	× 3
Total	21

[Number of wirings]

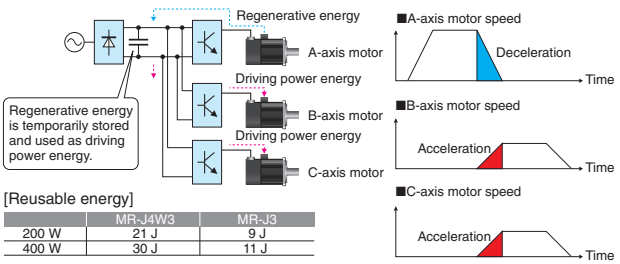
SSCNET III/H	× 1
Main circuit power supply	× 1
Control circuit power supply	× 1
Magnetic contactor connection	× 1
Magnetic contactor control	× 1
Encoder	× 3
Motor power input	× 3
Total	11

Optimal energy-conservative system for your system

Supporting energy-conservative machine using regenerative energy

In the multi-axis servo amplifier, the regenerative energy of an axis is used as driving power energy for the other axes, contributing to energy-conservation of machine. Reusable regenerative energy stored in the capacitor is increased for MR-J4W2-B/MR-J4W3-B as compared to the prior model. Regenerative option is no longer required.

* Regenerative resistor may be required depending on the conditions.
* In the multi-axis servo amplifier, the amount of temporarily stored regenerative energy can be increased by using a capacitor bank. (Available in the future) Contact your local sales office for more details.



[Reusable energy]

	MR-J4W3	MR-J3
200 W	21 J	9 J
400 W	30 J	11 J

A heritage of trust and continuity — the hallmark of every MELSERVO product.

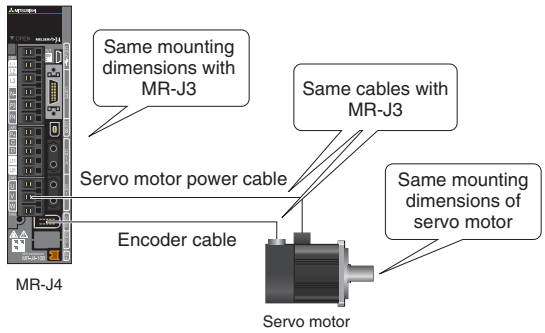
Heritage

Seamless integration with existing system

Easy replacement of MR-J3 series

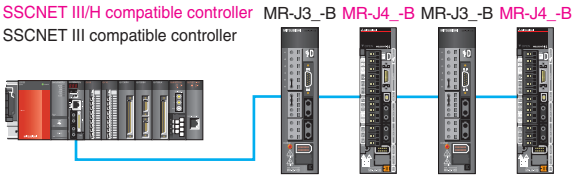
●MR-J4 series servo amplifier has the same mounting dimensions*1 with MR-J3 series servo amplifier. HG rotary servo motor series has the same mounting dimensions and uses the same cables for the power, the encoder*2, and the electromagnetic brake as HF series or HC-RP/HC-UP series.

*1. Mounting dimensions are smaller for 200 V 5 kW, 400 V 3.5 kW, 200 V/400 V 11 kW, and 200 V/400 V 15 kW servo amplifiers.
*2. 200 V/400 V 11 kW and 15 kW of HG-JR series use a different encoder cable from HF-JP series.



●SSCNET III/H compatible and SSCNET III compatible products can be used together.

* When the SSCNET III compatible products are in the system, the communication speed is 50 Mbps, and the function and the performance are equivalent to those of MR-J3.

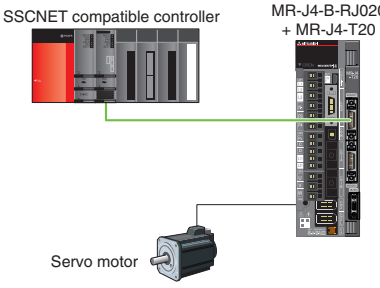


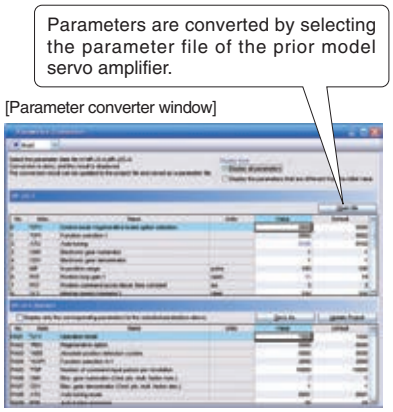
●Parameters are automatically converted by changing MR-J3-B to MR-J4-B with MELSOFT MT Works2. (Available in version 1.42U or later.)
Parameters of MR-J3-A are converted to those of MR-J4-A, using the parameter converter function of MR Configurator2. (Available in version 1.12N or later.)

Replacement of MR-J2 Super series

●Parameters are automatically converted by changing MR-J2S-B to MR-J4-B with MELSOFT MT Works2. (Available in version 1.42U or later.)
Parameters of MR-J2S-A are converted to those of MR-J4-A, using the parameter converter function of MR Configurator2. (Available in version 1.12N or later.)

●A combination of MR-J4-B-RJ020 and MR-J4-T20 is capable of connecting to the SSCNET of MR-J2S-B compatible servo system controller.





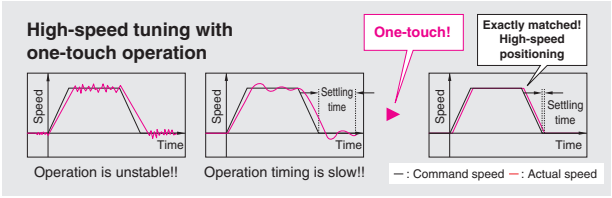
Servo Amplifier

MR-JE series

Global servo with one-touch ease

MR-JE-_A

General purpose interface compatible



[Easy To Use]

◎Advanced one-touch tuning adjusts servo gains with one-touch ease.

◎Instantaneous power failure tough drive function and a large capacity capacitor reduce machine downtime.

[High Performance]

◎The dedicated engine enables speed frequency response of 2.0 kHz, shortening the tact time.

◎The large capacity main circuit capacitor allows the regenerative energy to be used effectively.

[Global Standard]

◎Digital input/output is compatible with both sink and source type connections.

Command interface	Pulse train/Analog
Control mode	Position/Speed/Torque
Power specifications	3-phase 200 V AC
Capacity range	100 W to 3 kW
Compatible servo motor	Rotary servo motor

MELSERVO-J3 series

MELSERVO-J3 series is ranged from 100 W to 220 kW, and compatible with a variety of interfaces.

MR-J3-_B

SSCNET III compatible

A complete synchronous system for SSCNET III can be configured using 0.44 ms cycle high-speed serial communication between the controller and the servo amplifier.

Command interface	SSCNET III		
Control mode	Position		
Power specifications	1-phase 100 V AC	3-phase 200 V AC	3-phase 400 V AC
Capacity range	100 W to 400 W	30 kW to 37 kW	30 kW to 220 kW*
Compatible servo motor	Rotary servo motor		

* Contact your local sales office for the servo amplifier over 55 kW.

MR-J3-_BSafety

SSCNET III compatible/Drive safety compatible/ Fully closed loop control

STO (Safe torque off) is integrated for functional safety, and SS1 is enabled by using the optional unit MR-J3-D05. Fully closed loop control is also supported.

Command interface	SSCNET III		
Control mode	Position/Fully closed loop control		
Power specifications	1-phase 100 V AC	3-phase 200 V AC	3-phase 400 V AC
Capacity range	100 W to 400 W	30 kW to 37 kW	30 kW to 55 kW
Compatible servo motor	Rotary servo motor		

MR-J3-_A

General-purpose interface compatible

Pulse train and analog input, etc., are provided as a standard for the command interface. The control mode can be switched accordingly for position, speed or torque control.

Command interface	Pulse train/Analog/RS-422 multi-drop		
Control mode	Position/Speed/Torque		
Power specifications	1-phase 100 V AC	3-phase 200 V AC	3-phase 400 V AC
Capacity range	100 W to 400 W	30 kW to 37 kW	30 kW to 55 kW
Compatible servo motor	Rotary servo motor		

MR-J3-_T

CC-Link compatible/Built-in positioning function

The built-in positioning function sets position and speed data in the point tables in the servo amplifier. Positioning operation can be started using start signals from a host controller.

Command interface	CC-Link/DIO/RS-422 multi-drop pulse train		
Control mode	Position/Speed/Built-in positioning function		
Power specifications	1-phase 100 V AC	3-phase 200 V AC	3-phase 400 V AC
Capacity range	100 W to 400 W	100 W to 22 kW	600 W to 22 kW
Compatible servo motor	Rotary servo motor		

MELSERVO-J3W series

2-axis servo amplifier for energy-conservative, less-wiring compact machines with the same high performance, functionality, and usability as MR-J3-B.

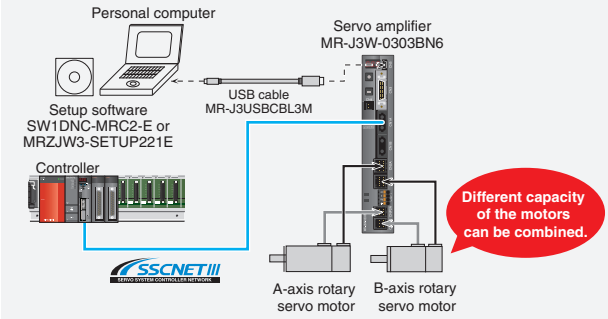
MR-J3W-0303BN6

Servo amplifier for ultra-compact servo motor

This 2-axis SSCNET III compatible servo amplifier drives two units of HG-AK ultra-compact servo motors.
The main circuit power supply is compatible with 48 V DC and 24 V DC.

Command interface	SSCNET III
Control mode	Position
Power specifications	48 V DC/24 V DC
Capacity range	30 W × 2 axes
Compatible servo motor	Rotary servo motor

■System configuration example



Servo amplifier lines

Model	Power supply	Capacity [kW]
MR-J4-B(-RJ)	1-phase 100 V AC	0.1 kW – *3 – 0.4 kW
	3-phase 200 V AC	0.1 kW – 22 kW
	3-phase 400 V AC	0.6 kW – 22 kW
MR-J4W2-B	3-phase 200 V AC	0.2 kW – 1 kW
MR-J4W3-B	3-phase 200 V AC	0.2 kW – 0.4 kW
MR-J4-B-RJ010 + MR-J3-T10	3-phase 200 V AC	0.1 kW – 7 kW – *3 – 22 kW
	3-phase 400 V AC	0.6 kW – *3 – 22 kW
MR-J4-A(-RJ)	1-phase 100 V AC	0.1 kW – *3 – 0.4 kW
	3-phase 200 V AC	0.1 kW – 22 kW
	3-phase 400 V AC	0.6 kW – 22 kW
MR-J3-B MR-J3-BSafety MR-J4-A	1-phase 100 V AC	0.1 kW – 0.4 kW
	3-phase 200 V AC	0.1 kW – *1 – 22 kW – 37 kW
	3-phase 400 V AC	0.6 kW – *1 – 22 kW – 55 kW – *2 – 220 kW
MR-J3-T	1-phase 100 V AC	0.1 kW – 0.4 kW
	3-phase 200 V AC	0.1 kW – 22 kW
	3-phase 400 V AC	0.6 kW – 22 kW
MR-J3W-0303BN6	48 V DC/24 V DC	30 W
MR-JE-A	3-phase 200 V AC	0.1 kW – 3 kW

0.01 0.1 1 10 100 1000

*1. This capacity range is also available with MR-J4 series. MR-J4_-B has "J3 compatibility mode" for using the MR-J4-B servo amplifier as MR-J3-B.
*2. This range is available only with MR-J3-_B4 servo amplifier. Contact your local sales office for the servo amplifiers over 55 kW.
*3. Servo amplifiers in this capacity range will be released in the future.

From rotary to linear and direct drive motors

The rotary servo motor is available in capacities from 10 W to 220 kW.
The linear servo motor and the direct drive motor respond to new needs for driving control by providing high rigidity, performance and flexibility in system configurations unique to a direct drive.
These motors also offer easy maintenance and cleanliness.

Rotary Servo Motor

A wide range of capacities and series for various system applications

HG series

Compatible servo amplifier: MR-J4 series

HG-KR

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

Capacity: 50 W to 750 W (200 V AC)
[Examples of use] ●Inserters, mounters and bonders ●PCB drilling machines ●In-circuit testers and label printers ●Knitting and embroidery machines ●Compact robots and robot hand sections

HG-MR

Small capacity, ultra-low inertia.
Perfect for high-throughput operations.

Capacity: 50 W to 750 W (200 V AC)
[Examples of use] ●Inserters, mounters and bonders ●Compact robot

HG-SR

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

Capacity: 0.5 kW to 7 kW (200 V AC/ 400 V AC)
[Examples of use] ●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 22 kW (200 V AC/ 400 V AC)
[Example of use] ●Food packaging machines ●Printers ●Injection molding machines ●Press machines

HG-RR

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

Capacity: 1 kW to 5 kW (200 V AC)
[Examples of use] ●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 (200 V AC)
[Examples of use] ●Robots ●Conveyors ●Winders ●Tension machines ●Food processing machines

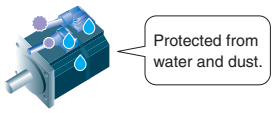
Equipped with high-resolution absolute encoder

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

Improved environmental safety

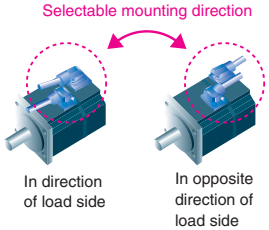
HG-KR/HG-MR/HG-RR/HG-UR and HG-SR/HG-JR are rated IP65 and IP67[*1], respectively.[*2]

*1. 22 kW of HG-JR series is rated IP44.
*2. The shaft-through portion is excluded.



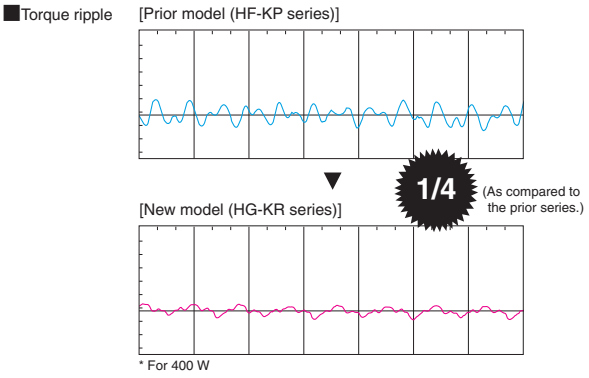
Cable leading direction

The power cable, the encoder cable, and the electromagnetic brake cable are led out to either in direction of or in opposite direction of the load side, depending on the selected cables. (HG-KR and HG-MR series)



Reduced torque ripple during conduction

By optimizing the combination of the number of motor poles and the number of slots, torque ripple during conduction is greatly reduced. Smooth constant-velocity operation of machine is achieved.



HF series
Compatible servo amplifier: MR-JE series

HF-KN

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

Capacity: 100 W to 750 W (200 V AC)
[Examples of use] ●Inserters, mounters and bonders ●PCB drilling machines ●In-circuit testers and label printers ●Knitting and embroidary machines

HF-SN

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

Capacity: 0.5 kW to 3 kW (200 V AC)
[Examples of use] ●Material handling systems ●Dedicated machines ●Robots ●Loaders and unloaders ●Winders, tension units ●Turrets ●X-Y tables

HG series
Compatible servo amplifier: MR-J3W-0303BN6

HG-AK

Small capacity, ultra-compact size.
Perfect for compact machines.

Capacity: 10 W to 30 W (48 V DC /24 V DC*)
[Examples of use] ●Mounters and bonders ●Semiconductor manufacturing systems ●Ultra-compact robot ●X-Y table
* A parameter needs to be changed to use 24 V DC.

HA series
Compatible servo amplifier: MR-J3 series

HA-LP

Medium to large capacity, low inertia.
Suitable for large capacity fields of large systems.

Capacity: 5 kW to 55 kW (200 V AC)
6 kW to 55 kW (400 V AC)
[Examples of use] ●Injection molding machines ●Semiconductor manufacturing devices ●Large material handling systems ●Press machines

HA-JP

Ultra-large capacity, low inertia.
Suitable for ultra-large machines.

Capacity: 110 kW to 220 kW (400 V AC)
[Examples of use] ●Large press machines ●LCD manufacturing machines ●Large material handling systems
* Contact your local sales office for HA-JP series.

Product lines

Series	Rated speed [r/min]	Maximum speed [r/min]	Capacity range [kW]	Compatible servo amplifier	Encoder resolution [pulses/rev]	With electromagnetic brake	With Reducer	IP rating*1
HG-KR	3000	6000	0.05 kW – 0.75 kW	MR-J4/J4W	4194304	●	●	IP65
HG-MR	3000	6000	0.05 kW – 0.75 kW	MR-J4/J4W	4194304	●	—	IP65
HG-SR	1000	1500	0.5 kW – 4.2 kW	MR-J4/J4W	4194304	●	—	IP67
	2000	3000	0.5 kW – 7 kW	MR-J4/J4W	4194304	●	●	IP67
HG-JR	3000	6000/5000	0.5 kW – 9 kW	MR-J4/J4W	4194304	●	—	IP67
	1500	3000/2500	11 kW – 22 kW	MR-J4	4194304	●*2	—	IP67/IP44
HG-RR	3000	4500	1 kW – 5 kW	MR-J4	4194304	●	—	IP65
HG-UR	2000	3000/2500	0.75 kW – 5 kW	MR-J4/J4W	4194304	●	—	IP65
HF-KP	3000	6000	0.05 kW – 0.75 kW	MR-J3/J3W	262144	●	●	IP65
HF-MP	3000	6000	0.05 kW – 0.75 kW	MR-J3/J3W	262144	●	●	IP65
HF-SP	1000	1500	0.5 kW – 4.2 kW	MR-J3/J3W	262144	●	—	IP67
	2000	3000	0.5 kW – 7 kW	MR-J3/J3W	262144	●	●	IP67
HC-LP	2000	3000	0.5 kW – 3 kW	MR-J3/J3W	262144	●	—	IP65
HC-RP	3000	4500	1 kW – 5 kW	MR-J3	262144	●	●	IP65
HC-UP	2000	3000/2500	0.75 kW – 5 kW	MR-J3/J3W	262144	●	—	IP65
HF-JP	3000	6000/5000	0.5 kW – 9 kW	MR-J3/J3W	262144	●	—	IP67
	1500	3000	11 kW – 15 kW	MR-J3	262144	●	—	IP67
HA-LP	1000	1200	6 kW – 37 kW	MR-J3	262144	●*2	—	IP44
	1500	2000	7 kW – 50 kW	MR-J3	262144	●*2	—	IP44
	2000	2000	5 kW – 55 kW	MR-J3	262144	●*2	—	IP44/IP65
HA-JP*3	2000	3000	110 kW – 220 kW	MR-J3	262144	—	—	IP44
HF-KN	3000	4500	0.1 kW – 0.75 kW	MR-JE	131072	●	—	IP65
HF-SN	3000/2500	3450/2875	0.5 kW – 3 kW	MR-JE	131072	●	—	IP67
HG-AK	3000	6000/5000	0.01 – 0.03 kW	MR-J3W-0303BN6	262144	●	—	IP55

0.01 0.1 1 10 100 1000

*1. The shaft-through portion is excluded.
*2. Some models are not available with electromagnetic brake.
*3. Contact your local sales office for HA-JP series.

Linear Servo Motor

Suitable for linear motion systems requiring high speed and accuracy

◎Supporting maximum speed of 3 m/s (LM-H3 series) and maximum thrust of 150 N to 18000 N. Small size and high thrust are achieved by increasing the winding density and by optimizing core and magnet geometries using electromagnetic field analysis.
◎Diverse product lines include core, liquid-cooling core, magnetic attraction counter-force core, and coreless types.
◎High accuracy tandem synchronous control is achieved by using the SSCNET III/H compatible Motion controller and MR-J4 series servo amplifier.

LM-H3 series

Core type suitable for space-saving.
The magnetic attraction force contributes to high rigidity.

LM-F series

Core type compact linear servo motor. The integrated liquid-cooling system doubles the continuous thrust. The magnetic attraction force contributes to high rigidity.

LM-K2 series

Core type with magnetic attraction counter-force. The magnetic attraction counter-force structure extends life of the linear guides and contributes to lowering audible noise.

LM-U2 series

Coreless type without cogging resulting in small speed fluctuation. The structure with no magnetic attraction force extends life of the linear guides.

Achieving high-performance machine

For higher machine performance

- Improved productivity due to high-speed driving part.
- High-accuracy positioning by fully closed loop control system.

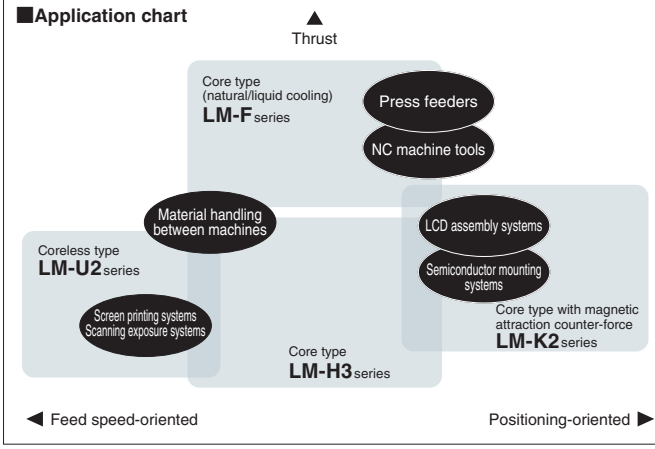
For easier use

- The linear servo motor enables simple and compact machine with high rigidity.
- Smooth operation and clean system are achieved.

For flexible machine configurations

- Multi-head and tandem systems are easily configured.
- The linear servo motor is suitable for long-stroke applications.

■Application chart



Product lines

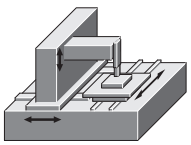
Series	Maximum speed [m/s]	Magnetic attraction force [N]	Continuous thrust [N] / Maximum thrust [N]	Compatible servo amplifier	IP rating
LM-H3	3	630 to 8800	70 N / 960 N; 175 N / 2400 N	MR-J4/J4W	IP00
LM-F	2	4500 to 45000	300 N / 3000 N (Natural cooling); 1800 N / 18000 N (Natural cooling); 600 N / 6000 N (Liquid cooling); 1800 N / 18000 N (Liquid cooling)	MR-J4/MR-J3-B-RJ004	IP00
LM-K2	2	0	120 N / 2400 N; 300 N / 6000 N	MR-J4/J4W/MR-J3-B-RJ004/J3W	IP00
LM-U2	2	0	50 N / 800 N; 150 N / 3200 N	MR-J4/J4W/MR-J3-B-RJ004/J3W	IP00

10 100 1000 10000 100000

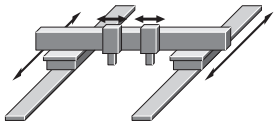
Application examples

Optimum for a direct acting system which requires a high speed and high accuracy. Easily achieve a tandem configuration or multi-head configuration.

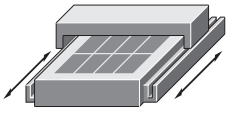
Machine tools XYZ stage



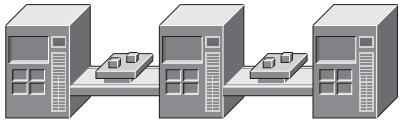
Semiconductor/LCD manufacturing systems
Electrical parts assembling/manufacturing systems



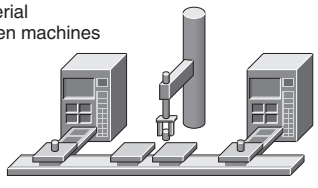
Screen printing systems and large LCD coaters



Material handling systems



Multi-head material handling between machines



Direct Drive Motor

For compact and simplified machine driving part with high-accuracy control

TM-RFM series

Sophisticated performance

◎High torque intensity is achieved with the latest technologies of magnetic designs and windings. The minimal torque ripple enables extremely smooth rotation.
◎Industry leading level of compact size and thinness contributes to compact construction and a low center of gravity for enhanced machine stability.
◎The motor is equipped with a high-resolution 20-bit absolute encoder, enabling higher accuracy systems.
◎The hollow shaft with diameter of 20 mm to 104 mm allows cables and air tubing to pass through.

Achieving high-performance machine

For higher machine performance

- Suitable for low-speed and high-torque operations.
- High-accuracy positioning is achieved because the motor is directly connected to the driving part.

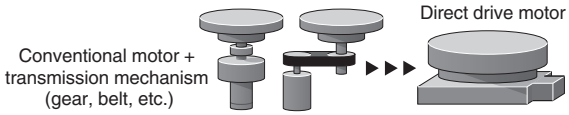
For easier use

- Since transmission mechanism is no longer required, no backlash and no abrasion occurs, enabling smooth operation with less audible noise, clean system, and easy maintenance.
- Less components are required for the system.

For flexible machine configurations

- Simple, compact, and rigid machine is achieved.
- Machine stability is enhanced due to the low-profile design and a low center of gravity.
- The motor has an inner rotor with hollow shaft that allows cables and pipes to pass through.

[No transmission mechanism contributing to no warp or distortion.]



Product lines

Series	Motor outer diameter [mm]	Rated speed [r/min]	Maximum speed [r/min]	Rated torque [N・m]/ Maximum torque [N・m]	Compatible servo amplifier	IP rating*1
TM-RFM	Φ130	200	500	2 N·m / 6 N·m / 6 N·m / 18 N·m	MR-J4/J4W/MR-J3-B-RJ080W/J3W	IP42
	Φ180	200	500	6 N·m / 18 N·m / 18 N·m / 54 N·m	MR-J4/J4W/MR-J3-B-RJ080W/J3W	IP42
	Φ230	200	500	12 N·m / 36 N·m / 72 N·m / 216 N·m	MR-J4/J4W/MR-J3-B-RJ080W/J3W	IP42
	Φ330	100	200	40 N·m / 120 N·m / 240 N·m / 720 N·m	MR-J4/J4W/MR-J3-B-RJ080W/J3W	IP42

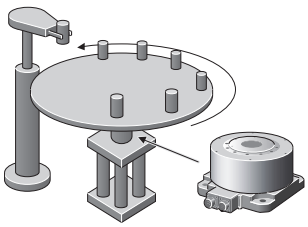
1 N·m　10 N·m　100 N·m　1000 N·m

*1: Connectors and gap between rotor and stator are excluded.

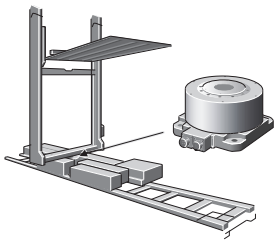
Application examples

Suitable for low speed and high torque applications.

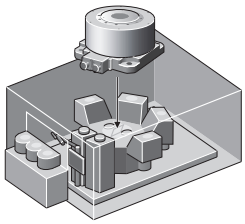
Index table for machine tools



Rotary axis for material handling robots

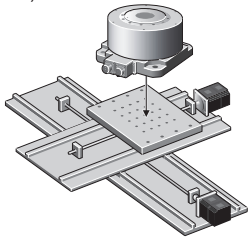


Painting and vapor deposition systems

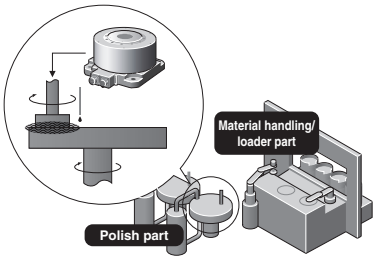


LCD/semiconductor spin-type cleaning systems

LCD/semiconductor testing systems (XYθ tables)



Rotary axis for polishing systems



The blazingly fast speed and response of 150 Mbps full-duplex baud rate SSCNET III/H optical networking

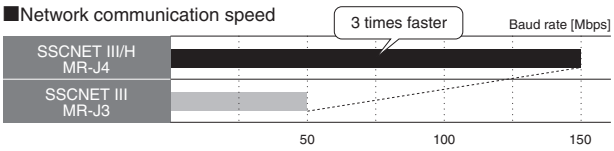
SSCNET III/H is a high-speed servo system controller network employing fiber optic cables, enabling high precision synchronization. The cycle time as fast as 0.22 ms increases responsivity and reduces tact time of machine. The dedicated fiber optic cable reduces the wiring and makes the setting up so simple.

Three times faster communication speed

Industry-leading levels

Communication speed is increased to 150 Mbps full duplex (equivalent to 300 Mbps half duplex), three times faster than the conventional speed. System response is dramatically improved.

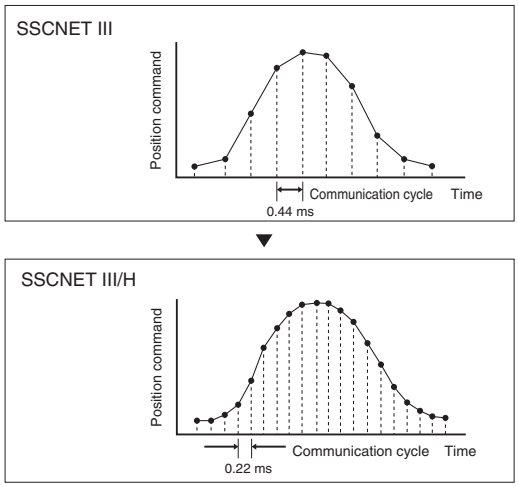
■Network communication speed



Cycle times as fast as 0.22 ms

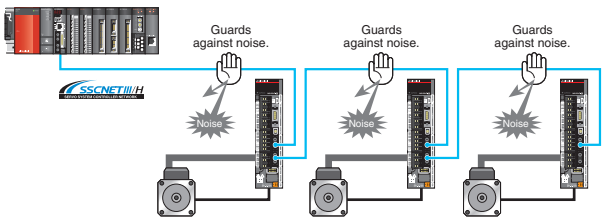
Industry-leading levels

Smooth control of machine is possible using high-speed serial communication with cycle times of 0.22 ms.



No transmission collision

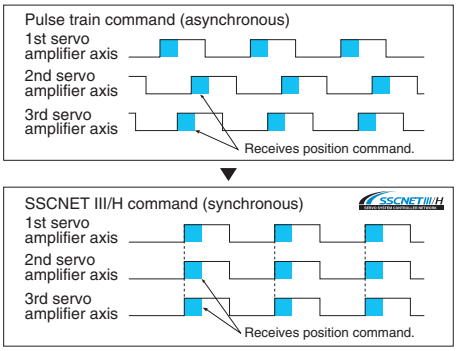
The fiber-optic cables thoroughly shut out noise that enters from the power cable or external devices. Noise tolerance is dramatically improved as compared to metal cables.



Deterministic and synchronized communication

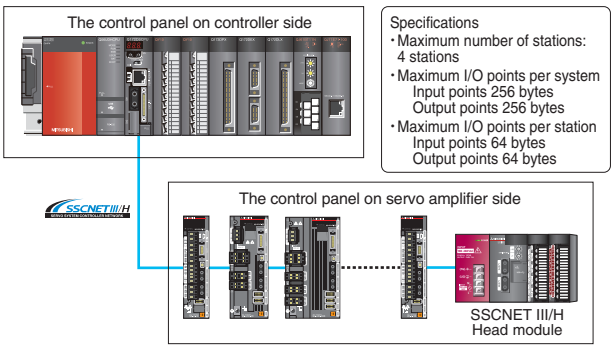
Complete deterministic and synchronized communication is achieved with SSCNET III/H, offering technical advantages in machines such as printing and food processing machines that require synchronous accuracy.

■Timing of servo amplifier processing



Dramatically reduced wiring

Using the SSCNET III/H Head module enables establishing the connection from the controller to various modules, such as I/O, analog, and high-speed counter via the SSCNET III/H network. Therefore, the wires can be significantly reduced by receiving I/O and analog I/O signals directly from the servo amplifier side.

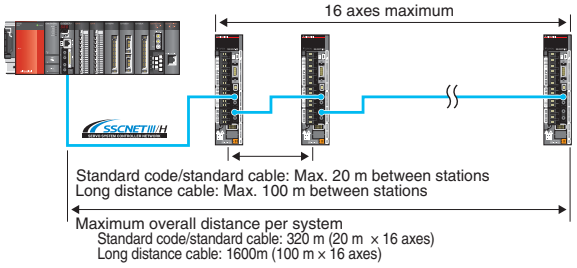


Long distance wiring up to 1600 m

Enhanced performance

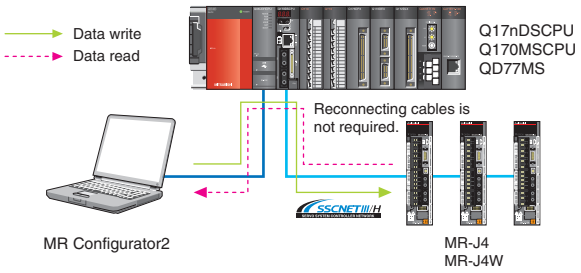
Long distance wiring is possible up to 1600 m per system (maximum of 100 m between stations × 16 axes). Thus, it is suitable for large-scale systems.

* This is when all axes are connected via SSCNET III/H.



Central control with network

Large amounts of servo data are exchanged in real-time between the controller and the servo amplifier.
Using MR Configurator2 on a personal computer that is connected to the Motion controller or the Simple Motion module helps consolidate information such as parameter settings and monitoring for the multiple servo amplifiers.

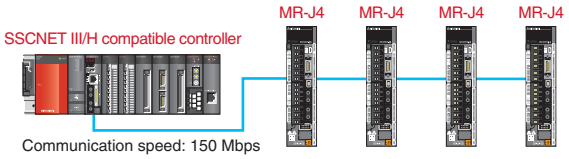


SSCNET III/H compatible and SSCNET III compatible products connected in a same system

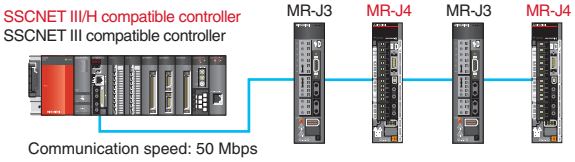
SSCNET III/H and SSCNET III compatible controllers support the use of SSCNET III/H and SSCNET III compatible servo amplifiers together in a same system.

* When the SSCNET III compatible products are in the system, the communication speed is 50 Mbps, and the function and the performance are equivalent to those of MR-J3.

■SSCNET III/H compatible controller + MR-J4-B/MR-J4W2-B/MR-J4W3-B



■SSCNET III compatible controller and MR-J3-B/MR-J3W in a same system*

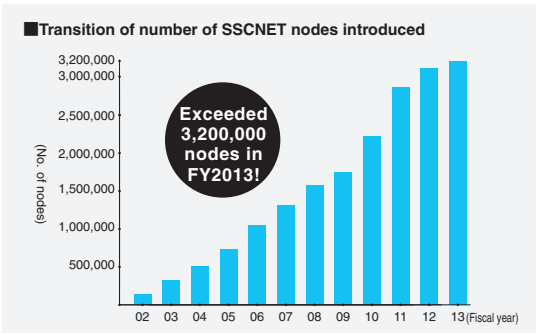


The SSCNET Partner Association (SNP) acting to spread SSCNET throughout the world.

SSCNETIII/H
SERVO SYSTEM CONTROLLER NETWORK

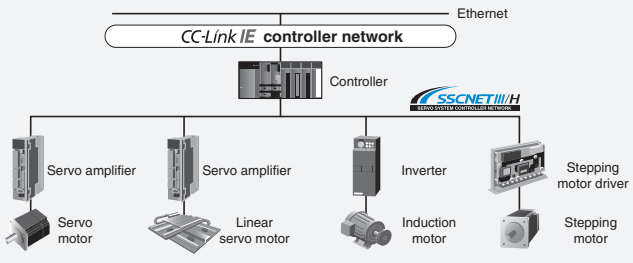
The SSCNET Partner Association (SNP) carries activities to introduce the advanced servo system controller network "SSCNET" and compatible products to many users. In cooperation with partner corporations, SNP widely promotes the performance attainable with SSCNET. In recent years, SNP holds partner meetings in Japan and other countries such as Taiwan and India. SNP and aims to make "SSCNET" a more global servo system controller network.

■Transition of number of SSCNET nodes introduced



(As of September 2013)

"SSCNET" increases the freedom of system configurations with the Mitsubishi servo as well as the variety of SSCNET compatible partner products including stepping motors and direct drive motors.



Main membership benefits

●Access to the latest trends and information on motion network SSCNET and Mitsubishi Electric FA businesses ●Participation in partner meetings in Japan and overseas ●Expanding business opportunities ●Introduction of member products and SSCNET compatible products to various tools and media

Members of The SSCNET Partner Association (in alphabetical order)

Asahi Engineering Co., Ltd.	GMC Hillstone Co., Ltd.	Hamamatsu Photonics K.K.	HOKUYO AUTOMATIC CO., LTD.	Mistubishi Electric Corporation	Nikki Denso Co., Ltd.
NIPPON THOMPSON CO., LTD.	ORIENTAL MOTOR Co., Ltd.	SANYO DENKI CO., LTD.	ShinMaywa Industries, Ltd.	THK CO.,LTD.	238 corporations in Japan and other countries

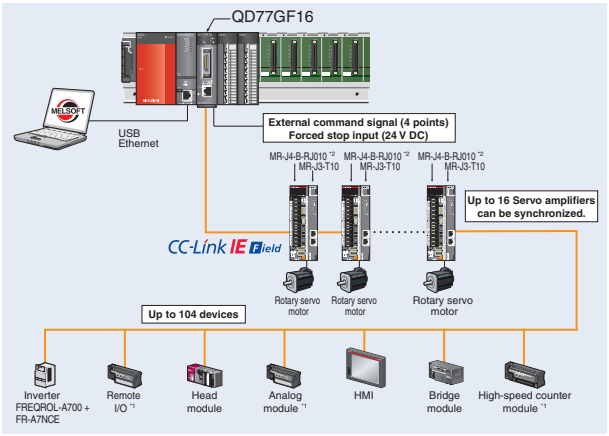
* SNP membership requires no joining fees or annual dues.

CC-Link IE Field Network —
All-rounder network opens up new areas of control

This Ethernet-based open network is designed to simultaneously handle distributed control, I/O control, safety control, and Motion control.

All-rounder network

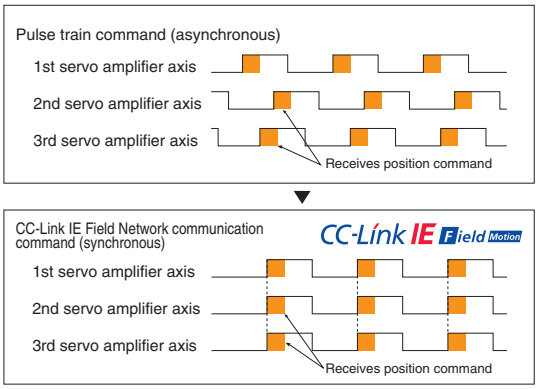
CC-Link IE Filed Network is an Ethernet-based open network. Its highly flexible wiring to match your device layout can perform high-speed controller distributed control, I/O control and safety control. Because the CC-Link IE Field Network is based on the Ethernet, cables and connectors are highly available in the world.



*1. Setting and diagnosis functions using GX Works2 are not supported.
*2. As MR-J4-B-RJ010 servo amplifier is designed exclusively for Motion control, use QD77GF Simple Motion module for a controller. (As of September 2013)

Motion control achieved

CC-Link IE Field Network is now equipped with a motion function. High-speed positioning control, synchronous control and cam control can be performed easily at a control cycle of 0.88 ms, 1.77 ms, or 3.55 ms just with simple parameter settings and startup from the sequence control. This network is suitable for food processing machines and machine tools which require synchronous control.

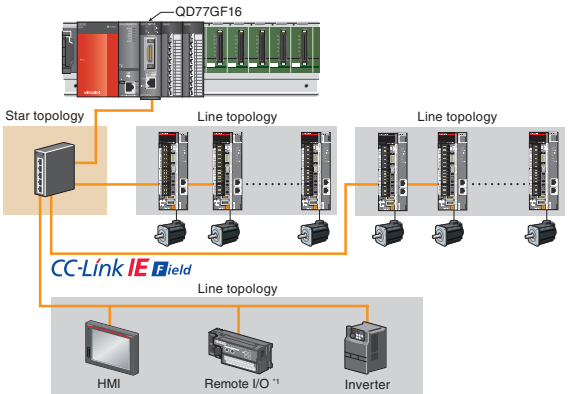


Flexible network topology

Line, star, and line/star mixed topologies are available for the CC-Link IE Field Network wiring layout.

Line/star mixed topology

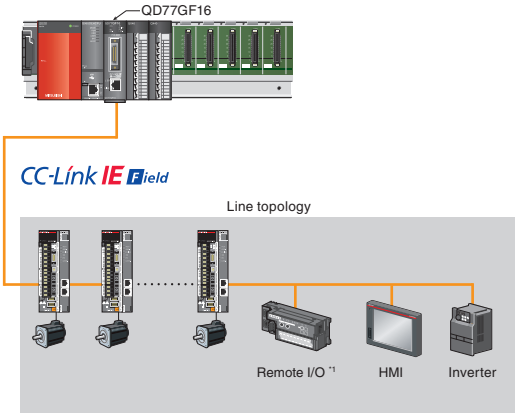
Star topology is available using a industrial switching HUB. HUB applied: DT135TX (manufactured by Mitsubishi Electric System & Service Co., Ltd.)



*1. Setting and diagnosis functions using GX Works2 are not supported.

Line topology

The Simple Motion modules (Master station) can be connected to slave devices without using a HUB, which reduces cost.

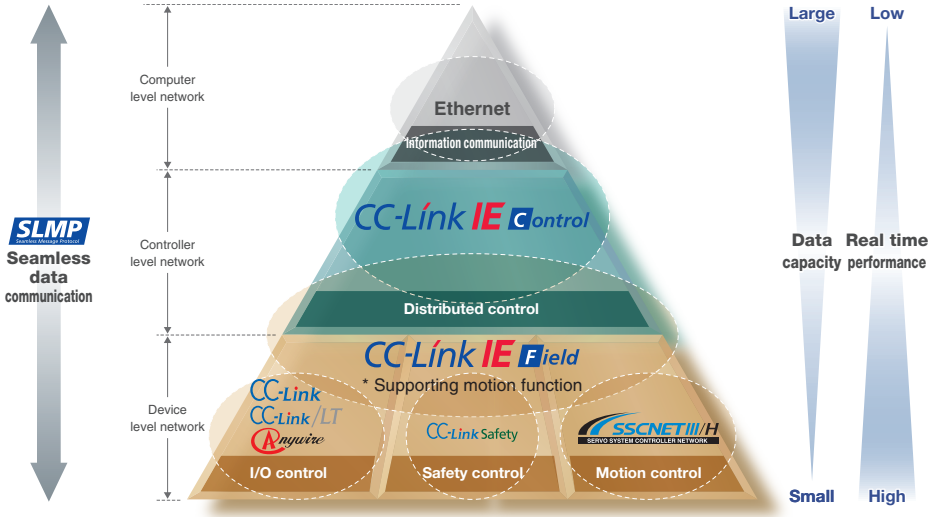


*1. Setting and diagnosis functions using GX Works2 are not supported.

FA integrated network for optimal FA environment

Seamless communication between upper-level information systems and lower-level field systems!
Choose the optimal network meet your needs.

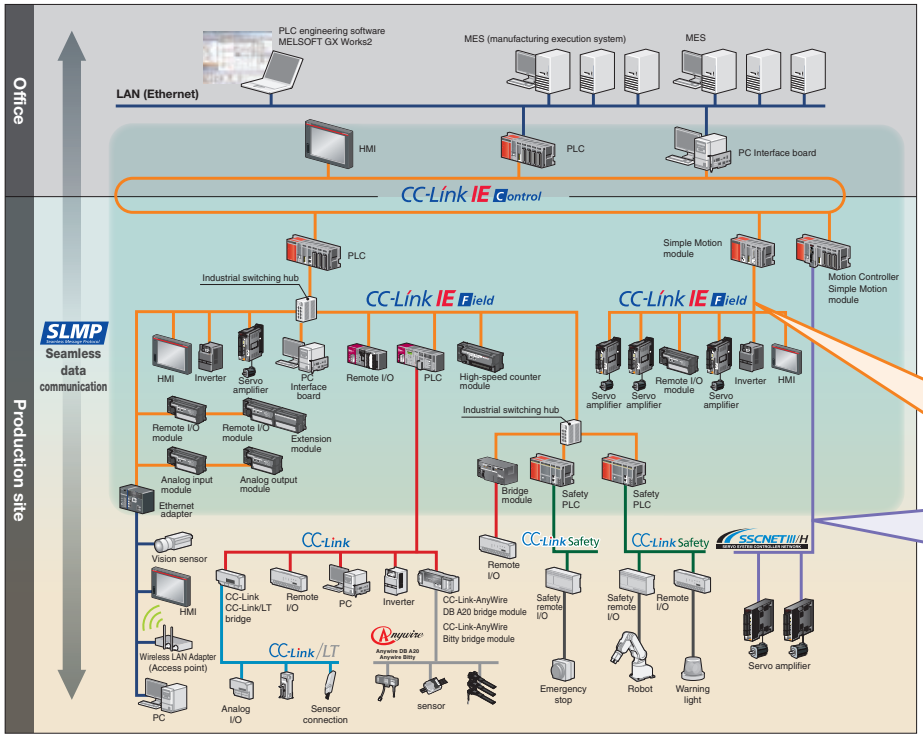
Seamless data communication with FA integrated network



One seamless solution that matches different demands with the appropriate network type.
Data and information can easily be shared among the different networks without the need for any special converters or overly complicated configuration process.

FA integrated network system architecture

Connections and accesses to various devices are possible through CC-link IE Control, the controller network; CC-Link IE Field, the field network; and SSCNET III/H, the motion network; and Anywire, the sensor network.
The network wiring layout is highly flexible to best fit the needs of the application.

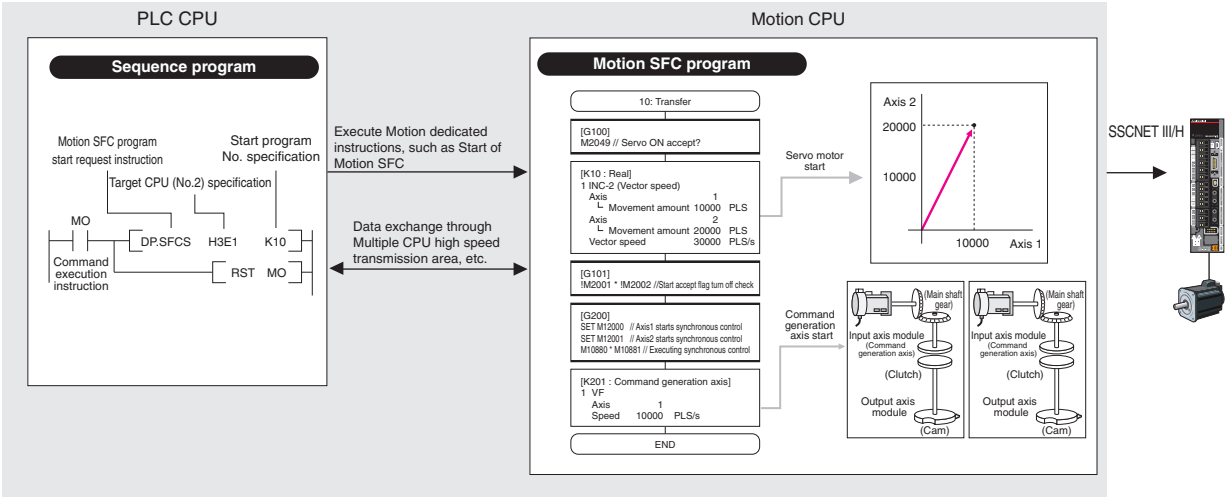


Features of Motion controller, Simple Motion module, and Positioning module

Features of Motion controller

The Motion controller is a CPU module used with PLC CPU for Motion control.

- Using Motion SFC program, the Motion CPU separately operates the controls from the PLC CPU.
- CPU loads are distributed by sharing tasks between Motion CPU and PLC CPU for advanced Motion control.
- Advanced Motion control is achieved, such as position follow-up and tandem operation.
- High-speed input and output are possible with direct management of various modules, such as I/O, analog, and high-speed counter.



Advanced Motion control

SSCNET III/H compatible
MELSEC-Q series

Q173DSCPU
Q172DSCPU

- For a large or medium scale system
- Maximum number of controlled axes:
  32 axes (Q173DSCPU), 16 axes (Q172DSCPU)
- A PLC CPU or a C Controller is selectable according to your application
- Up to 96 axes can be controlled by use of three modules of the Q173DSCPU
- Supports the safety observation function and the vision system

SSCNET III/H compatible
MELSEC-Q series

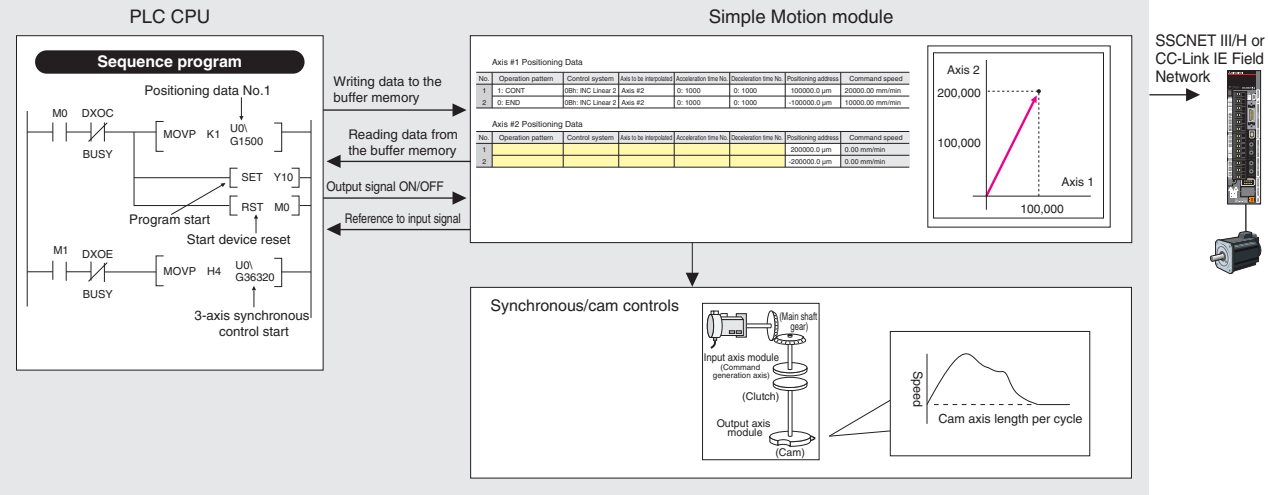
Q170MSCPU
Q170MSCPU-S1

- Highly cost-effective product for a small scale system
- Integrates a power supply, a PLC, and a Motion controller
- Controls up to 16 axes
- The program capacity: 60k steps (Q170MSCPU-S1),
  30k steps (Q170MSCPU)
- Supports the vision system

Features of Simple Motion module

The Simple Motion module is an intelligent function module which performs positioning control by following the instructions of PLC CPU. Synchronous control, which is unavailable with the Positioning module, is now available with the Simple Motion modules, while being simple to use just like Positioning modules.

- The positioning functions are used exactly in the same manner as those of the Positioning module.
- Linear interpolation control and other controls can be achieved easily just by writing positioning data to the buffer memory with sequence programs.
- Various advanced controls can be performed with only sequence programs.
- Positioning/synchronous/cam controls are easily performed with simple parameter setting and a start from a sequence program.
- Supports only GX Works2 as engineering software.



Advanced control but simple to use just like Positioning modules

SSCNET III/H compatible
MELSEC-Q series

QD77MS16
QD77MS4
QD77MS2

- Maximum number of controlled axes:
  16 axes (QD77MS16), 4 axes (QD77MS4), and 2 axes (QD77MS2)
- Equipped with all the functions of the QD75MH Positioning module

NEW

SSCNET III/H compatible
MELSEC-L series

LD77MS16
LD77MS4
LD77MS2

- For customers who need more compact and lower cost products
- Maximum number of controlled axes:
  16 axes (LD77MS16), 4 axes (LD77MS4), and 2 axes (LD77MS2)
- Equipped with all the functions of the QD75MH Positioning module

CC-Link IE Field Network compatible
MELSEC-Q series

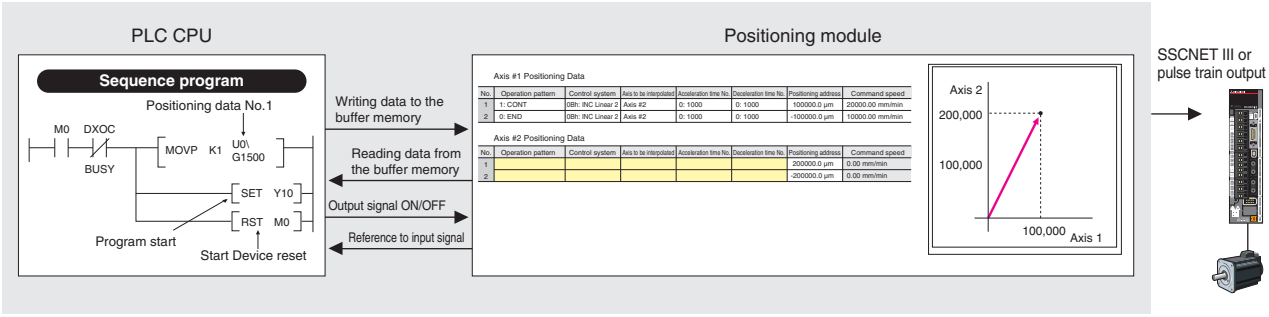
QD77GF16

- For customers who prefer to use open network
- Controls up to 16 axes
- Equipped with all the functions of the QD75MH Positioning module

Features of Positioning module

The Positioning module is an intelligent function module which performs positioning control easily by following the instructions of PLC CPU.

- Linear interpolation and other controls can be achieved easily just by writing positioning data to the buffer memory with a sequence program.
- Supports only GX Works2 as engineering software.
- Various advanced controls can be performed with only sequence programs.
- Based on your application, select the modules depending on the command interface: SSCNET III or pulse train output type.



High-speed and high-accuracy positioning

SSCNET III compatible
MELSEC-Q series

QD75MH4
QD75MH2
QD75MH1

- For customers who need continuous use of existing machines
- Maximum number of controlled axes:
  4 axes (QD75MH4), 2 axes (QD75MH2), and 1 axis (QD75MH1)
- Equipped with various positioning functions, such as circular interpolation and the target position change function

Pulse train compatible
MELSEC-Q series

QD75P4N, QD75D4N
QD75P2N, QD75D2N
QD75P1N, QD75D1N

- Maximum number of controlled axes:
  4 axes (QD75P4N), 2 axes (QD75P2N), 1 axis (QD75P1N),
  4 axes (QD75D4N), 2 axes (QD75D2N), and 1 axis (QD75D1N)
- Open-collector type or differential line driver type is selectable for pulse train output according to your application
- Equipped with various positioning functions, such as circular interpolation and the target position change function

Pulse train compatible
MELSEC-L series

LD75P4, LD75D4
LD75P2, LD75D2
LD75P1, LD75D1

- For customers who need continuous use of existing machines
- Maximum number of controlled axes:
  4 axes (LD75P4), 2 axes (LD75P2), 1 axis (LD75P1),
  4 axes (LD75D4), 2 axes (LD75D2), and 1 axis (LD75D1)
- Open-collector type or differential line driver type is selectable for pulse train output
- Equipped with various positioning functions, such as circular interpolation and the target position change function

Pulse train compatible
MELSEC-Q series

QD70P8, QD70D8
QD70P4, QD70D4

- Maximum number of controlled axes:
  8 axes (QD70P8), 4 axes (QD70P4), 8 axes (QD70D8),
  and 4 axes (QD70D4)
- Open-collector type or differential line driver type is selectable for pulse train output
- Connectable to a stepping motor
- For high-speed startup machine, not requiring complex functions

Pulse train compatible
MELSEC-L series

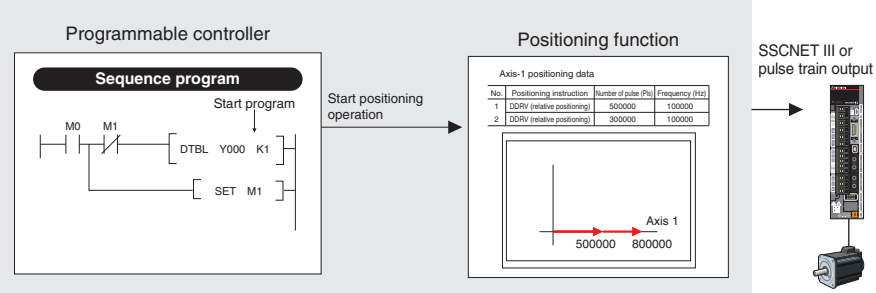
L02SCPU, L02CPU
L02CPU-P, L06CPU
L26CPU, L26CPU-BT
L26CPU-PBT

- For customers who need positioning functions with lower system cost
- Controls up to 2 axes
- Supports S-curve acceleration/deceleration
- Equipped with various functions as standard, such as positioning, high-speed counter, pulse catch, interrupt input, and general input/output functions

Features of MELSEC-F series positioning operation

MELSEC-F series product lines cover various modules for achieving positioning control such as programmable controller equipped with positioning instructions as standard; low-cost pulse output modules which perform positioning operation; and positioning dedicated modules which can perform more complex controls, such as multi-axis/interpolation controls.

●Based on your application, select the modules depending on the command interface: SSCNET III or pulse train output type.



Highly cost-effective products

Pulse train compatible MELSEC-F series

FX_{2N}-10GM
FX_{2N}-20GM

- For customers who use limited level of Motion control
- Maximum number of controlled axes: 2 axes (FX_{2N}-20GM), 1 axis (FX_{2N}-10GM)
- Equipped with various positioning operation modes

SSCNET III compatible MELSEC-F series

FX_{3U}-20SSC-H

- For customers who use only specific module
- Controls up to 2 axes
- High-speed and high-accuracy positioning

Pulse train compatible MELSEC-F series

$FX_{3U(C)}$ series

- For customers who use limited level of Motion control
- Controls up to 3 axes
- Programmable controller equipped with the built-in positioning function

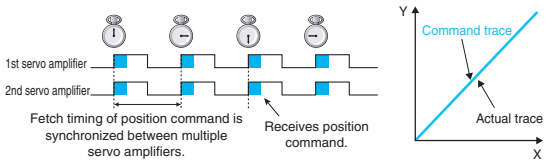
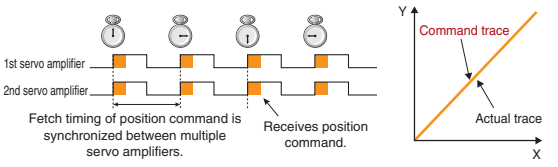
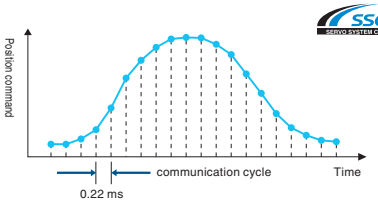
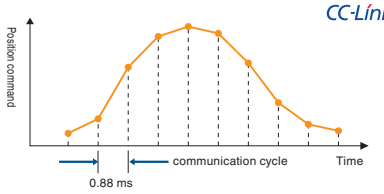
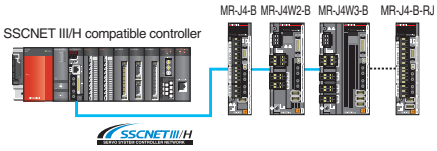
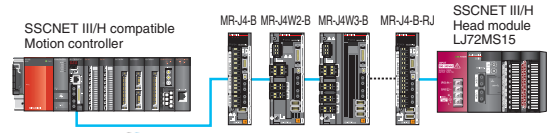
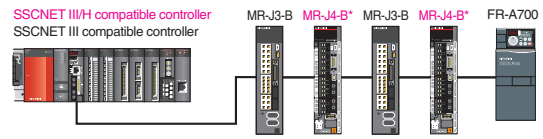
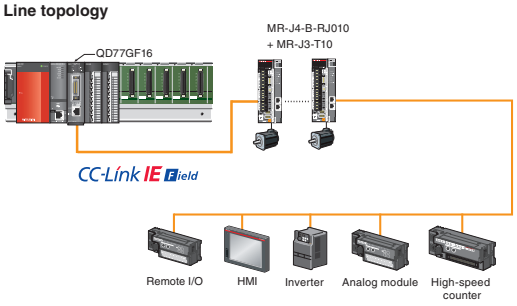
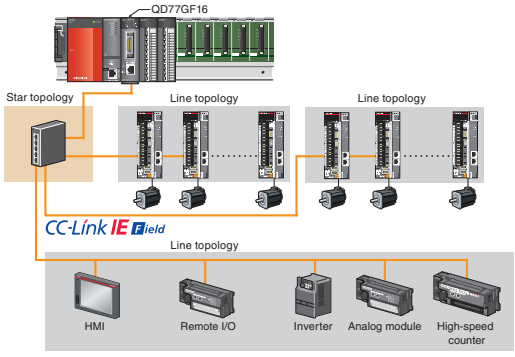
Function comparison of Motion controller and Simple Motion module

■ Featured functions

	Motion controller		Simple Motion module		
	Q173DSCPU Q172DSCPU	Q170MSCPU Q170MSCPU-S1	QD77MS16 QD77MS4 QD77MS2	LD77MS16 LD77MS4 LD77MS2	QD77GF16
Control mode	Position control Torque control Synchronous control Advanced synchronous control	Speed control Tightening & press-fit control Cam control	Position control Torque control (Note-2) Synchronous control	Speed control (Note-1) Tightening & press-fit control (Note-2) Cam control	
Positioning control	Linear interpolation Trajectory control Position follow-up control High-speed oscillation control	Circular interpolation Helical interpolation Speed control with fixed position stop Speed/position switching control	Linear interpolation Trajectory control Position/speed switching control	Circular interpolation Speed/position switching control (ABS) Speed/position switching control (INC)	
Acceleration/ deceleration control	Trapezoidal acceleration/deceleration Advanced S-curve acceleration/deceleration	S-curve acceleration/deceleration	Trapezoidal acceleration/deceleration	S-curve acceleration/deceleration	
Manual control	JOG operation JOG operation simultaneous start	Manual pulse generator operation	JOG operation	Manual pulse generator operation Inching operation	
Function to change the control details	Current value change Torque limit value change Acceleration/deceleration time change	Target position change Speed change	Current value change Torque limit value change Acceleration/deceleration time change	Target position change Speed change Override	
Home position return type	Proximity dog type 1 Scale home position signal detection type Count type 2 Data set type 1 Dog cradle type Stopper type 2 Dogless origin signal reference method	Proximity dog type 2 Count type 1 Count type 3 Data set type 2 Stopper type 1 Limit switch combined type	Proximity dog type Scale home position signal detection type Count type 2 Data set type	Count type 1	
Sub function	Forced stop Software stroke limit Amplifier-less operation Optional data monitor ROM operation Error history Safety observation (Note-3) Software security key Limit switch output	Hardware stroke limit Absolute position system Unlimited length feed Mark detection M-code output Digital oscilloscope Vision system High-speed reading Cam auto-generation	Forced stop Software stroke limit Amplifier-less operation Optional data monitor (Note-2) Flash ROM backup Error collection	Hardware stroke limit Absolute position system Unlimited length feed Mark detection M-code output Digital oscilloscope Cam auto-generation	

(Note-1): The QD77GF can perform only speed control with position loop.
(Note-2): Available only with the QD77MS and LD77MS.
(Note-3): The safety observation function is available with the Q173DSCPU/Q172DSCPU.

Comparison of command interface

	SSCNET III/H	CC-Link IE Field Network
Communication cable	Optical fiber cable (SSCNET III cable)	Metal cable (Ethernet cable)
Communication speed	300 Mbps (half duplex), 150 Mbps (full duplex)	1 Gbps
Max. number of control axis per system	16 axes	16 axes
Transmission distance	Maximum distance between stations: 100 m, Maximum overall distance: 1600 m (100 m × 16 axes)	Maximum distance between stations: 100 m, Maximum overall distance: 12000 m (One master station , 120 slave stations)
Noise tolerance	Very high	High
Synchronous communication	**Command by SSCNET III/H (synchronous)** 	**Command by CC-Link IE Field Network (synchronous)** 
Command communication cycle		
Network topology example	**SSCNET III/H compatible products connected in a same system**  **SSCNET III/H compatible products and the Head module connected in a same system**  Specifications • Maximum number of stations: 4 stations • Maximum I/O points per system Input points 256 bytes Output points 256 bytes • Maximum I/O points per station Input points 64 bytes Output points 64 bytes Connectable to various modules such as I/O, analog, and high-speed counter. **SSCNET III/H compatible and SSCNET III compatible products connected in a same system**  * When the SSCNET III compatible products are in the system, the function and the performance are equivalent to those of MR-J3.	**Line topology**  **Line/star mixed topology** 

Product lines

Programmable controller	Model		MELSOFT	Command interface	MELSERVO-J4		MELSERVO-JE	
					Servo amplifier	Servo motor	Servo amplifier	Servo motor
MELSEC Q series	Motion controller	Q17nDSCPU (iQ Platform)	MT Works2	SSCNET III/H	MR-J4(W)-B		—	—
		Q170MSCPU	GX Works2 MT Works2	SSCNET III/H	MR-J4(W)-B		—	—
		MR-MQ100	MT Works2	SSCNET III	MR-J4(W)-B		—	—
	Simple Motion module	QD77MS	GX Works2	SSCNET III/H	MR-J4(W)-B		—	—
		QD77GF		CC-Link IE Field	MR-J4-B-RJ010 MR-J3-T10		—	—
	Positioning module	QD75MH	GX Works2	SSCNET III	MR-J4(W)-B		—	—
		QD75PN	GX Works2	Open collector	MR-J4-A		MR-JE-A	
		QD75DN	GX Works2	Differential line driver	MR-J4-A		MR-JE-A	
		QD70P	GX Works2	Open collector	MR-J4-A		MR-JE-A	
		QD70D	GX Works2	Differential line driver	MR-J4-A		MR-JE-A	
MELSEC L series	CPU module	LCPU	GX Works2	Open collector	MR-J4-A		MR-JE-A	
	Simple Motion module	LD77MS	GX Works2	SSCNET III/H	MR-J4(W)-B		—	—
	Positioning module	LD75P	GX Works2	Open collector	MR-J4-A		MR-JE-A	
		LD75D	GX Works2	Differential line driver	MR-J4-A		MR-JE-A	
MELSEC F series	CPU module	$FX_{3U(C)}$	GX Works2	Open collector	MR-J4-A		MR-JE-A	
	Positioning module	FX_{3U}-20SSC-H	GX Works2 FX Configurator-FP	SSCNET III	MR-J4(W)-B		—	—
		FX_{3U}-1PG	GX Works2	Open collector	MR-J4-A		MR-JE-A	
		FX_{2N}-10PG	GX Works2	Differential line driver				
		FX_{2N}-10GM	GX Works2 FX-PCS-VPS/WIN	Open collector				
		FX_{2N}-20GM	GX Works2 FX-PCS-VPS/WIN	Open collector				

Open collector : Pulse train output of open-collector type
Differential line driver : Pulse train output of differential line driver type
MR-J4(W)-B : MR-J4-B, MR-J4W2-B, MR-J4W3-B, MR-J4-B-RJ

Positioning function

Programmable controller	Model		Number of controlled axes	Operation cycle	Positioning program	Control mode					Interpolation control		Absolute posi.	Unlimited length feed	Electronic gear
						Posi.	Speed	Torq.	Sync.	Cam	Linear	Circular			
MELSEC Q series	Motion controller	Q17nDSCPU (iQ Platform)	1 to 32	0.22 ms to	Motion SFC, Mechanical support language, Synchronous control parameter	○	○	○	○	○	○ (Up to 4 axes)	○	○	○	○
		Q170MSCPU	1 to 16	0.22 ms to	Motion SFC, Mechanical support language, Synchronous control parameter	○	○	○	○	○	○ (Up to 4 axes)	○	○	○	○
		MR-MQ100	1	0.44 ms to	Motion SFC, Mechanical support language	○	○	—	○	○	○ (Up to 1 axis)	—	○	○	○
	Simple Motion module	QD77MS	1 to 16	0.88 ms to	Motion profile table, Synchronous control parameter	○	○	○	○	○	○ (Up to 4 axes)	○	○	○	○
		QD77GF	1 to 16	0.88 ms to	Motion profile table, Synchronous control parameter	○	—	—	○	○	○ (Up to 4 axes)	○	○	○	○
	Positioning module	QD75MH	1 to 4	1.77 ms	Motion profile table	○	○	—	—	—	○ (Up to 4 axes)	○	○	○	○
		QD75PN	1 to 4	0.88 ms	Motion profile table	○	○	—	—	—	○ (Up to 4 axes)	○	○*	—	○
		QD75DN	1 to 4	0.88 ms	Motion profile table	○	○	—	—	—	○ (Up to 4 axes)	○	○*	—	○
		QD70P	1 to 8	1 ms to	Motion profile table	○	○	—	—	—	—	—	—	—	—
		QD70D	1 to 8	1 ms to	Motion profile table	○	○	—	—	—	—	—	—	—	—
MELSEC L series	CPU module	LCPU	1 to 2	1 ms to	Motion profile table	○	○	—	—	—	—	—	○*	—	—
	Simple Motion module	LD77MS	1 to 16	0.88 ms	Motion profile table, Synchronous control parameter	○	○	○	○	○	○ (Up to 4 axes)	○	○	○	○
	Positioning module	LD75P	1 to 4	0.88 ms	Motion profile table	○	○	—	—	—	○ (Up to 4 axes)	○	○*	—	○
		LD75D	1 to 4	0.88 ms	Motion profile table	○	○	—	—	—	○ (Up to 4 axes)	○	○*	—	○
MELSEC F series	CPU module	$FX_{3U(C)}$	1 to 3	1 ms to	Sequence program	○	—	—	—	—	—	—	○*	—	—
	Positioning module	FX_{3U}-20SSC-H	1 to 2	1.77 ms to	Motion profile table, Sequence program	○	○	—	—	—	○ (Up to 2 axes)	○	○	○	—
		FX_{3U}-1PG	1	1 ms to	Sequence program	○	○	—	—	—	—	—	○*	—	—
		FX_{2N}-10PG	1	1 ms to	Motion profile table, Sequence program	○	○	—	—	—	—	—	○*	—	—
		FX_{2N}-10GM	1	10 ms to	Motion profile table, Positioning dedicated language	○	—	—	—	—	—	—	○	—	—
		FX_{2N}-20GM	1 to 2	20 ms to	Positioning dedicated language	○	—	—	—	—	○ (Up to 2 axes)	○	○	—	—

* The absolute position of the controller is restored by reading the absolute position data of the servo amplifiers with the controller programs, such as sequence programs, when the controller power is ON.

Fully supporting all your needs from model selection, system design, startup to maintenance with diverse software

MELSOFT is FA integrated engineering software that demonstrate their abilities in various FA scenes including designing, debugging and startup, and operation and maintenance to facilitate all aspects from specification review to daily data collection.
MELSOFT offers an extensive software collection to efficiently support quick operation and maintenance of an optimal servo system.

Comprehensibly supporting Motion controller design and maintenance

Motion Controller Engineering Software MELSOFT MT Works2

Motion SFC programming, parameter setting, digital oscilloscope function, and simulation function are available. This software supports all necessary steps including system configuration, programming, debugging, and maintenance of Motion controllers.

Supporting settings of Simple Motion modules as well as sequence program creation

Programmable Controller Engineering Software MELSOFT GX Works2

This software supports sequence program creation and the necessary setup steps for use of Simple Motion modules, such as the creation, startup, debugging, and maintenance of parameters, positioning data, and cam data.

Startup support tool for a suitable machine system, optimum control and short setup time

Servo Setup Software MELSOFT MR Configurator2

Tuning, monitor display, diagnosis, reading/writing parameters, and test operations are easily performed on a personal computer. This startup support tool achieves a stable machine system, optimum control, and short setup time.

Motion Controller Engineering Software **MELSOFT MT Works2**
Programmable Controller Engineering Software **MELSOFT GX Works2**

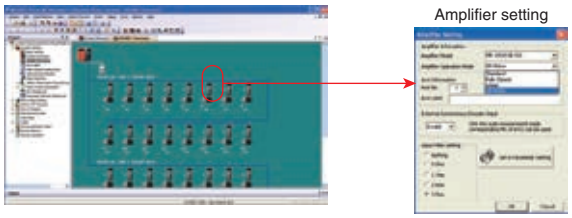
iQ Platform MELSOFT

System design

SSCNET settings

MT Works2 GX Works2

Servo amplifiers and modules can be set easily with a graphical system setting screen.



System configuration

MT Works2

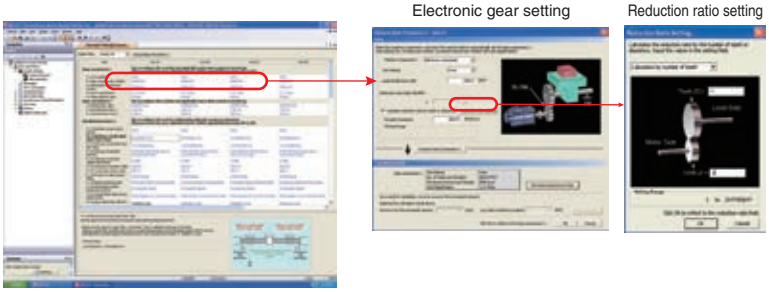
Motion modules can be set easily with a graphical screen.

Servo data setting

MT Works2 GX Works2

One-point help allows parameters to be set without a manual.

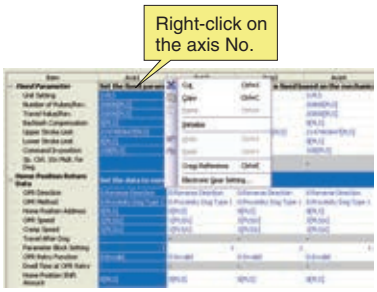
The electronic gear can be set easily just by inputting the machine specifications (reduction ratio, ball screw pitch, etc.).



Copying servo data

MT Works2 GX Works2

Copy & paste the data between axes easily.

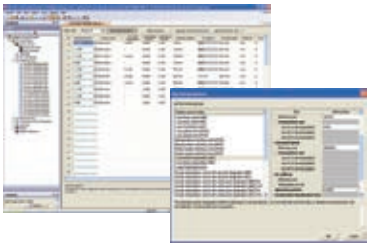


Programming

Positioning data setting

GX Works2

Functions such as Data setting assistant, Automatic calculation of auxiliary arc simplify the setting input process of positioning data.



Command speed automatic calculation

GX Works2

The speed is automatically calculated by specifying the movement distance, operation time, and acceleration/deceleration time.

Programming

MT Works2

User-friendly functions facilitate Motion controller program development.

Synchronous control parameter

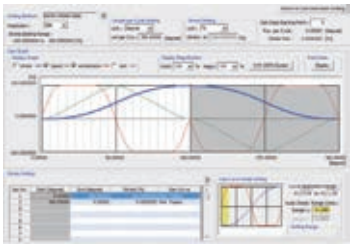
MT Works2 GX Works2

Using software to replace machine mechanisms, such as the gear, shaft, speed change gear and cam achieves synchronous control, just by setting parameters.

Cam data creation

MT Works2 GX Works2

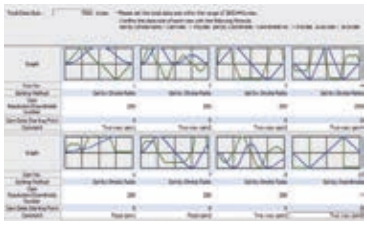
Cam control has become more flexible than the conventional. Various cam patterns are created.



Cam data list

MT Works2 GX Works2

The created cam data are easily viewed as thumbnails.

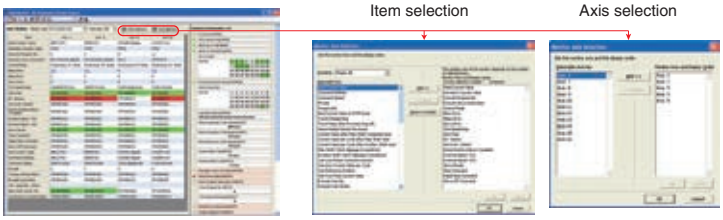


Startup and adjustment

Monitor

MT Works2 GX Works2

The items and axes to be displayed can be selected from various monitored information.



Simulator

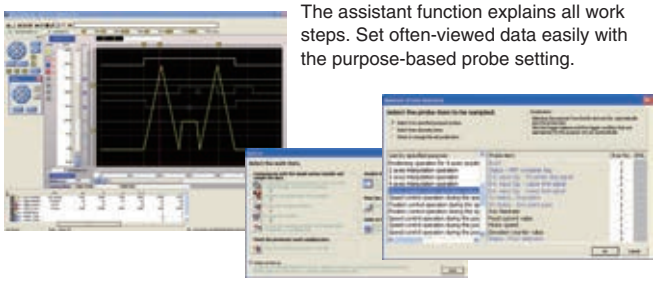
MT Works2

Program debugging can be executed without using Motion controller, which improves designing efficiency.

Digital oscilloscope

MT Works2 GX Works2

Operation check and troubleshooting are powerfully supported with data collection and wave displays which are synchronized to the Motion operation cycle.



The assistant function explains all work steps. Set often-viewed data easily with the purpose-based probe setting.

Test

MT Works2 GX Works2

Basic operations can be checked without a sequence program.

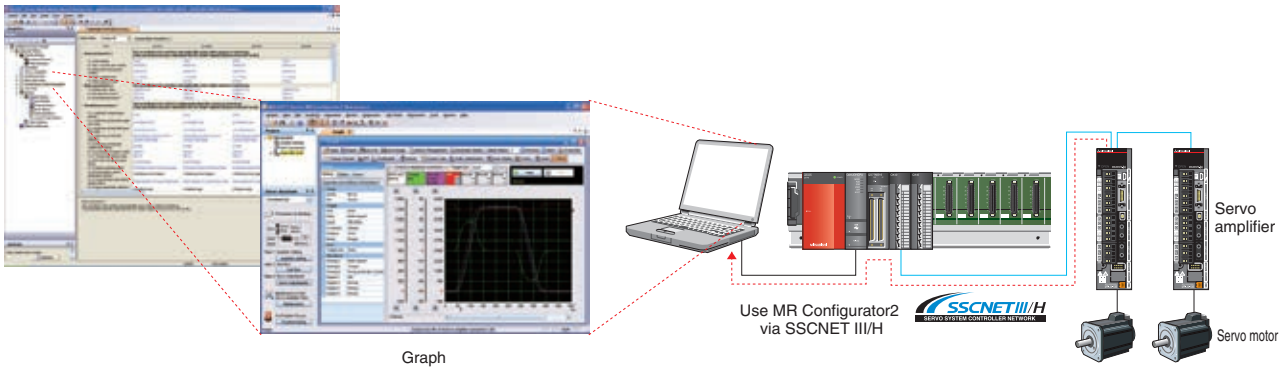
Easy setup

Servo setup software **MELSOFT MR Configurator2**

MR Configurator2

Tuning, monitor display, diagnosis, reading/writing parameters, and test operations are easily performed on a personal computer. This startup support tool achieves a stable machine system, optimum control, and short setup time.

* MELSOFT MR Configurator2 is included in MELSOFT MT Works2.



Setting and startup

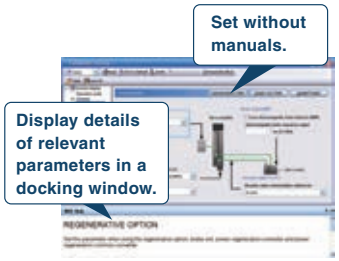
MR Configurator2

Servo assistant function

Complete setting up the servo amplifier just by following guidance displays.

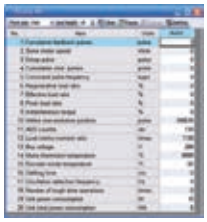
Parameter setting function

Display parameter setting in list or visual formats, and set parameters by selecting from the drop down list.



Monitor function

Monitor operation status on the "Display all" window. Measurement equipment such as electric power meter is not required since power consumption is monitored.

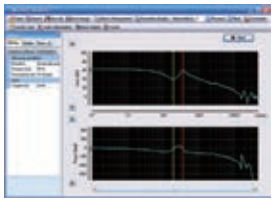


Servo adjustment

MR Configurator2

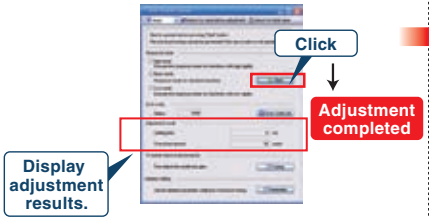
Machine analyzer

Input random torque to the servo motor automatically and analyze frequency characteristics (0.1 Hz to 4.5 kHz) of a machine system just by clicking the [Start] button. This function supports setting of machine resonance suppression filter, etc.



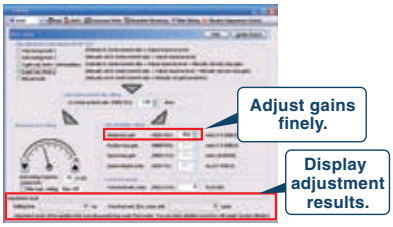
One-touch adjustment

Adjustments including estimating load to motor inertia ratio, adjusting gain, and suppressing machine resonance are automatically performed for the maximum servo performance just by clicking the start button.



Tuning function

Adjust model control gain finely on [Tuning] window manually for further performance after the one-touch tuning.

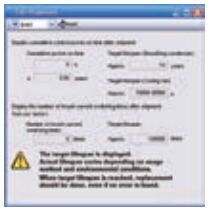


Maintenance

MR Configurator2

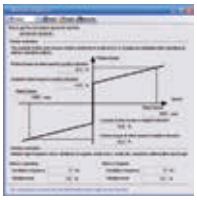
Servo amplifier life diagnosis function

Check cumulative operation time and on/off times of inrush relay.



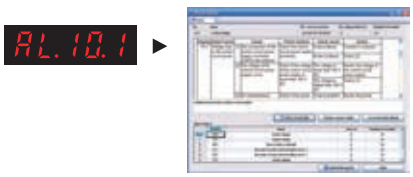
Machine diagnosis function

This function estimates and displays machine friction and vibration in normal operation without any special measurement.



Alarm screen

In MR-J4 series, servo alarms are displayed in 3 digits. Troubleshooting at alarm occurrence is easy.



Select the most suitable motor for your machine

Capacity selection software **MRZJW3-MOTSZ111E**

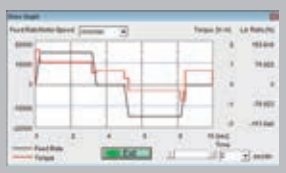
The most suitable servo amplifier, servo motor, and regenerative option can be selected just by setting machine specifications and operation pattern. Select the operation pattern from either position control mode or speed control mode. The capacity selection software is available for free download. Contact your local sales office for more details.

■ Horizontal ball screws, vertical ball screws, rack and pinions, roll feeds, rotating tables, carts, elevators, conveyors, linear servo, other devices
■ Prints entered specifications, operating pattern, calculation process, graph of selection process feed speed and torque, and sizing results.

Amplifier series selection

Motor series selection

Operation pattern



Calculation result

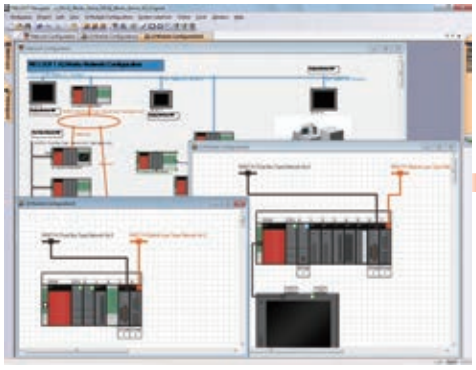
Implements a seamless engineering environment

MELSOFT iQ Works

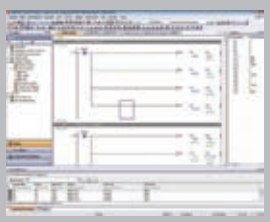
MELSOFT iQ Works is an integrated engineering software product, composing of GX Works2, MT Works2, GT Works3, and RT ToolBox2. By sharing information such as system designs and programming as the entire control system, the system design and programming efficiency are improved and total cost reduction is achieved.

MELSOFT Navigator

In combination with GX Works2, MT Works2, GT Works3, and RT ToolBox2, this software performs upstream system design and inter-software operation.
It provides such convenient functions as system configuration design, batch setting of parameters, system labeling, and batch reading.



MELSOFT Navigator



Programmable Controller Engineering Software MELSOFT GX Works2

Motion Controller Engineering Software MELSOFT MT Works2

Screen Design Software MELSOFT GT Works3

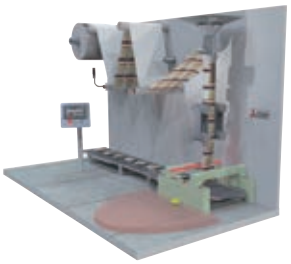
Robot Total Engineering Support Software MELSOFT RT ToolBox2

Our Total Solution for Your Satisfaction

Together with the maximized performance of the servo amplifiers and the servo motors with a combination of the servo system controllers, Mitsubishi Electric provides total system solutions for all your production needs.

Introducing the MELSERVO solutions for problems in production sites.
We offer the optimal solutions for various problems in various production sites.

Vertical Form, Fill & Seal For food/beverage bag filling and packing

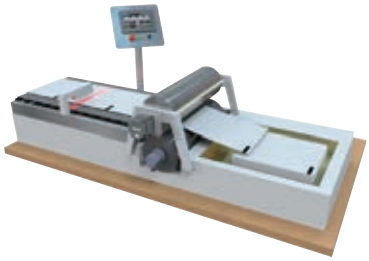


Solution 01 — Stabilizing the packing quality
→ Synchronous Control

Solution 02 — Shorter tact time without increasing shock to a machine
→ Cam Control

Solution 03 — Creating a safety system
→ Safety Observation Function

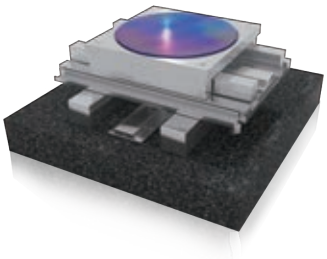
Rotary Knife For steel & paper cutting, stamping and labeling



Solution 01 — Cam creation on HMI screen
→ Cam Auto-generation Function

Solution 02 — Cutting the sheet using the registration mark as a reference
→ Mark Detection Function

Motion Alignment(X-Y-θ) For equipment requiring more accurate positioning

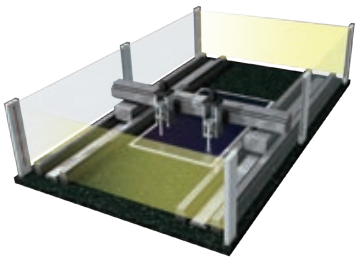


Solution 01 — More accurate positioning
→ COGNEX Vision System

Solution 02 — More precise drive operation
→ Direct Drive Motor

Solution 03 — Shorter tact time
→ Target Position Change Function

Gantry Application For material handling, automotive assembly and scanning



Solution 01 — Suppression of the machine vibration
→ Vibration Suppression Functions

Solution 02 — Simpler multi-head configuration
→ Linear Servo Motor

Solution 03 — Synchronized movement of axis-1 and axis-2
→ Tandem Configuration

Pick and Place Robot For material loading/unloading and sealing

Solution 01 — Suppression of the machine vibration
→ Advanced Vibration Suppression Control II

Solution 02 — Simpler setting of the suppression function
→ Machine Analyzer and Machine Resonance Suppression Filter

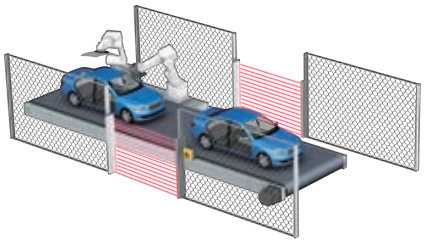
Solution 03 — Smaller size machine
→ 3-axis Type Servo Amplifier

Press-fit Machine For pressing, bonding, clamping, and cap tightening

Solution 01 — Pressing of the material with less shock to a machine
→ **Tightening & Press-fit Control**

Solution 02 — Monitoring of the machine movement
→ **Safety Signal Comparison Function**

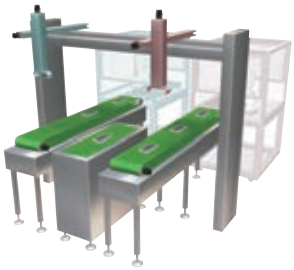
Conveyor System Utilizing Safety Observation Function For safety observation of printing, packing, and other lines



Solution 01 — Safety measures in case of a person entering in a restricted area
→ **Shut-off Function**

Solution 02 — Ensuring safe speed for manned assembly line
→ **Speed Monitoring Function (SLS)**

Eco-friendly Conveyors and Product Handling Equipment For conveyors, Motion alignment, packing, and robots

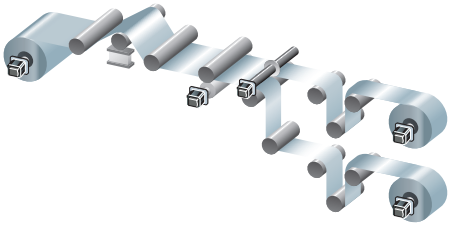


Solution 01 — Managing of total power consumption
→ **Power Monitor Function**

Solution 02 — Reduction of power consumption
→ **Multi-axis Servo Amplifier**

Solution 03 — Minimizing waste of power
→ **Capacity Selection Software**

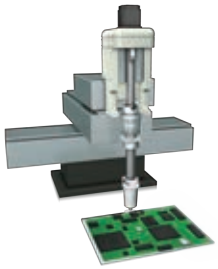
Film Slitting Machine For equipment with rollers



Solution 01 — Sending film with a constant speed or tension
→ **Speed Control, Torque Control**

Solution 02 — Utilizing regenerative energy
→ **PN Bus Voltage Connection + Power Regeneration Common Convert**

Screw Tightening Machine For tightening, pressing, and clamping



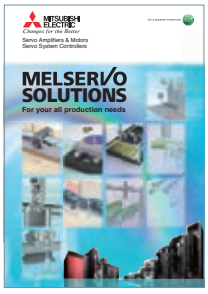
Solution 01 — Tightening screws without using a torque sensor
→ **Tightening & Press-fit Control**

Solution 02 — **Repeated accuracy in screw tightening operation**
→ **Reduced Torque Ripple During Conduction**

Every production site has unique problems that require unique and innovative solutions. MELSERVO offers the best solutions you have been looking for.

Exceptional Solutions for All of Your Production Needs

Refer to "MELSERVO SOLUTIONS catalog (L(NA)03094)" for details.



Homes of MELSERVO where the advanced FA technologies are incorporated

To guarantee the high quality and performance of MELSERVO, Mitsubishi Electric has built a cooperative system of three facilities - Shinshiro Factory, a branch factory of Nagoya Works; MEAMC (Mitsubishi Electric Automation Manufacturing (Changshu) Co., Ltd.) a manufacturing base; and Nagoya Works at the core. Mitsubishi Electric responds to customer needs throughout the world by uniting technologies and know-hows of these facilities.

Integrated manufacturing of servo amplifiers, motors, and other Mitsubishi servo system products.

Nagoya Works

Since its establishment as Mitsubishi Electric's first electric-motor mass-production factory in 1924, the Nagoya Works has continuously expanded the lines of FA and mechatronics products it handles. Today, the Nagoya Works develops and manufactures servo system products including not only servo amplifiers, servo motors, and Motion controllers but also programmable controllers, networks, software, and solutions.

Number of employees	3,400 *As of 2013
Site area	306,000 m²
Gross floor space	221,000 m² (Excluding satellite factories)

Another Mitsubishi servo motor manufacturing facility.

Shinshiro Factory

Shinshiro Factory was established in 1974 as a branch factory of Nagoya Works. From its establishment, the factory has been supplying various types of servo motors, in which the newest mechatronics technologies and system technologies are integrated. Moreover, Shinshiro Factory has introduced e-F@ctory, the FA integrated solution, to the processing line for motor shafts, which include a lot of special components. Thus, the productivity of the production line has been improved, and the factory is now able to handle a variety of and a small lot of products in a short period of tact time.

Number of employees	210 *As of 2013
Site area	137,000 m²
Gross floor space	40,000 m²

AC servo manufacturing facility in China

MEAMC (Mitsubishi Electric Automation Manufacturing (Changshu) Co., Ltd.)

Newly established in 2012 in Changshu, China as Mitsubishi Electric's second local manufacturing facility, MEAMC manufactures high-quality drive control units such as AC servos and NCs for distribution in the Chinese market.

Number of employees	100 *As of 2013
Site area	33,150 m²
Gross floor space	24,000 m²

e&eco-F@ctory implementation at the Nagoya Works

e&eco-F@ctory implementation at the Nagoya Works.
Here, we have linked production floor systems and equipment to information systems via MES. Mitsubishi Electric's e&eco-F@ctory solutions make production performance and energy consumption visible and are at work in the servo motor factory at the Nagoya Works where they are being used to boost capacity utilization and product quality, and reduce energy consumption. We use this facility as a model e&eco-F@ctory to which we welcome approximately 4,500 visitors a year.

Unique approach to guarantee MELSERVO quality

Manufacturing key parts in-house to maximize quality.

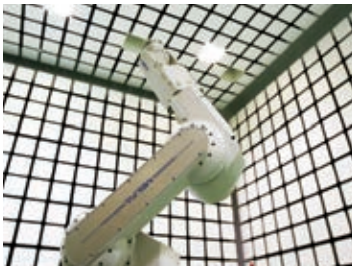
Encoders play an important role in servo systems. To guarantee the quality of the encoders, we manufacture these parts in our factory by incorporating our own technologies

Painstaking quality assurance through the application of cutting-edge testing equipment.

Ultrasonic Probing Devices

LSI testers

X-ray scanners



EMC center (large electromagnetic environment experiment room)

Equipment for highly accelerated life tests (HALT)

World-class R&D capabilities to offer a unique set of servo systems.

To spread advanced servo systems to the world as quickly as possible, Mitsubishi Electric has established FA-related development centers at its Nagoya Works, and in North America and Europe.
Together with our Advanced Technology R&D Center and Information Technology R&D Center, we are moving forward with the development of new products that reflect the latest technological directions and customer input.

Japan (Nagoya Works)

Integrating product-development ability as a comprehensive FA supplier.

FA Development Center

One thousand engineers of controllers and drives, including people from our affiliated companies work here. We are advancing the synergy of Mitsubishi's FA products. Enhancing the compatibility among the products by sharing the development technologies each other. Moreover, engineers share and use technological data and development knowledge with global bases and partners, as well through high-speed network communication environments accessible twenty-four hours a day. In addition, planning, development, and prototyping stages are virtualized by information technology to reduce development period and to enhance development quality.

The advanced base for advantage of technology and development of industrial mechatronics products.

Mechatronics Development Center

The Mechatronics Development Center is the development base of mechatronics products. This development center has established advanced machining technology to achieve ultra-fine machining at the accuracy level as high as nanometer, improving development efficiency and reducing development time by seamlessly linking itself with relevant technological organizations. The Mechatronics Development Center is also utilized for joint development projects with our customers, leading creation of products corresponding to new ways of usage and new markets.

Japan (Mitsubishi Electric Corporation group)

Advanced Technology R&D Center

This is the base for the most advanced technology in relation to the whole business of Mitsubishi Electric Corporation, advancing development of common basic technologies and new products and forwarding research and development projects to initiate future business.

Information Technology R&D Center

Here, research and development of basic technology is advanced in the fields of information, communication, multimedia, and light and radio wave to activate creation of new business. Moreover, the Information Technology R&D Center is playing a role in finding a technology for a future top-runner business and in refreshing existing business with achievements of research and development in the field of information technology.

Europe

Mitsubishi Electric Europe Development Center (EDC)

Since its establishment in 1996, EDC has been observing the latest FA market and technical trends in Europe by tying up with the European sales offices. We utilize the latest technologies into our new products to meet customer's requirement.

North America

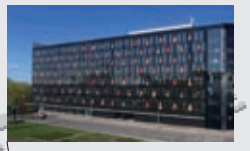
Mitsubishi Electric North American Development Center (NADC)

Since 1998, NADC has been making Research & Development as well as Marketing for our next-generation FA products in cooperation with our North American sales offices.

Global FA Center

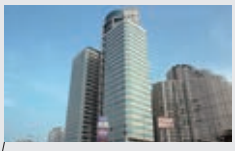
Ratingen, Germany
German FA Center/
Europe Development Center

Krakowska, Poland
European FA Center (Poland)



St. Petersburg, Russia
Russian FA Center

Pune/Gurgaon/Bangalore, India
India FA Center



Bangkok, Thailand
Thailand FA Center

Hatfield, U.K.
UK FA Center

Praha, Czech Republic
Czech Republic FA Center

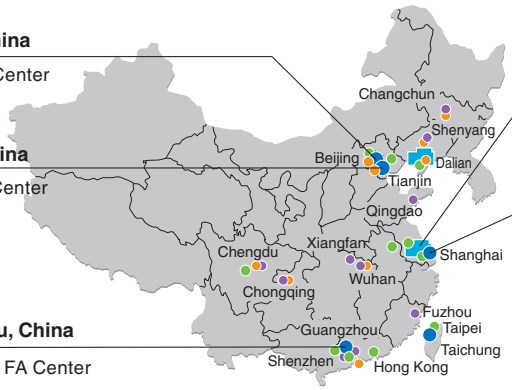
Singapore
ASEAN FA Center

China (including Hong Kong District)

Beijing, China
Beijing FA Center

Tianjin, China
Tianjin FA Center

Guangzhou, China
Guangzhou FA Center



Changshu, China
China Local Factory
Mitsubishi Electric Automation Manufacturing (Changshu) Co., Ltd.

Shanghai, China
Shanghai FA Center

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

MELSERVO-J4 series conforms to global standards.

* This product is not subject to China Compulsory Certification (CCC).
* Refer to "Servo Amplifier Instruction Manual" and "EMC Installation Guidelines" when your system needs to meet the EMC directive.
* For corresponding standards and models, contact your local sales office.

Global FA Center ● FA Center Satellite (China) ● Mechatronics Service Base (China) ● Mitsubishi Sales Offices
Production Facility ◆ Development Center

Seoul, Korea
Korean FA Center

Nagoya, Japan
Nagoya Works

Taiwan
Left: Taiwan FA Center (Taipei) /
Right: Taiwan FA Center (Taichung)

Chicago IL, U.S.A.
North America FA Center/
North American Development Center

Tlalnepantla Edo., Mexico
Mexico FA Center

Sao Paulo SP, Brazil
Brazil FA Center

Vietnam
Left: Hanoi FA Center/
Right: Ho Chi Minh FA Center

Indonesia
Indonesia FA Center

Complies with Restriction of Hazardous Substances Directive (RoHS).

Human and environment-friendly MELSERVO-J4 series 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.

* Refer to "Servo Amplifier Instruction Manual" and "EMC Installation Guidelines" when your system needs to meet the EMC directive.

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

Global All-Around Support

Across the globe, FA Centers provide customers with local assistance for purchasing Mitsubishi Electric products and with after-sales services. To enable national branch offices and local representatives to work together in responding to local needs, we have developed a service network throughout the world. We provide repairs, on-site engineering support, and sales of replacement parts. We also provide various services from technical consulting services by our expert engineers to practical training for equipment operations.

Technical Consultations

Our expert engineers answer questions about Mitsubishi Electric FA products, offer advice on their use, and propose optimal systems and devices. They also provide consulting services on operations and applications that suit local needs.

China

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

We provide practical training for equipment operations and programming using a variety of actual equipment. We support engineers in developing the skills needed on the site.

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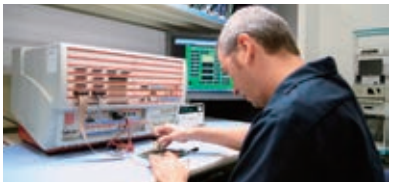

After-sales Service

With cutting edge information processing and communication technologies, we provide repairs, on-site engineering support and sales of replacement parts. We also have showrooms where you can experience the latest FA devices with our dedicated engineers.

America

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FA Products

PLC | MELSEC-Q Series Universal Model

Introducing the high-speed QCPU (QnUDVCPU) for faster processing of large data volumes.

◎Realize high-speed, high-accuracy machine control with various iQ Platform compatible controllers and multiple CPUs.
◎Easily connect to GOTs and Programming tools using built-in Ethernet port.
◎25 models from 10 k step small capacity to 1000 k step large capacity, are available.
◎Seamless communication and flexible integration at any network level.

Product Specifications

Program capacity	10k steps to 1000k steps
Number of I/O points [X/Y], number of I/O device points [X/Y]	256 points to 4096 points/8192 points
Basic instruction processing speed (LD instruction)	120ns to 1.9ns
External connection interface	USB (all models equipped), Ethernet, RS-232, memory card, extended SRAM cassette
Function module	I/O, analog, high-speed counter, positioning, simple motion, temperature input, temperature control, network module
Module extension style	Building block type
Network	Ethernet, CC-Link IE controller network, CC-Link IE field network, CC-Link, CC-Link/LT, MELSECNET/H, SSCNETⅢ (/H), AnyWire, RS-232, RS-422

Programmable Controller | MELSEC-L Series

"Light & Flexible" condensing various functions easily and flexibly.

◎CPU equipped as a standard with various functions including counter, positioning and CC-Link.
◎The base-less structure with high degree of freedom saves space in the control panel.
◎Easily confirm the system status and change the settings with the display unit.
◎Seven models are available in program capacities from 20 k steps to 260 k steps.

Product specifications

Program capacity	20 k steps/60 k steps/260 k steps
Number of input/output points [X/Y]	1024 points/4096 points
Number of input/output device points [X/Y]	8192 points
Basic instruction processing speed (LD instruction)	60 ns/ 40 ns/ 9.5 ns
External connection interface	USB, Ethernet, RS-232, SD memory card, CC-Link (L26CPU-BT/PBT)
Function modules	I/O, analog, high-speed counter, positioning, simple motion, temperature control, network module
Unit expansion style	Base-less structure
Network	Ethernet, CC-Link IE Field network, CC-Link, CC-Link/LT, SSCNETIII(/H), RS-232, RS-422

Programmable Controller | MELSEC-F Series

All-in-One Micro Programmable Controller equipped with all necessary functions in a compact body

◎Supporting small-scale control from 10 points to 384 points (using CC-Link) with an outstanding cost performance.
◎Wide range of options available for additional functions required by your system.
◎Easy to use and highly reliable. More than 10 million units have sold worldwide.
◎The GT10 HMI is equipped with FX Series communication driver enabled by default. Just connect for easy operation.

Product specifications

Program capacity	16k steps (FX_{3S}) to 64 k steps (FX_{3U}/FX_{3UC})
Number of input/output points	10 points (FX_{3S}) to 384 points (FX_{3U}/FX_{3UC} with CC-Link)
Basic instruction processing speed	0.21μs (FX_{3S}) to 65 ns (FX_{3U}/FX_{3UC})
External connection interface	RS-422, USB (FX_{3S}/FX_{3G}/FX_{3GC}/FX_{3GE} only), Ethernet (FX_{3GE} only), CC-Link/LT (FX_{3UC}-32MT-LT(-2) only)
Built-in functions	I/O, high-speed counter input, positioning pulse output, analog (FX_{3GE} only)
Extended functions	I/O, analog, temperature control, high-speed counter, positioning, network
Unit expansion style	Backplane-less design
Network	Ethernet、CC-Link、CC-Link/LT、SSCNETⅢ、CANopen, J1939,RS-232C、RS-422、RS-485

HMI | Graphic Operation Terminal GOT2000 Series GT27 Model

To the top of HMIs with further user-friendly, satisfactory standard features.

◎Comfortable screen operation even if high-load processing (e.g. logging, device data transfer) is running. (Monitoring performance is twice faster than GT16)

◎Actual usable space without using a SD card is expanded to 128MB for more flexible screen design.

◎Multi-touch features, two-point press, and scroll operations for more user-friendliness.

◎Outline font and PNG images for clear, beautiful screen display.

Product Specifications

Screen size	12.1", 10.4", 8.4" (15" coming soon)
Resolution	SVGA, VGA (XGA coming soon)
Intensity adjustment	32-step adjustment
Touch panel type	Analog resistive film
Built-in interface	RS-232, RS-422/485, Ethernet, USB, SD card
Applicable software	GT Works3
Input power supply voltage	100 to 240VAC (+10%, −15%), 24VDC (+25%, −20%)

HMI | Graphic Operation Terminal GOT1000 Series GT14 Model

Easy to use size and functions. New 5.7-inch standard.

◎This beautiful GOT display with 65,000 colors and 16-shade monochrome has an outstanding cost performance.

◎Ethernet, RS-422/485 and RS-232 interface equipped as a standard.

◎USB device is provided on front, and USB host on the back. Easily connect with personal computers and devices.

◎Built-in 9 MB memory and SD card slot provide powerful functions for data logging and backup restoration, etc.

Product specifications

Screen size	5.7-inch
Resolution	QVGA
Brightness adjustment	8 levels
Touch panel	Analog resistive film
Built-in interface	RS-232, RS-422/485, USB, SD card, Ethernet
Compatible software	GT Works3
Input power voltage	24 V DC (+10%, −15%)

Inverter | FR-A700 Series

High-function, high-performance inverter

◎High-accuracy, high-response speed control using real sensor-less vector control is possible with a general-purpose inverter having no PLG (encoder) (200% torque/0.3 Hz (3.7 K or less)).

◎Full-scale vector control is possible when used in combination with a motor with PLG (when using option).

◎The built-in noise filter (EMC filter) helps reduce noise generated from the inverter.

◎This series supports IPM motor operation. Use auto tuning to operate with the optimum motor characteristics.

Product Specifications

Inverter capacity	200V class: 0.4kW to 90kW, 400V class: 0.4kW to 500kW
Control method	IPM control, Soft-PWM control, high-carrier frequency PWM control (Select from V/F, advanced flux vector, or real sensor-less vector), vector control (when using options)
Output frequency range	0.2 to 400Hz (real sensor-less vector, upper frequency during vector control is 120Hz)
PM offline auto tuning	When using the MM-CF Series, the motor constants, etc., are automatically measured for operation with the optimum motor characteristics (IPM motors other than the MM-CF Series, and other IPM motor brands are also supported)
Starting torque	200% 0.3Hz (3.7K or less), 150% 0.3Hz (5.5K or more) (when using real sensor-less vector, vector control)

FA Products

Low Voltage Circuit Breakers | Mitsubishi WS-V Series Molded Case Circuit Breakers, Earth Leakage Circuit Breakers

Technologies based on long year experience realize more improved performance.

◎The new electronic circuit breakers can display various measurement items.
◎Improvement of breaking performance with new breaking technology “Expanded ISTAC”.
◎Compliance with global standard for panel and machine export.
◎Commoditization of internal accessories for shorter delivery time and stock reduction.

Product Specifications.

Frame	32-250A Frame
Applicable standard	Applicable to IEC, GB, UL, CSA, JIS and etc.
Expansion of UL listed product line-up	New line-up of 480VAC type with high breaking performance for SCCR requirement
Commoditization of internal accessories	Reduction of internal accessory types from 3 to 1
Commoditization for AC and DC circuit use	Common use of 32/63A frame in both AC and DC circuit
Compact size for easy to use	Thermal adjustable and electronic circuit breakers are same size as 250AF fixed type
Measuring Display Unit (MDU) breakers	MDU breakers measure, display and transmit energy date to realize energy management.

Magnetic motor starters | MS-T Series

Collection large satisfaction in a small body.

◎The industry-leading smallest dimension* is achieved in a general purpose Magnetic Contactor.
* In general Magnetic Contactors of 10A frame class (our survey in September, 2012)
◎Standard terminal cover improves safety.
◎Wide range of operation coil ratings available. Reducing inventory types and supporting selections.
◎Supporting your overseas business with compliance to various International Standards.

Product specifications

Frame	10 A to 32 A
Applicable standards	Certification to various standards including IEC, JIS, UL and CE (TÜV, CCC certification pending)
Terminal cover	Standard terminal cover improves safety, simplifies ordering, and reduces inventory, etc.
Improved wiring	Wiring and operability are improved with streamlining wiring terminal BC specifications.
Operation coil rating	Wide range of operation coil ratings reduces number of coil types from 14 (N Series) to seven types and simplifies selection.
Option units	Diverse lineup includes auxiliary contact blocks, surge absorber unit, and mechanical interlock unit.

Robot | MELFA F Series

High speed, high precision and high reliability industrial robot

◎Compact body and slim arm design, allowing operating area to be expanded and load capacity increased.
◎The fastest in its class using high performance motors and unique driver control technology.
◎Improved flexibility for robot layout design considerations.
◎Optimal motor control tuning set automatically based on operating position, posture, and load conditions.

Product Specifications

Degrees of freedom	Vertical:6 Horizontal:4
Installation	Vertical:Floor-mount, ceiling mount, wall mount (Range of motion for J1 is limited) Horizontal:Floor-mount
Maximum load capacity	Vertical:2-20kg Horizontal:3-20kg
Maximum reach radius	Vertical:504-1503mm Horizontal:350-1,000mm

CNC | Mitsubishi Numerical Control Unit C70 Series

iQ Platform compatible CNC to provide TCO reduction effect.

◎A CNC structured in building block method on iQ Platform.

◎High performance CNC integrated with high-speed PLC offers high-speed control to reduce cycle time.

◎A wide variety of FA products helps construct flexible lines.

Product specifications

Maximum number of control axes (NC axis + spindle + PLC axis)	16 axes
Maximum number of part system	Machining center system: 7 systems, Lathe system: 3 systems
Maximum number of NC axes per part system	8 axes
Maximum program capacity	2,000 kB (5,120 m)
Maximum number of files to store	124 files/252 files
Number of input/output points	4,096 points
Safety observation function	Safety signal comparison function, speed monitoring function, duplexed emergency stop

Check here for detailed information: http://www.mitsubishielectric.co.jp/fa/index.html

Three-Phase Motor | High Performance Energy-Saving Motor Super Line Premium Series SF-PR

High Efficiency & Compatible. New Launch of Super Line Premium Series SF-PR Model

◎Compared to general-purpose motor SF-JR model, generated loss is reduced by 37% on average, and it is compatible with highly efficient premium IE3.

◎Easy replacement is achieved as mounting dimension (frame number) is compatible with general-purpose motor SF-JR model.

◎One motor can accommodate different power sources of Japan and the U.S. Three ratings in Japan meet the Top Runner standards, while it corresponds to EISA in the U.S.

◎Standard specification is highly suitable for driving inverter. Advanced magnetic-flux vector control by our FR-A700 achieves steady torque drive up to 0.5Hz.

Product Specifications

Number of poles	2-poles, 4-poles, 6-poles
Voltage·Frequency	200/200/220/230V 50/60/60/60Hz EISA 230V 60Hz or 400/400/440/460V 50/60/60/60Hz EISA 460V 60Hz
Exterior	Totally enclosed fan cooled type (inside, outside installation)
Protection system	IP44
Electrically-driven power system	Motor with 2-poles over 11kW is dedicated for a direct connection. Motors with 4-poles and 6-poles are for both direct and crossed belt connections.
Rotation direction	Counter-clock-wise (CCW) direction viewed from the edge of axis.
Compatible standard	JEC-2137-2000 (Efficiency is compatible with IEC 60034-30.)

Mitsubishi Electric Corporation Nagoya Works is a factory certified for ISO14001 (standards for environmental management systems) and ISO9001(standards for quality assurance management systems)

Mitsubishi Servo System Family Catalog

⚠ Safety Warning

To ensure proper use of the products listed in this catalog, please be sure to read the instruction manual prior to use.

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